IP Telephony
Contact Centers
Mobility
Services

Communication Server
Integral 55 / Integral 55 LX

Operating instructions

Contents

Edition: 07/2006

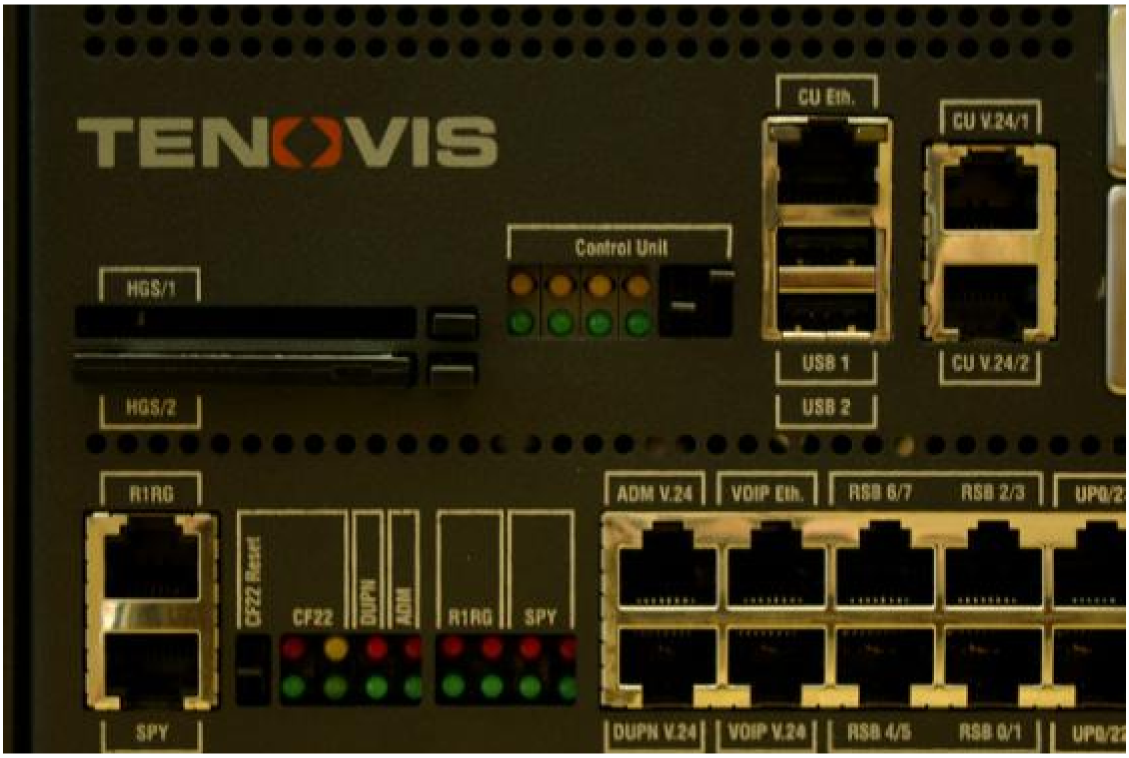
All technical data, information and properties of the product described in this document have been compiled to the best of our knowledge. They correspond to the state at the time of issue.

Subject to modification and improvements to the product in the course of technical developments.

AVAYA GmbH & Co. KG

1 About this Manual

This manual contains information for sales personnel, service technicians and installers for the acquisition, installation, service, maintenance and expansion of the Integral 55 Communication Server and Integral 55 Compact.



In this manual, abbreviations of boards and modules marked with an ”x” apply to specific variants of boards and/or modules.

A separate manual is available for each individual application.

2 Important notes

2.1 Safety Information

Prior to completing the connection of the system to the mains power, all cabling of the communication server Integral 55 must be completed and checked.

System service and repairs are the exclusive domain of an authorised specialist!

The telecommunications system must be connected to properly installed, earthed mains socket. The power supply voltage must correspond to the mains voltage. The provided mains cables must be used.

When connecting devices to the V.24 interfaces, only use the supplied shielded cables.

Each module must be connected to voltage compensation!

The occurrence of strong magnetic fields in the vicinity of the communication server Integral 55 must be prevented!

The communication server Integral 55 must not be exposed to shock, impact or vibrations!

ESD precautions must be followed when working with boards susceptible to electrostatic shock.

For reasons of EMC, vacant slots should be covered with frontplates.

Prior to removing power supply modules, they must be separated from the mains voltage!

Prior to commissioning, pull the protective hoods over the power supply devices on the front side.

Subsequent to system startup, the communication server Integral 55 must be closed (dust covers and rear panels depending on hardware configuration and module types)!

The following regulations or guidelines must be considered during system installation, startup and operation:

- DIN VDE 0100 Setting up heavy current systems
- DIN VDE 0105 Operating heavy current systems
- DIN VDE 0132 Fire countermeasures in electrical systems
- DIN VDE 0298 Use of cables and insulated wiring for heavy current systems
- DIN VDE 0800 Telecommunications engineering
- DIN VDE 0891 Use of cables and insulated wiring for telecommunication and information processing systems
- DIN 4102 Combustive properties of building materials and components
- DIN 5035 Interior lighting with artificial light
- VDI 2054 Air conditioning systems for data processing environments

Additional regulations or guidelines may apply in special or individual circumstances.

2.2 Environmental Conditions

The following placement guidelines must be considered in order to ensure trouble free operation of the Communication Server Integral 55:

- The room must be dry and provide options for ventilation.
- Gross weight, fully equipped - seeTechnical data → 27.
- The floor covering should possess antistatic properties. It should be easy to clean and abrasion resistant.
- If the system is to be installed in tight quarters, sufficient ventilation should be ensured. The Communication Server Integral 55 should not be exposed to radiated heat (e.g. radiator).
- If the PSL55 is doubled, the mains connections should be established using separate circuits (phase and fuse).
- An additional number of earthed mains sockets must be provided for service purposes.

Climatic conditions for operation, storage and transportation - see Technical data → 27.

	Access to the Communication Server Integral 55 (cabinet, standing casing) must be guaranteed from the front and the back.

2.3 Delivery and transportation

Only transport the Communication Server Integral 55 in its original packaging.
Check that the system is complete by referring to the delivery note and the accompanying installation documents.

2.4 Protective earthing

All modules must generally be earthed via a separately routed protective conductor. Earthing via the protective conductor of the power cord does not suffice.

The protective conductor must have a green-yellow insulating jacket and a minimum cross-section of 2.5 mm2 if mechanical protection is present, or 4 mm2 if this is not the case. More detailed information can be found in the chapter Earthing concept → 136

You will find ready-made solutions in the chapters GRAB=”T”>19” cabinet → 107, Standing casing → 110 and Housing/Cabinet solutions → 112.

The following must always be taken into account:

- The lockable earth plug with cable (49.9804.5750) is only used in standing casings with **one** rack.
- The FPE conductors in the cabinet are executed in green-yellow and have a minimum cross-section of 2,5 mm2. The potential equalisation conductor (PA) outside is protected and has a minimum cross-section of 6 mm2.
- Two cables have been defined for the fixed connection of the cabinet:
  - 49.9906.7592 5m with CEE plug blue

– 49.9906.7593 10m with CEE plug blue

- If more devices have been installed it is necessary to check if the leakage current is greater than 3.5 mA. If this is the case these devices, too, have to be connected tightly to the potential equalisation bar.
- If the leakage current is greater than 3.5 mA it is imperative to provide an earthing connection prior to connection to the supply circuit!
- Leakage currents of UPS systems must be taken into account. If the current is >3.5 mA the UPS must be provided with a FPE fixed connection.
- If a cabinet is supplied by an external UPS the connection must be made using the cable 49.9906.8660 (3x1.5 mm2 with earthing-pin plug and conductor end sleeves).
- With redundant power supply of the CSI55 ensure that the power supplies are powered by two different supply circuits. (cabinet with two multiple sockets)
- If the CSI55 rack is to be installed in third-party cabinets without a potential equalisation bar make sure that the FPE of the rack is connected to the potential equalisation conductor (PA) via a potential equalisation bar that has to be retro-fitted or that it is connected directly to the potential equalisation conductor.
- If cabinets on rollers are connected this always has to be done using a flexible connecting cable (litz-wire cable).
- If the computer board with V24 interface of the CSI55 is used, preference should be given ot the insulated interface V24I (28.7640.3242) or similar.

In the chapters FPE in cabinets → 106 andFPE in B3 module → 120 you will find a description of how to connect the earthing conductor.

19"cabinet → 107

2.5 Required Servicing Procedures

If servicing is required the Helpdesk has been called by:

- the customer,
- the technician/service technician,
- Remote alarm signalling,
- TNS (off hours)

.

In most cases, the Helpdesk will already have located the fault through the use of remote diagnostics. If this is the case, if necesary, simply replacing the faulty module will suffice. It should be stated, however, that remote diagnostics are not capable of locating every fault.

You must then:

- Condense the available information
- Interpret fault returns/indications or displays
- Locate the fault using the service PC
- Carry out diagnostics with the aid of the Helpdesk.

2.6 Connections to V.24 Interfaces

	To prevent the destruction of the V.24 interface drivers and receiver components when connecting circuits, it is **imperative** to use cables that are shielded on both ends (e.g. 27.5630.0561, .0562, .0564, .0565 or similar).

2.7 EU Declaration of Conformity

CE

We Avaya GmbH & Co. KG declare that the products Integral 55 and Integral 55 Compact (telecommunication systems in various upgrade stages) concur with the basic requirements and other relevant provisions of EU guideline 1999/5/EU concerning on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

The EU Declaration of Conformity is enclosed to the product and can be also requested at the Internet addresses:

http://www.avaya.de/gcm/emea/de/includedcontent/termsofuse.htm

or

http://www.avaya.de/gcm/emea/de/includedcontent/conformity.htm

or you use the search with the headword ”conformity” in our Internet.

3 Product overview

The boundaries between computers and telephones are becoming increasingly hazy. TC systems that can be installed directly in the data environment represent a further step in this direction. In this context, it is important to find integral solution approaches, which regard EDP, internet and telephone environments as a unit.

CSI55 is a product in 19” technology, which adapts itself with this construction to the IT environment. It is made up of uniform racks, which can be upgraded in any way. Accordingly, the CSI55 can handle port numbers of less than 30 to over 32,000 within a multi-modular configuartion.

In essence, the marketing strategy is based on the sale of solutions. This strategy is already in practice under the term ICC ”Integral Communication Center”. CSI55’s high flexibility enables the satisfaction of any customer wishes.

The merging CSI55 with the application integration of the ICC has created a highly flexible product, which will satisfy any customer. The new system offers a large range of opportunities in order to make use of all aspects of modern telecommunications. These include e.g. voice over IP, call identification, least cost routing and many more.

Integral 55 systems do not **require regularly scheduled** maintenance procedures.

The technician requires **no system specific tools**.

Special tools are available for factory trained technicians.

3.1 Structure

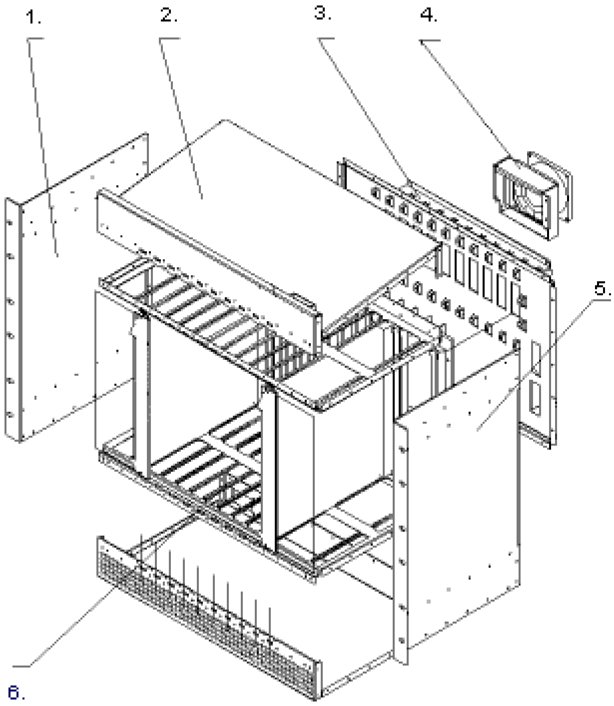
CSI55 is made up of uniform racks, built in 19-inch technology. They can be installed in standard 19” cabinets or in 19” frames. In addition, the racks can be installed in specially developed, more cost-efficient standing cases (see chapter Standing cases).

Up to four racks can be joined together to form a single module by means of 8-wire CAT6 copper cables with a length of up to 30m. This means that the racks can be assembled flexibly. For example they can be distributed over several 19-inch cabinets. The following provides a more detailed explanation of the HW components.

3.1.1 Rack

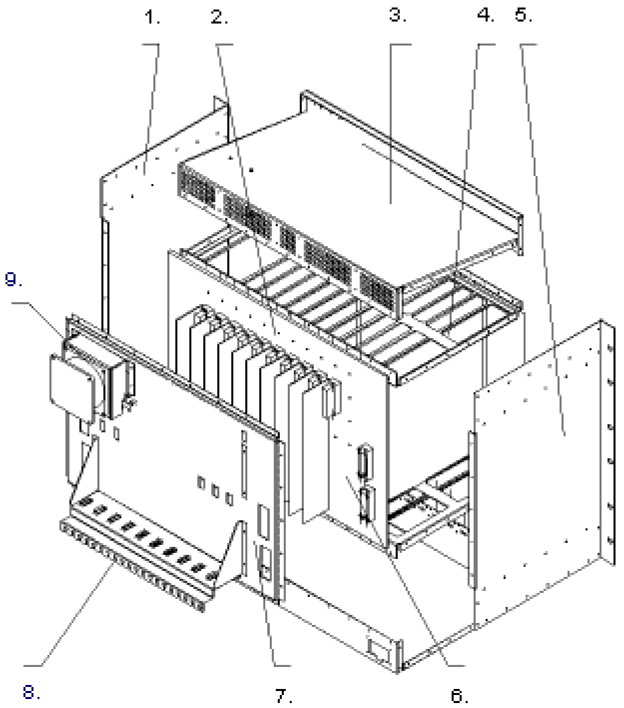
One rack consists of 8 slots for connecting circuit boards (ISUs) and 2 slots for the control boards (HSCB/ACB, CF2E/CF22). In addition, each end (right and left) has a slot for the power supply.

3.1.1.1 Rack assembly



Communication Server Integral 55, rack for installation in a 19” cabinet or in a standing casing (max. 256 ports), view from the front.

1. Left side
2. Upper part
3. Backplane
4. Fan (a fan must be fitted to the rack with ACB/HSCB and CF22/CF2E)
5. Right side
6. Board frame for eight connecting circuit boards



Communication Server Integral 55, rack for installation in a 19” cabinet or in a standing casing (max. 256 ports), view from the rear.

1. Right side
2. Connection boards on the backplane
3. Upper part
4. Board frame
5. Left side
6. Backplane
7. Rear cover
8. Fastening groove
9. Fan (a fan must be fitted to the rack with ACB/HSCB and CF22/CF2E)

Dimensions: 485x400(9HU)x418 (WxHxL)

3.1.2 Modules

In the CSI55 one module is made up of up to 4 individual uniform racks. In this way, a single module that is initially made up of one rack can be expanded later on simply by adding further racks. One module of the CSI55 is made up of up a maximum of 4 racks.

Up to 3 expansion racks can be connected to the basic rack using the connecting module ”R1 Rack Connector” R1RC.

Depending on the number of racks in use, the configurations are called C1 to C4.

- C1: consists of one rack
- C2: consists of 2 racks
- C3: consists of 3 racks
- C4: consists of 4 racks

The **control modules are only used in the basic rack**. The expansion racks (racks 2 to 4) are connected with the basic rack via an 8-wire copper cable in a star-shaped pattern and do not require any separate control. The slots for HSCB/ACB and CF2E/CF22 are not used beyond the second rack and are covered by frontplates.

Several modules (C1 to C4) can be joined together to form a twin or multi-group system.

For this purpose it is possible to use both, modules of different sizes (C1 to C4) in mixed form, and a system network made up of the CSI55 and the predecessor system I33.

3.1.2.1 Single module

A single module can be made up of up to 4 racks, thus enabling a maximum of 1,024 ports with only one control. This number of ports is achieved in that each subscriber receives a B-channel for the transmission of speech and a D-channel for signaling. The maximum possible number of ports may be reduced, depending on the number of participants with 2B+D configuration. In extreme cases, in which each subscriber has a 2B+D connection, the maximum number of ports is reduced to 512.

The expansion racks are connected by 8-wire CAT6 copper cable with a length of up to 30m, which transmits all information (signal pulse, CBus, Highways...). They are a form of separate modules without control, and can be stacked or arranged in star shapes.

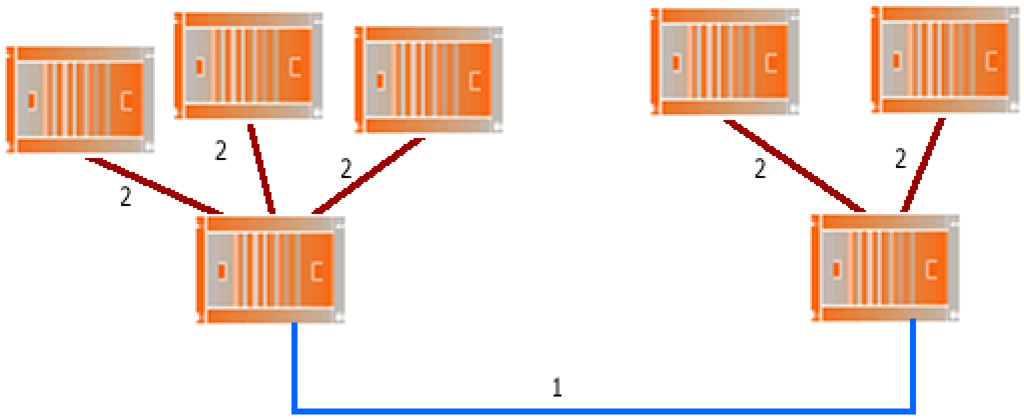
The Single module in tabular form		
Modules:	One module is made up of 1-4 racks (R1, R2, R3, R4). The CF22/CF2E is only connected with the R1 in slot 10. The ACB/HSCB board is only connected with the R1 rack, usually slot 9 (unless there is doubling of CF22/CF2E).	
Module types:	The following names have been defined for the various module types:	
	C1:	Module with one rack
	C2:	Module with 2 racks
	C3:	Module with 3 racks
	C4:	Module with 4 racks
The racks in the modules receive consecutive numbers. The basic rack is called R1, followed by R2 to R4.		
Rack number:	The following slots and CBI addresses have been defined for the racks R1-R4:	
	R1:	Slot 1-10/CBI-address 06 - 0F + 40
	R2:	Slot 11-18/CBI-address 10 - 19 + 41
	R3:	Slot 19-26/CBI-address 46 - 4F +42
	R4:	Slot 29-36/CBI-address 50 - 59 + 43
Backplane:	The backplane used in racks R1-R4 is always the same. The bus terminal resistances are integrated on the backplane. Additional submodules are not necessary.	
Power supply:	2 power supplies can be connected to each rack. The 1st power supply is connected to the right-hand power supply slot. The 2nd power supply can be connected to the left-hand power supply slot for redundant operation or to increase power. Alternatively a PS350A can be installed on the left side of the rack. For this purpose the PS350 Adaption set is available.	

Restriction on the number of subscribers:	• 960 digital/analogue subscribers (assumption: at least two boards per module are not intended for subscribers) • 640 analogue subscribers (restriction due to available DSP resources) • 864 subscribers with Stimulus terminals (restriction due to available processing capacity on the computer board)

3.1.2.2 Twin module

Twin module configurations consist of two single modules, coupled with each other. These are connected directly to the CF2E/CF22 board via the EOCSM or EOCMM or EOCPF submodules using fibre-optic cable. The individual modules can be put together and assembled in any way. The maximum number of ports with a twin module configuration is 2,048 (per subscriber 1B+D).

The fibre-optic connection between two modules can have a cable length of up to 15 kilometres. Larger distances can also be covered. In this case the modules can be network connected for example with QSIG. Connections of this kind are installed very often in corporate networks.



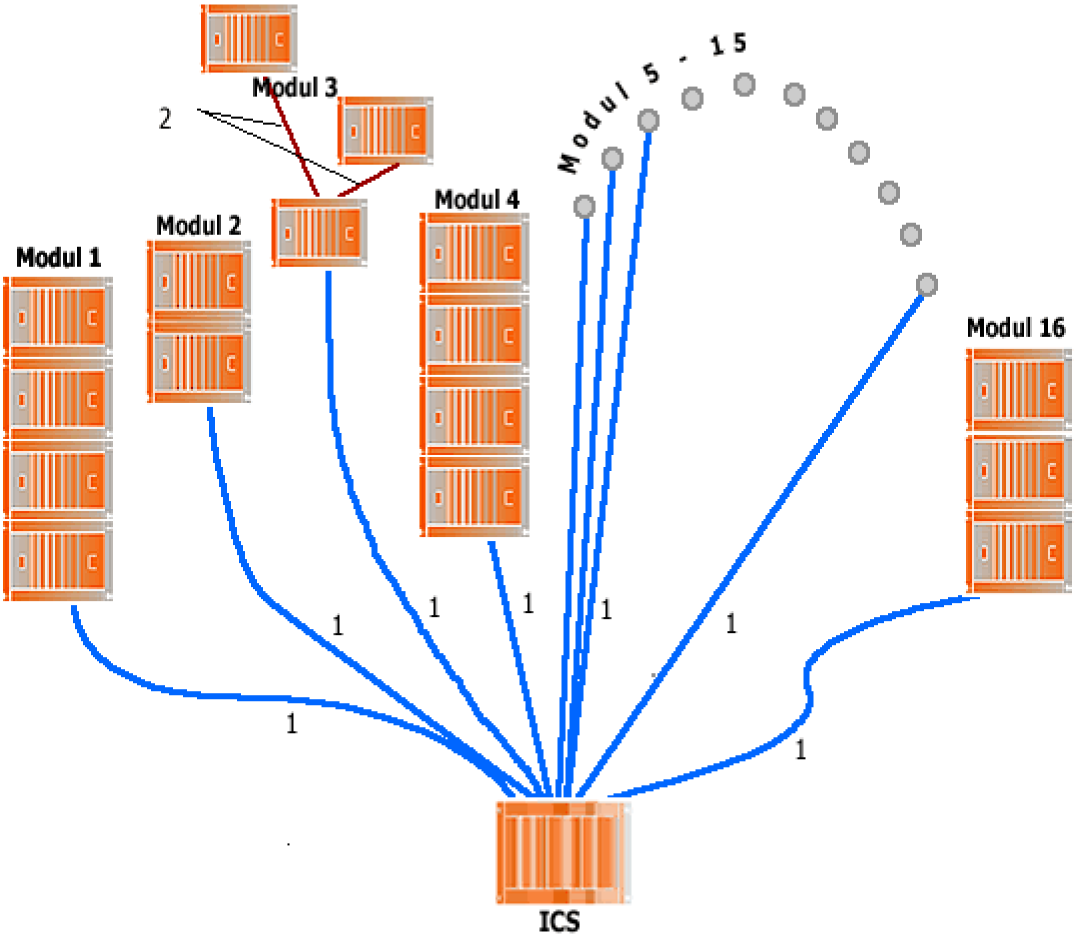
1. FOC
2. 8-wire CAT6 copper cable with a length of up to 30m

3.1.2.3 Multi-module

Large systems are built using multi-modules. A multi-module is used to link several individual modules. For up to 16 modules this can be done by means of an Interconnection Server ICS. If more than 16 modules have to be linked, up to 32 single modules (up to 128 racks if only C4 modules are used) can be connected to a B3 module to form one system. Such a system provides 32.768 ports.

Here, too, the connection to the multi-module is done on the system module side via the CF2E/CF22 module with the EOCSM or EOCMM or EOCPF submodules and using fibre-optic cable.

Thanks to fibre-optic links, the individual modules can be installed at a large distance from each other (up to 15 km, larger distances using QSIG). This way, for example individual modules or module systems can be distributed over the company premises. This is possible either across several storeys within one building or even in different buildings.



1. FOC
2. 8-wire CAT6 copper cable with a length of up to 30m

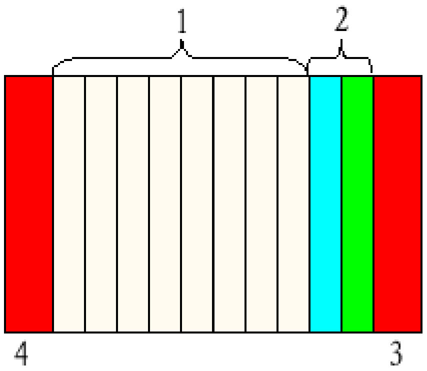
3.1.3 Power supply

The CSI55 is fed from a power supply unit specially designed for this purpose, called

PSL55, material number: 49.9902.4943 → 122.

The system contains two slots to provide the option of doubling the power supply. The mains units can be used for redundant operation and also in order to double capacity. in redundant operation, the second mains unit takes over the functions in the event of the first unit failing. Connect a second mains unit to the left-hand slot in the event of technical reasons (more than 5 DECT boards in one rack!) necessitating an increase in capacity.

Please observe that redundant operation will not be possible in this case!



Occupancy of slots in R1 rack

1. AO boards
2. Control modules
3. PSL55 (mandatory)
4. PSL55 (optional)

Alternatively a PS350A can be installed on the left side of the rack. For this purpose the

PS350 Adaption → 94

3.1.4 Configurations

Like I33, the CSI55 also realises single, twin and multi-modular configurations. CSI55 offers high flexibility, thus enabling the realisation of systems in a small port range and also up to 32,000 ports as a single system. Unlike I33, CSI55 does not require an exchange of modules for any system expansion! All you need to do is connect a new expansion rack. Even if a customer still owns an I33 system, he or she can expand it using new I55 racks, thus realising a mixed form of the old and the new integral systems.

CSI55 and I33 systems can be operated together in a system network.

3.2 Expansion options

One single rack represents a fully operative Communication Server I55. The rack can be installed in a standard 19” cabinet or in a standing casing.

One rack consists of 8 slots for connecting circuit boards (ICUs) and 2 slots for the control boards (ACB/HSCB, CF22/CF2E). As a result, there are the following expansion options:

- A single 19”-Rack.
- One single rack in a 19” standing casing.
- A single or multi rack for installation in a 19” cabinet or 19” frame existing at the customer’s location.
- A single or several racks in a provided 19” cabinet or 19” frame.
- Up to four racks (standing casing, racks in 19” cabinets, racks in 19” frames or any combination thereof) connected by flexible cables, can form a single module .

3.2.1 Standing casing

	In this assembly option, a CSI55 rack can be installed in a specially developed standing casing. The special construction means that there are two height units available for additional components such as a 19” server or UPS systems. The dimensions of the standings casings are 550 mm x 550 mm x 11 HU; they stand on four lockable wheels. No more than two standing casings may be stacked.

3.2.2 19” cabinets - 19” frames

	The CSI55 racks are installed in standard 19” cabinets or in frames. A maximum of 3 racks (one rack has 9 U) can be installed in one 19” cabinet with 33 U, which can be transported vertically through a standard door on a transport pallet. However, this does assume that the cabinet will be sufficiently ventilated or air conditioned (see Technical specifications). At the installation of additional components (data systems technology, server, UPS) the climatological conditions on every individual case must be checked according to the guidelines described in the chapter Tecnical Data! Additionally, single or several racks can be installed in a 19” assembly frame. On the one hand, like the 19” cabinets, these frames can be supplied as new ones, on the other hand, these racks can also be installed in frames existing at the customer’s location.

3.3 Technical Data

Connecting options, interfaces

Network interfaces	T0		T2		
Administration network management	S0		V.24		
Subscriber interfaces	a/b	UPN	US0	UPD	UK0

maximum number of subscribers	analogue/ module	digital/ module	Stimulus/ module	total/ module	IP clients/ system	DECT subscr./ system
	640	960	840	960	5000	2000

Modules	**C1**	**C2**	**C3**	**C4**
Connection possibilities in ports: 1B+D per port	256	512	768	1024
Connection possibilities in ports: 2B+D per port	128	256	384	512
Connecting circuit modules (max.)	8	16	24	32
Control module	2	2	2	2
Power supply				

Rack	
Dimensions WxHxL	485x400(9HU)x418
Empty weight	16.6 kg
Weight equipped with one PSL55, all module slots occupied	22.9kg
Weights in detail	Other weights → 29

Network connection	
Mains voltage	230V ± 10%
Mains frequency	50 Hz -6% +26%
Circuit protection	Automatic circuit breaker 16A Type C slow acting

Further information	
Sound pressure level	
at a distance of 1 m according to EN ISO 3744	<39dB(A)
in the rack	45dB(A)
Reliability and traffic values	
Technical reliability	Reliability → 29
Traffic values	Traffic capacity → 30

Telephones/terminals

Terminals of the T93 and T1 series and the telephones of the T3 series can be connected as well as various IP phones if our IPV solution is used.

Environmental conditions/Air conditioning			
	DIN ETS	Temperature range	Relative humidity
Storage:	300.019-Kl.1.1	-5 °C to +45 °C	
Transport:	300.019-Kl.2.2	-25°C to +70°C	
Operation:	300.019-Kl.232	-5 °C to +45 °C	5 to 95%
Air conditioning	Passive ventilation (e.g. an opening for incoming air in the skirting board or door) is sufficient if up to 2 racks are installed. Active ventilation is necessary if more than 2 racks or additional active components are installed.		

3.3.1 Other weights

Other weights

two modules R1RG		0.278 kg
a fan assembly set		0.338 kg
Power Supply PSL55		3.600 kg
Standard cable 16x2 connecting circuit, length: 5 m		0.800 kg
Mains connection cable, length: 3 m		0.240 kg

The weight of a rack was found using the following equipment

Rack without cable with:
a fan
a HSCB board incl. a Calluna disk drive
a CF2E board
a DT21 board
a DUPN boards
a DUPN board
a ADM board with a submodule ABSM and a submodule STSM
two ASC2 boards
two ATA boards, each with four SIGA submodules
eight cable adapters CA1B
a AV24B board
a ESB board
as well as
one power supply PSL 55
22.920 kg

3.3.2 Reliability

The reliability values (MTBF, availability, failure time per year) are specified for CSI55. This focuses on different system parameters.

Total system failure is considered. Total failure means that none of the functions in the entire system can be used. This corresponds with a failure of all subscribers.

In all of the values stated herein, the power supply devices were also taken into consideration. However, the failure of power supply devices is less frequent than the failure of mains voltage due to the the power plant. If UPS (uninterrupted power supply) is not used, this will lead to total system failure in both cases. This must be taken into account during the use of the values.

If invitations to tender specify that the system reliability values must be stated without power supply devices, the tables for the system can be applied with the power supply doubled.

Reliability CSI55

		MTBF (years)	Availability (%)	Failure time p.a.
Single module configuration	not redundant	34	99,9993	3.5 min.
	Redundant power supply	59	99,9996	2 min.
	Redundant power supply and central functions	147	99,9998	$<$ 1 min.

		MTBF (years)	Availability (%)	Failure time p.a.
Twin module configuration	not redundant	2 548 151	99,9999	$<$ 1 s
	Redundant power supply	7 724 300	99,9999	$<$ 1 s
	Redundant power supply and central functions	47 176 407	99,9999	$<$ 1 s

		MTBF (years)	Availability (%)	Failure time p.a.
Multi-module configuration	not redundant	2 548 151	99,9999	$<$ 1 s
	Redundant power supply	7 724 300	99,9999	$<$ 1 s
	Redundant power supply and central functions	47 176 407	99,9999	$<$ 1 s

3.3.3 traffic capacity

The term traffic capacity can be broken down into dynamic and static traffic capacity.

The dynamic traffic capacity is the capacity provided by the system. It is specified in BHCA (Busy Hour Call Attempts) and measures the number of calls that can be processed in an average busy hour. For ACD systems the unit BHCC is used (Busy Hour Call Completions) and measures the number of calls that are connected in an average busy hour and reach at least a queue with a recorded announcement.

The static traffic capacity describes the capacity of the switching matrix. It is specified in Erlang (Erl).

The basis for the dimensioning of telephone systems the FTZ guideline 12TR2. It specifies a traffic value of 0.3 Erlang for digital subscribers (2B+D) (see German BAPT regulations for traffic values).

The values listed in the tables below apply to the CSI55:

Traffic capacity up to E070V08:

Dynamic	
Single module	8000 BHCA
Twin module	16000 BHCA
Multi-module	24000 to 350000 BHCA depending on configuration
Static	
Single module	Non-blocking (1 Erlang/B channel)
Twin module	Non-blocking (1 Erlang/B channel)
Multi-module	0.88 Erlang with digital ports only and with a proportion of 50% of the traffic inside the module and 50% between modules.

Traffic capacity with IEE2:

Dynamic	
Single module	20000 BHCA
Twin module	40000 BHCA
Multi-module	60000 to 750000 BHCA depending on configuration
Static	
Single module	Non-blocking (1 Erlang/B channel)
Twin module	Non-blocking (1 Erlang/B channel)
Multi-module	0.88 Erlang with digital ports only and with a proportion of 50% of the traffic inside the module and 50% between modules.

4 Modules

A module is a complete unit which is fully operative. The smalles module is an Integral 55 rack. The following table shows a rough overview of the possible modules:

Module overview		
Module	**Description**	**Racks max.**
Single modules	consists of 1 to 4 racks Connection: 8-wire CAT6 copper cable, length $<$30m	4
Twin module	Two single modules Connection fibre-optic cable, length $<$15km, or via QSIG for larger distances	8
Multi-module	3 to 16 modules with ICS, up to 32 modules with B3 Connection: Fibre-optic cable, length $<$15km.	64 or 128

4.1 Single and twin module

One module can be made up of up to four racks.

The following restriction on the number of subscribers per module must be assumed for various reasons:

- 960 digital/analogue subscribers (assumption: at least two boards per module are not intended for subscribers)
- 640 analogue subscribers (restriction due to available DSP resources)
- 864 subscribers with Stimulus terminals (restriction due to available processing capacity on the computer board HSCB)

These restrictions only take effect with the use of the new ratio boards (twice the number of ports).

Twin module configurations consist of two single modules, coupled with each other.

4.1.1 Procedure for Installation

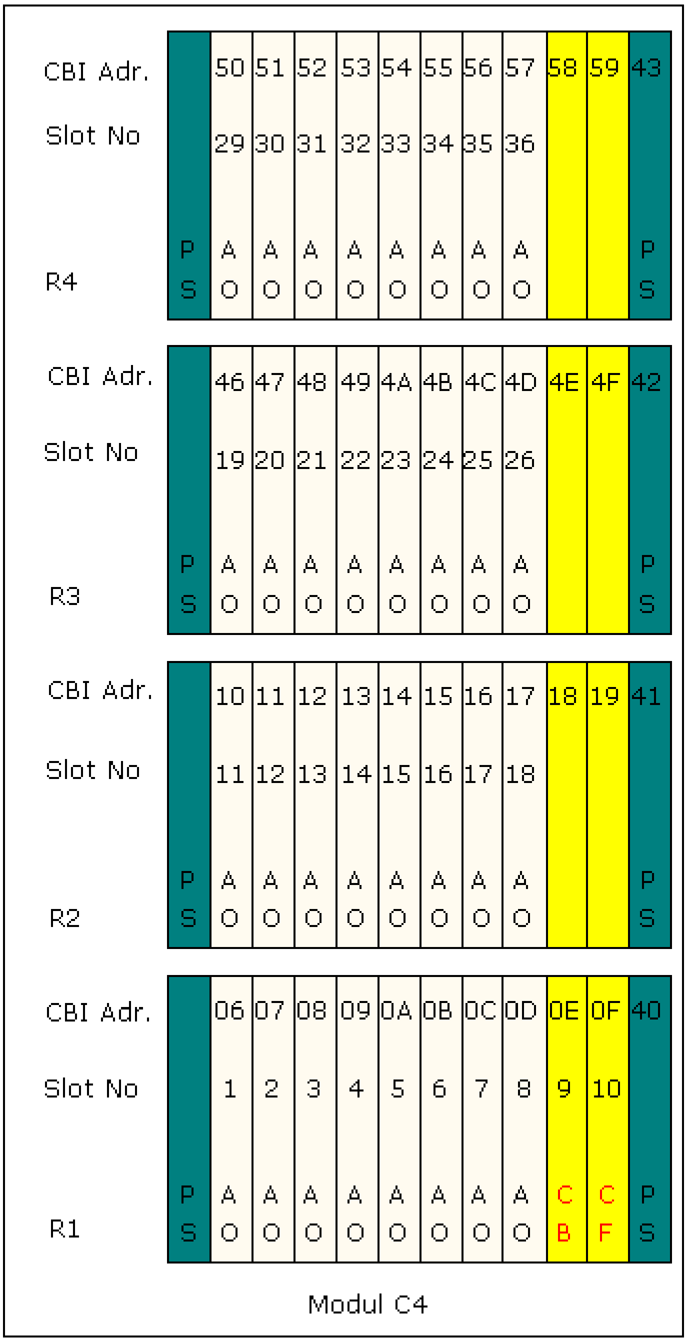
Depending on the configuration, the racks are, or must be, installed in standing casings or in 19” cabinets.

4.1.2 Board slots

For reasons of electromagnetic compatibility (EMC), board slots which are not occupied must be provided with metal shields.

Board slot	Material number:	49.9901.9774
Power supply unit	Material number:	49.9903.1809

When installing the shields they have to be held parallel to the front side because otherwise there is danger that no contact to the housing will be established.



In the view on the left you can see a C4 module with the board slots, the corresponding
in decimal form and the
in hexadecimal form.
The addresses and slot numbers of smaller modules are identical, please ignore other expansion modules in this view (for example, consider only R1 and R2 for C2).

Please note:
The slots with the CBI addresses **19;4F;59** (slots 20, 28 and 38) are not suitable for the use of a ACB/HSCB because there is no power fail signal on these slots.

4.1.3 General information on boards

The boards used in the module are listed hereafter:

Boards for Connection Technology and Signalling

AEV24B	Adapter Ethernet V24 B module
AV24B	Adapter V.24 for B Modules
ESBx	External Signalling B Module
CAxB	Cable Adapter
OFA2B	Optical Fibre Adapter 2 B Module
OFAS	Optical Fibre Adapter Single mode
CARUB	Cable Adapter Russia B Module
EESxB	Emergency Extension Switch B Module

Boards for Control, Central Functions and Transport

ACB	Advanced Computer Board
HSCB	High Speed Computer Board
DSPF	Digital Signal Processing Function
CF22	Central Function 22 (used in all modules)
CF2E	Central Function 2E (used in all modules)
R1RC	R1 Rack Connector for I55

Boards for Analog Interfaces

ASCxx	Analog Subscriber Circuit
ATLC	Analog Tie Line Circuit
ATxx	Analog Trunk Interface
DDID	Direct Dialling Inward Circuit
JPAT	JISCOS Public Analog Trunk
ADM	Analogue/Digital Mixboard

Boards for Digital Interfaces

DUP03	Digital Linecard UPN
DUPN	Digital Linecard UPN
DT0	Digital Linecard TIE/T0
DT21	Digital Linecard TIE/T2 (S2M)
DS02	Digital Linecard S0
DECT21	Digital Enhanced Cordless Telecommunication
CAS	Channel Associated Signalling
IPN	Intelligency Private Network
IMUX	Integrated Multiplexer
DCON	Digital Protocol Converter
MAC	Multi Access Circuit Board
HAMUX	Home Agent Multiplexer
BVT2	(part of a PC, Home Agent)
MULI	Multi-line

UIP	Universal Interface Platform
ADM	Analogue/Digital Mixboard

Boards for IP telephony

IPGW	Internet Protocol Gateway
VoIP	Voice over IP Board

Boards for Power Supply

PSL55 in racks R1 to R4	Power Supply Low 55
PS350A in racks R1 to R4 (optional)	Power Supply 350A

4.1.4 Access to the system

The available and familiar service programmes can be accessed in the following ways:

- Via V.24 with a connected terminal/PC in MML dialogue.
- Using the operator position in MML dialogue.
- Using S0 access via protocol stack.

The V.24 and S0interfaces can be accessed on the Service Panel.

Although this communication level presupposes the availability of a PC with corresponding software, it corresponds only to a conventional MML dialogue (transparent mode).

File Transfer

File transfer PC <—> HGS (Background Memory)

Traffic measurement

The VEME traffic measurement can be activated by one of the aforementioned methods; the resulting data however is output via the file handling system to the V.24 interfaces.

Central Call Charge Data Recording (ZGDE)

The ZGDE generally outputs data via the file handling system to the V.24 interfaces.

Callback

It is possible to set up an automatic connection to a PC or a service centre.

4.1.5 Inserting the Connecting Cables

The connection of the Communication Server Integral 55 with the MDF or NT is implemented using the supplied connecting cables. The connectors for these cables are located on the adapter modules (cable adapters), which can be reached from the rear side of the rack.

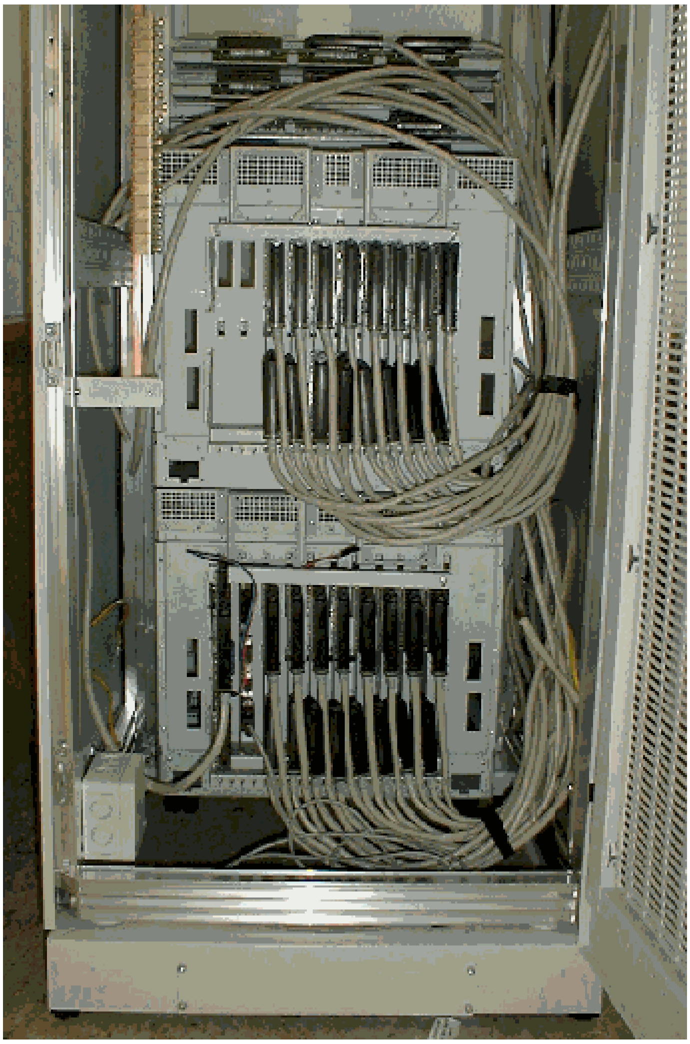
Example: 19” cabinet

Open the 19” cabinet

Mark the cable at both ends (server and MDF) using the supplied labels.

	Attach the connecting cable at the main distribution frame first, and then at the PBX.

Feed the ends of the connecting circuit cable into the console and then into the modules. The cable guides are illustrated.

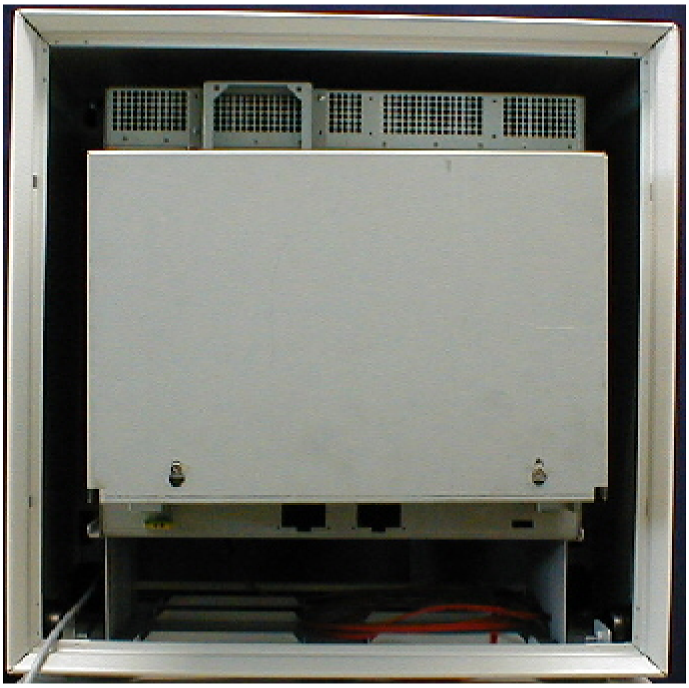


Rear side of cabinet with wiring

Insert the Champ plug of the connecting cable into the plug sockets of the adapter modules according to the configuration. The adapter modules are held in place by set-squares.

Attach the connecting cables to the provided fastening clamps in the racks using cable binders.

Cover the area with the CA cover.



Rack in standing casing, rear side with CA cover.

Each connecting circuit of a connecting circuit board is fitted with an overvoltage protection device to 4 kV on the output side. Make sure that removed boards are placed back into the same slot (various equipment of the connecting circuit boards with submodules).Ç

4.1.6 Connectivity

No more than four racks can be connected to form a module during the installation of a 19” cabinet.

Furthermore, an optical waveguide cable can be used to connect two of these modules **directly**.

- four racks (one module) and four racks (second module).

This presumes that the group is equipped with the CF22/CF2E boards. This board must also be compleeted by the Sub LP EOCSM/MM/PF.Ç

If three or more of these groups are to be connected to form a PBX, they must be connected using a B3 multi-module or ICS.

This is done via the fibre-optic cable on the MLB board of the multi-module. This presumes also that the modules are equipped with the CF22/CF2E boards.

The R1 rack can also be used as part of a **network**. Coupling is implemented via S2M on the DT21 or S0 submodules of the DT0 or ADM boards.

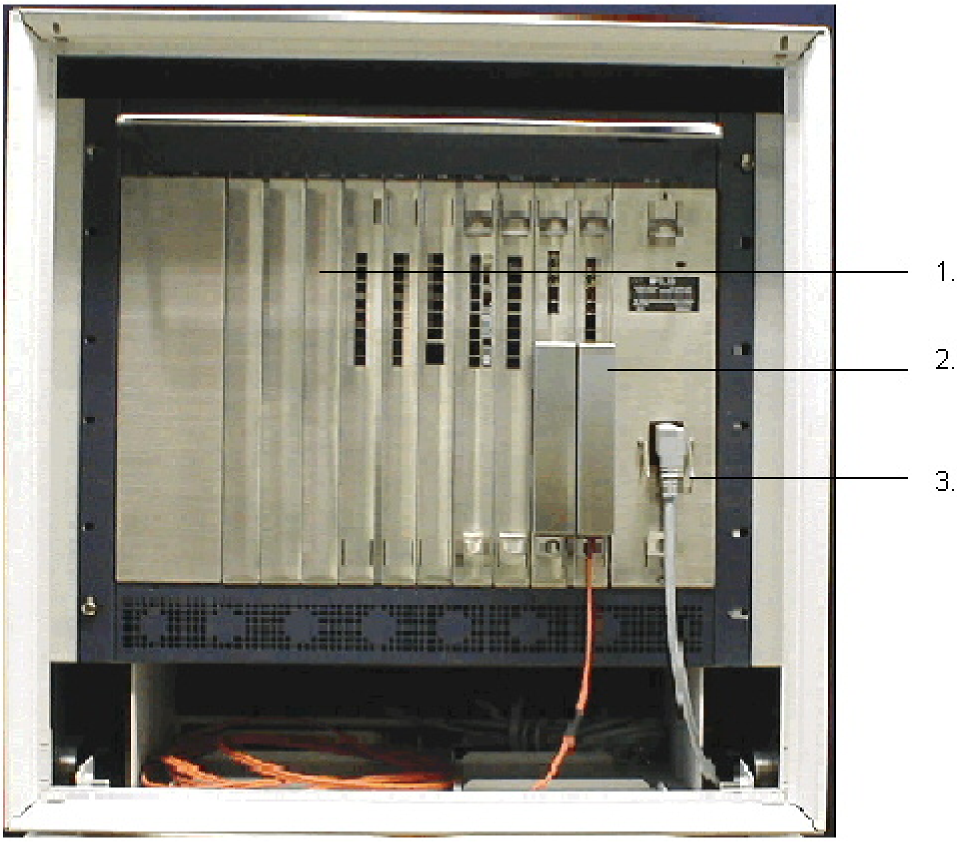
4.1.7 Switching on

Single module

Check the stable position of the power supply devices and power supply cables.

Cover all slots with the slot covers.

Insert all required covers over the front panels of the ACB or HSCB and CF22 or CF2E boards.



R1 rack in the standing casing

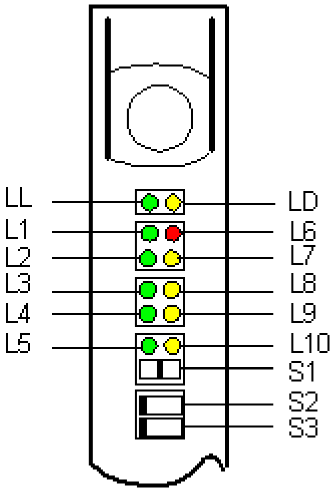
1. Slot cover
2. Covers for ACB or HSCB and CF22 or CF2E
3. Protective bracket for the mains connection cable

Pull the protective hoods over the slots of the mains connection cable on the front of the power supply devices.

Insert the earthed mains plug(s) of the mains connection cable(s) for the racks in their designated earthed mains sockets.

Startup with the ACB board

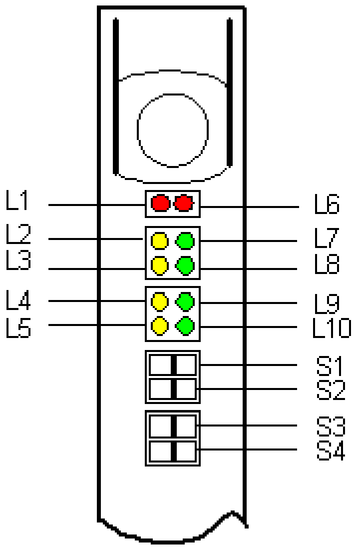
The module is now switched on and is loading the programs (loading duration less/equal 15 min).



If the illustrated green LEDs L1 to L2 of the Advanced Computer Board ACB are illuminated, the module is ready for operation.

Startup with the HSCB board

The module is now switched on and is loading the programs (loading duration less/equal 10 min).



If the illustrated yellow LEDs L7 to L10 of the High Speed Computer Board HSCB are off, the module is ready for operation.

Twin module

Check whether only **one** ESU is active in the Communication Server Integral 55 (DIL switch to CF22/CF2E).

Startup with the ACB board

(Information yet to come!)

Startup with the HSCB board

In twin operation, the S3 switch of the HSCB board without HGS should be placed in the right-hand position.

Switch on both modules of the server.

The loading phases shown in the modules (LEDs of the HSCB boards) may differ from time to time.

Having switched on both modules, first run through loading phases 15 to 6.

From this point, the HSCB board without HGS is held at loading phase 6 while the HSCB with inserted HGS runs through the remaining loading phases 5 and 4 (access to HGS).

The HSCB board without HGS subsequently runs through loading phases 5 and 4.

Finally both HSCB boards run through loading phases 3 to 0.

HSCB Loading Phases

No.	L7	L8	L9	L10	Phase name
15	1	1	1	1	Start reset phase
14	1	1	1	0	Test flash-PROM
13	1	1	0	1	Test QUICC
12	1	1	0	0	Test real time clock
11	1	0	1	1	Test C-bus interface
10	1	0	1	0	Test DUART (V.24 ports)
9	1	0	0	1	Test dynamic RAM
8	1	0	0	0	Output hardware image
7	0	1	1	1	End reset phase
6	0	1	1	0	Initial program loading (IPL)/IPL ready flag
5	0	1	0	1	STIN program loader is loaded and started
4	0	1	0	0	Operating system has been loaded and started (restart)
3	0	0	1	1	User programs (have been dispatched) have been loaded
2	0	0	1	0	Start of customer data loading in the user programs
1	0	0	0	1	All customer data loaded Start commissioning of module(s)
0	0	0	0	0	Module(s) in operation

1 = LED on

0 = LED off

4.1.8 Troubleshooting

Power supply

Fault	Action
Yellow LED on the PS350A power supply unit does not light up	Check the mains voltage. If mains voltage is present, replace the power supply unit.
Green LED on the power supply unit does not light up	Check the mains voltage. Check the battery voltage (for PS350A only). Observe battery switch function on PS350A! First check whether the malfunction can be rectified by removing the board(s). If this is the case, replace with new board(s). If this is not the case, replace the power supply unit.

General Points

Fault	Action
with ACB	
Loading procedure failed during first startup	(Information yet to come!)
with HSCB	
Loading procedure failed during first commissioning (single module)	Small reset (restart) Switch S2 (HSCB board) in left position, switch S1 (HSCB) in left and then back to middle position Large reset Switch S2 in right position, switch S1 in left and then back to middle position, switch S2 to left position after loading has finished (loading phase 0)
Loading procedure failed during first commissioning (twin module)	In the module with HSCB board and without HDD, check whether LED L8 on the CF22/CF2E board is flashing. If not, check the optical waveguide connections. If there is no connection, establish it. If subsequently necessary for these modules: Small reset (restart) Switch S2 (HSCB board) in left position, switch S1 (HSCB) in left and then back to middle position Large reset Switch S2 in right position, switch S1 in left and then back to middle position, switch S2 to left position after loading has finished (loading phase 0)

Further Course of Action

with ACB

(Information yet to come!)

with HSCB

First check the displays of the HSCB board with inserted HGS.
Then check the displays of the HSCB board without HGS (Twin Module).
Note down the status of the LEDs on all boards.
Inform your Service Control Centre.

4.2 ICS (multi-module)

Mains voltage

The ICS is operated with the PSL55. Therefore it is suitable for connection to 230 V; ±10 %, 50 Hz -6% +26% (**47 to 63 Hz**). For more details, see PSL55 → 122.

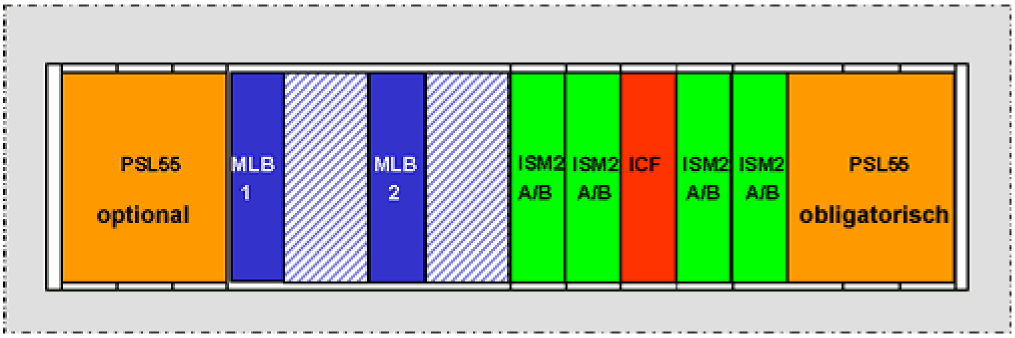
Power dissipation

Max. power dissipation with expansion for an 8-group system (A MLB board fully equipped with 8 EOC)	95 W
Max. power dissipation with expansion for a 12-group system (two MLBs, one equipped with 8 EOC, the other with 4 EOC)	115 W

Max. power dissipation with expansion for a 16-group system (Full expansion with two MLBs each equipped with 8 EOC)	130 W

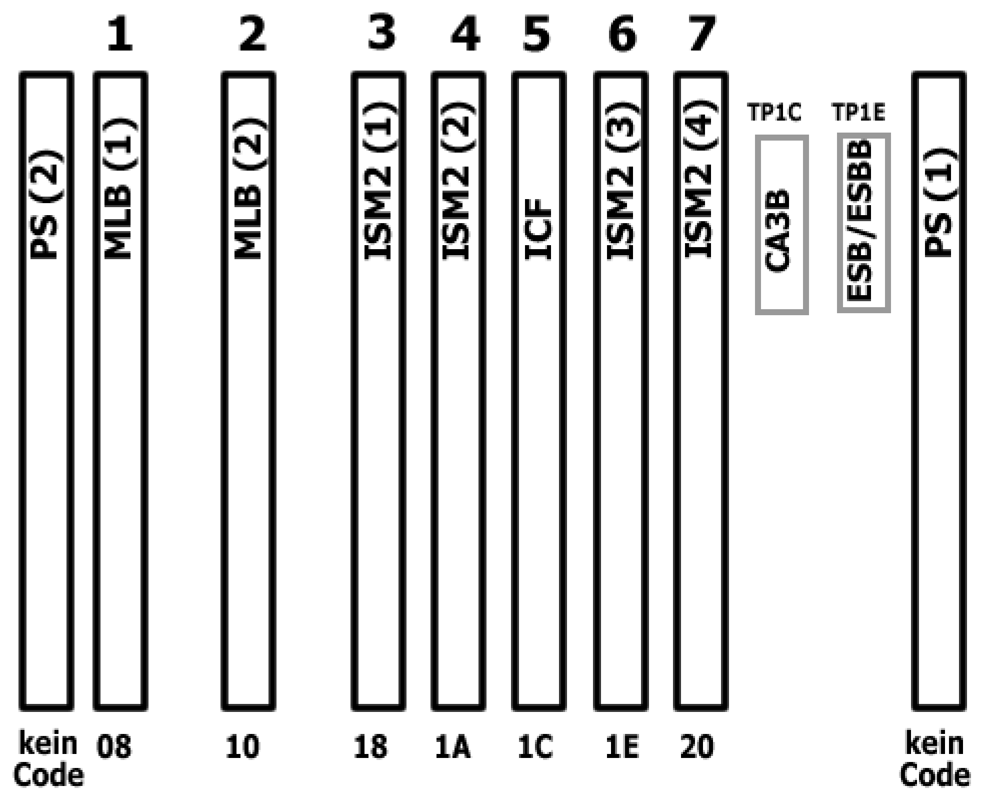
Board slots

The slots in the ICS are arranged as follows:



The slots for the ICF and ISM2 boards have a 27.5 mm spacing. The two slots for the MLB boards have a spacing of 68.75 mm. as the MLBs are equipped with EOC submodules.

The slots for the individual boards have the following C-bus addresses:



4.2.1 Rack and assembly

The assembly kit 49.9904.4791 must be ordered for the assembly of the ICS.

Shielding

Since the front side of the rack is the EMC barrier it is necessary to always create a complete cover. The slots of the ISM, ICF boards and a PSL55 power supply are always occupied, the shielding function is provided by the front panels of the boards.

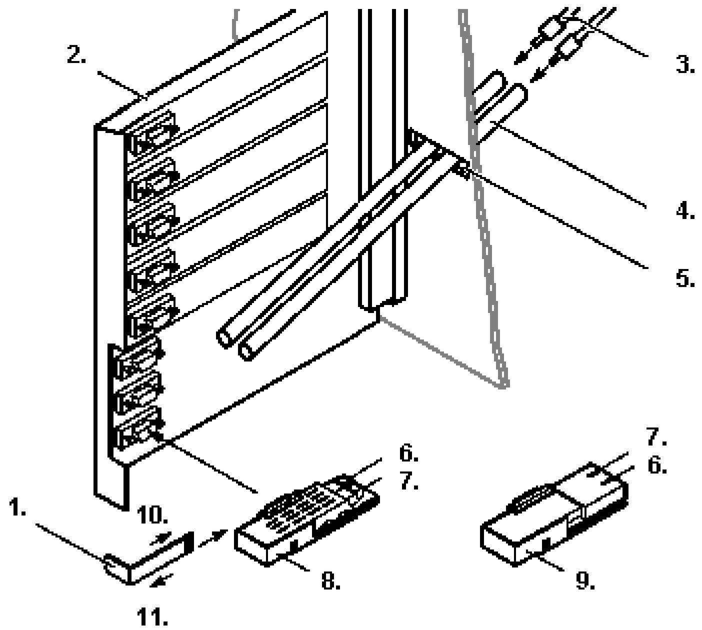
The slots of the MLB board must be provided with the same shields regardless of whether they are occupied or free. The shields are part of the scope of delivery of the rack.

The table shows the material numbers of the shields for the MLB and power supply slots:

Slot	Cover material number
MLB **free and occupied slots**	49.9906.2856
Power supply (free slot)	49.9903.1809

Installation of optical waveguides

The optical waveguides are led in via an opening in the backplane, which is located behind the MLB slots. They are linked to the EOCXX boards on the front side and these are then fitted to the MLB or MLBIML board (as applicable) and locked in place.



Board MLB EOCx submodules

1. Tool for locking and unlocking submodule EOC *
2. MLB board
3. OWG twin cable
4. Isolating hose facility *
5. Duct for OWG
6. Sending

7. Receiving
8. EOCPF submodule
9. EOCMM/SM submodule
10. locking
11. unlocking

* Component of tool kit for B3 module (OWG/EOCxx)

Contacting the fans, ESB installation; CA3B

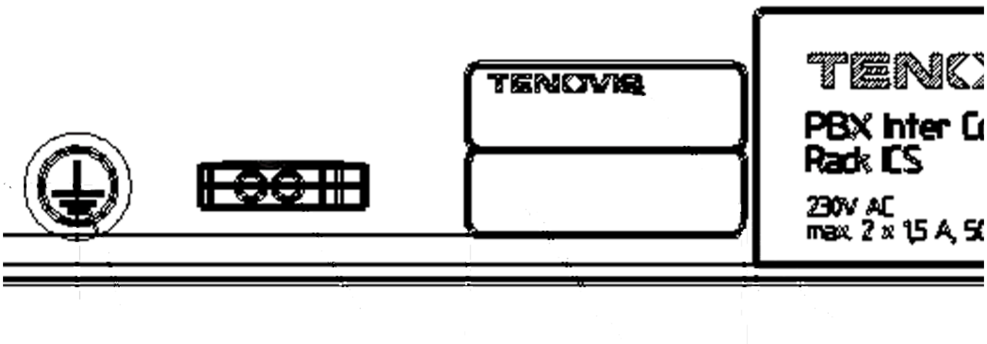
The multipoint connectors for installation of the ESB and CA3B boards are located under the rear cover hood. The slot TP1E is designed for the ESB board and the slot TP1C for the CA3B board. To connect them, the fixing screws on the rear ICS hood are loosened and the hood is removed. The boards are pressed into the slots designed for them.

The connections on the fans are linked to the connections on the ESB board for fans (see also Pin strips on the ESB → 278). The cables for this are laid out so that they go through the cover hood.

Then the hood is replaced and screwed on firmly using the two screws at the lower end.

Earth connection

The protective earth connection is achieved via the earthing terminal on the rear side of the housing. The ground clamp is mounted between the earthing sign and the ICS type plate.



4.2.2 Doubling

To increase the stability of communications in a multigroup system, two ICS can be linked to one another and to the corresponding modules via OWG (twin cable). One ICS performs normal function, and the second moves to the hot standby operating mode. The second ICF takes over the function of the first as soon as it reports a malfunction.

For more details, see also Complete doubling → 153.

4.2.3 General information on boards

The boards used in the B3 module and in the ICS are listed below.

Service board

CBT	C-Bus Tester (only B3 module)

Boards for Connection Technology and Signalling

CA3B	Cable Adapter 3 B Module
AV24B	Adapter V.24 B Module
EDU	Error Display Unit
ESB	External Signalling B Module
TER	Termination 2 and 3 (only B3 module)

Boards for Control, Central Functions and Transport

ISMx/ISM2x	IMTU Switching Matrix
MLB	Module Link Board
ICF	IMTU Central Functions
CL2M/CL2ME	Clock 2 Module (if CL2ME is used see also Intermodule-Handover)

Boards for Power Supply

ISPS	IMTU Supplementary Power Supply (only B3 module)
PS	Power Supply (PS280A or PS350A in B3 module, PSL55 and PS350A in racks R1 to R4, PSL55 in ICS)

	Check the correct positioning of TER2 and TER3 before switching on the B3 module! Make sure that any removed boards are reinserted in the same slot!

4.2.4 Switching on

Check the stable position of the power supply devices and power supply cables.

Pull the protective hoods over the slots on the front of the power supply devices.

Check whether only **one** ESU is active in the Communication Server Integral 55 (DIL switch to CF22/CF2E/ICF).

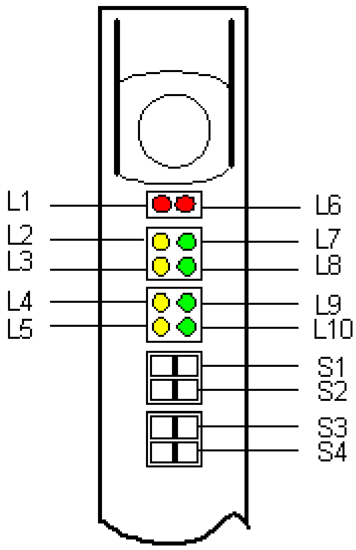
Insert the grounded plug of the mains connecting cable into the protection unit or earthed mains socket provided.

If necessary, connect the battery connector (e.g. inserting the -48 V fuse in the battery unit, etc).

If required, move the battery switch on all inserted PS350A power supply units to position 1 (front panel).

The I55 server is switched on and loading programs (loading time depends on number of modules).

Startup with the ACB board	
	(Information yet to come!)
Startup with the HSCB board	

Startup with the ACB board	
	In multi-module operation, the S3 switch of the HSCB boards without HGS should be placed in the right-hand position. The loading phases shown in the HSCB boards (LEDs L7-L10) may differ from time to time. Having switched on the modules, the HSCB boards first run through loading phases 15 to 6. From this point, the HSCB board without HGS is held at loading phase 6 while the HSCB with inserted HGS runs through the remaining loading phases 5 and 4 (access to HGS). The HSCB boards without HGS subsequently run though loading phases 5 and 4. Finally all HSCB boards run through loading phases 3 to 0. The L7 LEDs of the CF22/CF2E boards flash in the modules during the loading phases (signalling input of the valid module address). If the yellow LEDs L7 to L10 (loading phase 0) of the HSCB boards shown are off in all modules, this denotes that the server I55 is ready for operation.  Meaning of the LEDs on the front panel of the HSCB board

HSCB Loading Phases

No.	L7	L8	L9	L10	Phase name
15	1	1	1	1	Start reset phase
14	1	1	1	0	Test flash-PROM
13	1	1	0	1	Test QUICC
12	1	1	0	0	Test real time clock
11	1	0	1	1	Test C-bus interface

No.	L7	L8	L9	L10	Phase name
10	1	0	1	0	Test DUART (V.24 ports)
9	1	0	0	1	Test dynamic RAM
8	1	0	0	0	Output hardware image
7	0	1	1	1	End reset phase
6	0	1	1	0	Initial program loading (IPL)/IPL ready flag
5	0	1	0	1	STIN program loader is loaded and started
4	0	1	0	0	Operating system has been loaded and started (restart)
3	0	0	1	1	User programs (have been dispatched) have been loaded
2	0	0	1	0	Start of customer data loading in the user programs
1	0	0	0	1	All customer data loaded Start commissioning of module(s)
0	0	0	0	0	Module(s) in operation

1 = LED on
0 = LED off

4.2.5 Troubleshooting

Power supply

Fault	**Action**
Yellow LED on the PS350A power supply unit does not light up	Check the mains voltage. If mains voltage is present, replace the power supply unit.
Green LED on the power supply unit does not light up	Check the mains voltage (for PS280A only). Check the battery voltage (for PS350A only). Observe battery switch function on PS350A! First check whether the malfunction can be rectified by removing the boards(s). If this is the case, replace with new board(s). If this is not the case, replace the power supply unit.

General Points

Fault	**Action**
with ACB	
Loading procedure failed during first startup	(Information yet to come!)
with HSCB	

Loading procedure failed during first commissioning (twin module)	In all modules containing HSCB boards without HGS, check whether the L8 LEDs on the CF2x boards are flashing. If not, check the optical waveguide connections for these modules. Create any missing optical waveguide connections. If subsequently necessary for these modules: Small reset (restart): Switch S2 of the HSCB board in left-hand position, switch S1 of the HSCB board in left-hand and then back to middle position. Large reset: Switch S2 in right position, switch S1 in left and then back to middle position, switch S2 to left position after loading has finished (loading phase 0).

Further Course of Action

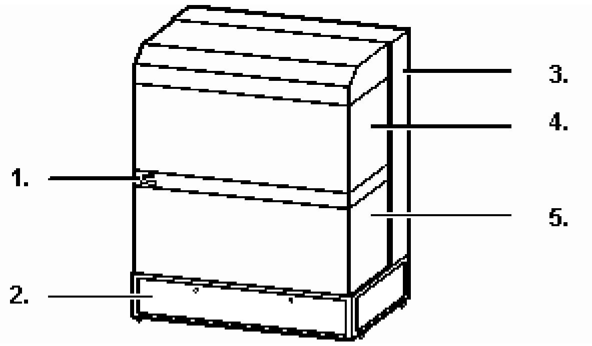
with ACB

(Information yet to come!)

with HSCB

First check the displays of the HSCB board with inserted HGS.
Then check the displays of the HSCB board without HGS (Twin Module).
Note down the status of the LEDs on all boards.
Inform your Service Control Centre.

4.3 B3 module (multi-module)



Communication Server Integral 55 - B3 Built-In-Module in the 1/2 K rack

1. Status display and service device connection
2. Console
3. 1/2 K rack
4. B3 Built-In-Module
5. Empty B module

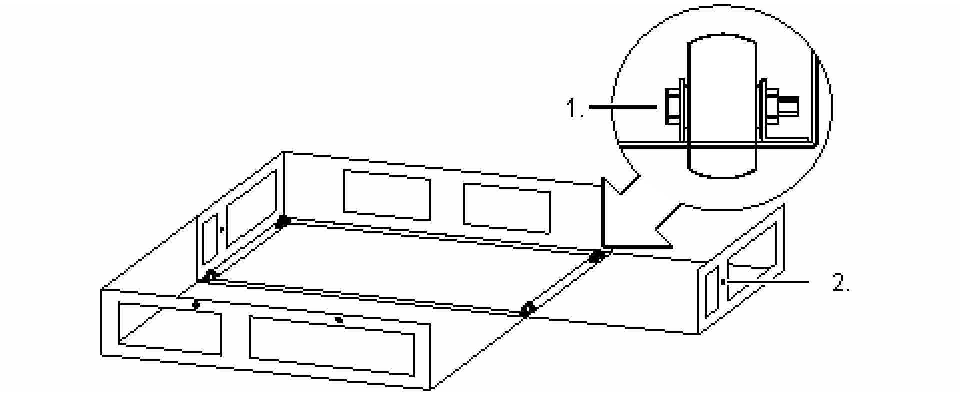
Procedure for Installation

The B3 Built-In-Module is accommodated in the 1/2 K rack The rack is on rollers.

Remove the covers of the console.

- Release the quick-action closures on the front side and remove the cover
- Press up and remove the remaining covers

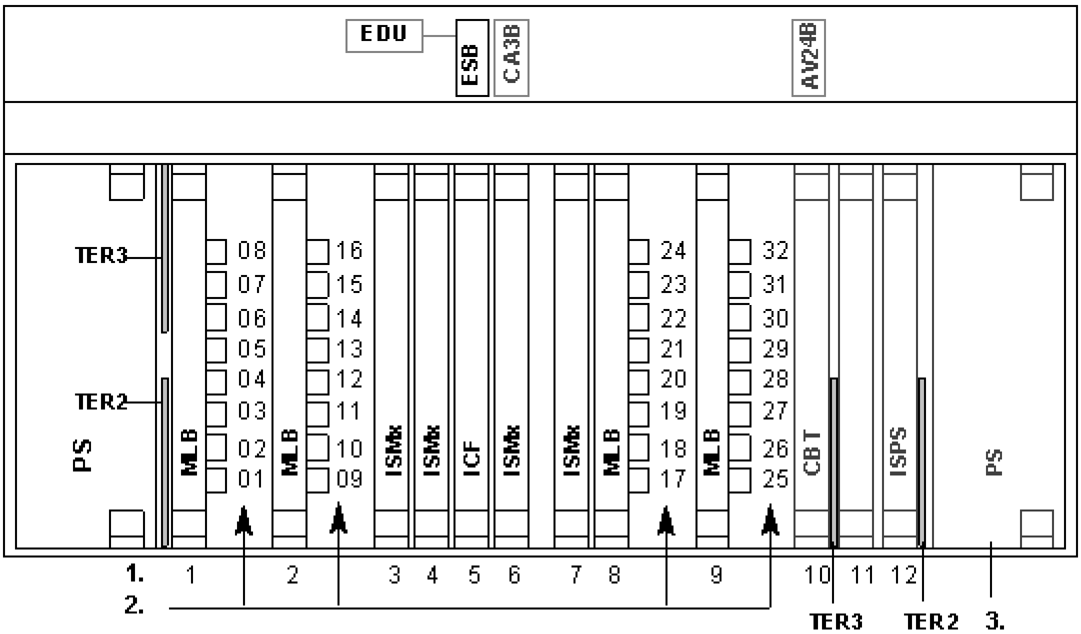
The four rollers in the console can be locked into place.



Console, position of rollers

1. Lock the rollers using 13 mm socket wrench
2. Connect the racks with M8 screw (two or more racks)

4.3.1 Board slots



Slot

1. Slot
2. External module number, decimal
3. A second PS350A and a ISPS are required if more than 14 groups are installed.

4.3.2 General information on boards

The boards used in the B3 module and in the ICS are listed below.

Service board

CBT	C-Bus Tester (only B3 module)

Boards for Connection Technology and Signalling

CA3B	Cable Adapter 3 B Module
AV24B	Adapter V.24 B Module
EDU	Error Display Unit
ESB	External Signalling B Module
TER	Termination 2 and 3 (only B3 module)

Boards for Control, Central Functions and Transport

ISMx/ISM2x	IMTU Switching Matrix
MLB	Module Link Board
ICF	IMTU Central Functions
CL2M/CL2ME	Clock 2 Module (if CL2ME is used see also Intermodule-Handover)

Boards for Power Supply

ISPS	IMTU Supplementary Power Supply (only B3 module)
PS	Power Supply (PS280A or PS350A in B3 module, PSL55 and PS350A in racks R1 to R4, PSL55 in ICS)

	Check the correct positioning of TER2 and TER3 before switching on the B3 module! Make sure that any removed boards are reinserted in the same slot!

4.3.3 Connectivity

Inserting the Connecting Cables

The B3 module is connected to the other modules belonging to the Communication Server Integral 55 using optical waveguides (twin cables).

Open the quick-action closures of the cover plates. Remove the cover plates.

Close the rear panel of the communication server Integral 55 using the supplied keys.

- 1/2 K rack: one rear panel without ventilation holes

Lift out the covers.

Feed the ends of the LWL twin cable into the console and then into the module **(bending radius min. 35 mm!)**.

Remove the covers of the LWL cable ducts on the rear side of the backplane.

With the I55 system switched on and unprotected coupling, there is a risk of short-circuiting when assembling the LWL twin cable!

For each LWL twin cable, insert the two insulating tubes (auxiliary item, part of the tool kit for the B3 module) through the respective cable duct of the backplane. See also

Insert the optical waveguide cable in the insulating tubes. Pull the insulating tubes containing the optical waveguide twin cable through the cable ducts toward the front.

Insert and secure the connections of the optical waveguide twin cable to the connectors of the EOCx submodule.

Make sure that the transmitting section of the EOCx submodule belonging to the B3 module is connected to the receiving section of the EOCx submodule. Conversely, the receiving section of the EOCx submodule belonging to the B3 module is to be connected to the transmitting section of the EOCx submodule.

EOCSM/EOCMM

The optical waveguide wire with the red plugs is to be inserted in the transmitting socket of the EOCSM/EOCMM and in the receiving socket of the B3 module. The opposite applies to the LWL wire with the black plugs.

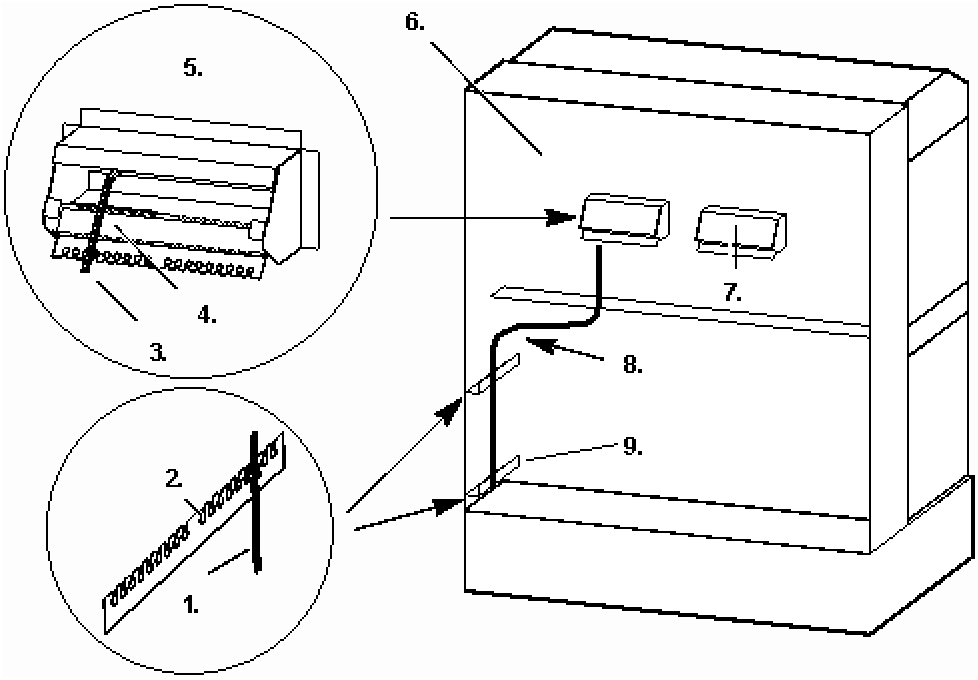
EOCPF

The LWL wire with the grey plugs is to be inserted in the grey sockets of both EOCPF submodules. The LWL wire with the blue plugs is to be inserted in the blue sockets.

Insert the EOCx submodules onto the MLB and lock the submodules into place (hook the tool on the locking rail of the EOCx and lock or unlock).

The slot addresses of the MLB/EOCx boards are defined in TIP.

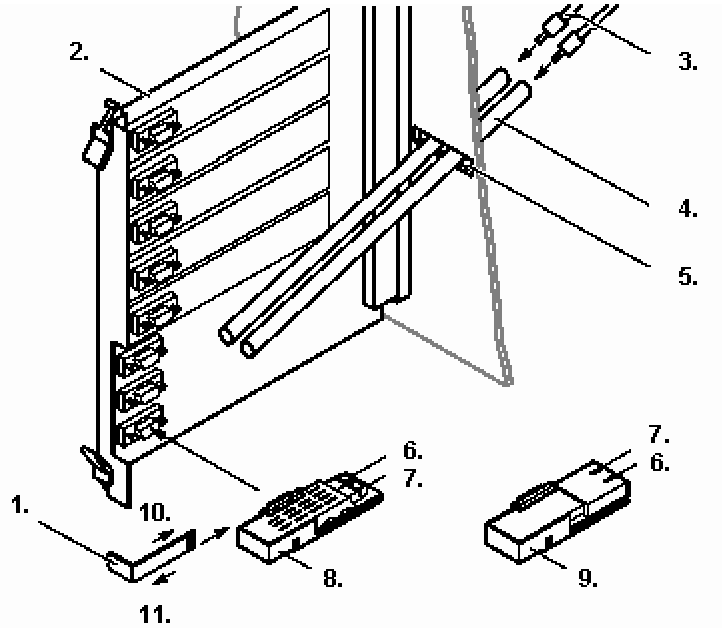
Insert the edge protector into the optical waveguide cable duct and fasten the connecting cable using cable binders on the fastening grooves provided (optical waveguide cable duct and side wall) in the B3 module.



Cable routing of fibre-optic twin cables, view of a 1/2 K rack with a B3 module from the rear side

1. OWG twin cable
2. Fastening groove
3. OWG twin cable
4. Edge protector
5. LWL cable duct
6. B3 module
7. Cover
8. Bending radius min. 35 mm!
9. OWG twin cable

Connections MLB



Board MLB EOCx submodules

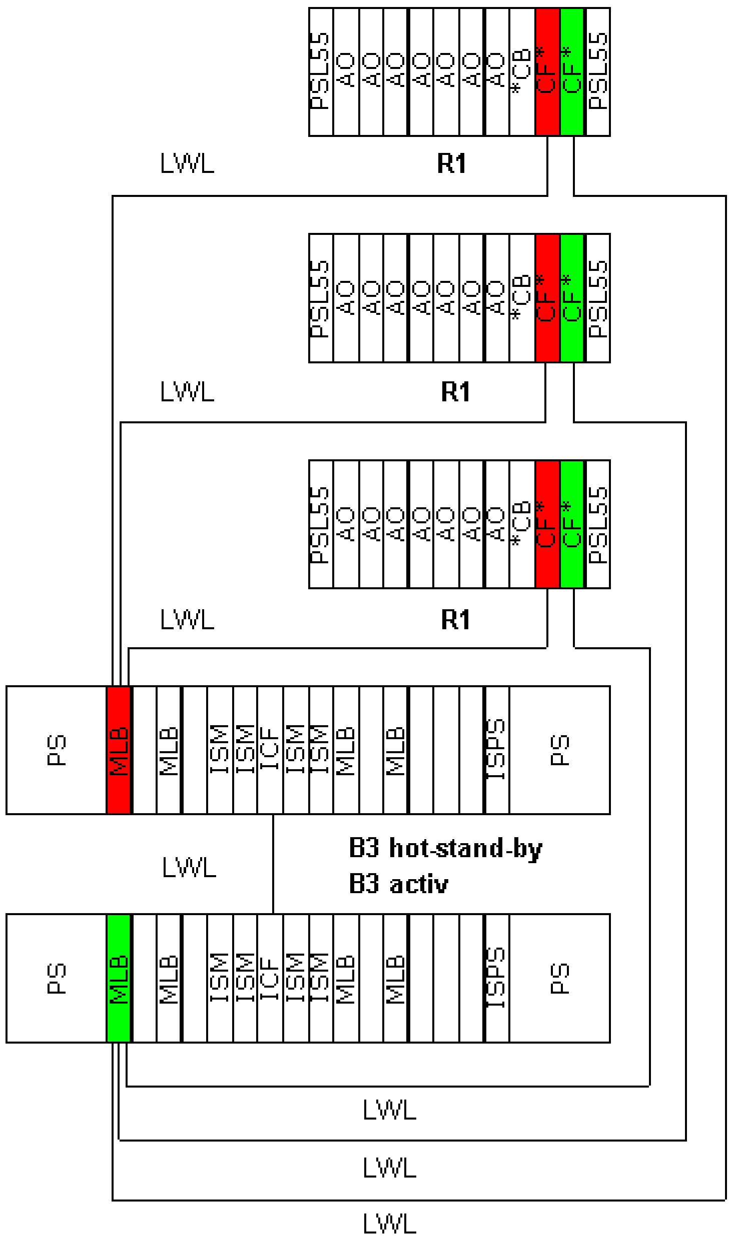
1. Tool for locking and unlocking submodule EOC *
2. MLB board
3. OWG twin cable
4. Isolating hose facility *
5. Duct for OWG
6. Sending
7. Receiving
8. EOCPF submodule
9. EOCMM/SM submodule
10. locking
11. unlocking

* Component of tool kit for B3 module (OWG/EOCxx)

4.3.4 Doubling

To increase the stability of communications in the system, two B3 modules can be linked to one another and to the corresponding modules via OWG (twin cable). This presumes that the B3 modules are equipped with the MLB boards.

Refer to the TIP documents for the required slots and assignment.



Doubling of the B3 module

AO = connecting circuit
CB = ACB/HSCB
CF* = CF22/CF2E
ICF = IMTU Central Functions
ISM = IMTU Switching Matrix
ISPS = IMTU Supplementary Power Supply
LWL = Optical waveguide (OWG)
MLB = Multi Link Board
PS = only PS350A
PSL55 = Power Supply Low 55

Wall-mounted and built-in modules can also be connected.

4.3.5 Switching on

Check the stable position of the power supply devices and power supply cables.

Pull the protective hoods over the slots on the front of the power supply devices.

Check whether only **one** ESU is active in the Communication Server Integral 55 (DIL switch to CF22/CF2E/ICF).

Insert the grounded plug of the mains connecting cable into the protection unit or earthed mains socket provided.

If necessary, connect the battery connector (e.g. inserting the -48 V fuse in the battery unit, etc).

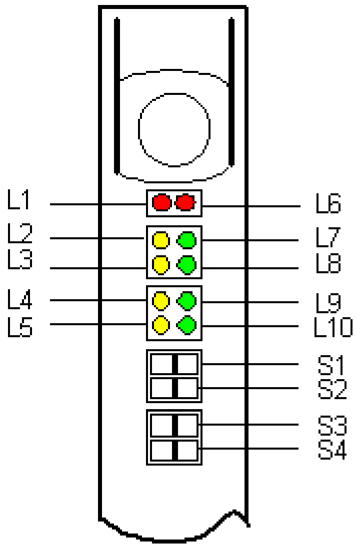
If required, move the battery switch on all inserted PS350A power supply units to position 1 (front panel).

The I55 server is switched on and loading programs (loading time depends on number of modules).

Startup with the ACB board	
	(Information yet to come!)
Startup with the HSCB board	

Startup with the ACB board

In multi-module operation, the S3 switch of the HSCB boards without HGS should be placed in the right-hand position.
The loading phases shown in the HSCB boards (LEDs L7-L10) may differ from time to time.
Having switched on the modules, the HSCB boards first run through loading phases 15 to 6.
From this point, the HSCB board without HGS is held at loading phase 6 while the HSCB with inserted HGS runs through the remaining loading phases 5 and 4 (access to HGS).
The HSCB boards without HGS subsequently run though loading phases 5 and 4.
Finally all HSCB boards run through loading phases 3 to 0.
The L7 LEDs of the CF22/CF2E boards flash in the modules during the loading phases (signalling input of the valid module address).
If the yellow LEDs L7 to L10 (loading phase 0) of the HSCB boards shown are off in all modules, this denotes that the server I55 is ready for operation.



Meaning of the LEDs on the front panel of the HSCB board

HSCB Loading Phases

No.	L7	L8	L9	L10	Phase name
15	1	1	1	1	Start reset phase
14	1	1	1	0	Test flash-PROM
13	1	1	0	1	Test QUICC
12	1	1	0	0	Test real time clock
11	1	0	1	1	Test C-bus interface

No.	L7	L8	L9	L10	Phase name
10	1	0	1	0	Test DUART (V.24 ports)
9	1	0	0	1	Test dynamic RAM
8	1	0	0	0	Output hardware image
7	0	1	1	1	End reset phase
6	0	1	1	0	Initial program loading (IPL)/IPL ready flag
5	0	1	0	1	STIN program loader is loaded and started
4	0	1	0	0	Operating system has been loaded and started (restart)
3	0	0	1	1	User programs (have been dispatched) have been loaded
2	0	0	1	0	Start of customer data loading in the user programs
1	0	0	0	1	All customer data loaded Start commissioning of module(s)
0	0	0	0	0	Module(s) in operation

1 = LED on
0 = LED off

4.3.6 Troubleshooting

Power supply

Fault	**Action**
Yellow LED on the PS350A power supply unit does not light up	Check the mains voltage. If mains voltage is present, replace the power supply unit.
Green LED on the power supply unit does not light up	Check the mains voltage (for PS280A only). Check the battery voltage (for PS350A only). Observe battery switch function on PS350A! First check whether the malfunction can be rectified by removing the boards(s). If this is the case, replace with new board(s). If this is not the case, replace the power supply unit.

General Points

Fault	**Action**
with ACB	
Loading procedure failed during first startup	(Information yet to come!)
with HSCB	

Loading procedure failed during first commissioning (twin module)	In all modules containing HSCB boards without HGS, check whether the L8 LEDs on the CF2x boards are flashing. If not, check the optical waveguide connections for these modules. Create any missing optical waveguide connections. If subsequently necessary for these modules: Small reset (restart): Switch S2 of the HSCB board in left-hand position, switch S1 of the HSCB board in left-hand and then back to middle position. Large reset: Switch S2 in right position, switch S1 in left and then back to middle position, switch S2 to left position after loading has finished (loading phase 0).

Further Course of Action

with ACB

(Information yet to come!)

with HSCB

First check the displays of the HSCB board with inserted HGS.
Then check the displays of the HSCB board without HGS (Twin Module).
Note down the status of the LEDs on all boards.
Inform your Service Control Centre.

5 19” cabinets and cooling

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The communication server Integral 55 is marketed in a 19” cabinet or integrated in the existing customer infratsurtcure.

The RJ45 slot connection system is used for the panels.

For the Communication Server Integral 55 there are available different cabinet versions:

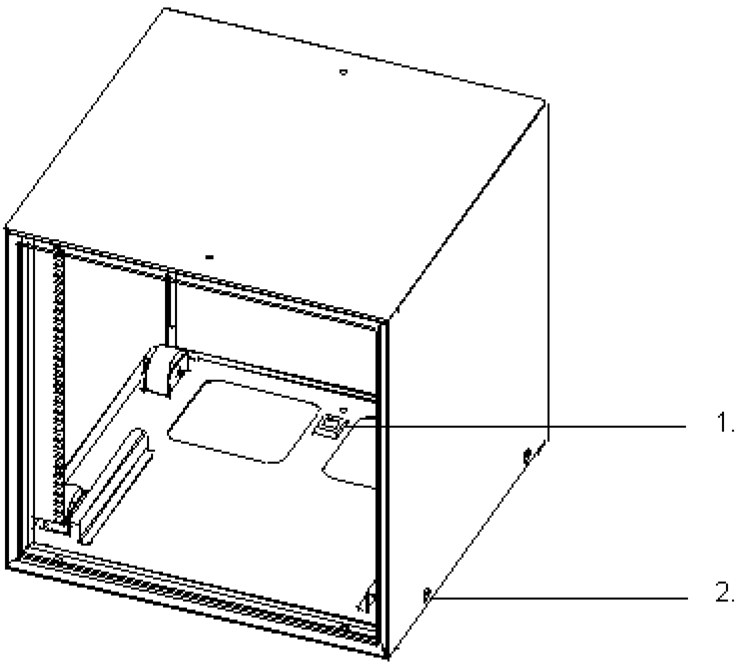
5.1 Standing casing

Standing casing S1 (material number: 49.9902.0611)

A rack can be installed in a standing casing S1. It can accommodate no more than one Communication Server Integral 55. In addition, two HU (height units) are available for the server and / or service panel (material number: 49.9904.8477).

The standing casing S1 is fitted with hidden rollers.

The front plate (plastic pane) can be ordered as a spare part.



Standing casing S1

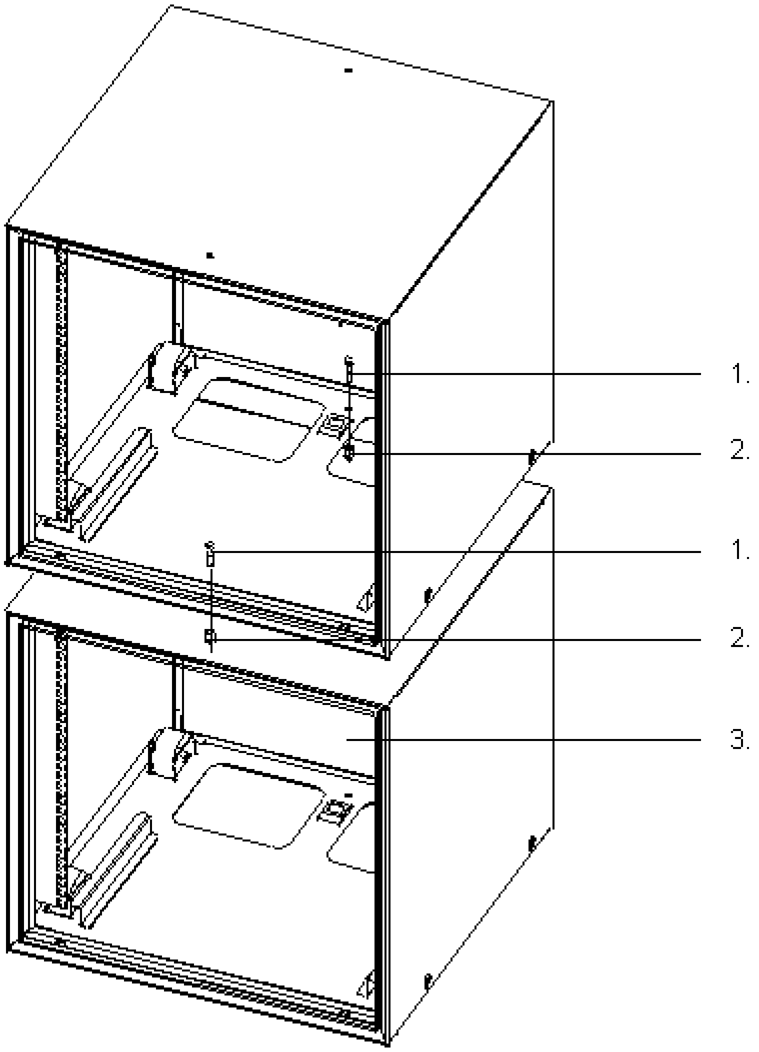
1. Ground clamps (max. 3)
2. The standing casing S1 is locked using a no. 13 nut key

Dimensions

- Width = 550 mm
- Length = 550 mm
- Height = 11 HU

Cabinet colour RAL 7035

Two standing casings S1 can be stacked on each other. Three standing casings must not be stacked on each other.



1. Hexagonal screw M6x30
2. Spacer roller
3. Covering plate

The two standing casings are connected using two M6 screws (1.). Spacer rollers (2.) must be fitted in between for each screw.

The two standing casings must be connected to each other using a earthing wire.

5.1.1 Cable routing

The Communication Server Integral 55 is placed on the ground in the standing casing S1 and then screwed tight on the guides.

The cable adapters are accessible from the rear. This is where the connecting circuit cables must be connected.

Section standing casing, cable on cable adapter

5.2 33HU

19-inch cabinet 33HU

Dimensions

- Width (exterior) = 600 mm
- Length (exterior) = 600 mm

- Height (exterior) = 1,650 mm
- Height (interior) = 33HU
- Profile rail = 495 mm

The cabinet colour and the colour of accessory parts is RAL 7035

Description

The cabinet can accommodate a maximum of 3 communications servers I55. Additionally, 6 HU are reserved for the application server, which must be separated thermally from the communication server I55.

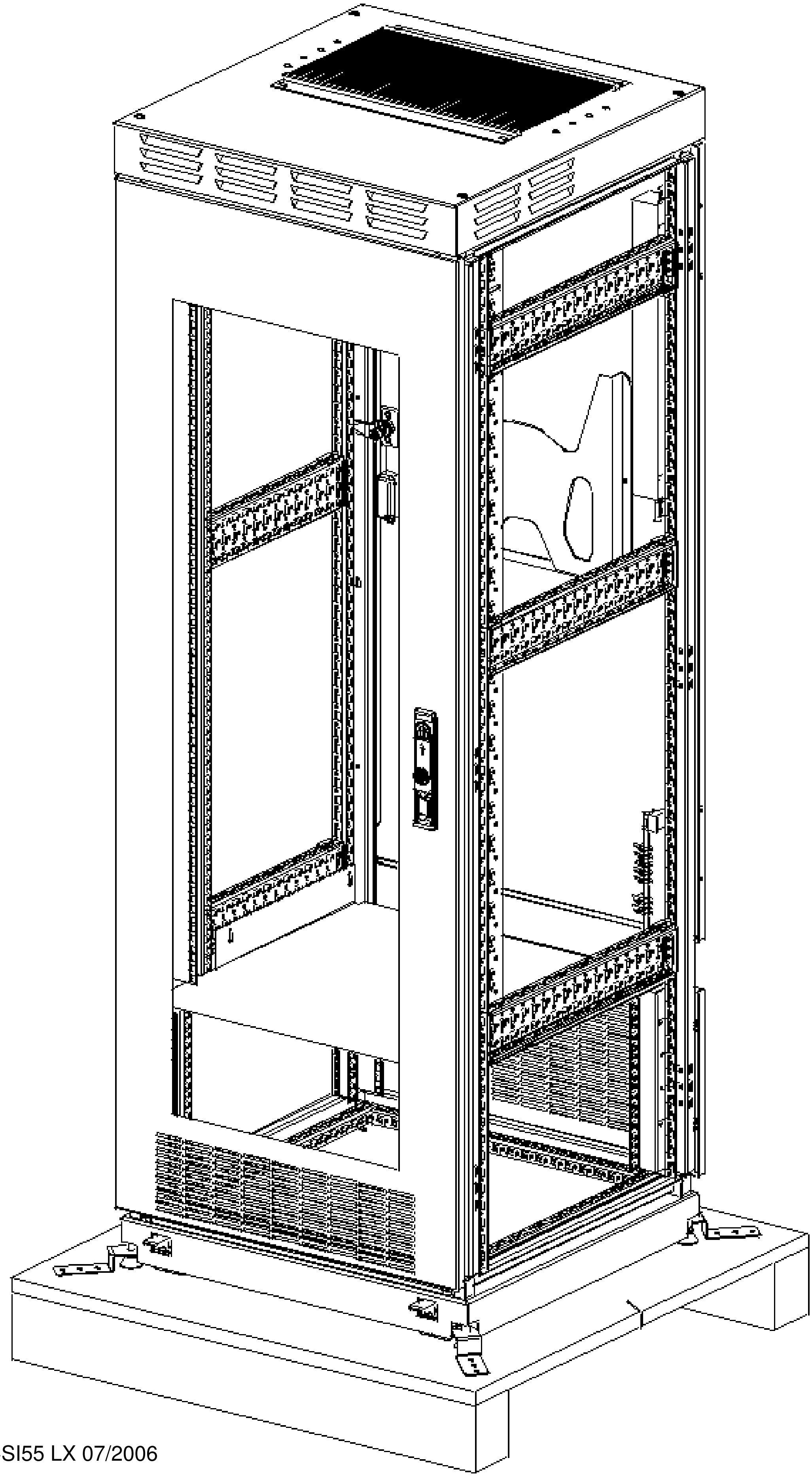
	Features:
	the cabinet is fitted with hidden rollers.
	vertical profile rail in 2 levels
	front level 120mm separation from the front door in the section where the communication server I55 is located
	no separation in the section where the application server is located
	lockable glass door in the front
	closed locakable door at the rear
	Lockable side panels
	Cable insertion at the rear under the door and/or through the roof
	Strain relief of the cables is installed at the server shield
	1 multiple socket with 8 sockets
	1 earthing rail for the connection of earthing cables 2,5-16 mm2
	Work lead
	Sliding rail for 1 application server
	50 cage nuts, 50 mounting screws are attached in bulk form

Delivery will be in pallets, the supplier’s packaging will be used for packaging.

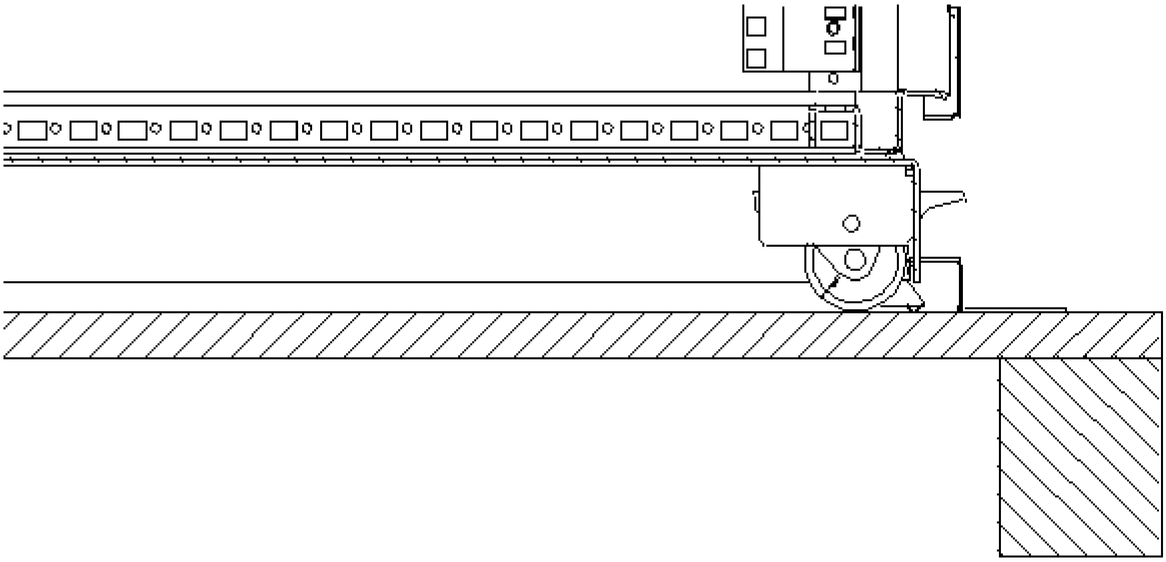
There is a documentation pocket in the door at the rear.

ECONET program options

Roof with 2 fans	49.9905.9115	is required if 3 racks are used
Multiple socket with 8 sockets		is required for redundant power supply
Bottom of the device, fixed	49.9904.8474	
19-inch keyboard tray type A	49.9904.6386	
Patch panel 1HU	27.9798.2413	
Blind panel 1HU	27.9798.2404	Blind panels serve to cover unoccupied height units
Blind panel 2HU	27.9798.2406	
Blind panel 3HU	27.9798.2407	
Blind panel 6HU	27.9798.2408	



19-inch cabinet 33HU



Section of the 19-inch cabinet 33 HU on the pallet

5.3 42HU 500mm

19-inch cabinet 42HU

Dimensions

- Width (exterior) = 800 mm
- Length (exterior) = 800 mm
- Height (exterior) = 2,150 mm
- Height (interior) = 42HU
- Profile rail = 500 mm

The cabinet colour and the colour of accessory parts is RAL 7035

Description

The system can be equipped with several Communication Servers I55 (max. 4) and several application servers.

Depending on the needs it is also possible to install uninterrupted power supplies UPS in the cabinet.

The level difference between the profile rails in the front and the rear is 500 mm.

	Features:
	vertical profile rail at one level, front level 125 mm separation from the front door
	Base 100 mm high with three-part floor panel (removable)
	Adjustable levelling feet for levelling on irregular floors
	ventilated lockable glass door in the front
	closed locakable door at the rear

	Lockable side panels
	Roof panel for cable insertion at the back
	Ventilation holes and prepared for active ventilation (fan kit can be retrofitted)
	Cable insertion through the floor, base and/or the roof
	Jumpering bracket for cable routing left, right, front and rear
	2 multiple sockets with 7 sockets each on 2 branching boxes.
	1 earthing rail horizontal for the connection of earthing cables 2,5-16 mm2
	Work lead
	50 cage nuts, 50 mounting screws Torx are attached in bulk form

Delivery will be in pallets, the supplier’s packaging will be used for packaging.

There is a documentation pocket in the door at the rear.

ECONET program options:

Fan insert for active ventilation incl. 2 fans 18W 140 m3/h	49.9808.0869	is required if more than 2 I55 are used
Fan expansion kit consisting of 1 fan	27.9798.2258	is required for expansion of the fan insert and for replacement
Patch panel 1HU	27.9798.2413	
Blind panel 1HU	27.9798.2404	Blind panels serve to cover unoccupied height units
Blind panel 2HU	27.9798.2406	
Blind panel 3HU	27.9798.2407	
Blind panel 6HU	27.9798.2408	
Bottom of the device, fixed 500mm	27.9798.2474	
Telescopic rail for bottom of device	27.9798.2553	
Sliding rail for the second and further servers	27.9798.2289	

5.4 42HU 730mm

19-inch cabinet 42HU

Dimensions

- Width (exterior) = 800 mm
- Length (exterior) = 800 mm
- Height (exterior) = 2,150 mm
- Height (interior) = 42HU
- Profile rail = 730 mm

The cabinet colour and the colour of accessory parts is RAL 7035

Description

This cabinet is used when the E200 application server is used. An assembly kit with a telescopic rail and a cable shears is preinstalled in the cabinet.

The system can be equipped with several Communication Servers I55 (max. 4) and several application servers.

Depending on the needs it is also possible to install uninterrupted power supplies UPS in the cabinet.

The level difference between the profile rails in the front and the rear is 730 mm.

	Features:
	vertical profile rail at one level, front level 120 mm separation from the front door
	Base 100 mm high with three-part floor panel (removable)
	Adjustable levelling feet for levelling on irregular floors
	ventilated lockable glass door in the front
	closed locakable door at the rear
	Lockable side panels
	Roof panel for cable insertion at the back
	Ventilation holes and prepared for active ventilation (fan kit can be retrofitted)
	Cable insertion through the floor, base and/or the roof
	Jumpering bracket for cable routing left, right, front and rear
	2 multiple sockets with 7 sockets each on 2 branching boxes
	1 earthing rail for the connection of earthing cables 2,5-16 mm2
	Work lead
	50 cage nuts, 50 mounting screws Torx are attached in bulk form

Delivery will be in pallets, the supplier’s packaging will be used for packaging.

There is a documentation pocket in the door at the rear.

ECONET program options:

Fan insert for active ventilation incl. 2 fans 18W 140 m3/h	49.9808.0869	is required if more than 2 racks are used
Fan expansion kit consisting of 1 fan	27.9798.2258	is required for expansion of the fan insert and for replacement
Patch panel 1HU	27.9798.2413	
Blind panel 1HU	27.9798.2404	Blind panels serve to cover unoccupied height units
Blind panel 2HU	27.9798.2406	
Blind panel 3HU	27.9798.2407	
Blind panel 6HU	27.9798.2408	

5.5 42HU-can be disassembled

ICC cabinet 42HU-can be disassembled

- Width (exterior) = 800 mm
- Length (exterior) = 900 mm
- Height (exterior) = 2,150 mm
- Height (interior) = 42 HU
- Profile rail = 730 mm

Cabinet same as2 HE 730mm” GRAB=”T”>19” 42HU 730mm $\rightarrow$ 65but with removable horizontal struts for easy disassembly of the cabinet as it is possible, depending on local conditions, that the cabinet must be disassembled.

42HU 730mm $\rightarrow$ 65

5.6 Overview of components (1)

Edition:	01.06.2002					
Material number	Name	HU	Weight in kg	ICC cabinet 6+27HU W X H X L 600 X 600 X 1650 Schroff Proline	ICC cabinet 42HU W X H X L 800 X 800 X 2150 Rittal TS8-Syst.	Notes
	Maximum tilting height without pallet and packaging			<1900	2295	
	Maximum tilting height with pallet and packaging			<1900	2402	
	Transport on pallet equipped with racks		25 per rack	X 1 to 3 racks (max..27HU)	X 1 to 4 racks	
4.999.059.049	ICC-XXL 6+27HU W 600 X H 600 X L 1680 Schroff Proline		120	X		
4.999.059.117	ICC-XXL 42HU with side panels W 800 X H 800 X L 2150 Rittal TS8-System DK 7995.453		240		X	

Edition:	01.06.2002					
Material number	Name	HU	Weight in kg	ICC cabinet 6+27HU W X H X L 600 X 600 X 1650 Schroff Proline	ICC cabinet 42HU W X H X L 800 X 800 X 2150 Rittal TS8-Syst.	Notes
4.999.070.388	ICC-XXL 42HU without side panels W 800 X H 800 X L 2150 Rittal TS8-System DK 7995.561		187		X	
4.999.070.418	1 pair of side panels 2000 X 800 for cabinet 4.999.070.388 DK 7824.208		53		O	
4.999.059.120	ICC-XXL 42HU with side panels W 800 X H 900 X L 2150 Rittal TS8-System DK 7995.454		260			
4.999.070.399	ICC-XXL 42HU without side panels W 800 X H 900 X L 2150 Rittal TS8-System DK 7995.563		205			
4.999.070.419	1 pair of side panels 2000 X 9000 for cabinet 4.999.070.399 and 4.999.070.411 DK 7824.209		55			
4.999.065.258	ICC-XXL 42HU with side panels W 800 X H 900 X L 2150 can be disassembled Rittal TS8-System DK 7995.455		260			

Edition:	01.06.2002					
Material number	Name	HU	Weight in kg	ICC cabinet 6+27HU W X H X L 600 X 600 X 1650 Schroff Proline	ICC cabinet 42HU W X H X L 800 X 800 X 2150 Rittal TS8-Syst.	Notes
4.999.070.411	ICC-XXL 42HU without side panels W 800 X H 900 X L 2150 can be disassembled Rittal TS8-System DK 7995.564		205			
4.999.070.420	Locks for 1 pair of side panels (4pcs) DK 7824.500				O	
4.998.081.260	Baying kit incl. fixing material PU =4pcs (2 PU are required to join 2 cabinets) PS 4582.500				O	
	Base with closed frontplates				X	
	Floor panel, three-part, slidable				X	
	Sliding rail (Rittal) for server 2.797.982.289				2X (for server + I55)	
	Sliding rail (Schroff) for server			1X (for server)		
	Telescopic rail for server E200 4.999.020.096 DK 7063.900					
	Sliding rail variable depth (Rittal) DK 7063.880 for installation of server E120					
	Multiple socket			X 1X 8 sockets with 5m cable and earthing-pin plug	X 2X 7 sockets on branching box	

Edition:	01.06.2002					
Material number	Name	HU	Weight in kg	ICC cabinet 6+27HU W X H X L 600 X 600 X 1650 Schroff Proline	ICC cabinet 42HU W X H X L 800 X 800 X 2150 Rittal TS8-Syst.	Notes
	Lockable glass door front with ventilation holes			X left hinge	X right hinge	
	Closed lockable door at the rear			X left hinge	X right hinge	
	Lockable side panels			X	X	
	Profile rails front			X 33HU distributed over 2 levels, 6HU for server and 27HU for CS I55 and others	X 42HU	Separation 100-125mm from front door.
	Profile rails rear			X 6HU below in the server section	X 42HU	
	Level difference profile rails front and rear			X 495mm in the server section	X 500mm	
	Cable insertion from rear			X	X through base	
	Cable insertion from below				X	
	Cable insertion from above			X	X	
	Earthing rail with clamp			X	X	Clamps in enclosed plastic bag
	12 jumpering bracktes front, 12 jumpering brackets rear.				X	
	Document pocket			X	X	on rear door
	Rollers			X		
	Levelling feet			X	X	
	Earth conductor 2,5mm2 conductor sleeves on both ends.			X 2	X 4	

Edition:	01.06.2002					
Material number	Name	HU	Weight in kg	ICC cabinet 6+27HU W X H X L 600 X 600 X 1650 Schroff Proline	ICC cabinet 42HU W X H X L 800 X 800 X 2150 Rittal TS8-Syst.	Notes
	x cage nuts, M6 mounting screws and plastic washers.			X (50x)	X (100x)	In enclosed plastic bag
	Racks I55	9	25	O max. 3	O max. 4	Voice Server
4.998.034.799	Application Server E120 Standard	5		O	O	
4.999.034.798	Application Server E120 Professional	5		O	O	
4.999.027.925	Application Server E200 Enterprise	6				
4.998.095.981	Retrofitting kit for E120			O	O	1X per E120 Server, sliding rail available in cabinet
2.797.982.289	Sliding rail for server DK 7063.500				O 2X part of the cabinet	Is required if more servers are used.
4.999.020.096	Telescopic rail for server E200 DK 7063.900					Is required if more servers are used.
4.999.069.426	Sliding rail variable depth (Rittal) DK 7063.880 for installation I55					is required additionally if more than one I55 are not installed one on top of the other
4.999.059.115	Roof with fan sheet			O		Is required if 3 I55 racks are installed.
4.998.080.869	Fan insert with 2 fans TS 7886.000				O	Is required if 3 or 4 I55 racks are installed.

Edition:	01.06.2002					
Material number	Name	HU	Weight in kg	ICC cabinet 6+27HU W X H X L 600 X 600 X 1650 Schroff Proline	ICC cabinet 42HU W X H X L 800 X 800 X 2150 Rittal TS8-Syst.	Notes
2.797.982.258	Fan expansion set DK 7980.000				O	Is required if 3 or 4 I55 racks are installed. The set consists of one fan for installation in the fan roof
4.999.048.474	Bottom of the device, fixed			O		Accessory shelf
2.797.982.474	Bottom of the device 500 DK 7145.035				O	
4.999.063.238	Assembly kit variable depth for bottom of the device DK 7063.860					
2.797.982.553	Telescopic drawer for bottom of the device (50kg) DK 7081.000				O +Bottom of the device 500	Extractable shelf
4.999.046.386	19” keyboard tray	1		O	O	
2.797.982.413	Jumpering bracket	1		O	O	
2.797.982.404	Blind panel	1		O	O	for covering slots that are not needed
2.797.982.406	Blind panel	2		O	O	for covering slots that are not needed
2.797.982.407	Blind panel	3		O	O	for covering slots that are not needed
2.797.982.704	Blind panel	6		O	O	for covering slots that are not needed

Edition:	01.06.2002					
Material number	Name	HU	Weight in kg	ICC cabinet 6+27HU W X H X L 600 X 600 X 1650 Schroff Proline	ICC cabinet 42HU W X H X L 800 X 800 X 2150 Rittal TS8-Syst.	Notes
4.999.046.814	Patch panel internal 3X8WE (4-wire)	1		O	O	
4.999.046.813	Patch panel internal 48WE (2-wire)	1		O	O	
4.999.048.477	Service panel	1		O	O	
4.998.045.619	Telecommunications patch panel external 24WE	1		O	O	
2.797.982.353	External patch panel CAT5 16WE	1		O	O	
2.797.982.354	External patch panel CAT5 32WE	2		O	O	
2.797.982.357	External patch panel CAT5 48WE	3		O	O	
4.999.065.625	Multiple socket			O		1X for doubling
4.998.079.986	C profile rail in 482,6 (6PU)				O	
4.998.079.987	Cable rail				O	
4.999.067.592	Mains cable with CEE plug blue 5m				O	
4.999.067.593	Mains cable with CEE plug blue 10m				O	
4.998.080.012	19” frames for LSA-Plus strips series 2(10 for 150 WP	3		O	O	

X = standard	O = optional	not possible

5.7 Overview of components (2)

Edition:	01.06.2002					
Material number	Name	HU	Weight in kg	ICC cabinet 42HU W X H X L 800 X 800 X 2150 Rittal TS8-Syst.	ICC cabinet 42HU W X H X L 800 X 900 X 2150 can be disassembled Rittal TS8-Syst.	Notes
	Maximum tilting height without pallet and packaging			2330	2330	
	Maximum tilting height with pallet and packaging			2438	2438	
	Transport on pallet equipped with racks		25 per rack	X 1 to 4 racks	X 1 to 4 racks	
4.999.059.049	ICC-XXL 6+27HU W 600 X H 600 X L 1680 Schroff Proline		120			
4.999.059.117	ICC-XXL 42HU with side panels W 800 X H 800 X L 2150 Rittal TS8-System DK 7995.453		240			
4.999.070.388	ICC-XXL 42HU without side panels W 800 X H 800 X L 2150 Rittal TS8-System DK 7995.561		187			
4.999.070.418	1 pair of side panels 2000 X 800 for cabinet 4.999.070.388 DK 7824.208		53			

Edition:	01.06.2002					
Material number	Name	HU	Weight in kg	ICC cabinet 42HU W X H X L 800 X 800 X 2150 Rittal TS8-Syst.	ICC cabinet 42HU W X H X L 800 X 900 X 2150 can be disassembled Rittal TS8-Syst.	Notes
4.999.059.120	ICC-XXL 42HU with side panels W 800 X H 900 X L 2150 Rittal TS8-System DK 7995.454		260	X		
4.999.070.399	ICC-XXL 42HU without side panels W 800 X H 900 X L 2150 Rittal TS8-System DK 7995.563		205	X		
4.999.070.419	1 pair of side panels 2000 X 9000 for cabinet 4.999.070.399 and 4.999.070.411 DK 7824.209		55	O	O	
4.999.065.258	ICC-XXL 42HU with side panels W 800 X H 900 X L 2150 can be disassembled Rittal TS8-System DK 7995.455		260		X	
4.999.070.411	ICC-XXL 42HU without side panels W 800 X H 900 X L 2150 can be disassembled Rittal TS8-System DK 7995.564		205		X	
S4.999.070.420	Locks for 1 pair of side panels (4pcs) DK 7824.500			O	O	

Edition:	01.06.2002					
Material number	Name	HU	Weight in kg	ICC cabinet 42HU W X H X L 800 X 800 X 2150 Rittal TS8-Syst.	ICC cabinet 42HU W X H X L 800 X 900 X 2150 can be disassembled Rittal TS8-Syst.	Notes
4.998.081.260	Baying kit incl. fixing material PU =4pcs (2 PU are required to join 2 cabinets) PS 4582.500			O	O	
	Base with closed frontplates			X	X	
	Floor panel, three-part, slidable			X	X	
	Sliding rail (Rittal) for server 2.797.982.289					
	Sliding rail (Schroff) for server					
	Telescopic rail for server E200 4.999.020.096 DK 7063.900			1X (for server)	1X (for server)	
	Sliding rail variable depth (Rittal) DK 7063.880 for installation of server E120			1x (for I55)	2X (for server + I55)	
	Multiple socket			X 2X 7 sockets on branching box	X 2X 7 sockets on branching box	
	Lockable glass door front with ventilation holes			X right hinge	X right hinge	
	Closed lockable door at the rear			X right hinge	X right hinge	
	Lockable side panels			X	X	
	Profile rails front			X 42HU	X 42HU	Separation 100-125mm from front door.

Edition:	01.06.2002					
Material number	Name	HU	Weight in kg	ICC cabinet 42HU W X H X L 800 X 800 X 2150 Rittal TS8-Syst.	ICC cabinet 42HU W X H X L 800 X 900 X 2150 can be disassembled Rittal TS8-Syst.	Notes
	Profile rails rear			X 42HU	X 42HU	
	Level difference profile rails front and rear			X 730mm	X 730mm	
	Cable insertion from rear			X through base	X through base	
	Cable insertion from below			X	X	
	Cable insertion from above			X	X	
	Earthing rail with clamp			X	X	Clamps in enclosed plastic bag
	12 jumpering bracktes front, 12 jumpering brackets rear.			X	X	
	Document pocket			X	X	on rear door
	Rollers					
	Levelling feet			X	X	
	Earth conductor 2,5mm2 conductor sleeves on both ends.			X 4	X 4	
	x cage nuts, M6 mounting screws and plastic washers.			X (100x)	X (100x)	In enclosed plastic bag
	Racks I55	9	25	O max. 4	O max. 4	Voice Server
4.998.034.799	Application Server E120 Standard	5		O	O	
4.999.034.798	Application Server E120 Professional	5		O	O	
4.999.027.925	Application Server E200 Enterprise	6		O	O	

Edition:	01.06.2002					
Material number	Name	HU	Weight in kg	ICC cabinet 42HU W X H X L 800 X 800 X 2150 Rittal TS8-Syst.	ICC cabinet 42HU W X H X L 800 X 900 X 2150 can be disassembled Rittal TS8-Syst.	Notes
4.998.095.981	Retrofitting kit for E120				O	1X per E120 Server, sliding rail available in cabinet
2.797.982.289	Sliding rail for server DK 7063.500					Is required if more servers are used.
4.999.020.096	Telescopic rail for server E200 DK 7063.900			O 1X part of the cabinet	O 1X part of the cabinet	Is required if more servers are used.
4.999.069.426	Sliding rail variable depth (Rittal) DK 7063.880 for installation I55			O 2X part of the cabinet	O 2X part of the cabinet	is required additionally if more than one I55 are not installed one on top of the other
4.999.059.115	Roof with fan sheet					Is required if 3 I55 racks are installed.
4.998.080.869	Fan insert with 2 fans TS 7886.000			O	O	Is required if 3 or 4 I55 racks are installed.
2.797.982.258	Fan expansion set DK 7980.000			O	O	Is required if 3 or 4 I55 racks are installed. The set consists of one fan for installation in the fan roof
4.999.048.474	Bottom of the device, fixed					Accessory shelf

Edition:	01.06.2002					
Material number	Name	HU	Weight in kg	ICC cabinet 42HU W X H X L 800 X 800 X 2150 Rittal TS8-Syst.	ICC cabinet 42HU W X H X L 800 X 900 X 2150 can be disassembled Rittal TS8-Syst.	Notes
2.797.982.474	Bottom of the device 500 DK 7145.035			O + assembly kit variable depth	O + assembly kit variable depth	
4.999.063.238	Assembly kit variable depth for bottom of the device DK 7063.860			O	O	
2.797.982.553	Telescopic drawer for bottom of the device (50kg) DK 7081.000			O +assembly kit variable depth +bottom of device	O +assembly kit variable depth +bottom of device	Extractable shelf
4.999.046.386	19” keyboard tray	1		O	O	
2.797.982.413	Jumpering bracket	1		O	O	
2.797.982.404	Blind panel	1		O	O	for covering slots that are not needed
2.797.982.406	Blind panel	2		O	O	for covering slots that are not needed
2.797.982.407	Blind panel	3		O	O	for covering slots that are not needed
2.797.982.704	Blind panel	6		O	O	for covering slots that are not needed
4.999.046.814	Patch panel internal 3X8WE (4-wire)	1		O	O	
4.999.046.813	Patch panel internal 48WE (2-wire)	1		O	O	
4.999.048.477	Service panel	1		O	O	
4.998.045.619	Telecommunications patch panel external 24WE	1		O	O	

Edition:	01.06.2002					
Material number	Name	HU	Weight in kg	ICC cabinet 42HU W X H X L 800 X 800 X 2150 Rittal TS8-Syst.	ICC cabinet 42HU W X H X L 800 X 900 X 2150 can be disassembled Rittal TS8-Syst.	Notes
2.797.982.353	External patch panel CAT5 16WE	1		O	O	
2.797.982.354	External patch panel CAT5 32WE	2		O	O	
2.797.982.357	External patch panel CAT5 48WE	3		O	O	
4.999.065.625	Multiple socket					1X for doubling
4.998.079.986	C profile rail in 482,6 (6PU)			O	O	
4.998.079.987	Cable rail			O	O	
4.999.067.592	Mains cable with CEE plug blue 5m			O	O	
4.999.067.593	Mains cable with CEE plug blue 10m			O	O	
4.998.080.012	19” frames for LSA-Plus strips series 2(10 for 150 WP	3		O	O	

X = standard	O = optional	not possible

5.8 Selection of cabinets for installation of the Integral 55

The rack is designed in such a way that it can be installed in any standard 19” cabinet, regardless of the other components. In order that components can be inserted in the rack from the front (EOC, cable etc.), there must be a gap of at least 150 mm length between the front of the rack and the cabinet door. Depending on the size of the cabinet, several racks or other 19” components can be installed stacked on top of each other.

The installation of lockable doors can prevent unauthorised access to the modules.

Selection of cabinets taking into account heat dissipation

How do I select a suitable 19” cabinet or how do I assess the suitability of an existing 19” cabinet for installation of a Integral 55 (1-n racks and/or additional devices), taking into account the thermal requirements?

Why is heat offtake so important?

Temperature is public enemy number one for the sensitive microelectronic components. A rule of thumb suggests that each increase in temperature by 10 °C (based on the recommended operating temperature) cuts the life-expectancy in half. Accordingly, it is very important that this energy is kept away from the components and is taken off outwards.

Thermal offtake concept for the 19” cabinet

The following options are available for thermal offtake from the 19” cabinet:

Passive ventilation

Passive ventilation of the cabinets is the simplest method. Using incoming air apertures in the base and/or the door and waste air apertures in the roof plate and/or door, the air exchange is managed on the basis of the principle ”front bottom for incoming, cool air” and ”top back to let the hot air out.” Whether or not this variant can be used depends on the power dissipation of the installed components and on the max. inner cabinet temperature (dependent on the equipment in use).

Active ventilation

Active ventilation (forced ventilation) is another possibility. Using incoming air apertures in the base and/or the door and waste air apertures in the roof plate and/or door, the air exchange is managed on the basis of the principle ”suck in incoming, cool air from the front bottom” and ”blow out hot air at the top back.” The number of fans is dependent on the power dissipation of the installed components and on the max. inner cabinet temperature (dependent on the equipment in use). As a standard, manufacturers offer roofs with 2 fans (air output per fan from 120 m3/h upwards). In general, additional fans can be retro-fitted. Furthermore, the fans can be controlled and monitored by thermostat or electronic, remote monitoring.

Solution: I55 in a 19” cabinet:

Conditions for the selection of cabinets for installation of the Integral 55:

19” cabinet with		I55 in a 19” cabinet without additional active components			
		1 rack (9HU)	2 racks (18HU)	3 racks (27HU)	4 racks (36HU)
Passive ventilation	No fan	X	X	-	-
Active ventilation with	at least 2 fans	X	X	X	-
	at least 3 fans	X	X	X	X
	at least 4 fans	X	X	X	X
	at least 5 fans	X	X	X	X

19” cabinet with		I55 in a 19” cabinet **with** additional active components -> determine power loss Pv					
		up to 500 W	501W-750W	751W-1000W	1001W-1250W	1251W-1500W	>1500 W
Passive ventilation	No fan	X	-	-	-	-	-
Active ventilation with	at least 2 fans	X	X	-	-	-	-
	at least 3 fans	X	X	X	-	-	-

	at least 4 fans	X	X	X	X	-	-
	at least 5 fans	X	X	X	X	X	Exact calculation is required.

Explanation/help:

- passive ventilation: Incoming air apertures in the base and/or door at the front and waste air apertures in the roof and/or door at the rear
- active ventilation: Forced ventilation using a fan, incoming air apertures in the base and/or door at the front and fans in the roof/side panel
- Power dissipation Pv Rack: 250 W are assumed per rack
- Determine total power loss = Pv (rack) x number of racks + Pv plus components + Pv plus components + ...
- Volume flow of the fans min. 120 m3/h
- An exact calculation is required if the power dissipation is greater than 1500 W
- The max. ambient temperature for the Integral 55 is 45 °C, i.e. the max. ambient temperature outside of the 19” cabinet should not exceed +40 °C.

Option: thermostat for fan control, remote monitoring of the fans

In view of the extremely varied possibilities, manufacturers of 19” cabinets ensure a flexible design of the cabinet systems, so that the cabinets can be adjusted to suit the thermal requirements retrospectively.

5.9 Air conditioning

5.9.1 Overview

Taking into consideration the following ambient conditions

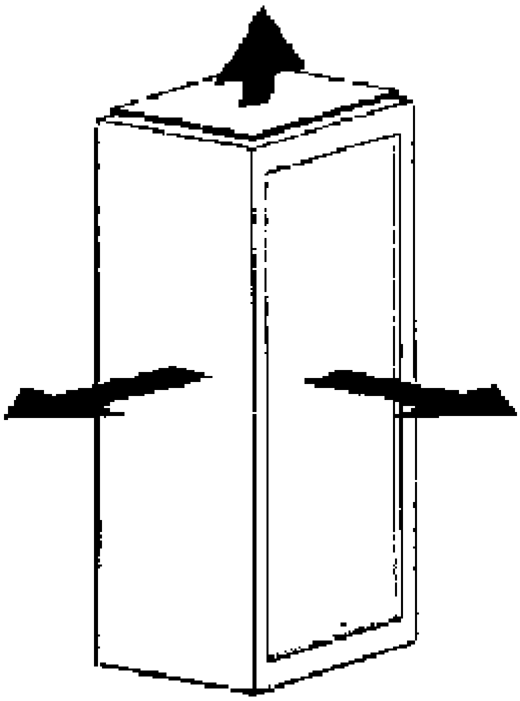
- electric power dissipation Pv of the Integral 55 in the cabinet
- electric power dissipation Pv of additional devices in the cabinet
- Ambient temperature Tu (outside of the cabinet)
- Temperature inside the cabinet Ti
- Temperature difference Delta Ti-Tu
- IP protection
- Cooling performance Qk
- Type and location of assembly and cabinet size (height HU, width, length)

the following options are available for the ventilation and cooling of the 19” cabinet:

- Intrinsic convection, heat transmission through the cabinet surface
- Passive ventilation, intrinsic convection with issue of the hot air from inside
- Active ventilation, forced convection, direct heat exchange using fans
- Heat offtake through the cooler (is not taken into consideration)
- Heat offtake through the cooler (is not taken into consideration)

5.9.2 Intrinsic convection, heat transmission through the cabinet surface

- Closed design, no apertures for incoming or outgoing air
- Max. feasible power dissipation between 300 and 500 W, depending on cabinet size, form of installation and temperature difference
- The feasible power loss is reduced by approx. 15 % in the event of series assembly
- IP protection max. IP55 possible



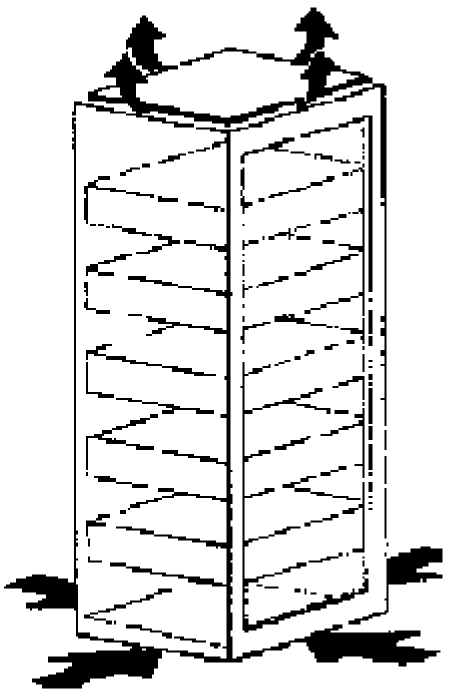
Calculation of the power loss that can be taken off

Po = k x A x (Ti - Tu) [W]

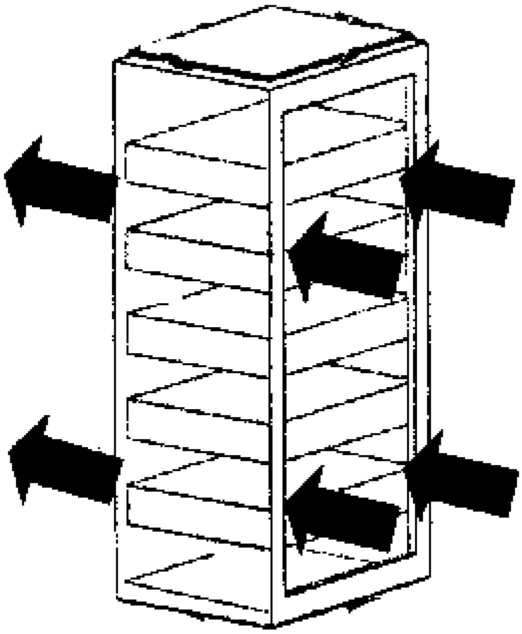
Po	power that can be taken off via the cabinet surface
k	Heat transfer coefficient (steel plate 5 W/m2K)
A	Effective cabinet surface, depending on the form of installation, for calculation see ”Calculation formula of the effective cabinet surface”
Ti	Inner temperature of cabinet
Tu	Ambient air temperature

5.9.3 Intrinsic convection with issue of the hot air from inside

- Open design, incoming air apertures on the base or door, waste air apertures in the roof
- Max.feasible power loss between 600 and 700 W, depending on cabinet size, form of installation and temperature difference
- The feasible power loss is reduced by approx. 10 % in the event of series assembly
- IP protection max. IP54 possible



Incoming air in the base, waste air in the roof

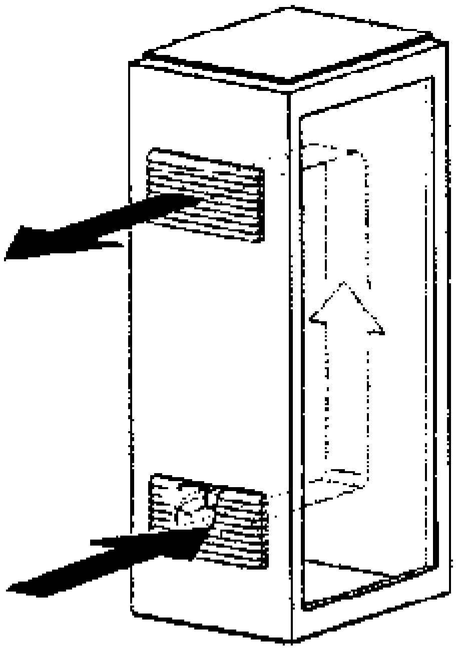


Incoming air from the front (side of door), waste air at the rear (aperture in door)

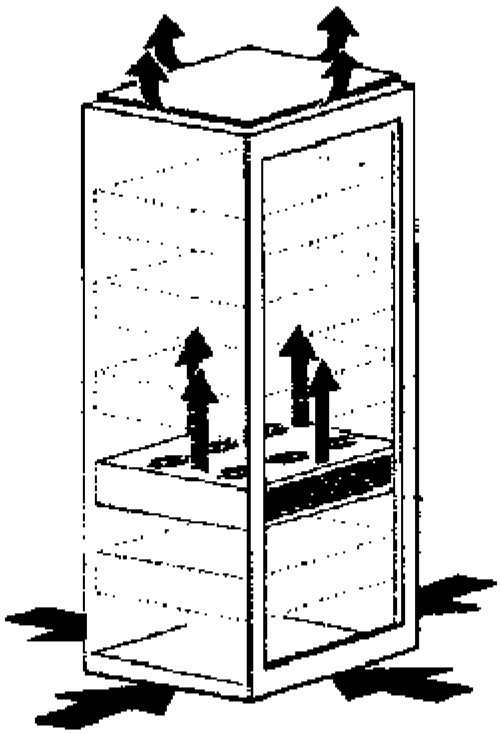
5.9.4 Forced convection, direct heat exchange using fans

- Open design
- Max. feasible power loss 1500 W, depending on fans in use (size, number) and temperature difference
- IP protection max. IP54 possible

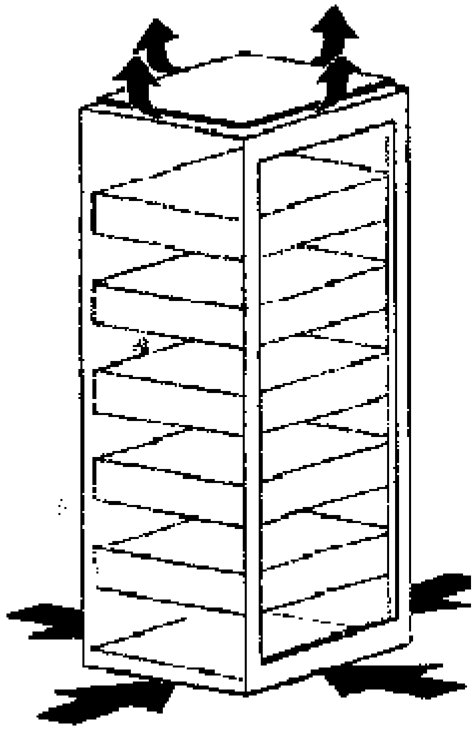
a) Filter fans



b) Fan operation



c) Roof fans



Calculation of the required volume flow

V = 4 x Pv / (Ti- Tu) [m3h]

V	Required volume flow
Pv	dissipation in the cabinet (heat output on the surface of the cabinet has been neglected)
Ti	Inner temperature of cabinet
Tu	Ambient air temperature

5.9.5 Thermal offtake by cooling device:

- Closed design
- Max. feasible power loss approx. 1000 W, depending on cabinet size, form of installation, air conditioning system and temperature difference
- IP protection max. IP54 possible

Calculation of the required cooling performance

Po = k x A x (Ti - Tu) [W]

Qk = Pv - Po [W]

Po	Power that can be taken off via the cabinet surface
k	Heat transfer coefficient (steel plate 5 W/m2K)
A	Effective cabinet surface, depending on the form of installation, for calculation see ”Calculation formula of the effective cabinet surface”
Ti	Inner temperature of cabinet

Tu	Ambient air temperature
Qk	Required cooling performance of the cooling device

5.9.6 Forced circulation due to heat exchanger (air/air)

- Closed design
- Max. feasible power loss approx. 1500 W, depending on cabinet size, form of installation and heat exchanger
- IP protection max. IP54 possible

Calculation of the required cooling performance

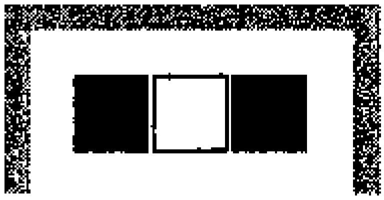
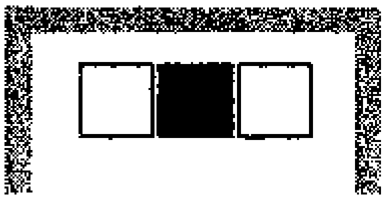
Po = k x A x (Ti - Tu) [W]

Qk = Pv - Po [W]

Po	Power that can be taken off via the cabinet surface
k	Heat transfer coefficient (steel plate 5 W/m2K)
A	Effective cabinet surface, depending on the form of installation, for calculation see ”Calculation formula of the effective cabinet surface”
Ti	Inner temperature of cabinet
Tu	Ambient air temperature
Qk	Required cooling performance of the cooling device

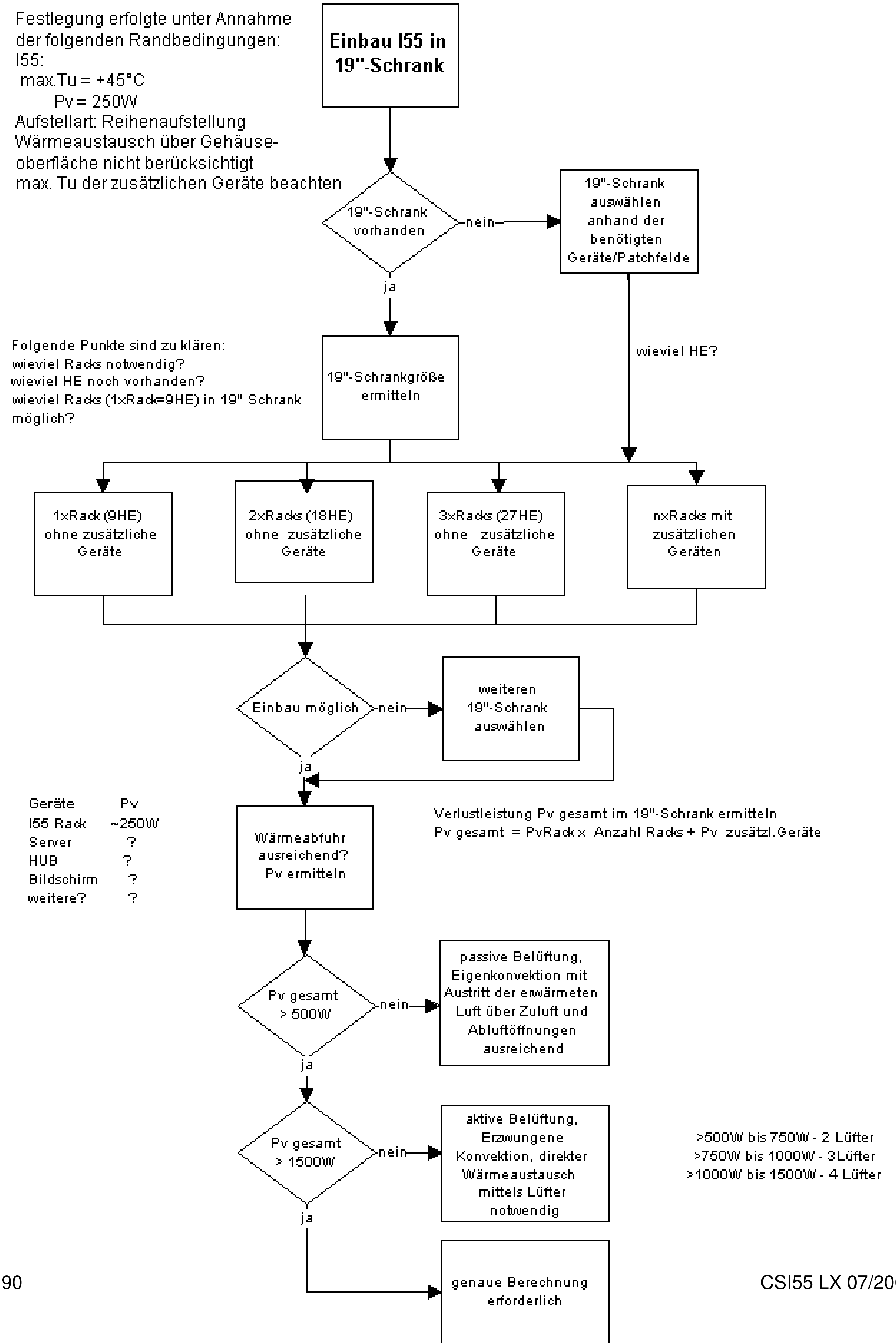
5.9.7 Calculation formula for the effective cabinet surface

	Individual casing, free-standing on all sides A = 1.8 x H x (W+D)+1.4 x W x D
	Individual casing for wall mounting A = 1.4 x W x (H+D)+1.8 x D x H

	Start-end casing, free-standing A = 1.4 x D x (H+W)+1.4 x W x H
	Start-end casing for wall mounting A = 1.4 x H x (W+D)+1.4 x W x D
	Central casing, free-standing A = 1.8 x W x H + 1.4 x W x D + D x H
	Central casing for wall mounting A = 1.4 x W x (H+D) + D x H

W = cabinet with
H = cabinet height
D = cabinet depth

5.9.8 Flow chart: Air conditioning in a 19”cabinet for the installation of I55



Flow chart

5.10 Universal installation aids

The universal installation aid consists of two round bolts with a groove running around and a M6 thread.

Section of cabinet, round bolts (1) and M6 thread (2)

This pins are screwed by hand into the upper mounting nuts on the left and right of the cabinet. Then grasp the rack by the bracket with one hand and underneath the rack with the other hand and place the cabinet on to the pins.

The mounting screws are screwed into the rack on the left and right sides, but are not tightened.
The round bolts are then crewed out of the upper part; the rack is raised slightly by the bracket in order to facilitate the removal of the bolts. Now screw in the upper screws and tighten, the lower screws are also tightened.

The upper mounting screws are removed and the bolts are fastened in order to remove a rack from the cabinet. The lower screws are then removed and the rack is raised carefully by the bolts.

	Take care that the lower section of the rack suspended from the bolts is always pressed with one hand against the cabinet, as the rack is only held by the nut on the bolt when on the pins.

The bolts are not enclosed with the system. They can be ordered separately.
The material number is: 4.999.054.358

The installation aids work in any cabinet in which the installations are attached using cage nuts M6.

	There is no counterpressure exerted against the insert screws M6 that run in the tracks (e.g. for Knürr cabinets), so that the screws may fall out.

The bracket used to collect the cable is also used as a grip. It is a standard part of each rack and remains attached.

	The bracket used to collect the cable should not be used as a grip for carrying during transport.

5.11 Integral- Com- Center- ICC- V 01

TS-DK networkcabinet DK 7821750 modified, reference number: : 4.999.089.755

Dimensions	
Width	800 mm
Height	2020 + 100 mm (42 U)
Depth	800 mm
Colour	
Surface execution	Profile frame rack in RAL 7044, electrophoresis immersion primer
Flat parts	RAL 7035 powder-coated texture

Further information can be found at Technology Portal/Data networks/System cabinets/ free-standing MDF.

5.12 Integral- Com- Center- ICC- V 33 F

TS-DK networkcabinet DK 7821.510 modified, reference number: 4.999.089.756

Dimensions	
Width	600 mm
Height	1600 + 100 mm (33 U)
Depth	800 mm
Colour	
Surface execution	Profile frame rack in RAL 7044, electrophoresis immersion primer

Flat parts	RAL 7035 powder-coated texture

Further information can be found at Technology Portal/Data networks/System cabinets/ free-standing MDF.

5.13 Integral- Com- Center- ICC- V 02

TS-DK networkcabinet DK 7821760 modified, reference number: 4.999.089.757

Dimensions	
Width	800 mm
Height	2020 + 100 mm (42 U)
Depth	900 mm
Colour	
Surface execution	Profile frame rack in RAL 7044, electrophoresis immersion primer
Flat parts	RAL 7035 powder-coated texture

Further information can be found at Technology Portal/Data networks/System cabinets/ free-standing MDF.

6 Power supply

General Points

In principle, all modules can be connected to the mains voltage of

230 V, 50 Hz and 60 Hz

The fuse protection for **every** electric circuit consists of a C Type 16 A slow acting automatic circuit breaker. Doubled PS must be fed by separate circuits (phase and fuse).

4 different power supply modules are available, used according to module or application: The same type of power supply unit is used for the two devices in the 19" rack, the CSI55 and the ICS.

Power supply CSI55 and ICS (19" racks)

- PSL55

For projects an adaption set - see PS350 Adaption → 94 In the ICS this set cannot be used.

Power supply units for the B3 module

- Direct feed PS280A (only B3 module)
- PS350A for reserve battery operation, doubling (for B3 module)
- Additional ISPS power supply for B3 module with more than 10 connected modules

The power supply boards PS280A and PS350A are connected to the designated slots on the B3 module.

	Redundant doubling of the PS in the B3 module can only be done using the PS350A.

In the B3 module, the supplementary ISPS power supply may only be used in the appropriate slot.

The supplementary ISPS power supply module is made up of two similar DC/DC converters. It is supplied with -48 V from two PS350As.

6.1 19"rack

/>

The following power supply units are used in the 19" rack:

- PSL55 → 122
- PS350A → 124 combined with PS350 Adaption (not in the ICS)

For the installation of the PS350A the

6.1.1 PS350 Adaption

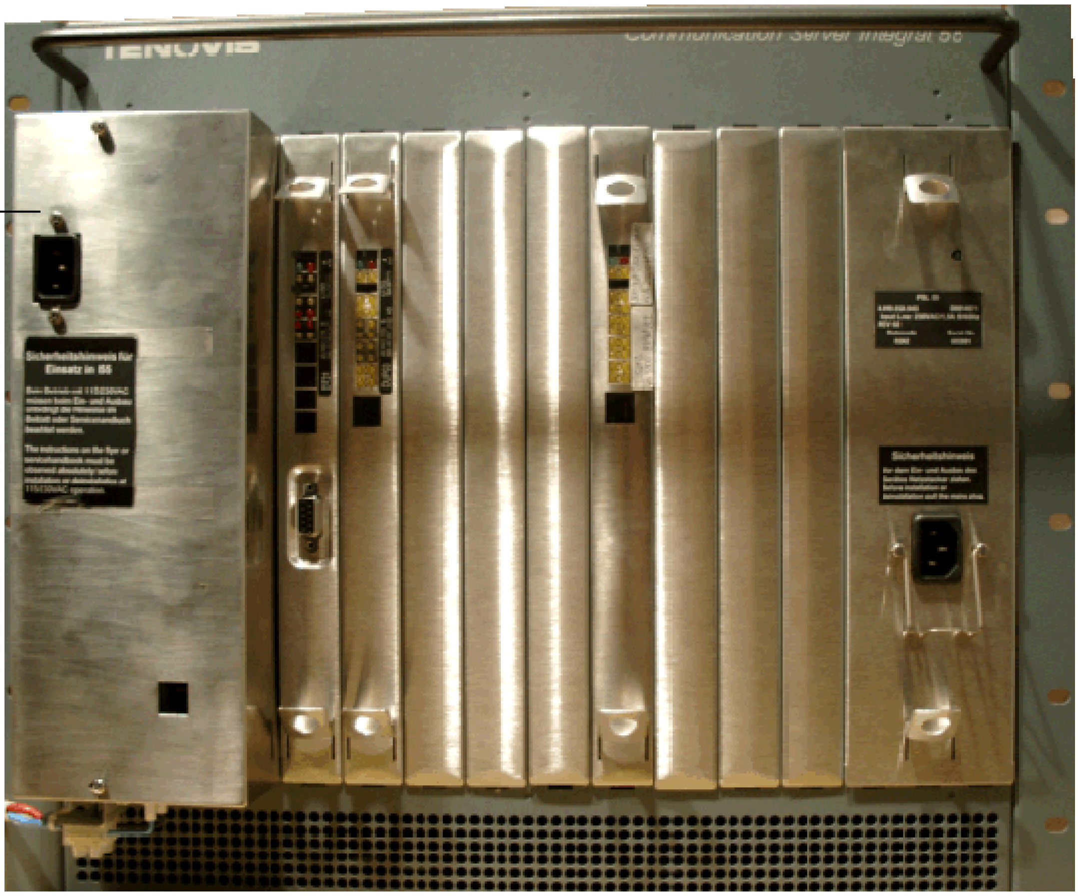
By means of a special adaption set a PS350A can be installed in the Integral 55 rack. The installation is done on the left side (front side). The first connecting circuit slot is lost.

The PS350A can be operated with both 48V and with 230 V, 50/60 Hz or 115 V, 60 Hz mains voltage. The electrical values of the PS350A are shown under PS350A, Technical data → 124

In combination with the PSL55, ringing voltage frequency 50 Hz, the PS350A can be operated as a redundant power supply.

	Assembly kit 1 or 2 has to be included in the order for the installation of the PS350A. It comprises the cover plate, filter, internal wiring and installation material.

1.



1. PS350 Adaption

Six assembly kits have been defined:

1. Assembly kit for 48V power supply with 50/25 Hz AC ringing voltage, material number: 49.9907.8083
2. Assembly kit for 230V/115V AC power supply with 50/25 Hz AC ringing voltage, material number: 49.9907.6490
3. Assembly kit fuse clamp for 19” cabinet, material number: 49.9907.7417
4. Assembly kit fuse clamp for standing casing, material number: 49.9907.7416
5. Assembly kit for expansions (19” cabinets and standing casings), material number: 49.9907.7419
6. Installation kit, material number: 49.9907.4791

The installation procedures during operation vary depending on the different application cases:

Failure and replacement of the PS350A in the case of redundant power supply or retrofitting of the PS350A	
PBX only with mains voltage 230V/115V	
Activity	**Note / Necessary auxiliary means**
Disconnection of 230V/115V	
Removal of the defective PS350A	
Connection of 230V/115V to a new PS350A	Mains cable with protective conductor required! Contained in assembly kit 2.
Insertion of the preloaded PS350A	
Disconnection of 230V/115V by removing the mains cable	
Install cover assembly kit	Installation kit 2
Connection of 230V/115V to PS350A cover	Mains cable without protective conductor (contained in assembly kit 6), or combination of mains cable with protective conductor and adapter cable

Failure and replacement of the PS350A in the case of redundant power supply or retrofitting of the PS350A	
System with 48V battery voltage	
Activity	**Note / Necessary auxiliary means**
Put the switch to OFF	
Disconnection of -48V	
Removal of the defective PS350A	
Put the switch of the new PS350A to OFF	
Connection of the -48V battery voltage; Screw cable to cover clamps	
Put the battery plug of the cover into the PS350A	
Put the switch to ON, preloading of the PS350A	
Insertion of the preloaded PS350A	
Install cover assembly kit	Installation kit 1

Failure and replacement of the PS350A in the case of redundant power supply or retrofitting of the PS350A
System with 230V and 48V battery voltage
Here, preference should be given to preloading using the 48V battery voltage. The installation/replacement is done with assembly kit 1.

6.1.1.1 Installation

Startup procedure of a PS350A in Integral 55

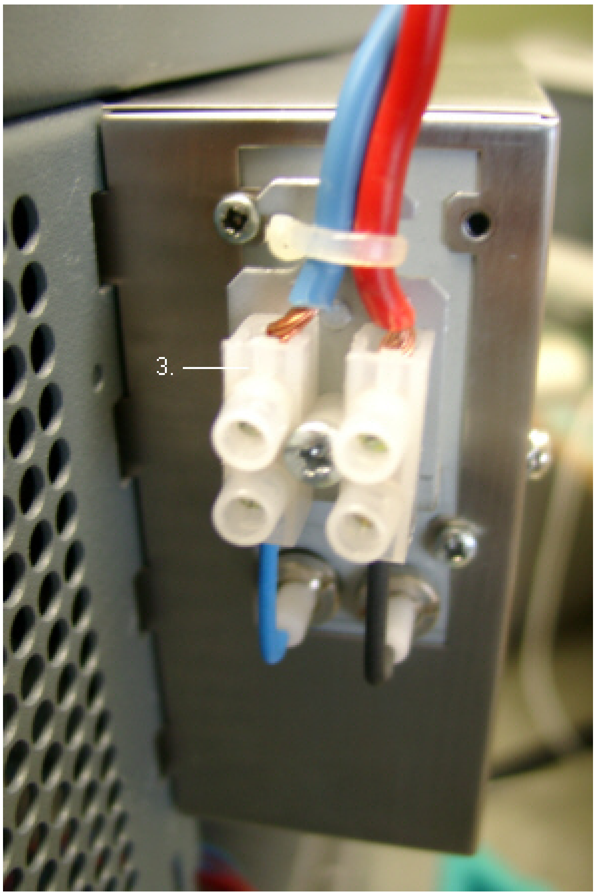
The startup procedure of a PS350A in I55 is as follows:

1. Simple power supply with PS350A
   - Installation of the PS350A
   - Connection of 230V
   - Put the switch to off
   - Connection of -48V
   - Put the switch to on
2. Redundant power supply with PS350A and PSL55
   - Installation of the PS350A
   - Connection of 230V
   - Put the switch to off
   - Connection of -48V
   - Put the switch to on
   - Installation of the PSL55
   - Connection of 230V
3. Failure and replacement of the PS350A in the case of redundant power supply
   - Put the switch to off
   - Disconnection of -48V
   - Disconnection of 230V
   - Removal of the defective PS350A
   - Put the switch of the new PS350A to off
   - Connection of -48V (preloading of the PS350A), hast to be preloaded with -48V because 230V must not be used due to the interruption of the protective conductor (PE).
   - Installation of the PS350A
   - Connection of 230V

Installation PS350 Adaption

1. Insert the PS350A into the slot
2. Screw the separators at the top and at the bottom (1.) into the rack.

3. Connect the wire ends for
   - 230V (1.)
   - -48V to the PS350A (2.) and
   - -48V to the clamps (3.).



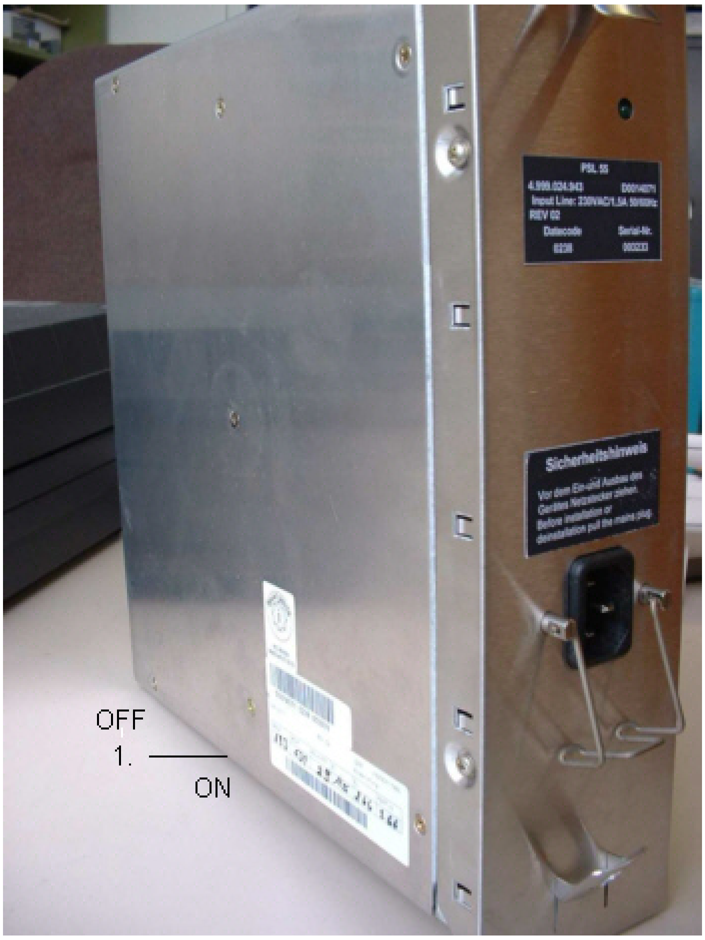
Put the cover onto the rack and screw it at the top and at the bottom (1).

6.1.1.2 Switching off the ringing current PSL55

The power supply unit PSL55 can be operated in conjunction with a PS350A Rev 02.

If it is necessary to ring with 72VAC/25Hz, the ringing current output on the PSL55 must be switched off so that the ringing current generator of the PS350A 72VAC/25Hz can be activated, see Ringing current switchover PS350A → 102.

This is done by means of the switch located on the underside of the PSL55. The switch must be placed in the direction of the multiple socket.



1. Ringer switch

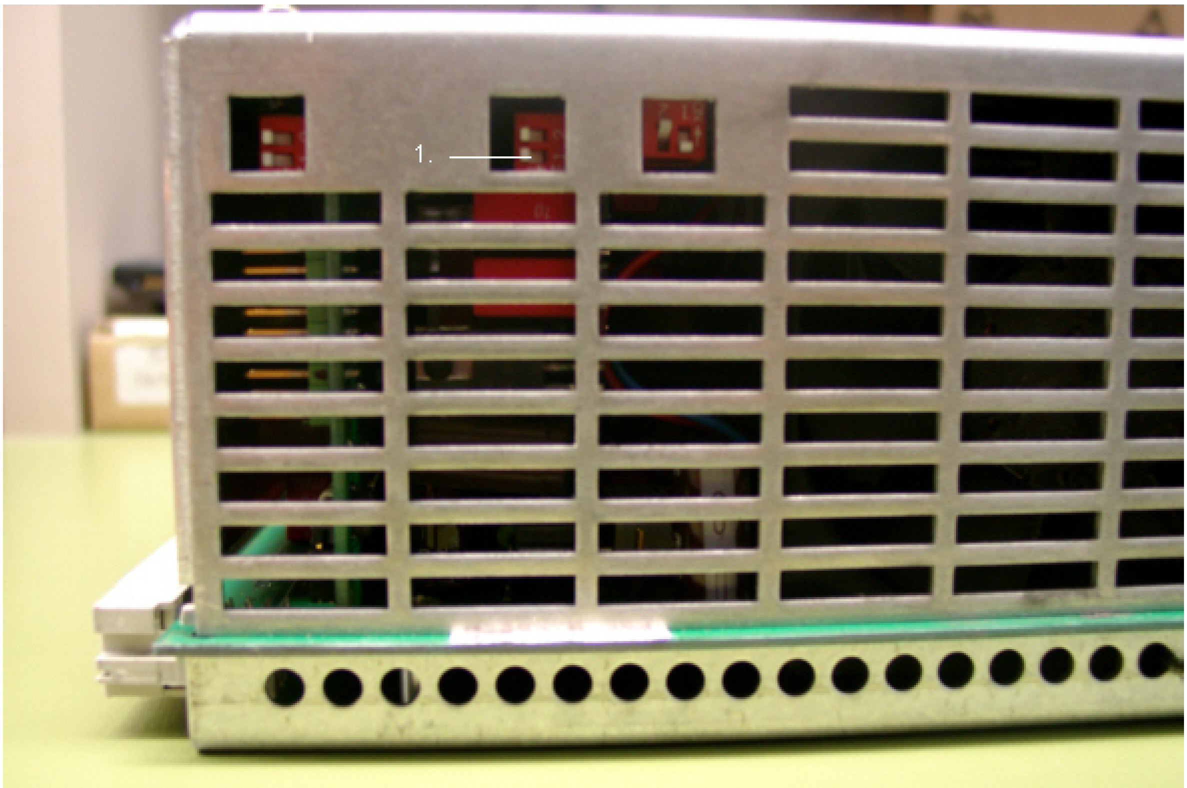
The supplied sticker must be attached to the PSL55.

6.1.1.3 Ringing current switchover PS350A

The power supply unit PS350A Rev 02 can be operated in conjunction with the PSL55.

If it is necessary to ring with 72VAC/25Hz the ringing current output on the PS350A must be switched from ringing voltage frequency 50 Hz to 25 Hz, see also Switching off the ringing current PSL55 → 101.

This is done by means of the switch located on the underside of the PS350A.



PS350A, underside

1. Switch for ringing voltage frequency

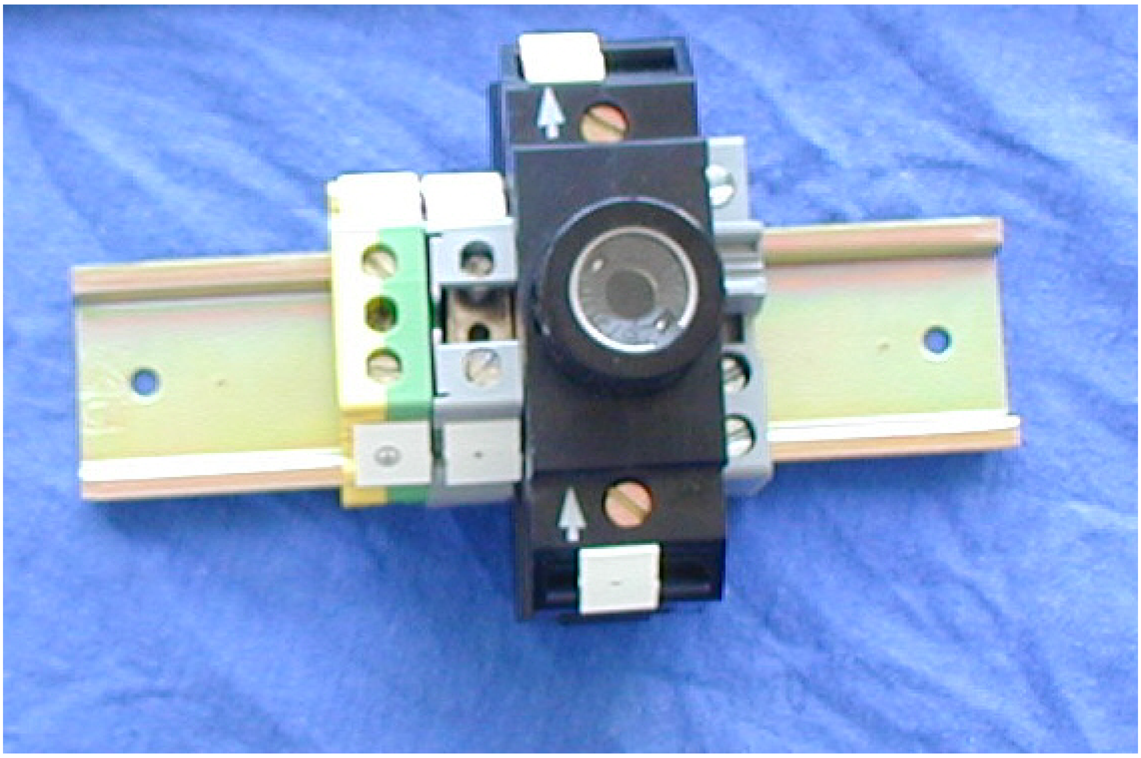
The instructions are shown on the side panel of the housing.

PS350A

1. PS350A
2. Instruction plate

6.1.1.4 48V in cabinet

There is a fuse clamp for 19” cabinet for the connection of the -48V voltage in the cabinet.



The fuse clamp can be extended by up to four connecting options.

In the standing casing the fuse clamp is mounted as shown in the picture.

6.1.1.5 Special aspects

The following points should be noted in the case of redundant power supply with PS350A:

- It is not possible to have redundant 48V supply in one rack. Only one PS350A can be plugged.
- The switchover time of the ringing voltage generators in the event of failure of a generator is approx. 20 ms from PS350A to PSL55 and approx. 200 ms from PSL55 to PS350A. This might disconnect an analogue connection that is in the calling state at that time.
- A redundant operation mode of the ringing voltage is not possible for the 25 Hz setting (for redundant power supply the ringing voltage must be deactivated on the PSL55).
- Fault signalling is not assigned unequivocally to the power supply unit and is also created twice.
- A special configuration and identification of the first connecting circuit slot is required for the use of the PS350A in CAT and IMS.
- When plugging or unplugging the PS350A a special startup procedure has to be followed.

Please note also the connection of the

6.1.2 FPE in cabinets

Connect the copper wire (FPE=green/yellow, greater/equal 2.5 mm2) to the earthing rail in the 19” cabinet.

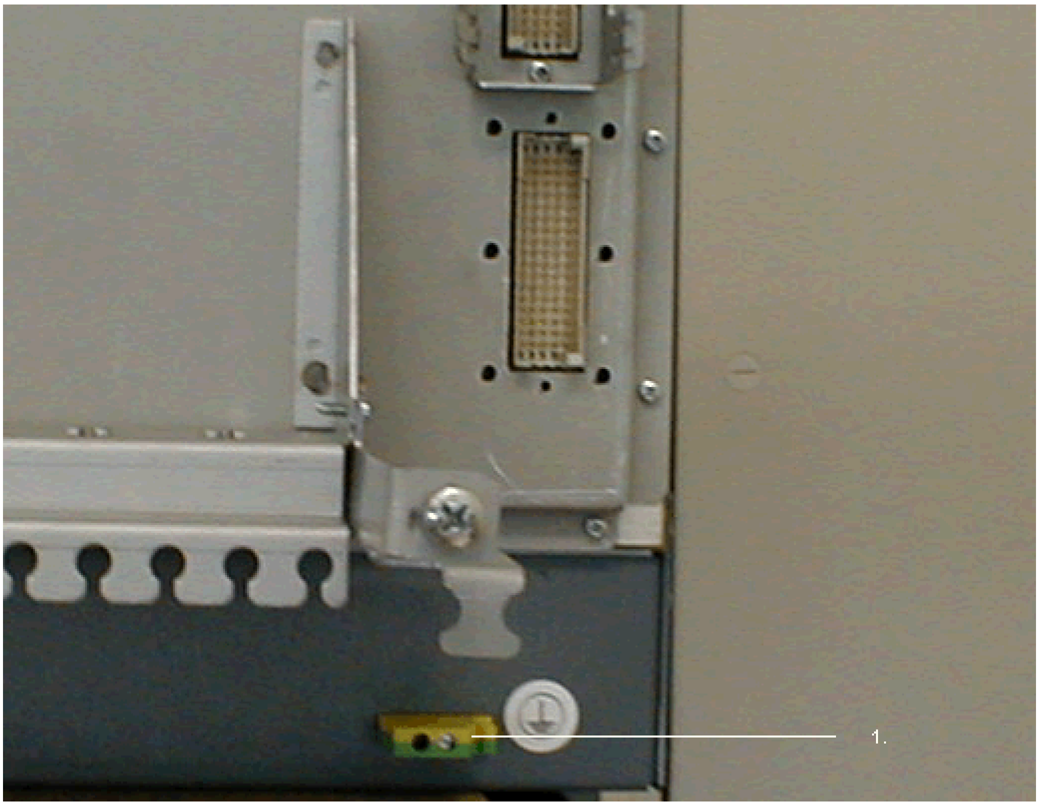
There is a clamp on the base of the standing casing for the copper wire.

All racks must be earthed via a separately routed protective conductor. Earthing via the protective conductor of the power cord does not suffice.

The protective conductor has a green-yellow insulating jacket and a minimum cross-section of 2.5 mm2.

It is clamped to:

- The earthing rail (19” cabinet) or ground clamp (standing casing).
- The ground clamp on the rear side depicted in the following diagram.



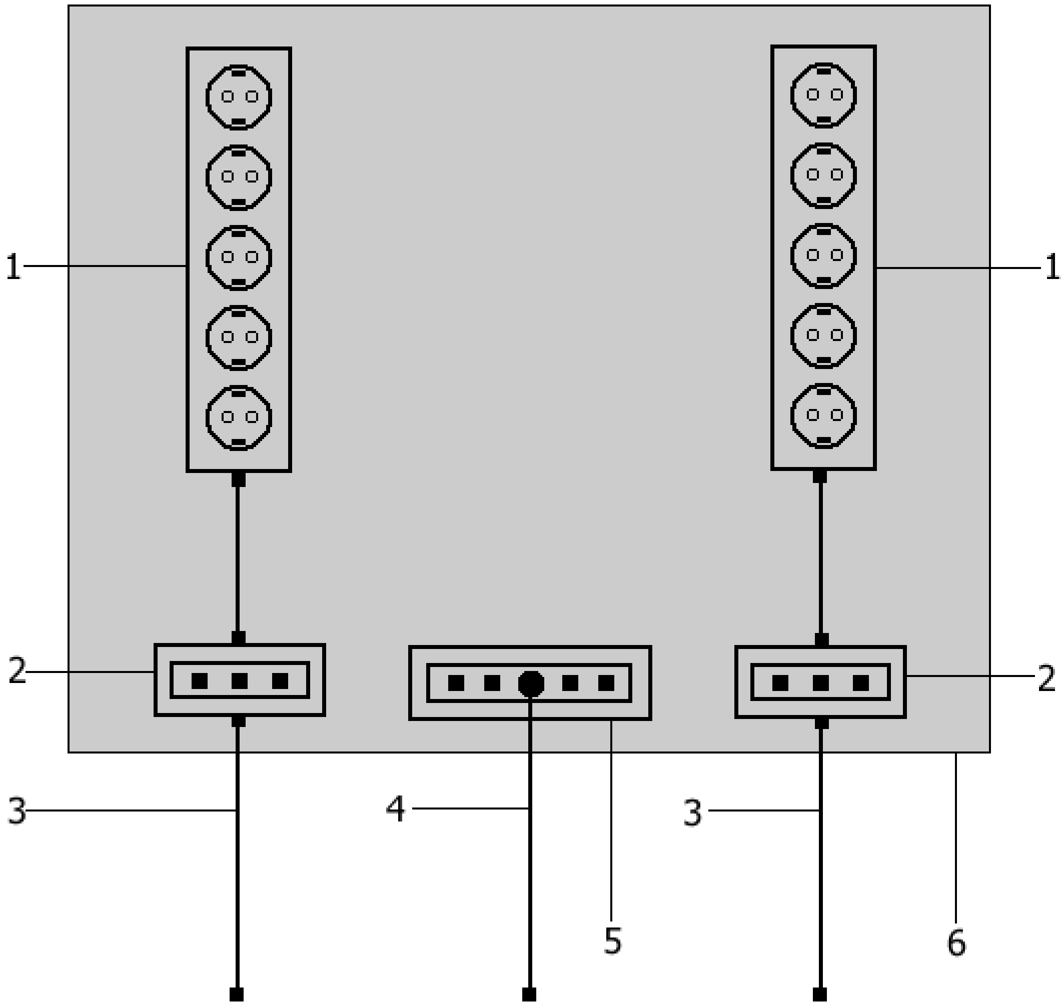
Section of the rear of the rack

1. Ground clamp

6.1.2.1 19”cabinet

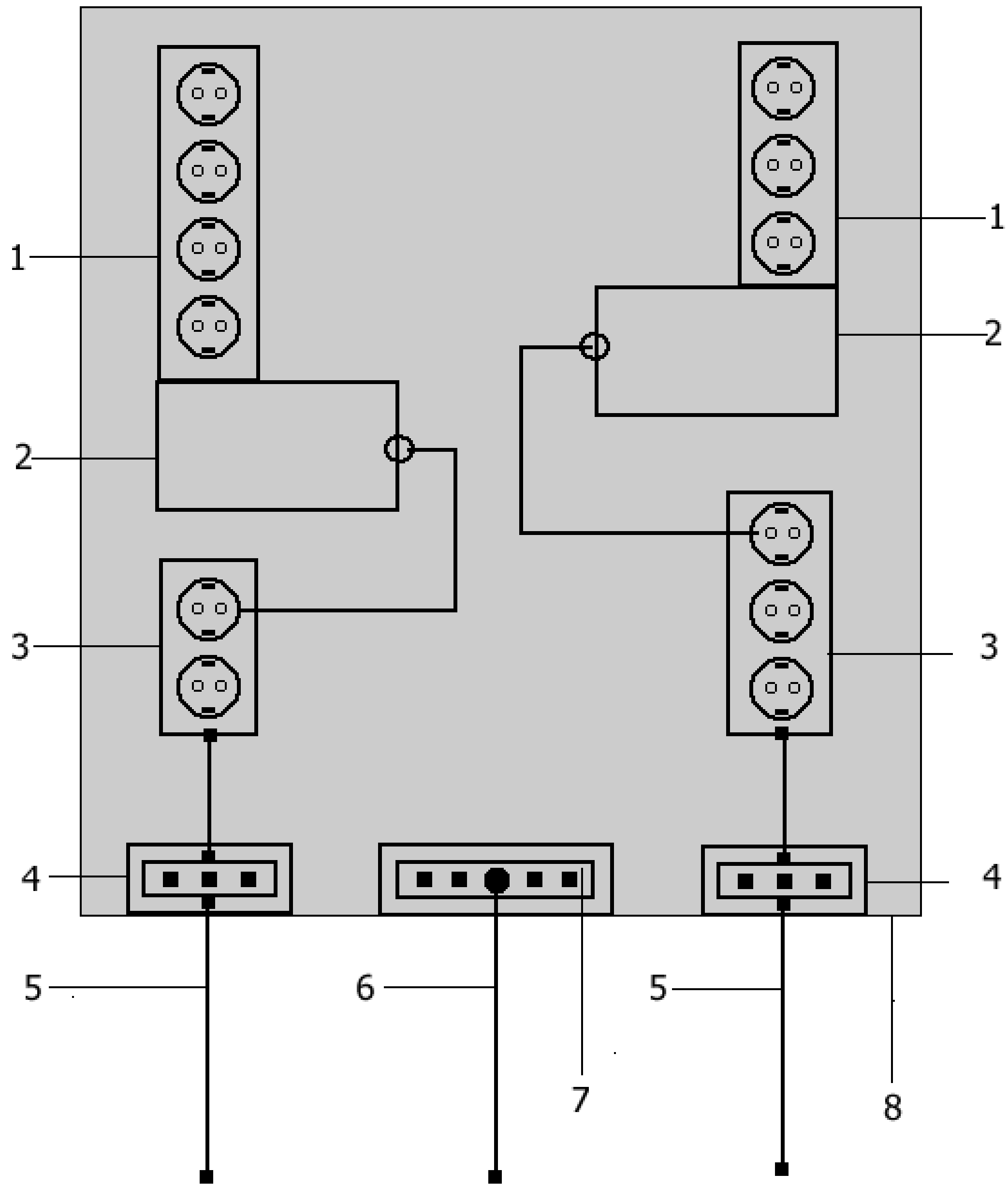
The general information of the earthing concept must be taken into account. In the following you will see graphic presentations of various configurations and their earthing measures.

Arrangement in 19” cabinet without UPS or with UPS outside the cabinet



1. Multiple sockets
2. Junction boxes in the cabinet
3. **For mains connection:**Fixed connection with separation option
   e.g. cable 49.9906.7592 with CEE plug
   For UPS: Connecting cable UPS system/cabinet 49.9906.8660
4. Potential equalisation conductor (PA) leads to the potential equalisation bar of the electrical installation of the building minimum 6 mm2
5. Potential equalisation bar cabinet
6. Cabinet housing

Arrangement in a 19” cabinet with UPS systems in the cabinet



1. Multiple socket of the UPS system
2. UPS system
3. Multiple socket in the cabinet
4. Junction box in the cabinet
5. Fixed connection with separation option, e.g. cable 49.9906.7592 with CEE plug
6. Potential equalisation conductor (PA) min. 6 mm2 to potential equalisation bar of electrical installation of the building
7. Potential equalisation bar cabinet
8. Cabinet

CSI55 and other devices such as servers can be connected to the sockets of the upper or lower configuration.

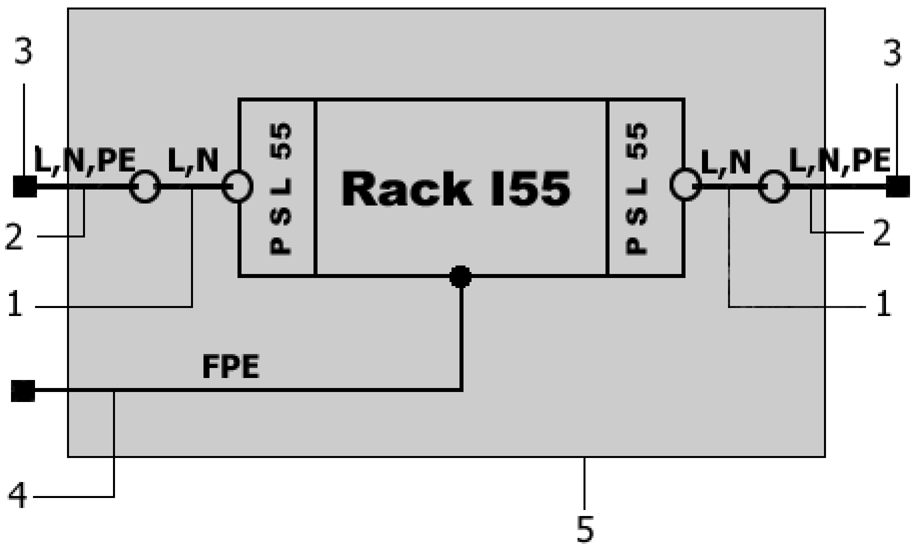
⚠	An intermediate cable with material number 29.4752.3540 must be used to connect the PSL55 power supply unit.

The mains cable, e.g. 27.4752.1003 is then connected to this intermediate cable that only has L and N conductors. The mains cable has L, N and PE.

The mains cable can then be connected to the mains connection for example via the multiple socket in the cabinet.

6.1.2.2 Standing casing

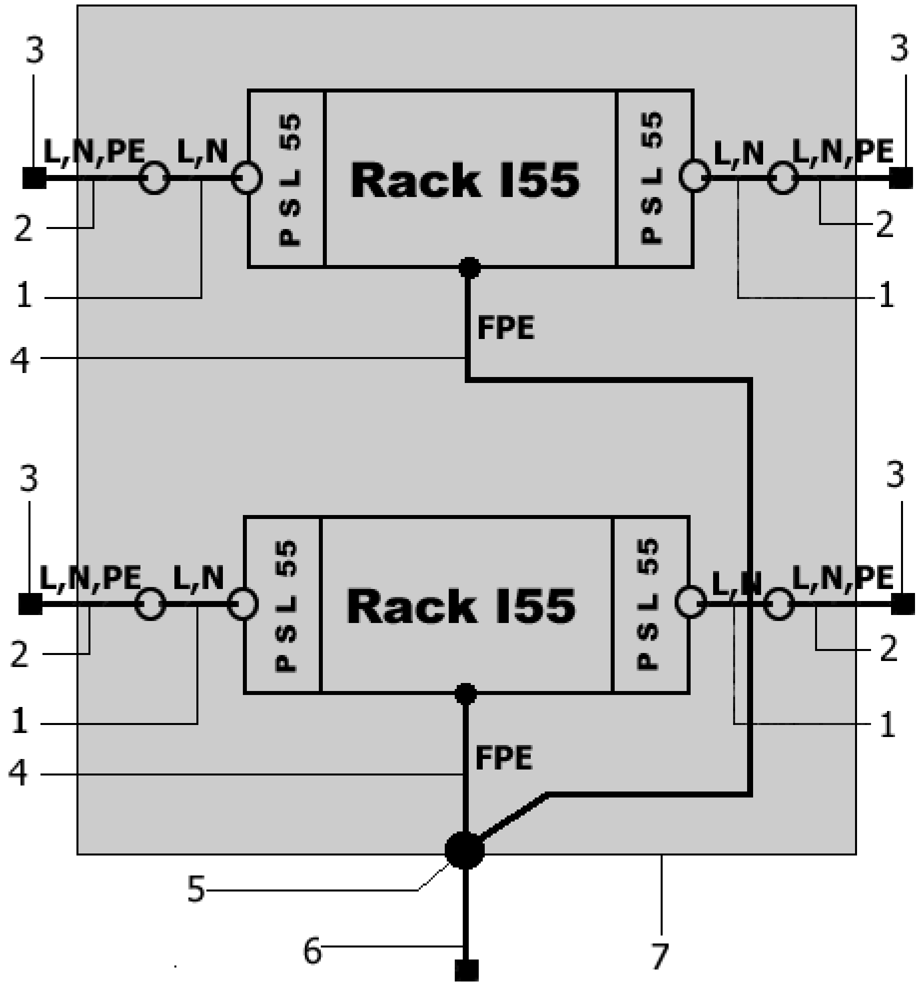
Connection of a rack in the standing casing (C1 module)



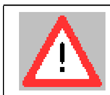
1. Intermediate cable 29.4752.3540
2. Mains cable, e.g. 27.4752.1003
3. Mains connection circuit or UPS connection
4. Lockable earth plug with cable 49.9804.5750
5. Cabinet

⚠	The lockable earth plug with cable 49.9804.5750 is only used in C1 modules!

Connection of two racks in the standing casing (C2 module)



1. Intermediate cable 29.4752.3540
2. Mains cable, e.g. 27.4752.1003
3. Mains connection circuit or UPS connection
4. FPE conductor min. 2.5 mm2
5. Potential equalisation bolt on standing casing
6. Potential equalisation conductor (PA) min. 6 mm2 to potential equalisation bar of electrical installation of the building
7. Cabinet

	An intermediate cable with material number 29.4752.3540 must be used to connect the PSL55 power supply unit.

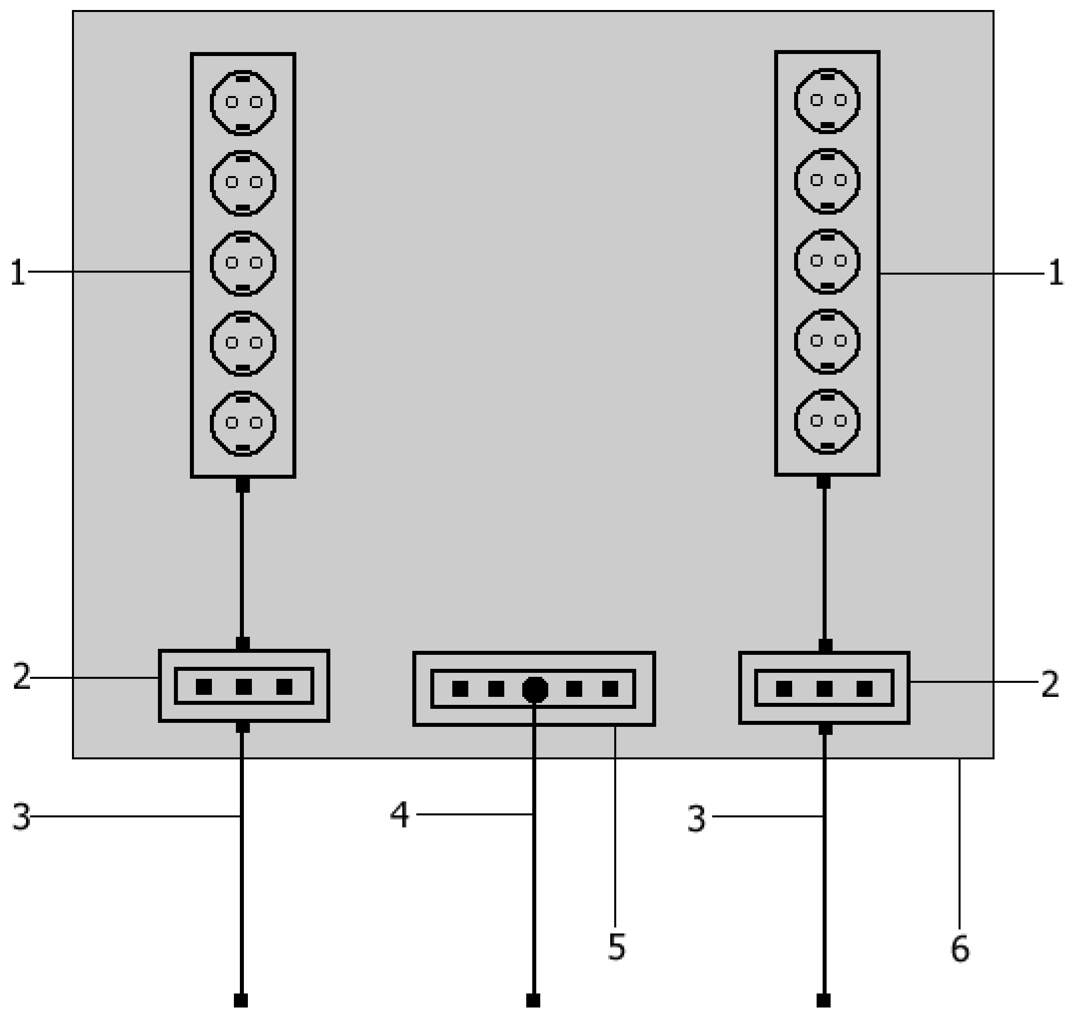
The mains cable, e.g. 27.4752.1003 is then connected to this intermediate cable that only has L and N conductors. The mains cable has L, N and PE.

The mains cable can then be connected to the mains connection for example via the multiple socket in the cabinet.

6.1.2.3 Housing/Cabinet solutions

The general information of the earthing concept must be taken into account. In the following you will see graphic presentations of various configurations and their earthing measures.

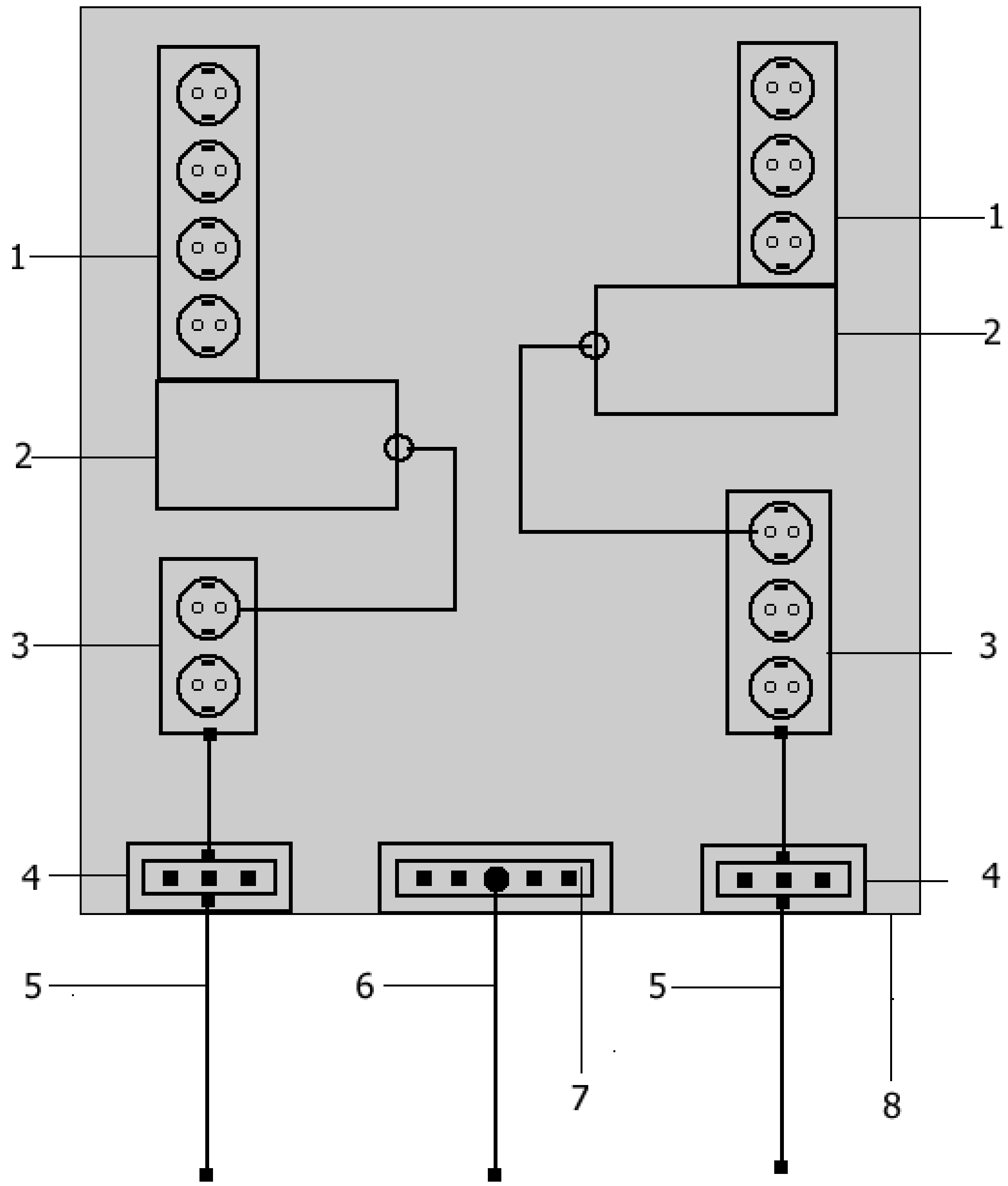
Arrangement in 19" cabinet without UPS or with UPS outside the cabinet



1. Multiple sockets
2. Junction boxes in the cabinet
3. **For mains connection:**Fixed connection with separation option
   e.g. cable 49.9906.7592 with CEE plug
   For UPS: Connecting cable UPS system/cabinet 49.9906.8660

4. Potential equalisation conductor (PA) leads to the potential equalisation bar of the electrical installation of the building minimum 6 mm2
5. Potential equalisation bar cabinet
6. Cabinet housing

Arrangement in a 19” cabinet with UPS systems in the cabinet



1. Multiple socket of the UPS system
2. UPS system
3. Multiple socket in the cabinet

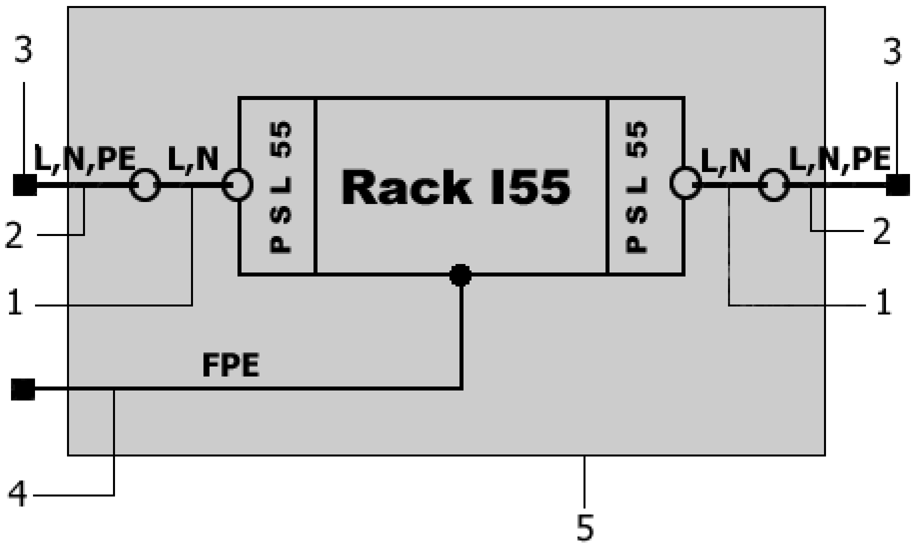
4. Junction box in the cabinet
5. Fixed connection with separation option, e.g. cable 49.9906.7592 with CEE plug
6. Potential equalisation conductor (PA) min. 6 mm2 to potential equalisation bar of electrical installation of the building
7. Potential equalisation bar cabinet
8. Cabinet

	An intermediate cable with material number 29.4752.3540 must be used to connect the PSL55 power supply unit.

The mains cable, e.g. 27.4752.1003 is then connected to this intermediate cable that only has L and N conductors. The mains cable has L, N and PE.

The mains cable can then be connected to the mains connection for example via the multiple socket in the cabinet.

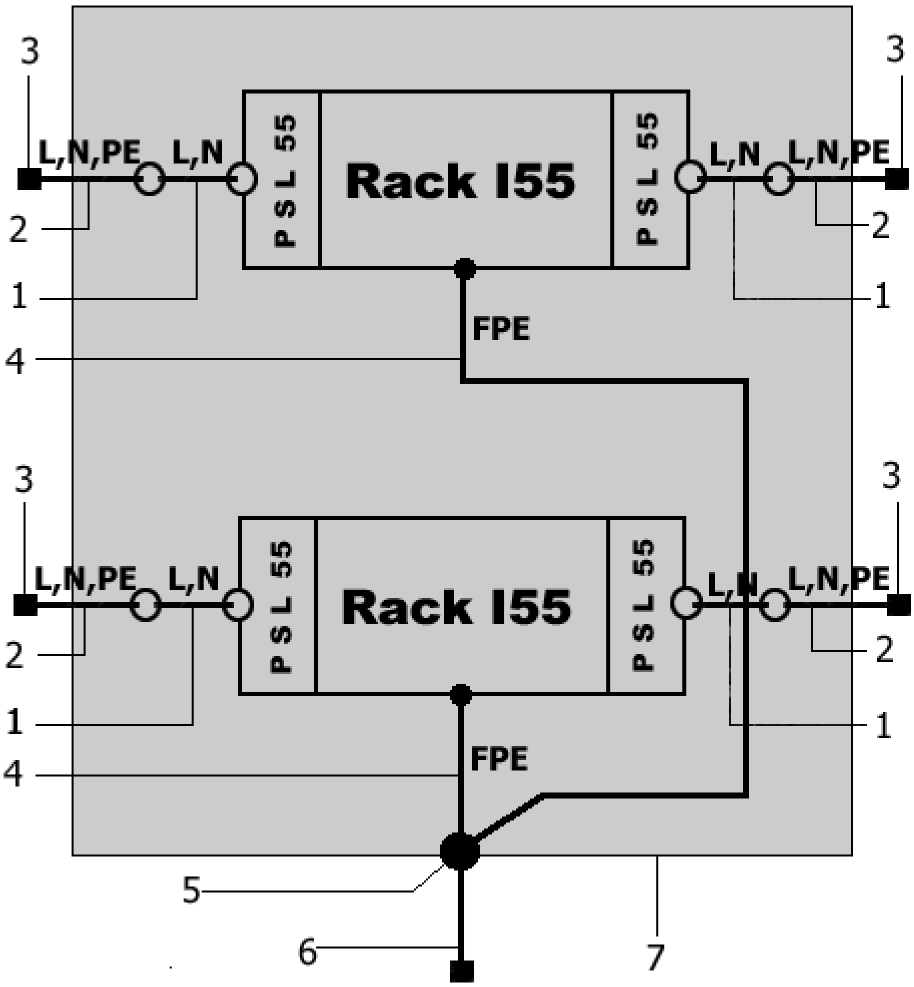
Connection of a rack in the standing casing (C1 module)



1. Intermediate cable 29.4752.3540
2. Mains cable, e.g. 27.4752.1003
3. Mains connection circuit or UPS connection
4. Lockable earth plug with cable 49.9804.5750
5. Cabinet

	The lockable earth plug with cable 49.9804.5750 is only used in C1 modules!

Connection of two racks in the standing casing (C2 module)



1. Intermediate cable 29.4752.3540
2. Mains cable, e.g. 27.4752.1003
3. Mains connection circuit or UPS connection
4. FPE conductor min. 2.5 mm2
5. Potential equalisation bolt on standing casing
6. Potential equalisation conductor (PA) min. 6 mm2 to potential equalisation bar of electrical installation of the building
7. Cabinet

.

6.2 B3 module

The following power supply units are used in B3 modules:

- PS280A → 123
- PS350A → 124
- ISPS (IMTU Supplementary Power Supply) → 125

The connection of 230V and 48V is made in the

6.2.1 Fuse Panels

Connection to the Supply Circuit

The B3 module is suitable for connection to 230 Volt alternating mains voltage or 48 Volt direct voltage or both. The modules may have more than one connection to the supply circuit.

Operation with Battery or External 48 Volt Direct Current Voltage

The connecting cables for the battery or the external 48 Volt direct current voltage supply to the 1/2 kg rack must have a minimum cross-section of 6 mm2.

Depending on the cable length, higher cable cross-sections may be required to prevent the voltage drop from exceeding the permissible values.

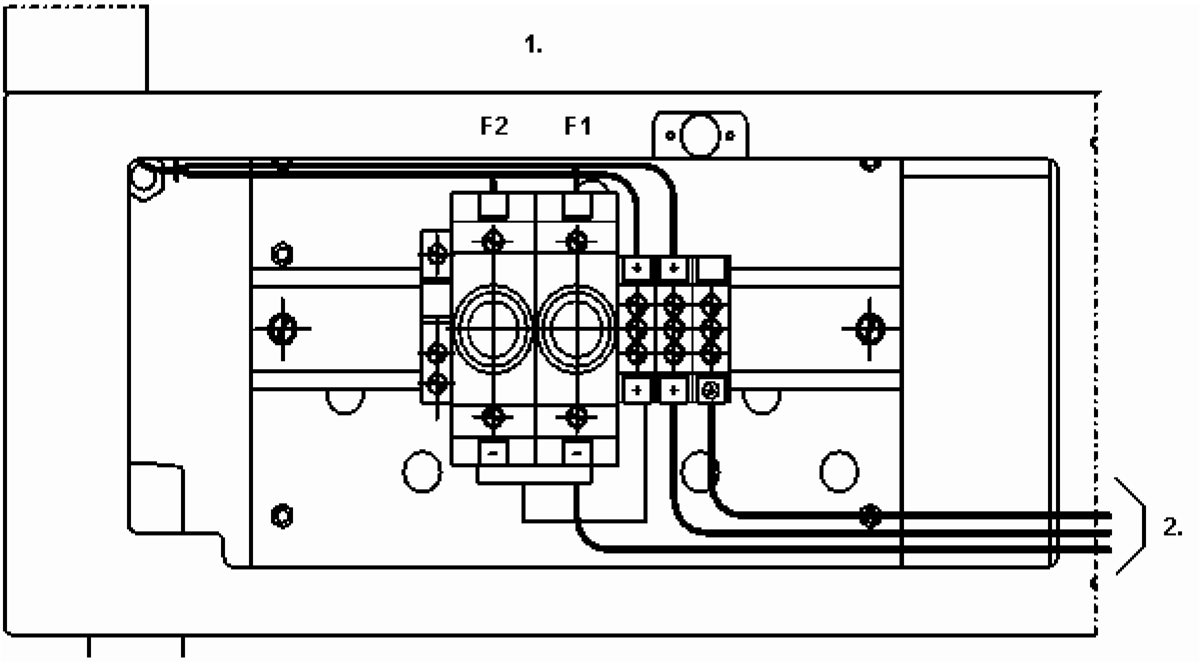
If the system is supplied by an external 48 Volt direct current voltage source, this must be safely isolated from the mains voltage and correspond with the classification for SELV. A suitable, easily accessible disconnecting device which corresponds to the current values above is to be provided in the supply circuit.

Protective Earthing

All modules must generally be earthed via a separately routed protective conductor. Earthing via the protective conductor of the power cord does not suffice.

The protective conductor must have a green-yellow insulating jacket and a minimum cross-section of 2.5 mm2 if mechanical protection is present, or 4 mm2 if this is not the case. More detailed information can be found in the “Earthing concept” section.

6.2.1.1 Fuse panel -48 V 1/2 K rack

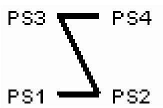


Fuse panel -48V 1/2 K rack

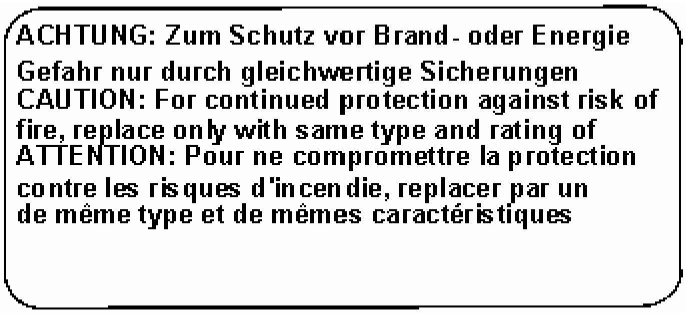
1. Fuses F1 to F2 DIAZET Type USED 16, S16 A/500 V, time-lag
2. From primary current supply

	F 1	F 2
PS 1	o	
PS 2		o
PS 3	x	
PS 4		x

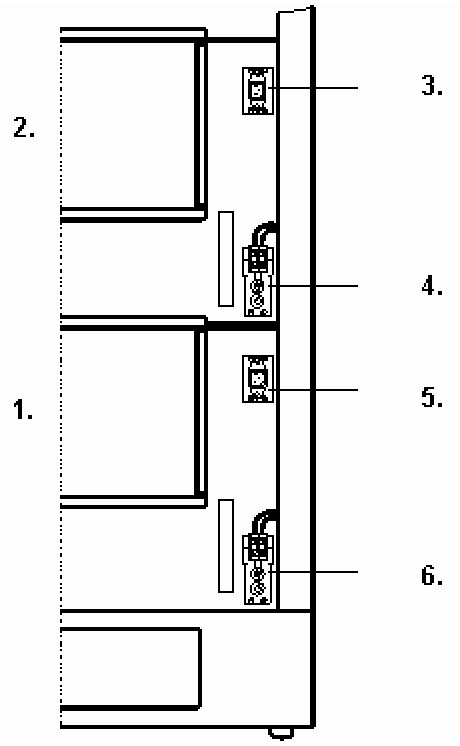
o = Single PS x = Doubled PS



Sequence pattern of PS1 to PS4 (front view)



Text on label



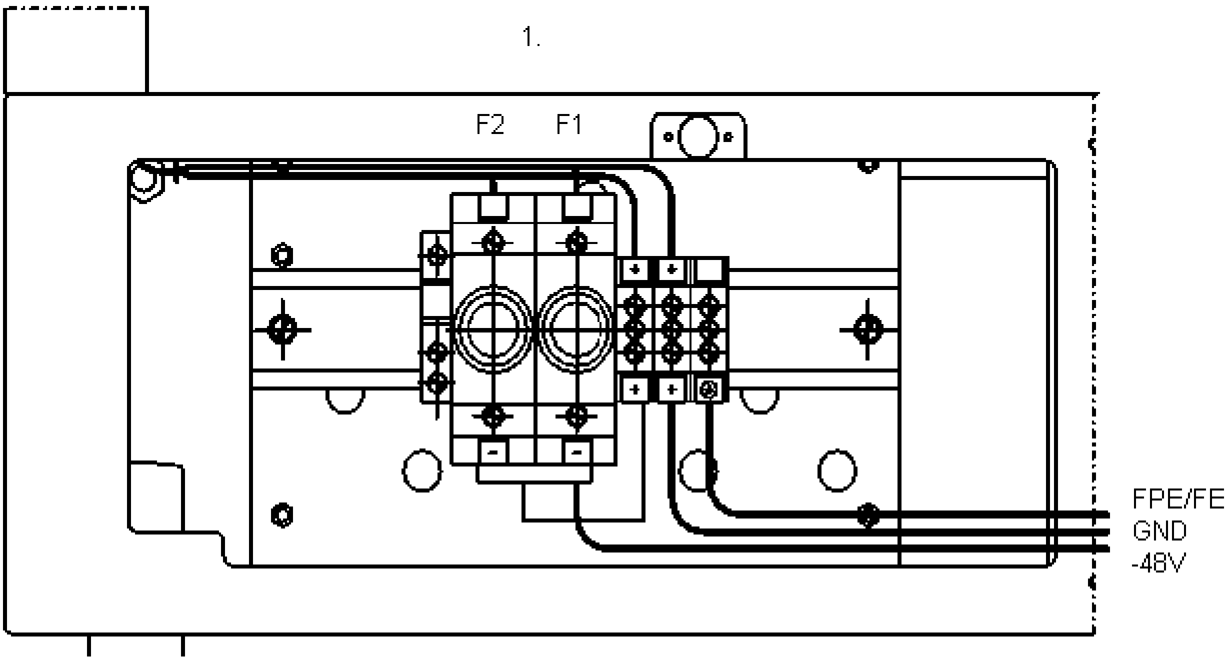
Rear view of the 1/2 K rack

1. first B3 module
2. second B3 module
3. Mains supply assembly kit B1, B3 230V 29.5630.8061
   or
   Mains supply assembly kit B3 230V 29.5630.8071
   for power supply second B module (PS2)
4. UPS operation assembly kit B1, B3 -48 V 29.5630.8081
   or
   UPS operation assembly kit B1E -48V 29.5630.8091
   for power supply second B module (PS2)
   or
   assembly kit -48V doubling of B modules 29.5630.830
5. Mains supply assembly kit B1, B3 230V 29.5630.8061
   for power supply first B module (PS1)

6. UPS operation assembly kit B1, B3 -48V 29.5630.8081
   for power supply first B module (PS1)
   or
   assembly kit -48V doubling of B modules 29.5630.8301

6.2.1.2 Connecting the Battery

Move the battery switch to position 0 on all inserted PS350 power supply units. The battery switch is located on the front panel of the unit.
Disconnect the battery connection (e.g. remove the -48V fuse in the battery compartment).
Strip the end of the cable (approx. 15 cm). Feed the connecting cable from the battery into the console. Strip the ends of both wires.
Clamp the red wire (GND) and the blue wire (-48 V) to the terminals on the locking plate illustrated.



1. Console, section of the front side

6.2.1.3 Cross-section of the cable between the B3 module and the battery

	Fuse as per standard value						
Simple distance	**16 A**	**20 A**	**25 A**	**32 A**	**50 A**	**63 A**	**80 A**
2 m	2.5 mm2	2.5 mm2	2.5 mm2	2.5 mm2	4 mm2	6 mm2	6 mm2
4 m	2.5 mm2	4 mm2	4 mm2	6 mm2	10 mm2	10 mm2	16 mm2
6 m	4 mm2	6 mm2	6 mm2	10 mm2	16 mm2	16 mm2	35 mm2
8 m	6 mm2	6 mm2	10 mm2	10 mm2	16 mm2	25 mm2	35 mm2
10 m	6 mm2	10 mm2	10 mm2	16 mm2	25 mm2	25 mm2	35 mm2
12 m	10 mm2	10 mm2	16 mm2	16 mm2	25 mm2	35 mm2	35 mm2
14 m	10 mm2	16 mm2	16 mm2	25 mm2	35 mm2	35 mm2	50 mm2

	Fuse as per standard value						
Simple distance	**16 A**	**20 A**	**25 A**	**32 A**	**50 A**	**63 A**	**80 A**
16 m	10 mm2	16 mm2	16 mm2	25 mm2	35 mm2	50 mm2	50 mm2
18 m	16 mm2	16 mm2	25 mm2	25 mm2	35 mm2	50 mm2	70 mm2
20 m	16 mm2	16 mm2	25 mm2	25 mm2	50 mm2	50 mm2	70 mm2
22 m	16 mm2	16 mm2	25 mm2	35 mm2	50 mm2	50 mm2	70 mm2
24 m	16 mm2	25 mm2	25 mm2	35 mm2	50 mm2	70 mm2	70 mm2
26 m	16 mm2	25 mm2	25 mm2	35 mm2	50 mm2	70 mm2	95 mm2
28 m	25 mm2	25 mm2	35 mm2	35 mm2	70 mm2	70 mm2	95 mm2
30 m	25 mm2	25 mm2	35 mm2	35 mm2	70 mm2	70 mm2	95 mm2
32 m	25 mm2	25 mm2	35 mm2	50 mm2	70 mm2	95 mm2	95 mm2
34 m	25 mm2	25 mm2	35 mm2	50 mm2	70 mm2	95 mm2	120 mm2
36 m	25 mm2	35 mm2	35 mm2	50 mm2	70 mm2	95 mm2	120 mm2
38 m	25 mm2	35 mm2	35 mm2	50 mm2	70 mm2	95 mm2	120 mm2
40 m	25 mm2	35 mm2	50 mm2	50 mm2	95 mm2	95 mm2	120 mm2
42 m	25 mm2	35 mm2	50 mm2	50 mm2	95 mm2	95 mm2	150 mm2
44 m	35 mm2	35 mm2	50 mm2	70 mm2	95 mm2	120 mm2	150 mm2
46 m	35 mm2	35 mm2	50 mm2	70 mm2	95 mm2	120 mm2	150 mm2
48 m	35 mm2	35 mm2	50 mm2	70 mm2	95 mm2	120 mm2	150 mm2
50 m	35 mm2	50 mm2	50 mm2	70 mm2	95 mm2	120 mm2	150 mm2
52 m	35 mm2	50 mm2	50 mm2	70 mm2	95 mm2	120 mm2	150 mm2
54 m	35 mm2	50 mm2	50 mm2	70 mm2	120 mm2	150 mm2	185 mm2
56 m	35 mm2	50 mm2	70 mm2	70 mm2	120 mm2	150 mm2	185 mm2
58 m	35 mm2	50 mm2	70 mm2	70 mm2	120 mm2	150 mm2	185 mm2
60 m	35 mm2	50 mm2	70 mm2	70 mm2	120 mm2	150 mm2	185 mm2
62 m	50 mm2	50 mm2	70 mm2	95 mm2	120 mm2	150 mm2	185 mm2
64 m	50 mm2	50 mm2	70 mm2	95 mm2	120 mm2	150 mm2	185 mm2
66 m	50 mm2	50 mm2	70 mm2	95 mm2	120 mm2	150 mm2	240 mm2
68 m	50 mm2	50 mm2	70 mm2	95 mm2	150 mm2	185 mm2	240 mm2
70 m	50 mm2	70 mm2	70 mm2	95 mm2	150 mm2	185 mm2	240 mm2

Clamp cross-section: B3 module 16 mm2

Intermediate distribution will be required for larger supply conductor cross-sections.

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Please note also the connection of the

6.2.2 FPE in B3 module

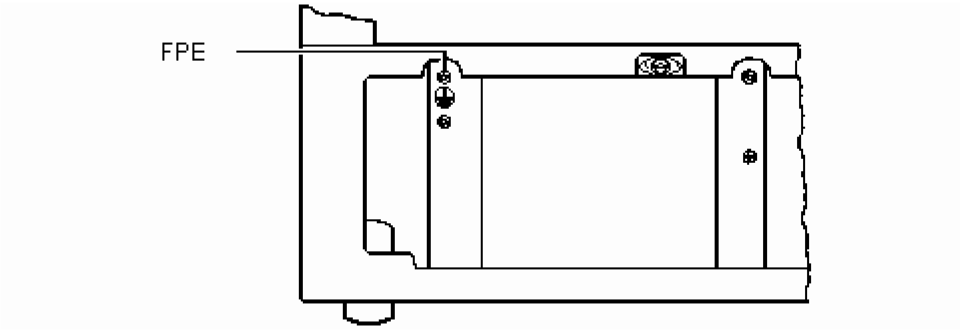
The standing casings, 19” cabinets and possibly also the standing cabinets must be connected to a FPE. The dimensions of the copper wire are dependent on the installations (sum of the amperage of the individual devices). The exact procedure is described in the chapter Earthing concept → 136 .

Feed the copper wire (FPE=green/yellow, greater/equal 2.5 mm2) through one of the cable openings in the console.

Strip the end of the wire.

Direct Supply

Use a cable lug to clamp the wire to the screw with toothed lock washer illustrated.



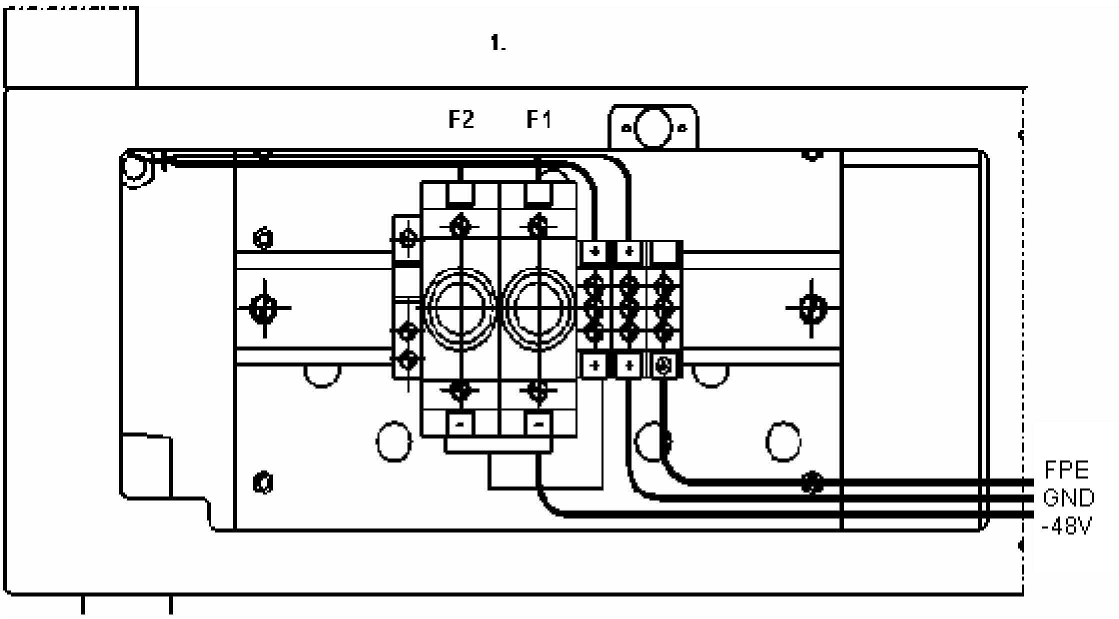
Console of the PBX Integral 55, section from the front side

Uninterrupted Power Supply

Clamp the wire on the screw terminal shown into the locking plate.

⚠	Check whether the FPE is properly connected to the potential equalisation bar, distribution battery and server!

Clamp the wire on the screw terminal shown into the locking plate.



1. Console, section of the front side

⚠	To protect against fire and energy hazards, fuses must only be replaced with fuses of the same type. Fuses F1 to F4 DIAZET Type USED 16, S16 A/500 V, time-lag

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6.3 PSL55

The power supply module PSL55 has the following performance features:

- Harmonics as per EN 61000 (PFC).
- Noise immunity input 4 kV (1.2/50).
- Delayed disconnection of outputs -28 V, -48 V, -60 V during overload/short-circuit
- Delayed disconnection of device during overload/short-circuit of +5 V output.
- Board ID data
- I2C bus port

Technical Data

Voltages and Frequencies

	PSL55, Part number: 49.9902.4943
Mains voltage	230 V; ±10 % (single phase alternating current)
Mains frequency	230 V, 50 Hz -6% +26%;
Reduced voltage	-5 V, +5 V, -28 V, -48 V, -60 V
AC ringing voltage	72 V
Ringing voltage frequency	50/60 Hz
Protection class	1 (in accordance with VDE 0100)
Radio interference suppression	Limit class B (in accordance with EN 55022 and VDE 878)

Device input
Power and currents

	PSL55, Part number: 49.9902.4943
Pprim	325 VA
Iprim	1.52 A

Device output
Power and currents

	PSL55, Part number: 49.9902.4943
P	262 W
+ 5V	18 A
-5V	1 A
-28 / 48V	*#2.2 / 3.2* A
-60V	1.3*# A
72 V	0.18 A

* = total performance max. 154W
# = total performance max. 140W

6.4 PS280A

The power supply module PS280A has the following performance features:

- Harmonics as per EN 61000 (PFC).
- Noise immunity input 4 kV (1.2/50).
- Delayed disconnection of outputs -28 V, -48 V, -60 V during overload/short-circuit
- Delayed disconnection of device during overload/short-circuit of +5 V output.

Technical Data

Voltages and Frequencies

	PS280A, Part number: 49.9807.6163
Mains voltage	230 V; plus/minus 10 % (single phase alternating current), switchable to 115 V; plus/minus 10 %
Mains frequency	230 V, 50 Hz or 60 Hz; plus/minus 3 Hz; 115 V, 60 Hz; plus/minus 3 Hz
Reduced voltage	-5 V, +5 V, -28 V, -48 V, -60 V
AC ringing voltage	72 V
Ringing voltage frequency	50/60 Hz
Protection class	1 (in accordance with VDE 0100)
Radio interference suppression	Limit class B (in accordance with EN 55022 and VDE 878)

Device input
Power and currents

	PS280A, Part number: 49.9807.6163
Pprim	450 VA
Iprim	1.82 A

Device output
Power and currents

	PS280A, Part number: 49.9807.6163
P	337 W
+ 5V	23 A
-5V	1.5 A
-28 / 48V	3.2* A
-60V	0.8 A
72 V	0.18 A

* total performance max. 154 W

6.5 PS350A

The power supply module PS350A (Frako) has the following performance features:

- Harmonics as per EN 61000 (PFC).
- Noise immunity input 4 kV (1.2/50).
- Power increase of outputs compared to PS280 (see table).
- Delayed disconnection of outputs -28 V, -48 V, -60 V during overload/short-circuit and power increase 28 V/5 A
- Delayed disconnection of device during overload/short-circuit of +5 V output.
- Call generator synchronisation when doubling the power supply (PS350A/PSL55 only in case of 50 Hz ringing voltage frequency)

Technical Data

Voltages and Frequencies

	PS350A, Part number: 49.9807.6164
Mains voltage	230 V; plus/minus 10 % (single phase alternating current), switchable to 115 V; plus/minus 10 %
Mains frequency	230 V, 50 Hz or 60 Hz; plus/minus 3 Hz; 115 V, 60 Hz; plus/minus 3 Hz
Battery voltage	-48 V
Reduced voltage	-5 V, +5 V, -28 V, -48 V, -60 V
AC ringing voltage	72 V
Ringing voltage frequency	50 Hz redundancy with PSL55; 25 Hz no redundancy with PSL55
Protection class	1 (in accordance with VDE 0100)
Radio interference suppression	Limit class B (in accordance with EN 55022 and VDE 878)

Device input
Power and currents

	PS350A, Part number: 49.9807.6164 with battery charge	**PS350A, Part number: 49.9807.6164 with battery operation**
Pprim	622 VA	622 VA
Iprim	2.7 A and 230 V	
Ibat		13 A and 55.2 V

Device output
Power and currents

	PS350A, Part number: 49.9807.6164 with battery charge	**PS350A, Part number: 49.9807.6164 with battery operation**

P	435 W	435 W
+ 5V	23 A	23 A
-5V	1.5 A	1.5 A
-28 / 48V	5.0/5.0* A	5.0/5.0* A
-60V	2.5* A	2.5* A
72 V	0.18 A	0.18 A
Ibat	1.8* A	

* = Total power less/equal 300 W

6.6 ISPS (IMTU Supplementary Power Supply)

The supplementary power supply module ISPS is used for the direct feeding of the boards of the B3 module if more than 10 modules are connected.

The 2 DC/DC converters work parallel to the B3 module's PS350A power pack. They convert the superfluous capacity of the -48 V rail to +5 V.

Maximum capacity 1 ISPS per B3 module

Technical data

Voltages and Frequencies

	ISPS, material number: 28.5630.1991
Mains voltage	-48 V direct current voltage from PS280 or PS350
Mains frequency	DC
Reduced voltage	+ 5 V

Device Input Side
Capacity and Currents

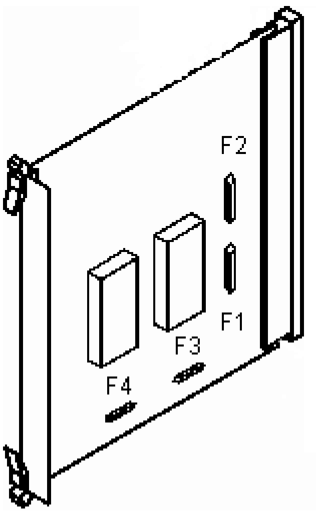
	ISPS, material number: 28.5630.1991
Pprim	122 VA
Iprim	2.55 A

Device Output Side
Capacity and Currents

	ISPS, material number: 28.5630.1991
P	100 W
+ 5V	20 A

6.6.1 Fuses

	To protect against fire and energy hazards, fuses must only be replaced with fuses of the same type. Remove cooling plate (four screws on conductor side) fuses F1 and F2 with G fuse link 6.3 x 32 mm, 20 A, 250 V, semi-lag fuses F3 and F4 with G fuse link 5 x 20 mm, 4 A, 250 V, time-lag



Board ISPS, location of fuses

6.7 Uninterrupted Power Supply

Stand-alone and built-in (19” technology) devices are available for the uniterrupted power supply (UPS).

The procedures that are relevant to assembly and commissioning are described in the manufacturer documents. These documents are enclosed with the products.

A distinction is made between online technology and line-interactive technology. The application fields of each type are partly different. While the line-interactive family is able to compensate

- Power failures
- Voltage oscillations
- Voltage peaks
- Undervoltage
- Overvoltage

online USP systems are also capable of compensating

- Voltage surges
- Alternating voltages
- Voltage bursts
- High harmonic oscillations

.

Online USP systems must always be used for customers with increased safety requirements such as Hospitals, Police, Fire Brigade or energy supply companies. In addition to that, online UPS systems will continue to be used in cases where a poor quality of the mains supply must be expected, for example near railway lines, sawmills etc.

The selection criteria are shown below.

Disturbances in the mains supply	**Time**	**EN 50091-3/ IEC 620403**	**UPS solution**	**Discharge solution**
1. Power failures	$>$ 10 ms	**VFD** Voltage+ Frequency Dependent	Classification 3 passive standby operation (**offline**)	———-
2. Voltage oscillations	$<$ 16 ms			———-
3. Voltage peaks	4 - 16 ms			———-
4. Undervoltage	continuous	**VI** Voltage+ Interpendent	Classification 2 **line interactive** operation	———-
5. Overvoltage	continuous			———-
6. Lightning strikes	sporadic	**VFI** Voltage+ Frequency Independent	Classification 1 double conversion operation (**online**)	Lighting and over voltage protection IEC (60364-5-534)
7. Voltage surges	$<$ 4 ms			———-
8. Frequency oscillations	sporadic			———-
9. Voltage bursts	periodic			———-
10. High harmonic oscillations	continuous			———-

6.7.1 Online UPS systems

Off.-Pos.	Material number or T-Mat. No.	Name	MGE Item number	Material number
		Online		
#.218.310.100	4.999.085.468	Pulsar Extreme 1000 C UPS	66346	4.999.084.360
#.218.310.101	4.999.085.469	Pulsar Extreme 1000 C battery pack	66349	4.999.084.361
#.218.310.104	4.999.085.472	Pulsar Extreme 1000 C Rack	66352	4.999.084.364
#.218.310.105	4.999.085.473	Pulsar Extreme 1000 C Rack Battery pack	66355	4.999.084.365
#.218.310.102	4.999.085.470	Pulsar Extreme 1500 C UPS	66347	4.999.084.362

Off.-Pos.	Material number or T-Mat. No.	Name	MGE Item number	Material number
		Online		
#.218.310.103	4.999.085.471	Pulsar Extreme 1500 C battery pack	66350	4.999.084.363
#.218.310.106	4.999.085.474	Pulsar Extreme 1500 C Rack	66353	4.999.084.366
#.218.310.107	4.999.085.475	Pulsar Extreme 1500 C Rack Battery pack	66356	4.999.084.367
#.218.310.108	4.999.085.476	Pulsar Extreme 2000	67747	4.999.084.368
#.218.310.109	4.999.085.477	Pulsar Extreme 2000 Battery LA	67960	4.999.084.369
#.218.310.110	4.999.085.485	Pulsar Extreme 2000 Battery XLA	67961	4.999.084.370
#.218.310.114	4.999.085.489	Pulsar Extreme 2000 Rack	67767	4.999.084.374
#.218.310.115	4.999.085.490	Pulsar Extreme 2000 Rack Battery LA	67980	4.999.084.375
#.218.310.116	4.999.085.491	Pulsar Extreme 2000 Rack Battery XLA	67981	4.999.084.376
#.218.310.111	4.999.085.486	Pulsar Extreme 3000	67827	4.999.084.371
#.218.310.112	4.999.085.487	Pulsar Extreme 3000 Battery LA	67964	4.999.084.372
#.218.310.113	4.999.085.488	Pulsar Extreme 3000 Battery XLA	67965	4.999.084.373
#.218.310.117	4.999.085.492	Pulsar Extreme 3000 Rack	67847	4.999.084.377
#.218.310.118	4.999.085.493	Pulsar Extreme 3000 Rack Battery LA	67984	4.999.084.378
#.218.310.119	4.999.085.494	Pulsar Extreme 3000 Rack Battery XLA	67985	4.999.084.379
#.218.310.120	4.999.085.495	Comet Extreme 4500	67865	4.999.084.380
#.218.310.121	4.999.085.496	Comet Extreme 4500 battery pack LA	67970	4.999.084.381
#.218.310.122	4.999.085.497	Comet Extreme 4500 Rack	67875	4.999.084.382

Off.-Pos.	Material number or T-Mat. No.	Name	MGE Item number	Material number
		Online		
#.218.310.123	4.999.085.498	Comet Extreme 4500 Rack Battery LA	67990	4.999.084.383

6.7.1.1 Technical Data

In the relevant documents:

Pulsar EXtreme C

Pulsar EXtreme

and

Comet EXtreme

you will find the technical specifications concerning the products from the firm MGE.

6.7.2 Line-Interactive UPS systems

Off.-Pos.	Material number or T-Mat. No.	Name	MGE Item number	Material number
		Interactive		
#.218.310.124	4.999.085.499	Pulsar Evolution 500 Kombi	66225	4.999.084.384
#.218.310.126	4.999.085.501	Pulsar Evolution 800 Rack	66227	4.999.084.386
#.218.310.125	4.999.085.500	Pulsar Evolution 800 Tower	66226	4.999.084.385
#.218.310.128	4.999.085.503	Pulsar Evolution 1100 Rack	66229	4.999.084.388
#.218.310.127	4.999.085.502	Pulsar Evolution 1100 Tower	66228	4.999.084.387
#.218.310.130	4.999.085.505	Pulsar Evolution 1500 Rack	66231	4.999.084.390
#.218.310.129	4.999.085.504	Pulsar Evolution 1500 Tower	66230	4.999.084.389
#.218.310.131	4.999.085.506	Pulsar Evolution 2200 Kombi	66232	4.999.084.391
#.218.310.132	4.999.085.507	Pulsar Evolution battery pack 2200	66235	4.999.084.392

6.7.2.1 Technical Data

In the relevant document

Pulsar Evolution

you will find the technical data concerning the product Pulsar Evolution from the firm MGE.

6.7.3 Supplementary components

Off.-Pos.	Material number or T-Mat. No.	Name	MGE Item number	Material number
		Accessories		
#.218.312.633	4.999.046.989	Status information kit card Pulsar Extreme C	66246	4.999.046.989
#.218.312.632	4.999.046.988	Status information kit card Pulsar/Comet Extreme	66060	4.999.046.988
#.218.310.003	4.999.077.567	WEB/SNMP card 10/100 BASET (Extreme)	66074	4.999.077.567
#.218.310.004	4.999.077.565	WEB/SNMP card 10/100 BASET (ExtremeC)	66244	4.999.077.565
#.230.001.368	4.999.100.382	Management Pac 2	66923	4.999.100.382
#.218.312.634	4.999.046.990	Mains earthed CEE input cable	Mains earthed CEEADAPT	4.999.046.990
		Multiple socket		4.999.092.960
		IEC 320-USE Adapter cable		4.999.093.055

6.7.4 Explanations

Name	Material number	Successor mat. no.	Parts list
Pulsar Extreme 1000 C UPS	4.999.085.468	4.999.084.360	4,999,084,360 Pulsar Extreme 1000 C Rack 4.999.046.990 Mains earthed CEE input cable 4.999.093.052 IEC 320-USE adapter cable 4.999.092.960 Multiple socket
Pulsar Extreme 1000 C battery pack	4.999.085.469	4.999.084.361	4.999.084.361 Pulsar Extreme 1000 C Battery Pack

Name	Material number	Successor mat. no.	Parts list
Pulsar Extreme 1500 C UPS	4.999.085.470	4.999.084.362	4,999,084,362 Pulsar Extreme 1500 C Rack 4.999.046.990 Mains earthed CEE input cable 4.999.093.052 IEC 320-USE adapter cable 4.999.092.960 Multiple socket
Pulsar Extreme 1500 C battery pack	4.999.085.471	4.999.084.363	4.999.084.363 Pulsar Extreme 1500 C UPS Battery Pack
Pulsar Extreme 1000 C Rack	4.999.085.472	4.999.084.364	4,999,084,364 Pulsar Extreme 1000 C Rack 4.999.046.990 Mains earthed CEE input cable 4.999.093.052 IEC 320-USE adapter cable 4.999.092.960 Multiple socket
Pulsar Extreme 1000 C Rack Battery pack	4.999.085.473	4.999.084.365	4,999,084,365 Pulsar Extreme 1000 C Rack Battery pack
Pulsar Extreme 1500 C Rack	4.999.085.474	4.999.084.366	4.999.084.366 Pulsar Extreme 1500 C Rack 4.999.046.990 Mains earthed CEE input cable 4.999.093.052 IEC 320-USE adapter cable 4.999.092.960 Multiple socket
Pulsar Extreme 1500 C Rack Battery pack	4.999.085.475	4.999.084.367	4.999.084.367 Pulsar Extreme 1500 C Rack Battery pack
Pulsar Extreme 2000	4.999.085.476	4.999.084.368	4,999,084,368 Pulsar Extreme 2000 4.999.092.960 Multiple socket
Pulsar Extreme 2000 Battery LA	4.999.085.477	4.999.084.369	4,999,084,369 Pulsar Extreme 2000 Battery LA
Pulsar Extreme 2000 Battery XLA	4.999.085.485	4.999.084.370	4,999,084,370 Pulsar Extreme 2000 Battery XLA
Pulsar Extreme 3000	4.999.085.486	4.999.084.371	4.999.084.371 Pulsar Extreme 3000 4.999.092.960 Multiple socket
Pulsar Extreme 3000 Battery LA	4.999.085.487	4.999.084.372	4.999.084.372 Pulsar Extreme 3000 Battery LA
Pulsar Extreme 3000 Battery XLA	4.999.085.488	4.999.084.373	4.999.084.373 Pulsar Extreme 3000 Battery XLA
Pulsar Extreme 2000 Rack	4.999.085.489	4.999.084.374	4.999.084.374 Pulsar EXtreme 2000 Rack 4.999.092.960 Multiple socket

Name	Material number	Successor mat. no.	Parts list
Pulsar Extreme 2000 Rack Battery LA	4.999.085.490	4.999.084.375	4,999,084,375 Pulsar Extreme 2000 Rack Battery LA
Pulsar Extreme 2000 Rack Battery XLA	4.999.085.491	4.999.084.376	4,999,084,376 Pulsar Extreme 2000 Rack Battery XLA
Pulsar Extreme 3000 Rack	4.999.085.492	4.999.084.377	4.999.084.377 Pulsar Extreme 3000 Rack 4.999.092.960 Multiple socket
Pulsar Extreme 3000 Rack Battery LA	4.999.085.493	4.999.084.378	4.999.084.378 Pulsar Extreme 3000 Rack Battery LA
Pulsar Extreme 3000 Rack Battery XLA	4.999.085.494	4.999.084.379	4.999.084.379 Pulsar Extreme 3000 Rack Battery XLA
Comet Extreme 4500	4.999.085.495	4.999.084.380	4.999.100.502 Comet EXtreme 4500 Basic device 4.999.084.381 Comet Extreme 4500 Battery Pack LA
Comet Extreme 4500 battery pack LA	4.999.085.496	4.999.084.381	4.999.084.381 Comet Extreme 4500 Battery Pack LA
Comet Extreme 4500 Rack	4.999.085.497	4.999.084.382	4.999.100.503 Comet Extreme 4500 Rack Basic device 4.999.084.383 Comet Extreme 4500 Rack Battery LA
Comet Extreme 4500 Rack Battery LA	4.999.085.498	4.999.084.383	4.999.084.383 Comet Extreme 4500 Rack Battery LA
Pulsar Evolution 500 Kombi	4.999.085.499	4.999.084.384	4.999.084.384 Pulsar Evolution 500 Kombi 4.999.046.990 Mains earthed CEE input cable 4.999.093.052 IEC 320-USE adapter cable 4.999.092.960 Multiple socket
Pulsar Evolution 800 Tower	4.999.085.500	4.999.084.385	4.999.084.385 Pulsar Evolution 800 Tower 4.999.046.990 Mains earthed CEE input cable 4.999.093.052 IEC 320-USE adapter cable 4.999.092.960 Multiple socket

Name	Material number	Successor mat. no.	Parts list
Pulsar Evolution 800 Rack	4.999.085.501	4.999.084.386	4.999.084.386 Pulsar Evolution 800 Rack 4.999.046.990 Mains earthed CEE input cable 4.999.093.052 IEC 320-USE adapter cable 4.999.092.960 Multiple socket
Pulsar Evolution 1100 Tower	4.999.085.502	4.999.084.387	4,999,084,387 Pulsar Evolution 1100 Tower 4.999.046.990 Mains earthed CEE input cable 4.999.093.052 IEC 320-USE adapter cable 4.999.092.960 Multiple socket
Pulsar Evolution 1100 Rack	4.999.085.503	4.999.084.388	4,999,084,388 Pulsar Evolution 1100 Rack 4.999.046.990 Mains earthed CEE input cable 4.999.093.052 IEC 320-USE adapter cable 4.999.092.960 Multiple socket
Pulsar Evolution 1500 Tower	4.999.085.504	4.999.084.389	4,999,084,389 Pulsar Evolution 1500 Tower 4.999.046.990 Mains earthed CEE input cable 4.999.093.052 IEC 320-USE adapter cable 4.999.092.960 Multiple socket
Pulsar Evolution 1500 Rack	4.999.085.505	4.999.084.390	4,999,084,390 Pulsar Evolution 1500 Rack 4.999.046.990 Mains earthed CEE input cable 4.999.093.052 IEC 320-USE adapter cable 4.999.092.960 Multiple socket
Pulsar Evolution 2200 Kombi	4.999.085.506	4.999.084.391	4,999,084,391 Pulsar Evolution 2200 Kombi 4.999.046.990 Mains earthed CEE input cable 4.999.093.052 IEC 320-USE adapter cable 4.999.092.960 Multiple socket
Pulsar Evolution battery pack 2200	4.999.085.507	4.999.084.392	4.999.084.392 Pulsar Evolution battery pack 2200

6.7.5 Installation and service concept

Installation and service concept for the Uninterrupted Power Supply from MGE, see Installation and service concept Uninterrupted Power Supply from MGE.

6.7.6 Earthing measures

6.7.6.1 Pulsar Extreme 700C-1500C, standing casing

For Discharge currents >3.5 mA, see

Annex 5 → 140 you must connect an earthing wire to Pulsar Extreme 700C-1500C, standing casing.

Proceed as follows:

Extract Pulsar Extreme 700C-1500C, standing casing

1. Ground clamp

- Clamp the earthing wire to the ground clamp (1.).

6.7.6.2 Pulsar Extreme 700C-1500C, rack version

For Discharge currents >3.5 mA, see

Annex 5 → 140 you must connect an earthing wire to Pulsar Extreme 700C-1500C, rack version.

Proceed as follows:

Extract Pulsar Extreme 700C-1500C, rack version

1. Ground clamp

- Clamp the earthing wire to the ground clamp (1.).

6.7.6.3 Pulsar Extreme 1500 - 3000

For Discharge currents >3.5 mA, see

Annex 6 → 141 you must connect an earthing wire to Pulsar Extreme 700C-3000.

Proceed as follows:

Extract Pulsar Extreme 1500 -3000

1. Cover
2. Opening for connecting cable
3. Connecting clamps

- Unscrew the cover (1).
- Insert the earthing wire through the designated opening (2.).
- Clamp the earthing wire to the ground clamp (3.).
- Screw the cover back on to the device (1).

6.8 Earthing concept

Telecommunications systems generally required protective earthing (E) and often functional earthing (FE).

Both protective earthing (PE) and functional earthing (FE) can be implemented by means of a functional and protective earthing conductor (FPE).

Earthing of telecommunications systems is based on EN 60950 and DIN VDE 0800, Part 2, “Telecommunications Engineering - Earthing and Potential Equalization”.

The PE supplied via the earthing-pin plug can then also be used as FE, provided that the operating current flowing via functional earthing from the telecommunications system is no more than 9 mA alternating current and/or more than 100 mA direct current from a direct voltage source with 60 V or more than 50 mA from a direct voltage source with 120 V. If this limit is exceeded, a permanently connected functional earthing conductor, that can also be used as FPE, must be fitted.

The question of when, how and which devices are to be earthed (PE) for reasons of electrical safety, as well as device-specific information, is dealt with in the decision-making diagram in the sections titled “Earthing concept for devices / systems” and “Earthing concept for devices/systems operating via a UPS”.

If a device/system has leakage current of greater than 3.5 mA, the protective-conductor terminal must always be permanently connected to earth. The leakage currents exhibited by I55 systems, also in combination with various UPSs, are listed in the tables in Annex 4 to Annex 6.

Housings and cabinet solutions were defined to allow safe and easy handling of the earthing measures.

6.8.1 General Requirements and Explanations for the Decision-Making Diagram

- A permanently connected protective earthing (PE) conductor for several devices is to be implemented in such a way that removal of one device does not lead to the PE connection for one or several other devices being interrupted at any point. This can be achieved, for example, by star-shaped routing of the PE connection from a local earth terminal to the individual devices. (DIN VDE 0800 part 2 Section 6.2.2.5.2)
- The protective earthing (PE) conductor is insulated in green/yellow or is bare (DIN VDE 0100, Part 540, Section 5.2).
- The minimum cross-section of the functional earthing (FE) conductor depends on the nominal current strength of the assigned safety device (e.g. automatic circuit breaker), but is at least 2.5 mm2. More detailed specifications can be found in Table 1 of DIN VDE 0800, Part 2, Section 6.2.2.5.5 (Annex 1).
- The absolute minimum cross-section of the **separate** earthing wire is: 2.5 mm2 if mechanical protection is provided (e.g. conductors sheathed in a cable, cable duct or conduit), 4 mm2 if this is not the case (see DIN VDE 0100 Part 540 Section 5). It also specifies that the minimum cross-section is proportionate to the operating current of the safety device and its response time as well as to a material coefficient. By way of providing a guideline, the minimum cross-section of the protective conductor must be same as the cross-section of the external conductor (mains supply cable) of the system. If the protective conductor comprises a conductor in a multi-wire cable (see DIN VDE 0100, Part 540, Section 5.2.1), the minimum cross-section is the same as the cross-section of the external conductor (see DIN VDE 0100, Part 540, Section 5.1.2). If the supply cable comprises a cable with flexible conductors, its minimum cross-section is 0.75mm2 (depending on the supply current) (see DIN VDE 0100, Part 520, Section 524.3, Table 52 J).
- The minimum cross-section of the functional and protective earthing conductor (FPE) is subjected to the same high requirements as for FE and E.

6.8.2 Explanations for the terms SELV, TNV1, TNV2 and TNV3:

In an **SELV electric circuit,** limited voltages only (max. 42.4 V peak value or 60 V direct voltage) may occur (both in standard operation and after a single fault), with the exception of temporary exceptions in the event of faults. SELV voltages are regarded as contact-safe. (refer to EN 60950, Section 2.3 for more detailed specifications).

In a **TNV2 electric circuit** limited voltages only may occur in standard operation: $Uac/70.7+Udc/120\ V<1$ (except for telephone ringing signals). Temporary exceptions in the event of single faults are permissible within defined boundaries. (refer to EN 60950, Section 6.2 for more detailed specifications).

TNV1 electric circuits are SELV circuits that are subjected to overvoltage surges of the telecommunications network.

TNV3 electric circuits are TNV2 circuits that are subjected to overvoltage surges of the telecommunications network.

6.8.3 Annex 1

Minimum cross-sections for sections of the functional earthing conductor (from DIN VDE 0800, Part 2, Section 6.2.2.5.5)

Nominal current strength of the assigned safety device 1) in A	Minimum cross-section of the copper conductor in mm2
up to 25	2,5
up to 35	4
up to 50	6
up to 63	10
up to 125	16
up to 160	25
up to 224	35
up to 250	50
up to 630	70
up to 800	95
up to 1000	120

1) The safety device must not be located in the course of the earthing conductor.

6.8.4 Annex 2

Earthing concept for devices/systems of protective class I

<table>
<tr><td colspan="4">Protective earthing (PE) required due to TNV/SELV #1</td></tr>
<tr><td colspan="2">yes</td><td colspan="2">no</td></tr>
<tr><td colspan="2">Discharge current >3.5 mA #3,5</td><td colspan="2">Discharge current >3.5 mA #3,5</td></tr>
<tr><td>yes</td><td>no</td><td>yes</td><td>no</td></tr>
<tr><td>Fixed access via:
Potential equalisation bar in the building
or
Oven connection socket</td><td>Fixed access via:
Potential equalisation bar in the building
or
Oven connection socket
or
Lockable two-pole earth plug</td><td>Fixed access via:
Potential equalisation bar in the building
or
Oven connection socket</td><td>PE via earthing-pin plug of device</td></tr>
</table>

Earthing concept for devices/systems in protective class II

<table>
<tr><td colspan="2">Protective earthing (PE) required due to TNV/SELV #1</td></tr>
<tr><td>yes</td><td>no</td></tr>
</table>

Fixed access via: **Potential equalisation bar in the building** or **Oven connection socket** or **Lockable two-pole earth plug**	No PE required

Explanations for the decision-making tables:

#1
If a device is connected to both TNV2 / TNV3 circuits (e.g. analog a/b connection or Uko interface) and also SELV or TNV1 circuits (e.g. V24, S0, UPo, S2m) (DIN EN 60950, section TNV circuit)

6.8.5 Annex 3

Earthing concept for devices/systems in protective class I operating via a UPS system

Protective earthing (PE) required due to TNV/SELV #1			
yes		no	
Discharge current >3.5 mA #2		Discharge current >3.5 mA #2	
yes	no	yes	no
Fixed access for all devices and UPS via: **Potential equalisation bar in the building** or **Oven connection socket**	Fixed access for all devices and UPS via: **Potential equalisation bar in the building** or **Oven connection socket** or **Lockable two-pole protection pin plug**	Fixed access for all devices and UPS via: **Potential equalisation bar in the building** or **Oven connection socket**	E via earthing-pin plug of the UPS and devices

Earthing concept for devices/systems in protective class II operating via a UPS system

Protective earthing (PE) required due to TNV/SELV #1	
yes	no
Fixed access for all devices and UPS via: **Potential equalisation bar in the building** or **Oven connection socket** or **Lockable two-pole earth plug** The PE for the UPS can be supplied via its earthing-pin plug if its leakage current is <3.5 mA. A fixed access is necessary if the discharge current is >3.5 mA.	**PE is not necessary for devices in protective class II.** The PE for the UPS can be supplied via its earthing-pin plug if its leakage current is <3.5 mA. A fixed access is necessary if the discharge current is >3.5 mA.

Explanations for the decision-making tables:

#1
If a device is connected to both TNV2 / TNV3 circuits (e.g. analog a/b connection or Uko interface) and also SELV or TNV1 circuits (e.g. V24, S0, UPo, S2m) (DIN EN 60950, section TNV circuit)

#2
Sum total of leakage currents from UPS and connected devices

6.8.6 Annex 4

Discharge currents of I55 systems

Module type	Power supply unit	Leakage current	Input filter leakage current	Total leakage current
C1 (R1)	1 x PS350 49.9902.4902	$<$ 0.8 mA	Not applicable	$<$ 0.8 mA
	2 x PS350 49.9902.4902	$<$ 0.8 mA		$<$ 1.6 mA
C2 (R1-R2)	2 x PS350 49.9902.4902	$<$ 0.8 mA	Not applicable	$<$ 1.6 mA
	4 x PS350 49.9902.4902	$<$ 0.8 mA		$<$ 3.2 mA
C3 (R1-R3)	3 x PS350 49.9902.4902	$<$ 0.8 mA	Not applicable	$<$ 2.4 mA
	6 x PS350 49.9902.4902	$<$ 0.8 mA		$<$**4.8 mA**
C4 (R1-R4)	4 x PS350 49.9902.4902	$<$ 0.8 mA		$<$ 3.2 mA
	8 x PS350 49.9902.4902	$<$ 0.8 mA		$<$**6.4 mA**

A fixed earth connection is certainly necessary for all extensions, as the lockable earth plugs are insufficient in this case to handle the high leakage current ($>$3.5 mA).

Module type	Power supply unit	PS leakage current	Input filter leakage current	Total leakage current
B3	1 x PS280A 49.9807.6163	$<$ 0.5 mA	$<$ 0.3 mA	$<$ 0.8 mA
	1 x PS350A 49.9807.6164	$<$ 0.7 mA		$<$ 1.0 mA
	2 x PS350A 49.9807.6164	$<$ 0.7 mA		$<$ 1.7 mA

6.8.7 Annex 5

Leakage currents of I55 systems with UPS Pulsar Extreme 700C, 1000C, 1500C

Module type	Power supply unit	Leakage current	UPS Pulsar Extreme 700C, 1000C, 1500C	Leakage current total
C1 (R1)	1 x PS350 49.9902.4902	$<$ 0.8 mA	$<$ 0.4 mA	$<$ 1.2 mA

	2 x PS350 49.9902.4902	< 1.6 mA		< 2.0 mA
C2 (R1-R2)	2 x PS350 49.9902.4902	< 1.6 mA	< 0.4 mA	< 2.0 mA
	4 x PS350 49.9902.4902	< 3.2 mA		<**3.6 mA**
C3 (R1-R3)	3 x PS350 49.9902.4902	< 0.8 mA	< 0.4 mA	< 2.8 mA
	6 x PS350 49.9902.4902	<**4.8 mA**		<**5.2 mA**
C4 (R1-R4)	4 x PS350 49.9902.4902	< 3.2 mA	< 0.4 mA	<**3.6 mA**
	8 x PS350 49.9902.4902	<**6.4 mA**		<**6.8 mA**

A fixed earth connection is certainly necessary for all extensions, as the lockable earth plugs are insufficient in this case to handle the high leakage current (>3.5 mA).

Module type	Power supply unit	PS leakage current	Input filter leakage current	Total leakage current
B3	1 x PS280A 49.9807.6163	< 0.5 mA	< 0.3 mA	< 0.8 mA
	1 x PS350A 49.9807.6164	< 0.7 mA		< 1.0 mA
	2 x PS350A 49.9807.6164	< 0.7 mA		< 1.7 mA

If an I55 is used in connection with a B3 module (IMTU), the values of the ”total leakage current” must be added to the values ”total leakage current” for the I55.

6.8.8 Annex 6

Leakage currents of I55 systems with UPS Pulsar Extreme 1500, 2000, 3000

Module type	Power supply unit	Leakage current	UPS Pulsar Extreme 1500, 2000, 3000	Total leakage current
C1 (R1)	1 x PS350 49.9902.4902	< 0.8 mA	< 2.7 mA	< 3.5 mA
	2 x PS350 49.9902.4902	< 1.6 mA		<**4.3 mA**
C2 (R1-R2)	2 x PS350 49.9902.4902	< 1.6 mA	< 2.7 mA	<**4.3 mA**

	4 x PS350 49.9902.4902	< 3.2 mA		<**5.9 mA**
C3 (R1-R3)	3 x PS350 49.9902.4902	< 2.4 mA	< 2.7 mA	<**5.1 mA**
	6 x PS350 49.9902.4902	<**4.8 mA**		<**7.5 mA**
C4 (R1-R4)	4 x PS350 49.9902.4902	< 3.2 mA	< 2.7 mA	<**5.9 mA**
	8 x PS350 49.9902.4902	<**6.4 mA**		<**9.1 mA**

A fixed earth connection is certainly necessary for all extensions, as the lockable earth plugs are insufficient in this case to handle the high leakage current (>3.5 mA).

Module type	Power supply unit	PS leakage current	Input filter leakage current	Total leakage current
B3	1 x PS280A 49.9807.6163	< 0.5 mA	< 0.3 mA	< 0.8 mA
	1 x PS350A 49.9807.6164	< 0.7 mA		< 1.0 mA
	2 x PS350A 49.9807.6164	< 0.7 mA		< 1.7 mA

If an I55 is used in connection with a B3 module (IMTU), the values of the ”total leakage current” must be added to the values ”total leakage current” for the I55.

6.9 Power consumption

-48 V Power consumption of the I55 when fully configured

Module/rack	I (A)
R1 rack	1.5 A
1/2K rack (B3)	14 A

Power supply parameteres for the connected terminals in the T13 families

Analogue terminals via ASCEU	48 V/7 mA (350 mW)
Analogue terminals via ASC2	28 V/9 mA (250 mW)
Digital terminals via S0 or UPN	48 V/7 mA (350 mW)
DECT per base station Bosch	48 V/70 mA (3.5 W)

7 Doubling

7.1 Doubling

There are two reasons for doubling:

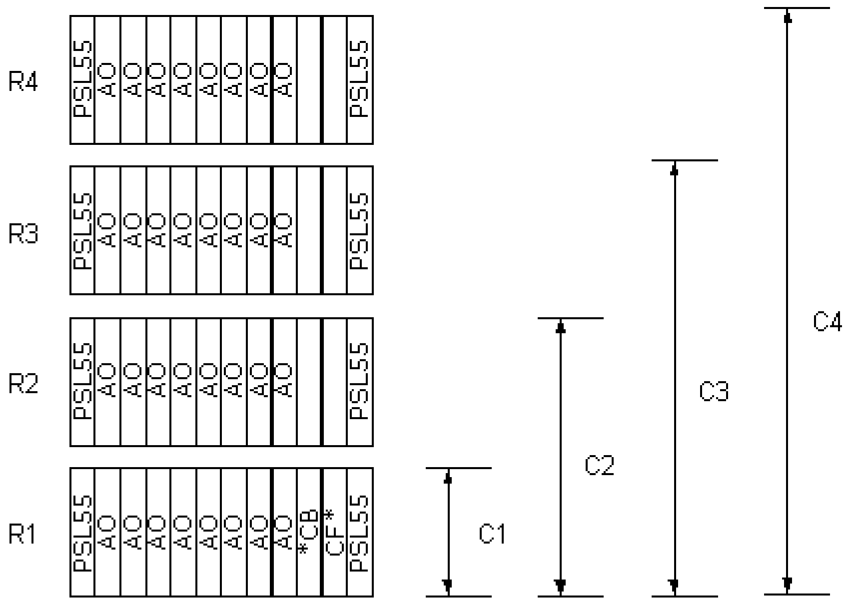
- As an option, the central functions of the communication server Integral 55 may be doubled redundantly in order to increase the security against failure.
- In addition to the redundant doubling, it may be necessary within the system to double certain functions in order to enhance the performance (e.g. processor performance or electrical output)

Because these functions have been created with the aid HW units (boards, equipment), this means that if doubling occurs, a unit will be used not once, but several times in the system.

7.2 Single module

Up to four racks (standing casing, racks in 19” cabinets, racks in 19” frames or any combination thereof) can form a single module, spread over any area and connected by flexible cables.

Module types:	The following names have been defined for the various module types:	
	C1:	Module with one rack (R1)
	C2:	Module with 2 racks (R1+R2)
	C3:	Module with 3 racks (R1+R2+R3)
	C4:	Module with 4 racks (R1+R2+R3+R4)

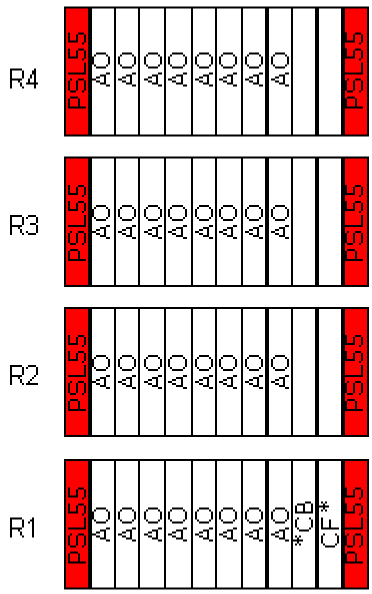


*CB = ACB/HSCB
CF* = CF22/CF2E

7.2.1 doubling PS

Doubling of the PS within one module is possible for each individual rack (R1, R2, etc.)

The PSL55 occupies the right-hand slot in the rack. A PSL55 is also connected to the left-hand side of the rack in the event of PS doubling.



AO = connecting circuit
CB = ACB/HSCB
CF* = CF22/CF2E

C4 Module with PS doubling

The doubling of the PSL55 may be necessary for reasons of:

- Redundancy
- Performance increase

For projects an adaption set - see PS350 Adaption → 94

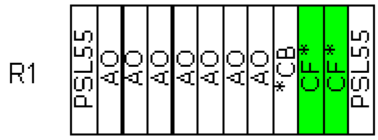
7.2.2 doubling CF*

Mixed operation CF22/CF2E in one module is not permitted.

CF doubling within one module is only possible in the R1 rack.

An additional CF22/CF2E board, which is normally operated by **hot stand-by**, can only be inserted there. In the event of trouble on the active CF22/CF2E side, a complete automatic switchover to the previously passive CF22/CF2E takes place. Individual messages may be lost here.

The slot for the second CF22/CF2E board is reserved and must be set up during system configuration.

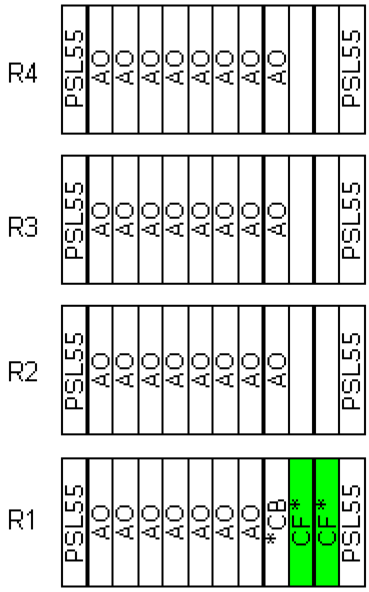


AO = connecting circuit
CB = ACB/HSCB
CF* = CF22/CF2E

R1 rack (C1 module) with CF doubling

The switching matrix facilities of a recently inserted CF22/CF2E are updated automatically by adopting the current information from the **active** CF22/CF2E, while at the same time entering all connections made since insertion.

CF doubling is possible in the R1 rack.



AO = connecting circuit
CB = ACB/HSCB
CF* = CF22/CF2E

C4 module with CF doubling

7.2.3 doubling *CB

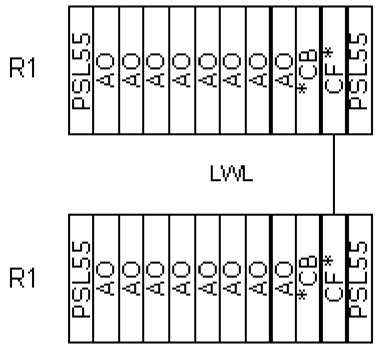
⚠	Mixed operation ACB/HSCB in one module is not possible (different operating systems).

Although doubling of the ACB/HSCB board is possible, technical reasons dictate that it is not necessary in the single module.

7.3 Twin module

An I55 twin module is made up of any two I55 single modules (C1, C2, C3 or C4), which, connected to each other by a transmission channel (optical waveguide), form an I55 system. With regard to the central boards, the facilities of the connected, individual modules is the same as with a single module.

Each module has its own CF22/CF2E and ACB/HSCB.



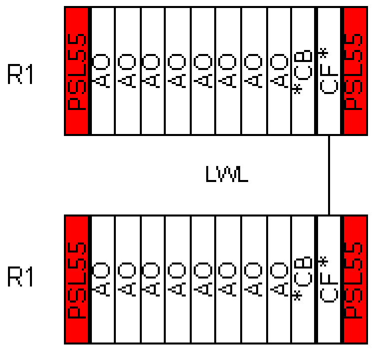
AO = connecting circuit
CB = ACB/HSCB
CF* = CF22/CF2E

e.g. a twin module consisting of 2 C1 modules

7.3.1 doubling PS

The power supply (PS) can generally be doubled in any rack of any module that forms a so-called twin module together with an additional module.

The purpose of the PS doubling may be to establish redundancy or to increase performance.



AO = connecting circuit
CB = ACB/HSCB
CF* = CF22/CF2E

e.g. a twin module consisting of 2 C1 modules

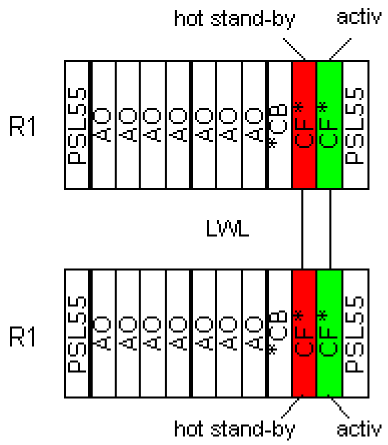
For projects an adaption set - see PS350 Adaption → 94

7.3.2 doubling CF* (within a module)

> Mixed operation CF22/CF2E in one module is not permitted. However, the other module (twin) can be equipped with two other CF boards which have to be identical, e.g. two CF2E.

If the central functions of this board are to be doubled redundantly, the CF22/CF2E boards will then be doubled in the R1 racks of the connected, single modules. This also includes an additional transmission link. For a transmission link to be operable however, it must not only have an optical waveguide, but also the **CFIML** function unit on the CF22/CF2E board.

In principle, the active CF22/CF2E board transmits on both available optical waveguide lines. This means the MTU functions operate respectively on the CF22/CF2E board which is active at that time. This also operates the optical waveguide line of the **hot stand-by** CF22/CF2E board however. In the event of a failure on the active side, a complete switchover to the hot stand-by CF22/CF2E side will take place.



AO = connecting circuit
CB = ACB/HSCB
CF* = CF22/CF2E

A twin module consisting of 2 C1 modules with CF22/CF2E doubling

If failure of a transmission link occurs without redundancy (double fault!), the two modules are separate and no longer form a joint unit, they each remain operable, if only in a limited sense.

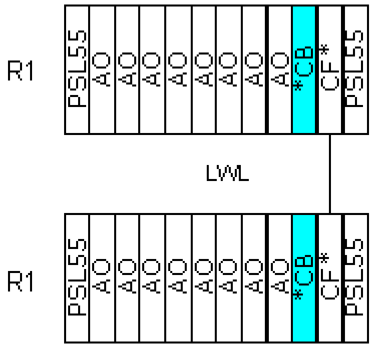
The switching matrix facilities of a recently inserted CF22/CF2E are updated automatically by adopting the current information from the **active** CF22/CF2E, while at the same time entering all connections made since insertion.

7.3.3 doubling *CB

> Mixed operation ACB/HSCB in one module is not possible (different operating systems).

Although doubling of the ACB/HSCB board is possible, technical reasons dictate that it is not necessary.

In the event of ACB/HSCB board failure in a twin module, the corresponding module will also fail. The second module will continue to operate without limitation. The second ACB/HSCB board, which is still intact, cannot take on the functions of the failed ACB/HSCB.



AO = connecting circuit
CB = ACB/HSCB
CF* = CF22/CF2E

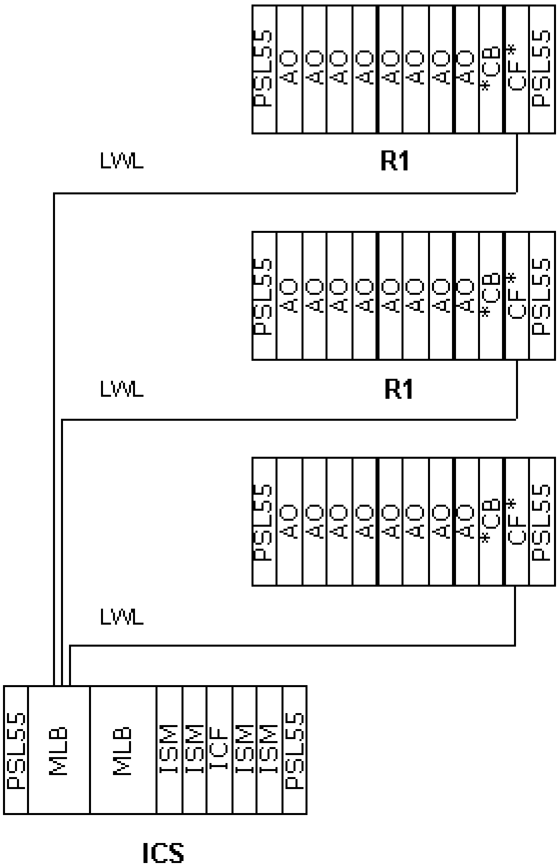
Twin module consisting of 2 C1 modules

7.4 Multi-module

7.4.1 Interconnected systems

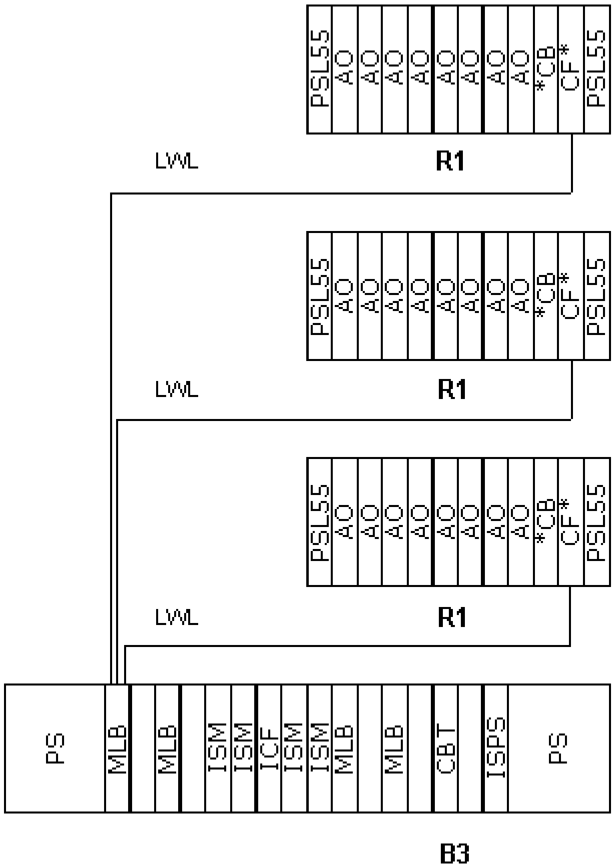
An I55 multi-module system is made up of several, varied I55 and I33 single modules (between 3 and 16 or between 17 and 32, depending on the configuration), which are connected to each other by a multi-module, which can be either an ICS (3 to 16 modules) or a B3 module (17 to 32 modules). The multi-module is accommodated in a separate module casing. If an ICS is used the casing is a 19” rack and can be installed in the same cabinet as the CSI55 modules. If more than 16 modules have to be interconnected it is necessary to use a B3 module with the IMTU function, which cannot be integrated in the 19” technology of the CSI55.

Multi-module without MTU/IMTU doubling with ICS



AO = connecting circuit
CB = ACB/HSCB
CF* = CF22/CF2E

Multi-module without MTU/IMTU doubling with B3 module



AO = connecting circuit
CB = ACB/HSCB
CF* = CF22/CF2E
PS = only PS350A

The following boards are used in the multi-module, among others:

- MLB Module Link Board
- ISMx IMTU Switching Matrix
- ICF IMTU Central Functions

The following chapters describe how operation with the multi-module can be carried out in various ways.

7.4.2 MLB (Module Link Board)

- Board for optical fibre connection; 8 modules can be connected by one 5ML. Up to 2 MLB boards can be used in one ICS (16 groups).
- Up to four MLB boards can be inserted in one B3 module (17 to 32-group system).
- The optical fibre connectors can be distributed as desired onto the MLB board.
- See also MLB Module Link Board → 209

Example:

4 required optical waveguide connections can be installed on one MLB, although they are distributed over 4 MLB boards.

7.4.3 ISMx

- Switching matrix with control
- See also ISMx Switching Matrix x → 206

Four of these boards are present in each multi-module. Should one of these board fail, the remaining connected modules continue working. Connections which have been made via the failed ISMx board will be disconnected.

	When doubled, both multi-modules must contain ISMx boards which are the same type.

7.4.4 ICF

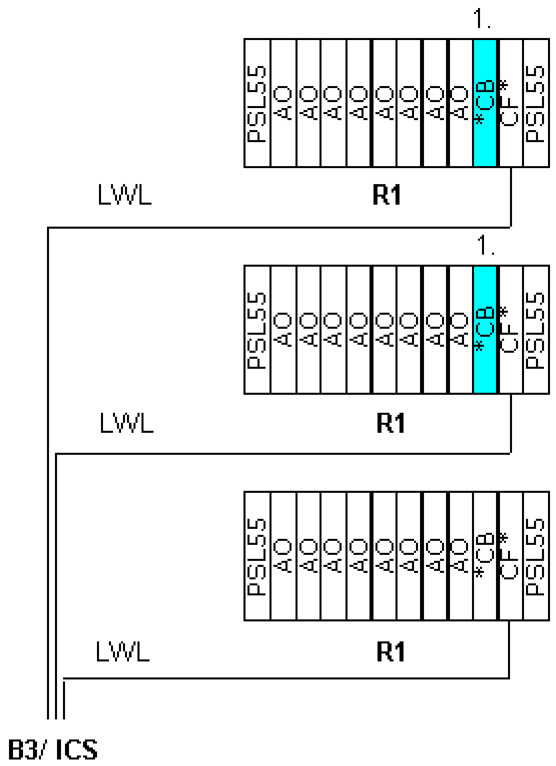
- Inter module manager, clock generation.
- An optical fibre pair can be connected to form a connection path between the IMTU's during doubling.
- See also ICF IMTU Central Functions → 285

7.4.5 IVZ on *CB boards

The IVZ is always doubled and is placed onto the ACBs/HSCBs of 2 participating modules. This variant is suitable as long as the number of modules is not too high (normal limit is 8 modules).

The I1 package can be configured with a maximum of 20 groups.

IVZ on ACB/HSCB boards



AO = connecting circuit
CB = ACB/HSCB
CF* = CF22/CF2E

1. IVZ

7.4.6 IVZ on separate *CB boards

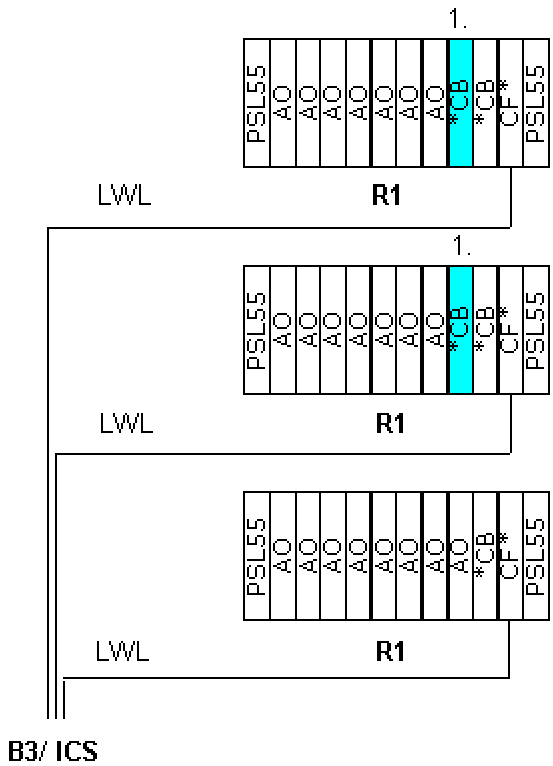
IVZ and RIVZ slots may be allocated as desired.

Installation of a ACB/HCSB (with IVZ function) in a B3/ICS module is generally **not** possible for software reasons!

The I2. I3 or I4 package can be expanded with a maximum of 32 groups.

Other functional units of the I3 and I4 packages are assigned to separate ACB/HSCB boards.

IVZ on separate ACB/HSCB boards



AO = connecting circuit
CB = ACB/HSCB
CF* = CF22/CF2E

1. IVZ

7.4.7 Doubling of the PS in the B3 module

The failure of a non-doubled PS in a B3 module is synonymous with the failure of the entire multi-module. This means that communication between the individual, connected modules is no longer possible. Accordingly, all modules fail completely for communication between modules excepting the two modules with IVZ functions.

This risk can be reduced by doubling the PS (only PS350A) in the multi-module redundantly.

7.4.8 Complete doubling

Doubling of the transmission link

In a multi-module system, only one transmission link per module can ever be connected to a multi-module (ICS or B3 module). Connecting two transmission links for one module to just one multi-module contradicts the redundancy concept and is therefore not technically possible - it would lead to erratic behaviour in the system.

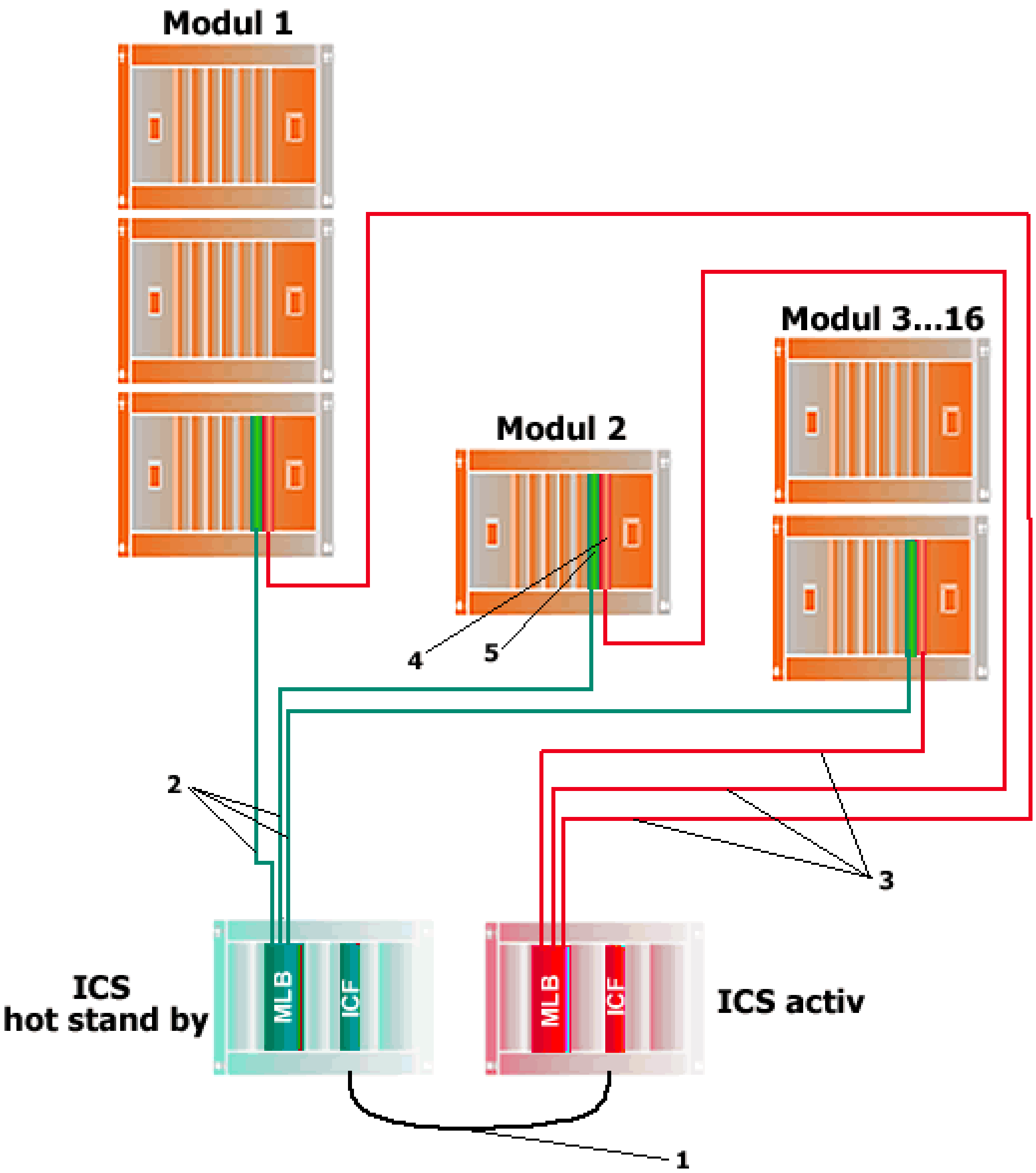
Accordingly, transmission links can only be doubled in a fully doubled multi-module system.

Fully redundant system

In a complete double system, the CF22/CF2E board is present twice over in the individual connected modules for redundancy purposes, and likewise the multi-module (ICS or B3 module).

Depending on the slots, one of the two CF22/CF2E boards in each module is connected with one of the two multi-modules by transmission link.

In this, each of the two multi-modules forms one half of the system together with the CF22/CF2E boards they are connected to. One of these is the "active" system half, in which all user data is processed, as for a non-doubled system. The other is the "hot stand-by" half, which is activated in different ways in the event of the "active" half failing.



1. Fibre-optic cable for linking the interconnection servers
2. Fibre-optic link to the "hot standby" half of the system
3. Fibre-optic link to the "active" half of the system
4. CF22/CF2E of the "hot standby" half of the system
5. CF22/CF2E of the "active" half of the system

Complete IMTU doubling

In the event of one of the functional units on one of the two CF22/CF2E or one optical waveguide connection failing, the missing information is brought over to the module in question from the inactive to the active side, and therefore is replaced. This alternative route will remain in existence for the duration of the failure.

Following repairs, the active CF22/CF2E in the ”default” active side should take over the information flow again. This is brought about by a manual service changeover on either one of the two CF22/CF2E boards of the affected module. This also automatically releases the alternative route between the two ICS/B3 modules, making it available for any new occurrence of an error in one of the connected modules.

If another error occurs in a different module on the active side while the first error is still in existence (failure on active CF22/CF2E or its transmission link), the system will react by completely switching over to the other system half, that is to say, all modules in the system switch to their ”hot standby” side.

The complete system half will also switch over in the event of failure of functional units within an active IMTU (see above).

If the hot standby side fails, the flow of information is unaffected.

Message loss is to be expected in all cases where a switchover occurs.

8 Boards

The board is a physical unit within the CSI55 system. It is made up of a multilayer, a socket connector, electronic components and a front panel with low force on/off connectors.

The board frame in the rack contains slots to accommodate various other boards.

Plug connectors are used to secure the boards to the board frame.

8.1 General Points

The boards may be removed and inserted during system operation.

Please note:

- ESD protective measures.
- All existing connections of the board are disconnected if it is removed.

For reasons of EMC, vacant slots should be covered with frontplates.

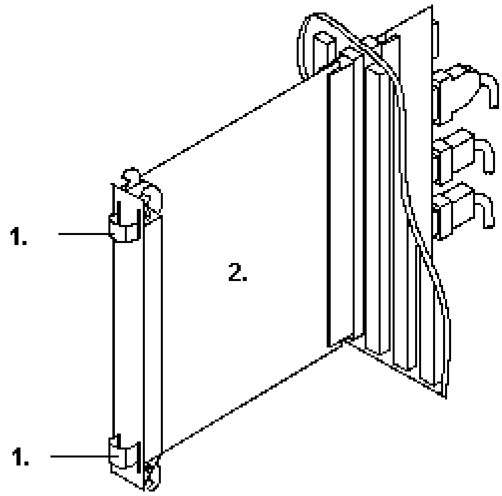
More information about removing and inserting should be noted for the following boards

- ACB
- HSCB
- CF22
- CF2E
- ICF
- ISM
- CBT (see Measuring and Testing Tools)
- V24IA V24 Interface Adapter (see Measuring and Testing Tools)

. You will find the information in the subchapter ”Removing and Inserting Modules” for the boards mentioned above.

Removing and inserting

Using the latch fasteners on the front panel, boards can be inserted and then interlocked into the board frame, or be detached and removed from it.



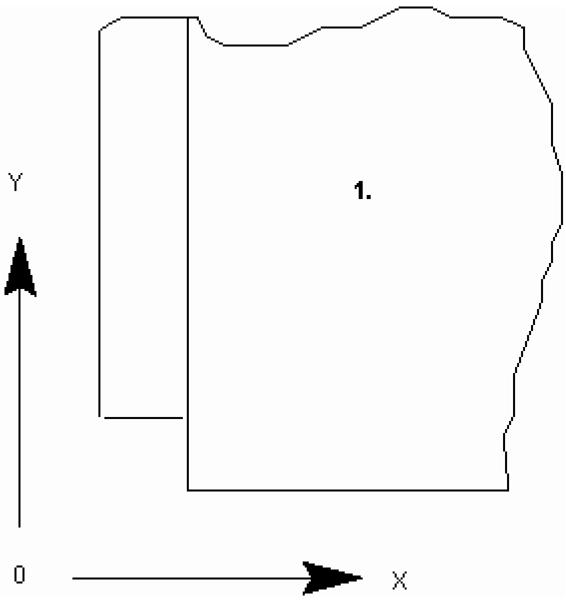
Board locking levers

1. Latch fasteners
2. Board

Bridges and Breakpoints

In some boards, it is possible to make hardware adjustments (e.g. for setting the current strength). This can be done by inserting or removing bridges and breakpoints.

The diagram opposite shows the coordinates which enable bridges and breakpoints to be located.

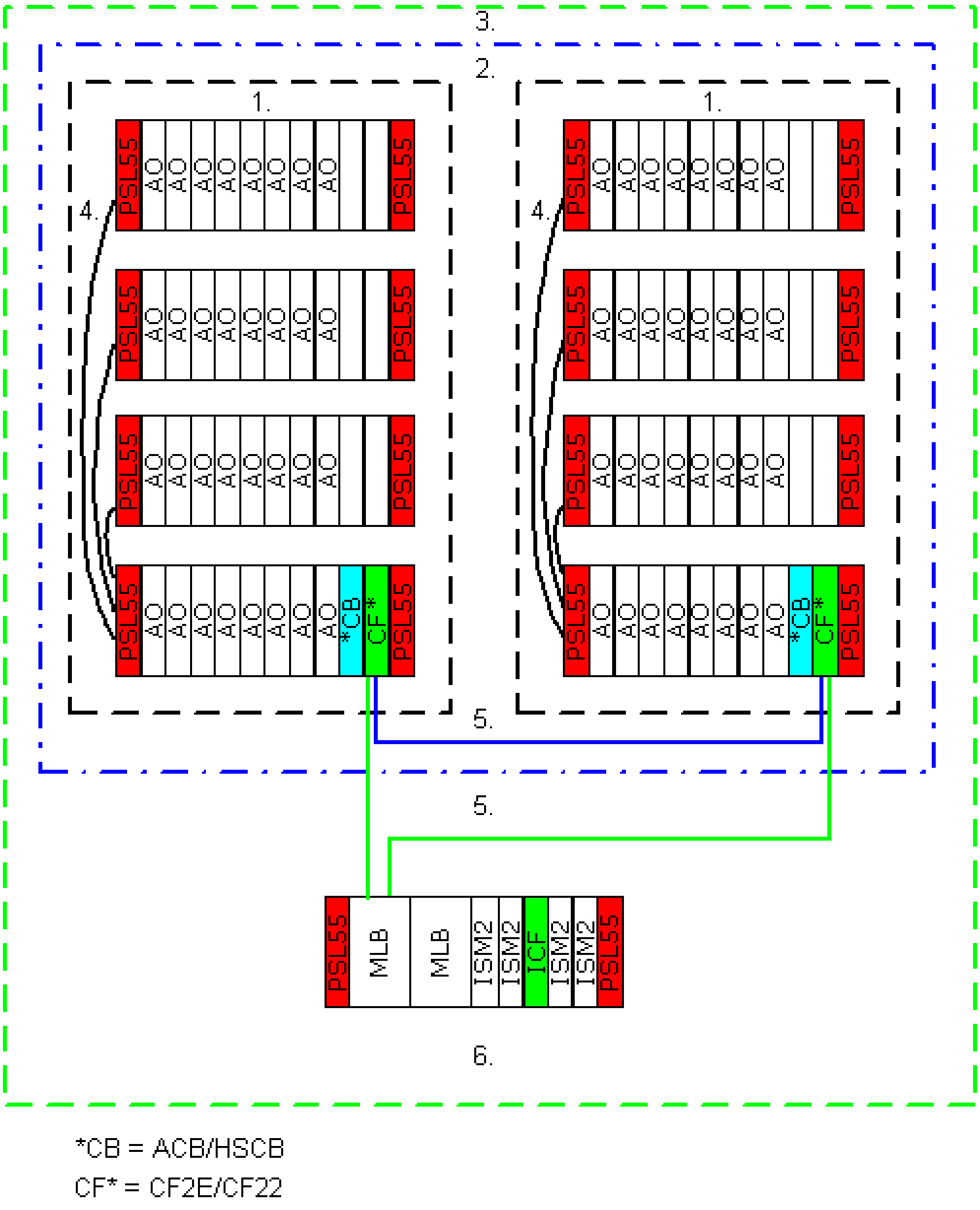


Board co-ordinates

1. Soldering side

8.2 Configurations

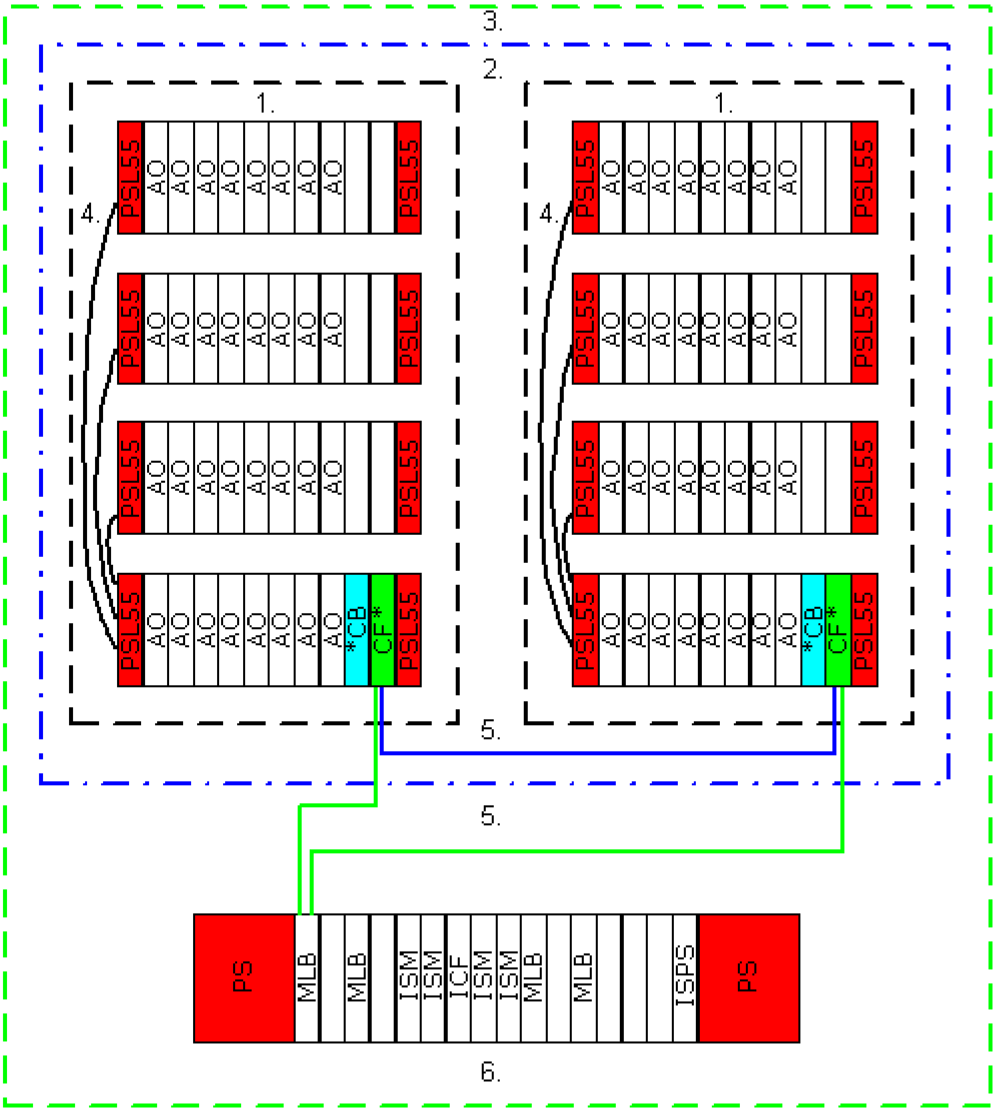
Example of a configuration with ICS as multi-module



1. Single module
2. Twin module
3. Multi-module
4. Cable for backplane connection
5. FOC
6. ICS

There is also an adaption module - see PS350 Adaption → 94

Example of a configuration with B3 module as multi-module



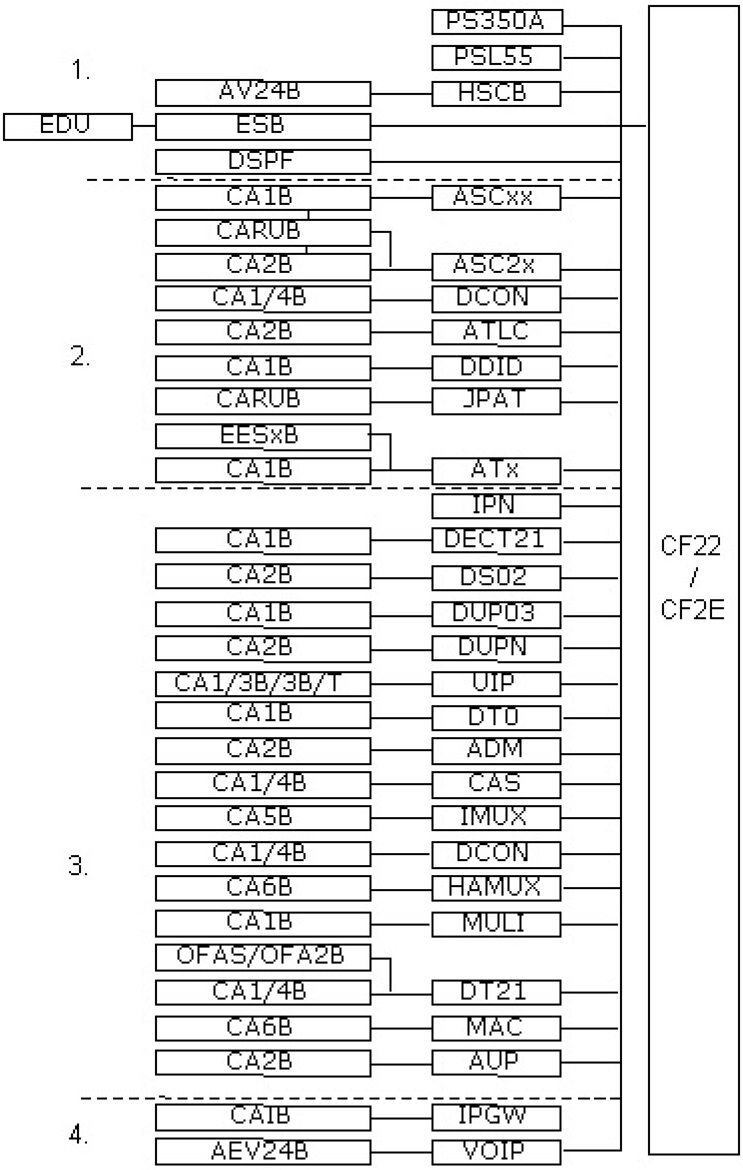
*CB = ACB/HSCB
CF* = CF2E/CF22

1. Single module
2. Twin module
3. Multi-module
4. Cable for backplane connection
5. FOC

6. B3 module

	Mixed operation of ISMx and ISM2x boards is not permissible.

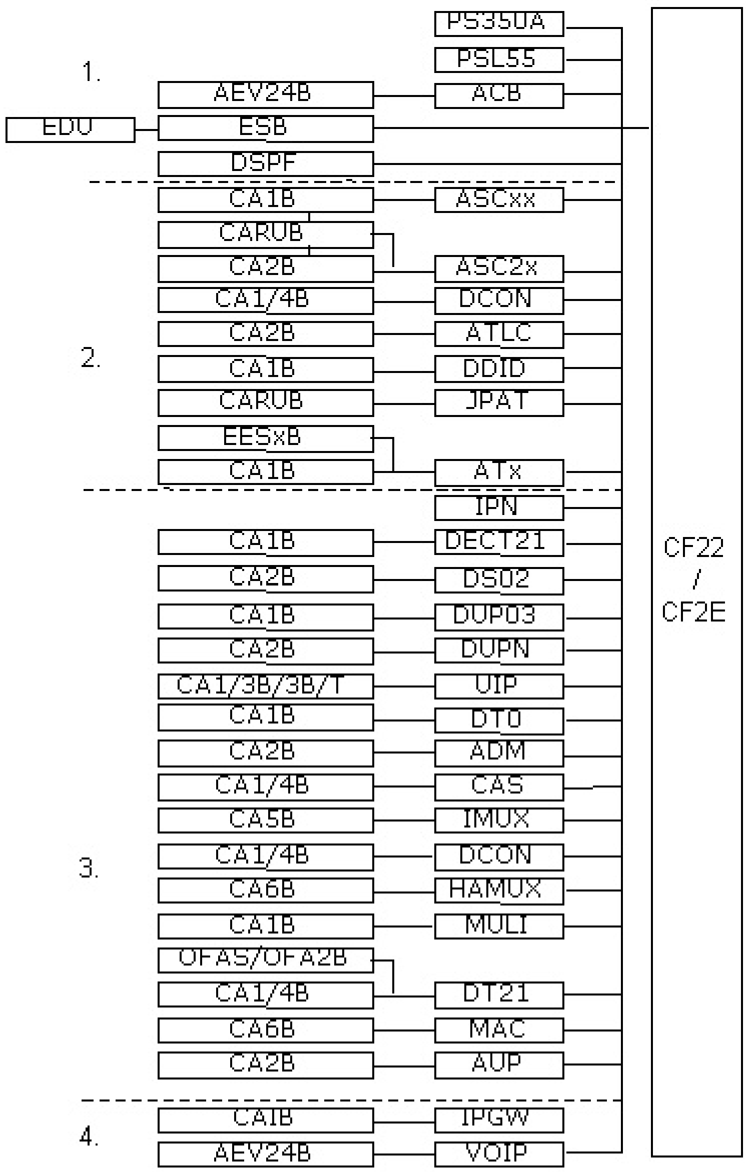
8.3 Block diagram of R1 rack



1. Central Functions, Control and Power Supply
2. analogue

3. digital
4. IP

Block diagram of R1 rack as of software IEE2



1. Central Functions, Control and Power Supply
2. analogue
3. digital
4. IP

8.4 Control, Central Functions and Transport

		Board		**Sub module**		**Connecting circuit board**
Module/ Rack/ Backplane	→	ACB/ACB1 → 221	→	V24I → 219	→	AEV24B → 230
			→	V24NI → 219		
	→	HSCB → 281	→	V24I → 219	→	AV24B → 238
			→	V24NI → 219		
			→	CBI1A3 → 172		
	→	CF22 → 248	→	CFIML → 187	→	ESBx → 276
						ESBA → 276
						ESBB → 276
						EOCSM/MM → 195
						EOCPF → 194
	→	CF2E → 256	→	CFIML Central Functions Inter Module Link → 187	→	ESB → 276
						ESBA → 276
						ESBB → 276
						EOCSM/MM → 195
						EOCPF → 194
	→	ICF → 285	→	CL2M → 401	→	ESB → 276
						ESBA → 276
						ESBB → 276
						CA3B cable adapter 3 for B modules → 393
				CL2ME → 402	→	CA3B → 393
	→	ISMx → 206				
	→	DSPF → 190	→	ASM3 → 171		
	→	MLB → 209	→	MLBIML → 212	→	EOCSM/MM → 195
					→	EOCPF → 194
	→	R1RC → 213				

Special application

Sub module		**Board**
V24M → 501	→	UIP → 495

8.4.1 ACB/ACB1 Advanced Computer Board

Short description

The ACB board is the basic equipment in all modules. This computer board must be used to support the software IEEx (Linux operating sistem). As HGS it is used a 2.5” hard disc drive.

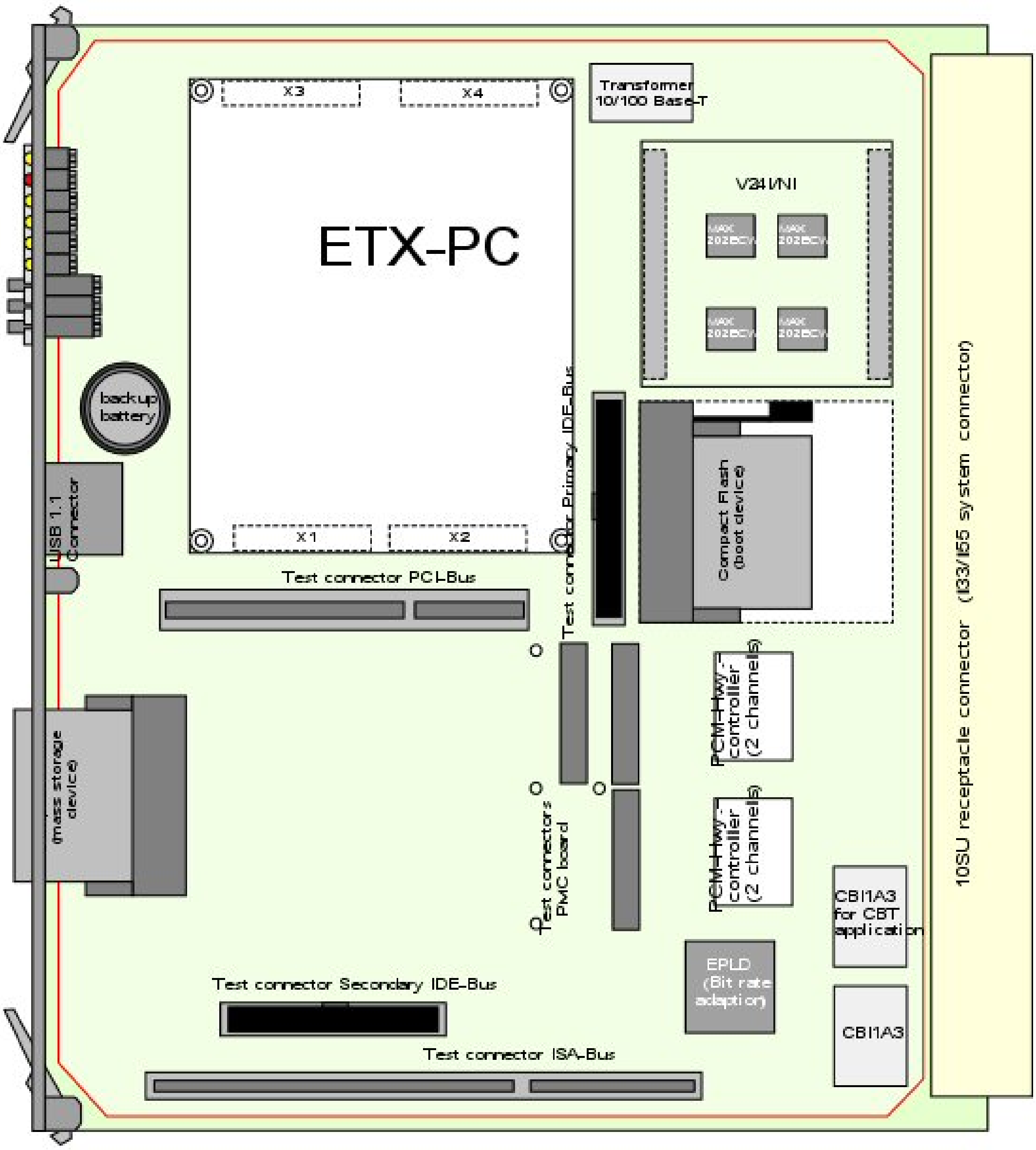
The ACB1 board is the follow-up board of the ACB and can be used starting with software version IEE2 (version L021V00_1_1.0). The difference to the ACB is the physical medium of the HGS. In the case of the ACB1, the HGS is a Compact Flash Card with different capacity according to system size, the following sizes are recommended:

	Compact Flash Card
for single and Twin system:	with 1 GB
for multi-module up to 4000 subscr.:	with 2 GB
for multi-module of more than 4000 subscr.:	with 4 GB

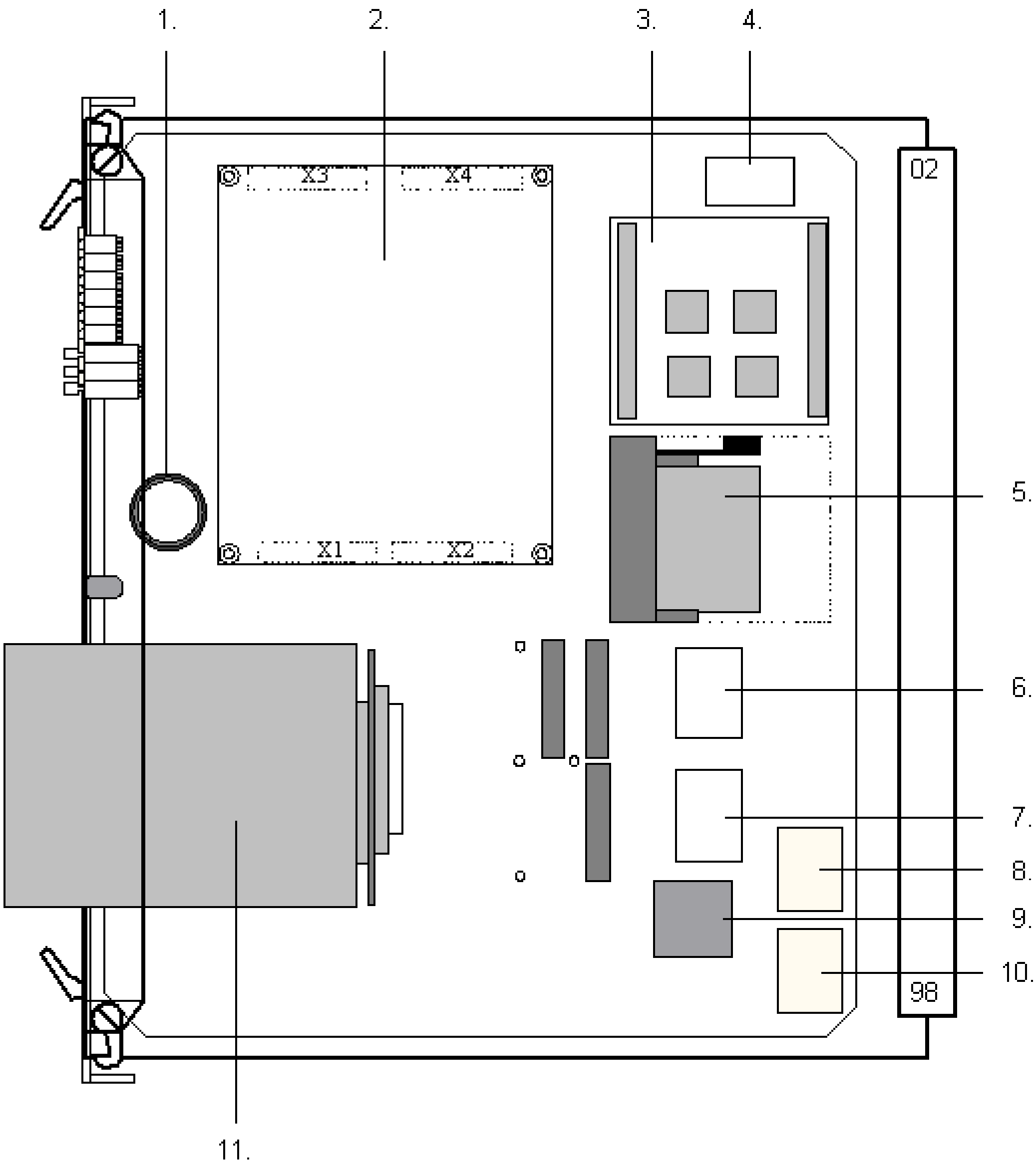
Handling, as well as switch and display functions of both boards are identical:

<table>
<tr><td colspan="2">Features</td></tr>
<tr><td rowspan="5">ETX-PC
The ETX-Board is a complet PC-System. All functions the current PCs offer are realized on this Board. Performance same as Pentium III/400MHz or higher.</td><td>512 MByte of main memory, (only one SO DIMM Modul)</td></tr>
<tr><td>Boot flash PROM with Phoenix Bios</td></tr>
<tr><td>Voltage generation</td></tr>
<tr><td>Real-time clock (RTC)</td></tr>
<tr><td>Hardware watchdog</td></tr>
<tr><td colspan="2">RTC battery (8 years buffer operation)</td></tr>
<tr><td colspan="2">Ethernet interface 10/100 Base T</td></tr>
<tr><td colspan="2">two V.24 interfaces (see AEV24B Adapter Ethernet V24 B Modul)</td></tr>
<tr><td colspan="2">Interface to the PCM highway (4 independent B channel accesses)</td></tr>
<tr><td colspan="2">PCI Bus (5V tolerant) 32Bit/33MHz</td></tr>
<tr><td colspan="2">Two CBus interfaces (ISA Bus)
on for system control reasons
one as SPY-remote Interface (SPY =System Protocoller and Analyser)</td></tr>
<tr><td colspan="2">IDE interface for HGS</td></tr>
</table>

The hardware prerequisites for remote logging with SPY are contained on the board.



ACB1 board, component side



ACB board, component side

1. Battery
2. ETX-PC
3. V24I/NI
4. Transformer 10/100 Base T
5. Boot Flash (Compact Flash Card)
6. PCM highway controller
7. PCM highway controller
8. CBI1A3 for SPY I55
9. EPLD

10. CBI1A3
11. HDD

The ACB is equipped with one of the following V.24 submodules:

- V.24I Insulated
- V.24NI Non-Insulated (basic configuration)

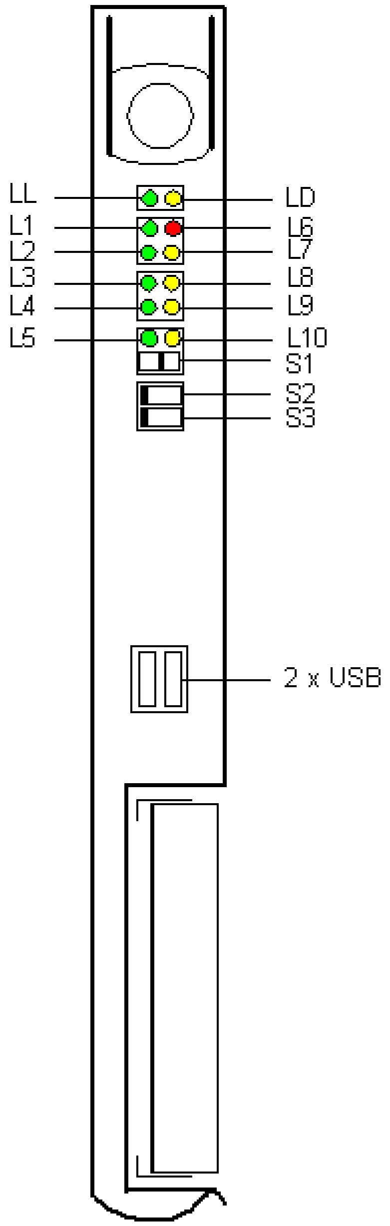
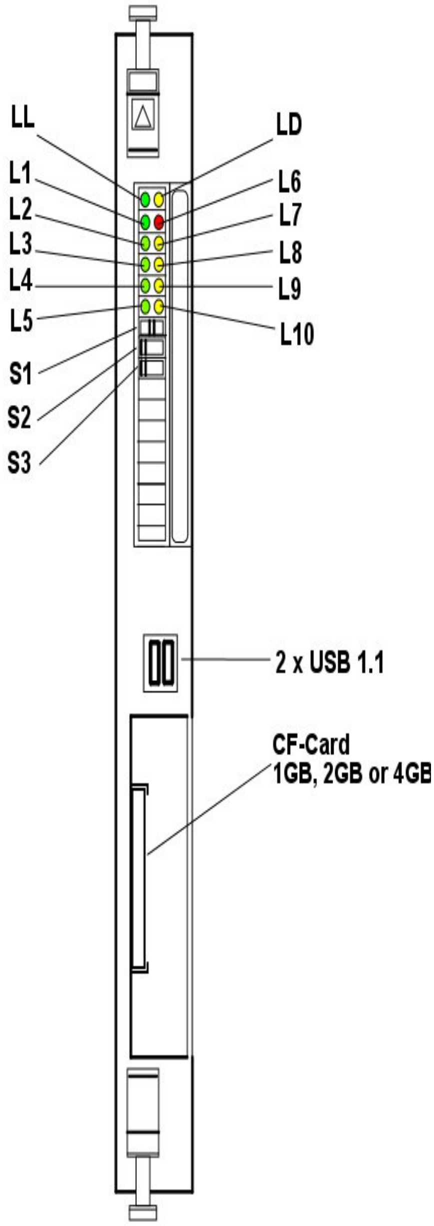
The following signals are available for the V.24:

- RXD
- TXD
- DTR
- GND
- DSR
- RTS
- CTS

Other features	
Power demand +5V	3.5A
The V24NI submodule is used as standard when connecting devices to the V.24 interfaces. If necessary, it is also possible to use the DC isolated V24I.	

AEV24B adapter Ethernet / V24 B module → 230

8.4.1.1 LEDs and Switch Functions

 ACB board, front side	 ATC board, front side

Switch Position in Normal Operation

S1	Neutral position
S2	Left position
S3	Left position

Switch Function

S1	**Reset switch**	
	Mean:	Operating status
	links:	Hardware Reset of the board, locking

	Right:	ACB is been shut down (by operating system), pushing
S2	**Hard Disk Change Request (HDCHR)**	
	links:	Operating status: IDE Hard Disk in operation
	Right:	Service position: Pulling out the IDE hard disk and plugging it back in
S3	**Service entry**	
	links:	The commissioning (OS, applications and customer's data load) is executed without break
	Right:	Before booting, the switch must be in the righthand position (reboot, power restoration). The boot phase is interrupted at a defined point. At this point an service access via ISM (WebMin) is possible. Changing of parameters as for example IP addresses or GCU slot address can be executed. Then the switch is to be brought in the left position. The service access is closed and a reboot is executed.

Meanings of LEDs

LL	On:	Ethernet connection status is OK
	off:	Ethernet connection status is interrupted
LD	On:	data transmission via Ethernet
	off:	no data transmission via Ethernet
L1	On:	The Ethernet interface of this module is connected to the network
	off:	The Ethernet interface of this module is not connected to the network
L2	On:	Alle the voltages of the board are present
L3	on or flashing:	Data transfer via the C bus
L4	on or flashing:	Access to the inserted background memory
L5	On:	Indicates that the HGS can be unplugged
	off:	Operating system does not allow pulling out the HGSs
L6	On:	Fault in GCU (collective display)
	off:	Operating status
L7 - L10	These light-emitting diodes show the statuses from reset to operation. After switching on the power a function check is executed (short flashing).	

If an error was recognized by SEM (System Error Management) which leads to a recovery (prozess restart or system shut down), the light-emitting diode L6 goes on (shines). The L7 to L10 remain unconsidered. If the recovery is finished, the L6 (red) is turned on for 5 sec. and afterwards is switched off. The status LEDs L7-L10 show now the actual system status.

The commissioning status is divided into eight groups:

1. Loading ACB from the flash software
2. Loading ACB from HGS at operating system level
3. Loading ACB from HGS at application level

4. Loading ACB in special status (APS change) during operation.

No.	L7	L8	L9	L10	Gr.	Status	Phase name
15	1	1	1	1	0	Commissioning starts	BIOS is running; LED test.
14	1	1	1	0	0	operating system takes over the funktion	Linux kernel is loaded. GRUB finished and initialization RAM-Disc started.
13	1	1	0	1	0	Load operating system via CBI	ACB board without HGS is loaded as a slave via C bus. Status 11 and 12 are skipped over.
12	1	1	0	0	0	Load operating system via Ethernet	ACB board without HGS is loaded as master via Ethernet. Status 11 and skipped over.
11	1	0	1	1	0	Load operating system via local bus	ACB board with HGS is loaded as master directly. Statuses 11 to 13 are not processed in the order.
10	1	0	1	0	0	Update flash SW	Flashsoftware ACB under development.
9	1	0	0	1	1	PAL startet	The pascal server is ready. All known pascal tasken will be started.
8	1	0	0	0	1	Download the application	Download Applikationfiles in progress.
7	0	1	1	1	3	Start of the platform applications	Start of the platform applications such as PFSP, PAL, L4AD.
6	0	1	1	0	3		
5	0	1	0	1	3		
4	0	1	0	0	3	APS change in progress (indication only at the IVL)	ACB with IVL funktion prepares an APS change.
3	0	0	1	1	2	Customer data conversion (display only at the IVL)	Customer data conversion (Started by MML CKDT is not displayed.).
2	0	0	1	0	2	Load APS customer data	DMS of the module signalls the phase loading customer data.
1	0	0	0	1	2	ICU commissioning	All customer data loaded. Start commissioning of the module(s).
0	0	0	0	0	2	Normal operation	Module(s) in operation

1 = LED on
0 = LED off

2 x USB	There are 16 USB devices preconfigurated. Beeing 8 of them designed for only TTY operation. Furthermore 4 are designed for the ACOM protocol and 4 as RAW, they are not used yet. By default all have the Host Index configured as group 1. But this can be changed by means of the Webmin at any moment. The USB devices are not connected normally with logical devices of the pascal applications. This must still be done via the Webmin interface. As soon as this is done, the pascal application (prolog task) will try to show its prompt (ˆC) on this new device. This activation can take up to one minute after the change of configuration data done by the Webmin. In the same way all other interfaces can be also configured (commissioning and shut down).

Reference numbers, that are available in the Ebuyer Tool:

4.999.096.855	USB Hub
4.999.096.856	USB/V24 adapter
4.999.100.643	USB/USB Laplink gold cable

8.4.1.2 Fan replacement

Replacement of defective fans in I55 systems with ACB

The ACB for standard systems is characterized by its relatively low heat generation. For this reason, even if no fan is used the risk that the processor reaches or exceeds the maximum operating temperature only exists under unfavourable conditions. Unfavourable conditions are a high room temperature (over 35 degrees C (95 degrees F)) and permanent high load (over 70 percent).

In the event of failure of one of the two fans we recommend replacing it within one week.

In the event of failure of both fans the CPU temperature and CPU usage (total load) of the ACB in question should be checked first (Webmin: Performance Management). If the CPU temperature is clearly below the limit value of 100 degrees C (212 degrees F) the defective fans should be replaced within the following two days. For safety reasons the CPU temperature should controlled at regular intervals until then. If the CPU temperature is only slightly below or even above the limit value the defective fans must be replaced as soon as possible.

Projects

Up to four ACBs shall be allowed per module. However, only two per frame to provide sufficient heat dissipation. The software can handle this (a confirmation test will be provided later), four per module were mentioned as the upper limit for systems with HSCB during the workshops with system specialists.

8.4.1.3 Removing and Inserting the board

The ACB board may be removed or inserted during system operation, if the S1 switch handle has been moved to the left.

In single module systems, removing the ACB board during operation will result in a total breakdown.

In multi-module systems, removing the ACB board will result in the failure of this module or of the central functions depending on the BS Confi data packet.

8.4.1.4 Operation ACB

Refer to handling specification HSP to ACB, APS IEE2.1

8.4.2 ASM3 Announcement Module 3

Short description

The announcement module ASM3 is a submodule of the DSPF.

The ASM3 variant is used in the CSI55 for recording and playback of ACD spoken announcements and for hotel applications. The corresponding hotel messages are pre-programmed in the hotel application.

Samples and announcements	
maximum number of samples recorded	1000
maximum total time recorded	32 minutes of announcements (PCM)
maximum number of simultaneous announcements	30
Samples in one announcement	up to 10

A sample is a recording with varied contents (music or spoken text).

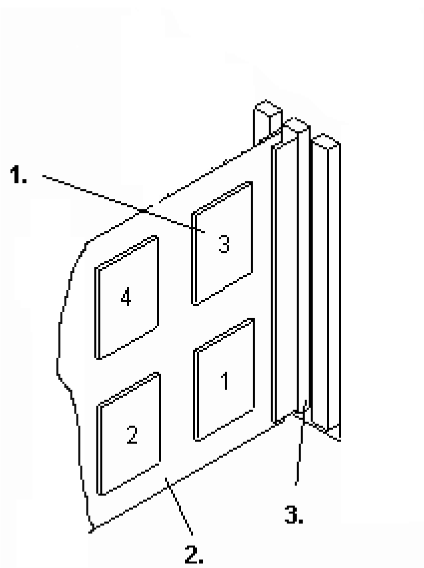
An announcement can be repeated several times, or even infinitely.

The 30 announcement channels are handled and managed as a digital port with 30 channels.

Each ASM3 also provides two additional channels for the recording of samples for ACD application. These samples are initially available as WAV files, and are loaded to the ASM3 by means of PC application (ACD user interface). The 2 recording channels are handled and managed as a digital port with 2 channels.

Other features	
Power demand +5V	300 mA

Each ASM3 can occupy up to 32 channels.



Location of the ASM3 on the DSPF module

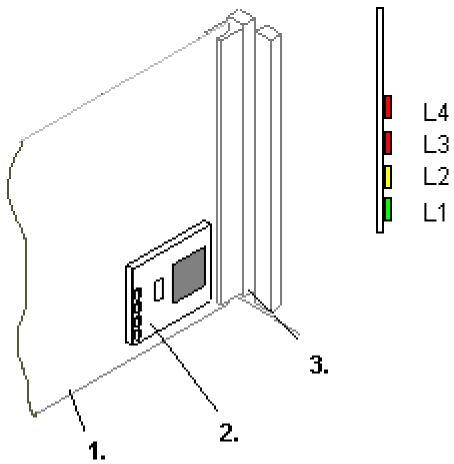
1. ASM3 Module
2. DSPF Module
3. Connecting circuit slot

8.4.3 CBI1A3 CBus Interface 1 Adapter Version 3

Short description

The CBI receives a message (data packet) from the micro processor and stores it internally in a buffer memory. Once the message has been completely entered from the micro processor (cyclic recording), the CBI sends the packet via the C-bus to the specified destination CBI. This CBI stores the packet internally and offers it to its micro processor (typ. per interrupt). The micro processor then receives the packet via cyclic readout from the CBI. The CBIs receiving and transmitting parts work independently of each other.

The CB1A3 is used on the HSCB board. Only one package for transmission and reception can be stored internally at any one time.



CBI1A3 submodule on the BG HSCB

1. BG HSCB module
2. CBI1A3 Module
3. HSCB slot

LED Denotations

L1	on:	High data traffic
	flashing:	Data packet being received/sent to/from the micro processor
L2	flashing:	Packet loss in transmission buffer because of transmit time-out or reset, or synchronization fault in the micro processor
L3	flashing:	Packet loss in receiver buffer because of receive time-out or reset

L4	on:	Abnormal operating status e.g.: • CBI cannot be used to transmit and receive • Reset status
	flashing weakly:	1 MBit of data has been transmitted on the C-bus.

8.4.4 CF22 Central Functions 22

Short description

The central board CF22 is the basic equipment in all modules. It replaces the CF2E board.

It supports:

- the dealer functions
- intermodule handover functions for DECT
  and
- call number display for incoming calls to analogue terminals (”CLIP” Calling Line Identification Protocol). As opposed to CF2E it only features one DSP system.

Features	
Ports	544
B channels (time slots)	1088
ILMx	+
DECT	+
Internal traffic flow	1088 Erl.
External traffic flow	225 Erl.

Features
Clock Supply and Module Synchronization
External synchronization via network nodes (S0, S2M).
Master function in multi-module systems can be set up using software.
Master free-run clock mode (internal clocking)

Module Switching Matrix
Bit rate 4,096 MBit/s
Module internal non-blocking

11 DTMF receiver sets, 4 DTMF transmitters (only for dialling)

Call Progress Tones
A maximum of 16 call progress tones can be generated as customer-specific or country-specific and can be cyclically repeated. At the same time unrestricted supply is possible.
In addition, a maximum of 3 tones with burst character can be supplied.

Short Voice Messages
Up to 8 voice messages or “music on holds” can be used. The total duration of **all** brief voice messages must be no longer than 64 sec.

Long Voice Messages
4 voice messages with unspecified time limits and confidata can be set up (connecting message devices via analogue subscriber line circuits). At the same time unrestricted supply is possible.

Tone Injection in Two-Party Conversations
Up to 3 various cyclic tones can be generated which may be fed into a maximum of 15 two-party conversations (e.g. call waiting tone, rolling tone etc.).

Conferences
The system software only allows three-party conferences. Only dealer terminals support conferences with more participants.

Call number ID
8 DTMF transmitters for CLIP (call nummer indication on analogue terminals for incoming calls)

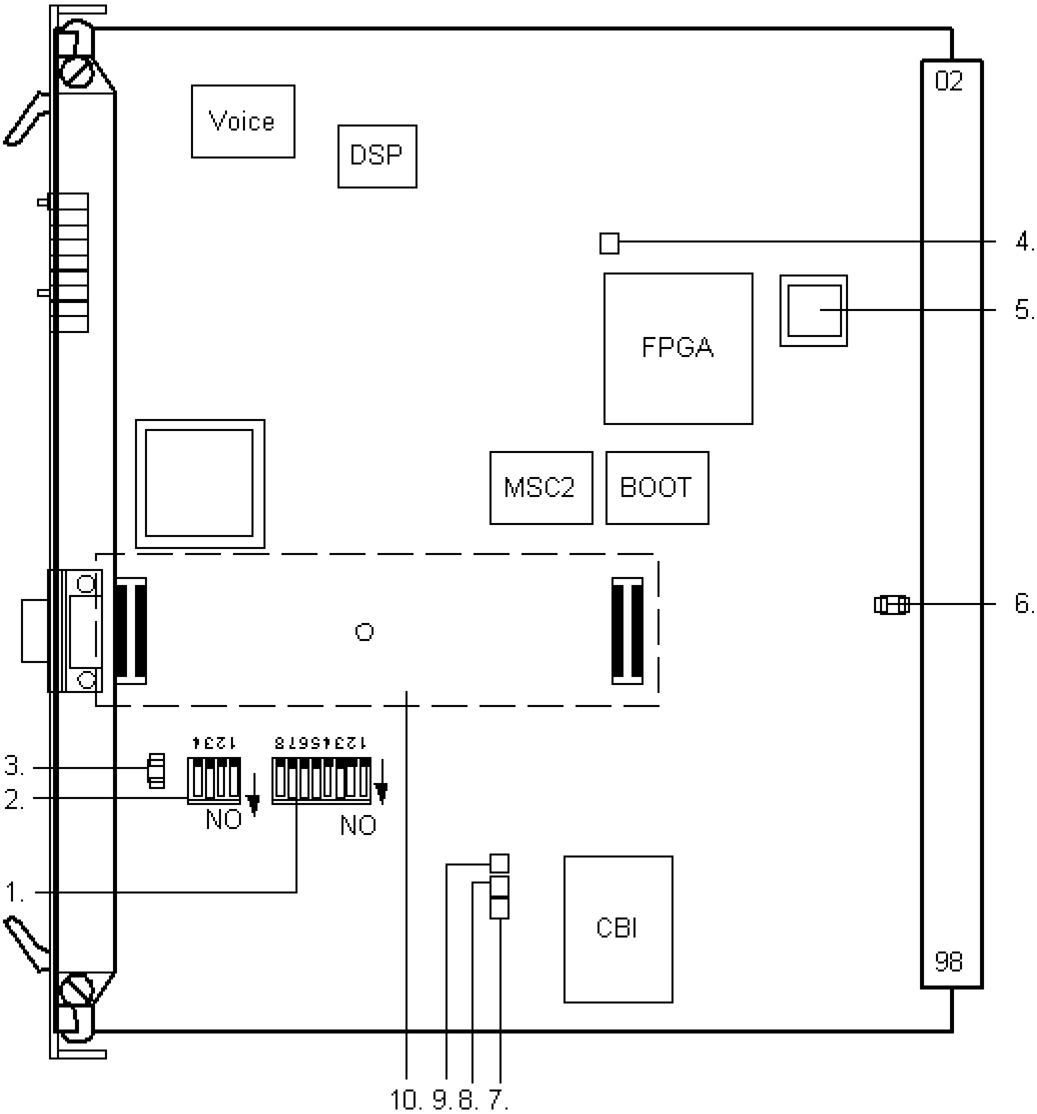
Other features	
Power demand +5V	1400 mA

A high precision reference clock is required for the intermodule handover functions. This can be carried out through the use of the CL2M submodule on the UIP or ICF. See also Intermodule Handover section.

If fibre-optic links are used, the CF22 board is to be fitted with the submodule CFIML Central Function Inter Module Link.

8.4.4.1 Jumper and DIL Switch Functions

Configuration switches are located on the component side of the board. The functions and positions of these switches are described below:



CF22 board, component side

1. DIL switch, 8-part
2. DIL switch, 4-part
3. Fuse F2 for the power supply EOC, 500 mA replaceable
4. LED red:
   Loadable hardware of the board out of service
   Operation of the board is not possible
5. FPGA Boot/Load PROM
6. Fire protection fuse 7A

	If the fire protection fuse is defective (burned out), the board must be replaced by a new one.

7. LED green: R/T active
   on: High data traffic
   flashing: Data packet being received/sent to/from the micro processor
8. LED yellow: TFAIL
   flashing: Packet loss in transmission buffer because of transmit time-out or reset, or synchronization fault in the micro processor
9. LED red: RFAIL
   flashing: Packet loss in receiver buffer because of receive time-out or reset
10. CFIML submodule Central Function Inter Module Link

Functions of the DIL Switches, 8-part

	Switch	Switch
System configuration for MMG	1	3
Single module system	ON	ON
Two module system, first module	ON	OFF
Two module system, second module	OFF	ON
Two module system, systems with more than two modules	OFF	OFF
Specification of highest scan address	2	4
35	ON	ON
55	ON	OFF
87	OFF	ON
126 **(Default)**	OFF	OFF
Battery status query (AIC)		5
Testing of -48 V battery is not possible		ON
(Default)		
Testing of -48 V battery active		OFF
When using PS350 with a connected battery (only Integral 33): Switching on the battery voltage monitoring		
Error signalling unit		6
with ESU		ON
without ESU		OFF

In order to get the correct signalling direction ATA with EE8B in a communication server Integral 55 with ESBA instead of ESB, switch 6 must be placed to ON (with ESU).

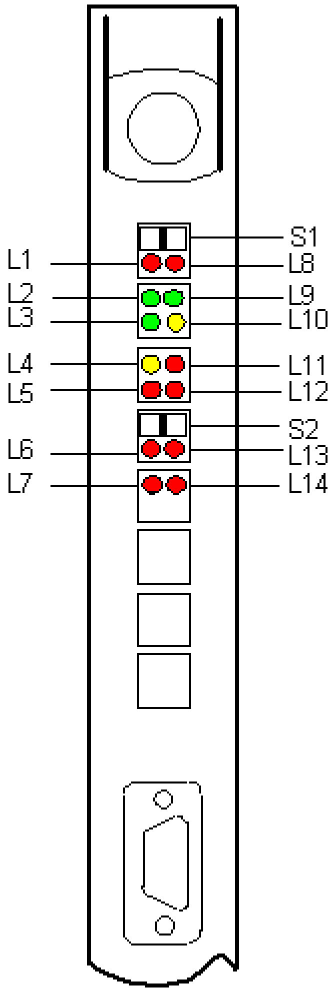
	Switch
Download	7
Download inactive	ON
Download possible **(default)**	OFF
Module Manager Watchdog	8

Watchdog inactive	ON
Watchdog active **(default)**	OFF

Functions of the DIL Switches, 4-part

	Switch
Intermodule handover	1
for twin and multi-module configuration: Intermodule handover active between modules	ON
for twin and B3 configuration: Intermodule handover not active between modules	OFF
Optical waveguide length compensation (only with doubled CF2E)	2
Activation of the length compensation function for the default passive CF slot	ON
Deactivation of the length compensation function for the default passive CF slot	OFF
Switch still without function	3
Switch still without function	4

8.4.4.2 LEDs and Switch Functions



CF22 board, front side

Switch Position in Normal Operation

S1	Middle position
S2	Middle position

Switch Function

S1	Reset switch	
	Middle:	Operating status
	Left:	Reset of the board, locking
	Right:	Reset board, keying
S2	Service Switch	
	Middle:	Operating status
	Left:	No function, locking
	Right:	With a doubled CF2x: Activate switchover, keying

Meanings of LEDs

L1	ACTIVE	MSMC active/inactive
	on:	MSMC (switching matrix processor unit) resetting/inactive
	flashing:	MSMC downloading or waiting for commissioning
	off:	MSMC active
L2	CLKUA	Clock unit active
	on:	Normal operation: Active module clock unit
L3	IMHOSYNC	
	on:	Module is synchronised for DECT operation
	flashing:	Resynchronization (flashes for 30 sec.)
	off:	Module is not synchronised for DECT operation
		This operating status may also occur if switch 1 of DIL switch 2 is in the **ON** position (IMHO active) while LED L4 is **on**.
L4	MAFREI	
	on:	Master free-run clock mode (internal clocking) or external synchronization (if L10 is also on)
	flashing:	Internal free-run clock mode (internal clocking) after failure of synchronous clock via beam waveguide path
L5	AMEX1S	Alarm message ext. synchr. clock 1 sec.
	on:	Failure of synchronizing clock signal for more than 1 sec. (with master module: clock pulse from local exchange, network node; with slave module: clock pulse via fibre-optic cable)
L6	DSP-LED1	Status - LED
	on:	Boot phase after board reset or DSP system permanently defective
	flashing:	temporary synchronization fault on a DSP Highway
	off:	DSP system in operation
L7	TFAIL	
	on or flashing:	One or more C-bus transmit errors
	off:	C-bus in operation. CFIML submodule not inserted into the CF22.
L8	MMG	MMG status
	on:	MMG not in operation (no board operation) or defective beam waveguide connection (after CF reset in multi-module system)
	flashing:	MMG in operation, but board logon not yet possible
	off:	MMG in operation
L9	CLKUSYN	Clock unit synchronization
	on:	Module clock system is synchronized
L10	MANK	Master network node
	on:	External synchronous clock switched on for synchronization by the system software
L11	IDR	IDR fault from IMLA (e.g. beam waveguide not in order)
L12	ECLKU	Error clock unit
	on:	Clock system error
	flashing:	After failure of synchronous clock via beam waveguide
L13	DSP-LED2	Status - LED
	on:	Boot phase after board reset or DSP system permanently defective

	flashing:	temporary synchronization fault on a DSP Highway
	off:	DSP system in operation
L14	RFAIL	
	on or flashing:	One or more C-bus receive errors
	off:	C-bus in operation. CFIML submodule not inserted into the CF22.

8.4.4.3 Doubling

It is possible to double the CF22 board in the R1 rack.

SeeDoubling → 143

8.4.4.4 Removing and Inserting the board

ESD-measures must be accomplished when working with boards susceptible to electrostatic shock.

The CF22 board can be removed or inserted during system operation. However, the module will not operate if the CF22 is not doubled.

Removal of the board is followed by a restart without loading customer data.

	When doubling, the CF22 board may only be removed when in passive status (LED 2 off). If LED 2 is on, place switch S2 into the right position. LED 2 Off The board can now be removed.

8.4.5 CF2E Central Functions 2E

Short description

The central board CF2E is the basic equipment in all modules.

It supports the dealer and intermodule handover functions for DECT.

Features	
Ports	544
B channels (time slots)	1088
ILMx	+
DECT	+
Internal traffic flow	1088 Erl.
External traffic flow	225 Erl.

Features
Clock Supply and Module Synchronization
External synchronization via network nodes (S0, S2M).
Master function in multi-module systems can be set up using software.
Master free-run clock mode (internal clocking)

Module Switching Matrix
Bit rate 4,096 MBit/s
Module internal non-blocking

11 DTMF receiver sets, 4 DTMF transmitters

Call Progress Tones
A maximum of 16 call progress tones can be generated as customer-specific or country-specific and can be cyclically repeated. At the same time unrestricted supply is possible.
In addition, a maximum of 3 tones with burst character can be supplied.

Short Voice Messages
Up to 8 voice messages or “music on holds” can be used. The total duration of **all** brief voice messages must be no longer than 64 sec.

Long Voice Messages
4 voice messages with unspecified time limits and confidata can be set up (connecting message devices via analogue subscriber line circuits). At the same time unrestricted supply is possible.

Tone Injection in Two-Party Conversations
Up to 3 various cyclic tones can be generated which may be fed into a maximum of 15 two-party conversations (e.g. call waiting tone, rolling tone etc.).

Conferences
The number of subscribers at a conference is 3.

Other features	
Power demand +5V	2200 mA

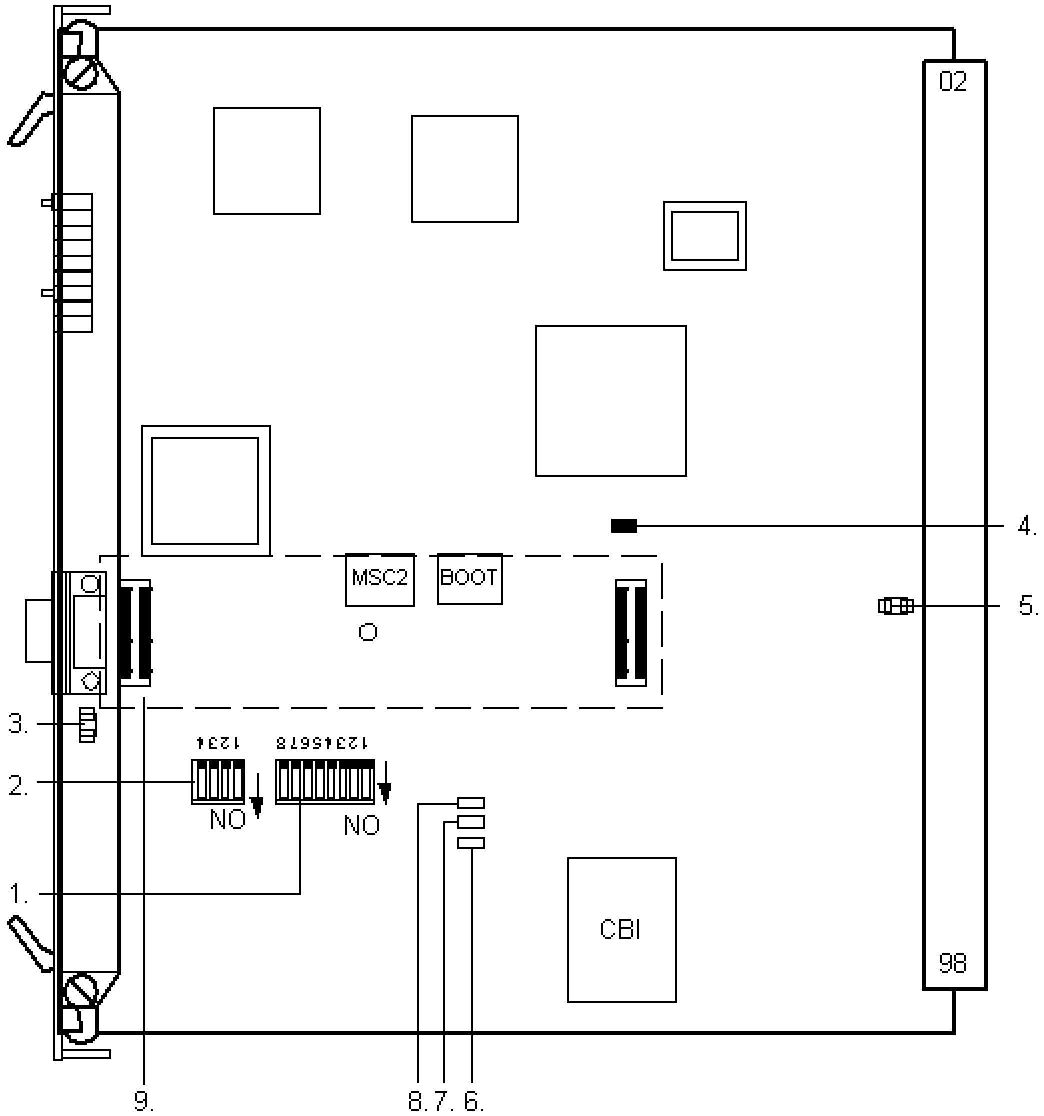
	The CF2E board is supported from the programme file MSC2P006 onwards.

A high precision reference clock is required for the intermodule handover functions. This can be carried out through the use of the CL2M submodule on the UIP or ICF. See also Intermodule Handover section.

In coupling via LWL, the CF2E module is to be fitted with the submodule CFIML central function inter module Link.

8.4.5.1 Jumper and DIL Switch Functions

Configuration switches are located on the component side of the board. The functions and positions of these switches are described below:



CF2E board, component side

1. DIL switch 3
2. DIL switch 2
3. Fuse F1 for the power supply EOC, 500 mA replaceable
4. LED red:
   Fault indicator of the central functions
   Hardware out of order
5. Fire protection fuse F3, 7 A

⚠	If the fire protection fuse is defective (burned out), the board must be replaced by a new one.

6. LED green: R/T active
   on: High data traffic
   flashing: Data packet being received/sent to/from the micro processor.
7. LED yellow: TFAIL
   flashing: Packet loss in transmission buffer because of transmit time-out or reset, or synchronization fault in the micro processor
8. LED red: RFAIL
   flashing: Packet loss in receiver buffer because of receive time-out or reset
9. CFIML submodule Central Function Inter Module Link

Functions of the DIL Switch 3

	Switch	**Switch**
System configuration for MMG	1	3
Single module system	ON	ON
Two module system, first module	ON	OFF
Two module system, second module	OFF	ON
Two module system, systems with more than two modules	OFF	OFF
Specification of highest scan address	2	4
35	ON	ON
55	ON	OFF
87	OFF	ON
126 **(Default)**	OFF	OFF
Battery status query (AIC)		5
Testing of -48 V battery is not possible		ON
(Default)		
Testing of -48 V battery active		OFF
When using PS350 with a connected battery (only Integral 33): Switching on the battery voltage monitoring		
Error signalling unit		6
with ESU		ON
without ESU		OFF

In order to get the correct signalling direction ATA with EE8B in a communication server Integral 55 with ESBA instead of ESB, switch 6 must be placed to ON (with ESU).

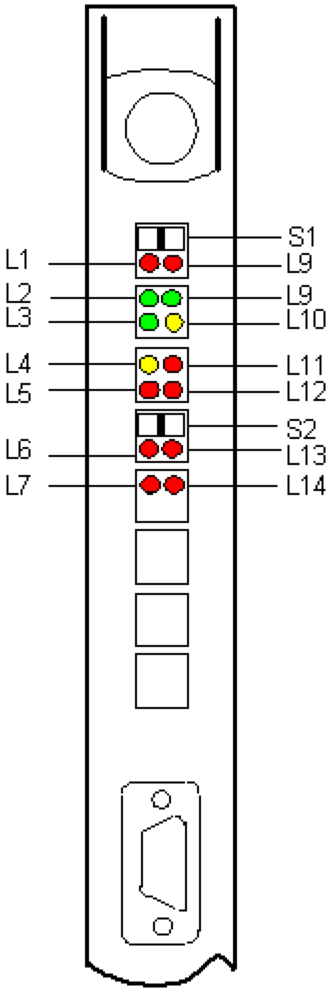
	Switch
Download	7

Download inactive	ON
Download possible **(default)**	OFF
Module Manager Watchdog	8
Watchdog inactive	ON
Watchdog active **(default)**	OFF

Functions of the DIL Switch 2

	Switch
Intermodule handover	1
for twin and multi-module configuration: Intermodule handover active between modules	ON
for twin and B3 configuration: Intermodule handover not active between modules	OFF
Optical waveguide length compensation (only with doubled CF2E)	2
Activation of the length compensation function for the default passive CF slot	ON
Deactivation of the length compensation function for the default passive CF slot	OFF
Switch still without function	3
Switch still without function	4

8.4.5.2 LEDs and Switch Functions



CF2E board, front side

Switch Position in Normal Operation

S1	Middle position
S2	Middle position

Switch Function

S1	Reset switch	
	Middle:	Operating status
	Left:	Reset of the board, locking
	Right:	Reset board, keying
S2	Service Switch	
	Middle:	Operating status
	Left:	No function, locking
	Right:	With a doubled CF2x: activate switchover, keying

Meanings of LEDs

L1	ACTIVE	MSMC active/inactive
	on:	MSMC (switching matrix processor unit) resetting/inactive
	flashing quickly:	MSMC downloading
	flashing slowly:	MSMC waiting for startup
	off:	MSMC active
L2	CLKUA	Clock unit active
	on:	Normal operation: Active module clock unit
		Doubling: active CF2x
L3	IMHOSYNC	
	on:	Module is synchronised for DECT operation
	flashing:	Resynchronization (flashes for 30 sec.)
	off:	Module is not synchronised for DECT operation
		This operating status may also occur if switch 1 of DIL switch 2 is in the **ON** position (IMHO active) while LED L4 is **on**.
L4	MAFREI	
	on:	Master free-run clock mode (internal clocking) or external synchronization (if L10 is also on)
	flashing:	Internal free-run clock mode (internal clocking) after failure of synchronous clock via beam waveguide path
L5	AMEX1S	Alarm message ext. synchr. clock 1 sec.
	on:	Failure of synchronizing clock signal for more than 1 sec. (with master module: clock pulse from local exchange, network node; with slave module: clock pulse via fibre-optic cable)
L6	DSP System 1	Status - LED
	on:	Boot phase after board reset or DSP system 1 defective
	off:	DSP system 25.40 mm operation
L7	TFAIL	
	flashing:	Packet loss in transmission buffer because of transmit time-out or reset, or synchronization fault in the micro processor
L8	MMG	MMG status
	on:	MMG not in operation (no board operation) or defective beam waveguide connection (after CF reset in multi-module system)
	flashing:	MMG in operation, but board logon not yet possible
	off:	MMG in operation
L9	CLKUSYN	Clock unit synchronization
	on:	Module clock system is synchronized
L10	MANK	Master network node
	on:	External synchronous clock switched on for synchronization by the system software
L11	IDR	IDR fault from IMLA (e.g. beam waveguide not in order)
L12	ECLKU	Error clock unit
	on:	Clock system error
	flashing:	After failure of synchronous clock via beam waveguide

L13	DSP System 2	Status - LED
	on:	Boot phase after board reset or DSP system 2 defective
	off:	DSP system 2 in operation
L14	RFAIL	
	flashing:	Packet loss in receiver buffer because of receive time-out or reset

8.4.5.3 Doubling

It is possible to double the CF2E board in the R1 rack.

SeeDoubling → 143

8.4.5.4 Removing and Inserting the board

ESD-measures must be accomplished when working with boards susceptible to electrostatic shock.

The CF2E board can be removed or inserted during system operation. However, the module will not operate if the CF2E is not doubled.

Removal of the board is followed by a restart without loading customer data.

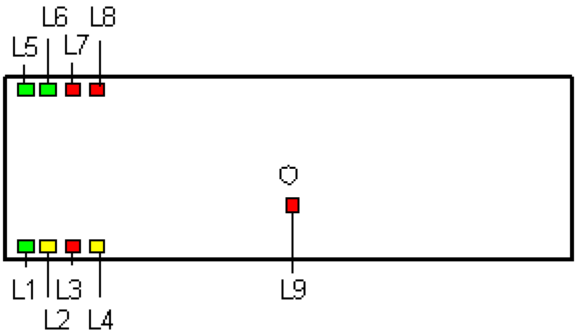
	When doubling, the CF2E board must only be removed when in passive status (LED 2 off). If LED 2 is on, place switch S2 into the right position. LED 2 Off The board can now be removed.

8.4.6 CFIML Central Functions Inter Module Link

Short description

The CFIML submodule is inserted in the CF22/CF2E board if this is connected via fibre-optic cable in twin or multi-module operation.

It is connected with the CF22/CF2E via two SMD pin strips.



CFIML board, soldering side

Meanings of LEDs

L1	on:	High data traffic
	flashing:	Data packet being received/sent to/from the micro processor
L2	flashing:	Packet loss in transmission buffer during regulatory transmit time-out or reset.
L3	flashing:	Packet loss in receiver buffer during regulatory receive time-out or reset.
L4	on:	• CBI cannot be used to transmit and receive. • Warm start or master reset. • FIFO is full (100%) in transmission or receiver direction
	flashing weakly:	Further data has been transmitted with 1 MByte/sec capacity.
L5	on:	IML path is frame synchronous.
L6	on:	IML path is ready to transmit C-bus data.
L7	on:	IML path is not ready to receive C-bus data in receiving direction.
L8	on:	IML path is not ready to receive C-bus data in transmitting direction.
L9	on:	ASICS loading procedure incomplete. CFIML out of operation

8.4.7 CL2M Clock 2 Module

Short description

The submodule CL2M on the UIP or ICF board implements an external clock supply for the PBX or a clock pulse output for external devices.

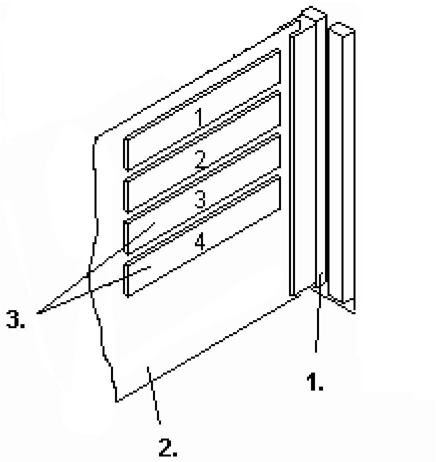
Use on	
UIP	receiver and transmitter 2048 kHz
ICF	receiver 2048/1544 kHz

This is necessary if digital dial-up lines or permanent connections are not available as the clock source, or if the customer has made high demands in terms of the reliability of the clock supply.

Other features	
Power demand +5V	100 mA

If the CL2M is positioned on slot 1 or 2 of the UIP, the line can be connected via the CA1B board.

With slots 3 or 4 occupied and V24M (slot 1 or 2) being used, the line must be connected via the CA3B board.



Location of CL2M on the UIP board

1. Connecting circuit slot
2. UIP module
3. CL2M module

8.4.8 CL2ME Clock 2 Module Extended

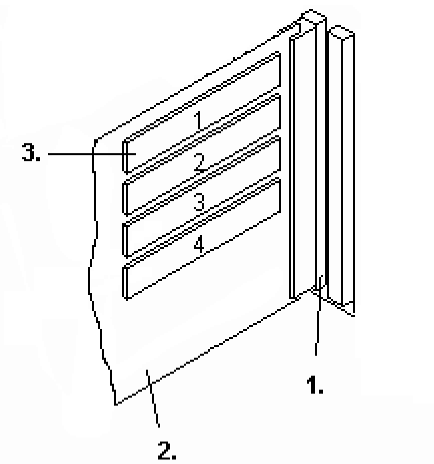
Short description

The CL2ME submodule is used to implement an external clock supply by means of a high precision reference clock (TAREF). This is needed if DECT Intermodule Handover is used in twin and multi-module configurations..

Use on	
UIP/ICF	Receiver 2048 kHz

Other features	
Power demand +5V	100 mA

If the CL2ME is positioned on slot 1 of the UIP, the line can be connected via the CA3B/T board.



Location of CL2ME on the UIP board

1. Connecting circuit slot
2. UIP module
3. CL2ME board

8.4.9 DSPF Digital Signal Processing Function

Short description

The DSPF as the basic board accommodates the ASM3 announcement module. The announcement module serves for recording and playback of ACD spoken announcements and for hotel applications. Depending on the application the DSPF can be equipped with up to:

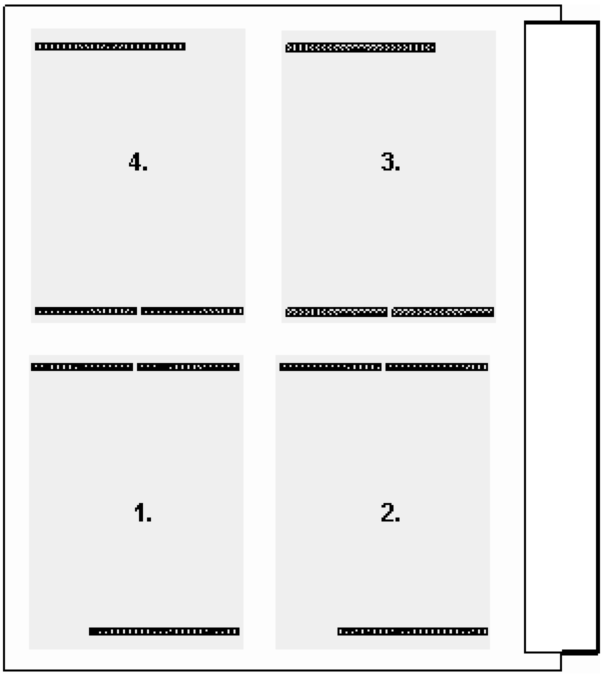
4 ASM3	for access to 128 time slots	in I55
2 ASM3	for access to 64 time slots	in I55C

Other features	
Country of application	National and international
Power demand +5V	850 mA

For more detailed information about configuration with ASM3 please refer to the service manual.

8.4.9.1 Inserting the submodule

The used ASM3 modules are inserted in the submodule slots “submodule 1” - “submodule 4” of the DSPF.



DSPF board, component side

1. Submodule 1
2. Submodule 2
3. Submodule 3
4. Submodule 4

The position must correspond to the setting in the confidata. The following allocation must be observed:

“Submodule number” parameter in the ICU Editor	Labelling	Labelling on the DSPF board
0	Submodule 1	SUB1
1	Submodule 2	SUB2
2	Submodule 3	SUB3
3	Submodule 4	SUB4

8.4.9.2 Time slot management

Each ASM3 submodule represents an ICU. This means that one DSPF board can implemented a maximum of 4 ICUs. The ICU of the physical slot of the board logs on with the ICU type DSFM (DSPF Master). The other (up to 3) ICUs are implemented on the same hardware by means of logical address entries in the CBI, and log on with the ICU type DSFS (DSPF Slave).

This means that the DSPF must have access to a total of 128 time slots. Because the slots in the Integral 55xE generally only have 32 time slots, access must be enabled as follows.

The DSPF uses:

Time slots of the DSPF slot	ICU TYPE DSFM
Time slots of the Auxiliary Highway, Part 1 - AUX1	ICU TYPE DSFS 1)
Time slots of the Auxiliary Highway, Part 2 - AUX2	ICU TYPE DSFS 1)
Time slots of the slot to the right of the DSPF	ICU TYPE DSFS 2)

1) Access to AUX1 and AUX2 is possible in each module to the left of the CF board. The time slots of the Auxiliary Highway are available only once per module.

2)In order to gain access to the time slots of the right slot, the DSPF must be configured on an odd slot.

These events provide the following framework conditions:

One DSPF with four submodules

- must use the AUX1 and AUX2
- can be configured only once in each module
- must be set up on an odd slot to the left of the CF circuit board

Every other DSPF (within the same module)

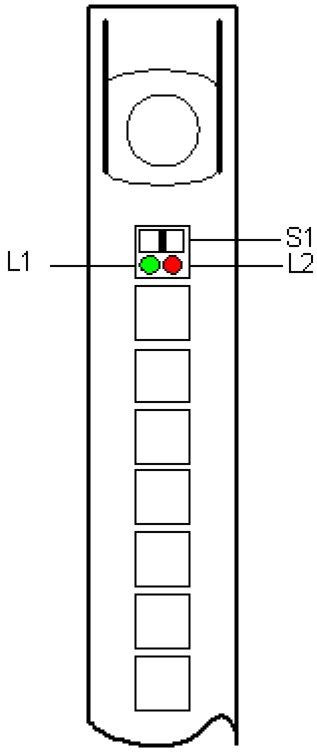
- has access to a maximum of 64 time slots (DSPF slot and slot to the right of the DSPF)
- can consequently supports two modules only
- must be set up on an odd slot (to the right of the CF also possible)

In accordance with the above conditions, each submodule slot and thus an ICU can be assigned an application (ACD or HOTCOM). This means that it is also possible to operate different applications on a DSPF. For example, four submodules could be set up for ACD, three for ACD and one for HOTCOM or two for ACD and two for HOTCOM, as well as any other possible configuration.

Setting up of the DSFM and DSFS ICUs prior to operation of the PBX is implemented using the KAD/CAT application and during operation using the ICU Editor service and management programme.

A connection to the MDF is not implemented at present.

8.4.9.3 LEDs and Switch Functions



DSPF board, front panel

Meaning of the switch on the front panel of the DSPF board

Up to 4 ICUs (1* DSFM and 3 * DSFS) can be implemented on the DSPF board. The common status of the ICUs can be controlled via the S1 front panel switch as follows:

S1	**Reset and blocking switch**	
	Middle position	All ICUs in operating status
	Left position	All ICUs in preparatory disabling
	Right position	All ICUs in reset
	Left position after board reset	Master ICU DSMF (DSPF board) receives a forced ICU download. After commencing the loading process, the switch must be returned to the middle position.

Meaning of the LEDs on the front panel of the DSPF board

Up to 4 ICUs (1* DSFM and 3 * DSFS) can be implemented on the DSPF board. The common status of the ICUs is displayed via the two front panel LEDs L1 and L10 according to the following pattern:

The display appears according to priority, i.e., if several functions of the scheme are represented by one LED, the one with the highest priority is implemented. Prio 1 is the highest priority, and prio 5 the lowest. In the cases with priority 1, the board is still in the reset or download phase, whereby the additional ICUs (DSFS) are not yet active.

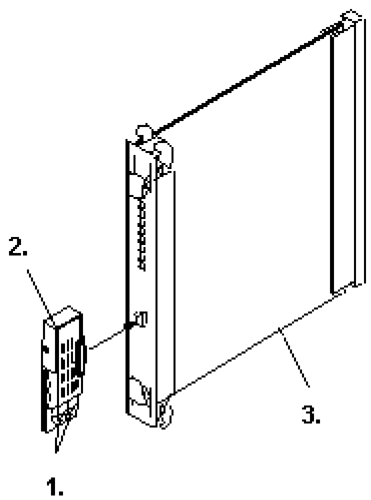
L1	flashing 5Hz	At least 1 ICU is still in startup, waiting for “Switching On” message	Prio 2
	flashing 1 Hz	All ICUs are preparatory disabled, the board is removeable	Prio 3

	an (in)	At least 1 ICU has a seizure in terms of switching technology in at least one channel. All ICUs (entire board) are in reset processing (if L10 is also on)	Prio 4 Prio 1
	off	All ICUs are in a resting state with their ports, the board is not occupied	Prio 5
L2	flashing 5Hz	At least 1 ICU is still waiting for commissioning Master ICU DSFM (DSPF board) ICU Download in progress	Prio 2 Prio 1
	flashing 1 Hz	/	Prio 3
	an (in)	Master ICU DSFM (DSPF board) in reset processing (if L1 is also on) Master ICU DSMF (DSPF board) Programming procedure in ICU download	Prio 1 Prio 1
	off	All ICUs in operation	Prio 4

8.4.10 EOCPF Electrical Optical Converter Plastic Fibre

Short description

EOCPF is an electrical optical interface for the connection of modules via PF conductors in both transmitting and receiving directions and can be installed onto the CF22, CF2E, MLB and ICF boards.



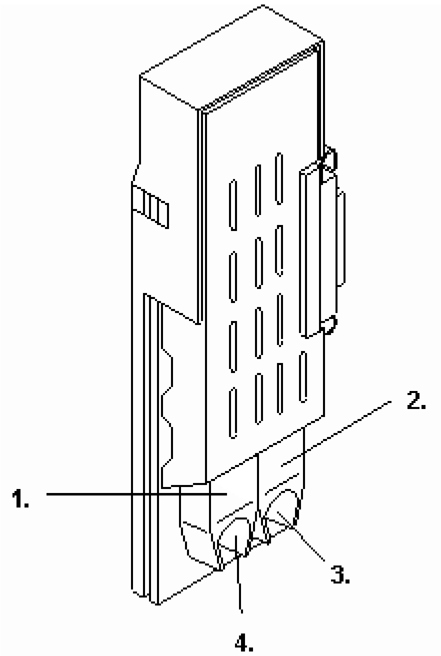
EOCPF submodule on the CF2E board

1. PF Connector
2. EOCPF Module
3. CF2E module

Fibre-optic cable length	
EOCPF	max. 40 m

Other features	
Country of application	National and international
Power demand +5V	180 mA
EOCPF submodule, can be inserted on the front side of the boards mentioned above.	
Max. transmission rate: aprox. 40 MBit/s	

	Observe the color coding when inserting the PF cable into the EOCPF submodule.



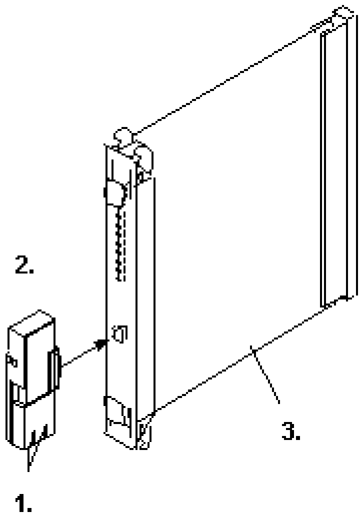
EOCPF, connectors for LWL

1. blue
2. grey
3. Transmitter
4. Receiver

8.4.11 EOCSM/MM Electrical Optical Converter

Short description

The two boards EOCSM (SM = Single Mode) and EOCMM (MM = multi-mode) are intended as interfaces for use in the twin module and in multi-module systems.



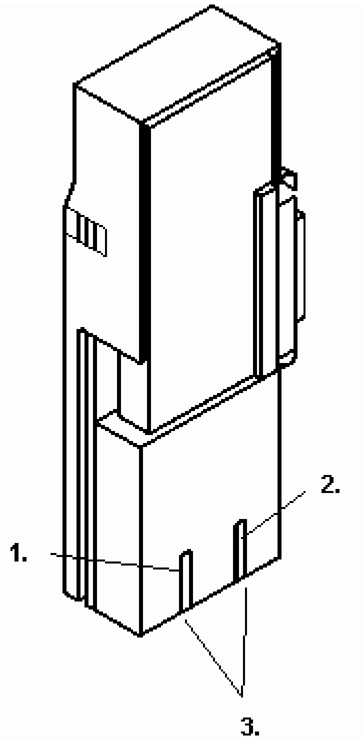
EOCSM/MM module on the CF2E board

1. LWL connector
2. EOCSM or EOCMM Module
3. CF2E module

Fibre-optic cable length	
EOCSM	15 km (single-mode graded-index fibre)
EOCMM	7 km (multi-mode graded-index fibre)

Other features	
Country of application	National and international
Power demand +5V	180 mA

When inserting the LWL cable into the EOCSM/MM submodules, it must be remembered that the “transmit” connector of one EOCSM/MM connects to the “receive” connector of another EOCSM/MM and vice versa.



EOCSM/MM, Connectors for the LWL

1. Sending
2. Receiving
3. FOC

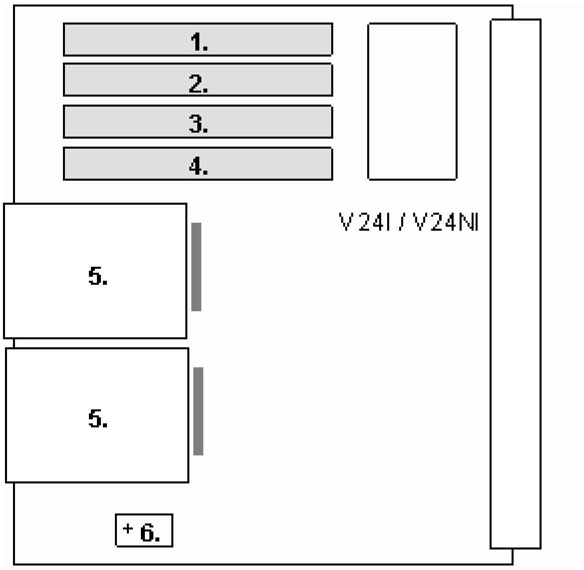
8.4.12 HSCB High Speed Computer Board

Short description

HSCB is the basic equipment in all modules. It is a computer board with dynamic RAM.

Features
Optionally with parity
128 kByte ERROR flash-PROM
512 kByte Boot flash-PROM
Buffered real time clock
Two-level hardware watchdog
Hardware status register
C-bus interface
4 B channel accesses
2 V.24 interfaces
Downloadable
2x PC card/ATA interfaces for 1.8” PC card driver with ATA mode. Hard disk drives with 260 MB or 1 GB (for large systems) are available for these interfaces.

Other features		
Application	Basic equipment in all modules	
Power demand +5V	1900 mA	without HGS
	2400 mA	with 1 HGS (startup current)
	2900 mA	with 2 HGS (startup current)
The drives can be replaced during operation.		
The V24NI submodule is used as standard when connecting circuits to the V.24 interfaces. If necessary, it is also possible to use the DC isolated V24I.		
Additional Memory	If additional memory submodules (PS2) are inserted into the HSCB, it should be taken into account that the **first** memory slot must always be occupied. The inserted PS2 memory modules must have an access time of 60 ns.	



HSCB board, component side

1. Memory 4
2. Memory 3
3. Memory 2
4. Memory 1
5. HGS
6. Battery

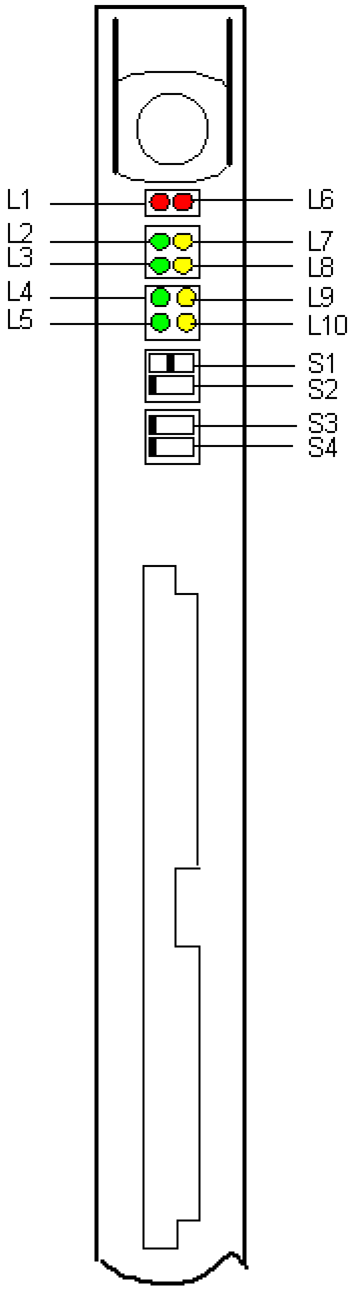
The HSCB is equipped with one of the following V.24 submodules:

- V.24I Insulated
- V.24NI Non-Insulated (basic configuration)

The following signals are available for the V.24:

- RXD
- TXD
- DTR
- GND
- DSR
- RTS
- CTS

8.4.12.1 LEDs and Switch Functions



HSCB board, front side

Switch Position in Normal Operation

S1	Middle position
S2	Left position
S3	Left position
S4	Left position

Switch Function

S1	Reset switch and MI button	
	Middle:	Operating status
	Left:	Reset board, locking (see S2)
	Right:	Monitor interruption (TENOBUG start), keying
S2	Memory test switch	
	Left: (Standard)	No memory test when resetting/restarting
	Right:	Memory test when reseting/reloading the TC system
S3	Hard Disk Change Request (HDCHR)	
	Left:	Operating status: PC-CARD-ATA-interfaces in operation
	Right:	Service position: Removing and inserting the HGS(s)
S4	System console connected (SCOCON)	
	Left:	No device connected (Default), or printer or video terminal connected
	Right:	System terminal connected

Meanings of LEDs

L1	Fault indication from the control (group statement)
L2	Indicates module data transfer via the C-bus (e.g. call at subcriber)
L3	Indicates access to the inserted background memory
L4	Indicates that the HGS(s) can be removed
L5	Indicates that the S4 switch is in the “right” position, and that the system terminal can be connected to the first V.24 interface on the AV24B/W (service)
L6	Unused
L7- L10	The LEDs flash to indicate the status from reset to operation. The display remains lit for about 5 seconds if a fault is found in the loading phases 15 to 7 (see following table). If a fatal fault occurs, the reset process is repeated from the beginning (loading phase 15).

No.	L7	L8	L9	L10	Phase name
15	1	1	1	1	Start reset phase
14	1	1	1	0	Test flash-PROM
13	1	1	0	1	Test QUICC
12	1	1	0	0	Test real time clock
11	1	0	1	1	Test C-bus interface

10	1	0	1	0	Test DUART (V.24 ports)
9	1	0	0	1	Test dynamic RAM
8	1	0	0	0	Output hardware image
7	0	1	1	1	End reset phase
6	0	1	1	0	Initial program loading (IPL)/IPL ready flag
5	0	1	0	1	STIN program loader is loaded and started
4	0	1	0	0	Operating system has been loaded and started (restart)
3	0	0	1	1	User programs (have been dispatched) have been loaded
2	0	0	1	0	Start of customer data loading in the user programs
1	0	0	0	1	All customer data loaded Start commissioning of module(s)
0	0	0	0	0	Module(s) in operation

1 = LED on
0 = LED off

8.4.12.2 Changing the HGSs

The HGS may be removed or inserted during system operation without the prior removal of the HSCB.

The following procedure must be adhered to:

- Remove static charge from the module frame
- Move S3 switch to the right
- Wait for L4 to light up
- Remove the appropriate HGS

	**Do not touch the components!**

Take hold of the drive from above and below.

- Insert the new HDD
- Move S3 switch to the left
- L4 will go out in a short time

8.4.12.3 Removing and Inserting the board

The HSCB board may be removed or inserted during system operation, if the S1 switch handle has been moved to the left.

In single module systems, removing the HSCB board will result in a total breakdown.

In multi-module systems, removing the HSCB board will result in the failure of this module.

8.4.13 ICF IMTU Central Functions

Short description

The central board of the B3 module or ICS is the ICF.

Features	
Clock Supply and Synchronization	Clock frequency precision for DECT.
	Remote synchronizable by high precision reference clock and master module (with CL2M or CL2ME)
	Master function for multi-module systems, adjustable using software.

External interfaces
128 receive/transmit highway
Outputs for ext. signalling
Remote control for power supply
LWL connector
Ref. clock supply (CL2M)
Clocks
Micro processor bus

Interface to Other Modules
Through MLB, with possible MLBIML
Transfer of C-bus data.
256 PCM channels.

Inter Module Manager (IMMG)

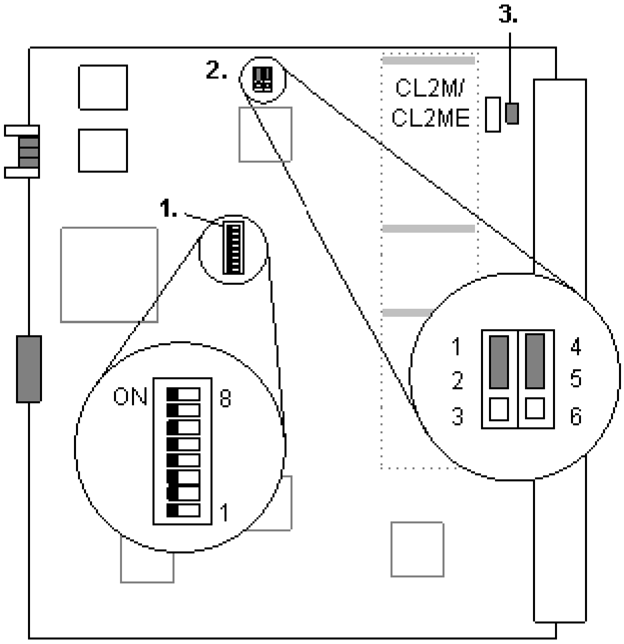
Fault Management using Inter Module Manager

Other features	
Application	Basic equipment in B3/ICS
Power demand +5V	3210 mA
Battery status query	
Memory Doubling e.g. for Downloading	
Fire Protection Fuse	

Difference between ICF .1321 and .1331
In .1331, CBI and IMLA are on the board.

The ICF with material number 49.9905.9146 can be used in the B3 module and in the ICS.

8.4.13.1 Jumper and DIL Switch Functions



ICF board, component side

1. DIL switch
2. Jumper
3. Fire Protection Fuse

Jumper Functions

Total breakdown (system not in operation) via ESB	
1 - 2	Normally closed contact for message
2 - 3	Normally open contact for message
Battery status query	
4 - 5	Testing of -48 V battery not possible **(default)**
5 - 6	Testing of -48 V battery active
When using PS350 with connected battery: Switch on the battery voltage monitoring option	

Fire Protection Fuse

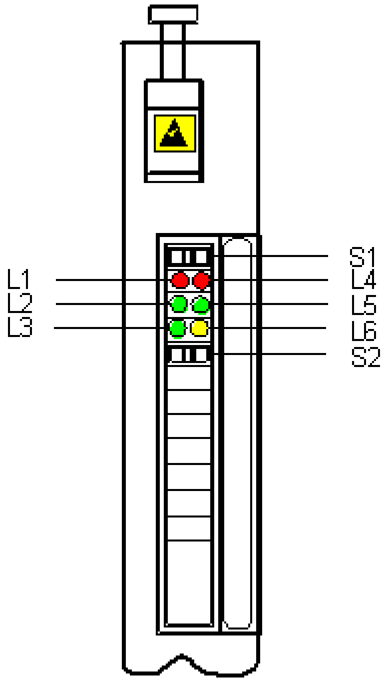
	If the fire protection fuse is defective (burned out), the board must be replaced by a new one.

Functions of the DIL Switches

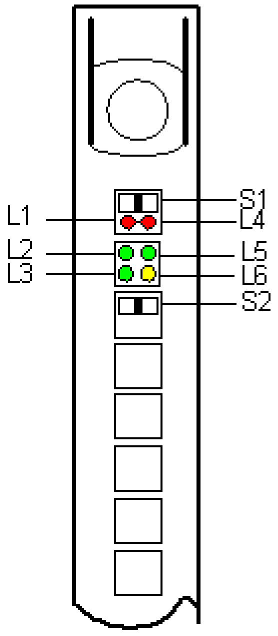
S1		Error signalling unit

	ON:	with ESU
	OFF:	without ESU
S2		System configuration for IMMG
	ON:	IMMG passive
	OFF:	IMMG active
S3	S4	Specification of highest scan address
ON	ON	16
OFF	ON	32
ON	OFF	64
OFF	OFF	128 (default)
S5		Inter module manager watchdog
	ON:	Watchdog inactive
	OFF:	Watchdog active (default)
S6		CBI master mode switching
	ON:	Test mode
	OFF:	CBI master (default) **For testing and servicing purposes. Do not change**
S7		Non-maskable interruption
	ON:	Enable NMI
	OFF:	NMI disable (default) **For testing and servicing purposes. Do not change**
S8		CBI speed
	ON:	2 MHz
	OFF:	4 MHz (default)

8.4.13.2 LEDs and Switch Functions



ICF board for B3 module, front side



ICF board for ICS and B3 module, front side

Switch Functions

S1	**Reset**	
	Left:	No function, locking
	Middle:	Operating status
	Right:	Reset board, keying
S2	**Service Switch**	
	Left:	No function, locking
	Middle:	Operating status
	Right:	With redundant star coupler: Activate switchover, keying

Meanings of LEDs

L1	No function	
L2	Clock unit active	
	on:	Active module clock unit
L3	When doubling, IMTU status	
	on:	IMTU active
	off:	IMTU hot stand-by
	flashing quickly:	IMTU active and alternate path switched
	flashing slowly:	IMTU hot-standby and alternate path switched
L4	IMMG status	

	on:	IMMG not in operation (no board operation)
	flashing:	IMMG in operation, but board logon not yet possible
		With doubled multi-module, also failure of the fibre-optic link ICF <–> ICF.
	off:	IMMG in operation
L5	Clock unit synchronization	
	on:	Module’s clock system is synchronized
L6	Master/free-run clock mode	
	on:	Module prepared by system software for master operation
		or
		module in master free-run clock mode

8.4.13.3 Removing and Inserting the board

The board may be removed and inserted during system operation.

All existing connections are disconnected if the board is removed. Exception when doubling.

	If the active ICF board of a doubled pair is to be removed, the service switch must be used to change it over to the hot stand-by side. After the ICF has been reinserted, the service switch must be switched back again.

8.4.13.4 Doubling

Only one ICF board can be inserted for each B3 module.
A doubling of the system can only be implemented by using a second ICS or B3 module.

SeeComplete doubling → 153

8.4.13.5 External clock pulse input

First V.24 interface of the CA3B (Cable Adapter 3 for B modules)

PIN 1	A1	External clock pulse input 2.048 MHz (high precision reference clock / TAREF)
PIN6	B1	

8.4.14 ISMx Switching Matrix x

Short description

The board ISMx is used in the basic configuration in the ICS and B3 module. Its task is to switch inter-module connections with a bit rate of 4 MBit/s.

> In order to ensure the total availability of the IMTU switching matrix function, 4 ISMx boards of the same variant are required. Mixed operation of ISMx and ISM2x boards is not permissible.

Variants for the B3 module	
ISMA	IMTU Switching Matrix variant A, material number: 28.5630.1512 4x per B3 module, up to 8 modules in conjunction with one MLB in slot 1
ISMB	IMTU Switching Matrix variant B, material number: 28.5630.1522 4x per B3 module, up to 16 modules in conjunction with two MLBs in slots 1 and 2
ISMC	IMTU Switching Matrix variant C, material number: 28.5630.1532 4x per B3 module, up to 32 modules in conjunction with three or four MLBs in slots 1, 2 and 8 or 1, 2, 8 and 9
ISM2A	IMTU Switching Matrix variant 2 A, material number: 49.9805.5675 4x per B3 module, up to 8 modules in conjunction with one MLB in slot 1, supersedes ISMA 28.5630.1512
ISM2B	IMTU Switching Matrix variant 2 B, material number: 49.9805.5676 4x per B3 module, up to 16 modules in conjunction with two MLBs in slots 1 and 2, supersedes ISMB 28.5630.1522
ISM2C	IMTU Switching Matrix variant 2 C, material number: 49.9805.5677 4x per B3 module, up to 32 modules in conjunction with three or four MLBs in slots 1, 2 and 8 or 1, 2, 8 and 9, supersedes ISMC 28.5630.1532

Variants for the ICS	
ISM2A	IMTU Switching Matrix variant 2 A, material number: 49.9905.9147 4x per rack ICS, up to 8 system modules in conjunction with one MLB in slot 1, supersedes ISM2A 49.9805.5675
ISM2B	IMTU Switching Matrix variant 2 B, material number: 49.9905.9148 4x per rack ICS, up to 16 modules in conjunction with two MLBs in slots 1 and 2, supersedes ISM2B 49.9805.5676

B3 module slot	1	2	3	4	5	6	7	8	9
Board	MLB	MLB			ICF			MLB	MLB
ISMA It No: 28.5630.1512 or **ISM2A** It No: 49.9805.5675	x		o	o	+	o	o		
ISMB It No: 28.5630.1522 or **ISM2B** It No: 49.9805.5676	x	x	o	o	+	o	o		
ISMC It No: 28.5630.1532 or **ISM2C** It No: 49.9805.5677	x	x	o	o	+	o	o	x	x

ICS slot	1	2	3	4	5	6	7
Board	MLB	MLB	ISM2	ISM2	ICF	ISM2	ISM2
ISM2A It No: 49.9905.9147	x		o	o	+	o	o

ISM2B It No: 49.9905.9148	x	x	o	o /td>	+	o	o

For each switching matrix, four switching matrix modules of the same type must be inserted (e.g. four ISMAs). With doubled IMTU, all eight switching matrix modules (2 x 4) must be of the same type.

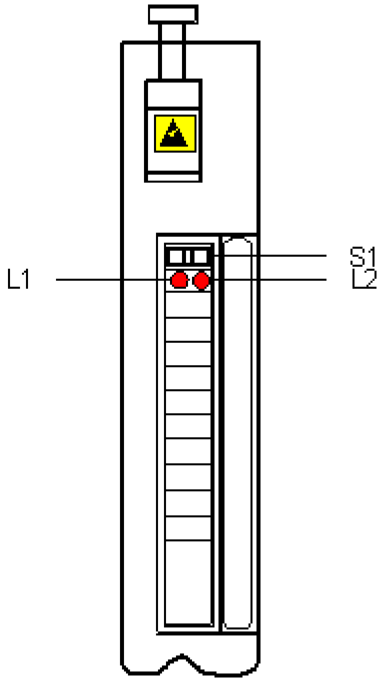
o = inserted switching matrix module

x = supported by switching matrix modules

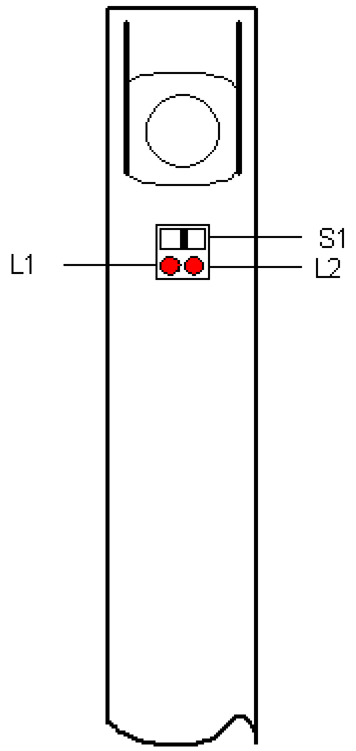
+ = fixed assignment

Other features		
Power demand +5V	ISMA	840 mA
	ISMB	980 mA
	ISMC	1460 mA
Download board software		
Board identification using board passport		
Maintenance function		

8.4.14.1 LEDs and Switch Functions



ISMx board, front side



ISM2x board, front

Switch Function

S1	Left:	No function, locking
	Middle:	Operating status
	Right:	Reset board, keying

Meanings of LEDs

L1		Switching matrix processor unit
	on:	Resetting or inactive
	flashing quickly:	Download
	flashing slowly:	Waiting for startup
	off:	active
L2		No function

8.4.14.2 Doubling

Redundancy of the boards for the system's switching matrix function is enabled by doubling the multi-module.

	The ISMx board variants must be the same for both IMTUs. Mixed operation of ISMx and ISM2x boards is not permissible.

8.4.14.3 Removing and Inserting the board

The board may be removed and inserted during system operation.
All existing connections are disconnected if the board is removed.

	In doubled systems, a service switchover (service switch S2 on ICF) should be carried out before removing an ISMx from the active multi-module. On completion of repairs, the service switch must be switched back in order to resume operation of the default active side.

8.4.15 MLB Module Link Board

Short description

The board MLB is used to connect modules to the multi-module. It can be equipped with the MLBIML sub-module and is designed for a maximum of 8 modules.

In standard configuration, the module is equipped with components for a max. of 3 modules. The MLBIML is used from the fourth module onward.

The module connection is managed using the boards EOCMM, EOCSM or EOCPF.

Features
Adaptation to C-bus and coupler interface.
Multiplexes and demultiplexes of the various types of data to be transmitted (C-bus data and Highway).

Line coding/decoding.
Clock generation.
Optical transmitting and receiving.
Test and maintenance function.

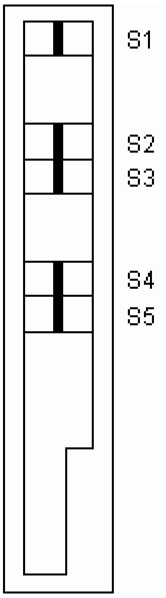
The following notes must be observed when using the MLB board:

- IMLE3 submodules with IML software 28.7637.8533 or IMLASB must be inserted in the connected CFx boards.
- A maximum of 13 modules can be connected (on two MLBs) to the B3 module without the ISPS board. **No CBT** must be inserted under these circumstances. These may only be inserted if only a **single MLB** board is fitted.
  The ISPS board is generally required from the 14th module on. In this case, the CBT may be inserted without restriction.

Other features		
Power demand +5V	1830 mA	3 MLBIML on the board and 330 mA for MLB logic and 0 EOC

8.4.15.1 LEDs and Switch Functions

Switch Function



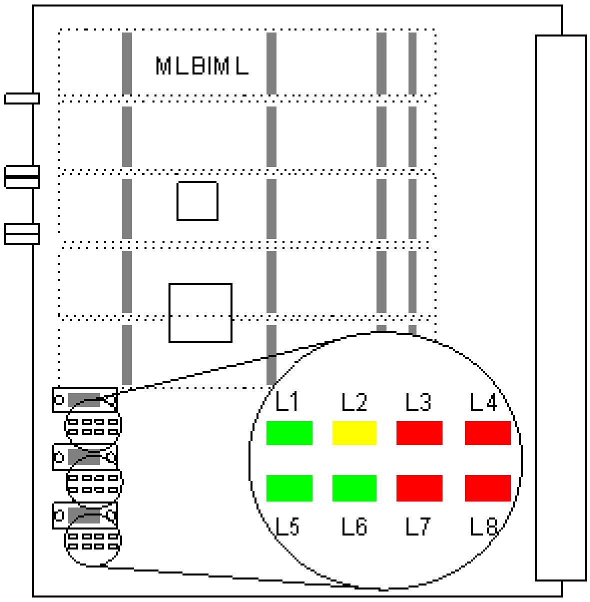
MLB board, front side

S1*	Middle:	Operating status
	Left:	No function
	Right:	Board RESET

* Depending on the configuration, adjusting the switch can result in a restart of the entire system.

S2	Middle:	Operating status, Link 7/8
	Left:	RESET Link 7
	Right:	RESET Link 8
S3	Middle:	Operating status, Link 5/6
	Left:	RESET Link 5
	Right:	RESET Link 6
S4	Middle:	Operating status, Link 3/4
	Left:	RESET Link 3
	Right:	RESET Link 4
S5	Middle:	Operating status, Link 1/2
	Left:	RESET Link 1
	Right:	RESET Link 2

LED Denotations



MLB board, component side

L1	on:	High data traffic
	flashing:	Data packet being received/sent to/from the micro processor
L2	flashing:	Packet loss in transmission buffer during regulatory receive time-out or reset, or synchronization fault in the micro processor.
L3	flashing:	Packet loss in receiver buffer during regulatory transmit time-out or reset.

L4	on:	• CBI cannot be used to transmit and receive. • Warm start or master reset. • FIFO is full (100%) in transmission or receiver direction
	flashing weakly:	Further data has been transmitted with 1 MByte/sec capacity.
L5	on:	IML path is frame synchronous.
L6	on:	IML path is ready to transmit C-bus data.
L7	on:	IML path is not ready to receive C-bus data in receiving direction.
L8	on:	IML path is not ready to receive C-bus data in transmitting direction.

8.4.16 MLBIML Module Link Board, Inter Module Link

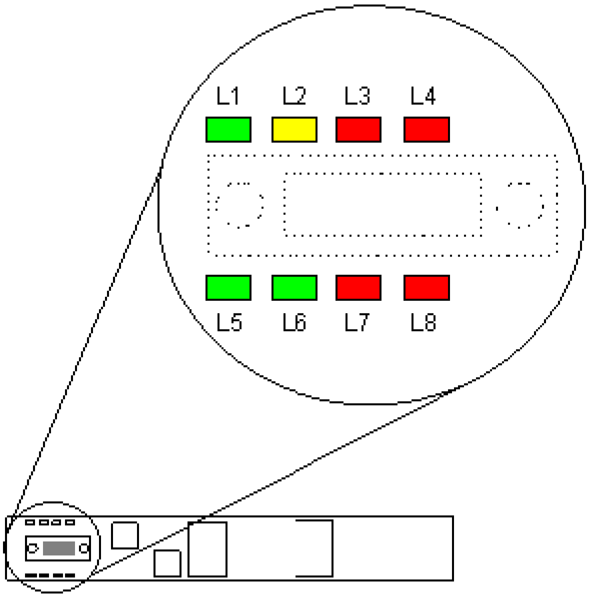
Short description

The board MLBIML a sub-board which is plugged into the MLB board from the fourth module onwards. It can optionally take an EOC.

Variants
EOCMM
EOCSM
EOCPF

Other features	
Power demand +5V	500 mA

8.4.16.1 Meanings of LEDs



MLBIML board, component side

L1	on:	High data traffic
	flashing:	Data packet being received/sent to/from the micro processor
L2	flashing:	Packet loss in transmission buffer during regulatory receive time-out or reset, or synchronization fault in the micro processor.
L3	flashing:	Packet loss in receiver buffer during regulatory transmit time-out or reset.
L4	on:	• CBI cannot be used to transmit and receive. • Warm start or master reset. • FIFO is full (100%) in transmission or receiver direction
	flashing weakly:	Further data has been transmitted with 1 MByte/sec capacity.
L5	on:	IML path is frame synchronous.
L6	on:	IML path is ready to transmit C-bus data.
L7	on:	IML path is not ready to receive C-bus data in receiving direction.
L8	on:	IML path is not ready to receive C-bus data in transmitting direction.

8.4.17 R1RC Rack Connector for I55

Short description

Up to 3 expansion racks can be connected to the basic rack in a star-shaped pattern, which are then called the C2-C4 modules. You will require an R1RC/R1RC2 adapter for the connection between the backplanes.

Variants	
R1RG (part no: 49.9903.5498) / R1RG2(part no: 49.9907.9213)	for use in the basic rack (R1 rack)
R1RE (part no: 49.9903.5500) / R1RE2 (part no: 49.9907.9214)	for the expansion racks R2, R3 and R4.

The adapters are connected to each other using cables. This connection transmits CBus information, highway information, status signals and I2C bus data, so that the connected modules act as a single module (B2 of the I33).

The adapters R1RG/R1RG2 and R1RE/R1RE2 are attached to the board frame from the rear.

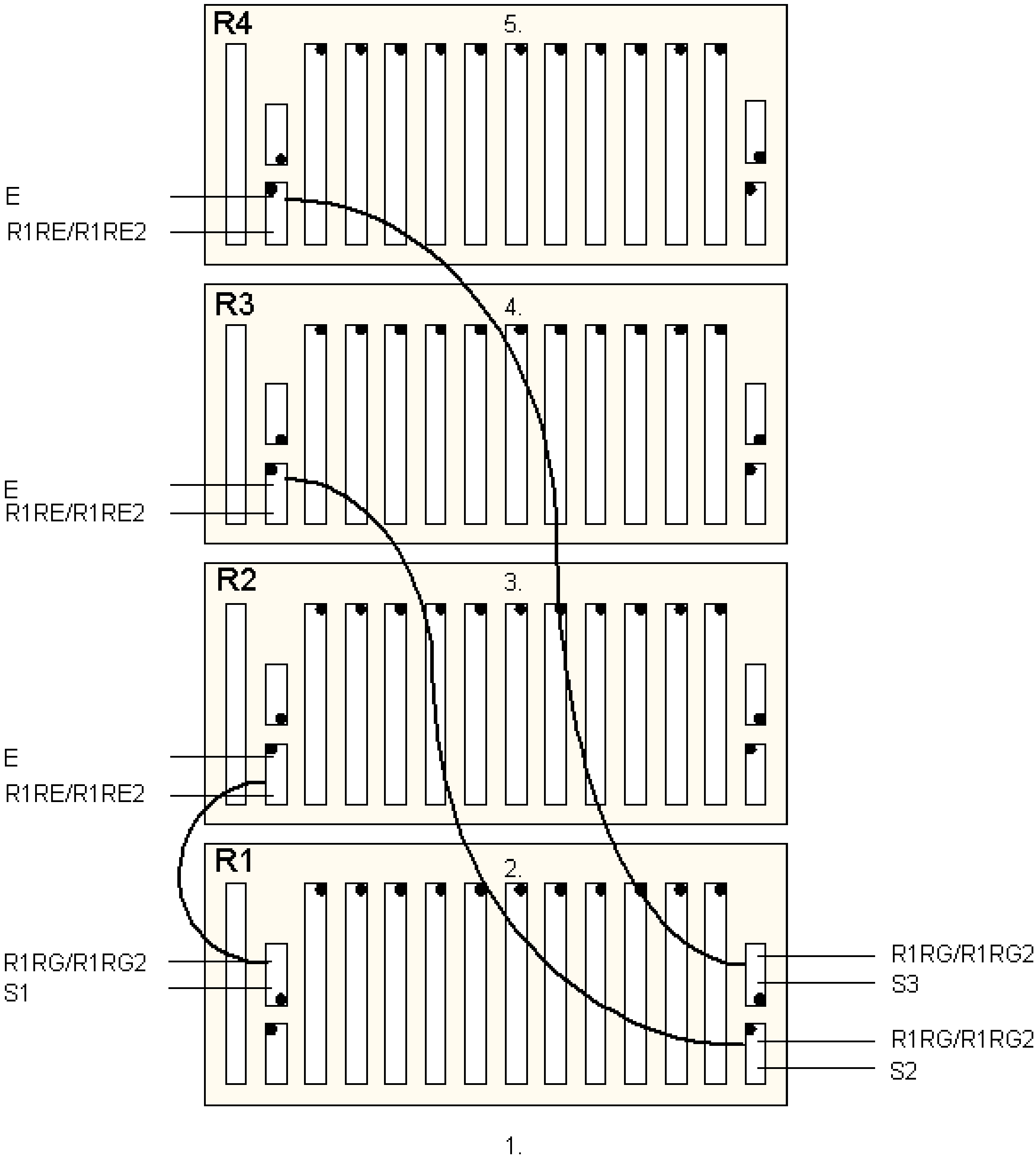
The R1RG/R1RG2 and R1RE/R1RE2 variants do not have to be identical. Mixed operation of the boards is possible.

Other features	
Application	for the expansion racks R2, R3 and R4.
Power demand +5V	400 mA

8.4.17.1 Connection of the expansion racks to the basic rack

The connection to the next board frame is made using a double-screened Ethernet cable ”category 6” (8-pin). The maximum length is 30 metres. Connection is implemented via a Western socket RJ45 (8-pin). A cable is required between each basic and expansion rack in order to transmit the system data. The connection is made to the Western socket 1 (see under Function of the Switches and LEDs).

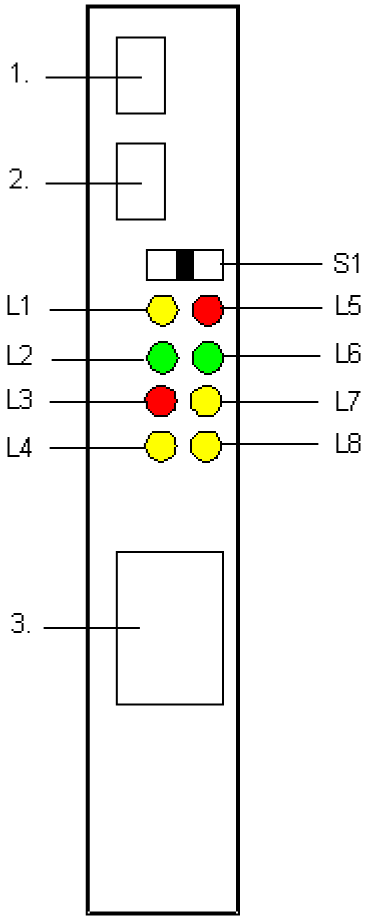
The following diagram depicts the principal connections.



Connection of the expansion racks to the basic rack

1. View from the rear
2. Basic rack
3. Expansion rack 1
4. Expansion rack 2
5. Expansion rack 3

8.4.17.2 LEDs and Switch Functions



R1RC (R1RG/R1RG2, R1RE/R1RE2) front side with LEDs and switches

1. Fan plug 1
2. Fan plug 2
3. Western socket RJ45 1

S1	**Switch 1**	Left:	No function
		Middle:	Operating status
		Right:	Reset

LED	**Name**		**Description**
L1	Status	on:	SMALRES CBI
L2	RTActive	on:	Send and receive active
L3	RFail	on:	Receive error
L4	TFail	on:	Send fault
L5	TMFail	on:	Transmission is not synchronous
L6	IDR	on:	Data transfer possible
L7	TXTC	on:	Greater traffic from the rack

L8	RXTC	on:	Greater traffic into the rack

Fault signaling

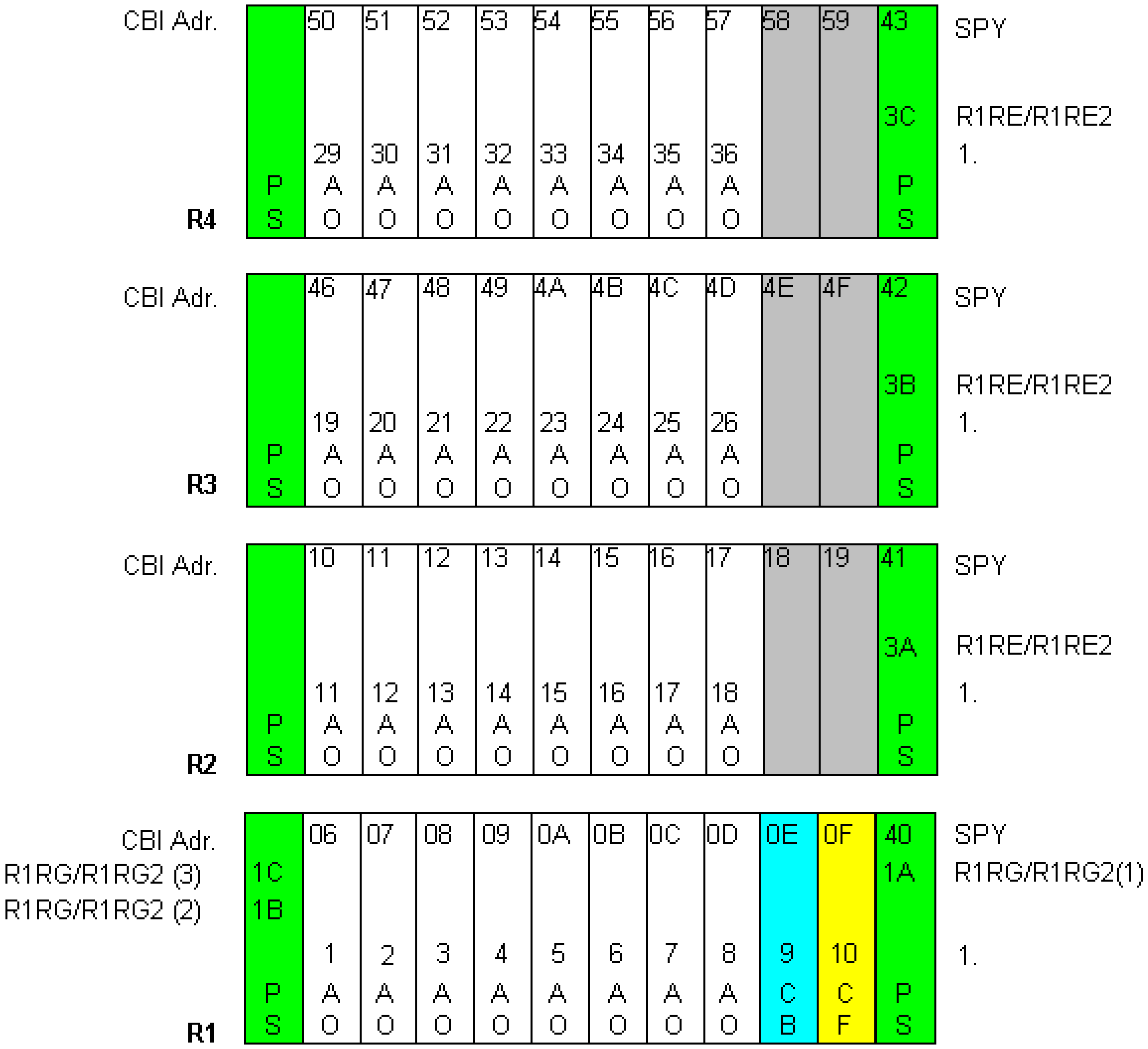
The following fault monitoring is implemented:

1. There are two equipment variations for the modules, one for the basic rack (R1RG/R1RG2) and one for the expansion rack (R1RE/R1RE2). A check is carried out whether the module is inserted in the correct rack. If this is not the case, the LEDs TMFail, IDR, RXTC and TXTC will blink.
2. The transmitted FP8K is checked on the receiver side. Further, the FP160ms is also checked. The LED TMFail then switches to inactive. If a FP8K or a FP160ms then fails, the LED TMFail switches to active and the checking procedure starts once more.
3. The IDR LED displays that data transfer is possible. In the event of a fault, it remains inactive for at least 127 ms.
4. As soon as the CBI is unable to receive and data from the transmission link (PWR inactive), this is displayed by the RXTC LED.
5. As soon as the CBI is unable to receive and data from the transmission link (PWR inactive), this is displayed by the RXTC LED.
6. The TMFail LED is activated as soon as the reception frequency of 49.152 MHz is no longer correct.

Western plug

The Western plug RJ45 is used to transmit system data (frame pulse, highway data, CBus data, status lines and I2C bus data) and the transmission pulses.

8.4.17.3 C-bus address distribution

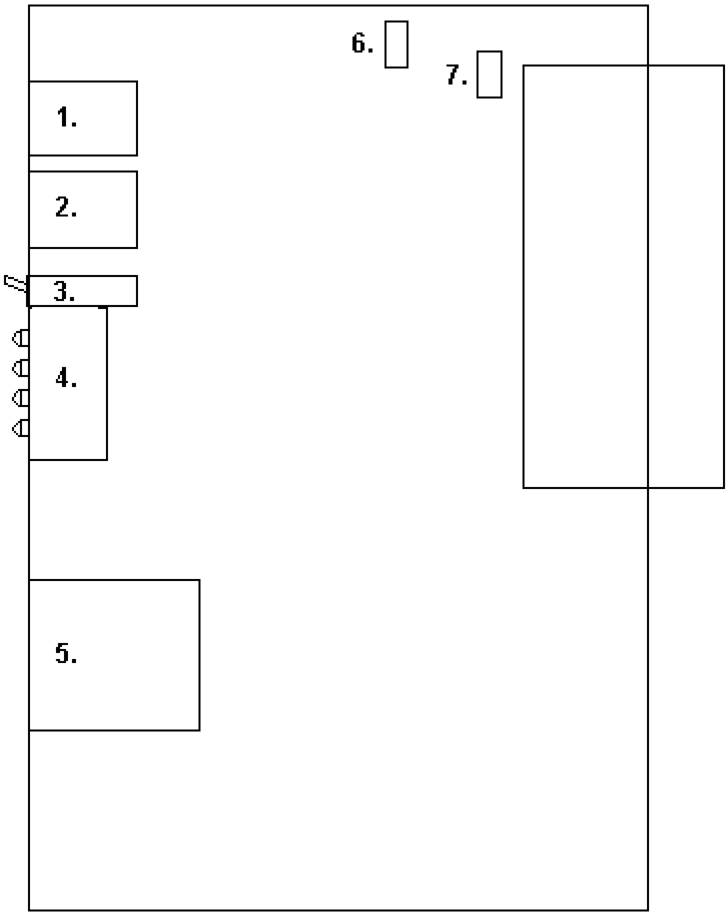


C-bus address distribution and slot numbers

1. Slot number

AO = connecting circuit

8.4.17.4 Fuses on the board



Component side of the R1Rc board

1. Fan plug
2. Fan plug
3. Switch
4. Light Emitting Diodes
5. Western plug 1
6. Fuses 48V (T SIC, 500 mA)
   - R1RG/R1RE: on the rear of the board
   - R1RG2/R1RE2: on the component side of the board
7. 5V fuse soldered in

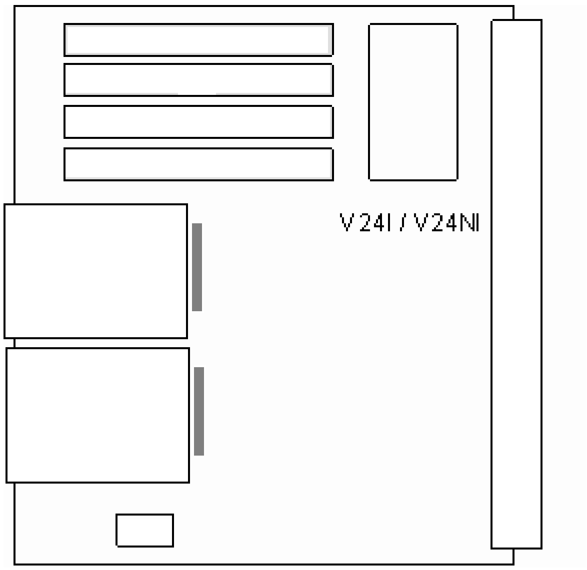
	If the fire 5V fuse is defective (burned out), the board must be replaced by a new one.

8.4.18 V24I/NI Insulated/Non-Insulated

Short description

Both submodules are inserted on to the ACB/HSCB board and have the following features:

- V24I,
  is for the DC decoupling of all signals and of the logic ground.
- V24NI,
  is for the direct connection of all signals and of the logic ground.



V24I/V24NI modules on the HSCB board

8.4.19 V24M Module

Short description

V24M is a sub-board for the UIP board. It comprises the layer 1 functions for a V.24 interface.

A maximum of two V24 modules can be inserted on slots 1 and 2 of the UIP board. This requires the connection of the connecting circuit line to be implemented via the CA3B board.

Other features	
Application	for further V.24 ports on the system
Power demand +5V	100 mA

8.5 Connector technology and signaling

Connection board		**of the connection board**
CA → 240	➨	**General description**

Connection board		of the connection board
AEV24B → 230	➨	ACB → 221, VoIP → 513
AV24B → 238	➨	HSCB → 281, CBT → 580
CA1B → 391	➨	ASCEU → 324, ASCF → 324, ASCGB → 324, ATA → 330, ATA2 → 333 ATB → 336, ATC → 338, CAS → 397, DDID → 354, DCON → 403, DUP03 → 430, MULI → 487, DECT21 → 415, DT0 → 423, DT21 → 427, UIP without V.24M → 495
CA2B → 392	➨	ASC2 → 310, ASC21 → 314, ATLC → 341, DS02 → 418, DS03 → 421, DUPN → 432, JPAT → 357, ADM → 301
CA3B → 393	➨	UIP with V24 → 495, ICF with CL2M/CL2ME → 285
CA3B/T → 394	➨	UIP with CL2ME → 495
CA4B → 395	➨	DT21 → 427, CAS → 397, DCON → 403
CA5B → 395	➨	IMUX → 458
CA6B → 396	➨	MAC → 475, HAMUX → 447
CAIB → 247	➨	IPGW → 502
CARUB → 248	➨	ASCEU → 324, ASC2 → 310, ASC21 → 314, ATLC → 341, JPAT → 357
EES1B → 275	➨	ATA → 330, ATA2 → 333, ATB → 336, ATC → 338
EES8B → 275	➨	ATA → 330, ATA2 → 333, ATB → 336, ATC → 338
EES0B → 436	➨	DT0 → 423
EESS0 → 440EESS0	➨	DT0 → 423, ADM → 301
ESBx → 276	➨	CF2E → 256, CF22 → 248, ICF → 285
ESBA → 276	➨	CF2E → 256, CF22 → 248, ICF → 285
ESBB → 276	➨	CF2E → 256, CF22 → 248, ICF → 285
OFA2B → 491	➨	DT21 → 427
OFAS → 491	➨	DT21 → 427
TER → 292	➨	**On backplane (only B3 module)**

Connection board		of the connection board
EDU → 263	➨	ESB → 276

8.5.1 ACB/ACB1 Advanced Computer Board

Short description

The ACB board is the basic equipment in all modules. This computer board must be used to support the software IEEx (Linux operating sistem). As HGS it is used a 2.5” hard disc drive.

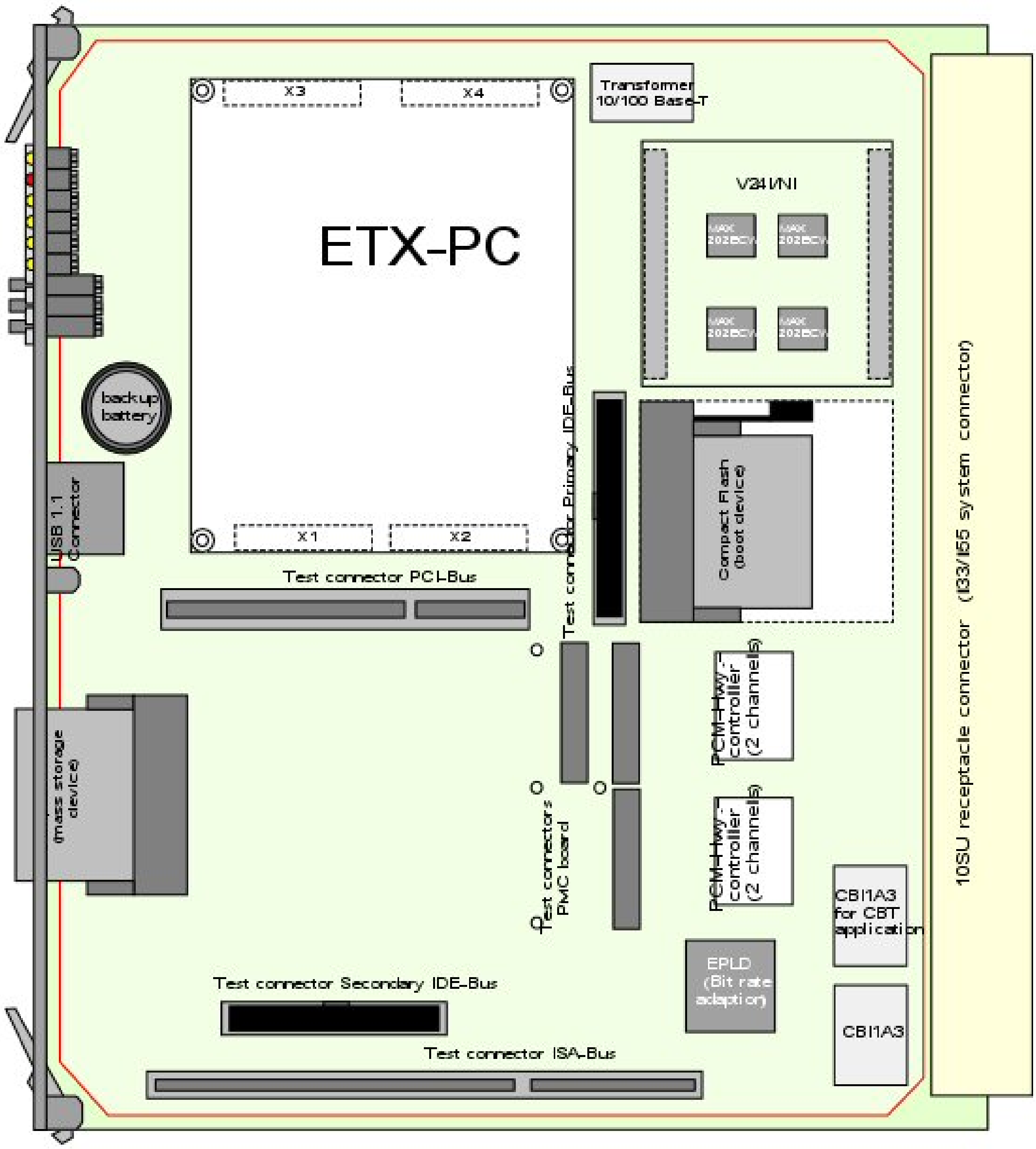
The ACB1 board is the follow-up board of the ACB and can be used starting with software version IEE2 (version L021V00_1_1.0). The difference to the ACB is the physical medium of the HGS. In the case of the ACB1, the HGS is a Compact Flash Card with different capacity according to system size, the following sizes are recommended:

	Compact Flash Card
for single and Twin system:	with 1 GB
for multi-module up to 4000 subscr.:	with 2 GB
for multi-module of more than 4000 subscr.:	with 4 GB

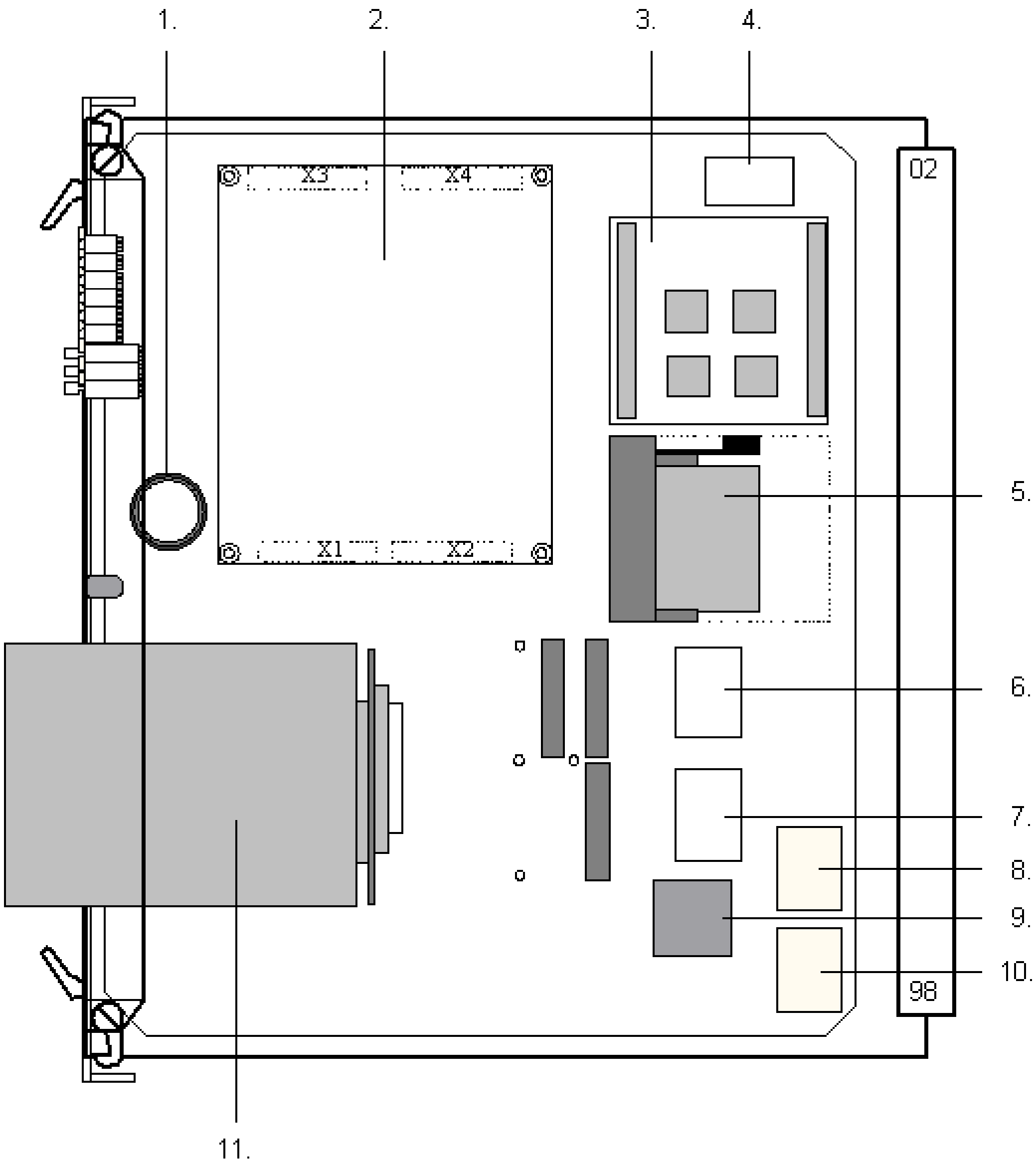
Handling, as well as switch and display functions of both boards are identical:

<table>
<tr><td colspan="2">Features</td></tr>
<tr><td rowspan="5">ETX-PC
The ETX-Board is a complet PC-System. All functions the current PCs offer are realized on this Board. Performance same as Pentium III/400MHz or higher.</td><td>512 MByte of main memory, (only one SO DIMM Modul)</td></tr>
<tr><td>Boot flash PROM with Phoenix Bios</td></tr>
<tr><td>Voltage generation</td></tr>
<tr><td>Real-time clock (RTC)</td></tr>
<tr><td>Hardware watchdog</td></tr>
<tr><td colspan="2">RTC battery (8 years buffer operation)</td></tr>
<tr><td colspan="2">Ethernet interface 10/100 Base T</td></tr>
<tr><td colspan="2">two V.24 interfaces (see AEV24B Adapter Ethernet V24 B Modul)</td></tr>
<tr><td colspan="2">Interface to the PCM highway (4 independent B channel accesses)</td></tr>
<tr><td colspan="2">PCI Bus (5V tolerant) 32Bit/33MHz</td></tr>
<tr><td colspan="2">Two CBus interfaces (ISA Bus)
on for system control reasons
one as SPY-remote Interface (SPY =System Protocoller and Analyser)</td></tr>
<tr><td colspan="2">IDE interface for HGS</td></tr>
</table>

The hardware prerequisites for remote logging with SPY are contained on the board.



ACB1 board, component side



ACB board, component side

1. Battery
2. ETX-PC
3. V24I/NI
4. Transformer 10/100 Base T
5. Boot Flash (Compact Flash Card)
6. PCM highway controller
7. PCM highway controller
8. CBI1A3 for SPY I55
9. EPLD

10. CBI1A3
11. HDD

The ACB is equipped with one of the following V.24 submodules:

- V.24I Insulated
- V.24NI Non-Insulated (basic configuration)

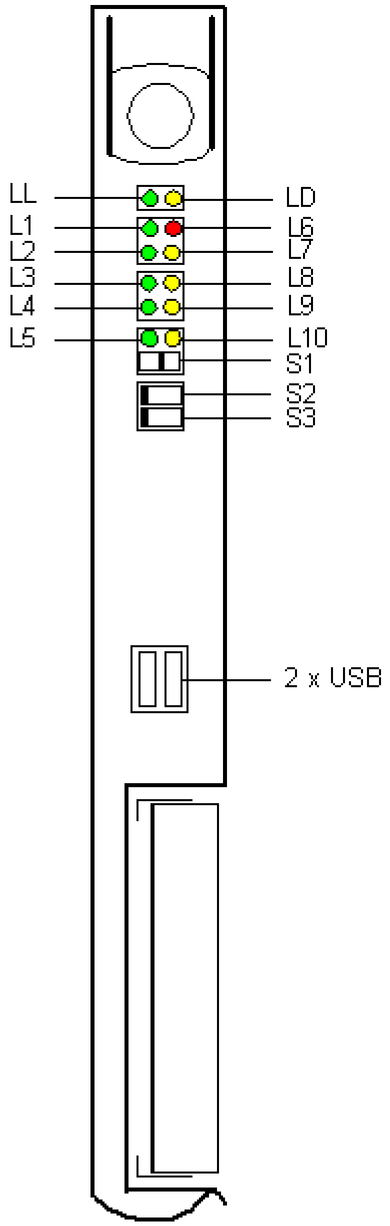
The following signals are available for the V.24:

- RXD
- TXD
- DTR
- GND
- DSR
- RTS
- CTS

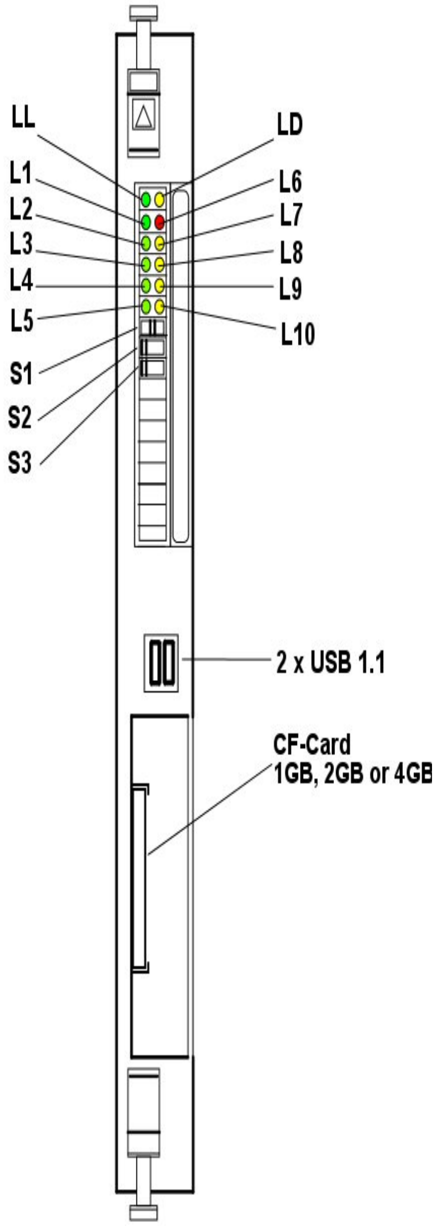
Other features	
Power demand +5V	3.5A
The V24NI submodule is used as standard when connecting devices to the V.24 interfaces. If necessary, it is also possible to use the DC isolated V24I.	

AEV24B adapter Ethernet / V24 B module → 230

8.5.1.1 LEDs and Switch Functions



ACB board, front side



ATC board, front side

Switch Position in Normal Operation

S1	Neutral position
S2	Left position
S3	Left position

Switch Function

S1	**Reset switch**	
	Mean:	Operating status
	links:	Hardware Reset of the board, locking

	Right:	ACB is been shut down (by operating system), pushing
S2	**Hard Disk Change Request (HDCHR)**	
	links:	Operating status: IDE Hard Disk in operation
	Right:	Service position: Pulling out the IDE hard disk and plugging it back in
S3	**Service entry**	
	links:	The commissioning (OS, applications and customer's data load) is executed without break
	Right:	Before booting, the switch must be in the righthand position (reboot, power restoration). The boot phase is interrupted at a defined point. At this point an service access via ISM (WebMin) is possible. Changing of parameters as for example IP addresses or GCU slot address can be executed. Then the switch is to be brought in the left position. The service access is closed and a reboot is executed.

Meanings of LEDs

LL	On:	Ethernet connection status is OK
	off:	Ethernet connection status is interrupted
LD	On:	data transmission via Ethernet
	off:	no data transmission via Ethernet
L1	On:	The Ethernet interface of this module is connected to the network
	off:	The Ethernet interface of this module is not connected to the network
L2	On:	Alle the voltages of the board are present
L3	on or flashing:	Data transfer via the C bus
L4	on or flashing:	Access to the inserted background memory
L5	On:	Indicates that the HGS can be unplugged
	off:	Operating system does not allow pulling out the HGSs
L6	On:	Fault in GCU (collective display)
	off:	Operating status
L7 - L10	These light-emitting diodes show the statuses from reset to operation. After switching on the power a function check is executed (short flashing).	

If an error was recognized by SEM (System Error Management) which leads to a recovery (prozess restart or system shut down), the light-emitting diode L6 goes on (shines). The L7 to L10 remain unconsidered. If the recovery is finished, the L6 (red) is turned on for 5 sec. and afterwards is switched off. The status LEDs L7-L10 show now the actual system status.

The commissioning status is divided into eight groups:

1. Loading ACB from the flash software
2. Loading ACB from HGS at operating system level
3. Loading ACB from HGS at application level

4. Loading ACB in special status (APS change) during operation.

No.	L7	L8	L9	L10	Gr.	Status	Phase name
15	1	1	1	1	0	Commissioning starts	BIOS is running; LED test.
14	1	1	1	0	0	operating system takes over the funktion	Linux kernel is loaded. GRUB finished and initialization RAM-Disc started.
13	1	1	0	1	0	Load operating system via CBI	ACB board without HGS is loaded as a slave via C bus. Status 11 and 12 are skipped over.
12	1	1	0	0	0	Load operating system via Ethernet	ACB board without HGS is loaded as master via Ethernet. Status 11 and skipped over.
11	1	0	1	1	0	Load operating system via local bus	ACB board with HGS is loaded as master directly. Statuses 11 to 13 are not processed in the order.
10	1	0	1	0	0	Update flash SW	Flashsoftware ACB under development.
9	1	0	0	1	1	PAL startet	The pascal server is ready. All known pascal tasken will be started.
8	1	0	0	0	1	Download the application	Download Applikationfiles in progress.
7	0	1	1	1	3	Start of the platform applications	Start of the platform applications such as PFSP, PAL, L4AD.
6	0	1	1	0	3		
5	0	1	0	1	3		
4	0	1	0	0	3	APS change in progress (indication only at the IVL)	ACB with IVL funktion prepares an APS change.
3	0	0	1	1	2	Customer data conversion (display only at the IVL)	Customer data conversion (Started by MML CKDT is not displayed.).
2	0	0	1	0	2	Load APS customer data	DMS of the module signalls the phase loading customer data.
1	0	0	0	1	2	ICU commissioning	All customer data loaded. Start commissioning of the module(s).
0	0	0	0	0	2	Normal operation	Module(s) in operation

1 = LED on
0 = LED off

2 x USB	There are 16 USB devices preconfigurated. Beeing 8 of them designed for only TTY operation. Furthermore 4 are designed for the ACOM protocol and 4 as RAW, they are not used yet. By default all have the Host Index configured as group 1. But this can be changed by means of the Webmin at any moment. The USB devices are not connected normally with logical devices of the pascal applications. This must still be done via the Webmin interface. As soon as this is done, the pascal application (prolog task) will try to show its prompt (ˆC) on this new device. This activation can take up to one minute after the change of configuration data done by the Webmin. In the same way all other interfaces can be also configured (commissioning and shut down).

Reference numbers, that are available in the Ebuyer Tool:

4.999.096.855	USB Hub
4.999.096.856	USB/V24 adapter
4.999.100.643	USB/USB Laplink gold cable

8.5.1.2 Fan replacement

Replacement of defective fans in I55 systems with ACB

The ACB for standard systems is characterized by its relatively low heat generation. For this reason, even if no fan is used the risk that the processor reaches or exceeds the maximum operating temperature only exists under unfavourable conditions. Unfavourable conditions are a high room temperature (over 35 degrees C (95 degrees F)) and permanent high load (over 70 percent).

In the event of failure of one of the two fans we recommend replacing it within one week.

In the event of failure of both fans the CPU temperature and CPU usage (total load) of the ACB in question should be checked first (Webmin: Performance Management). If the CPU temperature is clearly below the limit value of 100 degrees C (212 degrees F) the defective fans should be replaced within the following two days. For safety reasons the CPU temperature should controlled at regular intervals until then. If the CPU temperature is only slightly below or even above the limit value the defective fans must be replaced as soon as possible.

Projects

Up to four ACBs shall be allowed per module. However, only two per frame to provide sufficient heat dissipation. The software can handle this (a confirmation test will be provided later), four per module were mentioned as the upper limit for systems with HSCB during the workshops with system specialists.

8.5.1.3 Removing and Inserting the board

The ACB board may be removed or inserted during system operation, if the S1 switch handle has been moved to the left.

In single module systems, removing the ACB board during operation will result in a total breakdown.

In multi-module systems, removing the ACB board will result in the failure of this module or of the central functions depending on the BS Confi data packet.

8.5.1.4 Operation ACB

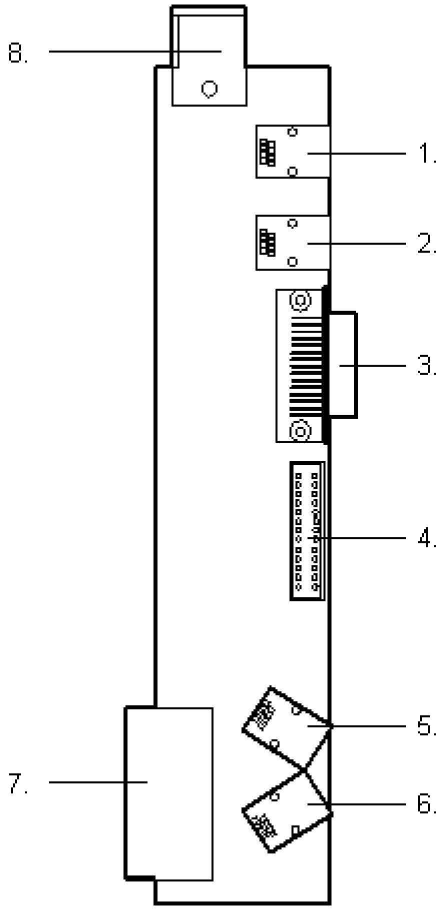
Refer to handling specification HSP to ACB, APS IEE2.1

8.5.2 AEV24B adapter Ethernet / V24 B module

Short description

The adapter board Ethernet / V24 B module (AEV24B) is fitted in the R1 racks only behind the ACB or VOIP boards.

	The use of the AEV24B in conjunction with HSCB or CBT boards is not permitted!



AVE24B board

1. RJ45 socket (8 pins), 1st V24
2. RJ45 socket (8 pins), 1st V24 (not for VOIP)
3. 15-pin D socket for 6-pair cable to the MDF (not for VOIP)
4. 26-pin connection strip as output for SCA 28.7640.385x using pre-assembled cable (only for use in I33 with the ACB Advanced Computer Board)

5. RJ45 socket for the Ethernet connection for the hub (data network connection, LAN switch)
6. RJ45 socket for the Ethernet connection for a PC (direct connection to PC)
7. Plug for backplane
8. Fixation

It is not permitted for the Ethernet connections for the hub (5) and the PC (6) to be active concurrently.

Applications for V24 ports

First V24 port	with ACB	Linux system console
	with VOIP	System console for the VOIP board

second V24 port	with ACB	MML system console
	with VOIP	none

8.5.2.1 MDF Connections

The connections described hereafter are only relevant for connection in the I33.

On the MDF the 6-pair (16-pin D plug) cable should be connected as follows.

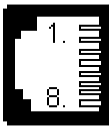
MDF	**AEV24B**
Colours	
RD/BU	A1/B1 (T) S0 connection for service PC (*)
WH/YE	C1/D1 (R) S0 connection for service PC (*)
WH/GN	A1/B1 (T) S0 test subscriber (*)
	UP0 test subscriber (*)
	a1/b1, analog test participants (*)
WH/BN	C1/D1 (R) S0 test subscriber (*)
WH/BK	free
WH/BU	free/GND (plug screen)

* Connect the S0-, UP0 and a/b test connections from the MDF to the PBX.

8.5.2.2 V.24 Interfaces

see also interface configuration

PIN assignment of the V24 ports

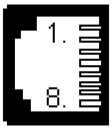


Assignment of the V.24 interfaces

PIN1=free;
PIN2=TXDx;
PIN3=RXDx;
PIN4=DSRx;
PIN5=GNDx;
PIN6=DTRx;
PIN7=CTSx
PIN8=RTSx
Plug screen=GND

8.5.2.3 Ethernet ports

PIN assignment of the Ethernet ports



PIN assignment of the RJ45 connection socket for the hub

Pin	Signal identification
1	TXD_P
2	TXD_M
3	RXD_P
4	Z1
5	Z1
6	RXD_M
7	Z2
8	Z2
Plug screen	GND

Z = matching resistor (symmetry)

PIN assignment of the RJ45 connection socket for the service PC

Pin	Signal identification
1	RXD_P
2	RXD_M
3	TXD_P
4	Z1
5	Z1
6	TXD_M
7	Z2
8	Z2
Plug screen	GND

Z = matching resistor (symmetry)

	The cable connections for the hub are not crossed; those for the PC are crossed.

8.5.3 ASCxx Analogue Subscriber Circuit

Short description

The ASC board is available in the following variants:

ASC**EU**: **Europe** with the following characteristics:

Country-specific variants are configurable using board software for the following countries:	Germany, Spain, Netherlands, Switzerland, Italy, Belgium, Austria, Greece, Mexico and Venezuela	
Power demand +5V	620 mA	
Interfaces	16 a/b (connectors for analog terminals in accordance with country-specific guidelines)	
Constant current supply	24 mA, switchable to 30 mA (mounting of a 0 ohm resistance)	
	Line resistance	2 x 475 Ohm
	Range	4 km installation cable J-Y(ST)Y Ø0.4 mm 9 km installation cable J-Y(ST)Y Ø0.6 mm 15 km installation cable J-Y(ST)Y Ø0.8 mm Line lengths for Message waiting → 325
DTMF/pulse dialling, flash and earth button detection, Telecom-specific (dependent on terminals)		
Short and long flash time, Telecom-specific (dependent on terminals)		
Overvoltage protection up to 4 kV		
Board software download		
Board identification using board pass		
Maintenance function		

Polarity reversion for “message waiting” signalling
Connection of external announcement devices

ASC**F**: **France** with the following characteristics:

Power demand +5V	620 mA
Interfaces	16 a/b (connectors for analog terminals in accordance with French guidelines and voice terminals)
Resistance feed (const. voltage)	2 x 400 Ohm
DTMF/pulse dialling, polarity reversal and button detection	
Overvoltage protection up to 4 kV	
Board software download	
Board identification using board pass	
Maintenance function	
Symmetric call supply	
Polarity reversion for “message waiting” signalling	
Connection of external announcement devices	

ASC**GB**: **Great Britain**

Power demand +5V	620 mA	
Interfaces	16 a/b (connectors for analog terminals in accordance with British guidelines)	
Constant current supply	30 mA	
	Loop range	900 ohms
DTMF/pulse dialling, flash and earth button detection		
Overvoltage protection up to 4 kV		
Board software download		
Board identification using board pass		
Maintenance function		
Polarity reversion for “message waiting” signalling		

8.5.3.1 Line lengths for Message waiting

The range for Message waiting signaling for analogue subscribers of the ASCEU board with the ICU programme ASCEU018.ICP in connection with the various apparatus types and seizure (pick up on call) and outgoing seizure (pick up) with the installation cable J-Y(ST)Y Ø0,4 mm is:

	Outgoing seizure (pick up)		Incoming seizure (pick up in call)	
Apparatus types	Line length [m]	Line length [W]	Line length [m]	Line length [W]
Tel. T40	1400	379	1400	379
Tel. TE51	1000	272	1000	272
Tel. TE91	1000	272	1000	272

Tel. TC91	1100	298	1100	298
Tel. TB510LED DE	1100	298	600	163
Tel. TB519D	900	245	900	245
Tel. TK40-20-2	300	83	300	83

Recommendation

The line length with which the performance feature Message waiting is to be operated with conventional signaling (permanently illuminated LED signal), should not exceed

600 m	(Installation cable J-Y(ST)Y Ø0.4 mm)
1.3 km	(Installation cable J-Y(ST)Y Ø0.6 mm)
2.4 km	(Installation cable J-Y(ST)Y Ø0,8 mm)

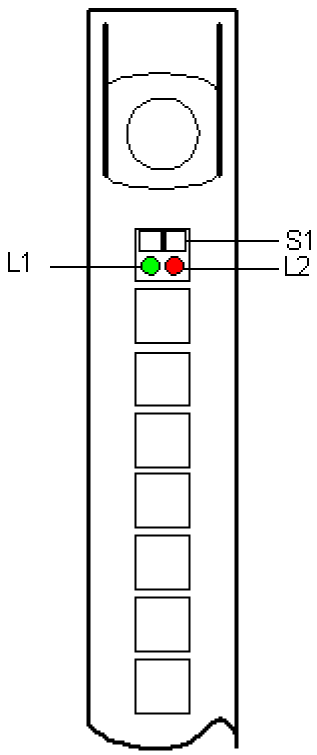
Malfunctions may occur when establishing a connection if the lines are any longer.

The tel. TK40-20-2 should only be operated with a 300 m (83W) line length.

Deviations from the recommended line length are possible.

If the lines are any longer, a different Message waiting signal (signal LED blinks) should be selected. Signalling is implemented in the ICU programme ASCEU019.ICP for the ASCEU board.

8.5.3.2 LEDs and Switch Functions



ASCxx board, front side

1. LED red
2. LED green

Switch Position in Normal Operation

S1	Middle position

Switch Function

S1	Left:	Preparatory disabling (of all connecting circuits)
	Middle:	Neutral/release/ operating status
	Right:	Reset board
	Right, then left:	Forced board download

Meanings of LEDs

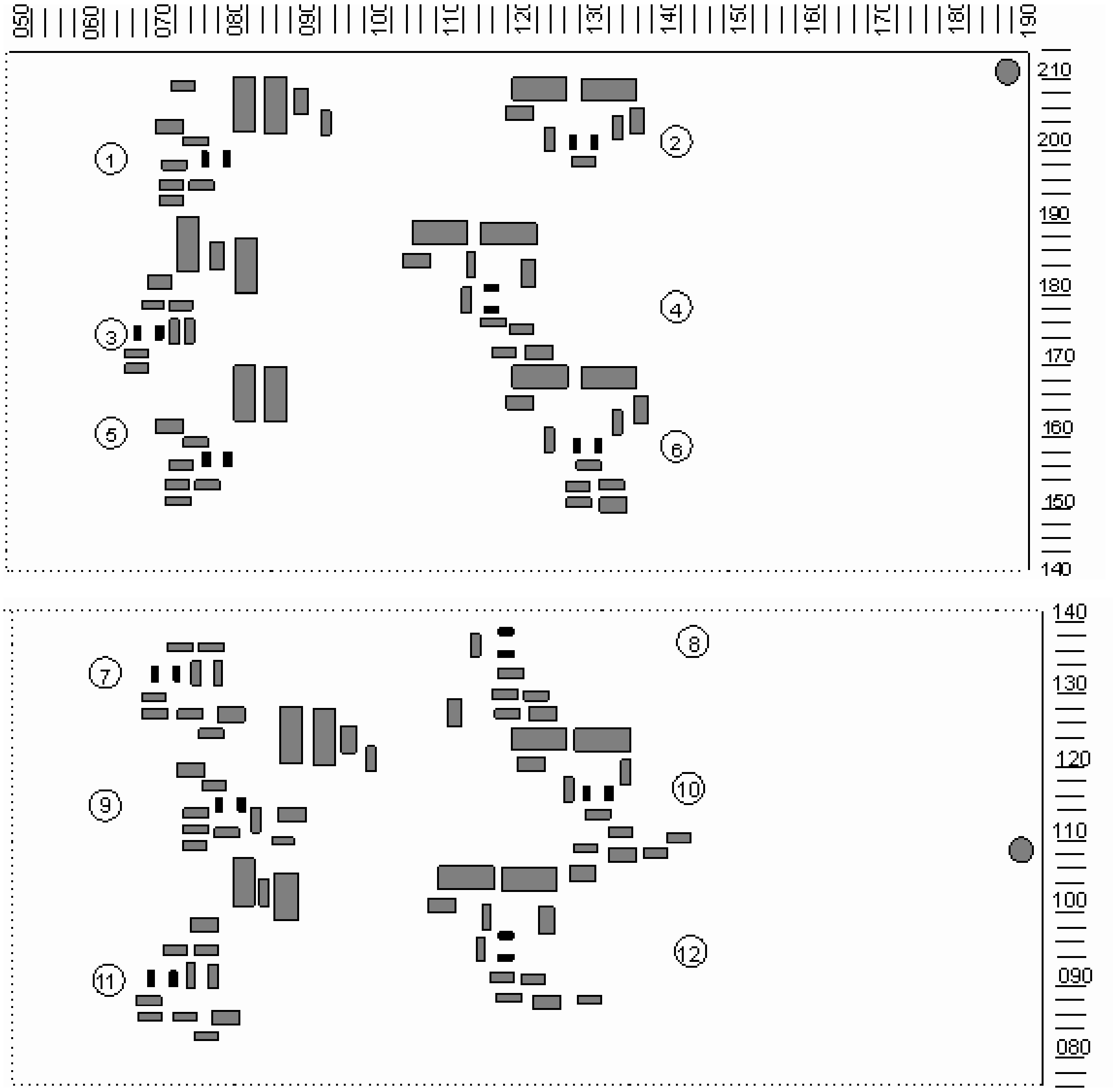
L1	on:	Board is busy with switching functions
	flashing:	Module can be removed after preparatory disabling (VSP) or blocked in terms of software
	off:	Board is not busy
L2	on:	Board reset in progress
	flashing:	Download in progress
	off:	Board in operation

8.5.3.3 Bridge positions

The power supply can be increased from 24 mA (standard) to 30 mA per line in this board: The increase in the supply current is implemented by inserted 0 Ohm resistors or bridges at the following coordinate points:

AO1	197 077
AO2	199 128
AO3	173 069
AO4	179 116
AO5	155 077
AO6	157 128
AO7	131 069
AO8	137 116
AO9	113 077
AO10	115 128
AO11	089 069
AO12	095 116
AO13	071 077
AO14	073 128
AO15	047 069

AO16	053 116


050
060
070
080
090
100
110
120
130
140
150
160
170
180
190
210
200
190
180
170
160
150
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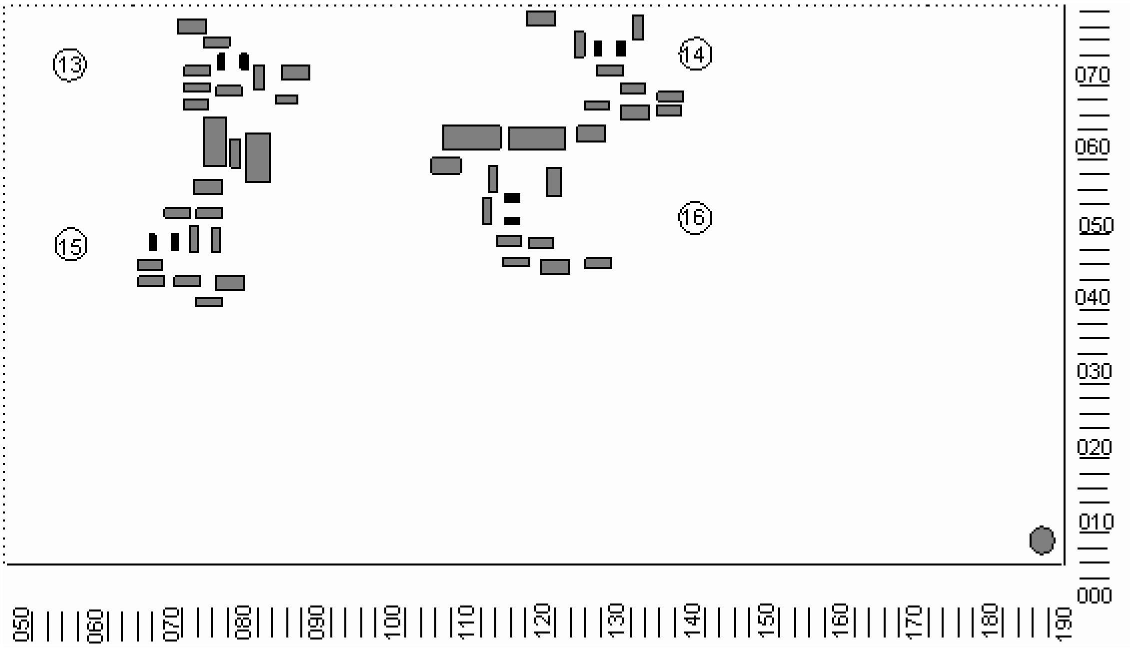
8
9
10
11
12



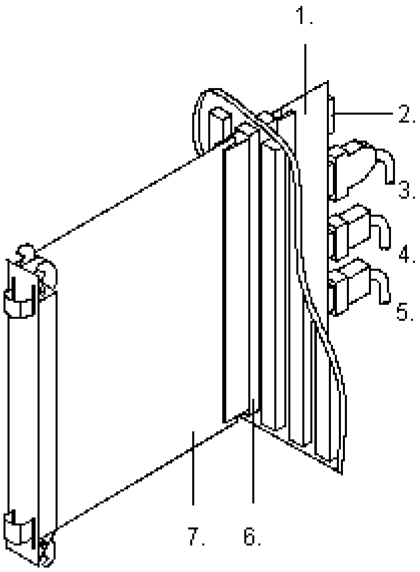
8.5.3.4 MDF Connections

MDF		Cable Adapter CA1B/CARUB from ASCxx
Colours 16x2	Patch panel for two-wire connection	
RD/BU	WE 1	a1/b1
WH/YE	WE 2	a2/b2
WH/GN	WE 3	a3/b3
WH/BN	WE 4	a4/b4
WH/BK	WE 5	a5/b5
WH/BU	WE 6	a6/b6
WH/YE	WE 7	a7/b7
WH/GN	WE 8	a8/b8
WH/BN	WE 9	a9/b9
WH/BK	WE 10	a10/b10
WH/BU	WE 11	a11/b11
RD/YE	WE 12	a12/b12
WH/GN	WE 13	a13/b13
WH/BN	WE 14	a14/b14
WH/BK	WE 15	a15/b15
WH/BU	WE 16	a16/b16

8.5.4 AV24B Adapter V24 B Module

Short description

The adapter board V24 / B module (AV24B) is fitted in the R1 racks only behind the HSCB board or with the CBT service board.



AV24 B board

1. BG AV24B, soldering side
2. 26-pin strip connector to the SCA 28.7640.385x board (only for use in I33)
3. 15-pin D plug for the six-pair cable to the HVT for a tester, service PC or DuWa test jack (only for use in I33)
4. 9-pin D plug, 2nd V24
5. 9-pin D plug, 1st V24
6. HSCB slot
7. BG HSCB module

First V24 port	Used to connect the PC for CBT applications, such as logging etc.
second V24 port	can be configured in the IVL (HSCB with HGS) as a connecting interface of the DCF77 receiver.

8.5.4.1 MDF Connections

The connections described hereafter are only relevant for connection in the I33.

MDF	AV24B
Colours	
RD/BU	A1/B1 (T) S0 connection for service PC (*)
WH/YE	C1/D1 (R) S0 connection for service PC (*)

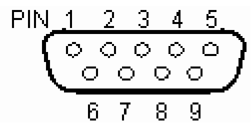
WH/GN	A1/B1 (T) S0 test subscriber (*)
	UP0 test subscriber (*)
	a1/b1, analog test participants (*)
WH/BN	C1/D1 (R) S0 test subscriber (*)
WHBK	a11/b11 (DID test device) (*)
WH/BU	a12/b12 (DID test device) (*)

* Connect the S0-, UP0 and a/b test connections from the MDF to the PBX.

8.5.4.2 V.24 Interfaces

seeInterface Configuration → 525

PIN assignment of the V24 ports



Assignment of the V.24 interfaces

PIN1=free;
PIN2=RXD;
PIN3=TXD;
PIN4=DTR (only supported for HSCB);
PIN5=GND;
PIN6=DSR (only supported for HSCB);
PIN7=RTS (only supported for HSCB);
PIN8=CTS (only supported for HSCB);
PIN9=free

Connections from the first V24 port of the CA3B in the B3 module

PIN1/PIN6	A1/B1 (R, external clock 2048/1544 kHz)

8.5.5 CA Cable Adapter

Short description

The CA Cable Adapters are fitted in the rack (only I55) and allow connecting circuit board connections to be switched through to the MDF.

8.5.5.1 CA Assignment

Cable Adapters for Digital connecting device boards

Board	Cable adapter
CAS	CA1B
	CA4B
DCON	CA1B
	CA4B
DECT21	CA1B
DS02	CA2B
DT0	CA1B
DT21	CA1B
	CA4B
	OFA2B
DUP03	CA1B
DUPN	CA2B
IMUX	CA5B
MAC	CA6B
HAMUX	CA6B
MULI	CA1B
ADM	CA2B
UIP without V.24M	CA1B
UIP with V.24M	CA3B

Cable Adapters for Analog connecting device boards

Board	Cable adapter
ASC2.	CA2B
	CARUB
ASC . .	CA1B
	CARUB
ATA/B/C	CA1B
ATLC	CA2B
	CARUB
DDID	CA1B
JPAT	CA2B
	CARUB

Cable adapters for IP telephoning Gateways

Board	Cable adapter
IPGW	CAIB
VoIP	AEV24B

Cable Adapters for Other Connectors

Board	Cable adapter

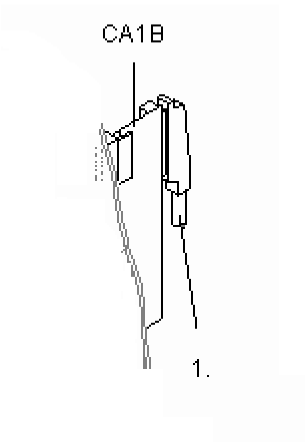
CF22/CF2E	ESBx
ACB	AEV24B
HSCB	AV24B
ICF + CL2M	CA3B (B3 module and ICS)

8.5.6 CA1B cable adapter 1 for B modules

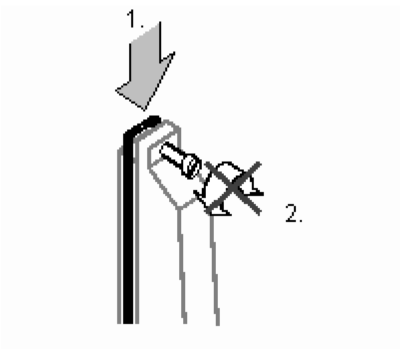
Short description

Cable adapter for 16, 4 or 2-pair analog or digital connecting circuit line for boards ASCEU, ASCF, ASCGB, ATAx, ATB, ATC, DDID, DUP03, DT0, DT21, CAS, DCON, UIP without V24M, MULI and DECT21 with

- 50-pin CHAMP plug as an output to the MDF
- Overcurrent breakpoint (230 V contact)



1. 16, 4 or 2-pair to the MDF/NT



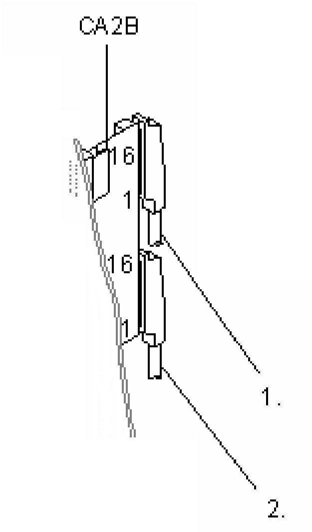
1. Release the lock by pressing the bracket
2. Do not turn the screw!

8.5.7 CA2B cable adapter 2 for B modules

Short description

Cable adapter for 2 to 8-wire analog or 4-wire digital connection device line for the ASC2, ASC21, ATLC, DS02, DUPN, JPAT and ADM boards with

- 50-pin CHAMP plug as an output to the MDF
- Overcurrent breakpoint (230 V contact)



1. Cable 1 (16x2) to the MDF
2. Cable 2 (16x2) to the MDF

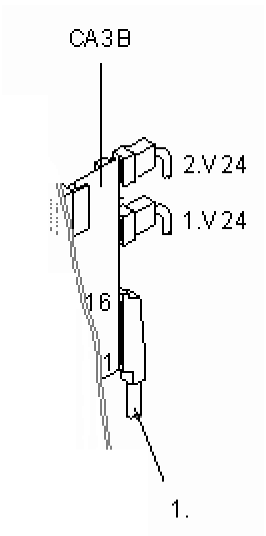
8.5.8 CA3B cable adapter 3 for B modules

Short description

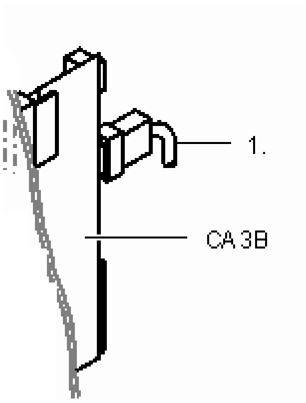
Cable adapter for the UIP board, provided that the V24M submodules are also inserted here. The board is also required for external synchronization when using the CL2M/CL2MEM on ICF (B3 module or ICS).

- 50-pin CHAMP plug as an output to the MDF
- 2x 9-pin D plugs for V24 interfaces or connection of high precision reference clock
- Overcurrent breakpoint (230 V contact)

If the first slot of a UIP board is equipped with a CL2ME for the clock supply of TAREF it is necessary to use the CA3B/T cable adapter.



1. Cable 16X2 to MDF



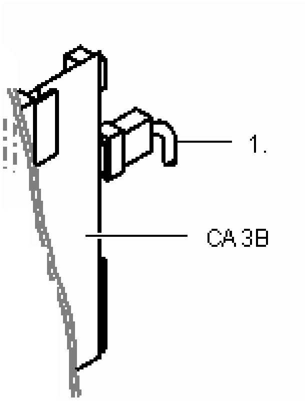
1. Cable for connecting an external clock source plugged on the first V.24

8.5.9 CA3B/T cable adapter 3 for B modules TAREF

Short description

Cable adapter for UIP board if the clock supply from TAREF is implemented via the CL2ME inserted on the first slot of the UIP.

The V24M submodules can also be inserted here.



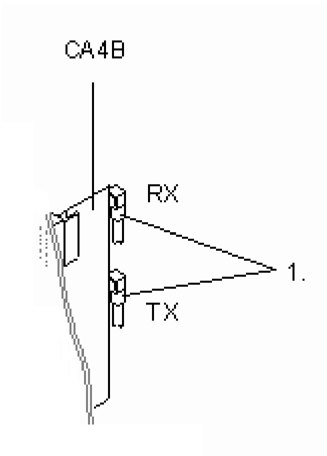
1. Cable for connecting the TAREF (material number: 27.5630.0531) inserted in the first V.24

8.5.10 CA4B cable adapter 4 for B modules

Short description

Cable adapter for the connection of coax lines when using boards DT21, CAS and DCON, provided that these modules are set on unsymmetrical interfaces.

- 2 BNC Coax sockets as output to NT or MUX.



1. Coax cable to NT or MUX

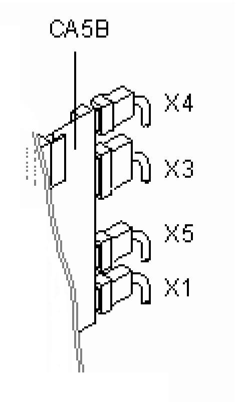
8.5.11 CA5B cable adapter 5 for B modules

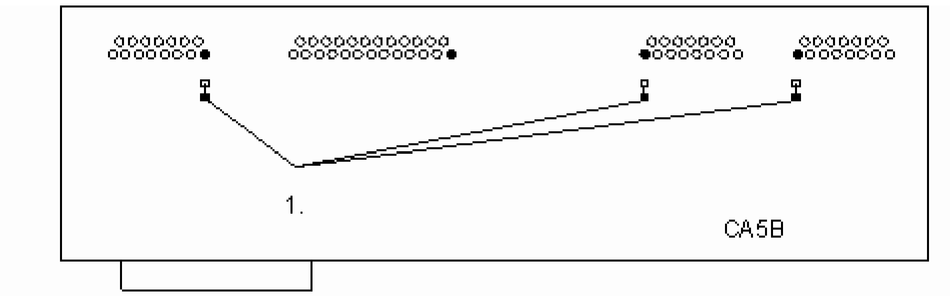
Short description

Cable adapters for the connection of V.24 and X.21 connectors to the IMUX board.

- Cable to the TA of the network operator or MDF (X1 and X5)
- 1x 15-pin Sub-D female Connector for X.21 data terminals (X4)

- 1x 25-pin Sub-D female Connector for V.24 data terminals (X3)
- Overcurrent breakpoint (230 V contact)
- Ground breakpoints (see IMUX board)





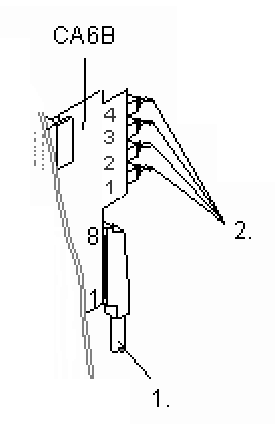
1. Cable Adapter 5B, rear component side, breakpoints

8.5.12 CA6B cable adapter 6 for B modules

Short description

Cable adapter for connecting UP0 and S2M connections to MAC and HAMUX boards.

- 50-pin CHAMP plug as an output to the MDF
- 8-pin WE plugs

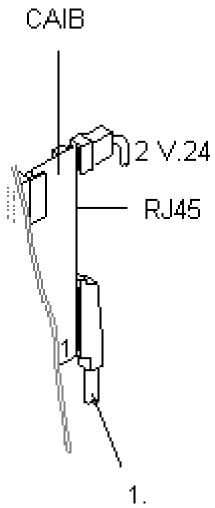


1. Cable 16X2 to MDF
2. 8-pin WE plugs

8.5.13 CAIB Cable Adapter I for B Modules

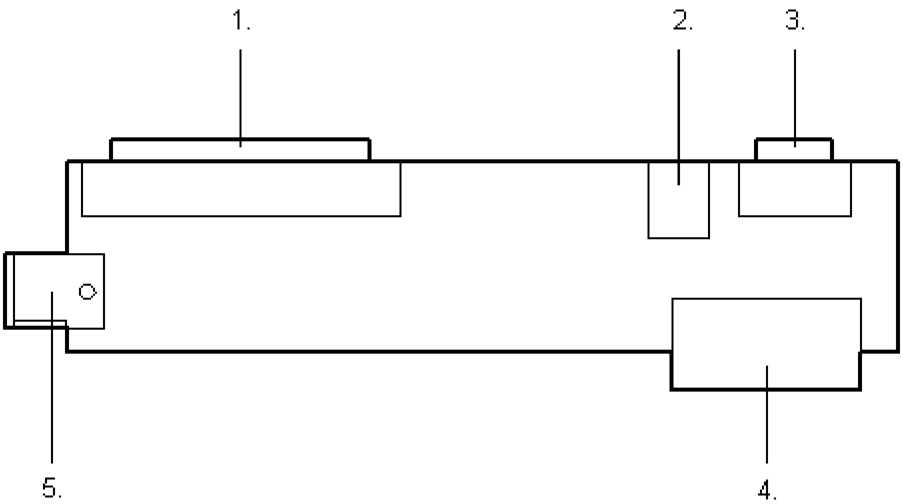
Short description

Cable adapters for the connection of the connections to the IPGW board.



CAIB cable adapter

1. Connection cable CAIB - MDF



Cable adapter CAIB, component side

1. Cable 6x2 to the main distribution frame
2. RJ45 socket for the Ethernet connection
3. V.24 connection

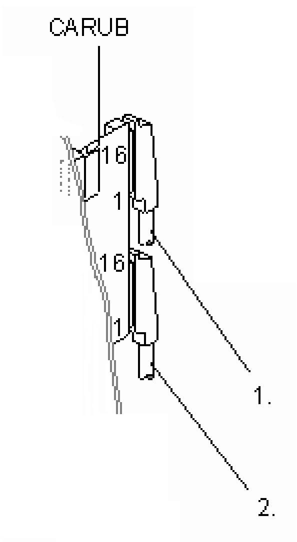
4. Plug for backplane
5. Fixation

8.5.14 CARUB Cable Adapter Russia B modules

Short description

The cable adaptor CARUB are used in Russia and the USA for the connection of ASCEU, ASC2, ASC21, JPAT and ATLC boards.

- 50-pin CHAMP plug as an output to the MDF
- Overcurrent breakpoint (230 V contact)
- Protective elements for contact with outside voltage



1. Cable 1 (16x2) to the MDF
2. Cable 2 (16x2) to the MDF

8.5.15 CF22 Central Functions 22

Short description

The central board CF22 is the basic equipment in all modules. It replaces the CF2E board.

It supports:

- the dealer functions
- intermodule handover functions for DECT
  and
- call number display for incoming calls to analogue terminals (”CLIP” Calling Line Identification Protocol). As opposed to CF2E it only features one DSP system.

Features	
Ports	544
B channels (time slots)	1088
ILMx	+
DECT	+
Internal traffic flow	1088 Erl.
External traffic flow	225 Erl.

Features
Clock Supply and Module Synchronization
External synchronization via network nodes (S0, S2M).
Master function in multi-module systems can be set up using software.
Master free-run clock mode (internal clocking)

Module Switching Matrix
Bit rate 4,096 MBit/s
Module internal non-blocking

11 DTMF receiver sets, 4 DTMF transmitters (only for dialling)

Call Progress Tones
A maximum of 16 call progress tones can be generated as customer-specific or country-specific and can be cyclically repeated. At the same time unrestricted supply is possible.
In addition, a maximum of 3 tones with burst character can be supplied.

Short Voice Messages
Up to 8 voice messages or “music on holds” can be used. The total duration of **all** brief voice messages must be no longer than 64 sec.

Long Voice Messages
4 voice messages with unspecified time limits and confidata can be set up (connecting message devices via analogue subscriber line circuits). At the same time unrestricted supply is possible.

Tone Injection in Two-Party Conversations
Up to 3 various cyclic tones can be generated which may be fed into a maximum of 15 two-party conversations (e.g. call waiting tone, rolling tone etc.).

Conferences
The system software only allows three-party conferences. Only dealer terminals support conferences with more participants.

Call number ID
8 DTMF transmitters for CLIP (call nummer indication on analogue terminals for incoming calls)

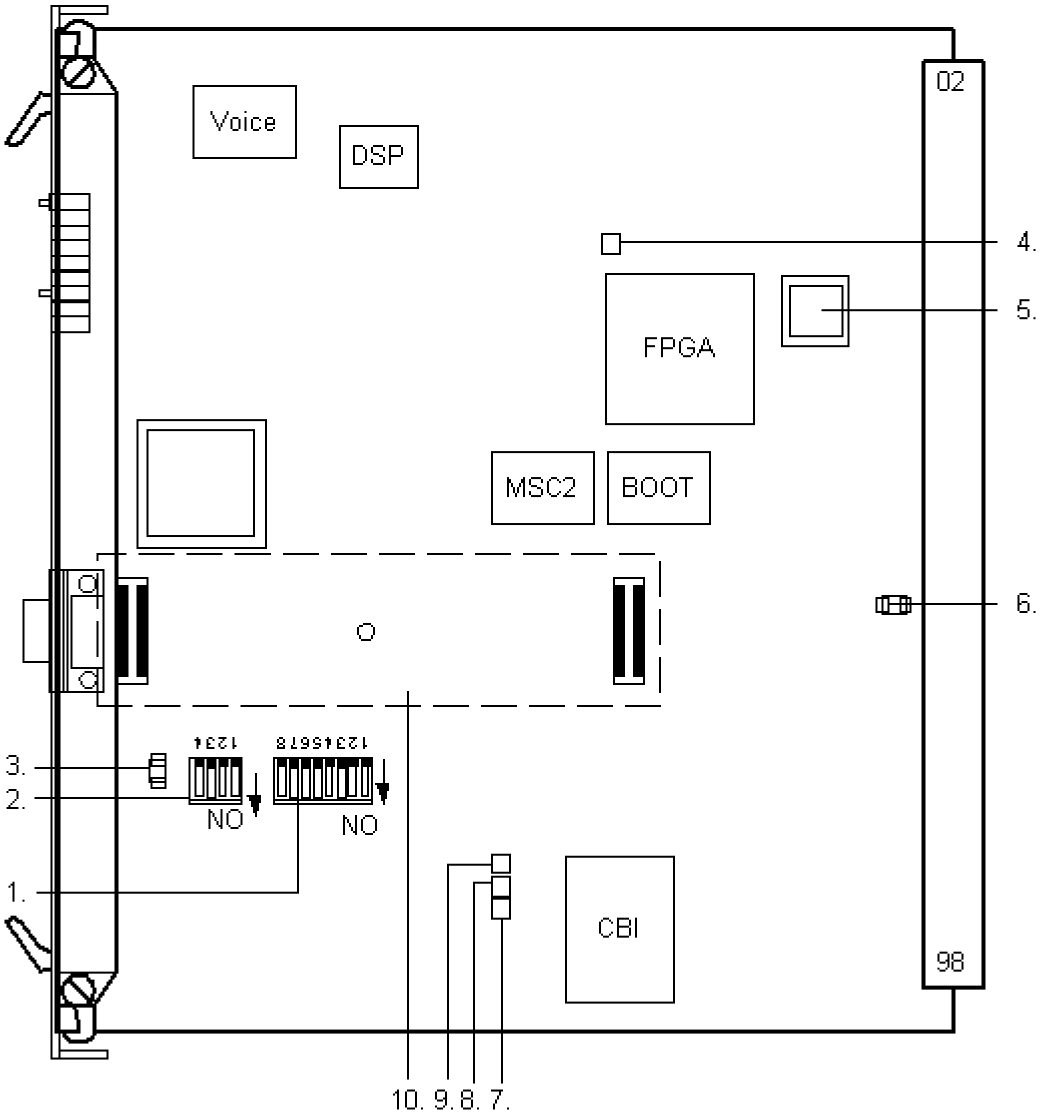
Other features	
Power demand +5V	1400 mA

A high precision reference clock is required for the intermodule handover functions. This can be carried out through the use of the CL2M submodule on the UIP or ICF. See also Intermodule Handover section.

If fibre-optic links are used, the CF22 board is to be fitted with the submodule CFIML Central Function Inter Module Link.

8.5.15.1 Jumper and DIL Switch Functions

Configuration switches are located on the component side of the board. The functions and positions of these switches are described below:



CF22 board, component side

1. DIL switch, 8-part
2. DIL switch, 4-part
3. Fuse F2 for the power supply EOC, 500 mA replaceable
4. LED red:
   Loadable hardware of the board out of service
   Operation of the board is not possible
5. FPGA Boot/Load PROM
6. Fire protection fuse 7A

⚠	If the fire protection fuse is defective (burned out), the board must be replaced by a new one.

7. LED green: R/T active
   on: High data traffic
   flashing: Data packet being received/sent to/from the micro processor
8. LED yellow: TFAIL
   flashing: Packet loss in transmission buffer because of transmit time-out or reset, or synchronization fault in the micro processor
9. LED red: RFAIL
   flashing: Packet loss in receiver buffer because of receive time-out or reset
10. CFIML submodule Central Function Inter Module Link

Functions of the DIL Switches, 8-part

	Switch	Switch
System configuration for MMG	1	3
Single module system	ON	ON
Two module system, first module	ON	OFF
Two module system, second module	OFF	ON
Two module system, systems with more than two modules	OFF	OFF
Specification of highest scan address	2	4
35	ON	ON
55	ON	OFF
87	OFF	ON
126 **(Default)**	OFF	OFF
Battery status query (AIC)		5
Testing of -48 V battery is not possible		ON
(Default)		
Testing of -48 V battery active		OFF
When using PS350 with a connected battery (only Integral 33): Switching on the battery voltage monitoring		
Error signalling unit		6
with ESU		ON
without ESU		OFF

In order to get the correct signalling direction ATA with EE8B in a communication server Integral 55 with ESBA instead of ESB, switch 6 must be placed to ON (with ESU).

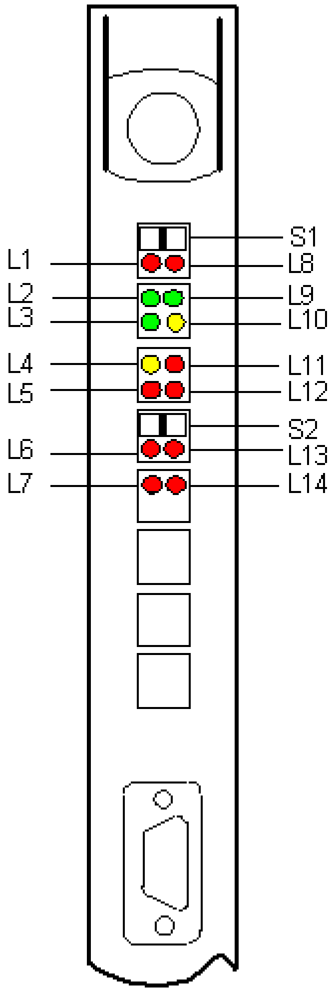
	Switch
Download	7
Download inactive	ON
Download possible **(default)**	OFF
Module Manager Watchdog	8

Watchdog inactive	ON
Watchdog active **(default)**	OFF

Functions of the DIL Switches, 4-part

	Switch
Intermodule handover	1
for twin and multi-module configuration: Intermodule handover active between modules	ON
for twin and B3 configuration: Intermodule handover not active between modules	OFF
Optical waveguide length compensation (only with doubled CF2E)	2
Activation of the length compensation function for the default passive CF slot	ON
Deactivation of the length compensation function for the default passive CF slot	OFF
Switch still without function	3
Switch still without function	4

8.5.15.2 LEDs and Switch Functions



CF22 board, front side

Switch Position in Normal Operation

S1	Middle position
S2	Middle position

Switch Function

S1	Reset switch	
	Middle:	Operating status
	Left:	Reset of the board, locking
	Right:	Reset board, keying
S2	Service Switch	
	Middle:	Operating status
	Left:	No function, locking
	Right:	With a doubled CF2x: Activate switchover, keying

Meanings of LEDs

L1	ACTIVE	MSMC active/inactive
	on:	MSMC (switching matrix processor unit) resetting/inactive
	flashing:	MSMC downloading or waiting for commissioning
	off:	MSMC active
L2	CLKUA	Clock unit active
	on:	Normal operation: Active module clock unit
L3	IMHOSYNC	
	on:	Module is synchronised for DECT operation
	flashing:	Resynchronization (flashes for 30 sec.)
	off:	Module is not synchronised for DECT operation
		This operating status may also occur if switch 1 of DIL switch 2 is in the **ON** position (IMHO active) while LED L4 is **on**.
L4	MAFREI	
	on:	Master free-run clock mode (internal clocking) or external synchronization (if L10 is also on)
	flashing:	Internal free-run clock mode (internal clocking) after failure of synchronous clock via beam waveguide path
L5	AMEX1S	Alarm message ext. synchr. clock 1 sec.
	on:	Failure of synchronizing clock signal for more than 1 sec. (with master module: clock pulse from local exchange, network node; with slave module: clock pulse via fibre-optic cable)
L6	DSP-LED1	Status - LED
	on:	Boot phase after board reset or DSP system permanently defective
	flashing:	temporary synchronization fault on a DSP Highway
	off:	DSP system in operation
L7	TFAIL	
	on or flashing:	One or more C-bus transmit errors
	off:	C-bus in operation. CFIML submodule not inserted into the CF22.
L8	MMG	MMG status
	on:	MMG not in operation (no board operation) or defective beam waveguide connection (after CF reset in multi-module system)
	flashing:	MMG in operation, but board logon not yet possible
	off:	MMG in operation
L9	CLKUSYN	Clock unit synchronization
	on:	Module clock system is synchronized
L10	MANK	Master network node
	on:	External synchronous clock switched on for synchronization by the system software
L11	IDR	IDR fault from IMLA (e.g. beam waveguide not in order)
L12	ECLKU	Error clock unit
	on:	Clock system error
	flashing:	After failure of synchronous clock via beam waveguide
L13	DSP-LED2	Status - LED
	on:	Boot phase after board reset or DSP system permanently defective

	flashing:	temporary synchronization fault on a DSP Highway
	off:	DSP system in operation
L14	RFAIL	
	on or flashing:	One or more C-bus receive errors
	off:	C-bus in operation. CFIML submodule not inserted into the CF22.

8.5.15.3 Doubling

It is possible to double the CF22 board in the R1 rack.

SeeDoubling → 143

8.5.15.4 Removing and Inserting the board

ESD-measures must be accomplished when working with boards susceptible to electrostatic shock.

The CF22 board can be removed or inserted during system operation. However, the module will not operate if the CF22 is not doubled.

Removal of the board is followed by a restart without loading customer data.

⚠	When doubling, the CF22 board may only be removed when in passive status (LED 2 off). If LED 2 is on, place switch S2 into the right position. LED 2 Off The board can now be removed.

8.5.16 CF2E Central Functions 2E

Short description

The central board CF2E is the basic equipment in all modules.

It supports the dealer and intermodule handover functions for DECT.

Features	
Ports	544
B channels (time slots)	1088
ILMx	+
DECT	+
Internal traffic flow	1088 Erl.
External traffic flow	225 Erl.

Features
Clock Supply and Module Synchronization
External synchronization via network nodes (S0, S2M).
Master function in multi-module systems can be set up using software.
Master free-run clock mode (internal clocking)

Module Switching Matrix
Bit rate 4,096 MBit/s
Module internal non-blocking

11 DTMF receiver sets, 4 DTMF transmitters

Call Progress Tones
A maximum of 16 call progress tones can be generated as customer-specific or country-specific and can be cyclically repeated. At the same time unrestricted supply is possible.
In addition, a maximum of 3 tones with burst character can be supplied.

Short Voice Messages
Up to 8 voice messages or “music on holds” can be used. The total duration of **all** brief voice messages must be no longer than 64 sec.

Long Voice Messages
4 voice messages with unspecified time limits and confidata can be set up (connecting message devices via analogue subscriber line circuits). At the same time unrestricted supply is possible.

Tone Injection in Two-Party Conversations
Up to 3 various cyclic tones can be generated which may be fed into a maximum of 15 two-party conversations (e.g. call waiting tone, rolling tone etc.).

Conferences
The number of subscribers at a conference is 3.

Other features	
Power demand +5V	2200 mA

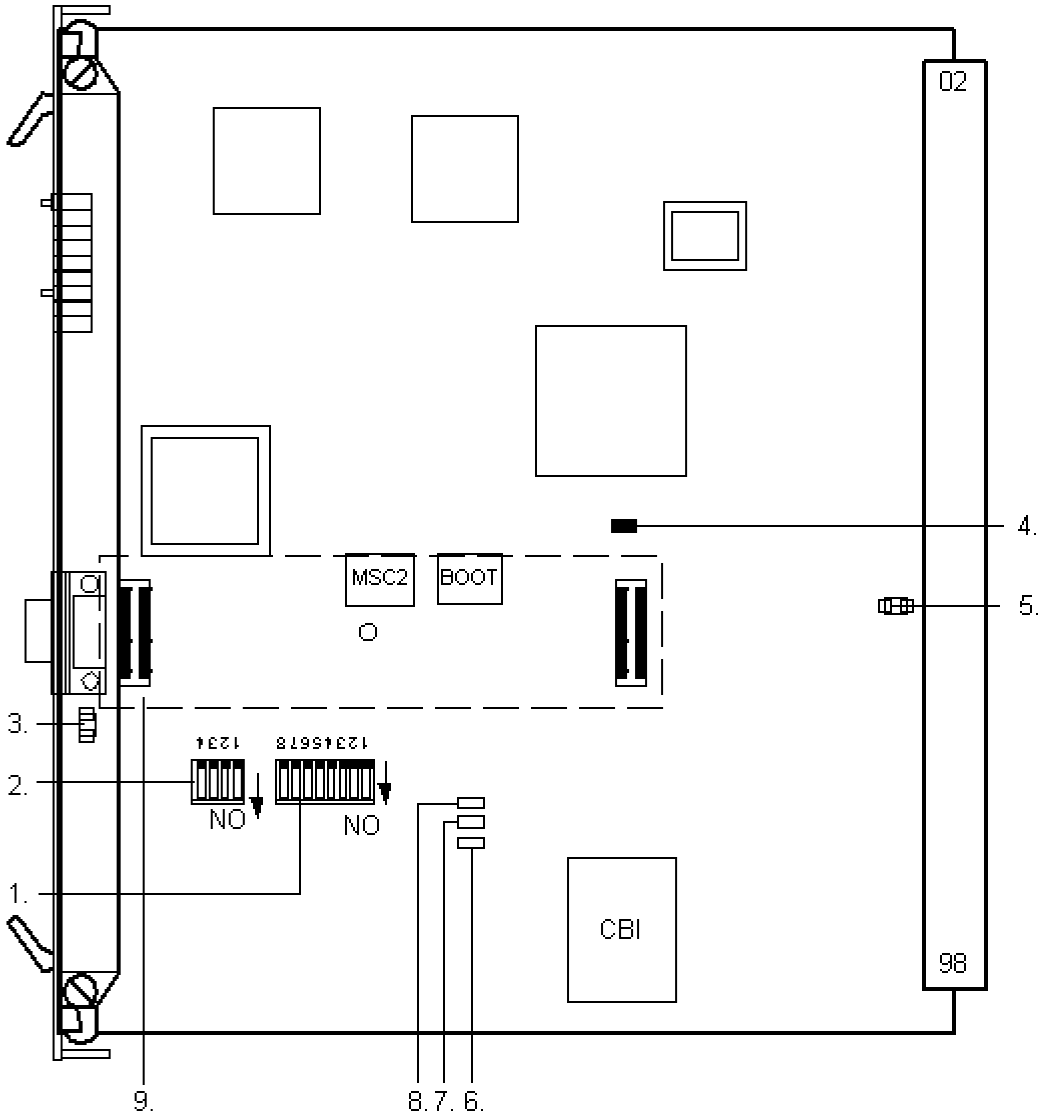
	The CF2E board is supported from the programme file MSC2P006 onwards.

A high precision reference clock is required for the intermodule handover functions. This can be carried out through the use of the CL2M submodule on the UIP or ICF. See also Intermodule Handover section.

In coupling via LWL, the CF2E module is to be fitted with the submodule CFIML central function inter module Link.

8.5.16.1 Jumper and DIL Switch Functions

Configuration switches are located on the component side of the board. The functions and positions of these switches are described below:



CF2E board, component side

1. DIL switch 3
2. DIL switch 2
3. Fuse F1 for the power supply EOC, 500 mA replaceable
4. LED red:
   Fault indicator of the central functions
   Hardware out of order
5. Fire protection fuse F3, 7 A

⚠	If the fire protection fuse is defective (burned out), the board must be replaced by a new one.

6. LED green: R/T active
   on: High data traffic
   flashing: Data packet being received/sent to/from the micro processor.
7. LED yellow: TFAIL
   flashing: Packet loss in transmission buffer because of transmit time-out or reset, or synchronization fault in the micro processor
8. LED red: RFAIL
   flashing: Packet loss in receiver buffer because of receive time-out or reset
9. CFIML submodule Central Function Inter Module Link

Functions of the DIL Switch 3

	Switch	**Switch**
System configuration for MMG	1	3
Single module system	ON	ON
Two module system, first module	ON	OFF
Two module system, second module	OFF	ON
Two module system, systems with more than two modules	OFF	OFF
Specification of highest scan address	2	4
35	ON	ON
55	ON	OFF
87	OFF	ON
126 **(Default)**	OFF	OFF
Battery status query (AIC)		5
Testing of -48 V battery is not possible		ON
(Default)		
Testing of -48 V battery active		OFF
When using PS350 with a connected battery (only Integral 33): Switching on the battery voltage monitoring		
Error signalling unit		6
with ESU		ON
without ESU		OFF

In order to get the correct signalling direction ATA with EE8B in a communication server Integral 55 with ESBA instead of ESB, switch 6 must be placed to ON (with ESU).

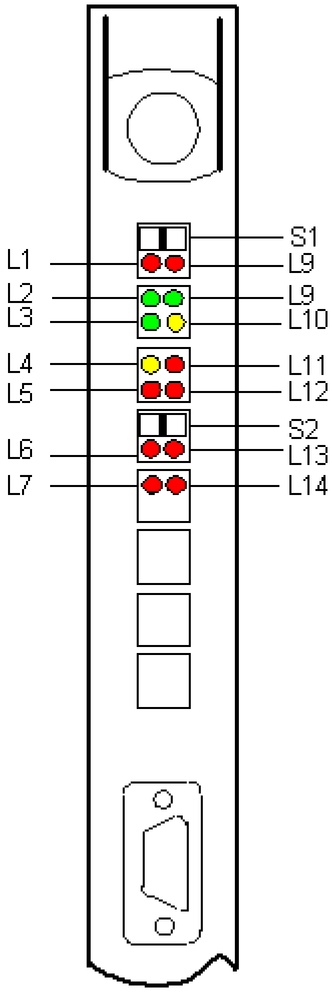
	Switch
Download	7

Download inactive	ON
Download possible **(default)**	OFF
Module Manager Watchdog	8
Watchdog inactive	ON
Watchdog active **(default)**	OFF

Functions of the DIL Switch 2

	Switch
Intermodule handover	1
for twin and multi-module configuration: Intermodule handover active between modules	ON
for twin and B3 configuration: Intermodule handover not active between modules	OFF
Optical waveguide length compensation (only with doubled CF2E)	2
Activation of the length compensation function for the default passive CF slot	ON
Deactivation of the length compensation function for the default passive CF slot	OFF
Switch still without function	3
Switch still without function	4

8.5.16.2 LEDs and Switch Functions



CF2E board, front side

Switch Position in Normal Operation

S1	Middle position
S2	Middle position

Switch Function

S1	Reset switch	
	Middle:	Operating status
	Left:	Reset of the board, locking
	Right:	Reset board, keying
S2	Service Switch	
	Middle:	Operating status
	Left:	No function, locking
	Right:	With a doubled CF2x: activate switchover, keying

Meanings of LEDs

L1	ACTIVE	MSMC active/inactive
	on:	MSMC (switching matrix processor unit) resetting/inactive
	flashing quickly:	MSMC downloading
	flashing slowly:	MSMC waiting for startup
	off:	MSMC active
L2	CLKUA	Clock unit active
	on:	Normal operation: Active module clock unit
		Doubling: active CF2x
L3	IMHOSYNC	
	on:	Module is synchronised for DECT operation
	flashing:	Resynchronization (flashes for 30 sec.)
	off:	Module is not synchronised for DECT operation
		This operating status may also occur if switch 1 of DIL switch 2 is in the **ON** position (IMHO active) while LED L4 is **on**.
L4	MAFREI	
	on:	Master free-run clock mode (internal clocking) or external synchronization (if L10 is also on)
	flashing:	Internal free-run clock mode (internal clocking) after failure of synchronous clock via beam waveguide path
L5	AMEX1S	Alarm message ext. synchr. clock 1 sec.
	on:	Failure of synchronizing clock signal for more than 1 sec. (with master module: clock pulse from local exchange, network node; with slave module: clock pulse via fibre-optic cable)
L6	DSP System 1	Status - LED
	on:	Boot phase after board reset or DSP system 1 defective
	off:	DSP system 25.40 mm operation
L7	TFAIL	
	flashing:	Packet loss in transmission buffer because of transmit time-out or reset, or synchronization fault in the micro processor
L8	MMG	MMG status
	on:	MMG not in operation (no board operation) or defective beam waveguide connection (after CF reset in multi-module system)
	flashing:	MMG in operation, but board logon not yet possible
	off:	MMG in operation
L9	CLKUSYN	Clock unit synchronization
	on:	Module clock system is synchronized
L10	MANK	Master network node
	on:	External synchronous clock switched on for synchronization by the system software
L11	IDR	IDR fault from IMLA (e.g. beam waveguide not in order)
L12	ECLKU	Error clock unit
	on:	Clock system error
	flashing:	After failure of synchronous clock via beam waveguide

L13	DSP System 2	Status - LED
	on:	Boot phase after board reset or DSP system 2 defective
	off:	DSP system 2 in operation
L14	RFAIL	
	flashing:	Packet loss in receiver buffer because of receive time-out or reset

8.5.16.3 Doubling

It is possible to double the CF2E board in the R1 rack.

SeeDoubling → 143

8.5.16.4 Removing and Inserting the board

ESD-measures must be accomplished when working with boards susceptible to electrostatic shock.

The CF2E board can be removed or inserted during system operation. However, the module will not operate if the CF2E is not doubled.

Removal of the board is followed by a restart without loading customer data.

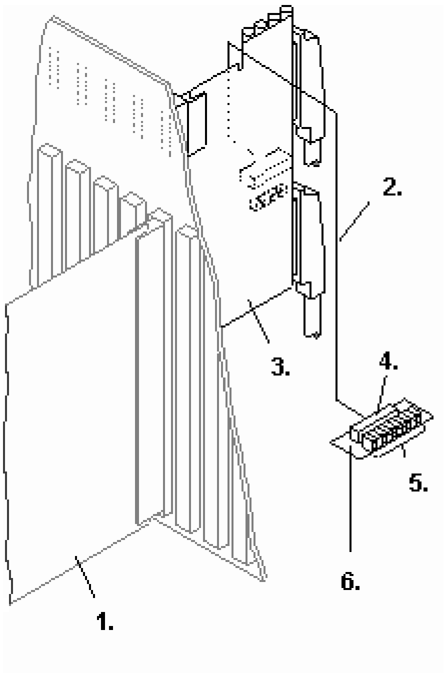
⚠	When doubling, the CF2E board must only be removed when in passive status (LED 2 off). If LED 2 is on, place switch S2 into the right position. LED 2 Off The board can now be removed.

8.5.17 EDU Error Display Unit

Short description

The EDU boards are used either optionally in the service panel or in the multi-module (1/2 k rack) as fault displays.

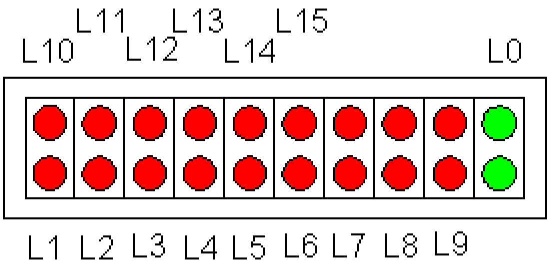
Features
18 red LEDs for indicating fault statuses.
1 green LED for display of operational readiness
26-pin pin strip for control cable connection



EDU board on the ESB board

1. BG ICF (only in the B3 module)
2. Ribbon cable
3. Board ESB
4. 26-pin plug
5. 10x2 LEDs
6. EDU board (located on the service panel or on the front of the1/2 K racks)

8.5.17.1 Meanings of LEDs



EDU board

LED	Short description	Description	S01 switch on text code	S01 switch off text code
L0		System in operation	233	-
L1	(lockstoe)	SMDT/automatic information call malfunction	599, 604	600

L2	(hgsausf)	HGS failure*	-	Switch off using MML after fault elimination.
L3	(zgdeaus)	ZGDE failure	126, 127, 297	128, 558, 564
L4	(ivgstoe)	Module malfunction	98	139
L5	(rivzaus)	Reserve CPU failure	-	Switch off using MML after fault elimination.
L6	(schnstoe)	Interface malfunction	262, 264, 265, 266, 267, 535	Switch off using MML after fault elimination.
L7	(lueausf)	Fan failure	611, 613	Switch off using MML after fault elimination.
L8	(ltgdef)	Analog/digital line fault	77, 555	565
L9	(amtalrm)	System ready for operation	664	665
L10	(stvstoe)	Power supply fault	605, 607, 609	Switch off using MML after fault elimination.
L11	(einzstoe)	Individual Fault	14, 81, 225, 575	Switch off using MML after fault elimination.
L12	(redver)	Loss of redundancy	227, 228, 361, 362, 363, 364, 401	Switch off using MML after fault elimination.
L13	(synausf)	Synchronization failure	649	650
L14	(ausfext)	External facility failure	530, 615, 617, 619, 621, 694, 696	Switch off using MML after fault elimination.
L15	(imtustoe)	IMTU malfunction	643, 644	645

* LED2 is activated via the HGS driver.

A LED stays activated until the required switch off text code is output or until it is switched off by means of the SSUP MML program (submenu MANI; command FSSM).

It is not possible to freely configure the LEDs that are not occupied. The assignment of LED and S01 text code is a fixed part of the S01 program.

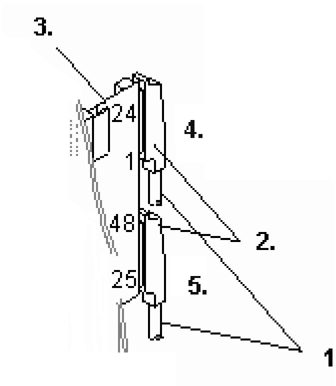
The S01 does not distinguish between the different system types; this has to be done by the user of the S01 task.

For a description of the S01 texts for the E070V06 version, see E070V06_S01

8.5.18 EES0B Emergency Extension Switch S0 B Module

Short description

For special services, such as the police force, fire brigade or Red Cross, whose answering facilities must always be available, the Emergency Extension Switch S0 for CSI55 is available. In the event of a power failure or other malfunctions, this modules enables a switchover from the connecting line coming from the ISDN network to sets that are powered by the ISDN network.



EES0B board

1. Cable 1 + 2, each 24-pair to external MDF
2. Champ plug
3. EES0B
4. Pl.1
5. Pl.2

Instructions
Connection to a DT0, i.e. 2 DAs are to be switched per port.
Switchover is implemented to a set that is only used when the switchover is active.
For this purpose, a switchover with 1 WP each for the analog voice documentation.
Two 50-pin plugs are available as external connectors.

Switch-over criteria
General power failure
PC Board DT0 removed
Manual actuation of an external potential-free switch

The number of ports is determined by the limited number of plug positions.

The port 1..6 contains the switchover option. Port 7 and 8 are directly switched through.

The switchover is implemented with 4 wires.

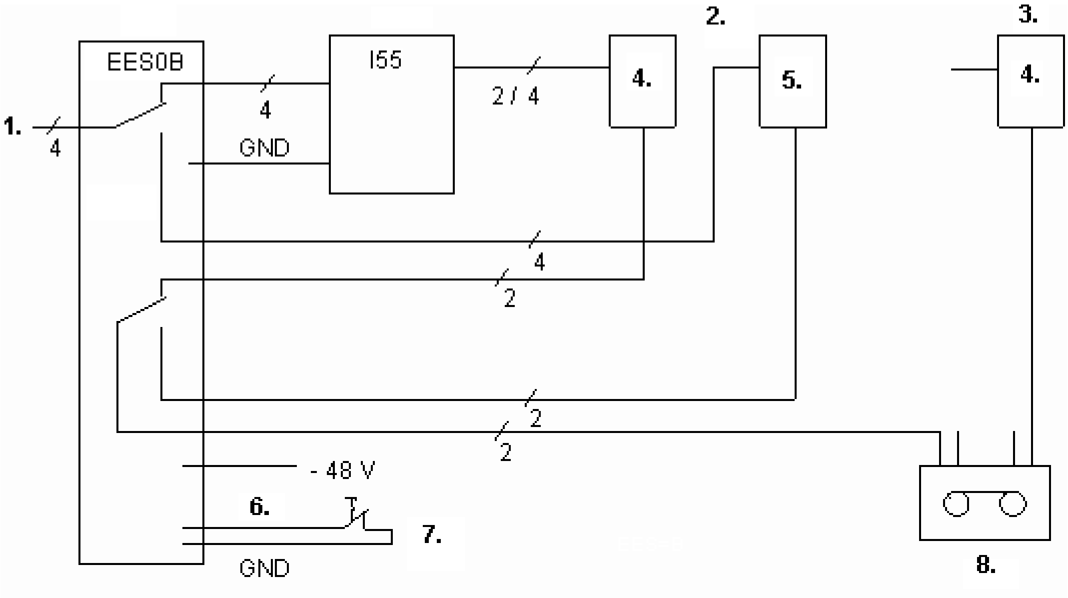
For each port, an additional 2 switchover contacts are brought out, via which, for example, lines to voice recording devices are switched.

The power supply to the board is implemented with GND from the DT0. -48 V is fed via the connecting cable.

One wire is fed for the forced switchover via the connecting cable.

Connection cables required: 2 cables 24x2 I55-HVT (MDF) 29.9030.56xx (xx = cable length)

Block Diagram



Emergency switchover facility for S0 lines

1. ISDN line
2. Answering with emergency set
3. Answering without emergency set
4. Answering
5. Emergency set
6. ZN
7. manual emergency switching
8. Documentation

8.5.18.1 Further Information

An NTBA with emergency supply is used as the NT, and the exchange dialling can be loaded with up to 380 mW in this case.

In normal operation, the emergency set has no function and therefore nothing appears in the display.

Facilities of this type are normally only to be handled by trained personnel. It can then be assumed that no unqualified actions shall be initiated by the users.

Each cable adapter is provided with 125 mA semi-lag fuse protection.

8.5.18.2 MDF Connections

MDF Cable 1	Emergency Extension Switch S0 with DT0	
Colours 24x2		
RD/BU	TA1/TB1	ISDN lines with emergency switching
WH/YE	TC1/TD1	
WH/GN	TA2/TB2	
WH/BN	TC2/TD2	
WH/BK	TA3/TB3	
WH/BU	TC3/TD3	
WH/YE	TA4/TB4	
WH/GN	TC4/TD4	
WH/BN	TA5/TB5	
WH/BK	TC5/TD5	
WH/BU	TA6/TB6	
WH/YE	TC6/TD6	
WH/GN	TA7/TB7	ISDN lines without emergency switching
WH/BN	TC7/TD7	
WH/BK	TA8/TB8	
WH/BU	TC8/TD8	
WH/YE	EA1/EB1	Emergency sets
WH/GN	EC1/ED1	
WH/BN	EA2/EB2	
WH/BK	EC2/ED2	
WH/BU	EA3/EB3	
WH/YE	EC3/ED3	
RD/GN	EA4/EB4	
WH/BN	EC4/ED4	

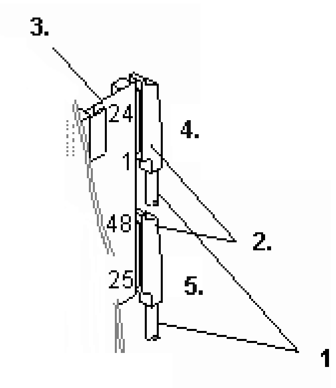
MDF Cable 2	Emergency Extension Switch S0with DT0	
Colours 24x2		
RD/BU	EA5/EB5	Emergency sets
WH/YE	EC5/ED5	
WH/GN	EA6/EB6	
WH/BN	EC6/ED6	
WH/BK	RA1/RB1	To analog voice recording
WH/BU	ERA1/ERB1	from handset of emergency set
WH/YE	EOA1/EOB1	From handset of answering facility
WH/GN	RA2/RB2	To analog voice recording
WH/BN	ERA2ERB2	from handset of emergency set
WH/BK	EOA2/EOB2	From handset of answering facility
WH/BU	RA3/RB3	To analog voice recording
WH/YE	ERA3ERB3	from handset of emergency set
WH/GN	EOA3/EOB3	From handset of answering facility

WH/BN	RA4/RB4	To analog voice recording
WH/BK	ERA4/ERB4	from handset of emergency set
WH/BU	EOA4/EOB4	From handset of answering facility
WH/YE	RA5/RB5	To analog voice recording
WH/GN	ERA5/ERB5	from handset of emergency set
WH/BN	EOA5/EOB5	From handset of answering facility
WH/BK	RA6/RB6	To analog voice recording
WH/BU	ERA6/ERB6	from handset of emergency set
WH/YE	EOA6/EOB6	From handset of answering facility
RD/GN	-48 V/-48 V	From power supply
WH/BN	ZN/GND	For the contingency of an emergency change-over

8.5.19 EESS0 Emergency Extension Switch S0

Short description

For special services, such as the police force, fire brigade or Red Cross, whose answering facilities must always be available, the adapter board Emergency Extension Switch S0 for CSI55 is available. In the event of a power failure or other malfunctions, this modules enables a switchover from the connecting line coming from the ISDN network to S0 sets that are powered by the ISDN network.



EESS0 board

1. Cable 1 + 2, each 24-pair to external MDF
2. Champ plug
3. EESS0
4. Pl.1
5. Pl.2

Instructions
Connection to a DT0 or ADM, i.e. 2 wire paris are to be switched per port.
Switchover is implemented to a set that is only used when the switchover is active.
For this purpose, a switchover with 1 WP each for the analog voice documentation.
Two 50-pin plugs are available as external connectors.

4.

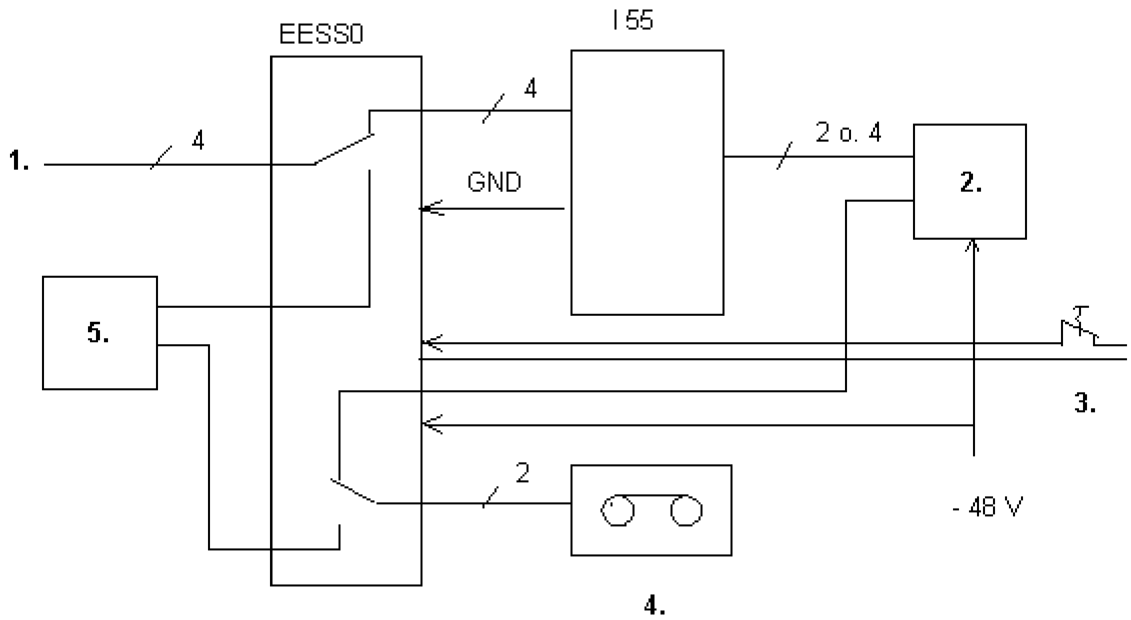
Switch-over criteria
General power failure
DT0/ADM board removed
Manual actuation of an external potential-free switch

Other features
Power demand -48V = 108mA
The number of ports is determined by the limited number of plug positions.
The port 1..6 contains the switchover option. Port 7 and 8 are directly switched through. Ports 9 to 16 cannot be used (only applies to ADM).
The switchover is implemented with 4 wires.
For each port, an additional 2 switchover contacts are brought out, via which, for example, lines to voice recording devices are switched.
The detection ”Board removed” is implemented with GND from the DT0 or ADM.
-48 V is fed via the connecting cable.
One wire is fed for the forced switchover via the connecting cable.
Connection cables required: 2 cables 24x2 I55-HVT (MDF) 29.9030.56xx (xx = cable length)

⚠	The X8 connector of the ADM board requires the EEADM submodule.

⚠	The EESS0 board differs from the EES0B board only in as far as in the EESS0 it is possible to prevent emergency switching of individual ports by means of jumpers.

Block Diagram

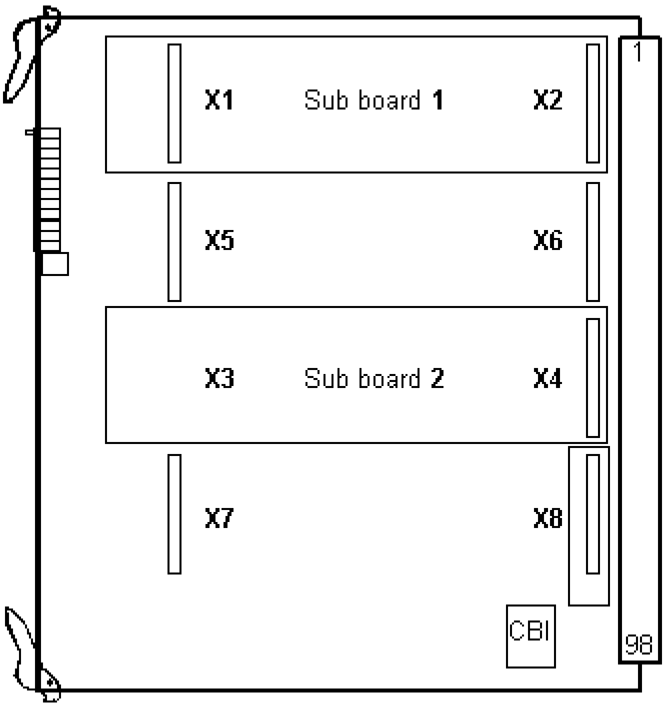


Emergency switchover facility for S0 lines

1. ISDN line
2. Answering station
3. Manual emergency switching
4. Documentation
5. Emergency answer

8.5.19.1 Additional measures with ADM

If the ADM board is used with emergency switching (EESS0 cable adapter) submodule 3 is not required. On the X8 connector (normally for submodule 4) you **must** insert the EEADM submodule instead of submodule 4.

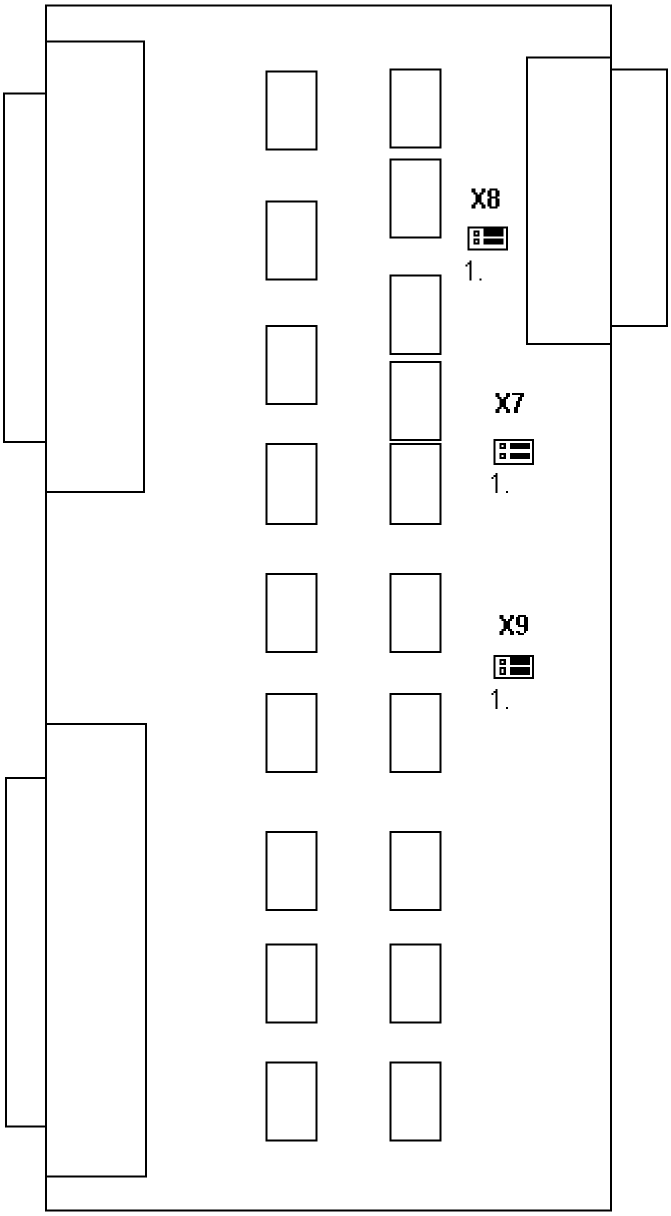


ADM board, location of EEADM on X8

If the EEADM board is inserted in the wrong place on the ADM board this will cause a defect in the ADM board.

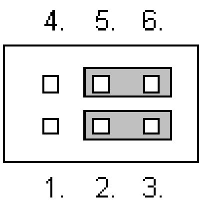
8.5.19.2 Jumper

The EESS0 features switching contacts with jumpers to prevent emergency switching of individual ports.



EESS0 cable adapter, component side

Upon first delivery emergency switching is active for ports 0 to 5, i.e. the jumpers are on 2-3 and 5-6. For special applications it is possible to exclude individual ports from emergency switching.



View of connectors X7, X8 and X9

Connector X7	Jumpers 1-2	Emergency switching for port 0 inactive

	Jumpers 2-3	Emergency switching for port 0 active
	Jumpers 4-5	Emergency switching for port 1 inactive
	Jumpers 5-6	Emergency switching for port 1 active
Connector X8	Jumpers 1-2	Emergency switching for port 2 inactive
	Jumpers 2-3	Emergency switching for port 2 active
	Jumpers 4-5	Emergency switching for port 3 inactive
	Jumpers 5-6	Emergency switching for port 3 active
Connector X9	Jumpers 1-2	Emergency switching for port 4 inactive
	Jumpers 2-3	Emergency switching for port 4 active
	Jumpers 4-5	Emergency switching for port 5 inactive
	Jumpers 5-6	Emergency switching for port 5 active

8.5.19.3 Further Information

The feedlines of the -48V should not be connected to the same fuse as those of the PBX because of the current difference between them.

The failure criteria such as fuse failure, board removed or manual switchover trigger a message on the system console so that monitoring from there is guaranteed.

An NTBA with emergency supply is used as the NT, and the exchange dialling can be loaded with up to 380 mW in this case.

In normal operation, the emergency set has no function and therefore nothing appears in the display.

Facilities of this type are normally only to be handled by trained personnel. It can then be assumed that no unqualified actions shall be initiated by the users.

8.5.19.4 MDF Connections

MDF Cable 1	**Emergency Extension Switch S0with DT0**	
Colours 24x2		
RD/BU	TA1/TB1	ISDN line 0
WH/YE	TC1/TD1	ISDN line 0
WH/GN	TA2/TB2	ISDN line 1

WH/BN	TC2/TD2	ISDN line 1
WH/BK	TA3/TB3	ISDN line 2
WH/BU	TC3/TD3	ISDN line 2
WH/YE	TA4/TB4	ISDN line 3
WH/GN	TC4/TD4	ISDN line 3
WH/BN	TA5/TB5	ISDN line 4
WH/BK	TC5/TD5	ISDN line 4
WH/BU	TA6/TB6	ISDN line 5
WH/YE	TC6/TD6	ISDN line 5
WH/GN	TA7/TB7	ISDN line 6
WH/BN	TC7/TD7	ISDN line 6
WH/BK	TA8/TB8	ISDN line 7
WH/BU	TC8/TD8	ISDN line 7
WH/YE	EA1/EB1	Emergency set 0
WH/GN	EC1/ED1	Emergency set 0
WH/BN	EA2/EB2	Emergency set 1
WH/BK	EC2/ED2	Emergency set 1
WH/BU	EA3/EB3	Emergency set 2
WH/YE	EC3/ED3	Emergency set 2
RD/GN	EA4/EB4	Emergency set 3
WH/BN	EC4/ED4	Emergency set 3

Complementary wire: GND

MDF Cable 2	**Emergency Extension Switch S0with DT0**	
Colours 24x2		
RD/BU	EA5/EB5	Emergency set 4
WH/YE	EC5/ED5	Emergency set 4
WH/GN	EA6/EB6	Emergency set 5
WH/BN	EC6/ED6	Emergency set 5
WH/BK	RA1/RB1	to analogue voice recording
WH/BU	ERA1/ERB1	from handset of emergency set
WH/YE	EOA1/EOB1	from handset of answering facility
WH/GN	RA2/RB2	to analogue voice recording
WH/BN	ERA2ERB2	from handset of emergency set
WH/BK	EOA2/EOB2	from handset of answering facility
WH/BU	RA3/RB3	to analogue voice recording
WH/YE	ERA3ERB3	from handset of emergency set
WH/GN	EOA3/EOB3	from handset of answering facility
WH/BN	RA4/RB4	to analogue voice recording
WH/BK	ERA4/ERB4	from handset of emergency set
WH/BU	EOA4/EOB4	from handset of answering facility
WH/YE	RA5/RB5	to analogue voice recording
WH/GN	ERA5/ERB5	from handset of emergency set

WH/BN	EOA5/EOB5	from handset of answering facility
WH/BK	RA6/RB6	to analogue voice recording
WH/BU	ERA6/ERB6	from handset of emergency set
WH/YE	EOA6/EOB6	from handset of answering facility
RD/GN	-48 V/-48 V	-48V from power supply
WH/BN	ZN/GND	Contact of forced emergency switching / to contact of forced emergency switching

Complementary wire: GND

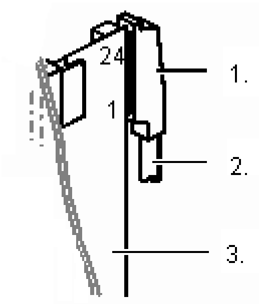
8.5.20 EESxB emergency extension switch B module

Short description

The board EESxB is used to connect the a/b interfaces of the ATA, ATB, ATC and ATA2 modules to the lines leading to the MDF.

The board EES1B serves the direct connection of an analog exchange line to a terminal in the event of a network failure. It provides connections for one analog exchange line, one line with analog terminal and one subscriber line circuit.

The EES8B enables an emergency switchover of eight analog subscriber sets to the network. The board also contains an overvoltage breakpoint (230 V contact).



EESxB Adapter module with connection

1. 50-pin Champ plug
2. Cable, 16 or 24-pair to external MDF
3. EESxB Adapter module

8.5.20.1 MDF Connections

MDF	via EES1B or EES8B from ATx
Colours 24x2	
RD/BU	a1/b1
WH/YE	a2/b2
WH/GN	a3/b3
WH/BN	a4b4

WH/BK	a5/b5
WH/BU	a6/b6
WH/YE	a7/b7
WH/GN	a8/b8
WH/BN	NST a1/b1
WH/BK	NST a2/b2 (8x only)
WH/BU	NST a3/b3 (8x only)
WH/YE	NST a4/b4 (8x only)
WH/GN	TLN-S a1/b1
WH/BN	TLN-S a2/b2 (8x only)
RD/BK	TLN-S a3/b3 (8x only)
WH/BU	TLN-S a4/b4 (8x only)
WH/YE	NST a5/b5 (8x only)
WH/GN	NST a6/b6 (8x only)
WH/BN	NST a7/b7 (8x only)
WH/BK	NST a8/b8 (8x only)
WH/BU	TLN-S a5/b5 (8x only)
WH/YE	TLN-S a6/b6 (8x only)
RD/GN	TLN-S a7/b7 (8x only)
WH/BN	TLN-S a8/b8 (8x only)

8.5.21 ESBx External Signalling B Module

Short description

The ESBx board is an adapter board which is inserted behind the CF2E, CF22 or ICF board.

Features
50-pin CHAMP plug as an output to the MDF.
18 relays for fault indication, one changeover contact per relay.
26-pin pin strip for connection of the EDU board
Total breakdown indication for single or doubled control (adjustable using jumper).
4 inputs used for external status queries, DC decoupled via optocoupler. These may be messages from a UPS for example, that are signalled via the PBX and activate a validation call.
4 fused -48 V electric circuits for the operator sets or NT
4 potential connections for fans with failure supervision.

Other features	
Power demand +5V	20-400 mA (depending on the number of relays to be activated)

Apart from the fully equipped variant of the ESB there are two variants with reduced equipment:

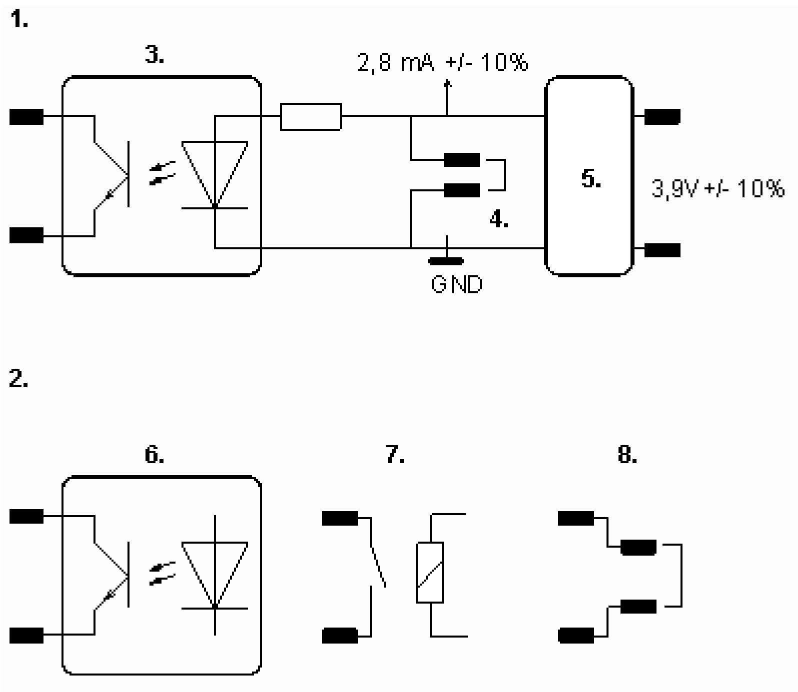
variant

ESBA	without external fault signalling, only power supplies for fan, VA and NT, with no EDU
ESBB	without external fault signalling, only power supplies for fan, VA and NT, with no EDU, all optocouplers equipped.

The characteristics of the boards can be found in the following table:

Characteristics of the ESBx board family				
Feature	ESB	ESBA	ESBB	Notes
Champ plug	1	1	1	to MDF
Relays for fault signalling	18	0	0	one changeover contact per relay
Champ plug	1	0	0	Fault signalling by the relay contacts
48V power supply circuit assured	4	4	4	Operator set or NT
Optocoupler inputs for interrogating external conditions	4	0	4	e.g messages from a UPS for example, that are signalled via the PBX and activate a validation call.
Connection facilities for a fan	4	4	4	with drop-out monitoring
26-pin connector	1	0	0	for EDU connection via ribbon cable

Schematic representation of the optocoupler interface



Possible opposite stations for the optocoupler

1. ESB
2. Possible Opposite Station

3. Optocoupler
4. Jumper to deactivate the interface
5. ESD
6. Optocoupler
7. or relay contact
8. or jumper

8.5.21.1 Pin strip on the ESBx

- If overload current points of division on the ESBx board are burnt out, the board must be replaced with a new one.
- Never attempt to repair the breakpoints!
- The system may carry out a reset when the board is inserted!

Assignment of pins to Pin strips on ESB and ESBB boards

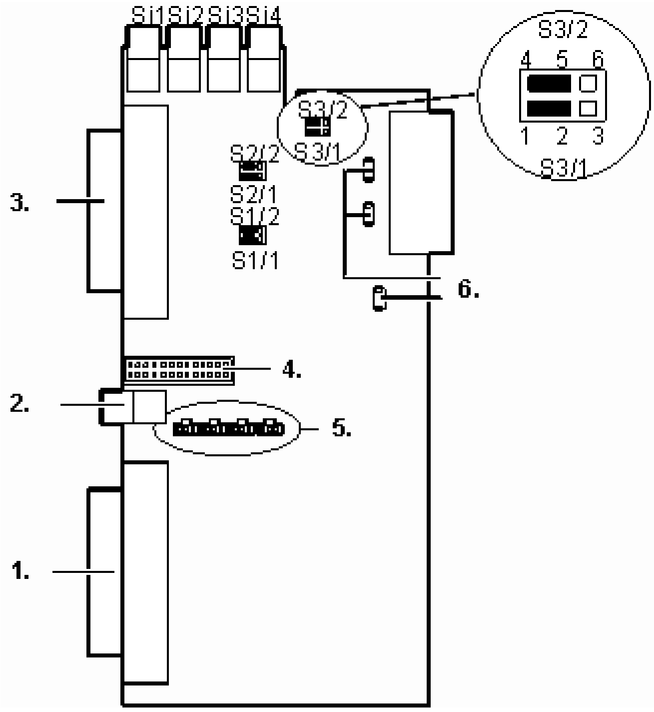
	Optoc.	Bridge	Optoc.	Bridge
S1/1	1 inactive	1 - 2	1 active	2 - 3
S1/2	2 inactive	4 - 5	2 active	5 - 6
S2/1	3 inactive	1 - 2	3 active	2 - 3
S2/2	4 inactive	4 - 5	4 active	5 - 6
S3/1	Module with 1 CFx	1 - 2	Module with 2 CFx's	2 - 3
S3/2	Default setting	4 - 5	Parking position	5 - 6

For use in B3 module (IMTU)

S3/1	Module with 1 ICF	1 - 2	not permissible	2 - 3

Insert the jumpers as required.

To protect against fire and energy hazards, fuses must only be replaced with fuses of the same type. Fuses S1 to S5 Wickmann type TR5-630 mA, 250 V time-lag.



ESBx adapter board, pin strip location

1. Cable 1, 4, 16 or 24-pair to external MDF
2. Fuse 5 for fan in housing
3. Cable 2, 16 or 24-pair to external MDF
4. Connector for EDU circuit board
5. Fan connectors
6. Fire protection device; Will require servicing if defective!

Si = Fuse

8.5.21.2 MDF Connections

Colours 4x2	Colours 16x2	Patch panel for the two-wire connection	Colours 24x2	Cable 1
BK/BN	RD/BU	WE 1	RD/BU	GND/-48 V (fuse 1, 630 mA, M) for VA or NT (all variants)
BK/RD	WH/YE	WE 2	WH/YE	GND/-48 V (fuse 2, 630 mA, M) for VA or NT (all variants)
BK/OR	WH/GN	WE 3	WH/GN	GND/-48 V (fuse 3, 630 mA, M) for VA or NT (all variants)
BK/YE	WH/BN	WE 4	WH/BN	GND/-48 V (fuse 4, 630 mA, M) for VA or NT (all variants)
	WH/BK	WE 5	WH/BK	Total failure contact (only ESB)

	WH/BU	WE 6	WH/BU	free / SMDT automatic information call malfunction contact, A (only ESB)
	WH/YE	WE 7	WH/YE	SMDT automatic information call malfunction contact, M/R (only ESB)
	WH/GN	WE 8	WH/GN	free / HGS failure contact, A (only ESB)
	WH/BN	WE 9	WH/BN	HGS failure contact, M/R (only ESB)
	WH/BK	WE 10	WH/BK	free / module malfunction contact, A (only ESB)
	WH/BU	WE 11	WH/BU	Module malfunction contact, M/R (only ESB)
	RD/YE	WE 12	WH/YE	free / individual malfunction contact, A (only ESB)
	WH/GN	WE 13	WH/GN	Individual malfunction contact, M/R (only ESB)
	WH/BN	WE 14	WH/BN	free / interface malfunction contact, A (only ESB)
	WH/BK	WE 15	RD/BK	Interface malfunction contact, M/R (only ESB)
	WH/BU	WE 16	WH/BU	Free contact (only ESB)
			WH/YE	free / IMTU malfunction contact, A (only ESB)
			WH/GN	IMTU malfunction contact, M/R (only ESB)
			WH/BN	free / reserve controls failure contact, A (only ESB)
			WH/BK	Reserve controls failure contact, M/R (only ESB)
			WH/BU	Ok. 1 external device malfunction (+/-, loop I 2.8 mA) (only ESB and ESBB)
			WH/YE	Ok. 2 external device malfunction (+/-, loop I 2.8 mA) (only ESB and ESBB)
			RD/GN	Ok. 3 external device malfunction (+/-, loop I 2.8 mA) (only ESB and ESBB)
			WH/BN	Ok. 4 external device malfunction (+/-, loop I 2.8 mA) (only ESB and ESBB)

Ok = optocoupler

Colours 16x2	Patch panel for the two-wire connection	Colours 24x2	Cable 2
RD/BU	WE 1	RD/BU	free / power supply malfunction contact, A (only ESB)
WH/YE	WE 2	WH/YE	Power supply malfunction contact, M/R (only ESB)
WH/GN	WE 3	WH/GN	free / fan failure contact, A (only ESB)
WH/BN	WE 4	WH/BN	Fan failure contact, M/R (only ESB)
WH/BK	WE 5	WH/BK	free / synchronisation failure contact, A (only ESB)
WH/BU	WE 6	WH/BU	Synchronisation failure contact, M/R (only ESB)
WH/YE	WE 7	WH/YE	free / ZGDE failure contact, A (only ESB)
WH/GN	WE 8	WH/GN	ZGDE failure contact, M/R (only ESB)
WH/BN	WE 9	WH/BN	free / system readiness contact, A (only ESB)
WH/BK	WE 10	WH/BK	System readiness contact, M/R (only ESB)

WH/BU	WE 11	WH/BU	free / line malfunction contact, A (only ESB)
RD/YE	WE 12	WH/YE	Analog/digital line fault contact, M/R (only ESB)
WH/GN	WE 13	WH/GN	free / loss of redundancy contact, A (only ESB)
WH/BN	WE 14	WH/BN	Loss of redundancy contact, M/R (only ESB)
WH/BK	WE 15	RD/BK	Free/contact malfunction external Facility, A (only ESB)
WH/BU	WE 16	WH/BU	Contact malfunction external Facility, M/R (only ESB)
		WH/YE	Free / contact not currently used, A (only ESB)
		WH/GN	Contact not currently used, M/R (only ESB)
		WH/BN	Free / contact not currently used, A (only ESB)
		WH/BK	Contact not currently used, M/R (only ESB)
		WH/BU	Free / contact not currently used, A (only ESB)
		WH/YE	Contact not currently used, M/R (only ESB)
		RD/GN	free/free
		WH/BN	free/free

8.5.22 HSCB High Speed Computer Board

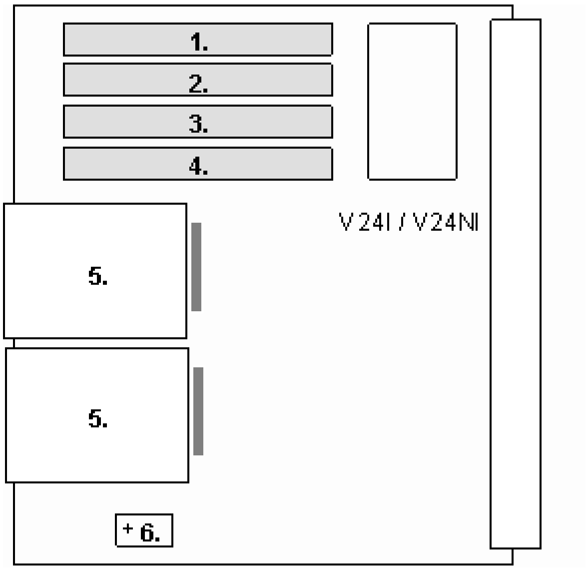
Short description

HSCB is the basic equipment in all modules. It is a computer board with dynamic RAM.

Features
Optionally with parity
128 kByte ERROR flash-PROM
512 kByte Boot flash-PROM
Buffered real time clock
Two-level hardware watchdog
Hardware status register
C-bus interface
4 B channel accesses
2 V.24 interfaces
Downloadable
2x PC card/ATA interfaces for 1.8” PC card driver with ATA mode. Hard disk drives with 260 MB or 1 GB (for large systems) are available for these interfaces.

Other features		
Application	Basic equipment in all modules	
Power demand +5V	1900 mA	without HGS
	2400 mA	with 1 HGS (startup current)
	2900 mA	with 2 HGS (startup current)
The drives can be replaced during operation.		
The V24NI submodule is used as standard when connecting circuits to the V.24 interfaces. If necessary, it is also possible to use the DC isolated V24I.		

Additional Memory	If additional memory submodules (PS2) are inserted into the HSCB, it should be taken into account that the **first** memory slot must always be occupied. The inserted PS2 memory modules must have an access time of 60 ns.



HSCB board, component side

1. Memory 4
2. Memory 3
3. Memory 2
4. Memory 1
5. HGS
6. Battery

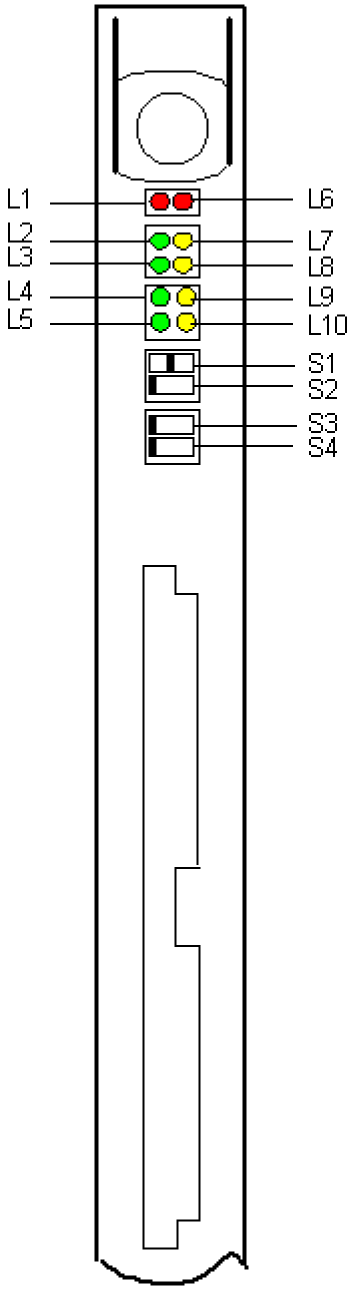
The HSCB is equipped with one of the following V.24 submodules:

- V.24I Insulated
- V.24NI Non-Insulated (basic configuration)

The following signals are available for the V.24:

- RXD
- TXD
- DTR
- GND
- DSR
- RTS
- CTS

8.5.22.1 LEDs and Switch Functions



HSCB board, front side

Switch Position in Normal Operation

S1	Middle position
S2	Left position
S3	Left position
S4	Left position

Switch Function

S1	Reset switch and MI button	
	Middle:	Operating status
	Left:	Reset board, locking (see S2)
	Right:	Monitor interruption (TENOBUG start), keying
S2	Memory test switch	
	Left: (Standard)	No memory test when resetting/restarting
	Right:	Memory test when reseting/reloading the TC system
S3	Hard Disk Change Request (HDCHR)	
	Left:	Operating status: PC-CARD-ATA-interfaces in operation
	Right:	Service position: Removing and inserting the HGS(s)
S4	System console connected (SCOCON)	
	Left:	No device connected (Default), or printer or video terminal connected
	Right:	System terminal connected

Meanings of LEDs

L1	Fault indication from the control (group statement)
L2	Indicates module data transfer via the C-bus (e.g. call at subcriber)
L3	Indicates access to the inserted background memory
L4	Indicates that the HGS(s) can be removed
L5	Indicates that the S4 switch is in the “right” position, and that the system terminal can be connected to the first V.24 interface on the AV24B/W (service)
L6	Unused
L7- L10	The LEDs flash to indicate the status from reset to operation. The display remains lit for about 5 seconds if a fault is found in the loading phases 15 to 7 (see following table). If a fatal fault occurs, the reset process is repeated from the beginning (loading phase 15).

No.	L7	L8	L9	L10	Phase name
15	1	1	1	1	Start reset phase
14	1	1	1	0	Test flash-PROM
13	1	1	0	1	Test QUICC
12	1	1	0	0	Test real time clock
11	1	0	1	1	Test C-bus interface
10	1	0	1	0	Test DUART (V.24 ports)
9	1	0	0	1	Test dynamic RAM
8	1	0	0	0	Output hardware image
7	0	1	1	1	End reset phase
6	0	1	1	0	Initial program loading (IPL)/IPL ready flag
5	0	1	0	1	STIN program loader is loaded and started
4	0	1	0	0	Operating system has been loaded and started (restart)
3	0	0	1	1	User programs (have been dispatched) have been loaded
2	0	0	1	0	Start of customer data loading in the user programs

1	0	0	0	1	All customer data loaded Start commissioning of module(s)
0	0	0	0	0	Module(s) in operation

1 = LED on
0 = LED off

8.5.22.2 Changing the HGSs

The HGS may be removed or inserted during system operation without the prior removal of the HSCB.

The following procedure must be adhered to:

- Remove static charge from the module frame
- Move S3 switch to the right
- Wait for L4 to light up
- Remove the appropriate HGS

	**Do not touch the components!**

Take hold of the drive from above and below.

- Insert the new HDD
- Move S3 switch to the left
- L4 will go out in a short time

8.5.22.3 Removing and Inserting the board

The HSCB board may be removed or inserted during system operation, if the S1 switch handle has been moved to the left.

In single module systems, removing the HSCB board will result in a total breakdown.

In multi-module systems, removing the HSCB board will result in the failure of this module.

8.5.23 ICF IMTU Central Functions

Short description

The central board of the B3 module or ICS is the ICF.

Features	
Clock Supply and Synchronization	Clock frequency precision for DECT.

	Remote synchronizable by high precision reference clock and master module (with CL2M or CL2ME)
	Master function for multi-module systems, adjustable using software.

External interfaces
128 receive/transmit highway
Outputs for ext. signalling
Remote control for power supply
LWL connector
Ref. clock supply (CL2M)
Clocks
Micro processor bus

Interface to Other Modules
Through MLB, with possible MLBIML
Transfer of C-bus data.
256 PCM channels.

Inter Module Manager (IMMG)

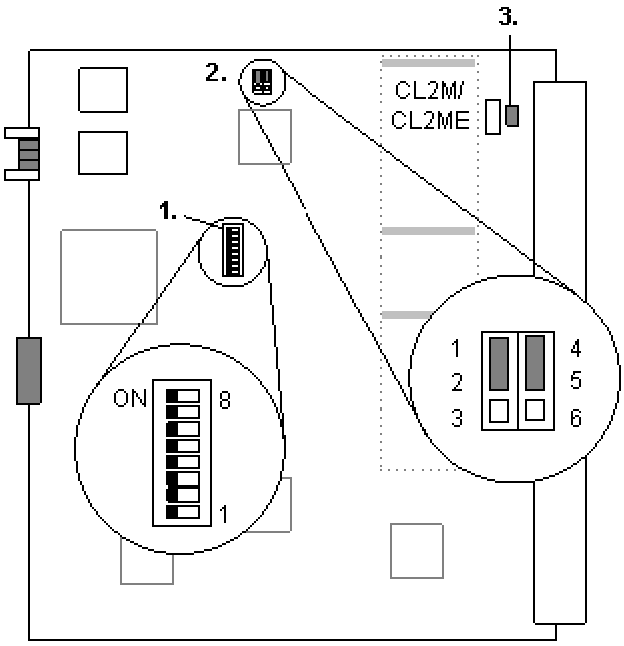
Fault Management using Inter Module Manager

Other features	
Application	Basic equipment in B3/ICS
Power demand +5V	3210 mA
Battery status query	
Memory Doubling e.g. for Downloading	
Fire Protection Fuse	

Difference between ICF .1321 and .1331
In .1331, CBI and IMLA are on the board.

The ICF with material number 49.9905.9146 can be used in the B3 module and in the ICS.

8.5.23.1 Jumper and DIL Switch Functions



ICF board, component side

1. DIL switch
2. Jumper
3. Fire Protection Fuse

Jumper Functions

Total breakdown (system not in operation) via ESB	
1 - 2	Normally closed contact for message
2 - 3	Normally open contact for message
Battery status query	
4 - 5	Testing of -48 V battery not possible **(default)**
5 - 6	Testing of -48 V battery active
When using PS350 with connected battery: Switch on the battery voltage monitoring option	

Fire Protection Fuse

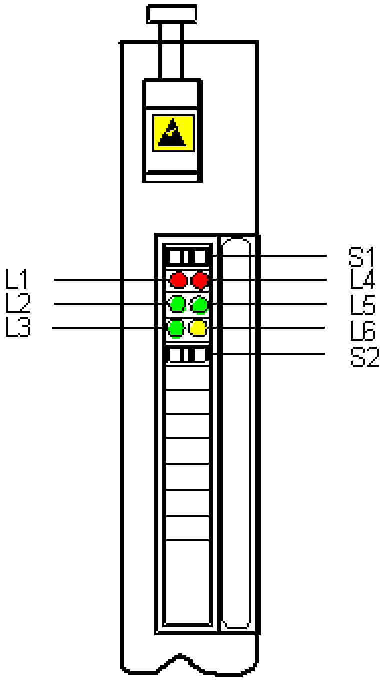
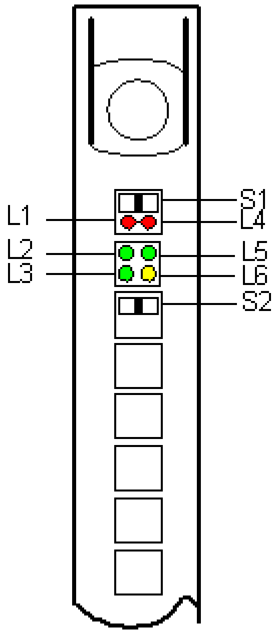
	If the fire protection fuse is defective (burned out), the board must be replaced by a new one.

Functions of the DIL Switches

S1		Error signalling unit

	ON:	with ESU
	OFF:	without ESU
S2		System configuration for IMMG
	ON:	IMMG passive
	OFF:	IMMG active
S3	S4	Specification of highest scan address
ON	ON	16
OFF	ON	32
ON	OFF	64
OFF	OFF	128 (default)
S5		Inter module manager watchdog
	ON:	Watchdog inactive
	OFF:	Watchdog active (default)
S6		CBI master mode switching
	ON:	Test mode
	OFF:	CBI master (default) **For testing and servicing purposes. Do not change**
S7		Non-maskable interruption
	ON:	Enable NMI
	OFF:	NMI disable (default) **For testing and servicing purposes. Do not change**
S8		CBI speed
	ON:	2 MHz
	OFF:	4 MHz (default)

8.5.23.2 LEDs and Switch Functions

	
ICF board for B3 module, front side	ICF board for ICS and B3 module, front side

Switch Functions

S1	**Reset**	
	Left:	No function, locking
	Middle:	Operating status
	Right:	Reset board, keying
S2	**Service Switch**	
	Left:	No function, locking
	Middle:	Operating status
	Right:	With redundant star coupler: Activate switchover, keying

Meanings of LEDs

L1	No function	
L2	Clock unit active	
	on:	Active module clock unit
L3	When doubling, IMTU status	
	on:	IMTU active
	off:	IMTU hot stand-by
	flashing quickly:	IMTU active and alternate path switched
	flashing slowly:	IMTU hot-standby and alternate path switched
L4	IMMG status	

	on:	IMMG not in operation (no board operation)
	flashing:	IMMG in operation, but board logon not yet possible
		With doubled multi-module, also failure of the fibre-optic link ICF <–> ICF.
	off:	IMMG in operation
L5	Clock unit synchronization	
	on:	Module’s clock system is synchronized
L6	Master/free-run clock mode	
	on:	Module prepared by system software for master operation
		or
		module in master free-run clock mode

8.5.23.3 Removing and Inserting the board

The board may be removed and inserted during system operation.

All existing connections are disconnected if the board is removed. Exception when doubling.

	If the active ICF board of a doubled pair is to be removed, the service switch must be used to change it over to the hot stand-by side. After the ICF has been reinserted, the service switch must be switched back again.

8.5.23.4 Doubling

Only one ICF board can be inserted for each B3 module.
A doubling of the system can only be implemented by using a second ICS or B3 module.

SeeComplete doubling → 153

8.5.23.5 External clock pulse input

First V.24 interface of the CA3B (Cable Adapter 3 for B modules)

PIN 1	A1	External clock pulse input 2.048 MHz (high precision reference clock / TAREF)
PIN6	B1	

8.5.24 OFA2B/OFAS Optical Fibre Adapter

Short description

The OFA2B Optical Fibre Adapter 2 B modules and OFAS Optical Fibre Adapter single mode are for connecting the optical waveguides when DT21 boards are used and the optical interfaces are employed.

The boards are used for various optical fibre types:

OFA2B		OFAS	
Graded-index fibres		Mono-mode fibres	
Ready-made cable types	Core$\varnothing\mu$m	Ready-made cable types	Core$\varnothing\mu$m
29.9030.6101-6199*	62,5	29.9030.6201-6299*	9,5

*The last two characters of the material number indicate the length of the pre-prepared cable in metres.

Cable lengths >99m are handled by the project division.

Common data for OFA2B and OFAS boards

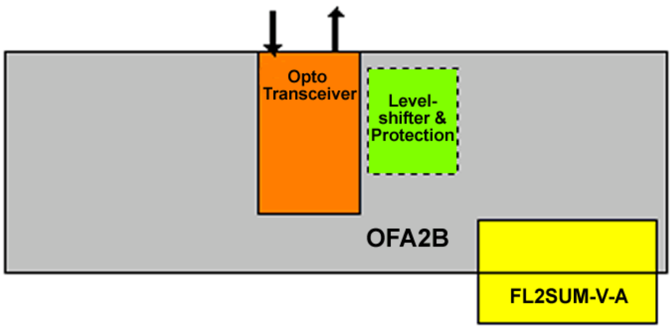
Interfaces	Number and form	Wavelength
Optical transmitters	1 SC socket	1300nm
Optical receivers	1 SC socket	1300nm

electrical values		
Supply voltage	5V	
Supply current	250mA	typical
Power consumption	1.25W	

Depending on the optical fibre used and cross-section area of the optical cable, different maximum cable lengths can be achieved:

Maximum distances			
Type of fibre	Optical fibre core $\varnothing\mu$m	maximum length km	
Graded-index fibre	62,5	10	
	50	6,2	
Mono mode	9,5	15	

Basic construction of OFA2B and OFAS



⚠	OFA2B and OFAS boards are designed for connecting to SC plugs. Neither board is thus compatible with the previous OFA1B board type, which was designed for mono-mode fibre and ST connectors.

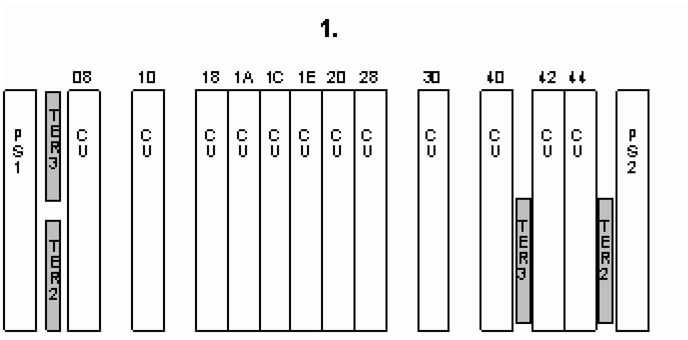
8.5.25 TER Termination

Short description

The TER boards are used for line terminations (terminating resistor) of the backplane. Depending on the application, the following TER boards are available:

Submodules		
TER2	Power demand +5V	110 mA
TER3	Power demand +5V	90 mA

⚠	When using TER boards, check that they are properly connected.



1. TER slot on the B3 backplane

8.6 Analog interfaces

		Board		Submodule		Connection board
Board/ Rack/ Backplane		ASCxx → 324				CA1B → 391, CARUB → 248
		ASC2 → 310				CA2B → 392, CARUB → 248
		ASC21 → 314				CA2B → 392, CARUB → 248
		ATA → 330		SIGA → 361		CA1B → 391, EESxB → 275
				SIGB → 362		

		Board		Submodule		Connection board
			→	SIGC → 362		
			→	SIGD → 363		
			→	SIGE → 364		
			→	SIGF → 365		
			→	SIGG → 365		
	→	ATA2 → 333	→	SIGH → 366	→	CA1B → 391, EESxB → 275
	→	ATB → 336	→	SUPA → 371	→	CA1B → 391, EESxB → 275
			→	SUPB → 372		
	→	ATC → 338	→	SSBA → 367	→	CA1B → 391, EESxB → 275
				SSBB → 368		
			→	SSBC → 368		
			→	SSBD → 369		
	→	ATLC → 341	→	SSSM → 370	→	CA2B → 392, CARUB → 248
			→	PLSM → 359		
			→	ALSM → 307		
			→	ALSMF → 308		
			→	ALSMH → 309		
			→	ACSM → 298		
	→	DDID → 354			→	CA1B → 391
	→	JPAT → 357	→	SUTC → 373	→	CARUB → 248
			→	SUTD → 379		
	→	ADM → 301	→	ABSM → 293	→	CA2B → 392
			→	ABSM1 → 294		
	→	**AUP**	**see Service and installation manual Analog Universal Platform AUP with submodule on I33**			

8.6.1 ABSM Analog Subscriber Submodule

Short description

The ABSM submodule is plugged into the ADM board. It makes available four a/b connection for analog end devices, according to country specific requirements with the following features:

Country-specific variants are configurable using board software for the following countries:	Germany, Austria, Switzerland, Netherlands, Great Britain, Italy, Spain, Belgium, Venezuela, Hungary, Czech Republic, Slovakian Republic, Mexico, Hong Kong, USA, Russia and France	
Power demand +5V	70 mA	
Interfaces	4 × a/b	
Constant current supply	24 mA convertible to 30 mA	
	Line resistance	2 x 475 Ohm

	range:	4 km installation cable J-Y(ST)Y Ø0,4 mm 9 km installation cable J-Y(ST)Y Ø0,6 mm 15 km installation cable J-Y(ST)Y Ø0,8 mm
DTMF/pulse dialling		
50 Hz ringing current (only with PS350A switchable to 25 Hz)		
Short and long flash time (end device dependent)		
Overvoltage protection up to 4 kV		
Board software download		
Board identification using board pass		
Maintenance function		
Polarity reversion for “message waiting” signalling		
Connection of external announcement devices		

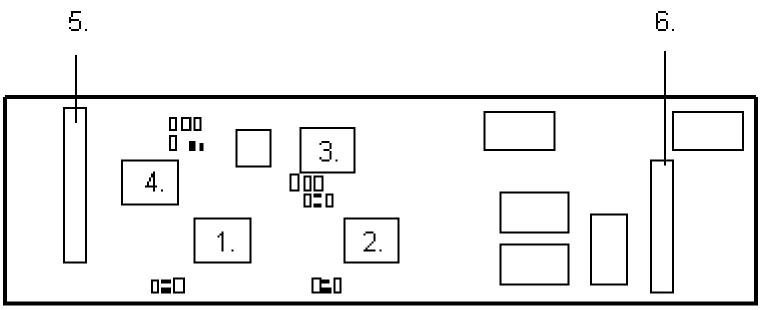
The connection on the MDF is carried out via the CA2B or CARUB boards.

Changing the Supply Current

The power supply per connecting circuit can be increased from 24 mA (standard) to 30 mA in this board.

The following actions are to be carried out per connecting circuit:

- Equip with 0 Ohm resistance (see illustration)



ABSM board, component side

1. Connecting circuit 1
2. Connecting circuit 2
3. Connecting circuit 3
4. Connecting circuit 4
5. Plug connector to the ADM (internal ADM interface)
6. Plug connector to the ADM (line interface)

8.6.2 ABSM1 Analog Subscriber Submodule 1

Short description

The ABSM1 submodule is plugged into the ADM board. It replaces the ABSM submodule and provides four a/b connections for analogue terminals, according to country-specific requirements, with the following features:

Country-specific variants are configurable using board software for the following countries:	Germany, Austria, Switzerland, Netherlands, Great Britain, Italy, Spain, Belgium, Venezuela, Hungary, Czech Republic, Slovakian Republic, Mexico, Hong Kong, USA, Russia and France	
Power demand +5V	70 mA	
Interfaces	4 $\times$ a/b	
Constant current supply	24 mA convertible to 30 mA	
	Line resistance	2 x 475 Ohm
	range:	4 km installation cable J-Y(ST)Y Ø0,4 mm 9 km installation cable J-Y(ST)Y Ø0,6 mm 15 km installation cable J-Y(ST)Y Ø0,8 mm
DTMF/pulse dialling		
50 Hz ringing current (only with PS350A switchable to 25 Hz)		
Short and long flash time (end device dependent)		
Overvoltage protection up to 4 kV		
Board software download		
Board identification using board pass		
Maintenance function		
Polarity reversion for “message waiting” signalling		
Connection of external announcement devices		

The connection on the MDF is carried out via the CA2B or CARUB boards.

Setting of the supply current 30mA per port

The ABSM1 board implements a subscriber interface with continuous current supply. This means that the switching regulator of each port component provides the supply voltage to the terminal (analogue telephone) in order for the supply current to flow (within the limits of the supply range). A continuous current of 24mA is adjusted by default.

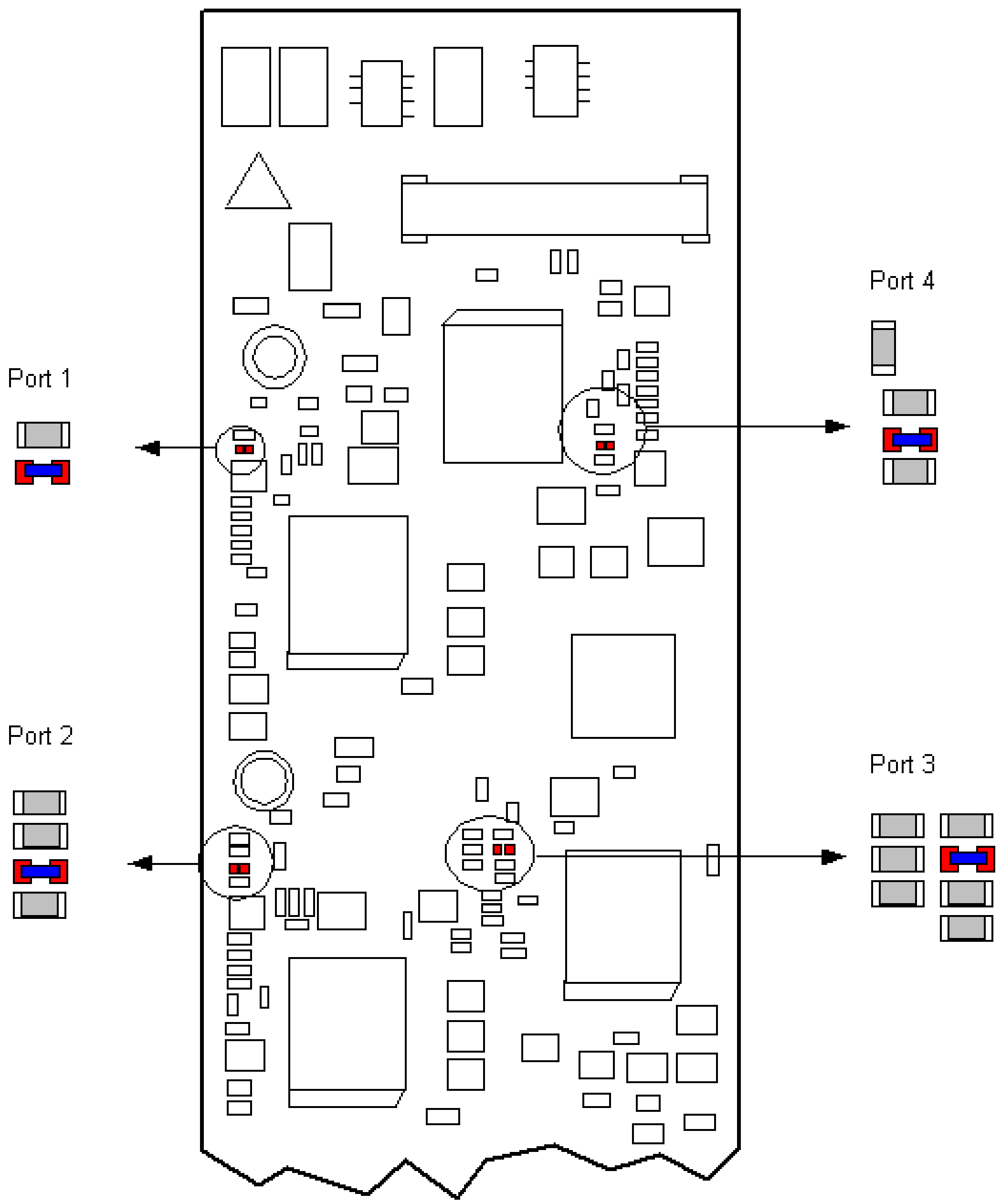
The supply current can be increased to 30mA by inserting bridges or 0 ohm resistances. Each of the 4 ports can be adapted individually. A maximum of 4 ports must be changed individually.

Only one of the following setting options should be used for the ABSM1 submodule. Mixing the variants does not make sense!

Increase of the supply current to 30mA by inserting bridges on the component side

The following picture shows the component side of the ABSM1. The positions of the soldering spots for the resistances (or bridges) are highlighted and shown in detail next to the board.

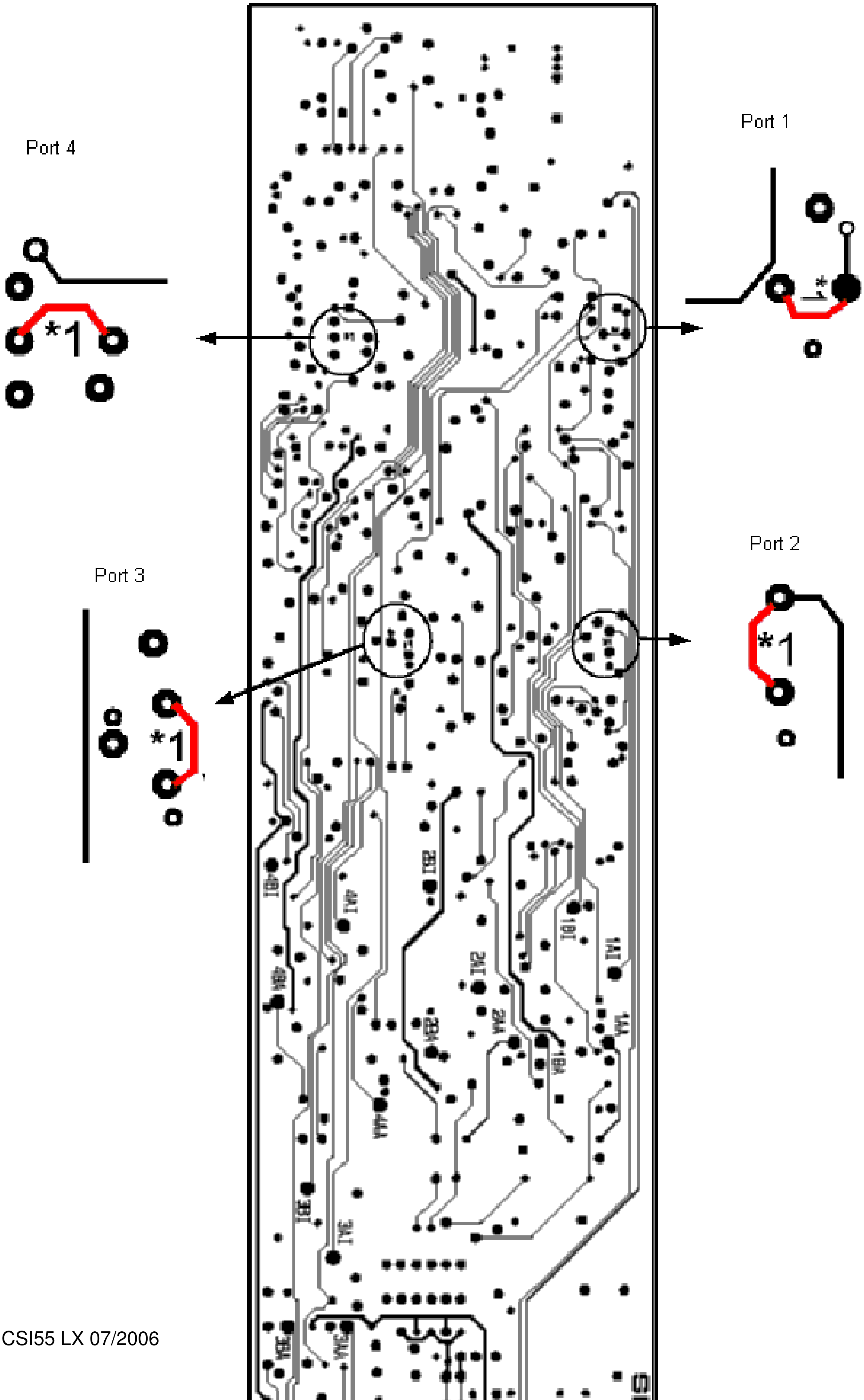
Simple wire bridges must be soldered on the component side. Short-circuits as a result of contact with neighbouring components and signalling lines at all costs must be avoided!



ABSM1 submodule, component side

Increase of the supply current to 30mA by inserting bridges on the solder side

Since the components are in close proximity to each other and since it is not possible to immediately find the modified current setting of an ABSM1 plugged onto the ADM, there is another possibility of setting the current. By soldering wire bridge onto the solder side of the ABSM1 it is possible to obtain the same effect as by soldering bridges onto the component side. The soldering points located between the *1 marks (very small) must be connected by means of a wire bridge. The following figure shows the soldering side of the ABSM1. The port-specific areas are outlined and shown in detail.


Port 4
*1
Port 1
*1
Port 3
*1
Port 2
*1

ABSM1 submodule, conductor side

	There are no components on the soldering side. This simplifies the soldering process and the optical recognition of a chosen current increase. A very exact orientation must be ensured with this variant! We recommend the use of a magnifying glass to make sure that the correct soldering points are connected to each other.

8.6.3 ACSM Alternating Current Signalling Submodule

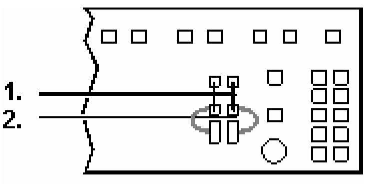
Short description

The Alternating Current Signalling submodule (ACSM) performs the signal exchange with the remote connecting circuit by transmitting 50Hz AC impulses back and forwards on the speech lines.

Other features	
Country of application	National and international
Power demand +5V	5 mA
Interface to the remote connecting circuit	an a/b (two-core line) The signalling current must be measured.
Combinations with other submodules on an ATLC board are possible.	

8.6.3.1 Setting up the ACSM

In exceptional application cases, a separate alternating current signal for signalling to the remote connecting circuit can be supplied instead of the alternating current from the power supply of the I55. At the MDF, the supply is implemented via the (in this case unused) wires of the incoming Ka/Kb speech path. To switch the alternating current signal, two bridges must be disconnected and two bridges inserted on the ACSM submodule.



Section of the soldering side on the ACSM submodule

1. Disconnect two bridges here
2. Insert two bridges here

Note

The supply must be implemented separately for each port via the associated Ka/Kb wires.

8.6.3.2 Calibrating the Signalling Current

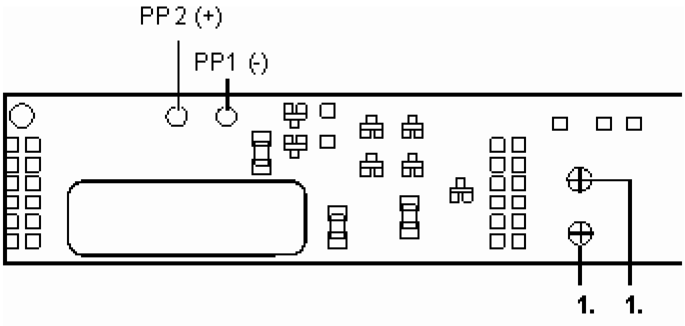
The signal current comprises the base for signalling between the ACSM and the remote connecting circuit. Because the strength of the current depends on the connecting line between ACSM and the remote connecting circuit, commissioning or alteration of the connecting line must be followed by individual adjustment of the signal current to and from the remote side.

If the signalling current is too weak, the individual criteria may not be identified. If the current is too strong, this may lead to signal distortion, and subsequent misrepresentation of the individual criteria.

The ACSM submodule is equipped with two potentiometers for adjustment of the signal current to the remote connecting circuit and two measuring points for identification of the signal current from the remote connecting circuit.

For the calibrating procedure, the ATLC board and the corresponding ACSM sub-board should be inserted into the TC system via the Board Adapter (BA) module, material number: 28.5630.590x. This provides access to the potentiometers and measuring points.

⚠	The a.c signalling voltage is located on the sleeve strip lines to the ATLC basic board. Contact with these parts as well as the component connections is to be avoided.



Soldering side of the ACSM submodule

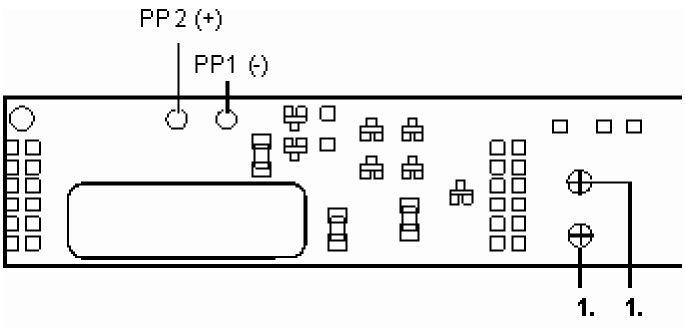
1. Potentiometers

8.6.3.3 Measuring the Transmitted Alternating Current from the remote connecting circuit

In order to do this, the remote connecting circuit must transmit a continuous alternating current. The intensity of the current is measured by a voltmeter, which is to be set as follows:

Measurement range: 1V -2V, DC

The required measuring points, PP1 (-) and PP2 (+), are illustrated.



Soldering side of the ACSM submodule

1. Potentiometers

The signalling current must be adjusted at the remote connecting circuit until the test points read 0.7 V DC voltage.

Once this process has been completed, the continuous alternating current from the remote connecting circuit is switched off.

8.6.3.4 Setting the Transmission Current to the remote connecting circuit

In order to carry out this process, the ACSM must send a continuous alternating current to the remote connecting circuit. To do this, the appropriate testing and blocking switches on the ATLC board must be switched into the right position. The associated LED will flicker slowly, the connecting circuit is now blocked and will transmit continuous alternating current to the remote connecting circuit.

The alternating current transmitted by the ACSM is now measured at the remote connecting circuit, and, by turning the potentiometers alternately, the ACSM adjusts the current to correspond with the remote connecting circuit's requirements. Turning the meters clockwise results in an increase of the transmission current. Turning anti-clockwise results in a decrease of the transmission current.

Subsequently, the testing and blocking switches on the corresponding port of the ATLC must be brought back into the middle (resting) position. The continuous alternating current is switched off, the accompanying LED goes out, and the connecting circuit is ready for operation.

The calibrating procedure is completed.

The ATLC board can now be removed from the BA module and inserted in its place in the PBX.

The corresponding adjustments must be made in the configuration data.

8.6.3.5 Adjusting the Configuration Data

- Physical line interface

  Set to "AC signalling active".
- Signalling plan

  Set the signalling plan so that is identical to that of (coordinated with) the remote connecting circuit.
- Speech path design and relative level

  Set one of the following combinations according to the requirement of the interface to the remote connecting circuit.

  If your country of application is not listed, select the required level setting for D. Your application then corresponds to German transmission technology.

Speech path design	Relative level (PrE/PrA)	Application in countries
2-wire	0/-7 dBr	A, D, E, GR
2-wire	0/-7 dBr	B, L
2-wire	0/-7 dBr	F
2-wire	0/-7 dBr	NL
2-wire	0/-7 dBr	I
2-wire	-3/-4 dBr	D, GR**(default setting)**
2-wire	-3/-4 dBr	F
2-wire	-4/-3 dBr	B, L

2-wire	-4/-3 dBr	NL
2-wire	-5/-2 dBr	D
2-wire	-6/-1 dBr	A
2-wire	-6/-1 dBr	F

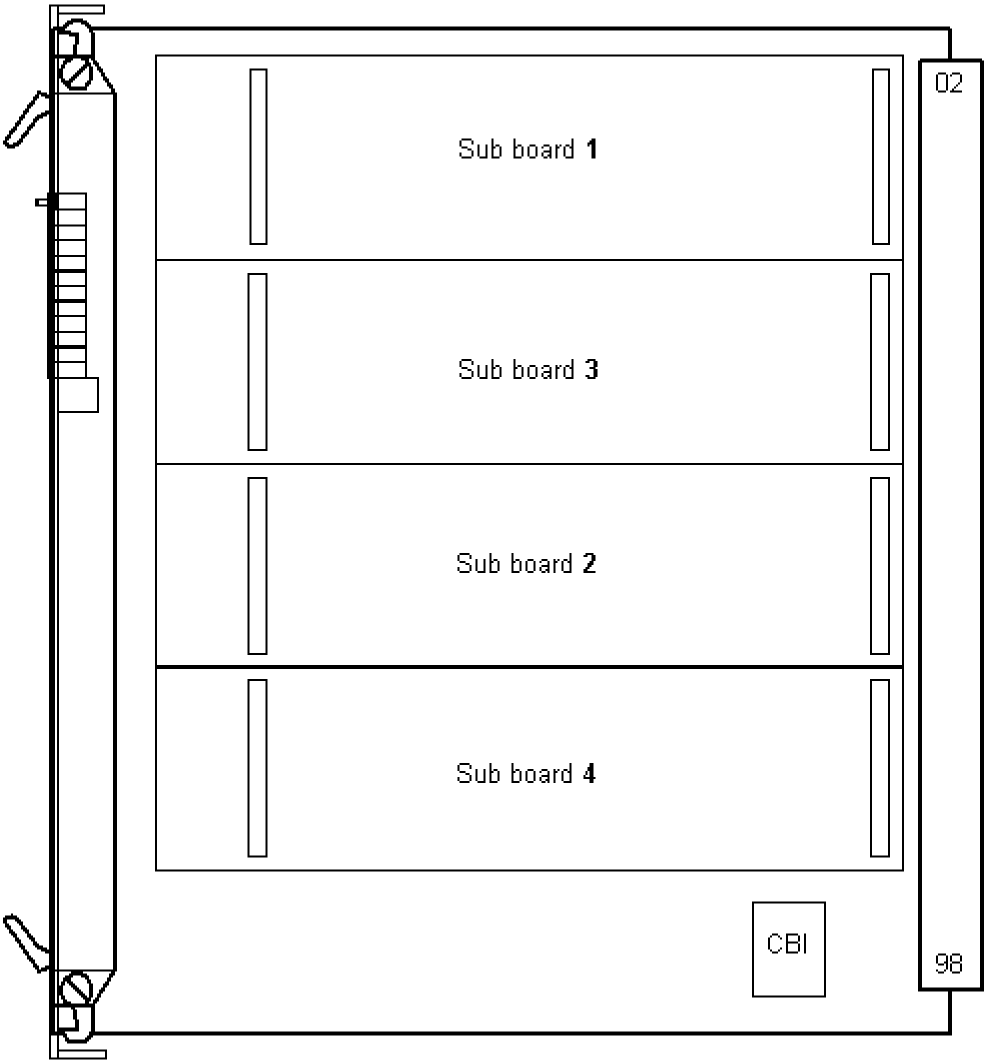
- Modifications of the signal times may only be made in exceptional circumstances on site.
- Some signalling plans require adjustments to be made to the “digits”. The permissible settings can be found in the respective signalling plan.
- Settings for the connecting circuit type must not be changed.

8.6.4 ADM Analog Digital Mixboard

Short description

The ADM board is a basic board which accomodates up to five submodules. The following submodules are available:

Submodule	Features
STSM	four S0/T0 interfaces as exchange, permanent connection or subscriber connection
UPSM	four UPN interfaces as subscriber connections or permanent connections
ABSM	four analogue subscriber ports (a/b)
UKSM	twoi UK0 master interfaces
EEADM	for use of the ADM with S0 emergency sets via cable adapter EESS0



ADM board, component side

	Observe numbering of the submodules

1	AO 1-4
3	AO 9-12
2	AO 5-8
4	AO 13-16

	If the ADM board is used with emergency switching (EESS0 cable adapter) submodule 3 is not required. On the X8 connector (normally for submodule 4) you **must** insert the EEADM submodule instead of submodule 4.

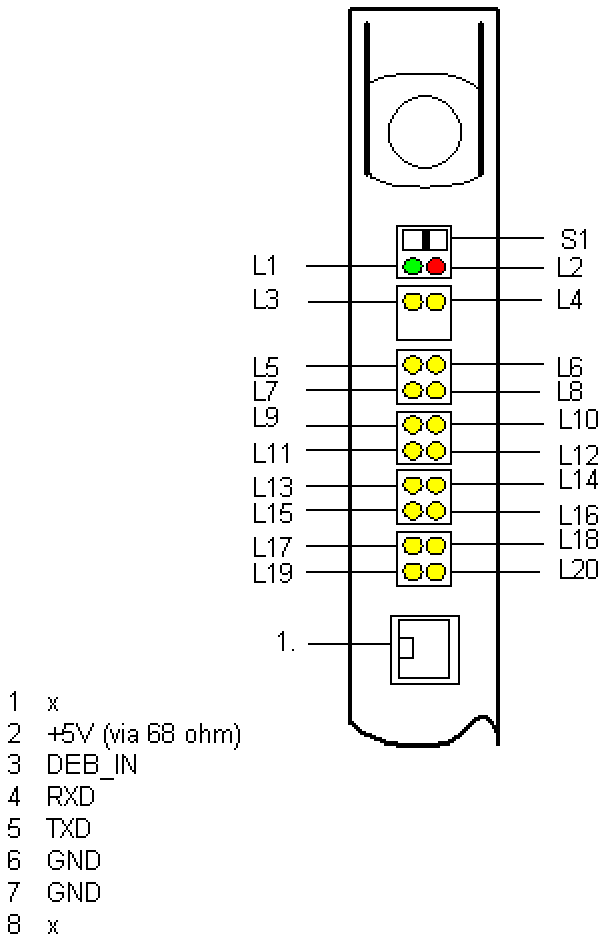
	If the EEADM board is inserted in the wrong place on the ADM board this will cause a defect in the ADM board.

	For the ADM board the ”Call Reference Length - (CRL)” can be set to a length of one or two bytes for the whole board by means of the ICU editor. The call reference length of 2 bytes is required for QSIG network connection with some third-party PBX. If this setting is used all ports have CRL=2 bytes no matter which protocol is selected. For this reason it was not possible to connect any system terminals with TN1R6 protocol to this ADM board. As of software version ADM0900.ICL / ADM00009.ICP of the ICU, the behaviour of the ADM board and of the Integral 55 Compact-ADM port has changed. The CRL setting is only adopted for the ports of the board which use the ”QSIG” protocol. For all other protocolos the call reference length will always be CRL=1. This makes it possible to configure QSIG ports with CRL=2 for networks with third-party systems while it is possible to use system terminals and permanent circuit lines with CRL=1 for other ports with TN1R6 protocol.

Other features	
Countries of application	Application in all countries
Power demand +5V	230 mA
Interfaces	16 times 2/4-wire
Overvoltage protection up to 4 kV	
Download board software	
Board identification using board passport	
Maintenance function	
In conjunction with V24IA module debugging interface on the board front	

Debugger

8.6.4.1 LEDs and Switch Functions



DECT board, front side

1. RJ45 connector with PIN assignment

Switch Functions

S1	Left:	Preparatory disabling (of all connecting circuits)
	Middle:	Operating status/release
	Right:	Reset board
	Right, then left:	Forced board download

Meanings of LEDs

L1	on:	Board is busy with switching functions
	flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L2	on:	Board reset in progress
	flashing:	Download in progress

	off:	Board in operation
L3		free
L4		free
L5	on:	Layer 1 of the digital connecting circuit 1 active or analog connecting circuit 1 busy
L6	on:	Layer 1 of the digital connecting circuit 2 active or analog connecting circuit 2 busy
L7- L19	on:	Layer 1 of the digital connecting circuit 3...15 active or analog connecting circuit 3...15 busy
L20	on:	Layer 1 of the digital connecting circuit 16 active or analog connecting circuit 16 busy

8.6.4.2 MDF Connections

MDF, Cable 1				**via CA2B from**			
Colours 16x2	Patch panel for the two wire connection	Patch panel for the four-wire connection		ADM with STSM	ADM with UPSM	ADM with UKSM	ADM with ABSM/ ABSM1
RD/BU	WE 1	WE 1	**1st** slot	A1/B1 (T)	A1/B1	A1/B1	a1/b1
WH/YE	WE 2			C1/D1 (R)	free	free	free
WH/GN	WE 3	WE 2		A2/B2 (T)	A2/B2	A2/B2	a2/b2
WH/BN	WE 4			C2/D2 (R)	free	free	free
WH/BK	WE 5	WE 3		A3/B3 (T)	A3/B3	free	a3/b3
WH/BU	WE 6			C3/D3 (R)	free	free	free
WH/YE	WE 7	WE 4		A4/B4 (T)	A4/B4	free	a4/b4
WH/GN	WE 8			C4/D4 (R)	free	free	free
WH/BN	WE 9	WE 5	**2nd** slot	A5/B5 (T)	A5/B5	A3/B3	a5/b5
WH/BK	WE 10			C5/D5 (R)	free	free	free
WH/BU	WE 11	WE 6		A6/B6 (T)	A6/B6	A4/B4	a6/b6
RD/YE	WE 12			C6/D6 (R)	free	free	free

WH/GN	WE 13	WE 7		A7/B7 (T)	A7/B7	free	a7/b7
WH/BN	WE 14			C7/D7 (R)	free	free	free
WH/BK	WE 15	WE 8		A8/B8 (T)	A8/B8	free	a8/b8
WH/BU	WE 16			C8/D8 (R)	free	free	free

MDF Cable 2				**via CA2B from**			
Colours 16x2	Patch panel for the two wire connection	Patch panel for the four-wire connection		ADM with STSM	ADM with UPSM	ADM with UKSM	ADM with ABSM/ ABSM1
RD/BU	WE 1	WE 1	**3rd** slot	A9/B9 (T)	A9/B9	A5/B5	a9/b9
WH/YE	WE 2			C9/D9 (R)	free	free	free
WH/GN	WE 3	WE 2		A10/ B10 (T)	A10/ B10	A6/B6	a10/b10
WH/BN	WE 4			C10/ D10 (R)	free	free	free
WH/BK	WE 5	WE 3		A11/ B11 (T)	A11/ B11	free	a11/b11
WH/BU	WE 6			C11/ D11 (R)	free	free	free
WH/YE	WE 7	WE 4		A12/ B12 (T)	A12/ B12	free	a12/b12
WH/GN	WE 8			C12/ D12 (R)	free	free	free
WH/BN	WE 9	WE 5	**4th** slot	A13/ B13 (T)	A13/ B13	A7/B7	a13/b13
WH/BK	WE 10			C13/ D13 (R)	free	free	free
WH/BU	WE 11	WE 6		A14/ B14 (T)	A14/ B14	A8/B8	a14/b14
RD/YE	WE 12			C14/ D14 (R)	free	free	free
WH/GN	WE 13	WE 7		A15/ B15 (T)	A15/ B15	free	a15/b15
WH/BN	WE 14			C15/ D15 (R)	free	free	free
WH/BK	WE 15	WE 8		A16/ B16 (T)	A16/ B16	free	a16/b16
WH/BU	WE 16			C16/ D16 (R)	free	free	free

8.6.5 ALSM Active Loop Submodule

Short description

The ALSM module is a submodule for the ATLC. It provides an extension to the signalling variants via a two-wire speech path (a/b line). The ALSM submodule is an interface featuring:

Options for use	National and international
Power demand +5V	30 mA
interface	a/b
Supply/loop recognition (subscriber line circuit)	
Ringing current signalling	
Flash key recognition	
Pulse and DTMF dial recognition	
Possible combination with other submodules in an ATLC board	

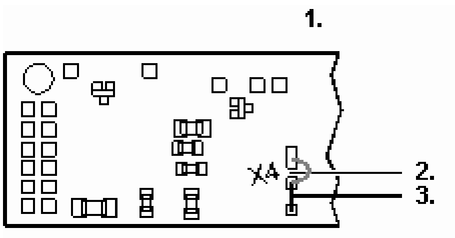
8.6.5.1 Setting up the ALSM

The Active Loop Submodule (ALSM) implements signal exchange with the remote connecting circuit by means of active loop signals (supply and ringing current) on the speech wires.

The ALSM submodule is used for the connection of special facilities (e.g. speech memory). It is also possible to connect analog CB sets or connecting lines which require this type of signalling.

Connection is implemented via a 2-wire line (a/b).

With the ALSM submodule, the supply current on the a/b line comprises 24 mA (standard). Current changeover to supply current of 30 mA is achieved by disconnecting one conductor path and inserting one bridge (see following illustration).



Section of the soldering side on the ALSM submodule

1. Material number: 28.7640.6961 or .6962
2. Insert bridge here
3. Disconnect bridge here

The corresponding adjustments must be made in the configuration data.

- Physical line interface
  Set to ”loop signalling active”.
- Signalling plan
  Set the signalling plan so that is identical to that of (coordinated with) the remote connecting circuit.

- Speech path design and relative level

  Set one of the following combinations according to the requirement of the interface to the remote connecting circuit.

Speech path design	Relative level (PrE/PrA)	Application in countries
2-wire	0/-7 dBr	A, D, E, GR **(def.)**
2-wire	0/-7 dBr	B, L
2-wire	0/-7 dBr	F (with ALSMF)
2-wire	0/-7 dBr	NL
2-wire	0/-7 dBr	I
2-wire	0/-6.5 dBr	CH
2-wire	+3/-5 dBr	UK
2-wire	Special application 1	

  If your country of application is not listed, select the required level setting for D. Your application then corresponds to German transmission technology.

  In the case of ALSM submodules with material number: 28.7640.6961 which do not show any wire changes, only a setting of “2-wire, special application 1” is permissible.

  In the case of ALSM submodules with material number: 28.7640.6962 and ASLM submodules with reference no. 28.7640.6961 which were changed by inserting wire bridges, all settings except “2-wire, special application 1” are permissible.

- Adjustments to times must not be made.

- Adjustments to the digits may be made if required.

  These settings depend on the application case and the selected signalling plan. The required setting measures are found in the respective signalling plan.

- Settings for the connecting circuit type

  The only other permissible setting in addition to connecting circuit type ”QUe” is ”TS”. This setting is used if the ATLC port is to be operated as a ”normal” subscriber line circuit. More detailed information can be found in the respective signal plan.

8.6.6 ALSMF Active Loop Submodule France

Short description

The ALSMF board is a submodule for the ATLC and is used in France. It provides an extension to the signalling variants via a two-wire speech path (a/b line). The ALSMF submodule is an interface featuring:

Options for use	National and international
Power demand +5V	30 mA
interface	a/b
Supply/loop recognition (subscriber line circuit)	
Ringing current signalling	
Flash key recognition	
Pulse and DTMF dial recognition	
Possible combination with other submodules in an ATLC board	

8.6.6.1 Setting up the ALSMF

The Active Loop Submodule France (ALSMF) implements signal exchange with the remote connecting circuit by means of active loop signals (supply and ringing current) on the speech wires.

In terms of its functions, the ALSMF is identical to the ALSM submodule. However, additional components mean that it is coordinated especially for French transmission technology.

Connection is implemented via a 2-wire line (a/b).

A switchover via a point of division is not possible with the ALSMF submodule.

The corresponding adjustments must be made in the configuration data.

- Physical line interface
  Set to ”loop signalling active”.
- Signal code
  Set the signalling plan so that is identical to that of (coordinated with) the remote connecting circuit.
- Speech path design and relative level
  Set one of the following combinations according to the requirement of the interface to the remote connecting circuit.

  If your country of application is not listed, select the required level setting for D. Your application then corresponds to German transmission technology.

Speech path design	Relative level (PrE/PrA)	Application in countries
2-wire	0/-7 dBr	A, D, E, GR **(def.)**
2-wire	0/-7 dBr	B, L
2-wire	0/-7 dBr	F (with ALSMF)
2-wire	0/-7 dBr	NL
2-wire	0/-7 dBr	I
2-wire	0/-6.5 dBr	CH
2-wire	+3/-5 dBr	UK
2-wire	Special application 1	

- Adjustments to times must not be made.
- Adjustments to the digits may be made if required.
  These settings depend on the application case and the selected signalling plan. The required setting measures are found in the respective signalling plan.
- Settings for the connecting circuit type
  The only other permissible setting in addition to connecting circuit type ”QUe” is ”TS”. This setting is used if the ATLC port is to be operated as a ”normal” subscriber line circuit. More detailed information can be found in the respective signal plan.

8.6.7 ALSMH Active Loop Submodule Hong Kong

Short description

The ALSMH module is a submodule of the ATLC and is used for direct inward dialling in Hong Kong.

Once the ALSMH has been installed, it must be set up by the ICU editor in terms of software for Hong Kong (deviating loadlist (.ICL) / Program (.ICP)).
Connection is implemented via a 2-wire line (a/b).

Setting up the ALSMH

Refer to the descriptions in the following documents:

- Setting up features
- ICU Editor User Manual

Other features:

Options for use	National and international
Power demand +5V	30mA

8.6.8 ASC2 Analog Subscriber Circuit 2

Short description

The ASC2 board makes available 32 a/b connections for analog end devices, according to country specific requirements with the following features:

Country-specific variants are configurable using board software for the following countries:	Germany, Austria, Switzerland, Netherlands, Great Britain, Italy, Spain, Belgium, Venezuela, Hungary, Czech Republic, Slovakian Republic, Mexico, Hong Kong, USA, Russia and France	
Power demand +5V	700 mA	
Interfaces	32 × a/b	
Constant current supply	22 mA convertible to 30 mA	
	Line resistance	2 x 235 Ohm
	range:	1.7 km installation cable J-Y(ST)Y Ø0,4 mm 4.0 km installation cable J-Y(ST)Y Ø0,6 mm 7.5 km installation cable J-Y(ST)Y Ø0,8 mm
DTMF/pulse dialling		
25/50 Hz ringing current (convertible)		
Short and long flash time (end device dependent)		
Overvoltage protection up to 4 kV		
Board software download		
Board identification using board pass		
Maintenance function		
Polarity reversion for “message waiting” signalling		
Connection of external announcement devices		

In conjunction with V24IA board debugging interface on board front Debugger = program that helps to track down errors

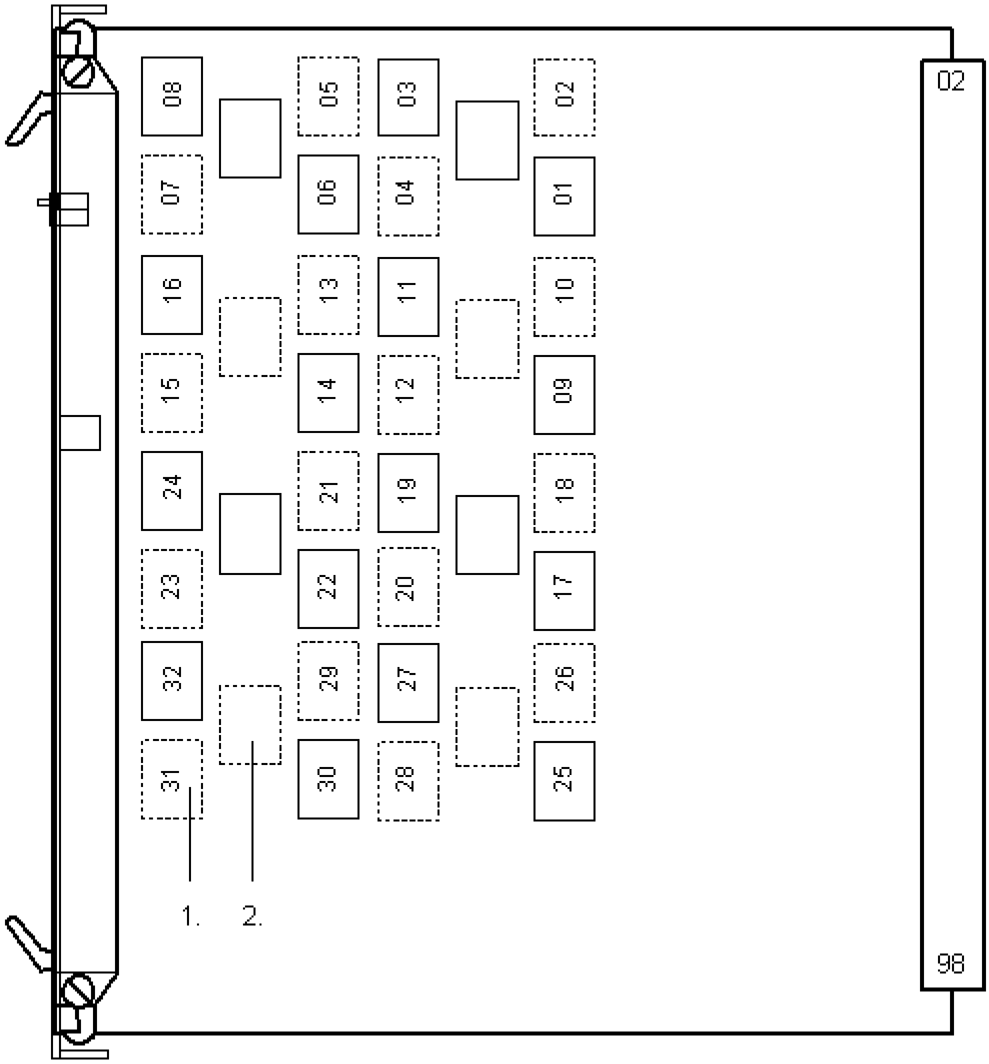
The connection on the MDF is carried out via the CA2B or CARUB boards.

8.6.8.1 Changing the Supply Current

The power supply per connecting circuit can be increased from 22 mA (standard) to 30 mA in this board.

The following steps must be taken:

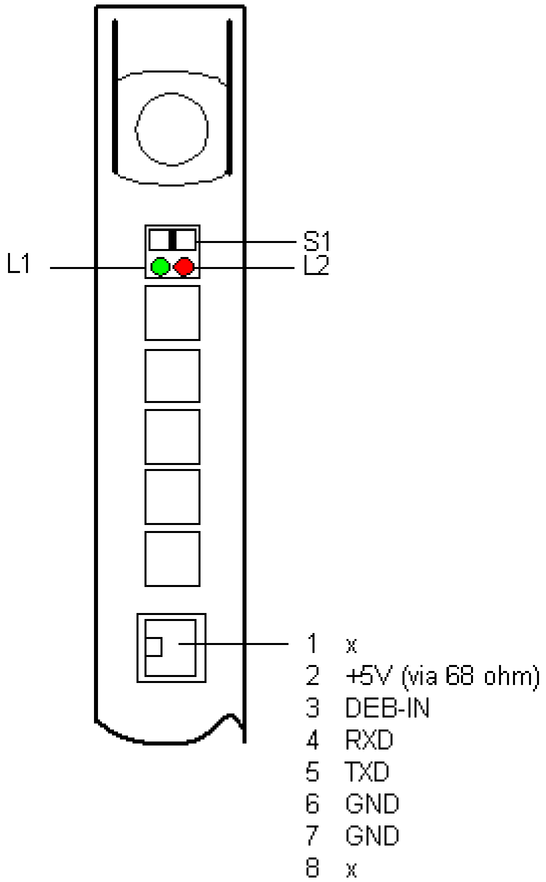
- Each connecting circuit is fitted with its number on the conductor side or component side of the board.
- The code digit *3 is found in this connecting circuit area.
- Four soldering points are arranged at the position labelled *3. The two soldering points in the middle are connected by a conductor path.
- Connect the right and left soldering point with the two soldering points in the middle. A supply current setting of 30 mA is thereby achieved.



ASC2 board

1. Connecting circuit e.g. 31
2. common for four connecting circuits

8.6.8.2 LEDs and Switch Functions



ASC2 board, front side with RJ45 connector and PIN assignment

Switch Position in Normal Operation

S1	Middle position

Switch Function

S1	Left:	Preparatory disabling (VSP) for all connecting circuits
	Middle:	Operating status/release
	Right:	Reset board
	Right, then left:	Forced board download

Meanings of LEDs

L1	on:	Board is busy with switching functions
	flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L2	on:	Board reset in progress

	flashing:	Download in progress
	off:	Module has gone into operation

8.6.8.3 MDF Connections

MDF		Cable Adapter CA2B or CARUB for ASC2	
Colours 16x2	Patch panel for two-wire connection	Cable 1	Cable 2
RD/BU	WE 1	a1/b1	a17/b17
WH/YE	WE 2	a2/b2	a18/b18
WH/GN	WE 3	a3/b3	a19/b19
WH/BN	WE 4	a4/b4	a20/b20
WH/BK	WE 5	a5/b5	a21/b21
WH/BU	WE 6	a6/b6	a22/b22
WH/YE	WE 7	a7/b7	a23/b23
WH/GN	WE 8	a8/b8	a24/b24
WH/BN	WE 9	a9/b9	a25/b25
WH/BK	WE 10	a10/b10	a26/b26
WH/BU	WE 11	a11/b11	a27/b27
RD/YE	WE 12	a12/b12	a28/b28
WH/GN	WE 13	a13/b13	a29/b29
WH/BN	WE 14	a14/b14	a30/b30
WH/BK	WE 15	a15/b15	a31/b31
WH/BU	WE 16	a16/b16	a32/b32

8.6.9 ASC21 Analog Subscriber Circuit 21

Short description

The ASC21 board provides 32 a/b connections for analog terminals, according to country-specific requirements with the following features:

Country-specific variants are configurable using board software for the following countries:	Germany, Austria, Switzerland, Netherlands, Great Britain, Italy, Spain, Belgium, Venezuela, Hungary, Czech Republic, Slovakian Republic, Mexico, Hong Kong, USA, Russia and France
Power demand +5V	600 mA
Interfaces	32 $\times$ a/b
Constant current supply	22 mA convertible to 30 mA

	Line resistance	2 x 235 Ohm
	range:	1.7 km installation cable J-Y(ST)Y Ø0,4 mm 4.0 km installation cable J-Y(ST)Y Ø0,6 mm 7.5 km installation cable J-Y(ST)Y Ø0,8 mm
DTMF/pulse dialling		
25/50 Hz ringing current (convertible)		
Short and long flash time (end device dependent)		
Overvoltage protection up to 4 kV		
Board software download		
Board identification using board pass		
Maintenance function		
Polarity reversion for “message waiting” signalling		
Connection of external announcement devices		

The connection on the MDF is carried out via the CA2B or CARUB boards.

8.6.9.1 Changing the Supply Current until F Revision

The supply current on the board can be set between 22mA (standard) and 30mA per connecting circuit.

Until the F Revision of the ASC21 (shown on the front panel: 49.9906.7719 F) the ASC21 is manufactured with power supply components in a 28-lead SO (SO = Small Outline Package). The housing can be distinguished by the plug-in connections (14) on each of the two longer sides.

The following steps must be taken:

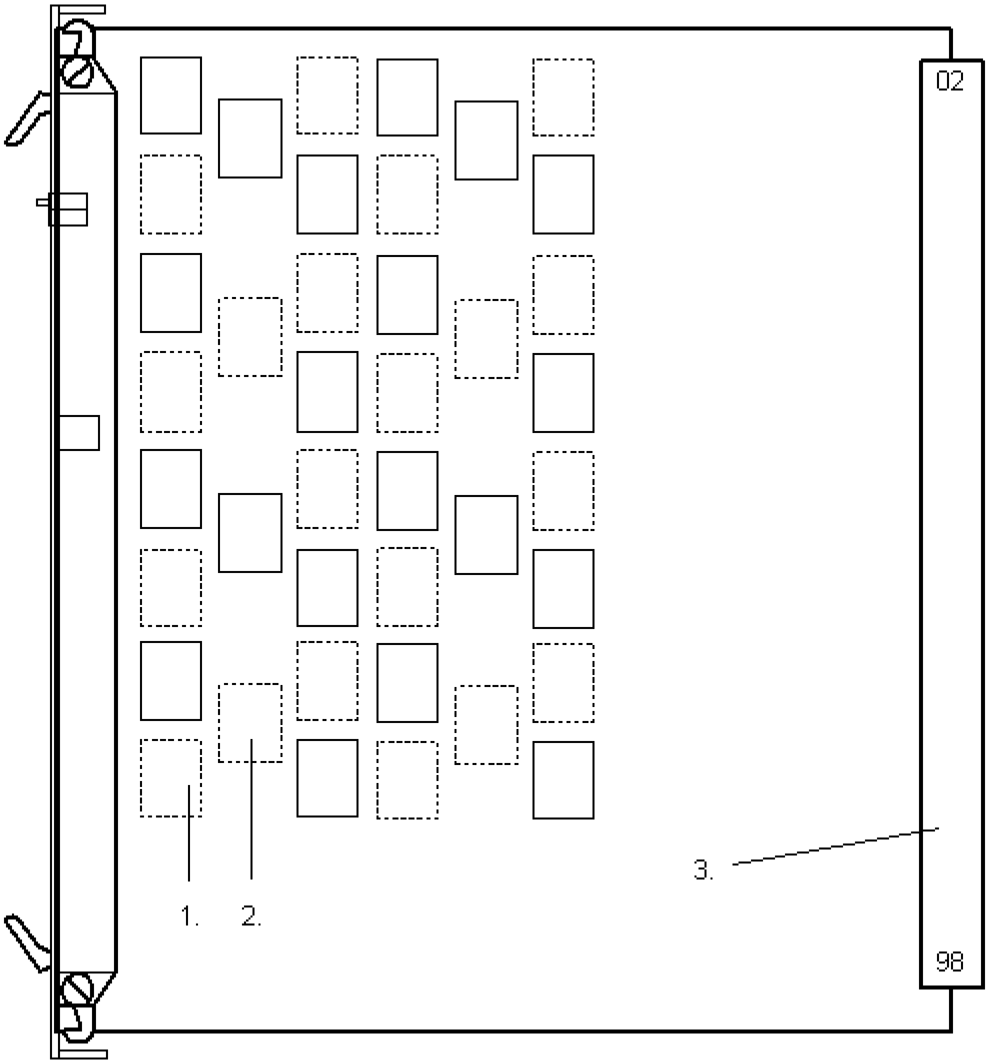
The number of the AO for which the current changeover can be made is stated on the conductor path side and on the component side.

Example:

The power supply component for AO 01 is located on the component side. The soldering points for setting the higher loop current are located on the conductor path side. For this reason the 01 marking is also located on the conductor path side.

The marking *3 is to be found in each AO area, close to which are four mounting spots for two not equipped resistors (0 ohm).

These mounting spots must be connected in pairs by wire jumpers. It is important to solder two wire jumpers per AO.

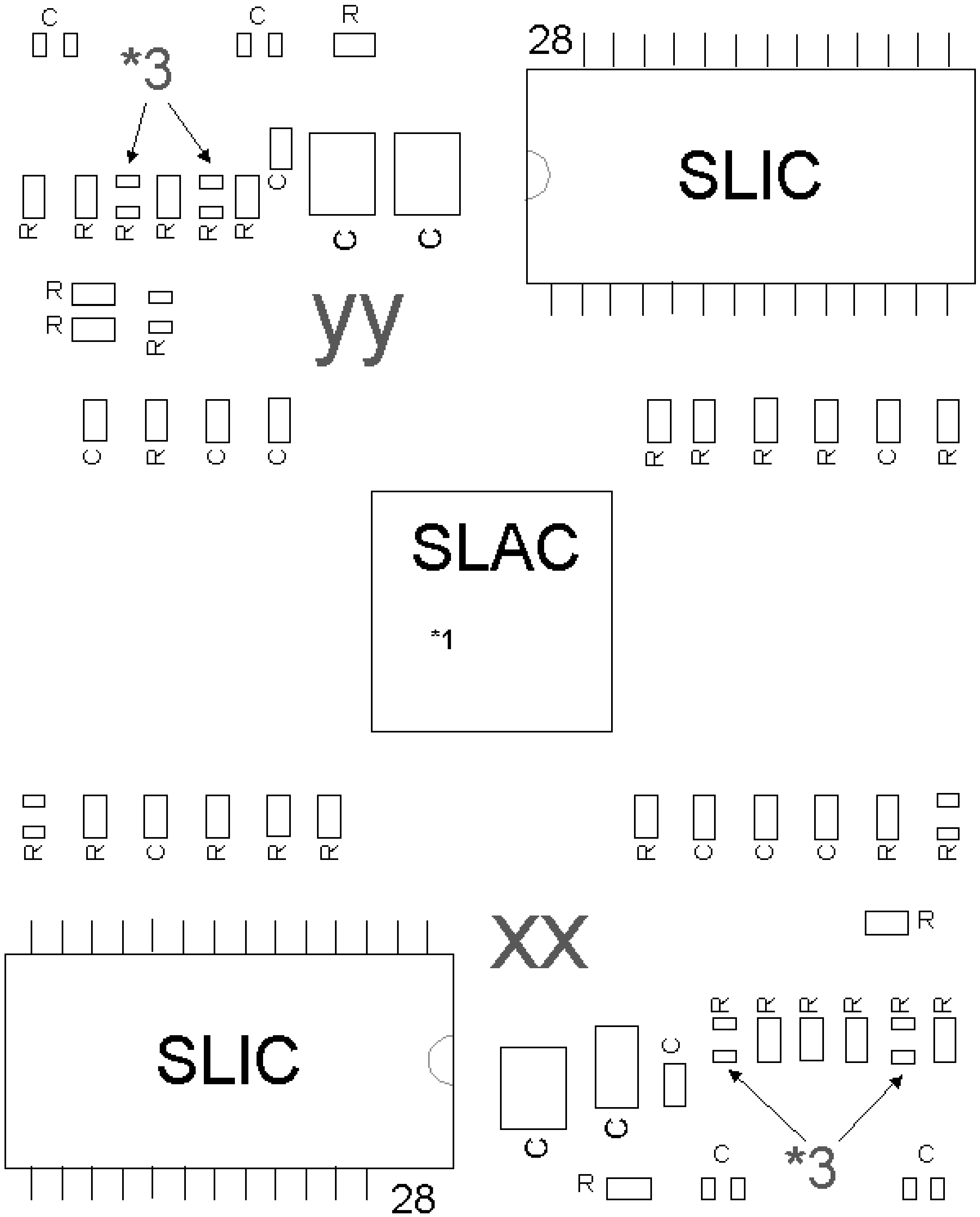


ASC21 board

1. Power supply component per AO
2. jointly for four AOs
3. Connector to backplane of I55

For better orientation, please turn the board so that the connector (3) is facing you and the numbers of the AOs are legible.

The following is a section from the component side on which you can see the position of the mounting spots to be bridged.



1 on component or soldering side, depending on port

The mounting spots must be vertically connected to each other.
The marking *3 relates to the mounting spots marked with an arrow.

The current increase can be set on the component side for the following AOs:

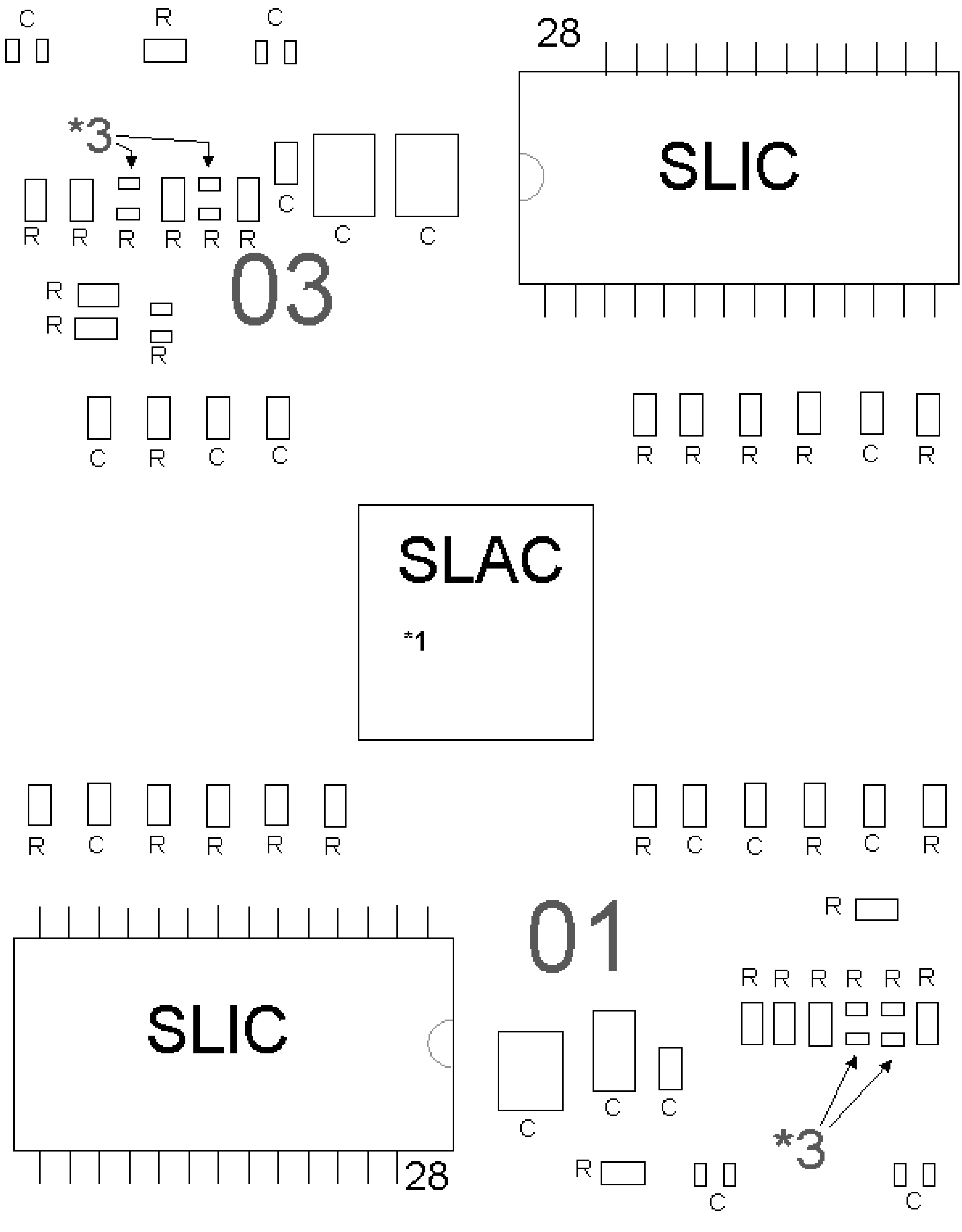
AO number

Number for xx	Number for yy
02	04
05	07
10	12
13	15
18	20
21	23
26	28
29	31

The components are arranged in the same way in all AOs marked with xx or yy.

The following is an section from the conductor side on which you can see the position of the mounting spots to be bridged.

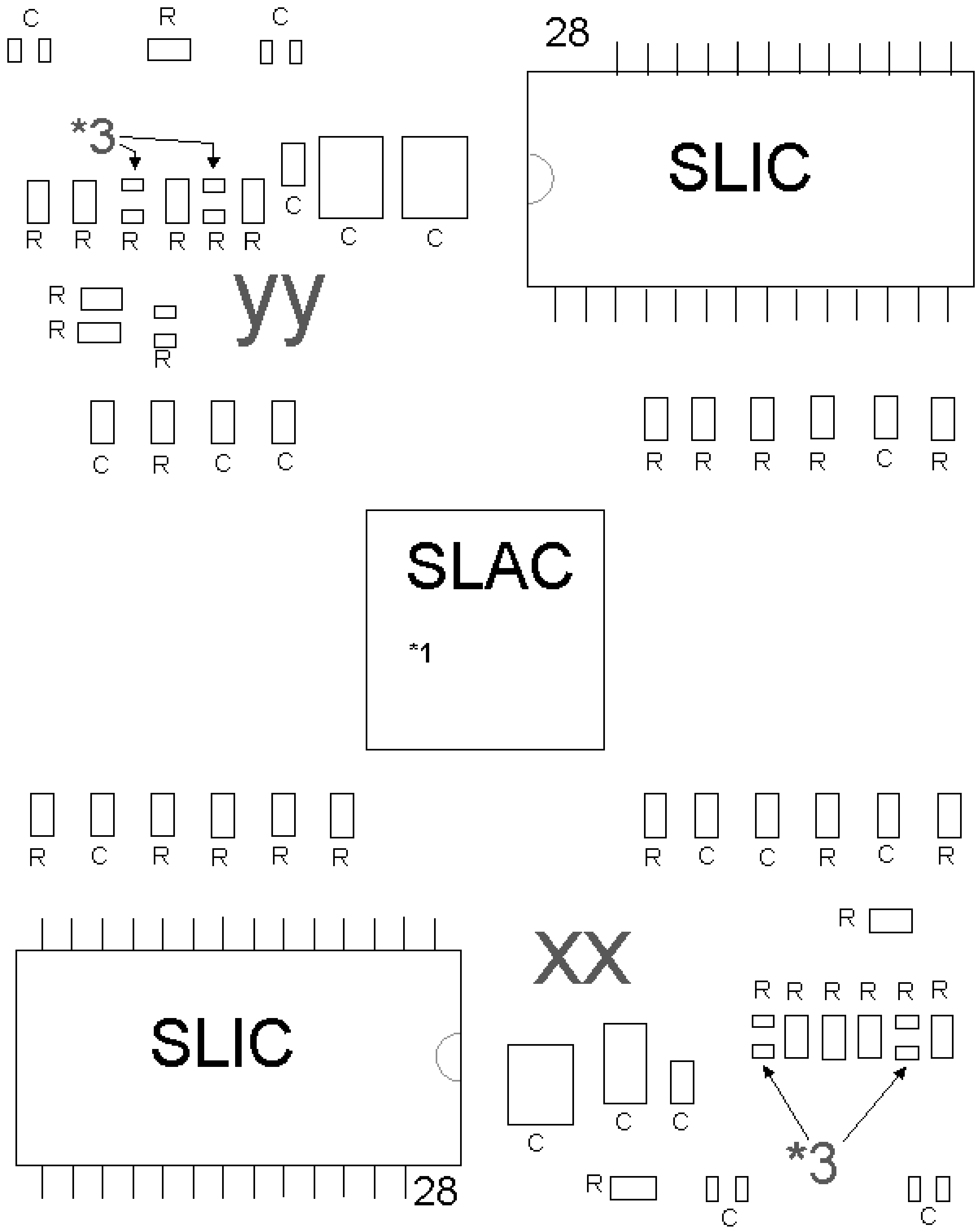
A different arrangement applies to AO 01 and the remaining AOs. First of all, the component arrangement for AOs 01 and 03:



1 on component or soldering side, depending on port

In AO 01 the two bridges to be vertically soldered lie side by side.
The marking *3 relates to the mounting spots marked with an arrow.

The components arrangement is the same for the remaining AOs on which the current increase can be set on the conductor side:



1 on component or soldering side, depending on port

The marking *3 relates to the mounting spots marked with an arrow.

The current increase can be set on the conductor side for the following AOs:

AO number	
Number for xx	Number for yy

01 **#1**	03
06	08
09	11
14	16
17	19
22	24
25	27
30	32

#1 The component arrangement is different on AO 01.

The components are arranged in the same way in all AOs marked with xx or yy.

⚠	Please connect (vertically) only the mounting spots which are marked accordingly! Bridges which are soldered differently may result in serious malfunctioning.

8.6.9.2 Conversion of supply current from G revision onwards

The supply current on the board can be set between 22mA (standard) and 30mA per connecting circuit.

From the G revision onwards (designation on front panel: 49.9906.7719 G) the ASC21 will be manufactured with power supply components in a 32-pole PLCC housing (PLCC = plastic leaded chip carrier) by modifying the shape of the housing. The housing can be distinguished by the plug-in connections distributed over all four sides.

The following steps must be taken:

- The number of the AO for which the current changeover can be carried out is stated on the conductor path and on the component side.
  Example:
  The power supply component for AO 01 is located on the component side. The soldering points for setting the higher loop current are located on the conductor path side. For this reason the 01 marking is also located on the conductor path side.
- The marking *3 is to be found in each AO area, close to which are four mounting spots for two not equipped resistors (0 ohm).
- These mounting spots must be connected in pairs by wire jumpers. It is important to solder two wire jumpers per AO.

For better orientation, please turn the board so that the connector (3) to the backplane is facing you and the numbers of the AOs are legible.

Since the component arrangement for the board from G revision onwards differs slightly from its predecessor, a section from the component side is shown, on which you will see the location of the mounting spots to be bridged.

The mounting spots must be vertically connected to each other.

The marking *3 relates to the mounting spots in the yellow (grey) highlighted area.

The current increase can be set on the component side for the following AOs:

AO number	
Number for xx	Number for yy
02	04
05	07
10	12
13	15
18	20
21	23
26	28
29	31

The components are arranged in the same way in all AOs marked with xx or yy.

The mounting spots to be connected are now always located side by side. A short-circuit between the two bridges to be inserted does not create a problem, provided the four points are connected to each other. A contact to adjoining components must be avoided.

Please connect (vertically) only the mounting spots which are marked accordingly!

Bridges soldered at other points may result in serious malfunctioning.

The following is an section from the conductor side from the board from G revision onwards, on which you can see the position of the mounting spots to be bridged.

Here the pattern for all affected ports is the same. Ports 01 and 03 are not shown separately.

The marking *3 relates to the mounting spots in the yellow (grey) highlighted area.

The current increase can be set on the conductor side for the following AOs:

AO number	
Number for xx	Number for yy
01	03
06	08
09	11
14	16
17	19
22	24
25	27
30	32

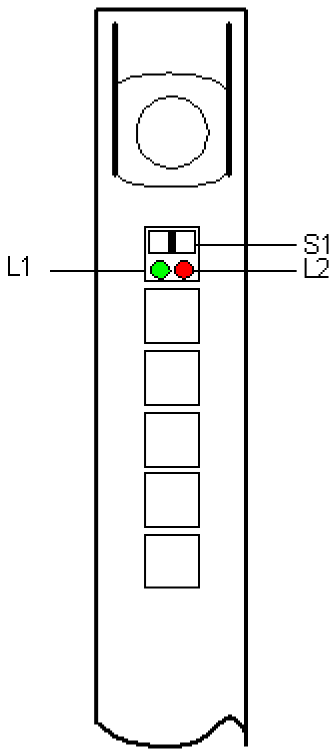
The components are arranged in the same way in all AOs marked with xx or yy.

The mounting spots to be connected are now always located side by side. A short-circuit between the two bridges to be inserted does not create a problem, provided the four points are connected to each other. A contact to adjoining components must be avoided.

Please connect (vertically) only the mounting spots which are marked accordingly!

Bridges soldered at other points may result in serious malfunctioning.

8.6.9.3 LEDs and Switch Functions



ASC21 board, front side

Switch Position in Normal Operation

S1	Middle position

Switch Function

S1	Left:	Preparatory disabling (VSP) for all connecting circuits
	Middle:	Operating status/release
	Right:	Reset board
	Right, then left:	Forced board download

Meanings of LEDs

L1	on:	Board is busy with switching functions
	flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L2	on:	Board reset in progress
	flashing:	Download in progress
	off:	Module has gone into operation

8.6.9.4 MDF Connections

MDF		Cable Adapter CA2B or CARUB for ASC21	
Colours 16x2	Patch panel for two-wire connection	Cable 1	Cable 2
RD/BU	WE 1	a1/b1	a17/b17
WH/YE	WE 2	a2/b2	a18/b18
WH/GN	WE 3	a3/b3	a19/b19
WH/BN	WE 4	a4/b4	a20/b20
WH/BK	WE 5	a5/b5	a21/b21
WH/BU	WE 6	a6/b6	a22/b22
WH/YE	WE 7	a7/b7	a23/b23
WH/GN	WE 8	a8/b8	a24/b24
WH/BN	WE 9	a9/b9	a25/b25
WH/BK	WE 10	a10/b10	a26/b26
WH/BU	WE 11	a11/b11	a27/b27
RD/YE	WE 12	a12/b12	a28/b28
WH/GN	WE 13	a13/b13	a29/b29
WH/BN	WE 14	a14/b14	a30/b30
WH/BK	WE 15	a15/b15	a31/b31
WH/BU	WE 16	a16/b16	a32/b32

8.6.10 ASCxx Analogue Subscriber Circuit

Short description

The ASC board is available in the following variants:

ASC**EU**: **Europe** with the following characteristics:

Country-specific variants are configurable using board software for the following countries:	Germany, Spain, Netherlands, Switzerland, Italy, Belgium, Austria, Greece, Mexico and Venezuela	
Power demand +5V	620 mA	
Interfaces	16 a/b (connectors for analog terminals in accordance with country-specific guidelines)	
Constant current supply	24 mA, switchable to 30 mA (mounting of a 0 ohm resistance)	
	Line resistance	2 x 475 Ohm

	Range	4 km installation cable J-Y(ST)Y Ø0.4 mm 9 km installation cable J-Y(ST)Y Ø0.6 mm 15 km installation cable J-Y(ST)Y Ø0.8 mm Line lengths for Message waiting → 325
DTMF/pulse dialling, flash and earth button detection, Telecom-specific (dependent on terminals)		
Short and long flash time, Telecom-specific (dependent on terminals)		
Overvoltage protection up to 4 kV		
Board software download		
Board identification using board pass		
Maintenance function		
Polarity reversion for “message waiting” signalling		
Connection of external announcement devices		

ASC**F**: **France** with the following characteristics:

Power demand +5V	620 mA
Interfaces	16 a/b (connectors for analog terminals in accordance with French guidelines and voice terminals)
Resistance feed (const. voltage)	2 x 400 Ohm
DTMF/pulse dialling, polarity reversal and button detection	
Overvoltage protection up to 4 kV	
Board software download	
Board identification using board pass	
Maintenance function	
Symmetric call supply	
Polarity reversion for “message waiting” signalling	
Connection of external announcement devices	

ASC**GB**: **Great Britain**

Power demand +5V	620 mA	
Interfaces	16 a/b (connectors for analog terminals in accordance with British guidelines)	
Constant current supply	30 mA	
	Loop range	900 ohms
DTMF/pulse dialling, flash and earth button detection		
Overvoltage protection up to 4 kV		
Board software download		
Board identification using board pass		
Maintenance function		
Polarity reversion for “message waiting” signalling		

8.6.10.1 Line lengths for Message waiting

The range for Message waiting signaling for analogue subscribers of the ASCEU board with the ICU programme ASCEU018.ICP in connection with the various apparatus types and seizure (pick up on call) and outgoing seizure (pick up) with the installation cable J-Y(ST)Y Ø0,4 mm is:

	Outgoing seizure (pick up)		Incoming seizure (pick up in call)	
Apparatus types	Line length [m]	Line length [W]	Line length [m]	Line length [W]
Tel. T40	1400	379	1400	379
Tel. TE51	1000	272	1000	272
Tel. TE91	1000	272	1000	272
Tel. TC91	1100	298	1100	298
Tel. TB510LED DE	1100	298	600	163
Tel. TB519D	900	245	900	245
Tel. TK40-20-2	300	83	300	83

Recommendation

The line length with which the performance feature Message waiting is to be operated with conventional signaling (permanently illuminated LED signal), should not exceed

600 m	(Installation cable J-Y(ST)Y Ø0.4 mm)
1.3 km	(Installation cable J-Y(ST)Y Ø0.6 mm)
2.4 km	(Installation cable J-Y(ST)Y Ø0,8 mm)

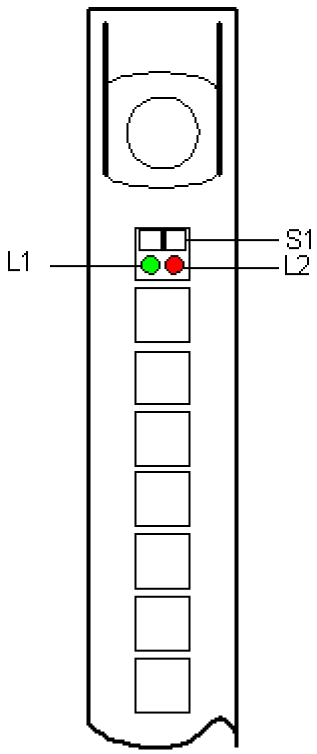
Malfunctions may occur when establishing a connection if the lines are any longer.

The tel. TK40-20-2 should only be operated with a 300 m (83W) line length.

Deviations from the recommended line length are possible.

If the lines are any longer, a different Message waiting signal (signal LED blinks) should be selected. Signalling is implemented in the ICU programme ASCEU019.ICP for the ASCEU board.

8.6.10.2 LEDs and Switch Functions



ASCxx board, front side

1. LED red
2. LED green

Switch Position in Normal Operation

S1	Middle position

Switch Function

S1	Left:	Preparatory disabling (of all connecting circuits)
	Middle:	Neutral/release/ operating status
	Right:	Reset board
	Right, then left:	Forced board download

Meanings of LEDs

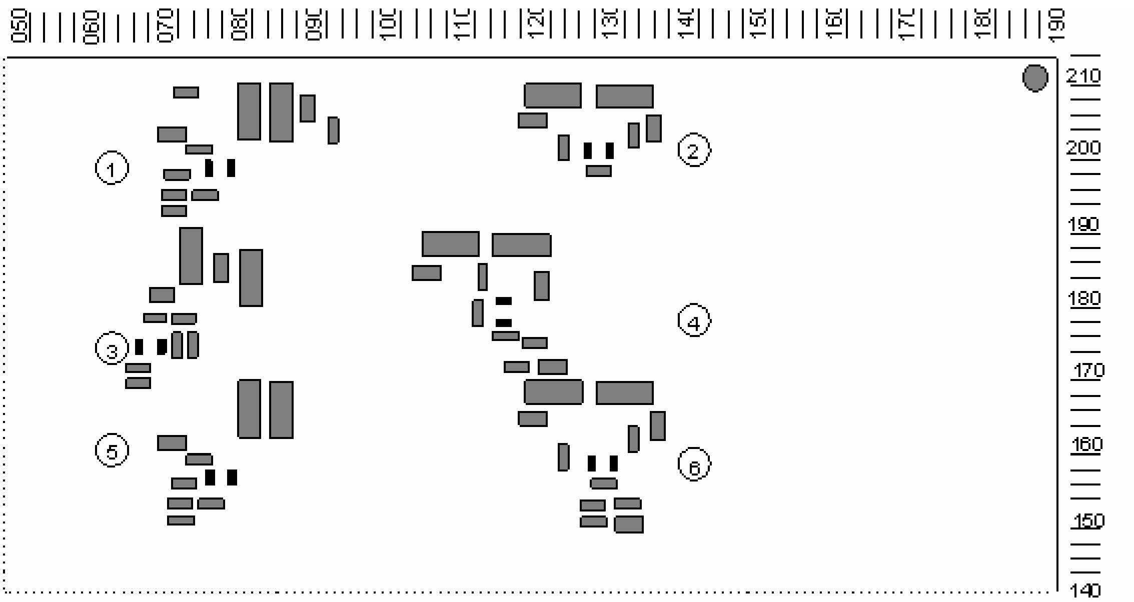
L1	on:	Board is busy with switching functions
	flashing:	Module can be removed after preparatory disabling (VSP) or blocked in terms of software
	off:	Board is not busy
L2	on:	Board reset in progress
	flashing:	Download in progress

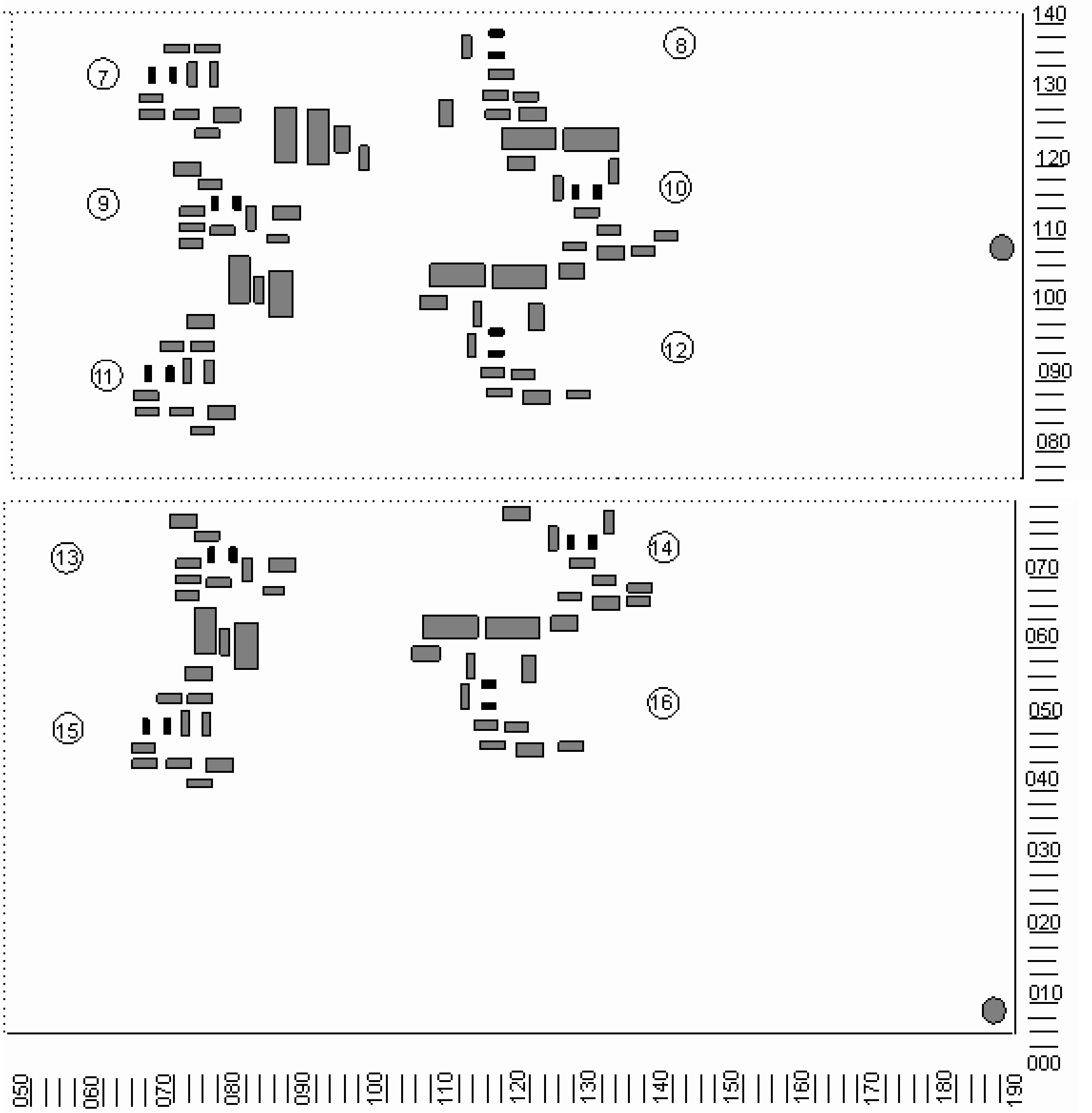
	off:	Board in operation

8.6.10.3 Bridge positions

The power supply can be increased from 24 mA (standard) to 30 mA per line in this board: The increase in the supply current is implemented by inserted 0 Ohm resistors or bridges at the following coordinate points:

AO1	197 077
AO2	199 128
AO3	173 069
AO4	179 116
AO5	155 077
AO6	157 128
AO7	131 069
AO8	137 116
AO9	113 077
AO10	115 128
AO11	089 069
AO12	095 116
AO13	071 077
AO14	073 128
AO15	047 069
AO16	053 116





8.6.10.4 MDF Connections

MDF		Cable Adapter CA1B/CARUB from ASCxx
Colours 16x2	Patch panel for two-wire connection	
RD/BU	WE 1	a1/b1
WH/YE	WE 2	a2/b2
WH/GN	WE 3	a3/b3
WH/BN	WE 4	a4/b4
WH/BK	WE 5	a5/b5
WH/BU	WE 6	a6/b6
WH/YE	WE 7	a7/b7

WH/GN	WE 8	a8/b8
WH/BN	WE 9	a9/b9
WH/BK	WE 10	a10/b10
WH/BU	WE 11	a11/b11
RD/YE	WE 12	a12/b12
WH/GN	WE 13	a13/b13
WH/BN	WE 14	a14/b14
WH/BK	WE 15	a15/b15
WH/BU	WE 16	a16/b16

8.6.11 ATA Analog Trunk Interface A

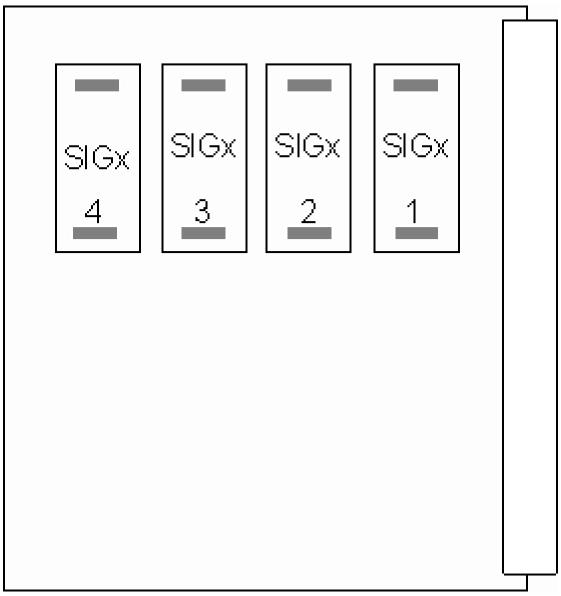
Short description

The ATA board provides the interface for up to 8 analog exchange accesses (PSTN) in accordance with country-specific guidelines. It is a universal Euro-based trunk module and can be adapted to individual countries by means of the corresponding submodule and software (level, impedances etc.).

Submodule	Countries of application
SIG**A** Signalling Unit A	Germany, Russia
SIG**B** Signalling Unit B	Switzerland
SIG**C** Signalling Unit C	Luxemburg
SIG**D** Signalling Unit D:	Austria
SIG**E** Signalling Unit E	Austria
SIG**F** Signalling Unit F	Belgium
SIG**G** Signalling Unit G	Hungary

A mixed combination of ATA boards and submodules is not possible.

The board can accommodate a maximum of 4 two-part submodules.

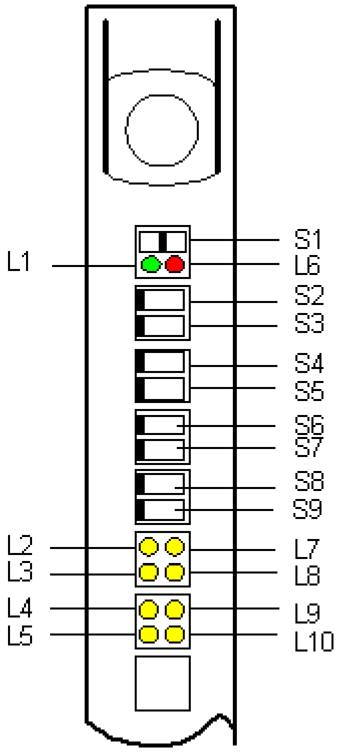


ATA board, slots

Other features	
Power demand +5V	530 mA with eight occupied connecting circuits
Interfaces	8 × a/b
DTMF/pulse dialling	
Overvoltage protection up to 4 kV	
Dial tone identification, charge count	
Board software download	
Board identification using board pass	
Maintenance function	

In the Integral55, an emergency operation switchover can be set up by inserting an EES1B (EES8B) board behind the ATA board; this is not possible in the Integral55 Compact.

8.6.11.1 LEDs and Switch Functions



ATA board, front side

Switch Position in Normal Operation

S1	Middle position
S2-S9	Left position

Switch Function

S1	Left:	Preparatory disabling (of all connecting circuits)
	Middle:	Operating status/release
	Right:	Reset board
	Right, then left:	Forced board download
S2	Right:	AO1 preparatory disabling
	Left:	Approve, operation status
S3-S8	Right:	AOx preparatory disabling;
	Left:	Approve, operation status
S9	Right:	AO8 preparatory disabling
	Left:	Approve, operation status

Meanings of LEDs

L1	on:	Board is busy with switching functions
	flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L6	on:	Board reset in progress
	flashing:	Download in progress or blocked by software
	off:	Board in operation
L2	on:	AO1 busy
	off:	AO1 not busy
L3, L4, L5, L7, L8, L9	on:	AOx busy
	off:	AOx not busy
L10	on:	AO8 busy
	off:	AO8 not busy

8.6.11.2 MDF Connections

MDF		**Cable Adapter CA1B for ATA**
Colours 16x2	Patch panel for two-wire connection	
RD/BU	WE 1	a1/b1
WH/YE	WE 2	a2/b2
WH/GN	WE 3	a3/b3
WH/BN	WE 4	a4/b4
WH/BK	WE 5	a5/b5
WH/BU	WE 6	a6/b6
WH/YE	WE 7	a7/b7
WH/GN	WE 8	a8/b8
WH/BN	WE 9	free
WH/BK	WE 10	free
WH/BU	WE 11	free

RD/YE	WE 12	free
WH/GN	WE 13	free
WH/BN	WE 14	free
WH/BK	WE 15	free
WH/BU	WE 16	free

8.6.12 ATA2 Analog Trunk Interface A2

Short description

The ATA2 board provides the interface for up to 8 analog exchange accesses (PSTN). It is a universal basic exchange line board for Europe. By

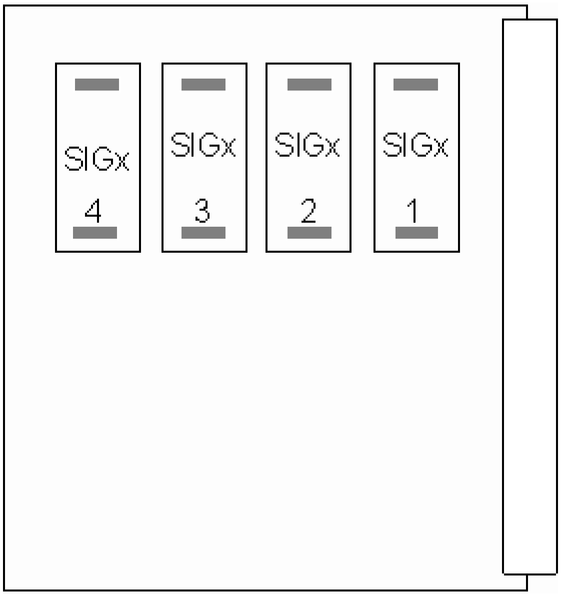
Submodule	Countries of application
SIG**H** Signalling Unit H	Czech/Slovak Republic

and software (level, impedance, etc.) it is adapted to the specific requirements of each country.

The difference between this module and the ATA board is the lower DC loop resistance.

A mixed combination of ATA2 modules and submodules is not possible.

The board can accommodate a maximum of 4 two-part submodules.



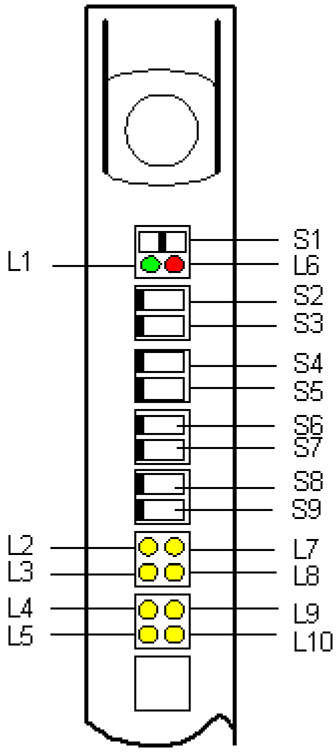
ATA2 board, slots

Other features	
Power demand +5V	530 mA with eight occupied connecting circuits
Interfaces	8 × a/b
Overvoltage protection up to 4 kV	
Dial tone identification, charge count	
Board software download	
Board identification using board pass	

Maintenance function

An emergency operation switchover can be set up by inserting an EES1B (EES8B) board behind the ATA2 board.

8.6.12.1 LEDs and Switch Functions



ATA2 board, slots

Switch Position in Normal Operation

S1	Middle position
S2-S9	Left position

Switch Function

S1		Left:
	Middle:	Operating status/release
	Right:	Reset board
	Right, then left:	Forced board download
S2	Right:	AO1 preparatory disabling
	Left:	Approve, operation status
S3-S8	Right:	AOx preparatory disabling;
	Left:	Approve, operation status
S9	Right:	AO8 preparatory disabling

	Left:	Approve, operation status

Meanings of LEDs

L1	on:	Board is busy with switching functions
	flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L6	on:	Board reset in progress
	flashing:	Download in progress or blocked by software
	off:	Board in operation
L2	on:	AO1 busy
	off:	AO1 not busy
L3, L4, L5, L7, L8, L9	on:	AOx busy
	off:	AOx not busy
L10	on:	AO8 busy
	off:	AO8 not busy

8.6.12.2 MDF Connections

MDF		**Cable Adapter CA1B from ATA2**
Colours 16x2	Patch panel for two-wire connection	
RD/BU	WE 1	a1/b1
WH/YE	WE 2	a2/b2
WH/GN	WE 3	a3/b3
WH/BN	WE 4	a4/b4
WH/BK	WE 5	a5/b5
WH/BU	WE 6	a6/b6
WH/YE	WE 7	a7/b7
WH/GN	WE 8	a8/b8
WH/BN	WE 9	free
WH/BK	WE 10	free
WH/BU	WE 11	free
RD/YE	WE 12	free
WH/GN	WE 13	free
WH/BN	WE 14	free
WH/BK	WE 15	free
WH/BU	WE 16	free

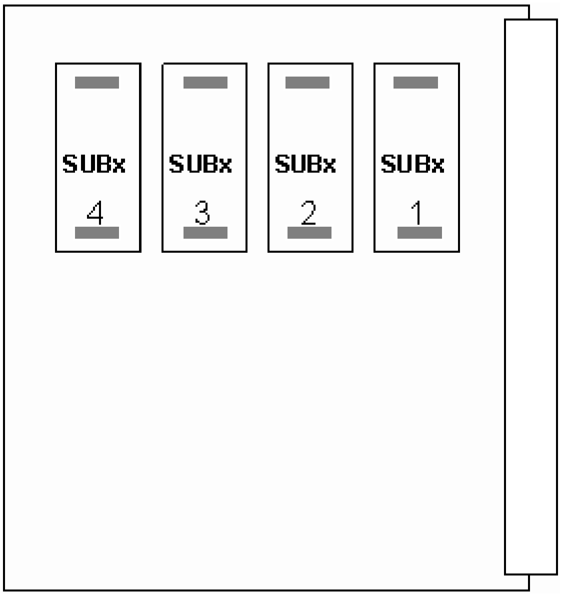
8.6.13 ATB Analog Trunk Interface B

Short description

The ATB board provides the interface for up to 8 analog network accesses (PSTN) in accordance with British Telecom guidelines. It is a universal basic exchange line board for Europe. By

Submodule	Countries of application
SUP**A** Loop Calling/Earth Calling	GB,HK
SUP**B** Loop Calling/Earth Calling	USA

and software (level, impedance, etc.) it is adapted to the specific requirements of each country.

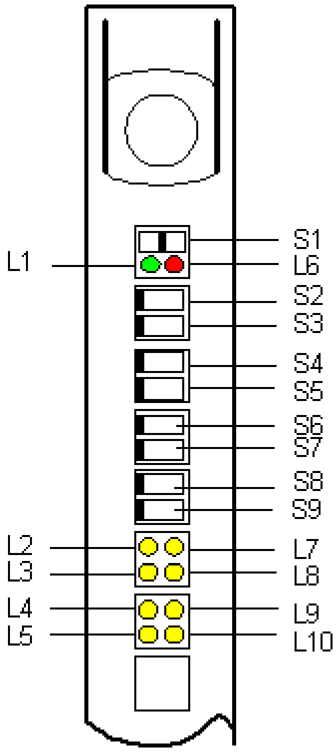


ATB board, slots

Other features	
Power demand +5V	595 mA with eight occupied connecting circuits
Interfaces	8 × a/b
Levels, impendances, etc. adjustable via confidata	
Signalling method selectable via software download	Loop calling guarded clearing
	Earth calling signalling system
	Simple call routing mode
DTMF/pulse dialling	
Overvoltage protection up to 4 kV	
Dial tone recognition, charge metering (350-440 Hz, 1111 Hz/50 Hz)	
Board software download	
Board identification using board pass	
Maintenance function	
Access to private MCL network via British Telecom lines.	

An emergency operation switchover can be set up by inserting an EES1B (EES8B) module behind the ATB board.

8.6.13.1 LEDs and Switch Functions



ATB board, front side

Switch Position in Normal Operation

S1	Middle position
S2-S9	Left position

Switch Function

S1	Left:	Preparatory disabling (of all connecting circuits)
	Middle:	Neutral/release
	Right:	Reset board
	Right, then left:	Forced board download
S2	Right:	AO1 preparatory disabling
	Left:	AO1 release
S3-S8	Right:	AOx preparatory disabling
	Left:	AOx release
S9	Right:	AO8 preparatory disabling
	Left:	AO8 release

Meanings of LEDs

L1	on:	Board is busy with switching functions
	flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L6	on:	Board reset in progress
	flashing:	Download in progress
	off:	Board in operation
L2	on:	AO1 busy
	off:	AO1 not busy
L3, L4, L5, L7, L8, L9	on:	AOx busy
	off:	AOx not busy
L10	on:	AO8 busy
	off:	AO8 not busy

8.6.13.2 MDF Connections

MDF		**Cable Adapter CA1B from ATB**
Colours 16x2	Patch panel for two-wire connection	
RD/BU	WE 1	a1/b1
WH/YE	WE 2	a2/b2
WH/GN	WE 3	a3/b3
WH/BN	WE 4	a4/b4
WH/BK	WE 5	a5/b5
WH/BU	WE 6	a6/b6
WH/YE	WE 7	a7/b7
WH/GN	WE 8	a8/b8
WH/BN	WE 9	free
WH/BK	WE 10	free
WH/BU	WE 11	free
RD/YE	WE 12	free
WH/GN	WE 13	free
WH/BN	WE 14	free
WH/BK	WE 15	free
WH/BU	WE 16	free

8.6.14 ATC Analog Trunk Interface C

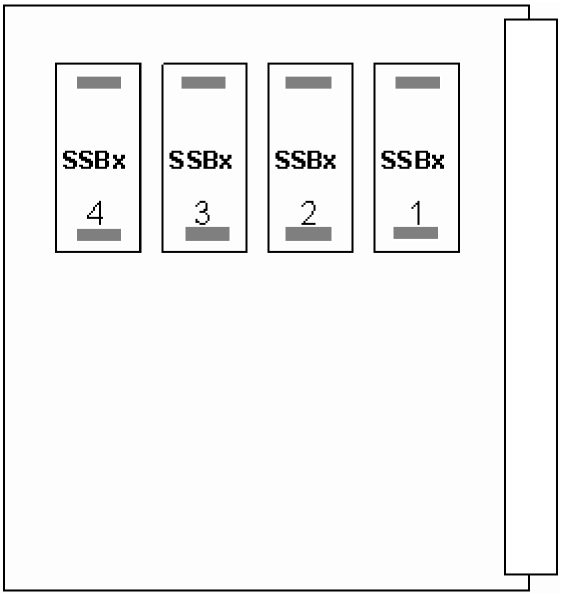
Short description

The ATC board provides the interfaces for up to 8 analog network accesses (PSTN) in accordance with country-specific guidelines. It is a universal basic exchange line board for Europe and can be adapted by

Submodule	Countries of application
SSB**A** Signalling Sub Board Type A	France
SSB**B** Signalling Sub Board Type B	Spain
SSB**C** Signalling Sub Board Type C	Italy
SSB**D** Signalling Sub Board Type D	Netherlands

and software (level, impedance, etc.) to meet the specific requirements of each country.

The board can accommodate a maximum of 4 two-part submodules.



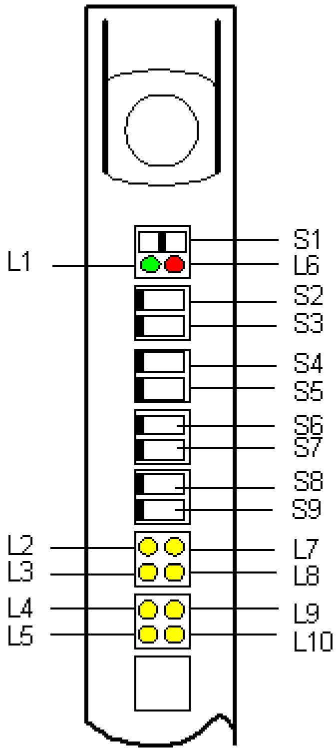
ATC board, slots

A mixed combination of ATC modules and submodules is not possible.

Other features	
Power demand +5V	530 mA with eight occupied connecting circuits
Interfaces	8 $\times$ a/b
DTMF/pulse dialling	
Overvoltage protection up to 4 kV	
Dial tone identification, charge count	
Board software download	
Board identification using board pass	
Maintenance function	
Direct current loop control	

An emergency operation switchover can be set up by inserting an EES1B (EES8B) module behind the ATC board.

8.6.14.1 LED and Switch Functions



ATC board, front side

Switch Position in Normal Operation

S1	Middle position
S2-S9	Left position

Switch Function

S1	Left:	Preparatory disabling (of all connecting circuits)
	Middle:	Neutral/release
	Right:	Reset board
	Right, then left:	Forced board download
S2	Right:	AO1 preparatory disabling
	Left:	AO1 release
S3-S8	Right:	AOx preparatory disabling
	Left:	AOx release
S9	Right:	AO8 preparatory disabling
	Left:	AO8 release

Meanings of LEDs

L1	on:	Board is busy with switching functions
	flashing:	Board removable after preparatory disabling
	off:	Board is not busy

L6	on:	Board reset in progress
	flashing:	Download in progress
	off:	Board in operation
L2	on:	AO1 busy
	off:	AO1 not busy
L3, L4, L5, L7, L8, L9	on:	AOx busy
	off:	AOx not busy
L10	on:	AO8 busy
	off:	AO8 not busy

8.6.14.2 MDF Connections

MDF		**Cable Adapter CA1B from ATC**
Colours 16x2	Patch panel for two-wire connection	
RD/BU	WE 1	a1/b1
WH/YE	WE 2	a2/b2
WH/GN	WE 3	a3/b3
WH/BN	WE 4	a4/b4
WH/BK	WE 5	a5/b5
WH/BU	WE 6	a6/b6
WH/YE	WE 7	a7/b7
WH/GN	WE 8	a8/b8
WH/BN	WE 9	free
WH/BK	WE 10	free
WH/BU	WE 11	free
RD/YE	WE 12	free
WH/GN	WE 13	free
WH/BN	WE 14	free
WH/BK	WE 15	free
WH/BU	WE 16	free

8.6.15 ATLC Analog TIE Line Circuit

Short description

The Analog TIE Line Circuit board (ATLC) is used for

- Networking of the CSI55 with identical or different telecommunication systems via analogue connecting lines,
- connection of special facilities (e.g. speech memory, door handsfree device).

The module can be used inland or abroad, e.g. in special police networks, power supply companies, etc.

The ATLC board contains 8 connecting circuits. These connecting circuits do not have submodules in their basic configuration. The exchange of signals with the remote connecting circuit can take place via separate signal wires depending on the signalling plan (San (in)/Sab (out) forr connection setup and realease and additionally S3an (in)/S3ab (out) for monitoring functions). The speech path can be executed as a two or four-wire path.

Speech wire designation:

- a/b two-wire speech path or outgoing speech path of the four-wire speech path,
- Ka/Kb incoming speech path of the four-wire speech path

The following signalling procedures can be used with these designs:

- Static signals on the Sin (E) and Sout (M) signal wires
- Time-assessed signals on the Sin (E) and Sout (M) signal wires
- Time-assessed signals on the signal wires San (in) (E) and Sab (out)(M) and monitoring functions via the signal wires S3an and S3ab.

Dialling information signalling, which controls the connection setup, may appear as:

- Pulses on signal wires San (E) and Sab(M)
- DTMF signals via the speech wires
- Pulse signalling procedure using speech wires (simultaneous transmission). Alternating current transmission

The individual connecting circuits can also be equipped with submodules according to application. One terminating set is occupied in each submodule.

The following submodules are available:

- Alternating Current Signalling Submodule (ACSM), alternating current transmission
- Simplex Signalling Submodule (SSSM), simultaneous transmission
- Active Loop Submodule (ALSM/ALSMF/ALSMH), subscriber
- Passive Loop Submodule (PLSM), loop transmission

Signal exchange for these applications takes place via the speech path. An exception to this rule is the PLSM submodule in certain applications.

The function of the ATLC board is assigned by means of the configuration data at the corresponding slot in the CSI55. The configuration data can be entered or changed using the ICU editor.

The following adaptations and adjustments must be made to the ATLC boards's configuration data for each connecting circuit:

- Physical interface condition must be adapted
- Signal exchange and speech path version must be adjusted

- Signalling function

  The signalling function for the ATLC and it's submodules is documented in signalling plans. These indicate the physical version (direct current, alternating current, etc.) and also the nature and duration of individual signals (seizure, selection, etc.) corresponding to the exchange connection status.

- Changing the connecting circuit type.

  This function type is used to log on the port of the ATLC to the CSI55's control. This connecting circuit type must coincide with the customer data set up in the CSI55! The basic setting of the connecting circuit type for all applications is "QUE". Exceptions to this are stated in the respective signalling plan.

The appropriate interface for the remote connecting circuit with regard to:

- physical realization and
- signal exchange

can be identified with the aid of the ATLC signalling plans:

Numbering scheme

Alternating current signalling, ACSM

Simplex signalling a/b earth, SSSM

No submodule, 2 signal lines

No submodule, 4 signal lines

Passive loop signal, PLSM

Active loop signal, ALSM

Special applications

Examples for the connection of door handsfree devices

A signalling plan is set up for each signalling process.

Other features	
Country of application	National and international
Power demand +5V	480 mA
Interfaces	8 times 2/4-wire speech path with 2/4 signal wires each
Overvoltage protection up to 4 kV	
Board software download	
Download of configuration data	
Board identification using board pass	
Maintenance function	

8.6.15.1 ATLC board Without Submodule

Each connecting circuit of the ATLC board that is being operated without a submodule can exchange signals with the remote connecting circuit using:

- static signals on the signal wires Sin (E) and Sout (M)

- time-assessed signals on the signal wires Sin (E) and Sout (M)
- time-assessed signals on the signal wires San (E) und Sab (M) and monitoring functions via the signal wires S3an und S3ab

Signalling of the dialling information in order to control the connection setup can be implemented using:

- Pulses on signal wires San (E) and Sab(M)

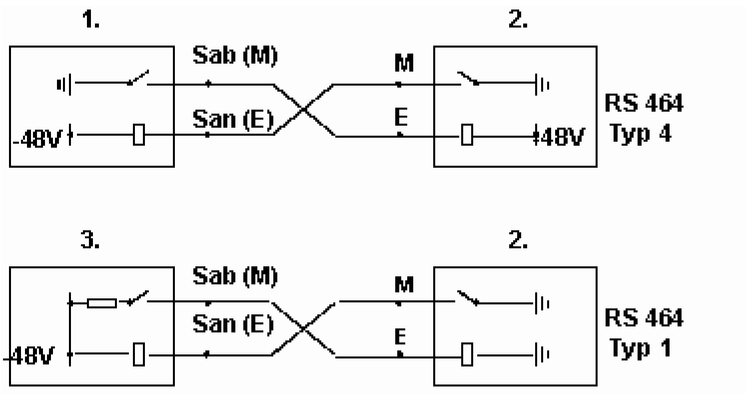
or

- DTMF signals via the speech wires

The corresponding adjustments must be made in the configuration data.

Signalling on the outgoing signal wires Sab (out)(M) and S3ab (out)is performed applying a 0V potential during the active signal. When resting or pausing from signalling, the signal wires are unconnected.

The signal wire Sab (out) (M) can be changed to signalling with a negative potential (-48V) for ATLC boards as of material number: 28.5630.4003. These different signalling methods are internationally designated as type 1 and type 4.



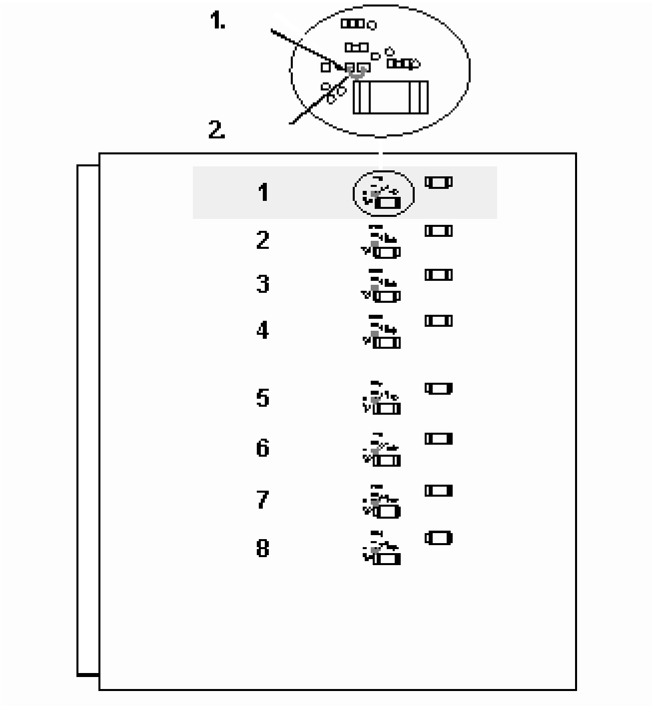
Signalling on signal wires Sout and Sin

1. ATLC (first delivery)
2. User
3. ATLC (altered)

The outgoing signal wire S3ab is not switchable.

In order to change the signal potential of the Sout signal wire, a breakpoint must be opened for each port and a wire bridge must be soldered in. The following illustration shows the location of the breakpoints and the bridging points.

!	The ATLC board is a multilayer circuit board. The connector must be removed at a flat angle, so that the conductor tracks located below are not damaged.

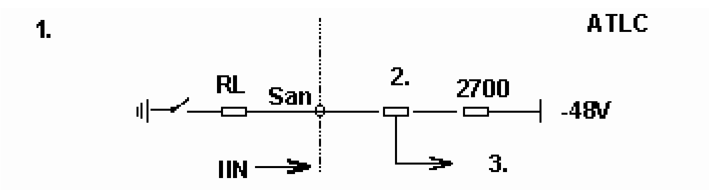


Soldering side of the ATLC board. Example of switching the signal potential on port 1 (port 0)

1. Disconnect
2. Connect

With an active Sout (M) line, the minimum current is monitored in static signalling. This recognizes the "presence" of the connected remote side. In order to ensure the error-free operation of the board, the following conditions for the signal wires must be observed.

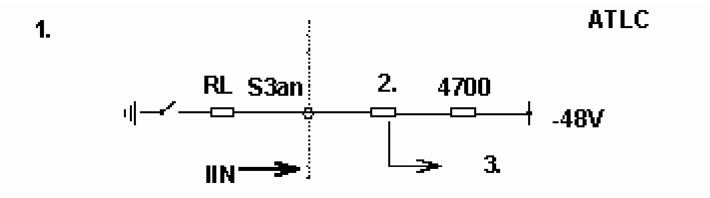
Input conditions:



Principle of the San signal wire

1. Remote side and connecting cable
2. Indicator
3. Control

With HW version .4001 or .4003		
IIN min:	3mA	
IIN max:	15 mA	(RL = 0 Ohm)
RL max:	12 kOhm	(resistive load)

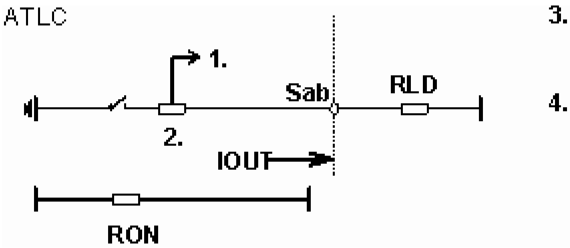


Principle of the S3an (in) signal wire

1. Remote side and connecting cable
2. Indicator
3. Control

With HW version .4001 or .4003		
IIN min:	3mA	
IIN max:	8.6 mA	(RL = 0 Ohm)
RL max:	10 kOhm	(resistive load)

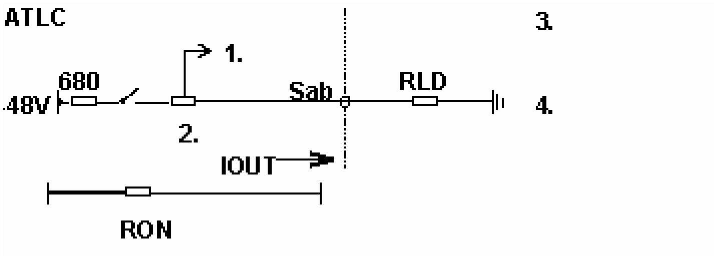
Output power:



Principle of the Sab (out) signal wire (condition when delivered)

1. Control
2. Indicator
3. Remote side and connecting cable
4. Counter-potential type: -48V

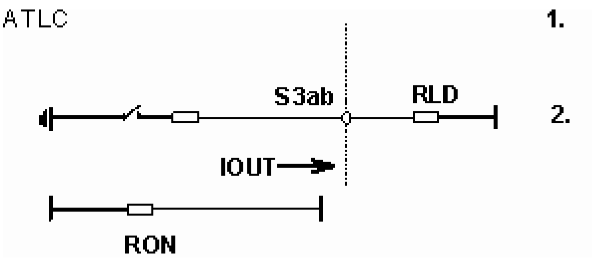
	With HW version 0.4001	With HW version .4003	
IOUT P max:	400 mA	400 mA	For max. 10 ms
IOUT C max:	100 mA	100 mA	Continuous load
RON typ:	700 Ohm	135 Ohm	IOUT=10 mA
IOUT min:	2.5 mA	1mA	
at UGP = -48V	(RLD = 16,4 kOhm)	(RLD = 46.5 kOhm)	



Principle of the Sab (out) signal wire (switched to -48 V)

1. Control
2. Indicator
3. Remote side and connecting cable
4. Counter-potential

	With HW version 0.4001	With HW version .4003	
IOUT P max:	Not switchable	400 mA	For max. 10 ms
IOUT C max:	——//——	65 mA	RLD = 0 Ohm
RON typ:	——//——	800 Ohm	IOUT=10 mA
IOUT min:	——//——	1mA at RLD = 47 kOhm	



Principle of the S3ab (out) signal wire

1. Remote side and connecting cable
2. Counter-potential type: -48V

With HW version .4001 or .4003		
IOUT P max:	400 mA	For max. 10 ms
IOUT C max:	100 mA	Continuous load
RON typ:	14 Ohm	IOUT=10 mA

Adjusting the Configuration Data

- Physical line interface
  Make a selected setting according to the requirement of the interface to the remote connecting circuit:

”No submodule, 2 signal lines” (default setting)
”No submodule, 4 signal lines”

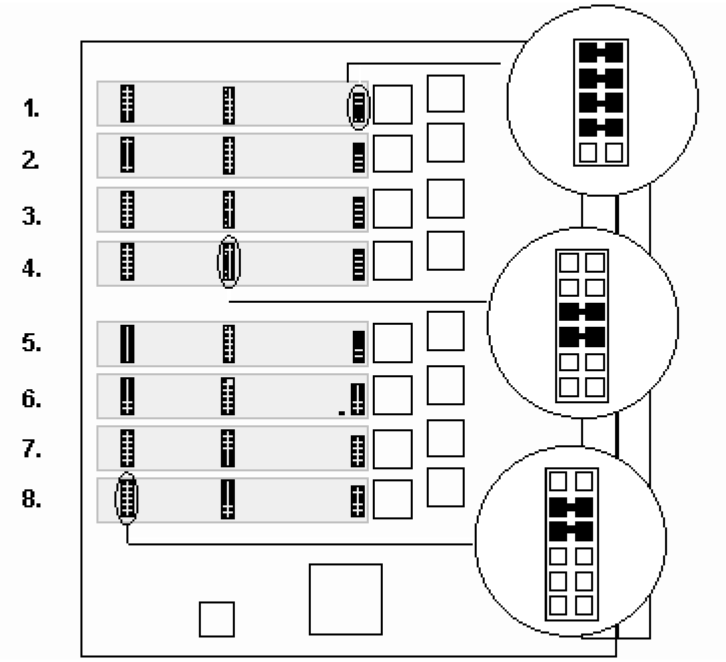
- Signalling plan

  Set the signalling plan so that is identical to that of (coordinated with) the remote connecting circuit.
- Speech path design and relative level
- Set one of the following combinations according to the requirement of the interface to the remote connecting circuit. If your country of application is not listed, select the required level setting for D. Your application then corresponds to German transmission technology.

Speech path design	Relative level (PrE/PrA)	Application in countries
2-wire	0/-7 dBr	A, D, E, GR
2-wire	0/-7 dBr	B, L
2-wire	0/-7 dBr	F
2-wire	0/-7 dBr	NL
2-wire	0/-7 dBr	I
2-wire	-3/-4 dBr	D, GR
2-wire	-3/-4 dBr	F
2-wire	-4/-3 dBr	B, L
2-wire	-4/-3 dBr	NL
2-wire	-5/-2 dBr	D
2-wire	-6/-1 dBr	A
2-wire	-6/-1 dBr	F
4-wire	0/0 dBr	
4-wire	-2.5/-4.5 dBr	(default setting)
4-wire	-3.5/-3.5 dBr	
4-wire	+4/-14 dBr	
4-wire	+9/-17 dBr	

- Modifications of the signal times may only be made in exceptional circumstances on site.
- Some signalling plans require adjustments to be made to the “digits”. The permissible settings can be found in the respective signalling plan.
- The only other permissible setting in addition to connecting circuit type “QUe” is “DUe”. This connecting circuit type is to be set if special facilities for line adaptation are to be connected to the ATLC board.

8.6.15.2 Inserting the Submodules



ATLC board, component side

1. Connecting circuit 1
2. Connecting circuit 2
3. Connecting circuit 3
4. Connecting circuit 4
5. Connecting circuit 5
6. Connecting circuit 6
7. Connecting circuit 7
8. Connecting circuit 8

Remove the ATLC board from the I55 slot.

The board may be removed and inserted during system operation. The switch functions and LED displays on the front panel must be taken into consideration however.

Remove the strapping plug of the corresponding connecting circuit (1-8) from the three pin strips.

Insert the submodule into the prepared location.

Insert the ATLC board into the I55 slot.

Once a submodule has been installed, the configuration data must be set up or changed in the I55 (line interface, signalling plan and speech path version/level). This is necessary for the ATLC board to work properly with the submodule.

8.6.15.3 Removing the Submodules

When removing a submodule, reinsert the bridge plug. Make sure it is in the correct position.

!	Installation which does not correspond with the diagram can lead to malfunctions in the whole board or Communication Server Integral 55.

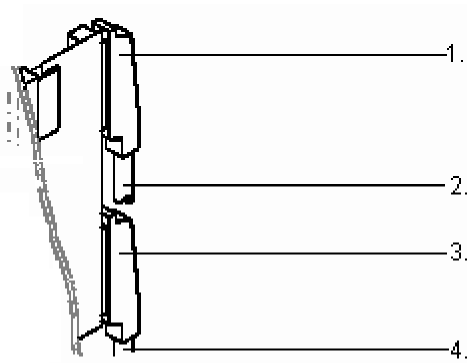
8.6.15.4 Connection to the MDF

The connectors of the ATLC board are picked up by two 16-pair cables on the CA2B adapter modules, and fed to the MD.

Insert the CA2B adapter module in the respective alignment section.

Insert the Champ plug of the connecting cable into the plug socket of the adapter module.

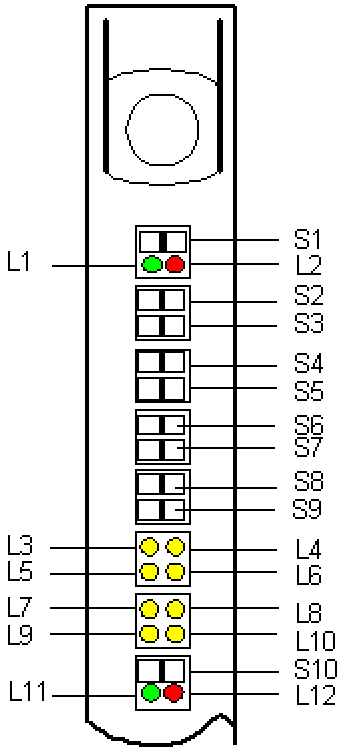
Attach the connecting cable to the designated fastening grooves.



CA2B adapter module with ATLC board

1. 50-pin Champ plug
2. Cable 1, 16-pair to MDF
3. 50-pin Champ plug
4. Cable 2, 16-pair to MDF

8.6.15.5 LEDs and Switch Functions



Switch Function

S1	Reset switch	
	Middle:	Operating status
	Left:	Preparatory disabling of board (VSP of all connecting circuits)
	Right:	Reset board
	Right, then left:	Forced board download
S2-S9	AO1-AO8	
	Middle:	Operating status
	Left:	Test AO1-AO8 (e.g. simulate an S3in signal)
	Right:	AO1-AO8 preparatory disabling (VSP)
S10 *	Test	
	Middle:	Operating status
	Left:	Extend DTMF signalling to approx. 20 sec. (for testing purposes only)
	Right:	Not used at present
* from .4003!		

Meanings of LEDs

L1	on:	Board is busy in terms of exchange functions
	flashing:	Board removable (all connecting circuits blocked or defective)
	off:	Board not busy
L2	on:	Board reset in progress. Programming break in download

	flashing:	Download in progress
	off:	Board in operation
L3		AO1 status display
L4		AO2 status display
L5		AO3 status display
L6		AO4 status display
L7		AO5 status display
L8		AO6 status display
L9		AO7 status display
L10		AO8 status display

Connecting Circuit (AO) status display

L..	on:	AO.. is busy in terms of exchange functions
	flashing quickly:	AO.. is defective
	flashing slowly:	AO.. is blocked (in terms of software or by preparatory disabling)
	Flickering to the rhythm of the dial pulse:	AO.. dials by pulse dialling to the remote connecting circuit, or AO.. receives pulse dialling dial pulses from the remote connecting circuit.
	off:	AO.. not busy
L11*	on:	Data exchange with I55 control
	off:	No data exchange
L12*	on:	Error while throughputting data with I55 control
	off:	Faultless data exchange with I55 control
* from .4003!		

8.6.15.6 MDF Connections

Main distributor

If necessary, connect the sheath wires of the connecting cable (open end and WP plug) with the ground clamps.

Connect the connectors of the connecting cable from the I55 with the line network (wiring blocks).

Mark the cable at both ends using the supplied labels.

Connections from the ATLC

Variants	Port	Interfaces/procedures	Connections
ATLC without submodules	8 (1 per line)	2-wire speech path, E+M signalling	a/b Sin/Sout
ATLC without submodules	8 (1 per line)	4-wire speech path, E+M signalling	a/b Ka/Kb Sin/Sout

ATLC without submodules	8 (1 per line)	4-wire speech path, E+M and S3an/S3ab-signalling	a/b Ka/Kb Sin/Sout S3in/S3out
ATLC with SSSM submodules	8 (1 per SSSM)	a/b earth	a/b
ATLC with ACSM submodules	8 (1 per ACSM)	50 Hz alternating current	a/b
ATLC with ALSM/ALSMF submodules	8 (1 per ALSM/ALSMF)	Special facility (e.g. speech memory)	a/b
or ALSMH	(1 per ALSMH)	Analog DID Hong Kong	a/b
ATLC with PLSM submodules	8 (1 per PLSM)	Special facility (e.g. door handsfree device)	a/b c/d e/f

MDF connection via CA2x or CARUx from the ATLC board without submodules

MDF		Cable Adapter CA2B or CARUB	
Colours 16x2	Patch panel for two-wire connection	Cable 1	Cable 2
RD/BU	WE 1	1a/1b	1Sin/1Sout
WH/YE	WE 2	1Ka/1Kb	1S3in/1S3out
WH/GN	WE 3	2a/2b	2Sin/2Sout
WH/BN	WE 4	2Ka/2Kb	2S3in/2S3out
WH/BK	WE 5	3a/3b	3Sin/3Sout
WH/BU	WE 6	3Ka/3Kb	3S3in/3S3out
WH/YE	WE 7	4a/4b	4Sin/4Sout
WH/GN	WE 8	4Ka/4Kb	4S3in/4S3out
WH/BN	WE 9	5a/5b	5Sin/5Sout
WH/BK	WE 10	5Ka/5Kb	5S3in/5S3out
WH/BU	WE 11	6a/6b	6Sin/6Sout
RD/YE	WE 12	6Ka/6Kb	6S3in/6S3out
WH/GN	WE 13	7a/7b	7Sin/7Sout
WH/BN	WE 14	7Ka/7Kb	7S3in/7S3out
WH/BK	WE 15	8a/8b	8Sin/8Sout
WH/BU	WE 16	8Ka/8Kb	8S3in/8S3out

MDF connection via CA2x or CARUx from the ATLC board with ACSM or ALSM/ALSMF/ALSMH or SSSM submodules

MDF	Cable Adapter CA2B or CARUB

Colours 16x2	Patch panel for two-wire connection	Cable 1	Cable 2
RD/BU	WE 1	1a/1b	free/free
WH/YE	WE 2	free/free	free/free
WH/GN	WE 3	2a/2b	free/free
WH/BN	WE 4	free/free	free/free
WH/BK	WE 5	3a/3b	free/free
WH/BU	WE 6	free/free	free/free
WH/YE	WE 7	4a/4b	free/free
WH/GN	WE 8	free/free	free/free
WH/BN	WE 9	5a/5b	free/free
WH/BK	WE 10	free/free	free/free
WH/BU	WE 11	6a/6b	free/free
RD/YE	WE 12	free/free	free/free
WH/GN	WE 13	7a/7b	free/free
WH/BN	WE 14	free/free	free/free
WH/BK	WE 15	8a/8b	free/free
WH/BU	WE 16	free/free	free/free

MDF connection via CA2x or CARUx from the ATLC board with PLSM submodules

MDF		**Cable Adapter CA2B or CARUB**	
Colours 16x2	Patch panel for two-wire connection	Cable 1	Cable 2
RD/BU	WE 1	1a/1b	1c/1d
WH/YE	WE 2	free/free	1f/1e
WH/GN	WE 3	2a/2b	2c/2d
WH/BN	WE 4	free/free	2f/2e
WH/BK	WE 5	3a/3b	3c/3d
WH/BU	WE 6	free/free	3f/3e
WH/YE	WE 7	4a/4b	4c/4d
WH/GN	WE 8	free/free	4f/4e
WH/BN	WE 9	5a/5b	5c/5d
WH/BK	WE 10	free/free	5f/5e
WH/BU	WE 11	6a/6b	6c/6d
RD/YE	WE 12	free/free	6f/6e
WH/GN	WE 13	7a/7b	7c/7d
WH/BN	WE 14	free/free	7f/7e
WH/BK	WE 15	8a/8b	8c/8d
WH/BU	WE 16	free/free	8f/8e

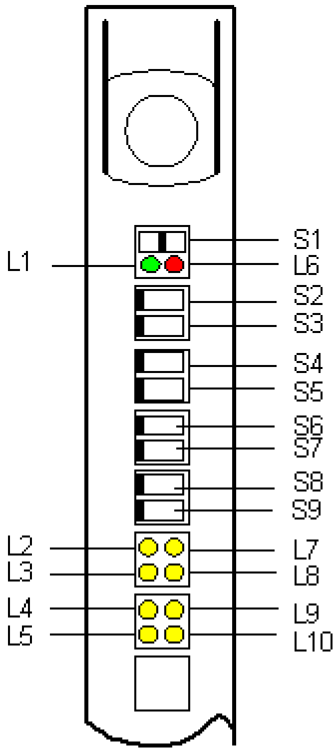
8.6.16 DDID Direct Dialling Inward Circuit

Short description

The DDID board is the interface for 8 analogue network accesses for direct dial in accordance with country-specific guidelines.

Other features	
Power demand +5V	450 mA
Interfaces	8 × a/b
16 kHz meter pulse count	
Overvoltage protection up to 4 kV	
Board software download	
Board identification using board pass	
Maintenance function	

8.6.16.1 LEDs and Switch Functions



DDID board, front side

Switch Position in Normal Operation

S1	Middle position
S2-S9	Middle position

Switch Function

S1	Left:	Preparatory disabling (VSP)
	Middle:	Neutral/release
	Right:	Reset board
	Right, then left:	Forced board download
S2	Left:	DID 1 preparatory disabling
	Middle:	DID 1 release
S3-S8	Left:	DID x preparatory disabling
	Middle:	DID x release
S9	Left:	DID 8 preparatory disabling
	Middle:	DID 8 release

Meanings of LEDs

L1	on:	Board is busy with switching functions
	flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L6	on:	Board reset in progress
	flashing:	Download in progress
	off:	Board in operation
L2	on:	DID 1 is busy
L3, L4, L5, L7, L8, L9	on:	DID x is busy
L10	on:	DID 8 is busy

8.6.16.2 MDF Connections

MDF		**Cable Adapter CA1B from DDID**
Colours 16x2	Patch panel for two-wire connection	
RD/BU	WE 1	a1/b1
WH/YE	WE 2	a2/b2
WH/GN	WE 3	a3/b3
WH/BN	WE 4	a4/b4
WH/BK	WE 5	a5/b5
WH/BU	WE 6	a6/b6
WH/YE	WE 7	a7/b7
WH/GN	WE 8	a8/b8
WH/BN	WE 9	free
WH/BK	WE 10	free
WH/BU	WE 11	free
RD/YE	WE 12	free
WH/GN	WE 13	free
WH/BN	WE 14	free

WH/BK	WE 15	free
WH/BU	WE 16	free

8.6.17 JPAT JISCOS Public Analog Trunk

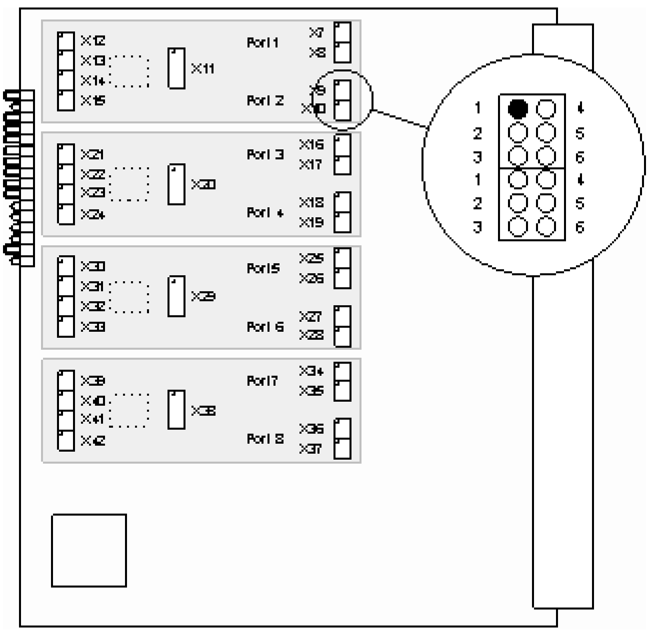
Short description

The board JPAT board provides a maximum of eight 3-wire, analogue connectors for the connection of exchange lines to the CSI55 in the public network.

In order to operate the JPAT module, it must be equipped with a least one of the following submodules:

Submodule	Country of application
SUTC Signaling Unit Trunk C	**Russia**
SUTD Signaling Unit Trunk D	**Russia**

Mixed combination with both submodules on the JPAT is possible.

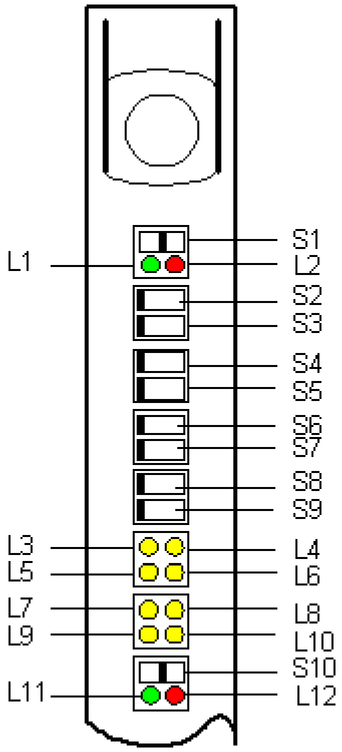


JPAT board, component side

Other features	
Interfaces	8 times 3-wire (2-wire speech path which is also used for signalling together with the c-wire)
Pulse dialling (DEC)	
MF-PS register signalling	
Transmission and receipt of ANI	

The JPAT is connected using the CARUB cable adapter.

8.6.17.1 LEDs and Switch Functions



S1	Reset switch	
	Middle:	Operating status
	Left:	Preparatory disabling of board (VSP of all connecting circuits)
	Right:	Reset board
S2-S9	AO1-AO8	
	Left:	AO1-AO8 Normal status (operating status)
	Right:	AO1-AO8 preparatory disabling (VSP)
S10 *	RS2323 Interface	
	Left:	On
	Right:	Off

Meanings of LEDs

L1	on:	Board is busy in terms of exchange functions
	flashing:	Board removable (all connecting circuits blocked or defective)
	off:	Board not busy
L2	on:	Board reset in progress. Programming break in download
	flashing:	Download in progress
	off:	Board in operation
L3		AO1 status display
L4		AO2 status display
L5		AO3 status display

L6		AO4 status display
L7		AO5 status display
L8		AO6 status display
L9		AO7 status display
L10		AO8 status display
L11		Message from or to the C-bus
L12		C-bus fault

8.6.17.2 MDF Connections

MDF		**Cable Adapter CARUB from JPAT**	
Colours 16x2	Patch panel for two-wire connection	Cable 1	Cable 2
RD/BU	WE 1	a1/b1	c1/free
WH/YE	WE 2	free/free	free/free
WH/GN	WE 3	a2/b2	c2/free
WH/BN	WE 4	free/free	free/free
WH/BK	WE 5	a3/b3	c3/free
WH/BU	WE 6	free/free	free/free
WH/YE	WE 7	a4/b4	c4/free
WH/GN	WE 8	free/free	free/free
WH/BN	WE 9	a5/b5	c5/free
WH/BK	WE 10	free/free	free/free
WH/BU	WE 11	a6/b6	c6/free
RD/YE	WE 12	free/free	free/free
WH/GN	WE 13	a7/b7	c7/free
WH/BN	WE 14	free/free	free/free
WH/BK	WE 15	a8/b8	c8/free
WH/BU	WE 16	free/free	free/free

8.6.18 PLSM Passive Loop Sub Modul

Short description

The submodule Passive Loop Sub Module (PLSM) performs the signal exchange with the remote connecting circuit by means of passive loop signals on the speech wires.

The PLSM submodule is used for the connection of special facilities, e.g.:

Door handsfree facilities
Paging systems
Dictation facilities

.

For certain special facilities (e.g. door opener), further signals can be fed via additional speech wires.

Other features	
Options for use	National and international
Power demand +5V	5 mA
interface	six wires (a/b/c/d/e/f)

8.6.18.1 Functions of the Wires

a/b wire

The seizure of special facilities is implemented by the closing of the a/b loop. The loop current must be supplied from the special facility (remote side). If the remote side cannot provide this supply, the ”ATLC without submodule” version is to be applied.

c wire

The c wire serves to check the operational readiness of the special facility. Here, a -48 V voltage is offered by the PLSM via a resistor. The operational readiness is signalled by the 0V potential from the special facility.

d wire

The d wire serves to switch on the special facility. The PLSM switches 0 V potential onto the line.

e wire

The e wire is used to implement, for example, the door opening function via the transmitted 0 V potential.

f wire

The f wire serves to block the respective connecting circuit from the paging system so as to prevent an outgoing seizure by the subscriber (0 V potential). When connecting to a door handsfree facility, the f wire can be connected to the door bell.

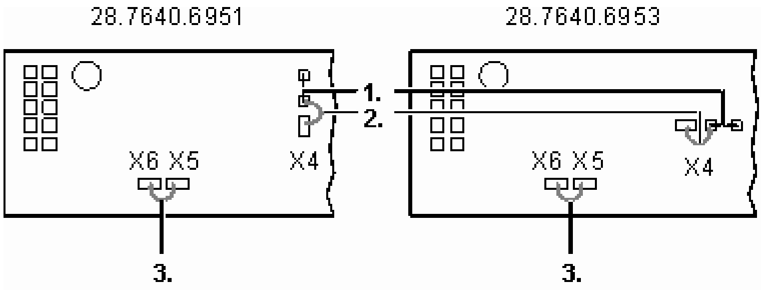
The functions of the e and f wires described above can be changed to the following functions in some signalling plans:

Loop monitoring in place of the f wire

Earth button function in place of the e wire

To do this, conductor paths must be disconnected and bridges inserted on the PLSM submodule.

The corresponding adjustments must be made in the configuration data.



Section of the soldering side on the PLSM submodule

1. For the evaluation of loop current monitoring in place of the f wire disconnect the bridge here

2. For the evaluation of loop current monitoring in place of the f wire insert the bridge here
3. Insert bridge here for the earth button function in place of the e wire

8.6.18.2 Adjusting the Configuration Data

- Physical line interface
  Set to ”loop signalling passive”.
- Signalling plan
  Set the signalling plan so that is identical to that of (coordinated with) the remote connecting circuit.
- Speech path design and relative level
  Set one of the following combinations according to the requirement of the interface to the remote connecting circuit.

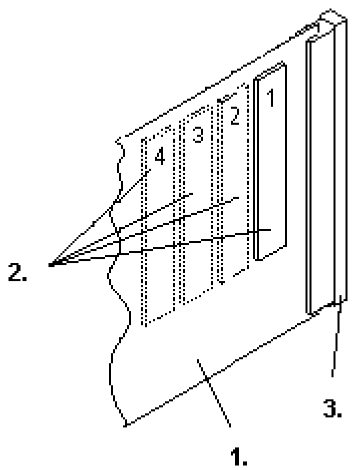
Speech path design	Relative level (PrE/PrA)	Application in countries
2-wire	0/-7 dBr	A, D, E, GR **(default setting)**
2-wire	-7/0 dBr	D

- Changes to the signal times must not be made.
- Adjustments to digits are to be made according to the application of the PLSM (door handsfree facility, paging system, etc.), for example, to provide a code to activate the door opening function. The code can be set once the number of digits in the code has been specified. The functions of the codes depend on the set signalling plan. They are explained in the respective signalling plan.
- Settings for the connecting circuit type must not be changed.

8.6.19 SIGA Signalling Unit A

Short description

The submodule SIGA contains the functions for 2 connecting circuits and is inserted on the ATA board. A maximum of 4 submodules can be used as analog trunk module (non direct inward).



Location of the SIGA on the ATA module

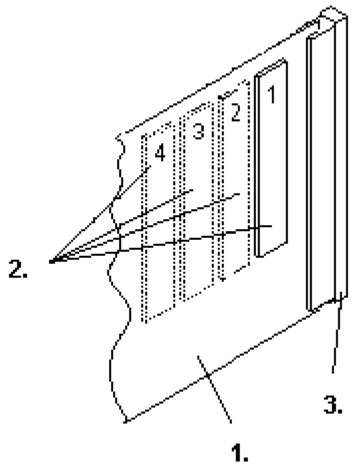
1. ATA module
2. Submodule SIGA
3. Connecting circuit slot

Other features	
Country of application	Germany, Russia
Call recognition (25/50 Hz)	
Charge recognition (16 kHz)	

8.6.20 SIGB Signalling Unit B

Short description

The submodule SIGB contains the functions for 2 connecting circuits and is inserted on the ATA board. A maximum of 4 submodules can be used as analog trunk modules without direct inward dialling.



Location of the SIGB on the ATA module

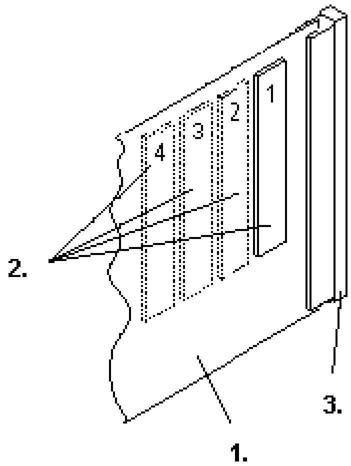
1. ATA module
2. Submodule SIGB
3. Connecting circuit slot

Other features	
Country of application	Switzerland
Call recognition (20/55 Hz)	
Charge recognition (12 kHz)	

8.6.21 SIGC Signalling Unit C

Short description

The submodule SIGC contains the functions for 2 connecting circuits and is inserted on the ATA board. A maximum of 4 submodules can be connected as trunk modules.



Location of the SIGC on the ATA module

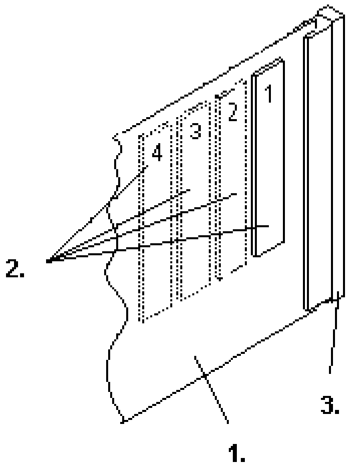
1. ATA module
2. Submodule SIGC
3. Connecting circuit slot

Other features	
Country of application	Luxemburg
Call recognition (25 Hz)	
Charge recognition (16 kHz or 50 Hz earth symmetric). The switchover is made using the ATA board software.	

8.6.22 SIGD Signalling Unit D

Short description

The submodule SIGD contains the functions for 2 connecting circuits and is inserted on the ATA board. A maximum of 4 submodules can be used for the direct inward dialling circuits with monitoring frequency.



Location of the SIGD on the ATA module

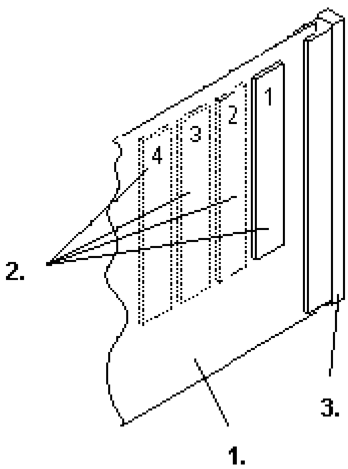
1. ATA module
2. Submodule SIGD
3. Connecting circuit slot

Other features	
Country of application	Austria
12 kHz identifier for supervisory frequency and charges	

8.6.23 SIGE Signalling Unit E

Short description

The submodule SIGE contains the functions for 2 connecting circuits and is inserted on the ATA board. A maximum of 4 submodules can be used for DC direct inward dialling (GSD).



Location of the SIGE on the ATA module

1. ATA module

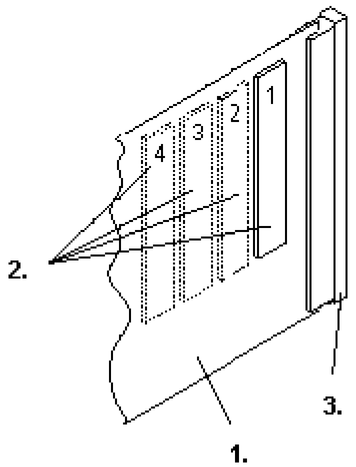
2. Submodule SIGE
3. Connecting circuit slot

Other features	
Country of application	Austria
Charge identifier (12 kHz)	
Call identifier (40-60 Hz)	
Potential switch and direct current identifier for GSD signalling process.	

8.6.24 SIGF Signalling Unit F

Short description

The submodule SIGF contains the functions for 2 connecting circuits and is inserted on the ATA board. A maximum of 4 submodules can be connected as trunk modules.



Location of the SIGF on the ATA module

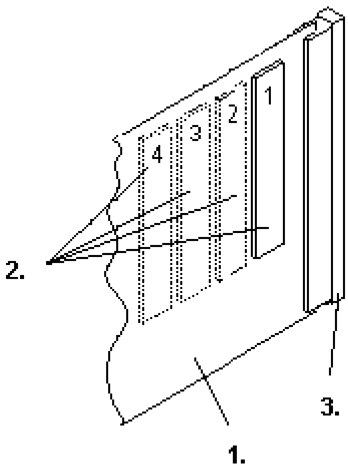
1. ATA module
2. Submodule SIGF
3. Connecting circuit slot

Other features	
Country of application	Belgium
Charge identifier (16 kHz)	
Call identifier (25 Hz)	
Dial tone identifier (f1 = 420-460 Hz, f2 = 1140 Hz)	

8.6.25 SIGG Signalling Unit G

Short description

The submodule SIGG contains the functions for 2 connecting circuits and is inserted on the ATA board. A maximum of 4 submodules can be used as analog trunk modules without direct inward dialling.



Location of the SIGG on the ATA module

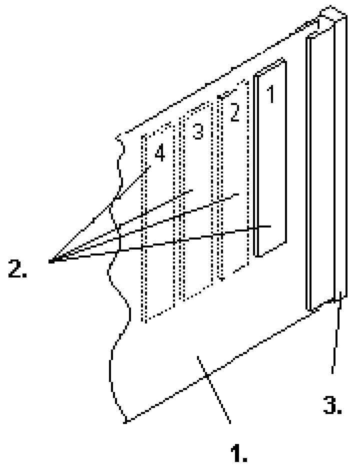
1. ATA module
2. Submodule SIGG
3. Connecting circuit slot

Other features	
Country of application	Hungary
Charge identifier (12 kHz)	
Call identifier (20-50 Hz)	

8.6.26 SIGH Signalling Unit H

Short description

The submodule SIGH contains the functions for 2 connecting circuits and is inserted on the ATA2 board. A maximum of 4 submodules can be used as analog trunk modules without direct inward dialling.



Location of the SIGH on the ATA module

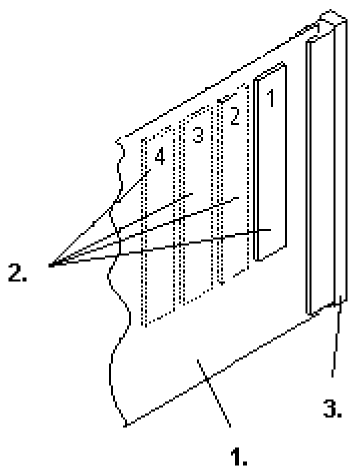
1. ATA module
2. Submodule SIGH
3. Connecting circuit slot

Other features	
Countries of application	Czech/Slovak Republic
Charge identifier (16 kHz)	
Call identifier (25-50 Hz)	

8.6.27 SSBA Signalling Sub Board A

Short description

The submodule SSBA contains the functions for 2 connecting circuits and is inserted on the ATC board. A maximum of 4 submodules can be connected.



Location of the SSBA on the ATC module

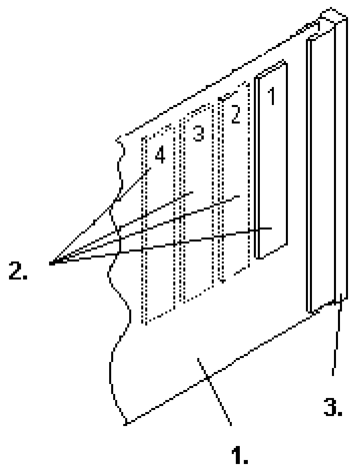
1. ATC module
2. Submodule SSBA
3. Connecting circuit slot

Other features	
Country of application	France
Call recognition (50 Hz)	
Charge identifier (12 kHz)	
Direct loop current limit: 60 mA	
Polarity reversal detection	

8.6.28 SSBB Signalling Sub Board B

Short description

The submodule SSBB contains the functions for 2 connecting circuits and is inserted on the ATC board. A maximum of 4 submodules can be connected.



Location of the SSBB on the ATC module

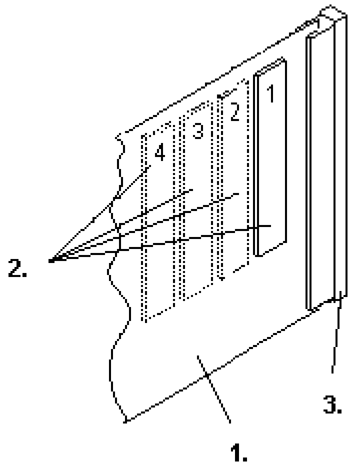
1. ATC module
2. Submodule SSBB
3. Connecting circuit slot

Other features	
Country of application	Spain
Call recognition (20-30 Hz)	
Charge identifier (50 Hz and 12 kHz)	

8.6.29 SSBC Signalling Sub Board C

Short description

The submodule SSBC contains the functions for 2 connecting circuits and is inserted on the ATC board. A maximum of 4 submodules can be connected.



Location of the SSBC on the ATC module

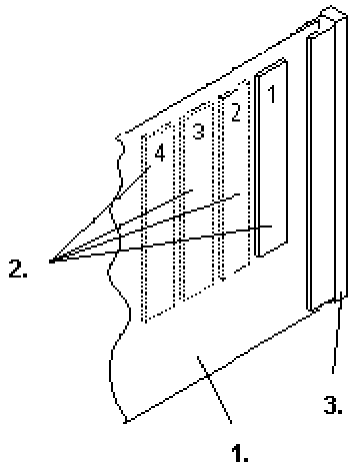
1. ATC module
2. Submodule SSBC
3. Connecting circuit slot

Other features	
Country of application	Italy
Call recognition (25-50 Hz)	
Charge identifier (12 kHz)	
Blocking of incoming seizure in case of malfunctions or during shutdown	
Polarity reversal detection	
Switchable loop impedance (high, low)	

8.6.30 SSBD Signalling Sub Board D

Short description

The submodule SSBD contains the functions for 2 connecting circuits and is inserted on the ATC board. A maximum of 4 submodules can be connected.



Location of the SSBD on the ATC module

1. ATC module
2. Submodule SSBD
3. Connecting circuit slot

Other features	
Country of application	Netherlands
Call recognition (50 Hz)	
Charge identifier (50 Hz)	
Polarity reversal detection	
Switchable loop impendance	

8.6.31 SSSM Simplex Signaling Sub Modul

Short description

The submodule Simplex Signalling Sub Module (SSSM) performs the signal exchange with the remote connecting circuit by means of continuous current signals on the speech wires.

Other features	
Country of application	National and international
Power demand +5V	45 mA
Interface to the remote connecting circuit	a/b earth signalling method (two-wire line) No calibrations are required for the signal exchange with the remote connecting circuit.
Combinations with other submodules on an ATLC board are possible.	

The corresponding adjustments must be made in the configuration data.

8.6.31.1 Adjusting the Configuration Data

- Physical line interface
  Set ”Simplex signalling a/b earth”.
- Signalling plan
  Set the signalling plan so that is identical to that of (coordinated with) the remote connecting circuit.
- Speech path design and relative level
  Set one of the following combinations according to the requirement of the interface to the remote connecting circuit.

Speech path design	Relative level (PrE/PrA)	Application in countries
2-wire	0/-7 dBr	A, D, E, GR
2-wire	0/-7 dBr	B, L
2-wire	0/-7 dBr	NL
2-wire	-3/-4 dBr	D, GR**(default setting)**
2-wire	-4/-3 dBr	B, L
2-wire	-4/-3 dBr	NL
2-wire	-5/-2 dBr	D
2-wire	-6/-1 dBr	A

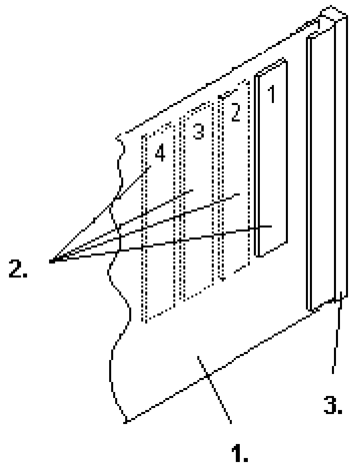
If your country of application is not listed, select the required level setting for D. Your application then corresponds to German transmission technology.

- Adjustments to times must not be made.
- Adjustments to digits must not be made.
- Settings for the connecting circuit type must not be changed.

8.6.32 SUPA Supplement A

Short description

The submodule SUPA contains the functions for 2 connecting circuits and is inserted on the ATB board. A maximum of 4 submodules can be connected.



Location of the SUPA on the ATB module

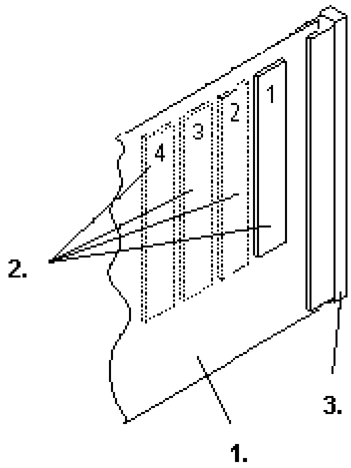
1. ATB module
2. Submodule SUPA
3. Connecting circuit slot

Other features	
Countries of application	Great Britain/Hong Kong
Call recognition/charge detector (14-26 Hz/50 Hz)	
Switch to turn on earth calling signalling systems (ECS)	
Highly resistant tape loop for loop calling guarded clearing (LGC)	
Auxiliary voltage switch for testing PSTN off-line condition in ECS.	

8.6.33 SUPB Supplement B

Short description

The submodule SUPB contains the functions for 2 connecting circuits and is inserted on the ATB board. A maximum of 4 submodules can be connected.



Location of the SUPB on the ATB module

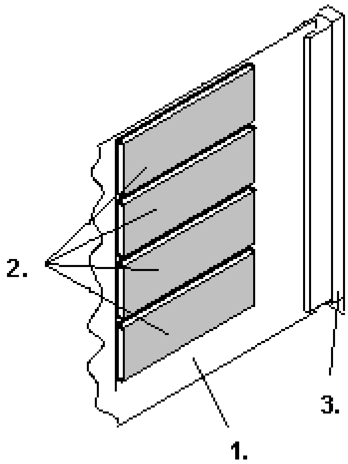
1. ATB module
2. Submodule SUPB
3. Connecting circuit slot

Other features	
Countries of application	USA
Call recognition (14-26 Hz/50 Hz)	
Ground Start	
Loop Start	
Auxiliary voltage switch for testing PSTN off-line condition in ECS.	

8.6.34 SUTC Signaling Unit Trunk C

Short description

The SUTC is a submodule of the JPAT. It is used for analog exchange lines (direct inward dialling) with 3-wire signalling.



Location of the SUTC on the JPAT module

1. JPAT module
2. Submodule SUTC
3. Connecting circuit slot

Other features	
Country of application	Russia
Variants	Incoming traffic, local
	Incoming traffic, long-distance

Two ports are implemented on each submodule. Using the ICU Editor, the two ports can be configured for incoming local, incoming long-distance or mixed traffic.

The transmission of signals is implemented in decimal dialling (DEC) via DC signalling only and using various resistance values. Only the transmission of ANI is implemented in the voiceband by means of frequency signalling.

The following tables indicate the correlation between the signal, transmission direction and associated resistance value.

8.6.34.1 Incoming Traffic, Local

Signal	**Direction / wire**	**Incoming end of connection**				**Notes**
		a	b	c	c	
				Operation with CO coordinates	Operation with CO HDW	
Idle condition control	C	-	+	-	-	The input resistance of the c-wire depends on the associated central office (CO coordinates or HDW) and on the line resistance of the c-wire at the HDW system.
	<——-	1000 Ohm	1000 Ohm	1040 Ohm	1)	

Seizure	C					A seizure is recognised in the I55 via a current in the c-wire (13 mA). Once recognized, the current in the c-wire is limited to 30 mA. (seizure acknowledgement)
	——->					
	C					
	<——-			1040 Ohm + greater/ equal R	Rin + greater/ equal R	
Call number reception (DEC or MF-PS)	a	-	+	-	-	DEC: Pulse/pause via a/b-wire, or pulse/pause via a-wire only. MF-PS Dial information in voiceband with frequency signaling (multi-frequency pulse shuttle).
	——->					
	b	1000 Ohm	1000 Ohm	1040 Ohm + greater/ equal R	Rin + greater/ equal R	

-	:	- 60 V
+	:	GND
greater/ equal R	:	The size of greater/equal R depends on the line resistance of the c-wire and the associated supply voltage
1)	:	Line resistance of the c-wire between 0 Ohm - > 500 Ohm = input resistance SUTC 1040 Ohm - 350 Ohm

Signal	**Direction / wire**	**Incoming end of connection**				**Notes**
		a	b	c	c	
				Operation with CO coordinates	Operation with CO HDW	
Reply or ANI prompt from the I55	a, b	+	-			
	<——-	1000 Ohm	200 kOhm			
Withdraw ANI prompt	a, b	-	+	-	-	
	<——-	1000 Ohm	1000 Ohm	1040 Ohm + greater/ equal R	Rin + greater/ equal R	
Subscriber B discon- nects first	a, b	+	-	1040 Ohm + greater/ equal R	Rin + greater/ equal R	Subscriber B (subsc. in I55) disconnects first after a call. Subscriber B (subsc. in I55) is busy. No free connection paths in the I55.

	<——-	200 kOhm	1000 Ohm			
Subscriber A disconnects	a	+	-	1040 Ohm + greater/ equal R	Rin + greater/ equal R	The signal is transmitted on two paths. The signal receiver stops working when the current is 6.5 mA. There is no detection if the current in the a-wire is smaller than 6.5 mA. The reception on the c-wire is interrupted when the control resistance circuit has reached 8000 Ohm and voltage of 74 V.
	——->	1000 Ohm	200 kOhm			

-	:	- 60 V
+	:	GND
greater/ equal R	:	The size of greater/equal R depends on the line resistance of the c-wire and the associated supply voltage

Signal	Direction / wire	Incoming end of connection a	b	c Operation with CO coordinates	c Operation with CO HDW	Notes
Disconnection in every status	c				Rin + greater/ equal R	The connection in the I55 is disconnected at current of I <10 mA.
	——->			1040 Ohm + greater/ equal R		
		Depends on technical switching status				
Transition to idle status	c	-	+	-	-	
	<——-	1000 Ohm	1000 Ohm	1040 Ohm	1)	
Blocking	c	-	+			The I55 informs the opposite station that it cannot be seized (blocking status).
	<——-	1000 Ohm	1000 Ohm	Insulation	Insulation	

-	:	- 60 V
+	:	GND
1)	:	Line resistance of the c-wire between 0 Ohm - > 500 Ohm = input resistance SUTC 1040 Ohm - 350 Ohm

8.6.34.2 Incoming Traffic, Long-distance

Signal	**Direction / wire**	**Incoming end of connection**				**Notes**
		a	b	c	c	
				Operation with CO coordinates	Operation with CO HDW	
Idle condition control	C	-	+	-	-	The input resistance of the c-wire depends on the associated central office (CO coordinates or HDW) and on the line resistance of the c-wire at the HDW system.
	<——-	1000 Ohm	1000 Ohm	1040 Ohm	1)	
Seizure	C					A seizure is recognized in the I55 via a current in the c-wire (13 mA). Once recognized, the current in the c-wire is limited to 30 mA. (seizure acknowledgement)
	——>					
	C					
	<——-			1040 Ohm + greater/ equal R	Rin + greater/ equal R	
Call number reception (DEC or MF-PS)	a	-	+	-	-	DEC: Pulse/pause via a/b-wire, or pulse/pause via a-wire only. MF-PS Dial information in voiceband with frequency signaling (multi-frequency pulse shuttle).
	——>					
	b	1000 Ohm	1000 Ohm	1040 Ohm + greater/ equal R	Rin + greater/ equal R	

-	:	- 60 V
+	:	GND
greater/ equal R	:	The size of greater/equal R depends on the line resistance of the c-wire and the associated supply voltage
1)	:	Line resistance of the c-wire between 0 Ohm - > 500 Ohm = input resistance SUTC 1040 Ohm - 350 Ohm

Signal	**Direction / wire**	**Incoming end of connection**				**Notes**
		a	b	c	c	
				Operation with CO coordinates	Operation with CO HDW	

Subscriber B free	a, b	+	-	-	-	Subscriber B (subsc. in I55) is free once the subscriber B call number is received.
	<——-	1000 Ohm	1000 Ohm			
Ringing	a or b	+	-	-	-	The remote side switches the a or b-wire to a lower resistance in order to display the call signalling.
	——->	1000 Ohm	1000 Ohm	1040 Ohm + greater/ equal R	Rin + greater/ equal R	
Subscriber busy or no free connection	a, b	+	-	-		The I55 informs the remote side about the status of the subscriber or I55.
	<——-	200 kOhm	1000 Ohm	1040 Ohm + greater/ equal R	Rin + greater/ equal R	Subscriber B (subsc. in I55) is busy no free connection path in the I55.
Reply	a, b	+	-	-		The I55 informs the remote side when the subscriber has lifted the handset and changes the resistance on the a, b-wire (conversation status).
	<——-	200 kOhm	200 kOhm	1040 Ohm + greater/ equal R	Rin + greater/ equal R	
Subscriber B disconnects	a, b	+	-	-		Subscriber B (subsc. in I55) disconnects first after a call.
	<——-	1000 Ohm	1000 Ohm	> = 1300 Ohm		

-	:	- 60 V
+	:	GND
greater/ equal R	:	The size of greater/equal R depends on the line resistance of the c-wire and the associated supply voltage

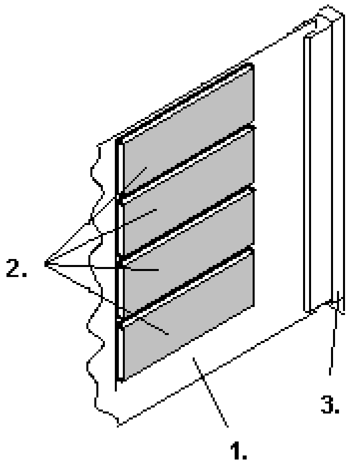
Signal	**Direction / wire**	**Incoming end of connection**				**Notes**
		a	b	c	c	
				Operation with CO coordinates	Operation with CO HDW	
Disconnection at every stage	c				Rin + greater/ equal R	The connection in the I55 is disconnected at current of I <10 mA.
	——->			1040 Ohm + greater/ equal R		
		Depends on technical switching status				
Blocking	c	-	+			The I55 informs the opposite station that it cannot be seized (blocking status).
	<——-	1000 Ohm	1000 Ohm	Insulation	Insulation	

-	:	- 60 V
+	:	GND

8.6.35 SUTD Signalling Unit Trunk D

Short description

The SUTD is a submodule of the JPAT. It is used for analog exchange lines with 3-wire signalling (direct inward dialling).



Location of the SUTD on the JPAT module

1. JPAT module
2. Submodule SUTD
3. Connecting circuit slot

Other features	
Country of application	Russia
variant	Outgoing local and long-distance traffic

The transmission of signals is implemented in decimal dialling (DEC) via DC signalling only and using various resistance values. Only the transmission of ANI is implemented in the voiceband by means of frequency signalling. The following tables indicate the correlation between the signal, transmission direction and associated resistance value.

Two ports are implemented on each submodule.

8.6.35.1 Outgoing traffic, local and long-distance

Signal	**Direction / wire**	**Outgoing end of connection**			**Notes**
		a	b	c	

Idle condition control	c	-	+	+	Ringing current monitoring (I 2 mA) to see if the central office (CO) is ready to be seized.
	<——-	insulated	insulated	+ 22 kOhm	
Seizure	c	- 42 kOhm	+ 1 kOhm	+ 22 kOhm	
	——->				
Dec. dialling (pulse)	a, b	+ 500 Ohm	- 500 Ohm		Pause: - 42 kOhm on a-wire Pause: + 1 kOhm on b-wire
	——->	insulated	insulated	> = 65 Ohm	
Subscriber busy	b	-42 kOhm	+ 1 kOhm	> = 65 Ohm	Checks whether current is flowing in the b-wire (I 13 - 20 mA)
	<——-				
Reply or ANI prompt	a	-42 Ohm	+ 1 kOhm	> = 65 Ohm	Checks whether current is flowing in the a-wire (I 1 mA)
	<——-				
Withdraw ANI prompt	a	-42 Ohm	+ 1 kOhm	> = 65 Ohm	No current in the a or b-wire
	<——-				
Disconnection by called subscriber B	a, b	-42 Ohm	+ 1 kOhm	> = 65 Ohm	Checks whether current is flowing in the b-wire (I 13 - 20 mA)
	<——-				

Signal	**Direction / wire**	**Outgoing end of connection**			**Notes**
		a	b	c	
Disconnection by called subscriber A	a	- 1 kOhm	+ 1 kOhm	< + 65 Ohm	Current in the a-wire increases from I 1 mA to I 13 - 20 mA
	——->				
Disconnection at any stage	c	Insulation	Insulation	> + 22 kOhm	
	——->				
Blocking/ idle condition control	c	Insulation	Insulation	> + 22 kOhm	Checks whether c wire ext. = open (no current from I 2 mA)
	<——-				

-	:	- 60 V
+	:	GND

8.7 Digital interfaces

		Board		Submodule		Connection board
Board/ Rack/ Backplane	→	DUP03 → 430			→	CA1B → 391
	→	DUPN → 432			→	CA2B → 392
	→	DT0 Digital Linecard T0 → 423			→	CA1B → 391, EES0B → 436, EESS0 → 440
	→	DS02 → 418			→	CA2B → 392
	→	DS03 → 421			→	CA2B → 392
	→	DT21 → 427			→	CA1B → 391
					→	CA4B → 395
					→	OFA2B → 491
					→	OFAS → 491
	→	DCON → 403			→	CA1B → 391
					→	CA4B → 395
	→	CAS → 397			→	CA1B → 391
					→	CA4B → 395
	→	IPN → 473				
	→	MAC → 475>	→	EMAC → 447	→	CA6B → 396
	→	DECT21 → 415			→	CA1B → 391
	→	IMUX → 458	→	SPCU	→	CA5B → 395
			→	S64LI		
			→	S64LI		
	→	UIP → 495	→	V24M → 501	→	CA3B → 393
			→	CL2M → 401	→	CA1B → 391/ CA3B → 393
			→	CL2ME → 402	→	CA3B/T → 394
	→	HAMUX → 447			→	CA6B → 396
	→	BVT2 → 387		**Mirror card to HAMUX in the PC**		
	→	MULI → 487			→	CA1B → 391
	→	ADM → 381	→	UPSM → 500	→	CA2B → 392, EESS0 → 440
			→	STSM → 494		
			→	UKSM → 499		
			→	EEADM → 435		

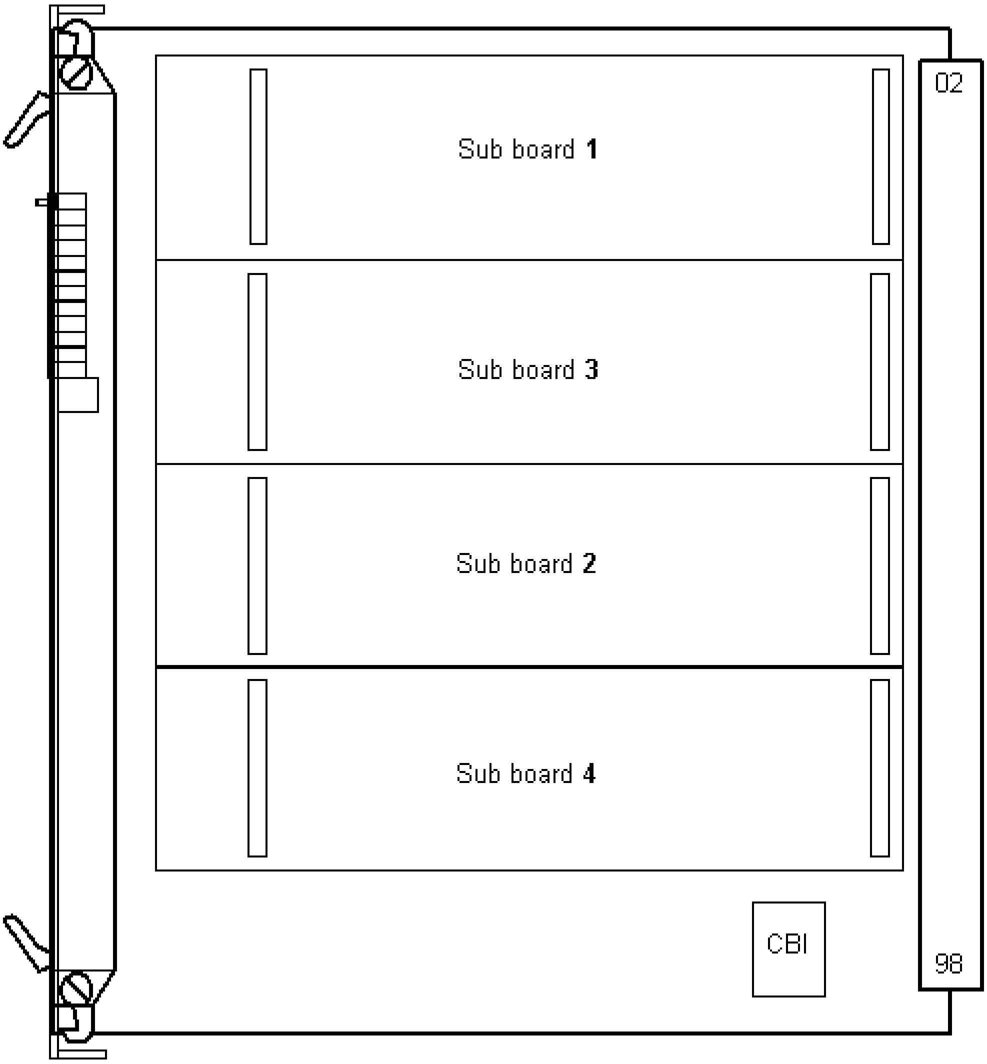
8.7.1 ADM Analog Digital Mixboard

Short description

The ADM board is a basic board which accomodates up to five submodules. The following submodules are available:

Submodule	Features
STSM	four S0/T0 interfaces as exchange, permanent connection or subscriber connection

UPSM	four UPN interfaces as subscriber connections or permanent connections
ABSM	four analogue subscriber ports (a/b)
UKSM	twoi UK0 master interfaces
EEADM	for use of the ADM with S0 emergency sets via cable adapter EESS0



ADM board, component side

	Observe numbering of the submodules

1	AO 1-4
3	AO 9-12
2	AO 5-8
4	AO 13-16

If the ADM board is used with emergency switching (EESS0 cable adapter) submodule 3 is not required. On the X8 connector (normally for submodule 4) you **must** insert the EEADM submodule instead of submodule 4.

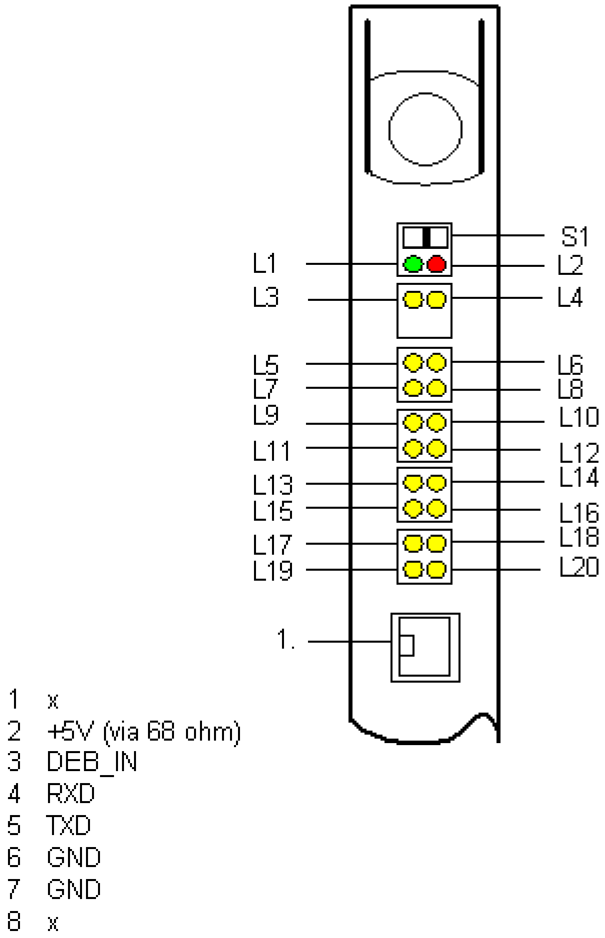
If the EEADM board is inserted in the wrong place on the ADM board this will cause a defect in the ADM board.

For the ADM board the ”Call Reference Length - (CRL)” can be set to a length of one or two bytes for the whole board by means of the ICU editor. The call reference length of 2 bytes is required for QSIG network connection with some third-party PBX. If this setting is used all ports have CRL=2 bytes no matter which protocol is selected. For this reason it was not possible to connect any system terminals with TN1R6 protocol to this ADM board.
As of software version ADM0900.ICL / ADM00009.ICP of the ICU, the behaviour of the ADM board and of the Integral 55 Compact-ADM port has changed. The CRL setting is only adopted for the ports of the board which use the ”QSIG” protocol. For all other protocolos the call reference length will always be CRL=1.
This makes it possible to configure QSIG ports with CRL=2 for networks with third-party systems while it is possible to use system terminals and permanent circuit lines with CRL=1 for other ports with TN1R6 protocol.

Other features	
Countries of application	Application in all countries
Power demand +5V	230 mA
Interfaces	16 times 2/4-wire
Overvoltage protection up to 4 kV	
Download board software	
Board identification using board passport	
Maintenance function	
In conjunction with V24IA module debugging interface on the board front	

Debugger

8.7.1.1 LEDs and Switch Functions



DECT board, front side

1. RJ45 connector with PIN assignment

Switch Functions

S1	Left:	Preparatory disabling (of all connecting circuits)
	Middle:	Operating status/release
	Right:	Reset board
	Right, then left:	Forced board download

Meanings of LEDs

L1	on:	Board is busy with switching functions
	flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L2	on:	Board reset in progress
	flashing:	Download in progress

	off:	Board in operation
L3		free
L4		free
L5	on:	Layer 1 of the digital connecting circuit 1 active or analog connecting circuit 1 busy
L6	on:	Layer 1 of the digital connecting circuit 2 active or analog connecting circuit 2 busy
L7- L19	on:	Layer 1 of the digital connecting circuit 3...15 active or analog connecting circuit 3...15 busy
L20	on:	Layer 1 of the digital connecting circuit 16 active or analog connecting circuit 16 busy

8.7.1.2 MDF Connections

MDF, Cable 1				via CA2B from			
Colours 16x2	Patch panel for the two wire connection	Patch panel for the four-wire connection		ADM with STSM	ADM with UPSM	ADM with UKSM	ADM with ABSM/ ABSM1
RD/BU	WE 1	WE 1	**1st** slot	A1/B1 (T)	A1/B1	A1/B1	a1/b1
WH/YE	WE 2			C1/D1 (R)	free	free	free
WH/GN	WE 3	WE 2		A2/B2 (T)	A2/B2	A2/B2	a2/b2
WH/BN	WE 4			C2/D2 (R)	free	free	free
WH/BK	WE 5	WE 3		A3/B3 (T)	A3/B3	free	a3/b3
WH/BU	WE 6			C3/D3 (R)	free	free	free
WH/YE	WE 7	WE 4		A4/B4 (T)	A4/B4	free	a4/b4
WH/GN	WE 8			C4/D4 (R)	free	free	free
WH/BN	WE 9	WE 5	**2nd** slot	A5/B5 (T)	A5/B5	A3/B3	a5/b5
WH/BK	WE 10			C5/D5 (R)	free	free	free
WH/BU	WE 11	WE 6		A6/B6 (T)	A6/B6	A4/B4	a6/b6
RD/YE	WE 12			C6/D6 (R)	free	free	free

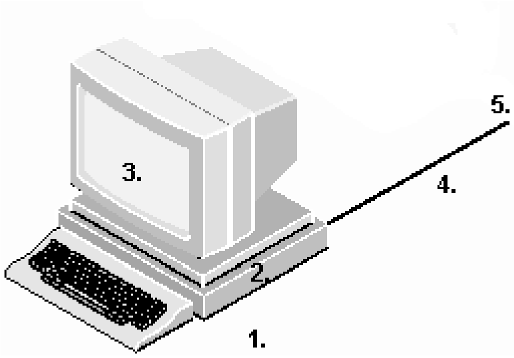
WH/GN	WE 13	WE 7		A7/B7 (T)	A7/B7	free	a7/b7
WH/BN	WE 14			C7/D7 (R)	free	free	free
WH/BK	WE 15	WE 8		A8/B8 (T)	A8/B8	free	a8/b8
WH/BU	WE 16			C8/D8 (R)	free	free	free

MDF Cable 2				**via CA2B from**			
Colours 16x2	Patch panel for the two wire connection	Patch panel for the four-wire connection		ADM with STSM	ADM with UPSM	ADM with UKSM	ADM with ABSM/ ABSM1
RD/BU	WE 1	WE 1	**3rd** slot	A9/B9 (T)	A9/B9	A5/B5	a9/b9
WH/YE	WE 2			C9/D9 (R)	free	free	free
WH/GN	WE 3	WE 2		A10/ B10 (T)	A10/ B10	A6/B6	a10/b10
WH/BN	WE 4			C10/ D10 (R)	free	free	free
WH/BK	WE 5	WE 3		A11/ B11 (T)	A11/ B11	free	a11/b11
WH/BU	WE 6			C11/ D11 (R)	free	free	free
WH/YE	WE 7	WE 4		A12/ B12 (T)	A12/ B12	free	a12/b12
WH/GN	WE 8			C12/ D12 (R)	free	free	free
WH/BN	WE 9	WE 5	**4th** slot	A13/ B13 (T)	A13/ B13	A7/B7	a13/b13
WH/BK	WE 10			C13/ D13 (R)	free	free	free
WH/BU	WE 11	WE 6		A14/ B14 (T)	A14/ B14	A8/B8	a14/b14
RD/YE	WE 12			C14/ D14 (R)	free	free	free
WH/GN	WE 13	WE 7		A15/ B15 (T)	A15/ B15	free	a15/b15
WH/BN	WE 14			C15/ D15 (R)	free	free	free
WH/BK	WE 15	WE 8		A16/ B16 (T)	A16/ B16	free	a16/b16
WH/BU	WE 16			C16/ D16 (R)	free	free	free

8.7.2 BVT2 Motherboard, Voice Transmitting Module 2

Short description

The board BVT2 is used to provide access to an I55 for PC supported applications. A UP0connector on the BVT2 module connects the PC to the I55.

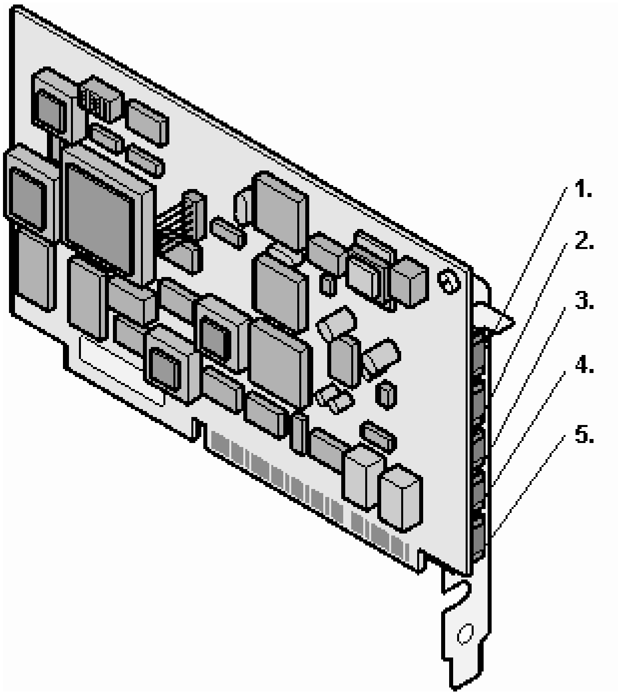


BVT2 board with CC telephone

1. PC
2. HAB with BVT2
3. CC telephone
4. Cable with UP0 connection
5. for I55

Application options	
ACD-UI application.	ACD system with CSI55.
CC telephone aplication.	Can **only** be used in conjunction with a call centre and the CSI55. Up to 15 IPN connections are possible per board.

8.7.2.1 BVT2 Module

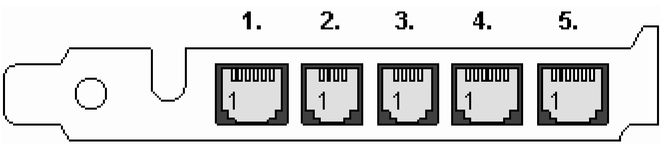


BVT2 board

The BVT2 board features the following connector options:

1. UP0 connection
2. AEI interface
3. Loudspeaker and microphone connector
4. Handset and headset connector
5. Hook switch connector

8.7.2.2 Pin Assignment



Assignment of the WE sockets

1. Hook switch
2. Handset
3. Loudspeaker and microphone
4. AEI
5. UP0

Hook switch

The pin configuration of GND and GU allows a hook switch function to be assigned. The make contact 1 is intended for the application of a tape recorder controller, and make contact 2 for the application of a door opener, for example.

Connector	Hook switch					
Pin	1	2	3	4	5	6
Seizure	GND	GU	K1	K1	K2	>K2

GND	=	Ground
GU	=	Hook switch
K1, K2	=	Make contact 1, 2

Handset or headset

Either a T1 handset or a headset can be connected to the 4-pin WE socket. Connecting a switchover module enables switchover between the handset and headset.

Connector	Handset or headset			
Pin	1	2	3	4
Seizure	SK-	HK+	HK-	SK+

SC	=	Transmitter inset (microphone)
HK	=	Receiver inset

Loudspeaker and microphone

A loudspeaker and a microphone can be connected to this interface for handsfree operation or open listening.

Connector	Loudspeaker and microphone			
Pin	1	2	3	4
Seizure	MIC-	MIC+	LS-	LS+

LS	=	Loudspeaker
MIC	=	Microphone

AEI interface

The AEI (Additional Equipment Interface) pursuant to ETSI features an analog X port and digital Y port. A tape recorder or headset can be connected to the AEI interface.

Connection is implemented via a 6-pin WE socket.

A connection cable must not exceed the total length of 6 m.

Connector	AEI interface					
Pin	1	2	3	4	5	6
Seizure	XTE OUT	XTE IN	GND A	YTE IN	GND D	YTE OUT

UP0 Interface

The UP0 interface is in two-wire design. Both wires transmit the user data and signalling data between the PC and the I55 using the time separation technique, also known as the ping-pong technique.

Connector	UP0 Interface					
Pin	1	2	3	4	5	6
Seizure	free	free	A	B	free	free

UP0 Interface Range

When planning the cable network, it is necessary to take into account that the range of the UP0 interface concerning the cables used is different:

- 0.6 mm diameter for 3.5 km outdoor cable; 1.7 km for installation cable
- 0.4 mm diameter for 2.1 km outdoor cable

The use of different cable types and the number of distributors in the network reduces the range of the UP0 interface.

When connecting the line network, the following instructions must be adhered to:

- The lines for the UP0 interface must be installed as a twisted wire pair.
- The shields of the cables must be connected to the earth potential on both sides.

The supply of the UP0 interface to a terminal is implemented via so-called Universal Connector Units (UAEs).

8.7.2.3 Tape recorder

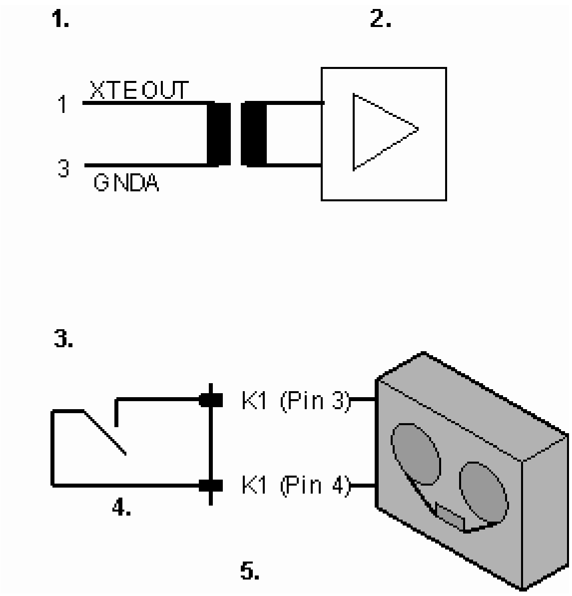
Connector

A tape recorder can be connected to the AEI interface. The input line of the tape recorder must be DC isolated and highly resistant (>10 kOhm).

The tape recorder is controlled via make contacts 1. See “AEI interface” table for pin assignment.

Control

The diagram illustrates the control connections on a tape recorder.



Tape recorder connection

1. AEI interface
2. Tape recorder NF input
3. BVT2
4. Relay contact
5. Interface for hook switch

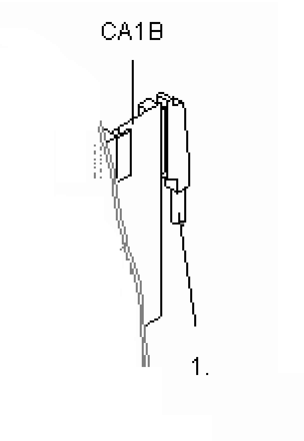
	AC	DC	Unit
I max	2	2	A
Umax	250	220	V
P max	62,5	30	W

8.7.3 CA1B cable adapter 1 for B modules

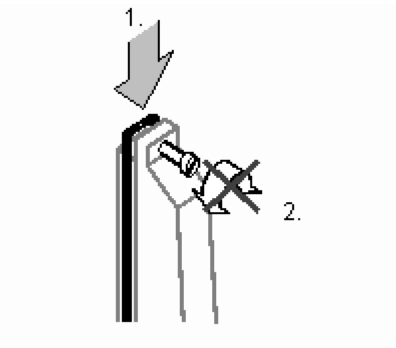
Short description

Cable adapter for 16, 4 or 2-pair analog or digital connecting circuit line for boards ASCEU, ASCF, ASCGB, ATAx, ATB, ATC, DDID, DUP03, DT0, DT21, CAS, DCON, UIP without V24M, MULI and DECT21 with

- 50-pin CHAMP plug as an output to the MDF
- Overcurrent breakpoint (230 V contact)



1. 16, 4 or 2-pair to the MDF/NT



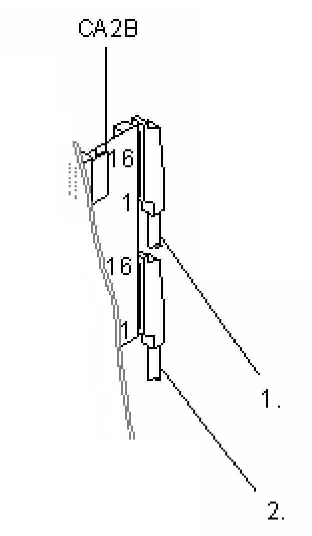
1. Release the lock by pressing the bracket
2. Do not turn the screw!

8.7.4 CA2B cable adapter 2 for B modules

Short description

Cable adapter for 2 to 8-wire analog or 4-wire digital connection device line for the ASC2, ASC21, ATLC, DS02, DUPN, JPAT and ADM boards with

- 50-pin CHAMP plug as an output to the MDF
- Overcurrent breakpoint (230 V contact)



1. Cable 1 (16x2) to the MDF
2. Cable 2 (16x2) to the MDF

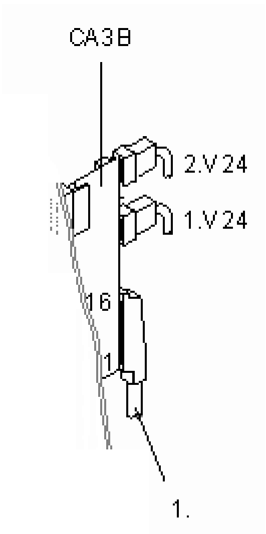
8.7.5 CA3B cable adapter 3 for B modules

Short description

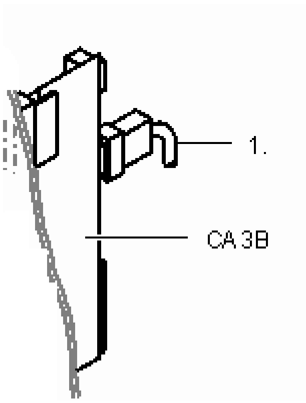
Cable adapter for the UIP board, provided that the V24M submodules are also inserted here. The board is also required for external synchronization when using the CL2M/CL2MEM on ICF (B3 module or ICS).

- 50-pin CHAMP plug as an output to the MDF
- 2x 9-pin D plugs for V24 interfaces or connection of high precision reference clock
- Overcurrent breakpoint (230 V contact)

	If the first slot of a UIP board is equipped with a CL2ME for the clock supply of TAREF it is necessary to use the CA3B/T cable adapter.



1. Cable 16X2 to MDF



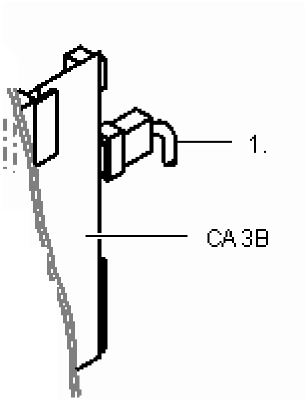
1. Cable for connecting an external clock source plugged on the first V.24

8.7.6 CA3B/T cable adapter 3 for B modules TAREF

Short description

Cable adapter for UIP board if the clock supply from TAREF is implemented via the CL2ME inserted on the first slot of the UIP.

The V24M submodules can also be inserted here.



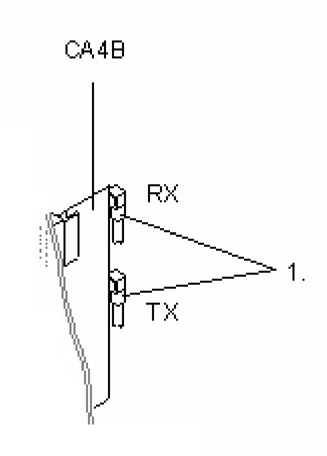
1. Cable for connecting the TAREF (material number: 27.5630.0531) inserted in the first V.24

8.7.7 CA4B cable adapter 4 for B modules

Short description

Cable adapter for the connection of coax lines when using boards DT21, CAS and DCON, provided that these modules are set on unsymmetrical interfaces.

- 2 BNC Coax sockets as output to NT or MUX.



1. Coax cable to NT or MUX

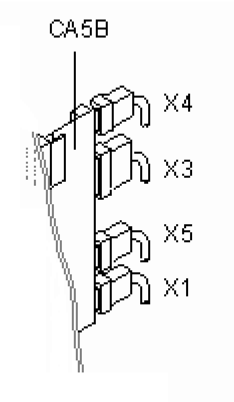
8.7.8 CA5B cable adapter 5 for B modules

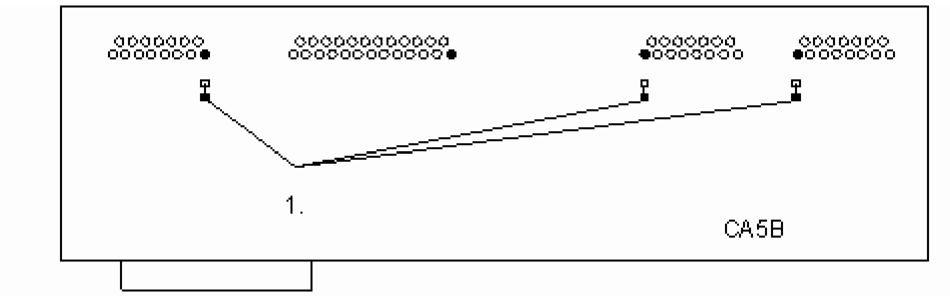
Short description

Cable adapters for the connection of V.24 and X.21 connectors to the IMUX board.

- Cable to the TA of the network operator or MDF (X1 and X5)
- 1x 15-pin Sub-D female Connector for X.21 data terminals (X4)

- 1x 25-pin Sub-D female Connector for V.24 data terminals (X3)
- Overcurrent breakpoint (230 V contact)
- Ground breakpoints (see IMUX board)





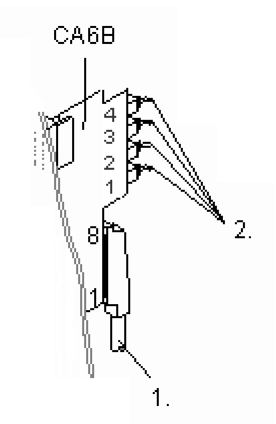
1. Cable Adapter 5B, rear component side, breakpoints

8.7.9 CA6B cable adapter 6 for B modules

Short description

Cable adapter for connecting UP0 and S2M connections to MAC and HAMUX boards.

- 50-pin CHAMP plug as an output to the MDF
- 8-pin WE plugs



1. Cable 16X2 to MDF
2. 8-pin WE plugs

8.7.10 CAS Channel Associated Signalling

Short description

The CAS board is a PCM30 interface for up to 30 B channels in accordance with CCITT. The board contains the following features:

Other features	
Country of application	National and international
Power demand +5V	930 mA
Line signalling in channel 16 (CAS) in accordance with CCITT or country/customer specifications.	
Register signalling in 30 B channels (inband) in accordance with CCITT or country/customer specifications.	
Can be used as an exchange interface, connection line or special interface.	
Incoming, outgoing and bothway traffic direction, can also be mixed as required	
Overvoltage protection up to 4 kV	
Board software download.	
PCM30 interface configuration via board software.	
Board identification using board pass	
Maintenance functions	

8.7.10.1 CAS-TIELINE User Program

Introduction

The CAS-TIELINE user program was developed for the I55 system on the CAS hardware platform, and is a tie-line transmission program. The 16 different tie-line transmission variants are designated E1 to E10/2.

The user data is adapted to individual requirements by means of the ICU mask.

Hardware

The CAS board (channel associated signalling) is used here. Depending on the application, the 2 MBit/s interface can be configured using the confidata (see Section “ICU mask and confidata”) with impedance of 75 W (unsymmetrical) or 120 W (symmetrical).

Depending on that, for the line connection one of the following adapter boards (only Integral 55) is then required:

- CA1B for 75 W
- CA4B for 120 W

Further general information about the CAS board, in particular about the controls and denotations of the front panel, can be gathered from the appropriate paragraphs.

SoftWare

The CAS board is set up with KAD (customer specific user data) for TIELINE application. This requires the corresponding load list name for the accompanying slot address to be entered.

The necessary parameters (confidata) are then set up using the ICU editor. The corresponding ICP files and the confidata subsequently end up on the CAS board by means of a download.

Short description of Applications

The TIELINE user program supports inband signalling (DTMF dial codes, call progress tones) and line signalling (signalling channel bit a). The following applies to line bits b, c and d: bcd = 101. Only changes to bit 'a' will be processed by the user program. Changes to the bcd bits will be ignored.

16 different signalling plans are produced from the available signal stock. These plans can be selected using the confidata and always apply to all 30 connecting circuits (AO).

In principle all the AOs are set up for both-way throughput.

Line signalling will not be carried out if all the signals appear as pulsed signals.

DTMF (dual tone multi-frequency dialling) and pulse dialling are suitable dialling systems.

The suffix dialling facility is guaranteed for the entire duration of an outgoing call, and for a predefined period of an incoming call.

If the criterion “message” is identified, an active call will be cancelled and the digits memory will be deleted.

The elegibility or inelegibility of a line can be set up by the confidata seperately for incoming and outgoing AOs.

In the same way, a 425 Hz continuous tone can be connected to the switching matrix as a proceed-to-select signal for outgoing traffic, or a 425 Hz busy tone to the line for incoming traffic according to configuration.

Up to 10 digits can be programmed for a destination number in outgoing traffic. The destination number will be chosen automatically according to the preset timeout when “elegible” or “inelegible” in the absence of the “dialling” message.

If “elegible”; incoming “dialling” messages are ignored once the timeout has ended. If “inelegible”; they will always be ignored. The suffix dialling facility is also guaranteed for the previous destination number when in call status.

Outgoing DTMF signals which are “called through” will be identified, and incoming “dialling” messages are subsequently ignored.

An area code may be programmed, which will be relayed to the GCU global control unit during incoming seizure once the proceed-to-select criterion (signal, time) has been met.

Where ”dial” or ”message” information is absent, the release which has been initialized by the user program's watchdog exists neither for incoming nor for outgoing traffic.

If a fault occurs, trouble signalling to the opposite side can be activated using confidata.

In the same way, an unblocking function can be set up for each connecting circuit: When active (blocking-n = on), and with the front panel switches TBS (total blocking switch) and TBS-N (total blocking switch minus n) switched on, the corresponding connecting circuit will **not** be blocked.

Specification of Inband Signals

The available DTMF transmitters and receivers are set out in accordance with CEPT recommendation T/CS 46-02.

The tone identifier will certainly operate in the range of 350 to 500 Hz with -30 dBm0.

The tone generator supplies a 425 Hz frequency with a transmission level of -3 dBm0. In outgoing traffic, it can be sent to the switching matrix as a proceed-to-select signal (continuous tone). In incoming traffic, it can be connected to the line as a busy tone (German rhythm).

Synchronization

The CAS board can generally be used as the synchronous clock supplier for synchronization purposes. In the TIELINE application, however, this is only meaningful if no digital exchange interfaces or tie lines are present.

. This is the reason for the default setting of “No synchronous clock”. This setting can be changed via the configuration data.

8.7.10.2 Identifying the Operation Phase

As described above, the boot software controls

- initialization,
- test and download procedures after a reset and
- indicates various statuses and possible faults by means of the LED’s on the front panel.

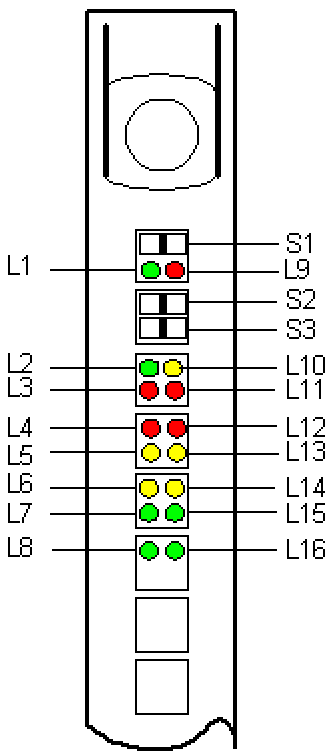
If no faults are found and all GCU messages (test messages, “startup ready” etc) have been received, L1 will flash eleven times and L9, L7, L8, L15 and L16 will go out, indicating that the operation phase has been reached.

8.7.10.3 LED and Switch Functions

The functions of the switches and LED’s on the front panel differ in boot phase from those in operation phase.

Following a reset, the boot software carries out initialization, test and download procedures, and indicates various statuses as well as possible faults via the LEDs on the front panel.

If no faults are found and all necessary GCU messages (test messages, “ready for startup” etc.) have been received, the CAS board will reach the operation phase, where user software is put into effect.



Switch Position in Normal Operation

S1	Middle position
S2	Middle position
S3	Middle position

Switch Function

S1	Left:	Preparatory disabling (TBS) *
	Middle:	Neutral/release
	Right:	Reset board
	Right, then left:	Forced board download
S2	Left:	Preparatory disabling (TBS-N) *
	Middle:	Neutral
	Right:	No function
S3	Left:	No function
	Middle:	No function
	Right:	No function

*	With S1 (TBS) in the left position and S2 (TBS-N) in the middle position, all 30 ports will be blocked.
	With S1 (TBS) and S2 (TBS-N) in the left position, all ports outlined in the configuration data will not be blocked.
	If S1 (TBS) is in the middle position, all 30 ports will not be blocked, irrespective of the position of S2 (TBS-N).

Meanings of LEDs

L1	TSL	Total status LED
L2	ESY	External synchronization
L3	LOS	No signal
L4	LOF	Frame failure
L5	CRC	CRC4 test fault
L6	RFR	Frame failure at remote side
L7	ISU1	**
L8	ISU3	**
L9	RDL	LED reset/download
L10	MSG	C-bus message
L11	AIS	Alarm identification signal
L12	LMF	Superframe failure
L13	BIT	Increased bit error ratio
L14	RMF	Superframe failure at remote side
L15	ISU2	**
L16	ISU4	**

**	The denotation of the LEDs depends on the application (display of R2 register, DTMF receiver/transmitter, tone transmitter/receiver)

8.7.10.4 MDF Connections

MDF Connection via CA1B from the CAS Module

Cable end	**CA1B**
Colours	CAS
BK/BN	A1/B1 (T)
BK/RD	C1/D1 (R)

MDF Connection via CA4B from the CAS Module

Coax	1	A1/B1	Transmit
Coax	2	C1/D1	Receive

8.7.11 CL2M Clock 2 Module

Short description

The submodule CL2M on the UIP or ICF board implements an external clock supply for the PBX or a clock pulse output for external devices.

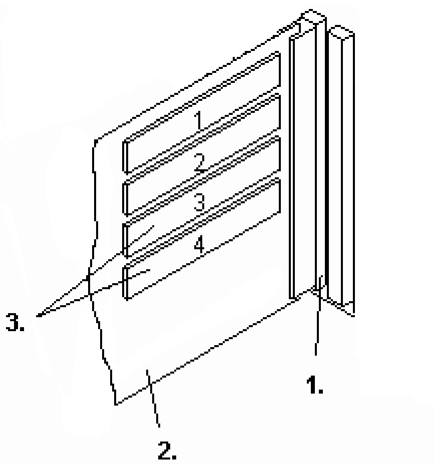
Use on	
UIP	receiver and transmitter 2048 kHz
ICF	receiver 2048/1544 kHz

This is necessary if digital dial-up lines or permanent connections are not available as the clock source, or if the customer has made high demands in terms of the reliability of the clock supply.

Other features	
Power demand +5V	100 mA

If the CL2M is positioned on slot 1 or 2 of the UIP, the line can be connected via the CA1B board.

With slots 3 or 4 occupied and V24M (slot 1 or 2) being used, the line must be connected via the CA3B board.



Location of CL2M on the UIP board

1. Connecting circuit slot
2. UIP module
3. CL2M module

8.7.12 CL2ME Clock 2 Module Extended

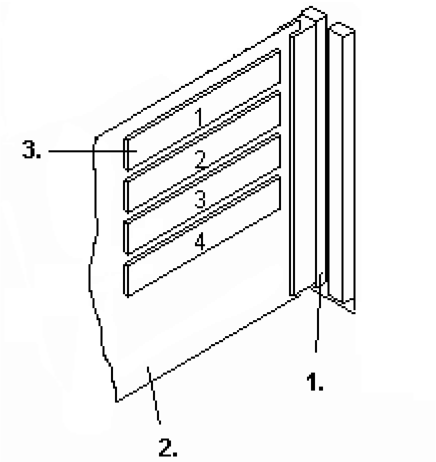
Short description

The CL2ME submodule is used to implement an external clock supply by means of a high precision reference clock (TAREF). This is needed if DECT Intermodule Handover is used in twin and multi-module configurations..

Use on	
UIP/ICF	Receiver 2048 kHz

Other features	
Power demand +5V	100 mA

If the CL2ME is positioned on slot 1 of the UIP, the line can be connected via the CA3B/T board.



Location of CL2ME on the UIP board

1. Connecting circuit slot
2. UIP module
3. CL2ME board

8.7.13 DCON Digital Protocol Converter

Short description

The DCON board network connects the systems from various manufacturers, in which signalling between the systems takes place via the DPNSS protocol.

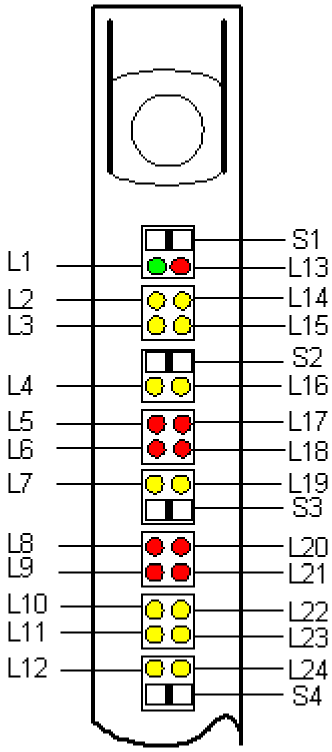
It provides this protocol by converting the TNet Bosch Network Protocol.

Other features	
Country of application	National and international
Power demand +5V	800 mA
Interfaces	A module contains one port (30B+D or 23B+D).
Overvoltage protection up to 4 kV	
Download board software	
Board identification using board passport	
Maintenance functions	

The CS155 SW and tools will treat the DCON like a DT2 with TNET protocol.

The board should generally be set up as a **SLAVE** type via the ICU data.

8.7.13.1 LEDs and Switch Functions



Switch Position in Normal Operation

S1	Middle position
S2	Middle position
S3	Middle position
S4	Middle position

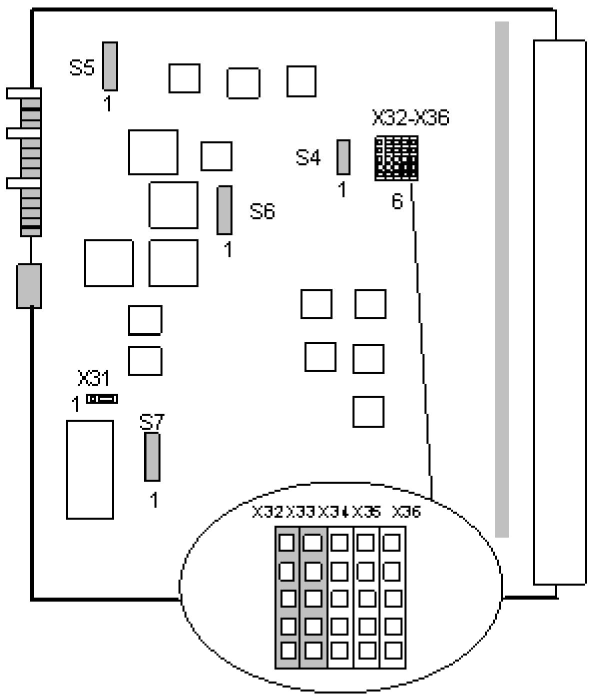
Switch Function

S1	Left:	Preparatory disabling
	Middle:	Operating status/release
	Right:	Reset DT2 part
	Right, then left:	Forced board download
S2	Left:	No function
	Middle:	Normal mode
	Right:	Report (fault statistic message to the system console) The switch must be moved back to the middle position after use.
S3	Left:	Trace mode
	Middle:	Normal mode
	Right:	Reset converter part
S4	Left:	No function
	Middle:	Normal mode
	Right:	Non-maskable interruption request

Meanings of LEDs

L1	on:	Module is busy in terms of exchange functions (active layer 3 connection)
	flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L2	on:	Module is clock supplier
L3	on:	Unused
L4	on:	Remote Alarm Indication RAI (remote side reporting fault status)
L5	on:	Alarm Indication Signal AIS (remote side reporting **Out of Order**)
L6	on:	Loss of Signal LOS (no receiving signal)
L7	on:	RES1 (reserve)
L8	on:	Trace mode (Test operation for fault tracking)
L9	on:	TNET LOS (loss of signal in TNET)
L10	on:	TNET L1 alarm (layer 1 failure in TNET)
L11	on:	TNET L2 alarm (layer 2 failure in TNET)
L12	on:	TNET in operation
L13	on:	Board reset in progress
	flashing:	Download in progress
	off:	Board in operation
L14	on:	Normal operation (layer 1 active, no alarm)
L15		Unused
L16	on:	Fault count$>$ E-6 (bit error rate $>$ 10-6)
L17	on:	Fault count$>$ E-3 (bit error rate $>$ 10-3)
L18	on:	Loss of Frame LOF (loss of frame synchronization)
L19	on:	RES2 (not busy at present)
L20	on:	Reset of converter part in progress
	off:	Converter part in operation
L21	on:	DPNSS LOS (loss of signal in DPNSS network)
L22	on:	DPNSS L1 alarm (layer 1 failure in DPNSS network)
L23	on:	DPNSS L2 alarm (layer 2 failure in DPNSS network)
L24	on:	DPNSS network in operation (layer 2 is o.k.)

8.7.13.2 Jumper Position



DCON board, component side

X32-X36 Line Impedance Selection

The line impedance is set using five-fold jumpers.

Connection	Impedance
X32-X33	75 Ohm
X33-X34	100 Ohm
X34-X35	100 Ohm
X35-X36	120 Ohm

X31

not equipped

8.7.13.3 DIL Switch Position

S4 Pulse Shape Selection

The shape of the transmission pulse can be adapted for 1.544 MHz applications using S4. For E1, the switch position is ignored and the pulse shape is set according to the specified line impedance. For DSX-1 applications, the pulse shape can be set according to the line length. S4/4 is not used.

S4/1	S4/2	S4/3	Application
OFF	OFF	OFF	DSX-1 (163-200 m)
ON	OFF	OFF	DSX-1 (122-163 m)

OFF	ON	OFF	DSX-1 (81-122 m)
ON	ON	OFF	DSX-1 (41-81 m)
OFF	OFF	ON	DSX-1 (0-41 m)
OFF	OFF	ON	CSU ECSA T1 C1.2
ON	OFF	ON	CSU FCC Part 68A
X	ON	ON	CSU FCC Part 68A

S5

This is used by the ZAP monitor (interactive module control). S5/6 and S5/7 determine the baud rate for the serial ZAP RS232 port.

S5/7	S5/6	Baud rate
Off	Off	38400
Off	On	19200
On	X	9600

X = Insignificant position

S5/1 is used to select the ”DT2 Transparent Mode” (**ON** position) The DCON acts as a normal DT2 in this mode. The board transfers all D channel messages transparently.

In the **OFF** position, the user program is booted and the board starts to operate automatically.

S5/2 determines whether the user program or the ZAP monitor program is loaded. In the ON position, the board will boot the ZAP monitor program, and is then ready for testing and debugging.

S6

Only S6/6 is used at present. This selects the clock source for the transmission port.

In the OFF position, the system's internal clock is used.

In the ON position, the clock is derived from the receiver port.

8.7.13.4 DCON Configuration

General Points

This chapter describes the user interface and the configuration parameters which are required for the TNet/ DPNSS board.

Each paragraph consists of a configuration menu, which appears to the user, and a description of the available options.

The user interface consists of a list of menus. Each menu option is selected by entering the number to the left of the option.

In order to commence a user interface session, the user must press any button within the first five seconds of system initialization. The user then selects the required option by entering the number to the left of the option.

Connecting the Terminal

The socket on the front side of the board is 9-pin (D Sub). 3 connectors are needed to connect the terminal. The connected terminal can be 9-pin or 25-pin.

A VT 100 compatible terminal or a VT 100 emulation on a PC can be used.

9-pin to 9-pin connection		
		Terminal
RXD 2	————	3 TXD
TXD 3	————	2 RXD
GND 5	————	5 GND

9-pin to 25-pin connection		
		Terminal
RXD 2	————	3 TXD
TXD 3	————	2 RXD
GND 5	————	7 GND

System Initialization

The following text will appear on the screen during initialization:

BOSCH TELECOM TNet/DPNSS Conversation
Version x.xx
DCON Initialising
Press Any Key for MMI: 3

In order to commence configuration, the user must press any key within the first five seconds of initialization. If no button is pressed during this time, the configuration menu will only become available again after a reset.

The following text will appear on the screen after initialization:

BOSCH TELECOM TNet/DPNSS Conversation
Version x.xx
Initialisation Complete
Reset DCON for MMI

Main menu

The configuration main menu is displayed.

BOSCH TELECOM TNet/DPNSS Conversation
Version x.xx
1. TNET Configuration
2. DPNS Configuration
3. System Clock Source
4. Software Download
5. Exit
Enter Option [1..5]:

The user selects an option by entering a number (1..5) and pressing the return button.

The following paragraphs describe the available options.

TNet Configuration

The TNet configuration main menu is displayed.

TNet Configuration

---

1. Orignation Adress
2. Timeslots
3. Timers

4. Write Settings
5. Exit
Enter Option [1..5]:

The following options are available:

1.	Default origination address (during call setup) in the TNet, if no line identity is supported by DPNSS.
2.	Incoming time slots can be configured individually.
3.	Signal timer configuration
4.	New settings are written in the flash-PROM, and the board is reset.
5.	Return to main menu.

Origination Address

The following options are available:

TNet Origination Adress

1. Default Origination Adress: 0525371393
2. Write Settings
3. Exit
Enter Option [1..3]:

1.	The user will be prompted to enter a new default origination address. Only digits between 0 and 9 are accepted. A maximum of 30 digits can be entered. Pressing the return button without entering any digits will result in the default origination address being erased.
2.	New settings are written in the flash-PROM, and the board is reset.
3.	Return to previous menu.

Time slots

The following options are available:

TNet Timeslot Configuration

[01] D [17] B
[02] D [18] B
[03] D [19] B
[04] D [20] B
[05] D [21] B
[06] D [22] B
[07] D [23] B
[08] D [24] B
[09] D [25] B
[10] D [26] B
[11] D [27] B
[12] D [28] B
[13] D [29] B
[14] D [30] B
[15] D [31] B
1. Edit
2. Exit

1.	Edit time slot configuration (as shown in next diagram).

2.	Return to previous menu.

All time slots are bidirectional in terms of default.

The time slots are selected using the numeric keypad. The user can select the following options:

TNet Timeslot Configuration
[01] D [17] B Use Numeric
[02] D [18] B keypad to
[03] D [19] B select timeslot -
8:up
2:down
4:left
6:right
[04] D [20] B
[05] D [21] B
[06] D [22] B
[07] D [23] B
[08] D [24] B Timeslot Settings:
[09] D [25] B
[10] D [26] B B:Bidirektional
[11] D [27] B I:Incomming
[12] D [28] B O:Outgoing
[13] D [29] B D:Disabled
[14] D [30] B
[15] D [31] B
W. Write Settings
E. Exit
Enter Option [B,I,O,D,W,E]:

B	Configure bidirectional time slot.
I	Configure incoming time slot.
O	Configure outgoing time slot.
D	Disable time slot for incoming and outgoing conversations.
W	Write new settings in the flash-PROM and reset the board
E	Return to previous menu.

Timer Configuration

The given values are default settings.

TNet Timer Configuration

———————

Time (Seconds)

————-

1. T302 15
2. T303 4
3. T304 60
4. T305 30
5. T308 3
6. T310 60
7. T313 30
8. T3AA 120

9. Edit
10. Exit
Enter Option [1..10]:

This menu allows the user to configure the TNet signalling software timer.

List of configurable timers:

	Timer	Start condition	Stop condition	
1	T302	Send SETUP ACK, restart if INFO received	Receive ALERT, CONN, CALL, SENT	Release with DISC
2	T303	Send SETUP	Receive ALERT, CONN, CALL, SENT	Release with DISC
3	T304	Receive SETUP ACK, restart when INFO sent	Receive CALL SENT, ALERT, CONN or INFO	Release with DISC
4	T305	Send DISC	Receive REL	Release with REL
5	T308	Send REL	Receive REL ACK	Repeat REL and restart from T308
6	T310	CALL SENT, receive INFO	Receive ALERT, CONN	Release with DISC
7	T313	Send CONN	Receive CONN ACK	Release with DISC
8	T3AA	Send ALERT	Send CONN	Release with DISC

All timers can be configured from 0 to 255 seconds. Other available options:

9	Write new settings in the flash-PROM and reset the board. Return to previous menu.
10	Return to previous menu.

DPNSS Configuration

The following options are available:

DPNSS Configuration
——————-
1. Timeslots
2. Timers
3. Layer 2/layer 3 Configuration
4. Layer 1 Stats
5. Write Settings
6. Exit
Enter Option [1..6]:

1.	Individual time slots can be configured as incoming, outgoing, bidirectional and disabled.
2.	Signalling timer configuration.
3.	DPNSS A/B and X/Y configuration
4.	Time interval between layer 1 statistic reports, which are sent via the V.24 interface.
5.	Write new settings and reset board.
6.	Return to previous menu.

Time slots

The following options are available:

1.	Edit time slot configuration (as shown in next diagram).
2.	Return to previous menu.

DPNSS Timeslot Configuration
———————————-
[01] B [17] B [33] B [49] B
[02] B [18] B [34] B [50] B
[03] B [19] B [35] B [51] B
[04] B [20] B [36] B [52] B
[05] B [21] B [37] B [53] B
[06] B [22] B [38] B [54] B
[07] B [23] B [39] B [55] B
[08] B [24] B [40] B [56] B
[09] B [25] B [41] B [57] B
[10] B [26] B [42] B [58] B
[11] B [27] B [43] B [59] B
[12] B [28] B [44] B [60] B
[13] B [29] B [45] B [61] B
[14] B [30] B [46] B [62] B
[15] B [31] B [47] B [63] B
1. Edit
2. Exit
Enter Option [1..2]:

All time slots are bidirectional set in terms of default.

Channels 1 to 31 are real channels. They are used as speech channels.

Channels 33 to 63 are virtual channels. They are required for features which do not need a speech channel (e.g. callback at a free subscriber).

The time slots are selected using the numeric keypad. The user can select the following options:

DPNSS Timeslot Configuration
———————————-
[01] B [17] B [33] B [49] B Use Numeric
[02] B [18] B [34] B [50] B keypad to
[03] B [19] B [35] B [51] B select
[04] B [20] B [36] B [52] B timeslot-8:up
[05] B [21] B [37] B [53] B 2:down
[06] B [22] B [38] B [54] B 4:left
[07] B [23] B [39] B [55] B 6:right
[08] B [24] B [40] B [56] B
[09] B [25] B [41] B [57] B Timeslot Settings:
[10] B [26] B [42] B [58] B
[11] B [27] B [43] B [59] B B:Bidirectional
[12] B [28] B [44] B [60] B I:Incoming
[13] B [29] B [45] B [61] B O:Outgoing
[14] B [30] B [46] B [62] B D:Disabled
[15] B [31] B [47] B [63] B
W. Write Setting
E. Exit
Enter Option [B,I,O,D,W.E]:

B	Configure bidirectional time slot.

I	Configure incoming time slot.
O	Configure outgoing time slot.
D	Disable time slot for incoming and outgoing conversations.
W	Write new settings in the flash-PROM and reset the board.
E	Return to previous menu.

Timer Configuration

The following options are available:

DPNSS Timer Configuration

————————-

Time (Seconds)

————-

1. ISRM/SSRM Timer 60
2. CRM Timer 10
3. Write Settings
4. Exit

Enter Option [1..4]:

1.	Configure ISRM/SSRM timer (0 to 255 seconds)
2.	Configure CRM timer (0 to 255 seconds)
3.	Write new settings in the flash-PROM and reset the board.
4.	Return to previous menu.

The above values are default settings.

Layer 2/Layer 3 Configuration

The following options are available:

DPNSS Timer Layer2/Layer3 Configuration

——————————————

Config.

——-

1. L2 Config A
2. L3 Config X
3. Write Settings
4. Exit

Enter Option [1..4]:

1.	Configure layer 2 A/B end
2.	Configure layer 3 X/Y end
3.	Write new settings in the flash-PROM and reset the board.
4.	Return to previous menu.

Configuration of layer 3 X/Y is necessary to eliminate call collisions. If a call collision occurs, the “Y” conversation is reset and the “X” conversation continues.

Configuration of layer 2 A/B is necessary for layer 2 signalling. One end of the DPNSS connection must be specified as the **A** end and the other as the **B** end. If A/B end configuration is implemented incorrectly, layer 2 will not be initialized.

Layer 1 Statistics

DPNSS Layer 1 Stats. Configuration
————————————

Time (Seconds)
————-

1. Layer 1 Stats: Interval 120
2. Write Settings
3. Exit

Enter Option [1..4]:

The following options are available:

1.	Time interval between DPNSS layer 1 statistic reports, which are sent via the V.24 interface (0 to 255 seconds). The layer 1 statistic reports are disabled, if the time interval is set to 0.
2.	Write new settings in the flash-PROM and reset the board.
3.	Return to previous menu.

Clock Source

The clock source is given as DPNSS or TNET. This parameter cannot be configured by the user interface.

Conversion System Clock
————————

System Clock Source: DPNSS
Press Any Key To Continue:

software download

This option is used to download the board.

The user will be asked to connect a PC to the board. This connection is made using the same interface which is being used for the user interface. If a PC with VT 100 emulation is already connected, this emulation can be ended in order to arrive at MS-DOS.

The user can leave this status by resetting the board.

The following paragraph describes the software download.

Software Download
——————

Connect PC and run download utility.

Software Download Program

The download program is used to load a new software version for the board. It will operate on every PC (IBM compatible). It can use either the COM1 or COM2 interface. Connection is made as already described for the user interface.

The download program is called up by the **DOWNLOAD** instruction. The program requires a default from COM1. If the COM2 is also required, the **DOWNLOAD COM2** instruction is entered. The baud rate is set to 19200.

The following display will appear when the program is called up:

– BOSCH Telecom TNet/DPNSS Conversation Download Utility Vx.xx
– Opening COMx: at 19k2 baud

The following display will appear if the board is detected:

– DCON Card Detected

If the board is not detected, an error message will appear and the program is ended:

– DCON COM PORT NOT DETECTED

The flash-PROM will be erased once the board has been detected. The following display will appear:

– Erasing Flash PROM
– Erase Complete

The user can choose whether to preserve the existing parameter:

– Preserve existing configuration? (Y/N):

The user must enter **Y** or **N**. No other keys will be accepted.

The filename is then entered:

– Enter filename ()...

The following display will appear if the file is not found:

– Cannot open file, retry, or <ret> to quit
– Enter filename ()...

The following display will appear when download commences:

– Download started

The following display will appear after a download:

– Download complete

The program returns to MS-DOS.

8.7.13.5 MDF Connections

via CA1B from the DCON module

Cable end	**CA1B**
Colours	DCON
BK/BN	A1/B1 (T)
BK/RD	C1/D1 (R)

via CA4B from the DCON module

Coax	1	A1/B1	Transmit
Coax	2	C1/D1	Receive

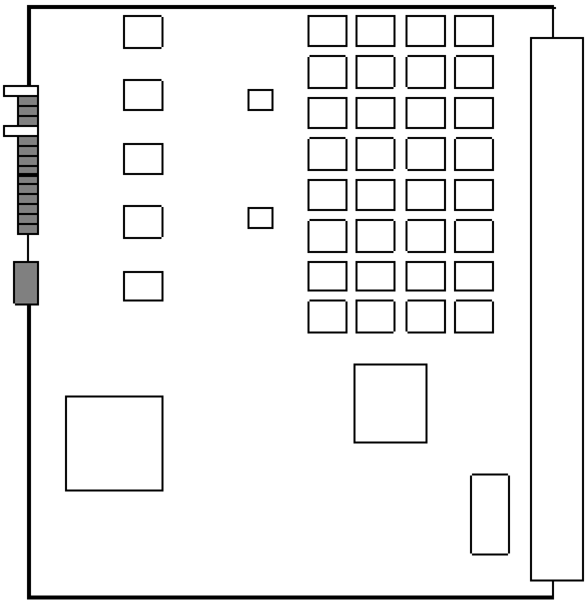
8.7.14 DECT21 ICU for DECT-Applications 21

Short description

The DECT21 board is used to connect the Radio Base Station RM 588, material number 4.998.001.296, to the CSI55.

It carries out an automatic run time measurement. The manual measurement of the individual routes up to 1 km is not applicable as long as no repeater is connected between.

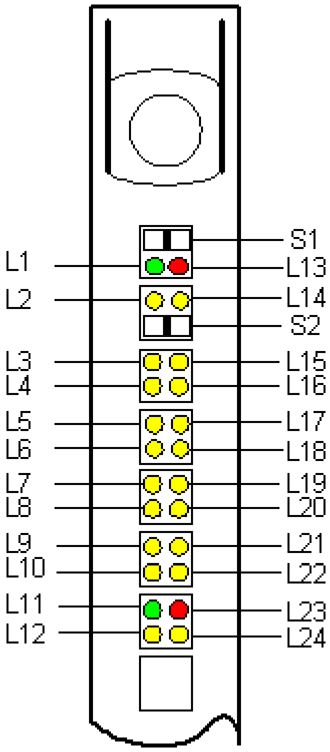
Other features	
Country of application	National and international
Power demand +5V	1100 mA
Interfaces	8 UPD interface for RBS One UPD interface physically corresponds to 2 UPN interfaces.
The ADPCM (Adaptive-Differential-Pulse-Code-Modulation, 32 kbit/s) conversion is carried out on the board.	
One of the two D channels is used for the transmission of synchronization information between the DECT21 board and the RBS.	
Overvoltage protection up to 4 kV	
Download board software	
Board identification using board passport	
Maintenance function	



DECT21 board, component side

Line lengths	
Installation cable J-Y(ST)Y Ø0,6 mm	1.0 km
Outdoor cable A-2YF(L)2Y Ø0,6 mm	2.8 km
Installation cable J-Y(ST)Y Ø0,6 mm and UPN repeater	2.0 km

8.7.14.1 LEDs and Switch Functions



DECT21 board, front side

Switch Function

S1	Right:	Reset board
	Middle:	Normal position
	Left:	No function
S2	Right:	Yet to be defined
	Middle:	Normal position
	Left:	Yet to be defined

Meanings of LEDs

L1	off:	Board is not busy
	on:	Module is busy in terms of exchange functions
L2	on:	Synch. Master
L3		Layer 1, active port 0
L4		Layer 1, active port 2
L5		Layer 1, active port 4
L6		Layer 1, active port 6
L7		Layer 1, active port 8
L8		Layer 1, active port 10
L9		Layer 1, active port 12
L10		Layer 1, active port 14
L11	flashing:	FP download active

L12		Yet to be defined
L13	off:	Board in operation
	on:	Board reset in progress
	flashing:	Download in progress
L14		All 30 B-channels are busy
L15		Layer 1, active port 1
L16		Layer 1, active port 3
L17		Layer 1, active port 5
L18		Layer 1, active port 7
L19		Layer 1, active port 9
L20		Layer 1, active port 11
L21		Layer 1, active port 13
L22		Layer 1, active port 15
L23	flashing:	SW IDM in ICU activated
L24		Yet to be defined

8.7.14.2 MDF Connections

MDF		**via CA1B from the DECT21**	
Colours 16x2	Patch panel for four-wire connection		
RD/BU	WE 1	1st Station	A1/B1
WH/YE			A2/B2
WH/GN	WE 2	2nd Station	A1/B1
WH/BN			A2/B2
WH/BK	WE 3	3rd Station	A1/B1
WH/BU			A2/B2
WH/YE	WE 4	4th Station	A1/B1
WH/GN			A2/B2
WH/BN	WE 5	5th Station	A1/B1
WH/BK			A2/B2
WH/BU	WE 6	6th Station	A1/B1
RD/YE			A2/B2
WH/GN	WE 7	7th station	A1/B1
WH/BN			A2/B2
WH/BK	WE 8	8th Station	A1/B1
WH/BU			A2/B2

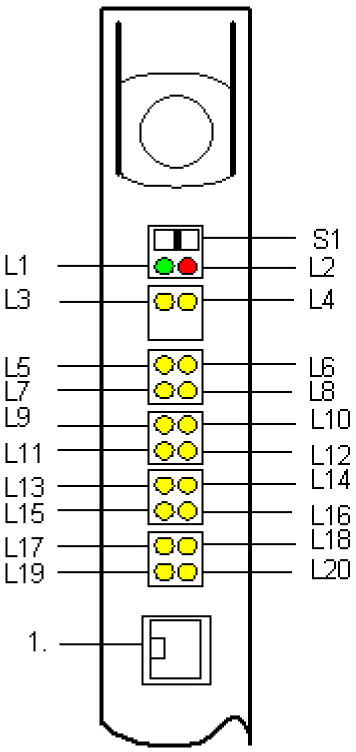
8.7.15 DS02 Digital Linecard S0 Variant 2

Short description

The DS02 board provides 16 supplied digital S0 subscriber ports.

Other features	
Country of application	National and international
Power demand +5V	300 mA
Power supply	48 V/100 mA short-circuit-proof
Interfaces	16 supplied, digital S0 subscriber ports
	four-wire
Overvoltage protection up to 4 kV	
Board software download	
Board identification using board pass	
Maintenance function	
In conjunction with V24IA board debugging interface on board front Debugger = program that helps to track down errors	

8.7.15.1 LEDs and Switch Functions



1 x
2 +5V (via 68 ohm)
3 DEB_IN
4 RXD
5 TXD
6 GND
7 GND
8 x

DS02 board, front side

1. RJ45 connector

Switch Position in Normal Operation

S1	Middle position

Switch Function

S1	Left:	Preparatory disabling (VSP) for all connecting circuits
	Middle:	Operating status/release
	Right:	Reset board
	Right, then left:	Forced board download

Meanings of LEDs

L1	on:	Board is busy with switching functions
	flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L2	on:	Board reset in progress
	flashing:	Download in progress
	off:	Module has gone into operation
L3	free	
L4	free	
L5	on:	Layer 1 of connecting circuit 0 active
	off:	Layer 1 of connecting circuit 0 inactive
L6- L19	on:	Layer 1 of connecting circuit 1/14 active
	off:	Layer 1 of connecting circuit 1/14 inactive
L20	on:	Layer 1 of connecting circuit 15 active
	off:	Layer 1 of connecting circuit 15 inactive

8.7.15.2 MDF Connections

MDF		**via CA2B from DS02/3**	
Colours 16x2	Patch panel for four-wire connection	Cable 1	Cable 2
RD/BU	WE 1	A1/B1 (T)	A9/B9 (T)
WH/YE		C1/D1 (R)	C9/D9 (R)
WH/GN	WE 2	A2/B2 (T)	A10/B10 (T)
WH/BN		C2/D2 (R)	C10/D10 (R)
WH/BK	WE 3	A3/B3 (T)	A11/B11 (T)
WH/BU		C3/D3 (R)	C11/D11 (R)
WH/YE	WE 4	A4/B4 (T)	A12/B12 (T)
WH/GN		C4/D4 (R)	C12/D12 (R)

WH/BN	WE 5	A5/B5 (T)	A13/B13 (T)
WH/BK		C5/D5 (R)	C13/D13 (R)
WH/BU	WE 6	A6/B6 (T)	A14/B14 (T)
RD/YE		C6/D6 (R)	C14/D14 (R)
WH/GN	WE 7	A7/B7 (T)	A15/B15 (T)
WH/BN		C7/D7 (R)	C15/D15 (R)
WH/BK	WE 8	A8/B8 (T)	A16/B16 (T)
WH/BU		C8/D8 (R)	C16/D16 (R)

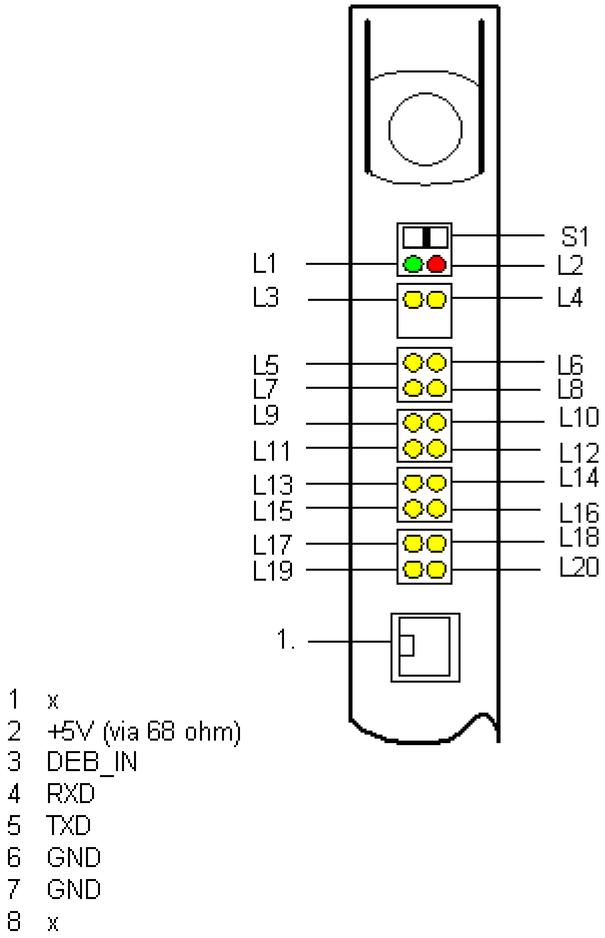
8.7.16 DS03 Digital Linecard S0 Variant 3

Short description

The DS03 board replaces the DS02 board and provides also 16 supplied, digitale S0 subscriber ports.

Other features		
Country of application	National and international	
Power demand +5V	445 mA, no terminal connected	
Power supply	48V/100mA, short-circuit-proof	
Interfaces	16 supplied, digital S0 subscriber ports	
	four-wire	
range:	150m	Bus S0 (four-wire), short bus, installation cable Ø0,6 mm J-Y(ST)Y
	500m	Bus S0 (four-wire), extended bus, installation cable Ø0,6 mm J-Y(ST)Y
	1km	S0 PTP (four-wire), installation cable Ø0,6 mm J-Y(ST)
Overvoltage protection up to 4 kV		
Board software download		
Board identification using board pass		
Maintenance function		
In conjunction with V24IA board debugging interface on board front Debugger = program that helps to track down errors		

8.7.16.1 LEDs and Switch Functions



DS03 board, front side

1. RJ45 connector

Switch Position in Normal Operation

S1	Middle position

Switch Function

S1	Left:	Preparatory disabling (VSP) for all connecting circuits
	Middle:	Operating status/release
	Right:	Reset board
	Right, then left:	Forced board download

Meanings of LEDs

L1	on:	Board is busy with switching functions
	flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L2	on:	Board reset in progress
	flashing:	Download in progress
	off:	Board has gone into operation
L3	free	
L4	free	
L5	on:	Layer 1 of connecting circuit 0 active
	off:	Layer 1 of connecting circuit 0 inactive
L6- L19	on:	Layer 1 of connecting circuit 1/14 active
	off:	Layer 1 of connecting circuit 1/14 inactive
L20	on:	Layer 1 of connecting circuit 15 active
	off:	Layer 1 of connecting circuit 15 inactive

8.7.16.2 MDF Connections

MDF		**via CA2B from DS02/3**	
Colours 16x2	Patch panel for four-wire connection	Cable 1	Cable 2
RD/BU	WE 1	A1/B1 (T)	A9/B9 (T)
WH/YE		C1/D1 (R)	C9/D9 (R)
WH/GN	WE 2	A2/B2 (T)	A10/B10 (T)
WH/BN		C2/D2 (R)	C10/D10 (R)
WH/BK	WE 3	A3/B3 (T)	A11/B11 (T)
WH/BU		C3/D3 (R)	C11/D11 (R)
WH/YE	WE 4	A4/B4 (T)	A12/B12 (T)
WH/GN		C4/D4 (R)	C12/D12 (R)
WH/BN	WE 5	A5/B5 (T)	A13/B13 (T)
WH/BK		C5/D5 (R)	C13/D13 (R)
WH/BU	WE 6	A6/B6 (T)	A14/B14 (T)
RD/YE		C6/D6 (R)	C14/D14 (R)
WH/GN	WE 7	A7/B7 (T)	A15/B15 (T)
WH/BN		C7/D7 (R)	C15/D15 (R)
WH/BK	WE 8	A8/B8 (T)	A16/B16 (T)
WH/BU		C8/D8 (R)	C16/D16 (R)

8.7.17 DT0 Digital Linecard T0

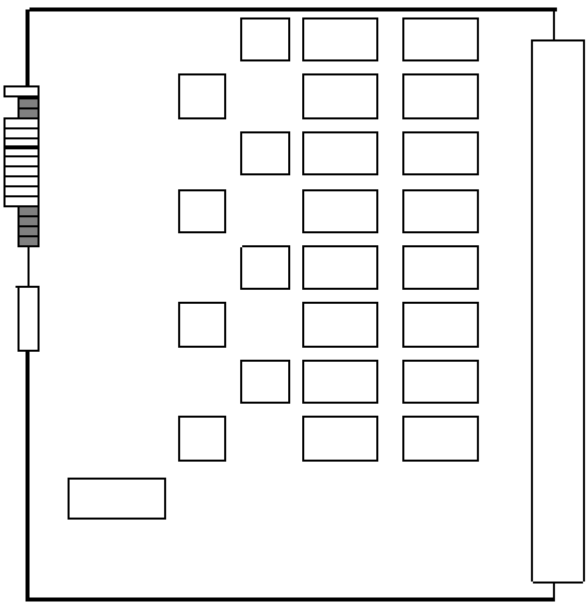
Short description

⚠	This component is no longer manufactured (February 2002). It has been replaced by the ADM Analog Digital Mixboard module. Please only use the ADM with the CS155.

The DT0 board provides 8-digit connections.

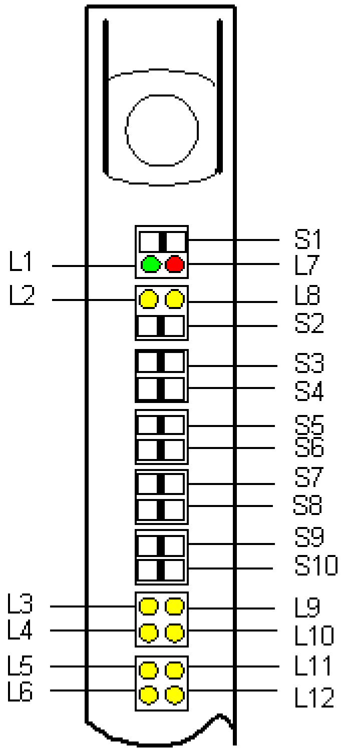
Other features	
Country of application	National and international
Power demand +5V	610 mA
Interfaces	8 digital T0 interfaces (exchange line ports)
	8 digital S0 interfaces (locally-fed terminals, e.g. VA93D, PC)
	8 digital S0FV interfaces for permanent circuits (clock master or clock slave) in private connections
Switchable digital attenuation for calls	
Overvoltage protection up to 4 kV	
Board software download	
Board identification using board pass	
Maintenance function	

The board contains the following additional features:



DT0 board, component side

8.7.17.1 LEDs and Switch Functions



DT0 board, front side

Switch Position in Normal Operation

S1	Middle position
S2-S10	Middle position

Switch Function

S1	Left:	Preparatory disabling (of all connecting circuits)
	Middle:	Operating status/release
	Right:	Reset board
	Right, then left:	Forced board download
S2	Not used	
S3	Right:	AO 1 preparatory disabling
	Middle:	AO 1 release/operating status
S4	Right:	AO 2 preparatory disabling
	Middle:	AO 2 release/operating status
S5	Right:	AO 3 preparatory disabling
	Middle:	AO 3 release/operating status
S6	Right:	AO 4 preparatory disabling
	Middle:	AO 4 release/operating status
S7	Right:	AO 5 preparatory disabling
	Middle:	AO 5 release/operating status

S8	Right:	AO 6 preparatory disabling
	Middle:	AO 6 release/operating status
S9	Right:	AO 7 preparatory disabling
	Middle:	AO 7 release/operating status
S10	Right:	AO 8 preparatory disabling
	Middle:	AO 8 release/operating status

Meanings of LEDs

L1	on:	Board is busy with switching functions
	flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L2	on:	Module is synchronous clock supplier
L7	on:	Board reset in progress
	flashing:	Download in progress
	off:	Board in operation
L8		Unused
L3	on:	Layer 1 of connecting circuit 1 active
L4, L5, L6, L9, L10, L11	on:	Layer 1 of connecting circuit X active
L12	on:	Layer 1 of connecting circuit 8 active

8.7.17.2 MDF connections DTD

MDF		via CA1x from the DT0
Colours 16x2	Patch panel for four-wire connection	
RD/BU	WE 1	A1/B1 (T)
WH/YE		C1/D1 (R)
WH/GN	WE 2	A2/B2 (T)
WH/BN		C2/D2 (R)
WH/BK	WE 3	A3/B3 (T)
WH/BU		C3/D3 (R)
WH/YE	WE 4	A4/B4 (T)
WH/GN		C4/D4 (R)
WH/BN	WE 5	A5/B5 (T)
WH/BK		C6/D5 (R)
WH/BU	WE 6	A6/B6 (T)
RD/YE		C6/D6 (R)
WH/GN	WE 7	A7/B7 (T)
WH/BN		C7/D7 (R)
WH/BK	WE 8	A8/B8 (T)

WH/BU		C8/D8 (R)

8.7.18 DT21 Digital Linecard T2 Variant 1

Short description

The DT21 board provides one configurable S2Minterface.

Other features	
Country of application	National and international
Power demand +5V	400 mA
Interfaces	a S2Minterface (CO (T2) - or Tie (TIE)), 120 Ohm symmetric or 75 Ohm asymmetric. **(not intended for use in I55C)**
	Driver for optical interface**(not intended for use in I55C)**
	Switchable digital attenuation for speech connections (B-channels), adjustable via the ICU Editor
2.048MHz pulse output **(not intended for use in I55C)**	
V.24 Test interface (front panel)	
Overvoltage protection up to 4 kV	
Board software download	
Board identification using board pass	
Maintenance function	

Cable adapter		
if used in I55	Possible adapter boards:	CA1B, CA4B, OFA2B, OFAS
	Power supply NT	via ESBx
if used in I55C	none, direct connection on front side	
	Power supply NT	via external plug power supply (material number 27.4402.1056).

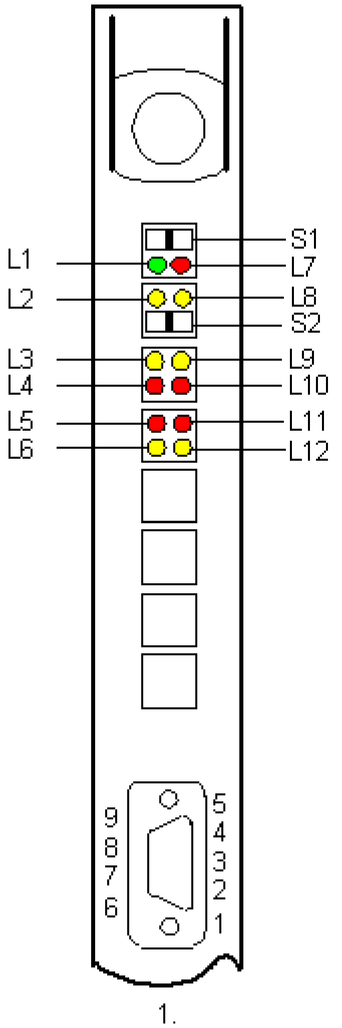
Ranges

if used in I55		
37 dB attenuation range		
Wire interfaces (CA1B or CA4B)		
120 Ohm symmetric	0.9 km	Installation cable
	1.8 km	TF cable
75 Ohm coax	1.5 km	
Optical interface (OFA1B)	monomode cable 9/125 micrometer, 11 dB max. attenuation for entire optical path (e.g. max. 20 km at 0.4 dB/km and 7 plug connections 0.4 dB/plug)	

if used in I55C
37 dB attenuation range

if used in I55C		
Wire interfaces (direct connection on the front side)		
120 Ohm symmetric	0.9 km	Installation cable
	1.8 km	TF cable

8.7.18.1 LEDs and Switch Functions



DT21 board, front side

1. V.24 Test plug

1 = not assigned
2 = TXD
3 = RXD
4 = not assigned
5 = GND
6 = D channel data upstream
7 = D channel data downstream

8 = Clock burst 2.048 MHz
9 = +5V

Switch Position in Normal Operation

S1	Neutral position
S2	Neutral position

Switch Function

S1	links:	Preparatory disabling
	Mean:	Operating status/release
	Right:	Reset board
	Right, then left:	Forced board download
S2	Left, then right:	Report (fault statistic message to the system console) The switch must be moved back to the middle position after use (2 MHz clock output off) or to the right (2 MHz clock output on).
	Mean:	Normal operating mode / 2 MHz clock output off
	Right:	2 MHz clock output on

Meanings of LEDs

L1	On:	Board is busy with switching functions
	Flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L2	On:	Module is synchronous clock supplier
L3	On:	Remote Alarm Indication RAI (opposite side reporting fault status)
L4	On:	Alarm Indication Signal AIS (opposite side reporting ”Out of Order”)
L5	On:	Loss of Signal LOS (no receiving signal)
L6	On:	Rx E bit errors
L7	On:	Board reset in progress
	Flashing:	Download in progress
	off:	Board in operation
L8	On:	Normal operation (layer 1 active, no alarm)
L9	On:	Bit error rate $>$ 10-6
L10	On:	Bit error rate $>$ 10-3
L11	On:	Loss of Framing LOF (loss of frame synchronization)
L12	On:	The LED signals an activated debug monitoring. LED 12 is used as indicator as this debugging applies to the real time function of the module. It is possible to activate the debugging with a connected terminal and finally removing the terminal - then the debugging remains on and unaffected.

In order to connect an IDM to the front panel, an optional component must be inserted on the DT21, reference number: 49.9801.4247.

8.7.18.2 MDF connections DT21

MDF Connection via CA1B from the DT21 Module

Cable end	via CA1B from the DT21
Colours	
BK/BN	A1/B1 (T)
BK/RD	C1/D1 (R)
BK/OR	A2/B2 (2 MHz pulse to NT)
BK/YE	free

MDF Connection via CA4B or OFA1B from the DT21 Module

Coax	1	A1/B1	Transmit
Coax	2	C1/D1	Receive

8.7.19 DUP03 Digital Subscriber UP0 HW Variant 3

Short description

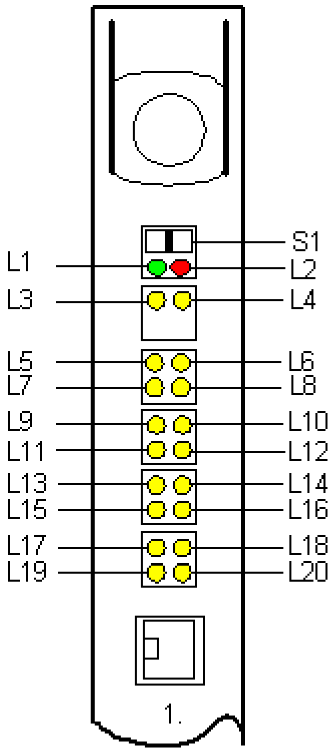
The DUP03 board provides 16 UPNinterface.

Other features		
Country of application	National and international	
Power demand +5V	640 mA	
Interfaces	16 UPN ports for digital UPNterminals e.g. terminals likeTK93 etc. as well as the terminals of the T3 family	
	two-wire; transmission rate: 384 kbit/s	
	Two 64 kbit/s B channels and one 16 kbit/s D channel	
	16 dB attenuation range	
Power supply	-48 V/max. 60 mA short-circuit-proof for increased power consumption, e.g. T3 terminals	
Overvoltage protection up to 4 kV		
Board software download		
Board identification using board pass		
Maintenance function		
In conjunction with V24IA board debugging interface on board front Debugger = program that helps to track down errors		
Line lengths	1 km	Installation cable (I-Y(ST)Y Ø0.6 mm

	2.8 km	Outdoor cable A-2YF(L)2Y Ø0,6 mm
	1.8 km	Outdoor cable A-2YF(L)2Y Ø0.4 mm

Using a UPN repeater enables the range of the UPN interface to be extended.

8.7.19.1 LEDs and Switch Functions



DUP03 board, front side

1. RJ45 connector with PIN assignment

1 = not seized
2 = +5 V (via 68 Ohm)
3 = DEB IN
4 = RXD^{-}
5 = TXD
6 = GND
7 = GND
8 = not seized

Switch Functions

S1	Left:	Preparatory disabling (of all connecting circuits)
	Middle:	Operating status/release
	Right:	Reset board
	Right, then left:	Forced board download

Meanings of LEDs

L1	on:	Board is busy with switching functions
	flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L2	on:	Board reset in progress
	flashing:	Download in progress
	off:	Board in operation
L3		free
L4		free
L5	on:	Layer 1 of connecting circuit 1 active
L6	on:	Layer 1 of connecting circuit 2 active
L7- L19	on:	Layer 1 of connecting circuit .. or .. active
L20	on:	Layer 1 of connecting circuit 16 active

8.7.19.2 MDF Connections

MDF		via CA1B from the DUP03
Colours 16x2	Patch panel for the two-wire connection	
RD/BU	WE 1	A1/B1
WH/YE	WE 2	A2/B2
WH/GN	WE 3	A3/B3
WH/BN	WE 4	A4/B4
WH/BK	WE 5	A5/B5
WH/BU	WE 6	A6/B6
WH/YE	WE 7	A7/B7
WH/GN	WE 8	A8/B8
WH/BN	WE 9	A9/b9
WH/BK	WE 10	A10/B10
WH/BU	WE 11	A11/B11
RD/YE	WE 12	A12/B12
WH/GN	WE 13	A13/B13
WH/BN	WE 14	A14/B14
WH/BK	WE 15	A15/B15
WH/BU	WE 16	A16/B16

8.7.20 DUPN Digital Subscriber UPN

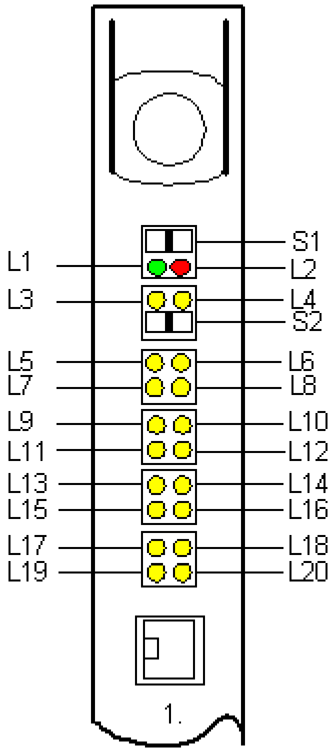
Short description

The DUPN board provides 32 UPNinterfaces for digital terminals.

Other features		
Country of application	National and international	
Power demand +5V	1100 mA	
Interfaces	32 UPN ports for digital UPNterminals e.g. terminals likeTK93 etc. as well as the terminals of the T3 family	
	Mode	one B channel per interface
		two B channels per interface
	two-wire; transmission rate: 384 kbit/s	
	one or two 64 kbit/s B channels and one 16 kbit/s D channel	
	16 dB attenuation range	
Power supply	-48 V/max. 60 mA short-circuit-proof for increased power consumption, e.g. T3 terminals	
Overvoltage protection up to 4 kV		
Board software download		
Board identification using board pass		
Maintenance function		
In conjunction with V24IA board debugging interface on board front Debugger = program that helps to track down errors		
Line lengths	1 km	Installation cable (I-Y(ST)Y Ø0.6 mm
	2.8 km	Outdoor cable A-2YF(L)2Y Ø0,6 mm

Using a UPN repeater enables the range of the UPN interface to be extended.

8.7.20.1 LEDs and Switch Functions



DUPN board, front side

1. RJ45 connector with PIN assignment

1 = not seized
2 = +5 V (via 68 Ohm)
3 = DEB IN
4 = RXD
5 = TXD
6 = GND
7 = GND
8 = not seized

Switch Functions

S1	Left:	Preparatory disabling (of all connecting circuits)
	Middle:	Operating status/release
	Right:	Reset board
	Right, then left:	Forced board download
S2	Left or middle:	Status display of layer 1 of the AOs 1..0.16 activated
	Right:	Status display of layer 1 of the AOs 17...32 activated

Meanings of LEDs

L1	on:	Board is busy with switching functions

	flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L2	on:	Board reset in progress
	flashing:	Download in progress
	off:	Board in operation
L3		free
L4		free
L5	on:	Layer 1 of connecting circuit 1 or 17 active
L6	on:	Layer 1 of connecting circuit 2 or 18 active
L7- L19	on:	Layer 1 of connecting circuit .. or .. active
L20	on:	Layer 1 of connecting circuit 16 or 32 active

8.7.20.2 MDF connections DUPN

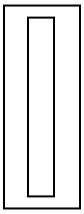
MDF		**via CA2B from DUPN**	
Colours 16x2	Patch panel for the two wire connection	Cable 1	Cable 2
RD/BU	WE 1	A1/B1	A1/B17
WH/YE	WE 2	A2/B2	A18/B18
WH/GN	WE 3	A3/B3	A19/B19
WH/BN	WE 4	A4/B4	A20/B20
WH/BK	WE 5	A5/B5	A21/B21
WH/BU	WE 6	A6/B5	A22/B22
WH/YE	WE 7	A7/B7	A23/B23
WH/GN	WE 8	A8/B8	A24/B24
WH/BN	WE 9	A9/B9	A25/B25
WH/BK	WE 10	A10/B10	A26/B26
WH/BU	WE 11	A11/B11	A27/B27
RD/YE	WE 12	A12/B12	A28/B28
WH/GN	WE 13	A13/B13	A29/B29
WH/BN	WE 14	A14/B14	A30/B30
WH/BK	WE 15	A15/B15	A31/B31
WH/BU	WE 16	A16/B16	A32/B32

8.7.21 EEADM Emergency Extension Analog Digital Mixboard

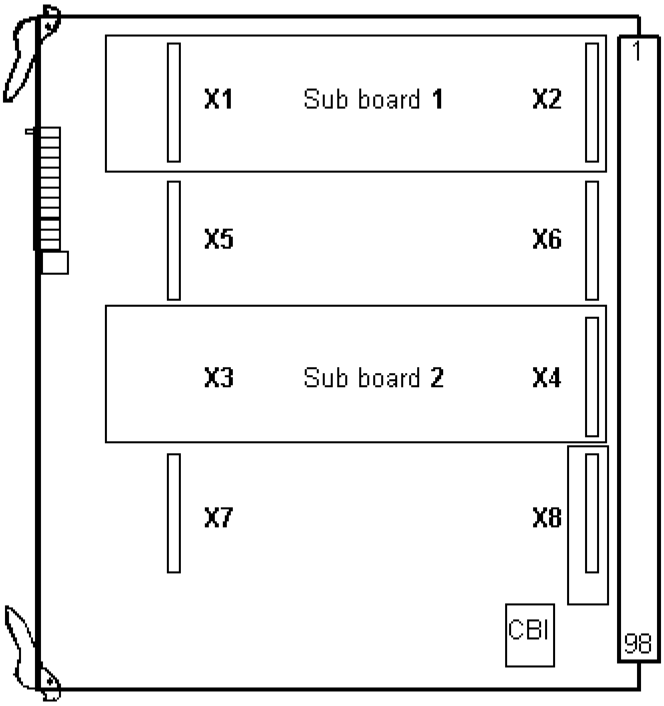
Short description

On the ADM board the EEADM subboard is plugged on the X8 connector together with the STSM subboard, if it is used with emergency switching (cable adapter EESS0). It serves to detect if the ADM is present.

Insert the EEADM subboard if required, see the following figure,



onto the X8 connector of the ADM board.



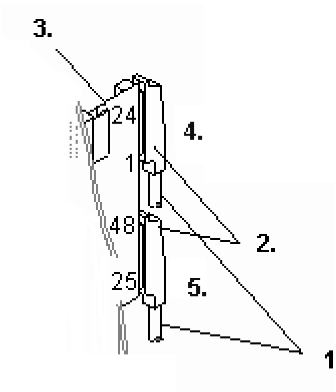
ADM board, component side

In this case slot 3 (X5/X6) remains free.

8.7.22 EES0B Emergency Extension Switch S0 B Module

Short description

For special services, such as the police force, fire brigade or Red Cross, whose answering facilities must always be available, the Emergency Extension Switch S0 for CSI55 is available. In the event of a power failure or other malfunctions, this modules enables a switchover from the connecting line coming from the ISDN network to sets that are powered by the ISDN network.



EES0B board

1. Cable 1 + 2, each 24-pair to external MDF
2. Champ plug
3. EES0B
4. Pl.1
5. Pl.2

Instructions
Connection to a DT0, i.e. 2 DAs are to be switched per port.
Switchover is implemented to a set that is only used when the switchover is active.
For this purpose, a switchover with 1 WP each for the analog voice documentation.
Two 50-pin plugs are available as external connectors.

Switch-over criteria
General power failure
PC Board DT0 removed
Manual actuation of an external potential-free switch

The number of ports is determined by the limited number of plug positions.

The port 1..6 contains the switchover option. Port 7 and 8 are directly switched through.

The switchover is implemented with 4 wires.

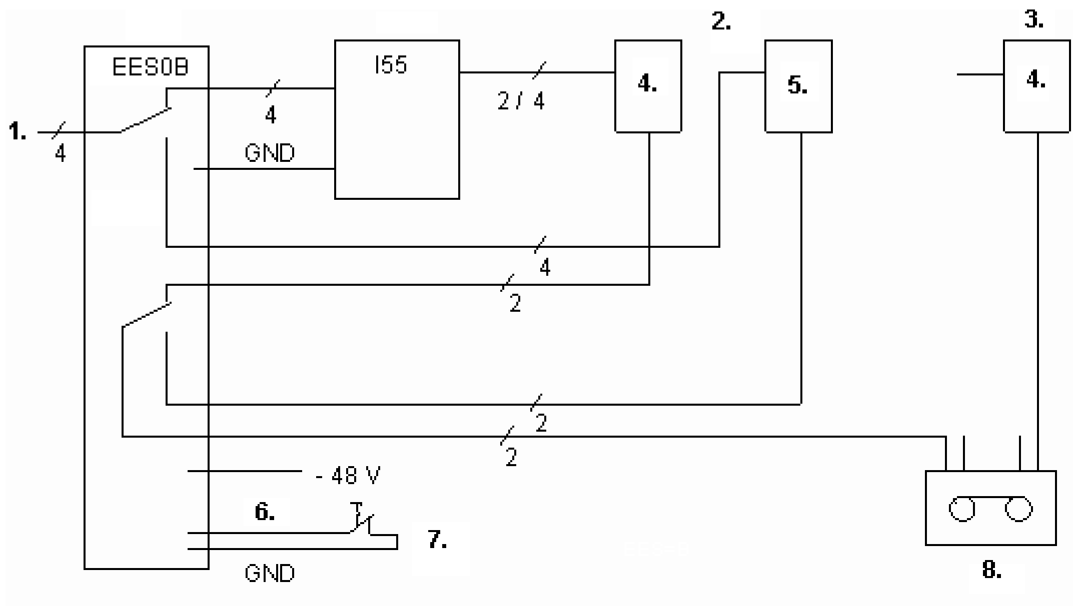
For each port, an additional 2 switchover contacts are brought out, via which, for example, lines to voice recording devices are switched.

The power supply to the board is implemented with GND from the DT0. -48 V is fed via the connecting cable.

One wire is fed for the forced switchover via the connecting cable.

Connection cables required: 2 cables 24x2 I55-HVT (MDF) 29.9030.56xx (xx = cable length)

Block Diagram



Emergency switchover facility for S0 lines

1. ISDN line
2. Answering with emergency set
3. Answering without emergency set
4. Answering
5. Emergency set
6. ZN
7. manual emergency switching
8. Documentation

8.7.22.1 Further Information

An NTBA with emergency supply is used as the NT, and the exchange dialling can be loaded with up to 380 mW in this case.

In normal operation, the emergency set has no function and therefore nothing appears in the display.

Facilities of this type are normally only to be handled by trained personnel. It can then be assumed that no unqualified actions shall be initiated by the users.

Each cable adapter is provided with 125 mA semi-lag fuse protection.

8.7.22.2 MDF Connections

MDF Cable 1	**Emergency Extension Switch S0 with DT0**	
Colours 24x2		
RD/BU	TA1/TB1	ISDN lines with emergency switching

WH/YE	TC1/TD1	
WH/GN	TA2/TB2	
WH/BN	TC2/TD2	
WH/BK	TA3/TB3	
WH/BU	TC3/TD3	
WH/YE	TA4/TB4	
WH/GN	TC4/TD4	
WH/BN	TA5/TB5	
WH/BK	TC5/TD5	
WH/BU	TA6/TB6	
WH/YE	TC6/TD6	
WH/GN	TA7/TB7	ISDN lines without emergency switching
WH/BN	TC7/TD7	
WH/BK	TA8/TB8	
WH/BU	TC8/TD8	
WH/YE	EA1/EB1	Emergency sets
WH/GN	EC1/ED1	
WH/BN	EA2/EB2	
WH/BK	EC2/ED2	
WH/BU	EA3/EB3	
WH/YE	EC3/ED3	
RD/GN	EA4/EB4	
WH/BN	EC4/ED4	

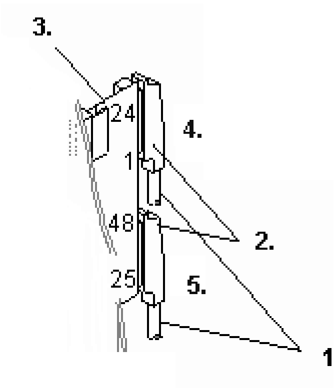
MDF Cable 2	**Emergency Extension Switch S0with DT0**	
Colours 24x2		
RD/BU	EA5/EB5	Emergency sets
WH/YE	EC5/ED5	
WH/GN	EA6/EB6	
WH/BN	EC6/ED6	
WH/BK	RA1/RB1	To analog voice recording
WH/BU	ERA1/ERB1	from handset of emergency set
WH/YE	EOA1/EOB1	From handset of answering facility
WH/GN	RA2/RB2	To analog voice recording
WH/BN	ERA2ERB2	from handset of emergency set
WH/BK	EOA2/EOB2	From handset of answering facility
WH/BU	RA3/RB3	To analog voice recording
WH/YE	ERA3ERB3	from handset of emergency set
WH/GN	EOA3/EOB3	From handset of answering facility
WH/BN	RA4/RB4	To analog voice recording
WH/BK	ERA4/ERB4	from handset of emergency set
WH/BU	EOA4/EOB4	From handset of answering facility

WH/YE	RA5/RB5	To analog voice recording
WH/GN	ERA5/ERB5	from handset of emergency set
WH/BN	EOA5/EOB5	From handset of answering facility
WH/BK	RA6/RB6	To analog voice recording
WH/BU	ERA6/ERB6	from handset of emergency set
WH/YE	EOA6/EOB6	From handset of answering facility
RD/GN	-48 V/-48 V	From power supply
WH/BN	ZN/GND	For the contingency of an emergency change-over

8.7.23 EESS0 Emergency Extension Switch S0

Short description

For special services, such as the police force, fire brigade or Red Cross, whose answering facilities must always be available, the adapter board Emergency Extension Switch S0 for CSI55 is available. In the event of a power failure or other malfunctions, this modules enables a switchover from the connecting line coming from the ISDN network to S0 sets that are powered by the ISDN network.



EESS0 board

1. Cable 1 + 2, each 24-pair to external MDF
2. Champ plug
3. EESS0
4. Pl.1
5. Pl.2

Instructions
Connection to a DT0 or ADM, i.e. 2 wire paris are to be switched per port.
Switchover is implemented to a set that is only used when the switchover is active.
For this purpose, a switchover with 1 WP each for the analog voice documentation.
Two 50-pin plugs are available as external connectors.

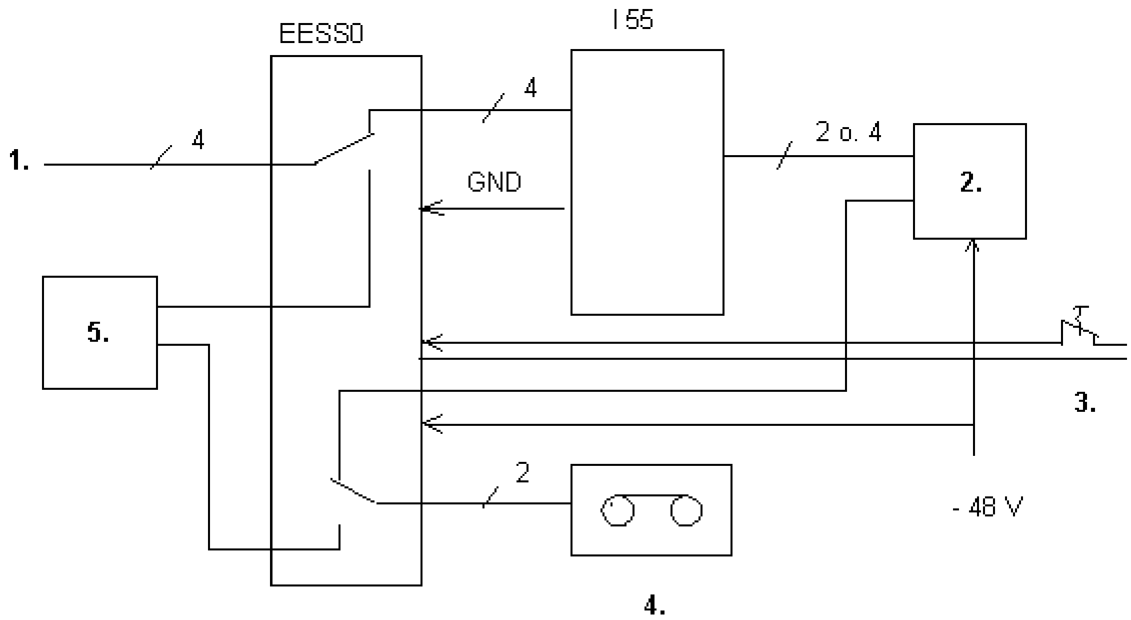
Switch-over criteria
General power failure
DT0/ADM board removed
Manual actuation of an external potential-free switch

Other features
Power demand -48V = 108mA
The number of ports is determined by the limited number of plug positions.
The port 1..6 contains the switchover option. Port 7 and 8 are directly switched through. Ports 9 to 16 cannot be used (only applies to ADM).
The switchover is implemented with 4 wires.
For each port, an additional 2 switchover contacts are brought out, via which, for example, lines to voice recording devices are switched.
The detection ”Board removed” is implemented with GND from the DT0 or ADM.
-48 V is fed via the connecting cable.
One wire is fed for the forced switchover via the connecting cable.
Connection cables required: 2 cables 24x2 I55-HVT (MDF) 29.9030.56xx (xx = cable length)

The X8 connector of the ADM board requires the EEADM submodule.

The EESS0 board differs from the EES0B board only in as far as in the EESS0 it is possible to prevent emergency switching of individual ports by means of jumpers.

Block Diagram

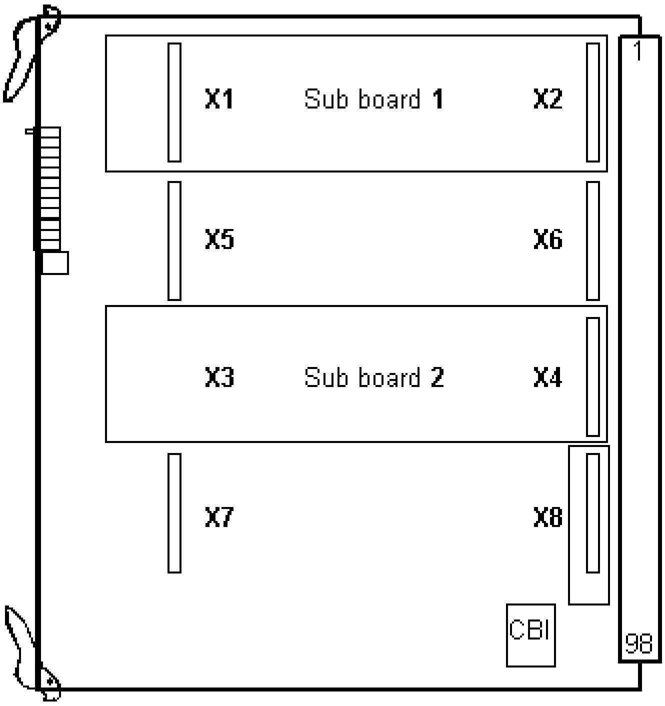


Emergency switchover facility for S0 lines

1. ISDN line
2. Answering station
3. Manual emergency switching
4. Documentation
5. Emergency answer

8.7.23.1 Additional measures with ADM

	If the ADM board is used with emergency switching (EESS0 cable adapter) submodule 3 is not required. On the X8 connector (normally for submodule 4) you **must** insert the EEADM submodule instead of submodule 4.

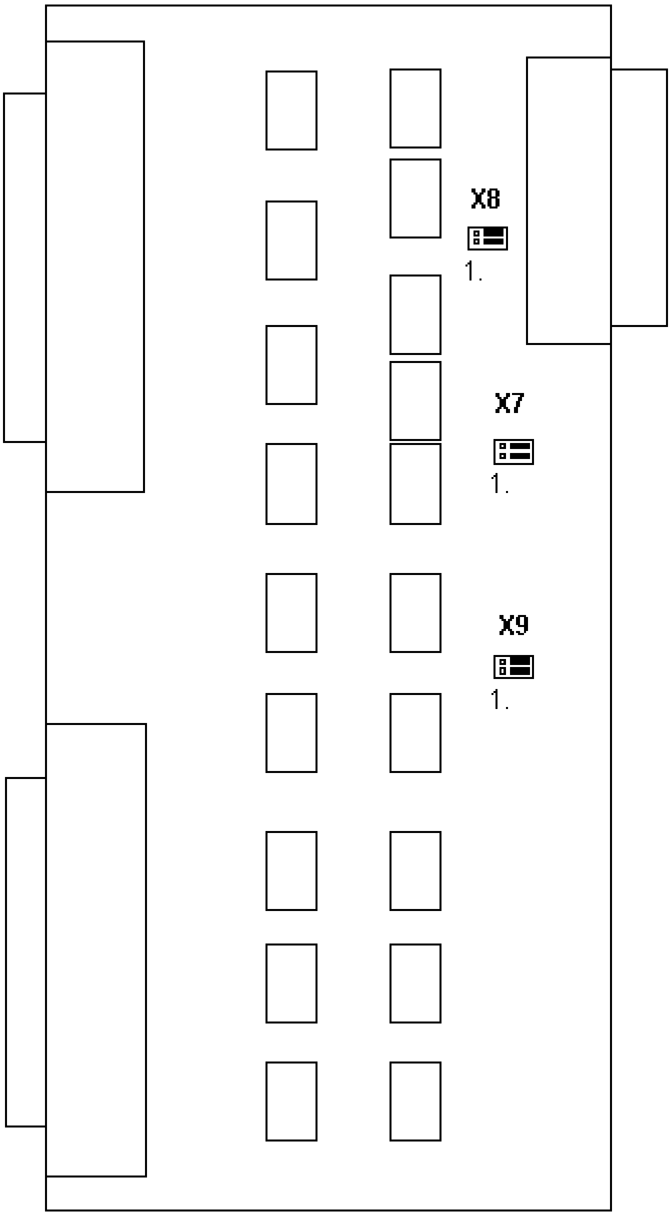


ADM board, location of EEADM on X8

	If the EEADM board is inserted in the wrong place on the ADM board this will cause a defect in the ADM board.

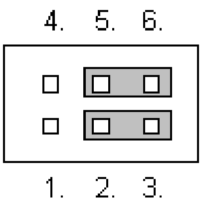
8.7.23.2 Jumper

The EESS0 features switching contacts with jumpers to prevent emergency switching of individual ports.



EESS0 cable adapter, component side

Upon first delivery emergency switching is active for ports 0 to 5, i.e. the jumpers are on 2-3 and 5-6. For special applications it is possible to exclude individual ports from emergency switching.



View of connectors X7, X8 and X9

Connector X7	Jumpers 1-2	Emergency switching for port 0 inactive

	Jumpers 2-3	Emergency switching for port 0 active
	Jumpers 4-5	Emergency switching for port 1 inactive
	Jumpers 5-6	Emergency switching for port 1 active
Connector X8	Jumpers 1-2	Emergency switching for port 2 inactive
	Jumpers 2-3	Emergency switching for port 2 active
	Jumpers 4-5	Emergency switching for port 3 inactive
	Jumpers 5-6	Emergency switching for port 3 active
Connector X9	Jumpers 1-2	Emergency switching for port 4 inactive
	Jumpers 2-3	Emergency switching for port 4 active
	Jumpers 4-5	Emergency switching for port 5 inactive
	Jumpers 5-6	Emergency switching for port 5 active

8.7.23.3 Further Information

The feedlines of the -48V should not be connected to the same fuse as those of the PBX because of the current difference between them.

The failure criteria such as fuse failure, board removed or manual switchover trigger a message on the system console so that monitoring from there is guaranteed.

An NTBA with emergency supply is used as the NT, and the exchange dialling can be loaded with up to 380 mW in this case.

In normal operation, the emergency set has no function and therefore nothing appears in the display.

Facilities of this type are normally only to be handled by trained personnel. It can then be assumed that no unqualified actions shall be initiated by the users.

8.7.23.4 MDF Connections

MDF Cable 1	**Emergency Extension Switch S0with DT0**	
Colours 24x2		
RD/BU	TA1/TB1	ISDN line 0
WH/YE	TC1/TD1	ISDN line 0
WH/GN	TA2/TB2	ISDN line 1

WH/BN	TC2/TD2	ISDN line 1
WH/BK	TA3/TB3	ISDN line 2
WH/BU	TC3/TD3	ISDN line 2
WH/YE	TA4/TB4	ISDN line 3
WH/GN	TC4/TD4	ISDN line 3
WH/BN	TA5/TB5	ISDN line 4
WH/BK	TC5/TD5	ISDN line 4
WH/BU	TA6/TB6	ISDN line 5
WH/YE	TC6/TD6	ISDN line 5
WH/GN	TA7/TB7	ISDN line 6
WH/BN	TC7/TD7	ISDN line 6
WH/BK	TA8/TB8	ISDN line 7
WH/BU	TC8/TD8	ISDN line 7
WH/YE	EA1/EB1	Emergency set 0
WH/GN	EC1/ED1	Emergency set 0
WH/BN	EA2/EB2	Emergency set 1
WH/BK	EC2/ED2	Emergency set 1
WH/BU	EA3/EB3	Emergency set 2
WH/YE	EC3/ED3	Emergency set 2
RD/GN	EA4/EB4	Emergency set 3
WH/BN	EC4/ED4	Emergency set 3

Complementary wire: GND

MDF Cable 2	**Emergency Extension Switch S0with DT0**	
Colours 24x2		
RD/BU	EA5/EB5	Emergency set 4
WH/YE	EC5/ED5	Emergency set 4
WH/GN	EA6/EB6	Emergency set 5
WH/BN	EC6/ED6	Emergency set 5
WH/BK	RA1/RB1	to analogue voice recording
WH/BU	ERA1/ERB1	from handset of emergency set
WH/YE	EOA1/EOB1	from handset of answering facility
WH/GN	RA2/RB2	to analogue voice recording
WH/BN	ERA2ERB2	from handset of emergency set
WH/BK	EOA2/EOB2	from handset of answering facility
WH/BU	RA3/RB3	to analogue voice recording
WH/YE	ERA3ERB3	from handset of emergency set
WH/GN	EOA3/EOB3	from handset of answering facility
WH/BN	RA4/RB4	to analogue voice recording
WH/BK	ERA4/ERB4	from handset of emergency set
WH/BU	EOA4/EOB4	from handset of answering facility
WH/YE	RA5/RB5	to analogue voice recording
WH/GN	ERA5/ERB5	from handset of emergency set

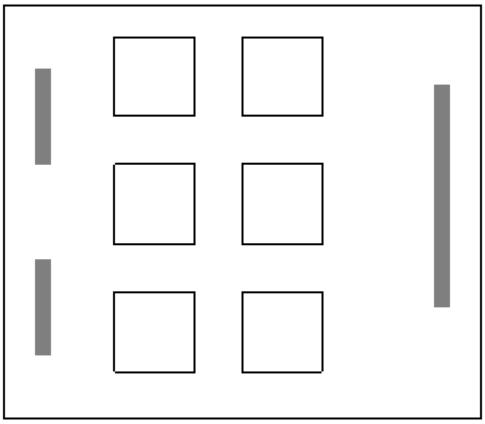
WH/BN	EOA5/EOB5	from handset of answering facility
WH/BK	RA6/RB6	to analogue voice recording
WH/BU	ERA6/ERB6	from handset of emergency set
WH/YE	EOA6/EOB6	from handset of answering facility
RD/GN	-48 V/-48 V	-48V from power supply
WH/BN	ZN/GND	Contact of forced emergency switching / to contact of forced emergency switching

Complementary wire: GND

8.7.24 EMAC Extended Multi Access Circuit Board

Short description

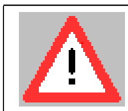
The board EMAC module is a submodule of the MAC and is used for the extension of 2x2 MBit interfaces.



EMAC board, component side

8.7.25 HAMUX Home Agent Multiplexer

Short description

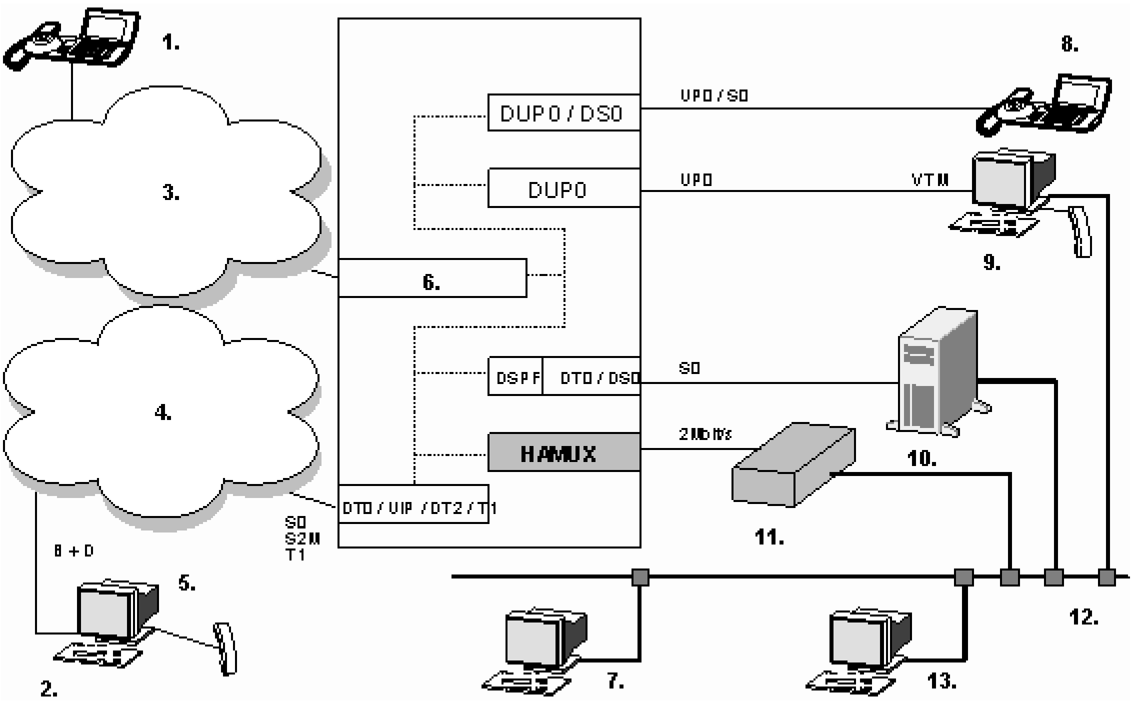
	The following description provides a basic outline of the board HAMUX More detailed information about module features, installation and configuration can be found in a separate manual entitled **HAMUX Home Agent Multiplexer**.

The HAMUX board with the associated SPCU submodules is used for the integration of up to 8 “Home Agents” in the Call Center and operates with software versions from E04.1 on.

It is a central board with line interfaces, but with a **virtual short-circuit** between the two connecting circuits, and enables the simultaneous transmission of compressed speech, data and signalling to a home agent via a B channel.

Included in shipment
ISDN exchange access (to home agent) via CS155 standard boards
Purchasable passive ISDN card for S0 bus interface with D-channel protocols

Cable adapter with 2x 2 MBit interfaces
ISDN dial-up connection via S0interface with a B-channel and D-channel
Multiplexing of the B channel
Communication protocol of the data application/transmission
Speech compression
Within the CSI55xE connection of the HAMUX to the DP world is implemented via a 2 Mbit/s multiport server



Principal overview of a Call Center with home agent

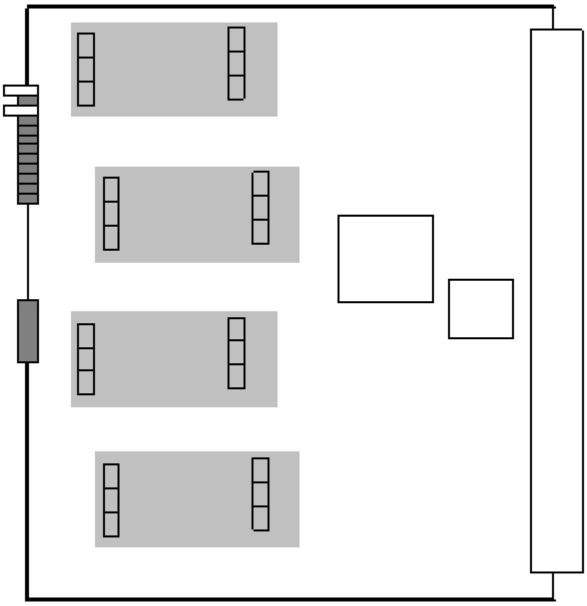
1. Customer
2. HOME Agent
3. Network analog or digital
4. ISDN
5. Home agent PC board
6. Digital or analog connector board
7. Database
8. Agent/Supervisor
9. PC Agent/Supervisor
10. BCC Server
11. Router
12. LAN

13. HOST

In order to implement the 8 home agents, the board must be logged in with 16 connecting circuits. Connecting circuits AO0 - AO7 are responsible for the setup of the carrier connections to the home agents.

Connecting circuits AO8 - AO15 are subjected to tunnelled transmission and represent the actual agent connecting circuits.

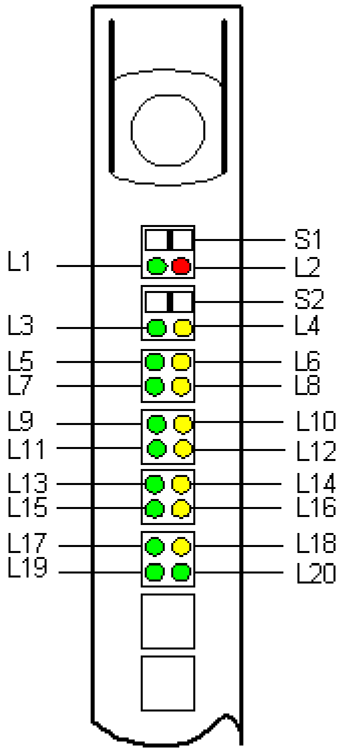
Data transmission is implemented to a router via a 2 MBit/s data interface independently of startup and switching software. To enable better exploitation of the router capacity, it is possible to operate the data interfaces of the HAMUX board in cascades.



HAMUX board

8.7.25.1 LEDs and Switch Functions

Meanings of LEDs



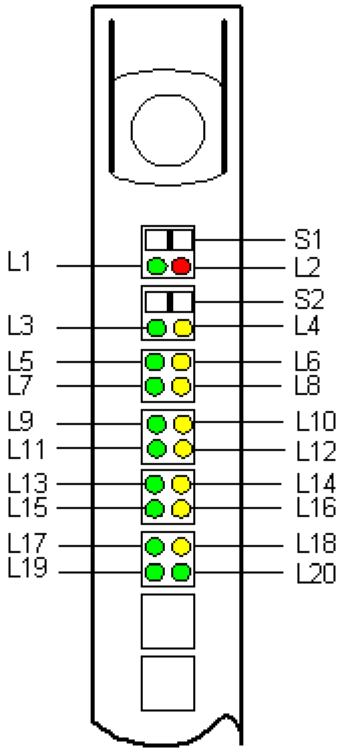
HAMUX board, front side

L1	Total status of LEDs	
	on:	1 or more L3 ports active
	flashing:	All ports are blocked or not active
	off:	All ports are in idle condition
L2	Total status of LEDs	
	on:	Reset
	flashing:	Failure of the configuration data received
	off:	Normal operation of ICU
L3	Port 0	
	on:	L3 active
	off:	Idle state
	flashing:	Barred
L4	Port 8	
	on:	L2 and L3 active
	off:	Idle state
	flashing:	Barred
L5	Port 1	
	on:	L3 active
	off:	Idle state
	flashing:	Barred
L6	Port 9	
	on:	L2 and L3 active
	off:	Idle state
	flashing:	Barred

L7	Port 2	
	on:	L3 active
	off:	Idle state
	flashing:	Barred
L8	Port 10	
	on:	L2 and L3 active
	off:	Idle state
	flashing:	Barred
L9	Port 3	
	on:	L3 active
	off:	Idle state
	flashing:	Barred
L10	Port 11	
	on:	L2 and L3 active
	off:	Idle state
	flashing:	Barred
L11	Port 4	
	on:	L3 active
	off:	Idle state
	flashing:	Barred
L12	Port 12	
	on:	L2 and L3 active
	off:	Idle state
	flashing:	Barred
L13	Port 5	
	on:	L3 active
	off:	Idle state
	flashing:	Barred
L14	Port 13	
	on:	L2 and L3 active
	off:	Idle state
	flashing:	Barred
L15	Port 6	
	on:	L3 active
	off:	Idle state
	flashing:	Barred
L16	Port 14	
	on:	L2 and L3 active
	off:	Idle state
	flashing:	Barred
L17	Port 7	
	on:	L3 active
	off:	Idle state
	flashing:	Barred

L18	Port 15	
	on:	L2 and L3 active
	off:	Idle state
	flashing:	Barred
L19	Message	
	flashing:	Message from C-bus
L20	TEST LED1	
	on:	Fault in Direct Data Interface
	off:	Normal operation

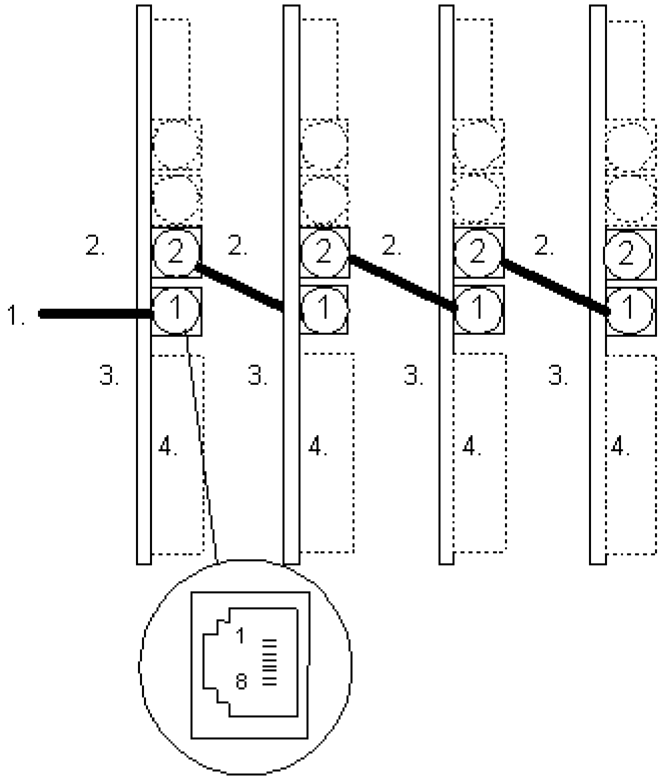
Switch Functions



HAMUX board, front side

S1	Total block	
	Left:	Hardware block of all 16 ports
	Middle:	Normal position
	Right:	Reset of ICU
S2	Test	
	Links	Test procedure
	Right:	Normal position

8.7.25.2 Interfacing



Upgrading of the HAMUX module

1. to Router/Server
2. Cable
3. CA6B Cable Adapter
4. 50-pin Champ

The HAMUX board is connected to the I55 via cable adapter CA6B. At the same time, the interface to the router/server is implemented via WE socket 1 of the cable adapter.

In the event that several HAMUX boards are to be integrated into the system, a cascading of the modules is implemented via WE socket 2 of the respective cable adapter.

PIN assignment, socket 1				
PIN	3	6	4	5
Function	1a (Rx)	1b (Rx)	2a (Tx)	2b (Tx)

PIN assignment, socket 2				
PIN	3	6	4	5
Function	2a (Tx)	2b (Tx)	1a (Rx)	1b (Rx)

8.7.25.3 Configuration of the Connecting Circuits

Carrier Connections AO0-A07

Connecting circuits 0-7 are responsible for the setup and release of the carrier connections to the home agents. They each provide a transparent B channel between the HAMUX board and a home agent.

On the HAMUX board, this is implemented by the simulation of a digital subscriber.

The connecting circuit is designated the **digital subscriber** type. The second B channel is blocked and assigned to the **Data service** function only.

A carrier connection connecting circuit is not able to setup a connection itself, but simply to seize the connection.

Agents AO8-AO15

Connecting circuits 8-15 are set up as agents in the Call Center. They are designated the **digital position** type. The second B channel is blocked.

The **telephony service** function only is set up for the agent connecting circuit.

Virtual short-circuit

On the HAMUX board, a virtual short-circuit is created by each carrier connection connecting circuit and an agent connecting circuit. The D channel of the agent connecting circuit is packed.

The status of a carrier connection connecting circuit (carrier connection present/not present) corresponds to the status of the agent connecting circuit (active/deactive).

Configuration Overview

AO	AO-type	Log file	Service	B Channel No.	B Channel Status
00	Digital subscriber	EDSS1 (EST1 Version 0)	Data only	1	free
				2	Barred
01	Digital subscriber	EDSS1 (EST1 Version 0)	Data only	1	free
				2	Barred
02	Digital subscriber	EDSS1 (EST1 Version 0)	Data only	1	free
				2	Barred
03	Digital subscriber	EDSS1 (EST1 Version 0)	Data only	1	free
				2	Barred
04	Digital subscriber	EDSS1 (EST1 Version 0)	Data only	1	free
				2	Barred
05	Digital subscriber	EDSS1 (EST1 Version 0)	Data only	1	free
				2	Barred
06	Digital subscriber	EDSS1 (EST1 Version 0)	Data only	1	free
				2	Barred
07	Digital subscriber	EDSS1 (EST1 Version 0)	Data only	1	free
				2	Barred
08	Digital position	TN1R6 (Version 0)	TLP only	1	free
				2	Barred
09	Digital position	TN1R6 (Version 0)	TLP only	1	free
				2	Barred
10	Digital position	TN1R6 (Version 0)	TLP only	1	free

				2	Barred
11	Digital position	TN1R6 (Version 0)	TLP only	1	free
				2	Barred
12	Digital position	TN1R6 (Version 0)	TLP only	1	free
				2	Barred
13	Digital position	TN1R6 (Version 0)	TLP only	1	free
				2	Barred
14	Digital position	TN1R6 (Version 0)	TLP only	1	free
				2	Barred
15	Digital position	TN1R6 (Version 0)	TLP only	1	free
				2	Barred

8.7.25.4 Configuration example for a carrier connection conn. circ.

	20.11.97 07:51:19
Connecting circuit	
Call number	:3300
Slot/HWA	:01-01-05-00
AO-type	:DITN

General ADS data					
Name	:				
Accounting section	:0000				
Log files	:				
	Log file	Version	defective	busy2	error
	ETSI	0	OFF	OFF	OFF
Overload priority	:2				
SPWKGR. Public exchange access	:0				
SPWKGR. COLISEE	:0				
DISA group	:0				
Dealer group	:0				
CN alloc. HKZ & tie	:				
Category	:-1				
Waiting field max.	:0				
Reserved	:				
Connection memory	:0				
Service memory	:1				
AO state	:In operation				
Service block	:sv-free				

Service data					
	DAT				
Status	Free				
Dialling group	30				
Traffic group	1				
Switchover group	0				
Code dialling group	0				
LCR group	0				
Dial retrieval	DEACTIVE				
Backward rel.	DEACTIVE				

B channel data					
Allocation code	: -				
Deliberation code	: -				

B ch no.	Bund no.	Dir.	Acc.	State	B ch no.	Bund no.	Dir.	Acc.	State
1	-	-	-	F	2	-	-	-	S

Number of seizable B channels: 1

Seizure direction			Status		
G	-	Outgoing	B	-	BUSY
K	-	Incoming	D	-	DEFECTIVE
W	-	Bothway	EB	-	EDSS1 BUSY
			ER	-	EDSS1 RESERVED
			F	-	FREE
			G	-	FAULTY
			R	-	RESERVED
Access Authorization			S	-	BLOCKED
M	-	with	T	-	DEFECTIVE/BLOCKED
O	-	without	V	-	BUSY/BLOCKED

8.7.25.5 Configuration example for an agent conn. circ.

20.11.97 07:51:19		
Connecting circuit		
Call number	:3700	
Slot/HWA	:01-01-05-08	
AO-type	:DIPL	-log. position no.: 61

General ADS data					
Name	:				
Accounting section	:0000				
Log files	:				
	Log file	Version	defective	busy2	error
	TN1R6	0	OFF	OFF	OFF
Overload priority	:2				
SPWKGR. Public exchange access	:0				
SPWKGR. COLISEE	:0				
DISA group	:0				
Dealer group	:0				
CN alloc. HKZ & tie	:				
Category	:-1				
Waiting field max.	:0				
Reserved	:				
Connection memory	:0				
Service memory	:1				
AO state	:HW blocked				
Service block	:sv-free				

Service data				
	DAT			
Status	Free			
Dialling group	30			
Traffic group	1			
Switchover group	0			
Code dialling group	0			
LCR group	0			
Dial retrieval	DEACTIVE			
Backward rel.	DEACTIVE			

B channel data					

Allocation code	: -				
Deliberation code	: -				

B ch no.	Bund no.	Dir.	Acc.	State	B ch no.	Bund no.	Dir.	Acc.	State
1	-	-	-	F	2	-	-	-	S

Number of seizable B channels: 1

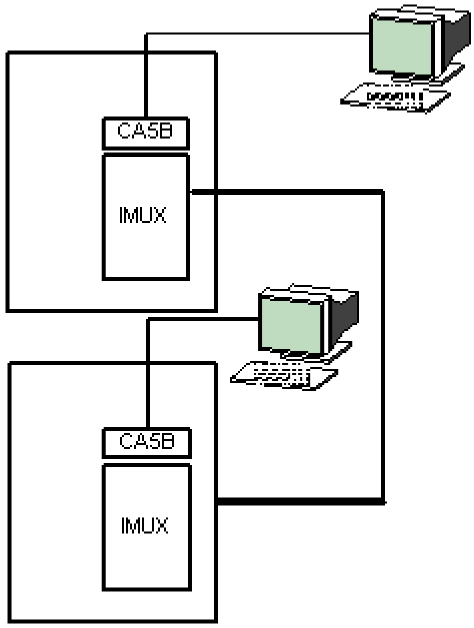
Seizure direction			Status		
G	-	Outgoing	B	-	BUSY
K	-	Incoming	D	-	DEFECTIVE
W	-	Bothway	EB	-	EDSS1 BUSY
			ER	-	EDSS1 RESERVED
			F	-	FREE
			G	-	FAULTY
			R	-	RESERVED
Access Authorization			S	-	BLOCKED
M	-	with	T	-	DEFECTIVE/BLOCKED
O	-	without	V	-	BUSY/BLOCKED

8.7.26 IMUX Integrated Multiplexer

Short description

IMUX board is used to link CSI55 systems via permanent connections (FV).

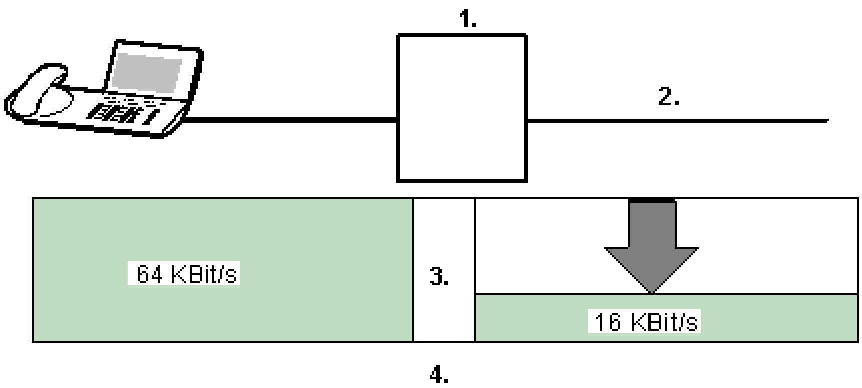
Type
D64S (S interface with 1 x 64 KBit/s B channel)
DS01/DTS01 (S interface with 1 x 64 KBit/s B channel and 1 x 16 KBit/s D channel)
DS02/DTS02 (S interface with 2 x 64 KBit/s B channel and 1 x 16 KBit/s D channel)
International leased line as per X.21 (X.21 interface with a transmission rate of 64 KBit/s)



I55 with the IMUX board

Functions of the IMUX board:

- The IMUX board permits the transmission of several compressed speech channels in one B channel of the permanent circuit. In the process, the band width per speech channel is reduced/compressed to 16 Kbit/s in accordance with G.728 LD-CELP. This process ensures very high speech quality despite the compression of 4:1, and is better than ADPCM coding with the same band width, for example. They are better, for example, than a ADPCM coding with the same band width.

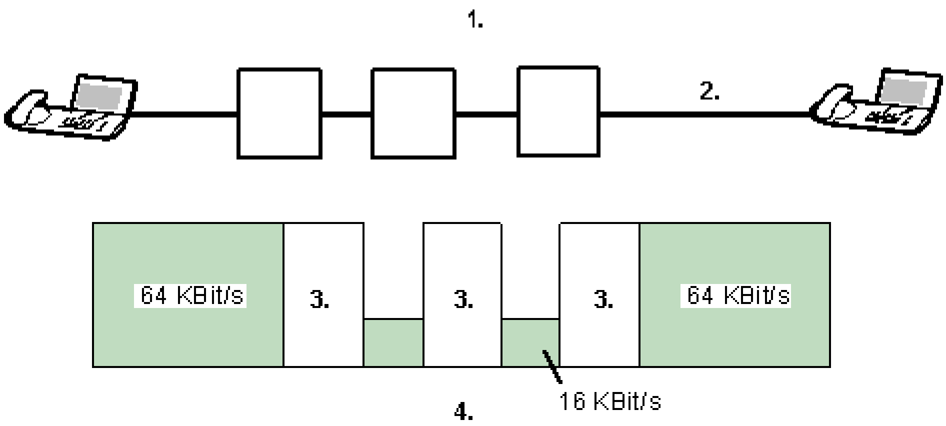


Speech compression in the IMUX board

1. I55 with IMUX
2. Line
3. IMUX
4. Bandwidth

- **Every** speech channel is provided with identification **and** processing functions for fax group 3. Identification of a group 3 fax is necessary, as fax connections must not be subjected to the speech compression. The transmission is implemented at max. 9.6 KBit/s.

- The line may also be used for data transmission via the direct data interface as per V.24/X.21.
  The data is multiplexed from the direct data interface on the line separately from the speech channels, demultiplexed at the remote side on the second IMUX of the line, and fed to the direct data interface. This means that the data is fed neither via the decompression/compression units of the IMUX boards nor via the switching matrixes of the systems.
- The **data service** is not supported by the IMUX, as data transport is not possible via compressed channels of IMUX. The Integral 55 uses the service identification function to automatically check whether it is dealing with the service type (DAT). If this is the case, the connection is not fed via the IMUX board, but by means of alternate routing to another bundle. If the alternate routing is not activated, "occupied" is signaled. This procedure functions for a 3 call number plan types: common, hidden, open.
- Transit functions: If a connection is fed via several I55 systems, compression is performed in the originating node and decompression in the destination node. This ensures that repeated compression/ decompression is avoided.
  The prerequisite for this is that **all** routes between the participating nodes are equipped with IMUX boards and that the connection is fed via IMUX routes without exception.
  The transit functions also apply when two compressed connections arriving at a transit node from a system need to be routed in different directions.



Transit functions of the IMUX board

1. I55 with IMUX
2. Line
3. IMUX
4. Bandwidth

Data connections via the direct data interface cannot be set up via several transit nodes, but only as point-to-point connections between 2 systems.

Other features	
Country of application	National and international
Power demand +5V	650 mA
Overvoltage protection up to 4 kV	
Board software download.	

Board identification using board pass
Maintenance function

Hardware Requirements

- The number of IMUX boards used per module is not limited. Each IMUX board occupies one connecting circuit slot.

Restrictions

- If a permanent circuit with 8 speech channels (DS02/DTS02) or two permanent circuits each with 4 speech channels (DS01/DTS01) is set up, the application of four SPCU speech compression units is required. IMUX boards that are equipped in this way must not be installed in directly neighbouring slots. In this case, one slot must remain free or be occupied by a board with low dissipated power (ASCEU, DS0, DT0, DT2....).

Software Requirements

Software from **E03.2** is required for operation of the IMUX boards.

8.7.26.1 Components and Cables

Components of the IMUX board:

The IMUX board is made up of one basic board and submodules:

Components	Function	Material number
IMUX	This board is the basic board and requires a connecting circuit slot.	28.5630.318x
SPCU	Submodule of the IMUX for speech compression. Each SPCU can process two (speech) channels. A maximum of 4 SPCUs can be inserted onto the basic board.	28.7640.517x
S64LI	Submodule of the IMUX for the implementation of the D64S (1xB), DS01/DTS01 (1xB+D) and DS02/DTS02 (2xB+D) line interfaces. One submodule is required for each of the mentioned interfaces.	28.7640.516x
X64LI	Submodule of the IMUX, implements the line interface: International leased line X.21 with a transmission rate of 64Kbit/s. One line interface is implemented per submodule. Max. 2 S64LI, 2 X64LI, or 1 S64LI and 1 X64LI can be inserted on the basic board at any one time.	28.7640.515x
CA5B	Adapter module for B modules	28.7640.366x

Cable:

- 6x2 Sub-D/open ext. Connection cable TC-MDF (material number 29.9030.5101 for 1 m up to 29.9030.5199 for 99 m).
- 1x15-pin D-sub (male)/D-sub (female) for X64LI (material numbers 27.5630.0541 to .0543) in lengths of 5, 20 and 50 m. This cable can also be used for connection between the direct X.21 data interface and a data terminal.

For the direct V.24 async./sync. interface, a conventional 25-pin D-sub (male)/D-sub (female) cable can be used. The number of wires depends on the data terminal (HW handshake). For sync. transmission, the clock lines must always be switched.

- The following line interfaces can be served:

Line interface type	Structure	maximum number of speech channels
D64S	1xB	3
DS01/DTS01	1xB+D	4
DS02/DTS02	2xB+D	8
International leased line as per X.21	64 KBit/s	3

The data transmission as per X.21 allows a point-to-point data transmission only. Each line interface requires its own D channel (one D channel for two identical line interfaces is **not** possible. The number 3 for lines without dedicated D channel ensues due to the fact that D channel signalling also needs to be transmitted inband within the B channel. This is why not the entire band width is available for user data.

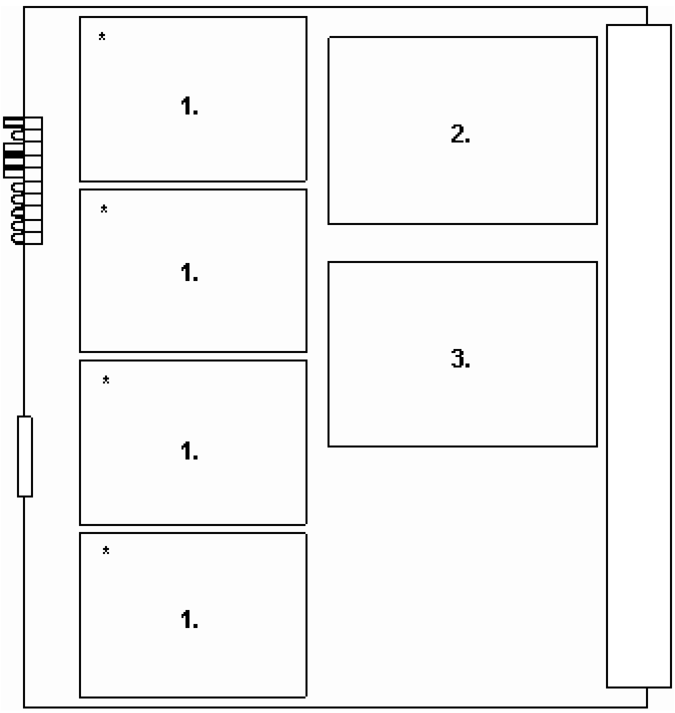
8.7.26.2 Inserting the Submodules

Remove the IMUX board from the I55 slot.

Note

The board may be removed and inserted during system operation.

Insert the S64LI and/or X64LI submodule onto Line-Interface A and/or Line-Interface B. One or more speech compression units (SPCUs) can be inserted at random on one or more free SPCU1-SPCU4 slots.



IMUX board, component side

1. SPCU Speech Compression Unit 2*G728/G.711 Speech Compression/Decompression
2. Line-Interface A Either: **S64LI** (Structured 64 KBit/s Line Interface) or **X64LI** (X.21 64 KBit/s Line Interface)
3. Line-Interface B Either: **S64LI** (Structured 64 KBit/s Line Interface) or **X64LI** (X.21 64 KBit/s Line Interface)

In order to guarantee the error-free operation of the board, the type and number (max. 2) of inserted line interfaces (S64LI and/or X64LI), as well as the number of speech compression units (2 speech compression units per SPCU board –> max. 8 speech compression units), must be adapted to the customer application. The configuration data must always be entered accordingly using the ICU Editor.

Insert the IMUX board into the I55 slot.

An installation that does not correspond to the diagram can lead to malfunctions in the board. For better orientation, the material number (*) must be located on the left side of the SPCUs to ensure that they are installed the right way around.

8.7.26.3 Synchronization

When networking I55 systems via the IMUX, it is **unavoidable** that the systems run **synchronously**, because:

- The speech compression algorithm reacts very sensitively to transmission faults through transmutation processes.
- Error-free operation cannot be guaranteed for the data interface without synchronization.

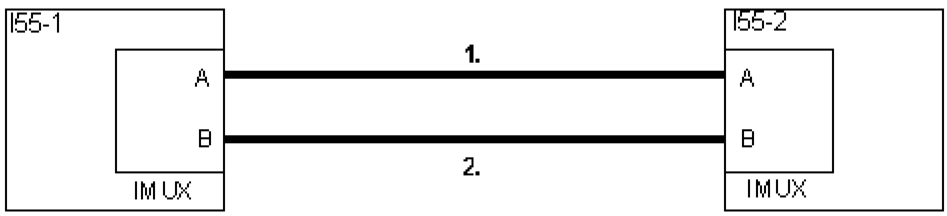
When networking systems via the permanent circuit of the public network, the IMUX line interfaces are configured as the “slave” on both sides of the permanent circuit (normal case). With direct connection, one side is set as the “master” and the other side as the “slave”. This means that the same rules must be followed as, for example, with a permanent circuit operated with the DT0 board.

For synchronization purposes, I55 systems exchange information via the networking permanent circuit. This is carried out via the signalling channels of the logical ports. This means that synchronization can only be present via IMUX lines to which ports are assigned (i.e. that are set up for transportation of one or more B channels).

The IMUX board software will reject a configuration (configuration error) that results in a port number = 0 for the entire board.

However, a port number = 0 (entire band width for data transmission) is possible for one of the individual IMUX lines (A, B). These represent special cases that are to be observed with regard to synchronization.

Special case 1: 2 I55 systems network connected via two permanent circuits (FV) operated with IMUX



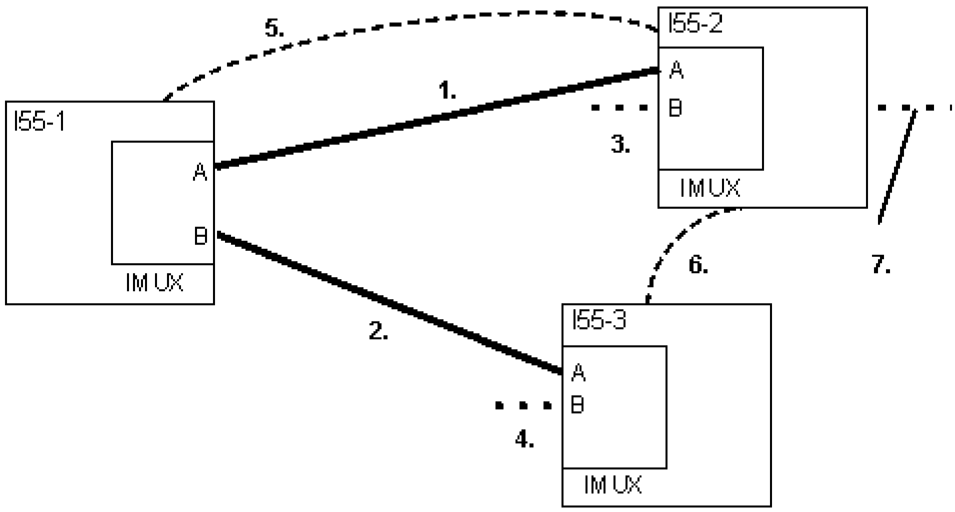
Special case 1 for synchronization

1. FV1: only data
2. FV2: only B channels

Because no ports (no B channels) are configured for permanent circuit FV1, synchronization of the two I55xE systems is only possible via FV2 (or via further permanent circuit lines that can be operated with IMUX or other boards such as DT0 or DT2, for example).

Note:
With the appropriate configuration of the line interfaces, the permanent circuit (FV) lines in the above example can also be connected to the line interfaces of the IMUX in a “crossed” pattern.

Special case 2: 3 I55 systems network connected via two permanent circuits (FV) operated with IMUX



Special case 2 for synchronization

1. FV1: only data
2. FV2: only B channels
3. FV3
4. FV4
5. FV5
6. FV6
7. Access to public network

The I55-1 and I55-2 cannot be synchronized via FV1 (no ports)! However, because synchronization must be ensured (data transmission), it is necessary to provide further synchronization paths:

- Via further permanent circuits between I55-1 and I55-2 and operated with IMUX, e.g. FV3.
- Via further permanent circuits (operated with IMUX, DT0, DT2...) e.g. FV5.
- Via permanent circuits between I55-2 and I55-3, e.g. FV6.
- Via access of systems to the public network.

8.7.26.4 Configuration

ICU Editor

The module possesses 2 physical ports, the line interfaces A (upper line submodule) and B (lower line submodule).

The ICU Editor is used to select the interface type and a band width distribution for each line interface (A, B). The distribution is made up of a B channel number (compressed speech channels of 16 KBit/s each) and band width reservation for the transmission of data (see table below). The number of B channels provides the quantity, numbering and type of logical ports (connecting circuits). This means that with the IMUX, the number of logical ports represented for the switching software (MSU1 task) depends entirely on the configuration.

1. Example: Line A 3B chanels, slave (e.g. DS01)
Line B 5B channels, master (DS02)
results:

Port (AO) no.	Port type	Transmitted on physical line
0	BAVLN-2B-Slave	A
1	BAVLN-1B-Slave	A
2	BAVLN-2B-Master	B
3	BAVLN-2B-Master	B
4	BAVLN-1B-Master	B

2. Example: Line A not installed
Line B 4B channels, slave
results:

Port (AO) no.	Port type	Transmitted on physical line
0	BAVLN-2B-Slave	B
1	BAVLN-2B-Slave	B

The ICU Editor checks whether the number of B channels on an IMUX board is greater/equal 8 and, if required, returns an error message. If this does not occur, the ICU Editor provides information about the number of speech compression units to be inserted (half the number = number of SPCUs).

When the IMUX module is started, the available band width of a physical line (e.g. 64 Kbit/s with type D64S) is divided into subwidths by means of a “Mapping” algorithm. The input information for this process is as follows:

- The number of required B channels (ICU Editor).
- The reserved band width for transmission of the data channel (ICU Editor), see data interfaces.
- In some cases, the required band width for the D signalling channel (permanently set, [8 KBit/s] e.g. with D64S) if the inteface type does not provide a separate D channel.

It must be ensured that the ’Mapping’ algorithm provides the same results on both sides of a permanent circuit operated with IMUX (this means that the subbands have the same position throughout the entire band)! To this end, the line interfaces on both sides of the FV must **on all accounts have the same configuration** concerning B-channel numbers and reserved capacity for the data channel.

This requirement must be met for each line interface. This means, for example, that if line A of an IMUX in an I55 system 1 is connected with line B of an IMUX in system 2 via a permanent circuit, the two line interfaces A (system 1) and B (system 2) must be configured in the same way.

Configuration checks

The ICU Editor carries out configuration checks for the IMUX board. This virtually rules out incorrect settings being made:

- Check of whether the total number of B channels is 8 (max. possible number of speech compression units).
- Check of whether the reserved band width on the line selected for transmission of the data channel is sufficient for the current configuration of the 'direct data interface'.
- In addition, the number of required speech compression units is output (half the number = number of SPCU submodules).

The above points are checked by the ICU software of the board. The hardware configuration data is also checked. In the event of inconsistencies in the configuration, the IMUX will not be started and indicates a configuration data error. This indication involves the top two LEDs flashing red and green on the front panel and a message to MCOM.

An error occurs if:

- The configuration data structure is unknown. (Always switch off the “Type name from ICU.TAB” option in the ICU Editor.)
- The total number of B channels is greater than 8.
- The reserved capacity for transmitting the data channel is insufficient.
- One or both inserted line submodules is not compatible with the type of the selected line interface.
- No B channel has been configured for the entire module (port number = 0).

If an insufficient number of SPCU submodules is inserted, some ports on the IMUX will not start up (traffic restriction!). This status is indicated by a continuously flashing LED (see “LEDs and Switches”).

Customer data

When setting up the customer data, it must be ensured that enough ports of the BAV type are set up with port addresses 0, 1, 2...

Because one speech compression unit must be present on the board for each B channel, and the maximum number of speech compression units that can be inserted is 8 (2 per SPCU submodule), the maximum number of ports is 5. This means that when setting up customer data for 5 ports of the BAV type with the addresses 0 to 4 on the IMUX slot, all configuration cases of the board are covered.

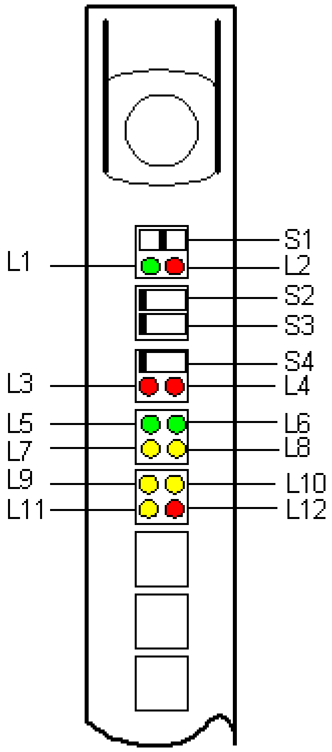
Networking via the TNET protocol

The switching control regards the channels of the IMUX board as channels to “link line networks” (**b**asic **a**ccess **v**ln) using the TNET protocol. The **IMX** feature must be enabled in order to implement switching of the connecting circuits of the IMUX board, which are also set up with a “basic access vln” connecting circuit type. All other customer data is subjected to the known regulations for basic access vln (TNET).

Prevention of 'non speech connections'

In 'non-speech connections', e.g. in the data service, the switching controller recognizes, with the aid of the customer data, during the connection setup that the desired service is not set up. The response to this is either disconnection or alternate routing. In networks with open numbering plans (exchange line code for each node), it is possible via the customer data to set up the exchange line code for IMUX connections only in dial groups for the speech service.

8.7.26.5 LEDs and Switch Functions



IMUX board, front side

Switch Function

S1	Right:	Reset board
	Middle:	Normal position
	Left:	Service disabling (preparatory) for all log. ports (AO) of the board
S2	Left:	Normal position
	Right:	Service disabling (preparatory) for line A
S3	Left:	Normal position
	Right:	Service disabling (preparatory) for line B
S4		No function

Meanings of LEDs

L1	Summation display via all ports	
	off:	No active layer 3 connections, all ports free
	on:	At least 1 layer 3 connection
	flashing:	All available ports have ’blocked’ status
L2	off:	Normal
	on:	Board reset status
	flashing:	Startup or download in progress
L3	off:	Layer 1 on line A active
	on:	Layer 1 on line A inactive (alarm)

L4	off:	Layer 1 on line B active
	on:	Layer 1 on line B inactive (alarm)
L5	Summation display via all ports allocated to line A	
	off:	No active layer 3 connections on line A, all allocated ports free
L6	Summation display via all ports allocated to line B	
	off:	No active layer 3 connections on line B, all allocated ports free
	on:	At least 1 layer 3 connection on line B
	flashing:	All ports allocated to the line have 'blocked' status
	on:	At least 1 layer 3 connection on line A
	flashing:	All ports allocated to the line have 'blocked' status
L7	off:	Board is not supplying synchronous clock to I55xE central clock supply
	on:	Board supplying synchronous clock
L8	Only valid if SYN LED (L7) is "on"!	
	off:	Synchronous clock is being fed from line B
	on:	Synchronous clock is being fed from line A
L9	off:	Normal
	flashing:	Insufficient number of compression units (too few SPCU's)
L10		No function
L11	The LED lights up briefly when C-bus messages are received	
L12	One-off fault states (IMUX internal buffer overflows) when transmitting data from the "direct data interface" result in the LED lighting up for 30 seconds. Such faults may occur if, • The network connected I33 systems are not in sync with each other or with the public network. • Asynchronous data interfaces transmit data from the IMUX and the data terminal at adversely differing rates. (IMUX corrects this fault automatically by slightly increasing the data output rate to the data interface.)	

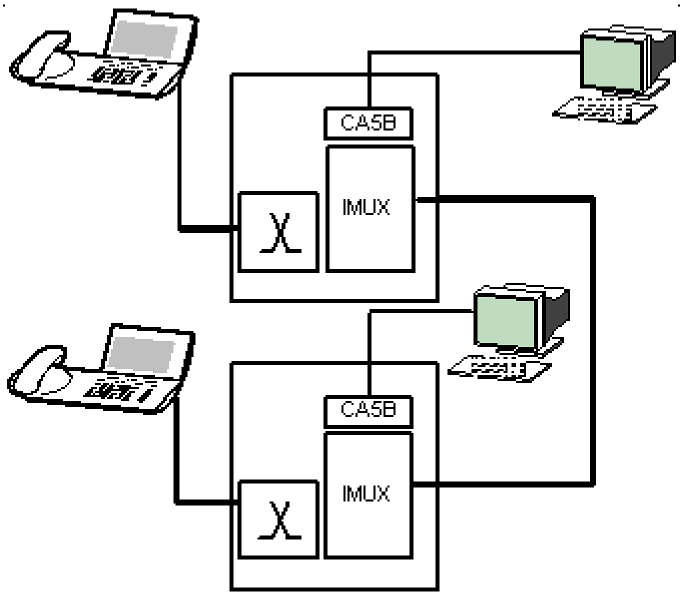
During startup, the LEDs indicate various board statuses. The phase is indicated by LED 12 being continuously **ON**. When LED 12 has been switched off once, the LEDs resume their normal functions. The simultaneous flashing of LEDs 1 and 7 indicates a **configuration fault** (board will not operate).

8.7.26.6 Data Interfaces

Onedata interface exists for each IMUX which can be configured as an asynchronous type (V.24/V.28) or synchronous type (V.24/V.28 or X.21/V.11) with various data rates.

These data connections are fed directly to the board via the switching matrix.

The data connections **cannot** be set up via transit nodes. The respective plug is on the cable adapter CA5B that belongs to the board.



I55 with the IMUX board

The data is transported via **one** (configurable) of the permanent circuit (FV) lines. For this purpose, sufficient capacity for the data channel must be reserved on the selected line.

The ICU Editor checks whether the reserved band width on the selected transmission line is sufficient for the desired transmission rate. All data rates which fall below the reserved capacity are permissible but not necessarily sensible, as band width may be left unused.

Example:

Data interface 1200 baud asynchronous, transmission on line A, 32 KBit/s reserved on line A. Because band width can be reserved in increments of 8 KBit/s a capacity of 24 KBit/s remains unused, meaning that at least 1 other B channel could be set up.

Transmission rate (Bit/s)		**Line bandwidth to be reserved (KBit/s)**
asynch.	**synch.**	
$<$ 9600	$<$ 8000	8
19200	16000	16
-	24000	24
38400	32000	32
-	48000	48
-	64000	64

As only one data channel can be transmitted, band width also only needs to be provided on one permanent circuit line. Any additional capacity reserved on the second line would remain unused.

The data interfaces operate protocol-transparent in all operating modes.

An end-to-end data backup should generally be implemented through the connected data terminals.

For all synchronous operating modes, the data interface is the **clock master** for the data terminal.

The **V.24 data interface** involves unsymmetrical dual power lines that perform the following tasks:

		Direction

TxD (CT103):	Transmit data	DEE	–>	DÜE (IMUX)
RxD (CT104):	Receive data		<–	
CTS (CT106):	Transmit stand-by		<–	
DSR (CT107):	Operational readiness		<–	
GND (CT102):	Operational earth			
DCD (CT109):	Receive signal level		<–	

In a synchronous transmission, the two lines below supply the DEE with pulse timing information (no function in asynchronous transmission):

TxC2 (CT114):	Transmitting pulse		<–	
RxC2 (CT115):	Receiving pulse		<–	

Subsequent to the activation of the interface, the CTS, DSR and DCD lines are permanently set to “ON” and remain at this signal until the board is reset (the data interface of the IMUX signals permanent stand-by).

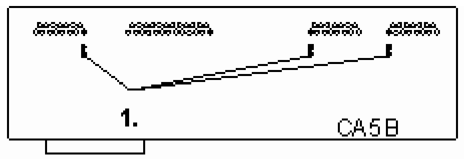
Signal on the lines	V1 < -3 Volt	V1 > +3 Volt
Data lines	Binary 1	Binary 0
Control and clock lines	OFF	ON

The **X.21 data interface** involves symmetrical dual power lines that perform the following tasks:

		Direction		
T:	Sending	DEE	–>	DÜE (IMUX)
R:	Receiving		<–	
C:	Control		–>	
I:	Report		<–	
S:	Clock pulse		<–	
G:	Earth or return conductor			

Subsequent to the activation of the interface, the I line is permanently set to “ON” and remains at this signal until the board is reset (the data interface of the IMUX signals permanent stand-by). Line C is not evaluated.

The ’Gnd1’ line can be set to ground irrespective of the country of application. The CA5B cable adapters feature a breakpoint which can be used to disconnect this line from ground.



Breakpoints on the cable adapter

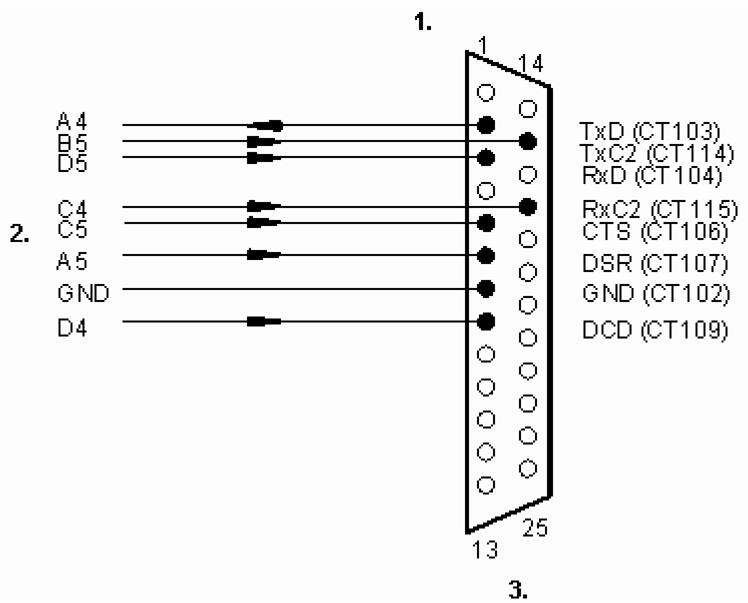
1. Breakpoints

Signal on the lines	VA...VB	VA...VB

	< -0.3 Volt	> +0.3 Volt
Data lines	Binary 1	Binary 0
Control and clock lines	OFF	ON

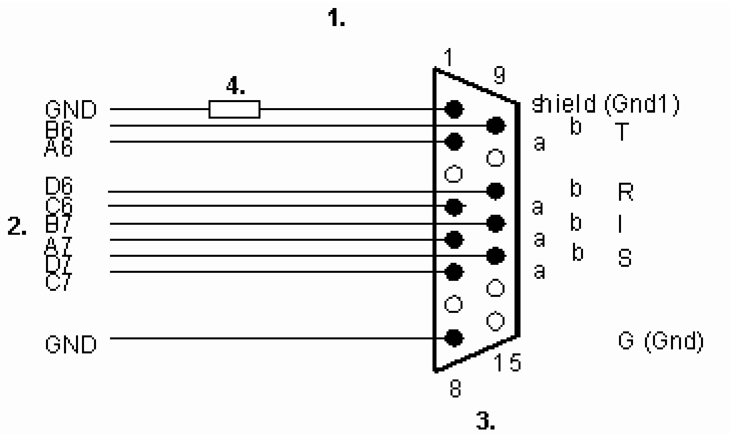
The following bit rates are supported which can be configured using ISM or the ICU Editor:

V.24 synch.	**V.24 asynch. (1 start bit, 1 stop bit, parity bit is possible)**	**X.21 synch.**
1000 Bit/s	300 Bit/s	1000 Bit/s
2000 Bit/s	600 Bit/s	2000 Bit/s
4000 Bit/s	1200 Bit/s	4000 Bit/s
8000 Bit/s	2400 Bit/s	8000 Bit/s
16000 Bit/s	4800 Bit/s	16000 Bit/s
24000 Bit/s	9600 Bit/s	24000 Bit/s
32000 Bit/s	19200 Bit/s	32000 Bit/s
	38400 Bit/s	48000 Bit/s
		64000 Bit/s



Assignment of the X3 plug

1. Assignment for V.24
2. Signal names on the backplane
3. female 25-pin Sub-D (ISO 2110)



Assignment of the X4 plug

1. Assignment for X.21
2. Signal names on the backplane
3. female 15-pin Sub-D (ISO 4903)
4. 0 Ohm

8.7.26.7 MDF Connections

The connectors of the IMUX board are picked off with the corresponding cables on the adapter modules CA5B and fed to the MDF, terminal adapter or data terminal.

When using S64LI as the line interface, the cable with material number 29.9030.51xx is used, whereby xx represents the length of the cable in m (1 to 99).

The 15-pin Sub-D plug is connected to the X1 plug (line interface A) or X5 plug (line interface B) of the CA5B. The open end of this cable is connected with 4 lines in the MDF (2 twisted pairs plus earth wire to ground).

Lines used:

Colours	Pin on the Sub-D	Name	Function
YE/WH	4/3	TDa/TDb	Transmit Data
GN/WH	6/5	RDa/RDb	Receive Data

When using X64LI as the line interface, the cable with material number 27.5630.054x is used, whereby x represents the length of the cable in m: (x=1 for 5 m, x=2 for 20 m, x=3 for 50 m). This cable is connected directly to a TA of the network operator.

Pinning of the X1 and X5 plugs (Sub-D 15 male)

Pin	1	2	3	4	5	6	7	8	9	10
Name	Gndb	Ta	Ca	Ra	Ia	Sa	Xa	Gnda	Tb	Cb
Pin	11	12	13	14	15					
Name	Rb	Ib	Sb	Xb	NC					

The X3 plug comprises a 25-pin Sub-D female plug that serves the connection of an external data terminal with V.24 (synchronous/asynchronous) interface.

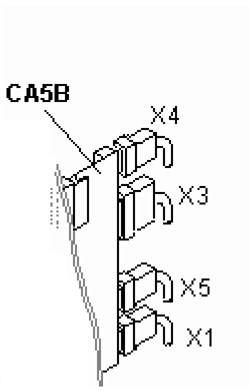
Pinning of the X3 plug

Pin	2	3	5	6	7	8	15	17	Rest
Name	TxD	RxD	CTS	DSR	GND	DCD	TxC2	RxC2	NC

The X4 plug comprises a 15-pin Sub-D female plug that serves the connection of an external data terminal with X.21 (synchronous) interface.

Pinning of the X4 plug

Pin	1	2	3	4	5	6	7	8	9	10
Name	Gnd1	Ta	NC	Ra	Ia	Sa	NC	Gnd	Tb	NC
Pin	11	12	13	14	15					
Name	Rb	Ib	Sb	NC	NC					



CA5B with plugs

8.7.27 IPN Intelligent Private Network

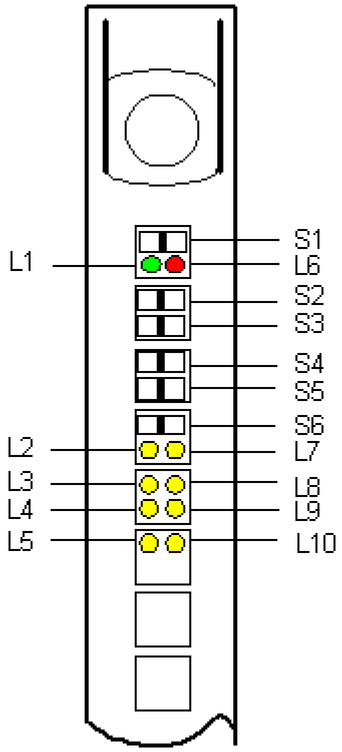
Short description

The board IPN module enables the operation of intelligent private networks between systems (CSI55, I33) by means of data transmission in the speech channel of a digital dial-up line.

Other features	
Power demand +5V	710 mA
Up to 15 IPN connections are possible per board.	
Board software download.	
Board identification using board pass	
Maintenance function	

⚠	The board must operate in conjunction with an ISDN exchange board.

8.7.27.1 Function of Switches and LEDs



IPN board, front side

Switch Position

S1	Left:	Preparatory disabling
	Right:	Reset board
S2	Left:	Board status display not possible at a terminal for testing purposes, as Sub-D plug is not equipped
S3	Left:	Test
S4	Left:	Further status display of the board is not possible at a terminal for testing purposes, as Sub-D plug is not equipped
S5	Left:	Protocol output 'on'
S6		No function

Meanings of LEDs

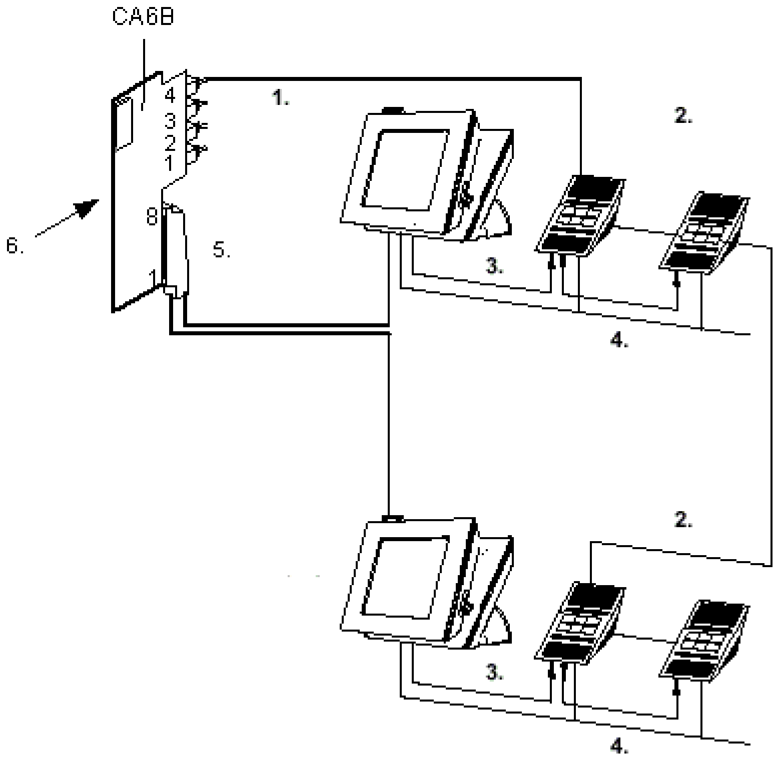
L1	on:	At least 1 connecting circuit is occupied
	flashing:	All connecting circuits are blocked
	off:	Operating status
L2		No function
L3	flashing:	defective DSPA test
	1x	Reserved
	2x	Checksum failure
	3x	X-RAM defect
	4x	Y-RAM defect

	5x	SSI defect
	6x	Illegal instruction
	7x	Receive SSI with overflow
	8x	Transmit SSI with underrun
	9x	Stack overflow
	10x	Illegal host message received
	11x	Field 2 info has been received before
	13x	External RAM error
	14x	External ROM error
	off:	Operating status
L4		No function
L5	on:	At least one occupancy is active (occupancy summation display)
	off:	Operating status
L6	on:	Reset status
	flashing:	Download in progress
	off:	Operating status
L7	on:	Logging switched on
L8	flashing:	See L3 function
	off:	Operating status
L9		No function
	12x	Main program runtime $> 125\ \mu$s
L10	on:	At least one channel **blocked**
	flashing:	At least one channel **defective**
	off:	Operating status

8.7.28 MAC Multi Access Circuit Board

Short description

The MAC board is required for the application of the I55 system as a dealer, special network, railway or master terminal system. It is the connecting circuit module for the digital terminals (e.g. TH93M) and peripheral devices (e.g. speech recording unit). It is also provides switching matrix and mixer functions for the application of special dealer functions.



Overview

1. 2 MB Interface
2. 2 MB Module Loop
3. Databus
4. Power supply
5. UP0 Interface
6. MAC module with submodule EMAC

The board is always required if multi connections (monitoring, OLD, extra handset, speech recording) are to be used in conjunction with the dealer terminals. Without these multi connections, a dealer terminal may also be connected to the UIP or DUP0 board.

Features
8 UP0 interfaces for the connection of TH93x terminals.
2 x 2 MBit interfaces for the connection TH93Zx modules or speech recording devices.
Expansion of the module by means of the EMAC submodule provides an additional two 2 MBit interfaces for the connection of TH93Z modules and speech recording devices.

	The 2 MBit interface of a MAC can only be assigned to the terminals and Z modules that are located on the same MAC.

Other features	
Country of application	National and international
Power demand +5V	1500 mA
Overvoltage protection up to 4 kV	
Board software download.	
Board identification using board pass	
Maintenance function	

System requirements

The MAC board can only be used in the R1 rack in each module. It can be connected with any of the eight slots.

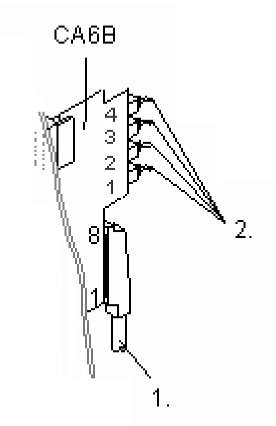
8.7.28.1 System Requirements

The MAC board can only be used in the R1 rack in each module. It can be connected with any of the eight slots.

8.7.28.2 CA6B for mains connection

Cable adapter for connecting UP0 and S2M connections to the MAC board.

- 50-pin CHAMP plug as an output to the MDF
- 8-pin WE plugs



CA6B with connections

1. 16-paired cable to external MDF, AO 1-8
2. 8-pin WE plug for the 2MBit interfaces

Ranges

UP0 Interface

The interface ranges are comparable to those of other UP0 interfaces within the CSI55:

Line length	
3.5 km	Earth cable Ø0.6 mm
2.1 km	Earth cable Ø0.4 mm
1.8 km	Installation cable Ø0.6 mm

2 MBit Interface

The interface range varies according to the cable attenuation.

When at 1 MHz, the wave attenuation must be no more than 6 dB.

Example 1:

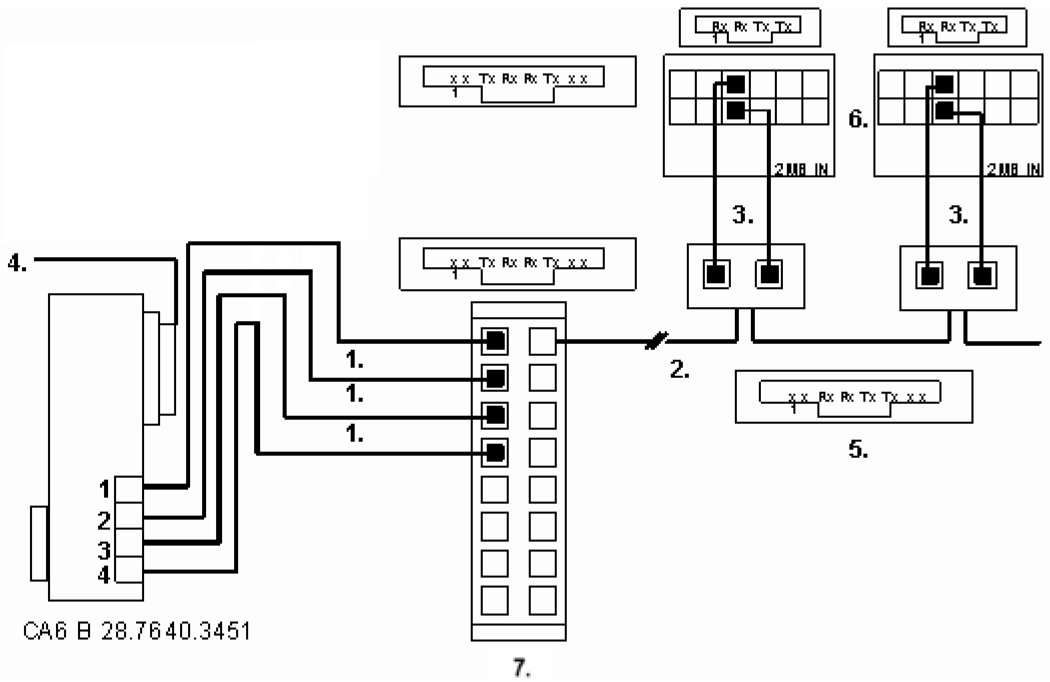
The J-2Y (SST)Y 2x2x0.6 III Bd (28.9802.0151) installation cable has wave attenuation of 28 dB/1 km (2,8 dB/100 m) when at 1 MHz, resulting in a maximum range of 6 dB: 2,8 dB = 214 m.

Example 2:

The ECONET cable (category 5) has wave attenuation of 16 dB/ 1km (1,6 dB/100 m) when at 1 MHz, resulting from a maximum range of 6 dB : 1,6 dB = 375 m.

8.7.28.3 Connections

Connection of the 2 MBit Interface

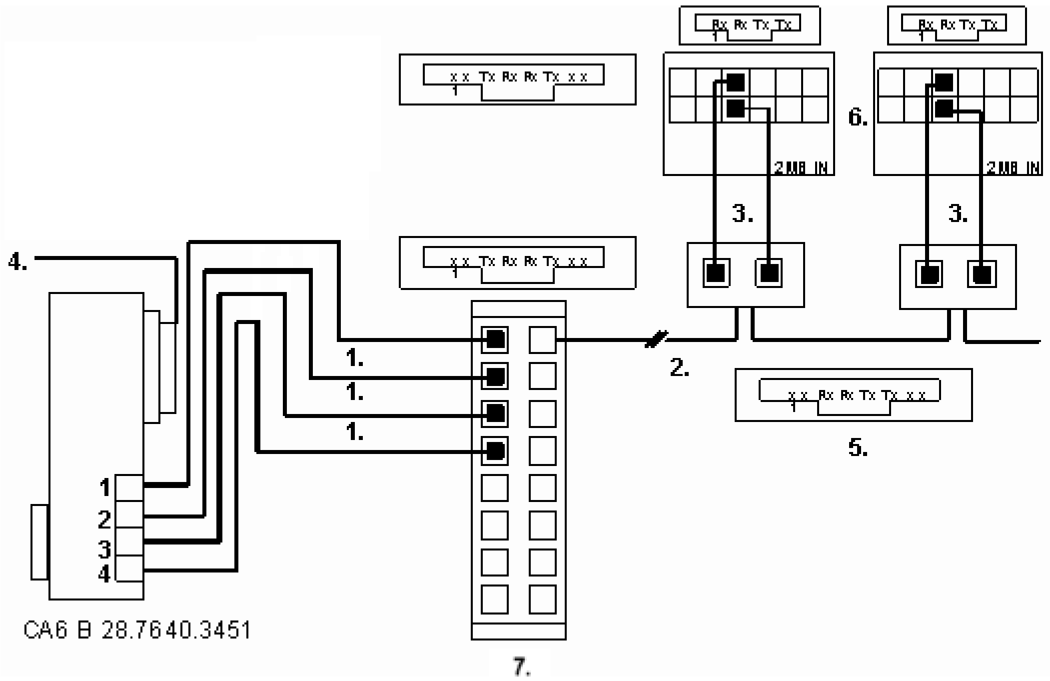


Connection of 2 MBit interface using WE6-WE4 module connecting cord

1. Patch cable:
   0.8 m 27.9798.0231
   2.0 m 27.9798.0232
   3.0 m 27.9798.0233
   to
   10 m 27.9798.0230

2. ECONET Cable 4x2 27.9798.0016
3. 4-wire connecting cord WE4/WE6 (junction box 17.8761.1598)
4. MDF cable:
   1m 29.9030.5301
   2m 29.9030.5302
   to
   99m 29.9030.5399
5. Junction boxes
6. Z modules
7. Patch panel:
   16-part 27.9798.2353
   24-part 27.9798.2354
   48-part 27.9798.2357

Connection of 2 MBit Interface, ECONET Standard

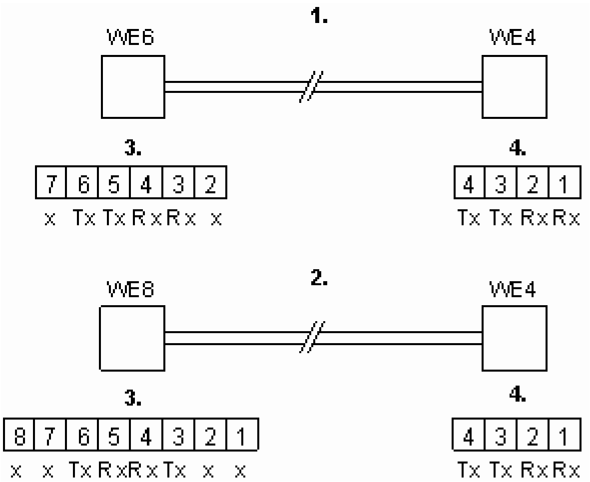


Connection of 2 MBit interface using WE8-WE4 module connecting cord in accordance with ECONET standard

1. Patch cable:
   0.8 m 27.9798.0231
   2.0 m 27.9798.0232
   3.0 m 27.9798.0233
   to
   10 m 27.9798.0230
2. ECONET Cable 4x2 27.9798.0016
3. 4-wire connecting cord WE4/WE8 (junction box 17.8761.1598)

4. MDF cable:
   1m 29.9030.5301
   2m 29.9030.5302
   to
   99m 29.9030.5399
5. Junction boxes
6. Z modules
7. Patch panel:
   16-part 27.9798.2353
   24-part 27.9798.2354
   48-part 27.9798.2357

To be able to meet the requirements of the ECONET cabling standard (featuring standardized configuration of connections), the extension modules now come supplied with a different connecting cord. Further information about cabling can be found in the Installation Manual of the respective extension modules.

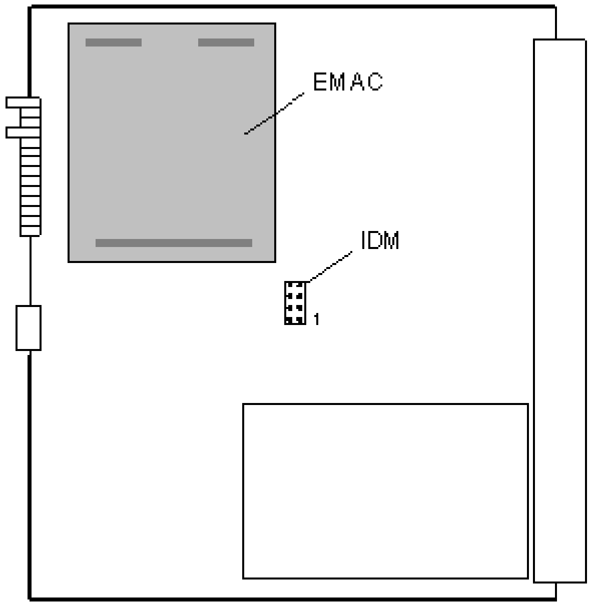


Connector Configuration

1. Old Connecting Cord (17.8761.1589)
2. New Connecting Cord (17.XXXX.XXXX)
3. Offering side
4. Z module side

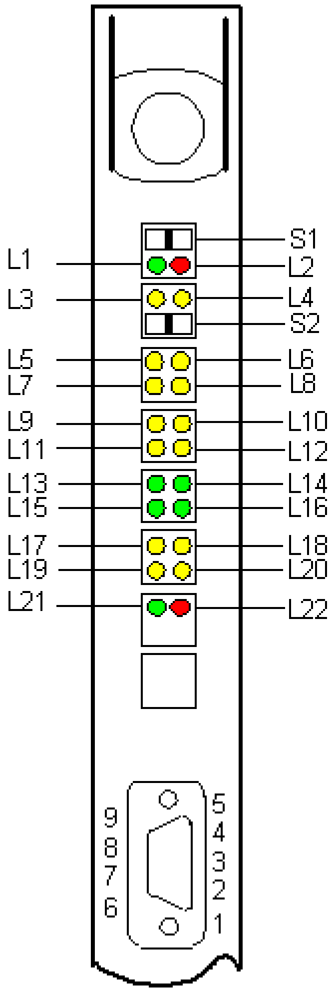
This connecting cord is identifiable via the plug design (WE8 on the offering side).

8.7.28.4 Board



MAC board, component side

8.7.28.5 LEDs and Switch Functions



MAC board, front side

1. V.24 plug

PIN	3	TXD
PIN	4	RXD
PIN	8	CTS
PIN	5	GND
PIN	4	+5V

Switch Function

S1	Middle:	Idle position
	Left:	ICU data requires preparatory disabling after reset
	Right:	Reset
S2	Middle:	Idle position

	Left:	Yet to be defined
	Right:	Yet to be defined

Meanings of LEDs

L1	on:	Busy
	flashing:	Preparatory disabling execution
	off:	Normal
L2	on:	Reset
	flashing:	Downloading
	off:	Normal
L3		Yet to be defined
L4		Yet to be defined
L5		UP0 port 1, layer 1 active
L6		UP0 port 2, layer 1 active
L7		UP0 port 3, layer 1 active
L8		UP0 port 4, layer 1 active
L9		UP0 port 5, layer 1 active
L10		UP0 port 6, layer 1 active
L11		UP0 port 7, layer 1 active
L12		UP0 port 8, layer 1 active
L13		2 MB interface 1 active
L14		2 MB interface 2 active
L15		2 MB interface 3 active
L16		2 MB interface 4 active
L17		DSP1
L18		DSP1
L19		DSP2
L20		DSP2
L21		CBI LED RXTX active
L22		CBI LED FAIL or PCANCEL

8.7.28.6 Commissioning

When starting up the MAC, the individual stages of the initialization are indicated by means of the LEDs on the front panel. LEDs 1 - 16 provide the following signalling:

1.	RESET of module On	→	LED 5-12 On
2.	pre_init_interrupt_adresses	→	LED 5 Off
3.	Init. of hardware register, end of module RESET	→	LED 6 Off
4.	Initialization Interrupt Disable counter	→	UP0 7 LED Off LED 13-16 On
5.	Network initialization		

a.	Initialization of switching modules (mtsl_init)	→	LED 13 Off
b.	Initialization of mixer module (musac_init)	→	LED 14 Off
c.	Initialization of mixer with level setting (musac_a_init)	→	LED 15 Off
d.	S2M Initialization (falc_init)	→	LED 16 Off
e.	Initialization of switching components between UP0 and highways (epic_init)	→	LED 8 Off
6.	init_interrupt_addresses	→	LED 9 Off
7.	initialize_heap	→	LED 10 Off
8.	Initialization of layer 2 timer	→	LED 11 Off
9.	V24 Initialization	→	All LEDs Off

The initialization of the MAC board is now complete.

Setting up the board using the ICU Configuration Editor

MAC board

Card				Field designation	active	Effect or function
Gen.	S2M	UP0				
X				Country setting		Selection of country
X				EMAC present		EMAC expansion level inserted, yes/no
X				DSP present		DSM expansion level inserted, yes/no
		X		Protocol version		Specification of which protocol the terminal is using

The installation of the MAC board requires the presence of CF2x modules and W1D, W2D or B1D modules. Setting up the MAC also requires a MACS to be set up on slots 90 and 91.

Correlations

When using the DSPF board, the AUX-HYs can no longer be used. This means that the DSPF board can now only be used for a maximum of 60 announcement channels and for this purpose uses only the bus bar which is available for the module slot itself and the free slot located below.

MACS board

Card				Field designation	active	Effect or function
Gen.	S2M	UP0				
						The pseudo module MACS (MAC Slave) must always be set up on slot 90 and 91 if at least one MAC is present within the module. The MACS enables the reservation of time slots, through which the call progress tones are connected to the MAC.
X				Country setting		
X				EMAC present		
X				DSP present		

	X					
		X		Protocol version		

8.7.28.7 Configuration Example for a Dealer Position on the MAC

20.11.97 07:51:19			
Connecting circuit			
Call number	:520		
Slot/HWA	:01-01-03-00		
AO-type	:DIPL	-log. position no.: 73	

General ADS data					
Name	:MAC position 00				
Accounting section	:0000				
Log files	:				
	Protocol	Version	defective	busy2	error
	TN1R6	0	OFF	OFF	OFF
Overload priority	:2				
SPWKGR. Public exchange access	:1				
SPWKGR. COLISEE	:0				
DISA group	:0				
Dealer group	:0				
CN alloc. HKZ & tie	:				
Category	:-1				
Waiting field max.	:10				
Reserved	:				
Connection memory	:0				
Service memory	:2				
AO state	:IN OPERAT.				
Service block	:sv-free				

Service data		
	TLP	DAT
Status	Free	FREE
Dialling group	2	3
Traffic group	1	1
Switchover group	0	0

Code dialling group	0	0
LCR group	0	0
Dial retrieval	DEACTIVE	DEACTIVE
Backward rel.	DEACTIVE	DEACTIVE

B channel data		
Allocation code	: -	
Deliberation code	: -	

	B ch no.	Bund no.	Dir.	Acc.	Status
Serves the signalling of extra handsets	1	-	-	-	F
	2	-	-	-	F
	3	-	-	-	F
	4	-	-	-	F
	5	-	-	-	F
	6	-	-	-	F
	7	-	-	-	F
	8	-	-	-	F
	9	-	-	-	F
	10	-	-	-	F
	11	-	-	-	F
	12	-	-	-	F
	13	-	-	-	F
	14	-	-	-	F
	15	-	-	-	F
	B ch no.	Bund no.	Dir.	Acc.	Status
Serves the signalling of the seized monitor channels, max. 16 channels	16	-	-	-	F
	17	-	-	-	F
	18	-	-	-	F
	19	-	-	-	F
	20	-	-	-	F
	21	-	-	-	F
	22	-	-	-	F
	23	-	-	-	F
	24	-	-	-	F
	25	-	-	-	F
	26	-	-	-	F
	27	-	-	-	F
	28	-	-	-	F
	29	-	-	-	F

	30	-	-	-	F

Number of seizable channels: 30

8.7.28.8 MDF Connections

The cable adapter CA6B must be used for the integration of the MAC into the I55 modules.

MDF		**via CA6B of the MAC**
Colours	Patch panel for two-wire connection	UP0
RD/BU	WE 1	A1/B1
WH/YE	WE 2	A1/B1
WH/GN	WE 3	A1/B1
WH/BN	WE 4	A1/B1
WH/BK	WE 5	A1/B1
WH/BU	WE 6	A1/B1
WH/YE	WE 7	A1/B1
WH/GN	WE 8	A1/B1
WH/BN	WE 9	free
WH/BK	WE 10	free
WH/BU	WE 11	free
RD/YE	WE 12	free
WH/GN	WE 13	free
WH/BN	WE 14	free
WH/BK	WE 15	free
WH/BK	WE 16	free

8.7.29 MULI Multi-line

Short description

The following description provides a basic outline of the board MULI. More detailed information about module features, installation and configuration can be found in a separate manual entitled **MULI Multi-Line**.

The MULI board is used for digital subscribers who have convenience features and who work together in a team or department.

The principle of the multi-line function is a pool containing call numbers that are assigned to the multi-line board. Each connected terminal is assigned call numbers which correspond to a B channel from this pool.

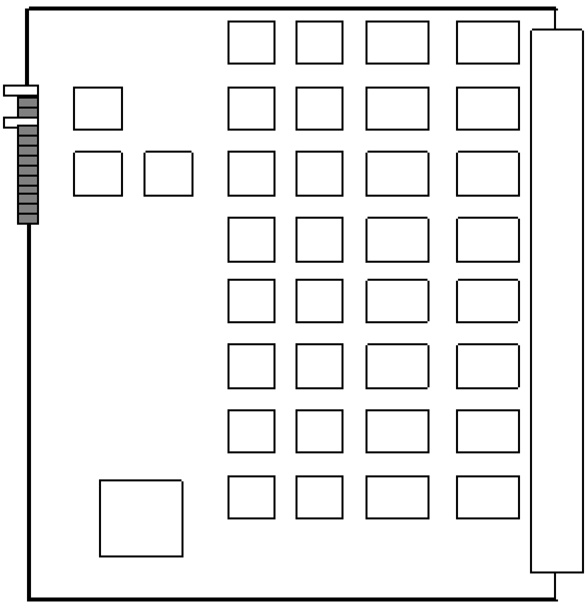
Features
Each subscriber has access to each line.
Access is gained directly via the keys of the terminal.

Holding calls (for consultation).
Each subscriber may retrieve a call in hold status at his terminal and continue conversation.
Definition of individual multi-line group per subscriber.

Line display to the terminal
Own call number (Primary Directory Number –> PDN)
Call number of other subscribers (Secondary Directory Number –> SDN)
Virtual call number (Phantom Directory Number –> PhDN)

Other features	
Country of application	National and international
Overvoltage protection up to 4 kV	
Board software download.	
Board identification using board pass	
Maintenance function	

8.7.29.1 Functionality



MULI board

The MULI board serves to provide the multi-line functions.

There exist three different configuration options:

- Single multi-line:

Board with 16 HWAs.
16 ports, each port with a maximum of two call numbers.
Multi-line pool with a maximum of 32 call numbers.

- Single multi-line:

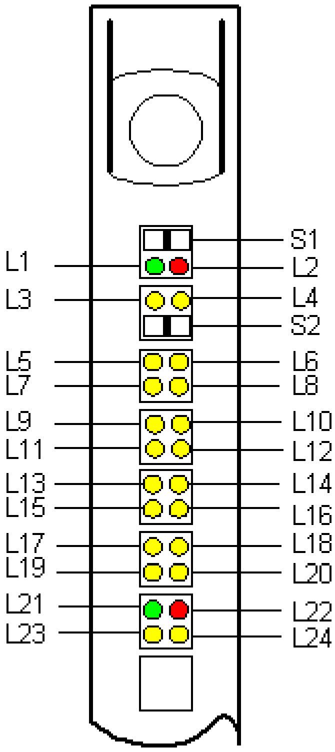
Boards with 32 HWAs with a neighbouring slot for a replacement board.
16 ports, each port with a maximum of two call numbers.
Multi-line pool with a maximum of 64 call numbers.

- Twin multi-line: (for step 2)

Boards, each with 16 HWA
32 ports, each port with a maximum of two call numbers.
Multi-line pool with a maximum of 64 call numbers.

The entire process of signalling and message exchange is implemented by the MULI board.

8.7.29.2 LEDs and Switch Functions



MULI board, front side

LED Functions

L1	on:	Busy
	flashing:	Preparatory disabling execution
	off:	Idle position
L2	on:	Reset
	flashing:	Download
	off:	Idle position
L3	on:	Yet to be defined
L4	on:	Yet to be defined
L5	on:	MULI Port 0 (16) layer active
L6	on:	MULI Port 1 (17) layer active
L7	on:	MULI Port 2 (18) layer active
L8	on:	MULI Port 3 (19) layer active
L9	on:	MULI Port 4 (20) layer active
L10	on:	MULI Port 5 (21) layer active
L11	on:	MULI Port 6 (22) layer active
L12	on:	MULI Port 7 (23) layer active
L13	on:	MULI Port 8 (24) layer active
L14	on:	MULI Port 9 (25) layer active
L15	on:	MULI Port 10 (26) layer active
L16	on:	MULI Port 11 (27) layer active
L17	on:	MULI Port 12 (28) layer active
L18	on:	MULI Port 13 (29) layer active
L19	on:	MULI Port 14 (30) layer active
L20	on:	MULI Port 15 (31) layer active
L21	on:	Yet to be defined
L22	on:	Yet to be defined
L23	on:	Yet to be defined
L24	on:	Yet to be defined

The numbers in brackets apply to the multi-line group for step 2, which can be implemented using two boards.

Switch Functions

S1	Left:	Preparatory disabling call from ICU data after a reset
	Middle:	Idle position
	Right:	Reset
S2	Links	Not used
	Middle:	Idle position
	Right:	Not used

8.7.29.3 MDF Connections

MDF		**via CA1B from MULI (UP0)**
Colours 16x2	Patch panel for the two wire connection	
RD/BU	WE 1	A1/B1
WH/YE	WE 2	A2/B2
WH/GN	WE 3	A3/B3
WH/BN	WE 4	A4/B4
WH/BK	WE 5	A5/B5
WH/BU	WE 6	A6/B6
WH/YE	WE 7	A7/B7
WH/GN	WE 8	A8/B8
WH/BN	WE 9	A9/B9
WH/BK	WE 10	A10/B10
WH/BU	WE 11	A11/B11
RD/YE	WE 12	A12/B12
WH/GN	WE 13	A13/B13
WH/BN	WE 14	A14/B14
WH/BK	WE 15	A15/B15
WH/BU	WE 16	A16/B16

8.7.30 OFA2B/OFAS Optical Fibre Adapter

Short description

The OFA2B Optical Fibre Adapter 2 B modules and OFAS Optical Fibre Adapter single mode are for connecting the optical waveguides when DT21 boards are used and the optical interfaces are employed.

The boards are used for various optical fibre types:

OFA2B		OFAS	
Graded-index fibres		Mono-mode fibres	
Ready-made cable types	CoreØμm	Ready-made cable types	CoreØμm
29.9030.6101-6199*	62,5	29.9030.6201-6299*	9,5

*The last two characters of the material number indicate the length of the pre-prepared cable in metres.

Cable lengths >99m are handled by the project division.

Common data for OFA2B and OFAS boards

Interfaces	Number and form	Wavelength
Optical transmitters	1 SC socket	1300nm
Optical receivers	1 SC socket	1300nm

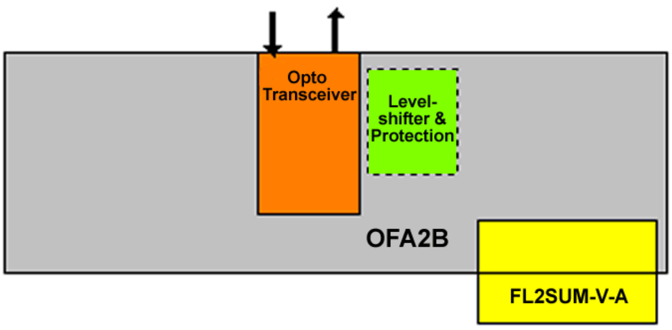
electrical values		
Supply voltage	5V	

Supply current	250mA	typical
Power consumption	1.25W	

Depending on the optical fibre used and cross-section area of the optical cable, different maximum cable lengths can be achieved:

Maximum distances			
Type of fibre	Optical fibre core Øμm	maximum length km	
Graded-index fibre	62,5	10	
	50	6,2	
Mono mode	9,5	15	

Basic construction of OFA2B and OFAS

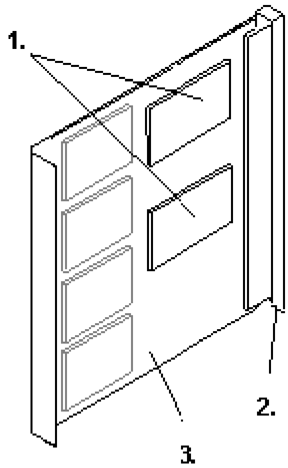


⚠	OFA2B and OFAS boards are designed for connecting to SC plugs. Neither board is thus compatible with the previous OFA1B board type, which was designed for mono-mode fibre and ST connectors.

8.7.31 S64LI Structured 64 KBit Line Interface

Short description

The S64LI is a submodule of the IMUX for connection to digital permanent connections. The maximum transmission rate is 64 kBit/s.



S64LI submodule on the IMUX board

1. S64LI submodule
2. Connecting circuit slot
3. IMUX board

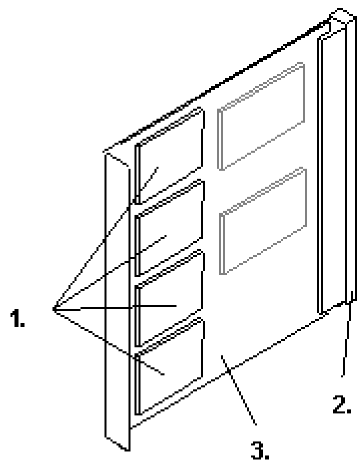
Other features	
Country of application	National and international
Power demand +5V	40 mA
Configurable for standard digital permanent connections.	
PCM coupling and layer 1 function	
Can be combined with the X64LI submodule on the IMUX board	

8.7.32 SPCU Speech Compression Unit

Short description

SPCU is an submodule of the IMUX which aids compression of the bit rate from 64 kBit/s to 16 kBit/s on rapid signal processors with digital speech signals.

Implementation occurs here of the



SPCU submodule on the IMUX board

1. SPCU Submodule
2. Connecting circuit slot
3. IMUX board

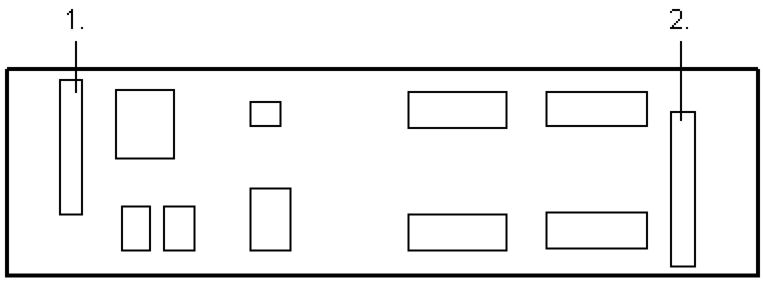
Other features	
Country of application	National and international
Power demand +5V	300 mA
Transmission of FAX signals with 9,6 kBit/s	

8.7.33 STSM S0/T0 Submodule

Short description

The submodule STSM is plugged into the ADM board. It provides four S0- or T0interface. It contains layer 1 and layer 2 HW ports.

Configurable interfaces
Subscriber connection (S0 powered); Layer 1 master (standard) or layer 1 slave (outlying extension)
Exchange line (T0, unpowered)
Exchange line simulation (T0, unpowered)
Permanent connection (T0, unpowered, master clock or clock slave, layer 2 master or slave)



STSM submodule, component side

1. Plug connector to the ADM (internal ADM interface)
2. Plug connector to the ADM (line interface)

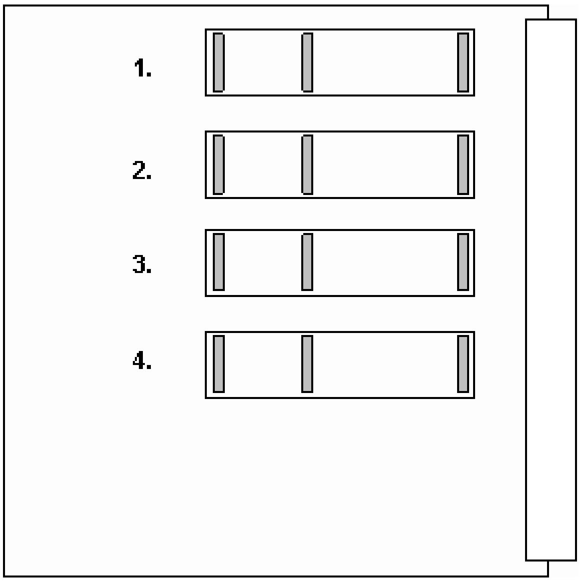
Other features	
Country of application	Application in all countries
Power demand +5V	10 mA
Selection free configuration of each individual connection	
Overvoltage protection up to 4 kV	
Download board software	
Board identification using board pass	
Maintenance function	

8.7.34 UIP Universal Interface Platform

Short description

The UIP board is a basic board which accomodates up to 4 submodules.

Submodules
V24M with a V.24 interface.
CL2M for the reception and transmission of external synchronous clock signals.
CL2ME for receiving an external high-precision reference clock by means of a clock normal (TAREF).



UIP board, component side

1. Slot 1
2. Slot 2
3. Slot 3
4. Slot 4

The following signals are available for the V.24:

RXD	
TXD	
DTR	(unsupported)
GND	
DSR	(unsupported)
RTS	(unsupported)
CTS	(unsupported)

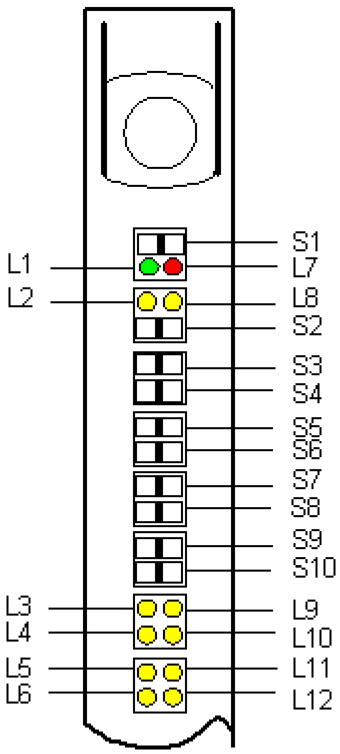
The V24M submodule may only be inserted in the first two (upper) slots. The others are freely configurable.

When using the CL2ME in the first slot the cable adapter CA3B/T must be used for connecting the TAREF.

Other features	
Country of application	Application in all countries

Power demand +5V	500 mA
Overvoltage protection up to 4 kV	
Download board software	
Board identification using board pass	
Maintenance function	

8.7.34.1 LEDs and Switch Functions



UIP board, front side

Switch Position in Normal Operation

S1-S10	Middle position

Switch Function

S1	Left:	Preparatory disabling of all connecting circuits
	Middle:	Normal mode
	Right:	Reset board
	Right, then left:	Forced board download
S2		Not used
S3	Right:	Connecting circuit 1 preparatory disabling
	Middle:	Connecting circuit 1 release
	Left:	No function

S4	Right:	Connecting circuit 2 preparatory disabling
	Middle:	Connecting circuit 2 release
	Left:	No function
S5	Right:	Connecting circuit 3 preparatory disabling
	Middle:	Connecting circuit 3 release
	Left:	No function
S6	Right:	Connecting circuit 4 preparatory disabling
	Middle:	Connecting circuit 4 release
	Left:	No function
S7	Right:	Connecting circuit 5 preparatory disabling
	Middle:	Connecting circuit 5 release
	Left:	No function
S8	Right:	Connecting circuit 6 preparatory disabling
	Middle:	Connecting circuit 6 release
	Left:	No function
S9	Right:	Connecting circuit 7 preparatory disabling
	Middle:	Connecting circuit 7 release
	Left:	No function
S10	Right:	Connecting circuit 8 preparatory disabling
	Middle:	Connecting circuit 8 release
	Left:	No function

Meanings of LEDs

L1	on:	Board is busy with switching functions
	flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L7	on:	Board reset in progress
	flashing:	Download in progress
	off:	Board in operation
L2, L8	Not busy	
L3	on:	Layer 1 of connecting circuit 1 active
L4, L5, L6, L9, L10, L11	on:	Layer 1 of connecting circuit x active
L12	on:	Layer 1 of connecting circuit 8 active

8.7.34.2 MDF Connections

MDF	UIP slot	via CA1B/3B from the UIP with four CL2M	via CA1B/3B from the UIP with four CL2ME

Colours 16x2	Patch panel for the two wire connection	Patch panel for the four-wire connection			
RD/BU	WE 1	WE 1	1	A1/B1 (T)	A1/B1 (R)
WH/YE	WE 2			C1/D1 (R)	free
WH/GN	WE 3	WE 2		free	free
WH/BN	WE 4			free	free
WH/BK	WE 5	WE 3	2	A2/B2 (T)	A2/B2 (R)
WH/BU	WE 6			C2/D2 (R)	free
WH/YE	WE 7	WE 4		free	free
WH/GN	WE 8			free	free
WH/BN	WE 9	WE 5	3	A3/B3 (T)	A3/B3 (R)
WH/BK	WE 10			C3/D3 (R)	free
WH/BU	WE 11	WE 6		free	free
RD/YE	WE 12			free	free
WH/GN	WE 13	WE 7	4	A4/B4 (T)	A4/B4 (R)
WH/BN	WE 14			C4/D4 (R)	free
WH/BK	WE 15	WE 8		free	free
WH/BU	WE 16			free	free

MDF Connection via CA3B from UIP

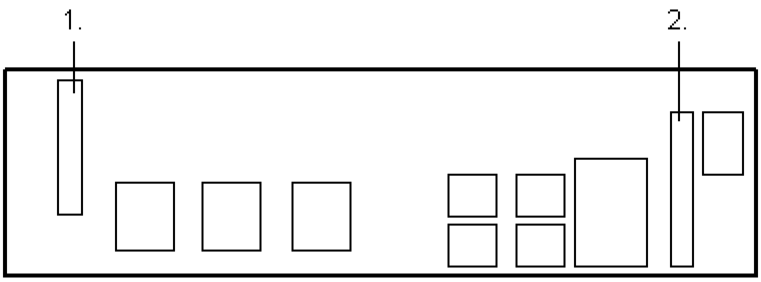
The V24M submodules used on slots 1 and 2 can be connected directly to the Sub-D plug of the cable adapter.

In the case of mixed combination, slots 1 and 2 with CL2M, CL2ME and V24M, see table above.

8.7.35 UKSM UK0 Submodule

Short description

The UKSM submodule is inserted on the ADM board. It provides two UK0master interfaces. It contains layer 1 and layer 2 HW ports.



UKSM submodule, component side

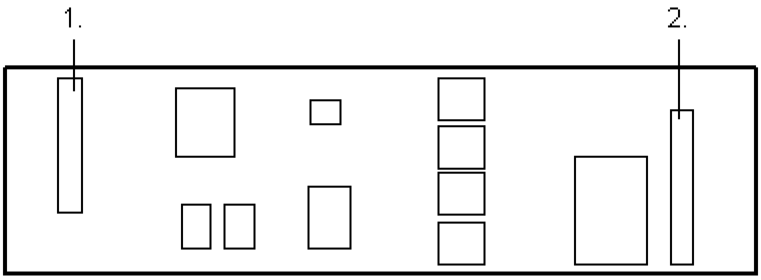
1. Plug connector to the ADM (internal ADM interface)
2. Plug connector to the ADM (line interface)

Other features	
Country of application	Application in all countries
Power demand +5V	400 mA
Interface description	UK0interface; two-wire; transmission rate: 384 kbit/s
	Coding 2B1Q
Line lengths	4,5 km installation cable (I-Y(ST)Y Ø0.6 mm
	8 km outdoor cable A-2YF(L)2Y Ø0.6 mm
Overvoltage protection up to 4 kV	
Download board software	
Board identification using board pass	
Maintenance function	

8.7.36 UPSM UPN submodule

Short description

The UPSM submodule is inserted on the ADM board. It provides four UPNinterfaces for digital terminals or permanent connection.



UPSM submodule, component side

1. Plug connector to the ADM (internal ADM interface)
2. Plug connector to the ADM (line interface)

Other features	
Country of application	Application in all countries
Power demand +5V	35 mA
Interface description	four UPN interfaces; two-wire
	Transmission rate: 384 kbit/s
	16 dB attenuation range
-48 V/max. 60 mA short-circuit-proof supply for increased power consumption, e.g. T3 terminals	
Line lengths	1 km installation cable (I-Y(ST)Y Ø0.6 mm
	2.8 km outdoor cable A-2YF(L)2Y Ø0.6 mm
Overvoltage protection up to 4 kV	
Download board software	

Board identification using board pass
Maintenance function

Using a UPN-Repeater the range of the UPNinterface can be extended.

8.7.37 V24M Module

Short description

V24M is a sub-board for the UIP board. It comprises the layer 1 functions for a V.24 interface.

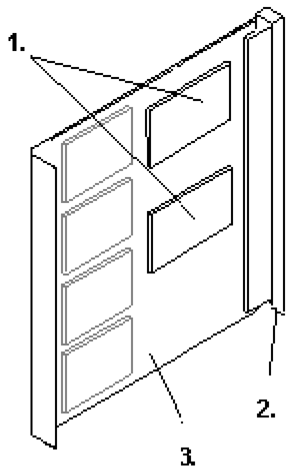
A maximum of two V24 modules can be inserted on slots 1 and 2 of the UIP board. This requires the connection of the connecting circuit line to be implemented via the CA3B board.

Other features	
Application	for further V.24 ports on the system
Power demand +5V	100 mA

8.7.38 X64LI kBit Line Interface

Short description

The S64LI is a submodule of the IMUX for connection to international digital leased lines.



X64LI submodule on the IMUX board

1. X64LI submodule
2. Connecting circuit slot
3. IMUX board

Other features

Country of application	Application in all countries
Power demand +5V	220 mA
Maximum transmission rate	64 kBit/s
Use only as permanent connection or leased line	
PCM coupling and layer 1 function	
Can be combined with the S64LI submodule on the IMUX board.	

8.8 IP Telephoning Gateways

		Board		Submodule		Connection board
Board/ Rack/ Backplane		IPGW → 502		DSP → 506		CAIB → 247
				S0 → 506		
		VoIP → 513		SOM-2 → 576		AEV24B → 230

8.8.1 IPGW Internet Protocol Gateway

This board is no longer available. It has been replaced by VOIP board, see VoIP Voice over IP Board → 513

Short description

Besides excellent conformance to the relevant standards, the IPGW board offers a variety of new features.

Features
High voice quality
Up to 30 parallel calls per device
All relevant speech codings (G.711, G.723.1, G.726, G.729A)
Full telephone convenience with single-digit and block dialling, local and remote dialling tone, local noise generation in call intervals.
Flexible voice routing options IP-IP, ISDN-ISDN and IP-ISDN (any to any dialling)
Flexible configuration options, connection as a subscriber or exchange to the PABX, ISDN network or by looping into the existing exchange line.
Remote maintenance capability
Preconfiguration option
Built-in gatekeeper
Interoperability with other VoIP products

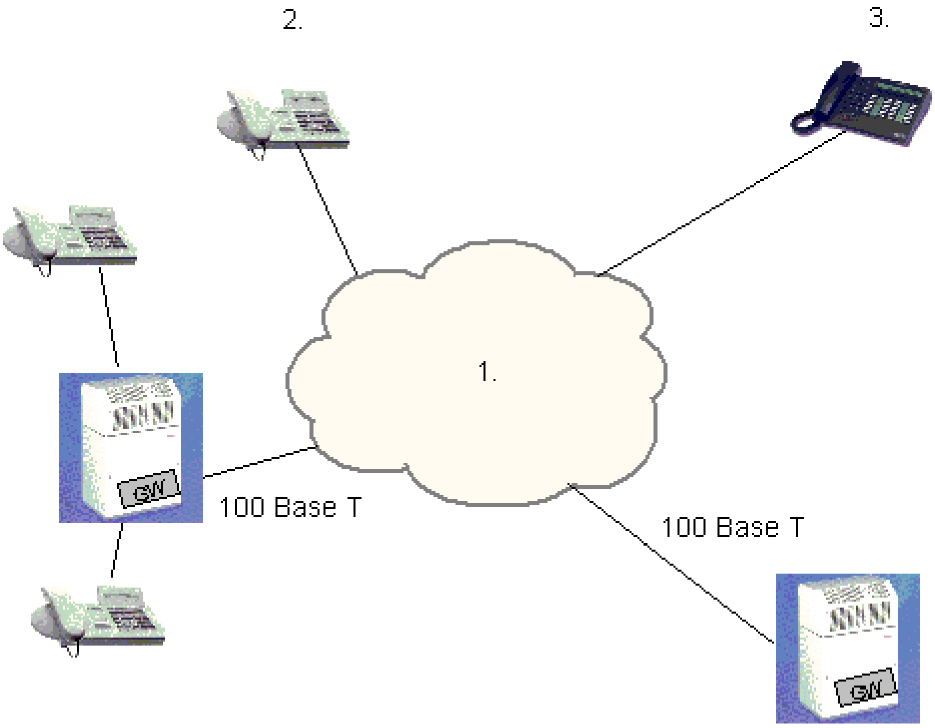
It consists of a gateway with integrated gatekeeper and two S2M interfaces (QSIG or DSS1 protocol) for connection to the CSI55.

The gateway can be coupled with the CSI55 and an existing S2M exchange line via the two S2M interfaces. An additional DT2 board is not required for the purpose. Calls from the public port are then transferred transparently through the gateway. Connection to the IP network is via an Ethernet interface.

The IP interface offers the H.323 Media Stream protocol for speech and enables IP telephony on up to 30 channels (equippment option: 10, 20, 30 channels). Either H.323 terminals or other gateways for IP networking of PABXs can be connected.

Support with tools (KAD, CAT, ISM) is not currently possible.

Until our own IP phone is available, the IP phone manufactured by Tiptel will be used as a terminal for direct connection to the IP world.

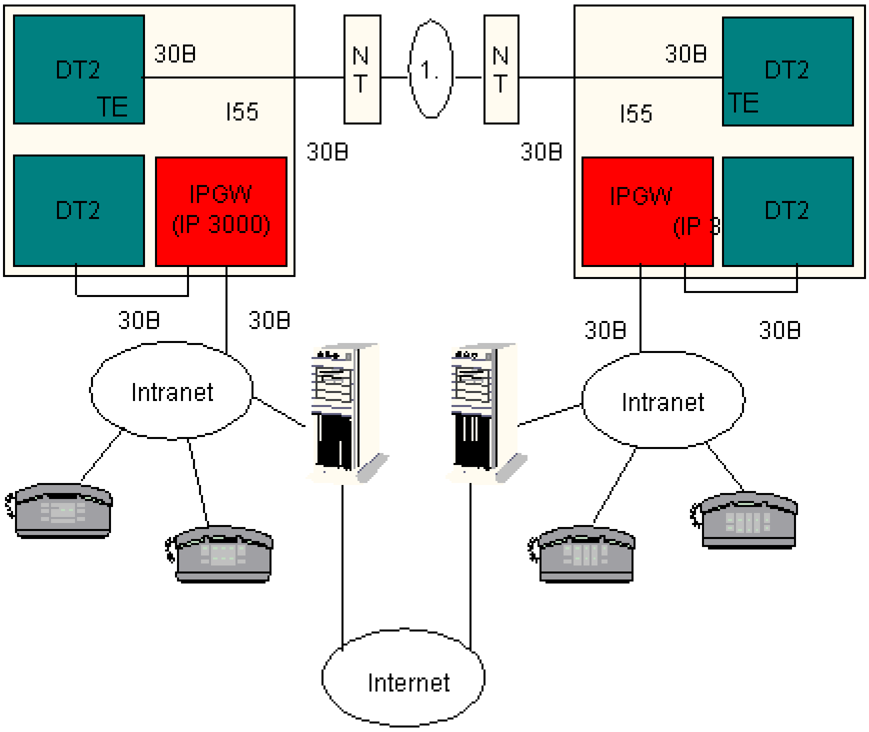


H.323 environment

1. IP network (IP Network H.323 LM)
2. IP phone (NTP IP phone; H.323)
3. H.323 terminal

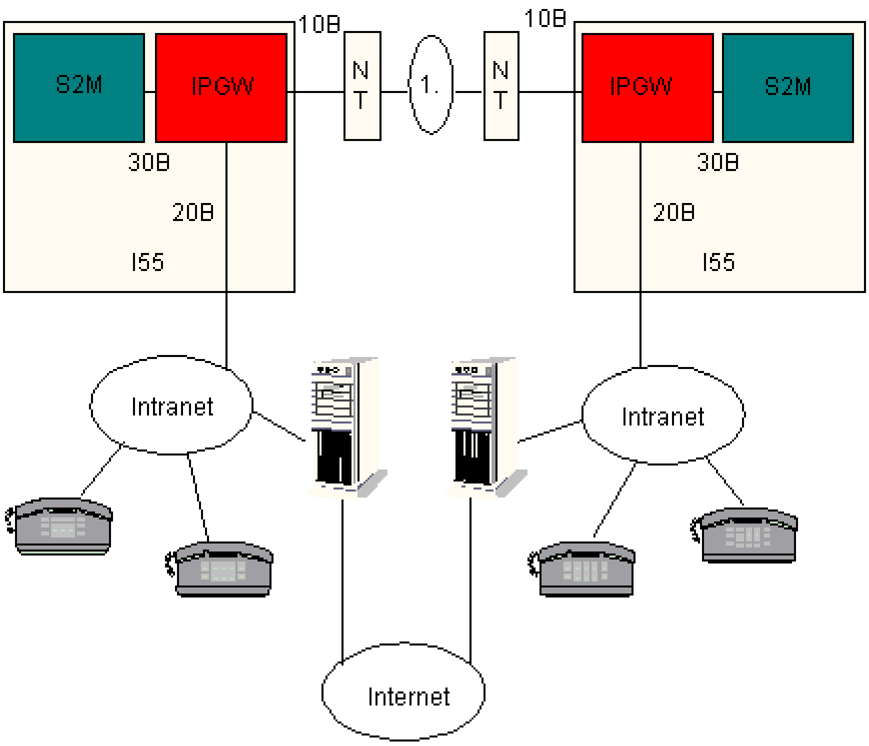
8.8.1.1 Configurations

Exchange line
Own DT2 board for each IPGW



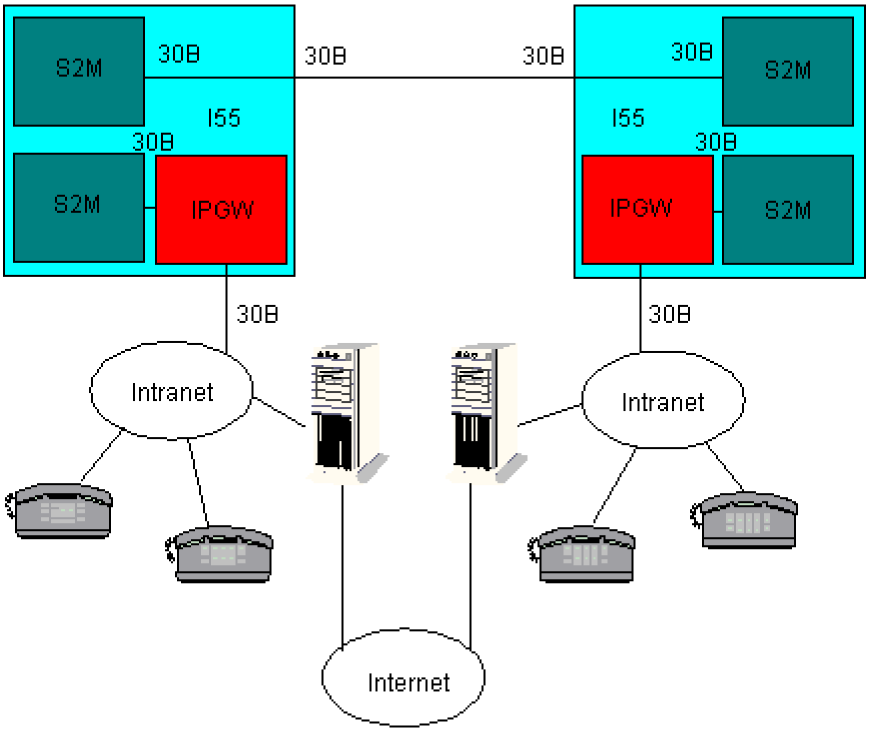
1. Public network

Exchange line
IPGW looped in

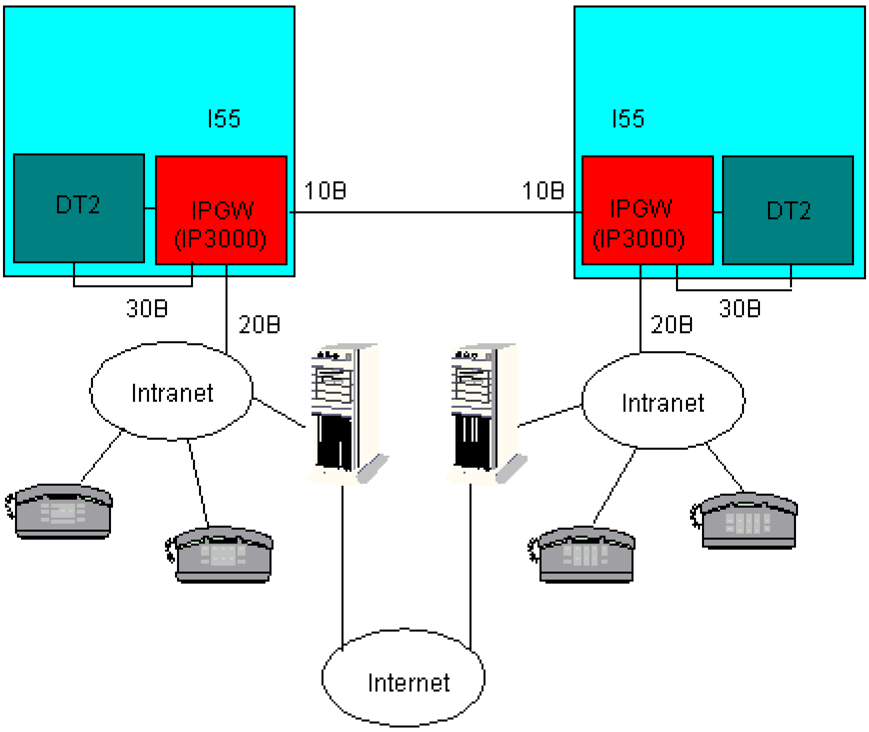


1. Public network

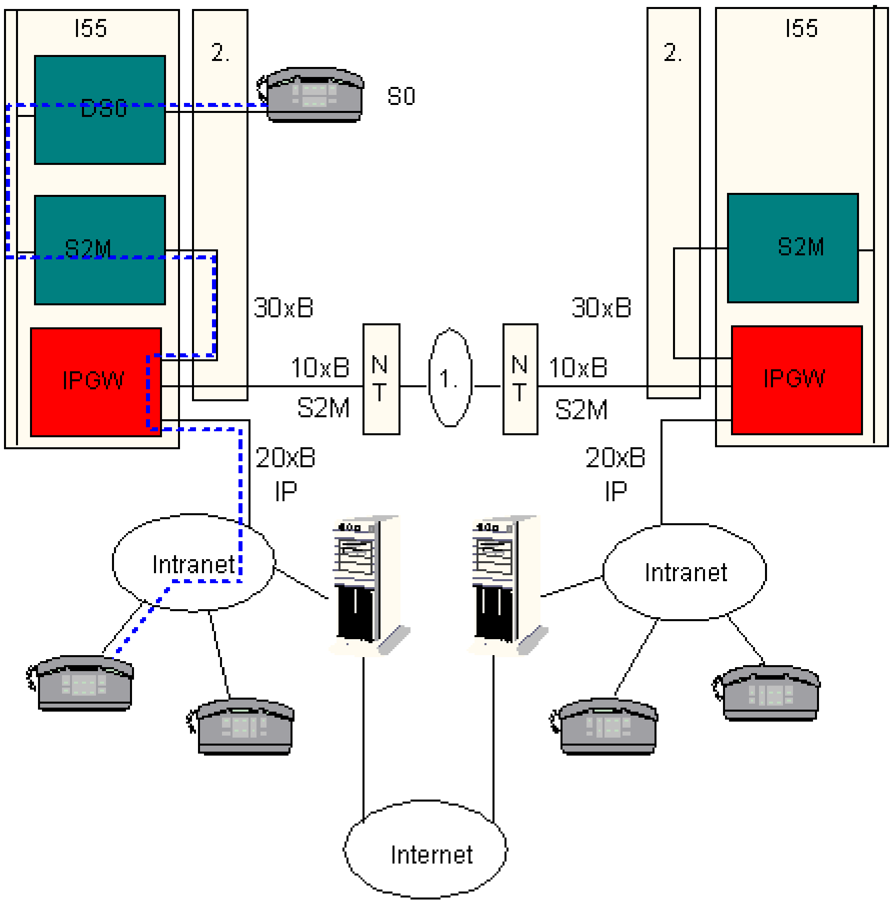
Permanent connection
Own DT2 board for each IPGW



Permanent connection
IPGW looped in



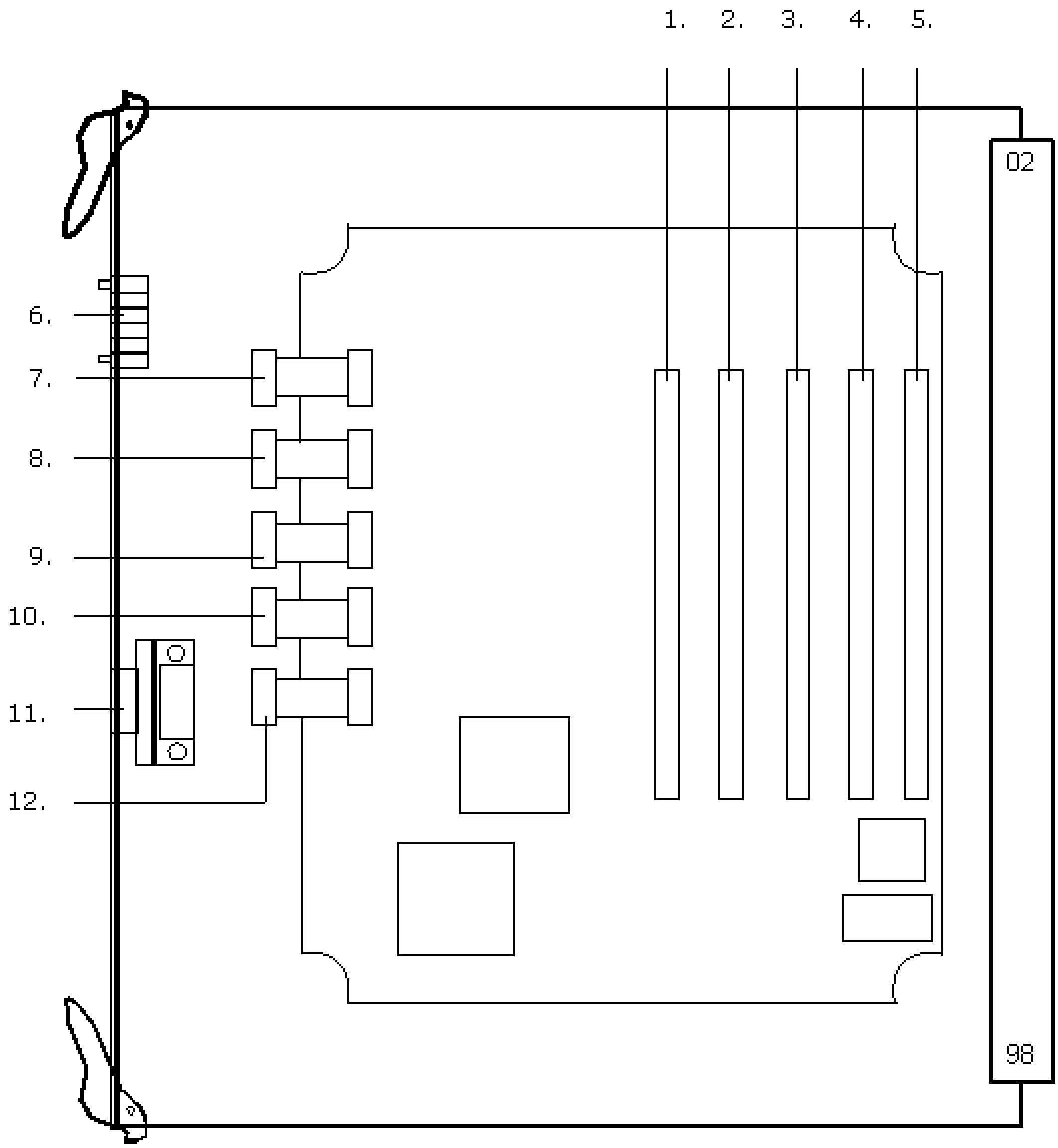
Example of a connection



1. Public network
2. MDF

8.8.1.2 Submodules on IPGW

The IPGW board is equipped with a S0submodule and a Digital Signal Processor (DSP) submodule. Depending on the configuration of IP channels on the IPGW, the board is additionaly equipped with a maximum of two additional DSP submodules.

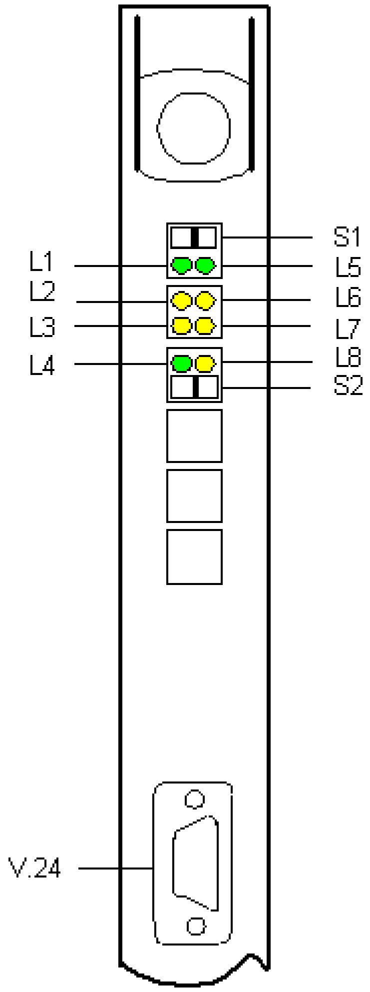


Component side of the IPGW board

1. Slot for submodule S0
2. submodule slot for submodule DSP for the following equipment option: 10 channels (IP network connections)
3. submodule slot for submodule DSP for the following equipment option: 20 channels
4. submodule slot for submodule DSP for the following equipment option: 30 channels
5. free (currently not used)
6. LEDs and switches
7. PRI1
8. PRI2
9. S0

10. 10/100 Base T
11. V.24 interface
12. V.24

8.8.1.3 LEDs and Switch Functions



IPGW board, front side

Switch Position in Normal Operation

S1 center

S2 left

Middle position

Switch Function

S1	Left:	No function
	Middle:	Operating status/release
	Right:	Reset board *
* Reset duration		

greater 5s	Standard configuration and special reset mode
smaller 5s	Normal operating status with activated DHCP (Dynamic Host Configuration Protocol) server mode

S2	Left:	Prepare the board for the connection to a hub
	Middle:	Configure the board for the connection to a PC

Meanings of LEDs

L1	5V	on:	5V present/available
		off:	5V not present/available
L2	PRI1 TE	on:	Layer 1 of transmission path is established
L3	S/T	on:	Layer 1 of transmission path is established
L4	ACT	on:	Ethernet receives or sends data
		off:	Idle state
L5	Ready	on:	Board in operation, configuration in order
		Flashing 1 time, then 1s pause. The process starts once more from the beginning.	DSP error
		Flashing 2 times, aprox. 0.5s pauses, then 1s pause. The process starts once more from the beginning.	S0 error
		Flashing 4 times, aprox. 0.5s pauses, then 1s pause. The process starts once more from the beginning	S2M error
		Flashing 6 times, aprox. 0.5s pauses, then 1s pause. The process starts once more from the beginning	Enet error (Enet = Ethernet)
		Flashing 7 times, aprox. 0.5s pauses, then 1s pause. The process starts once more from the beginning	Uart error (Uart = V.24)
		off:	Board not ready
L6	PRI2 NT	on:	Layer 1 of transmission path is established
L7	LINK	on:	Ethernet connection is running
		off:	Ethernet connection is not running
L8	Speed	on:	100 Mbps
		off:	10 Mbps

Assignment of the V.24 interface (male DSub 9) on the front panel

Signal name	Description	DSub 9 pin

TXD	Transmit Data (send data)	3
RXD	Receive Data (reception data)	2
RTS	Request To Send (switch on the transmitter)	7
CTS	Clear To Send (readiness for sending)	8
DTR	Data Terminal Ready (terminal ready for operation)	4
DSR	Data Set Ready (operational readiness)	6
GND		5
DCD	Data Carrier Detect (receive signal level)	NC

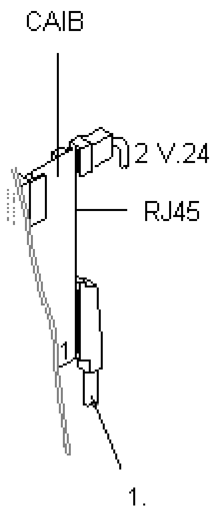
The V.24 interface (console port) can be used for the first configuration of the IPGW.

Set the RS232 interface of your PC as follows:

Adjustments of the console port	
Bits per second	9600
Data bits	8
Parity	None
Stop bits	1
Protocol / flow control	None

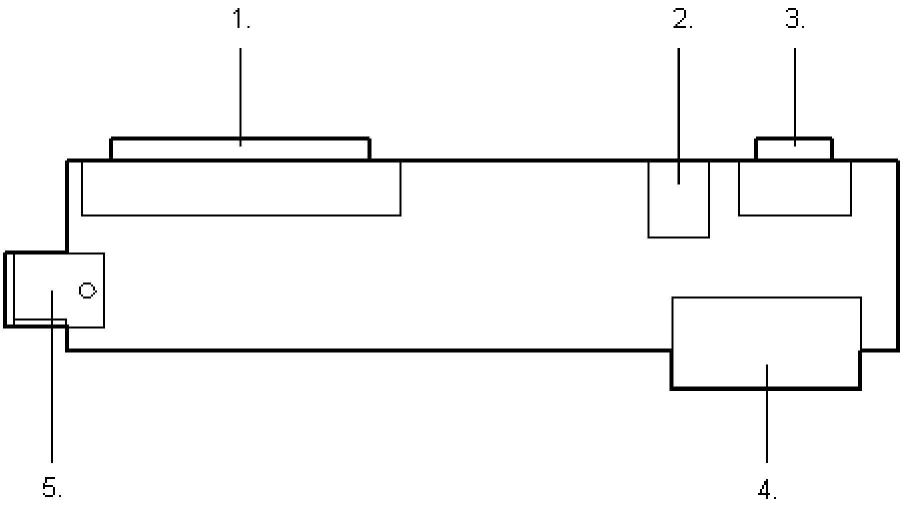
8.8.1.4 MDF Connections

The CAIB cable adapter serves for the connection of the cable network.



CAIB cable adapter

1. Connection cable CAIB - MDF



Cable adapter CAIB, component side

1. Cable 6x2 to the main distribution frame
2. RJ45 socket for the Ethernet connection
3. V.24 connection (free)
4. Plug for backplane
5. Fixation

Two cables are available for the connection to the main distributor:

- ext. connection cable IPGW, 10m: 49.9903.4483
- ext. connection cable IPGW, 40m: 49.9903.4485

Through these cables the:

- Exchange line or permanent connections (S2M)
- Service, synchronization (S0)

are connected.

MDF	Cable Adapter CAIB	
Colours 6x2	**IPWG**	
WH (white) / BN (brown)	PRI1	A1/B1 (TX+/TX-)
GN (green) / YE (yellow)		A2/B2 (RX+/RX-)
GY (grey) / PK (pink)	PRI2	A1/B1 (TX+/TX-)
BU (blue) / RD (red)		A2/B2 (RX+/RX-)
BK (black) / VT (violet)	BRI	A1/B1 (TX+/TX-)
GY PK (grey/pink) / RD BU (red/blue)		A2/B2 (RX+/RX-)

PRI=Primary Rate Interface (S2M)

BRI=Basic Rate Interface (S0 /T0)

PRI1=TE

PRI2=NT

BRI=S0 (service, synchronization input)

8.8.1.5 Connection of the Ethernet Interface

The Ethernet connection located on thecable adapter is connected to the Ethernet 10/100 base T-connection using a CAt5 structure cable with RJ45 plug.

The total length of the connection to the switch must not exceed 100 m.

Seizure of the Ethernet connection (RJ45)

Signal name	Description	RJ45 pin
TX+	Transmit	1
TX-	Transmit	2
RX+	Receive	3
		4
		5
RX-	Receive	6
		7
		8

8.8.1.6 Administration

The board mentioned above cannot be managed in CSI55 and in the tools. In order to avoid mistakes when altering or retrofitting communication servers Integral 55 in the field due to the lack of tool administration to the greatest possible extent, please proceed as follows:

1.
   - In the event of supply via KSPA, set up a **"T1CCS"** as a pseudo-module (digital AO, country selection USA) in the KAD/CAT on the IPGW slot. The corresponding lines belonging to the DT2 board are to be labelled **Fxx01 - Fxx30** and named **VoIP line**
   - When retrofitting in the field, set up a **"T1CCS"** as a pseudo-module (digital AO, country selection USA) in the KAD/CAT on the IPGW slot. The corresponding lines belonging to the DT2 board are to be labelled **Fxx01 - Fxx30** and named **VoIP line**
2. The register the system with ZOLS or change with the **"Comment"**: Please register in the customer data: **Attention! IPGW board on the T1CSS slot (pseudo-board)**

8.8.1.7 Technical Data

Log files

Internet:	IP, TCP, UDP, RTP, DHCP, TFTP, ICMP

Configuration:	Telnet, HTTP, Java
ISDN:	ETSI DSS1, Q.SIG
Voice-over-IP:	H.323, H.225, H.245, RTP, RTCP, RAS
Voice:	Speech pause recognition (VAD)
	Comfort noise generation (CNG),
	dynamic jitter buffer,
	G.711 A-law
	G.711 μ-law
	G.723.1 5.3 and 6.3 kbps
	G.729A
	G0.165

Special Features	”Overlapped” und ”non-overlapped sending”
	Direct dialing-in (DDI)
	Display caller and
	called number (CLI, CPN)
	Generate dial tones
	Integrated gatekeeper
	Optional operation to external gatekeeper
	(RAS protocol)
	Optional looping in the TC system
	Public exchange
	Upgradable for a greater number of ports

8.8.1.8 Description of software functions

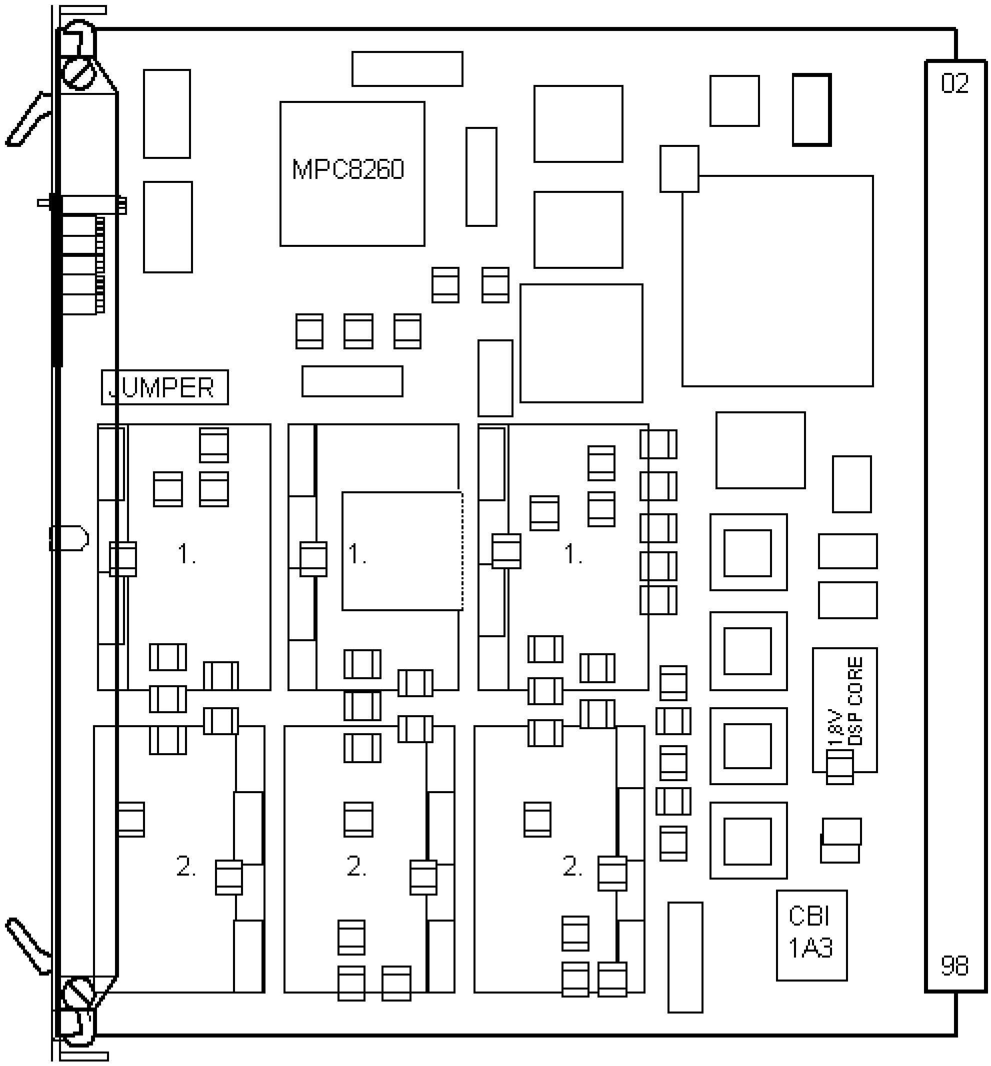
The enclosed descriptionHBIP400 refers to IP400. All procedures correspond with those of the IPGW board.

8.8.2 VOIP Voice over IP Board

Short description

For the VOIP board and all additional information for setup, dimensioning etc. you can find a detailed description under Notes concerning VoIP.

It is shown once again in the figure below.



VOIP board, component side

1. Speech compression / packetizing
2. Echo cancellation

The basic board VOIP (material number: 49.9903.7976) has 6 slots for SOM-2 submodules, with two DSP chips each(Digital Signal Processing Small Outline Module 2, material number: 49.9903.7980) in order to increase the number of DSP chips used in the system. These DSP chips have two functions:

- Voice compression, in order to pack voice information from the highway into data packets and thus to compress the speech data when desired (from G.711 64 kbit/s to G.729A 8kbit/s)
- Echo cancellation for the voice connection from the IP terminal to the ISDN/analog terminals

The upper three slots (in the centre of the board) are used for voice compression and packetizing, while the lower three slots are used for echo cancellation.

Due to the very high cost of DSP chips, the number of SOM-2 submodules must be selected in accordance with the customer configuration (see calculation of the number of SOM-2 submodules).

In addition, 4 DSP chips are soldered on the VoIP board. These are responsible for central functions such as announcements, mixers, and tone input, and support a fixed number of channels for voice compression and echo cancellation.

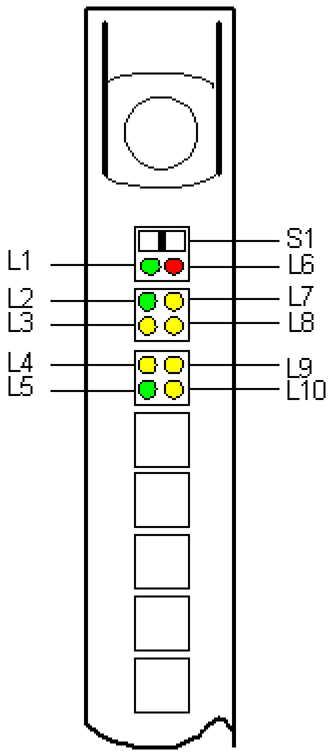
The VOIP board connection to the peripherals is done via the AEV24B cable adapter.

Other features		
Application	Integration of the CSI55 extensions into the existing IP-based data network environment of the customer (LAN, WAN, Corporate Network)	
Power demand +5V	1800 mA	additionally per SOM-2: 240 mA

Notes to VoIP → 576

8.8.2.1 LEDs and Switch Functions

In the figure below the view of the front panel and the funktions of the switches and LEDs.



View of the front panel

Switch Functions

S1	Left:	Preparatory disabling (VSP)
	Middle:	Operating status/release
	Right:	Reset
	Right, then left:	Forced board download

Meanings of LEDs

L1	on:	Module is busy in terms of exchange functions (active layer 3 connection)
	flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L2 POWER GOOD)	on:	All voltages (5V, 3.3V, DSP on-board VCC 1.8V and PQUICC Vcore currently 2.5V) are within their permitted ranges of tolerance
L3 (ETH Link)	on:	Ethernet Link has been established
L4 (ETH 10/100)	on:	100Mbit transmission is in process (SPEED)
L5 (ETH active)	flashing:	Activity on the Ethernet (transmitting and receiving ends)
L6	on:	Board reset in progress
	flashing:	Download in progress
	off:	Board in operation
L7	on:	Status LED 2/3
L8	on:	Status LED 2/2
L9	on:	Status LED 2/1
L10	on:	Status LED 2/0

9 BS Confidata:

Operating System – Configuration Data from E050

The distribution of software components and / or tasks in the 9030 system among the single GCU controls is determined by the operating system configuration data. Like the 8030 system, each customer system is not separately configured, instead certain configurations are specified by means of package-formation, which each cover an area of the system. The slot allocation of the GCU is an exception, this occurs in the 9030 individually as per customer data.

From version E06 onwards, the OMSF task in the packages S2, I1...I4 is doubled (no primary function).

9.1 Packages

A configuration data package determines the operating system configuration data for a specific system extension. The packages are produced in the operating system development.

For the 9030 there are currently six packages.

- Package S1 for a single module
- package S2 for a twin-module and
- Packages I1,I2,I3 and I4 for various multi-module configurations.

9.2 GCU configuration

Each package defines the minimum and maximum number of GCUs in a system. The minimum number is dependent on the imperative functions (e.g. central switching functions), the maximum number is dependent on the GCUs defined in the package. The package defines which software (operating system/tasks) are loaded on each GCU.

Each GCU is assigned to a logical group number (LGN - logical group number) The LGN must be defined for a physical slot address on the module by TIP/PC-KAD. The LGNs, a function name (abbreviation of the control function, e.g. CSF) and a ”mandatory/optional” code are supplied into TIP/PC-KAD/CAT in a data file.

9.2.1 Package S1

For single modules

LGN	1
mandatory/ optional	m
	MSF1
	MSF
	CSF
	LCF
	MML

	PRST
	CCC
	AIC
	O+M
	CCU
	ACT
	TKOM
	HOKO
	FHS

9.2.1.1 Abbreviations

ACOM	Asynchronous Communication (Protocol)
ACT	Access Control Task
AIC	Automatic Information Call
CCC	Central Call Charge
CCU	CSTA Control Unit
CCU'	Standby CCU
CSF	Central Switching Functions
CSF'	Standby CSF
FHS	File Handling System
GCU	Generic Control Unit
ICU	Interface Control Unit
LCF	Loading Central Function (IVL)
MML	Man Machine Language (management)
MSF	Module Switching Functions (IVG)
PRST	Protocol stack
UIP	Universal Interface Platform
OMSF	Operation and Maintenance Switching Functions
OMSF'	Standby OMSF
OMCF	Operation and Maintenance Configuration Functions
OMAD	Operation and Maintenance Access Data
OMBT	Operation and Maintenance Backup Terminal
O+M	Operation and Maintenance Function Package (OMSF, OMCF, OMAD, OMBT, ...)
HOKO	Server task (Hotel communication)
TKOM	Server task (text communication)

9.2.2 Package S2

For twin-modules

LGN	1	2

mandatory/ optional	m	m
	MSF1	MSF2
	MSF	MSF
	CSF	CSF’
	LCF	CCC
	MML	CCU’
	AIC	OMSF’
	O+M	PRST
	CCU	
	ACT	
	TKOM	
	HOKO	
	PRST	
	FHS	FHS

9.2.2.1 Abbreviations

ACOM	Asynchronous Communication (Protocol)
ACT	Access Control Task
AIC	Automatic Information Call
CCC	Central Call Charge
CCU	CSTA Control Unit
CCU’	Standby CCU
CSF	Central Switching Functions
CSF’	Standby CSF
FHS	File Handling System
GCU	Generic Control Unit
ICU	Interface Control Unit
LCF	Loading Central Function (IVL)
MML	Man Machine Language (management)
MSF	Module Switching Functions (IVG)
PRST	Protocol stack
UIP	Universal Interface Platform
OMSF	Operation and Maintenance Switching Functions
OMSF’	Standby OMSF
OMCF	Operation and Maintenance Configuration Functions
OMAD	Operation and Maintenance Access Data
OMBT	Operation and Maintenance Backup Terminal
O+M	Operation and Maintenance Function Package (OMSF, OMCF, OMAD, OMBT, ...)
HOKO	Server task (Hotel communication)

TKOM	Server task (text communication)

9.2.3 Package I1

for systems with up to 20 boards (use of 5ML board in the IMTU). In the first 3 modules of this package, central and module-specific functions (CSF, LCF and MSF) are mixed.

LGN	1	2	3	4	5	6-20
mandatory/ optional	m	m	o	o	o	o
	MSF1	MSF2	MSF3	MSF4	MSF5	MSF6-20
	MSF	MSF	MSF	MSF	MFS	MSF
	LCF	CSF	CSF’			
	CCC	CCU	CCU’			
	MML	O+M	OMSF’			
	AIC					
	TKOM					
	HOKO					
	PRST	PRST				
	FHS	FHS	FHS	FHS	FHS	
	ACT					

Remark:

If central functions are made available on separate GCU controls, it is possible to distribute these controls freely in the system 1 (slots are alloted by TIP or KAD/CAT), but no slots are possible in the IMTU module.

1		GCU slots must be situated under a fan within the framework of the slots defined by the GCU control.

9.2.3.1 Abbreviations

ACOM	Asynchronous Communication (Protocol)
ACT	Access Control Task
AIC	Automatic Information Call
CCC	Central Call Charge
CCU	CSTA Control Unit
CCU’	Standby CCU
CSF	Central Switching Functions
CSF’	Standby CSF
FHS	File Handling System
GCU	Generic Control Unit

ICU	Interface Control Unit
LCF	Loading Central Function (IVL)
MML	Man Machine Language (management)
MSF	Module Switching Functions (IVG)
PRST	Protocol stack
UIP	Universal Interface Platform
OMSF	Operation and Maintenance Switching Functions
OMSF'	Standby OMSF
OMCF	Operation and Maintenance Configuration Functions
OMAD	Operation and Maintenance Access Data
OMBT	Operation and Maintenance Backup Terminal
O+M	Operation and Maintenance Function Package (OMSF, OMCF, OMAD, OMBT, ...)
HOKO	Server task (Hotel communication)
TKOM	Server task (text communication)

9.2.4 I2 Package

for customers, who want to see central functions in the hardware, and for large systems due to load. 2 additional controls are made available for the central switching functions (CSF and CSF').

LGN	81	82	1	2	3	4	5	6-32
mandatory/ optional	m	m	m	o	o	o	o	o
	LCFA	CSFP	MSF1	MSF2	MSF3	MSF4	MSF5	MSF6-32
	CFS	CFS'	MSF	MSF	MSF	MSF	MFS	MSF
	LCF	CCC						
	MML	CCU'						
	AIC	OMSF'						
	ACT							
	O+M							
	CCU							
	TKOM							
	HOKO							
	PRST	PRST						
	FHS	FHS			FHS	FHS	FHS	

Remark:

If central functions are made available on separate GCU controls, it is possible to distribute these controls freely in the system 1 (slots are alloted by TIP or KAD/CAT), but no slots are possible in the IMTU module.

1		GCU slots must be situated under a fan within the framework of the slots defined by the GCU control.

9.2.4.1 Abbreviations

ACOM	Asynchronous Communication (Protocol)
ACT	Access Control Task
AIC	Automatic Information Call
CCC	Central Call Charge
CCU	CSTA Control Unit
CCU’	Standby CCU
CSF	Central Switching Functions
CSF’	Standby CSF
FHS	File Handling System
GCU	Generic Control Unit
ICU	Interface Control Unit
LCF	Loading Central Function (IVL)
MML	Man Machine Language (management)
MSF	Module Switching Functions (IVG)
PRST	Protocol stack
UIP	Universal Interface Platform
OMSF	Operation and Maintenance Switching Functions
OMSF’	Standby OMSF
OMCF	Operation and Maintenance Configuration Functions
OMAD	Operation and Maintenance Access Data
OMBT	Operation and Maintenance Backup Terminal
O+M	Operation and Maintenance Function Package (OMSF, OMCF, OMAD, OMBT, ...)
HOKO	Server task (Hotel communication)
TKOM	Server task (text communication)

9.2.5 I3 Package

for customers, who want to see central functions in the hardware, and for large systems due to load. 2 additional controls are made available for the central switching functions (CSF and CSF’). Furthermore, the LCF and CCC functions are evacuated.

LGN	81	82	91	92	1	2	3	4-32
mandatory/ optional	m	o	m	m	m	o	o	o
	CSFA	CSFP	LCFA	CCC	MSF1	MSF2	MSF3	MSF4-32
	CFS	CFS’	LCF	CCC	MSF	MSF	MFS	MSF
	CCU	CCU’	MML	OSMF’				
			AIC					
			ACT					
			O+M					
			TKOM					
			HOKO					

			PRST	PRST				
	FHS	FHS	FHS	FHS	FHS			

Remark:

If central functions are made available on separate GCU controls, it is possible to distribute these controls freely in the system 1 (slots are alloted by TIP or KAD/CAT), but no slots are possible in the IMTU module.

1		GCU slots must be situated under a fan within the framework of the slots defined by the GCU control.

9.2.5.1 Abbreviations

ACOM	Asynchronous Communication (Protocol)
ACT	Access Control Task
AIC	Automatic Information Call
CCC	Central Call Charge
CCU	CSTA Control Unit
CCU'	Standby CCU
CSF	Central Switching Functions
CSF'	Standby CSF
FHS	File Handling System
GCU	Generic Control Unit
ICU	Interface Control Unit
LCF	Loading Central Function (IVL)
MML	Man Machine Language (management)
MSF	Module Switching Functions (IVG)
PRST	Protocol stack
UIP	Universal Interface Platform
OMSF	Operation and Maintenance Switching Functions
OMSF'	Standby OMSF
OMCF	Operation and Maintenance Configuration Functions
OMAD	Operation and Maintenance Access Data
OMBT	Operation and Maintenance Backup Terminal
O+M	Operation and Maintenance Function Package (OMSF, OMCF, OMAD, OMBT, ...)
HOKO	Server task (Hotel communication)
TKOM	Server task (text communication)

9.2.6 Package I4

for customers, who want to see central functions in the hardware, and for large systems due to load. 2 additional controls are made available for the central switching functions (CSF and CSF'), 2 controls for the

CCU functions and 2 controls for the LCF and CCC functions. .

LGN	81	82	91	92	71	72	1	2-32
mandatory/ optional	m	m	m	m	m	o	m	o
	CSFA	CSFP	LCFA	CCC	CCUA	CCUP	MSF1	MSF2-32
	CFS	CFS’	LCF	CCC	CCU	CCU’	MFS	MSF
			MML	OSMF’				
			AIC					
			ACT					
			O+M					
			TKOM					
			HOKO					
	PRST	PRST	PRST	PRST				
	FHS	FHS	FHS	FHS			FHS	

Remark:

If central functions are made available on separate GCU controls, it is possible to distribute these controls freely in the system 1 (slots are alloted by TIP or KAD/CAT), but no slots are possible in the IMTU module.

1		GCU slots must be situated under a fan within the framework of the slots defined by the GCU control.

9.2.6.1 Abbreviations

ACOM	Asynchronous Communication (Protocol)
ACT	Access Control Task
AIC	Automatic Information Call
CCC	Central Call Charge
CCU	CSTA Control Unit
CCU’	Standby CCU
CSF	Central Switching Functions
CSF’	Standby CSF
FHS	File Handling System
GCU	Generic Control Unit
ICU	Interface Control Unit
LCF	Loading Central Function (IVL)
MML	Man Machine Language (management)
MSF	Module Switching Functions (IVG)
PRST	Protocol stack

UIP	Universal Interface Platform
OMSF	Operation and Maintenance Switching Functions
OMSF'	Standby OMSF
OMCF	Operation and Maintenance Configuration Functions
OMAD	Operation and Maintenance Access Data
OMBT	Operation and Maintenance Backup Terminal
O+M	Operation and Maintenance Function Package (OMSF, OMCF, OMAD, OMBT, ...)
HOKO	Server task (Hotel communication)
TKOM	Server task (text communication)

9.3 Interface Configuration

Each package also determines, among other things, the number and designation of hard disks and V.24 interfaces in the system. In this context, a distinction should be made between V.24 interfaces on GCU and V.24 interfaces on UIP.

Each GCU is equipped with two V.24 interfaces, which are configured in the configuration data of the operating system. The interfaces are addressed via the device name. The device names are allocated to a certain interface by the physical device numbers (PDN = physical device number). The device names, PDN, the interface type (console, ACOM) and the physical parameters can be changed within the system by operating system configuration task.

Two V.24 interfaces can be connected to one UIP board. Configuration data and device names are pre-configured in each package for V.24 interfaces on UIP. The allocation between an interface and a device name is once more managed by PDN. The PDN must be allocated to an interface by ICU configuration data.

In each package there are currently 2 possible UIPs with V.24 in the system, each of which is partly operated by the LCF.

Each configuration package contains

- a default configuration for the devices on GCU (online devices)
- an alternative configuration for the devices on GCU (offline devices)
- a predefined configuration for the devices on UIP

The main console (CO-01) is normally not connected to the system. The main console and console 2 (CO-02) are configured on the same interface; when necessary, the main console is activated by a switch (only applies to LCFs).

The following must be taken into account concerning the use of the consoles by the text output task S01:

In view of the fact that the S01 issues an extremely sizeable volume of reports on the console, a LCF console should always be used for output. This means it is not necessary for these reports to be rerouted from the S01 to the LCF via the CBus system, thus generating a longer processing time.

The following interfaces are currently defined in the operating system configuration data:

9.3.1 Single Modules S1

Single Module - Configuration Package S1

Device name	LGN	Device number	PDN	State	GCU/ ICU	Device driver	Type	Inter face
CO-01	173	1/2/3	101	ON1	GCU	DVZT/ DHZT	System console	ASS2 Port A
CO-02	173	4/5/6	102	ON1	GCU	DVZT/ DHZT	Console	ASS2 Port A
CO-03	173	7/8/9	103	OFF	GCU	DVZT/ DHZT	Console	ASS2 Port B
CO-04	181	19/20/ 21	105	2	ICU	ICZT	Console	Port 03
CO-05	182	22/23/ 24	106	2	ICU	ICZT	Console	Port 23
ZG-01	173	12	104	ON	GCU	DVZA/ DHZA	ACOM	ASS2 Port B
VC-01	173	14	108	OFF	GCU	DVZA/ DHZA	ACOM	ASS2 Port B
HS-01	171	16	301	ON	GCU	DVZH/ DHZP	Harddisk	SCS0
HS-02	171	17	302	OFF	GCU	DVZH/ DHZP	Harddisk	SCS0
TC-01-01	173	28	700	ON	GCU	-	S01 output to ISM	S0
TC-01-02	173	29	700	ON	GCU	-	Transparent console	S0
TC-01-03	173	30	700	ON	GCU	-	Transparent console	S0
TC-02-01	173	31	700	ON	GCU	-	S01 output to ISM	S0
TC-02-02	173	32	700	ON	GCU	-	Transparent console	S0
TC-02-03	173	33	700	ON	GCU	-	Transparent console	S0
TC-03-01	173	34	700	ON	GCU	-	S01 output to ISM	S0
TC-03-02	173	35	700	ON	GCU	-	Transparent console	S0
TC-03-03	173	36	700	ON	GCU	-	Transparent console	S0
ZG-02	183	13	109	2	ICU	ICZT	ACOM	Port 03
VC-02	184	25	10A	2	ICU	ICZT	ACOM	Port 23
DC-01	173	38	10B	OFF	GCU	DVZT/ DHZT	DCF77	ASS2 Port B

1	dependent on the ”System Console Connected” switch on the computer board (GCU)
2	dependent on the ICU customer data
3	The allocation of the PDN to a port on the ICU is defined in the ICU customer data, the given values are only suggestions.

9.3.1.1 Abbreviations

ACOM	Asynchronous Communication (Protocol)
ACT	Access Control Task
AIC	Automatic Information Call
CCC	Central Call Charge
CCU	CSTA Control Unit
CCU'	Standby CCU
CSF	Central Switching Functions
CSF'	Standby CSF
FHS	File Handling System
GCU	Generic Control Unit
ICU	Interface Control Unit
LCF	Loading Central Function (IVL)
MML	Man Machine Language (management)
MSF	Module Switching Functions (IVG)
PRST	Protocol stack
UIP	Universal Interface Platform
OMSF	Operation and Maintenance Switching Functions
OMSF'	Standby OMSF
OMCF	Operation and Maintenance Configuration Functions
OMAD	Operation and Maintenance Access Data
OMBT	Operation and Maintenance Backup Terminal
O+M	Operation and Maintenance Function Package (OMSF, OMCF, OMAD, OMBT, ...)
HOKO	Server task (Hotel communication)
TKOM	Server task (text communication)

9.3.2 Twin module S2

Twin-Module - Configuration Package S2

Device name	LGN	Device number	PDN	State	GCU/ ICU	Device driver	Type	Inter face
CO-01	173	1/2/3	101	ON1	GCU1	DVZT/ DHZT	System console	ASS2 Port A
CO-02	173	4/5/6	102	ON1	GCU1	DVZT/ DHZT	Console	ASS2 Port A
CO-03	173	7/8/9	103	ON	GCU1	DVZT/ DHZT	Console	ASS2 Port B
CO-04	181	19/20/ 21	105	2	ICU	ICZT	Console	2
CO-05	182	22/23/ 24	106	2	ICU	ICZT	Console	2
ZG-01	173	12	104	OFF	GCU1	DVZA/ DHZA	ACOM	ASS2 Port B

Device name	LGN	Device number	PDN	State	GCU/ ICU	Device driver	Type	Inter face
VC-01	173	14	108	OFF	GCU1	DVZA/ DHZA	ACOM	ASS2 Port B
HS-01	171	16	301	ON	GCU1	DVZH/ DHZP	Harddisk	SCS0
HS-02	171	17	302	OFF	GCU1	DVZH/ DHZP	Harddisk	SCS0
TC-01-01	173	28	700	ON	GCU1	-	S01 output to ISM	S0
TC-01-02	173	29	700	ON	GCU1	-	Transparent console	S0
TC-01-03	173	30	700	ON	GCU1	-	Transparent console	S0
TC-02-01	173	31	700	ON	GCU1	-	S01 output to ISM	S0
TC-02-02	173	32	700	ON	GCU1	-	Transparent console	S0
TC-02-03	173	33	700	ON	GCU1	-	Transparent console	S0
TC-03-01	173	34	700	ON	GCU1	-	S01 output to ISM	S0
TC-03-02	173	35	700	ON	GCU1	-	Transparent console	S0
TC-03-03	173	36	700	ON	GCU1	-	Transparent console	S0
ZG-02	173	13	109	2	ICU	ICZT	ACOM	2
VC-02	173	25	10A	2	ICU	ICZT	ACOM	2
DC-01	173	38	10B	OFF	GCU1	DVZT/ DHZT	DCF77	ASS2 Port B
CO-12	176	4/5/6	102	OFF	GCU2	DVZT/ DHZT	Console	ASS2 Port A
CO-13	176	7/8/9	103	OFF	GCU2	DVZT/ DHZT	Console	ASS2 Port B
ZG-11	176	12	104	ON	GCU2	DVZA/ DHZA	ACOM	ASS2 Port B
VC-11	176	14	108	OFF	GCU2	DVZA/ DHZA	ACOM	ASS2 Port B
ZG-12	176	13	109	OFF	GCU2	DVZA/ DHZA	ACOM	ASS2 Port A
VC-12	176	25	10A	ON	GCU2	DVZA/ DHZA	ACOM	ASS2 Port A

1	dependent on the ”System Console Connected” switch on the computer board (GCU)
2	dependent on the ICU customer data
3	The allocation of the PDN to a port on the ICU is defined in the ICU customer data, the given values are only suggestions.

9.3.2.1 Abbreviations

ACOM	Asynchronous Communication (Protocol)
ACT	Access Control Task
AIC	Automatic Information Call
CCC	Central Call Charge
CCU	CSTA Control Unit
CCU'	Standby CCU
CSF	Central Switching Functions
CSF'	Standby CSF
FHS	File Handling System
GCU	Generic Control Unit
ICU	Interface Control Unit
LCF	Loading Central Function (IVL)
MML	Man Machine Language (management)
MSF	Module Switching Functions (IVG)
PRST	Protocol stack
UIP	Universal Interface Platform
OMSF	Operation and Maintenance Switching Functions
OMSF'	Standby OMSF
OMCF	Operation and Maintenance Configuration Functions
OMAD	Operation and Maintenance Access Data
OMBT	Operation and Maintenance Backup Terminal
O+M	Operation and Maintenance Function Package (OMSF, OMCF, OMAD, OMBT, ...)
HOKO	Server task (Hotel communication)
TKOM	Server task (text communication)

9.3.3 Multi-Module I1

Multi-Module (up to 20 Modules) - Configuration Package I1

Device name	LGN	Device number	PDN	State	GCU/ ICU	Device driver	Type	Inter face
CO-01	173	1/2/3	101	ON1	GCU1	DVZT/ DHZT	System console	ASS2 Port A
CO-02	173	4/5/6	102	ON1	GCU1	DVZT/ DHZT	Console	ASS2 Port A
CO-03	173	7/8/9	103	OFF	GCU1	DVZT/ DHZT	Console	ASS2 Port B
CO-04	181	19/20/ 21	105	2	ICU	ICZT	Console	2
CO-05	182	22/23/ 24	106	2	ICU	ICZT	Console	2
ZG-01	173	12	104	ON	GCU1	DVZA/ DHZA	ACOM	ASS2 Port B

Device name	LGN	Device number	PDN	State	GCU/ ICU	Device driver	Type	Inter face
VC-01	173	14	108	OFF	GCU1	DVZA/ DHZA	ACOM	ASS2 Port B
HS-01	171	16	301	ON	GCU1	DVZH/ DHZP	Harddisk	SCS0
HS-02	171	17	302	OFF	GCU1	DVZH/ DHZP	Harddisk	SCS0
TC-01-01	173	28	700	ON	GCU1	-	S01 output to ISM	S0
TC-01-02	173	29	700	ON	GCU1	-	Transparent console	S0
TC-01-03	173	30	700	ON	GCU1	-	Transparent console	S0
TC-02-01	173	31	700	ON	GCU1	-	S01 output to ISM	S0
TC-02-02	173	32	700	ON	GCU1	-	Transparent console	S0
TC-02-03	173	33	700	ON	GCU1	-	Transparent console	S0
TC-03-01	173	34	700	ON	GCU1	-	S01 output to ISM	S0
TC-03-02	173	35	700	ON	GCU1	-	Transparent console	S0
TC-03-03	173	36	700	ON	GCU1	-	Transparent console	S0
ZG-02	183	13	109	2	ICU	ICZT	ACOM	2
VC-02	184	25	10A	2	ICU	ICZT	ACOM	2
DC-01	173	38	10B	OFF	GCU1	DVZT/ DHZT	DCF77	ASS2 Port B
CO-12	176	4/5/6	102	ON	GCU2	DVZT/ DHZT	Console	ASS2 Port A
CO-13	176	7/8/9	103	OFF	GCU2	DVZT/ DHZT	Console	ASS2 Port B
ZG-11	176	12	104	OFF	GCU2	DVZA/ DHZA	ACOM	ASS2 Port B
VC-11	176	14	108	ON	GCU2	DVZA/ DHZA	ACOM	ASS2 Port B
ZG-12	176	13	109	OFF	GCU2	DVZA/ DHZA	ACOM	ASS2 Port A
VC-12	176	25	10A	OFF	GCU2	DVZA/ DHZA	ACOM	ASS2 Port A

1	dependent on the ”System Console Connected” switch on the computer board (GCU)
2	dependent on the ICU customer data
3	The allocation of the PDN to a port on the ICU is defined in the ICU customer data, the given values are only suggestions.

9.3.3.1 Abbreviations

ACOM	Asynchronous Communication (Protocol)
ACT	Access Control Task
AIC	Automatic Information Call
CCC	Central Call Charge
CCU	CSTA Control Unit
CCU'	Standby CCU
CSF	Central Switching Functions
CSF'	Standby CSF
FHS	File Handling System
GCU	Generic Control Unit
ICU	Interface Control Unit
LCF	Loading Central Function (IVL)
MML	Man Machine Language (management)
MSF	Module Switching Functions (IVG)
PRST	Protocol stack
UIP	Universal Interface Platform
OMSF	Operation and Maintenance Switching Functions
OMSF'	Standby OMSF
OMCF	Operation and Maintenance Configuration Functions
OMAD	Operation and Maintenance Access Data
OMBT	Operation and Maintenance Backup Terminal
O+M	Operation and Maintenance Function Package (OMSF, OMCF, OMAD, OMBT, ...)
HOKO	Server task (Hotel communication)
TKOM	Server task (text communication)

9.3.4 Multi-Module I1 (continued)

Multi-Module (up to 20 Modules) - Configuration Package I1 ... continued

Device name	LGN	Device number	PDN	State	GCU/ ICU	Device driver	Type	Interface
CO-22	177	4/5/6	102	ON	GCU3	DVZT/ DHZT	Console	ASS2 Port A
CO-23	177	7/8/9	103	ON	GCU3	DVZT/ DHZT	Console	ASS2 Port B
ZG-21	177	12	104	OFF	GCU3	DVZA/ DHZA	ACOM	ASS2 Port B
VC-21	177	14	108	OFF	GCU3	DVZA/ DHZA	ACOM	ASS2 Port B
ZG-22	177	13	109	OFF	GCU3	DVZA/ DHZA	ACOM	ASS2 Port A
VC-22	177	25	10A	OFF	GCU3	DVZA/ DHZA	ACOM	ASS2 Port A

Device name	LGN	Device number	PDN	State	GCU/ ICU	Device driver	Type	Interface
CO-32	178	4/5/6	102	ON	GCU4	DVZT/ DHZT	Console	ASS2 Port A
CO-33	178	7/8/9	103	ON	GCU4	DVZT/ DHZT	Console	ASS2 Port B
ZG-31	178	12	104	OFF	GCU4	DVZA/ DHZA	ACOM	ASS2 Port B
VC-31	178	14	108	OFF	GCU4	DVZA/ DHZA	ACOM	ASS2 Port B
ZG-32	178	13	109	OFF	GCU4	DVZA/ DHZA	ACOM	ASS2 Port A
VC-32	178	25	10A	OFF	GCU4	DVZA/ DHZA	ACOM	ASS2 Port A
CO-42	179	4/5/6	102	ON	GCU5	DVZT/ DHZT	Console	ASS2 Port A
CO-43	179	7/8/9	103	ON	GCU5	DVZT/ DHZT	Console	ASS2 Port B
ZG-41	179	12	104	OFF	GCU5	DVZA/ DHZA	ACOM	ASS2 Port B
VC-41	179	14	108	OFF	GCU5	DVZA/ DHZA	ACOM	ASS2 Port B
ZG-42	179	13	109	OFF	GCU5	DVZA/ DHZA	ACOM	ASS2 Port A
VC-42	179	25	10A	OFF	GCU5	DVZA/ DHZA	ACOM	ASS2 Port A

1	dependent on the ”System Console Connected” switch on the computer board (GCU)
2	dependent on the ICU customer data
3	The allocation of the PDN to a port on the ICU is defined in the ICU customer data, the given values are only suggestions.

9.3.4.1 Abbreviations

ACOM	Asynchronous Communication (Protocol)
ACT	Access Control Task
AIC	Automatic Information Call
CCC	Central Call Charge
CCU	CSTA Control Unit
CCU’	Standby CCU
CSF	Central Switching Functions
CSF’	Standby CSF
FHS	File Handling System
GCU	Generic Control Unit

ICU	Interface Control Unit
LCF	Loading Central Function (IVL)
MML	Man Machine Language (management)
MSF	Module Switching Functions (IVG)
PRST	Protocol stack
UIP	Universal Interface Platform
OMSF	Operation and Maintenance Switching Functions
OMSF'	Standby OMSF
OMCF	Operation and Maintenance Configuration Functions
OMAD	Operation and Maintenance Access Data
OMBT	Operation and Maintenance Backup Terminal
O+M	Operation and Maintenance Function Package (OMSF, OMCF, OMAD, OMBT, ...)
HOKO	Server task (Hotel communication)
TKOM	Server task (text communication)

9.3.5 Multi-Modules I2

Multi-Module (up to 32 Modules) - Configuration Package I1

Device name	LGN	Device number	PDN	State	GCU/ ICU	Device driver	Type	Interface
CO-01	173	1/2/3	101	ON1	GCU81	DVZT/ DHZT	System console	ASS2 Port A
CO-02	173	4/5/6	102	ON1	GCU81	DVZT/ DHZT	Console	ASS2 Port A
CO-03	173	7/8/9	103	OFF	GCU81	DVZT/ DHZT	Console	ASS2 Port B
CO-04	181	19/20/ 21	105	2	ICU	ICZT	Console	2
CO-05	182	22/23/ 24	106	2	ICU	ICZT	Console	2
ZG-01	173	12	104	ON	GCU81	DVZA/ DHZA	ACOM	ASS2 Port B
VC-01	173	14	108	OFF	GCU81	DVZA/ DHZA	ACOM	ASS2 Port B
HS-01	171	16	301	ON	GCU81	DVZH/ DHZP	Harddisk	SCS0
HS-02	171	17	302	OFF	GCU81	DVZH/ DHZP	Harddisk	SCS0
TC-01-01	173	28	700	ON	GCU81	-	S01 output to ISM	S0
TC-01-02	173	29	700	ON	GCU81	-	Transparent console	S0
TC-01-03	173	30	700	ON	GCU81	-	Transparent console	S0
TC-02-01	173	31	700	ON	GCU81	-	S01 output to ISM	S0

Device name	LGN	Device number	PDN	State	GCU/ ICU	Device driver	Type	Interface
TC-02-02	173	32	700	ON	GCU81	-	Transparent console	S0
TC-02-03	173	33	700	ON	GCU81	-	Transparent console	S0
TC-03-01	173	34	700	ON	GCU81	-	S01 output to ISM	S0
TC-03-02	173	35	700	ON	GCU81	-	Transparent console	S0
TC-03-03	173	36	700	ON	GCU81	-	Transparent console	S0
ZG-02	183	13	109	2	ICU	ICZT	ACOM	2
VC-02	184	25	10A	2	ICU	ICZT	ACOM	2
DC-01	173	38	10B	OFF	GCU81	DVZT/ DHZT	DCF77	ASS2 Port B
CO-12	174	4/5/6	102	ON	GCU82	DVZT/ DHZT	Console	ASS2 Port A
CO-13	174	7/8/9	103	OFF	GCU82	DVZT/ DHZT	Console	ASS2 Port B
ZG-11	174	12	104	OFF	GCU82	DVZA/ DHZA	ACOM	ASS2 Port B
VC-11	174	14	108	ON	GCU82	DVZA/ DHZA	ACOM	ASS2 Port B
ZG-12	174	13	109	OFF	GCU82	DVZA/ DHZA	ACOM	ASS2 Port A
VC-12	174	25	10A	OFF	GCU82	DVZA/ DHZA	ACOM	ASS2 Port A

1	dependent on the ”System Console Connected” switch on the computer board (GCU)
2	dependent on the ICU customer data
3	The allocation of the PDN to a port on the ICU is defined in the ICU customer data, the given values are only suggestions.

9.3.5.1 Abbreviations

ACOM	Asynchronous Communication (Protocol)
ACT	Access Control Task
AIC	Automatic Information Call
CCC	Central Call Charge
CCU	CSTA Control Unit
CCU’	Standby CCU
CSF	Central Switching Functions
CSF’	Standby CSF

FHS	File Handling System
GCU	Generic Control Unit
ICU	Interface Control Unit
LCF	Loading Central Function (IVL)
MML	Man Machine Language (management)
MSF	Module Switching Functions (IVG)
PRST	Protocol stack
UIP	Universal Interface Platform
OMSF	Operation and Maintenance Switching Functions
OMSF'	Standby OMSF
OMCF	Operation and Maintenance Configuration Functions
OMAD	Operation and Maintenance Access Data
OMBT	Operation and Maintenance Backup Terminal
O+M	Operation and Maintenance Function Package (OMSF, OMCF, OMAD, OMBT, ...)
HOKO	Server task (Hotel communication)
TKOM	Server task (text communication)

9.3.6 Multi-Module I2 (continued)

Multi-Module (up to 32 Modules) - Configuration Package I2 ... continued

Device name	LGN	Device number	PDN	State	GCU/ ICU	Device driver	Type	Interface
CO-22	177	4/5/6	102	ON	GCU3	DVZT/ DHZT	Console	ASS2 Port A
CO-23	177	7/8/9	103	ON	GCU3	DVZT/ DHZT	Console	ASS2 Port B
ZG-21	177	12	104	OFF	GCU3	DVZA/ DHZA	ACOM	ASS2 Port B
VC-21	177	14	108	OFF	GCU3	DVZA/ DHZA	ACOM	ASS2 Port B
ZG-22	177	13	109	OFF	GCU3	DVZA/ DHZA	ACOM	ASS2 Port A
VC-22	177	25	10A	OFF	GCU3	DVZA/ DHZA	ACOM	ASS2 Port A
CO-32	178	4/5/6	102	ON	GCU4	DVZT/ DHZT	Console	ASS2 Port A
CO-33	178	7/8/9	103	ON	GCU4	DVZT/ DHZT	Console	ASS2 Port B
ZG-31	178	12	104	OFF	GCU4	DVZA/ DHZA	ACOM	ASS2 Port B
VC-31	178	14	108	OFF	GCU4	DVZA/ DHZA	ACOM	ASS2 Port B
ZG-32	178	13	109	OFF	GCU4	DVZA/ DHZA	ACOM	ASS2 Port A
VC-32	178	25	10A	OFF	GCU4	DVZA/ DHZA	ACOM	ASS2 Port A

Device name	LGN	Device number	PDN	State	GCU/ ICU	Device driver	Type	Interface
CO-42	179	4/5/6	102	ON	GCU5	DVZT/ DHZT	Console	ASS2 Port A
CO-43	179	7/8/9	103	ON	GCU5	DVZT/ DHZT	Console	ASS2 Port B
ZG-41	179	12	104	OFF	GCU5	DVZA/ DHZA	ACOM	ASS2 Port B
VC-41	179	14	108	OFF	GCU5	DVZA/ DHZA	ACOM	ASS2 Port B
ZG-42	179	13	109	OFF	GCU5	DVZA/ DHZA	ACOM	ASS2 Port A
VC-42	179	25	10A	OFF	GCU5	DVZA/ DHZA	ACOM	ASS2 Port A

1	dependent on the ”System Console Connected” switch on the computer board (GCU)
2	dependent on the ICU customer data
3	The allocation of the PDN to a port on the ICU is defined in the ICU customer data, the given values are only suggestions.

9.3.6.1 Abbreviations

ACOM	Asynchronous Communication (Protocol)
ACT	Access Control Task
AIC	Automatic Information Call
CCC	Central Call Charge
CCU	CSTA Control Unit
CCU’	Standby CCU
CSF	Central Switching Functions
CSF’	Standby CSF
FHS	File Handling System
GCU	Generic Control Unit
ICU	Interface Control Unit
LCF	Loading Central Function (IVL)
MML	Man Machine Language (management)
MSF	Module Switching Functions (IVG)
PRST	Protocol stack
UIP	Universal Interface Platform
OMSF	Operation and Maintenance Switching Functions
OMSF’	Standby OMSF
OMCF	Operation and Maintenance Configuration Functions
OMAD	Operation and Maintenance Access Data
OMBT	Operation and Maintenance Backup Terminal

O+M	Operation and Maintenance Function Package (OMSF, OMCF, OMAD, OMBT, ...)
HOKO	Server task (Hotel communication)
TKOM	Server task (text communication)

9.3.7 Multi-Modules I3

Multi-Module (up to 32 Modules) - Configuration Package I3

Device name	LGN	Device number	PDN	State	GCU/ ICU	Device driver	Type	Interface
CO-01	173	1/2/3	101	ON1	GCU91	DVZT/ DHZT	System console	ASS2 Port A
CO-02	173	4/5/6	102	ON1	GCU91	DVZT/ DHZT	Console	ASS2 Port A
CO-03	173	7/8/9	103	OFF	GCU91	DVZT/ DHZT	Console	ASS2 Port B
CO-04	181	19/20/ 21	105	2	ICU	ICZT	Console	2
CO-05	182	22/23/ 24	106	2	ICU	ICZT	Console	2
ZG-01	173	12	104	OFF	GCU91	DVZA/ DHZA	ACOM	ASS2 Port B
VC-01	173	14	108	ON	GCU91	DVZA/ DHZA	ACOM	ASS2 Port B
HS-01	171	16	301	ON	GCU91	DVZH/ DHZP	Harddisk	SCS0
HS-02	171	17	302	OFF	GCU91	DVZH/ DHZP	Harddisk	SCS0
TC-01-01	173	28	700	ON	GCU91	-	S01 output to ISM	S0
TC-01-02	173	29	700	ON	GCU91	-	Transparent console	S0
TC-01-03	173	30	700	ON	GCU91	-	Transparent console	S0
TC-02-01	173	31	700	ON	GCU91	-	S01 output to ISM	S0
TC-02-02	173	32	700	ON	GCU91	-	Transparent console	S0
TC-02-03	173	33	700	ON	GCU91	-	Transparent console	S0
TC-03-01	173	34	700	ON	GCU91	-	S01 output to ISM	S0
TC-03-02	173	35	700	ON	GCU91	-	Transparent console	S0
TC-03-03	173	36	700	ON	GCU91	-	Transparent console	S0
ZG-02	183	13	109	2	ICU	ICZT	ACOM	2
VC-02	184	25	10A	2	ICU	ICZT	ACOM	2

Device name	LGN	Device number	PDN	State	GCU/ ICU	Device driver	Type	Interface
DC-01	173	38	10B	OFF	GCU91	DVZT/ DHZT	DCF77	ASS2 Port B
CO-12	174	4/5/6	102	ON	GCU92	DVZT/ DHZT	Console	ASS2 Port A
CO-13	174	7/8/9	103	OFF	GCU92	DVZT/ DHZT	Console	ASS2 Port B
ZG-11	174	12	104	ON	GCU92	DVZA/ DHZA	ACOM	ASS2 Port B
VC-11	174	14	108	OFF	GCU92	DVZA/ DHZA	ACOM	ASS2 Port B
ZG-12	174	13	109	OFF	GCU92	DVZA/ DHZA	ACOM	ASS2 Port A
VC-12	174	25	10A	OFF	GCU92	DVZA/ DHZA	ACOM	ASS2 Port A

1	dependent on the ”System Console Connected” switch on the computer board (GCU)
2	dependent on the ICU customer data
3	The allocation of the PDN to a port on the ICU is defined in the ICU customer data, the given values are only suggestions.

9.3.7.1 Abbreviations

ACOM	Asynchronous Communication (Protocol)
ACT	Access Control Task
AIC	Automatic Information Call
CCC	Central Call Charge
CCU	CSTA Control Unit
CCU’	Standby CCU
CSF	Central Switching Functions
CSF’	Standby CSF
FHS	File Handling System
GCU	Generic Control Unit
ICU	Interface Control Unit
LCF	Loading Central Function (IVL)
MML	Man Machine Language (management)
MSF	Module Switching Functions (IVG)
PRST	Protocol stack
UIP	Universal Interface Platform
OMSF	Operation and Maintenance Switching Functions
OMSF’	Standby OMSF
OMCF	Operation and Maintenance Configuration Functions

OMAD	Operation and Maintenance Access Data
OMBT	Operation and Maintenance Backup Terminal
O+M	Operation and Maintenance Function Package (OMSF, OMCF, OMAD, OMBT, ...)
HOKO	Server task (Hotel communication)
TKOM	Server task (text communication)

9.3.8 Multi-Module I3 (continued)

Multi-Module (up to 32 Modules) - Configuration Package I3 ... continued

Device name	LGN	Device number	PDN	State	GCU/ ICU	Device driver	Type	Interface
CO-22	177	4/5/6	102	ON	GCU81	DVZT/ DHZT	Console	ASS2 Port A
CO-23	177	7/8/9	103	ON	GCU81	DVZT/ DHZT	Console	ASS2 Port B
ZG-21	177	12	104	OFF	GCU81	DVZA/ DHZA	ACOM	ASS2 Port B
VC-21	177	14	108	OFF	GCU81	DVZA/ DHZA	ACOM	ASS2 Port B
ZG-22	177	13	109	OFF	GCU81	DVZA/ DHZA	ACOM	ASS2 Port A
VC-22	177	25	10A	OFF	GCU81	DVZA/ DHZA	ACOM	ASS2 Port A
CO-32	178	4/5/6	102	ON	GCU82	DVZT/ DHZT	Console	ASS2 Port A
CO-33	178	7/8/9	103	ON	GCU82	DVZT/ DHZT	Console	ASS2 Port B
ZG-31	178	12	104	OFF	GCU82	DVZA/ DHZA	ACOM	ASS2 Port B
VC-31	178	14	108	OFF	GCU82	DVZA/ DHZA	ACOM	ASS2 Port B
ZG-32	178	13	109	OFF	GCU82	DVZA/ DHZA	ACOM	ASS2 Port A
VC-32	178	25	10A	OFF	GCU82	DVZA/ DHZA	ACOM	ASS2 Port A
CO-42	179	4/5/6	102	ON	GCU1	DVZT/ DHZT	Console	ASS2 Port A
CO-43	179	7/8/9	103	ON	GCU1	DVZT/ DHZT	Console	ASS2 Port B
ZG-41	179	12	104	OFF	GCU1	DVZA/ DHZA	ACOM	ASS2 Port B
VC-41	179	14	108	OFF	GCU1	DVZA/ DHZA	ACOM	ASS2 Port B
ZG-42	179	13	109	OFF	GCU1	DVZA/ DHZA	ACOM	ASS2 Port A
VC-42	179	25	10A	OFF	GCU1	DVZA/ DHZA	ACOM	ASS2 Port A

1	dependent on the ”System Console Connected” switch on the computer board (GCU)
2	dependent on the ICU customer data
3	The allocation of the PDN to a port on the ICU is defined in the ICU customer data, the given values are only suggestions.

9.3.8.1 Abbreviations

ACOM	Asynchronous Communication (Protocol)
ACT	Access Control Task
AIC	Automatic Information Call
CCC	Central Call Charge
CCU	CSTA Control Unit
CCU’	Standby CCU
CSF	Central Switching Functions
CSF’	Standby CSF
FHS	File Handling System
GCU	Generic Control Unit
ICU	Interface Control Unit
LCF	Loading Central Function (IVL)
MML	Man Machine Language (management)
MSF	Module Switching Functions (IVG)
PRST	Protocol stack
UIP	Universal Interface Platform
OMSF	Operation and Maintenance Switching Functions
OMSF’	Standby OMSF
OMCF	Operation and Maintenance Configuration Functions
OMAD	Operation and Maintenance Access Data
OMBT	Operation and Maintenance Backup Terminal
O+M	Operation and Maintenance Function Package (OMSF, OMCF, OMAD, OMBT, ...)
HOKO	Server task (Hotel communication)
TKOM	Server task (text communication)

9.3.9 Multi-Modules I4

Multi-Module (up to 32 Modules) - Configuration Package I4

Device name	LGN	Device number	PDN	State	GCU/ ICU	Device driver	Type	Interface
CO-01	173	1/2/3	101	ON1	GCU91	DVZT/ DHZT	System console	ASS2 Port A
CO-02	173	4/5/6	102	ON1	GCU91	DVZT/ DHZT	Console	ASS2 Port A

Device name	LGN	Device number	PDN	State	GCU/ ICU	Device driver	Type	Interface
CO-03	173	7/8/9	103	OFF	GCU91	DVZT/ DHZT	Console	ASS2 Port B
CO-04	181	19/20/ 21	105	2	ICU	ICZT	Console	2
CO-05	182	22/23/ 24	106	2	ICU	ICZT	Console	2
ZG-01	173	12	104	OFF	GCU91	DVZA/ DHZA	ACOM	ASS2 Port B
VC-01	173	14	108	ON	GCU91	DVZA/ DHZA	ACOM	ASS2 Port B
HS-01	171	16	301	ON	GCU91	DVZH/ DHZP	Harddisk	SCS0
HS-02	171	17	302	OFF	GCU91	DVZH/ DHZP	Harddisk	SCS0
TC-01-01	173	28	700	ON	GCU91	-	S01 output to ISM	S0
TC-01-02	173	29	700	ON	GCU91	-	Transparent console	S0
TC-01-03	173	30	700	ON	GCU91	-	Transparent console	S0
TC-02-01	173	31	700	ON	GCU91	-	S01 output to ISM	S0
TC-02-02	173	32	700	ON	GCU91	-	Transparent console	S0
TC-02-03	173	33	700	ON	GCU91	-	Transparent console	S0
TC-03-01	173	34	700	ON	GCU91	-	S01 output to ISM	S0
TC-03-02	173	35	700	ON	GCU91	-	Transparent console	S0
TC-03-03	173	36	700	ON	GCU91	-	Transparent console	S0
ZG-02	183	13	109	2	ICU	ICZT	ACOM	2
VC-02	184	25	10A	2	ICU	ICZT	ACOM	2
DC-01	173	38	10B	OFF	GCU91	DVZT/ DHZT	DCF77	ASS2 Port B
CO-12	174	4/5/6	102	ON	GCU92	DVZT/ DHZT	Console	ASS2 Port A
CO-13	174	7/8/9	103	OFF	GCU92	DVZT/ DHZT	Console	ASS2 Port B
ZG-11	174	12	104	ON	GCU92	DVZA/ DHZA	ACOM	ASS2 Port B
VC-11	174	14	108	OFF	GCU92	DVZA/ DHZA	ACOM	ASS2 Port B
ZG-12	174	13	109	OFF	GCU92	DVZA/ DHZA	ACOM	ASS2 Port A

Device name	LGN	Device number	PDN	State	GCU/ ICU	Device driver	Type	Interface
VC-12	174	25	10A	OFF	GCU92	DVZA/ DHZA	ACOM	ASS2 Port A

1	dependent on the ”System Console Connected” switch on the computer board (GCU)
2	dependent on the ICU customer data
3	The allocation of the PDN to a port on the ICU is defined in the ICU customer data, the given values are only suggestions.

9.3.9.1 Abbreviations

ACOM	Asynchronous Communication (Protocol)
ACT	Access Control Task
AIC	Automatic Information Call
CCC	Central Call Charge
CCU	CSTA Control Unit
CCU’	Standby CCU
CSF	Central Switching Functions
CSF’	Standby CSF
FHS	File Handling System
GCU	Generic Control Unit
ICU	Interface Control Unit
LCF	Loading Central Function (IVL)
MML	Man Machine Language (management)
MSF	Module Switching Functions (IVG)
PRST	Protocol stack
UIP	Universal Interface Platform
OMSF	Operation and Maintenance Switching Functions
OMSF’	Standby OMSF
OMCF	Operation and Maintenance Configuration Functions
OMAD	Operation and Maintenance Access Data
OMBT	Operation and Maintenance Backup Terminal
O+M	Operation and Maintenance Function Package (OMSF, OMCF, OMAD, OMBT, ...)
HOKO	Server task (Hotel communication)
TKOM	Server task (text communication)

9.3.10 Multi-Module I4 (continued)

Mult-Module (up to 32 Modules) - Configuration Package I2 ... continued

Device name	LGN	Device number	PDN	State	GCU/ ICU	Device driver	Type	Interface
CO-22	177	4/5/6	102	ON	GCU81	DVZT/ DHZT	Console	ASS2 Port A
CO-23	177	7/8/9	103	ON	GCU81	DVZT/ DHZT	Console	ASS2 Port B
ZG-21	177	12	104	OFF	GCU81	DVZA/ DHZA	ACOM	ASS2 Port B
VC-21	177	14	108	OFF	GCU81	DVZA/ DHZA	ACOM	ASS2 Port B
ZG-22	177	13	109	OFF	GCU81	DVZA/ DHZA	ACOM	ASS2 Port A
VC-22	177	25	10A	OFF	GCU81	DVZA/ DHZA	ACOM	ASS2 Port A
CO-32	178	4/5/6	102	ON	GCU82	DVZT/ DHZT	Console	ASS2 Port A
CO-33	178	7/8/9	103	ON	GCU82	DVZT/ DHZT	Console	ASS2 Port B
ZG-31	178	12	104	OFF	GCU82	DVZA/ DHZA	ACOM	ASS2 Port B
VC-31	178	14	108	OFF	GCU82	DVZA/ DHZA	ACOM	ASS2 Port B
ZG-32	178	13	109	OFF	GCU82	DVZA/ DHZA	ACOM	ASS2 Port A
VC-32	178	25	10A	OFF	GCU82	DVZA/ DHZA	ACOM	ASS2 Port A
CO-42	179	4/5/6	102	ON	GCU1	DVZT/ DHZT	Console	ASS2 Port A
CO-43	179	7/8/9	103	ON	GCU1	DVZT/ DHZT	Console	ASS2 Port B
ZG-41	179	12	104	OFF	GCU1	DVZA/ DHZA	ACOM	ASS2 Port B
VC-41	179	14	108	OFF	GCU1	DVZA/ DHZA	ACOM	ASS2 Port B
ZG-42	179	13	109	OFF	GCU1	DVZA/ DHZA	ACOM	ASS2 Port A
VC-42	179	25	10A	OFF	GCU1	DVZA/ DHZA	ACOM	ASS2 Port A

1	dependent on the ”System Console Connected” switch on the computer board (GCU)
2	dependent on the ICU customer data
3	The allocation of the PDN to a port on the ICU is defined in the ICU customer data, the given values are only suggestions.

For consoles (CO-xx), three devices have been mapped onto each interface:

- CO-xx-1 Fault output level

- CO-xx-2 Control level (for prologue)
- CO-xx-3 Input/Output level (for dialogue)

9.3.10.1 Abbreviations

ACOM	Asynchronous Communication (Protocol)
ACT	Access Control Task
AIC	Automatic Information Call
CCC	Central Call Charge
CCU	CSTA Control Unit
CCU'	Standby CCU
CSF	Central Switching Functions
CSF'	Standby CSF
FHS	File Handling System
GCU	Generic Control Unit
ICU	Interface Control Unit
LCF	Loading Central Function (IVL)
MML	Man Machine Language (management)
MSF	Module Switching Functions (IVG)
PRST	Protocol stack
UIP	Universal Interface Platform
OMSF	Operation and Maintenance Switching Functions
OMSF'	Standby OMSF
OMCF	Operation and Maintenance Configuration Functions
OMAD	Operation and Maintenance Access Data
OMBT	Operation and Maintenance Backup Terminal
O+M	Operation and Maintenance Function Package (OMSF, OMCF, OMAD, OMBT, ...)
HOKO	Server task (Hotel communication)
TKOM	Server task (text communication)

10 Cable network

10.1 Connections from CSI

The connections of the connecting circuit boards and test connections are conducted through prefabricated cables in

- Main distributor
- Network Termination
- Service panel

10.1.1 Main Distribution Frame or Network Termination

The cables running from the cable adapters to the main distributor can be supplied in two variants:

- Open end on the main distributor frame
- With champ connector for the patch panel

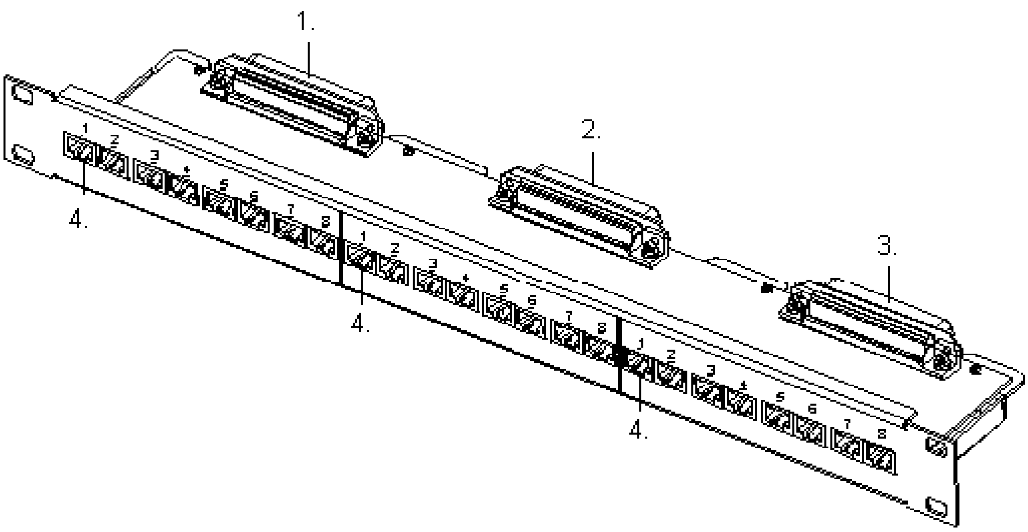
Cable with open end

	Connect the sheath wires of the connecting cables with the open end to the ground clamps.

Cable for patch panels

The following patch panel variants can be mounted in the cabinets:

	Patch panel 24 part (3x8 WE, 4-wire)	Material number: 4.999.046.814



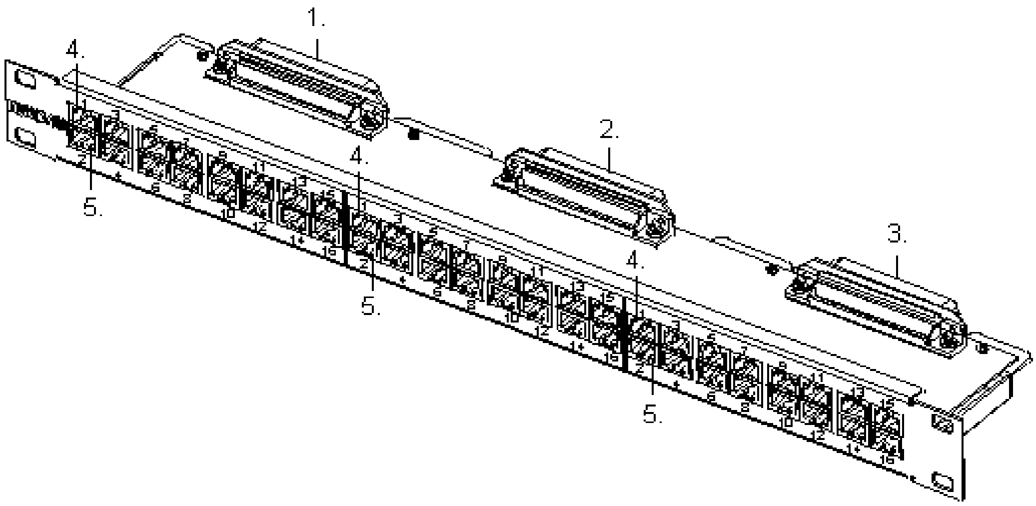
Champ-PIN								
WE-PIN	WE 1	WE 2	WE 3	WE 4	WE 5	WE 6	WE 7	WE 8
1								
2								
3	2	4	6	8	10	12	14	16
4	1	3	5	7	9	11	13	15
5	26	28	30	32	34	36	38	40
6	27	29	31	33	35	37	39	41
7								
8								

1. Champ 1
2. Champ 2
3. Champ 3
4. WE1

This patch panel is designed for the four-wire connection. These may be the connections for the following boards:

ADM → 551
DECT21 → 552
DS02/3 → 553
DT0 → 553
UIP → 554

	Patch panel 48 ports (3x16 WE, 2-wire)	Material number: 4.999.046.813



Champ-PIN																
WE-PIN	WE 1	WE 2	WE 3	WE 4	WE 5	WE 6	WE 7	WE 8	WE 9	WE 10	WE 11	WE 12	WE 13	WE 14	WE 15	WE 16
1																
2																
3																
4	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
5	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
6																
7																
8																

1. Champ 1
2. Champ 2
3. Champ 3
4. WE1
5. WE2

This patch panel is designed for the two-wire connection. These may be the connections for the following boards:

ADM → 551	ATB → 557	DUP03 → 548
ASC2 → 554	ATC → 557	DUPN → 548
ASC21 → 550	ATLC → 558	MAC → 549
ASCEU → 555	DDID → 561	MULI → 549
ATA → 556	JPAT → 560	UIP → 554
ATA2 → 556		

	Take note that if appropriate you may have to use two cables for each connecting circuit board.

For the service the

	Service patch panel → 562	Material number: 49.9904.8477

is available.

10.1.1.1 MDF connections of DUP03

MDF		via CA1B from the DUP03
Colours 16x2	Patch panel for the two-wire connection	
RD/BU	WE 1	A1/B1
WH/YE	WE 2	A2/B2
WH/GN	WE 3	A3/B3
WH/BN	WE 4	A4/B4
WH/BK	WE 5	A5/B5
WH/BU	WE 6	A6/B6
WH/YE	WE 7	A7/B7
WH/GN	WE 8	A8/B8
WH/BN	WE 9	A9/b9
WH/BK	WE 10	A10/B10
WH/BU	WE 11	A11/B11
RD/YE	WE 12	A12/B12
WH/GN	WE 13	A13/B13
WH/BN	WE 14	A14/B14
WH/BK	WE 15	A15/B15
WH/BU	WE 16	A16/B16

10.1.1.2 MDF connections DUPN

MDF		via CA2B from DUPN	
Colours 16x2	Patch panel for the two wire connection	Cable 1	Cable 2
RD/BU	WE 1	A1/B1	A1/B17
WH/YE	WE 2	A2/B2	A18/B18
WH/GN	WE 3	A3/B3	A19/B19
WH/BN	WE 4	A4/B4	A20/B20

WH/BK	WE 5	A5/B5	A21/B21
WH/BU	WE 6	A6/B5	A22/B22
WH/YE	WE 7	A7/B7	A23/B23
WH/GN	WE 8	A8/B8	A24/B24
WH/BN	WE 9	A9/B9	A25/B25
WH/BK	WE 10	A10/B10	A26/B26
WH/BU	WE 11	A11/B11	A27/B27
RD/YE	WE 12	A12/B12	A28/B28
WH/GN	WE 13	A13/B13	A29/B29
WH/BN	WE 14	A14/B14	A30/B30
WH/BK	WE 15	A15/B15	A31/B31
WH/BU	WE 16	A16/B16	A32/B32

10.1.1.3 MDF connections MAC

The cable adapter CA6B must be used for the integration of the MAC into the I55 modules.

MDF		**via CA6B of the MAC**
Colours	Patch panel for two-wire connection	UP0
RD/BU	WE 1	A1/B1
WH/YE	WE 2	A1/B1
WH/GN	WE 3	A1/B1
WH/BN	WE 4	A1/B1
WH/BK	WE 5	A1/B1
WH/BU	WE 6	A1/B1
WH/YE	WE 7	A1/B1
WH/GN	WE 8	A1/B1
WH/BN	WE 9	free
WH/BK	WE 10	free
WH/BU	WE 11	free
RD/YE	WE 12	free
WH/GN	WE 13	free
WH/BN	WE 14	free
WH/BK	WE 15	free
WH/BK	WE 16	free

10.1.1.4 MDF connections of MULI

MDF	**via CA1B from MULI (UP0)**

Colours 16x2	Patch panel for the two wire connection	
RD/BU	WE 1	A1/B1
WH/YE	WE 2	A2/B2
WH/GN	WE 3	A3/B3
WH/BN	WE 4	A4/B4
WH/BK	WE 5	A5/B5
WH/BU	WE 6	A6/B6
WH/YE	WE 7	A7/B7
WH/GN	WE 8	A8/B8
WH/BN	WE 9	A9/B9
WH/BK	WE 10	A10/B10
WH/BU	WE 11	A11/B11
RD/YE	WE 12	A12/B12
WH/GN	WE 13	A13/B13
WH/BN	WE 14	A14/B14
WH/BK	WE 15	A15/B15
WH/BU	WE 16	A16/B16

10.1.1.5 MDF connections of ASC21

MDF		**Cable Adapter CA2B or CARUB for ASC21**	
Colours 16x2	Patch panel for two-wire connection	Cable 1	Cable 2
RD/BU	WE 1	a1/b1	a17/b17
WH/YE	WE 2	a2/b2	a18/b18
WH/GN	WE 3	a3/b3	a19/b19
WH/BN	WE 4	a4/b4	a20/b20
WH/BK	WE 5	a5/b5	a21/b21
WH/BU	WE 6	a6/b6	a22/b22
WH/YE	WE 7	a7/b7	a23/b23
WH/GN	WE 8	a8/b8	a24/b24
WH/BN	WE 9	a9/b9	a25/b25
WH/BK	WE 10	a10/b10	a26/b26
WH/BU	WE 11	a11/b11	a27/b27
RD/YE	WE 12	a12/b12	a28/b28
WH/GN	WE 13	a13/b13	a29/b29
WH/BN	WE 14	a14/b14	a30/b30
WH/BK	WE 15	a15/b15	a31/b31

WH/BU	WE 16	a16/b16	a32/b32

10.1.1.6 MDF connections of ADM

MDF, Cable 1				via CA2B from			
Colours 16x2	Patch panel for the two wire connection	Patch panel for the four-wire connection		ADM with STSM	ADM with UPSM	ADM with UKSM	ADM with ABSM/ ABSM1
RD/BU	WE 1	WE 1	**1st** slot	A1/B1 (T)	A1/B1	A1/B1	a1/b1
WH/YE	WE 2			C1/D1 (R)	free	free	free
WH/GN	WE 3	WE 2		A2/B2 (T)	A2/B2	A2/B2	a2/b2
WH/BN	WE 4			C2/D2 (R)	free	free	free
WH/BK	WE 5	WE 3		A3/B3 (T)	A3/B3	free	a3/b3
WH/BU	WE 6			C3/D3 (R)	free	free	free
WH/YE	WE 7	WE 4		A4/B4 (T)	A4/B4	free	a4/b4
WH/GN	WE 8			C4/D4 (R)	free	free	free
WH/BN	WE 9	WE 5	**2nd** slot	A5/B5 (T)	A5/B5	A3/B3	a5/b5
WH/BK	WE 10			C5/D5 (R)	free	free	free
WH/BU	WE 11	WE 6		A6/B6 (T)	A6/B6	A4/B4	a6/b6
RD/YE	WE 12			C6/D6 (R)	free	free	free
WH/GN	WE 13	WE 7		A7/B7 (T)	A7/B7	free	a7/b7
WH/BN	WE 14			C7/D7 (R)	free	free	free
WH/BK	WE 15	WE 8		A8/B8 (T)	A8/B8	free	a8/b8
WH/BU	WE 16			C8/D8 (R)	free	free	free

MDF Cable 2		via CA2B from

Colours 16x2	Patch panel for the two wire connection	Patch panel for the four-wire connection		ADM with STSM	ADM with UPSM	ADM with UKSM	ADM with ABSM/ ABSM1
RD/BU	WE 1	WE 1	**3rd** slot	A9/B9 (T)	A9/B9	A5/B5	a9/b9
WH/YE	WE 2			C9/D9 (R)	free	free	free
WH/GN	WE 3	WE 2		A10/ B10 (T)	A10/ B10	A6/B6	a10/b10
WH/BN	WE 4			C10/ D10 (R)	free	free	free
WH/BK	WE 5	WE 3		A11/ B11 (T)	A11/ B11	free	a11/b11
WH/BU	WE 6			C11/ D11 (R)	free	free	free
WH/YE	WE 7	WE 4		A12/ B12 (T)	A12/ B12	free	a12/b12
WH/GN	WE 8			C12/ D12 (R)	free	free	free
WH/BN	WE 9	WE 5	**4th** slot	A13/ B13 (T)	A13/ B13	A7/B7	a13/b13
WH/BK	WE 10			C13/ D13 (R)	free	free	free
WH/BU	WE 11	WE 6		A14/ B14 (T)	A14/ B14	A8/B8	a14/b14
RD/YE	WE 12			C14/ D14 (R)	free	free	free
WH/GN	WE 13	WE 7		A15/ B15 (T)	A15/ B15	free	a15/b15
WH/BN	WE 14			C15/ D15 (R)	free	free	free
WH/BK	WE 15	WE 8		A16/ B16 (T)	A16/ B16	free	a16/b16
WH/BU	WE 16			C16/ D16 (R)	free	free	free

10.1.1.7 MDF connections of DECT21

MDF		**via CA1B from the DECT21**	
Colours 16x2	Patch panel for four-wire connection		
RD/BU	WE 1	1st Station	A1/B1
WH/YE			A2/B2
WH/GN	WE 2	2nd Station	A1/B1

WH/BN			A2/B2
WH/BK	WE 3	3rd Station	A1/B1
WH/BU			A2/B2
WH/YE	WE 4	4th Station	A1/B1
WH/GN			A2/B2
WH/BN	WE 5	5th Station	A1/B1
WH/BK			A2/B2
WH/BU	WE 6	6th Station	A1/B1
RD/YE			A2/B2
WH/GN	WE 7	7th station	A1/B1
WH/BN			A2/B2
WH/BK	WE 8	8th Station	A1/B1
WH/BU			A2/B2

10.1.1.8 MDF connections of DS02

MDF		via CA2B from DS02/3	
Colours 16x2	Patch panel for four-wire connection	Cable 1	Cable 2
RD/BU	WE 1	A1/B1 (T)	A9/B9 (T)
WH/YE		C1/D1 (R)	C9/D9 (R)
WH/GN	WE 2	A2/B2 (T)	A10/B10 (T)
WH/BN		C2/D2 (R)	C10/D10 (R)
WH/BK	WE 3	A3/B3 (T)	A11/B11 (T)
WH/BU		C3/D3 (R)	C11/D11 (R)
WH/YE	WE 4	A4/B4 (T)	A12/B12 (T)
WH/GN		C4/D4 (R)	C12/D12 (R)
WH/BN	WE 5	A5/B5 (T)	A13/B13 (T)
WH/BK		C5/D5 (R)	C13/D13 (R)
WH/BU	WE 6	A6/B6 (T)	A14/B14 (T)
RD/YE		C6/D6 (R)	C14/D14 (R)
WH/GN	WE 7	A7/B7 (T)	A15/B15 (T)
WH/BN		C7/D7 (R)	C15/D15 (R)
WH/BK	WE 8	A8/B8 (T)	A16/B16 (T)
WH/BU		C8/D8 (R)	C16/D16 (R)

10.1.1.9 MDF connections of DT0

MDF		via CA1x from the DT0
Colours 16x2	Patch panel for four-wire connection	
RD/BU	WE 1	A1/B1 (T)
WH/YE		C1/D1 (R)

WH/GN	WE 2	A2/B2 (T)
WH/BN		C2/D2 (R)
WH/BK	WE 3	A3/B3 (T)
WH/BU		C3/D3 (R)
WH/YE	WE 4	A4/B4 (T)
WH/GN		C4/D4 (R)
WH/BN	WE 5	A5/B5 (T)
WH/BK		C6/D5 (R)
WH/BU	WE 6	A6/B6 (T)
RD/YE		C6/D6 (R)
WH/GN	WE 7	A7/B7 (T)
WH/BN		C7/D7 (R)
WH/BK	WE 8	A8/B8 (T)
WH/BU		C8/D8 (R)

10.1.1.10 MDF connections of UIP

MDF			**UIP slot**	**via CA1B/3B from the UIP with four CL2M**	**via CA1B/3B from the UIP with four CL2ME**
Colours 16x2	Patch panel for the two wire connection	Patch panel for the four-wire connection			
RD/BU	WE 1	WE 1	1	A1/B1 (T)	A1/B1 (R)
WH/YE	WE 2			C1/D1 (R)	free
WH/GN	WE 3	WE 2		free	free
WH/BN	WE 4			free	free
WH/BK	WE 5	WE 3	2	A2/B2 (T)	A2/B2 (R)
WH/BU	WE 6			C2/D2 (R)	free
WH/YE	WE 7	WE 4		free	free
WH/GN	WE 8			free	free
WH/BN	WE 9	WE 5	3	A3/B3 (T)	A3/B3 (R)
WH/BK	WE 10			C3/D3 (R)	free
WH/BU	WE 11	WE 6		free	free
RD/YE	WE 12			free	free
WH/GN	WE 13	WE 7	4	A4/B4 (T)	A4/B4 (R)
WH/BN	WE 14			C4/D4 (R)	free
WH/BK	WE 15	WE 8		free	free
WH/BU	WE 16			free	free

MDF Connection via CA3B from UIP

The V24M submodules used on slots 1 and 2 can be connected directly to the Sub-D plug of the cable adapter.

In the case of mixed combination, slots 1 and 2 with CL2M, CL2ME and V24M, see table above.

10.1.1.11 MDF connections of ASC2

MDF		**Cable Adapter CA2B or CARUB for ASC2**	
Colours 16x2	Patch panel for two-wire connection	Cable 1	Cable 2
RD/BU	WE 1	a1/b1	a17/b17
WH/YE	WE 2	a2/b2	a18/b18
WH/GN	WE 3	a3/b3	a19/b19
WH/BN	WE 4	a4/b4	a20/b20
WH/BK	WE 5	a5/b5	a21/b21
WH/BU	WE 6	a6/b6	a22/b22
WH/YE	WE 7	a7/b7	a23/b23
WH/GN	WE 8	a8/b8	a24/b24
WH/BN	WE 9	a9/b9	a25/b25
WH/BK	WE 10	a10/b10	a26/b26
WH/BU	WE 11	a11/b11	a27/b27
RD/YE	WE 12	a12/b12	a28/b28
WH/GN	WE 13	a13/b13	a29/b29
WH/BN	WE 14	a14/b14	a30/b30
WH/BK	WE 15	a15/b15	a31/b31
WH/BU	WE 16	a16/b16	a32/b32

10.1.1.12 MDF connections of ASCxx

MDF		**Cable Adapter CA1B/CARUB from ASCxx**
Colours 16x2	Patch panel for two-wire connection	
RD/BU	WE 1	a1/b1
WH/YE	WE 2	a2/b2
WH/GN	WE 3	a3/b3
WH/BN	WE 4	a4/b4
WH/BK	WE 5	a5/b5
WH/BU	WE 6	a6/b6
WH/YE	WE 7	a7/b7
WH/GN	WE 8	a8/b8
WH/BN	WE 9	a9/b9
WH/BK	WE 10	a10/b10
WH/BU	WE 11	a11/b11
RD/YE	WE 12	a12/b12
WH/GN	WE 13	a13/b13
WH/BN	WE 14	a14/b14

WH/BK	WE 15	a15/b15
WH/BU	WE 16	a16/b16

10.1.1.13 MDF connections from ATA

MDF		**Cable Adapter CA1B for ATA**
Colours 16x2	Patch panel for two-wire connection	
RD/BU	WE 1	a1/b1
WH/YE	WE 2	a2/b2
WH/GN	WE 3	a3/b3
WH/BN	WE 4	a4/b4
WH/BK	WE 5	a5/b5
WH/BU	WE 6	a6/b6
WH/YE	WE 7	a7/b7
WH/GN	WE 8	a8/b8
WH/BN	WE 9	free
WH/BK	WE 10	free
WH/BU	WE 11	free
RD/YE	WE 12	free
WH/GN	WE 13	free
WH/BN	WE 14	free
WH/BK	WE 15	free
WH/BU	WE 16	free

10.1.1.14 MDF connections from ATA2

MDF		**Cable Adapter CA1B from ATA2**
Colours 16x2	Patch panel for two-wire connection	
RD/BU	WE 1	a1/b1
WH/YE	WE 2	a2/b2
WH/GN	WE 3	a3/b3
WH/BN	WE 4	a4/b4
WH/BK	WE 5	a5/b5
WH/BU	WE 6	a6/b6
WH/YE	WE 7	a7/b7
WH/GN	WE 8	a8/b8
WH/BN	WE 9	free
WH/BK	WE 10	free
WH/BU	WE 11	free
RD/YE	WE 12	free

WH/GN	WE 13	free
WH/BN	WE 14	free
WH/BK	WE 15	free
WH/BU	WE 16	free

10.1.1.15 MDF connections from ATB

MDF		**Cable Adapter CA1B from ATB**
Colours 16x2	Patch panel for two-wire connection	
RD/BU	WE 1	a1/b1
WH/YE	WE 2	a2/b2
WH/GN	WE 3	a3/b3
WH/BN	WE 4	a4/b4
WH/BK	WE 5	a5/b5
WH/BU	WE 6	a6/b6
WH/YE	WE 7	a7/b7
WH/GN	WE 8	a8/b8
WH/BN	WE 9	free
WH/BK	WE 10	free
WH/BU	WE 11	free
RD/YE	WE 12	free
WH/GN	WE 13	free
WH/BN	WE 14	free
WH/BK	WE 15	free
WH/BU	WE 16	free

10.1.1.16 MDF connections from ATC

MDF		**Cable Adapter CA1B from ATC**
Colours 16x2	Patch panel for two-wire connection	
RD/BU	WE 1	a1/b1
WH/YE	WE 2	a2/b2
WH/GN	WE 3	a3/b3
WH/BN	WE 4	a4/b4
WH/BK	WE 5	a5/b5
WH/BU	WE 6	a6/b6
WH/YE	WE 7	a7/b7
WH/GN	WE 8	a8/b8
WH/BN	WE 9	free
WH/BK	WE 10	free
WH/BU	WE 11	free

RD/YE	WE 12	free
WH/GN	WE 13	free
WH/BN	WE 14	free
WH/BK	WE 15	free
WH/BU	WE 16	free

10.1.1.17 MDF connections from ATLC

Main distributor

If necessary, connect the sheath wires of the connecting cable (open end and WP plug) with the ground clamps.

Connect the connectors of the connecting cable from the I55 with the line network (wiring blocks).

Mark the cable at both ends using the supplied labels.

Connections from the ATLC

Variants	Port	Interfaces/procedures	Connections
ATLC without submodules	8 (1 per line)	2-wire speech path, E+M signalling	a/b Sin/Sout
ATLC without submodules	8 (1 per line)	4-wire speech path, E+M signalling	a/b Ka/Kb Sin/Sout
ATLC without submodules	8 (1 per line)	4-wire speech path, E+M and S3an/S3ab-signalling	a/b Ka/Kb Sin/Sout S3in/S3out
ATLC with SSSM submodules	8 (1 per SSSM)	a/b earth	a/b
ATLC with ACSM submodules	8 (1 per ACSM)	50 Hz alternating current	a/b
ATLC with ALSM/ALSMF submodules	8 (1 per ALSM/ALSMF)	Special facility (e.g. speech memory)	a/b
or ALSMH	(1 per ALSMH)	Analog DID Hong Kong	a/b
ATLC with PLSM submodules	8 (1 per PLSM)	Special facility (e.g. door handsfree device)	a/b c/d e/f

MDF connection via CA2x or CARUx from the ATLC board without submodules

MDF		**Cable Adapter CA2B or CARUB**	
Colours 16x2	Patch panel for two-wire connection	Cable 1	Cable 2
RD/BU	WE 1	1a/1b	1Sin/1Sout
WH/YE	WE 2	1Ka/1Kb	1S3in/1S3out

WH/GN	WE 3	2a/2b	2Sin/2Sout
WH/BN	WE 4	2Ka/2Kb	2S3in/2S3out
WH/BK	WE 5	3a/3b	3Sin/3Sout
WH/BU	WE 6	3Ka/3Kb	3S3in/3S3out
WH/YE	WE 7	4a/4b	4Sin/4Sout
WH/GN	WE 8	4Ka/4Kb	4S3in/4S3out
WH/BN	WE 9	5a/5b	5Sin/5Sout
WH/BK	WE 10	5Ka/5Kb	5S3in/5S3out
WH/BU	WE 11	6a/6b	6Sin/6Sout
RD/YE	WE 12	6Ka/6Kb	6S3in/6S3out
WH/GN	WE 13	7a/7b	7Sin/7Sout
WH/BN	WE 14	7Ka/7Kb	7S3in/7S3out
WH/BK	WE 15	8a/8b	8Sin/8Sout
WH/BU	WE 16	8Ka/8Kb	8S3in/8S3out

MDF connection via CA2x or CARUx from the ATLC board with ACSM or ALSM/ALSMF/ALSMH or SSSM submodules

MDF		**Cable Adapter CA2B or CARUB**	
Colours 16x2	Patch panel for two-wire connection	Cable 1	Cable 2
RD/BU	WE 1	1a/1b	free/free
WH/YE	WE 2	free/free	free/free
WH/GN	WE 3	2a/2b	free/free
WH/BN	WE 4	free/free	free/free
WH/BK	WE 5	3a/3b	free/free
WH/BU	WE 6	free/free	free/free
WH/YE	WE 7	4a/4b	free/free
WH/GN	WE 8	free/free	free/free
WH/BN	WE 9	5a/5b	free/free
WH/BK	WE 10	free/free	free/free
WH/BU	WE 11	6a/6b	free/free
RD/YE	WE 12	free/free	free/free
WH/GN	WE 13	7a/7b	free/free
WH/BN	WE 14	free/free	free/free
WH/BK	WE 15	8a/8b	free/free
WH/BU	WE 16	free/free	free/free

MDF connection via CA2x or CARUx from the ATLC board with PLSM submodules

MDF		**Cable Adapter CA2B or CARUB**	
Colours 16x2	Patch panel for two-wire connection	Cable 1	Cable 2

RD/BU	WE 1	1a/1b	1c/1d
WH/YE	WE 2	free/free	1f/1e
WH/GN	WE 3	2a/2b	2c/2d
WH/BN	WE 4	free/free	2f/2e
WH/BK	WE 5	3a/3b	3c/3d
WH/BU	WE 6	free/free	3f/3e
WH/YE	WE 7	4a/4b	4c/4d
WH/GN	WE 8	free/free	4f/4e
WH/BN	WE 9	5a/5b	5c/5d
WH/BK	WE 10	free/free	5f/5e
WH/BU	WE 11	6a/6b	6c/6d
RD/YE	WE 12	free/free	6f/6e
WH/GN	WE 13	7a/7b	7c/7d
WH/BN	WE 14	free/free	7f/7e
WH/BK	WE 15	8a/8b	8c/8d
WH/BU	WE 16	free/free	8f/8e

10.1.1.18 MDF connections from JPAT

MDF		**Cable Adapter CARUB from JPAT**	
Colours 16x2	Patch panel for two-wire connection	Cable 1	Cable 2
RD/BU	WE 1	a1/b1	c1/free
WH/YE	WE 2	free/free	free/free
WH/GN	WE 3	a2/b2	c2/free
WH/BN	WE 4	free/free	free/free
WH/BK	WE 5	a3/b3	c3/free
WH/BU	WE 6	free/free	free/free
WH/YE	WE 7	a4/b4	c4/free
WH/GN	WE 8	free/free	free/free
WH/BN	WE 9	a5/b5	c5/free
WH/BK	WE 10	free/free	free/free
WH/BU	WE 11	a6/b6	c6/free
RD/YE	WE 12	free/free	free/free
WH/GN	WE 13	a7/b7	c7/free
WH/BN	WE 14	free/free	free/free
WH/BK	WE 15	a8/b8	c8/free
WH/BU	WE 16	free/free	free/free

MDF		**Cable Adapter CARUB from JPAT**	

Colours 16x2	Patch panel for two-wire connection	Cable 1	Cable 2
RD/BU	WE 1	a1/b1	c1/free
WH/YE	WE 2	free/free	free/free
WH/GN	WE 3	a2/b2	c2/free
WH/BN	WE 4	free/free	free/free
WH/BK	WE 5	a3/b3	c3/free
WH/BU	WE 6	free/free	free/free
WH/YE	WE 7	a4/b4	c4/free
WH/GN	WE 8	free/free	free/free
WH/BN	WE 9	a5/b5	c5/free
WH/BK	WE 10	free/free	free/free
WH/BU	WE 11	a6/b6	c6/free
RD/YE	WE 12	free/free	free/free
WH/GN	WE 13	a7/b7	c7/free
WH/BN	WE 14	free/free	free/free
WH/BK	WE 15	a8/b8	c8/free
WH/BU	WE 16	free/free	free/free

10.1.1.19 MDF connections from DDID

MDF		**Cable Adapter CA1B from DDID**
Colours 16x2	Patch panel for two-wire connection	
RD/BU	WE 1	a1/b1
WH/YE	WE 2	a2/b2
WH/GN	WE 3	a3/b3
WH/BN	WE 4	a4/b4
WH/BK	WE 5	a5/b5
WH/BU	WE 6	a6/b6
WH/YE	WE 7	a7/b7
WH/GN	WE 8	a8/b8
WH/BN	WE 9	free
WH/BK	WE 10	free
WH/BU	WE 11	free
RD/YE	WE 12	free
WH/GN	WE 13	free
WH/BN	WE 14	free
WH/BK	WE 15	free
WH/BU	WE 16	free

10.1.2 Service panel

10.1.2.1 General Points

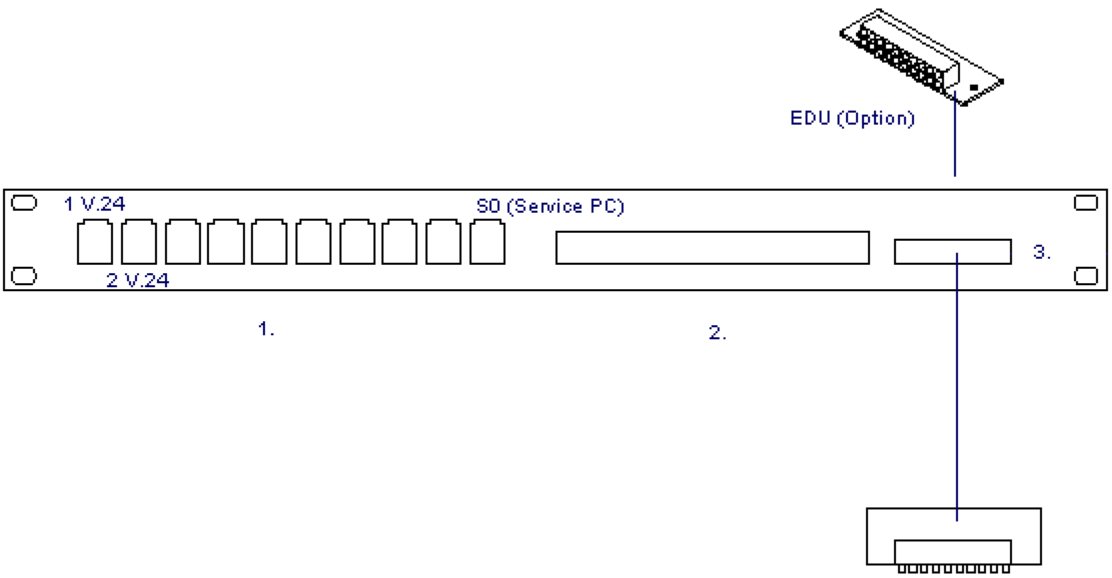
The service panel provides all connections required for service purposes. It must be installed above or below the rack with the boards ACB/HSCB and CF22/CF2E.

The service panel requires a height unit.

As a standard, the two V.24 interface connections on the AEV24B/AV24B are offered for the first two RJ45 couplings, viewed from the left side. The last (tenth) RJ45 coupling is reserved for the S0 connection for the service PC (variant main distributor with patch cable).

There are eight RJ45 located in the middle of the panel, which are fitted at the rear with 8 LSA Plus connections each on a circuit board. This means that project-specific connections can be brought to the panel from the main distributor frame. This may also be the S0 connection for the service PC (main distributor frame for cable with open end).

There is an opening on the right hand side to install the error display unit (EDU). This installation is optional.



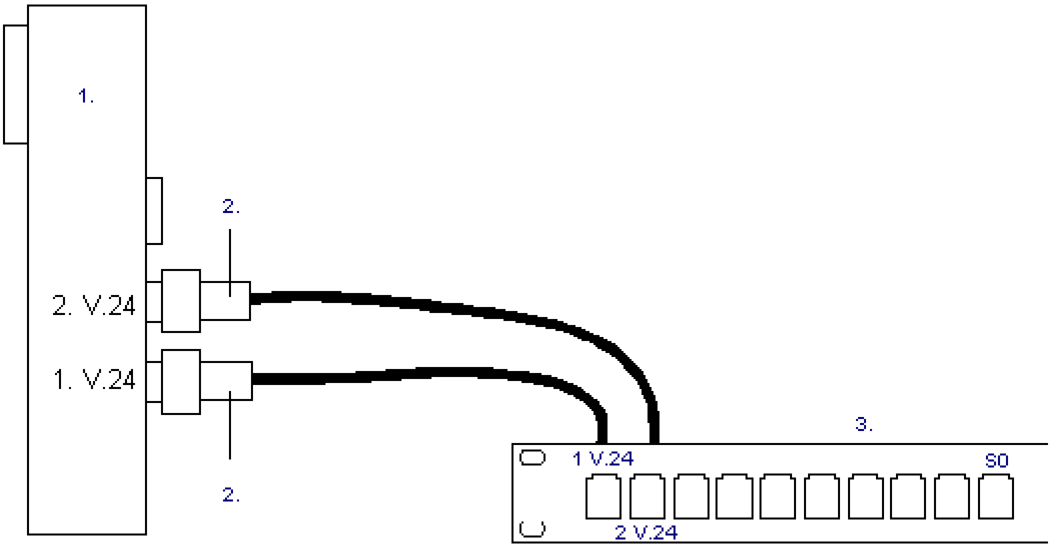
Service panel I55

1. 10 RJ 45 couplings
2. 8 RJ45 with LSA Plus connections (freely wirable)
3. Opening for EDU board

10.1.2.2 V.24 Interfaces

The connections of the V.24 interfaces (GCU Generic Control Unit, ACB/HSCB) are adapted on the adapter module AEV24B/AV24B with the adapters V.24/RJ45 (connect adapter V.24/RJ45 to 9-pin D-sub-connector).

Then connect the adapter RJ45 with the service panel RJ45 using coupling 1 or 2 to 8-wire panel cables.



V.24 Interfaces to the service panel

1. Adapter module AEV24B/AV24B
2. Adapter V.24 RJ45
3. Service panel

10.1.2.3 S0 connection

There are two possibilities, depending on the type of main distributor frame:

- Connection via patch cable

  In this variant, you must make a connection between the patch panel on the main distributor frame and the service panel
  (right RJ45 coupling).

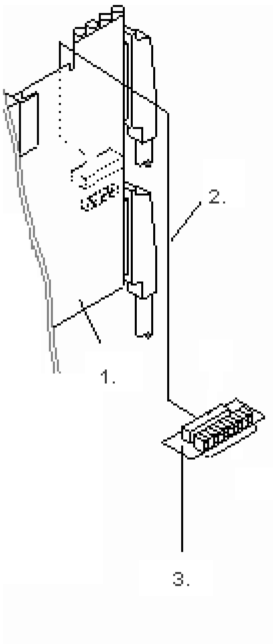
- Connection with installation cable via the LSA Plus connections

  This is where the appropriate jumpering must be carried out on the main distributor frame.

10.1.2.4 Installing the EDU

Optionally, the service panel can be retro-fitted with the submodule EDU.

A ribbon cable us used to connect the EDU.



Connect the EDU to the EDB

1. ESB Adapter
2. Ribbon cable ESB-EDU
3. Sub-module EDU

The EDU is fastened to the service panel using two screws.

10.2 Line lengths

When planning the network, it is necessary to take into account the fact that the Ranges of the interfaces (S0, UP0etc.) are different.

When connecting the line network, the following instructions must be adhered to:

- The two transmission and receiving line pairs (S0) and the double wire for UP0, UPN and UK0 must be executed as a twisted wire pair.
- When dealing with cables with four twisted wires, use a four for the joint transmission and reception line of a S0 interface.
- The naked wires of the cable used must be connected to ground potential.

The following diagrams explain the correlations of:

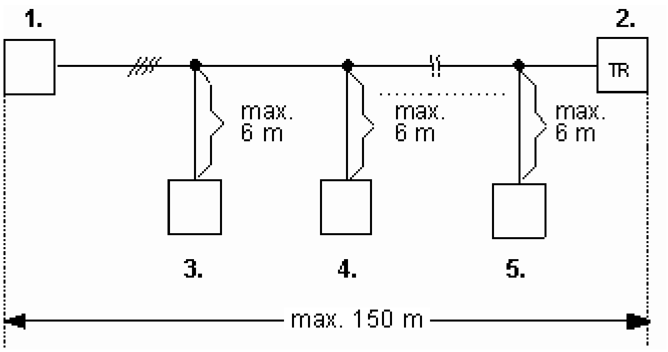
- Ranges
- Interfaces
- Cable types

Cable type		Wire diameter	Range of the interfaces in metres						
			S0bus		S0PTP	UP0	UPN	UPD	UK0
			short	extended					
Installation cable	J-Y(ST)Y	0.6 mm	150	500	1000	1800	1000	1000	4500
	J-2Y(St)Y St III BD	0.6 mm							
Outdoor cable	A-2YF(L)2Y	0.4 mm				2100			
		0.6 mm				3500	2800	2800	8000

Cabling systems	Cable type	Wire diameter	Range of the interfaces in metres						
			S0bus		S0PTP	UP0	UPN	UPD	UK0
			short	extended					
CAT.5	Li-2YCH 4x2x0,48L	0.48 mm	150	500	650	2000	2000	2000	4000
CAT.5	J-2YY 4x2x0,51	0.51 mm	150	500	800	2500	2500	2500	4500
CAT.6	J-02YS(St)CY 4x2x0,52	0.52 mm	150	500	800	2500	2500	2500	5000
CAT.6	J-2YY 4x2x0,52	0.52 mm	150	500	800	2500	2500	2500	5000
CAT.6	J-02YSCY 4x2x0,56 PiMF	0.56 mm	150	500	1000	3000	2500	2500	6000
CAT.7	J-02YSCY 4x2x0,56 PiMF	0.56 mm	150	500	1000	3000	2500	2500	6000
CAT.7	J-02YSCY 4x2x0,56 PiMF	0.645 mm	150	500	1000	3500	2800	2800	8000

10.3 Configuration Examples

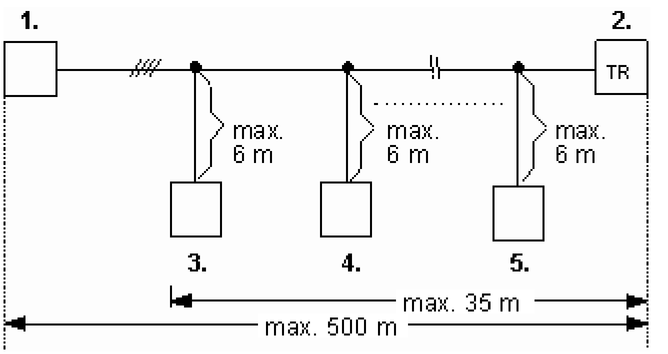
Examples of configuration (installation cable J-Y(ST)Y, wire diameter 0.6 mm)



Short bus

1. e.g. UIP, DS0
   or PCM 2 TD
   or private termination (PT)
2. Last junction box (install the terminating resistors here)
3. 1. Terminal with S0 interface
4. 2. Terminal with S0 interface
5. 4. Terminal with S0 interface

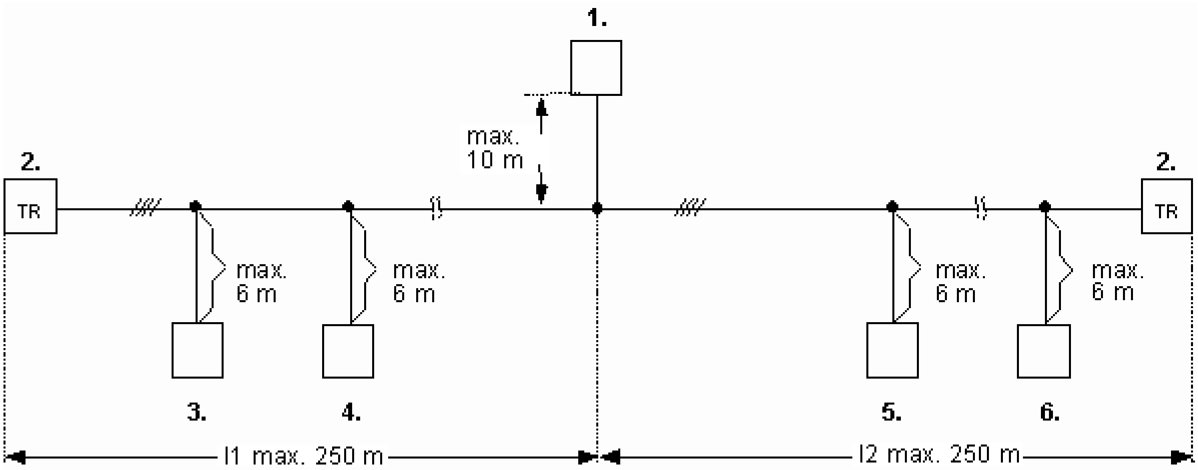
Examples of configuration (installation cable J-Y(ST)Y, wire diameter 0.6 mm)



extended bus

1. e.g. UIP, DS0
   or PCM 2 TD
   or private network termination (PT)
2. Last junction box (install the terminating resistors here)
3. 1. Terminal with S0 interface
4. 2. Terminal with S0 interface
5. 4. Terminal with S0 interface

Examples of configuration (installation cable J-Y(ST)Y, wire diameter 0.6 mm)



Passive bus, Y configuration

1. e.g. UIP, DS0
   or PCM 2 TD
   or private network termination (PT)
2. Last junction box (install the terminating resistors here)
3. 1. Terminal with S0 interface
4. 2. Terminal with S0 interface
5. 3. Terminal with S0 interface
6. 4. Terminal with S0 interface

The difference of the cable lengths l1 and l2 may not exceed 50 m

10.4 Contact occupation of the modular plug connection

The cabling systems structured for the application incoming language or data services generally do not use all the contacts of the modular plug connections. The interfaces of the individual services are assigned to the contacts as follows.

Contacts	Analogue telephone	ISDN S0	ISDN UP0/ UPN/ UK0	Ethernet 10/100 Base T	Token Ring	TP-PMD	AS400	3270	ATM
1				TX+		TX+			X
2				TX-		TX-			X
3		RX+		RX+	RX+			RX+	
4	a	TX+	A		TX-		TX+	TX+	
5	b	TX-	B		TX+		TX-	TX-	
6		RX-		RX-	RX-			RX-	
7						RX+			X
8						RX-			X
Adaptation	-	X	X	-	X	X	X	X	-

TX = Transmitting direction

RX = Receiving direction

Adaptation = device specific in dependence of jumpering distributor components

10.5 LWL-specifications

The characteristics of the LWL cable are available from the relevant documents.

LWL twin cable SC 29.9030.6100-6199

LWL twin cable SC 29.9030.6200-6299

LWL plastic cable 49.9801.3759-3764

11 Note on DECT:

11.1 Intermodule Handover

The new capacity feature Intermodule Handover (IMHO) for the CS155 denotes the consideration of a sequence of important things for the installation and operation. These are to be found in the hardware side as well as the software side. The following instructions contain component and software requirements, the observation of which will ensure the orderly operation of the IMHO. Applies to single, twin or multi-module in principle:

- IMHO is supported first from **E06** system software.
- For the central function a **CF22** (ref. no: **49.9906.5748**) or **CF2E** (ref. no.: **49.9903.4968**) should be used.
- Use **DECT or DECT21** boards as connecting circuit board instead of **DECT2**.
- IMHO **and** doubling of CF22/CF2E boards are generally only possible with T1 devices. The use of TC93 devices is not possible.
- For the intermodule central function (only for multi-group) a**ICF** with the ref. no.: **28.5630.1321 or .1331 or 49.9905.9146** is required. In doing so, make sure that the software on the ICF is doubling-compatible.
- For this ICF, the CL2ME (material number: 49.9904.2214) should be used.

It is important to take note when planning the radio hops that the base stations of a module represent a cohesive radio hop. The radio hops formed by various modules should meet as infrequently as possible. This will prevent unnecessary handovers between the modules. These would only generate superfluous load for the system switching matrix.

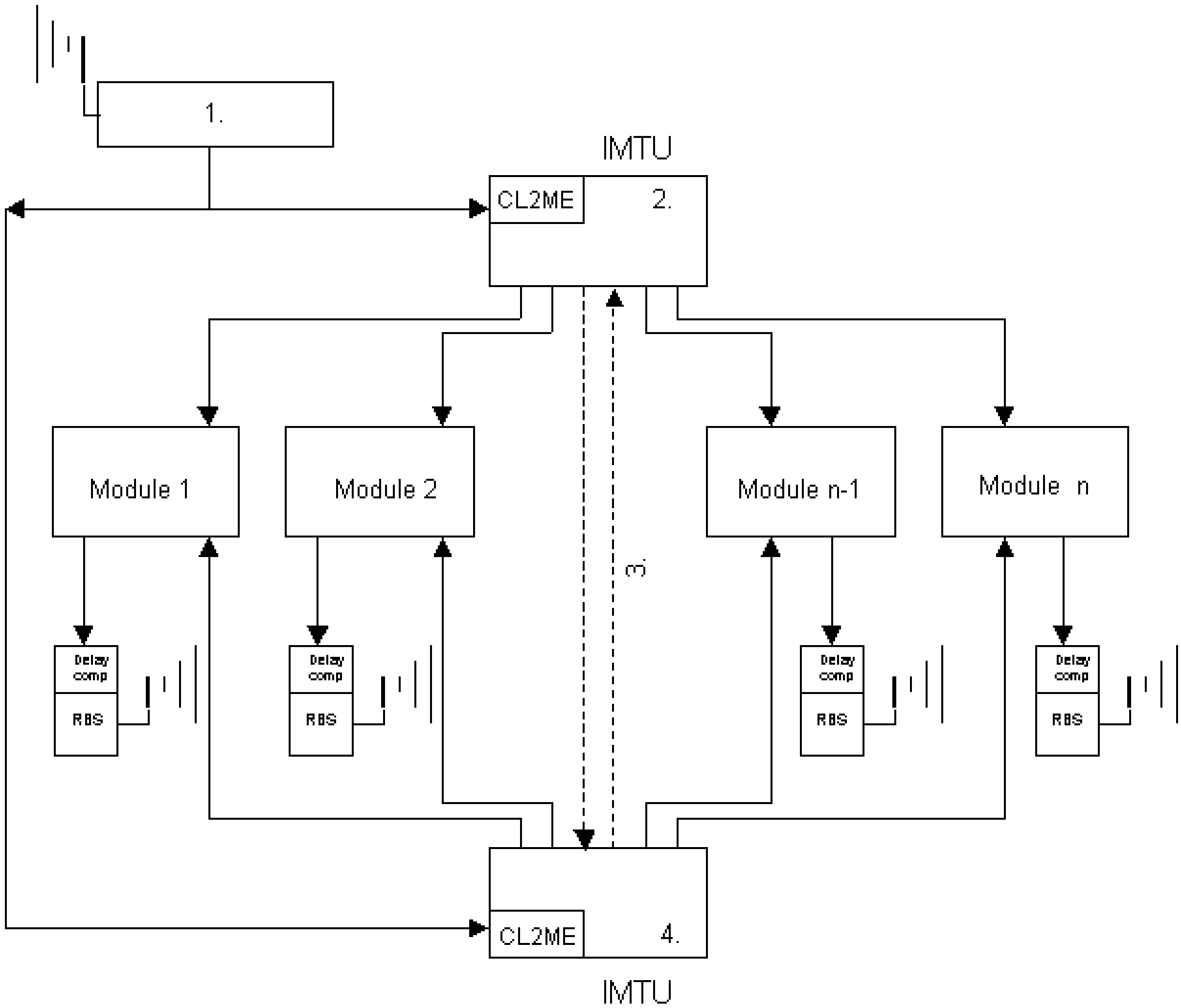
11.1.1 Application in the Multi-Module

The hardware side

An external high precision reference clock is to be connected. See: **Connection of the external high precision reference clock to the CSI55**. This connection is to be connected to the ICF board in the multi-module via the function unit CL2ME. In multi-module with doubling, both ICF boards under application of the CL2ME are to be connected to the high precision reference clock.
The other modules in the multi-group system are supplied with clocks in the usual manner via the LWL paths. The individual modules may be connected to the multi-module via differing length LWL paths. This length difference results in that the 160 ms frame signal arrives in the individual modules asynchronous. This asynchronous condition is balanced out in that, in the RBS stations, correction values have been entered. These correction values arrive at the radio base stations (RBS) by means of customer data via the DECT boards. The length input of the LWL path in meters is carried out by means of the aid CAT (Customer Administration Tool SW E06 and up). The equalization of the phase positions of the 160 ms frame signal is achieved with the aid of the RBS.
In order to measure the optical waveguide length, refer to the regional network service as it has the necessary know-how.
In the event of doubling the multi-module, ensure that the two optical waveguides that lead to the same module also have the same length. This also applies even if the optical waveguides have different line routes. If this is not the case, handover will not be possible following a switchover.
On the boards CF22/CF2E, only switch 1 of the 4 dip switches is to be set to ON, all others remain at OFF. When the CF22/CF2E become synchronous with the incoming 160 ms clock, LED 3 in the front panel lights up.

The software side

Upon startup, the software sets the clock source of the ICF in the multi-module with the address 7D (Hex) as highest priority. In doubling, the ICF in the module with the address 7E (Hex) follows with the same priority level. After startup the clock sources at 7D and 7E are switched on as clock master.
In the event of failure of the input clock on the ICF in the multi-module 7D, the ICF in multi-module 7E will be switched on as clock master. This then leads the clock supply of the ICF in the module 7D via the LWL path of the alternate route. The clock supply is implemented via the active paths which are connected on the module's 7D for all connected modules.
During this switchover, however, each of the multi-modules resynchronises to the new clock source. This may lead to a separation of calls in DECT connections.
After an alternative route switchover, a module is no longer IMHO-compatible after the switchover, as it is the only module to be supplied with clock information from another multi-module as a single module. A system half switchover will take place if the module then receives another switchover request. After this, all modules will receive clock information from one B3 module, and IMHO-compatibility is restored.



Multi-module

1. GPS receiver (GPS = Global Positioning System)
2. Clock master in the CL2M mode
   Production of the frame and DECT pulse

3. Master clock from doubling clock master after clock switchover
4. Production of the frame and DECT pulse
   clock slave B3 in the IML mode

11.1.2 Application in the Twin module

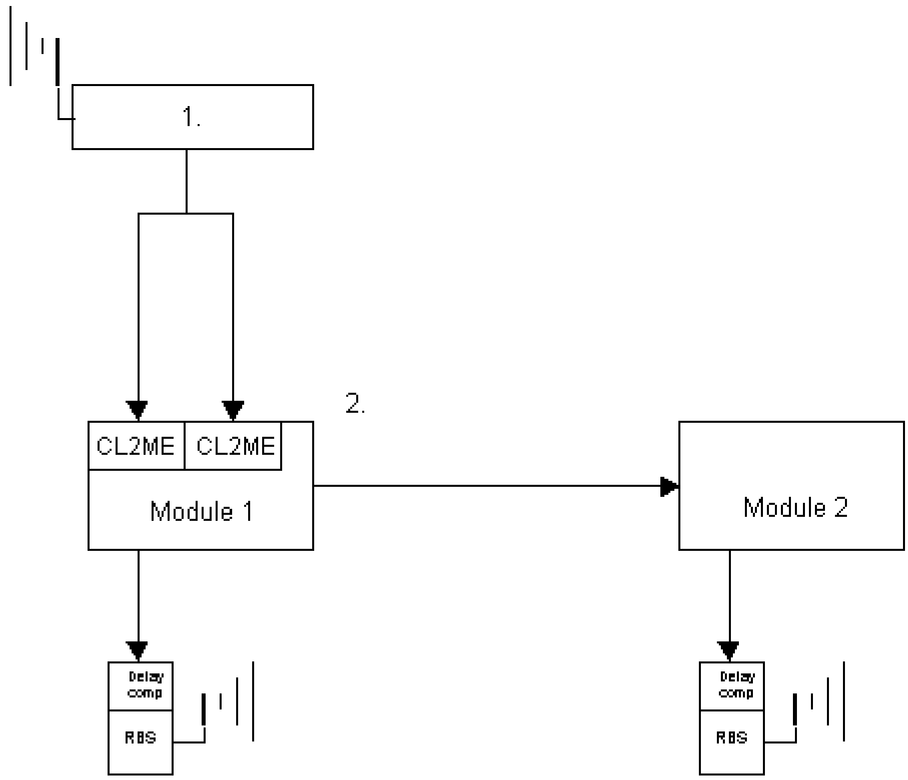
The hardware side

An external high precision reference clock is to be connected. See: **Connection of the external high precision reference clock to the CSI55.**
In module no. 1, this connection is to be brought about via the CL2ME function unit on the UIP board. If greater safety is desired, a second connection is to be brought about via a CL2ME and another UIP in module no. 1
The module no: 2 remains the clock slave The intermodule handover function is no longer relevant in the event of failure of one of the twin modules.
On the boards CF22/CF2E, only switch 1 of the 4 dip switches is to be set to ON, all others remain at OFF.
When the CF22/CF2E become synchronous with the incoming 160 ms clock, LED 3 in the front panel lights up.

The software side

Upon startup, the software sets a UIP module in module no. 1 as clock source with the highest priority. In doubling and failure of one UIP, the other UIP follows in module no.:. 1 as a clock source.
Here also applies that module no. 2, connected via a LWL path, receives a delayed frame signal in relation to module no. 1. This asynchronicity is balanced out in that, in the RBS stations, correction values have been entered. These correction values arrive at the radio base stations (RBS) by means of customer data via the DECT boards. The length input of the LWL path to the module no." 2 , in meters, occurs with the CAT auxiliary item.

The same here applies with regard to the measurement and length of the optical waveguide, see **Application in Multi-Module - The Hardware Side**



Twin module

1. GPS receiver (GPS = Global Positioning System)
2. Clock master in the CL2M mode
   Production of the frame and DECT pulse

11.1.3 Configurations not allowed

Comments on the inadmissible connection or operation forms and their reasons by which no orderly operation of the Intermodule Handover are ensured.

Application in the Multi-Module

- The hardware side:
  Connection via CL2ME and UIP in another module than B3 module.
- The software side:
  After startup, this module with its clock source is selected as clock master and drives all other modules via the B3 module.

The module specific delay times may no longer be active in the clock derived module because it would result in a displacement of the edges of the 160 ms frame signal.
In the other modules, the delay for the path from the clock derived module to the B3 module would have to be added to their own delay times. This would all have to occur therewith all modules work with equal phase positions of the frame signal and is not carried out in the software.

Calls will be separated in the event of switchovers, active/passive switch of the CF22/CF2E. The IMHO function is enabled once more once the switchover has taken place.

Application in the Twin Module

- The hardware side:
  Connection of another CL2ME via UIP in the module no.: 2.
- The software side:
  Up commissioning, a module UIP from the software in module no.: 1 should be used a clock source with the highest priority. In the event of doubling and failure of one UIP, there is a switch-over to the other UIP in the module no.:. 2 as a clock source.
  It also applies here that the module no. 2 receives a delayed frame signal in relation to module 1. This asynchronicity is balanced out in that, in the RBS stations, correction values have been entered. These correction values arrive at the radio base stations (RBS) by means of customer data via the DECT boards.

Now model no.: 2 clock master receives module no.: 1 receives a delayed frame signal in relation to module no. 1. Now the RBS stations in module no.: 2 does not require input of the correction value but that in module no.: 1. The would be treated by software and it is not implemented in the SW.

Calls will be separated in the event of switchovers, active/passive switch of the CF22/CF2E. The IMHO function is enabled once more once the switchover has taken place.

It is important to emphasise once more that the system can be switched to an offered exchange line clock with the aid of synchro management in the event of a total failure of the TAREF or upon separation of the connection to the CL2ME: Due to the ”quality” of the exchange line clock, it is not possible to guarantee that continued operations will be absolutely smooth. However, should a longer period of ”only exchange line clock” operation be unavoidable, the switch 1 of the 4 Dip switches must be set to OFF on all boards of the type CF22/CF2E.

Failure of TAREF and switchover to a different clock source

It is important to emphasise once more that the system can be switched to an offered exchange line clock with the aid of synchro management in the event of a total failure of the TAREF or upon separation of the connection to the CL2ME: Due to the ”quality” of the exchange line clock, it is not possible to guarantee that continued operations will be absolutely smooth. However, should a longer period of ”only exchange line clock” operation be unavoidable, the switch 1 of the 4 Dip switches must be set to OFF on all boards of the type CF22/CF2E.

11.1.4 Connection of the external high precision reference clock to the CSI55

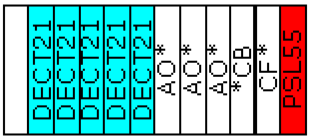
A device from the firm R.A.M. with the designation TAREF is used as external high precision reference clock. A coax socket is located on the back of this device for the 2MHz output, which serves as the connection for the CL2ME line. This connect is supplied by the R.A.M. company together with the TAREF, including all of the required ”mini-transmitters” for the implementation of the coax connection on a symmetrical transmission with a 120 Ohm termination according to CCITT G703. The maximum length of these connecting cables is 10 metres. Only connect the braid screen of the cable with the casing of the ICS module. A screened sub-D-plug in 9-pin design is used as a plug connection to the CS155, connection to the adapter module and therefore to the CL2ME. This enables ”plug and play” functions.

The device will be fitted with a second output for 2MHz within the framework of a redesign (supply starts in June 2001). This means that only one TAREF device is required for a doubled multi-module (ICS or B3 module). The system transmitter will also be integrated in the system. This coax connection to TAREF will then also be modified by R.A.M and the cable is adapted.

11.2 Supply of the DECT-Net Base Station to the Integral 55

The introduction of the Bosch DECT-base station and the PSL55 provides a new and extended calculation basis for the Integral 55.

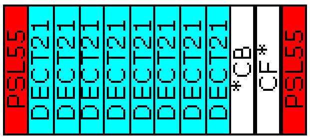
A PSL55 in one rack can feed a maximum of 5 DECT21 boards. The three vacant slots can be equipped with boards that do not require 48 V.

R1 

*CB = ACB/HSCB
CF* = CF22/CF2E
AO* = Connecting circuit (only boards without 48V-requirement)

A second PSL55 provides a redundant power supply for this expansion.

⚠	In cases which necessitate up to 8 DECT21 boards per rack, the rack must be fitted with two PLS55s. PS redundancy is not possible with this configuration.

R1 

*CB = ACB/HSCB
CF* = CF22/CF2E

⚠	There is also an adaption module - seePS350 Adaption → 94 available. Up to 7 DECT21 boards can be operated with it. However, with an additional PSL55 no 48V redundance was reached with this configuration.

11.3 Suitable cable types used to connect DECT RBS

General requirements

- A RBS has two UPN-interfaces. The wire pairs of both Un-interfaces must run in the same cable.
- The opposite wires of star-quad cables form a pair.
- No branch lines may be laid out.
- Non-connected connections to UPO-end devices in its cable must be avoided.
- The maximum allowed loop resistance of the cables is 130 Ohm/km.

Minimum cable requirements

J-Y(ST)Y, St III 2x2x0.6	static shielded cable with 2 wire-pairs (twisted quad cable, **opposing wires form a pair**, to be ensured upon installation!) according to VDE 0815.
or	
2x2xAWG22 S/UTP category 3 (or higher)	according to DIN EN 50173 and ISO/IEC 11801

Wiring to Multiple RBS

J-Y(ST)Y nx2x0.6 Lg	static shielded cable with n wire-pair (wire-pairs stranded in positions) according to VDE 0815. n = 4, 6, 8, ...
or	
nx2xAWG22 S/UTP category 3 (or higher)	according to DIN EN 50173 and ISO/IEC 11801. n = 4, 6, 8, ...

Recomendation:
For new installations it is generally recommended the use of twisted pair cables (e. g. J-Y(ST)Y 2x2x0,6 GR, CU 13 or more pairs) or the use of Cat 3 cables (or higher). With these cables the best experiences could be achieved in the field.

Note:
The laying of parallel wire pairs to different terminals within the same cable may under certain circumstances cause problems if the near-end cross talk level (NEXT) is too high. Cable types of higher quality should therefore be used in the event of problems, e.g. S/STP types.

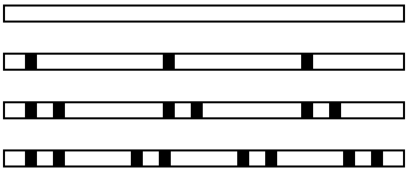
When using twisted pair cables such problems are not known to us.

Remarks on data cables according to DIN EN 50173 and ISO/IEC 11081:

- **AWG** (american wire gauge) must be 22 or smaller. 22 corresponds to an wire diameter of $>$0.643 mm. The smaller the AWG, the larger the wire diameter.
- **S/UTP** screened/unshielded twisted pair; cable shielded but the individual wire-pairs are not.
- **S/STP** screened / unshielded twisted pair; cable and individual wire pairs are electro-statically shielded.
- Category
  1. for analog transmissions
  2. up to 4 Mbit/s
  3. up to 10 Mbit/s.

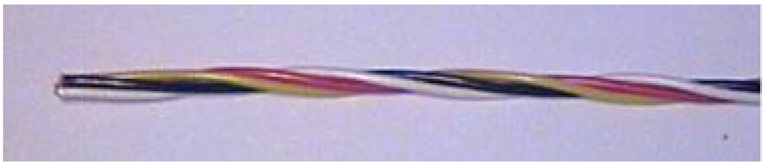
11.4 The structure of the cables

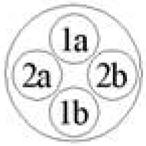
The wires of the cable are star quad twisted. The wires of the star qued have always the same colour. Five star quads form a basic bundle with all colours.

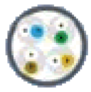
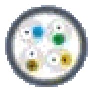
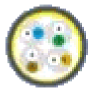
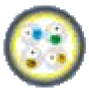
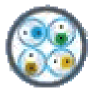


1. A-wire : without marks
2. B-wire : with a ring
3. 2A-wire : with two rings, long distance
4. 2B-wire : with two rings, short distance

another example of star-quad:





Abbr.	Meaning	Application	
UTP	"Unshielded Twisted Pair" unshielded, twisted in pairs, symmetrical copper cable for data with 2 or 4 wire pairs	Local networks in the close workplace area, connection or installation cable	
S/ UTP	"Screened Unshielded Twisted Pair" 2 or 4 wire pairs, twisted in pairs, symmetrical copper cable for data with an additional outer shield	Installation cable for horizontal cabling	
FTP	"Foll Twisted Pair" shielded by foil, twisted in pairs, symmetrical copper cable for data	Installation cable for horizontal cabling	
S/ FTP	"Screened Foll Twisted Pair" screened in layers and shielded by foil, twisted in pairs, symmetrical copper cable for data	Installation cable for horizontal cabling	
STP	"Shielded Twisted Pair" 2 or 4 wire pairs, symmetrical cooper cable for data with individually shielded wire pairs	for data transmission up to100 MBit/s or for the close workplace area, e. g. between floor distributor and data connection	
S/ STP	"Screened Shielded Twisted Pair" 2 or 4 wire pairs cooper cable for data with individually shielded pairs and additional outer shield	Installation cable for horizontal cabling	
PiMf	"Pair in Metallfoil" shielded with metal foil, twisted pair of a copper cable for data with high close crosstalk attenuation	for wiring of large systems or for transmission of high bit-rates or installation cable for horizontal cabling	
ViMf	"Vierer in Metallfolie" quad shielded with matal foil, four wires, copper cable for data	Installation cable for horizontal cabling	

12 Notes to VoIP

Starting with software E07, the communication server Integral 55 offers the integration of voice over IP (VoIP). Here Integral 55 outlying extensions are integrated into the customer's existing IP-based data network environment (LAN, WAN, corporate network). In addition, the networking of Integral 55 systems to different locations via the IP infrastructure is possible.

The performance characteristic description as well as the set-up are shown in the relevant documents.

VoIP in Integral 55 (1)

VoIP in Integral 55 (2)

13 Operator sets

Notes on the installation and service of the OS13 are available in the service and installation manual 0S13, OSM and OSPC - see OS13.

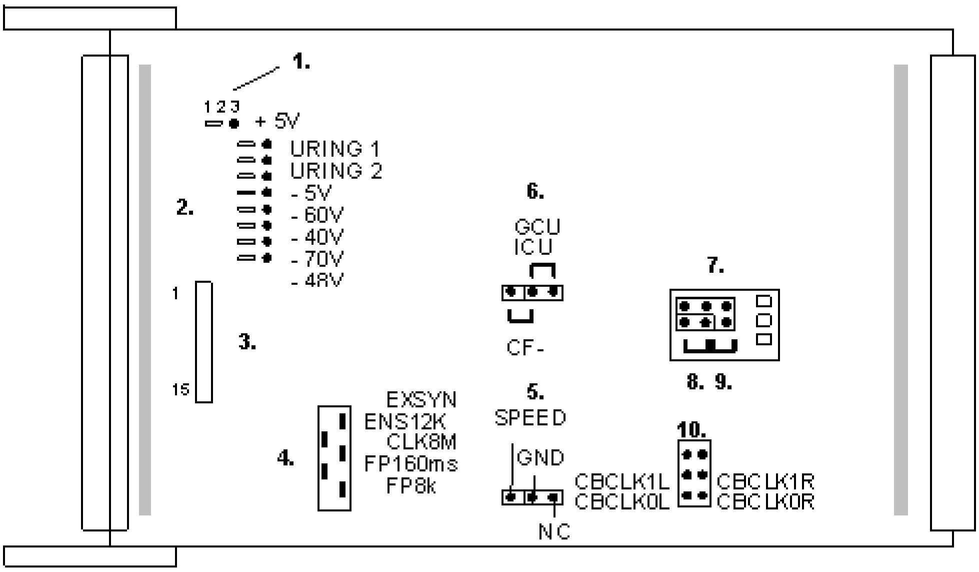
Notes on the installation and for the service of the OS33 are available in the service and installation manual 0S33, OSM and OSPC - see: OS33.

14 Measuring and Testing Tools

14.1 BA Board Adapter

Short description

The board adapter is used for service purposes. The modules to be processed must be inserted in the board adapter, so that it can be subsequently inserted into the PBX.



Board Adapter

1. PIN 1-2 Current reading, PIN 3 Voltage reading
2. Meas. points
3. see table
4. Clock meas. points
5. CBI speed setting
6. Selection of the adapted board (GCU/ICU or CFx)
7. BA chip submodule
8. not clock supplied (only with adapted ICU)
9. clock supplied (only with adapted ICU)
10. Measuring points for C-bus clock

Connectors for C-bus data test pins (3.):

1	GND
2	GND
3	GND
4	GND

5	PF 1
6	PF 2
7	ERRV
8	FCPS
9	WSYN
10	ERLINE 1
11	ERLINE 2
12	ERBAT
13	ERDPS 2
14	REMCNTR 1
15	ERDPS 1

14.2 CBT C-Bus Tester

Short description

The C-bus tester serves as a testing tool for the CS155.

The C-bus tester has two applications:

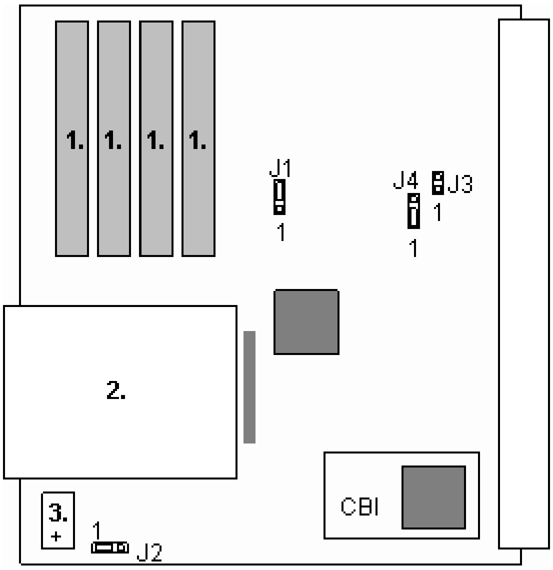
- Lists the message transfer in the system.
- Tests the other printed circuit boards in the laboratory.

Using this program, it is possible to control two different functions:

- Edit messages and send them to the system via the C-bus tester.
- Save messages from the telephone system on the PC hard disc, and display them on the PC screen.

The C-bus tester is made up of two parts:

- A printed circuit board, which is inserted into the CS155 system.
- A DOS program, named CBTPC.



CBT board, component side

1. Memory
2. HGS Slot
3. Battery

The CBTPC program does not perform an analysis of the messages. The MPA (Message Protocol Analysis) program is required for this purpose. However, if the protocol is recorded in ASCII format, it can be viewed in any text program.

Packets which are to be dispatched within only one control cannot be recorded.

14.2.1 Hardware and Software Conditions

You require an AT-compatible PC with a free serial interface (COM1: or COM2:) and at least 512 kB free RAM. A mouse and colour monitor are recommended.

In order to save the protocol data of a C-bus test, the PC's hard disc should have at least 20 MB of free memory.

The CBTPC program is a DOS program. It will not function in Windows.

14.2.2 Installing the Printed Circuit Board

Before a C-bus protocol can be recorded, the printed circuit board for the C-bus tester must be installed in the I55. The following printed circuit boards can be used:

- CBI1T
- CBI1A (Using this CBI may result in a data loss when recording!)

14.2.3 Conditions

The following components are needed to make a connection to the system:

- Printed circuit board for the C-bus tester with at least 4 MB RAM. In the event of several memory modules being installed, they must be on top of each other in the main memory area.
- AV24B adapter module
- Connection cable for connection of two PC-AT's (9-pin, hand shake via RTS/CTS).

14.2.4 Procedure

Insert the printed circuit board in a free slot in the system. The B3 module contains a slot specifically for the CBT.

You should not used the following slots under any circumstances: 0E and 0F reserved slots

14.2.5 Connection cable between CBT and PC

The CBT board and the PC with CBTPc must be connected by a cable.

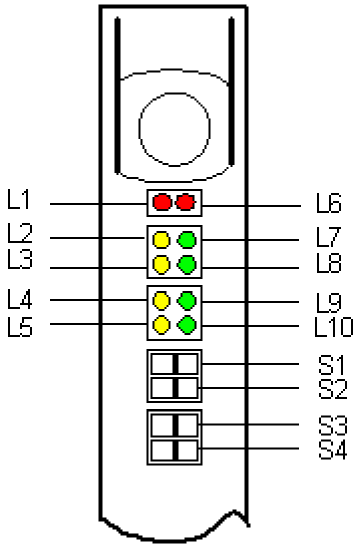
Insert the AV24B printed circuit board on the back side of the system. Connect the COM 1 or COM 2 interface on the PC to the 1st V.24 interface on the AV24B printed circuit board.

	In AV24B, the 1st interface is marked V.24

The cable connects two serial interfaces and must be configured as follows (zero modem):

Signal designation	PC 25-pin socket	PC 9-pin socket	CBT 9-pin socket
TxD	2	3	2
RxD	3	2	3
CTS	4	7	8
RTS	5	8	7
DSR	6	6	4
GND	7	5	5
DTR	20	4	6

14.2.6 LEDs and Switch Functions



CBT board, front side

Meanings of LEDs

The LEDs signal the different phases of the reset process (the bottom two LED's are missing on the old CBTs).

If a module locates a fault, the red LED flashes whilst in the corresponding test, and then lights up again once the reset has been completed.

O	O	-Resets-tests CPU
O	X	
O	X	
O	X	
O	X	
O	O	-Resets-tests memory
O	O	
O	O	
O	O	
O	O	
X	O	-Resets-tests clock component timed interruptions. If this test fails, no further tests are carried out.
O	O	
O	X	
O	O	
O	O	
X	O	-Resets-tests CBI (Master and slave reset, describes the Init register, transmits and receives packets, etc.).
O	X	
O	O	
O	O	
O	O	
X	O	-Reset-tests DUART (local transmission, buffer (FIFO) on the receiver side).
O	X	

O	X	
O	O	
O	O	
X	O	Initializes the individual modules (clock, CBI, DUART ...) The LEDs on the right side have the same denotations as above.
O	O	
O	O	
O	X	
O	O	
O	O	Logging active Recording messages
O	O	
O	O	
O	O	
O	X	

X = LED on

O = LED off

Switch Function

S1	Reset switch	
	Middle:	Operating status
	Left:	Reset board, locking, restart
	Right:	Warm start
S2	Memory test switch	
	Left:	Big memory test
	Right:	Small memory test
S3	No function	
S4	No function	

14.2.7 Removing and Inserting the board

The CBT board may be removed or inserted during system operation, if the S1 switch handle has been moved to the left.

Further information can be found in the **C-Bus Tester Manual**, material number 20.0003.0950, release: 04/95.

14.3 MAHC Measuring Adapter Half Channel

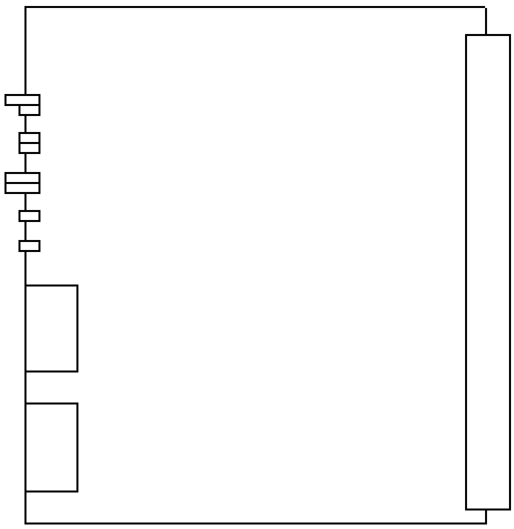
Short description

The MAHC (Measuring Adapter Half Channel) provides the measuring interface for transmission-technical half channel measurements on analogue and digital peripheral connectors for the CS155.

For use in the CS155, the front panel plus lever must be removed. It is possible to use the board lever of the CS155, material number: 4.999.017.193, in conjunction with screw BGH, material number: 4.999.017.192 and axis BGH, material number: 4,999,017,191 is to be used. These parts are required twice per board.

> Operation is virtually identical to that of the MAH board for the I33x (8030). See I33x manual DSV, material number 20.0003.0013.

The measuring adapter is located on a pc board which is inserted into the slot on an **ASCxx** analogue line circuit in order to carry out the half channel measurements in a I55 system.



MAHC module, component side

The board is divided into five function groups:

- Adaptation part for the control and the analog interfaces.
- Line circuit for the connection of the testing device for connection setup.
- Digital measuring interface for the connection of measuring devices with digital access.
- Analog measuring interface for the connection of analog measuring devices.
- Control elements and display board for setting and displaying the operating functions.

14.3.1 Line Circuit

The line circuit function group is provided for connection setup (switch S3 in 'Test' position). The test connection is set up using a DTMF or pulse dialling test telephone instrument which is inserted onto the connector studs. These are located on the component side of the pc board. For test connections in an incoming seizure direction, the test telephone instrument must be called. The test telephone instrument maintains the test connection while the measurement is being taken. Because the receiving direction remains through-connected during the measurement, the measuring signals can be overheard.

14.3.2 Digital Measuring Interface

This interface is a 64kBit/s codirectional interface in accordance with CCITT. For purposes of function control and correct setting of the measuring device, a digital short-circuit connection has also been implemented (switch S3 in 'Test' position).

14.3.3 Analog Measuring Interface

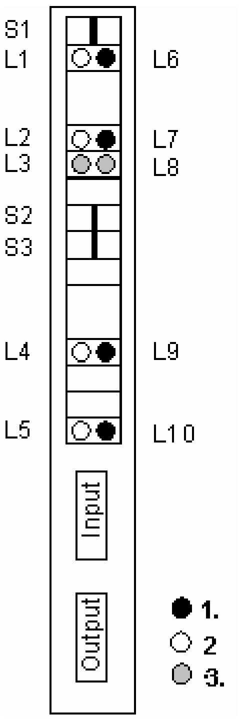
This interface is a 600 ohm, 4-wire measuring interface that can be switched to ZR. The following features are relevant for the interface:

- The relative input and output level is 0 dBr
- Deviations of the relative level and the frequency response are up to +/-0.2 dB
- Input or output impedance (measured as deflection attenuation) >20 dB

If the analog interface is to be used for exact measurements, the respective deviation must be established (second MAHC) and the measuring result corrected accordingly.

In order to check the analog measuring interface (switch S3 in 'Test' position), a short-circuit connection has been provided on the digital side. In doing this, the deviations of the input and output are added.

14.3.4 LEDs and Switch Functions



MAHC board, front side

1. red
2. green

3. yellow

Meanings of LEDs

L1	Seizure
L2	ZR
L3	Measuring
L4	Digital
L5	Digital
L6	Fault
L7	500 Ohm
L8	Measuring
L9	Analogue
L10	Analogue

Switch Function

S1	Middle:	
	Left:	Reset board
	Right:	Micro-Module
S2	Left:	Digital measurement
	Right:	Analog measurement
S3	Left:	Test/connection setup
	Right:	Measuring

14.4 SP1 Spy Probe 1 (SP1)

What is Spy and how can I use this tool?

Spy is designed in such a way because it can record as many system events as possible. The Sky predecessor, the CBus Tester (CBT), only recorded CBus packets. The SKy concept permits simultaneous recording, display and decoding of:

- CBus packets
  messages which run over the CBus. Packets are recorded in separate modules.
- CBus special events
  This includes: Packet losses, blocking times of μPs, packet transmission repetition times, CBus load etc.
- Ethernet packets
  Ethernet packets can be recorded via a network card of the PC card to be recorded at the same time as the CBus recording.
- CBT recording
  Event type which results when reading in BIN files (recordings of CBT)
- Console messages
  event type S01, HGS, FRP-events on the system console. The corresponding capture files can be import and mixed with a recording and therefore can be brought into a temporal relationship.

- Conversion
  The SPY-generated *.frec* files can be converted to.*bin*-files. As a result, further use of this is possible through MAT (MessageAnalysesTool).
- IDM (planned)
  messages between system and terminals or other systems
- Local highways (planned)
  recording of which highway is occupied, number of the occupied highways
- I2C-Bus (planned)
  I2C-Bus signalling in the backplane

For further information on SP1 see SPY1.

14.5 V24IA V24 Interface Adapter

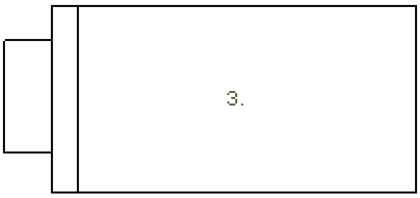
Short description

The V24IA is used as a debugging interface in connection with the DS02, ADM, DUPN or ASC2 boards.

Note:	The use of the V24IA board in the Integral 55 Compact is not necessary, because the requirements already have been implemented.

It is connected as an interface between a terminal or PC and the board. The 9-pin Cannon socket is inserted directly onto the terminal or PC. Between the board and the adapter, an 8-pin RJ45-RJ45 cable required (S0-cable, patch cable).

1.



2.

V24IA board, component side

1. Terminal or PC
2. via cable to DS02/ADM/DUPN or ASC2 board
3. Shrink pipe

The activation of the display at the terminal or PC is carried out via the space key.

The displayed menu items may now be selected.

The following controls may be carried out (DEBUG MENU):

- D channel monitor
- C-BUS monitor
- Layer 1 monitor (crc/abort)

- resource monitor
- show error counters (Bit errorr)
- ci monitor

The reaction times of the board may be increased by activating the controls.

Removing and Inserting the board

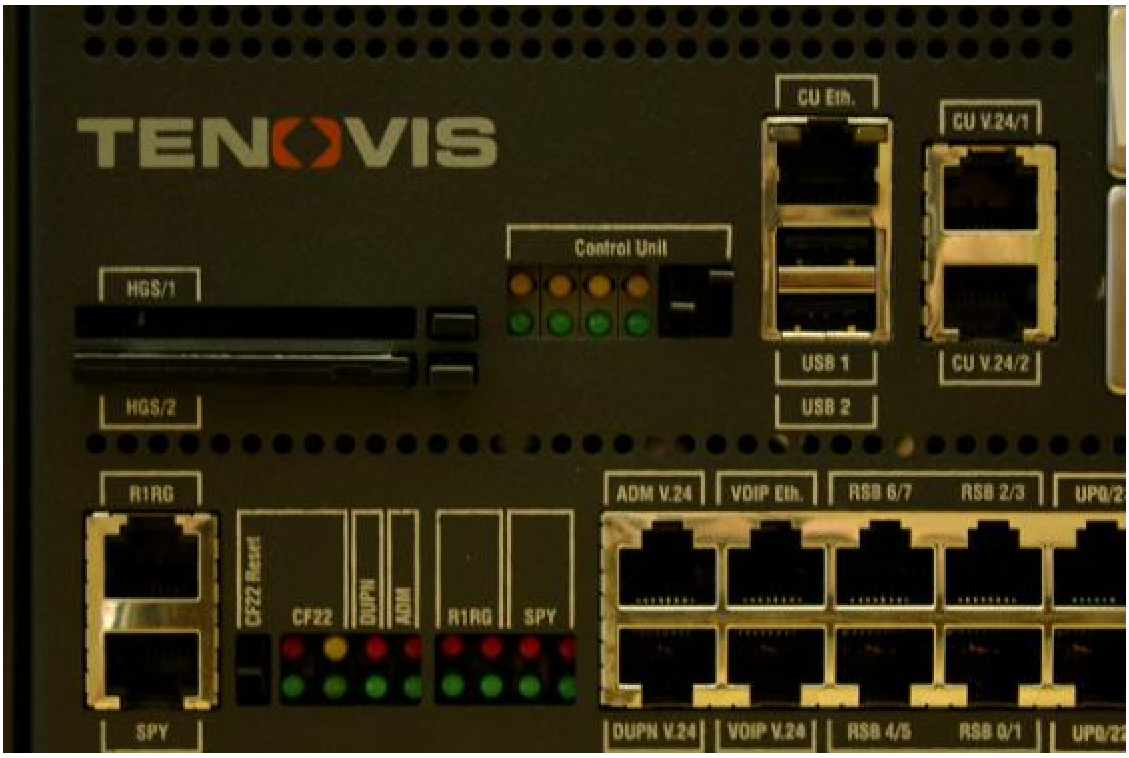
The board may be removed and inserted during system operation.

All debugging tasks should be switched off before removing the cable from the board.

15 Integral 55 Compact / Integral 55 Compact LX

15.1 About this Manual

This manual contains information for sales personnel, service technicians and installers for the acquisition, installation, service, maintenance and expansion of the Communication Server Integral 55 Compact.



A separate manual is available for each individual application.

15.2 Important notes

Safety Information

Prior to completing the connection of the system to the mains power, all wiring of the Integral 55 Compact must be completed and checked!

System service and repairs are the exclusive domain of an authorised specialist!

During installation of the Integral 55 Compact in 19” cabinets, desktop, standing or wall mounting, enough strain relief for all cables and accesses must be ensured.

When connecting circuits to the V.24 interfaces, only use the supplied shielded cables.

The Integral 55 Compact must be connected to the potential equalization!

The presence of strong magnetic fields in the vicinity of the Integral 55 Compact must be avoided!

The Integral 55 Compact must not be exposed to shock, impact or vibrations!

For EMC and conformity reasons, in the Integral 55 Compact only boards may be used that are approved and equipped with metal front panels!

ESD-measures must be accomplished when working with boards susceptible to electrostatic shock.

For reasons of EMC, vacant slots should be covered with frontplates.

In case of wall mounting, a minimum distance for extracting/inserting the boards must be kept.

The following regulations or guidelines must be considered during system installation, commissioning and operation:

- DIN VDE 0100 Setting up heavy current systems
- DIN VDE 0105 Operating heavy current systems
- DIN VDE 0132 Fire countermeasures in electrical systems
- DIN VDE 0298 Use of cables and insulated wiring for heavy current systems
- DIN VDE 0800 Telecommunications engineering
- DIN VDE 0891 Use of cables and insulated wiring for telecommunication and information processing systems
- DIN 4102 Combustive properties of building materials and components
- DIN 5035 Interior lighting with artificial light
- VDI 2054 Air conditioning systems for data processing environments

Additional regulations or guidelines may apply in special or individual circumstances.

Transport

The Integral 55 Compact may be transported only in the original packing or installed in a 19” cabinet.

Check that the system is complete by referring to the delivery note and the accompanying installation documents.

Connections to V.24 Interfaces

To prevent the destruction of the V.24 interface driver and receiver components when connecting devices, it is **imperative**, to use the following cables:

Cable for logging (PK HAL Cat5, grey, 1:1)	Length	Material number
	1m	4.999.045.210
	3m	4.999.045.212
	5m	4.999.045.214
	10m	4.998.045.215

Additionally, the adapter plug RJ45/D-Sub, material number: 4.999.059.171, is available.

15.2.1 Environmental Conditions

The following placement guidelines must be considered in order to ensure trouble free operation of the Integral 55 Compact:

- The room must be dry and provide options for ventilation.
- Weight in the case of full capacity, see Technical data.
- The floor covering should possess antistatic properties. It should be easy to clean and abrasion resistant.
- The Integral 55 Compact should not be exposed to heat (e.g. radiator).
- An additional number of earthed mains sockets must be provided for service purposes.

Climatic conditions for operation, storage and transportation - see Tecnical data.

The access to the Integral 55 Compact must be guaranteed from the front and the back.
In the case of wall mounting, a minimum distance for extracting/inserting the boards must be kept.

Technical Data → 596

15.2.2 Required Servicing Procedures

If servicing is required the Helpdesk has been called by:

- the customer,
- the technician/service technician,
- Remote alarm signalling
- TNS (off hours)

.

In most cases, the Helpdesk will already have located the fault through the use of remote diagnostics. If this is the case, if necesary, simply replacing the faulty module will suffice. It should be stated, however, that remote diagnostics are not capable of locating every fault.

You must then:

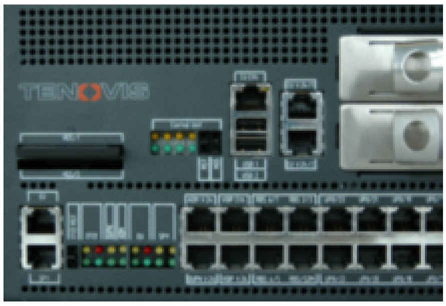
- Condense the available information

- Interpret fault returns/indications or displays
- Locate the fault using the service PC
- Carry out diagnostics with the aid of the Helpdesk.

15.3 Product description

The Integral 55 Compact is the ideal platform in modern business communication for medium-sized and large companies with branch offices. It is designed primarily for linking branch structures to the headquarter. It supports the standard interfaces of conventional technology as well as VoIP solutions and IP network connections. The integrated VoIP - interface can be configured for subscribers as well as for network connections. Furthermore, this technology converts the Integral 55 Compact into an ideal supplement of already existing Integral systems.

15.3.1 Comparison Integral 55/Integral 55 Compact



Overview of the most important differences (details in the text!)		
	Integral 55	**Integral 55 Compact**
Construction	19”	19”
Installation	In the cabinet	In the cabinet, wall-mounted, free-standing device
Cable adapter	required	not required
Multigroup capability	yes	no, only single module
Expandability	yes	possible
Errorsignaling	yes	no, no ESB/EDU
Potential-free switching contacts:	yes	no
ISDN emergency telephone	yes	no

Overview of the most important differences (details in the text!)		
Blower	not redundant	redundant
V.24	insulated or not insulated	not insulated
Harddisk	PCMCIA	only Compact Flash
UK0	yes	no
Slots for boards	32	4
Expansion boards	arbitrarily	ATA, CAS, DECT21, DT21, DSPF, IPN and VOIP
Use of the ATLC and IMUX boards	yes	no
Free selection of slots	yes	conditional
Power supply	redundant	not redundant
CF22	redundant	not redundant
S2M power supply NT	via ESB board	external plug-in power supply unit

As a member of the Integral 55 family in a new, compact 19” housing, Integral 55 Compact offers virtually the same features as the other Integral 55 systems. The main purpose of the Integral 55 Compact was to achieve a cost reduction in minor expansion options.

- The integration of central components and subscriber/line interfaces on a HW platform (given configuration),
- a cost- and function-optimized power supply unit,
- relinquishment of the rarely used HW interfaces,
- and a new, optimized design,

made it feasible to offer the Integral 55 with a variety of features at a competitive price, even in the under 50 subscriber segment.

The Integral 55 Compact runs on the same system software as the other Integral 55 systems. The same service and network administration applications (ISM, ICU-Editor, CAT, ADN, etc.) are also employed for the administration and monitoring of the Integral 55 Compact.

The following differences exist between the Integral 55 Compact system and the Integral 55 system:

General

- 19” mounting system with 3 vertical modules With the appropriate mounting attachments it can be wall-mounted or used as a table or upright unit.
- No rear cable adaptors (boards) with champ plugs are used for wiring the interfaces. The interfaces are all accessible from the front and are installed with RJ-45 cabling.
- Only single module configuration is possible. Integral 55 Compact has no IML (inter module link) interface; twin- and multi-module configurations are therefore not possible with the I55 Compact.
- Module type is O1, Integral 55 Compact is currently not upgradeable.
- CF doubling is not possible.
- Integral 55 Compact has no error signalling LEDs, relay contacts or optocoupler inputs. An ESB/EDU cannot be equipped.

- Integral 55 Compact has no free switching points.
- No connection of ISDN emergency phones is necessary (no EES0B board).
- In comparison to the I55 with its standard single fan, the I55 Compact has a redundant double fan system. If one of the blowers fails, the system continues to work in the permissible temperature range.

Integrated components

- The functions of the HSCB/ACB, CF22, ADM and DUPN boards are firmly integrated into the base unit (BU). CBI addresses / slot assignment are predetermined:
  - Slot 3 / CBI address 08: ADM
  - Slot 5 / CBI address 0A: DUPN
  - Slot 9 / CBI address 0E: HSCB/ACB
  - Slot 10 / CBI address 0F: CF22
- Only the non-isolated V.24 interface is located on the HSCBO and ACBO boards. An isolated V.24 interface is not possible.
- The MI switch function has not been implemented on the HSCBO.
- The HSCBO uses only CompactFlash as a medium for the backup memory. Other media such as hard disks may not be used!
- The DUPN built into the motherboard (MBO) supports only 24 subscribers instead of 32.
- The ADM is also integrated into the motherboard (MBO) of the base unit (BU).
  - ADM submodule 1 is an ABSM (ports 0 to 3): It is built-in (4 analog subscriber interfaces).
  - ADM submodule 4 is an STSM (ports 12 to 15) and also built-in (four S0 or T0 interfaces).
  - ADM submodules 2 and 3 can be configured as UPSM, STSM or ABSM. Submodule UKSM cannot be used in the BU.
- Integral 55 Compact has no single port occupation LEDs for the integral ADM/DUPN functions.

Expansion slots

- Integral 55 Compact has two slots for boards. These are only to a limited extent selectable.
- The following rules apply to board slots:
  - Slot 1 / CBI address 06 (upper slot on BU):
    Only the VoIP, DSPF or IPN boards may be inserted into this slot.
  - Slot 7 / CBI address 0C (lower slot on BU):
    Boards ATA, CAS, DECT21, DT21, DSPF or IPN may be inserted into this slot.
  - When using the DT21 module, the optical 2 Mbit/s interface (submodule OFAS) and coax connection (CA4x) cannot be connected.
  - When using the DECT21 board a maximum of 8 base stations may be configured.
- No auxiliary highways are present at these two slots. The DSPF board may therefore only be equipped with a maximum of two ASN3 submodules. i.e. DSPF has access to 64 channels, which is sufficient for the configuration of the Integral 55 Compact.
- When using the DT21 board for connection to an S2M NT, voltage must be supplied to the network terminator (NT) via an external plug-in power supply (material number 27.4402.1056).

Power supply unit

- The Integral 55 Compact power supply unit PSO is built-in. The PSU cannot be doubled.
- No 110V network supply.
- No -60V partial voltage generation in the BU.
  Therefore the -72V supply voltage of the UKO interfaces on the UKSM submodule cannot be generated for the integrated ADM.
- No external -48V battery supply.
- No 25 Hz ringing voltage.

15.3.2 Technical Data

Connection options
up to 52 voice or data channels in the basic configuration
up to 240 VoIP voice channels
up to 8 radio base stations (DECT) or 1x S2M

Network interfaces			
4 wire ISDN basic access	BRI	T0	B+B+D channel structure
ISDN Primary Rate Access (if required) PRI S2M			30xB+D channel structure

Basic configuration	
S0-Interfaces	4
UPN-(B+B+D) interfaces	24
a/b interface	4

Expansions	
a/b or	max. 1 x per system
S0 or	max. 1 x per system
UPN	max. 1 x per system
VoIP	240 channels for networking and subscribers
DECT	8 RBS
DT21	one S2M-Interface (exchange line (T2) - or FV(TIE, tie line)), 120 Ohm symm.
ATA	8 analog exchange accesses (PSTN)
CAS	one S2M-Interface (exchange interface, connection line or special interface)

* If DT21 is used, DECT is not possible. In this case DECT over IP!

Dimensions	
Integral 55 Compact (WxHxD)	482x132x483,5 mm (3 U)
Wall-mounted device (wall mount bracket and Integral 55 Compact, WxHxD)	510x530x135,1 mm
Floor-mounted device (wall mount bracket, pedestal and Integral 55 Compact, WxHxD)	510x574x444,8 mm

Weights	
Integral 55 Compact	11.00 kg
Wall-mounted device (wall mount bracket and Integral 55 Compact)	16.25 kg
Floor-mounted device (wall mount bracket, pedestal and Integral 55 Compact)	20.50 kg

Colour	
Wall mount bracket, pedestal and Integral 55 Compact	RAL 7016 (anthracite grey)

Network connection	
Mains voltage	230V $\pm$ 10%
Mains frequency	50 Hz -6% +26%
Maximum power consumption	0.6A
Electrical circuit protection	16A automatic circuit breaker C type

Additional data	
Heat output at full configuration	75 W
Sound pressure level (at 1m distance to EN ISO 3744)	$<$45 dB(A)

Telephones/terminals

Al the telephones available for the Communication Server Integral 55 can be connected:

- IP telephones
- ISDN telephones
- Analogue telephones

Ambient conditions/air conditioning				
	DIN ETS	Temperature range	Relative humidity	Comments
Storage:	300.019-Kl.1.1	-5°C to +45°C		
Transport:	300.019-Kl.2.2	-25°C to +70°C		
Operation:	300.019-Kl.232	-5°C to +45°C		stationary use, weather protected

Reliability

In all of the values stated herein, the power supply device was also taken into consideration. However, the failure of power supply devices is less frequent than the failure of mains voltage due to the the power plant. If UPS (uninterrupted power supply) is not used, this will lead to total system failure in both cases. This must be taken into account during the use of the values.

Reliability		
MTBF for the whole system	>/= 35 years	
Fault rate of individual boards	</= 0.75%	in the 1st year
	</= 0.5%	in the 2nd year

Traffic capacity

The term traffic capacity subdivides itself into the dynamic one and the static traffic capacity.

The dynamic traffic capacity is the one provided by the system. It is given by the unity BHCA, i.e. Busy Hour Call Attempts and identifies the number of processed call attempts per main traffic hour. It is given by the unity BHCA, i.e. Busy Hour Call Attempts and identifies the number of processed call attempts per main traffic hour.

The static traffic capacity describes the performance of the switching matrix. It is shown in the unit Erlang (Erl).

The basis for the dimensioning of telephone systems is the FTZ Guideline 12TR3. For digital subscribers (2B+D) it results in a traffic intensity value of 0,3 Erlang (see BAPT - Bundesamt fuer Post- und Telekom-Angelegenheiten regulations for traffic intensity values).

The values listed below in the table apply for the Integral 55 Compact:

Traffic capacity	
Dynamic	8000 BHCA
Static	Non-blocking (1 Erlang/B channel)

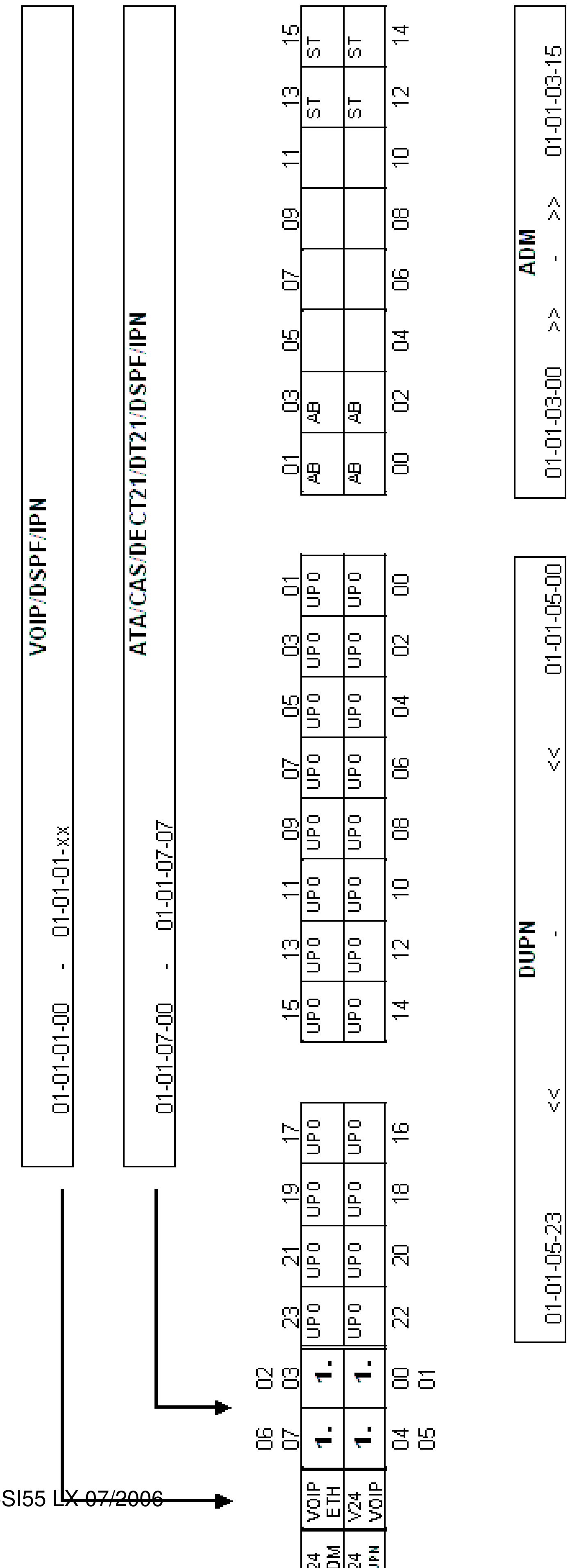
15.4 Base Unit

Die Base Unit integriert die zentralen Komponenten, Teilnehmer- / Leitungsschnittstellen sowie die Stromversorgung.

Es stehen nur zwei Steckplätze zur Verfügung. Grundsätzlich wurde die BU für die VOIP und DECT Baugruppen konzipiert. Dennoch können diese im Bedarfsfall mit folgenden Baugruppen ersetzt oder kombiniert werden:

- ATA
- CAS
- DSPF (nur 32 Kanäle stehen zur Verfügung)
- DT21
- IPN

Peripherie-Baugruppen der Base Unit (BU) und die Lage ihrer Anschlussorgane


VOIP/DSPF/IPN
01-01-01-00 - 01-01-01-xx
ATA/CAS/DECT21/DT21/DSPF/IPN
01-01-07-00 - 01-01-07-07
DUPN
01-01-05-23 << - << 01-01-05-00
ADM
01-01-03-00 >> - >> 01-01-03-15

1. je nach gesteckter AO-Baugruppe

Die Tabelle zeigt die Kombinationsmöglichkeiten aller einsetzbaren Baugruppen in einer Matrix dargestellt.

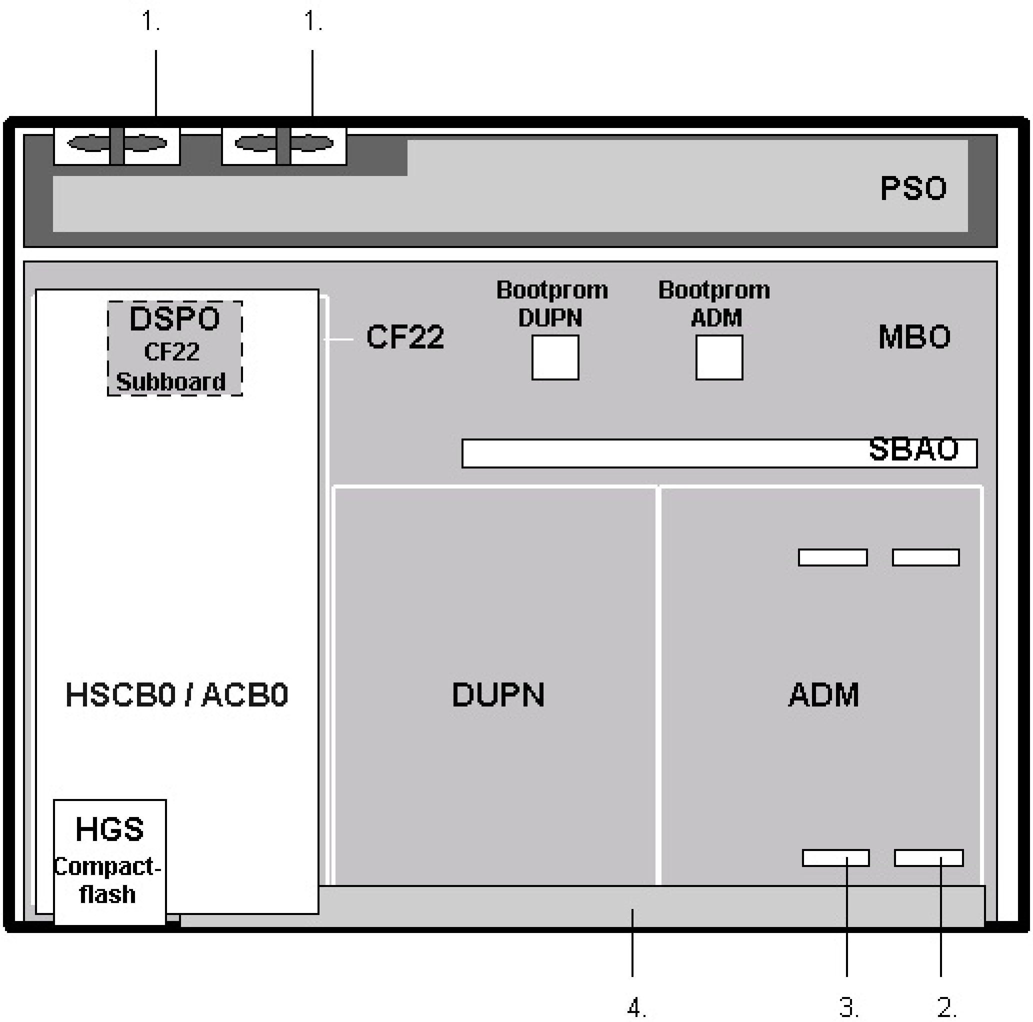
	VoIP	DECT21	DT21	DSPF	ATA	IPN	CAS
VoIP	-	X	X	X	X	X	X
DECT21	X	-	-	X	-	X	-
DT21	X	-	-	X	-	X	-
DSPF	X	X	X	-	X	X	X
ATA	X	-	-	X	-	X	-
IPN	X	X	X	X	X	-	X
CAS	X	-	-	X	-	X	-
X = possible combinations							

15.4.1 Layout

The base unit (BU) is accommodated in a universal housing. It is intended for mounting in a 19” cabinet (three vertical modules) and can be used as a wall, floor or table-top housing.

- The rack is installed in the 19” cabinet with the aid of two simple mounting brackets and sliding rails.
- As a table-top unit with rubber feet in the base.
- The rack is mounted on the wall by means of a simple enamelled wall holder.
- The basic housing can be used as an upright unit with simple accessories.

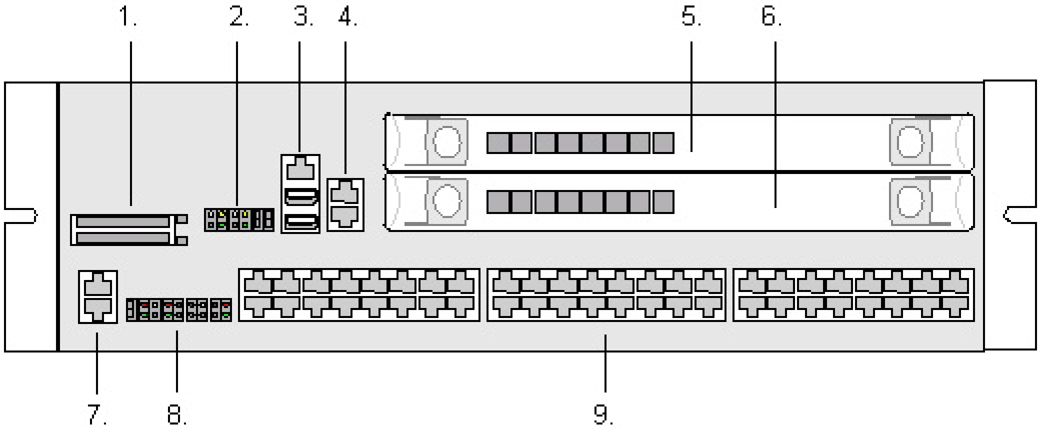
All interfaces and control/display elements can be accessed from the front. The blowers can be replaced from the outside during operation.



Interior view of the Integral 55 Compact (motherboard as a board solution lying in housing), seen from above.

1. Blower
2. Socket for third submodule of the ADM (S0, T0, UPN or a/b)
3. Socket for second submodule of the ADM (S0, T0, UPN or a/b)
4. RJ45 connector strips

15.4.2 Front



Front view of the Integral 55 Compact

1. 2x HGS
   - top = HGS1
   - bottom = HGS2
2. LEDs and control elements HSCBO/ACBO
3. RJ45 jack and 2x USB jacks for ACBO
   - top = CU Eth (Ethernet interface for ACBO control unit)
   - centre = USB/1 (universal serial bus interface 1)
   - bottom = USB/2 (universal serial bus interface 2)
4. RJ45 jacks for HSCBO/ACBO
   - top = CU V.24/1 (first V.24 interface for HSCBO/ACBO control unit)
   - bottom = CU V.24/2 (second V.24 interface for HSCBO/ACBO control unit)
5. Slot for additional VOIP/DSPF or IPN board
6. Slot for additional ATA/CAS/DECT21/DT21/DSPF or IPN board
7. RJ45 jacks
   - top = EU (extension unit port, R1RG/1)
   - bottom = SPY (R1RG/2 SPY)
     These two ports are reserved for future applications and are not yet usable.
8. LEDs and control elements of the MBO board
9. RJ45 jacks for AO ports

15.4.3 Housing open

If the housing must be opened (e.g. for retro-fitting submodules), proceed as follows:

- Loosen the five Torx screws with several rotations (1.)

- Pull the housing cover towards you.

- Lift the housing cover over the screw heads.

- Now the cover can be removed by pulling it away.

Use the reverse procedure to close the housing.

15.4.4 Table unit

If the base unit is set on a table, it must be fitted with four rubber feet (included in the mounting set) on the underside of the housing.

15.4.5 Install in the cabinet

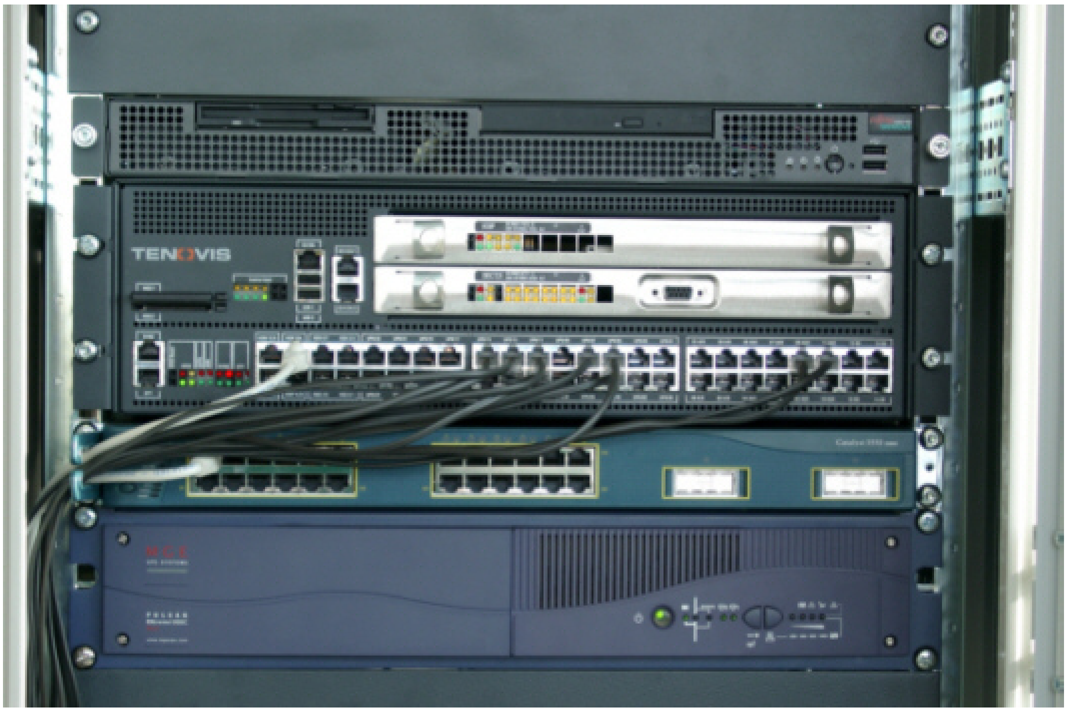
When installing in a cabinet the base unit must be mounted on sliding rails.

Fit the sliding rails in the cabinet for the base unit.

Provide the appropriate holes in the mounting channels with M6 cage nuts.

The base unit is supplied with mounting brackets already fitted. Place the unit into the proposed verticle module. Secure it in the cabinet by means of four torx screws.

The following illustration shows an installed base unit of the Integral 55 Compact.

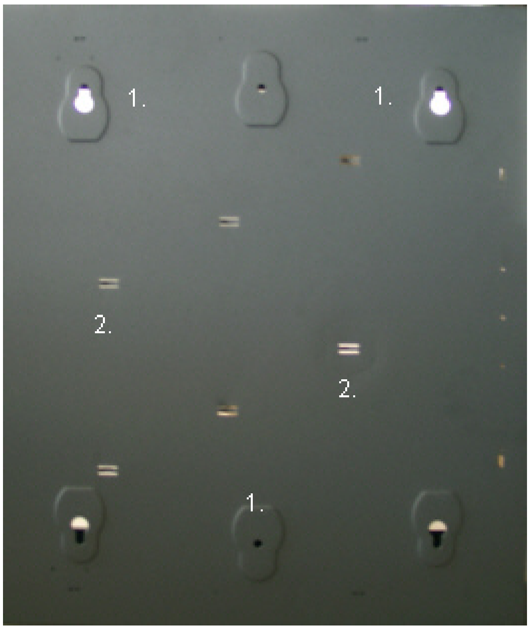


15.4.6 Mounting on the wall.

The Integral 55 Compact base unit must be placed in the wall-mounting bracket so that the LED and switch block are always on top.

The base unit must be assembled in the preferred state, i.e. left-hand access to boards and patch field.

If the access is on the right, the cable should be long enough to permit the boards to be pulled out for servicing. The excess cable after commissioning can be stored in the rear.



Three points (1.) for the drillholes can be marked on the wall with the aid of the drilling jig (packaging with punched drillhole diagram).
Drill the holes and insert the enclosed plugs.

The wall bracket should be mounted to suit the given circumstances!
Observe: Wall spacing
Sufficient space must be provided for plugging and unplugging the boards.

	The holder should then be hung on the upper two screws and locked in place with the lower screw. Tighten up all three screws. The connecting cables of the Integral 55 Compact must be secured on the pull-throughs (2.) and strain relief bars (3.) on the left and right side with cable fasteners.

Set the Integral 55 Compact base unit on the lower plate of the wall-mounting bracket. Push the unit inside. The springy bracket and mounting bracket at the front will determine the full depth and positioning in the wall-mounting bracket.

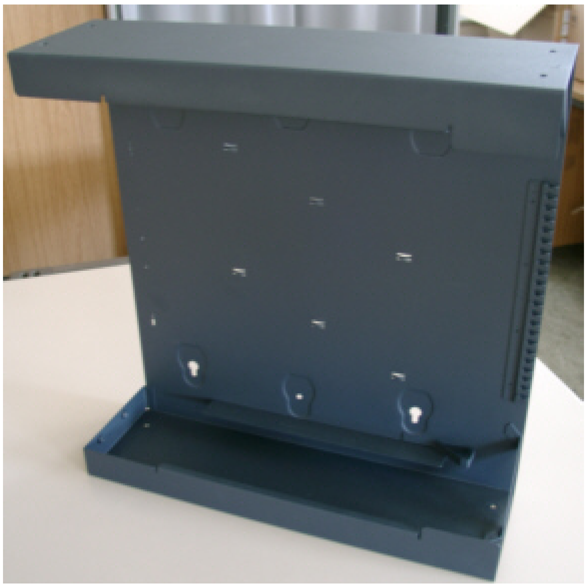
Secure the unit on the wall-mounting bracket with four torx screws.

Plug the connecting cable into the corresponding RJ45 jacks on the front of the base unit.

15.4.7 Setting up in the room

Place the holder in the foot with rubber studs.

Foot (from above)

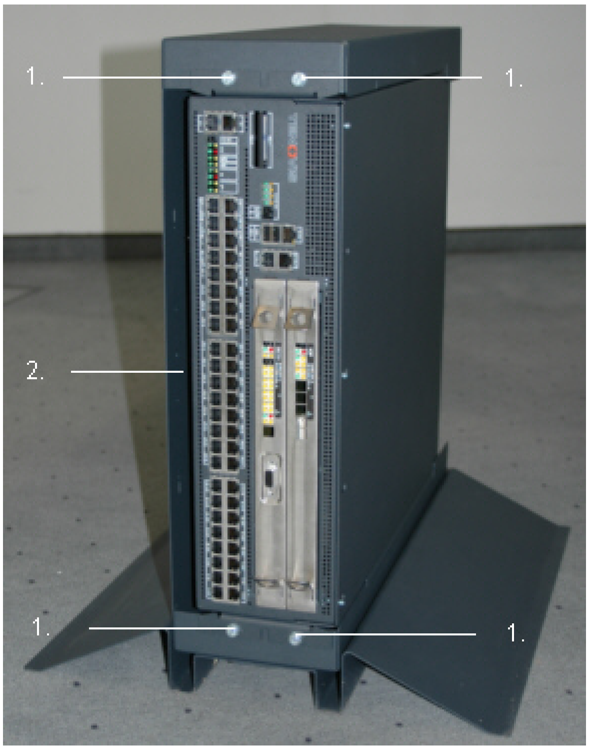


Wall-mounting bracket

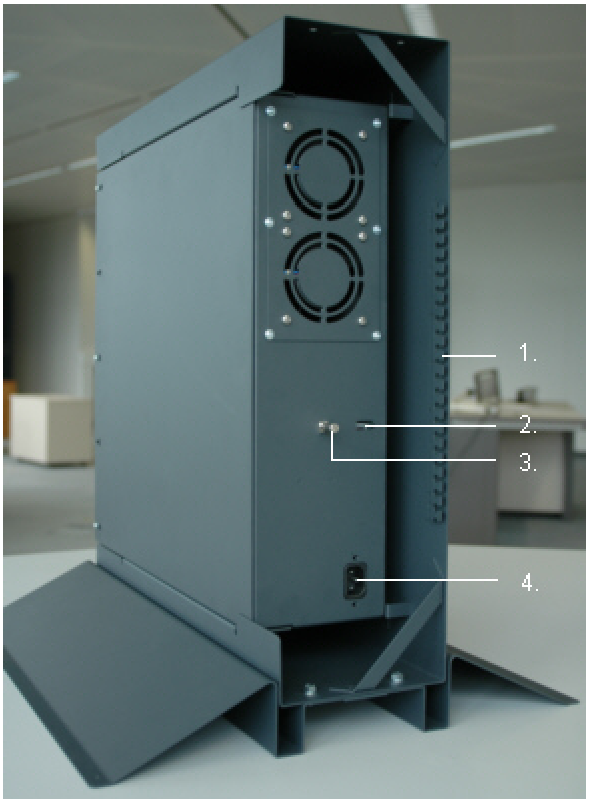
1. Connect the holder to the foot with the four torx screws.

The connecting cables of the base unit must be secured with cable fasteners on the pull-throughs at the left and right of the wall-mounting bracket (see illustrations).

Push the Integral 55 Compact base unit into the holder from the side shown in the following illustration.



1. Secure the unit on the wall-mounting bracket with four torx screws.
2. Plug the connecting cable into the corresponding RJ45 jacks on the front of the base unit.



1. Fastening for cables with fast binders (strain relief).
2. Strain relief lug for earthing wire
3. Clamp for earthing wire
4. IEC power plug

Mounting on the wall. → 605

15.5 Boards

The boards inserted in the front side may be removed and inserted during system operation. The ESD measures must be followed

	For EMC and conformity reasons in the Integral 55 Compact are used only released boards equipped with metalic front strips! For reasons of EMC, vacant slots should be covered with frontplates.

Board	Base Unit
ACBO → 610	X
ASC2	
ASC21	
ASCxx	

Board	Base Unit
ATA → 628	X
ATA2	
ATB	
ATC and	
CAS → 632	X
DDID	
DECT21 → 638	X
DS02	
DS03	
DSPF → 642	X
DT21 → 646	X
DUP03	
DUPN	
HSCBO → 651	X
IPN → 654	X
MBO → 656	X
SBAO → 664	X
VOIP → 664	X

15.5.1 ACBO Advanced Computer Board Office

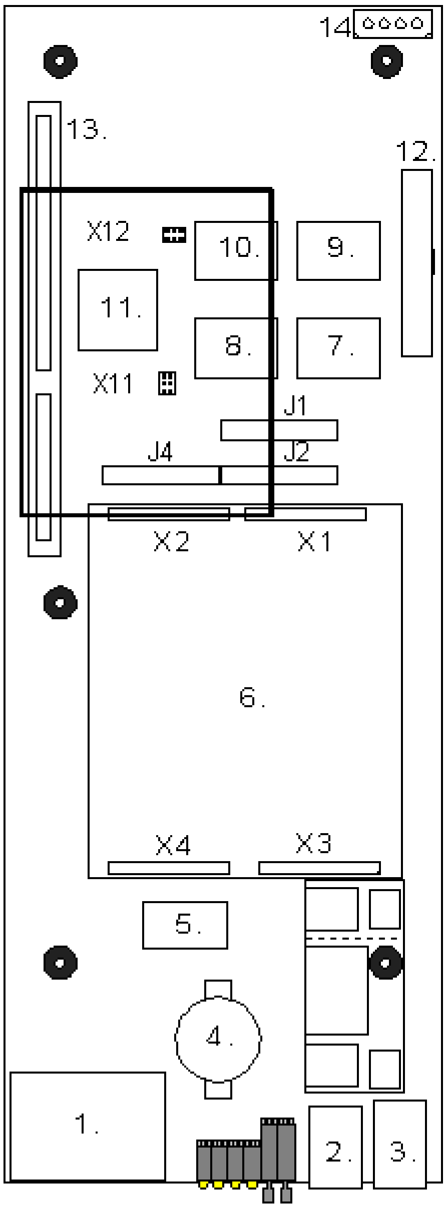
Short description

The ACBO board is the basic equipment in the Integral 55 Compact LX. They are located in the Base Unit (BU). This computer board is used when the software IEEx (Linux operating sistem) is used.

<table>
<tr><td colspan="2">Features</td></tr>
<tr><td rowspan="4">ETX-PC
The ETX-Board is a complet PC-System. All functions the current PCs offer are realized on this Board. Performance same as Pentium III/400MHz or higher.</td><td>512 MByte of main memory, (only one SO DIMM Modul)</td></tr>
<tr><td>Boot flash PROM with Phoenix Bios</td></tr>
<tr><td>Voltage generation</td></tr>
<tr><td>Real-time clock (RTC)</td></tr>
<tr><td colspan="2">Hardware watchdog</td></tr>
<tr><td colspan="2">RTC battery (8 years buffer operation)</td></tr>
<tr><td colspan="2">Ethernet interface 10/100 Base T</td></tr>
<tr><td colspan="2">two V.24 interfaces (not isolated)</td></tr>
<tr><td colspan="2">Interface to the PCM highway (4 independent B channel accesses)</td></tr>
<tr><td colspan="2">PCI Bus (5V tolerant) 32Bit/33MHz</td></tr>
<tr><td colspan="2">Two CBus interfaces (ISA Bus)
on for system control reasons
one as SPY-remote Interface (SPY = System Protocoller and Analyser)</td></tr>
<tr><td colspan="2">IDE interface for Compact Flash (HGS)</td></tr>
<tr><td colspan="2">USB1/2 for more V.24 interfaces</td></tr>
</table>

The hardware prerequisites for remote logging with SPY are contained on the board.

	As the software for the logging from remote is **currently** not implemented, it must be made locally using a SP1 board (reference number: 49.9902.8112) and a PC.



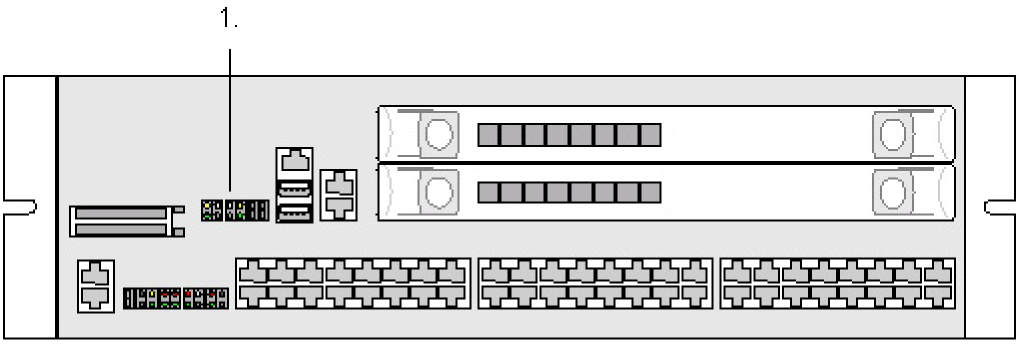
ACBO board, component side

1. HGS, Compact Flash (component side); boot flash, Compact Flash, (conductor side)
2. Ethernet USB 1.1
3. 2 x V.24
4. Battery

5. Transformer 10/100 Base T
6. ETX-PC
7. CBI
8. PCM highway controller
9. CBT
10. PCM highway controller
11. SEPL
12. Ribbon cable
13. ISA Bus testconnector
14. Power supply plug

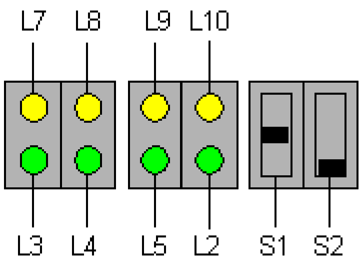
Other features		
Power demand +5V	2200 mA	with 2 * Compact Flash

15.5.1.1 LEDs and Switch Functions



1. Position of the control elements and LEDs (Control Unit)

LEDs and switches of the ACBO



ACBO board, front side

Switch Position in Normal Operation

S1	Middle:
S2	Below

Switch Function

S1	**Reset switch**	
	Middle:	Operating status
	Below:	Hardware reset of the board, locking
	Above:	ACB is shut down (by the operating system), keying
S2	**Hard Disk Change Request (HDCHR)**	
	Below:	Operating status: IDE Hard Disk in operation
	Above:	Service position: Removing and Inserting the IDE Hard Disk

Meanings of LEDs

L3	on:	CBI access
L4	on:	Access to Compact Flash 1/2
L5	on:	Compact Flash (HSG) can be removed/inserted
L2	on:	Power OK
L7- L10	These LEDs indicate the statuses from reset to operation. After the voltage supply has been switched on a functional check is carried out (LEDs light up briefly).	

The commissioning status is divided into four groups:

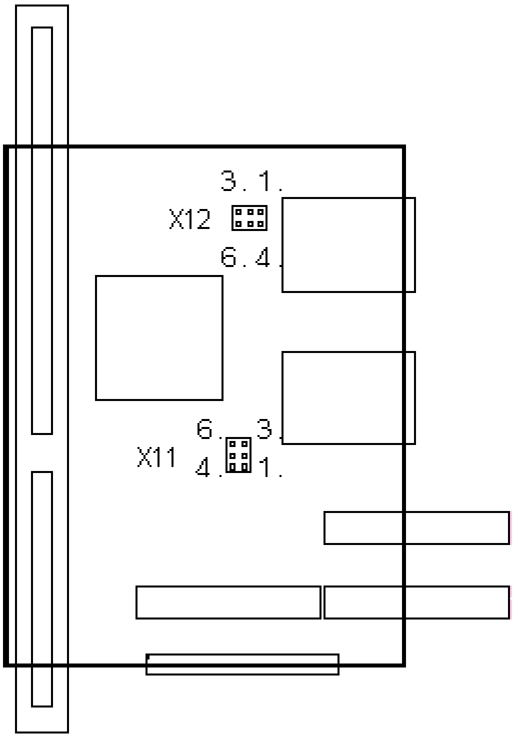
1. ACBO loading from flash software
2. ACBO loading from HGS to operating system level
3. ACBO loading from HGS to application level
4. ACBO loading in special status (APS change) during operation.

No.	L7	L8	L9	L10	Gr.	Status	Phase name
15	1	1	1	1	0	Commissioning starts	BIOS is running; LED test.
14	1	1	1	0	0	Operating system takes up work	Linux-Kernel has been loaded. GRUB finished and initialization RAM Disc started.
13	1	1	0	1	0	Load operating system via CBI	ACB board without HGS is loaded as slave via C bus. Status 11 and 12 skipped.
12	1	1	0	0	0	Load operating system via Ethernet	ACB board without HGS is loaded as master via Ethernet. Status 11 and 13 skipped.

No.	L7	L8	L9	L10	Gr.	Status	Phase name
11	1	0	1	1	0	Load operating system via local bus	ACB board with HGS is loaded as master directly. Status 11 to 13 are not processed in the normal order.
10	1	0	1	0	0	Flash software update	ACB flash software in progress.
9	1	0	0	1	1	PAL starts	The PAL server is ready. All known Pascal tasks are started.
8	1	0	0	0	1	Download of the application files	Download of applications files in progress.
7	0	1	1	1	3	Start of the platform applications	Start of the platform applications such as PFSP, PAL, L4AD.
6	0	1	1	0	3		
5	0	1	0	1	3		
4	0	1	0	0	3	APS change in progress (only displayed on the IVL)	ACB with IVL function is preparing an APS change.
3	0	0	1	1	2	Conversion of customer data (only displayed on the IVL)	Conversion of customer data (CKDT started with MML command is not displayed).
2	0	0	1	0	2	Load APS customer data	DMS of the module signales the loading customer data phase
1	0	0	0	1	2	ICU commissioning	All customer data loaded. Start commissioning of module(s)
0	0	0	0	0	2	Normal operation	Module(s) in operation

1 = LED on
0 = LED off

On the component side of the ACBO there are two pin strips X11 and X12.



Section of the component side ACBO board

Jumper functions

Jumper on X11	
1 - 2	Adress bit A9 = 1
2 - 3 (default)	Adress bit A9 = 0
4 - 5	Board passport protected
5 - 6 (default)	Board passport not protected
Jumper on X12	
1 - 2 (default)	Watchdog enable
2 - 3	Watchdog disable
4 - 5	SCOCON fulfilled (Service entry)
5 - 6 (default)	SCOCON not fulfilled

15.5.2 ASC21 Analog Subscriber Circuit 21

Short description

The ASC21 board provides 32 a/b connections for analog terminals, according to country-specific requirements with the following features:

Country-specific variants are configurable using board software for the following countries:	Germany, Austria, Switzerland, Netherlands, Great Britain, Italy, Spain, Belgium, Venezuela, Hungary, Czech Republic, Slovakian Republic, Mexico, Hong Kong, USA, Russia and France

<table>
<tr><td>Power demand +5V</td><td colspan="2">600 mA</td></tr>
<tr><td>Interfaces</td><td colspan="2">32 × a/b</td></tr>
<tr><td rowspan="3">Constant current supply</td><td colspan="2">22 mA convertible to 30 mA</td></tr>
<tr><td>Line resistance</td><td>2 x 235 Ohm</td></tr>
<tr><td>range:</td><td>1.7 km installation cable J-Y(ST)Y Ø0,4 mm
4.0 km installation cable J-Y(ST)Y Ø0,6 mm
7.5 km installation cable J-Y(ST)Y Ø0,8 mm</td></tr>
<tr><td colspan="3">DTMF/pulse dialling</td></tr>
<tr><td colspan="3">25/50 Hz ringing current (convertible)</td></tr>
<tr><td colspan="3">Short and long flash time (end device dependent)</td></tr>
<tr><td colspan="3">Overvoltage protection up to 4 kV</td></tr>
<tr><td colspan="3">Board software download</td></tr>
<tr><td colspan="3">Board identification using board pass</td></tr>
<tr><td colspan="3">Maintenance function</td></tr>
<tr><td colspan="3">Polarity reversion for “message waiting” signalling</td></tr>
<tr><td colspan="3">Connection of external announcement devices</td></tr>
</table>

The connection on the MDF is carried out via the CA2B or CARUB boards.

15.5.2.1 Changing the Supply Current

The supply current on the board can be set between 22mA (standard) and 30mA per connecting circuit.

The following steps must be taken:

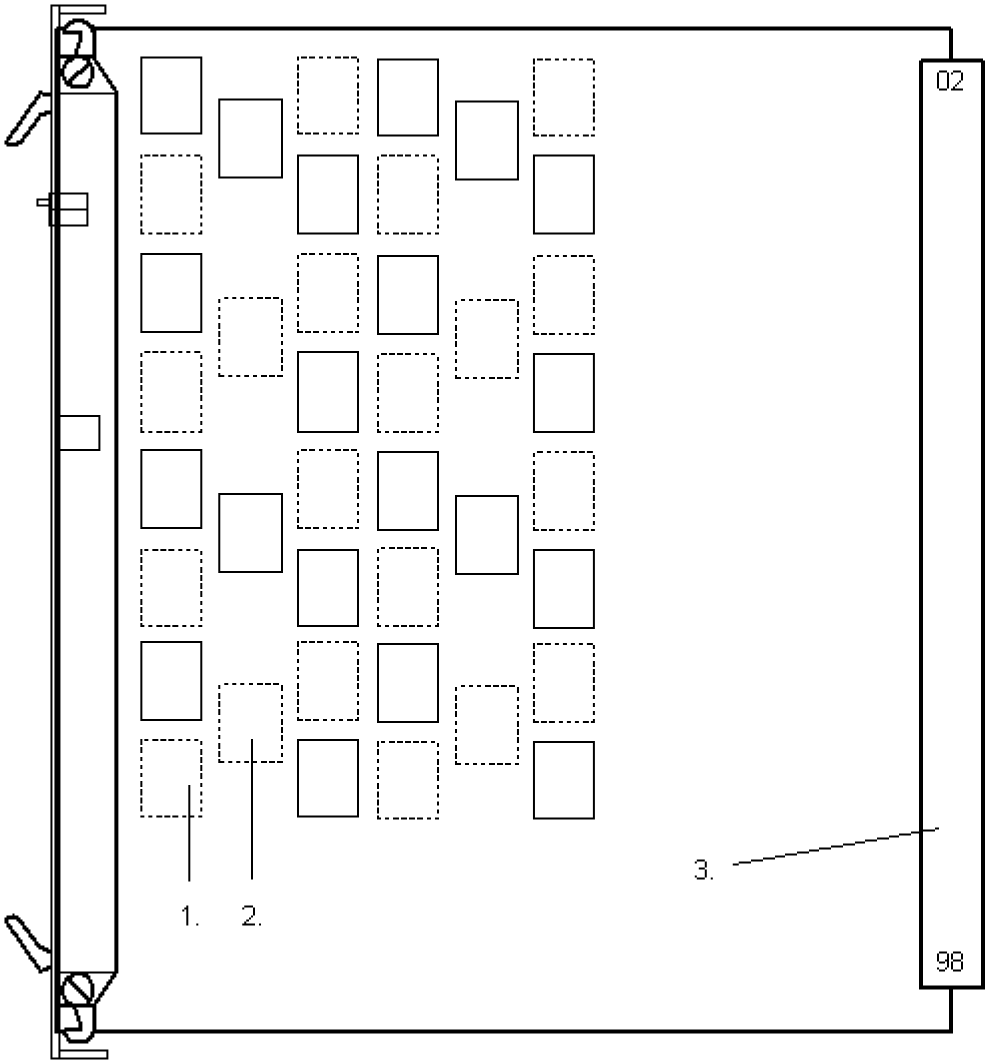
The number of the AO for which the current changeover can be made is stated on the conductor path side and on the component side.

Example:

The power supply component for AO 01 is located on the component side. The soldering points for setting the higher loop current are located on the conductor path side. For this reason the 01 marking is also located on the conductor path side.

The marking *3 is to be found in each AO area, close to which are four mounting spots for two not equipped resistors (0 ohm).

These mounting spots must be connected in pairs by wire jumpers. It is important to solder two wire jumpers per AO.

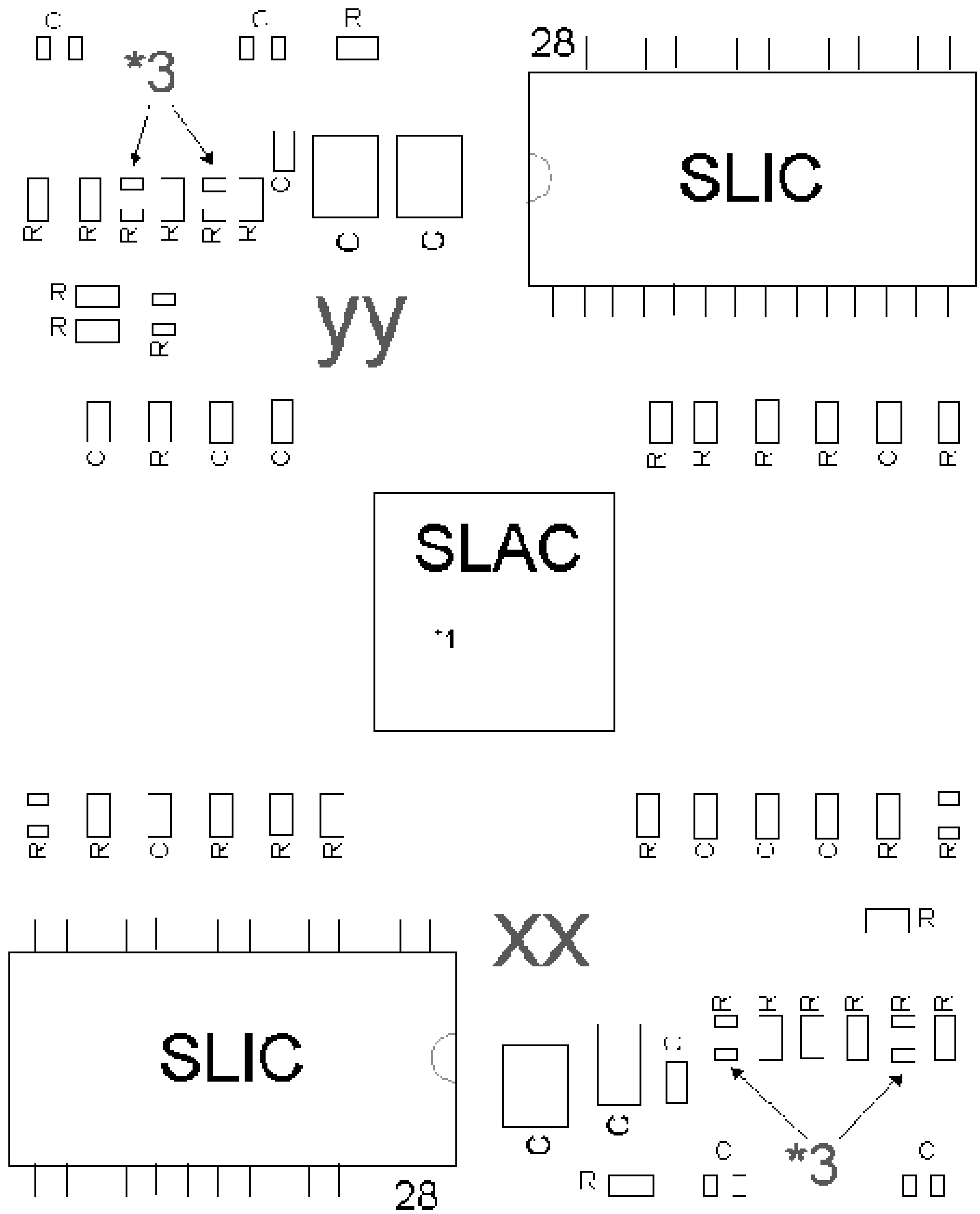


ASC21 board

1. Power supply component per AO
2. jointly for four AOs
3. Connector to backplane of I55

For better orientation, please turn the board so that the connector (3) is facing you and the numbers of the AOs are legible.

The following is a section from the component side on which you can see the position of the mounting spots to be bridged.



1 on component or soldering side, depending on port

The mounting spots must be vertically connected to each other.
The marking *3 relates to the mounting spots marked with an arrow.

The current increase can be set on the component side for the following AOs:

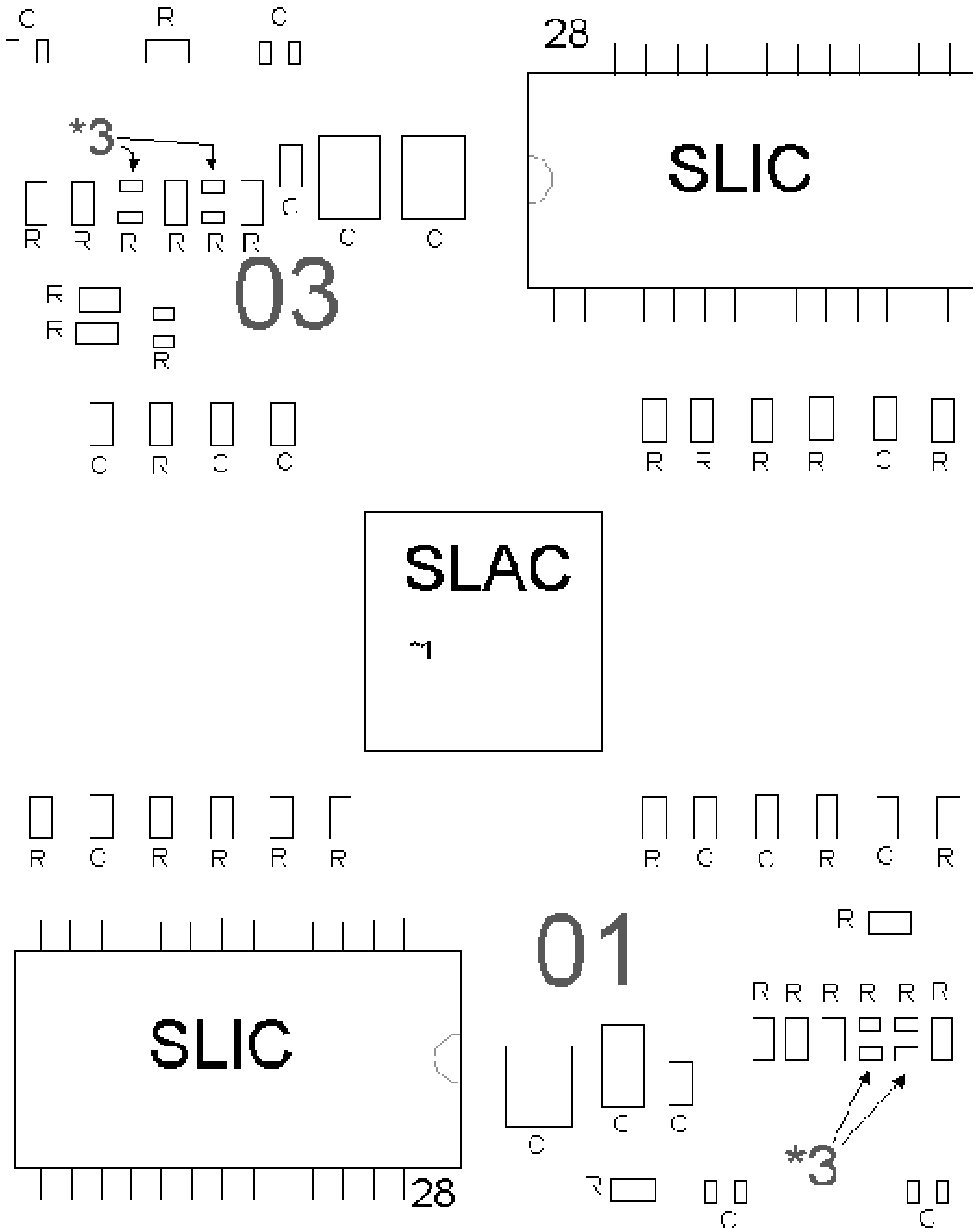
AO number	
Number for xx	Number for yy
02	04
05	07
10	12
13	15

18	20
21	23
26	28
29	31

The components are arranged in the same way in all AOs marked with xx or yy.

The following is an section from the conductor side on which you can see the position of the mounting spots to be bridged.

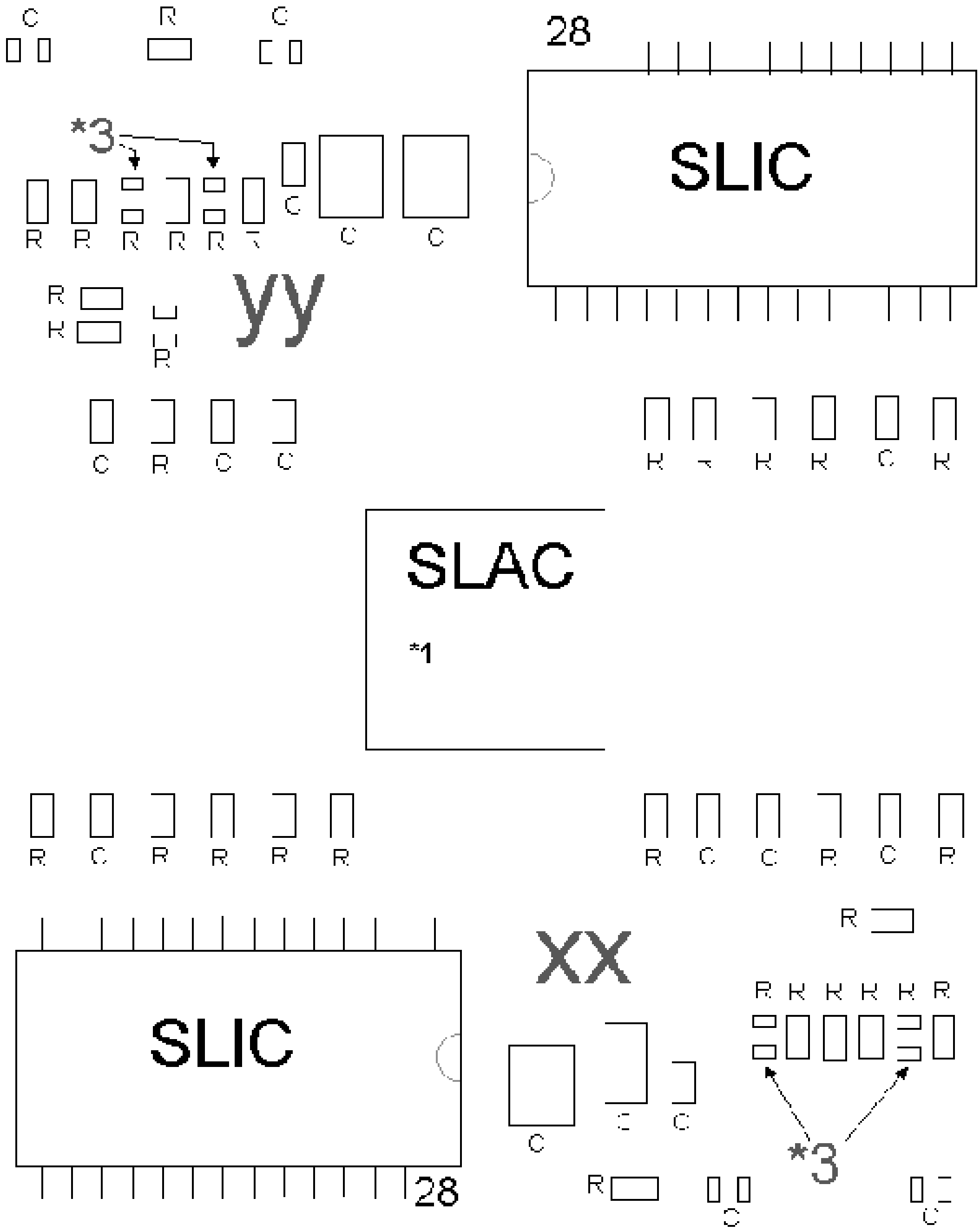
A different arrangement applies to AO 01 and the remaining AOs. First of all, the component arrangement for AOs 01 and 03:



1 on component or soldering side, depending on port

In AO 01 the two bridges to be vertically soldered lie side by side.
The marking *3 relates to the mounting spots marked with an arrow.

The components arrangement is the same for the remaining AOs on which the current increase can be set on the conductor side:



1 on component or soldering side, depending on port

The marking *3 relates to the mounting spots marked with an arrow.

The current increase can be set on the conductor side for the following AOs:

AO number	
Number for xx	Number for yy
01 **#1**	03
06	08
09	11
14	16

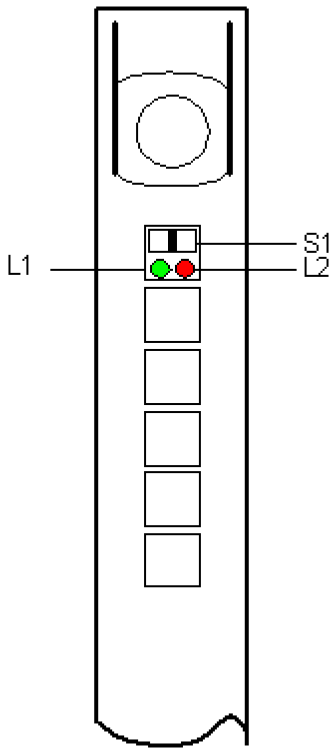
17	19
22	24
25	27
30	32

#1 The component arrangement is different on AO 01.

The components are arranged in the same way in all AOs marked with xx or yy.

	Please connect (vertically) only the mounting spots which are marked accordingly! Bridges which are soldered differently may result in serious malfunctioning.

15.5.2.2 LEDs and Switch Functions



ASC21 board, front side

Switch Position in Normal Operation

S1	Middle position

Switch Function

S1	Left:	Preparatory disabling (VSP) for all connecting circuits
	Middle:	Operating status/release

	Right:	Reset board
	Right, then left:	Forced board download

Meanings of LEDs

L1	on:	Board is busy with switching functions
	flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L2	on:	Board reset in progress
	flashing:	Download in progress
	off:	Board has gone into operation

15.5.3 ASCxx Analogue Subscriber Circuit

Short description

The ASC board is available in the following variants:

ASC**EU**: **Europe** with the following characteristics:

Country-specific variants are configurable using board software for the following countries:	Germany, Spain, Netherlands, Switzerland, Italy, Belgium, Austria, Greece, Mexico and Venezuela	
Power demand +5V	620 mA	
Interfaces	16 a/b (connectors for analog terminals in accordance with country-specific guidelines)	
Constant current supply	24 mA, switchable to 30 mA (mounting of a 0 Ohm resistance)	
	Line resistance	2 x 475 Ohm
	Range	4 km installation cable (J-Y(ST)Y Ø0,4 mm 9 km installation cable (J-Y(ST)Y Ø0,6 mm 15 km installation cable (J-Y(ST)Y Ø0,8 mm Line lengths for Message waiting
DTMF/pulse dialling, flash and earth button detection, Telecom-specific (dependent on terminals)		
Short and long flash time, Telecom-specific (dependent on terminals)		
Overvoltage protection up to 4 kV		
Board software download		
Board identification using board pass		
Maintenance function		
Polarity reversion for “message waiting” signalling		
Connection of external announcement devices		

ASC**F**: **France** with the following characteristics:

Power demand +5V	620 mA

Interfaces	16 a/b (connectors for analog terminals in accordance with French guidelines and voice terminals)
Resistance feed (const. voltage)	2 x 400 Ohm
DTMF/pulse dialling, polarity reversal and button detection	
Overvoltage protection up to 4 kV	
Board software download	
Board identification using board pass	
Maintenance function	
Symmetric call supply	
Polarity reversion for “message waiting” signalling	
Connection of external announcement devices	

ASC**GB**: **Great Britain**

Power demand +5V	620 mA	
Interfaces	16 a/b (connectors for analog terminals in accordance with British guidelines)	
Constant current supply	30 mA	
	Loop range	900 Ohm
DTMF/pulse dialling, flash and earth button detection		
Overvoltage protection up to 4 kV		
Board software download		
Board identification using board pass		
Maintenance function		
Polarity reversion for “message waiting” signalling		

15.5.3.1 Line lengths for Message waiting

The range for Message waiting signaling for analogue subscribers of the ASCEU board with the ICU programme ASCEU018.ICP in connection with the various apparatus types and seizure (pick up on call) and outgoing seizure (pick up) with the installation cable J-Y(ST)Y Ø0,4 mm is:

	Outgoing seizure (pick up)		Incoming seizure (pick up in call)	
Apparatus types	Line length [m]	Line length [W]	Line length [m]	Line length [W]
Tel. T40	1400	379	1400	379
Tel. TE51	1000	272	1000	272
Tel. TE91	1000	272	1000	272
Tel. TC91	1100	298	1100	298
Tel. TB510LED DE	1100	298	600	163
Tel. TB519D	900	245	900	245
Tel. TK40-20-2	300	83	300	83

Recommendation

The line length with which the performance feature Message waiting is to be operated with conventional signaling (permanently illuminated LED signal), should not exceed

600 m	(Installation cable J-Y(ST)Y Ø0.4 mm)
1.3 km	(Installation cable J-Y(ST)Y Ø0.6 mm)
2.4 km	(Installation cable J-Y(ST)Y Ø0,8 mm)

Malfunctions may occur when establishing a connection if the lines are any longer.

The tel. TK40-20-2 should only be operated with a 300 m (83W) line length.

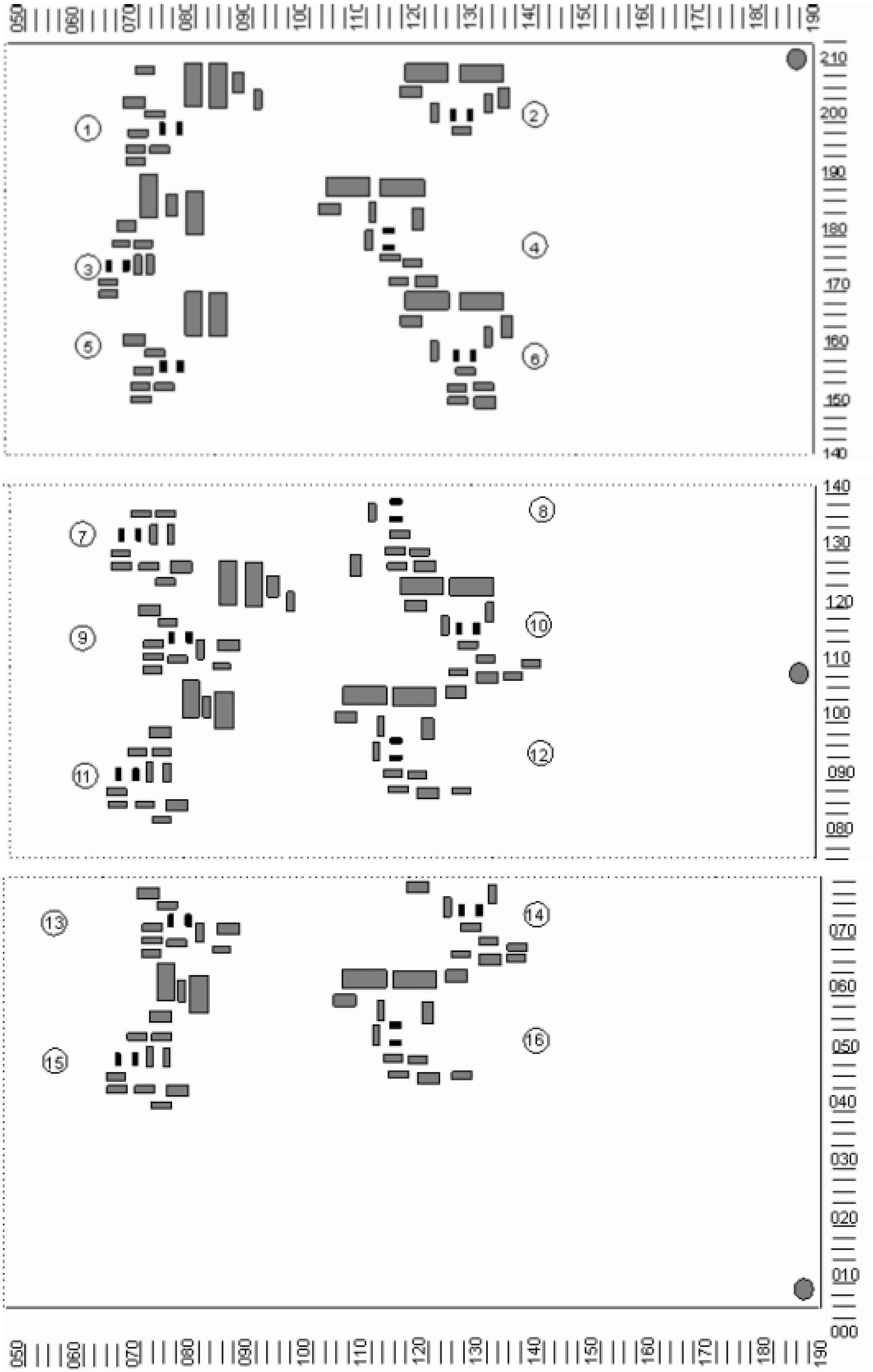
Deviations from the recommended line length are possible.

If the lines are any longer, a different Message waiting signal (signal LED blinks) should be selected. Signalling is implemented in the ICU programme ASCEU019.ICP for the ASCEU board.

15.5.3.2 Bridge positions

The power supply can be increased from 24 mA (standard) to 30 mA per line in this board: The increase in the supply current is implemented by inserted 0 Ohm resistors or bridges at the following coordinate points:

AO1	197 077
AO2	199 128
AO3	173 069
AO4	179 116
AO5	155 077
AO6	157 128
AO7	131 069
AO8	137 116
AO9	113 077
AO10	115 128
AO11	089 069
AO12	095 116
AO13	071 077
AO14	073 128
AO15	047 069
AO16	053 116


1
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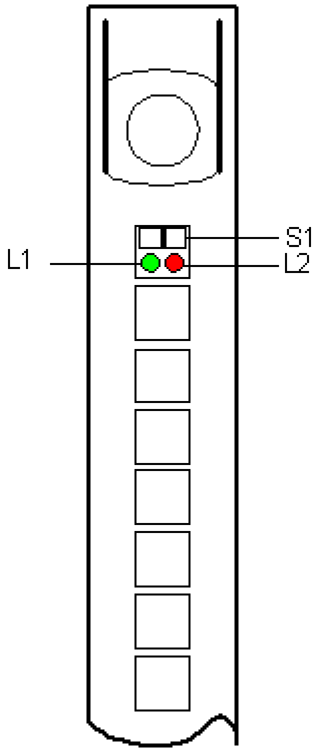
16

15.5.3.3 LEDs and Switch Functions



ASCxx board, front side

1. LED red
2. LED green

Switch Position in Normal Operation

S1	Middle position

Switch Function

S1	Left:	Preparatory disabling (of all connecting circuits)
	Middle:	Neutral/release/ operating status
	Right:	Reset board
	Right, then left:	Forced board download

Meanings of LEDs

L1	on:	Board is busy with switching functions
	flashing:	Module can be removed after preparatory disabling (VSP) or blocked in terms of software
	off:	Board is not busy
L2	on:	Board reset in progress
	flashing:	Download in progress

	off:	Board in operation

15.5.4 ATA Analog Trunk Interface A

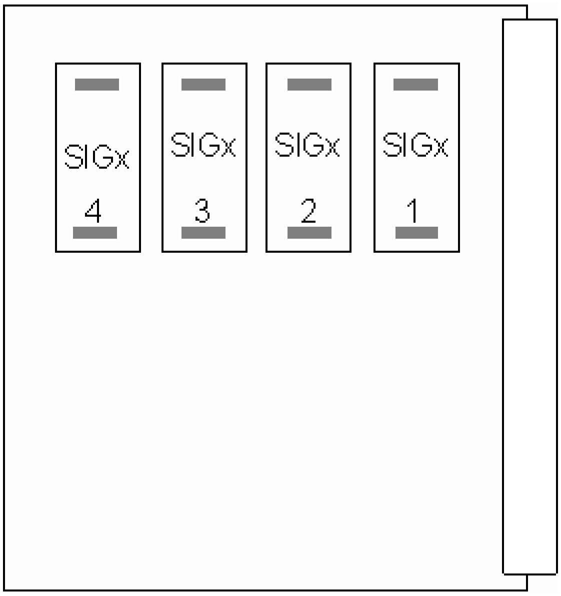
Short description

The ATA board provides the interface for up to 8 analog exchange accesses (PSTN) in accordance with country-specific guidelines. It is a universal Euro-based trunk module and can be adapted to individual countries by means of the corresponding submodule and software (level, impedances etc.).

Submodule	Countries of application
SIG**A** Signalling Unit A	Germany, Russia
SIG**B** Signalling Unit B	Switzerland
SIG**C** Signalling Unit C	Luxemburg
SIG**D** Signalling Unit D:	Austria
SIG**E** Signalling Unit E	Austria
SIG**F** Signalling Unit F	Belgium
SIG**G** Signalling Unit G	Hungary

A mixed combination of ATA boards and submodules is not possible.

The board can accommodate a maximum of 4 two-part submodules.



ATA board, slots

Other features	
Power demand +5V	530 mA with eight occupied connecting circuits
Interfaces	8 × a/b
DTMF/pulse dialling	
Overvoltage protection up to 4 kV	

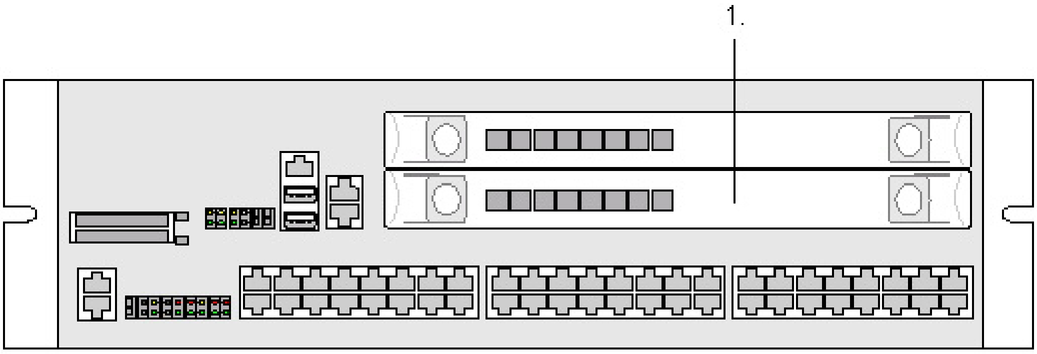
Other features
Dial tone identification, charge count
Board software download
Board identification using board pass
Maintenance function

In the Integral55, an emergency operation switchover can be set up by inserting an EES1B (EES8B) board behind the ATA board; this is not possible in the Integral55 Compact.

15.5.4.1 Installation

Base Unit

The ATA board must be inserted into the slot shown below.

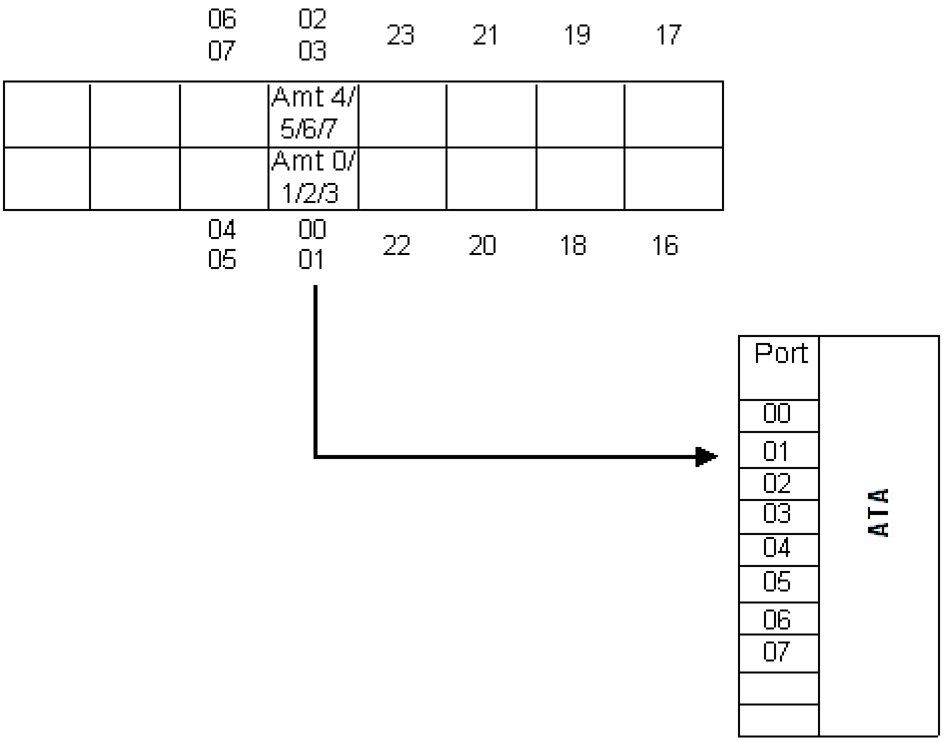


1. Slot for the ATA board

Details

Use on the ATA slot

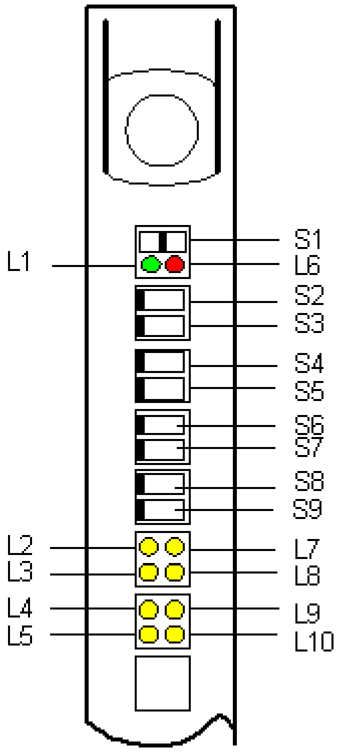
Slot address:	01-01-07-xx
CBI address:	0C hex.
xx = port number	



Connections ATA to contact strip 1

Connections see: Connections from the BU **→ 680.**

15.5.4.2 LEDs and Switch Functions



ATA board, front side

Switch Position in Normal Operation

S1	Middle position
S2-S9	Left position

Switch Function

S1	Left:	Preparatory disabling (of all connecting circuits)
	Middle:	Operating status/release
	Right:	Reset board
	Right, then left:	Forced board download
S2	Right:	AO1 preparatory disabling
	Left:	Approve, operation status
S3-S8	Right:	AOx preparatory disabling;
	Left:	Approve, operation status
S9	Right:	AO8 preparatory disabling
	Left:	Approve, operation status

Meanings of LEDs

L1	on:	Board is busy with switching functions
	flashing:	Board removable after preparatory disabling
	off:	Board is not busy

L6	on:	Board reset in progress
	flashing:	Download in progress or blocked by software
	off:	Board in operation
L2	on:	AO1 busy
	off:	AO1 not busy
L3, L4, L5, L7, L8, L9	on:	AOx busy
	off:	AOx not busy
L10	on:	AO8 busy
	off:	AO8 not busy

15.5.5 CAS Channel Associated Signalling

Short description

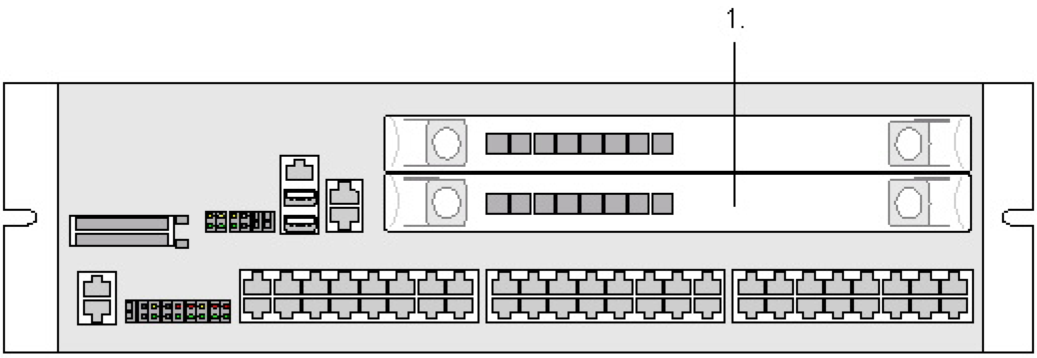
The CAS board is a PCM30 interface for up to 30 B channels in accordance with CCITT. The board contains the following features:

Other features	
Country of application	National and international
Power demand +5V	930 mA
Line signalling in channel 16 (CAS) in accordance with CCITT or country/customer specifications.	
Register signalling in 30 B channels (inband) in accordance with CCITT or country/customer specifications.	
Can be used as an exchange interface, connection line or special interface.	
Incoming, outgoing and bothway traffic direction, can also be mixed as required	
Overvoltage protection up to 4 kV	
Board software download.	
PCM30 interface configuration via board software.	
Board identification using board pass	
Maintenance functions	

15.5.5.1 Installation

Base Unit

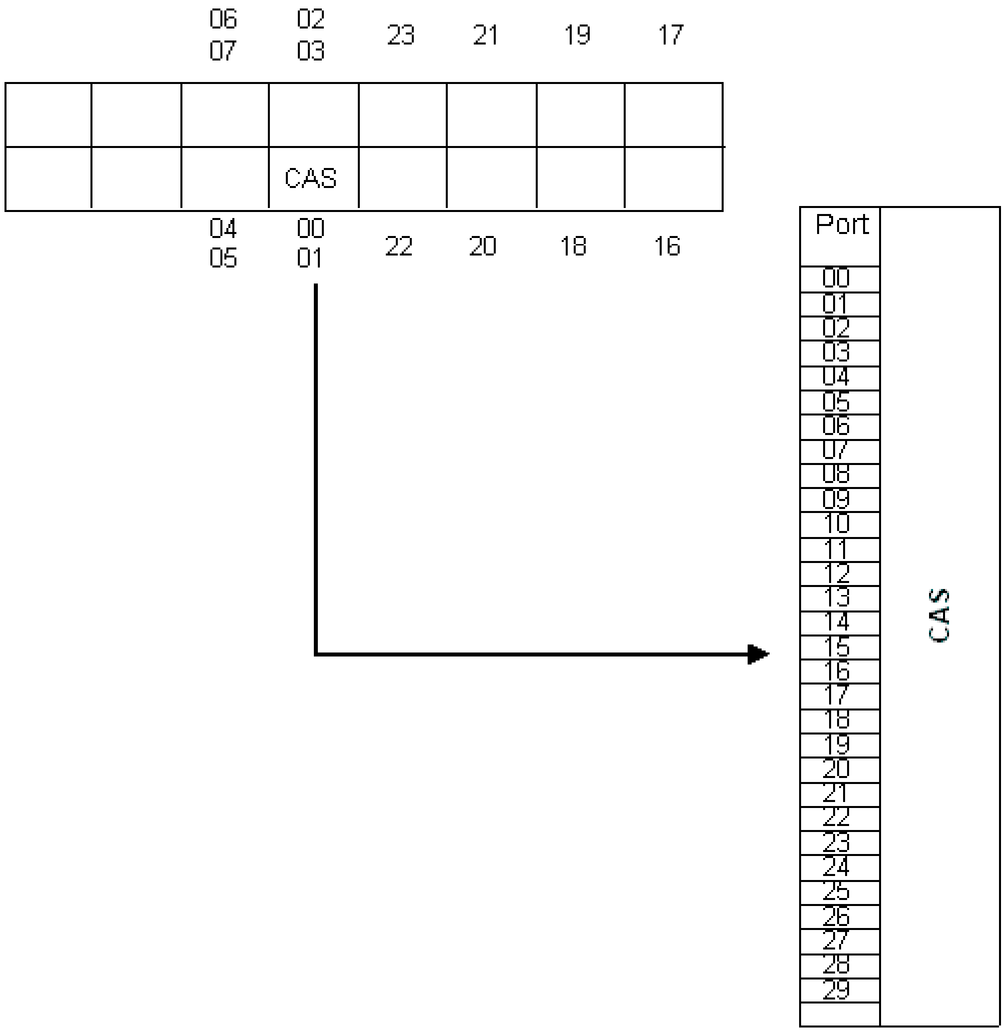
The CAS board can be plugged into the slot shown below.



1. Slot of the CAS board

Details

Slot address:	01-01-07-xx
CBI address:	0C hex.
xx = port number	



Connections CAS to contact strip 1

Connections see: Connections from the BU → 680.

15.5.5.2 CAS-TIELINE User Program

Introduction

The CAS-TIELINE user program was developed for the I55 system on the CAS hardware platform, and is a tie-line transmission program. The 16 different tie-line transmission variants are designated E1 to E10/2.

The user data is adapted to individual requirements by means of the ICU mask.

Hardware

The CAS board (channel associated signalling) is used here. Depending on the application, the 2 MBit/s interface can be configured using the confidata (see Section "ICU mask and confidata") with impedance of 75 W (unsymmetrical) or 120 W (symmetrical).

Depending on that, for the line connection one of the following adapter boards (only Integral 55) is then required:

- CA1B for 75 W

- CA4B for 120 W

Further general information about the CAS board, in particular about the controls and denotations of the front panel, can be gathered from the appropriate paragraphs.

SoftWare

The CAS board is set up with KAD (customer specific user data) for TIELINE application. This requires the corresponding load list name for the accompanying slot address to be entered.

The necessary parameters (confidata) are then set up using the ICU editor. The corresponding ICP files and the confidata subsequently end up on the CAS board by means of a download.

Short description of Applications

The TIELINE user program supports inband signalling (DTMF dial codes, call progress tones) and line signalling (signalling channel bit a). The following applies to line bits b, c and d: bcd = 101. Only changes to bit 'a' will be processed by the user program. Changes to the bcd bits will be ignored.

16 different signalling plans are produced from the available signal stock. These plans can be selected using the confidata and always apply to all 30 connecting circuits (AO).

In principle all the AOs are set up for both-way throughput.

Line signalling will not be carried out if all the signals appear as pulsed signals.

DTMF (dual tone multi-frequency dialling) and pulse dialling are suitable dialling systems.

The suffix dialling facility is guaranteed for the entire duration of an outgoing call, and for a predefined period of an incoming call.

If the criterion “message” is identified, an active call will be cancelled and the digits memory will be deleted.

The elegibility or inelegibility of a line can be set up by the confidata seperately for incoming and outgoing AOs.

In the same way, a 425 Hz continuous tone can be connected to the switching matrix as a proceed-to-select signal for outgoing traffic, or a 425 Hz busy tone to the line for incoming traffic according to configuration.

Up to 10 digits can be programmed for a destination number in outgoing traffic. The destination number will be chosen automatically according to the preset timeout when “elegible” or “inelegible” in the absence of the “dialling” message.

If “elegible”; incoming “dialling” messages are ignored once the timeout has ended. If “inelegible”; they will always be ignored. The suffix dialling facility is also guaranteed for the previous destination number when in call status.

Outgoing DTMF signals which are “called through” will be identified, and incoming “dialling” messages are subsequently ignored.

An area code may be programmed, which will be relayed to the GCU global control unit during incoming seizure once the proceed-to-select criterion (signal, time) has been met.

Where ”dial” or ”message” information is absent, the release which has been initialized by the user program's watchdog exists neither for incoming nor for outgoing traffic.

If a fault occurs, trouble signalling to the opposite side can be activated using confidata.

In the same way, an unblocking function can be set up for each connecting circuit: When active (blocking-n = on), and with the front panel switches TBS (total blocking switch) and TBS-N (total blocking switch minus n) switched on, the corresponding connecting circuit will **not** be blocked.

Specification of Inband Signals

The available DTMF transmitters and receivers are set out in accordance with CEPT recommendation T/CS 46-02.

The tone identifier will certainly operate in the range of 350 to 500 Hz with -30 dBm0.

The tone generator supplies a 425 Hz frequency with a transmission level of -3 dBm0. In outgoing traffic, it can be sent to the switching matrix as a proceed-to-select signal (continuous tone). In incoming traffic, it can be connected to the line as a busy tone (German rhythm).

Synchronization

The CAS board can generally be used as the synchronous clock supplier for synchronization purposes. In the TIELINE application, however, this is only meaningful if no digital exchange interfaces or tie lines are present.

. This is the reason for the default setting of “No synchronous clock”. This setting can be changed via the configuration data.

15.5.5.3 Identifying the Operation Phase

As described above, the boot software controls

- initialization,
- test and download procedures after a reset and
- indicates various statuses and possible faults by means of the LED’s on the front panel.

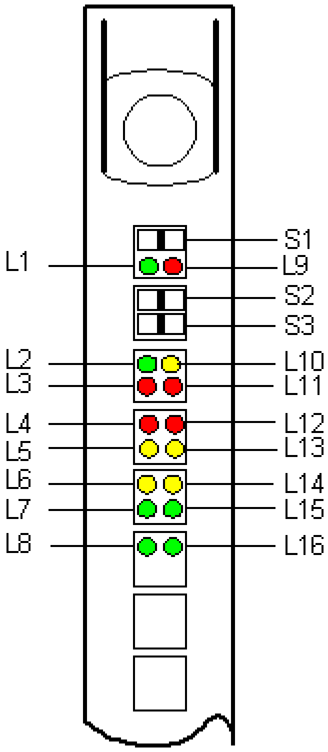
If no faults are found and all GCU messages (test messages, “startup ready” etc) have been received, L1 will flash eleven times and L9, L7, L8, L15 and L16 will go out, indicating that the operation phase has been reached.

15.5.5.4 LED and Switch Functions

The functions of the switches and LED’s on the front panel differ in boot phase from those in operation phase.

Following a reset, the boot software carries out initialization, test and download procedures, and indicates various statuses as well as possible faults via the LEDs on the front panel.

If no faults are found and all necessary GCU messages (test messages, “ready for startup” etc.) have been received, the CAS board will reach the operation phase, where user software is put into effect.



Switch Position in Normal Operation

S1	Middle position
S2	Middle position
S3	Middle position

Switch Function

S1	Left:	Preparatory disabling (TBS) *
	Middle:	Neutral/release
	Right:	Reset board
	Right, then left:	Forced board download
S2	Left:	Preparatory disabling (TBS-N) *
	Middle:	Neutral
	Right:	No function
S3	Left:	No function
	Middle:	No function
	Right:	No function

*	With S1 (TBS) in the left position and S2 (TBS-N) in the middle position, all 30 ports will be blocked.
	With S1 (TBS) and S2 (TBS-N) in the left position, all ports outlined in the configuration data will not be blocked.
	If S1 (TBS) is in the middle position, all 30 ports will not be blocked, irrespective of the position of S2 (TBS-N).

Meanings of LEDs

L1	TSL	Total status LED
L2	ESY	External synchronization
L3	LOS	No signal
L4	LOF	Frame failure
L5	CRC	CRC4 test fault
L6	RFR	Frame failure at remote side
L7	ISU1	**
L8	ISU3	**
L9	RDL	LED reset/download
L10	MSG	C-bus message
L11	AIS	Alarm identification signal
L12	LMF	Superframe failure
L13	BIT	Increased bit error ratio
L14	RMF	Superframe failure at remote side
L15	ISU2	**
L16	ISU4	**

**	The denotation of the LEDs depends on the application (display of R2 register, DTMF receiver/transmitter, tone transmitter/receiver)

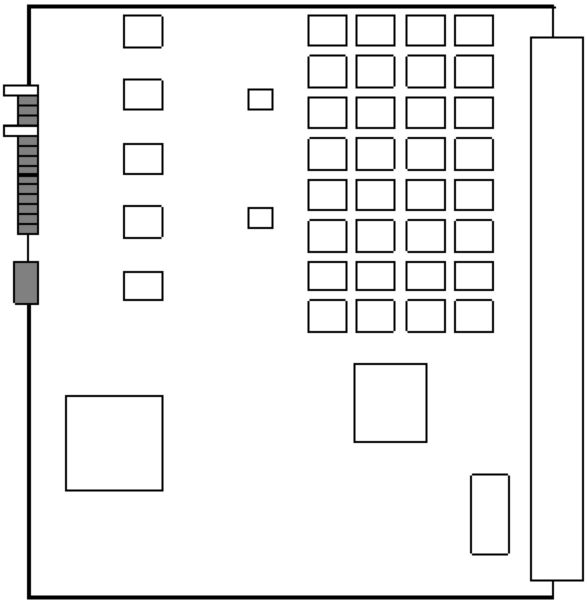
15.5.6 DECT21 ICU for DECT-Applications 21

Short description

The DECT21 board is used to connect the Radio Base Station RM 588, material number 4.998.001.296, to the CSI55.

It carries out an automatic run time measurement. The manual measurement of the individual routes up to 1 km is not applicable as long as no repeater is connected between.

Other features	
Country of application	National and international
Power demand +5V	1100 mA
Interfaces	8 UPD interface for RBS One UPD interface physically corresponds to 2 UPN interfaces.
The ADPCM (Adaptive-Differential-Pulse-Code-Modulation, 32 kbit/s) conversion is carried out on the board.	
One of the two D channels is used for the transmission of synchronization information between the DECT21 board and the RBS.	
Overvoltage protection up to 4 kV	
Download board software	
Board identification using board passport	
Maintenance function	



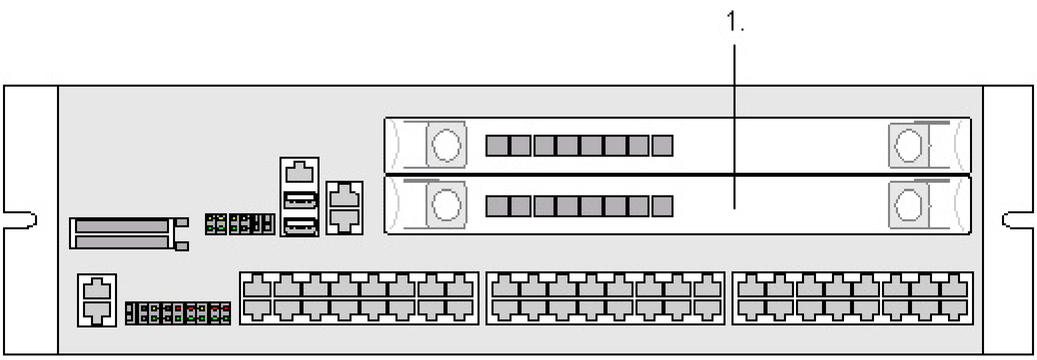
DECT21 board, component side

Line lengths	
Installation cable J-Y(ST)Y Ø0,6 mm	1.0 km
Outdoor cable A-2YF(L)2Y Ø0,6 mm	2.8 km
Installation cable J-Y(ST)Y Ø0,6 mm and UPN repeater	2.0 km

15.5.6.1 Installation

Base Unit

The DECT21 board must be inserted into the slot shown below.

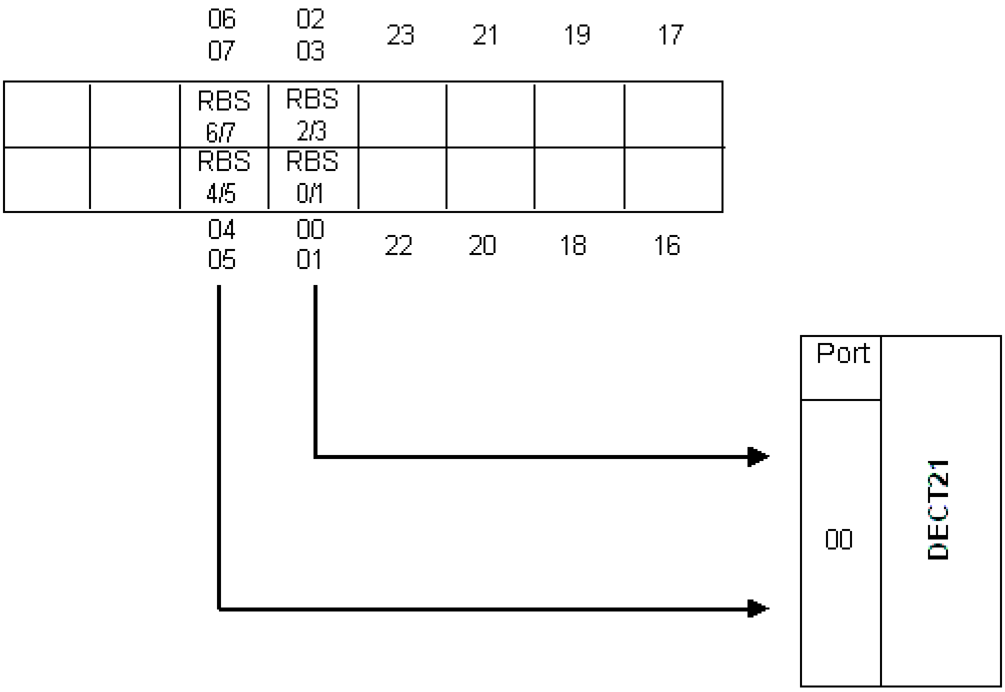


1. Slot for the DECT21 board

Details

Use on the slot of the DECT21

Slot address:	01-01-07-xx
CBI address:	0C hex.
xx = port number	

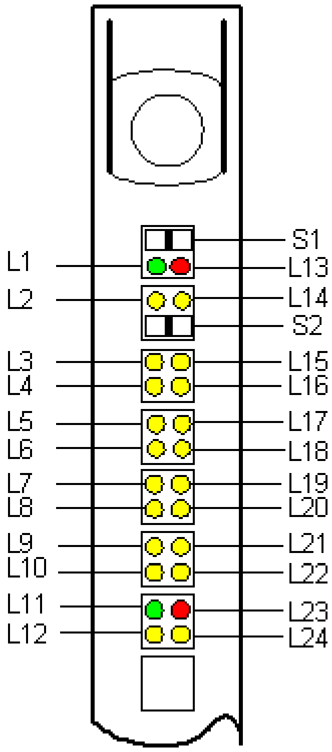


Connections DECT21 to contact strip 1

⚠	The RBSs are connected physically via ports 00 to 07.

Connections see: Connections from the BU → 680.

15.5.6.2 LEDs and Switch Functions



DECT21 board, front side

Switch Function

S1	Right:	Reset board
	Middle:	Normal position
	Left:	No function
S2	Right:	Yet to be defined
	Middle:	Normal position
	Left:	Yet to be defined

Meanings of LEDs

L1	off:	Board is not busy
	on:	Module is busy in terms of exchange functions
L2	on:	Synch. Master
L3		Layer 1, active port 0
L4		Layer 1, active port 2
L5		Layer 1, active port 4
L6		Layer 1, active port 6
L7		Layer 1, active port 8
L8		Layer 1, active port 10
L9		Layer 1, active port 12
L10		Layer 1, active port 14
L11	flashing:	FP download active

L12		Yet to be defined
L13	off:	Board in operation
	on:	Board reset in progress
	flashing:	Download in progress
L14		All 30 B-channels are busy
L15		Layer 1, active port 1
L16		Layer 1, active port 3
L17		Layer 1, active port 5
L18		Layer 1, active port 7
L19		Layer 1, active port 9
L20		Layer 1, active port 11
L21		Layer 1, active port 13
L22		Layer 1, active port 15
L23	flashing:	SW IDM in ICU activated
L24		Yet to be defined

15.5.7 DSPF Digital Signal Processing Function

Short description

The DSPF as the basic board accommodates the ASM3 announcement module. The announcement module serves for recording and playback of ACD spoken announcements and for hotel applications. Depending on the application the DSPF can be equipped with up to:

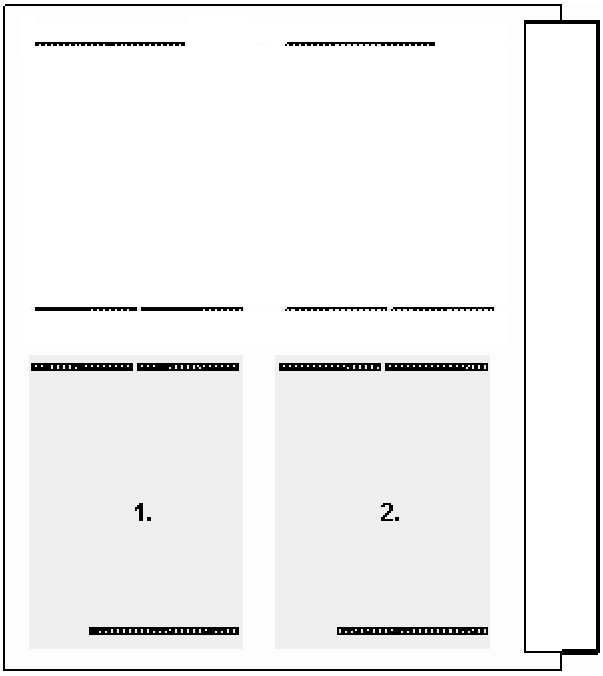
4 ASM3	for access to 128 time slots	in I55
2 ASM3	for access to 64 time slots	in I55C

Other features	
Country of application	National and international
Power demand +5V	850 mA

For more detailed information about configuration with ASM3 please refer to the service manual.

15.5.7.1 Inserting the submodule

The used ASM3 modules are inserted in the submodule slots “submodule 1” - “submodule 2” of the DSPF.



DSPF board, component side

1. Submodule 1
2. Submodule 2

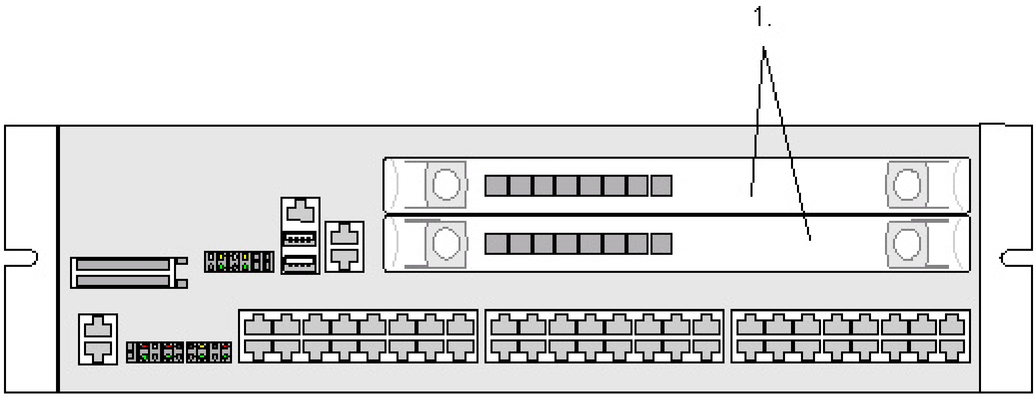
The position must correspond to the setting in the confidata. The following allocation must be observed:

“Submodule number” parameter in the ICU Editor	**Labelling**	**Labelling on the DSPF board**
0	Submodule 1	SUB1
1	Submodule 2	SUB2

15.5.7.2 Installation

Base Unit

The DSPF board can be inserted in the slots shown below.



1. Slots of the DSPF board

15.5.7.3 Time slot management

The Integral 55 Compact is designed so that the DSPF can only be plugged into an uneven slot.

Each ASM3 submodule represents an ICU. The DSPF has access to a total of 64 time slots in the Integral 55 Compact. It can realize a maximum of two ICUs. The ICU of the board's physical slot of the (time slots 0-31) logs on with ICU type DSFM (DSPF master). The further ICU is realized on the same hardware by **logical** address entries (time slots 32-63) in the CBI. These log on with the ICU type DSFS (DSPF slave).

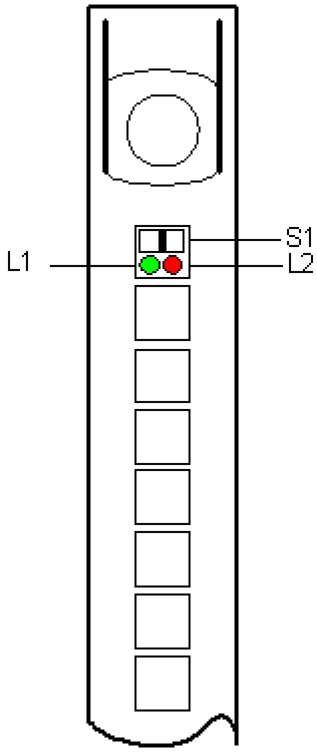
The configuration of a second DSPF in the same module is not expedient.

Allowing for the above conditions, the two submodule slots and thus each of the two ICUs can be assigned to an application (ACD or HOTCOM).

Prior to operation of the PABX the DSFM and DSFS ICUs are assigned with the CAT application and during operation with the service and administration programs with ICU editor.

This module has no external connections.

15.5.7.4 LEDs and Switch Functions



DSPF board, front panel

Meaning of the switch on the front panel of the DSPF board

Up to 4 ICUs (1* DSFM and 3 * DSFS) can be implemented on the DSPF board. The common status of the ICUs can be controlled via the S1 front panel switch as follows:

S1	**Reset and blocking switch**	
	Middle position	All ICUs in operating status
	Left position	All ICUs in preparatory disabling
	Right position	All ICUs in reset
	Left position after board reset	Master ICU DSMF (DSPF board) receives a forced ICU download. After commencing the loading process, the switch must be returned to the middle position.

Meaning of the LEDs on the front panel of the DSPF board

Up to 4 ICUs (1* DSFM and 3 * DSFS) can be implemented on the DSPF board. The common status of the ICUs is displayed via the two front panel LEDs L1 and L10 according to the following pattern:

The display appears according to priority, i.e., if several functions of the scheme are represented by one LED, the one with the highest priority is implemented. Prio 1 is the highest priority, and prio 5 the lowest. In the cases with priority 1, the board is still in the reset or download phase, whereby the additional ICUs (DSFS) are not yet active.

L1	flashing 5Hz	At least 1 ICU is still in startup, waiting for “Switching On” message	Prio 2
	flashing 1 Hz	All ICUs are preparatory disabled, the board is removeable	Prio 3

	an (in)	At least 1 ICU has a seizure in terms of switching technology in at least one channel. All ICUs (entire board) are in reset processing (if L10 is also on)	Prio 4 Prio 1
	off	All ICUs are in a resting state with their ports, the board is not occupied	Prio 5
L2	flashing 5Hz	At least 1 ICU is still waiting for commissioning Master ICU DSFM (DSPF board) ICU Download in progress	Prio 2 Prio 1
	flashing 1 Hz	/	Prio 3
	an (in)	Master ICU DSFM (DSPF board) in reset processing (if L1 is also on) Master ICU DSMF (DSPF board) Programming procedure in ICU download	Prio 1 Prio 1
	off	All ICUs in operation	Prio 4

15.5.8 DT21 Digital Linecard T2 Variant 1

Short description

The DT21 board provides one configurable S2Minterface.

Other features	
Country of application	National and international
Power demand +5V	400 mA
Interfaces	a S2Minterface (CO (T2) - or Tie (TIE)), 120 Ohm symmetric or 75 Ohm asymmetric. **(not intended for use in I55C)**
	Driver for optical interface**(not intended for use in I55C)**
	Switchable digital attenuation for speech connections (B-channels), adjustable via the ICU Editor
2.048MHz pulse output **(not intended for use in I55C)**	
V.24 Test interface (front panel)	
Overvoltage protection up to 4 kV	
Board software download	
Board identification using board pass	
Maintenance function	

Cable adapter		
if used in I55	Possible adapter boards:	CA1B, CA4B, OFA2B, OFAS
	Power supply NT	via ESBx
if used in I55C	none, direct connection on front side	
	Power supply NT	via external plug power supply (material number 27.4402.1056).

Ranges

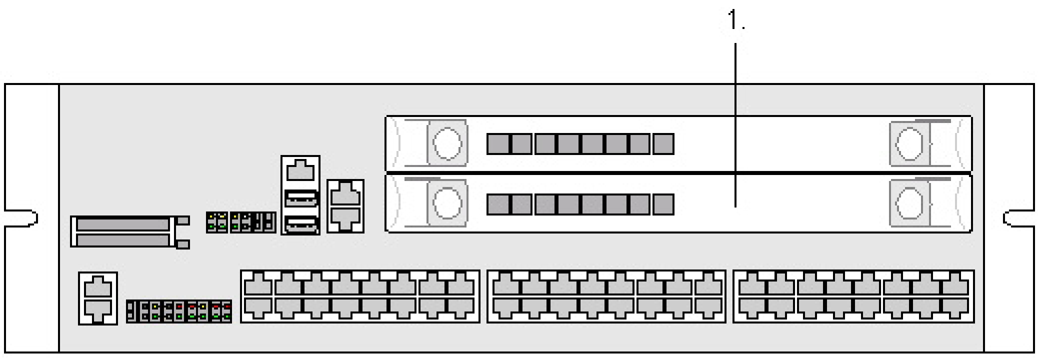
if used in I55		
37 dB attenuation range		
Wire interfaces (CA1B or CA4B)		
120 Ohm symmetric	0.9 km	Installation cable
	1.8 km	TF cable
75 Ohm coax	1.5 km	
Optical interface (OFA1B)	monomode cable 9/125 micrometer, 11 dB max. attenuation for entire optical path (e.g. max. 20 km at 0.4 dB/km and 7 plug connections 0.4 dB/plug)	

if used in I55C		
37 dB attenuation range		
Wire interfaces (direct connection on the front side)		
120 Ohm symmetric	0.9 km	Installation cable
	1.8 km	TF cable

15.5.8.1 Installation

Base Unit

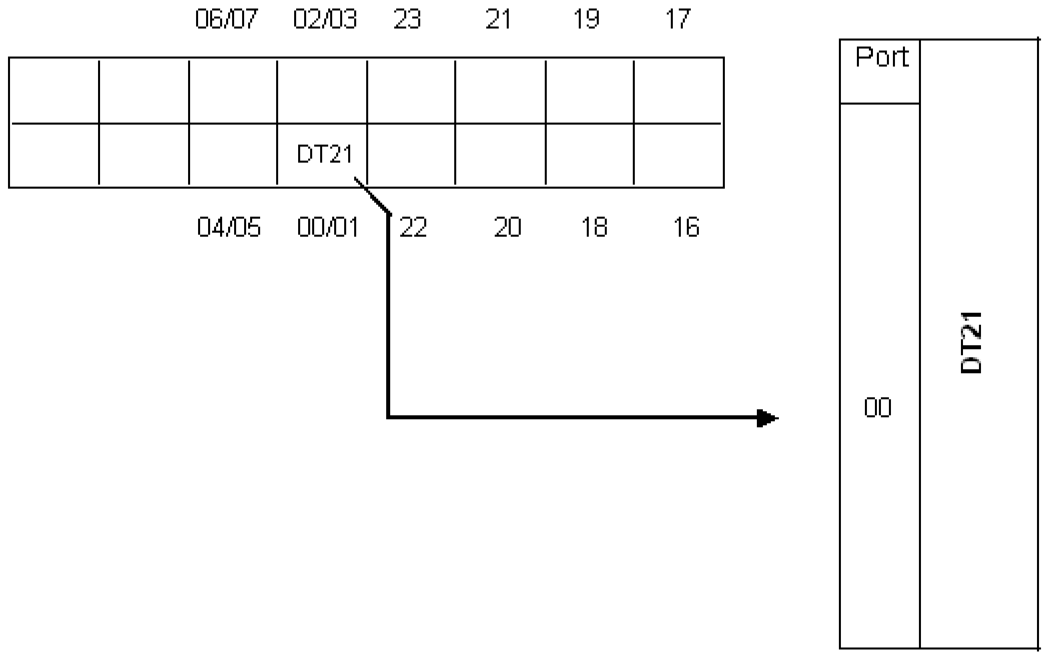
The DT21 board can be plugged into the slot shown below.



1. Slot for the DT21 board

Details

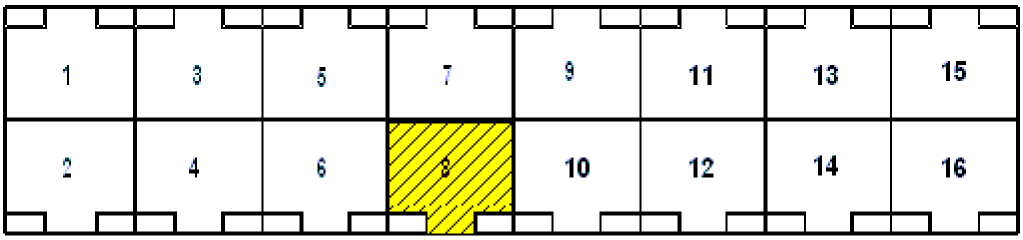
Slot address:	01-01-07-xx
CBI address:	0C hex.
xx = port number	



Connections DT21 (slot for DECT21) to contact strip 1

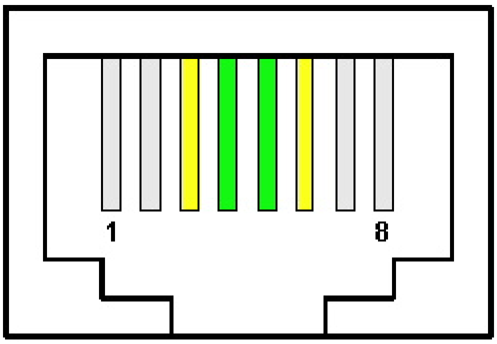
The connections for DECT21 are located in the first 16 block of the Western socket (RJ45) Thus the trunk line interface of the DT21 is also there.

Illustration of a 16 block:



Front view of 16 x RJ45 jacks

The two DECT21 connections for the first RBS stations are in jack 8.

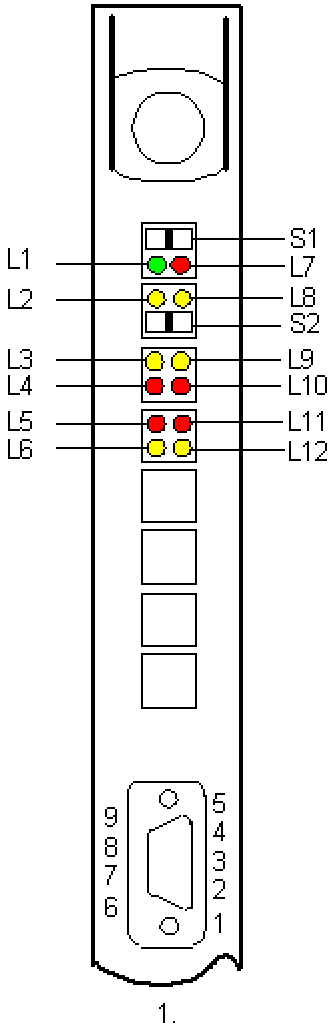


Connection of jack 8

Wire DECT_A1 leads to contact no.: 4 (shown in green)
Wire DECT_B1 leads to contact no.: 5 (shown in green)
This corresponds to lines TX+ and TX- when a DT21 is used

Wire DECT_A2 leads to contact no.: 6 (shown in yellow)
Wire DECT_B2 leads to contact no.: 3 (shown in yellow)
That corresponds to wires RX+ and RX- when using a DT21

15.5.8.2 LEDs and Switch Functions



DT21 board, front side

1. V.24 Test plug

1 = not assigned
2 = TXD
3 = RXD
4 = not assigned
5 = GND
6 = D channel data upstream
7 = D channel data downstream
8 = Clock burst 2.048 MHz
9 = +5V

Switch Position in Normal Operation

S1	Neutral position
S2	Neutral position

Switch Function

S1	links:	Preparatory disabling
	Mean:	Operating status/release
	Right:	Reset board
	Right, then left:	Forced board download
S2	Left, then right:	Report (fault statistic message to the system console) The switch must be moved back to the middle position after use (2 MHz clock output off) or to the right (2 MHz clock output on).
	Mean:	Normal operating mode / 2 MHz clock output off
	Right:	2 MHz clock output on

Meanings of LEDs

L1	On:	Board is busy with switching functions
	Flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L2	On:	Module is synchronous clock supplier
L3	On:	Remote Alarm Indication RAI (opposite side reporting fault status)
L4	On:	Alarm Indication Signal AIS (opposite side reporting ”Out of Order”)
L5	On:	Loss of Signal LOS (no receiving signal)
L6	On:	Rx E bit errors
L7	On:	Board reset in progress
	Flashing:	Download in progress
	off:	Board in operation
L8	On:	Normal operation (layer 1 active, no alarm)
L9	On:	Bit error rate > 10-6
L10	On:	Bit error rate > 10-3
L11	On:	Loss of Framing LOF (loss of frame synchronization)
L12	On:	The LED signals an activated debug monitoring. LED 12 is used as indicator as this debugging applies to the real time function of the module. It is possible to activate the debugging with a connected terminal and finally removing the terminal - then the debugging remains on and unaffected.

In order to connect an IDM to the front panel, an optional component must be inserted on the DT21, reference number: 49.9801.4247.

15.5.9 HSCBO High Speed Computer Board Office

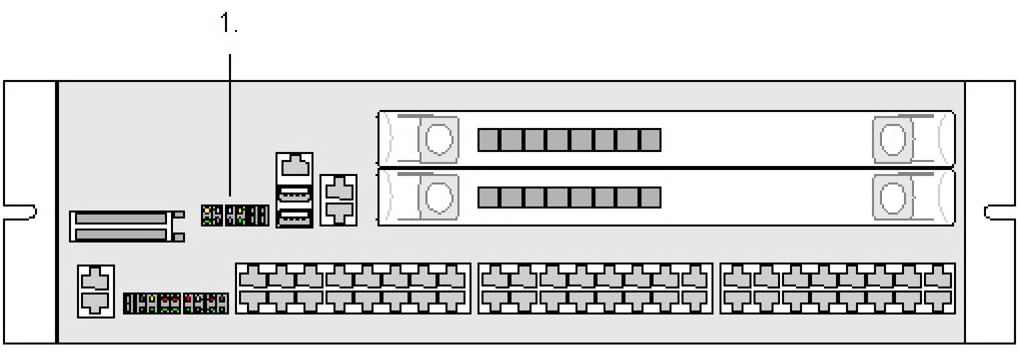
Short description

HSCBO (High Speed Computer Board Office) is a computer board (central system control) with dynamic RAM.

Features
Optionally with parity
128 kByte ERROR flash-PROM
512 kByte Boot flash-PROM
Buffered real time clock
Two-level hardware watchdog
Hardware status register
C-bus interface
4 B channel accesses
2x V.24 interfaces (not insulated)
Downloadable
2x interfaces for Compactflash memory cards

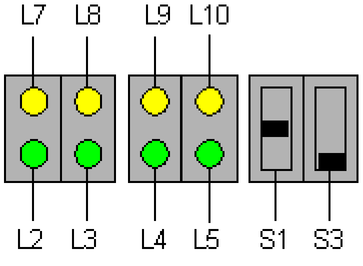
Other features		
Power demand +5V	1900 mA	with 1 * Compact Flash (HGS)
The Compact Flash can be replaced during operation.		

15.5.9.1 LEDs and Switch Functions



1. Position of the control elements and LEDs

Control elements and LEDs of the HSCBO



HSCBO board, front side

Switch Position in Normal Operation

S1	Middle position
S3	lower position

Switch Function

S1	Reset switch and MI button	
	Middle:	Operating status
	Left:	Reset of the board, locking
	Right:	Monitor interruption (TENOBUG start), keying
S3	Hard Disk Change Request (HDCHR)	
	below:	Operating status: PC-CARD-ATA-interfaces in operation
	above:	Service position: Removing and inserting the HGS(s)

Meanings of LEDs

L2	Indicates module data transfer via the C-bus (e.g. call at subcriber)
L3	Indicates access to the inserted background memory
L4	Indicates that the HGS(s) can be removed
L5	Indicates that the system terminal can be connected to the first V.24 interface (service)
L7- L10	The LEDs flash to indicate the status from reset to operation. The display remains lit for about 5 seconds if a fault is found in the loading phases 15 to 7 (see following table). If a fatal fault occurs, the reset process is repeated from the beginning (loading phase 15).

No.	L7	L8	L9	L10	Phase name
15	1	1	1	1	Start reset phase
14	1	1	1	0	Test flash-PROM
13	1	1	0	1	Test QUICC
12	1	1	0	0	Test real time clock
11	1	0	1	1	Test C-bus interface
10	1	0	1	0	Test DUART (V.24 ports)
9	1	0	0	1	Test dynamic RAM
8	1	0	0	0	Output hardware image
7	0	1	1	1	End reset phase
6	0	1	1	0	Initial program loading (IPL)/IPL ready flag
5	0	1	0	1	STIN program loader is loaded and started
4	0	1	0	0	Operating system has been loaded and started (restart)
3	0	0	1	1	User programs (have been dispatched) have been loaded
2	0	0	1	0	Start of customer data loading in the user programs
1	0	0	0	1	All customer data loaded Start commissioning of module(s)
0	0	0	0	0	Module(s) in operation

1 = LED on
0 = LED off

15.5.10 IPN Intelligent Private Network

Short description

The board IPN module enables the operation of intelligent private networks between systems (CSI55, I33) by means of data transmission in the speech channel of a digital dial-up line.

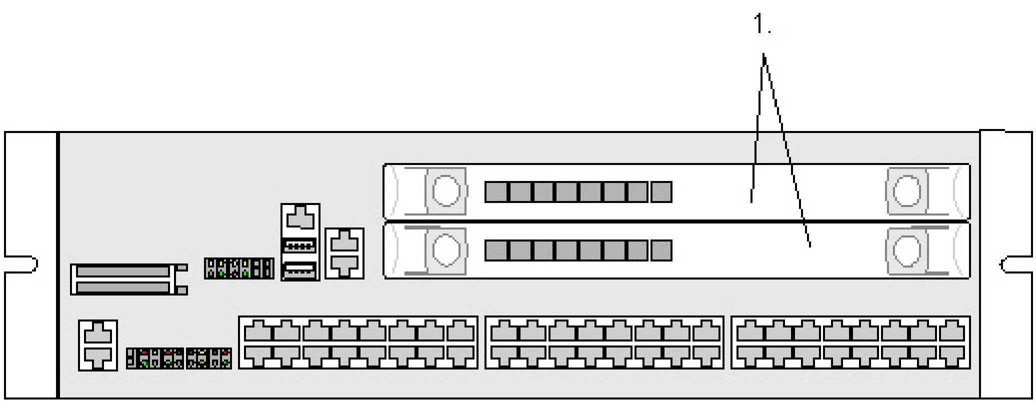
Other features	
Power demand +5V	710 mA
Up to 15 IPN connections are possible per board.	
Board software download.	
Board identification using board pass	
Maintenance function	

	The board must operate in conjunction with an ISDN exchange board.

15.5.10.1 Installation

Base Unit

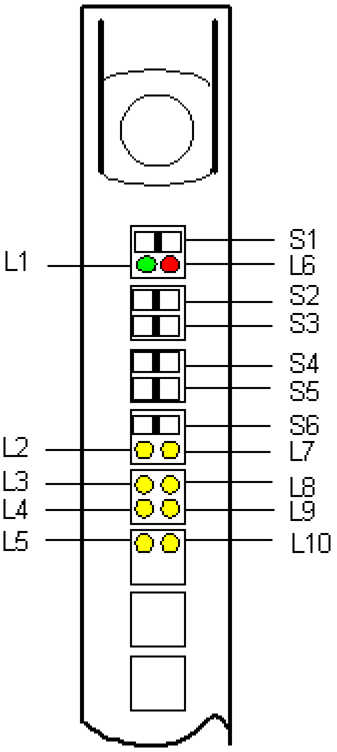
The IPN board can be inserted in the slots shown below.



1. Slots of the IPN board

Details:
The IPN board has no connection via the Western socket.

15.5.10.2 LEDs and Switch Functions



IPN board, front side

Switch Position

S1	Left:	Preparatory disabling
	Right:	Reset board
S2	Left:	Board status display not possible at a terminal for testing purposes, as Sub-D plug is not equipped
S3	Left:	Test
S4	Left:	Further status display of the board is not possible at a terminal for testing purposes, as Sub-D plug is not equipped
S5	Left:	Protocol output ’on’
S6		No function

Meanings of LEDs

L1	on:	At least 1 connecting circuit is occupied
	flashing:	All connecting circuits are blocked
	off:	Operating status
L2		No function
L3	flashing:	defective DSPA test
	1x	Reserved
	2x	Checksum failure
	3x	X-RAM defect
	4x	Y-RAM defect

	5x	SSI defect
	6x	Illegal instruction
	7x	Receive SSI with overflow
	8x	Transmit SSI with underrun
	9x	Stack overflow
	10x	Illegal host message received
	11x	Field 2 info has been received before
	13x	External RAM error
	14x	External ROM error
	off:	Operating status
L4		No function
L5	on:	At least one occupancy is active (occupancy summation display)
	off:	Operating status
L6	on:	Reset status
	flashing:	Download in progress
	off:	Operating status
L7	on:	Logging switched on
L8	flashing:	See L3 function
	off:	Operating status
L9		No function
	12x	Main program runtime $> 125\ \mu$s
L10	on:	At least one channel **blocked**
	flashing:	At least one channel **defective**
	off:	Operating status

15.5.11 MBO Motherboard Office

Short description

The MBO board (Motherboard Office) combines in the BU the functional units of the central functions (CF22) and part of the analogue and digital interfaces (max. 40 port). For cost reduction of the MBO (number of layers), the digital signalling processors that belong to the CF22 have been passed to the DSPO submodule.

Together with the HSCBO board and the PSO they constitute the fundamental components of the I55-Compact system. Via the adapter module SBAO the VOIP and DECT21 boards can be connected to the system.

Features

Clock Supply and Module Synchronization
External synchronization via network nodes (S0, S2M)
Master free-run clock mode (internal clocking)

Module Switching Matrix
Bit rate 4,096 MBit/s
Module internal non-blocking

11 DTMF receiver sets, 4 DTMF transmitters (only for dialling)

Call Progress Tones
A maximum of 16 call progress tones can be generated as customer-specific or country-specific and can be cyclically repeated. At the same time unrestricted supply is possible.
In addition, a maximum of 3 tones with burst character can be supplied.

Short Voice Messages
Up to 8 voice messages or “music on holds” can be used. The total duration of **all** brief voice messages must be no longer than 64 sec.

Long Voice Messages
2 voice messages with unspecified time limits and confidata can be set up (connecting message devices via analogue subscriber line circuits). At the same time unrestricted supply is possible.

Tone Injection in Two-Party Conversations
Up to 3 various cyclic tones can be generated which may be fed into a maximum of 15 two-party conversations (e.g. call waiting tone, rolling tone etc.).

Conferences
The system software only allows three-party conferences.

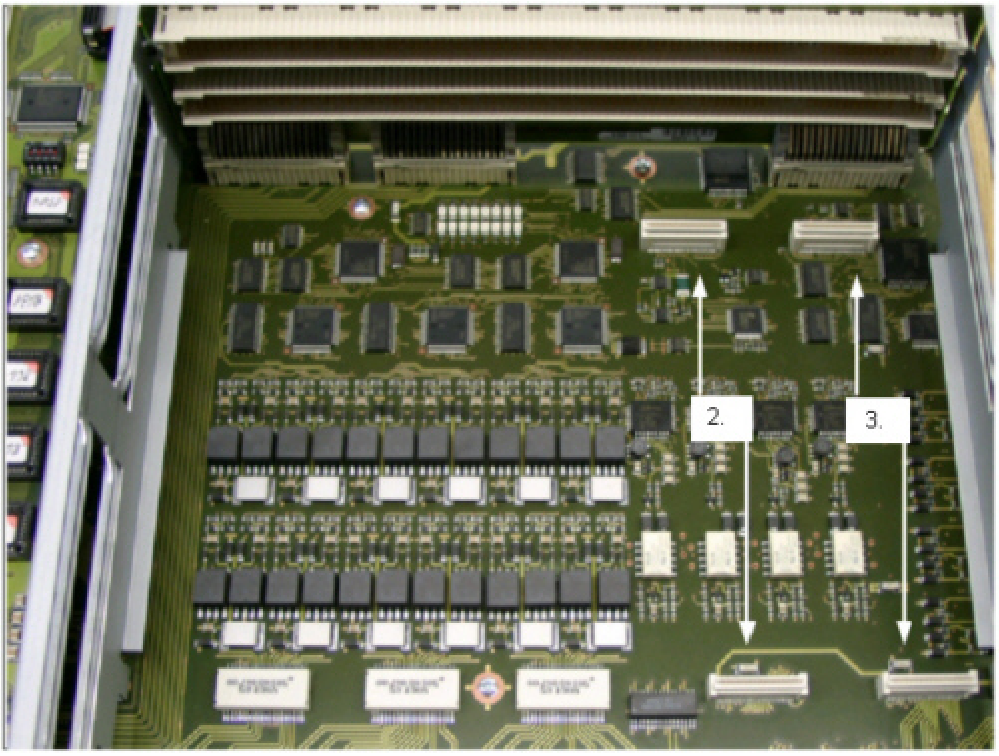
Call number ID
8 DTMF transmitters for CLIP (call number indication on analogue terminals for incoming calls)

With basic equipment, the circuit of the **analogue digital Mixboards ADM** contains the function of:

- 24 digital UPN interfaces as subscriber poarts
- four ports for S0 or T0 for subscribers or exchange lines (ADM submodule 4, STSM, built in, port 12 through 15)
- four ports for analogue subscribers, a/b (ADM submodule 1, ABSM, built in, port 0 to 3)

In addition, two ADM submodules, from the following list, can be plugged on this port, according to the requirements or configuration (see the following figure).

Submodule	Features
STSM	four S0/T0 interfaces as exchange, permanent connection or subscriber connection
UPSM	four UPN interfaces as subscriber ports
ABSM	four analogue subscriber ports (a/b)



2nd slot for subboard 2 (SUB2, port 4-7)
3rd slot for submodule 3 (SUB3, port 8-11)

For the ADM board the "Call Reference Length - (CRL)" can be set to a length of one or two bytes for the whole board by means of the ICU editor. The call reference length of 2 bytes is required for QSIG network connection with some third-party PBX. If this setting is used, all ports have CRL=2 bytes no matter which protocol is selected. This led to the fact that it was not possible to connect subscribers / lines with the protocols TN1R6, 1TR6, DKZN, VN3, NI2 and ETSI with CRL=1 to this ADM board.
As of software version ADM0900.ICL / ADM00009.ICP of the ICU, the behaviour of the ADM board and of the Integral 55 Compact-ADM port has changed. The CRL setting is only adopted for the ports of the board which uses the "QSIG" protocol. For all other protocolos the call reference length will always be CRL=1.
This makes it possible to configure QSIG ports with CRL=2 for networks with third-party systems, while on other ports with the protocols TN1R6, 1TR6, DKZN, VN3, NI2 and ETSI the CRL=1 is used.

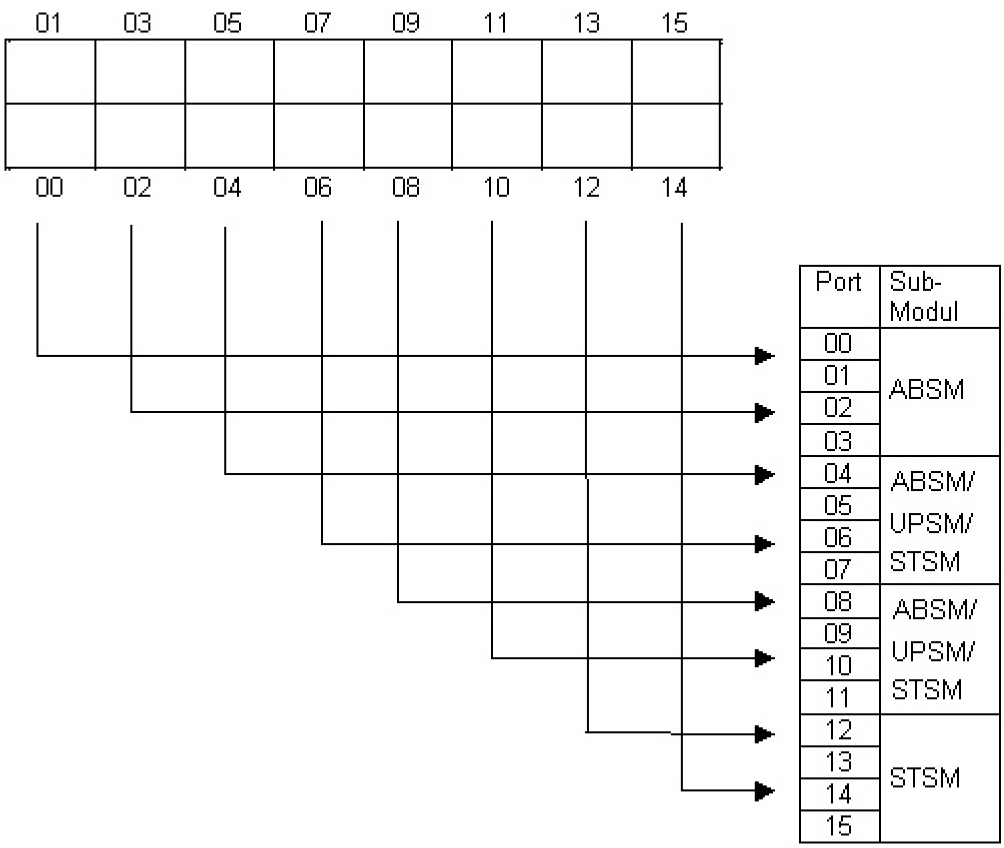
Other features			
Countries of application	Application in all countries		
Power demand +5V	6000 mA		
Interfaces	Standard	24 times	UPN

Other features			
		4 times	a/b
		4 times	S0
	Optional (max. 2 submodules)	4 times	UPN
		4 times	a/b
		4 times	S0
Overvoltage protection up to 4 kV			
Download board software			
Board identification using board passport			
In case of logging adapter plug RJ45/D-Sub, material number: 49.9905.9171, has to be used.			
In conjunction with ports of the ADM and DUPN protocol interfaces for boards on the PBX front side.			

15.5.11.1 Details

ADM on MBO

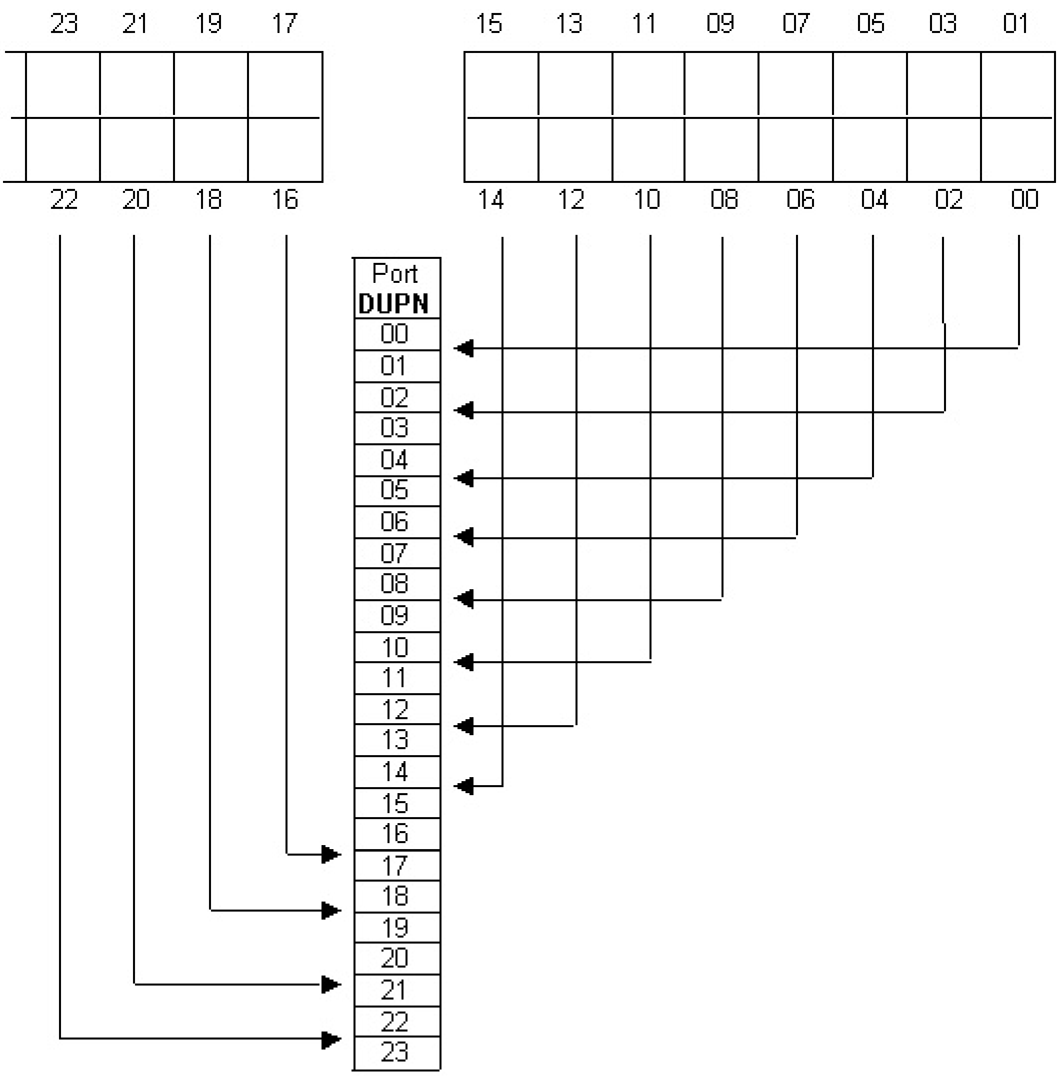
Slot address:	03.01.01-xx
CBI address:	08 hex.
xx = port number	



Connections port ADM on MB0 to contact strip 3

DUPN on MBO

Slot address:	05.01.01-xx
CBI address:	0A hex.
xx = port number	

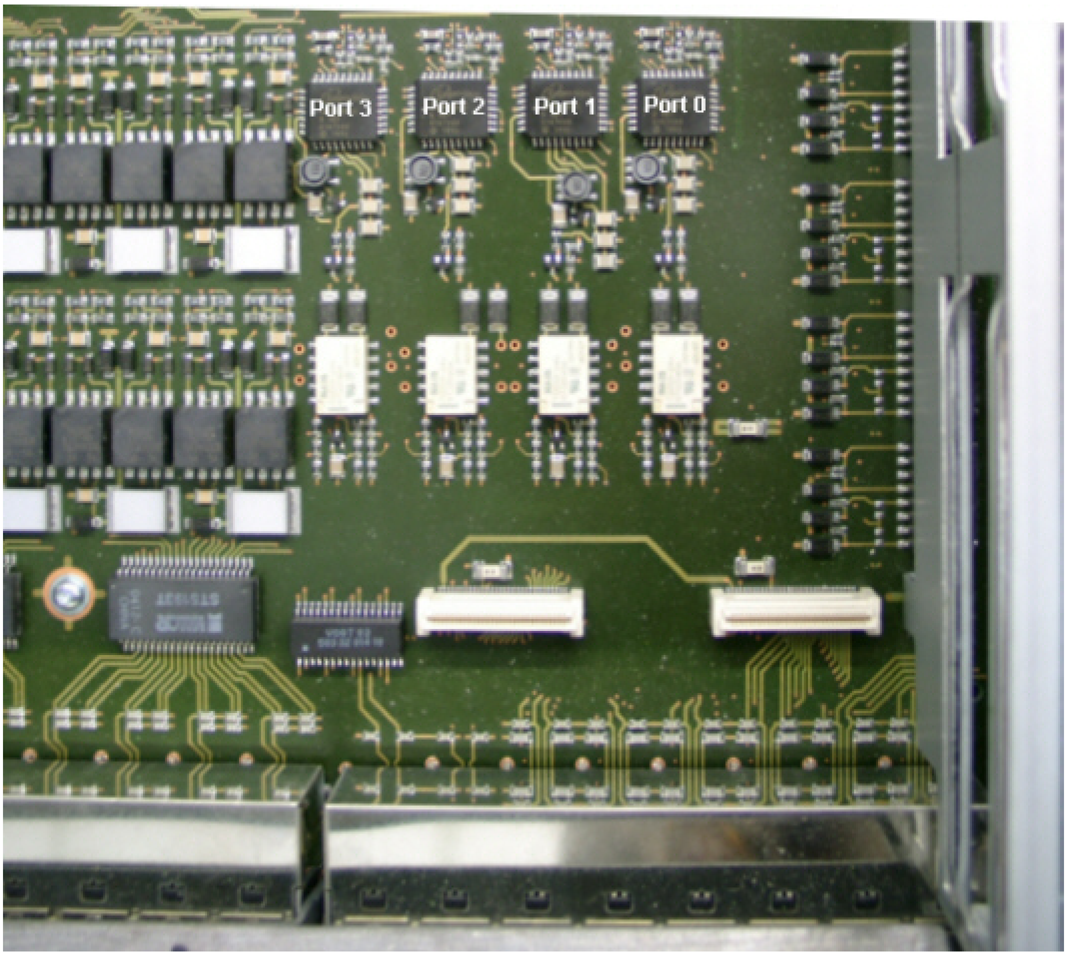


Connections port DUPN on MB0 to contact strip 1 (port) and contact strip 2

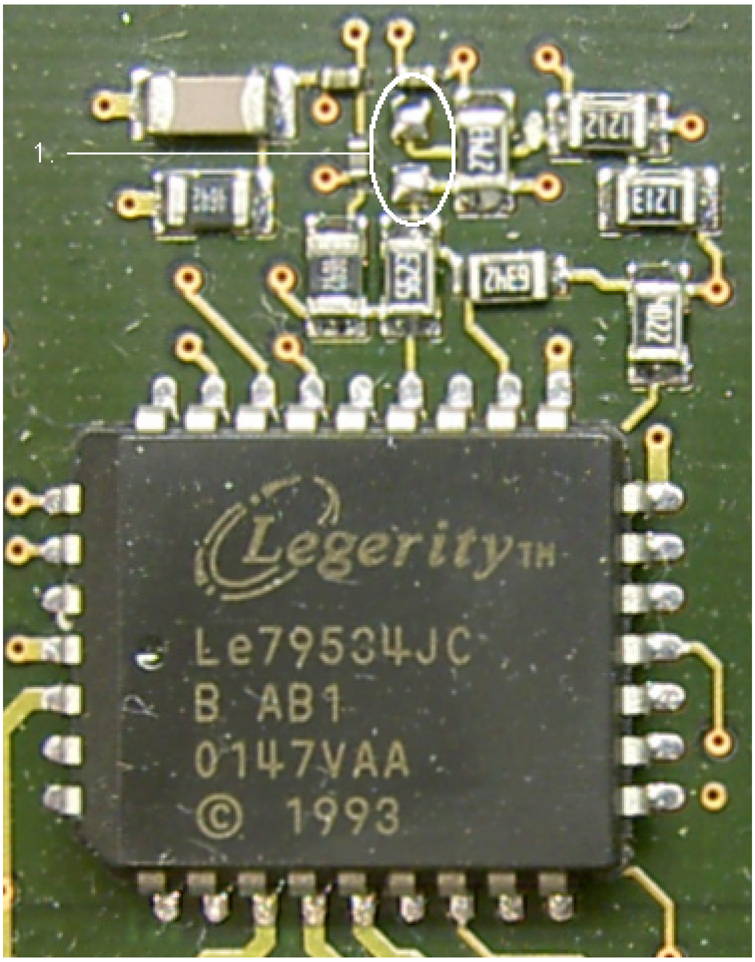
15.5.11.2 Current setting

	Changes on the MBO are to be executed carefully and using suitable tools because work on a fundamental component is performed.

The circuit of the **analog/digital Mixboards ADM** includes the **ABSM**, which realises four ports for analogue subscribers a/b, with a constant power supply of 24 mA. A current changeover to 30 mA is possible. It is implemented per port, connecting the soldering points shown under 1.



Section of the MBO, position of the ports for analogue subscribers

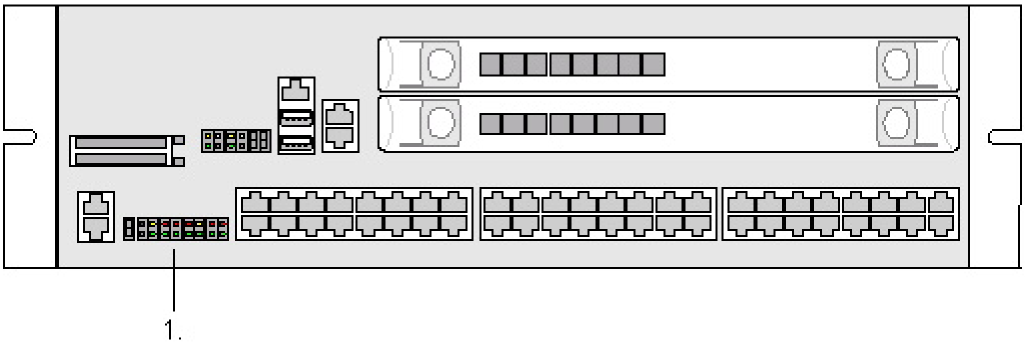


1. Per port (AO) in case of current changeover to 30 mA, insert bridge.

Section of the MBO, soldering points for one port (AO)

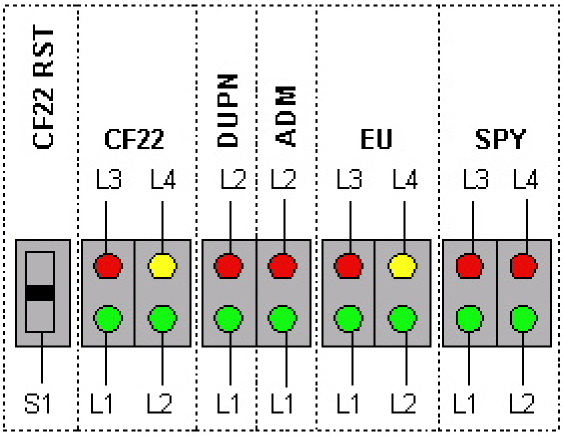
Other features	
Line resistance	2 x 475 Ohm
range:	4 km installation cable J-Y(ST)Y Ø0,4 mm 9 km installation cable J-Y(ST)Y Ø0,6 mm 15 km installation cable J-Y(ST)Y Ø0,8 mm

15.5.11.3 LEDs and Switch Functions



1. Position of the control elements and LEDs

Control elements and LEDs of the MBO



Switch block and LED block of the CF22

Switch Functions

S1	Reset switch	
	Middle:	Operating status
	Below (left):	Reset of the board, locking
	Above (right):	Reset of the board, keying On the HSCBO board the switch for the memory test does not exist. In order to be able to execute a restart by means of the switch, the S1 switch of the MBO must be turned upwards (reset of the CF22). As a result, the HSCBO also executes a restart.

Meanings of LEDs

L1 (green)	Power Good	
	on:	All required operating voltages are present
	off:	Failure of one operating voltage

L2 (green)	CLKUSYN	Clock unit synchronization
	on:	Module clock system is synchronized
L3 (red)	MSMC	MSMC active/inactive
	on:	MSMC (switching matrix processor unit) resetting/inactive
	flashing:	MSMC downloading or waiting for commissioning
	off:	MSMC active
L4 (yellow)	MANK	Master network node
	on:	External synchronous clock switched on for synchronization by the system software

LED block of the DUPN

L1 (green)	on:	Board is busy with switching functions
	flashing:	All AOs blocked after preparatory disabling (VSP)
	off:	Board is not busy
L2 (red)	on:	Board reset in progress
	flashing:	Download in progress
	off:	Board in operation

LED block of the ADM

L1 (green)	on:	Board is busy with switching functions
	flashing:	All AOs blocked after preparatory disabling (VSP)
	off:	Board is not busy
L2 (red)	on:	Board reset in progress
	flashing:	Download in progress
	off:	Board in operation

LED block of the EU (Extension Unit)

Not yet implemented

LED block of the SPY

Not yet implemented

15.5.12 SBAO System Board Adapter Office

Short description

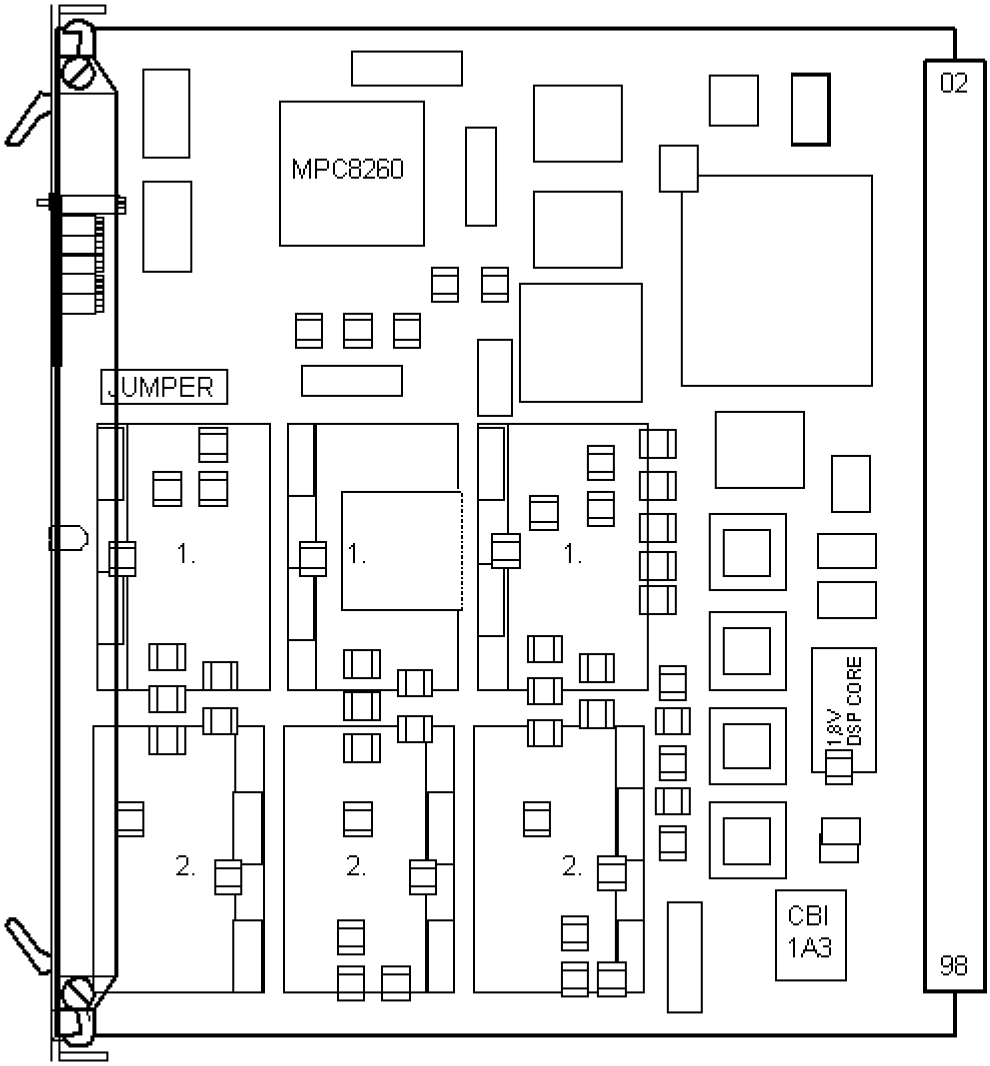
The SBAO board (System Board Adapter Office) is a small backplane which provides two connecting circuit slots with most signals and tensions used in the I55. It is built in the BU.

15.5.13 VOIP Voice over IP Board

Short description

For the VOIP board and all additional information for setup, dimensioning etc. you can find a detailed description under Notes concerning VoIP.

It is shown once again in the figure below.



VOIP board, component side

1. Speech compression / packetizing
2. Echo cancellation

The basic board VOIP (material number: 49.9903.7976) has 6 slots for SOM-2 submodules, with two DSP chips each(Digital Signal Processing Small Outline Module 2, material number: 49.9903.7980) in order to increase the number of DSP chips used in the system. These DSP chips have two functions:

- Voice compression, in order to pack voice information from the highway into data packets and thus to compress the speech data when desired (from G.711 64 kbit/s to G.729A 8kbit/s)
- Echo cancellation for the voice connection from the IP terminal to the ISDN/analog terminals

The upper three slots (in the centre of the board) are used for voice compression and packetizing, while the lower three slots are used for echo cancellation.

Due to the very high cost of DSP chips, the number of SOM-2 submodules must be selected in accordance with the customer configuration (see calculation of the number of SOM-2 submodules).

In addition, 4 DSP chips are soldered on the VoIP board. These are responsible for central functions such as announcements, mixers, and tone input, and support a fixed number of channels for voice compression and echo cancellation.

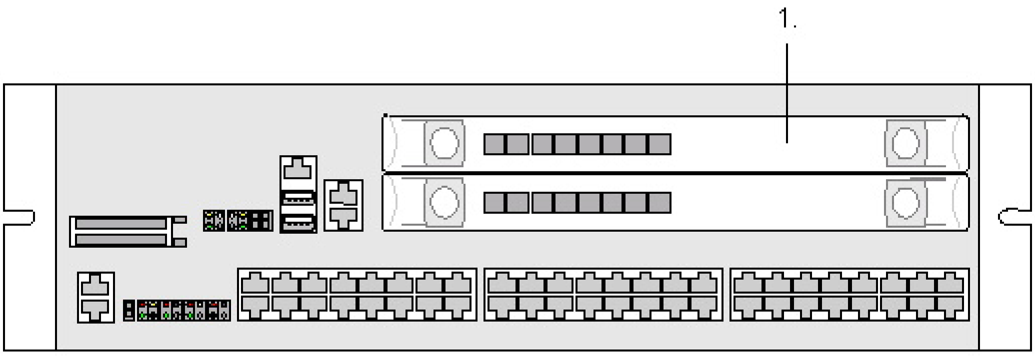
The VOIP board connection to the peripherals is done via the AEV24B cable adapter.

Other features		
Application	Integration of the CSI55 extensions into the existing IP-based data network environment of the customer (LAN, WAN, Corporate Network)	
Power demand +5V	1800 mA	additionally per SOM-2: 240 mA

15.5.13.1 Installation

Base Unit

The VOIP board is **always** inserted into the upper slot (slot 01).

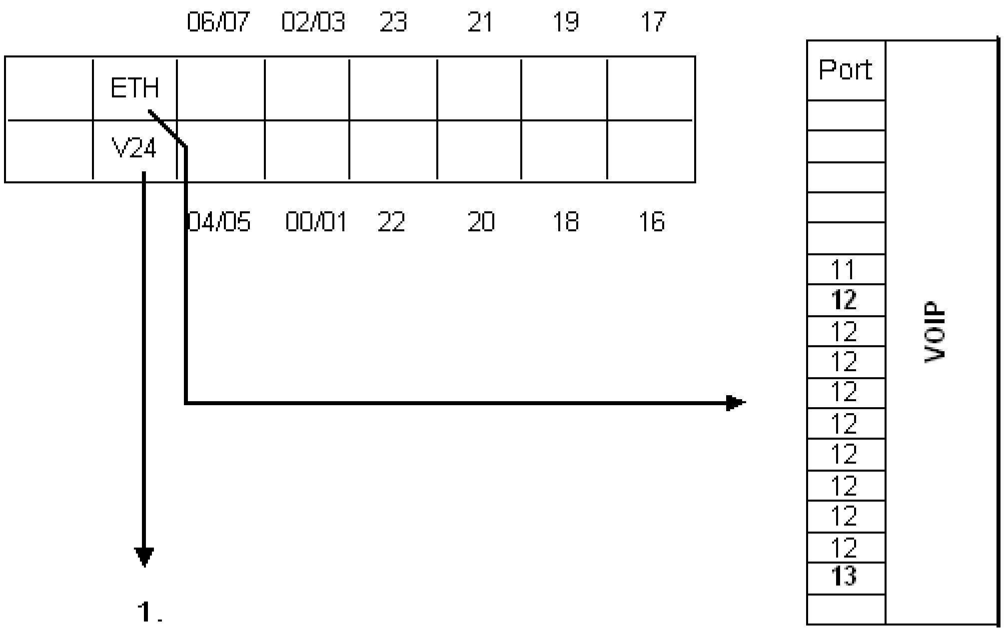


1. Slot for the VoIP board

In the Integral 55 Compact the slots are addressed in such a way that the neighbouring slots always remain free. Therefore, the VOIP board can occupy 64 channels if required.

Details

Slot address:	01.01.01-11 to 01.01.01-62
	01.01.01-00-S to 01.01.01-62-S
	02.01.01-00 to 02.01.01-62
	02.01.01-00-S to 02.01.01-62-S
CBI address:	06 hex.



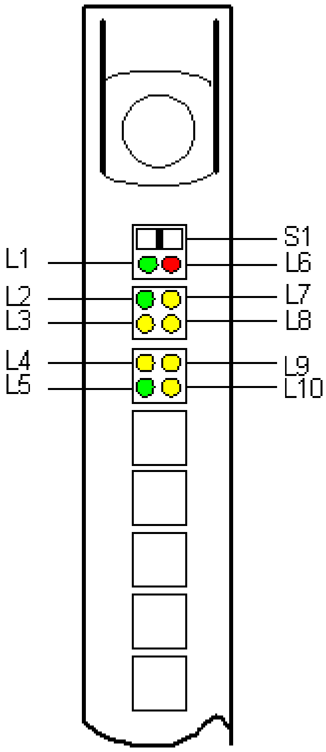
1. V24. Console of the VOIP board

Connections VOIP to contact strip 1

Connections see: Connections from the BU → 680.

15.5.13.2 LEDs and Switch Functions

In the figure below the view of the front panel and the funktions of the switches and LEDs.



View of the front panel

Switch Functions

S1	Left:	Preparatory disabling (VSP)
	Middle:	Operating status/release
	Right:	Reset
	Right, then left:	Forced board download

Meanings of LEDs

L1	on:	Module is busy in terms of exchange functions (active layer 3 connection)
	flashing:	Board removable after preparatory disabling
	off:	Board is not busy
L2 POWER GOOD)	on:	All voltages (5V, 3.3V, DSP on-board VCC 1.8V and PQUICC Vcore currently 2.5V) are within their permitted ranges of tolerance
L3 (ETH Link)	on:	Ethernet Link has been established
L4 (ETH 10/100)	on:	100Mbit transmission is in process (SPEED)
L5 (ETH active)	flashing:	Activity on the Ethernet (transmitting and receiving ends)
L6	on:	Board reset in progress
	flashing:	Download in progress
	off:	Board in operation
L7	on:	Status LED 2/3

L8	on:	Status LED 2/2
L9	on:	Status LED 2/1
L10	on:	Status LED 2/0

15.6 Power supply

In principle, the Integral 55 Compact can be connected to the mains voltage **230 V, 50 Hz and 60 Hz**. The fuse protection for every electric circuit consists of a C Type 16 A slow acting automatic circuit breaker. It is a separate electric circuit (phase and fuse).

As power supply module the PSO is available. This device is designed for direct supply.

15.6.1 PSO Power Supply Office

Short description

The PSO board (Power Supply Office) provides the required voltages for the Integral 55 Compact. Additionally, two module fans are connected to it.

It has the following features:

- Harmonics as per EN 61000 (PFC).
- Jamming immunity input 4 kV (1.2/50).
- Delayed disconnection of the -48V output in the case of overload/short-circuit
- Delayed disconnection of device during overload/short-circuit of +5 V output.
- Board passport
- I2C-bus connection

Technical data

Voltages and Frequencies	
Mains voltage	230V; ±10 % (single-phase alternating current)
Mains frequency	47 - 63Hz
Reduced voltage	+5,1V, -5V, -48V
AC ringing voltage	72 V
Ringing voltage frequency	47 - 63Hz
Protection class	1 (in accordance with VDE 0100)
Radio interference suppression	Limit class B (in accordance with EN 55022 and VDE 878)

Device Input Side, power and currents	
Pprim	138W
Iprim	0.6A

Device Output Side, power and currents	
P	102W
+5.1V	10A
-5V	0.2A
-48V	1A, included fan
72V	0,04A

All outputs are short-circuit-proof.

In the embedded document on

PSO

you can find more information about the product.

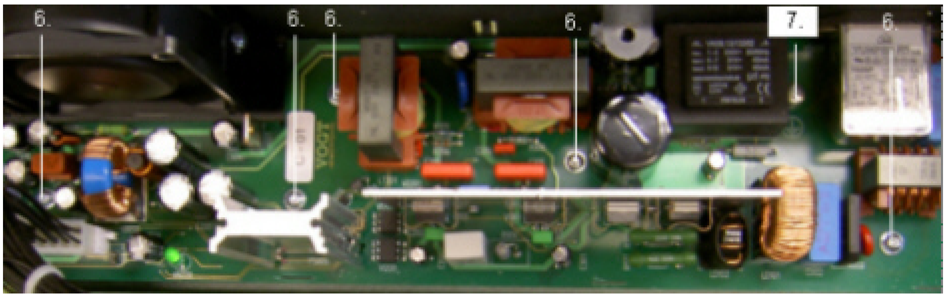
15.6.1.1 Replacement

If necessary, the power supply module is replaced on site.

Proceed as follows:

1. Withdraw the power cable on the IEC power plug.
2. Remove the IEC power plug from the rear side of the housing (two screws).
3. Open the unit (refer to openingof housing).
4. Remove the cover plate from the PSO (1 screw).
5. Pull the connecting cable from the PSO (two blower- and 1 connecting cable).

6. Loosen fixing screws (five screws).
7. Loosen earthing screw (one screw marked with the earthing symbol).



8. Remove PSO and replace.
9. To reassemble, follow this procedure in reverse.
   Ensure good contact between the housing floor and the PSO circuit board by means of the earthing screw, so that the requirements of EN 60950 have been fulfilled (earth conductor to housing </= 0.1 ohm).

Housing open → 602

15.6.2 PE or FPE

The Integral 55 Compact can be connected with either a PE or an FPE.

PE

The Integral 55 Compact can be protected by fixed earthing conductor (PE) with lockable plug and cable:

- Length 3m, part no. 4,998,045,750
- Length 5m, part no. 4,998,069,828

By this alternative, connection of the Integral 55 Compact to the equipotential bonding strip via a separate copper wire is not necessary. The main application is likely to be in the form of table and upright units.

FPE

If an FPE is available, this can be used. The main application in this case will be wall and cabinet mounting, althought this does not rule out the table and upright unit.

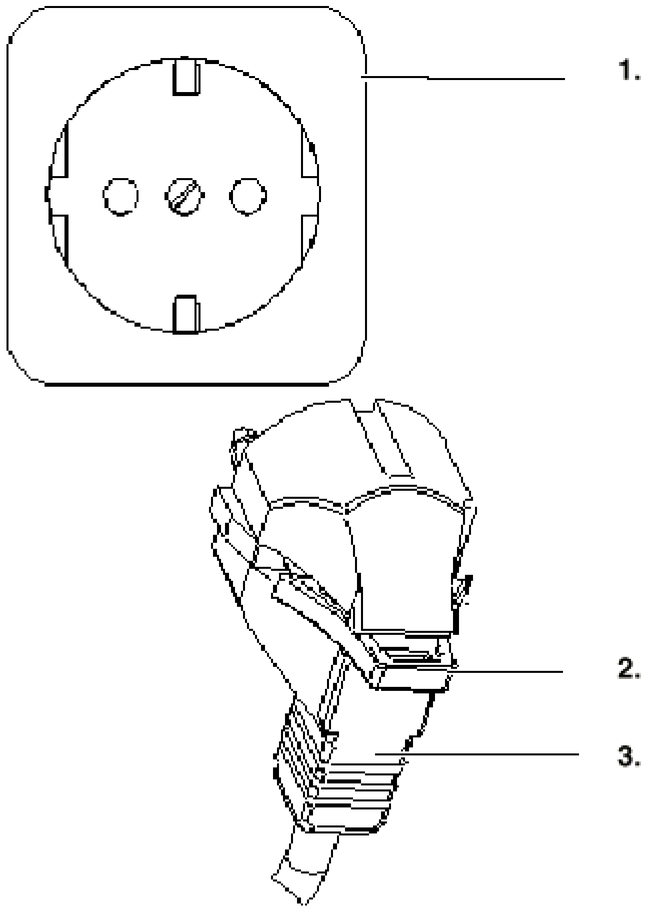
For connecting the Integral 55 Compact to the mains supply use the power cable with cut off PE:

- Length 3m, material number: 4.999.079.215
- Length 5m, material number: 4.999.079.453

The Integral 55 Compact may only be connected with a variant (PE or FPE).
Loop formation!

15.6.2.1 Connection of the PE

Insert the earthing pin plug of the connecting cable into the Integral 55 Compact.
If you insert the earth plug into the receptacle and press the black lock, the plug will be locked.



1. Wall socket
2. Lock (black)
3. Earth plug, lockable with cable

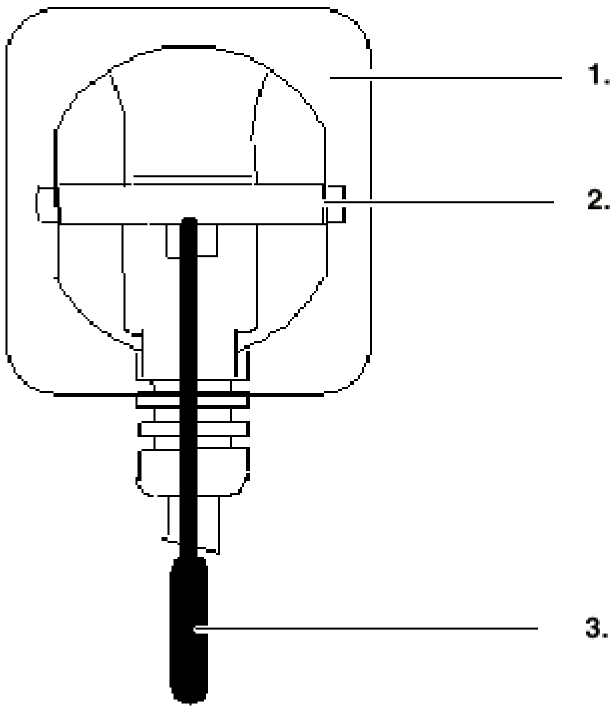
Putting the system into operation.

Unlocking and pulling the earth plug

Shut down the system.

Use a screwdriver to pull out the black lock approx. 10 mm.

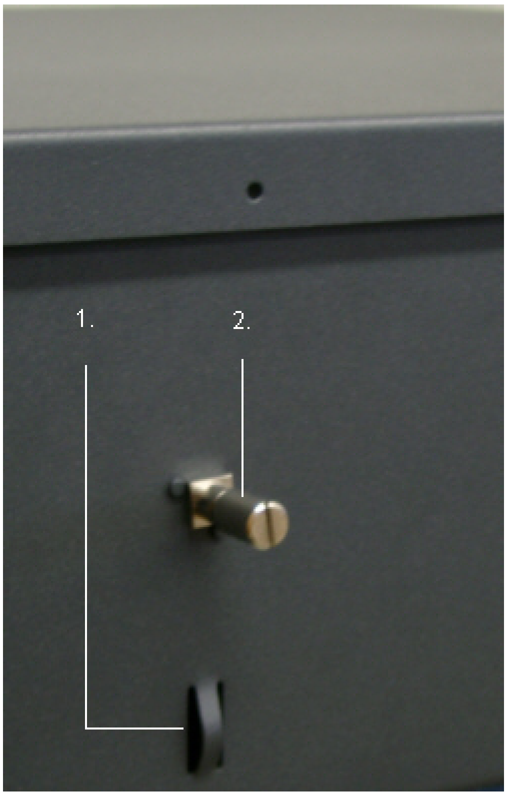
The plug is unlocked and can be removed.



1. Wall socket
2. Lock (black)
3. Screwdriver

15.6.2.2 Connection of the FPE

Secure the earthing wire with a cable fastener onto the lug of the housing (1.).



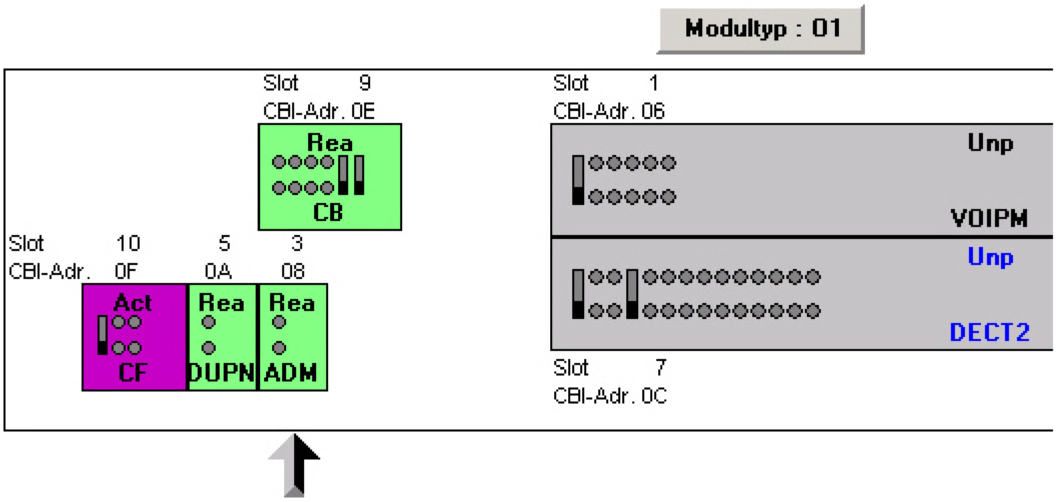
Clamp the insulated end of the stripped copper wire (FPE=green/yellow, >/= 4 mm2) in the terminal (2.) at the back of the housing.

Check that the FPE on the equipotential bonding strip and PABX has been properly connected!

When you place the Integral 55 Compact into the cabinet, a 2,5 mm earth conductor2 with wire sleeves on both ends is available. The earth conductor is a delivered together with the cabinets.

15.7 View of module in the ISM

The module view shows a sample configuration with VoIP and DECT21 boards.

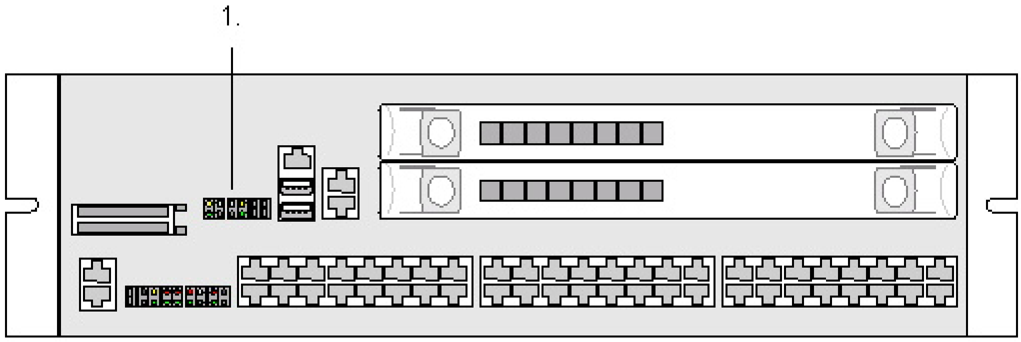


15.8 Commissioning

Make sure that all cables have been secured.

Cover the free slots of the front AO boards with slot covers.

Insert the safety plug of the power supply cord into the earthing contact socket provided for the purpose.

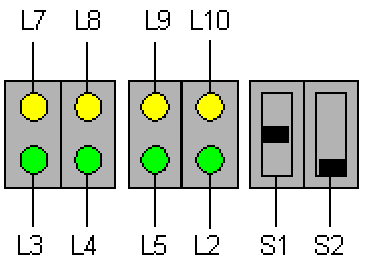


1. Position of the control elements and LEDs

Switching on with ACBO module (= Advanced Computer Board Office)

The module is switched on and loads the programs in less than 15 minutes. It is ready for operation when

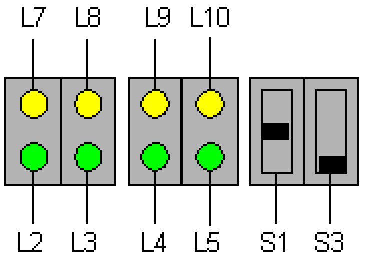
- the yellow LEDs L7 to L10 are off,
- the green LED L3 flashes and
- the green LED L2 is lit.



Switching on with HSCBO module (= High Speed Computer Board Office)

The module is switched on and loads the programs in less than 10 minutes. It is ready for operation when

- the yellow LEDs L7 to L10 are off and
- the green LED L2 is flashing.



15.9 Cable network

Join the cables from the connecting devices at the front side(s) of the Integral 55 Compact with the patch field or main distribution frame using the cable set.

15.9.1 Cross-connect cable

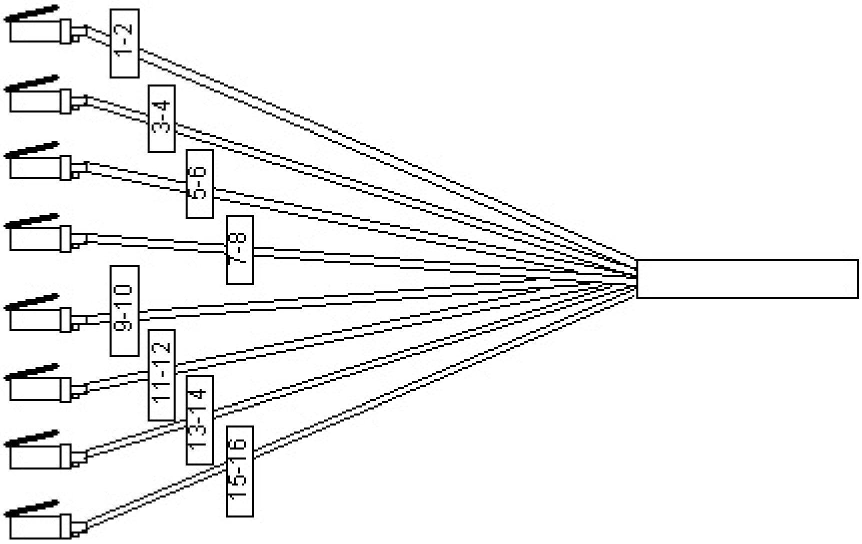
Two cable versions are available for connecting the AO ports on the front side(s) of the Integral 55 Compact with the main distribution frame and a Y adapter for the RBS port:

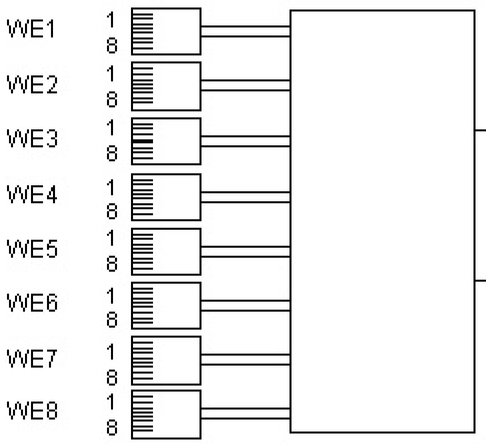
15.9.1.1 Cable with open end

Cable with solid copper wires, like installation cable J-Y(ST)Y, must be used for connecting the Integral 55 Compact to a conventional main distribution frame (e.g. plug-and-cut method).

8x WE8/4 cable with open end

The cable with material number 4.999.020.564 conforms to requirements and fits all connecting devices. This also applies to an S2M interface when a DT21 is plugged into the BU instead of the DECT21.

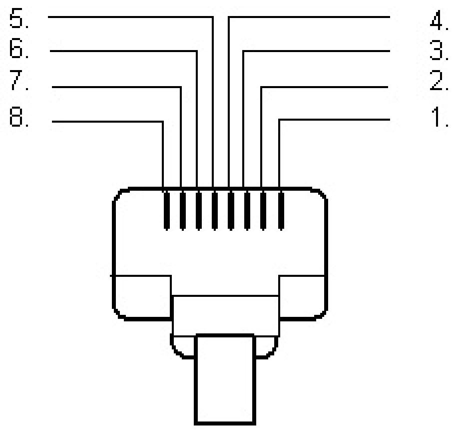




External ring (1.)
1. RD/BL
2. WH/YE
3. WH/GN
4. WH/BN
5. WH/BK
6. WH/BL
7. WH/YE
8. WH/GN
9. WH/BN
10. WH/BK
11. WH/BL

Internal ring (2.)
12. RD/YE
13. WH/GN
14. WH/BN
15. WH/BL
16. WH/BL

Cable 8xWE8/4 (16x2x0,6) 5m, material number: 4.999.020.564, with assignment



WE 1	1	free	WE 2	1	free	WE 3	1	free	WE 4	1	free
	2	free		2	free		2	free		2	free
	3	WH (P2)		3	WH (P4)		3	WH (P6)		3	WH (P8)
	4	RD (P1)		4	WH (P3)		4	WH (P5)		4	WH (P7)
	5	BL (P1)		5	GN (P3)		5	BK (P5)		5	YE (P7)
	6	YE (P2)		6	BN (P4)		6	BL (P6)		6	GN (P8)
	7	free		7	free		7	free		7	free
	8	free		8	free		8	free		8	free

WE 5	1	free	WE 6	1	free	WE 7	1	free	WE 8	1	free
	2	free		2	free		2	free		2	free
	3	WH (P10)		3	WH (P12)		3	WH (P14)		3	WH (P16)
	4	WH (P9)		4	WH (P11)		4	WH (P13)		4	WH (P15)
	5	BN (P9)		5	BL (P11)		5	GN (P13)		5	BK (P15)
	6	BK (P10)		6	YE (P12)		6	BN (P14)		6	BL (P16)
	7	free		7	free		7	free		7	free
	8	free		8	free		8	free		8	free

e.g. P11 = pair 11

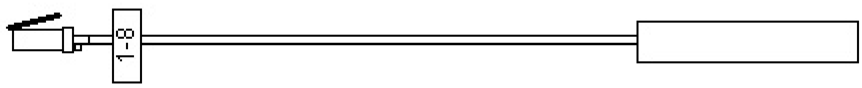
Assignment of the WE plugs

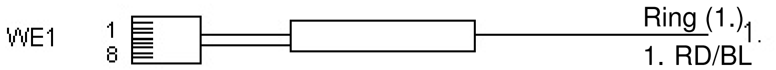
Cable WE8/8, with open end

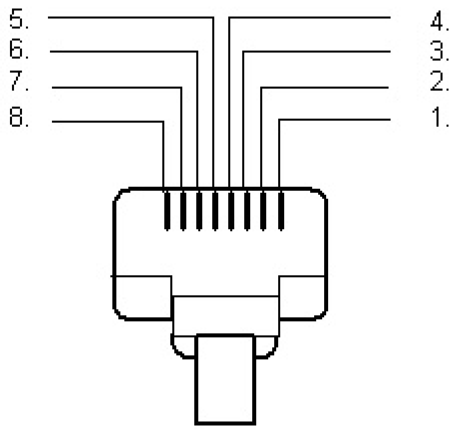
The cable with material number 4.999.089.690 (length 10m) is used when

- a T0exchange line (ADM board with STSM) at a NTBA
  or
- the ATA board with eight exchange lines is inserted in the BU

must be connected.







Cable WE8/8 (10m) with assignment, material number: 4.999.089.690

WE 1	1	WH (P4)
	2	BN (P4)
	3	WH (P2)
	4	RD (P1)
	5	BL (P1)
	6	YE (P2)
	7	WH (P3)
	8	GN (P3)

e.g. P4 = pair 4

Assignment of the WE plug

Connection of the RBS

For the DECT connections in the BU are required (see RBS connection → 680). It splits the two connections.

Alternately, in the BU it is also possible to use the WE8/8 cable with open end for wiring the DECT connections.

15.9.1.2 Patch Cable

The following connecting cables are used for the connection of the connecting circuits (RJ45 sockets on the front side(s) of the Integral 55 Compact) to an main distributor made up of patch panels:

Patch cords	Length	Material number
	1m	4.998.051.621
	3m	4.999.045.218
	5m	4.999.048.490

	10m	4.998.055.426

Y adapters are required for the DECT connections (see RBS connection → 680). It splits the two connections.

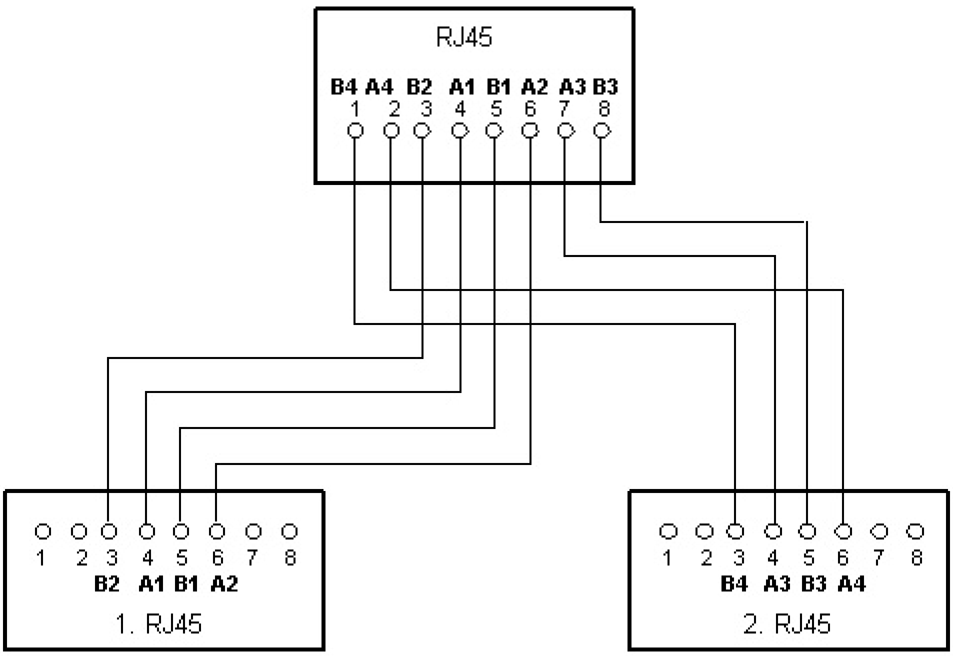
	Exception! When a T0 exchange line must be wired, the WE8/8 cable with open end (length 10m), material number 4.999.089.690 must be used and connected to the NTBA.

15.9.1.3 RBS connection

Note that at the DECT21 sockets, in case of direct connection of the cable, only 1 RBS can be operated per plug. If both RBS connections of one socket are to be used, between cable plug and connection socket, the Y-adapter 8/8 to 2x 4/8, material number: 4,999,028,515 is to be used.

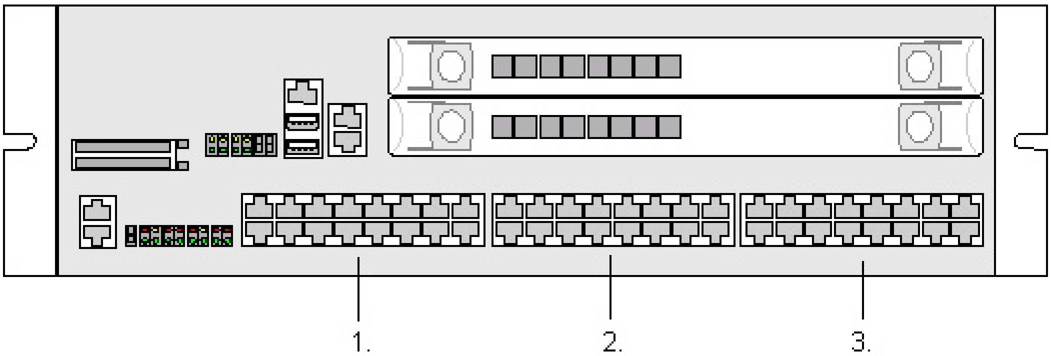
The adapter splits the two connections.

The pinning of the RJ45 sockets for the RBSs on the front side results in the pinning of the RJ45-Y-adapter 8/8 to 2x 4/8.



15.9.2 Connections from the BU

The connections of the connecting circuits are located on the front side of the Integral 55 Compact



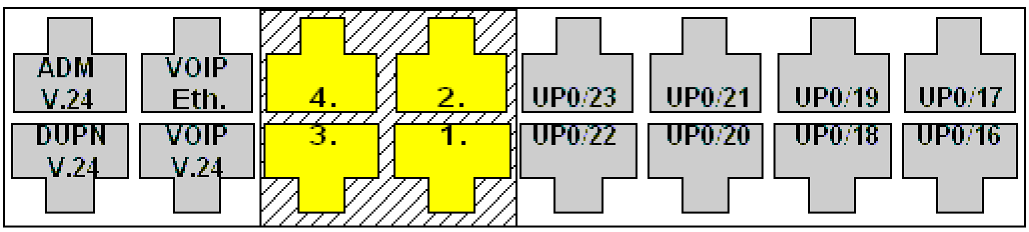
1. Contact strip 1
2. Contact strip 2
3. Contact strip 3

RJ45 socket pin assignment

On the contact strip 1 are present:

- Protocol interface of the ADM board
- Protocol interface of the DUPN board
- Protocol interface of the VOIP board
- Ethernet connection of the VOIP board
- Connections for eight Radio Base Stations
    1. RBS 0/1
    2. RBS 2/3
    3. RBS 4/5
    4. RBS 6/7

  or
  at 1st the S2Mconnection for the DT21 board
  or
  at 1st and 2nd eight analog exchange lines of the ATA board
  or
  at 1st S2Mconnection of the CAS board
- Connections for the last eight UPN subscribers



- Connections of DECT21 (RBS/S2M) or DT21

  Connections of DECT21 (RBS0) or DT21
  Wire DECT A1 leads to contact no.: 4
  Wire DECT B1 leads to contact no.: 5
  This corresponds to lines TX+ and TX- when a DT21 is used

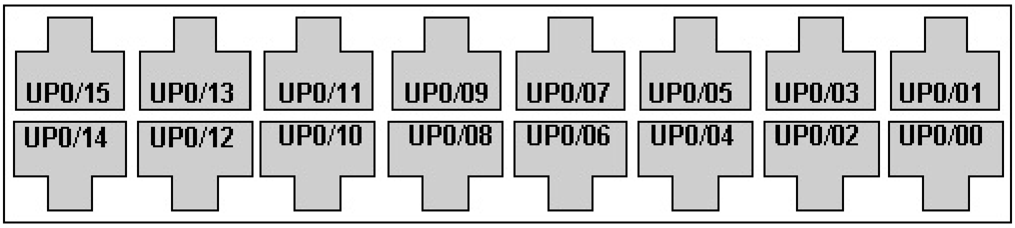
  wire DECT A2 leads to contact no.: 6
  Wire DECT B2 leads to contact no.: 3
  This corresponds to lines RX+ and RX- when a DT21 is used

  Connections of DECT21 (RBS1)
  Wire DECT A3 leads to contact no.: 7
  Wire DECT B3 leads to contact no.: 8

  Wire DECT A4 leads to contact no.: 1
  Wire DECT B4 leads to contact no.: 2

On the contact strip 2 are present:

- Connections for the first 16 UPN subscribers



On the contact strip 3 are present:

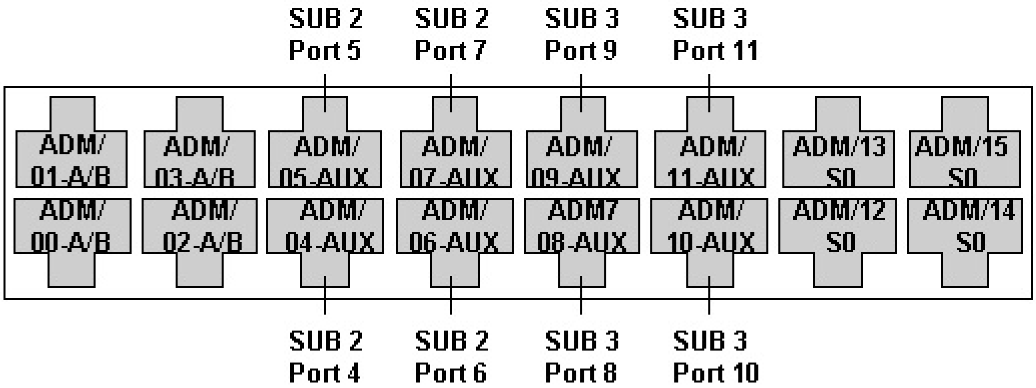
- Connections for four analogue a/b subscribers
- Connections for four S0 or T0 for subscribers or exchange lines

and optionally (depending on the equipment of the two slots of the ADM with submodules UPSM, ABSM or STSM)

- Connections for four UPN subscribers
- Connections for four analogue a/b subscribers

or

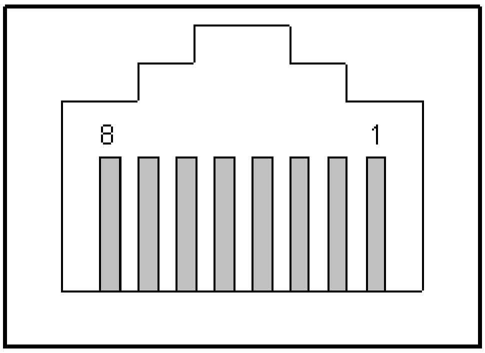
- Connections for four S0 or T0 for subscribers or exchange lines

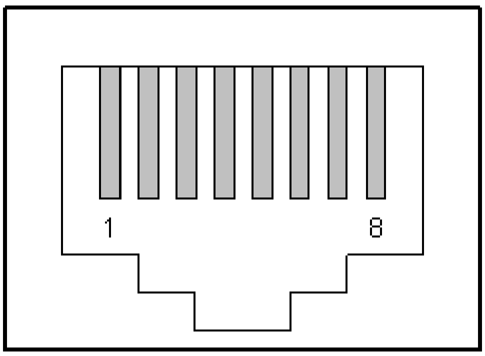


Front views

RJ45 sockets

Front view of RJ45 sockets from above





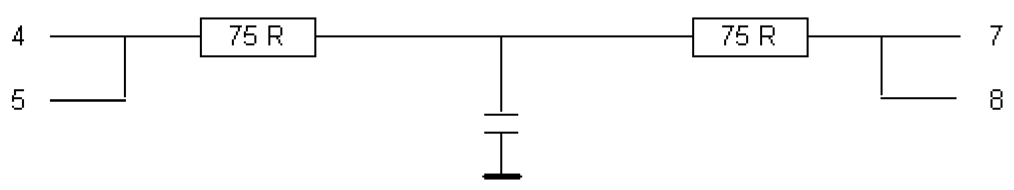
Front view of RJ45 sockets from below

Signal assignment

Board (Submodule)	Signal at RJ45 pin								Remarks
	1	2	3	4	5	6	7	8	
ADM (ABSM)			GND	a	b				
ADM (STSM)			A2	A1	B1	B2			A1/B1 = S0 Tx, A2/B2 = S0 Rx

Board (Submodule)	Signal at RJ45 pin								Remarks
ADM (UPSM)			GND	A	B	GND			
DUPN				A	B				
DECT21	A4	B4	B2	A1	B1	A2	A3	B3	4 x UP0 per RJ45 for 2 x RBS
DT21			B2	A1	B1	A2			A1/B1 = TX+/TX- (S2M), A2/B2= RX+/RX- (S2M)
ATA	a4	b4	b2	a1	b1	a2	a3	b3	2 x 4 AOs per RJ45
CAS			B2	A1	B1	A2			A1/B1 = TX+/TX- (S2M), A2/B2= RX+/RX- (S2M)
VOIP [ETH]	Tx P	Tx M	Rx P	*1	*1	Rx M	*1	*1	*1 Configuration see below
VOIP [V24]		TxD	RxD		GND				V24 signal level (no TTL)
ADM [V24]		TxD	RxD		GND				V24 signal level (no TTL)
DUPN [V24]		TxD	RxD		GND				V24 signal level (no TTL)
HSCBO [V24]		TxD	RxD	DSR	GND	DTR	CTS	RTS	V24 signal level (no TTL)
ACBO [V24]		TxD	RxD	DSR	GND	DTR	CTS	RTS	V24 signal level (no TTL)

*1



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Avaya-Tenovis GmbH & Co. KG
Kleyerstraße 94
60326 Frankfurt am Main
Telefon 0 800 266 - 10 00
Fax 0 800 266 - 12 19
kundendialog-center@avaya.tenovis.com
avaya.tenovis.de

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