



INDeX Media Gateway

Installation Manual

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Introduction

General

This manual covers the installation of an INDeX Media Gateway operating with IP Office Level 2.1+ or higher software. It is intended for use by installers and maintainers who have successfully completed the appropriate IP Office training courses.



Ensure that you have read and understood this manual before beginning installation.

Scope of this Manual

This manual covers the following subjects and should be read in the sequence shown below:

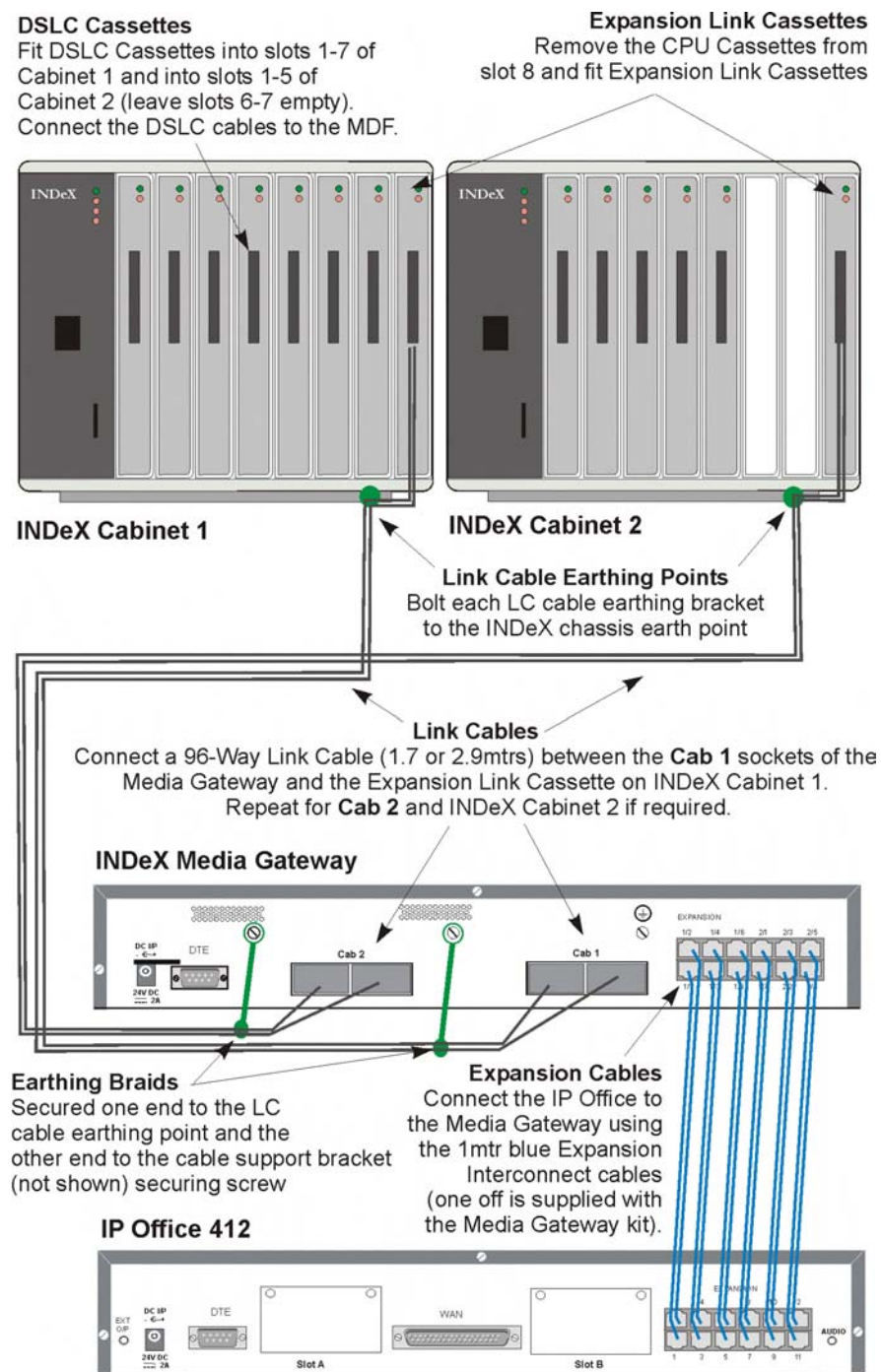
- **INDeX Media Gateway:**
This section provides details of the INDeX Media Gateway module and how it allows existing INDeX equipment to be connected to either Avaya IP406 or IP412 Office platforms. An illustration of a fully configured INDeX Media Gateway is provided.
- **Preparing for a new system:**
These sections provide all the information required and the actions to be performed to physically install an INDeX Media Gateway, i.e. what tools are required, the environmental/power requirements, etc. It also covers extracting the existing INDeX database so that the information can be imported into the IP Office platform.
- **Installing a new system:**
This section details the recommended sequence for installing the INDeX media Gateway into an existing INDeX system. This manual only covers the installation of the IP Office suite of programs. For full details refer to the IP Office Installation Wizard Help files and/or to the Manuals contained on the documentation CD (supplied with IP406 or IP412 units).
- **Reference Section:**
This provides all the necessary Safety, Homologation Statements and Regulatory Instructions for Use required. This section also detail where further information, including other Manuals and support telephone numbers, can be obtained. It also includes technical data on the Port Pinouts/Safety classifications, cables, and basic technical specifications only. Descriptions of the functionality, features and performance of the IP Office are covered by the Product Description.

The INDeX Media Gateway

The INDeX Media Gateway provides the means of connecting existing INDeX 8 slot cabinets, along with their associated digital telephones, to either IP406 or IP412 Office platforms. Up to 180 digital telephones can be supported on an IP406 and up to 360 digital telephones on an IP412 Office Platform. This is achieved by using an IP Office 412 with the maximum of 12 Digital Subscriber Line Cassettes (DSLCS) in the INDeX cabinets.

- Notes:**
1. Although a DSLC cassette can support up to 32 channels, when used with Media Gateway **only the first 30 channels** per DSLC are used.
 2. As both the INDeX Media Gateway and the IP Office Expansion Modules (see page 38) share the same **Expansion** ports on the rear of the IP Office then, for each IP Expansion Module used, one less DSLC can be used.

The major elements of an INDeX Media Gateway, using the maximum of 12 DSLCs, is shown below:

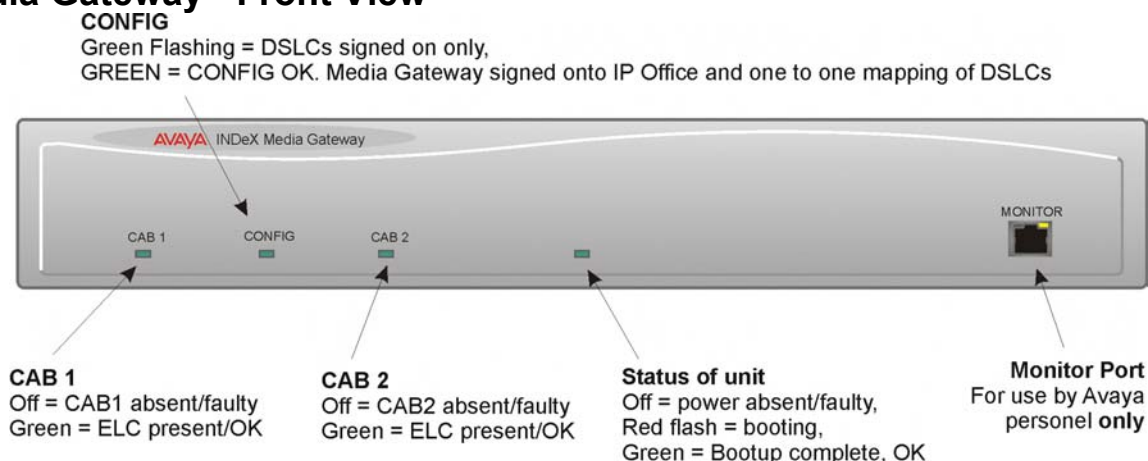


INDeX Media Gateway Module

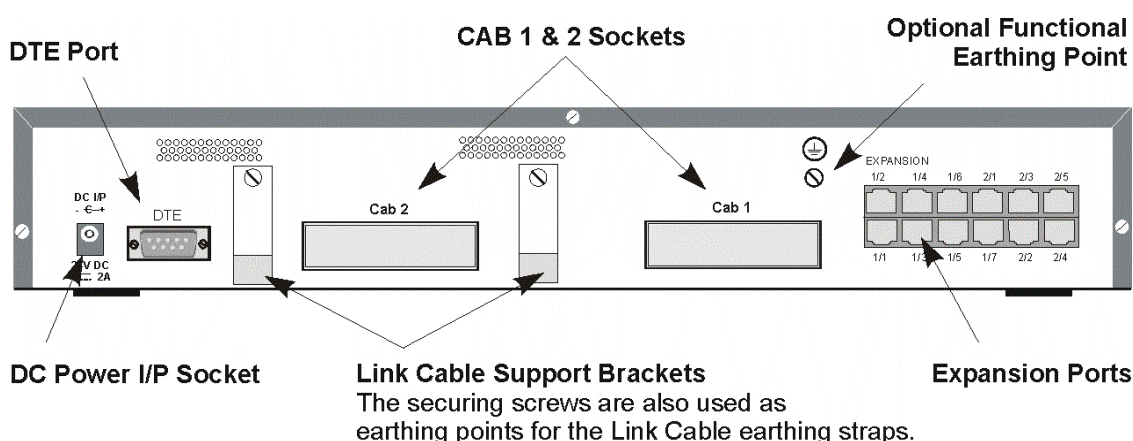
General

The INDeX Media Gateway provides the means of connecting existing INDeX cabinets, along with their associated digital telephones, to either IP406 Office (maximum 180 digital telephones) or IP412 Office (maximum 360 digital telephones) platforms. Details on either Office platform, the expansion modules or IP Office country variants can be found in the Reference Section on page 28.

Media Gateway - Front View



Media Gateway - Rear View



Port connections

- **DC Power I/P Socket:** Only use the external 24V DC power supply supplied with the Media Gateway kit (including 3-pin earthed plug).
- **DTE Port:** A 9-way D-type socket. Used for maintenance only.
- **CAB1/CAB2 Sockets:** 96-Way sockets for the Link Cables to the ELCs in the INDeX cabinets 1 & 2 respectively. The CAB2 socket is normally blanked off with a protection plate. Hence, where a 2nd INDeX cabinet is to be connected, remove this plate from over the CAB2 socket.
- **Expansion Ports 1-12:** Used to connect to the IP412 or IP406 Office Platforms.

Port Pinouts and Cables

- For Port Pinouts and Cables, refer to pages 49 and 53 respectively.

Functional Earth

For Functional Earth connections see page 29.

Preparing for Installation

Introduction

This section reviews the requirements for installing an INDeX Media Gateway. You must meet these requirements for the system to operate safely and in the intended manner.

This section covers:

- Tools & Parts Required on page 6.
- Space Requirements on page 7.
- Environmental requirements on page 8.
- Power Supply Requirements on page 9.
- Cabling & Trunking Requirements on page 10.

EMC & Earthing Requirements are detailed on page 28.

Tools & Parts Required

General:

- Pozidrive No. 1 screwdriver for removal of IP Office unit covers.
- Pozidrive No. 4 screwdriver for IP Office Analog Trunk 16 expansion module grounding post.
- 6.5mm Slothead screwdriver for removal of INDeX cabinet covers.
- No.1 Crosspoint for INDeX cassette screws and cabinet grille plate.
- Cutter/knife for cable ties.
- Cable ties - 3mm x 50mm.

Note: In addition, ensure that you have sufficient cables that are **not supplied** with the modules:-

- Line Cords for structured cabling (see page 53)
- Power supply cables (see page 44).
- Link Cable(s). 2.9mtrs (38YCN00001SEC) or 1.7mtrs (38YCN00001SEK). The earth braids (two off) for connection to the INDeX Media Gateway are supplied with the module.

IP Office Programming:

These are the tools required for programming of a newly installed IP Office system.

- PC running Windows 98/2000/ME/XP or NT with the following specification: Intel Pentium II 333Mhz or faster, 100MB HD space, CD-ROM drive, COM port, terminal emulation (e.g. HyperTerminal) and a super VGA Monitor (set to 1024x768).
- PC with a LAN card with either a fixed IP address (allocated by your system administrator) or be using DHCP to obtain an IP address.
- IP Cat. 5E patch cable (red – supplied with system see page 55).
- IP Office Administration CD (supplied with system).
- IP Office Manager Application Manual (supplied on CD with system).
- IP Office Feature Key (where software that requires a Licence Key is to be installed).

Space Requirements

For INDeX:

The INDeX Cabinets should have already been installed. However, check the following guide line:

WARNING:

Cabinets must not be mounted vertically above each other except in a proper fan cooled rack installation (see Rack Installation Notes Manual).

- Allow a minimum clearance of 50mm to the left and right of the cabinet.
- Between cabinets, allow a separation of 50 to 100mm.
- Allow for trunking to the lower-right corner of each cabinet.
- Check there is suitable lighting for installation, system programming and future maintenance. Similarly check that there is sufficient working space for installation and future maintenance.
- Check that there is sufficient space for any anticipated future expansion or addition of peripheral equipment, e.g. Voice and CCC systems and other Server PC products.
- Ensure that likely activities near the system will not cause any problems, e.g. access to and maintenance of any other equipment in the area.

For IP Office:

Check that the planned location meets the following requirements.

Height: IP406, IP412 and all Expansion modules are 71mm(2.8 inches) high.
Hence the total height of a system is the number of modules multiplied by 71mm (2.8 inches).

Width: IP406, IP412 and all Expansion modules are 445mm (17.5 inches) wide.

Depth: IP40, 412 and all Expansion modules are 245mm (9.7 inches) deep.

- IP403, IP406, IP412 and Expansion modules can be mounted in 19" racks (see page 25).
- When modules are free standing (ideally mounted one upon another), allow a minimum clearance of 50mm (20 inches) either side for cable trunking.
- Check there is suitable lighting for installation, system programming and future maintenance.
- Check that there is sufficient working space for installation and future maintenance.

Ensure that likely activities near the system will not cause any problems, e.g. access to and maintenance of any other equipment

Environmental requirements

The planned location must meet the following requirements:

- Check that the area is a well ventilated, having a temperature range of 0°C to +40°C and a humidity range of 10% to 90% non-condensing.
- Check there are no flammable materials in the area.
- Check there is no possibility of flooding.
- Check that no other machinery or equipment needs to be moved first.
- Check that it is not an excessively dusty atmosphere.
- Check that the area is unlikely to suffer rapid changes in temperature and humidity.
- Check for the proximity of strong magnetic fields, sources of radio frequency and other electrical interference.
- Check there are no corrosive chemicals or gasses.
- Check there is no excessive vibration or potential of excessive vibration, especially of the cabinet mounting surface.

IMPORTANT SAFETY INSTRUCTIONS

When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

1. Do not use this product near water, for example, near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement or near a swimming pool.
2. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
3. Do not use the telephone to report a gas leak in the vicinity of the leak.
4. Use only the power cord and batteries indicated in this manual. Do not dispose of batteries in a fire. They may explode. Check with local codes for possible special disposal instructions.

SAVE THESE INSTRUCTIONS.

Power Supply Requirements

INDeX, INDeX Media Gateway, IP Office and Expansion Modules should only be connected to a clean power supply or a UPS. Check the following:

INDeX Cabinets:

- Each cabinet requires a separate switched mains supply. This should be a 230V ($\pm 10\%$), 50Hz single-phase mains supply rated at 10A maximum. The supplied mains-in cable length is 3 metres. Each mains supply must provide an earth connection (see *"EMC & Earthing Requirements"* on page 28).
- The INDeX power supply **must be** a PSU8.

INDeX Media Gateway, IP Office and Expansion Modules:

- IP Office modules require a separate **switched** mains supply. Power on the Expansion Modules **first**. If the main IP Office Module does not detect an item at power on, it will never use it. If power is switched on from a central point for all modules, then, as the main unit is the slowest to start, this will be taken care of automatically.
- Standard Lump-in-Line Power Supply units are supplied with each **must be** used.

CAUTION: The Lump-in-Line PSUs supplied with each IP Office module must only be connected to a 50/60Hz, 100-240V power source.

UPS Equipment:

- The use of UPS's to support the INDeX Media Gateway during mains power failure is highly recommended. Such equipment also provides mains conditioning. Contact Avaya for details of preferred and tested suppliers and models. Contact Avaya for details of preferred and tested suppliers and models.

Cabling & Trunking Requirements

The table below shows the maximum cable distances allowed from INDeX DSLC cassettes to the MDF and to the INDeX Media Gateway module. If the cabling is already in place, check that it does not exceed those distances.

Check also that the correct types of cables and sockets have been used and that the site wiring is clearly labelled. All cables and wires should run through protective trunking or ducts wherever possible.

Table of Cable Distances.

Cabinet to :	Cable Type	Standard Cable Length	Maximum Length
To MDF	32 twisted-pair cable	3m	15m
MDF to:			
20 Series Terminal Socket	Type CW1308 (1 twisted pair)	–	1000m
Two-Wire Socket	Type CW1308 (1 twisted pair)	–	2400m
Mains	–	3m	3m
INDeX to:			
Media Gateway Module	Link Cable	1.7 or 2.9mtrs	
INDeX Media Gateway to:			
IP Office Module	Expansion Cable	1.0mtrs	

Note: It is recommended that the distance between the INDeX cabinet(s) and the INDeX Media Gateway modules is restricted to less than 2mts maximum. Similarly, that the maximum distance between the IP Office module and the INDeX Media Gateway is restricted to less than 1mtr.

IDC Cable Connection Requirements

The DSLC cassettes used in the INDeX connect to the MDF using an INDeX 32-pair cable. We strongly recommended that you provide IDC connection points for every cable pair even if the cassette does not require all 32 pairs. This allows for system expansion and maintenance with the minimum cable rewiring.

The INDeX 32-pair cable uses wires with a conductor diameter of 0.4mm (26 AWG).

- In excess of 100 re-terminations of the same wire diameter is possible provided that an approved IDC tool is always used.
- When new IDC connectors are used it is possible to terminate two wires of the same diameter in one contact, i.e. 2 x 0.4mm diameter wires.
- It is not acceptable to terminate two wires of different diameters in one contact. Once an INDeX 32-pair cable wire has been terminated (wires of 0.4mm diameter), a wire of greater diameter (e.g. 0.5mm) must not be terminated on top of it, even if only for test purposes. Such an action could result in poor contact of the smaller wire.
- Once a IDC connector has been terminated with a wire of diameter greater than 0.4mm it cannot be used for an INDeX 32-pair cable wire connection as this will result in poor contact.
- It is bad practice to use old IDC connectors unless you are certain that only 0.4mm diameter wires have previously been used in them.

INDeX Programming Connections

The INDeX supports programming connections through either serial ports or a 10/100 Base-T ethernet port connection.

Serial Connections

The INDeX supports programming via serial cable connections. This can be either a direct serial cable connection or a modem serial connection.

Ethernet Port Connections

The INDeX has a 10/100 Base-T ethernet port. This can be used to connect the INDeX to a LAN or directly to a PC network card for programming access.

IP Office Programming Connections

The IP Office supports programming through any one of it's 10/100 Base-T hub port connections. The tools required for programming of a newly installed IP Office system are:

- PC running Windows 98, NT, 2000, XP or ME (see page 6).
- PC with a LAN (NIC) card with either a fixed IP address (allocated by your system administrator) or by using DHCP to obtain an IP address.
- IP Office Cat. 5E patch cable (red – supplied with system see page 55).
- IP Office Administration CD (supplied with system).
- IP Office Manager Application Manual (supplied on CD with system).
- IP Office Feature Key (where software that requires a Licence Key is to be installed).

Note: Once installed, the software level of all software fitted to the IP Office system can be identified. With Manager running, use *File/Advanced/Upgrade* to display menu. Refer to the Manager Application Manual for details of system configuration, software upgrade, etc.

PC to IP Office LAN Port Connection

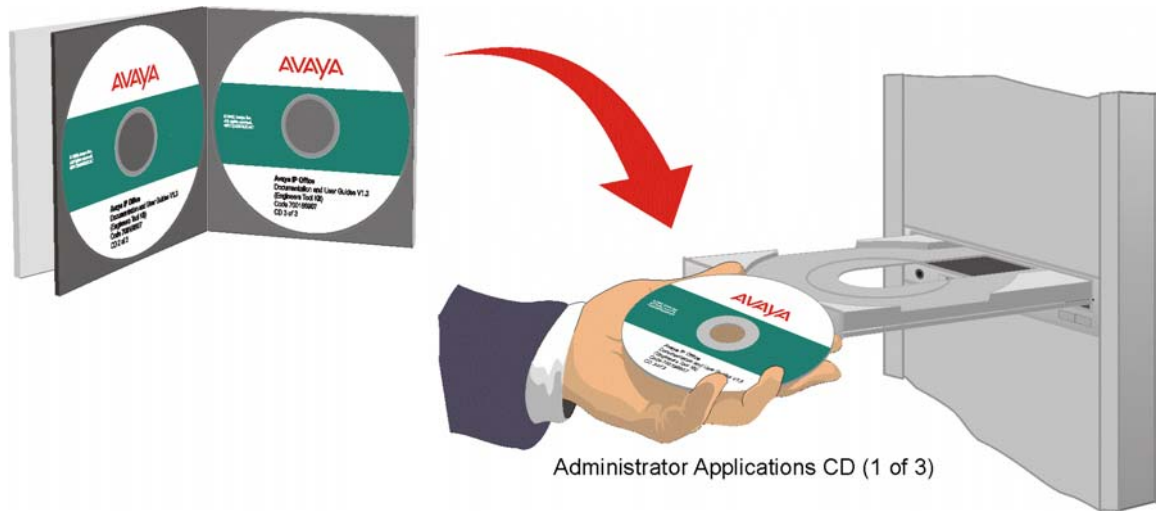
An IP Office system, when first powered up, will scan the LAN for a DHCP server that will allocate it with an IP address. If the IP Office system does not find a DHCP server then it will automatically become a DHCP server itself with an IP address of 192.168.42.1. The IP Office system will allocate an IP address to the PC if required. Initially, the IP Office system assumes that all addresses are on the local LAN and that the PC software supplied uses broadcast to establish communication with the IP Office system.

The IP Office hub port can be connected in two ways; either directly to a PC or as part of a LAN. Both methods use an IP Office Cat. 5E patch cable (see page 55) connected between one of the LAN hub ports on the front of the IP Office base unit and the PC.

- **Direct Connection:**
This method is used for local system programming directly from a PC.
- **LAN Network Connection:**
This is the option to use for remote programming access. It will require liaison with the LAN network manager to obtain the IP address details and to ensure that the IP traffic routing is allowed. When connected to an IP LAN network, you must consult with the Network Manager to obtain the required IP settings. For IP operation the IP Office requires a static IP address including a subnet mask and default gateway value

Installing the IP Office Administration Suite

All the software used to configure and manage the IP Office system must be installed on your PC from the supplied Administrator CD. With the initial assembly completed (see page 15) and your PC connected to the IP Office system, insert and run the Administrator (CD 1 of 3) to install Software Level 2.1+ on your PC.



1. The CD Autoruns. You are initially presented with the option to select which language you wish to use. Select the language from the pull down list and click **OK**.
2. If not already installed on your PC, you are then given the option to install the Microsoft Net 1.1 Framework application. Ignore this for INDeX Media Gateway. The *Welcome* screen is then displayed; click **Next** to continue.
3. The *Destination* folder location option menu is displayed. Either accept the default location (click on **Next**) of where the Administration Suite is to be installed or change the location by clicking on **Browse** and entering a new location. Make a note of this location as it is recommended that you use this later as the location of the Media Gateway IPOData.csv file (see page).
4. Select which components you wish to install by selecting the appropriate boxes (*Manager* and *Voice Mail* are default minimums) and click **Next**.
5. Name the program folder or accept the default (**IP Office**).
6. Click **Next** and wait for the Administration Suite installation to be completed.
7. Installation runs and on completion select **Restart now** and click **Finish** twice.

The IP Office Administration suite of applications is now installed on your PC and you are now ready to import the data from the INDeX before using the Manager application to import the INDeX data into the IP Office.

Converting the INDeX Database

The INDeX database needs to be downloaded. A data conversion tool is then used to extract the information, which can then be imported into the IP Office 406/412 platform.

Note: This data **must be** extracted from the INDeX and imported into the IP Office 406/412 platform **before** the INDeX system is dismantled.

Download INDeX Database

From the Database Management menu, download and save the INDeX Database.

Running the INDeX Media Gateway conversion file

The following data can be extracted from the INDeX database:

- Extension DN
- Extension Name
- Divert All
- Divert All Status
- Divert No Answer (duplicated for use by Divert Busy)
- Group DN
- Group Name
- Group Members
- Group Ring Mode

The data conversion tool is designed to work on specific versions of INDeX database. The different versions of the tool are supplied on the IP Office Administration CD in the directory 'MG Support'.

To extract the data:

1. Open a command prompt window.
2. Change to the drive or directory containing the conversion tool(s).
3. Enter the name of the tool appropriate for the database and the file name of the database to be converted i.e. enter **101X-MG <filename.db>**. to convert a database from an INDeX running 10.1 on a CPU-X.
4. If the database is the correct format you are presented with three menu options:
 1. Run Conversion for IP 406
 2. Run Conversion for IP 412
 3. Quit
5. Select the required option and key CR.
6. The programs runs. You will be asked for the destination folder. It is recommended that you use the *Destination* folder location used for the IP Office Administration suite (see page 12).
7. On completion you are presented with *Conversion for IP406/412 successful*. The *Destination* folder will now contain a file called *IPOData.csv*, which can now be loaded into your IP Office.

Import Database into IP Office

1. Using the IP Office Administration CD, install the IP Office Administration Suite on your PC (see page 12). Make a note of which directory the IP Office Admin suite is going to be installed in.
2. Using the Administration CD, run the conversion file mgcon.exe. This will create a file called IPOData.csv. This file should be stored in the directory containing the IP Office Admin suite as noted in step 4 above.
3. With the IP Office Manager, use **File | Open** to open the configuration file for the IP Office platform. Accept the default settings.
4. In Manager, select **File | Import/Export | Import as text**.
5. Open the directory where the file IPOData.csv is stored and select **Run**.
6. On completion, a message *Conversion for IP406/412 successful* is displayed.
7. From the Manager Configuration Tree items **Extension**, **User** and **Hunt Groups** you can check that the data from the INDeX has been imported.
8. To update the IP Office database, you **must save** the configuration. Click on the **File | Save** and follow the instructions.

The data retrieved from the INDeX has now been imported into the IP Office database and you are now ready to configure the IP Office system

Installing a New System

Unpacking

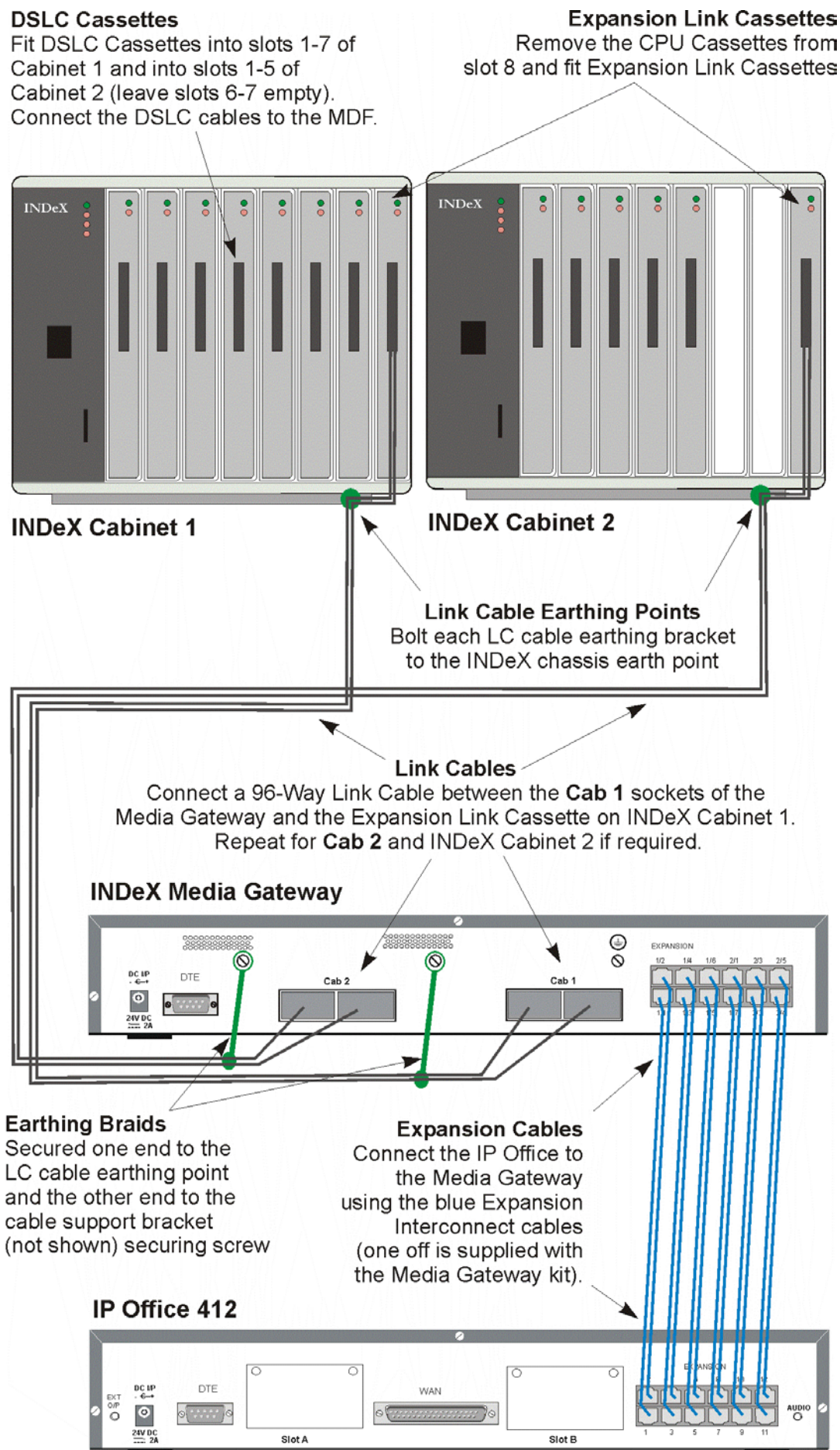
Before proceeding with installation, ensure that you have read the instructions in Preparing for Installation on page 6.

Unpacking and checking:

1. Before unpacking check for any signs of damage that has occurred during transit. If any damage exists bring it to the attention of the carrier.
2. Check all cartons against the packing slip and ensure that you have the correct item(s) as per the country variants (see page 43). Report any errors or omissions to the equipment supplier.
3. While unpacking the equipment, retain all the packaging material. Fault returns are accepted only if repackaged in the original packaging.
4. Visually inspect each item and check that all the necessary documentation and accessory items have been included. Report any errors or omissions to the dealer who supplied the equipment.
5. Ensure you read and understand any documentation included with any item.

An overview of the interconnections for an INDeX Media Gateway is shown on page 16.

Overview of INDeX Media Gateway Interconnections



INDeX Configuration

The following sequence is recommended for installing the INDeX Media Gateway into an existing INDeX system.

1. Note and record the extension numbering plan and extension cabling to the MDF of the existing INDeX system.
2. Make a note of the general programming details of the system.
3. Make sure that the INDeX database has been downloaded, see page 13.
4. Switch off and remove all power from the existing INDeX system.
5. Open the INDeX front cover(s) and remove all cassettes.
6. Insert the required number of DSLC cassettes (maximum of 12) starting from slot 1 of cabinet 1.
7. Connect the DSLC cassettes to the existing MDF using an INDeX 32 pair cable. Use the extension/cabling details recorded in step 1 of the installation.

CAUTION: INDeX Media Gateway only uses 30 channels per DSLC, hence the twisted pairs for channels 31 and 32 become spare.

Installing DSLC Cassettes

This section covers the installation of DSLC cassettes for 20 series terminals.

- a. Ensure that you have the correct cassette and a plan of which cassette goes in each slot. The cassette's label shows its capacity as **DSLcx** where **x** is the number of 20 series terminals supported.
- b. Remove the screw at the top of the slot to be used. Insert the new cassette.
- c. When power is restored, at the end of the installation process, check which lamps come on.
 - **Green On/Red Off:** Power supply to cassette okay.
 - **Green Off:** Swap cassette, if the problem persists, check the PSU/CPU.
 - **Red On:** Swap cassette, if the problem persists, check the PSU/CPU.
- d. Secure the cassette using its top tab (*using the screw previously removed*).
- e. Connect a 32-pair INDeX cable to the cassette. Attach the cable's P-clip to the appropriate point at the base of the cabinet for the cassette slot.
- f. Cable tie the cable to the front of the cassette.

DSL/C Cassette Cable Connections

The table below shows the connections from the DSL/C cassette to the MDF using an INDeX 32 pair cable (only 30 pairs used with INDeX Media Gateway). You **must earth** the cable screen at the MDF (see page 28). For the connection from the MDF, each channel requires a Slave Jack Socket (Type LJU 2/3A). The wire pairs connect to pins 3 & 4.

Ensure that the cable and wires are labelled at both ends.

<u>Channel</u>	<u>DSL/C-8</u>	<u>DSL/C-16</u>	<u>DSL/C-24</u>	<u>DSL/C-32</u>	<u>Wrap</u>	<u>Speech & Data</u>	<u>Speech & Data</u>
Channel 1	DSL/C	DSL/C	DSL/C	DSL/C	Orange	White/Blue	Blue/White
Channel 2	DSL/C	DSL/C	DSL/C	DSL/C	Orange	White/Orange	Orange/White
Channel 3	DSL/C	DSL/C	DSL/C	DSL/C	Orange	White/Green	Green/White
Channel 4	DSL/C	DSL/C	DSL/C	DSL/C	Orange	White/Brown	Brown/White
Channel 5	DSL/C	DSL/C	DSL/C	DSL/C	Orange	White/Slate	Slate/White
Channel 6	DSL/C	DSL/C	DSL/C	DSL/C	Orange	Red/Blue	Blue/Red
Channel 7	DSL/C	DSL/C	DSL/C	DSL/C	Orange	Red/Orange	Orange/Red
Channel 8	DSL/C	DSL/C	DSL/C	DSL/C	Orange	Red/Green	Green/Red
Channel 9	–	DSL/C	DSL/C	DSL/C	Orange	Red/Brown	Brown/Red
Channel 10	–	DSL/C	DSL/C	DSL/C	Orange	Red/Slate	Slate/Red
Channel 11	–	DSL/C	DSL/C	DSL/C	Green	Black/Blue	Blue/Black
Channel 12	–	DSL/C	DSL/C	DSL/C	Green	Black/Orange	Orange/Black
Channel 13	–	DSL/C	DSL/C	DSL/C	Green	Black/Green	Green/Black
Channel 14	–	DSL/C	DSL/C	DSL/C	Green	Black/Brown	Brown/Black
Channel 15	–	DSL/C	DSL/C	DSL/C	Green	Black/Slate	Slate/Black
Channel 16	–	DSL/C	DSL/C	DSL/C	Green	Yellow/Blue	Blue/Yellow
Channel 17	–	–	DSL/C	DSL/C	Green	Yellow/Orange	Orange/Yellow
Channel 18	–	–	DSL/C	DSL/C	Green	Yellow/Green	Green/Yellow
Channel 19	–	–	DSL/C	DSL/C	Green	Yellow/Brown	Brown/Yellow
Channel 20	–	–	DSL/C	DSL/C	Green	Yellow/Slate	Slate/Yellow
Channel 21	–	–	DSL/C	DSL/C	Brown	White/Blue	Blue/White
Channel 22	–	–	DSL/C	DSL/C	Brown	White/Orange	Orange/White
Channel 23	–	–	DSL/C	DSL/C	Brown	White/Green	Green/White
Channel 24	–	–	DSL/C	DSL/C	Brown	White/Brown	Brown/White
Channel 25	–	–	–	DSL/C	Brown	White/Slate	Slate/White
Channel 26	–	–	–	DSL/C	Brown	Red/Blue	Blue/Red
Channel 27	–	–	–	DSL/C	Brown	Red/Orange	Orange/Red
Channel 28	–	–	–	DSL/C	Brown	Red/Green	Green/Red
Channel 29	–	–	–	DSL/C	Brown	Red/Brown	Brown/Red
Channel 30	–	–	–	DSL/C	Brown	Red/Slate	Slate/Red
Channel 31	Spare – not used with INDeX Media Gateway					Black/Blue	Blue/Black
Channel 32	Spare – not used with INDeX Media Gateway					Black/Orange	Orange/Black

Installing the Expansion Link.

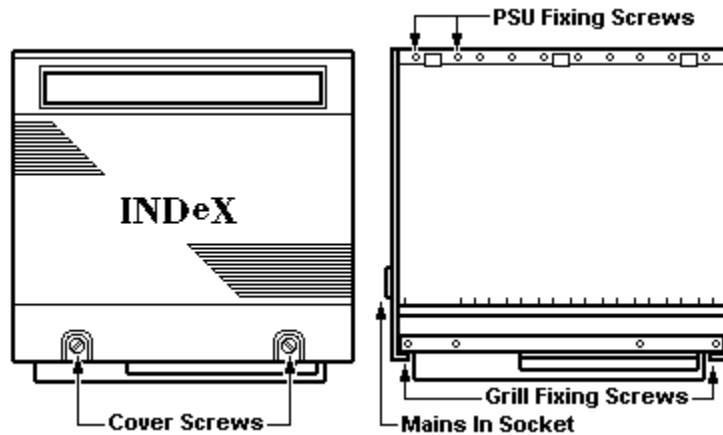
1. Insert an Expansion Link Cassette into each slot 8 of the INDeX cabinets and connect to the INDeX Media Gateway module.
 - a. Remove the screw at the top of the right-most slot of the cabinet (slot 8) labelled **ELC** or **CPU Only**.
 - b. If not already done so, remove the CPU-X cassette and insert the Expansion Link cassette into that slot (slot 8).
 - c. Secure the cassette (*using the screw previously removed*) through its top tab.
 - d. Plug in the Link Cassette cable(s) from the INDeX Media Gateway module. Use **CAB1** socket for the first INDeX cabinet and **CAB2** for the second cabinet. Link Cable(s). Cable lengths are 2.9mtrs (38YCN00001SEC) or 1.7mtrs (38YCN00001SEK). The earth braids (two off) for connection to the INDeX Media Gateway are supplied with the module.
 - e. Cable tie the cable to the front of the Link Expansion cassette.
 - f. Connect the Link Cable earthing clamp to the rear base of the cabinet slot labelled "**ELC/LC**".
 - g. When power is restored, at the end of the installation process, check which cassette lamps come on.
 - **Green On/Red Off:** Power supply to cassette okay.
 - **Green Off:** Swap cassette, if the problem persists, check the PSU/CPU.
 - **Red On:** It is normal for ELC Cassettes to display a red lamp until another cassette is installed in the Expansion Cabinet. If after this the lamp stays on, swap cassette, if the problem persists, check the PSU/CPU.
 - h. Repeat for any other cabinets in the system.

Complete INDeX Configuration.

1. Close off the INDeX cabinets.
2. Mount the INDeX Media Gateway and the IP Office modules in their final location.
3. Connect the Expansion Link Cassette(s) to the INDeX Media Gateway using Link Cable(s). Ensure that the Link Cables are connected to **both** the INDeX cabinet earth and the INDeX Media Gateway earth points. Refer to page 28 for details.
4. For the IP Office modules, ensure that the require trunk interfaces and the optional integral modules have been fitted.
5. Connect the IP Office module Expansion Ports to the INDeX Media Gateway Expansion ports. Where IP Office Expansion modules are to be used, also connect the IP Office module Expansion Ports to these Expansion modules.
6. Proceed with initial programming of the INDeX Media Gateway (see page 26).

Closing Off the INDeX Cabinet(s)

You must follow the steps below in order to maintain the EMC compliance of the INDeX system.



To close off a cabinet :

- a. Ensure that each cassette displays just the single green lamp.
- b. Check that each cable to the cassettes is clearly labelled and identified.
- c. Slide the cabinet grille plate back into the base of the cabinet. Ensure that the cables all exit the cabinet through the proper cable exit points.
- d. Secure the grille plate using the 2 screws previously removed at the start of installation.
- e. Adjust the cable clamp provided at the cable exit point.
- f. Hook the front cover back onto the cabinet and secure the two captive cover screws.
- g. Check that none of the cabinet ventilation grills have been blocked.

IP Office Installation

Prior to initial assembly and mounting (rack or free standing) of your INDeX Media Gateway and IP Office modules, check that the following **has been** performed:

- The required IP Office Trunk Interface Modules have been installed (see pages 34, 37 and 22), are of the correct country variant type (see page 44) and if functional grounding is required (see page 29) that it has been fitted.
- Any optional IP Office Integral Voice Compression and/or Dual Modem Modules have been fitted (see pages 23 and 24 respectively).
- Where rack mounting is required, that the mounting brackets have been fitted (see page 25).
- The Link Cable(s) between the INDeX Expansion Link Cassette(s) and the INDeX Media Gateway **CAB** socket(s) are earthed at **both** ends (see page 28).
- That the DSLC INDeX cables have been connect to the MDF (see page 18).
- For IP Office Analogue Trunk 16 expansion modules, ensure that the protective ground is fitted (see pages 42 and 29).
- Where structured cabling is to be used it has been installed, conforms to all local regulations and is clearly labelled.

Perform the following:

1. Mount the INDeX Media Gateway and the IP Office modules in their final location (free standing units are ideally stacked one upon another).
2. Run the individual Lump-in-Line PSU cables back to the switchable mains supply but **do not switch-on or connect** the PSUs to the IP Office modules.
3. With the exception of a WAN3 module, connect the IP Office base module to the Expansion Modules using the 1mtr Expansion Interconnect Cables (blue - see page 59). These cables run from one of the Expansion Ports on the rear of a base module to the Expansion Port on the rear of the Expansion Modules. For WAN3 Modules, use a LAN Interconnect cable (see page 56) running between one of the LAN Ports on the front of a base unit to the LAN Port on the front of the WAN3 module.
4. Connect the Trunk Ports on the IP Office base module, using PRI/BRI CAT5E cables (see page 55), to your provider's trunk sockets.
5. Connect any DT/POT Ports on the front of the IP Office units, using DT Line Cords (see page 54), to the structured cable sockets. Note that in default, the lowest port number corresponds to the lowest extension number (201).
6. Connect your PC LAN Port to one of the LAN Ports on the front of an IP Office base module using a LAN Cable (see page 57).
7. Connect the individual Lump-in-Line PSU to each IP Office module*. Switch on the INDeX Cabinet(s) first, then the INDeX Media Gateway module, then the IP Office Expansion modules and finally the IP Office 406/412
Caution: This sequence **must be followed**. If the IP Office base module does not detect an item at power on, it will never use it. If power is switched on from a central point for all modules, then, as the main unit is the slowest to start, this will be taken care of automatically. A hot-plug ability is not available with INDeX Media Gateway.
8. From the Administrator CD, install on your PC the software required to configure and manage your Avaya IP Office. The IP Office System needs to be programmed, refer to page 26.

Installation of Integral Modules

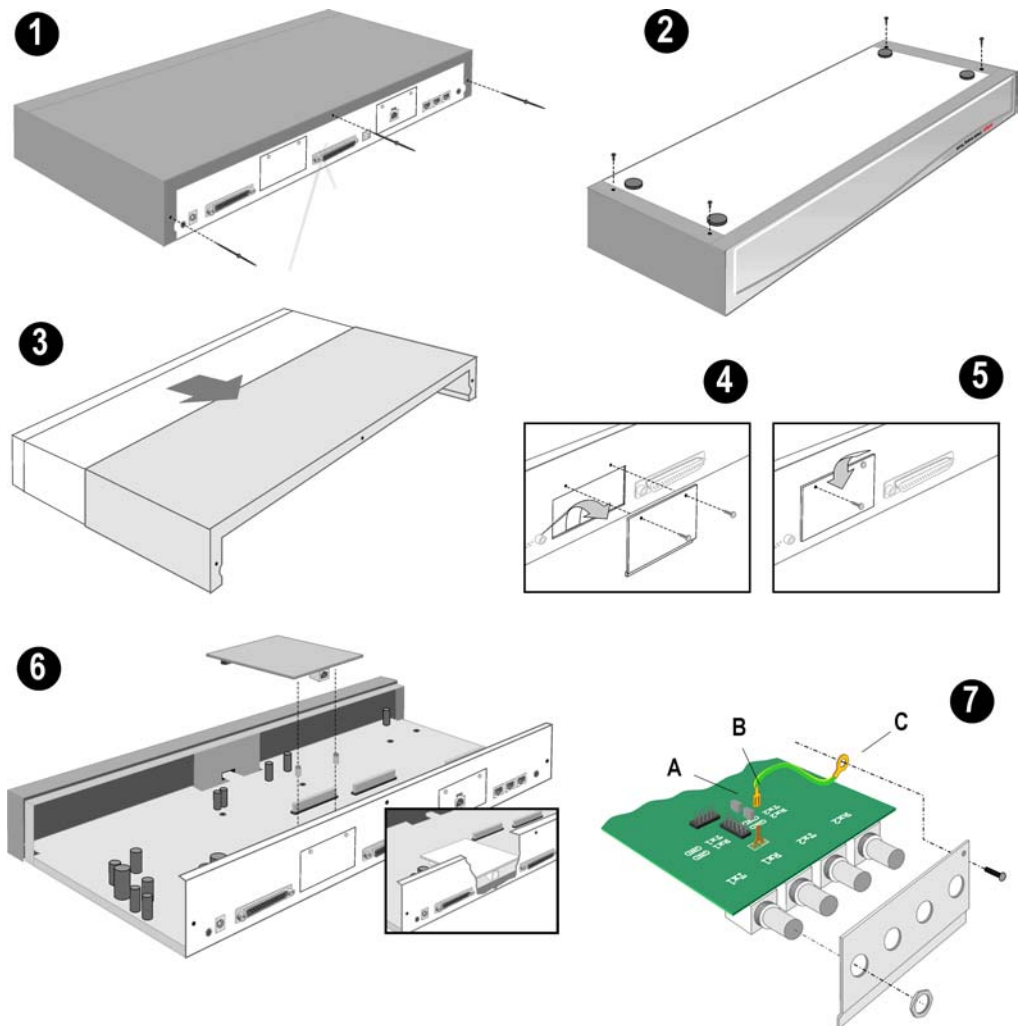
To install an integral module in an IP Office system, follow the pictorial instructions given below:

Trunk Interface Modules (BRI/PRI/ANALOGUE4)

For IP406 see page 34 and for IP412 see page 37.

Procedure

1. Remove the three fixing screws on the rear of cover.
2. Turn the unit over and remove the four fixing screws from the base.
3. Slide the cover from the unit.
4. Remove the two blanking plate securing screws and remove blanking plate.
5. Insert the trunk module and secure with the two screws.
6. Mount the trunk module in position as shown below and secure with the two snap-in spacers (except for PRI E1/R2).
7. For CALA only: On the PRI E1/R2 coaxial module, use the shorting blocks (A) to connect Rx1 to GND, Tx1 to GND and/or Rx2 to GND, Tx2 to GND as required. Connect the earthing strap spade end (B) to the spade connection on the board and the other end (C) to the chassis with the long securing screw (both of which are supplied with the kit).
8. Where required, fit the functional ground (see page 29).
9. Replace cover and secure with the seven fixing screws.



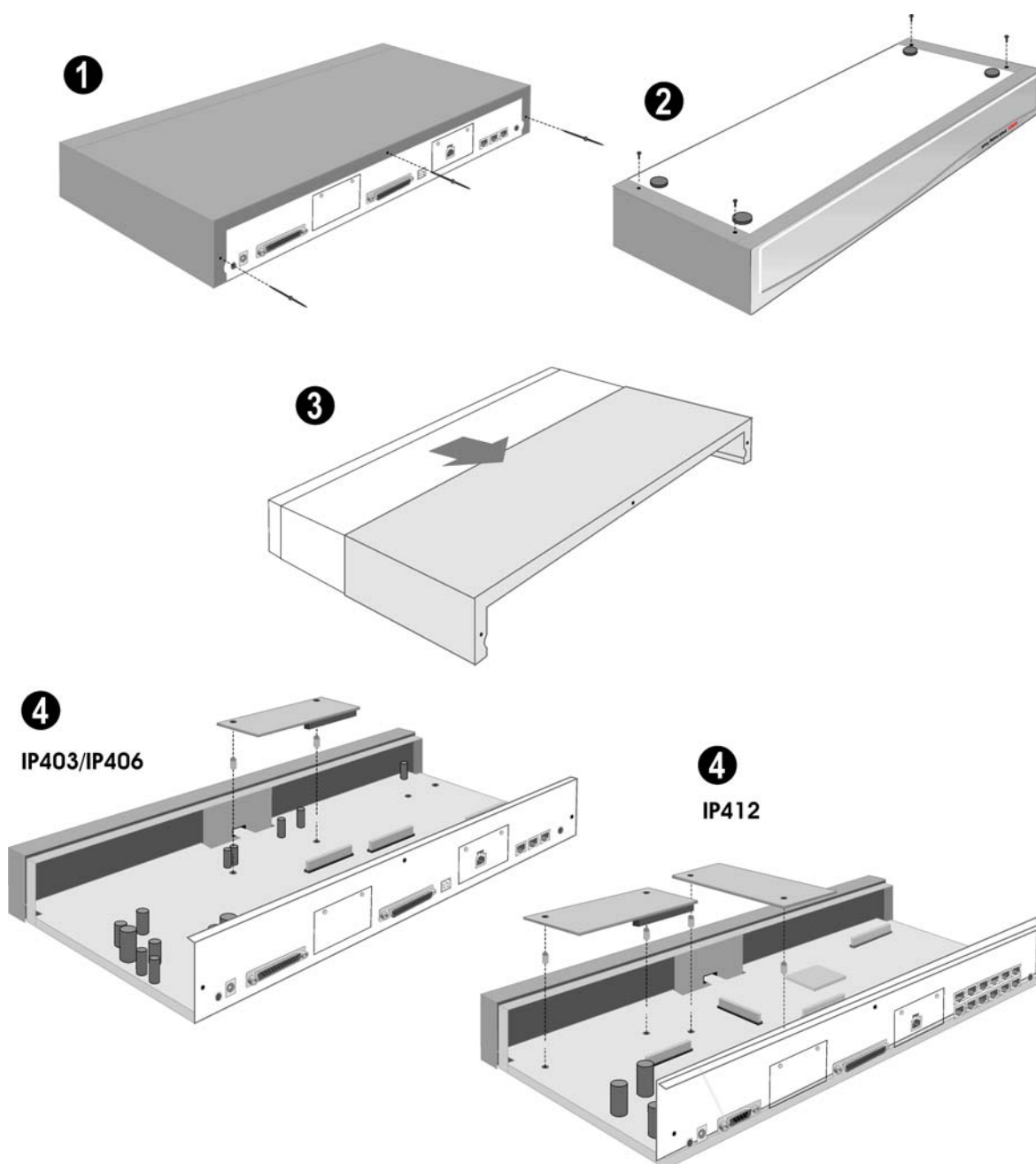
CAUTION: While installing, ensure that you wear a ground wrist strap that is connected to a suitable grounding point.

Installation of Voice Compression Modules (VCM)

Optional Voice Compression Modules (only one for IP 403/IP406 module and a max. of two for IP412, see pages 32 and 35 respectively) are fitted to an IP Office base unit as follows:

Procedure

1. Remove the three fixing screws on the rear of cover.
2. Turn the unit over and remove the four fixing screws from the base.
3. Slide the cover from the unit.
4. Mount the VCM in position as shown below and secure with the two snap-in spacers.
Only an IP412 Office can accommodate a second VCM (of any type); the first module can be mounted in either position.
5. Replace the cover and secure with the seven fixing screws.



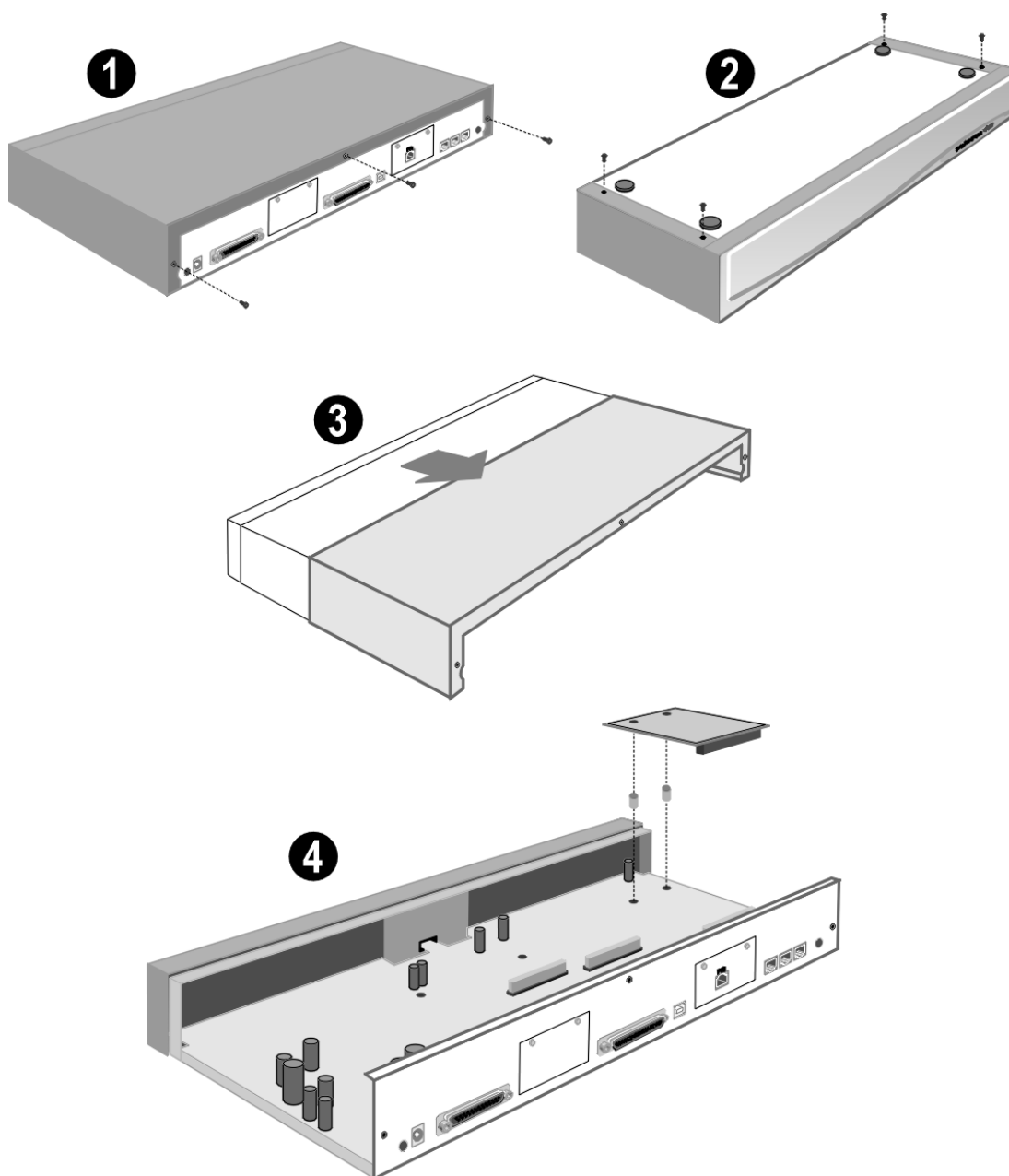
CAUTION: While installing, ensure that you wear a ground wrist strap that is connected to a suitable grounding point.

Dual Modem Module

An optional Dual Modem Module (see pages 32 and 35) is fitted to an IP Office base unit as follows:

Procedure

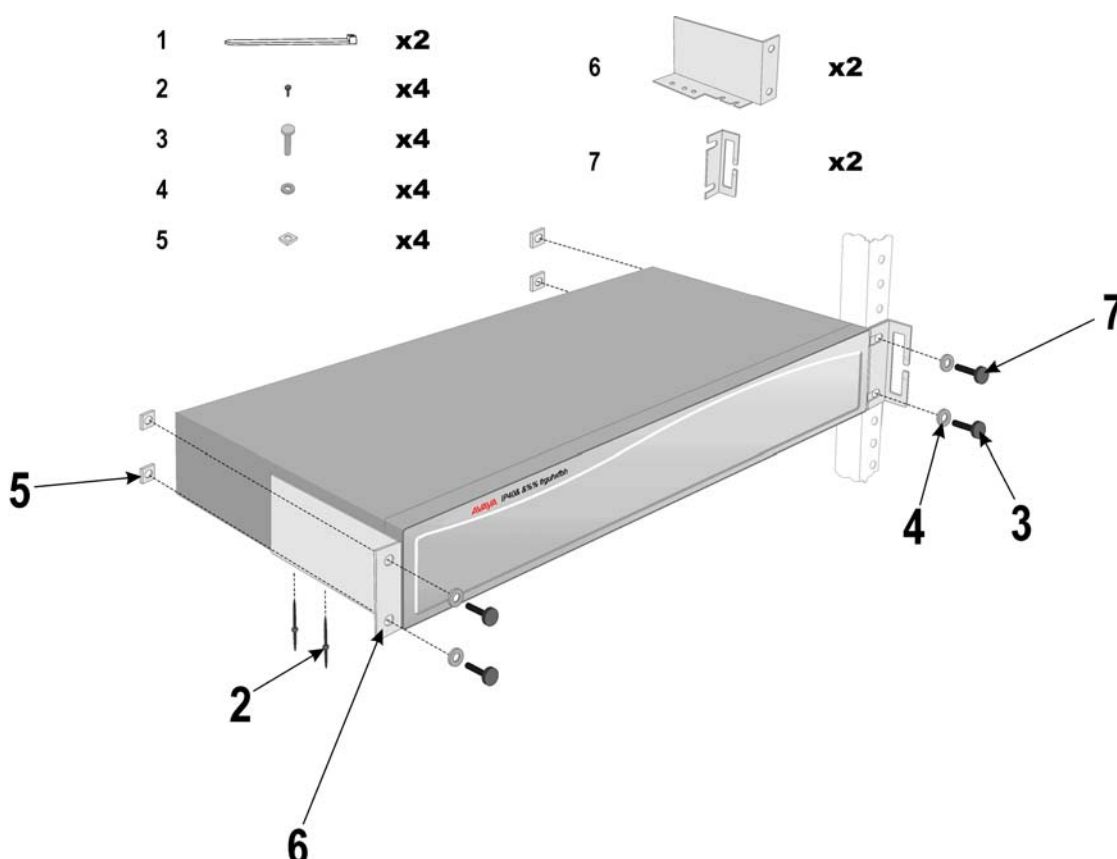
1. Remove the three fixing screws on the rear of cover.
2. Turn the unit over and remove the four fixing screws from the base.
3. Slide the cover from the unit.
4. Mount the module in position as shown below and secure with the two snap-in spacers.
5. Replace the cover and secure with the seven fixing screws.



CAUTION: While installing, ensure that you wear a ground wrist strap that is connected to a suitable grounding point.

Rack Mounting Assembly Instructions

INDeX Media Gateway, IP406, IP412 and IP Expansion modules can be mounted in any standard 19" rack as follows:



CAUTIONS: Elevated Operating Ambient Temperature:

If installed in a closed or multi-unit rack assemble, the operating ambient temperature of the rack environment may be greater than the room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (T_{mra}).

Reduced Air Flow:

Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

Mechanical Loading:

Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

Circuit Overloading:

Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits might have on over current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Reliable Grounding:

Reliable grounding of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips). See page 29.

IP Office System Programming

Introduction

This section covers only the most basic aspects of system programming required to install an IP Office system. When first powered up, all IP Office systems will operate as a simple PBX. However, full system programming is highly dependent on customer requirements. The Administration CD (supplied with each system) contains the suite of programs required to install and maintain the IP Office system. These should have been loaded earlier (see page 12). Once loaded, interactive *Help* files provide all the instructions and details required to operate and administer the program suite.

On completion of the mechanical installation of the Media Gateway components (see page 15) and INDeX to IP Office data transfer (see page 13) refer to the IP Office Manager application manual, or use the Help files, to configure your new IP Office system.

- Notes:**
1. When applying power to the IP Office system, the INDeX Media Gateway and the Expansion Modules **must be** switched on **first**. If the main IP Office Module does not detect an item at power on it will never use it. If power is switched on from a central point for all modules, then, as the IP Office 406/412 unit is the slowest to start, this will be taken care of automatically.
 2. When powered up correctly, all modules will display a steady green light in the centre of each module. When connection is established with ports, the port socket on the appropriate module will show a green LED, e.g. the hub port connected to your PC for programming. IP Office systems are ready for use within 1 minute of power on.

CAUTION: There is limited hot maintenance available with INDeX Media Gateway i.e. a cassette may be swapped like for like without powering down the system. It is not possible to add DSLC's or change the size of an existing DSLC with the system running.
If Media Gateway is switched off, a blue cable/link cassette cable is removed or if the IP406/412 is switched off then the whole system has to be power cycled and switched back on using the sequence, INDeX cabinets first, then Media Gateway, then Expansion units with the IP406/412 last.

System Handover

Checklist

Equipment:

- Have all extensions been tested?
- Have all exchange lines been tested?
- Have all private wires been tested?
- If fitted has the modem/Reporter been tested?
- Is system programming in line with the customer specification?
- Have system backup disks been made and left on site?
- Has the customer been made aware of the drop back (power fail) locations?
Are those clearly marked and have they been tested?
- Has the mains supply (and any UPS if fitted) been tested?
- Have any peripheral systems been tested (e.g. CCC, Voice Mail, etc)?

Wiring:

- Is the distribution wiring satisfactory to the required national standards?
- Are all wires and cables clearly labelled.
- Is the site clean and tidy with all rubbish removed?

Documentation:

- Have the system documents, TJF records and floor plans been completed?

Information:

- Have the handset user guides been issued to the user.
- Has the customer been made aware of the telephone number for maintenance/fault reports.

Reference Section

EMC & Earthing Requirements

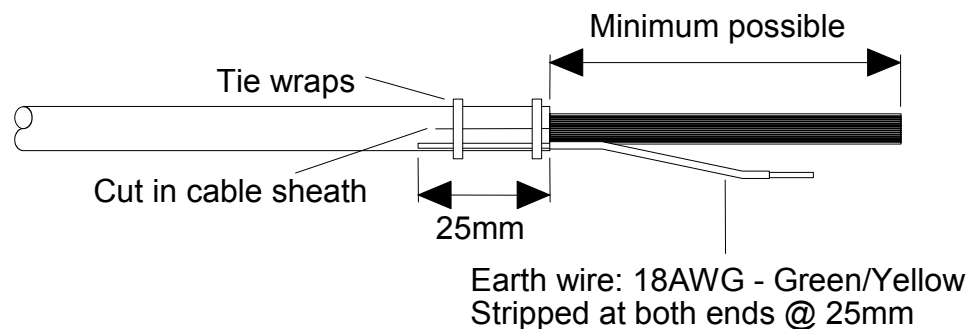
The INDeX Media Gateway is EMC approved and carries CE mark approval. For an installation to be EMC compliant, it must meet the following requirements at all times:

7. Only EMC approved equipment must be used.
8. You must install all cabinets with their base grilles and front covers in place.
9. You must only use EMC INDeX Cassette cables (i.e. cables in which the sheath includes a braid and foil barrier).
10. Where provided all cables exiting a cabinet must use their P-clip for earthing.
11. The mains supply must provide an earth connection.

Cable Earthing

The INDeX DSLC cables must be earthed at the MDF using one of the following methods. In all cases, you must keep the amount of sheathing removed from the cable to a minimum.

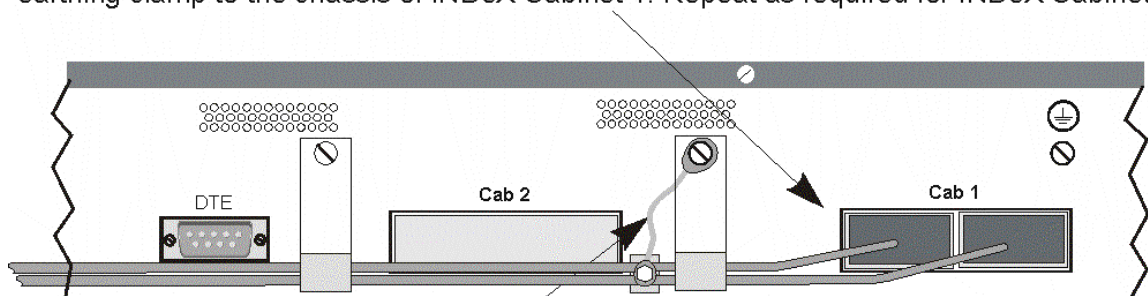
12. A P-clip earth connection if provided.
13. Adding an earth lead to the cable end (see the diagram below).



The INDeX Link Cable(s), from the INDeX Media Gateway module to the INDeX cabinet(s), must be earthed at both ends. Earth point clamping points are provided on the Link Cables. Connect one end directly to the INDeX cabinet and, using the earth braid supplied with the Link Cables, connect the other end to the top securing screw of the Media Gateway Link Cable support bracket.

Link Cassette Cable

Connect one end to the **CAB1** sockets and the other end to the Expansion Link Cassette of INDeX Cabinet 1. At INDeX Cabinet 1, secure the Link Cassette Cable earthing clamp to the chassis of INDeX Cabinet 1. Repeat as required for INDeX Cabinet 2.



Earthing Braid

Secure one end to the support bracket securing screw and the other end to the Link Cassette Cable earthing clamp.

Grounding

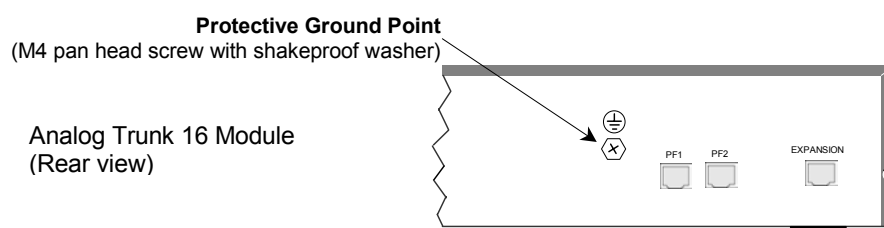
Provision is made for both protective ground (earthing) and functional ground (earthing) of IP Office analogue trunk modules. In addition, where the installation of telephone and/or other standard (tip/ring) devices in another building is required, In-Range-Out-Of-Building (IROB) protectors must be fitted (see page 30).

Protective Ground

A protective ground **must be permanently** fitted to IP400 Analogue Trunk 16 modules (see page 42). Connection of this protective ground requires the use of suitable tools and **must be** connected at **both ends** before connection is made to the telecommunications network.

To connect the protective ground:

1. Attached one end of a #14 AWG (minimum) solid insulated cable (sleeve **must be** green/yellow) to the Protective Ground Point as shown below. Ensure that the Ground Post securing screw is fully tightened.



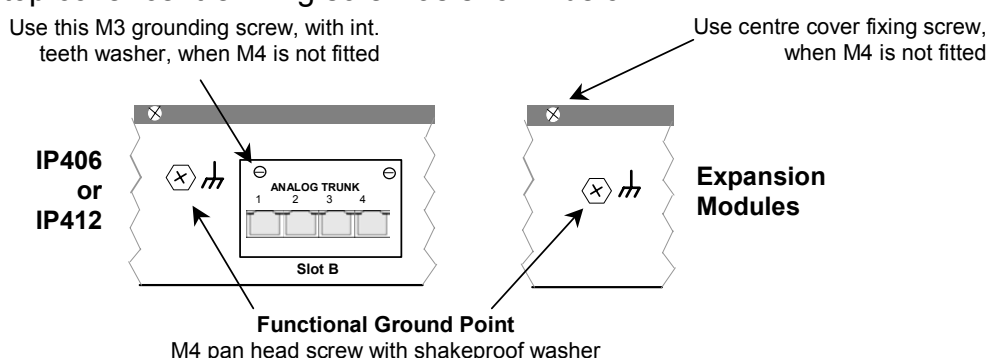
2. Connect, using a fastening that satisfies local regulations, the other end of the wire to the approved protective ground.

Functional Ground

To ensure proper operation of the IP Office equipment, functional grounding is required:

Caution: This functional ground is **not** a protective ground – see above for **protective** grounding.

On some models of the units/expansion modules, there may not be a specific M4 functional ground point. In which case use either the Trunk module kit fixing screw or the top cover centre fixing screw as shown below:



To connect the functional ground:

1. Attached one end of a #14 AWG (minimum) solid insulated cable (sleeve **must not be** green/yellow) to the grounding screw and fully tightened.
2. Connect, using a fastening that satisfies local regulations, the other end of the wire to the approved ground, such as building steel or an earthed metal cold water pipe.

Out of Building Telephone Installations

Installation of telephone and/or other standard (tip/ring) devices that are external to the building housing the Avaya IP Office or in another building require In-Range-Out-Of-Building (IROB) protectors to protect the control unit and device from electrical surges. These must be fitted as follows:

System telephone : two IROB protectors

Standard telephone : two IROB protectors plus one carbon block protector.

Primary protection **must be** provided at the point where the cable enters the building. This should be three point protection (tip, ring and ground). Typically this would be gas tube protection provided by the local telephone company. The ground wire must be thick enough to handle all the lines being affected by indirect strike at the same time.

CAUTION: All cabling between buildings **must not be** exposed. E.g. cabling between buildings **must be** carried in suitably earthed ducting; ideally underground.

Three versions of IROBs are available as follows :

146C - Trunks - SAP code 407228923

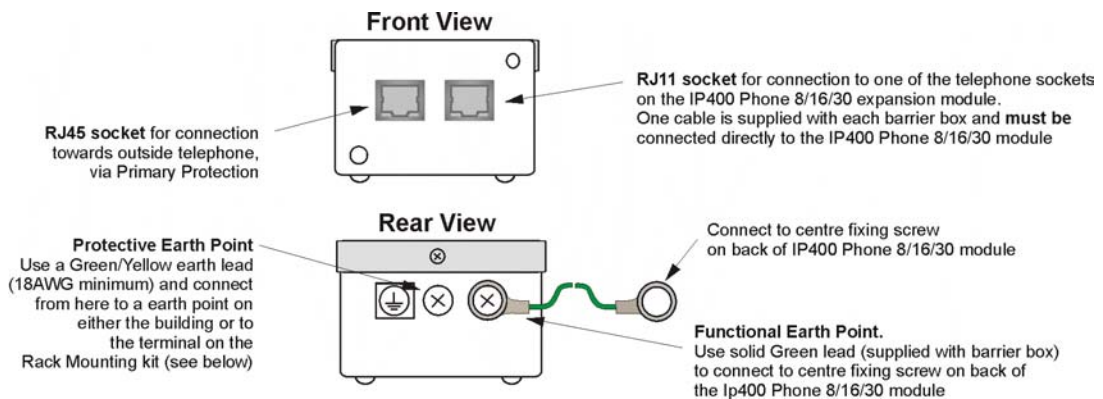
146E - TDL - SAP code 407568161

IP400 Phone Barrier Box - SAP code 700293897

Installation of a Contact Closure Adjunct controlled device outside the building requires a 146G Surge Protector – SCL/8 to protect the control unit from electrical surges. Install the 146C and 146E IROBs as per the instructions supplied with the IROBs.

Avaya IP400 Phone Barrier Boxes must only be used in conjunction with UL Listed Avaya IP400 Phone 8/16/30 modules.

Where more than three Avaya IP400 Phone Barrier boxes are to be used they **must be** rack mounted (see page 31). For non-rack mounting of the Avaya IP400 Phone Barrier Box, proceed as follows:



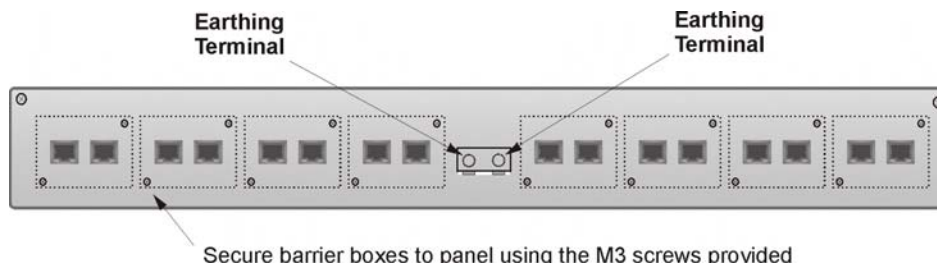
- Notes:**
- The following wires **must be** kept apart, e.g. not routed in the same bundle:
 - Earth lead from the barrier box to the IP400 Phone 8/16/30.
 - Internal wires, e.g. wires going directly to the IP400 Phone 8/16/30.
 - Wires from external telephone going directly to the barrier box(es).
 - The Avaya IP400 Phone Barrier Box will not connect the ringing capacitor in the UK, hence a Master socket is required.

- CAUTIONS:**
- The analogue ports on the front of the IP403 **must not be used** for lines external to the building.
 - The Avaya IP400 Phone Barrier Box **must not be** connected to the analogue trunk lines

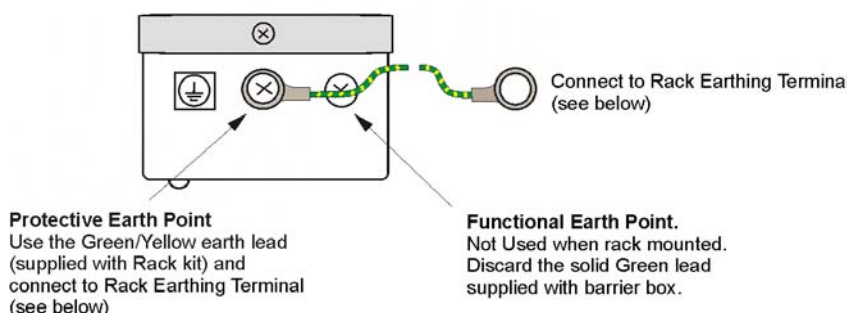
Rack Mounting Barrier Boxes

Where more than three Avaya IP400 Phone Barrier Boxes are to be used they **must be** rack mounted. Rack mounting kits are available (SAP Code 700293905) for mounting eight Avaya IP400 Phone Barrier Boxes. A maximum of 16 Avaya IP400 Phone Barrier Boxes (using two Rack kits) can be connected to one IP400 Phone 30 module. To rack mount up to eight Avaya IP400 Phone Barrier Boxes into a rack, perform the following:

1. Mount the Barrier boxes in the rack as shown below.



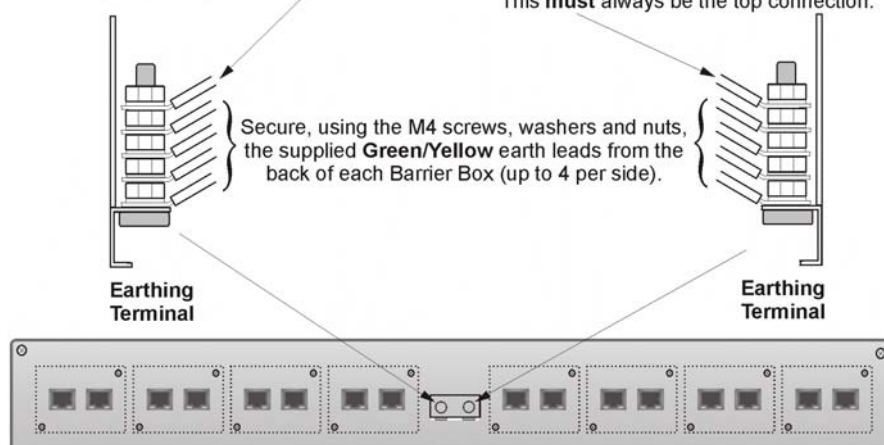
2. For each Barrier Box, discard the solid green earth wire and connect the green/yellow earth wire to the Protective Earth Point on the back of the Barrier Box.



3. Connect the earth leads as follows:

Secure, using the M4 screws, washers and nuts, a **Green/Yellow** earth lead (#14AWG minimum) from the here to a suitable Earth Protection point. This **must** always be the top connection.

Secure, using the M4 screws, washers and nuts, a solid **Green** earth lead (#14AWG minimum) from here to the centre case fixing screw on the back of the IP400 Phone 8/16/30. This **must** always be the top connection.



- Notes:**
1. The following wires **must be** kept apart, e.g. not routed in the same bundle:
 - Earth lead from the barrier box to the IP400 Phone 8/16/32.
 - Internal wires, e.g. wires going directly to the IP400 Phone 8/16/32.
 - Wires from external telephone going directly to the barrier box(es).
 2. The Avaya IP400 Phone Barrier Box will not connect the ringing capacitor in the UK, hence a Master socket is required.

IP406 Office Platform

General

The IP406 Office base unit supports up to 180 extensions by using a combination of INDeX DSLCs (via the Media Gateway) or IP Expansion modules. Connection to trunks is via any two of the following integral interface modules as follows:-

- Single PRI E1/PRI E1-R2 (30 trunks) or
- Quad BRI (8 trunks) or
- Analogue 4 (loop start).

An eight port auto-negotiating 10/100 BaseT LAN hub provides access to networks and/or up to eight IP telephones.

(Where IP telephones are to be used a suitable LAN switch with QoS capabilities, should be used).

Expansion Modules

In combination with the INDeX DSLCs, the optional **Expansion Modules** (see page 38) allow the IP406 Office to be expanded to 180 extensions. These modules are connected via the Expansion Port sockets that are located on the back of each unit with the exception of the IP400 WAN3 where the expansion modules are connected via one of the LAN Ports located in the front of each unit..

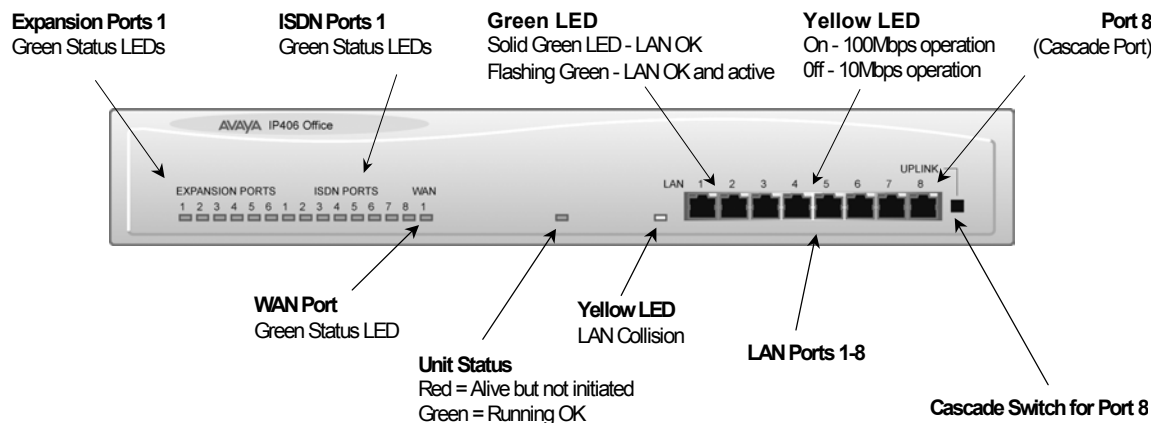
Note: As both the INDeX Media Gateway and the IP Office Expansion Modules share the same Expansion ports on the rear of the IP Office, then, for each IP Expansion Module used, one less DSLC can be used.

Integral Modules (Optional)

In addition the IP406 Office can be fitted with either or both of the following optional Integral Modules (see pages 23 and 24):

- **Voice Compression Module (VCM)**
Supports VoIP applications including trunking and support for IP telephones. Available in 5, 10 and 20 channel variants.
- **Dual Modem Module**
Allows termination of two simultaneous analogue modem calls up to and including 56kbps.

IP406 Office - Front View



Port connections

- **LAN Ports**

The eight auto-negotiating 10/100 BaseT LAN hub ports are used for PC and server connectivity. They can also be used to connect to the optional IP400 WAN3 Expansion Module (see page 41) and IP telephones.

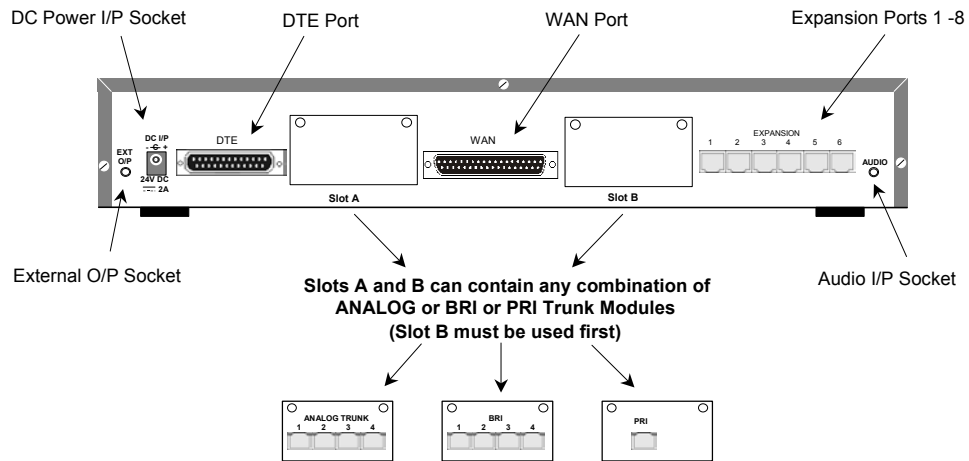
LAN ports allow information relating to incoming and outgoing telephone calls to be forwarded to PC based applications. They also provide access to the router functionality/configuration of the IP406 Office platform for both data and Voice over IP (VoIP) calls. (Where IP telephony is required, the hub must be connected to a suitable LAN switch with QoS capabilities.) This eight port auto-negotiating 10/100 BaseT LAN hub supports a single MAC address only (printed on the base of the module).

Where more than eight LAN connections are required, the eighth LAN port can be used for cascading to other hubs. The Cascade pushbutton to the right of this port is used to set the mode. When the Cascade switch is in the out position the port can be connected to another hub without the need for a crossover cable, i.e. the port is an MDI type port. When the Cascade switch is in the in position the port can be connected directly to a PC.

Cables

IP406 Office PRI 30 E1 modules are supplied with one red CAT5E cable. IP406 Office Analogue 4 is supplied with four red CAT5E cables. IP406 Office BRI 16 is supplied with eight red CAT5E cables. For Port Pinouts and Cables, refer to pages 49 and 53 respectively.

IP406 Office - Rear View



Port connections

- **External O/P Socket:** Two relay ports that allow externally powered circuits to be controlled via a single 3.5mm stereo jack socket.
- **DC Power I/P Socket:** Socket for the external 24V DC unregulated power supply (supplied with kit).
- **DTE Port:** A 25-way D-type socket. Used for connection to PCs, servers and EFTPOS terminals.
- **BRI/PRI/ALOG Ports:** The trunk interface modules are fitted into either Slots A or B and can consist of any combination of:
 - Quad Analogue - 4 trunks (see page 29 for grounding)
 - PRI E1/PRI E1-R2: 30 trunks
 - Quad BRI: 8 trunks.

See page 22 for installation, page 43 for country specific variants and page 29 for grounding.

WAN Port: This port supports a single synchronous data connection, which can be X.21, V.35 or V.24. The selection of the required interface is automatically determined from the pin-out of the cable plugged into the 'WAN' port. This cable **must be** connected before power is applied for auto detection to work. Connection to a Digital Leased Circuit is made by connecting the WAN port on the rear of the unit to the existing Network Terminating Unit (NTU) via the appropriate X.21, V.35 or V.24 cable.

See pages 60, 61 and 62 for cable details and page 52 for port details. *These interfaces are identical to those on the WAN3 Extension Module (see page 41).*

- **Expansion Ports 1-6:** Used to provide access to either the optional **Expansion Modules** (see page 32) or the **INDeX Media Gateway** (see page 4), which allows the IP406 Office to be expanded to 180 DT extensions.
- **Audio I/P Socket:** A single 3.5mm stereo or mono jack socket that enables input from an external 'Music-on-Hold' source.

Port Pinouts and Cables

For Port Pinouts and Cables, refer to pages 49 and 53 respectively.

Functional Earth

For Functional Earth connections see page 29.

IP412 Office Platform

General

The IP412 Office base unit supports up to 360 extensions by using a combination of INDeX DSLCs (via the Media Gateway) or IP Expansion modules. Connection to trunks is via any two of the following integral interface modules as follows:-

- Single or Dual PRI E1/PRIE1-R2 (30 or 60 trunks respectively)
- Quad BRI (8 trunks)
- Analogue 4 (4 loop start trunks)

Dual independent auto-negotiating 10/100 BaseT Ethernet ports provide segmented access (allows a firewall break to be used) to the LAN.

(Where IP telephones are to be used a suitable LAN switch with QoS capabilities, must be used.)

Expansion Modules

In combination with the INDeX DSLCs, the optional **Expansion Modules** (see page 38) allow the IP412 Office to be expanded to 360 extensions. These modules (with the exception of the WAN3 – see below) are connected via the Expansion Port sockets that are located on the back of each unit.

Note: As both the INDeX Media Gateway and the IP Office Expansion Modules share the same Expansion ports on the rear of the IP Office, then, for each IP Expansion Module used, one less DSLC can be used.

The following Expansion Modules are supported by the IP406 Office.

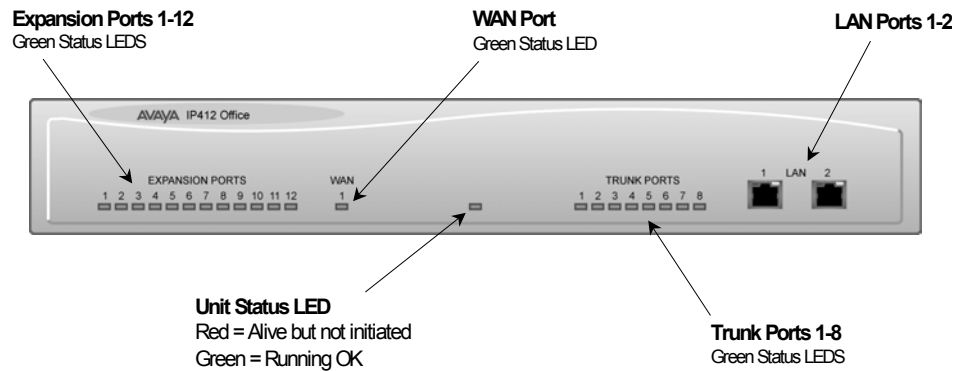
- **IP400 Digital Terminal:** Two variants (16 or 30 extensions) for digital telephones (see page 38).
- **IP400 Phone 8/16/30:** Three variants (8, 16 or 30 extensions) for analogue telephones (see page 39).
- **IP400 So8:** An S-bus module that provides 8 Basic rate ISDN interfaces (see page 40).
- **IP400 WAN3:** Provides support for a further 3 digital leased line (WAN) connections (see page 41). These expansion modules are connected to the IP403 Office unit via one of the LAN Ports located on the front of each unit.
- **IP400 Analogue Trunk 16:** Provides support for up to 16 Loop Start or Ground Start analogue trunks (see page 42). Two power fail sockets are also provided.

Integral Modules (Optional)

In addition the IP412 Office can be fitted with either or both of the following optional Integral Modules (see pages 23 and 24):

- **Voice Compression Module (VCM)**
Provides VoIP applications including trunking and support for IP telephones. Available in 5, 10, 20 and 30 channel variants. The IP412 Office can have two VCMs (of any type).
- **Dual Modem Module**
Allows termination of two simultaneous analogue modem calls at speeds up to and including 56kbps (V.90).

IP412 Office - Front View



Port connections

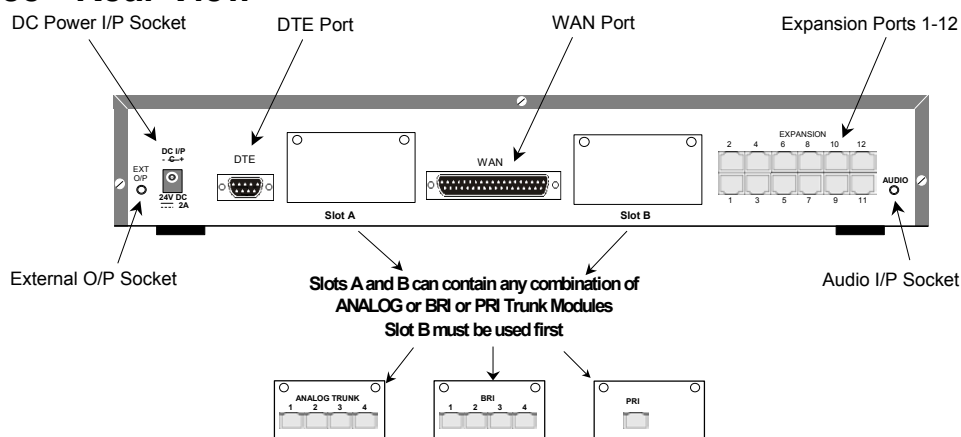
- **LAN Ports:** The segmented dual independent auto-negotiating 10/100 BaseT Ethernet ports are used for PC and server connectivity. They can also be used to connect to the optional IP400 WAN3 Expansion Module (see page 41) and IP telephones.

Information relating to incoming and outgoing telephone calls can be forwarded to PC based applications via these ports. These segmented Ethernet ports support separate IP and MAC addresses and hence a Firewall break may be implemented. They also provide access to the router functionality/configuration of the IP412 Office platform for both data and Voice over IP (VoIP) calls. (Where IP telephony is required, a suitable switch LAN switch with QoS capabilities.)

Cables

IP412 Office DT PRI 30 E1 & DS PRI 24 T1 are supplied with one red CAT5E cable. IP412 Office DT PRI60 E1 & PRI48 T1 are supplied with two red CAT5E cables. For Port Pinouts and Cables, refer to pages 49 and 53 respectively.

IP412 Office - Rear View



Port connections

- External O/P Socket**
 Two relay ports that allow externally powered circuits to be controlled via a single 3.5mm stereo jack socket.
- DC Power I/P Socket**
 Socket for the external 24V DC unregulated power supply (supplied with kit).
- DTE Port**
 A 9-way D-type socket. Used for connection to PCs, servers and EFTPOS terminals.
- BRI/PRI/ALOG Ports**
 The trunk interface modules are fitted into either Slots A or B as follows:
Slot A - Quad Analogue: 4 trunks (see page 29 for grounding)
 - Quad BRI: 8 trunks
 - Single or Dual PRI E1/E1-R2: 30 or 60 trunks respectively
Slot B - Single or Dual PRI E1/E1-R2: 30 or 60 trunks respectively.
 See page 22 for installation, page 43 for country specific variants and page 29 for grounding.
- WAN Port:** This port supports a single synchronous data connection, which can be X.21, V.35 or V.24. The selection of the required interface is automatically determined from the pin-out of the cable plugged into the WAN port. This cable **must be** connected before power is applied for auto detection to work. Connection to a Digital Leased Circuit is made by connecting the WAN port on the rear of the unit to the supplied Network Terminating Unit (NTU) via the appropriate X.21/V.35 /V.24 cable. See pages 60, 61 and 62 for cable details and page 52 for port details. *These interfaces are identical to those on the WAN3 Extension Module (see page 41).*
- Expansion Ports 1-12:** Used to provide access to either the optional **Expansion Modules** (see page 35) or the **INDeX Media Gateway** (see page 4), which allows the IP406 Office to be expanded to 180 extensions.
- Audio I/P Socket:** A single 3.5mm stereo or mono jack socket that enables input from an external 'Music-on-Hold' source.

Port Pinouts and Cables

For Port Pinouts and Cables, refer to pages 49 and 53 respectively.

Functional Earth

For Functional Earth connections see page 29.

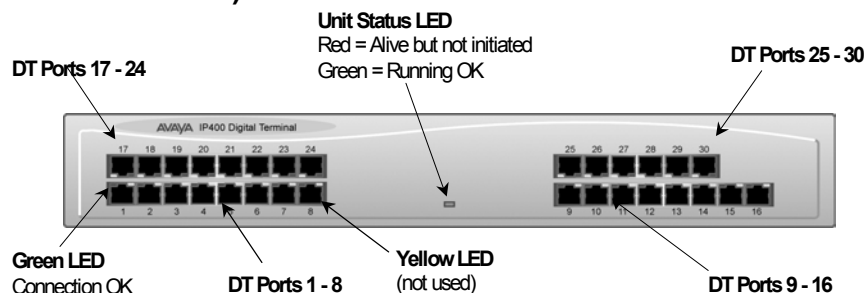
Expansion Modules

Dependent upon configuration requirements, combinations of the following Expansion Modules are used with IP Office platforms. With the exception of the WAN3 module (see page 41), all of these Expansion Modules are connected to the Expansion Ports of an IP Office platform using Expansion Cables.

Note: As both the INDeX Media Gateway and the IP Office Expansion Modules share the same **Expansion** ports on the rear of the IP Office, then, for each IP Expansion Module used, one less INDeX DSLC can be used.

IP400 Digital Terminal 16/30

Front View (30 Port version)

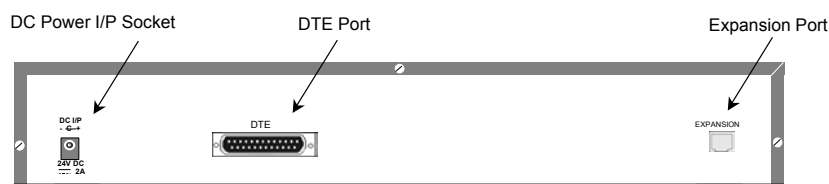


Note: The IP400 Digital Terminal 16 Expansion Module is only equipped with the bottom row of ports (1-16).

Port connections

- **DT ports** are used for connection to Avaya 2000 series telephones and support either A-Law or μ -Law PCM encoding. At default the ports are set to μ -Law but can be switched, in software, to A-Law (refer to the IP Office Administration Manager Manual for details). Using DT Line Cords (see page 54) and standard structured wiring, these RJ45 ports can be extended to the required telephone location. In addition, converters can be used to provide BT New Plan sockets (431A/631A) if required (see page 63). When devices are equipped with line cords that terminate in RJ11 plugs, then RJ11/RJ45 adapters should be used.

Rear View



Port connections

- **Expansion Port:** Used to connect a Digital Terminal Expansion Module to the Expansion Port of an IP Office platform.
- **DC Power I/P Socket:** Socket for the external 24V DC unregulated power supply (supplied with kit).
- **DTE Port:** A 25-way D-type socket. Used for diagnostics only.

Cables

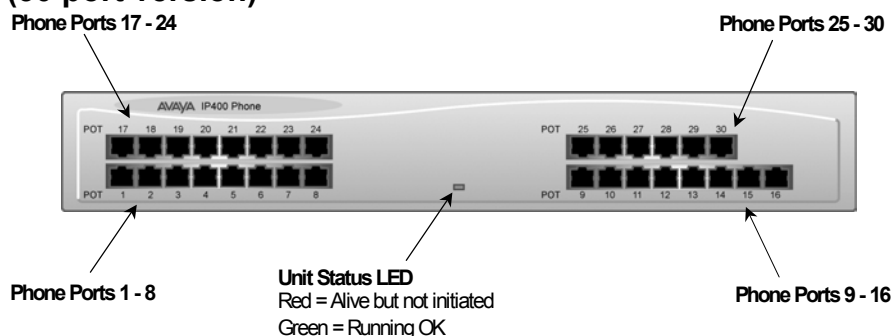
All IP400 Office Digital Terminal variants are supplied with one blue Expansion Interconnect cable. For Port Pinouts and Cables, refer to pages 49 and 53.

Functional Earth

For Functional Earth connections see page 29.

IP400 Phone 8/16/30

Front View (30 port version)

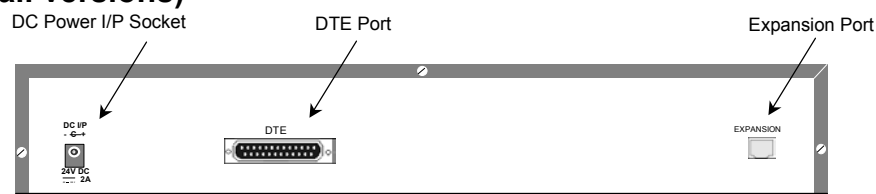


- Notes:**
1. The IP400 Phone 8 variant is only equipped with the bottom left row of ports.
 2. The IP400 Phone 16 variant is only equipped with the bottom row of ports.

Port connections

- **Plain Ordinary Telephone (POT) Ports:** These ports are used for connection to standard analogue telephones, fax machines and modems. Using standard structured wiring, these RJ45 ports can be extended to the required telephone location. Converters can be used to provide BT New Plan sockets (431A/631A) if required (see page 63). When devices are equipped with line cords that terminate in RJ11 plugs, then RJ11/RJ45 adapters should be used.
- All analogue telephones must conform to the port specification (see page 66).

Rear View (all versions)



Port connections

- **Expansion Port:** Used to connect a Phone Expansion Module to the Expansion Ports of an IP Office platform.
- **DC Power I/P Socket:** Socket for the external 24V DC unregulated power supply (supplied with kit).
- **DTE Port:** A 25-way D-type socket. Used for diagnostics only.

Cables

IP400 Office Phone variants are supplied with one blue Expansion Interconnect cable. For Port Pinouts and Cables, refer to pages 49 and 53 respectively.

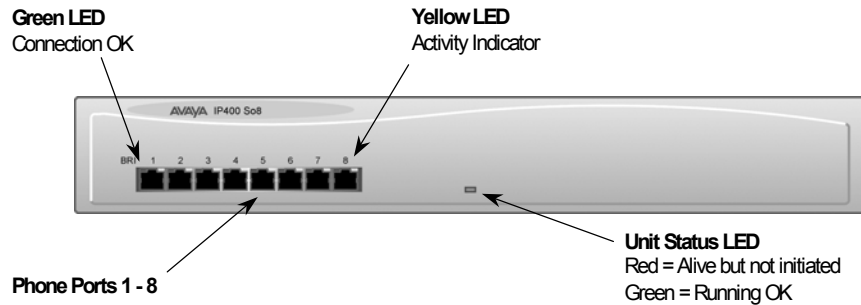
Functional Earth

For Functional Earth connections see page 29.

IP400 So8

The So8 Module is only applicable to countries that support the ETSI signalling protocol.

Front View



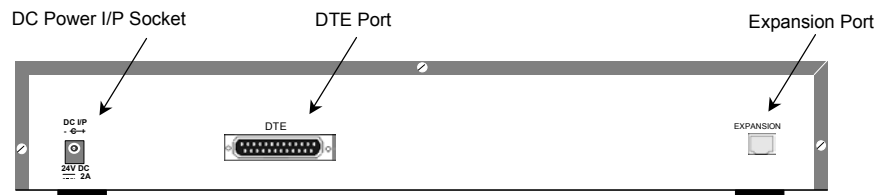
Port connections

- **BRI Ports:** These are 64k ISDN BRI S-Bus ports and are used for connection to ISDN Telephones, Group 4 faxes, Video conferencing units, etc.

WARNING:

BRI phone ports 1-8 must not be connected to the external ISDN Connections.

Rear Views



Port connections

- **Expansion Port**
Used to connect a So8 Module to the Expansion Ports of an IP Office platform.
- **DC Power I/P Socket**
Socket for the external 24V DC unregulated power supply (supplied with kit).
- **DTE Port**
A 25-way D-type socket. Used for connection to PC (as a diagnostic aid).

Cables

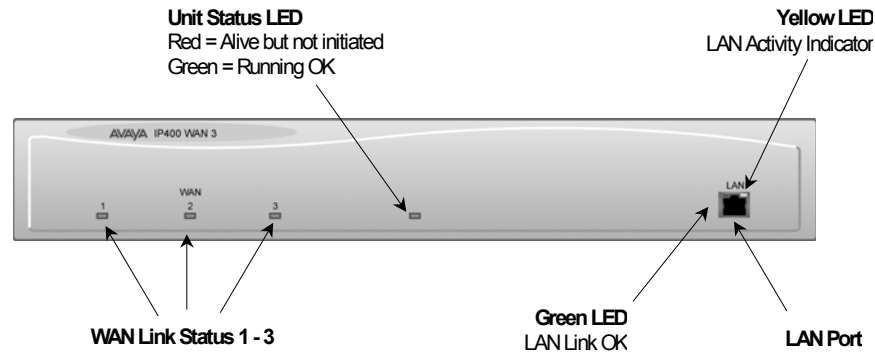
IP400 So8 is supplied with one blue Expansion Interconnect cable. For Port Pinouts and Cables, refer to pages 49 and 53 respectively.

Functional Earth

For Functional Earth connections see page 29.

IP400 WAN3

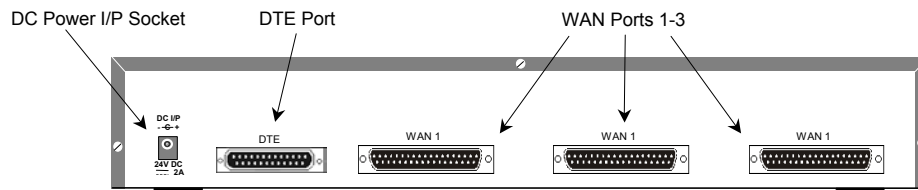
Front View



Port connections

- **LAN Port:** The LAN Port is the expansion port and permits connection to an IP403, IP406 or IP412 Office platform LAN Port. A LAN Interconnect cable (see page 56) is required for connection to an IP403 or IP406 and an IP412 requires a Crossover cable (see page 58).

Rear View



Port connections

- **WAN Ports:** These ports support a single synchronous data connection, which can be X.21, V.35 or V.24/V.28. The selection of the required interface is automatically determined from the pin-out of the cable plugged into the WAN port. This cable **must be** connected before power is applied for auto detection to work. Connection to a Digital Leased Circuit is made by connecting the WAN port on the rear of the unit to the existing Network Terminating Unit (NTU) via the appropriate X.21, V.35 or V.24 cable. These cables are detailed in the table below (see pages 60, 61 and 62 for details).

Cable Type	SAP Code
V.24/V.28 Cable	700213416
V.35 Cable	700213408
X.21 Cable	700213424

These WAN ports are identical to those on the IP406/412 Office platforms (see pages 34 and 37).

- **DC Power I/P Socket:** Socket for the external 24V DC unregulated power supply (supplied with kit).
- **DTE Port:** A 25-way D-type socket. Used for connection to PC (as a diagnostic aid).

Cables

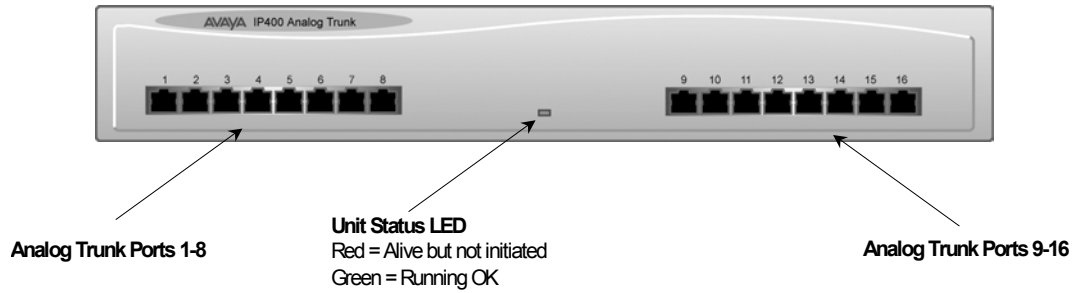
IP400 WAN3 is supplied with one green LAN Interconnect cable. For Port Pinouts and Cables, refer to pages 49 and 53 respectively.

Functional Earth

For Functional Earth connections see page 29.

IP400 Analogue Trunk 16

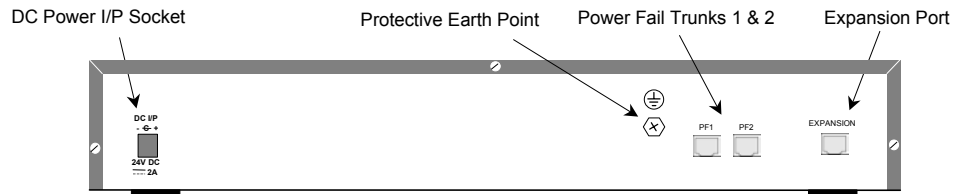
Front View



Port connections

- **Analogue Trunk Ports:** These ports are used for connection to standard analogue trunks (loop start or ground start). Using standard structured wiring, these RJ45 ports can be extended to the required trunk sockets. Trunk ports 1 and 2 are, in the event of power failure, automatically switched to PF1 and PF2 respectively on the rear of the unit (see below).

Rear View



Port connections

- **Expansion Port:** Used to connect the Analogue Trunk Expansion Module an Expansion Ports of an IP400 Office platform.
- **DC Power I/P Socket:** Socket for the external 24V DC unregulated power supply (supplied with kit).
- **Power Fail Trunks:** These two ports **must be** set and connected to Loop Start trunks only. POTs plugged into these two sockets are mapped to trunk ports 1& 2 such that, in the event of a mains power failure, PF1 and PF2 can operate as 'hot lines' to the emergency services (e.g. 911, etc).

Cables

IP400 Analogue Trunk 16 is supplied with one blue Expansion Interconnect cable. For Port Pinouts and Cables, refer to pages 49 and 53 respectively.

IP Office Country Variants

The following are lists of the country variants for each IP400 Office platform, trunk module kits, Integral module kits and expansion modules. The PCS level for each module can be found on a label that is stuck to the base of each module.

IP400 Office Systems

Throughout this section the following abbreviations are used:

All = Everywhere
 EU = Europe
 JP = Japan
 NZ = New Zealand
 ROW = Rest of world

Use ROW variant unless stated otherwise.

IP401 Compact Office

Variant	A-Law / μ -Law	Country	SAP Code
IP401 Compact Office DT2	A	ROW	700184617
IP401 WAN Expansion kit	-	ROW	700185093
IP401 Memory Expansion kit	-	ROW	700198351
IP401 CO DT2 Expansion kit	-	ROW	700185085
IP401 Compact Office DT4	A	ROW	700184633

IP403 Office

Variant	A-Law / μ -Law	Country	SAP Code
IP403 Office DT (No Trunks)	A	ROW	700210578
IP403 Office DT BRI 8	A	ROW	700184641
IP403 Office DT PRI 30 E1	A	ROW	700184658
IP403 Office DS (No Trunks)	A	ROW	700234453

IP406 Office

Variant	A-Law / μ -Law	Country	SAP Code
IP406 Office (No Trunks)	A	ROW	700234461
IP406 Office BRI 16	A	ROW	700184682
IP406 Office PRI 30 E1	A	ROW	700184690

IP412 Office

Variant	A-Law / μ -Law	Country	SAP Code
IP412 Office (No Trunks)	A	ROW	700234479
IP412 Office PRI 30 E1	A	ROW	700184724
IP412 Office PRI 60 E1	A	ROW	700184732

Integral Module Kits

Voice Compression Modules (VCM)

Variants	Country	SAP Code
IP400 VCM 5 expansion kit	ALL	700185119
IP400 VCM 10 expansion kit	ALL	700185127
IP400 VCM 20 expansion kit	ALL	700185135
IP400 VCM 30 expansion kit	ALL	700293939

Dual Modem Module

Variants	Country	SAP Code
IP400 Modem 2 expansion kit (V.90)	ALL	700185226

Trunk Module Kits

BRI Trunk Interface Module

Variant	Country	SAP Code
IP400 BRI expansion kit	ROW	700185168
IP400 BRI 8 (UNI) expansion kit	ROW	700262017

Analogue Trunk Interface Module

Variant	Country	SAP Code
IP400 ANALOGUE 4 EU (LS) expansion kit	EU	700241672
IP400 ANALOGUE 4 NZ (LS) expansion kit	NZ	700241706

PRI Module

Variant	Country	SAP Code
IP400 PRI 60 E1 Expansion Kit	ROW	700185184
IP400 PRI 30 E1 Expansion Kit	ROW	700185176
IP400 PRI 24 J1 Expansion Kit	JP	700262033
IP400 PRI 48 J1 Expansion Kit	JP	700262041

Power Supplies

Common Lump-in-Line Power Supply units are supplied with each IP Office/Expansion Module. However, the power leads are county specific and **must be** ordered separately.

The INDeX Media Gateway is supplied with both a Lump-in-Line Power Supply unit and a 3-pin earthed plug.

These power leads are only applicable to IP Office base units/Expansions modules and **must not be used** on the IP Office Small Edition, see the separate Installation Manual for details.

Variant	Country	SAP Code
IP400 Power Supply	ALL	700210792
IP400 Power Lead Japan	JP	700261993
IP400 Power Lead UK	UK	700213374
IP400 Power Lead UK Pack 10	UK	700177557
IP400 Power Lead European CEE7/16	EU	700213382
IP400 Power Lead European CEE7/16 Pack 10	EU	700177556

IP Office Rack Mounting Kits

Rack Mounting Kit

Variant	Country	SAP Code
Rack Mounting kit for 19 inch racks	ALL	700210800

Expansion Modules

IP400 Phone

Variant	Country	SAP Code
IP400 Phone 8	ALL	700184773
IP400 Phone 16	ALL	700184781
IP400 Phone 30	ALL	700184799

IP400 Digital Terminals

Variant	Country	SAP Code
IP400 Digital Terminal 16	ROW	700185606
IP400 Digital Terminal 30	ROW	700185069

IP400 Digital Stations

Variant	Country	SAP Code
IP400 Digital Station 16	ALL	700184807
IP400 Digital Station 30	ALL	700184880

IP400 Analogue 16 Trunks

Variant	Country	SAP Code
IP400 Analogue Trunk 16 EU	EU	700241680
IP400 Analogue Trunk 16 NZ	NZ	700241698

IP400 So8

Variant	Country	SAP Code
IP400 So8	ALL	700185077

IP400 WAN3

Variant	Country	SAP Code
IP400 WAN3	ALL	700185028
IP400 WAN3 10/100	ALL	700262009

Safety and Homologation Statements

CE Mark

The "CE" mark affixed to this equipment means that the unit complies with the 1999/5/EC (R&TTE), 89/336/EEC (EMC) and 72/23EEC (LVD) Directives

Declaration of Conformity

The Declaration of Conformity (DoC) for the IP400 Office products is contained within the CD accompanying the products.



This warning symbol is found on the base of both the IP416 and IP412 units. Refer to page 47 for information concerning which Trunk Interface module variants are fitted in which country.

WARNING

The Avaya IP400 Office units are intended to be installed by 'Service Personnel' and it is the responsibility of the Service Personnel to ensure that all subsidiary interconnected equipment is wired correctly and also meet the safety requirements of IEC60950 or UL60950 where applicable.

Lithium Batteries

A lithium battery is fitted to the real time clock on the IP406 and IP412 mother boards.

WARNING

The Lithium battery must only be replaced by Avaya personnel or authorized representatives. There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Hazard Symbols



The shock hazard symbol is intended to alert personnel to electrical hazard or equipment damage. The following precautions must also be observed when installing telephone equipment:

1. **Never install** telephone wiring during a lightening storm.
2. **Never install** telephone jacks in wet locations unless the jack is specifically designed for wet locations.
3. **Never Touch** un-insulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
4. Always use caution when working with telephone lines.

Electromagnetic Interference Information

Federal Communications Commission (FCC)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his or her own expense.

89/336/ EEC (EMC Directive) CISPR 22:1993 including A1 + A2, AS/NZ 3548:1995 (ROW)

WARNING

INDeX Media Gateway, IP406, IP412 and all Expansion Modules are Class A products. In a domestic environment IP406, IP412 and all Expansion Modules may cause radio interference in which case the user may be requested to take adequate measures.

Trunk Interface Modules

Rest Of World (ROW)

To ensure the validation of the approvals in ROW (i.e. EU, Hungary, Australia and New Zealand), only the following interface cards must be installed as detailed in the following IP400 Office products:

Product	Interface Modules					
	Quad BRI	PRI-E1 PRI E1-R2	PRI-T1	Analogue Trunk 4 (LS)	Dual PRI-E1 Dual PRI-E1-R2	Dual PRI-T1
IP406 Office	Yes	Yes	No	Yes	No	No
IP412 Office	Yes	Yes	No	Yes	Yes	No

Further Information and Product Updates

Further information, including Product and Reference Manual updates, can be obtained from Avaya's Dealers and Distributors, or from Avaya's web site: <http://www.avaya.com>.

This guide is also available from the Avaya's support web site: <http://support.avaya.com>

Regulatory Instructions for Use

Any changes or modifications not expressly approved by Avaya ECS Ltd could void the user's authority to operate the equipment.

IP Office Operation in Australia

Connection

Connection of IP400 Office products must be via a Line Isolation Unit with a telecommunications compliance label.

BRI Interface

During the configuration, ensure "000" emergency number is not barred, by performing the following:

Short Code: "000" Telephone No.: "000;" Function: "Dial Emergency"

Connections to TS013, the following Bearer Capabilities shall not be used:

7kHz Audio

Video

Restricted Digital Information

If unknown type of number is used in calling party number, the network will use the default CLI.

The system must be configured for Point to Multi point connection to comply with Austel requirements for connecting to TS013 circuits.

As the IP Office does not support emergency dialling after loss of power, the following warning notice should be recognized:

WARNING

This equipment will be inoperable when mains power fails.

PRI Interface

During the configuration, ensure "000" emergency number is not barred, by performing the following:

Short Code: "000" Telephone No.: "000;" Function: "Dial Emergency"

WARNING

This equipment will be inoperable during mains power failure.

IP Office Operation in EU

1. 999 and 112 calls must not be barred. Doing so will invalidate the approval.
2. All connections at the MDF shall be identifiable by suitable labeling.
3. The CE mark displayed on IP Office equipment indicates the systems compliance with the EMC, LVD, and R&TTE Directives and common technical regulations for Primary Rate and Basic Rate ISDN.
4. All ports for the connection of other non-telecommunications apparatus have a Safety Extra Low Voltage (SELV) safety status.

IP Office Operation in New Zealand

The grant of a Telepermit for any item of terminal equipment indicates only that Telecom has accepted that the item complies with minimum conditions for connection to its network. It indicates no endorsement of the product by Telecom, nor does it provide any sort of warranty. Above all, it provides no assurance that any item will work correctly in all respects with another item of Telepermitted equipment of a different make or model, nor does it imply that any product is compatible with all of Telecom's network services.

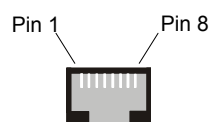
Technical Data

Port Pinouts

This section provides the technical specifications for the IP Office ports with the exception of the USB port and cable. All diagrams are viewed from the front. The USB port and cable (up to 5 meters) are standard. Refer to page 53 for cable details.

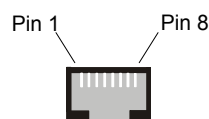
Note: Throughout the following, Tx = from IP Office and Rx = to IP Office.

Analogue Trunk Ports (RJ45)



Pin No.	Description
1-3	Do not use
4	Ring
5	Tip
6-8	Do not use

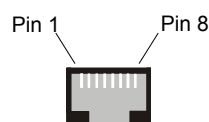
Power Fail and POT Ports (RJ45)



Pin No.	Description
1 & 3	Do not use
2	Connected to pin 6*
4	Ring
5	Tip
6	Connected to pin 2*
7-8	Do not use

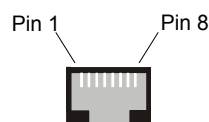
* Pins 2 and 6 are shorted together and, via a 'ringer' capacitor, connected to in 5.

DS/DT Ports (RJ45)

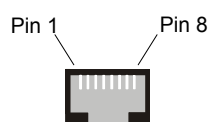


Pin No.	Description
1-3	Do not use
4	Sig 1
5	Sig 2
6-8	Do not use

ISDN Port – BRI (RJ45)



Pin No.	Description	Signal Direction
3	Transmit Data (Tx-A)	➔
4	Receive Data (Rx-A)	➔
5	Receive Data (Rx-B)	➔
6	Transmit Data (Tx-B)	➔

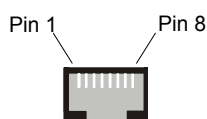
ISDN Port – PRI (RJ45)

Pin No.	Description	Signal Direction
1	Receive Data (Rx-A)	←
2	Receive Data (Rx-B)	←
4	Transmit Data (Tx-A)	→
5	Transmit Data (Tx-B)	→

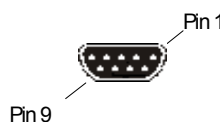
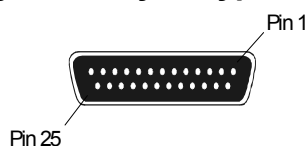
LAN Port – 10/100 BaseT

For IP Office 403/406 the information below refers to LAN ports 1 – 7. Port 8 is switchable in software (exchanges Tx and Rx signals).

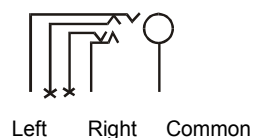
For IP412 and WAN3, both ports have the Rx and Tx connections exchanged.



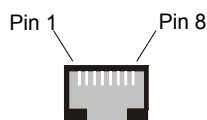
Pin No.	Description	Signal Direction
1	Receive Data (Rx-A)	←
2	Receive Data (Rx-B)	←
3	Transmit Data (Tx-A)	→
6	Transmit Data (Tx-B)	→

DTE Port (25 Way or 9 Way D-Type socket)

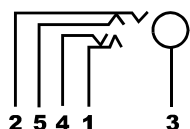
Pin No (25 Way).	Pin No (9 Way).	Description	Signal Direction
2	3	Receive Data (Rx)	←
3	2	Transmit Data (Tx)	→
4	7	Request to Send (RTS)	←
5	8	Clear to Send (CTS)	→
6	6	Data Set Ready (DSR)	→
7	5	Signal Ground	
8	1	Data Carrier Detect (DCD)	→
20	4	Data Terminal Ready (DTR)	←
22	9	Ring Indicator (RI)	→

Audio Port (3.5mm Stereo Jack Socket)

Pin No.	Description	Signal Direction
Common	Common	
Left	Audio in – Left Channel	←
Right	Audio in – Right Channel	←

Expansion Port (RJ45 Socket)

Pin No.	Description	Signal Direction
1	Receive Data (Rx-B)	←
2	Receive Data (Rx-A)	←
3	Sync-B	→
4	Clock (Clk-B)	→
5	Clock (Clk-A)	→
6	Sync-A	→
7	Transmit Data (Tx-B)	→
8	Transmit Data (Tx-A)	→
Shield	Connected to chassis	Ground

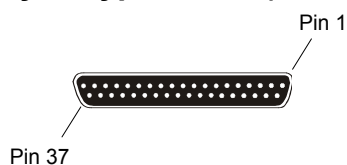
External Control Port (3.5mm Stereo Jack Socket)

Pin No.	Description
1	Circuit 1
2	Circuit 2
3	0 Volts (Ground/Chassis)
4	Not Connected
5	Not Connected

Control Circuit	Information
Control Circuit 1	Pin 2 and Pin 3, ensure that Pin 2 is at a positive voltage with respect to Pin 3.
Control Circuit 2	Pin 1 and Pin 3, ensure that Pin 1 is at a positive voltage with respect to Pin 3.

Each circuit can be switched independently.

Switch Setting	Information
ON	Low resistance between Pins.
OFF	High resistance between Pins.

WAN Port (37 Way D-Type Socket)

Pin No.	Description	Signal Dir.	Pin No.	Description	Signal Dir.
1	V11 Rx-B	←	20	V11 Rx-A	←
2	V11 Ind-A	←	21	V11 Ind-B	←
3	V11 Clk-A	←	22	V11 Clk-B	←
4	V11 Tx-A	→	23	V11 Tx-B	→
5	V11 Ctl-B	→	24	V11 Ctl-A	→
6	V11 Gnd		25*	WAN ID 0	←
7*	WAN ID 1	←	26	V24 Tx	→
8	V24 DTR	→	27	V24 RTS	→
9	V24 Rx	←	28	V24 RxClk	←
10	V24 TxClk	←	29	V24 RI	←
11	V24 DCD	←	30	V24 DSR	←
12	V24 CTS	←	31	N/C	
13	N/C		32	V35 Tx-A	→
14	V35 Tx-B	→	33	V35 SCTE-A	→
15	V35 SCTE-B	→	34	V35 Gnd	
16	V35 Rx-B	→	35	V35 Rx-A	→
17	V35 TxClk-B	←	36	V35 TxClk-A	←
18	V35 RxClk-B	←	37	V35 RxClk-A	←
19	CHASSIS				

- Notes:**
1. For the USA, only FCC Part 68 registered data circuit terminal equipment should be connected to the WAN Ports.
 2. * For X21, V24/28 and V35 variants, pins 7 and 25 are connected as follows:
 X21: Pin 7 is connected to pin 6
 V24/28: Pin 25 is connected to pin 6
 V35: Pins 7 and 25 are connected to pin 6

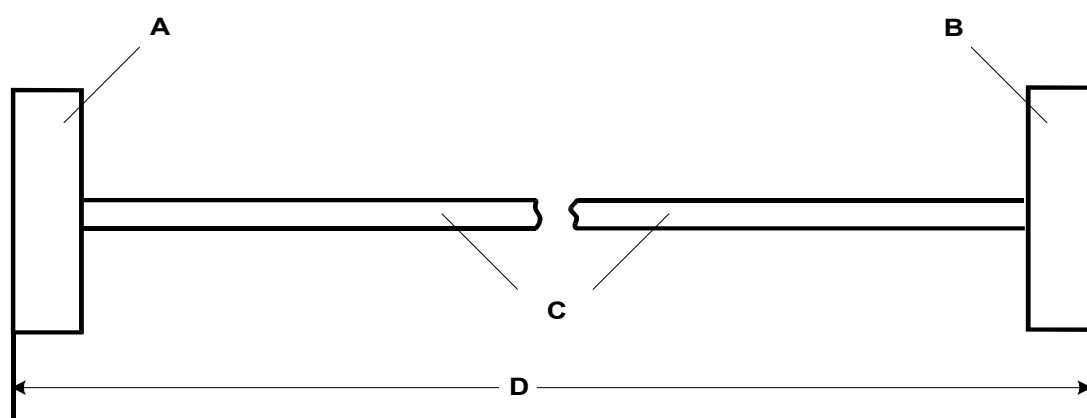
Cables

This section provides information about the cables that are used with IP Office.
Refer to page 49 for port pin out details.
All of the following cables are for internal use only.
All structured cabling/site wiring **must** conform to all local regulations.

- Cautions:**
1. All ISDN and WAN cables should not be longer than 5 meters in length.
 2. For Analogue Trunk cables, to reduce the risk of fire, use only No. 26 AWG or larger telecommunications line cord.

DTE Cable

SAP Code:- 700213432 (25 Way)



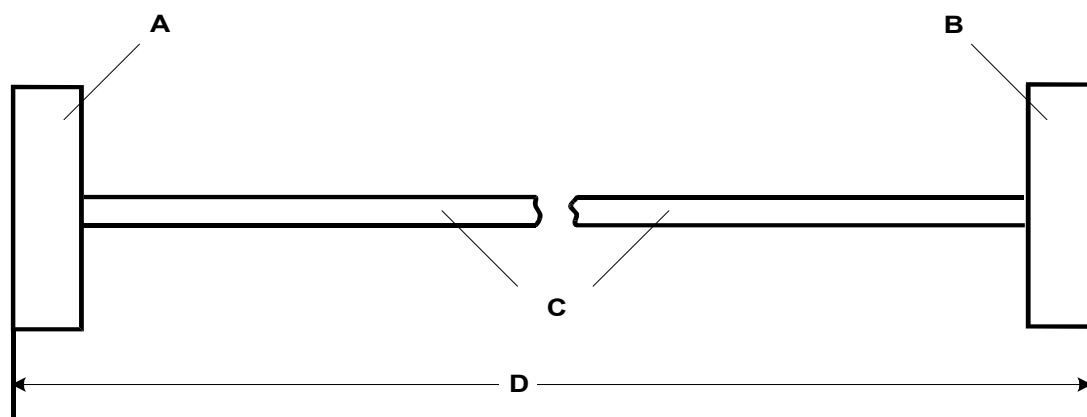
- A 25 Way (or 9 Way on IP412) D-Type Plug with UNC 4-40 locking screws.
B 9 Way D-Type Socket with UNC 4-40 locking screws.
C 12 core screened cable - each core is 7/0.203mm (24 AWG) tinned copper stranded wire, nominal capacitance of 95pF/m, resistance of 92 Ω /km, screened with tinned copper braid, maximum working voltage of 440V rms and a Maximum current per core of 1A rms
D 2 meters/6.57ft.

Pin Connections

End A (25 Way)	End A (9 Way)	Name	End B
2	3	Receive data	3
3	2	Transmit Data	2
4	7	RTS (Request To Send)	7
5	8	CTS (Clear To Send)	8
6	6	DSR (Data Set Ready)	6
7	5	Ground	5
8	1	DCD (Data Carrier Detect)	1
20	4	DTR (Data Terminal Ready)	4
22	9	RI (Ring Indicator)	9

DT Line Cord for Structured Cabling

SAP Code:- 700047871



- A RJ11 Plug.
- B RJ45 Plug.
- C Cable.
- D 4 meters/13.2ft.

Pin Connections

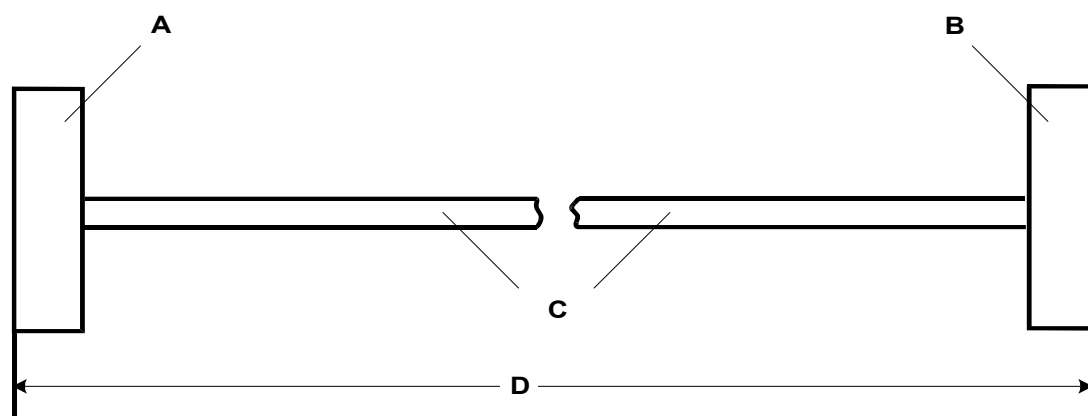
RJ11 Pin Number	RJ45 Pin Number
3	5
4	4

This cable can be used to replace the RJ11 to BT Newplan plug that is attached to the 20 series telephones to allow connection to structured cabling.

PRI/BRI ISDN Cable

SAP Code:- 700213440

Supply: As standard with IP Office systems.



A RJ45 Plug.

B RJ45 Plug.

C Cat 5 UTP cable - **RED**.

D 3 meters/9.84ft.

Pin Connections

End A	BRI	PRI	Color	Cable Notes	End B
4	*Rx-A	*Tx-A	Blue/White	Twisted pair	4
5	*Rx-B	*Tx-B	White/Blue	Twisted pair	5
3	*Tx-A	---	White/Green	Twisted pair	3
6	*Tx-B	---	Green/White	Twisted pair	6
1	---	*Rx-A	White/Orange	Twisted pair	1
2	---	*Rx-B	Orange/White	Twisted pair	2
7	---	---	White/Brown	Twisted pair	7
8	---	---	Brown/White	Twisted pair	8

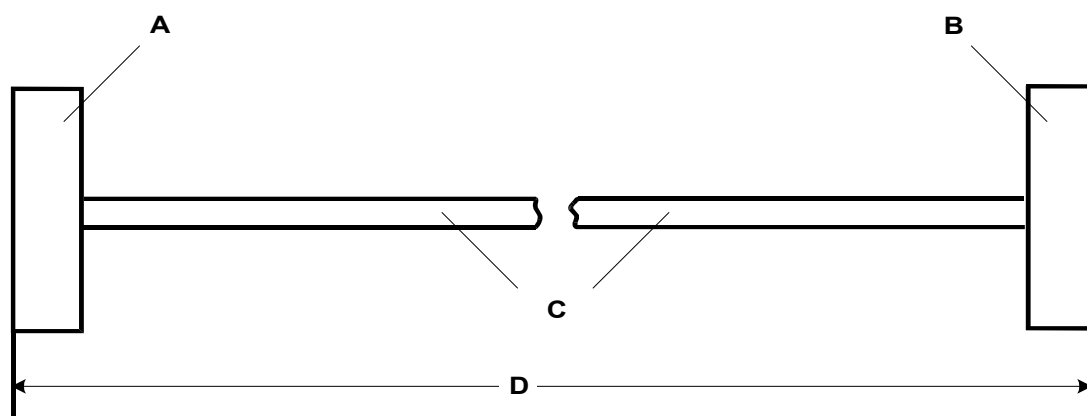
* With reference to the TE.

- Pins 7 and 8 are through connected for ease of construction. They are not actually used.

LAN Interconnect Cable

SAP Code:- 700213465

Supply: The cable is supplied with the WAN3 Expansion Module.



A RJ45 Plug.

B RJ45 Plug.

C Cat 5 UTP cable - **GREEN**.

D 1 meter/3.28ft.

Pin Connections

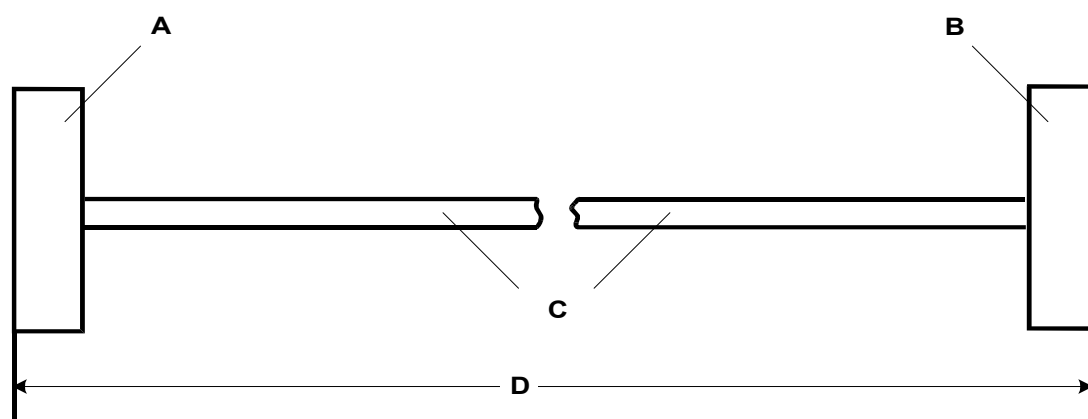
End A	Color	Cable Notes	End B
1	White/Orange	Twisted Pair	1
2	Orange/White		2
3	White/Green	Twisted Pair	3
6	Green/White		4
4	Blue/White	Twisted Pair	5
5	White/Blue		6
7	White/Brown	Twisted Pair	7
8	Brown/White		8

- This cable is used:
 When connecting IP Office hub ports 1 - 7 directly to a PC.
 When connecting a WAN3 to an IP403/406 hub port which is located in the same cabinet as the IP Office.

Pins 4,5,7 and 8 are through connected for ease of construction. They are not actually used.

LAN Cable

SAP Code:- 700213481



- A RJ45 Plug.
- B RJ45 Plug.
- C Cat 5 UTP cable - **GREY**.
- D 3 meters/9.84ft.

Pin Connections

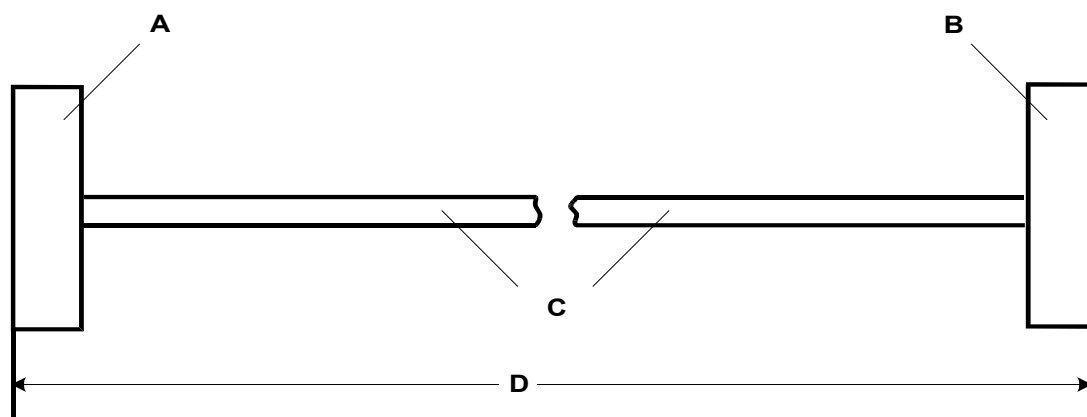
End A	Color	Cable Notes	End B
1	White/Orange	Twisted Pair	1
2	Orange/White		2
3	White/Green	Twisted Pair	3
6	Green/White		6
4	Blue/White	Twisted Pair	4
5	White/Blue		5
7	White/Brown	Twisted Pair	7
8	Brown/White		8

- This cable is used:
 - When connecting IP Office hub ports 1 - 7 directly to a PC.
 - When connecting a WAN3 port to an IP403/406 hub port which is not located in the same cabinet as the IP Office.

Pins 4, 5, 7 and 8 are through connected for ease of construction. They are not actually used.

LAN Crossover Cable

SAP Code:- 700213473



- A RJ45 Plug.
- B RJ45 Plug.
- C Cat 5 UTP cross-over cable - **BLACK**.
- D 3 meters/9.84ft.

Pin Connections

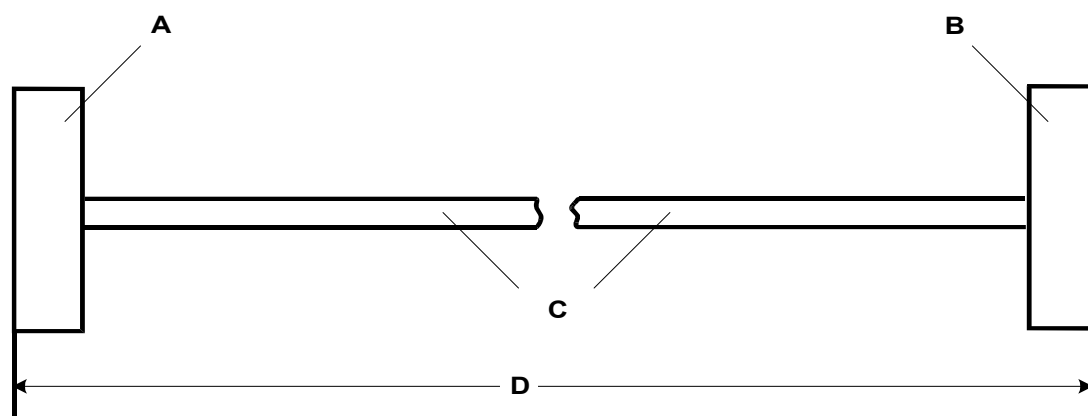
End A	Color	Cable Notes	End B
1	White/Orange	Twisted Pair	3
2	Orange/White		6
3	White/Green	Twisted Pair	1
6	Green/White		2

- This cable is used when connecting Hub Ports 1 - 7 directly to another Hub and for connecting a WAN3 to an IP412.

Expansion Interconnect Cable

SAP Code:- 700213457

Supply: One per Expansion Module.



A Shielded RJ45 Plug.

B Shielded RJ45 Plug.

C STP (Shielded Twisted Pair) cable - **BLUE**.

D 1 meter/3.28ft.

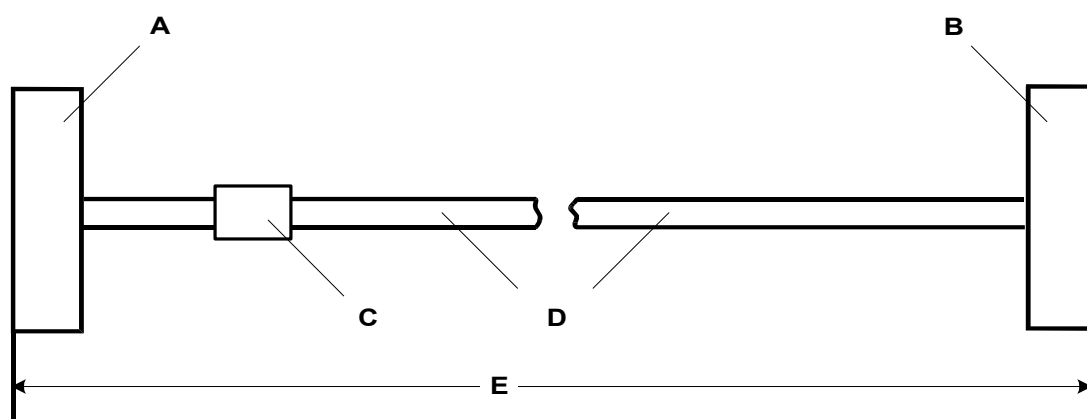
Pin Connections

End A	Name	Color	Cable Notes	End B
1	Rx-A	White/Orange	Twisted Pair	1
2	Rx-B	Orange/White		2
3	Sync-A	White/Green	Twisted Pair	3
6	Sync-B	Green/White		6
4	Clock-A	Blue/White	Twisted Pair	4
5	Clock-B	White/Blue		5
7	Tx-A	White/Brown	Twisted Pair	7
8	Tx-B	Brown/White		8

- The RJ45 Plug Shell at each end of the cable is connected to the STP Cable Drain Wire.

V.24/V.28 WAN Cable

SAP Code:- 700213416



- A 37 Way D-Type Plug with UNC 4-40 locking screws.
- B 25 Way D-Type Plug with UNC 4-40 locking screws.
- C Label
- D 12 core screened cable - each core is 7/0.203mm (24 AWG) tinned copper stranded wire, nominal capacitance of 95pF/m, resistance of 92 Ω /km, screened with tinned copper braid, maximum working voltage of 440V rms and a Maximum current per core of 1A rms
- E 3 meters/9.84ft.

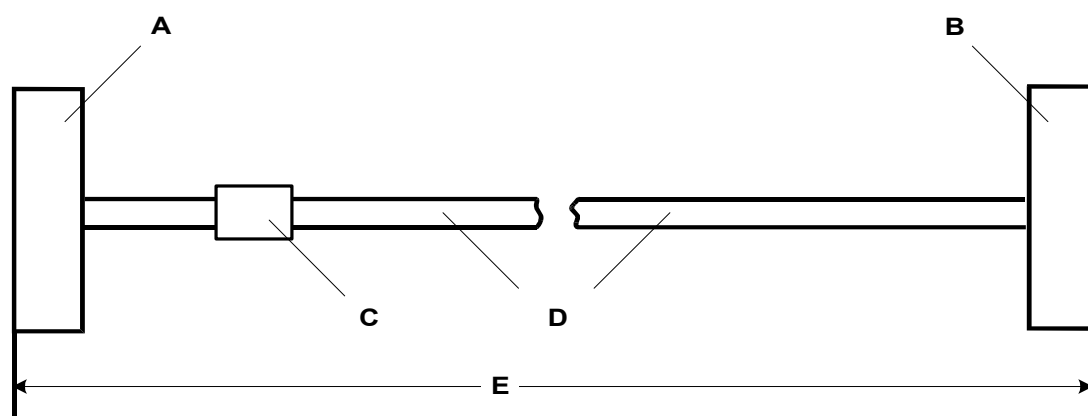
Pin Connections

End A	Name	End B
6	Ground	7
8	DTR (Data Terminal Ready)	20
9	Receive Data	3
10	Transmit Clock	15
11	DCD (Data Carrier Detect)	8
12	CTS (Clear To Send)	5
26	Transmit Data	2
27	RTS (Request To Send)	4
28	Receive Clock	17
29	RI (Ring Indicator)	22
30	DSR (Data Set Ready)	6

- Connect pin 25 to pin 6 at End A **only**.
- Pin 19 at end A is connected to the Screened Cable Drain Wire.
- The maximum core to core capacitance must not exceed 800pF.
- This cable is used to connect a WAN port to a Digital leased Line.

X.21 WAN Cable

SAP Code:- 700213408



- A 37 Way D-Type Plug with UNC 4-40 locking screws.
- B 15 Way D-Type Plug with M3 locking screws.
- C Label
- D 6 twisted pair screened cable - each core is 7/0.203mm (24 AWG) tinned copper stranded wire, nominal capacitance of 98pF/m, impedance of 77 Ω at 1MHz, screened with aluminized tape and a tinned copper wire drain.
- E 3 meters/9.84ft.

Pin Connections

End A	Name	Cable Notes	End B
1	Receive (Rx-B)	Twisted Pair	11
20	Receive (Rx-A)		4
4	Transmit (Tx-A)	Twisted Pair	2
23	Transmit (Tx-B)		9
24	Control (Ctl-A)	Twisted Pair	3
5	Control (Ctl-B)		10
2	Indicate (Ind-A)	Twisted Pair	5
21	Indicate (Ind-B)		12
3	SE-Timing (S-A)	Twisted Pair	6
22	SE-Timing (S-B)		13
6	Ground	-----	8

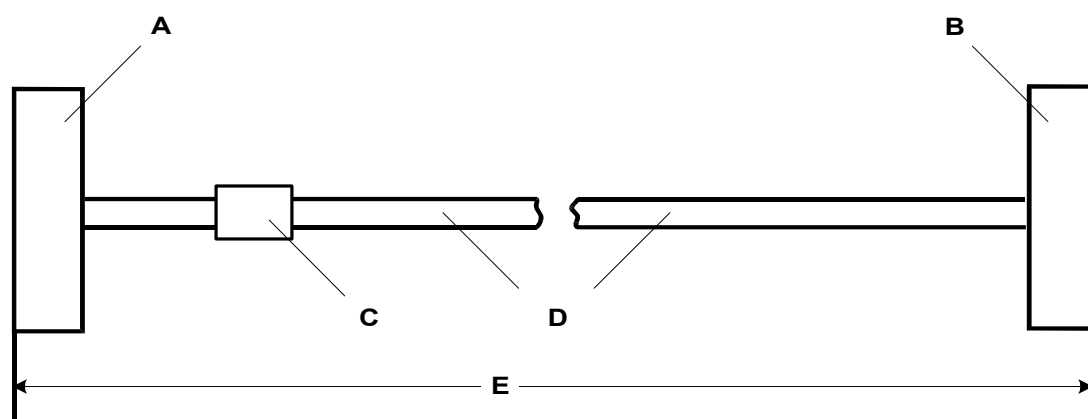
► Connect pin 7 to pin 6 at End A **only**.

Pin 19 at end A is connected to the Screened Cable Drain Wire.

This cable is used to connect a WAN port to a Digital leased Line.

V.35 WAN Cable

SAP Code:- 700213424



- A 37 Way D-Type Plug with UNC 4-40 locking screws.
- B 34 Way MRAC Plug.
- C Label
- D 10 twisted pair screened cable - each core is 7/0.203mm (24 AWG) tinned copper stranded wire, nominal capacitance of 98pF/m, impedance of $80 \Omega \pm 10\%$ at 1MHz, screened with aluminized tape and a tinned copper wire drain.
- E 3 meters/9.84ft.

Pin Connections

End A	Name	Cable Notes	End B
8	DTR (Data Terminal Ready)	-----	H
11	DCD (Data Carrier Detect)	-----	F
12	CTS (Clear To Send)	-----	D
27	RTS (Request To Send)	-----	C
29	RI (Ring Indicator)	-----	J
30	DSR (Data Set Ready)	-----	E
32	Transmit Data - A	Twisted Pair	P
14	Transmit Data - B		S
35	Receive Data - A	Twisted Pair	R
16	Receive Data - B		T
36	Transmit Clock - A	Twisted Pair	Y
17	Transmit Clock - B		AA
37	Receive Clock - A	Twisted Pair	V
18	Receive Clock - B		X
33	External Clock - A	Twisted Pair	U
15	External Clock - B		W
34	Ground	-----	B

► Connect pins 7 and 25 to pin 6 at End A **only**.

Pin 19 at end A is connected to the Screened Cable Drain Wire.

The maximum core to core capacitance **must not** exceed 800pF.

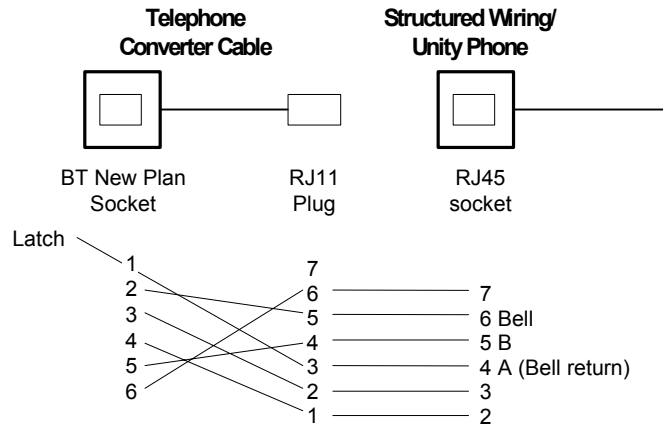
This cable is used to connect a WAN port to a Digital leased Line.

Telephone Converter Cables

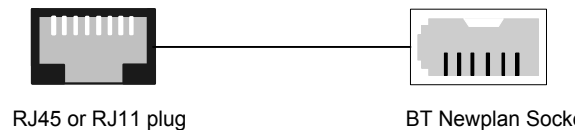
The following diagrams show the pin-outs of various Structured Cabling Telephone Converters. The first two telephone converters shown provide the required conversion allowing correct operation of the attached telephone.

Each telephone port on the **Phone** modules acts as a Master socket, thus only Slave Telephone Converters are required.

RJ45 - Compatible Converter



RJ11/45 Adapter



RJ11 Pin Number	RJ45 Pin Number	BT Newplan Socket Pin Number
3	4	3
4	5	4

Other connections are not relevant.

BT Newplan socket connections may be reversed as polarity is not important. This adapter may be used with DT telephones fitted with BT Newplan plugs.

Port Safety Classification

The Avaya IP Office systems have the following ports:

- Expansion ports
- 10/100 BaseT LAN ports
- Telephone ports which are either DT (A-Law encoding) or DS (μ -Law encoding)
- ISDN ports
- Analogue ports
- Power Fail ports
- WAN ports
- DTE ports
- Audio I/P port
- DC Power Input port
- External Control port

These Ports are classified as follows:

Port Name	Port Description	Port Classification
PRI port	PRI ISDN connection (NET)	TNV (Operating within the limits of SELV)
BRI ports	BRI ISDN connection (NET)	TNV (Operating within the limits of SELV)
Analogue ports	Two wire analogue trunk	TNV3
Power fail ports	Two wire analogue trunk	TNV3
DTE port	Async Data connection.	SELV
Analogue Telephone Ports	Telephone Extension ports	TNV2
Digital Telephone Ports	Telephone Extension ports	SELV
WAN port	WAN connection (NET).	SELV
LAN ports	10/100 BaseT attachment to LAN.	SELV
Expansion ports	Expansion Module connector.	SELV
Audio port	Connector for Music on Hold.	SELV
External Control port	Connector for Controlling Ancillary circuits.	SELV
DC Input port	Connector for DC input power.	SELV

Interconnection circuits shall be selected to provide continued conformance with the requirements of EN 609050:1992/A3:1995 clause 2.3 for SELV circuits and with the requirements of clause 6 for TNV circuits, after connections between equipment.

Compliance with FCC Rules

Transmit and Receive Gain Settings for PRI/T1 and Analogue Ports

The Gain settings are password controlled for use by qualified installation personnel only and must not be made available to the end user. The default gain settings of 0dB ensures compliance with FCC part 68 section 68.308(b)(5) and TIA/EIA-IS-968 Section 4.5.2.5. "Through transmission amplification from ports for the connection of separately registered equipment or from other network connection ports". Gain setting adjustment by unqualified personnel may result in violation of the FCC rules. Qualified personnel may adjust gain settings above these levels only where:

1. Measurement is made to ensure that the power levels sent to line at each network interface connected does not exceed the maximum levels specified in FCC part 68 section 68.308(b) and TIA/EIA-IS-968 Section 4.5 for that specific interface type.
2. Where gain adjustment away from the default values are made, precautions should be taken to ensure that the connection of terminal equipment is controlled by qualified installation personnel.

Technical Specifications

General

Dimensions (unboxed)	IP406/12 & Exp. Modules : Width: 445mm (17.5") Height: 71mm (2.8") Depth: 245mm (9.7")										
Dimensions (boxed)	IP406/12 & Exp. Modules : Width: 445mm (17.5") Height: 71mm (2.8") Depth: 245mm (9.7")										
Environmental	0 to +40°C. 95% relative humidity, non-condensing.										
Weight (unboxed)	Gateway	406	412	Analogue	16	DT/DS16	DT/DS30	WAN3	So8	Phones	8 ... 16 ... 30
Kgs	2.6	3.0	3.0	2.9		3.0	3.50	2.8	2.8	2.8	2.9 3.10
lbs	5.8	6.6	6.7	6.5		6.7	7.8	6.3	6.3	6.3	6.5 6.94
Weight (boxed)	Gateway	406	412	Analogue	16	DT/DS16	DT/DS30	WAN3	So8	Phones	8 ... 16 ... 30
Kgs	3.85	4.3	4.3	4.2		4.3	4.8	4.1	4.1	4.1	4.2 4.4
lbs	8.6	9.6	9.6	9.4		9.6	10.8	9.2	9.2	9.2	9.4 9.7
Power Supply Consumption (nominal Watts)	2.5mm DC inlet socket. 24Vdc Power input. Rating 24Vd.c., 2A max. Gateway 406 412 Analogue 16 DT/DS16 DT/DS30 WAN3 So8 Phones 8 ... 16 ... 30 26 16 17.5 5 24 30 12 24 12 16 30										
Lump-in-Line PSU	Power Requirements: I/P 100-240Vac, 50/60Hz, 81-115VA, Input current 2A max Standard PSUs: O/P 24Vdc, 1.875A, output power 45W max. DS30 80W PSU: O/P 16Vdc, 5A, output power 80W max. Lump-in-line PSUs are CE/UL/Dentori Safety Approved.										

Interfaces

Interface	Information
DTE	25 way D-Type female connector, V.24/V.28. (9 way D-type on IP412s)
ISDN	ROW Interfaces: BRI : RJ45 sockets. ETSI S/T Interface to CTR3 for Pan European Connection. PRI E1: RJ45 socket. ETSI T Interface to CTR4 for Pan European Connection. PRI E1-R2: RJ45 socket. ETSI T Interface to CTR4 for Pan European Connection. PRI E1-R2: 75Ω BNC Coax.. ETSI T Interface. PRI T1: RJ45 socket: FCC Part 68/JATE connection.
Analogue ports	RJ45 sockets: Loop start/Ground start (region dependant)
Power Fail ports	RJ45 sockets: telephone ports act as master sockets
ISDN Data Rates	BRI: B-channel 64kbps or 56kbps, D-channel 16kbps. PRI: B-channel 64kbps or 56kbps, D-channel 64kbps.
Telephone	RJ45 sockets. EU - Telephone ports act as master sockets. CLI Schemes: DTMFA, DTMFC, DTMFD, FSK and UK20. REN = 2 Off Hook current = 25mA. Ring Voltage = 40V (nominal) RMS. External Bell (via analogue port); REN = 1
LAN	RJ45 sockets. Auto-negotiating 10/100BaseT Ethernet (10Mbps). Port 8 is MDI/MDIX switchable via the adjacent Cascade pushbutton switch. Refer to pages 33 and 36.
WAN	37 way D-Type female sockets. X.21 interface to 2048k bps, V.35 interface to 2048k bps and V.24 Interface to 19k2 bps.
Audio	3.5mm Stereo Jack socket. Input impedance - 10k /channel. Maximum a.c. signal – 200mV rms.
External Control	3.5mm Stereo Jack socket. Switching Capacity - 0.7A. Maximum Voltage - 55V d.c. On state resistance - 0.7Ω. Short circuit current - 1A. Reverse circuit current capacity - 1.4A.

Protocols

Protocol		Information
A-Law	- - -	PCM encoding (mainly used outside N.America)
μ -Law	- - -	PCM encoding (mainly used in N.America and Japan)
V.120	- - -	A standard Rate Adaption mechanism.
V.110	- - -	A standard Rate Adaption mechanism.
PPP	RFC 1661	Point to Point Protocol.
LCP	RFC 1570	Link Control Protocol.
MP	RFC 1990	Multi-Link (Point to Point) Protocol.
PAP	RFC 1334	Password Authentication Protocol.
CHAP	RFC 1994	Challenge Handshake Authentication Protocol.
CCP	RFC 1962	Compression Control Protocol.
STAC	RFC 1974	Stac LZS Compression Protocol.
MPPC	RFC 2118	Microsoft Point to Point Compression (Protocol).
BACP	RFC 2125	Bandwidth Allocation Control Protocol.
IPCP	RFC 1332	Internet protocol Control Protocol.
TCP/IP	RFC 793	Transmission Control Protocol/Internet Protocol.
DHCP	RFC 1533	Dynamic Host Control Protocol.
NAT	RFC 1631	Network Address Translation.
BOOTP	RFC 951	Bootstrap Protocol.
SNMPv1	RFC1157 (STD15) RFC1155 (STD16) RFC1212 (STD16) RFC1215	Simple Network Management Protocol Structure and Identification of Management Information for TCP/IP-based internets Concise MIB Definitions A Convention for Defining Traps for use with the SNMP
MIB-II	RFC1213 (STD17)	Management Information Base for Network Management of TCP/IP-based internets:MIB-II
RIP	RFC1058 RFC2453 RFC1722 (STD57)	Routing Information Protocol (STD56) RIP Version 2 RIP Version 2 Protocol Applicability Statement
IPSEC	RFC2401 RFC2402 RFC2403 RFC2404 RFC2405 RFC2406 RFC2407 RFC2408 RFC2409 RFC2410 RFC2411	Security Architecture for the Internet Protocol IP Authentication Header The Use of HMAC-MD5-96 within ESP and AH The Use of HMAC-SHA-1-96 within ESP and AH The ESP DES-CBC Cipher Algorithm With Explicit IV IP Encapsulating Security Payload (ESP) The Internet IP Security Domain of Interpretation for ISAKMP. Internet Security Association and Key Management Protocol The Internet Key Exchange (IKE). The NULL Encryption Algorithm and Its Use With IPsec. IP Security Document Roadmap.
L2TP	RFC2661 RFC3193	Layer Two Tunneling Protocol "L2TP" Securing L2TP using IPsec
ENTITY MIB	RFC2737	Entity MIB (Version 2)
TFTP	RFC 1350	Trivial File Transfer Protocol

Internal Data Channels

Base Unit	Max. No. of Internal Data Channels	Max. No. of Internal Data Channels for Voicemail
IP401	2	2
IP403	18	10
IP406	24	20
IP412	100	30

Regulatory Instructions for Use

INDeX Operation in United Kingdom

- 1) 999 and 112 calls must not be barred. Doing so will invalidate BABT approval.
- 2) Simple Call Routing Mode (SCRM) lines must be identified separately from the non-SCRM lines (loop start disconnect clearing & guarded clearing) at the MDF.
- 3) PSTN lines must be segregated from non-PSTN lines and their connection strips shall be suitably labelled.
- 4) All connections at the MDF shall be identifiable by suitable labelling.
- 5) The CE mark displayed on INDeX equipment indicates the systems compliance with the European EMC LV, and R&TTE directive and common technical regulations for Primary Rate and Basic Rate ISDN.
- 6) All ports for the connection of other non-telecommunications apparatus have a Safety Extra Low Voltage (SELV) safety status.

INDeX Operation in Australia

- 1) 000 emergency calls must not be barred. Doing so will invalidate the approval to TS031 and TS038.
- 2) When connecting to a TS013 ISDN Basic Rate Interface, only Point to Multi-Point to operation shall be configured.
- 3) When connecting to a TS013 ISDN Basic Rate Interface only terminals that comply with TS013 may be connected to the BRI 'S' ports as the bearer capability is passed through the switch
- 4) As the INDeX does not support emergency dialling after loss of power, the following warning notice should be recognised:

WARNING

This equipment will be inoperable when mains power fails.

INDeX Operation in Finland

To comply with the safety regulations for Finland, the INDeX Cabinet must be connected to a safety earth as follows:

WARNING

Attach earth lead to cabinet with a suitable M6 bolt/screw in threaded insert provided adjacent to mains input socket on the left hand side of cabinet (facing to the front).

The earth lead and connections **are not** provided by Avaya.

INDeX Operation in Singapore

To comply with the safety regulations for Singapore, the INDeX Cabinet must be connected to a safety earth as follows:

WARNING

Attach earth lead to cabinet with a suitable M6 bolt/screw in threaded insert provided adjacent to mains input socket on the left hand side of cabinet (facing to the front).

The earth lead and connections **are not** provided by Avaya.

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