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AUDIX®

Maintenance for Tier 1

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Comments

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Acknowledgment

This document was prepared by the AT&T Product Documentation Development Department, Denver, CO 80234-2703.

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About This Document

This manual covers routine maintenance and troubleshooting procedures for an AUDIX Voice Messaging System running R1V5 through R1V8 software.

Normally, remote service technicians try to isolate and repair problems *first.* If the problem needs local attention, they will dispatch a technician to resolve the problem on-site (such as hardware replacement).

INTENDED AUDIENCES

This manual is intended for local (on-site) service personnel.

PREREQUISITE SKILLS OR KNOWLEDGE

No prerequisite skills or knowledge are presumed. However, AUDIX training is available and strongly recommended.

HOW THIS DOCUMENT IS ORGANIZED

Make sure you are familiar with the following before servicing the AUDIX system. This will speed and simplify problem diagnosis and repair procedures.

- *Chapters 1 and 2: Introduction and Orientation* — This material introduces the new or infrequent AUDIX technician to the manual and the AUDIX machine. Chapter 1 provides the general rules of AUDIX maintenance, tools and aids, and a list of related documentation that could be helpful. Chapter 2 includes routine maintenance procedures, the physical layout of the AUDIX machine, and fault diagnosis.
- *Chapters 3 through 5: Basic Troubleshooting* — These chapters attempt to isolate and resolve problems with the AUDIX system. Topics include:
  - — Determining the state of the system (is it in service and is the software running?)
  - — Resolving alarmed problems when the software is running
  - — Resolving unalarmed problems when the software is running
- *Chapters 6 and 7: Diagnostic Procedures* — These chapters give specific steps for diagnosing disk drive, power, and environmental problems. Installation procedures and proper settings for each type of disk drive are included.

- *Chapter 8: Terminal Setup and Use* — This chapter covers problems with terminals, modems, and printers. Proper settings for each are included along with troubleshooting steps when any of this equipment is not working.
- *Chapter 9: Adding New Hardware* — This chapter covers the addition of voice ports (i.e., TN747B and TN501B circuit packs) and the addition of the AUDIX expansion cabinet. (To add disks, see Chapter 6. To replace faulty circuit packs, including the TN747B and TN501B, see the appropriate section in Chapter 4.)
- *Chapter 10: Filesystem Problems* — This chapter covers how to resolve file redundancy alarms, restore mirroring after a disk or system problem, and distribute filesystems across disks for optimum performance.
- *Appendices A, B, and C: Reference* — Reference material includes:
  - Appendix A: Basic procedures such as blocking service, handling removable cartridges, shutting down the system, and making a visual inspection
  - Appendix B: Error code descriptions, administration log, software tables
  - Appendix C: Reference material including component ordering tables, references to other documentation, acronyms and abbreviations, and a glossary

CHANGES FROM THE PREVIOUS ISSUE

Changes from the previous issue of this document include:

- The document has been updated to reflect AUDIX R1V8 software.
- The main alarm-troubleshooting table in Chapter 3 (Table 3-1, *Alarm Resolution Procedures*) has been expanded and updated.
- Additional fault and unit codes have been added to Chapters 4 and 7.
- Options settings for the new 14-, 20-, and 33-hour disk drives have been added to Chapter 6.
- The option-setting procedure for the Optima 2400 modem has been added to Chapter 8.
- The TD-bus terminator board procedure when adding an expansion cabinet has been corrected in Chapter 9.

CONVENTIONS USED IN THIS DOCUMENT

The following typographic conventions are used in this document:

- Information that appears on your terminal screen — including displays, field names, prompts, and error messages — is shown in a different style of type. Information that you are to type just as it appears in the document is shown in **`bold`** type. For example:

  At the `when?` prompt, type **`now`**.

- Keys on the terminal that you press are shown in curved-edge boxes. For example, an instruction to press the return, carriage return, or equivalent key is shown in this document as:

  Press (RETURN).

- Variables that the system supplies or that you must supply are shown in italic type. For example, an error message that is displayed on the screen with one of your specific filenames might be shown in this document as:

  Your file *filename* is formatted incorrectly.

NOTE The terms ''DEFINITY Generic 3i'' and ''DEFINITY Generic 3s'' in this document refer to the latest version of switch software based on DEFINITY Generic 1 features. The term ''DEFINITY Generic 3r'' refers to the latest version of switch software based on DEFINITY Generic 2 features. The term ''DEFINITY Generic 3'' is used to refer to *all* DEFINITY Generic 3 systems (Generic 3i, Generic 3s, and Generic 3r).

TRADEMARKS AND SERVICE MARKS

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RELATED RESOURCES

This document is designed to supplement, *not replace*, other volumes in the AUDIX document library. Always refer to the appropriate document for specific information on installing, administering, or maintaining an AUDIX system. Documents related to AUDIX systems are listed in the following table.

Refer to the *Global Business Communications Systems Publication Catalog* (555-000-010) for a more complete list of documents related to switching systems and peripheral equipment that can be integrated with AUDIX systems. Refer to the *AUDIX Documentation Guide* (585-300-010) for a more detailed list of AUDIX documents, including which documents to order for a specific release (R1V5 through R1V8) of AUDIX software.

Title	**Document Number**
AUDIX Administration	585-305-501
AUDIX Installation	585-305-105
AUDIX Networking	585-300-903
AMIS Analog Networking	585-300-512
AUDIX Release 1 Version 5 Forms Reference	585-305-202
AUDIX Release 1 Version 6 Forms Reference	585-305-204
AUDIX Release 1 Version 7 Forms Reference	585-305-208
AUDIX Release 1 Version 8 Forms Reference	585-305-209
AUDIX Upgrade Instructions	585-302-108
AUDIX-L Maintenance	585-304-102
GBCS Products Security Handbook	555-025-600
Switch Administration for AUDIX Voice Messaging	585-305-505

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Product Documentation Development Department
Room 22-2C11
11900 North Pecos Street
Denver, Colorado 80234

1. Introduction

This chapter presents the general rules for servicing an AUDIX system. It also contains tools, aids, and related documents that may be helpful.

GENERAL RULES

When servicing an AUDIX system, always:

1. Follow the troubleshooting procedures, which start in Chapter 3.

   NOTE If you are unfamiliar with the AUDIX system, see Chapter 2, *Orientation*.

2. Notify the customer (or AUDIX system administrator) *before* shutting down the AUDIX system.
3. *A software shutdown must be performed before powering down the AUDIX system or doing filesystem maintenance.*
4. Shut down and power down the AUDIX system before changing any circuit pack, internal cable, or other piece of hardware.
5. Verify that normal service has been restored after a repair is completed (see *Before Leaving The Site* in Chapter 2).
6. Follow your local escalation procedures when a problem cannot be corrected within a reasonable amount of time.

TOOLS AND AIDS

For efficient service, the following equipment, tools, and information should be available *before* servicing an AUDIX system:

- *Customer Complaint(s):* Have the trouble ticket(s) describing the problem, time of occurrence, and customer contact(s).
- *Documentation:* Installation, maintenance, administration, forms, and user's manuals. A shelf for holding service manuals is located at the top front of each cabinet. Try to keep a complete set of manuals with the machine at all times.
- *New Parts:* Replacement units as diagnosed by preliminary service should be on-site (if available).
- *Terminal:* Local Maintenance Terminal (LMT) or Remote Maintenance Terminal (RMT) and touch-tone telephone(s) next to the AUDIX system
- *Test Equipment:* Digital voltmeter and EMC wrist strap
- *Local Contact:* Name and number of the AUDIX system administrator
- *Configuration:* AUDIX type, AUDIX software, switch type, and switch software for that site
- *AUDIX-to-Switch Translations:* AUDIX adjunct (machine) number, data link translations, voice port extension numbers, and call-distribution or hunt group numbers
- *AUDIX Access Information:* AUDIX extension number, voice mailbox number(s) for testing, maintenance-terminal login number, and passwords

RELATED DOCUMENTS

The following AUDIX documents can be good resources when specialized information is needed on one of the specific topics listed. These documents should all be shipped with the AUDIX system. Try to keep a complete library on-hand to ensure all the necessary information is readily available to you. Appendix C, *Equipment and References*, lists additional related AUDIX and switch manuals.

- *AUDIX System Description* (585-305-201) includes:
  - Individual circuit pack and hardware component descriptions
  - Overview of configuration, switch, and hardware considerations
  - System architecture and detailed internal functions
  - Non-AT&T switch configurations
- *AUDIX Feature Descriptions* (585-305-203) includes a detailed description of AUDIX software features and interactions.
- *AUDIX Installation* (585-305-105) includes:
  - Cabling from AUDIX to the switch including data link variations
  - Preinstallation requirements including power, environment, and switch information
  - Maintenance and administration terminal installation
- *Switch Administration for AUDIX Voice Messaging* (585-305-505) includes the administration of the System 75, System 75 XE, System 85, DEFINITY Communications Systems (Generic 1, 2, and 3), and DIMENSION PBX systems for interfacing with AUDIX systems.
- The *AUDIX Release 1 Version 8 Forms Reference* (585-305-209) and earlier versions of this manual (see the *Related Resources* section in the preface) include:
  - Details on the use of all AUDIX forms, including the purpose of each form, procedural tasks, display line messages, and an illustration
  - Procedures for setting up the terminals used to display the forms
- *AUDIX Administration* (585-305-501) includes:
  - Filesystem creation, deletion, addition, changes, and backups
  - Subscriber issues, requests, and procedures
- If you are working on an AUDIX Large system, you will need *AUDIX-L Enhanced III Maintenance* (585-304-102) in addition to *AUDIX Maintenance for Tier I* (585-305-106).
- The subscriber interface changed slightly in R1V8 software to be more streamlined; fewer keystrokes are needed to perform the same functions. Refer to the *AUDIX Documentation Guide* (585-300-010) to locate the subscriber and quick-reference documents to use for the specific release of AUDIX software installed on the system you are working on (R1V5 through R1V8).

2. Orientation

This chapter presents an overview of the AUDIX system and provides the concepts and procedures for servicing an AUDIX system. It is organized as follows:

- Physical Description
- Routine Maintenance
- Fault Diagnosis
- Before Leaving The Site

PHYSICAL DESCRIPTION

This section covers the AUDIX cabinet, connectors, and circuit packs. You may wish to review this section for differences in AUDIX systems if you work on more than one type of AUDIX system.

AUDIX Large (or AUDIX-L)

This is a two-cabinet, 2- to 32-port system. It has many configurable elements such as one or two disk controllers (0 and 1), one Removable Storage Drive (RSD), and one to seven Fixed Storage Drives (FSD). AUDIX-L may run AUDIX R1V1 through R1V5 software.

NOTE

Use *AUDIX-L Enhanced III Maintenance* (585-304-102) to troubleshoot AUDIX-L hardware. Use *AUDIX Maintenance for Tier I* (585-305-106) to troubleshoot AUDIX-L software.

One-Cabinet AUDIX (formerly AUDIX-S)

This is a half-height cabinet, 2- to 16-port system. It supports one disk controller (0), one Removable Cartridge Drive (RCD), and one to three Hard Disk Drives (HDDs). It may run AUDIX R1V2 or later AUDIX software.

Two-Cabinet AUDIX

The AUDIX two-cabinet system is a one-cabinet system with an expansion cabinet stacked on top. The additional cabinet provides up to sixteen additional ports. This system uses the same disk controller and provides up to three additional HDDs. This system may run AUDIX R1V3 or later AUDIX software.

Administration and Maintenance Forms

Forms are summarized in the appropriate forms reference manual for your version of AUDIX software (refer to the *Related Resources* section in the preface for a list). The *AUDIX Feature Descriptions* (585-305-203) covers software changes between releases in an appendix.

The AUDIX one- and two-cabinet and AUDIX-L systems share the same maintenance software. Some differences among AUDIX models include:

- A one-cabinet system does not have a Voice Session Processor (VSP). This processor and associated subsystem are present in a two-cabinet system (when an expansion cabinet is added) and in the AUDIX-L.
- Forms may list more than one disk controller (0 and 1). Only AUDIX-L uses controller 1.
- AUDIX-L hardware terms (such as GPP, SI, and IPC/DIM) are listed as aliases in various tables or forms in the text.

AUDIX Hardware

Figure 2-1, *AUDIX Connector Panel (Rear View)*, shows a close-up of the lower (base) cabinet cable connector panel. Original versions of AUDIX use the early version of the cable connector; newer shipments use a connector panel with additional monitor connectors used in troubleshooting. Both types are shown in the figure. Table 2-1, *AUDIX Connectors*, provides a description of each connector.

Figure 2-2, *AUDIX Connectors (Expansion Cabinet)*, shows a close-up of the top (expansion) cabinet cable connector. There is only one version of this connector panel. Table 2-2, *AUDIX Connectors (Expansion Cabinet)*, provides a description of these connectors.

AUDIX hardware includes:

- *Carriers:* The basic AUDIX system uses a single circuit-pack carrier built into the half-height cabinet. The system can also have an expansion cabinet stacked on top of the original system. The expansion cabinet has the same carrier layout as the basic system, but only certain circuit packs are installed in the top cabinet. AUDIX circuit packs are listed in Table 2-3, *One-Cabinet AUDIX Circuit Packs*, and Table 2-4, *Two-Cabinet AUDIX Circuit Packs*.
- *Environment Control:* Fans, an air filter, thermal sensors, and air diverters (plenums) regulate each cabinet's temperature.
- *Hard Disk Drive (HDD):* Up to six HDDs of varying size may be installed in the cabinet to provide system and customer data storage. Early AUDIX systems contain only 5.25-inch drives. Later AUDIX systems typically contain 3.5-inch drives that are equivalent in storage capacity to the 5.25-inch drives. Current disks are sized by hours instead of megabytes.
- *Power Distribution:* AUDIX has two power options. One of the following options is required:
  - — AUDIX may have an AC power supply and a DC battery reserve. During normal operation, AUDIX is supplied with 120 V AC from a standard wall outlet. During brief power outages, the battery reserve supplies 48 V DC power to the vital circuits within the AUDIX cabinet. A battery charger is included with the power supply.
  - — AUDIX may receive DC power directly from the building battery plant.
- *Removable Cartridge Drive (RCD):* One 50-Mbyte cartridge-type drive with removable media is used for routine backups of system data and updating system software if needed. On two-cabinet systems, the RCD is located in the bottom cabinet. (Early systems have a 20-Mbyte RCD; see Appendix A for cartridge-handling procedures.)

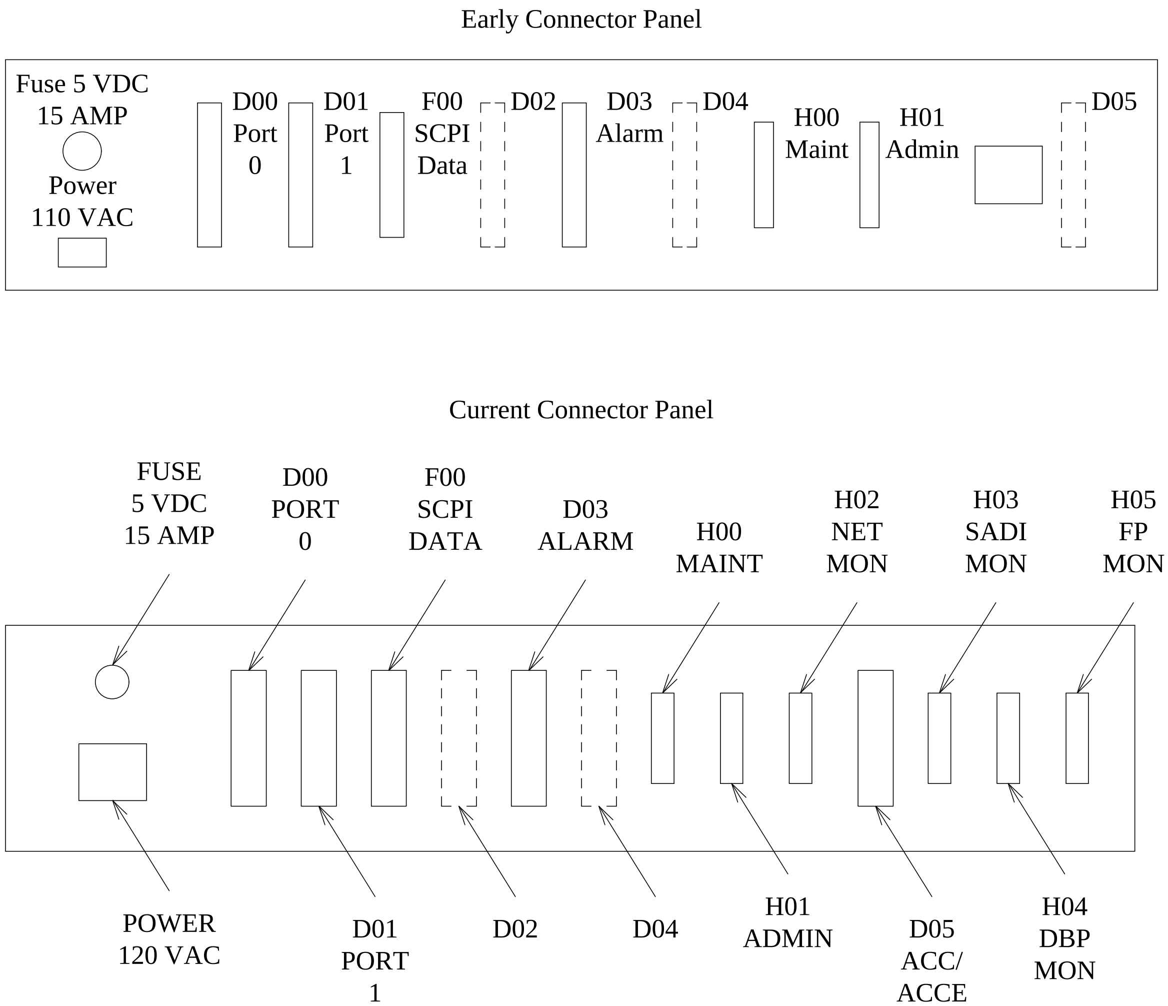


Figure 2-1. AUDIX Connector Panel (Rear View)

Table 2-1. AUDIX Connectors

Function	Description	Labels	
Early Connector Panel			
Voice Ports	Female 25-pair amphenol (8 ports) Female 25-pair amphenol (8 ports)	PORT 0 PORT 1	D00 D01
Alarms *	Female 25-pair amphenol (1 pair)	ALARM	D03
Data Link	Male 37-pin RS-449 connector	SCPI DATA	F00
Maintenance *	Female 25-pin RS-232C	MAINT	H00
Administration	Female 25-pin RS-232C	ADMIN	H01
(Reserved for future use)	Female 25-pair amphenol Female 25-pair amphenol Female 25-pair amphenol	*none* *none* *none*	D02 D04 D05
Current Connector Panel			
Voice Ports	Female 25-pair amphenol (2 to 8 ports) Female 25-pair amphenol (10 to 16 ports)	PORT 0 PORT 1	D00 D01
Data Link	Male 37-pin RS-449 connector	SCPI DATA	F00
(Reserved for SL-1 use) †	Female 25-pair amphenol	*none*	D02
Remote Alarms Link *	Female 25-pair amphenol (1 pair)	ALARM	D03
(Reserved for future use)	Female 25-pair amphenol	*none*	D04
Maintenance Terminal *	Female 25-pin RS-232C	MAINT	H00
Administration Terminal	Female 25-pin RS-232C	ADMIN	H01
ACC(E) Monitor *	Female 25-pin RS-232C	NET MON	H02
SADI Monitor *	Female 25-pin RS-232C	SADI MON	H03
DBP Monitor *	Female 25-pin RS-232C	DBP MON	H04
FP Monitor *	Female 25-pin RS-232C	FP MON	H05
Networking Link	Female 25-pair amphenol (2 links)	ACC/ACCE	D05

* For Services or Development use only.

† Used for VPT 5 on an SL-1 switch; see the *AUDIX Integration Package for the SL-1 Switch* (585-304-203) for details.

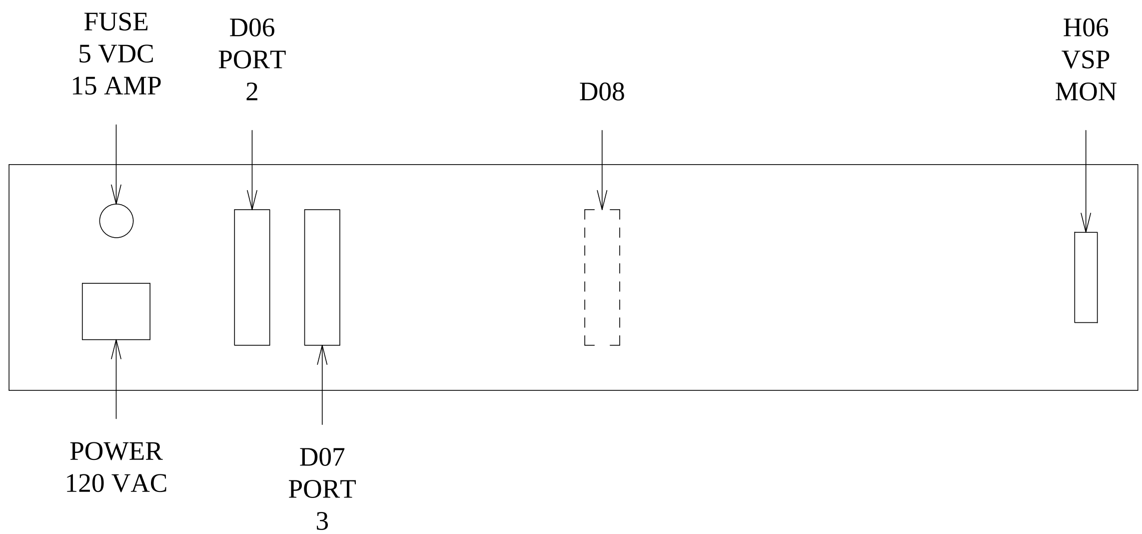


Figure 2-2. AUDIX Cable Connectors (Expansion Cabinet)

Table 2-2. AUDIX Expansion Connectors (Expansion Cabinet)

Function	**Description**	**Labels**	
Voice Port:	Female 25-pair amphenol (8 ports)	PORT 2	D06
	Female 25-pair amphenol (8 ports)	PORT 3	D07
VSP Monitor *	Female 25-pin RS-232C	VSP MON	H06
(Reserved for future use)	Female 25-pair amphenol	*none*	D08

* For Services or Development use only.

Table 2-3. One-Cabinet AUDIX Circuit Packs

Slot	Circuit Pack	Description and Names	Installed?
00	TN506B	Bus Controller (BC)	Standard
01	TN475B	SCSI-to-AUDIX Disk Interface (SADI)	Standard
02	TN532 *or* TN540	Data Base Processor Random Access Memory (DBP-RAM, DBP-MEM, or DVRAM)	Standard
03	TN366(B) *or* TN539(B)	AUDIX Communications Controller (ACC) or ACC Enhanced (ACCE)	Networking Networking
04	TN472C	DBP Central Processing Unit (DBP-CPU or DFC)	Standard
05	UN162	Voice Store and Forward Interface (VSFI)	Standard
06	UN160B	Data Base Processor Interface (DBPI)	Standard
07	TN511	Maintenance Interface (MI)	Standard
08	TN535	Processor Monitor (FP-MON or MON)	Testing
09	TN591 *or* TN523	Feature Processor Central Processing Unit (FP-CPU, FP-PE, or PE 0) CPU in early systems with < 24 ports; requires TN734 RAM boards	Standard
10	TN761 *or* TN734	FP Random Access Memory board 1 (FP-RAM 0) (One TN761 replaces two TN734s)	Standard
11	TN734	FP Random Access Memory board 2 (FP-RAM 1) (Empty if slot 10 has a TN761 installed)	Standard
12	–	Spare	–
13	TN716B	FP Bus Interface (FP-BI or Interface 1)	Standard
14	TN727	Network Control (NC or NETCON)	Standard
15	TN533 *or* TN547B	Switch Communications Processor Interface (SCPI), or Multiprotocol Switch Interface (MPSI)	Standard
16	TN500 *or* TN477	Time Division Bus Interface – 16 ports (TDBI), or (TDBI-8 in early systems with ≤ 8 ports)	Standard
17	TN520	Voice Buffer (VB)	Standard
18	TN714	Tone and Clock (TC)	Standard
19	TN747B	Voice Port 1 (VPT)	Standard *
20	TN501B	Voice Processor 1 (VPC)	Standard
21	TN501B	Voice Processor 2 (VPC)	Optional †
22 to 23	TN501B	Voice Processors 3 and 4 (VPC)	Optional
24	TN747B	Voice Port 2 (VPT)	Optional *
25 to 28	TN501B	Voice Processors 5 to 8 (VPC)	Optional

* For SL-1 applications, this may be a TN762B.

† For SL-1 applications, this may be a TN747B or TN762B (VPT 3).

Table 2-4. Two-Cabinet AUDIX Circuit Packs *(Part 1 of 2)*

Upper (Expansion) Cabinet			
Slot	**Circuit Pack Code**	**Acronym**	**Quantity**
00 - 07	–	Spare	
08	TN535	FP-MON or MON	Testing
09	TN591 or TN523	VSP-CPU	1
10	TN761 or TN734	VSP-RAM	1
11, 12	–	Spare	
13	TN716B	VSP-BI	1
14	TN727	NC	1
15	–	Spare	
16	TN500	TDBI 2	1
17	TN520	VB 2	1
18	–	Spare	
19	TN747B	VPT 3	1 * †
20	TN501B	VPC 9	1 *
21	TN501B	VPC 10	1 *
22	TN501B	VPC 11	1 *
23	TN501B	VPC 12	1 *
24	TN747B	VPT 4	1 * †
25	TN501B	VPC 13	1 *
26	TN501B	VPC 14	1 *
27	TN501B	VPC 15	1 *
28	TN501B	VPC 16	1 *

* Optional port boards. One VPT board handles up to four VPC boards.

† For SL-1 applications, this may be a TN762B.

(Continued)

TABLE 2-4. Two-Cabinet AUDIX Circuit Packs *(Part 2 of 2)*

Lower (Base) Cabinet			
Slot	**Circuit Pack Code**	**Acronym**	**Quantity**
00	TN506B	BC	1
01	TN475B	SADI	1
02	TN540	DBP-RAM	1
03	TN366(B) or TN539(B)	ACC or ACCE	1 #
04	TN472C	DBP-CPU	1
05	UN162	VSFI	1
06	UN160B	DBPI	1
07	TN511	MI	1
08	TN535	FP-MON or MON	Testing
09	TN591 or TN523	FP-CPU	1
10	TN761 or TN734	FP-RAM	2
11	TN734	FP-RAM	2 $
12	–	Spare	
13	TN716B	FP-BI	1
14	–	Spare	
15	TN533 or TN547B	SCPI or MPSI	1
16	TN500	TDBI 1	1
17	TN520	VB 1	1
18	TN714	T/C	1
19	TN747B	VPT 1	1 †
20	TN501B	VPC 1	1 *
21	TN501B	VPC 2	1 * ‡
22	TN501B	VPC 3	1 *
23	TN501B	VPC 4	1 *
24	TN747B	VPT 2	1 * †
25	TN501B	VPC 5	1 *
26	TN501B	VPC 6	1 *
27	TN501B	VPC 7	1 *
28	TN501B	VPC 8	1 *

* Optional port boards. One VPT board handles up to four VPC boards.

\# Used only for AUDIX Networking.

$ Only installed if another TN734 is installed in slot 10, otherwise empty.

† For SL-1 applications, this may be a TN762B.

‡ For SL-1 applications, this may be a TN747B or TN762B (VPT 5).

The following figures illustrate AUDIX system hardware.

- Figure 2-3, *One-Cabinet AUDIX System (Front View)*, shows a single-cabinet system with the newer equipment: the 50-Mbyte RCD, finger guard over the power switch, and 3.5-inch Hard Disk Drives (HDDs).
- Figure 2-4, *Two-Cabinet AUDIX System (Front View)*, shows the base cabinet and expansion cabinet in a two-cabinet AUDIX configuration. One-cabinet AUDIX systems will only have the base cabinet (the lower cabinet in the figure). Figure 2-4 shows the 20-Mbyte RCD and 5.25-inch drives used in earlier AUDIX systems.
- Figure 2-5, *Early Two-Cabinet AUDIX System (Rear View)*, and Figure 2-6, *Current Two-Cabinet AUDIX System (Rear View)*, show the variations in the hardware that may be found in early or newer AUDIX systems. One-cabinet AUDIX systems have only the base cabinet (the lower cabinet shown in each figure).

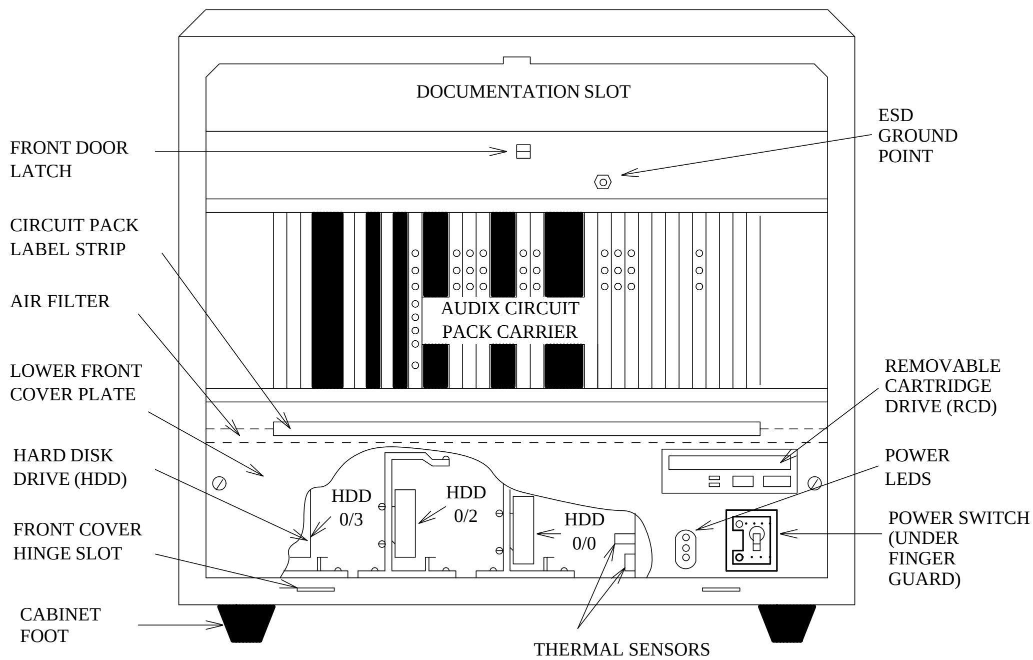


Figure 2-3. One-Cabinet AUDIX System (Front View)

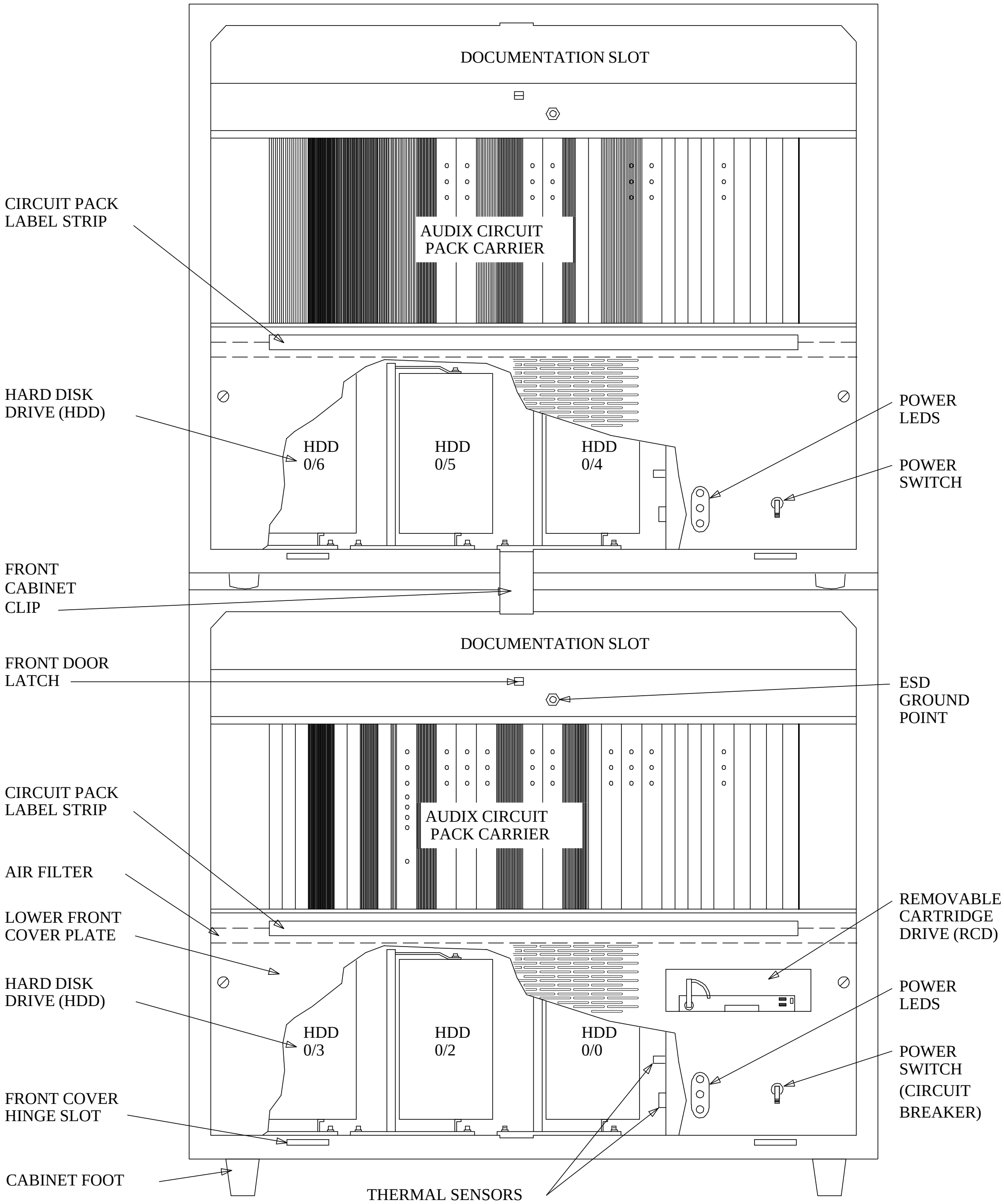


Figure 2-4. Two-Cabinet AUDIX System (Front View)

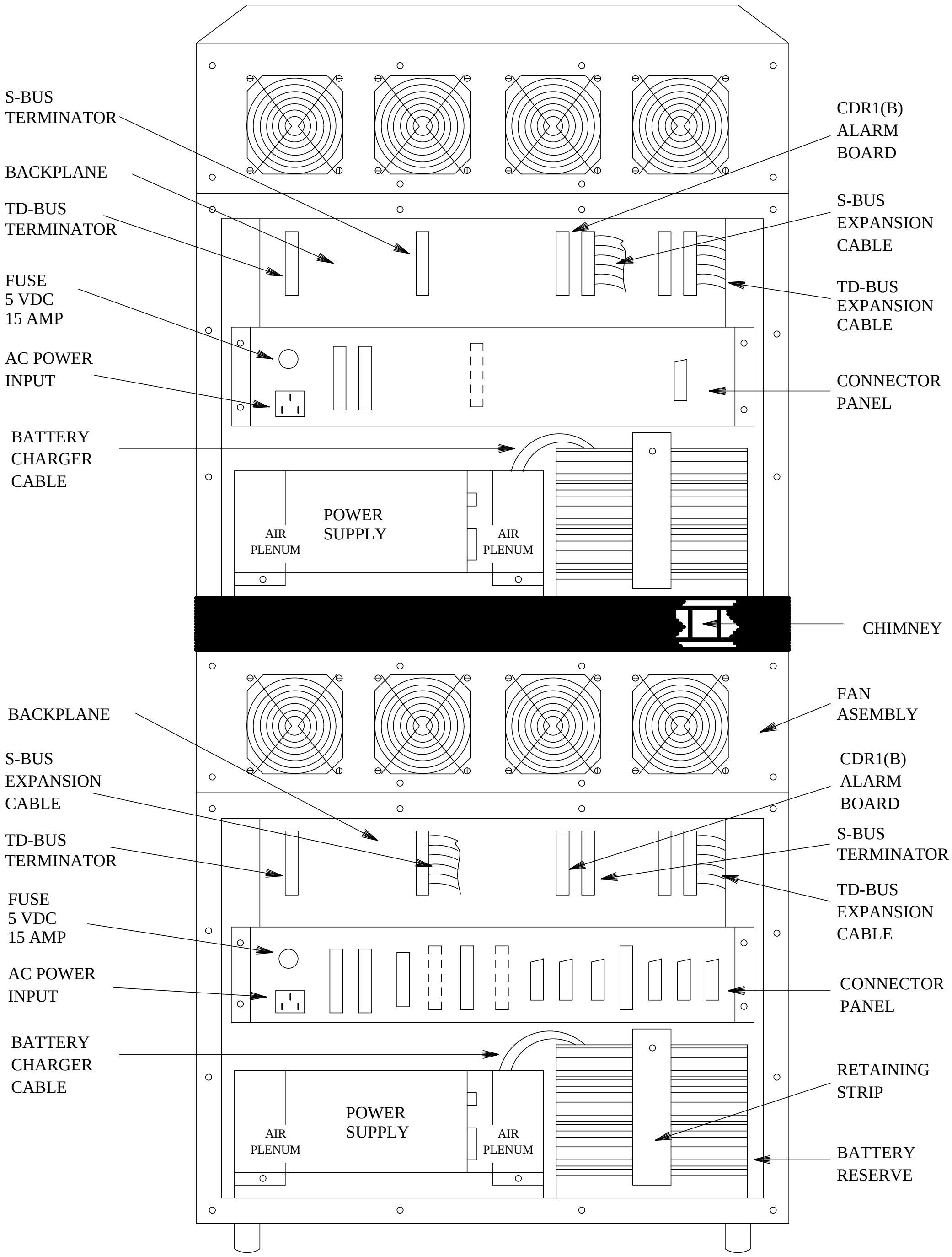


Figure 2-5. Early Two-Cabinet AUDIX System (Rear View)

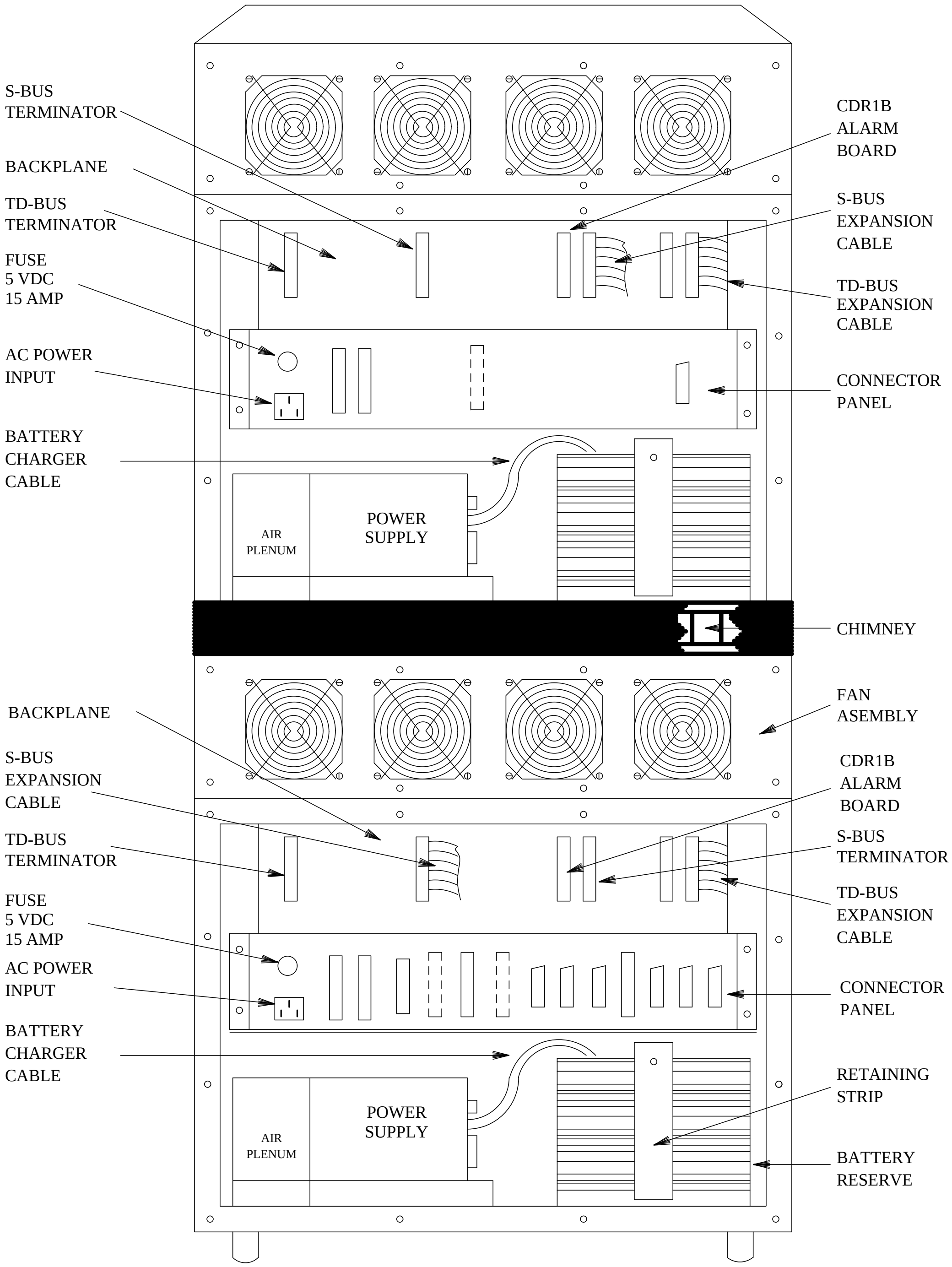


Figure 2-6. Current Two-Cabinet AUDIX System (Rear View)

ROUTINE MAINTENANCE

Routine preventive maintenance should be performed as part of a service call when the technician responses to a customer complaint or system alarm.

NOTE

Keep a log for each site so you know when a routine check or replacement is due.

Air Filter

The air filter below the circuit pack carrier of each cabinet should be checked. See Chapter 7, *Power and Environment*, for replacement procedures.

Battery Reserve

For systems using AC power with battery backup, check battery voltage(s). The battery reserve supplies emergency DC power during a power failure, giving the system time to shut down software to protect valuable system and subscriber data. See Chapter 7, *Power and Environment*, for battery checking and replacement procedures.

Cartridge-Handling Procedures

The Removable Cartridge Drive (RCD) cartridges must be handled carefully to prevent damage to the media or drive. See *RCD Cartridge Handling* in Appendix A for complete cartridge-handling precautions and removal procedures. In two-cabinet systems, the RCD is always in the bottom cabinet.

Environment

AUDIX requires a clean, regulated environment in order to work properly.

- The air should be clean, free of dust and particles (such as those produced by copy machines), smoke, and corrosive gases.

CAUTION

Smoke, dust, or dirty conditions can severely damage removable cartridges. Keep the environment as clean as possible.

- Air conditioning should handle up to 2337 BTUs/hour (685 watts) for a one-cabinet system. For two-cabinet systems, the air conditioning should handle 3757 BTUs/hour (673 watts for the base cabinet and 428 watts for the expansion cabinet). The air should not blow directly at the cabinet or it may interfere with internal cooling patterns.
- The room should be well ventilated with a relative humidity of 10 to 80 percent (noncondensing). Maximum wet-bulb temperature should be 79°F (26°C).
- Optimum temperature should range from 65 to 85°F (18 to 29°C). However, AUDIX can operate at temperatures from 50 to 95°F (10 to 35°C), the same maximum ambient temperature needed for the switch.
- If RCD cartridges are exposed to extreme temperatures – those greater than 100°F (38°C) or lower than 39°F (4°C) – allow them to acclimate at least 1 hour before using them. Let the RCD warm up (run) about 40 minutes before reading from or writing to the cartridge.

NOTE

AUDIX can operate at temperatures between 32 and 122°F (0 and 50°C) and at 5 to 10 or 80 to 95 percent relative humidity for no more than 72 continuous hours or a total of 15 days in 1 year.

Fans

Check that *all four* fans at the back of *each* cabinet are running. (Three fans run on high if one fan is not working.) If any fan is not running, see Chapter 7, *Power and Environment*, for replacement procedures.

Check for Current Filesystem Backups

Routine filesystem backups (copies) should be made on a separate disk or cartridge. In the event of a hardware or operational error, the backup copy may be the only way to restore valuable customer data. Work closely with the AUDIX system administrator to implement a backup strategy. Check for current backups of critical filesystems as follows:

1. Check the RCD cartridge for current sdat filesystem backups (use the `filesystem : list` form). The backup filesystems are created automatically through nightly audits and are named by date (for example, the backup from December 5, 1993 is named `sd931205`).
2. Check that the names filesystem is being backed up on a weekly basis. Use the `system : announcement : filesystems` form.
3. If the system uses custom announcements (announcements voiced-in or altered by the customer), check that there is a backup announcement filesystem for these custom announcements. If the customer uses the announcement set as it was shipped from the factory, this backup is not necessary.
4. Check that the vtext filesystems are balanced (similar in size) and are spread out over more than one disk if possible (use the `filesystem : list` form).
5. Make sure the system administrator is updating the backup boot filesystem any time the system configuration is changed. This includes the addition of voice ports and disks or whenever translations are changed. Also check that a copy of the generic-program cartridge is stored in an acceptable storage location.

FAULT DIAGNOSIS

AUDIX is designed for modular hardware replacement in the field. Comcodes for AUDIX circuit packs and other equipment are listed in Appendix C, *Equipment and References*. A general summary of on-site troubleshooting procedures is included in this section.

Faults are reported in two ways. One way is through alarms generated internally by AUDIX diagnostics. The alarms appear on the AUDIX system, on the maintenance terminal, and if equipped to do so, at the switch and at a remote maintenance location. The second method of reporting faults is through service complaints. (Look for areas in this manual that address ‘‘unalarmed’’ problems.)

Generally, remote maintenance personnel try to diagnose any problem, alarmed or unalarmed, from information gathered from the trouble ticket and from the maintenance port. Internal AUDIX diagnostics try to narrow the problem down to a faulty circuit pack or component (called a *replaceable unit*). If possible, the system takes a faulty device out of service through automatic system reconfiguration so the system can continue to provide service, although possibly at a reduced capacity.

Use the following procedures to aid in the diagnosis.

Visual Inspection

The first part of an on-site service visit is to inspect the system visually for obvious problems. See *Visual Inspection* in Appendix A for detailed steps.

- *TN511 MI Alarm Panel:* The TN511 Maintenance Interface (MI) contains extra red and yellow LEDs to display system alarms, warnings, or shutdown status. If you already plugged in the Local Maintenance Terminal (LMT), the IN USE LED should be lit.
- *TN475B SADI LEDs:* The TN475B SADI circuit pack lights yellow LEDs 10 to 16 for each disk drive installed in the system (RCD 0/1 and HDD 0/0 to HDD 0/6). See Chapter 6, *Disk Drives*, for more information on disk drives.
- *Other Circuit Pack LEDs:* Any steadily lit red (alarm) LED may mean a circuit pack is faulty. Check for yellow (warning) LEDs, or yellow LEDs marking normal in-use activity. A green LED indicates a test (if steady) or heartbeat (if pulsing). *Visual Inspection* in Appendix A lists LEDs which should be lit.
- *Front Panel LEDs:* The three LEDs next to the POWER switch on each cabinet indicate the system power source (AC or DC holdover) and battery-reserve faults. Only the green LED should be lit.
- *Cable Connections:* Each cabinet’s POWER switch should be ON and the 120 V AC power cord or DC power feeders at the rear of each unit must connected to building power. The connectors on the rear panels are summarized in Table 2-1 and Table 2-2 along with *Visual Inspection* in Appendix A. Connect the LMT to H00 on the back of the cabinet in place of the remote maintenance modem during an on-site visit.

Check Alarm, Error, Administrator, and Activity Logs

If software is running and forms can be used, check the alarm log and the error log for the cause of a problem. See *Alarm and Error Log (Display and Use)* in Appendix A for details on the alarm and error logs. Chapter 3, *Start Troubleshooting* covers steps for using the logs to troubleshoot or solve problems.

- *Alarm Log:* Alarms (faults) are recorded on the `maintenance : active alarm : display` form in the order in which they should be resolved (most severe fault first). Each alarm shows a fault, unit, and device number used to identify the problem.

  Use the `maintenance : active alarm : specification` form *before* going to the `maintnenace : active alarm : display` form if you are looking for a specific alarm log entry. Select a specific date, time, type of alarm, etc.).

- *Resolved Alarm Log:* Faults that have been corrected appear on the `maintenance : resolved alarm : display` form. Check this log to be sure alarms are cleared after maintenance. Faults that resolve themselves and then re-occur are called *intermittent* faults.

- *Error Log:* Errors are listed on the `maintenance : error : display` form. You may use error reports when the alarm log is not sufficient. Because 10,000 or more errors may be listed, use the `maintenance : error : specification` form *first* to specify what set of errors to view. Use the error log as directed in Chapter 3, *Start Troubleshooting*.

  The `maintenance : error : specification` form also allows you to activate an *enhanced activity trace* for a set of error codes (1000-1099) that track detailed system events. If you choose to activate the *enhanced activity trace* feature, you *cannot* also activate the activity log (described below).

- *Activity Log*: The AUDIX system records certain mailbox-related activities in a disk file known as the activity log. This provides the system administrator or technician with a tool for investigating user-reported troubles (for example, delayed deliveries). The technician may display the activities for any local subscriber.

  In order to record errors, the activity log must first be activated using the `system : activity log : specification` form. Subsequent mailbox activities can then be displayed on the `system : activity log : display` form.

- *Administration Log:* Certain errors which should be handled by the system administrator appear on the `system : log : display` form. Do *not* display this form without first informing the system administrator or having him or her present. Once displayed, the entries are cleared unless a date and time are specified on the `system : log : specification` form.

  Although these errors are the responsibility of the administrator, this log may point to potential problems with system operation. This log can be very useful in troubleshooting unalarmed problems in an AUDIX network. Look for errors in message delivery or machine connection failures that may indicate a problem with AUDIX networking, if used.

Block Service

Service may be interrupted (blocked) on an AUDIX system to keep subscribers from using faulty equipment, and to allow the technician to do repairs, tests, or filesystem audits (update programs) without interference. On a blocked system, users who try to access the system hear reorder tone (fast-busy) or ringing with no answer.

Always notify the customer before blocking service. Try to block service only during light or no-traffic conditions if possible. On integrated (data link) systems, you may use the `maintenance : datalink : busyout` form to block all new calls to the system (this is the normal method). You could also use the `maintenance : vsp : busyout` form to remove any or all TDBI, VB, VPC, or VPT ports or channels from service (if not in use). Be sure to release the data link and/or voice ports once you have finished the repair action. See *Block/Restore Service* in Appendix A for details.

Shut Down Software

A system shutdown protects software and customer data. A software shutdown is *always* required prior to powering down the system, and may be required for many filesystem procedures. If the Control Mode Menu is on the screen, the system software is already shut down (firmware is in control). See *Shut Down Software* in Appendix A for details. *Notify the customer and schedule a time,* then shut down system software as follows:

- **Shutdown Using a Form (Remote and Local):** When the system is in normal (in-service) mode, you may use the `shutdown` form to close software files and bring down the system. Select the type of shutdown you need based on urgency and function:

  — A *camp-on* shutdown (c) prevents new calls and gradually blocks service as calls in progress end. A *forced* shutdown (f) drops all calls and should be used only when there is no traffic on the system or if maintenance is urgent.

  — An *administrative* shutdown (a) closes all files except the active boot and adat, but remounts the filesystems so administration or maintenance can be done. A *maintenance* shutdown (m) should be used just before powering down the system to close and unmount all filesystems except the active boot.

NOTE	A maintenance shutdown automatically spins down the RCD (wait for the green LED to go out). An administrative shutdown leaves the cartridge active.

- **Shutdown Using the MI Toggle Switch (Local Only):** You may *cycle* the MI toggle switch to shut the system down (pull the toggle switch out and set it from the center to the off-center position). This action is equivalent to a forced maintenance shutdown and should be done only in urgent or no-traffic situations. See *MI Toggle Switch* in Appendix A for details.

Power Down and Replace Hardware

To replace any unit, first shut down the software using the maintenance (m) option (see the previous section). If software is not running, use the MI toggle switch. Wait for the RCD to spin down (the green LED goes out) and for the red COMPL LED on the MI to light. When shutdown is complete, turn the POWER switch OFF. Replace the unit as described in this manual.

CAUTION *When replacing circuit packs, always plug the jack on your antistatic EMC wrist strap into the Electro-Static Discharge (ESD) ground point on the front of the cabinet. Refer to Figure 2-4,* **Two-Cabinet AUDIX System (Front View)***, for an illustration.*

When you turn power back ON, the system should initialize automatically. Block service to run verification test(s) on the new unit. If you had an alarm, check the alarm logs to make sure it is resolved. See *Remove Cover Plates* in Appendix A for details.

Initialize the System

Return the system to full service as follows:

1. *Start Initialization:* Reinitialize by powering the system up, moving the MI toggle from off-center to center, running the `startup` form, or using Control Mode Menu options. You may do a *restart* (partial initialization from FP memory), or a *reboot* (automatically loads programs from disk after a power up or failed restart).

2. *Select Initialization Options:* Standard initialization may take 10 to 45 minutes, depending on the system configuration. You may manually select other options to run additional tests or select alternative devices or filesystems to test them.

3. *Watch Initialization:* Hardware initialization and self-tests take from 6 to 20 minutes, depending on the options selected. When the system displays `MAINTENANCE INTERFACE ENTERING NORMAL MODE`, it starts software initialization (a restart starts here). This step takes from 5 to 45 minutes, depending on the size of the data base and if the system was shut down properly.

4. *Start Service:* After software is loaded, the terminal screen displays the message `start service` and gives a login prompt (both MI connectors are now active). After about 1 minute, the data link to the switch is initialized (on integrated systems) and full service is available.

   A `service not started` message normally means that a filesystem is missing. The system will not accept calls until the problem is corrected and the system restarted.

Equipping Devices

Equipping a device means to make the software aware of its presence.

1. *VSP Devices:* To equip or unequip a VB/TDBI pair, VPT, or VPC (called VSP devices), use the `maintenance : vsp : equipage` form. Existing devices must be busied out using the `maintenance : vsp : busyout` form before they can be unequipped.
2. *DBP Devices:* The only devices in the Data Base Processor (DBP) subsystem that can currently be equipped or unequipped on AUDIX are the disks (the RCD cartridge or HDDs). To equip or unequip these devices, use the `maintenance : dbp : equip` and `maintenance : dbp : unequip` forms.

NOTE

An unequip command on disk01 automatically spins down the RCD (wait for the green LED to go out). An equip command spins up the drive (wait for a steady green LED). The start/stop button is disabled while the green LED is blinking. See *RCD Cartridge Handling* in Appendix A for details.

BEFORE LEAVING THE SITE

After the problem is resolved, do the following:

1. *Restore Service:* If you blocked service, use the appropriate AUDIX form or switch procedure to free the blocked ports for use. See *Block/Restore Service* in Appendix A for details.
2. *Make a Test Call:* Call the AUDIX number to verify that full service is available.
3. *Check Trouble Tickets:* Verify that the original problem or customer complaint is solved and that related features are working correctly.
4. *Check Alarm Logs:* Check the active, administration, and resolved alarm logs for new faults and for the correct resolved entries. See *Alarm and Error Logs (Display and Use)* in Appendix A for details.
5. *Check the Terminal:* Check the maintenance terminal STATUS line to make sure all faults or threshold violations are resolved. See Chapter 8, *Terminal Setup and Use* for details.
6. *Check LEDs:* Check the circuit packs and front panel for lit red (alarm) or yellow (in use or warning) LEDs. Also verify that the fans and disk drives are running. See *Visual Inspection* in Appendix A for details.
7. *Routine Maintenance:* Do any routine (preventive) maintenance needed for that site (see *Routine Maintenance* in Chapter 2).
8. *Restore Original Setup:* Place the MI toggle switch in the center position. Disconnect the LMT cable from the MAINT port (H00) on the back of the cabinet and reconnect the cable for the remote maintenance site's modem. Turn off the LMT.

3. Start Troubleshooting

This chapter is the starting point for diagnosing any problem on AUDIX. It contains:

- Troubleshooting Summary: A quick guide for experienced service personnel
- Control Mode Menu: A list of options active when the AUDIX firmware has taken control over a troubled system
- Initial Diagnosis: Basic diagnostic procedures to determine the state of the AUDIX system and locate active alarms (if present)
- Solving Active Alarms: Procedures to resolve alarms
- Solving Customer Complaints: A list of typical complaints and their solutions
- Solving Unalarmed Problems: A procedure to diagnose the system when no alarm is present
- Verify Good Service: Steps to verify good service after the system is repaired

NOTE

If you are not experienced with AUDIX or have not worked on an AUDIX system for some time, you should first review Chapter 2, *Orientation*, Chapter 8, *Terminal Setup and Use*, and Appendix A, *Basic Procedures*.

AUDIX problems fall into two categories: those that cause alarms (faults), and those that do not. For problems that cause alarms to appear in the alarm log, look up the alarm unit number in Table 3-1, *Alarm Resolution Procedures*, for directions on how to resolve them. Resolve the alarms in the order in which they appear in the alarm log.

Problems that do not raise alarms are those usually reported by users of the AUDIX system. First verify that there is a problem. Try to reproduce it from the explanation given by the user. If you cannot fix the problem using *Solving Customer Complaints* and/or *Solving Unalarmed Problems*, escalate it per local procedures.

TROUBLESHOOTING SUMMARY

If you are familiar with AUDIX systems, use the following quick list as a guide for diagnosing AUDIX problems. This summary is a memory jogger for experienced services personnel. If the problem is complex or if you need more information, go on to *Initial Diagnosis*.

1. Log in to the AUDIX system. If the Control Mode Menu appears, use the procedures of *Control Mode Menu* to get the software running and return here to step 2. If the path line and screen layout appear, go directly to step 2.

2. Check the STATUS line for alarms. If there is an active alarm, do the following. If there is no active alarm, go to step 3.

   a. If there is an active `M, m, or w` alarm, display the `maintenance : active alarm : display` form. Each entry has a unit number associated with it. Look the unit number up in Table 3-1 and go to the indicated chapter for problem resolution.

   b. Use the `maintenance : resolved alarm : display` form or the `maintenance : error : display` form to track down intermittent faults. Look up suspected units in Table 3-1 and go to the indicated chapter.

NOTE	Errors 1000 to 1099 are used only to track system or subscriber activity. They should not be interpreted as a problem. In the event a subscriber reports a problem, these errors can be used to trace that subscriber's sequence of button pushes.

   c. For an active `A` alarm, inform the system administrator. This is an *administrative* alarm that might indicate possible break-in attempts, subscriber problems, or other issues that require system administrator attention.

3. Check the STATUS line for filesystem threshold violations. If any are reported:

   a. Use the `system : thresholds` form to locate filesystems that are exceeding space limitations. Use the `system : limits` form to compute new sizes for ndat, sdat, sst, or vdat. For vtext filesystems, create a new filesystem of the same size as the existing ones (if fewer than 10 vtext filesystems are assigned).

   b. You can shut the system down and either increase the filesystem sizes if possible using the `filesystem : detail` form (all vtext filesystems *must* be the same size), or move the filesystem to a disk that has more available space (use the `filesystem : list` and `filesystem : copy` forms).

4. If the STATUS line shows no problems, check that all hardware devices are equipped and enabled (ready for use).

   a. Use the `maintenance : dbp : status` and `maintenance : vsp : equipage` forms to check hardware status.

   b. Activate any devices if needed using the `maintenance : dbp : equip` or `maintenance : vsp : busyout` and `maintenance : vsp : equipage` forms.

5. If the hardware looks correct, check that all required filesystems are mounted and active:

   a. Use the `system : filesystems` form to verify that an sd, vd, ss, boot, and one or more vm filesystems are shown as active.

      Use the `system : announcement : filesystems` form to verify that an active announcement filesystem and a names filesystem are shown. There may be an administrative filesystem also shown, but not required. It is highly recommended that a weekly names backup filesystem be shown.

   b. Activate any required filesystems using these forms. If a filesystem cannot be activated, check the `filesystem : list` form to verify that the filesystem has a mount point. If not, use the `filesystem : mount` form to mount the filesystem and then go back and try to activate it.

6. If the software looks correct, place a test call through any suspected ports or channels using the `maintenance : system : test call` form.
7. If the problem is still not detected, *notify the customer about an interruption in service,* then restart the system at an agreed-upon time. See if the problem is cleared.
8. If the problem persists, *arrange for another service interruption with the customer,* then reboot the system. (A reboot may run automatically if the restart in the previous step fails.)
9. If the problem is still not isolated, go to *Solving Unalarmed Problems* (if software is running). If the software is not running (Control Mode Menu is displayed), go to *Control Mode Menu*.
10. After repair procedures, go to *Verify Good Service*.
11. Make sure the customer complaint or original problem is solved.

CONTROL MODE/VISUAL INSPECTION CHECKLIST

CAUTION

DO NOT *cycle power, restart, or reboot the system without recording the information in the checklist* **first.** *Otherwise, this data will be lost and a valuable clue to repairing the system will be erased.*

Whenever AUDIX software is not running, take 5 minutes to record the Control Mode Menu and visual inspection information before doing any service procedures. This quick check is vital to help you isolate a simple problem. It also ensures you have a record of the initial system state so you can bring other people up to date (for example, if remote maintenance is called).

This section gives a step-by-step checklist for checking control mode and visual information on a nonworking system. A service technician must be on-site in order to do the visual inspection steps. Remote service technicians may do steps 1 to 4 (Control Mode Menu display and analysis) to assist with problem diagnosis if desired.

CONTROL MODE/VISUAL INSPECTION CHECKLIST

Step:		Normal:	Abnormal:
1	– Access and Display Control Mode Menu	____	____
2	– Record System Status (Display Option 1)	____	____
3	– Record Alarms (Display Option 2)	____	____
4	– Record Initialization History (Display Option 3)	____	____
5A	– Check Power Status (AC/Battery Reserve or DC)	____	____
5B	– Check Fans and Fuse	____	____
6	– Check Disk Drives	____	____
7	– Check Circuit Pack LEDs	____	____

CONTROL MODE WORKSHEET

(Copy this page or use a separate sheet of paper)

Step 1: Control Mode Menu appears: YES___ (continue) NO___ (go to *Verify Good Service*)

Step 2: Record all nonzero fields and asterisks (Menu Option 1):

DBPI____ SCPI____ VB1____ VB2____ FP____ DBP________ MI____

Step 3: Check off all currently active alarms (Menu Option 2):

CHG_RATE____ CNVDSK_____ FANALM_____ FUSALM_____
LOW_BAT______ ON_RESV____ OPTALM_____ RESV_FLT____

Step 4: Record the last two or three initialization messages (Menu Option 3):

____
____
____

Step 5A: Record any abnormal battery reserve or power states in both cabinets (if installed):

	Lower Cabinet	Upper Cabinet	
Red LED:	ON___ OFF___	ON___ OFF___	(Should be OFF)
Yellow LED:	ON___ OFF___	ON___ OFF___	(Should be OFF)
Green LED:	ON___ OFF___	ON___ OFF___	(Should be ON)
Power Switch:	ON___ OFF___	ON___ OFF___	(Should be ON when AC cord plugged in)

Step 5B: Check off any stopped fan(s) or blown fuse:

Fuse blown (lower)___ (upper)___ All fans stopped (lower)___ (upper)___
One fan stopped (lower): Left___ Left-middle___ Right-middle___ Right___
One fan stopped (upper): Left___ Left-middle___ Right-middle___ Right___

Step 6: Check if drives are running and have lit yellow LEDs on TN475B SADI:

disk00 (LED 10):___ RCD (LED 11):___ disk02 (LED 12):___ disk03 (LED 13):___
disk04 (LED 14):___ disk05 (LED 15):___ disk06 (LED 16):___

Step 7: Record any circuit packs with red LEDs, and record the status shown on the MI alarm panel (alarms, shutdown state):

____
____
____

INITIAL DIAGNOSIS

This section helps to identify the type of problem AUDIX is having, and directs you to the appropriate section for problem resolution. Figure 3-1, *Troubleshooting Flowchart*, outlines the basic troubleshooting procedure.

Is AUDIX Taking Calls?

Before doing any service procedure, first see if AUDIX is answering calls. If so, AUDIX is providing service. Whenever AUDIX is running and allowing subscribers to log in, do *not* shut down the system without customer consent.

To see if AUDIX is taking calls:

1. Place a Voice Mailbox call to see if AUDIX answers (dial the AUDIX-associated extension).
2. If AUDIX answers, see if it will accept your login (i.e., your extension number and the # sign followed by your password and the # sign).

   If the AUDIX answers in Standalone mode (AUDIX requests that you redial your extension number), the data link is not working. Check the SCPI (or MPSI) in slot 15 for a yellow LED.
3. If AUDIX answers, it is providing service. Do *not* interrupt service without customer consent.
4. If AUDIX does *not* answer, it is *not* providing service. Do the steps needed to restore service freely.

If you cannot log in to AUDIX yourself (for example, if no voice terminal is available):

1. Ask the system administrator or customer if AUDIX is taking calls.
2. Check for red LEDs on the TN523, TN533, or UN160B circuit packs. This indicates a core hardware fault that has put the system out-of-service. Note any lit red LEDs.
3. Check the VPC boards for yellow LEDs indicating that calls are in progress. This may not be accurate because calls can hang (terminate incorrectly), leaving connections up.

Is AUDIX Software Running?

If AUDIX is *not* taking calls from the switch, you must next determine what is controlling the AUDIX system (software or firmware) by using the remote or local maintenance terminal.

NOTE If AUDIX is taking calls, software is always running.

1. *For Local Technicians:* Disconnect the RMT connection and attach the Local Maintenance Terminal (LMT) to the MAINT (H00) connector on the back of the bottom cabinet.
2. Make sure the terminal is powered on and that option settings are correct (see Chapter 8, *Terminal Setup and Use*).
3. Press the BREAK and RETURN keys a couple of times slowly (if needed to change the baud rate) until either of the following appears:

```
login:             (software is in control)
        or
Control mode menu:  (firmware is in control)
```

4. If `login:` appears, software is running and you can access forms. Go to the next section.
5. If the Control Mode Menu appears, the firmware is in control and forms (including alarm and error logs) cannot be used. Go to *Control Mode Menu Alarms* in Chapter 7.
6. *If neither message appears:*
   a. If the terminal screen remains blank or does not respond to keystrokes as described above, go to *Troubleshooting the Display Terminal and Printer* in Chapter 8.
   b. If the AUDIX system is not running *at all* (all LEDs are dark), go to *Unalarmed Problems* in Chapter 7.

Are There Active Alarms?

Check for active alarms on the terminal STATUS line and in the alarm log using the `maintenance : active alarm : display` form. If alarms appear, go to *Solving Active Alarms*.

Are There Customer Complaints?

Customer-generated complaints are often related to some unalarmed software problem that impacts system performance. For example, a filesystem may be damaged so it can no longer be used. For customer complaints:

1. Use the complaint as a guide for your troubleshooting. If you have any active alarms, solve these *first* and see if they fix the reported problem.

2. If you have no active alarms to go by, check the list of problems in *Solving Customer Complaints* and follow any suggested procedures that pertain to the complaint.

   a. Recheck the customer complaint form. Should this complaint have been fixed as a result of the troubleshooting procedures you just did?

   b. Try to reproduce the error. If fixed, you should not be able to duplicate the complaint.

   c. If you can reproduce the error, the problem may be another unalarmed problem or an operator (subscriber) error. Go to *Solving Unalarmed Problems*.

3. If you cannot find a similar problem in the customer complaints section, run through the list of steps in *Solving Unalarmed Problems*. Repeat the verification steps in the list above to see if the problem is fixed.

4. As an option, you can also check the error log (`maintenance : error : display`) for a clue (see Appendixes A and B).

SOLVING ACTIVE ALARMS

Most AUDIX problems cause an entry in the active alarm log. The alarm log is the primary means of diagnosing and repairing a system when software is in control.

Active Alarm Resolution

Resolve active alarms as follows:

1. Log in and check for active alarms on the terminal STATUS line and in the alarm log using the `maintenance : active alarm : display` form (see *Control Mode/Visual Inspection Checklist* if needed).
2. Faults are displayed by order of severity and should be resolved in this order. Record the first four alarm codes listed (fault, unit, and device numbers called *triplets*).
3. Use Table 3-1, *Alarm Resolution Procedures,* to find the unit associated with the first alarm. Go to the indicated chapter to resolve the alarm.
   a. If the first-choice procedure does not solve the alarm, use the second- or (if needed) third-choice procedures.
   b. If you can't solve the first alarm, try to solve the next alarm in the list by returning to Table 3-1 and repeating these steps.
4. To check if the problem is resolved, use the `maintenance : active alarm : display` form. The fault code should no longer appear in this log.

NOTE Some faults require the system to be rebooted before they are cleared from the log. If the alarm still appears, reboot the system (if you have not already done so) and see if the fault disappears.

5. To check if other problems still exist, use the `maintenance : active alarm : display` form. Record any fault(s) in the log and repeat steps 3 and 4 to resolve it.
6. When all problems are resolved, the active alarm log should show no entries and the previously active alarm codes should be listed under the `maintenance : resolved alarm : display` log with a recent time.
7. After repair procedures, verify good service by making test calls using the `maintenance : system : test call` form. See Appendix A, *Basic Procedures*, for test call procedures.
8. If you feel you are not making progress or cannot resolve the faults, escalate the problem using your local procedures.

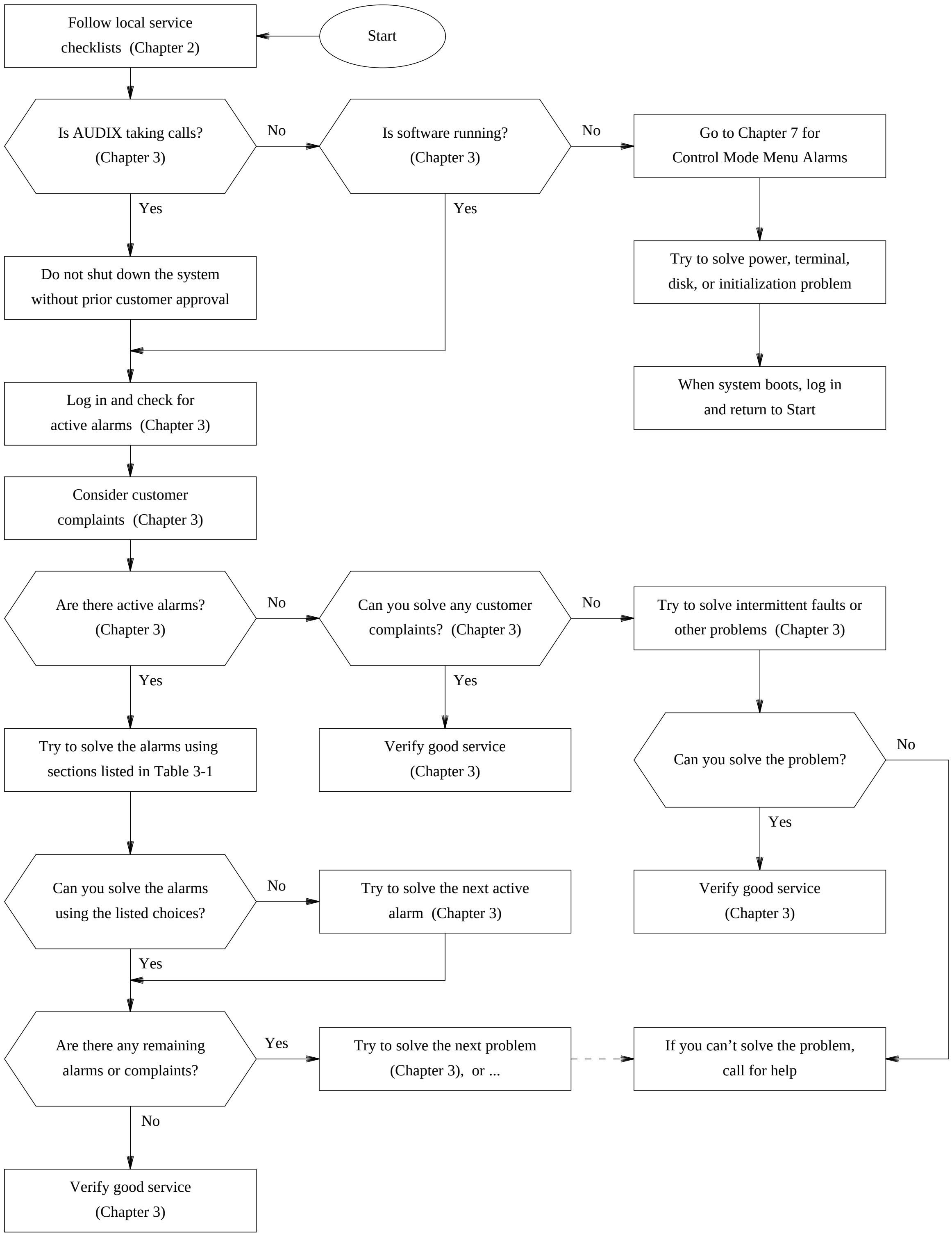


Figure 3-1. Troubleshooting Flowchart

Alarmable Units and Resolution Procedures

Table 3-1 shows the physical device or software problem associated with each unit number in the alarm log. To use it:

1. Look up the unit causing the alarm. Go to the indicated chapter to resolve the alarm.
2. Look up the fault and unit/device pair numbers in the alarm-resolution table in the referenced chapter and follow the listed procedure. If you can’t find the unit number in the table, escalate the problem to the appropriate remote maintenance service center. For example:
   - The AUDIX Upgrade Control Center (AUCC) may be contacted at 1-800-248-1234.
   - The International Technical Assistance Center (ITAC) may be contacted at 1-303-538-4666.
   - The Technical Service Center (TSC) may be contacted at 1-800-248-1234.

Table 3-1. Alarm Resolution Procedures *(Part 1 of 2)*

Unit	Name	Description	Alias	See Page:
1	TN472C	DBP-CPU board	DCPU	4-10
2	TN532/TN540	DBP-RAM board	DUMER, DEXPR	4-38
3	TN506B	BC board	BUS CTRL, DBCTRL	4-30
4	Terminal	DBP monitor	DTERM	Escalate
5	UN162	VSFI board	DVSFI	4-58
6	Disk controller	TN475B SADI	DISK CTRL, DCTL	4-11
7	TN475(B)	SADI board	IPC, DIPC	4-11
8	TN475(B)	SADI board	DIM, DDIM	4-11
9	RCD, HDD	Disk drive	RSD, FSD, DDISK	6-1
11	DBP bus	DBP subsystem	VME bus	Escalate
12	UN160B	DBPI board		4-57
14	UN162	VSFI or DBP bus	DVSFI, VME bus	4-58
15	S Bus	S Bus	SBUS	Escalate
16	TDM Bus	TDM Bus	TDMBUS	Escalate
17	TN511	MI board	MI	4-31
21	Filesystem	Voice Message	vm1	10-1
22	Filesystem	Voice Message	vm2	10-1
23	Filesystem	Voice Message	vm3	10-1
24	Filesystem	Voice Message	vm4	10-1
25	Filesystem	Voice Message	vm5	10-1
26	Filesystem	Voice Message	vm6	10-1
27	Filesystem	Voice Message	vm7	10-1
30	TN547(B) *or*	MPSI	SWITCH_LINK	4-45
	DCIU, PI, SCI	Data link	SWITCH_LINK	5-2
32	Translation fault	Switch/AUDIX software	SW_VMS_TDATA	5-9
33	TN591/TN523, TN716B, and TN761/TN734	FP Processor Element (PE)	PE 0, FP-PE, FP-CPU, FP-BI, FP-RAM/MEM	4-34
34	TN591/TN523, TN716B, and TN761/TN734	VSP Processor Element (PE)	PE 1, VSP-PE, VSP-CPU, VSP-BI, VSP-RAM/MEM	4-34
35	TN747B	VPT port	VPT_COMMON, CO Trunk	4-51
36	TN501B	VPC channel	VPC_COMMON	4-16
37	TN477/TN500	TDBI channel	TDBI_COMMON	4-12
38	TN714	TC (tone-clock) board	TC_COMMON	4-46

(Continued)

TABLE 3-1. Alarm Resolution Procedures *(Part 2 of 2)*

Unit	Name	Description	Alias	See Page:
42	TD-bus time slot	Time-division bus	T_SLOT	Escalate
43	TN533	SCPI board	SCP, SAI	4-39
45	Power	Power, env. component	CC_CCAR	7-2
49	Filesystem	Primary Announcement	UNANPFS_MT	10-1
50	Filesystem	Secondary Announcement	UNANSFS_MT	10-1
51	Filesystem	System Status	UNSSFS_MT	10-1
52	Filesystem	System Data	UNSDFS_MT	10-1
53	Filesystem	Voice Data	UNVDFS_MT	10-1
54	Filesystem	Voice Message	UNVM0FS_MT	10-1
55	TN747B	VPT board	VPT_COMMON, CO Trunk	4-51, 4-52
56	TN501B	VPC board	VPC_COMMON	4-16, 4-24
57	TN477/TN500	TDBI board	TDBI_COMMON	4-12, 4-13
58	TN714	TC TD-bus circuit	TC_COMMON	4-46
59	Switch port	Data link	GPP_COMMON	–
61	TN520	VB board	VB_COMMON	4-32
62	Filesystem	Voice Message	vm8	10-1
63	Filesystem	Voice Message	vm9	10-1
91	Adat filesystem	Missing filesystem		Escalate
93	Sst filesystem	Missing filesystem		Escalate
94	Sdat filesystem	Backup problem	FSDBACKUP	Escalate
116	Environmental component	Environmental or power equipment	CTRL CABINET, CONT_CAB, C_PWRU	7-2
117	Power	Power, env. component	CC_CCAR	7-2
120	TN727	NC (NETCON) board	SI, SI_COMMON	4-48
121	PE software fault	System load threshold	SYS_SW	4-37
140	TN727	NC TD-bus circuit	SI, SI_COMMON	4-48
141	TN366(B)/TN539(B)	ACC(E) board	ACC	4-6, 4-42
142	TN366(B)/TN539(B)	ACC(E) port	ACC_P	4-6, 4-42
143	Filesystem	Module init failure	MODINIT	Escalate
144	TN366(B)/TN539(B)	AUDIX Networking	NET_CON	4-6
150	Filesystem	Names	UNNMFS_MT	10-1
151	Filesystem	Names backup	UNNMFS_SY	Escalate

SOLVING CUSTOMER COMPLAINTS

Customers (subscribers) may report problems to the AUDIX system administrator or the remote maintenance site (trouble reports). Customer-generated complaints often reflect problems that do not cause alarms, such as damaged (corrupted) filesystems or other software problems. For many problems, the technician may need to call the listed customer contact for more information.

If you have a customer complaint, see if it matches one of the following customer-reported problems. If so, go to the chapter listed and try to reproduce the problem. If you cannot duplicate or resolve the problem, go to *Solving Unalarmed Problems* in this chapter or escalate the problem.

Some troubleshooting guidelines include:

- Some troubleshooting steps test the switch-to-AUDIX data link. Standalone systems do not have this link. If you are working an AUDIX Standalone system, skip any steps which require you to test the data link.
- Many of the following tests use the `maintenance : system : test call` form to test voice ports. When the AUDIX is connected to a 1A ESS Switch or 5ESS Switch, you cannot test individual ports using this form. If the system you are working on is connected to a 1A ESS Switch or 5ESS Switch, skip any steps which have you use the test call form.
- When investigating a subscriber-reported problem, go to the activity log (the `system : activity log : display` form) and display subscriber activity for the user in question (if possible). As an alternative, you can activate enhanced activity tracking on the `maintenance : error : specification` form (see Table B-2 in Appendix B for a list of these error codes).

  Both the activity log and/or error log must be activated *before* they can collect any data on system activity. Refer to the appropriate forms reference manual for details on activating and using these features (see the *Related Resources* section in the preface). Both the activity log and enhanced activity tracking *cannot* be active at the same time; normally only the activity log is active.

This section is organized as follows:

- Ringback But No Answer on a Voice Mailbox Call
- Ringback But No Answer on a Call Answer Call
- AUDIX Answers After Long Ringing
- Bad or Noisy Connection
- No, Wrong, or Garbled AUDIX Announcements
- Garbled or Missing Unified Messages
- Message-Waiting Lamp Problems
- Subscribers Hear ‘‘No Message to Play Back’’
- Subscribers Hear ‘‘No Room in Your Mailbox’’
- Subscribers Hear Reorder Tone
- Subscribers Get Faint or Silent Messages

- Administrator is Unable to Add Subscribers
- Network Messages Are Not Being Sent
- An Integrated AUDIX Answers in Standalone Mode
- Slow Response Time on Terminal
- An Upgraded AUDIX Does not Transfer Calls

Ringback But No Answer on a Voice Mailbox Call

After dialing the AUDIX extension (for a voice mailbox call), a subscriber hears ringback tone but the AUDIX system never answers. Check the following:

1. *On Standalone systems*: AUDIX will not answer calls if the system clock is not set. Display the `system : clock` form and check the time:
   a. If the time is correct, go to the next step.
   b. If the time is not correct, go to *TN727: NC* in Chapter 4 to set and test the system clock.
2. If the problem occurs *rarely* on some ports (once every several thousand calls), it is possibly due to a lost data link message. Report this problem to the appropriate remote maintenance service center.
3. If the problem occurs *always* on all ports, AUDIX might have lost a boot, sdat, sst, or vdat filesystem or had a disk crash involving one of these filesystems. Go to *No Alarms and Software Running* (step 3) in *Solving Unalarmed Problems*.
4. If the problem occurs *frequently*, it is probably either in the switch-to-AUDIX analog connection, or in the AUDIX voice port (VPT) or voice processor (VPC) boards. Make a VPT test call to each port to check each switch-to-AUDIX voice path using the `maintenance : system : test call` form. Instructions for the test call can be found in Appendix A, *Basic Procedures*.
   a. If a repeatable problem is *not* found on one VPT port, make VPC test calls to test all the AUDIX voice processors. If this does not lead you to the problem, there is probably an intermittent fault in the system. Go to *Solving Unalarmed Problems*.
   b. If a repeatable problem is found on one port, continue.
5. Test the switch port by placing a test phone at the switch cross-connect field. Call the switch extension related to the failing AUDIX port to check for ringing.
   a. If you receive ringing, go on-hook and connect the test phone to the circuit you just dialed. Go off-hook and verify that dial tone is received, then break dial tone to verify that the switch port listens. If these tests pass, the switch port is functioning correctly.
   b. If these tests fail, inspect the cabling and the connectors associated with the circuit. Repair or replace any faulty equipment and retry the VPT test call. If the test still fails, replace the switch port board. Retry the VPT test call.
6. If these tests pass and the problem remains, replace the AUDIX VPT that may be faulty and verify that the problem is fixed by making VPT test calls (test all the ports). Use the `maintenance : system : test call` form.

7. If the problem continues, the system may have an intermittent fault. Go to *Solving Unalarmed Problems*.

Ringback But No Answer on a Call Answer Call

After dialing the system for a call answer call, a subscriber receives ringback tone, but the AUDIX system never answers. This problem is probably *not* caused by the AUDIX-to-switch hardware. Check the following:

1. *On Standalone systems*: AUDIX will not answer calls if the system clock is not set. Display the `system : clock` form and check the time:
   a. If the time is correct, go to the next step.
   b. If the time is not correct, go to *TN727: NC* in Chapter 4 to set and test the system clock.
2. The subscriber's mailbox may be full. Since AUDIX could not record a message, it did not answer. The system administrator should tell the subscriber to delete unneeded messages in the mailbox (especially the old and file cabinet areas), or increase the subscriber's mailbox size. (Subscribers should hear a warning message when they log in for this problem.)

   In AUDIX R1V5 and later software, the full-mailbox feature allows AUDIX to answer and inform the caller that there is no room in the called mailbox. If the complainant states that the call was not answered, you can disregard a full mailbox as a possible problem on R1V5 and later systems.
3. The subscriber may not be set up with call answer permission on the `subscriber : local` form. The system administrator should check this field.
4. Filesystem thresholds may be exceeded or the system may be out of voice message (vtext) space. Check the STATUS line or `system : thresholds` form for threshold violation messages. If found, escalate the problem.
5. The AUDIX call-coverage translation on the switch (ACD, Call Forwarding, etc.) or related equipment translations may be incorrect. Use *Switch Administration for AUDIX Voice Messaging* (585-305-505) to check for this problem.
6. The switch-to-AUDIX data link (DCIU, PGATE, PI, or SCI) could have been out of service temporarily. (Calls never reach AUDIX if the link is down; they will not follow the coverage path to AUDIX.) To determine if this is the problem, look for data link restart errors (159, 871, 878, 902, and 903) and software restart errors (907 and 908) in the `maintenance : error : display` log.
   a. If these errors are found but occur less than twice a day, ignore the problem. If errors are *not* found, go to the next step.
   b. If the problem occurs frequently, run data link tests from both the switch and AUDIX ends (see Chapter 5).
7. The system may have lost one or more filesystems. Do the following:
   a. Check if all filesystems are active and present.
   b. If filesystems appear good, check the disks (see Chapter 6).
8. If none of these fix the problem, go to *Solving Unalarmed Problems* in this chapter to check the switch.

AUDIX Answers After Long Ringing

After dialing the system, AUDIX answers but only after many rings. Check the following:

1. This is normal during heavy traffic conditions. It only means that all available switch-to-AUDIX voice ports were busy and the user was placed in a waiting queue. Verify heavy traffic by looking at the maximum traffic peg on the `traffic : load : day/hour` form.
2. If this problem occurs frequently during medium or light traffic conditions, it is possible that some of the voice ports are not in service or have incorrect translations. Check traffic activity on each port by using the `traffic : load : day/hour` forms. *If a port has not been used for some time:*
   a. Verify that all installed VPT, VPC, TDBI, and VB ports are equipped and enabled using the `maintenance : vsp : equipage` form.
   b. Verify that the AUDIX voice port translations are correct using the `system : translation : voice port` form and *Switch Administration for AUDIX Voice Messaging* (585-305-505).
3. If these are correct or do not solve the problem, go to *Solving Unalarmed Problems*.

Bad or Noisy Connection

After dialing the AUDIX system, subscribers hear static and abnormal noise. Check the following:

1. *Listen to a sample message:* For all ‘‘bad message’’ problems on AUDIX, encourage the customer to save a copy of the bad or noisy message. Have the subscriber or the system administrator mail the bad message to a test mailbox (something the technician can access) so services personnel can hear it. This greatly facilitates problem diagnosis.
2. *Garbled or noisy message:* For garbled or noisy messages (versus AUDIX system announcements):
   a. Check whether the caller created the AUDIX message using one of the following devices:
      — Speakerphone
      — Mobile or cordless phone
      — Pay phone

      Occasionally one of these devices will cause a garbled or noisy message to be left on AUDIX. This is a result of the device used, *not* the AUDIX system.
   b. Check the switch facilities. Many times a noisy message can be traced to the telephone set, the cross-connect field, or other switch facilities.
3. *Background hum:* If subscribers dial AUDIX and hear a hum in the background, the noise is probably coming from a TN753 DID trunk port on the switch, or from some other switch facility. You should hear this hum a moment before AUDIX answers if this is the problem. A technician can help trace the problem, or the customer can ask their local telephone company to check their facilities.

4. *Static or tone in messages:* Most static noises or background tones in AUDIX messages are a problem in one of the AUDIX TN747B VPT or TN501B VPC boards. To diagnose this problem:

   a. Check the error log and resolved alarm log to try to determine which pack is faulty. If you suspect problems with a pack, replace it.

   b. If you can't find a suspect board using the software, try to isolate the problem by making test calls using the `maintenance : system : test call` form (see Appendix A, *Basic Procedures*, for test call procedures).

   c. If you can't isolate the faulty pack through the test calls, arrange with the customer for a time to take the system down. Then, try popping the TN501B VPC packs one by one, making test calls each time you pull an additional VPC free from the backplane. Often one pack can create a tone on the whole system. If the tone goes away, replace the last pack you pulled from the backplane.

5. *Static in greetings or system prompts:* The static in personal greetings or system announcements is almost always a problem in the AUDIX TN500 TDBI or TN520 VB. If you have a two-cabinet system, make test calls using the `maintenance : system : test call` form to isolate which TN500/TN520 pair is causing the problem (see Appendix A, *Basic Procedures*, for test call procedures).

6. *Squeal:* If subscribers hear an AC hum or squeal on messages, headers, and system announcements whenever they access AUDIX, the problem is almost always the AUDIX power supply. You can also check the switch analog port packs (TN742 or TN746B) for an alternative cause of the problem.

7. If you can't solve the problem using these guidelines, follow the procedures in *Solving Unalarmed Problems*, or escalate the problem to your remote maintenance service center.

NOTE

If pocket-dialer, international, or some long distance calls are constantly having bad connections, the customer may want to install a Voice Gain Amplifier as described in *AUDIX Installation* (585-305-105).

No, Wrong, or Garbled AUDIX Announcements

After making a voice mail or call answer call, the subscriber is connected to AUDIX but receives no system announcements, wrong announcements, garbled announcements, or announcements out of order. Check the following:

1. If static, noise, or a squeal occurs on all messages, use the troubleshooting steps in the previous section, *Bad or Noisy Connection*.

2. If bad announcements occur *rarely*, the user may be accessing a faulty AUDIX port. Follow the repair procedures in *Solving Unalarmed Problems*.

3. If garbled announcements occur *sometimes*, one or more AUDIX VPC boards may be faulty. Make a VPC test call to check each AUDIX voice processor using the `maintenance : system : test call` form.

4. If bad announcements occur *frequently or always*, the system may not be able to access the announcement data (adat) filesystem. Do the following:

   a. Display the `system : announcement : filesystems` form and check the `active announcements` field. If this field is empty, escalate the problem.

   b. If filesystems appear good, check the disks (see Chapter 6).

   c. If the disks appear good, the adat filesystem may be corrupt even though it is mounted. Escalate the problem.

5. If the announcement filesystems are good and the problem remains, go to *Solving Unalarmed Problems*.

Garbled or Missing Unified Messages

One of the following messages may be garbled or is not announced:

- ‘‘Leave Word Calling message’’ (from switch)
- ‘‘Electronic Text message’’ (from AP)
- ‘‘Message Center message’’ (from AP)

Check the subscriber’s phone and the switch-to-AUDIX path for correct translations. For example, if the message should be coming from an AP, check translations for the AP, switch, and AUDIX voice ports. See *Switch Administration for AUDIX Voice Messaging* (585-305-505) for all AUDIX/switch translations.

NOTE These messages are available only on an integrated AUDIX setup with an AT&T PBX.

Message-Waiting Lamp Problems

The MESSAGE lamp may not light or extinguish properly. A few causes are listed below. For the correct switch translations, see *Switch Administration for AUDIX Voice Messaging* (585-305-505).

- *Lamp Does Not Light:* After sending a message, you found out that the receiving person’s message-waiting lamp did not light. Check the following:

  — Check the switch voice-port hardware for problems.

  — Check the message-waiting lamp translations on the switch for the subscriber’s phone.

  — Check the subscriber’s telephone set for a faulty switchhook.

  — If the AUDIX system is in a DCS network, verify that the switch number on the AUDIX `subscriber : local` form is correct.

- *Lamp Does Not Extinguish:* After all new messages in the incoming mailbox have been played and either deleted or saved, the message-waiting lamp does not extinguish. Check the following:

— Check the message-waiting translations on the switch for the subscriber's phone.

— Check if the subscriber has LWC on the switch (or another Unified Messaging service). The message-waiting lamp might be lit because the subscriber has a new message waiting on some other messaging service.

- *System 75 Lamp Not Correct:* Occasionally on System 75, the message-waiting lamp may be inconsistent with the state of the AUDIX mailbox (it may light when there are no new messages, or fail to extinguish when all new messages have been accessed). This is an audit problem with some older releases of System 75 software. However, the AUDIX login statement informing you of new (or no new) messages is correct.

Subscribers Hear ''No Message to Play Back''

AUDIX callers may hear AUDIX announce that there is ''no message to play back'' during a Voice Mailbox call when scanning messages. On a call answer call, this announcement may be followed by a standard system greeting instead of a personal greeting. Check the following:

1. Check if all vtext filesystems are active and present.
2. If filesystems appear good, check the disks (see Chapter 6).
3. If the problem is still present, go to *Solving Unalarmed Problems*.

NOTE

If a vtext was corrupt and had to be replaced, the ''No Message to Play Back'' announcement is expected.

Subscribers Hear ''No Room in Your Mailbox''

During a Voice Mailbox call, the caller may hear the message ''no room in your mailbox'' when trying to create a message. Check the following:

1. The subscriber's mailbox may be full. The system administrator should tell the subscriber to delete unneeded messages in the mailbox (especially the old and file cabinet areas), or increase the subscriber's mailbox size. (Subscribers should hear a warning message when they log in if their mailboxes are getting full.)
2. If the mailbox is *not* full, the AUDIX system administrator should check the subscriber's maximum message lengths on the `subscriber : local` form to make sure they are set to the standard size (they may need to be increased).
3. If the subscriber's mailbox has adequate space and they hear this message, the vdat or one or more vtext filesystems may be missing. Escalate the problem.

Subscribers Hear Reorder Tone

After dialing the system, a subscriber receives reorder tone (fast-busy). Check the following:

1. This is a normal occurrence if you were working on AUDIX and busied out the data link (from either the AUDIX or the switch side) or *all* the voice ports. If you were *not* doing service at the time of the complaint, continue.
2. The switch-to-AUDIX data link may have been out-of-service due to a restart or data link crash. Check for intermittent problems as follows:
   a. Check the switch and AUDIX resolved alarm log history for data link problems.
   b. Check the AUDIX `maintenance : error : display` log for data link restart errors (159, 871, 878, 902, and 903) and software restart errors (907 or 908).
   c. If these problems have occurred more than once a day, run the data link tests (affects service) from both the switch and AUDIX ends (see Chapter 5).
3. If the problem is not resolved, go to *Solving Unalarmed Problems*.

Subscribers Get Faint or Silent Messages

Subscribers may occasionally complain that they are receiving AUDIX messages that have very faint recordings or are simply silent. Possible causes might be:

- Certain loads of switch software.
- A possible problem with the DCIU boards on a System 85 or Generic 2 (the DCIU can set up a one-way communications path to AUDIX). If this problem goes uncorrected, AUDIX may eventually fail to respond to touch-tone commands.

If you suspect this problem exists on your system, escalate it using your local procedures.

Administrator is Unable to Add Subscribers

If the AUDIX system administrator cannot add new subscribers, check the following:

1. Use the `system : limits` form to see if the maximum allowable number of subscribers has been reached. If so, increase the number on this form.
2. The subscriber's name may be a touch-tone equivalent of another subscriber (names must be unique). The administrator should get a `subscriber already exists` error message if this is the problem. Try modifying the name.
3. The sdat filesystem may be full. Refer to *AUDIX Administration* (585-305-501).

Network Messages Are Not Being Sent

If the system is part of an AUDIX network, and messages are not being transmitted between machines, check the administration log for connect failures using the `system : log : display` form. If there is a problem between the local AUDIX and machines in the network, go to *TN366(B): ACC* in Chapter 4 to solve the problem.

Also check the transmission schedule on the `system : translation : machine : audix/amis/call delivery` form. Network messages may only be sent once a day, or the transmission schedule may have been cleared and therefore messages would only be sent when the networking queue was full. See *AUDIX Networking* (585-300-903) for details on networking operation and administration.

An Integrated AUDIX Answers in Standalone Mode

If an AUDIX system is connected to a 1A ESS Switch or 5ESS Switch through a data link, but is answering in the standalone mode (i.e., the system prompts call answer callers to enter the extension of the number they dialed), the data link may be down. If this occurs on all calls, go to Chapter 5 to run data link tests. If this occurs rarely, the system is not getting a connect message from the switch in time and will answer the call in standalone mode rather than not at all.

Slow Response Time on Terminal

This usually happens to the administration terminal, although the maintenance terminal might be affected if the administration terminal uses a modem.

Occasionally the modem connected to the maintenance port experiences problems or is optioned incorrectly; this causes extremely poor response time on the terminal connected to the other port (usually the ADMIN port). To solve this problem:

1. Cycle power on the modem connected to the other port (usually the MAINT port).
2. Check the option switches for the modem using Chapter 8 as a guide.
3. If you still suspect the modem is incorrectly optioned, escalate the problem.

An Upgraded AUDIX Does not Transfer Calls

If an AUDIX system was upgraded to run R1V7 or later software, the Call Transfer Out of AUDIX feature was turned off. This is standard procedure for *all* R1V7 or later upgrades. (The only exception is an upgrade from R1V7 to R1V8 8:1 software; in this one case, the upgrade utility leaves the call transfer feature settings unchanged.)

To allow call transfer following an upgrade, instruct the customer or system administrator to activate Call Transfer Out of AUDIX using the steps described in the *AUDIX Release 1 Version 7 Forms Reference* (585-305-208) or *AUDIX Release 1 Version 8 Forms Reference* (585-305-209).

CAUTION

Customers **must** *activate the Call Transfer Out of AUDIX feature themselves so they will see the warning message about possible toll fraud. Under* **no** *circumstances are on-site technicians to activate the Call Transfer Out of AUDIX feature for a customer.*

If the customer or system administrator has turned call transfer *on* following an upgrade and call transfer still does not work:

1. Display the `system : appearance` form.
2. Check the `call transfer out of AUDIX feature (y/n)?` field.
   — If the field is displaying an **n**, the customer has *not* activated the Call Transfer Out of AUDIX feature. The customer needs to change this field to a **y**.

   — If the field is displaying a **y**, go to the next step.
3. Check whether the `enhanced call transfer (y/n)?` field is displaying a **y** or an **n**.
   — If the field is displaying a **y**, the customer must have a System 75 R1V3 Issue 1.4 (or later), System 85 R2V4 (or later), or a DEFINITY Communications System Generic 1, 2, or 3 for enhanced call transfer to work.

   If the customer does not have one of these switches, he or she must reset the field to **n** for call transfer to work. **Do not set this field to n for the customer!**

   — If the field is displaying an **n**, call transfer should work. Check for other reasons for call transfer to fail (such as switch translations).

SOLVING UNALARMED PROBLEMS

If you have no active alarms, you need to check for other possible problems or intermittent faults as outlined in this section.

NOTE If the Control Mode Menu appears on the terminal screen, go to *Control Mode/Visual Inspection Checklist*.

No Alarms – System Not Running

A local (on-site) service technician may find that AUDIX is not running at all (no fans are on and no LEDs are lit). Take the following steps:

1. Check that the AUDIX AC power cord is plugged in to a working 120 V AC, 60-Hz outlet.
2. Check that the POWER switch on the lower front panel is ON.
3. Make sure AC power is available from the outlet (no general power outage is currently taking place). Plug something else such as a lamp into the outlet and see if it works.
4. If AUDIX still won't run and AC power should be available, go to *Unalarmed Problems* in Chapter 7 to check the power supply and internal wiring.

No Alarms and Software Running

This section covers problems that do not result in an alarm in the active alarm log, although there may be intermittent alarms (faults which repeatedly recur and resolve themselves). AUDIX may or may not answer calls, or it may be providing only limited service. Use the trouble ticket as a guide for all customer-reported problems. **You must be able to log in and access forms** in order to use this section. If you cannot log in, go to *Control Mode/Visual Inspection Checklist*.

CAUTION *If AUDIX answers calls and allows people to log in,* **do not** *shut down the system without prior customer consent.*

Step 1: Check for Intermittent Alarms

Unalarmed service problems may be due to an error or alarm that is resolving itself and then becoming active again (an *intermittent* fault). Check for these as follows:

1. Using the LMT, log in to AUDIX (see Chapter 8 for terminal procedures if needed).
2. If no alarms appear in the active alarm log, check the resolved alarm log using the `maintenance : resolved alarm : display` form. Record the last several resolved alarms reported. Record the unit and device numbers for the fault(s).
3. Use the `maintenance : error : specification` form to select errors by recent date or the time of the problem.
4. Display these errors using the `maintenance : error : display` form. Check if any of the errors match those with resolution procedures in Table 3-2. Record the unit and device numbers for the error(s).

Step 2: Check Hardware Configuration

Check the hardware configuration to verify that AUDIX software has the correct information:

1. Count the number of optional VPC boards installed in slots 20 to 23 and slots 25 to 28.
2. Record any circuit packs that have red (fault) LEDs lit.
3. Use the `maintenance : vsp : equipage` and `maintenance : vsp : busyout` forms to verify all installed VPT, VPC, TDBI, and VB boards and channels in the system are equipped and released (not busy). Record those which are not.
4. Use the `maintenance : td-bus : status` form to see if all installed VPT, VPC, TDBI, and TC boards are in service (IS) or out of service (OOS). Record any that are not in service.
5. Use the `maintenance : dbp : status` form to check that the disks are equipped and enabled (EQ/EN). Note any that are installed but unequipped or disabled.
6. Check the `switch : translation : switch connection` form to verify that the information shown is correct (i.e., switch number, AUDIX number, data link translations). These translations must match the translations at the switch. Correct any problems.
7. Check the `system : translation : voice port` form to verify that the voice port extensions are correctly translated. Note any problems.
8. Check traffic activity on each port by using the `traffic : load : day` and `traffic : load : hour` forms. *If a VPT port has not been used recently,* check its switch translations. Use *Switch Administration for AUDIX Voice Messaging* (585-305-505).
9. Check the S-bus boards using the `maintenance : system : hardware status` form.
   a. Write down each unit that has no status (`can't determine`) or bad status (1). Good status is shown by zeros (0).
   b. See if the unit(s) with a bad (or no) hardware status match the unit(s) with resolved alarms or errors (from step 1). Match unit numbers to devices using Table 3-1.

Step 3: Check Software Configuration

1. Display the `system : filesystems` form and check for active vtext filesystems (up to ten), other active filesystem types (sdat, sst, and vdat), and the active boot filesystem (usually disk00.boot_f).
2. Display the `filesystem : list` form for each volume. Look for corrupt filesystems. These often have unusual sizes. Verify that all filesystem types are mounted and present.
3. Display the `system : announcement : filesystems` form and check for active announcement filesystems (adat and ndat). If the system uses custom announcements, check also for a backup version of the adat filesystem.

Table 3-2. Common Error Codes *(Part 1 of 2)*

Errors	**Cause**	**Go to:**
Data link:		
159, 871, 878 902, 903	Data-link errors.	Chapter 5
198	AUDIX time was resync'd with switch (DEVICE field shows the number of minutes adjusted; normal after 908 error).	Chapter 5
325-328	Switch-to-AUDIX protocol errors (if > 10 per week).	Chapter 5
Disk or Files:		
32, 115	Disk play/record errors (usually, a user or software audit could not find message after a listen (0 or *L) command.	Chapter 6
181, 897, 900	Disk error followed by a recovery.	Chapter 6
704	Disk play/record errors.	Chapter 6
Filesystem:		Escalate
42, 1533	Administration error if at 22:00 (no backup cartridge).	
50-64 69-70	Problem initializing filesystems. Check filesystem (ckfs) program found errors.	
194	No name recorded for subscriber (extension number as above).	
224	DBP error buffer to AUDIX overflowed (log may be full)	
823, 127, 167	Possible corrupt filesystem, if occurring in this order	

(Continued)

TABLE 3-2. Common Error Codes *(Part 2 of 2)*

Errors	**Cause**	**Go to:**
Intermittent:		
308	Normal software time-out. If > 4 per day, indicates a problem.	*Solving Unalarmed Problems*
907-908	Normal initialization. If these occur and you did *not* restart/reboot the system, you have an unexplained restart.	
1576	MI toggle switch moved *if* UNIT=17 (1=offc, 0=cntr).	Chapter 4
Routine:	Always ignore (up to 12 per day are normal).	*Ignore up to 12 per day*
14, 24	Subscriber file updated or mailbox message-waiting lamp out-of-synchronization. Not a user problem.	
29, 153	Normal error after deleting subscribers or sending 2-body messages (after an audit or user scans the outgoing mailbox).	
65	DBPA audit resync'd internal free space with the DBP processor (DEVICE field shows number of blocks adjusted).	
127, 167	Messages that often appear with errors 32 and 115. If they appear with error 823, escalate.	
706, 712, 753, 756, 822	Always ignore (up to 12 per day are normal).	
(710)	(May frequently appear on pre-R1V6 systems; ignore)	
710	Normal if subscribers or CA callers hang up at certain times or if no activity (silence) for 20 seconds while recording. These errors can number into the hundreds.	
725	New firmware using unknown suffix for board code report.	
736	Late angel scan (big bursts of 20 to 50 may cause alarm).	
821	Hardware time-out; normal if CA caller hangs up at certain times.	
–	Some errors against UNIT 35 (VPT), 36 (VPC), 37 (TDBI) are normal if occur on different devices. If many occur on *one* device, indicates a bad port on that board. If so –	... go to Chapter 4

Step 4: Restart/Reboot the System

Many problems are resolved simply by restarting or rebooting the system. If the system is providing service, *clear this action with the customer first.*

1. Restart the system using the `startup` form.
   a. If the restart fails, the system automatically attempts a reboot. If the reboot fails (the system does not initialize), go to *Control Mode/Visual Inspection Checklist*.
   b. If the restart passes (the system enters normal mode and gives you a `start service, login:` prompt), log in and see if the problem is corrected (refer to the list of problems you recorded in the previous steps).
   c. If the restart gives you the message `service not started`, go to step 4.
   d. If the restart has no affect on the problem(s), go to the next step.
2. If the system did not already do a reboot, try one now. Use the `shutdown` form to shut down the system software, using the camp-on option (c) if there is traffic. Otherwise, use options (f) and (m) on the form, or cycle the MI toggle switch.
3. After shutdown, press CTRL and c simultaneously or cycle the MI toggle switch to show the Control Mode Menu. Use Option 5 to reboot the system software, selecting the same boot filesystem that the system was running from in step 3 when you checked the configuration (normally disk00.boot_f).
   a. If the reboot fails, go to *Control Mode/Visual Inspection Checklist*.
   b. If the reboot is successful and `start service` appears, go to the next section (step 5).
4. If the reboot is successful, but `service not started` displays, a filesystem is missing or corrupt.
   a. Check the alarm log to find out which filesystem is missing or what software manager is indicating a problem.
   b. Escalate the problem.

Step 5: Check if the Problem is Fixed

If the reboot is successful and `start service` appears, check for intermittent problems as follows:

1. Wait 1 or 2 minutes for the switch data link to come up, then display the active alarm log.
   a. If any active alarms appear, go back to *Solving Active Alarms*.
   b. If no alarms appear, try to reproduce the original problem (you shouldn't be able to).
2. Recheck the hardware status from step 2 (hardware configuration).
   a. If any devices were unequipped, busy, or out of service, see if they are now correctly placed in service. If not, continue.
   b. Check that any translation problems are now corrected.
   c. Check if any recorded bad (or nonexistent) hardware status has now cleared, and if packs that had red LEDs are now normal. If not, continue.

3. Begin to replace circuit packs, one at a time, that presently have red LEDs, did not equip correctly during initialization, or have no or bad status (follow the replacement rules for each circuit pack as listed in Chapter 4). If there are none, continue.
4. Begin to replace circuit packs that *previously* had red LEDs or other hardware status problems before the reboot (recorded in step 2).
5. After each hardware replacement, power up the system (it will initialize itself).
   a. If the initialization succeeds, go back to the beginning of this step to check for alarms and see if the problem is fixed.
   b. If the initialization fails, go to *Control Mode/Visual Inspection Checklist*.
6. If the problem seems to be fixed, verify good service by making test calls.
7. If the problem is still not resolved, escalate the problem.

VERIFY GOOD SERVICE

After solving any AUDIX service problem, make sure full service is restored as follows:

1. If you blocked service, restore full service as follows:
   a. Use the `maintenance : vsp : busyout` form if you busied-out individual ports.
   b. Use the `maintenance : datalink : release` form if you blocked the data link. See *Block/Restore Service* in Appendix A for details if needed.
   c. Release the AUDIX voice ports at the switch (for a 1A ESS Switch, a 5ESS Switch, or a standalone AUDIX system).
2. Using a telephone, call the AUDIX number to check for good response and verify that full service is available.
3. Double-check your trouble ticket(s) to make sure the customer complaint(s) is solved and related features are working correctly.
4. Check the active and resolved alarm logs for new faults and for the correct resolved entries. See *Alarm Logs (Display and Use)* in Appendix A for details if needed.
5. Check the STATUS line of the terminal screen for any unresolved alarms or threshold (disk space) problems. See Chapter 8, *Terminal Setup and Use*, for details on terminal setup and use if needed.

Local Technicians Do the Following Before Leaving

1. Check the circuit packs and front panel lights for red (alarm) LEDs or warning conditions, and verify that the fans and disk drives are running. See *Visual Inspection* in Appendix A for details if needed.
2. Do any routine maintenance needed for that site (see *Routine Maintenance* in Chapter 2).
3. Place the MI toggle switch in the center position (if not already there).
4. Disconnect the LMT cable from the MAINT port (H00) on the back of the bottom cabinet and reconnect the cable for the Remote Maintenance Terminal (RMT) modem.
5. Turn off the LMT.

4. Circuit Pack Faults

This chapter covers procedures for resolving circuit pack alarms and replacing faulty boards. Only the circuit packs in the AUDIX carrier(s) are covered in this section. For help with backplane boards and buses, contact your remote maintenance service center.

Circuit packs are covered in the order shown in the following table.

CIRCUIT PACK OVERVIEW

The AUDIX circuit packs, terminology, and general procedures for handling and replacing circuit packs are covered in this section.

Figure 4-1, *One-Cabinet AUDIX Carrier and Circuit Packs*, shows the required and optional one-cabinet AUDIX circuit packs and their slot locations. The circuit packs in slots 03 and 21 through 28 are optional.

AUDIX Carrier

00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
TN506B	TN475B	TN532 *	TN539B †	TN472C	UN162	UN160B	TN511		TN591 ‡	TN761 &			TN716B	TN727

15	16	17	18	19	20	21	22	23	24	25	26	27	28
TN533 $	TN500 #	TN520	TN714	TN747B	TN501B	TN501B	TN501B	TN501B	TN747B	TN501B	TN501B	TN501B	TN501B

|◄– – – Optional – – –►| (slots 21–28)

* A TN540 may be in this slot (a TN540 is required for two-cabinet systems).

† The TN539 or TN539B ACCE replaces the TN366 or TN366B ACC in new networked systems.

‡ The TN591 CPU replaces the TN523 CPU in new systems.

& One TN761 RAM board replaces two TN734 RAM boards in slots 10 and 11 in systems using a TN591 CPU.

$ The TN547 or TN547B MPSI replaces the TN533 SCPI for 1A ESS, 5ESS, or some non-AT&T switch applications.

The TN477 TDBI-8 is used in some early systems with ≤ 8 ports instead of the TN500 TDBI.

Figure 4-1. One-Cabinet AUDIX Carriers and Circuit Packs

Figure 4-2, *Two-Cabinet AUDIX Carriers and Circuit Packs*, shows the required and optional two-cabinet AUDIX circuit packs and their slot locations. Empty slots are reserved for future use.

AUDIX Expansion Carrier

Slot	Circuit Pack
00	
01	
02	
03	
04	
05	
06	
07	
08	
09	TN591 †
10	TN761 &
11	
12	
13	TN716B
14	TN727
15	
16	TN500
17	TN520
18	
19	TN747B
20	TN501B
21	TN501B
22	TN501B
23	TN501B
24	TN747B
25	TN501B
26	TN501B
27	TN501B
28	TN501B

Optional (slots 19–28)

AUDIX Base Carrier

Slot	Circuit Pack
00	TN506B
01	TN475B
02	TN540
03	TN539B *
04	TN472C
05	UN162
06	UN160B
07	TN511
08	
09	TN591 †
10	TN761 &
11	
12	
13	TN716B
14	
15	TN533 $
16	TN500
17	TN520
18	TN714
19	TN747B
20	TN501B
21	TN501B
22	TN501B
23	TN501B
24	TN747B
25	TN501B
26	TN501B
27	TN501B
28	TN501B

Optional (slots 21–28)

* The TN539 or TN539B ACCE replaces the TN366 or TN366B ACC in new networked systems.

† The TN591 CPU replaces the TN523 CPU in new systems.

& One TN761 RAM board replaces one or two TN734 RAM boards in slots 10 and 11 in systems using a TN591 CPU.

$ The TN547 or TN547B MPSI replaces the TN533 SCPI for 1A ESS, 5ESS, or some non-AT&T switch applications.

Figure 4-2. Two-Cabinet AUDIX Carriers and Circuit Packs

Resolving Alarms

Each circuit pack has an Alarm Resolution table. The first two columns in each table contain the fault, unit, and device numbers that appear in the alarm log. The tables also have a ‘‘1st’’ and sometimes a ‘‘2nd’’ or ‘‘3rd’’ choice for resolving an alarm. To resolve an alarm, do the following:

1. Start in Chapter 3, *Start Troubleshooting* and record the unit, device, and fault numbers of the first several entries in the alarm log (shown on the `maintenance : active alarm : display` form).

2. Use Table 3-1 to find the unit number of the first entry in the alarm log, then go to the section indicated.

3. Find the alarm (the fault, unit, *and* device number) you want to resolve in the table in this section. Follow the 1st-choice procedure to resolve this alarm.

   NOTE

   For systems with an expansion cabinet, circuit pack slot numbers are the same for each cabinet. The alarm resolution tables have an L next to alarmed circuit packs in the lower cabinet and a U next to alarmed circuit packs in the upper cabinet.

   When an expansion cabinet is added, the TN727 Network Control (NC) is moved from the lower to the upper cabinet. The slot remains empty on the bottom cabinet.

4. Use the `maintenance : active alarm : display` form to verify that all alarms are resolved. When you are finished, no alarms should appear.

   a. If the 1st-choice procedure fails to resolve the alarm and you replaced the 1st-choice circuit pack, insert the *original* circuit pack back into its slot and proceed.

      CAUTION

      See the circuit pack handling procedures on the following page before inserting any circuit packs. You need to check the backplane for possible damage or you may damage the replacement pack.

   b. Replace the 2nd-choice unit, if provided, using that unit’s general replacement procedure.

   c. If the second choice fails to resolve the alarm, replace the 3rd-choice unit, if provided. Otherwise, try to resolve the next alarm in the log.

   d. If the third choice fails to resolve the alarm, or if you feel you are not making progress, escalate the problem using your local procedures.

5. After the original 1st-choice fault is resolved, check the `maintenance : active alarm : display` form for additional faults that may have occurred. Repeat the steps in this list if needed to resolve any remaining active alarms.

6. When the faults in this section are solved, return to *Verify Good Service* in Chapter 3.

Replacing Circuit Packs

Shut down and power down the system before removing boards unless specifically instructed to do otherwise. *Always* shut down and power down before inserting boards.

NOTE

The Voice Port Controller (VPC) and Voice Port Trunk (VPT) circuit packs in slots 21 to 28 of each cabinet are optional. While these boards are designed to be replaced without powering down the system, the AUDIX backplane does not support this [the Time Division (TD) bus may hang, or other problems may occur]. All AUDIX packs should be replaced *only* after shutting down software and powering down the system.

CAUTION

Always wear an antistatic EMC wrist strap before handling any circuit pack. Plug the jack into the Electro-Static Discharge (ESD) ground point near the front cover latch on the cabinet. See Figure 2-3 in Chapter 2.

Before inserting or swapping circuit packs:

1. After removing a circuit pack, look into the empty slot (you may need a flashlight). Look for bent pins on the backplane; a bent or broken pin may have damaged the circuit pack.
2. Examine the connector on the removed circuit pack. Look for broken pins that may have pulled out of the backplane and stuck to the connector. Also look for a burn mark on the connector that may indicate a short on the backplane.
3. If you find bent or broken pins or burn marks indicating a backplane problem, escalate the problem to your remote maintenance service center.

Circuit-pack handling terms include:

1. Unseat or *pop* the circuit pack by opening the faceplate lever of the pack, ‘‘popping’’ it out of its backplane connector.
2. Install or *push* in a new or equivalent circuit pack. Carefully insert the pack into the backplane connector. Once the circuit pack is close enough to hook the bottom of the faceplate to the carrier, push the faceplate at the top with your thumb, then latch and push the faceplate lever into position at the bottom.

   CAUTION

   Never force circuit packs into a slot or you can damage the backplane. If the backplane is damaged, check with your remote maintenance service center for procedures to replace a broken backplane pin.

3. Exchange or *swap* circuit packs by replacing a pack with a spare, or by changing the positions of duplicate packs within the system.

TN366(B): ACC

The AUDIX Communications Controller (ACC) allows an AUDIX system to network with other AUDIX adjuncts. The TN366 or TN366B circuit pack has two Digital Communications Protocol (DCP) links that provide dial access to and from other AUDIX systems.

A networked system must have a TN366 Vintage 5 (or later) or TN366B ACC, or a TN539 or TN539B ACCE; see *TN539(B): ACCE* later in this chapter. If the AUDIX networking ports connect to a Generic 2 Universal Module or to a MERLIN II, the TN366B or a TN539(B) *must* be used. The AUDIX system must also have a TN472C Vintage 2 or later circuit pack and a UN160B Vintage 2 (or later) circuit pack.

Table 4-1. ACC [TN366(B)] Alarm Resolution *(Part 1 of 2)*

Alarm Log		**Description**	**Repair Action**		
Fault	**Unit:Dev**		**1st Choice** (ckt,slot,proc.)	**2nd** (ckt,slot)	**3rd**
240	141 : 0	Miscellaneous error in the ACC	TN366B, 3, A	–	–
249	141 : 0	ACC Board was Reset	TN366B, 3, A	–	–
253	141 : 0	ACC Address Error Fault	TN366B, 3, A	–	–
254	141 : 0	ACC Bus Error Fault	TN366B, 3, A	–	–
255	141 : 0	ACC Zero Divide	TN366B, 3, A	–	–
256	141 : 0	ACC Exception on CHK Instruction	TN366B, 3, A	–	–
257	141 : 0	ACC Privilege Violation	TN366B, 3, A	–	–
258	141 : 0	ACC Program Logic Error	TN366B, 3, A	–	–
259	141 : 0	ACC Spurious or Unknown Interrupt	TN366B, 3, A	–	–
260	141 : 0	ACC NMI	TN366B, 3, A	–	–
261	141 : 0	ACC I/O (DMA) Fault	TN366B, 3, A	–	–
262	141 : 0	ACC I/O (HDLC) Fault	TN366B, 3, A	–	–
263	141 : 0	ACC I/O (USART) Fault	TN366B, 3, A	–	–
264	141 : 0	ACC Sanity Timeout	TN366B, 3, A	–	–
265	141 : 0	ACC Link Reset	TN366B, 3, A	–	–
266	141 : 0	ACC System Queue/Buffer Corruption	TN366B, 3, A	–	–
267	141 : 0	ACC Unknown Mailbox Interrupt	TN366B, 3, A	–	–
268	141 : 0	ACC RAM Failed Background Test	TN366B, 3, A	–	–
269	141 : 0	ACC EPROM Failed Background Test	TN366B, 3, A	–	–
270	141 : 0	ACC Firmware: Mailbox or Queue Audit Error	TN366B, 3, A	–	–
271	141 : 0	ACC Firmware: Bad Channel	TN366B, 3, A	–	–
271	141 : 1	ACC Firmware: Bad Channel	TN366B, 3, A	–	–
272	141 : 0	ACC Firmware: Channel okay	–	–	–
272	141 : 2	ACC Firmware: Bad Channel	TN366B, 3, A	–	–

(Continued)

TABLE 4-1. ACC [TN366(B)] Alarm Resolution *(Part 2 of 2)*

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice** (ckt,slot,proc.)	**2nd** (ckt,slot)	**3rd**
241	142 : 1	Miscellaneous error in the ACC	TN366B, 3, A	–	–
242	142 : 2	Miscellaneous error in the ACC	TN366B, 3, A	–	–
243	142 : 3	Miscellaneous error in the ACC	TN366B, 3, A	–	–
244	142 : 4	Miscellaneous error in the ACC	TN366B, 3, A	–	–
245	142 : 5	Miscellaneous error in the ACC	TN366B, 3, A	–	–
246	142 : 6	Miscellaneous error in the ACC	TN366B, 3, A	–	–
247	142 : 7	Miscellaneous error in the ACC	TN366B, 3, A	–	–
248	142 : 8	Miscellaneous error in the ACC	TN366B, 3, A	–	–
501-600	144:1-100	Continuing connection failure (device = node)	TN366B, 3, B	–	–
701-800	144:1-100	Remote Update failure (device = node)	TN366B, 3, D	–	–

Procedure A: General Replacement Steps

Do the following steps to resolve the alarm:

1. Display the `maintenance : network` form. Check the status of the channels. This should indicate which ones are assigned.

   a. If the RS-232 channels are NOT AVAILable, the system is using a TN366(B). If the RS-232 channels are NOT EQUIPPED, a TN539(B) is being used, but these channels are unequipped on the `system : translation : network port` form.

   b. If any DCP channels are shown as NOT EQUIPPED, check your switch configuration:

   — A System 75, Generic 1, or Generic 3 switch can use only two of the DCP channels: 2 and 4.

   — A MERLIN switch can use only two of the DCP channels: 1 and 3.

   c. If any channels which display the message NOT EQUIPPED should be equipped, go to step 2. Otherwise, skip to step 3.

2. Display the `system : translation : network port` form.

   a. Try equipping the channels that should be equipped. Refer to the *AUDIX Networking* manual (585-300-903) for complete information on using this form.

   b. If you have a switch that only supports two DCP channels, make sure the correct channels are equipped (see the previous step).

   c. After re-equipping or re-assigning the ports, go to the next step.

3. Perform test number 2 for each assigned channel. When the test is complete, check the `test result` field.

   a. If the test passes for all channels, go to step 8.

   b. If you get FAIL: NO ANSWER, the remote AUDIX can probably be reached, but does not respond (does not answer). Retry the test.

   c. If you get FAIL: BUSY, it usually indicates the local switch facilities are suspect. Check the switch facilities (modem pooling) and translations.

   d. If you get TEST FAILED, check the *channel status* fields for the cause of the failure.

   e. If the alarm remains, select test number 5, board reset, and press CHANGE. Repeat the tests and see if the alarm is resolved. If not, go to the next step.

4. Do a maintenance shutdown and power down.

5. Replace the TN366(B) in slot 3.

6. Power up and initialize the system.

7. Display the `maintenance : network` form.

   a. The board status should now show `NORMAL`. Each channel status should show `IDLE`, `IN USE`, or `NOT EQUIPPED`. If this is the current status of the board and channels, go to *Verify Good Service* in Chapter 3.

   b. If any status is bad or the alarm becomes active again, go to the next step.

8. Check the active alarm log.

   a. If the alarm is still active, check for other alarms. If there are other active alarms, try resolving them and see if this helps resolve the current alarm.

   b. If there are no additional active alarms and you cannot resolve this alarm, it may go away by itself or you may have to restart the system. Check with the customer for a convenient time.

   c. If the restart clears the alarm, go to *Verify Good Service* in Chapter 3.

For complete information on AUDIX networking connections, administration, and testing, see the *AUDIX Networking* manual (585-300-903).

Procedure B: Resolving Connection Failures

Do the following steps to resolve this alarm:

1. The device field of the fault code points to a specific AUDIX machine. Look up this number on the `list : machine` form.

2. Go to the `maintenance : network` form and try to connect to this machine (test 1). You must enter the remote AUDIX's machine name. If the connect test succeeds, the fault should be cleared.

3. If the connect test fails, go to Procedure A. After completing Procedure A, retry the connect test. If there is still a fault, go to Procedure C.

Procedure C: Check Translations and Switch Facilities

When logged in to the local AUDIX:

1. Check the local AUDIX translations on the `system : translation : machine : audix/amis/call delivery` form. (*local/remote* = **l**)

   NOTE AUDIX networking administration, forms, and field descriptions are covered in the *AUDIX Networking* manual (585-300-903).

2. Check the remote AUDIX translations (*local/remote* = **r**).
3. Translations for the remote AUDIX machine(s) should correspond to translations for the host (local) AUDIX. Check the machine names, the network connection type (or network data phone number), data rate (or network data speed), and channel (for RS-232 dedicated connections), and dial string (characters to be sent to the remote AUDIX machine to establish a connection). Then retry the connect test.

   NOTE This form varies depending on the release of AUDIX software installed on your system. Check the appropriate forms reference manual for a description of fields related to digital networking (see the *Related Resources* section in the preface).

4. The *dial string* may contain special characters that, when enclosed in double quotes act as control characters for the ACCE. The AUDIX must have the TN539(B) to use these characters.
5. If there is still an alarm, check the switch translations and facilities. Commom problems include the installation and administration of modem pooling, option settings on the data sets, etc. Retry the connect test (Procedure B) once everything is checked.
6. If the problem cannot be located, try tracing the problem from the remote AUDIX to the local AUDIX machine.
7. Some of the AUDIX ports may be unequipped. Refer to steps 1 and 2 in Procedure A to try re-equipping the channels using the `system : translation : network port` form.

Procedure D: Remote Update Failure

This fault is raised whenever three consecutive remote update attempts to the same remote adjunct fail. The fault will resolve itself when a remote update to the remote adjunct is successful. This could be an automatic update or an update performed manually using the `system : translation : remote updates` form.

If the Remote Updates feature is turned off at the local adjunct for updates to/from the remote adjunct, the fault will eventually disappear.

TN472C: DBP-CPU

The TN472C Data Base Processor (DBP) Central Processing Unit (CPU) performs filesystem data-base management and handles initialization and maintenance for the DBP subsystem.

If the AUDIX is networked, the TN472C must be a Vintage 2 or later circuit pack.

Table 4-2. DBP-CPU (TN472C) Alarm Resolution

Alarm Log		Description	Repair Action		
Fault	Unit:Dev		1st Choice (ckt,slot,proc.)	2nd Choice	3rd Choice
897	1 : 0	DBP-CPU diagnostic result (116F)	TN472C, 04, A	–	–
Note: Fault code 116 is not currently alarmed.					

Procedure A: General Replacement Steps

To replace the DBP-CPU circuit pack:

1. Shut down system software (if running), spin down the RCD (if not done automatically), and power down the system.
2. Replace the DBP-CPU. Power up the system. The system should initialize.
3. Verify that the alarm is resolved using the `maintenance : active alarm : display` form.

TN475(B): SADI

The TN475 or TN475B Small Computer Systems Interface (SCSI)-to-AUDIX Disk Interface (SADI) board is the disk controller for the AUDIX system. The SADI has LEDs to show which disk drives are connected and accessible. It communicates with the TN472C DBP-CPU and the disk drives over the DBP (VME) bus.

Table 4-3. SADI (TN475B) Alarm Resolution

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice** (ckt,slot,proc.)	**2nd Choice** (see section)	**3rd Choice**
322	6 : 0	Controller did not respond before timeout (file redundancy error)	TN475B, 01, A	DBP/VME bus	
332	6 : 0	Error detected in disk controller test	TN475B, 01, A	DBP/VME bus	
334	6 : 0	Communication error with DBP disk driver	TN475B, 01, A	DBP/VME bus	
419	6 : 0	Disk controller failure	TN475B, 01, A	DBP/VME bus	
897	6 : 0	Controller DBP diagnostic result (102F)	TN475B, 01, A	DBP/VME bus	
897	7 : 0	Disk controller diagnostic result (104F)	TN475B, 01, A	DBP/VME bus	
897	8 : 0	Disk controller diagnostic result (106F)	TN475B, 01, A	DBP/VME bus	
Note: Fault codes 102 to 106 are not currently alarmed.					

Procedure A: General Replacement Steps

To replace the SADI circuit pack:

1. Shut down system software (if running), spin down the RCD (if not done automatically), and power down the system.
2. Replace the TN475(B). Power up the system. The system should initialize.
3. Verify that the alarm is resolved using `maintenance : active alarm : display`.
4. If the alarm returns, have your remote maintenance service center check the DBP/VME bus.

SADI Diagnostic Tests

The SADI runs diagnostic tests during a DBP subsystem reboot (as in step 2 in Procedure A). If the red LED remains lit, a SADI test failed. LEDs 10 to 13 show a binary code for the diagnostic test. All but one of these codes indicate a problem with the SADI board. The exception is when yellow LEDs 10, 11, and 13 are lit (see Table A-2 in Appendix A for test 11, VME bus-access failure). In this case, the problem is probably some other board on the DBP (VME) bus. For other LED patterns, if the TN475(B) SADI has a lit red LED, the SADI is probably faulty and should be replaced.

TN477 (TDBI-8) OR TN500 (TDBI)

The Time Division Bus Interface (TDBI) circuit pack is the data-exchange interface between the TN520 VB and TN501B VPC boards. The TN477 has eight channels. The TN500 has sixteen. The TN477 was only installed in early one-cabinet systems containing four or fewer TN501Bs. The TN500 is installed in most cabinets.

The following table shows fault and device codes for solving either TN477 TDBI-8 or TN500 TDBI problems. Even though the table always points to the TN500 for repair action, repair action can apply to either the TN500 or the TN477.

Table 4-4. TDBI-8 (TN477) or TDBI (TN500) Alarm Resolution *(Part 1 of 2)*

Alarm Log		**Description**	**Repair Action**		
Fault	**Unit:Dev**		**1st Choice (Note)** (ckt,slot,proc.)	**2nd Choice** (ckt,slot)	**3rd Choice**
684	37 : 1-8	Slave processor ROM failure	TN500, 16L, A	–	–
685	37 : 9-16	Slave processor ROM failure	TN500, 16L, A	–	–
686	37 : 17-24	Slave processor ROM failure	TN500, 16U, A	–	–
687	37 : 25-32	Slave processor ROM failure	TN500, 16U, A	–	–
688	37 : 1-8	Slave processor insane	TN500, 16L, A	–	–
689	37 : 9-16	Slave processor insane	TN500, 16L, A	–	–
690	37 : 17-24	Slave processor insane	TN500, 16U, A	–	–
691	37 : 25-32	Slave processor insane	TN500, 16U, A	–	–
692	37 : 1-8	Late voice buffer scan	TN500, 16L, A	TN520, 17L	–
693	37 : 9-16	Late voice buffer scan	TN500, 16L, A	TN520, 17L	–
694	37 : 17-24	Late voice buffer scan	TN500, 16U, A	TN520, 17U	–
695	37 : 25-32	Late voice buffer scan	TN500, 16U, A	TN520, 17U	–
696	37 : 1-8	Slave processor RAM failure	TN500, 16L, A	–	–
697	37 : 9-16	Slave processor RAM failure	TN500, 16L, A	–	–
698	37 : 17-24	Slave processor RAM failure	TN500, 16U, A	–	–
699	37 : 25-32	Slave processor RAM failure	TN500, 16U, A	–	–
700	37 : 1-8	TDBI VB/DPR error	TN500, 16L, A	TN520, 17L	any TN501B
701	37 : 9-16	TDBI VB/DPR error	TN500, 16L, A	TN520, 17L	any TN501B
702	37 : 17-24	TDBI VB/DPR error	TN500, 16U, A	TN520, 17U	any TN501B
703	37 : 25-32	TDBI VB/DPR error	TN500, 16U, A	TN520, 17U	any TN501B

Note: For systems with an expansion cabinet, the lower cabinet board is shown with an L next to the slot number and the upper cabinet board is shown with a U next to the slot number.

(Continued)

TABLE 4-4. TDBI-8 (TN477) or TDBI (TN500) Alarm Resolution *(Part 2 of 2)*

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice (Note)** (ckt,slot,proc.)	**2nd Choice** (ckt,slot)	**3rd Choice**
704	37 : 1-8	Slave processor serial link error	TN500, 16L, A	–	–
705	37 : 9-16	Slave processor serial link error	TN500, 16L, A	–	–
706	37 : 17-24	Slave processor serial link error	TN500, 16U, A	–	–
707	37 : 25-32	Slave processor serial link error	TN500, 16U, A	–	–
716-723	37 : 1-8	Hardware time-out	TN500, 16L, A	–	–
724-731	37 : 9-16	Hardware time-out	TN500, 16L, A	–	–
732-747	37 : 17-32	Hardware time-out	TN500, 16U, A	–	–
748-755	37 : 1-8	Protocol chip test error	TN500, 16L, A	–	–
756-763	37 : 9-16	Protocol chip test error	TN500, 16L, A	–	–
764-779	37 : 17-32	Protocol chip test error	TN500, 16U, A	–	–
780-787	37 : 1-8	Slave processor HDLC/PC link error	TN500, 16L, B	any TN501B	–
788-795	37 : 9-16	Slave processor HDLC/PC link error	TN500, 16L, B	any TN501B	–
796-811	37 : 17-32	Slave processor HDLC/PC link error	TN500, 16U, B	any TN501B	–
812-819	37 : 1-8	TDBI external loop-around test	TN500, 16L, B	any TN501B	–
820-827	37 : 9-16	TDBI external loop-around test	TN500, 16L, B	any TN501B	–
828-843	37 : 17-32	TDBI external loop-around test	TN500, 16U, B	any TN501B	–
844-851	37 : 1-8	TDBI crosstalk	TN500, 16L, C	TD bus	–
852-859	37 : 9-16	TDBI crosstalk	TN500, 16L, C	TD bus	–
860-875	37 : 17-32	TDBI crosstalk	TN500, 16U, C	TD bus	–
1145	57 : 1	TD-bus sanity	TN500, 16L, E	TD bus	–
1146	57 : 2	TD-bus sanity	TN500, 16U, E	TD bus	–
1171	57 : 1	TD-bus control channel	TN500, 16L, D	TD bus	–
1172	57 : 2	TD-bus control channel	TN500, 16U, D	TD bus	–
1197	57 : 1	Angel ROM or RAM error	TN500, 16L, E	TD bus	–
1198	57 : 2	Angel ROM or RAM error	TN500, 16U, E	TD bus	–
1223	57 : 1	Angel program logic inconsistency	TN500, 16L, E	TD bus	–
1224	57 : 2	Angel program logic inconsistency	TN500, 16U, E	TD bus	–
1249	57 : 1	Translation error	TN500, 16L, E	TD bus	–
1250	57 : 2	Translation error	TN500, 16U, E	TD bus	–
1256	57 : 1	VB initialization failed	TN500, 16L, A	TN520, 17L	–
1257	57 : 2	VB initialization failed	TN500, 16U, A	TN520, 17U	–
1533	37 : 1	Angel serial link error	TN500, 16L, A	–	–
1534	37 : 2	Angel serial link error	TN500, 16U, A	–	–

Note: For systems with an expansion cabinet, the lower cabinet board is shown with an L next to the slot number and the upper cabinet board is shown with a U next to the slot number.

Procedure A: General Replacement Steps

To replace the TN500 TDBI or TN477 TDBI-8 circuit pack (TDBI or TD-bus tests can be performed on either the TDBI or TDBI-8):

1. Shut down system software (if running), spin down the RCD (if not done automatically), and power down the system.
2. Replace the alarmed circuit pack.
3. Power up the system. After the system initializes, block service using the appropriate form or switch procedure. See Appendix A for details.
4. Run the complete TD-bus test on the replaced unit using the `maintenance : td-bus : test` form. Select 5 repetitions and option `y` for the long test.
5. Run the TDBI external HDLC (loop-around) test on each channel controlled by the replaced unit using the `maintenance : tdbi : test` form. Select 5 repetitions and the `n` option to run the short test.
6. Verify that the alarm did not become active again using the `maintenance : active alarm : display` form.
   a. If the alarm is *not* active, go to the next step and verify that the alarm is resolved if traffic allows. If you cannot keep the system down, enable service using the appropriate form or switch procedure and continue with step 7 when traffic allows.
   b. If the alarm is still active, go to the next step.
7. To ensure complete TDBI operation, display the `maintenance : system : test call` form. Make eight TDBI test calls (on a TN477) or 16 test calls (on a TN500) to test all the channels on the replaced TDBI. See Appendix A for test call procedures.
8. Verify that the alarm is resolved using the `maintenance : active alarm : display` form.
9. If you have not already restored service, use the `maintenance : datalink : release` form.
10. If the alarm returns, replace the 2nd-choice board or have your remote maintenance service center check the TD bus.

Procedure B: TDBI External HDLC (Loop-Around) Test

This test can be performed on either the TDBI or TDBI-8.

Run the TDBI external HDLC (loop-around) test on the alarmed channel (repetitions = 5). Use the `maintenance : tdbi : test` form and the `n` option to run the short test.

If the test fails, follow Procedure A with the addition that the external HDLC (loop-around) test must run five times successfully to resolve the alarm (repetitions = 5).

Procedure C: Complete TDBI Channel Test

This test can be performed on either the TDBI or TDBI-8.

Run the TDBI NPE crosstalk test on the alarmed channel (repetitions = 5). Use the `maintenance : tdbi : test` form and the `y` option to run the long test.

If the test fails, follow Procedure A with the addition that the NPE crosstalk test must run five times successfully to resolve the alarm (repetitions = 5).

Procedure D: TD-Bus Control Channel Test

This test can be performed on either the TDBI or TDBI-8.

Run the TD-Bus control channel test on the alarmed TDBI unit (repetitions = 5). Use the `maintenance : td-bus : test` form and the `n` option to run the short test.

If the test fails, follow Procedure A with the addition that the TD-Bus control channel test must be run five times successfully to resolve the alarm (repetitions = 5).

Procedure E: Complete TD-Bus Test

This test can be performed on either the TDBI or TDBI-8.

Run the complete TD-bus test on the alarmed TDBI board (repetitions = 5). Use the `maintenance : td-bus : test` form and the `y` option to run the long test.

If the test fails, follow Procedure A to resolve the alarm.

TN501B: VPC

Each Voice Port Controller (VPC) board has two ports that connect to the TD bus. Each port has two channels: one to the TN747B VPT board, and the other to the disk drives through the TN472C DBP-CPU. The VPC circuit pack encodes and compresses messages to reduce disk storage requirements. It also controls speed and volume control, speech compression and expansion, and touch-tone signal detection and generation.

If the alarmed unit is 36, only one channel on the board is failing. The board can still provide service on its other channel.

Table 4-5. VPC (TN501B) Alarm Resolution *(Part 1 of 13)*

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice (Note)** (ckt,slot,proc.)	**2nd Choice** (ckt,slot)	**3rd Choice**
300-301	36 : 1-2	Hardware time-out	TN501B, 20L, A	TN727, 14	–
302-303	36 : 3-4	Hardware time-out	TN501B, 21L, A	TN727, 14	–
304-305	36 : 5-6	Hardware time-out	TN501B, 22L, A	TN727, 14	–
306-307	36 : 7-8	Hardware time-out	TN501B, 23L, A	TN727, 14	–
308-309	36 : 9-10	Hardware time-out	TN501B, 25L, A	TN727, 14	–
310-311	36 : 11-12	Hardware time-out	TN501B, 26L, A	TN727, 14	–
312-313	36 : 13-14	Hardware time-out	TN501B, 27L, A	TN727, 14	–
314-315	36 : 15-16	Hardware time-out	TN501B, 28L, A	TN727, 14	–
316-317	36 : 17-18	Hardware time-out	TN501B, 20U, A	TN727, 14U	–
318-319	36 : 19-20	Hardware time-out	TN501B, 21U, A	TN727, 14U	–
320-321	36 : 21-22	Hardware time-out	TN501B, 22U, A	TN727, 14U	–
322-323	36 : 23-24	Hardware time-out	TN501B, 23U, A	TN727, 14U	–
324-325	36 : 25-26	Hardware time-out	TN501B, 25U, A	TN727, 14U	–
326-327	36 : 27-28	Hardware time-out	TN501B, 26U, A	TN727, 14U	–
328-329	36 : 29-30	Hardware time-out	TN501B, 27U, A	TN727, 14U	–
330-331	36 : 31-32	Hardware time-out	TN501B, 28U, A	TN727, 14U	–
332-333	36 : 1-2	VPC DSP #1, 2, 3 ROM or	TN501B, 20L, A	–	–
334-335	36 : 3-4	RAM error	TN501B, 21L, A	–	–
336-337	36 : 5-6	(same)	TN501B, 22L, A	–	–
338-339	36 : 7-8	(same)	TN501B, 23L, A	–	–
340-341	36 : 9-10	(same)	TN501B, 25L, A	–	–
342-343	36 : 11-12	(same)	TN501B, 26L, A	–	–
344-345	36 : 13-14	(same)	TN501B, 27L, A	–	–
346-347	36 : 15-16	(same)	TN501B, 28L, A	–	–

Note: For systems with an expansion cabinet, the lower cabinet board is shown with an L next to the slot number and the upper cabinet board is shown with a U next to the slot number.

(Continued)

TABLE 4-5. VPC (TN501B) Alarm Resolution *(Part 2 of 13)*

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice (Note)** (ckt,slot,proc.)	**2nd Choice** (ckt,slot)	**3rd Choice**
348-349	36 : 17-18	VPC DSP #1, 2, 3 ROM or	TN501B, 20U, A	–	–
350-351	36 : 19-20	RAM error	TN501B, 21U, A	–	–
352-353	36 : 21-22	(same)	TN501B, 22U, A	–	–
354-355	36 : 23-24	(same)	TN501B, 23U, A	–	–
356-357	36 : 25-26	(same)	TN501B, 25U, A	–	–
358-359	36 : 27-28	(same)	TN501B, 26U, A	–	–
360-361	36 : 29-30	(same)	TN501B, 27U, A	–	–
362-363	36 : 31-32	(same)	TN501B, 28U, A	–	–
364-365	36 : 1-2	VPC HDLC/PC init error	TN501B, 20L, A	–	–
366-367	36 : 3-4	VPC HDLC/PC init error	TN501B, 21L, A	–	–
368-369	36 : 5-6	VPC HDLC/PC init error	TN501B, 22L, A	–	–
370-371	36 : 7-8	VPC HDLC/PC init error	TN501B, 23L, A	–	–
372-373	36 : 9-10	VPC HDLC/PC init error	TN501B, 25L, A	–	–
374-375	36 : 11-12	VPC HDLC/PC init error	TN501B, 26L, A	–	–
376-377	36 : 13-14	VPC HDLC/PC init error	TN501B, 27L, A	–	–
378-379	36 : 15-16	VPC HDLC/PC init error	TN501B, 28L, A	–	–
380-381	36 : 17-18	VPC HDLC/PC init error	TN501B, 20U, A	–	–
382-383	36 : 19-20	VPC HDLC/PC init error	TN501B, 21U, A	–	–
384-385	36 : 21-22	VPC HDLC/PC init error	TN501B, 22U, A	–	–
386-387	36 : 23-24	VPC HDLC/PC init error	TN501B, 23U, A	–	–
388-389	36 : 25-26	VPC HDLC/PC init error	TN501B, 25U, A	–	–
390-391	36 : 27-28	VPC HDLC/PC init error	TN501B, 26U, A	–	–
392-393	36 : 29-30	VPC HDLC/PC init error	TN501B, 27U, A	–	–
394-395	36 : 31-32	VPC HDLC/PC init error	TN501B, 28U, A	–	–
396-397	36 : 1-2	VPC CAB/DSP error	TN501B, 20L, A	–	–
398-399	36 : 3-4	VPC CAB/DSP error	TN501B, 21L, A	–	–
400-401	36 : 5-6	VPC CAB/DSP error	TN501B, 22L, A	–	–
402-403	36 : 7-8	VPC CAB/DSP error	TN501B, 23L, A	–	–
404-405	36 : 9-10	VPC CAB/DSP error	TN501B, 25L, A	–	–
406-407	36 : 11-12	VPC CAB/DSP error	TN501B, 26L, A	–	–
408-409	36 : 13-14	VPC CAB/DSP error	TN501B, 27L, A	–	–
410-411	36 : 15-16	VPC CAB/DSP error	TN501B, 28L, A	–	–
412-413	36 : 17-18	VPC CAB/DSP error	TN501B, 20U, A	–	–
414-415	36 : 19-20	VPC CAB/DSP error	TN501B, 21U, A	–	–
416-417	36 : 21-22	VPC CAB/DSP error	TN501B, 22U, A	–	–
418-419	36 : 23-24	VPC CAB/DSP error	TN501B, 23U, A	–	–

Note: For systems with an expansion cabinet, the lower cabinet board is shown with an L next to the slot number and the upper cabinet board is shown with a U next to the slot number.

(Continued)

TABLE 4-5. VPC (TN501B) Alarm Resolution *(Part 3 of 13)*

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice (Note)** (ckt,slot,proc.)	**2nd Choice** (ckt,slot)	**3rd Choice**
420-421	36 : 25-26	VPC CAB/DSP error	TN501B, 25U, A	–	–
422-423	36 : 27-28	VPC CAB/DSP error	TN501B, 26U, A	–	–
424-425	36 : 29-30	VPC CAB/DSP error	TN501B, 27U, A	–	–
426-427	36 : 31-32	VPC CAB/DSP error	TN501B, 28U, A	–	–
428-429	36 : 1-2	Angel serial link error	TN501B, 20L, A	–	–
430-431	36 : 3-4	Angel serial link error	TN501B, 21L, A	–	–
432-433	36 : 5-6	Angel serial link error	TN501B, 22L, A	–	–
434-435	36 : 7-8	Angel serial link error	TN501B, 23L, A	–	–
436-437	36 : 9-10	Angel serial link error	TN501B, 25L, A	–	–
438-439	36 : 11-12	Angel serial link error	TN501B, 26L, A	–	–
440-441	36 : 13-14	Angel serial link error	TN501B, 27L, A	–	–
442-443	36 : 15-16	Angel serial link error	TN501B, 28L, A	–	–
444-445	36 : 17-18	Angel serial link error	TN501B, 20U, A	–	–
446-447	36 : 19-20	Angel serial link error	TN501B, 21U, A	–	–
448-449	36 : 21-22	Angel serial link error	TN501B, 22U, A	–	–
450-451	36 : 23-24	Angel serial link error	TN501B, 23U, A	–	–
452-453	36 : 25-26	Angel serial link error	TN501B, 25U, A	–	–
454-455	36 : 27-28	Angel serial link error	TN501B, 26U, A	–	–
456-457	36 : 29-30	Angel serial link error	TN501B, 27U, A	–	–
458-459	36 : 31-32	Angel serial link error	TN501B, 28U, A	–	–
460-461	36 : 1-2	Slave proc. ROM, RAM,	TN501B, 20L, A	–	–
462-463	36 : 3-4	insane, mode err	TN501B, 21L, A	–	–
464-465	36 : 5-6	(same)	TN501B, 22L, A	–	–
466-467	36 : 7-8	(same)	TN501B, 23L, A	–	–
468-469	36 : 9-10	(same)	TN501B, 25L, A	–	–
470-471	36 : 11-12	(same)	TN501B, 26L, A	–	–
472-473	36 : 13-14	(same)	TN501B, 27L, A	–	–
474-475	36 : 15-16	(same)	TN501B, 28L, A	–	–
476-477	36 : 17-18	(same)	TN501B, 20U, A	–	–
478-479	36 : 19-20	(same)	TN501B, 21U, A	–	–
480-481	36 : 21-22	(same)	TN501B, 22U, A	–	–
482-483	36 : 23-24	(same)	TN501B, 23U, A	–	–
484-485	36 : 25-26	(same)	TN501B, 25U, A	–	–
486-487	36 : 27-28	(same)	TN501B, 26U, A	–	–
488-489	36 : 29-30	(same)	TN501B, 27U, A	–	–
490-491	36 : 31-32	(same)	TN501B, 28U, A	–	–

Note: For systems with an expansion cabinet, the lower cabinet board is shown with an L next to the slot number and the upper cabinet board is shown with a U next to the slot number.

(Continued)

TABLE 4-5. VPC (TN501B) Alarm Resolution *(Part 4 of 13)*

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice (Note)** (ckt,slot,proc.)	**2nd Choice** (ckt,slot)	**3rd Choice**
492-493	36 : 1-2	VPC slave processor reset	TN501B, 20L, A	–	–
494-495	36 : 3-4	VPC slave processor reset	TN501B, 21L, A	–	–
496-497	36 : 5-6	VPC slave processor reset	TN501B, 22L, A	–	–
498-499	36 : 7-8	VPC slave processor reset	TN501B, 23L, A	–	–
500-501	36 : 9-10	VPC slave processor reset	TN501B, 25L, A	–	–
502-503	36 : 11-12	VPC slave processor reset	TN501B, 26L, A	–	–
504-505	36 : 13-14	VPC slave processor reset	TN501B, 27L, A	–	–
506-507	36 : 15-16	VPC slave processor reset	TN501B, 28L, A	–	–
508-509	36 : 17-18	VPC slave processor reset	TN501B, 20U, A	–	–
510-511	36 : 19-20	VPC slave processor reset	TN501B, 21U, A	–	–
512-513	36 : 21-22	VPC slave processor reset	TN501B, 22U, A	–	–
514-515	36 : 23-24	VPC slave processor reset	TN501B, 23U, A	–	–
516-517	36 : 25-26	VPC slave processor reset	TN501B, 25U, A	–	–
518-519	36 : 27-28	VPC slave processor reset	TN501B, 26U, A	–	–
520-521	36 : 29-30	VPC slave processor reset	TN501B, 27U, A	–	–
522-523	36 : 31-32	VPC slave processor reset	TN501B, 28U, A	–	–
524-525	36 : 1-2	VPC NPE crosstalk	TN501B, 20L, C	TD-bus	–
526-527	36 : 3-4	VPC NPE crosstalk	TN501B, 21L, C	TD-bus	–
528-529	36 : 5-6	VPC NPE crosstalk	TN501B, 22L, C	TD-bus	–
530-531	36 : 7-8	VPC NPE crosstalk	TN501B, 23L, C	TD-bus	–
532-533	36 : 9-10	VPC NPE crosstalk	TN501B, 25L, C	TD-bus	–
534-535	36 : 11-12	VPC NPE crosstalk	TN501B, 26L, C	TD-bus	–
536-537	36 : 13-14	VPC NPE crosstalk	TN501B, 27L, C	TD-bus	–
538-539	36 : 15-16	VPC NPE crosstalk	TN501B, 28L, C	TD-bus	–
540-541	36 : 17-18	VPC NPE crosstalk	TN501B, 20U, C	TD-bus	–
542-543	36 : 19-20	VPC NPE crosstalk	TN501B, 21U, C	TD-bus	–
544-545	36 : 21-22	VPC NPE crosstalk	TN501B, 22U, C	TD-bus	–
546-547	36 : 23-24	VPC NPE crosstalk	TN501B, 23U, C	TD-bus	–
548-549	36 : 25-26	VPC NPE crosstalk	TN501B, 25U, C	TD-bus	–
550-551	36 : 27-28	VPC NPE crosstalk	TN501B, 26U, C	TD-bus	–
552-553	36 : 29-30	VPC NPE crosstalk	TN501B, 27U, C	TD-bus	–
554-555	36 : 31-32	VPC NPE crosstalk	TN501B, 28U, C	TD-bus	–
556-557	36 : 1-2	Protocol chip test error	TN501B, 20L, A	–	–
558-559	36 : 3-4	Protocol chip test error	TN501B, 21L, A	–	–
560-561	36 : 5-6	Protocol chip test error	TN501B, 22L, A	–	–
562-563	36 : 7-8	Protocol chip test error	TN501B, 23L, A	–	–

Note: For systems with an expansion cabinet, the lower cabinet board is shown with an L next to the slot number and the upper cabinet board is shown with a U next to the slot number.

(Continued)

TABLE 4-5. VPC (TN501B) Alarm Resolution *(Part 5 of 13)*

Alarm Log		**Description**	**Repair Action**		
Fault	**Unit:Dev**		**1st Choice (Note)** (ckt,slot,proc.)	**2nd Choice** (ckt,slot)	**3rd Choice**
564-565	36 : 9-10	Protocol chip test error	TN501B, 25L, A	–	–
566-567	36 : 11-12	Protocol chip test error	TN501B, 26L, A	–	–
568-569	36 : 13-14	Protocol chip test error	TN501B, 27L, A	–	–
570-571	36 : 15-16	Protocol chip test error	TN501B, 28L, A	–	–
572-573	36 : 17-18	Protocol chip test error	TN501B, 20U, A	–	–
574-575	36 : 19-20	Protocol chip test error	TN501B, 21U, A	–	–
576-577	36 : 21-22	Protocol chip test error	TN501B, 22U, A	–	–
578-579	36 : 23-24	Protocol chip test error	TN501B, 23U, A	–	–
580-581	36 : 25-26	Protocol chip test error	TN501B, 25U, A	–	–
582-583	36 : 27-28	Protocol chip test error	TN501B, 26U, A	–	–
584-585	36 : 29-30	Protocol chip test error	TN501B, 27U, A	–	–
586-587	36 : 31-32	Protocol chip test error	TN501B, 28U, A	–	–
588-589	36 : 1-2	VPC tone level test	TN501B, 20L, B	TN714, 18	–
590-591	36 : 3-4	VPC tone level test	TN501B, 21L, B	TN714, 18	–
592-593	36 : 5-6	VPC tone level test	TN501B, 22L, B	TN714, 18	–
594-595	36 : 7-8	VPC tone level test	TN501B, 23L, B	TN714, 18	–
596-597	36 : 9-10	VPC tone level test	TN501B, 25L, B	TN714, 18	–
598-599	36 : 11-12	VPC tone level test	TN501B, 26L, B	TN714, 18	–
600-601	36 : 13-14	VPC tone level test	TN501B, 27L, B	TN714, 18	–
602-603	36 : 15-16	VPC tone level test	TN501B, 28L, B	TN714, 18	–
604-605	36 : 17-18	VPC tone level test	TN501B, 20U, B	TN714, 18	–
606-607	36 : 19-20	VPC tone level test	TN501B, 21U, B	TN714, 18	–
608-609	36 : 21-22	VPC tone level test	TN501B, 22U, B	TN714, 18	–
610-611	36 : 23-24	VPC tone level test	TN501B, 23U, B	TN714, 18	–
612-613	36 : 25-26	VPC tone level test	TN501B, 25U, B	TN714, 18	–
614-615	36 : 27-28	VPC tone level test	TN501B, 26U, B	TN714, 18	–
616-617	36 : 29-30	VPC tone level test	TN501B, 27U, B	TN714, 18	–
618-619	36 : 31-32	VPC tone level test	TN501B, 28U, B	TN714, 18	–
620-621	36 : 1-2	VPC data count	TN501B, 20L, B	TN714, 18	–
622-623	36 : 3-4	VPC data count	TN501B, 21L, B	TN714, 18	–
624-625	36 : 5-6	VPC data count	TN501B, 22L, B	TN714, 18	–
626-627	36 : 7-8	VPC data count	TN501B, 23L, B	TN714, 18	–
628-629	36 : 9-10	VPC data count	TN501B, 25L, B	TN714, 18	–
630-631	36 : 11-12	VPC data count	TN501B, 26L, B	TN714, 18	–
632-633	36 : 13-14	VPC data count	TN501B, 27L, B	TN714, 18	–
634-635	36 : 15-16	VPC data count	TN501B, 28L, B	TN714, 18	–

Note: For systems with an expansion cabinet, the lower cabinet board is shown with an L next to the slot number and the upper cabinet board is shown with a U next to the slot number.

(Continued)

TABLE 4-5. VPC (TN501B) Alarm Resolution *(Part 6 of 13)*

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice (Note)** (ckt,slot,proc.)	**2nd Choice** (ckt,slot)	**3rd Choice**
636-637	36 : 17-18	VPC data count	TN501B, 20U, B	TN714, 18	–
638-639	36 : 19-20	VPC data count	TN501B, 21U, B	TN714, 18	–
640-641	36 : 21-22	VPC data count	TN501B, 22U, B	TN714, 18	–
642-643	36 : 23-24	VPC data count	TN501B, 23U, B	TN714, 18	–
644-645	36 : 25-26	VPC data count	TN501B, 25U, B	TN714, 18	–
646-647	36 : 27-28	VPC data count	TN501B, 26U, B	TN714, 18	–
648-649	36 : 29-30	VPC data count	TN501B, 27U, B	TN714, 18	–
650-651	36 : 31-32	VPC data count	TN501B, 28U, B	TN714, 18	–
652-653	36 : 1-2	VPC CAB chip test error	TN501B, 20L, A	–	–
654-655	36 : 3-4	VPC CAB chip test error	TN501B, 21L, A	–	–
656-657	36 : 5-6	VPC CAB chip test error	TN501B, 22L, A	–	–
658-659	36 : 7-8	VPC CAB chip test error	TN501B, 23L, A	–	–
660-661	36 : 9-10	VPC CAB chip test error	TN501B, 25L, A	–	–
662-663	36 : 11-12	VPC CAB chip test error	TN501B, 26L, A	–	–
664-665	36 : 13-14	VPC CAB chip test error	TN501B, 27L, A	–	–
666-667	36 : 15-16	VPC CAB chip test error	TN501B, 28L, A	–	–
668-669	36 : 17-18	VPC CAB chip test error	TN501B, 20U, A	–	–
670-671	36 : 19-20	VPC CAB chip test error	TN501B, 21U, A	–	–
672-673	36 : 21-22	VPC CAB chip test error	TN501B, 22U, A	–	–
674-675	36 : 23-24	VPC CAB chip test error	TN501B, 23U, A	–	–
676-677	36 : 25-26	VPC CAB chip test error	TN501B, 25U, A	–	–
678-679	36 : 27-28	VPC CAB chip test error	TN501B, 26U, A	–	–
680-681	36 : 29-30	VPC CAB chip test error	TN501B, 27U, A	–	–
682-683	36 : 31-32	VPC CAB chip test error	TN501B, 28U, A	–	–
876-877	36 : 1-2	VPC encoder test failure	TN501B, 20L, A	–	–
878-879	36 : 3-4	VPC encoder test failure	TN501B, 21L, A	–	–
880-881	36 : 5-6	VPC encoder test failure	TN501B, 22L, A	–	–
882-883	36 : 7-8	VPC encoder test failure	TN501B, 23L, A	–	–
884-885	36 : 9-10	VPC encoder test failure	TN501B, 25L, A	–	–
886-887	36 : 11-12	VPC encoder test failure	TN501B, 26L, A	–	–
888-889	36 : 13-14	VPC encoder test failure	TN501B, 27L, A	–	–
890-891	36 : 15-16	VPC encoder test failure	TN501B, 28L, A	–	–
892-893	36 : 17-18	VPC encoder test failure	TN501B, 20U, A	–	–
894-895	36 : 19-20	VPC encoder test failure	TN501B, 21U, A	–	–
896-897	36 : 21-22	VPC encoder test failure	TN501B, 22U, A	–	–
898-899	36 : 23-24	VPC encoder test failure	TN501B, 23U, A	–	–

Note: For systems with an expansion cabinet, the lower cabinet board is shown with an L next to the slot number and the upper cabinet board is shown with a U next to the slot number.

(Continued)

TABLE 4-5. VPC (TN501B) Alarm Resolution *(Part 7 of 13)*

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice (Note)** (ckt,slot,proc.)	**2nd Choice** (ckt,slot)	**3rd Choice**
900-901	36 : 25-26	VPC encoder test failure	TN501B, 25U, A	–	–
902-903	36 : 27-28	VPC encoder test failure	TN501B, 26U, A	–	–
904-905	36 : 29-30	VPC encoder test failure	TN501B, 27U, A	–	–
906-907	36 : 31-32	VPC encoder test failure	TN501B, 28U, A	–	–
908-909	36 : 1-2	VPC decoder test failure	TN501B, 20L, A	–	–
910-911	36 : 3-4	VPC decoder test failure	TN501B, 21L, A	–	–
912-913	36 : 5-6	VPC decoder test failure	TN501B, 22L, A	–	–
914-915	36 : 7-8	VPC decoder test failure	TN501B, 23L, A	–	–
916-917	36 : 9-10	VPC decoder test failure	TN501B, 25L, A	–	–
918-919	36 : 11-12	VPC decoder test failure	TN501B, 26L, A	–	–
920-921	36 : 13-14	VPC decoder test failure	TN501B, 27L, A	–	–
922-923	36 : 15-16	VPC decoder test failure	TN501B, 28L, A	–	–
924-925	36 : 17-18	VPC decoder test failure	TN501B, 20U, A	–	–
926-927	36 : 19-20	VPC decoder test failure	TN501B, 21U, A	–	–
928-229	36 : 21-22	VPC decoder test failure	TN501B, 22U, A	–	–
930-931	36 : 23-24	VPC decoder test failure	TN501B, 23U, A	–	–
932-933	36 : 25-26	VPC decoder test failure	TN501B, 25U, A	–	–
934-935	36 : 27-28	VPC decoder test failure	TN501B, 26U, A	–	–
936-937	36 : 29-30	VPC decoder test failure	TN501B, 27U, A	–	–
938-939	36 : 31-32	VPC decoder test failure	TN501B, 28U, A	–	–
940-941	36 : 1-2	VPC touch tone detector test	TN501B, 20L, A	–	–
942-943	36 : 3-4	VPC touch tone detector test	TN501B, 21L, A	–	–
944-945	36 : 5-6	VPC touch tone detector test	TN501B, 22L, A	–	–
946-947	36 : 7-8	VPC touch tone detector test	TN501B, 23L, A	–	–
948-949	36 : 9-10	VPC touch tone detector test	TN501B, 25L, A	–	–
950-951	36 : 11-12	VPC touch tone detector test	TN501B, 26L, A	–	–
952-953	36 : 13-14	VPC touch tone detector test	TN501B, 27L, A	–	–
954-955	36 : 15-16	VPC touch tone detector test	TN501B, 28L, A	–	–
956-957	36 : 17-18	VPC touch tone detector test	TN501B, 20U, A	–	–
958-959	36 : 19-20	VPC touch tone detector test	TN501B, 21U, A	–	–
960-961	36 : 21-22	VPC touch tone detector test	TN501B, 22U, A	–	–
962-963	36 : 23-24	VPC touch tone detector test	TN501B, 23U, A	–	–
964-965	36 : 25-26	VPC touch tone detector test	TN501B, 25U, A	–	–
966-967	36 : 27-28	VPC touch tone detector test	TN501B, 26U, A	–	–
968-969	36 : 29-30	VPC touch tone detector test	TN501B, 27U, A	–	–
970-971	36 : 31-32	VPC touch tone detector test	TN501B, 28U, A	–	–

Note: For systems with an expansion cabinet, the lower cabinet board is shown with an L next to the slot number and the upper cabinet board is shown with a U next to the slot number.

(Continued)

TABLE 4-5. VPC (TN501B) Alarm Resolution *(Part 8 of 13)*

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice (Note)** (ckt,slot,proc.)	**2nd Choice** (ckt,slot)	**3rd Choice**
972-973	36 : 1-2	VPC idle time slot test	TN501B, 20L, B	TD-bus	–
974-975	36 : 3-4	VPC idle time slot test	TN501B, 21L, B	TD-bus	–
976-977	36 : 5-6	VPC idle time slot test	TN501B, 22L, B	TD-bus	–
978-979	36 : 7-8	VPC idle time slot test	TN501B, 23L, B	TD-bus	–
980-981	36 : 9-10	VPC idle time slot test	TN501B, 25L, B	TD-bus	–
982-983	36 : 11-12	VPC idle time slot test	TN501B, 26L, B	TD-bus	–
984-985	36 : 13-14	VPC idle time slot test	TN501B, 27L, B	TD-bus	–
986-987	36 : 15-16	VPC idle time slot test	TN501B, 28L, B	TD-bus	–
988-989	36 : 17-18	VPC idle time slot test	TN501B, 20U, B	TD-bus	–
990-991	36 : 19-20	VPC idle time slot test	TN501B, 21U, B	TD-bus	–
992-993	36 : 21-22	VPC idle time slot test	TN501B, 22U, B	TD-bus	–
994-995	36 : 23-24	VPC idle time slot test	TN501B, 23U, B	TD-bus	–
996-997	36 : 25-26	VPC idle time slot test	TN501B, 25U, B	TD-bus	–
998-999	36 : 27-28	VPC idle time slot test	TN501B, 26U, B	TD-bus	–
1000-1001	36 : 29-30	VPC idle time slot test	TN501B, 27U, B	TD-bus	–
1002-1003	36 : 31-32	VPC idle time slot test	TN501B, 28U, B	TD-bus	–
1004-1005	36 : 1-2	VPC dial tone detection error	TN501B, 20L, B	TN714, 18	–
1006-1007	36 : 3-4	VPC dial tone detection error	TN501B, 21L, B	TN714, 18	–
1008-1009	36 : 5-6	VPC dial tone detection error	TN501B, 22L, B	TN714, 18	–
1010-1011	36 : 7-8	VPC dial tone detection error	TN501B, 23L, B	TN714, 18	–
1012-1013	36 : 9-10	VPC dial tone detection error	TN501B, 25L, B	TN714, 18	–
1014-1015	36 : 11-12	VPC dial tone detection error	TN501B, 26L, B	TN714, 18	–
1016-1017	36 : 13-14	VPC dial tone detection error	TN501B, 27L, B	TN714, 18	–
1018-1019	36 : 15-16	VPC dial tone detection error	TN501B, 28L, B	TN714, 18	–
1020-1021	36 : 17-18	VPC dial tone detection error	TN501B, 20U, B	TN714, 18	–
1022-1023	36 : 19-20	VPC dial tone detection error	TN501B, 21U, B	TN714, 18	–
1024-1025	36 : 21-22	VPC dial tone detection error	TN501B, 22U, B	TN714, 18	–
1026-1027	36 : 23-24	VPC dial tone detection error	TN501B, 23U, B	TN714, 18	–
1028-1029	36 : 25-26	VPC dial tone detection error	TN501B, 25U, B	TN714, 18	–
1030-1031	36 : 27-28	VPC dial tone detection error	TN501B, 26U, B	TN714, 18	–
1032-1033	36 : 29-30	VPC dial tone detection error	TN501B, 27U, B	TN714, 18	–
1034-1035	36 : 31-32	VPC dial tone detection error	TN501B, 28U, B	TN714, 18	–
1036-1037	36 : 1-2	VPC HDLC external test	TN501B, 20L, B	TN500, 16L	–
1038-1039	36 : 3-4	VPC HDLC external test	TN501B, 21L, B	TN477/500, 16L	–
1040-1041	36 : 5-6	VPC HDLC external test	TN501B, 22L, B	TN500, 16L	–
1042-1043	36 : 7-8	VPC HDLC external test	TN501B, 23L, B	TN500, 16L	–
1044-1045	36 : 9-10	VPC HDLC external test	TN501B, 25L, B	TN500, 16L	–

(Continued)

TABLE 4-5. VPC (TN501B) Alarm Resolution *(Part 9 of 13)*

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice (Note)** (ckt,slot,proc.)	**2nd Choice** (ckt,slot)	**3rd Choice**
1046-1047	36 : 11-12	VPC HDLC external test	TN501B, 26L, B	TN500, 16L	–
1048-1049	36 : 13-14	VPC HDLC external test	TN501B, 27L, B	TN500, 16L	–
1050-1051	36 : 15-16	VPC HDLC external test	TN501B, 28L, B	TN500, 16L	–
1052-1053	36 : 17-18	VPC HDLC external test	TN501B, 20U, B	TN500, 16U	–
1054-1055	36 : 19-20	VPC HDLC external test	TN501B, 21U, B	TN500, 16U	–
1056-1057	36 : 21-22	VPC HDLC external test	TN501B, 22U, B	TN500, 16U	–
1058-1059	36 : 23-24	VPC HDLC external test	TN501B, 23U, B	TN500, 16U	–
1060-1061	36 : 25-26	VPC HDLC external test	TN501B, 25U, B	TN500, 16U	–
1062-1063	36 : 27-28	VPC HDLC external test	TN501B, 26U, B	TN500, 16U	–
1064-1065	36 : 29-30	VPC HDLC external test	TN501B, 27U, B	TN500, 16U	–
1066-1067	36 : 31-32	VPC HDLC external test	TN501B, 28U, B	TN500, 16U	–
1129	56 : 1	TD-bus sanity	TN501B, 20L, E	TN714, 18	–
1130	56 : 2	TD-bus sanity	TN501B, 21L, E	TN714, 18	–
1131	56 : 3	TD-bus sanity	TN501B, 22L, E	TN714, 18	–
1132	56 : 4	TD-bus sanity	TN501B, 23L, E	TN714, 18	–
1133	56 : 5	TD-bus sanity	TN501B, 25L, E	TN714, 18	–
1134	56 : 6	TD-bus sanity	TN501B, 26L, E	TN714, 18	–
1135	56 : 7	TD-bus sanity	TN501B, 27L, E	TN714, 18	–
1136	56 : 8	TD-bus sanity	TN501B, 28L, E	TN714, 18	–
1137	56 : 9	TD-bus sanity	TN501B, 20U, E	TN714, 18	–
1138	56 : 10	TD-bus sanity	TN501B, 21U, E	TN714, 18	–
1139	56 : 11	TD-bus sanity	TN501B, 22U, E	TN714, 18	–
1140	56 : 12	TD-bus sanity	TN501B, 23U, E	TN714, 18	–
1141	56 : 13	TD-bus sanity	TN501B, 25U, E	TN714, 18	–
1142	56 : 14	TD-bus sanity	TN501B, 26U, E	TN714, 18	–
1143	56 : 15	TD-bus sanity	TN501B, 27U, E	TN714, 18	–
1144	56 : 16	TD-bus sanity	TN501B, 28U, E	TN714, 18	–
1155	56 : 1	TD-bus control channel	TN501B, 20L, D	TN714, 18	–
1156	56 : 2	TD-bus control channel	TN501B, 21L, D	TN714, 18	–
1157	56 : 3	TD-bus control channel	TN501B, 22L, D	TN714, 18	–
1158	56 : 4	TD-bus control channel	TN501B, 23L, D	TN714, 18	–
1159	56 : 5	TD-bus control channel	TN501B, 25L, D	TN714, 18	–
1160	56 : 6	TD-bus control channel	TN501B, 26L, D	TN714, 18	–
1161	56 : 7	TD-bus control channel	TN501B, 27L, D	TN714, 18	–
1162	56 : 8	TD-bus control channel	TN501B, 28L, D	TN714, 18	–
1163	56 : 9	TD-bus control channel	TN501B, 20U, D	TN714, 18	–
1164	56 : 10	TD-bus control channel	TN501B, 21U, D	TN714, 18	–

(Continued)

TABLE 4-5. VPC (TN501B) Alarm Resolution *(Part 10 of 13)*

Alarm Log		Description	Repair Action		
Fault	Unit:Dev		1st Choice (Note) (ckt,slot,proc.)	2nd Choice (ckt,slot)	3rd Choice
1165	56 : 11	TD-bus control channel	TN501B, 22U, D	TN714, 18	–
1166	56 : 12	TD-bus control channel	TN501B, 23U, D	TN714, 18	–
1167	56 : 13	TD-bus control channel	TN501B, 25U, D	TN714, 18	–
1168	56 : 14	TD-bus control channel	TN501B, 26U, D	TN714, 18	–
1169	56 : 15	TD-bus control channel	TN501B, 27U, D	TN714, 18	–
1170	56 : 16	TD-bus control channel	TN501B, 28U, D	TN714, 18	–
1181	56 : 1	Angel ROM or RAM error	TN501B, 20L, E	–	–
1182	56 : 2	Angel ROM or RAM error	TN501B, 21L, E	–	–
1183	56 : 3	Angel ROM or RAM error	TN501B, 22L, E	–	–
1184	56 : 4	Angel ROM or RAM error	TN501B, 23L, E	–	–
1185	56 : 5	Angel ROM or RAM error	TN501B, 25L, E	–	–
1186	56 : 6	Angel ROM or RAM error	TN501B, 26L, E	–	–
1187	56 : 7	Angel ROM or RAM error	TN501B, 27L, E	–	–
1188	56 : 8	Angel ROM or RAM error	TN501B, 28L, E	–	–
1189	56 : 9	Angel ROM or RAM error	TN501B, 20U, E	–	–
1190	56 : 10	Angel ROM or RAM error	TN501B, 21U, E	–	–
1191	56 : 11	Angel ROM or RAM error	TN501B, 22U, E	–	–
1192	56 : 12	Angel ROM or RAM error	TN501B, 23U, E	–	–
1193	56 : 13	Angel ROM or RAM error	TN501B, 25U, E	–	–
1194	56 : 14	Angel ROM or RAM error	TN501B, 26U, E	–	–
1195	56 : 15	Angel ROM or RAM error	TN501B, 27U, E	–	–
1196	56 : 16	Angel ROM or RAM error	TN501B, 28U, E	–	–
1207	56 : 1	Angel program logic inconsistency	TN501B, 20L, E	–	–
1208	56 : 2	Angel program logic inconsistency	TN501B, 21L, E	–	–
1209	56 : 3	Angel program logic inconsistency	TN501B, 22L, E	–	–
1210	56 : 4	Angel program logic inconsistency	TN501B, 23L, E	–	–
1211	56 : 5	Angel program logic inconsistency	TN501B, 25L, E	–	–
1212	56 : 6	Angel program logic inconsistency	TN501B, 26L, E	–	–
1213	56 : 7	Angel program logic inconsistency	TN501B, 27L, E	–	–
1214	56 : 8	Angel program logic inconsistency	TN501B, 28L, E	–	–
1215	56 : 9	Angel program logic inconsistency	TN501B, 20U, E	–	–
1216	56 : 10	Angel program logic inconsistency	TN501B, 21U, E	–	–
1217	56 : 11	Angel program logic inconsistency	TN501B, 22U, E	–	–
1218	56 : 12	Angel program logic inconsistency	TN501B, 23U, E	–	–
1219	56 : 13	Angel program logic inconsistency	TN501B, 25U, E	–	–
1220	56 : 14	Angel program logic inconsistency	TN501B, 26U, E	–	–

Note: For systems with an expansion cabinet, the lower cabinet board is shown with an L next to the slot number and the upper cabinet board is shown with a U next to the slot number.

(Continued)

TABLE 4-5. VPC (TN501B) Alarm Resolution *(Part 11 of 13)*

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice (Note)** (ckt,slot,proc.)	**2nd Choice** (ckt,slot)	**3rd Choice**
1221	56 : 15	Angel program logic inconsistency	TN501B, 27U, E	–	–
1222	56 : 16	Angel program logic inconsistency	TN501B, 28U, E	–	–
1233	56 : 1	Translation error	TN501B, 20L, E	–	–
1234	56 : 2	Translation error	TN501B, 21L, E	–	–
1235	56 : 3	Translation error	TN501B, 22L, E	–	–
1236	56 : 4	Translation error	TN501B, 23L, E	–	–
1237	56 : 5	Translation error	TN501B, 25L, E	–	–
1238	56 : 6	Translation error	TN501B, 26L, E	–	–
1239	56 : 7	Translation error	TN501B, 27L, E	–	–
1240	56 : 8	Translation error	TN501B, 28L, E	–	–
1241	56 : 9	Translation error	TN501B, 20U, E	–	–
1242	56 : 10	Translation error	TN501B, 21U, E	–	–
1243	56 : 11	Translation error	TN501B, 22U, E	–	–
1244	56 : 12	Translation error	TN501B, 23U, E	–	–
1245	56 : 13	Translation error	TN501B, 25U, E	–	–
1246	56 : 14	Translation error	TN501B, 26U, E	–	–
1247	56 : 15	Translation error	TN501B, 27U, E	–	–
1248	56 : 16	Translation error	TN501B, 28U, E	–	–
1314	56 : 1	Angel vintage inconsistency	TN501B, 20L, E	–	–
1315	56 : 2	Angel vintage inconsistency	TN501B, 21L, E	–	–
1316	56 : 3	Angel vintage inconsistency	TN501B, 22L, E	–	–
1317	56 : 4	Angel vintage inconsistency	TN501B, 23L, E	–	–
1318	56 : 5	Angel vintage inconsistency	TN501B, 25L, E	–	–
1319	56 : 6	Angel vintage inconsistency	TN501B, 26L, E	–	–
1320	56 : 7	Angel vintage inconsistency	TN501B, 27L, E	–	–
1321	56 : 8	Angel vintage inconsistency	TN501B, 28L, E	–	–
1322	56 : 9	Angel vintage inconsistency	TN501B, 20U, E	–	–
1323	56 : 10	Angel vintage inconsistency	TN501B, 21U, E	–	–
1324	56 : 11	Angel vintage inconsistency	TN501B, 22U, E	–	–
1325	56 : 12	Angel vintage inconsistency	TN501B, 23U, E	–	–
1326	56 : 13	Angel vintage inconsistency	TN501B, 25U, E	–	–
1327	56 : 14	Angel vintage inconsistency	TN501B, 26U, E	–	–
1328	56 : 15	Angel vintage inconsistency	TN501B, 27U, E	–	–
1329	56 : 16	Angel vintage inconsistency	TN501B, 28U, E	–	–
1333-1334	36 : 1-2	VPC error during play or record	TN501B, 20L, E	–	–
1335-1336	36 : 3-4	VPC error during play or record	TN501B, 21L, E	–	–

Note: For systems with an expansion cabinet, the lower cabinet board is shown with an L next to the slot number and the upper cabinet board is shown with a U next to the slot number.

(Continued)

TABLE 4-5. VPC (TN501B) Alarm Resolution *(Part 12 of 13)*

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice (Note)** (ckt,slot,proc.)	**2nd Choice** (ckt,slot)	**3rd Choice**
1337-1338	36 : 5-6	VPC error during play or record	TN501B, 22L, E	–	–
1339-1340	36 : 7-8	VPC error during play or record	TN501B, 23L, E	–	–
1341-1342	36 : 9-10	VPC error during play or record	TN501B, 25L, E	–	–
1343-1344	36 : 11-12	VPC error during play or record	TN501B, 26L, E	–	–
1345-1346	36 : 13-14	VPC error during play or record	TN501B, 27L, E	–	–
1347-1348	36 : 15-16	VPC error during play or record	TN501B, 28L, E	–	–
1349-1350	36 : 17-18	VPC error during play or record	TN501B, 20U, E	–	–
1351-1352	36 : 19-20	VPC error during play or record	TN501B, 21U, E	–	–
1353-1354	36 : 21-22	VPC error during play or record	TN501B, 22U, E	–	–
1355-1356	36 : 23-24	VPC error during play or record	TN501B, 23U, E	–	–
1357-1358	36 : 25-26	VPC error during play or record	TN501B, 25U, E	–	–
1359-1360	36 : 27-28	VPC error during play or record	TN501B, 26U, E	–	–
1361-1362	36 : 29-30	VPC error during play or record	TN501B, 27U, E	–	–
1363-1364	36 : 31-32	VPC error during play or record	TN501B, 28U, E	–	–
1434-1435	36 : 1-2	VPC DSP ROM error	TN501B, 20L, E	–	–
1436-1437	36 : 3-4	VPC DSP ROM error	TN501B, 21L, E	–	–
1438-1439	36 : 5-6	VPC DSP ROM error	TN501B, 22L, E	–	–
1440-1441	36 : 7-8	VPC DSP ROM error	TN501B, 23L, E	–	–
1442-1443	36 : 9-10	VPC DSP ROM error	TN501B, 25L, E	–	–
1444-1445	36 : 11-12	VPC DSP ROM error	TN501B, 26L, E	–	–
1446-1447	36 : 13-14	VPC DSP ROM error	TN501B, 27L, E	–	–
1448-1449	36 : 15-16	VPC DSP ROM error	TN501B, 28L, E	–	–
1450-1451	36 : 17-18	VPC DSP ROM error	TN501B, 20U, E	–	–
1452-1453	36 : 19-20	VPC DSP ROM error	TN501B, 21U, E	–	–
1454-1455	36 : 21-22	VPC DSP ROM error	TN501B, 22U, E	–	–
1456-1457	36 : 23-24	VPC DSP ROM error	TN501B, 23U, E	–	–
1458-1459	36 : 25-26	VPC DSP ROM error	TN501B, 25U, E	–	–
1460-1461	36 : 27-28	VPC DSP ROM error	TN501B, 26U, E	–	–
1462-1463	36 : 29-30	VPC DSP ROM error	TN501B, 27U, E	–	–
1464-1465	36 : 31-32	VPC DSP ROM error	TN501B, 28U, E	–	–
1466-1467	36 : 1-2	VPC DSP ROM error	TN501B, 20L, E	–	–
1468-1469	36 : 3-4	VPC DSP ROM error	TN501B, 21L, E	–	–
1470-1471	36 : 5-6	VPC DSP ROM error	TN501B, 22L, E	–	–
1472-1473	36 : 7-8	VPC DSP ROM error	TN501B, 23L, E	–	–
1474-1475	36 : 9-10	VPC DSP ROM error	TN501B, 25L, E	–	–
1476-1477	36 : 11-12	VPC DSP ROM error	TN501B, 26L, E	–	–

Note: For systems with an expansion cabinet, the lower cabinet board is shown with an L next to the slot number and the upper cabinet board is shown with a U next to the slot number.

(Continued)

TABLE 4-5. VPC (TN501B) Alarm Resolution *(Part 13 of 13)*

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice (Note)** (ckt,slot,proc.)	**2nd Choice** (ckt,slot)	**3rd Choice**
1478-1479	36 : 13-14	VPC DSP ROM error	TN501B, 27L, E	–	–
1480-1481	36 : 15-16	VPC DSP ROM error	TN501B, 28L, E	–	–
1482-1483	36 : 17-18	VPC DSP ROM error	TN501B, 20U, E	–	–
1484-1485	36 : 19-20	VPC DSP ROM error	TN501B, 21U, E	–	–
1486-1487	36 : 21-22	VPC DSP ROM error	TN501B, 22U, E	–	–
1488-1489	36 : 23-24	VPC DSP ROM error	TN501B, 23U, E	–	–
1490-1491	36 : 25-26	VPC DSP ROM error	TN501B, 25U, E	–	–
1492-1493	36 : 27-28	VPC DSP ROM error	TN501B, 26U, E	–	–
1494-1495	36 : 29-30	VPC DSP ROM error	TN501B, 27U, E	–	–
1496-1497	36 : 31-32	VPC DSP ROM error	TN501B, 28U, E	–	–

Note: For systems with an expansion cabinet, the lower cabinet board is shown with an L next to the slot number and the upper cabinet board is shown with a U next to the slot number.

Procedure A: General Replacement Steps

To replace a VPC circuit pack:

1. Shut down system software (if running), spin down the RCD (if not done automatically), and power down the system.
2. Using the table, find the correct board related to the alarm (it should have a lit red LED).
3. Replace the indicated VPC board. Power up the system. The system should initialize.
4. Make a test call on both channels of the replaced VPC board by calling the AUDIX number (use the `maintenance : system : test call` form). See Appendix A, *Basic Procedures* for test call procedures.
5. To ensure complete VPC operation, you may run the following additional tests. These tests will also run later in the background, but slowly.
   a. Run the complete TD-bus test on the replaced unit (repetitions = 5). Use the `maintenance : td-bus : test` form and the `y` option to run the long test.
   b. Run the short version of the VPC test on each channel controlled by the replaced unit (repetitions = 5). Use the `maintenance : vpc : test` form and the `n` option.
6. Use the `maintenance : active alarm : display` form to verify that the alarm has not returned. If the alarm is still not resolved, do a restart.
7. If the alarm continues to return, replace the 2nd-choice circuit pack or have your remote maintenance service center check the TD bus.

Procedure B: VPC Short Test

Run the short version of the VPC test on the alarmed channel (repetitions = 5). Use the `maintenance : vpc : test` form and the `n` option to run the short test.

If the test fails, follow Procedure A with the addition that the short version of the VPC test must run five times successfully to resolve the alarm (repetitions = 5).

Procedure C: Complete VPC Test

Run the complete VPC test on the alarmed channel (repetitions = 5). Use the `maintenance : vpc : test` form and the `y` option to run the long test.

If the test fails, follow Procedure A with the addition that the complete VPC test must run five times successfully to resolve the alarm (repetitions = 5).

Procedure D: TD-Bus Control Channel Test

Run the TD-Bus control channel test on the alarmed VPC unit (repetitions = 5). Use the `maintenance : td-bus : test` form and the `n` option to run the short test.

If the test fails, follow Procedure A with the addition that the TD-Bus control channel test must be run five times successfully to resolve the alarm (repetitions = 5).

Procedure E: Complete TD-Bus Test

Run the complete TD-bus test on the alarmed VPC board (repetitions = 5). Use the `maintenance : td-bus : test` form and the `y` option to run the long test.

If the test fails, follow Procedure A to resolve the alarm.

TN506B: BC

AUDIX has a single TN506B Bus Controller (BC) board in slot 0. This board combines the function of bus controller and bus terminator. The BC also does DBP (VME) bus master-bus clocks, reset signals, and data flow control.

The terminator board for the DBP bus is the AHF102 board on the backplane. The AHF102 is used only for DBP bus impedance termination and never generates an alarm. However, it might be an alternate replacement circuit pack as a last choice.

Table 4-6. BC (TN506B) Alarm Resolution

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice** (ckt,slot,proc.)	**2nd Choice**	**3rd Choice**
897	3 : 0	DBP Diagnostic Result (126F)	TN506B, 00, A	–	–
Note: Fault code 126 is not currently alarmed.					

Procedure A: General Replacement Steps

To replace the BC circuit pack:

1. Shut down system software (if running), spin down the RCD (if not done automatically), and power down the system.
2. Replace the TN506B. Power up the system. The system should initialize.
3. Verify that the alarm is resolved using the `maintenance : active alarm : display` form.

TN511: MI

The Maintenance Interface (MI) circuit pack handles major and minor alarms passed to it from the CDR1 or CDR1B alarm board. The MI is connected to the FP-PE through the M bus. It can reset (reboot), restart, or shut down the FP through software, firmware thresholds, or its toggle switch. The MI handles administration and maintenance terminal access (RS-232C compatible ADMIN and MAINT connectors) and monitors environment and power. The system can run without an MI if the FP is in control. However, if the MI is bad, faulty alarms (or no alarms) may be generated.

Table 4-7. MI (TN511) Alarm Resolution

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice** (ckt,slot,proc.)	**2nd Choice**	**3rd Choice**
899	17 : 0	Bad MI dual-ported RAM (86F)	TN511, 07, A	–	–

Procedure A: General Replacement Steps

To replace the TN511 MI board:

1. Shut down system software (if running), spin down the RCD (if not done automatically), and power down the system.
2. Replace the TN511. Power up the system. The system should initialize.
3. Verify that the alarm is resolved using the `maintenance : active alarm : display` form. Make sure it does not return by waiting one minute past initialization and rechecking for alarms.

TN520: VB

The TN520 Voice Buffer (VB) circuit pack handles voice data flow to and from the Data Base Processor (DBP) subsystem over the System (S) bus and UN160B. The TN520 VB can handle up to 16 active voice ports simultaneously and supports two channels per port (32 channels per board).

Table 4-8. VB (TN520) Alarm Resolution

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice (Note)** (ckt,slot,proc.)	**2nd Choice** (ckt,slot)	**3rd Choice** (cause)
168	61 : 1	DBPI fails to VB 1, not to PEs, VB 2	TN520, 17L, A	UN160B, 06	S bus
169	61 : 2	DBPI fails to VB 2; not to PEs, VB 1	TN520, 17U, A	UN160B, 06	S bus
171	61 : 1	Only VB S-bus test passes	TN520, 17L, A	S bus	–
172	61 : 1	Only VB S-bus test fails	TN520, 17L, A	–	–
177	61 : 2	Only VB 2 S-bus test passes	TN520, 17U, A	S bus	–
178	61 : 2	Only VB 2 S-bus test fails	TN520, 17U, A	S bus	–
182	61 : 2	DBPI cannot access VB 2 and VB 2 down	TN520, 17U, A	UN160B, 06	–
176	61 : 1	DBPI cannot access VB 1 and VB 1 down	TN520, 17L, A	UN160B, 06	–
186	61 : 1	PE 0 fails to VB 1; not to PE 1, VB 2	TN520, 17L, A	TN523, 09L	S bus
187	61 : 2	PE 1 fails to VB 2; not to PE 0, VB 1	TN520, 17U, A	TN523, 09U	S bus
1254	61 : 1	VB channels not in sync with software	TN520, 17L, A	Software	–
1255	61 : 2	VB channels not in sync with software	TN520, 17U, A	Software	–
1258	61 : 1	VB initialization failed	TN520, 17L, A	TN500, 16L	–
1259	61 : 2	VB initialization failed	TN520, 17U, A	TN500, 16U	–
1260	61 : 1	VB CPU failure	TN520, 17L, A	TN500, 16L	–
1261	61 : 2	VB CPU failure	TN520, 17U, A	TN500, 16U	–
1262	61 : 1	VB RAM memory error	TN520, 17L, A	TN500, 16L	–
1263	61 : 2	VB RAM memory error	TN520, 17U, A	TN500, 16U	–
1264	61 : 1	VB EPROM memory error	TN520, 17L, A	TN500, 16L	–
1265	61 : 2	VB EPROM memory error	TN520, 17U, A	TN500, 16U	–
1266	61 : 1	VB invalid mailbox	TN520, 17L, A	S bus	–
1267	61 : 2	VB invalid mailbox	TN520, 17U, A	S bus	–
1268	61 : 1	TDBI/VPC error detected by VB	TN520, 17L, B	TN500, 16L	any TN501B
1269	61 : 2	TDBI/VPC error detected by VB	TN520, 17U, B	TN500, 16U	any TN501B
1270	61 : 1	VB firmware audit failure	TN520, 17L, A	–	–
1271	61 : 2	VB firmware audit failure	TN520, 17U, A	–	–
1272	61 : 1	TDBI DPR failure	TN520, 17L, A	TN500, 16L	–
1273	61 : 2	TDBI DPR failure	TN520, 17U, A	TN500, 16U	–
1274	61 : 1	VB had shut down	TN520, 17L, A	TN500, 16L	S bus
1275	61 : 2	VB had shut down	TN520, 17U, A	TN500, 16U	S bus

Note: For systems with an expansion cabinet, the lower cabinet board is shown with an L next to the slot number and the upper cabinet board is shown with a U next to the slot number.

Procedure A: General Replacement Steps

To replace the VB circuit pack:

1. Shut down system software (if running), spin down the RCD (if not done automatically), and power down the system.
2. Replace the TN520. Power up the system. The system should initialize.
3. To ensure complete VB operation, display the `maintenance : system : test call` form. Make 8 VB test calls (to a TN477 TDBI-8 board) or 16 test calls (to a TN500 TDBI board) to test all the channels on the replaced VB.
4. Verify that the alarm is resolved using the `maintenance : active alarm : display` form.
5. If the alarm returns, replace the 2nd-choice board or have your remote maintenance service center check the S bus.

Procedure B: VPC/TDBI Check

If any TDBI or VPC board is also alarmed, replace it *first*. Otherwise, use Procedure A.

TN523 (OR TN591), TN716B, TN734 (OR TN761): PE

A Processing Element (PE) consists of a TN523 or TN591 Central Processing Unit (CPU), one or two TN734 (or one TN761) Random Access Memory (RAM) boards, and a TN716B Bus Interface (BI) board. These packs are connected by a Memory (M) bus. A one-cabinet AUDIX has a single PE, the Feature Processor (FP). When an expansion cabinet is added, an additional PE, the Voice Session Processor (VSP) is added. The term PE 0 refers to the FP-CPU, FP-RAM, and FP-BI, and the term PE 1 refers to the VSP-CPU, VSP-RAM, and VSP-BI.

The only circuit board alarmed in either PE is the CPU (TN523 or TN591). However, the fault could actually be on the associated BI (TN716B) or one of the RAM (TN734 or TN761) circuit packs. The alarm resolution procedures for these 2nd-choice boards appear later in this section. The best test for any PE circuit pack is a successful system initialization.

The CPU is responsible for overall operation of both PE 0 and PE 1. Firmware runs low-level functions, while software loaded into the RAM boards runs the primary AUDIX programs.

Table 4-9. PE Alarm Resolution

Alarm Log		Description	Repair Action		
Fault	Unit:Dev		1st Choice * (ckt,slot,proc.)	2nd Choice (ckt,slot)	3rd Choice (ckt,slot)
80	33 : 0	FP-CPU, RAM, or ROM errors	TN523, 09L, A	TN734, 10 or 11L	TN716B, 13L
81	34 : 0	VSP-CPU, RAM, or ROM errors	TN523, 09U, A	TN734, 10U	TN716B, 13U
140	33 : 0	FP S bus error	TN523, 09L, A	TN716B, 13L	S bus
142	34 : 0	VSP S bus error	TN523, 09U, A	TN734, 10U	TN716B, 13U
162	34 : 0	SCP fails to PE 1; not to PE 0	TN523, 09U, A	TN716B, 13U	TN533, 15
163	33 : 0	SCPI fails to PE 0	TN523, 09L, A	TN716B, 13L	TN533, 15
166	33 : 0	DBPI fails to PE 0, not to VB	TN523, 09L, A	TN716B, 13L	UN160B, 06
167	34 : 0	DBPI fails to PE 1; not to PE 0 or VBs	TN523, 09U, A	TN716B, 13U	UN160B, 06
173	33 : 0	VB 1 fails to PE 0, not to PE 1, DBPI	TN523, 09L, A	TN716B, 13L	TN500, 16L
174	34 : 0	VB 1 fails to PE 1; not to PE 0, DBPI	TN523, 09U, A	TN716B, 13U	TN500, 16U
179	33 : 0	VB 2 fails to PE 0; not to PE 1, DBPI	TN523, 09L, A	TN716B, 13L	TN500, 16L
180	34 : 0	VB 2 fails to PE 1; not to PE 0, DBPI	TN523, 09U, A	TN716B, 13U	TN500, 16U
183	34 : 0	S bus test fails for PE 1 only	TN523, 09U, A	TN716B, 13U	–
184	34 : 0	SCP, DBPI, VBs and PE 0 fail to PE 1	TN523, 09U, A	TN716B, 13U	–
188	34 : 0	SCP, DBPI and VBs fail to PE 1	TN523, 09U, A	TN716B, 13U	–
189	33 : 0	Only PE 0 S-bus test passes	TN523, 09L, A	TN716B, 13L	–
190	34 : 0	PE 0 fails to PE 1; not DBPI or SCP	TN523, 09U, A	TN716B, 13U	TN523, 09L
193	33 : 0	SCPI DBPI and VB fail to PE 0	TN523, 09L, A	TN716B, 13L	–

* The CPU may be a TN523 or a TN591. The RAM may be a TN734 or a TN761.
A TN523 CPU requires TN734 RAM boards, while a TN591 may use either TN734 or TN761 boards.

Note: For systems with an expansion cabinet, the lower cabinet board is shown with an L next to the slot number and the upper cabinet board is shown with a U next to the slot number.

Procedure A: General Replacement Steps

Before replacing the CPU:

1. Verify that the correct RAM boards are installed:
   — A TN523 CPU requires that TN734 RAM boards be installed (two in the base cabinet and one in the expansion cabinet, if installed).
   — A TN591 CPU may use either TN734 or TN761 RAM boards.
2. If the CPU and RAM boards are incompatible, update the CPU with a TN591, or replace the RAM boards with TN734 packs.

To replace the PE:

1. Shut down system software (if running), spin down the RCD (if not done automatically), and power down the system.
2. Replace the alarmed TN523 or TN591. Power up the system. The system should initialize.
3. Verify that the alarm is resolved using the `maintenance : active alarm : display` form. Wait one minute past initialization and recheck to see if the alarm returns.
4. If the alarm is *not* resolved or returns, replace the 2nd- or 3rd-choice packs as needed.

TN716B: Bus Interface (PE-BI)

The BI circuit pack provides a bidirectional path for data transfer between the Memory (M) bus and the System (S) bus. The BI also provides interrupt and clock functions for control of and communication with processor components on the S bus. The BI is not alarmed by software but can be a 2nd-choice replacement for the PE. The best test of a BI is a successful system initialization.

To replace the BI circuit pack:

1. Shut down system software (if running), spin down the RCD (if not done automatically), and power down the system.
2. Replace the TN716B indicated in the previous table. Power up the system. The system should initialize.
3. Initialization completes if the PE-BI board is functional.
   a. If the initialization is successful, verify that the alarm is resolved using the `maintenance : active alarm : display` form.
   b. If the initialization is *not* successful, go to *Control Mode/Visual Inspection Checklist* in Chapter 3.

TN734 or TN761: Random Access Memory (FP-RAM or PE-RAM)

AUDIX uses two different RAM boards:

- Early systems use the TN734 circuit pack containing 2 Mbytes of Random Access Memory (RAM). The TN734 board can be used with either the TN523 or TN591 CPU board.
- Later systems use the TN761 board containing 4 Mbytes of RAM. The TN761 board can *only* be used in systems that have a TN591 CPU board.

The FP requires 4 Mbytes of RAM, so either two TN734 packs or one TN761 pack may be installed in the base cabinet. The VSP in two-cabinet systems requires only 2 Mbytes of RAM, so either a single TN734 or TN761 board may be installed in the upper cabinet.

The RAM board provides dynamic memory control and error detection/correction functions for each CPU. Background RAM tests on the board run slowly but continuously.

The PE-RAM is not alarmed by software but may be a 2nd-choice replacement for the PE, or it may halt initialization and cause the red LED to light on the failing RAM board. The best test for a PE-RAM board is a successful initialization using the extended RAM test.

To replace the PE-RAM board(s):

1. Shut down system software (if running), spin down the RCD (if not done automatically), and power down the system.
2. Replace the board with the lighted red LED. If the FP is alarmed, and neither pack in slot 10 or 11 is alarmed, replace first one, then the other. If the VSP is alarmed, replace the board in slot 10 of the top cabinet.
3. Power up the system. Start a nonstandard initialization (press CTRL-c on the terminal).
4. Run the extended memory (RAM) test (select option `y`). This adds about 15 to 30 minutes to the initialization. Initialization completes if the RAM boards are functional.
5. If the initialization is successful, verify the alarm is resolved using the `maintenance : active alarm : display` form.

   If initialization does *not* complete, replace the associated BI or CPU. If this does not fix the problem, go to *Control Mode/Visual Inspection Checklist* in Chapter 3.

PE Software Load Threshold Alarms

This software alarm occurs when the AUDIX system load is greater than the expected engineered load. Unlike the other PE procedures, there are no packs to replace. However, you *must escalate* the problem to your remote maintenance service center so load re-engineering can be done if needed.

Table 4-10. System Software Alarm Resolution

Alarm			Repair
Fault	**Unit:Dev**	**Description**	**Procedure**
1501	121 : 33	PE 0 software path record low watermark (90F)	A
1501	121 : 34	PE 1 software path record low watermark (90F)	A
1502	121 : 33	PE 0 software path record high watermark (87F)	A
1502	121 : 34	PE 1 software path record high watermark (87F)	A
1504	121 : 33	PE 0 software message buffer low watermark (91F)	A
1504	121 : 34	PE 1 software message buffer low watermark (91F)	A
1505	121 : 33	PE 0 software message buffer high watermark (88F)	A
1505	121 : 34	PE 1 software message buffer high watermark (88F)	A
1507	121 : 33	PE 0 software S-bus queue low watermark (92F)	A
1507	121 : 34	PE 1 software S-bus queue low watermark (92F)	A
1508	121 : 33	PE 0 software S-bus queue high watermark (89F)	A
1508	121 : 34	PE 1 software S-bus queue high watermark (89F)	A

Procedure A: Reduce Load and Report

1. Reduce the system load by busying out one or two VPT ports using the `maintenance : vsp : busyout` form. In a Standalone system, these ports must be busied out at the switch also.
2. Check to see of the alarm is resolved. Even if the alarm resolves itself, *the problem must be reported.*
3. Record the alarm and description and call your remote maintenance service center.

TN532 OR TN540: DBP-RAM

The TN532 Data Base Processor (DBP) Random Access Memory (RAM) circuit pack contains 2 Megabytes (Mbytes) of memory using 256K RAM chips. This board is used only in one-cabinet systems. The TN540 DBP-RAM board contains 4 Mbytes of memory using 1M RAM chips. It is used in two-cabinet systems. The DBP-RAM circuit pack buffers voice data channels between the TN520 VB and the disk drives over the DBP (VME) bus.

Table 4-11. DBP-RAM (TN532 or TN540) Alarm Resolution

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice** (ckt,slot,proc.)	**2nd Choice**	**3rd Choice**
410	2 : 0	DBP-RAM correctable fault	TN532/TN540, 02, A	TN472C, 04, A	–
897	2 : 0	DBP-RAM Diagnostic Result (118F)	TN532/TN540, 02, A	–	–
Note: Fault code 118 is not currently alarmed.					

Procedure A: General Replacement Steps

To replace a DBP-RAM circuit pack:

1. Shut down system software (if running), spin down the RCD (if not done automatically), and power down the system.
2. Replace the DBP-RAM board in slot 02. Power up the system. The system should initialize.
3. Verify that the alarm is resolved using the `maintenance : active alarm : display` form.

TN533: SCPI

The TN533 Switch Communications Processor Interface (SCPI) board supports the AUDIX data link to an AT&T PBX. This may be:

- The DCIU on System 85, Generic 2, and DIMENSION PBX
- The PGATE on Generic 3r
- The PI on System 75, System 75 XE, Generic 1, Generic 3i, and Generic 3s
- The SCI on System 75

The SCPI has an RS-449 synchronous BX.25-compatible data link that runs at 9600 bps. The data devices in the switch link provide electrical isolation for signals. They also act as null-modems in directly cabled applications since both data link boards are DTE devices. The SCPI connects to the S bus and transmits data to and from FP memory over the data link.

Table 4-12. SCPI (TN533) Alarm Resolution

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice** (ckt,slot,proc.)	**2nd Choice** (cause)	**3rd Choice**
18	43 : 0	VIP-SCPI loopback failure	TN533, 15, A	Data link	
25	43 : 0	SCPI CPU error	TN533, 15, B	Data link	–
26	43 : 0	SCPI RAM error	TN533, 15, B	Data link	–
27	43 : 0	SCPI ROM error	TN533, 15, B	Data link	–
28	43 : 0	SCPI S-bus access	TN533, 15, B	S bus	–
29	43 : 0	SCPI mailbox failure	TN533, 15, B	S bus	–
31	43 : 0	SCPI firmware audit	TN533, 15, B	–	–
82	43 : 0	SCPI PE 0 memory access	TN533, 15, B	TN523, 09L	–
84	43 : 0	SCPI write buffer checksum	TN533, 15, B	–	–
160	43 : 0	Only SCPI S-bus test fails	TN533, 15, C	–	–
161	43 : 0	Only SCPI S-bus test passes	TN533, 15, C	–	–
191	43 : 0	PE 0 fails to SCPI, not to DBPI	TN533, 15, C	TN523, 09L	–
215	43 : 0	Maint removed SCPI from S bus	TN533, 15, D	Data link	–

NOTE

The TN533 is present in a Standalone system, but is not used. However, the board can still be alarmed. If you have a Standalone system and this board is alarmed, system operation should not be affected. Try steps 2, 3, and 4 of Procedure A if the customer is worried about the alarm.

Procedure A: General Replacement Steps

You should do the following *before* replacing the SCPI to make sure the correct alarm was entered in the alarm log (the fault code may change). If you have intermittent (or no) alarms, run this test once or twice and check the active alarm log to see if a fault occurred.

1. If an alarm for the SCPI just occurred, wait 15 minutes for the background test to run to see if it resolves the alarm.
2. If alarm remains active, run the data link test using the `maintenance : datalink : test` form. This will reset the data link to the host and all nonhost switches in a Distributed Communications System (DCS) network.

   After running the test:

   a. If the SCP test passes, verify that the alarm is resolved.

   b. If the test fails, run the test once more. If it still fails, use the following steps to replace the SCPI.

   CAUTION *This test causes all DCS access to AUDIX to be busied out. It may also take longer to run on a network, depending on its size.*

3. Shut down system software (if running), spin down the RCD (if not done automatically), and power down the system.
4. Replace the TN533. Power up the system. The system should initialize.
5. Verify that the alarm is resolved using the `maintenance : active alarm : display` form. Wait 15 minutes and recheck the form to make sure the fault does not return.
6. If the fault returns, run the data link test again using the `maintenance : datalink : test` form. Wait 15 more minutes.
7. If the alarm returns, replace the 2nd-choice board, check the S bus (contact your remote maintenance service center), or check the data link (see Chapter 5, *Data Link Or Switch Problems*).

Procedure B: FSW Test

Follow Procedure A up to step 3, then display the `maintenance : scpi : fsw` form and press ENTER (F8) *before* the data link test to resolve the original alarm.

Procedure C: Restart System

Do a restart, wait 5 minutes after the `start service` message, and check to see if the alarm is resolved. If not, do Procedure A.

Procedure D: Restart and FSW Test

Do a restart, wait 5 minutes after the `start service` message, then display the `maintenance : scpi : fsw` form and press (ENTER) (F8). Check to see if the alarm is resolved. If not, do Procedure A and run the `maintenance : scpi : fsw` form again.

TN539(B): ACCE

The AUDIX Communications Controller — Enhanced (ACCE) circuit pack allows an AUDIX system to network with other AUDIX adjuncts.

The TN539 or TN539B ACCE provides the same two DCP links as the TN366 or TN366B ACC (for a total of four network channels). It also provides two Electronic Industries Association (EIA) RS-232 links for two additional networking channels. In addition, its firmware allows new connection options; refer to the *AUDIX Networking* manual (585-300-903) for details on capabilities.

The following faults indicate a problem with the RS-232 ports. The faults listed under *TN366(B): ACC* may also be present, indicating a problem with another part of the TN539(B) or with the network.

Table 4-13. ACCE [TN539(B)] Alarm Resolution

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice** (ckt,slot,proc.)	**2nd Choice**	**3rd Choice**
420	141 : 4	RS-232 failure (ACCE port 5)	TN539B, 03, A	Translations, B	–
421	141 : 5	RS-232 failure (ACCE port 6)	TN539B, 03, A	Translations, B	–

Procedure A: General Replacement Steps

See the procedures given under *TN366(B): ACC*. Replace any defective TN539 with a TN539B.

NOTE

For complete information on AUDIX networking connections, administration, and testing, see the *AUDIX Networking* manual (585-300-903).

Procedure B: Check Translations

When logged in to the local AUDIX:

1. Check the local AUDIX translations on the `system : translation : machine : audix/amis/call delivery` form. (*local/remote* = **l**)
2. Check the remote AUDIX translations (*local/remote* = **r**).

NOTE

AUDIX networking administration, forms, and field descriptions are covered in the *AUDIX Networking* manual (585-300-903).

3. Translations for the remote AUDIX machine(s) should correspond to translations for the host (local) AUDIX. Check the *machine name*, the *dial string*, (characters to be sent to the remote AUDIX to establish a connection), *network connection type*, *data rate* (if type is rs232s and data rate is 56K or 64K, you may have a distance limitation and dialing restrictions), and *channel* (only used for RS-232 dedicated connections). Then retry the connect test.
4. The *dial string* may contain special characters that, when enclosed in double quotes act as control characters for the ACCE. The AUDIX must have a TN539(B) to use these characters.
5. If there is still an alarm, check the switch translations and facilities. Commom problems include the installation and administration of modem pooling, option settings on the data sets, etc. Retry the connect test once everything is checked.
6. If the problem cannot be located, try tracing the problem from the remote AUDIX to the local AUDIX.
7. Check the `system : translation : network port` form.
   a. Check the data rate assigned on AUDIX that will be used on incoming DCP Mode 2 calls; the switch will ask the ACCE what speed to use. The ACCE will respond with the speed administered on the `system : translation : network port` form. Each DCP channel is assigned a speed. The default is 9600 bps, while a zero (0) indicates the port is not equipped.
   b. The RS-232 ports should be assigned the following attributes:
      — equipped or unequipped
      — asynchronous or synchronous
      — Up to three data rates
      — Switched or dedicated facility
      — A string that is sent to initialize the modem

   If the RS-232 ports are assigned, press the ENTER key (F8) to obtain the status of the ports (PASS or FAIL).

   NOTE

   The RS-232 ports are for direct connections (i.e., not to a modem-pool). The modems must support Hayes-compatible dialing. The RS-232 ports are hard-set at parity - none, data bits - 8, stop bits - 1 (if asynchronous), and can support up to three different data rates. The modems must match these attributes and be compatible with the assigned rate(s).

8. When testing the ACCE ports, use the `maintenance : network` form. Test 6 (modem loop-around) allows you to test the RS-232 ports, if used.

9. If the tests don't pass, reset the board (test 5) and try the other tests again. If the tests continue to fail, try the procedures associated with the TN366(B). In addition, note the following:

   — The use of *network connection type* - **rs232s** and *data rate* - **56000** or **64000** imposes distance limitations and dialing restrictions on the network connections.

   — Running DCP Mode 2 at 19,200 bps on several ports may reduce their throughput.

   — The *dial string* on the `system : translation : machine : audix/amis/call delivery` form may have special characters entered that are treated as control characters by the ACCE. These characters must be enclosed in double quotes on the *dial string* line.

TN547(B): MPSI

The TN547 or TN547B Multiprotocol Switch Interface (MPSI) circuit pack provides the data link between AUDIX and a 1A ESS Switch, 5ESS Switch, or other vendor switches.

Table 4-14. MPSI [TN547(B)] Alarm Resolution

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice** (ckt,slot,proc.)	**2nd Choice**	**3rd Choice**
344	30 : 0	MPSI configured for DCIU-SCI switch	TN547B, 15, B	Data link	–
346	30 : 0	Corrupt MPSI	TN547B, 15, A	Data link	–

Procedure A: General Replacement Steps

1. Shut down system software (if running), spin down the RCD (if not done automatically), and power down the system.
2. Replace the TN547(B) board. Power up the system. The system should initialize.
3. Verify that the alarm is resolved using the `maintenance : active alarm : display` form. If the alarm has not been resolved, check the data link (Chapter 5).

Procedure B: Check System Configuration

This alarm indicates the system has a TN547(B) installed, but the `system : translation : switch connection` form has the system set for a DCIU/SCI data link. Check the following:

1. If the system is using a DCIU, PGATE, PI, or SCI data link (AUDIX is connected to a System 75, System 85, DEFINITY Communications System, or DIMENSION PBX), you must have a TN533 SCPI installed in slot 15. Order the TN533 and replace the TN547(B) when it arrives.
2. If the system is connected to a 1A ESS Switch, 5ESS Switch, or other vendor switch, you must change the `system : translation : switch connection` form to indicate the correct type of data link. See *AUDIX Installation* (585-305-105) for the correct translations of this form.
3. If the alarm has not been resolved, go to Chapter 5, *Data Link Or Switch Problems*.

TN714: TC

The TN714 Tone and Clock (TC) board provides the master reference clock for the TD bus and performs digital generation of the standard call-progress tones.

Table 4-15. TC (TN714) Alarm Resolution

Alarm Log		**Description**	**Repair Action**		
Fault	**Unit:Dev** (Note)		**1st Choice** (ckt,slot,proc.)	**2nd Choice** (ckt,slot)	**3rd Choice** (cause)
1068	38 : 1	Hardware has gone insane	TN714, 18, B	TN727, 14	TD bus
1070	38 : 1	TC did not initialize	TN714, 18, A	TD bus	–
1071	38 : 1	TC dial tone detection test	TN714, 18, C	TD bus	–
1072	38 : 1	TC data count	TN714, 18, B	TD bus	–
1073	38 : 1	TC tone level test	TN714, 18, B	TD bus	–
1074	38 : 1	TC NPE crosstalk test	TN714, 18, C	TD bus	–
1147	58 : 1	TD-bus sanity	TN714, 18, E	TN727, 14	TD bus
1173	58 : 1	TD-bus control channel	TN714, 18, D	TN727, 14	TD bus
1199	58 : 1	ROM or RAM error	TN714, 18, E	–	–
1225	58 : 1	Program logic inconsistency	TN714, 18, E	–	–
1251	58 : 1	Translation error	TN714, 18, E	–	–
1397	58 : 1	Hardware time-out	TN714, 18, E	–	–

Procedure A: General Replacement Steps

1. Shut down system software (if running), spin down the RCD (if not done automatically), and power down the system.
2. Replace the TN714 board. Power up the system. The system should initialize.
3. Run the complete TD-bus test on the replaced pack. Use the `maintenance : td-bus : test` form. Select the TC board, 5 repetitions, and the `y` option to run the long test.
4. Run the complete TC test using the `maintenance : tc : test` form. Select 1 repetition and the `y` option to run the long test.
5. Verify that the alarm is resolved using the `maintenance : active alarm : display` form. Wait one minute past initialization and recheck to see if the alarm returns.
6. If the alarm returns, replace the 2nd-choice board or have your remote maintenance service center check the TD bus.

Procedure B: TC Short Test

Run the short version of the TC test using the `maintenance : tc : test` form. Select 5 repetitions and the `n` option for the short test.

If the test fails, follow Procedure A with the addition that the short version of the TC test must run five times successfully to resolve the alarm (repetitions = 5).

Procedure C: Complete TC Test

Run the complete TC test on the TC board (repetitions = 5). Use the `maintenance : tc : test` form and the `y` option for the long test.

If the test fails, follow Procedure A with the addition that the complete TC test must run five times successfully to resolve the alarm (repetitions = 5).

Procedure D: TD-Bus Control Channel Test

First, shut down system software and power down. Next, power the system back up. The system should initialize.

1. Log in and run the short version of the TD-Bus control channel test on the alarmed TC pack (repetitions = 5). Use the `maintenance : td-bus : test` form and the `n` option.
2. *If the test fails,* follow Procedure A with the addition that the TD-Bus control channel test must run five times successfully to resolve the alarm (repetitions = 5).

Procedure E: Complete TD-Bus Test

First, shut down system software and power down. Next, power the system back up. The system should initialize.

1. Log in and run the complete TD-bus test on the TC board (repetitions = 5). Use the `maintenance : td-bus : test` form and the `y` option to run the long test.
2. *If the test fails,* follow Procedure A to resolve the alarm.

TN727: NC

The TN727 Network Control (NC) board is also known as the Switch Interface (SI) board. The NC circuit pack is a bidirectional path for transferring status and control information between the FP-PE on the M bus and devices on the TD bus. The NC continuously scans the TD bus for messages and hardware problems. The AUDIX real-time clock is included on this circuit pack.

This board must be working correctly for any of the TD-bus tests to run. See the `maintenance : nc : test` form, the `maintenance : system : test call` form, the `maintenance : tdbi : test` form, the `maintenance : tc : test` form, the `maintenance : vpc : test`, and the `maintenance : vpt : test` form.

Table 4-16. NC (TN727) Alarm Resolution

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev** (Note)		**1st Choice** (ckt,slot,proc.)	**2nd Choice** (ckt,slot)	**3rd Choice** (cause)
1	120 : 1	NC archangel reset test	TN727, 14, B	TN714, 18	TD bus
2	120 : 1	NC control channel	TN727, 14, C	TD bus	–
3	120 : 1	NC DPR failure	TN727, 14, B	–	–
4	120 : 1	NC error	TN727, 14, A	–	–
5	120 : 1	TD-bus clock failed	TN714, 18, E	TN727, 14	–
7	120 : 1	Hardware insane, LSIIOP3, etc.	TN727, 14, B	TN714, 18	–
9	120 : 1	LSIIOP14	TN727, 14, B	TN714, 18	–
10	120 : 1	LSIIOP1, LSIIOP2, LSIIOP4, etc.	TN727, 14, C	TN714, 18	–
11	120 : 1	LSIIOP11, LSIIOP12, LSIIOP2	TN727, 14, C	–	–
252	120 : 1	System clock failure	TN727, 14, F	–	–
603	120 : 1	Real-time clock failure	TN727, 14, A	–	–
604	120 : 1	Boot time file cannot be accessed	–, –, G	–	–
1124	140 : 1	TD-bus sanity	TN727, 14, D	TN714, 18	TD bus
1150	140 : 1	TD-bus control channel	TN727, 14, D	TN714, 18	TD bus
1176	140 : 1	ROM or RAM error	TN727, 14, D	–	–
1202	140 : 1	Program logic inconsistency	TN727, 14, D	TN714, 18	–
1228	140 : 1	Translation error	TN727, 14, D	–	–
1398	140 : 1	Hardware time-out	TN727, 14, A	TN714, 18	–

Note: For systems with an expansion cabinet, the TN727 is in slot 14 of the *top* cabinet.

Procedure A: General Replacement Steps

To replace the NC circuit pack:

1. Shut down system software (if running), spin down the RCD (if not done automatically), and power down the system.
2. Replace the TN727 board. For systems with an expansion cabinet, the TN727 is slot 14 of the top cabinet.
3. Power up the system. After the system initializes, block service using the appropriate form or switch procedure. See Appendix A, *Basic Procedures* for details.
4. Run the complete NC test twice using the `maintenance : nc : test` form. Select repetitions = 2 and the `y` option for the long test.
5. Verify that the alarm is resolved using the `maintenance : active alarm : display` form. Wait one minute past initialization and recheck to see if the alarm returns.
6. Enable service using the appropriate form or switch procedure.
7. If the alarm returns, replace the 2nd-choice board or have your remote maintenance service center check the TD bus.

Procedure B: NC Short Test

Run the short group of NC tests (repetitions = 3) using the `maintenance : nc : test` form and the `n` option for the short test.

If the test fails, follow Procedure A with the addition that the group of short tests must run three times successfully to resolve the alarm (repetitions = 3).

Procedure C: NC Long Test

Run the complete group of NC tests twice (repetitions = 2) using the `maintenance : nc : test` form and the `y` option for the long test.

If the test fails, follow Procedure A to resolve the alarm.

Procedure D: TD-Bus Reset

This alarm affects only the bus interface part of the board. No test currently exists to resolve this alarm. If you wish, you may leave the alarm active unless you notice other negative affects on service. If you do:

1. Run the `maintenance : td-bus : reset` form to try to clear the processors on the TD bus.
2. If the alarm remains active, clear it by doing a software shutdown and power down. Next, power the system back up.
3. After the system initializes, check if the alarm is resolved. If the alarm returns, replace the board (see Procedure A).

Procedure E: TD Bus Failed Clock

This alarm often indicates that a clock from the TN714 TC has failed. In this case, replacing the NC will not resolve the problem. If there are no other active alarms against unit 120 or 140, replace the TC first. Otherwise, use Procedure A to replace the NC.

Procedure F: System Clock Reset

If, at initialization, the system cannot find the necessary filesystem for setting the system clock, this alarm will be raised. Use the following steps to reset the system clock and resolve the alarm:

1. Display the `system : clock` form.
2. Enter an **x** in the `set system clock` field.
3. Fill in the date, time, and day of week in the appropriate fields. Press CHANGE.
4. Tab to the `test system clock` field and enter an **x**. Press CHANGE.

Procedure G: Boot Time File Problem

This alarm indicates the system cannot access or correct the time file in the filesystem you booted from. This alarm can indicate many problems in the DBP subsystem and often appears with other errors. Check for the following additional problems to isolate the cause:

- Corruption of disk drive media
- Disk drive controller problem (TN475B SADI)
- A system crash that caused the clock to be invalid (the system may have lost the year). In this case, reset the clock using the `system : clock` form (see Procedure F).

TN747B: VPT

Each Voice Port Trunk (VPT) board has eight voice-port circuits for analog connections to a call-distribution group on the switch. It performs signaling and analog/digital conversions for each port. One VPT board provides analog interfaces for up to four VPC boards (two channels each) over the TD bus. Some circuit packs in the field may be TN747 vintage boards.

Table 4-17. VPT (TN747B) Alarm Resolution *(Part 1 of 4)*

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice (Note)** (ckt,slot,proc.)	**2nd Choice** (cause)	**3rd Choice** (cause)
12-19	35 : 1-8	Single polarity ring current	TN747B, 19L, B	Switch port brd	Cables
20-27	35 : 9-16	Single polarity ring current	TN747B, 24L, B	Switch port brd	Cables
28-35	35 : 17-24	Single polarity ring current	TN747B, 19U, B	Switch port brd	Cables
36-43	35 : 25-32	Single polarity ring current	TN747B, 24U, B	Switch port brd	Cables
44-51	35 : 1-8	Ringing without ground	TN747B, 19L, B	–	–
52-59	35 : 9-16	Ringing without ground	TN747B, 24L, B	–	–
60-67	35 : 17-24	Ringing without ground	TN747B, 19U, B	–	–
68-75	35 : 25-32	Ringing without ground	TN747B, 24U, B	–	–
76-83	35 : 1-8	No PBX release on disconnect	TN747B, 19L, A	Switch port brd	Cables
84-91	35 : 9-16	No PBX release on disconnect	TN747B, 24L, A	Switch port brd	Cables
92-99	35 : 17-24	No PBX release on disconnect	TN747B, 19U, A	Switch port brd	Cables
100-107	35 : 25-32	No PBX release on disconnect	TN747B, 24U, A	Switch port brd	Cables
108-115	35 : 1-8	Ground detector stuck active	TN747B, 19L, A	Switch port brd	Cables
116-123	35 : 9-16	Ground detector stuck active	TN747B, 24L, A	Switch port brd	Cables
124-131	35 : 17-24	Ground detector stuck active	TN747B, 19U, A	Switch port brd	Cables
132-139	35 : 25-32	Ground detector stuck active	TN747B, 24U, A	Switch port brd	Cables
140-147	35 : 1-8	VPT trunk diagnostic test	TN747B, 19L, B	Switch port brd	Cables
148-155	35 : 9-16	VPT trunk diagnostic test	TN747B, 24L, B	Switch port brd	Cables
156-163	35 : 17-24	VPT trunk diagnostic test	TN747B, 19U, B	Switch port brd	Cables
164-171	35 : 25-32	VPT trunk diagnostic test	TN747B, 24U, B	Switch port brd	Cables
172-179	35 : 1-8	VPT port diagnostic test	TN747B, 19L, B	Switch port brd	Cables
180-187	35 : 9-16	VPT port diagnostic test	TN747B, 24L, B	Switch port brd	Cables
188-195	35 : 17-24	VPT port diagnostic test	TN747B, 19U, B	Switch port brd	Cables
196-203	35 : 25-32	VPT port diagnostic test	TN747B, 24U, B	Switch port brd	Cables
204-211	35 : 1-8	VPT dial tone seizure test	TN747B, 19L, B	Switch port brd	Cables
212-219	35 : 9-16	VPT dial tone seizure test	TN747B, 24L, B	Switch port brd	Cables

Note: For systems with an expansion cabinet, the lower cabinet board is shown with an L next to the slot number and the upper cabinet board is shown with a U next to the slot number.

(Continued)

TABLE 4-17. VPT (TN747B) Alarm Resolution *(Part 2 of 4)*

Alarm Log		**Description**	**Repair Action**		
Fault	Unit:Dev		1st Choice (Note)	2nd Choice	3rd Choice
220-227	35 : 17-24	VPT dial tone seizure test	TN747B, 19U, B	–	–
228-235	35 : 25-32	VPT dial tone seizure test	TN747B, 24U, B	–	–
236-243	35 : 1-8	VPT hybrid circuit test	TN747B, 19L, B	TN714, 18	–
244-251	35 : 9-16	VPT hybrid circuit test	TN747B, 24L, B	TN714, 18	–
252-259	35 : 17-24	VPT hybrid ckt test	TN747B, 19U, B	TN714, 18	–
260-267	35 : 25-32	VPT hybrid ckt test	TN747B, 24U, B	TN714, 18	–
268-275	35 : 1-8	VPT NPE crosstalk	TN747B, 19L, C	TD bus	–
276-283	35 : 9-16	VPT NPE crosstalk	TN747B, 24L, C	TD bus	–
284-291	35 : 17-24	VPT NPE crosstalk	TN747B, 19U, C	TD bus	–
292-299	35 : 25-32	VPT NPE crosstalk	TN747B, 24U, C	TD bus	–
1125	55 : 1	TD-bus sanity	TN747B, 19L, E	TD bus	–
1126	55 : 2	TD-bus sanity	TN747B, 24L, E	TD bus	–
1127	55 : 3	TD-bus sanity	TN747B, 19U, E	TD bus	–
1128	55 : 4	TD-bus sanity	TN747B, 24U, E	TD bus	–
1151	55 : 1	TD-bus control channel	TN747B, 19L, D	TD bus	–
1152	55 : 2	TD-bus control channel	TN747B, 24L, D	TD bus	–
1153	55 : 3	TD-bus control channel	TN747B, 19U, D	TD bus	–
1154	55 : 4	TD-bus control channel	TN747B, 24U, D	TD bus	–
1177	55 : 1	Angel ROM or RAM error	TN747B, 19L, E	TD bus	–
1178	55 : 2	Angel ROM or RAM error	TN747B, 24L, E	TD bus	–
1179	55 : 3	Angel ROM or RAM error	TN747B, 19U, E	TD bus	–
1180	55 : 4	Angel ROM or RAM error	TN747B, 24U, E	TD bus	–
1203	55 : 1	Angel program logic inconsistency	TN747B, 19L, E	TD bus	–
1204	55 : 2	Angel program logic inconsistency	TN747B, 24L, E	TD bus	–
1205	55 : 3	Angel program logic inconsistency	TN747B, 19U, E	TD bus	–
1206	55 : 4	Angel program logic inconsistency	TN747B, 24U, E	TD bus	–
1229	55 : 1	Translation error	TN747B, 19L, E	TD bus	–
1230	55 : 2	Translation error	TN747B, 24L, E	TD bus	–
1231	55 : 3	Translation error	TN747B, 19U, E	TD bus	–
1232	55 : 4	Translation error	TN747B, 24U, E	TD bus	–
1310	55 : 1	Angel vintage inconsistency	TN747B, 19L, E	TD bus	–
1311	55 : 2	Angel vintage inconsistency	TN747B, 24L, E	TD bus	–
1312	55 : 3	Angel vintage inconsistency	TN747B, 19U, E	TD bus	–
1313	55 : 4	Angel vintage inconsistency	TN747B, 24U, E	TD bus	–

Note: For systems with an expansion cabinet, the lower cabinet board is shown with an L next to the slot number and the upper cabinet board is shown with a U next to the slot number.

(Continued)

TABLE 4-17. VPT (TN747B) Alarm Resolution *(Part 3 of 4)*

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice (Note)** (ckt,slot,proc.)	**2nd Choice** (cause)	**3rd Choice** (cause)
1278-1285	35 : 1-8	Belated PBX release	TN747B, 19L, A	Switch port brd	Cables
1286-1293	35 : 9-16	Belated PBX release	TN747B, 24L, A	Switch port brd	Cables
1294-1301	35 : 17-24	Belated PBX release	TN747B, 19U, A	Switch port brd	Cables
1302-1309	35 : 25-32	Belated PBX release	TN747B, 24U, A	Switch port brd	Cables
1365-1372	35 : 1-8	Hardware time-out	TN747B, 19L, A	–	–
1373-1380	35 : 9-16	Hardware time-out	TN747B, 24L, A	–	–
1381-1388	35 : 17-24	Hardware time-out	TN747B, 19U, A	–	–
1389-1396	35 : 25-32	Hardware time-out	TN747B, 24U, A	–	–
1402-1409	35 : 1-8	No loop-current detected	TN747B, 19L, B	Switch port brd	Cables
1410-1417	35 : 9-16	No loop-current detected	TN747B, 24L, B	Switch port brd	Cables
1418-1425	35 : 17-24	No loop-current detected	TN747B, 19U, B	Switch port brd	Cables
1426-1433	35 : 25-32	No loop-current detected	TN747B, 24U, B	Switch port brd	Cables
1498	35 : 1	VPT touch tone test (flash transfer)	TN747B, 19L, B	Switch port brd	Cables
1499	35 : 2	VPT touch tone test (flash transfer)	TN747B, 19L, B	Switch port brd	Cables
1500	35 : 3	VPT touch tone test (flash transfer)	TN747B, 19L, B	Switch port brd	Cables
1501	35 : 4	VPT touch tone test (flash transfer)	TN747B, 19L, B	Switch port brd	Cables
1502	35 : 5	VPT touch tone test (flash transfer)	TN747B, 19L, B	Switch port brd	Cables
1503	35 : 6	VPT touch tone test (flash transfer)	TN747B, 19L, B	Switch port brd	Cables
1504	35 : 7	VPT touch tone test (flash transfer)	TN747B, 19L, B	Switch port brd	Cables
1505	35 : 8	VPT touch tone test (flash transfer)	TN747B, 19L, B	Switch port brd	Cables
1506	35 : 9	VPT touch tone test (flash transfer)	TN747B, 24L, B	Switch port brd	Cables
1507	35 : 10	VPT touch tone test (flash transfer)	TN747B, 24L, B	Switch port brd	Cables
1508	35 : 11	VPT touch tone test (flash transfer)	TN747B, 24L, B	Switch port brd	Cables
1509	35 : 12	VPT touch tone test (flash transfer)	TN747B, 24L, B	Switch port brd	Cables
1510	35 : 13	VPT touch tone test (flash transfer)	TN747B, 24L, B	Switch port brd	Cables
1511	35 : 14	VPT touch tone test (flash transfer)	TN747B, 24L, B	Switch port brd	Cables
1512	35 : 15	VPT touch tone test (flash transfer)	TN747B, 24L, B	Switch port brd	Cables
1513	35 : 16	VPT touch tone test (flash transfer)	TN747B, 24L, B	Switch port brd	Cables
1514	35 : 17	VPT touch tone test (flash transfer)	TN747B, 19U, B	Switch port brd	Cables
1515	35 : 18	VPT touch tone test (flash transfer)	TN747B, 19U, B	Switch port brd	Cables
1516	35 : 19	VPT touch tone test (flash transfer)	TN747B, 19U, B	Switch port brd	Cables
1517	35 : 20	VPT touch tone test (flash transfer)	TN747B, 19U, B	Switch port brd	Cables
1518	35 : 21	VPT touch tone test (flash transfer)	TN747B, 19U, B	Switch port brd	Cables

Note: For systems with an expansion cabinet, the lower cabinet board is shown with an L next to the slot number and the upper cabinet board is shown with a U next to the slot number.

(Continued)

TABLE 4-17. VPT (TN747B) Alarm Resolution *(Part 4 of 4)*

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice (Note)** (ckt,slot,proc.)	**2nd Choice** (cause)	**3rd Choice** (cause)
1519	35 : 22	VPT touch tone test (flash transfer)	TN747B, 19U, B	Switch port brd	Cables
1520	35 : 23	VPT touch tone test (flash transfer)	TN747B, 19U, B	Switch port brd	Cables
1521	35 : 24	VPT touch tone test (flash transfer)	TN747B, 19U, B	Switch port brd	Cables
1522	35 : 25	VPT touch tone test (flash transfer)	TN747B, 24U, B	Switch port brd	Cables
1523	35 : 26	VPT touch tone test (flash transfer)	TN747B, 24U, B	Switch port brd	Cables
1524	35 : 27	VPT touch tone test (flash transfer)	TN747B, 24U, B	Switch port brd	Cables
1525	35 : 28	VPT touch tone test (flash transfer)	TN747B, 24U, B	Switch port brd	Cables
1526	35 : 29	VPT touch tone test (flash transfer)	TN747B, 24U, B	Switch port brd	Cables
1527	35 : 30	VPT touch tone test (flash transfer)	TN747B, 24U, B	Switch port brd	Cables
1528	35 : 31	VPT touch tone test (flash transfer)	TN747B, 24U, B	Switch port brd	Cables
1529	35 : 32	VPT touch tone test (flash transfer)	TN747B, 24U, B	Switch port brd	Cables

Note: For systems with an expansion cabinet, the lower cabinet board is shown with an L next to the slot number and the upper cabinet board is shown with a U next to the slot number.

Procedure A: General Replacement Steps

1. Shut down system software (if running), spin down the RCD (if not done automatically), and power down the system.
2. If this AUDIX machine has more than one VPT board, you can swap (exchange) the alarmed VPT with the other one and reboot. If the fault moves to follow the originally alarmed board, that VPT is faulty. Shut down and power down again.
3. *On Standalone systems:* If there are specific ports alarmed on the VPT, busy out the corresponding circuits at the switch until a replacement VPT arrives. Display the `system : translation : voice port` form and record the extension associated with the each alarmed port. Then busy out each extension at the switch. *Remember to release the ports at the switch when the replacement VPT arrives.*
4. Replace the VPT. Power up the system. The system should initialize.
5. Make a VPT test call on all ports of the replaced VPT board using the `maintenance : system : test call` form.
6. To ensure complete VPT operation, you may run additional tests. These tests will also run later in the background, but slowly.
   a. Run the complete TD-bus test on the replaced board. Use the `maintenance : td-bus : test` form. Select repetitions = 5 and long version = y.
   b. Run the short version of the VPT test on each channel controlled by the replaced unit. Use the `maintenance : vpt : test` form and select long version = n.

7. Verify that the alarm has not returned using the `maintenance : active alarm : display` form. If the alarm is still not resolved, do a restart.
8. If the alarm continues to return, replace the 2nd-choice board, check the switch boards and cables (see Chapter 5), or have your remote maintenance service center check the TD bus.

Procedure B: VPT Short Test

Many VPT alarms are caused by switch problems. Check for these as follows:

1. Verify that the call-distribution group in the switch has no restriction for call origination:
   — For System 85, Generic 2, and DIMENSION PBX, this is in switch PROC 010, Word 3, Field 18.
   — For System 75, System 75 XE, Generic 1, and Generic 3, this is the `cor` form.

   See *Switch Administration for AUDIX Voice Messaging* (585-305-505) or the appropriate switch documents for details on all switch translations.
2. For other faults (or if the switch translations are good), check the physical connection (wiring) to the switch to make sure it is sending dial tone to AUDIX.
   a. Disconnect the AUDIX port and install a test phone on the line, then ring the phone and go off-hook to dial. Make sure the test phone has touch-tone dialing when trying to break dial tone.
   b. If you cannot get dial tone from the switch, check the wall field connections. If the physical connections look good, test or replace the associated switch port board.
3. If the switch side looks good, run the short version of the VPT test on the alarmed channel (repetitions = 5). Use the `maintenance : vpt : test` form and long version = n. *If the test fails,* follow Procedure A.

NOTE

In early releases of AUDIX software, background maintenance tests for the TN747B VPT boards frequently generated alarms due to hybrid test failures. Beginning in R1V7 7:2, the hybrid tests have been removed from background maintenance and the `hybrid test` fields no longer appear on the `maintenance : vpt : test` form. The switch software also no longer runs hybrid testing as part of routine maintenance because the hybrid test does not provide a reliable indicator of board health.

Procedure C: Complete VPT Test

Run the complete version of the VPT test twice on the alarmed channel (repetitions = 2). Use the `maintenance : vpt : test` form and long version = y.

If the test fails, follow Procedure A with the addition that the complete VPT test must run successfully twice to resolve the alarm (repetitions = 2).

Procedure D: TD-Bus Control Channel Test

Run the TD-Bus control channel test on the alarmed VPT unit (repetitions = 5). Use the `maintenance : td-bus : test` form and long version = n.

If the test fails, follow Procedure A with the addition that the TD-Bus control channel test must be run five times successfully to resolve the alarm (repetitions = 5).

Procedure E: Complete TD-Bus Test

Run the complete TD-bus test on the alarmed VPT board (repetitions = 5). Use the `maintenance : td-bus : test` form and long version = y.

If the test fails, follow Procedure A to resolve the alarm.

UN160B: DBPI

The UN160B Data Base Processor Interface (DBPI) board connects the FP subsystem with the DBP subsystem over the S bus. It works with the UN162 VSFI to allow AUDIX system communication with the DBP subsystem and disk storage. If the AUDIX system is networked with other AUDIX adjuncts, the UN160B must be Vintage 2 (or later).

Table 4-18. DBPI (UN160B) Alarm Resolution

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice** (ckt,slot,proc.)	**2nd Choice** (ckt,slot,proc.)	**3rd Choice** (ckt,slot)
164	12 : 0	Only DBPI S-bus test fails	UN160B, 06, A	M-bus RAM, B	–
165	12 : 0	Only DBPI S-bus test passes	UN160B, 06, A	–	–
170	12 : 0	VB and PE 0 fail to DBPI	UN160B, 06, A	UN162, 05	–
175	12 : 0	VB fails to DBPI, not PE 0	UN160B, 06, A	TN520, 17	UN162, 05
192	12 : 0	PE 0 fails to DBPI, not SCPI	UN160B, 06, A	TN523, 09L	UN162, 05
201	12 : 0	DBPI RAM failure	UN160B, 06, A	–	–
202	12 : 0	DBPI ROM failure	UN160B, 06, A	–	–
203	12 : 0	DBPI CPU failure	UN160B, 06, A	–	–
204	12 : 0	DBPI mailbox failure	UN160B, 06, A	S bus	–
205	12 : 0	Maint removed DBPI from S bus	UN160B, 06, A	S bus	–
212	12 : 0	General IOK error	UN160B, 06, A	UN162, 05	–

Procedure A: Replace the DBPI

1. Shut down system software (if running) and spin down the RCD (if not done automatically).
2. Power down the system, replace the UN160B, power up the system, and log in.
3. Verify that the alarm is resolved using the `maintenance : active alarm : display` form. Wait one minute past initialization and recheck to see if the alarm returns.
4. If the alarm continues, replace the 2nd-choice board or have your remote maintenance service center check the S bus.

Procedure B: Check the M-Bus (PE) RAM

1. Reboot the system and select a nonstandard initialization.
2. Run the extended memory (RAM) test (select option `y`). This will add about 15 to 30 minutes to the initialization.
3. *If the test fails*, replace the FP-RAM boards one at a time as directed in *TN523 (or TN591), TN716B, TN734 (or TN761): PE*.

UN162: VSFI

The UN162 Voice Store and Forward Interface (VSFI) links all DBP subsystem interactions with the FP subsystem. The UN162 VSFI connects to the S bus through the UN160B DBPI board and enables voice data transfer between the TN532/540 DBP-RAM on the DBP (VME) bus and the TN520 VB voice buffer on the S bus. The UN162 VSFI is initialized by the UN160B DBPI.

Table 4-19. VSFI (UN162) Alarm Resolution

Alarm Log		Description	Repair Action		
Fault	**Unit:Dev**		**1st Choice** (ckt,slot,proc.)	**2nd Choice** (ckt,slot)	**3rd Choice** (cause)
197	14 : 0	DBP memory access and VME-bus fault	UN162, 05, A	UN160B, 06	DBP/VME bus
206	5 : 0	VSFI dual-ported RAM failure	UN162, 05, A	UN160B, 06	DBP/VME bus
897	5 : 0	DBP diagnostic result (127F)	UN162, 05, A	UN160B, 06	DBP/VME bus
Note: Fault code 127 is not currently alarmed.					

Procedure A: General Replacement Steps

To replace the VSFI:

1. Shut down system software (if running), spin down the RCD (if not done automatically), and power down the system.
2. Replace the UN162. Power up the system. The system should initialize.
3. When the initialization completes:
   a. If the initialization is successful, verify the alarm is resolved by waiting one minute past initialization and rechecking for alarms.
   b. If initialization stops before the `start service` message, go to *Control Mode/Visual Inspection Checklist* in Chapter 3.
4. If the alarm returns, replace the 2nd-choice board or have your remote maintenance service center check the DBP bus.

5. Data Link or Switch Problems

The AUDIX data link passes call connect, disconnect, and message-waiting lamp data as well as other call-related information to a fully integrated switch. The term used for the data link depends on the type of switch to which AUDIX is connected. It can be any of the following:

- The Data Communications Interface Unit (DCIU) on System 85, DEFINITY Generic 2, or DIMENSION PBX
- The PGATE board for a DEFINITY Generic 3r
- The Processor Interface (PI) board (or PIB) on System 75, System 75 XE, DEFINITY Generic 1, Generic 3i, or Generic 3s
- The Switch Communications Interface (SCI) or the AP/CMS/DCS interface on System 75
- The Simplified Message Service Interface (SMSI) on the 1A ESS Switch and certain configurations of the 5ESS Switch
- The Basic Rate Interface–Applications Processor Interface (BRI-API) on the 5ESS Switch

This chapter covers alarmed and unalarmed problems with the AUDIX-to-switch data link, including:

- Data Link Alarms (Unit 30)
- Software Translation Alarms (Unit 32)
- Data Link Hardware
- Switch Administration

NOTE

If you are troubleshooting the data link for an AUDIX system connected to a non-AT&T switch, refer to the appropriate document for troubleshooting procedures:

- *AUDIX Integration Package for the DMS-100 Switch* (585-304-204)
- *AUDIX Integration Package for the SL-1 Switch* (585-304-203)

DATA LINK ALARMS

Data link failures (Unit 30) indicate that there is a problem either with the TN547(B) (if used) or with the link to the switch. This link may include other links to the nodes of a DCS. If the AUDIX uses a TN533 and not the TN547(B), Unit 30 alarms usually point to the link. A TN533 failure there would result in a Unit 43 alarm.

Some failures might be that the switch data link board might fail, the connecting hardware or cabling could be faulty, the data link translations may have been changed at the switch, or (in a DCS network) one or more of the nonhost switches could have a data link problem. See *Switch Administration for AUDIX Voice Messaging* (585-305-505) for details on DCS networks.

If you are working on an AUDIX Standalone system (i.e., one without a data link) and one of these alarms is active, escalate per your local procedures.

Table 5-1. Data Link Alarm Resolution

Alarm Log		Description	Repair Action		
Fault *	**Unit:Dev** *		**1st Choice** (cause,proc.)	**2nd Choice** (cause,proc.)	**3rd Choice** (cause,proc.)
22	30 : 0	Corrupt DCIU/PGATE/PI/SCI channel	AUDIX, A	Data link, B	Switch, C
157	30 : 0	VIP L4 is out of data transfer	AUDIX, A	Data link, B	Switch, C
158	30 : 0	DLC/MPDM handshake problem	AUDIX, A	Data link, B	Data, C
218	30 : 1	VIP L4 out of data transfer to host switch	AUDIX, A	Data link, B	Switch, C
219 – 237	30 : 2-20	VIP L4 is out of data transfer to remote switch 2 to 20 (in DCS networks only)	AUDIX, A	Data link, B	Switch, C
344	30 : 0	MPSI configured for DCIU/SCI	Translations, D	–	–
345	30 : 0	SCPI configured for SMSI/API	Translations, D	–	–
345	30 : 45	LCEN doesn’t match SCA	SCA, A	–	–
346	30 : 0	MPSI corrupt	TN547B, 15, E	–	–
347	30 : 35	End to end data transfer problems	AUDIX, A	Data link, B	Switch, C
348	30 : 42	SCA ISDN layer 1 failure	AUDIX, A	Data link, B	Switch, C
349	30 : 39	1A ESS Retry Later	Switch, A	Data link, B	–
350	30 : 41	No response from SCA	SCA, A	Data link, B	Switch, C
351	30 : 36	No SMSI/API end-to-end message, timeout	AUDIX, A	Data link, B	Switch, C
352	30 : 43	SCA layer 2 failure or failure to assign Network Termination Endpoint ID	SCA, A	Data link, B	Switch, C
353	30 : 44	SCA failed beyond ISDN	SCA, A	Data link, B	Switch, C
354	30 : 45	LCEN doesn’t match SCA	SCA, A	Data link, B	Switch, C

* Sometimes the fault code and device number do not match up. If this happens, use the device number to locate the appropriate **Repair Action** to take.

Procedure A: Data Link Tests

This test is designed to narrow the problem down to AUDIX hardware, switch hardware or software, or the data link connecting equipment. The information returned by AUDIX after running the switch connect test will determine the additional steps needed to restore the data link.

CAUTION *The data link test will temporarily affect service (2 to 20 minutes) and should be run during a low- or no-traffic period. It will also bring down the AUDIX link to the host switch and busy-out access to all DCS switches configured. When the data link is alarmed, AUDIX will not accept calls so the test can be run immediately.*

Use the following steps to restore the data link:

1. Display the `maintenance : datalink : test` form.
2. Select loopback point 1 and press CHANGE.
3. When the test is finished, check the *test result* field and look up the appropriate set of instructions.

Failure at SCPI

The TN533 SCPI or TN547(B) MPSI internal test failed. The type of board you have depends on what type of switch you are connected to, but in either case the board in slot 15 is probably bad. When you get the proper replacement board, do the following:

1. Do a maintenance shutdown and power down the system.
2. Replace the board in slot 15.
3. Power up and initialize the system.
4. Check the `maintenance : active alarm : display` form to see if the original alarm returns. If so, escalate the problem immediately.
5. The system may take up to 5 minutes to completely initialize the data link. When the link is up (the yellow LED on the board in slot 15 is lit), make test calls to ensure proper operation.

Failure at Host Switch

The test failed somewhere outside the AUDIX cabinet. You will need to run additional tests to isolate the problem. Go to Procedure B to test the interface equipment.

Failure at Remote Switch

The test failed in a remote switch. Have the PBX switch personnel check their remote DCS links.

Pass

The system was able to send a message to the switch and get an acknowledgement back. Do the following:

1. Check the `maintenance : active alarm : display` form to see if the alarm is now resolved. If so, release the data link and make test calls to ensure normal service.
2. If AUDIX still won't accept calls (you receive fast busy when you call AUDIX), restart the system using the `startup` form.
3. If the system doesn't accept calls or the alarm remains active after the restart, escalate per local procedures.

For systems connected to a 5ESS Switch, the following additional messages may be displayed.

Failure at SCA

The Switch Communications Adapter (SCA) did not respond to AUDIX. Cycle power on the SCA (turn the SCA off and then back on) and rerun the switch connect test on the `maintenance : datalink : test` form.

1. If the system test now passes, check that the alarm is resolved and the system will now answer calls.
2. If the test still fails, go to *Data Link Hardware* to test the SCA and associated cabling and hardware.

SCA Failed Layer 1 Protocol

The SCA passed internal tests and can communicate with AUDIX, but can't complete the physical link to the switch.

1. Check the connection between the SCA and Network Termination 1 (NT1) if an NT1 is required. If you do not have access to this connection, escalate per local procedures.
2. If the two are connected, try replacing the modular cord between the SCA and NT1.
3. If all of the hardware on site is good, the 5ESS Switch translations will have to be checked. Escalate per local procedures.

SCA Failed Layer 2 Protocol

The SCA was able to establish a physical link with the 5ESS Switch, but could not establish communication. Someone will have to check the translations at the 5ESS Switch and make sure they are consistent with those in AUDIX and the SCA. Make sure the Terminal Endpoint Identifier is assigned correctly.

SCA Failed Beyond ISDN Software

The SCA was able to establish communications with the Integrated Services Digital Network (ISDN) software at the switch, but cannot complete the communication path. Someone will have to check the translations at the 5ESS Switch and make sure they are consistent with those in AUDIX and the SCA.

Failure at ISDN

The test failed at the Central Office (CO) switch. Have the CO switch personnel check their switch facilities.

Line Card Equipment Number Improperly Assigned

The Line Card Equipment Number (LCEN) is set using dip switches inside the SCA. You will need to find out the correct LCEN set in the 5ESS Switch and then set the switches inside the SCA box to match it. See Figure 5-11, *SCA Option Settings*, for dip switch locations.

Procedure B: Interface Equipment Tests

The following test can further isolate an unresolved data link problem. If you run a loop-around test on a device you do not have, the test will always fail. The `maintenance : datalink : test` form shows test 3 as `LADS or MPDM`, but will also test the link with a DSU or 202T modem as well as a LADS or MPDM (formerly called ‘‘PDM’’).

The equipment to be tested depends on the type of switch to which AUDIX is connected. It can be any of the following:

- Data Service Unit (DSU): Used on System 75, System 75 XE, System 85, DIMENSION PBX, or DEFINITY Communications Systems for distances over 400 feet (122 meters). Needs to be set in loop-back mode. The DSU replaces the LADS. See *AUDIX System Description* (585-305-201) for details on the various DSUs available for use with AUDIX.
- Isolating Data Interface (IDI): Used on System 75, System 75 XE, System 85, DIMENSION PBX, or DEFINITY Communications Systems for distances of 400 feet or less. Requires a manual loop-back plug (ED-1E422-10, Group 6) to be physically inserted in the data link.
- Local Area Data Set (LADS): Used on the System 75, System 75 XE, System 85, or DIMENSION PBX for distances over 400 feet. Needs to be set in loop-back mode. *The LADS has been replaced by the DSU, but is still used at some sites.*
- Modular Processor Data Module (MPDM): Sometimes used in a System 75, System 75 XE, System 85, or DEFINITY Communications Systems data link. Needs to be set in loop-back mode. The MPDM has been discontinued but may still be used at certain sites.
- Direct Cabling: Used to connect the AUDIX to a 5ESS Switch through an Advanced Communications Package (ACP), which runs on an Applications Processor (AP) and provides an SMSI data link.
- 202T Modem: Used to connect the AUDIX to a 1A ESS Switch or to a 5ESS Switch using an SMSI data link.
- Switch Communications Adapter (SCA): The SCA is a protocol converter made specifically for AUDIX to connect to a 5ESS Switch with a BRI-API data link.

Use the following steps to test the data link interface equipment:

1. First, verify that the MPDM, LADS, DSU, or 202T modem option settings are set correctly (see *Data Link Hardware*). The IDI has no option settings.

2. Run the MPDM, DSU, or LADS self-tests to see if they are causing the alarm (see *Data Link Hardware* for details). The IDI and the 202T modem do not have a self-test mechanism. If the self-tests fail, replace the unit. If they pass, continue.
3. Busy-out the data link using the `maintenance : datalink : busyout` form.
4. Remove the cable connected to the SCPI DATA port (F00) on the AUDIX cabinet.
5. Place a loop-back plug on the back of the cabinet.
6. Run the `maintenance : datalink : test` form using loopback point 4. If the test passes, re-connect the cable to F00 and go to the next step. If the test fails, replace the TN533 or TN547(B) in slot 15 of the AUDIX carrier and rerun the test. If this test passes, restore service. If this test fails, there is a problem with the connection between the AUDIX backplane and the connector panel. Escalate the problem immediately.
7. Set up for a local loop-back test. This will test the MPDM, the local LADS, the local DSU, the local 202T modem (the unit nearest AUDIX), or the cabling to an IDI or 5ESS Switch AP.
   a. Place the MPDM, LADS, or DSU in local loop-back mode (modem check).
   b. For 202T modems, press the AL (Analog Loop) button on the front of the modem.
   c. For an IDI, disconnect the Group 174 cable at the IDI and place a loop-back plug on the end of the cable.
   d. For direct cabling to an AP, replace the Group 110 cable and/or the H600-258 cable and go to step 10.
8. Run the `maintenance : datalink : test` form using loopback point 3. This tests the near-end connection to AUDIX.
   a. If the test passes, consider the unit and/or cabling good. Take the unit out of loopback mode or remove the loopback plug and reconnect the cabling. Go to the next step.
   b. If the test fails, either replace the cable or replace the bad unit (see *Data Link Hardware*). If a LADS is bad, you may have to replace it with a DSU, which may require replacing both LADS in the link with DSUs. Go back to steps 1, 2, and 7.
9. Test the other half of the link:
   a. For a LADS or DSU, set up for a remote loop-back test. Set the unit nearest the switch in far-end (remote) loop-back mode. Run the `maintenance : datalink : test` form using loopback point 3.
      — If the test passes, consider that unit good. Take the unit out of loop-back mode.
      — If the test fails, run data link tests from the switch if possible (see Procedure C). If these tests fail, replace the failed unit (see *Data Link Hardware*). If both the AUDIX and switch tests pass, it is unlikely that the IDI, MPDM, LADS, DSU, or 202T is faulty. Escalate the problem using local procedures.
   b. For an IDI, check the Group 304 cable by replacing it with a known good cable. Go to step 10 to test the new cable. If that test fails, replace the IDI and return to step 10.
10. If a bad unit was replaced, rerun the `maintenance : datalink : test` form at AUDIX using loopback point 1. If the test passes, go to the next step. If the test fails, go to Procedure C.
11. After the tests are finished, use the `maintenance : datalink : release` form to enable the link for service.

12. Run the `maintenance : datalink : test` form again using loop-back point 1. If the test passes:

    a. Use the `maintenance : active alarm : display` form to verify the fault is resolved.

    b. Wait 15 minutes past initialization and verify the fault does not return.

13. If the fault is still not resolved or returns, use Procedure C.

Procedure C: Check the Link Translations

If the AUDIX SCPI or MPSI board and its connecting equipment appear good, the next step is to double-check the switch translations and port board as follows:

1. Make sure the AUDIX `system : translation : switch connection` and `system : translation : voice port` forms are administered correctly (see Procedure D).

2. Wait 15 minutes from when the alarm was activated to see if the background data link test resolves the alarm. Check if the alarm now is resolved using the `maintenance : active alarm : display` form.

3. Check the translations on the host switch to see if the alarm is in the switch administration or switch data link board. See *Switch Administration for AUDIX Voice Messaging* (585-305-505) for complete administration procedures.

    a. On System 75 with an MPDM: If the switch seems okay and if AUDIX is on interface link 1, try moving it to another link (2 through 4). This may require readministering another adjunct, such as an AP or CMS link.

    b. On System 85, Generic 2, and DIMENSION PBX: Check with the switch administrator in case PROC 027, test 3 has made the data link to AUDIX inactive. Have the switch administrator use PROC 650 to check the switch for alarms. PROC 650, test 3, can run an external loop-around test to an MPDM or pair of DSUs/LADS in the link.

    c. On a 1A ESS Switch or 5ESS Switch: Have the switch translations checked for errors.

4. If a fault is found at the host switch, have the switch administrator correct the problem. If the repair requires the AUDIX data link to the host switch to be shut down:

    a. Inform the customer of a service interruption. At the scheduled time, do an administrative shutdown using the `shutdown` form.

    b. After the switch repair is complete, restart AUDIX using the `startup` form.

5. *In a DCS Network:* If the alarm is not resolved, inform the switch administrator that there could be a hardware or administration problem with a data link to a nonhost switch data link. Check the nonhost node number(s) on the `system : translation : switch connection` form while the switch administrator checks the switch.
6. After a switch repair procedure, use the `system : translation : alarm resolution` form to immediately clear the problem on AUDIX. If you changed any translations on the host switch, you need to restart AUDIX using the `startup` form.
7. Check if the AUDIX alarm is resolved using the `maintenance : active alarm : display` form. Check for alarms again after 15 minutes to make sure the problem is fixed.

Procedure D: Check System Configuration

These alarms indicate there is a problem with translations on the `system : translation : switch connection` form. Check the following:

- *For fault 344, device 0:* The system has a TN547(B) MPSI installed in slot 15, but the `system : translation : switch connection` form is translated for a DCIU-SCI type of data link.
  - — If the system uses an SMSI or API data link (it is connected to either a 1A ESS Switch or 5ESS Switch) or it is integrated with some other vendor switch, change the `system : translation : switch connection` form to indicate the correct type of data link.
  - — If the system is connected to an AT&T PBX, order a TN533 SCPI and replace the TN547(B) MPSI when the new board arrives.
- *For fault 345, device 0:* The system has a TN533 SCPI installed in slot 15, but the `system : translation : switch connection` form is translated for either an SMSI or API data link.
  - — If the system uses a DCIU, PGATE, PI, or SCI (it is connected to a System 75, System 75 XE, System 85, DEFINITY Communications System, or DIMENSION PBX), change the `system : translation : switch connection` form so that the correct translations are shown.
  - — If the system uses an SMSI or API link, order a TN547(B) MPSI and replace the TN533 SCPI when the new board arrives.
- *For fault 345, device 45:* The SCA dip switch settings must match the Line Card Equipment Number (LCEN) in the 5ESS Switch. See Procedure A.

Procedure E: General Replacement Steps

Use the following procedure to replace the TN547(B) MPSI:

1. Shut down system software (if running), spin down the RCD (if not done automatically), and power down the system.
2. Replace the TN547(B) board. Restore power to the system. The system should initialize.
3. Verify the alarm is resolved using the `maintenance : active alarm : display` form.

SOFTWARE TRANSLATION ALARMS

Software translation alarms generally refer to administrative errors. For example, if the call-distribution group (ACD/EUCD/UCD) member extension administered on the switch is inconsistent with AUDIX administration, calls cannot be connected on the AUDIX port. Either AUDIX or the switch translation needs to be corrected.

Most of these faults apply only to AT&T PBX data links (DCIU, PGATE, PI, or SCI). Fault 67 and Fault 68 can occur on a DCIU-SCI, BRI-API, or SMSI link.

Table 5-2. Software Translation Alarm Resolution *(Part 1 of 2)*

Alarm		Description	Repair
Fault	**Unit:Dev**	**(see Note)**	**Procedure**
36	32 : 0	Port 1 C-D member extension translation inconsistent	A
37	32 : 0	Port 2 C-D member extension translation inconsistent	A
38	32 : 0	Port 3 C-D member extension translation inconsistent	A
39	32 : 0	Port 4 C-D member extension translation inconsistent	A
40	32 : 0	Port 5 C-D member extension translation inconsistent	A
41	32 : 0	Port 6 C-D member extension translation inconsistent	A
42	32 : 0	Port 7 C-D member extension translation inconsistent	A
43	32 : 0	Port 8 C-D member extension translation inconsistent	A
44	32 : 0	Port 9 C-D member extension translation inconsistent	A
45	32 : 0	Port 10 C-D member extension translation inconsistent	A
46	32 : 0	Port 11 C-D member extension translation inconsistent	A
47	32 : 0	Port 12 C-D member extension translation inconsistent	A
48	32 : 0	Port 13 C-D member extension translation inconsistent	A
49	32 : 0	Port 14 C-D member extension translation inconsistent	A
50	32 : 0	Port 15 C-D member extension translation inconsistent	A
51	32 : 0	Port 16 C-D member extension translation inconsistent	A
52	32 : 0	Port 17 C-D member extension translation inconsistent	A
53	32 : 0	Port 18 C-D member extension translation inconsistent	A
54	32 : 0	Port 19 C-D member extension translation inconsistent	A
55	32 : 0	Port 20 C-D member extension translation inconsistent	A
56	32 : 0	Port 21 C-D member extension translation inconsistent	A
57	32 : 0	Port 22 C-D member extension translation inconsistent	A
58	32 : 0	Port 23 C-D member extension translation inconsistent	A
59	32 : 0	Port 24 C-D member extension translation inconsistent	A

Note: ‘‘C-D’’ refers to a call-distribution group (ACD/EUCD/UCD).

(Continued)

TABLE 5-2. Software Translation Alarm Resolution *(Part 2 of 2)*

Alarm		Description	Repair
Fault	**Unit:Dev**	**(see Note)**	**Procedure**
60	32 : 0	Port 25 C-D member extension translation inconsistent	A
61	32 : 0	Port 26 C-D member extension translation inconsistent	A
62	32 : 0	Port 27 C-D member extension translation inconsistent	A
63	32 : 0	Port 28 C-D member extension translation inconsistent	A
64	32 : 0	Port 29 C-D member extension translation inconsistent	A
65	32 : 0	Port 30 C-D member extension translation inconsistent	A
66	32 : 0	Port 31 C-D member extension translation inconsistent	A
67	32 : 0	Port 32 C-D member extension translation inconsistent or no port assigned to C-D member extension(s)	B
67	32 : 32	AUDIX has no voice port translations	B
68	32 : 0	Data link translations inconsistent between host and AUDIX	C
250	32 : 0	AUDIX rejected switch clock time	D

Note: ‘‘C-D’’ refers to a call-distribution group (ACD/EUCD/UCD).

Procedure A: Check Specific Port and Extension Translations

Whenever AUDIX sends the switch a call-distribution group (ACD/EUCD/UCD) member extension and receives an error message, check the switch and AUDIX translations:

1. Using the AUDIX `system : translation : voice port` form, find the call-distribution member extension corresponding to the alarmed port number.

   NOTE Only the first bad translation is alarmed, so check all translations using the detailed steps in *Switch Administration for AUDIX Voice Messaging* (585-305-505).

2. Verify that this extension is consistent with the switch administration as follows:

   a. On System 75, System 75 XE, Generic 1, and Generic 3: Check the `analog-stations` and `hunt-group` forms for AUDIX.

   b. On System 85, Generic 2, and DIMENSION PBX: Check Procedure 026.

3. This alarm often involves other port translation problems. Therefore, verify all other extensions starting with the last call-distribution member extension assigned.

4. Next, try to resolve the alarm using the `system : translation : alarm resolution` form.

5. *If you changed the extension length,* run the Service Dispatcher audit on the `maintenance : audits : fp` form. (A system restart also does this; do one only if there is no traffic.)

6. Verify the alarm is resolved using the `maintenance : active alarm : display` form. Monitor system traffic to ensure that the problem does not occur again.

Procedure B: Check for Call Forwarding

Whenever AUDIX receives a call-distribution group member extension in a message for which there is no port number assigned, you should first check if the AUDIX associated number has been call forwarded at the switch. If it has, calls to AUDIX normally ring with no answer; see if you have a customer complaint about this.

1. Check for Call Forwarding at the switch. If it is on, remove it. Then restart the AUDIX.
2. If this is not the problem or does not resolve the alarm, go to Procedure A.

Procedure C: Check for Translation Consistency

This procedure checks the data link between the switch and AUDIX. If you are working on a Standalone system, there is no data link. Escalate per your local procedures.

This alarm shows that the BX.25 data link translations are inconsistent between AUDIX and the host switch, or that the data link is down for another reason. Check for consistent translations as follows:

1. Check all switch and AUDIX fields and numbers on the `system : translation : switch connection` form. These fields are described in detail in the appropriate forms reference manual for your system. Generally, data link administration includes:
   a. The `communication-interface processor-channels` form on System 75, System 75 XE, Generic 1, and Generic 3.
   b. PROC 257 on System 85 and Generic 2 or PROC 256 on DIMENSION PBX.
2. Make sure all switch and AUDIX fields and numbers on the `system : translation : voice port` form are consistent with the data link translations. Go to Procedure A, step 2, to continue checking translations and run the repair procedures.

Procedure D: Check Switch Clock

AUDIX relies on the time set through the switch to send messages at the correct time, delete voice messages after a certain number of days, and make traffic and error reports. Because AUDIX has no way to keep its own time internally on systems running R1V2 software, the correct time must come from the switch. If the switch is set to the wrong day or time, the time-dependent operations in AUDIX do not work as expected because AUDIX was given the wrong information.

If you have a time-related fault or warning, a user complaint about unexpected deletions or scheduling, or see many time-dependent errors, check the switch clock time as follows:

1. First, go to the `system : clock` form and synchronize the AUDIX clock with the switch clock. This should resolve any alarm associated with the clock.
2. Check the switch clock for accuracy. If the switch clock is incorrect, consult local maintenance personnel to have it reset. **Do not reset the clock without prior consultation.** Altering the clock could have adverse affects on traffic studies. After resetting the clock, repeat step 1.
   - On System 75, System 75 XE, Generic 1, and Generic 3, use the `set time` command.
   - On System 85, Generic 2, and DIMENSION PBX, use PROC 284 (system clock).

DATA LINK HARDWARE

This section covers problems related to the data link between the switch and AUDIX. A Standalone system does not have this link. If you are working on a Standalone system, and you believe you have switch problems, escalate the problem to your remote maintenance service center.

Steps for ordering, installing, testing, and checking option switch settings for data link hardware can be found in Table C-1, *AUDIX System Parts List*, of Appendix C.

Check the IDI

The Isolating Data Interface (IDI) is a passive device and has no self-test capabilities. The only way to check the IDI is to exchange it and/or the cables with known-good components.

CAUTION *IDI cables may be up to 400 feet long, depending on the group ordered. Do* **not** *leave excess cable in a coil.*

System 75/XE, Generic 1, and Generic 3i/s

The IDI connection can be checked by inserting a manual loop-back plug (ED-1E422-10, Group 6) in the link (see the *Data Link Alarms* section).

- If this test indicates a near-end problem, try exchanging the 4.5-foot ED-1E434-11, Group 174 cable and IDI connected to the AUDIX SCPI DATA port.
- If the test fails near the switch end, try replacing the 10- to 400-foot H600-210 cable with known-good components.

See Figure 5-1, *IDI Data Link to a System 75/XE, Generic 1, or Generic 3i/s,* and Figure 5-2, *IDI Data Link to a Generic 3r,* for correct cabling setups.

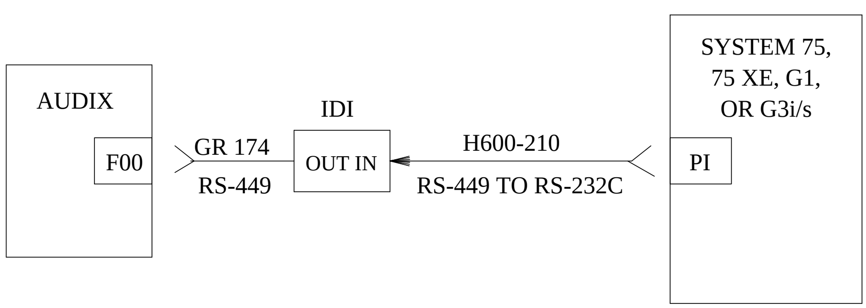


Figure 5-1. IDI Data Link to a System 75/XE, Generic 1, or Generic 3i/s

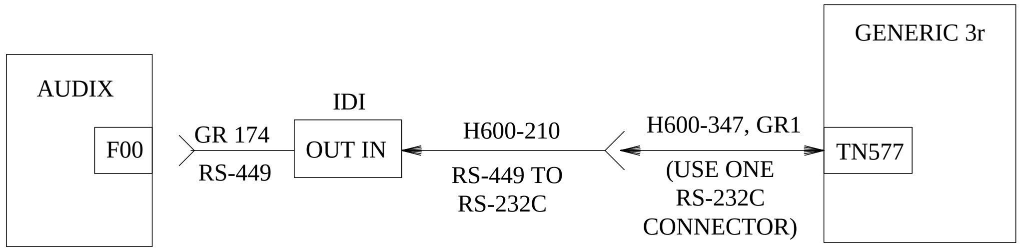


Figure 5-2. IDI Data Link to a Generic 3r

System 85, Generic 2, and DIMENSION PBX

See Figure 5-3, *IDI Data Link to a System 85, Generic 2, or DIMENSION PBX*, for the correct IDI setup. The IDI connection can be checked by inserting a manual loop-back plug (ED-1E422-10, Group 6) in the link (see the *Data Link Alarms* section).

- If this test indicates a near-end problem, try exchanging the 4.5-foot ED-1E434-11, Group 174 cable and IDI connected to the AUDIX SCPI DATA port.
- If the test fails near the switch end, try replacing the 25- to 400-foot Group 304 cable or the Group 342 ‘‘Y’’ cable (for duplicated common control) with known-good components.

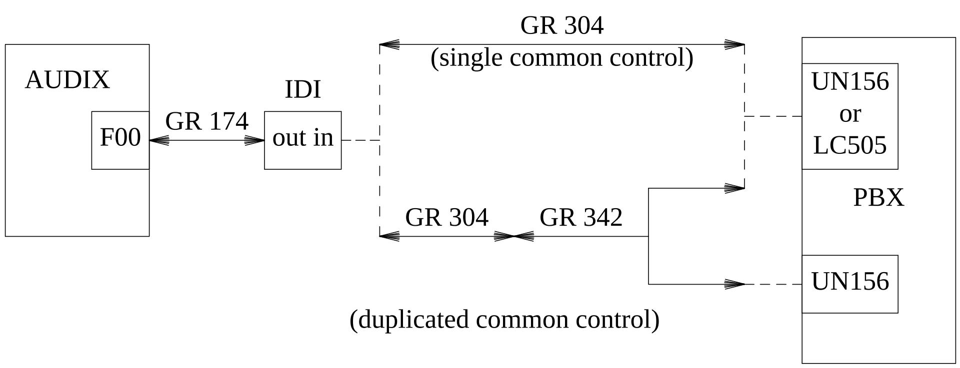


Figure 5-3. IDI Data Link to a System 85, Generic 2, or DIMENSION PBX

Check the DSU

A pair of DATAPHONE II Data Service Units (DSUs) (2500, 2600, or 2700 series) may be used in place of the IDI to extend the AUDIX data link. These units replace the LADS.

Use the following procedure to run self-tests on the DSUs. See the DSU user's manual for details.

1. Press the LL test switch. This begins the internal local loop around test. WAIT should be displayed on the front of the unit.
2. Press the TP test switch. The TP box indicator should appear and the SD and RD indicators should flash.
3. After 30 seconds, the WAIT indicator should disappear and a result should display:
   a. If PASS is displayed, the unit is good. Check for a damaged cable. If a cable is causing the problem, replace it and verify the problem is solved. If not, continue.
   b. If FAIL is displayed, continue.
4. Replace the DSU. Set the new DSU's options as shown:

   speed = 9600
   timing = internal
5. Power up the new DSU. Run installation tests as directed by the user's guide.
6. Restart the system using the `startup` form. Wait a few minutes after getting the `start service` message, then execute the `maintenance : datalink : test` form.
7. Verify that the alarm is resolved using the `maintenance : active alarm : display` form.

Correct cabling configurations are shown in Figure 5-4, *DSU Data Link to a System 75, Generic 1, or Generic 3i/s*, Figure 5-5, *DSU Data Link to a Generic 3r*, and Figure 5-6, *DSU Data Link to a System 85, Generic 2, or DIMENSION PBX*.

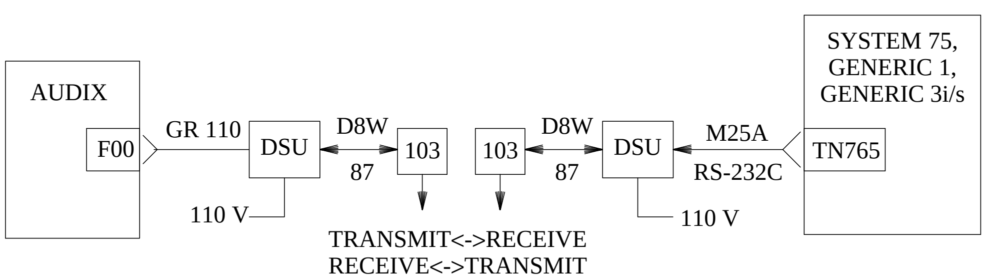


Figure 5-4. DSU Data Link to a System 75, Generic 1, or Generic 3i/s

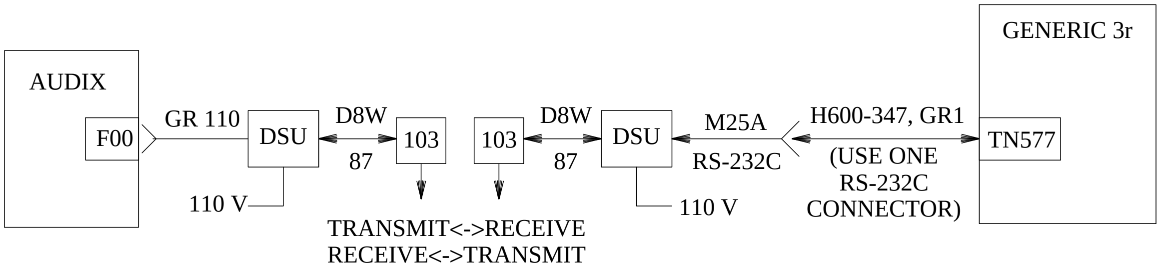


Figure 5-5. DSU Data Link to a Generic 3r

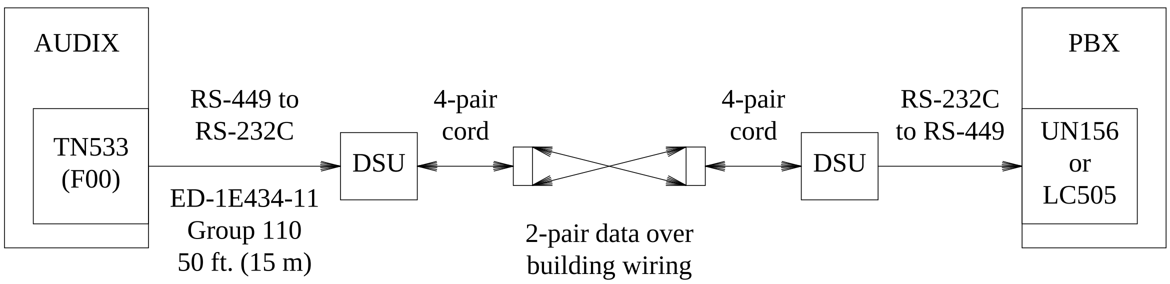


Figure 5-6. DSU Data Link to a System 85, Generic 2, or DIMENSION PBX

Check the LADS

A pair of Local Area Data Sets (LADS) can be used to extend the distance of the data link beyond the 400-foot limitation of the IDI. LADS are typically used only at existing System 85, Generic 2, or DIMENSION PBX installations.

The following paragraphs provide cabling and option settings appropriate for AUDIX. For complete information and self-test procedures, see the *LADS User's Guide* (999-100-166 AB).

Cabling: Two LADS may be connected back-to-back over building wiring. See Figure 5-7, *Data Link Using LADS*. Because the LADS can run self-tests (see the user's manual), they can usually detect their own faults. Before replacing a LADS, therefore, you should swap their connecting cables to see if this fixes the problem. In addition to the loop-around tests run from AUDIX or the switch (see *Data Link Alarms*), you may also try crossing over the transmit and receive wire pairs at the cross-connect field to double-check transmission and reception capability.

Either ED-1E434-11, Group 110 (50-foot) cables attach each LADS to the AUDIX or to the switch. A 25-pair cable (up to 200 feet long) or building wiring (up to 15,000 feet long) connects the two LADS. When connecting the LADS, make sure the transmit pair of one LADS connects to the receive pair of the other, and vice versa.

NOTE

If a Group 342 cable ‘‘Y’’ cable is required at the switch for duplicated common control, connect it between the Group 110 cable and the UN156 connector. See Figure 5-3 for a similar connection.

Option Settings: When installing or replacing a pair of LADS, or when troubleshooting problems with this data link, check the following option settings. Open the LADS chassis to access the circuit card. Also, remove the ground strap for the power supply if in place.

2/4 WIRE = FOUR	RCV CLK = NORM (XZ5)
CA/CB DELAY = 0 (XZ5)	RCV HOLD = MARK (XZ3)
CARR CONT = ON (XZ2)	RCV IMPD = 150 ohms
DATA RATE = 9.6 (XZ3)	XMT CLK = NORM (XZ5)
DX MODE = FULL (XZ2)	XMT IMPD = 150 ohms
OUTPUT LEVEL = –16 (XZ1)	XMIT TMG = INT (XZ2)

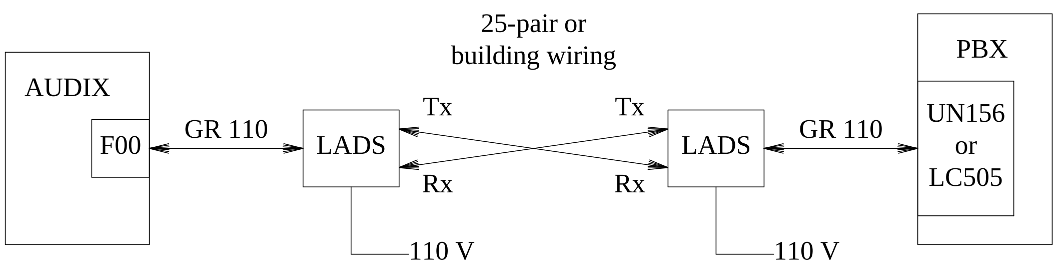


Figure 5-7. LADS Data Link to a System 85, Generic 2, or DIMENSION PBX

Check the MPDM

A Modular Processor Data Module (MPDM) is used for AUDIX data links to a System 75 that uses a Switch Communications Interface (SCI) for its data link. The AUDIX connects to a TN754 Digital Line board in order to reach the SCI. An MPDM data link may also be used to connect to a TN754 board on DEFINITY Generic 1 or Generic 3.

To check the MPDM:

1. At a customer-approved time, shut down system software using the `shutdown` form.
2. Run the MPDM self-test. See the *MPDM User’s Guide* (999-700-300 IS) for details:
   a. Place the SELF TEST switch in the SELF TEST position to test internal circuitry. During the test, the TEST IN PROGRESS lamp lights.
   b. If the test passes, the TEST RSLT lamp is steadily on. If it *fails,* the lamp flashes.
   c. If the MPDM passes the internal circuit test, a known bit sequence is looped through the internal data path for an error check.

d. Any bit error causes the TEST RSLT lamp to flutter momentarily. If no bit errors occur, the TEST RSLT lamp is steadily on.

e. At the end of the test, place the SELF TEST switch in the off position. The TEST IN PROGRESS and TEST RSLT lamps are turned off.

— If the TEST RSLT lamp flashed or fluttered in the test, continue.

— If the MPDM passed the self-test, check the cabling for damage. Turn off the MPDM and replace the cabling (see the following figures). Verify the alarm is resolved. If not, continue.

3. Power down and replace the MPDM. Set the new MPDM's options as shown:

9600	ON
SYNC	ON
INT	ON
AANS	ON
others	OFF

4. Power up the new MPDM. Run its installation tests as directed by the user's guide. When ready for normal operation, all LEDs should be ON *except* the TEST IN PROGRESS and CHECK OPTIONS lamps.

5. Restart AUDIX using the `startup` form. Wait 2 minutes, then execute the `maintenance : datalink : test` form.

NOTE If the data link has been down for 15 minutes or more, System 75 will only try to reset the link at previously specified times. You may need to busy out and then release-busy the link on the switch side in order to restore service.

6. Verify the alarm is resolved using the `maintenance : active alarm : display` form. Wait 15 minutes longer, then recheck for active alarms to see if the alarm returns.

See Figure 5-8, *MPDM Data Link to a System 75, Generic 1, or Generic 3i/s,* or Figure 5-9, *MPDM Data Link to a Generic 3r,* for correct cabling configurations.

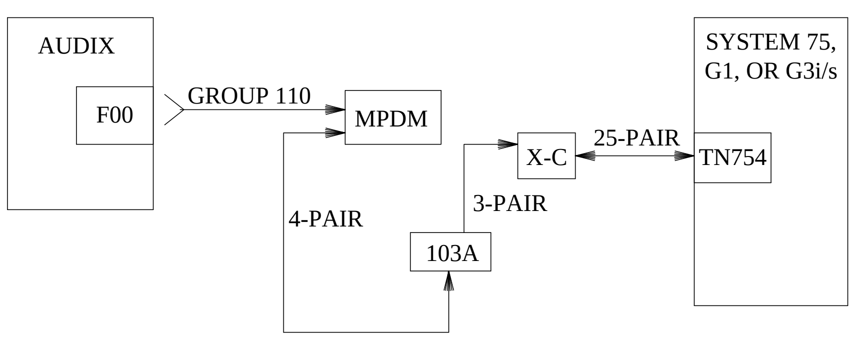


Figure 5-8. MPDM Data Link to a System 75, Generic 1, or Generic 3i/s

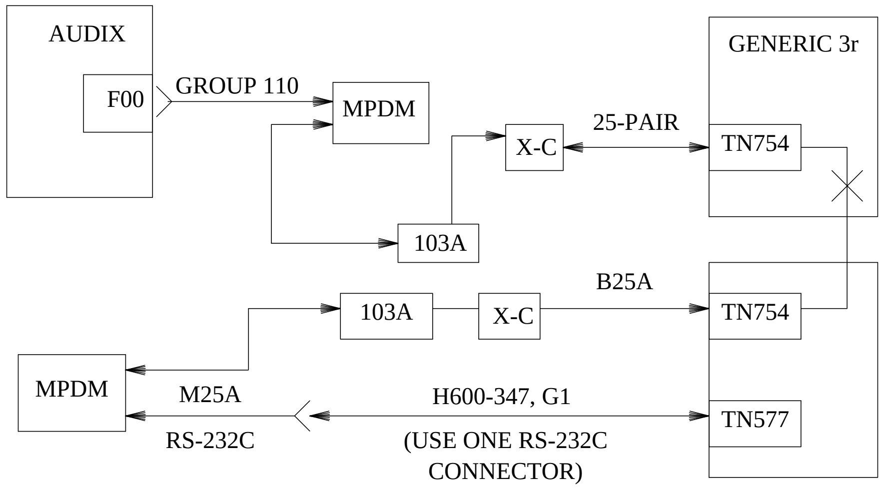


Figure 5-9. MPDM Data Link to a Generic 3r

Check the SCA

If the AUDIX is connected to a 5ESS Switch with a BRI-API data link, the system needs the SCA protocol converter to communicate with the switch. Figure 5-10, *AUDIX to 5ESS Switch Data Link Using the SCA*, shows the data link connection between AUDIX and the 5ESS Switch. Check the SCA as follows:

1. Check the LEDs on the front of the box.
   a. The ‘‘Power’’ LED should always be lit when the box is on. If this LED is not lit, check the on/off switch and the power connector.
   b. The ‘‘In Use’’ LED should be lit if the SCA can communicate with the ISDN side of the connection. If this LED is lit, the problem is probably between AUDIX and the SCA.
   c. If the red ‘‘Fault’’ LED is lit, there is a problem with the SCA or beyond. This LED is lit if AUDIX can determine a problem and the SCA can understand the message from AUDIX to light the LED. Check the SCA option settings, 5ESS Switch translations, and cabling.
   d. The ‘‘P1’’ port LED is lit when AUDIX has a physical connection to the SCA. If this LED is lit, the cabling between the AUDIX and the SCA is good; however, there may be errors in the AUDIX translations.
   e. If all of the LEDs on the front of the box are lit correctly, continue.
2. There is a 7-segment LCD inside the SCA box which should be lighting segment by segment in a square around the display when the SCA is working correctly. You can see this display by looking through the window in the front or removing the top cover.

3. If this display is working correctly, the problem is either outside of the box or with incorrect dip switch settings inside the SCA. Check the option switches inside the box. See Figure 5-11, *SCA Option Settings*. If there is an incorrect dip setting, make the necessary corrections and rerun the switch connection test. The AUDIX installation manual has the correct option settings. If the dips are all correct, escalate per local procedures.
4. If the display shows a value (such as 1, 2, 3, etc.), the SCA has a problem. Replace the box and rerun the switch connection test.

If you still cannot get the AUDIX to communicate with the switch, escalate per your local procedures.

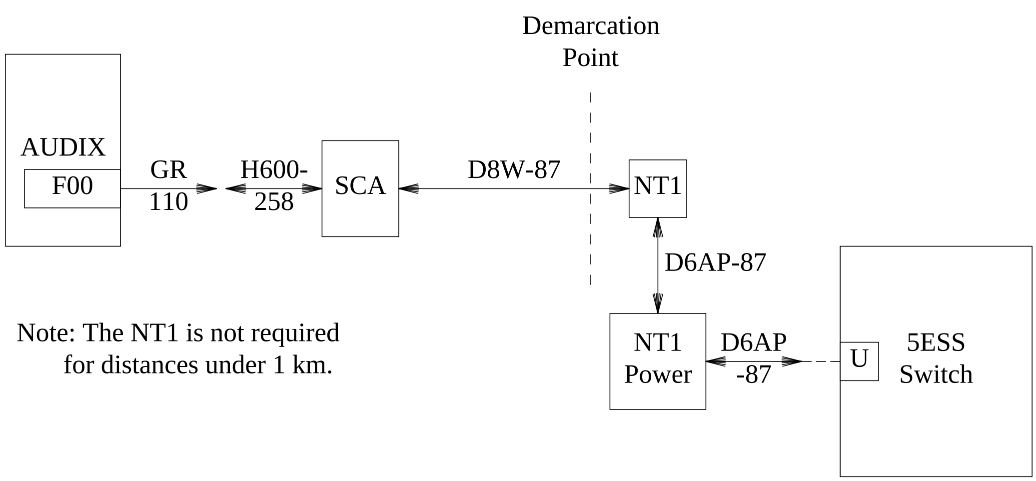


Figure 5-10. AUDIX to 5ESS Switch Data Link Using the SCA

Check the 202T Modem

When a system is connected to any 1A ESS Switch, or to a 5ESS Switch through an Advanced Communications Package (ACP) running on an Applications Processor (AP), a 202T modem is used in the data link. See Figure 5-12, *AUDIX Data Link to a 1A ESS Switch*, and Figure 5-13, *AUDIX Data Link to a 5ESS Switch ACP*. Check the 202T as follows:

1. Put the modem in analog loop-back.
2. Display the `maintenance : datalink : test` form.
3. Enter `loopback point 3`. Press CHANGE.
4. When the test completes, the system will return a test result:
   a. If the test fails, the problem is either the modem or the cabling between the AUDIX and the 202T. Replace one or the other and rerun the test.
   b. If the test passes, the problem in the data link is somewhere beyond the connection between the AUDIX and the 202T.

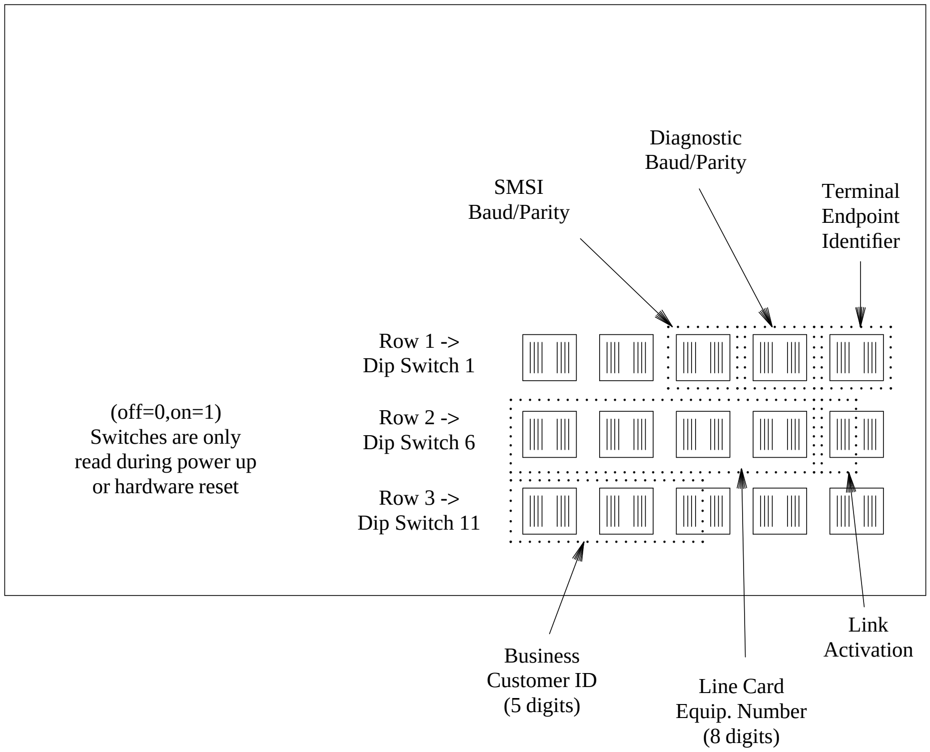


Figure 5-11. SCA Option Settings

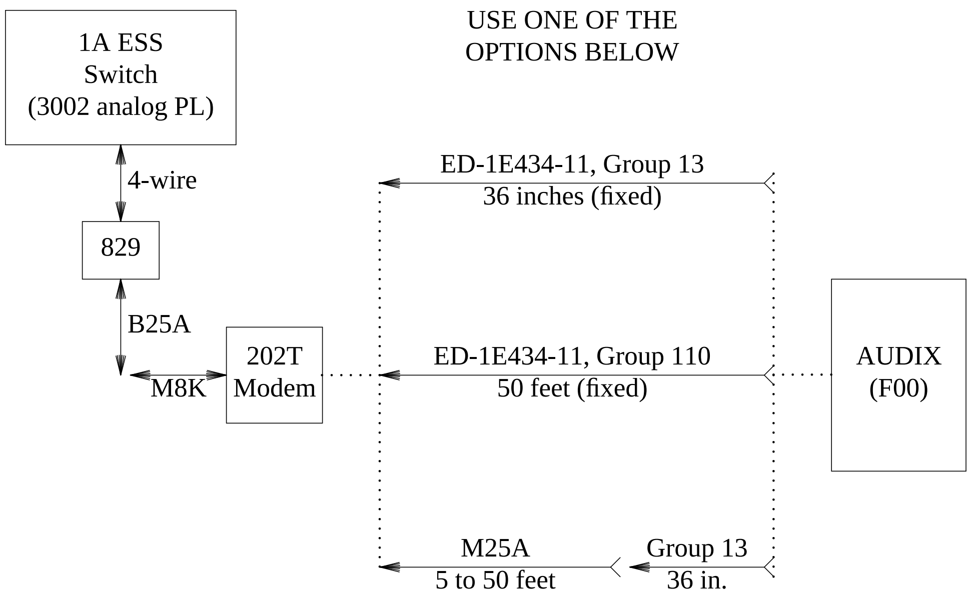


Figure 5-12. AUDIX Data Link to a 1A ESS Switch

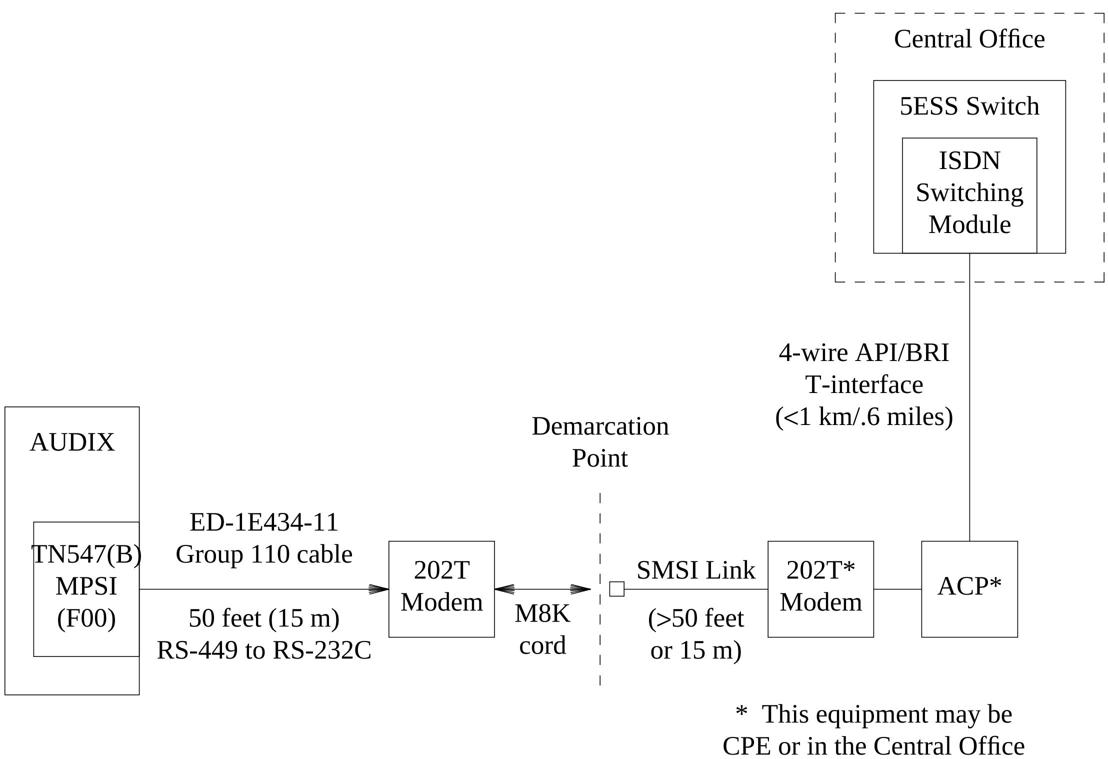


Figure 5-13. AUDIX Data Link to a 5ESS Switch ACP

Check the Cabling to an ACP

On the 5ESS Switch, the AUDIX may be cabled directly to a local ACP as shown in Figure 5-14, *AUDIX Data Link to a 5ESS Switch Local ACP*. If problems occur, try swapping the cables with known-good cables to try to isolate the problem.

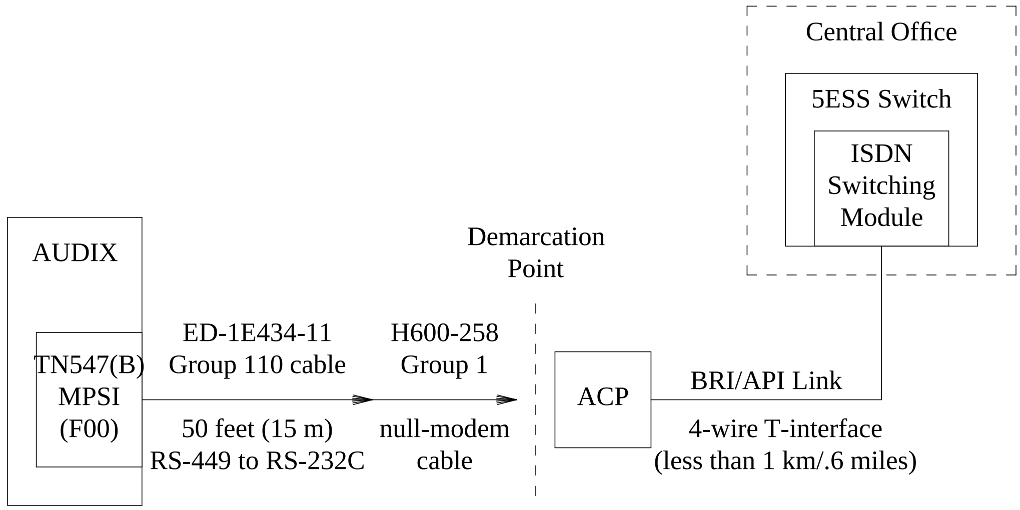


Figure 5-14. AUDIX Data Link to a 5ESS Switch Local ACP

SWITCH ADMINISTRATION

Switch administration involves setting up the logical links between the AUDIX adjunct and the switch so the two systems operate smoothly together. Translations must be consistent for the data link and voice ports on both AUDIX and the switch (see *Data Link Alarms* and *Data Link Hardware*). For complete switch administration procedures, see *Switch Administration for AUDIX Voice Messaging* (585-305-505).

This section covers additional switch administration concerns for maintenance, including reliability factors and DCS network administration.

Switch Port Reliability

The call-distribution group (ACD/EUCD/UCD) for AUDIX should be set up so that service interruptions are minimized. A good strategy is to spread out the switch ports in the group over as many port boards or carriers as possible. This distributes ring blocking over a larger area and reduces the size of failure groups when they occur. For example:

- DEFINITY Generic 2 traditional modules, DIMENSION PBX, and System 85 ring four ports per 1/4 carrier. By spreading port boards over more carriers or parts of carriers, more than 4 ports can ring at one time.
- System 75, System 75 XE, Generic 1, and Generic 3 can ring 4 ports per board on an 8-port TN742. The 16-port TN746B board can ring 4 ports out of each set of 8 (4 ports can simultaneously ring on ports 1 through 8 and 4 ports can simultaneously ring on ports 9 through 16). AUDIX ports should be distributed among different boards to minimize ring blocking.

DCS Network Administration

The Distributed Communications System (DCS) connects two or more switches or *nodes* together with logical (channel) and physical links. Each node uses one link on a DCIU or SCI. Tie trunks provide voice links between switches.

AUDIX is directly connected only to the *host* (local) switch. Full feature transparency is always available between AUDIX and its host switch. The *remote* switches on other nodes of the network can only access AUDIX through the local switch. The degree of feature transparency between AUDIX and a remote switch varies according to the type of switch and software. See *AUDIX Feature Descriptions* (585-305-203) for details on feature operation in a DCS network.

DCS messages passed among switches include those listed below. Most messages travel through the data link. If you have problems with any of the following, you may wish to test the data link from your local AUDIX to the local host. You *cannot* test the other links in the network from your site (they must be tested individually by switch administrators at other sites).

- Connect/disconnect messages
- Extension availability
- Integrated Message Notification (IMN)
- LWC activation (except on DIMENSION PBX)
- Message waiting lamp status
- Time synchronization

DCS Administration

A DCS network uses the same forms and procedures as those used for administering the local AUDIX switch link. The major difference is that the additional channels, ports, and switch numbers must be consistent across the network or errors will occur. AUDIX administration considerations include:

- The AUDIX voice ports and data link are physically connected only to the host switch. Remote switches are connected to AUDIX with logical ‘‘hop’’ channels through the host switch for data transmission. DCS trunks are used for voice transmission.
- Each switch has a unique node number. AUDIX currently supports switch numbers 1 to 20. Some switch software releases support numbers greater than 20, but AUDIX cannot serve a switch with a number greater than 20.
- The AUDIX logical channel may be numbered 1 to 64 (but only 20 switches are currently supported in a DCS network).
- The switch ports and logical channels may be numbered 1 to 64 except with DIMENSION PBX, which allows numbering 1 to 20. AUDIX does not support any number greater than 64.

AUDIX Forms for DCS Administration

This information must be consistent with the rest of the network. Forms which contain DCS information are listed below. See the appropriate forms reference manual for details and field descriptions of these forms.

- `subscriber : local` – Includes the switch number the AUDIX subscriber is on (1 to 20) and can be changed at any time. Filled in by subscriber data audit.

NOTE Do not use the `subscriber : remote` form. It is only used when two or more AUDIX systems are networked.

- `switch time zone` – Includes daylight savings time and a time zone for each switch in the DCS network (usually done during installation).
- `system : translation : switch connection` – Identifies an AUDIX port (1 to 20), a switch port (1 to 64), a logical channel (1 to 64), and the AUDIX data link (always 1) for each switch in the network.
- `system : translation : voice port` – Identifies the switch call-distribution extensions for AUDIX voice ports. Extensions may be 4 or 5 digits long in this case.

See *Switch Administration for AUDIX Voice Messaging* (585-305-505) for details on these translations.

DCS Subscriber Selection

To solve some customer-reported problems, you may need to know how subscribers were selected. Usually one of the following two methods is used, or a combination of both.

1. One AUDIX in the DCS network: All AUDIX subscribers are selected using the `subscriber : local` form. Other AUDIX's may be tied to switches in the network, but are not part of the DCS network.
2. Multiple AUDIX machines in the DCS network using different numbering plans: DCS allows 5-digit extension numbering for easy grouping of numbering plans. A DCS network may have two or three numbering plans in order to distribute the hardware facilities among the network users. For example, if the DCS network has 20,000 users, the DCS planners may divide these users into 5 numbering plans to allow 5 AUDIX machines to serve this group. Each AUDIX serves the users in its numbering plan and is directly connected only to its local (host) switch, even though the numbering plan may stretch across a number of switches.

Some DCS users may have to use two pound (#) signs to access AUDIX when entering the AUDIX-associated extension and their number. System 85 software load R2V3 1.0 has this problem, but load 1.1 does not.

6. Disk Drives

This chapter covers alarmed and unalarmed problems with AUDIX disk drives. Topics include:

- Disk Drive Alarm Resolution (when software is running)
- Unalarmed Disk Drive Troubleshooting
- Replacing and Installing Disk Drives
- Disk Drive Jumper Settings

DISK DRIVE ALARM RESOLUTION

If you have a disk drive alarm, use Table 6-1, *Disk Drive Alarm Resolution*, to find the alarmed drive, then follow the diagnostic procedures. Disk drive numbering is shown in Figure 6-1, *Order of Disk Drives in AUDIX Cabinets*. Afterwards, verify that the fault is resolved using the alarm logs.

Table 6-1. Disk Drive Alarm Resolution

Alarm Log		**Description**	**Repair Action**	
Fault	**Unit:Dev**		**1st Choice** (controller/disk,proc.)	**2nd Choice**
290-296	9 : 0-6	DBP disk drive seek failure	Disk00-Disk06, A	–
298-304	9 : 0-6	DBP disk drive read failure	Disk00-Disk06, A	–
306-312	9 : 0-6	DBP disk drive write failure	Disk00-Disk06, A	–
314-320	9 : 0-6	DBP disk drive returned bad data	Disk00-Disk06, A	–
324-330	9 : 0-6	Disk defect map couldn't be read at equip	Disk06-Disk06, A	–
336-342	9 : 0-6	A filesystem has run out of space	Disk00-Disk06, B	–
411-417	9 : 0-6	Disk device status error	Disk00-Disk06, A	–
897	9 : 0-6	DBP disk drive diagnostic result	Disk00-Disk06, A	–

Note: Fault codes 108 to 111 are not currently alarmed.

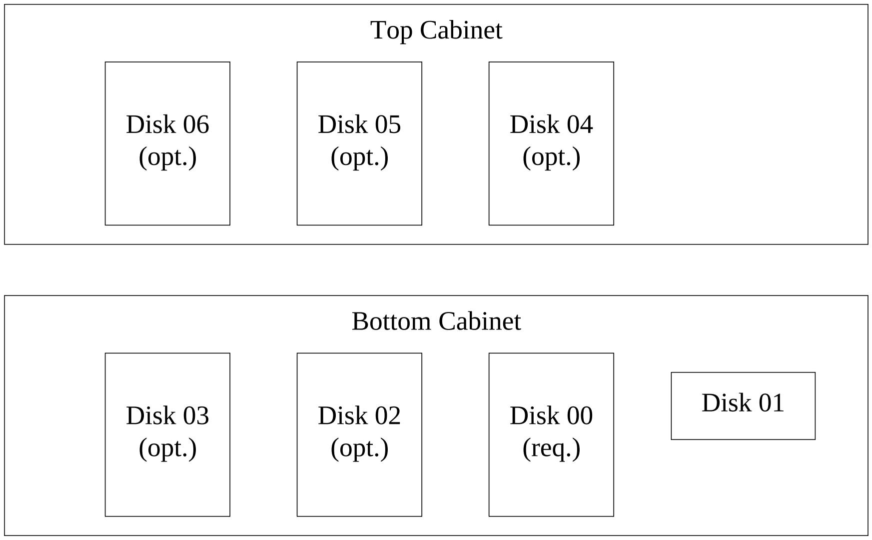


Figure 6-1. Order of Disk Drives in AUDIX Cabinets

Procedure A: General Replacement Steps

To check or replace a faulty drive:

1. Go to the `maintenance : dbp : status` form and check the status of the alarmed drive.
   a. If the status is `UEQ/D`, go to step 2.
   b. If the status is `EQ/D`, go to *Replacing and Installing Disk Drives* (see page 6-11).

   NOTE As an option, you may continue with Procedure A if you see a status of `EQ/D`, but be aware that an attempt to re-equip the drive may cause the system to crash. To avoid any possibility of a crash, go directly to *Replacing and Installing Disk Drives*.

2. Verify that the alarmed disk is actually faulty by re-equipping it as follows:
   a. Unequip the alarmed disk using the `maintenance : dbp : unequip` form. This removes it from the system configuration and spins down the disk.
   b. Reactivate the drive using the `maintenance : dbp : equip` form (do *not* reinitialize or erase it!). This runs verification tests.
   c. If you get an error message on the RCD, go to step 3. Otherwise, go to step 4.

3. *If an RCD fails to equip* (you receive an error message):

   a. Make sure a cartridge is installed (press the eject button).

      — If the RCD did not spin down automatically (the light is still on or flashing), shut the system down using the `shutdown` form.

      — Press the button on the TN506B BC and wait five minutes. If the RCD has not spun down, spin it down by pressing the start/stop button.

   b. Insert or reseat the cartridge, then restart the system using the `startup` form.

   c. Try to re-equip the cartridge using the `maintenance : dbp : equip` form.

   d. If the cartridge was inserted correctly and the RCD still fails to equip, replace the cartridge. Initialize a new cartridge using the steps under *Equip the New Disk or Cartridge* after Procedure B. See if this solves the problem.

   e. *If you replace the cartridge and the fault returns*, the RCD is probably faulty. Go to the next step.

4. If the disk drive equips, go to the next step. If a Hard Disk Drive (HDD) or an RCD with a *good* cartridge fails to equip, the drive is probably bad. Do the following:

   a. Go to *Unalarmed Disk Drive Troubleshooting* and follow the checklist to make sure the disk is the problem.

   b. If you verify the disk is bad, replace it using the steps in *Replacing and Installing Disk Drives*. When the new disk is installed and the TN475B SADI lights the correct LEDs, return to this procedure and go to step 5.

5. If the drive equips, check the error log for 181 errors using the `maintenance : error : specification` and `display` forms.

   a. If *no* 181 errors are found, the disk drive is good. To clear the alarm, wait until there is no traffic on the system, then restart the system using the `startup` form. Verify that the alarm is resolved using the `maintenance : active alarm : display` form.

   b. If 181 errors *are* found, the disk drive probably has a media defect. Escalate the problem.

   c. If the media damage is severe or remote maintenance personnel recommend it, you should replace the faulty drive (go to *Replacing and Installing Disk Drives*). When the new disk is installed and the TN475B SADI lights the correct LEDs, return to step 6 in this section.

NOTE

When replacing a drive, *make sure* the new drive's jumper settings match the logical number of the drive you are replacing. See *Disk Drive Jumper Settings* or the enclosed disk drive information for a description of these settings.

6. After the drive is replaced, equip and test the new disk as described in *Equip the New Disk or Cartridge*.

7. When software is running, verify the alarm is resolved using the `maintenance : active alarm : display` form.

8. Restore any lost filesystems as needed.

Procedure B: Increase the Size of a Filesystem

1. Check the threshold violations (on the AUDIX STATUS line and on the `system : thresholds` form. This could indicate what filesystem is out of space. Or else go to the `system : filesystems` form. It will be one of these filesystems.
2. Go to the `filesystem : detail` and display each suspected filesystem. Filesystems out of space will have `0` free space.
3. Shut down the software using the `shutdown` form. (Active filesystems cannot be increased while the software is running.)
4. Go back to the `filesystem : detail` form and set **size** to a larger number (e.g., increase size by 30%). Press CHANGE.
5. If the disk is out of space, try decreasing the size of any largely unused filesystem(s) on the same disk. If that isn't possible, the filesystem/disk usage scheme will have to be reworked.

   See the appropriate forms reference manual for your system for more information on copying filesystems.

Equip the New Disk or Cartridge

The new disk or removable cartridge must be equipped (identified to system software and activated) before it can be used. Afterwards, the disk contents must be recreated or copied (restored) from recent backups to bring the new disk into full service. Disks may be equipped as follows:

- *For the RCD:* Equip the new disk using the steps in this section.
- *For HDD 0/0:* Escalate to the remote maintenance service center.
- *For HDD 0/2 to HDD 0/6:* For R1V6 6:3 or later systems, escalate to the remote maintenance service center. On earlier systems, you may equip the new disk using the steps in this section. However, it is recommended you always contact the remote maintenance service center to initialize a new hard disk.

To equip a new disk02 to disk06 or a replacement cartridge for the RCD:

1. Initialize the system after replacing the disk drive and powering up. *If the RCD or its cartridge crashed,* insert a new cartridge in the drive (see Appendix A for steps if needed).
2. When software is running, log in and display the `maintenance : dbp : equip` form. Specify `circuit pack code` = SCSI and `disk device number` = 1 to 6.

NOTE	The `circuit pack code` in early systems was SD160 (for an HDD) and SD20 (for the RCD). This code still works, but is no longer needed. AUDIX software automatically reads the size and type of each disk.

3. Next to `volume label`, give the new drive a meaningful name that is 1 to 7 characters long:
   a. For HDDs 0/2 to 0/6, use `disk02`, `disk03`, etc.
   b. For the RCD, use `back01` or whatever name was previously used for the backup cartridge that was lost when the drive crashed.
4. In the *erase* (or initialization) field, type **y** and press CHANGE.

CAUTION

Starting in R1V6 6:3 software, hard disks can only be initialized by remote services personnel; if you attempt a hard disk initialization, you will get an `Access denied` *message. Contact your remote maintenance service center to initialize a new hard disk.*

Removable cartridges may be initialized from any valid login. If you initialize a drive or cartridge that already contains data, **all** *data on the device is erased.*

5. When the disk finishes initializing, the new drive is verified and identified to the system.
6. Restore or create new filesystems on the disk.

UNALARMED DISK DRIVE TROUBLESHOOTING

Isolate or diagnose suspected disk drive faults as outlined in this section. Steps include:

- Check LEDs on the SADI and disk drives
- Check for a disk crash
- Check the disk drive data and power cables
- Check drives through software if possible
- If these steps fail to solve the problem or the only candidate left is a faulty drive, replace the drive.

Check TN475B SADI LEDS

The TN475B SADI is the best indicator of an actual disk failure. The LEDs on the SADI circuit pack's faceplate show the number of drives installed and whether or not they are working. One yellow LED should be lit on the TN475B for each installed disk drive as shown in Table 6-2, *TN475B SADI LEDs and Disk Drive Position*.

Table 6-2. TN475B SADI LEDs and Disk Drive Position

SADI LED	Disk Drive and Position	Label	Required	Cabinet
10	HDD 0/0	disk00	Yes	Bottom
11	RCD 0/1	Varies *	Yes	Bottom
12	HDD 0/2	disk02	Optional	Bottom
13	HDD 0/3	disk03	Optional	Bottom
14	HDD 0/4	disk04	Optional	Top
15	HDD 0/5	disk05	Optional	Top
16	HDD 0/6	disk06	Optional	Top
*	Cartridges are named by the system administrator according to contents (for example, `backup` or `back01`).			

Check the LEDs for the following problems:

1. If *one* LED is *not* lit, the missing LED indicates a faulty drive. Go to *Check the Disk Drive LEDs* and *Check for Disk Crash*.
2. If *no* drive LEDs are lit, there is a common problem such as a faulty data or power cable. Go to *Check Data and Power Cables*.
3. If *extra* drive LEDs are lit, the option settings on a new or replaced disk are probably wrong. Go to *Disk Drive Jumper Settings* to check them.
4. *If you just replaced a drive and now the SADI is alarmed (its red LED is lit)*, the data cable is probably upside down. Return to *Replacing and Installing Disk Drives* to fix the problem.

Check the Disk Drive LEDS

The disk drive LEDs can sometimes indicate problems as follows:

1. If the system is running, check for normal operation:
   a. *For the RCD*, the green LED should be steadily lit when the drive is up to speed and ready for use. If this LED is blinking or dark, continue.
   b. For most drives, the LED on the front of the drive indicates it is reading from or writing to the disk (it is *not* a fault indicator). Check for disk activity.
2. If you suspect a drive, shut down the system software, spin down the RCD (if it didn't spin down automatically), and power down the system.
3. Restore power and watch the LEDs.
   a. The RCD's green LED should start blinking as the drive spins up. If the green LED blinks, then shuts off, check that a cartridge is installed. If the green LED does *not* light or continues to blink for more than 2 minutes, the drive is faulty.

b. The LED on the front of all drives should light as disk drive diagnostics are run. If the LED does *not* light during initialization (or if it stays lit), the drive is probably faulty.

Check for Disk Crash

In a disk drive crash, the read/write heads (which normally coast above the disk surface) hit the media, often damaging it or breaking the drive heads. This usually damages the drive (and any data on it) beyond repair. A crashed disk should be alarmed through software (check the alarm log) and replaced (see *Replacing and Installing Disk Drives*). Some checks for a disk crash are:

1. You bumped or dropped a drive, and now it fails to work.
2. You notice broken heads, pieces of media, or other damage when you remove or try to insert a cartridge in the RCD.
3. You dropped a cartridge from a height greater than about 4 feet. (A short drop probably won't hurt the cartridge, but you may want to replace it anyway to be safe.)

CAUTION *Do* **not** *use damaged cartridges or cartridges that were in use when an RCD crashed. They can break the new drive. Throw them away or (if requested by remote maintenance) return them to the factory for analysis.*

4. You hear a loud screeching sound while the drive is running.

NOTE The MICROPΩLIS hard disk may buzz loudly if its ground screw is vibrating. The drive should still be good (you find no disk problems). To stop the noise, remove or tape down the metal tab in the center of the drive's circuit pack.

Check the Data and Power Cables

If the TN475B SADI shows *no* lit disk drive LEDs when the system is running, a disk drive data or power cable may be faulty. Use the following procedure to check the cables. If the system is a two-cabinet AUDIX, be sure to check both cabinets.

To check if one or more cables are bad:

1. Shut down software using the MI toggle switch or `shutdown` form with the maintenance (m) option. Wait for the RCD to spin down, then power down the system.
2. Unplug the AC power cord at the rear of the cabinet.

3. Remove the lower front cover and gently pull the disk drives out of the cabinet (remove the two hex nuts that attach each bracket to the cabinet floor).

   For the RCD, note that the mounting bracket on early models of the RCD hooked **over** the retaining bar. Push the bracket backwards slightly to unhook it from the retaining bar, then lift the entire assembly out of the cabinet.

4. Check the 50-pin data cable (ED-1E434-11 Group 183 or 186 SCSI-bus cable).

   a. For each drive, make sure the data cable is seated correctly (it is keyed to fit). *If a cable is loose,* press it into place. Go to step 6 to see if the problem is fixed.

   b. If the cables are seated correctly, carefully check the ribbon cable for breaks or other physical damage. Unplug each connector and visually check for damage.

   c. If you suspect the data cable, use an ohmmeter to check the leads for continuity. The cable terminates on the AHF104 disk interface board. Bring the RCD connector around to the back of the cabinet to check the leads against those at the end of the cable.

   d. *If you find a problem,* repair or replace the data cable. To reattach it to the drives, turn the cable red-stripe down.

5. If the data cable appears good, check the disk drive power cable.

   a. Plug in the AC power cord.

   b. Unplug the 4-pin power connector from each drive. Restore power to the system.

   c. Using a voltmeter, check for the following voltages starting with the connector leading to the CDR1B board and ending with the plug for the RCD (see Figure 6-2, *Disk Drive Power Cabling*).

Pin:	**Voltage:**
1	+12 VDC
2	12 return
3	5 return
4	+5 VDC

   d. If the voltages are correct, the cable is good. Go to the next step.

   e. If you get a break in the voltage, the cable is damaged. Power down the system and repair the cable if possible. *If you cannot fix the cable,* you need to return the entire AUDIX cabinet to the factory for rewiring.

6. To reattach the cables to the drives, spin down the RCD and power down the system. Unplug the AC power cord. Carefully plug the keyed cables back into the correct connectors, checking for good seating. Plug in the AC power cord.

7. Restore power. Watch the disk drive LEDs to make sure they are getting power during initialization (see *Check the Disk Drive LEDs*).

8. When the system is up, see if the problem is corrected. If not, replace the SADI board or call for further instructions.

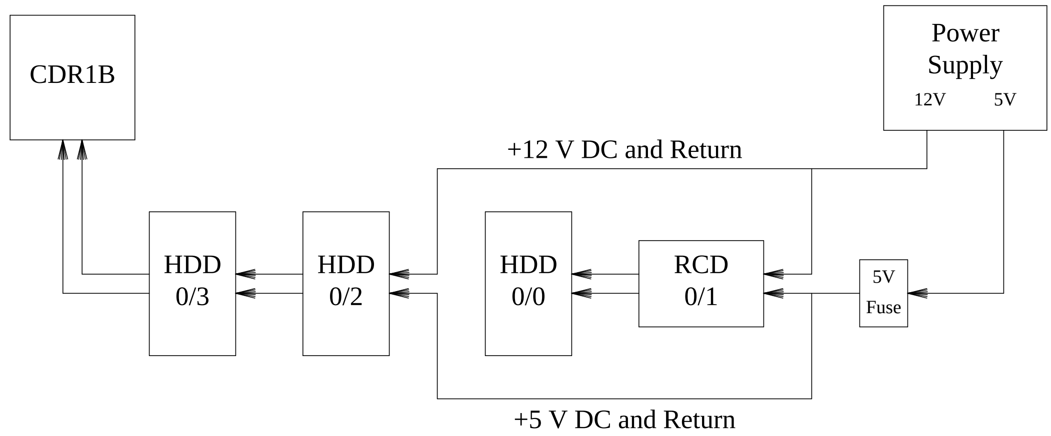


Figure 6-2. Disk Drive Power Cabling

Check Drives Through Software

These procedures assume the system is initialized and running from software on a good disk drive. These steps may be used to test a newly installed disk drive or to isolate a faulty drive except disk00. If disk00 (HDD 0/0) is bad, you need to replace the drive and boot filesystems (go to *Replacing and Installing Disk Drives*).

1. Check the status of the DBP equipment by displaying the `maintenance : dbp : status` form.
   a. All installed drives should show EQ/EN (equipped/enabled) status. If so, go to step 2.
   b. If the status is `UEQ/D` (unequipped/disabled), the drive is unequipped (software does not know it exists). Equip (activate) it using the `maintenance : dbp : equip` form. This will run verification tests on the drive. Afterwards, check the `maintenance : dbp : status` form and see if the drive is now enabled.
   c. If the status is `EQ/D` (equipped/disabled), the DBP took it out of service. Normally this indicates a problem with the drive. Go to *Replacing and Installing Disk Drives*.

   NOTE

   As an option, you may attempt to re-equip a drive with a status of `EQ/D`, but be aware that this may cause the system to crash. To avoid any possibility of a crash, go directly to *Replacing and Installing Disk Drives*.

2. Check the alarm log for active alarms. Disk drive alarms (fault 897, unit 9) always indicate a hardware problem on AUDIX.
3. Check the error log for the following errors: 42, 69, 70, 181, 704. If any of these appear, a drive may be faulty or a filesystem may be missing.

4. Use the `filesystem : list` form to read from each equipped disk drive (disk00 to disk06).
   a. If the form returns filesystem names and information, the volume (disk) is working correctly. *If a drive was just installed,* the form will show no data.
   b. If the form gives the message `unavailable at this time` or `invalid data`, the disk has a problem. Continue.
5. If you noticed any problems, do a restart using the `startup` form. *Clear this action with the customer first if the system is providing service.*
   a. If a `start service` message appears, the problem is corrected. Verify good service.
   b. If a `service not started` message appears, a filesystem is missing. Check the TN475B SADI LEDs to make sure an LED is lit for each drive (see Table 6-2). If these look good, restore the missing filesystem(s).
   c. If the restart fails, a reboot runs automatically. If this fails, go to Chapter 3, *Start Troubleshooting* and check the control mode menu options.
6. Remote services can also run tests on SCSI devices (disk drives) remotely. Contact your remote maintenance service center if you feel a disk drive test is warranted.

REPLACING AND INSTALLING DISK DRIVES

This section covers procedures for replacing a faulty disk drive, or for adding an optional hard disk. Comcodes are in Table C-1 of Appendix C.

CAUTION

If drives or cartridges were exposed to extreme temperatures during shipment [greater than 100°F (38°C) or lower than 39°F (4°C)], allow them to acclimate at least 1 hour before powering them up. The RCD should always warm up about 40 minutes before booting off it.

Handle all drives carefully! Do not shake or drop them.

Never reuse cartridges that were in use when an RCD failed. If you use this cartridge in the replacement RCD, it could break the new drive. Equip and initialize a new cartridge for this drive as directed.

Replacing 5.25-inch Drives with 3.5-inch Drives

AUDIX currently uses two kinds of hard disk drives: 3.5-inch drives and 5.25-inch drives. A 3.5-inch drive could potentially replace a 5.25-inch drive in the field, although a 5.25-inch drive should *not* be used as a replacement for a 3.5-inch drive because of the difference in storage capacity.

Technicians should attempt to replace a faulty drive (either 3.5-inch or 5.25-inch) with the same type of drive. However, if 5.25-inch replacement drives are no longer available through maintenance stock, 3.5-inch drives must be used as a replacement for them. If needed, replace 5.25-inch drives with 3.5-inch drives as shown in Table 6-3, *3.5-inch Disk Drive Replacements for 5.25-inch Drives*.

Table 6-3. 3.5-inch Disk Drive Replacements for 5.25-inch Drives

5.25-inch Disk Drive that must be Replaced	3.5-inch Disk Drive to Substitute
120-Mbyte drive (11-hour disk)	20-hour drive
170-Mbyte drive (18-hour disk)	20-hour drive
380-Mbyte drive (40-hour disk)	58-hour drive

On some early AUDIX systems, replacing a 5.25-inch drive with a 3.5-inch drive may require a new disk drive bracket to be ordered as follows:

- If the AUDIX system that needs the replacement drive was shipped prior to December 1991, the disk drive bracket used for the 5.25-inch drive will *not* be able to accommodate the 3.5-inch drive. Systems shipped after this date use a universal bracket that can mount either type of drive (compare Figures 6-3 and 6-4).
- If the AUDIX system has only the 5.25-inch disk drive brackets and requires a universal bracket for a replacement 3.5-inch drive, technicians should order D-kit D-181972 (comcode 105466254) *in addition*

to the comcode they use to order the replacement disk. This kit includes the universal mounting bracket (comcode 845799048) and four screws (comcode 840058564). Refer to the *AUDIX System Parts List* table in Appendix C for complete ordering codes for AUDIX equipment.

NOTE

The early 760-Mbyte drive (formerly called the 80-hour disk) and the new 88-hour drive are the identical 5.25-inch disk drive. A new disk drive bracket is not needed if you are replacing a 760-Mbyte disk with an 88-hour drive.

Replacing a Faulty Drive

If you have not already done so, verify the drive is faulty using the procedures in *Disk Drive Alarm Resolution* and *Unalarmed Disk Drive Troubleshooting*. Figures 6-3 and 6-4 show the disk drive replacement procedure for 3.5-inch and 5.25-inch drives.

Before replacing a faulty drive, call your remote maintenance service center to see if you can save any information from the disk.

To replace a faulty drive:

1. *If you are replacing the RCD*, unequip and remove the cartridge currently in the drive (see *RCD Cartridge Handling* in Appendix A).
2. Shut down system software using the MI toggle switch or the `shutdown` form with the maintenance (m) option.
3. Wait for the RCD to spin down (the green LED should go out), then power down the system.
4. *If you are replacing the RCD*, unplug the AC power cord at the rear of the cabinet.
5. Remove the lower front cover plate (loosen the two quarter-turn screws).
6. Locate the faulty drive (see Figure 6-1 if needed). Remove the two hex nuts and washers that attach the drive's mounting bracket to the floor of the cabinet. Slide the bracket and disk drive *gently* forward and out of the cabinet.

   If you are replacing the RCD, note that the mounting bracket on early models of the RCD hooked **over** the retaining bar. Push the bracket backwards slightly to unhook it from the retaining bar, then lift the entire assembly out of the cabinet.
7. Unplug the 4-pin power cord and the 50-pin data cable from the faulty drive.
8. Remove the four screws that attach the mounting bracket to the faulty drive. Refer to Figure 6-3 or Figure 6-4 for the different mounting methods between 3.5-inch and 5.25-inch drives.
9. The bad drive is now ready to ship back to the factory.

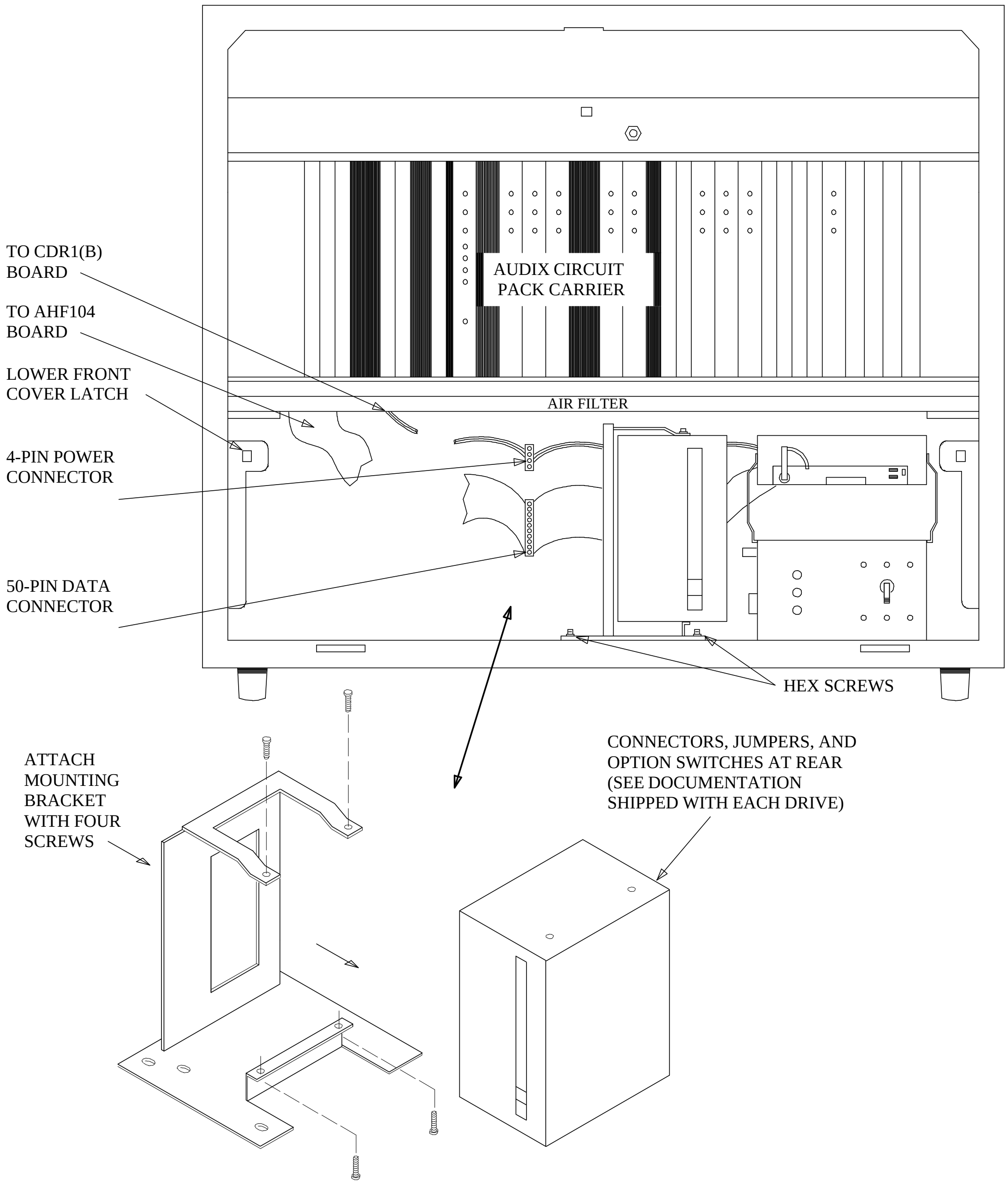


Figure 6-3. 5.25-inch Disk Drive Replacement Procedure

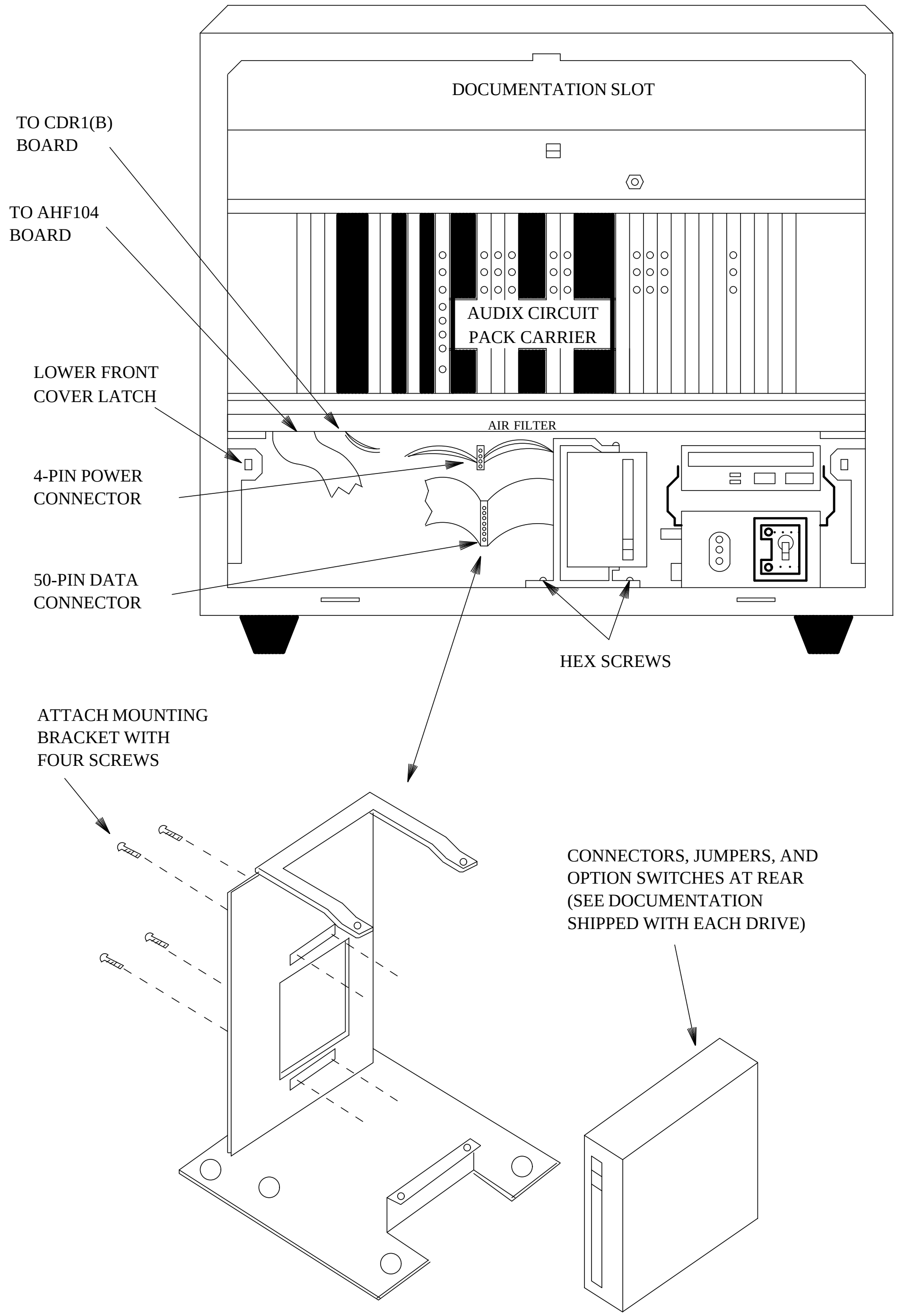


Figure 6-4. 3.5-inch Disk Drive Replacement Procedure

Installing a Replacement Drive

To insert and activate the replacement drive:

1. Inspect the new drive. Because AUDIX uses more than one type of drive, it may look different from the drive you're replacing.
2. Check the shock-watch indicator on the drive. If activated, the disk may have been damaged during shipment. *Do not use it.*
3. *Read* the documentation shipped with the drive. Set the jumpers as indicated in *Disk Drive Jumper Settings*.
4. Attach the old disk's mounting bracket to the new drive. (Make sure the two holes at the base of the bracket are at the *front* of the new drive.)
5. Place the disk in front of the empty slot. Reattach the data and power cables.
6. Lift the drive back into the cabinet. Slide the back of the mounting bracket under the disk drive's retaining bar. *For early models of RCD,* hook the mounting assembly over the back of the retaining bar and slide the unit forward.
7. Reattach the two hex nuts and washers to secure the drive's mounting bracket to the cabinet.
8. Check for continuous grounding between the drive and cabinet by placing probes on the bracket and an unpainted surface on the cabinet (such as the front latch). You should get a near 0-ohms reading. If not, make sure the two hex nuts are tight.
9. *If you unplugged the AC power cord,* reattach it to the back of the cabinet.
10. Restore power. Watch for the drive's LED to light.
11. Press CTRL-c on the LMT or set the MI toggle switch off-center to halt the initialization (this is essential when replacing HDD 0/0). Wait for the green LED on the RCD to light steadily, then press the reset button on the TN506B BC board (in LED slot 13).

NOTE	A new RCD should always be shipped with a dummy cartridge in place. If no cartridge is inserted, the green LED will turn off after the drive tries to spin up, and the TN475B SADI will not light LED 11.

12. After you reset the DBP bus, wait for the TN475B SADI to complete its diagnostics, then check that the correct yellow LED is lit for each drive (see Table 6-2).
    a. If the correct LED *does not* light, or if the wrong number of LEDs light, you probably incorrectly set the jumpers that identify the drive's logical position (0, or 2 to 6) to software. If this happens, spin down the RCD, turn power off, remove the drive, and recheck the settings (see *Disk Drive Jumper Settings*). Reinstall the drive and repeat steps 10 to 12.
    b. If the TN475B SADI *alarms itself* (the red LED stays lit), you probably connected the data cable to the disk drive upside down. Spin down the RCD and turn power off. Remove the drive and recheck the cable connections and seating. Reinstall the drive and repeat steps 10 to 12 to verify the LEDs are correct.

13. Reattach the lower front cover plate.
14. Initialize the system and equip the new disk (if possible) as follows:
    — *For the RCD:* Equip the new disk using the steps in *Equip the New Disk or Cartridge*.
    — *For an HDD (0/0 to 0/6):* Escalate to the remote maintenance service center.

Installing a New Disk Drive

Use the following steps to add a new HDD (see Figures 6-3 and 6-4 for an illustration). If you are servicing a two-cabinet AUDIX system with space for additional drives in either cabinet, try to keep a balance of equipment between them.

1. Shut down system software using the MI toggle switch or the `shutdown` form with the maintenance (m) option.
2. Wait for the RCD to spin down, then power down the system. Remove the lower front cover plate (loosen the two quarter-turn screws).
3. Inspect the new drive and check the shock-watch indicator.
4. *Read* the documentation shipped with the drive. Set the jumper settings as indicated in *Disk Drive Jumper Settings*.
5. Attach the mounting bracket to the drive with 4 screws (these are shipped separately). Make sure the two holes at the base of the bracket are at the *front* of the new drive.
6. Position the new drive in front of the correct position (see Figure 6-1 if needed). Connect the corresponding data and power cables in the harness (cables are keyed to fit).
7. Lift the drive into the cabinet, sliding the back of the mounting bracket under the lower retaining bar. Connect the bracket to the cabinet floor with the two hex nuts and washers.
8. Check for continuous grounding between the drive and cabinet by placing probes on the bracket and an unpainted surface on the cabinet (such as the front latch). You should get a near 0-ohms reading. If not, make sure the two hex nuts are tight.
9. *If you have added a new drive (HDD):*
    a. Unplug the AC power cord from the back of the cabinet.
    b. Pull the RCD from the cabinet. (Note that the mounting bracket on early models of the RCD hooked **over** the retaining bar. Push the bracket backwards slightly to unhook it from the retaining bar, then lift the entire assembly out of the cabinet.)
    c. Check the jumpers on the back of the RCD (see Figure 6-5). The only jumpers that should be installed are:
        — *On the 20-Mbyte RH5261 drive:* Jumper JP3
        — *On the 50-Mbyte RH5500 drive:* The left-most jumper of JP2
    d. If extra jumpers are installed, **remove** them or errors will be logged against the new disk and AUDIX will crash.
    e. Return the RCD to the cabinet and reattach the AC power cord.

10. Restore power. Watch for the drive's LED to light.

11. Wait for the TN475B SADI to complete its diagnostics, then check for LED 12 or higher to light yellow (see Table 6-2). *If all LEDs do not light correctly,* go to step 10 of the previous procedure.

12. When all LEDs light correctly, reattach the lower front cover plate.

13. *On systems running R1V6 6:2 or earlier software,* you may equip the new disk (identify it to the system) using the `maintenance : dbp : equip` form as follows. However, it is always recommended you contact the remote maintenance service center to initialize a new hard disk.

    a. Specify *circuit pack code* = SCSI

    b. Specify *disk device number* = 2, 3, 4, 5, or 6.

    c. Give the new drive a 1- to 7-character name (*volume label*), usually disk02, disk03, etc. In the *erase* (or initialization) field, type **y** and press CHANGE.

    CAUTION *Starting in R1V6 6:3 software, hard disks can only be initialized by remote services personnel; if you attempt a hard disk initialization, you will get an* `Access denied` *message. Contact your remote maintenance service center to initialize a new hard disk.*

14. Update the backup boot filesystem using `filesystem : update configuration`.

15. You are now ready to add filesystems to the new disk.

JUMPER SETTINGS

Before installing a disk drive, make sure it has the correct settings. Documentation showing drive settings should be shipped with every new drive. Every drive used by AUDIX uses jumper wires. Settings required by AUDIX are described in this chapter in the following order:

- The RICOH Model RH5261 20-Mbyte Removable Cartridge Drive (RCD)
- The RICOH Model RH5500 50-Mbyte RCD
- The CDC* Model 94161-155 HDD (also Seagate Model ST4182N HDD)
- The CDC* Model 94171-344 HDD (also Seagate Model ST4350N HDD)
- The CDC* Model 94191-766 HDD (also Seagate Model ST4766N HDD)
- The HP Model 97536SX and Model 97548SX HDDs
- The MICROPΩLIS Model 1375 HDD
- The MICROPΩLIS Model 1578-15 HDD
- The MAXTOR Model 7120S HDD
- The MAXTOR Model 4380S and Model XT-8760S HDDs
- Seagate Model ST3283N HDD
- Seagate Model ST1480N HDD
- MAXTOR Model 7213S-7104 or 7245S-7104 HDD
- MAXTOR Model 7213S-7148 or 7245S-7148 HDD
- MAXTOR Model 7245S HDD

After installing the drive, check the following:

1. If software is running, display the `maintenance : dbp : status` form and check that the right number of disk drives are equipped and enabled (EQ/EN) in the system.
2. Make sure the TN475B SADI has the correct LEDs lit for each drive (see Table 6-2 in *Unalarmed Disk Drive Troubleshooting*). If the wrong LED(s), too few, or too many LEDs are lit, the drive is incorrectly identified to software.

NOTE

If the system is using 33-hour (380-Mbyte) or larger disk drives, it must be equipped with a TN475B Vintage 2 or later SADI board to support the larger disk sizes. A TN475B Vintage 5 (or later) is required for all two-cabinet systems.

* CDC disk drives will have one of three labels; CDC, Imprimis, or Seagate. Seagate Technology Incorporated has purchased Imprimis Technology Incorporated, a subsidiary of CDC which makes the WREN III Model 94161-155 disk drive and the WREN IV Model 94171-344 disk drive.

RICOH Model RH5261 and RH5500 Drives

The RICOH Small Computer System Interface (SCSI) drive is currently used as the AUDIX Removable Cartridge Drive (RCD). The RICOH is a 5.25-inch cartridge drive. Two models are currently in use:

- The RH5261 is a 20-Mbyte drive which was shipped in early AUDIX systems. This drive is identified by its flip-down faceplate.
- The RH5500 is a 50-Mbyte drive. This is the drive which is currently shipped.

Figure 6-5 shows the option settings for the 20-Mbyte RH5261 and the 50-Mbyte RH5500. Correct settings include:

- *Drive Identification:* The RICOH RCD is always drive 01 (disk01). On the RH5261, place a jumper on JP3 only (JP1 and JP2 must be removed). On the RH5500, the left-most segment of JP2 (five segments side-by-side) should be installed.
- *Auto Spin-up, Data Buffer, etc.:* On the RH5500, all JP1 segments (three segments end-to-end) should be installed.
- *Missing Jumpers:* On the RH5261, jumpers JP1, JP2, JP4, JP5, JP6, and JP7 should *not* be installed. On the RH5500, only the left-most segment of JP2 should be installed. The other segments should *not* be installed.
- *Terminators:* On the RH5261, interface terminators AR1, AR2, and AR3 *must* be installed. On the RH5500, all three terminators *must* be installed.

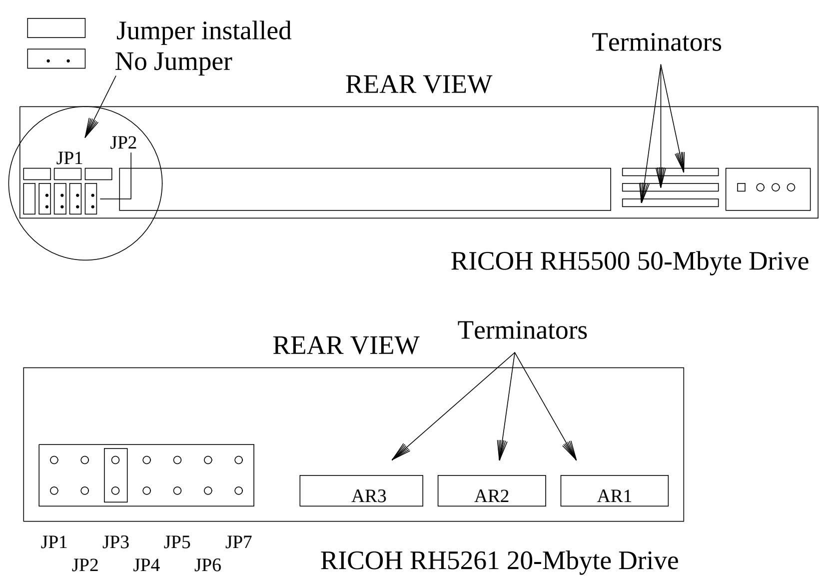


Figure 6-5. RICOH Drive Jumper Settings

CDC Model 94161-155 or Seagate Model ST4182N Drive

The CDC WREN III SCSI Model 94161-155 drive is a 5.25-inch HDD that can hold about 170-Mbytes of data. This same drive is also shipped under the label Seagate Model ST4182N.

Figure 6-6, *CDC Model 94161-155 or Seagate Model ST4182N Drive Jumper Settings*, shows the Connector J4 (at the left rear of the drive). The jumper field at the top of the figure represents J4 in early versions of this drive. The jumper field at the bottom shows the later version. Jumper settings should be:

- *Drive Identification:* Use jumpers ID0, ID1, and ID2 to identify the drive using binary coding. Assign the disk drive position as follows:

HDD	Jumpers	HDD	Jumpers
0/0	None	0/4	ID2
0/2	ID1	0/5	ID0, ID2
0/3	ID0, ID1	0/6	ID1, ID2

- *Motor-Start Jumper:* The motor-start jumper M should be installed.
- *Parity-Check Jumper:* The parity checking jumper P should be installed.
- *Missing Jumpers:* The TP jumper should *not* be installed.
- *Terminators:* Interface terminators U20, U32, and U41 (located behind the data connector at the back of the drive) must *not* be installed.

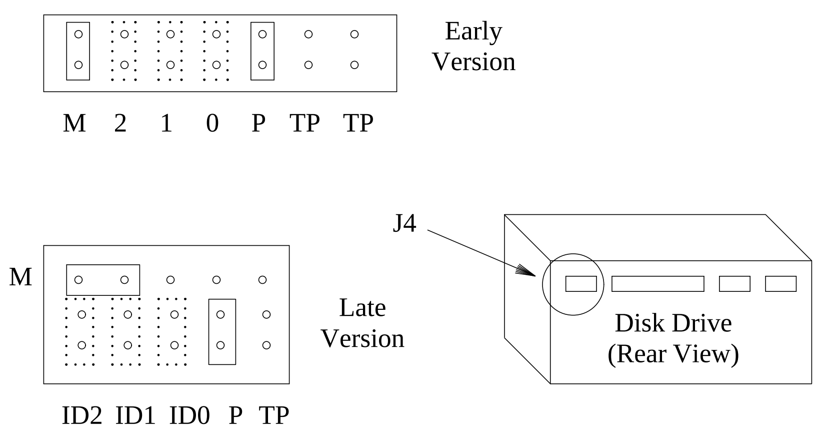


Figure 6-6. CDC Model 94161-155 or Seagate Model ST4182N Drive Jumper Settings

CDC Model 94171-344 or Seagate Model ST4350N Drive

The CDC WREN IV SCSI Model 94171-344 drive is a 5.25-inch HDD that can hold approximately 380-Mbytes of data. This same drive is also shipped under the label Seagate Model ST4350N.

NOTE The system must be equipped with a TN475B Vintage 2 or later SADI board in order to support 33-hour (380-Mbyte) or larger drives.

Figure 6-7, *CDC Model 94171-344 or Seagate Model ST4350N Drive Jumper Locations (Rear View)*, shows the location of the jumpers. Jumper settings should be:

- *Drive Identification:* The jumper field contains jumpers 0, 1, and 2 to identify the drive using binary coding. Assign the disk drive position as follows:

HDD	Jumpers	HDD	Jumpers
0/0	None	0/4	2
0/2	1	0/5	0, 2
0/3	0, 1	0/6	1, 2

- *Motor-Start Jumper:* The motor-start jumper M should be installed for delayed start on command.

  NOTE This option is *required* for all Model 94171-344 drives.

- *Parity-Check Jumper:* The P jumper on the leftmost pins on the jumper field should be installed to enable parity checking.
- *Ground Select Jumper:* The GS1 ground select jumper across pins 3 and 4 of the ground select field should be installed to select chassis ground.
- *Missing Jumpers:* The GS2 ground select jumpers for the two rightmost pins on the ground select field and the TP (terminal power) jumpers should *not* be installed.
- *Terminators:* Interface terminators U53 and U54 must *not* be installed. Verify that these terminators are absent. See Figure 6-7 for terminator socket locations.

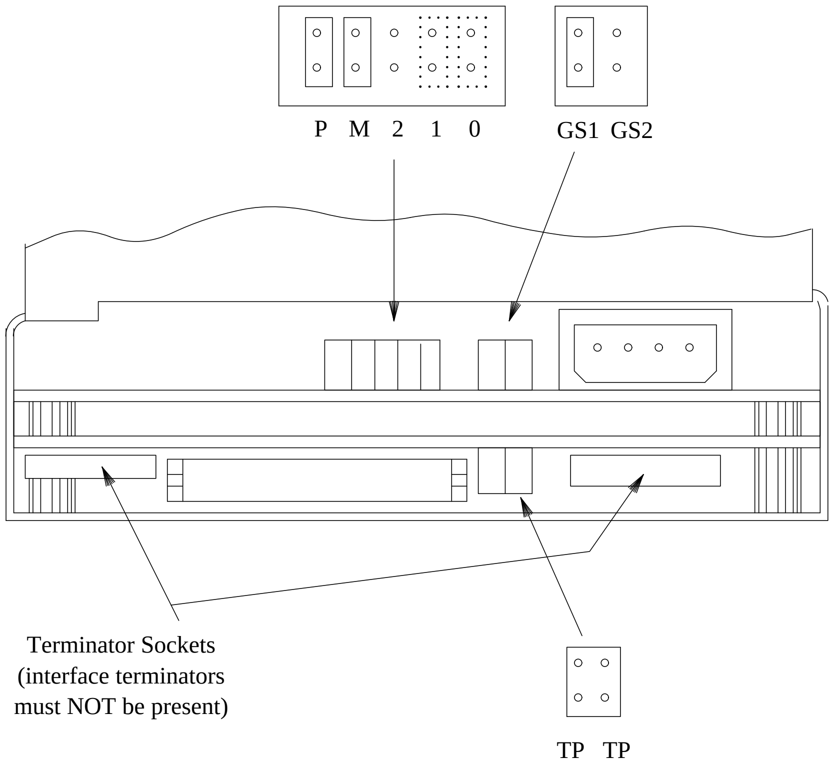


Figure 6-7. CDC Model 94171-344 or Seagate Model ST4350N Drive Jumper Locations (Rear View

CDC Model 94191-766 or Seagate Model ST4766N Drive

The CDC WREN VI SCSI Model 94191-766 drive is a 5.25-inch HDD that holds 760-Mbytes of data. This same drive is also shipped under the label Seagate Model ST4766N.

NOTE

The system must be equipped with a TN475B Vintage 2 or later SADI board in order to support 33-hour (380-Mbyte) or larger drives.

Figure 6-8, *CDC Model 94191-766 or Seagate Model ST4766N Drive Jumper Locations (Rear View)*, shows a view of the J4 connector where the jumpers are located. The J4 connector is located next to the data connector (J3). Jumper settings should be:

- *Drive Identification:* The jumper field contains three jumpers (jumpers 4, 2, and 1 in the figure) to identify the drive using binary coding. Assign the disk drive position as follows:

HDD	Jumpers	HDD	Jumpers
0/0	None	0/4	4
0/2	2	0/5	4, 1
0/3	2, 1	0/6	4, 2

- *Motor-Start Jumper:* The motor-start jumper M should be installed for delayed start on command. This option is *required* for all Model 94191-766 drives.
- *Parity-Check Jumper:* The parity jumper P should be installed to enable parity checking.
- *Missing Jumpers:* No other jumpers should be present on this jumper field.
- *Terminators:* Interface terminators (located behind J3) must *not* be installed. Verify that these terminators are absent.

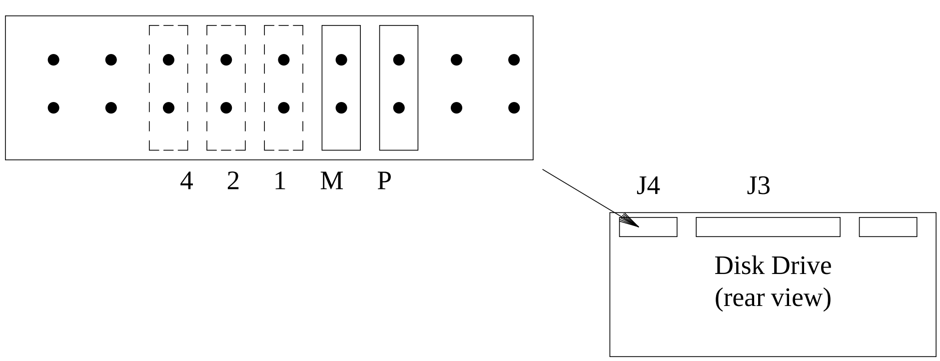


Figure 6-8. CDC Model 94191-766 or Seagate Model ST4766N Drive Jumper Locations (Rear View)

HP Model 97536SX and Model 97548SX Drives

The HP Model 97536SX 380-Mbyte drive and the HP Model 97548SX 760-Mbyte drive are types of SCSI, 5.25-inch AUDIX HDDs. The jumper settings for each drive are similar. Figure 6-9, *HP Drive Jumper Settings*, shows Connector J4 (located at the lower left rear of either drive). There are seven jumper settings and they should be installed as follows:

- *Drive Identification:* Jumpers 5, 6, and 7 identify the drive to the system. Assign the disk drive position as follows:

HDD	Jumpers	HDD	Jumpers
0/0	None	0/4	5
0/2	6	0/5	5, 7
0/3	6, 7	0/6	5, 6

- *Bus-Parity Jumper:* Jumper 3 should be installed to enable parity. Check that this jumper is in place.
- *Motor-Start Jumper:* Jumper 4 should *not* be a installed so that the drive will wait for a start command before spinning up. Make sure this jumper is not installed. This option is required for all drives.
- *Terminators:* The HP has three terminator slots located directly below the SCSI interface cable connector (J1). These terminators should *not* be installed. If you can see terminator packs in these slots, remove them.

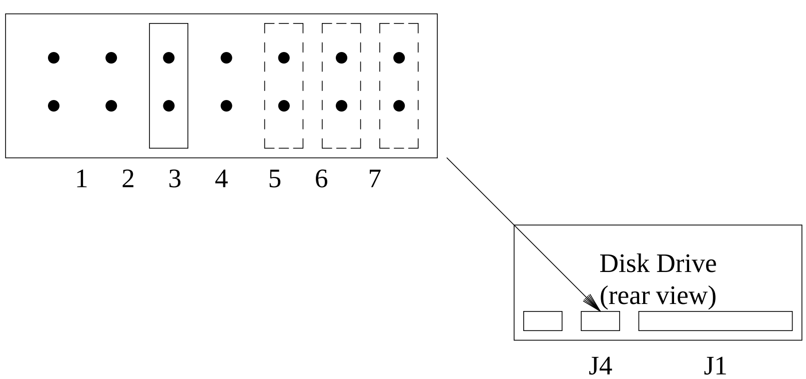


Figure 6-9. HP Drive Jumper Settings

MICROPΩLIS Model 1375 Drive

The MICROPΩLIS Model 1375 is a SCSI, 5.25-inch AUDIX HDD. The Model 1375 drive can hold about 170 Mbytes of data. Figure 6-10, *MICROPΩLIS Model 1375 Drive Jumper Settings*, shows Connector J2 (located at the lower left rear of the drive). Jumper settings should be:

- *Drive Identification:* Jumpers ID0, ID1, and ID2 on the rightmost side of the connector identify the drive to the system. Assign the disk drive position as follows:

HDD	Jumpers	HDD	Jumpers
0/0	None	0/4	ID2
0/2	ID1	0/5	ID0, ID2
0/3	ID0, ID1	0/6	ID1, ID2

- *Bus-Parity Jumper:* The W9 jumper between pins 9 and 10 on connector J2 should *not* be present to enable parity checking. If it is installed, remove it.
- *Motor-Start Jumper:* The motor-start jumper W3 between pins 7 and 8 on J2 should be installed for delayed start on command.
- *Missing Jumpers:* All jumpers from pin 9 to 28 should *not* be installed.
- *Terminators:* Interface terminators RN1, RN7, and RN8 (located behind the data connector at the back of the drive) must *not* be installed. To verify that these terminators are absent, look into the slit on the drive housing above the data connector for three flat bars sticking up (you should not see anything). If you can see them, they need to be removed.

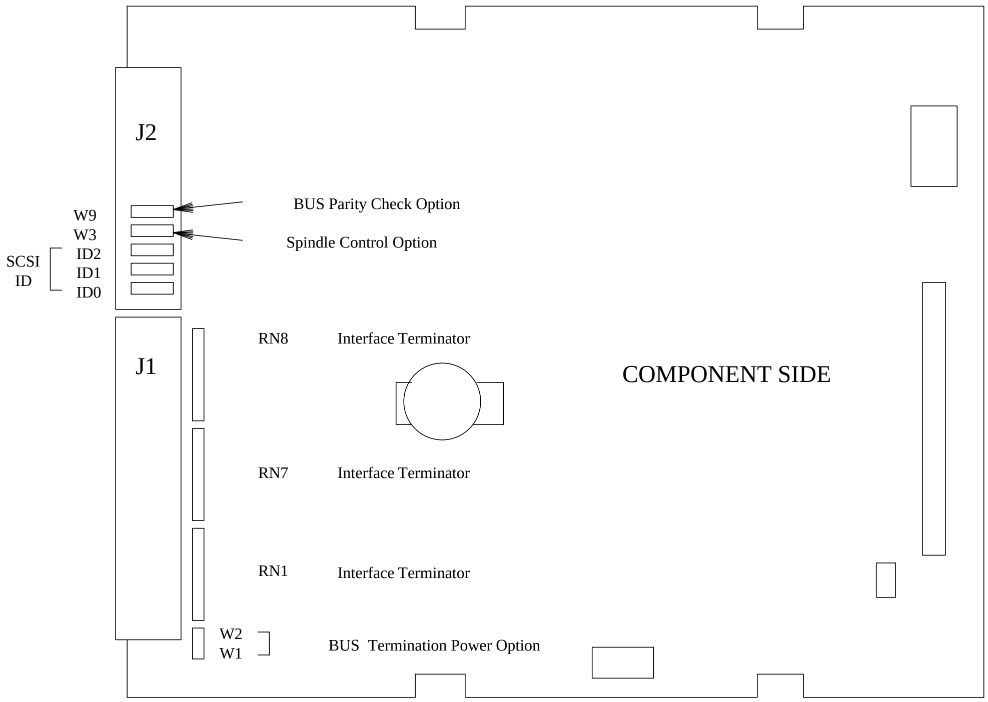


Figure 6-10. MICROPΩLIS Model 1375 Drive Jumper Settings

MICROPΩLIS Model 1578-15 Drive

The MICROPΩLIS Model 1578-15 drive is a 5.25-inch, 380-Mbyte SCSI HDD. Figure 6-11, *MICROPΩLIS Model 1578-15 Drive Jumper Settings*, shows the jumpers which are located on top of the mother board, behind Connector J3. Jumper settings should be:

- *Drive Identification:* Jumpers ID0, ID1, and ID2 identify the drive to the system. Assign the disk drive position as follows:

HDD	Jumpers	HDD	Jumpers
0/0	None	0/4	ID2
0/2	ID1	0/5	ID0, ID2
0/3	ID0, ID1	0/6	ID1, ID2

- *Bus-Parity Jumper:* The W4 jumper between pins 3 and 4 should *not* be present to enable parity checking. If it is installed, remove it.
- *Motor-Start Jumper:* The motor-start jumper W5 between pins 5 and 6 should be installed for delayed start on command.

NOTE

This option is *required* for all Model 1578-15 drives.

- *Missing Jumpers:* There should be *no* jumpers installed across pins 1 to 4.
- *Terminators:* Interface terminators RN1, RN7, and RN8 (located behind the data connector at the back of the drive) must *not* be installed. To verify that these terminators are absent, look into the slit on the drive housing above the data connector for three flat bars sticking up (you should not see anything). If you can see them, they need to be removed.

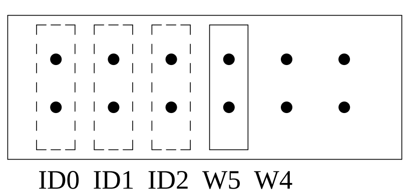


Figure 6-11. MICROPΩLIS Model 1578-15 Drive Jumper Settings

MAXTOR Model 7120S

The MAXTOR Model 7120S 125-Mbyte drive is a 5.25-inch AUDIX Hard Disk Drive that supports the SCSI interface. Figure 6-12, *MAXTOR Model 7120S Drive Jumper Settings*, shows the printed circuit board on which the jumpers are located.

- *Drive Position Jumpers:* Jumpers J602 (5-6), J602 (7-8), and J602 (9-10) tell the AUDIX software the drive's position inside the cabinet(s).

HDD	Jumpers	HDD	Jumpers
0	None	4	J602 (5-6)
2	J602 (7-8)	5	J602 (5-6), J602 (9-10)
3	J602 (7-8), J602 (9-10)	6	J602 (5-6), J602 (7-8)

- *Bus-Parity Jumper:* The J601 (5-6) jumper disables parity. It should *not* be installed.
- *Motor-Start Jumper:* The J602 (1-2) jumper determines the start up sequence. This jumper should *not* be installed so the drive will wait for a start command.
- *Terminator Power:* Jumper J601 (1-2) should be installed.
- *Bus Terminators*: Terminators RP601 and RP602 should *not* be installed.

Other jumpers should *not* be used.

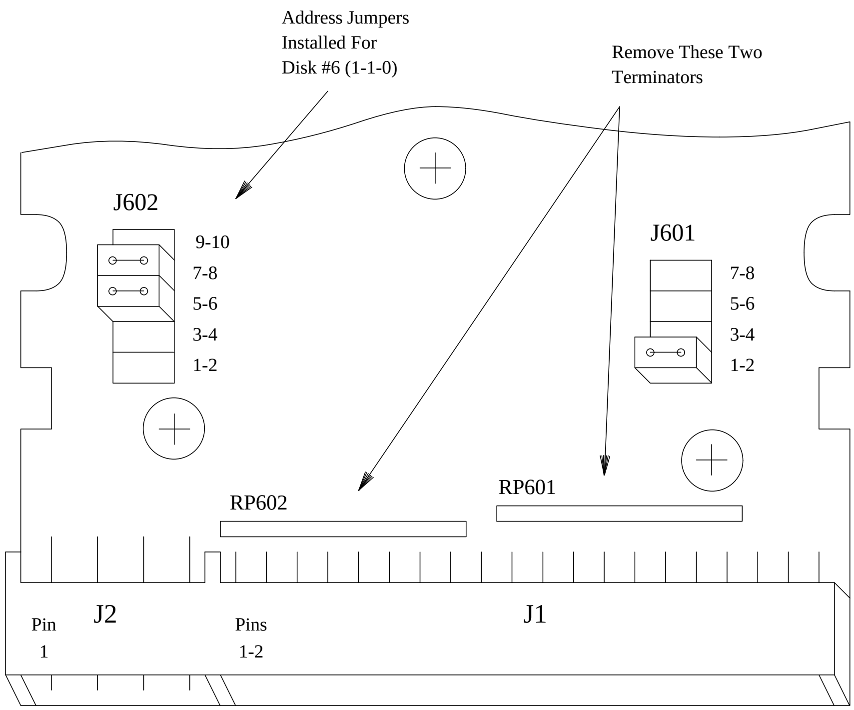


Figure 6-12. MAXTOR Model 7120S Drive Jumper Settings

MAXTOR Model 4380S and Model XT-8760S Drives

The MAXTOR Model 4380S 380-Mbyte drive and the MAXTOR Model 8760S 760-Mbyte drive are both SCSI, 5.25-inch AUDIX Hard Disk Drives. The MAXTOR Model XT-8760S drive currently ships as the 88-hour disk drive.

NOTE

The system must be equipped with a TN475B Vintage 2 or later SADI board in order to support 33-hour (380-Mbyte) or larger drives.

Figure 6-13, *MAXTOR Model 4380S and Model XT-8760S Drive Jumper Settings*, shows the side of a MAXTOR drive where the drive settings are located. Although the Model 4380S and Model XT-8760S drives are similar, the settings are slightly different.

- *Drive Position Jumpers:* Jumpers JP35, JP36, and JP37 tell the AUDIX software the drive's position inside the cabinet(s).

HDD	Jumpers	HDD	Jumpers
0	None	4	JP37
2	JP36	5	JP35, JP37
3	JP35, JP36	6	JP36, JP37

- *Disk Size Jumper* The JP39 jumper should be installed on Model XT-8760S drives. The Model 4380S drive does *not* use this jumper.
- *Bus-Parity Jumper:* The JP40 jumper sets parity and should be installed.
- *Motor-Start Jumper:* Two jumpers, JP14 and JP38, determine the start up sequence. Jumper JP38 should be installed and jumper JP14 should *not* be installed so the drive will wait for a start command. Check that these jumpers are correctly set.
- *Terminators:* There should be no interface terminators installed on the board. Check that all terminators are removed.

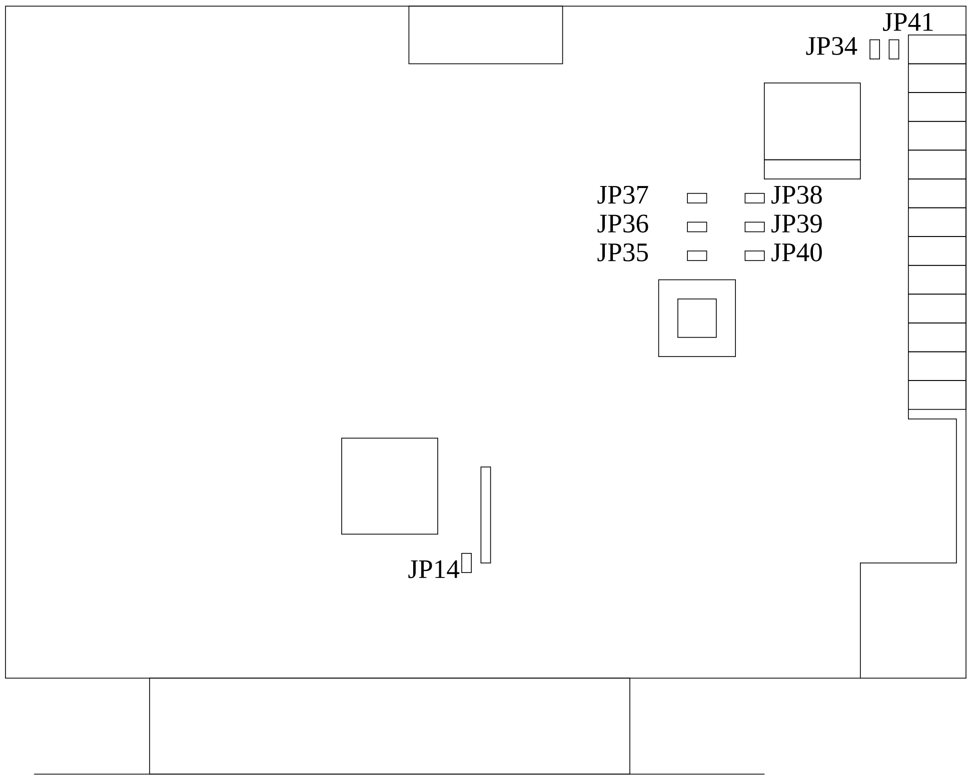


Figure 6-13. MAXTOR Model 4380S and Model XT-8760S Drive Jumper Locations

Seagate Model ST3283N Drive

The Seagate Model ST3283N drive is 3.5-inch, SCSI HDD that may be used in place of any of the 170-Mbyte 5.25-inch drives that were shipped in early AUDIX systems. This drive in turn has been replaced by the MAXTOR Model 7245S 33-hour disk drive (described later in this chapter).

Figure 6-14, *Seagate Model ST3283N Drive Jumper Settings*, shows the location of the jumpers and terminating resistors. Jumper settings should be:

- *Parity/Remote Start Jumper Block:*
  - *Bus Parity:* When a jumper is installed on pins 1-2 of this jumper block, the drive will check the SCSI bus parity. Although the drive will operate with or without this jumper, it is recommended that this jumper be installed.
  - *Spindle Control (Remote Motor Start):* When a jumper is installed on pins 3-4 of this jumper block, the drive spindle motor will not start on power-up until it has received a motor start command. This feature is used to sequence drive spin-up to reduce maximum current requirements. Therefore a jumper should be installed on this position.
- *SCSI ID Address Jumper Block:* Pins 1-2, 3-4, and 5-6 are used to control the identification of the disk drives in AUDIX using binary coding. Set the jumpers to correctly identify the position of the disk drive as follows:

  Disk00 should *not* have any of the three jumpers installed.
  Disk01 should only have the 5-6 jumper installed.
  Disk02 should only have the 3-4 jumper installed.
  Disk03 should only have the 3-4 and 5-6 jumpers installed.
  Disk04 should only have the 1-2 jumper installed.
  Disk05 should only have the 1-2 and 5-6 jumpers installed.
  Disk06 should only have the 1-2 and 3-4 jumpers installed.
- *Terminators:* Interface terminator packs should *not* be installed. Verify that they are not present.
- *Other Jumpers:* Any other jumpers on this disk drive should be left alone. Do *not* remove or change any jumpers not previously specified.

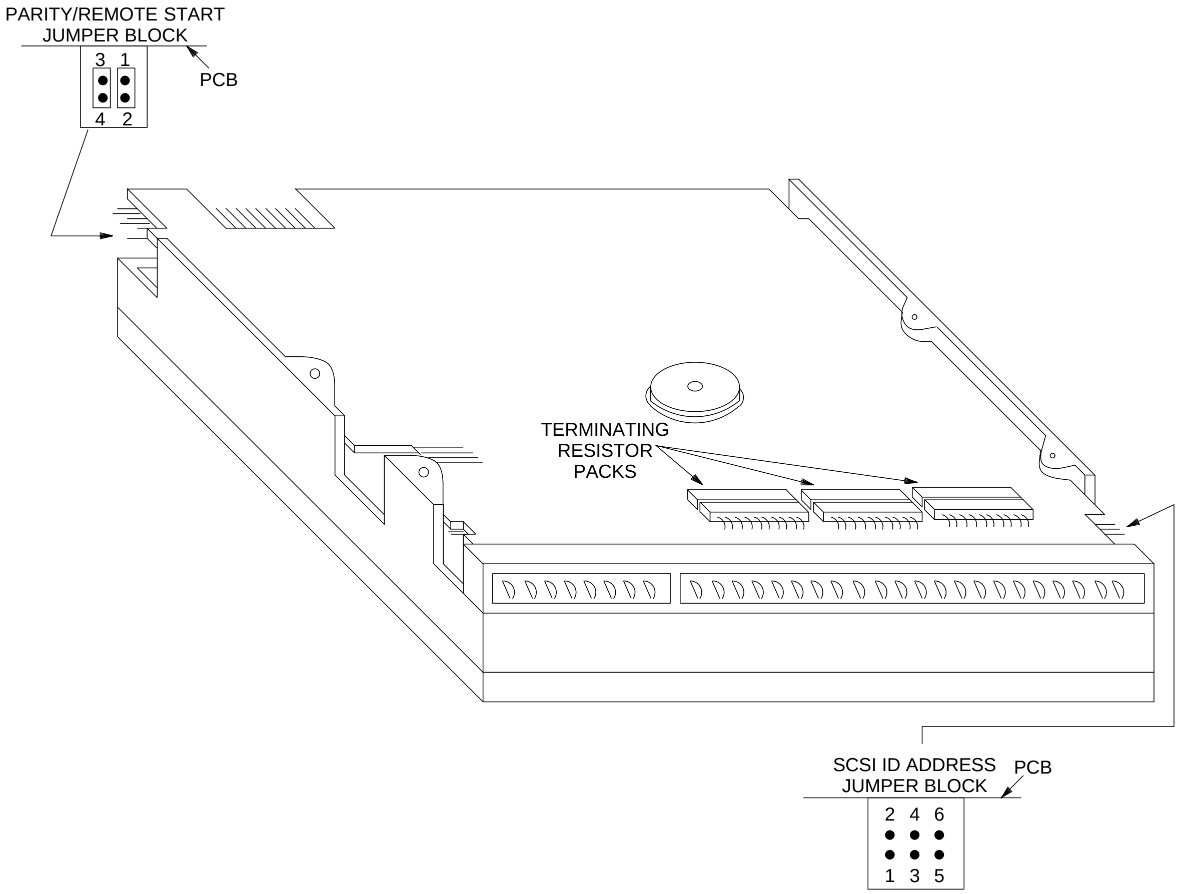


Figure 6-14. Seagate Model ST3283N Drive Jumper Settings

Seagate Model ST1480N Drive

The Seagate Model ST1480N drive is 3.5-inch, SCSI HDD that may be used in place of any of the 380-Mbyte 5.25-inch drives that were shipped in early AUDIX systems. This drive currently ships as the 58-hour disk drive.

Figure 6-15, *Seagate Model ST1480N Drive Jumper Settings*, shows the location of the jumpers and terminating resistors. Jumper settings should be:

- *Bus Parity:* When a jumper is installed on J6 position 5, the drive will check the SCSI bus parity. Although the drive will operate with or without this jumper, it is recommended that this jumper be installed.
- *Spindle Control (Remote Motor Start):* When a jumper is installed on J6 position 2, the drive spindle motor will not start on power-up until it has received a motor start command. This feature is used to sequence drive spin-up to reduce maximum current requirements. Therefore a jumper should be installed on this position.
- *Drive Identification:* Jumpers J5-1, J5-2, and J5-3 are used to control the identification of the disk drives in AUDIX using binary coding. Set the jumpers to correctly identify the position of the disk drive as follows:

  Disk00 should *not* have any of the three jumpers installed.
  Disk01 should only have the J5-3 jumper installed.
  Disk02 should only have the J5-2 jumper installed.
  Disk03 should only have the J5-2 and J5-3 jumpers installed.
  Disk04 should only have the J5-1 jumper installed.
  Disk05 should only have the J5-1 and J5-3 jumpers installed.
  Disk06 should only have the J5-1 and J5-2 jumpers installed.

- *Terminators:* Interface terminator packs should *not* be installed. Verify that they are not present.
- *Other Jumpers:* Any other jumpers on this disk drive should be left alone. Do *not* remove or change any jumpers not previously specified.

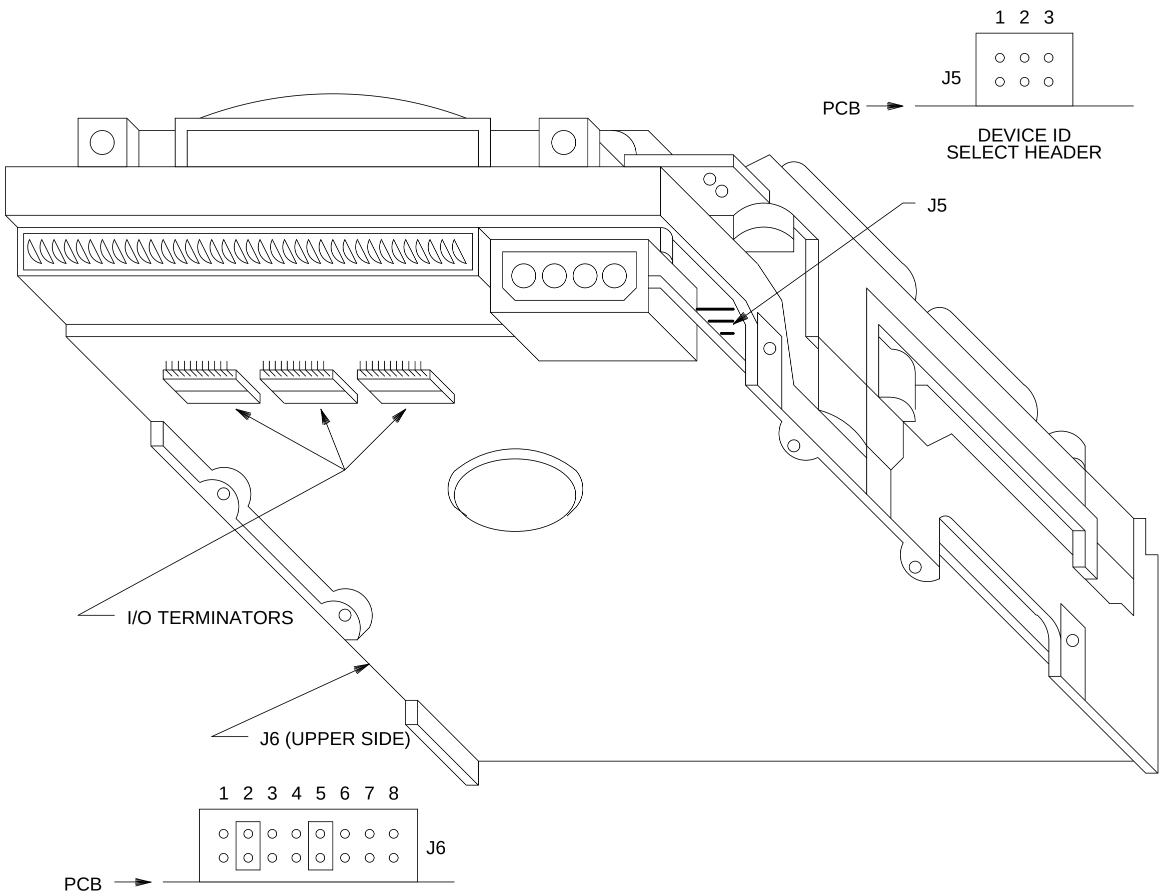


Figure 6-15. Seagate Model ST1480N Drive Jumper Settings

MAXTOR Model 7213S and 7245S Drives

The MAXTOR Model 7213S and 7245S disk drives are 3.5-inch HDDs that support the SCSI interface. They are currently used in place of the 120-Mbyte or 170-Mbyte drives that were offered on earlier AUDIX systems.

The MAXTOR drives are formatted to support the appropriate hours of storage prior to shipment. Several models support varying disk drive capacities, as shown in the following table.

MAXTOR Drive Model	Approximate Storage Capacity	Comcode
7213S-7104 *or* 7245S-7104	14 hours	406949149
7213S-7148 *or* 7245S-7148	20 hours	406949156
7245S	33 hours	407033653

Figure 6-16, *MAXTOR Model 7213S and 7245S Drive Jumper Settings*, shows the location of the jumpers and terminating resistors. Jumper settings should be:

- *Terminators:* Interface terminators RP302 and RP301 should *not* be installed. Verify that they are not present.
- *Spindle Control (Remote Motor Start):* When jumper J302 is removed, the drive spindle motor will *not* start on power-up until it has received a motor start command. Because this feature is used to sequence drive spin-up to reduce maximum current requirements, J302, if present, should be removed.
- *Bus Parity:* If the parity jumper J303 is installed, the drive will *not* check the SCSI bus parity. The drive will operate with or without this jumper. However, it is recommended that this jumper be removed (factory default).
- *Drive Identification:* Jumpers J309, J308, and J307 are used to control the identification of the AUDIX disk drives using binary coding. Set the jumpers to correctly identify the position of the disk drive as follows:

  Disk00 should *not* have any of the three jumpers installed.
  Disk01 should only have the J309 jumper installed.
  Disk02 should only have the J308 jumper installed.
  Disk03 should only have the J309 and J308 jumpers installed.
  Disk04 should only have the J307 jumper installed.
  Disk05 should only have the J309 and J307 jumpers installed.
  Disk06 should only have the J308 and J307 jumpers installed.

- *Other Jumpers:* Any other jumpers on this disk drive should be left alone. Do *not* remove or change any jumpers not previously specified.

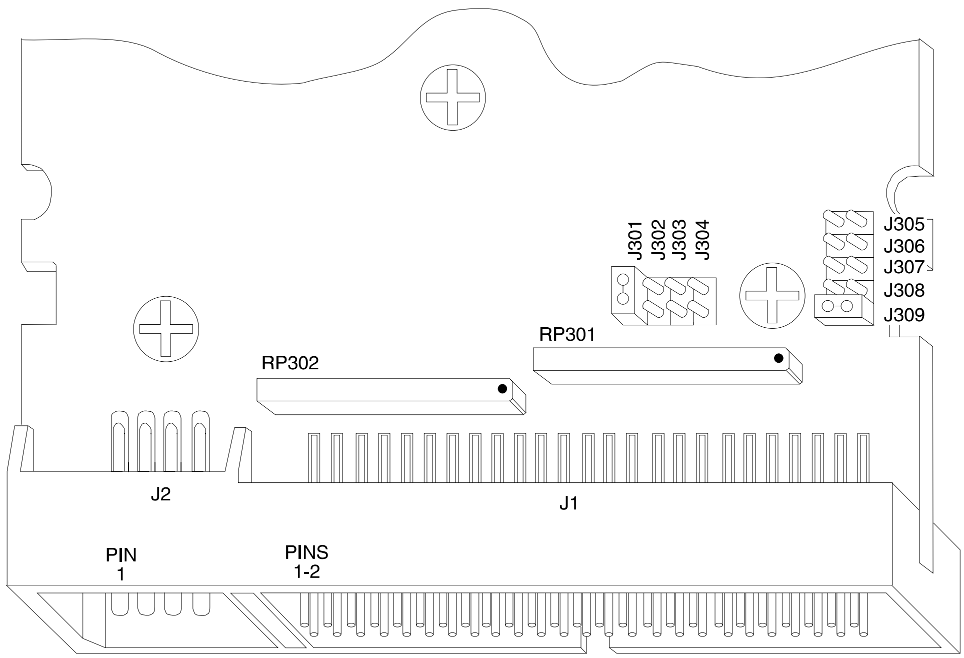


Figure 6-16. MAXTOR Model 7213S-7104 and 7213S-7148 Drive Jumper Settings

7. Power and Environment

Environmental and power component problems fall into two categories: those that raise alarms and those that do not. This chapter covers both cases:

- Environmental Alarm Resolution (when software is running)
- Control Mode Menu Alarm (when software is *not* running)
- Unalarmed Problems

Although this chapter addresses AUDIX systems installed with AC power, the procedures can be used to isolate problems on systems with DC power also. Once a problem is isolated down to the power supply itself, see *Unalarmed Problems* for replacement.

ENVIRONMENTAL ALARM RESOLUTION

If you were referred here to resolve an alarm, use Table 7-1, *Environmental Alarm Resolution*, to locate the diagnostic procedure you should follow. After doing the steps in the indicated section, verify that the fault is resolved using the alarm logs (if software is running) or Control Mode Menu Option 2 (if the system is *not* running). Comcodes for AUDIX parts and cables are in Table C-1 of Appendix C.

Table 7-1. Environmental Alarm Resolution

Alarm Log		Description	Repair Action		
Fault	Unit:Dev	(see Note)	1st Choice	2nd Choice	3rd Choice
16	116 : 0	Battery charging at high rate (CHG_RATE)	Batteries, E	Power supply	–
70	116 : 0	Cabinet over temperature (OPTALM)	External, A	Fans	CDR1B
71	116 : 0	Cabinet differential too great (FANALM)	Filter, A	Fans	CDR1B
75	116 : 0	Battery power below 48 VDC (LOW_BAT)	Batteries, B	Batt. cable	Power sup.
77	116 : 0	Cabinet fuse failure (FUSALM)	Fuse, C	Fuse cable	CDR1B
78	116 : 0	On battery reserve, no AC power (ON_RES)	Power, D	Power supply	Cables
155	116 : 1	Battery charger fault or open battery string (RESV_FLT)	Batteries, B	Batt. cable	Power sup.
74 74	45 : 0 117 : 0	System lost +5, –5, 12, or 48 VDC from power supply (CNVDSK)	Voltage, F	Short ckt	Fuse
156	117 : 0	DC voltage not in tolerance	Voltage, F	Short ckt	Fuse

Note: Control Mode Menu alarm equivalents (Option 2) appear in parentheses.
For two-cabinet systems, the same alarms will appear for each cabinet.
The troubleshooting steps explain how to tell which cabinet is alarmed.

Procedure A: Fan or Over-Temperature Faults

AUDIX detects many environmental problems indirectly by monitoring temperature. For over-temperature conditions, check the following:

1. Check if the room temperature is excessively high (greater than 95°F or 35°C). If so, wait until the external problem at the site is corrected and check if the alarm is resolved.
2. Look for air obstructions to the fans [such as things stacked against the back of the cabinet, or the system being too close to the wall (less than 38 inches)]. Correct the problem if present and see if the alarm is resolved.
3. If there is no external obstruction, check the air filter below the circuit pack carrier of each cabinet (see *Check or Replace Air Filter* after Procedure F). If a filter is dirty, clean or replace it. See if this resolves the problem.

4. If the air filter is clean, check the fans.

    a. If *one* fan is not running, go to *Replace a Fan or Fan Assembly* in this section to replace it. Return to this list to see if the problem is resolved.

    b. If *all* fans in a cabinet are not running, go to *Replace a Fan or Fan Assembly* to check the fan assembly. Follow the steps in that section to determine when the fault is resolved.

5. If these procedures do not resolve the fault, check the cabling to the CDR1B board(s) (see *Unalarmed Problems*).

Procedure B: Check the Batteries

The batteries should be checked in response to most power alarms, including CHG_RATE, LOW_BAT, and RESV_FLT. The batteries should also be replaced periodically as part of routine system maintenance. There are no visual checks to tell which cabinet's batteries are bad in a stack cabinet system. You will have to do this check for each cabinet. To check the batteries:

1. Shut down system software (if running), spin down the RCD (if not done automatically), power down the system, and unplug the AC power cord(s) in that order.

2. Remove the lower panel from the back of the cabinet. (Loosen the 4 bottom screws, then remove the other 9 screws. Slide the panel up to remove it and set it aside.)

3. The battery reserve is on the right side of the cabinet. First check the cabling:

    a. Make sure the red and black battery cable is securely attached to the power supply.

    b. Make sure the 10-pin power-supply alarm cable is securely attached to the bottom connector (J7) of the CDR1B board. This connector is located above the air plenum on the right of the power supply.

4. To see if the batteries are good, disconnect the red and black battery-charger cable from the right side of the power supply.

5. Using a voltmeter, check the voltage leading to the battery reserve (place a probe on each of the two metal pins inside the connector). The voltage should read:

    49 VDC to 56 VDC

6. If the voltage is low, power up the system and check the output voltage of the battery charger. It should also be 49–56 VDC. If the output is okay, reconnect the battery-charger cable to the batteries and allow them to recharge for at least 16 hours. Afterwards, recheck the voltage.

    If the output of the charger is not okay, replace the power supply (the charger is integrated with the supply). See *Unalarmed Problems*.

7. If the voltage is still low after recharging, replace the batteries. (Remove the screw in the retaining strip, unplug the battery cables, slide out the old pack, and insert a new 48V, 24-cell battery module.)

Procedure C: Check the 5V Fuse

A 5 VDC fuse is located on the connector panel of each cabinet (10-amp fuses should be replaced with 15-amp fuses per QPPCN 363DR).

For two-cabinet systems, check each cabinet's fuse to determine where the problem is. When you have found which cabinet is having the problem, follow the recovery steps for that cabinet.

The fuse at the back of the AUDIX cabinet may be blown if:

1. The disk drives *all* fail to work (or any other indication of a short on the 5 VDC bus).
2. A FUSALM fault has been reported (either in the Control Mode Menu or alarm log).

To Check or Replace the Fuse:

1. Locate the 5 VDC fuse on the back of the AUDIX cabinet. Press in the fuse and turn it counterclockwise. The fuse will pop out.
2. Using an ohmmeter, place a probe on the metal tip of the fuse and place a second probe on the metal ring below the cap.
   a. *If you get an open-circuit reading* (for example, OL or overload), the fuse is blown. Replace the fuse with a standard 125V, 15-amp BUSS fuse.
   b. *If you get a 0 ohms reading* (a beep on some ohmmeters), the fuse is good.

   NOTE If the existing fuse is *not* a 15-amp fuse (early models use a 10-amp fuse), order Quality Protection Plan Change Notice (QPPCN) 363DR. This change will make the system more reliable.

3. After you have replaced the fuse or determined it is good, go on with your troubleshooting or verification procedures.
4. *If the fuse blows again,* isolate the cause as follows:
   a. Disconnect all disk drive power cables and the 4-pin disk drive power connector (J2) at the upper right of the CDR1B board. See Chapter 6, *Disk Drives* for disk drive removal procedures.
   b. Recheck the fuse. If it blows, the cable is damaged. Check for pinches or nicks. If found, repair the cable if possible. *If you cannot fix the cable,* you need to exchange the entire internal wiring harness (LCJ58886U-1) through the factory.
   c. If the cable is good, plug the power connectors back into the disk drives one by one, rechecking the fuse after each new connection. *If the fuse blows,* the last disk drive you plugged in is bad and should be replaced. See Chapter 6, *Disk Drives* for disk drive replacement procedures.
   d. If the disk drives are good, plug the power connector back into the J2 connector on the CDR1B board and recheck the fuse. *If the fuse blows,* the CDR1B board is bad and should be replaced (see *Unalarmed Problems*).

Procedure D: Battery Reserve Alarms

The ON_RES alarm is a normal condition if AC power has been lost and AUDIX is running on DC (battery) power. To resolve it:

1. Check the LEDs at the lower right front of the AUDIX cabinet(s).
   a. The yellow LED (ON RESERVE) should be the only LED lit, indicating the battery reserve is supplying power. Go to step 2.
   b. *If the red LED (RESERVE FAULT) is also lit,* go back to Procedure B to check the batteries.
   c. *If the green LED (AC) is also lit*, the power supply is sending a bad signal. Check cabling to the CDR1B board (see *Unalarmed Problems*). If good, suspect the power supply.
2. Check for AC power to the AUDIX cabinet (see *Unalarmed Problems*).
   a. If the AC power has been interrupted to the site, wait for the external problem to be resolved. Check to see if the alarm is resolved.
   b. Make sure the AC power cord(s) is plugged in correctly. If not, plug it in and see if this corrects the problem.
   c. If you *do* have AC power and this alarm is raised, check cabling to the CDR1B alarm board (see *Unalarmed Problems*). If good, suspect the power supply.

Procedure E: Batteries Charging

The CHG_RATE fault is a warning condition that the batteries are charging. This alarm normally follows an AC power outage where AUDIX had to temporarily use DC (battery) power.

1. If the CHG_RATE (fault 16) alarm is accompanied by a LOW_BAT low voltage (fault 75) alarm, allow the batteries to fully recharge (up to 16 hours).

   NOTE
   If the batteries are low, the red ENV LED on the TN511 MI may flicker. The yellow WRN LED should be lit.

2. When the batteries are (or should be) completely recharged, check if the alarm is resolved. If not, check the battery voltage (go back to Procedure B).
   a. If the voltage is *not* correct and cabling is not the problem, replace the batteries.
   b. If the voltage is correct or the batteries are good, check cabling to the CDR1B board (see *Unalarmed Problems*). If good, suspect the power supply.

If the charging condition continues over 30 hours, the MI automatically escalates this to a RESV_FLT alarm (go back to Procedure B).

Procedure F: Check the Power Supply Voltages

On two-cabinet systems, the alarmed cabinet will *not* have its green LED lit. Do the following steps on the alarmed cabinet.

CAUTION

Always power down both cabinets when you are instructed to turn the power off. See Appendix A, **Basic Procedures***, for details on how to power down a system.*

The CNVDSK alarm (fault 117) means that the power supply has found one of its four voltages incorrect (+5, –5, +12, or –48 VDC). To isolate which channel is causing this problem:

1. Shut the system software down using the MI toggle switch or the `shutdown` form with the maintenance (m) option.
2. Wait for the RCD to spin down, power down the system, then unplug the AC power cord(s).
3. Remove the lower panel from the back of the cabinet. (Loosen the four bottom screws, then remove the other screws on the sides and top. Slide the panel up to remove it.)
4. If needed, you may remove the battery module in order to get room to work on the power supply:
   a. Disconnect the red and black battery-charger cable from the battery reserve.
   b. Remove the two nuts and washers that hold down the battery housing on the right of the cabinet, then remove the battery module.

   NOTE

   Removing the battery module is optional in later models because the right air plenum has been removed. However, you can remove the battery module if you need more room.

5. *If the right air plenum is installed (see Figure 7-3):* Remove the screw(s) that attach the air plenum to the right side of the power supply, then remove the air plenum. (Early models have three screws, newer models have one at the bottom in front. The latest models have no right air plenum to remove).
6. On the right side of the power supply are four terminals that carry the four voltages. Plug in the AC cord(s) and restore power. Using a voltmeter, check the voltage of each channel.
   a. If *all* channels are incorrect, the power supply or harness is faulty and should be replaced (see Table 7-3 if needed).
   b. If the *+5 or –5 VDC* channels are incorrect, check for a faulty circuit board by turning power off, unseating all boards except the MI, and turning power back on. Push the boards in one at a time, checking after each one for the fault to return. If it does, replace the last board pushed in.
   c. If the *+12 VDC* channel is incorrect, check the disk drives and their cabling to the CDR1B board (see *Unalarmed Problems* if needed).
   d. If the *–48 VDC* channel is incorrect, check the – 48V fuse (see the next section).

To Check the –48V Fuse:

The CNVDSK fault may indicate that the –48 VDC fuse *in the power supply* is blown. To resolve this problem:

1. Remove the back panel and plenum to the power supply as described in the previous section (if not already off).
2. Locate the –48 VDC fuse (on some supplies, it is on the right side at the upper left corner). Insert a screwdriver into the fuse cap and turn it counterclockwise. The fuse will pop out.
3. Visually check for a blown fuse. (If you need to use an ohmmeter, go back to Procedure C.)
4. If the fuse is blown, replace it with a standard 250 V, 1-amp slow-blow (1 ASB) fuse (a 3AG-type fuse). Restore power to the system.
5. *If the fuse blows again,* (or if it was good and not replaced), one of the –48 V circuit boards may be bad. Isolate the cause as follows:
   a. Spin down the RCD and power down the system.
   b. Slide the TN511 MI and the TN747B VPT boards out of their slots. Restore power. *If the fuse blows,* the problem is with the power supply or wiring. Replace the appropriate unit.
   c. If the fuse remains good, push in the MI and VPT boards *one at a time,* checking the fuse (or the –48 VDC terminals on the power supply) after each board. *If the fuse blows,* the last board you pushed in is the problem. Replace the faulty board.
   d. If the fuse blows *after* the boards are replaced, check the backplane for damage or bent pins. If the backplane requires work or replacement, call your remote maintenance service center.

Check or Replace the Air Filter

The filter under the AUDIX carrier may be dirty or blocked if software reports a FANALM fault. The filter should also be cleaned or changed when necessary as part of routine system maintenance. On two-cabinet systems, do the following for both cabinets. To remove the filter:

1. Turn the two quarter-turn screws on the lower front panel. Lift the panel out of the bottom groove and set it aside.
2. Reach into the cabinet above the disk drives and slide the filter straight out of the cabinet.
3. Replace the filter if dirty or old.
4. If you *cannot* replace the filter, you may clean it as follows:
   a. Agitate the filter in a solution of water and mild detergent.
   b. Rinse the filter thoroughly with clean running water and allow it to dry *completely* before reinserting it.
5. Slide the new (good) filter back into place.
6. If you changed the filter in response to an alarm, check that the problem is resolved. If not, go on to the next problem choice (go back to Procedure A).

Replace a Fan or Fan Assembly

On two-cabinet systems, use the following steps for the cabinet that is having problems.

If you observe a single fan not working or have diagnosed a fan or temperature fault (FANALM or OPTALM), take the following steps (see Figure 7-1, *Replacing a Fan or Fan Assembly*):

1. Shut the system software down using the MI toggle switch or the `shutdown` form with the maintenance (m) option.
2. Wait for the RCD to spin down, power down the system, then unplug the AC power cord(s) in that order.
3. *If you are replacing a single fan:*
   a. Remove the eight screws that fasten the fan assembly to the back of the AUDIX cabinet. (You will need to hold up the fan assembly.)
   b. Remove the four screws that hold the fan in place. Unplug the power cord to the fan.
   c. Insert a good fan into the fan assembly. Reinsert the screws and plug it back in. Go to step 5.
4. *If you are replacing the entire fan assembly:*
   a. Remove the middle panel to disconnect the fan assembly's power cord from the CDR1B board. (Loosen the seven screws along the bottom of the panel, then remove the four screws along the top. Slide the panel upwards to remove it.)
   b. *Before replacing the fan assembly:* Check the cabling to the CDR1B (alarm) board. The fan assembly uses the 6-pin connector (J3) at the top left of the board. If this (or any other cables) on the CDR1B are loose, reseat them firmly and recheck the fan assembly (go to step 5). If the cables are *not* loose, continue here.
   c. Unplug the fan assembly's 12 VDC power cord from the CDR1B board's J3 connector.
   d. Remove the 8 screws that fasten the fan assembly to the back of the cabinet.
   e. Pull the fan assembly away from the unit (the power cord will pull upwards through a hole into the fan section). Set the old fan assembly aside.
   f. Push the power cord from a new fan assembly through the hole in the fan section down to the CDR1B board.
   g. Plug the new power cord back into the CDR1B J3 connector.
5. Before reattaching the fan assembly, verify that the replaced fan (or assembly) works. Power up the system.
6. *For a single-fan replacement:* Check if the replaced fan is working. If the fan is *not* working, replace the entire fan assembly (go back to step 4).
7. If the fan (or fan assembly) *fails to work*, check the cables from the CDR1B board to the power supply (see *Unalarmed Problems*).
8. If the fan (or fan assembly) appears to be good, reattach the fan assembly to the back of the AUDIX cabinet and replace the middle panel.
9. If you are responding to an alarm, reinitialize the system and verify that the fault is resolved.

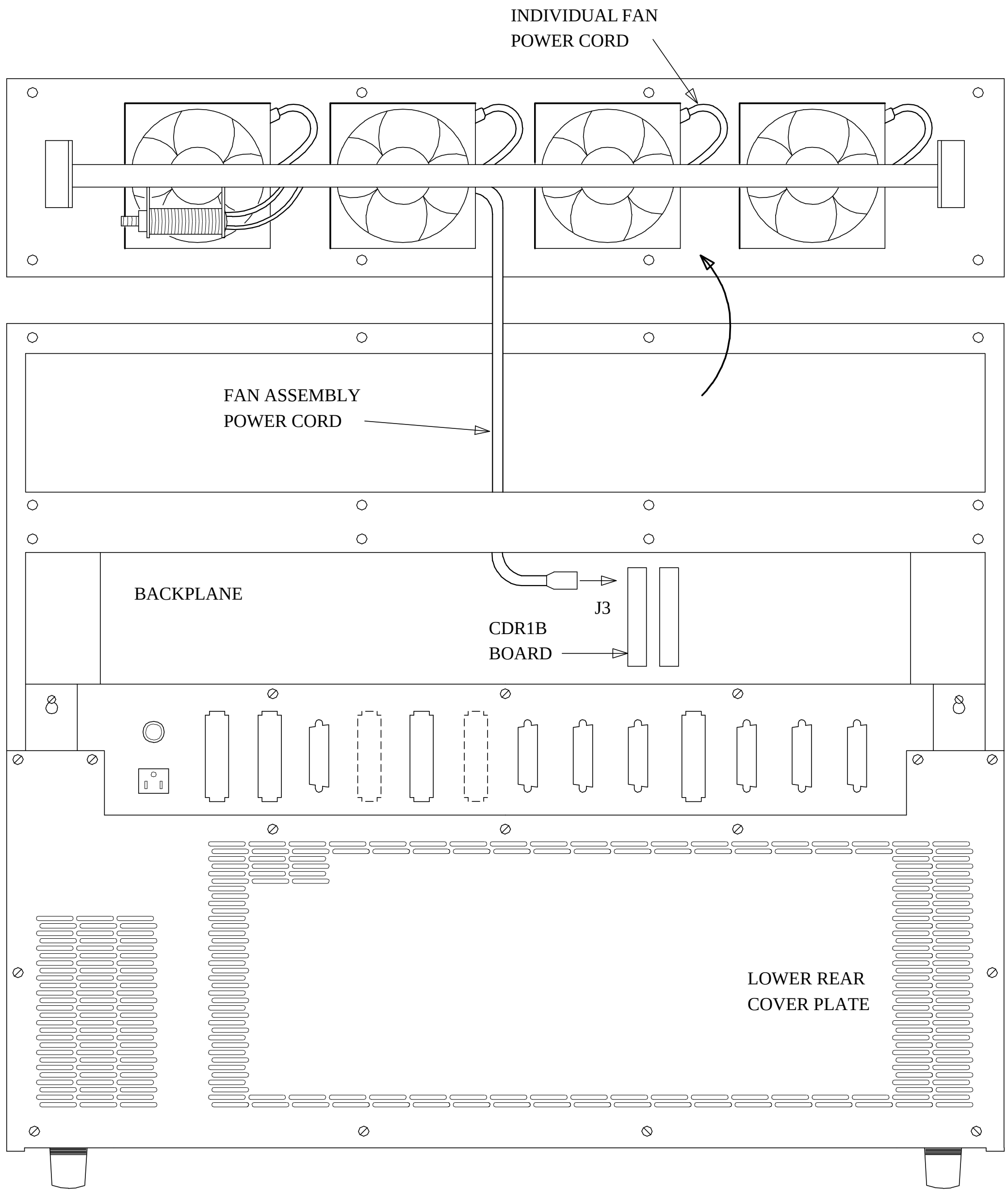


Figure 7-1. Replacing a Fan or Fan Assembly

CONTROL MODE MENU ALARMS

Option 2 on the Control Mode Menu shows environmental or power alarms that relate to the resolution procedures in the previous section (see Table 7-2, *Control Mode Menu Alarm Resolution*). You can therefore solve environmental alarms even when the system software is not running. On two-cabinet AUDIX systems, the same alarms appear for either cabinet. Each section indicates how to tell which cabinet is having problems and any additional steps required to resolve alarms. Ambiguous major alarms are explained briefly below.

Table 7-2. Control Mode Menu Alarm Resolution

Control Mode Menu Alarm		Fault	Use Procedure *
CHG_RATE	(warning)	16	E
CNVDSK	(major)	74	F
FANALM	(major)	71	A
FUSALM	(major)	77	C
LOW_BAT	(major)	75	B
ON_RES	(major)	78	D
OPTALM	(major)	70	A
RESV_FLT	(major)	155	B

* Procedures are in the *Environmental Alarm Resolution* section.

FANALM: Temperature Differential

The FANALM fault is sent when the two cabinet thermistors register a difference of temperature between them greater than 30°F (16.6°C). A thermistor is located on the back of the fan assembly (to monitor heat output) and at the left of the RCD bracket (to monitor incoming air temperature). The FANALM fault is retired when the temperature difference falls below 29.5°F (16°C).

Because external or mechanical factors can cause this alarm, the fault cannot precisely identify the source of trouble. Use Procedure A to isolate the probable cause, which could include:

1. A blocked air filter
2. Blocked or stopped fans
3. Loose cabling to the CDR1B board affecting the fan assembly.

OPTALM: Over-Temperature

The OPTALM fault is sent when one of the cabinet's thermal switches detects an exit-air temperature greater than 150°F (65.5°C). Two thermal switches (thermostats) are located on each side of the fan assembly, and another at the bottom left of the RCD bracket. The OPTALM fault can indicate any of the following problems:

1. A breakdown of the facility's normal air conditioning (environmental fault, not AUDIX). Check with the customer for possible site problems.
2. Blocked or stopped fans. Use Procedure A in *Environmental Alarm Resolution*.

UNALARMED PROBLEMS

Not all environmental problems cause alarms. If you suspect an environmental or power problem, check the following list and go to the indicated section to resolve it.

NOTE

For two-cabinet systems, do each step for both cabinets, if applicable.

- *A single nonworking fan.* This problem is compensated for by the other fans and must be checked visually (see *One Nonworking Fan* in this section).
- *External or cabinet component.* The air filter or external problems cannot be reported directly. Use Procedure A in *Environmental Alarm Resolution* to diagnose these problems. If these steps fail, check the CDR1B board cabling (see *Check the CDR1B Alarm Board*).
- *Front panel not working.* If the three LEDs and the POWER switch on the front panel do not work, check the CDR1B board cabling and related wiring (see *Check the CDR1B Alarm Board*).
- *No power.* AUDIX cannot report problems when it cannot run (see *No Power* in this section).
- *No switch alarms or terminal response.* If one of the alarm, maintenance, or administration connectors on the rear connector panel fails to send signals or respond, check the external cabling and the CDR1B board cabling (see *Check the CDR1B Alarm Board*).
- *Fans on high.* If the ambient temperature at the site is over 95°F (35°C), the fans switch to high speed, but no alarm is issued. Solve the external problem if possible.

One Nonworking Fan

The fans are set on high if the thermostats detect an exit-air temperature greater than 95°F (35°C). This action can compensate for a single failed fan. Therefore, check for one-fan failures as a routine part of on-site service:

1. Check if the fans are running on high speed (normally the fans run on low speed).
2. If fans are on high, visually check for one fan that is not turning. If you locate a nonworking fan, replace it as described in *Environmental Alarm Resolution*.

No Power

If AUDIX is not running at all, the on-site service technician should take the following steps:

1. Check that the AUDIX AC power cord(s) is plugged in to a working 120 VAC, 60-Hz outlet. Plug something else such as a lamp into the outlet and see if it works.
2. Check that the circuit breaker on the lower front panel is ON. Check both cabinets if this is a two-cabinet AUDIX system. If off, try powering up the system. If for some reason the circuit breaker tripped, it may or may not happen again. Even if it does, it could take hours or days before the same sequence of events cause it to trip. *It is highly unlikely that the breaker itself is faulty.*
3. Do a visual inspection of the AUDIX system. If the circuit breaker(s) is ON and *no* LEDs are lit, check the cabling to the CDR1B board (see the next section).

Check the CDR1B Alarm Board

The CDR1B alarm board transmits signals to and from the MI board to most of the major components and connectors in the system. While the CDR1B board itself is rarely faulty, loose cables to this board could raise false alarms.

NOTE

Early one- or two-cabinet systems may have a CDR1 vintage board. However, the CDR1B vintage board is always required for DC-powered systems.

Diagnose CDR1B Cabling Problem

Because the CDR1B board is not alarmed directly, check the following list to see if a loose cable could be causing the problem. See Figure 7-2, *CDR1B Alarm Board and Cable Connections*, for an illustration of CDR1B connectors.

1. Check the connectors for specific problems as follows:
   - *J1: Backplane.* If the MI does not register alarms correctly, make sure the CDR1B is fastened securely to the backplane.
   - *J2: Disk Power.* This 4-pin connector carriers 5 and 12 VDC and GRD from the disk drives to the fan assembly. Check it if you have a nonworking fan assembly.
   - *J3: Fan Assembly.* If the fan assembly fails to work, make sure this 6-pin connector is seated correctly.
   - *J4: Front Panel.* If the three LEDs, POWER switch(es), and temperature alarms do not work, check that the 10-pin J4 connector is attached.
   - *J5:* The topmost connector is used to connect the two CDR1B boards in a two-cabinet cabinet system. Make sure this cable is properly connected if it is present.

- *J6: Switch Alarms.* If AUDIX reports alarms locally but fails to send them to the remote site, make sure that this 6-pin connector is well-seated on the CDR1B and the ALARM (D03) connector on the rear panel.
- *J7: Power Supply.* All power and battery alarms go through this 10-pin connector. Check that it is well-seated whenever you check the batteries or power supply.
- *J8: RS-232C Connectors.* If the local maintenance *and* administration terminals do not respond, or if the remote maintenance terminal cannot dial-in to AUDIX, check that this 16-pin connector is firmly attached to the CDR1B board and to each of the EIA connectors on the rear panel (MAINT H00 and ADMIN H01).

2. If you have one or more of these problems and the cables are securely attached, check the suspected cable(s) for damage.
3. If the cable(s) appear good, replace the CDR1B board (see the next section) *except* for power problems.
4. *For power problems:* Replace the power supply before the CDR1B. See *Replace the AC Power Supply* or *Replace the DC Power Supply*, whichever is applicable.
   a. If the replacement supply does not work, replace the CDR1B board.
   b. In the unlikely event that neither of these actions solves the power problem, you may try replacing the circuit breaker (see *To Replace the Circuit Breaker*), or call for help.

To Replace the CDR1B Board:

1. Shut the system software down using the MI toggle switch or the `shutdown` form with the maintenance (m) option.
2. Wait for the RCD to spin down, power down the system, and unplug the AC power cord(s) in that order.
3. Remove the middle panel to access the CDR1B board. (Loosen the seven screws along the bottom of the panel, then remove the four screws along the top. Slide the panel upwards to remove it.)
4. Remove all the cables as listed in the previous section (see Figure 7-2).
5. Pull the CDR1B off the backplane (rear of slot 7), noting where it is connected.
6. Insert a new CDR1B on the correct pins (marked AB3) of the backplane. Reattach all cables securely.
7. Before reattaching the back panel, check that the new board is operational. Tests include:
   a. Checking that the LMT and LAT can *both* log in.
   b. Shutting down power and seeing if the MI and switch both report the correct alarms.
   c. Making sure the fans, disk drives, and LEDs are working.
8. If the new board solves the problem, reattach the middle panel. If the problem persists, call for help.

To Replace the Circuit Breaker:

If you replace the CDR1B board and/or the power supply and you still cannot get AC power, the only thing left to suspect is the POWER switch (circuit breaker). To replace the circuit breaker:

1. Make sure the system's power is off and the AC power cord(s) is unplugged before you begin.
2. Remove the two nuts and washers that attach the RCD bracket to the cabinet as described in Chapter 6, *Disk Drives*. Pull the entire bracket assembly out of the cabinet.
3. Remove the old circuit breaker from the back of the bracket, and insert a good breaker.
4. To test the new breaker, plug the AC power cord(s) back in and power up the system.
5. If the system powers up and the green LED (AC) lights, the breaker is good. If the new breaker does *not* work, call for help.

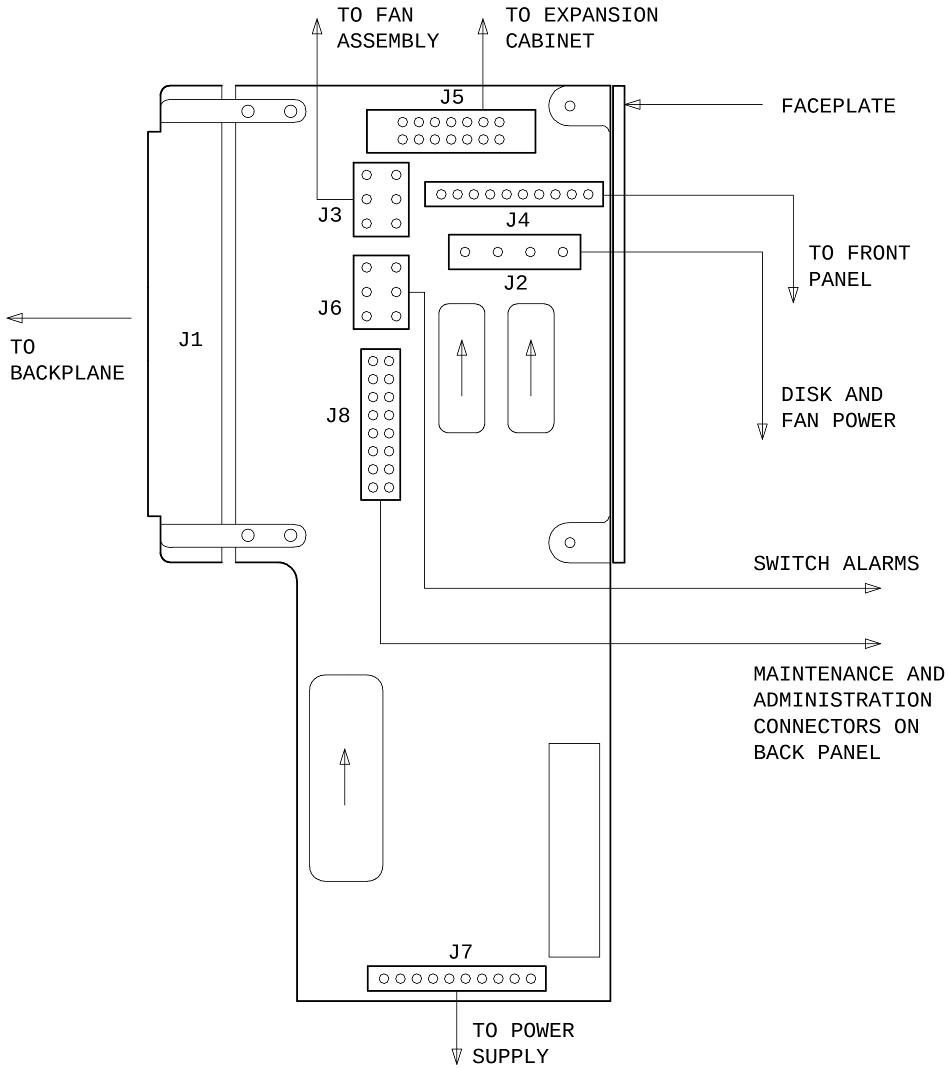


Figure 7-2. CDR1B Alarm Board and Cable Connections

Replace the AC Power Supply

The power supply is a last-choice replacement after checking cables. See Figures 7-3 and 7-4, *Power Supply Replacement (Early Hardware)* and *Power Supply Replacement (Newer Hardware)* for an illustration of this procedure. Comcodes for replacement parts are in Table C-1 of Appendix C.

NOTE

AUDIX can use more than one type of power supply, so the replacement module may not look exactly like the supply you just removed. However, the cable harness (LCJ58886U-1) is identical for each power supply and will connect in a similar manner.

If the customer wants to replace the AC power supply with DC power, obtain Kit no. D-182236 (comcode 845367522). Instructions are included with the kit.

Remove the Existing AC Power Supply

1. Shut the system software down using the MI toggle switch or the `shutdown` form with the maintenance (m) option.
2. Wait for the RCD to spin down, power down the system, and unplug the AC power cord(s) in that order.
3. Remove the lower panel from the back of the cabinet. (Loosen the four bottom screws, then remove the other screws on the sides and top. Slide the panel up to remove it.)
4. If needed, you may remove the battery module in order to get room to work on the power supply:
   a. Disconnect the red and black battery-charger cable from the battery reserve.
   b. Remove the two nuts and washers that hold down the battery housing on the right of the cabinet, then remove the battery module.

   NOTE

   Removing the battery module is optional in later models because the right air plenum has been removed. However, you can remove the battery module if you need more room.

5. *If the right air plenum is installed (see Figure 7-3):* Remove the screw(s) that attach the air plenum to the right side of the power supply, then remove the air plenum. (Early models have three screws, newer models have one at the bottom in front. The latest models have no right air plenum to remove).
6. *If the left air plenum is attached with a single screw (in later models):* Remove the single screw to the left air plenum, then lift and pull out the left air plenum. (In early models, leave the left air plenum attached to the power supply base.)
7. Remove the nuts and washers that attach the power supply’s base to the cabinet. Early models have four, later models have two.

8. Lift the power supply and base above the lower rim of the cabinet and slide the right side partially out of the cabinet to better access the screws and cables on the side. *If it does not lift freely,* you may need to loosen or remove one or more of the lower, outer screws (see Figure 7-3).

9. Starting at the innermost side of the power supply, remove all plugs and cables:

   a. Unplug the red and black battery-charger cable.

   b. Pop off the 9-pin molex connector (you may need to use a screwdriver).

   c. Remove the two nuts and washers from the 5 VDC 5/16 stud terminals. *Label* the cables if they are unlabeled (one large and two small 5V return cables, and one large and one small +5V cable). Slip the cables off the stud terminals.

   d. Loosen all six screws over the screw terminals. Pull the terminals down as a set (some screws hold down two terminals each). *Label* these wires as you remove them to ensure you can replace them in the same position.

   e. Loosen the screw terminals to remove the two AC connectors. *Label* the cables if they are unlabeled. On some supplies, you need to remove the AC guard plate (see the discussions on power supplies later in this section).

   f. Loosen the nut and remove the green-wire ground (GWG).

10. Lift out the power supply and base. Remove the four screws on the bottom of the base to free the power supply.

11. Replace the hardware you removed (nuts, washers, AC guard plate). The power supply should be shipped back to the factory.

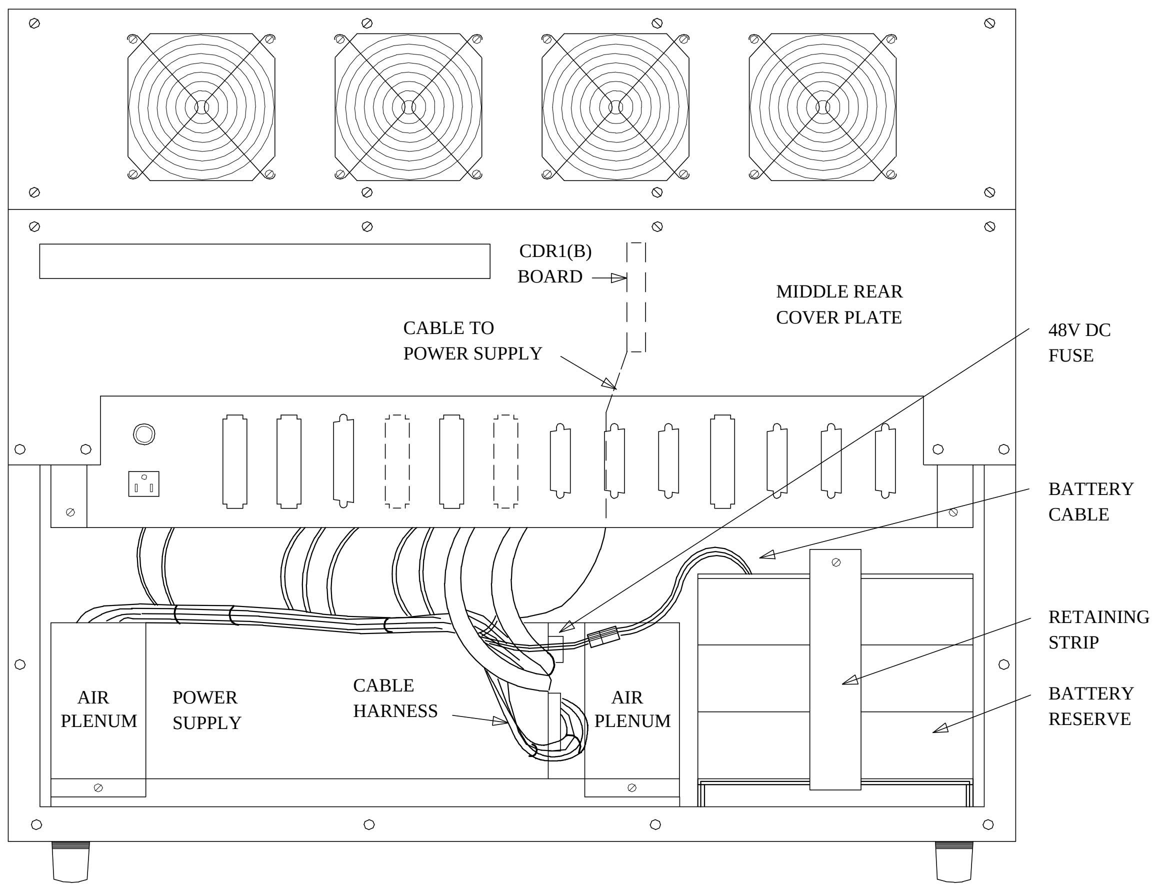


Figure 7-3. Power Supply Replacement (Early Hardware)

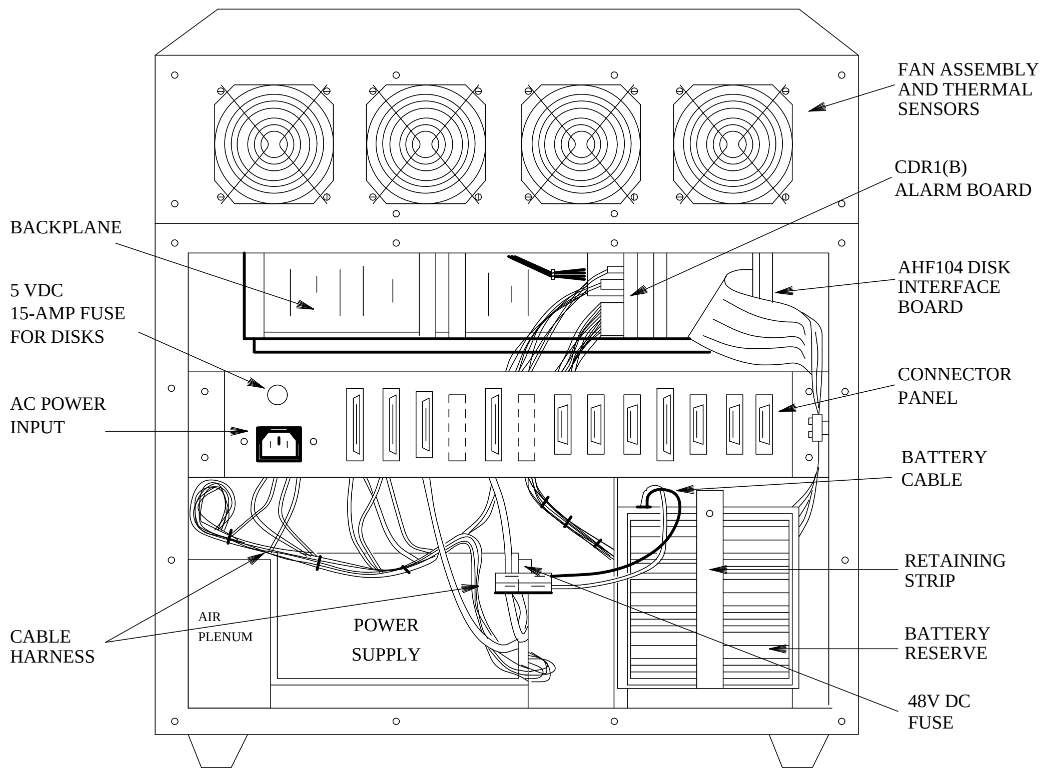


Figure 7-4. Power Supply Replacement (Newer Hardware)

Install the Replacement Module

1. Check the option straps for the correct (115 VAC) voltage (see the next section).
2. Align the holes on the bottom of the replacement module with those in the base you removed. (If you have an early-model AUDIX, the air plenum should be on the opposite side from the terminals.) Reinsert the four screws.

NOTE	Because AUDIX can use more than one type of power supply, the placement of the screws at the bottom of the base and the exact location of the connectors for the cable harness may differ slightly.

3. Slide the replacement module into the cabinet and turn the right side partially outward.
4. Reattach all terminals and connectors in the reverse order that you disconnected them (see step 8 in the previous section).
5. *Before reattaching* the base of the new module to the cabinet, test the new power supply:
   a. Connect the AC power plug to the rear of the cabinet. Restore power.
   b. The LEDs on the circuit packs at the front of the cabinet should light and the fans should come on. Consider the power supply good (go to the next step).
   c. If nothing happens, spin down the RCD, power down, and recheck your connections. Try restoring power. If the power supply still fails to work, call for help.
6. If the power supply seems good when you power it up, you may verify the voltage at the backplane as follows:
   a. Loosen the screws along the bottom of the middle rear cover panel, then remove the four screws along the top of the panel. Slide the cover upwards to remove it.
   b. Place probes from a voltmeter across the +5 and GRDD points on the backplane (where the big cables from the power supply connect). Voltage should range from 5.0 to 5.05 VDC.
   c. If the voltage is off, use a tweak tool to adjust the +5 VDC potentiometers on the power supply. When the voltage is correct, replace the middle rear cover panel.
7. When the power supply works correctly, spin down the RCD, power down the system, and disconnect the AC power cord(s) again.
8. *If you removed the right air plenum*, reattach it (early models have three screws, newer models have one at the bottom in front).
9. Slide the power supply into the cabinet and bolt it down with its (two or four) nuts and washers.
10. *If you removed the left air plenum*, position it beside the power supply and reattach it with its single screw.
11. *If you removed the battery module*, reinstall the battery reserve and reconnect the red and black battery cable.
12. Reattach the back panel and plug in the AC power cord. Restore power.
13. Return to Chapter 3, *Start Troubleshooting* for service verification steps.

Check AC Power Supply Strapping Options

The power supply (ED-1E524-70) is located at the lower left side of the AUDIX cabinet. AUDIX uses more than one vendor for its system-wide power supply. All qualified power supplies must meet the regulated input and output voltages listed in Table 7-3, *AUDIX Power Supply Input and Output Voltages*. They also must meet the following specifications:

- *Alarms:* Report power or battery problems to the system through the CDR1B board.
- *Input:* Accept 120 VAC (nominal), 60-Hz, single-phase from a standard wall outlet. (The 220 VAC option is reserved for future use.)
- *Physical design:* Fit the cabinet dimensions (up to 5 by 8 by 13.5 inches), connect to the internal wiring harness (LCJ58886U-1), and contain an internal DC fan and 48 VDC fuse.
- *Safety:* Meet Underwriter Laboratories (UL) approval.

Table 7-3. AUDIX Power Supply Input and Output Voltages

Input Voltage:	**for:**	
90 to 132 VAC	Nominal 120 VAC	
180 to 264 VAC	Nominal 220 VAC	
47 to 63 Hz	Frequency variation	
Output Voltage:	**Range:**	**Amperes:**
+ 5 VDC	+ 4.85 to + 5.15	100 A
– 5 VDC	– 4.85 to – 5.15	2 A
+ 12 VDC	+ 11 to + 13	15 A
– 48 VDC	– 44 to – 52.5	0.5 A

Check Option Straps

For all power supplies, the factory should set the power to 120 (115) VAC using an option strap before shipping the cabinet. Before inserting a replacement power supply, you should check the new supply to make sure the strap is set for 115 VAC power. On all qualified power supplies, the voltage option straps are metal tabs inserted under screw terminals. Check the straps for the appropriate vendor as described in the following sections.

Computer Products (Unipower) and jETA Option Straps

Both the Computer Products (now Unipower) and jETA power supplies have the same markings and option straps. To check the straps:

1. Remove the black plastic AC guard plate on the power supply.
2. Check that the metal strap links the correct terminals over the barrier strip for 115 VAC power [see Figure 7-5, *jETA Power Supply*, and Figure 7-6, *Computer Products (Unipower) Power Supply*]. If the strap is set up for 230 VAC power, loosen the screw terminals and move the strap to match Figure 7-5.
3. The other two screw terminals are ACN (ac neutral) and ACH (ac hot). These are connected to the local LCJ58886U-1 cable during installation.

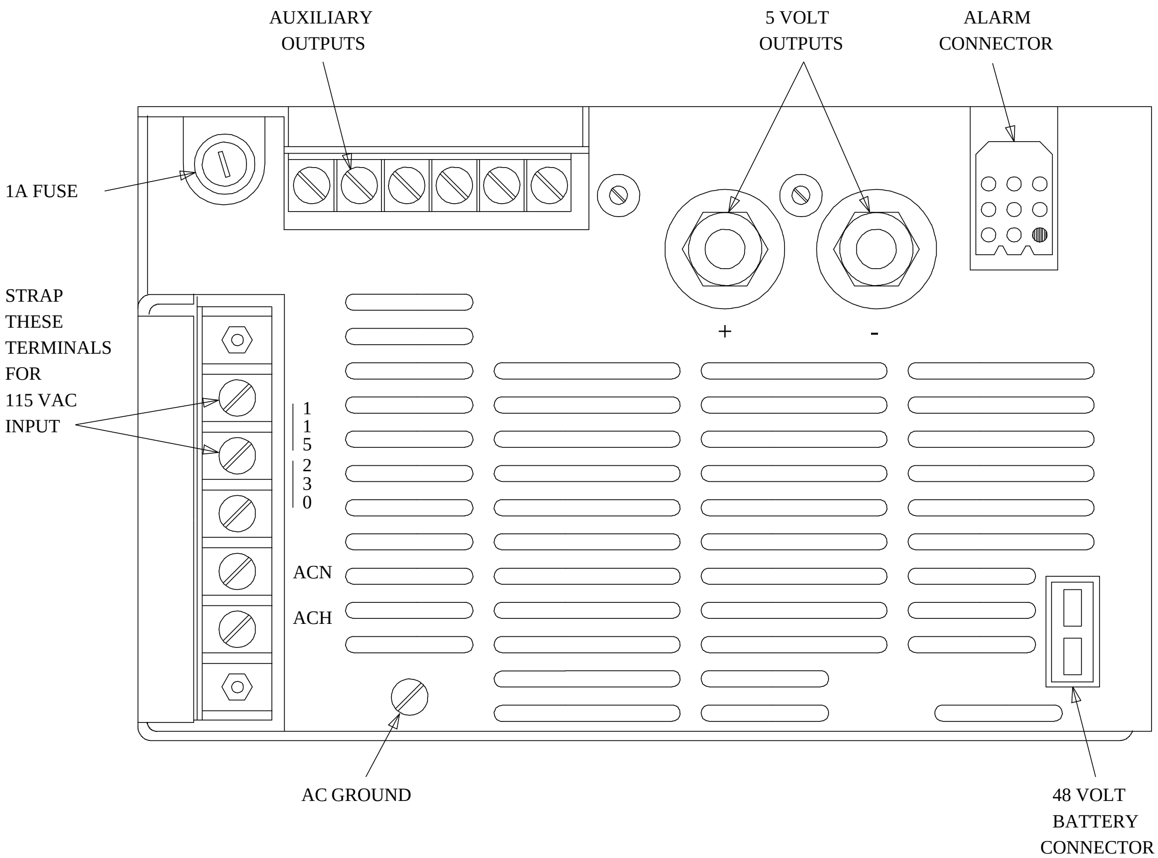


Figure 7-5. jETA Power Supply

Auxiliary outputs are paired from left to right: -48/RTN, -5/RTN, and +12/RTN.

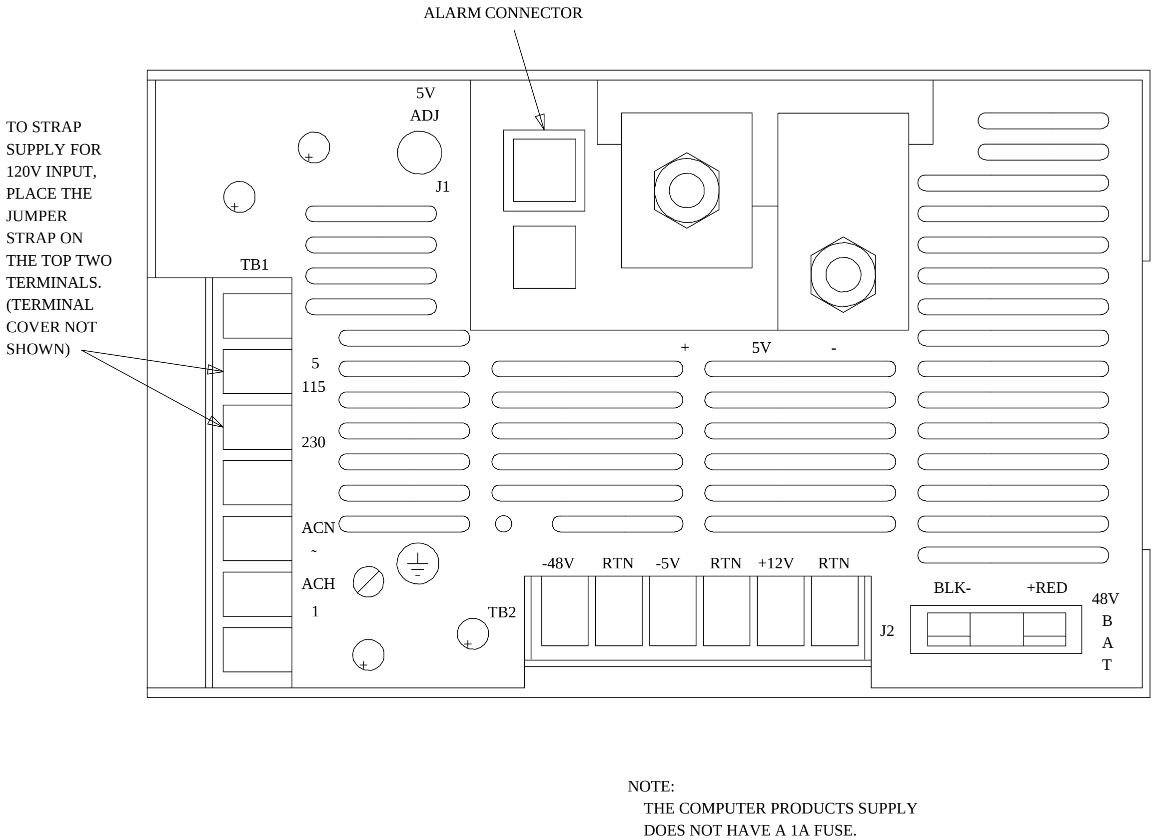
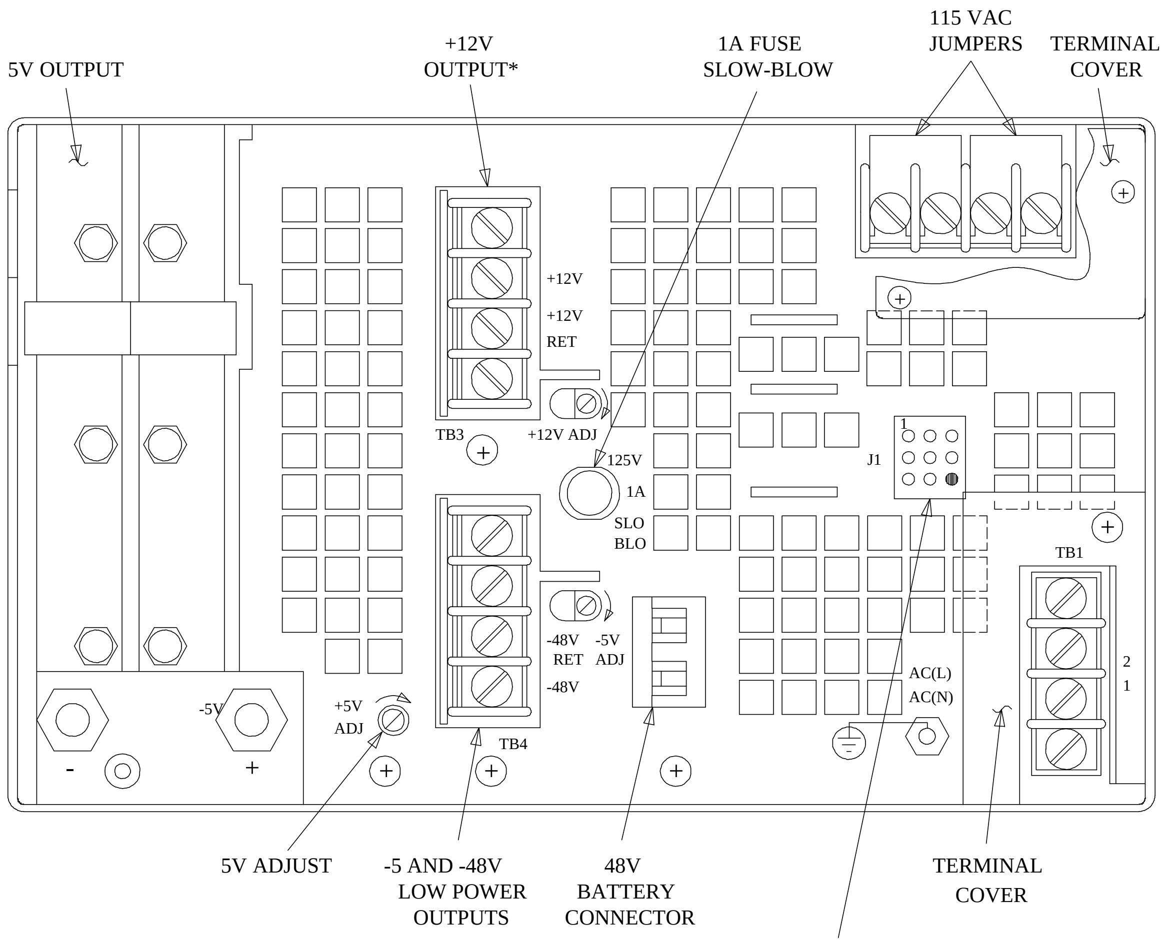


Figure 7-6. Computer Products (Unipower) Power Supply

LH Research Power Supply Option Straps

The LH Research power supply has a different physical setup and markings. To check the straps:

1. Look through the clear AC guard plate. Two metal straps are needed for 115 VAC power (see Figure 7-7, *LH Research Power Supply Strapped for 115V Input*). One strap should link the two leftmost terminals and the other should link the two rightmost terminals around the barrier strips.
2. If the straps are set up for 230 VAC power, remove the AC guard plate, then loosen the 230 VAC screw terminals (both metal straps under the 230 VAC power strap). Connect the straps to the 115 VAC terminals.
3. Two other screw terminals in a different location are AC (N) (AC common or neutral) and AC (L) (AC line or hot). These connect to the local LCJ58886U-1 cable during installation.



J1 ALARM CONNECTOR

PIN	FUNCTION
1	+5 (V)
2	OPEN
3	ALARM RET GND
4	-5 (V)
5	POWER FAIL
6	CHARGER CKF FAULT
7	BATTERY REMOTE OFF
8	DC OK
9	CHARGER ROTE

* NOTE:

A JUMPER STRAP MUST CONNECT THE TOP 2 POSITIONS (+12V OUTPUT)

A SECOND JUMPER STRAP MUST CONNECT THE BOTTOM 2 POSITIONS (+12V RETURN)

Figure 7-7. LH Research Power Supply Strapped for 115V Input

ITT Power Supply

Figure 7-8, *ITT Power Supply Wiring (Original AUDIX Harness)*, and Figure 7-9, *ITT Power Supply Wiring (Second-Design AUDIX Harness)*, show two different wiring configurations used with an ITT power supply when installed in the AUDIX cabinet. The wire colors shown in Figure 7-8 represent the original AUDIX wiring harness. For AUDIX cabinets with wire colors other than that shown here, refer to Figure 7-9.

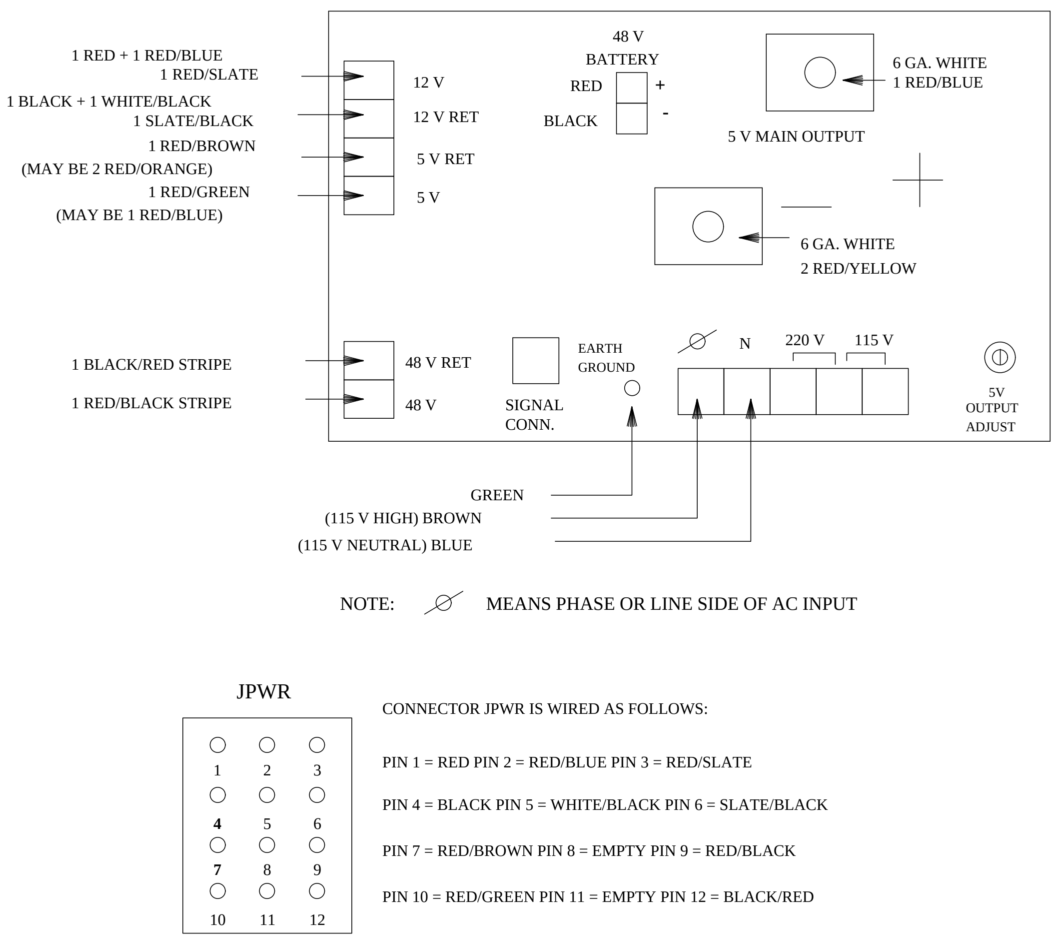


Figure 7-8. ITT Power Supply Wiring (Original AUDIX Harness)

The wire colors shown in Figure 7-9 represent the second-design AUDIX wiring harness. For AUDIX cabinets with wire colors other than that shown here, refer to Figure 7-8.

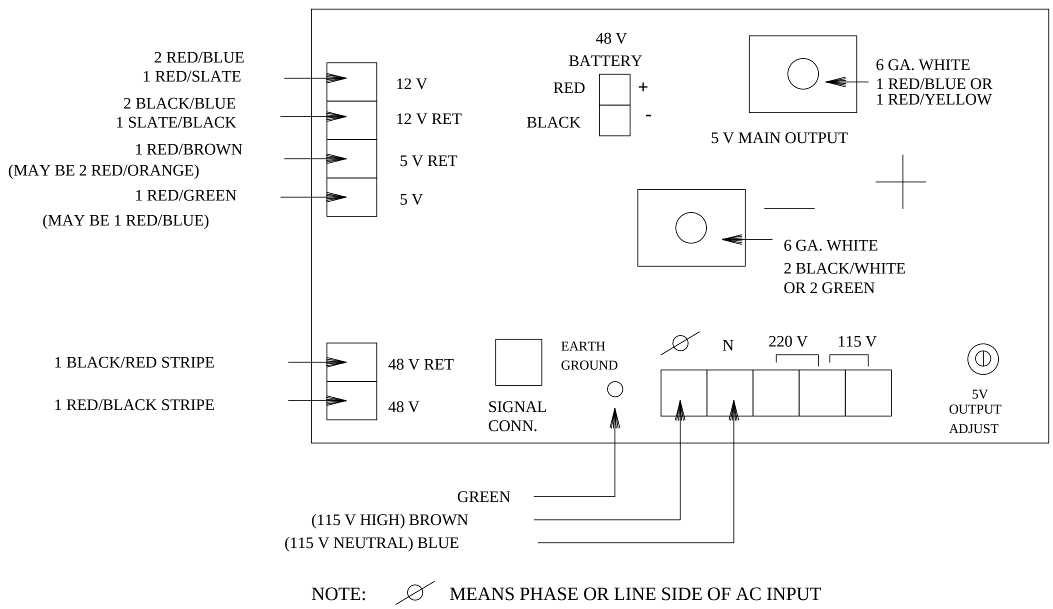


Figure 7-9. ITT Power Supply Wiring (Second-Design AUDIX Harness)

Replace the DC Power Supply

The power supply is a last-choice replacement after checking cables. Comcodes for replacement parts are in Appendix C. Instructions for installing DC power components are in Kit no. D-182236 and repeated in Chapter 9, *Adding New Hardware* for your convenience. Steps 26 through 34 describe the connections to the power supply. *Make sure the system is shut down and powered off at the system and at the DC power plant before servicing the DC power supply.*

8. Terminal Setup and Use

Both local and remote service personnel use a display terminal to access the AUDIX system. There is only one maintenance port on the back of the AUDIX system, so this port must be shared. Before starting any troubleshooting, first make sure that the terminal is connected to this port.

This chapter contains the following information:

- Display Terminal Troubleshooting
- Printer Troubleshooting
- Display Terminal and Printer Setup
- Option Settings
- Terminal Commands and Use

DISPLAY TERMINAL TROUBLESHOOTING

These procedures should isolate the problem to the terminal, the connecting equipment, or the AUDIX MI board (TN511).

Check the Power

1. If the display terminal is not powered up, first plug it into an approved outlet. Most local terminals require a 60-Hz, 120 V AC outlet fed from the same AC load center as AUDIX.
2. Place the terminal's power switch in the ON position. If the AUDIX system and the maintenance terminal are operational, this causes a `login:` prompt to appear.
3. If nothing happens, plug a working appliance (such as a lamp) into the terminal's AC outlet to see if it is working. If the outlet is okay, go to the next section.

Check the Terminal

1. Check the brightness setting. If turned all the way down, the screen appears blank.
2. Make sure the option settings and modes are correct (see *Option Settings*).
3. Press BREAK slowly several times to try to get a response. This should cause the `login:` prompt to appear.
4. If there is still no response, run the terminal self-tests if possible (see *Option Settings* or the appropriate user's manual). If the terminal passes, go to the next section.

Check the MI Connection

1. If you still do not get a prompt and the terminal seems okay, check for a good MI connection by pressing CTRL-e on the terminal. (This empties the MI buffer.)
2. *If characters appear or a bell sounds,* the MI is communicating with the terminal. The missing prompt is probably an AUDIX system problem. Do the following:
   a. Reinitialize the system (reboot or use the `startup` form).
   b. Press BREAK again. If a `login:` prompt appears, the problem is fixed.
3. *If there is no response to the CTRL-e,* the MI is *not* communicating with the terminal. This is probably a connection problem. Check the physical connections (either to the remote maintenance modem or to the MAINT connector on the AUDIX cabinet) as follows:
   a. Make sure all necessary cables are present and seated correctly (see *Display Terminal and Printer Setup*).
   b. For the RMT, check the modem and option settings (see *Display Terminal and Printer Setup* and *Option Settings*).
   c. Swap any damaged or suspected cables with known good cables.
4. Recheck for a good MI connection by pressing CTRL-e again. If characters appear or the bell sounds, the problem is fixed.
5. If there is still no response, the TN511 MI circuit pack may be faulty. A local technician should replace the MI board as described in Chapter 4, *Circuit Pack Faults* then do the following:
   a. Recheck the MI connection by pressing CTRL-e on the LMT. If characters appear or the bell sounds, the problem is fixed.
   b. If you get no response and cannot solve the problem, escalate the problem using your local procedures.

If *both* local terminals fail to respond, check the CDR1B alarm board’s internal cable connections to the rear connector panel. See Chapter 7, *Power and Environment*.

PRINTER TROUBLESHOOTING

To troubleshoot problems with printer, follow these basic steps:

1. Check that the printer is correctly set up (see *Display Terminal and Printer Setup* and *Option Settings*).

   NOTE A printer connected to a 610 BCT or 615 MT must be optioned for the same speed as the 610/615.

2. Turn the printer off and back on. Try to print again. If the printer still fails to work, check that all cables are seated in the connectors and that the terminal is correctly set up.
3. If these steps do not fix the printer, refer to the printer's user manual.

DISPLAY TERMINAL AND PRINTER SETUP

The AUDIX MAINT connector (H00) is used to connect both the Local Maintenance Terminal (LMT) and the Remote Maintenance Terminal (RMT). One of these connections must always be in place as described in this section.

LMT and RMT Cabling

The local and remote maintenance terminals are required for every AUDIX system. Both terminals share the MAINT connector, so only one maintenance connection can be active at a time. The connection may run at 1200 bps (remotely) or 4800 bps (locally).

AUDIX works with any of the 513-family terminals, including the 715 Business Communications System (BCS), the 615 Multi-tasking Terminal (MT), or the 610 Business Communications Terminal (BCT). Other equivalent terminals include the TELETYPE 5420 terminal or the AT&T 4415, 4425, or a 6300-type Personal Computer such as the PC 6300 (+) using a 513 emulator software package.

Cabling for the LMT, RMT, and printer are covered in this section. For details on the possible different configurations, see the AUDIX installation manual or AUDIX system description manual.

NOTE Each terminal has its own configuration and installation requirements. Always obtain and read the correct documentation for the type of terminal you are using. Option settings for several different models are provided here.

LMT Cabling

The Local Maintenance Terminal (LMT) should be installed in the equipment room within sight of the AUDIX front panels. The LMT is cabled directly (hard-wired) to the AUDIX maintenance port (MAINT H00); this connection should run at 4800 bps. A local terminal installation requires an ED-1E434-11 Group 311 (RS-232C compatible) and an H600-258 Group 1 (AUDIX null modem) cable, shipped with the basic AUDIX system.

Figure 8-1, *Local Maintenance Terminal Setup*, shows the standard LMT connection. If you use another setup for this terminal connection, see *Option Settings*.

NOTE	The AUDIX null-modem (H600-258 Group 1) cable is a special crossover cable (more than just the transmit and receive leads are crossed). You *cannot* use this cable in place of any other standard null-modem cable.

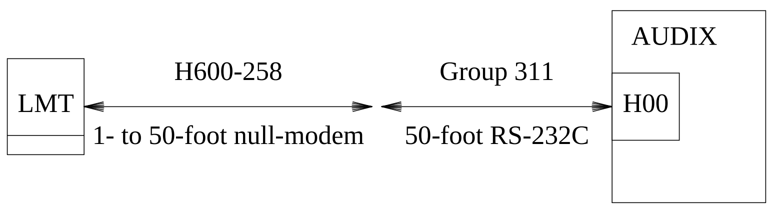


Figure 8-1. Local Maintenance Terminal Setup

RMT Cabling

The Remote Maintenance Terminal (RMT) connection should always be in place except when the LMT is being used. It connects AUDIX to a remote maintenance site. Normally, an analog modem (data set) transmits signals over the AUDIX maintenance port at 1200 bps. Analog signals require only 1-pair wiring and can be used with any switch. Because a modem uses an RS-232C interface, it should be located within the recommended limit of 50 cable feet from the AUDIX port.

An Optima 2400, Paradyne DM224, AT&T 2212, 212AR, 4000, or equivalent Hayes-compatible modem is connected to the AUDIX H00 (MAINT) connector with an ED-1E434-11 Group 311 (RS-232C compatible) cable (this cable is shipped with the AUDIX system). The modem must be plugged into a 120 V AC power outlet and attached to the switch with a D8W-87 modular wall cord plugged into a 104A wall jack.

Typically the D8W-87 4-pair wall cord plugs into the modem's modular LINE connector, and is then attached to the building wiring or cross-connect field. Another modem and the RMT are at the far end of the connection. Figure 8-2, *Remote Maintenance Cabling*, shows the local cabling for the RMT connection.

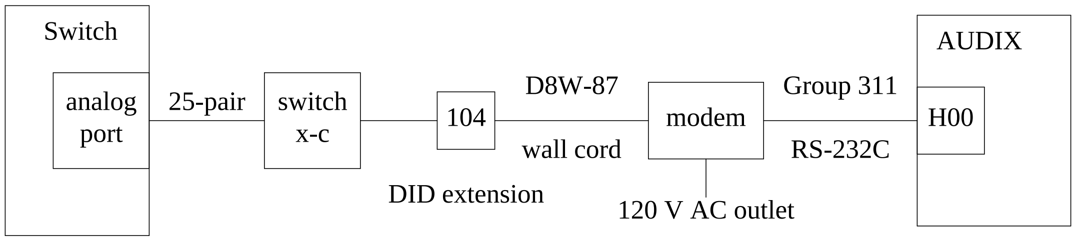


Figure 8-2. Remote Maintenance Cabling

Local Printer Cabling

A parallel or serial printer (6417, 475/572, or equivalent) may be attached to the Local Administration Terminal (LAT) so the AUDIX system administrator can print out traffic reports, subscriber data, and system configuration information. If possible, connect the LAT to the H00 connector temporarily for use as an LMT during a service visit.

OPTION SETTINGS

This section contains option settings for terminals, printers, and modems. It also contains alternative modem arrangements.

Display Terminal Option Settings

AUDIX software can automatically load the correct option settings and program the soft (screen-labeled) keys for TELETYPE 5420 and 513 BCT-type displays, such as the 715 BCS, 615 MT, or 610 BCT. If desired, other compatible terminals may be substituted, but they often require more complicated keyboard commands, additional option settings, or other customization.

The following option settings apply to the 715 BCS, 615 MT, 610 BCT, 513 or 515 BCT, TELETYPE 5420, AT&T 4425, or other compatible terminals.

1. Access the terminal's options menu as described by the user's manual for that terminal.
   a. On a 715 BCS, 615 MT, or 610 BCT, press CTRL Set-Up.
   b. On a 513-type BCT, press SHIFT LCL MENU, then press the terminal setup screen-labeled key (f1).
   c. On a TELETYPE or AT&T terminal, press SHIFT SET-UP.

Make sure the following options are set.

On all terminals:	On some terminals:	On a 610/615 BCT:
Speed = 4800 Send Parity = even Check Parity = no Return Key = CR Newline on LF = no	Duplex = full Clock = asynch Transmission = char	Autowrap = on (other personal functions)
"Enter" Key = ec[2a	where ‘‘ec’’ is ESCAPE. The ENTER key is programmed automatically for the terminals listed in *Terminal Commands and Use*.	

2. Save the option settings. On most AT&T terminals, press SAVE ALL (f6) to exit the menu. On a 610/615 BCT, press SAVE, then CTRL Set-Up again. On a 715 BCS, return to the Setup Menu and press SAVE.

NOTE You cannot do the next two steps on all terminals (such as the 610/615 BCT). Check your user’s manual for appropriate tests.

3. Run terminal tests. See the appropriate user’s manual if the tests fail. For the 715 BCS, see the *715 BCS User’s Guide and Service Manual* (999-300-765) for terminal and keyboard tests.
   a. On most terminals, press SHIFT LCL MENU. On a 513-type BCT, also press tests (f6).
   b. Next, press the TERMINAL TEST screen-labeled key. A beep means it passes.
   c. Finally, press KEYBOARD TEST. A beep means it passes.
4. Check terminal and transmission modes.
   a. On most terminals, press SHIFT MODES.
   b. Next, press each relevant function key to set the following modes. An asterisk (*) in the field means the mode is *on*:

      Character Mode = ON (CHAR MODE *)
      Remote Mode = ON (LOCAL MODE) or (REMOTE MODE *)
      Others = OFF (no *’s required).

NOTE You may set certain options such as XON/XOFF (DC1DC3 *) or timing without hurting AUDIX operation.

5. To return to the original screen-labeled keys on most terminals, press SHIFT SYS PF or SHIFT USER PF. On a 610/615 BCT, press CTRL Sys Fkey or CTRL User Fkey. On a 715 BCS, press CTRL Systm or CTRL User.

NOTE

If you are missing some AUDIX function keys on your compatible terminal (such as ENTER on a 6300-type AT&T PC), you should also recode your Programmed Function (PF) keys with the appropriate AUDIX function if possible (see Table 8-2, *USER PF Key Setup*).

Modem Option Settings

A modem (data set) is the most common type of remote connection used for the RMT. The Optima 2400, Paradyne DM224, AT&T 2212, 212AR, 4000, or equivalent Hayes-compatible modem is recommended for the remote maintenance link. Always obtain the correct document for the type of data device you are using for complete information. For modem installation or for remote troubleshooting, check the following option settings:

1200 bps = ON	internal timing = ON
asynchronous transmission = ON	local echo = ON
automatic answer = ON	loss-of-carrier or space disconnect = ON
data transparency = ON	10-bit character length = ON

See Figure 8-2, *Remote Maintenance Cabling*, for details on installation (including cable connections) and an illustration.

2212 and 2212C Modems

The 2212 modem needs to have one soft option adjusted before it can be attached to AUDIX. A display terminal must be connected to the modem:

1. At the terminal, press CTRL f1 simultaneously. Set baud rate to 1200. Set parity to even. Set RETURN key to CR/LF. Press SAVE ALL. Press CTRL f1 to clear the screen.
2. Disconnect the modem from the AC outlet. Then temporarily disconnect the 2212 from the H00 port and connect the Group 311 cable to the terminal.
3. Press RETURN a couple times or until `dialer waiting` is displayed.
4. Press o (or O) and RETURN.
5. Enter **data transparency=y** and press RETURN.
6. Reconnect the modem to the AUDIX H00 port. Reconnect the modem to the AC outlet. Reconnect and reoption the terminal as it was.

If you are using a 2212C modem, use the same procedure mentioned above to set the soft options. Before you reconnect power to the modem, set the four dip switches inside the unit (component side) to dip1 - closed (rocker pressed toward the number), dip2 - open, dip3 - open, and dip4 - closed.

Optima 2400 Modem

The options for the Optima 2400 modem are set at the factory for intelligent operation. To adjust the settings for remote maintenance operation:

1. Temporarily connect the modem to the Local Maintenance Terminal (LMT) using an RS-232 cable.
2. Set the terminal to run at 1200 baud.
3. Type **`at`** and press the RETURN key on the terminal.

   The screen should display `OK` to indicate the terminal recognizes the modem.
4. Type the following commands in order, pressing RETURN after each one. The word `OK` should appear after every command.
   a. **`atz0`** (reset options to default values)
   b. **`atS0=1`** (autoanswer on first ring, set for Hayes Optima modem only)
   c. **`atS37=5`** (lock speed at 1200 bps)
   d. **`at&v`** (verify S37 value)
   e. **`at&w1`** (save settings in user profile 1)
   f. **`at&y1`** (designate user profile 1 as the power-up options)
5. Put the 2400 modem in dumb mode after setting the options. Refer to the installation guidelines shipped with the modem for an illustration of this procedure.
   a. Power off the modem and disconnect all cables (this includes the power cord, the D8W-87 cord, an optional phone, and the terminal).
   b. Insert a screwdriver in the notch on the side of the front end cap, then twist the screwdriver to loosen the end cap.
   c. The dumb mode jumper is located near the left side. It is set at the factory to connect the two rightmost of the three pins for intelligent operation. To enable dumb mode, move the jumper so it connects the two *leftmost* pins.
   d. Reattach the front end cap, then attach the modem to the RS-232 cable connected to the H00 (MAINT) connector on the AUDIX system.
   e. Reconnect the modem to the telephone line (the D8W-87 cord), then reconnect the power cable.
   f. Power up the modem.
6. Dial into the maintenance port from another terminal/modem. The AUDIX system should answer and provide a `login:` prompt.

Paradyne DM224 Option Settings

Set the options for the DM224 modem as follows:

Step 1: Connect a 1200 bps terminal to the back of the modem.

Step 2: Type **at** and press RETURN. You should get an OK response.

Step 3: Type **at s0=1 \n3 q1 &w** and press RETURN. You should get an OK response.

Step 4: Set dip switch number 1 to ON (up).

Step 5: Disconnect the terminal and connect the modem to the RMT cabling.

2224G Option Settings

Set the options for the 2224 modem as follows:

Step 1: Locate the switches on the modem faceplate. Set Switches 1 and 6 to the UP position (1200 baud).

Step 2: Connect an RS-232 cable to the modem and to the INPUT connector on the back of a display terminal.

Step 3: Set the terminal to 1200 bps, even parity and Return Key to "CR".

The 2224's PASS lamp should be on after power up. Press RETURN a few times until **dialer waiting** is displayed.

Step 4: Press SHIFT-o and RETURN. Options S1 through S4 and options 1 through 11 should be displayed. Parity should be set to even. Press RETURN again. Options 12 through 26 should be displayed.

Step 5: If necessary, enter **set parity=even** (for even parity).

Enter **o34=3**.

Enter **o36=1**.

Step 6 Disconnect the terminal from the 2224 modem and return the terminal options to their original values. Connect the RS-232 cable to H00 (MAINT) on the back of the AUDIX.

Other Data Setups

Some installations may have other data devices connecting their terminals to AUDIX. Some possible setups are discussed in this section.

Asynchronous Data Unit (ADU)

The Asynchronous Data Unit (ADU) is used to extend the distance between RS-232C devices or between a device and the switch. The ADU always requires an external AC power transformer when it is attached to one of the AUDIX 25-pin ports (H00 or H01). The transformer may be located in an equipment closet or plugged into an outlet near the AUDIX cabinet. ADU setups include:

- *Hard-Wired:* Two ADUs may be used back-to-back to extend the distance to the terminal. A D8AM-87 crossover cord must be between them. No option settings are needed.
- *Switched Access:* If ADUs are connected through an AT&T digital PBX, the switch port boards must be set up for AUDIX and terminal operation. See *SN238 EIA Port Application Notes* (555-103-522) for System 85 and Generic 2 option settings. On System 75, Generic 1, or Generic 3, options may be set on

the TN726 Data Line board or through a user options menu accessed by pressing BACKSPACE or CTRL-h after getting a `DIAL:` prompt on the screen.

See the AUDIX system description manual for details on ADU setups with AUDIX. The AUDIX installation manual shows cabling connections. See the *Asynchronous Data Unit (Z3A) User Manual* (555-401-701) for complete information on ADUs.

Other Data Devices

Other devices for connecting terminals include a pair of modems (analog switched access), LADS (hard-wired access), or MPDMs (digital switched access). See the AUDIX installation manual for option settings, cable connections, and switch requirements.

- *Analog modems* may be used on any switch (see the previous section).
- *LADS* may be used for extended local applications.
- *MPDMs* may be used for digital switched access on System 75, System 85, or DEFINITY Communications Systems.

Printer Option Settings

A printer should be attached to the Local Administration Terminal (LAT) for record keeping. A variety of printers may be used as long as they are compatible with the display terminal. See *AUDIX Installation* (585-305-105) or the documentation shipped with the printer to set the printer options.

The 6417 25-pin dot-matrix parallel printer is shipped with many new AUDIX systems. To check the option settings:

1. On a 715 BCS terminal, press CTRL Setup to access the Setup Menu, then access the User Preferences submenu and enable the printer port.
2. Access the Printer Options submenu and change the Print Teminator to `FF` (Form Feed after print file is complete) and set the Printer Type to `BCS`.

Many AUDIX systems use a 475 or 572 dot-matrix printer that has an RS-232C serial interface and prints 120 characters per second (cps). On most compatible terminals, set the following options for a 475/572 or equivalent printer:

1. Access the terminal's options menu as described by the user's manual for that terminal.
   - — On a 513-type BCT, press SHIFT LCL MENU, then press terminal setup.
   - — On a compatible TELETYPE or AT&T terminal, press SHIFT SET-UP.
   - — On a 715 BCS, press CTRL Setup to access the Setup Menu, then select the Printer Options submenu.

   Make sure the following options are set:

   Speed = 1200

   Printer Model = 470 (for a 475 or 572 printer also)

For a 715: Set the Printer Type/Driver field to 475 or 572/573

Flow Control = DC1DC3 (XON/XOFF)

Alarm = pin 20 (or none).

2. Save the option settings.
   - — On most terminals, press the SAVE ALL screen-labeled key to exit the menu.
   - — On a 715 BCS, return to the Setup Menu and press SAVE.

CAUTION

To set printer options on a 610/615 BCT, you need to manually set the printer's option switches to 1200 bps. See the appropriate user's manual. Common reference manuals are listed in Appendix C, **Equipment and References***.*

TERMINAL COMMANDS AND USE

This section covers terminal operation procedures including logging on and off, using the printer, accessing and using forms, using keyboard keys and commands, and programming function keys.

Logging On and Off

Once the terminal is correctly set up as described in the previous sections, remote or local maintenance personnel access the AUDIX screen forms as described in this section.

Logging On

Use the following procedure to log on to AUDIX:

1. The terminal should be powered on and connected to the AUDIX MAINT connector as described in *Display Terminal and Printer Setup*.
2. If this is the first time you are using this terminal to access AUDIX, verify that the option settings are correct (see *Option Settings*).
3. *For Remote Personnel:* Dial the number of the AUDIX site using a modem as follows:
   a. Make sure the modem is set up correctly.
   b. Press BREAK to select 1200 bps. A `login:` prompt should appear.
   c. Dial the number of the remote AUDIX site and press return.
4. *For Local Personnel:* Press BREAK to change the baud rate between 4800 bps and 1200 bps as needed.

NOTE On a PC 6300, CTRL can also be used to toggle the baud rate.

5. If AUDIX software is running, the terminal screen should display a `login:` prompt.

   If the prompt does not appear, press BREAK slowly a couple of times. If you can't get a response, go back to *Display Terminal Troubleshooting*.

   Type in your login code and press RETURN (*not* ENTER). The four default system logins are *craft, cust, inads,* and *ap.* Service personnel should use `craft`.

   NOTE If you make a typing error, use BACKSPACE or CTRL-h.

6. After you press RETURN the system should display a `password:` prompt.

   Type in your password (usually **`craft`**) and press RETURN. The system automatically blacks out the password so it cannot be read off the screen.

   NOTE Call the appropriate remote maintenance service center (such as the AUCC) for the lastest craft password to log in to AUDIX.

7. After you press RETURN, the system should display a `terminal type:` prompt.

   Type in terminal type **`513`** (for any 715 BCS, 615 MT, 610 BCT, 513 BCT, or equivalent) or **`5420`** (for any TELETYPE or AT&T-equivalent terminal) and press RETURN.

8. The AUDIX STATUS and PATH lines should appear at the top of the display screen. You can now access any administration or maintenance form.

NOTE If the login information is not correct, the AUDIX screen-labeled keys will not appear. Log off (press CTRL-d) and try the login procedure again.

Logging Off

From any form on any type of terminal, press CTRL-d to log off. The system responds:

```
logged off.  good-bye.
```

You may also turn the terminal off to drop a connection. AUDIX software has a built-in time-out for idle sessions. If you do not enter any characters for 1 hour, the session is automatically logged off. To extend the session, press any key.

Using the Printer

To use an attached printer, see the printer's user manual. For any 513-type BCT (such as the 610 BCT or 615 MT with the 513 emulation cartridge) or equivalent terminal:

1. When the data you wish to print is on the terminal screen:
   a. On a 715, 615, or 610, press CTRL Print.
   b. On a 513-type BCT, press SHIFT LCL PRT.
   c. On a TELETYPE or AT&T terminal, press SHIFT PRINT.
2. Press the appropriate screen-labeled key such as PRINT SCREEN, PRINT LINE, or STOP PRINT. Do *not* use LOG TEXT on BCTs.
3. To return to the original screen-labeled keys, press SHIFT SYS PF or SHIFT USER PF. On a 610 or 615, press CTRL Sys Fkey or CTRL User Fkey. On a 715 BCS, press CTRL Systm or CTRL User.

Displaying Screen Forms

Screen forms are only available when the system is in the normal (in-service) mode. Certain forms may be used in the administrative shutdown mode, a subset of normal mode [see the AUDIX forms reference manual for details]. Some forms simply display information (read-only) while others allow you to add or change information. For the latter, use the screen-labeled function keys (shown at the bottom of the form) to do the desired action. Figure 8-3, *The* `list : volume names` *Form*, shows a sample screen form (`list : volume names`) and the regular AUDIX screen-labeled function keys.

Forms are displayed by supplying the correct name on the PATH line. Path names are divided into *segments* (subdirectories) which identify the form and its location to software. This software arrangement is called a *parse tree*, where the different segments are *branches* of the tree.

```
AUDIX STATUS:  alarms: none,  logins: 1,  thresholds: none
 PATH:  list : volume names

controller       device         name          free space/size (blocks)

    0              0          disk00          3054/8651
    0              1          backup           172/1020
    0              2          disk02          1132/8651






Error and confirmation messages appear here.

| CHANGE | ADD  | DELETE |    | HELP | FIELD |    | CLEAR | EXIT | ENTER |
| or RUN |      |        |    |      | HELP  |    | FORM  |      |       |
```

Figure 8-3. The `list : volume names` Form

The STATUS Line

When the MI and software are working, a STATUS line appears at the top of the display terminal screen. The STATUS line shows alarms (warning, minor, major, administrative, or none), logins (two terminals may be logged in at one time), and threshold violations (if any) as follows:

- **alarms:** This field shows *none* for no alarms or *w* (warning), *m* (minor), *M* (major), or *A* (administration) according to the severity of the alarm. Go to Chapter 3, *Start Troubleshooting* if any alarms are reported.
- **logins:** This field shows the number of display terminals logged on to the system. Up to two logins are possible at any given time. If you notice another login in progress, always contact that person (usually the system administrator) to make sure your actions do not conflict (two people cannot access the same form simultaneously).
- **thresholds:** This field shows filesystem disk space violations. For any status other than *none*, call your remote maintenance service center for software troubleshooting.

The PATH Line

The PATH line appears below the STATUS line on the display screen. This line is the input field that allows you to select the maintenance or administration form you wish to display. You may use either ENTER or RETURN after typing in each segment of the form you wish to access. If you press HELP, a list of choices for the next segment appears. See Table 8-1, *Terminal Commands*, for additional commands and information.

The Message Line

The blank line just above the AUDIX screen-labeled function keys is the error/confirmation message display line. When you access or try to run an AUDIX form, a message appears here informing you of problems, progress, or success. These messages are listed and explained in the appropriate forms reference manual for your system.

Screen-Labeled Keys

The eight reverse-video boxes at the bottom of the screen are the AUDIX function keys. They are called *screen-labeled* keys because the AUDIX software programs these keys when you log in to AUDIX. In some cases you need to set up these keys yourself (see *Programming Function Keys* at the end of this section). AUDIX function keys include:

1. CHANGE or RUN: This key executes a form or processes new data after you have made changes or requested a test to run.
2. ADD: This key adds a subscriber, filesystem, or other entity to the system.
3. DELETE: This key removes a subscriber, filesystem, or other entity from the system.
4. HELP: This key displays online information about the form currently on the screen, including its display-only fields. If you are on the PATH line, it shows you the next possible entries from your current position. It is equivalent to the HELP key on the keyboard (if present) or the CTRL-key commands listed in Table 8-1.
5. FIELD HELP: This key displays online information about a specific data-entry (modifiable) field on a currently displayed form. The cursor marks the field to be described.
6. CLEAR FORM: This key is used to blank all fields without leaving the form.
7. EXIT: This key is used to leave a form or back up on the PATH line. It is equivalent to EXIT on the keyboard (if present) or the CTRL-x command.
8. ENTER: This key is used to display information on a form. It is equivalent to ENTER on the keyboard (if present) or the CTRL-key commands listed in Table 8-1.

Online Help

The online help facility gives a terminal user a summary of commands, forms, or field options at the touch of a key. All AUDIX administration and maintenance forms offer three levels of online help to supplement written documentation:

PATH Line Help Whenever your cursor is on the PATH (command) line of the terminal screen, you can use the help feature to find out the next possible segments (parts) of a form name. You can activate the help feature by pressing HELP or by using a CTRL-key sequence (see Table 8-1). The help feature lists all legal command options available to you at that point in the path. After typing a valid segment (or its unique abbreviation) and pressing ENTER, you can again request help for the next segment.

Form Help Whenever a form is displayed on the screen, use HELP (or equivalent) to show a summary of the form's purpose, valid commands (such as CHANGE or ENTER), and other pertinent information. The display-only fields for that form (if any) are also listed in the form help summary.

Field Help Whenever the cursor is on a data-entry (modifiable) field in a form, use FIELD HELP to show a brief description of that field and list valid options you may enter. Because the cursor cannot rest on a display-only field, these fields are described under the form help.

PATH Line and Terminal Commands

Table 8-1 shows commands which may be used on the PATH line or in an AUDIX form. These commands may be given through the programmable function (screen-labeled) keys discussed previously, or by using the following *keyboard-labeled* keys that are physically present on the keyboard. The CTRL (control) characters are often used on non-BCT terminals. Hold down the CTRL key, then press the other key linked with a hyphen (‘‘?’’, ‘‘d’’, etc.) to do the function.

Table 8-1. Terminal Commands

Function	**610/615 or 513 BCT Family**	**54xx- or 44xx- Type Terminal**	**PC 6300 or 715 BCS**
Back up cursor over the last character typed	BACKSPACE	CTRL-h	Backspace
End entry of one segment (part) of a form name or its unique abbreviation	ENTER *	ENTER * †	ENTER * (on PC) RETURN (on 715)
Show the next possible segment entries for your current position	HELP *	CTRL-?	CTRL-_
Move cursor to the next enterable data field	NEXT or TAB	TAB	TAB
Move cursor to the last previous enterable data field	PREV or SHIFT-TAB	SHIFT-TAB	SHIFT-TAB
Exit the form or back up one (more) segment in the command path	EXIT * or CTRL-x	CTRL-x	CTRL-x
Exit the form and clear the entire PATH line	SHIFT-EXIT or CTRL-z	CTRL-z	CTRL-z
Log off from any point in a form or on the PATH line	CTRL-d	CTRL-d	CTRL-d

Note: The PC 6300 (or equivalent) must be running a 513 emulation package.

* These keys also appear on the screen-labeled function keys.

† For some terminals, you may need to use the codes in Table 8-2.

Accessing and Using Forms

This section discusses how to move into and out of forms, move within a screen form, and run (execute) a form. Key sequences that may be programmed on User PF keys are shown in Table 8-2, *USER PF Key Setup*.

Accessing a Form

To show a form, enter each segment individually on the PATH line as follows:

1. Type each segment name (or a unique abbreviation) individually (press the space bar or RETURN between segments). Colons (:) are automatically inserted by software. For example, the `maintenance : dbp : equip` form can be entered as:

   m SPACE *db* SPACE *e* RETURN

   NOTE

   RETURN works the same as ENTER on the PATH line, but *not* in the form.

   If you choose an abbreviation that is not unique, the system displays an error message.

2. To display the menu of segment(s), press HELP, CTRL-?, or CTRL-_.

Moving in a Form

To move around the different fields in a form, use the following keys:

1. NEXT or TAB: Moves the cursor to the next data field that you are allowed to change (you cannot type on display-only fields)
2. PREV or SHIFT + TAB: Moves the cursor to the previous enterable data field
3. —>: Moves the cursor right one field or down one line
4. <—: Moves the cursor left one field or up one line

Changing Data Fields

For fields that allow data input, type in the desired characters using the appropriate keys on your terminal. For example:

1. To erase any information already in the field, you may use the space bar, CLEAR LINE, DEL LINE, DEL CHAR, or DEL WORD if available.
2. To add new information, you may need to use INS CHAR or INS LINE if available. The <— and —> keys may also be used.

3. To clear all information from the form and place the cursor at the top of the form, press CLEAR FORM.
4. To find out what to type for a specific field, move your cursor to the field and press FIELD HELP.

Using the Form

The use of a form depends on its function. Some forms or fields are read-only (you can only display information). Others allow you to type in new data or run an operation.

1. To execute a form, use CHANGE or RUN, ADD, or DELETE. The correct key to press for your operation should be noted on the screen. See AUDIX forms reference manual for details on running forms.
2. To display information on a form, use ENTER. For example, you may need to type a volume or filesystem name, then press ENTER to see additional information about it.
3. To display information on a read-only form, simply type the form's path name. After a pause, the form and its information appear.

Exiting the Form or Path

You may back up the PATH line out of the form partially or all at once.

1. To back up one segment, press EXIT or CTRL-x. The screen shows the PATH line with one less segment.
2. To clear the entire PATH line and exit the form, press SHIFT EXIT or CTRL-z. The PATH line will be blank.

Logging Off

To log off of AUDIX, press CTRL-d at any point (in a form or on the PATH line).

Programming Function Keys

The BCT-family of terminals including the 513, 610, and 615 MT have EXIT, HELP, and ENTER on their keyboards. On a 715 BCS, TELETYPE 5420 terminal, AT&T 4425-type terminal, or 6300-type PC, you must press two keys simultaneously as shown in Table 8-1.

To use a single button for these 2-key functions, you may code these functions on the User Programmable Function (USER PF or User Fkey) keys as shown in Table 8-2. Once programmed, the corresponding screen-labeled key acts like the appropriate keyboard-labeled (physical) key on a BCT terminal. To access the User PF keys, press SHIFT SET-UP twice on most terminals. On a 610 BCT or 615 MT, press CTRL Set-Up, then NEXT SET-UP. On a 715 BCS, press CTRL User. To program the keys, access the User Function Key Setup submenu under the Setup Menu (CTRL Setup).

AUDIX software automatically programs the System Programmable Function (SYS PF or Sys Fkey) keys for many compatible terminals with the screen-labeled AUDIX function keys described in this section. See the sample form in Figure 8-3. These terminals include:

- TELETYPE 5420 and 5410 terminals
- AT&T 4415, 4420, and 4425 terminals
- 513-type terminals including the 515 BCT, 715 BCS, and the 610 BCT or 615 MT with a 513 emulation cartridge

As an option, you may recode some (or all) of these AUDIX functions on your User PF key menu. You can then run all your chosen screen-labeled key options with one button push, without switching between the User PF and System PF menus. For example, if you already have EXIT on your keyboard, you may wish to recode the EXIT screen-labeled function key with another function you *do not* have. However, it is recommended that you use the first five entries in this table (F1 to F5) to match the normal AUDIX system screen-labeled keys.

Table 8-2. USER PF Key Setup

Function Key	Key Label	R1V2 to R1V4 Coding Sequence *	R1V5 and Later Coding Sequence *
F1	CHANGE or RUN	EcOc	EcOc
F2	ADD	EcOd	EcOd
F3	DELETE	EcOe	EcOe
F4	HELP	EcOf	EcOf
F5	FIELD HELP	EcOb	EcOg
F6 (V2)	CLEAR PATH	CTRL-z or Ec[P (DEL CHAR) †	
F6 (V3)	CLEAR FORM	CTRL-g	EcOh
F7	EXIT	CTRL-f or CTRL-x ‡	EcOi
F8	ENTER	CTRL-b or Ec[2a ‡	EcOj

* Ec = ESC (escape) key.

† AUDIX downloads this as a blank key (CTRL-a) in R1V2, but you can make it whatever function you wish. Two examples are shown (the delete character function is recommended for a PC 6300).

‡ The two coding options shown for F7 and F8 act the same.

9. Adding New Hardware

This chapter covers adding voice port boards, swapping a new TN500 Time Division Bus Interface (TDBI) for the early TN477 TDBI-8, and converting a one-cabinet AUDIX system into a two-cabinet AUDIX system. Also, be sure to follow any specific instructions that come with the hardware device.

NOTE If you plan to add hardware to an existing AUDIX system, or if you need to convert a one-cabinet AUDIX system into a two-cabinet system, contact the appropriate remote maintenance service center such as the AUDIX Upgrade Control Center (AUCC).

This chapter is organized as follows:

- Switch Prerequisites
- Adding TN501B Circuit Packs Only
- Adding TN501B, TN747B, and TN500 Circuit Packs
- Adding An AUDIX Expansion Cabinet
- Adding DC Power

NOTE To add new disk drives, see Chapter 6, *Disk Drives*. To add circuit packs other than the ones mentioned, see Chapter 4, *Circuit Pack Faults*.

SWITCH PREREQUISITES

Before installing any new TN501B circuit packs, the switch must have spare analog port circuits. These circuits must be patched through to the AUDIX cross-connect field, and switch administration must be in place. Contact the switch administrator to have these additions made as required. Switch requirements and cabling from AUDIX to the switch are described in *AUDIX Installation* (585-305-105). Switch translations are described in *Switch Administration for AUDIX Voice Messaging* (585-305-505).

It is recommended that all the switch translations be entered and in place with the exception of the addition of the AUDIX extensions in the AUDIX UCD/ACD hunt group; these will be added later.

NOTE

When a new TN747B is required at AUDIX, a new 25-pair cable must be installed from the corresponding AUDIX D0x connector to the AUDIX cross-connect.

ADDING TN501B CIRCUIT PACKS ONLY

These steps are for adding new TN501B circuit packs in the slots associated with an existing TN747B. If the existing TN747B has no empty TN501B slots, a new TN747B is required and you must follow the steps in *Adding TN501B, TN747B, and TN500 Circuit Packs*.

NOTE

You do *not* have to shut down and power down the AUDIX system for the following steps.

1. Insert the TN501B(s) in the next available VPC slot(s). The slot has a corresponding VPC board number (e.g., VPC-1). This board number is used in step 7.

   Note the red LED on the TN501B's faceplate. It should be lit momentarily and then go dark. If it does not go dark, the pack is bad. Remove it and get a replacement. If the LED goes dark, continue with step 2.

2. At the Local Maintenance Terminal (LMT), log in using the craft login and password. Enter the terminal type.

3. At the path line, enter **`m vsp eq`** and press [ENTER] (F8).

   Tab to the VPC fields that correspond to the TN501B(s) that was inserted in step 1. Press [DELETE CHAR]. This changes the UEQ to EQ. You could also type over the UEQ by entering **`eq`** (followed by the space bar). When all new VPCs are equipped, press [CHANGE or RUN] (F1).

   When `operation confirmed` appears on the message line, press [EXIT] (F7) three times to exit this form (or press [CTRL-z] once).

4. At the path line, enter **`sy tr v`** and press [ENTER] (F8).

   Tab to the first unassigned field (should correspond to the new TN501B). Enter the switch extension assigned to this AUDIX voice port. Check the cross-connect field and the switch translations, if necessary. If this is not done correctly, the new ports won't work.

   Repeat for each new AUDIX voice port. Once the extensions are entered in the correct fields, press [CHANGE or RUN] (F1).

   When `operation confirmed` appears, press [EXIT] (F7) three times to exit.

5. You need a telephone close to the LMT for this step. At the path line, enter **`m sy test`** and press [ENTER] (F8).

   Tab to `port number` and enter the port number for the first new port added. Then tab to `type` and enter **`c`**. *Before you press the F1 key*, go to the phone and dial the extension assigned to this port.

When you hear ringing, then press CHANGE or RUN (F1) at the LMT. Wait for `operation confirmed`. The message `allocated` should appear under `status` on the LMT. At the phone you should hear AUDIX answer. If AUDIX does not answer, proceed to step 6. *(Do not hang up the phone.)*

If AUDIX answers, press * H on the phone's keypad and verify that the voiced messages can be heard clearly.

Hang up the phone. At the LMT, set `type` to **d** and press CHANGE or RUN (F1). When `operation confirmed` appears, press CLEAR FORM (F6) to clear the form. Repeat this process for each newly added port and extension. When finished, press EXIT (F7) two times. See step 7.

6. If you hear ringing and no answer on the phone, note the state of the amber light on the TN747B associated with new VPC. Is it lit or dark? You can now hang up the phone. At the LMT, set `type` to **d** and press CHANGE or RUN (F1) to disconnect. If the light was lit, go to item (b). If the amber light was dark, go to item (a).

   a. Press EXIT (F7) two times. At the end of the path line, enter **vsp busy** and press ENTER (F8). Tab to `type` and enter **vpt**. Press CHANGE or RUN (F1). If `b` is displayed in the field(s) corresponding to the ports just added, then a restart of AUDIX is required to release these ports. Press EXIT (F7) three times to clear the path line.

      Inform the customer that you need to take the AUDIX out of service for a short period of time. At the path line, enter **startup**. Press ENTER (F8). Then press CHANGE or RUN (F1) as instructed on the form. Shortly initialization messages start scrolling on the screen, indicating that the AUDIX is restarting. Wait for several `login:` prompts to appear. Wait for `start service` to appear. Then log in at the next login prompt. Go back to step 5 to retest the port(s).

   b. The cross-connections are suspect at this point. Recheck and verify that these are correct. Once verified, go back to step 5.

7. At the path line, enter **vpc test**. Press ENTER (F8).

   Tab to `board` and enter the VPC number associated with the new TN501B.

   Tab to `repetitions` and enter **3**. Tab to `long version` and enter **n**. Tab to `start` and enter **x**. Press CHANGE or RUN (F1).

   When `operation confirmed` appears, check the status of the test by clearing the `start` field (press the space bar), tab to `status`, enter **x**, and press CHANGE or RUN (F1). All fields should pass.

   NOTE The NPE crosstalk result is displayed only when `long version` = y.

   If the test takes longer than a few seconds, you can monitor the progress of the test by repeatedly pressing CHANGE or RUN (F1). When all three repetitions have passed, press CLEAR FORM (F6) to clear the form. Repeat this test for each VPC added.

   When finished, press EXIT (F7) three times.

8. The extensions assigned to the new AUDIX voice ports can now be added to the UCD/ACD hunt group. Have the system administrator perform this step.

9. After the extensions are added to the hunt group, enter **m au fp** on the LMT path line. Press ENTER (F8).

Tab to `Service Dispatcher` and enter **x**. Tab to `start` and enter **x**. Press CHANGE or RUN (F1). This audit generally takes only a few seconds.

When `operation confirmed` appears on the message line, tab to `start`, press space bar, tab to `status`, enter **x**, and press CHANGE or RUN (F1).

The demand status field should display `completed`. This test should result in the AUDIX ports being staffed in and ready to take calls.

Press EXIT (F7) three times to exit this form.

10. At the path line, enter **fi up** and press ENTER (F8). At the `update boot filesystem to:` field, enter the name of the backup boot filesystem (this is generally disk00.boot_e or disk02.boot_e).

    Press CHANGE or RUN (F1). When `operation confirmed` appears on the message line, exit the form by pressing EXIT (F7) twice. Then press CTRL-d to log off.

ADDING TN501B, TN747B, AND TN500 CIRCUIT PACKS

Once the switch has been cabled and translated as described in *Adding TN501B Circuit Packs Only*, the following instructions should be followed. *Inform the customer that you need to take the AUDIX out of service for a short period of time.*

1. Log in to the LMT with your craft login. At the path line, enter **sy fi** and press ENTER (F8). Record the location and name of the active boot filesystem (e.g., disk00.boot_f). Press EXIT (F7) twice.

   If slot 16 of the AUDIX cabinet is already equipped with a TN500, then go to step 2. If a TN477 is in this slot, its ports must be busied, the board must be unequipped, and the board must be replaced with the TN500. Start with item (a).

   a. At the path line, enter **m vsp bu** and press ENTER (F8). Set `type` to **tdbi**. Press CHANGE or RUN (F1).

      All ports associated with this TDBI should have a status of `r`. Tab to each of these fields and overwrite each `r` with a `b`. Press CHANGE or RUN (F1). The message `operation confirmed` should be displayed.

      Press EXIT (F7) once to exit this form.

   b. At the end of the path line, enter **eq** and press ENTER (F8). Tab to `vb/tdbi`, overwrite the EQ with UEQ (first field is for the base cabinet, second field is for the expansion cabinet), and press CHANGE or RUN (F1).

      When `operation confirmed` appears on the message line, press EXIT (F7) three times to exit the form and proceed to step 2.

2. At the path line, enter **st** and press ENTER (F8). Press CHANGE or RUN (F1).

   When FP RESET appears on the screen, press CTRL-c. The Control Mode menu appears on the screen.

3. Follow the instructions on the AUDIX cabinet to power down the system.

4. Once the power has been turned off, remove the TN477 (if there) and insert the TN500.

   Insert the additional VPT and VPC(s) in their assigned slots.

   Install the new 25-pair cable and patch it to the newly assigned analog ports at the switch.

5. Power up the system.

6. At the LMT, respond to the initialization questions as follows:

   Standard Initialization? n <CR>
   Perform extended test of RAM? n <CR>
   Standard boot filesystem? n <CR>

   (The next responses depend on where the boot filesystem is located. This was recorded in step 1. Here we are using *disk02.boot_f* as an example.)

   Boot Disk Controller number? 0 <CR>
   Boot disk number? 2 <CR>
   Boot filesystem boot_? f <CR>
   Initialization stop point desired? n <CR>

   Several messages, including several login prompts, scroll across the screen. Wait for the login preceded by `start service`.

7. Log in with your craft login.

8. Check the new boards for any lit red LEDs. If there are none, go to step 9. If there is one or more lit, the board(s) must be busied and/or unequipped and replaced:

   a. If the TN500 is bad, busy out its ports and unequipped the board as outlined in step 1. Then unequip the new TN747B and TN501B boards.

      If the TN500 is good, but the TN747B and/or TN501B is bad, just unequip the bad board(s).

   b. Shut down the AUDIX system and power down as outlined in steps 2, 3, and 4. Then remove all the unequipped boards. If the TN500 is bad, reinstall the TN477.

   c. Power up the system as in steps 4 and 5. When `start service` is displayed, log in with your craft login. Re-equip the TN477 and make sure its ports are released.

      Make a call to the AUDIX main number to verify service. Once new packs have been received, start over with step 1.

9. Wait a few minutes. Then at the path line enter **`m vsp eq`** and press [ENTER] (F8). Tab to each field corresponding to the board(s) that you have added and press [DELETE CHAR] (or enter **`eq`** followed by the space bar.

   Press [CHANGE or RUN] (F1). Wait for `operation confirmed`. Press [EXIT] (F7) three times to exit.

10. At the path line, enter **`sy tr v`** and press [ENTER] (F8).

    Tab to the first unassigned field (should correspond to the new TN501B). Enter the switch extension assigned to this AUDIX voice port. Check the cross-connect field and the switch translations, if necessary. If this is not done correctly, the new ports won't work.

    Repeat for each new AUDIX voice port. Once the extensions are entered in the correct fields, press [CHANGE or RUN] (F1).

When `operation confirmed` appears, press EXIT (F7) three times to exit.

11. You need a phone close to the LMT for this step. At the path line, enter **`m sy test`** and press ENTER (F8).

    Tab to `port number` and enter the port number for the first new port added. Then tab to `type` and enter **`c`**. Before you press the F1 key, go to the phone and dial the extension assigned to this port. When you hear ringing, press CHANGE or RUN (F1) at the LMT. Wait for `operation confirmed`. The message `allocated` should appear under `status` on the LMT. At the phone you should hear AUDIX answer. If AUDIX does not answer, proceed to step 12. *(Do not hang up the phone.)*

    If AUDIX answers, press * H on the phone's keypad and verify that the voiced messages can be heard clearly.

    Hang up the phone. At the LMT, set `type` to **`d`** and press CHANGE or RUN (F1). When `operation confirmed` appears, press CLEAR FORM (F6) to clear the form. Repeat this process for each newly added port and extension. When finished, press EXIT (F7) two times. Go to step 13.

12. If you hear ringing and no answer on the phone, note the state of the amber light on the TN747B associated with new VPC. Is it lit or dark? You can now hang up the phone. At the LMT, set `type` to **`d`** and press CHANGE or RUN (F1) to disconnect. If the light was lit, go to item (b). If the amber light was dark, go to item (a).

    a. Press EXIT (F7) two times. At the end of the path line, enter **`vsp busy`** and press ENTER (F8). Tab to `type` and enter **`vpt`**. Press CHANGE or RUN (F1). If `b` is displayed in the field(s) corresponding to the ports just added, then a restart of AUDIX is required to release these ports. Press EXIT (F7) three times to clear the path line.

       At the path line, enter **`startup`**. Press ENTER (F8). Then press CHANGE or RUN (F1) as instructed on the form. Shortly initialization messages start scrolling on the screen, indicating that AUDIX is restarting. Wait for several `login:` prompts to appear. Wait for `start service` to appear. Then log in at the next login prompt. Go back to step 11 to retest the port(s).

    b. The cross-connections are suspect at this point. Recheck and verify that these are correct. Once verified, go back to step 11.

13. At the path line, enter **`vpc test`**. Press ENTER (F8).

    Tab to `board` and enter the VPC number associated with the new TN501B.

    Set `repetitions` to **`3`**. Set `long version` to **`n`**. Set `start` to **`x`**. Press CHANGE or RUN (F1).

    When `operation confirmed` appears, tab to `start`, press the space bar, tab to `status`, enter **`x`**, and press CHANGE or RUN (F1). All fields should pass. The NPE crosstalk result is displayed only when `long version` = y.

    If the test takes longer than a few seconds, you can monitor the progress of the test by repeatedly pressing CHANGE or RUN (F1). When all three repetitions have passed, press CLEAR FORM (F6) to clear the form. Repeat this test for each VPC added. When finished, press EXIT (F7) two times.

14. At the path line, enter **`m vpt test`** and press ENTER (F8).

    At the `board` field, enter the VPT number associated with the new TN747B. Tab to `repetitions` and enter **`3`**. Tab to `long version` and enter **`n`**. Tab to `start` and enter **`x`**. Press CHANGE or RUN (F1).

    When `operation confirmed` appears on the message line, check the status of the test (see step 13 above). The dial tone test only tests those ports that have extensions assigned in the `system : translation : voice port` form. Repeat this test for each VPT added. When finished, press EXIT (F7) three times. Continue with step 15.

15. If you changed a TN477 with a TN500, you need to test this board. If not, proceed to step 16.

    At the path line, enter **`m tdbi test`** and press ENTER (F8). At the `board` field, enter the TDBI number associated with the new TN500. Tab to `repetitions` and enter **`3`**. Tab to `long version` and enter **`n`**. Tab to `start` and enter **`x`**. Press CHANGE or RUN (F1).

    When `operation confirmed` appears on the message line, check the status of the test (see step 13 above). After successfully testing the TDBI, press EXIT (F7) three times. Continue with step 16.

16. The extensions assigned to the new AUDIX voice ports can now be added to the UCD/ACD hunt group. Have the system administrator perform this step.

17. After the extensions are added to the hunt group, enter **`m au fp`** on the LMT path line. Press ENTER (F8).

    Tab to `Service Dispatcher` and enter **`x`**. Tab to `start` and enter **`x`**. Press CHANGE or RUN (F1). This audit generally takes only a few seconds.

    When `operation confirmed` appears on the message line, check the status.

    The demand status field should display `completed`. This test should result in the AUDIX ports being staffed in and ready to take calls.

    Press EXIT (F7) three times to exit this form.

18. At the path line, enter **`fi up`** and press ENTER (F8). At the `update boot filesystem to:` field, enter the name of the backup boot filesystem (this is generally disk00.boot_e or disk02.boot_e).

    Press CHANGE or RUN (F1). When `operation confirmed` appears on the message line, exit the form by pressing EXIT (F7) twice. Then press CTRL-d to log off.

ADDING AN AUDIX EXPANSION CABINET

This section describes the steps required to add an expansion cabinet to a one-cabinet AUDIX system.

NOTE

Call your remote maintenance service center prior to beginning the addition of the expansion cabinet. They will schedule a time to have someone on hand to guide you through the installation process and through any troubleshooting that may be required.

Required Tools

The following is a list of tools you will need add an expansion cabinet to a one-cabinet AUDIX system:

- Two 5/16-inch box wrenches or a 5/16-inch socket, used to loosen the bottom cabinet bus bar ground lug
- A hammer, used to remove the bottom cabinet knockout
- A chisel or large screwdriver, also used to remove the knockout
- A flashlight, needed to install backplane circuit boards
- One or two screwdrivers, used to remove and install the various screws on the cabinet

NOTE

If you need to install the floor anchors and front cabinet plate (required for earthquake zones), see *Floor Mounting* in this section for required tools and equipment needed to install the additional hardware.

Inventory of Parts

Before interrupting service of the currently active system, make sure you have addressed the following:

1. *The switch.* The switch must be upgraded with additional analog ports and extension numbers for assignment to the new AUDIX voice ports.
2. *The expansion cabinet.* This cabinet should have the following hardware:
    a. All circuit packs shown in Table 2-4 for the upper cabinet *except* the TN727 NC. This board will be moved from the bottom cabinet to the expansion cabinet during this procedure.
    b. The TN540 in slot 02. This board will be moved to the bottom cabinet before the system is powered up.

c. The backplane boards shown in Table 9-1, *Backplane Boards*, for the expansion (upper) cabinet. You have to remove the rear covers to check for these boards.

d. The expansion cabinet power cord. This should be shipped in the slot above the circuit packs at the front of the machine.

3. *The bottom cabinet.* This cabinet should have the following:

- The backplane circuit boards for the bottom cabinet (these ship in a separate package from the expansion cabinet):
  - — The AHF107 S-Bus expansion board
  - — The AHF108 S-Bus terminator board
  - — The AHF109 TD-Bus expansion board.
- New power down instructions (yellow label) for the front of the cabinet
- New carrier label
- If the existing AUDIX system does not have the following circuit packs, they should have been shipped for the two-cabinet conversion:
  - — A TN475B in slot 01 (comcode 105474118) (Vintage 5 or greater)
  - — A TN472C in slot 04 (comcode 105474126)
  - — A UN160B in slot 06 (comcode 105319818)
  - — A TN716B in slot 13 (comcode 105442412)
  - — A TN500 in slot 16 (comcode 103281085)

4. The intercabinet cables used to connect the two cabinets (see Table 9-2, *Intercabinet Cables*). These ship either with the expansion cabinet or in a separate package.

5. Additional hardware (shipped in a package separate from the expansion cabinet):

- The rectangular chimney (ductwork) needed to route the intercabinet cables from the expansion cabinet to the base cabinet (comcode 845952902)
- The cabinet connector clip that goes between the two cabinets, connecting them in front (comcode 845798123)

NOTE

If this AUDIX is located in an earthquake zone, a front cabinet plate may replace the connector clip. Four bolts will also be included for mounting to the floor. This equipment may require that you do some drilling in the bottom cabinet and the floor. If this is the case, *Floor Mounting* shows where to drill holes in the AUDIX system.

- The rear bracket that physically connects the two cabinets (comcode 846242840)
- One or two ED-1E434-11, Group 300 voice port cables

Table 9-1. Backplane Boards

Circuit Board	Acronym	Slot L1 / L2, L4 *	Field Designation L1 / L2, L4 *	Quantity
Upper (Expansion) Cabinet				
AHF109	TDBUS-EXP	00	AB5	1
AHF104	SADI-I/O	01	AB0	1
AHF107	SBUS-EXP	06	AB2	1
CDR1B	ALARM-BD	07	AB3	1
AHF108	SBUS-TERM	17	AB4	1
WP91602, L1 †	TDBUS-TERM	28	AB6	1
Lower (Base) Cabinet				
AHF109	TDBUS-EXP	28 / 00	AB6 / AB5	1
AHF104	SADI-I/O	01	AB0	1
AHF102	VME-TERM	05	AB1	1
AHF108	SBUS-TERM	06	AB2	1
CDR1B	ALARM-BD	07	AB3	1
AHF107	SBUS-EXP	17	AB4	1
WP91602, L1 †	TDBUS-TERM	18 / 28	AB5 / AB6	1

* The bottom (base) cabinet may be a PWJ58886U1, L1 or a PWJ58886U1, L2 or L4. The list (L1 versus L2 or L4) determines the location of the AHF109 and the AHF1 or WP91602, L1 boards.

† An AHF1 board may be installed instead of the WP91602, List 1 board in some early systems. Only *one* AHF1 or WP91602, List 1 board should be installed per system (in a two-cabinet system, it is in the expansion cabinet).

Table 9-2. Intercabinet Cables

Cable	Conductors	Connects	Quantity
SADI–I/O (1E434-11 Grp. 186)	50	AHF104 in base cabinet to all disks in the system (daisy chain).	1
CDR1B/Alarms (1E434-11 Grp. 185)	14	Upper and base cabinet CDR1B alarm boards.	1
TD-Bus Expansion (1E434-11 Grp. 187)	40	AHF109 to AHF109, extending the TD-Bus to the expansion cabinet.	1
S-Bus Expansion (1E434-11 Grp. 329)	60 each cable	AHF107 to AHF107, extending the S-Bus to the expansion cabinet.	2
S-Bus Signal Ground (H600-140 Grp.403)	Stranded #10 wire	AHF107 to AHF107 ground lugs of the two cabinets. A 5-foot black cable.	1
S-Bus Ground (H600-140 Grp. 404)	Stranded #10 wire	Bottom cabinet AHF107 board ground to the ground on the bus bar. An 8-inch green cable.	1

Two-Cabinet Conversion Procedures

If you are converting a one-cabinet AUDIX system to a two-cabinet system and you are *not* upgrading the software (for example, if you are converting a one-cabinet R1V8 system to a two-cabinet R1V8 system), do the steps in this section.

NOTE If you are converting a one-cabinet AUDIX system to a two-cabinet system and you are also upgrading the software (for example, if you are upgrading an R1V2 or later system to R1V8 software), skip this section. You will upgrade the software following the hardware conversion using the steps in the *AUDIX Upgrade Instructions* (585-302-108).

Before doing the hardware conversion, you must first copy the backup boot filesystem from the generic program cartridge shipped with the expansion cabinet and delete the existing backup filesystem as follows:

1. Unequip the RCD using the `maintenance : dbp : unequip` form.
2. Remove the RCD cartridge currently in the drive and replace it with the 50-Mbyte generic program cartridge (or cartridge 1 of 2 for a system with a 20-Mbyte RCD) that was shipped with the expansion cabinet.
3. Re-equip the drive using the `maintenance : dbp : equip` form.
4. Verify the location of the current one-cabinet backup (boot_e) filesystem using the `filesystem : list` form.

5. Display the `filesystem : detail` form. Enter the boot_e filesystem in volume.filesystem format (for example, **`disk02.boot_e`**). Enter **`boot`** in the type field. Press ENTER.
6. The system should fill in the rest of the fields on the form. When all of the data is displayed, press DELETE. This removes the old one-cabinet boot_e filesystem.
7. Display the `list : volume names` form and make a note of the volume name of the RCD cartridge.
8. Display the `filesystem : copy` form. Copy the boot_e filesystem from the generic cartridge to disk00 (the destination filesystem should be **`disk00.boot_e`**).
9. Display the `system : filesystems` form. Record or print the contents of the form.
10. Finally, display the `filesystem : update configuration` form and update disk00.boot_e. This copies the current system configuration information to the new backup boot filesystem.

Assemble the System

This section includes steps for preparing the bottom cabinet, stacking the expansion cabinet, inserting the intercabinet chimney, and preparing the two backplanes.

NOTE

Before removing the AUDIX from service, make sure that you have all required cabling and hardware to do the conversion. If any part is missing, order it now and wait for it to arrive before continuing.

1. Shut down the AUDIX system and turn the power OFF. Remove the AC power cord from the connector panel.
2. If floor mounting hardware is shipped with the system for earthquake mounting, go to *Floor Mounting* for installation instructions. Once you have prepared the cabinet for the earthquake mounting, return here to continue the assembly.
3. Remove the front cover of each cabinet.
4. *If a TN532 DBP-RAM board is installed*, remove it from slot 02 of the base cabinet and replace it with the TN540 DBP-RAM board shipped in slot 02 of the expansion cabinet. Return the TN532 to your local MLO or MMS, per your local procedures.
5. Remove the TN727 NC from slot 14 of the bottom cabinet and place it in slot 14 of the expansion cabinet.
6. Remove the two rear panels of each cabinet. One panel is the slotted screen covering the power supply/battery area. The other is the solid panel directly above the connector panel.
7. On the bottom cabinet, remove the knockout at the top rear of the cabinet. You need a hammer and chisel or screwdriver to remove the knockout. There is a second knockout, located on the bottom of the fan assembly directly below the first, that must also be removed.

WARNING

Be sure to wear eye protection when removing the knockouts. Metal chips could fly off during removal.

8. Position the bottom cabinet *exactly* where the system should stand when the expansion cabinet is added. The two-cabinet system cannot be moved once the two cabinets are stacked.
9. Stack the expansion cabinet on the existing cabinet. Two people are required to stack the cabinets. Center the cabinets. Do not try to line up the knockouts. The chimney is angled slightly to compensate for this.
10. Remove the battery pack assembly from the expansion cabinet. See Chapter 7, *Power and Environment* for details.
11. The chimney should angle toward the back of the cabinet when inserted. Squeeze the chimney together and slide it through the holes in the two cabinets. It expands to fit tightly when completely inserted. You may have to adjust the expansion cabinet slightly to make the chimney fit.
12. Exchange the following backplane boards in the bottom cabinet (all of the new backplane boards are shipped in a package separate from the expansion cabinet):
    a. *For List 1 backplanes*: Remove the AHF1 or WP91602, List 1 TD-Bus terminator board from slot 18, field AB5, in the base cabinet. If the correct board is not already installed (or shipped with) the expansion cabinet, place the one from the base cabinet in slot 28, field AB6, of the expansion cabinet.
    b. *For List 2 or List 4 backplanes*: Remove the AHF1 or WP91602, List 1 TD-Bus terminator board from slot 28, field AB6, in the base cabinet. If the correct board is not already installed (or shipped with) the expansion cabinet, place the one from the base cabinet in slot 28 of the expansion cabinet.
    c. Remove the ZAHF8 S-Bus terminator board on slot 17, field AB4, in the base cabinet. Put the AHF107, S-Bus expansion board in this slot.
    d. Remove the ZAHF8 S-Bus terminator board on slot 06, field AB2, in the base cabinet. Replace it with the AHF108, S-Bus terminator board.
13. Connect the green H600-140 Group 404 S-Bus ground cable to the bus bar. Use the two 5/16 inch box wrenches (or a 5/16 inch socket) to remove the bolt on the ground bar. If you use a crescent wrench it may slip and bend backplane pins.

    When the cable is connected to the bus bar, connect the other end to the inside ground lug on the AHF107 board on slot 17. It may be easier to remove the AHF107 before attaching the cable. But be sure to identify the board's location so that it is reinstalled correctly.

CAUTION

Although the bus bar bolt needs to be tight once the cable is on, applying too much pressure can break off the terminal. Be careful!

Intercabinet Cabling

This section gives detailed steps on how to route and connect the intercabinet cables required to extend the system buses. Follow the instructions and use the diagram given for each cable in the order they appear. Figure 9-4, *Intercabinet Cabling (List 2 or List 4 Backplanes)*, (at the end of this section) shows the backplane boards and cables for a system with a List 2 or List 4 backplane in the bottom cabinet.

Wait until all the cables are installed before dressing them down. Leave enough slack so that the battery pack(s) can be reinstalled easily.

Routing Cables Through the Chimney

Group the following cable ends so that they can be routed down through the chimney:

- Two ends of the ED-1E434-11 Group 186, disk drive (SADI) cable (usually blue). If this cable is not already attached to the expansion cabinet's disk drives, attach it now.
- One end of the ED-1E434-11 Group 185, alarm cable (gray w/ red stripe)
- One end of each ED-1E434-11 Group 329, S-Bus signaling cable (two cables, rainbow color)
- One end of the ED-1E434-11 Group 403, S-Bus ground cable (black)
- One end of the ED-1E434-11 Group 187, TD-Bus signaling cable (gray w/ black stripe)

Route them down through the chimney so that they can be accessed from either side of the chimney. Continue with the following steps.

SADI Cables

The SADI cable (ED-1E434-11 Group 186) is connected as follows:

NOTE

It may be easier to remove the AHF104 board from the backplane before installing the following cable. However, this increases the chance of damaging backplane pins or reinstalling the board incorrectly.

1. In the expansion cabinet, make sure the daisy-chained portion of this cable is connected to the disk drives. The other two ends should be routed down through the chimney.
2. In the bottom cabinet:
   a. Unplug the 50-position female connector currently attached to the AHF104 board in slot 01. Attach this female connector to the male connector on the Group 186 cable.
   b. Attach the Group 186 cable's female connector to the now-vacant connector of the AHF104. The cable's connector should be red on one end with a key on one side. The red end goes at the top and the key should face the inside of the cabinet.

The expansion cabinet AHF104 board does not have a cable connected to it.

Alarm Signal Cable

The alarm cable (ED-1E434-11 Group 185) is connected as follows, allowing the expansion cabinet to report alarms to the FP:

NOTE

It may be easier to remove the CDR1B boards from the backplanes before installing the following cable. However, this increases the chance of damaging backplane pins or reinstalling the boards incorrectly.

1. In the expansion cabinet, route one end of the Group 185 cable over the top of the CDR1B board (see Figure 9-1, *Expansion Cabinet Alarm Cabling*). Connect the cable to the J5 connector on the board. The cable and/or the J5 connector may not be keyed. If not, there should be a red stripe down one side of the cable. Connect the cable so the stripe is toward the outside of the cabinet.
2. In the bottom cabinet, connect the other end of the Group 185 cable to the J5 connector on the bottom cabinet CDR1B board. As you did with the expansion cabinet, route the cable over the top of CDR1B with the red stripe to the outside of the cabinet.

NOTE

If the cable is installed incorrectly, both battery and fan alarms become active when the system is powered up. If you get these alarms, check to see if the cable is correctly installed.

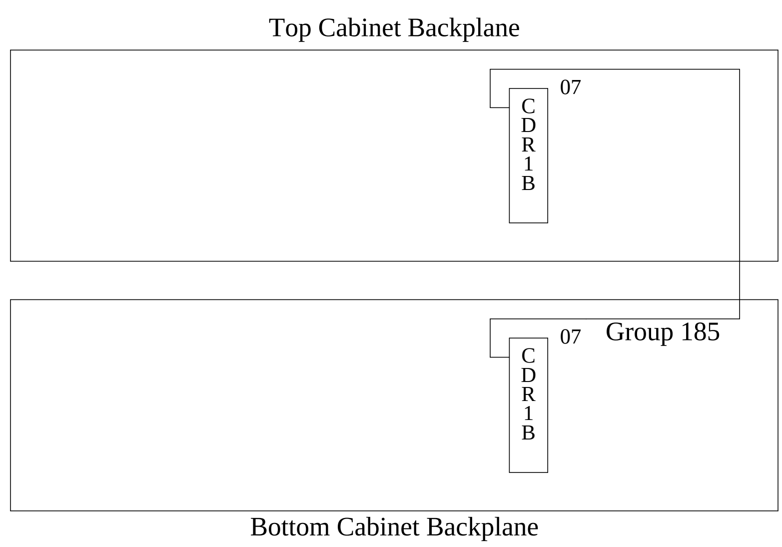


Figure 9-1. Expansion Cabinet Alarm Cabling

S-Bus Expansion Cables

The ED-1E434-11 Group 329, S-Bus signaling cables and the ED-1E434-11 Group 403, S-Bus ground cable are connected as follows (see Figure 9-2, *Expansion Cabinet S-Bus Cabling*):

NOTE	It may be easier to remove the AHF107 boards from the backplanes before installing the following cables. However, this increases the chance of damaging backplane pins or reinstalling the boards incorrectly.

1. In the expansion cabinet, connect one of the Group 329 cables to the inside connector (closest to the backplane) of the AHF107 board in slot 06. *Make sure the notch on the cable connector matches the slot on the connector of the board.*
2. In the bottom cabinet, connect the other end of the same Group 329 cable to the inside connector of the AHF107 board in slot 17. Again, be sure the notch on the cable connector and slot on the board connector match.

NOTE	A lot of cable is left hanging once it is connected. Leave the cable hanging until you have connected all of the intercabinet cables, then dress all of the cables across the back of the cabinet at once.

3. In the expansion cabinet, connect the second Group 329 cable to the outside connector of the AHF107 board in slot 06.
4. In the bottom cabinet, connect the other end of the second Group 329 cable to the outside connector of the AHF107 board in slot 17.
5. In the expansion cabinet, connect one end of the black Group 403 cable to the remaining ground lug on the AHF107 board in slot 06.
6. In the bottom cabinet, connect the other end of the Group 403 cable to the AHF107 board in slot 17.

NOTE	If the expansion and base cabinet connectors are reversed, the system will not boot.

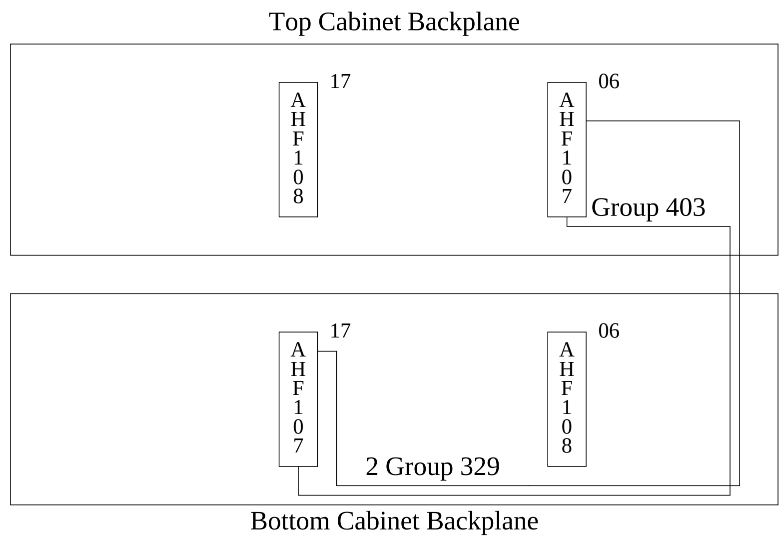


Figure 9-2. Expansion Cabinet S-Bus Cabling

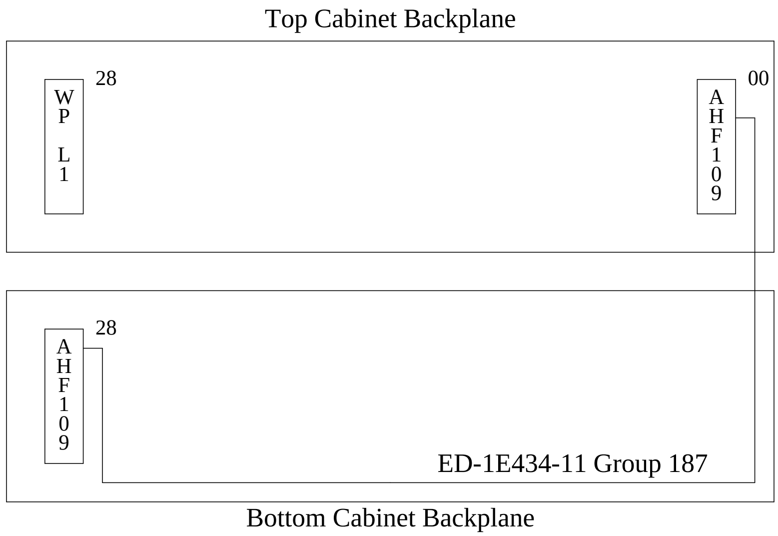
TD-Bus Cable

The ED-1E434-11 Group 187, TD-Bus cable is connected as follows (see Figure 9-3, *Expansion Cabinet TD-Bus Cabling*):

NOTE	It may be easier to remove the AHF109 boards from the backplanes before installing the following cable. However, this increases the chance of damaging backplane pins or reinstalling the boards incorrectly.

1. In the expansion cabinet, connect one end of the Group 187 cable to the AHF109 board. This cable may or may not be keyed. If it isn't keyed, look for a black stripe which runs down one side of the cable. Connect the cable so the stripe is at the bottom and facing you. If the cable is keyed, follow the keying.
2. In the bottom cabinet:
   a. A plastic cable clamp may be on the side of the cabinet to hold this cable is place. If there is one, put the cable in it.
   b. Connect the other end of the Group 187 cable to the AHF109 in the bottom cabinet (slot 00 in List 2 or List 4 backplanes, slot 28 in List 1). Make sure the black stripe is at the bottom of the connector, facing the inside of the cabinet.

List 1 Backplanes



List 2 or List 4 Backplanes

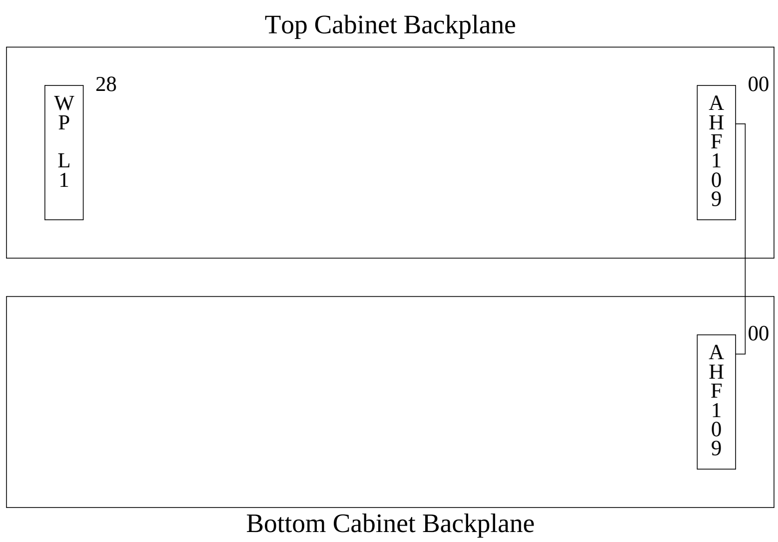


Figure 9-3. Expansion Cabinet TD-Bus Cabling

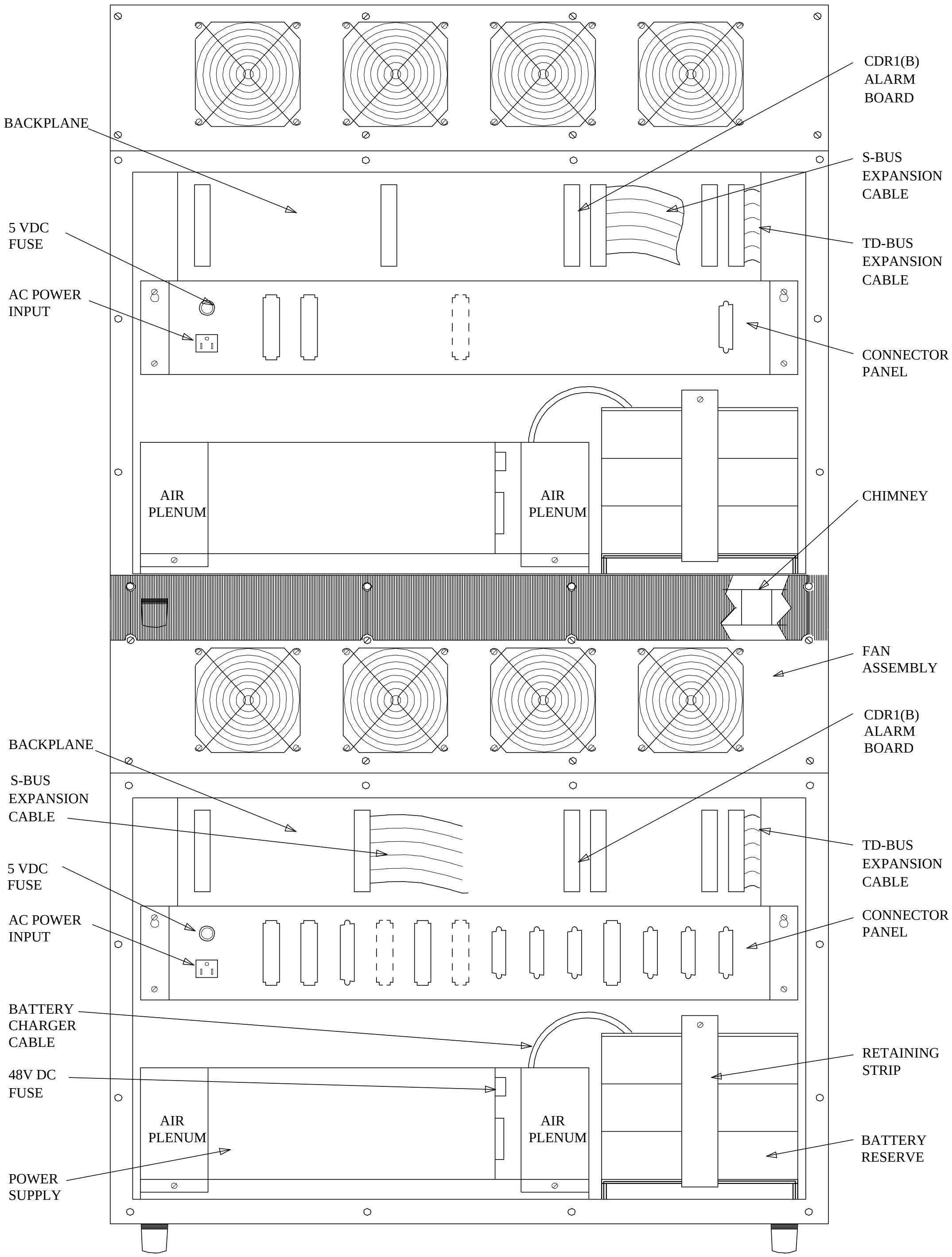


Figure 9-4. Intercabinet Cabling (List 2 or List 4 Backplanes)

Complete the Assembly

This section describes how to finish assembling the system. Do the following:

1. When you are sure the cables are correctly connected, carefully replace the battery in the expansion cabinet. Remove the battery from its housing (remove the retaining bar in front of the battery pack), place the housing in position, and then put battery back in the housing. Make sure no cables are pinched or caught under the battery housing.

   NOTE A thin piece of cardboard placed against the cables makes it easier to slide the battery pack assembly back in. This also protects the cables from getting pinched in the future.

2. Most of the cables are longer than necessary and hang out of the back of the cabinet. Run the excess cable across the back of the system. Be careful not to bend any backplane pins when you dress the cables.
3. Reattach the four rear panels. Leave the four screws on the bottom edge of the expansion cabinet off. The rest of the screws can be completely tightened.
4. Remove the four screws across the fan bracket at the top edge of the base cabinet. Attach the rear cabinet bracket that fastens the two cabinets together on both cabinets. Tighten all screws completely.
5. At the front of the cabinet, place the cabinet clip between the two cabinets by pressing it into the slots at the center of each cabinet. The slots are about 1 inch wide; the clip is 1 inch by 1.75 inches. If you are installing the front cabinet plate, go to *Front Cabinet Plate Mounting* (later in this section) to drill the bottom cabinet if necessary. Then return here.
6. Mount the new bottom cabinet labels.
   a. Place the yellow power-down instruction label on the front of the machine over the old instructions.
   b. Place the new circuit pack carrier label over the old label.
7. Run the Group 300 cable(s) from the expansion cabinet to the wall field. At the expansion cabinet, connect the cable(s) to D06 and D07. Patch the voice port wire pairs to the analog switch ports.
8. Plug in the AC power cords of each cabinet if so equipped. The cabinets should be powered either by two separate AC outlets, each with its own 15-amp fuse or one outlet with a 20-amp fuse. If the system uses DC power, the expansion cabinet needs to be wired to the building DC Power Plant. Instructions for DC power are provided in *Adding DC Power*.
9. If the maintenance terminal is not currently connected, attach it to the maintenance port on the back of the bottom cabinet.
10. Check the following during power up in step 10:
    a. If the red LEDs on the expansion cabinet TN500, TN747Bs, and TN501Bs stay lit for more than 10 seconds, the TD-Bus expansion cable is installed incorrectly. Put the system in control mode (toggle the MI switch), spin down the RCD (press the button on the front of the drive), power down both cabinets, and flip *one* of the AHF109 cable connectors around.

b. If all the of the LEDs on the TN523 (or TN591), TN734 (or TN761), and TN716B in both cabinets stay lit after a few seconds, the S-Bus expansion cables are installed backwards. Power down the system and swap the inside and outside cable connectors on the bottom cabinet AHF107.

c. If the red LEDs on the TN523 (or TN591) and TN716B in both cabinets stay red after a few seconds, the expansion cable connected to the outside connector of the AHF107 in the bottom cabinet is installed upside down. Power down the system and flip the cable connector around.

d. If all of the LEDs on the TN523 (or TN591) and TN734s (or TN761s) in both cabinets stay lit after a few seconds, the expansion cable connected to the inside connector of the bottom cabinet's AHF107 is installed upside down. Power down the system and flip the cable connector around.

e. If all of the LEDs on the expansion cabinet TN523 (or TN591) and TN734 (or TN761) stay lit, the cable connected to the inside connector of one of the AHF107s is not properly seated. Power down and check the cabling on each board.

11. Power up the machine using the circuit breakers (power switches) at the front of each cabinet. Power up the expansion cabinet first, followed by the bottom cabinet. The red LEDs on all of the circuit packs should flash on and then most turn off. If there are no problems as outlined in the previous step, go to the next section where a non-standard initialization will be performed.

NOTE

If you cannot start a non-standard initialization within a few minutes from now, press CTRL-c to bring up the Control Mode menu. This halts the otherwise automatic standard initialization that occurs on timeout when at the `Standard initialization` prompt.

Boot the System

You are now ready to boot the two-cabinet system. If you did a hardware conversion only (installed an expansion cabinet *without* needing to upgrade the software), follow the steps in this section.

NOTE

If you are doing a software upgrade (for example, if you are upgrading an R1V2 or later system to R1V8 software), return to the *AUDIX Upgrade Instructions* (585-302-108) document and continue the upgrade instructions from the point you left off.

1. Boot the system using a non-standard initialization from the disk00.boot_e filesystem you created in the *Two-Cabinet Conversion Procedures* section (contact your remote maintenance service center for assistance if needed).
2. Display the `filesystem : detail` form. Enter the boot_f filesystem in volume.filesystem format (for example, **`disk00.boot_f`**). Enter **`boot`** in the type field. Press ENTER.
3. The system should fill in the rest of the fields on the form. When all of the data is displayed, press DELETE. This removes the previously active one-cabinet boot_f filesystem.

4. Display the `filesystem : copy` form. Copy the boot_f filesystem from the generic cartridge to disk00 (the destination filesystem should be **`disk00.boot_f`**).
5. Display the `maintenance : vsp : equipage` form. Equip any additional VPT, VPC, and VB/TDBI boards in the expansion cabinet that are physically present but are currently unequipped (type **`EQ`** in the appropriate fields and press (CHANGE or RUN)).
6. If any additional disk drives are installed in the expansion cabinet, equip them using the `maintenance : dbp : equip` form. The disks must also be initialized before they can be used.

NOTE

Starting in R1V6 6:3 software, hard disks can only be initialized by remote services personnel; if you attempt a hard disk initialization, you will get an `Access denied` message. Contact your remote maintenance service center to initialize new hard disk(s).

7. Display the `filesystem : update configuration` form and update disk00.boot_f. This copies the current system configuration information from boot_e to the new boot_f filesystem.
8. Shut down the system using the `shutdown` form.
9. Do a standard initialization from the boot_f filesystem by executing the `startup` form.
10. The two-cabinet system is now ready for regular use. Log in and check the `STATUS` line for alarms or other problems (for example, you will have to reset the system clock using the `system clock` form). Use the *AUDIX System Administration* chapter in *AUDIX Installation* (585-305-105) as a guide.

Floor Mounting

Some areas require special floor mounting for the AUDIX system in case of an earthquake. If you are in one of these areas, you should have been shipped the following:

- Four anchors for the floor
- Four bolts and eight washers used to anchor the base cabinet to the floor (the base cabinet may already be anchored in the front)
- A front cover plate (the same plate that is used for the back; you should have two).
- Self tapping screws for the front plate.

If you have all of this equipment, you need the following tools to install the earthquake hardware:

- A hammer drill, used to drill and place the floor anchors
- A power drill with a number 26 (.147 inch) drill bit, a 9/32 inch bit, and a 9/16 inch bit.
- A 9/16 inch chassis punch, used to punch the holes in the back of the base cabinet, if available. Otherwise, a normal drill can be used to drill the bottom cabinet.

CAUTION *All of the following steps must be done with power to both cabinets off. If AC power is used, unplug the AC power cord(s). If DC power is used, trip the AUDIX circuit breaker(s) at the DC power plant.*

When you have all of the required tools and hardware, do the following to install the floor mounting:

1. If necessary, remove the two bolts that fasten the front of the AUDIX system to the floor. Move the AUDIX system to the side. This may require two people.
2. *Earthquake Mounting:* The following procedures are designed to enable a two-cabinet AUDIX to withstand earthquakes in Zones 1 through 4. Local construction codes always apply.

   To anchor the AUDIX base cabinet to a floor, holes must be drilled in concrete.

   a. Draw a diagram like that shown in Figure 9-5, *Earthquake Mounting Floor Template,* on the floor where the AUDIX base cabinet will go.

   b. Using one of the anchor bits supplied with ED-1E496-70 and a hammer drill, drill a hole at one of the four anchor hole marks indicated in the following figure. Stop drilling when the mark on the bit reaches floor level (see the next figure). Pull the bit from the floor and insert one of the four plugs that come with ED-1E496-70. Drill the anchor back into the hole until the mark again reaches floor level. Pull on the drill to make sure the anchor is firmly in place. Using the drill as a lever, snap off the top of the anchor. Repeat this step with the other three anchors.

   c. Using the cap screws (or rods and nuts), flat washers, and nylon washers supplied with ED-1E496-70, fasten the AUDIX base cabinet to the floor. Insert the nylon washers between the flat washers and the cabinet.

      If the base cabinet does *not* have holes in the rear, continue with the following steps.

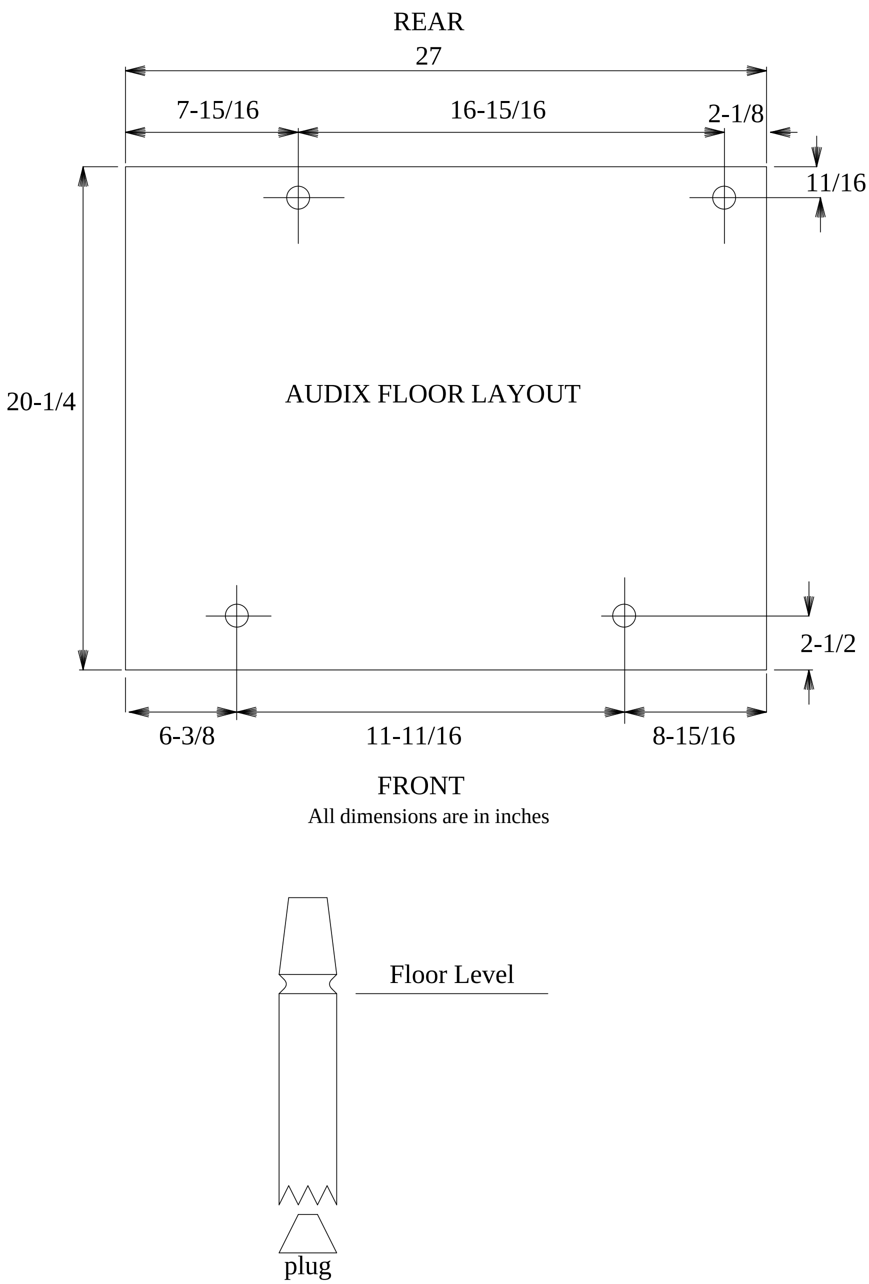


Figure 9-5. Earthquake Mounting Floor Template

3. At the front of the base cabinet, unscrew the nuts holding disk00 in place. Slide the drive out as far as it will go, and pull the SADI and power cabling as far toward the front of the cabinet as they will go. This helps protect the cables when you move the power supply in the following steps.
4. At the back of the base cabinet, unscrew the four nuts holding the power supply in place.
5. Lift the supply up and out until it is no longer held by the retaining bar at the center of the cabinet. Then slide it toward the front of the cabinet. *Be careful not to pinch the SADI or power cables you moved in the previous step.*
6. Check the base cabinet for holes drilled in the positions shown at the rear of the cabinet in Figure 9-6, *Anchor Hole Locations*.
   a. If the holes are there, they will have plugs in them. Remove the plugs and go to step 11.
   b. If the holes are not there, you have to drill them. *The base cabinet must be moved from the equipment room before drilling. If it isn't, warranties on other computer equipment could be voided.* Moving the base cabinet requires at least two people. Go to the next step to drill the holes.
7. Measure and mark the position of the holes as shown in Figure 9-6. Be sure to measure from the inside of the cabinet. There is a 0.06 inch difference between the outside and inside wall of the cabinet that could affect the floor mounting.
8. Drill two 9/32 inch pilot holes at the marked positions.
9. If you have a 9/16 inch chassis punch, use it to make the holes the required size. Otherwise, drill the holes using the 9/16 inch drill bit. File the edges so that no sharp edges are left.
10. If a front cabinet plate is used to attach the two cabinets, holes may have to be drilled across the top of the base cabinet. If so, drill these holes also (see *Front Cabinet Plate Mounting*). Then return here.
11. When the holes have been completed, clean up all of the metal shavings created while making the holes. You can use tape or a *small* magnet to clean them up. Remember, magnets can erase or damage disk drives.

CAUTION *If any shavings are left in the cabinet, they can ruin disk drives and circuit packs. Be sure you have them all cleaned up.*

12. Move the base cabinet back into the equipment room.
13. Install the front and rear anchor bolts (total of four).
14. When the floor mounting is complete, replace the power supply and disk00. If this is an expansion cabinet conversion, leave the battery pack out until the cabling is completed. Otherwise, replace the battery pack also.
15. Return to the two-cabinet conversion steps to finish the hardware procedures.

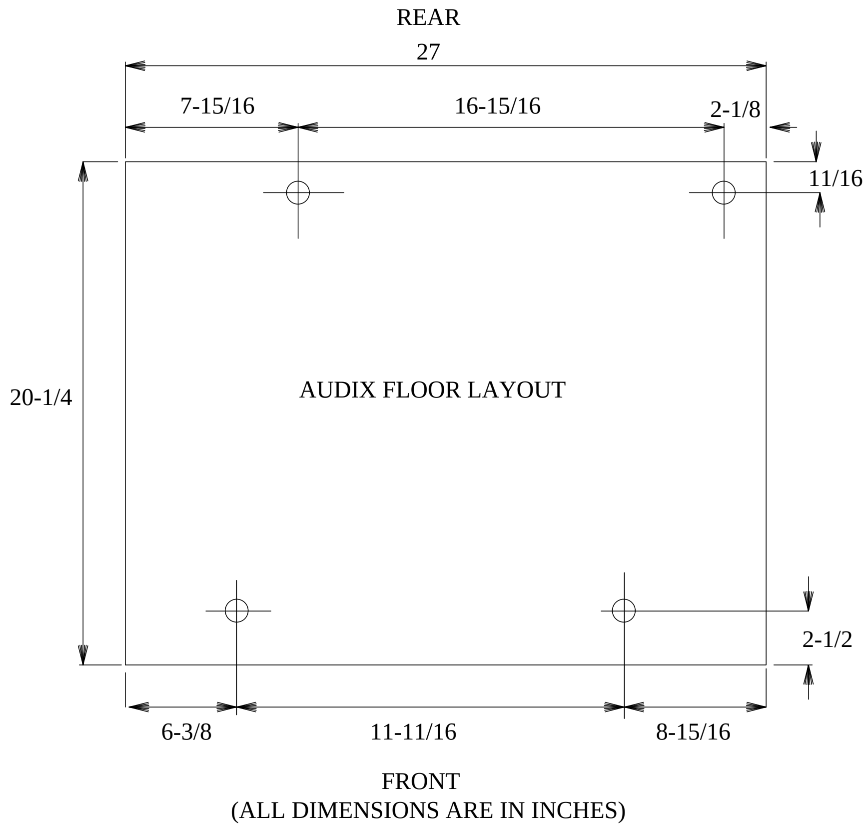


Figure 9-6. Anchor Hole Locations

Front Cabinet Plate Mounting

Most two-cabinet systems use a front connector clip to connect the two cabinets. Some, however, require a front cabinet plate to be installed instead of the clip for additional stability (such as systems installed in earthquake zones). If the expansion cabinet was shipped with a connector plate (versus a clip) for the front of the cabinet (in addition to the one required for the back of the cabinet), do the following steps to install the plate on the front of the system.

First, check to see whether the bottom cabinet needs to be drilled. Early versions of the cabinets do not have the required holes across the top of the cabinet. Newer systems and all two-cabinet installations should have the new cabinet. Check to see if there are four holes along the top of the cabinet. If there are, you do not need to do any drilling. Otherwise, you have to drill these holes yourself.

If you have to drill the holes, you need the following:

- A large piece of plastic to cover the circuit pack carrier. If you do not use this plastic, metal chips could ruin the circuit packs and disk drives. The plastic should be large enough to spread across the front of the cabinet and reach to the floor.
- A drill
- A number 26 (.147 inch) drill bit
- A center punch
- Tape strong enough to hold up the piece of plastic

When you have all of the required materials, do the following:

1. *Move the base cabinet from the equipment room. Drilling the base cabinet inside the equipment room may void the warranty of other computer equipment.* Moving the base cabinet requires at least two people.
2. Tape the plastic across the inside top of the cabinet an inch or so deep.
3. When the plastic is in place, connect the front cover plate to the expansion cabinet. Mark the position of the holes on the bottom cabinet.
4. Remove the front cabinet plate from the expansion cabinet.
5. Center punch the holes at the marked positions.
6. Drill the holes using the number 26 (.147 inch) drill bit.

   CAUTION *Make sure all metal shavings are caught by the plastic or land on the floor. Any shavings in the cabinet can ruin disk drives or circuit packs.*

7. Remove the plastic from the front of the cabinet.
8. Move the base cabinet back into the equipment room.

Two-Cabinet Conversion Troubleshooting

Use this section to return the system to a one-cabinet configuration. You do not have to remove all of the expansion hardware. You only need to make a few minor hardware changes and then boot up the original one-cabinet boot filesystem.

Hardware Changes

Make the following changes to the hardware to return the system to a one-cabinet configuration.

1. Shut down and power down the system.
2. *If you replaced the TN532 DBP-RAM board,* remove the TN540 from slot 02 of the bottom cabinet and replace it with the TN532 you removed earlier in the procedure.
3. Remove the TN727 NC in slot 14 of the expansion cabinet and put it in slot 14 of the base cabinet.
4. Pop the TN523 (or TN591), TN734 (or TN761), TN716B, TN500, and TN520 circuit packs in the expansion cabinet. Pull them out far enough so that they don't touch the backplane. You do not have to remove them completely.

Boot the System

You now have to boot from the one-cabinet active boot filesystem. If you already erased both one-cabinet boot filesystems, you have to boot from the one-cabinet generic cartridge.

1. Power up the system *(expansion cabinet first)*.
2. Choose a non-standard initialization and enter the one-cabinet boot filesystem.
3. When the system has booted, it should work as it did before. If there are still problems, escalate per local procedures.

NOTE

If you used the generic cartridge, you have to reconfigure (translate) the hardware, data link, voice ports, time zone, etc. See *AUDIX Installation* (585-305-105) if necessary.

ADDING DC POWER

The following instructions are for installing the AUDIX DC power option (Kit no. D-182236) in the field. You need to remove the battery, power supply assembly, local wiring harness, AC receptacle, and the circuit breaker on the RCD (Removable Cartridge Drive). You then install a new circuit breaker, a new local DC cable, a new DC power supply, a cover (in place of the AC receptacle), a DC terminal strip assembly, a new lower rear cover, and a CDR1B alarm board (if not already installed). These instructions do not apply to the installation of an AUDIX system that is shipped to the customer with the DC option *already* installed.

If the AUDIX already contains the DC hardware, only two basic procedures are necessary:

- Run the feeder lines between the DC power source and the DC terminal strip assembly in the AUDIX cabinet (proceed to step 26).
- Install the gutter tap ground wire (see step 27).

The installation requires the following tools:

Quantity	Description
1	screwdriver — straight, small-blade "tweeker"
1	screwdriver — straight, long-blade
1	1/4" nut driver
1	1/2" socket
1	open-ended wrench (9/16" or crescent)
1	drill motor with #34 (or .111") bit
1	voltmeter
1	magic marker
1	large wire cutters
1	needle-nose pliers
3	tie-wraps 6"

Before starting the installation, visually inspect the DC power option kit to make sure that all items are present according to the following list. Report damaged, stolen, or missing equipment to the account team, installation supervisor, services organization, or the carrier or shipper as appropriate.

Quantity	Description	Product Identifier
1	CDR1B	105711238
1	Cover, lower rear	846303824
1	Local cable	LCJ58886U-1A, G3
1	Power supply, DC	405951781
1	Mounting assembly, DC terminal strip	846360014
2	Screw #8	901090308
1	AC receptacle outlet cover	846306843
2	Screw #4	901125294
1	Screw 1/4-20x1/2	841059843
1	Washer	804236362
2	Nut	802207563
1	Kit, D-181895 Gutter tap ground	105434559
1	Circuit breaker	405951757
1	Wire assembly, power supply	H600-232
1	Wire assembly, fuse holder	846511681
4	Wire assembly, disk (1 required per disk)	H600-261
1	Wire assembly, ground	H600-275
2	Screw	840058267
2	Nut	802108282
2	Washer	804236313
2	Screw, flathead, 6-32x1/4	901082313
2	Nut, 6-32	801259524
2	Washer, external tooth	804236321
1	Instruction sheet	846367522

This procedure can be used for either an AUDIX main cabinet or AUDIX expansion cabinet.

1. Open the front of the AUDIX cabinet. Shut down the software and power off the system according to the instructions given on the cabinet label. If no label is provided, power-down instructions are given in Appendix A, *Basic Procedures*.
2. Unplug the AC power cord.
3. Disconnect the cables from the back of the connector panel. Make sure cables are properly labeled for reconnection.
4. At the back of the cabinet, remove the middle cover (the cover above the connector panel). Also remove the cover below the connector panel.
5. At each end of the connector panel are four screws that hold the panel in place. Loosen (do not remove) these four screws.

NOTE In the next step, be careful not to damage the flat SCSI (Small Computer System Interface) ribbon cable when removing the battery assembly.

6. At the lower righthand side of the cabinet is the battery. Disconnect the battery's black and red connector from the local wire harness. Remove the two nuts that hold the battery assembly to the cabinet. Remove the battery assembly.

7. Remove the air duct (plenum) located at the righthand side of the power supply held in place by three screws.

8. Remove the four nuts that fasten the power supply assembly to the cabinet. Carefully slide the power supply assembly partway out of the cabinet far enough to allow access to the wiring on the power supply.

9. Disconnect all wires from the power supply, then remove the power supply assembly from the cabinet.

10. Remove the power supply from its base. *The base of the assembly will be used to mount the DC power unit.*

11. Disconnect the power cables from the disk drives. Leave the flat (ribbon) cables attached.

12. Check slot 07 at the AUDIX backplane to see which alarm board is installed. The board is either a CDR1 or a CDR1B.

    a. If a CDR1 is installed, remove all connectors from the board (connector locations are shown in Figure 9-7, *CDR1B Board Connectors*), remove the board from the backplane, and install in its place a CDR1B board (105711238). When installing this board, be careful not to bend the backplane pins.

       Referring to Figure 9-7 for locations, reconnect P3, P6, and P8 to J3, J6, and J8 respectively on the CDR1B board. The remaining connections come from the DC harness when it is installed.

       NOTE

       Connector J5 and its cable are used only in two-cabinet systems. Reconnect this cable if you are working on a two-cabinet system. If the system is a one-cabinet, the cable is not present and the connection is unused. Note that J5 is not keyed. For correct installation, make sure that the red stripe on the J5 cable is toward the backplane on both cabinets.

    b. If a CDR1B is installed, remove the following connectors from the locations shown in Figure 9-7: J2, J4, and J7 (connections from the AC harness). These connections will be replaced with connections from the new DC harness when it is installed.

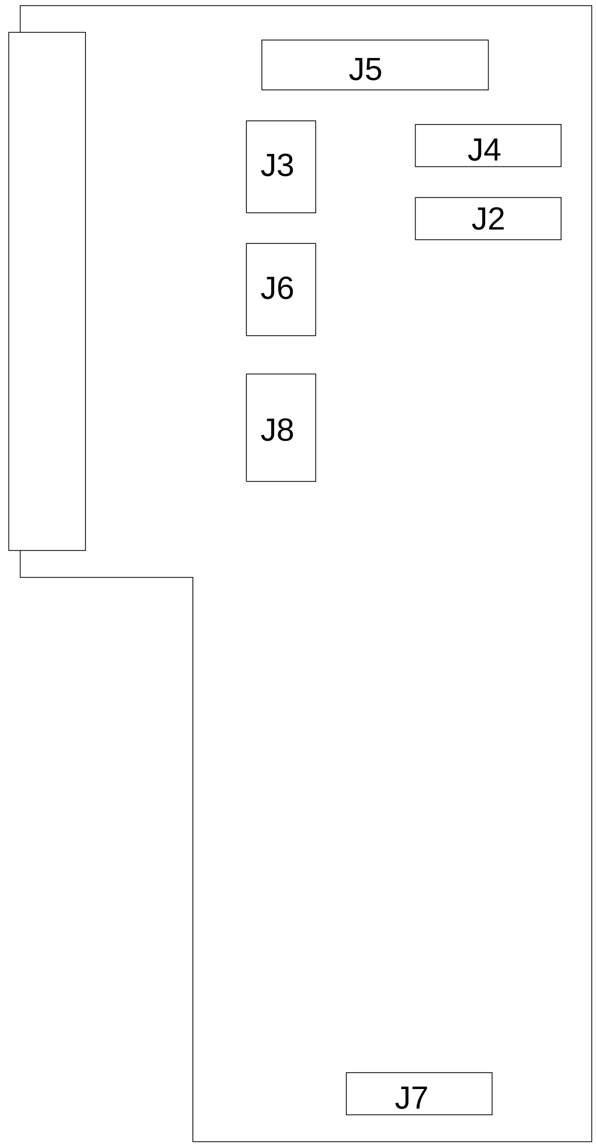


Figure 9-7. CDR1B Board Connectors

CAUTION

Be careful when working around the backplane. The protruding pins can scratch or puncture the skin, and are easily bent.

c. *Carefully* remove the Faston connectors from the bottom of the backplane. The connectors are pressed into place but not soldered. Use a screwdriver to hold the male end of the connector (tab) against the backplane while removing the female end of the connector (Faston) with needle-nose pliers.

— Disconnect the black wire from PL00.

— Disconnect the red wire from PL01.

— Disconnect the pink terminals from PL02 and PL03.

— Disconnect the blue terminals from PL04 and PL05.

— Disconnect the pink terminals from PL06 and PL07.

d. At the front of the cabinet, unbolt and remove the tape drive/circuit breaker assembly located at the far right side of the cabinet. Remove the circuit breaker (ON/OFF switch) from the faceplate of this assembly. Disconnect the mate-and-lock connector from the local power harness.

e. Go to the rear of the cabinet. At the connector panel, remove the AC power cord receptacle. If rivets are used to fasten the AC receptacle, they have to be drilled out with a .111 diameter (#34) drill. *It may be necessary to unmount the connector panel to access the back of the AC receptacle.*

f. Disconnect the green wires from the ground stud near the AC receptacle. Return the washer and both nuts to the ground stud after removing the wires. You will use these later to connect the DC harness grounds.

g. Disconnect the wires from the fuse assembly. Cut the fasteners that hold the local wiring harness to the connector panel and remove the harness from the cabinet.

This completes the removal of the AC power hardware.

Install the DC hardware as follows:

1. Lay the local DC power cable (LC158886U-1A, G3) in the bottom of the cabinet, with the taped portion of the cable going to the location vacated by the tape drive/circuit breaker assembly and the long thin part of the cable going to the disk drives.

2. Connect the wires from the DC cable to the new circuit breaker (405951757) as follows:

- R-W wire to the top right terminal (the top portion of the circuit breaker has the word ‘‘line’’ printed on it)
- R wire to the bottom right terminal (the bottom portion of the circuit breaker has the word ‘‘load’’ printed on it)
- BK-W wire to the top left terminal
- BK wire to the bottom left terminal.

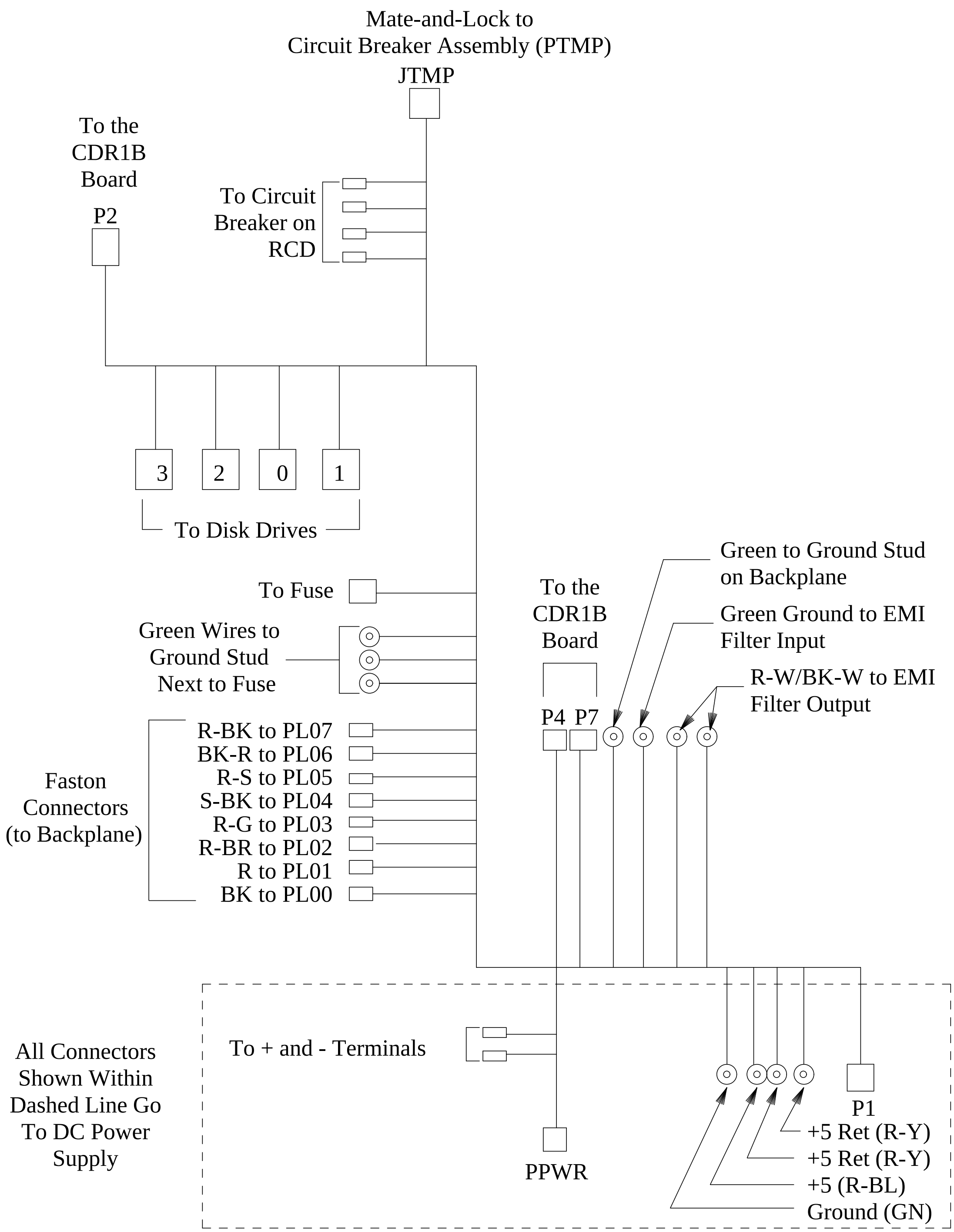


Figure 9-8. Local DC Cable

3. Install the new circuit breaker in the tape drive/circuit breaker assembly.

NOTE	The new circuit breaker is attached with four screws instead of six. Use the four holes on the righthand side of the faceplate. If a finger guard was present, use screws (901082313), nuts (801259524), and washers (804236321) to attach the finger guard to the lefthand holes.

4. Connect the mate-and-lock connectors on the DC cable (JTMP) and the circuit breaker (PTMP).
5. Connect one disk wire assembly (H600-261) to *each* disk drive and to the disk drive connectors on the DC power cable (see Figure 9-8).
6. On the DC cable, locate the point where the three short green ground wires break out of the cable near the fuse connector J FUSE. Position this point approximately 2 to 3 inches to the right of the hole vacated by the receptacle cover. When position is correct, use tie-wraps to secure the DC power cable to the connector panel.
7. If you did not have to drill out the AC power cord receptacle, use the two #4 screws from the kit to attach the AC receptacle cover (846306843) over the hole left by the removal of the AC power cord receptacle.

   If you had to drill out the AC receptacle, use screws (840058267), nuts (802108282), and washers (804236313) from the kit to mount the receptacle cover. Attach the cover using the holes drilled out during the removal of the AC receptacle.

   — In one of the holes in the receptacle cover, insert screw (841059843), and attach with washer (804236362) and nut (802207563). The head of the screw should be on the outside of the cover and the washer and nut on the inside (toward the backplane).

   — Leave the other hole in the AC receptacle cover empty. It will be used when you install the gutter tap grounding wire from the battery plant (step 28).

8. Locate the green ground wire (H600-275) in the kit. Remove both nuts from the ground stud near the AC receptacle cover. Attach the ground wire (H600-275) to this stud, using only one of the nuts. Tighten the nut down on the wire, making sure this connection is secure. *Loosely* replace the second nut on the ground stud. You will use this later to connect additional ground wires. Attach the other end of the ground wire (H600-275) to the AC receptacle cover below the nut you installed in step 19. Be sure this connection is secure.
9. Near the AC receptacle cover, locate the three short green wires on the DC harness. Attach these wires to the ground stud under the top (loose) nut. Tighten the nut, making sure that all the ground wires attached to the stud are securely fastened and fanned out around the stud to ensure solid connections.
10. Remove the fuse holder from the connector panel. Remove the fuse for installation in the new fuse holder. Install the new fuse holder/wire assembly (846511681) and fuse in place of the old fuse holder.

NOTE	The new fuse holder is installed from *inside* the cabinet with the washer attached from the *outside* of the cabinet [see Figure 9-9, *Installation of New Fuse Holder (Side View)*].

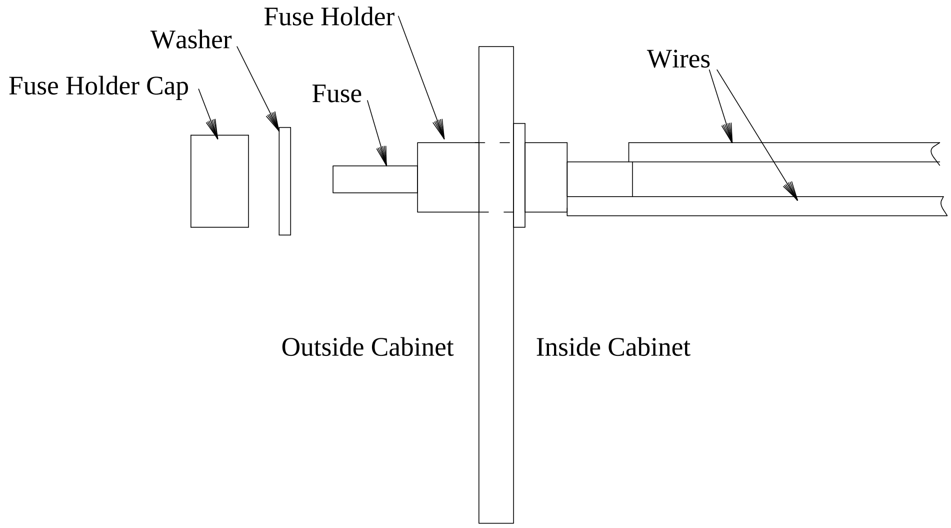
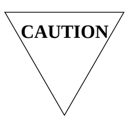


Figure 9-9. Installation of New Fuse Holder (Side View)

Connect the wires from the fuse holder to the fuse connector on the DC harness (P FUSE Connector into J FUSE Connector).



Be careful when working around the backplane. The protruding pins can scratch or puncture the skin, and are easily bent.

11. Using needle-nose pliers, connect the center group of wires on the DC cable (see Figure 9-8, *Local DC Cable*) to the bottom of the backplane. Make sure the female portion of the Faston connector is secure on the male end.
    - R-BK to PL07
    - BK-R to PL06
    - R-S to PL05
    - S-BK to PL04
    - R-G to PL03
    - R-BR to PL02
    - R to PL01
    - BK to PL00
12. Locate Connectors P2, P4, and P7 on the wire harness. Referring to Figure 9-7, attach these connectors to J2, J4, and J7 respectively, on the CDR1B board at the backplane.
13. Mount the DC power supply to the base power supply assembly that you removed from the AUDIX cabinet earlier. Do not reinstall the righthand plenum yet.

14. Locate the H600-232 wire assembly in the kit. Refer to Figure 9-10, *Connections at the DC Power Supply*, and connect the terminals on the H600-232 wire assembly to the main terminal block on the power supply as follows:

NOTE	You may encounter a power supply that is different from the one shown in Figure 9-10. The terminal block and other connectors are the same, but they may be in different locations.

- Attach the R-BL and R wire pair to the +12 V terminal.
- Attach the R-SL wire to the +12 V terminal.
- Attach the W-BK and BK wire pair to the +12 V return terminal.
- Attach the SL-BK wire to +12 V return terminal.
- Attach the R-G wire to the -5 V terminal.
- Attach the R-BR wire to the -5 V return terminal. (If you have trouble distinguishing R-BK from R-BR, R-BK has a thinner stripe.)
- Attach the R-BK wire to the -48 V terminal.
- Attach the BK-R wire to the -48 V return terminal.

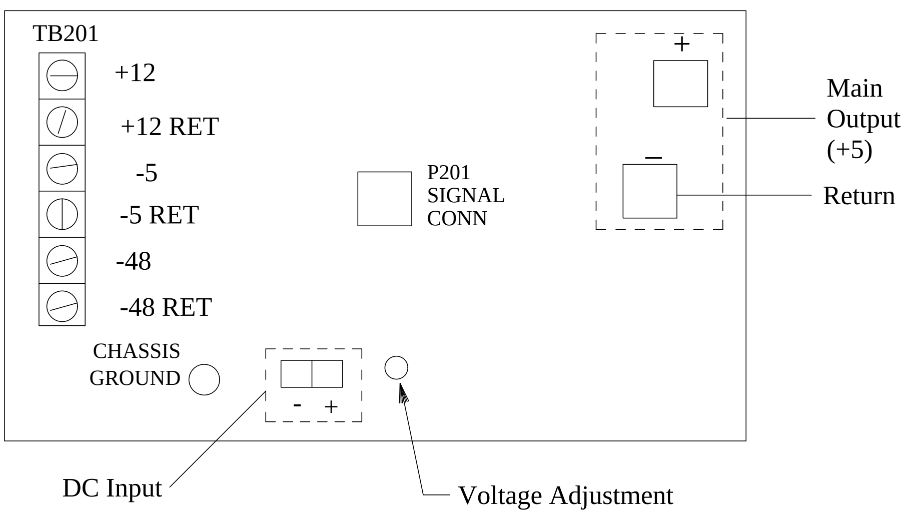


Figure 9-10. Connections at the DC Power Supply

15. Slide the DC power supply partway into the AUDIX cabinet so that you can connect the remaining wires on the DC cable to the power supply.

16. Plug Connector P1 on the DC harness into the Molex connector (P201 in Figure 9-10) on the power supply.

17. At the power supply, plug the red powerlock connector on the DC cable into the ‘‘+’’ connector and plug the black powerlock connector into the ‘‘-’’ (negative) connector. See Figure 9-10.
18. Attach the two 6-gauge white wires from the bus bar (+5 V DC and GRDD) to the main output (+ and RETURN, respectively) on the DC power supply. Be sure that the polarity is correct (see Figure 9-10).
19. Connect the two 14-gauge wires (R-Y) to the +5 RETURN terminal on the main output of the power supply. This terminal has the 6-gauge +5 return cable (GRDD) connected to it as well as the two 14-gauge wires.
20. Connect the 10-gauge wire (R-BL) to the +5 terminal on the main output of the power supply (+5). This terminal has the 6-gauge +5 cable connected to it as well as the one 10-gauge wire.
21. Connect the PPWR connector on the DC cable to the H600-232 (Connector JPWR) wire assembly attached to the power supply.
22. Toward the power supply end of the harness, locate the three green ground wires still unconnected. Locate the green wire with the smallest hole in the ring terminal. Connect this wire to chassis ground on the power supply.
23. The EMI filter is located on the terminal strip assembly (846360014). The input side of the filter has three terminals designated 48 RTN (left) and -48 (right). The middle terminal (ground) is not labeled.

    At the output end of the EMI filter (the end with two studs) on the terminal strip assembly, connect the R-W wire to RETURN; connect the BK-W wire to -48 V.

    NOTE

    Terminals at the output side of the EMI filter may not be labeled. If not, remember that the polarity goes straight through from the input side.

24. On the DC harness, locate the two green ground wires with the larger ring terminals.
    a. Connect the green wire with the larger ring terminal to the ground terminal (GRDD) on the bus bar. The 6-gauge +5 return wire is also connected to this terminal.

       NOTE

       In the case of a two-cabinet configuration, this wire should only be connected in the lower cabinet. In the upper cabinet, fold the wire out of the way and wrap electrical tape around the ring terminal to prevent accidental shorting.

       In the upper cabinet, a green wire should have been factory installed. This wire connects the ground terminal (GRDD) on the bus bar and the AHF 107 backplane board. Check to make sure its connections are secure.

    b. Connect the green wire with the smaller ring terminal to the middle terminal on the input end (the end with three studs) of the EMI filter. It may be necessary to remove the terminal strip to connect this ground wire. Be sure the terminal strip is securely fastened when reconnected to the terminal strip base.
25. Mount the DC Terminal Strip in the spot vacated by the battery.
26. Make sure that the circuit breaker located on the DC power plant is off and that the circuit breaker on the AUDIX is off. Install the 6-gauge feeders from the DC Power Plant to the terminal strip.

NOTE

Depending on local code, feeders from the DC power source may have to be installed by an electrician.

Leads are identified as 48 RTN (left) and -48 (right). A one-cabinet AUDIX uses one set of DC cables (DC power and return). An expansion cabinet requires an additional set for a total of four cables. A separate dedicated 30-amp breaker is required for each cabinet (see Figure 9-11, *AUDIX DC Power and Ground Connections*).

NOTE

The feeders from the battery plant supply a *negative* voltage. Be sure that the negative conductor (-48V) is connected to -48V, and the positive conductor (48 RTN or 0V) is connected to 48 RTN.

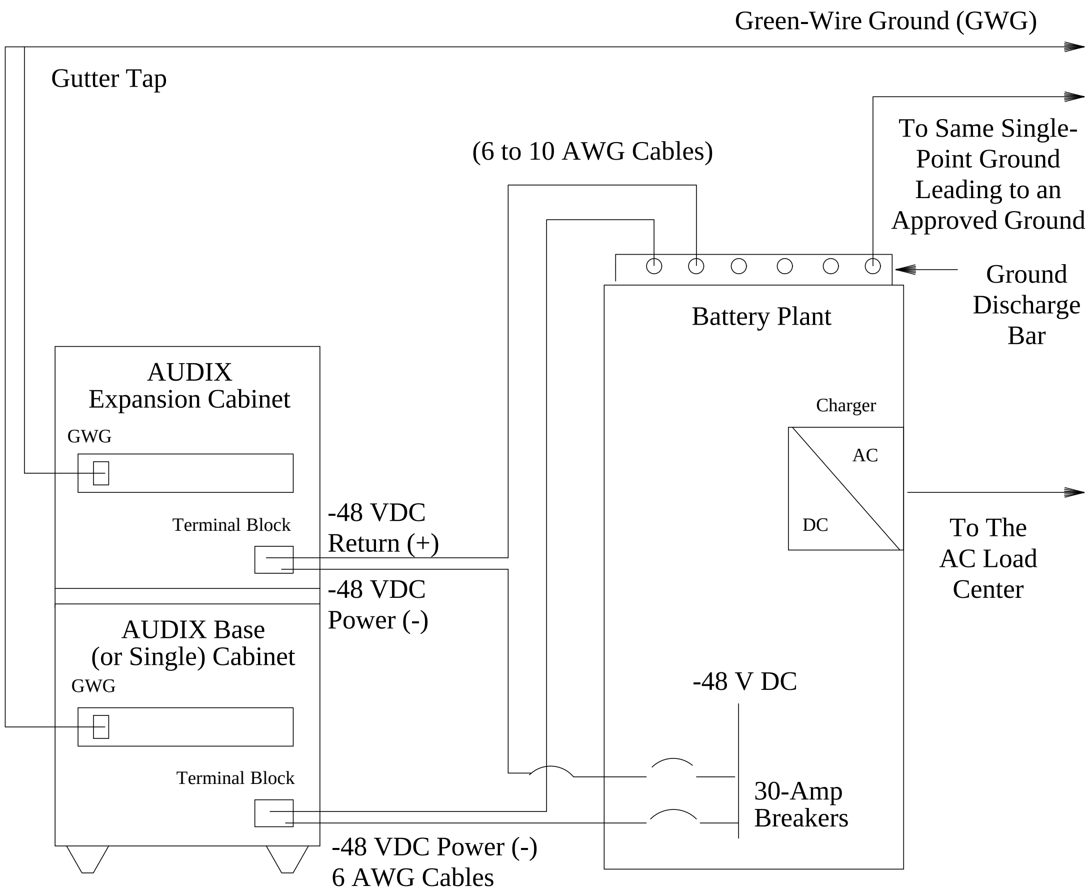


Figure 9-11. AUDIX DC Power and Ground Connections

27. Inspect gutter tap kit D-181895. Make sure the following items are present:

Quantity	Description	Product Identifier
1	Tap, gutter, ILSCO	405 265 315
4	Lug, Thomas & Betts	403 210 479
4	Screw, SPHM 1/4-20x1/2 289A finish	841 059 843
4	Washer, external tooth, lock 1/4, 289A finish	804 236 362
4	nut, 1/4-20, 289A finish	802 207 563

28. Install the gutter tap kit as follows:

    a. At an appropriate location on the 2-gauge wire, remove insulation to accommodate the gutter tap (see Figure 9-12, *Gutter Tap*).

    b. Attach the gutter tap to the 2-gauge wire.

    c. Using screw (841059843), washer (804236362), and nut (802207563), attach lug (405265315) to the remaining hole in the AC receptacle cover.

    d. Cut a piece of 6-gauge wire long enough to reach from the gutter tap on the 2-gauge wire to the lug on the AC receptacle cover. Strip insulation from each end of the 6-gauge wire. Attach the 6-gauge wire to the gutter tap and to the lug on the AC receptacle cover. Make sure that the 6-gauge wire and the green ground wire (H600-275) to the ground stud (inside the cabinet) are on *separate* screws at the AC receptacle cover. See ‘‘A’’ in Figure 9-12.

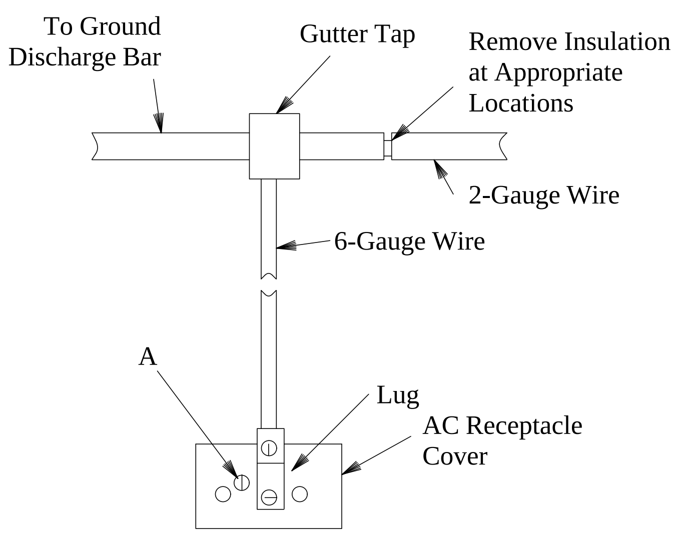


Figure 9-12. Gutter Tap

NOTE

If this is a two-cabinet system, run a separate gutter tap to each cabinet.

29. At the DC power plant, turn on the breaker controlling the 6-gauge feeder cables to the AUDIX system. Before turning the AUDIX on, use a voltmeter to verify the polarity of the battery plant feeder wires at the terminal block inside the AUDIX cabinet. The measurement can be taken at the screw heads at the terminal block. With the voltmeter ground probe on the 48RTN screw and the positive probe on the –48V screw, the measurement should be approximately –52 VDC. If the voltage is positive (+52 VDC), TURN OFF THE CIRCUIT BREAKER AT THE BATTERY PLANT, reverse the feeder wires at the AUDIX terminal block, and repeat the measurement. When correct polarity is verified, power up the AUDIX according to standard procedures.

CAUTION

In the next step, be careful not to cause a short against the backplane pins.

At the bus bar in the AUDIX cabinet, check the voltage across the +5 VDC and ground (the two large leads). Voltage should be between 5 VDC and 5.05 VDC. If necessary, *slowly* adjust the voltage at the power supply, monitoring the voltage at the backplane at the same time until the proper voltage level is achieved. See Figure 9-10 for location of the voltage adjustment potentiometer.

30. Remount the righthand plenum to the base of the power supply. The harness wires dress to the outer side of the power supply (toward the rear of the cabinet). Be careful not to crimp any of the wires between the plenum and the power supply base.

31. Attach the power supply assembly to the AUDIX cabinet.

32. Tighten the four screws used to mount the connector panel. Reconnect the cables that you disconnected in step 3.

33. Install the new lower cover (846303824). Use the old screws plus the two #8 screws to mount the new cover. Remount the middle cover.

34. At the back of the AUDIX cabinet (in about the middle), locate the label that reads "120V AC, 11.5 AMPS, 60 HZ". Use a marker to cross out this label. Locate the yellow CAUTION labels at the front and back of the AUDIX cabinet. Use a marker to cross out these labels.

This completes the installation.

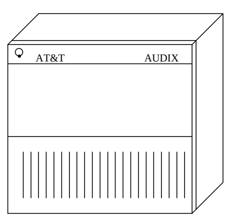
UPGRADE THE RICOH RH5261 TO A RICOH RH5500

The following parts, provided in Kit no. D-182482, are required to replace the 20-Mbyte removable cartridge drive (RCD) with the 50-Mbyte RCD:

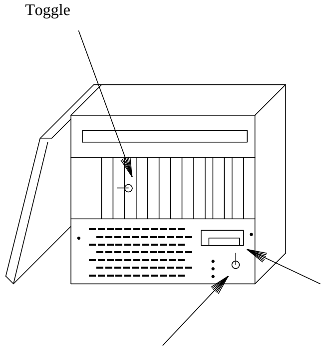
- 1 - Ricoh Removable Cartridge Drive
- 1 - adapter bracket (846675882)
- 4 - flat-head screws (802260711). These may already be installed.

The AUDIX system must be shut down and powered down in the following steps.

— One-cabinet AUDIX systems look similar to the cabinet shown below. Two-cabinet AUDIX systems have two of these cabinets stacked on top of each other. You will work on the bottom (base) cabinet of a two-cabinet system.



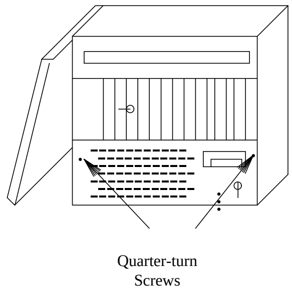
Step 1: Remove the Front Cover



Step 2: Shut Down the Software
Using the MI Toggle Switch

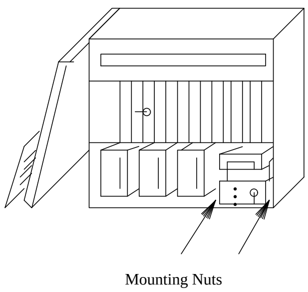
— The red COMPL lamp on the TN511 should light within four minutes. Once it does, check the RICOH drive. Its green lamp should be OFF. If so, proceed with step 3.

— If the green lamp is not off, press the small white button on the TN506B. After five minutes, press the small black button on the RICOH drive. The RICOH drive should now spin down and its green lamp should go OFF. Proceed with step 3.

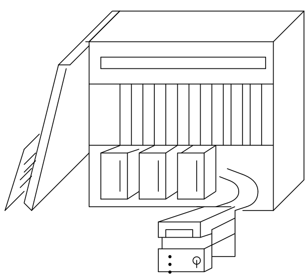


Step 3: Follow Standard Procedures for Powering Down the System

Step 4: Remove the Lower Screen Using the Quarter-turn Screws

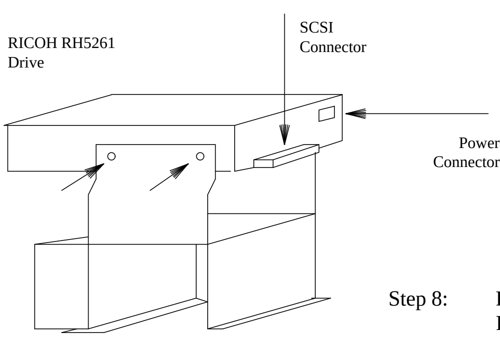


Step 5: Remove the Two Nuts that Hold the Removable Disk Assembly in Place



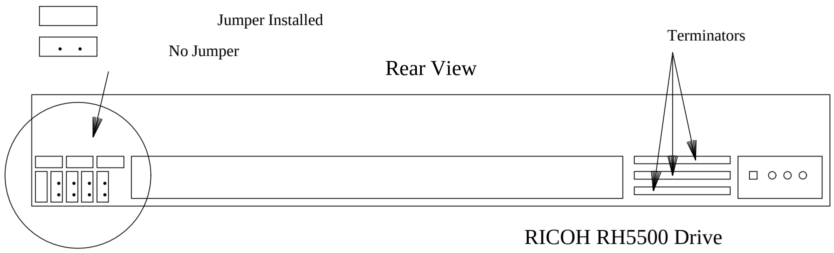
Step 6: Pull the Assembly Forward Only Enough to Access the Connectors at the Back of the RICOH Drive

Step 7: Disconnect the Power Cable and the SCSI Ribbon Cable

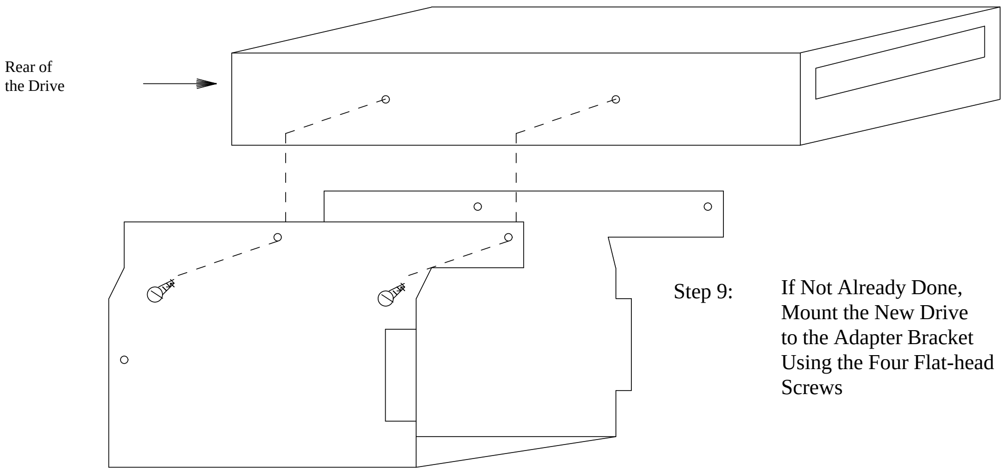


Step 8: Remove the Four Screws that Fasten the Drive to the Bracket

Save Two of the Screws



RICOH RH5500 Drive

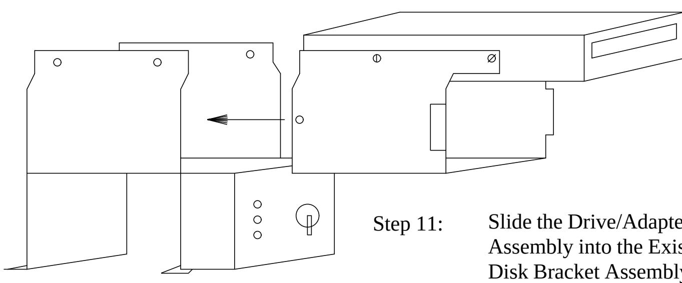


Step 9: If Not Already Done, Mount the New Drive to the Adapter Bracket Using the Four Flat-head Screws

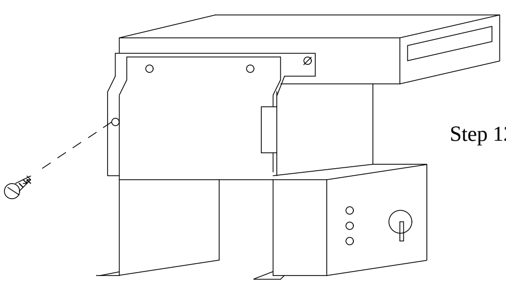
Step 10: Check the Rear of the Drive

Terminators Should be Installed

Jumpers Should be Installed as Shown



Step 11: Slide the Drive/Adapter Assembly into the Existing Disk Bracket Assembly



Step 12: Install Two Screws, One on Each Side of the Adapter as Shown to Act as Stops

— Connect the SCSI ribbon cable and the power cable to the back of the new drive.

— Carefully slide the assembly into the cabinet. Do not pinch any wires.

— Install the nuts that fasten the assembly to the cabinet.

— Reinstall the lower panel. Power up the system. It should initialize by itself.

— Once the system has initialized, reinstall the cabinet cover.

10. Filesystem Problems

This chapter covers file redundancy and filesystem distribution problems on an AUDIX system.

SOLVING FILE REDUNDANCY ALARMS

Starting in R1V4 software, AUDIX has the capability to duplicate (*mirror*) filesystems; this is called the File Redundancy feature. When a filesystem is mirrored, the system automatically keeps an updated, backup copy on another disk drive. The primary filesystem is called the *master* and is shown as mounted on the `filesystem : list` form. The backup filesystem is called the *slave* and is not mounted under normal conditions. If the master filesystem becomes corrupt or lost, the system automatically mounts the slave filesystem, uses it as the active filesystem, and alarms the master. If the slave filesystem becomes corrupt or lost, the system simply alarms the bad filesystem and will not use it, even if there are problems with the master.

If either a master or slave filesystem is alarmed, use Table 10-1 to find the appropriate troubleshooting procedure. If both the master and slave filesystems are alarmed, call your remote maintenance service center to restore the corrupt filesystem(s).

Table 10-1. Filesystem Mirroring Alarms

Alarm Log		Description	Repair Procedure
Fault	**Unit:Device ***		
360	49 : 0, 1	Master/slave active announcement filesystem	A or B
361	50 : 0, 1	Master/slave admin announcement filesystem	A or B
362	51 : 0, 1	Master/slave sst filesystem	A or B
363	52 : 0, 1	Master/slave sdat filesystem	A or B
364	53 : 0, 1	Master/slave vdat filesystem	A or B
365	150 : 0, 1	Master/slave names filesystem	A or B
366	54 : 0, 1	Master/slave vm0 filesystem	A or B
367	21 : 0, 1	Master/slave vm1 filesystem	A or B
368	22 : 0, 1	Master/slave vm2 filesystem	A or B
369	23 : 0, 1	Master/slave vm3 filesystem	A or B
370	24 : 0, 1	Master/slave vm4 filesystem	A or B
371	25 : 0, 1	Master/slave vm5 filesystem	A or B
372	26 : 0, 1	Master/slave vm6 filesystem	A or B
373	27 : 0, 1	Master/slave vm7 filesystem	A or B
374	62 : 0, 1	Master/slave vm8 filesystem	A or B
375	63 : 0, 1	Master/slave vm9 filesystem	A or B

* For an alarmed master filesystem (device 0), see Procedure A.
For an alarmed slave filesystem (device 1), see Procedure B.

Note: Error 349 points to Alarms 360 to 375. Error 350 points to Alarms 376 to 391.

Procedure A: Master Filesystem Alarm Resolution

To resolve an alarm for a *master* filesystem:

1. First, find which disk the alarmed filesystem is on. Display the `filesystem : list` form for each disk to find the alarmed filesystem. It should be unmounted (not have a mount point).
2. Check the alarm and error logs to be sure the disk drive the master filesystem was on is not bad. See Table 3-2 for errors that may point to potential disk failures. If the disk looks bad, go to Chapter 6 to investigate possible disk problems.
3. When you have found the bad filesystem, display the `filesystem : detail` form (see Figure 10-1, *The* `filesystem : detail` *Form*, for an example).
4. Enter the name of the currently active filesystem (the former slave filesystem) and press ENTER.
5. Turn mirroring off (change the `redundant` field to **n**) and press CHANGE.
6. Now press CLEAR FORM and enter the name and type of the alarmed filesystem (the former master filesystem) and press ENTER.
7. When the filesystem data is displayed, press DELETE to remove this filesystem.
8. Enter the name of the currently active filesystem again and press ENTER. When the fileystem data is displayed, change the `redundant` field back to **y**.
9. When the system prompts you for the slave filesystem name, enter the name of the former master filesystem (the filesystem you just deleted). Press CHANGE.

Procedure B: Slave Filesystem Alarm Resolution

When a slave filesystem is alarmed, the alarm can be resolved without shutting the system down. Do the following:

1. Check the alarm and error logs to be sure the disk drive the master filesystem was on is not bad. See Table 3-2 for errors that may point to potential disk failures. If the disk looks bad, replace it using Chapter 6 and restore service.
2. When you have found the bad filesystem, display the `filesystem : detail` form. Enter the name and type of the *master* filesystem. Press ENTER.
3. When the system displays the filesystem information, tab to the `redundant` field and enter **n**. Press CHANGE. The alarm should now be resolved.
4. Now press CLEAR FORM and enter the name and type of the former *slave* filesystem. Press ENTER. When the filesystem information is displayed, press DELETE.
5. Finally, re-enter the name and type of the *master* filesystem. Press ENTER. When the filesystem information is displayed, tab to the `redundant` field and enter **y**. Tab to the *slave* field and enter the name of the slave filesystem. Press CHANGE.

```
AUDIX STATUS:  alarms: none,  logins: 1,  thresholds: none
 PATH:  filesystem : detail

filesystem: disk00.sd              type: sdat

(PRESS ENTER TO DISPLAY FILESYSTEM DATA)

       size: 1000         free: 275

       redundant (y/n/d)? y  status: complete

       master filesystem: disk00.sd

       slave filesystem : disk02.sd




Error and confirmation messages appear here.

CHANGE | ADD | DELETE      HELP | FIELD       CLEAR | EXIT | ENTER
or RUN |     |                  | HELP        FORM  |      |
```

Figure 10-1. The `filesystem : detail` Form With Sample Data

NOTE

On R1V4 systems, the `redundant` field may be labeled `mirrored` and the `d` and `all` options may not be available.

RESTORING FILE REDUNDANCY FOR MULTIPLE FILESYSTEMS

A system error or disk crash may cause you to lose one or more of your duplicated filesystems (you may have received a `bad slave` or equivalent message). When the system problem is fixed, you can restore all missing duplicate filesystems in one step as follows:

1. Display the `filesystem : detail` form.
2. Move the cursor to the `filesystem` field and type **`all`**.
3. Move the cursor to the `redundant` field and type **`y`** for yes.
4. Press F1 (CHANGE or RUN).

The system will begin making copies of all filesystems that are no longer mirrored as a result of the disk problem. It may take up to 30 minutes for the system to duplicate each filesystem.

DISTRIBUTING FILESYSTEMS

Customers who have more than one hard (or fixed) disk in their AUDIX systems can improve their response time by placing the busiest filesystems on separate hard disks.

Activity of Filesystems

The most frequently accessed AUDIX filesystems are:

- sdat
- sst (especially if the Activity Log is turned on)
- vdat

The next most active filesystems are:

- adat
- ndat

System response time will improve to the extent that these filesystems can be separated. General guidelines include:

1. The three busiest filesystems (sdat, sst, and vdat) should be placed on separate disks whenever possible.
2. The next busiest filesystems (adat and ndat) should separated from sdat, sst, and vdat if possible.
3. The vtext filesystems should be spread as evenly as possible among disks.

Table 10-2, *Recommended Filesystem Distribution*, shows how filesystems should be distributed, based on the number of disks in the system, to result in optimum performance.

File Redundancy

Table 10-3, *Recommended Filesystem Distribution with File Redundancy*, shows the recommended filesystem distribution if full mirroring is used (all filesystems are duplicated and continuously updated). Customers who are using the File Redundancy feature to duplicate only some of their filesystems should combine the recommendations from Tables 10-2 and 10-3 as appropriate.

Table 10-2. Recommended Filesystem Distribution

Number of Hard Drives	disk00	disk02	disk03	disk04	disk05	disk06
1 HDD	boot_f boot_e sdat vdat sst adat ndat all vtext					
2 HDDs	boot_f sdat vdat 50% vtext	boot_e sst adat ndat 50% vtext				
3 HDDs	boot_f sdat ndat 30% vtext	boot_e vdat adat 30% vtext	sst 40% vtext			
4 HDDs	boot_f sdat 25% vtext	boot_e vdat 25% vtext	sst 25% vtext	adat ndat 25% vtext		
5 HDDs	boot_f sdat 20% vtext	boot_e vdat 20% vtext	sst 20% vtext	adat 20% vtext	ndat 20% vtext	
6 HDDs	boot_f sdat 15% vtext	boot_e vdat 15% vtext	sst 15% vtext	adat 15% vtext	ndat 15% vtext	25% vtext

In the following table, duplicated (*mirrored*) filesystems are indicated with an `m` prefix.

Table 10-3. Recommended Filesystem Distribution with File Redundancy

# of Drives	disk00	disk02	disk03	disk04	disk05	disk06
2 HDDs	boot_f sdat vdat 50% vtext msst madat mndat 50% mvtext	boot_e sst adat ndat 50% vtext msdat mvdat 50% mvtext				
3 HDDs	boot_f sdat ndat 33% vtext mvdat 33% mvtext	boot_e vdat adat 33% vtext msst 33% mvtext	sst 34% vtext msdat madat mndat 34% mvtext			
4 HDDs	boot_f sdat 25% vtext mvdat 25% mvtext	boot_e vdat 25% vtext msdat 25% mvtext	sst 25% vtext madat mndat 25% mvtext	adat ndat 25% vtext msst 25% mvtext		
5 HDDs	boot_f sdat 20% vtext mvdat 20% mvtext	boot_e vdat 20% vtext mndat 20% mvtext	sst 20% vtext madat 20% mvtext	adat 20% vtext msst 20% mvtext	ndat 20% vtext msdat 20% mvtext	
6 HDDs	boot_f sdat 16% vtext 16% mvtext	boot_e vdat 16% vtext 16% mvtext	sst 16% vtext 16% mvtext	adat 16% vtext mvdat 16% mvtext	ndat 16% vtext msdat 16% mvtext	20% vtext msst madat mndat 20% mvtext

A. Basic Procedures

This appendix covers basic tasks of remote and local AUDIX service technicians. It is intended as an introductory guide for service personnel who are unfamiliar with AUDIX maintenance procedures, and as a quick-reference for experienced technicians who simply need a reminder of the basic AUDIX support tasks.

Basic procedures include the following:

- Block/Restore Service (includes busying-out and releasing VSP devices and the data link)
- MI Toggle Switch (Modes and Use)
- RCD Cartridge Handling
- Remove Cover Plates
- Restart or Reboot the System
- Shut Down the Software
- Visual Inspection
- Alarm and Error Logs (Display and Use)
- VPT (Voice Port) Test Calls

BLOCK/RESTORE SERVICE

Normally service is blocked (interrupted) to keep subscribers from using faulty equipment until you can repair and test it, or run audits on a restored filesystem. If service is *not* blocked, callers could get confusing responses after dialing AUDIX, or tests might give misleading results.

When the AUDIX system is taken out of service, subscribers who try to access their mailboxes hear reorder tone (fast-busy). This tone is used whenever the switch cannot access AUDIX (either the data link is down, or no voice ports are attached or in service). People who would normally reach AUDIX through the Call Answer feature are not forwarded to AUDIX (they hear ringing and no answer at the number they called).

Block Service (Busy-Out or Shutdown)

Service may be blocked completely or partially, depending on the method you choose. You normally block service by *busying-out* an AUDIX device, which means temporarily removing it from service. You *release* the device to return it to service.

You may busy-out either the data link or the Voice Session Processor (VSP) devices on the TD bus (the VB, TDBI, VPT, or VPC boards). You may also force all calls to be dropped, or allow service to be blocked gradually as calls end (called *camp-on* busy-out).

Block All Service

To block all calls to AUDIX, use one of these methods:

- *Data Link Busy-Out:* Use the `maintenance : datalink : busyout` form to drop all calls in progress and to block all new calls coming from the switch. This is the recommended busy-out procedure for systems with a data link unless attached to a 1A ESS Switch or 5ESS switch (see *Standalone Busy-out*).
- *Standalone Busy-Out:* In a Standalone system, there is no data link. In order to block service, you must busy out each AUDIX port *on the switch side*. To restore service, release each AUDIX port at the switch. This method is also used when the switch is a 1A ESS or 5ESS switch. (If you busy out the data link, the AUDIX starts to answer calls in stand-alone mode.)
- *System Shutdown:* You may shut the system down to prevent callers from accessing it by:
  - Using the `shutdown` form to do an administrative (a) or maintenance (m) shutdown, with a forced (f) or camp-on (c) option.
  - Using the MI toggle switch to force off all active calls and shut down the system (same as a forced, maintenance shutdown).

NOTE

Whenever you restart or reboot the system, devices you have manually busied out are automatically returned to service.

Partially Block Service

You can busy-out individual VSP-board ports or channels so AUDIX can continue to provide service over good ports. VSP devices include the VPT, VPC, TDBI, and VB boards. These boards (or some of their ports or channels) are routinely busied-out and released so you can make test calls (force a call through a desired device). You may also need to keep traffic from using a possibly faulty device, port, or channel until you test or repair it. After you busy-out service, an incoming call can be answered by any idle port or channel.

To busy-out a VSP device:

1. Use the `maintenance : vsp : busyout` form to remove traffic from one or all VPT or VPC ports, or from one or more VB or TDBI channels.

   NOTE

   On a Standalone system, busy-out the desired ports *on the switch side.*

   a. To *partially* block service, busy-out only the ports or channels you need to work on. This allows service to continue over the ports and channels still in service. You can then unequip or test the selected VSP device without interference.

   b. To block *all* service, remove all ports or channels from service. Users receive reorder tone or hear ringing with no answer.

2. Select the forced (f) option to drop all calls immediately (used during off-peak hours or for urgent repairs), or camp-on (c) option to block service gradually as ports become idle. *If all calls are not dropped within 2 minutes,* AUDIX software may cancel the camp-on busy-out request.

3. When tests or repairs are complete, use the `maintenance : vsp : busyout` form to release the busied-out port(s) or channel(s) and restore normal service.

Force Off Traffic

You may force traffic off the system to do urgent repairs or tests. Normally, service should be done during nonpeak hours when little or no traffic is on the system. You may force off traffic by:

- Using the `maintenance : datalink : busyout` form.
- Using the MI toggle switch (always a forced shutdown) or running the `shutdown` form with the forced (f) option.
- Using the `maintenance : vsp : busyout` form with the forced (f) option.

CAUTION

A forced busy-out or shutdown should be used only if no traffic is on the system or if maintenance is urgent and must be done immediately. Always notify the customer **before** *blocking service if AUDIX is providing service.*

Restore Service (Release or Reboot)

After repairing or testing the system, return it to service as follows:

1. *If the system was shut down,* restart or reboot it. This automatically releases any devices you manually busied-out.
2. If you busied-out the data link to block all service, use the `maintenance : datalink : release` form to bring up the switch link.
3. If you busied-out some VSP devices to partially block service, use the `maintenance : vsp : busyout` form to release them.

   NOTE If the VSP device to be released is on an unequipped VSP board, it must be equipped using the `maintenance : vsp : equipage` form first.

4. Verify that full service is restored by making a test call using the `maintenance : system : test call` form.

MI TOGGLE SWITCH (MODES AND USE)

The toggle switch on the Maintenance Interface (MI) circuit pack faceplate may be used to shut down or reboot the system depending on the system mode and switch movement. The switch's position does *not* affect normal power-up or initialization. Equivalent actions on the terminal, MI and FP LEDs, system modes, and general MI board description are discussed in this section.

Using the MI Toggle Switch

The MI toggle switch must be pulled out before it can move to either side. The switch movement causes the actions shown in Table A-1 depending on its mode. The *center* movement means moving the switch from off-center (offc) to center (cntr). Moving the toggle from off-center to the center (cntr) position (if not already there), then off-center (offc), is called *cycling* the toggle switch.

Table A-1. Toggle Switch Movement and Effects

System Mode	Switch Movement	Time (Note)	Effect
Control	cntr to offc	–	None; system shows Control Mode Menu
	offc to cntr	immed.	System does a full initialization (reboot) from disk
Initialization	cntr to offc	immed.	System shows Control Mode Menu; FP is reset
(hardware)	offc to cntr	–	None; system continues hardware initialization
Normal	cntr to offc	1-4 min.	Starts forced system shutdown; when the red COMPL LED lights, the FP is reset (its red LED lights), and the Control Mode Menu appears
(software running)	cntr to offc, back to cntr	1-4 min.	Starts forced system shutdown as above, then immediately starts a full initialization (reboot)
	offc to cntr	–	None; software stays up and all screen forms are accessible
Normal	cntr to offc	4 min.	Starts forced system shutdown (see above)
(software shutdown)	cntr to offc, back to cntr	4 min.	Starts forced system shutdown as above, then immediately starts a full initialization (reboot)
	offc to cntr	–	None; filesystems are closed so administrative or maintenance tasks can be done
Note:	Shutdown normally takes about 30 seconds depending on load. If software is insane or was already shut down, the MI does a shutdown after a 4-minute time-out.		

MI Toggle Switch Equivalents

AUDIX is designed so that all actions done using the MI toggle switch can be done from the terminal. The toggle switch is simply a short-cut that may be used locally, or another means of controlling the system in case the terminal is not working or is unavailable. Actions include:

- *Display the Control Mode Menu:*
  - — In hardware initialization mode (before the `ENTERING NORMAL MODE` message), press CTRL-c on the terminal to stop initialization and show the menu.
  - — In normal mode (after the `ENTERING NORMAL MODE` message and when forms are accessible), run the `startup` form and press CTRL-c immediately after the `FP reset` message. The Control Mode Menu appears.
- *Initialize (restart or reboot):*
  - — In control mode, use the Control Mode Menu Options 4 (restart), 5 (reboot), or 6 (FP restart with DBP reboot). Only Option 5 (reboot) resets the FP.
  - — In normal mode (after the `ENTERING NORMAL MODE` message and when forms are accessible), run the `startup` form (to restart), *or* press CTRL-c after the `FP reset` message and go to the Control Mode Menu (to reboot).
- *Shut down system software:*
  - — In control mode, software is already shut down.
  - — In initialization mode (before the `ENTERING NORMAL MODE` message), press CTRL-c on the terminal to stop initialization and show the Control Mode Menu.
  - — In normal mode (after the `ENTERING NORMAL MODE` message and when forms are accessible), run the `shutdown` form. The toggle switch does a forced maintenance shutdown (options m and f). However, the form also allows you to select administrative (a) or camp-on (c) options.

MI Toggle Switch and LEDs

After the toggle switch is moved (or an equivalent action is done), the MI and FP-CPU circuit pack LEDs indicate system modes as follows:

a. MI LEDs:
   - TEST (green) – Initialization is in progress.
   - ACT (green) – Software shutdown from normal mode is in progress.
   - COMPL (red) – Software is shut down.

b. FP-CPU LEDs:
   - Red – FP is reset. When the TN523 or TN591 is red, software is always shut down.
   - Green heartbeat – FP has finished initialization tests.

MI Board Alarm Panel

An alarm panel on the front of the MI circuit pack shows MI board and AUDIX system status (see Figure A-1, *MI Circuit Pack Faceplate*). These LEDs are described in this section.

MI Board Status

Three LEDs show MI circuit pack status:

- *FAULT – Red:* Steadily lit when the MI board detects a failed self-test. This LED also lights briefly when the system is powered on (most LEDs flash on power-up).
- *TEST – Green:* Lights when the FP tests the board or during initialization
- *IN USE – Yellow:* Lights when a Local Maintenance Terminal (LMT) is connected to the MAINT H00 port, *or* when an RMT modem is attached *and* a call is in progress.

AUDIX System Status

Four LEDs under the ALARMS label show AUDIX system status. The MI reports major and minor alarms to the remote maintenance site through the CDR1B alarm board and the alarm link (D03) using the existing alarm-reporting facilities in place for the switch. The MI also displays alarms on the terminal STATUS line (if a display terminal is logged on). The ALARMS LEDs are:

- *MAJ – Red:* Lights when the system has detected a major alarm or is in control mode. A major alarm can potentially affect over 25 percent of the system.
- *MIN – Red:* Lights when the system has a minor alarm (may be lit when the MAJ alarm LED is lit). A minor alarm can potentially affect up to 25 percent of the system.
- *WRN – Yellow:* Lights when the system has a warning alarm (may be lit when either the MAJ or MIN alarms LEDs are lit). A warning alarm is a problem that needs attention but has (as yet) a limited impact on service.
- *ENV – Red:* Lights when the system has an environmental alarm (sent from the CDR1B alarm board to the MI). Environmental alarms include power or temperature equipment.

System Shutdown Status

Two LEDs located above and below the MI toggle switch show system shutdown status. The system may be shut down with the MI toggle switch or the `shutdown` form.

- *ACT – Green:* Lights when system shutdown is activated when the system is in normal mode (software is running).
- *COMPL – Red:* Lights when shutdown is complete (from 30 seconds to 4 minutes, depending on the size of the system). This indicates the filesystems on disk have been closed. You may now safely power down the system without losing data. Sometimes this red LED does not light after 4 minutes. However, the TN523 or TN591 FP-CPU will light red, indicating the system is shut down.

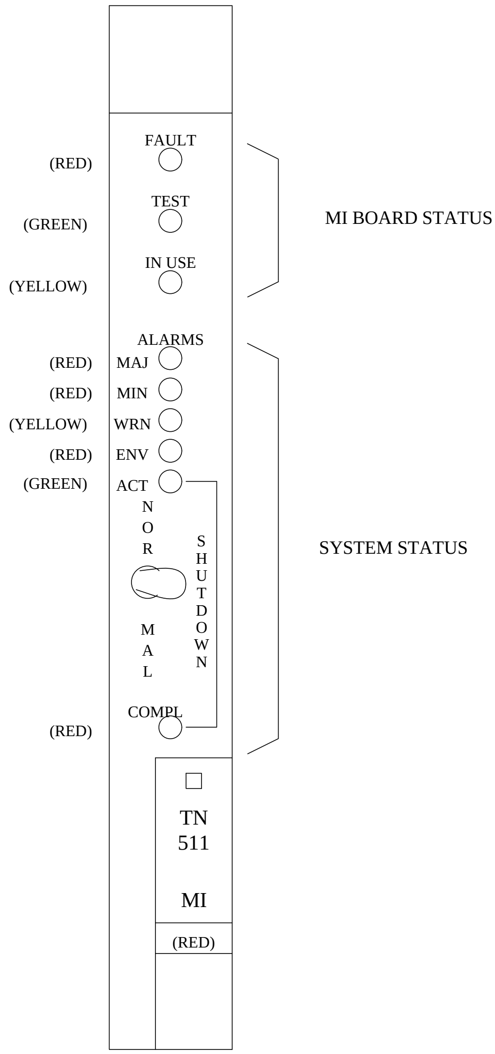


Figure A-1. MI Circuit Pack Faceplate

MI Board and System Modes

The MI displays the mode or state in which AUDIX operates. Some modes are transitional states; others remain in effect until a specific action is taken. AUDIX modes include:

1. *Control Mode:* The MI firmware is in control, the FP is not active (the red LED on the TN523 or TN591 CPU is lit), and screen forms cannot be accessed. Only the MI's maintenance connector (MAINT H00) is active, so the maintenance terminal must be attached to it to do any commands. If the system is held in control mode, a Control Mode Menu appears on the terminal screen, and the FP-CPU TN523 or TN591 CPU is always red.
2. *Initialization Mode:* If the MI switch is moved (see Table A-1, *Toggle Switch Movement and Effects*) or if AUDIX is powered down and then up, the system passes through this mode to test its hardware and load software. A complete initialization from disk is called a *reboot;* a partial initialization from FP memory is called a *restart.*
3. *Normal Mode:* Software is in control. The system enters normal mode during software initialization, marked by the `MAINTENANCE INTERFACE ENTERING NORMAL MODE` message. Normal mode is the usual, in-service state of AUDIX operation. The administration or maintenance forms can be accessed and displayed on terminals connected to either MI RS-232C port (H00 or H01).
4. *Shutdown Mode:* The system closes files and saves data. If an administrative shutdown was done using a form, some forms are still accessible (for example, software may be restarted using a form). Administrative commands may be done because the system remains in a subset of normal mode. If the MI toggle switch was used, the system returns to control mode and forms are not available.

MI Board Terminal Connectors

The MI board controls the two 25-pin RS-232C compatible connectors for attaching administration and maintenance display terminals: MAINT (H00) and ADMIN (H01). The MI sets the baud rates the terminals can use at 1200 bits per second (bps) or 4800 bps (default). To toggle the baud rate, press BREAK on an attached terminal.

When the system is initializing or held in control mode, only the maintenance connector is active, so the maintenance terminal must be attached to the MAINT H00 connector to do any commands. In normal mode (software is running), both connectors are active. See Chapter 8, *Terminal Setup and Use*, for information on terminals.

RCD CARTRIDGE HANDLING

This section covers Removable Cartridge Drive (RCD) cartridge handling, automatic spin up or spin down of the cartridge, faceplate design, and cartridge-changing procedures. Two types of RCDs are in current use:

- Early AUDIX systems use a 20-Mbyte RICOH drive. This drive is identified by its flip-down lid and lid latch. Any references to the physical nature of the RCD or its cartridges in this section correspond to the 20-Mbyte drive.
- Newer systems use a 50-Mbyte RICOH drive. This drive has a button to push for simpler cartridge handling.

The LED patterns and spin-up/spin-down behavior of the RCD are the same for 50-Mbyte and 20-Mbyte drives.

Cartridge-Handling Procedures

Handle RCD cartridges carefully to prevent damage to the media or drive. Precautions include:

1. RCD cartridges are designed to handle falls from heights of about 3 to 4 feet without breaking (a short drop probably won't hurt the cartridge). However, *do not use* cartridges that fell from a higher height or seem damaged. They may break the drive.
2. *Never use* cartridges that were in an RCD that crashed. They can break the new drive.
3. Keep cartridges away from motors or other magnetic devices.
4. Store cartridges in a cool, dry, protected area. Keep all cartridges out of direct sunlight. Always store cartridges in their protective holders to keep them clean.
5. Keep the environment clean to protect the media; no smoking.
6. If cartridges are exposed to extreme temperatures – those greater than 100°F (38°C) or lower than 39°F (4°C) – allow them to acclimate at least 1 hour before using them.
7. Never leave the RCD empty without a cartridge inserted or the heads may become contaminated. Insert the null (dummy) cartridge that was shipped with the drive if needed so the drive is never left empty.
8. *Never force* the 20-Mbyte drive's front latch to move (such as when power is off). This will break the latch.
9. Close the RCD door securely after inserting or removing a cartridge.
10. *Never open* the drive door while the drive is spinning, when the heads are accessing the disk, or when power is off.

RCD Faceplate Design

The 20-Mbyte and 50-Mbyte RICOH drives have the following LEDs and switches. See Figure A-2, *RICOH 20-Mbyte RCD Faceplate*, and Figure A-3, *RICOH 50-Mbyte RCD Faceplate*, for an illustration.

- The *red* LED flashes when one of the drive heads is writing to disk. This light is on only when the disk is running correctly.
- The *green* LED is steady whenever the drive is ready for use. A *flashing green* light means the drive motor is in the process of spinning up or down. A 50-Mbyte drive takes about 20 seconds to spin up and 4 seconds to spin down. The 20-Mbyte drive takes about 30 seconds to spin up and 10 seconds to spin down.
- The *start/stop button* to the right of the LEDs starts the spin down/spin up process and retracts the drive heads (if exposed). If the start/stop button has *not* been pressed and the green LED is blinking, this indicates a drive fault.
- *For a 20-Mbyte drive:* The front *latch* holds the upper lid in place. The drive *must have power on* for the front latch to operate, but the drive *must* be spun down (both LEDs must be dark). The latch keeps the top cover from being flipped back during normal drive operation.

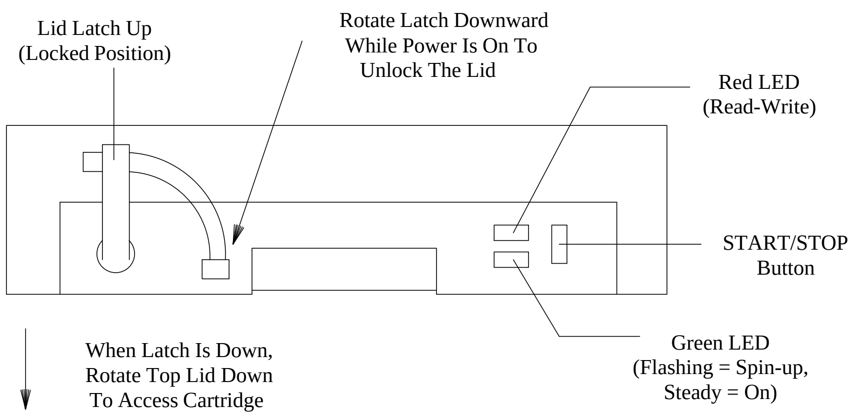


Figure A-2. RICOH 20-Mbyte RCD Faceplate

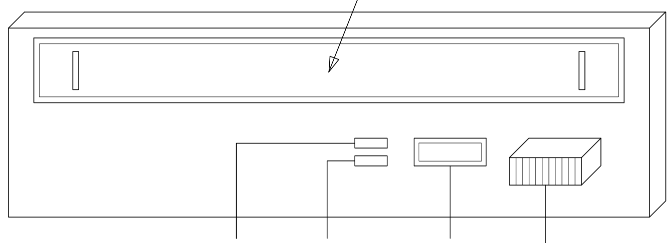


Figure A-3. RICOH 50-Mbyte RCD Faceplate

RCD Spin-Up/Spin-Down Behavior

AUDIX software automatically spins up or down the RCD in certain cases. The green LED flashes for 4 to 30 seconds until spin-up (steady green LED) or spin-down (LEDs dark) is complete.

NOTE

The start/stop button is disabled during a software request to spin the drive up or down. This prevents you from accidentally interrupting or reversing an automatic spin-up/spin-down cycle.

1. Software automatically spins *down* the RCD when:
   a. The `maintenance : dbp : unequip` form for the RCD (disk01) is used.
   b. The `shutdown` form with the maintenance (m) option is used.
   c. The MI toggle switch is used to shut down the system (see Table A-1).
2. Software automatically spins *up* the RCD when:
   a. The `maintenance : dbp : equip` form for the RCD is used (where *disk device number* = 1 for disk01).
   b. The `startup` form is used. (This form does a maintenance shutdown first, which spins down the RCD, then a restart which spins up the RCD.)
   c. A system initialization (reboot) or power on procedure is done. (A DBP subsystem initialization always spins up the RCD.)

Changing RCD Cartridges

The RCD cartridge is normally changed using these procedures. It may also be changed any time the system is shut down before a reboot (*not* a restart) if power is on.

1. Make sure the power is on and software is running.
2. Use the `maintenance : dbp : unequip` form to unequip the RCD (take it out of service). Specify *disk device number* = 1 and press CHANGE. This form should cause the RCD to spin down (the green LED will flash as the drive motor spins down).
3. Remove the AUDIX cabinet front cover if needed (turn the top-center screw a quarter-turn and lift the cover out of the bottom hinge slots).
4. *For a 50-Mbyte drive:*
   a. If the green LED is lit, press the start/stop button (the left-hand button) to spin down the drive.
   b. Once the green LED goes out, press the eject button (the right-hand button) to eject the cartridge. Go to step 6.
5. *For a 20-Mbyte drive:*
   a. When the green LED goes out (all RCD LEDs are off), move the lever on the left of the faceplate down 90 degrees to unlatch the door.

      CAUTION

      DO NOT *move the latch if the green LED is on or flashing, or if power to the system is OFF. This will damage the drive.*

   b. Grasp the front of the RCD and pull the drive forward out of the lower cover housing. The drive will click when it is about 6 inches out.
   c. When the drive clicks into place, rotate the front lid (the top of the faceplate) forward and down. The cartridge should pop up. Go to the next step.
6. Remove the cartridge. *Before setting it down,* make sure the cartridge is clearly labeled with the volume name and contents. Place the cartridge in its protective cover.
7. *For a 50-Mbyte drive:*
   a. Check the cartridge you are going to insert and verify that the red tab on the underside of the cartridge is set to the W/R position (for write/read).
   b. Position the cartridge so that the arrow is on top and pointing toward the slot. (See Figure A-4, *Inserting a 50-Mbyte Cartridge*.)
   c. Slide in the cartridge.
   d. Press the start/stop button to spin it up. The green LED will blink and then stay on. (This takes about 20 seconds). Go to step 9.

8. *For a 20-Mbyte drive:*

   a. Position the new cartridge so the label faces forward and the write-enable tab is at the bottom right (this covers the write-protect notch). The head-access panel at the rear of the cartridge should be shut.

   CAUTION *You cannot write to a write-protected disk or RCD, so you cannot initialize a system without a write-enable tab over the notch.*

   b. Insert the cartridge and push down firmly on the housing so it snaps into place.

   c. Lift the front lid back into place, and return the front lever to the latched (upright) position. Push the RCD drive back into place (the drive will not slide back in unless the latch is up). Go to the next step.

9. Use the `maintenance : dbp : equip` form to equip the RCD (identify it to software). Use the following options:

   a. Specify *circuit pack code* = SCSI and *disk device number* = 1. Press CHANGE.

      If this cartridge has already been used, the volume name appears when you press CHANGE.

   CAUTION *If* `initialization` *or* `erase` *= n, you will erase all the cartridge contents.*

   NOTE The *circuit pack code* in early systems was SD20. This code still works, but is no longer needed. AUDIX software automatically reads the size and type of each disk.

   b. *For a new cartridge ONLY,* assign it a meaningful volume name (label) that is 1 to 7 characters long. In the *erase* (or *initialization*) field, enter **y** and press CHANGE.

10. This form should cause the RCD to spin up (the green LED should start to flash). *If the green LED does not blink,* push on the front of the RCD to make sure it is back in place, then press the start/stop button to spin up the drive manually.

11. When the green LED remains steady, the cartridge is ready for use. File the cartridge you removed in a cool, dry, safe place.

NOTE If the green LED blinks more than 2 to 3 minutes, open the RCD again starting with step 4 or 5. Make sure the cartridge is correctly inserted and seated.

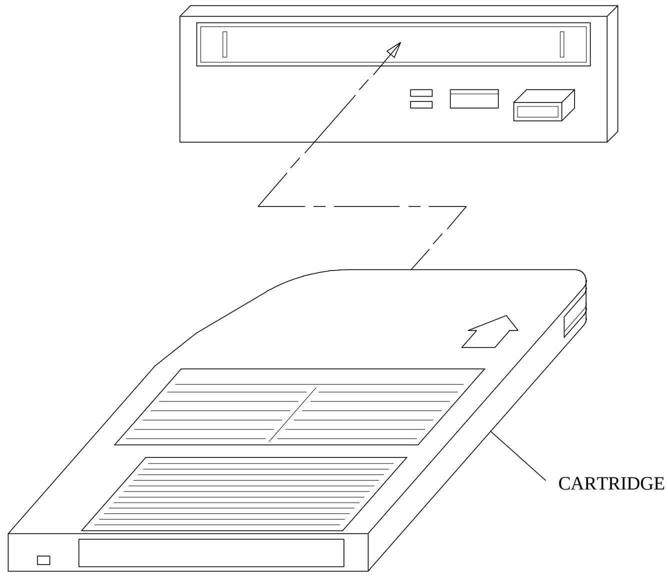


Figure A-4. Inserting a 50-Mbyte Cartridge

REMOVE COVER PLATES

Many procedures require the front or back cover plates to be removed from one of the AUDIX cabinet. This section details procedures for removing:

- Front cover and lower front cover plate
- Middle rear cover plate (above the connector panel)
- Lower rear cover plate (below the connector panel)

Removing the Front Cover

Remove the AUDIX front cover to access:

- The circuit-pack carrier
- The Electro-Static Discharge (ESD) ground point for the EMC wrist strap
- The RCD (bottom cabinet only)
- The documentation slot

See Figure A-5, *Removing the Front Cover and Lower Cover Plates*, and the following steps to remove the front cover:

1. Turn the quarter-turn screw in the top center of the cover.
2. Tip the cover forward, then lift it out of the bottom hinge slots and set it aside.

Removing the Lower Front Cover Plate

Remove the lower front cover plate to access:

- The air filter (below the carrier)
- The disk drives (HDDs, RCD bracket, or their cables)
- The LED/circuit-breaker module.

See Figure A-5 and the following steps to remove the lower front cover plate:

CAUTION

Before removing the front cover plate, shut down the software and power down the system. It is too easy to trip the cabinet power switch when removing the plate.

1. Remove the front cover (see previous procedure).
2. Turn the 2 quarter-turn screws on the lower front cover plate.
3. Lift the plate out of the bottom hinge slots and set it aside.

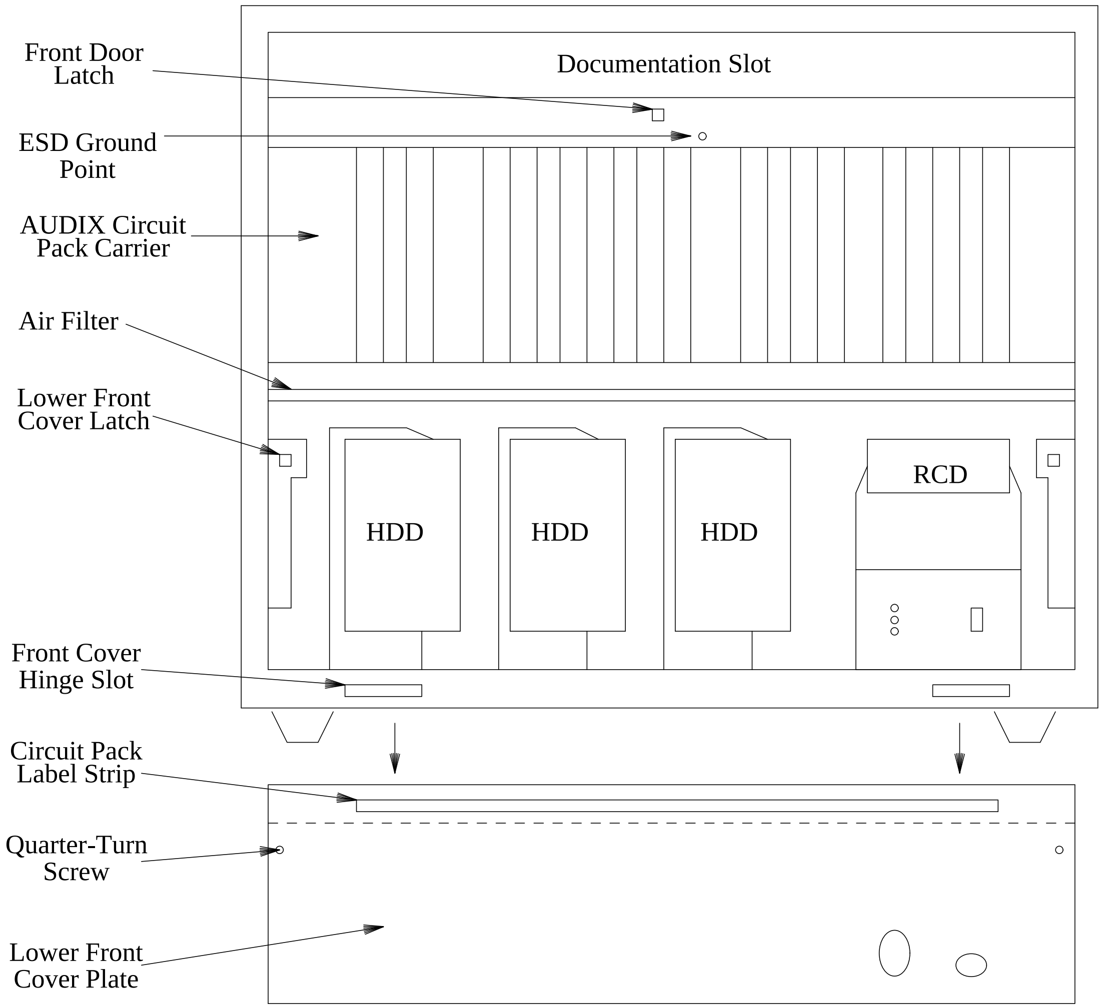


Figure A-5. Removing the Front Cover and Lower Cover Plate

Removing the Rear Cover Plates

You may need to remove one or more of the rear cover plates to access components inside the back of the AUDIX cabinet. See Figure A-6, *Removing the Rear Cover Plates*, and do the following:

- Remove the *top* panel only to access the fans in the fan assembly (see Chapter 7, *Power and Environment*).
- Remove the *middle* cover plate to access:
  - — The backplane and paddle boards
  - — Internal cables including those for the fan assembly, CDR1B alarm board, and the connectors inside the rear connector panel

— *On two-cabinet systems:* The intercabinet cabling that connects the two cabinets

- Remove the *lower* cover plate to access:
  — The power supply
  — The battery-charger cable and battery pack

CAUTION *The software must be shut down and the power turned* **OFF** *before you remove any cover plate on the back of the cabinet.*

Step 1: Shut Down and Power Down

1. If software is running, shut the system down using the MI toggle switch or the `shutdown` form with the maintenance (m) option.
2. Wait for the RCD to spin down (green LED goes dark), then power down the system.

   CAUTION *Turn the power off* **before** *unplugging the cord. Otherwise, AUDIX will run on its battery power even if you turn the power switch(es) off afterwards.*

3. If AC power is used, unplug the power cord(s) from the 120 V AC 3-prong connector at the rear of the cabinet(s).

DANGER **The POWER switch should be OFF** *and* **the power cord should be unplugged to prevent you from accidentally contacting electrical current in the backplane.**

Step 2: Remove the Cover Plate(s)

The AUDIX middle and lower cover plates (located above and below the connector panel) are notched to slide out for easier removal and reassembly. To replace either cover, reverse the steps.

To remove the *middle* cover plate:

1. Loosen (do *not* remove) the 7 screws along the bottom of the middle cover plate. (The 4 screws on the sides also attach the bottom cover plate.)
2. Remove the 4 screws along the *top* of the middle cover plate and set them aside.
3. Slide the middle cover plate upwards to remove it from the back of the AUDIX cabinet.

To remove the *lower* cover plate:

1. Loosen (do *not* remove) the 4 screws along the bottom of the lower cover plate.

2. Remove the 9 screws along the top and sides of the lower cover plate and set them aside.
3. Slide the lower cover plate upwards to remove it from the back of the AUDIX cabinet.

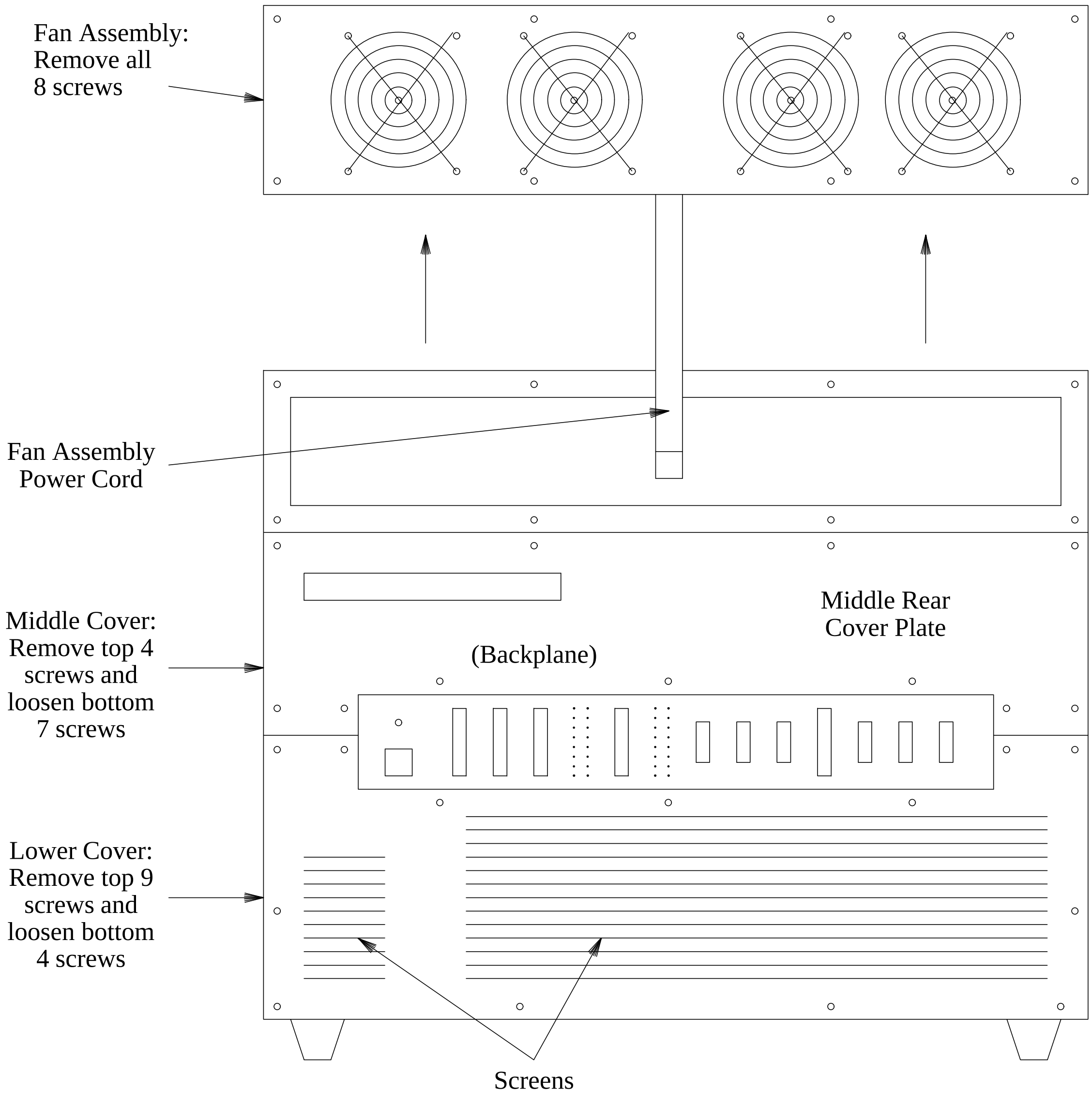


Figure A-6. Removing the Rear Cover Plates

RESTART OR REBOOT THE SYSTEM

A system restart is a partial initialization started from FP memory. A reboot is a full initialization started by loading programs into FP memory from disk. Both options are intended to return AUDIX to service following a problem resolution or hardware replacement. They both reset the FP and attempt to bring a system out of control mode and back into normal (in-service) mode.

Restarts

A system *restart* brings the system software back into full service, usually after an administrative shutdown. This is often done to try to clear software problems. To restart the system, do one of the following:

1. If software is running, use the `startup` form.
2. If software is *not* running, access the Control Mode Menu by using the MI toggle switch (if local) or pressing CTRL-c at log in (if remote). Select Option 4 (restart) on the menu.
3. During an initialization, press CTRL-c any time *before* the software boots and *after* the `MAINTENANCE INTERFACE ENTERING NORMAL MODE` message appears. When the Control Mode Menu appears, select Option 4.
4. The message `FP reset` should appear on the screen, followed by a software initialization. You need to log in after a restart.

A system restart resets the FP, tests the FP-RAM, then starts loading software programs from DBP-RAM to FP-RAM. Part of the process checks the FP memory against disk memory. If a checksum differs, the system will reboot instead of restarting (you will see a list of initialization options). This may happen if you have not restarted the system for a long time.

Reboots

A system *reboot* is done to clear major system problems (such as corrupt program memory). It also runs automatically whenever the system is powered up. To reboot the system, do one of the following:

1. Power the system down, then up.
2. Move the MI toggle switch from off-center to center. After 2 minutes, an initialization starts automatically.
3. Move the MI toggle switch from center to off-center. When the Control Mode Menu appears, select Option 5 (for a complete reboot) or Option 6 (to restart the FP and reboot only the DBP subsystem).
4. Some internal software problems may cause the FP to reset automatically.

A manual reboot resets the FP, then prompts you to select initialization options. If you don't type anything, a standard initialization begins after 2 minutes. The system first does a hardware initialization from disk, which loads software into FP memory. A check filesystem (ckfs) program tests all filesystems for bad data or structure, and may delete files or unmount filesystems depending on errors it finds. After testing the hardware, a software initialization from disk is run, normally ending with the `start service` message.

SHUT DOWN THE SOFTWARE

A shutdown procedure protects system software and customer data. A software shutdown is *always* required before powering down the system. It may also be required for certain maintenance and administration procedures. You may use a software form or the MI toggle switch (local only).

NOTE

If the Control Mode Menu is on the screen and the TN523 or TN591 FP-CPU has a red LED lit, software is already shut down.

CAUTION

You **must** *shut down the system software before a power down, or valuable customer and system data will be lost.*

Shutdown Using a Form (Remote and Local)

Whenever the system is in normal (in-service) mode, you may use the `shutdown` form to close software files and bring down the system.

Gradual or Immediate Shutdown

Select the type of shutdown you need based on urgency as follows:

- The *camp-on* shutdown (c) should be used whenever the system is running and calls are in progress. This option prevents new calls from being made and gradually blocks service as calls in progress are dropped and ports become idle. *If current calls are not ended within 2 minutes,* this option times out and must be restarted.
- The *forced* shutdown (f) should be used when there is no traffic on the system or if maintenance is urgent. If any calls are in progress, they are immediately disconnected.

Maintenance Shutdown

Do a *maintenance* shutdown before replacing hardware and powering down the system. This shutdown closes all files and unmounts all filesystems except the boot filesystem running the system. Most forms are not accessible. To do this type of shutdown:

1. Display the `shutdown` form and choose the maintenance shutdown option.

   NOTE A maintenance shutdown automatically spins down the RCD (wait for the green LED to go out). An administrative shutdown leaves the cartridge active.

2. Select the forced (f) or camp-on (c) option (you normally enter **`f`**).
3. Press CHANGE and wait for `operation complete` to appear (this normally takes about 30 seconds to 1 minute). The red COMPL (complete) LED will light on the MI faceplate. (If this LED never lights, see if the TN523 or TN591 has a red LED lit.)

   NOTE Verify that the RCD has spun down (its green light is OFF). If so, continue. If not, press the button on the TN506B. After a few minutes, press the button on the RCD. It should now spin down and its light should go off. If it doesn't, you can still go to the next step.

4. You may now power down the system to replace hardware. You could also restart the system without a power down to return to normal mode when ready.

Administrative Shutdown

Use an *administrative* shutdown to close all files, and then remount the filesystems so filesystem administration or maintenance may be done. The only filesystem that is left open is the announcement (adat) filesystem; this allows AUDIX to play system prompts or announcements. However, no other filesystems may be accessed. Screen forms are accessible and most filesystem maintenance is done in this mode.

This type of shutdown is normally followed with a system restart to return to normal mode. To do an administrative shutdown:

1. Display the `shutdown` form and choose the administrative shutdown option (enter **`a`**).
2. Select the forced (f) or camp-on (c) option (you normally enter **`c`**).
3. Do the required disk or filesystem operation using screen forms. When complete, do a restart to return the system to service.

Shutdown Using The MI Toggle Switch (Local Only)

You may *cycle* the MI toggle switch (set it from center to off-center position) to shut the system down. This action is equivalent to a forced maintenance shutdown and should be performed only if immediate maintenance is needed or if no traffic is on the system.

Cycling the toggle switch resets the FP, then the system displays the Control Mode Menu. All files are closed, all active calls are dropped, and all filesystems are unmounted except the boot filesystem running the system. After cycling the toggle switch:

1. The green ACT (active) LED lights, indicating a shutdown request is active.
2. The red COMPL (complete) LED lights after 15 seconds to 4 minutes, depending on the size of the system. This indicates that the software filesystems on disk have been closed.
3. You may then power down the system. If you wish, you may immediately reboot the system by returning the toggle switch to the center position.

VISUAL INSPECTION

Visually inspect the AUDIX system for obvious problems as listed in this section. Any questions about or deviations from these standard connections should be resolved using *AUDIX Installation* (585-305-105).

Circuit Pack LEDs

The LEDs on the circuit pack faceplates can indicate possible problems. Normal LED patterns are listed in this section. Record any deviation from this pattern as part of system diagnosis. The inspection includes both one- and two-cabinet configuration checks.

NOTE

Yellow (in-use) LEDs that are steadily lit during normal operation are marked ‘‘ON’’ in capital letters. Any steadily lit red LED indicates a possible fault.

Base Cabinet Circuit Packs

This is for a one-cabinet AUDIX system or the base cabinet of a two-cabinet AUDIX system. Check for the following normal LED patterns:

1. Slot 0 – TN506B BC: LED 18 (yellow) = ON
   (There is no red LED on the BC; faults must be located through the alarm log or circuit pack isolation.)
2. Slot 1 – TN475B SADI should be lit as follows:
   - LED 9: yellow = ON when passing data from SADI memory to DBP (VME) bus
   - LED 10: yellow = ON when disk00 (HDD 0/0) is installed and operational
   - LED 11: yellow = ON when disk01 (RCD 0/1) is installed and operational
   - LED 12: yellow = ON when disk02 (optional HDD 0/2) is installed and operational
   - LED 13: yellow = ON when disk03 (optional HDD 0/3) is installed and operational
   - LED 14: yellow = ON when disk04 (optional HDD 0/4) is installed and operational
   - LED 15: yellow = ON when disk05 (optional HDD 0/5) is installed and operational
   - LED 16: yellow = ON when disk06 (optional HDD 0/6) is installed and operational
   - LED 17: yellow = ON when passing data between SADI and SCSI (disk) bus
   - LED 18: red = OFF (ON if pack is alarmed or during initialization)
   - LED 19: green = quick (1-second) heartbeat. Under heavy disk load, this heartbeat slows down (LEDs 9 and 17 should be flickering)

   NOTE The SADI lights show diagnostic tests during a reboot. See the next section.

3. Slot 2 – TN532 or TN540 RAM: LED 9 (yellow) = ON
   LED 18 (red) = OFF (if ON, pack is alarmed)
   LED 19 (green) = only under test
4. Slot 3 – TN366(B) ACC or TN539(B) ACCE: LED 9 (yellow) = ON (when Networking is active)
   LED 18 (red) = OFF (if ON, pack is alarmed)
   LED 19 (green) = quick (1-second) heartbeat
5. Slot 4 – TN472C DBP-CPU: LED 9 (yellow) = ON
   LED 15 (green) = quick (1-second) heartbeat
   LEDs 18 (red) and 19 (green) = same as TN532/540
6. Slot 5 – UN162 VSFI: LED 9 (yellow) = ON when passing data
   LEDs 18 (red) and 19 (green) = same as TN532
7. Slot 6 – UN160B DBPI: Same as UN162

8. Slot 7 – TN511 MI: Yellow (IN USE) LED = ON when LMT connected or RMT logged in
   Green (TEST) LED = ON during self-test or initialization
   Red (FAULT) LED = off (if ON, pack is alarmed)
   All other alarm panel LEDs = off (If ON, see the MI section in this appendix.)

9. Slot 8 (spare)

10. Slot 9 – TN523 or TN591 FP-CPU: Yellow LED = ON
    Green LED = 2-second heartbeat
    Red LED = OFF (if ON, pack is alarmed)

11. Slot 10 – TN734 or TN761 FP-RAM: Yellow LED = ON
    Green LED = ON only during test
    Red LED = OFF (if ON, pack is alarmed)

12. Slot 11 – TN734 FP-RAM: Yellow LED = ON (empty if Slot 10 contains TN761)
    Green LED = ON only during test
    Red LED = OFF (if ON, pack is alarmed)

13. Slot 12 (spare)

14. Slot 13 – TN716B FP-BI: Same as TN734 or TN761

15. Slot 14 – TN727 NC: Same as TN734 or TN761 (in top cabinet of two-cabinet systems)

16. Slot 15 – TN533 SCPI or TN547(B) MPSI: LED 9 (yellow) = ON (Integrated system)
    = OFF (Standalone system)
    LED 18 (red) = OFF (if ON, pack is alarmed or switch data link is not up)
    LED 19 (green) = ON when under test

17. Slot 16 – TN477 or TN500 TDBI: Yellow LED = ON when passing data from the TD bus
    Green LED = ON only during test
    Red LED = OFF (if ON, pack is alarmed)

18. Slot 17 – TN520 VB: Yellow LED = ON when traffic is on system
    Green and red LEDs = same as TN477/500

19. Slot 18 – TN714 TC: Yellow LED = slow (4-second) heartbeat
    Green and red LEDs = same as TN477

20. Slot 19 – TN747B VPT: LED 8 (yellow) = ON when port(s) in use
    LED 4 (red) = OFF (if ON, pack is alarmed)
    LED 6 (green) = ON when under test

21. Slots 20 to 23 – TN501B VPC: LED 9 (yellow) = ON when port(s) in use
    LED 18 (red) = OFF (if ON, pack is alarmed)
    LED 19 (green) = ON when under test

22. Slot 24 – TN747B VPT (Optional): Same as slot 19

23. Slots 25 to 28 – TN501B VPC (Optional): Same as slots 20 to 23

NOTE

If the AUDIX system is integrated with an SL-1, slots 19, 21, and 24 may contain TN747Bs or TN762Bs. Refer to the *AUDIX Integration Package for the SL-1 Switch* (585-304-203) for complete information.

Expansion (Top) Cabinet Circuit Packs

This is for the expansion cabinet of a two-cabinet AUDIX system. Check for the following normal LED patterns.

1. Slots 0 to 8 – Spare
2. Slot 9 – TN523 or TN591 VSP-CPU: Yellow LED = ON
   Green LED = 2-second heartbeat
   Red LED = OFF (if ON, pack is alarmed)
3. Slot 10 – TN734 or TN761 VSP-RAM: Yellow LED = ON
   Green LED = ON only during test
   Red LED = OFF (if ON, pack is alarmed)
   Slots 11 and 12 – Spare
4. Slot 13 – TN716B FP-BI: Same as TN734 or TN761
5. Slot 14 – TN727 NC: Same as TN734 or TN761
6. Slot 15 – Spare
7. Slot 16 – TN500 TDBI: Yellow LED = ON when passing data from the TD bus
   Green LED = ON only during test
   Red LED = OFF (if ON, pack is alarmed)
8. Slot 17 – TN520 VB: Yellow LED = ON when traffic is on system
   Green and red LEDs = same as TN500
9. Slot 18 – Spare
10. Slot 19 – TN747B VPT: LED 8 (yellow) = ON when port(s) in use
    LED 4 (red) = OFF (if ON, pack is alarmed)
    LED 6 (green) = only under test
11. Slots 20 to 23 – TN501B VPC: LED 9 (yellow) = ON when port(s) in use
    LED 18 (red) = OFF (if ON, pack is alarmed)
    LED 19 (green) = ON when under test
12. Slot 24 – TN747B VPT (Optional): Same as slot 19
13. Slots 25 to 28 – TN501B VPC (Optional): Same as slots 20 to 23

NOTE

If the AUDIX system is integrated with an SL-1, slots 19 and 24 may contain TN747Bs or TN762Bs. Refer to the *AUDIX Integration Package for the SL-1 Switch* (585-304-203) for complete information.

SADI Diagnostic Tests

During a DBP subsystem reboot, the SADI runs diagnostic tests. All but one of these indicates a problem with the SADI board if the test fails (the red LED remains lit). These tests use LEDs 10 to 13 as a binary code for the diagnostic test. LEDs 14 to 17 show the subtest that failed in binary (this component-level information is not needed in the field).

If the TN475B SADI has a lit red LED, the SADI is probably faulty. The exception is when yellow LEDs 10, 11, and 13 are lit (see test 11 in Table A-2, *SADI Diagnostic Tests*, VME bus-access failure). In this case, the problem is probably not the SADI, but some other board on the DBP (VME) bus. The low-order bit (LED 10) is on the right.

Table A-2. SADI Diagnostic Tests

SADI Test	LEDs 13–10	SADI Test	LEDs 13–10
1. CPU	0001	8. FIFO circuit	1000
2. EPROM	0010	9. DTB DMAC	1001
3. Control bus RAM	0011	10. VTB DMAC	1010
4. MFP chip	0100	11. VME bus access	1011
5. PIT chip	0101	12. SPC chip	1100
6. DRAM	0110	13. Extended DRAM	1101
7. VME bus RAM	0111		

Cable Connections

The cables connected depend on the backplane used.

Base Cabinet Backplane (List 1)

Check for the following connections:

- AC Power cord: should be plugged in to a working 120 V AC 60-Hz outlet, or
- DC Power feeders: should be wired to the building’s DC Power Plant
- D00 (PORT 0): should be connected with a 25-pair cable to the switch analog call-distribution group (ACD/EUCD/UCD) for 2 to 8 ports
- D01 (PORT 1): should be connected with a 25-pair cable to the switch analog call-distribution group (ACD/EUCD/UCD) for 9 to 16 ports

- F00 (SCPI DATA): should be connected with an RS-449 cable to an IDI or LADS leading to the DCIU or SCI on the switch
- D03 (ALARM): should be connected with a 25-pair cable to the alarm-reporting facilities used by the switch
- H00 (MAINT) should be connected to either:
  - — An RS-232C cable leading to the modem to the remote maintenance site
  - — *Local only:* An AUDIX null-modem cable and an RS-232C cable to the LMT
- H01 (ADMIN): should be connected to the local administration terminal (LAT) with a null-modem cable and RS-232C cable, or to any data device as described in the installation manual

Base Cabinet Backplane (List 2 or List 4)

A system with a List 2 or List 4 backplane on the base cabinet should have all of the connections that a List 1 backplane has plus the following:

- D02 (PORT 2): may be connected with a 25-pair cable to an SL-1 switch for 1 to 3 ports
- H02 (NET MON): should only be used by system developers when high level troubleshooting is required
- D05 (ACC): should be connected with a 25-pair cable or an H600-330, Group 1 cable to the switch when the system is part of an AUDIX network
- H03 (SADI MON): should only be used by system developers when high level troubleshooting is required
- H04 (DBP MON): should only be used by system developers when high level troubleshooting is required
- H05 (FP MON): should only be used by system developers when high level troubleshooting is required

Expansion (Top) Cabinet

For two-cabinet AUDIX systems, the following cables should also be connected to the top cabinet connector panel:

- D06 (PORT 2): should be connected with a 25-pair cable to the switch analog call-distribution group (ACD/EUCD/UCD) for 17 to 24 ports
- D07 (PORT 3): should be connected with a 25-pair cable to the switch analog call-distribution group (ACD/EUCD/UCD) for 25 to 32 ports
- H06 (VSP MON): should only be used by system developers when high level troubleshooting is required

Lower Front Panel

The POWER switch/circuit breaker should be ON during normal power operation.

Three LEDs are located on the lower right (by the POWER switch). These should read as follows. (If the red or yellow LED is lit, see Chapter 7, *Power and Environment*.)

1. RESERVE FAULT: red LED should be off (if on, there is a battery problem)
2. ON RESERVE: yellow LED should be off (if on, the system is running on battery power)
3. AC: green LED should be ON (normal cabinet power, AC or DC). If this light is off, the cabinet is using its batteries for power.

ALARM AND ERROR LOGS (DISPLAY AND USE)

This section describes how to access the alarm and error logs and how to use them. For a list of alarm log and error log entries, see Appendix B.

Alarm Log

AUDIX software keeps two alarm logs on disk in the sst filesystem: the active alarm log, showing current faults, and the resolved alarm log, showing retired faults. You normally use the `maintenance : active alarm : display` log to find current problems with the system. Occasionally you may use the `maintenance : resolved alarm : display` log to track down intermittent faults.

Active Alarm Log

Figure A-7, *The* `maintenance : active alarm : display` *Form*, shows a sample entry from the active alarm log. The entries are listed by severity order, not date. Solve alarms from top to bottom as directed in Chapter 3, *Start Troubleshooting*. For example, solving fault 897 (the SADI) may solve subordinate fault 197 (the DBP bus). However, it may not solve an unrelated fault (such as 82, the SCPI).

Normally you do *not* use the `maintenance : active alarm : specification` form before displaying the active alarm log (you usually want all faults to display). The LEVEL column shows the alarm's severity; 0 level errors are reported to the remote maintenance site. Look up the UNIT number in Table 3-1 in Chapter 3, *Start Troubleshooting*. When you turn to the listed section, look up the *triplet* (fault, unit, and device) numbers in the table to find the correct resolution procedure.

Resolved Alarm Log

The resolved alarm log is used less frequently than the active alarm log, usually only to track down intermittent faults (those that recur and resolve themselves). Because the resolved alarm log shows retired faults in historical order (oldest first), and the log may contain hundreds of entries, you normally use the `maintenance : resolved alarm : specification` form before displaying the resolved alarm log. Select entries based on date, time, unit code, level, or fault code.

The entries in the log are interpreted the same as those in the active alarm log. Look up the UNIT number in Table 3-1 in Chapter 3, *Start Troubleshooting*, to find the alarmed unit.

```
AUDIX STATUS:  alarms: none,  logins: 1,  thresholds: none
 PATH:  maintenance : active alarm : display

  DATE       TIME      FAULT    LEVEL    UNIT    DEVICE
01/15/88    01:24      897        0        7        0
01/15/88    13:10      82         0        43       0
01/15/88    01:27      197        0        14       0

END OF LOG _

Error and confirmation messages appear here.

| CHANGE | ADD | DELETE |   | HELP | FIELD |   | CLEAR | EXIT | ENTER |
| or RUN |     |        |   |      | HELP  |   | FORM  |      |       |
```

Figure A-7. The `maintenance : active alarm : display` Form

Error Log

Use the error log to find a clue to a problem when other troubleshooting techniques fail. Some errors correspond to alarms, although many use different numbers than the associated faults. Other errors log normal software activity or nonalarm conditions (such as error 907, which is logged each time the system reinitializes). Common errors which indicate solvable problems are listed in Table 3-2 in Chapter 3, *Start Troubleshooting*.

Error Log Description

Errors are logged with the date and time that the error occurred, the number of times the error occurred that minute (count), an associated error code (to identify it), the class of severity, the session/unit, software module, and device numbers (see Figure A-8, *The* `maintenance : error : display` *Form*). The last three columns usually refer to software elements. If the error can be traced to an extension number (such as a subscriber call), that number appears in the `DEVICE` column. For 5-digit dialing, the first digit of the extension is in the `MODULE` column.

Errors are divided into classes of 0 to 2, where 0 is the most severe and usually triggers an alarm. Generally:

- CLASS = 0 is a switch-related or system-wide problem
- CLASS = 1 is a unit-related problem
- CLASS = 2 is a software session code

Error reports are buffered through FP-RAM and then stored in the error log on disk. The log is actually a file in the sst filesystem. You can increase the size of the log if needed using the `system : limits` form (for example, to track intermittent errors). Normally the default 10,000 entries is enough. The FP-RAM buffer can hold up to 1,000 error reports; these can be used for diagnosis in case the sst filesystem is lost or corrupted. If a disk is not accessible, the most current errors are saved and the oldest are erased.

Interpreting Error Log Data

Figure A-8 shows a sample end of the error log. Errors appear in historical order, with the oldest listed first. Unless you use the `maintenance : error : specification` form first, all errors will be listed (starting with any 1984 errors). Since the log usually contains up to 10,000 entires, you may choose to filter out older errors by using the *starting date* field on the specification form. Every system reinitialization resets the *starting date* to the default of 010184 (January 1, 1984).

NOTE

Starting in R1V5, the error log has been expanded to include a line of descriptive information in addition to the regular error code display. On the `maintenance : error : specification` form, set the *expanded display mode* field to **y** to display this extra information.

The following examples show how to use the error log.

1. The first error shown in Figure A-8, number 894, is probably a hardware error (CLASS=1). Looking up this error in Table B-1 shows that this error can activate Fault 1036 to 1067. The particular fault in this case depends on the device code. Here the device is 8 and points to Fault 1043.

   Looking up Unit 36 in Table 3-1 shows the recommended resolution procedure to be in Chapter 4 (the TN501B VPC). For hardware faults, ignore MODULE (this is simply the module that reported the error).

2. The next two entries show software errors (CLASS=2). Table B-1 shows that error code 194 does not map to any fault code. Check Table 3-2. Error 194 maps to a subscriber problem (the system administrator needs to voice-in a name). The extension number for this subscriber is shown under DEVICE. (For 5-digit dialing, the first digit of this extension would be under MODULE.)

3. The final entry shows a normal software time-out error (308). This error code does not map to any fault. The session number indicates what was taking place when the listed module reported the error. The device field shows the decimal equivalent of the software opcode and its associated module. Table 3-2 shows that no action is normally required for this error.

```
AUDIX STATUS:  alarms: none,  logins: 1,  thresholds: none
 PATH:  maintenance : error : display

 DATE      TIME  COUNT  ERROR   CLASS SESSION/UNIT MODULE DEVICE

01/09/88   01:16  1      894      1       36         28    8
01/09/88   01:25  1      194      2       52         0     3410
01/09/88   01:25  1      194      2       52         0     3413
01/09/88   01:42  1      308      2       14         22    5666








END OF LOG _


Error and confirmation messages appear here.

CHANGE   ADD     DELETE       HELP    FIELD        CLEAR   EXIT    ENTER
or RUN                                HELP         FORM
```

Figure A-8. The `maintenance : error : display` Form

VPT (VOICE PORT) TEST CALLS

Test each voice port found in the `system : translation : voice port` form.

Step 1: On the `maintenance : system : test call` form, enter a port number and set *type* to **c**. Press CHANGE. The port's extension will be displayed.

Step 2: At a voice terminal, dial the extension number associated with the port. Wait for ringing.

Step 3: On the `maintenance : system : test call` form, press CHANGE to connect the call.

Step 4: At the voice terminal, verify that AUDIX plays back the login prompt.

Step 5: At the AUDIX, record the location of the yellow LEDs that light on the VPT, VPC, VB, and TDBI circuit packs.

Step 6: On the `maintenance : system : test call` form, set *type:* to **d** and press CHANGE. Go on-hook at the voice terminal.

Step 7: Repeat steps 1 through 5 for the other ports. On the `maintenance : system : test call` form, specify a different VPC and VB-TDBI channel for each call.

B. Error and Alarm Tables

This appendix contains error code descriptions, a description of the administration log, a description of the software modules (or managers), and a description of the software sessions.

ERROR CODE DESCRIPTIONS

This section contains Table B-1, *Error Code Descriptions*, which describes most AUDIX errors, and Table B-2, *Error Codes Used to Track Subscriber Activity*, which covers special 1000-series errors.

The general procedure for using the error logs is summarized below.

If the system is reporting an alarm:

1. Check the alarm log (`maintenance : active alarm : display`) for the unit, device, and error code triplet.
2. Look up the error code in Table B-1, *Error Code Descriptions*, which provides a description of the error.
3. Locate the corresponding unit code in Table 3-1, *Alarm Resolution Procedures*, to find the section of the manual that provides the resolution procedures.

If the customer is reporting problems but no alarms are active:

1. Check the error log (`maintenance : error : display` form) and Table 3-2, *Common Error Codes*, for possible causes of the problems.
2. If the error does not appear in Table 3-2, use the error descriptions in Table B-1.
3. Many errors can be traced to a fault and unit code. If shown, use the unit code and Table 3-1 to find the section of the manual that provides the resolution procedures. Errors without fault and unit codes do not cause alarms.

Table B-1. Error Code Descriptions *(Part 1 of 19)*

Err	Mnemonic	Description	Fault	Unit
2	LVMLISTERR	Error in VM allocator list		
3	LVMSTATERR	Error in VM task status table		
4	LVMCONFIGERR	Error in VM hardware configuration		
5	LVMRESERR	VM resource not deallocated by user	1401	49
6	LCCMLISTERR	Error in CCM event list		
7	LCCMSTATERR	Error in CCM task status table		
10	LINITLVL	Not all processes were created/connected		
11	LCORVIP	Channel-port translation is corrupt	68	32
12	LCORSD	Port-UCD extension translation is corrupt	36-67	32
13	LCORSDM	System profile is corrupt		
14	LCORSM	Subscriber file is corrupt		
15	LCORMBOX	Mailbox is corrupt		
16	LCORMM	Message header file is corrupt		
17	LCORDM	Delivery list is corrupt		
18	LCORWB	Wastebasket is corrupt		
19	LCORAM	Announcement set is corrupt		
20	LCORNETP	Network machine profile is corrupt		
21	LCORMATX			
23	LCORDB1	DBP hardware configuration is corrupt		
24	LCORAMW	Message-waiting lamp status is corrupt		
25	LINC1	Subscriber file inconsistent with distribution list		
26	LINC2	Subscriber file inconsistent with sys profile		
27	LINC3	Mailbox inconsistent with subscriber file		
28	LINC4	Delivery list inconsistent with message header file		
29	LINC5	Mailbox inconsistent with message header file		
30	LINC6	Message header file inconsistent with subscriber file		
31	LINC7	Message header file inconsistent with distribution list		
32	LINC8	No voice body associated with message header		
33	LINC9	Missing data in delivery list		
34	LINC10	Number of new messages in Directory inconsistent with mbox		
35	LINC11	Unneeded voice bodies exist		
36	LINC12	Unneeded distribution list exists		
37	LINC13	Delivery list inconsistent with mailbox file		
38	LSID	Used up subscriber ID		
41	LDBPA1	Locking audit		
42	LDBPA2	DBP error: invalid error code or access failure		
43	LDBPA3	Internal error		

(Continued)

TABLE B-1. Error Code Descriptions *(Part 2 of 19)*

Error	Mnemonic	Description	Fault	Unit
44	LDBPA4	Bad slave filesystem		
45	LDBPA5	Mailbox audit		
46	LDBPA6	Audit fail on init		
47	LDBPA7	Stsdev fail on init		
48	LDBPA8	Open config fail on init		
49	LDBPA9	Bad slave config		
50	LDBPA10	Bad master filesystem		
51	LDBPA11	Record read fail on init		
52	LDBPA12	Volume not found on init		
53	LDBPA13	Ckfs fail primitives on init		
54	LDBPA14	Error in DBP/ckfs non-SUCCESS return code		
55	LDBPA15	Mount failed on init		
56	LDBPA16	Mirrorfs failed on init		
57	LDBPA17	Could not mount permanent filesystem because of errors, ckfs, no volume, etc.		
58	LDBPA18	Bad master		
59	LDBPA19	Bad slave		
60	LDBPA20	Check fs found error in master		
61	LDBPA21	Check fs found error in slave		
62	LDBPA22	Warning internal error trying to remove filesystem with outstanding find_space		
63	LDBPA23	Exceeded the number of filesystems defined		
64	LDBPA24	Duplicate labels on equipped disks		
65	LDBPA25	DBPA audit resync'd int. free space with DBP		
66	LDBPA26	Unused		
67	LDBPA27	Unused		
68	LDBPA28	Unused		
69	LDBPA29	Error reported in DBP/ckfs: error type		
70	LDBPA30	Error reported in DBP/ckfs: action taken		
71	LCORDB2	DBP logical resources are corrupt		
72	LBADTX	Bad message transmission		
73	LNOSPC	No more data space		
75	LCORTRAF	Traffic collection is corrupt		
76	LCORTIME	Timer services are corrupt		
77	LFAIDBP	DBP I/O failure		
78	LINTLOG	Internal logic check failure		
85	LFATAL	Initialization failed	392-407	143
86	LSEMIFATAL	Semifatal initialization	601,602	143

(Continued)

TABLE B-1. Error Code Descriptions *(Part 3 of 19)*

Error	Mnemonic	Description	Fault	Unit
105	LNFD	DBP file descriptor is invalid		
106	LNFILE	DBP file name is invalid		
111	LVBPAR	Invalid parameter to VB		
115	LVSCPAR	VSC called with a bad parameter		
119	LCCMEVENT	CCM event number overflow		
120	LPSWSM	Conflict with system guest password		
121	LNVPC	No VPCs exist for new call		
122	LNVB	No VB channels exist for new call		
123	LNTS	No time slots exist for new call		
124	LNVHFILE	Voice hardware configuration file missing		
125	LCORSIIOP	Corrupt SI (NC) driver		
126	LCORCCM	Corrupt CCM extent list or status table		
127	LCORVM	Voice resources are corrupt		
128	LCORVSH	Voice hardware status is corrupt		
129	LOPERR	Oryx/Pecos error		
130	LCORSCH	Scheduler has no valid time (/sd missing?)		
133	LTDMSG	Corrupt uplink received		
134	LNUNIT	Invalid board type		
135	LVOPEN	Error during vopen		
136	LVCLOSE	Error during vclose		
137	LVSEEK	Error during vseek		
138	LMKANN	Error during mkann		
139	LATRUNC	Error during atrunc		
142	LSIKADM	ADM manager is insane		
144	LSIKAUD	AUD manager is insane		
146	LSIKDM	DM manager is insane		
147	LSIKER	ER manager is insane		
148	LSIKDBPA	DBPA manager is insane		
149	LSIKDIAG	DIAG manager is insane		
150	LSIKFC	FC manager is insane		
151	LSIKFPI	FPI manager is insane		
152	LSIKMBOX	MBOX manager is insane		
153	LSIKMM	MM manager is insane		
154	LSIKMTCE	MTCE manager is insane		

(Continued)

TABLE B-1. Error Code Descriptions *(Part 4 of 19)*

Error	Mnemonic	Description	Fault	Unit
155	LSIKSD	SD manager is insane		
156	LSIKSDM	SDM manager is insane		
157	LSIKSM	SM manager is insane		
159	LSIKVIP	VIP manager is insane		
160	LSIKNET	NET manager is insane		
162	LSIKVSPI	VSPI manager is insane		
163	LSIKWM	WM manager is insane		
164	LSIKDBP	DBPA manager is insane		
165	LSIKCCM	CCM manager is insane		
166	LSIKAM	AM manager is insane		
167	LSIKVSC	VSC manager is insane		
168	LSIKVM	VM manager is insane		
169	LSIKTM	TM manager is insane		
170	LVSFI_DPR	VSFI DPRAM failure		
171	LDI_RAM	DBPI RAM failure		
172	LDI_EPROM	DBPI EPROM failure	11,202	12
173	LVME_PWR	DBP/VME-bus power failure		
174	LDBPI_CPU	DBPI CPU failure		
175	LVME_INTRF	DBP/VME-bus interface failure	159 197	13 14
176	LDBP_ACC	DBP memory access failure	17 197	11 14
177	LDBI_MBOX	DBPI mailbox failure		
178	LDBP_CPU	DBP CPU failure		
181	L_DISK	Disk failure	99	11
182	L_RAM	DBP RAM failure	3,98	11
183	L_ROM	DBP ROM failure	4,100,183	11
184	L_OBRAM	DBP on-board RAM failure	1,5,184	11
185	L_SCPU	DBP slave CPU failure	79,185	11
190	LNOWBF	No waste basket file		
191	LCORFR	Fragment data corrupt		
192	LCORAN	Announcement data corrupt		
193	LCORSU	Subscriber data corrupt		
194	LINCSU	Subscriber with no name fragment		
195	LCORFI	File information corrupt		
197	LCORSWCLR	Switch real-time clock is down		
198	LCORVCLR	VMS real-time clock was off		

(Continued)

TABLE B-1. Error Code Descriptions *(Part 5 of 19)*

Error	Mnemonic	Description	Fault	Unit
199	LCLKOFF	AUDIX, switch clock off by more than 15 min.	250	32
200	LCLKSYNC	AUDIX, switch clock now within 15 min.	251	32
201	LCLKFAIL	System clock needs to be reset or replaced	603,604	120
206	LBUSTO	Bus time-out	8,97	11
207	LMMUER	Memory management error	1,5,207	11
208	LVRPAR	Parity error	4 3,208	2 11
209	LUEE	DBP CPU failure	1,5,209	11
210	LADDEX	DBP CPU failure	1,5,210	11
211	LIIEX	DBP CPU failure	1,5	11
212	LZDIV	Divide by zero	1,5	11
213	LMISC	Miscellaneous error	1,5	11
214	LDISK	Disk error		
215	LOBRAM	On-board RAM failure		
216	LSCPU	Slave CPU failure		
217	LCTL	Controller failure	419 7	6 11
218	LMEM_ACC	Memory access failure		
219	LBOOT	Maintenance boots DBP	6	11
220	LSMBOX	S-bus mailbox error	12,204	12
221	LCPU	CPU error	13,203	12
222	LBI	Bus interface error		
224	L_DOVFL	Device overflow		
225 – 240	LDSEC00 – LDSEC15	Bad sector/block number device 0 through device 15. See note below to determine suspected track number.		

(Continued)

NOTE

Error codes 225 through 240 use the unit and device fields to identify the track where the error was found (these errors always follow other errors logged by the DBPA which indicate the type of error).

If UNIT = 0, DEVICE identifies in decimal format the track number.

If UNIT ≠ 0, convert both UNIT and DEVICE to hexadecimal (e.g., UNIT 123, DEVICE 47 equals 7B 2F). Add leading zeros to DEVICE to form a four character hexadecimal number (i.e., 7B 002F). Concatenate the two numbers (i.e., 7B002F). Convert this number to decimal to yield the bad track (i.e., 8060975).

TABLE B-1. Error Code Descriptions *(Part 6 of 19)*

Error	Mnemonic	Description	Fault	Unit
306	LINVAL	Invalid parameter (faulted board unequipped)		
308	LTMOUT	Time-out		
309	LCORALRM	Alarm data corrupt		
310	LCONFIG	Invalid data link configuration	344,345	30
311	LMPSI	MPSI is corrupt	346	30
312	LCORSCA	SCA is corrupt	350	30
313	LSMSI	SMSI link difficulties	348	30
314	LSCA	SCA (BRI/API link) difficulties	348,352-354	30
315	LMWIBLK	Message waiting updates blocked by host (5ESS)		
318	LBADMP	Bad maintenance procedure		
325	LCNTRLSW	VMS-SW port control is in error		
326	LIESSD	Invalid enhanced services message from SD		
327	LIESSW	Invalid enhanced services message from SW		
328	LSLOWLINK	Slow data link or slow switch		
329	LDBPAMK	Make a hardware unit known to the system		
330	LDBPAINT	Run internal DBP voice/volume audits		
331	LDBPASHTDN	Shut the DBP down		
332	LDBPAPERM	Permanent filesystem audit		
333	LDBPACFG	Configuration file audit		
334	LDBPASTRT	DBPA startup		
335	LDBPALCK	Lock audits		
336	LDBPADBERR	Get DBP errors		
337	LDBPACLSE	Close the configuration file		
338	LDBPAFS	Create VMS filesystems		
339	LDBPAFLCR	Create VMS filesystems		
340	LDBPARMCFL	Remove the configuration file		
341	LSIKMTA1	MTA1 manager insane		
342	LSIKMTA2	MTA2 manager insane		
343	LSIKMTP1	MTP1 manager insane		
344	LSIKVMTP	VMTP manager insane		
345	LETIME	Nonfatal timer manager error		
346	LTDXLATERR	Angel port translation audit error		
347	LINBOX	Incoming mailbox error		
348	LOUTBOX	Outgoing mailbox error		
		Mirroring (redundancy) errors:		
349	L_MIRFAIL	Filesystem mirroring has failed	Table 10-1	
350	L_MIRCLR	Clear the FDMIRFn alarm	Table 10-1	

(Continued)

TABLE B-1. Error Code Descriptions *(Part 7 of 19)*

Err	Mnemonic	Description	Fault	Unit
		Mirroring (redundancy) errors:		
351	LDRETRY	I/O command succeeded with retries		
352	LDSEEK	Seek failed (all retries failed)	290-297	9
353	LDREAD	Read failed (all retries failed)	298-305	9
354	LDWRITE	Write failed (all retries failed)	306-313	9
355	LDCMP	Bkgnd write/read ok but returned bad data	314-321	9
356	LDTOUT	Controller didn't respond before timeout	322-323	9
357	LDBADDISK	Disk defect map couldn't be read at equip	324-331	9
358	LDCTLR	Error detected in disk controller test	332-333	6
359	LDDRV	Communication error between disk controller and DBP disk driver	334-335	6
360	LDCUS	Unsolicited status from controller		
361	LDALLOC	A filesystem has run out of space	336-343	9
362	LDINFO	Disk controller return code information		
		Hardware errors:		
631	LVBCPU	VB CPU failure	1260-1261	61
634	LVBRAM	VB RAM memory error	1262-1263	61
635	LVBEPROM	VB EPROM memory error	1264-1265	61
636	LVBMINV	VB invalid mailbox	1266-1267	61
642	LVBTDBIDPR	TDBI DPR failure	1272-1273	61
643	LVPTIN	VPT port in-line error		
644	LVPTTRUNK	VPT trunk in-line error		
645	LVPTNOREL	VPT in-line error, no external release		
646	LVPTGD	VPT in-line error, ground detect stuck		
647	LVPTDIGT	VPT trunk diagnostic test failure	140-171	35
648	LVPTDIGP	VPT port diagnostic test failure	172-203	35
649	LVPTDTONE	VPT dial tone seizure test	204-235	35
650	LVPTHYBRID	VPT hybrid circuit test	236-267	35
651	LVPTXTALK	VPT NPE crosstalk	268-299	35
652	LGPPBSCAN	DLC (GPP) port in-line, bad scan		
653	LGPPXMIT	DLC (GPP) port in-line, xmit stuck		
654	LPIMAUDIT	PDM (PIM) audit failure		
655	LGPPLINK	DLC (GPP) link reset		
656	LGPPLP	DLC (GPP) local loop-around test		
657	LGPPXTALK	DLC (GPP) crosstalk test		
658	LVPTANSF	VPT no loop current detected after off-hook	1402-1433	35
659	LVPTTONE	VPT touch-tone test (flash transfer) failed	1498-1529	35

(Continued)

TABLE B-1. Error Code Descriptions *(Part 8 of 19)*

Error	Mnemonic	Description	Fault	Unit
666	LVPCXTALK	VPC crosstalk	524-555	36
667	LVPCDTMF	VPC DTMF digit detection test		
668	LVPCTONE	VPC tone level test	588-619	36
669	LVPCCNT	VPC data count	620-651	36
670	LTCDSP	TC DSP sanity		
671	LTCDPR	TC DPR failure		
672	LTCXLN	TC bad port translation		
673	LTCDTMF	TC DTMF digit test	1071	38
674	LTCCNT	TC data count	1072	38
675	LTCTONE	TC tone level test	1073	38
676	LTCXTALK	TC crosstalk test	1074	38
677	LSIRESET	SI (NC) archangel reset test	1	120
678	LSICCHAN	SI (NC) control channel	2	120
679	LSIDPR	SI (NC) DPR failure	3	120
680	LSIMEM	SI (NC) 8051 memory		
681	LSIBCLK	SI (NC) bus clock failure		
682	LSIINSAN	SI (NC) archangel sanity		
683	LSIINLIN	SI (NC) in-line error		
684	LSIDTLCLK	SI (NC) DTL clock		
685	LDBPRVRY	DBP entering recover mode	216	11
686	LDBPNORM	DBP returning to normal mode	217	11
		Errors from VB return codes:		
700	LREAD	Data link read operation failure		
701	LADDR	Invalid VB memory address is specified		
702	LCMLGTH	Invalid command length		
703	LCNTRNO	Counter out of range		
704	LDBPPR	DBP error during play or record		
705	LLMSLT	Length of message slot out of range		
706	LNCH	Invalid channel	1254-1255 1322	41 11
707	LNMSLT	Number of message slots out of range		
708	LNUMBYTE	DBP and VPC byte counts differ		
709	LOPCODE	Invalid command opcode		
710	LVPCPR	VPC or TDBI error during play or record	1333-1364	36
711	LSZMBX	Total size of mailbox is out of range		
712	LVBHALT	Voice activity halted by voice buffer		
713	LWRITE	Data link write operation failure		

(Continued)

TABLE B-1. Error Code Descriptions *(Part 9 of 19)*

Error	Mnemonic	Description	Fault	Unit
		Errors from VB (FD counters on VSP):		
714	LVBFWADT	VB firmware audit failure	1270-1271	61
715	LTDERR	TDBI/VPC error detected by VB	1268-1269	61
716	LVBSHTDWN	VB has shutdown	1274-1275	61
717	LVBINIT	VB initialization failed	1256-1257	57
			1258-1259	61
718	LRESET	VB/TDBI reset requested	1276-1277	57,61
		Errors from VB (FD counters on FP):		
719	LVBBDP	DBP timed out to a VB		
720	LSBUSI	S-bus interface failure	134,164,165	12
			144	43
			145,149,171	61
			172,177,178	61
			161,191	43
			184	34
			189	33
721	LDBPI	DBPI failure detected by VB	148	61
			170,175,181	12
722	LFPM	FP memory access failure detected by VB	135	12
			143	34
			146,150	61
			161	43
			166,173,179	33
			185,193	33
723	LVSPM	VSP memory access failure detected by VB	136	12
			147,151	61
			167,174,188	34
		Errors from TDBI:		
724	LTDBITO	S-bus processor status request time-out	139,170,192	12
		or TDBI time-out during maintenance	153,154,182	61
			186,187	61
		Errors from CCM:		
725	LCORUL	Corrupt uplink from TD-bus angel		
726	LCORTUL	Corrupt transparent uplink from TD-bus angel		

(Continued)

TABLE B-1. Error Code Descriptions *(Part 10 of 19)*

Error	Mnemonic	Description	Fault	Unit
		Errors from CCM:		
728	LBATREV	VPT: Battery reversal switch to port		
729	LNMSG	Message corruption error from TD-bus angel		
730	LHWPLING	CCM TD-bus uplink message:	1202	140
		firmware insane	1203-1206, and 1538	55
		firmware Program Logic inconsistent	1207-1222	56
			1223-1224	57
			1225	58
			1226	59
			1227	60
731	LTCERR	Generic TC board error	1070	38
732	LSPROM	Slave processor ROM failure	460-491	36
			684-687	37
733	LSPRAM	Slave processor RAM failure	460-491	36
			696-699	37
734	LSPINSANE	Slave processor insane	460-491	36
			688-691	37
735	LSPMODE	Slave processor mode audit error	460-491	36
736	LLSCAN	Late angel scan		
737	LSPRESET	VPC slave processor reset	492-523	36
738	LPC	Protocol chip test error	556-587	36
			748-779	37
739	LCAB	VPC CAB chip test error	652-683	36
740	LENCODER	VPC encoder test error	876-907	36
741	LDECODER	VPC decoder test error	908-939	36
742	LTTD	VPC touch-tone detector test error	940-971	36
743	LAGC	VPC AGC test error		
744	LDSP1ROM	VPC DSP #1 ROM test error	332-363	36
745	LDSP2ROM	VPC DSP #2 ROM test error	332-363	36
746	LDSP3ROM	VPC DSP #3 ROM test error	332-363	36
747	LDSP1RAM	VPC DSP #1 RAM test error	332-363	36
748	LDSP2RAM	VPC DSP #2 RAM test error	332-363	36
749	LDSP3RAM	VPC DSP #3 RAM test error	332-363	36
750	LANGELPLI	Angel program logic error		
751	LANGELCMD	Angel command error		

(Continued)

TABLE B-1. Error Code Descriptions *(Part 11 of 19)*

Error	Mnemonic	Description	Alarm	Unit
752	LANGELLINK	Angel serial link error	428-459 1533-1534	36 37
753	LSPPLI	Slave processor program logic error		
754	LSPLINK	Slave processor serial link error	460-491 704-707	36 37
755	LSPHDLC	Slave processor HDLC/PC link error	780-811	37
756	LCAB_DSP	VPC CAB/DSP error	396-427	36
757	LLVBSCAN	Late voice buffer scan	692-695	37
758	LVB_DPR	TDBI VB/DPR error	700-703	37
759	LVPCLNK	VPC HDLC/PC init error	364-395	36
760	LRNGDENIAL	DLC (GPP): ring denial		
761	LLNKRES	TN762B board - link reset		
762	LLNKRESFAIL	TN762B board - link reset failed		
763	LEPFONNL	DLC (GPP): electronic power feed on no load		
764	LDLBUFOV	DLC (GPP): downlink buffer overflow		
765	LXMITSTUCK	DLC (GPP): transmit stuck		
766	LRNGVOLT	DLC (GPP): ringing voltage absent		
767	LZEROCUR	DLC (GPP): zero current absent		
768	LSWHKERR	DLC (GPP): switch-hook error		
769	LRNGTRIP	DLC (GPP): ring trip voltage absent		
770	LNSTATION	DLC (GPP): station set absent		
771	LRNGON	DLC (GPP): ringing function on		
772	LRNGOFF	DLC (GPP): ringing function off		
773	LMWAITON	DLC (GPP): message-waiting function on		
774	LMWAITOFF	DLC (GPP): message-waiting function off		
775	LMFATSCAN	DLC (GPP): bad MFT scan alarm		
776	LTSTPASS	TN762B board - test pass message		
777	LTSTFAIL	TN762B board - test fail message		
778	LGNDNR	VPT detected ground without ringing		
779	LSPRNG	Single polarity ring current	12-43	35
780	LRNGNGND	Ringing without ground	44-75	35
781	LGNDDET	Ground detect stuck active	108-139	35
782	LCOREL	Belated PBX release	1278-1309	35
783	LTIP	No tip ground on outgoing call		
784	LSIIOP1	NC DPR pointers out of range	10	120
785	LSIIOP2	NC ACK pointer corrupted	10	120
786	LSIIOP3	NC invalid ACK received	7	120

(Continued)

TABLE B-1. Error Code Descriptions *(Part 12 of 19)*

Error	Mnemonic	Description	Fault	Unit
787	LSIIOP4	NC message lost	10	120
788	LSIIOP5	NC downlink ‘‘in’’ pointer corrupt	10	120
789	LSIIOP6	NC downlink ‘‘out’’ pointer corrupt	10	120
790	LSIIOP7	NC archangel problem	7	120
791	LSIIOP8	NC uplink directory ‘‘in’’ pointer corrupt	7	120
792	LSIIOP9	NC uplink directory ‘‘out’’ pointer corrupt	10	120
793	LSIIOP10	NC uplink buffer out pointer corrupt	10	120
794	LSIIOP11	NC uplink from angel has bad checksum	11	120
795	LSIIOP12	NC uplink from angel has bad message length	11	120
796	LSIIOP13	Corrupt SIIOP	10	120
797	LSIIOP14	NC message but ACKed, no space for transmission	9	120
798	LSIIOP15	NC downlink message retransmission to TD-bus angel		
799	LSIIOP16	Not used		
801	LSIIOP17	Not used		
802	LSIIOP18	Corrupt SIIOP	10	120
803	LSIIOP19	NC out of sequence numbers		
804	LSIIOP20	NC linked list corruption	10	120
805	LSIIOP21	NC uplink with invalid angel address	11	120
806	LSIIOP22	NC	7	120
807	LSIIOP23	NC in overload	7	120
808	LSIIOP24	NC downlink directory full		
809	LSIIOP25	NC downlink buffer full	10	120
810	LSIIOP26	NC no SIIOP buffer space		
811	LSIIOP27	NC downlink directory ‘‘in’’ pointer corrupt		
812	LSIIOP28	NC downlink directory ‘‘out’’ pointer corrupt		
813	LSIIOP29	NC dead		
814	LSIIOP30	NC received too many uplinks from TD-bus angel		
821	LHWTO	Hardware time-out	300-331 716-747 1365-1396 1397 1398	36 37 35 38 140
822	LVBERR	VB error	137-138	12
823	LDBPERR	DBP error	9	
824	LVPCERR	VPC error		
825	LVPTERR	VPT error		

(Continued)

TABLE B-1. Error Code Descriptions *(Part 13 of 19)*

Error	Mnemonic	Description	Fault	Unit
826	LTDBIERR	TDBI error		
827	LNLPCUR	No loop current detected after off-hook		
828	LLPCUR	Loop current detected after on-hook		
835	LSIERR	SI (NC) error	4	120
836	LPECPU	PE CPU errors	80	33
			81	34
837	LPESBMEM	Single-bit memory errors		
838	LPEMBMEM	Multi-bit memory errors	80	33
			81	34
839	LPEMBUS	M-bus errors	80	33
			81	34
840	LPESBUS	S-bus errors	80,140,189	33
			81,142,183-184	34
			161	43
			165	12
			172,178	61
841	LPEROM	PE ROM checksum errors	80	33
			81	34
842	LPERAM	PE RAM checksum errors	80	33
			81	34
843	LPEIVT	IVT audit errors		
846	LFILELEN	File length and VM file length differ		
848	LHWINSANE	Hardware has gone insane	7	120
			1068	38
			1124	140
			1535	55
849	LHWNINSANE	Hardware has become sane	6	120
			1069	38
850	LUEXPTUL	CCM received response uplink when it wasn't looking for a response or unexpected transparent uplink received		
851	LUEXPUL	Unexpected uplink received		
852	LSIOVLD	SI (NC) entered overload mode		
853	LSINOVLD	SI (NC) left overload mode		
855	LTDCLKERR	TD-bus clock failed	5	120

(Continued)

TABLE B-1. Error Code Descriptions *(Part 14 of 19)*

Error	Mnemonic	Description	Fault	Unit
856	LTDCLKRST	TD-bus clock restored	5	120
857	LROMERR	ROM error	1176 1177-1180,1537 1181-1196 1197-1198 1199	140 55 56 57 58
858	LRAMERR	RAM error	10,201 15,206 1176 1177-1180,1537 1181-1196 1197-1198 1199	12 15 140 55 56 57 58
859 860	LINCDL LIAUDERR	Inconsistent downlink Board initialization audit error		
861	LNETUPDERR	Network update audit error	1228 1229-1232,1539 1233-1248 1249-1250 1251	140 55 56 57 58
862	LHOLDOVR	Battery fault or battery reserve failure (RESV_FLT) *or* on battery reserve – no ac power (ON_RES) (now says memory holdover failure)	78,155 156	116 117
863	LBREAKER	Circuit breaker tripped	863	46,117
864	L_LOW48	Battery holdover below 48 V dc (LOW_BAT) (now says DC power less than -48 volts)	75 76	116 46,117
865	L_NODCPW	Rectifier’s DC breaker tripped or no DC disk power	70,865 73,238,865	116 117
866	LOVRTEMP	Cabinet over temperature (OPTALM)	70	116
867	L_FAN	Fan failure or cabinet differential too great (FANALM)	71 867	116 44,117
868	L_FUSE	Fuse failure (FUSALM)	77	116

(Continued)

TABLE B-1. Error Code Descriptions *(Part 15 of 19)*

Error	Mnemonic	Description	Fault	Unit
869	L_CNVR	Disk or port power failure – voltage loss (CNVDSK) (now says converter failure)	74 74	45,117 118,119
870	L_RCTFR	Rectifier failure	870	116,117
871	LCORSCP	Corrupt SCPI or MPSI	24 25-29,31 82-84,160 162,184,188 163,189,193 165 172 178	30 43 43 34 33 12 61 61
872 873 874 875 876 878	LSCPLOOPBK LADLLOOPBK LUDLLOOPBK LGPPLOOPBK LPIMLOOPBK LCORBX25	VIP-SCP loop-back failure Assigned data link loop-back failure Unassigned data link loop-back failure DLC (GPP) loop-back failure PDM (PIM) loop-back failure Corrupt BX.25 channel	18 19 23 20 21 22	43 40 40 39 10 30
879	LMT_RES	Maintenance reset	14,201-204 206 33	12 12 43
880 881 882 883 884	LSIFC LSIDRIVER LSITDBUS LTDBIEXTLP LTDBIXTALK	SI (NC) DPR overflow SI (NC) SIIOP sick SI (NC) TD-bus failure TDBI external loop-around test TDBI crosstalk	 812-843 844-875	 37 37
885	LTDSAN	TD-bus sanity	1124 1125-1128, and 1535 1129-1144 1145-1146 1147	140 55 56 57 58
886	LTDCCHAN	TD-bus control channel	1150 1151-1154, and 1536 1155-1170 1171-1172 1173	140 55 56 57 58

(Continued)

TABLE B-1. Error Code Descriptions *(Part 16 of 19)*

Error	Mnemonic	Description	Fault	Unit
887	LTDANG	TD-bus angel background test		
888	LTDLOGIC	TD-bus logical inconsistency		
889	LTDXTALK	TD-bus crosstalk		
890	LTDTSLOT	TD-bus time slot	1123	42
891	L_CHGRTE	Battery at high charge rate (CHG_RATE)	16	116
892	LVPCITS	VPC idle time slot test	972-1003	36
893	LVPCDIAL	Changed to Error Code 1051		
894	LVPCEXT	VPC HDLC external test	1036-1067	36
895	LNCOREL	No PBX release on VMS disconnect	76-107	35
896	LDREQ	DBP diagnostic request		
897	LDDIAG	DBP diagnostic result	116-117	1
			118-125	2
			127	5
			102-103	6
			104-105	7
			106-107	8
			108-115	9
898	LCKSUM	Checksum error		
899	LMIDPR	Bad MI dual ported RAM	86	17
900	LDBP_REQ	DBP test request		
901	LTDVIN	TD-bus common angel vintage inconsistent		
902	LDATAXFER	VIP L4 is out of data transfer	157,347	30
			218-237	30
			349,351	30
903	LHANDSHAKE	DLC/PDM handshake can’t restart	158	30
904	LDI_FWADT	DBPI firmware audit failure		
		Errors added for I17:		
905	LDI_VBERR	VB failure detected by DBPI	168,169	61
			176,182	61
906	LPEVSFI	PE VSFI test failure		
		Errors that delimit initialization:		
907	LSTARTINIT	Beginning of AUDIX initialization		
908	LENDINIT	End of AUDIX initialization		
		Errors for DBP error logging:		
909	LMEMCOR	DBP memory correctable error		
910	LMEMNCOR	DBP memory noncorrectable error	408	2

(Continued)

TABLE B-1. Error Code Descriptions *(Part 17 of 19)*

Error	Mnemonic	Description	Fault	Unit
911	LMEMNRDY	DBP memory not ready error	409	2
912	LDSKSTAT	Disk device status error	410 411-418	2 9
913	LDBPSRV	DBP server hung		
1000 – 1035		Service codes to track subscriber activity (see Table B-2)		
1051	LVPCDIAL	VPC dial tone detection test	1004-1035	36
1100	LVPTDTONE	VPT dial tone seizure test (replaces error code 1052)	204-235	35
1101	LVPTANSF	VPT no loop current detected after offhook (replaces error code 1053)	1402-1433	35
		Operating system errors:		
1501	LLPRECWM	Path record low watermark	90	121
1502	LHPRECWM	Path record high watermark	87	121
1503	L0PRECWM	Path record goes below low watermark	93	33,34
1504	LLMBUFWM	Message buffer low watermark	91	121
1505	LHMBUFWM	Message buffer high watermark	88	121
1506	L0MBUFWM	Message buffer goes below low watermark	95	33,34
1507	LLSBQWM	S-bus queue low watermark	92	121
1508	LHSBQWM	S-bus queue high watermark	89	121
1509	L0SBQWM	S-bus queue goes below low watermark	94	33,34
1510	LSBPKT	S-bus packet watermark hit		
1511	LACCNMI	AC-low NMI	260	141
1512	LBEENMI	Bus error NMI		
1513	LBKYNMI	BREAK key NMI		
1514	LBTENMI	Bus time-out NMI		
1515	LHBKNMI	Hardware breakpoint NMI		
1516	LHLTNMI	Halt exception NMI		
1517	LIDENMI	Interrupt disable exception NMI		
1518	LIIENMI	Illegal interrupt NMI		
1519	LMEENMI	Memory error NMI		
1520	LOBENMI	Out of bounds exception NMI		
1521	LPIONMI	Privileged I/O exception NMI		
1522	LPVENMI	Privileged exception NMI		
1523	LSDENMI	Stack/data error NMI		
1524	LSOENMI	Stack overflow NMI		
1525	LWPENMI	Write-protection exception NMI		
1526	LYZENMI	Yellow zone exception NMI		

(Continued)

TABLE B-1. Error Code Descriptions *(Part 18 of 19)*

Error	Mnemonic	Description	Fault	Unit
		Operating system additions done in I17:		
1530	LORYX	General Oryx error		
1531	LPECOS	General Pecos error		
1532	LIOK	General IOK error	211	11
			212,214	12
			213	61
			215	43
		Filesystem problems:		
1533	LSDBACKUP	Sdat filesystem backup failed	239	94
1534	LNMBACKUP	Weekly name backup failed	1530	151
1535	LNOANNFS	No announcement filesystem	1531	91
		ACC manager errors:		
1536	LNONMFS	No name filesystem	1532	151
1537	LACCERR	Miscellaneous error in the ACC	240	141
			241-248	142
1538	LCORUPD	Remote subscriber audit		
1539	LCORNET	Corrupt net manager		
1540	LACCRES	ACC error	249	141
1541	LAACAE	ACC Address Error	253	141
1542	LACCBE	ACC Bus Exception Error	254	141
1543	LACCZERO	ACC Zero Divide Error	255	141
1544	LACCILL	ACC Illegal Instruction Error	258	141
1545	LACCCHK	ACC Check Instruction Error	256	141
1546	LACCTRAP	ACC Trap Instruction Error	258	141
1547	LACCPRIV	ACC Privileged Instruction Error	257	141
1548	LACCSINT	ACC Spurious Interrupt Error	259	141
1549	LACCUINT	ACC Unknown Interrupt Error		
1550	LACCPAR	ACC RAM parity error NMI		
1551	LACCSAN	ACC Sanity Timeout	264	141
1552	LACCDMAX	ACC DMA Transmit Error	261	141
1553	LACCDMAR	ACC DMA Receive Error	261	141
1554	LACCORN	ACC HDLC Receive Overrun Error	262	141
1555	LACCCRC	ACC HDLC Frame CRC Error	262	141
1556	LACCUSX	ACC USART Transmit Error	263	141
1557	LACCUSR	ACC USART Receive Error	263	141
1558	LACCTMRA	ACC Timer A Error	258	141
1559	LACCTMRB	ACC Timer B Error	258	141

(Continued)

TABLE B-1. Error Code Descriptions *(Part 19 of 19)*

Error	Mnemonic	Description	Fault	Unit
1560	LACCTMRC	ACC Timer C Error	258	141
1561	LACCTMRD	ACC Timer D Error	258	141
1562	LACCTSTK	ACC Task Stack Overflow	258	141
1563	LACCLRST	ACC Link Reset	265	141
1564	LACCSYSQ	ACC System Queue/Buffer Corruption	266	141
1565	LACCMBI	ACC Unknown Mailbox Interrupt	267	141
1566	LACCRAM	ACC RAM Failed Background Test	268	141
1567	LACCEPROM	ACC EPROM Failed Background Test	269	141
1568	LACCSAUD	ACC Firmware: System Queue Audit Error	270	141
1569	LACCMAUD	ACC Firmware: Mailbox Audit Error	270	141
1570	LACCHAUD	ACC Firmware: Bad Channel	271-272 420-421	141 141
1571	LACCCHOK	ACC Firmware: Channel OK		
1572	LACCLOG	ACC Error Log Overflow		
1573	LACCSPARE	ACC Spare Error Encode		
1574	LDBPTO	ACC Timed Out on DBP	273	141
1575	LNETTMP	/vd/net_tmp file is missing		
1576	LSHTDWN	MI Shutdown logged by Vip		
1577	LCORCDR	CDR data corruption	422	93
1578	LCLRCDR	CDR data corruption cleared	423	93
1579	LINVINIT	Invalid RS-232C initialization		
1580	LACCTRAF	Unanswered calls due to all ports active		
1582	LNCONF	Continuing connection failure to a remote machine	501-600	144
1583	LCORFSU	Field update software version incompatible	501-600	144
1584	LFUPDFAIL	Network remote update failed	701-800	144
1585	LDSREAD	Unable to read data from alternate data segment		
1586	LDWRITE	Unable to write data from alternate data segment		

Table B-2. Error Codes Used to Track Subscriber Activity *(Part 1 of 2)*

Error	Description	Unit Field	Device Field
1000	A subscriber has logged in	s_id	new message count
1001	A subscriber has logged off	s_id	new message count
1002	A subscriber logs off with another session using the same directory record	s_id	new message count
1003	Directory record s_id does not match that of the subscriber logging in (inquire_mws)	s_id	directory record s_id
1004	Directory record s_id does not match the s_id of the subscriber logging in (mb_conn)	s_id	directory record s_id
1005	Directory record s_id does not match the s_id of the subscriber logging off (mb_disc)	s_id	directory record s_id
1006	Directory record s_id does not match the s_id of the subscriber logged in (next_msg)	s_id	directory record s_id
1007	Session descriptor s_id does not match the subscriber mailbox record s_id (next_cell)	session desc. s_id	mailbox record s_id
1008	Directory record s_id does not match the s_id of the subscriber logged in (del_current)	s_id	directory record s_id
1009	Session descriptor s_id does not match the subscriber mailbox record s_id (del_cell)	session desc. s_id	mailbox record s_id
1010	Message id of a message being deleted does not match the message id in the mailbox record	mailbox s_id	directory record s_id
1011	Directory record s_id does not match the s_id of the subscriber logged in (upd_status)	s_id	directory record s_id
1012-1014	Session descriptor s_id does not match the subscriber mailbox record s_id (upd_cell)	session descr. s_id	mailbox record s_id
1015	Directory record s_id does not match the s_id of the subscriber logged in (store_msg)	s_id	directory record s_id
1016-1017	Session descriptor s_id does not match the subscriber mailbox record s_id (store_cell)	session descr. s_id	mailbox record s_id
1018	Directory record s_id does not match the s_id of the subscriber logged in (prev_msg)	s_id	directory record s_id
1019	Directory record s_id does not match the s_id of the mailbox being audited (audit_sub)	s_id	directory record s_id
1020	Directory record s_id does not match the s_id of the directory key (val_mbkey)	directory key s_id	directory record s_id

(Continued)

TABLE B-2. Error Codes Used to Track Subscriber Activity *(Part 2 of 2)*

Error	Description	Unit Field	Device Field
1021	Mailbox key s_id does not match the subscriber mailbox record s_id (mbox_reorg)	mailbox key s_id	mailbox record s_id
1022	A message has been stored in a mailbox	recip. s_id	new msg ct.
1023	Successful mb_conn has been performed	s_id	new msg ct.
1024	Subscriber has logged in using valid ext/passwd	s_id	ext.
1025	Guest has logged in using valid ext/passwd	s_id	ext.
1026	mb_conn call failed during log on	s_id	ret. code
1027	New Vsc session was started before the previous one had cleaned up (logon)	new s_id	new ext.
1028	New Vsc session was started before the previous one had cleaned up (new_call)	new s_id	msg type
1029	Vsc global s_id does not agree with the local s_id during scanning of incoming mail	local s_id	global s_id
1030	Message waiting status was sent to the switch	status	ext.
1031	Connect message has been received by Vip (DCIU and SMSI data links only)	ring ext.	calling ext.
1032	Connect message has been received by Sd (DCIU and SMSI data links only)	port num	calling ext.
1033	Vsc is playing out a name voiceback and new message status	s_id	new msg count
1034	Vsc new message count disagrees with the service map provided by Sd (msg wait. lamp)	session	new msg count
1035	New message count is being played out. If no name voiceback, there will be one error logged for each digit in the caller’s ext.	Am session	Fragment id

ADMINISTRATION LOG

The administration (system) log is used to record errors which require the attention of the system administrator but do not directly affect the overall operation of the local AUDIX (for example, full mailboxes, break-in attempts to subscriber's mailboxes, or extensions without names recorded). Table B-3, *Administration Log Entries and Types*, lists the types of entries in the administration log. The path name used to display this log is `system : log : display`.

NOTE

Do not display this form without first informing the system administrator or having him or her present (these entries often system administrator require attention). Once displayed, the entries cannot be again displayed unless a date and time are always specified on the `system : log : specification` form.

The log is divided into two types of errors, those that apply to the local machine and those that apply to the network. You probably do not need to use the administration log if the system is not networked with other systems. In a network environment, this log may help to identify problems. The best indication of problems in a network are connect failures or other entries where two systems were unable to communicate due to some type of transmission error. In these cases, call your remote maintenance service center for steps to test the network and repair any problems.

Table B-3. Administration Log Entries and Types *(Part 1 of 2)*

Type	Local Machine Entries
bsxt	Call answer for non-subscriber {owner's extension}
bsxt	Leave word calling for non-subscriber {owner's extension}
dxlt	UCD extension {extension} not in switch translations
lbpa	Break-in attempt into mailbox owned by {name}, {owner's extension} from {originating extension}
lcdl	Canceled Delivery: {originating extension} to {destination extension} at {machine name} created at {time and date}
lfmb	Full mailbox for {extension}
lsos	System out of space
lnnr	Name not recorded for {name} {extension}
sclk	Check AUDIX system clock
accb	No valid network modem speed found, defaulted to 9600 baud
furm	A full update has been requested by {machine name}

(Continued)

TABLE B-3. Administration Log Entries and Types *(Part 2 of 2)*

Type	Network Entries
furm	Full update completed successfully to {machine name}
furm	Update discrepancies require full update to {machine name}
furm	Unable to perform requested full update to {machine name} updates temporarily disabled
furm	No permissions for requested full update to {machine name}
furm	Starting full update from {machine name}
furm	Remote update discrepancies require full update from {machine name}
furm	Full update completed successfully from {machine name}
furm	Full update denied due to permissions from {machine name}
furm	Update discrepancies require full update from {machine name}
furm	Full update aborted and transmissions temporarily disabled due to errors from {machine}
ndny	Remote subscriber update from {machine name} denied
ncol	Name changed at {extension} due to name conflict
ncfl	Connect failure to {machine name}
nrli	Machine {machine name} rejected login
nnrv	Remotely administered subscriber {name} {extension} does not have a voice name
nlrl	Rejected login for remote machine {machine name}
nrnf	Remote subscriber {name} {extension} not found on machine {machine name}
nsna	Subscriber {name} {extension} not addressable
n8ar	The 85% threshold for administered remote subscribers has been reached
nmar	The maximum number of administered remote subscribers has been reached
n8nr	The 85% threshold for non-administered remote subscribers has been reached
nmnr	The maximum number of non-administered remote subscribers has been reached
nmff	Message transmission threshold reached for machine {machine name}
nmtl	Message transmission limit reached for machine {machine name}

AUDIX SOFTWARE TABLES

AUDIX software can sometimes give a clue to a failing processor or filesystem when other troubleshooting methods fail. Generally, software errors are flagged in the error log with a 2 in the CLASS column (least severe type of error).

Software Modules

The software module that logs an error is listed in the MODULE field of the error log.

Table B-4. AUDIX Software Modules *(Part 1 of 2)*

Module	Mnemonic	Description
0	MOD_ADM	Administration
1	MOD_ALRM	Alarm Manager
2	MOD_AM	Announcement Manager
3	MOD_CCM	Control Channel Manager
4	MOD_DBPA	DBP Administrator
5	MOD_DM	Delivery Manager
6	MOD_EC	Error Collector
7	MOD_ER	Error Reporter
8	MOD_FC	Forms Control
9	MOD_FFD	FP Fault Detector
10	MOD_FMTC	FP Maintenance
11	MOD_FPI	FP System Initialization
12	MOD_FPM	FP-PE Maintenance Manager
13	MOD_FSCH	FP Maintenance Scheduler
14	MOD_MBOX	Mailbox Manager
15	MOD_MM	Message Manager
16	MOD_MMI	Maintenance Manager Interface
17	MOD_MTA1	Maintenance Activity
18	MOD_MTA2	Maintenance Activity
19	MOD_MTP1	FP Maintenance Procedure
20	MOD_SD	Service Dispatcher
21	MOD_SDM	System Data Manager
22	MOD_SM	Subscriber Manager
23	MOD_TM	Terminal Manager
24	MOD_VFD	VSP Fault Detector
25	MOD_VIP	VMS Interface Protocol Manager
26	MOD_VM	Voice Manager
27	MOD_VMTC	VSP Maintenance Manager

(Continued)

TABLE B-4. AUDIX Software Modules *(Part 2 of 2)*

Module	Mnemonic	Description
28	MOD_VMTP	VSP Maintenance Procedure
29	MOD_VSC	Voice Session Controller
30	MOD_VSCH	VSP Maintenance Scheduler
31	MOD_VSPI	VSP System Initialization
32	MOD_VSPM	VSP-PE Maintenance Manager
33	MOD_NET	Networking Manager

Software Sessions

Errors that indicate a problem between software modules are usually logged with a number (1 to 52) in the SESSION/UNIT column of the error log. This number indicates the software session having the communication problem as listed below.

Table B-5. AUDIX Software Sessions

Session	Mnemonic	Description
1-32	P1_SESS	Assigned to Each Port
33	DM_SESS	Delivery Manager
34	LIB_SESS	General Library Session
35	SD_SESS	VIP / Service Dispatcher
36	ADM_SESS	Background Administration
37	FC1_SESS	Administration Terminal
38	FC2_SESS	Maintenance Terminal
39	INDS_SESS	INADS Request
40	AP_SESS	AP Request
41	FPI_SESS	FP System Initialization
42	VSPI_SESS	VSP System Initialization
43	SDM_SESS	System Data Manager
44	SM_SESS	Subscriber Manager
45	MBOX_SESS	Mailbox Manager
46	MM_SESS	Message Manager
47	TM_SESS	Terminal Manager
48	AM_SESS	Announcement Manager
49	VM_SESS	Voice Manager
50	DBPA_SESS	DBP Administrator
51	TD_SESS	TD-Bus Uplinks
52	MTCE_SESS	Maintenance

C. Equipment and References

This appendix contains circuit pack definitions, component ordering information, and references to other documents.

CIRCUIT PACKS

AHF1	TD-Bus Terminator Board
AHF3	TD-Bus Terminator Board
AHF102	DBP/VME-Bus Terminator
AHF104	Disk Interface
AHF107	S-Bus Expansion Board
AHF108	S-Bus Terminator Board
AHF109	TD-Bus Expansion Board
CDR1(B)	Alarm board
LC02	Line Circuit Board (4 ports)
LC03	Line Circuit Board (4 ports)
LC505	DCIU – Data Communications Interface Unit for DIMENSION PBX
PWJ58886U	AUDIX Backplane
SN222	Analog Line Port Board (8 ports)
SN228	Analog Line Port Board (8 ports)
SN229	Analog Line Port Board (8 ports)
SN238	EIA Port Board (4 ports)
SN270	GPP – General Purpose Port (4 ports)
TN366(B)	ACC – AUDIX Communications Controller (AUDIX networking)
TN472C	DBP-CPU
TN475(B)	SADI
TN477	TDBI-8 – Time Division Bus Interface (8 ports)
TN500	TDBI – Time Division Bus Interface (16 ports)
TN501B	VPC – Voice Processor
TN506B	BC – Bus Controller

TN507C	IPC – Intelligent Peripheral Controller (AUDIX-L)
TN508	DBP-RAM – Data Base Processor Random Access Memory (AUDIX-L)
TN509	DBP-CPU – Data Base Processor Central Processing Unit (AUDIX-L)
TN511	MI – Maintenance Interface
TN520	VB – Voice Buffer
TN521	SCP – Switch Communication Processor (AUDIX-L)
TN523	CPU – Central Processing Unit (FP or VSP)
TN531	MI – Maintenance Interface (AUDIX-L)
TN532	DBP-RAM – Data Base Processor Random Access Memory
TN533	SCPI – Switch Communication Processor Interface
TN547(B)	MPSI – Multi-Protocol Switch Interface
TN535	MON – Processor Monitor
TN539(B)	ACCE – AUDIX Communications Controller — Enhanced (AUDIX networking)
TN549	DBP-CPU – Data Base Processor Central Processing Unit
TN591	CPU – Central Processing Unit (FP or VSP)
TN714	TC – Tone and Clock
TN716(B)	BI – Bus Interace (FP or VSP)
TN719	SAI – Synchronous/Asynchronous Interface (AUDIX-L)
TN726	Data Line Board (8 ports)
TN727	NC – Network Controller (also SI – Switch Interface)
TN734	RAM – 2-Mbyte Random Access Memory (FP or VSP)
TN738	INT2 – Interface Board for System 75 SCI (4 links)
TN742	Analog Line Port Board (8 ports)
TN746B	Analog Line Port Board (16 ports)
TN747B	VPT – Voice Port Trunk (8 ports)
TN754	DLC – Digital Line Circuit (8 ports) ISDN Basic Rate Interface (BRI) Digital Line Circuit (Universal Module)
TN759	Processor Circuit Pack for System 75 XE
TN760B	Analog Trunk Board (4 ports)
TN761	RAM – 4-Mbyte Random Access Memory
TN762B	VPT – Voice Port Trunk (8 ports) used with SL-1 integration
TN765	Processor Interface (PI) (4 links plus EIA port)
TN767	Digital Service (DS1) Tie Trunk (Universal Module)
TN769	Analog Line Port Board (8 ports)

TN775	Maintenance Circuit Pack
TN777	Network Control Circuit Pack
UN156	DCIU – Data Communications Interface Unit (8 links)
UN160B	DBPI – Data Base Processor Interface
UN161B	DIM – Disk Interface Module (AUDIX-L)
UN162	VSFI – Voice Store and Forward Interface
WP91602, L1	New TD-Bus Terminator Board
ZAEH5B	Alarm Board (AUDIX-L)
ZAHF8	S-Bus Terminator Board (AUDIX-L)
ZAJU1	Disk Drive Cable Terminator Board (AUDIX-L)

COMPONENT ORDERING TABLES

The following tables list AUDIX components, circuit packs, and cables by comcode. See *AUDIX System Description* (585-305-201) for Price Element Codes (PECs) for AUDIX equipment.

Table C-1. AUDIX System Parts List *(Part 1 of 6)*

Item	Comcode	Notes
Backplane Area:	–	(Included in main J58886U-1 AUDIX drawing)
Backplane (List 1)	105263909	PWJ58886U-1, L1 board (mounts paddle boards)
Backplane (List 2)	105442941	PWJ58886U-1, L2 board (mounts paddle boards)
Backplane (List 3)	106239858	List 3 boards should be replaced with List 4
Backplane (List 4)	106413933	PWJ58886U-1, L4 board (mounts paddle boards)
Bus Bar	845 797 364	Assembly to supply power to backplane
Cable Clamp	901086173	Holds data cable for AHF104 disk interface board
Cable Ties (6)	400891735	Hold local LCJ58886U-1 wiring harness to connector panel
Connector Cables	–	H600-165 Group 4 and 5 cables attach alarm (D03) and RS-232C connectors (H00 and H01) to CDR1B board, respectively. Group 6 connects SCPI (F00) to backplane.
Connector Panels:		
Lower Cabinet	846151090	Marked panel for mounting rear connectors, fuse, ac cord
Upper Cabinet	845953124	Marked panel for mounting rear connectors, fuse, ac cord
Fuse Holder	405362617	Contains rear 5 VDC fuse (see Power section for fuse)
Cabinet Equipment:	–	J58886U-1 includes circuit packs, disks, internal wiring, labels, subassemblies, cabinet frame and equipment, and expansion cabinet hardware
Air Filter	405302159	Cabinet filter under circuit pack carrier

(Continued)

TABLE C-1. AUDIX System Parts List *(Part 2 of 6)*

Item	Comcode	Notes
Cabinet Equipment:	–	(Continued)
Cabinet Feet:		Four needed per cabinet; need List 3 or 4
Short	405289547	J58886U-1 L4 7/8-inch foot for table or stack mount; used with 10-32 x 3/4 PH screw (comcode 840059885)
Tall	405193699	J58886U-1 L3 2-inch foot for floor mount; used with 10-32 x 1.5L PH screw (comcode 840059935)
Anchor Studs	–	If the welded studs that hold drives and power supply break off, knock out the PEM fasteners and replace them with a #8 screw (8-32x.5-inch)
Connector Clip	845798123	Used to connect upper and lower cabinets on expanded system.
Cover Plates:	–	(See also Backplane and Fan Assembly sections)
Lower Front Cover	845799063	Lower front cover plate over disk drives; includes quarter-turn screw fasteners
Lower Rear	845799097	Covers power supply and batteries
Middle Rear	845799105	Covers backplane
Screws	901090308	8-32 x 3/8 SHWH #8 screws attach rear covers
EMC Wrist Strap	900792888	Plugs into ESD ground point on cabinet front
Front Door	–	ED-1E521-70 front door assembly; includes latch
Grounding Plate	845555994	Connects back of upper and lower cabinets
Hex Nuts	802065185	The 8-32 size hex nuts connect disk drive brackets (2 nuts each), power supply (4 nuts), and battery housing (2 nuts) to the cabinet floor; used with #8 washers (comcode 801831470)
Labels:		(Rear labels part of J58886U-1)
Lower Cabinet		(Must be ordered when expansion cabinet added)
Carrier Label	845799170	Label strip identifying circuit packs
Shutdown Label	845797661	Label for software shutdown and power down
Upper Cabinet		(Differs from lower cabinet strip)
Carrier Label	845953157	Label strip identifying circuit packs

(Continued)

TABLE C-1. AUDIX System Parts List *(Part 3 of 6)*

Item	Comcode	Notes
Disk Drives:	–	(Included in main J58886U-1 AUDIX drawing)
HDD Bracket	845799048	Mounting bracket for 3.5- or 5.25-inch disk drives
Bracket Screws (4)	840058564	6-32 x 3/16 #6 screws attach each disk to bracket
Hard Disk Drives:		
14-Hour Drive	406949149	Qualified 14-hour 3.5-inch HDD
20-Hour Drive	406949156	Qualified 20-hour 3.5-inch HDD
33-Hour Drive *or*	406744565 407033653	Qualified 33-hour 3.5-inch HDD
58-Hour Drive	406740613	Qualified 58-hour 3.5-inch HDD
88-Hour Drive	406071746	Qualified 760-Mbyte 5.25-inch HDD on WP91507-L3 spec
Early Disk Drives:		*The following are no longer available.*
120 Mbyte	406621607	Qualified 120-Mbyte 5.25-inch HDD
170 Mbyte *or*	405391889 406744565	Any 170-Mbyte 5.25-inch HDD on WP91507-L1 spec Equivalent qualified 3.5-inch HDD
380 Mbyte *or*	405684978 406740613	Any 380-Mbyte 5.25-inch HDD on WP91507-L2 spec Equivalent qualified 3.5-inch HDD
RCD Assembly:	–	ED-1E523-70 includes RCD, bracket, circuit breaker, LEDs, lower-front cabinet thermal equipment
Circuit Breaker – AC – DC	406785121 405951757	AC breaker for POWER switch on RCD bracket (early AC breaker 405532290 should be replaced) DC circuit breaker for DC-powered system
RCD Bracket – early – current – screws (4)	 845949932 846653327 840058564	Mounting bracket for RCD and front panel equipment (slides under disk-drive retaining bar; current mounts 50-Mbyte drive) 8-32 x 3/16 PH #6 screws attach the RCD to bracket
RCD (20-Mbyte)	405356981	Removable cartridge drive (20-Mbyte)
RCD (50-Mbyte)	406411306	Removable cartridge drive (50-Mbyte)
Thermal Assembly	845797711	Includes wiring, thermistor probe assembly (comcode 843630427), and two thermostats (comcode 403216781)
RCD Cartridges:		
20-Mbyte Cartridge	405376336	At least one J58889UB-1 L1 (blank) is always needed
50-Mbyte Cartridge	406411314	At least one J58889UB-1 L20 (blank) is always needed
SCSI-Bus Cable	–	ED-1E434-11 Group 183 50-pin data cable for disk drives

(Continued)

TABLE C-1. AUDIX System Parts List *(Part 4 of 6)*

Item	Comcode	Notes
Fan Assembly:	–	ED-1E522-70 includes fans, thermal assembly, rear plate
Cover Plate	845798958	Attaches fans to rear of cabinet
Fans	405357302 406421677	Four per assembly (early and current comcodes, resp.; the newer fan is more efficient)
	402667851 406281949	Four finger guards (one per fan); finger guards will work on either fan
	840058713	Sixteen 6-32 x 3/4 PHM screws (four per fan)
Thermal Assembly	–	ED-1E430-70 Group 5 has thermal, mounting equipment, H600-140 Groups 387 and 388 wiring assemblies
Connector Assembly	845797729	Includes wiring, thermistor probe assembly (comcode 843630427), and two thermostats (comcode 402825756)
Misc. Equipment:		
FASTECH Backplane 940A Tool Kit	403425705	List 2, used to insert or remove 1-type pins from the backplane; see Tier III manual for more information
Isolating Data Interface (IDI)	103981742	For data link on System 85, DIMENSION PBX, System 75 XE, and DEFINITY Generic 1, 2, or 3. *System 85, Generic 2, and DIMENSION PBX:* also need 4.5-foot ED-1E434-11 Group 174 cable, Group 304 RS-449 extender cable (up to 400 feet), and (for duplicated common control) Group 342 ‘‘Y’’ cable. *System 75 XE, Generic 1, and Generic 3i/s:* also need 4.5-foot ED-1E434-11 Group 174 cable, and H600-210 Group 1 to 7 cable (group depends on length of cable: 1=10 ft., 2=25 ft., 3=50 ft., 4=100 ft., 5=200 ft., 6=300 ft., 7=400 ft). *Generic 3r:* requires two preceding cables plus an H600-347 Group 1.
Local Area Data Set (LADS)	403304827 (disc.)	Two needed for extended local access or the System 85/Generic 2/DIMENSION PBX data link
SCA	405766460	For data link on 5ESS Switch. Also needed is an ED-1E434-11, Group 311 cable, an H600-258 cable, and a D8W-87 modular cord to the demarcation point.
2400 modem	406793471	Stand-alone 2400 bps modem with modular cord for remote maintenance or administration

(Continued)

TABLE C-1. AUDIX System Parts List *(Part 5 of 6)*

Item	Comcode	Notes
Power Equipment:	–	(Included in main J58886U-1 AUDIX drawing)
5 V Fuse	997964622	Standard 125 V DC, 15-amp BUSS fuse at rear of cabinet (early 10-amp fuses should be replaced with 15-amp fuses per QPPCN 363DR)
48 V Fuse	–	Standard 250 V DC, 1-amp slow-blow (1 ASB) fuse (commercially avail. 3AG-type fuse) in power supply
AC Power Cord	405362641	Supplies main power to AUDIX cabinet
Battery Housing	845799147	Metal container for battery module
Retaining Strip	845799113	Holds battery module in housing; uses 8-32 x 3/8 SHWH screw (comcode 901090308)
Battery Module	405358060	48 V, 24-cell battery pack
Internal Cables:	–	(Included in main J58886U-1 AUDIX drawing)
Port Cables	405005570	Two WP-90753, L2 cables to D00 and D01
Wiring Assemblies	–	H600-140 Groups 382 and 383 connect the power supply to +5 and GRDD on the backplane; Group 384 grounds the ac receptacle to the connector panel
Wiring Harness	–	LCJ58886U-1 internal (local cable) harness supplies most internal power, including disk drives
AC Power Assembly:	–	ED-1E524-70 assembly includes air plenums, base plate, and power supply
Air Plenums	845799014	Early left air plenum at rear of cabinet
(early model)	845799006	Right air plenum at cabinet rear; early plenums use three 6-32 x 3/8 SHWH #6 screws (comcode 900757253), later plenums use one screw. Grommet inside right air plenum is comcode 401780226
(current model)	846821833	New left air plenum does *not* mount to the new power supply base plate
Base Plate (early model)	845798990	Mounts power supply and early air plenums (later model does not mount air plenums); uses four 8-32 x 1/4 SHWH #8 screws (comcode 900714064)
(current model)	846821817	New base plate does *not* mount air plenum(s)

(Continued)

TABLE C-1. AUDIX System Parts List *(Part 6 of 6)*

Item	Comcode	Notes
Power Equipment:	-	(Continued)
Power Supplies:		
jETA Power Supply	405356809	Approved AUDIX main power supply
LH Research	-	Included in WP91569, use comcode 405356809
Computer Products	-	Included in WP91569, use comcode 405356809
DC Power Assembly:	105733547	D-kit #D-182236
Cover, lower rear	846303842	
Local cable	-	LCJ58886U-1A, G3
Power supply	405951781	
Mounting assembly	846360014	DC terminal strip
Screw #8	901090308	two provided
cover	846306843	AC receptacle outlet cover
Screw #4	901125294	two provided
Screw .25-20x1/2	841059843	one provided
Washer	804236362	one provided
Nut	802207563	two provided
Kit, D-181895	105434599	Gutter tap ground
Circuit breaker	405951757	
Wire assembly	-	H600-232, power supply
Wire assembly	-	H600-269, fuse
Wire assembly	-	H600-261, four provided (one for each disk)
Wire assembly	-	H600-275, ground
Screw	840058267	two provided
Nut	802108282	two provided
Washer	804236313	two provided
Fuse holder	406018903	one provided
Instruction sheet	846367522	
Note:	The fuse wire assembly (H600-269) is soldered to the fuse holder (406018903) at the factory.	

The following circuit packs are used in the AUDIX carrier and backplane. Some circuit packs can be ordered from compatible switch stock or swapped with AUDIX Large machines if needed.

Table C-2. AUDIX Circuit Pack Codes *(Part 1 of 2)*

Circuit Pack	Comcode	Number Used	Description	Also Used On
AHF1 *	103810586	2	TD-Bus Terminator	A-L
AHF102	105167233	1	DBP/VME-Bus Terminator	–
AHF104	105190839	1	Disk Interface	–
AHF107	105408710	2	S-Bus Extender	–
AHF108	105408728	2	S-Bus Terminator	–
AHF109	105465603	2	TD-Bus Extender	–
CDR1	105266498	1	Early alarm board	–
CDR1B	105711238	1	Current alarm board	–
PWJ58886U (L1)	105263909	1	List 1 Backplane	–
PWJ58886U (L2)	105442941	1	List 2 Backplane	–
PWJ58886U (L4)	106413933	1	List 4 Backplane	–
TN366	103279840	1	ACC	A-L
TN366B	106186588	1	ACC	A-L
TN472C	105474126	1	DBP-CPU	–
TN475	103280830	1	SADI	–
TN475B	105474118	1	SADI	–
TN477	103280855	1	TDBI-8 (8 ports)	–
TN500	103281085	1 or 2	TDBI (16 ports)	A-L
TN501B	103965182	1 – 16	VPC (2 ports each)	A-L
TN506	103281143	1	BC	A-L
TN506B	105222301	1	BC	A-L
TN511	103281192	1	MI	–
TN520	103281283	1 or 2	VB	A-L
TN523	103281317	1 or 2	CPU (FP and VSP)	A-L
TN532	103281408	1	DBP-RAM (2 Mbyte)	–
TN533	103281416	1	SCPI	–
TN539	103281473	1	ACCE	A-L
TN539B	106757768	1	ACCE	A-L
TN540	103281481	1	DBP-RAM (4 Mbyte)	–
TN547	103281556	1	MPSI	A-L
TN547B	105717359	1	MPSI	A-L
TN591	103281994	1 or 2	CPU (FP and VSP)	–

* The AHF1 has been replaced by the WP91602, L1.

(Continued)

TABLE C-2. AUDIX Circuit Pack Codes *(Part 2 of 2)*

Circuit Pack	Comcode	Number Used	Description	Also Used On
TN714	103556676	1	TC	A-L, S75
TN716	103556692	1 or 2	BI	A-L, S75
TN716B	105442412	1 or 2	BI	A-L, S75
TN727	103556809	1	NC	A-L, S75
TN734	103556874	2 or 3	RAM (2 Mbyte)	A-L, S75
TN747B	105167266	1 – 4	VPT (8 ports each)	A-L, S75/G1/G3
TN761	103557146	1 or 2	RAM (4 Mbyte)	S75
TN762B	103976171	1 – 4	VPT for SL-1 setups	S75/G1/G3
UN160	103666038	1	DBPI	A-L
UN160B	105319818	1	DBPI	A-L
UN162	103666053	1	VSFI	A-L
WP91602, L1	405522780	2	TD-Bus Terminator	A-L
ZAHF8	103963336	2	S-Bus Terminator	A-L

Table C-3. AUDIX Cable Codes and Descriptions *(Part 1 of 2)*

ED-1E434-11 Cable	Gender and Connectors (Note 1)	Associated PEC (Note 2)	Number Used	Description (Note 3)
Group 13	M RS-232C to F RS-449	65254A	1	36-inch for Aux. cabinet device (PEC includes Groups 304, 342)
Group 30	M-to-F RS-232C	65233	1	36-inch extender for cabinet-mount
Group 110	M RS-232C to F RS-449	65259	1	Straight-through cable from an RS-232C device (such as LADS) to a DCIU; order length by comcode: 601085087 = 20 ft. 601085095 = 30 ft. 601085103 = 40 ft. 601085111 = 50 ft.
Group 174	F-to-M RS-449	65399 attr. CNN07	as needed	4.5-foot cable between the AUDIX and IDI (leads to switch DCIU)
Group 175	F RS-449 to M RS-232C	65399 attr. CNN06	as needed	4.5-foot cable between the AUDIX and LADS (leads to switch DCIU)
Group 183	Four F connectors	Basic	1	50-pin SCSI-bus disk-data cable
Group 185	2 F connectors	70310	1	10-pin CDR1B alarm signal extender
Group 186	4 F and 1 M	70310	1	50-pin SADI cable for top cabinet
Group 187	2 F connectors	70310	1	40-pin TD-bus extender cable
Group 300	M-to-M shielded Amphenol	65258/A LNG10 to 32	as needed	Extra 25-pair cable(s) to wall field; LNG10 = 35 ft. (601000904) LNG11 = 50 ft. (601000938) LNG12 = 75 ft. (601000979) LNG13 = 100 ft. (600046338) LNG14 = 125 ft. (601004625) LNG15 = 150 ft. (601085301) LNG16 = 175 ft. (601085319) LNG17 = 200 ft. (601001399) LNG20 = 15 ft. (601000854) LNG21 = 25 ft. (601000888) LNG25 = 20 ft. (601000862) LNG27 = 30 ft. (601000896) LNG28 = 40 ft. (601000912) LNG30 = 60 ft. (601000953) LNG32 = 80 ft. (601000987)

(Continued)

TABLE C-3. AUDIX Cable Codes and Descriptions *(Part 2 of 2)*

ED-1E434-11 Cable	Gender and Connectors (Note 1)	Associated PEC (Note 2)	Number Used	Description (Note 3)
Group 304	M-to-F RS-449	65399 attr. LNG10 to 49	as needed	Extender cable from IDI to DCIU; LNG21 = 25 ft. (601089535) LNG10 = 35 ft. (601089543) LNG11 = 50 ft. (601003585) LNG12 = 75 ft. (601089550) LNG13 = 100 ft. (601085426) LNG15 = 150 ft. (601089568) LNG16 = 175 ft. (601089576) LNG17 = 200 ft. (601085434) LNG47 = 250 ft. (601089584) LNG48 = 300 ft. (601085442) LNG49 = 400 ft. (601089592)
Group 309	M-to-F RS-232C		as needed	Extender cable, same as 50-foot M25A except for lengths (5, 12, 25, or 50 feet)
Group 311	M-to-M RS-232C	Basic	2	50-foot RS-232C extender cable 601087075 = 5 ft., 601087083 = 10 ft., 601087091 = 20 ft., 601087109 = 30 ft., 601087117 = 40 ft., 601001365 = 50 ft.
Group 329	2 F connectors	70310	2	60-pin S-bus expansion cable.
Group 342	M RS-449 to two F RS-449s	65259, 65399 attr. CCT02	as needed	‘‘Y’’ cable for duplicated common control on switch DCIU
Group 350 *	M-to-F RS-232C	Basic attr. LNF05 to 28	2	Up to 50-foot AUDIX null-modem cable; order 601088008 = 1 ft., LNF05 = 5 ft. (601089733), LNF50 = 10 ft. (601088016), LNF25 = 20 ft. (601089741), LNF27 = 30 ft. (601089758), LNF28 = 40 ft. (601089766), LNF11 = 50 ft. (601088032)

Note 1. M = Male connector (plug). F = Female connector (receptacle).

Note 2. Basic PECs for AUDIX models are in *AUDIX System Description* (585-305-201).

Note 3. DCIU is on System 85, Generic 2, or DIMENSION PBX only.

* The H600-258 Group 1 cable replaces the Group 350 in R1V4 and later systems.

REFERENCES

The following documents may help you maintain and service the AUDIX. Many of these documents should be available in the library received with your AUDIX or switch. They may also be obtained through your AT&T Account Executive.

AUDIX Documentation

See the *About this Document* section for a current list of AUDIX customer and services documentation. Some key volumes are described in more detail in Chapter 1.

AUDIX Technical Documentation

One- and two-cabinet AUDIX technical documentation includes:

- AUDIX Cabinet Assembly (J58886U-1) — CD/SD-1E601-01

AUDIX-L technical documentation includes:

- Control Carrier — J58888H (CD/SD-1E587-01)
- DBP Carrier — J58888K (CD/SD-1E589-01)
- DC Power Carrier — J58888L (CD/SD-1E590-01)
- Disk Drive Cabinet and Power Units — J58886M and J58886M-2 (CD/SD-1E577-01)
- Port Carrier — J58888J (CD/SD-1E588-01)

Engineering Drawing (ED) Documentation

AUDIX technical drawings include:

- ED-1E430-70 — Thermal assembly (Group 5)
- ED-1E434-11 — Custom cables
- ED-1E520-70 — Cabinet weldment
- ED-1E521-70 — Front door assembly
- ED-1E522-70 — Fan assembly
- ED-1E523-70 — RCD assembly
- ED-1E524-70 — Power supply assembly

AUDIX-L technical drawings include:

- ED-1E430-70 — Thermal sensor assembly

- ED-1E434-11 — Custom cables
- ED-1E435 — AUDIX-L cabinet power and ground bus bar
- ED-1E464-70 — AUDIX fascias
- ED-1E465-70 — Overhead ductwork
- ED-1E489-70 — Disk drive shelf assembly
- ED-1E496-70 — Cabinet floor anchors (Group 2 subfloor; Group 3 raised floor)

Switch Documentation

This section lists documents for compatible AT&T switches in the following order: general information; DEFINITY Generic 3, Generic 2, and Generic 1; System 75 and 75 XE; System 85, 1A ESS Switch; 5ESS Switch, and DIMENSION PBX. Documents for data devices and other peripheral equipment appear at the end of this section.

General Information Documents

555-015-201	Terminals and Adjuncts Reference
555-025-101	DS1/DMI/ISDN-PRI Reference
555-025-205	Trunk Signaling and Transmission Application Notes
555-400-010	Premises Distribution System Publications
555-025-201	Network and Data Services Reference

DEFINITY Communications System Generic 3 Documentation

555-230-020	Introduction to AT&T DEFINITY Communications System Generic 3
555-204-105	Generic 1 and Generic 3i Maintenance
555-230-105	Generic 3r Maintenance
555-204-106	Generic 1 and Generic 3i Upgrades and Additions
555-230-106	Generic 3r Upgrades and Additions
555-230-200	System Description
555-230-201	Feature Description
555-230-650	Generic 3i Implementation
555-230-651	Generic 3r Implementation

AT&T DEFINITY Communications System Generic 2 Documentation

AT&T DEFINITY Generic 2 corresponds to the newest release of System 85-based software (based on the System 85 R2V4 release).

555-104-120	Electrical Protection, Grounding, and Exposure Checklist
555-104-104	Installation
555-104-111	Upgrades
555-104-630	Wiring
555-104-020	An Introduction to DEFINITY Communications System Generic 2
555-104-506	Generic 2.1 Administration Procedures
555-104-507	Generic 2 Administration of Features and Hardware
555-104-730	Attendant Console User's Guide
555-104-603	Equipment Room Floor Plans and Specifications
555-105-301	Feature Descriptions
555-105-117	Maintenance Procedures
555-105-118	Maintenance Repair Strategies
555-104-505	Manager II MS-DOS Version Operation
555-104-401	New Capabilities
555-105-201	System Description
555-104-504	Traffic Theory
555-104-109	X-Ray and System Tests

AT&T DEFINITY Communications System Generic 1 Documentation

AT&T DEFINITY Generic 1 corresponds to the newest release of System 75-based software (based on the System 75 R1V3 release).

555-200-500	Administration and Measurement Reports
555-200-700	Console Operations
555-200-201	Feature Description
555-200-600	Planning/Configuration
555-200-111	Wiring Guide
555-204-499	Capabilities
555-204-652	Implementation
555-204-654	Implementation
555-204-104	Installation and Test

555-204-200	System Description
555-204-105	Maintenance
555-204-106	Upgrades and Additions

System 75 and System 75 XE Documentation (R1V3)

555-200-020	Introduction to AT&T System 75
555-209-003	Distributed Communications System
555-200-652	Implementation Release 1 Version 3
555-200-200	System 75 System Description
555-200-104	Installation and Test
555-200-105	Maintenance
555-201-104	Installation and Test
555-201-200	System 75 XE System Description
555-200-105	Maintenance
555-200-106	System Upgrades and Additions

System 85 Documentation (R2V2 to R2V4)

555-103-521	Data Communications Interface Unit (DCIU)
555-104-120	Electrical Protection, Grounding, and Exposure Checklist
555-102-107	Feature Translations (R2V3)
555-103-507	Administration of Features and Hardware (R2V4)
555-104-603	Equipment Room Floor Plans and Specifications
555-105-301	Feature Descriptions
555-104-104	Installation
555-102-108	Maintenance (R2V3)
555-105-201	System Description
555-103-109	System Tests (R2V4)
555-104-630	Wiring

1A ESS Switch Documents

231-099-029TD	1A ESS Switch Input/Output Asynchronous Protocol Specifications, Switching Systems
231-390-170	1A ESS Switch Message Service
231-390-176	1A ESS Switch Simplified Message Desk Service
Index 40	Central Office Equipment Engineering System (COEES) SMSI and MSS
Index 47	Central Office Equipment Engineering System (COEES)
231-302-305	Enhanced Input/Output Subsystem – Implementation Procedures for Customer Channels 24 through 95 (1AE9 and Later Generic Programs)
231-099-022TD	Message Service System Interface Specifications, Switching Systems
231-318-364	Recent Change Formats and Implementation – Description and Procedures – Message Desk Service (1AE9 Generic Program)
231-099-023TD	Simplex Voiceband Digital Interface Specification, Switching Systems
231-099-006TD	Simplified Message Desk Interface, Switching Systems
592-031-100	202T Modem Transmitter/Receiver Description and Operation
592-031-200	202T Modem Transmitter/Receiver Installation and Connections
592-031-500	202T Modem Transmitter/Receiver Test Procedures
592-031-501	202T Modem Transmitter/Receiver Maintenance

5ESS Switch Documents

533-605-206	3A SMSI Translator User's Guide
5D5-001-001	5ESS Switch Documentation Guide
5D5-600-304	5ESS Switch Equipment Communications Data (ECD/SG) Data Base 5E4 (3 Volumes)
–	5ESS Switch Growth Procedures
5D5-700-100	5ESS Switch Interface/Compatibility Guide
5D5-900-301	5ESS Switch ISDN Basic Rate Interface Specification 5E4
5D5-900-303	5ESS Switch ISDN Applications Processor Interface Specification 5E4/5E5 Generic Program
5D5-118-213	5ESS Switch Recent Change Procedures Menu Mode 5E4 (2 Volumes)
5D5-600-102	5ESS Switch Translation Data 5E4 (5 Volumes)
TG-5	5ESS Switch Translations Guide (5 Volumes)
IPH 555	5ESS Switching System Installation Procedures Handbook 555 and IPH 555A
533-604-100	Advanced Communications Package (ACP) Information Guide

IPH 565	Advanced Communications Package Installation Procedures Handbook Version 4.2
5D5-200-100	Business and Residence Custom Services (BRCS) Assignment Guide
592-031-100	202T Modem Transmitter/Receiver Description and Operation
592-031-200	202T Modem Transmitter/Receiver Installation and Connections
592-031-500	202T Modem Transmitter/Receiver Test Procedures
592-031-501	202T Modem Transmitter/Receiver Maintenance

DIMENSION System Documentation

554-010-406	DIMENSION PBX Electronic Custom Telephone Service (ECTS) and Automatic Call Distribution (ACD) for Use With DIMENSION 400E/600 600SN, 2000 and Custom PBX (includes AUDIX administration, installation, and testing)
554-105-322	DIMENSION 400E/600/600SN PBX — Feature Translations
554-105-320	DIMENSION 400E/600/600SN PBX — Installation
554-105-100	DIMENSION 400E/600/600SN PBX — System Description and Planning Information
554-105-324	DIMENSION 400E/600/600SN PBX — Trouble Analysis — Alarms
554-111-302	DIMENSION 2000 and Custom PBX — Feature Translations
554-111-300	DIMENSION 2000 and Custom PBX — Installation
554-111-100	DIMENSION 2000 and Custom PBX — System Description and Planning Information
554-111-304	DIMENSION 2000 and Custom PBX — Trouble Analysis — Alarms

Peripheral and Data Equipment Documentation

999-102-160	212AR Modem User’s Manual
999-300-180	4410 Display Terminal
999-310-181	4425 Display Terminal
999-300-285	470/471, 475/476 Printers Users Guide
999-700-303	475 Printer Users Guide
999-700-493	513 BCT Technical Reference Manual
999-700-486	513 BCT User’s Guide
999-801-202	513 Terminal Emulator User’s Guide
999-700-483	515 BCT User’s Guide
#609	5420 User’s Guide (Teletype Corporation)

999-300-561	570/571 Printers Users Guide
999-300-562	572/573 Printers Users Guide
999-300-327	600 Terminal 513 BCT/System 75 User's Guide
999-300-270	610 Business Communications Terminal (BCT)
999-300-302	615 Multi-Tasking Terminal User's Guide
999-300-303	615 Multi-Tasking Terminal Pocket Reference Guide
ST-2112-09	6417 Users Guide (NCR order number)
999-300-765	715 BCS User's Guide and Service Manual
999-100-198	DATAPHONE II 2212C Modem User's Manual
999-100-199	DATAPHONE II 2212D Modem User's Manual
999-100-295	DATAPHONE II 2224G Modem User's Manual
999-100-287	DATAPHONE II 2296A Modem User's Manual (Stand-alone or Data-mounting Configuration)
999-100-188	DATAPHONE II 2500 Series Data Service Unit User's Manual
999-100-196	DATAPHONE II 2600 Series Data Service Unit User's Manual
999-100-197	DATAPHONE II 2700 Series Data Service Unit User's Manual
999-100-166	Local Area Data Set User's Guide
999-700-300	Modular Processor Data Module User's Guide
999-700-301	Modular Trunk Data Module User's Guide
555-401-702	Multiple Asynchronous Data Unit (MADU) User Manual
555-016-715	PC/PBX Connection documentation set (6 documents)
555-016-201	PC/PBX Connection Installation and Reference Manual
999-700-028	Processor Data Module User's Guide
555-016-711	Quick Guide to PC/PBX Connection
555-103-522	SN238 EIA Port Application Notes (for an ADU on System 85)
555-401-708	Z3A Asynchronous Data Unit Product Manual

Abbreviations

AC Alternating Current

ACC AUDIX Communications Controller (for networking)

ACCE AUDIX Communications Controller — Enhanced

ACD Automatic Call Distribution

ACP Advanced Communications Package

ADAP AUDIX Data Acquisition Package

ADFTC Analog/Digital Facilities Test Circuit (System 85 or Generic 2)

ADU Asynchronous Data Unit (Z3A)

AE Account Executive

AMIS Audio Messaging Interchange Specification

AMLS Automated Message Link Service

AMWI Audible Message-Waiting Indicator

AMWL Automatic Message-Waiting Lamp

AP Applications Processor

API Applications Processor Interface

AUCC AUDIX Upgrade Control Center

AUDIX Audio Information Exchange (one- or two-cabinet AUDIX)

AUDIX-L Audio Information Exchange – Large

AUDIX-S Audio Information Exchange – Small (renamed ‘‘one-cabinet AUDIX’’)

AUX Auxiliary

AVD Alternate Voice/Data

AWG American Wire Gauge

BC Bus Controller (TN506B)

BCS Business Communications System

BCT Business Communications Terminal

BI Bus Interface (TN716)

bps bits per second

BRI Basic Rate Interface

BTU British Thermal Unit

CCITT	International Consultive Committee for Telephony and Telegraphy
CMS	Call Management System
CO	Central Office
CPU	Central Processing Unit
CSM	Centralized System Management
DBP	Data Base Processor (Subsystem)
DBP-CPU	Data Base Processor Central Processing Unit
DBP Bus	Data Base Processor Bus (also VME Bus)
DBPI	Data Base Processor Interface
DBP-RAM	Data Base Processor Random Access Memory
DC	Direct Current
DCE	Data Communications Equipment
DCIU	Data Communications Interface Unit
DCP	Digital Communications Protocol
DCS	Distributed Communications System
DFC	Dedicated Function Computer (also DBP-CPU)
DID	Direct Inward Dialing
DIM	Disk Interface Module (UN161B on AUDIX-L)
DLC	Digital Line Circuit (TN754)
DMI	Digital Multiplexed Interface
DOSS	Delivery Operations Support System
DRAM	Dynamic Random Access Memory
DS1	Digital Service 1
DSI	Digital Service Interface
DSL	Digital Subscriber Line
DSO	Data Service Organization
DSU	Data Service Unit
DTE	Data Terminal Equipment
EDC	Electronic Document Communications
EDI	Engineering Drawing Information
EIA	Electronic Industries Association
EMC	Electro-Magnetic Compatibility
EMI	Electro-Magnetic Interference

EPROM	Erasable Programmable Read Only Memory
ES	Enhanced Services
ESS	Electronic Switching System
ETN	Electronic Tandem Network
EUCD	Enhanced Uniform Call Distribution
FAC	Feature Access Code
FP	Feature Processor (Subsystem)
FP-BI	FP Bus Interface (TN716)
FP-CPU	FP Central Processing Unit (TN523 or TN591)
FP-PE	FP Processor Element (includes BI, CPU, and RAM)
FP-RAM	FP Random Access Memory (TN734 or TN761)
FSD	Fixed Storage Drive (AUDIX-L)
FSW	Failure Status Word
GBCS	Global Business Communications Systems
GND	Ground
GPP	General Purpose Port (SN270)
HDD	Hard Disk Drive (AUDIX)
HDLC	High-Level Data Link Controller
ID	Identification
IDI	Isolating Data Interface
INADS	Initialization and Administration System
INT	Interface Board 1 to 3 for System 75 SCI
IPC	Intelligent Peripheral Controller (TN507C on AUDIX-L)
ISCN	Information Systems Change Notice
ISDN	Integrated Services Digital Network
ISLU-T	Integrated Services Line Unit — T Interface
ITAC	International Technical Assistance Center
K or Kbyte	Kilobyte (1024 bytes)
LADS	Local Area Data Set
LAT	Local Administration Terminal
LDN	Listed Directory Number
LEC	Local Exchange Carrier
LED	Light-Emitting Diode

LMT	Local Maintenance Terminal
LWC	Leave Word Calling
MAAP	Maintenance and Administration Panel
MADU	Multiple Asynchronous Data Unit
Mbyte	Megabyte (≃ one million bytes)
M Bus	Memory Bus
MCS	Message Center Service
MDM	Modular Data Module
MEM	Memory (also RAM)
MFAT	Multifunction Analog Terminal
MFET	Multifunction Electronic Terminal
MHz	Megahertz
MI	Maintenance Interface (TN531 or TN511)
MLHG	Multiline Hunt Group
MMC	Material Management Center
MNP	Microcom Networking Protocol
MPSI	Multiprotocol Switch Interface
MON	Processor Monitor (TN535)
MPDM	Modular Processor Data Module
ms	Millisecond
MSC	Message Service Center
MSS	Message Service Center
MT	Multi-Tasking Terminal
MTBF	Mean Time Between Failures
MWI	Message-Waiting Indication
NC	Network Controller (TN727) (also NETCON)
NCSC	National Customer Support Center (now the TSC)
NEC	National Engineering Center (now the Business Communications Systems Engineering Center)
NT1	Network Termination 1 Unit
OLS	Off-Line Switcher
PBX	Private Branch Exchange
PC	Power Converter (AUDIX-L), or Personal Computer
PDM	Processor Data Module

PE	Processor Element
PEC	Price Element Code
PI	Processor Interface (System 75, System 75 XE, Generic 1, or Generic 3i/s)
PMX	Private Message Exchange
PRI	Primary Rate Interface
PROC	Procedure
PROFS	Professional Office System
PROM	Programmable Read Only Memory
RAM	Random Access Memory
RCD	Removable Cartridge Drive (AUDIX)
RMATS	Remote Maintenance, Administration, and Traffic System (now INADS)
RMT	Remote Maintenance Terminal
ROM	Read Only Memory
RSD	Removable Storage Drive (AUDIX-L)
SADI	SCSI-to-AUDIX Disk Interface (AUDIX)
SAI	Synchronous/Asynchronous Interface (TN719 on AUDIX-L)
SAT	System Administration Terminal
S Bus	System Bus
SC	System Consultant
SCA	Switch Communications Adapter
SCI	Switch Communication Interface
SCP	Switch Communications Processor (TN521)
SCPI	Switch Communications Processor Interface (TN533)
SCSI	Small Computer System Interface (AUDIX)
SDU	Synchronous Data Unit (Z3B1)
SI	Switch Interface (also TN727 NC)
SMDI	Simplified Message Desk Interface
SMSI	Simplified Message Service Interface
SMT	System Management Terminal
SNC	Service Node Controller
TC	Tone and Clock (TN714) (also Technical Consultant)
TCM	Terminal Change Management
TD	Time Division (also Transmit Data)

TDBI	Time Division Bus Interface (TN500)
TD Bus	Time Division Bus
TE	Terminal Equipment
TEI	Terminal Endpoint Identifier
TMC	Technical Marketing Center
TMS	Time Multiplexed Switch
TRACS	Translation Recovery, Additions and Conversion System
TSC	Technical Service Center (formerly the NCSC)
TSO	Technical Support Operations
UCD	Uniform Call Distribution
UDM	Universal Data Module
UL	Underwriters Laboratories
UM	Unified Messaging
UPS	Uninterruptible Power Supply
VB	Voice Buffer (TN520)
VDN	Vector Directory Number
VMAAP	Visual Maintenance and Administration Panel
VME Bus	Versa-Module European Bus (also DBP Bus)
VMWI	Visual Message-Waiting Indicator
VPC	Voice Processor Computer (TN501B)
VPT	Voice Port (TN747B)
VSFI	Voice Store and Forward Interface (UN162)
VSP	Voice Session Processor (Subsystem on AUDIX-L only)
VSP-BI	Voice Session Processor Bus Interface (TN716B)
VSP-CPU	Voice Session Processor Central Processing Unit (TN523 or TN591)
VSP-PE	VSP Processor Element (includes BI, CPU, and RAM)
VSP-RAM	Voice Session Processor Random Access Memory (TN734 or TN761)
WGS	Work Group System

Glossary

1A ESS Switch	An AT&T Central Office (CO) switch that supports integrated AUDIX applications in AUDIX R1V4 and later software.
5ESS Switch	An AT&T switch that supports ISDN protocol and integrated AUDIX applications in AUDIX R1V4 and later software. The 5ESS Switch is a CO that connects the Customer Premises Equipment (CPE) to an ISDN network over a U interface (2-wire outside plant wiring) through an NT1 unit, or directly from the switch through an ISLU-T (4-wire) interface.
Accessed Message	Voice mail that a recipient has received and scanned (either the entire message or just the header).
Active Filesystems	The filesystems used by AUDIX to provide service. These include types adat, boot, sdat, sst, vdat, vtext, and (beginning in R1V3) ndat. Most are activated by the `system : filesystem` form. The adat filesystem is activated using the `system : announcement : filesystem` form. (See also *Mount/Unmount*)
Activity	An option in the highest-level menu voiced to an AUDIX subscriber after first accessing the AUDIX system. Selecting an activity is the starting point for all user operations.
Activity Menu	The list of main options voiced to subscribers when they first access AUDIX. To hear the complete menu, press * H. To interrupt an activity and return to the activity menu, press * R.
Address	A memory location in disk or RAM. Also, subscriber identification indicating to whom AUDIX is to deliver a message.
Adjunct	A separate system that is closely integrated with a switch, such as an AUDIX or an AP.
Administration	The activity of setting up a system (such as the switch or AUDIX) so that it will function as desired. Options and defaults are set up (translated) by the AUDIX system administrator or service personnel.
Administrative Shutdown	An option on the `shutdown` form used to shut down the system software for administrative reasons, either gradually as calls are ended (camp-on) or immediately (forced). Filesystems are closed but left mounted.
Advanced Communications Package (ACP)	A 3B2 Applications Processor (AP) designed for the 5ESS Switch and compatible with AUDIX CO applications.
Alarm Board	The CDR1B, which monitors the system for alarms and passes warnings or faults to the MI board, which alerts remote service personnel over the alarm link leading to the switch.

Alarm Link	A 25-pair cable connection from the back of the AUDIX cabinet to alarm-reporting facilities on the switch. The link notifies remote service personnel about an AUDIX problem.
Alarm Log	A list of faults, including unit and device numbers, that is stored in a software file on disk. The `maintenance : active alarm : display` form shows alarm log faults in severity order. Use the `maintenance : active alarm : specification` form to select alarms by device, date, etc.
Alarms	Hardware, software, or environmental problems (detected by maintenance testing) that may affect system operation. Alarms (or faults) are classified as major, minor, or warning. They are reported to services personnel through the alarm link and logged in the alarm log on disk.
Alphanumeric	Alphabetic, numeric, or punctuation symbols.
Alternate Tracking	A disk drive procedure where bad tracks are mapped out on a defect map that lists bad tracks and alternate tracks to use. The DBP reads this information during system initialization or when equipping a disk drive (or new removable cartridge).
Analog	A continuous signal (versus digital, discrete signals).
Announcement Fragment	A numbered piece of spoken AUDIX information that makes up a system message or prompt.
Applications Processor (AP)	The AP 16 or 3B5 AP switch adjunct on a PBX that provides such services as Directory, EDC, Message Center, and Unified Messaging. The AP on a 5ESS Switch is called an ACP.
Applications Processor Interface (API)	Robust type of data link connection to an integrated 5ESS Switch in AUDIX R1V4 and later software.
Architecture	The composition and functional components of a system.
Asynchronous Data Unit (ADU)	A small device that can extend data transmissions far beyond recommended EIA limits over building wiring. AUDIX and terminals may connect to Z3A1, Z3A2, and Z3A4 ADUs.
Asynchronous Transmission	A form of serial communications where each transmitted character is bracketed with a start bit and one or two stop bits. The AUDIX display terminals use an asynchronous link to the MI.
Audio Information Exchange – Small (AUDIX)	A complete voice mail message system operated by a touch-tone telephone and integrated into a switch. Current models include the one- and two-cabinet AUDIX system and the earlier AUDIX-L.
AUDIX Data Acquisition Package (ADAP)	A software package compatible with AUDIX R1V2 and later software. ADAP allows the AUDIX administrator to transfer subscriber, maintenance, or traffic data from AUDIX to to a compatible 62xx or 63xx Personal Computer (PC) or Work Group System (WGS).
AUDIX Basic (R1V1)	The basic AUDIX software. This version has been discontinued.

AUDIX Enhanced (R1V2)	An enhanced version of AUDIX software providing new user features. This version may run on early AUDIX-L and one-cabinet machines.
AUDIX Enhanced II (R1V3)	A version of AUDIX software that may run on any AUDIX one-cabinet, two-cabinet, or AUDIX-L machine. It includes all features from previous releases, plus the Automated Attendant, Networking, Outcalling, and Standalone features.
AUDIX Enhanced III (R1V4)	A version of AUDIX software that includes all features from previous releases, plus support of integrated 1A ESS Switch and 5ESS Switch interfaces, File Redundancy, Standalone Message Notification, Executive Features summary, administrable login ID length, and the Text Service Interface.
AUDIX Release 1 Version 5	A version of AUDIX software that includes all features from previous releases, plus Multiple Personal Greetings, Message Sending Restrictions, Priority Messaging, enhancements to Automated Attendant, and Call Detail Recording (off a PC interface).
AUDIX Release 1 Version 6	A version of AUDIX software that includes all features from previous releases, plus Call Delivery and the ability to network with other-vendor voice-mail systems using an AMIS analog network (see **Audio Messaging Interchange Specification**).
AUDIX Release 1 Version 7	A version of AUDIX software that includes all features from previous releases, plus network connection turnaround and loop-around testing, the Undelete Message feature, and administrable coverage for the Escape to Attendant feature.
AUDIX Release 1 Version 8	A version of AUDIX software that includes all features from previous releases, plus the *standard* (streamlined) announcement set, enhanced AMIS analog networking capabilities, and Automated Attendant transfers by name.
AUDIX-L (Large)	AUDIX-L is the original AUDIX model; new machines are no longer available. Its equipment is arranged in two AT&T System 85-type equipment cabinets. AUDIX-L can run AUDIX R1V1 through R1V5 software.
AUDIX-S (Small)	The AUDIX-S model, now called the ‘‘one-cabinet AUDIX,’’ is physically the smallest member of the AUDIX family. All AUDIX-S hardware is housed in a single, half-height cabinet. AUDIX-S runs R1V2 or later software.
AUDIX Two-Cabinet Configuration	The newest AUDIX model consists of a one-cabinet (AUDIX-S) base cabinet with an expansion cabinet on top. The two-cabinet AUDIX offers 32 ports and greater disk storage than an AUDIX-L. It runs R1V3 or later software.
Audio Messaging Interchange Specification (AMIS)	A standard for interchange of voice messages between inter-vendor systems. Messages are sent in analog format. AUDIX uses its voice ports rather than its network links to transmit these messages. Messages between AUDIX adjuncts are still sent in digital form (that is, DCP or EIA RS-232) using the network links.
Audit	A software program that resolves filesystem incompatibilities and updates restored filesystems to a workable level of service. Audits are run nightly or after a failure.
Automated Attendant	An AUDIX R1V3 and later feature that allows the customer to set up a main number with a menu of options that route callers to an appropriate department at the touch of a button.

Automatic Call Distribution (ACD)	The System 85 or DEFINITY Generic 2 or 3 call-distribution group of analog ports that connect to AUDIX.
Background Testing	Testing that runs when the system is not busy performing other service tasks.
Backup	A duplicate copy of a filesystem saved on an RCD cartridge or on an HDD volume separate from the original. The backup filesystem may be copied back (restored) if the active version is damaged (corrupted) or lost.
Basic Call Transfer	A switchhook-flash method used on AUDIX Standalone and many switches to send the AUDIX transfer command over analog voice ports.
Basic Rate Interface (BRI)	(Also called Basic Rate Access) International standard protocol for connecting a station terminal to an ISDN switch. ISDN BRI supports two 64 kbps information bearer channels (B1 and B2), and one 16 kbps call status and control (D) channel (a 2B + D format).
Baud Rate	Transmission signaling speed (see **bps**).
Binary Digit (Bit)	Two-number notation that uses the digits 0 and 1. Low-order bits are on the right (for example, 0001=1, 0010=2, etc.). Four bits make a nybble; eight bits make a byte.
Blank Cartridge	One or more spare removable cartridges required to back up system information.
Block Service	Prevent use of a port, channel, or entire system through a fault or maintenance procedure.
Body	The part of AUDIX voice mail that contains the actual spoken message.
Boot (or Reboot)	An activity that brings up (initializes) a system by loading programs from disk to FP memory, activated by the Control Mode Menu (Function 5), a power up, or the MI toggle switch. Control Mode Menu (Function 6) does a partial reboot (the FP is restarted and the DBP initialized).
Boot Filesystem	The filesystem selected during system initialization, either automatically or manually, from which the system tries to load its initial programs. The filesystem names are usually `boot_f` for the active version and `boot_e` for the backup copy.
bps (bits per second)	The number of binary units of information (1s or 0s) that can be transmitted per second. Mbps refers to a million bits per second; kbps refers to a thousand bits per second.
Buffer	Memory used to compensate for time differences in transmission by temporarily storing data.
Bulletin Board	See Information Service.
Bus	The circuitry that links the various AUDIX subsystems together. The major AUDIX buses are the DBP (or VME), S (System), TD (Time Division), and M (Memory) bus.
Business Communications Terminal (BCT)	The currently recommended terminal for AUDIX maintenance or system administration.

Busy-Out/Release	To remove an AUDIX device from service (make it appear ‘‘busy’’ or in use), and later restore it to service (release it). The AUDIX data link, voice ports, or VB/TBDI channels may be busied out if faulty or while maintenance tests are run.
Byte	A binary element string operated on as a unit and equal to eight bits.
Call Answer	An AUDIX feature that allows AUDIX to answer a call and record a message when the subscriber is unavailable. Callers may be redirected to AUDIX through the call coverage or Call Forwarding switch features. Subscribers may record a personal greeting for these callers.
Call Coverage	A switch feature that defines a preselected path for calls to follow if the first (or second) coverage points are not answered. AUDIX may be placed at the end of a coverage path to handle redirected calls through call coverage, Send All Calls, Go To Cover, etc.
Call-Distribution Group	The set of analog port boards on the switch that connects subscribers and users to AUDIX by distributing new calls to idle ports. This group (or *split*) is called Automatic Call Distribution (ACD) on System 85, Enhanced Uniform Call Distribution (EUCD) on a DIMENSION PBX, and Uniform Call Distribution (UCD) on System 75.
Call Vectoring	A System 85 R2V4 and Generic 2 feature that uses a vector (switch program), allowing a switch administrator to customize the behavior of calls sent to an ACD group.
Camp-On	A shutdown option that waits for ports to become idle before blocking service to them, allowing subscribers to finish calls in progress. A data link busy-out uses camp-on blocking.
Central Office	A main telephone office where private customer lines are terminated and connected to the public network through common carriers.
Central Processing Unit (CPU)	The hardware that controls AUDIX subsystem operation (data transfer, I/O, and logical instructions) by executing instructions obtained from memory. The Feature Processor (FP) and Data Base Processor (DBP) CPUs form the major AUDIX subsystems on one-cabinet systems. The Voice Session Processor (VSP) CPU assists the FP-CPU on two-cabinet and AUDIX-L systems.
Circuit Pack Carrier	The physical box that contains circuit packs and connects them to a backplane.
Class of Service (COS)	The standard set of features given to subscribers when they are first administered (set up with an AUDIX Voice Mailbox).
Co-located	An AUDIX installed in the same physical location as the host switch (also called a local installation).
Closing Filesystems	Taking an active filesystem out of service, usually by doing an administrative or maintenance shutdown. Closed filesystems may still be mounted (operated on but not written to).
Colocated Adjunct	Two or more adjuncts that are serving the same switch (i.e., each has voice port connections to the switch) or that are serving different switches but can be networked through a direct RS-232 connection due to their proximity.

Commands	For AUDIX users, commands are one- or two-key touch tones that control a Voice Mailbox activity or function (such as 0 or *H). A *processor* command is an instruction to the system, usually sent from a display terminal (such as CTRL-c).
Configuration	The particular composition and hardware selected for a system, including external connections, internal options, and peripheral equipment.
Control Mode	A state of the AUDIX machine where firmware is in control and software is shut down. The maintenance terminal displays the Control Mode Menu and forms are not available.
Control Mode Menu	A list of Control Mode functions that may be done while software is shut down. The menu appears on the maintenance terminal and includes the options: (1) system status, (2) environmental alarm status, (3) initialization history, (4) restart, (5) reboot, (6) restart with DBP reboot.
Corrupt Filesystem	A damaged filesystem. It may have an usually small or large size, or a negative number on the `filesystem : list` form.
Create Message Activity	Activity 1 on the Activity Menu, used by AUDIX subscribers to record or edit a voice mail message.
Customer Premises Equipment (CPE)	Any ISDN data or Terminal Equipment (TE) that is installed at the customer site, not the CO. The NT1 unit is the normal boundary between CPE and CO (off-site) equipment.
Data Base	A collection of filesystems and files in disk memory that store the voice and nonvoice (program data) necessary for AUDIX system operation.
Data Base Processor (DBP)	One of the major AUDIX subsystems that interacts with the other subsystems to move voice and nonvoice data to and from disk.
Data Base Processor Interface (DBPI)	This processor (UN160B) talks to a Voice Buffer (TN520) over the S-bus, and to the DBP through the VSFI (UN162) pack and the DBP/VME Bus.
Data Communications Equipment (DCE)	Standard type of data interface normally used to connect to DTE-type devices. DCE devices include the DSU, IDI, and MPDM.
Data Communications Interface Unit (DCIU)	A switch device that allows nonvoice (data) communication between AUDIX and a System 85 or DIMENSION PBX. The DCIU is a high-speed synchronous data link that communicates with the Common Control switch processor over a Direct Memory Access (DMA) channel that reads data directly from FP memory.
Data Link	The connection from the AUDIX cabinet to the switch DCIU or SCI Interface boards that enables nonvoice (data) messages to pass between AUDIX and the switch, such as message-waiting lamp, time, and call-status information. The link varies according to the type of AUDIX and switch used. Each AUDIX adjunct needs one data link.

Data Service Unit (DSU)	DATAPHONE II 2500 DSUs are synchronous DCE devices used for extended-local AUDIX connections. The 2596A DSUs support 2400, 4800, and 9600 bps connections. The 2600 or 2700 series may also be used; these are more expensive DSU options and support diagnostic testing and the DATAPHONE II Service network system.
Data Terminal Equipment (DTE)	Standard type of data interface normally used for the endpoints in a connection. Normally AUDIX, most terminals, and the switch DCIU or SCI are DTE devices.
Data Set	(See also *Modem*) AT&T term for modem; a data set usually includes the telephone.
DBP Bus	The main bus in the DBP subsystem that interconnects the DBP-CPU, RAM, disk controller, and VSFI. The BC circuit pack is the primary bus controller.
Dedicated Line	A communications path that does not go through a switch. A dedicated (hard-wired) path may be formed with directly connected cables. LADS, ADUs, or other devices may also be used to extend the distance that signals can travel directly through the building wiring.
Default	A value that is automatically supplied if no other value is specified.
Defect Map	See ‘‘Alternate Tracking.’’
Delivered Message	Voice mail that has been successfully transmitted to a recipient’s incoming mailbox.
Demand Testing	Testing performed on request (usually by service personnel using a form).
Device	A replaceable piece of hardware shown on the alarm and error log forms (part of a unit).
Dial-Ahead/Dial-Through	The act of interrupting or preceding AUDIX system announcements by typing (buffering) touch-tone commands in the order the system would normally prompt for them.
Digital	Discrete data or signals such as 0 and 1.
Digital Communications Protocol (DCP)	A 64 kbps digital data transmission code with a 160 kbps bipolar bit stream divided into two information (I) channels and one signaling (S) channel.
Digital Subscriber Line (DSL)	The ISDN Basic Rate Access (BRI) DSL is the 2B+D format used for the T 4-wire (2-pair) interface which connects CPE to ISDN.
Directory	An AUDIX feature allowing you to hear a subscriber’s name and extension after typing [*] [*] [N] at the activity menu. Also, a group of related files accessed by a common name in software, such as the *mount point* on disk where filesystems are located (for example, /ss, /sd, /vd).
Disk Controller	The SADI circuit packs that controls up to four disk drives in a one-cabinet system and seven disk drives in a two-cabinet system. Because there is only one controller, it is always number 0.
Disk Device	The drive number associated with a disk controller that indicates its physical position. Device numbers on AUDIX may be 0 to 6. The removable cartridge drive is always 1, the main hard disk is 0, and the other drives are hard disks numbered 2 to 6.

Display Terminal	A data terminal with a screen and keyboard used for displaying AUDIX forms and performing maintenance or administration activities.
Distributed Communications System (DCS)	The connection of two or more switches over logical and physical data links to provide full or partial feature transparency. Voice links are provided with tie trunks. The DCS configuration is set up using the `system : translation : switch connection` form.
Distribution List	See Mailing List.
Ductwork	The overhead structure used for holding cables and supplying power to an AUDIX-L system. Ductwork is optional for most switches, although it may be used to conform to an equipment room layout.
Duplex	See ‘‘Half-Duplex’’ or ‘‘Full-Duplex.’’
Electronic Document Communications (EDC)	An AP program used for composing and sending text messages to other AP and switch users.
Enabled/Disabled	The state of a hardware (DBP) device that indicates whether or not the AUDIX system can use it. Devices must be equipped before they can be enabled (made active).
Enhanced Uniform Call Distribution (EUCD)	See ‘‘Call-Distribution Group.’’
Environmental Alarm	Power, temperature, and airflow alarms that are monitored and reported to the MI through the alarm board, displayed by the Control Mode Menu (Function 2) or the alarm log.
Equipped/ Unequipped	The state of a DBP or VSP device that indicates whether or not AUDIX software has recognized it. Devices must be equipped before they can be enabled (made active) using either the `maintenance : dbp : equip` or `maintenance : vsp : equipage` form.
Error Log	A list of errors in a software file on disk. The `maintenance : error : display` form normally shows errors in historical order. The `maintenance : error : specification` form can be used first to select errors to display based on type, time, etc.
Errors	Problems detected by the system during maintenance self-tests and recorded in the error log. Errors can produce an alarm (fault) if they exceed a threshold.
Escape to Attendant	An AUDIX feature that allows an AUDIX subscriber with the Call Answer feature to have a personal attendant or operator administered to potentially pick up an unanswered call. A system-wide extension could also be used to send callers to a live agent.

Executive Features	A set of features introduced in R1V4 software that include Private Messaging (**P), Allow Forwarding (**F), Untouched Message (**H or Hold), and a Security Password Length, where a minimum-length password up to 15 characters long is administered to increase system security.
Exit Command	An AUDIX feature that allows callers to use the **X (Exit) command to have AUDIX disconnect a call *without* hanging up. This is especially useful during calls made from a toll phone or for ending Outcalling sessions from a remote location.
Expansion Cabinet	The upper cabinet of an AUDIX two-cabinet configuration, where the base cabinet is an AUDIX one-cabinet system.
Extended RAM Test	Initialization option selected during a nonstandard initialization that runs extended hardware tests on the FP processor memory (tests take about 10 to 15 minutes).
Failure Status Word (FSW)	Failure codes in bytes reported by a processor's firmware. Use the Control Mode Menu (Function 1) or the `maintenance : system : hardware status` form to show these bytes.
Faults	See ''Alarms.''
Feature Processor (FP)	The major AUDIX subsystem that controls feature operation, communicates with the switch through the data link, and supports the maintenance and administration interfaces.
Field	An area on a form, menu, or report where you can type or display information. For input fields, fill in the blanks or type over information already there. Read-only or output fields cannot be changed; you usually press ENTER to display information.
File	A collection of like records (data) stored under a single name on disk.
File Cabinet	A storage area for subscribers to keep copies of voice messages for future reference or action.
File Redundancy	An AUDIX R1V4 or later feature that allows data from crucial filesystems to be continuously copied to duplicate (mirror) filesystems while the system is running. If the system has some problem where an original ''master'' filesystem cannot be used, the backup ''slave'' filesystem is placed in service automatically.
Filesystem	A collection of related files (programs or data) stored on disk. Seven types of filesystems are required to initialize AUDIX and provide full service: adat, ndat (R1V3 and later), sdat, sst, vdat, vtext, and boot.
Fixed Storage Drive (FSD)	A permanently mounted disk drive on AUDIX-L. AUDIX uses an HDD.
Form	(Also called ''Screen Form'') A screenful of related data that can be shown on the display terminal. AUDIX software transfers screen forms out to the terminal where the user can display, add, or change information.
Format	To set up a disk with a predetermined arrangement of characters so the system can interpret meaningful information. If a disk is reformatted, all data is erased.
Full-Duplex	Simultaneous two-way, independent, asynchronous transmission in both directions.
Full Service	A fully functional AUDIX system with data and voice link communication with the switch that answers calls with good quality and no alarms.

Function	Individual steps or procedures within a Voice Mailbox activity.
Function Keys	See Programmed Function Keys.
Generic 1, 2, or 3	AT&T DEFINITY Communications System software releases. *Generic 1* and *Generic 3* correspond to releases based on System 75-type software. *Generic 2* is the newest release of System 85-based software.
Generic 4 or 5	Compatible 5ESS Switch software, used for integrated AUDIX applications.
Generic 7, 8, or 9	Compatible 1A ESS Switch software, used for integrated AUDIX applications. The different generics support different types of message-waiting indication capability.
Generic-Program Cartridge	A copy of the uncustomized software shipped with a new system or software upgrade.
Get Messages	See ‘‘Scan Incoming Mailbox Activity.’’
Grade of Service (GOS)	The level of service subscribers receive based on the number of seconds they have to wait before AUDIX answers a call.
Guest Password	An AUDIX feature that allows people who are *not* AUDIX subscribers to leave messages on AUDIX by dialing a subscriber’s extension and entering a system-wide guest password.
Half-Duplex	Asynchronous transmission between devices in either direction, but not both directions at once.
Hard Disk Drive (HDD)	A permanently mounted, fixed disk drive on AUDIX.
Header	Information that AUDIX creates to identify a message. A message header includes the originator or recipient, type of message, creation time, and delivery time.
Help	A command run by pressing HELP or CTRL-? on a display terminal to show the options available at your current form position. In AUDIX, press * H on a touch-tone telephone to get a list of options.
Hexadecimal	Alphanumeric numbering scheme used in some error messages to represent the numbers 0 to 15. Hexadecimal digits include the numbers 0 to 9 and the characters A, B, C, D, E, and F.
Host Switch	The switch directly connected to AUDIX over the data link; also, the physical link connecting AUDIX to the rest of a DCS network. (See also *Distributed Communications System*).
Hunt Group	A group of analog ports on the switch, usually administered to search for available ports in a circular pattern. Used on AUDIX Standalone systems and some switches.
Information Service	(Also called *Bulletin Board*) An AUDIX feature that allows a message to be played to callers who dial the extension. Callers cannot leave a message (it is a listen-only service).
Inactive Filesystem	Any filesystem that is not administered as an active filesystem on the `system : filesystem` or `system : announcement : filesystems` forms.

Initialization	The process of bringing a device or system to a predetermined starting state. The full AUDIX start-up (boot) procedure tests hardware; loads the boot filesystem programs; locates, mounts, and opens other required filesystems; and starts normal service.
Initialization and Administration System (INADS)	A computer-aided maintenance system that offers AUDIX maintenance services at a centralized location. Major and minor alarms are sent over the AUDIX ALARM link using existing switch alarm-reporting facilities.
Initialization History	Function 3 on the Control Mode Menu that displays the last hardware initialization message.
Initialization Options	A series of initialization choices available by manually selecting a nonstandard initialization. The options include extended RAM tests, standard or nonstandard boot, and stop points.
Initialization Stop Points	An initialization option available through manual selection of initialization options, allowing the initialization to be halted at some point, then resumed, for diagnostic purposes.
Initializing a Disk	Erasing a disk directory, then reading its volume label (name) from the `maintenance : dbp : equip` form. Old disk contents are erased.
Integrated AUDIX	An AUDIX with a data link. Compatible switch software is required.
Integrated Message Notification (IMN)	A feature that allows several message services to alert users of new messages through a common service using descriptive announcements and the message-waiting lamp. (Unified Messaging)
Integrated Services Digital Network (ISDN)	A protocol being developed in response to a recommendation from an international standards body. It defines how equipment from different manufacturers should communicate with one another in end-to-end digital connections using standard interfaces.
Integrated Services Line Unit — T Interface (ISLU-T)	A 4-wire (2-pair) connection from CPE devices directly to the ISDN switch. This connection may be used instead of installing an NT1 to convert 4-wire signals to the 2-wire U interface.
Intelligent Unit	Any circuit pack or group of packs controlled by a single microprocessor or microcontroller that coordinates maintenance activities for that unit.
Interface	The device or software that forms the boundary between two devices or parts of a system, allowing them to work together.
Isolating Data Interface (IDI)	A synchronous, full duplex data device used for direct cable connections between an AUDIX with an SCPI and the switch DCIU.
Label	The name assigned to a disk device (either a removable cartridge or permanent drive) through software. Cartridge labels may have a generic name (such as 1:3) to indicate the software release, or a descriptive name if used for backup purposes (such as back1). Permanent disk drive labels usually indicate the position of the disk (such as disk00).

Leave Word Calling (LWC)	A switch feature that allows the calling party to leave a standard (nonvoice) message for the called party using a feature button or dial-access code.
Light-Emitting Diode (LED)	Indicator on a circuit pack faceplate or disk drive to show status of AUDIX operations and possible fault conditions.
Listen to Messages	See ‘‘Scan Incoming Mailbox Activity.’’
Link	One of 20 data links shown on the `system : translation : switch connection` form that terminate on a switch port number.
Load	To read software from external storage (such as disk) and place a copy in system memory.
Local Administration Terminal (LAT)	The system administrator’s display terminal used to set up AUDIX subscribers, check traffic and space, etc. for that site. Usually has a printer attached.
Local Adjunct	The adjunct to which the administration or maintenance terminal is connected. All other adjuncts, including colocated adjuncts, are considered remote to this adjunct.
Local Area Data Set (LADS)	A signal-extending data device used for connecting AUDIX to a switch DCIU for distances greater than 400 feet.
Local Installation	(see also *Co-located*) A switch, adjunct, or piece of peripheral equipment installed physically near the host switch or system.
Local Maintenance Terminal (LMT)	A display terminal located near the AUDIX cabinet (usually directly cabled) which is temporarily attached to the MAINT connector during an on-site service visit.
Login	(See also *Password*) A unique code used to gain approved access to the AUDIX system, either a subscriber’s Voice Mailbox or a display terminal.
Mailbox	A portion of disk memory given to each subscriber for creating and storing outgoing and incoming messages. Space is usually allocated as needed.
Mailing List	A group of subscriber addresses assigned a list ID and public or private status. A mailing list may be used to simplify sending messages to several subscribers.
Maintenance	The process of identifying and correcting system problems and taking steps to prevent them.
Maintenance Interface (MI)	An intelligent circuit pack that has two RS-232C ports for maintenance and administration, a shutdown toggle switch, and system alarm LEDs. The MI controls system maintenance, modes, initialization, and alarm functions.
Maintenance Port (MAINT)	The RS-232C (H00) connector on the rear of the cabinet that connects the LMT (over cables) or the RMT (over a modem) to AUDIX.
Maintenance Shutdown	The process of closing all filesystems, leaving them unmounted and inaccessible (normally used before a system power down). This may be done with the MI toggle switch or `shutdown` form.
Major Alarm	An alarm detected by AUDIX software that affects at least one fourth of the AUDIX ports in service. Often a major alarm indicates that no AUDIX service is available.

Manager	A software module responsible for the operation of one part or function of the system.
Memory	A device which can store logic states such that data can be accessed and retrieved. Memory may be temporary (such as system RAM) or permanent (such as disk).
Message Categories	Groups of messages in subscribers' mailboxes. Categories include new, unopened, and old for the incoming mailbox, and delivered, accessed, undelivered, not deliverable, and file cabinet for the outgoing mailbox.
Message Center	An AP call-answering feature that allows an agent to enter a message for a busy or unanswered extension. Also called Message Center Service (MCS).
Message Line	The third line from the bottom of a terminal screen where help information and error messages are displayed.
Message-Waiting Lamp	An LED on a voice terminal (telephone) that alerts subscribers to new messages. Also called Automatic Message-Waiting (AMW) Lamp.
MI Toggle Switch	A switch on the MI (TN511) circuit pack used to shut down system software by moving it off-center (left or right), or reinitialize a system when returned to center position.
Microcom Networking Protocol	This provides online compressing data for increased throughput, provides error detection, correction, and retransmission, and provides data rate matching with the opposite endpoint.
Minor Alarm	An alarm detected by maintenance software that affects less than one fourth of the AUDIX ports in service, but has exceeded error thresholds or may impact service.
Mirroring	See File Redundancy.
Mode	An operating state in which the system can perform certain tasks. AUDIX modes include control mode, normal mode, administrative or maintenance shutdown mode, and initialization.
Modem	A modulator/demodulator device for transmitting analog (continuous) signals.
Modem Pool	A group of modems set up to accept incoming data calls from a remote device. The switch's modem-pooling feature inserts modems into the link automatically. The transmission rate could range from 1200 to 9600 bps depending on facilities.
Modular Processor Data Module (MPDM)	A data device that converts RS-232C or RS-449 protocol signals to Digital Communications Protocol (DCP) used by the System 75/85 switch. MPDMs may connect AUDIX to a switch DCIU or SCI link, or connect terminals to a switch port board.
Modular Trunk Data Module (MTDM)	A Data Terminal Equipment (DTE) device that converts RS-232C or RS-449 signals to Digital Communications Protocol (DCP) used by the System 75, System 85, or DEFINITY Communications Systems. MTDMs are often used in modem pools.
Mount Point	A software abbreviation for a filesystem that allows software to find it independent of its physical location. Similar to a directory.
Mount	The process of identifying a filesystem to software and making it accessible.
Mounted	The state of a filesystem when it is identified to the software and accessible.

Network Termination 1 (NT1) Unit A physical and electrical interface between the 2-wire U interface and the 4-wire T interface. The NT1 unit marks the boundary between Customer Premises Equipment (CPE) and the ISDN network.

Networking An AUDIX R1V3 or later feature that allows the customer to link together up to 100 remote AUDIX machines for a total of up to 36,000 subscribers.

Nonstandard Boot A manual initialization option run by typing **n** after the standard/nonstandard boot question. This must be followed with controller, device, and boot filesystem information.

Nonstandard Initialization A manual initialization option run by typing **n** to the standard/nonstandard initialization question. Subsequent questions allow you to specify a type of initialization.

Normal Mode The state of the AUDIX system after hardware initialization, where software is running and maintenance and administration forms are available.

Not Deliverable Message A message that could not be delivered after a number of attempts specified by the system administrator (up to ten). This usually means the subscriber's mailbox is full.

Null Modem A device that rearranges (crosses over) the leads in a cable, allowing signals to be exchanged between two Data Terminal Equipment (DTE) devices. A null-modem cable is required to directly connect a display terminal to the AUDIX MI administration or maintenance connectors in a hard-wired local installation.

Online Help An AUDIX feature allowing system administrators and maintenance personnel to obtain screen form information by pressing a key for the PATH line, field, or form.

One-Cabinet AUDIX Current name for the 16-port AUDIX-S (Small) system. This half-height cabinet supports up to 2,000 subscribers (see **AUDIX-S**).

Operating System The set of programs that runs the hardware and interprets software commands.

Opening a Filesystem The process of making an inactive filesystem capable of providing service through a restart or a reboot.

Oryx/Pecos The AUDIX operating system (application software shipped on the generic program cartridge from the factory), a set of programs that runs hardware and interprets software commands.

Outcalling An AUDIX R1V3 or later feature that allows AUDIX to dial subscribers' numbers to inform them they have new messages (often used with AUDIX Standalone or if the subscribers' telephones do not have message-waiting lamps).

Password A code assigned to every terminal user for security reasons. After dialing AUDIX, subscribers must correctly dial a personal password to log on to AUDIX.

Password and List Administration Activity Activity 5 on the Activity Menu that allows subscribers to change their password, or to create, scan, or edit mailing lists.

Path	The form string (or location) typed on the second line of an AUDIX screen form that identifies the form to display. Parts of a path name are called segments. Each part must be typed with enough characters to uniquely name that segment, followed with an ENTER key.
Path Line	The second line from the top of a terminal display form used to identify the form you wish to display. Type segments individually followed by ENTER or a carriage return; you need to type only enough characters to name a unique form (such as **`m e d`**).
Peripherals	The voice terminals, printers, display terminals, and other devices external to the AUDIX cabinet, but necessary for full AUDIX operation and maintenance.
Personal Computer (PC)	An AT&T 62xx or 63xx desktop computing device, required for the AUDIX Data Acquisition Package (ADAP) and Text Service Interface.
Personal Greeting Administration Activity	Activity 3 on the Activity Menu that allows subscribers with the Call Answer feature to record a personal message. This greeting is played to callers who are redirected to AUDIX. The Information Service and Automated Attendant features also use this option for recorded messages or menus.
Port	A connection or link between two devices, allowing information to travel through it to a desired location. For example, a switch port connects to an AUDIX voice port to allow a subscriber on a voice terminal to leave a message on disk.
Power Down	The activity of turning off system power before changing hardware or reinitializing a faulty system. Always shut down the system software before turning power off, or data will be lost.
Power Up	The activity of turning power on to start system initialization and automatic self-tests; disks spin up.
Primary Rate Interface (PRI)	International standard protocol for connecting a switch or PBX to a computer, network, or another switch. PRI supports twenty-three 64 Kbps information channels and one 64 Kbps signaling channel (called 23B+D format or Extended DSL) over high-speed T1 facilities.
Private Mailing List	A list of addresses that only the owning subscriber can access.
Private Messaging	One of the Executive Features that allows a subscriber to send a voice mail message that can’t be forwarded by the recipient.
Programmed Function (PF) Keys	User- or system-coded keys that allow information to be inserted or functions to be done by simply pressing the key.
Processor Element (PE)	The combination of CPU, RAM, and BI boards that together make up the FP or VSP. The CPU controls the other PE boards and is the heart of that subsystem.
Processor Interface (PI)	(Also known as Processor Interface Board or PIB). A System 75, System 75 XE, Generic 1, and Generic 3i or Generic 3s data link; AUDIX usually uses the EIA port connection (one of four links).
Processor Data Module (PDM)	See ‘‘Modular Processor Data Module (MPDM).’’

Processor Element (PE)	The combination of CPU, RAM, and BI boards that together make up the FP (or AUDIX-L VSP). The CPU controls the other PE boards and is the heart of that subsystem.
Protocol	A set of conventions or rules governing the format and timing of message exchanges (signals) to control data movement and the detection and possible correction of errors.
Public Mailing List	A list of addresses that any subscriber can use if that subscriber knows the owner's list ID# and extension number. Only the owner can modify a public list.
R1Vx	The release and version of software. See AUDIX Basic (R1V1), AUDIX Enhanced (R1V2), and AUDIX Enhanced II (R1V3), AUDIX Enhanced III (R1V4), and AUDIX Release 1 Version 5 through AUDIX Release 1 Version 8 for details.
Real-Time Clock	The internal AUDIX clock which may or may not be synchronized with the clock in the switch.
Reboot	Any boot after the first system initialization. (See also *Boot*)
Reinitialization	The process of repeating an initialization completely or in part, either automatically or manually.
Remote Adjunct	Any adjunct other than the adjunct to which the administration or maintenance terminal is connected.
Remote Installation	A system, site, or piece of peripheral equipment that is installed in a different location from the host switch or system.
Remote Maintenance	The service personnel at a centralized maintenance site who can access the AUDIX through the remote MAINT connection to perform off-site troubleshooting or routine checks.
Remote Maintenance, Administration, and Traffic System (RMATS)	Early computer-aided maintenance system (replaced with INADS).
Remote Maintenance Terminal (RMT)	A display terminal at the remote maintenance site which dials-in to AUDIX over a modem connected to the MAINT port.
Removable Cartridge Drive (RCD)	A 20- or 50-Mbyte AUDIX disk drive with a removable magnetic-media cartridge.
Removable Storage Drive	An AUDIX-L disk drive that permits removal and replacement of the 80-Mbyte magnetic-media cartridge. One RSD is required per system for software updates and backup procedures.
Replaceable Unit	Any removable device that the system can identify as faulty. The unit may have more than one part (such as the FP-PE, which controls three circuit packs).
Reset	A low-level hardware function that causes various processors to interrupt, then begin to execute their RAM initialization.

Resolved Alarm Log A list of the date and time at which alarms were activated and resolved (or *retired*), shown by the `maintenance : resolved alarm : display` form. The `maintenance : resolved alarm : specification` form can be used to select resolved alarms to display based on type or time.

Restart (AUDIX) An AUDIX feature that allows subscribers who have reached AUDIX through the Call Answer feature to access their own mailboxes by typing the *R (Restart) command. This is especially useful for long-distance calls or for AUDIX Standalone users who wish to access AUDIX when all the Voice Mail ports are busy.

Restart (System) A partial system initialization from FP memory using booted programs already in RAM. This can be done using the Control Mode Menu (Function 4) or the `startup` form. A restart resets the FP and opens and mounts all filesystems that need to be active for full service.

Retention Time The amount of time messages are saved on disk before being automatically deleted from a subscriber's mailbox.

Return Call to Sender An AUDIX feature that allows subscribers to place a call immediately to the originator of an incoming message if that person is in the switch's dial plan.

S Bus The main bus of the AUDIX system which connects all other major processor subsystems (FP and DBP) as well as the minor processors (VB, SCPI, and DBPI).

Scan To listen to a message body or header.

Scan Incoming Mailbox Activity Activity 2 on the Activity Menu which allows subscribers to review, forward, or respond to messages they have received from other subscribers or through the Call Answer feature.

Scan Outgoing Mailbox Activity Activity 4 on the Activity Menu which allows subscribers to review, edit, or redirect messages they have scheduled for delivery, or to check the status of messages that are already sent.

Scheduled Delivery Time A time and/or date that a subscriber optionally assigns to a message that tells AUDIX when to deliver it. If a delivery time is omitted, AUDIX sends the message immediately.

Screen-Labeled Keys The top row of eight keys on a display terminal whose functions are marked by reverse video blocks at the bottom of the screen. The keys' functions change when the screen labels change.

SCSI-to-AUDIX Disk Interface (SADI) The SADI (TN475B) is the AUDIX disk controller. It uses the Small Computer System Interface (SCSI) protocol to communicate with the AUDIX disk drives. The SADI's LEDs show which drives are active. The 50-pin drive data cable is called the SCSI cable.

Simplified Message Service Interface (SMSI) Type of data link connection to an integrated 1A ESS Switch or 5ESS Switch in AUDIX software.

Service Not Started A message displayed at the end of unsuccessful initialization which indicates software problems, such as a missing or corrupt (bad) filesystem. Normally the system can still display forms, but cannot provide service (answer calls). You may log in after this message.

Shutdown A procedure required to disable system operation and protect customer data stored on disk before a power down. Select the type of shutdown based on the tasks you need to perform and their urgency, using either the `shutdown` form or MI toggle switch.

Split A group (or queue) of analog ports on the switch. See also ‘‘Call-Distribution Group.’’

Standalone An AUDIX R1V3 or later feature that allows AUDIX to connect to any switch without using a data link. This allows AUDIX to work with a switch built by a different vendor or one that runs an incompatible load of software.

Standard Initialization (Standard Boot) The normal automatic (default) initialization of the AUDIX system, where firmware first scans for the program `boot_f` on disk 0/0. If not found, the firmware looks for another boot filesystem to load until all possible combinations have been examined.

Start Service A message displayed at the end of a successful initialization, indicating that system software is active and display forms are available.

Start-up See ‘‘Restart.’’

Status Line The top line of an administration or maintenance form displayed on a terminal, showing the active system alarms (if any), logins (up to two), and threshold (disk space) violations.

Subscriber A person to whom the AUDIX administrator assigns the ability to access the Voice Mailbox feature. Subscribers may also be assigned the optional Call Answer feature on the `subscriber : local` or `cos` forms or given LWC permission through the switch.

Subsystem A major functioning element of AUDIX software and hardware. Subsystems include the Feature Processor (FP), Data Base Processor (DBP), and Voice Session Processor (VSP) (the VSP is only used on AUDIX two-cabinet or AUDIX-L systems).

Switch An analog, digital, or electronic system where data and voice transmissions are not confined to fixed communications paths, but are routed among available ports or channels.

Switch Communications Adapter (SCA) Custom device used for making AUDIX connections to a 5ESS Switch.

Switch Communication Interface (SCI) The System 75 data link device. An AUDIX adjunct connects to the SCI TN738 Interface-2 (INT2) board through an MPDM.

Switched Access A connection made from one endpoint to another through switch port boards. This allows the endpoint (such as a terminal) to be used for several applications.

Synchronous Transmission A type of transmission where the data characters and bits are exchanged at a fixed rate with the transmitter and receiver synchronized. This allows greater efficiency and supports more powerful protocols. The AUDIX-to-switch data link is synchronous.

System Administrator Person usually at customer site who is responsible for AUDIX system administration and possibly Networking coordination.

System Administration Activity	Activity 9 on the Activity Menu which may be used only by an AUDIX system administrator who has announcement-control permission. This option allows the administrator to record, play, or edit subscriber names or system announcement fragments.
System Status	Function 1 on the Control Mode Menu that shows the Failed Status Words (FSW) last reported to the MI before shutdown. These bytes are updated every 30 seconds.
T Interface	The standard ISDN 4-wire (2-pair) interface used for terminal connection and data transmission on the customer premises. (Also called S interface.)
T1 Carrier	A short-haul digital transmission line that uses time-division multiplexing. A bipolar signal is transmitted at 1.544 Mbps along 16- to 20-gauge copper-conductor cables.
TD Bus	A main AUDIX bus that connects the VPT, VPC, and TDBI ports together during a call.
Terminal Line	The second line from the bottom of the display terminal screen that shows cursor line, column position, caps status, and current input mode.
Terminal Type	The last required entry before gaining access to the AUDIX display forms, giving the type of display terminal. All compatible terminals must use types `5420` or `513.`
Text Service Interface	An AUDIX R1V4 or later feature that allows AUDIX headers to be sent to electronic mail services such as IBM PROFS using a PC/PBX 2780/3780 interface.
Threshold	A boundary used to indicate when available disk space is getting low. Both subscribers and filesystems are assigned thresholds.
Time Division Bus Interface (TDBI)	The TDBI (TN500) provides a 16-port interface between the VB and the VPCs (up to 4 boards) over the TD bus. Some early AUDIX one-cabinet systems may use the 8-port TN477 TDBI-8.
Tone Generator	A device acoustically coupled to a rotary phone, used to produce touch-tone sounds when subscribers cannot use a regular touch-tone generating voice terminal.
Traffic	The flow of attempts, calls, and messages across a telecommunications network.
Translations	Software assignments telling a system what to expect on a certain voice port or the data link, or how to handle incoming data. They customize AUDIX and switch features for users.
Triplet	An alarm or error code consisting of a unit, fault, and device number.
Type	The name entered on a screen form that identifies a kind of filesystem to software. The following types must be active for AUDIX to operate: boot, adat, ndat (beginning in R1V3), sdat, sst, vdat, and vtext.
U Interface	The standard ISDN 2-wire (1-pair) interface to the 5ESS Switch. It connects to the NT1 unit and carries signals off-premises to the CO.
Undelivered Message	A message that has not yet been sent to a subscriber's incoming mailbox. The message resides in the sender's outgoing message and may be modified or redirected by the sender.
Unequip	See ''Equipped/Unequipped.''
Unfinished Message	(Also called Working Message) A message that has been recorded but not approved or addressed, usually the result of an interrupted AUDIX session.

Unified Messaging	A switch software feature that allows various message-handling services to keep track of new messages from all internal, switch, and AP sources on the system, including Message Center, EDC, LWC, and electronic mail services such as AT&T Mail and UNIX System mail.
Uniform Call Distribution (UCD)	The System 75 or DEFINITY Generic 1 or 3 call-distribution group of analog port boards that connects users to AUDIX.
Unit	A piece of software, hardware, or a group of hardware devices. All AUDIX alarms are recorded against and ordered by a specific unit number.
Unmount	The process of making a filesystem inaccessible to the DBP. (See also *Mount*)
Untouched Message	One of the Executive Features that allows a subscriber to keep a message in its current category by using the **H (Hold) command. If the message is in the new category, message-waiting indication remains active (for example, the message-waiting lamp will remain lit).
User Population	A combination of light, medium, and heavy users on which AUDIX configuration guidelines are based.
Vector	A customized program in the switch for processing incoming calls.
VME Bus	The Versa Module European Bus. See ‘‘DBP Bus.’’
Voice Buffer	The TN520 circuit pack that works with the TDBI circuit pack to support the AUDIX voice ports by moving blocks of voice information to and from the DBP.
Voice Link	The AUDIX VPT connection(s) to a call-distribution group (or hunt group) of analog ports on the switch.
Voice Mailbox	The standard AUDIX feature assigned to all subscribers giving them access to disk space on which to store, create, and send voice mail messages.
Voice Message	(Also called ‘‘Voice Mail’’) Digitized voice information stored by AUDIX on disk memory.
Voice Port Trunk (VPT)	The TN747B circuit pack that provides the voice interface between the AUDIX voice ports and the analog ports on the switch used to connect subscribers’ voice terminals during a call.
Voice Processor (VPC)	The TN501B 2-port circuit pack that analyzes and compresses voice signals, detects touch-tones and silence, controls playback and recording volume, and controls playback speed.
Voice Session Processor (VSP)	A major AUDIX-L subsystem that processes the voice and data information that control the AUDIX call setup operation, including port hardware and buffers. On AUDIX, the FP controls these boards (TDBI, VB, VPC, and VPT packs).
Voice Store and Forward Interface (VSFI)	The UN162 circuit pack transfers voice information between the DBP bus and S bus.
Voice Terminal	A telephone used for spoken communications with AUDIX. A touch-tone telephone with a message-waiting lamp is recommended for all AUDIX subscribers.

Voicing	Either speaking a message into the AUDIX system during recording, or having the system playback a message or prompt to a subscriber.
Volume	A physical removable cartridge or disk drive device. Volume *labels* are disk software names.
Work Group System (WGS)	A 6312, 6286, 6386, or equivalent WGS is a PC-like device required for the AUDIX Data Acquisition Package (ADAP) and the Text Service Interface.

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