Lucent Technologies
Bell Labs Innovations

MultiPoint Conferencing Unit (MCU)

Release 6.0

Installation and Test

555-027-108
Comcode 108394693
Issue 1
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About This Document

This manual provides the background information and procedures for the Installation and Testing of the Lucent Technologies MultiPoint Conferencing Unit (MCU) Release 6.0.

Intended Audience

This manual is intended for engineering personnel located at the Lucent Technologies Video Technical Center (VTC)/NetCare Center, Lucent Technologies field technicians, and authorized installers of the MCU.

Related Information

The following list of manuals provides supplemental information for the MCU:

- *Lucent Technologies MultiPoint System Guide for the MultiPoint Conferencing Unit/Conference Reservation and Control System*, 555-027-214

  Provides an overview of the MultiPoint Conferencing Unit (MCU) and Conference Reservation and Control System (CRCS), including their capabilities, features, and advantages to the customer.

- *Lucent Technologies MultiPoint Conferencing Unit Administration,* 555-027-502

  Provides detailed information and instructions that an MCU telecommunications manager can use for ongoing administration, troubleshooting, and reports.

- *Lucent Technologies MultiPoint Conferencing Unit Maintenance,* 555-027-107

  Provides information about tests, alarms, and the actions you need to take to maintain your Lucent Technologies MCU.

- *Lucent Technologies Conference Reservation and Control System Installation Guide,* 555-027-109

  Describes how to install the Conference Reservation and Control System (CRCS).

- *Lucent Technologies Conference Reservation and Control System User's Guide and Quick Tour,* 555-027-755

  Online document that provides detailed information and procedures that a CRCS administrator or reservations agent can use to install CRCS, set up and manage CRCS databases, reserve conferences, and perform CRCS system administration.

- *715GBCS-2 Terminal User's Guide and Service Manua*l, 555-230-876

  Discusses how to install, configure, operate, and troubleshoot the 715GBCS-2 terminal, which is used as an MCU management terminal (MCU-MT) or an MCU scheduling terminal (MCU-ST).

- *BCS Products Security Handbook*, 555-025-600

  Discusses security risks and measures that help prevent external telecommunications fraud involving Lucent Technologies products.

- *BCS Products: Insights into Securing Against Toll Fraud,* BG9054W

  Provides an individualized learning program on insights into securing against toll fraud involving Lucent Technologies products. Using passwords and monitoring various reports are discussed, among other topics.

- *Lucent Technologies BCS Toll Fraud Overview,* 015-338-100

  Provides an explanation of the industry-wide toll fraud problem and the actions needed to protect your telecommunications system.

Organization

This manual contains six chapters and an appendix, including:

- Chapter 1, “Product Overview” describes the various MCU components, configuration examples, and high level operation of the system.
- Chapter 2, “Pre-Installation Procedures” discusses the checks you should make and the procedures you should follow before installing the MCU and its components.
- Chapter 3, “Installing the MCU and Components” explains how to install the MCU and its components.
- Chapter 4, “Connecting to the Network” provides the wiring and connections required for the MCU. It identifies the cross-connect fields, lists the hardware equipment room requirements, and provides procedures for installing cables.
- Chapter 5, “Activating the MCU” defines the steps necessary to “bring up” the MCU for subsequent administration.
- Appendix A, “Cable Connectivity” presents figures of the cables used for ESM connectivity.
- This document also has a glossary and an index.

Typographic Conventions

Several conventions are used to quickly convey information. These conventions are as follows:

- This *typeface* is used for references of titles of other documents and when referring to fields on screens.
- This **typeface** is used to identify commands and values for fields.
- This `typeface` is used when a word or phrase must be written on a paper form and when a message is returned by the MCU.
- The following icon:

WARNING:

indicates information you need to prevent equipment damage.

- The following icon:

CAUTION:

emphasizes information that is important to your safety.

- The following icon:

NOTE:

identifies additional information pertinent to the text preceding it.

Getting Help

If you need help with the procedures or other information in this document, and if you are a customer in the United States or Canada, be sure to call the Video Technical Center (VTC)/NetCare Center at 800 242-2121. If you are a customer outside of the US or Canada, call the International Technical Assistance Center (ITAC) at 303 804-3777.

Product Overview

1

Overview

This document is intended for technical center engineers and authorized installers of the Lucent Technologies MultiPoint Conferencing Unit (MCU).

MCU Components

The Lucent Technologies MCU is a networking device that allows multiple remote video endpoints to participate on a single H.320 video conference call. It is a multimedia product because it combines audio, data, and video.

The Lucent Technologies MCU can be connected directly to a network or behind a Private Branch Exchange (PBX), including the DEFINITY® Enterprise Communications Server (ECS). The Lucent Technologies MCU connects to many different PBXs, Central Offices (COs), and Interexchange Carriers (IXCs). Several network services are supported.

The Lucent Technologies MCU is fully compliant with the H.320 standards for multimedia communications recommended by the International Telecommunications Union (ITU-T, formerly CCITT) and supports compliant H.320 terminals.

Video Standards

The MCU supports the following video standards:

- H.221 Frame Structure
- H.224 Low-Delay Application Protocol
- H.230 Control Capabilities
- H.231 Multipoint Conferencing Units
- H.242 Establishing Point-to-Point Communications
- H.243 Establishing Multipoint Communications
- H.261 Video Coding (FCIF, QCIF)
- H.320 Terminal Specifications
- H.263 Video Coding
- H.281 Recommendation for Far-End Camera Control Operations

Data Standards

The MCU supports the following data standards:

- T.122 MCS Service Definition
- T.123 Network Protocol Stacks
- T.124 Generic Conference Control
- T.125 MCS Protocol Specifications
- T.126 Multipoint Still Image (SI) and Annotation Protocol
- T.127 Multipoint Binary File Transfer Protocol

Audio Standards

The MCU supports the ClearPresence™ @716 Audio Coder, G.711, G.722, and G.728 audio standards.

Optional Algorithms

The MCU supports the following optional algorithms:

- SG4™
- H.CTX™, H.CTX+™ (Service Providers Only)
- INTEL Indeo® MultiRate Video (MRV)

System Configurations and Capacities

The following table provides various MCU system configurations and capacities:

Table 1-1. MCU System Configurations and Port Capacities

System Configuration	Maximum
2B	96 ports
H0	96 ports
112/128k (BONDing, Multirate ISDN)	96 ports
168/192k (BONDing, Multirate ISDN)	96 ports
224/256k (BONDing, Multirate ISDN)	96 ports
280/320k (BONDing, Multirate ISDN)	96 ports
336/384k (BONDing, H0, Multirate ISDN)	96 ports
448/512k (BONDing, Multirate ISDN)	72 ports
672/768k (BONDing, Multirate ISDN)	48 ports
1008/1152k (Multirate ISDN)	28 ports
1288/1472k (Multirate ISDN)	24 ports
1344/1536k (Multirate ISDN)	24 ports
1680/1920k (Multirate ISDN)	24 ports
H.320 Ports per Conference	25 ports
Integrated Audio Conferencing	32 ports
Integrated Audio Ports per Conference	25 ports
Basic Rate Interface (BRI) Direct Connect	36 ports
Data Interface (DI) Direct Connect	32 ports
Distributed Communications Protocol (DCP) Direct Connect	4 ports
Speed Match Conferences	8
H.261/H.263 Transcoded Conferences	8
Continuous Presence *Plus* Conferences	8
Continuous Presence *Plus* Ports per Conference	25
T.120 MultiPoint Data Conferencing	24 ports
T.120 MultiPoint Data Ports per Conference	24
Direct Connect BRI Endpoints for Switching	36
Universal Conference Control (UCC)	24 ports

Table 1-1. MCU System Configurations and Port Capacities — *Continued*

System Configuration	Maximum
UCC Ports per Conference	1 port
Active conferences per MCU	24
MCUs Cascaded per Conference (H.243)	25
H.320 Ports with Cascading (H.243)	600 ports
H.320 Conferences with Cascading (H.243)	24
Star Cascading	600 ports

Network Interfaces

The MCU supports the following network interfaces:

- T1/ISDN PRI
- ISDN-BRI
- E1 (ETSI 300)
- V.35/RS449/EIA-530

Reservation Capabilities

MCU conferences can be reserved via the following:

- Conference Reservation and Control System (Optional)
- Built-in MCU Scheduler

Transcoding Capabilities

The following table indicates transcoding capabilities for the MCU.

Table 1-2. MCU Transcoding Capabilities

Category	Interacting Standards
Audio Transcoding	G.711/G.722
	G.711/G.728
	G.711/G.723 (through a gateway)
	G.722/G.728
	G.722/G.711
	G.728/G.711
	ClearPresence @716/G.722
	ClearPresence @716/G.728
	ClearPresence @716/G.711
Video Transcoding	Frame Rates (7.5 FPS to 30 FPS)
	Resolutions (CIF/QCIF)
	Compression (H.261/H.263)
Network Access	Rates (56k to 768k)
	Modes (BONDing, Multirate, Multichannel)
MultiPoint Protocols	H.320 and H.323
T.120 Data Conferencing	Allowed in Transcoded Conferences
	H.320/H.323 mix (through a gateway)

Technology Derived from the DEFINITY ECS

The MCU derives its processor, memory, backplane, cabinets, and software platform from the DEFINITY ECS. It also uses the latest Digital Communications Protocol (DCP) circuit packs, tone circuit packs, DS1 circuit packs, and data interface circuit packs.

The MCU circuit packs are housed in a cabinet called a Multimedia Server Module (MSM). For conferences involving T.120 Data Conferencing, additional circuit packs are housed in a cabinet called an Expansion Services Module (ESM).

The MSM can be an Enhanced Single-Carrier MSM (ESCC-MSM), a Single-Carrier MSM (SCC-MSM), or a Multicarrier MSM (MCC-MSM). To support H.320 video and audio exchange, the MCU has two multimedia conferencing circuit packs: the Multimedia Interface (MMI) circuit pack and the Voice Conditioner (VC) circuit pack.

The MMI is a TN787K circuit pack that receives multimedia input from remote video endpoints via a DS1 circuit pack. It terminates H.320 H.221 protocol and aligns B-channels from an endpoint. The MMI multiplexes and demultiplexes the multimedia stream into separate audio, video, and data for conference purposes. The cable-ready MMI is connected directly to the DS1 circuit pack to increase efficiency and free up valuable resources on the TDM Bus.

The VC is a TN788 circuit pack, and it supplies the audio-conferencing functions for multipoint conferences. It decodes G.728 (LD-CELP) to G.711 (PCM) and encodes G.711 (PCM) to G.728 (LD-CELP) when requested for a conference. It detects voice energy and level to determine who is viewed as the speaker by the conference participants. It gates off background noise and eliminates audio feedback for optimum voice quality. ClearPresence™@716 is an audio mode that provides more bandwidth for video than some of the other audio modes, and it therefore produces a higher quality video.

The Data Interface (DI) is a TN2236 circuit pack, and it provides MCU system connections involving various data interfaces, including EIA-530, RS449, and V.35. Endpoints connecting to the MCU for single-channel calls require one DI. Endpoints connecting to the MCU for 2B calls require two DIs. Endpoints using the 672k or higher bandwidths require that the DI be connected to a dedicated MMI with a DI-MMI-Y cable.

To support T.120 Data Conferencing, the MCU system requires an ESM, which is connected to the MSM. The ESM is based on the MAP/40 architecture. If an ESM is included into the MCU system, additional circuit packs (including the ESM-DS1/-UDS1 and the ESM-MMI) must be added to the MSM.

Table 1-3. MCU Internal Hardware

Circuit Pack	Number	Function
Analog Line	TN746	Supports remote modem pooling access to the MCU
Call Classifier	TN744	Provides out-of-band, touch-tone conference control (Universal Conference Control [UCC]).
Call Classifier	TN744	Enhanced Call Classifier circuit pack. Provides the capabilities of the TN744B, TN748D, and TN420C circuit packs jointly.
Data Interface	TN2236	Supports EIA-530, RS449, and V.35 data interfaces to the MCU
Digital Line	TN754 TN2224	Supports maintenance alarm terminals (alarms and Automatic Circuit Assurance) and provides data connectivity for the MCU Scheduling Terminal (MCU-ST) and for the optional system printer and Call Detail Recording (CDR)
DS1 (MSM and ESM versions)	TN767	Terminates incoming DS1 trunks to the MCU
ISDN-BRI	TN2185	Provides a four-wire ISDN-BRI connection between the MCU and the network. This circuit pack is required for the ISDN-BRI Trunk Interface feature.
ISDN-BRI	TN2198	Provides a two-wire connection between the MCU and the network that allows longer tie-trunk connections using ISDN-BRI.
ISDN-BRI Maintenance	TN556	Provides support for ISDN-BRI endpoints
Maintenance/Test	TN771	Provides a standalone mode for inspecting the Packet Bus for faults
Multimedia Interface (H.221 and ESM versions)	TN787	Terminates the H.221 H.320 protocol (H.221-MMI). Also, manipulates the T.120 data stream (ESM-MMI), and enables conferences with H.263 video mode
Network Control	TN777	Provides the interface between the Processor Interface circuit pack and the rest of the system

Table 1-3. MCU Internal Hardware — *Continued*

Circuit Pack	Number	Function
PACCON	TN778	Provides support for ISDN-BRI endpoints and ISDN over PACCON.
Processor	TN790	Provides high-level control handling
Processor Interface	TN765	Terminates incoming PRI D-channel for ISDN-PRI
Tone Detector	TN748 TN420	Collects incoming digit information from trunks and supports testing of MCU resources
Tone/Clock	TN768 TN780 TN2182	Provides conference tones and supports testing of MCU resources
UDS1 (MSM and ESM versions)	TN2207	Terminates incoming UDS1 trunks to the MCU
Video Processor	TN2237	Supports Continuous Presence *Plus,* Video Speed Match, and H.261/H.263 Transcoding
Voice Conditioner	TN788	Provides audio-conferencing support

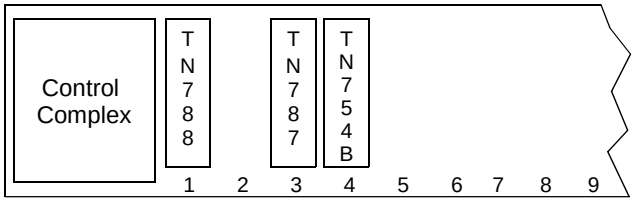


Figure 1-1. Basic Lucent Technologies MCU Configuration (4 Ports)

NOTE:
For other Lucent Technologies MCU configurations, refer to the MCU Administration document.

Lucent Technologies Video Product Family

To provide a complete video solution to our customers, the MCU supports the Lucent Technologies Group Video System (when upgraded to support H.320 with the LINK 64E option installed).

MCU Components

The current version of the Lucent Technologies MCU is offered in administerable 4-port increments up to 64 ports. This increment is applicable to each port type (multimedia, BONDing, data, Audio Add-on, or UCC) as long as the maximum allowable number of ports is not exceeded.

A 96-port MCU model has the capacity to support, for example, five simultaneous 12-party, 2-channel 112k or 128k conferences. Larger conferences can be achieved by connecting two Lucent Technologies MCUs (known as “cascading”). By using the cascading feature with two 24-port models, for example, Lucent Technologies can support various combinations of port types (for example, 46 multimedia participants [known as “conferees”] plus two Audio Add-on participants, 44 multimedia participants plus four Audio Add-on participants, etc.).

For a three-cabinet system (required for 64-port configurations), the first Single-Carrier cabinet (SCC) is installed in position A, and the second and third SCCs are installed in positions B and C, respectively.

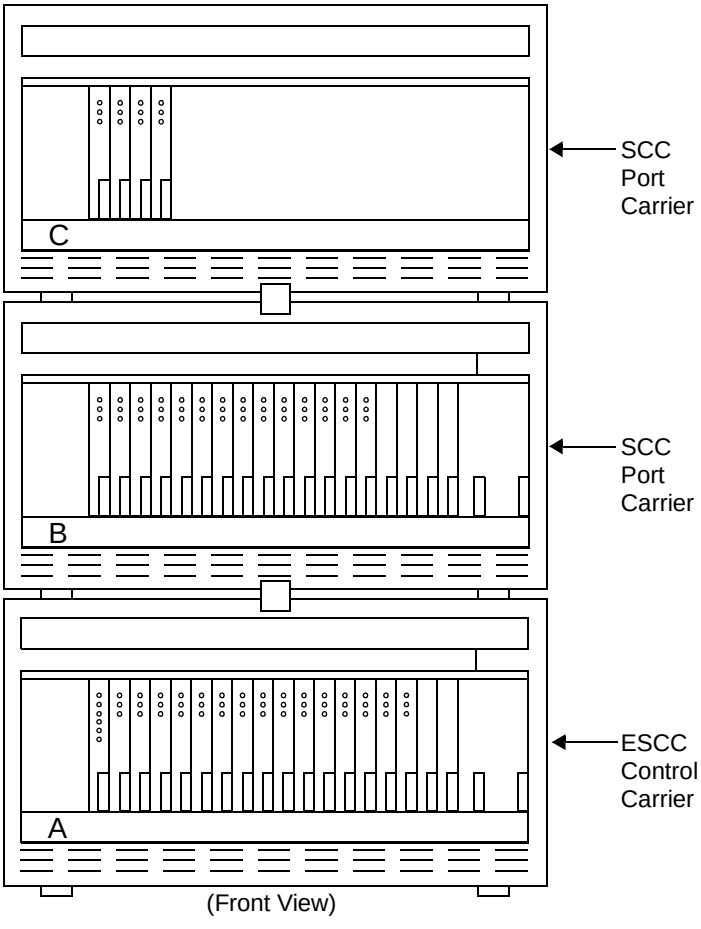


Figure 1-2. Lucent Technologies MCU 64-Port Configuration

External Components

The Lucent Technologies MCU product offer includes the following equipment:

- **MCU Management Terminal (MCU-MT):** A 715GBCS-2 terminal is used by the telecommunications manager to perform system administration, maintenance and troubleshooting. Ideally, it should be installed in close proximity to the MCU. It can also be used as an MCU-ST.
- **MCU Scheduling Terminal (MCU-ST) [optional]**: A 715GBCS-2 terminal connected to the MCU via a data module (7400B) is used for scheduling conferences, registering endpoints, and basic troubleshooting. This terminal is optional for non-CRCS systems that need a second terminal in addition to the provided MCU-MT.

  NOTE:
  An optional PC-based reservation system, the Lucent TechnologiesConference Reservation and Control System (CRCS), automates the conference reservation process. It is a plug replacement for the MCU-ST.

- **Remote Access Port for Maintenance:** This port provides the connection to INADS and the technical center for alarms, remote administration and maintenance. The connection to INADS is only for alarms designated as major or minor. The customer supplies an analog line for remote access.
- **Call Detail Recording Interface:** This port connects to an optional system printer to provide records on MCU port usage and length of call per endpoint for billing purposes.
- **System Printer:** An optional system printer can be connected through a data module (7400B) to print alarms and system reports. Printers can also be connected directly to the MCU-MT and the MCU-ST to print conference information and screens.

Supported Network Configurations

The MCU connects to a serving network (Lucent Technologies, other IXC, LEC, or private PBX) via DS1 Robbed Bit Signaling (RBS), DS1 or UDS1 ISDN-PRI signaling, ISDN-BRI Trunking, or rChannel Associated Signaling (CAS). The MCU supports connectivity over T1 or (only when it is behind the PBX) E1 facilities. E1 facilities are used to support international MCU capabilities and require use of the UDS1 TN2207 circuit pack. Only digital trunks are supported, including RBS, ISDN-PRI or CAS. Two ISDN-PRI features, Non-Facility Associated Signaling (NFAS) and D-channel backup, are supported in North America but not internationally.

The MCU can also be configured to connect directly to a maximum of 36 endpoints involving a combination of the following: a maximum of 36 endpoints via ISDN-BRI and a maximum of four video endpoints via Digital Communications Protocol (DCP). In addition, the MCU can be configured to allow endpoints in private networks to access the MCU via dedicated T1 or E1 *non-signaled* connections.

The MCU can also connect to an H.320, H.CTX, or SG4 codec via an EIA-530, RS449, or V.35 data interface either directly or by using RS366 Dialing. These data interfaces allow endpoints either connected directly to the MCU or behind an encryption device or proprietary inverse multiplexor to participate in multipoint conferences at a rate in the range 112k to 1920k. RS366 Dialing can also use any of these data interfaces to enable H.323 endpoints connected behind H.323 gateways to participate in MCU conferences.

The MCU can interoperate with the Lucent PacketStar AC60 to provide integrated access to private and public asynchronous transfer mode (ATM) networks. It also interoperates with the L2W323 Gateway from RADVision to provide H.323 and H.323/H.320 multimedia conferencing.

The MCU can be set up to function as a tandeming switch for video (but not audio or data) traffic with either another MCU or a DEFINITY ECS. For this setup, ISDN-PRI is required.

Calls to and from the Lucent Technologies MCU can be 1x56k, 1x64k, 2x56k or 112k (where the MCU combines two DS0s), 2x64 or 128k (where the MCU combines two DS0s), or 384k (H0); a multirate ISDN bandwidth, including 112k, 128k, 168k, 192k, 224k, 256k, 280k, 320k, 336k, 384k, 448k, 512k, 672k, 768k, 1008k, 1152k, 1288k, 1344k, 1472k, 1536k, 1680k, or 1920k; or a Bandwidth on Demand (BONDed) rate, including 112/128k, 168/192k, 224/256k, 280/320k, 336/384k, 448/512k, or 672/768k.

56k multirate ISDN rate increments are available only for data interface (DI) and access endpoints. An access endpoint is a dedicated endpoint for which there is no signaling.

Signaling is ISDN-PRI, ISDN-BRI, RBS, or CAS; framing is D4 or ESF; and linecoding is B8ZS or ZCS. All calls are data calls.

Connections Behind a PBX

The MCU connects to a PBX via DS1, UDS1, or DI trunks. The PBX functions as a tandem in front of the MCU so that calls terminate on the MCU and not the PBX. The PBX networking software determines the digits passed to the MCU.

DS1 (UDS1) trunks connecting the PBX to the network may be shared between PBX endpoints and the MCU. All Lucent Technologies PBXs with a DS1 (UDS1) ISDN-PRI/CAS interface support MCU connectivity for 56k/64k bandwidth. Also, all Lucent Technologies PBXs with a DS1 RBS interface supports MCU connectivity for 56k bandwidth.

NOTE:
Note that UDS1 trunks do not support RBS and that 64k bandwidth does not use RBS.

For 384k bandwidth, the Lucent Technologies MCU can be behind a DEFINITY ECS Release 2 that is connected to switched digital 384 services or networked privately to other DEFINITY ECS Release 2. For a 336k or 384k BONDing connection, the caller must set up six calls using the same SDDN number.

Connections Involving BONDing Compliant Inverse Multiplexer (IMUX)

The MCU may be served by an ANSI BONDing compliant IMUX that is directly connected to the switched network. Based on the right-to-use (RTU) purchased, callers can establish 112k BONDing through 768k BONDing calls via this connection.

Direct Network Connections

The MCU can be connected to IXCs and LECs via ISDN-PRI or DS1 robbed bit. Each video endpoint participating in an MCU conference *must* subscribe to one of the same network services as the MCU. Unlike voice services provided by IXCs, a subscriber to a given service cannot call endpoints connected to a service provided by another IXC. Even within the same IXC, such as the AT&T Network Services, subscribers of one digital service cannot connect to subscribers of a different service, unless it is provisioned to do so.

However, the MCU can be connected to multiple network services. Therefore, if the MCU is connected to both AT&T and Sprint, for example, then any endpoint that is connected to either network can join an MCU video conference (provided all other criteria are met). Since the video endpoints view the connection to the MCU as a point-to-point call, the MCU accepts a call from an endpoint using the AT&T network and another endpoint using the Sprint network then places them in the same conference.

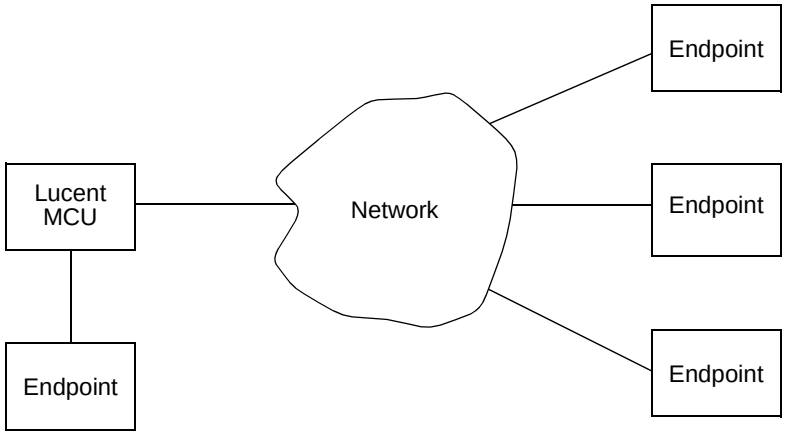


Figure 1-3. Direct Network Connection

Call Routing and Establishment

The MCU allows video conference calls to originate from the MCU and also be received by the MCU. Both incoming and outgoing calls gain access to the network via DS1 (UDS1) trunks. For incoming calls (Meet-Me calls) from the network, the MCU processes the call digits and routes the call based on the designated digits. The MCU selects an MCU port from its available resources and terminates the call on the selected port. The number of available ports is determined by the hardware installed and administration settings.

For outgoing multimedia calls (dial-out) where the Lucent MCU calls the conferees or another Lucent Technologies MCU, the MCU pulses the digits over the network. The call is directed through the network and terminates on the conferee's video terminal. Once the network confirms that the call has been answered, the Lucent Technologies MCU provides the necessary multimedia ports from the MCU port resource pool. (Actually, the ports needed for the call have been previously allocated when the conference was reserved.) The call is terminated to an extension associated with the dialed-out number.

Call establishment is the procedure used for making an outgoing call to a conferee's endpoint or cascading to another Lucent Technologies MCU. Call establishment is triggered by one of the following events:

- Conference status change: When a reserved or dedicated conference becomes active.
- Administration change: When a reservation agent adds a dial-out conferee or changes an existing dial-out conferee's destination number.
- Retry: When a second attempt is made to connect the dialed-out number.

After any of the above events occurs, a dial-out call is placed. Once the call is answered, the Lucent Technologies MCU connects the call to the allocated MCU ports.

The MCU offers 440 extensions to provide flexibility for assigning network numbers.

These extensions are administered to many types of data channels, to the maintenance phone, and to MCU-extensions.

Network numbers are assigned to the MCU as Meet-Me numbers. The MCU maps each Meet-Me number to one of the 440 extensions assigned to the MCU. Meet-Me numbers are mapped to MCU extensions via digit deletion/insertion or Automatic Alternate Routing (AAR) tables. When a Meet-Me number is received by the MCU, it is mapped to an extension, which selects an available port for the call. If the video call is over two B-channels (112k or 128k), the MCU actually receives two incoming network calls for the same Meet-Me number. Both calls are routed to the same port. Similarly, a BONDed 336k call occupies six B-channels, and the MCU receives six incoming network calls for the same Meet-Me number. On the other hand, a 384k (H0) call also occupies six B-channels, but the MCU receives just one incoming network call for this type of call. The MCU also receives just one incoming network call for a 768k call, which occupies 12 B-channels.

Conferees are unaware of the corresponding MCU extensions; they join a multipoint conference by dialing in on the assigned Meet-Me number or receive a call from the MCU.

Digits are sent to the MCU per network provisioning or per tandem PBX provisioning. The MCU also has AAR digit manipulation functionality. Digit manipulation can be done in the network, within the serving PBX, on the MCU trunk group, or in the MCU call routing tables.

Pre-Installation Procedures

2

Overview

This chapter discusses the procedures to follow before installing the MCU and its components.

NOTE:
The main MCU cabinet is referred to as the Multimedia Server Module (MSM). The supplementary MAP/40 processor cabinet that serves as the T.120 module is referred to as the Expansion Services Module (ESM).

Basic Steps and Required Tools

The following table lists the basic installation steps and the tools and test equipment required to perform MSM installation.

Table 2-1. Tools and Test Equipment Needed for MSM Installation

Installation Step	Tool or Equipment	Recommended Type
Unpack the MSM	Tin Snips Utility Knife Adjustable Wrench	 6 or 8 inch
Position the MSM	Chalk Line Ruler Bubble Level	 30 inch
Install the MSM (includes procedures for earthquake protection mounting)	Electric Drill Masonry Bit Drill Bit (for computer floors) Drift Punch Adjustable Wrench Ratchet Sockets Nut Driver Screwdriver Allen Wrench	Impact Type 1/2 inch 5/8 inch Length to reach concrete floor 6 to 8 inch 1/2 inch 5/16, 1/2 and 3/4 inch 1/4 inch 8 inch, flat blade AC: 1/8 inch DC: 3/16 inch (supplied)
Check commercial power Connect ground and power	Digital Multimeter	KS-20599
Install administration devices		
Power up the MSM		
Interconnect the MSM elements		
Install auxiliary equipment		
Wire the system		
Contact the VTC		

To assemble and disassemble the ESM hardware, the following tools are required:

- Medium screwdriver with flat blade
- No. 2 Phillips Screwdriver
- Small pair of needle-nose pliers
- Small pair of wire cutters
- A sharp pointed instrument, such as a pen

  CAUTION:
  Do not use a lead pencil point. The graphite can damage the circuit card, causing problems such as electrical shorts

- Antistatic grounded wrist strap
- Antistatic grounded work mat
- Standard electronic test equipment, such as a digital multi-meter, is recommended

Environmental Checklist

Review the following sections to cover all environmental requirements.

ESM Arrangement

The ESM is currently available in a desk-side arrangement.

The desk-side unit is a tower configuration. The unit sits in a vertical position on a small support base. You must attach the support base to the unit. See the following figure. Also, see Chapter 3 for details on how to attach the base. Position the unit with approximately a 6-inch clearance on all sides of the equipment to provide for adequate air intake and exhaust. The Universal Power Supply (UPS) should sit on the floor alongside the tower unit.

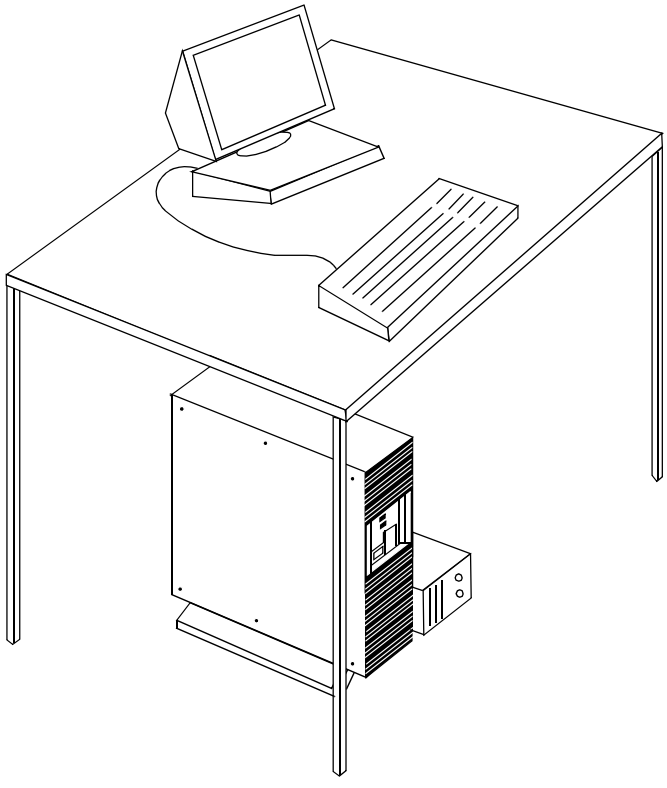


Figure 2-1. Desk-Side ESM with UPS

Floor Plans

The MSM includes two different cabinet profiles.

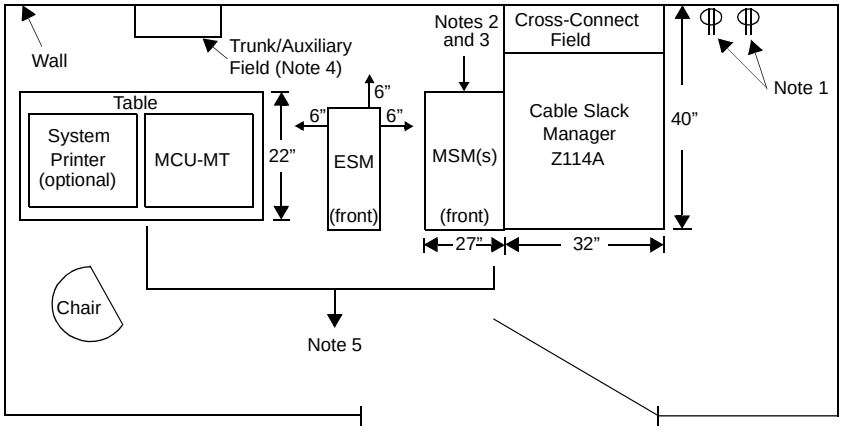
One profile includes one or more cabinets that hold a single carrier. This physical design allows for modular grouth, one cabinet at a time. The first cabinet in this profile is the Expansion Services Carrier Cabinet (ESCC). This cabinet provides the MCU's complex and some port capacity. A maximum of three additional Single-Carrier Cabinets (SCC) cabinets can be added to the ESCC to provide more conferencing port capacity.

The second profile includes a Multi-Carrier Cabinet (MCC). This cabinet is used in a large-end system, and it includes five carrier shelves. This cabinet is intended for system that require growth for a large port capacity.

The MSM and MCU-MT should always be positioned within 50 feet of one another. Although floor plans depend on the size of the equipment room, be sure to keep the MSM clear of all objects (such as shelves, windows, and pictures) and allow for future space requirements needed for capacity upgrades. For example, the 24-port MCU requires two SCCs. If a customer is anticipating adding ports in the future, allow vertical space for the second SCC required to expand from 20 to 24 ports.

Typical Layouts

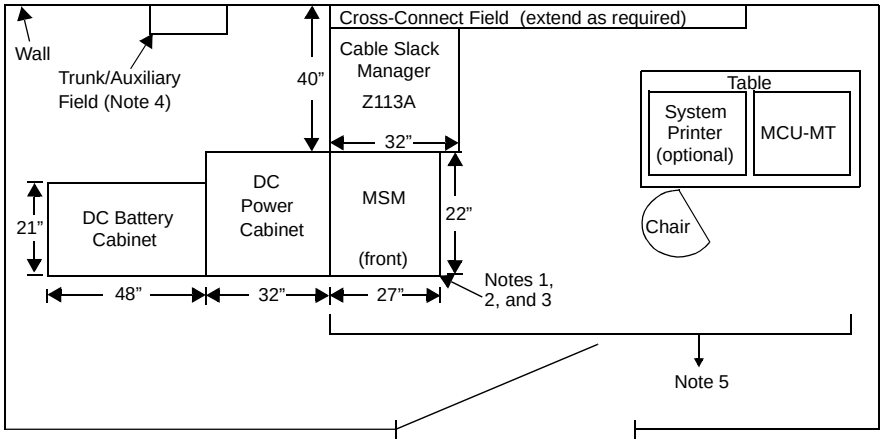
The figures in this section provide typical floor plans for various MCU systems.



NOTES:

1. AC receptacles must be separately fused and not under control of a wall switch. Receptacles must not be shared with other equipment, and should be located outside the cross-connect field area.
2. System must be grounded by one of the approved methods.
3. Earthquake protection may be required.
4. The trunk/auxiliary field may be located within the cross-connect field.
5. MCU-MT, MSM, and ESM must be within 50 feet of one another.

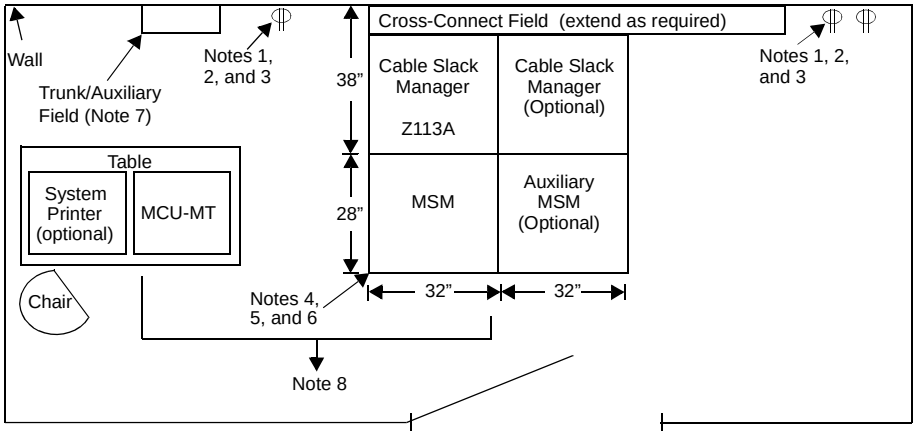
Figure 2-2. Typical Floor Plan for AC-Powered MCU with Single-Carrier MSM and an ESM Configuration



NOTES:

1. Allow at least 36 inches of space in front of MSM to let door swing open.
2. System must be grounded by one of the approved methods.
3. Earthquake protection may be required.
4. The trunk/auxiliary field may be located within the cross-connect field.
5. MCU-MT and MSM must be within 50 feet of one another.

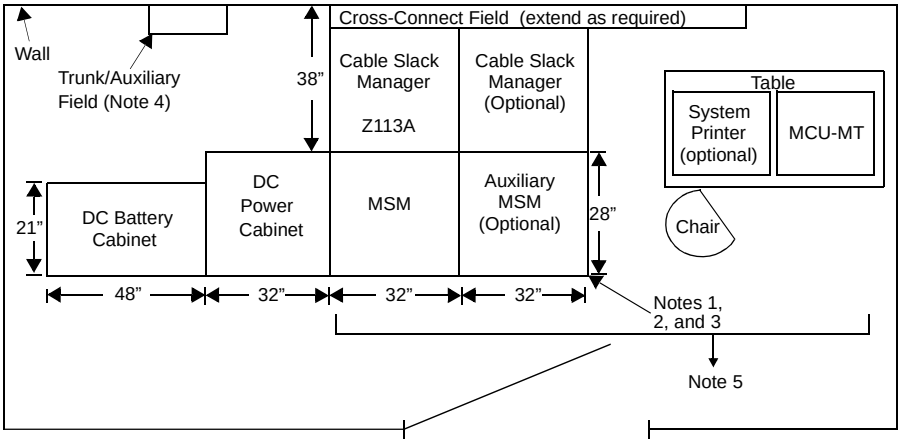
Figure 2-3. Typical Floor Plan for DC-Powered MCU with Single-Carrier MSM



NOTES:

1. AC receptacles must be separately fused and not under control of a wall switch. Receptacles must not be shared with other equipment, and should be located outside the cross-connect field area.
2. An MSM cabinet requires a special 120 volt, 60 Hz, 50 amp AC receptacle (NEMA 5-50R receptacle or equivalent) or 250 volt, 60 Hz, 30 amp AC receptacles (NEMA L14-30R receptacle or equivalent).
3. Auxiliary MSMs require a special 120 volt, 60 Hz, 20 amp AC receptacle (NEMA 5-20R receptacle or equivalent).
4. Allow at least 36 inches of space in front of MSM to let door swing open.
5. System must be grounded by one of the approved methods.
6. Earthquake protection may be required.
7. The trunk/auxiliary field may be located within the cross-connect field.
8. MCU-MT and MSM must be within 50 feet of one another.

Figure 2-4. Typical Floor Plan for AC-Powered MCU with Multicarrier MSM



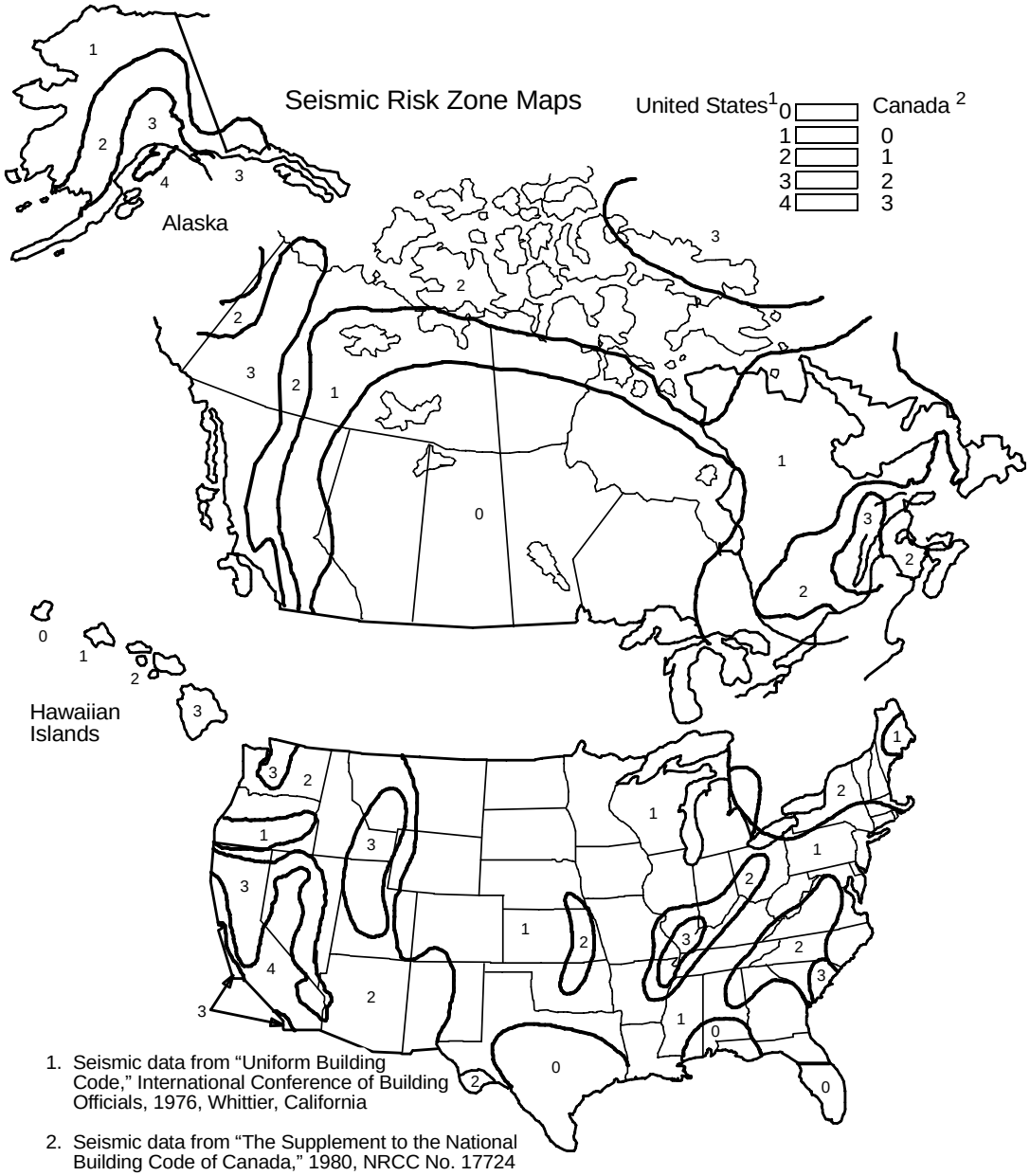
NOTES:

1. Allow at least 36 inches of space in front of MSM to let door swing open.
2. System must be grounded by one of the approved methods.
3. Earthquake protection may be required.
4. The trunk/auxiliary field may be located within the cross-connect field.
5. MCU-MT and MSM must be within 50 feet of one another.

Figure 2-5. Typical Floor Plan for DC-Powered MCU with Multicarrier MSM

The following requirements pertain to any MCU floor plan:

- The floor must have a commercial floor loading code of at least 50 pounds per square foot.
- AC receptacles must be separately fused and not under control of a wall switch, shared with other equipment or located inside the cross-connect field.
- The MCU must be grounded by one of the approved methods.
- Earthquake protection may be required by law (see the following figure). Areas designated with a 0 have a low susceptibility; higher numbers mean a greater susceptibility. Four is the highest number for the United States; three is the highest number for Canada.
- The trunk and auxiliary fields may be located within the cross-connect field.



1. Seismic data from “Uniform Building Code,” International Conference of Building Officials, 1976, Whittier, California

2. Seismic data from “The Supplement to the National Building Code of Canada,” 1980, NRCC No. 17724

Figure 2-6. North American Continent Earthquake Environment

Floor Area and Space

Floor area requirements in the equipment room vary depending on the type of MSM. Refer to the appropriate section.

Requirements for ESCCs and SCCs

The ESCC and SCC are 27 inches (69 cm) wide and 22 inches (56 cm) deep. A single ESCC/SCC is about 20 inches (51 cm) high, a two-cabinet system is 39 inches (99 cm) high, and a three-cabinet system is 58 inches (1.5 m) high. The cable slack manager requires 38 inches between the ESCC/SCC and wall. The system cabinets and the cable slack manager occupy about eight square feet (.74 square m) of floor space. Allow at least 36 inches in front of the ESCC/SCC for door removal.

Requirements for MCC

The MCC is 32 inches (81 cm) wide and 28 inches (71 cm) deep. The cabinet is 70 inches (1.8 m) high. The cable slack manager requires 38 inches between the MCC and wall. Each MCC (including the door opening) and cable slack manager occupy about 22 square feet (2 square m) of floor area. Allow at least 36 inches in front of the MCC for door removal.

Requirements for ESM

The ESM is 17.7 inches high, 7.0 inches wide (13 inches wide with the base), and 21 inches deep. The ESM weighs approximately 45 pounds. Position the unit with approximately a 6-inch clearance on all sides of the equipment to provide for adequate air intake and exhaust. Install the ESM in an area that provides protection from excessive sunlight, heat, cold, chemicals, static electricity, magnetic fields, vibration, dust, and grime.

The following table lists the approximate weight and size of the primary ESM hardware components. Note that the weight listed for the ESM includes the basic chassis, hard disk, floppy disk, streaming tape drive, and five circuit cards: central processing unit, video controller, hard disk controller, MSM interface card, and Remote Maintenance Board.

Table 2-2. ESM Space Requirements

EQUIPMENT	WEIGHT (LBS.)	HEIGHT (inches)	WIDTH (inches)	DEPTH (inches)
ESM	45	17.7	7.0 (12.6 With Base)	21
Monitor	15	13.5	13	14.5
Keyboard	5	2.5	19	8
400VA, 115v UPS	20	7.0	4.5	15.25
250VA, 230v UPS	11	6	3.4	10.1

Requirements for Terminals

The 715GBCS-2 terminals used as the MCU Management Terminal (MCU-MT) and MCU Scheduling Terminal (MCU-ST) require approximately 3.2 square feet of desk space.

Temperature and Humidity

MSM

The MSM should be installed in a well ventilated area. Temperatures should range between 40 and 120 degrees Fahrenheit (4 to 49 degrees Celsius). Relative humidity should range as follows:

- From 40 degrees Fahrenheit up to 84 degrees Fahrenheit (29 degrees Celsius), between 10 to 95 percent
- From 85 degrees Fahrenheit up to 120 degrees Fahrenheit (49 degrees Celsius), between 10 to 34 percent

Environments beyond these limits may reduce system life and impede operation.

NOTE:
For altitudes above 5,000 feet, reduce the maximum short-term temperature by 1 degree Fahrenheit for each 1,000 feet of elevation above 5,000 feet. For example, at 10,000 feet, the maximum short-term temperature is 115 degrees Fahrenheit (46 degrees Celsius).

The MSM can operate at the maximum short-term operational limits for a period not to exceed 72 consecutive hours or for more than 15 days in a year.

ESM

Place the ESM in an area where the following environmental requirements are maintained.

Table 2-3. ESM Temperature and Humidity Considerations

OPERATING STATE	TEMPERATURE	HUMIDITY
Operating	+10 ° to +38 ° C	**********
Non-Operating	-40 °to +60 ° C	5% to 92% non-condensing
Continuous Operating	**********	20% to 55% non-condensing
Short Term Operating (72 consecutive hours)	**********	20% to 80% non-condensing

CAUTION:
The ESM has a narrower operating temperature range than the basic MSM cabinet and thus may need to be located in a different room than the MSM.

Air Purity

Do not install the MSM in an area where the air contains excessive dust, lint, carbon particles, paper fiber or metallic contaminates, or corrosive gases (such as sulfur or chlorine).

Lighting

For the MSM, lighting should be sufficient for administration and maintenance personnel to perform tasks. The recommended light intensity level is 50 to 70 footcandles to comply with the standards set by the Occupational Safety and Health Act (OSHA).

For the ESM, lighting should be sufficient for maintenance personnel to perform tasks on the ESM hardware or from the ESM-MT. The recommended light intensity level is 50 to 70 footcandles to comply with the standards set by the Occupational Safety and Health Act (OSHA).

Noise

In most cases, electrical noise is introduced into the MCU through trunk and station cables, or both. However, electromagnetic fields near the MCU may also cause noise in the system. Therefore, the MCU and cable runs should not be placed in areas where a high electromagnetic field strength exists.

Radio transmitters (AM or FM), television stations, induction heaters, motors (with commutators) of 0.25 horsepower (187 watts) or greater, and similar equipment can cause interference. Motors without commutators and field strengths below 1.0 volt are unlikely to cause interference. These fields can be measured with a tunable meter, such as the Electro-Metrics Division Model R-70. To measure fields strengths greater than 1.0 volt, use a broadband meter, such as the HOLADAY HI3001 meter or the Instruments for Industry, Inc., Model EFS-1.

To estimate the field strength caused by radio transmitters, divide the square root of the emitted power of kilowatts by the distance from the antenna in kilometers. This yields the approximate field strength in volts per meter and is relatively accurate for distances greater than half a wavelength (150 meters for a frequency of 1000 kHz).

Additional Considerations

Noise and heat generated by the MSM should also be considered when selecting its location. The ESCC-MSM or SCC-MSM produces 48 dBA of acoustic noise at a distance of five feet. When the door is open, there is an additional 1 dBA of noise.

The noise produced by an MCC-MSM system with a 5-carrier cabinet at a distance of five feet (1.5m) is 51, 53, and 56 dBA at a low, medium, and high fan speed, respectively.

The following table shows the average and maximum power consumption and also the heat dissipation for the MSM. For each power consumption figure, the maximum system conference capacity is assumed. The MCU MSM has an average power consumption of 710 watts and a maximum power consumption of 730 watts. The average heat dissipation for an MCU MSM is 2420 BTUs per hour.

Electrical Requirements Checklist

Review the figures and checklist below to cover all electrical requirements for the MCU. This section includes considerations for power, grounding, lightning protection, sneak current protection, standby power, and wiring requirements.

MSM

Power Requirements

Each ESCC/SCC requires a separate power outlet. These outlets must not be shared with other equipment, must not be under switch control, and should be located outside the cross-connect field. Any available power source can be used as long as the phase or leg provides 120 volt AC at the required drain.

AC-Powered ESCC/SCC

This cabinet uses the 1217A power supply. This is a power factor-corrected, 50/60-Hz, autoranging (90-264 VAC) input, multi-output power supply providing regulated DC output and switch-selectable 20/25-Hz AC Ringer output voltages. The 1217A mounts in the power supply slot of the carrier. A power cord with a 3-prong plug on one end connects the supply to a dedicated AC power source.

NOTE:
This cabinet is available domestically (in the US and Canada) and internationally.

AC-Powered MCC

This cabinet uses a 631DB power supply. This power supply accepts 120 VAC 60 Hz and produces -48 VDC at 8 A and -5 VDC at 6 A, distributed on the carrier backplanes. The -48 VDC also supplies power to the cabinet fans. If the AC input power fails, the unit converts 144 VDC from the optional batteries in the AC power distribution unit to at -48 VDC at 8 A and -5 VDC at 6 A. A circuit in the optional battery charger detects the highest equivalent AC or DC input voltage and switches to the correct input voltage.

NOTE:
This cabinet is available only domestically (in the US and Canada); it is not available internationally.

DC-Powered ESCC/SCC

NOTE:
DC-power distribution is not required whenever the MCU is within 30 ft of the power unit.

This cabinet uses a 676C power supply. A -48 VDC source supplies power to the DC power supply at up to 25 A. The 676C provides multiple +5 VDC, -5 VDC, -48 VDC, and +12 VDC ouput. The AC ringing voltage output value and frequency depend on the country of use. The power supply has circuit breakers and Electromagnetic Interference (EMI) filtering. The +12 volts DC used to program the FLASH ROM is generated by a +5v DC to +12v DC converter on the Network Control circuit pack (TN777B).

NOTE:
This cabinet is available only domestically (in the US and Canada); it is not available internationally.

DC-Powered MCC

A DC-powered MCC uses a 649A power supply. The 649A converts a -48 VDC input into outputs of -48 VDC at 10 A, +5 VDC, and -5 VDC at 6 A, which it distributes to circuit pack slots in the carriers. Only one 649A converter is required per carrier except for SN carriers. SN carriers require 2 converters, one on each end. The 649A allows an increase in the number of terminals supported per carrier.

NOTE:
This cabinet is available only domestically (in the US and Canada); it is not available internationally.

A DC-powered MSM has the following input power requirements:

Table 2-4. Input Power Requirements for a DC-Powered MSM (SCC and MCC)

Parameter	Requirements
Static Voltage	-48V DC nominal, -42.5V DC minimum, -52.5V DC maximum (measured at input to MCU).
Dynamic Voltage	Transient change in voltage (+/- 5% of steady state voltage); allowed transient duration up to 200 ms.
AC Ripple Voltage	Maximum wideband AC ripple 450 mvpp in the 3 kHz to 20 mHz band.
Low Voltage Disconnect	Automatic disconnect occurs when input voltage becomes less than -42.5V DC (control provided with battery plant).
Overvoltage Protection	Input voltage must not exceed -52.5V DC.
Voltage Drop	Maximum drop must not exceed 0.5V DC one way on feeder cable between the power board and the MCU. Feeders must be UL-approved and CSA-certified. Feeder gauge must be no smaller than 6 AWG and no larger than 1/0 gauge. Recommended -48V DC feeder cable (Royal Electrol #4905 or equivalent). 1-AWG is required for distances up to 50 feet. Cable resistance must be equal to or less than 0.1290 ohms per 1,000 feet.
Current Draw	The battery plant rectifiers must be capable of providing current for the MCU, including current required for system holdover and charging the batteries. In addition, this may include DC current required for an inverter providing AC power to peripheral equipment (if installed), and for future growth. The -48V DC supplied by the battery plant to the system cabinet will be maintained between -42.5 and -52.5V DC at all times, ensuring proper operation and preventation of damage to hardware.
Circuit Breaker	A UL-listed and CSA-certified circuit breaker must be provided at the battery plant power board for each system cabinet feeder. Recommended circuit breakers are 75 ampere Airpax UPL1-1-REC2-52-753 or Heinemann AM1-B2-A-75-2.

Table 2-4. Input Power Requirements for a DC-Powered MSM (SCC and MCC) — *Continued*

Parameter	Requirements
Redundancy	Redundancy of the battery chargers and rectifiers should be considered. It would also provide the additional current necessary to recharge the batteries after being fully discharged.
Electrical Noise	Voice band noise from the battery plant to the system must be less than 32 dBmC.
Grounding	A single point ground must be maintained. A ground conductor must be installed from the isolated ground discharge bar to the closest approved ground via the shortest route required by the NEC/REC. The gauge must be no smaller than the largest conductor in the system and larger than 6 AWG. The ground discharge bar must not be electrically connected to the chassis of the battery plant chargers, power board, or inverter. All output power must be isolated from input power.
Lightning Protection	There must be adequate lightning protection in the battery plant to ensure that the MCU will not be damaged.

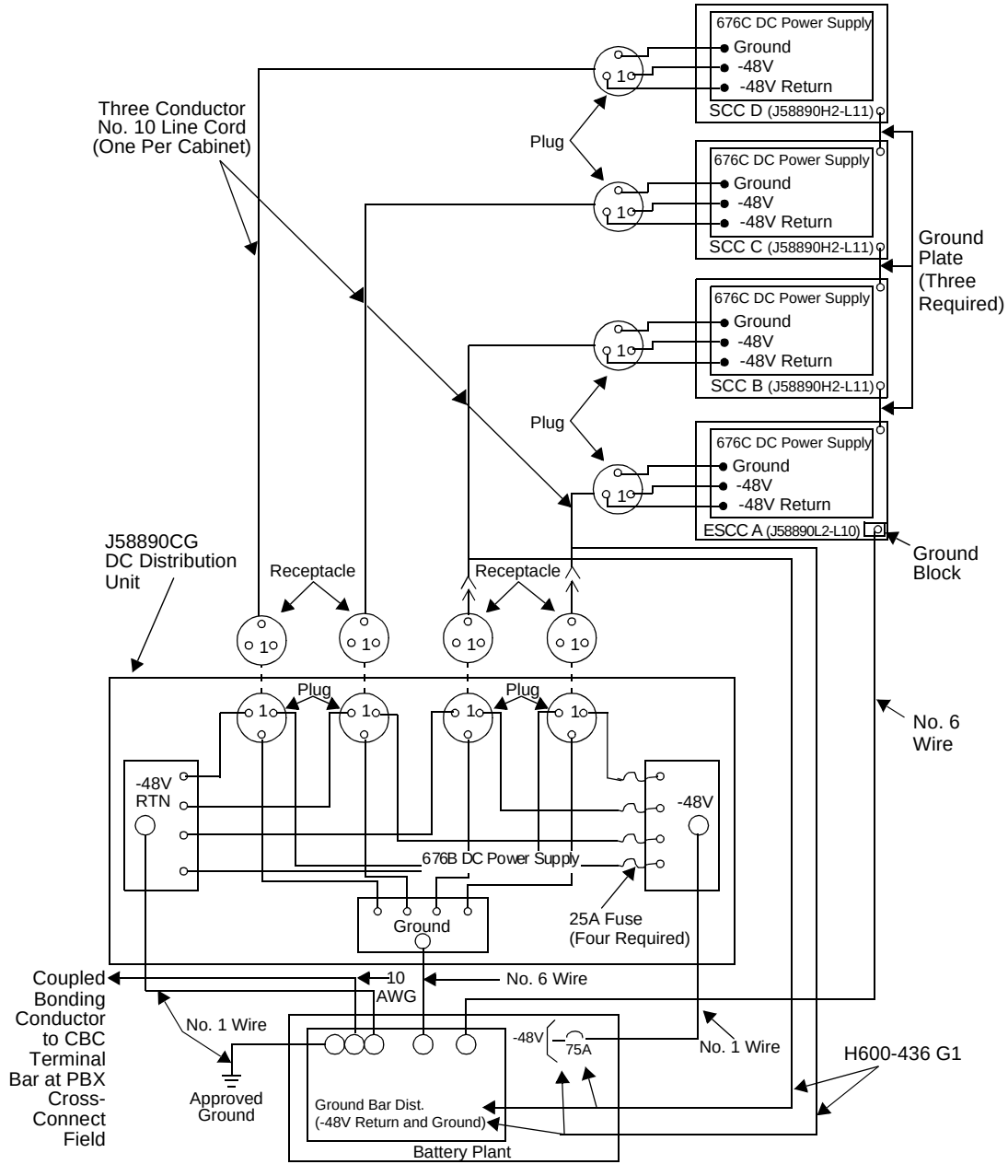


Figure 2-7. Typical ESCC/SCC DC Power and Grounding Layout (MSM)

NOTE:
DC power distribution is not required if the MCU is within 30 ft of the power unit.

Heat Dissipation

The following table provides the typical heat dissipation of SCC-MSMs.

Table 2-5. Typical Heat Dissipation of SCC-MSMs

BTUs Per Hour	Gram-Calories Per Hour	Watts
1700 (one SCC-MSM including terminals)	438	499
5700 (SCC-MSM stack including terminals)	1436	1672

The following table provides the typical heat dissipation of fully loaded (five carriers) MCC-MSMs.

Table 2-6. Typical Heat Dissipation of MCC-MSMs

BTUs Per Hour	Gram-Calories Per Hour	Watts
6687.52 (excluding terminals)	1638.24	1960
11600.8 (including terminals)	2919.92	3400

Grounding

An approved ground for the MSM in the equipment room is essential. Here are a number of suggestions for an approved ground:

- **Grounding Building Steel:** The metal frame of the building effectively grounded by one of the following items: acceptable metallic water pipe, concrete-encased ground, or a ground ring.
- **Acceptable Water Pipe:** A metal underground water pipe (at least 1/2 inch in diameter) in direct contact with earth for at least 10 feet. The pipe must be electrically continuous or made electrically continuous by bonding insulated joints, plastic pipe, or plastic meters, to the point where the protector ground wire is connected. A metallic underground water pipe must be supplemented by the metal frame of the building, a concrete-encased ground or a ground ring. If these grounds are not available, the water pipe ground can be supplemented as follows:

  NOTE:
  All approved grounds must be bonded to form a single grounding electrode system as required in Section 250-81 of the National Electrical Code.

- Metal underground gas piping system is an electrically continuous system that is uninterrupted with insulating sections or joints and without an outer nonconductive coating.
- Other local metal underground systems or structures including local underground structures such as tanks and piping systems.
- Rod and pipe electrodes of a 5/8 inch (solid rod) or 3/4 inch (conduit or pipe) electrode, driven to a minimum depth of eight feet.
- Plate electrodes exposed to a minimum of two square feet of metallic surface to the exterior soil.

- **Concrete-Encased Ground:** An electrode encased by at least two inches of concrete and located within and near the bottom of a concrete foundation or footing in direct contact with the earth. The electrode must be at least 20 feet of one or more steel reinforcing bars or rods, not less than 1/2 inch in diameter, or at least 20 feet of bare, solid copper wire not smaller than 4 AWG.
- **Ground Ring:** A buried ground that encircles a building or structure at a depth of at least 2 1/2 feet below the earth's surface. The ring must consist of at least 20 feet of bare copper conductor no smaller than 2 AWG.

Approved floor grounds are grounds on the floors of high-rise buildings suitable for connection to the ground terminal in the riser closet and to the MCU single-point ground terminal. These grounds can be any one of the following:

- Building steel
- Grounding conductor for the secondary side of the power transformer feeding the floor
- Metallic water pipes
- Power feed metallic conduit supplying panel boards on the floor
- A grounding point specifically provided in the building for the purpose

Lightning Protection

A coupled bonding conductor is tie-wrapped to all trunks. The coupled bonding conductor can be any one of the following:

- 10-AWG ground wire
- Continuous cable sheath
- Six unused pairs of wire

The coupled bonding conductor connects the MSM single-point ground block and runs all the way to the approved ground located nearest the telephone company-owned protector block at the building entrance.

Sneak Current Protection

Sneak fuses protect the building wiring and circuit packs from “foreign potential” by providing a current interruption capability. Sneak fuse panels, when provided, are installed on the MCU side of the network interface. All incoming and outgoing trunks and off-premises station lines pass through the sneak fuses. Sneak current protection is required for installation in Canada. The sneak fuses must be CSA certified.

Standby Power

The following provides battery reserve, uninterrupted power supply, and battery backup information.

- Battery Reserve:
  - **ESCCs/SCCs**: During commercial power failure, the ESCC/SCC power supplies provide a 250-ms power holdover to allow the MCU to remain in service. If power is restored within 250 ms, there is no interruption of service. A battery reserve is automatically activated if commercial AC power fails.

    The battery, located inside the MSM on the top of the carrier, allows the power supply to provide a two-minute battery reserve holdover to the control circuit packs and fans during power failure beyond 250 ms. All port circuit packs are out of service during this time.

    When commercial power is restored within two minutes, the MCU reinitializes the memory stored in the processor circuit pack. All port circuit packs remain out of service during the approximately 25 seconds required to restore the system. When commercial power is restored after two minutes, the MCU also reinitializes. This time, however, the reinitialization takes longer (approximately 10 minutes), and the port circuit packs remain out of service for the duration.

    If additional holdover power is necessary, an alternate, independent source of on-premises power is required to maintain the MCU for a limited time. An external, commercial UPS or battery backup arrangement can be used as an alternate source of power during a commercial power failure.

  - **MCCs**. MCCs have an internal battery system that supplies holdover power to the whole cabinet for a specific amount of time. Generally, the internal battery system supplies power to the cabinet for 10 seconds. Power is also supplied to the port carriers.

    An AC power interruption to the MCU that lasts fewer than 10 seconds is not noticed by the customer. After 10 seconds, the system powers down the port carriers in the MCU, but the entire control carrier continues to be powered for 10 minutes. The circuit packs in the port carriers are “removed” by the software and, as a result, all connections are dropped.

Connections and call processing are preserved on the control carrier for the entire holdover period. After 10 minutes, the control carriers are powered down and the connections are dropped. The 10 minute interval does not exhaust a fully charged battery. The system is designed to sustain multiple AC service interruptions before the battery has time to recharge fully. After power is restored, the batteries are recharged by a circuit that monitors current and time. If the battery takes longer than 30 hours to recharge, a minor alarm is sent to INADS. This alarm indicates that the battery should be replaced or that the charging circuit should be repaired.

The 397 Battery Charger Circuit immediately detects the loss of AC power. Once AC power loss is detected, an AC power alarm is generated. Included with the AC power fail alarm are several other alarms associated with the loss of power. Several maintenance objects cause a major alarm to be reported (processor interface links, external DS1 timing) but, in general, no specific power-related major or minor alarm results. If the switch is accessed during the 10 minute interval, an AC power warning alarm appears in the active alarm as “resolved.”

If AC power is restored during the 10 second interval, no service interruption results. If AC power is restored between 10 seconds and 10 minutes, service to the port carriers is restored after the software “reinserts” the circuit packs. This can take up to one minute. Links that have their connectivity through the control carriers remain up unless they rely on hardware that is powered externally (for example, channel service units for DS1 facilities). If the CSU is not connected to a power reserve system, the DS1 facility is dropped.

If AC power is restored after 10 minutes (or, if the battery does not have sufficient capacity, in less than 10 minutes), the MCU must reload all software and translation data. The MCU must also “reinsert” all circuit packs. These processes can take several minutes, depending on the size of the system. All links are re-established according to their initialization requirements.

As an option, the internal battery may be omitted on MCC-MSMs that are ordered with UPS. If the battery is omitted, and if the AC from the UPS fails, the system does not report an alarm.

Critical services or services that take a long time to restore (for example, digital announcement circuit packs) should be placed in control carriers, where they can be held up the longest. If AC power interruptions of longer than 10 minutes are frequent, and if the customer's service requirements warrant, consideration should be given to equipping the system with either an external UPS system or an external DC power system.

- Uninterruptible Power Supply (optional): If long-term holdover is required, an external UPS can be provided as an alternate source of power during a commercial power failure. Any UPS that meets the requirements given in the following table can be used with the MCU.

  An ESCC/SCC carrier has the following UPS power requirements:

  — volt-ampere rating: 1200

  — frequency Hertz: 60 +/- 5%

  — power factor: 0.6

  — maximum cut-in time: 200 ms

  Larger UPS' are available for MCCs, and their power rating varies according to the number of populated carriers and the system configuration.

- Battery Back-Up: A battery supply and an inverter can be used to provide standby power for up to eight hours after a commercial power failure. When standby power is provided, the following items must be taken into consideration:

  - Size and weight of batteries
  - Size and weight of inverter
  - Heat dissipation
  - Air flow and circulation
  - Equipment receiving power

  The standby power system contains the following:

  - Inverter
  - Batteries
  - Battery stand

  The MSM requires a 120-volt AC input provided by the inverter. The size of the inverter is determined by the MCU configuration and the additional equipment to be provided with power in the event of a commercial power failure.

  The size of the battery supply required depends on the length of time power is to be provided and the particular power demands of the system.

House Wiring

House wiring includes all on-premises wiring on the customer side of the cross-connect field, which can be either 66-type or 110-type hardware. Wiring is distributed from the cross-connect field by 25-pair cables. The 25-pair cables are connected either directly to terminal wall jacks using adapters or to satellite locations.

Satellite locations are used when already present or when required by the length of the wiring runs. The 25-pair cables can be divided into either 3-pair or 4-pair wiring groups (4-pair groups are recommended). From the satellite locations, 4-pair, D-inside cables connect the satellite locations to information outlets (modular wall jacks).

ESM

Power Requirements

The AC-powered ESM CPU requires an AC power circuit capable of providing up to 8A at 115v or 4A at 230v. However, the typical power consumption of the ESM CPU is approximately 60 watts. The maximum power consumption of an ESM is 80 watts. The monitor requires 2A at 115v or 1A at 230v. It is best if the monitor is not plugged into the auxiliary outlet on the ESM CPU due to the limited current capacity of the outlet. Also, to extend the holdover time when an Uninterruptible Power Supply (UPS) is used, the best results are obtained if the monitor is not plugged into the UPS.

Because the ESM components can change, be sure to check the specifications (figures) printed near the power connectors on the ESM CPU and then monitor these specifications for changes.

Uninterrupted Power Supply (UPS)

Since the ESM software runs with a UNIX operating system, it is strongly recommended that the ESM always have some level of battery backup. A 400VA UPS is available for AC inputs in the 120V range and a 250VA UPS for AC inputs in the 230V range.

The following are the typical holdover times for a fully charged UPS with both the ESM processor and the ESM monitor being powered thru the UPS.

NOTE:
For the best results, the monitor should not be powered via the UPS.

Table 2-7. UPS Holdover Time

UPS Style	Approximate Holdover Time
400VA, 115v	12 minutes
250 VA, 230v	7.5 minutes

WARNING:
Interruption of the ESM input power without first performing a proper UNIX shutdown sequence can cause file corruption which could render the ESM inoperational and require one to re-install all ESM system software again.

The normal specifications for the 400 VA / 115 volt and 250 VA / 230 volt Lucent Technologies UPS' are provided in the following table.

Table 2-8. Lucent Technologies 400 VA, 115v and 250 VA, 230v UPS Specifications

	115V Model	230V Model
Input Voltage Range	90—100 to 132 Vac (may be adjusted with option switches)	180—200 to 265 Vac (may be adjusted with option switches)
Input Power Factor	0.6 minimum	
Frequency Range	50/60 Hz + or - 3 Hz (may be adjusted with dip switches)	
Surge Protection	UL 1449 approved IEEE 587	IEC 801-5
Output Wave Form on Battery	Step-sine wave; RMS values equivalent to utility	
Output Voltage on Battery	115 Vac + or - 5%	230 Vac + or - 5%
Audible Noise	40 dBA @ 1 meter	
Input Cord	Detachable 2.5-meter Schuko 10A cord	
Outlets	Model 250: 5-15R (2) Model 400: 5-15R (3)	Model 250: IEC 320 (2) Model 400: IEC 320 (3)
Batteries	12 Vdc, 7 Ah maintenance-free rechargeable lead acid; user-replaceable	
Battery Run Time (Full Load)	Model 250: 10 minutes; Model 400: 5 minutes	
Operating Environment	Temperature: 10° C to 40° C (50° F to 104° F) Humidity: 5% to 95% (noncondensing)	
Agency Approvals	Safety: UL 1778 CAN/CSA-C22.2 No. 107.1-M91 EMC: FCC Part 15 Class B	Safety: EN 50091-1, EN 60950 CE: TUV Certified EMC: En 55022 Class B

Installing the MCU and Components

3

Overview

This chapter discusses installing the MCU and its components, including the various cabinet types.

Installing the Single-Carrier MSM

The Single-Carrier MSM (SCC-MSM) is shipped in a polyethylene bag and packed in a cardboard container. It is fastened to a wood and styrofoam pallet with two carriage bolts. The cardboard container is strapped to the pallet with a metal band.

DANGER:
The SCC-MSM weighs approximately 130 pounds when fully loaded and requires two handlers.

Unpacking and Inspecting

1. Check the status of the SHOCKWATCH and/or TILTWATCH indicators on the cardboard container. The SHOCKWATCH and TILTWATCH indicators are normally white. If the container has been jarred or tilted beyond specifications, the indicators will be red, indicating potential damage. Report any damage per local instructions.
2. Remove the SCC-MSM from the cardboard container.
3. Remove all cardboard, tape, and plastic.
4. Open and remove the front door and rear screw-on panels from the SCC-MSM.

5. Remove all packing material from inside cabinet.
6. Inspect the SCC-MSM for damage caused during shipping. Report any damage per local instructions.
7. Check all circuit packs to be sure they are fully seated in the proper slots. Report any discrepancies between circuit pack type or quantity and the purchased configuration.

Carrier Installation Sequence

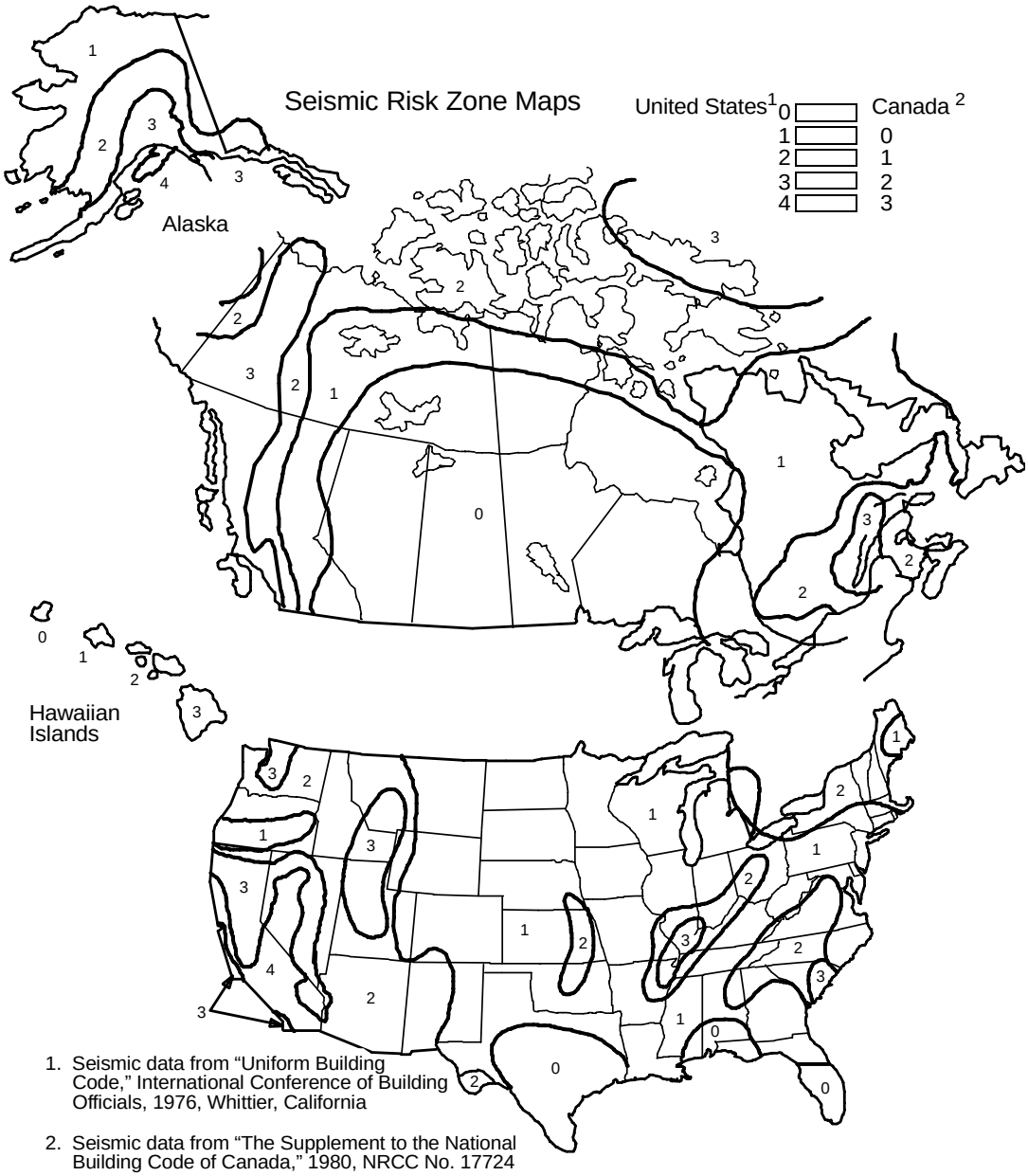
For a SCC-MSM or ESCC-MSM configuration, install the ESCC-MSM in position “A.” If the SCC-MSM carriers are required, install them in positions “B,” “C,” and “D.”

Positioning the MSM

1. Place the ESCC in position at the designated location.
2. Be sure the AC power receptacle is within 10 feet of the ESCC/SCC. If earthquake protection is required, skip to "Adding Earthquake Protection" on page 3-2.
3. If earthquake protection is not required, install hole plugs (provided with the cabinet) in the holes previously occupied by the two carriage bolts at the bottom rear of the ESCC/SCC. Skip to "Connecting Battery Leads" on page 3-9.

Adding Earthquake Protection

The following sections discuss how to add earthquake protection based on the floor type. The following figure shows the earthquake environment for North America.



1. Seismic data from "Uniform Building Code," International Conference of Building Officials, 1976, Whittier, California

2. Seismic data from "The Supplement to the National Building Code of Canada," 1980, NRCC No. 17724

Figure 3-1. North American Continent Earthquake Environment

NOTE:
Instructions for adding the earthquake front plate and earthquake ground plate are given at the appropriate point in the installation sequence.

Procedure for a Concrete Floor

To provide earthquake protection for a concrete floor, do the following:

1. Place the front mounting angle at the location selected for the front of the SCC in cabinet position “A.”
2. Using the angle as the template, mark the location of the mounting bolts.
3. Drill two holes 1/2 inch in diameter and 1-1/2 inches deep at the spot marked in step 2.
4. Insert the concrete anchors.
5. Mount the front mounting angle to the floor using the 3/8-16 x 1.25 bolt with a nylon insulating washer.
6. Move the ESCC back into place.
7. Attach the ESCC to the angle with two No. 12-24 x 1/2 inch thread-forming screws.
8. Insert a pencil or marker through the holes previously occupied by the carriage bolts in the bottom rear of the ESCC and mark the floor directly beneath each hole.
9. Remove the screws installed in step 5 and move the ESCC out of the way.
10. Drill two holes 1/2 inch in diameter and 1-1/2 inches deep at the spot marked in step 8.

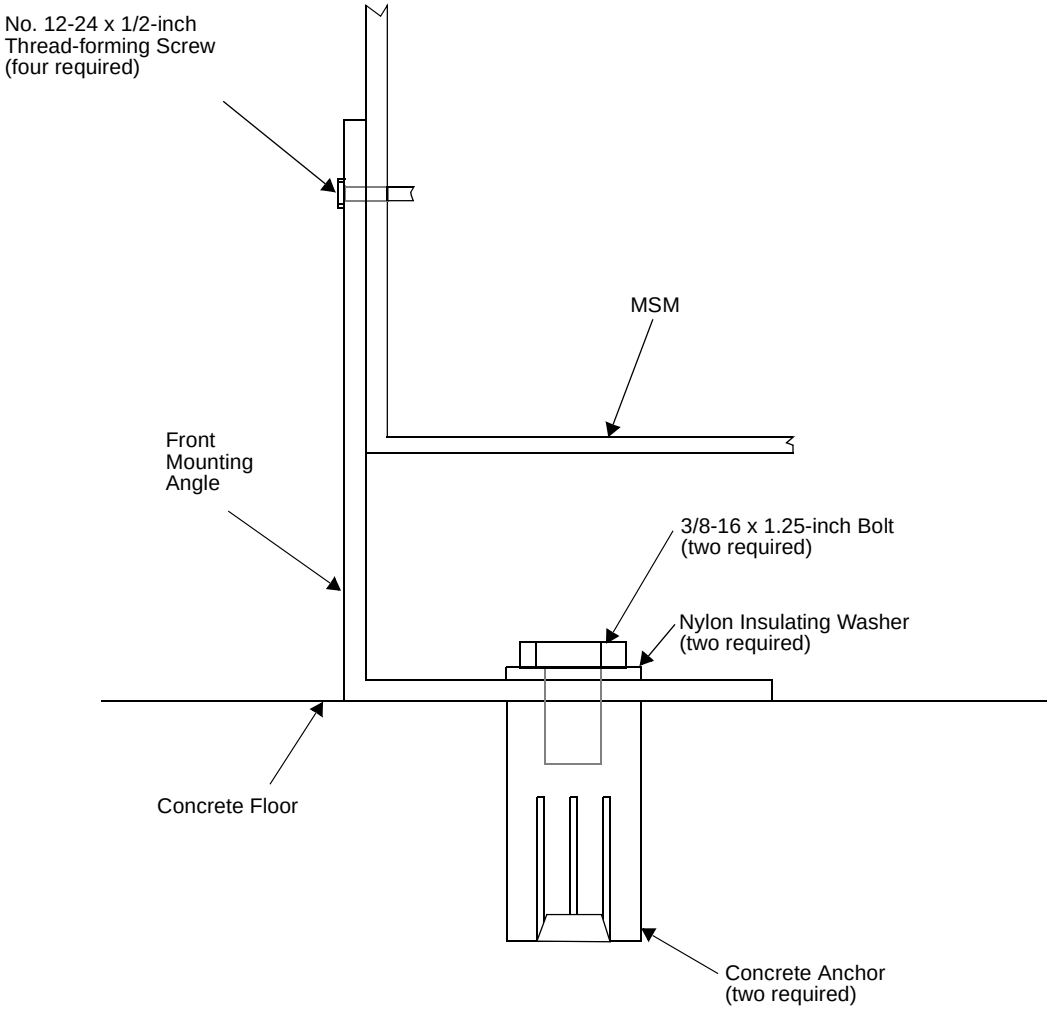


Figure 3-2. Front Mounting Angle— Concrete Floor

11. Move the SCC back into place.
12. Attach the SCC to the front mounting angle using four No. 12-24 x 1/2 inch thread-forming screws.
13. In the rear of the SCC, lay the stiffener on the bottom of the SCC, aligning the stiffener with the holes in the bottom of the SCC.
14. Fasten the SCC to the floor using the 3/8-16 x 3.25 hex bolt and nylon insulating washer.

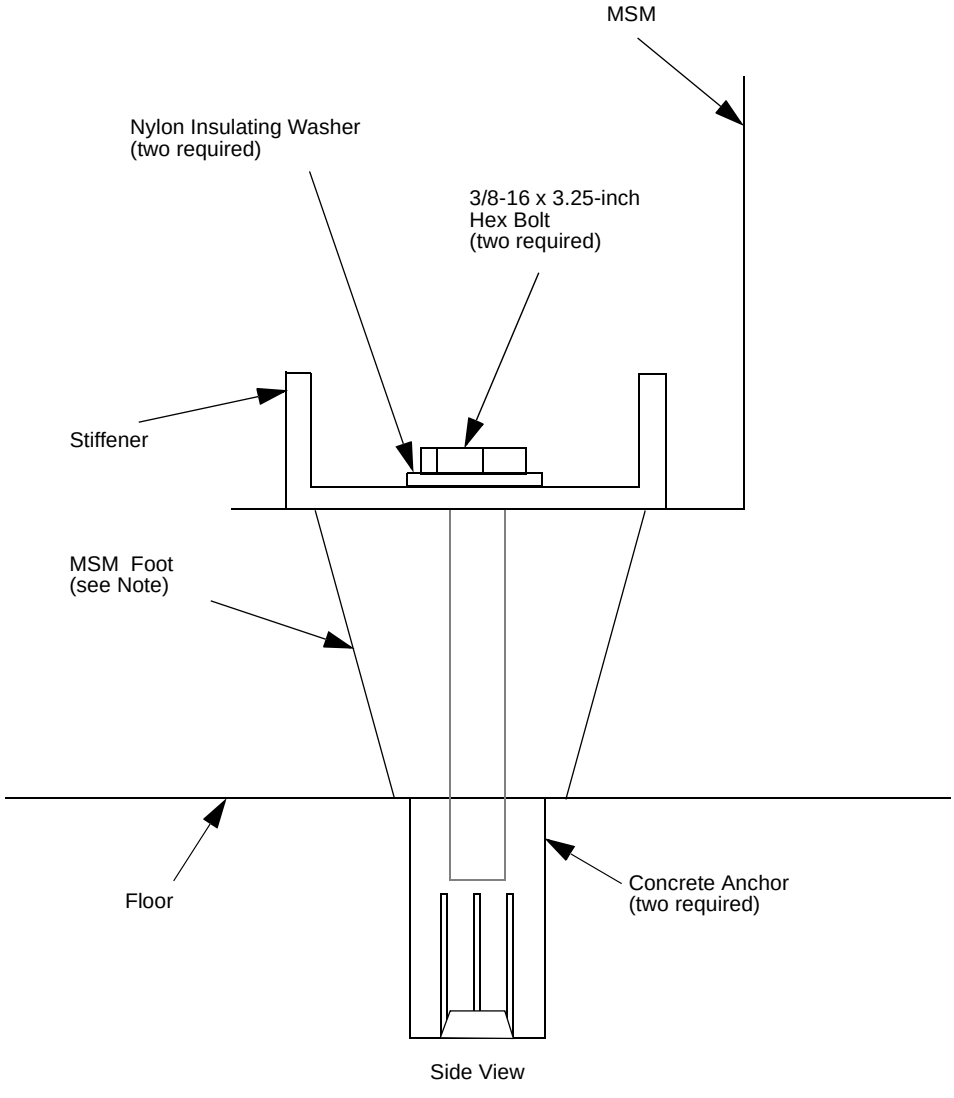


Figure 3-3. MSM Earthquake Mounting—Concrete Floor

Procedure for a Raised Computer Floor

If earthquake protection is required on a raised computer floor over a concrete subfloor, do the following:

1. Mark the locations where the four holes should be drilled to bolt the ESCC to the floor.
2. See CAUTION. Drill four holes 5/8-inch in diameter through the floor panels marked in step 1.

   ⚠ CAUTION:
   Take care while drilling the holes through the raised floor that the drill bit does not penetrate any cables beneath the raised floor that would cause damage to the cable or injury to the installer.

3. Insert a long punch through the holes drilled in step 2 and mark the concrete floor beneath the raised floor.
4. Remove the raised floor panel(s) in which the holes were drilled in step 2.
5. Using the supplied anchor bits, drill a hole at each of the locations marked in step 3. Stop drilling when the mark on the side of the bit reaches the floor level.
6. Insert a plug into the hole.
7. Drill the anchor into the hole until the mark on the bit reaches floor level again. Snap the top of the anchor bit off. Repeat for the other holes.
8. Replace the floor panel(s) removed in step 4.
9. Fasten the MSM to the floor (see the next figure).

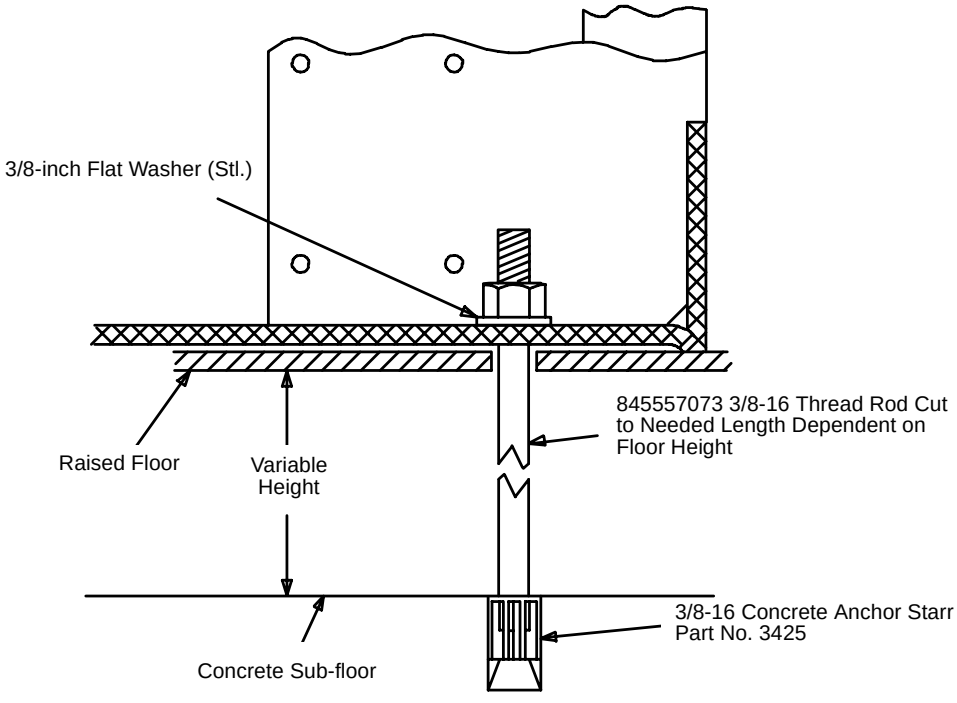


Figure 3-4. Earthquake Mounting—Computer Raised Floor

Checking Circuit Pack Configuration

CAUTION:
Be sure you are wearing wrist straps before you complete the following steps.

1. Verify that all circuit packs are fully seated in proper slots according to the Customer Service Document (CSD) and Port Assignment Worksheet.
2. Report any discrepancies in circuit pack type or quantity.\

Connecting Battery Leads

NOTE:
This procedure is only for AC-powered MCUs. If a 2-cabinet, DC-powered MCU is being installed, skip to "Installing Additional SCCs" on page 3-10. For a one-carrier SCC installation, skip to "Connecting DC Power to Single-Carrier MSMs" on page 3-22.

To confirm that an MCU is AC-powered, look at the front tab on the power supply (the hinge on the circuit board). The number “1217A” identifies the power supply as AC.

The battery is located inside the cabinet on the top of the carrier. The ESCC in position “A” is shipped with the battery lead disconnected to prevent the battery from discharging. Use the following steps to connect the battery:

1. Ensure that the circuit breaker is in the OFF position.
2. Remove the front panel. The battery lead is to the left of the battery. (You may need to reach inside to get to it.)
3. Connect the battery lead and push it back into the ESCC.
4. If additional SCCs are not being installed, skip to "Connecting AC Power to Single-Carrier MSMs" on page 3-17.

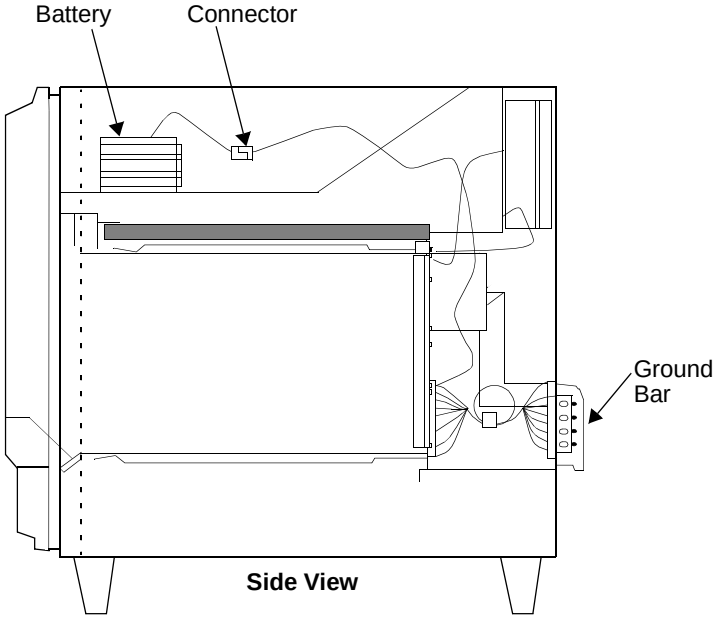


Figure 3-5. Battery Location

Installing Additional SCCs

NOTE:
This procedure is only for installing a second SCC. If you are performing a single ESCC installation, skip to "Connecting AC Power to Single-Carrier MSMs" on page 3-17 or "Connecting DC Power to Single-Carrier MSMs" on page 3-22, as appropriate.

1. Stack SCCs “B,” “C,” and “D” on top of ESCC “A.” (The SCCs are labeled appropriately on the front and back on the left side of the SCC carrier labels.)

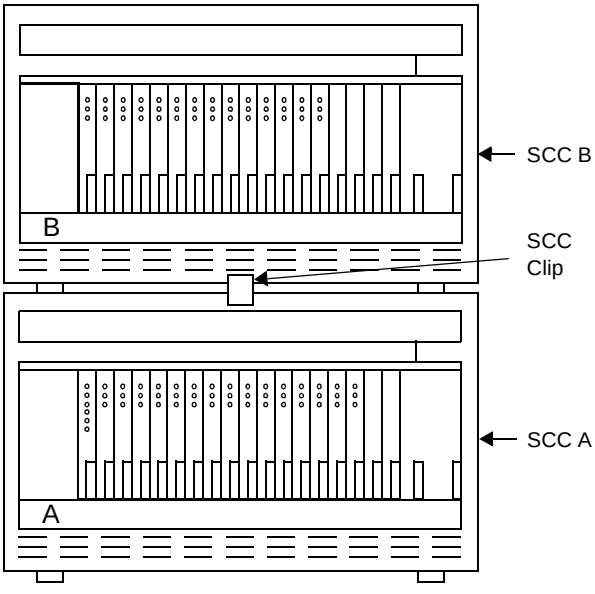


Figure 3-6. Installing Additional SCCs

2. Remove the TDM Bus terminator in slot 22 of ESCC-A backplane and move it to slot 17 of the top SCC.
3. Connect TDM Bus cables as shown in the next figure. The TDM Bus cable is located behind the lower panel.
4. On the backplane of SCCs B, C, and D, to the right of slot 00, six pins are marked for the SCC address plug connections. Verify that the address plug for each SCC is in the right place, as shown in the next figure.

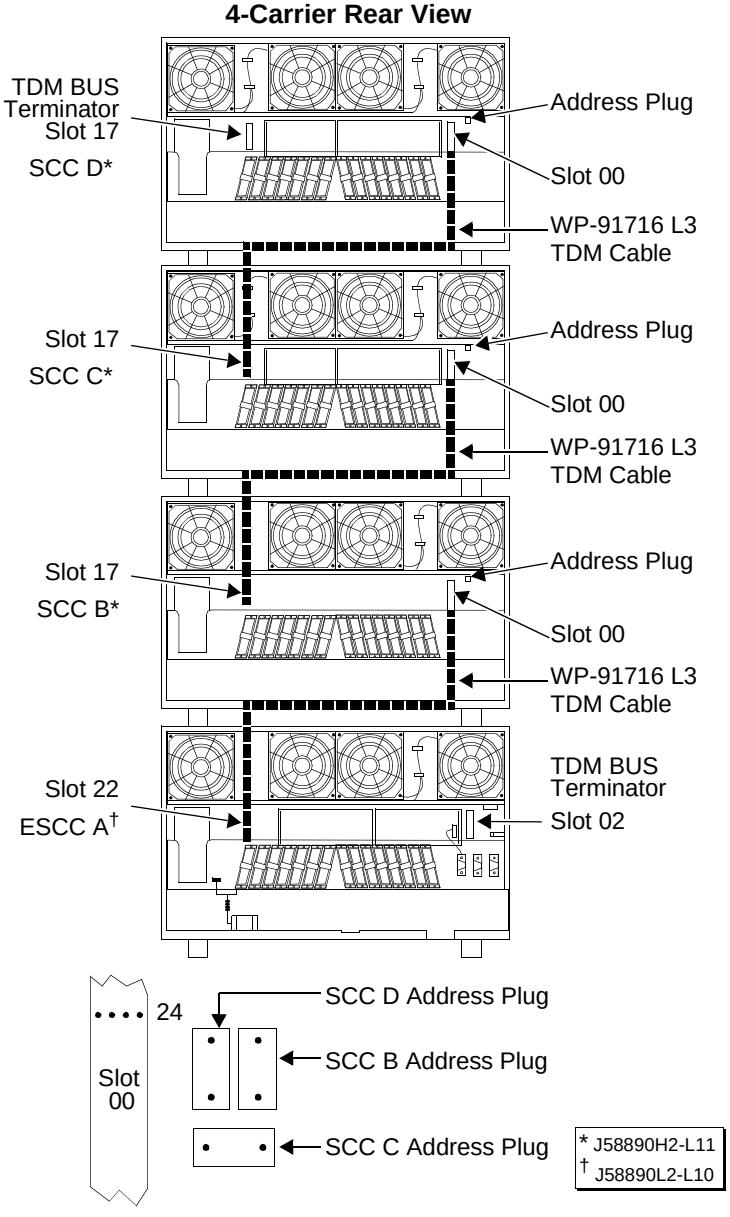


Figure 3-7. TDM Bus Connections for the Single-Carrier MSM

Installing Ground Plates

NOTE:
This procedure is only for MCUs with two or more SCCs.

A ground plate is required between each pair of SCCs for ground protection and stabilization.

1. At the rear of the SCCs, replace the upper and lower panels (leave the screws loose). Refer to Figure 3-7 on page 3-12.
2. On SCC B, place the top of the ground plate over the bottom of the lower rear panel so the four No. 8-32 x 3/8 inch screws at the bottom of the lower rear panel go through the four ground plate keyhole slots.
3. Slide the ground plate down over the top of the upper rear SCC panel of SCC A so the four No. 8-32 x 3/8 inch screws that attach the upper rear panel go through the four lower ground plate slots.
4. Ensure that the exposed portion of the TDM Bus cable between the SCCs does not get pinched.
5. Tighten the screws. If earthquake protection is required, skip to "Installing Earthquake Plates" on page 3-14.

Installing Cable Clamps

Two cable clamps are required for MCUs.

1. At the rear of the SCCs, on each ground plate, install two cable clamps using the screws provided.
2. These clamps hold the external connection cables.

Installing Cabinet Clips

1. At the front of the SCCs, install a cabinet clip between the SCCs. Refer back to Figure 3-6 on page 3-11.
2. Start joining the cabinets by inserting one end of a clip into one cabinet and the other end of a clip into an adjoining cabinet. Continue this process until all the cabinets are joined.

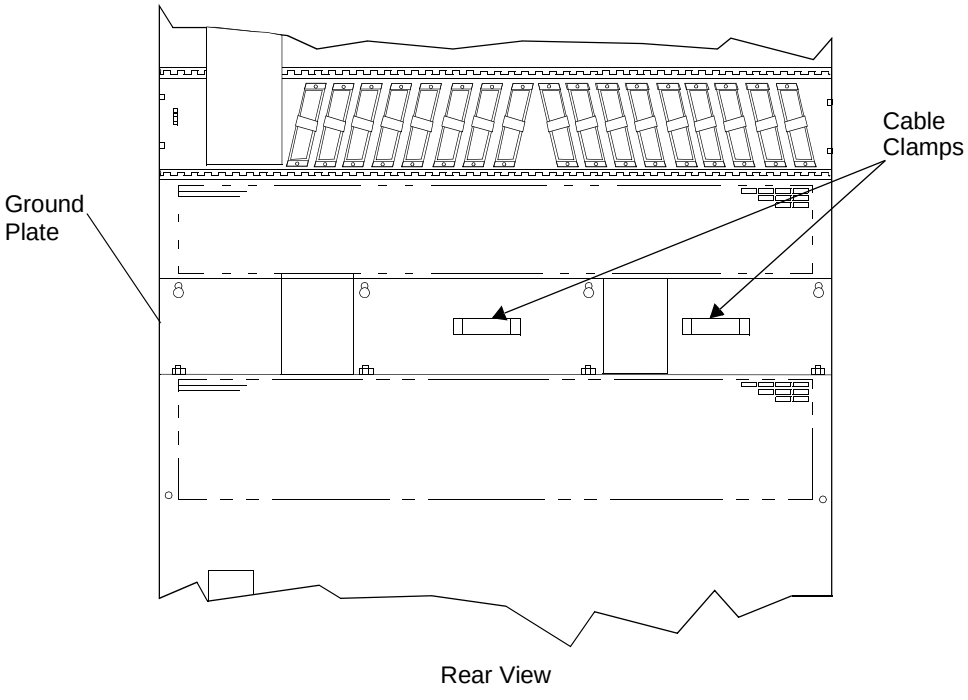


Figure 3-8. Ground Plate and Cable Clamp Locations

Installing Earthquake Plates

NOTE:
This procedure is only for MCUs with two or more SCC cabinets and earthquake protection.

The ground plate provides the ground connection and stabilization between SCCs A and B. The earthquake front plate replaces the cabinet clip.

1. At the front of the SCCs, line up the holes in the top of the earthquake front plate with the holes at the bottom of SCC B and insert the four No. 8-32 x 3/8 inch screws. Do not tighten them yet.
2. At the front of the cabinets, line up the holes in the bottom of the earthquake front plate with the holes at the top of ESCC A and insert the four No. 12-24 x 1/2 inch thread-forming screws.
3. Tighten the earthquake plate screws.

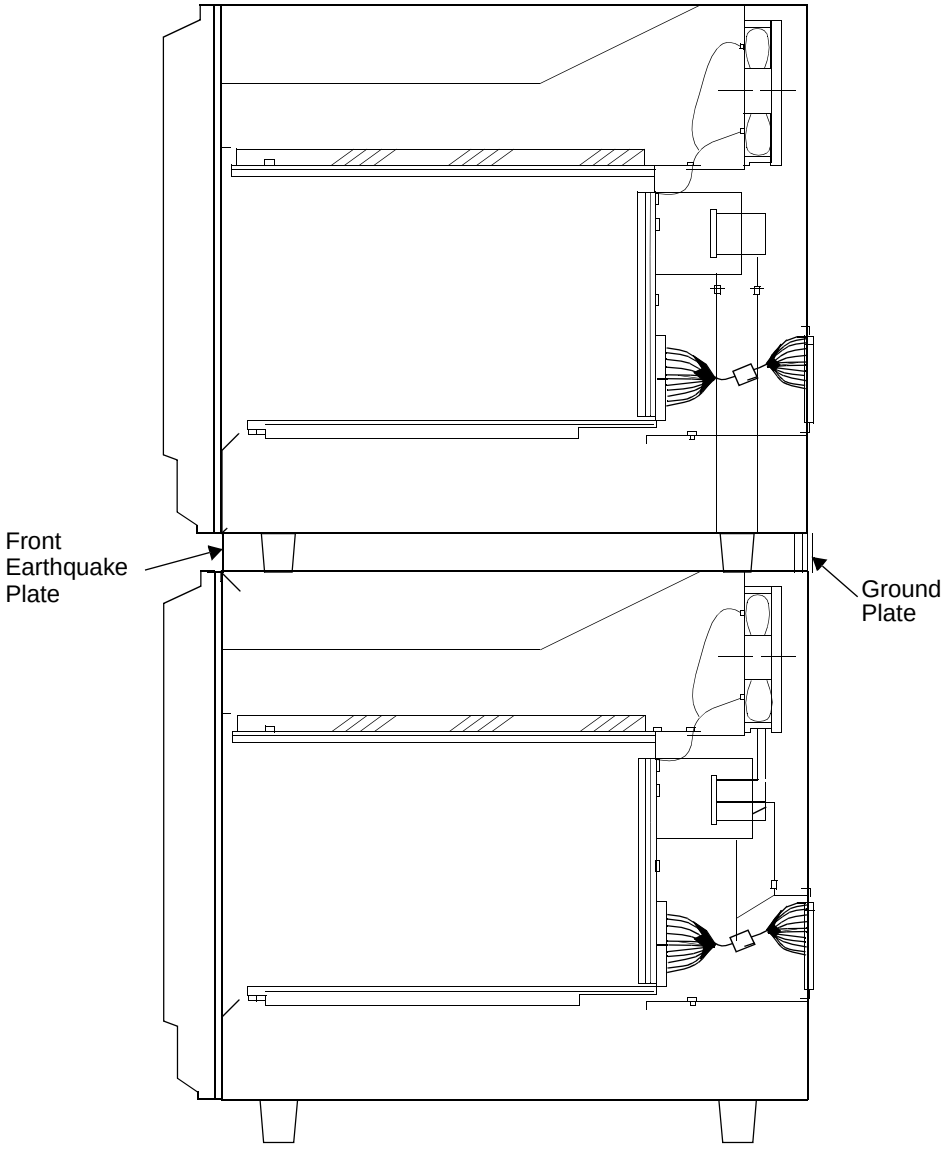


Figure 3-9. Ground Plate and Earthquake Front Plate

Installing Grounds for the Coupled Bonding Conductor

A Coupled Bonding Conductor (CBC) must be tie-wrapped to all trunk cables. The CBC connects the cabinet single-point ground block to the approved ground located nearest the telephone company-owned protector block at the building entrance facility (see the following figure).

NOTE:
The CBC is a conductor that is connected to ground and run adjacent to the pairs in an inside wiring cable. The mutual coupling between the bonding conductor and the cable pairs reduces potential differences in terminating equipment. The conductor consists of a 10-AWG wire that is tie-wrapped to the inside wiring cable.

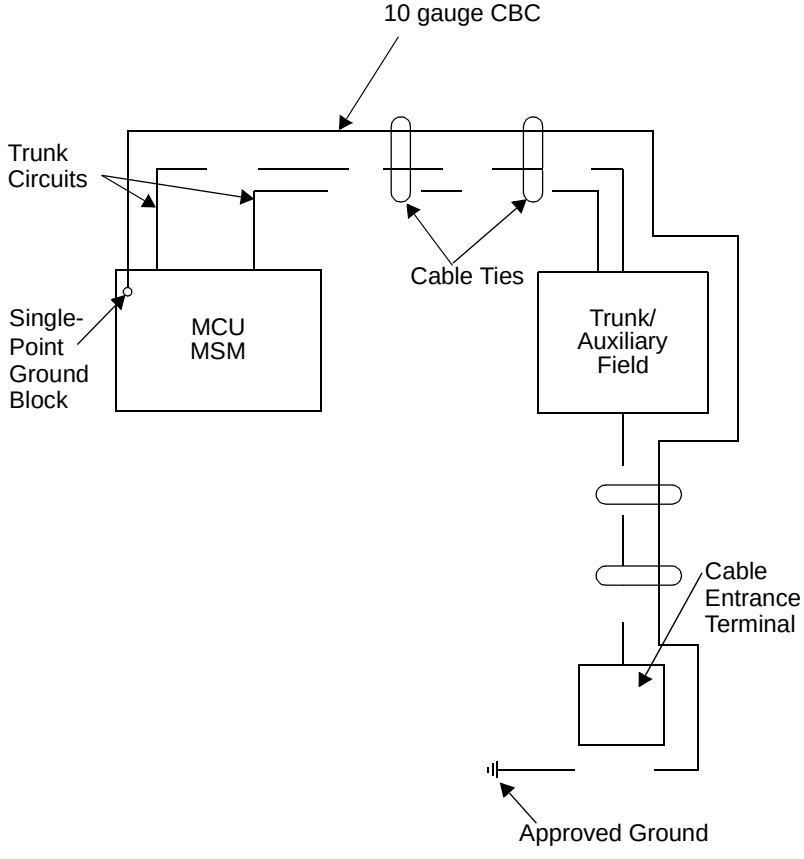


Figure 3-10. Installing the Coupled Bonding Conductor

Approved Grounds

An approved ground is the closest acceptable medium for grounding the building entrance protector, entrance cable shield, or single-point ground of MCU equipment. If more than one type of approved ground is available on the premises, the grounds must be bonded together as required in Section 250-81 of the National Electrical Code. See Chapter 2, “Grounding” for a list of approved grounds.

DANGER:

If the approved ground or approved floor ground can only be accessed inside a dedicated power equipment room, then only a licensed electrician should make the connections to the ground.

Connecting AC Power to Single-Carrier MSMs

NOTE:

For DC-powered MCUs, skip to "Connecting DC Power to Single-Carrier MSMs" on page 3-22.

To confirm that an MCU is AC-powered, look at the front tab on the power supply (the hinge on the circuit board). The number “1271A” identifies the power supply as AC. The AC power is either 120v, 60 cycle or 240v, 50 cycle.

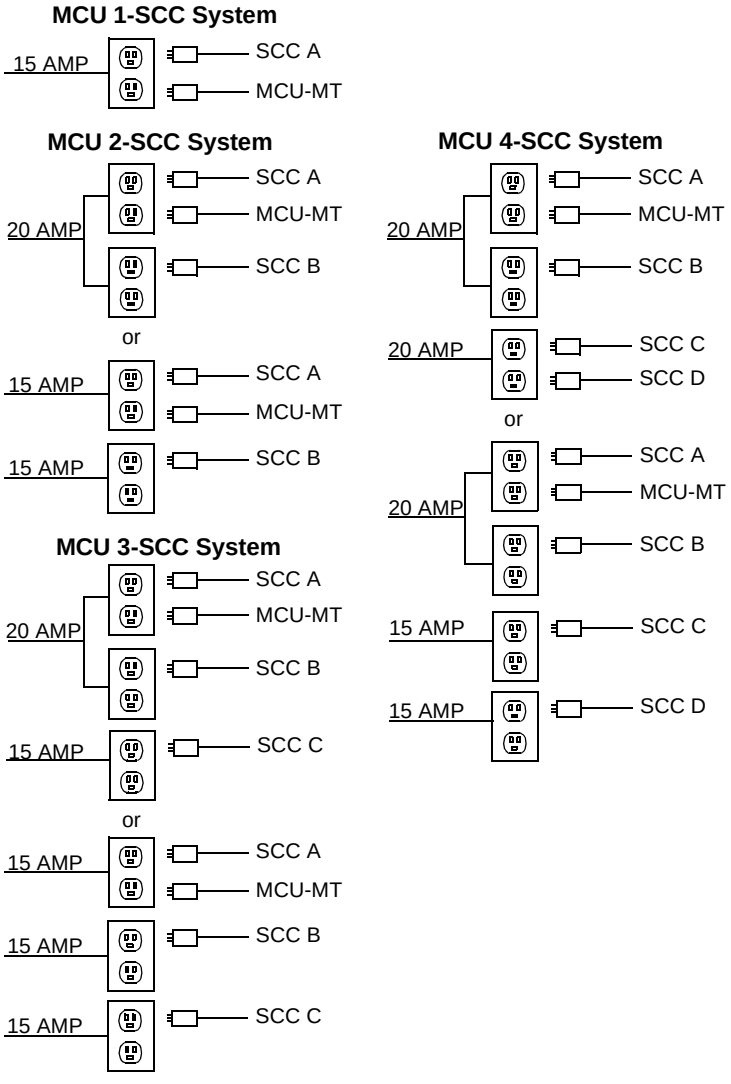


Figure 3-11. Typical AC Power Receptacle Requirements for SCC Systems

Grounding

Grounding is relatively simple for the AC-powered MCU; a single ground wire is connected from the MSM to an approved ground. Grounding must comply with the general rules contained in Article 250 of the National Electrical Code, NFPA 70. The MCU requires a properly grounded 3-prong AC power receptacle for safe operation.

⚠ CAUTION:
Do not cut or remove the third ground prong from the Lucent Technologies power cord. Do not use 2-wire extension cords or adapters, as this defeats the safety feature of the equipment. If the customer only has a 2-prong receptacle, have it replaced with a properly grounded 3-prong one by a qualified electrician.

Checking 120 Volt AC Power

1. Before beginning equipment installation, use an outlet tester or voltmeter to check the AC receptacle for the presence of ground.
2. Before powering up, check the AC power.

⚠ DANGER:
High voltage present.

a. Using a digital voltmeter (VM), set the AC voltage range scale to greater than 250 volts AC.
b. Measure voltage between the hot side and the neutral side of the receptacle.
c. Verify that the voltage measured from Phase to Neutral is 110 to 125 volts AC. Correct any power problem before proceeding.
d. Measure voltage between the phase side of the receptacle and receptacle ground.
e. Verify that the voltage between the phase side of the receptacle and the receptacle ground reads between 110 and 125 volts AC. Correct any power problem before proceeding.
f. Measure voltage from Neutral to Ground.
g. Verify that the meter reads less than 1 volt AC. Correct any grounding problem before proceeding.

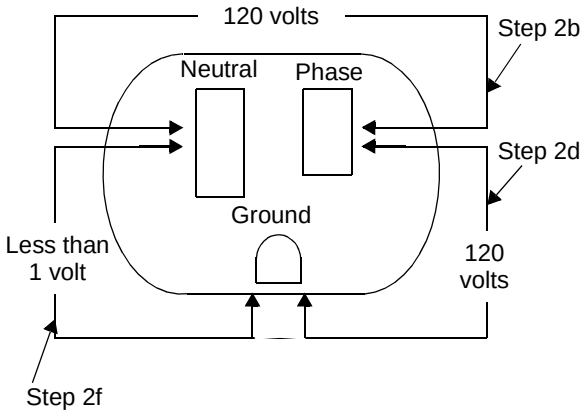


Figure 3-12. Three-Prong 120 Volt AC Receptacle

Connecting AC Power to the ESCC/SCC

Each ESCC/SCC has its own power supply, and the circuit breaker is located on the rear of each power supply.

1. Verify that the circuit breakers are in the OFF position.
2. At the lower left rear of cabinet A, connect a 6-AWG ground wire to the MSM ground bar. Use a screwdriver to loosen and tighten the bolts that secure the ground wire to the ground bar.

   NOTE:
   All approved grounds must be bonded together to form a single grounding electrode system.

3. Run the 6-AWG ground wire to an approved ground. The approved ground must be identified with an Lucent Technologies ground tag (FORM 15657NR or equivalent).
4. Connect a 10-AWG wire to the MSM ground bar. This ground wire (coupled bonding conductor) will later be tie-wrapped to the trunk cables and terminated at the coupled-bonding conductor-terminal bar at the MCU's cross connect field.
5. Connect the SCC AC line cords first to the SCCs and then to the AC power receptacle.

   NOTE:
   An external, commercial Uninterruptible Power Supply (UPS) or a battery backup arrangement may be used. Standby power is engineered to customer needs depending on the MCU size and configuration.

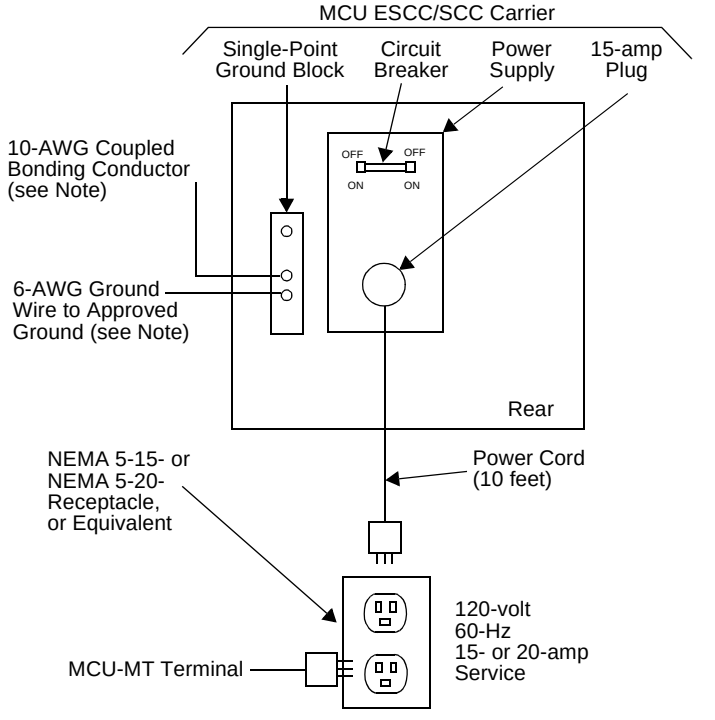


Figure 3-13. Typical Grounding and Power Arrangement

Connecting DC Power to Single-Carrier MSMs

First, verify the label near the circuit breaker on the power supply toward the rear of each MSM corresponds to the local voltage type.

DANGER:

*If the label is different than the voltage type at the site, notify your Lucent Technologies representative immediately for a replacement power supply. Do **not**, under any circumstances, connect an incorrect power supply to DC power.*

DC Power Connections

A 30 Foot (9 meter) cable connects to each MSM. A special connector on one end of the cable is plugged into the cabinet power connector. The cable must be cut to length and terminated inside the J58890R DC Power MSM.

Each rectifier assembly can supply up to 50 Amps of DC current. A minimum of two rectifiers are installed in each DC Power MSM to supply a total of 100 Amps. A third rectifier assembly can be installed and is used as a backup (N+1). Each Single-Carrier MSM can pull up to 15 Amps. Up to three DC Power MSMs can be stacked to supply power to Single-Carrier MSM stacks.

Figure 3-14 shows a typical power and ground layout for a DC-powered system without a J58890CG DC Power Distribution Unit. The J58890CG is required if the distance between the DC Power MSM(s) is greater than 30 feet (9 m). Figure 3-15 shows a typical power and ground layout for a DC-powered system containing a DC power distribution unit.

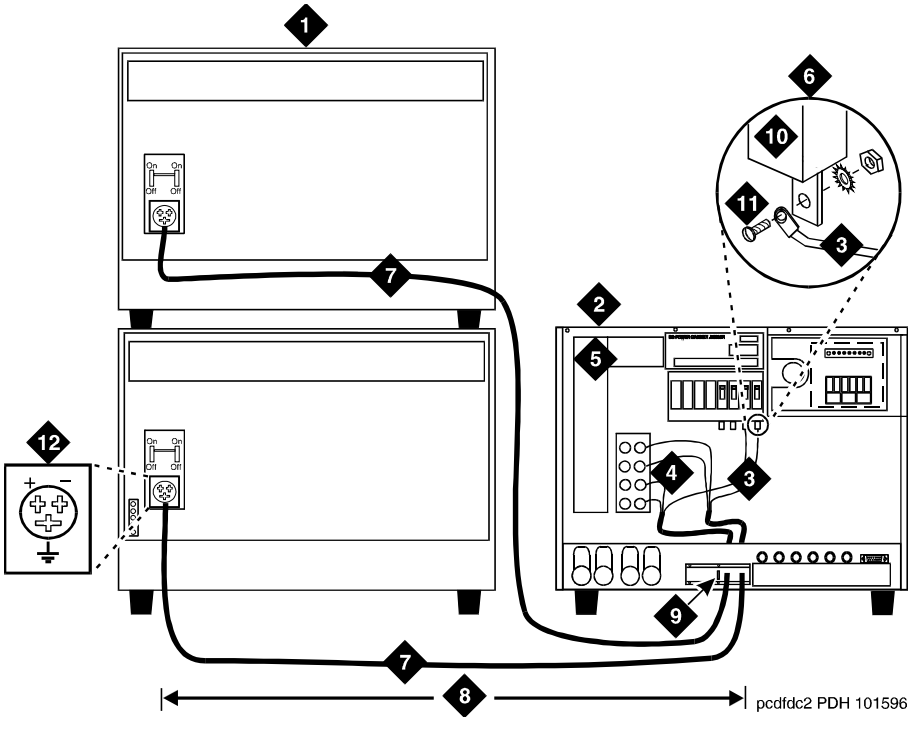


Figure Notes

1. System MSM Stack
2. DC Power MSM
3. White Wires
4. Green Ground Wires and Black Wires Connect to the -48 VDC Return Bus
5. -48 VDC Bus
6. Connect White Wires to Circuit Breakers
7. DC Power Cable (H600-436, G1) to Power Connector on Each MSM. Cut to Length and Crimp a Ring Terminal Onto Each Wire
8. 30 Feet (9 m) Maximum
9. Route Cables Through Sliding Door
10. Circuit Breaker
11. Supplied #10-32 Screw, #10 Star Washer, and #10-32 Hex Nut
12. Inset Showing DC Power Connector (Male)

Figure 3-14. Typical DC Power Connections

DC Power Connections with DC Distribution Unit

A 10 foot (3 meter) power cord is equipped with the appropriate connectors. In the configuration shown in Figure 3-15, each cabinet stack has a DC Power Distribution Unit associated with it.

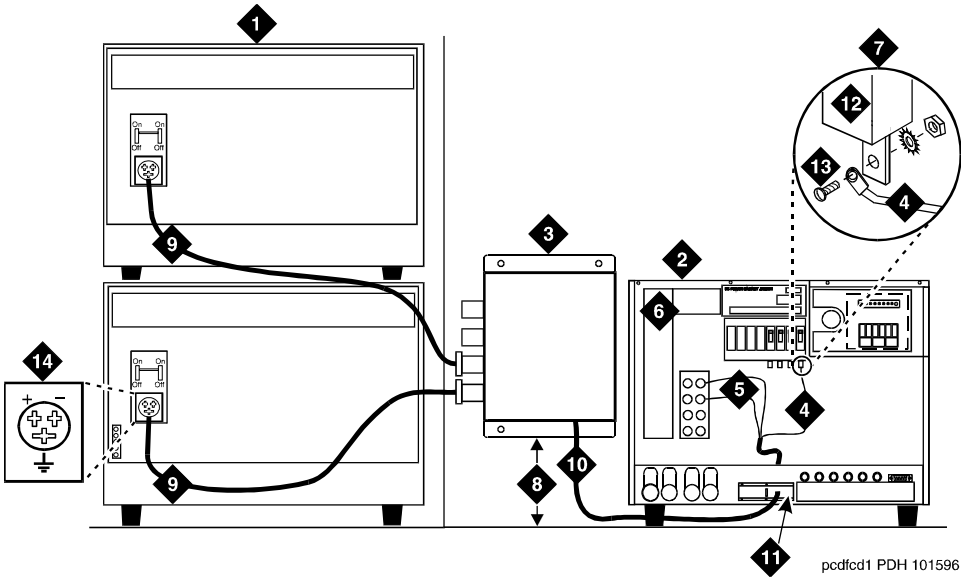


Figure Notes

1. System MSM Stack
2. DC Power MSM
3. DC Power Distribution Unit (Position to the Right of the MSM Stack)
4. White Wire (Connect to Circuit Breaker). See Inset.
5. Green Ground Wire and Black Wire Connect to the -48 VDC Return Bus
6. -48 VDC Bus
7. Inset
8. 12 Inches (30.5 cm) From Floor to DC Power Distribution Unit
9. DC Power Cable to Power Connector on Each MSM
10. DC Power Distribution Unit Power Cord (Route to Rear of DC Power MSM)
11. Route Power Cord Through Sliding Door
12. Circuit Breaker
13. Supplied #10-32 Screw, #10 Star Washer, and #10-32 Hex Nut
14. Inset Showing DC Power Connector (Male)

Figure 3-15. Connections Using DC Power Distribution Unit

Installing the Multicarrier MSM

The MCU MCC-MSM is shipped in a polyethylene bag packed in a cardboard container. The MCC-MSM is fastened to a wood/styrofoam pallet by four carriage bolts. The cardboard container is strapped to the pallet by two metal bands.

The cardboard container is strapped to the pallet with a metal band.

DANGER:
The MCC-MSM may weigh as much as 800 pounds and be top-heavy. Use extreme caution.

Unpacking and Inspecting

1. Check the status of the SHOCKWATCH and/or TILTWATCH indicators on the cardboard container. These indicators are usually white. If the container has been jarred or tilted beyond specifications, the indicator will be red, indicating potential damage. Report any indication of damage per local instructions.
2. See DANGER. Cut and remove bands.

DANGER:
Take care to avoid injury while cutting and removing bands.

3. Determine which cabinet contains the ramp and open it first.
   The carton containing the ramp will have a “ramp enclosed label’’ on it.
4. See CAUTION. Cut the tape holding the container together.

CAUTION:
Deep knife penetration may damage the MCC.

5. Remove all cardboard, tape, and plastic from the MCC.
6. To open the MCC doors, use a screwdriver to turn the screws clockwise. The screws are located on the front and rear doors to release the door latches (see the following figures).
7. Lift off the front and rear doors (do not remove the screws from the door hinges).

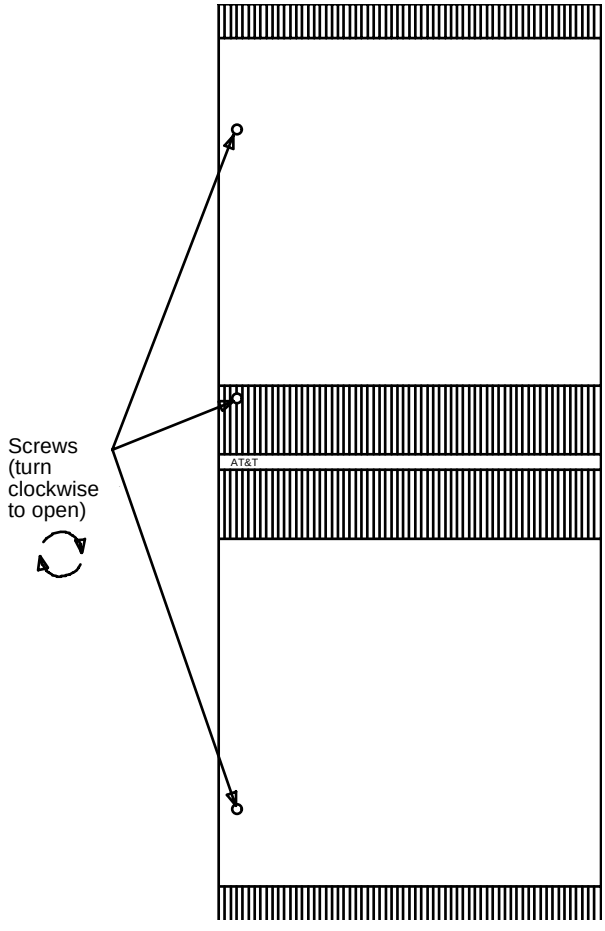


Figure 3-16. Location of MCC Door Latches (Front)

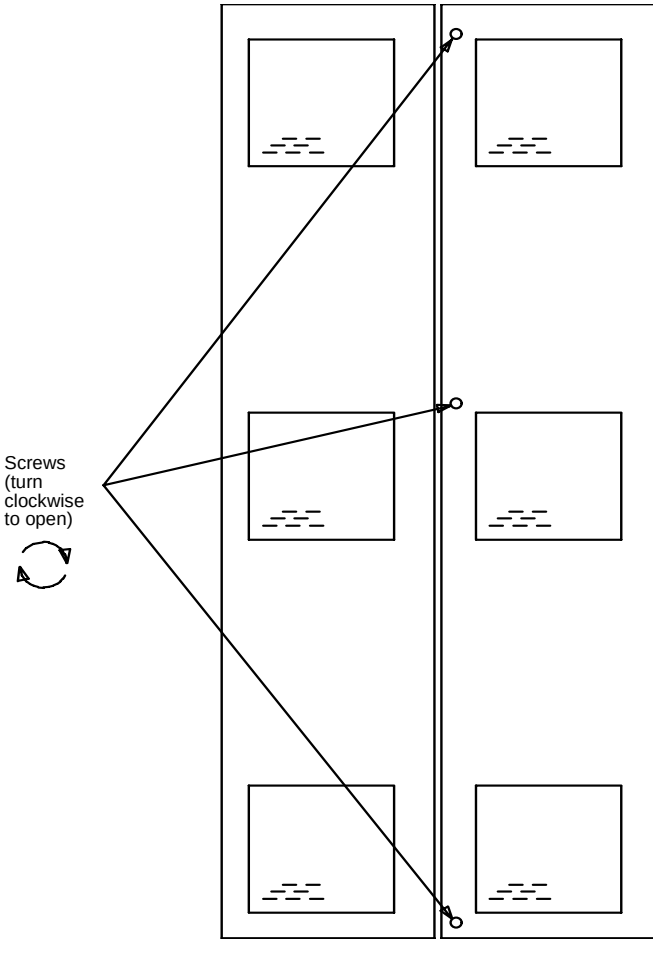


Figure 3-17. Location of MCC Door Latches (Rear)

8. Remove all packing material from inside the MCC.
9. Inspect the MCC for any damage caused during shipping. Report any damages per local instructions.
10. Use an adjustable wrench to remove the carriage bolt nuts located at each bottom corner of the MCC.
11. Drive the carriage bolts downward until they clear the MCC.
12. Remove the ramp from the side of the MCC carton.
13. Remove the power cord stored under or inside the MCC of AC-powered systems, and lay it over the top of the MCC.

14. Remove the supporting block of wood by raising the rear corner of the MSM using a pry bar (if necessary). Repeat for the other rear corner of the MSM.
15. Screw the MSM stabilizing bolts all the way up to provide clearance between the MSM and the pallet when the MSM is rolled down the ramp.
16. Place the ramp as shown in Figure 3-17 on page 3-27. Bolt it into position using the bolts provided in the plastic bag attached to the ramp.
17. Hold both sides of the rear of the MSM. (It is recommended that another technician assist in moving the MSM.)
18. Roll the MSM off the ramp and onto the floor.

Connecting the Carriers in Multicarrier MSMs via TDM/LAN Bus Cabling

TDM/LAN extension cables (WP-91716) connect the carriers in each multicarrier MSM. These cables are flat ribbon-type cables that go to the connectors labeled “TDM/LAN” on each carrier backplane. The cable is 15 ft. long across the five carriers within an MSM. The cable (WP-91716 L7) connected across the fans between the carrier in position A and the carrier in position D is longer than the other cables (WP-91716 L6).

Each end of the TDM/LAN bus in a cabinet is terminated on a carrier backplane by a TDM/LAN terminator (ZAHF4) installed in a TDM/LAN connector. If a carrier is not in place (for example, if a port carrier is not in position E), the terminator is installed in the previous carrier (for example, the port carrier in position D).

The following figure provides a rear view of the TDM/LAN bus cabling for a fully loaded multicarrier MSM configuration.

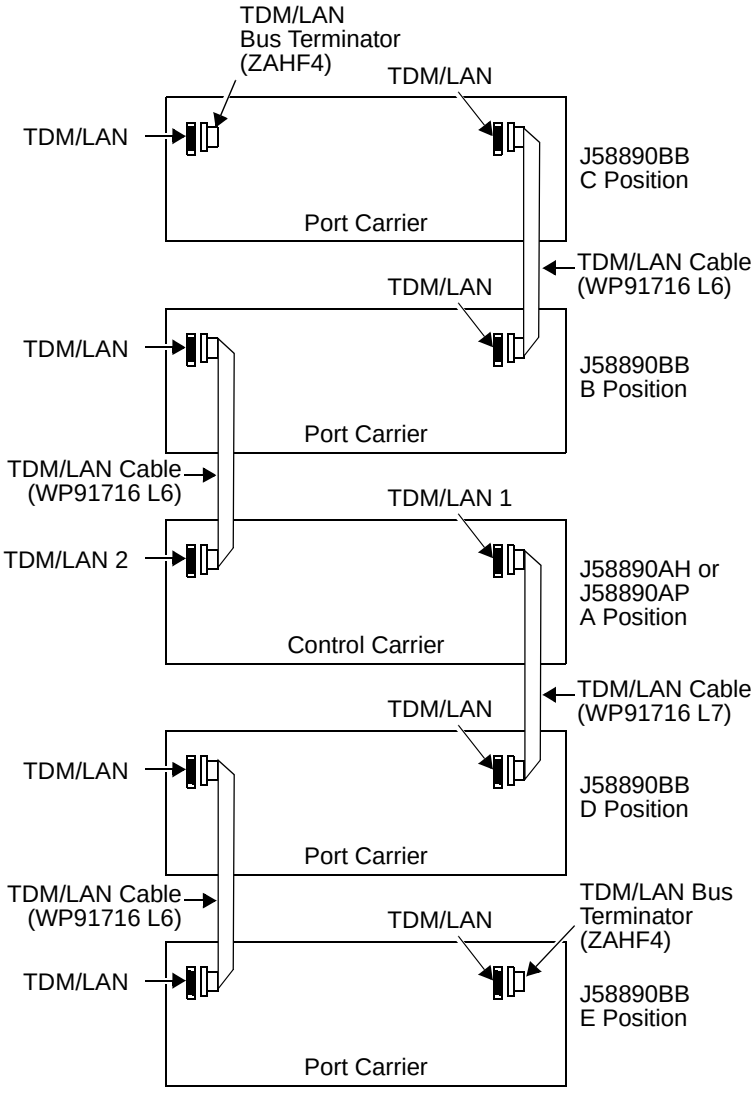


Figure 3-18. TDM/LAN Bus Cabling — Rear View of a Fully Loaded Multicarrier MSM Configuration

Positioning the MSM

Roll the MSM into position at the designated location. See Caution.

CAUTION:
If your system is supplied with cable ductwork, the MSMs must be spaced on 32-inch centers (+-1/8 in). The MSMs must also be level and square with respect to one another. These precautions are advised to prevent problems with ductwork installation. If your system is supplied with slack managers, the MSMs must be placed far enough from the connection field to lay down the (32-inch) slack managers and to provide a little extra room for the cables to access the managers.

NOTE:
Check location of the AC power receptacle. The receptacle must be on a separately fused circuit that is not controlled by a wall switch. It must be located within 10 feet of where the power cord leaves the base of the MSM and should be located outside the cross-connect field area.

Adding Earthquake Protection (If Provided)

1. If earthquake protection is required on a concrete floor:
    a. Insert a pencil or marker through the holes previously occupied by the carriage bolts (front and rear) in the bottom of the MCC, and mark the floor directly beneath each hole.
    b. Roll the MCC out of the way and drill four 1/2-inch diameter holes (about 1-1/2 inches deep) at the spots marked in the previous step.
    c. Insert anchors in the holes.
    d. Roll the MCC back into place, and align the MCC holes over the holes in the floor.
    e. Repeat this procedure from the beginning for each MCC being installed.
    f. When all MCCs are in place, adjust their leveling legs until the MCCs are level. See Caution.

CAUTION:
If your system is supplied with cable ductwork, the MCCs must be level from front to rear and from side to side. They must be square with respect to one another to within + or -1/8 in.

    g. Secure the MCC(s) to the floor with a 3/8-16 X 4.5-inch bolt and flat washer.

2. If earthquake protection is required on a raised computer floor over a concrete sub-floor:

    a. Insert a pencil or marker through the holes previously occupied by the carriage bolts (front and rear) in the bottom of the MCC(s), and mark the floor directly beneath each hole.

    b. See CAUTION. Drill four holes 5/8 inch in diameter through the floor panels marked in step a.

CAUTION:
Take care while drilling the holes through the raised floor that the drill bit does not penetrate any cables beneath the raised floor that would cause damage to the cable or injury to the installer.

    c. Insert a long punch through the hole drilled in step b and mark the concrete floor beneath the raised floor.

    d. Remove the raised floor panel(s) in which the holes were drilled in step b.

    e. Drill four holes 1/2 inch in diameter and 1-1/2 inches deep at the spot marked in step c.

    f. Insert the anchors in the holes.

    g. Replace the floor panel(s) removed in step d.

    h. Repeat this procedure from the beginning for each MCC being installed.

    i. When all MCCs are in place, adjust their leveling legs until the MCCs are level. See Caution.

CAUTION:
If your system is supplied with cable ductwork, the MSMs must be level from front to rear and from side to side. They must be square with respect to one another to within + or -1/8 in.

    j. Fasten the MSM to the floor.

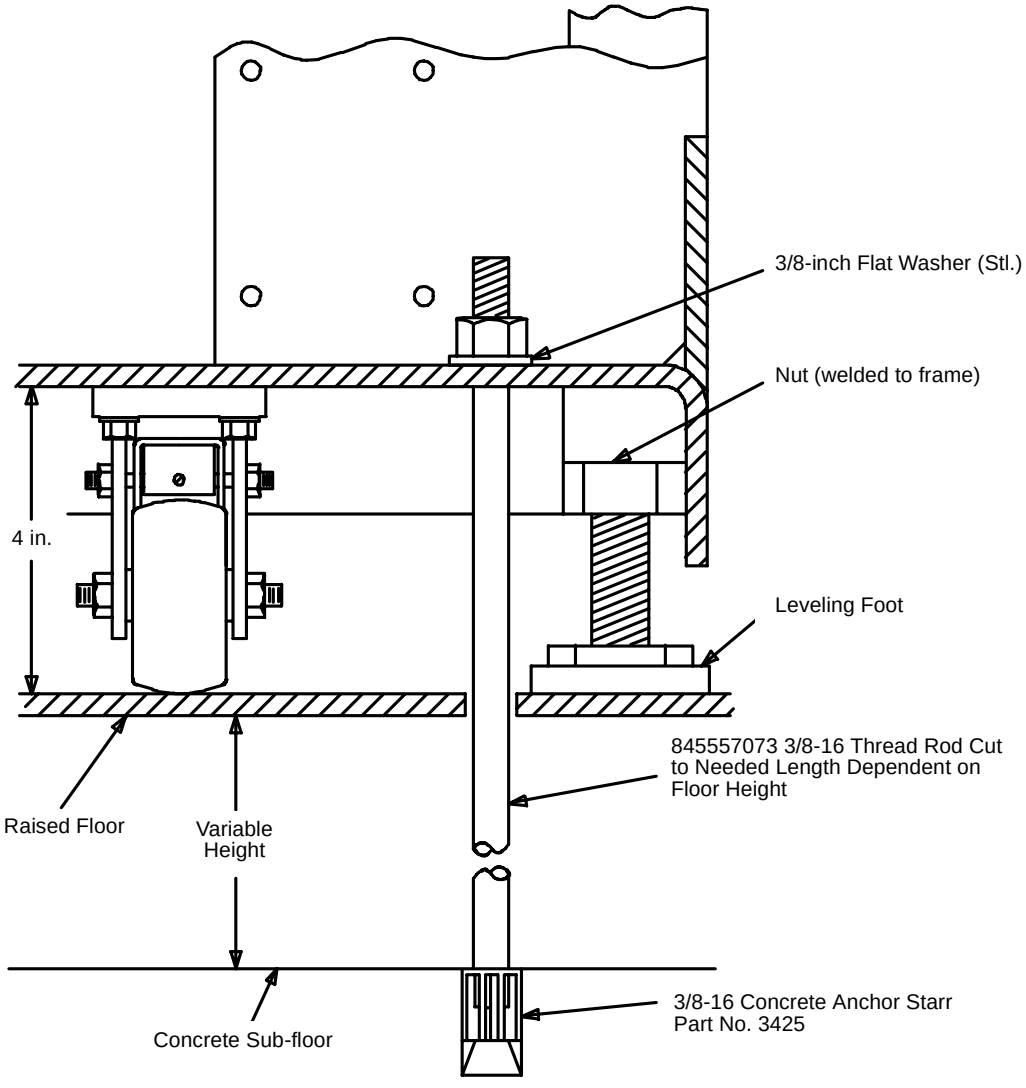


Figure 3-19. Earthquake Mounting—Computer Raised Floor

Completing Cabinet Installation (Earthquake Protection not Provided)

1. Repeat the appropriate procedures from the previous sections for each MCC being installed.
2. When all MCCs are in place, adjust their leveling legs until the MCCs are level. See Caution.

CAUTION:
If your system is supplied with cable ductwork, the MCCs must be level from front to rear and from side to side. They must be square with respect to one another to within + or -1/8 in.

3. Adjust and lock the cabinet stabilizing bolts to keep the MCC from moving.
4. At the bottom of the MCC, install hole plugs (provided with the MCC) in the holes previously occupied by the four carriage bolts.

Connecting AC Power to Multicarrier MSMs

The following procedures apply to AC-powered MCC-MSMs for MCUs.

The following figure shows a typical AC power and grounding layout. The switch may be powered by a 120 volt, a 220 volt, a 208 volt, or a 240 volt AC source, depending on which is required for the particular installation. The power circuit must be dedicated to the switch. It must not be shared with other equipment, and it **must not be** controlled by a wall switch. The AC receptacle should not be located under the cross-connect field. (The coupled bonding connector shown in the illustration is described later in this chapter.)

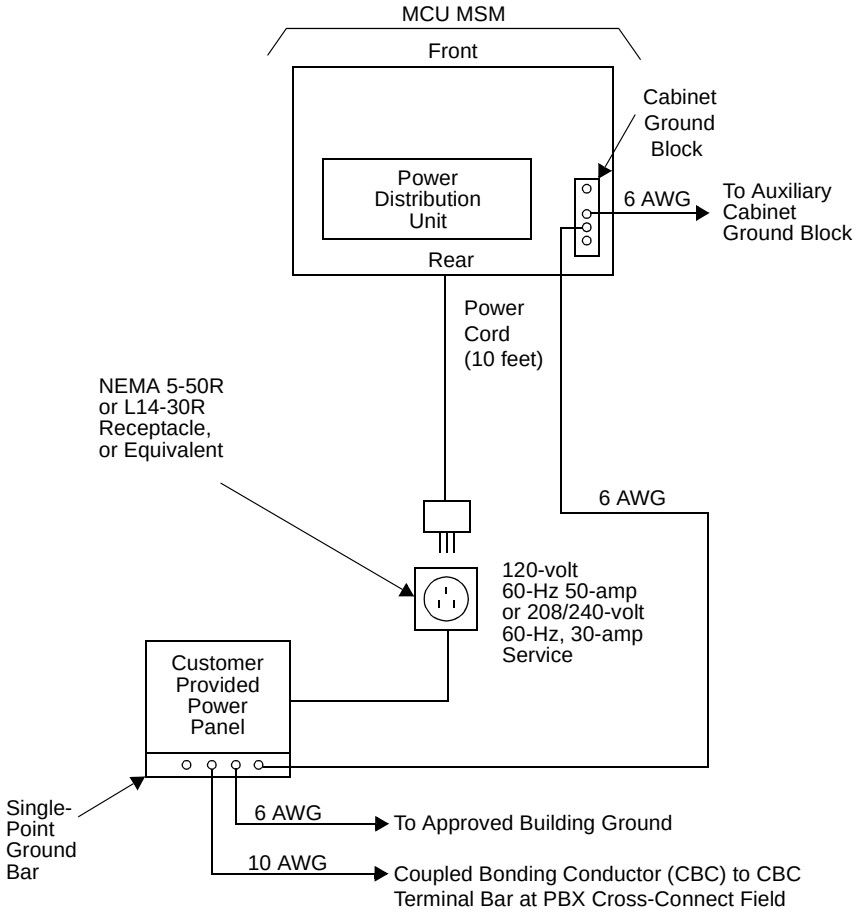


Figure 3-20. Typical AC Power and Grounding Arrangement for a MCC-MSM

It is necessary to note the difference between 208 volt and the other kinds of AC power. The most common power arrangements currently in use are single-phase 3-wire and three-phase 4-wire wye systems. Both arrangements are illustrated in the following figures. On a three-phase 4-wire system, 208 volt can be obtained from any two phases of the three-phase system. Either method is satisfactory as long as 208 volt three-phase or 220 to 240 volt single-phase 50 to 60 Hz AC, centered around a neutral connection, is furnished at the correct amperage capacity and meets the national and local electrical codes.

The type of power required by a MCC-MSM is given on its rear door. The type of power required by a SCC-MSM is also given on its rear cover.

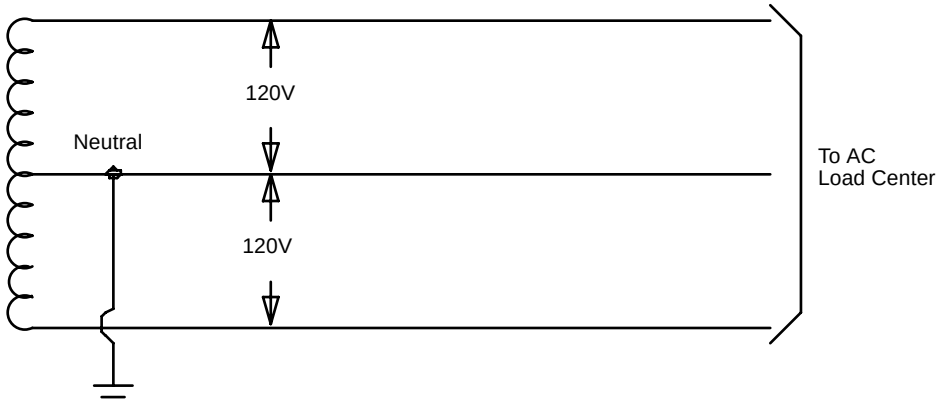


Figure 3-21. Single-Phase 3-Wire (220 to 240 VAC) System

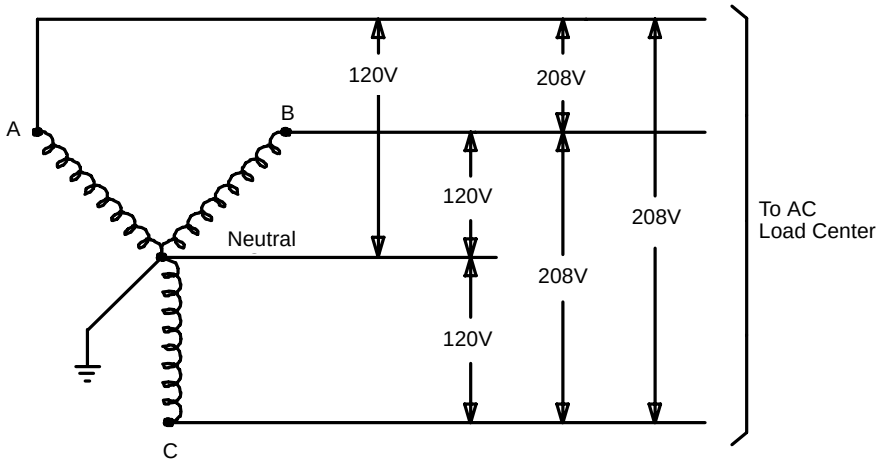


Figure 3-22. Three-Phase 4-Wire Wye 208 VAC System

Connecting to 50Hz Power through a Customer-Provided Transformer

International 50 Hz commercial power is often supplied without a centered neutral connection. In situations like this, the power must be transformed to work with the MCU. Use a transformer with a single-phase tapped primary and a center-tapped secondary to provide compatible power. The following illustration shows an example of a properly wired transformer.

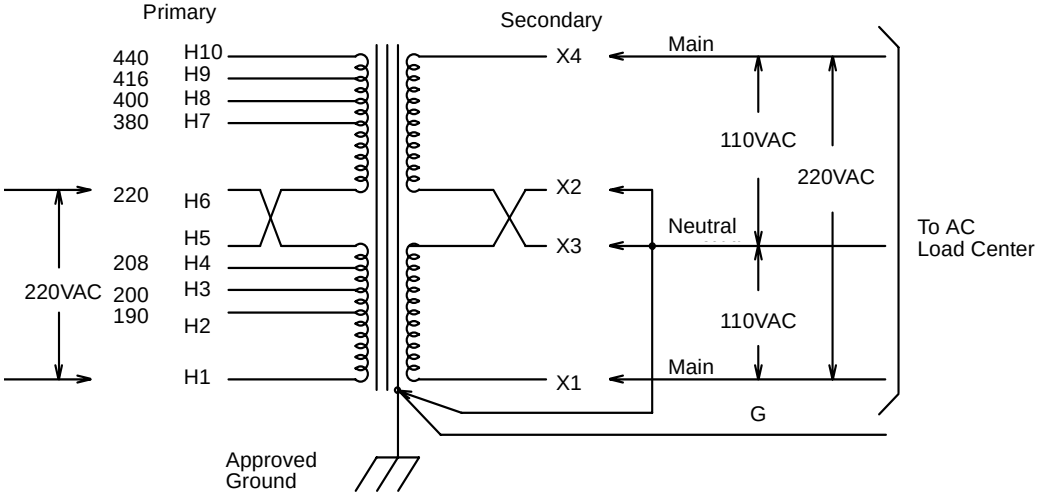


Figure 3-23. Typical Center-Tapped Isolation Transformer

Transformers of several capacities are available. The size of the transformer specified for your system depends on the current requirements of the system. The following table shows a selection of transformers available for use with MCC-MSM
systems. (The **Square-D** part number 3S67F transformer, a 3KVA model, is adequate to power one typical MSM.)

Table 3-1. International 50Hz Transformers

Capacity	Square-D Part No.
3.0 KVA	3S67F
5.0 KVA	5S67F
7.5 KVA	7S67F
10.0 KVA	10S67F
15.0 KVA	15S67H
25.0 KVA	25S67H

Connecting Grounding

CAUTION:
Grounding of the system shall comply with the general rules for grounding contained in Article 250 of the National Electrical Code, NFPA 70.

Grounding is relatively simple for an AC-powered switch. Basically, the cabinets are connected to each other. Then, a single ground wire is connected from the MSM to the single-point ground terminal (SPGT) bar at the AC load center (or optional AC protector cabinet). The SPGT bar is connected to your approved ground by 6-AWG wire.

Coupled Bonding Conductor

This conductor is connected to the single-point ground-terminal bar and run adjacent to pairs in an associated cable. The mutual coupling between the bonding conductor and the pairs reduces potential differences in terminating equipment. The conductor consists of a 10-AWG wire that is tie-wrapped to the inside wiring cable and terminated at the coupled-bonding conductor-terminal bar at the PBX cross-connect field.

DANGER:
If the approved ground or approved floor ground can be accessed only inside a dedicated power equipment room, connections to this ground should be made by a licensed electrician.

All approved grounds must be bonded together to form a single grounding electrode system.

To connect ground, do the following.

1. At lower right rear of the MSM, connect a 6-AWG ground wire to the MSM ground bar (Figure 3-20 on page 3-34). See the accompanying note.

   NOTE:
   An 1/8-inch allen wrench is required to loosen and tighten the bolts securing the ground wire to the ground bar.

2. Run the ground wire to the single-point ground-terminal bar at the AC load center (shown as “power panel’’ in Figure 3-20 on page 3-34).
3. Run the ground wire to the the MSM, and connect it to the MSM ground bar (Figure 3-21 on page 3-35).
4. At the AC load center, connect a 10-AWG wire single-point ground-terminal bar. This ground wire (coupled bonding conductor) will later be tie-wrapped to the trunk cables and connected to the coupled bonding conductor ground bar at the cross-connect field and finally terminated at the customer-provided load center (Figure 3-21 on page 3-35).

Checking Commercial Power

Before powering up system, check the AC power.

1. Set KS-20599, list 4-digital voltmeter (VM), or equivalent, to AC voltage range scale greater than 250 VAC.
2. See DANGER. Measure voltage at receptacle (Figure 3-24 on page 3-39).

DANGER:
High voltage present.

3. Is the MCU being powered by a 120 volt, a 208 volt, or a 240 volt source? If powered by a 120 volt source, verify that the meter reads 104 to 129 VAC. If your source is powered by a 208 or 220/240 VAC, verify that the meter reads 104 to 129 VAC between neutral and either hot line. If the power source is not within tolerance, correct the problem. Then recheck the power levels.

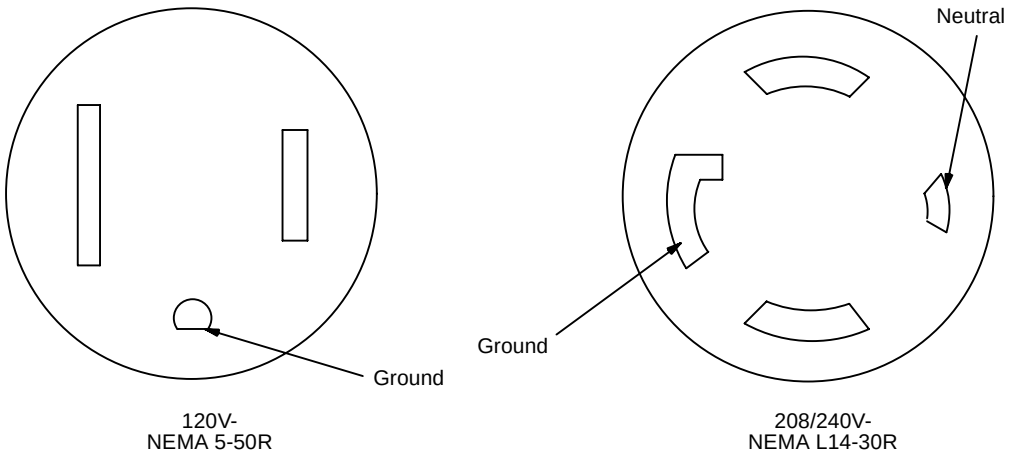


Figure 3-24. AC Receptacle

Connecting Battery Leads (J58890CH-1)

Figure 3-25 shows a typical optional small battery holdover assembly. These assemblies may ship with the battery leads disconnected to prevent the batteries from discharging.

1. Plug the battery connector into the -48 VDC Batteries connector on the rear of the J58890CH-1 Power Distribution Unit.

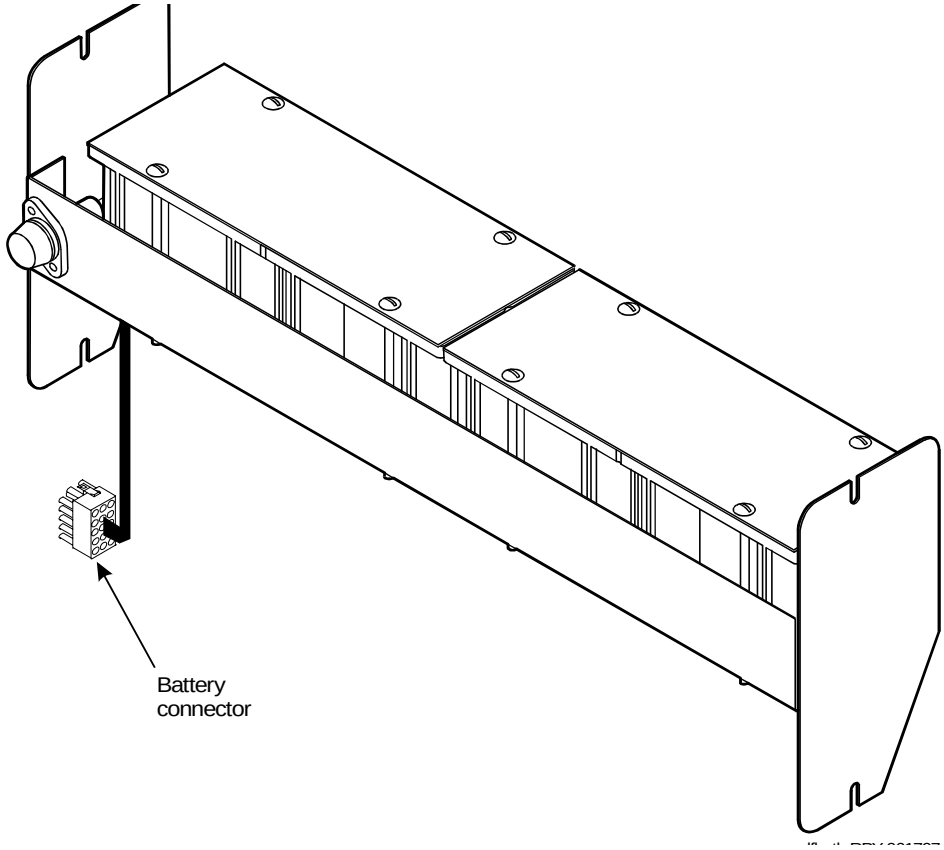


Figure 3-25. Typical Small Battery Assembly

CAUTION:
Power is present in the cabinet even if the AC power cable is unplugged. Turn off the main circuit breaker on the front of the power distribution unit when procedures require ALL power to be removed from the MSM.

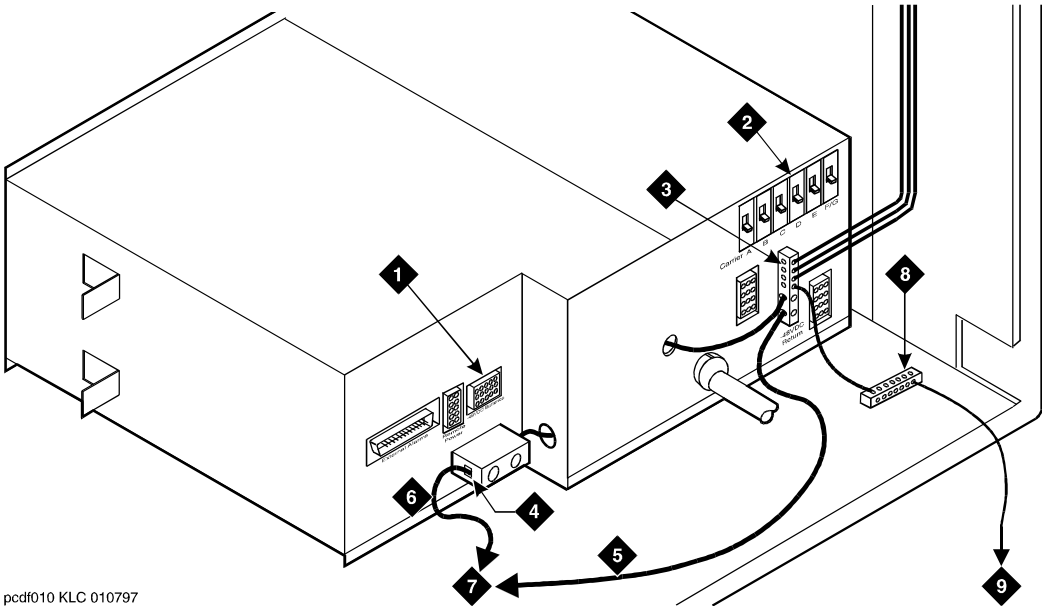


Figure Notes

1. Connect small battery holdover cable (or temperature sensor cable from large battery cabinet) to J20
2. Carrier Circuit Breakers
3. Ground Terminal Block
4. Connect large battery holdover cable here
5. -48 VDC Return - 1/0 AWG (50 mm^2) cable
6. -48 VDC - 1/0 AWG (50 mm^2) cable
7. 1/0 AWG (50 mm^2) 50 feet (15.2 m) cable to large battery cabinet. For cables greater than 50 feet (15.2 m), contact your Lucent Technologies representative.
8. Ground Terminal Block
9. To AC load center or approved single-point ground block

Figure 3-26. Power Distribution Unit (J58890CH)

2. Be sure the main power to the power distribution unit is OFF.
3. At the power distribution unit, set all carrier circuit breakers OFF.

Small Battery Holdover

1. Connect the small battery holdover cable to J20. See Figure 3-26.

Connecting Shorting Cable to J58890CE-2

CAUTION:
For MSM with a battery charger, read the caution label on the 397C battery charger before disconnecting batteries.

Some cabinets contain a J58890CE-2 AC Power Distribution Unit without an optional battery charger. Install the shorting cable only when a battery charger is *not* installed.

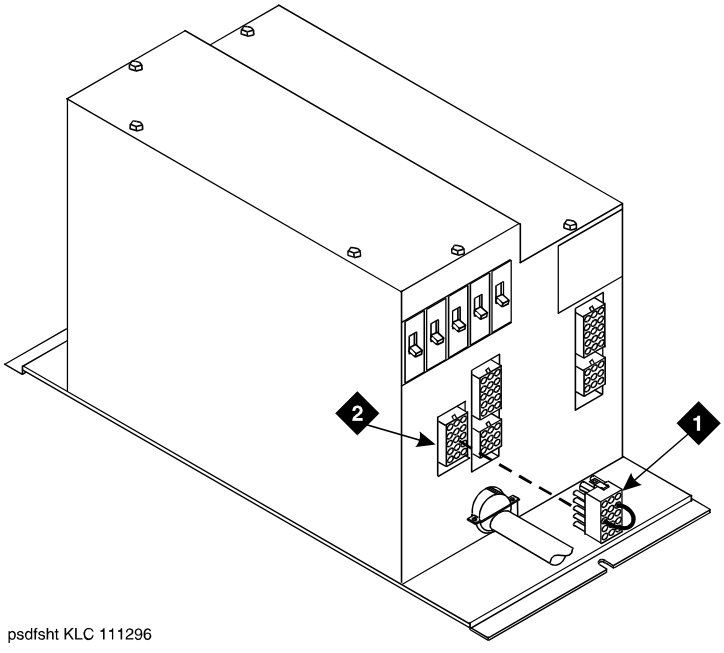


Figure Notes

1. Shorting Cable (H600-442-G1) (If Battery Charger is Not Installed)
2. J11

Figure 3-27. Shorting Cable Installation

1. Set the circuit breakers on the power distribution unit OFF. See Figure 3-27.
2. At the rear of the MSM, insert the shorting cable (H600-442-G1) into J11. The cable is keyed so it can fit only one way.

Connecting AC Power

The main circuit breaker on a MCC-MSM is located on the front of the AC/DC power distribution unit (Figure 3-24 on page 3-39).

1. Verify that the circuit breakers are in the **OFF** position.
2. Connect cabinet AC line cords to AC power receptacles (Figure 3-24 on page 3-39).

Connecting DC Power to Multicarrier MSMs

Refer to the "-48VDC Input Power Requirements" table in the "Connecting DC Power to Single-Carrier MSMs" section earlier in this chapter for the input parameters required for MCC-MSMs powered by a -48VDC battery plant.

The following illustration shows a typical power and grounding layout for a DC-powered MCC-MSM. The size of the wire required for the -48 volt DC and -48 volt return must be engineered to ensure the **-48 volt DC supplied by the battery plant to the MSMs will be maintained between -42.5 and -52.5 volt DC at all times** to ensure proper operation and to prevent hardware damage.

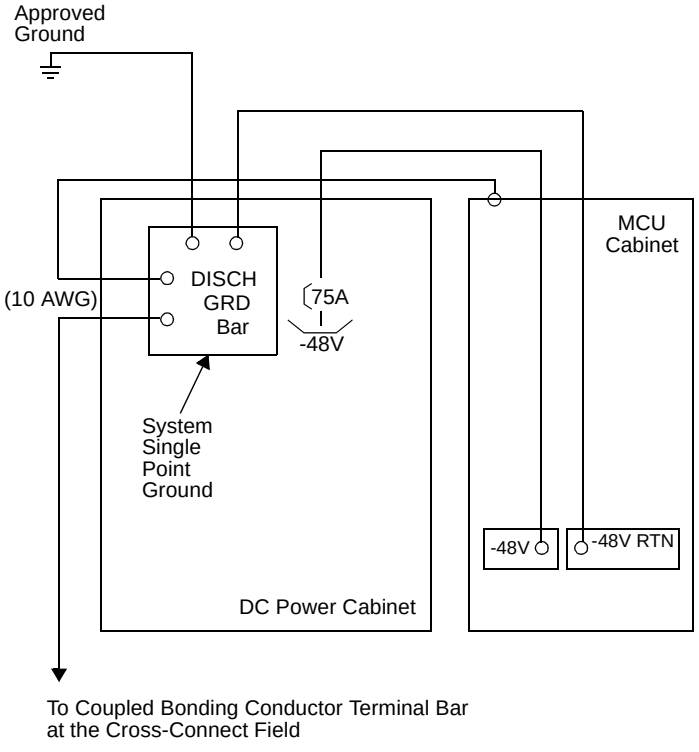


Figure 3-28. Power and Grounding Arrangement for DC-Powered MCC-MSM

Connecting Grounding

CAUTION:
Grounding of the system shall comply with the general rules for grounding contained in Article 250 of the National Electrical Code, NFPA 70.

The grounding scheme for the DC-powered switch is more complex than that of an AC-powered switch.

Coupled Bonding Conductor

This conductor is connected to the single-point ground-terminal bar and run adjacent to pairs in an associated cable. The mutual coupling between the bonding conductor and the pairs reduces potential differences in terminating equipment. The conductor consists of a 10-AWG wire that is tie-wrapped to the inside wiring cable and terminated at the coupled-bonding conductor-terminal bar at the PBX cross-connect field.

Connecting DC Battery and Power Cabinet Frame Grounds

1. Measure and cut a piece of 6-AWG wire (Comcode 846110971) long enough to reach between the **GROUND CONNECTION** terminal in the DC battery cabinet and the **DISCH GRD** bar in the DC power cabinet.
2. Crimp the terminal lugs on each end of the wire.

   NOTE:
   Terminal lugs are furnished as part of D-181895, Kit of Parts.

3. At the DC power cabinet, connect wire to the **DISCH GRD** bar.
4. Route the wire through one of the holes in the side of the cabinets and terminate it on the **GROUND CONNECTION** terminal in the DC battery cabinet.

Connecting Power Plant Ground

1. At the DC power cabinet, connect a 1-AWG ground wire to the **DISCH GRD** bar.
2. Route the ground wire out of the cabinet and terminate it on the approved ground, as shown in the following figure. The approved ground must be identified with an Lucent Technologies-supplied grounding tag (FORM 15657NR or equivalent).

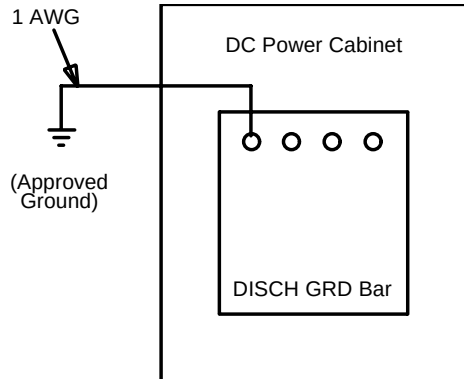


Figure 3-29. Power Plant Grounding

Connecting AC Power to a DC Power Cabinet

1. Have an electrician connect AC power leads to the rectifiers in the DC power cabinet. Each rectifier should have its own branch circuit. Terminate leads on the **AC INPUT** terminal block of each rectifier.
2. Ensure that the associated circuit breakers at the AC power panel are in the **OFF** position.

Connecting System Cabinet Ground Wires

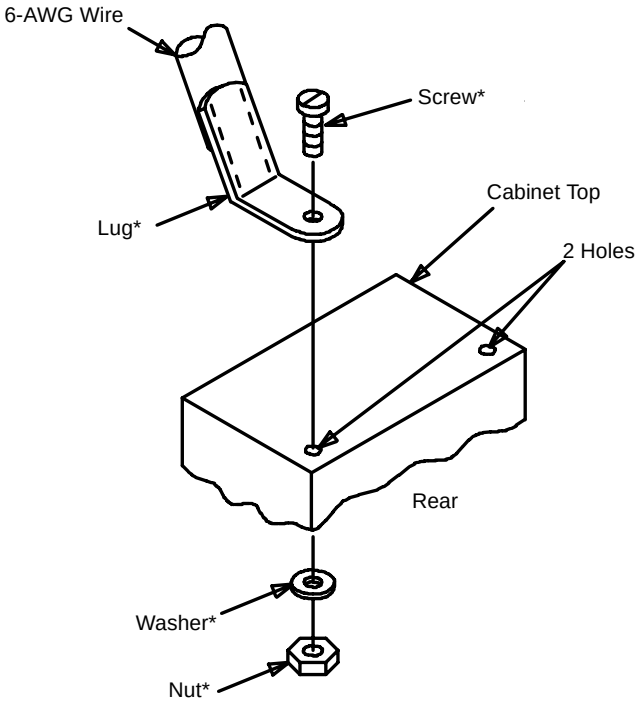
There are two approved methods of grounding the system cabinets. Either method is sufficient. The element common to both methods is that the cabinets that make up the system are wired in a series from the most distant cabinet to the DC power cabinet. You can either wire the tops of the cabinets together or wire the cabinet's ground blocks together. Determine which method the system has been engineered for and then follow the appropriate instructions in the following section.

Connecting Top-Mounted Cabinet Grounds

1. Measure and cut a piece of 6-AWG wire long enough to reach from the **DISCH GRD** bar in the DC power cabinet to the top rear corner of the cabinet, as shown in the next two figures.
2. Crimp terminal lugs on each end of the wire.

   NOTE:
   Terminal lugs are furnished as part of D-181895, Kit of Parts.

3. At the DC power cabinet, connect wire to the **DISCH GRD** bar. Route wire out of DC power cabinet and up to the top rear corner of the MSM.
4. On top of the MSM, terminate the 6-AWG ground wire, as shown in the following figure.



* Included in D-181895, Kit of Parts (Comcode 105434559)

Figure 3-30. MSM Frame Ground Connections

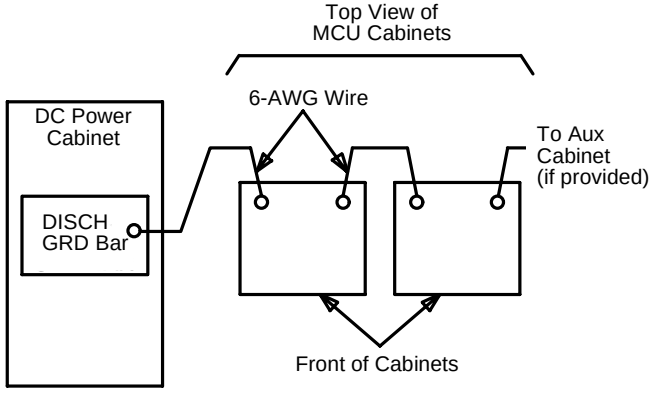


Figure 3-31. Frame Ground Attachment

5. If the switch is equipped with an auxiliary MSM, go to the next step. If it is not, the MSM is grounded and the job is done.
6. Cut a piece of 6-AWG wire long enough to reach between the MSM and the AUX MSM.
7. Crimp terminal lugs on each end of the wire.
8. Connect wire at the top rear corner of the MSM (per the previous figures).
9. Terminate the other end of the wire at the top rear corner of the AUX MSM.

Connecting to the MSM's Ground Blocks

1. At the bottom rear of the MSM (shown in the next figure), use an allen wrench to connect a 6-AWG wire to the MSM ground block.
2. Route the wire out of the MSM and into the DC power cabinet.
3. At the DC power cabinet, terminate the wire on the **DISCH GRD** bar.
4. If the switch is equipped with one or more AUX MSMs, wire from the main MSMs ground block to the first AUX MSMs ground block.
5. Continue to wire serially from ground block to ground block until all of the MSMs are connected through a series of ground blocks to the discharge ground bar at the DC power cabinet.

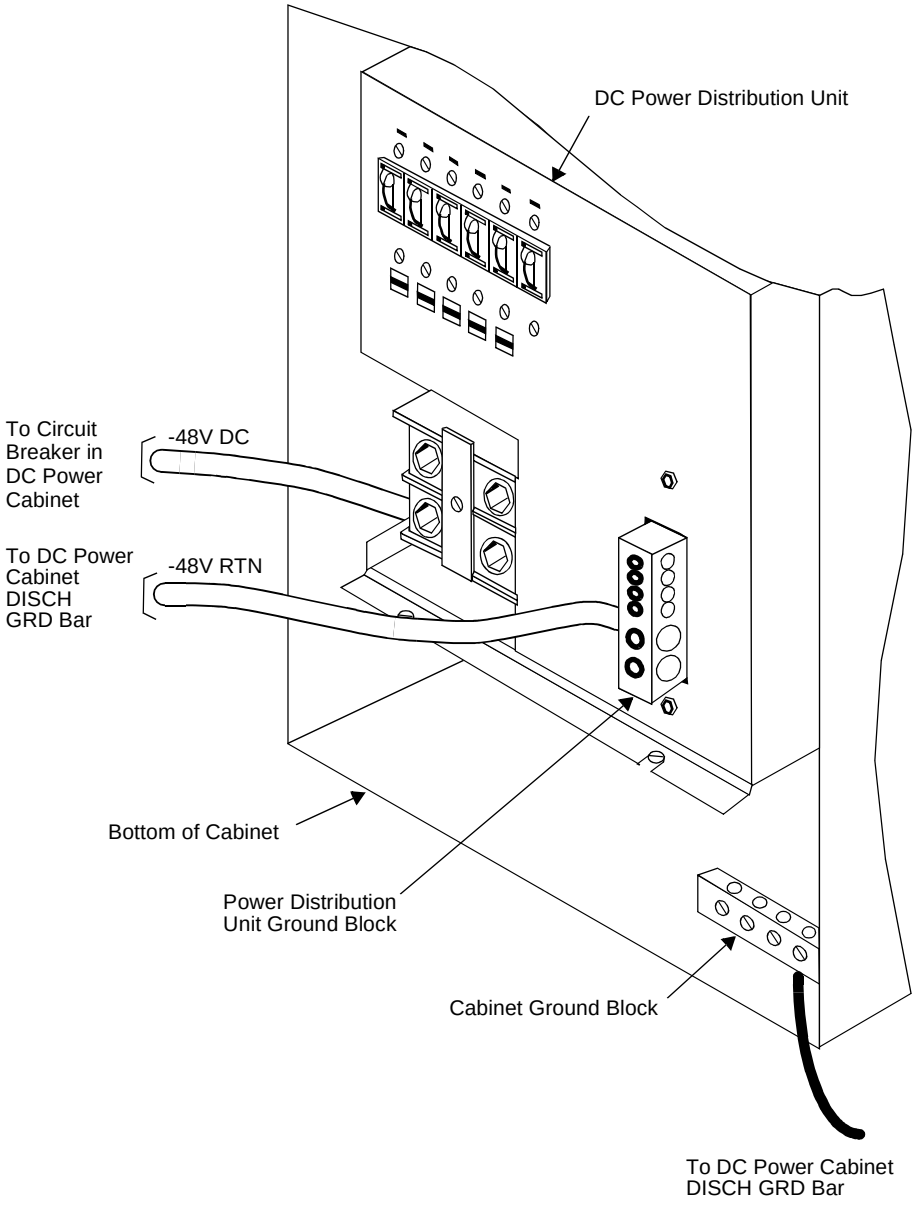


Figure 3-32. Power and Ground Connections for a DC-Powered MCC-MSM

Connecting DC Power to the MSM

NOTE:
Check the DC power plant's documentation to find out if the power plant must be tested before it is connected to your system. If so, perform these tests in the suggested sequence.

The main circuit breaker on a DC-powered MCC-MSM is located on the front of the DC power distribution unit. The circuit breakers on the rear of the DC power distribution unit (CB1 through CB6) control the power to the individual carriers. The following table shows the circuit breaker to carrier relationship.

Table 3-2. Circuit Breaker Definition

Circuit Breaker	Associated Carrier
CB1	Carrier A
CB2	Carrier B
CB3	Carrier C
CB4	Carrier D
CB5	Carrier E
CB6	Filter

Connect power to the MSM as follows:

1. Set the main circuit breaker to OFF.
2. At the MSM:
   a. Using a 3/8-inch allen wrench, connect the -48 volt DC lead as shown in Figure 3-31 on page 3-48.
   b. Using a 3/16-inch allen wrench, connect the -48 volt RTN lead as shown in Figure 3-31 on page 3-48.
3. Route the leads out of the MSM through the mouse hole in the lower rear cover and over to the DC power cabinet.
4. At the DC power cabinet:
   a. Terminate the -48VDC lead on a **DC OUTPUT** circuit breaker.
   b. Terminate the -48V RTN lead on the **DISCH GRD** bar.
5. Repeat the procedure for each MSM.

Installing the ESM

This section discusses ESM installation. Specifcially, it discusses how to unpack the ESM, and it provides instructions on how to install the support base. The chapter also includes figures and descriptions of the ESM platform, hardware components, and peripheral devices.

Heeding Warnings

Warnings and cautions appear throughout this book as needed when describing procedures. These notices indicate when the actions you are about to perform can harm you or the equipment unless you follow the procedure steps as listed. (See “Typographical conventions” section in the “About this Book” chapter.)

CAUTION:
Perform a “soft” boot on the UNIX operating system if it is on-line before shutting off power to the system.

WARNING:
Shut the main power switch off only after executing a “soft” system shutdown, and disconnect the power cord before removing the dress cover or access panel and before working within the ESM.

WARNING:
When lifting the ESM chassis, use proper handling practices to prevent back strain or hand injuries.

WARNING:
Do not use the edge of the chassis front bezel of the ESM as a way to lift the unit. The bezel cover comes off easily.

CAUTION:
Observe proper electrostatic discharge precautions when handling computer components. Wear a ground wrist strap against your bare skin and connect to an earth ground.

CAUTION:
The manufactuer(s) do not accept liability for a damaged unit if the individual equipment is not returned in the original packing materials and carton. The carton has been designed to ensure product warranty and to prevent damage.

Gathering Tools and Test Equipment.

To assemble and disassemble the ESM hardware, the following tools are required:

- Medium screwdriver with flat blade
- No. 2 Phillips Screwdriver
- Small pair of needle-nose pliers
- Small pair of wire cutters
- A sharp pointed instrument, such as a pen

CAUTION:
Do not use a lead pencil point. The graphite can damage the circuit card, causing problems such as electrical shorts

- Antistatic grounded wrist strap
- Antistatic grounded work mat
- Standard electronic test equipment, such as digital multi-meter, is recommended

Unpacking the MAP/40P

The MAP/40P, keyboard, and monitor are shipped in individual cartons.

CAUTION:
A boxed, fully-loaded MAP/40P weighs approximately 20 kg (45 lbs).

To unpack the MAP/40P, see Figure 3-33 and complete the following procedure:

1. Set up a work area that includes a work table at least 1- by 1.5-m (3- by 5-ft).
2. Place the MAP/40P carton on the floor.
3. Cut the carton top seam and the left and right end seams. Cut the seams so that you can reuse the carton. See the folllowing “Saving Packing Materials” section.
4. The following items are packed in the top of the MAP/40P box:
   - A plastic packet containing two stabilizing feet (wrapped in paper) and an instruction sheet for installing the stabilizing feet.
   - A 2- to 3-m (6- to 8-ft) power cord (depending on country).
   - Installation and maintenance books (in a cardboard box).

- A plastic packet containing a blank cartridge tape, a diskette with the system configuration and software, a diagnostic diskette, factory information regarding the system, and a yellow BCS return tag.

NOTE:
If you must return a MAP/40P to the manufacturer, complete the yellow BCS return repair tag and attach it to the unit.

Remove all of the items packed on top of the MAP/40P from the box.

5. Remove the top cardboard tray.
6. Locate the back end of the MAP/40P that is resting against the cut-out piece of foam. The foam at this end is easier to press inward than the foam backed by cardboard on the other end.
7. Press in on the foam and lift the end of the MAP/40P.

CAUTION:
An antistatic bag that covers the chassis makes the MAP/40P slippery to handle.

CAUTION:
Do not use the bezel cover as a grip area to move or lift the MAP/40P.

8. Lift the MAP/40P enough to drag it at an angle from the end of the box rather than lifting straight up.
9. Place both of your hands on the sides of the chassis, lift it out of the box, and place it on the work table.

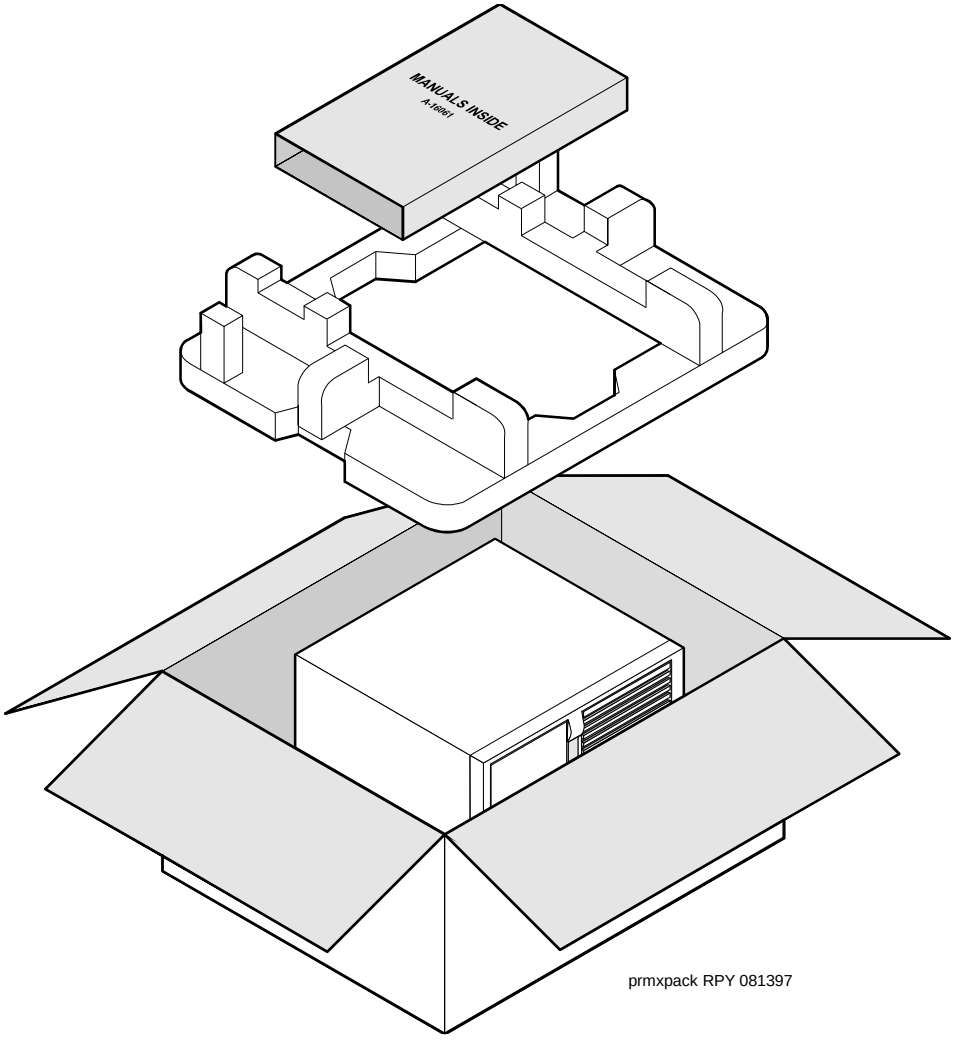


Figure 3-33. Unpacking the MAP/40P

Saving Packing Materials

In case you need to return the MAP/40P to the manufacturer, save the following shipping and packing materials:

- Shipping cartons (MAP/40P, keyboard and monitor)
- Antistatic bags
- Bubble wrap
- Foam inlays

NOTE:
If you ordered multiple MAP/40P units, saving one set of cartons and packing materials should be sufficient.

CAUTION:
The manufacturer does not accept liability for a damaged unit if you do not return it in the original packing materials and carton. The carton has been designed to prevent damage and ensure product warranty.

System Arrangement

The MAP/40P is a deskside unit in a tower configuration (Figure 3-34). It sits vertically on stabilizing feet, which you will install as described in the following "Attaching the Stabilizing Feet" section.

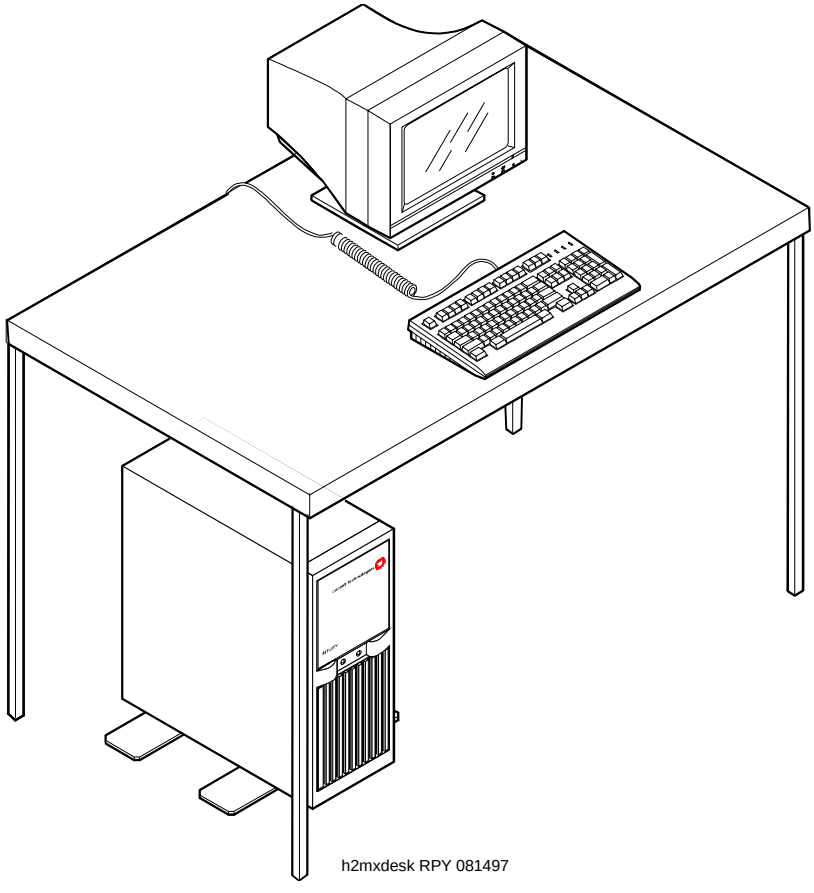


Figure 3-34. MAP/40P Deskside Unit

Attaching the Stabilizing Feet

The manufacturer attaches four screws to the bottom of the MAP/40P to use with the stabilizing feet. See Figure 3-35 for a view of the stabilizing feet.

Complete the following procedures to attach the stabilizing feet:

1. Remove the stabilizing feet from the plastic packet.
2. Remove the paper surrounding the stabilizing feet.
3. Place the MAP/40P bottom up.
4. Turn the stabilizing feet upside down with wings up.
5. Using a No. 2 Phillips head screwdriver, loosen the four mounting screws.
6. Lower the stabilizing feet onto the mounting screws.

7. Rotate the stabilizing feet until they are perpendicular to the MAP/40P.

NOTE:
See the manufacturer's instruction sheet included in the plastic packet for more information.

8. Tighten the four mounting screws to secure the feet to the MAP/40P.
9. Grip opposite corners of the chassis and reset the MAP/40P in an upright position.

NOTE:
The final position of the MAP/40P must include a front-to-back clearance of at least 16 cm (6 in.) to provide for adequate air intake and exhaust.

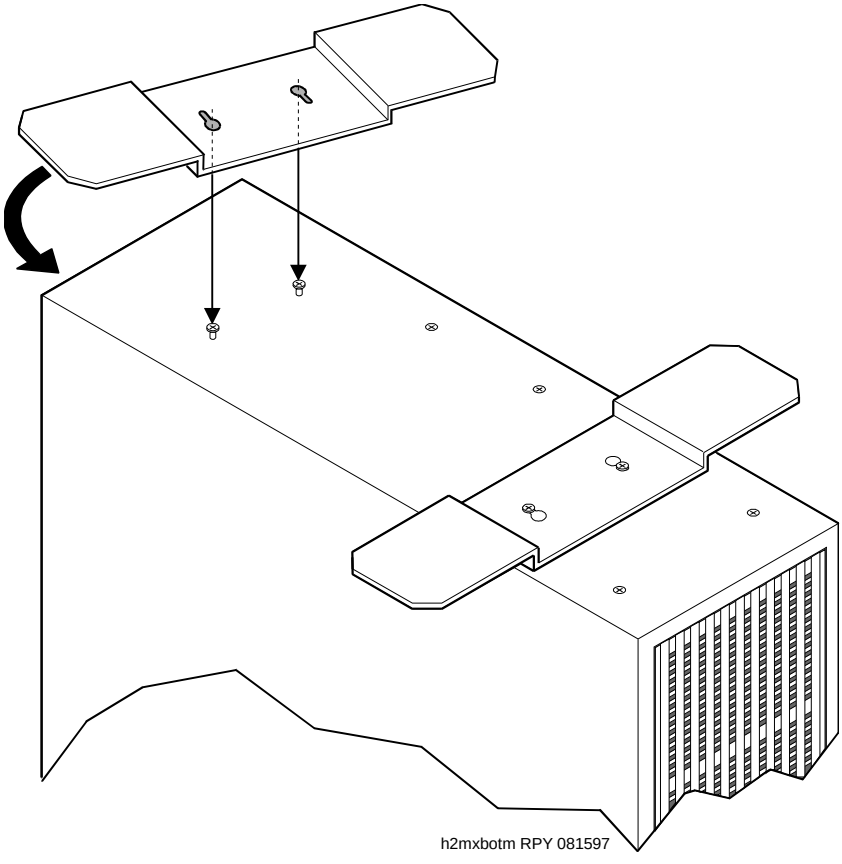


Figure 3-35. Attaching the Stabilizing Feet

Locating Key Components on the MAP/40P

Use the following sections and graphics to locate key components on the MAP/40P.

Three views of the MAP/40P are included:

- Front of the chassis
- Back of the chassis
- Locations of the peripheral drive devices

Front of the Chassis

Figure 3-36 shows the front view of the MAP/40P. The following components are accessible on the front of the MAP/40P:

- Cartridge tape drive
- Diskette drive
- Reset switch
- Power indicator LED
- Disk activity indicator LED
- Power switch

Cartridge Tape Drive

The cartridge tape drive is a peripheral device used to back up and restore files from a tape cartridge.

Diskette Drive

The diskette drive is a peripheral device used to provide storage and random access to the operating system, application software, and speech data.

Reset Switch

The reset switch resets the MAP/40P.

Power Indicator LED

The power indicator LED lights green when the power is on.

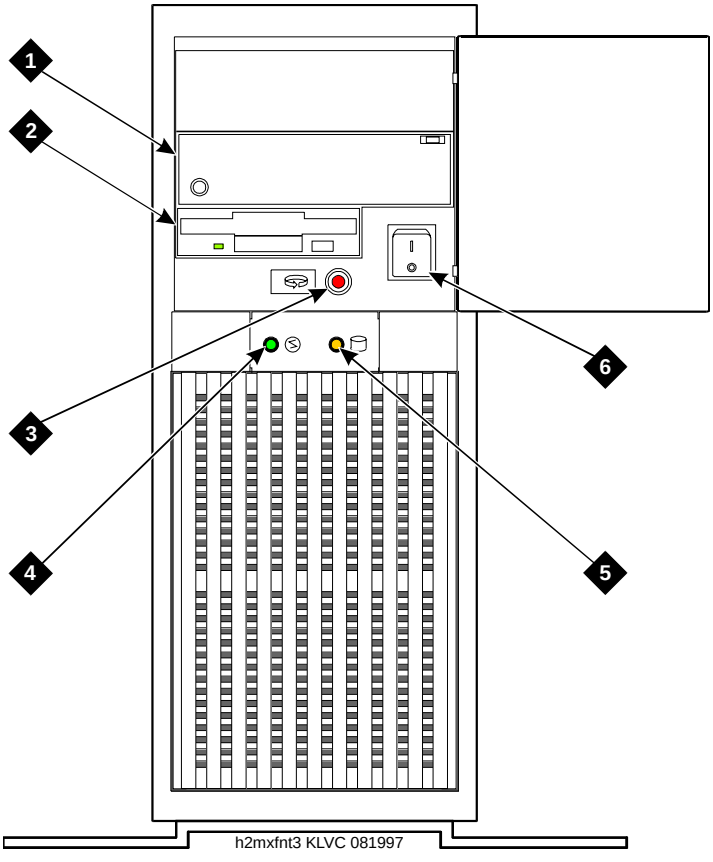
Disk Activity Indicator LED

The disk activity indicator LED lights yellow when the hard disk is active.

Power Switch

The power switch turns the MAP/40P on and off.

Figure 3-36 shows the front view of the MAP/40P.



1. Cartridge tape drive
2. Diskette drive
3. Reset switch
4. Power indicator LED
5. Disk activity indicator LED
6. Power switch

Figure 3-36. Front View of the MAP/40P

Back of the Chassis

These key components are accessible from the back of the MAP/40P chassis:

- AC power inlet receptacle
- AC power supply outlet
- External SCSI connector
- Parallel port
- COM2
- Keyboard connector
- Power supply fan exhaust
- Mouse connector
- Video connector
- COM1

See Figure 3-37 for the locations of these components on the MAP/40P.

AC Power Inlet Receptacle

The AC power inlet receptacle connects the MAP/40P to the AC power source through a 3-prong, 5/10A, 110/230V power cord.

AC Power Supply Outlet

The AC power supply outlet connects the MAP/40P to the monitor using a 2 m (6 ft) monitor power cord.

External SCSI I/O Connector

The external SCSI I/O connector provides an external SCSI connector and an active termination for the SCSI bus. No terminating resistor is shown in Figure 3-37.

Parallel Port

The parallel port communicates with the printer through a 25-pin female plug.

COM2

COM2 is reserved for Lucent remote support.

Keyboard Connector

The keyboard connector connects the keyboard to the MAP/40P through a 6-pin female circular DIN plug.

NOTE:
Do not use the keyboard receptacle for any other purpose than to connect the keyboard.

Power Supply Fan Exhaust

The power supply fan exhaust maintains air flow within the chassis.

Mouse Connector

The mouse connector provides a connection to a serial mouse, although the MAP/40P does not use a mouse.

NOTE:
Do not use the mouse connector for any other purpose.

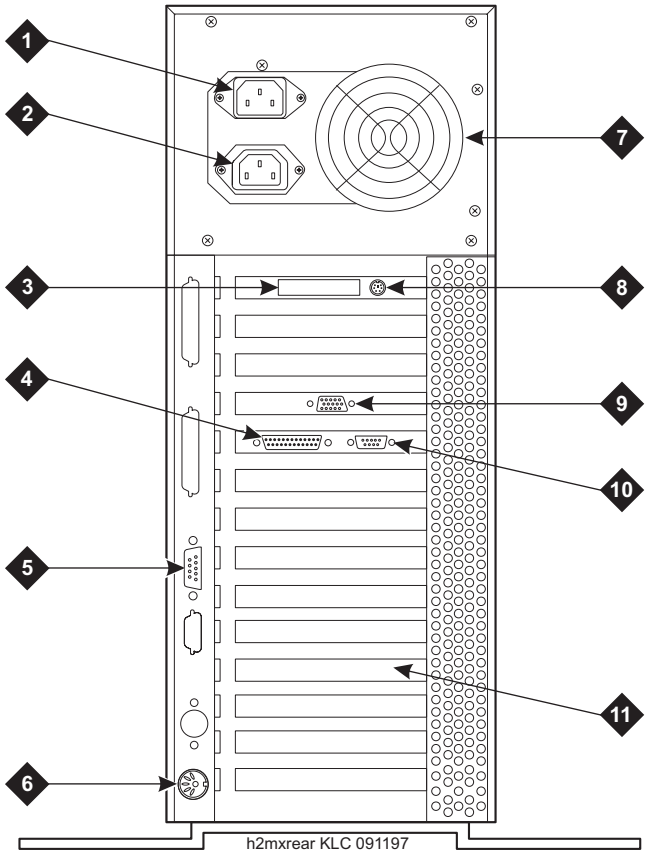
Video Connector

The video connector connects the MAP/40P to the monitor through a 15-pin female D subminiature plug.

COM1

COM1 provides RS-232 connectivity through a 9-pin male D subminiature plug.

Figure 3-37 shows the back view of the MAP/40P.



1. AC power inlet receptacle
2. AC power supply outlet
3. External SCSI I/O connector
4. Parallel port
5. COM2
6. Keyboard connector
7. Power supply fan exhaust
8. Mouse connector
9. Video connector
10. COM1
11. MSM interface card

Figure 3-37. Back View of the MAP/40P

Locations of Peripheral Drive Devices

The MAP/40P contains the following peripheral drive devices:

- Cartridge tape drive
- Diskette drive
- Hard disk drives

See Figure 3-38 for the location of peripheral drive devices.

NOTE:
The specifics of these devices are subject to change.

Cartridge Tape Drive

The cartridge tape drive is a SCSI component used for back-up and restore functions and to load the system.

Diskette Drive

The diskette drive uses 3.5-inch 1.44-Mbyte high-density diskettes. It is used for system configuration and diagnostic testing.

Hard Disk Drives

The following 2-Gbyte SCSI hard disk drives are available in the MAP/40P:

- Hard disk 0
- Hard disk 1

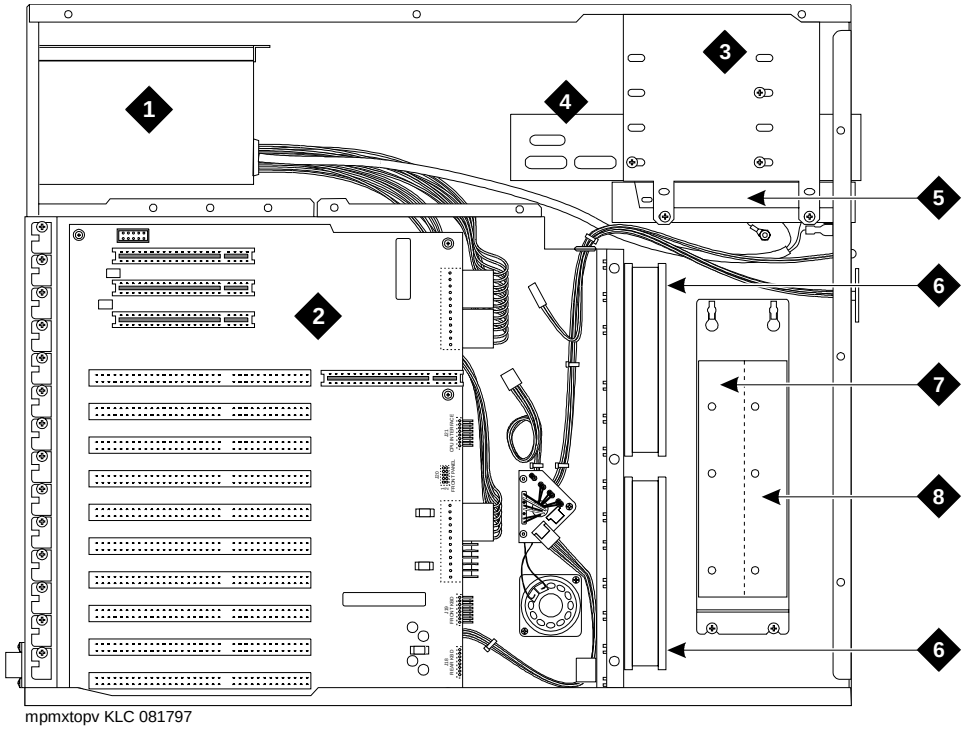
MAP/40P hard disk drives are located between the lower front dress cover and the two circuit card cage fans.

NOTE:
For more information on hard disk drives, see the maintenance book specific to your platform.

Hard Disk 0. Hard disk drive 0 is present in all systems. It is located in the rear slot of the hard disk drive support box, toward the circuit card cage fans. It stores the operating system, application software, and speech data.

Hard Disk 1. Hard disk drive 1 may or may not be present in your system. If it is installed, it is located in the front slot of the hard disk drive support box, toward the lower front dress cover. Hard disk 1 can be used for mirroring.

Figure 3-38 includes a side view of the MAP/40P peripheral drive device locations.



1. Power supply
2. Backplane
3. Empty peripheral bay
4. Cartridge tape drive
5. Diskette drive
6. Circuit card cage fans
7. Hard disk drive 0
8. Hard disk drive 1 (if used)

Figure 3-38. Side View of MAP/40P Including Locations of Peripheral Drive Devices

Chassis Cooling System

Air must circulate inside and around the MAP/40P chassis to prevent components from overheating, which can cause system malfunctions.

There are two ways to maintain proper temperatures within the MAP/40P:

- Interior fans
- Proper clearance around the chassis

Interior Fans

The fans in the MAP/40P help maintain air flow in the unit to prevent components from overheating, which can cause components to malfunction.

The cooling system for the MAP/40P includes three fans:

- Two circuit card cage fans
- Power supply fan

Circuit Card Cage Fans. The circuit card cage fans are located, one on top of the other, behind the hard disk drive(s) of the MAP/40P. Air flows through the circuit card cage fan and exits through vents in the back of the MAP/40P.

Power Supply Fan. The power supply fan is located within the power supply. This fan exhausts air to the rear of the unit.

Proper Clearance Around the Chassis

You must maintain clearance around the chassis so that air can circulate to prevent overheating. The final position of the MAP/40P must include a front-to-back clearance of at least 16 cm (6 in) to provide for adequate air intake and exhaust. You must also leave a minimum of 5 cm (2 in) space along both sides of the chassis.

MSM Hardware Needed for T.120 Support

The following dedicated hardware is needed in the MSM cabinet for interfacing between the ESM and MSM to support T.120 Data Conferencing:

- ESM-MMI, TN787 circuit pack
- ESM-DS1, TN2207 E1 circuit pack, 32CH
- Y-Cable, ED1E434-11,G506
- 356A Adapter, 50-Pin to 8-by-8 Pin Module Plug
- D8W Cable

Installing the ESM-MMI and ESM-DS1 Circuit Packs

The ESM-MMI and ESM-DS1 circuit packs are cabled together using the Y-cable. Therefore, these circuit packs must be physically located in adjoining port slots in the MCU cabinet. If two adjoining slots are not available, rearrange the existing universal port circuit packs to create a pair of available adjoining slots.

Insert the TN787 ESM-MMI circuit packs into one of the two slots. It is recommended that the ESM-MMI circuit pack be installed into the slot to the right of the ESM-DS1 circuit pack to simplify cable management later. Record the location of the ESM-MMI circuit pack (Port Network and Board Number). This information is required later for administering the TN2207 ESM-DS1 circuit pack.

NOTE:
The ESM-MMI circuit pack is labeled simply as a TN787 MMI circuit pack. It is the same as any other MMI circuit pack used for H.221 network interfacing or BONDing work. The circuit pack takes on the name "ESM-MMI" only from the context of the application in which it is going to be used in the system. When administration of the ESM-DS1 circuit pack is completed properly (for example, defining this pair of circuit packs as dedicated for T.120 support), the TN787 circuit pack automatically reconfigures its on-board firmware to operate in a T.120 mode rather than in an H.221 or BONDing mode. Again, the ESM-MMI circuit pack is physically and electrically identical to and labeled the same as every other MMI circuit pack, and it can be substituted with any other TN787 circuit pack in the system for maintenance reasons.

Before installing the TN2207 ESM-DS1 circuit pack into the system, first verify its on-board jumper/switch configuration to ensure that it is configured as a 32-channel E1 circuit pack and not as a 24-channel DS1 circuit pack. Move the jumper to the 32-channel position, and insert the TN2207 ESM-DS1 circuit pack into the slot directly to the left of the ESM-MMI circuit pack.

NOTE:
Be sure to take proper ESD precautions, including using a grounded wrist strap, when handling the MMI and DS1 circuit packs.

Set the switches on the TN2207 circuit pack to select bit rate and impedance match. See the following table and figure.

Table 3-3. Option Switch Settings On the TN2207

120 Ohms	Twisted pair
75 Ohms	Coaxial requiring 888A adapter
32 Channel	2.048 Mbps
24 Channel	1.544 Mbps

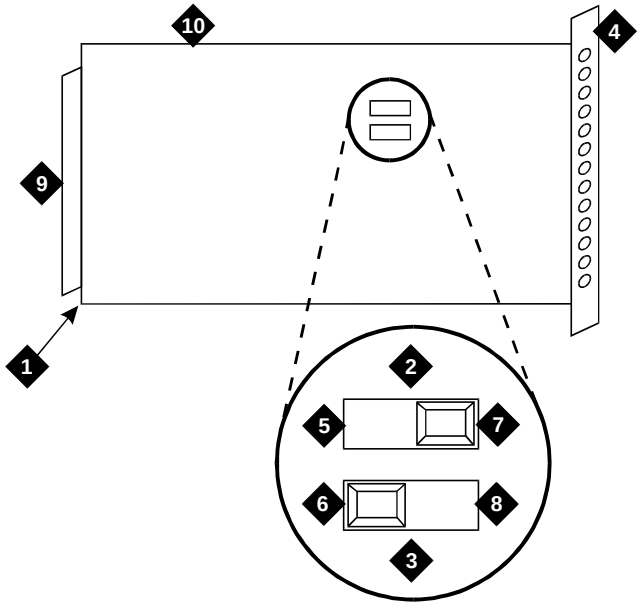


Figure Notes:

1. Backplane Connectors
2. 24/32 Channel Selector
3. 75/120 Ohm Selector
4. Faceplate
5. 32 Channel
6. 120 Ohm (shown selected)
7. 24 Channel (shown selected)
8. 75 Ohm
9. Connector
10. TN2207

Figure 3-39. TN2207 Option Settings

NOTE:
The standard configuration for TN2207 circuit packs shipping from the factory is 24-channel DS1 service with a termination impedance of 120 ohms (24CH/120ohm). Therefore, the 24/32CH jumper/switch must be deliberately moved to the 32CH E1 position before installing the TN2207 circuit pack as an ESM-DS1 circuit pack. If this is not done, the ESM-MSM Link will never establish itself as in-service. The impedance can remain at the factory default setting.

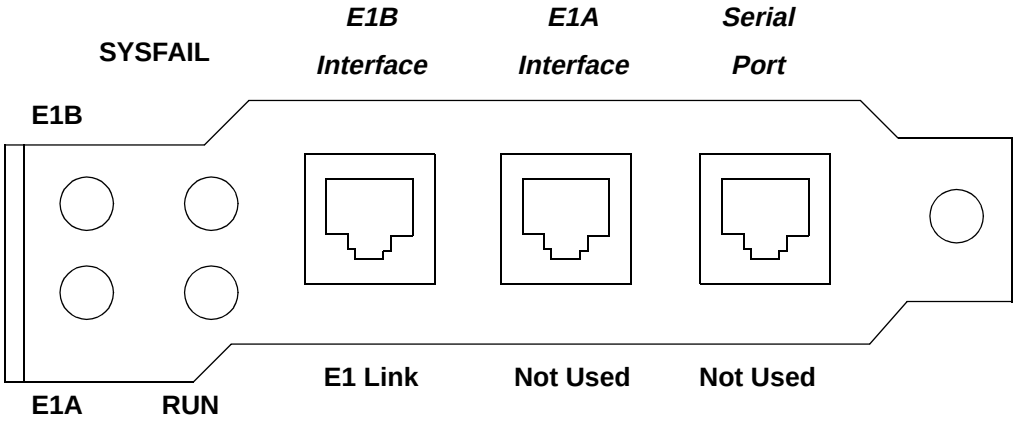


Figure 3-40. Rear Bracket of the MSM Interface Card

Connecting the MSM to the ESM

Use the following figure to connect the MSM to the ESM.

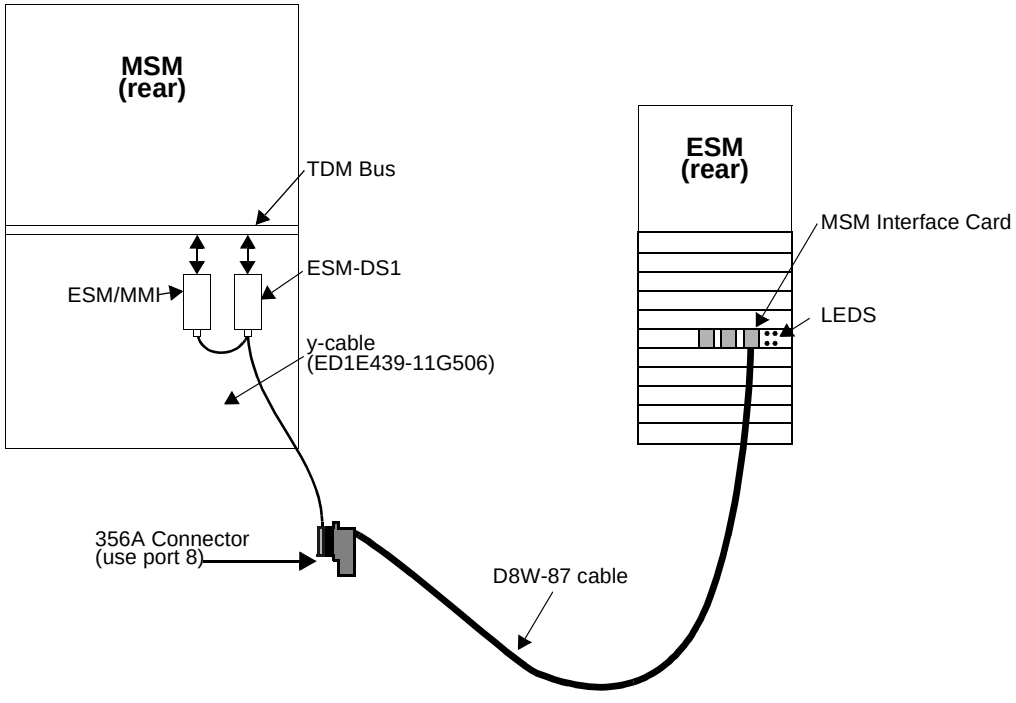


Figure 3-41. Cabling the ESM / MSM Link

Connecting the Monitor

This section describes how to make the connections between the MAP/40P and a monitor.

Required Cabling for Monitor

Two cables connect the monitor to the MAP/40P:

- Video cable connector
- Power cable

Video Cable Connector

The video cable connector has a video input connector at one end. The other end of the cable is permanently attached to the monitor.

Power Cable

The power cable has a male plug at one end and a female plug at the other end.

Connecting Monitor Cables

To connect the monitor cables:

1. Plug the video cable connector from the monitor directly into the video connector located on the back of the MAP/40P. See Figure 3-37 for the location of the video connector.
2. Tighten the thumb-screws on the video cable connector with your fingers or with a small flat-blade screwdriver.
3. Plug the female end of the power cable into the monitor.
4. Plug the male end of the power cable into a grounded outlet.

Connecting the Keyboard

A 6-pin female DIN receptacle is located in the back of the MAP/40P. The mating male plug is provided with the keyboard. Both of the connector assemblies are keyed to provide proper alignment. See Figure 3-37 for the location of the keyboard connector.

NOTE:
Do not use the keyboard receptacle for any other purpose than to connect the keyboard. Do not plug the keyboard into the mouse connector.

Figure 3-42 shows the receptacle and plug.

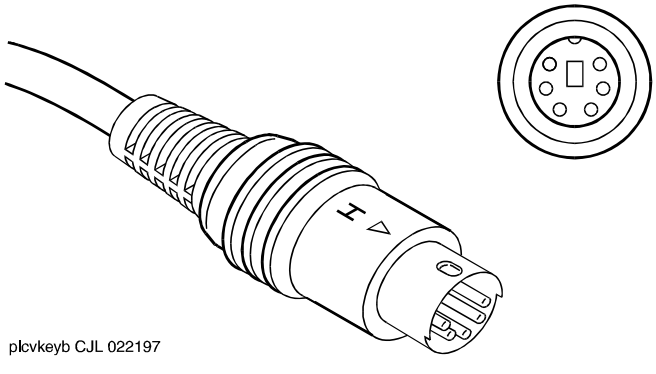


Figure 3-42. Circular DIN 6-Pin Connector for the Keyboard

Connecting the Modem for Remote Access to the ESM

The ESM can be reached remotely via either the COM2 port on the ESM or the Remote Maintenance Board (RMB).

NOTE:
Newer MCU systems (starting with Release 5.0) are made available *without* the RMB and therefore use the COM2 port for remote access. This is true even in the US.

Connection Via COM2 Port

The following sections discuss how to add and administer a modem on the COM2 port of the ESM.

UNIX Port Monitor Configuration

This step is required to configure the ttymon port monitor deamon, to monitor the COM2 port, and to spawn the required service on the port.

1. Log in as root.
2. Invoke sysadm by typing **sysadm.** The Sysadm Menu appears.

   NOTE:
   Ensure that this is in your path.

3. From the Sysadm Menu, select “ports” and press ENTER.
4. In the resulting form, select “port_monitors” and press ENTER.
5. Select “add.”
6. Populate the resulting form as follows:
   - *port monitor tag*: **ttymon3**
   - *port monitor type*: **ttymon**
   - *Command to start the port monitor*: **/usr/lib/saf/ttymon**
   - *start port monitor immediately*: **Yes**
   - *Start state*: **ENABLED**
   - *Restart Count*: **0**
7. Submit the form by selecting F3.
8. From the second menu, select “port_services.”
9. Select “add.”
10. Select “add to many.”
11. Select “ttymon.”

12. Populate form-6 as follows:
    - *Service tag*: **tty01**
    - *Identification and authentication scheme*: **login**
    - *service invocation identity*: (leave blank)
    - *port/service state*: **enabled**.
    - *utmp entry to be created for this service*: **Yes**
    - *Version Number*: (leave the default value)
13. Submit the form by selecting F3.
14. Populate the resulting form as follows:
    - *Name of TTY device*: **/dev/tty01h**
    - *ttylabel*: **9600**
    - *Service command*: **/usr/bin/shserv**
    - *tty line options*:
        - *hangup*: **Yes**
        - *Connect-on-carrier*: **No**
        - *Bidirectional*: **No**
        - *Wait-read:* **No** (count “blank”)
    - *Timeout*: **0**
    - *Prompt message*: **login**
    - *Modules to be pushed*: **ldterm**
15. Leave the rest of the form and submit it.
16. For “quick_terminal,” select “add” and populate as follows:
    - *Port Number*: **/dev/tty01h**
    - *speed*: **9600**
17. For “tty_settings,” select “add” and populate as follows:
    - *Ttylabel*: **ttymon3**
    - *Enable autobaud*: **Yes**
    - *Baud Rate*: (leave blank)
    - *Nextlabel*: **auto**.
18. Leave the default values for the initial line settings and final line settings.
19. Save the form by selecting F3.
20. Shut down and restart the machine.

Configuring the 3820 Modem Via a Terminal

Use the following procedure to configure the 3820 via a terminal rather than on the control panel of the modem.

1. Connect a terminal to the 3820 modem.
2. See the documentation provided with the terminal and make sure that the terminal is acting as a DTE.
3. Set the terminal line to eight bits, no parity, and one stop bit.
4. Set the baud rate of the terminal line to the required modem speed.

   For example, for the 3820 modem attached to the remote maintenance port, set the terminal line to a baud rate of 9600.
5. Enter **AT** on the terminal.

   If the modem returns “OK,” it is ready to accept AT commands from the terminal. If the modem does not return OK, check the connection and the terminal setup.
6. Enter the following AT command:

   AT&TF3L0&D2&S1\N0\Q3S41=*<dial line rate>*S2=128&W0

   where *<dial line rate>* is one of the following values:

   3=9600

   5=4800

   6=2400

   7=1200 (V.22)

   8=1200 (212A)

   20=19200

   For example, to set the 3820 modem for COM2 use where the baud rate is 9600, enter **3** as the *<dial line rate>* as shown below:

   AT&TF3L0&D2&S1\N0\Q3S41=3S2=128&W0

   The modem should return “OK.”

Connecting the UPS

Connect the UPS as follows:

1. Check the labels on the UPS to verify that the UPS input voltage (115v or 230v) is appropriate for your site.
2. Check the bank of option switches to verify Switch 1 is set correctly for your site (60hz or 50hz). The remaining option switches can be left in their default (off) position.

3. Place the UPS on its feet in a well-ventilated area away from any heat sources or sunlight. The UPS should be within seven feet of the UPS so that the UPS alarm cable can reach the RMB board in the ESM (where used).
4. For 230v units, plug the appropriate end of the UPS power supply cord into the input connector located on the UPS rear panel. For 115v units, the power supply cord is already built into the UPS.
5. For 115v installations where the RMB board is used, connect the UPS alarm cable from the DB-9 UPS communications port to the UPS port on the RMB board in the ESM.
6. Plug the UPS power supply cord into a grounded, 3-wire AC receptacle.

   NOTE:
   Do not use a ground plug adapter with the power supply cord. If you cannot completely insert the power supply cord plug into the outlet, contact your electrician for a replacement.

7. Turn on the UPS by pressing the ON/OFF button. The UPS performs a self-test, and it verifies the utility line voltage and frequency. The alarm beeps (to indicate a successful test) and the indicator illuminates. Turn the UPS off.

   NOTE:
   The UPS is shipped with a fully-charged battery. Howerver, the UPS may lose some battery charge during shipping and storage. You may use the UPS immediately after unpacking; however, it may not provide its full rated backup time during a power failure. The unit needs to operate for 24 hours before full backup battery time can be expected.

8. Verify that the ESM is set to operate on the correct voltage (115v or 230v). Check the label on the back of the ESM for instructions on how to change, if necessary, the input voltage setting.
9. Plug the ESM power cord into the UPS.

Powering Up the ESM

The ESM can operate on either international or domestic power, either of which is switch-selectable. The ESM may be AC-powered or DC-powered. The manufacturer labels the platform to indicate which intake voltage (either 115 VAC or 220 VAC) the ESM has been set to accommodate. Check the label.

If it is necessary to change the input voltage or verify the setting, check the rocker switch on the back of the ESM. This switch is located in the upper-left corner between the power outlet and the inlet receptacles.

To power up an ESM used *with a UPS*, do the following:

1. Turn on the UPS.
2. Turn on the power switch to the monitor. An indicator light should come on.
3. Turn on the power to the ESM by using the power switch on the front panel of the ESM.

To power up an ESM *for which a UPS is not being used with an AC-powered system*, do the following:

1. Provide a dedicated source of commercial power for the ESM
2. Verify that the ESM is set to operate on the correct voltage (115v or 230v). Check the label on the back of the ESM for instructions on how to change the input voltage setting, if necessary.
3. Plug the UPS power supply cord into a grounded, 3-wire AC receptacle.

NOTE:
Do not use a ground plug adapter with the power supply cord. If you cannot completely insert the power supply cord into the outlet, contact your electrician for a replacement.

Connecting the System to the AC Power Supply

The ESM can operate on the full range of global AC power sources. An AC Input Voltage Selection Switch is located on the rear of the unit. This allows the ESM to operate at the traditional 120 Volt AC and 230 Volt AC levels. The recommended ranges of operation are 90V to 135V and 189V to 270V, respectively. The manufacturer labels the ESM PC rear chassis to indicate which intake voltage (115 VAC or 230 VAC) the ESM is set to accommodate.

CAUTION:
Check the position of the Voltage Select Switch before applying AC Input power to the ESM.

If it is necessary to change the intake voltage or verify the setting, check the rocker switch on the back of the AC-powered ESM. This switch is located in the upper-left corner of the rear plate of the ESM between the power outlet and the power receptacles.

Provide a dedicated line to the ESM. Use the following procedure to ensure that the system is connected properly to the power outlet and is receiving power.

1. Plug one end of the ESM power cord into the AC on the rear of the unit.
2. Place the monitors switch in the ON position.

3. Turn on the power switch in the front of the ESM.

   The green lamp labeled POWER ON on the front of the unit should light. Resident diagnostics should be initiated on the monitor.

4. A green amber lamp should light on the front bottom, screen base area of the monitor.

5. If the monitor lamp does not light, or if diagnostics are not initiated on the monitor screen, recheck the power connections.

Loading ESM Software

Refer to the instructions in the MCU Maintenance document for the latest software installation instructions whenever you are performing an ESM software upgrade on a system that is already installed. New installations arrive from the factory with the ESM software already loaded and tested.

ESM Software Requirements

To install or upgrade system software on the ESM successfully , the following components are required:

- ESM Boot Diskettes 1, 2, and 3
- ESM System Cartridge Tape
- RMB Package Diskette (US only)
- RMB Configuration Utilities Diskette (US only)

ESM Shutdown Procedures

At any time during an ESM software installation, you may be instructed to perform a shutdown of the system. Execute the following sequence of UNIX commands directly to complete a proper shutdown of the UNIX operating system and to kill all running ESM Application software processes.

1. Log in as “root.”
2. Enter **init S** to bring the system to a Single-User Mode. This will take from 10 to 30 seconds.
3. A prompt is then provided for entering the root password. Enter the root password to enter the Single-User Mode.
4. Enter **/usr/sbin/killall.**
5. Enter **/sbin/shutdown -g0 -y.**
6. Wait for the system to shut down and display “Press CNTRL_ALT_DEL to Reboot.” Do not press “(CTRL_ALT_DELETE).”

7. To turn off (if desired) the ESM at this time, power off the machine at the ON/OFF switch at the front of the unit.

NOTE:
It is recommended that the “Reset” button on the front of the ESM not be used.

WARNING:
Interruption of the ESM input power without first performing a proper UNIX shutdown sequence can cause file corruption. This can render the ESM in-operational and require reinstalling all ESM system software.

Post-Installation Cleanup

If the unit needs cleaning after installation, use the procedures in the following sections.

Cleaning the Chassis Exterior

Disconnect the power source before cleaning. Follow the proper shutdown procedures as outlined in the “Routine Maintenance Procedures” section (to be supplied). Use a mild detergent on a damp cloth to clean the chassis. If you use a spray cleaner, also use a cloth. Dampen the cloth with the cleaner and wipe the chassis surface. Using a spray directly could seep into the chassis and cause damage.

Cleaning the Monitor

Local office supply centers sell CRT screen cleaning wipes (wet pads). Use only these wipes to clean the screen. Follow directions provided with the product. Other than the CRT screen, clean the exterior monitor in the same manner as the chassis exterior. Use a mild detergent or a damp cloth. If you use spray cleaner, use a cloth. Dampen the cloth with the cleaner and wipe the surface.

Cleaning the Keyboard

Disconnect the keyboard from the ESM. Use a mild detergent on a damp cloth to clean the chassis. If you use a spray cleaner, use a cloth. Dampen the cloth with the cleaner and wipe the surface. There are also keyboard brushes and vacuums available to remove dirt particles from between and under the key buttons.

Cleaning the Cartridge Tape Drive

To clean the cartridge tape drive, use 3M products DC-6320 or 3M DC 6150 cleaning tape cartridges. These are available at your local computer or office supply store. Follow the instructions provided.

Cleaning the Floppy Diskette Drive

If you find that you can no longer read or write when the floppy disk is in use, have the drive replaced. The manufacturer recommends not cleaning the disk heads because they are susceptible to scratching and are easily damaged.

Cleaning the Air Filter

The air filter is located in the front of the chassis in the lower bezel cover, and it is reusable. The air filter should be checked and cleaned on a regular basis. (See the “Routine Maintenance Procedures” section.) To remove the air filter and clean it, use the following procedure.

1. Press down on the center tab at the top of the lower bezel and pull forward to remove the bezel.
2. Remove the air filter.
3. Wash with mild soap and water.
4. Allow the air filter to thoroughly air dry.

   NOTE:
   Do not use heat to dry the filter, and do not place a wet or damp filter into the computer.

5. Place the dry filter into the lower bezel.
6. Insert the bottom tab of the bezel into the exterior chassis bezel.
7. Bring the bezel forward and press the center tab down.
8. Lock into place.

The procedure is now completed.

Installing the Management Terminals

The MCU is administered using the MCU Management Terminal (MCU-MT). Conference scheduling and troubleshooting are performed using the MCU Scheduling Terminal (MCU-ST). Both the MCU-MT and the MCU-ST are Lucent Technologies model 715GBCS-2 terminals.

NOTE:
The MCU-ST is a customer option. It is not included with a standard MCU shipment.

The MCU-MT must be located in the same equipment room as the MCU MSM. It can be either directly connected to the MSM or within 50 feet of the MSM. The other terminal, the MCU-ST, can be located remotely.

NOTE:
If the terminal connects to a DC-powered system, install a 116A Isolator on the term connector of Carrier A (comcode 106005242).

Installing the MCU-MT

The MCU-MT is primarily used for administration and maintenance functions. However, if needed, it can also provide the same conference scheduling and troubleshooting functions as the MCU-ST.

1. Unpack the MCU-MT and inspect it for damage.
2. Connect the MAIN COM1 or P2 (DTE) of the MCU-MT to the TERM connector on the MCU with an M25B (EIA) cord or equivalent. The TERM connector interfaces with the processor.

   NOTE:
   Refer to the *715GBCS-2 Terminal User's Guide and Service Manual*, 555-230-876, for information on initial setup and power.

3. On the MCU-MT, connect the keyboard cord to the KBD jack on the rear of the terminal.

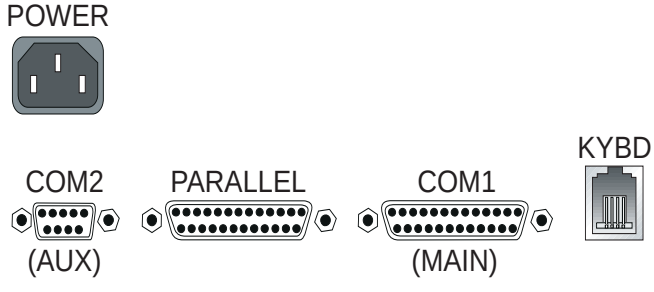


Figure 3-43. MCU-MT Back Panel Connectors

4. Plug in the AC power and turn on the terminal (power switch is at the rear of the terminal).
5. Using the keyboard, hold down CTRL and press F1 to view the default values.
6. Press TAB until the Keyboard folder tab is highlighted.
7. Press the grey down-arrow and stop on Key Remapping.
8. Press ENTER.
9. Press ENTER/CHG HOST (located at the far right on the keyboard).
10. Press ESC (located at the top left on the keyboard).
11. Type “SB.”
12. Press the grey down-arrow and stop on Save/Exit.
13. Press ENTER.
14. Press CTRL and F1.

Installing the MCU-ST or System Printer

NOTE:
If the customer purchased the optional Lucent Technologies Conference Reservation and Control System (CRCS), it is a plug replacement for the MCU-ST. CRCS allows the reservation agent to use a PC to schedule and reserve conferences on the MCU in advance of the conference date. It replaces the MCU-ST for conference scheduling and 24-hour reservations. See the CRCS Installation document for installation instructions.

The MCU-ST, also known as the remote manager terminal, is primarily used for scheduling conferences but can also be used to perform administration and maintenance functions if needed. The optional system printer is used for printing alarm and system reports.

The MCU-ST and the system printer may be located some distance from the MCU. If the distance between the MCU and the MCU-ST or system printer is greater than 50 feet, it is considered a remote connection. Also, any terminal that is not connected to the DTE connector on the back of the MSM in position “A” is considered a remote connection. A 8400B, 7400B, or 7400A data module (all of which are optional) and an M25B cable are used to connect either the MCU-ST or the system printer to the MCU.

The following table provide requirements concerning each of the data modules.

Table 3-4. Data Module Requirements

Data Module	Circuit Pack	Distance Limit (24 Gauge Wire)	Distance Limit (26 Gauge Wire)
8400B (ALL)	TN2224	3500 ft, 1066 meters	2800 ft, 853 meters
7400B (USA, CA)	TN754	5000 ft, 1524 meters	4000 ft, 1219 meters
7400A (international)			

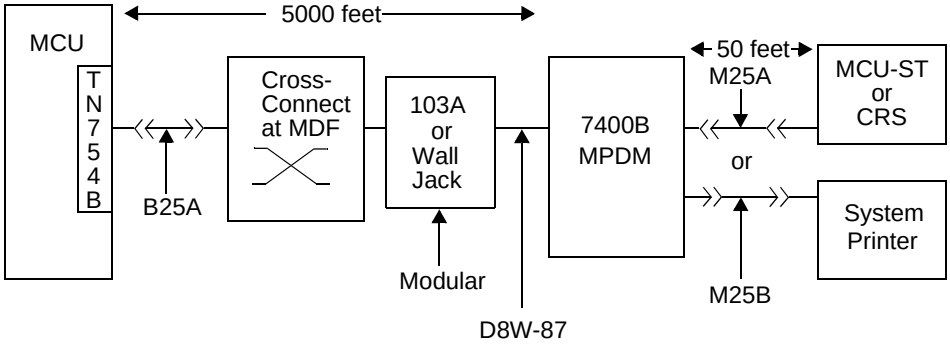


Figure 3-44. Typical Remote Connection for MCU-ST, Lucent Technologies CRCS, or System Printer

MCU-ST Installation

Install the MCU-ST as follows:

1. Unpack the MCU-ST and inspect for damage.
2. Connect the MAIN COM1 or P2 (DTE) of the MCU-ST to the 7400B data module with an M25B (EIA) cord or equivalent. The 7400B data module is connected with a D8W-87 cable to the wall jack.

   NOTE:
   Refer to the *715GBCS-2 Terminal User's Guide and Service Manual*, 555-230-876, for information on initial setup and power.

3. On the MCU side, connect the B25A cable to the TN754B Digital Line circuit pack.
4. On the MCU-ST, connect the keyboard cord to the KBD jack on the rear of the terminal.

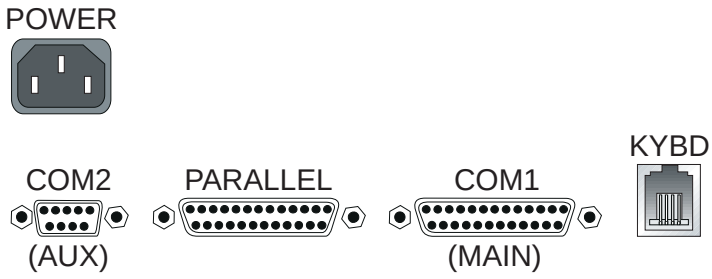


Figure 3-45. MCU-ST Back Panel Connectors

5. Plug in the AC power and turn on the terminal (power switch is at the rear of the terminal).
6. Press TAB until the Keyboard folder tab is highlighted.
7. Press the grey down-arrow and stop on Key Remapping.
8. Press ENTER.
9. Press ENTER/CHG HOST (located at the far right on the keyboard).
10. Press ESC (located at the top left on the keyboard).
11. Type “SB.”
12. Press the grey down-arrow and stop on Save/Exit.
13. Press ENTER.
14. Press CTRL and F1.

Installing and Using Data Modules

This section discusses various topics concerning setting up and using data modules.

Setting the 8400B Data Module for CRCS or the MCU-ST

Follow the instructions below to set the 8400B data module before connecting it to the CRCS or MCU-ST.

1. Connect a dumb terminal to the 8400B data module using a DSF cable (25-pin RS232 cable).
2. Enter the following commands:
   a. Enter **at** and the screen displays 0K.

      NOTE:
      If 0K is not displayed, press RETURN, then enter **at&s0&c0**.

   b. Enter **at&v** to view the options. Look at the top line of the active profile.
   c. Enter **at&c1&d2&s1&s0=1&w0&w1&y0s24=001**.
3. These settings produce the following results:

   &c1 sets the data carrier detect (DCD) circuit to operate according to the EIA standard.

   &d2 sets the data module to go on hook when an on-to-off transition is detected on the data terminal ready (DTR) input, disconnecting the call.

   &s1 sets the data module to respond to the data set ready (DSR) signal.

   &s0=1 turns on the automatic answer feature and causes the data module to answer on the first ring.

   &w0 causes the current configuration to be stored in data profile storage location 0.

   &w1 causes the current configuration to be stored in data profile storage location 1.

   &y0 selects the configuration stored in data profile storage location 0 to become the current configuration every time the data module is powered on.

   s24=001 indicates that no telephone is connected.

DTE/DCE Hardware Setup (7400 Data Module)

Under the top access panel of the data module is a small circuit board inserted in a card-edge connector. The orientation of this circuit board, referred to as the Electronic Industries Association (EIA) Connector Board, determines whether the data module is configured for a Data Communications Equipment (DCE) or Data Terminal Equipment (DTE) operation. Always verify that the EIA Connector Board is oriented correctly for your application prior to installation.

To determine the current orientation of the EIA Connector Board, and to reposition it, if necessary, do the following:

1. Disconnect the power cord, the line cord, and the EIA-232-D cable from the data module.
2. Refer to the following figure. Remove the top access panel of the data module:
    a. Apply a gentle lifting pressure at the rear edge of the access panel, and insert the tip of a ballpoint pen or other suitable device into each of the two tab-lock holes in the rear panel to release the locking tabs.
    b. Lift and remove the access panel.

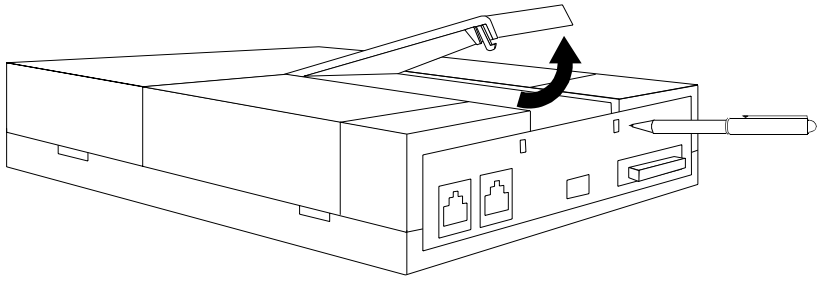


Figure 3-46. Removing the Top Access Panel

3. Turn the data module so that you are looking at it from the front.
4. Look down into the access opening of the data module. Then locate the large silver arrow pointing toward the back of the unit; the arrow points to the EIA Connector Board.
5. Look at the board from the front of the data module. Note that “DCE” is etched into the upper left corner of the board. This indicates that the board is oriented for a DCE operation. See the following figure.

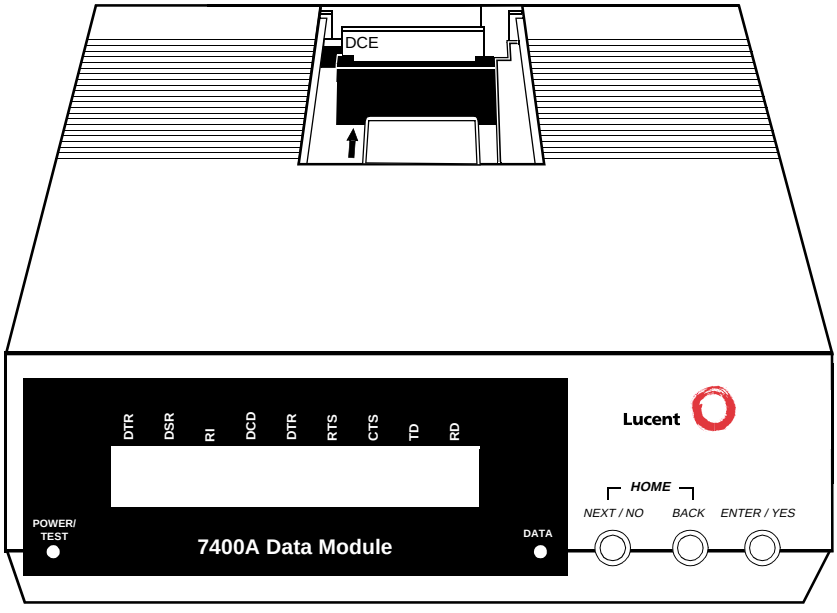


Figure 3-47. EIA Connector Board Shown in DCE Position

Using the Front Panel (7400 Data Module)

The following sections discuss using buttons and menus.

Buttons

The following list identifies the buttons on the module and explains their use.

- **NEXT/NO** is used to scroll forward through the menu and/or reject the function displayed. By keeping this button depressed, you can quickly scroll through menu items.
- **BACK** is used to scroll backward through the menu. By keeping this button depressed, you can quickly scroll back through menu items.
- **NEXT/NO** and **BACK** pressed simultaneously returns the user automatically to the “Home” screen from many menus. However, do not press these two keys simultaneously while changing option values. If this done, the system queries if you want to save the changes you have made, and it does not return you to the “Home” screen.
- **ENTER/YES** is used to set an option or execute the function displayed.

Main Menu

The main menu has several levels of options and suboptions.

- Press **NEXT/NO** to scroll through the entire first level to view each available option.
- Scroll to the desired main menu option, and select it by pressing **ENTER/YES**. You are now one level deeper within the options; accordingly, select the desired suboption from those available.
- Press **NEXT/NO** and **BACK** simultaneously at any time to return to the "Home" display automatically.

DCE Operations—Terminal Device Applications (7400 Data Module)

To set the 7400A Data Module using the AT command interface, do the following:

1. From the **HOME** screen, press **NEXT/NO** until the system prompts with **SET INTERFACE?**.
2. Press **ENTER/YES**. The system prompts with **INT = AT COMM?** or **INT --> AT COMM?**.
3. Press **ENTER/YES**.
4. The system displays **INT = AT COMMAND**.

The 7400A Data Module then performs a self-test.

Options and Settings for DCE AT Command Interface

The following table provides the options and settings for the DCE AT command interface. For each option, value "on" is the default.

Table 3-5. Options and Settings for DCE AT Command Interface

Set Option Displays	Possible Values
Set 300 speed	on, off
Set 1200 speed	on, off
Set 2400 speed	on, off
Set 4800 speed	on, off
Set 9600 speed	on, off
Set 19200 speed	on, off

Setting the 7400A Data Module for CRCS

Complete the following instructions to set the 7400A data module before connecting it to CRCS.

1. Open the cover on the 7400A data module and confirm that the data module is optioned for DCE mode. (There is a card in the data module that should read “DCE” when it is viewed from the front side.)
2. Complete the following settings on the data module:
   a. Set the interface for the AT command by pressing the NEXT/NO button until the 7400A prompts with the “SET INTERFACE?” message.
   b. Press the ENTER/YES button . The 7400A prompts with the “INT = AT COMM” or “INT---> AT COMM?” message.
   c. Press the ENTER/YES button. The 7400A displays the “INT = AT COMMAND” message, and it will perform a self test.
   d. Press the NEXT/NO button. The 7400A prompts with the “Set Options?” message.
   e. Press the ENTER/YES button.
   f. Use the ENTER/YES and NEXT/NO buttons to make the following baud settings:
      - 300 = off
      - 1200 = off
      - 2400 = off
      - 4800 = off
      - 9600 = on
      - 19200 = off
3. Ensure that you are using a model WP-90110 L7 power supply that provides an input of 117V, 60Hz, and 20W and outputs of +5V, 1.5A; +12V, -10A; and -12V, -10A.
4. Ensure that the indicators on the data module read as follows:

DTR	DSR	RI	DCD	RTS	CTS	TD	RD
high	high	-----	high	high	high	-----	-----
1	3	5	7	9	11	13	15

Also, ensure that the power LED is on.

Setting the 7400B Data Module for the MCU-ST

Follow the instructions below to set the 7400B data module before connecting it to the MCU-ST.

1. Connect a dumb terminal to the 7400B data module using a DSF cable (25-pin RS232 cable).
2. Enter the following commands:
   a. Enter **at** and the screen displays 0K.

      NOTE:
      If 0K is not displayed, press RETURN, then enter **at&s0&c0**.

   b. Enter **at&v** to view the options. Look at the top line of the active profile.
   c. Enter **at&c1&d2&s1&s0=1&w0&w1&y0**.
3. These settings produce the following results:

   &c1 sets the data carrier detect (DCD) circuit to operate according to the EIA standard.

   &d2 sets the data module to go on hook when an on-to-off transition is detected on the data terminal ready (DTR) input, disconnecting the call.

   &s1 sets the data module to respond to the data set ready (DSR) signal.

   &s0=1 turns on the automatic answer feature and causes the data module to answer on the first ring.

   &w0 causes the current configuration to be stored in data profile storage location 0.

   &w1 causes the current configuration to be stored in data profile storage location 1.

   &y0 selects the configuration stored in data profile storage location 0 to become the current configuration every time the data module is powered on.

Setting the 7400B Data Module for the System Printer

Follow the instructions below to set the 7400B data module before connecting it to the system printer.

1. Connect a dumb terminal to the 7400B data module using a DSF cable (25-pin RS232 cable).
2. Enter the following commands:
   a. Enter **at** and the screen displays 0K.

      NOTE:
      If 0K is not displayed, press RETURN then enter **at&s0&c0**.

   b. Enter **at&v** to view the options. Look at the top line of the active profile.
   c. Enter **at&f&c1&d2e0q1s0=1&w0&y0**.
3. These settings produce the following results:

   &f resets the options to the factory defaults.

   &c1 sets the data carrier detect (DCD) circuit to operate according to the EIA standard.

   &d2 sets the data module to go on hook when an on-to-off transition is detected on the data terminal ready (DTR) input, disconnecting the call.

   e0 turns off the echo.

   q1 turns off the result codes, which would be the normal response of the data module when it receives commands.

   s0=1 turns on the automatic answer feature and causes the data module to answer on the first ring.

   &w0 causes the current configuration to be stored in data profile storage location 0.

   &y0 selects the configuration stored in data profile storage location 0 to become the current configuration every time the data module is powered on.

Installing the System Printer

1. Unpack the system printer and inspect for damage.
2. Connect the MAIN PORT or P2 (DTE) of the system printer to the 7400B data module with an M25B (EIA) cord or equivalent. The 7400B data module is connected with a D8W-87 cable to the wall jack.
3. On the MCU side, connect the B25A cable to the TN754B Digital Line circuit pack.

Lead Designations for Connections

The following table provides lead designations for terminating the maintenance alarm terminal on the TN754 circuit pack. It also includes the lead designations for terminating 25-pair cables on the TN767 or TN2207 circuit pack. The battery and ground leads for connecting the INADS line or an external alarm are shown for the TN790 Aux Jack circuit pack.

Table 3-6. Lead Designations

110 Pin	Color	ISDN-BRI Line TN556	ISDN-BRI Line 2-Wire TN2198	Analog Line (16) TN746	Digital Line TN754	Digital Line 2-Wire 24 Ports TN2224	DS1 (UDS1) Tie Trunk TN767 (TN2207)	Aux Jack TN790
01	W-BL	PXR1	T1	T1		T1		Major
02	BL-W	PXT1	R1	R1		R1		Major
03	W-O	TXT1	T2	T2	TXT1	T2		Minor
04	O-W	TXR1	R2	R2	TXR1	R2		Minor
05	W-G	PXR2	T3	T3	PXT1	T3		
06	G-W	PXT2	R3	R3	PXR1	R3		
07	W-BR	TXT2	T4	T4		T4		
08	BR-W	TXR2	R4	R4		R4		
09	W-S	PXR3	T5		TXT2	T5		
10	S-W	PXT3	R5		TXR2	R5		
11	R-BL	TXT3	T6		PXT2	T6		
12	BL-R	TXR3	R6		PXR2	R6		
13	R-O	PXR4	T7			T7		
14	O-R	PXT4	R7			R7		
15	R-G	TXT4	T8		TXT3	T8		
16	G-R	TXR4	R8		TXR3	R8		
17	R-BR	PXR5	T9	T5	PXT3	T9		
18	BR-R	PXT5	R9	R5	PXR3	R9		
19	R-S	TXT5	T10	T6		T10		
20	S-R	TXR5	R10	R6		R10		
21	BK-BL	PXR6	T11	T7	TXT4	T11		E. GND
22	BL-BK	PXT6	R11	R7	TXR4	R11		M. -48
23	BK-O	TXT6	T12	T8	PXT4	T12		E. GND

Table 3-6. Lead Designations — *Continued*

110 Pin	Color	ISDN-BRI Line TN556	ISDN-BRI Line 2-Wire TN2198	Analog Line (16) TN746	Digital Line TN754	Digital Line 2-Wire 24 Ports TN2224	DS1 (UDS1) Tie Trunk TN767 (TN2207)	Aux Jack TN790
24	O-BK	TXR6	R12	R8	PXR4	R12		R. -48
25	BK-G	PXR7		T9		T13		G. GND
26	G-BK	PXT7		R9		R13		- -48
27	BK-BR	TXT7		T10	TXT5	T14		X. GND
28	BR-BK	TXR7		R10	TXR5	R14		T. -48
29	BK-S	PXR8		T11	PXT5	T15		R. GND
30	S-BK	PXT8		R11	PXR5	R15		P. -48
31	Y-BL	TXT8		T12		T16		O. GND
32	BL-Y	TXR8		R12		R16		W. -48
33	Y-O	PXR9			TXT6	T17		E. GND
34	O-Y	PXT9			TXR6	R17		R. -48
35	Y-G	TXT9			PXT6	T18		
36	G-Y	TXR9			PXR6	R18		
37	Y-BR	PXR10				T19		A. GRD
38	BR-Y	PXT10				R19		C. -48
39	Y-S	TXT10			TXT7	T20		C. GND
40	S-Y	TXR10			TXR7	R20		P. -48
41	V-BL	PXR11		T13	PXT7	T21		W. GND
42	BL-V	PXT11		R13	PXR7	R21		R. -48
43	V-O	TXT11		T14		T22	L1*	
44	O-V	TXR11		R14		R22	L1	
45	V-G	PXR12		T15	TXT8	T23	L0	EXT.
46	G-V	PXT12		R15	TXR8	R23	L0*	ALARM
47	V-BR	TXT12		T16	PXT8	T24	LBACK2	
48	BR-V	TXR12		R16	PXR8	R24	LBACK1	
49	V-S							T (INADS)
50	S-V							R (INADS)

* Denotes the ring side or high side of a pair.

The following table shows the pinouts for the TN2185 ISDN-BRI 4-wire S Interface.

Table 3-7. TN2185 ISDN-BRI — 4-Wire S Interface Pinout

Port	Signal	Cross-Connect Pin	Color	Amphenol Pin	Backplane Pin
1	TXT.1	1	W-BL	26	102
	TXR.1	2	BL-W	01	002
	PXT.1	3	W-O	27	103
	PXR.1	4	O-W	02	003
2	TXT.2	5	W-G	28	104
	TXR.2	6	G-W	03	004
	PXT.2	7	W-BR	29	105
	PXR.2	8	BR-W	04	005
3	TXT.3	9	W-SL	30	106
	TXR.3	10	SL-W	05	006
	PXT.3	11	R-BL	31	107
	PXR.3	12	BL-R	06	007
4	TXT.4	13	R-O	32	108
	TXR.4	14	O-R	07	008
	PXT.4	15	R-G	33	109
	PXR.4	16	G-R	08	009
5	TXT.5	17	R-BR	34	110
	TXR.5	18	BR-R	09	010
	PXT.5	19	R-SL	35	111
	PXR.5	20	SL-R	10	011
6	TXT.6	21	BK-BL	36	112
	TXR.6	22	BL-BK	11	012
	PXT.6	23	BK-O	37	113
	PXR.6	24	O-BK	12	013
7	TXT.7	25	BK-G	38	302
	TXR.7	26	G-BK	13	202
	PXT.7	27	BK-BR	39	303
	PXR.7	28	BR-BK	14	203
8	TXT.8	29	BK-SL	40	304
	TXR.8	30	SL-BK	15	204
	PXT.8	31	Y-BL	41	305
	PXR.8	32	BL-Y	16	205

Three-Pair and Four-Pair Modularity

Figure 3-48 shows 3-pair and 4-pair modularity from the port circuit pack to the voice or data terminal.

Most terminals connect to an information outlet (modular jack) installed at the work location. Make the connections as shown in Figure 3-48.

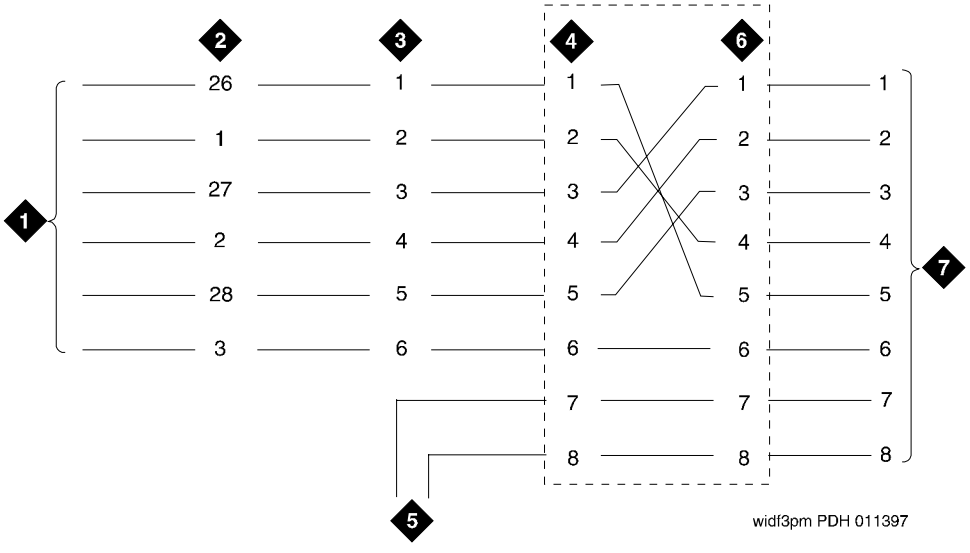


Figure Notes

1. Port Circuit Pack
2. System MSM Connector Pins (3-Pair Modularity)
3. Main Distribution Frame (MDF) Pins (3-Pair Modularity)
4. Input to Information Outlet (4-Pair Modularity)
5. Adjunct Power
6. Output From Information Outlet (4-Pair Modularity)
7. Voice or Data Terminal Pins

Figure 3-48. 3-Pair and 4-Pair Modularity

Installing the INADS Interface

The INADS trunk is a two-way, rotary dial, loop start trunk that connects to the TN790 Processor circuit pack through the INADS terminals at the trunk/auxiliary cross-connect field. The INADS trunk is used only for the INADS connection.

1. Determine the INADS trunk appearance at the green trunk/auxiliary cross-connect field.
2. Label terminals for INADS trunk appearance (IN).
3. Install jumpers between INADS trunk appearance (IN) and INADS terminals.

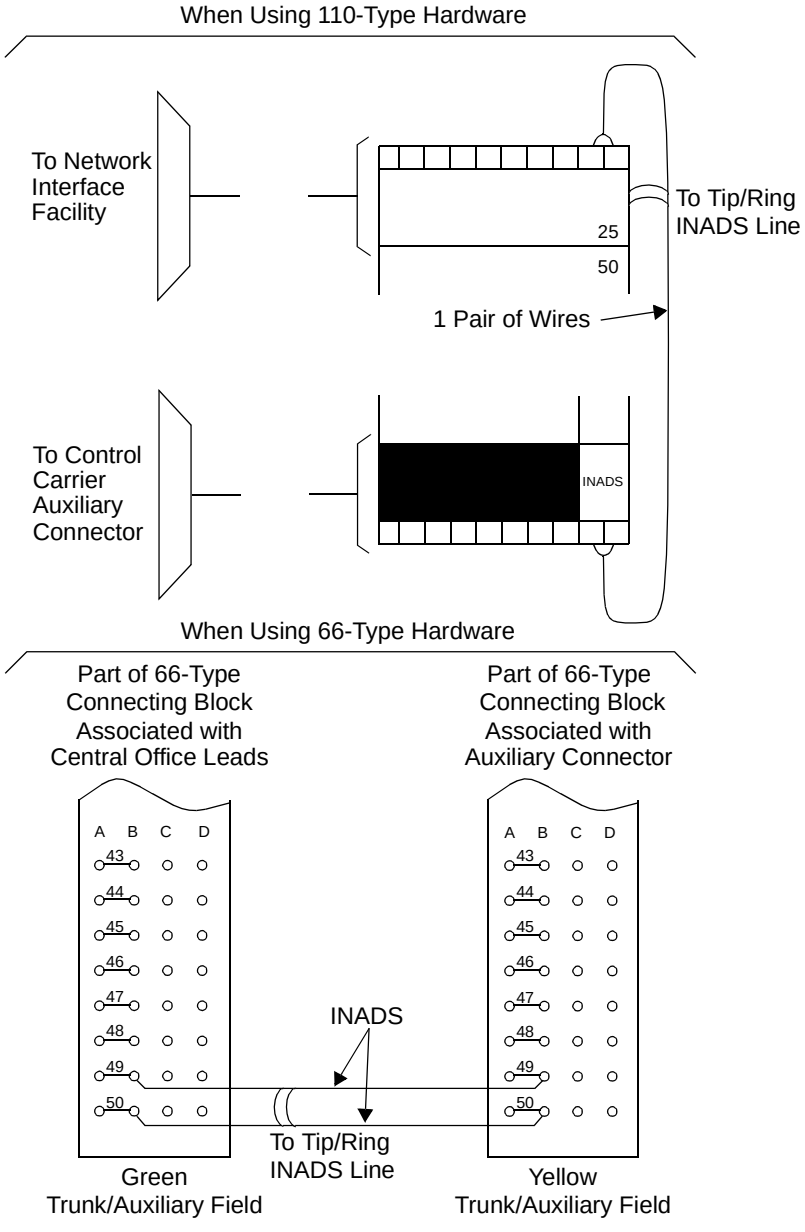


Figure 3-49. Connections at Trunk/Auxiliary Field for INADS Trunk

Cabling for DS1 or UDS1 Tie Trunks

DS1 or UDS1 tie trunks provide digital data service between an MSM and a PBX or between the MCU and a data network using T1 or E1 carrier facilities through a Channel Service Unit (CSU). The TN767E DS1 (TN2207 UDS1) tie trunk circuit pack provides connection capability to the DS1 (USD1) facility for 24 independent trunks. The following table shows the lead designations for the DS1 (UDS1) circuit pack.

NOTE:
For details on installing trunk cables, see Chapter 4, *"Connecting to the Network."*

The H600307 connector cable (comcode 104307376) is used to connect the DS1 (UDS1) tie trunk to a PBX or to a CSU. This cable is a 50-foot shielded cable equipped with a 50-pin male connector on each end.

NOTE:
Connector pins 2 and 3 have wires with a clear sleeve attached.

NOTE:
In the United Kingdom, an 888A adapter is required to link the 25-pair cable to the coaxial cable leading to the network.

Table 3-8. DS1 Interface Cable H600-307 (and C6C)

50-Pin			15-Pin		
Pin	**Color**	**Designation**	**Pin**	**Color**	**Designation**
02	W-BL				
03	BL-W				
47	W-G	LI (High)	11	W-G	LI (High)
22	G-W	LI	03	G-W	LI
48	W-BR	LO	09	W-BR	LO
23	BR-W	LO (High)	01	BR	LO (High)
49	W-SL	LOOP2	06	W-SL	LOOP2
24	SL-W	LOOP1	05	SL-W	LOOP1

All other pins empty.

The following figure shows a typical DS1-MMI cable configuration.

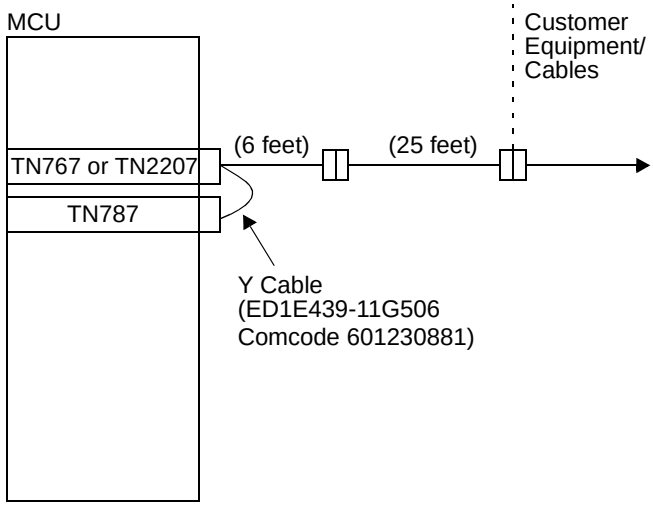


Figure 3-50. Typical DS1-MMI Cable Configuration

Installing TN2236 Data Interface Cables

This section describes the cables that support the V.35/RS449/EIA-530 data interfaces supported by the TN2236 Data Interface circuit pack. These cables are used to connect external V.35/RS449/EIA-530 interfaces.

Cable Description

Cables designed for the V.35/RS449/EIA-530 interfaces used twisted and shielded pairs of 24 AWG wires to minimize radiation. All the cables are 25 ft long. The maximum distance between the Lucent Technologies MCU and the V.35/RS449/EIA-530 endpoint is currently 50 ft. For distances greater than 50 ft, digital loop extenders must be used. All extension cables must be of Plenum quality.

The V.35/RS449/EIA-530 cables can connect to DTE or DCE equipment. Generally, a male connector at the end of each cable presents DTE, while a female connector presents DCE.

Cable Summary and Typical Application

The following table contains a summary of all the TN2236 cables:

Table 3-9. Summary of TN2236 Cables

Cable	Gender	Drawing Number	Comcode
DI-MMI-Y	NA	H600-478 G1	601838444
V.35	DTE	H600-479 G1	601838451
V.35	DCE	H600-479 G2	601838469
RS449	DTE	H600-480 G1	601838477
RS449	DB37 F-F gender changer to make DCE	NA	407709716
EIA-530	DTE	H600-481 G1	601838485
EIA-530	DB25 F-F gender changer to make DCE	NA	407709724
RS366 DCE Y	DCE	H600-494 G1	601875982

The protocol cables are 50-pin Amphenol at the system end and protocol-specific at the customer end. The user may connect equipment or extension cables at this point.

NOTE:
The RS449 DCE and the EIA-530 DCE are provided by using the DTE versions with gender changes. This cannot be done for the V.35 interface.

The following figure shows a typical cable application with two types of connections.

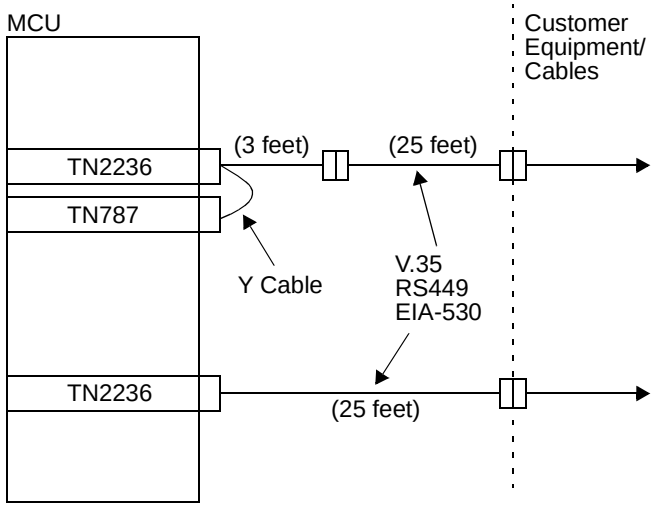


Figure 3-51. Typical Data Interface Cable Configurations

For one connection, the TN2236 DI circuit pack is cabled to the TN787 MMI circuit pack. This is done with a separate Y-cable with three 50-pin Amphenol connectors. For the other connection, a cable is connected directly to the TN2236 circuit pack.

The following two figures show scenarios involving the RS366 DCE-Y cable, which is required to support customer equipment dialing into the MCU.

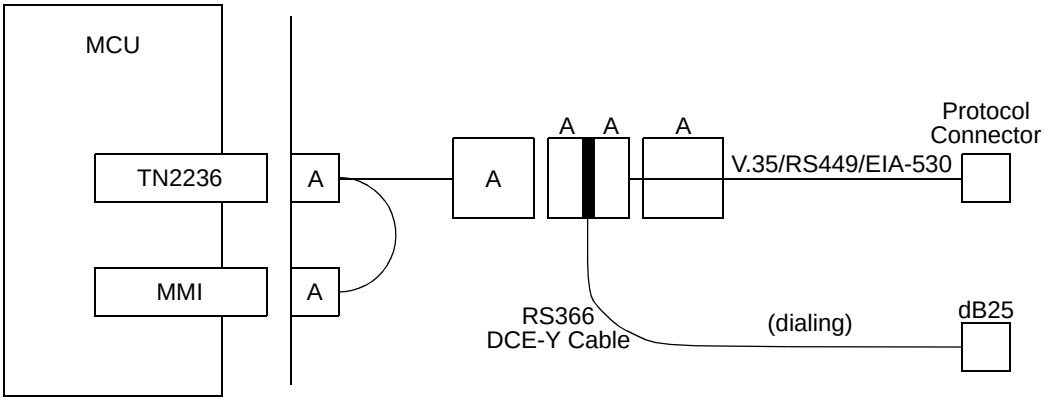


Figure 3-52. Data Interface Cable Configuration Including the RS366 DCE-Y Cable (Scenario 1)

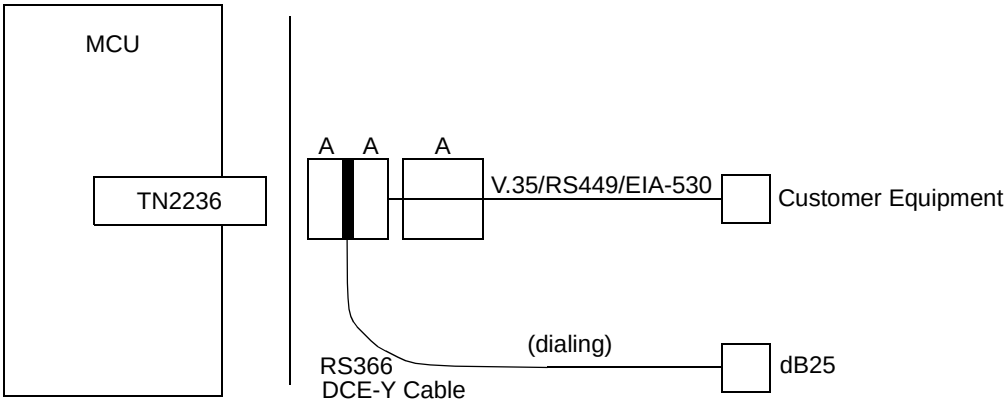


Figure 3-53. Data Interface Cable Configuration Including the RS366 DCE-Y Cable (Scenario 2)

Pin Connections for Rates Exceeding 672k

The following table provides the pin connections of the cable for the MMI and DI circuit packs. This cable is connected to the connector panel at the back side of the MCU. The L1 Amphneol connector is connected to the V.35, RS449, and EIA-530 Interface cables (discussed later)

Table 3-10. DI-MMI-Y Cable Pin Connections

MMI Amphenol	DI Amphenol	LI Amphenol	Signal Name
35 10	49 24		trsync ~trsync
37 12	37 12		trclk ~trclk
34 09	48 23		tdata ~tdata
33 08	36 11		rdata ~rdata
38 13	47 22		~ds1here ~pahere
	35 10	35 10	term_tim_a term_tim_a
	46 21	46 21	snd_tim_a snd_tim_b
	34 09	34 09	rec_tim_a rec_tim_b
	45 20	45 20	tr_data_a tr_data_b
	33 08	33 08	rec_data_a rec_data_b
	44 19	44 19	los_a los_b
	32 07	32 07	rr_a rr_b
	43 18	43 18	dte_rdy_a dte_rdy_b
	31 06	31 06	dce_rdy_a dce_rdy_b
	42	42	moatgrd
	17	17	ring_ind

Table 3-10. DI-MMI-Y Cable Pin Connections — *Continued*

MMI Amphenol	DI Amphenol	LI Amphenol	Signal Name
	30 05	30 05	cts_a cts_b
	41 16	41 16	r_t_s_a r_t_s_b
	29 04	29 04	moatgrd sp_nb8_rx
	40 15	40 15	dlo_nb4_rx dsc_nb2_rx
	28 03	28 03	pwi_nb1_rx pnd_crq_rx
	39 14	39 14	acr_dpr_rx moatgrd
	27 02	27 02	nb8_sp_tx nb4_dlo_tx
	38 13	38 13	nb2_dsc_tx nb1_pwi_tx
	26 01	26 01	crq_pnd_tx dpr_acr_tx
50 25	50 25	50 25	

DI-MMI-Y Cable (H600-478 G1)

The DI-MMI-Y cable uses the connections indicated in the previous table. All TN2236 circuit packs that support transfer rates in the range of 672k to 1920k are cabled to a TN787 MMI circuit pack via this cable. If a DI circuit pack is cabled to an MMI circuit pack, the system reserves the appropriate number of resources to ensure that the administered DI capacity can be used. Excess MMI capacity may be used by any other DS1 or DI circuit pack. Therefore, the cable shown in this section is not used whenever the transfer rate is less than 672k.

Whenever the DI-MMI-Y cable is used on the system, the L1 connector end is connected to the TN2236 DI Male Amphenol connector shown in the following sections, depending on the interface type. The TN2236 DI Amphenol is labeled “DI,” the TN787MMI Amphenol is labled “MMI,” and the L1 connector Amphenol is labled “LI Conn.”

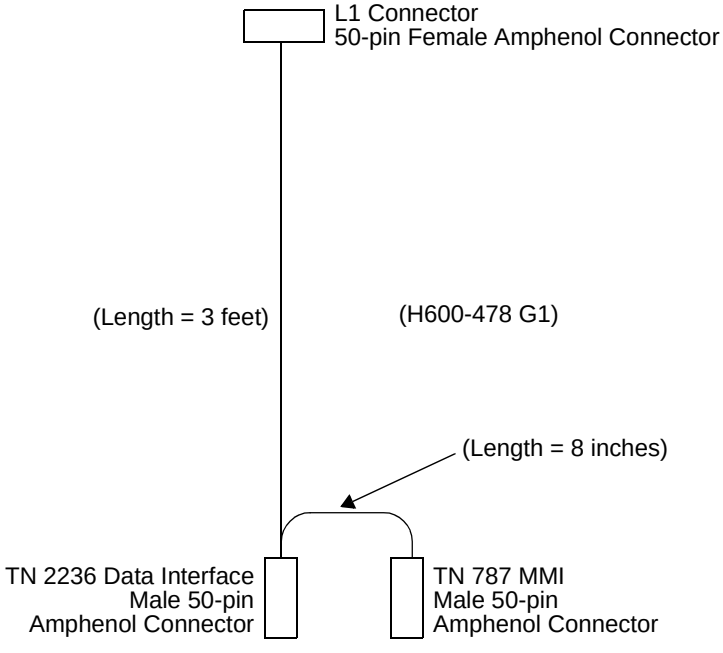


Figure 3-54. DI-MMI-Y Cable

RS366 DCE-Y Cable (H600-494 G1)

The RS366 DCE-Y cable is required to support customer equipment dialing into the MCU. The cable appears as follows:

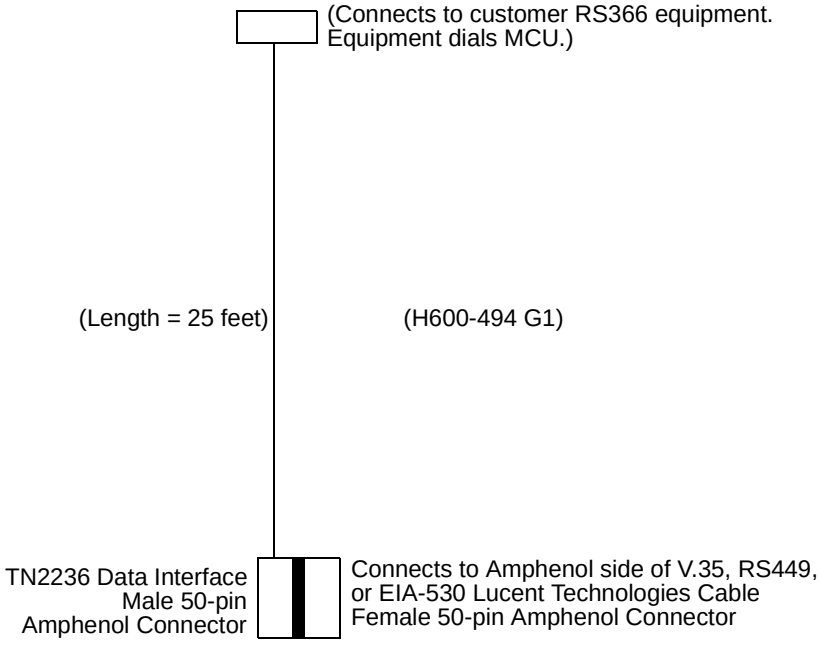


Figure 3-55. RS366 DCE-Y Cable

Pin Connections for the RS366 DCE-Y Cable

The following table indicates pin connections for the RS366 DCE-Y Cable

Table 3-11. RS366 DCE-Y Cable Pin Connections

DCE -db25 f	Amphenol m	Amphenol f	Signal Name
	49 24	49 24	trsync ~trsync
	37 12	37 12	trclk ~trclk
	48 23	48 23	tdata ~tdata
	36 11	36 11	rdata ~rdata
	47 22	47 22	~ds1here ~pahere
	35 10	35 10	term_tim_a term_tim_a
	46 21	46 21	snd_tim_a snd_tim_b
	34 09	34 09	rec_tim_a rec_tim_b
	45 20	45 20	tr_data_a tr_data_b
	33 08	33 08	rec_data_a rec_data_b
	44 19	44 19	los_a los_b
	32 07	32 07	rr_a rr_b
	43 18	43 18	dte_rdy_a dte_rdy_b
	31 06	31 06	dce_rdy_a dce_rdy_b
	42	42	moatgrd
	17	17	ring_ind
	30 05	30 05	cts_a cts_b
	41 16	41 16	r_t_s_a r_t_s_b

Table 3-11. RS366 DCE-Y Cable Pin Connections — *Continued*

DCE -db25 f	Amphenol m	Amphenol f	Signal Name
7 17	29 04	29 04	moatgrd sp_nb8_rx
16 15	40 15	40 15	dlo_nb4_rx dsc_nb2_rx
14 4	28 03	28 03	pwi_nb1_rx pnd_crq_rx
2 7	39 14	39 14	acr_dpr_rx moatgrd
--- 22	27 02	27 02	nb8_sp_tx nb4_dlo_tx
13 6	38 13	38 13	nb2_dsc_tx nb1_pwi_tx
5 3	26 01	26 01	crq_pnd_tx dpr_acr_tx
1 1	50 25	50 25	gnd gnd

Cable Connections for All Transfer Rates

The tables in the following sections shows the pin connections for V.35, RS-449, and EIA-530 for both DTE and DCE types to the Data Interface circuit pack. The cable for each interface is a straight cable from Amphenol to the V.35, RS-449, or EIA-530 connection. For V.35 DTE and DCE cables, the resistors identified in the table in the next section are inside the cable connector.

V.35 Interface Cable

The V.35 Interface Cable appears as follows:

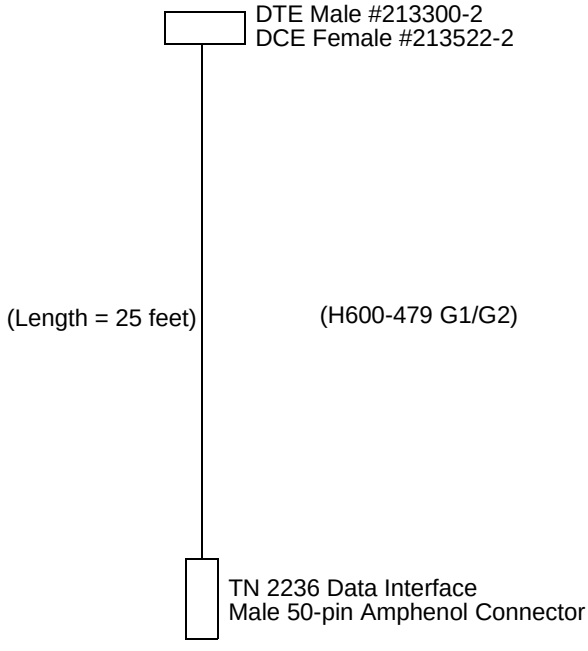


Figure 3-56. V.35 Interface Cable

The cable is available in two versions. The DCE V.35 version provides female 34-pin connections, and the DTE V.35 version provides male 34-pin connections. DTE-to-DCE conversions are done with the help of a 150 ohm resistor that is embedded within the cable. The maximum distance between the Lucent Technologies MCU and the V.35 endpoint is 50 ft when using the extension cable. This means that a 25 ft extension cable is added to the 25 ft Lucent Technologies cable.

The following table shows the pin connections for the V.35 cable and the TN2236 Interface circuit pack (Amphenol):

Table 3-12. V.35 Cable—TN2236 DI Amphenol Connections

V.35 Cable		TN2236 Amphenol	Signal Name
DTE	DCE		
U W*	U W	35 10	term_tim_a term_tim_a
Y AA	Y AA#	46 21	snd_tim_a snd_tim_b
V X	V X#	34 09	rec_tim_a rec_tim_b
P S*	P S	45 20	tr_data_a tr_data_b
R T	R T#	33 08	rec_data_a rec_data_b
- -	- -	44 19	los_a los_b
F -	F -	32 07	rr_a rr_b
H -	H -	43 18	dte_rdy_a dte_rdy_b
E -	E -	31 06	dce_rdy_a dce_rdy_b
B*	B#	42	moatgrd
J	J	17	ring_ind
D -	D -	30 05	cts_a cts_b
C -	C -	41 16	r_t_s_a r_t_s_b
A A	A A	50 25	

* Requires 150 ohm resistors connecting pin W (10) to pin B (42), and pin S (20) to pin B (42)

RS449 Interface Cable

The RS449 Interface Cable appears as follows:

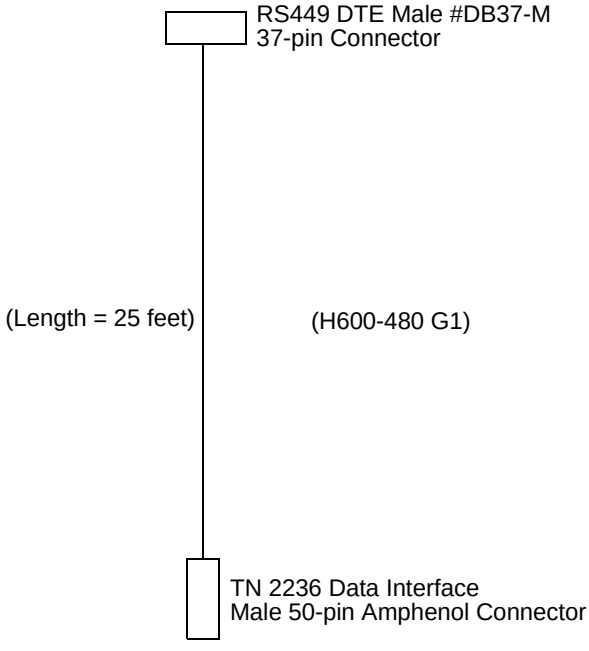


Figure 3-57. RS449 Interface Cable

Only the DTE version of this cable is available. For DCE versions, a female to female gender changer can be used to convert a male connection to a female connection. The maximum distance using the extension cable between the MCU and the RS449 endpoint is 50 ft. This means that a 25 ft extension cable is added to the 25 ft Lucent Technologies cable.

The following table shows the pin connections for the RS449 cable and the TN2236 Interface circuit pack (Amphenol):

Table 3-13. RS449 Cable—TN2236 DI Amphenol Connections

RS449 Cable		TN2236 Amphenol	Signal Name
DTE	DCE		
17 35	17 35	35 10	term_tim_a term_tim_a
5 23	5 23	46 21	snd_tim_a snd_tim_b
8 26	8 26	34 09	rec_tim_a rec_tim_b
4 22	4 22	45 20	tr_data_a tr_data_b
6 24	6 24	33 08	rec_data_a rec_data_b
3 21	- -	44 19	los_a los_b
13 31	13 31	32 07	rr_a rr_b
12 30	12 30	43 18	dte_rdy_a dte_rdy_b
11 29	11 29	31 06	dce_rdy_a dce_rdy_b
19	19	42	moatgrd
15	15	17	ring_ind
9 27	9 27	30 05	cts_a cts_b
7 25	7 25	41 16	r_t_s_a r_t_s_b
1 1	1 1	50 25	

EIA-530 Interface Cable

The EIA-530 Interface Cable appears as follows:

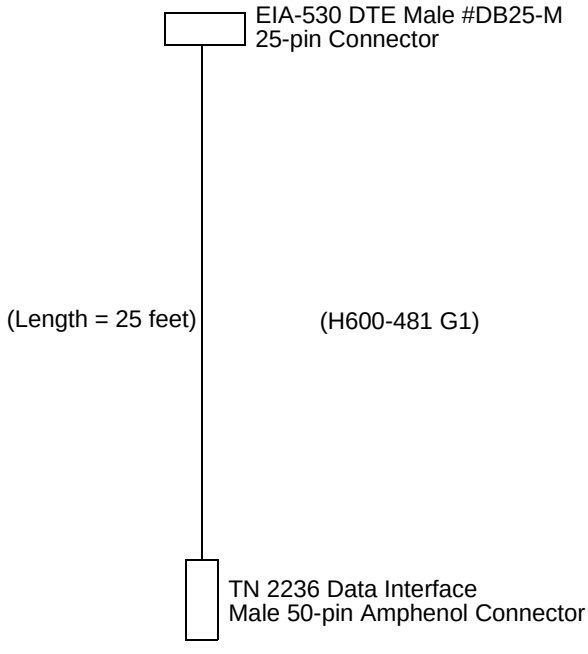


Figure 3-58. EIA-530 Cable

Only the DTE version of this cable is available. To convert a DTE interface to a DCE interface, a female-to-female gender changer is used. The maximum distance between the MCU and the EIA-530 endpoint is 50 ft. This means that a 25 ft extension cable is added to the 25 ft Lucent Technologies cable.

The following table shows the pin connections for the EIA-530 cable and the TN2236 Interface circuit pack (Amphenol):

Table 3-14. EIA-530 Cable—TN2236 DI Amphenol Connections

EIA-530 Cable		TN2236 Amphenol	Signal Name
DTE	DCE		
24 11	24 11	35 10	term_tim_a term_tim_a
15 12	15 12	46 21	snd_tim_a snd_tim_b
17 9	17 9	34 09	rec_tim_a rec_tim_b
2 14	2 14	45 20	tr_data_a tr_data_b
3 16	3 16	33 08	rec_data_a rec_data_b
- -	- -	44 19	los_a los_b
8 10	8 10	32 07	rr_a rr_b
20 23	20 23	43 18	dte_rdy_a dte_rdy_b
6 22	6 22	31 06	dce_rdy_a dce_rdy_b
7	7	42	moatgrd
-	-	17	ring_ind
5 13	5 13	30 05	cts_a cts_b
4 19	4 19	41 16	r_t_s_a r_t_s_b
1 1	1 1	50 25	

Applications and Interactions

The following devices interact with the V.35, RS-449, and EIA-530 interfaces:

- H.320 endpoints that use Group Systems that connect directly to the MCU via a DCE V.35, RS449, or EIA-530 Interface
- Devices such as encryptions devices, IMUXs running proprietary protocols, and satellite modems that connect directly to the MCU via a DTE V.35, RS449, or EIA-530 Interface
- V.35, RS449, and EIA-530 connections

The following figures show typical V.35, RS449, and EIA-530 connections to the Lucent Technologies MCU.

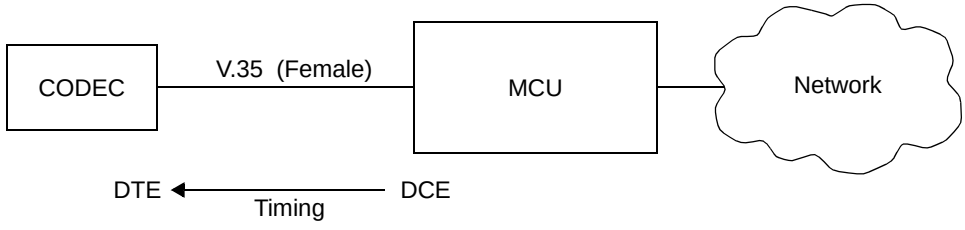


Figure 3-59. V.35 Codec Directly Connected to the MCU

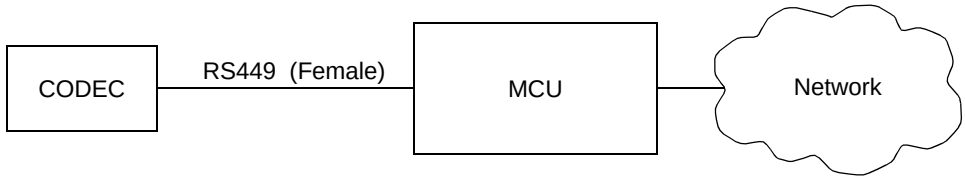


Figure 3-60. RS449 Codec Directly Connected to the MCU

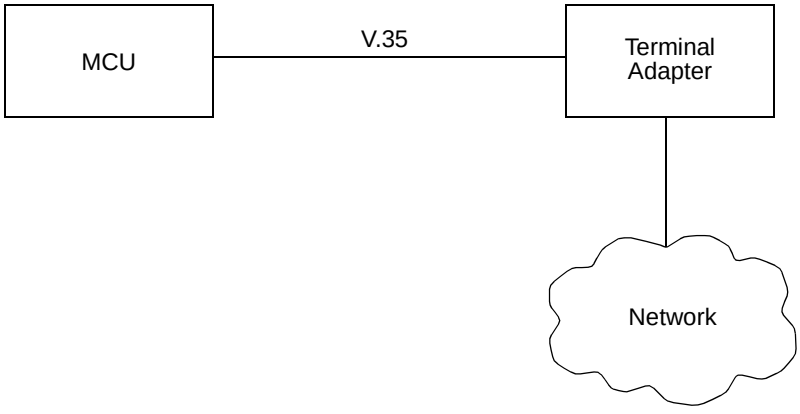


Figure 3-61. Inverse Multiplexor (Terminal Adapter) Connected to the MCU

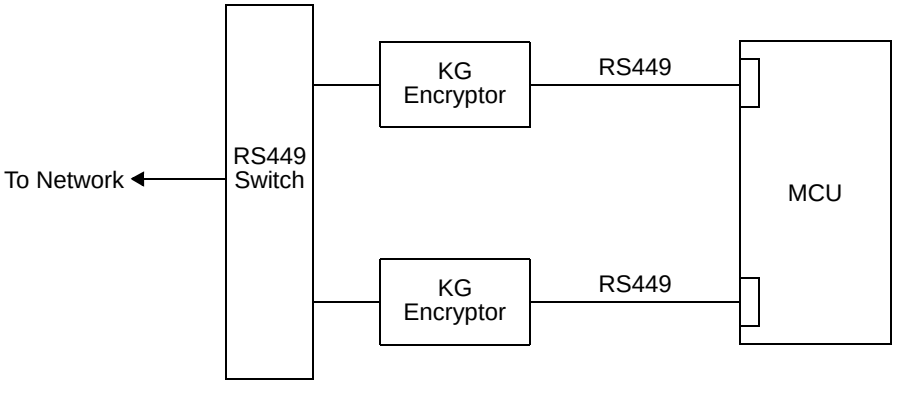


Figure 3-62. KG Encryption Device Connected to the MCU

Connecting to the Network

4

Overview

This section describes the wiring and connections required for the MCU. It identifies the cross-connect fields, lists the hardware equipment room requirements, and provides procedures for installing cables.

Hardware Equipment Room

In the equipment room, 66- or 110-type hardware is used for the cross-connect field. A cross-connect field contains a trunk/auxiliary field and a distribution field (port, auxiliary, and maintenance alarm terminals).

Trunk/Auxiliary Field

The trunk/auxiliary field contains three distinct cross-connect areas (Lucent Technologies SYSTIMAX® standards):

- Green field: This field terminates the network interface leads from the CO and provides the terminals to cross-connect the CO leads to the purple or yellow fields as required. A single row of the 66-type connecting block or 110-type terminal block can terminate 24 one-pair, 8 three-pair, or 12 two-pair trunks.
- Purple field: This field terminates the trunk circuits from the MCU with WP-90929, List 1 and List 3 (110-type terminal block) or WP-90929, List 2 or List 4 (66-type connecting block) concentrator cables. Also, 25-pair cables can be used to terminal trunk circuits from the MCU with each trunk circuit pack connecting to one 25-pair row of the 66-type connecting

block/110-type terminal block. Each 66-type connecting block or 110-type terminal block row can terminate 24 one-pair, 8 three-pair, or 12 two-pair trunks.

- Yellow field: This field provides cross-connection terminals for the INADS trunk lead from the MCU. One 25-foot cable is required for the INADS connection.

Distribution Field

The distribution field contains the following cross-connect area:

- Purple field (port field): This area terminates the 25-pair cables from the MCU for the maintenance alarm terminals. Each line circuit pack connects to one 66-type connecting block or to one 25-pair row of the 110-type terminal block. One 25-pair cable is required for each line circuit pack.

Table 4-1. Distribution Field-110A-Type Terminal Blocks

3-Pair Port Field (Purple)	4-Pair Station Field (Blue)	3-Pair Station Field (Blue or White)
110AC1-300STM/6	110AB1-100FT	110AC1-100FT
110AC1-300STF/6	110AB1-300FT	110AC1-300FT
		110AC1-300STM/6
		110AC1-300STF/6

66-Type Hardware

The following figure shows a typical cross-connect field using 66-type hardware. It is possible that only a few 66-type connecting blocks will be required in the trunk/auxiliary field for the green and yellow fields. For this reason, if 157B connecting blocks mounted on a purple 183-type of 166-type backboard is used as the trunk/auxiliary field, then some of the extra connecting blocks in the purple field can be used as the green and yellow fields to avoid ordering extra backboards and connecting blocks.

When this is done, the green and yellow fields should be clearly identified to avoid confusion. When white backboards are required for cross-connections with a satellite closet, they must be ordered from an outside vendor. If a blue backboard is used for these cross-connections, the part of the blue field that is functionally used as the white field should be clearly identified.

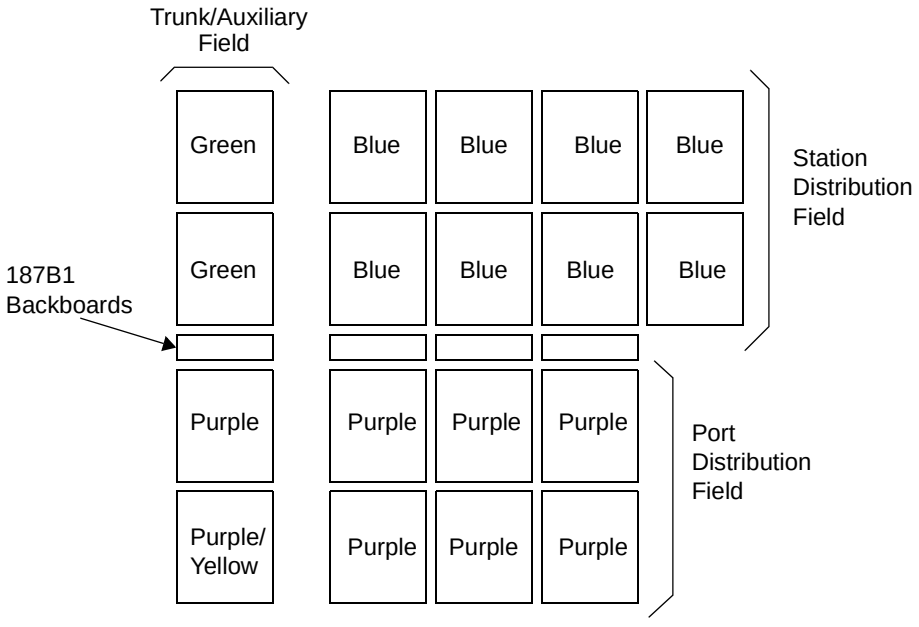


Figure 4-1. Typical Cross-Connect Field Arrangement Using 66-Type Hardware

The 66-type connecting blocks can be mounted directly onto the wall without using colored backboards. If this is the case, all the cross-connect field functional colors should be identified on the wall.

Cross-Connect Field Using 110-Type Hardware

The cross-connect field is located directly behind the MSM. The following figure shows a typical cross-connect field installation using 110A-type terminal blocks.

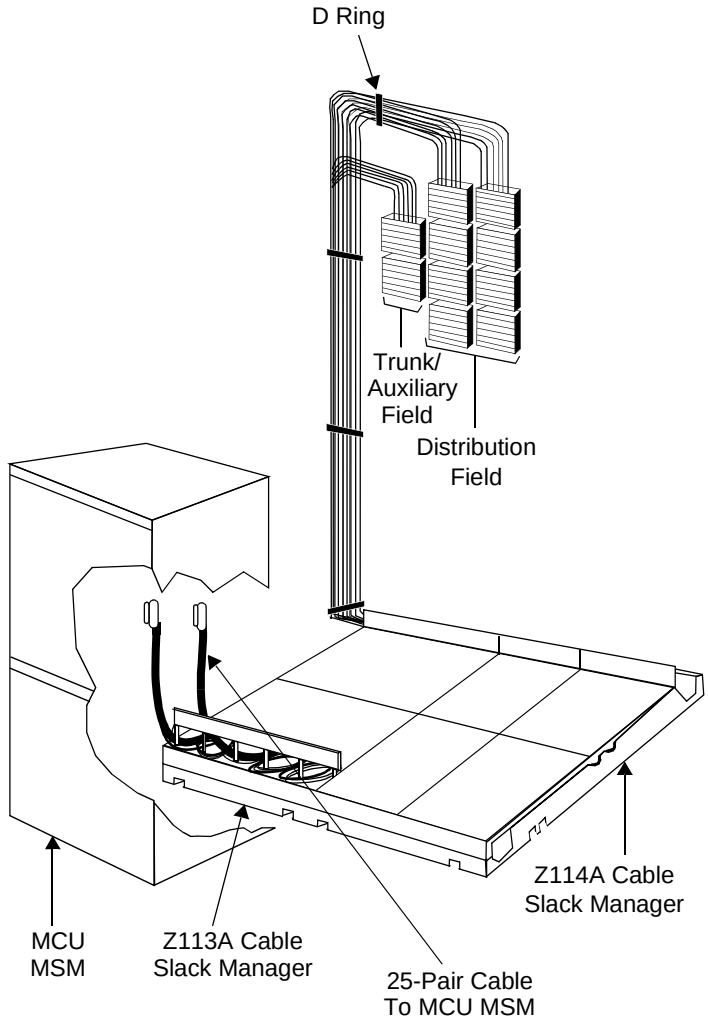


Figure 4-2. Typical Cross-Connect Field Installation Using 110A-Type Hardware

Cross-Connect Field Using 66-Type Hardware

The following figure shows a typical cross-connect field installation using 66-type hardware.

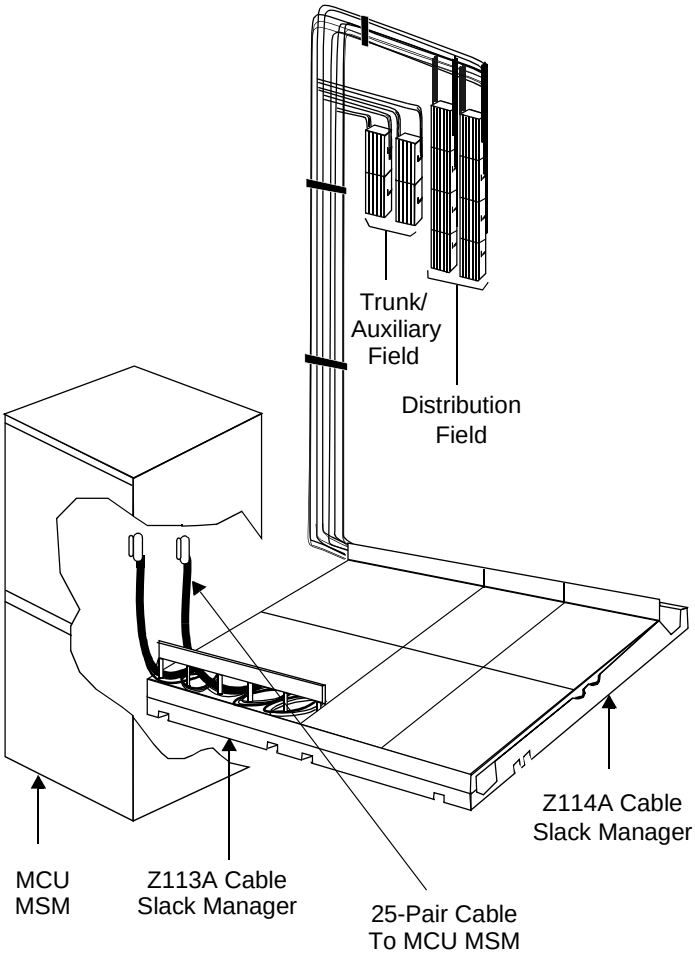


Figure 4-3. Typical Cross-Connect Field Installation Using 66-Type Hardware

Equipment Requirements

Review the following requirements for connecting the MCU to the network.

Wall Space for 110-Type Hardware

The trunk/auxiliary field and the distribution field are mounted on the same wall. Each 110P-type terminal block is 8 1/2 inches wide. Vertical patch cord troughs are 5 5/16 inches wide and horizontal patch cord troughs are 23 inches wide.

Each 110-A type terminal block is 10 13/16 inches wide; however, no horizontal patch cord troughs are used and the blocks are shorter than 110P-type terminal blocks. This allows the 110A-type terminal blocks to be stacked. Therefore, the 110A-type hardware requires less space than the 110P-type hardware on a per-station basis.

Wall Space for 66-Type Hardware

The trunk/auxiliary field and the distribution field are mounted on the same wall. If the 66-type connecting blocks are mounted directly on a wall, the space requirements of a 183-type backboard should be used to determine the required wall space for the connecting blocks.

This method allows enough wall space between the connecting blocks for jumper wires and cable connections. The 183A-type backboard mounts four 66-type connecting blocks and is 8 1/2 inches wide and 20 inches tall. The 183B-type backboard mounts eight 66-type connecting blocks, and is 17 inches wide and 20 inches tall.

Installing Equipment Room Hardware

The procedures for installing hardware assume a system technician is performing the installation alone. If possible, locate the cross-connect field directly behind the MCU cabinet.

Wall Mounting 110A-Type Terminal Blocks

The 110A-type hardware can be stacked in almost any arrangement at any height or location on the wall. One arrangement is shown in the following figure. The distance between the mounting screw holes on the terminal blocks is 10-13/16 iinches. If a vertical patch cord trough is used, the distance between the mounting screws is 5-5/16 inches.

Wall Mounting 66-Type Connecting Blocks

The first column of 66-type connecting blocks should be aligned with the left side of the MSM. This arrangement allows for orderly growth toward the right side of the cross-connect field.

The connectorized 66-type connecting blocks are factory wired for cable routing from the top so the cable connector aligns with the connector on the connecting block. If cable routing from the bottom is desired, then the connector on the connecting block must be removed and rotated 180 degrees. Then the connector must be relocated in the previously unoccupied hole since the connecting block leads are not long enough to reach the hole where the connector was previously mounted. The Velcro® cable retainer must also be relocated.

To install the cross-connect field, use the following procedure:

1. Draw a level horizontal line on the wall 12 inches above the floor.
2. Place the bottom of the first backboard/connecting block on the line and align it vertically with the left side of the MSM. Mark the mounting holes.
3. Remove the backboard and connecting block and drill holes in the wall for 3/4 inch No. 12 wood screws.
4. Move the backboard and connecting block into place and fasten it to the wall with 3/4 inch No. 12 wood screws.
5. The next backboard and connecting block is mounted to the right or above the one previously installed, depending on the space requirement. Repeat steps 2 through 4 until each backboard or connecting block is installed.

NOTE:
The 66-type connecting blocks should not be installed more than 78 1/2 inches above the floor.

Labeling the Cross-Connect Field

The following figure shows the graphic symbols used (instead of words) on labels for the MCU, cross-connections, information outlets, and cables. The labels are color-coded to identify system wiring as follows:

- Green: Leads to the Central Office (CO)
- Purple: Leads to MCU ports
- Yellow: Leads to the INADS connection

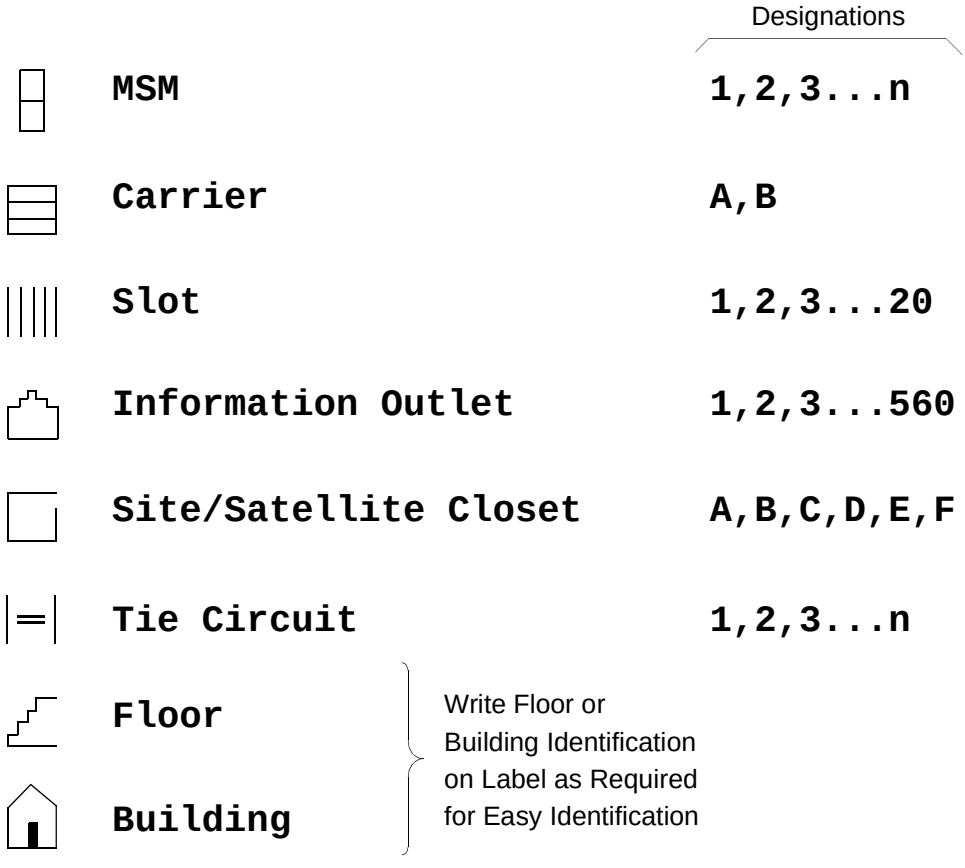


Figure 4-4. Label Graphic Symbols and Designation Nomenclature

Installing Cables

The purple port label shown in the following figure is installed with both ends of the 25-pair cables that connect to the trunk/auxiliary field and/or the distribution field.

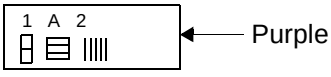
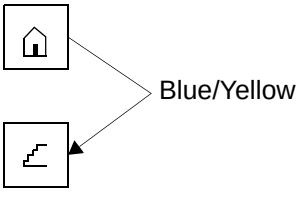
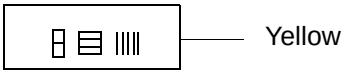
Label Name	Range	Sample Label
Port Cable	1A1-1A10, 1B1-1B20, 1C1-1C20, 1D1-1D20, 1E1-1E20	
Building	Field Identified	
Floor	Field Identified	
Auxiliary Cable	Field Identified	
Site or Satellite	A-F and/or Field Identified	

Figure 4-5. Equipment Room Cabling Labels

The blue/yellow label is for 25-pair cables that connect to site/satellite closets.

Table 4-2. Cable/Connector/Building Label Ordering Information

Description	Quantity Per Code	Comcode
201A Labels	34 sheets	103969994

Guidelines for Routing Cables

The following two figures show typical cable routing from the MSM to the top and bottom of the cross-connect field, respectively.

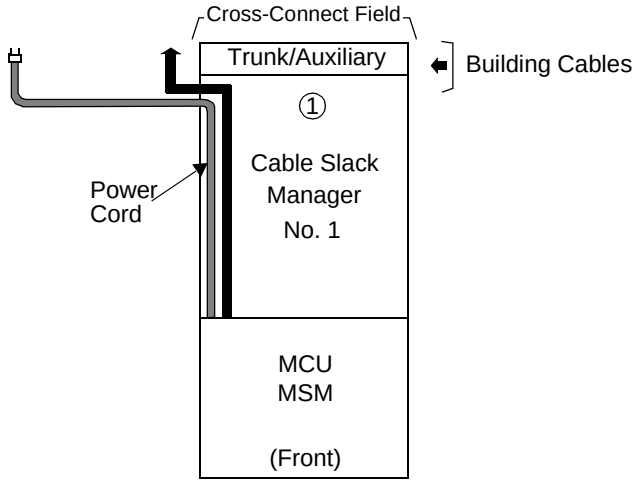
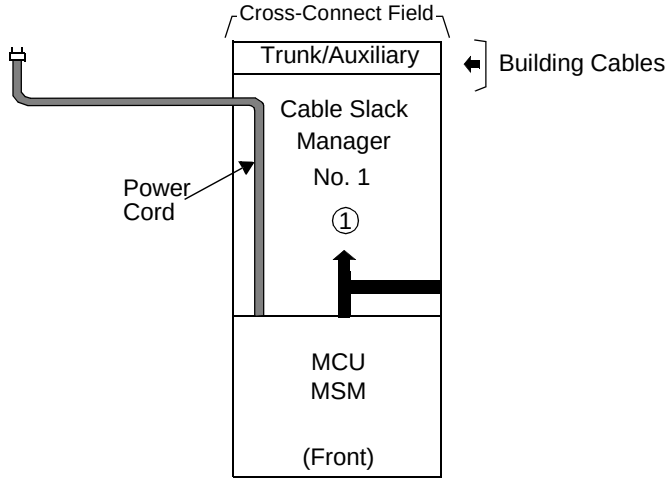


Figure 4-6. Cable Routing from MSM to Cross-Connect Field (using top)

The following guidelines should be followed when routing cables from the MSM to the cross-connect field.

- When cable routing is to the top or bottom of the cross-connect field, each port cable is connected at the MSM and then routed along the front trough of the cable slack manager to the connecting/terminal block where the cable is to be terminated.



① Cables Run from MSM to Trunk/Auxiliary Field

Figure 4-7. Cable Routing from MSM to Cross-Connect Field (using bottom)

- Enough slack must be left at the MSM end of the cable to allow for proper dressing of the cables.
- Route the cable from the MSM to the wall. Place the cable beside one of the rows of columns in the cable slack manager (see NOTE).

  NOTE:
  Retainers mounted on columns keep the cable from protruding above the top of the base of the cable slack manager.

- Determine the length of the cable required to reach from the cable slack manager to the assigned connecting/terminal block.
- The cable must be supported on the wall using D rings.
- Cable slack is stored by coiling the cable around the columns in the cable slack manager. The first run should always go across the full length of the five columns in the cable slack manager.
- Connect the cable to the assigned connecting/terminal block.

Installing Control Carrier Outputs Cable

The control carrier AUXILIARY connector outputs support the INADS trunk connection. There is one connector on the back of the control carrier that is labeled *AUX*. A 25-pair cable connects this control carrier AUXILIARY connector to a 66-type connecting block or 110-type terminal block in the yellow field of the trunk/auxiliary field.

110-Type Hardware

Place the appropriate AUXILIARY connector label on the assigned 110-type terminal block row. On the control carrier cable, place a yellow auxiliary label on the connectors at each end of the cable. Write the letters AUX on each label.

66-Type Hardware

Write the lead designations for the AUXILIARY connector on the 66-type connecting block. If cable labels are used, place a yellow auxiliary label on the connectors at each end of the cable. Write the letters AUX on the connectors at each end of the cable.

Connecting the Control Carrier Outputs Cable

Plug the connector cable in the AUXILIARY connector on the rear of the control carrier. Route the connector cable through the cable slack manager to the assigned 66-type connecting block or 110-type terminal block in the yellow field of the trunk/auxiliary field.

Use this procedure to install the cables:

1. For 110-type hardware (see step 2 for 66-type hardware), connect patch cords or jumper wires from the terminal block in the green field to the associated terminal block in the purple field.
2. For 66-type hardware, install bridging clips on the 66-type connecting blocks as required.

   NOTE:
   The left half of the 66-type connecting block is designated as part of the green field and the right half is designated as part of the purple field.

3. Connect the single-fingered end of the concentrator cables to the 110-type terminal block or 157B connecting block connectors associated with the purple row.

4. At the rear of the MSM, connect the other end (2/3 fingered end) of the concentrator cables to the appropriate carrier slots. Equipped carrier slots are identified on the CSO. Mark the nomenclature strips above the carrier to identify the equipped slots.
5. Label connectors on each end of the cables that connect to the MSM.
6. Dress cables down the sides of the MSM and store the excess cable slack in the cable slack manager as described previously.

Installing Grounds for the Coupled Bonding Conductor

A Coupled Bonding Conductor (CBC) must be tie-wrapped to all trunk cables. The CBC connects the cabinet single-point ground block to the approved ground located nearest the telephone company-owned protector block at the building entrance facility (see the following figure).

NOTE:
The CBC is a conductor that is connected to ground and run adjacent to the pairs in an inside wiring cable. The mutual coupling between the bonding conductor and the cable pairs reduces potential differences in terminating equipment. The conductor consists of a 10-AWG wire that is tie-wrapped to the inside wiring cable.

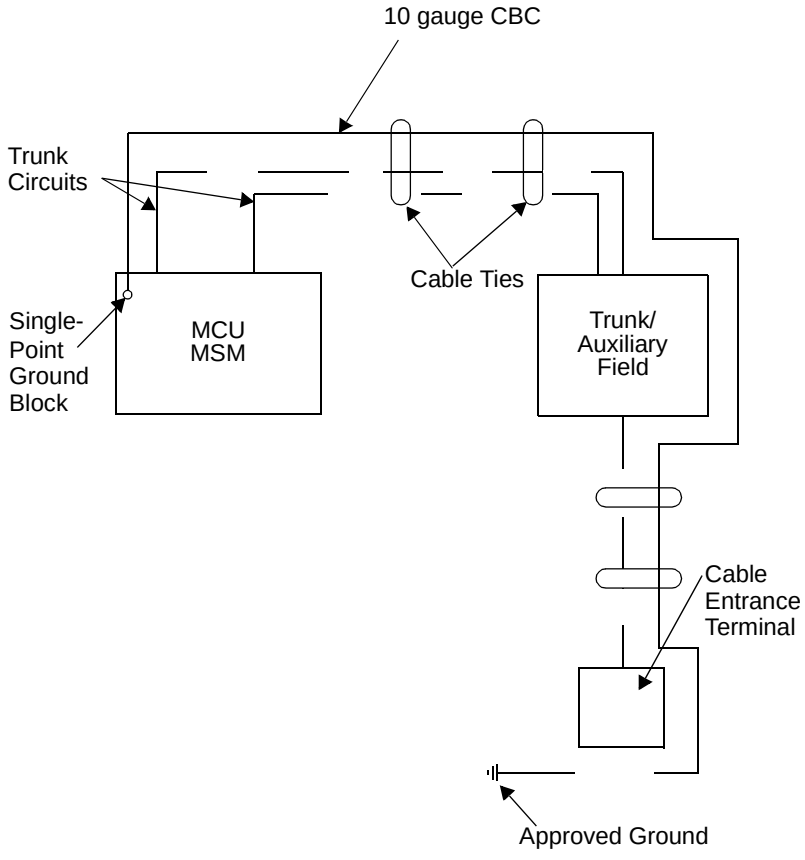


Figure 4-8. Installing the Coupled Bonding Conductor

Approved Grounds

An approved ground is the closest acceptable medium for grounding the building entrance protector, entrance cable shield, or single-point ground of MCU equipment. If more than one type of approved ground is available on the premises, the grounds must be bonded together as required in Section 250-81 of the National Electrical Code. See Chapter 2, “Grounding” for a list of approved grounds.

DANGER:

If the approved ground or approved floor ground can only be accessed inside a dedicated power equipment room, then only a licensed electrician should make the connections to the ground.

Installing DS1 or UDS1 Trunks

The following figures show the connections between the MCU to a PBX and between the MCU and a CSU for a direct network connection. In this example, the DS1 circuit pack is used. For information on installing a CSU, see the documentation provided with the unit.

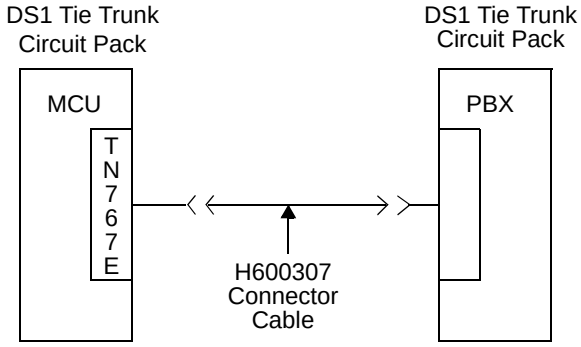


Figure 4-9. Connections for DS1 Trunks Between the MCU and PBX

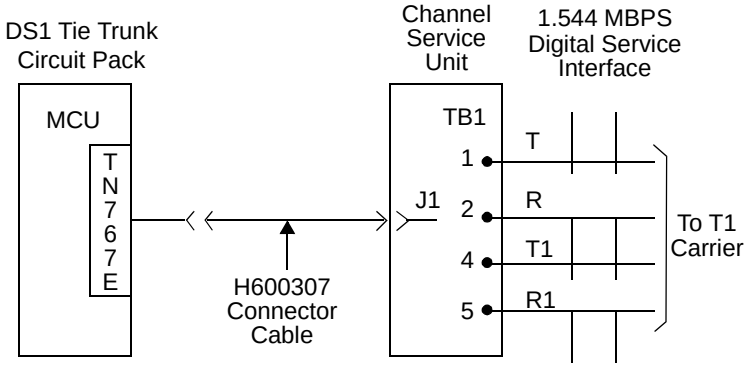


Figure 4-10. Connections for DS1 Trunks Between the MCU and CSU

Activating the MCU

5

Overview

This chapter contains instructions for activating the MCU. Be sure to complete the instructions in the order they are provided.

CAUTION:
To prevent damage from static electricity, always wear an EMC wrist strap (comcode 900 698 226) when handling circuit packs.

WARNING:
White-labeled control circuit packs must not be reseated without powering down first.

Powering Up SCCs

If your system contains one or more SCCs, have the on-site technician start powering up as follows:

1. Verify that the slide on the memory card, shipped with the MCU, is not in the write-protect position as shown in Figure 5-1.
2. Insert the memory card into the TN777B Network Control circuit pack in the direction indicated by the arrow on the label.

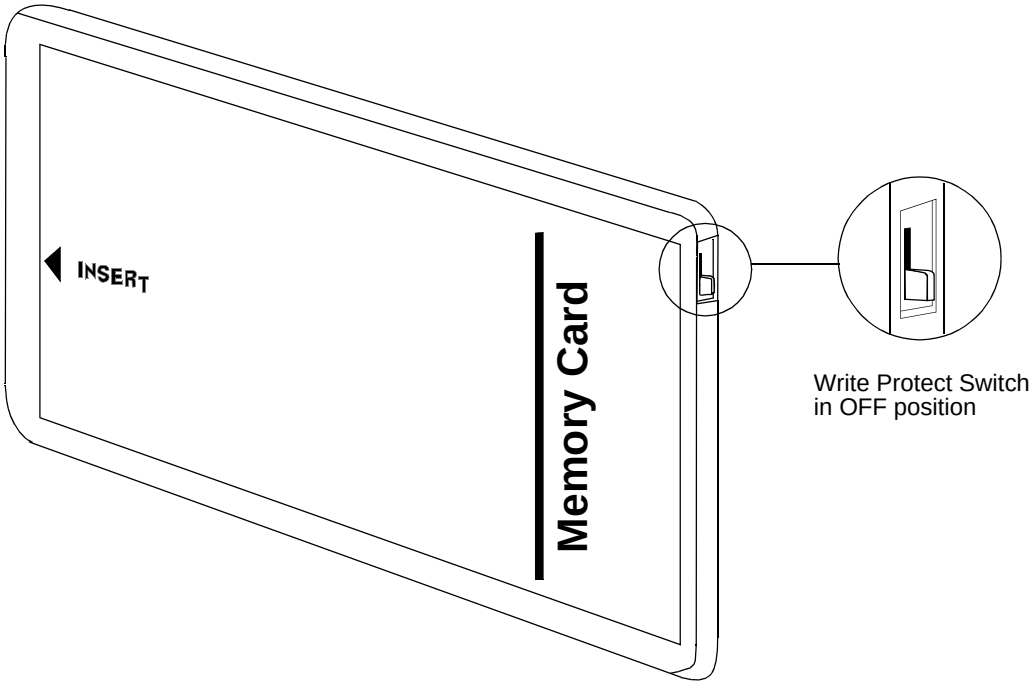


Figure 5-1. Memory Card

Procedure For an AC-Powered System

To power up AC-Powered SCCs, complete the following steps:

1. Set the associated circuit breakers on the AC power panel to ON.
2. At the rear of each cabinet, set the circuit breakers to ON.

   This starts the system initialization and test. Some red lights may be on but will be turned off by other procedures in this chapter.
3. After several minutes, check the MCU-MT to verify that all tests pass.

   NOTE:
   If any of the terminal messages indicate a test has failed, or if the "`spe down mode`" message is displayed, refer to the MCU Maintenance document or call your Lucent Technologies representative to clear the trouble.
4. About two minutes after "`REBOOT PERFORMED`" is displayed, verify that the screen displays: `Login:`

Procedure For a DC-Powered System

To power up DC-powered SCCs, complete the following steps:

1. At the DC battery cabinet (if installed), set the circuit breaker to ON.
2. At the DC power cabinet, set the circuit breakers on the associated rectifiers to ON.
3. At the rear of each power distribution unit (if installed), set the circuit breaker to ON.

   This starts the system initialization and test. Some red lights may be on, but they will be turned off by other procedures in this chapter.

Powering Up the MCC

If your system contains an MCC, have the on-site technician power up as follows:

1. Verify that the slide on the memory card, shipped with the MCU, is not in the write-protect position as shown in Figure 5-1.
2. Insert the memory card into the TN777B Network Control circuit pack in the direction indicated by the arrow on the label.
3. Verify that all cabinet power modules are OFF.
4. Plug the MSM power cable into the appropriate receptacle. For DC-powered systems, go to step 6.
5. For AC-powered systems, ensure that the associated circuit breakers at the AC power panel are in the ON position.
6. At the DC battery cabinet, set the circuit breaker to ON.
7. At the DC power cabinet, set the circuit breaker on associated rectifiers to ON.
8. In each MSM, in front of the power distribution unit, set the MAIN circuit breaker to ON.
9. In each MSM, at the rear of the power distribution unit, set each of the circuit breakers to ON.

   NOTE:
   This action starts the system initialization test. All red LEDs on the circuit packs go on, then off. Some LEDs will remain on until translations are completed (for example, the DS1 circuit pack).

10. After several minutes, check the MCU Managment Terminal (MCU-MT) to verify that all tests pass.

    NOTE:
    If any message indicates a test failed or the message, "`spe down mode`" is displayed, refer to the MCU Maintenance document to clear the problem.

11. About two minutes after "`RESET 4 (REBOOT) PERFORMED`" is displayed, verify the screen displays: `Login:`

CAUTION:
To prevent damage from static electricity, always wear an EMC wrist strap (comcode 900 698 226) when handling circuit packs.

WARNING:
White-labeled control circuit packs must not be reseated without powering down first.

12. If any of the red LEDs that remain on should be off, refer to the MCU Maintenance document to identify and clear the problem.

    NOTE:
    LEDs for DS1 circuit packs are red until these circuit packs are administered.

    Alarms appear in the Alarm Log (available from the MCU-MT) when power is applied to the MCU before all equipment connecting to port circuit packs is installed. Normally, some alarms are logged when power is applied, but they should be resolved quickly. If no equipment is connected to the port packs, alarms associated with these ports can take up to four hours to come in, but clear automatically after all equipment is installed and operating correctly.

Logging In

The on-site technician uses the craft login to log into the MCU.

Perform the following procedure to log in to the MCU:

1. At the MCU-MT, verify the screen displays: `Login:`
2. Enter **craft** and press RETURN.
3. Verify the screen displays: `password:`
4. Enter **crftpw** and press RETURN.

   NOTE:
   For security purposes, the password is not displayed as you enter it. The MCU verifies the login and password. If an invalid login or incorrect password name is entered, the screen displays: `login incorrect.` Try again.

5. Verify the software version.
6. Verify that the screen displays: `Terminal Type (Enter 715, 513, 4410, or 4425): [715]).`
7. Press RETURN.
8. The screen should now display: `command:`
9. Type **change password craft** and press RETURN.
10. Verify that the screen displays the Password Change form.
11. At the *Your Current Password* field, enter **craftpw** and press RETURN.
12. In the *New Password For Login Name* field, enter the new password (see **NOTE**) and press RETURN.

    NOTE:
    Valid passwords have four to seven alpha or numeric characters or a combination of both. Passwords should be selected on the basis of local procedures and recorded in accordance with those procedures.

13. Reenter the new password in the *New Password (enter again)* field and press SUBMIT.
14. Verify that the screen displays: `command successfully completed` followed by `command:`

Setting the Date and Time

The 24-hour conference scheduling system uses the MCU system clock to know when to begin and end conferences. It is vital that the clock is correctly set to ensure conference functionality; if the Lucent Technologies Conference Reservation and Control System (CRCS) is installed, you must synchronize the date and time on the MCU with the date and time set on CRCS.

The system clock is affected only when power is interrupted for more than two minutes. The optional Uninterrupted Power Supply (UPS) may be used to protect against power outages to the MCU.

The date and time are set using the Set Date and Time form. Use the following procedure to set the date and time:

NOTE:
Be sure to obtain the accurate time by calling the National Bureau of Standard Time at **202 844-1234**.

1. At the *command:* prompt, type **set time** then press RETURN.
2. At the *Day of the Week* field, enter the day of the week.
3. At the Month field, enter the current month.
4. In the *Day of the Month* field, enter the current day (**1** through **31**).
5. In the *Year* field, enter the current year.
6. In the *Hour* field, enter the current hour in military time. (**00** is midnight, 12 is noon, **23** is 11 p.m. The p.m. time is hour plus 12.)
7. In the *Minute* field, enter the current minute (**0** through **59**).

   NOTE:
   Seconds are reset to **00** for the minute selected.

8. Press ENTER.
9. When the screen displays: `command successfully completed` followed by `command:`, enter **display time** to verify the setting.

Saving Translations

The save translation command copies the current system translations onto the memory card located on the network control circuit pack. Use the following procedure to save translations on the original system memory card and to make a backup memory card (not included):

NOTE:
To order the 10 meg backup memory card (J58890TG1,L15), use comcode 601817430.

1. Be sure the system memory card is inserted in the network control circuit pack.
2. At the `command:` prompt, type **save translation** and press RETURN. Wait two minutes.
3. Check for a **0** in the *Error Code* column; it indicates the save translation was successfully completed.

   NOTE:
   If a number other than **0** appears, the save translation process did not complete. Record the number in the *Error Code* field along with any *Error Message* and notify maintenance support.

4. If the save translation procedure was successful and the customer has a backup memory card, remove the system memory card and insert the backup memory card. Repeat steps 2 and 3, and then swap the memory cards. Place the backup memory card in a safe place.

Testing the Network

Test the connection of each DS1 or UDS1 circuit pack to the network as follows:

1. At the MCU-MT, enter **test ds1** ***location*** **long** where ***location*** is the cabinet and slot address of the DS1 (UDS1) circuit pack (for example, **1a05**).
2. Verify that all board level tests pass. If not, check the network connections.

NOTE:
If the board level tests pass but the port level tests either abort or fail, network service is not turned on.

Logging Off

After initializing the MCU, log off the system to prevent unauthorized changes to the data entered and to save the changes that were made.

1. At the MCU-MT, enter **logoff**.
2. The screen displays: `Login:`

Calling INADS

The final step in the on-site installation procedure is to call INADS to report a new system installation and to test the INADS interface as follows:

1. The on-site technician calls INADS to report a new system installation and asks them to call the MCU.
2. INADS displays the System Parameters Maintenance form to confirm the product identification.
3. INADS enters **test inads-link**.
4. INADS terminates the login and disconnects.
5. INADS checks the trouble ticket generated by the test. It should show `"INADS,n,MINOR"` to indicate a minor off-board alarm was reported.
6. INADS calls back and checks the error log to verify there are no problems.
7. INADS displays the Change Password form (see "Changing Passwords" for details) and changes the appropriate passwords.
8. INADS displays the Maintenance-Related System Parameters form (see "Setting System Maintenance Parameters") to establish customer-supplied alarm thresholds and contact numbers.
9. INADS terminates the login and disconnects.

Setting System Maintenance Parameters

The Maintenance-Related System Parameters form identifies MCU scheduled maintenance parameters and maintenance thresholds. The fields are defined as follows; specific entries must be obtained from the customer.

Use the following procedure under the craft login to change maintenance parameters:

1. At the `command:` prompt, type **change system-parameters maintenance** then press RETURN.
2. Verify that the screen displays the Maintenance-Related System Parameters form.
3. From the *Product Identification* field, use TAB and RETURN to advance to the fields you want to change.

   NOTE:
   An entry must be made in the *Product Identification* field and the *OSS Telephone Number* field.

4. When the form is completed, verify the screen displays: `command successfully completed` followed by `command:`
5. To verify the form, type **display system-parameters maintenance** then press RETURN.

Maintenance-Related System Parameters Form

An example of the Maintenance-Related System Parameters form appears as follows:

```
change system parameters maintenance                          Page  1 of  3


                    MAINTENANCE-RELATED SYSTEM PARAMETERS


 OPERATIONS SUPPORT PARAMETERS
             Product Identification: 1000000000
         First OSS Telephone Number:                   Abbrev Alarm Report? y
        Second OSS Telephone Number:                   Abbrev Alarm Report? n
    Alarm Origination to OSS Number: neither
         Cleared Alarm Notification? n                Suspension Threshold: 5
               Restart Notification? n
            Test Remote Access Port? n
         CPE Alarm Activation Level: none
     Sch Adj Alarm Activation Level: none
               Packet Bus Activated? n
      Customer Access to INADS Port? n
        Repeat Dial Interval (mins): 7

 SCHEDULED MAINTENANCE
                  Start Time: 01 : 00                 Stop Time: 06 : 00
           Daily Maintenance: daily           Save Translation: daily
```

Figure 5-2. Maintenance-Related System Parameters Form (Page 1)

```
change system-parameters maintenance                    Page 2 of 3

                    MAINTENANCE-RELATED SYSTEM PARAMETERS

MINIMUM MAINTENANCE THRESHOLDS ( Before Notification )
        TTRs: 4_       CPTRs: 1        Call Classifier Ports: _




ISDN MAINTENANCE
   ISDN_PRI Test Call Extension: ____  ISDN BRI Service SPID: ____


DS1 MAINTENANCE
   DS0 Loop-Around Test Call Extension: ____
```

Figure 5-3. Maintenance-Related System Parameters Form (Page 2)

```
change system-parameters maintenance                    Page  3 of  3

                    MAINTENANCE-RELATED SYSTEM PARAMETERS

          Modem Connection: internal
                 Data Bits: 8
                    Parity: none
```

Figure 5-4. Maintenance-Related System Parameters Form (Page 3)

The fields on the Maintenance-Related System Parameters form are defined in the following paragraphs. Specific entries can be obtained from your technical center and/or the customer.

Page 1: **Operations Support Parameters Area**

- *Product Identification*

  Identifies the MCU to an Operations Support System (OSS), such as INADS or System Network Management Protocol (SNMP). This field must be populated if you want to make changes to this form. The number must start with “1” and contain ten digits.

- *First OSS Telephone Number*

  The first number that the MCU uses for alarm origination. This number can also be used to dial a telephone number when an alarm is raised on the MCU. The number must be obtained from the National Customer Support Center (NCSC) or the Technical Support Center (TSC). Characters # and * are not allowed in the telephone number.

- *Abbrev Alarm Report*

  Enables the Abbreviated Alarm Report feature for the first OSS. Default is **y**.

- *Second OSS Telephone Number*

  The second number that the MCU uses for alarm origination. This number can also be used to dial a telephone number when an alarm is raised on the MCU. The number must be obtained from the National Customer Support Center (NCSC) or the Technical Support Center (TSC). Characters # and * are not allowed in the telephone number.

- *Abbrev Alarm Report*

  Enables the Abbreviated Alarm Report feature for the second OSS. Default is **y**.

- *Alarm Origination to OSS Numbers*

  Indicates one of four options for alarm origination. If this field is set to any value other than **neither** (default), the craft login has a 30-minute inactivity timeout.

  — For value **both**, all major and minor alarms result in an automatic call to both OSS telephone numbers. Both OSS telephone numbers must be administered.

  — For value **first-only**, all major and minor alarms result in an automatic call to the first OSS number only. The switch does not call the second OSS telephone number even if the number is administered. The first OSS telephone number must be administered.

  — For value **neither**, alarm origination does not take place. Warning alarms are not reported to either numbers.

  — For value **second-as-backup**, all major and minor alarms result in an automatic call to the first OSS telephone number. If calling the first OSS telephone number fails four attempts, the switch starts to call the second OSS telephone number as a backup until calling the first OSS telephone number becomes successful. Both OSS telephone numbers must be administered.

- *Cleared Alarm Notification*

  Enables the MCU to originate a call to the alarm receiver and sends an alarm resolution message whenever all previously reported major and minor alarms are resolved. Alarm origination must be activated for *Cleared Alarm Notification* to work. Values include **y** and **n**.

- *Restart Notification?*

  Generates an automatic call to the OSS number if the MCU has a restart. Values include **y** and **n**

- *Test Remote Access Port*

  Indicates whether to test the remote access port on the Processor circuit pack.

- *CPE Alarm Activation Level*

  Indicates the level at which the customer premises equipment (CPE) alarm is activated. If the level is set to **major**, the CPE alarm is activated only on major alarms. If the level is set to **minor**, the CPE alarm is activated for both major and minor alarms. If the level is **warning**, the CPE alarm is activated for all alarms. If the level is set to **none**, the CPE does not activate for any alarm.

- *Sched Adj Alarm Activation Level*

  SCH-ADJ allows the MCU to originate an alarm to the alarm center whenever CRCS fails to communicate with the MCU for a given time period. This halt in communication may occur if the user powers down the CRCS, or if a problem occurs within the CRCS PC. If the user has a CRCS connected to the MCU, the CRCS logs into the MCU once every hour to display the time (this represents an attempt to synchronize the data and time for the MCU and CRCS). Once the CRCS logs into the MCU, the MCU knows that the CRCS is active. If, within the hour, the CRCS does not log into the MCU, an error is logged against SCH-ADJ. If the CRCS does not log into the MCU for three consecutive hours, an alarm is raised.

  Values for this field include **major**, **minor**, **warning**, and **none** (default). Only major or minor alarms automatically notify the alarm center.

- *Packet Bus Activated?*

  Indicates whether the TN778 PACCON circuit pack is inserted and the packet bus is activated. Values include **y** and **n**.

- *Customer Access to INADS Port*

  Allows the user to prohibit access to system administration and maintenance interface via the INADS port when using customer login ID's. This field can be activated only by Lucent Technologies services via system-parameters maintenance administration. Values include **y** and **n** (default).

Page 1: Scheduled Maintenance Area

- *Start Time*

  Indicates the hour and minute the daily scheduled maintenance actions start. Enter a number from **0** to **23** for hours and **0** through **59** for minutes. The scheduled maintenance actions are: daily maintenance and save translation

- *Stop Time*

  Indicates the hour and minute when scheduled daily maintenance will stop running. If any daily maintenance operations are not completed by this time, the system notes where in the sequence it stopped, and it performs those operations during the next scheduled daily maintenance.

- *Daily Maintenance*

  Displays the status **daily** to indicate the maintenance tests are automatically run each day. This value cannot be changed.

- *Save Translation*

  Indicates if the MCU translation data should be automatically backed up on a specified day of the week (**sunday**, **monday**, etc.) all week (**daily**), or not at all (**no**).

Page 2: **Minimum Thresholds Area**

- *TTRs*

  Shows the minimum number of touch-tone receivers (**1** through **200**) administered in the MCU. If fewer than this number are in service, a warning alarm is raised. Enter value **8** for each TN744 Call Classifier circuit pack in the MCU.

- *CPTRs*

  Shows the minimum number of call progress tone receivers (**1** through **200**) administered in the MCU. If fewer than this number are in service, a warning alarm is raised. Enter value **8** for each TN744 Call Classifier circuit pack in the MCU.

- *Call Classifier Ports*

  Shows the minimum number of call classifiers (**1** through **200**) administered in the MCU. If fewer than this number are in service, a warning alarm is raised. Enter value **8** for each TN744 Call Classifier circuit pack in the MCU.

Page 2: ISDN Maintenance Area

- *ISDN-PRI Test CALL extension*

  Defines the extension number for an ISDN test call. This test allows a far-end ISDN node to test the ISDN-PRI trunks between the far end and the MCU. Enter an unassigned DNIS extension number.

- *ISDN-BRI Service SPID*

  N/A for the MCU. Leave blank.

- *DSO Loop-Around Test Call Extension*

  Indicates the extension used by the network service provider to set up a DSO loop-around connection for testing non-ISDN DS1 trunks.

  This feature is used primarily for testing DSO channels associated with non-ISDN-PRI trunks. The loop-around is activated by dialing the test extension number. Multiple DSO Loop-Around connections can be set up by placing multiple calls to the loop-around extension.

  For more information, see the information about Facility Test Calls in the maintenance document for your system.

Page 3:

- *Modem Connection*

  Indicates the type of modem connection. Values are **internal**, **external**, and **none**. Value cannot be **none** if *Alarm Origination to OSS Numbers* is enabled.

- *Data Bits*

  Enter the number of data bits. Values include **7** and **8**.

- *Parity*

  Display-only field. Value is **none**.

Cable Connectivity

A

Overview

This appendix provides information on cable connectivity.

Miscellaneous ESM Cables

The following figures show the cables used for ESM connectivity.

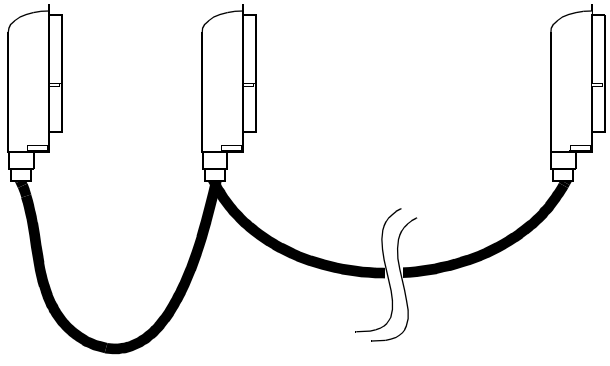


Figure A-1. Y-Cable 25 Feet

The DS1 Y-Cable has a length of 6 ft, while the DI Y-Cable has a length of three ft.

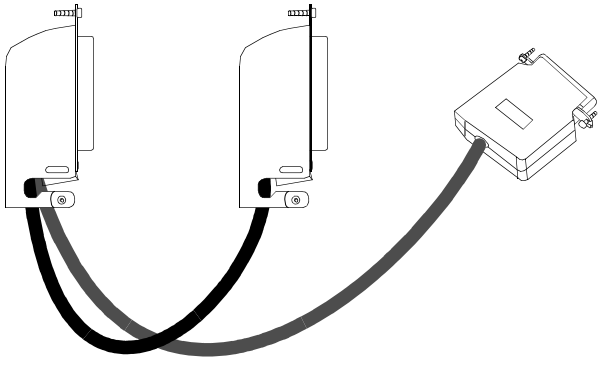


Figure A-2. RS366 DCE-Y Cable

The RS366 DCE Y-Cable is 25 ft.

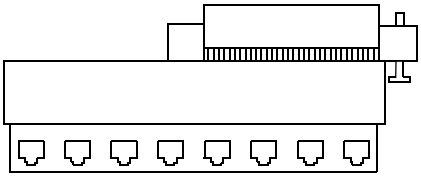


Figure A-3. 356A Conductor

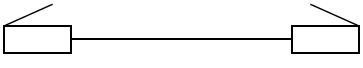


Figure A-4. D8W Cable

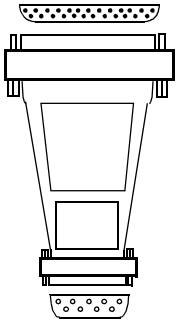


Figure A-5. DB-25 Male to DB-9 Female Adapter

An adapter such as this one may be needed if an external modem is connected to the ESM.

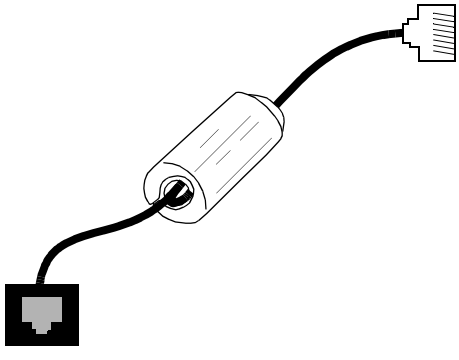


Figure A-6. RMB/EMI Suppression Cable

This cable is placed between the RMB modem jack and an analog telephone line.

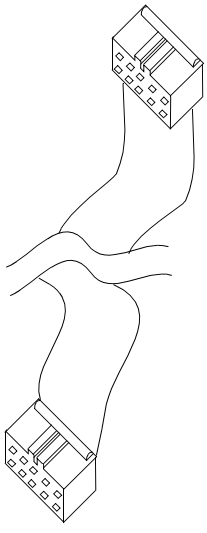


Figure A-7. ESM Internal Reset Cable

This cable is inside the ESM PC and is connected to the RMB board.

ESM/MSM E1 Cabling Pinouts for Cross-Connect Wiring

In certain installations, it may be desirable to connect the ESM/MSM E1 span through a cross connect panel rather than direct D8W cabling from the TN2207 to the MSM Interface Card. When connecting through a cross connect panel, it is necessary to know the wiring pinouts from the MSM Interface Card's E1B connector and the wiring pinouts of the 50 pin Y-cable connection from the TN2207 board.

Table A-1. MSM Interface Card E1B Pin Assignments (PRI-ISA64)

E1B Pin	Signal Name
1	Receive Ring
2	Receive Ring
3	No Connection
4	Transmit Ring
5	Transmit Tip
6	No Connection
7	No Connection
8	No Connection

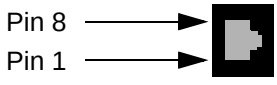


Figure A-8. E1B Connector

C6F Connector Cable (Comcode 104-307-475) 50 foot long shielded cable equipped with a 50 pin male connector on one end and a three inch stub on the other end. This cable is used to connect the TN2207 E1 trunk circuit pack to cross-connect fields requiring hardwire connections.

Table A-2. C6F Connector Cable Lead Identification

Wire Color	Lead Designation	Connector Pin Number
WG	Receive Ring	47
G	Receive Tip	22
W-BR	Transmit Tip	48
BR	Transmit Ring	23
W-S	LBACK2	49
S	LBACK1	24

Glossary

A

AAR
See *Automatic Alternate Routing*.

access endpoint
Endpoint connected to the MCU via non-signaled T1/E1, V.35, RS449, or EIA-530 connections. The ports designated for the endpoint are dedicated to the endpoint.

Access Security Gateway
A challenge/response authentication engine that is intended to provide some remote access security for the MCU.

ACD
See *Automatic Call Distribution*.

active
A reserved conference status when the conference is scheduled to begin but no conferees have joined. A dedicated conference is active at all times.

Adjust Audio Volume for Audio Add-On Party
UCC option that allows the user to increase, decrease, or reset the volume of specified endpoints within an MCU conference. The commands for this option are denied if the specified endpoint has not joined the conference or is not an Audio Add-On party.

Advanced mode
A feature of the MCU that offers Presentation and Broadcast with Auto-Scan conference modes.

AE
See *access endpoint*.

American National Standards Institute
Professional and technical association in the US that supports a variety of standards.

ANI
See *Automatic Number Identification*.

ANSI
See *American National Standards Institute*.

Application Compliant flag
A per-user flag in the Conference Record that indicates which endpoints use non-compliant applications.

ARS
See *Automatic Route Selection*.

ASG
See *Access Security Gateway*.

Asynchronous Transfer Mode
A high-speed, connection-oriented switching and multiplexing technology that uses 53-byte cells (including a 5-byte header and a 48-byte payload) to transmit different types of traffic simultaneously, including voice, video, and data. The mode is asynchronous because information streams can be sent independently without a common clock.

ATM
See *Asynchronous Transfer Mode*.

Audio Add-On
Feature that allows the MCU to support up to six non-H.320 audio-only endpoints per non-cascaded conference and up to 12 such endpoints per cascaded conference.

Audio Add-On Echo Control
An echo canceler function implemented in the MCU to prevent echoes caused by Audio Add-On conferees who dial into a conference through an analog circuit. Echoes occur at the two- to four-wire conversion (hybrid) in the network or in PBXs and are caused by impedance mismatches at those points.

audio port
The port used for an Audio Add-On party to join a conference. See also *port*.

Automatic Alternate Routing
Feature that sends calls to a route other than the route of first choice when facilities are unavailable.

Automatic Call Distribution
Feature that answers calls and then, depending on administered instructions, delivers messages appropriate for the caller and routes the call to an agent when one becomes available.

Automatic mode
Feature of the MCU that offers voice-activated conference mode.

Automatic Number Identification
Representation of the calling number for display or for further use to access information about the caller.

Automatic Route Selection
Feature that allows the system to choose automatically the least cost-effective way to send a toll call.

B

B-channel
A bearer channel provided by the network from a video endpoint to the MCU.

bandwidth
Specifies a transfer rate or range of frequencies for an amount of data moving from one point to another. Used in context for video bandwidth rates, the more free bandwidth for video, the better the picture quality transmitted. The MCU port capacity provides for 112k/128k bandwidth (2B-channel 56k/64k), 1-channel multirate ISDN bandwidths of 1x56k, 1x64k, 112k, 128k, 168k, 192k, 224k, 256k, 280k, 320k, 336k, 384k, 448k, 512k, 672k, 768k, 1008k, 1288k, 1344k, 1472k, 1536k, 1680k, and 1920k, or BONDing bandwidths of 112/128k, 168/192k, 224/256k, 280/320k, 336/384k, 448/512k, and 672/768k.

Bandwidth on Demand
Feature that allows the Lucent Technologies MCU to establish conferences at bandwidths greater than 128k without the use of ISDN-PRI and Wideband H0 channels.

Basic Rate Interface
A standard ISDN frame format that specifies the protocol used between two or more communications systems. BRI runs at 192 Mbps and provides two 64k B-channels (voice and data) and one 16k D-channel (signaling). The D-channel connects, monitors, and disconnects all calls. It also can carry low-speed packet data at 9.6k.

Basic/Enhanced Service Flag
A flag in the Conference Record that disables commands/caps that are known to cause problems (such as crashing) to specific endpoints.

BONDing
See *Bandwidth on Demand*.

BONDing ports
The ports in an MCU conference that use one of the following BONDed bandwidths: 112/128k, 168/192k, 224/256k, 280/320k, 336/384k, 448/512k, or 672/768k.

BRI
See *Basic Rate Interface*.

BRI/DCP Direct Connect Interface
Feature that allows the user to connect BRI or DCP endpoints directly to the MCU without involving a public or private network, PBX, or MUX. The feature allows up to 12 BRI stations or up to four DCP group systems to connect directly to the MCU.

Broadcast w/Auto Scan
A conference mode where one video endpoint's video, audio and data are broadcast to all other conferees. The broadcaster views the other locations one after another for a fixed duration of time. The broadcaster is constantly viewed by all other locations.

broadcaster
A video endpoint is considered the broadcaster when it sends the same video, audio and data signal to two or more locations.

Browse
A Universal Conference Control option that allows the broadcaster to scan endpoints in the conference without specifying an endpoint number for each scanned endpoint. With this option, only the broadcaster sees a change in video caused by the scan.

C

Call Detail Recording
Feature that uses software and hardware to record call data.

cascading
Connecting two or more Lucent Technologies MCUs via an H.320 communications link. This feature allows endpoints connected on different MCUs to participate in the same conference.

CDR
See *Call Detail Recording*.

Chair control mode
A conference mode where one site controls which endpoints are added and/or dropped during a conference.

CIF
See *Common Intermediate Format*.

class
A Conference Record has one of three classes: reserved, dedicated, or file.

Class of Restriction
Feature that allows a maximum of 96 classes of call origination and call termination restrictions for voice terminals, voice-terminal groups, data modules, and trunk groups.

Class of Service
Feature that uses a number to specify if voice-terminal users can activate any of the following features: Automatic Callback, Call Forwarding All Calls, Data Privacy, or Priority Calling.

ClearPresence @716 Audio Coder
Algorithm developed by Lucent Technologies that provides 7 kHz of audio bandwidth at a bit rate of 16k. This feature provides a more natural sounding voice quality than other audio modes, such as G.728 and G.711, which provide 3.5 kHz.

Common Intermediate Format
An industry-standard means for encoding video signals for high-quality pictures. QCIF MPI specifies picture interval numbers. Also known as Full CIF (FCIF).

complete
A reserved conference has a status of complete when the stop time has passed and the last conferee has dropped from the conference.

conferee
A video endpoint participating in a multipoint video conference.

Conference Appointment Form
A form that is used to record all the information necessary to schedule and reserve a multipoint video conference.

Conference Redial flag
A flag in the Conference Record that allows an endpoint to be “redialed” during a conference (therefore, this flag is in effect for Dial-Out calls).

Continuous Presence *Plus*
A customer feature that enables a multipoint video conference to compose a picture consisting of the video from multiple sites participating in the conference. As such, the feature allows one or more conferees to see up to 16 sites in the conference at one time.

convener
The person who schedules a conference and is responsible for distributing the Meet-Me numbers.

COR
See *Class of Restriction*.

COS
See *Class of Service*.

CPP
See *Continuous Presence Plus.*

CRCS
See *Lucent Technologies Conference Reservation and Control System*.

D

DA
See *Dedicated Access*.

Data Communication Equipment
Equipment that provides the functions to establish, maintain, and terminate a connection, the signal conversion, and coding required for communication between the Data Terminal Equipment (DTE) and the data circuit.

Data Terminal Equipment
Equipment comprising the data source, data sink, or both the source and sink.

DCE
See *Data Communication Equipment*.

DCP
See *Digital Communications Protocol*.

dedicated
A conference class that reserves a specified number of MCU ports for a multipoint video conference at any time.

Dedicated Access
A feature that enables endpoints to participate in multipoint audio and video conferences via non-signaled T1 facilities. For this feature, the MCU connects to a Multiplexer (MUX), a Digital Access Crosspoint System (DACS), or to H.320 endpoints via DS1 facilities. A maximum of 20 DS1 connections to the MCU are supported.

Dial-Out
A feature that allows H.320 calls to originate (dial out) from the MCU in addition to receiving dial-in calls. Therefore, conference participants can join conferences by receiving calls from the MCU.

Digital Communications Protocol
Proprietary protocol used to transmit both digitized voice and digitized data over the same communications link. A DCP link is made up of two 64k information (I-) channels and one 8k signaling (S-) channel. The DCP protocol supports two information-bearing channels and, therefore, two telephones or data modules.

DTE
See *Data Terminal Equipment*.

Dynamic Conference Resizing
A feature that allows the user to add and remove conference participants before the conference starts as well as during the conference.

E

electronic tandem network
Tandem tie-trunk network that has automatic call-routing capabilities based on the number dialed and the most preferred route available. Each switch in the network is assigned a unique private network office code (RNX), and each voice terminal is assigned a unique extension.

encoding
Changing video and/or audio signals into digital form for more efficient and accurate transmission (movement) from one entity to another.

endpoint
A video unit such as a camera, PC, video recorder, speakers, and other equipment used for transmitting multimedia (voice, audio, full-motion video, and graphics) during an MCU conference. The video capabilities of an endpoint can be linked to a specific site.

entry tone
A tone that alerts conferees already on a conference that another conferee has joined in the conference.

ETN
See *electronic tandem network*.

Executive Conferencing
A customer option that enables a conference to compose a picture of two or three “other” sites (endpoints) for each conference participant. With this feature, no endpoint ever sees itself.

exit tone
A tone that alerts conferees on a conference that a conferee has left the conference.

F

FAC
Facility Access Code.

far end
When troubleshooting problems on the MCU, the video endpoint is often referred to as being on the far end of the connection.

Far-End Camera Control
A feature that allows a site that requests far-end camera control to control the camera of the far-end site that it is currently viewing.

FCIF
See *Common Intermediate Format*.

FECC
See *Far-End Camera Control*.

file
A conference class that saves a copy of a Conference Record for future use.

G

G.711 Audio
See *Pulse Code Modulation*.

G.722 Audio
An audio mode that enables the system to bridge G.722 (7kHz) audio. 7kHz is the audio bandwidth provided by G.722. This bandwidth allows for a more natural sounding voice conference. The MCU supports G.722-conferenced audio at 48k or 56k, as defined in ITUT-T Recommendation G.722.

G.728 Audio
See *LD-CELP*.

GCC
See *Generic Conference Control*.

Generic Conference Control
A high-level framework for conference management encompassing conference establishment and termination, conference roster, application roster, remote actuation, conductorship, bandwidth control, and registry services.

H

H0
A one-channel 384k bandwidth call.

H11
A one-channel 1472k or 1536k bandwidth call.

H12
A one-channel 1920k bandwidth call.

H.320
The multipoint conferencing standard adopted by the ITU-T. This standard includes some of the other H-series standards governing the definition of multimedia equipment and equipment transmission (movement of data) capabilities and methods.

H.323
ITU standard that governs videoconferencing over local area networks (LANs) and the Internet.

H.323 Gateway
Device that enables an Internet protocol-based H.323 terminal to communicate with an H.320 terminal and with a regular telephone on a switched network.

H-series
See *H.320*.

handshake
An expression relating to the establishment of communications between the MCU and a video endpoint.

heterogeneous conference
A conference in which the endpoints are expected to be either H.261 or H.263 video capable.

homogeneous conference
A conference in which all the endpoints are expected to have the same video mode (for example, H.263 video).

I

IMUX
See *Inverse Multiplexor*.

In use
A conference status when a reserved conference has begun and at least one conferee has joined the conference.

Inactive
A conference status when a conference is reserved but has not begun and when a conference has a class of file.

INADS
See *Initialization and Administration System*.

Initialization and Administration System
An asynchronous modem that originates alarms to a remote maintenance system and allows remote technicians to run maintenance and administration commands.

International Telecommunications Union-Telecommunications
An international group established in 1993 to develop standards to allow video endpoints to communicate with each other.

Inverse Multiplexor
Device used to create a single higher-speed data channel by combining and synchronizing two or more lower-speed data channels. This device is used primarily with video codecs and data bridges/routers for speeds up to 2 Mbps.

ISDN-BRI Trunk Interface
A feature that provides ISDN-BRI connections to the public network. This feature is intended primarily for customers with relatively small line sizes in countries and geographic locations where BRI lines are less expensive than PRI lines.

ITU-T
See *International Telecommunications Union-Telecommunications*.

L

LD-CELP (G.728)
A means of encoding audio so a smaller portion of bandwidth is allocated to audio. This results in greater bandwidth for video, thus improving picture quality.

Lip Synchronization
Feature that provides additional or no audio delay within an MCU CPP conference.

login
A keyword assigned to a user to access the MCU.

login password
A code word that can be customized by the user that corresponds with the user's login.

Low-/High-Speed Interworking
A feature that allows 56k or 64k endpoints to join higher-speed conferences as Audio Add-On endpoints via conventional dial-in H.320 ports. Multiple H.320 ports in a conference can implement this feature simultaneously

Lucent Technologies Conference Reservation and Control System
A PC-based reservation system that manages the MCU reservation system, automates the scheduling tasks, performs conflict resolution, and ensures that participating video endpoints have the proper capabilities to join the conference.

Lucent Technologies MultiPoint Conferencing Unit
Equipment that provides high-quality multimedia conferencing with video endpoints that communicate via the ITU-T H.320 standards.

Lucent Technologies Video Technical Center
A video technical support group that is available to help with questions about the Lucent Technologies MCU.

M

Management Terminal
A 715GBCS terminal used primarily for administration and maintenance functions.

Manipulate Most Recently Joined Endpoint
UCC option that allows the user to perform various operations on the endpoint that most recently joined the MCU conference. These operations include broadcasting, muting, unmuting, and dropping the most recently joined endpoint; performing Solo Audio on the most recently joined endpoint; and setting the most recently joined endpoint into a quadrant.

Manufacturer and Product Information Exchange
The MCU exchanges ns-caps with each endpoint that joins the conference. Besides information regarding capabilities, ns-cap messages contain manufacturer and product information for the MCU or endpoint. Such information received by the MCU from the endpoint is displayed on the Status Conference form.

MCU
See *Lucent Technologies MultiPoint Conferencing Unit*.

MCU-extension
An extension on the MCU that corresponds to the number a conferee dials to join a multipoint video conference.

MCU-Extensions and Numbers to Dial Form
A list of all MCU-extensions, supported bandwidth, and corresponding Meet-Me numbers that conferees dial to join a conference.

MCU Express
A process that focuses on installing and provisioning the MCU more expediently. Components include customer self-installation and self-maintenance, improved customer training, firmware upgrade, and CRCS ease-of-use enhancements.

MCU-MT
See *Management Terminal*.

MCU-ST
See *Scheduling Terminal*.

Meet-Me number
A number a conferee dials to join a multipoint video conference.

Mixed conference mode
Feature that allows the MCU to support both Meet-Me and Dial-Out endpoints in the same conference.

modem pooling
Capability that provides shared conversion resources (modems and data modules) for cost-effective access to analog facilities by data terminals. When needed, modem pooling inserts a conversion resource into the path of a data call. Modem pooling serves both outgoing and incoming calls.

MSM
Multimedia Server Module.

multimedia
The use of a variety of media, including audio, data, graphics, and full-motion video.

multipoint video conferencing
A technique of combining video, audio, and data from three or more video endpoints onto a single video conference call.

multirate bandwidths
Bandwidths of one channel that use an ISDN-PRI facility from an endpoint that provides the appropriate size bandwidth. These bandwidths include 112k, 128k, 168k, 192k, 224k, 256k, 280k, 320k, 336k, 384k, 448k, 512k, 672k, 768k, 1008k, 1288k, 1344k, 1472k, 1536k, 1680k, and 1920k. The 56k increments can be multirate only when the endpoint is directly connected to a Data Interface circuit pack.

N

network service
The telephone company that provides the trunks and Meet-Me numbers to access the MCU.

network type
Specifies whether a video endpoint is connected to a private network (behind a PBX) or a public network.

non-transcoded conference
A conference that does not support transcoding between H.263 video and H.261 video.

notification tones
The entry, exit, and warning tones available with some of the MCU models.

O

OneNumber Access
Feature that allows multiple endpoints in a conference to access the MCU from the same external extension. A OneNumber Access extension is a duplicated MCU-extension within a single conference. Endpoints sharing a OneNumber Access extension are not preassigned to a specific conference endpoint number; instead, these endpoints share a pool of endpoint numbers and receive a conference endpoint ID based on when they join the conference.

P

PacketStar Access Concentrator- (AC-) 60
A component that provides an ATM interface to the MCU The AC-60 aggregates H.320 video traffic at premises on the user side, adapts this traffic to ATM format, and then transmits it over an ATM network on the network side.

panoramic
Continuous Presence *Plus* configuration in which a video image appears within each of the two lower quadrants of and the upper half of the screen. The user can therefore see up to three participants. Also known as “three-image.”

paper-based scheduling system
A method of recording and tracking conference reservations to prevent overbooking of the MCU.

PC-based scheduling
A scheduling method that uses the Lucent Technologies Conference Reservation and Control System to accept reservations and qualify video endpoints to participate in a multipoint video conference.

PCM
See *Pulse Code Modulation*.

per-conference password
A password for a conference that is provided by the customer at conference reservation time. Conferees are prompted for the password when they join the conference.

per-user password
A feature that allows individual passwords to be assigned to each dial-out H.320 endpoint as well as to the Audio Add-On port (if present) in the conference. Therefore, the feature provides a higher level of security than does the per-conference password feature.

point-to-point
A conference involving only two sites whose video endpoints are not connected through the MCU.

port
A logical entity where the video call terminates on the MCU. It provides a specific bandwidth (data rate) capacity, such as 56k, 64k, etc.

Presentation
A conference mode where a video endpoint’s video is constantly broadcast to the other locations. However, the audio portion of the conference switches according to who is speaking. Any conferee can be a speaker. The video endpoint that is the presenter views endpoints determined by voice-activated switching.

PRI
See *primary rate interface*.

primary rate interface
A standard ISDN frame format that specifies the protocol used between two or more communications systems. PRI runs at 1.544 Mbps and, as used in North America, provides 23 64k B-channels (voice or data) and one 64k D-channel (signaling). The D-channel is the 24th channel of the interface and contains multiplexed signaling information for the other 23 channels.

protocol
A set of international industry-standard rules governing the exchange of data between two entities.

Pulse Code Modulation
A means of encoding audio by assigning less bandwidth to video. G.711 audio mode is used.

PVC
See *permanent virtual circuit*.

Q

QCIF
See *Quarter Common Intermediate Format*.

Quarter Common Intermediate Format
An industry-standard means of encoding video signals to produce medium-quality pictures by encoding only a quarter of the video resolution of CIF.

R

Rate Adaptation
Feature that allows the Lucent Technologies MCU to interwork endpoints operating with 2B-channels that are on both 56k and 64k networks.

RBS
Robbed-Bit Signaling.

Real-Time Conference Status
Feature that allows the real-time status of a conference and its associated conferees to be displayed on the MCU-MT. The **monitor conference** command is used for this purpose. Once the command is issued, the display is automatically updated approximately once every 30 seconds. Accordingly, this feature is intended for troubleshooting purposes.

recurring meeting
A meeting that occurs more than once in a definite pattern, such as every Thursday.

reservations agent
The person responsible for accepting multipoint conference reservations, making reservations on the MCU-ST or CRCS, and resolving minor problems.

reserved
A conference class that indicates a conference will begin and end within the next 24 hours.

RNX
See *Route-Number-Index*.

Rollcall
A Universal Conference Control option that allows the broadcaster to scan endpoints in the conference without specifying an endpoint number for each scanned endpoint. With this option, all endpoints in the conference see a change in video caused by the scan.

rotation scan time
The number of seconds that a broadcaster views each location before viewing the next location in the rotation.

Route-Number-Index
Private network office code.

RS-232C
A physcial interface specified by the Electronic Industries Association (EIA). RS-232C transmits and receives asynchronous data at speeds of up to 19.2k over cable distances of up to 50 ft.

RS366
EIA standard for interconnecting data terminal equipment and automatic calling equipment for data communications.

RS366 Dialing
Feature that allows H.320 codecs that are directly connected to the MCU via a V.35/RS449/EIA-530 interface to dial into multimedia, multipoint conferences. This allows endpoints to join conferences after the conference start time and to drop from conferences early. Also allows the aforementioned codecs to place and receive spontaneous 2B and multirate point-to-point calls with other endpoints directly connected to the MCU and other endpoints anywhere in the network. Finally, allows H.323 endpoints connected behind H.323 gateways to participate in multimedia, multipoint conferences for which there is a V.35/RS449/EIA-530 connection between the gateway and the MCU. The H.323 endpoints can dial into MCU conferences.

RSC
Regional Support Center.

S

scan time
See *rotation scan time*.

scheduling terminal
Also known as the MCU-ST. A 715 Business Communications Terminal (BCT) used for reserving conferences on the MCU and for checking the status of conferences and availability of MCU ports.

SCI
Switch Communication Interface.

SCO
System Control Office.

SDN
Software Defined Network.

site profile
A list of video endpoints that may participate in multipoint video conferences and their location, time zone, bandwidth, and network type.

SM
See *Speed Match*.

SPE
See *Switch Processing Element*.

Speed Match
Feature that enables endpoints with varying audio modes, video formats, and transfer rates to participate in the same MCU conference. The feature enables low-speed desktop video endpoints to interwork with high-speed group system video endpoints in a multipoint conference with full video and audio capabilities.

status
The current state of a conference. A reserved conference status can be active, in use, or complete. A file conference status is always inactive. A dedicated conference status is always active.

Switch Processing Element
A complex of circuit packs (including the processor, memory, and bus interface cards) that are mounted in a control carrier. The SPE serves as the control element for the MCU.

system administrator
The on-site telecommunications manager who administers the MCU trunks, maintenance alarm terminals, dial plan, passwords, MCU-extensions and numbers, and system time. The system administrator can request system reports to check on MCU performance and also has access to all conference-related forms.

T

T.120
The suite of standards defined by the ITU-T in support of data conferencing. The Lucent Technologies MCU includes support for the T.120 infrastructure recommendations, including T.123 (transport), T.122/T.125 (MCS), T.124 (GCC), T.126, and T.127.

TDM
See *time division multiplexing*.

Terminal Names
A feature that enables the MCU to poll and ascertain “naming/identification” parameters from endpoints and to pass the information onto other endpoints. Therefore, conference participants whose endpoints display this information can identify other conference participants.

time division multiplexing
Multiplexing that divides a transmission channel into successive time slots.

tones
See *Notification Tones*.

U

UCC
See *Universal Conference Control*.

UDP
See *Uniform Dial Plan*.

Uniform Dial Plan
A feature that allows a unique 4- or 5-digit number assignment between the MCU and another MCU or PBX.

Universal Conference Control
A customer feature that enables an endpoint to manage an H.320 conference out-of-band. UCC is intended to provide a number of powerful services similar to, and in lieu of, H.243 Chair Control. The controlling terminal for UCC *Star* is a regular touchtone telephone, such as that used by an Audio Add-On party. The terminal does not receive audio, video, or data from the conference it is managing, and it does not transmit this media to the H.320 conference multiplex. UCC *P&C* (Point and Click) provides an alternative user interface to UCC *Star*; namely, a graphical-user interface (GUI) on a PC.

V

VAS
See *Voice-Activated Switching*.

video endpoint
A video codec, with camera, speakers, screen, and other equipment required for multimedia conferencing.

Video-Switching Mode and Broadcaster Notification
A feature used by the MCU to announce to all the conference endpoints the current video-switching mode and broadcaster. The feature is also used whenever the endpoint initiates a See-Me (User-Activated Presentation) request that cannot be honored.

Voice-Activated Switching
A conference mode where the video image of the person speaking is seen by all other conferees. The speaker sees the video image of the previous speaker. When a new speaker begins talking, the video switches to the new speaker.

VTC
See *Lucent Technologies Video Technical Center*.

W

warning tone
A tone that sounds when only 10 minutes remain in a conference.

Web.Res.Now
Web-based conference reservation system that manages dedicated MCU conferences.

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