RouteAbout Central EP

Installation and Configuration

Part Number: EK-DEZPR-IN. A01

This manual describes how to install and configure the RouteAbout Central EP.

Revision/Update Information: This is a new document.

FCC Notice — Class A Computing Device:
This equipment generates, uses, and may emit radio frequency energy. The equipment has been type tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC rules, which are designed to provide reasonable protection against such radio frequency interference. Operation of this equipment in a residential area may cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference. Any modifications to this device - unless expressly approved by the manufacturer - can void the user's authority to operate this equipment under part 15 of the FCC rules.

VCCI Notice — Class 1 Computing Device:
This equipment is in the 1st Class category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council for Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in commercial and/or industrial areas. Consequently, when used in a residential area or in an adjacent area thereto, radio interference may be caused to radios and TV receivers. Read the instructions for correct handling.

CE Notice — Class A Computing Device:

Warning!
This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Achtung!
Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in welchen Fällen der Benutzer für entsprechende Gegenmaßnahmen verantwortlich ist.

Avertissement!
Cet appareil est un appareil de Classe A. Dans un environnement résidentiel cet appareil peut provoquer des brouillages radioélectriques. Dans ce cas, il peut être demandé à l'utilisateur de prendre les mesures appropriées.

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Preface

Overview

Purpose of This Document

This manual describes how to install and set up the RouteAbout Central EP module. It also provides problem solving information, connector pin assignments, and other general information.

Intended Audience

This manual is intended for use by personnel who will install and set up the RouteAbout Central EP.

Organization

This manual is organized as follows:

Section	Description
Chapter 1	Provides an overview of the RouteAbout Central EP and describes its features.
Chapter 2	Provides instructions for installing the RouteAbout Central EP in a DIGITAL MultiSwitch 900.
Chapter 3	Provides instructions for installing the setup port cable on the RouteAbout Central EP.
Chapter 4	Describes how to configure the RouteAbout Central EP when it resides in a DEChub ONE.
Chapter 5	Describes how to configure the RouteAbout Central EP when it resides in a DIGITAL MultiSwitch 900.
Chapter 6	Defines what you will need to support ISDN.
Chapter 7	Describes how to configure the ISDN port.
Chapter 8	Describes how to remove the RouteAbout Central EP from the DIGITAL MultiSwitch 900.
Appendix A	Provides installation-specific problem solving information using the LEDs.
Appendix B	Describes connectors, adapters, pin assignments and cable connections.
Appendix C	Contains installation information required for the United Kingdom.
Appendix D	Provides product specifications and a parts list.

Conventions and Terms

Overview

This book uses the following conventions.

Convention	Description
Special Type	This special type in examples indicates system output.
Boldface	Boldface type in examples indicates user input.
Boldface Italic	Boldface italic type in examples indicates user input with example values.
<Return>	Indicates that you should press the Return key.

Terms Used in This Manual

This book uses the following terms:

Term	Definition
Primary Rate	A specific ISDN offering providing users with up to 30 64Kb/s data channels (e.g. "B" channels) and one 64Kb/s signalling channel (e.g. "D" channel).
Basic Rate	A specific ISDN offering providing users with two 64Kb/s data channels (e.g. "B" channels) and one 16Kb/s signalling channel (e.g. "D" channel).
Ethernet	The DIGITAL term for its product compatibility with ISO 8802-3/ANSI/IEEE 802.3 standards and the Ethernet standards for CSMA/CD local area networks (LANs).
ISDN	Integrated Services Digital Network, a telco industry service providing users with digital connections to the telephone network.
SNMP	Simple Network Management Protocol, an industry standard protocol for network management.
dedicated Ethernet cable	IEEE 10Base2 coaxial cable that carries Ethernet signals.
WAN	Wide Area Network. A generic term used to identify serial links which traverse large geographic areas.

Associated Documents

The following documents provide related information. For information on how to order additional documentation, see the ordering information provided in this preface.

Title and Order	Description
DIGITAL MultiSwitch 900 Owner's Manual EK-DH2MS-OM	Provides installation, use, security, and troubleshooting information for the DIGITAL MultiSwitch 900.
DEChub ONE Installation EK-DEHU2-IN	Provides installation and operation guidelines for standalone module configuration, including mounting options and cabling.
Distributed Routing Software Bridging Configuration Guide AA-QL29E-TE	Describes bridging methods, operational features of bridging, configuration methods and basic configurations, and monitoring of bridging software.
Distributed Routing Software Event Logging System Messages Guide AA-QL2AE-TE	Describes messages logged by the Event Logging System.
Distributed Routing Software Network Interface Operations Guide AA-QL2BE-TE	Describes the configuring and monitoring of the network interfaces in the Distributed Routing Software.
Distributed Routing Software Routing Protocols Reference Guide AA-QL2CE-TE	Provides detailed reference information about the micro-operating system structure and the protocols and interfaces that the bridging routers support.
Distributed Routing Software Routing Protocols Users Guide AA-QL2DE-TE	Explains how to configure and monitor the routing protocol software.
Distributed Routing Software clearVISN Router Configurator User's Guide AA-R08YB-TE	Explains how to install the clearVISN Router Configurator software, and use it to create and load a basic configuration for bridging routers running the Distributed Routing Software.
Distributed Routing Software System Software Guide AA-QL2EE-TE	Describes the installation, configuration, and operation of the Distributed Routing Software.

Title and Order	Description
Distributed Routing Software Quick Reference Guide AA-R7QAA-TE	Provides quick reference information about installing, configuring, and operating the Distributed Routing Software system software.
clearVISN Installation	Provides pre- and post-installation information, as well as actual installation procedures for each application.
clearVISN Overview	Provides an overview of clearVISN, an explanation of each application and descriptions of all concepts necessary to understand and use the application efficiently.
clearVISN User's Guide	Provides information for starting each application, configuring them and general use information.

Correspondence

Documentation Comments

If you have comments or suggestions about this document, send them to the Network Products Business Organization.

Attn: Documentation Project Manager
FAX: (978) 506-6093
E-MAIL: doc_feedback@lkg.mts.dec.com

Online Services

To locate product specific information, refer to the following online services:

WWW   The Digital Equipment Corporation Network Products Business Home Page on the World Wide Web is at the following addresses:

Americas:	http://www.networks.digital.com
Europe:	http://www.networks.europe.digital.com
Asia Pacific:	http://www.networks.digital.com.au

How to Order Additional Documentation

To order additional documentation, use the following information:

To Order:	Contact:
By Telephone	Continental USA: 1-800-DIGITAL (1-800-344-4825)
	Canada: 1-800-267-6215
	Alaska, New Hampshire, and Hawaii: 1-603-884-6660
Electronically (USA. only)	Dial 1-800-DEC-DEMO (For assistance, call 1-800-DIGITAL)
By Mail (USA and Puerto Rico)	DIGITAL EQUIPMENT CORPORATION P.O. Box CS2008 Nashua, New Hampshire 03061 (Place prepaid orders from Puerto Rico with the local Digital subsidiary: 809-754-7575)
By Mail (Canada)	DIGITAL EQUIPMENT CORPORATION LTD. 940 Belfast Road Ottawa, Ontario, Canada K1G 4C2 Attn: A&SG Business Manager
Internationally	DIGITAL EQUIPMENT CORPORATION A&SG Business Manager c/o local Digital subsidiary or approved distributor
Internally	U.S. Software Supply Business (SSB) DIGITAL EQUIPMENT CORPORATION 8 Cotton Road Nashua, New Hampshire 03063

Safety

Overview

Any warning or caution that appears in this manual is defined as follows:

WARNING	Contains information to prevent personal injury.
CAUTION	Contains information to prevent damage to equipment.
VORSICHT	Enthält Informationen, die beachtet werden müssen um den Benutzer vor Schaden zu bewahren.
ACHTUNG	Enthält Informationen, die beachtet werden müssen um die Gerate vor Schaden zu bewahren
DANGER	Signale les informations destinées à prévenir les accidents corporels.
ATTENTION	Signale les informations destinées à prévenir la détérioration du matériel.
AVISO	Contiene información para evitar daños personales.
PRECAUCIÓN	Contiene información para evitar daños al equipo.

CAUTION	This action deletes all configured settings and replaces them with factory default values. All configuration settings will be lost.
ACHTUNG	Bei diesem Vorgang werden alle Konfigurationseinstellungen gelöscht und die Werkseinstellungen wieder eingesetzt. Alle Konfigurationsdaten gehen verloren.
ATTENTION	Cette action supprime tous les paramètres de configuration et les remplace par des valeurs prédéfinies. Tous les paramètres de configuration seront perdus.
PRECAUCIÓN	Esta intervención borrará todos los parámetros de configuración y los sustituirá por valores por defecto definidos de fábrica. Se perderán todos los parámetros de configuración.

Industry Canada Warnings

The following notices apply to products purchased for use in Canada.

INDUSTRY CANADA WARNINGS

NOTICE:

The Industry Canada Label identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

AVIS D'INDUSTRIE CANADA

AVIS:

L'étiquette d'Industrie Canada identifie le matériel homologué. Cette étiquette certifie que le matériel est conforme aux normes de protection, d'exploitation et de sécurité des réseaux de télécommunications, comme le prescrivent les documents concernant les exigences techniques relatives au matériel terminal. Le Ministère n'assure toutefois pas que le matériel fonctionnera à la satisfaction de l'utilisateur.

Industry Canada Warnings

Avant d'installer ce matériel, l'utilisateur doit s'assurer qu'il est permis de le raccorder aux installations de l'entreprise locale de télécommunication. Le matériel doit également être installé en suivant une méthode acceptée de la raccordement. L'abonné ne doit pas oublier qu'il est possible que la comformité aux conditions énoncées ci-dessus n'empêche pas la dégradation du service dans certaines situations.

Les réparations de matériel homologué doivent être coordonnées par un représentant désigné par le fournisseur. L'entreprise de télécommunications peut demander a l'utilisateur de débrancher un appareil à la suite de réparations ou de modifications effectuées par l'utilisateur ou à cause de mauvais fonctionnement.

Pour sa propre protection, l'utilisateur dot s'assurer que tous les fils de mise a la terre de la source d'énergie électrique, des lignes téléphoniques et des canalisations d'eau métalliques, s'il y en a, sont raccordés ensemble. Cette precaution est particulièrement importante dans les régions rurales.

Avertissement: L'utilisateur ne doit pas tenter de faire ces raccordements lui-même; il doit avoir recours à un service d'inspection des installations électriques, ou à un électricien, selon le cas.

FCC ISDN Rules

WARNING

This equipment complies with Part 68 of the Federal Communications commision (FCC) rules for the United States.

A label is located on the underside of the base unit containing the FCC reistration number. You must upon request, provide the following information to your local telephone company:

Facility Interface Code: 04DU-ISDN
Service Order Code: 6.0N
USOC Jack Type: RJ48C

If trouble is experienced with this equipment (RouteAbout Central EP), for repair or warranty information, please contact

Digital Equipment Corporation
165 Dascomb Road
Andover, MA 01810-5897
Attention: Richard Gould

If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

For repair/warranty information. The telephone company may ask you to disconnect this equipment from the line network until the problem has been corrected.

This equipment cannot be used on public coin phone service provided by the telephone company. Connection to party line service is subject to state tariffs.

Your telephone company may discontinue your service if your equipment causes harm to the telephone network. They will notify you in advance of disconnection, if possible. During notification, you will be informed of your right to file a complaint to the FCC.

Occasionally, your telephone company may make changes in its facilities, equipment, operation, or procedures that could affect the operation of your equipment. If so, you will be given advance notice of th change to give you an opportunity to maintain uninterrupted service.

Chapter 1

Product Introduction

Overview

Introduction

This chapter provides a description of the RouteAbout Central EP module and its features.

In This Chapter

Topic	Page
What Is the RouteAbout Central EP?	1-2
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What Is the RouteAbout Central EP?

The RouteAbout Central EP is a central site bridge/router (also referred to in this manual as the module) that provides multiprotocol routing for linking remote sites through its wide area network (WAN) connections.

The module can be configured in the DIGITAL MultiSwitch 900 (formerly DEChub 900 MultiSwitch) or as a standalone unit in a DEChub ONE (see the *DEChub ONE Installation* manual).

The RouteAbout Central EP is available with the Multiprotocol (MP) package. The MP package supports IP, bridging, IPX, AppleTalk, DECnet Phase IV, and OSI. The RouteAbout Central EP comes in two versions: one supporting T1, one supporting E1.

The RouteAbout Central EP has two independent Ethernet ports, four synchronous WAN ports capable of T1 or EI rates, and two Primary Rate ISDN ports. The Ethernet ports can be switched to the front panel or to the DIGITAL MultiSwitch 900 matrix channels.

The RouteAbout Central EP standards-compliant technology (IEEE 802.1d, 802.2, and 802.3) ensures operability in multivendor networks.

Features

Your RouteAbout Central EP router module includes the following features.

Hot Swap

The module's hot swap capability allows you to install or remove the module from a DIGITAL MultiSwitch 900 without turning off the power.

Performance and Memory

The RouteAbout Central EP contains the following performance and memory features:

- Implements industry-standard processors operating at 25 Mhz clock rates, and utilizes 32-bit address and data buses for maximum bus bandwidth.

- 16 Mbytes of system memory using PC compatible memory DSIMMS.

- Hardware co-processor that performs data compression functions.

Time of Year Clock

The module has an internal time of year (TOY) clock that allows the accurate setting of calendar time to take advantage of Telesaving features.

Configuration and Management

The following configuration and management options are available:

- Support for configuration and management through a command line interface in two ways:

  — locally via the setup port in a DEChub ONE docking station or the DIGITAL MultiSwitch 900 (in a DIGITAL MultiSwitch 900, you must redirect the hub setup port to the module)

  — remotely via Telnet in both the DIGITAL MultiSwitch 900 and the DEChub ONE

- Upgradeable device firmware (in nonvolatile Flash memory) using Trivial File Transfer Protocol (TFTP).

- Out-of-Band Management (OBM) over Serial Line Internet Protocol (SLIP) through the OBM connector as an alternative to in-band management.

- LAN hopping and launching of Telnet windows via the DIGITAL clearVISN MultiChassis Manager product.

- Simple Network Management Protocol (SNMP) for monitoring.

- In a DEChub ONE docking station, the option to direct the port 2 Ethernet channel either to the DEChub ONE's AUI port or to the module's front panel.

- Ports are individually switchable with clearVISN MultiChassis Manager.

- Supports product environmental management features, including automatic fan speed control, overtemperature warning and overtemperature shutdown.

EasyStart

EasyStart is a feature that allows you to downline load configuration files that are stored on a central server via BootP/TFTP.

Using EasyStart eliminates the need for an initial manual configuration. When the module is booted, it autoconfigures all interfaces and sends out requests to load its configuration file. Once the file is received, the module automatically restarts so that the configuration parameters specified in the file take effect.

See the *Distributed Routing Software System Software Guide* for information about using the EasyStart feature.

Bridging

The following bridging options are supported:

- Spanning tree loop detection protocol IEEE 802.1d.

- Ability to enable or disable spanning tree algorithm on individual Ethernet ports.

- High-speed local traffic filtering and forwarding.

- Flexible filtering (source address, destination address, and protocol) for greater network control, increased security and bandwidth utilization, and reduced propagation of network problems.

- Option to turn off automatic learning and manually load the address database.

Routing Protocols

The following routing protocols are supported:

- IP protocols, which are as follows:

  — OSPF (Open Shortest Path First)

  — RIP (Routing Information Protocol)

  — BGP-4 (Border Gateway Protocol)

  — EGP (Exterior Gateway Protocol)

  — IS-IS (Integrated Intermediate System to Intermediate System)

  — MOSPF (Multicast Open Shortest Path First)

  — DVMRP (Distance Vector Multicast Routing Protocol)

- IPX

- AppleTalk Phases I & II

- DECnet Phase IV

- DECnet/OSI

- X.25 Switching

SNMP

The complete MIB-II is provided with the exception of ifInNUcastPkts, ifOutNUcastPkts, and the TCP group. SNMP Gets and Traps are supported for the following RFCs.

- Structure and Identification of Management Information for TCP/IP-based Internets (RFC 1155)

- SNMP management (RFC 1157)

- Management Information Base for Network Management of TCP/IP-Based Internets: MIB-II (RFC 1213)

- AppleTalk MIB (RFC 1243)

- OSPF Version 2 MIB (RFC 1253)

- Bridge MIB (RFC 1286)

- Frame Relay DTE MIB (RFC 1315)

- RS232-Like Hardware Device MIB (RFC 1317)

- PPP Link Control Protocol MIB (RFC 1471)

- Evolution of the Interfaces Group of MIB-II (RFC 1573)

- Ethernet MIB (RFC 1623)

- Bandwidth Reservation System Private MIB

- Distributed Routing Software Private MIB

- LLC MIB (Internet Draft Version 01)

- Novell IPX MIB

- Novell RIP-SAP MIB

- Telesaving Private MIB

Features

Sets are supported for enabling and disabling router interfaces. The address translation and routing tables are not settable.

The module can be managed using any generic SNMP management application that supports the MIBs listed above.

Chapter 2

Installing the Module

Overview

Introduction

This chapter describes the front and back panel components of the RouteAbout Central EP and tells you how to install the module in a DIGITAL MultiSwitch 900 (formerly DEChub 900 MultiSwitch).

To install a module in a DEChub ONE docking station refer to the *DEChub ONE Installation* manual.

In This Chapter

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Module Components

The following sections describe the front and back panel components for the RouteAbout Central EP.

Front Panel Components

Table 2-1 describes the front panel components, including LEDs, that are illustrated in Figure 2-1.

For problem-solving information using the LEDs, refer to Appendix A.

Table 2-1: Front Panel LEDs and Connectors

Item	Icon	Name	Description
1	⊘	Power LED	Lights when the module has power.
2	○	Module OK LED	Lights when the module passes self-test.
3	╫	Ethernet OK LEDs 1 and 2	Indicate network connection or port state.
4	→	Ethernet Activity LED 1	Indicates Ethernet network traffic. Connection can be through the front, via DIGITAL MultiSwitch 900 dedicated Ethernet channel, or through the back, via one of the six flex channels. Blinks faster as traffic becomes heavier.
	→	Ethernet Activity LED 2	Indicates Ethernet network traffic. Connection can be through the front, or if in a DEChub ONE, through the AUI port or through one of the six DIGITAL MultiSwitch 900 flex channels. Blinks faster as traffic becomes heavier.
5		Port 3-6 Serial Line OK LEDs	Indicate operation mode on ports 3 to 6.
6		Primary Rate ISDN Ports 7 and 8 LEDs	Indicate operation mode on ports 7 and 8.
7		Ethernet Label	Lists the first of two consecutive Ethernet MAC addresses of the module.
8		Yellow Alarm, Red Alarm, and Blue Alarm LEDs for Ports 7 and 8	Reflect the alarm status of the Primary Rate ISDN ports.
9		Twisted Pair (10BaseT) Connectors	Connect the module to a 10BaseT network.

Module Components

Item	Icon	Name	Description
10		PCMCIA Slot	Reserved for DIGITAL use only.
11		Synchronous Serial Port Connectors (labeled 3 through 6)	These ports support the EIA530A, RS232/V.28, RS422/V.11, V.35, X.21 Leased Lines (LL), RS423/V.10
12		ISDN PRI Port Connections (labeled 7 and 8)	These ports support the Primary Rate ISDN connections.
13	⮑	Dump Button	Reserved for DIGITAL use only.

Figure 2-1: Front Panel LEDs and Connectors
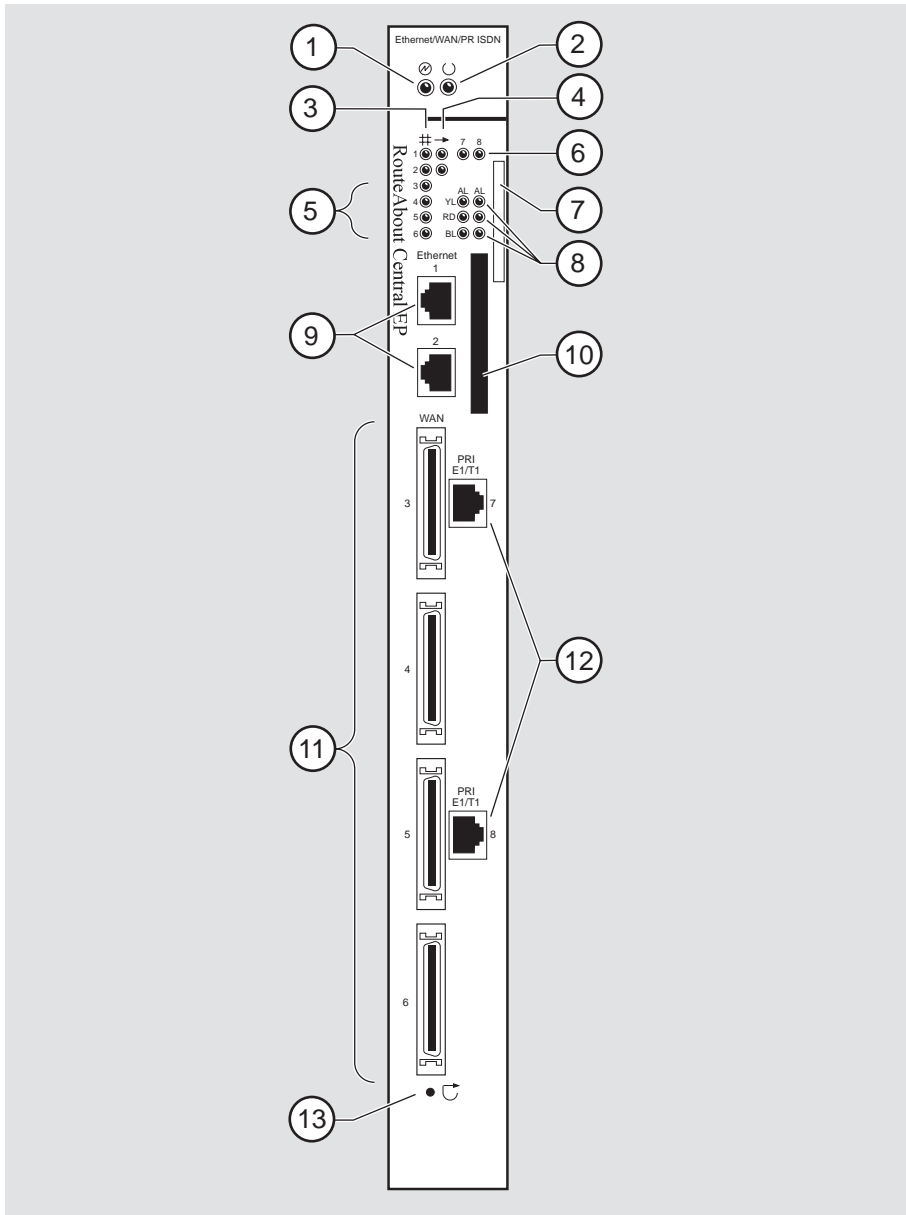
NPB-0847-97F

Back Panel

Table 2-2 describes the back panel components that are illustrated in Figure 2-2.

Table 2-2: Back Panel Feature Components

Item	Name	Description
1	Locking tab	Locks the module into a MultiSwitch 900 backplane or into a DEChub ONE docking station. Contains the hot-swap switch lever.
2	48-pin connector	Provides network and power connections to the module when the module is installed in a MultiSwitch 900 or DEChub ONE docking station.
3	Grounding bolt	Provides a chassis grounding connection between the module and the MultiSwitch 900 or the DEChub ONE docking station.
4	Manufacturing label	Lists the module's part number, serial number, revision level, and power requirements.
5	160-pin connector	Provides network and power connections to the module when the module is installed into a MultiSwitch 900 or a DEChub ONE docking station.
6	Mounting tab	Secures the module when it is installed into a MultiSwitch 900 or a DEChub ONE docking station.
7	Grounding fingers	Provide additional chassis grounding between the module and a MultiSwitch 900 or a DEChub ONE docking station.

Figure 2-2: Back Panel Layout
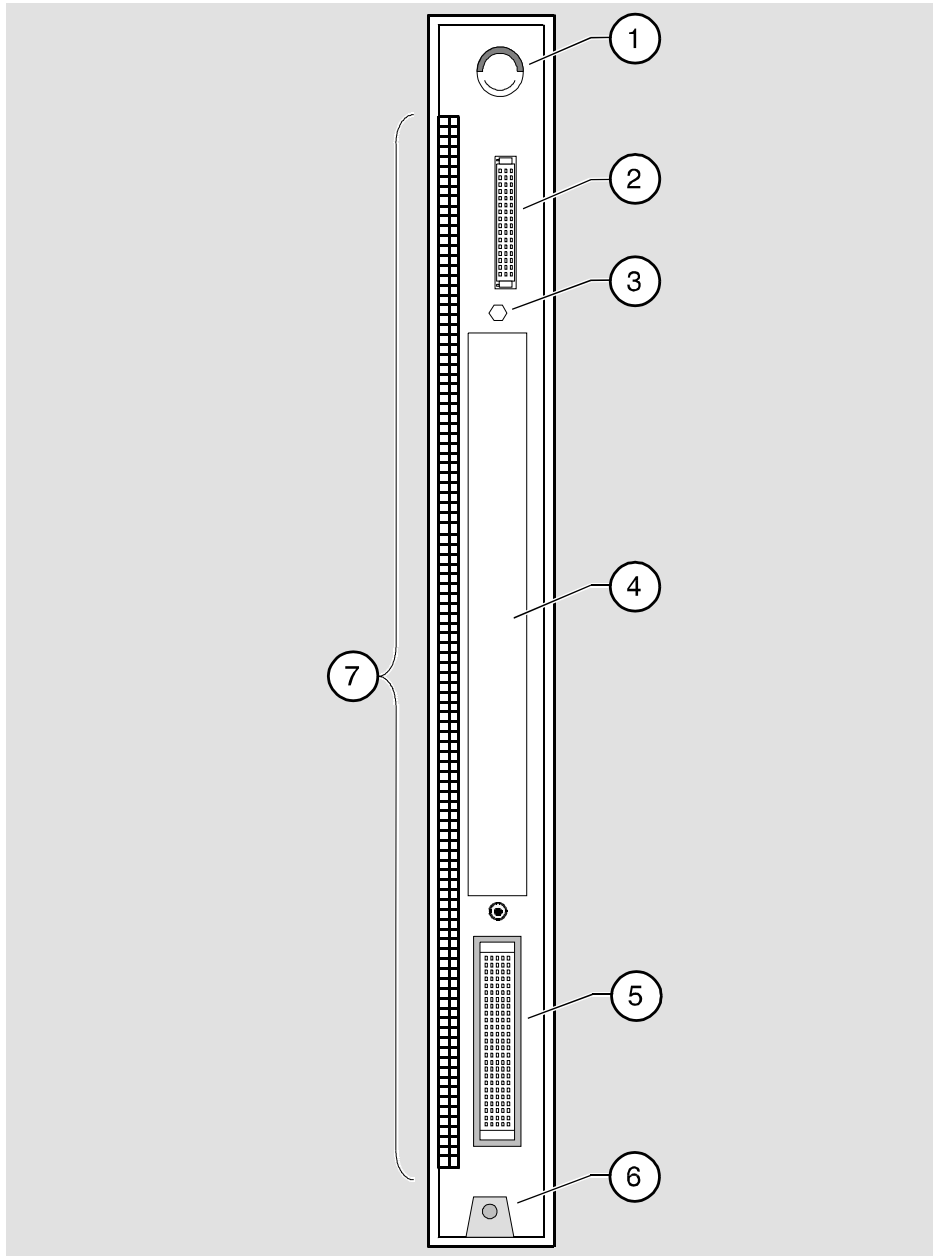
NPG-9723-95F

How to Install the Module

The hotswap feature allows you to install the module into the DIGITAL MultiSwitch 900 without turning off power. Seating the module initiates the power-up.

To install the module, complete the following tasks.

Task	Description
1	Compare the power ratings.
2	Seat the module into the DIGITAL MultiSwitch 900.
3	Verify initial LED operation.
4	Connect the cables.

Task 1: Compare the Power Ratings

Compare your module's power requirements with the values shown in the Hub Manager status display (Figure 2-3).

If any of the module's power requirements **(1)** exceed the values shown in the status display **(2)**, add another power supply (see the *DIGITAL MultiSwitch 900 Owner's Manual*).

NOTE

The 12V power in the DIGITAL MultiSwitch 900 is derived from the 15V power source. Although it is listed separately in the product specifications, the 12V requirements are included in the 15V power total.

Figure 2-3: Power Ratings
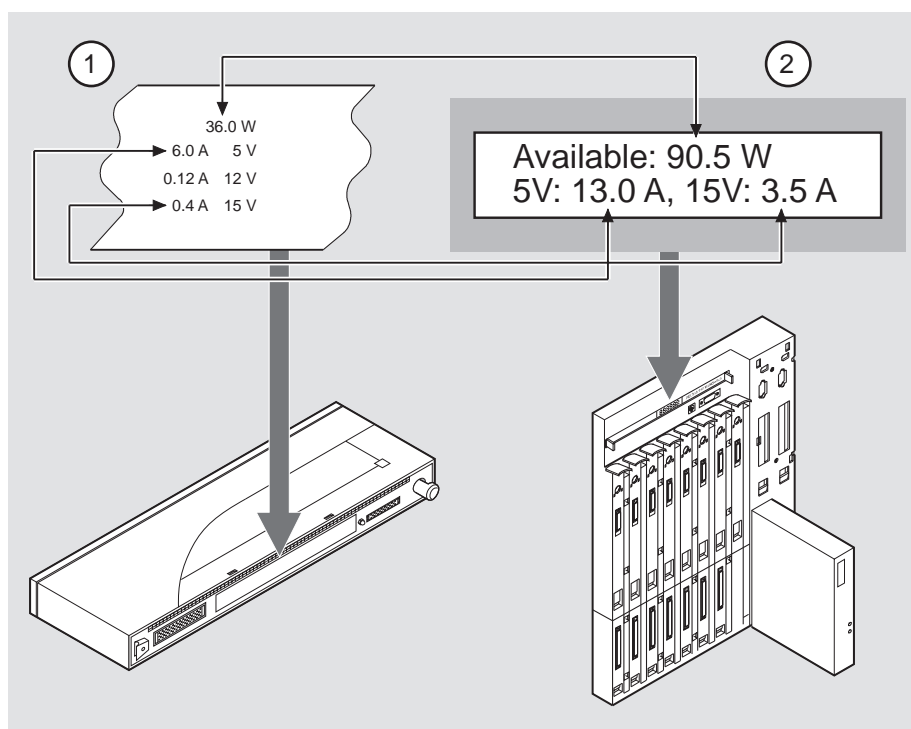
NPB-0848-97F

Task 2: Seat the Module into the DIGITAL MultiSwitch 900

To seat the module, complete the following steps:

Step	Action
1	Place the module's mounting tab **(1)** into a mounting slot on the DIGITAL MultiSwitch 900.
2	Pull up and hold the release lever **(2)** to its unlocked position.
3	Pivot the module on the mounting tab, align the connectors and firmly push the module onto the backplane connectors.
4	Press down on the release lever **(3)** to ensure that it is locked.

Figure 2-4: Seating the Module
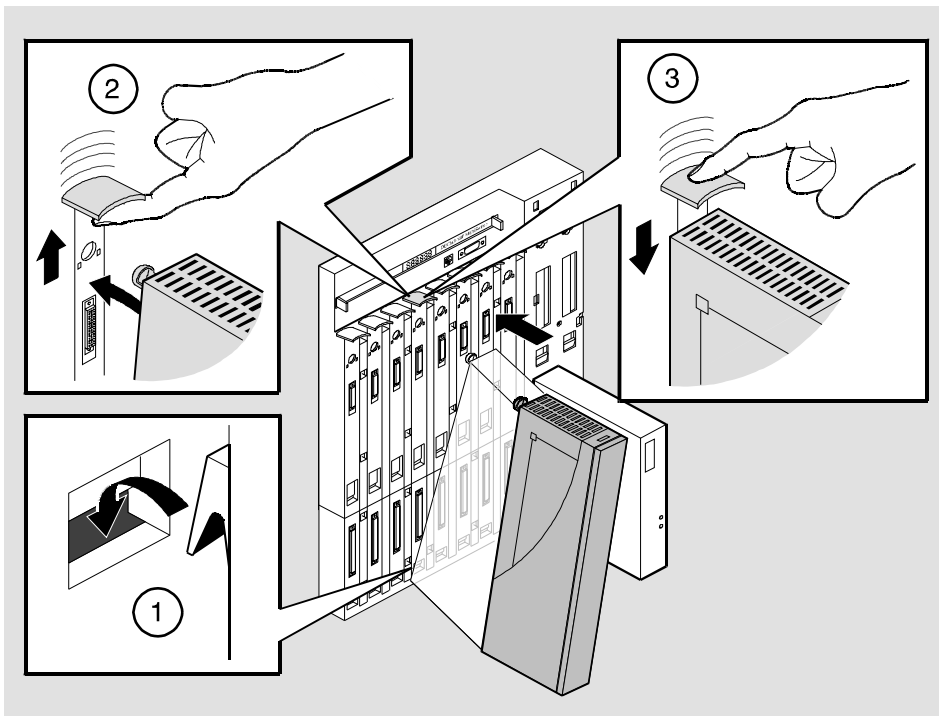
NPG-0004-95F

Task 3: Verify Initial LED Operation

If this is a new installation, turn on the power to the DIGITAL MultiSwitch 900. If the module was installed while the DIGITAL MultiSwitch 900 was powered up, seating the module will initiate the module's power up sequence. For locations of the module's LEDs, refer to Figure 2-1.

Step	Action
1	Upon receiving power, verify that the module's Power LED lights within a few seconds. At this time, the module performs a self-test. Note: The self-test takes approximately 90 seconds to complete.
2	After the module completes self-test, the Module OK LED lights. The Hub Manager status display identifies the module as the RouteAbout Central EP.

NOTE

If the LEDs do not operate as described, refer to Appendix A, Problem Solving.

Task 4: Connect the Cables

Connect the WAN Serial and ISDN Cables

To connect the WAN serial cable and the ISDN cable (Figure 2-5), complete the following steps:

Step	Action
1	Insert the module's WAN serial cable **(1)** into the connector, ensuring that the release tabs snap into the locked position. See Appendix B for cable information.
2	Connect the other end of the WAN cable into an appropriate CSU/DSU device. Note that this device may or may not be provided by your local telephone company.
3	Align the release tab on the ISDN cable plug **(2)** with the keyway on the module's ISDN port connector.
4	Insert the ISDN line phone cord into the ISDN port, ensuring the release tab snaps into the locked position.
5	Connect the other end of the ISDN cable to an appropriate CSU. Note that this device is usually provided by your local telephone company. Figure 2-5 illustrates these cable connections.

Figure 2-5: Cable Connection
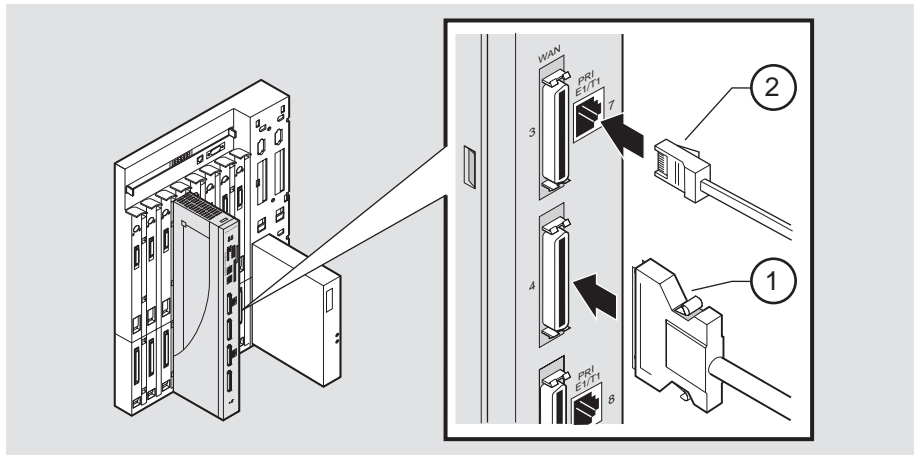
NPB-0851-97F

Connect the UTP/ScTP Cable

The RouteAbout Central EP uses straight-through, 10BaseT, 8-pin MJ port connectors. Select the appropriate UTP/ScTP cable type, crossover or straight-through, to ensure that the module's transmit/receive signals connect correctly to the transmitter/receiver of the connected device.

Before connecting the cables to the module, note the following rules:

If the device you are connecting to the module uses	Then use
Crossover connectors[1]	Straight-through cables
Straight-through connectors[2]	Crossover cables

[1]The sum of crossovers must always equal an odd number.

[2]The DIGITAL straight-through cables are marked (=); crossover connectors and cables are marked (x).

Task 4: Connect the Cables

To connect the UTP/ScTP cable (Figure 2-6), complete the following steps:

Step	Action
1	Align the release tab on the cable plug **(1)**, with the keyway **(2)** on the module's 10BaseT port connector.
2	Insert the plug into the connector, ensuring that the release tab snaps into the locked position.

Figure 2-6: UTP/ScTP Cable Connection
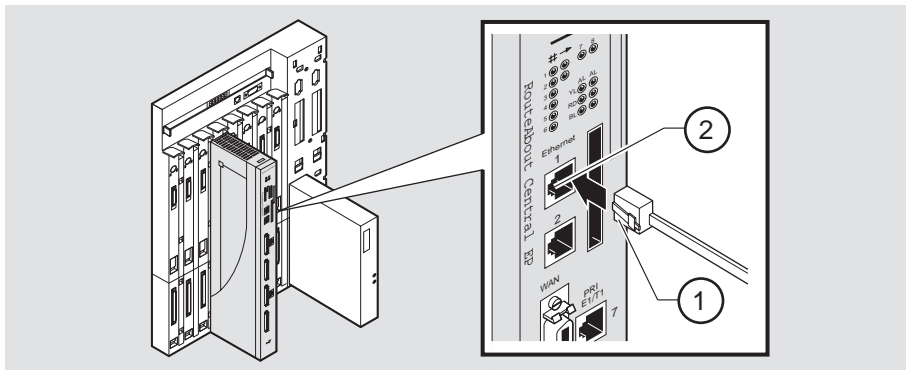
NPB-0849-97F

Example Installation Using Open DECconnect Modular Mounting System

Introduction

Figure 2-7 shows an example installation in which a RouteAbout module (in this example, a RouteAbout Central EI) is installed in the Open DECconnect Modular Mounting System. This is a space-saving system that attaches to the wall and expands with additional available options. The Open DECconnect Modular Mounting System allows you to build a multi-purpose access system that uses industry standard rack mounting and various DEChub modules.

Table 2-3 lists the components of the installation, including the connecting cables.

Table 2-3: Components of Example Installation

Item	Product and Part Number
1	Open DECconnect Modular Mounting System DERMS-AA
2	19-inch RETMA standard angled brackets H3108-RB
3	Universal Equipment Shelf H3108-TC
4	Patch Panel H3108-PB, loaded with UTP 8-pin MJ inserts H3117-LA to provide up to 48 ports
5	Super 5 UTP 8MP-8MP patch cable, BN25G-01. Goes to Media Access Unit (MAU) or to front MJ connector
6	Connections to Telco lines
7	Network Terminators, up to 12 units[1]
8	Connections to power strip
9	Modem or DSU/CSU[1]
10	Serial line connection to port 6. See Appendix B, Connectors, Adapters and Cable Connections for list of supported serial cables.
11	Super 5 UTP 8MP-8MP patch cable, BN25G-0x
12	H3111-C faceplate

[1]These connections are used only with RouteAbout Central EI modules.

Example Installation Using Open DECconnect Modular Mounting System

Figure 2-7: Example RouteAbout Module Installation
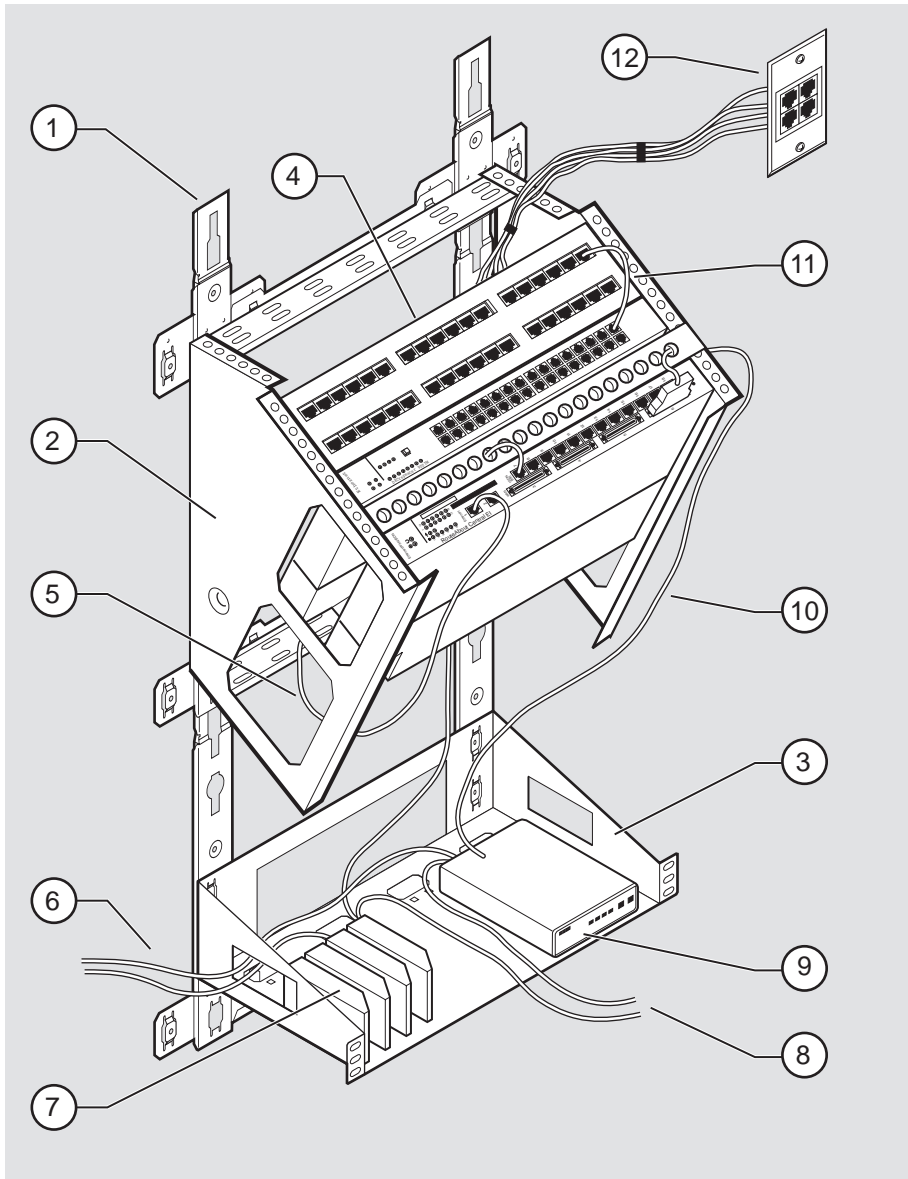
NPB-0667-96F

Example Installation Using Open DECconnect Modular Mounting System

Description

The configuration in Figure 2-7 includes a DECrepeater 900TM twisted-pair repeater module and a patch panel. Installing this configuration requires doing the following tasks:

Step	Action
1	Attach the Modular Mounting System (DERMS-AA) to the wall.
2	Snap on the rack mount bracket (H3108-RB) and the Universal Equipment Shelf (H3108-TC).
3	Mount the patch panel, DECrepeater 900TM, and RouteAbout module using the mounting racks and the hardware shipped with the DEChub ONE docking station.
4	Wire up the system using the appropriate cables.
5	Select a power strip that can accommodate the total number of power cords used. This configuration, which includes up to 12 Network Terminator units, uses up to 19 power cords.

See these manuals and installation instructions for more information:

Name	Part Number
Installing the DERMS Modular Mounting System	EK-DERMS-IN
Installation Instructions for the H310/S-Series Patch Panels and Mounting Components	EK-H3108-IN
DEChub One Installation	EK-DEHUA-IN

Chapter 3

Installing the Setup Port Cable

Overview

Introduction

This chapter describes how to connect the RouteAbout Central EP module to the setup port on a DIGITAL MultiSwitch 900 (formerly DEChub 900 MultiSwitch) or a DEChub ONE docking station.

In This Chapter

Topic	Page
Signaling Standards	3-2
Setup Port Device Cabling	3-3
Connecting the Setup Port	3-4

Signaling Standards

Signals from the DIGITAL MultiSwitch 900 Hub Manager setup port conform to the EIA-232D signaling standard at 9600 baud. To the user, the port appears as a data terminal equipment (DTE) device.

The DIGITAL MultiSwitch 900 Hub Manager setup port is compatible with devices that use the EIA-423 signaling standard.

Setup Port Device Cabling

The setup port (see Figure 3-1) on the DIGITAL MultiSwitch 900 or the DEChub ONE docking station can be connected to a setup port device (a terminal or personal computer), using the following cables and adapters:

If the setup port device is a ...	Use this cable...	With this adapter...
PC with a 9-pin D-Sub communications port	BN24H-xx[1]	H8571-J
Terminal with a 25-pin D-Sub connector	BN24H-xx[1]	H8575-A
Terminal with a 6-pin MMJ connector	BN24H-xx[1]	Not required.

[1]xx indicates cable length in meters.

Connecting the Setup Port

To connect the setup port on the RouteAbout Central EP module, complete the following steps:

Step	Action
1	Ensure that the transmit and receive baud rates on the setup port device are set to 9600 baud.
2	Connect the setup port device to the setup port connector on either the DIGITAL MultiSwitch 900 or the DEChub ONE docking station (see Figure 3-1).

The following legend identifies the setup port cabling in Figure 3-1:

Item	Description
1)	OBM Port
2)	Setup Port
3)	Setup Port Device

Figure 3-1: Setup Port Cabling Components

DEChub 900 Multiswitch

DEChub ONE

DEChub ONE-MX

H8571-J

BN24H

H8575-A
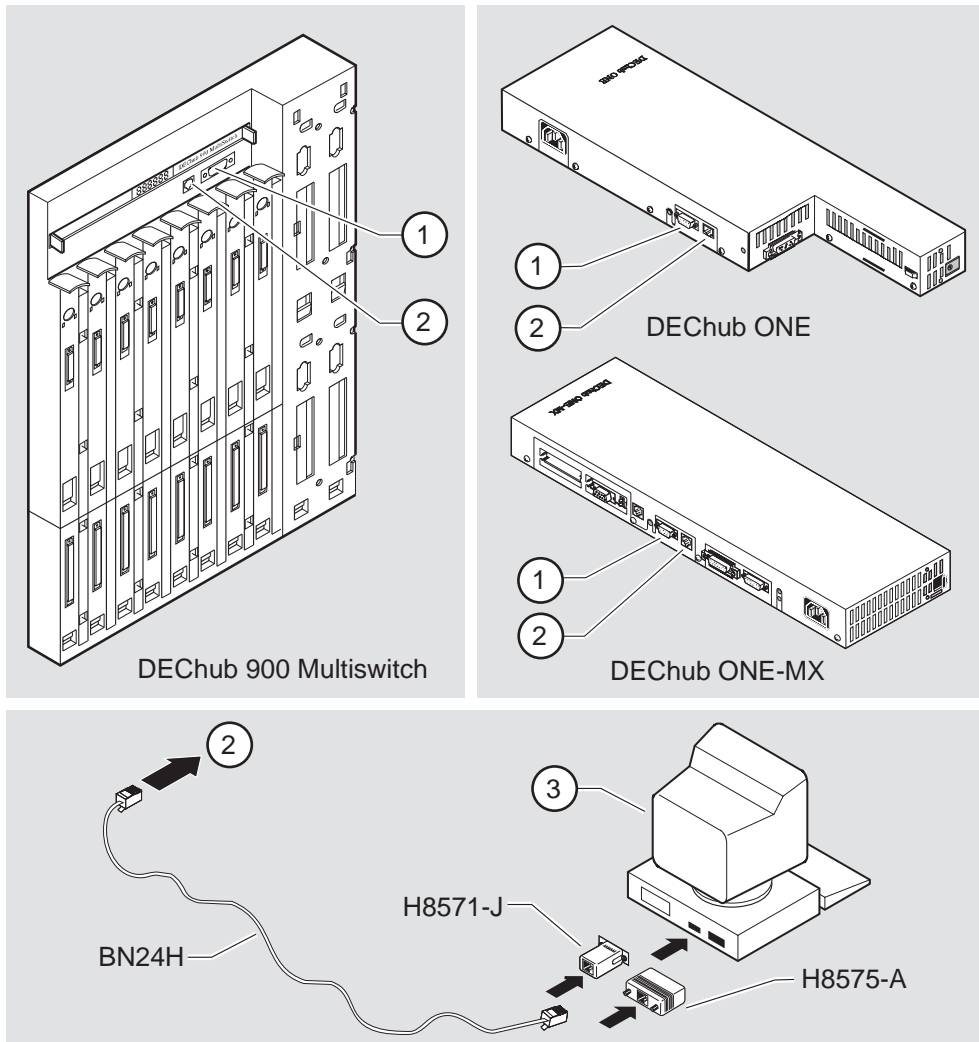
NPG-0020-95F

After all cables are connected, go to one of the following sections:

To	Go to
Configure the module in a DEChub ONE	Chapter 4
Configure the module in a DIGITAL MultiSwitch 900	Chapter 5

Chapter 4

Configuring the Module in a DEChub ONE

Overview

Introduction

This chapter describes how to set up and configure the module when it is installed in a DEChub ONE docking station. Use these procedures for the initial configuration of a module via a Telnet connection or locally via the setup port on the DEChub ONE docking station. For DEChub ONE installation procedures refer to the *DEChub ONE Installation* manual.

If you use this module in environments where BootP/TFTP services are available, you may want to consider using the clearVISN Router Configurator in conjunction with the EasyStart feature to load the module's initial configuration. Refer to the *Distributed Routing Software System Software Guide* and *Distributed Routing Software clearVISN Router Configurator User's Guide* for more information.

In This Chapter

Accessing the Setup Port

To configure your module and make it remotely accessible you must assign:

- An IP address

- A subnet mask

- A default gateway

The setup port provides menus that allow you to access the RouteAbout Central EP. These menus allow you to set up the module for basic connectivity. After the initial setup, you then configure the module's software using a command-based interface. These commands can be accessed remotely via TCP/IP Telnet, or locally through the setup port on a DEChub ONE docking station.

Examples of the setup screen displays are provided in this section to aid in the description of the setup port and to display the options that are available. Because they are examples only, the displays can vary slightly from the actual screen displays on your setup port device. Boldface type in the screen display examples indicates user input.

To access the setup menus, press the <Return> key on the setup port device until the `RtAbt Cntrl EP/MP INSTALLATION MENU` appears.

To configure the module using	Go to the section titled
Menus	Using Menus to Set Up the Module
Commands	Go to Local Console

Using Menus to Set Up the Module

This section describes the options that are available from the RtAbt Cntrl EP INSTALLATION MENU when the module is installed in the DEChub ONE docking station.

The following example shows the menu options available when the module is set up with factory defaults.

```
        RtAbt Cntrl EP/MP
        =============================================================
                    RtAbt Cntrl EP/MP   INSTALLATION MENU

                [1]   Restart with Factory Defaults
                [2]   Restart with Current Settings
                [3]   Show Current Settings
                [4]   IP Configuration
                [5]   Out-of-Band Port Configuration
                [6]   Go to Local Console

        =============================================================
               Enter selection:
```

If the module was previously configured, the following menu options are available.

```
RtAbt Cntrl EP/MP
==================================================================
        RtAbt Cntrl EP/MP INSTALLATION MENU
    *********************************************************************
     To fully manage this device telnet to one of the
    following IP addresses or select item [3] below.
            Out-of-Band: Not Configured
            In-Band    : 192.12.13.14
    *********************************************************************
         [1] Restart with Factory Defaults
         [2] Restart with Current Settings
         [3] Go to Local Console
      ========================================================
         Enter selection :
```

NOTE

The Out-of-Band and In-Band values are listed only if one or more IP parameters have been set.

The following pages describe the installation menu options available on the `RtAbt Cntrl EP Installation Menu`:

Option	Page
[1] Restart with Factory Defaults	4-5
[2] Restart with Current Settings	4-6
[3] Show Current Settings	4-7
[4] IP Configuration	4-8
[5] Out-of-Band Port Configuration	4-13
[6] Go To Local Console	4-15

[1] Restart with Factory Defaults

This option initializes the router's configuration to factory default values by resetting the module's nonvolatile configuration storage parameters and restarting the module. (To retain the current values, use Option `[2] Restart with Current Settings`). Allow up to one minute for the module to restart.

CAUTION

This action deletes all configured settings and replaces them with factory default values. All configuration settings will be lost.

The following example shows the dialog associated with this option.

```
                Enter selection : 1

RtAbt Cntrl EP/MP
==========================================================

                RESTART WITH FACTORY DEFAULTS


   * * * * * * * * * * * * * * * * * * * * * * * * * * * *
   *          IMPORTANT!    IMPORTANT!    IMPORTANT!     *
   * * * * * * * * * * * * * * * * * * * * * * * * * * * *
   * This selection will delete the current configuration *
   * settings and reset the system with the factory        *
   * default settings. All configuration settings will     *
   * be lost.                                               *
   * * * * * * * * * * * * * * * * * * * * * * * * * * * *

==========================================================
                Press Y to confirm [N]:  <Return>
            Press Return for Main Menu...
```

Then, the EasyStart rebooting feature becomes active. The EasyStart feature allows the module to boot up using existing configuration files. EasyStart messages will appear on the console device. See the *Distributed Routing Software System Software Guide* for more information about the EasyStart feature.

[2] Restart with Current Settings

This option restarts the module but leaves the module's configured nonvolatile configuration storage parameters at their current values.

The following example shows the dialog associated with this option.

```
                    Enter selection:  2

RtAbt Cntrl EP/MP
===============================================================
               RESTART WITH CURRENT SETTINGS

  This selection will restart your system with the current
  configuration settings.
===============================================================
              Press Y to confirm [N] :  <Return>
            Press Return for Main Menu...
```

If you select Y, then the RtAbt Cntrl EP INSTALLATION MENU appears.

[3] Show Current Settings

This option shows the module's current settings. If the module is being configured for the first time, some of the fields will be blank.

The following example shows the screen display associated with this option.

```
                  Enter selection : 3
 RtAbt Cntrl EP/MP
 ================================================================
 RtAbt Cntrl EP/MP, Brouter: 2 Enet 4T1 2T1PRI, HW=1, RO=1, #1489,SW=v3.0.000
 SysUpTime                          : 00:00:52  28 resets
 SNMP Read/Write Community          : Not Available
 Out-of-Band (OBM) Management RTS   : Disabled
 Default Gateway                    : Not Configured
 --------------------------------------------------------------
 Interface     IP Address       Subnet Mask      Other Info

 Ethernet      192.12.13.14     255.255.255.0

 Out-of-Band                                     Speed 9600 bps
 --------------------------------------------------------------
 ==============================================================
         Press Return for Main Menu...
```

[4] IP Configuration

The IP Configuration option provides you with five selections.

The following example shows the menus available with this option.

```
              Enter selection : 4

RtAbt Cntrl EP/MP
==========================================================
                  IP CONFIGURATION
  * * * * * * * * * * * * * * * * * * * * * * * * * * *
  *  Configuration will not take effect until module    *
  *  is restarted                                        *
  * * * * * * * * * * * * * * * * * * * * * * * * * * *

       [1]  Set SNMP Read/Write Community
       [2]  Set In-Band Interface IP Address
       [3]  Set Out-of-Band Interface IP Address
       [4]  Set Default Gateway
       [5]  Return to Main Menu
==========================================================
         Enter selection:
```

The following pages describe the IP Configuration options.

Option	Page
[1] Set SNMP Read/Write Community	4-9
[2] Set In-Band Interface IP Address	4-10
[3] Set Out-of-Band Interface IP Address	4-11
[4] Set Default Gateway	4-12

[1] Set SNMP Read/Write Community

This option prompts you to enter the module's SNMP read/write community name.

The following example shows the dialog associated with this option.

```
                    Enter selection : 1

 RtAbt Cntrl EP/MP
 ==================================================================
                  SET SMNP READ/WRITE COMMUNITY
 Format: The format for a community name is a string, consisting
         of 4 to 31 printable Ascii characters, that
         describes the relationship between an SNMP agent and
         one or more SNMP managers. The string defines the
         authentication mechanism that is employed to validate
         the use of the community by the sending SNMP entity.

 ==================================================================

 Enter the community string [public] : public <Return>

 SNMP Read/Write community string set.

                 Press Return for IP Configuration Menu...
```

[2] Set In-Band Interface IP Address

This option prompts you to change or enter the IP address and subnet mask for the in-band interface. You can only configure one in-band interface at a time. The module does not need to be configured with a subnet mask for SNMP communications when management stations are on the same subnet as the module.

The format for these values is the standard 4-octet dotted decimal notation, in which each octet of the address is represented as a decimal value, separated by a decimal point (.).

The following example shows the dialog associated with this option.

```
                   Enter selection   2
RtAbt Cntrl EP/MP
================================================================

           IN-BAND INTERFACE IP ADDRESS CONFIGURATION

  Format:  The standard 4 octet dotted decimal notation
           in which each octet of the address is
.          represented as a decimal value, separated
            by a "." character.

                   example: 192.12.13.14

   To delete the IP address, enter 0 in the appropriate
   address field.
   ------------------------------------------------------------
 Interface        IP Address     Subnet Mask     Other Info
 Ethernet
 Out-of-Band
  ------------------------------------------------------------

================================================================
 Port Number (1-2) [ ] : 2
 IP address [] : 192.12.13.14    <Return>
 Subnet Mask [] : 255.255.0.0 : <Return>
            Press Return for IP Configuration Menu.....
```

[3] Set Out-of-Band Interface IP Address

This option prompts you to change or enter the IP address and subnet mask for the out-of-band interface.

This feature allows you to manage your module through the OBM port on the DEChub ONE docking station as an alternative to normal in-band management. To enable out-of-band management, you need to assign an OBM IP address and select an OBM port speed from the `RtAbt Cntrl EP/MP INSTALLATION MENU`.

The module does not need to be configured with a subnet mask for SNMP communications when management stations are on the same subnet as the module.

The following example shows the dialog associated with this option.

```
                 Enter selection   3

RtAbt Cntrl EP/MP
================================================================

           OUT-OF-BAND INTERFACE IP ADDRESS CONFIGURATION

  Format:  The standard 4 octet dotted decimal notation
           in which each octet of the address is
.          represented as a decimal value, separated
            by a "." character.

                 example: 192.12.13.14

   To delete the address, enter 0 in the appropriate
   address field.
  ----------------------------------------------------------------
 Interface         IP Address      Subnet Mask      Other Info

 Ethernet          192.12.13.14    255.255.255.0
 Out-of-Band                                        Speed 9600 bps
  ----------------------------------------------------------------

 ================================================================
 IP address [] : 192.12.13.14 <Return>
 Subnet Mask [] : 255.255.0.0 : <Return>
           Press Return for IP Configuration Menu.....
```

[4] Set Default Gateway

This option sets the default gateway, if necessary for the in-band interface. This is the address of a router that the module will use when communicating to a remote host. The default gateway address must be an address in the same subnet as your in-band address.

The following example shows the dialog associated with this option.

```
                Enter selection : 4
RtAbt Cntrl EP/MP
============================================================

     SET IN-BAND INTERFACE DEFAULT GATEWAY ADDRESS

Format:  The standard 4-octet dotted decimal notation
         in which each octet of the address is
         represented as a decimal value, separated
         by a "." character.

               example: 192.12.13.14

 To delete the address, enter 0 in the appropriate
 address field.
============================================================
  Default Gateway []: 192.12.13.14 <Return>

  Default Gateway Address Set.

             Press Return for IP Configuration Menu . . .
```

[5] Out-of-Band Port Configuration

This option lets you set the out-of-band port speed and enable or disable Request To Send (RTS).

NOTE

The port speeds at both ends of the communications link must be identical.

The following example shows the dialog associated with this option.

```
               Enter selection : 5
RtAbt Cntrl EP/MP
=========================================================
           OUT-OF-BAND PORT CONFIGURATION

 * * * * * * * * * * * * * * * * * * * * * * * * * * * *
 *    Configuration will not take effect until module is *
 *    restarted.                                          *
 * * * * * * * * * * * * * * * * * * * * * * * * * * * *
                  [1] Set Port Speed
                  [2] Enable/Disable RTS
                  [3] Return to Main Menu
=========================================================
                  Enter selection :
```

The following pages describe out-of-band configuration options.

Option	Page
[1] Set Port Speed	4-13
[2] Enable/Disable RTS	4-14

[1] Set Port Speed

This option lets you select the out-of-band port speed. The factory default for this option is 9600 baud. The OBM port speed that you select must match the speed of your OBM device.

The following example shows the dialog associated with this option.

[5] Out-of-Band Port Configuration

```
                 Enter selection : 1
RtAbt Cntrl EP/MP
==========================================================
            SET OUT-OF-BAND PORT CONFIGURATION

              [1] 2400 baud
              [2] 9600 baud
              [3] 38400 baud

==========================================================
     Enter selection [2] (9600): 1 <Return>

            OBM port speed set.

             Press Return for Main Menu . . .
```

[2] Enable/Disable RTS

This option allows you to enable or disable Request To Send (RTS). The factory default for this option is Disabled.

If the RTS is disabled, the following dialog appears on the screen.

```
                 Enter selection : 2
 RtAbt Cntrl EP/MP

 ================================================================
             ENABLE/DISABLE OUT-OF-BAND PORT RTS

 Enable/Disable request to send (RTS) option allows additional
 control to modem communications. When the RTS option is disabled
 the RTS signal on the OBM port is asserted after self-test is
 completed and left asserted. When the RTS option is Enabled the
 RTS signal is asserted only when there is data to be transmitted
 and deasserted after the data has been transmitted.
 ================================================================
 RTS is Disabled. Would you like to ENABLE RTS? [N]
```

If RTS is enabled, the screen shows:

```
   RTS is Enabled. Would you like to Disable RTS?
```

Go to Local Console

This option lets you configure the module. You must configure the module before it is operational. The `Go to Local Console` option provides two different configuration methods, depending on whether the module has been set up with factory defaults or has been previously configured.

If the module has been set up with factory defaults, then this is option `[6] Go to Local Console` from the `RtAbt Cntrl EP/MP INSTALLATION MENU`. This option runs a quick configuration interactive question and answer dialog. This method (qconfig) allows fast configuration of interfaces, basic bridging, IP, IPX, DNA, booting, OBM and time of year (TOY).

If the module has been previously configured, then this is option `[3] Go to Local Console` from the installation menu.

NOTE

You must restart the module in order for the configuration changes to take effect.

---

[6] Go To Local Console

This selection runs quick configuration. If you reset to factory defaults and select `Go to Local Console` without having configured the router via the installation menu, you automatically enter **qconfig**.

After making changes, exit quick configuration and apply the changes you made by typing **restart**. The system displays the following messages:

```
Quick Config Done
Type RESTART at Config (only) prompt for the configuration to take
effect
Config (only) >
```

If you type RESTART at the `Config (only)>` prompt, the following message appears:

```
Are you sure you want to restart the gateway? (Yes [No]):
```

Go to Local Console

Enter **yes** to proceed.The following menu is then displayed.

```
RtAbt Cntrl EP/MP
=================================================================
        RtAbt Cntrl EP/MP INSTALLATION MENU
    **********************************************************************
     To fully manage this device telnet to one of the
    following IP addresses or select item [3] below.
            Out-of-Band: Not Configured
            In-Band    : 192.12.13.14
    **********************************************************************
          [1] Restart with Factory Defaults
          [2] Restart with Current Settings
          [3] Go to Local Console
     ==========================================================
          Enter selection :
```

[3] Go To Local Console

If you have configured the module, then the following installation menu appears.
Select [3] Go To Local Console to modify the configuration.

```
RtAbt Cntrl EP/MP
==========================================================

        RtAbt Cntrl EP/MP INSTALLATION MENU

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*  To fully manage this router Telnet to one of its     *
*  IP addresses or select item [3] below.               *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

          [1] Restart with Factory Defaults
          [2] Restart with Current Settings
          [3] Go to Local Console

==========================================================
          Enter selection number: 3 <Return>
```

The system displays copyright statements and the following prompt:

```
  MOS Operator Control
   *
```

After the system prompt (*) appears, go to the section CONFIG Commands.

CONFIG Commands

This section describes commands that are unique to the RouteAbout Central EP. Other CONFIG commands needed to configure the RouteAbout Central EP can be found in the *Distributed Routing Software System Software Guide*. Commands listed in this manual include a command description, syntax requirements, and an example.

NOTE

You can configure the module at any time using Quick Configuration, by typing **qconfig** at the Config> prompt

---

To configure the module using commands, perform the following steps:

Step	Action
1	At the system prompt (*), enter: **talk 6**
2	Select one of the following options.

Option	Page
Configuring Ethernet Port Connection	4-17
Configuring OBM	4-19

Configuring Ethernet Port Connection

This section describes how to configure the Ethernet port by choosing either the front panel 8-pin MJ connector or the DEChub ONE AUI connector. The default setting of the ports is autoconfigure, which gives preference to the 8-pin MJ connector. To change the configuration, see the following procedures.

NOTE

The RouteAbout Central EP allows only Ethernet Port 2 (Net 1) to be directed to the AUI connector on the DEChub ONE.

To connect the Ethernet for port 2 to the front panel 8-pin MJ connector (RJ45), perform the following steps:

Step	Action
1	At the Config> prompt enter: **net 1**
2	At the ETH config> prompt enter: **connector-type RJ45**

To connect the Ethernet for port 2 to the AUI connector on the DEChub ONE, perform the following steps:

Step	Action
1	At the Config> prompt enter: **net 1**
2	At the ETH config> prompt enter: **connector-type AUI**

To Exit and Restart

When you modify parameters, you must restart the router for the change to take effect. Enter the following three commands in the order shown.

Prompt	Command
ETH Config>	**exit**
Config>	**control/p**
* (System prompt)	**restart**

If you need to configure additional software, refer to the *Distributed Routing Software System Software Guide.*

Configuring OBM

This section describes how to set the OBM IP address, speed, and enable RTS. After entering **talk 6**, at the `Config>` prompt you can set the following three OBM parameters as follows:

Parameter	Description	Default
set obm ip *192.12.13.14*	Sets the out-of-band management port IP-address (for example, 192.12.13.14).	0.0.0.0
set obm speed *38400*	Sets the OBM port speed (2400, 9600, or 38400 bps).	9600
set obm rts *enable*	Sets data transmission Request to Send (RTS) to Enable or Disable.	Disable

To Exit and Restart

When you modify parameters, you must restart the router for the change to take effect. Enter the following commands.

Prompt	Command
`Config>`	**control/p**
* (System prompt)	**restart**

If you need to configure additional software, refer to the *Distributed Routing Software System Software Guide.*

Chapter 5

Configuring the Module in a DIGITAL MultiSwitch 900

Overview

Introduction

This chapter describes how to configure the module when it resides in a DIGITAL MultiSwitch 900 (formerly DEChub 900 MultiSwitch). Use these procedures for the initial configuration of a module via a Telnet connection or locally via the setup port on the DIGITAL MultiSwitch 900.

Using the clearVISN Router Configurator can ease the initial configuration of the module. Refer to the *Distributed Routing Software System Software Guide* and *Distributed Routing Software clearVISN Router Configurator User's Guide* for more information.

In This Chapter

Topic	Page
Assigning an IP Address (DIGITAL MultiSwitch 900)	5-2
DIGITAL MultiSwitch 900 Installation Menu	5-3
Using Menus to Set Up the Module	5-5
Go to Local Console	5-15

Assigning an IP Address (DIGITAL MultiSwitch 900)

After the module has been installed in a DIGITAL MultiSwitch 900, and the cables connected, you will need to configure the desired protocols. This is done through either of the following methods:

- A Telnet session

  or

- Through the console configuration interface, which is accessed through a terminal connected to the setup port on the DIGITAL MultiSwitch 900.

If you configure through the setup port, the following menu will appear:

```
*******************************************
Interfaces Configuration
*******************************************
Type 'Yes' to Configure Interfaces
Type 'No' to skip Interface Connection
Type 'Quit' to exit Quick Config

Configure Interfaces? (Yes, No, Quit): [Yes]
```

To perform a Telnet session, you must assign an IP address. To do this, perform the following steps:

Step	Action
1	Install the module into a slot on the DIGITAL MultiSwitch 900.
2	Redirect the DIGITAL MultiSwitch 900 setup port to the slot occupied by the module.
3	Select the IP Configuration option from the menu.
4	Set the In-Band IP address.
5	Set the Default Gateway, if necessary.
6	Return to the DIGITAL MultiSwitch 900 Installation Menu and select Restart with Current Settings.
7	Perform a Telnet session into the module from the management station for further configuration.

DIGITAL MultiSwitch 900 Installation Menu

The following screen is an example of the DIGITAL MultiSwitch 900 INSTALLATION MENU.

To access the module's set up screen, you must choose option [9] Start Redirect Mode.

```
DIGITAL MultiSwitch 900
=============================================================

        DIGITAL MultiSwitch 900 INSTALLATION MENU

             [1]  Reset with Factory Defaults
             [2]  Reset with Current Settings
             [3]  Show Current Settings
             [4]  Configure IP
             [5]  Dump Error Log
             [6]  Downline Upgrade
             [7]  Configure Out-of-Band Port
             [8]  Start Event Display Mode
             [9]  Start Redirect Mode
             [10] Product-Specific Options
=============================================================


    Enter selection number: 9 <Return>
  Press Return for Main Menu ...
```

[9] Start Redirect Mode

The Start Redirect Mode option redirects the DIGITAL MultiSwitch 900 Hub Manager set-up port to the set-up port of any network module (such as the RouteAbout Central EP) that is installed into the DIGITAL MultiSwitch 900. Choosing this option allows you to set-up or obtain the status of an installed network module by accessing the specified network module's installation menu.

After you choose the Start Redirect Mode option, the screen display prompts you for a slot number (8) as shown in the following example. After you enter the number of the slot in which the RouteAbout Central EP is installed, the console is redirected to this slot.

NOTE

The slot number may change to reflect the slot number in which your module is installed.

The following example shows the dialog associated with this option.

```
Enter selection: 9
========================================================
Enter the slot number for redirection (1-8):  8 <Return>
Console redirected to 8: RtAbt Cntrl EP/MP
Attempting connection
[Ctrl/C] to abort...
```

If the redirection is successful after you press the <Return> key, the RtAbt Cntrl EP/MP INSTALLATION MENU appears on your screen. Go to the section Using Menus to Set Up the Module for more information.

Using Menus to Set Up the Module

This section describes the options that are available from the `RtAbt Cntrl EP/MP INSTALLATION MENU` when the module is installed in the DIGITAL MultiSwitch 900.

The following example shows the menu options available when the module is setup with factory defaults.

```
        RtAbt Cntrl EP/MP - slot 8
        ===============================================================
                    RtAbt Cntrl EP/MP  INSTALLATION MENU

                  [1]   Restart with Factory Defaults
                  [2]   Restart with Current Settings
                  [3]   Show Current Settings
                  [4]   Configure IP...
                  [5]   Go to Local Console


        [Ctrl/C] Return to Hub Manager Installation Menu
        ===============================================================
                    Enter selection: <Return>
```

If the module was previously configured, the following menu options are available.

```
RtAbt Cntrl EP/MP - slot 8
=================================================================
            RtAbt Cntrl EP/MP INSTALLATION MENU

     ***************************************************
       To fully manage this device telnet to one of the
       following IP addresses or select item [3] below.
       Out-of-Band: Not Configured
       In-Band    : 192.12.13.14
     ***************************************************


              [1] Restart with Factory Defaults
              [2] Restart with Current Settings
              [3] Go to Local Console


==========================================================
                  Enter selection :
```

NOTE

The Out-of-Band and In-Band values are listed only if one or more IP parameters have been set.

The following table describes the installation menu options.

Topic	Page
[1] Restart with Factory Defaults	5-7
[2] Restart with Current Settings	5-8
[3] Show Current Settings	5-9
[4] IP Configuration	5-10
Go to Local Console	5-15

[1] Restart with Factory Defaults

This option restarts the module, causing the module's configured nonvolatile configuration storage parameters to be initialized to factory default values. (To retain current values, use option `[2] Restart with Current Settings`). Allow up to one minute for the module to restart.

CAUTION

This action deletes all configured settings and replaces them with factory default values. All configuration settings will be lost.

The following example shows the dialog associated with this option.

```
            Enter selection : 1

RtAbt Cntrl EP/MP - slot 8
===========================================================

               RESET WITH FACTORY DEFAULTS


   * * * * * * * * * * * * * * * * * * * * * * * * * * * *
   *           IMPORTANT!    IMPORTANT!    IMPORTANT!     *
   * * * * * * * * * * * * * * * * * * * * * * * * * * * *
   * This selection will delete the current configuration  *
   * settings and reset the system with the factory        *
   * default settings. All configuration settings will     *
   * be lost.                                               *
   * * * * * * * * * * * * * * * * * * * * * * * * * * * *

===========================================================

    Press Y to confirm [N]:  <Return>
     Press Return for Main Menu...
```

If you selected Y, then the following messages appear:

```
    Module Not Responding! Connection Closed!
    Press Return for Main Menu...
```

The `DIGITAL MultiSwitch 900 INSTALLATION MENU` appears. Redirect to the module in order to resume communication.

The `RteAbt Cntrl EP/MP INSTALLATION MENU` appears.

[2] Restart with Current Settings

This option restarts the module but leaves the module's configured nonvolatile configuration storage parameters at their current values.

NOTE

Allow up to one minute for the module to Restart.

The following example shows the dialog associated with this option.

```
                    Enter selection:  2

RtAbt Cntrl EP/MP - slot 8
=============================================================
             RESTART WITH CURRENT SETTINGS

  This selection will reset your system with the current
    configuration settings.
=============================================================
Press Y to confirm [N] :  Y <Return>
Module Not Responding! Connection Closed!

Press Return for Main Menu...
```

The DIGITAL MultiSwitch 900 INSTALLATION MENU appears. Redirect to the module in order to resume communication.

[3] Show Current Settings

This option shows the module's current settings. If the module is being configured for the first time, some of the fields will be blank.

The following example shows the screen display associated with this option.

```
Enter selection : 3

 RtAbt Cntrl EP/MP - slot 8
 ============================================================
 RtAbt Cntrl EP/MP, Brouter:2Enet 4T1 2T1PRI,HW=1,#1489,SW=v3.0.000
 SysUpTime                        : 00:00:52   28 resets

 SNMP Read/Write Community        : smith95

 Out-of-Band (OBM) Management RTS : Disabled

 Default Gateway                  : 192.12.13.14
 ------------------------------------------------------------

 Interface     IP Address        Subnet Mask     Other Info

 Ethernet      192.12.13.14      255.255.255.0

 Out-of-Band
 ------------------------------------------------------------

 ============================================================
          Press Return for Main Menu...
```

[4] IP Configuration

The IP Configuration option provides you with five selections.

The following example shows the dialog associated with this option.

```
             Enter selection : 4

RtAbt Cntrl EP/MP - slot 8
===========================================================
                    IP CONFIGURATION
  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
  *  Configuration will not take effect until module    *
  *  is restarted                                       *
  * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

        [1]  Set SNMP Read/Write Community
        [2]  Set In-Band Interface IP Address
        [3]  Set Out-of-Band Interface IP Address
        [4]  Set Default Gateway
        [5]  Return to Main Menu
===========================================================
          Enter selection:
```

The following pages describe IP Configuration options.

Option	Page
[1] Set SNMP Read/Write Community	5-11
[2] Set In-Band Interface IP Address	5-12
[3] Set Out-of-Band Interface IP Address	5-13
[4] Set Default Gateway	5-14

[1] Set SNMP Read/Write Community

This option prompts you to enter the module's read/write community name. The
following example shows the dialog associated with this option.

```
                    Enter selection : 1


 RtAbt Cntrl EP/MP - slot 8
 =================================================================
                   SET SMNP READ/WRITE COMMUNITY
Format:  The format for a community name is a string, consisting
         of 4 to 31 printable Ascii characters, that
         describes the relationship between an SNMP agent and
         one or more SNMP managers. The string defines the
         authentication mechanism that is employed to validate
         the use of the community by the sending SNMP entity.

 =================================================================


 Enter the community string [] : public <Return>


 SNMP Read/Write community string set.

              Press Return for IP Configuration Menu...
```

[4] IP Configuration

[2] Set In-Band Interface IP Address

This option prompts you to change or enter the IP address and subnet mask for the in-band interface. The module does not need to be configured with a subnet mask for SNMP communications when management stations are on the same subnet as the module.

The format for these values is the standard 4-octet dotted decimal notation, in which each octet of the address is represented as a decimal value, separated by a decimal point (.).

The following example shows the dialog associated with this option.

```
                 Enter selection   2
RtAbt Cntrl EP/MP – slot 8
================================================================

           IN-BAND INTERFACE IP ADDRESS CONFIGURATION

  Format:  The standard 4-octet dotted decimal notation
           in which each octet of the address is
.          represented as a decimal value, separated
            by a "." character.

                    example: 192.12.13.14

   To delete the IP address, enter 0 in the appropriate
   address field.
----------------------------------------------------------------
 Interface       IP Address     Subnet Mask     Other Info
 Ethernet
 Out-of-Band
  --------------------------------------------------------------

================================================================
 Port Number (1-2) [ ] : 2
 IP address [] : 192.12.13.14 <Return>
 Subnet Mask [255.0.0.0] : 255.255.0.0 : <Return>
 Press Return for IP Configuration Menu.....
```

[3] Set Out-of-Band Interface IP Address

This option prompts you to change or enter the IP address and subnet mask for the out-of-band interface. The module does not need to be configured with a subnet mask for SNMP communications when management stations are on the same subnet as the module.

The format for these values is the standard 4-octet dotted decimal notation, in which each octet of the address is represented as a decimal value, separated by a decimal point (.).

The following example shows the dialog associated with this option.

```
                Enter selection   3
RtAbt Cntrl EP/MP - slot 8
================================================================

           OUT-OF-BAND INTERFACE IP ADDRESS CONFIGURATION

  Format:  The standard 4-octet dotted decimal notation
           in which each octet of the address is
           represented as a decimal value, separated
 .          by a "." character.

                    example: 192.12.13.14


   To delete the address, enter 0 in the appropriate
   address field.
 ---------------------------------------------------------------
 Interface        IP Address      Subnet Mask     Other Info
 Ethernet         192.12.13.14   255.255.255.0
 Out-of-Band

 ---------------------------------------------------------------

================================================================
 IP address [] : 192.12.13.14 <Return>
 Subnet Mask [255.0.0.0] : 255.255.0.0 : <Return>
       Press Return for IP Configuration Menu.....
```

[4] Set Default Gateway

This option sets the default gateway, if necessary, for the in-band interface. This is the address of a router that the module uses when communicating to a remote host. The default gateway address must be in the same subnet as your in-band address.

The following example shows the dialog associated with this option.

```
            Enter selection : 4
 RtAbt Cntrl EP/MP - slot 8
 ===========================================================

      SET IN-BAND INTERFACE DEFAULT GATEWAY ADDRESS

 Format:  The standard 4-octet dotted decimal notation
          in which each octet of the address is
          represented as a decimal value, separated
          by a "." character.

                 example: 192.12.13.14


  To delete the address, enter 0 in the appropriate
 address field.
 =========================================================
   Default Gateway []: 192.12.13.14 <Return>

   Default Gateway Address Set.

          Press Return for IP Configuration Menu . . .
```

If you need to configure additional software, refer to the *Distributed Routing Software System Software Guide*.

Go to Local Console

This option lets you configure the module. You must configure the module before it is operational. The `Go to Local Console` option provides two different configuration methods, depending on whether the module has been set up with factory defaults or has been previously configured.

If the module has been set up with factory defaults, then this is option `[5] Go to Local Console` from the `RtAbt Cntrl EI/MP INSTALLATION MENU`. This option runs a quick configuration interactive question and answer dialog. This method (qconfig) allows fast configuration of interfaces, basic bridging, and IP and IPX.

If the module has been previously configured, then this is option `[3] Go to Local Console` from the installation menu.

NOTE

You must restart the module in order for the configuration changes to take effect. The DIGITAL MultiSwitch 900 will close the connection to the selected slot after restart, but you can resume communication with the desired slot after redirection.

---

[5] Go To Local Console (Qconfig)

This selection runs quick configuration. If you reset to factory defaults and select Go to Local Console without having configured the router via the installation menu, you automatically enter **qconfig**.

After making the changes you want, exit quick configuration and apply the changes you made by typing **restart**. The system displays the following messages:

```
Quick Config Done
Type RESTART at Config (only) prompt for the configuration to take
effect
Config (only) >
```

If you type RESTART at the Config (only)> prompt, the following message appears:

```
Are you sure you want to restart the gateway? (Yes [No]):
```

Type **yes** to proceed. You are returned to the DIGITAL MultiSwitch 900 main menu. Redirect to the module. The following menu is then displayed.

```
RtAbt Cntrl EP/MP - slot 8
============================================================

         RtAbt Cntrl EP/MP INSTALLATION MENU

 * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
 *  To fully manage this router Telnet to one of its     *
 *  IP addresses or select item [3] below.               *
 * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *


         [1] Restart with Factory Defaults
         [2] Restart with Current Settings
         [3] Go to Local Console
         [Ctrl/C] Return to the Hub Manager Installation Menu
============================================================
          Enter selection :
```

[3] Go To Local Console (Commands)

If you have configured the module, then the following installation menu appears. Select [3] Go To Local Console to modify the configuration.

```
RtAbt Cntrl EP/MP - slot 8
============================================================

         RtAbt Cntrl EP/MP INSTALLATION MENU

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*  To fully manage this router Telnet to one of its     *
*  IP addresses or select item [3] below.               *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

         [1] Restart with Factory Defaults
         [2] Restart with Current Settings
         [3] Go to Local Console

============================================================
        Enter selection number: 3 <Return>
```

The system displays copyright statements and the following prompt:

```
MOS Operator Control
*
```

Chapter 6

Supporting ISDN

Overview

Introduction

Before you begin to configure your module, you must make sure you have completed the necessary steps in obtaining ISDN support.

This chapter defines what you will need to do to obtain the proper ISDN support.

In This Chapter

Topic	Page
Ordering Your ISDN Line	6-2
Obtaining a Channel Service Unit	6-5

Ordering Your ISDN Line

You should order your primary rate ISDN service from your local telephone company or PTT. When you order your ISDN service, request 64K circuit-switched data on your "B" channels. The module does not support voice services or hyper channel offerings.

NOTE

T1 service is provided in North America. E1 service is provided in Europe and Australia. To find out what type of service is offered in your area, contact your local telecommunications authorities.

If a non-zero TEI (Terminal Endpoint Interface) is assigned by the TELCO, you must configure the module for non-zero TEI. The module's default TEI setting is zero. See Chapter 7 for more information.

Table 6-1 lists the possible values for the ISDN parameters where T1 service is offered. Table 6-2 lists the possible values for the ISDN parameters where E1 service is offered. The telephone company will provide you with the ISDN parameter settings for your service. You will need these to properly configure the module for ISDN operation.

Table 6-1: Possible Values for ISDN Parameters, T1 Service

ISDN Parameter	Possible Values, T1 Service
Switch Type	• INS1500 — used in Japan • 4ESS — AT&T custom for 4ESS toll switch • 5ESS — AT&T custom for 5ESS local office exchange • DMS100 — Northern Telecom custom • NI2 — National ISDN-2, deployed by several vendors on their switches
TEI	usually has a default value of 0
Line Encoding	• AMI —Alternate Mark Inversion • JBZS — Jam Bit Zero Suppression • B8ZS — Binary 8 Zero Substitution, the default and most common setting
Line Framing	• ESF — Extended Super Frame • D4 — Super Frame
Local Number	The number to call to reach your PRI interface
Directory Number(s)	Optional; these are normally the same as the Local Number plus one alternate number that also reaches you
Clocking	• Internal — the module supplies the clock to the network • External — clocking is taken from the network (default)

Keep this information available when you configure the RouteAbout Central EP.

Table 6-2: Possible Values for ISDN Parameters, E1 Service

ISDN Configuration Parameter	Possible Values, E1 Service
Switch Type	• NET5 — the default and most common setting • AUSTEL — Australian Telecom TS.014
TEI	usually has a default value of 0
Line Encoding	• AMI — Alternate Mark Inversion • JBZS — Jam Bit Zero Suppression • HDB3 — the default and most common setting
Line Framing	• MF — Multiframe, the default and most common setting • DF — Doubleframe
Local Number	The number to call to reach your PRI interface
Directory Number(s)	Optional; these are normally the same as the Local Number plus one alternate number that also reaches you
Clocking	• Internal — the module supplies the clock to the network • External — clocking is taken from the network, the default

Keep this information available when you configure the RouteAbout Central EP.

Obtaining a Channel Service Unit

The module supports what are termed *short-haul* connections. You will require a channel service unit (CSU) connected between the module and the service provider network. The service provider usually provides this at the time of line installation.

Chapter 7

Configuring the ISDN Ports

Overview

Introduction

After you have installed the module, you must configure the ISDN ports. The ISDN ports allow you to make calls to remote ISDN devices and services.

The instructions provided in this chapter describe how to set up and configure the ISDN ports. For more detailed information about the ISDN configuration commands, see the *Distributed Routing Software Network Interface Operator's Guide*.

In This Chapter

Topic	Page
Configuring the ISDN Ports	7-2
Adding ISDN Addresses	7-3
Configuring ISDN Parameters	7-4
Verifying Configuration	7-9

Configuring the ISDN Ports

This section describes the commands that are unique to the RouteAbout Central EP. To begin configuring the ISDN ports, at the * prompt enter the following command:

```
* talk 6
```

The actual ISDN ports are net 6 and net 7. The following shows their correlation:

net	ISDN Interface
6	ISDN/0
7	ISDN/1

To Exit and Restart

When you modify parameters, you must restart the module for the change to take effect. Enter the following three commands in the order shown:

Type at this prompt	Command
Circuit Config>	exit
Config>	control/p
*	**restart** and answer **Yes** at the prompt

Adding ISDN Addresses

You need to add an ISDN address for each ISDN interface, as well as for each destination. The ISDN address includes:

- *Address name.* Description of the address. You can use any string of up to 23 printable ASCII characters. Address names are case sensitive.

- *Network dial address.* Telephone numbers of the local or destination port. You can enter up to 15 numbers as well as 16 other characters, including spaces and punctuation. The router uses only the numbers.

- *Network subdial address.* Optional. Additional part of the telephone number, such as an extension, that is passed through the telephone network and interpreted by the customer equipment. You can enter up to 20 numbers as well as 11 additional spaces and punctuations. The router uses only the numbers.

NOTE

Not all telephone companies support subaddressing.

Configuring ISDN Parameters

The following sections describe how to add information that is obtained from the telephone company to your ISDN configuration.

Setting the Local Number

To add your local ISDN information, perform the following steps when prompted:

Step	Action
1	Config> **add isdn-address**
2	Assign address name [1-23] chars []? *myaddress*
3	Assign network dial address [1-15 digits] []? *1-222-555-1000*
	Note: The number provided here is an example. You must enter your assigned ISDN number here. In the United States, 1+ area code may not be allowed when calling within the area code.
4	Assign subdial address [0-15 digits] [] **<Return>**

Setting the Remote Dial Number

To add your remote ISDN information, perform the following steps when prompted:

Step	Action
1	Config> **add isdn-address**
2	Assign address name [1-23] chars []? *remoteaddress*
3	Assign network dial address [1-15 digits] []? *1-222-555-2000*
	Note: The number provided here is an example. You must enter your assigned ISDN number here. In the United States, 1+ area code may not be allowed when calling within the area code.
	This is the number that will be sent to the switch when making a call. You must add required access codes, for example, some PBXs require a leading **9** to access an outside line.
4	Assign subdial address [0-15 digits] []? *999*
	Note: The subdial address is optional. It can be selected by the user, if desired.

Creating the PPP Circuit

To add the names and telephone numbers of remote sites you will be communicating with, perform the following step for each site when prompted:

Step	Action
1	`Config>` **add device dial**
	The following message appears:
	``` Adding device as interface 8 Defaulting Data-link protocol to PPP Use "net 8" command to configure circuit parameters ```
	Note: If more than one dial circuit is added, a number other than 8 will appear.

Configuring the ISDN Net

The following steps allow you to select the switch type that your service provider uses, as well as additional characteristics. The switch type should have been identified by your service provider.

NOTE

The RouteAbout Central EP supports only one switch variant at a time for all ISDN ports. For example, if you set one port to 5ESS, then you must also set the other port to this switch type.

The switch type must be set on ISDN interface 0 (net 6). Once set, this interface will determine the switch variant for all of the ISDN interfaces. Attempts to set interface 1 (net 7) to a different switch type will result in warning messages issued by the software.

To configure your ISDN net, perform the following steps when prompted:

Step	Action
1	`Config>` **net 6**
	The `ISDN Config>` prompt appears.
	At any time you can view a list of current parameters by entering **list** at the `ISDN Config>` prompt.

Step	Action
2	`ISDN Config>` **list**
	A list of current configurations appear.
3	`Config>` **set switch-variant**
	This sets the type of switch to which the ISDN interface is connected. If T1 service is provided in your area, set the switch to one of the following values: INS1500, 4ESS, 5ESS, DMS100, or NI2.
	If E1 service is provided, set the switch to either NET5 or AUSTEL.
	Note: You can list parameters at any time to confirm your changes.
4	Switch-Variant-Model []? *4ESS*
	The `ISDN Config>` prompt appears.
5	`ISDN Config>` **set local** *myaddress*
	This sets the local network ISDN address with the name you assigned earlier for your number.
6	`ISDN Config>` **line**
	This brings you to the Line Configuration submenu. The `PRI Line Config>` prompt appears.
7	`PRI Line Config>` **set framing**
	This sets the line frame type for the ISDN line. If T1 service is provided in your area, the options are ESF and D4. If E1 service is provided, the options are MF and DF.
8	`PRI Line Config>` **set encoding**
	This sets the Line Encoding for the ISDN line. T1 service options are AMI, JBZS, and B8ZS. E1 service options are HDB3, AMI, and JBZS.
9	`PRI Line Config>` **set clock**
	This sets the source of the clock pulses. Choose Internal or External.
10	`PRI Line Config>` **exit**
	You are returned to the `ISDN Config>` prompt.
11	`ISDN Config>` **list**
	A list of current configurations appears.
12	`ISDN Config>` **exit**
	You are returned to the `Config>` prompt.

Assigning ISDN to your PPP Dial Circuit

To assign ISDN to the PPP dial circuit, perform the following steps when prompted:

Step	Action
1	Config> **net 8** The module responds with Circuit Configuration. The Circuit Config> prompt appears. At any time you can view a list of current parameters by entering **list** at the ISDN Config> prompt.
2	Circuit Config> **set net**
3	Base net for this circuit []? *6* Enter either 6 (ISDN/0) or 7 (ISDN/1)
4	Circuit Config> **set destination** This selects the number that the module will call and that you expect to call you.
5	Assign destination address name []? *remoteaddress* You are returned to the Config> prompt. Note: This is the remote address that you defined when you set the remote dial number.
6	Circuit Config> **list** This confirms settings.

Set Calls INBOUND, OUTBOUND, or BOTH

You have the option to restrict the circuit to be used for inbound calls only, outbound calls only, or both (the default). To set the type of calls that will be accepted, perform the following steps when prompted:

Step	Action
1	Config> **net 8** The module responds with Circuit Configuration. The Circuit Config> prompt appears.
2	Circuit Config> **set calls** *options* The *options* are INBOUND, OUTBOUND, or BOTH.

Step	Action
3	Circuit Config> **list**
	This confirms the listing of settings.

Accepting Calls From Any Number

To set the module to accept calls from any number, perform these steps:

Step	Action
1	Config> **net 8**
	The module responds with Circuit Configuration.
	The Circuit Config> prompt appears.
	At any time you can view a list of current parameters by entering **list** at the ISDN Config> prompt.
2	Circuit Config> **set any**
	This sets the device to accept calls from any number.
	Note: Use the **set any** command with caution. See the *Network Interface User's Guide* for more information.
3	Circuit Config> **list**
	This confirms the listing of settings.

Verifying Configuration

You can list the current configuration by performing the following steps when prompted:

Step	Action
1	Config> **net 6**
2	ISDN Config> **list**
	A list of current configurations appear.

After you exit and restart the module so that the changes can take effect, you can view your configuration from the GWCON (+) prompt by performing the following steps:

Step	Action
1	At the system prompt (*) enter: **talk 5**
	The following message appears:
	CGW Operator Console
2	At the GWCON prompt (+) enter: **config**
	A display of the configured interfaces and the state of the interfaces appears.

Verifying Configuration

The following example shows the dialog associated with this option:

```
RtAbt Cntrl EP/IP, BROUTER: 2 Enet 4T1 2T1PRI,HW=5,RO=1,#212,SW=V3.0
Hostname: [not configured]
Boot ROM version  3.14    Watchdog timer enabled    Auto-boot switch enabled

Time: 14:10:22 Monday October 27, 1997
Num Name  Protocol
0   IP    DOD-IP
3   ARP   Address Resolution
11  SNMP  Simple Network Management Protocol

Num Name  Feature
2   MCF   MAC Filtering
7   TEL   Telesaving
8   BUD   Budgeting
10 Networks:
Net Interface  MAC/Data-Link        Hardware                  State
0   Eth/0      Ethernet/IEEE 802.3  SCC Ethernet              Up
1   Eth/1      Ethernet/IEEE 802.3  SCC Ethernet              Up
2   PPP/0      Point to Point       SCC Serial Line           Down
3   PPP/1      Point to Point       SCC Serial Line           Down
4   PPP/2      Point to Point       SCC Serial Line           Down
5   PPP/3      Point to Point       SCC Serial Line           Down
6   ISDN/0     ISDN Base Net        Primary Rate ISDN         Down
7   ISDN/1     ISDN Base Net        Primary Rate ISDN         Up
8   PPP/4      Point to Point       Primary Rate ISDN         Down
9   PPP/5      Point to Point       Primary Rate ISDN         Up
+
```

Chapter 8

Removing the Module

Overview

Introduction

This chapter describes how to remove the module from a DIGITAL MultiSwitch 900 (formerly DEChub 900 MultiSwitch). To remove the module from a standalone unit, refer to the *DEChub ONE Installation* manual.

In This Chapter

Topic	Page
Removing the Cables	8-2
Unseating the Module	8-3

Removing the Cables

To remove cables from the module, complete the following steps (see Figure 8-1).

Step	Action
1	Press the release tab (**1**) on the ISDN cable plug**,** then pull out the cable.
2	Push in the release tab (**2**) on the side of the WAN serial cable connector, then pull out the cable.

Figure 8-1: Removing the Cables
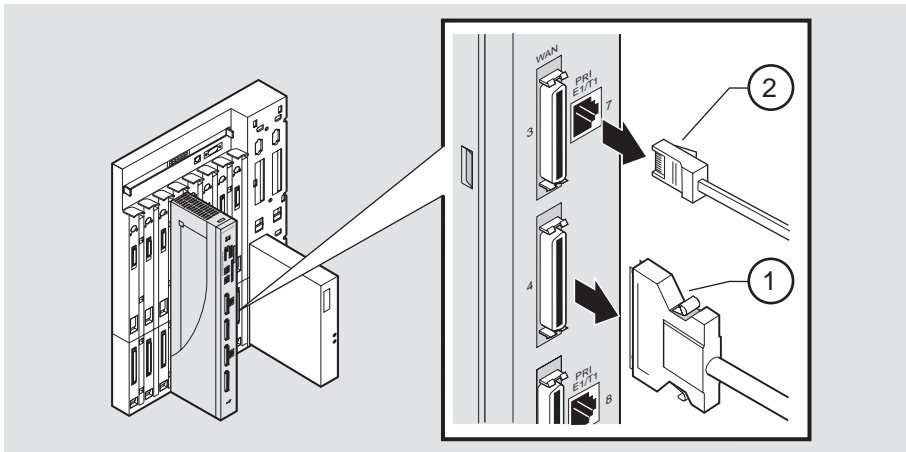
NPB-0852-97F

Unseating the Module

To unseat the module from the DIGITAL MultiSwitch 900, complete the following steps (refer to Figure 8-2).

Step	Action
1	Lift the release lever **(1)** located at the top of the DIGITAL MultiSwitch 900 slot.
2	While holding up the release lever, pivot the module back on its bottom mounting tab. **(2)**
3	Lift the module from the backplane. **(3)**

Figure 8-2: Unseating the Module
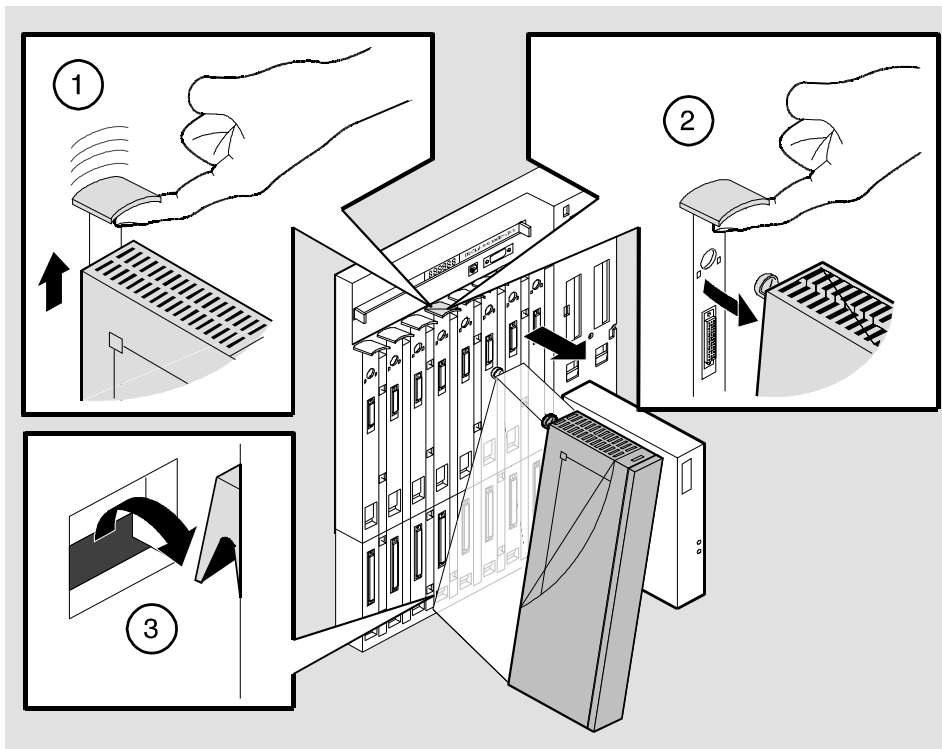
NPG-0008-95F

Appendix A

Problem Solving

Overview

Introduction

This appendix describes the LED functions and provides problem solving information. The LEDs on the front of the module, with this appendix, provide information to help you correct possible problems.

In This Appendix

Topic	Page
Normal Powerup	A-2
Self-Test Progress States	A-3
LED Descriptions	A-6
Problem Solving Using the LEDs	A-8

Normal Powerup

When the module power is initially turned on, the following events occur:

Event	Description
1	The module's Power LED lights as soon as power is applied to the unit.
2	The module initiates its built-in self-test. Flashing port serial line LEDs and activity LEDs indicate that the module is running various subroutines as part of the self-test. See Table A-1.
3	After the successful completion of self-test, the Module OK LED lights, and remains lit.
4	The remaining LEDs now indicate their operational status, as described in the Table A-2.

Self-Test Progress States

Upon power up, the module immediately begins a sequence of self tests and memory sizing. The following sequence of LEDs pass by so quickly that it is difficult to identify the discrete steps on a functioning module.

Should a hardware fault be detected, the LEDs will reflect the progress made into the self–test. This information can be useful when describing problems to your service representative.

NOTE

These tests are run prior to the Module OK LED being lit.

Table A-1 describes the module's self–test progress LED states.

Table A-1: Module Self Test Progress LED States

⊘	○	1	2	3	4	5	6	
1	0	0	0	0	0	0	0	Microprocessor test and register setup
1	0	G	0	0	0	0	1	Microprocessor interrupts set up
1	0	G	0	0	0	1	0	Option card microprocessor set up
1	0	G	0	0	0	1	1	Option card interrupts set up
1	0	G	0	0	1	0	0	Memory controller port and memory set up
1	0	G	0	0	1	0	1	Peripheral controller port set up
1	0	G	0	0	1	1	0	Option card port set up (if present)
1	0	G	0	0	1	1	1	Restart configuration set up
1	0	G	0	1	0	0	0	Memory controller dpram test
1	0	G	0	1	0	0	1	Peripheral controller dpram test
1	0	G	0	1	0	1	0	Option card dpram set up (if present)
1	0	G	0	1	0	1	1	DIGITAL MultiSwitch 900 serial channel internal loopback test
1	0	G	0	1	1	0	0	Debug console internal loopback test
1	0	0	G	0	0	0	1	Memory test set up
1	0	0	G	0	0	1	0	Bank 0 simm presence test
1	0	0	G	0	0	1	1	Bank 1 simm presence test
1	0	0	G	0	1	0	0	Test for no memory present
1	0	0	G	0	1	0	1	Test for simm size, bank 0
1	0	0	G	0	1	1	0	Test for simm size, bank 1
1	0	0	G	0	1	1	1	Re-map available memory
1	0	0	G	1	0	0	0	Refresh test
1	0	0	G	1	0	0	1	Dram array test

⏚	○	**1**	**2**	**3**	**4**	**5**	**6**	
1	0	0	G	1	0	1	0	Save dram configuration and size
1	0	0	G	1	0	1	1	Set the stack pointer and jump to manufacturing tests

1 = On, 0 = Off
G = On, Green
Ethernet activity LEDs and LEDs associated with option cards are not used during the built-in self-tests.
Upon detection of a hardware failure LED 1 and LED 2 will change in color from Green to Amber.

LED Descriptions

The module's LEDs provide dynamic indications of the status of the module. The LEDs can be in various states (on, off, or flashing), and can change color (green or yellow) depending on the operational status of the module or the level of activity on the network.

Table A-2 shows the states that are possible for each of the module's LEDs.

Table A-2: Module LED States After Self-Test Completion

LED Name	Off	On (Green)	On (Yellow)	Flashing
Power	No power to module.	Module receiving power.	N/A	N/A
Module OK	Self-test failed.	Module passed self-test.	N/A	Non-fatal failure.
Ethernet OK 1 and 2	Ethernet port is not connected to a properly terminated and operational LAN.	Ethernet port is connected to a properly terminated and operational LAN.	Port hardware failed self-test.	Port is in backup or listening state or management is disabled.
Ethernet Activity 1	No network activity.	Connected through front.	Connected through back.	Flashes more rapidly and appears brighter as network traffic increases.
Ethernet Activity 2	No network activity.	Connected through front or AUI.	Connected through back.	Flashes more rapidly and appears brighter as network traffic increases.

LED Name	Off	On (Green)	On (Yellow)	Flashing
ISDN Ports 7-8	The module is not connected, or the CSU port is not powered up, or port failed.	Normal operation.	N/A	Self-test mode or management is disabled.
Serial Line Ports 3-6 OK	The module is not connected, or the DSU/CSU port is not powered up, or port failed.	Normal operation.	N/A	Self-test mode or management is disabled.
Yellow Alarm, Port 7 or 8	Normal operation.	N/A	Remote site or network provider is indicating Red Alarm.	N/A
Red Alarm, Port 7 or 8	Normal operation.	N/A	Loss of signal or framing.	N/A
Blue Alarm, Port 7 or 8	Normal operation.	N/A	Network provider is sending alarm indication.	N/A

Problem Solving Using the LEDs

When diagnosing a problem with the module, note that the problem is often indicated by the states of the module's LEDs. Table A-3 lists the states of the LEDs for various error conditions that can occur during initial installation of the device, along with probable causes and corrective actions to take.

Table A-3: LED States

Symptom	Probable Cause	Corrective Action
Power LED is off.	Bad Power LED.	Replace the module.
	The module is not receiving +5.0 V.	Check the power LED on the DIGITAL MultiSwitch 900 power supply.
	If the power LED on the DIGITAL MultiSwitch 900 power supply is off, then there is a problem with the DIGITAL MultiSwitch 900 power supply.	See the troubleshooting procedures in the *DIGITAL MultiSwitch 900 Owner's Manual.*
	If the power LED on the DIGITAL MultiSwitch 900 power supply is on and the other power LED components are off, then the DIGITAL MultiSwitch 900 has a power problem.	See the troubleshooting procedures in the *DIGITAL MultiSwitch 900 Owner's Manual.*
	If the power LED turns on when reseated in the same slot, then the module was not properly seated.	Make sure the module is properly seated in the slot.

Symptom	Probable Cause	Corrective Action
Power LED is off (cont.)	If the power LED turns on when reseated in another slot, then the problem is with the DIGITAL MultiSwitch 900.	See the troubleshooting procedures in the *DIGITAL MultiSwitch 900 Owner's Manual*.
	If the DIGITAL MultiSwitch 900 does not have enough power to turn on the module, then the module will not power up.	Increase the power capability of the DIGITAL MultiSwitch 900 by adding on an optional power supply.
	If the module does not turn on in a known good slot, then the module is defective.	Replace the module.
Module OK LED is off.	Self-test in progress.	Wait for self-test to complete.
	Self-test failed.	If the LED does not light after 1 minute 40 seconds, reseat the module to repeat the self-test. If the self-test fails again, replace the module.
Module OK LED is flashing	Possible fan failure.	Replace the module.
Network OK LED 1 and 2 does not stay on after the functional code begins execution.	The network interface self-test has failed.	Refer to the *Distributed Routing Software System Software Guide* to determine the network interface status and to display any logged network interface events.

Symptom	Probable Cause	Corrective Action
Network Activity LED is off.	There is low network activity or no network activity.	Ensure there is network activity. If the Network Activity LED still fails to turn on, turn the unit off momentarily by removing it from the power supply. Check that the Network Activity LED blinks momentarily during the LED powerup self test.
	The module or any other unit in the DIGITAL MultiSwitch 900 may not be connected to an active segment.	Connect a known active segment to any unit in the DIGITAL MultiSwitch 900.
	If the module is connected to a known active segment and the Network Activity LED is off, then the module is defective.	Replace the module.
ISDN Ports 7-8 OK LED does not stay on after the functional code begins execution.	Ports 7-8 interface self-test has failed.	Refer to *the System Software Guide* to determine the serial port interface status and to display any logged serial port interface events.
Serial Line Ports 3-6 OK LED does not stay on after the functional code begins execution.	Port 3-6 interface self-test has failed.	Refer to *the System Software Guide* to determine the serial port interface status and to display any logged serial port interface events.

Symptom	Probable Cause	Corrective Action

After correctly installing the module on a DIGITAL MultiSwitch 900, the information display does not read:
 	
`RtAbt Cntrl`
`EP/MP up`
	Defective module.	Replace the module.

After correctly installing the module on a DIGITAL MultiSwitch 900, the hub manager does not display configuration information.	Defective module.	Replace the module.

Appendix B

Connectors, Adapters and Cable Connections

Overview

Introduction

This appendix shows detailed illustrations of the connectors, adapters, pin assignments and cable connections used on the RouteAbout Central EP.

In This Appendix

Connector Assignments

50-pin Connector

The following illustration shows the 50-pin connector and its pin assignments.

Figure B-1: 50-pin Connector
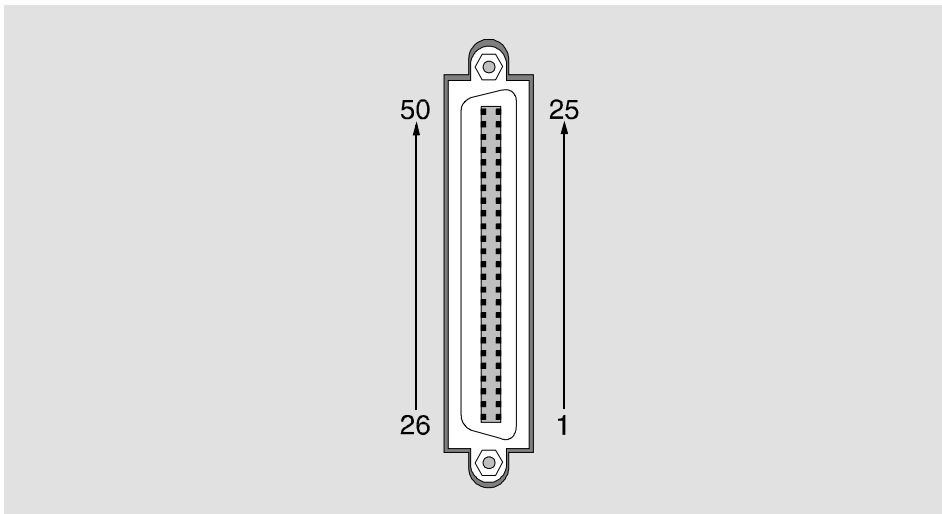
NPG-0275-95F

Table B-1: 50-pin Connector Assignments

Pin	Assignment	Pin	Assignment
1	Code Ground[1]	2	Cable_ID<1>
3	N/C	4	DSR A
5	TX Data A	6	DCD A
7	TX Data A	8	RTS A
9	CTS A	10	RX Data A
11	Ring Indicate	12	N/C
13	RX Clock A	14	DTR A

Pin	Assignment	Pin	Assignment
15	TX Clock A	16	N/C
17	TX Clock A	18	N/C
19	TX Clock A	20	LBK
21	V.35 TX Clock A	22	V.35 Clock A
23	V.35 RX Data A	24	V.35 TX Data A
25	V.35 RX Clock A	26	Cable_ID<0>
27	Cable_ID<2>	28	N/C
29	DSR B	30	TX Data B
31	DCD B	32	RTS A
33	RTS B	34	CTS B
35	RX Data B	36	N/C
37	DTE Ground[1]	38	RX Clock B
39	DTR B	40	TX Clock B
41	N/C	42	TX Clock B
43	N/C	44	DTR A
45	N/C	46	V.35 TX Clock B
47	V.35 Clock B	48	V.35 RX Data B
49	V.35 TX Data B	50	V.35 RX Clock B

[1]Contacts tied together.

10BaseT Port (8-pin MJ) Connector

The following illustration shows the 8-pin MJ crossover connector and its pin assignments:

Figure B-2: 8-pin MJ Connector

Pin   1 ⟶ 8
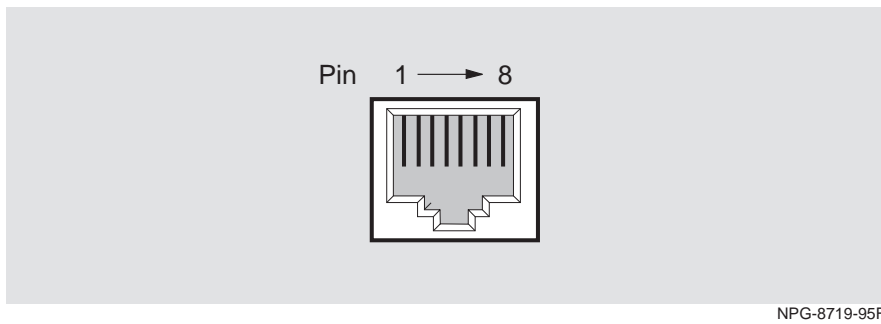
NPG-8719-95F

Table B-2: 8-pin Connector Assignments

Pin	Assignment	Pin	Assignment
1	TX+	5	N/C
2	TX-	6	RX-
3	RX+	7	N/C
4	N/C	8	N/C

ISDN (8-pin MJ) Connector

The following illustration shows the ISDN 8-pin MJ connector and its pin assignments:

Figure B-3: ISDN 8-pin MJ Connector

NPB-0425-96F
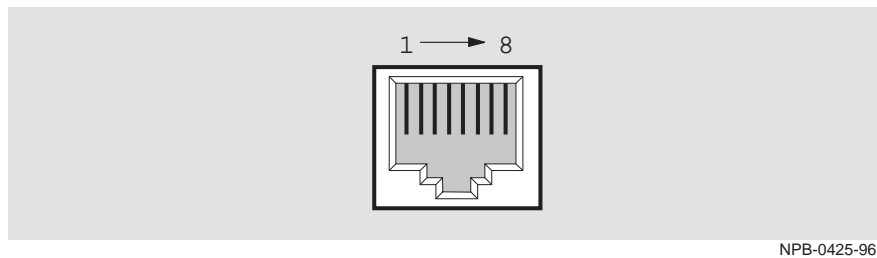
Table B-3: ISDN 8-pin MJ Assignments

Pin No.	Assignment	Pin No.	Assignment
1	RX Ring	5	TX Tip
2	RX Tip	6	N/C
3	N/C	7	N/C
4	TX Ring	8	N/C

Adapters

H8571-J Adapter

The following illustration shows the H8571-J adapter (6-pin MMJ connector to 9-pin D-Sub connector) and its pin assignments:

Figure B-4: H8571-J Adapter
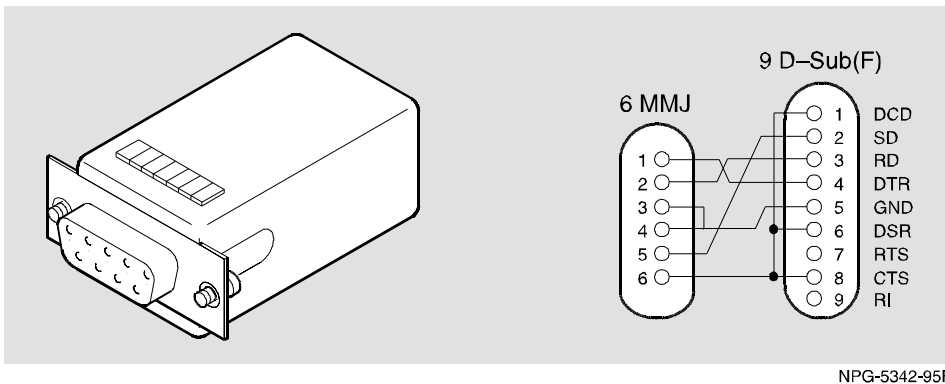
NPG-5342-95F

H8575-A Adapter

The following illustration shows the H8575-A adapter (6-pin MMJ connector to 25-pin D-Sub connector) and its pin assignments:

Figure B-5: H8575-A Adapter
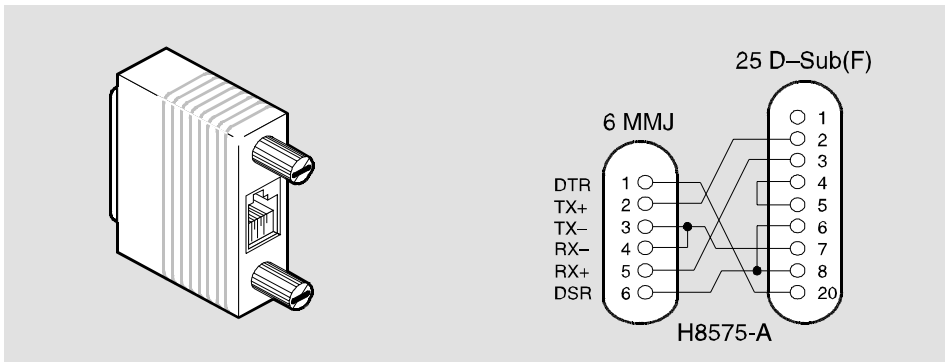
NPG-8793-95F

Cable Connections

The following tables list the proper cable connections for the X.21, EIA422, V.35, EIA530A, EIA423, and V.24/EIA232 standards. The E1 ISDN cable connection is also listed in this section.

Table B-4: X.21 Cable Connections (BC12F-06, 17-03580-01)

From Pin Connector (P1)	To X.21 Pin Connector (P2)	Signal Name
1, 2, 26	–	Code Ground[1]
5	2	T(A) TX Data A
30	9	T(B) TX Data B
6	5	I(A) DCD A
31	12	I(B) DCD B[2]
8	3	C(A) RTS A
33	10	C(B) RTS B
10	4	R(A) RX Data A
35	11	R(B) RX Data B[2]
17	6	S(A) TX Clock A
22	13	S(B) TX Clock B[2]
13, 15	-	RX Clock A DTE Clock B[1]
38, 40	-	RX Clock B DTE Clock B[2]
37	8	G DTE Ground

[1] Contacts tied together.
[2] 120 OHM resistor, 1/2w between pins 6 and 31, 10 and 35, 17 and 42. The resistors are at the P1 end of the cable.

Table B-5: EIA422/V.11/V.36 Cable Connections (BC12H–06, 17–03767–01)

From Pin Connector (P1)	To EIA422 Pin Connector (P2)	Signal Name
1, 27	–	Code Ground[1]
4	11	DSR A
29	29	DSR B
5	4	TX Data A
30	22	TX Data B
6	13	DCD/I A
31	31	DCD/I B
8	7	RTS/C A
33	25	RTS/C B
9	9	CTS A
34	27	CTS B
10	6	RX Data A
35	24	RX Data B[2]
11	15	Ring Indicate
12	20	DCE Ground
13	8	RX Clock A
38	26	RX Clock B[2]
14	12	DTR A
39	30	DTR B
15	17	Clock A
40	35	Clock B
17	5	TX Clock A
42	23	TX Clock B[2]

From Pin Connector (P1)	To EIA422 Pin Connector (P2)	Signal Name
18	18	Test Indicate
37	19, 37	DTE Ground[1]
20	10	Local Loop
41	16	Speed Select
45	14	Remote Loop
Shell	Shell	Shield Braid

[1] Contacts tied together.

[2] 120 OHM resistor, 1/2w between pins 10 and 35, 13 and 38, 17 and 42. The resistors are at P1 end of cable.

Cable Connections

Table B-6: V.35 Connection (BC12G-06, 17-03766-01)

From Pin Connector (P1)	To V.35 Pin Connector (P2)	Signal Name
1, 26	–	Code Ground[1]
4	E	DSR A
6	F	DCD/I A
9	D	CTS A
11	J	Ring Indicate
21	Y	TX Clock A
46	A	TX Clock B
22	U	Clock A
47	W	Clock B
23	R	RX Data A
48	T	RX Data B
24	P	TX Data A
49	S	TX Data B
25	V	RX Clock A
50	X	RX Clock B
32	C	RTS
12, 29, 31, 34, 37	B	DTE Ground[1]
44	H	DTR
Shell	Braid Strap	Overall Cable Shield
20	K	Local Loop

[1]Contacts tied together.

Table B-7: EIA530A Cable Connections (BC12J-06, 17-03760-01)

From Pin Connector (P1)	To EIA530A Pin Connector (P2)	Signal Name
1, 26, 27	–	Code Ground[1]
4	6	DSR A
5	2	TX Data A
30	14	TX Data B
6	8	DCD/I A
31	10	DCD/I B
8	4	RTS/C A
33	19	RTS/C B
9	5	CTS A
34	13	CTS B
10	3	RX Data A
35	16	RX Data B[2]
11	22	Ring Indicate
12	23	DCE Ground
13	17	RX Clock A
38	9	RX Clock B[2]
15	24	Clock A
40	11	Clock B
17	15	TX Clock A
42	12	TX Clock B[2]
18	25	Test Indicate
20	18	Local Loop
29, 37	7	DTE Ground[1]
44	20	DTR

From Pin Connector (P1)	To EIA530A Pin Connector (P2)	Signal Name
45	21	Remote Loop
Shell	Shell	Shield Braid

[1]Contacts tied together.
[2]120 OHM resistor, 1/2W between pins 10 and 35, 13 and 38, 17 and 42.
The resistors are at P1 end of cable.

Table B-8: EIA423/V.10 Cable Connections (BC12K-06, 17-03761-01)

From Pin Connector (P1)	To EIA423 Pin Connector (P2)	Signal Name
1, 2, 27	–	Code Ground[1]
4	11	DSR A
29	29	DSR B
6	13	DCD/I A
31	31	DCD/I B
7	4	TX Data
9	9	CTS A
34	27	CTS B
10	6	RX Data A
35	24	RX Data B
11	15	Ring Indicate
12	20	DCE Ground
13	8	RX Clock A
38	26	RX Clock B
17	5	TX Clock A
42	23	TX Clock B
18	18	Test Indicate

From Pin Connector (P1)	To EIA423 Pin Connector (P2)	Signal Name
20	10	Local Loop
32	7	RTS/C
37	19, 22, 25, 30, 35, 37	DTE Ground[1]
41	16	Speed Select
44	12	DTR
45	14	Remote Loop
Shell	Shell	Shield Braid
19	17	Clock

[1]Contacts tied together.

Table B-9: V.28/EIA232 Cable Connections (BC12L-06, 17-03762-01)

From Pin Connector (P1)	To V.24/EIA232 Pin Connector (P2)	Signal Name
1, 2	–	Code Ground[1]
4	6	DSR A
6	8	DCD/I A
7	2	TX Data
9	5	CTS A
10	3	RX Data A
11	22	Ring Indicate
13	17	RX Clock A
17	15	TX Clock A
18	25	Test Indicate
19	24	Clock
20	18	Local Loop
32	4	RTS
12, 29, 31, 34, 35, 37, 38, 42	7	DTE Ground[1]
41	23	Speed Select
44	20	DTR
45	21	Remote Loop

[1] Contacts tied together.

E1 ISDN Cable

Two three-meter cables are provided with the E1 variant of the RouteAbout Central EP. These cables connect the module's Primary Rate ISDN ports to the network provider equipment (or CSU if the network provider does not provide other equipment). One end of the cable has a modular plug 8 (MP8) connector that connects to the module. The other end of the cable is not terminated and connects to the network provider equipment or CSU. The unterminated end can be connected to screw-type connectors or used with insulation displacement connector (IDC) punchdown blocks.

Table B-10: E1 ISDN Cable (17-04775-01)

From Pin Connector (P1)	To	Signal Name
1	White/Green	+RX
2	Green	-RX
3	White/Orange	N/C
4	Blue	+TX
5	White/Blue	-TX
6	Orange	N/C
7	White/Brown	N/C
8	Brown	N/C

Appendix C

Installation Information – United Kingdom

Overview

This appendix contains the installation information, which is required for the United Kingdom only.

In This Appendix

Service Categories

Table C-1 lists the BABT-approved service specifications for the module for UK compliance.

Table C-1: BABT-Approved Service Specifications

Service Requirements	Service Category 1	Service Category 2
Interface Type	X.21 bis	X.21 bis
Electrical	V.24/V.28	V.35
Physical	ISO 2110, BS.6623: part 1, 1985	ISO 2593. BS.6623: part 4, 1986
Approved Cables	Adapters: • BC12L-06 • 17-03762-01 Extension: • BC22F-xx[1] • BC13B-10	Adapters: • BC12G-06 • 17-03766-01 Extension: • BC19L-xx[1]
Data Rate (bps) available from Public Telecommunications Operators	2400: BT, Hull, MCL[2] 4800: BT, Hull, MCL[2] 9600: BT, Hull, MCL[2] 19200: MCL[2]	48k: BT, Hull, MCL[2] 56k: BT, MCL[2] 64k: MCL[2] 2048k: N/A

[1]BT - British Telecommunications plc
Hull - Kingston Communications (Hull) plc
MCL - Mercury Communications Limited
[2]xx represents the cable length in feet. The total length of cable used must not exceed 27 feet.

Power Rating, Module Isolation and Safety Status

Host Power Rating

DIGITAL has designed all permutations of the host configuration to operate within the limits of the host power rating as shown in Table C-2.

Table C-2: Module Power

Input Voltage	Max. Input Current (Amperes)
5Vdc	6.0 amps
12Vdc	0.12 amps
15Vdc	0.40 amps

Module Isolation

No special clearances or creepage distances need to be maintained as the module is contained within its own cabinet, which meets all clearances for PTT approval.

Safety Status

All interconnection points on this product are SELV circuits and should only be connected to products with like SELV circuits.

Cable Approval

The module is approved for direct connection to a particular digital circuit. This approval includes an interconnecting cable with mating connectors that conform to the British standard BS6623, parts 1 and 4. If the module is connected to the service with anything other than its own approved cables, those cables must benefit from relevant general approval NS/G/1235/100009 or conform to any other applicable requirements, or both.

Supported Cables

DIGITAL supports all of the cables in Table C-3. The approved module may not use all of these cables; therefore, check the instructions to determine which interface types are supported.

Table C-3: Cables Supported by the Approved Module

Interface	Cable Type	Name	Molding	Pins
V.24/V.28	Adapter	BC12L-06	Straight	50-25
V.24/V.28	Extension	BC22F-xx[1]	–	–
V.24/V.28	Extension low cap	BC13P-10[1]	–	–
V.10	Adapter	BC12K-06	Straight	50-37
V.35	Adapter	BC12G-06	Straight	50-34
V.35	Extension	BC19L-xx[1]	–	–
X.21	Adapter	BC12F-06	Straight	50-15
X.21	Extension	BC22Z-xx[1]	–	–

[1]Where xx is the length in feet. Total cable length with extension should never exceed 27 feet.

Equipment Between the Approved Module and a Digital Circuit (PTT)

If you are going to connect any other equipment, including cables or wiring, between the approved module and the point of connection to any particular digital circuit, then that equipment must conform to the following standards:

- The overall transmission characteristics of all other equipment must not have any material effect on the electrical conditions between the equipment and the digital circuit.

- The equipment must be approved, which may be subject to limitations on its use, for the purpose of connection between it and a particular digital circuit.

- Cable or wiring must comply with a code of practice for the installation of equipment covered by this standard or other requirements that may be applicable.

Appendix D

Product Specifications

Overview

This appendix lists the specifications and available parts for the RouteAbout Central EP.

In This Appendix

Product Specifications

Table D-1 lists the product specifications for the module.

Table D-1: Product Specifications

Parameter	Specification
Environment	
Operating Temperature[1]	5° C to 50° C (41 ° F to 122 ° F)
Relative Humidity	10% to 95% noncondensing
Operating Altitude	Sea level to 4267 m (14,000 ft)
Non-Operating Altitude	Sea level to 12192 m (40,000 ft)
Power	36 W @ 6.0 amps, total power[2]
	6.0 A, 5Vdc, 30 W 0.12 A, 12Vdc, n/a 0.40 A, 15Vdc, 6 W
Physical	
Height	44.45 cm (17.5 in)
Width	4.45 cm (1.75 in)
Depth	15.20 cm (6.0 in); 25.40 cm (10.0 in) when installed as a standalone unit.
Weight	2.11 kg (4.65lb) standalone; 3.52 kg (7.75 lb) when installed in the DEHUA DEChub ONE.
Shock (Class A/B for products weighing under 100 lbs)	10 G / 10 ms half sine pulse in three orthogonal axes
Vibration (Class C)	5 to 200 Hz sine sweep @ 0.25 G limited by 0.02" (0.5mm) displacement DA* 200 to 500 Hz sine sweep @ 0.10 G
Certification	CE, CSA, FCC, TÜV, UL, VCCI, C-Tick, BCiQ

[1]For sites above 2400 m (8,000 ft), decrease the operating temperature specification by 1.8° C for each 1000 m or 3.2°F for each 3200 ft.

[2]The 12Vdc power in the DIGITAL MultiSwitch 900 is derived from the 15Vdc power source. Although it is listed separately in the product specifications, the 12Vdc requirements are included in the 15Vdc power total.

Acoustical Specifications

Table D-2 lists the acoustical specifications for the module in English. Table D-3 lists the acoustical specifications in German.

Table D-2: Acoustical Specifications

Declared Values per ISO 9296 and ISO 7779[1]

Product	Sound Power Level L_{WAd}, B	Sound Pressure Level L_{pAm}, dBA (bystander positions)
	Idle/Operate	Idle/Operate
DEZPR RouteAbout Central EP	4.9	35
DEZPR + DEHUA RouteAbout Central EP + DEChub ONE docking station	5.3	39

[1] Current values for specific configurations are available from Digital Equipment Corporation representatives. 1 B = 10 dBA.

Table D-3: Aktuelle Werte für spezielle Produkt

Schallemissionswerte Werteangaben nach ISO 9296 und ISO 7779/DIN EN27779[2]

Produkt	Schalleistung-spegel L_{WAd}, B	Schalldruckpegel L_{pAm}, dBA (Zuschauerpositionen)
	Leerlauf/Betrieb	Leerlauf/Betrieb
DEZPR RouteAbout Central EP	4,9	35
DEZPR + DEHUA RouteAbout Central EP + DEChub ONE docking station	5,3	39

[2]Aktuelle Werte für spezielle Ausrüstungsstufen sind über die Digital Equipment Vertretungen erhältlich. 1 B = 10 dBA.

Connectors

Table D-4 provides a list connectors for RouteAbout Central EP.

Table D-4: Connectors for the RouteAbout Central EP

Connector Type	Quantity
8-pin MJ 10BaseT twisted pair connector	2
8-pin MJ ISDN primary rate interface connector	2
50-pin WAN connector	4

Table D-5 lists connectors for the DEChub ONE.

Table D-5: Connectors for the DEChub ONE

Connectors	Quantity
8-pin MJ (setup port)	1
DB-9 (OBM)	1
15-pin D-Sub (AUI port)	1

Parts List

Table D-6 provides a list of available parts for RouteAbout Central EP.

Table D-6: RouteAbout Central EP Parts List

Part	Part Number
RouteAbout Central EP	DEZPR-RB T1 Multiprotocol module
	DEZPR-RC E1 Multiprotocol module
Console Port Adapter	H8584-AC
Loopback Connector, Ethernet and Serial Line	H4082-AA
Loopback Connector, ISDN	H4082-AB
ISDN Cable (MJ8 to MJ8)	BN25G-03, 17-03212-03
ISDN Cable (MP8 to IDC), 3 meters long	17-04775-01
Cable, EIA530A	BC12J-06, 17-03760-01
Cable, RS232/V.28	BC12L-06, 17-03762-01
Cable, RS422/V.11	BC12H-06, 17-03767-01
Cable, RS423/V.10	BC12K-06, 17-03761-01
Cable, V.35	BC12G-06, 17-03766-01
Cable, X.21 (LL)	BC12F-06, 17-03580-01

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