

NetPerformer[®] Hardware Installation Guide

SDM-9120/9220/9230/9140



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This publication covers the following NetPerformer products:

SDM-9120

SDM-9220

SDM-9230

SDM-9140

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Preface

This chapter provides an overview of the NetPerformer SDM-9XXX Series unit, explains how to use the NetPerformer documentation, provides Memotec technical support information and describes the training services provided by Memotec.

1.1 Chapter Overview

This chapter contains the following sections:

- [“Product Overview” on page 1-3](#)
- [“About this Document” on page 1-7](#)
- [“Changes to Console Operations” on page 1-10](#)
- [“Technical Support” on page 1-11](#)
- [“Training and Documentation” on page 1-12](#)

1.2 Product Overview

1.2.1 SDM-9120

The NetPerformer SDM-9120 is an entry-level standalone chassis designed for network convergence at the branch office level. It is a high speed, low cost, flexible and compact unit that supports 8 analog or 60 digital telephony channels in a multitude of application scenarios.

The SDM-9120 base unit has a 1U chassis with:

- One universal serial port equipped with HD-26 female connector (up to 8Mbps).
- Two 10/100Base-T Ethernet ports (RJ45 connectors).
- One console port (DB9M).
- One internal connector for DSP.
- Up to 8 FXS/FXO or E&M, or 60 T1/E1 CAS/PRI (lease lines) digital channels per unit.
- Two expansion slots.
- All UAC base units come equipped with universal AC power supply and a choice of 120 VAC North American or 240 VAC European power cord (must be specified at time of ordering).
- A DB9F-DB9F console cable and 19-inch rackmount kit are also included in the product package.
- A custom cable (HD-26 male connector) is required for the serial port, available from Memotec Inc. or your NetPerformer distributor.

The basic software set provides support of PowerCell Voice and Data (including legacy user data) and IP routing over Ethernet, serial or digital ports using PPP or Frame Relay RFC-1490. Optional software licenses can be procured for support of:

- SkyPerformer satellite access
- TCP Acceleration
- SIP VoIP
- IP header compression
- Link Delay Compensation
- IPv6

1.2.2 SDM-9220

The NetPerformer SDM-9220 is an entry-level standalone chassis designed for network convergence at the branch office level. It is a high speed, low cost, flexible and powerful unit that supports 8 analog voice connections in a multitude of application scenarios.

The SDM-9220 base unit has a 2U chassis with:

- One serial port equipped with HD-26 female connector.
- Two 10/100Base-T Ethernet ports (RJ45 connectors).
- One console port (DB9M).
- Two expansion slots.
- All UAC base units come equipped with universal AC power supply and a choice of 120 VAC North American or 240 VAC European power cord (must be specified at time of ordering).
- A DB9F-DB9F console cable and 19-inch rackmount kit are also included in the product package.
- A custom cable (HD-26 male connector) is required for the serial port, available from Memotec Inc. or your NetPerformer distributor.

The basic software set provides support of PowerCell Voice and Data (including legacy user data) and IP routing over Ethernet, serial or digital ports using PPP or Frame Relay RFC-1490. Optional software licenses can be procured for support of:

- SkyPerformer satellite access
- TCP Acceleration
- SIP VoIP
- IP header compression
- Link Delay Compensation
- IPv6

1.2.3 SDM-9230

The NetPerformer SDM-9230 is a standalone chassis designed for network convergence at the branch office level. It is a high speed, low cost, flexible and powerful unit that supports analog/digital voice and data in a multitude of application scenarios. It is ideal for branch offices that require support for up to 12 analog or 120 digital telephony channels.

The SDM-9230 base unit has a 2U chassis with:

- One serial port equipped with HD-26 female connector.
- Two 10/100Base-T Ethernet ports (RJ45 connectors).
- One console port (DB9M).
- Three expansion slots for analog voice, digital (T1/E1) voice/data and dual serial interface cards.
- All UAC base units come equipped with universal AC power supply and a choice of 120 VAC North American or 240 VAC European power cord (must be specified at time of ordering).
- A DB9F-DB9F console cable and 19-inch rackmount kit are also included in the product package.
- A custom cable (HD-26 male connector) is required for the serial port, available from Memotec Inc. or your NetPerformer distributor.

The basic software set provides support of PowerCell Voice and Data (including legacy user data) and IP routing over Ethernet, serial or digital ports using PPP or Frame Relay RFC-1490. Optional software licenses can be procured for support of:

- SkyPerformer satellite access
- TCP Acceleration
- SIP VoIP
- IP header compression
- Link Delay Compensation
- IPv6

1.2.4 SDM-9140

The NetPerformer SDM-9140 is a standalone chassis designed for network convergence at the branch office and central site level. It is a high speed, low cost, flexible and powerful unit that supports analog/digital voice and data in a multitude of application scenarios. It is ideal for locations that require support for up to 16 analog or 120 digital telephony channels.

The SDM-9140 product line comes in two models: the SDM-9140s (standard model) or the SDM-9140e (extended model). Both units have a 1U chassis with:

For the SDM-9140s and SDM-9140e

- One serial port equipped with HD-26 female connector.
- Two 10/100/1000Base-T Ethernet ports (RJ45 connectors).
- One console port (RJ45F).
- Four expansion slots for analog voice, digital (T1/E1) voice/data and single serial interface cards.
- Hot swappable AC/DC power supply option.
- All UAC base units come equipped with universal AC power supply and a choice of 120 VAC North American or 240 VAC European power cord (must be specified at time of ordering).
- A USB to RJ-45M console cable (Ordering part number: **CBLH-CONS-USB**) and 19-inch rackmount kit are also included in the product package.
- A custom cable (HD-26 male connector) is required for the serial port, available from Memotec Inc. or your NetPerformer distributor.
- External clocking options (GPS or OCXO).
- Wireless connectivity option (WiFi & Bluetooth or LTE).

For the SDM-9140e only

- SFP connection option for the two 10/100/1000Base-T Ethernet ports
- Six additional 10/100/1000Base-T Ethernet ports (RJ45 connectors) connected through an integrated LAN switch.
- External E1-120 ohms clocking port.

The basic software set provides support of PowerCell Voice and Data (including legacy

user data) and IP routing over Ethernet, serial or digital ports using PPP or Frame Relay RFC-1490. Optional software licenses can be procured for support of:

- SkyPerformer satellite access
- TCP Acceleration
- SIP VoIP
- IP header compression
- Link Delay Compensation
- IPv6

1.2.5 Sales Contacts

To order NetPerformer units, DSP modules, cables and optional parts, contact Memotec Inc. or your NetPerformer distributor. To contact Memotec Inc.:

- Mail:
Memotec Inc.
7755 Henri Bourassa Blvd. West
Montreal, Quebec
Canada H4S 1P7
- Telephone: +1 (514) 738-4781 during regular business hours, EST (GMT-5:00)
Fax: + (1) 514 738 4436
- Web: <http://www.memotec.com>

1.3 About this Document

This document, *NetPerformer® SDM-9XXX Series Hardware Installation Guide*, provides the following information about the SDM-9120, SDM-9220, SDM-9230 and SDM-9140:

- Unpacking instructions (“[Unpacking](#)” on page 2-1)
- Hardware installation instructions (“[Hardware Installation](#)” on page 3-1)
- Product description (“[Product Description](#)” on page 4-1)
- Serial port specifications and user equipment connection (“[Serial Port and User Equipment Connections](#)” on page 5-1)
- Troubleshooting procedures (“[Troubleshooting Tips](#)” on page 6-1)
- Warranty information (“[Warranty Information](#)” on page A-1)
- Regulatory compliance information (“[Compliance Information and Safety Warning](#)” on page B-1)

For information on configuring the NetPerformer, consult the *NetPerformer Reference Guides*. See the “[NetPerformer Document Set](#)” on page 1-8 for a list of other references.

NOTE: All NetPerformer documents are available on the *NetPerformer Companion CD*, which is included with your product package.

1.3.1 Naming Conventions

In this document:

- The notation *SDM-9XXX Series* denotes the SDM-9120, SDM-9220, SDM-9230 and SDM-9140 products. The product is identified on the front of the unit.
- SDM-9120 products refer to the SDM-9120 UAC model.
- SDM-9220 products refer to the SDM-9220 UAC or -48VDC models.
- SDM-9230 products refer to the SDM-9230 UAC or -48VDC models.
- SDM-9140 products refer to the SDM-9140s and SDM-9140e UAC or -48VDC models.

NOTE: The model number is identified on the nameplate on the bottom of the unit.

1.3.2 Audience

This document is intended for use by NetPerformer system administrators as well as technicians who are qualified to set up, configure and troubleshoot a NetPerformer Enterprise Network.

Installation of NetPerformer hardware requires knowledge and proficiency in the

configuration, operation, maintenance and security of all enterprise network elements in your application. You should also have a thorough understanding of telecommunications and be familiar with the networking strategies and telephony solutions currently used by your organization.

1.3.3 Instructions to the Reader

Instructions to the reader include notes, cautions and warnings, which are distinguished from the rest of the text by distinctive formatting and icons. Here is an example of each:

NOTE: A note may contain a reference, tip or other information related to the subject at hand. The content of a note is intended to be helpful or of interest to the reader.



Caution

A caution contains an instruction that the reader **must follow** in order to prevent damage to equipment, network failure or loss of data. **The content of a caution must be read carefully and explicitly obeyed.**



Warning

A warning contains an instruction that the reader **must follow** in order to prevent electrical shock, death or serious injury to personnel. **The content of a warning must be read carefully and explicitly obeyed.**

1.3.4 NetPerformer Document Set

For complete information on the NetPerformer, consult the following:

- *NetPerformer Reference Guides*
Includes detailed information on new generation NetPerformer features, menus, commands, parameters and statistics displays.
- *NetPerformer Hardware Installation Guides*
These documents describe the hardware specific to each NetPerformer product, including installable options, complete installation instructions and firmware download procedures.
- *NetPerformer Release Bulletins*
These documents summarize the system specifications, software fixes and changes, and post-production documentation changes for a particular NetPerformer release.
- *NetPerformer Network Design Guide*
Offers valuable tips on how to design a NetPerformer application for maximum efficiency, including an analysis of data and voice traffic throughput issues and the impact of traffic flow. Provides examples of network setup and traffic measurement using various NetPerformer products.

1.3.5 Related Documents

All of the documents listed here are available on the *NetPerformer Companion CD*, which is included with your product package (Ordering part number: **520-0081-001**).

1.4 Changes to Console Operations

The following change to console operations was made in NetPerformer firmware version V9.2.0, and still applies to firmware version V10.1.X and higher. If you are familiar with earlier versions of the NetPerformer firmware, this change should be taken into consideration before you configure or manage the product.

- The way you access the NetPerformer console has changed to allow for multiple user profiles:



Caution

The default **LOGIN** is now **ADMIN** instead of **ACT**.

NOTE: The default **PASSWORD** for this login remains **SETUP**.

For full instructions on setting up user profiles, refer to the *Quick Configuration* module of the *NetPerformer Reference Guides*.

1.5 Technical Support

Memotec Technical Support is designed to meet your full range of support needs. From basic service to mission-critical support, we are committed to ensuring your success with NetPerformer products. By employing state-of-the-art products and the latest technologies available, we provide some of the fastest, most efficient service in the industry.

Our entire support organization is focused on complete customer satisfaction and providing immediate solutions to your business needs.

You can contact Technical Support by calling or sending email to our help-desk facilities:

- Telephone: +1 (514) 738-4781 during regular business hours, EST (GMT-5:00)
- Email: memotecsupport@memotec.com

Be prepared to provide the following information:

- Your name
- Company name
- Your location
- Telephone number
- Product serial number (see next section)
- Product work order number (see next section)
- Detailed problem description
- Remote access to the troubled unit via Telnet or dial-up modem

1.5.1 Providing Product Numbers to Technical Support

The product serial number may be requested when communicating with NetPerformer Technical Support. The serial number can be found on the rear of the unit. See [“Rear View of the SDM-9220/9230 UAC” on page 4-5.](#)

1.5.2 Checking the Contents of Your Product Package



Caution

As soon as you receive your NetPerformer product, check the carton and its contents for any sign of damage during shipment. **If there is any damage, contact the shipping agent immediately.**

Before you install your NetPerformer product, verify the contents of the carton to ensure that you have received all the unit's, accessories, cables and optional hardware that you ordered.

NOTE: A summary of product items appears on “[Product Description](#)” on page 4-1.

If any items are missing, or if you have any questions concerning your shipment, contact Technical Support.

1.5.3 Returning a NetPerformer Unit

If you need to return a NetPerformer unit for any reason, **you must ship it in the original carton using adequate shock insulation material.** Failure to do so may void the equipment warranty. Consult the Warranty statements included with the product package. Contact Technical Support for RMA requirements.

1.6 Training and Documentation

We offer a variety of classes to reduce your learning curve and make your employees more productive. Students learn how to tailor NetPerformer products to meet their specific business requirements. Each course is developed and delivered by certified instructors who have in-depth expertise and extensive technical training experience. Customized courses, tailored to meet your business needs, are also available.

To learn more about our training services, email our education facilities at memotctraining@memotec.com.

1.6.1 Request for Comments

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Unpacking

This chapter provides information on how to select an appropriate location for the NetPerformer SDM-9XXX Series unit, and includes details on size, distance and environmental requirements. It also explains how to prepare the site for trouble-free installation.

2.1 Chapter Overview

This chapter contains the following sections:

- [“Selecting a Location” on page 2-3](#)
- [“Preparing the Site” on page 2-5](#)

2.2 Selecting a Location

To ensure that the SDM-9XXX Series unit functions properly, you should install the unit in an appropriate location which satisfies certain criteria for size, connection distance and ambient environment.



Caution

Unit must be installed in a restricted access location.

Size Requirements

- Select a standard 19" (48 cm) equipment rack or a hard, flat surface that is:
 - Near an easily accessible AC power source (or possibly DC as required).
 - Capable of supporting the weight and size of the SDM-9XXX Series unit, its cabling and attached equipment.
- To ensure proper ventilation of the SDM-9XXX Series unit, leave 5 cm (2 inches) of unobstructed space around the unit chassis.
- Ensure that a sufficient number of shelves, supports, racks and cabinets are available to safely house all equipment.

Distance Requirements

- The SDM-9XXX Series unit should be no more than 2 meters (approx. 6 feet) away from an easily accessible power supply appropriate to the type of power supply on the unit:
 - SDM-9120 UAC, SDM-9220 UAC or SDM-9230 UAC: 100-240 VAC, (50/60 Hz)



Warning

In countries where a 2-pin non-grounded power cord must be used for the SDM-9XXX Series UAC, ensure that the unit is independently grounded with a wire from Ground securely attached to the ground lug on the power supply at the rear of the unit chassis. For the location of the ground lug, refer to:

["Rear View of the SDM-9120" on page 4-3](#) or
["Rear View of the SDM-9220/9230 UAC" on page 4-5](#) or
["Rear View of the SDM-9140 with UAC Power Supply Options" on page 4-8](#) or
["Rear View of the SDM-9140 with -48VDC Power Supply Options" on page 4-9](#)

- The maximum length of user equipment connections is relative to the serial (WAN/user) port speed:
 - 6 Mbps: 8 meters (25 feet)
 - 2 Mbps or less: 30 meters (100 feet)
- There should be no more than 8 meters (25 feet) between modems and WAN link (PVCR) connections.

- Equipment that is directly connected to the voice interfaces can be placed much farther away. Up to 2750 meters (9000 feet) of cable is permitted between each NetPerformer analog interface and its attached equipment.

NOTE: Distance may be an important factor for an E&M interface on the SDM UAC unit. If the PBX and the NetPerformer UAC unit are not near each other (in the same room, for example) then their AC grounds may not be the same. See [“E&M Grounding Considerations”](#) on page 3-26 for a workaround.

Environmental Requirements

For trouble-free operation of the SDM-9XXX Series unit, its location must satisfy the following environmental criteria:

- Operating temperature: 0°C to 50°C (32°F to 122°F).
NOTE: Above 3048 meters (10 000 feet) altitude the maximum operating temperature of the unit drops from 45°C to 35°C.
- Storage temperature: -20°C to 65°C (-4°F to 149°F).
- Relative humidity: 10% to 90%, non-condensing.
- Maximum operating altitude: 4572 meters (15 000 feet)*.
- Ventilation requirement: leave 5 cm (2 inches) of unobstructed space around the unit. **All unused slots must be closed with a plate.**

2.3 Preparing the Site

2.3.1 What You Will Need

For trouble-free installation of the NetPerformer hardware make sure you have the following on hand:

- The SDM-9XXX Series unit, with all accessories, cables and optional hardware you received in the product package. For details, see [“Product Description” on page 4-1](#).
- At least one of the following configuration and management access devices:
 - A console terminal (TTY terminal or a PC equipped with terminal emulation software) for direct or dial-up connection to the console port at the rear of the SDM-9XXX Series unit, **or**
 - A TELNET network device accessed through IP connectivity over LAN/WAN, **or**
 - An SNMP agent accessed through IP connectivity over LAN/WAN.

NOTE: When you first take the SDM-9XXX Series unit out of the box, the only configuration device you can use is the console terminal, since the unit does not yet have an IP address. For details, see [“Connecting the Console Terminal” on page 3-34](#).

- A sufficient number and length of cables for all ports:
 - One RJ-48 to RJ-48 cable for each T1/E1 port (at least 26AWG, or 0.4mm)
 - Two BNC coaxial cables for each T1/E1 port that will be configured for E1-75 operations

NOTE: An adapter is also required for an E1-75 connection on an E1/T1 port. The following adapter is available:
RJ-48 to E1-75 dual BNC (Ordering part number: **AG2CA0001**). See [“Adapter Cable” on page 4-45](#) for details.

- One custom-made HD-26 cable for each serial port. Details are provided in [“Serial Port and User Equipment Connections” on page 5-1](#).
- One straight through 10/100 Base-T LAN cable, RJ-45M to RJ-45M, for each Ethernet port.

NOTE: The above cables are *not* provided with the SDM-9XXX Series product package.

- One RJ-11 to RJ-11 cable for each FXS or FXO port
- One RJ-45 to RJ-45 cable for each E&M/PTT port
- All user equipment that will be directly connected to the serial ports.
- A sufficient number of ferrites for the cables connecting to the ports on the unit. For details, see [“Installing the Ferrites \(EMI Filters\)”](#) on page 3-27 for the ferrites required on the different product models for the various types of ports, the countries where these ferrites are required, and installation instructions.

NOTE: These ferrites are not provided with the product package.

3

Hardware Installation

This chapter provides step-by-step procedures on how to set up and install the NetPerformer SDM-9XXX Series unit.

3.1 Chapter Overview

This chapter contains the following sections:

- [“Installing the DSP module” on page 3-3](#)
- [“Installing or Upgrading the DSP Module” on page 3-5](#)
- [“Closing the Chassis Casing” on page 3-7](#)
- [“Removing an Interface Card” on page 3-9](#)
- [“Hardware Strapping” on page 3-13](#)
- [“Installing an Interface Card” on page 3-16](#)
- [“Installing the Unit in a Rack” on page 3-21](#)
- [“E&M Wiring and Grounding” on page 3-24](#)
- [“Installing the Ferrites \(EMI Filters\)” on page 3-27](#)
- [“Powering the Unit” on page 3-29](#)
- [“Connecting the Console Terminal” on page 3-34](#)
- [“Installing the Licensed Software Options” on page 3-38](#)
- [“Connecting the LAN Hub” on page 3-39](#)

3.2 Installing the DSP module

This procedure must be followed to install a DSP module.

NOTE: This procedure does not apply to the SDM-9140, which uses onboard DSP circuits for digital voice instead of a DSP module.

3.2.1 Opening the Chassis Casing

► **To open the casing of the SDM-9120/9220/9230 chassis:**

1. Wear an ESD (Electrostatic Sensitive Devices) wrist strap, and attach it to the ground lug on the power supply at the rear of the SDM-9120/9220/9230 chassis.

See [“Rear View of the SDM-9120” on page 4-3](#) or [“Rear View of the SDM-9220/9230 UAC” on page 4-5](#) for the exact location of the ground lug.



Caution

Electrostatic charges can damage system components. Always use an ESD wrist strap when accessing internal components of the unit.

NOTE: In countries where a 2-pin non-grounded power cord must be used, ensure that the SDM-9120/9220/9230 unit is independently grounded with a wire from Ground securely attached to the ground lug located at the rear of the SDM-9120/9220/9230 chassis.

2. Ensure that the SDM-9120/9220/9230 unit is securely placed on a hard, flat surface, with the port connectors facing you.
 3. Turn the power switch **OFF** by pushing it to **0**, and unplug the power cord from the power supply.
-



Warning

To avoid electrical shock and damage to the unit, make sure that the unit is disconnected from its power source before you access any of its internal components. Use ESD procedure at all times.

4. Remove the cover of the unit, and depending on the model (SDM-9220 and SDM-9230, or SDM-9120) do as follows:

- a. Remove the 3 screws that secure the lip of the cover to the rear of the unit's chassis.

For the SDM-9220 and SDM-9230

- b. Pull the cover up slightly from the rear of the unit first, to disengage it from the clips on the chassis wall that hold it in place.
- c. Nudge the cover forward slightly over the front panel.
- d. Roll the cover off over the front of the unit.

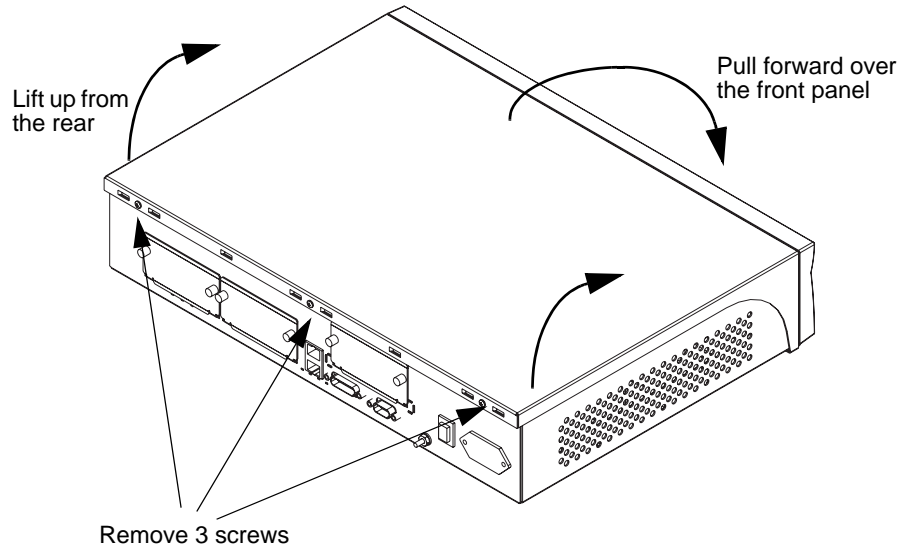


Figure 3-1: Removing the Cover from the SDM-9220/9230 Chassis

For the SDM-9120 only

- a. Remove the 3 screws on the top of the chassis and the 2 screws on each side of the unit.
- b. By holding the bottom sides of the cover, pull the cover up gently while slightly pulling to either side of the unit.

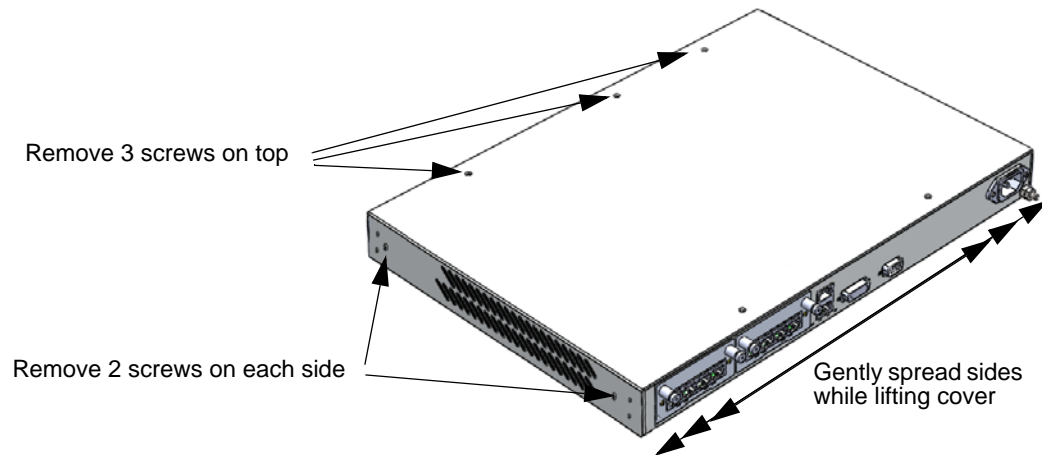


Figure 3-2: Removing the Cover from the SDM-9120 Chassis

3.2.2 Installing or Upgrading the DSP Module

Follow the procedure in this section for both installation and upgrade of a DSP module on the SDM-9120/9220/9230 unit.



Caution

The low-density (DSP-160) and high-density (HD) DSP modules are intended for the SDM-9120/9220/9230 unit only.

DO NOT replace the DSP-160 or HD DSP module with a DSP module intended for the SDM-9360, SDM-9380 or SDM-9585.

Likewise, do not install a DSP-160 or HD DSP module in an SDM-9360, SDM-9380 or SDM-9585 unit.

NOTE: The synchronous HD DSP module requires NetPerformer software version 10.2.3 R08 or higher. The synchronous low-density DSP module requires version 10.3.5 R02 or higher. Earlier software versions will report a hardware problem and log an error.

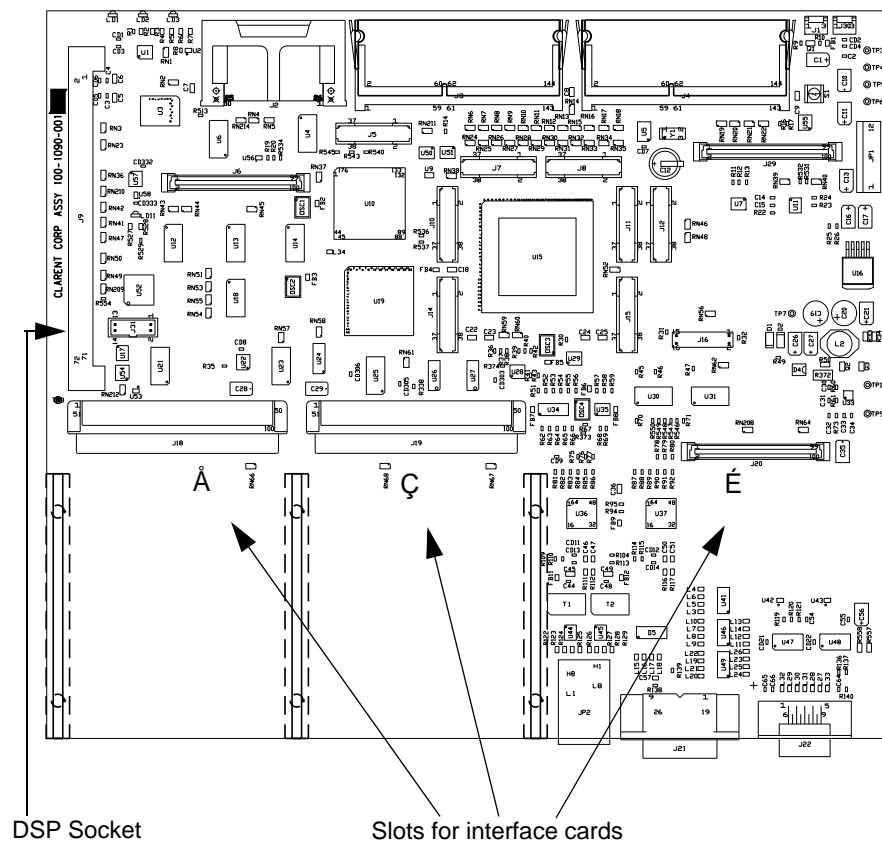


Figure 3-3: Location of Optional Hardware on the Main Board

The optional DSP module is installed in the DSP socket located on the main board of the SDM-9120/9220/9230 unit. See [Figure 3-3](#) for the exact location of the DSP socket.

You can install either the HD DSP module or the DSP-160 module in this DSP socket. See [“DSP Resources” on page 4-21](#) for a description of these two types of DSP modules.

NOTE: To ensure proper digital voice operations and performance, install the optional DSP module **before** you power up and configure the unit.

► **To install a DSP module:**

1. Open the SDM-9120/9220/9230 chassis casing as described on [“Installing the DSP module” on page 3-3](#), heeding the **Caution** note concerning ESD procedure, and the **Warning** to turn the unit off and disconnect the power cord first.
2. Locate the DSP socket on the main board. It is a standard 72-pin DSP connector located in the upper left corner of the unit when looking at the main board from the rear. See [“Location of Optional Hardware on the Main Board” on page 3-5](#) for the exact location.
3. Holding the DSP module by the edge, carefully remove it from its protective packaging.



Caution

Do not expose the DSP module or the SDM-9120/9220/9230 unit to a magnetic field or electrostatic charge at any time. Otherwise, damage to the components may occur. Use ESD procedures at all times.

4. Hold the DSP module over the DSP socket at an angle of about 15° with its **notched edge down, closest to the edge of the unit’s chassis**. Center the module over the socket.
5. Insert the DSP module into the DSP socket:
 - a. First push the bottom edge of the module into the socket.
 - b. Then press the top edge back to the right until the module snaps into place between two metal clips at each end of the DSP socket.

When properly installed, the DSP module should rest at an angle of about 45°.



Caution

Do not force the DSP module into the DSP socket. If the DSP module does not snap into place easily or sit properly in the socket, make sure you have inserted it with the notched edge down, closest to the edge of the unit’s chassis.

6. Close the chassis casing as described on [“Closing the Chassis Casing” on page 3-7](#).

3.2.3 Removing a DSP Module

**Caution**

DSP modules must be removed with care. Use ESD procedure at all times.

► To remove a DSP module:

1. Open the SDM-9120/9220/9230 chassis casing as described on “[Installing the DSP module](#)” on page 3-3, heeding the **Caution** note concerning ESD procedure, and the **Warning** to turn the unit off and disconnect the power cord first.
2. Locate the small metal clips that hold the DSP module into place at each end of the DSP socket. Push the clips apart with the tips of your fingers. The module will spring into a more vertical position.
3. Holding the DSP module by its edge, carefully lift it up and out of its socket.

**Caution**

Do not expose the DSP module or the SDM-9120/9220/9230 unit to a magnetic field or electrostatic charge at any time. Otherwise, damage to the components may occur. Use ESD procedures at all times.

4. If you are not installing another DSP, replace the unit’s cover as described in the next section.

3.2.4 Closing the Chassis Casing

**Caution**

Do not turn the unit on unless its cover is properly installed and secured.

► To close the casing of the SDM-9220/9230 chassis:

1. Hook the bottom lip of the front of the cover onto the bottom of the SDM-9120/9220/9230 unit’s front panel, using an upward motion.
NOTE: If the bottom lip of the cover is fitted properly onto the front of the chassis, the light pipes for the system status LEDs will slip easily into the holes provided for them.
2. Keeping the bottom lip in place on the front panel, rotate the rear of the cover down over the unit chassis. You may need to push the cover slightly toward the rear to ensure that it is well seated over the rear panel. See [Figure 3-4](#).

3. To secure the lip of the cover to the rear of the unit's chassis, replace the three screws that you removed earlier. See [Figure 3-1](#) on "Removing the Cover from the SDM-9220/9230 Chassis" on page 3-4 for their exact location.

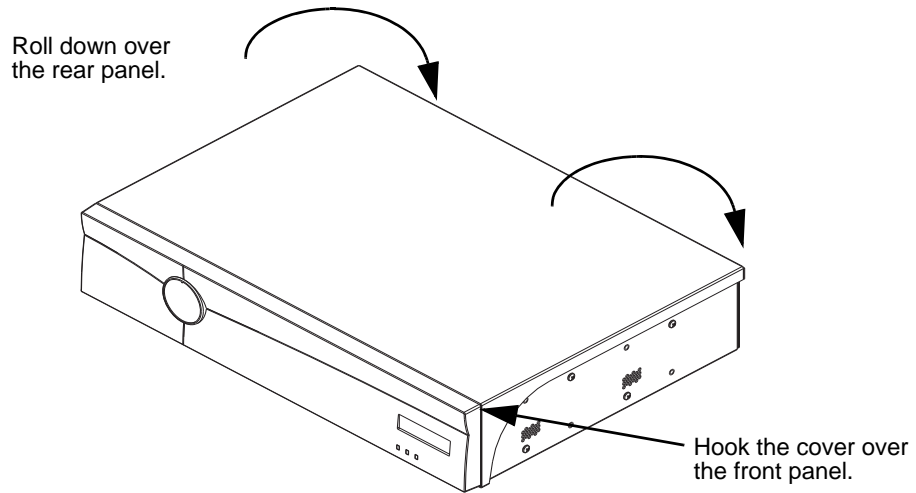


Figure 3-4: Replacing the Cover on the SDM-9220/9230 Chassis

► **To close the casing of the SDM-9120 chassis:**

1. Align the cover with the base of the unit.
2. Push the cover down gently, until it snaps into place.
3. Secure the cover to the base unit by replacing all screws that were removed earlier, see [Figure 3-2](#) for their exact location.

3.3 Removing an Interface Card

NOTE: This procedure must be followed to change the hardware strapping on an interface card that has already been installed. (For interface card installation, see [“Installing an Interface Card” on page 3-16.](#))

► **To remove an interface card:**



Caution

Do not expose the interface card or the SDM-9XXX Series unit to a magnetic field or electrostatic charge at any time. Electrostatic charges can damage system components. Always follow ESD procedures and use an ESD (Electrostatic Sensitive Devices) wrist strap when accessing internal components of the unit.



Warning

To avoid electrical shock and damage to the unit, make sure that the unit is disconnected from its power source before you access any of its internal components. Use ESD procedure at all times.

1. Wear an ESD (Electronic Sensitive Devices) wrist strap, and attach it to the ground lug on the power supply at the rear of the SDM-9XXX Series chassis.

For the exact location of the ground lug, see:

[“Rear View of the SDM-9120” on page 4-3](#) or

[“Rear View of the SDM-9220/9230 UAC” on page 4-5](#) or

[“Rear View of the SDM-9140 with UAC Power Supply Options” on page 4-8](#) or

[“Rear View of the SDM-9140 with -48VDC Power Supply Options” on page 4-9](#)

NOTE: In countries where a 2-pin non-grounded power cord must be used, ensure that the SDM-9XXX Series unit is independently grounded with a wire from Ground securely attached to the ground lug located at the rear of the SDM-9XXX Series chassis.

2. Ensure that the SDM-9XXX Series unit is securely placed on a hard, flat surface, with the port connectors facing you.
3. Turn the power switch **OFF** by pushing it to **0**, and unplug the power cord from the power supply.

NOTE: You do not need to disconnect any cables that may be connected to the data (**WAN/User**), **LAN** or **console** ports, or to other interface cards that may be already installed.

4. Using a small, non-magnetized Phillips screwdriver, loosen the 2 captive screws that hold the faceplate of the interface card onto the chassis wall.

5. Pull the interface card horizontally out of the slot using the tips of your fingers.



Caution

If you are removing an FXS or E&M card from an SDM-9140 Series unit:

To prevent damage to certain electronic components located under the **FXS** and **E&M** cards, use one of the following methods when removing them from either the **TOP** or **BOTTOM** card slots of SDM-9140 units.

► **Removing an FXS or E&M interface card from the TOP interface slot of an SDM-9140 Series unit:**

- a. If the bottom interface card slot is empty, remove the faceplate.

OR

If the bottom interface card slot contains a card, partially remove the bottom card by sliding it out approximately 3.8 cm or 1.5 inches from the card slot (see [Figure 3-5](#)).

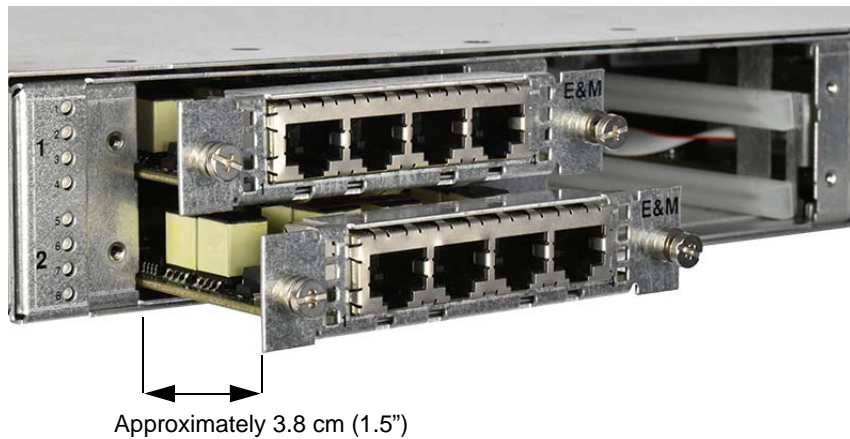


Figure 3-5: Partially Removing the Bottom Card in an SDM-9140 Unit

- b. Slowly pull the interface card horizontally out of the slot using the tips of your fingers.

IMPORTANT: When removing the top card, make sure that the solder side (bottom) of the card does not interfere with the component side (top) of the bottom interface card.

- c. Reinstall the faceplate of the bottom interface card slot.

OR

Reinsert the bottom interface card into the card slot.

► **Removing an FXS or E&M interface card from the BOTTOM interface slot of an SDM-9140 Series unit:**

- a. If the top interface card slot is empty, remove the metal faceplate.

OR

If the top interface card slot contains a card, remove the card from the top interface card slot.

- b. Using the tips of your fingers, slowly pull the interface card horizontally out of the slot, **at a slight angle** (see [Figure 3-6](#)), making sure the components on the bottom of the card do not touch the base of the chassis.

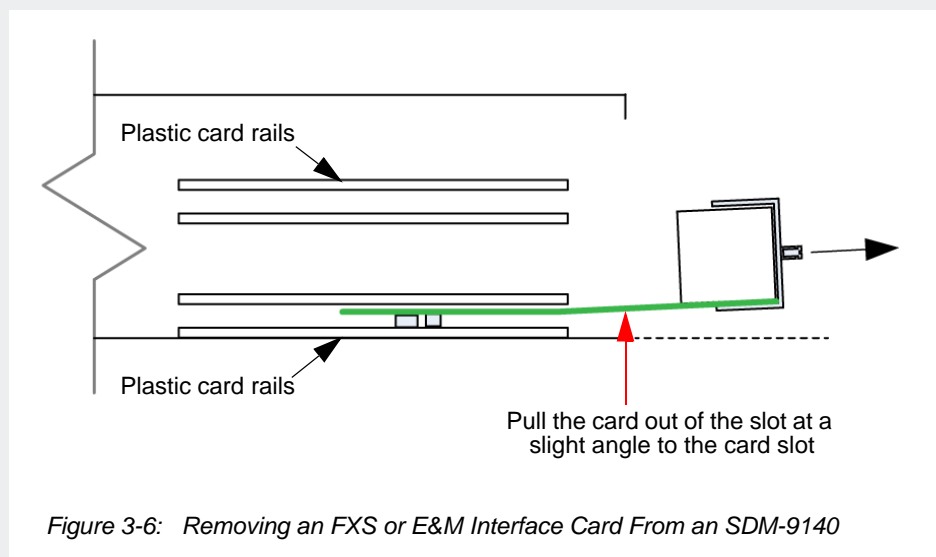


Figure 3-6: Removing an FXS or E&M Interface Card From an SDM-9140

- c. Reinstall the faceplate on the top interface card slot.

OR

Reinsert the top interface card into the card slot.

IMPORTANT: When reinserting the top interface card, make sure that the solder side (bottom) of the top card does not interfere with the component side (top) of the bottom card.

6. To disengage the interface card from the connector on the main board, you may need to use a small, **non-magnetized** flat-head screwdriver to gently pry the faceplate of the interface card away from the chassis wall. If you must do this, **be very careful that you do not apply too much force on the interface card or its faceplate.**
7. Install a metal faceplate to cover the slot cutout. The metal faceplate goes behind the chassis wall, and can be inserted through the slot opening. To secure the metal faceplate in place, tighten the 2 captive screws.

NOTE: To limit electromagnetic interference and ensure optimum ventilation inside the unit's chassis, there should be **no large openings on the rear panel** of the unit.

3.4 Hardware Strapping

3.4.1 E1-75 Jumpers

On the single/dual port T1/E1 interface card, 2 jumpers must be installed for each port that will be used for an E1 connection at 75 Ohms. These jumpers are required for compliance with EMC Immunity standard EN 55024. They are provided with the card.



Caution

If the jumpers are not installed correctly, an E1-75 connection may experience noise due to electromagnetic interference.

NOTE: An E1-75 connection is accomplished by installing an adapter on the E1/T1 port. The following adapter is available from Memotec: RJ-48 to E1-75 dual BNC (Ordering part number: **AG2CA0001**). **If you are *not* using an adapter for E1-75 operations, you can skip this procedure.**

The jumper connectors are located between the two ports (refer to [Figure 3-7](#)):

- Port 1 (on the left when the card is viewed from the front) is governed by jumpers installed on connector J4. **This is the only jumper connector available on the single port T1/E1 interface card.**
- Port 2 (on the right) is governed by jumpers installed on connector J7.

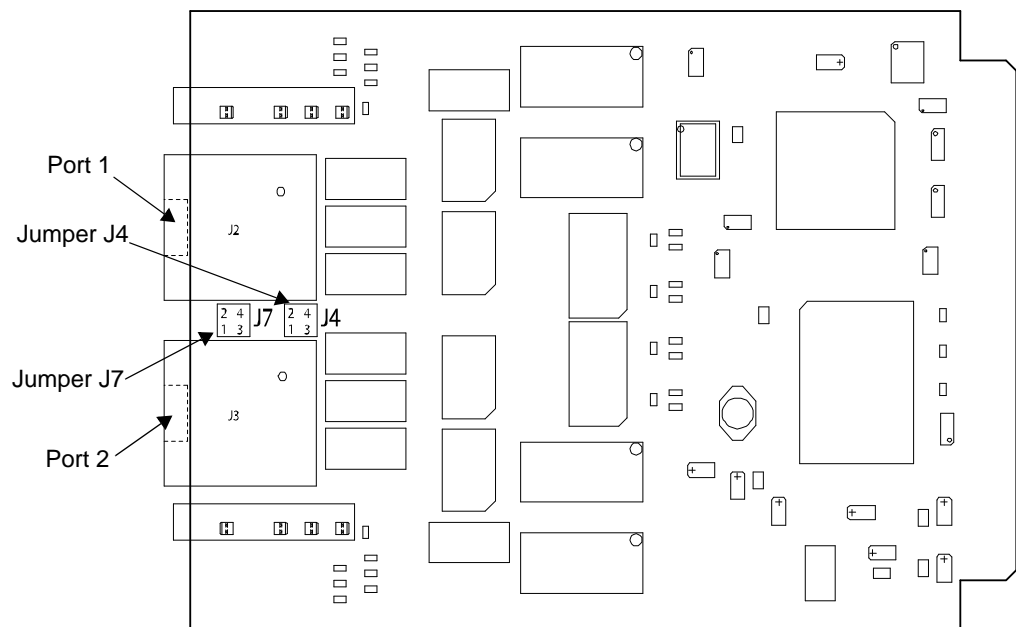


Figure 3-7: Jumper Connectors J4 and J7 on the Dual Port T1/E1 Interface Card

► **To install jumpers for an E1-75 connection on a single/dual port T1/E1 interface card:**

NOTE: Hard strapping must be done carefully, to ensure that the pins are well-engaged in the jumper base on both sides.



Warning

Use extreme caution when setting the NT/TE mode. Jumpers must not be installed while the unit is under power. To avoid electrical shock and damage to the interface card or other hardware components, make sure that the unit is disconnected from its power source before you access any of its internal components. **Also ensure that the RJ-48 to E1-75 dual BNC adapter cable has been disconnected from the digital port.** Use ESD procedure at all times.

1. Remove the T1/E1 interface card from the SDM-9XXX Series chassis, following the procedure [“Removing an Interface Card” on page 3-9.](#)
2. Hold the interface card firmly in one hand.



Caution

Do not expose the interface card or the SDM-9XXX Series unit to a magnetic field or electrostatic charge at any time. Otherwise, damage to the components may occur. Use ESD procedures at all times.

3. Using needle-nosed pliers, install the two jumpers as follows (refer to [Figure 3-7](#)):

Port	Connector	Jumper	Pins Covered
1	J4	1	1 and 3
		2	2 and 4
2	J7	1	1 and 3
		2	2 and 4

Table 3-1 Jumper Installation Parameters

A **white dot** is printed on the board next to pin 1.

As a result, the long side of the jumpers will lay parallel to the port connectors J2 and J3 on the card.



Caution

Make sure that the pins are well-engaged in the jumper base on both sides.

4. Close the chassis casing as described on [“Closing the Chassis Casing” on page 3-7.](#)

-
5. Connect the following adapter for E1-75 operations onto the digital port: RJ-48 to E1-75 dual BNC adapter cable (Ordering part number: **AG2CA0001**).

NOTE: Without an adapter, the E1 port will *not* operate at 75 ohms.



Caution

The adapter and attached BNC coaxial cables require strain relief to ensure that they do not loosen from the digital port:

- If the unit is mounted in a rack, **you must secure the cables to a side rail using tie-wraps, or support the weight of the cables on a tray**
- If the unit is on a table, **you must support the weight of the cables on the table.**

The digital port can desynchronize and the unit reset if the full weight of the BNC coaxial cables is unsupported.

3.5 Installing an Interface Card

Interface cards are installed in the interface card slots (2 slots, 3 slots or 4 slots, depending on the SDM model) located at the rear (SDM-9120/9220/9230) or the front (SDM-9140) of the SDM-9XXX Series chassis (see [Figure 3-8](#) and [Figure 3-12](#)).

NOTE: You should set the NT/TE mode (see [“E1-75 Jumpers”](#) on page 3-13) and E1-75 jumpers (see [“E1-75 Jumpers”](#) on page 3-13) before you install an interface card. You should install all interface cards required for your application before you power up and configure the unit (see [“Powering the Unit”](#) on page 3-29).

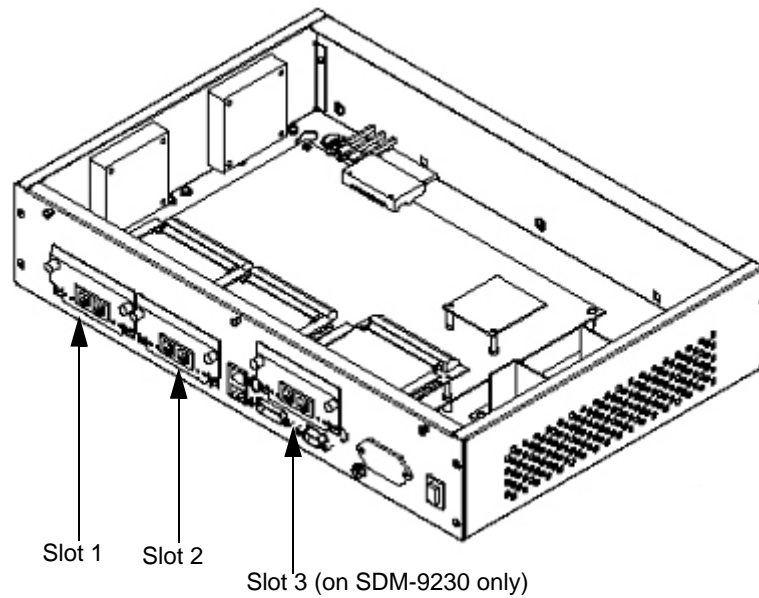


Figure 3-8: Location of Interface Cards in the SDM-9120/9220/9230 Slots

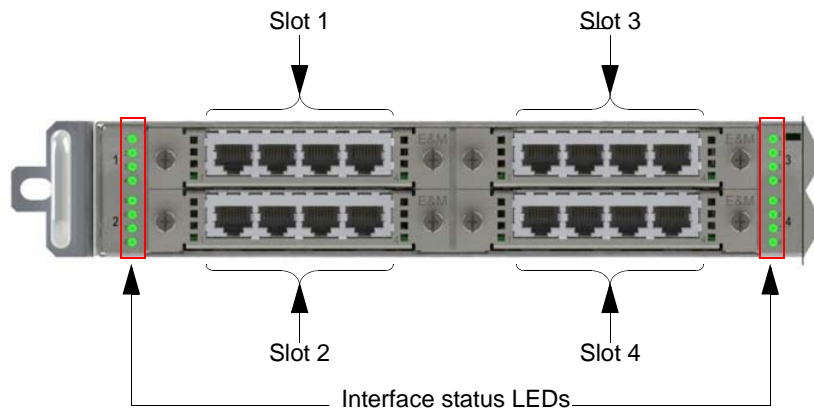


Figure 3-9: Location of Interface Cards in the SDM-9140 Slots

► **To install an interface card:**



Caution

Do not expose the interface card or the SDM-9XXX Series unit to a magnetic field or electrostatic charge at any time. Electrostatic charges can damage system components. Always follow ESD procedures and use an ESD (Electrostatic Sensitive Devices) wrist strap when accessing internal components of the unit.



Warning

To avoid electrical shock and damage to the unit, make sure that the unit is disconnected from its power source before you access any of its internal components. Use ESD procedure at all times.



Caution

Do not force the interface card into the slot. If the interface card is properly aligned, it should slide easily all the way in along the side rails provided inside the unit.

1. Wear an ESD (Electrostatic Sensitive Devices) wrist strap, and attach it to the ground lug on the power supply at the rear of the SDM-9XXX Series chassis.

For the exact location of the ground lug, see:

[“Rear View of the SDM-9120” on page 4-3](#) or

[“Rear View of the SDM-9220/9230 UAC” on page 4-5](#) or

[“Rear View of the SDM-9140 with UAC Power Supply Options” on page 4-8](#) or

[“Rear View of the SDM-9140 with -48VDC Power Supply Options” on page 4-9.](#)

NOTE: In countries where a 2-pin non-grounded power cord must be used, ensure that the SDM-9XXX Series unit is independently grounded with a wire from Ground securely attached to the ground lug located at the rear of the SDM-9XXX Series chassis.

2. Ensure that the SDM-9XXX Series unit is securely placed on a hard, flat surface, with the port connectors facing you.
3. Turn the power switch **OFF** by pushing it to **0**, and unplug the power cord from the power supply.

NOTE: You do not need to disconnect any cables that may be connected to the data (**WAN/User**), **LAN** or **console** ports, or to other interface cards that may be already installed.
4. On the rear wall of the unit's chassis (front wall for the SDM-9140), select an empty interface card slot; **SLOT 1**, **SLOT 2**, **SLOT 3** (SDM-9230 and SDM-9140 only) or **SLOT 4** (SDM-9140 only).
5. Remove the metal faceplate from the slot you have selected:
 - a. Using a small, non-magnetized Phillips screwdriver, loosen the 2 captive screws that hold the faceplate in place behind the slot cutout on the rear wall of the chassis.

- b. Slide the faceplate out from the chassis wall, and set it aside.

Important: Keep the faceplate for possible reuse at a later time. To limit electromagnetic interference and ensure optimum ventilation inside the unit's chassis, there should be no large openings on the rear panel. If you decide to remove an interface card at a later time, you will need to replace the faceplate for that slot.

- 6. Carefully remove the interface card from its protective packaging.
- 7. Hold the interface card so that the printing on the faceplate is right side up.
- 8. Insert the card by slowly sliding it into the side rails of the card slot.



Caution

If you are inserting an FXS or E&M interface card into an SDM-9140 Series unit:

To prevent damage to certain electronic components located under the **FXS** and **E&M** interface cards, use one of the following methods when inserting them into the **TOP** or **BOTTOM** card slots of SDM-9140 units.

► **Sliding an FXS or E&M interface card in the TOP interface slot of an SDM-9140 Series unit:**

- a. If the bottom interface card slot is empty, remove the faceplate.

OR

If the bottom interface card slot contains a card, partially remove the bottom card by sliding it out approximately 3.8 cm or 1.5 inches from the card slot.

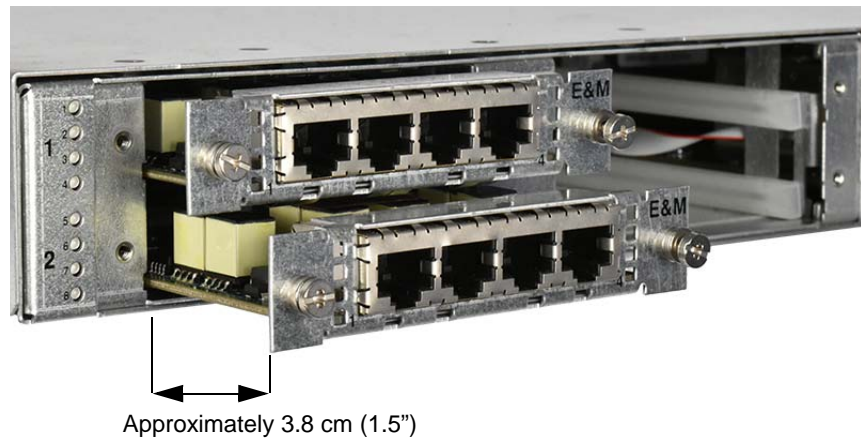


Figure 3-10: Partially Removing the Bottom Card in an SDM-9140 Unit

- b. Slowly insert the top card into the side rails of the top card slot until it is fully inserted.

IMPORTANT: When inserting the top card, make sure that the solder side (bottom) of the card does not interfere with the component side (top) of the bottom interface card.

c. Reinstall the faceplate of the bottom interface card slot.

OR

Reinsert the bottom interface card into the card slot.

► **Sliding an FXS or E&M card in the BOTTOM interface card slot of an SDM-9140 Series unit:**

a. If the top interface card slot is empty, remove the metal faceplate.

OR

If the top interface card slot contains a card, remove the card from the top interface card slot.

b. Position the bottom interface card **at a slight angle** in front of the card slot.

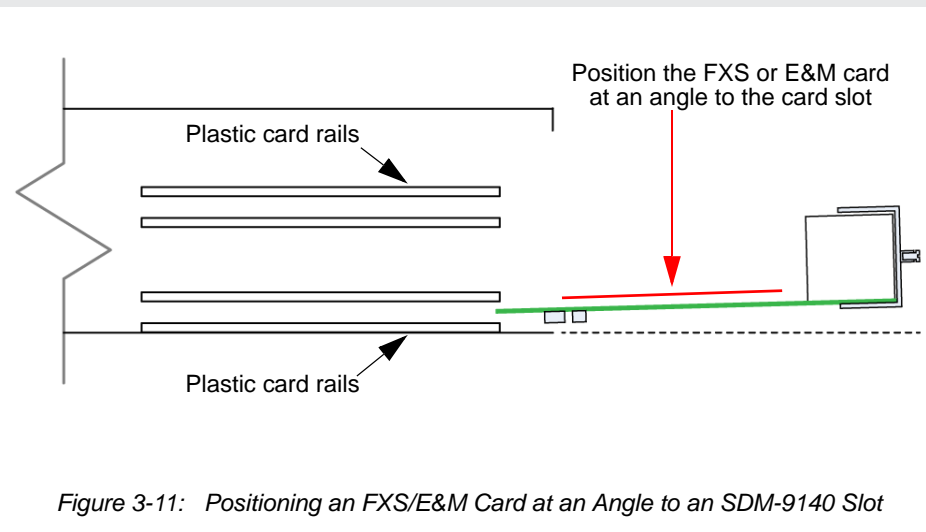


Figure 3-11: Positioning an FXS/E&M Card at an Angle to an SDM-9140 Slot

c. Slowly slide the card into the side rails of the slot, making sure the components on the bottom of the card do not touch the base of the chassis.

d. Continue to insert the card until it is fully inserted.

e. Reinstall the faceplate on the top interface card slot.

OR

Reinsert the top interface card into the card slot.

IMPORTANT: When reinserting the top interface card, make sure that the solder side (bottom) of the top card does not interfere with the component side (top) of the bottom card.

9. Press the interface card firmly into place to ensure that it engages securely into the connector at the rear (on the main board of the unit).



Caution

Be careful to insert interface cards fully into the unit, and ensure that all screws are properly tightened. If an interface card is not correctly installed, proper contact may not be made. This could result in a continuous reset of the unit, or the unit could boot but the Signaling Engine crash shortly afterward.

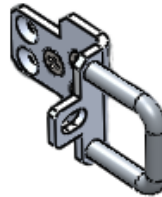
10. Screw the faceplate of the interface card onto the chassis wall by tightening the 2 captive screws.

NOTE: Torque on the faceplate screws should be no more than 6 in-lbs.

3.6 Installing the Unit in a Rack

3.6.1 Installing the SDM-9120 or SDM-9140 in a Rack

A rackmount kit is provided with each SDM-9120 or SDM-9140 unit for optional rackmount installation of the unit's chassis (Ordering part number: **KT-0021088**). Details about the rackmount kit are provided on "[Rackmount Kit](#)" on page 4-18.



Install each bracket into pre-drilled holes on side of unit.

Figure 3-12: SDM-9120/9140 Rackmount Brackets

► **To assemble the rackmount kit and install the unit in a rack:**

1. Screw the brackets to the front or rear of the SDM-9120 or SDM-9140 unit using 2 small screws along the bottom of each bracket, as shown in [Figure 3-12](#).
2. Optionally, you can add a handle to the bracket by aligning the handle with the holes and screw the handle using the 2 provided screws.
3. Carefully insert the SDM-9120 or SDM-9140 unit with the attached brackets into the rack. Secure the front of each bracket onto the rack using two mounting screws with washers.

3.6.2 Installing the SDM-9220/9230 in a Rack

A rackmount kit is provided with each SDM-9220/9230 unit for optional rackmount installation of the unit chassis (Ordering part number: **100-1086-001**). Details about the rackmount kit are provided on [“Rackmount Kit” on page 4-18](#).

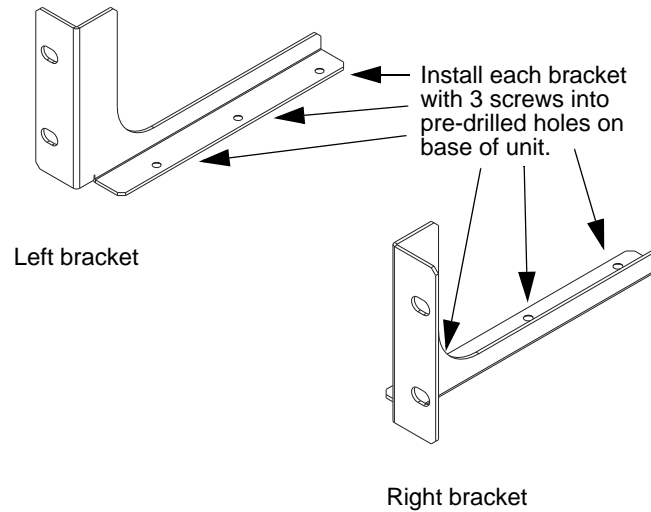


Figure 3-13: SDM-9220/9230 Rackmount Brackets

► **To assemble the rackmount kit and install the unit in a rack:**

1. Screw the brackets to the front or rear of the SDM-9220/9230 unit using 3 small screws along the bottom of each bracket, as shown in [Figure 3-13](#).

NOTE: Screw holes for this purpose have already been made at the factory along the bottom of the unit chassis. **You can align the rackmount bracket along any 3 of these holes, depending on the depth of your rack. You can mount the brackets in either direction, depending on whether you want to access the front or rear of the unit once it is installed in the rack.**

2. Carefully insert the SDM-9220/9230 unit with the attached brackets into the rack. Secure the front of each bracket onto the rack using two mounting screws with washers, as shown in [Figure 3-14](#).



Four mounting screws securely hold unit in place

Figure 3-14: Completed Rackmount Installation

3.7 E&M Wiring and Grounding

In a two-wire E&M application, connect wires 4 and 5 to the PBX R and T pair, respectively. See [Table 4-11](#).

- The R and T pair carry voice/fax analog signals between the SDM-9XXX Series unit and the PBX.

In a four-wire E&M application, connect wires 4 and 5 to the PBX R and T pair, and wires 3 and 6 to the PBX R1 and T1 pair, respectively.

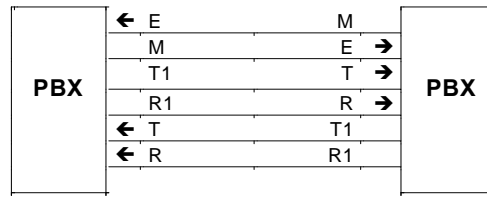
- The R and T pair carry voice/fax analog signals from the SDM-9XXX Series unit to the PBX.
- The R1 and T1 pair carry voice/fax analog signals from the PBX E&M tie trunk to the SDM-9XXX Series unit.

Connect the signaling wires as indicated in the following table:

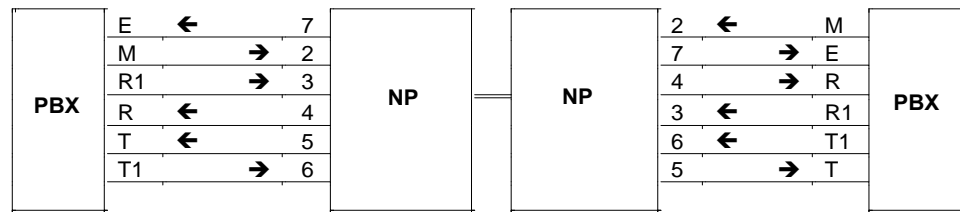
E&M Signaling Type	Pin No.	Connect to PBX Lead
I, V	7	E
	2	M
	8	SG (common ground)
II	7	E
	8	SG
	2	M
	1	SB

Table 3-2 E&M Wiring

When PBX-to-PBX E&M tie trunks are installed, the E lead of one PBX is normally crossed over and connected to the M lead of the other PBX, and vice versa. See the first connection scenario in [“Four-Wire E&M Connections” on page 3-25](#). In a multiplexing application the crossover is accomplished digitally. Therefore, when connecting an analog PBX to the E&M interface card, **the E and M leads of the PBX connect to the E and M leads of the analog voice port straight through, without crossing.**



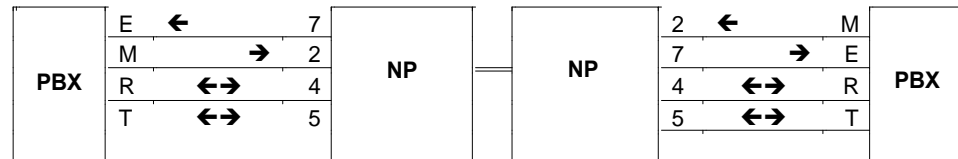
PBX-to-PBX Connection



Connection Through SDM-9XXX Series Units

Figure 3-15: Four-Wire E&M Connections

NOTE: All signals are listed from the PBX's point of view.



Connection Through SDM-9XXX Series Units

Figure 3-16: Two-Wire E&M Connections

NOTE: All signals are listed from the PBX point of view.

3.7.1 E&M Grounding Considerations

Proper grounding is essential for correct operation of telephone equipment in E&M applications. E&M signaling works by applying DC voltages to the E and M leads for connecting and disconnecting. Without a proper ground, the DC voltages do not have a common point of reference, which can result in unintended or sporadic signaling.

Distance may be an important factor for an E&M interface on the SDM-9220 UAC and SDM-9230 UAC. If the PBX and the NetPerformer UAC unit are not near each other (in the same room, for example) then their AC grounds may not be the same. To avoid grounding problems on the UAC unit, ensure that your installation respects the following conditions:

- Check the distance between the PBX and the NetPerformer UAC unit.
 - If the two are not within close proximity, then their AC grounds may not be the same.
 - If the NetPerformer UAC unit and the PBX are in the same room, it is likely that they share the same AC ground.
- In an E&M application, the common ground must be the Telco/PTT ground. This ensures that the ground potential of the PBX telephone interface and the NetPerformer telephone interface are the same.

Based on the above conditions, grounding may be established directly or indirectly.

- **Direct Method:** Connect a grounding wire between the Telco/PTT interfaces on the PBX and the NetPerformer UAC unit.
 - Connect the ground wire from the PBX to pin 8 (SG) of the RJ45 connector on the E&M interface card.
This will establish the same ground potential at both interfaces.
- **Indirect Method:** If direct grounding is not possible or practical, establish an indirect ground.
 - Make sure the Telco/PTT grounds of the PBX and the NetPerformer UAC unit are connected to their respective AC grounds.
Check with the PBX manufacturer for information on how to connect the PBX AC ground to the Telco/PTT ground.
 - The AC grounds of the two units must be at the same potential, which is usually the case when they are located in close proximity.



Caution

Connecting the AC ground to the Telco/PTT ground on telephone equipment may violate the rules of certain regulatory agencies. For complete grounding regulations, please check with your local telephone company and/or agency.

3.8 Installing the Ferrites (EMI Filters)

NOTE: Ferrites are *not* provided with the product package.

Ferrites, or EMI filters, are required in the following circumstances:

- For E&M/PTT connections on all SDM-9XXX Series products, in all countries.
- For FXO and FXS connections on the SDM-9XXX Series UAC models, in the European Union and Russia only. These ferrites ensure compliance with standard *EN 55024:2010 + A1 + A2*.

[Table 3-3](#) provides details on ferrite requirements.

Port Type	Models affected	Where required	Ferrite required	Cable Wrapping
E&M/PTT	All SDM-9XXX Series models	All countries	LFB159079-000 (Steward)	4 times
FXO	SDM-9XXX Series UAC models	EU and Russia only	742 717 33, and single Wrap (Würth)	6 times
FXS	SDM-9XXX Series UAC models	EU and Russia only	742 717 33, and single Wrap (Würth)	6 times

Table 3-3 SDM-9XXX Series Ports Requiring a Ferrite

► **To install a ferrite:**

1. Thread the cable from the NetPerformer port through the ferrite opening
2. Wrap the cable around the ferrite the number of times required for the port, referring to [Table 3-3](#). [Figure 3-17](#) shows an example of a single wrap around the ferrite.

NOTE: Wrapping is not required in the case of an E1-75 connection, as the coaxial cable connected to the RJ48 to BNC adapter is too bulky to permit it.

3. Allow no more than three inches (one inch is ideal) between the wrap and the RJ-45 or RJ-48 connector that plugs into the user device or telephone outlet.

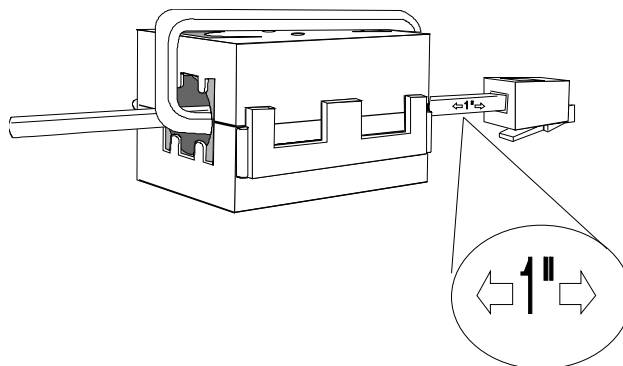


Figure 3-17: Installing a Ferrite with an RJ-45/RJ-48 Connector

3.9 Powering the Unit

All the SDM-9XXX Series units are AC or DC powered, except for the SDM-9120 unit which is AC powered only.

NOTE: Information about the power supply is provided on “Power Supply” on page 4-17.

3.9.1 SDM-9XXX Series UAC Power Cords

A removable power cord is supplied with the unit, either:

- 115VAC North American type, **or**
- 240VAC European Schuko type (see [Figure 3-18](#)).



Figure 3-18: Power Cords for the SDM-9220 UAC or SDM-9230 UAC Unit

► **To connect a UAC unit to its power source:**

1. Ensure that all interface cards are fully inserted into their slots and securely screwed into place.
2. Connect the factory supplied power cord to the AC inlet, located at the rear of the SDM-9XXX Series chassis.
3. Plug the other end of the power cord into an AC power outlet (100-240 VAC, 50/60 Hz) with a protective earthing connection in good condition.
4. For the SDM-9220/9230 units, turn the power switch **ON** by pushing it to **1**. The unit will begin power-up and system check immediately.

For the SDM-9120 or SDM-9140, you only need to plug the unit to a power source. The unit will begin to power up and system check immediately.



Warning

If at a later time you need to remove the unit cover or access internal components, turn **OFF** the unit and disconnect it from its power source to avoid electrical shock and damage to the unit.

**SDM-9220/
9230 DC Unit**



Caution

Connection of the -48 VDC unit to its power source must be carried out by a qualified electrical technician only.



Warning

A 20A circuit breaker must be provided as part of the building installation for the -48VDC power connection.

A removable wiring harness is supplied with the unit:

- Harness and triple wire cable
- 2 m. (approx. 6 feet) long

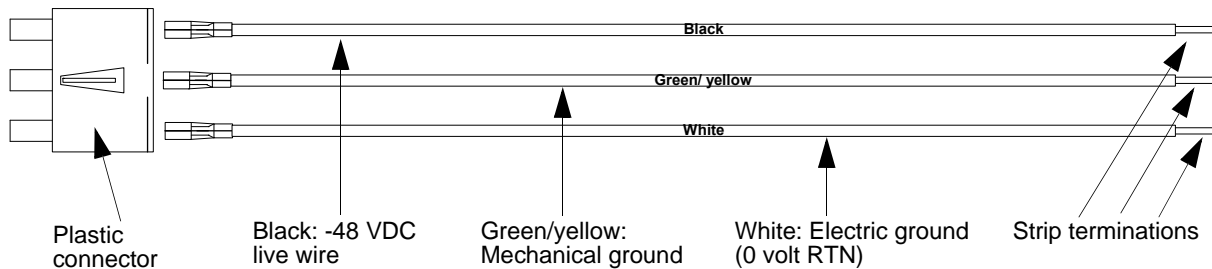


Figure 3-19: Harness and Wire for a DC Power Connection

► **To connect a -48 VDC unit to its power source:**

1. Turn off the circuit breakers to the -48 volt DC power supply.



Warning

To avoid electrical shock and possible damage to the unit, **ensure that the -48 VDC power supply is shut OFF before you connect the unit.**

2. Ensure that all interface cards are fully inserted into their slots and securely screwed into place.

3. Ensure that the 3 wires of the factory-supplied harness are properly inserted into the plastic connector of the harness. See [Figure 3-19](#).
 - Black wire: -48 VDC live wire
 - Green/yellow wire: chassis ground
 - White wire: electric ground (0 volt RTN)
4. Connect the plastic connector of the factory-supplied harness to the DC inlet, located at the rear of the SDM-9220/9230 chassis, so that the wires terminate as follows:
 - Black wire: to the lug labeled **-48V**
 - Green/yellow: to the ground lug
 - White wire: to the lug labeled RTN
5. Connect the strip terminations of the 3 harness wires to the -48 volt DC power supply, as follows:
 - Black wire: to the -48 VDC post
 - Green/yellow wire: to the facility ground
 - White wire: to the 0 VDC post
6. Turn on the circuit breakers to the -48 volt DC power supply.
7. Turn the chassis power switch **ON** by pushing it to **1**. The unit will begin power-up and system check immediately.

**Warning**

If at a later time you need to remove the unit's cover or access internal components, **turn OFF the unit and the -48 VDC power supply, and disconnect the harness from the DC inlet on the NetPerformer chassis** to avoid electrical shock and damage to the unit.

SDM-9140 DC Unit

The SDM-9140 DC unit has a single or redundant terminal block-48VDC power input, with an operating range from -36VDC to -72VDC.

The power supply modules are associated with the LEDs PS1 and PS2 on the front of the device. When facing the back of the unit, PS1 is on the left and PS2 is on the right.

- The wire gauge to be used must be no smaller than 14 AWG. A rectangular tongue terminal (stud size M3.5) is recommended to secure the wire to the terminal block.
- The RETURN (positive lead) must be connected to the screw identified as "RTN"
- The -48VDC (negative lead) must be connected to the screw identified as "-36V - 72V"
- The Frame (Earth) Ground must be connected to the screw identified with the Ground symbol.

[Figure 3-20](#) below shows a typical DC terminal block located either on an hot-swap power supply or fixed on the device. Note that the actual connector may be slightly different.

NOTE: You only need one power connector for normal operation. The second connector is to connect a redundant power source. When using only one hot-swap power source, the second slot should have a power supply slot cover.



Figure 3-20: DC Power Supply

3.9.2 System Status on Power-Up

On power-up, the SDM-9XXX Series unit executes program decompression, Signaling Engine software load and system test, which takes less than one minute to complete. You can follow the status of the initialization sequence from the console (see next section), or by watching the front or rear panel LEDs.

[Table 3-4](#) shows the various front panel LED states that occur during the NetPerformer startup sequence (after a power-on or software reset).

NOTE: The entire startup sequence is executed within 30 seconds. Some of its stages are brief, and may be difficult to distinguish from the rest. Refer also to [“System Status LEDs”](#) on page 4-11.

Stage	PWR	ST	AL	Current Status of the SDM-9XXX Series Unit
1	green	blink	blink	Quick hardware test by the bootstrap. Blinking and frequent changes of the STATUS and ALARM LEDs occur during this stage
2	green	red	green	Hardware initialization by the bootstrap

Table 3-4 Front Panel LED States During System Startup

Stage	PWR	ST	AL	Current Status of the SDM-9XXX Series Unit
3	green	red	off	Bootstrap is running. Preparing to start the boot sector
4	green	amber	off	Boot sector is running. Validating the application
5	green	amber	amber	Boot sector is running. Decompressing the application
6	green	off	off	Application has started from a power-on
			red	Application has started from a software reset
7	green	green	off	Application has started from a power-on; at least one link is up
			red	Application has started from a software reset; at least one link is up

Table 3-4 Front Panel LED States During System Startup

NOTE: If the **PWR** LED does not light up or the **STATUS** LED is red at the end of this sequence, the unit may be faulty. Contact Technical Support for assistance (see [“Technical Support” on page 1-11](#)). See also [“Troubleshooting Tips” on page 6-1](#).

3.10 Connecting the Console Terminal

A console cable is provided with the product package to connect the SDM-9XXX Series unit to the console terminal.

- For the SDM-9120/9220/9230 unit, this is a standard TIA-232 (V.24) straight-through cable with DB-9 female connectors at both ends (Ordering part number: **502-0811-006**).



Figure 3-21: TIA-232 (V.24) Straight-through Cable with DB-9 Female Connectors

- For the SDM-9140 unit, this is a USB to RJ-45M console cable (Ordering part number: **CBLH-CONS-USB**).



Figure 3-22: USB to RJ-45 Console Cable

This cable connects into a free USB port and is supported on computers running Windows (7/8).

NOTE: Some driver installation may be needed and may require Internet access.

Memotec also offers a DB-9 (female) to RJ-45 console cable (Ordering part number: **CBLH-CONS**, length of 2m or more) that must be connected into a computer serial port (DB-9 male connector). For computers not equipped with a serial port, this console cable can be used with the help of a USB-to-serial adapter, available in most computer supply stores and/or sites.

NOTE: The only purpose of the console port is to access the CLI (see [Figure 3-23](#)).

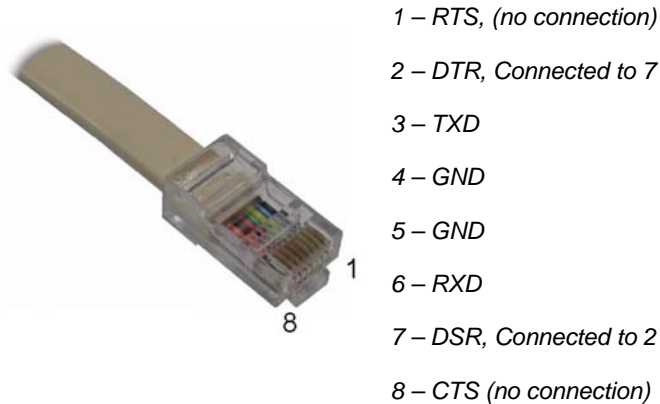


Figure 3-23: RJ-45 Connector of Console Cable

3.10.1 Console Port Interface

► **To connect the console terminal to the SDM-9120/9220/9230 unit:**

1. Install one end of the console cable to the SDM-9120/9220/9230 console port, labeled **CONSOLE** on the rear panel. See [“Rear View of the SDM-9120” on page 4-3](#) and [“Rear View of the SDM-9220/9230 UAC” on page 4-5](#).
2. Connect the other end of the cable to a COM port on the console terminal or PC, or to a modem for dial-up connection to a remote console.

► **To connect the console terminal to the SDM-9140 unit:**

1. Install the RJ-45M end of the console cable to the SDM-9140 console port, labeled **CONSOLE** on the front panel. See [“Front View of the SDM-9140e” on page 4-7](#).
2. Connect the other end of the cable (USB) to a USB port on your PC or laptop.

3.10.2 Important Console and Modem Settings for Startup

The console port performs autobaud detection when in auto-sensing mode. The SDM-9XXX Series unit will set the speed of the console port as soon as it detects an active connection.



Caution

For a trouble-free startup, you must set the console terminal and modem as follows:

-
- **Console terminal:** The default console speed is 9600 bps during bootstrap initialization, boot sector validation and system initialization. **Set your console terminal emulator to 9600 bps** to view all the system status messages of the SDM-9XXX Series unit on-screen during the startup sequence.
 - **Modem:** Configure your modem with the following **AT** commands:
 - **at&d0** to ignore DTR. The SDM-9XXX Series unit cannot supply DTR to the modem when in auto-sensing mode (the default setting).
 - **ats0=1** for Auto Answer mode.
 - **at&w0** to save the modem configuration.

Once system startup has completed successfully, the SDM-9XXX Series unit enters auto-sensing mode automatically. At that point, you can change your console speed, if desired.

- Available console speeds are 1200, 2400, 4800, 9600, 19200, 28800, 38400, 57600 and 115200 bps. **The equipment you connect to the console port must operate at one of these speeds.**

3.10.3 Activating the Console Connection

► **To activate the console connection:**

1. Ensure that the SDM-9XXX Series unit has successfully powered up with no system status errors (see [“System Status on Power-Up” on page 3-32](#)).
2. Power the console terminal on or start your console terminal emulation program. Take note of: [“Important Console and Modem Settings for Startup” on page 3-36](#)
3. When you see the prompt **Type <ENTER> to connect**, press the **<Enter>** key on the console terminal keyboard several times, until the SDM-9XXX Series unit responds with a prompt for the user login.
4. Enter the administrator login: **ADMIN**.
This is the default login. Additional user logins can be defined. Refer to the *NetPerformer Reference Guides* for details.
5. Enter the password for this login.

When the password is entered correctly, the SDM-9XXX Series unit sends the product banner to the console screen, as in this example:

```
LOGIN:ADMIN
PASSWORD:*****

ACCEPTED
SDM-9230 vx.x.x Memotec Technologies, Inc. (c) 2007
Signaling Engine x.x.x
DSP code version: x.x.x
Console connected on port CSL
B327091>
```

NOTE: The default password for the administrator login is **SETUP**. Consult the *NetPerformer Reference Guides* for instructions on how to change or remove the user password, if desired.

6. Enter the Display Alarms (**DA**) command at the NetPerformer console command line to verify that your unit is problem free. In particular, look for any alarm messages that indicate **Call Technical Support**.

3.11 Installing the Licensed Software Options

Execute the Product License Status (**PLS**) command at the NetPerformer console command line to install all licensed software options you have purchased for your SDM-9XXX Series unit.

Each licensed option includes a Software Licensing Agreement, which can be found in the product package. **You must agree to the terms and conditions of this agreement before loading the software. Each NetPerformer unit participating in the software application must be installed with a separate software license.**

3.11.1 Software License Key

The Memotec Software License Key is a traceable number that is used to activate the licensed software option. Contact Memotec Technical Support for your Software License Key.

- Enter this number during execution of the **PLS** command to activate the software license.
- You must then execute Reset Unit (**RU**) command to apply the new license.

For details concerning installation of licensed software options, refer to the *Software Installation and Licensing* module of the *NetPerformer Reference Guides*, which are included on the *NetPerformer Documentation CD* in the product package.

3.12 Connecting the LAN Hub

You must provide a standard straight through Ethernet 802.3 LAN cable (10/100/1000 Base-T, RJ-45M to RJ-45M) for connection to each LAN port. **LAN cables are *not* provided with the product package.**

► **To connect the SDM-9120/9220/9230 unit to a LAN hub:**

1. Connect one end of the LAN cable to one of the SDM-9120/9220/9230 Ethernet LAN ports, labeled **ETHERNET** on the rear panel. See [“Rear View of the SDM-9220/9230 UAC” on page 4-5.](#)
2. Connect the other end of the LAN cable to one of the 10/100 Base-T ports on your local LAN hub.
3. The link is up when the **LNK** LED is on. The LED color indicates the speed of the LAN connection:
 - **Amber:** 100 Mbps
 - **Green:** 10 Mbps

► **To connect the SDM-9140 unit to a LAN hub:**

1. Connect one end of the LAN cable to one of the SDM-9140 Ethernet LAN ports labeled **ETHERNET** on the front panel. See [“Front View of the SDM-9140e” on page 4-7.](#)
2. Connect the other end of the LAN cable to one of the 10/100/1000 Base-T ports on your local LAN hub.
3. The Ethernet port link is up when the **Left** LED is on. The LEDs indicate the following:
 - **Left LED:**
 - **Blinking/Green:** Activity (traffic transmitted or received)
 - **On:** The Ethernet port link is up
 - **Right LED:**
 - **Yellow:** The speed of the LAN connection is 100 or 1000 Mbps
 - **Off:** The speed of the LAN connection is 10 Mbps

LAN connection does not work	No power to LAN hub	Make sure the power outlet has power Make sure the LAN hub is properly plugged in and switched on
	Incorrect cable connection	If LINK LED is off, check LAN cable and replace if damaged If LINK LED is on, make sure you are using the correct IP address for transmissions

4

Product Description

This chapter describes the main features of each SDM-9XXX Series base unit, and provides information about the optional hardware, the base unit's chassis, Ethernet and Console ports, power supply, rackmount kit, DSP resources and interface cards.

4.1 Chapter Overview

This chapter contains the following sections:

- “SDM-9120 Base Unit” on page 4-3
- “SDM-9220/9230 Base Unit” on page 4-5
- “SDM-9140 Base Unit” on page 4-7
- “Optional Hardware” on page 4-10
- “Base Unit Chassis” on page 4-11
- “Ethernet Ports” on page 4-13
- “Console Port” on page 4-15
- “Power Supply” on page 4-17
- “Rackmount Kit” on page 4-18
- “DSP Resources” on page 4-21
- “Interface Cards” on page 4-24

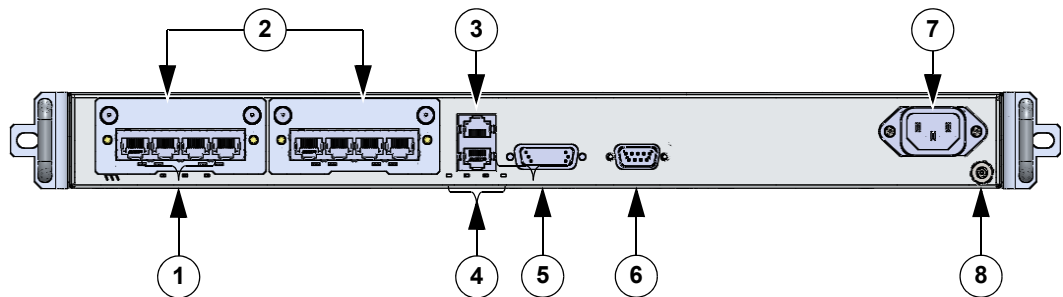
4.2 SDM-9120 Base Unit

4.2.1 Front View of the SDM-9120 Base Unit



Figure 4-1: Front View of the SDM-9120

4.2.2 Rear View of the SDM-9120 Base Unit



1	System status LEDs	5	Serial port
2	Interface card slots	6	Console port
3	Ethernet ports (2)	7	Power supply
4	LAN status LEDs	8	Ground lug

Figure 4-2: Rear View of the SDM-9120

Item	Details
Base unit chassis, with two slots for interface cards	“Base Unit Chassis” on page 4-11
Two Ethernet ports (require customer-supplied LAN cables)	“Ethernet Ports” on page 4-13
One serial port (requires custom serial cable)	“Serial Port” on page 5-3
One console port, with console cable	“Console Port” on page 4-15

Table 4-1 Basic Features of the SDM-9120 Unit

Item	Details
One UAC power supply, with removable power cable.	“Power Supply” on page 4-17
One rackmount kit	“Rackmount Kit” on page 4-18

Table 4-1 Basic Features of the SDM-9120 Unit

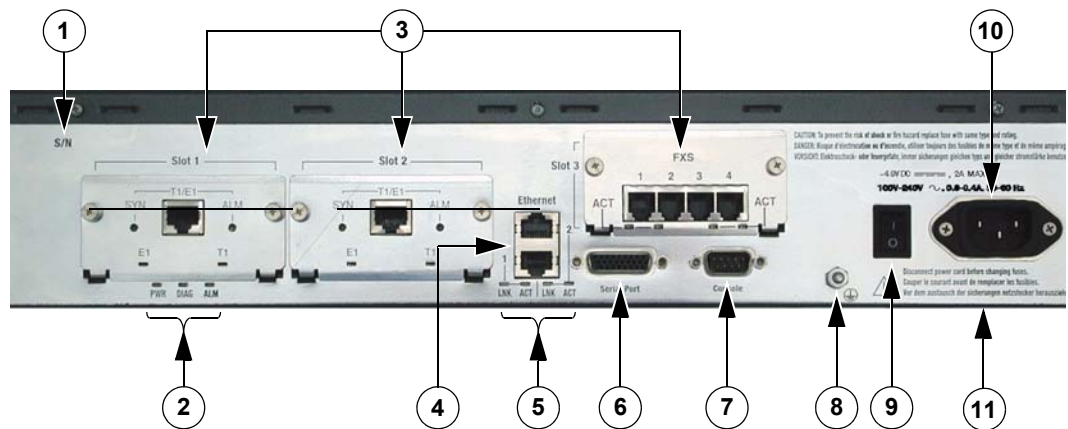
4.3 SDM-9220/9230 Base Unit

4.3.1 Front View of the SDM-9220/9230 Base Unit



Figure 4-3: Front View of the SDM-9220/9230

4.3.2 Rear View of the SDM-9220/9230 Base Unit



1	Serial number	7	Console port
2	System status LEDs	8	Ground lug
3	Interface card slots	9	ON/OFF switch
4	Ethernet ports (2)	10	AC connector
5	LAN status LEDs	11	Power supply
6	Serial port		

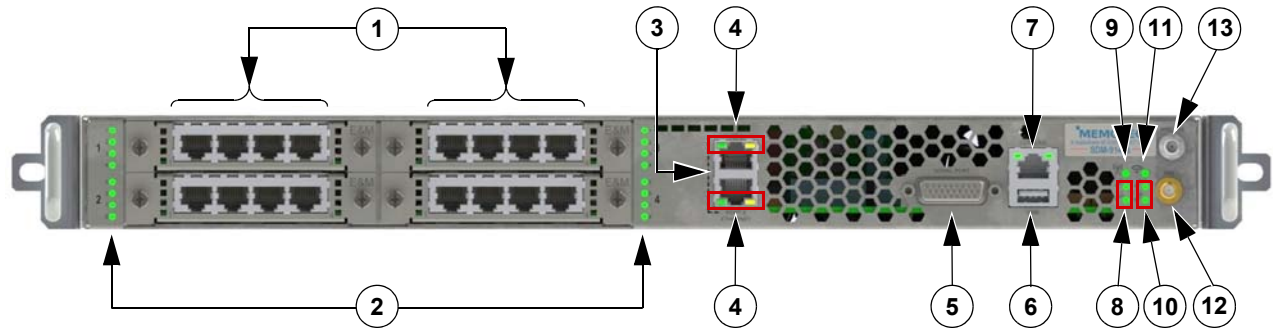
Figure 4-4: Rear View of the SDM-9220/9230 UAC

Item	Details
Base unit chassis, with two (SDM-9220) or three (SDM-9230) slots for interface cards	“Base Unit Chassis” on page 4-11
Two Ethernet ports (require customer-supplied LAN cables)	“Ethernet Ports” on page 4-13
One serial port (requires custom serial cable)	“Serial Port” on page 5-3
One console port, with console cable	“Console Port” on page 4-15
One power supply, with removable power cable.	“Power Supply” on page 4-17
One rackmount kit	“Rackmount Kit” on page 4-18

Table 4-2 Basic Features of the SDM-9220/9230 Unit

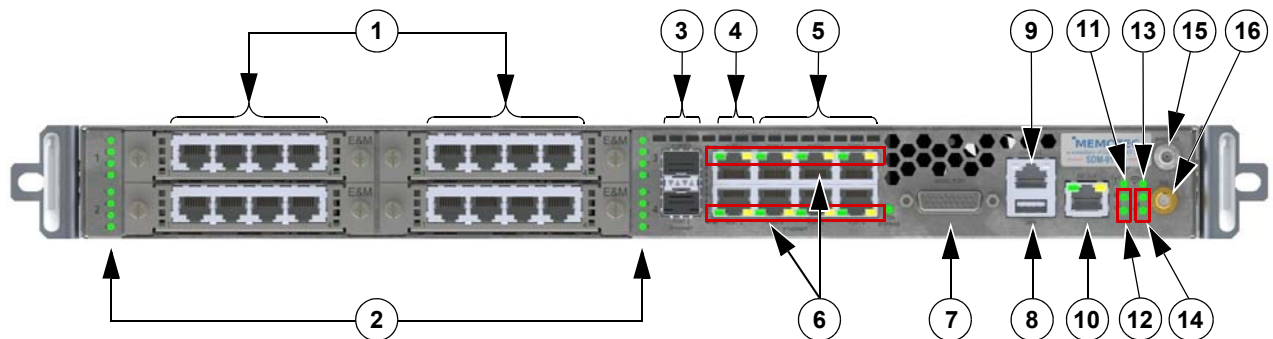
4.4 SDM-9140 Base Unit

4.4.1 Front View of the SDM-9140 Base Unit



1	Interface card slots (4)	6	USB port	11	Wireless status LED
2	Interface status LEDs	7	Console port	12	GPS antenna connector
3	Gig Ethernet ports (2)	8	Power supplies status LEDs	13	Wireless antenna connector
4	LAN status LEDs	9	GPS status LED		
5	Serial port	10	System status LEDs		

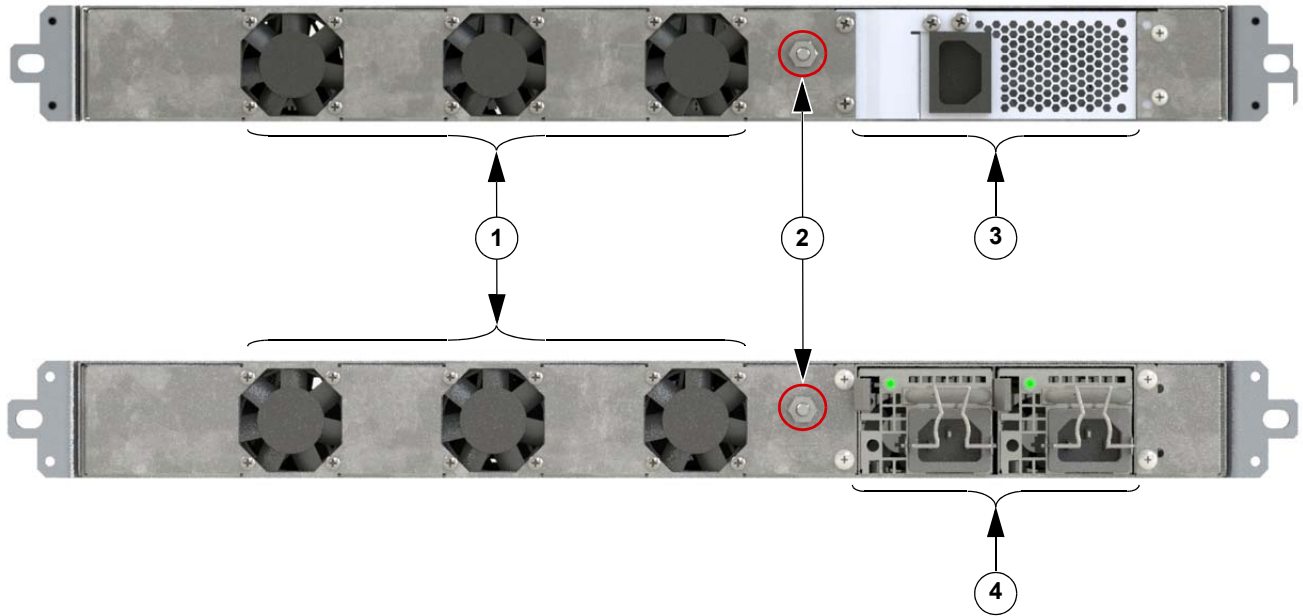
Figure 4-5: Front View of the SDM-9140s



1	Interface card slots (4)	5	Gig Ethernet ports 3-8 (RJ45/LAN switch)	9	Console port	13	Wireless status LED
2	Interface status LEDs	6	LAN status LEDs	10	External clock In/Out	14	System status LEDs
3	Gig Ethernet ports 1-2 (SFP option)	7	Serial port	11	GPS status LED	15	Wireless antenna connector
4	Gig Ethernet ports 1-2 (RJ45)	8	USB port	12	Power supplies status LEDs	16	GPS antenna connector

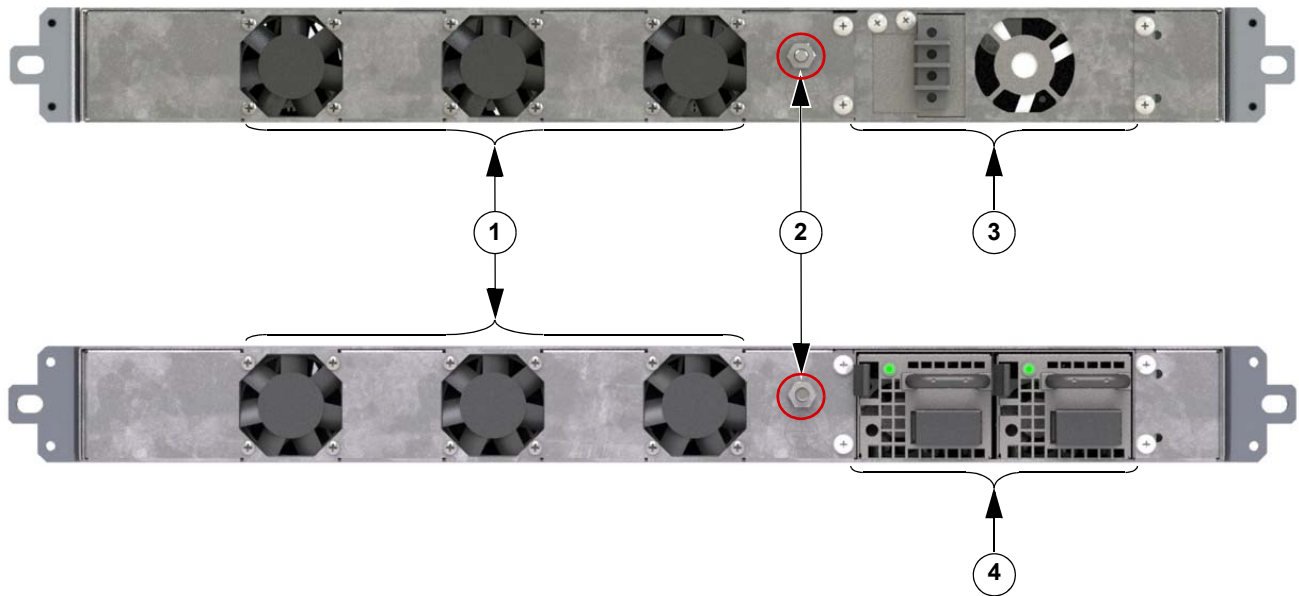
Figure 4-6: Front View of the SDM-9140e

4.4.2 Rear View of the SDM-9140 Base Unit



1	Cooling fans (3)	3	90-264 VAC Single Power Supply, 47-63 Hz
2	Ground lug	4	Hot-Swap Redundant AC Power Supply 1+1 (90-264 VAC, 47-63Hz)

Figure 4-7: Rear View of the SDM-9140 with UAC Power Supply Options



1	Cooling fans (3)	3	-36 to -60 VDC Single Power Supply
2	Ground lug	4	Hot-Swap Redundant DC Power Supply 1+1 (-35 to -60 VDC)

Figure 4-8: Rear View of the SDM-9140 with -48VDC Power Supply Options

Item	Details
Base unit chassis, with four slots for interface cards	“Base Unit Chassis” on page 4-11
Two or eight Ethernet ports (require customer-supplied LAN cables)	“Ethernet Ports” on page 4-13
One serial port (requires custom serial cable)	“Serial Port” on page 5-3
One console port, with console cable	“Console Port” on page 4-15
One to two power supplies, with removable power cable.	“Power Supply” on page 4-17
One rackmount kit	“Rackmount Kit” on page 4-18

Table 4-3 Basic Features of the SDM-9140 Unit

4.5 Optional Hardware

Item	Details
DSP module: low or high-density	“DSP Resources” on page 4-21
Interface cards: FXS (dual or quad port), FXO (dual or quad port), E&M/PTT (quad port), T1/E1 (single or dual port), Serial (dual port, SDM-9220/9230 only or single port SDM-9120/9140 only)	“Interface Cards” on page 4-24

Table 4-4 Optional Hardware

NOTE: The third interface card slot is not available on the SDM-9120/9220. The fourth interface card slot is not available on the SDM-9120/9220/9230. The Ethernet Switch is only available on the SDM-9140e.

On the NetPerformer console, the ports are identified as follows:

Physical Port	Port Number on Console (LINK)
Slot 1, digital port 1	100
Slot 1, digital port 2	150
Slot 2, digital port 1	200
Slot 2, digital port 2	250
Slot 3, digital port 1	300
Slot 3, digital port 2	350
Slot 4, digital port 1	400
Slot 4, digital port 2	450
ETHERNET (top)	ETH1
ETHERNET (bottom)	ETH2
ETHERNET SWITCH (Ethernet ports 3 to 8 for the SDM-9140e)	ETHSWITCH
SERIAL PORT	1
CONSOLE	CSL

Table 4-5 List of Physical Ports and Their Port Numbers

4.6 Base Unit Chassis

4.6.1 SDM-9220/9230 Physical Dimensions

- Width: 42.7 cm (16.8")
- Depth: 31 cm (12.2")
- Height: 8.9 cm (3.5")
- Typical weight: 4.5 kg (10 lb)

4.6.2 SDM-9120 Physical Dimensions

- Width: 42.7 cm (16.8")
- Depth: 31 cm (12.2")
- Height: 4.5 cm (1.75")
- Typical weight: 1.8 kg (4 lb)

4.6.3 SDM-9140 Physical Dimensions

- Width: 42.7 cm (16.8")
- Depth: 36 cm (14.2")
- Height: 4.5 cm (1.75")
- Typical weight: 4.5 kg (10 lb)

4.6.4 System Status LEDs

Front Panel Three system status LEDs: **POWER**, **STATUS** and **ALARM**, are provided on the front panel of the SDM-9XXX Series. These LEDs are located on the right side of the unit when viewed from the front. See [“Front View of the SDM-9220/9230 Base Unit” on page 4-5](#) or [“Front View of the SDM-9140e” on page 4-7](#).

NOTE: For added convenience, on the SDM-9120/9220/9230 units, the same three LEDs are provided on the rear panel, below Slot 1. See [“Rear View of the SDM-9220/9230 UAC” on page 4-5](#).

- **POWER** (green) goes on when the unit is powered on.
- **STATUS** (red/amber/green) indicates which program is operating on the unit, as shown in [Table 4-6](#).

- **ALARM** (red/amber/green) indicates several states, including a system alarm when a software reset occurs. See [Table 4-7](#).

State	Interpretation
Blinking Red/ Amber/Green	Early stage of system startup, when the bootstrap program is executing a quick hardware test
Red	Middle stages of system startup, when the bootstrap program is running
Amber	Later stages of system startup, when the boot sector is running NOTE: The exact function that is taking place can be determined in conjunction with the ALARM LED. See Table 3-4 in “ Front Panel LED States During System Startup ” on page 3-32
Off	System startup complete. The application is running but no link is up
Green	The application is running and at least one link is up

Table 4-6 STATUS LED States

State	Interpretation
Blinking Red/ Amber/Green	Early stage of system startup, when the bootstrap is executing a quick hardware test
Red	A software reset has occurred ^a
Amber	A <i>Write</i> operation to Flash memory is in progress, e.g. while saving the application after a download
Green	Hardware initialization is in progress
Off	No alarm has occurred on the unit since the alarms were last cleared

Table 4-7 ALARM LED States

NOTE: To turn the **ALARM** LED off, enter the **CE** (Clear ERR/DIAG LED) command at the console command line.

Rear Panel

As mentioned in the preceding section, the rear panel also includes a set of system status LEDs, below Slot 1. These LEDs (**POWER**, **STATUS** and **ALARM**) duplicate the front panel system status LEDs. See “[System Status LEDs](#)” on page 4-11 for details.

4.7 Ethernet Ports

4.7.1 Ports

- 2 fully routed Ethernet IEEE 802.3 LAN interfaces with two optional SFP slots for the SDM-9140e, each of which can accept a 1000Base-LX Ethernet optical SFP or a 1000Base-T RJ-45 electrical SFP.
- 6 additional Ethernet ports for the SDM-9140e connected through an integrated LAN switch.
- RJ-45 10/100 Base-T connectors and 1000 Base-T (for the SDM-9140).
- Each port can be configured with 6 IP addresses, providing a maximum of 12 IP addresses per unit.
- Auto-detect speed, 10 or 100 Mbps or 1000 Mbps (for the SDM-9140).
- Frame types: Ethernet II, IEEE 802.2, 802.3, SNAP.
- Ethernet interface: Ethernet II and IEEE 802.2, 802.3.
- Standards: IP RIP V1/V2 or Static, OSPF, NAT, IP Multicast IGMP V1/V2 PIM-DM, BOOTP/DHCP Relay, DHCP client, IPX RIP and SAP, LLC2, 802.1p/q prioritization and VLAN, 802.1D Spanning Tree Protocol (STP), MAC Layer.
- Filter Criteria: Based on protocol, address (source, destination or SAP) or custom filtering.

For information on connecting to the LAN hub, refer to [“Connecting the LAN Hub” on page 3-39](#).

4.7.2 LAN Status LEDs

For the SDM-9120/9220/9230 units, two pairs of LAN status indicators are located below the Ethernet ports on the rear panel of the chassis (refer to [“Rear View of the SDM-9220/9230 UAC” on page 4-5](#)). The LEDs for Ethernet port 1 are located on the left, and the LEDs for Ethernet port 2 are located on the right.

These LEDs indicate the following:

- **LINK:** Goes on when the corresponding LAN connection passes the Link Integrity test. In addition, the LED color indicates the LAN speed:
 - **Amber:** Link integrity at 100 Mbps
 - **Green:** Link integrity at 10 Mbps
 - **Off:** No link integrity signal detected
- **ACT:** Goes on (green) when there is activity on the corresponding LAN port (LAN traffic transmitted or received).

For the SDM-9140, two LEDs are embedded in each RJ-45 Ethernet connector (refer to [“Front View of the SDM-9140e” on page 4-7](#)).

The Ethernet Port link is up when the **Left** LED is on. The LEDs indicate the following:

- **Left LED:**
 - **Blinking/Green:** Activity (traffic transmitted or received)
 - **On:** The link is up
- **Right LED:**
 - **Yellow:** The speed of the LAN connection is 100 or 1000 Mbps
 - **Off:** The speed of the LAN connection is 10 Mbps

4.7.3 LAN Cables

Each Ethernet LAN port has an RJ-45 female connector to attach a LAN cable. Select a standard LAN cable with RJ-45 connectors at both ends.

RJ-45 Connector for Ethernet LAN Port

On the rear panel of the SDM-9120/9220/9230 and on the front panel of the SDM-9140, the RJ-45 female connectors marked **Ethernet 1** and **2** provide two physical LAN ports for attachment to the local LAN hub (10/100Base-T, 1000Base-T for the SDM-9140, MDI connection).

The following table describes the RJ-45 pinout for the LAN port.

Pin No.	Usage	Description
1	TX+	Transmit (+) Output
2	TX-	Transmit (-) Output
3	RX+	Receive (+) Input
4	–	(not used)
5	–	(not used)
6	RX-	Receive (-) Input
7	–	(not used)
8	–	(not used)

Table 4-8 RJ-45 Pinout for Ethernet LAN Port

4.8 Console Port

4.8.1 Port

One PC-compatible console port:

- DB-9 male connector on the SDM-9120/9220/9230 and RJ-45 female on the SDM-9140
- TIA-232 (V.24) serial interface
- Autobaud asynchronous transmission, 1200, 2400, 4800, 9600, 19200, 28800, 38400, 57600 and 115200 bps

NOTE: The equipment you connect to the console port **must operate at 9600 bps when you first power up the NetPerformer unit**. Also, if you are connecting to the console terminal via a modem, **you must set the modem to ignore DTR**. See [“Important Console and Modem Settings for Startup” on page 3-36](#).

- Auto-gender DTE/DCE
- Protocol: VT-100 or PPP
- Reverse console function provides an outbound port for control of external equipment using **ASYNC** communication via Telnet

4.8.2 Console Cable

A cable for the console port is included with the SDM-9XXX Series product package.

- For the SDM-9120/9220/9230 unit, this cable is a standard TIA-232 (V.24) straight-through cable with DB-9 female connectors at both ends (Ordering part number: **502-0811-006**).
- For the SDM-9140 unit, this cable is a USB to RJ-45 console cable (Ordering part number: **CBLH-CONS-USB**).

► **To connect the SDM-9120/9220/9230 cable:**

1. Connect one end of the cable to the SDM-9XXX Series console port, labeled **CONSOLE** on the rear faceplate. See [“Rear View of the SDM-9220/9230 UAC” on page 4-5](#).
2. Connect the other end of the cable to a COM port on the console terminal or PC, or to a modem for dial-up connection to a remote console.

For computers not equipped with a COM port, this cable can be used with the help of a USB-to-serial adapter, available in most computer supply stores and/or sites.

► **To connect the SDM-9140 cable:**

1. Install the RJ-45M end of the console cable to the SDM-9140 console port, labeled **CONSOLE** on the front panel. See [“Front View of the SDM-9140e” on page 4-7](#).
2. Connect the other end of the cable (USB) to a USB port on your PC or laptop.

4.9 Power Supply

The power supply is located on the right side when the SDM-9XXX Series unit is viewed from the rear. A different power supply is provided on the UAC and DC units.

NOTE: For information about the factory-supplied power cable and connection to the power source, turn to [“Powering the Unit” on page 3-29](#).

4.9.1 SDM-9120 UAC

- AC power connector
- Voltage: Auto-sensing 100-240 VAC
- Frequency: 50/60 Hz
- Current: 0.8 A at 100 V and 0.4 A at 240 V
- Maximum power consumption: 50 Watts

4.9.2 SDM-9220 UAC and SDM-9230 UAC

- AC power connector
- Voltage: Auto-sensing 100-240 VAC
- Frequency: 50/60 Hz
- Current: 0.8 A at 100 V and 0.4 A at 240 V
- Maximum power consumption: 50 Watts

NOTE: Normal power consumption may be lower when the unit is not fully populated.

4.9.3 SDM-9140 UAC

- AC power connector
- Optional Hot-Swap Redundant AC Power Supply (1+1)
- Voltage: Auto-sensing 90-264 VAC
- Frequency: 47-63 Hz
- Current: TBD
- Maximum power consumption: TBD

4.10 Rackmount Kit

One rackmount kit is supplied with the unit for mounting in a standard 19" (48 cm) rack. The ordering part number for the SDM-9220/9230 is **100-1086-001**, and **KT-0021088** for the SDM-9120. To assemble the rackmount kit and install the unit in a rack, refer to ["Installing the Unit in a Rack" on page 3-21](#).



Figure 4-9: SDM-9220/9230 Installed with Rackmount Brackets

For the SDM-9220/9230 units, the kit includes:

- Two brackets (left and right)
- Six small screws for the brackets: Phillips 5 mm (3/16")
- Four mounting screws with washers: Phillips 10 mm (3/8")

4.10.1 Using the Mounting Brackets for the SDM-9120 or SDM-9140

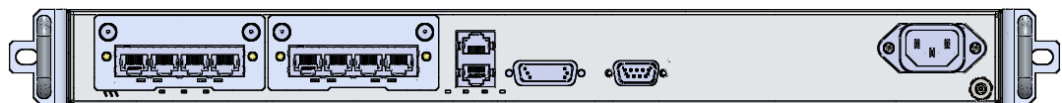


Figure 4-10: SDM-9120 with Rackmount Brackets

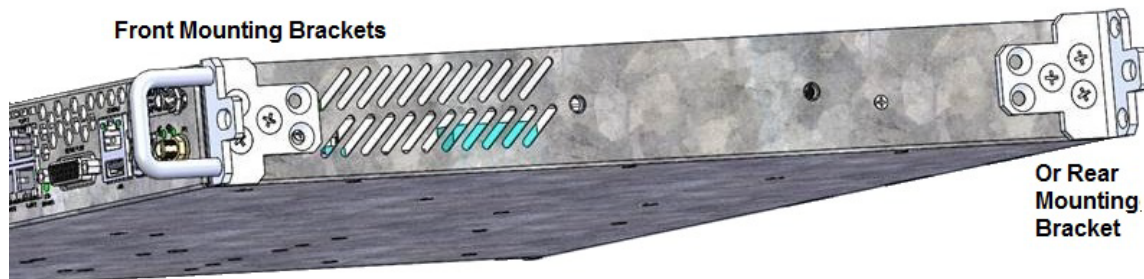


Figure 4-11: SDM-9140 with Rackmount Brackets

► **To place the unit in a rack, follow these steps:**

1. Secure the rack so that it does not move during the installation.
2. Prepare the mounting brackets and the support screws. See [Figure 4-12](#).

When you unpacked your unit, locate a pair of mounting brackets with a bag of mounting screws. The larger screws secure the mounting brackets to the unit. The smaller screws are to attach the optional handle to the bracket.



Figure 4-12: Mounting Screws and Mounting Bracket

3. Optionally, you can add a handle to the bracket by aligning the handle with the holes and attaching the handle using 2 screws provided.
4. Using the mounting screws, secure each mounting bracket on either side of the unit along the front edge. Secure the bracket to the side of the unit with 3 screws, using the 3 holes closest to the front of the bracket. See [Figure 4-13](#).
5. Insert the unit into the rack at the desired level and line the holes in the unit mounting SDM-9120 brackets with the holes in the rack mounting plates.

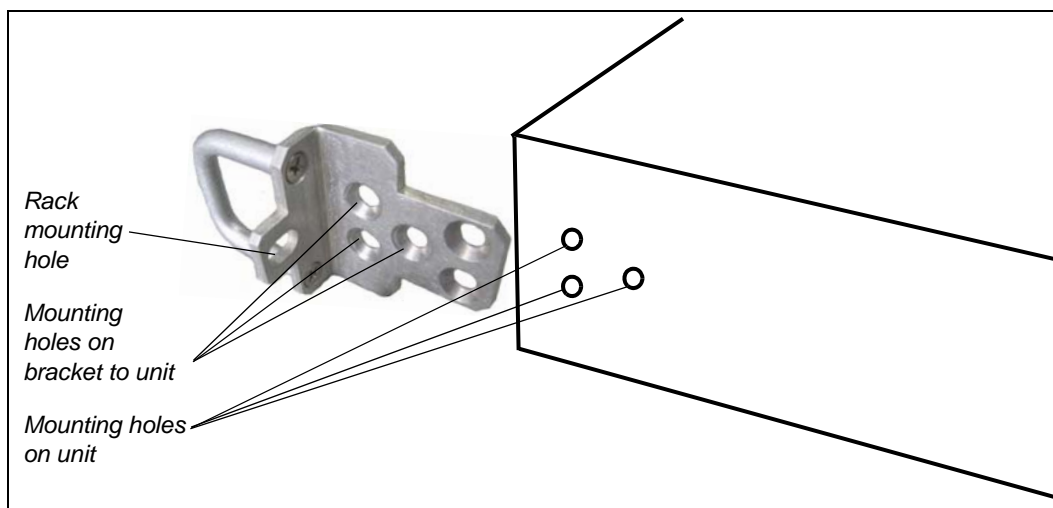


Figure 4-13: Side View of a Unit with a Bracket

TIP: The unit can be more easily mounted if support screws are installed halfway **just below** the bottom of the unit's final resting position in the rack. The mounting brackets now have a place to rest during the installation process.

6. Once the unit is in position, tighten all the rack mounting screws.

► **To install the inner rails, do as follows:**

1. Take the rails (Ordering part number: **PP-0020642**) from the box, and take them apart to extract the inner rail.
2. Attach to the right side of the device, as seen in the image below. Place the inner rail as in the image and secure with three screws.
3. Repeat for the left side.

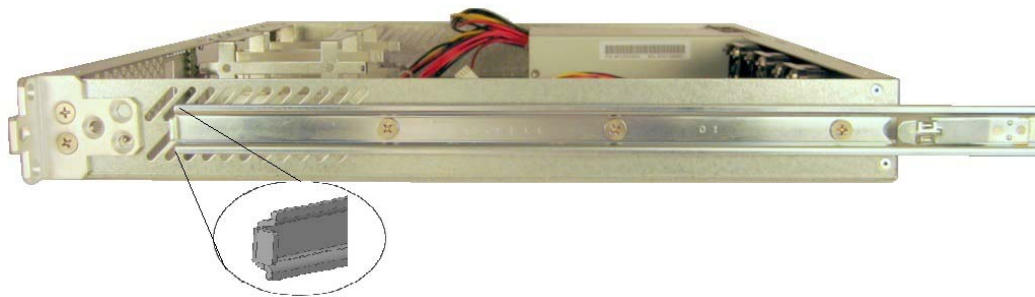


Figure 4-14: Side View of Rails

► **To install the outer rails, do as follows:**

1. Take the right side outer rail and front/rear bracket from the box.
2. Attach the rear bracket to the rear side of the outer rail flat side, with provided screws. Do not tighten the screws as it will have to be adjusted to the correct rack size.
3. Attach the front bracket to the front side of the outer rail flat side, with provided screws.
4. Insert the outer rail inside the rack, adjusting the rear bracket if needed. When done, tighten the rear bracket screws.
5. Secure the front and rear of the right side outer rail to the rack.
6. Repeat for the left side outer rail.

► **To slide the device into the rack, do as follows:**

1. Make sure inner and outer rails are firmly in place.
2. Align the inner rails on the unit with outer rails on the rack.
3. Slide the device into the rails, pushing evenly on each side, until you hear a 'click' from the locking mechanism.
4. Secure the front bracket to the rack, to prevent the unit from sliding out.

4.11 DSP Resources

High density, high performance DSP processors digitize, process and compress voice signals on the NetPerformer unit. The DSP processors handle voice compression software and fax/modem emulation.

4.11.1 DSP-160 Module for SDM-9120/9220/9230

A single low-density module (DSP-160) has 1, 2, 3, 5 or 6 DSP processors. Each DSP processor supports 5 digital timeslots. Maximum 30 voice channels per DSP module.

NOTE: One low-density onboard DSP processor is provided with each FXS, FXO and E&M interface card to support analog voice calls. A maximum of 8 analog voice channels is permitted.



Figure 4-15: DSP-160 Module

NOTE: If you require support of more than 30 voice channels, upgrade to the high-density DSP module (HD-DSP).



Caution

The low-density DSP module is intended for the SDM-9120, SDM-9220 and SDM-9230 only. **DO NOT replace the low-density DSP module with a DSP intended for legacy NetPerformer products (SDM-9360, SDM-9380 and SDM-9585).**

4.11.2 High-density DSP Module for SDM-9120/9230

The high-density DSP module (HD-DSP) can be installed to support a greater number of voice calls.



Figure 4-16: High-Density DSP Module

- A maximum of one HD DSP module can be installed on the SDM-9120 or SDM-9230.

A single high-density DSP module supports 60, 80, 100 or 120 timeslots. Maximum 120 voice channels per DSP.

NOTE: High-density DSP modules require NetPerformer software version 10.3.5 R01 or higher. Earlier software versions will report a hardware problem and log an error.



Caution

The high-density DSP module is intended for the SDM-9120, SDM-9230, SDM-9606 and SDM-9620 only. **DO NOT** replace the high-density DSP module with a DSP intended for the SDM-9360, SDM-9380 or SDM-9585.

4.11.3 High-density Onboard DSP for SDM-9140

For the SDM-9140, the high-density DSP resources required for digital voice are provided onboard (unlike the SDM-9120/9230, which uses the DSP module). See [“High Density Onboard DSP” on page 4-23](#).

The SDM-9140 can be ordered with 0, 2 (40 voice channels) or 6 (120 voice channels) high density onboard DSP processors.

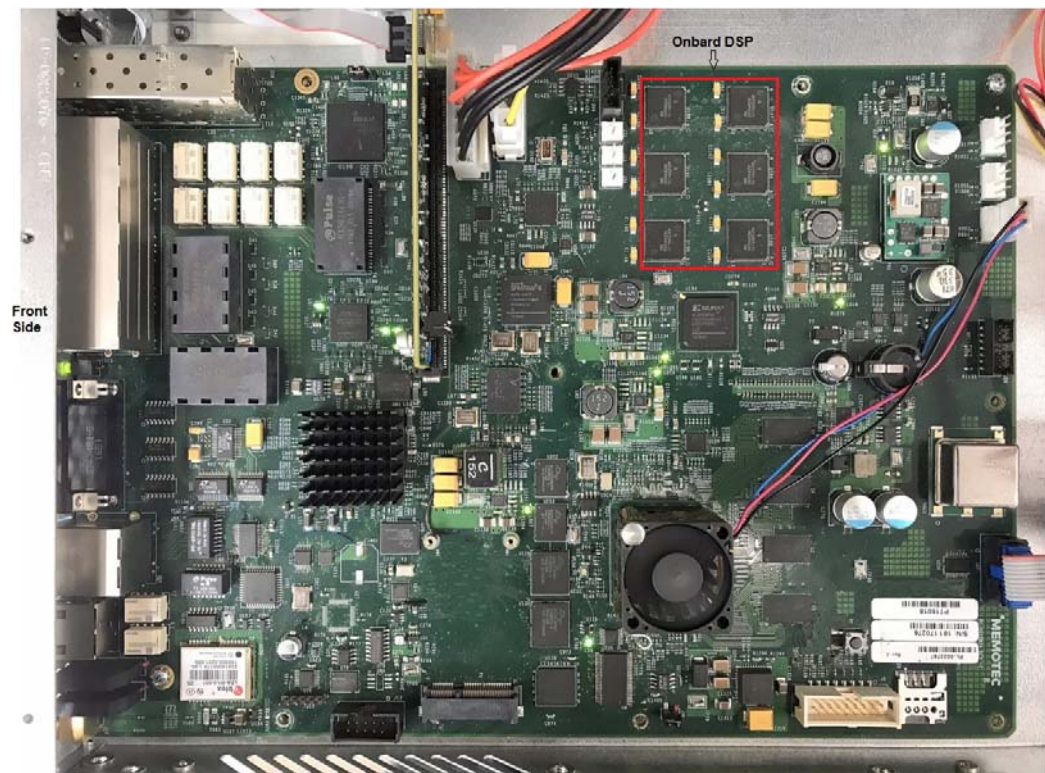


Figure 4-17: High Density Onboard DSP

4.12 Interface Cards

The NetPerformer interface cards add optional hardware interfaces to the SDM-9XXX Series. They provide a physical interface to external devices and networks, scalable to the needs of your application.

- The SDM-9120 can be installed with a maximum of 2 low-profile interface cards.
- The SDM-9220 can be installed with a maximum of 2 interface cards.
- The SDM-9230 can be installed with a maximum of 3 interface cards.
- The SDM-9140 can be installed with a maximum of 3 ultra-low-profile interface cards.

For SDM-9120/9220/9230 units, the interface cards slide into slots located at the rear of the units (see [“Rear View of the SDM-9220/9230 UAC”](#) on page 4-5).

For the SDM-9140 unit, the interface cards slide into slots located at the front of the unit. See [“Front View of the SDM-9140e”](#) on page 4-7.

To install an interface card in the SDM-9XXX Series chassis, follow the procedure in [“Installing an Interface Card”](#) on page 3-16.

4.12.1 SDM-9120 Compared to the SDM-9220/9230

All three units use the same interface boards; however, the SDM-9120 has a low profile chassis requiring only 1 Rack Unit of space. Consequently, the SDM-9120 interface cards must also be low profile using different faceplate than the SDM-92x0. See [Figure 4-18](#) below.

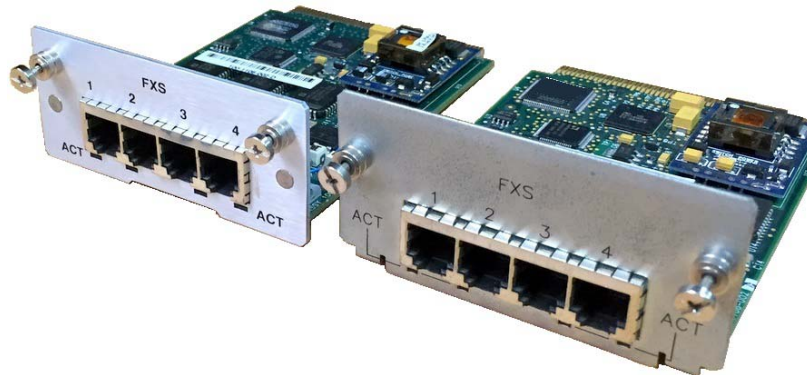


Figure 4-18: Low-Profile and Regular Interface Cards

4.12.2 SDM-9140 Compared to the SDM-9220/9230

All three units use the same interface boards; however, the SDM-9140 has a 1 Rack Unit of space chassis; two interface cards can be stacked on top of one another into the chassis. Consequently, the SDM-9140 interface cards must be ultra low profile and use different faceplates than the SDM-92x0. See [Figure 4-19](#) below.

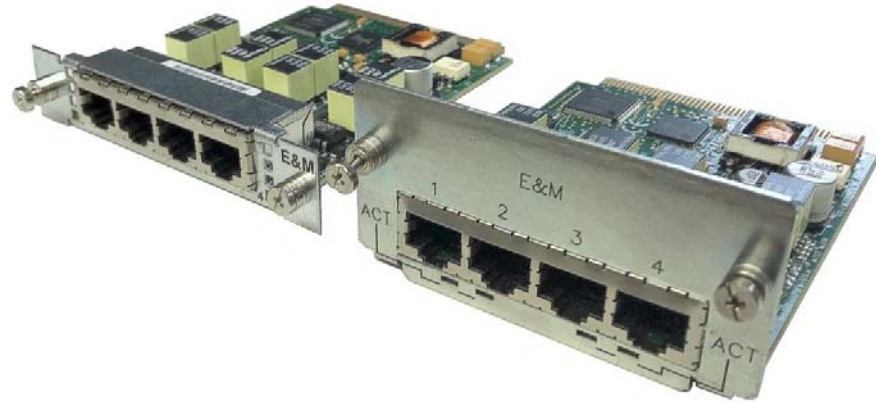


Figure 4-19: Ultra-Low-Profile and Regular Interface Cards

4.12.3 Converting an SDM-92x0 Card to an SDM-9120 Low-Profile

1. Remove the SDM-92x0 type faceplate from the interface card by unscrewing the two screws securing that faceplate to the interface card.
2. On the SDM-9120 type low-profile faceplate, secure the L-shaped mounting brackets using the bolts provided with the faceplate kit. Make sure that you put the brackets in their correct positions as illustrated in [Figure 4-20](#) below.
3. Secure the assembled SDM-9120 type faceplate to the interface card by screwing back the two screws used to fix the faceplate to the interface card as illustrated in [Figure 4-20](#) below.

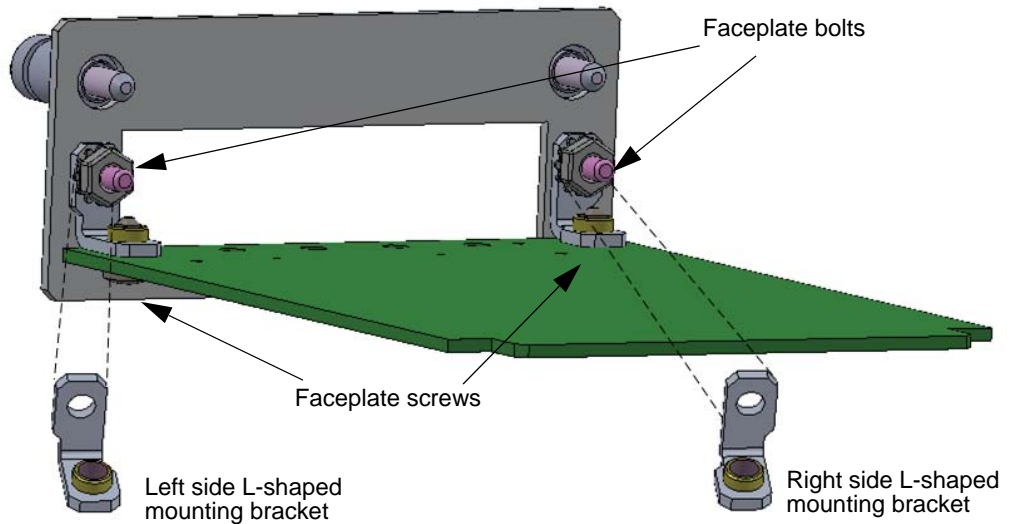


Figure 4-20: SDM-9120 Interface Card Faceplate

The ordering part numbers for the replacement faceplate kits from SDM-92x0 to SDM-9120 are as follows:

- **KT-0021210:** SDM-9120 Replacement Faceplate Kit for Quad E&M
- **KT-0021208:** SDM-9120 Replacement Faceplate Kit for Dual FXO
- **KT-0021206:** SDM-9120 Replacement Faceplate Kit for Quad FXO
- **KT-0021204:** SDM-9120 Replacement Faceplate Kit for Dual FXS
- **KT-0021202:** SDM-9120 Replacement Faceplate Kit for Quad FXS
- **KT-0021200:** SDM-9120 Replacement Faceplate Kit for Single E1/T1
- **KT-0021198:** SDM-9120 Replacement Faceplate Kit for Dual E1/T1

4.12.4 Converting an SDM-92x0 Card to an SDM-9140 Ultra Low-Profile

1. Place the provided Mylar insulator onto the bottom part of the SDM-9140 ultra low-profile faceplate.

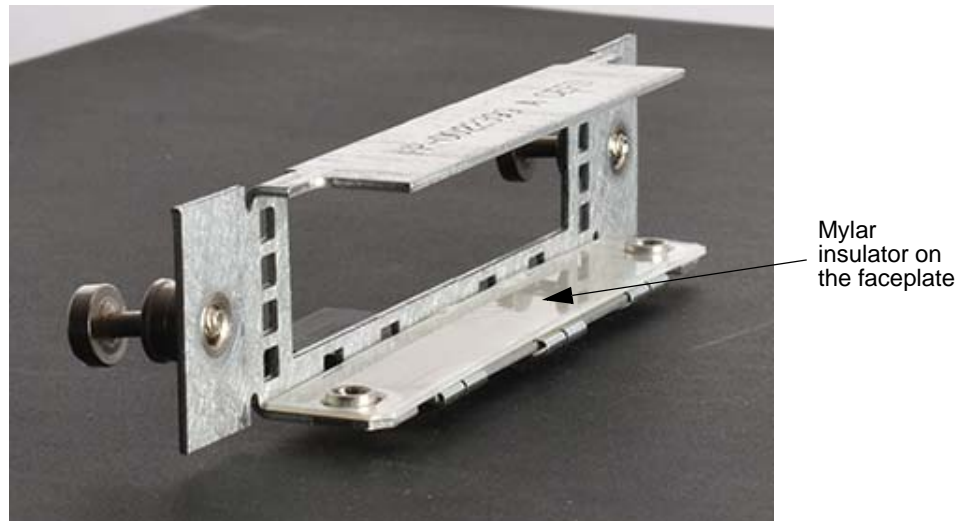


Figure 4-21: Mylar Overlay Installed on an SDM-9140 Faceplate

2. Position the SDM-92x0 interface card **at a slight angle** in front of the faceplate..

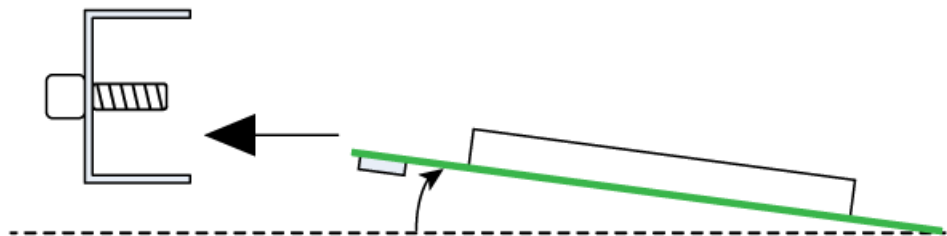


Figure 4-22: SDM-92x0 Card at an Angle in Front of the SDM-9140 Faceplate

3. Keeping the same angle, slide and position the interface card onto the faceplate.



Caution

When sliding the card onto the faceplate, take care not to damage the solder side components located under the card.

4. Secure the faceplate to the interface card with the two screws provided.

NOTE: The screws provided with the Quad E&M replacement faceplate kit must be used with the provided Allen key. A standard #1 Phillips screwdriver can be

used with the screws provided with the other replacement faceplate kits.

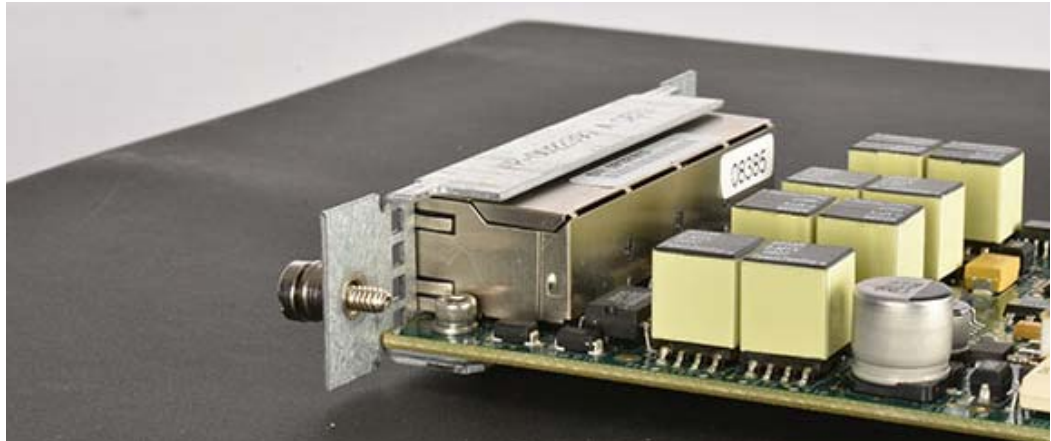


Figure 4-23: SDM-92x0 Card Inserted into an SDM-9140 Faceplate

The ordering part numbers for the replacement faceplate kits from SDM-92x0 to SDM-9140 are as follows:

- **KT-0021385:** SDM-9140 Replacement Faceplate Kit for Dual FXS
- **KT-0021386:** SDM-9140 Replacement Faceplate Kit for Quad FXS
- **KT-0021387:** SDM-9140 Replacement Faceplate Kit for Dual FXO
- **KT-0021388:** SDM-9140 Replacement Faceplate Kit for Quad FXO
- **KT-0021389:** SDM-9140 Replacement Faceplate Kit for Quad E&M
- **KT-0021390:** SDM-9140 Replacement Faceplate Kit for Single E1/T1
- **KT-0021391:** SDM-9140 Replacement Faceplate Kit for Dual E1/T1
- **KT-0021392:** SDM-9140 Replacement Faceplate Kit for Single Serial

4.12.5 Types of Interface Cards

There are three types of interface cards:

- Analog voice interface cards: FXS (dual or quad port), FXO (dual or quad port), E&M/PTT (quad port)
- Channelized digital interface cards: T1/E1 (single or dual port)
- Serial port (WAN) interface card (dual for the SDM-9220/9230 or single for the SDM-9140)

Analog Voice Interfaces

Three types of analog voice interface cards are available:

- **FXS** (dual or quad port). See [“FXS Interface Cards” on page 4-29](#).
- **FXO** (dual or quad port). See [“FXO Interface Cards” on page 4-31](#).
- **Universal E&M/PTT** (quad port). See [“Universal E&M/PTT Interface Card” on page 4-32](#).

FXS Interface Cards

- A Telco/PTT interface that acts like a PSTN Central Office.
- Provides a Subscriber Line connection to a conventional two-wire analog telephone (pulse dial or DTMF touch-tone).
- Generates loop current and ring voltage (derived from -48V) as well as pulse dial or DTMF tones.
- Detects off-hook and on-hook states.
- Dual port interface with 2 RJ-11 female connectors for the dual FXS interface card.
- Quad port interface with 4 RJ-11 female connectors for the quad FXS interface card.
- Equipped with an onboard DSP processor.
- Up to 2 FXS interface cards can be installed in the SDM-9120 and SDM-9220, up to 3 in the SDM-9230, and up to 4 in the SDM-9140, providing up to 16 analog FXS voice ports in a single unit.

Ordering part numbers for SDM-9120:

161-1350-000 for the dual FXS interface card
161-1326-000 for the quad FXS interface card.

Ordering part numbers for SDM-9220/9230:

161-1050-000 for the dual FXS interface card
161-1026-000 for the quad FXS interface card.

Ordering part numbers for SDM-9140:

161-1450-000 for the dual FXS interface card
161-1426-000 for the quad FXS interface card.

NOTE: To meet EMI homologation requirements, using the specific cables included with the SDM-9140 FXS interface card is mandatory.

For the Dual FXS:

- KT-0021369
- Kit, 2 x Cables for FXS or FXO, SDM-9140
- cable: CA-0021855

For the Quad FXS:

- KT-0021370
 - Kit, 4 x cables for FSX or FXO, SDM-9140
 - cable: CA-0021855
-

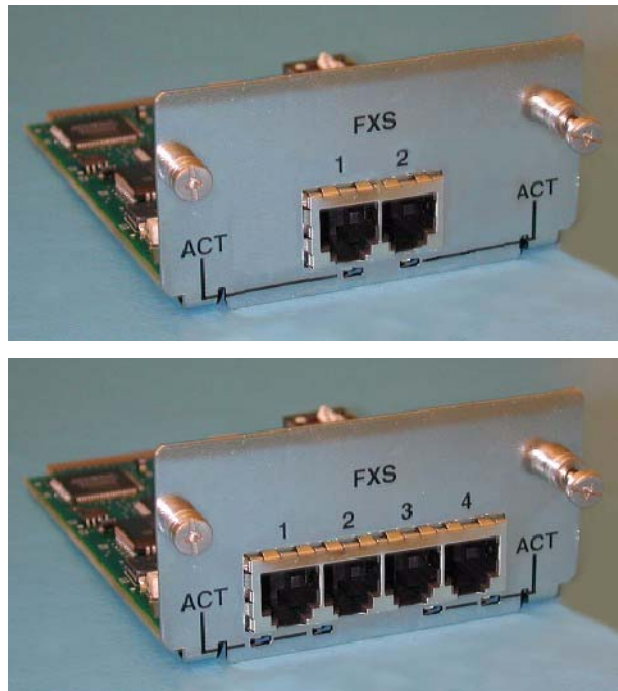


Figure 4-24: Dual FXS Interface Card (above), Quad FXS Interface Card (below)

NOTE: To interpret the status LEDs on these interface cards, refer to [“Interface Card Status LEDs”](#) on page 4-39.



Caution

Use a two-wire cable for FXS connections. In rare circumstances, your telephone or fax may not work if you use a four-wire cable. Should this occur, **replace the four-wire cable with a two-wire cable.** If the problem persists, contact Technical Support.

NOTE: Except for the **SDM-9140**, you must install a ferrite on each cable connected to an FXS port on an **SDM-9XXX Series UAC unit installed in the European Union or Russia**. These ferrites are *not* provided with the product package. For instructions, turn to [“Installing the Ferrites \(EMI Filters\)” on page 3-27](#).

FXO Interface Cards

Ordering part numbers for the **SDM-9220/9230**:

161-1051-000 for the dual FXO interface card
161-1052-000 for the quad FXO interface card.

Ordering part numbers for the **SDM-9120**:

161-1351-000 for the dual FXO interface card
161-1352-000 for the quad FXO interface card.

Ordering part numbers for the **SDM-9140**:

161-1451-000 for the dual FXO interface card
161-1452-000 for the quad FXO interface card.

NOTE: To meet EMI homologation requirements, using the specific cables included with the **SDM-9140** FXO interface card is mandatory.

For the Dual FXO:

- KT-0021369
- Kit, 2 x Cables for FXS or FXO, **SDM-9140**
- cable: CA-0021855

For the Quad FXO:

- KT-0021370
 - Kit, 4 x cables for FSX or FXO, **SDM-9140**
 - cable: CA-0021855
-

The FXO interface card is a Telco/PTT interface that acts like a standard telephone set (a two-wire telephone in a loop start circuit). This interface card:

- Provides a Subscriber Line connection to a Central Office or the station side of an analog PBX.
- Detects ring voltage, closes the loop during off-hook, and opens the loop in an on-hook condition.
- Generates pulse dial or DTMF tones.
- Dual port interface with 2 RJ-11 female connectors for the dual FXO interface card.

- Quad port interface with 4 RJ-11 female connectors for the quad FXO interface card.
- Equipped with an onboard DSP processor.
- Up to 2 FXO interface cards can be installed in the SDM-9120 or SDM-9220, up to 3 in the SDM-9230, and up to 4 in the SDM-9140, providing up to 16 analog FXO voice ports in a single unit.

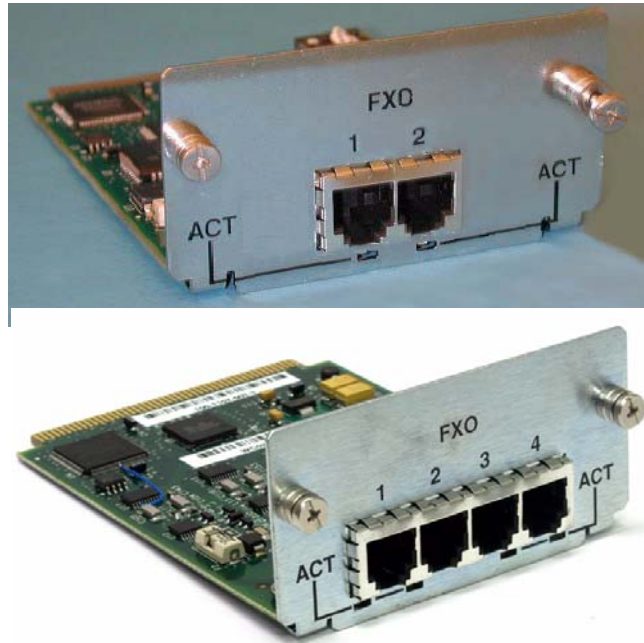


Figure 4-25: Dual FXO Interface Card (above), Quad FXO Interface Card (below)

To interpret the status LEDs on these interface cards, refer to [“Interface Card Status LEDs”](#) on page 4-39.

NOTE: Except for the SDM-9140, you must install a ferrite on each cable connected to an FXO port on an SDM-9XXX Series UAC unit installed in the European Union or Russia. These ferrites are *not* provided with the product package. For instructions, turn to [“Installing the Ferrites \(EMI Filters\)”](#) on page 3-27.

**Universal
E&M/PTT
Interface Card**

Ordering part number for the SDM-9220/9230:
161-1030-000 for the Universal E&M/PTT interface card.

NOTE: Replaces the legacy E&M card, part number 161-1027-000.

Ordering part number for the SDM-9120:
161-1330-000 for the Universal E&M/PTT interface card.

Ordering part number for the SDM-9140:
161-1430-000 for the Universal E&M/PTT interface card.

NOTE: To meet EMI homologation requirements, using the specific cables included with the E&M interface card is mandatory.

For the Quad E&M:

- KT-0021370
- Kit, 4 x cables for E&M, SDM-9140
- cable: CA-0021857

The universal E&M/PTT interface card:

- Provides a local (on-premises) E&M tie-line connection to an analog PBX.
- Supports E&M Types I, II and V.

E&M type selection is made through soft strapping. The E&M interface card is set to Type I at the factory. To change to a different type, configure the *E&M Type* parameter using the **LINK** item of the **SETUP/SLOT** menu. For details on product configuration, consult the *NetPerformer Reference Guides*.

- Supports Immediate Start, Wink Start or customized signaling on each E&M line.
- Quad port interface with 4 RJ-45 female connectors.
- Equipped with an onboard DSP processor.
- Supports voltage from -48VDC to +48VDC.

Up to 2 E&M interface cards can be installed in the SDM-9120 or SDM-9220, 3 in the SDM-9230, or 4 in the SDM-9140 providing up to 16 analog E&M voice ports in a single unit.



Figure 4-26: The E&M Interface Card

To interpret the status LEDs on this interface card, refer to [“Interface Card Status LEDs” on page 4-39](#).

E&M signaling requires two sets of wires: one to carry signaling information (the E and the M leads), and the other to carry the VF audio signals.

- Audio signals are transported over either two wires (two-wire E&M) or four wires (four-wire E&M).
- Up to eight wires can be required in all, depending on the type of E&M used on the PBX.



Caution

For important E&M wiring and grounding considerations, refer to [“E&M Wiring and Grounding” on page 3-24](#).

NOTE: Except for the **SDM-9140**, you must install a ferrite on each cable connected to an E&M port on an **SDM-9XXX Series unit**. These ferrites are *not* provided with the product package. For instructions, turn to [“Installing the Ferrites \(EMI Filters\)” on page 3-27](#).

Channelized Digital Interfaces

The following digital interface cards are available: single port T1/E1 and dual port T1/E1.

You must use DSP resources if you intend to use any of these interface cards for digital voice. See [“DSP Resources” on page 4-21](#).

T1/E1 Interface Cards

Ordering part numbers for **SDM-9220/9230**:

161-1032-001 for the single port interface card
161-1032-002 for the dual port interface card.

Ordering part numbers for **SDM-9120**:

161-1332-001 for the single port interface card
161-1332-002 for the dual port interface card.

Ordering part numbers for **SDM-9140**:

161-1432-001 for the single port interface card
161-1432-002 for the dual port interface card.

- Single port interface with one RJ-48 female connector
- Dual port interface with two RJ-48 female connectors
- Two independent software configurable transceivers:
 - T1 (DS1)/ISDN-PRI: Provides a 1.544 Mbps channelized digital connection at 100 Ohms with up to 24 timeslots
 - E1 (CEPT) PCM-30/ISDN-PRI: Provides a 2.048 Mbps channelized digital connection with up to 32 timeslots, software selectable at 75 or 120 OhmsAn E1-75 connection requires an RJ-48 to E1-75 dual BNC adapter cable (Ordering part number: **161-0469-001**) and two jumpers for each port. See [“T1/E1 Interface Cards at 75 Ohms” on page 4-36](#), and [“E1-75 Jumpers” on](#)

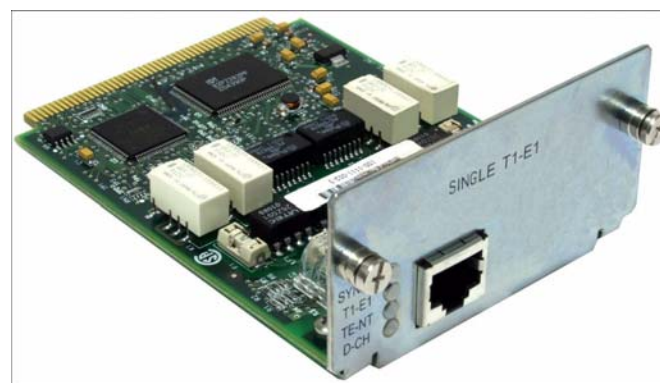
[page 3-13](#).

- Framing and line coding:
 - T1: D4 or ESF framing and B8ZS, B7ZS or AMI line coding
 - E1: Provides G.704 framing and HDB3 line coding
- Maximum 3 interface cards per unit, providing a maximum of 120 voice channels or 124 data channels

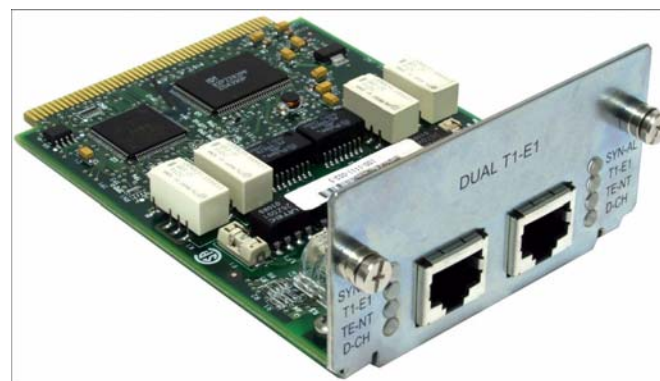
NOTE: Requires DSP resources for voice calls (see [“DSP Resources”](#) on page 4-21).

- Interoperability with other channelized digital interface cards:
 - Can be installed and operated on a unit that has one or more single/dual port T1/E1 or legacy E1 interface cards installed in the other slots.
 - **Cannot be installed on a unit that has one or more legacy T1 interface cards installed in another slot.**

Workaround: Substitute a dual port T1/E1 interface card for the T1 interface, and configure it for T1 operations.



Single-port interface card



Dual-port interface card

Figure 4-27: Single-Port and Dual-Port T1/E1 Interface Cards

NOTE: T1 operations are indicated when the port LED labeled **T1-E1** is green. E1 operations are indicated when the **T1-E1** LED is yellow. To interpret the other status LEDs, refer to [“Interface Card Status LEDs” on page 4-39](#).

**T1/E1 Interface
Cards at 75
Ohms**

Ordering part numbers for the SDM-9220/9230:

161-1032-001 (single port interface card) or
161-1032-002 (dual port interface card) with
AG2CA0001 (RJ-48 to dual BNC cable)

Ordering part numbers for the SDM-9120:

161-1332-001 (single port interface card) or
161-1332-002 (dual port interface card) with
AG2CA0001 (RJ-48 to dual BNC cable)

Ordering part numbers for the SDM-9140:

161-1432-001 (single port interface card) or
161-1432-002 (dual port interface card) with
AG2CA0001 (RJ-48 to dual BNC cable)

- Supports digital voice/data at 75 Ohms
- Provides a 2.048 Mbps channelized digital connection with up to 32 timeslots
- Single port interface with one RJ-48 female connector
- Dual port interface with two RJ-48 female connectors
- RJ-48 to E1-75 dual BNC adapter cable provides an E1-75 connection



Caution

To prevent electromagnetic interference, you must also strap 2 jumpers for each port that will be used as an E1-75 connection. For details and installation procedure, refer to [“E1-75 Jumpers” on page 3-13](#).

- G.704 framing and HDB3 line coding.
- Maximum 3 interface cards per unit, providing a maximum of 120 voice channels or 124 data channels.
Requires DSP resources for voice calls (see [“DSP Resources” on page 4-21](#)).
- Interoperability with other channelized digital interface cards:
 - Can be installed and operated on a unit that has one or more single/dual port T1/E1 or legacy E1 interface cards installed in the other slots.
 - **Cannot be installed on a unit that has one or more legacy T1 interface cards installed in the other slots.**

Workaround: Substitute a dual port T1/E1 interface card for the T1 interface, and configure it for T1 operations.

- E1 operations are indicated when the **T1-E1** LED is yellow (see [Figure 4-27](#)). To interpret the other status LEDs, see [“Interface Card Status LEDs”](#) on page 4-39.

NOTE: You must install a ferrite on each coaxial cable connected to an RJ48 to BNC cable associated with a T1/E1 interface card on an SDM-9XXX Series UAC unit.

These ferrites are *not* provided with the product package. For instructions, turn to [“Installing the Ferrites \(EMI Filters\)”](#) on page 3-27.

Serial Port (WAN) Interface

Ordering part number for SDM-9220/9230: 161-1035-000 (Dual Serial Port (WAN) Interface only)

The dual serial port interface card (also referred to as the Dual SCC interface card) provides the capacity to increase the number of serial ports on the SDM-9220/9230 according to data traffic needs. **Only one slot on the SDM-9220 or SDM-9230 can be loaded with a dual serial port interface card.**

Ordering part number for SDM-9120:
161-1335-000 (Single Serial Port (WAN) Interface only)

Ordering part number for SDM-9140:
161-1435-000 (Single Serial Port (WAN) Interface only)

On the SDM-9120 or SDM-9140 units, the single serial port interface card (also referred to as the single SCC interface card) provides the capacity to increase the number of serial ports according to data traffic needs.

These interface cards have the following characteristics:

- 1 or 2 universal serial ports per interface card, supporting V.35/V.11, TIA-232 (V.24), X.21, X.21 CE, TIA-449 (V.36) and TIA-530 interfaces.
- HD-26 female connectors that provide auto-detection of interface and gender according to the type of HD-26 custom cable that is installed. For details, refer to [“Custom Serial Cable Specifications”](#) on page 5-7.
- Each port permits connection of a WAN/user line for data traffic.
- Protocols supported: **P-SDLC, S-SDLC, HDLC, PVCN, FR-NET, FR-USER, DDCMP, T-ASYNC, R-ASYNC, BSC, COP, PASSTHRU**, synchronous and asynchronous **PPP, X25** and **SP** (available with SkyPerformer license only).
- Throughput speeds: 8 to 2048 Kbps, on both ports of the interface card.

- Together with the built-in serial port, a maximum of 3 serial ports are available on an SDM-9XXX Series unit.



Figure 4-28: Dual Serial Port Interface Card (SDM-9220 and SDM-9230 Only)

NOTE: There are no status LEDs on this interface card. All monitoring can be carried out using the Display Port State console command (**DS/PORT**), described in the *NetPerformer Reference Guides*.



Figure 4-29: The Single Port Interface Card (SDM-9120 or SDM-9140 Only)

NOTE: The Single Port Interface Card for the SDM-9140 unit is not supported on the SDM-9140 unit with Rev. A main board assembly.

4.12.6 Interface Card Status LEDs

Analog Voice Interface Cards

The LEDs on the front face of an analog voice interface card (FXS, FXO or E&M) indicate activity on the corresponding port. For the LED locations refer to:

- [“Dual FXS Interface Card \(above\), Quad FXS Interface Card \(below\)” on page 4-30](#)
- [“Dual FXO Interface Card \(above\), Quad FXO Interface Card \(below\)” on page 4-32](#)
- [“Dual FXO Interface Card \(above\), Quad FXO Interface Card \(below\)” on page 4-32](#)
- [“The E&M Interface Card” on page 4-33](#)

Intf. Card	LED	Color	Indication
FXS	ACT (one for each port)	Green	Activity (traffic transmitted or received) on the analog voice port located immediately above the LED. Blinks when the channel is ringing a phone

Table 4-9 Status LED Indicators on Analog Voice Interface Cards

Intf. Card	LED	Color	Indication
FXO	ACT (one for each port)	Green	Activity (traffic transmitted or received) on the analog voice port located immediately above the LED. Blinks when the channel detects ring voltage
Universal E&M/PTT	ACT (one for each port)	Green	Activity (traffic transmitted or received) on the analog voice port located immediately above the LED

Table 4-9 Status LED Indicators on Analog Voice Interface Cards

Channelized Digital Interface Cards

The T1/E1 interface cards have four LEDs per port. For the LED locations refer to:

- [“Single-Port and Dual-Port T1/E1 Interface Cards” on page 4-35](#)

Intf. Card	LED	Color	Indication
Single/ Dual port T1/E1	SYN-AL	Off	Either the port is not configured (State = DISABLED) or the interface card did not pass the power-up self test and is not functional
		Green	The digital link is synchronized
		Amber	One or more <i>Yellow Alarms</i> have occurred on the link. NOTE: The NetPerformer assumes that the physical link is out of sync when a yellow alarm is detected, and brings down any active channels on that link
		Red	A fatal error has occurred, for example, loss of synchronization on the digital link
	T1-E1	Off	Either the port is not configured or the interface card did not pass the power-up self test and is not functional
		Green	The port has been configured for T1 operation
		Yellow	The port has been configured for E1 operation
	TE-NT	Off	Either the port is not configured or the interface card did not pass the power-up self test and is not functional
		Green	The port <i>Line mode</i> has been configured for NT operation
		Yellow	The port <i>Line mode</i> has been configured for TE operation
	D-CH	Off	The D-channel is DOWN
		Green	The D-channel is UP

Table 4-10 Status LED Indicators on Channelized Digital Interface Cards

4.12.7 FXS and FXO Interface Cards

Use an RJ-11 cable provided in the product package to attach telephone and facsimile equipment to an FXS or FXO interface card (Subscriber Line connection). This cable is a flat telephone cable with RJ-11 plugs at both ends.

- Four standard RJ-11 to RJ-11 cables are provided for each quad port FXS or FXO interface card (Ordering part number: **161-1026-000**).
- Two standard RJ-11 to RJ-11 cables are provided for each dual port FXS or FXO interface card (Ordering part number: **161-1050-000**).

Each RJ-11 jack on an FXS or FXO interface card supports two pins:

- Ring (pin 3)
- Tip (pin 4)

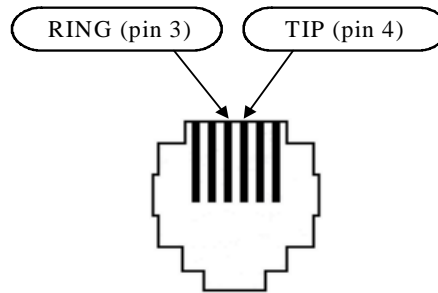


Figure 4-30: RJ-11 Pinout (Female Jack)

Cables from analog voice ports to the voice/fax equipment can be installed in any order.

► **To connect an RJ-11 cable:**

1. Connect one end of the cable to the RJ-11 connector on the interface card.
2. Connect the other end to the RJ-11 connector on the voice/fax unit: a telephone set, fax machine, key telephone system, CO (CX), or the station side of an analog PBX.



Caution

Use a two-wire cable for FXS connections. In rare circumstances, your telephone or fax may not work if you use a four-wire cable. Should this occur, **replace the four-wire cable with a two-wire cable**. If the problem persists, contact Technical Support.

NOTE: You must install a ferrite on each cable connected to an FXS or FXO port on an SDM-9XXX Series UAC unit installed in the European Union or Russia. These ferrites are *not* provided with the product package. For instructions, turn to [“Installing the Ferrites \(EMI Filters\)” on page 3-27](#).

4.12.8 E&M Interface Card

Use an RJ-45 cable provided in the product package to make an analog PBX tie-line connection on an E&M interface card.

This cable is a solid wire cable with 8 conductors and RJ-45 plugs (8 pins) at both ends.

Four RJ-45 to RJ-45 cables are provided for each E&M interface card.

The following table describes the RJ-45 pinout for an E&M port.

Pin No.	Usage	Description
1	SB	Signal Battery. Return for M Signal
2	M	Control Signal from PBX
3	R1	Voice from PBX (Transmit Ring)
4	R	Voice to PBX (Receive Ring) two-wire connection
5	T	Voice to PBX (Receive Tip) two-wire connection
6	T1	Voice from PBX (Transmit Tip)
7	E	Control Signal to PBX
8	SG	Signal Ground

Table 4-11 RJ-45 Pinout for E&M Interface Card

NOTE: The pinout functions on an E&M/PTT port are slightly different from that of a standard E&M port.

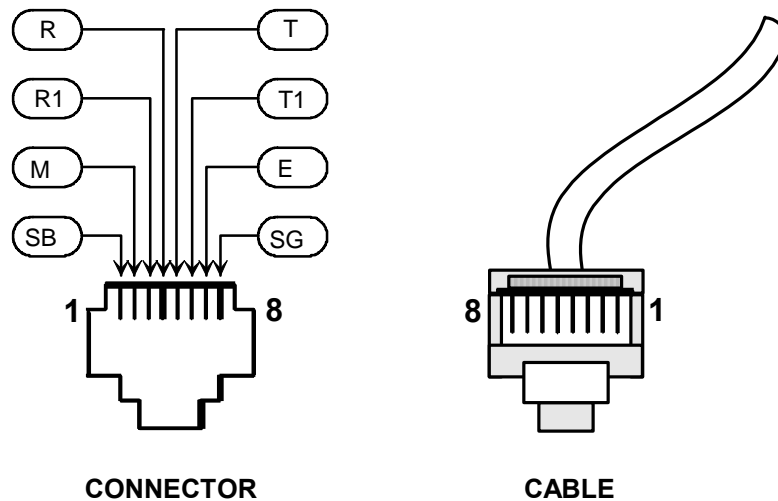


Figure 4-31: RJ-45 Pinout (Female Jack) for the E&M Interface Card

► **To connect this cable:**

1. Connect one end of the cable to the RJ-45 connector on the interface card.
2. Connect the other end to the RJ-45 connector on the trunk side of the PBX
As an alternative, you can cut it off and punch on a Telco/PTT block termination.



Caution

For important E&M wiring and grounding considerations, refer to [“E&M Wiring and Grounding”](#) on page 3-24.

NOTE: You must install a ferrite on each cable connected to an E&M port on an SDM-9XXX Series unit in all countries. These ferrites are *not* provided with the product package. For instructions, turn to [“Installing the Ferrites \(EMI Filters\)”](#) on page 3-27.

4.12.9 T1/E1 Interface Cards

Use an RJ-48 cable for T1/E1 (E1-120) connections. This cable is a standard unshielded twisted pair (UTP) male-male cable with RJ-48 connectors.

NOTE: One RJ-48 to RJ-48 cable is provided for each physical digital port on the T1/E1 interface cards.

TE Mode		NT Mode	
Pin No.	Signal	Pin No.	Signal
1	Receive (+)	1	Transmit
2	Receive (-)	2	Transmit
3	(not used)	3	(not used)
4	Transmit (+)	4	Receive
5	Transmit (-)	5	Receive
6	(not used)	6	(not used)
7	(not used)	7	(not used)
8	(not used)	8	(not used)

Table 4-12 RJ-48 Pinout for Single- or Dual-Port T1/E1 Interface Cards

► **To connect an RJ-48 cable:**

1. Connect one end of the cable to the RJ-48 connector on the interface card.
2. Connect the other end to the network or to the RJ-48 connector on another digital interface card.

4.12.10 Supporting E1-75 on a T1/E1 Port

An E1-75 connection requires:

- An adapter for E1-75 operations, as described in the next section.
- Strain relief for the cables to ensure that they do not loosen from the digital port. See [“E&M Wiring and Grounding” on page 3-24](#).
- 2 jumpers on the interface board, to prevent electromagnetic interference. For installation, refer to [“E1-75 Jumpers” on page 3-13](#).

Adapter Cable

- RJ-48M to E1-75 dual BNC adapter cable (Ordering part number: **AG2CA0001**)

- Installed between the digital port and the BNC coaxial cable. See [“Connect the following adapter for E1-75 operations onto the digital port: RJ-48 to E1-75 dual BNC adapter cable \(Ordering part number: AG2CA0001\).” on page 3-15.](#)

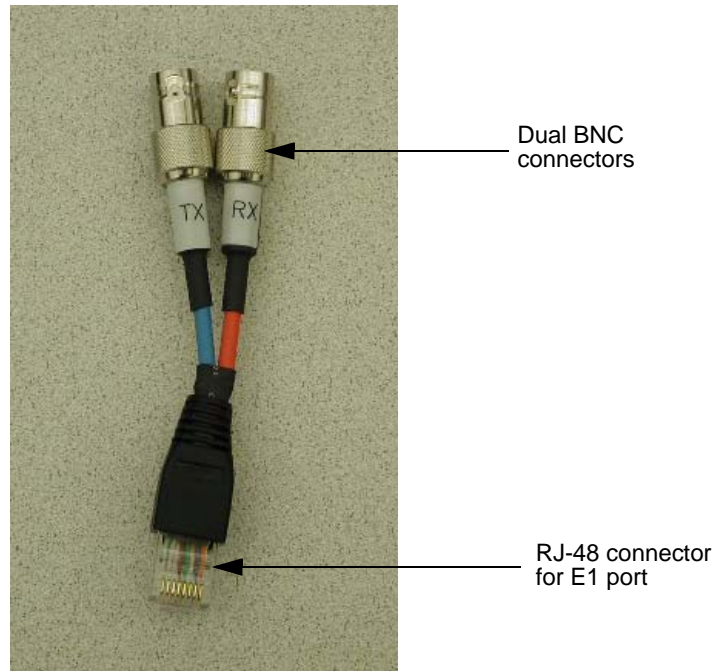


Figure 4-32: RJ-48 to E1-75 Dual BNC Adapter Cable

Cables

Use BNC cables for E1-75 connections on a single or dual port T1/E1 interface card that has been configured for E1-75 operations. Two BNC cables are required for each interface card, one for the receive side and the other for the transmit side.

► To connect the BNC cables:

1. Connect one end of each cable to the BNC connectors on the interface card, respecting the transmit (TX connector) and receive (RX connector) requirements for the cable terminations.
2. Connect the other end of each cable to the network or the BNC connectors on another interface card set to E1-75. Once again, select the TX or RX connector according to your application requirements.
3. Provide adequate strain relief for the cables, as described in the **Caution** below.



Caution

The adapter and attached BNC coaxial cables require strain relief to ensure that they do not loosen from the digital port:

- If the unit is mounted in a rack, **you must secure the cables to a side rail using tie-wraps, or support the weight of the cables on a tray**
- If the unit is on a table, **you must support the weight of the cables on the table.**

The digital port can desynchronize and the unit reset if the full weight of the BNC coaxial cables is unsupported.

NOTE: If the line does not come up on this interface card, the problem could be related to the TX/RX cable connections. Try inverting the cables attached to the left (TX) and right (RX) BNC connectors of the port.

5

Serial Port and User Equipment Connections

This chapter provides information about the serial ports, the custom HD-26 cables, step-by-step procedures on how to connect the user equipment, WAN/User port specifications, custom serial cable specifications as well as serial port connector and custom HD-26 cable set connectivity.

5.1 Chapter Overview

This chapter contains the following sections:

- [“Serial Port” on page 5-3](#)
- [“Custom HD-26 Cables” on page 5-3](#)
- [“Connecting the User Equipment” on page 5-5](#)
- [“WAN/User Port Specifications” on page 5-6](#)
- [“Custom Serial Cable Specifications” on page 5-7](#)
- [“Serial Port Connector and Custom HD-26 Cable Set Connectivity” on page 5-9](#)

5.2 Serial Port

One (1) built-in serial port for WAN/user traffic, with 2 optional serial ports using the dual serial port interface card (SDM-9220/9230 only) or two single serial port interface cards (SDM-9120/9140 only):

- HD-26 female connector
- Asynchronous speeds: 300 bps to 115.2 Kbps
- Synchronous speeds: 1200 bps to 6 Mbps (6144 Kbps) without data compression; 896 Kbps link port maximum speed with data compression

For further details concerning the serial port, turn to [“WAN/User Port Specifications” on page 5-6](#).

5.3 Custom HD-26 Cables

Each serial port requires a **custom-made HD-26 male cable** which can be ordered from Memotec Inc. or your NetPerformer distributor. For ordering information, refer to [“Sales Contacts” on page 1-6](#).

NOTE: The same custom cables are used for the port built into the base unit and ports on the dual serial port interface card.

The required cable depends on the interface and gender of the attached equipment. Twelve custom HD-26 serial cable models are available:

- V.35/V.11 DCE, V.35/V.11 DTE (for details see [“V.35/V.11 Cables” on page 5-7](#))
- TIA-232 (V.24) DCE, TIA-232 (V.24) DTE (see [“TIA-232 \(V.24\) Cables” on page 5-7](#))
- X.21 DCE, X.21 DTE, with 4-40 screw on the DB-25 connector (see [“X.21 Cables” on page 5-7](#))
- X.21 EU DCE, X.21 EU DTE, with metric M3 screw on the DB-15 connector (see [“X.21 EU Cables” on page 5-8](#))
- TIA-449 (V.36) DCE, TIA-449 (V.36) DTE (see [“TIA-449 \(V.36\) Cables” on page 5-8](#))
- TIA-530 DCE, TIA-530 DTE (see [“TIA-530 Cables” on page 5-8](#))

All cables are 1.8 meters (6 feet) long, and have HD-26 male connectors at one end. At the other end:

- A male connector indicates that the cable is DTE and that it connects to a DCE device (a modem, for example).
- A female connector indicates that the cable is DCE and that it connects to a DTE device (a terminal or another NetPerformer, for example).

NOTE: When ordering a cable for the serial port, **make sure you specify the correct gender.**

The HD-26 female connector automatically detects the interface and gender according to the type of HD-26 custom cable that is installed. For example, with a V.35/V.11 DTE cable the port will select V.35/V.11 electrical characteristics and DTE. Software configuration of these characteristics is thus not required.

For details concerning the custom serial cable, refer to [“Custom Serial Cable Specifications” on page 5-7.](#)

5.4 Connecting the User Equipment

► **To connect the user equipment to the serial port:**

1. Locate the HD-26 custom cable that is appropriate for:
 - The device you are attaching: DTE or DCE
 - The interface you want to use: V.35/V.11, TIA-232 (V.24), X.21, X.21 EU, TIA-449 (V.36) or TIA-530.
2. Connect the male end of the HD-26 cable to a serial port on the SDM-9XXX Series unit.
3. Connect the other end of the cable to the user device (CSU/DSU, modem, router, front end processor, etc.).



Caution

Do not connect a data port (WAN/user) to a host, PU, or Frame Relay device until you have configured the port protocol via the software. Refer to the *NetPerformer Reference Guides* for details.

5.4.1 Activating the User Equipment Connection



Caution

Configure the E&M interface type **before you connect the cables to ports on the E&M interface card**. Otherwise, the interface card could be damaged. FXO, FXS and digital voice channels can be configured before or after cable connection.

► **To activate the user equipment connection:**

1. Configure all parameters and options for the connection. Refer to the *NetPerformer Reference Guides*, which is included on the *NetPerformer Documentation CD*.
2. Activate a data connection by bringing up the connected user equipment.
3. Activate a voice connection by dialing a speed dial number to place a call.
4. Check the status of the NetPerformer, its connections and all active channels, ports, PVCs and SVCs by executing the statistics commands (refer to the *NetPerformer Reference Guides* for details).

5.5 WAN/User Port Specifications

- 1 built-in serial port, configurable as user or link, supporting V.35/V.11, TIA-232 (V.24), X.21, X.21 EU, TIA-449 (V.36) and TIA-530 interfaces.
- Maximum speed without compression: 6 Mbps (6144 Kbps).
For a port with INTERNAL clocking, if the port speed is configured higher than 2 Mbps (2048 Kbps), the clock speed will be 3 Mbps (3072 Kbps) or 6 Mbps (6144 Kbps), whichever is closer to the configured speed. For EXTERNAL clocking all port speeds are supported.
- Link port maximum speed with compression: 896 Kbps.
- HD-26 female connectors, gender and interface autodetect from custom HD-26 cables: V.35 DCE, V.35 DTE, X.21 DCE, X.21 DTE, X.21 EU DCE, X.21 EU DTE, TIA-232 DCE, TIA-232 DTE, TIA-449 DCE, TIA-449 DTE, TIA-530 DCE, TIA-530 DTE.
- Circuits: either leased, switched or Frame Relay.
- Coding: NRZI or NRZ.
- WAN port protocols: synchronous full-duplex HDLC, Frame Relay (FR-USER for network connection), RFC-1490.
- Synchronous user port protocols: HDLC, Synchronous PPP.
- Frame Relay protocols: Frame Relay User (FR-USER), Frame Relay Network (FR-NET), RFC-1490, UNI-DTE, UNI-DCE.
- Frame Relay management: LMI, ANSI TI.617/Annex D, ITU-T Q.933/Annex A, CLLM or disabled.
- PVC switching: 300 PVCs, automatic DLCI discovery.
- SVCs: Frame Relay telephony applications, one SVC per voice call.
- SNA: SDLC, LAN or Frame Relay RFC1490 (BAN, BNN); SDLC spoofing of up to 64 PUs, type 1, 2.0, 2.1 and 4/5, local SDLC and LLC2 spoofing, SDLC-to-LLC2 conversion.
- Asynchronous user port protocols: ENQ/ACK, XON/XOFF, CTS/DTR, Transparent, Reliable, Asynchronous PPP.

5.6 Custom Serial Cable Specifications

In the following sections the *Ordering part number* is required for ordering extra cables. The *Stock number* is printed on the cable.

5.6.1 V.35/V.11 Cables

- HD-26 male connector at one end for connection to the NetPerformer serial port
- ISO-2593 female (DCE) or male (DTE) connector at the other end for connection to the V.35/V.11 equipment

- Use the DCE cable for connection to a male connector on the V.35/V.11 equipment (typically a DTE device).

Ordering part number **161-0893-001**, Stock number **502-0940-006**.

- Use the DTE cable for connection to a female connector on the V.35/V.11 equipment (typically a DCE device).

Ordering part number **161-0894-001**, Stock number **502-0941-006**.

5.6.2 TIA-232 (V.24) Cables

- HD-26 male connector at one end for connection to the NetPerformer serial port
- DB-25 female (DCE) or male (DTE) connector at the other end for connection to the TIA-232 (V.24) equipment

- Use the DCE female cable for connection to a male connector on the TIA-232 (V.24) equipment (typically a DTE device).

Ordering part number **161-0897-001**, Stock number **502-0944-006**.

- Use the DTE male cable for connection to a female connector on the TIA-232 (V.24) equipment (typically a DCE device).

Ordering part number **161-0898-001**, Stock number **502-0945-006**.

5.6.3 X.21 Cables

An X.21 cable has a 4-40 screw on the DB-15 connector.

- HD-26 male connector at one end for connection to the NetPerformer serial port
- DB-15 female (DCE) or male (DTE) connector at the other end for connection to the X.21 equipment

- Use the DCE female cable for connection to a male connector on the X.21 equipment (typically a DTE device).

Ordering part number **161-0895-001**, Stock number **502-0942-006**.

- Use the DTE male cable for connection to a female connector on the X.21 equipment (typically a DCE device).

Ordering part number **161-0896-001**, Stock number **502-0943-006**.

5.6.4 X.21 EU Cables

NOTE: An X.21 EU cable has a metric M3 screw on the DB-15 connector.

- HD-26 male connector at one end for connection to the NetPerformer serial port
- DB-15 female (DCE) or male (DTE) connector at the other end for connection to the X.21 equipment
 - Use the DCE female cable for connection to a male connector on the X.21 EU equipment (typically a DTE device).
Ordering part number **161-0904-001**, Stock number **502-0951-006**.
 - Use the DTE male cable for connection to a female connector on the X.21 EU equipment (typically a DCE device).
Ordering part number **161-0903-001**, Stock number **502-0950-006**.

5.6.5 TIA-449 (V.36) Cables

- HD-26 male connector at one end for connection to the NetPerformer serial port
- DB-37 female (DCE) or male (DTE) connector at the other end for connection to the TIA-449 (V.36) equipment
 - Use the DCE female cable for connection to a male connector on the TIA-449 (V.36) equipment (typically a DTE device).
Ordering part number **161-0901-001**, Stock number **502-0948-006**.
 - Use the DTE male cable for connection to a female connector on the TIA-449 (V.36) equipment (typically a DCE device).
Ordering part number **161-0902-001**, Stock number **502-0949-006**.

5.6.6 TIA-530 Cables

- HD-26 male connector at one end for connection to the NetPerformer serial port
- DB-25 female (DCE) or male (DTE) connector at the other end for connection to the TIA-530 equipment
 - Use the DCE female cable for connection to a male connector on the TIA-530 equipment (typically a DTE device).
Ordering part number **161-0899-001**, Stock number **502-0946-006**.
 - Use the DB-25/DTE male cable for connection to a female connector on the TIA-530 equipment (typically a DCE device).
Ordering part number **161-0900-001**, Stock number **502-0947-006**.

5.7 Serial Port Connector and Custom HD-26 Cable Set Connectivity

[Table 5-1](#) on the next page provides the pinout and directionality of signals on the SDM-9XXX Series serial port connectors and the custom HD-26 cable that connects to these connectors.

NOTE: For V.24 and V.35, refer to V.35 for the ITU circuit number

Descriptions within parentheses refer to X.21 only

The abbreviation *n/a* means **not applicable**.

The abbreviation *n/s* means **not supported**.

Main Board		Cable		V.35		TIA-232/ V.24		TIA-530		TIA-449/ V.36		X.21		⇐ Interface	
HD-26 Female		HD-26 Male		ISO 2593		DB-25/ISO - 2110		DB-25		DB-37/ISO- 4902		DB-15/ISO- 4903		⇐ Connector	
Net- Name	Pin	Pin DTE	Pin DCE	Circuit	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal from	Description
TXDA	2	2	3	103	P	TXD	2	TXDA	2	TXDA	4	T[A]	2	DTE	Transmit Data (Transmit on wire)
TXDB	14	14	16	103	S	n/a	n/a	TXDB	14	TXDB	22	T[A]	9	DTE	
RXDA	3	3	2	104	R	RXD	3	RXDA	3	RXDA	6	R[A]	4	DCE	Receive Data (Receive on wire)
RXDB	16	16	14	104	T	n/a	n/a	RXDB	16	RXDB	24	R[A]	11	DCE	
TXCA	15	15	15	114	Y	TXC	15	TXCA	15	TXCA	5	S[A]	6	DCE	Transmit Clock (Signal element timing)
TXCB	12	12	12	114	AA	n/a	n/a	TXCB	12	TXCB	23	S[A]	13	DCE	
RXCA	17	17	24	115	V	RXC	17	RXCA	17	RXCA	8	B[A]	7	DCE	Receive Clock (Signal ele-ment timing)
RXCB	9	9	11	115	X	n/a	n/a	RXCB	9	RXCB	26	B[B]	14	DCE	
XTXCA	24	24	17	113	U	XTXC	24	XTXCA	24	XTXCA	17	n/a	n/a	DTE	External Transmit Clock
XTXCB	11	11	9	113	W	n/a	n/a	XTXCB	11	XTXCB	35	n/a	n/a	DTE	
DTRA	20	20	6	108	H	DTR	20	DTRA	20	DTRA	12	C[A]	3	DTE	Data Terminal Ready (Control on wire)
DTRB	23	23	22	n/a	n/a	n/a	n/a	DTRB	23	DTRB	30	C[B]	10	DTE	
DSRA	6	6	20	107	E	DSR	6	DSRA	6	DSRA	11	n/a	n/a	DCE	Data Set Ready
DSRB	22	22	23	n/a	n/a	n/a	n/a	DSRB	22	DSRB	29	n/a	n/a	DCE	

Table 5-1 Serial Connector and NetPerformer Custom HD-26 Cable Set

Main Board	Cable			V.35		TIA-232/ V.24		TIA-530		TIA-449/ V.36		X.21		← Interface	
RTSA	4	4	5	105	C	RTS	4	RTSA	4	RTSA	7	n/a	n/a	DTE	Ready To Send
RTSB	19	19	13	n/a	n/a	n/a	n/a	RTSB	19	RTSB	25	n/a	n/a	DTE	
CTSA	5	5	4	106	D	CTS	5	CTSA	5	CTSA	9	n/a	n/a	DCE	Clear To Send
CTSB	13	13	19	n/a	n/a	n/a	n/a	CTSB	13	CTSB	27	n/a	n/a	DCE	
DCDA	8	8	8	109	F	DCD	8	DCDA	8	DCDA	13	I[A]	5	DCE	Data Carrier Detect (Indication on wire)
DCDB	10	10	10	n/a	n/a	n/a	n/a	DCDB	10	DCDB	31	I[B]	12	DCE	
n/a	n/a	n/a	n/a	140	N	RL	21	n/a	n/a	RL	14	n/a	n/a	DTE	Remote Loopback
n/a	n/a	n/a	n/a	141	L	LL	18	n/a	n/a	LL	10	n/a	n/a	DTE	Local Loopback
n/a	n/a	n/a	n/a	142	NN	TI	25	n/a	n/a	TI	18	n/a	n/a	DCE	Test Indicator
n/a	n/a	n/a	n/a	125	n/s	CI	22	n/a	n/a	CI	15	n/a	n/a	DCE	Call Indicator
SGND	7	7	7	102	B	SGND	7	SGND	7	SGND	19	SGND	8	n/a	Signal Ground
n/a	n/a	n/a	n/a	102a	n/s	n/a	n/a	n/a	n/a	SGND	37	n/a	n/a	n/a	DTE Common Return
n/a	n/a	n/a	n/a	102b	n/s	n/a	n/a	n/a	n/a	SGND	20	n/a	n/a	n/a	DCE Common Return
SHIELD	1	1	1	Shield	A	Shield	1	Shield	1	Shield	1	Shield	1	n/a	Shield

Table 5-1 Serial Connector and NetPerformer Custom HD-26 Cable Set

NOTE: The pinout above indicates the active signals that are used when communicating with external DTE or DCE equipment via a NetPerformer serial interface. These HD-26 cables are custom and proprietary to the NetPerformer. The information in this table is not sufficient to manufacture a working cable that can interoperate with the serial port on the NetPerformer unit.



Troubleshooting Tips

This section provides NetPerformer SDM-9XXX Series unit troubleshooting tips that describe the symptoms, the possible issues and the solutions.



6.1 Chapter Overview

This chapter contains the following section:

- [“Symptoms, Issues and Solutions” on page 6-3](#)

6.2 Symptoms, Issues and Solutions

Symptom	Possible Issue	Solution
<p>Unit does not start, with:</p> <p>POWER LED off</p> <p>STATUS LED off</p> <p>ALARM LED off</p>	No power to unit	<p>Make sure the power cord is properly plugged into the power inlet on the unit, and the power outlet on the wall.</p> <p>Check power cord and replace immediately if damaged.</p> <p>Make sure the power outlet has power.</p>
<p>Unit does not start, with:</p> <p>POWER LED amber</p> <p>STATUS LED any state</p> <p>ALARM LED any state</p>	Unit may be faulty	Contact Technical Support for assistance (see “Technical Support” on page 1-11).
<p>Unit starts, with:</p> <p>POWER LED green</p> <p>STATUS LED any state</p> <p>ALARM LED red</p>	A software reset occurred	<p>Enter DA at the console command line to view the alarms.</p> <p>If a soft start (rst) alarm has been logged with the notation M=xx A=xx D=xx, enter ER to dump the Exit Record. Send to Technical Support.</p> <p>Enter CE (Clear ERR/DIAG LED) to turn the ALARM LED off.</p>
<p>Unit starts, with an alarm message of the type:</p> <p>An error has occurred (0x00100000 0xC0000002), please call technical support.</p>	A hardware error occurred	<p>Enter DA at the console command line to view the alarms.</p> <p>Contact Technical Support and provide alarm codes.</p>

Symptom	Possible Issue	Solution
Console connection does not work, with: POWER LED green STATUS LED amber ALARM LED any state	Incorrect cable connection	Make sure you are using the factory-supplied console cable. Make sure the cable is properly plugged into the CONSOLE port and the console terminal COM port.
	HyperTerminal communications program	Change <i>Emulation</i> parameter setting from Auto detect to ANSI .
Console terminal displays unreadable characters	Incorrect modem setting	Set the modem to ignore DTR: execute the AT command at&d0 Set the modem to Auto Answer mode: execute ats0=1 .
	Console terminal was not set to the default console speed before startup	Set your console terminal emulator to 9600 bps, and start again.
LAN connection does not work	No power to LAN hub	Make sure the power outlet has power. Make sure the LAN hub is properly plugged in and switched on.
	Incorrect cable connection	If LINK LED is off, check LAN cable and replace if damaged. If LINK LED is on, make sure you are using the correct IP address for transmissions.

Symptom	Possible Issue	Solution
User equipment connection does not work	No power to user equipment	<p>Make sure AC power outlet has power.</p> <p>Make sure user equipment is properly plugged in and switched on.</p>
	Incorrect cable connection	<p>Make sure you have the correct HD-26 custom cable for the gender and interface of the user equipment (see “Custom Serial Cable Specifications” on page 5-7).</p> <p>Make sure the cable is properly plugged into the serial port and the user equipment.</p>
	Modem signals down	<p>Enter DPORT at the console command line to view the current modem signal status on all ports.</p> <p>If modem signals are down, make sure the modem is plugged in, switched on and properly connected to the port.</p>



Appendix A: Warranty Information

This appendix explains the conditions of the product warranty.

Chapter Overview

This chapter contains the following sections:

- [“Memotec Standard Warranty Policy” on page A-3](#)

Memotec Standard Warranty Policy

This standard warranty policy sets out the sole obligation and liability of Memotec and the customer's exclusive remedies for claims based on defects in or failure of any product sold (including software) by Memotec. This standard warranty policy replaces all other warranties, expressed or implied with respect to Products sold or services rendered by Memotec Inc. No representative is authorized to assume for Memotec any other liability in connection with the sale of the Product.

IN NO EVENT SHALL MEMOTEC BE LIABLE, WHETHER IN CONTRACT OR IN TORT OR ON ANY OTHER BASIS, FOR ANY DAMAGES SUSTAINED BY THE DISTRIBUTOR/ BUSINESS PARTNER OR ANY OTHER PERSON (a "Customer") ARISING FROM OR RELATED TO LOSS OF USE, FAILURE OR INTERRUPTION IN OPERATION OF ANY PRODUCTS, OR DELAY IN MAINTENANCE OR FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT OR SPECIAL DAMAGES OR LIABILITIES, OR FOR LOSS OF REVENUE, LOSS OF BUSINESS OR OTHER FINANCIAL LOSS ARISING OUT OF OR IN CONNECTION WITH THE SALE, LEASE, MAINTENANCE, USE PERFORMANCE OR FAILURE OF A PRODUCT.

Hardware Warranty

Memotec warrants that each new Product sold by Memotec will be free from defective material and workmanship. Memotec agrees to remedy in accordance with terms specified below any such defect which is disclosed under conditions of normal installation, use and service. To exercise the warranty, the Customer must deliver the product intact for examination, with all transportation charges prepaid, to the facility designated by Memotec. Burden for all shipping costs back to Memotec are the responsibility of the Customer.

Returns for repair will NOT be accepted without prior authorization from Memotec. When a return is authorized, a Return Authorization number (RA number) is assigned. The RA number must be written on the outside of each returning package. An RA number may be obtained by sending an e-mail (including a description of the problem) to memotecrepair@memotec.com or a fax at: +1-514-738-4436.

The specific terms of the warranty are as follows:

1. The Standard Warranty Period commences on the date the title of property of the Product is transferred to the customer, which is equal to the delivery date of the Product as per the Incoterms 2010 applicable definition, as specified in the Purchase Order.
2. The warranty applies to the Customer, provided however, that when a Distributor/ Business Partner resells any Products, pursuant to its rights hereunder, the said warranty shall apply to any end-users which purchase such Products from Distributor/ Business Partner.
3. Memotec will be responsible for both material and labor required to effect all repairs under terms of the warranty for the Standard Warranty Period (see section below for Standard Warranty Period for specific Memotec product lines), providing the Product is returned to Memotec as specified above.

4. During the Standard Warranty Period, the Distributor/Business Partner or end-user may return defective parts for replacement at no charge (except shipping to Memotec), in lieu of returning the complete Product.
5. The warranty does not apply if:
 - Any part of a product that has been installed, altered, repaired, or misused in any way that, in the opinion of Memotec, would affect the reliability or detracts from the performance of any part of the product, or is damaged as the result of use in a way or with equipment that had not been previously approved by Memotec;
 - The warranty seal has been broken or the Product has been opened without obtaining prior authorization in writing from Memotec. This excludes Product option upgrades as long as Memotec documented procedures for option upgrades are strictly adhered to;
 - The Product has had the serial number altered, defaced or removed; or
 - The Product has been damaged by accessories, peripherals, and/or other attachments not approved by Memotec.
6. The warranty does not cover replacement or repair necessitated by loss or damage from any cause beyond the control of Memotec, such as lightning (power surge or brown out) or other natural and weather related events, outbreak of hostilities or wartime environments.
7. The warranty does not cover damage or loss incurred in any transportation of the product.
8. The warranty does not cover any labor involved in the removal and or reinstallation of warranted equipment or parts on site, or any labor required to diagnose the nature of the problem and establish the necessity for repair or replacement of the Product.
9. The warranty excludes any responsibility by Memotec for incidental or consequential damages arising from the use of the Product, or for any inability to use them either separate from or in combination with any other equipment or products.
10. It is the Distributor/Business Partner's (or direct purchasers) responsibility to ensure all paperwork complies with customs requirements.
11. Memotec is not responsible for any storage fees that shipping companies may charge nor for any delay caused by lack of information on Product that is returned.
12. The Distributor/Business Partner (or direct purchaser) is responsible for all custom and shipping fees related to the returned Product.

A fixed charge established for each product will be imposed for all equipment returned for warranty repair where Memotec cannot identify the cause of the reported failure. The fee for this service is defined in the current "Memotec Service Programs" document, identified as "No Problem Found Fee".

Memotec also offers a Warranty Extension Service for most products, providing yearly extensions to the Standard Warranty Period. All the terms of this Standard Warranty Policy apply for the warranty extension period for an additional price. The price and the additional benefits of the Warranty Extension Service are described in the "Memotec Service Programs" document.

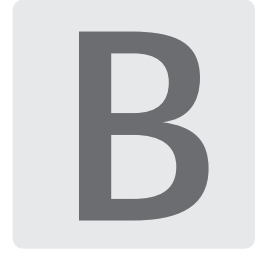
Repaired units benefit from the standard guarantee for a period of 90 days, or until the end of the Standard Warranty Period, whichever is the later date.

Standard Warranty Period for Specific Memotec Product Lines (other than software)

- CX-U, CX-UA, FX, HX, WX, NP (NetPerformer), AG (AccessGate) – 24 months
- Legacy CX – 12 months
- NMS and Third Party Sourced Equipment – 12 months, or differently as specified in quotation.

Limited Software Warranty

Software is warranted to substantially conform to Memotec's specifications for a limited period of ninety (90) days from the date of delivery. Memotec's sole obligation under this warranty shall be limited to using its best commercial efforts to correct such Software as soon as practical after Distributor/Business Partner or end-user has notified Memotec of such defects. Memotec does not warrant that operation of any of the Software shall be uninterrupted or error-free or that functions contained in the licensed Software shall operate in combinations which may be selected for use by the Distributor's/Business Partner or end-user or meet the Distributor's/Business Partner's or end-user's requirements. No warranty shall apply to any Software that is modified without Memotec's prior written consent.



Appendix B: Compliance Information and Safety Warning

This appendix provides compliance, regulatory and environmental details, safety warnings and precautions, and cautionary information on making changes to the NetPerformer SDM-9XXX Series unit.



Chapter Overview

This chapter contains the following sections:

- [“Regulatory – Compliance and Agency Approval”](#) on page B-3
- [“Compliance and Regulatory Statements”](#) on page B-5
- [“Environmental Information”](#) on page B-18
- [“Safety Warnings and Precautions”](#) on page B-20
- [“Making Changes or Modifications”](#) on page B-21

Regulatory – Compliance and Agency Approval

SDM-9220 UAC and SDM-9230 UAC: these products comply with or have obtained Regulatory Agency approval at least against the following standards:

- EMC – Emission – Class A
 - FCC Part 15
 - EN55032:2012
 - AS/NZS CISPR32
- EMC – Immunity
 - EN 55024:2010
- Safety
 - EN60950-1:2006 + A11, A1, A12, A2
 - IEC 60950-1:2005 + A1, A2
 - UL 60950-1
 - CSA C22-2 N°60950-1
 - AS/NZS 60950
- Telecom – Digital
 - FCC Part 68 + TIA-968-A
 - IC CS-03 Issue 8 - Part 2 and Part 6
 - AS/ACIF S016
 - AS/ACIF S031
 - AS/ACIF S038
 - TBR 1 + TBR 2
 - TBR 3
 - TBR4
 - TBR 12 + TBR 13
 - NTR4
- Telecom – Analog
 - FCC Part 68 + TIA-968-A
 - IC CS-03 Issue 8 - Part 1
 - AS/ACIF S002
 - TBR 15 + TBR 17
 - TBR 21

SDM-9120 UAC: this product complies with or has obtained Regulatory Agency approval at least against the following standards:

- EMC – Emission – Class A
 - FCC Part 15
 - EN55032:2012
 - AS/NZS CISPR32
- EMC – Immunity
 - EN 55024:2010
- Safety
 - EN60950-1:2006 + A11, A1, A12, A2
 - IEC 60950-1:2005 + A1, A2
 - UL 60950-1
 - CSA C22-2 N°60950-1

- Telecom – Digital
IC CS-03 Issue 8 - Part 2 and Part 6
TBR 1 + TBR 2
TBR4
TBR 12 + TBR 13
- Telecom – Analog
IC CS-03 Issue 8 - Part 1
TBR 15 + TBR 17
TBR 21

Compliance and Regulatory Statements

EU Directives: EMC + Safety + RoHS



DECLARATION OF CONFORMITY

We **MEMOTEC, Inc**
declare under our sole responsibility that the NetPerformer:

SDM-9220
Consisting of the model SDM-9220 UAC and SDM-9220 DC

SDM-9230
Consisting of the model SDM-9230 UAC and SDM-9230 DC

With interface cards:

- SDM-92X0 Quad E&M (100-1092-502)
- SDM-92X0 Quad FXS (100-1106-502)
- SDM-92X0 Dual FXS (100-1106-503)
- SDM-92X0 Quad FXO (100-1107-503)
- SDM-92X0 Dual FXO (100-1107-504)
- SDM-92X0 Single Serial (100-1126-501)
- SDM-92X0 Single T1/E1 (100-1111-501)
- SDM-92X0 Dual T1/E1 (100-1111-502)

With Cable :

- RJ-48 to Dual BNC (502-0458-001)

to which this declaration relates, is in conformity with the following European Directives:

2014/30/EU (EMC)
2014/35/EU (Safety)
2011/65/EU (RoHS)

The standards used to show compliance are:

EN 55032:2012/AC:2013
EN 55024:2010
EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013
EN 50581:2012

The technical file is kept at:

Memotec Inc
7755 Blvd Henri Bourassa west
Montreal, Quebec, Canada, H4S 1P7

Montreal, September 21, 2017


Claude Rocray
Vice-President, Engineering

7755 BLVD HENRI BOURASSA WEST, MONTREAL (QUEBEC) H4S 1P7 CANADA | O: +1 514.738.4781 | F: +1 514.738.4436
WWW.MEMOTEC.COM A SUBSIDIARY OF COMTECH EF DATA



DECLARATION OF CONFORMITY

We **MEMOTEC, Inc**
declare under our sole responsibility that the NetPerformer:

SDM-9120
Consisting of the model SDM-9120 UAC

- With interface card:
- SDM-92X0 Quad E&M (100-1092-502A)
 - SDM-92X0 Quad FXS (100-1106-532A)
 - SDM-92X0 Dual FXS (100-1106-533A)
 - SDM-92X0 Quad FXO (100-1107-503A)
 - SDM-92X0 Dual FXO (100-1107-504A)
 - SDM-92X0 Single Serial (100-1126-501A)
 - SDM-92X0 Single T1/E1 (100-1111-501A)
 - SDM-92X0 Dual T1/E1 (100-1111-502A)

to which this declaration relates, is in conformity with the following European Directives:

- 2014/30/EU (EMC)
- 2014/35/EU (Safety)
- 2011/65/EU (RoHS)

Recast) The standards used to show compliance are:

- EN 55032:2012/AC:2013
- EN55024:2010
- EN 61000-3-2:2014
- EN 61000-3-3 :2013
- EN 60950-1:2006 + A11:2009 + A1:2010 + A12:2011 + A2:2013
- EN 50581:2012

The technical file is kept at:
Memotec Inc
7755 Blvd Henri Bourassa west
Montreal, Quebec, Canada, H4S 1P7

Montreal, September 21, 2017

Claude Rocray
Vice-President, Engineering

DECLARATION OF CONFORMITY

We **MEMOTEC, Inc**
declare under our sole responsibility that the NetPerformer:

SDM-9140

Consisting of the model:

- SDM-9140e-AC and SDM-9140e-RPS-AC
- SDM-9140s-AC and SDM-9140s-RPS-AC

With interface card:

- SDM-92X0 Quad E&M (100-1092-502B)
- SDM-92X0 Quad FXS (100-1106-532B)
- SDM-92X0 Dual FXS (100-1106-533B)
- SDM-92X0 Quad FXO (100-1107-503B)
- SDM-92X0 Dual FXO (100-1107-504B)
- SDM-92X0 Single T1/E1 (100-1111-501B)
- SDM-92X0 Dual T1/E1 (100-1111-502B)
- SDM-92X0 Single Serial (100-1126-501B)

to which this declaration relates, is in conformity with the following European Directives:

2014/30/EU (EMC)
2014/35/EU (Safety)
2011/65/EU (RoHS)

The standards used to show compliance are:

EN 55032:2012/AC:2013
EN 55024:2010
EN 61000-3-2:2014
EN 61000-3-3 :2013
EN 62368-1:2014 (2nd Edition).
EN 50581:2012

The technical file is kept at:

Memotec Inc
7755 Blvd Henri Bourassa west
Montreal, Quebec, Canada, H4S 1P7

Montreal, July 24, 2019



Claude Rocray
Vice-President, Engineering

- MEMOTEC vakuuttaa täten että SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC tyyppinen laite on direktiivin 2014/30, 2014/35, 2011/65 oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
- Hierbij verklaart MEMOTEC dat het toestel SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 2014/30, 2014/35, 2011/65.
- Par la présente MEMOTEC déclare que les SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC sont conformes aux exigences essentielles et aux autres dispositions pertinentes des Directives 2014/30, 2014/35, 2011/65.
- Härmed intygar MEMOTEC att denna SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC står i överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 2014/30, 2014/35, 2011/65.
- Undertegnede MEMOTEC erklærer herved, at følgende udstyr SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC overholder de væsentlige krav og øvrige relevante krav i direktiv 2014/30, 2014/35, 2011/65.
- Hiermit erklährt MEMOTEC, dass sich dieses SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC in Übereinstimmung mit den grundlegenden Anforderungen und den anderen relevanten Vorschriften der Richtlinie 2014/30, 2014/35, 2011/65 befindet (BMW).
- ΜΕ ΤΗΝ ΠΑΡΟΥΣΑ ΜΕΜΟΤΕC ΔΗΛΩΝΕΙ ΟΤΙ SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC ΣΥΜΜΟΡΦΩΝΕΤΑΙ ΠΡΟΣ ΤΙΣ ΟΥΣΙΩΔΕΙΣ ΑΠΑΙΤΗΣΕΙΣ ΚΑΙ ΤΙΣ ΛΟΙΠΕΣ ΣΧΕΤΙΚΕΣ ΔΙΑΤΑΞΕΙΣ ΤΗΣ ΟΔΗΓΙΑΣ 2014/30, 2014/35, 2011/65.
- Con la presente MEMOTEC dichiara che questo SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 2014/30, 2014/35, 2011/65.
- Por medio de la presente MEMOTEC declara que el SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 2014/30, 2014/35, 2011/65.
- MEMOTEC declara que este SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC está conforme com os requisitos essenciais e outras disposições da Directiva 2014/30, 2014/35, 2011/65.
- Hawnhekk, MEMOTEC, jiddikjara li dan SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC jikkonforma mal-tiġijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Direttiva 2014/30, 2014/35, 2011/65.
- Käesolevaga kinnitab MEMOTEC seadme SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC vastavust direktiivi 2014/30, 2014/35, 2011/65 põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.
- Alulirott, MEMOTEC nyilatkozom, hogy a SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC megfelel a vonatkozó alapvető követelményeknek és az 2014/30, 2014/35, 2011/65 irányelv egyéb előírásainak.
- MEMOTEC týmto vyhlasuje, že SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC splňa základné požiadavky a všetky príslušné ustanovenia Smernice 2014/30, 2014/35, 2011/65.
- MEMOTEC tímto prohlašuje, že tento SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 2014/30, 2014/35, 2011/65.
- Šiuo MEMOTEC deklaruoja, kad šis SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC atitinka esminius reikalavimus ir kitas 2014/30, 2014/35, 2011/65 Direktyvos nuostatas.
- Ar šo MEMOTEC deklarē, ka SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC atbilst Direktīvas 2014/30, 2014/35, 2011/65 būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.
- MEMOTEC izjāvja, da je ta SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 2014/30, 2014/35, 2011/65.
- Hér með lýsir MEMOTEC yfir því að SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC er í samræmi við grunnkröfur og aðrar kröfur, sem gerðar eru í tilskipun 2014/30, 2014/35, 2011/65.
- Niniejszym MEMOTEC oświadcza, że SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 2014/30, 2014/35, 2011/65.
- MEMOTEC erklærer herved at utstyret SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC er i samsvar med de grunnleggende krav og øvrige relevante krav i direktiv 2014/30, 2014/35, 2011/65.
- Noi MEMOTEC declarăm că aparatul SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC este în conformitate cu cerințele esențiale și cu alte prevederi relevante ale Hotărârii Guvernului nr.88/2003 și Directivei 2014/30, 2014/35, 2011/65.
- MEMOTEC декларирам на своя отговорност, че далекосъобщително устройство SDM-9120 UAC + SDM-9220 UAC + SDM-9230 UAC съответства на съществениите изисквания по 2014/30, 2014/35, 2011/65.

Marking

The SDM-9120 UAC, SDM-9220 UAC and the SDM-9230 UAC bear the following CE mark:



Intent of Use and Network Compatibility

Item	Compatible Telecom Services
The SDM-9120/9220/9230 unit with the appropriate DTE cables	<p>This telecom Equipment is intended to be connected to the following telecom services:</p> <ul style="list-style-type: none">• X.21, V.24, V.35 or V.36 Leased Circuits, in all the countries listed below:• Packet Switched Data offering X.21, V.24, V.35 or V.36 physical interface, in all the countries listed below: <p>Austria, Belgium, Bulgaria, Czech Republic, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Republic of Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom</p>
The SDM-9220/9230 with Interface Card P/N 100-1126-001 or -501 (Dual Serial)	<p>This telecom Equipment is intended to be connected to the following telecom services:</p> <ul style="list-style-type: none">• X.21, V.24, V.35 or V.36 Leased Circuits, in all the countries listed below• Packet Switched Data offering X.21, V.24, V.35 or V.36 physical interface, in all the countries listed below: <p>Austria, Belgium, Bulgaria, Czech Republic, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Republic of Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom</p>

Table B-1 Compatible Telecom Services

Item	Compatible Telecom Services
<p>The SDM-9220/9230 with Interface Cards P/N 100-1111-001/002 or -501/502 (Single/Dual T1/E1-120). The SDM-9120 with Interface card 100-1111-501A/502A</p>	<p>This telecom Equipment is intended to be connected to the following telecom services:</p> <ul style="list-style-type: none"> • ISDN Primary rate access at 2048 kbps in all the countries listed below: • G.703 Leased circuits at 2048 kbps structured and unstructured, using 120 Ohm interface, in all the countries listed below: <p>Austria, Belgium, Bulgaria, Czech Republic, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Republic of Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom</p>
<p>The SDM-9220/9230 with Interface Cards P/N 100-1111-001/002 or -501/502 (Single/Dual T1/E1) and with cable P/N 502-0458-001 (75 ohm). The SDM-9120 with Interface card 100-1111-501A/502A</p>	<p>This telecom Equipment is intended to be connected to the following telecom service:</p> <ul style="list-style-type: none"> • G.703 Leased circuits at 2048 kbps unstructured, using 75 Ohm interface, in the United Kingdom
<p>The SDM-9220/9230 with Interface Cards P/N 100-1097-001 or -501 (ISDN-BRI S/T)</p>	<p>This telecom Equipment is intended to be connected to the following telecom service:</p> <ul style="list-style-type: none"> • ISDN Basic rate access in all the countries listed below: <p>Austria, Belgium, Bulgaria, Czech Republic, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Republic of Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom</p>
<p>The SDM-9220/9230 with Interface Cards P/N 100-1107-003/004 or -503/504 (Quad/Dual FXO). The SDM-9120 with Interface card 100-1107-503A/504A</p>	<p>This telecom Equipment is intended to be connected to the following telecom service:</p> <ul style="list-style-type: none"> • Analog access to PSTN, in all the countries listed below <p>Austria, Belgium, Bulgaria, Czech Republic, Cyprus, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Republic of Ireland, Italy, Latvia, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland, United Kingdom.</p>

Table B-1 Compatible Telecom Services

Item	Compatible Telecom Services
<p>The SDM-9220/9230 with Interface Cards P/N 100-1092-002 or -502 (Quad E&M). The SDM-9120 with Interface card 100-1092-502A</p>	<p>This telecom Equipment is intended to be connected to the following telecom services:</p> <ul style="list-style-type: none"> • 2-wire Analog access to Leased Circuits in all the countries listed below • 4-wire Analog access to Leased Circuits in all the countries listed below <p>Austria, Belgium, Bulgaria, Czech Republic, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Republic of Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, UK.</p>

Table B-1 Compatible Telecom Services

EN55032 and CISPR32 Statement

The SDM-9120, SDM-9220 and SDM-9230 are Class A products that may cause radio interference.

In this case the user may be required to take adequate measures

FCC Part 15 Statement

The SDM-9120, SDM-9220 and SDM-9230 have been tested and found to comply with the limits for Class A digital devices, pursuant to Part 15 of the FCC Rules.

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

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

FCC Part 68 Statement

The SDM-9220 and the SDM-9230 comply with Part 68 of the FCC rules and the

requirement adopted by ACTA of the United States.

On the product nameplate of this equipment (located on the underside of the product chassis) is a label that contains, among other information, a product identifier in the format US:AAAEQ##TXXXX.

If requested, this number must be provided to the telephone company.

Connection to the Telephone Line

- This equipment uses jacks for connection to the telephone line. You must, upon request, provide the following “USOC Jack type” to your local telephone company:
 - For equipment equipped with the interface card 100-1107-003/004, the **USOC jack type: RJ11C**.
 - For equipment equipped with the interface card 100-1111-001/002, the **USOC jack type: RJ48C**.
- This equipment cannot be used on the 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 the change to give you an opportunity to maintain uninterrupted service.
- THE REGISTRATION NUMBER OF THE SYSTEM MUST BE PROVIDED SO THAT THE TELEPHONE COMPANY CAN ASCERTAIN INTENDED MODES OF OPERATION AND VERIFICATION OF REGISTRATION PORTS.
- If a need arises in the future, the telephone company will call the user and request the following information for any equipment being connected to the Public Switched Telephone Network:

For equipment equipped with interface cards 100-1107-003/004 or -503/504 (Quad/Dual FXO):

- Manufacturer: *Memotec Inc.*
- Model Number: *Refer to the nameplate on the bottom of the unit*
- FCC Registration #: *Refer to the nameplate (bottom of the unit)*
- Ringer Equivalence Number (REN): *0.1B*
- Facility Interface Code (FIC): *04DU9-1SN*
- Service Order Code (SOC): *6.0F*
- Telephone plug: *RJ11C*

For equipment equipped with interface cards 100-1111-001/002 or -501/502 (Dual/Single T1):

- Manufacturer: *Memotec Inc.*

-
- Model Number: *Refer to the nameplate on the bottom of the unit*
 - FCC Registration #: *Refer to the nameplate (bottom of the unit)*
 - Ringer Equivalence Number (REN): *Not applicable*
 - Facility Interface Code (FIC):
 - *04DU9-BN* for 1.544 Mbps, D4
 - *04DU9-DN* for 1.544 Mbps, D4 and B8ZS
 - *04DU9-1KN* for 1.544 Mbps, ANSI ESF
 - *04DU9-1SN* for 1.544 Mbps, ANSI ESF and B8ZS
 - Service Order Code (SOC): *6.0F*
 - Telephone plug: *RJ48C*

Problems, Repair and Warranty

Should you experience trouble with this telephone equipment or for repair or warranty information, please contact Memotec Inc. Canada, Inc. at +1 (514) 738-4781. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect this equipment from the line network until the problem has been corrected.



Supplier's DECLARATION OF CONFORMITY

We **MEMOTEC**
hereby certify that the following NetPerformers:

SDM-9210
Consisting of Models SDM-9210 UAC and SDM-9210 DC

SDM-9220
Consisting of Model SDM-9220 UAC

SDM-9230
Consisting of Model SDM-9230 UAC

bearing labeling identification number **US: 2PDDF01B009230**

comply with the Federal Communications Commission's (FCC) Rules and Regulations 47 CFR Part 68, and the Administrative Council on Terminal Attachments (ACTA) adopted technical criteria TIA-968-A, Telecommunications – Telephone Terminal Equipment – Technical Requirements for Connection of Terminal Equipment to the Telephone Network, October 2002, TIA-968-A-1, TIA-968-A-2, TIA-968-A-3, TIA-968-A-4, TIA-968-A-5, and also comply with TIA-1096-A, Telecommunications – Telephone Terminal Equipment Connector Requirements for Connection of Terminal Equipment to the Telephone Network, March 2008.

Montreal, 21 October 2008

Stéphane Caron
Hardware Manager

137-0022-054 C

Industry Canada Statements

The SDM-9120, SDM-9220 and SDM-9230 do not exceed Class A limits for radio noise emissions for digital apparatus, set out in Radio Interference Regulation of the Industry Canada.

Operation in a residential area may cause unacceptable interference to radio and TV reception requiring the owner or operator to take whatever steps necessary to correct the interference.

The SDM-9120, SDM-9220 and SDM-9230 meet the applicable Industry Canada technical specifications.

The Industry Canada label identifies certified equipment. The certification means that the equipment meets certain telecommunications network protective, operations, and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The Industry Canada 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 made by a Memotec Inc. authorized maintenance facility. 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.



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

The Ringer Equivalence Number (REN)

The Ringer Equivalence Number assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of Ringer Equivalence Numbers of all the devices does not exceed 5.

Notice d'Industrie Canada

Les SDM-9120, SDM-9220 et SDM-9230 ne dépassent pas les limites de Classe A d'émission de bruits radioélectriques pour les appareils numériques, telles que prescrites par le Règlement sur le brouillage radioélectrique établi par l'Industrie Canada.

L'exploitation faite en milieu résidentiel peut entraîner le brouillage des réceptions de radio et de télévision, ce qui obligerait le propriétaire ou l'opérateur à prendre les dispositions nécessaires pour en éliminer les causes.

Les SDM-9120, SDM-9220 et SDM-9230 sont conformes aux spécifications techniques applicables d'Industrie Canada.

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.

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 raccordement. L'abonné ne doit pas oublier qu'il est possible que la conformité 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 Memotec Inc. L'entreprise de télécommunications peut demander à l'utilisateur de débrancher un appareil à la suite de réparations ou de modifications effectuées par l'utilisateur ou à cause d'un mauvais fonctionnement.

Pour sa propre protection, l'utilisateur doit s'assurer que tous les fils de mise à 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 précaution est particulièrement importante dans les régions rurales.



Attention

L'utilisateur ne doit pas tenter de faire les raccordements lui-même, mais doit avoir recours à un service d'inspection d'installations électriques ou d'un électricien.

Indice d'équivalence de la sonnerie (IES)

L'indice d'équivalence de la sonnerie assigné à chaque dispositif terminal indique le nombre maximal de terminaux qui peuvent être raccordés à une interface. La terminaison d'une interface téléphonique peut consister en une combinaison de quelques dispositifs, à la seule condition que la somme d'indices d'équivalence de la sonnerie de tous les dispositifs n'excède pas 5.

Notice for Users in Australia – Emergency Dialing Warning



Warning

In the event of a power failure, an FXO interface card for the SDM-9220/9230 (Ordering part number **100-1107-003/004** or **-503/504**) and for the SDM-9120 (Ordering part number **100-1107-503A/504A**) will not operate.

Approval in Russia

The SDM-9220 UAC and SDM-9230 UAC are approved.

1. The Telecom approval certificate has been issued on 04/17/2017. It will expire on 04/17/2020.
2. The approval number is OC-5-SPD-1937.

Environmental Information

Waste Electrical and Electronic Equipment – WEEE

The WEEE (Waste Electrical and Electronic Equipment) legislation aims to raise the level of recycling of electrical and electronic equipment and to encourage designers to create products with recycling in mind.

The NetPerformer equipment that you bought has required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.



In order to avoid the dissemination of those substances in our environment and to diminish the pressure on the natural resources, we encourage you to use the appropriate take-back systems. Those systems will reuse or recycle most of the materials of your end-of-life equipment in a sound way.

The crossed-out wheeled bin symbol invites you not to dispose of WEEE as unsorted municipal waste and to collect such WEEE separately.

If you need more information on the collection, reuse and recycling systems, please contact your local or regional waste administration.

You can also contact us for more information on the environmental performances of our products

Compliance to China RoHS

符合中国 RoHS

部件名称 (Parts)	有毒有害物质或元素 (Hazardous Substances)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CrV)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
主板 (Main board)	○	○	○	○	○	○
接口卡 (Interface Cards)	○	○	○	○	○	○
电缆 (Cables)	○	○	○	○	○	○
电源 (Power Supply)	○	○	○	○	○	○
开关 (Switch)	○	○	○	○	○	○
机箱 (Chassis)	○	○	○	○	○	○
风扇 (Fans)	○	○	○	○	○	○
盖板 (Cover)	○	○	○	○	○	○

- 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。
Indicates that the concentration of the hazardous substance in all homogeneous materials in the parts is below the relevant threshold of the SJ/T11363-2006 standard.

Safety Warnings and Precautions



Warning
Warnung
Avertissement

Access to the interior of this unit shall be made only by a qualified technician.	Der Zugang ins Innere des Gerätes ist nur einem fachlich qualifizierten Techniker gestattet.	Seul un spécialiste doit avoir accès à l'appareil.
Remove power plug from the power socket before performing any service on the unit.	Vorm Öffnen des Gerätes muss der Netzstecker vom Stromnetz getrennt werden!	Débranchez l'appareil avant de l'ouvrir.
To ensure adequate cooling of the equipment, a 2-inch unobstructed space must be provided around all sides of the unit.	Um die Kühlung des Gerätes nicht zu beeinträchtigen, ist es notwendig, an allen Seiten des Gerätes ca 5 cm Raum zu lassen.	Afin de ne pas nuire au processus de refroidissement, il est nécessaire de laisser un espace d'environ 5 cm de chaque côté de l'appareil.
The Power Socket shall be installed near the equipment and shall be easily accessible.	Stellen Sie das Gerät in der Nähe eines geerdeten Schutzkontaktsteckers so auf, dass der Stecker leicht erreichbar und zugänglich ist.	Placez l'appareil près d'une prise de courant facilement accessible.
To prevent the risk of shock or fire hazard, replace fuse with same type and rating.	Zür Vermeidung der Stromschlag-und Feuergefahr beim Auswechseln Sicherungen des gleichen Typs und der gleichen Nennleistung einsetzen.	Afin d'éviter tout risque d'incendie ou d'électrocution, remplacez les fusibles par des fusibles de même type et de même ampérage.



Caution

The ground lug is a main earth terminal that must be permanently connected to earth.



Vorsicht

Die Erdungsöse ist einer der wichtigsten Erdungsklemme, die dauerhaft auf die Erde angeschlossen werden muss.



Attention

La cosse de terre est une borne de terre principale qui doit être connectée en permanence à la terre.

Making Changes or Modifications



Caution

Any changes and modifications not expressly approved by Memotec Inc. will void any compliance and regulatory approval, and will void the user's authority to operate the equipment.



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