IBM TotalStorage SAN256N Director

2045-N16 Installation and Maintenance Guide

Read Before Using

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GC26-7714-00

IBM TotalStorage SAN256N Director

2045-N16 Installation and Maintenance Guide

GC26-7714-00

Note:
Before using this information and the product it supports, read the information in the Notices section.

First Edition (November 2004)

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Safety Notices

This section contains safety notices for the SAN256N director documentation. The safety notices include danger, caution, and warning notices.

Danger Notice Definition

A special note in the text that calls attention to a situation that is potentially lethal or extremely hazardous to people.

Caution Notice Definition

A special note in the text that calls attention to a situation that is potentially hazardous to people because of some existing condition, or to a potentially dangerous situation that might develop because of some unsafe practice.

Attention Notice Definition

An attention notice indicates the possibility of damage to a program, device, or system, or to data. An exclamation point symbol may accompany an attention notice, but is not required.

Who Should Use this Information

Anyone who plans, installs, operates, or services the system should be familiar with and understand the safety notices contained herein. Read the related safety information before beginning work.

Each safety notice contains a reference number. You can use this reference number to check the safety notice in each language.

The safety notices are presented in the following languages:

English:

Arabic:

Brazillian Portuguese:

Chinese (traditional):

Danish:

French/Canadian French:

German:

Hebrew:

Italian:

Korean:

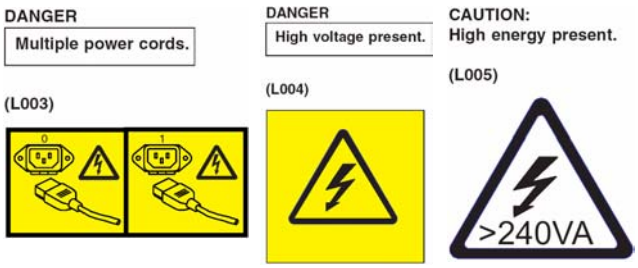
Polish:

Spanish:

Swedish:

DANGER

Electrical voltage and current from power, telephone, and communication cables are hazardous.



To avoid a shock hazard:

- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.
- Connect all power cords to a properly wired and grounded electrical outlet. Ensure outlet supplies proper voltage and phase rotation according to the system rating plate.
- Connect any equipment that will be attached to this product to properly wired outlets.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.
- Connect and disconnect cables as described below when installing, moving, or opening covers on this product or attached devices.

To Disconnect:

- Turn everything OFF (unless instructed otherwise).
- Remove power cords from the outlet.
- Remove signal cables from connectors.
- Remove all cables from devices.

To Connect:

1. Turn everything OFF (unless instructed otherwise).
2. Attach all cables to devices.
3. Attach signal cables to connectors.
4. Attach power cords to outlet.
5. Turn device ON.

(D005)

CAUTION:

Energy hazard present. Shorting may result in system outage and possible physical injury. Remove all metallic jewelry before servicing. (C001)

CAUTION:
High energy present.

(L005)

CAUTION:

Only trained service personnel may replace this battery. The battery contains lithium. To avoid possible explosion, do not burn or charge the battery.

DANGER

Hazardous voltage, current, or energy levels are present inside any component that has this label attached.

(L001)

Do Not:

- Throw or immerse into water
- Heat to more than 100°C (212°F)
- Repair or disassemble

Exchange only with the IBM-approved part. Recycle or discard the battery as instructed by local regulations. (C002)

CAUTION:

The system contains circuit cards and/or assemblies that contain lead solder. To avoid the release of lead (Pb) into the environment, do not burn. Discard the circuit card as instructed by local regulations. (C014)

CAUTION:

This assembly contains mechanical moving parts. Use care when servicing this assembly. (C025)

CAUTION:
Hazardous moving parts nearby.

(L008)

CAUTION:

This product may contain one or more of the following: CD-ROM, DVD-ROM, DVD-RAM, or laser module, which are Class 1 laser products. Please note the following:

- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of the controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

(C026)

CAUTION:

Servicing of this product or unit is to be performed by trained service personnel only. (C032)

DANGER

Hazardous voltage, current, or energy levels are present inside any component that has this label attached.

(L001)

CAUTION:

The emergency power disconnect is provided by the equipment's inlet connectors. All area personnel must be briefed on this method of disconnecting power. These connectors must be accessible to all personnel. (W001)

The following general safety information should be used for all rack-mounted devices:

- Always lower the leveling pads on the rack cabinet.
- Always install stabilizer brackets on the rack cabinet.
- To avoid hazardous conditions due to uneven mechanical loading, always install the heaviest devices in the bottom of the rack cabinet. Always install servers and optional devices starting from the bottom of the rack cabinet.
- Rack-mounted devices are not to be used as a shelf or work space. Do not place any object on top of rack-mounted devices.
- Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.
- An electrical outlet that is not correctly wired could place hazardous voltage on the metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock.
- Do not install a unit in a rack where the internal rack ambient temperatures will exceed the manufacturer's recommended ambient temperature for all your rack-mounted devices.
- Do not install a unit in a rack where the air flow is compromised. Ensure that air flow is not blocked or reduced on any side, front, or back of a unit used for air flow through the unit.
- Consideration should be given to the connection of the equipment to the supply circuit so that overloading of the circuits does not compromise the supply wiring or overcurrent protection. To provide the correct power connection to a rack, refer to the rating labels located on the equipment in the rack to determine the total power requirement of the supply circuit.

(R001)

Translations of safety notices

Each of the above notices is followed by an ID in parentheses, for example (D005), which can be used to locate the translated notice in the IBM TotalStorage Translated Safety Notices (GC26-7717) document.

About this document

This guide provides information on hardware installation and maintenance for the IBM TotalStorage SAN Switch SAN256N Director 2045-N16 as well as hardware replacement procedures.

The intended audience for this document is anyone who is responsible for installing, maintaining, or operating the SAN256N director.

The sections that follow provide information about:

- “IBM TotalStorage SAN256N Director 2045-N16”
- “Web sites”
- “Getting software updates”
- “Getting help”
- “How to send your comments”

IBM TotalStorage SAN256N Director 2045-N16

The following documents contain information related to this product:

- IBM TotalStorage SAN256N Director 2045-N16 Installation and Maintenance Guide (GC26-7714) - this document
- IBM TotalStorage SAN256N Director 2045-N16 Release Notes (GC26-7716)
- IBM TotalStorage SAN Director 2045 Statement of Limited Warranty (GC26-7718)
- IBM TotalStorage SAN n-type Director Family Enterprise Manager Installation and Operator Guide (GC26-7720)
- IBM TotalStorage SAN n-type Director Series Site Planning Guide (GC26-7715)
- IBM TotalStorage Translated Safety Notices (GC26-7717)

Web sites

You can find additional information related to the software for this and other switches at the following Web site:

http://www.ibm.com/servers/storage/support/san

To get specific details about models and firmware that the switch supports, see the following Web site:

http://www.storage.ibm.com/ibmsan/

For detailed information about the Fibre Channel standards, see the Fibre Channel Industry Association (FCIA) Web site at:

www.fibrechannel.org/

For a directory of worldwide contact information, including technical support, see the following Web site:

www.ibm.com/contact/

Getting software updates

Contact IBM for software updates and maintenance releases.

Select the SAN support link at the following Web site:

http://www.storage.ibm.com/ibmsan/index.html

Getting help

Before contacting technical support, check for solutions in this guide or check with the network administrator.

Online

Contact technical support at the following Web site:

http://www.ibm.com/servers/storage/support/san/index.html

Telephone

Within the United States, call 1-800-IBM-SERV (1-800-426-7378).

Outside the United States, go to the following Web site to find the appropriate service number:

http://www.ibm.com/planetwide/

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Chapter 1. Introduction

This chapter discusses the IBM TotalStorage SAN256N director 2045-N16 and provides several installation topics that should be addressed before you begin unpacking the SAN256N director equipment.

Introducing the IBM TotalStorage SAN256N director 2045-N16

The SAN256N director provides IT managers with an expandable and scalable fibre channel switching platform for migrating Storage Area Networks (SANs) into true-enterprise-class environments for data center applications. The SAN256N director provides a high-speed backbone infrastructure for controlling server and/or storage connectivity and a centralized point from which to manage and expand storage networks efficiently.

The SAN256N director shown below is a 256-port Fibre Channel Director (SANC40N), which may be configured up to 256-ports via sixteen 16-port I/O blades. The SAN256N director has a port speed of 2 Gbps with a maximum frame size of 2148 bytes.

Refer to the *IBM TotalStorage SAN n-type Director Series Site Planning Guide (GC26-7715)* for additional configuration details for the SANC40N.

Figure 1. SANC40 cabinet Fibre Channel director, front and rear view

IBM TotalStorage SAN n-type Director Series Site Planning Guide (GC26-7715)

Refer to the *IBM TotalStorage SAN n-type Director Series Site Planning Guide* if you need to familiarize yourself with SAN256N director product features, components, specifications, or configuration options. The site planning guide also includes examples of all the worksheets that should be completed prior to installation.

General installation information

Make sure you read the following general installation topics before you begin moving and unpacking the SAN256N director equipment as described in “Installation” on page 25. These topics contain important information.

Supplemental information for installation

Important supplemental up-to-date information that must be read during the installation process is provided in the:

- **Read me.txt** files, contained on the Software CD, for the latest Software release information.
- **Release Notes.pdf** files, **Release_notes.txt** files, or **Release_notes.doc** files on the Software CD, for the latest Firmware release information.
- **Field Service Technical Support Technical Bulletins**, **Technical Alerts**, or **Technical Memos**, available on the IN-Site Web Site and from the Technical Support Organization.

Site survey check list

The Site Survey Check List, completed during the site planning and preparation process, summarizes SAN256N director installation tasks and responsibilities. This check list must be reviewed prior to performing any installation procedures. Obtain a copy of the completed Site Survey Check List from the appropriate Sales, Systems Engineer, or Field Service personnel who were involved in the sale and site planning for this installation.

Most of the information on the Site Survey Check List is obtained during the Pre-installation Planning Activities and Site Survey walk through prior to shipment of the equipment. Use this check list to learn about the site, and to gather information you need to ensure a successful installation. If information is missing, or if some of the planning/preparation activities are not complete, it may be necessary to gather the information and complete the activities before starting the installation.

Verify that the **Check** column is marked to indicate that the activity or task as being completed and the date has been noted when the activity or task is completed. The order of tasks and the number of steps required on site may differ from the order and number suggested by the check list.

Electrostatic Discharge (ESD) precautions

Static electricity can be very damaging to certain types of equipment in the work place. Static has been responsible for causing computer equipment to become inoperable, and in some cases even destroyed.

To help understand Electrostatic Discharge (ESD) and ESD Sensitive (ESDS) devices, the following definitions are provided:

- *ESD* - a sudden transfer of a charge between two objects.
- *ESDS* - term used to describe devices that are damaged from electrostatic discharge.
- *Charge* - an excess or deficiency of electrons on the surface of material.

There are two methods by which static will reach sensitive devices:

- Through a worker's fingertips - which is the most common method.
- Through induction - which is when static is transferred from types of material (plastic cups, synthetic fabrics) onto sensitive devices without physically touching those devices.

You can prevent ESD damage by handling all static sensitive devices in a static-safe work place, and by using the following static control materials:

- Wrist straps
- Dissipative work mats
- Ground cords
- Conductive bags, tote boxes, or tote trays whenever handling ESDS

The SAN256N director contains the following ESDS components:

- TFIO blades
- TSW modules
- TCM modules
- TMF/TFD module
- Upper fan assemblies
- Side fan assemblies
- Power supply assemblies
- SFPs

Each of the ESDS components contained inside the SANC40 cabinet have yellow and black ESD labels placed in high-visibility areas to identify the component as an ESDS component. Refer to the following ESD label example.

Figure 2. Example of the ESD label

ESD wrist strap connections

ESD wrist strap connections are located on the front and rear of the SANC40 cabinet chassis.

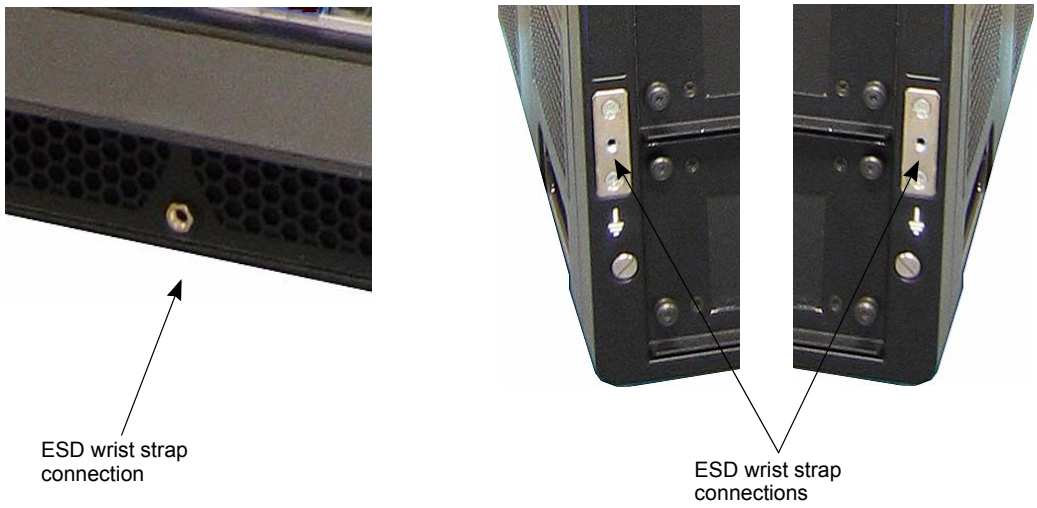

Figure 3. ESD wrist strap connections

ESD Precautionary Check List

The following table provides an Electrostatic Discharge Precautionary Check List for handling ESD sensitive parts in the SAN256N director.

As you review this check list, keep in mind that all steps suggested will help minimize ESD damage to the equipment because of its sensitivity to any type of static discharge. The chronological order of checks suggested by this list might not always have to be performed in the order suggested. Modify this list as applicable.

Table 1. ESD Precautionary Check List

General ESD Precautions and Controls	Yes	No	Not Applicable
Are grounding connections (grounding wrist strap, ground wires on cords) checked for electrical continuity?			
Are the cabinet AC power cords plugged into a properly grounded AC outlet in order for the chassis to be grounded?			
Does conductive flooring have a resistance of less than 100K ohms from any point on the tile to earth ground?			
Are surface resistivity tests performed and results recorded on conductive floors?			
Are ESD wrist straps worn by personnel when working with ESDS PCBs?			
Are personnel handling ESDS components receiving ESD training? Are ESD training records maintained?			
Are there ESD caution signs at appropriate places around equipment that contain ESDS components?			

Table 1. ESD Precautionary Check List (Continued)

General ESD Precautions and Controls	Yes	No	Not Applicable
Is there an ESD awareness training program for all personnel?			
Is there a designated site ESD representative or coordinator to resolve any ESD questions and/or problem areas?			
Has an ESD field meter been purchased and used to periodically check work areas?			
Is there a static control work mat placed in front of the equipment?			
Are there periodic walk-through checks to ensure that nonessential and personal items are not placed on or near ESDS components or equipment?			
Does a Site Safety Engineer (or designated personnel) perform a safety review of new or modified ESD Ground connections prior to initial use or installation of ESDS equipment?			

Chapter 2. SAN256N director components

This chapter discusses the individual system components in the IBM TotalStorage SAN256N director 2045-N16.

SAN256N director components

The basic components of the SAN256N director system include the following:

- TFIO 16-Port I/O blade
- TCM control module
- TSW switch module
- TMP midplane
- TMF/TFD upper fan control module
- Power supply assemblies
- Upper fan assemblies
- Side fan assemblies
- Cabinet
- Enterprise Manager software

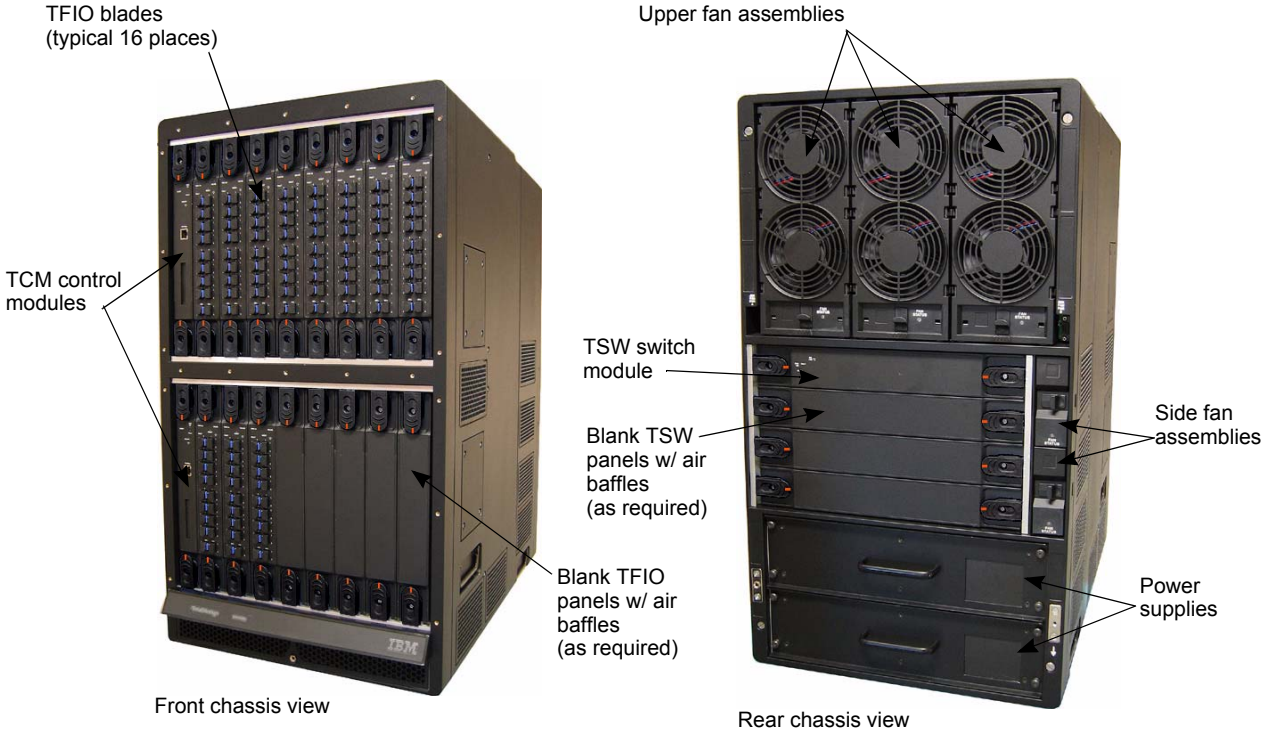

Figure 4. SANC40N cabinet; basic components

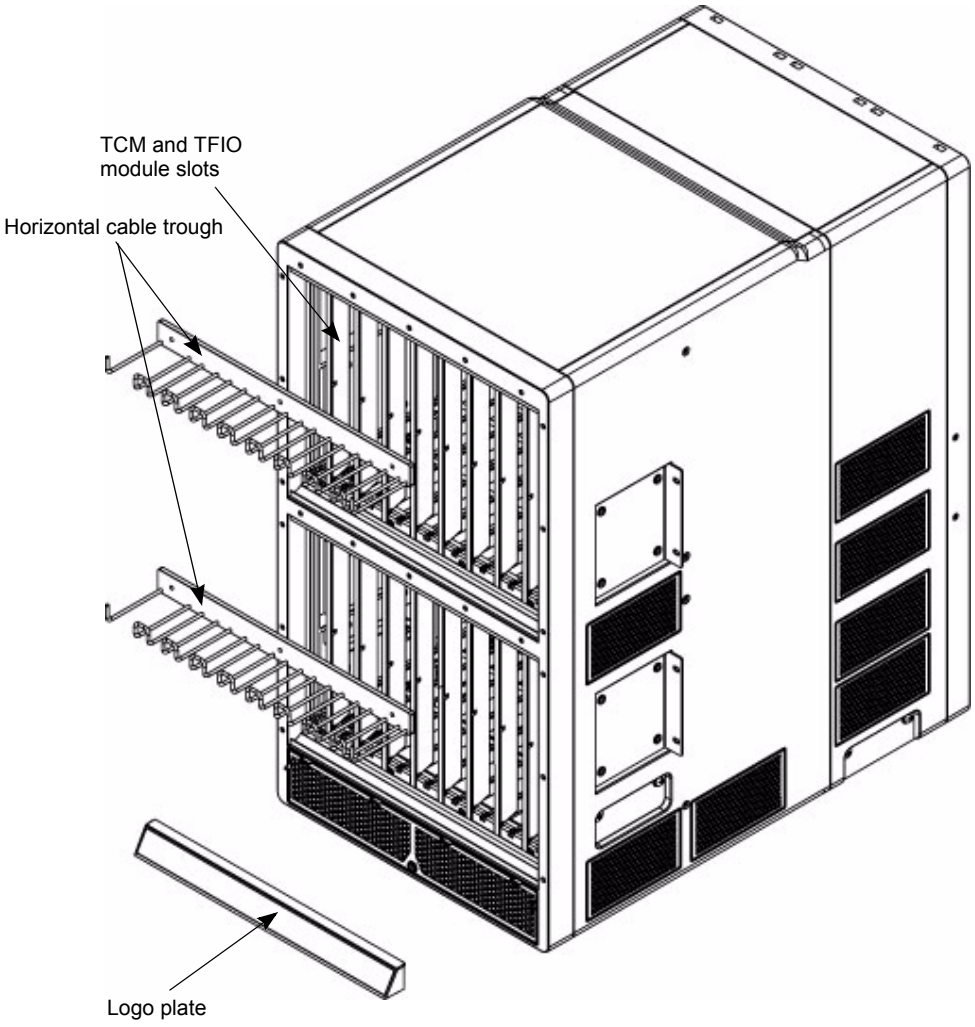

Figure 5. SANC40N cabinet; front view

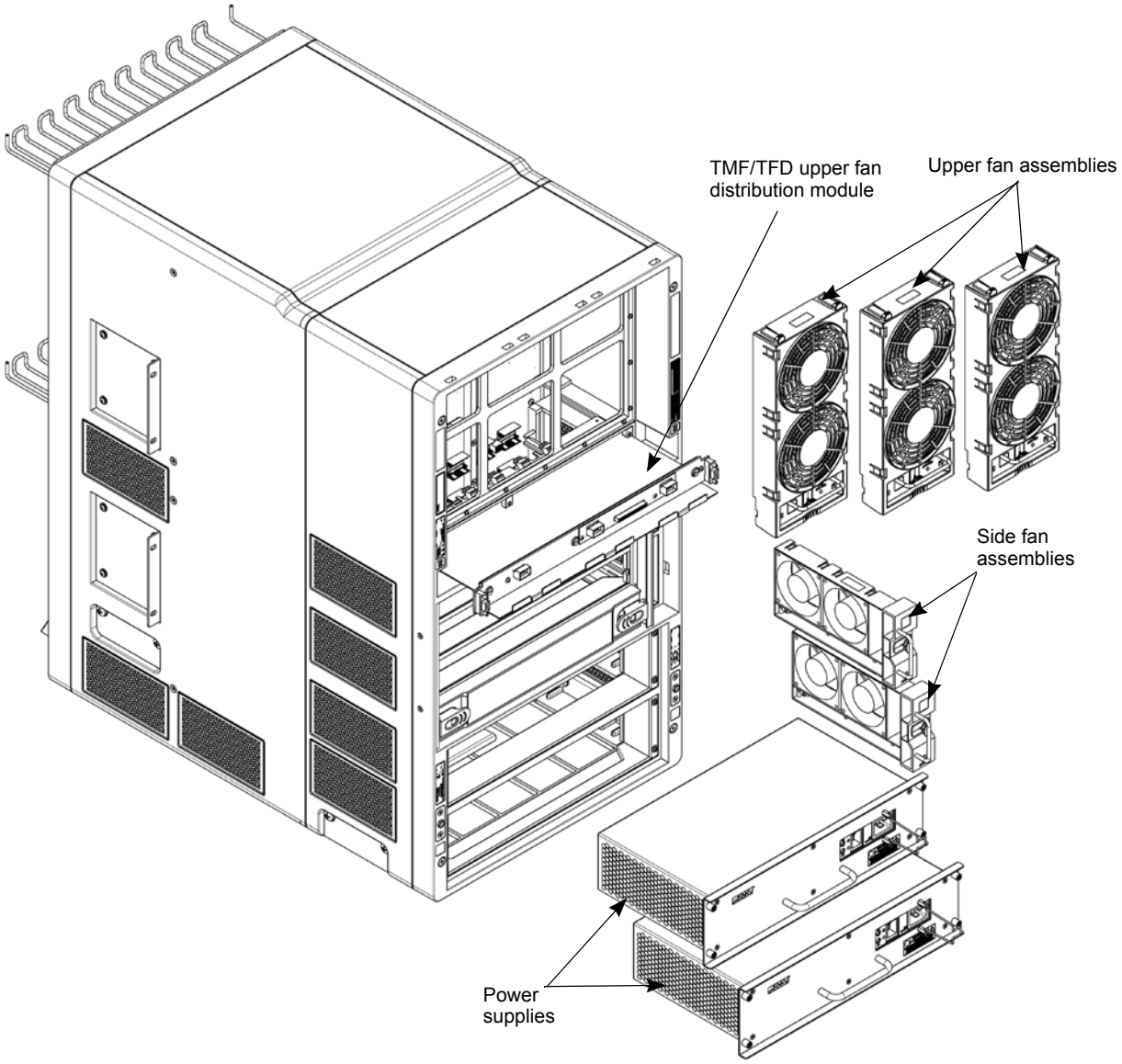

Figure 6. SANC40N cabinet; rear view

TCM control module

Description

The SAN256N director control module (TCM) provides a control interface for the SAN256N director system. The module is responsible for monitoring the general health of the system and acting as a proxy for all external communications destined for other modules in the system. The TCM also provides control and management of communications, between itself and the TFIO and TSW modules, as well as the system clock. The TCM is a critical module in the SAN256N director system, requiring a redundant module in the system acting as a standby.

The TCM monitors the following components:

- TFIO blades
- TSW modules
- TCM modules
- Power supply assemblies
- Fans, upper and side assemblies

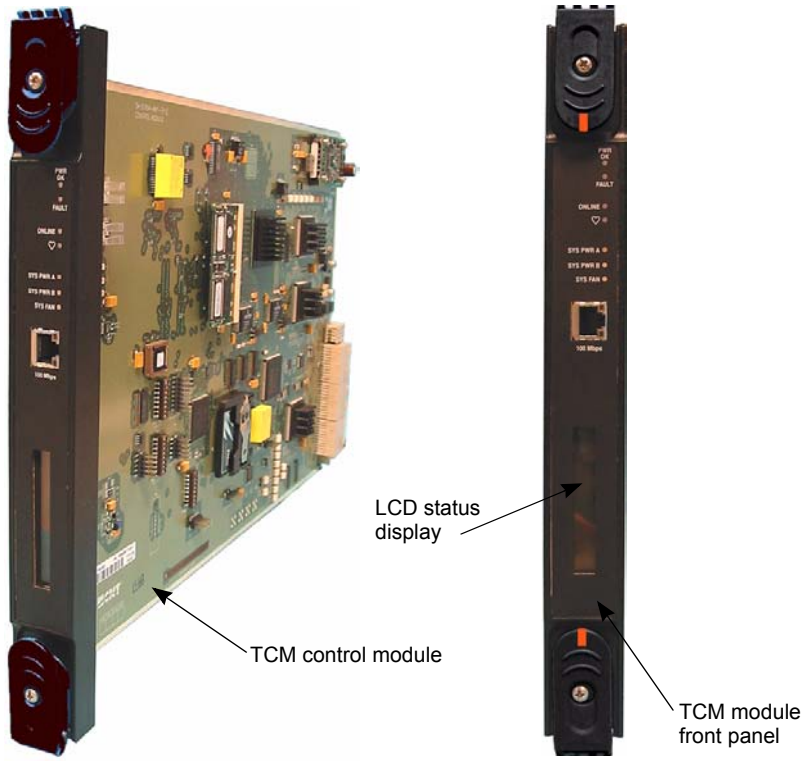

Figure 7. TCM control module

Front panel indicators

Each TCM has four LED indicators on the front panel to indicate TCM status. The functionality and colors are as follows:

- **Fault** LED - Lights red to indicate when an error condition has occurred.
- **Online** LED - Lights green to indicate when the module is in an Online state.
- **Power OK** LED - Lights green to indicate that DC power to the module is within tolerances and the module is not in a power on reset condition.
- **Heartbeat** LED - Lights yellow and toggles off and on every second, indicating that the module is functioning correctly. Error conditions are indicated by distinctive blink patterns.

Three additional LED indicators on the front panel indicate system power and cooling fan operational status. The functionality and colors are as follows:

- **Sys Pwr A** LED - System Power A lights red to indicate a failure of the Primary power supply.
- **Sys Pwr B** LED -System Power B lights red to indicate a failure of the Secondary power supply.

- **Sys Fan** - System Fan LED lights red to indicate when one or more of the cooling fans has failed.

LCD display
A 16-character alphanumeric LCD display is included on the TCM front panel. This display is used to show system information, such as:

- Switch name
- IP address
- Status of the Field Replaceable Units (FRUs):
  - TFIO blades
  - TSW modules
  - TCM modules
  - Power supply assemblies
  - Fans, upper and side assemblies

Ethernet connection
An RJ-45 connector, located on the TCM front panel, provides a 100 Mbps Ethernet network connection between the SAN256N director and the Enterprise Manager PC.

TFIO 16-port I/O blade

Description
The SAN256N director Fibre Channel I/O blade (TFIO) is a sixteen-port input/output line card that plugs into a slot in the front of the chassis. The chassis is capable of accepting up to sixteen TFIO blades, providing a total port count of 256 ports per chassis.

The TFIO blade has 16 Fibre Channel ports to accept IBM certified SFP shortwave (850nM) and longwave (1310-1550nM) modules. Depending on what devices they are connected to, the SFP modules can auto negotiate at either 1.0625 Gbps or 2.125 Gbps.

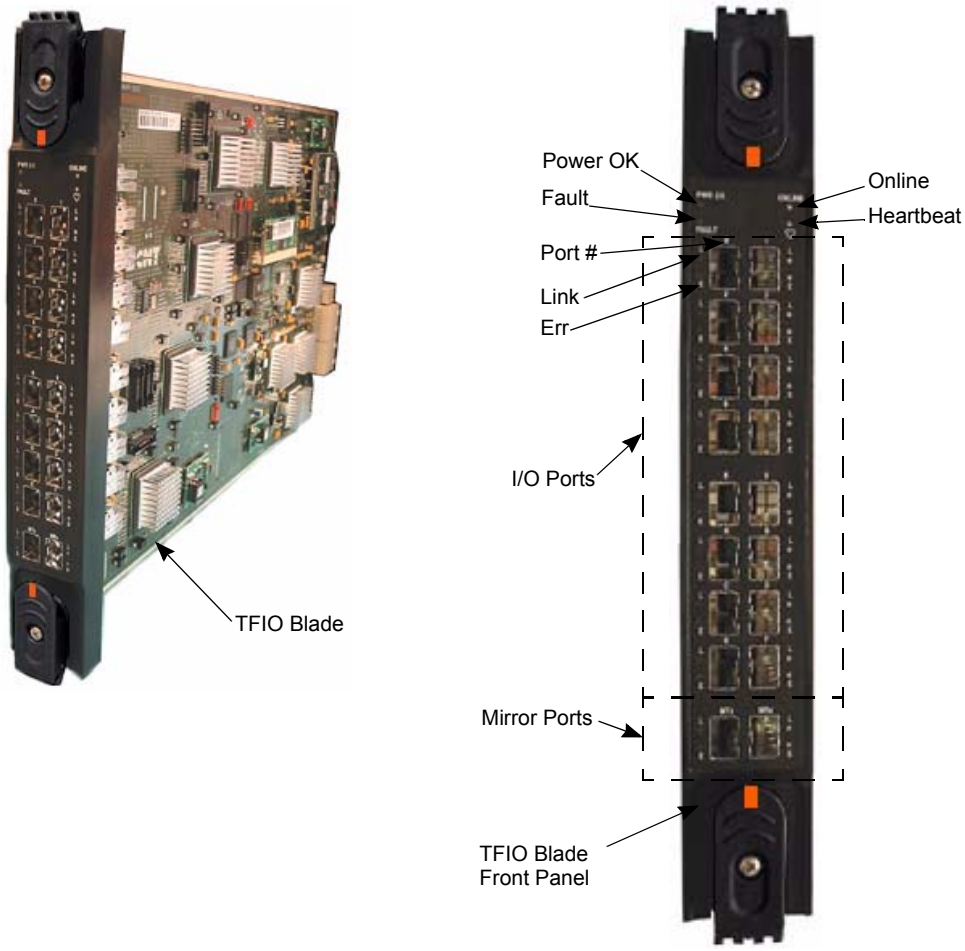

Figure 8. TFIO blade

Front panel indicators
The front panel contains LED status indicators showing the current state of the module, and for each of the individual I/O ports.

Board status LED indicators
Each TFIO blade has four LED indicators on the front panel to indicate module status. Additionally, each I/O port has two LED indicators to show the condition of the individual port. The functionality and colors of the TFIO blade status indicators are as follows:

- **Fault** LED - Lights red to indicate when an error condition has occurred.
- **Online** LED - Lightsgreen to indicate when the module is in an Online state.
- **Power OK** LED - Lights green to indicate that DC power to the module is within tolerances and the module is not in a power on reset condition.
- **Heartbeat** LED - Lights yellow and toggles off and on every second, indicating that the module is functioning correctly. Error conditions are indicated by distinctive blink patterns.

Port status LED indicators
Each I/O port (0 - 9, A - F) has two individual port status LED indicators showing the status and activity of the port.

- **L** (Link) LED -Displays the speed and link status of the I/O port. This LED will be solid yellow if a device is logged into the TFIO as a 1.0625 Gbps device but there is no data activity on the port. The LED will flash yellow as 1.0625 Gbps activity streams into or out of the port. If the device attached and logged in is 2.125 Gbps, then the LED will be lit green. It will blink green if 2.125 Gbps data is transmitted or received for that port.
- **E** (Error) LED -Lights red to indicate that a port error has occurred.

Mirror ports

In order to provide non-disruptive visibility into the Fibre Channel data stream, mirror ports are employed. The ports are designated as Mirror Transmit (MTx) and Mirror Receive (MRx). Data only exits these mirror ports, so what MTx means is that data is being transmitted out of the port being mirrored, and MRx designates the data that is being received at the port being mirrored.

Each mirror port has two individual port status LED indicators showing the status and activity of the port.

Like the rest of the Fibre I/O ports, each mirror port has two LED indicators. Rather than indicating port log in, the solidly lit **L** LED means that the mirror port is enabled. Again, flashing LED lights mean activity, although mirror ports only transmit out and don't receive any data.

- **L** (Link) LED - This LED shows the speed and link status of the I/O port. The bicolor LED will be solid yellow if a device is logged into the TFIO as a 1.0625 Gbps device but there is no data activity on the port. The LED will flash yellow as 1.0625 Gbps activity streams out of the port. If the device attached and logged in is 2.125 Gbps, then the LED will be solid green. It will blink green if 2.125 Gbps data is transmitted at that port.
- **E** (Error) LED - this LED lights red to indicate that a port error has occurred.

TSW switch module

Description

The SAN256N director Switch Modules (TSW) provides the physical and logical connectivity between the TFIO blades installed in the SANC40N cabinet. The TSWs provide non-blocking any-to-any switching capabilities between the switch fabric ports and to the TFIO blades.

A typical switch fabric, supporting up to 256 Fibre Channel user ports (at 2.125 Gbps, per port) uses three TSW modules to provide the switch fabric. Only two TSWs are required for full bandwidth, 256-port any-to-any connectivity.

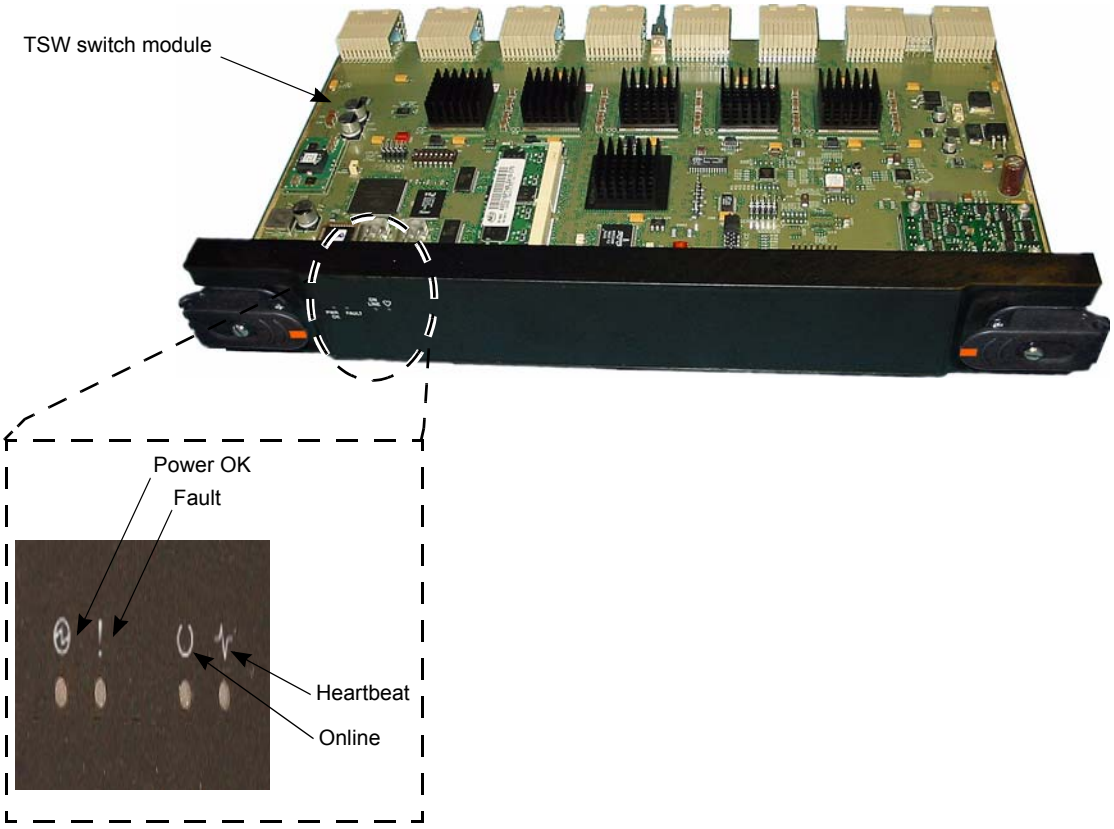

Figure 9. TSW switch module

Front panel indicators

Each TSW front panel has four LED indicators, located on the front panel, on the front panel to indicate TSW status. The functionality and colors are as follows:

- **Fault** LED - Lights red to indicate when an error condition has occurred.
- **Online** LED - Lights green to indicate when the module is in an Online state.
- **Power OK** LED - Lights green to indicate that DC power to the module is within tolerances and the module is not in a power on reset condition.
- **Heartbeat** LED - Lights yellow and toggles off and on every second, indicating that the module is functioning correctly. Error conditions are indicated by distinctive blink patterns.

Midplane fan distribution module

The SAN256N director midplane fan distribution module (TMF/TFD) provides power and signal I/O for the upper fan assemblies and connectors for attaching optional external cooling fans that are mounted on the top of the SANC40N cabinet. The TMF/TFD is connected to the SAN256N director chassis midplane at the rear of the chassis. Three 8-pin connectors (one per upper fan assembly) support the fan assemblies; two DB9F connectors support the optional external cabinet fans.

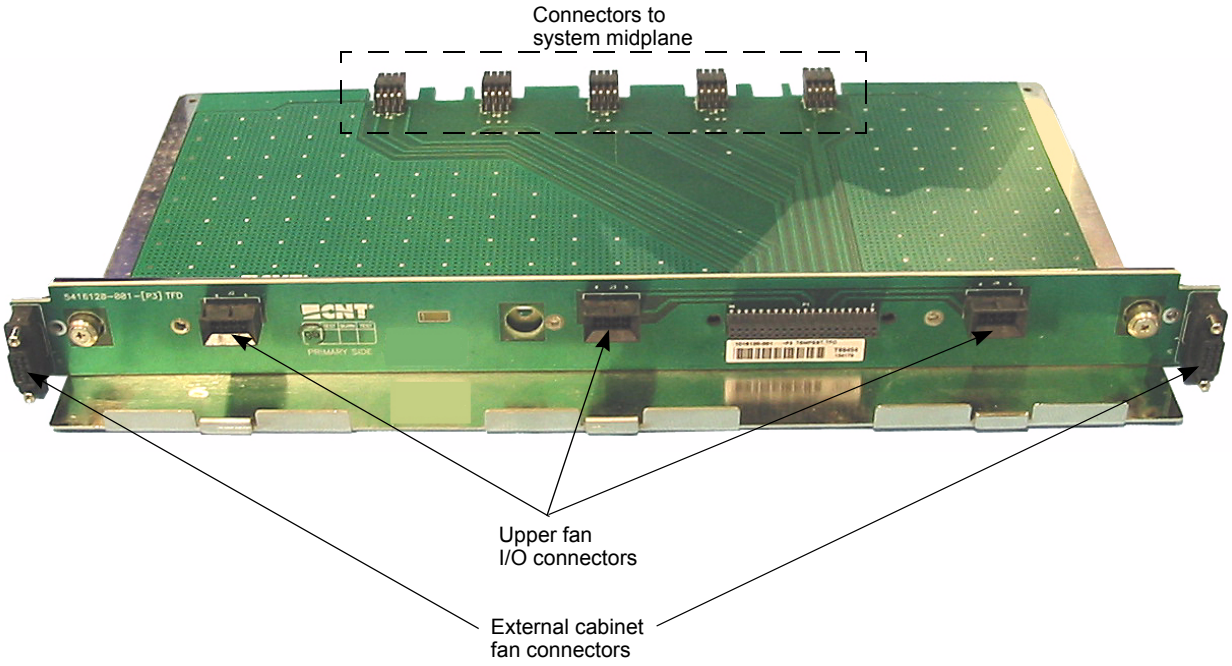

Figure 10. TMF/TFD module

SAN256N director midplane

The SAN256N director midplane provides connectivity between the TFIO, TCM, TSW, power supply assemblies and fan assemblies. The backplane has the capability to expand the SAN256N director from 256 ports to 512 ports (at a data rate of 1 Gbps and 2 Gbps) by cabling two SANC40N cabinet together.

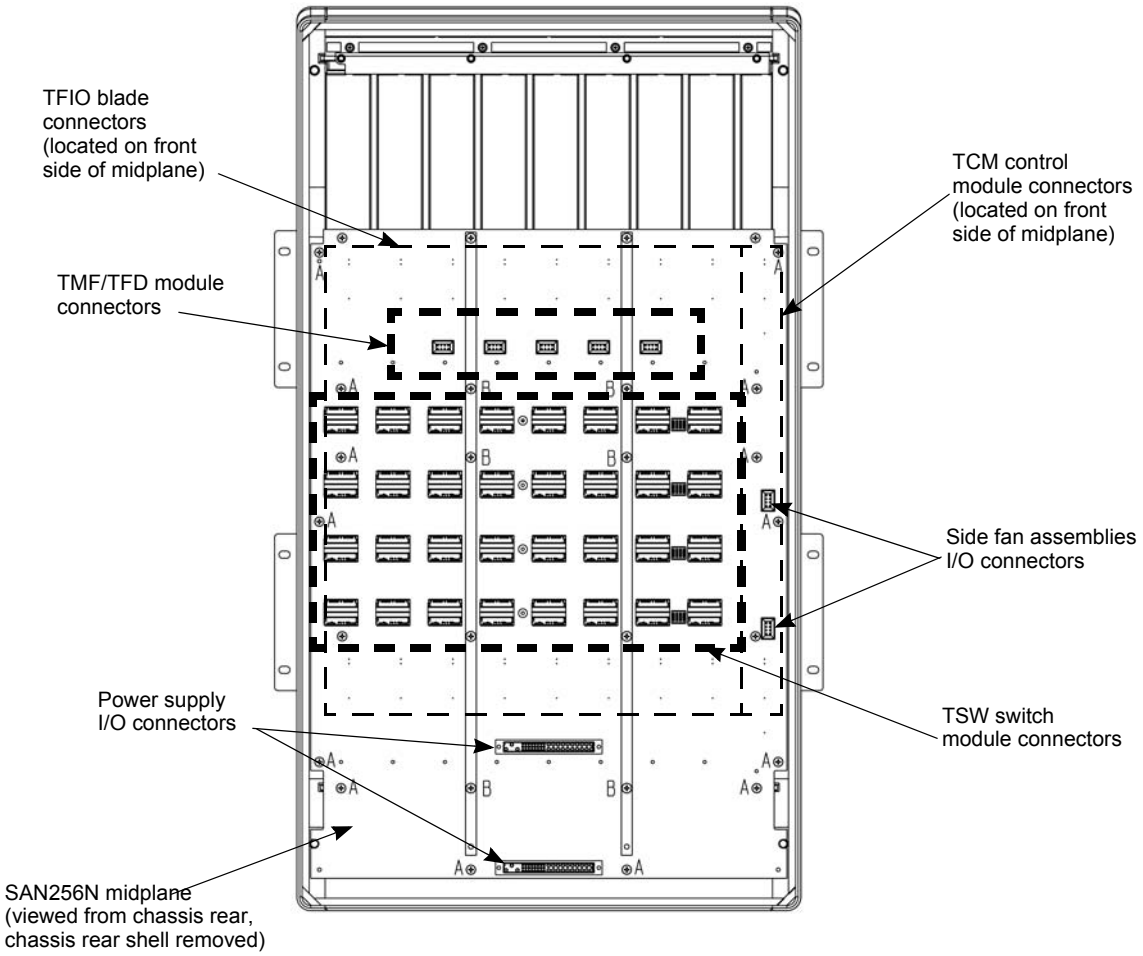

Figure 11. SAN256N director midplane

Power supply assemblies

Two power supply assemblies are located in the lower rear of the chassis. Each power supply assembly is a removable, integrated subchassis and is a hot-swappable unit. The two power supply assemblies provide the SAN256N director with full DC redundancy (load sharing) for a single chassis system.

Integrated fans are contained within each power supply assembly. The fans draw air through the entire length of each power supply assembly. The fan assembly air flow is isolated from the system air flow (chassis fan assemblies).

The electrical specifications of the power supply assembly are:

- Input voltage is 220 VAC nominal; VAC input range is from 200 VAC to 240 VAC.
- Input frequency is 50/60 Hz nominal; frequency range is 47 Hz to 63 Hz.
- Output voltage is 48 VDC nominal, plus/minus 5%

AC input power is supplied to each power supply via a separate line cord (IEC-320-C19 Plug to L6-20P Plug; line cord rated 16A @ 250VAC). Each supply also has its own DC Power On/Off switch.

Each power supply assembly has two front panel LED indicators, that indicate whether the VAC input voltage and the DC voltage output are within specification.

Figure 12. Power supply assembly

Upper fan assemblies

Three fan module assemblies, located in the upper rear of the chassis, provide the cooling capability for the SAN256N director and airflow around the PCB modules (in particular, the TFIO blades) by pushing air out of the chassis. The upper portion of the chassis is cooled by a push-pull airflow drawn from the lower air inlets, located at the front and sides of the chassis, and exhausted at the top of the chassis rear.

Each of the upper fan assemblies are powered by 48 Volts DC and provide up to 380 cfm per fan assembly. As a universal fan assembly, any of the three fan modules can be replaced with the same fan module. In the event of a single fan failure, the remaining fans increase speed to a higher operating RPM to compensate for the single fan failure.

Each upper fan assembly consists of two fans mounted vertically in a pull-out module. The fan modules are interchangeable.

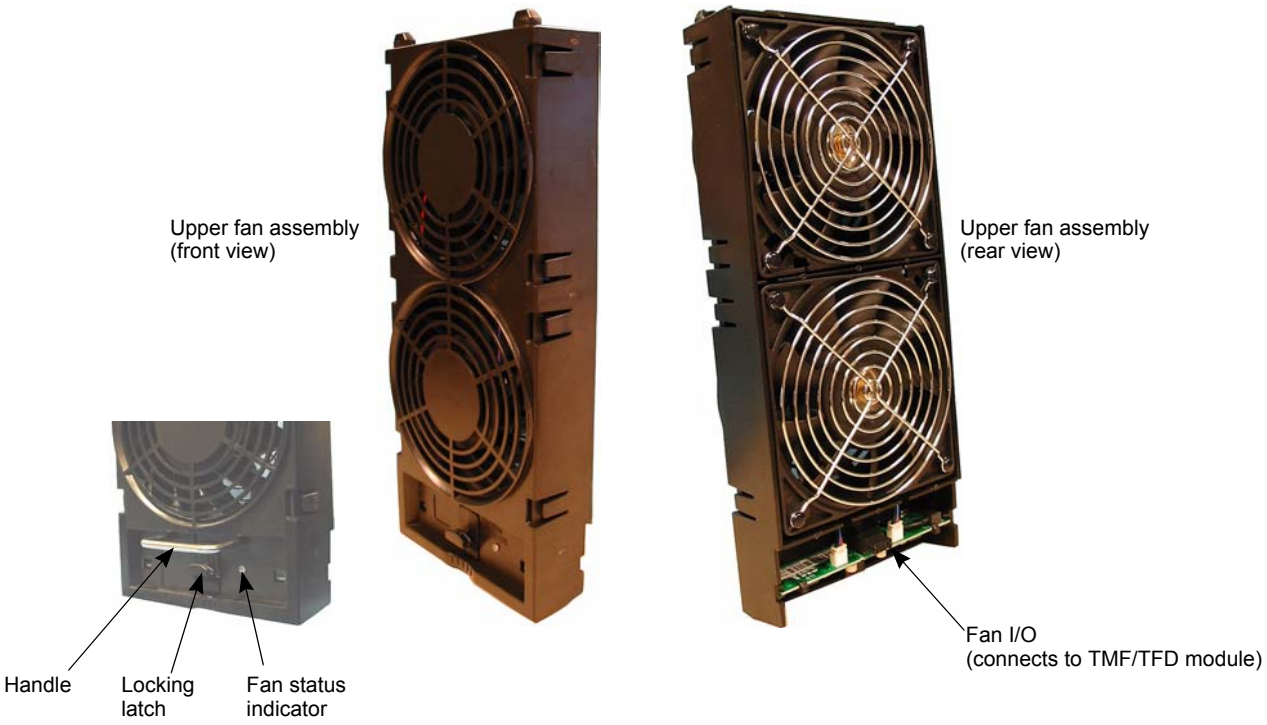

Figure 13. Upper fan assembly

Fan status indicators

Each upper fan assembly has one LED indicator, located on the front panel, to indicate fan status. The colors and fan operating conditions are as follows:

- Green - Indicates proper operation of the fan assembly.
- Orange - Indicates a marginal fan under-speed fault.
- Red - Indicates a fan under-speed fault.
- LED Off - Indicates a circuit fault.

Side fan assemblies

Two fan module assemblies (located in the right-hand side, middle rear of the chassis), are used to pull air into the SANC40N cabinetto aid in cooling the chassis components (in particular, the TSW modules) by pushing air out of the chassis. The middle portion of the chassis is cooled by a push-pull airflow drawn from the middle side air inlets, located at the rear portion of the chassis, and exhausted at the right-hand side of the rear chassis.

Each of the side fan assemblies are powered by 48 Volts DC and provides up to 70 cfm per fan assembly. As a universal fan assembly, any of the two fan modules can be replaced with the same type fan module. In the event of a single fan failure, the remaining fans increase speed to a higher operating RPM to compensate for the single fan failure.

Each side fan module consists of two fans mounted horizontally in a pull-out module. The fan modules are interchangeable.

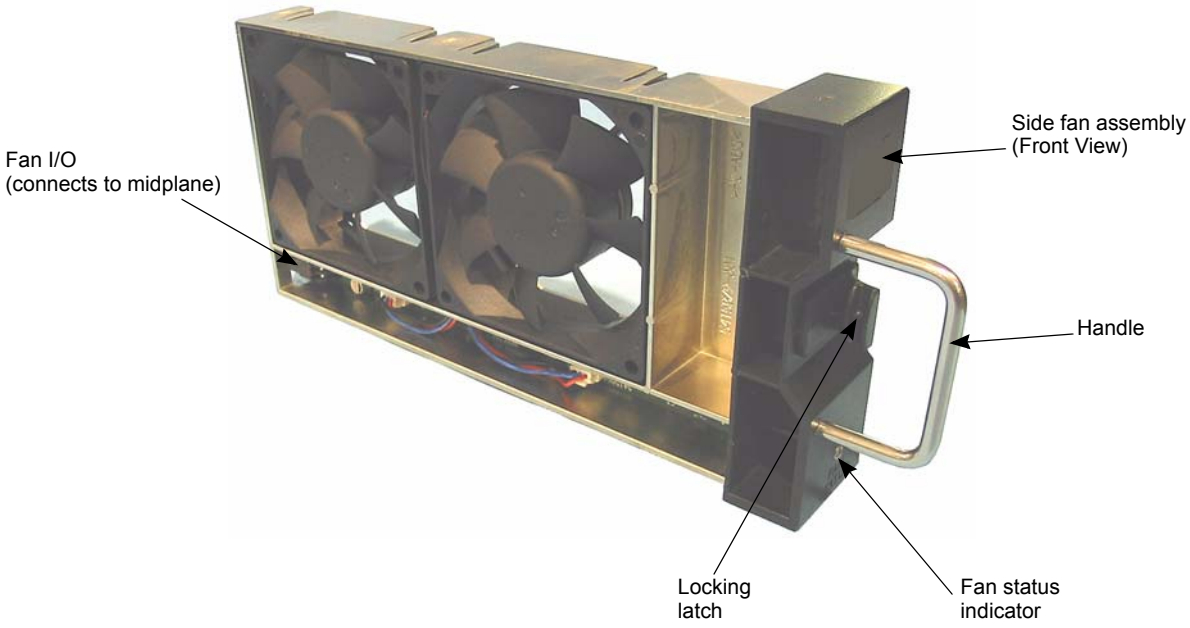

Figure 14. Side fan assembly

Fan status indicators

Each side fan assembly has one LED indicator, located on the front panel, to indicate fan status. The colors and fan operating conditions are as follows:

- Green - Indicates proper operation of the fan assembly.
- Orange - Indicates a marginal fan under-speed fault.
- Red - Indicates a fan under-speed fault.
- LED Off - Indicates a circuit fault.

Air baffles

Air baffles are installed in slots not containing TFIO or TSW modules to maintain the proper air flow required in the SANC40N cabinet. The TFIO air baffles have the same physical dimensions as an actual TFIO blade, only with a blank front panel, while the TSW air baffles have the same physical dimensions as an actual TSW module, also with a blank front panel. The baffles are installed into the chassis in the same manner as TFIO and TSW modules.

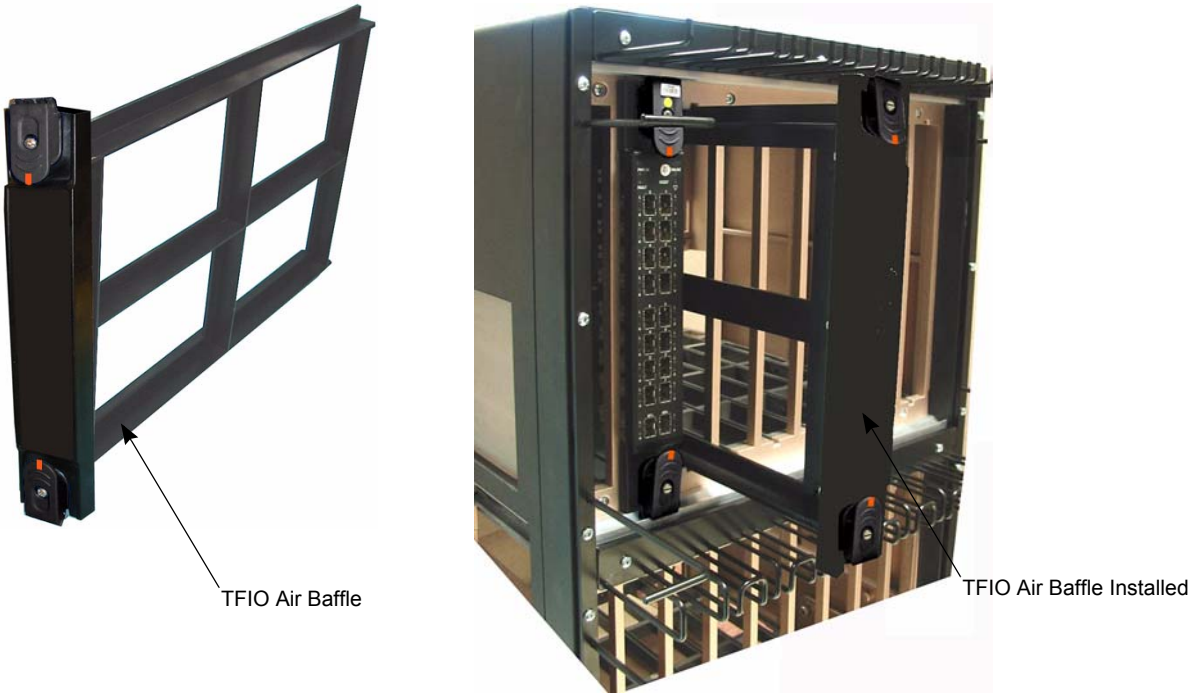

Figure 15. TFIO air baffle

Cabinet

The SANC40N cabinet provides the capability to install two SANC40N cabinet in a single 40U cabinet along with providing fiber cable management for each SANC40N cabinet.

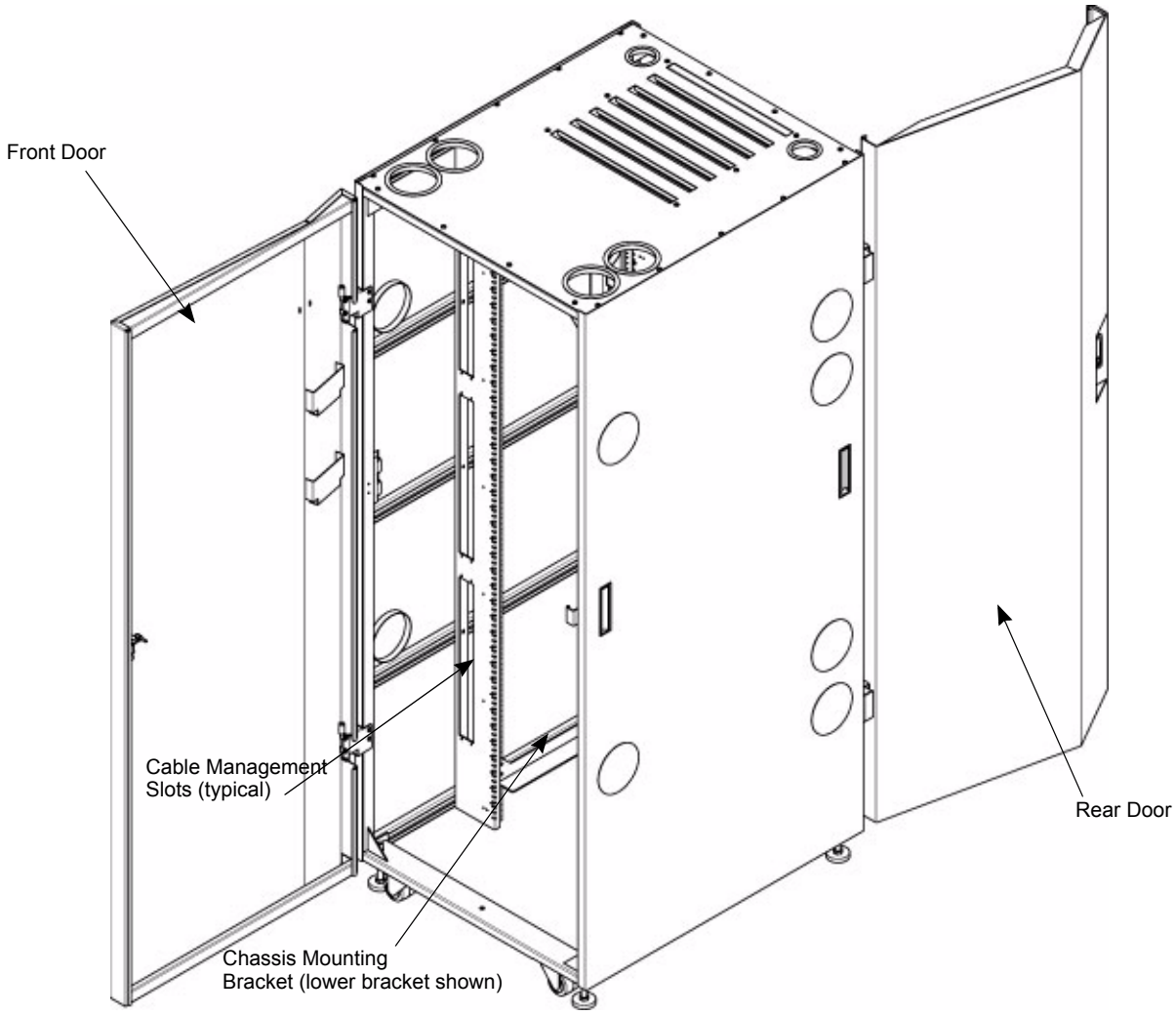

Figure 16. SANC40N cabinet; front view

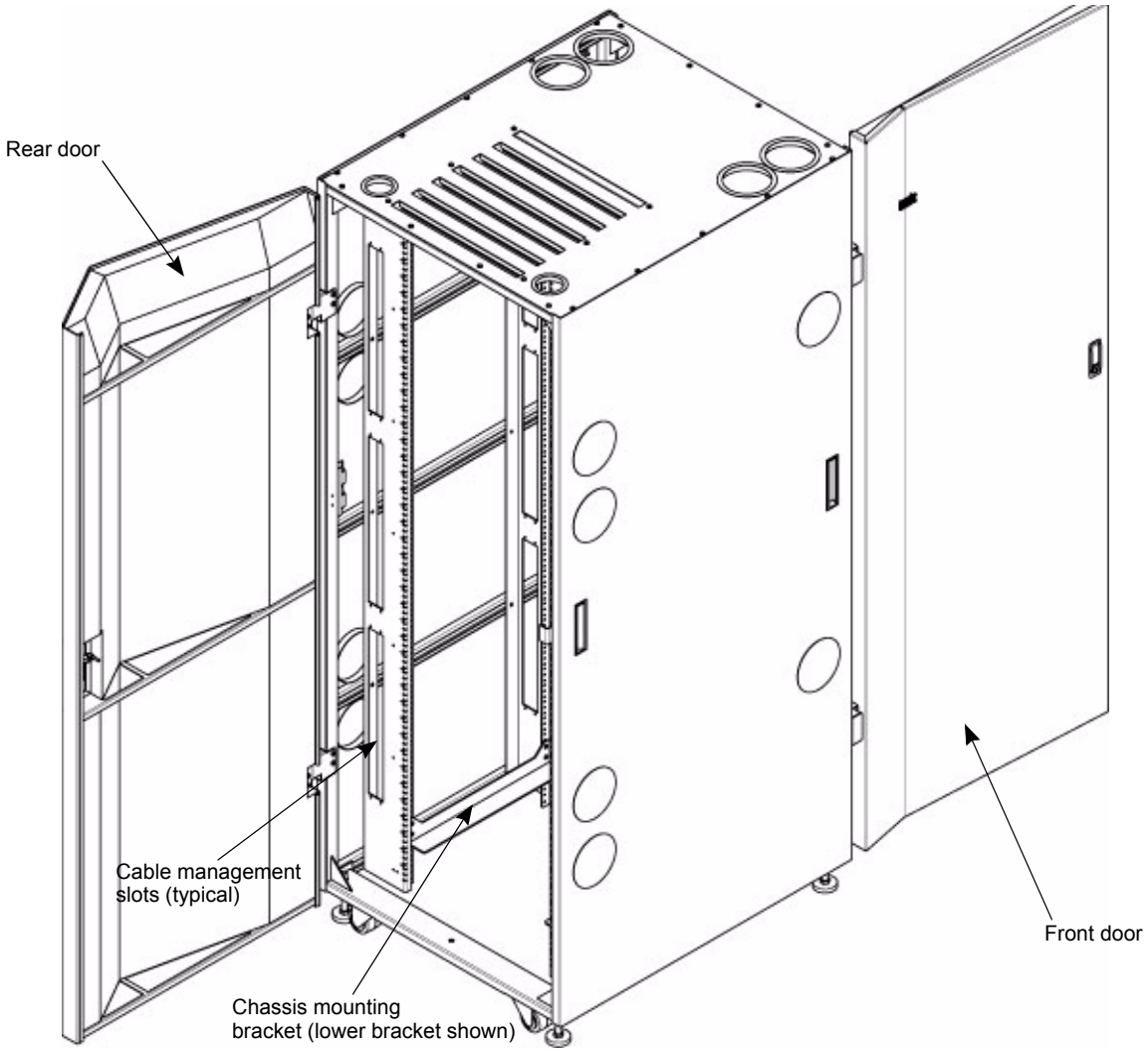

Figure 17. SANC40N cabinet; rear view

Enterprise Manager

Overview

The SAN256N director is controlled by a graphical user interface (GUI) called the Enterprise Manager.

Fabric/switch interoperability

The Enterprise Manager manages fabrics made up of SAN256N director and FC/9000 Director switches. In addition, Enterprise Manager is capable of managing SAN256N director and FC/9000 director fabrics that connect to FC/9000-8, FC/9000-16, and FC16-2 switches. Currently, the SAN256N director can control FC/9000 8- and 16-port switches and FC/9000 64-, 128- and 256-port directors. Enterprise Manager allows you to view, but not control, the FC16-2 switch and switches from other vendors.

System requirements

The following section provides specifications for the Connection System Manager (CSM) available for the Enterprise Manager. It also provides recommendations if a PC other than the IBM CSM is to be used to run the Enterprise Manager.

The Windows-based Enterprise Manager system *requires* the following:

- Enterprise Manager—Executes functions on an IBM-compatible PC workstation under Microsoft Windows 2000 Professional or Windows XP Professional to provide for the configuration, control, maintenance, and testing of SAN256N director and FC/9000 Fibre Channel Switches attached to that workstation. The Enterprise Manager software uses a Graphical User Interface (GUI). A workstation running Enterprise Manager (referred to as the Enterprise Manager workstation) can also act as a multi-user server in that it provides an access path to the SAN256N director and FC/9000 directors attached to it.
- 500 MB of available disk space for a new install.
- Server—Windows 2000 Professional®. The current version of Enterprise Manager is designed to operate under Windows 2000 Professional. IBM does not support Enterprise Manager operation under *any* earlier versions of Windows.
- Client—Windows 2000 Professional®, Windows 98®, Windows 95®, Windows XP®, Linux®, Solaris®.
- PC workstation—The recommended PC workstations are IBM PCs with Pentium processors. The workstation should be capable of running the Enterprise Manager module (Client, Server, or both).
- Starting with Enterprise Manager release 8.0.0.6, JAVA 1.4.1 is required to run Enterprise Manager. Make sure that you install JAVA 1.4.1 (included on the installation CD) before installing Enterprise Manager. It is recommended that you uninstall any previous JAVA versions before installing JAVA 1.4.1.

Recommended workstation:

- IBM NetVista™ M41 PC or an IBM-Compatible PC
- 1.8 GHz Pentium 4, 256 or 512 MB SDRAM
- 4 MB video RAM
- 40 GB hard drive
- 1.44 MB diskette drive
- CD-ROM
- 1 parallel port
- 2 Ethernet 10Base-T/100 Base-TX and an IBM or equivalent mouse
- 2 external serial com ports (external modem)
- 1 internal com port (internal modem)
- 17-inch 1280 x 1024 x 256 SVGA monitor
- Windows 2000 Professional or Windows XP Professional (Service Pack 2 is required for either Windows 2000 or Windows XP)
- Internal and external modem compatibility

- Analog, protocol support: V.90 5 6kbps ITU Standard, 3Com/US Robotic/Multi-Tech (international) hardware compatible modems recommended (do not use Winmodem® software controlled modems)

You can substitute any Pentium-based IBM-compatible PC that is comparably equipped and capable of supporting the operating system needed to run the Enterprise Manager module (Client, Server, or both).

Chapter 3. Installation

This chapter provides detailed instructions for installing the IBM TotalStorage SAN256N director 2045-N16 hardware. SAN256N director hardware installation consists of the following major steps, which are described in this chapter in the following sequence.

Note: The site preparation data sheets and worksheets described in the *IBM TotalStorage SAN n-type Director Series Site Planning Guide (GC26-7715)* must be completed before you can install the SAN256N director hardware.

Moving and unpacking the equipment

The following topics describe how to move and unpack SAN256N director equipment for North American and international shipments.

North American shipments

When the SAN256N director is shipped within the United States and Canada, a transportation carrier is used who specializes in moving and transporting electronic and electronic ESD-sensitive equipment.

For detailed information describing the transportation carrier's responsibilities, refer to the *IBM TotalStorage SAN n-type Director Series Site Planning Guide*.

Moving the equipment

Refer to the SAN256N director Site Planning Grid for the customer's building, floor, and room destination for the SAN256N director. This worksheet is completed during the site planning process.

The customer or shipping carrier (noted on the sales order) is responsible for transporting the SAN256N director equipment to its final destination location at the customer's site, before removing the protective plastic shipping bag.

IBM recommends that a minimum of two people unpack and move the SANC40 cabinet.

Important: When the SAN256N director is shipped in conditions of extreme (high/low) temperature and/or humidity, allow 24 hours for environmental stabilization of the SAN256N director chassis and/or cabinet at room temperature. This 24-hour environmental stabilization period must be accomplished in the room/area where the installation will take place. The ESD bag/shipping materials must be removed to allow proper environmental stability prior to the installation of the SAN256N director system.

Unpacking the SAN256N director when shipped in a cabinet

When the SAN256N director is shipped in a 70-inch high cabinet (40U), it is packed with shipping blankets, metal straps, and a protective anti-static plastic shipping bag. Remove the metal straps and shipping blankets.

Leave the anti-static plastic shipping bag and nylon straps in place on the cabinet until a IBM Field Service representative, or a certified Third Party Field Service Organization representative, is present to unpack the cabinet. The Field Service representative will then continue with the unpacking and removal of the nylon straps and protective plastic shipping bag from the cabinet. Discard the plastic bag and nylon straps in accordance with local regulations.

Locate the remaining shipping boxes that contain the AC power cords, SFPs, horizontal and vertical cable guides, Customer's Spares Kit, and other cabinet installation parts. The ESD wrist strap assembly is shipped in a protective plastic bag attached, via a plastic tie-wrap, to the inside right panel of the front of cabinet.

Unpacking the SANC40 cabinet when shipped by itself

When the SANC40 cabinet is shipped by itself, it is shipped in a protective anti-static bag inside a triple-wall (90 lb weight) cardboard carton with two 1/2-inch steel banding straps securing the cardboard carton to a wooden skid. Remove the metal straps, cardboard carton and foam inserts. Leave the anti-static plastic shipping bag in place on the chassis until a IBM Field Service representative, or a certified Third Party Field Service Organization representative, is present to unpack the chassis. The Field Service representative will then continue with the unpacking and removal of the nylon straps and protective plastic shipping bag from the chassis. Discard the plastic bag and nylon straps in accordance with local regulations.

Note: When removing shipping materials from the chassis or cabinet and unpacking boxes shipped with the chassis or cabinet, place discarded shipping materials and boxes in one area, away from the installation work area. Maintaining a neat installation work area will keep access to the chassis or cabinet and cables free from blockage and trash.

International shipments

When the SAN256N director is shipped internationally, an international transportation carrier is used who specializes in moving and transporting electronic and electronic ESD-sensitive equipment. The SANC40 cabinet is shipped in a protective anti-static bag inside a corrugated (90 lb weight) cardboard box mounted on a wooden skid.

For detailed information describing the transportation carrier's responsibilities, refer to the *IBM TotalStorage SAN n-type Director Series Site Planning Guide*.

Moving the equipment

Refer to the SAN256N director Site Planning Grid for the customer's building, floor, and room destination for the SAN256N director. This worksheet is completed during the site planning process.

The customer or shipping carrier (noted on the sales order) is responsible for transporting the SAN256N director equipment to its final destination location at the customer's site, before removing the SAN256N director from the shipping crate and skid.

IBM recommends that a minimum of two people be involved in the removal of the SANC40 cabinet from the wooden shipping crate and a moving of the SANC40 cabinet into the designated area.

Unpacking the SANC40 cabinet

To unpack the SANC40 cabinet:

Note: A minimum of two people is required to safely uncrate the SANC40 cabinet.

1. Cut away and discard the plastic stretch wrap surrounding the SAN256N director shipping package.
2. Remove the accessories box from the top of the SAN256N director shipping package by cutting the two plastic straps securing the accessories box to the SAN256N director shipping package. Place the accessories box in a safe location until required during chassis installation.
3. Cut and remove the two metal straps from around the cardboard shipping box and wooden skid.

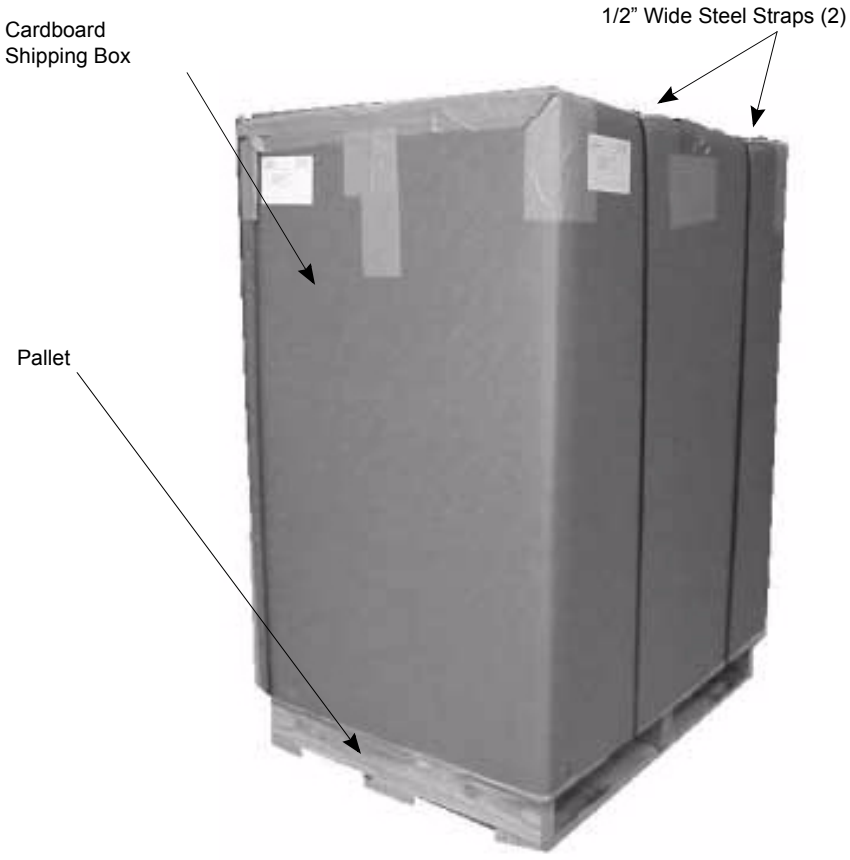

Figure 18. SAN256N director shipping box

4. Unscrew and remove the four #6 x 1-5/8” drywall screws and washers securing the cardboard shipping box to the pallet.
5. Cut through the taped seams and open the cardboard flaps.
6. Remove the shipping cap from the top of the SANC40 cabinet.

7. Cut and remove the packaging tape securing the ESD bag over the SANC40 cabinet.
8. Remove the ESD bag by lifting the bag over the top of the chassis.
9. Remove the sheet of pink ESD shipping material from the front side of the chassis.

Figure 19. Pink ESD shipping material on SANC40 cabinet

IBM Logo plate installation

In the event that the IBM logo plate becomes unattached from the front of the SANC40 cabinet during shipment, use this procedure to re-attach the logo plate to the chassis.

1. Position the logo plate in front of the chassis air grill, and line up the notches in the back of the logo plate with the tabs on the chassis.

Note: The logo plate is shown tilted back more than necessary to show tab/notch detail.

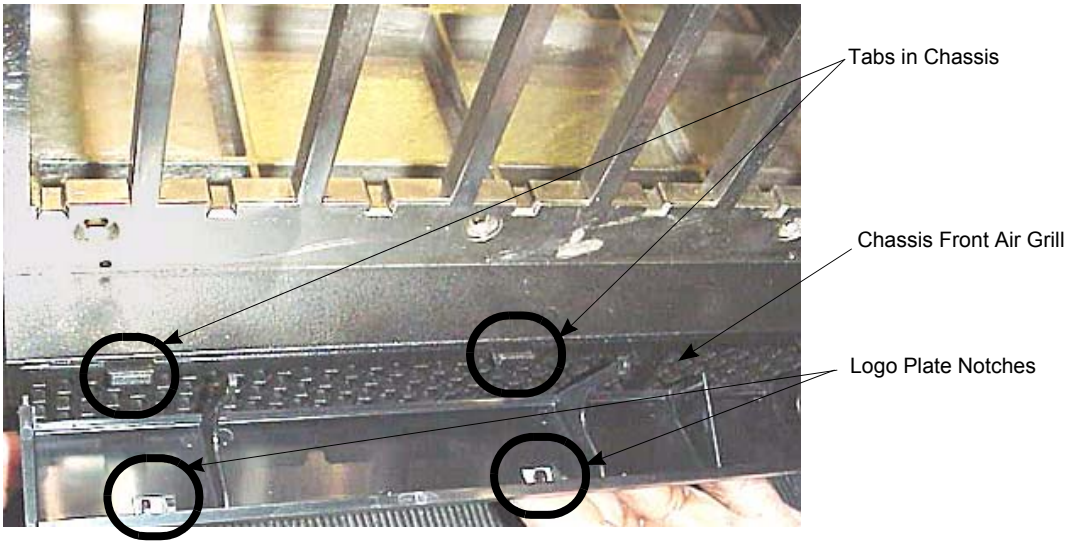

Figure 20. Logo plate tabs

2. Counting 2.5 holes down from the top of the grill, insert the long tabs of the logo plate into the honey comb mesh.

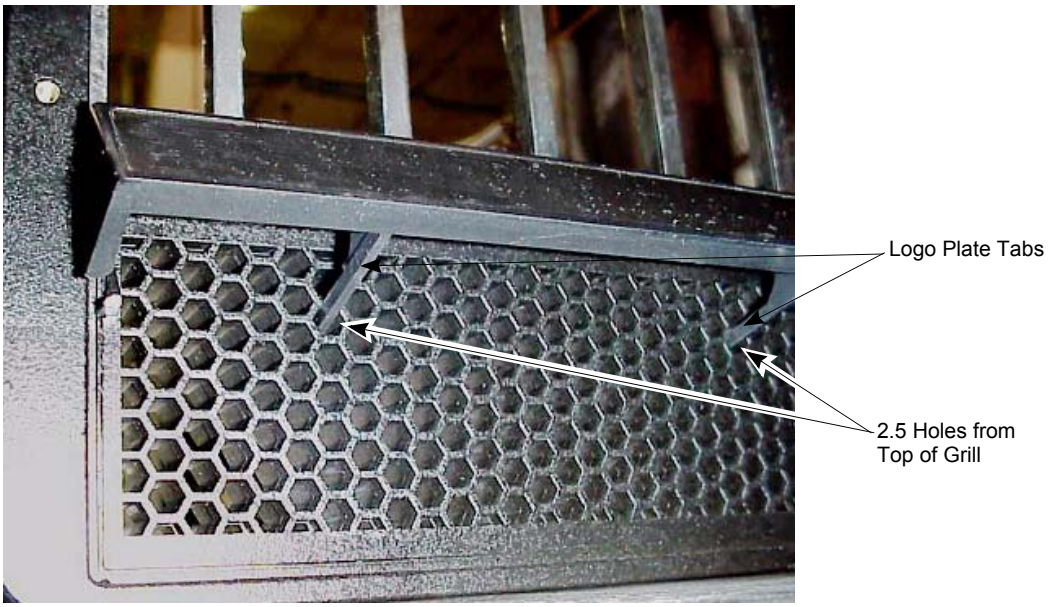

Figure 21. Logo plate tabs, 2.5 holes

3. To lock the logo plate notches into the chassis tabs, gently push in from the front, and down on the top of the logo plate.

Unpacking the SANC40 cabinet

To unpack the SANC40 cabinet:

Note: A minimum of two people is required to safely uncrate the SAN256N director.

1. Cut and remove the two metal straps from around the shipping crate and wooden skid.
2. With one person supporting the front of the shipping container/hinged ramp, unlatch the four ramp link locks.
3. Carefully lower the hinged ramp to the floor. The following graphic shows the crate with the ramp lowered.

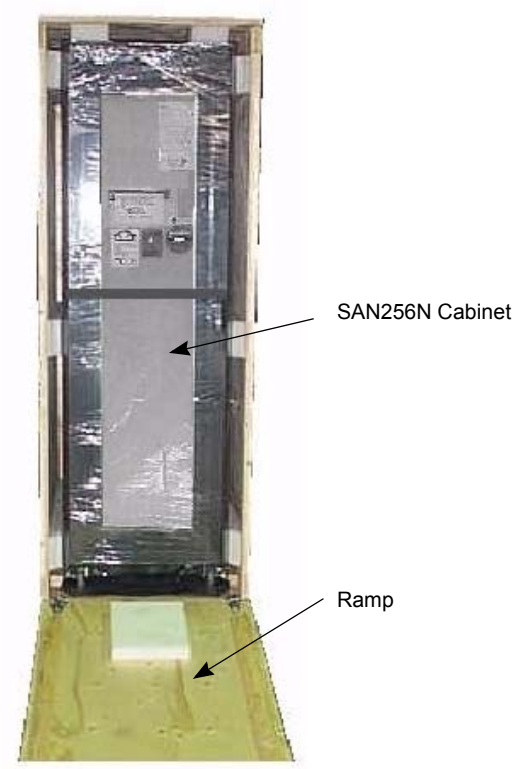

Figure 22. SANC40 cabinet with crate ramp lowered

4. Unlatch the five top lid link locks and remove the top lid. Place the lid in a secure area.
5. Carefully roll the SAN256N director down the ramp to a holding area for unwrapping.

6. Cut the plastic strap securing the ESD bag to the SANC40 cabinet. Remove and discard the plastic strap. Remove and save the four plastic corner protectors. Place the corner protectors in the shipping crate for storage.

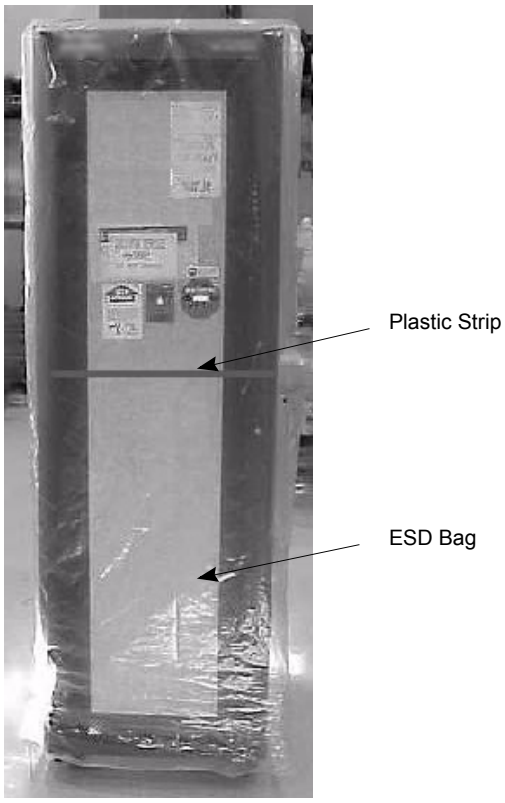

Figure 23. SANC40 cabinet with plastic strip

7. Leave the anti-static plastic shipping bag in place on the cabinet until a IBM Field Service representative, or a certified Third Party Field Service Organization representative, is present to unpack this equipment. The Field Service representative will then continue with the unpacking and removal of the protective plastic shipping bag from the cabinet. *Do not discard the plastic bag*; place it with the packaging materials in the event that the SANC40 cabinet should have to be returned to IBM.

Important: When the SAN256N director is shipped in conditions of extreme (high/low) temperature and/or humidity, allow 24 hours for environmental stabilization of the SANC40 cabinet and/or cabinet at room temperature. This 24-hour environmental stabilization period must be accomplished in the room/area where the installation will take place. The ESD bag/shipping materials must be removed to allow proper environmental stability prior to the installation of the SAN256N director.

8. After unpacking the SAN256N director, collect and store the all the shipping and packaging materials, including the shipping crate in the event that the SANC40 cabinet would have to be returned to IBM.
9. Locate the remaining shipping boxes that contain the Software/Firmware Release CDs, SFPs, cables, Customer's Spares Kit, and other miscellaneous chassis or cabinet installation parts.

Floor tile cutouts

Raised flooring with tile cutouts to accommodate forced airflow and cable access (power cables, braided ground strap, and fiber optic cables) requirements are preferred and recommended.

For cooling requirements of the SAN256N director, raised floor tile positioning requirements and measurements should be followed as indicated in the figure below for each cabinet to be installed.

Floor tile cutout for cabling should be in accordance with the measurements shown in the figure below; a 27.94 cm by 15.24 cm (11 inch by 6 inch) cutout in the front center of one floor tile which is for the AC power and fiber optic cables. The second floor tile must be a checkerboard perforated pattern, allowing a 60% open airflow area..

Enlarged view of standard 61 by 61 cm (24 by 24 inch) floor tiles

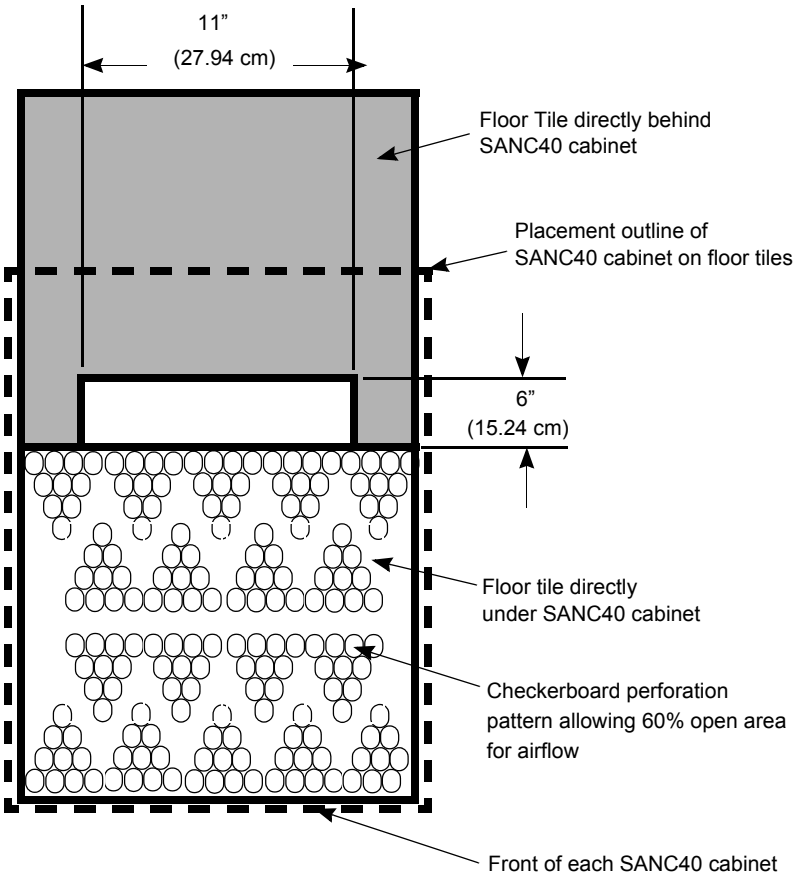

Figure 24. Floor tile layout for the SAN256N director

Place the cabinet into position in accordance with the customer’s approved site floor plans that were used during the planning site survey physical layout.

Locate the remaining shipping boxes that contain the fan assemblies, cables, Customer’s Spares Kit, and other cabinet installation parts.

Factory-installed items

The factory installs most internal chassis assemblies/parts and cabinet (if applicable) that are specified on the sales order before the SAN256N director is shipped to the customer's site. The SFP assemblies for the TFIO blades are not factory installed and are shipped in a separate box.

Before performing the installation procedure for the SAN256N director in its final destination at the site, visually check the assemblies, including the SFP assemblies, against the sales order to verify that all the ordered assemblies and parts either have been installed in their respective proper locations or are present in a shipping box. To verify that all hardware assemblies and software components have been shipped, check the sales order, the packing slip, and the SAN256N director Customer Data Sheet and SAN256N director Site Configuration Worksheet that were completed during site planning.

If any hardware assembly or software component is missing, notify the Account Executive, Sales Engineer, and call the Help Desk.

If the SAN256N director is installed in a 40U cabinet, unlock and open the front and rear panel doors.

Factory-installed chassis items include the following:

- SAN256N director I/O Blades (TFIO)
  - For a maximum 256-port, 1-chassis configuration - quantity of 1 to 16
- SAN256N director switching modules (TSW)
  - For a maximum 256-port, 1-chassis configuration - quantity of 3 to 4
- SAN256N director control modules (TCM)
  - For a maximum 256-port, 1-chassis configuration - quantity of 2
- Power supply assemblies
  - For a 256-port, 1-chassis configuration - quantity of 2
- Fan (upper) assemblies
  - For a 256-port, 1-chassis configuration - quantity of 3
- Fan (side) assemblies
  - For a 256-port, 1-chassis configuration - quantity of 2
- TFIO air baffles (if required)
- TSW air baffles (if required)
- AC power cords
  - For a 256-port, 1-chassis configuration - quantity of 2

Chassis installation

Installation procedures

The following step-by-step procedures describe how to physically install a SAN256N director into a 40U cabinet. Two cabinet variations are described:

- SAN256N-style 40U cabinet
- FC/9000-style 40U cabinet

The SAN256N is designed to be installed into an IBM-supplied SANC40 cabinet. If the SAN256N is to be installed in a non-IBM-supplied cabinet, the customer must contact the IBM Account Executive and Technical Support representatives. The IBM Account Executive and Technical Support representatives must review and approve the customer's supplied cabinet(s) to certify that the cabinet(s) meets all airflow and mechanical requirements/specifications prior to installation. This IBM review and approval of a non-IBM-supplied cabinet is required to ensure compliance to airflow specifications and mechanical specifications for proper installation and operation of the SAN256N director.

Lifting device requirements

A hydraulic, electrical, or mechanical lifting device is required to lift the chassis from the wooden shipping skid and install it in a cabinet.

CAUTION: The director weighs approximately 167 pounds or 75.9 kilograms. The use of an approved lift tool is recommended to safely lift the device. Failure to observe this may result in injury to personnel or damage to the director..

Using the lift tool and the 24-inch load plate

Step 1 through step 17 describe how to use the lift tool (PN 09P2481) and the 24-inch load plate (PN 11P4369) to install a 2045-N16 (SAN256N) in the cabinet.

CAUTION: A fully populated 2045-N16 weighs approximately 75.9 kg (167 lbs) and requires a minimum of two people and a lift tool to install it.

C001

ATTENTION: Before you install it, verify that the additional weight of the chassis does not exceed the cabinet's weight limits or unbalance the cabinet. When you calculate the additional weight, include fully 35 populated cards and all power supplies.

CAUTION: A pinch point exists between the load plate and the cabinet.

Perform the following steps to install a SAN256N:

1. Assemble the lift tool if it is not assembled. The assembly and disassembly instructions are included with the lift tool.
2. Attach the 24-inch load plate to the lift tool.
3. Move the lift tool next to the pallet that contains the SAN256N
4. Adjust the load platform to the same height.
5. Slide the SAN256N from the pallet onto the load platform. Secure the director on the load platform with the retention straps.
6. Center the director on the load platform.

7. If the load platform is not at its lowest position, lower the load platform to its lowest position.
8. Move the lift tool to a position near the rear of the cabinet.

Note: If you are passing through a narrow passage or door, it might be necessary to rotate the drawer on the load platform.

9. Set the wheel brake by pressing down on the wheel brake pedal.
10. Locate the anti-tips bars. If they are not attached, attach them to the lift tool, as follows:
    a. Pull up on the leg lock pins and insert the anti-tip bars inside the legs.
    b. Pull on the legs and anti-tip bars to ensure that they are locked into position.
    c. Raise the platform to allow enough room to attach the anti-tip bracket.
    d. Secure the anti-tip bars by using the anti-tip bracket and bolt.
11. Adjust the load platform to the same level (height) of the cabinet guide rails.
12. Turn the winch crank counterclockwise, 1/4 turn, to set the winch brake.
13. Set the wheel brake and place the wheel chocks around the wheels.
14. Remove the retention straps. Slide the switch into the cabinet.
15. Remove the wheel chocks, release the wheel brake, and move the lift tool away from the cabinet.
16. Fasten the two flat left and right mount brackets that are on the chassis to the cabinet mount brackets.
17. Reinstall the cabinet doors after you put the SAN256N director in place.

Installing SAN256N into SANC40 cabinet

Attention: Refer to safety notices before starting an installation.

Use this procedure to install a SAN256N chassis into a SANC40 cabinet.

Required Kit: SAN256N director to SANC40 cabinet Upgrade: 1016969-001

Important: When the SAN256N director is shipped in conditions of extreme (high/low) temperature and/or humidity, allow 24 hours for environmental stabilization of the SAN256N chassis at room temperature. This 24-hour environmental stabilization period must be accomplished in the room/area where the installation will take place. The ESD bag/shipping materials must be removed to allow proper environmental stability prior to the installation of the SAN256N director.

Notes

- Use a hydraulic, electrical, or mechanical lifting device that can safely handle a minimum weight of 250 lbs. to remove the chassis from the wooden skid.
- IBM recommends that a minimum of two people be involved in the removal of the chassis from the shipping skid and installation of the chassis into the designated cabinet/rack.
- Due to the weight of the SAN256N, approximately 210 lbs. fully loaded, IBM recommends that each installer wear a protective back brace while positioning the chassis into the cabinet.

- AC power is not applied to the SAN256N director during this installation procedure.

1. Install two SAN256N chassis support brackets (5416871-201) onto the inside rails of the SANC40 cabinet. The support brackets are positioned so that a 3.5 inch opening exists between the top of the existing SAN256N chassis and the bottom of the (to be installed) SAN256N chassis.
2. Verify the positioning of the SAN256N chassis mounting brackets on the sides of the chassis. For a SANC40 cabinet installation, the mounting bracket ears are positioned toward the rear of the SAN256N chassis. If the brackets are not installed in this orientation, unscrew the four sets of mounting hardware on each bracket, then remove, reverse and remount the brackets to the chassis.

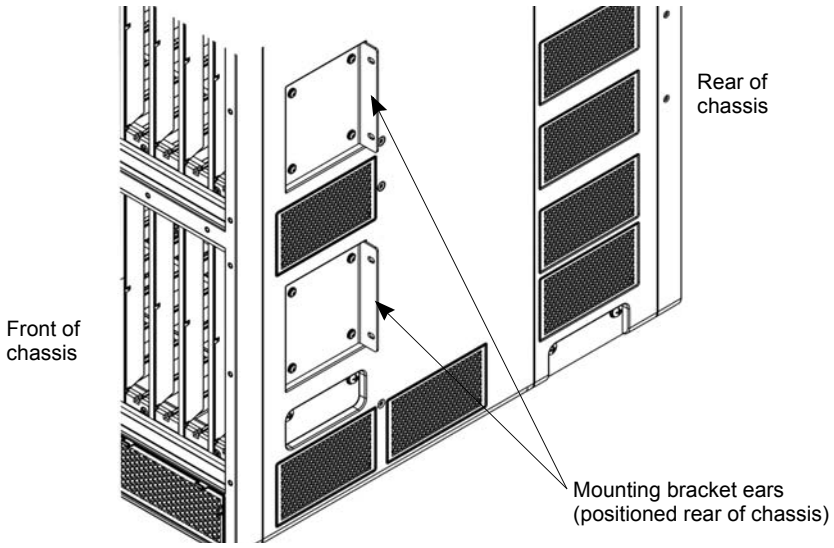

Figure 25. Mounting brackets

3. Tilt the chassis upward from the packing skid, high enough to allow the blades of the lifting device to slide underneath the bottom of the chassis as the blades are inserted from the front side of chassis.
4. Carefully position the chassis on the blades; raise the blades to a safe and comfortable height for transporting chassis to the designated cabinet for installation.
5. Transport the chassis to the front side of the cabinet.
6. Position the lifting device in front of the cabinet so that the chassis is horizontal and elevated slightly above the chassis support brackets installed earlier.
7. Carefully slide the chassis onto the chassis support brackets until the left and right SAN256N chassis mounting brackets are tight against the cabinet's mounting rails.
8. Carefully lower the blades from underneath the chassis and remove the lifting device from the cabinet.
9. Insert eight 10/32 x 3/8 PPH screws and #10 washers, through the bracket mounting holes. Tighten the screws to secure the brackets/chassis to the cabinet rails.

10. Using four 10/32 x 3/8 PPH screws and #10 washers, mount two chassis support brackets (5316325-201) at the rear of the cabinet as shown below. The brackets should be positioned/centered approximately between the two power supply assemblies. Adjust the support brackets by sliding them inward so the brackets press firmly against the sides of the SAN256N chassis. Tighten the screws to secure the brackets to the cabinet rails and the sides of the chassis.

Figure 26. Chassis support brackets (left), sliding support brackets (right)

11. Position two chassis vibration brackets (5416951-201: right hand, -202: left hand) on the rear top of the SAN256N chassis. Using four 10/32 x 3/8 PPH screws and washers, mount the brackets to the rear vertical cabinet rails. Tighten the screws to secure the brackets to the cabinet rails and to assure that the brackets provide a tight press fit against the top of the chassis.

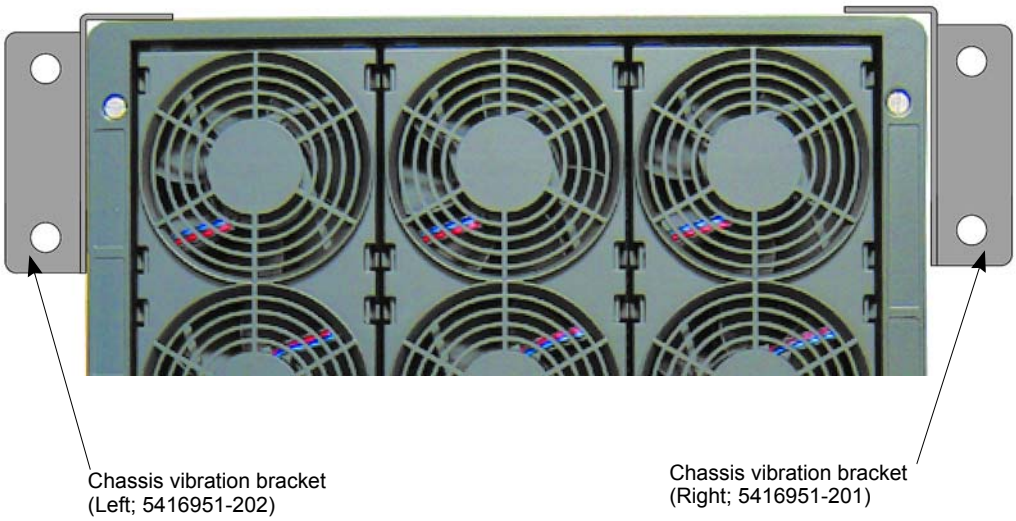

Figure 27. Chassis vibration bracket

12. Verify that all front and rear chassis / mounting bracket attaching hardware is installed and tight; and that the chassis is securely mounted to the cabinet.

Installing SAN256N director chassis into FC/9000 cabinet

Attention: Refer to safety notices before starting the installation.

Use this procedure to install a SAN256N director chassis into an FC/9000 chassis/ cabinet assembly.

Required Kit: Upgrade SAN256N director to Existing FC/9000 System: 1016966-001

Important: When the SAN256N director is shipped in conditions of extreme (high/low) temperature and/or humidity, allow 24 hours for environmental stabilization of the SAN256N director chassis at room temperature. This 24-hour environmental stabilization period must be accomplished in the room/area where the installation will take place. The ESD bag/shipping materials must be removed to allow proper environmental stability prior to the installation of the SAN256N director.

Notes

- Use a hydraulic, electrical, or mechanical lifting device that can safely handle a minimum weight of 250 lbs. to remove the chassis from the wooden skid.
- IBM recommends that a minimum of two people be involved in the removal of the chassis from the shipping skid and installation of the chassis into the designated cabinet/rack.
- Due to the weight of the SAN256N director chassis, approximately 210 lbs. fully loaded, IBM recommends that each installer wear a protective back brace while positioning the chassis into the cabinet.
- AC power is not applied to the SAN256N director during this installation procedure.

1. Install two SAN256N chassis support brackets (54xxxxx-201) into the inside rails of the FC/9000 cabinet. The support brackets are positioned so that a 3.5 inch opening exists between the top of the existing FC/9000 chassis and the bottom of the SAN256N chassis.
2. Verify the SAN256N chassis mounting brackets mounted on the chassis. For a SAN256N chassis into an FC/9000 system cabinet installation, offset mounting brackets (5415891-202) are used. If the standard (short) brackets are mounted to the SAN256N chassis, notify IBM support and request the correct brackets.
3. Tilt the chassis upward from the packing skid, high enough to allow the blades of the lifting device to slide underneath the bottom of the chassis as the blades are inserted from the front side of chassis.
4. Carefully position the chassis on the blades; raise the blades to a safe and comfortable height for transporting chassis to the designated cabinet for installation.
5. Transport the chassis to the front side of the cabinet.
6. Position the lifting device in front of the cabinet so that the chassis is horizontal and elevated slightly above the SAN256N chassis support brackets installed earlier.
7. Carefully slide the chassis onto the support brackets, until the left and right SAN256N chassis mounting brackets are tight against the cabinet's vertical mounting rails.

8. Insert eight 10/32 x 3/8 PPH screws and #10 washers through the bracket mounting holes. Tighten the screws to secure the brackets/chassis to the cabinet rails.
9. Using four 10/32 x 3/8 PPH screws and #10 washers, mount two chassis support brackets (5316325-201) at the rear of the cabinet as shown below. The brackets should be positioned/centered approximately between the two power supply assemblies. Adjust the support brackets by sliding them inward so the brackets press firmly against the sides of the SAN256N chassis. Tighten the screws to secure the brackets to the cabinet rails and the sides of the chassis.
10. Verify that all front and rear chassis / mounting bracket attaching hardware is installed and tight; and that the chassis is securely mounted to the cabinet.
11. Carefully lower the blades from underneath the chassis and remove the lifting device from the cabinet.
12. Using 6-32 x 3/8 PPH screws, install two vertical cable management trays to the front of the SAN256N chassis.

Cabinet installation

Cabinet installation considerations

The following conditions should be considered when installing a SAN256N director:

- Elevated operating ambient - If a SAN256N chassis is installed into the system cabinet, the operating ambient temperature of the cabinet environment may be greater than room ambient. Therefore, consideration should be given to installing the cabinet in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.
- Reduced air flow - Installation of the SANC40 cabinet should be such that the amount of air flow required for safe operation of the equipment is not compromised.
- Mechanical loading - Mounting of a SAN256N chassis into the system cabinet should be such that a hazardous condition is not achieved due to uneven mechanical loading.
- Circuit overloading - Consideration should be given to the connection of the SAN256N director and associated equipment to the supply circuit and the effect that overloading of the circuits might have on over-current protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- Reliable earthing - Reliable earth grounding of the SANC40 cabinet should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Installation procedures

The following step-by-step procedures describe how to physically install the SAN256N director, factory shipped, as follows:

- A SAN256N director factory installed chassis, in a 40U cabinet

The SAN256N chassis is designed to be installed into a IBM-supplied 40U cabinet. If the SAN256N chassis is to be installed in a non-IBM-supplied cabinet, the customer must contact the IBM Account Executive and Technical Support representatives. The IBM Account Executive and Technical Support representatives must review and approve the

customer's supplied cabinet(s) to certify that the cabinet(s) meets all airflow and mechanical requirements/specifications prior to installation. This IBM review and approval of a non-IBM-supplied cabinet is required to ensure compliance to airflow specifications and mechanical specifications for proper installation and operation of the SAN256N director.

Installing a SANC40 cabinet

Attention: Refer to safety notices before starting the installation.

Use this procedure to install the factory-shipped SANC40 cabinet.

Important: When the SANC40 cabinet is shipped in conditions of extreme (high/low) temperature and/or humidity, allow 24 hours for environmental stabilization of the SAN256N chassis and/or cabinet at room temperature. This 24-hour environmental stabilization period must be accomplished in the room/area where the installation will take place. The ESD bag/shipping materials must be removed to allow proper environmental stability prior to the installation of the SANC40 cabinet.

1. Verify that the SANC40 cabinet is in the correct position in relation to the floor tile cutouts (see Figure 24.).

DANGER: To prevent the SANC40 cabinet from tipping over, the leveler feet *must* be fully extended.

R001

2. Fully extend all levelers to place the SANC40 cabinet at a level position, and then slightly lift the cabinet off its wheels to prevent cabinet movement.
3. If necessary, loosen and adjust the 3/4-inch nut on the leveling feet with a 3/8-inch thick adjustable foot wrench.
4. If locked, unlock and open the cabinet front panel door by pulling the door latches, located on the right center edge of the panel doors, outward and upward CW to open the panel door. Retain the door latch key(s) for future use.
5. Verify that all attaching hardware is installed and tight and the chassis is securely mounted to the cabinet.
6. Verify that the SANC40 cabinet power supply assembly switches are set on the **0** (Off) position.

   Attention: Use a properly attached ESD wrist strap when handling any TFIOs, TSWs, TCMs, or power supply assemblies; otherwise damage to equipment may occur.

7. Connect an ESD wrist strap plug into the ESD connector on the chassis, located on the center front of the chassis, and place the ESD strap around your wrist. Fasten the strap using the Velcro strap fastener.
8. Verify that each TFIO blade is seated properly in the chassis and tightly connected to the appropriate Midplane connectors.
9. Verify that each TSW module is seated properly in the chassis and tightly connected to the appropriate Midplane connectors.

10. Verify that each TCM module is seated properly in the chassis and tightly connected to the appropriate Midplane connectors.
11. Verify that the appropriate number of power supply assemblies are installed for this site configuration, and record each of the power supply assembly serial numbers.

Note: The power supply serial numbers can be obtained from the white bar-code label located on each power supply handle.

12. Locate the serial number on the label and record the serial number on the SAN256N director Site Configuration Worksheet under Power Supply Assembly Serial Numbers.
13. Verify that the power supply assemblies are secured in position.
14. Verify that blank panel air baffles (for TFIO and/or TSM modules) are installed in all empty chassis slots.

Note: If blank panel air baffles for TFIO and/or TSW modules are not installed in the empty chassis slots, or are not shipped with the chassis, contact the Account Executive, Sales Engineer, and call the Help Desk to report that these parts are missing and are required to complete the installation.

15. Check the AC power cables to ensure that all cables are connected firmly and correctly to the power supplies, the wire bail strain reliefs are firmly connected to the AC power cord connectors, and that the AC power cable plugs going to the customers AC power receptacles are the correct plugs for this site. If the AC power cable plugs are incorrect for this installation, refer to “AC power reference” on page 123.
16. Remove the protective plastic cover from the front of the front panel door.
17. Remove the protective plastic cover from the rear of the front panel door.The front and rear panel doors should remain unlocked and open at this time.

Applying AC power

Attention: Refer to safety notices before starting the installation.

Before you apply AC power to the SAN256N director, take the following precautions:

- Verify that the site is set up to provide full AC power redundancy. Two separate, independent power lines with two separate circuit breakers are required for a single chassis (SAN256N director-16). An uninterruptible power supply (UPS) should be connected to the redundent power source.
- Verify that the SANC40 cabinet is properly grounded according to local electrical codes.
- Verify that AC power can be shut down quickly in case of an emergency. You should have easy access to the AC input power connections.
- Verify that the supplied power cables are of adequate length and are correct for the site. Refer to Appendix B. AC power reference on page 123 if the power cables do not appear to be correct.

Supplying AC power to the SAN256N director

1. Verify that the SAN256N power supply switches are set in the **0** (Off) position.
2. Verify, using a voltmeter, the customer's AC voltage from the AC power source is between 200 VAC and 240 VAC and is single phase. Also, verify the circuit breakers for each line (A and B) are 20 amp breakers, and that when circuit breakers are turned Off, the AC voltage measurement indicates zero (0) volts.
3. Verify that the customer's AC power source circuit breakers are set to the **Off** position.
4. Verify that the correct power plug has been installed at the ends of the two SAN256N director AC power cords.

Attention: Do not apply AC power to the SAN256N director at this time.

Attention: Refer to safety notices before starting an installation.

R001

5. Verify that access to the customer's AC power receptacles and SAN256N director AC power receptacles are not restricted so service technicians can easily disconnect the AC power cords.
6. Route and connect the two 6-foot power cords of the SAN256N director to the customer's AC power receptacles.
7. Mark or tag the customer's receptacles to indicate which line cord, Line A or Line B, is connected to which receptacle.

Powering on the SAN256N director

Attention: Refer to safety notices before starting an installation.

Use the following procedure to turn on power to the SAN256N director.

1. Verify that the customer's AC power source circuit breakers that are supplying power to the SAN256N director are set to **ON**.
2. Verify that the AC power cord plug(s) are tightly connected to the AC Input recessed receptacles on the power supplies, located at the rear of the SAN256N chassis. The AC indicators should be lit green, and the DC indicators should be lit red on each power supply.

3. Locate the AC power switch(es) on the front panel of the power supplies, and set the switch(es) to the **ON** position. The AC indicators should be lit green, and the DC indicators should be lit green on each power supply.

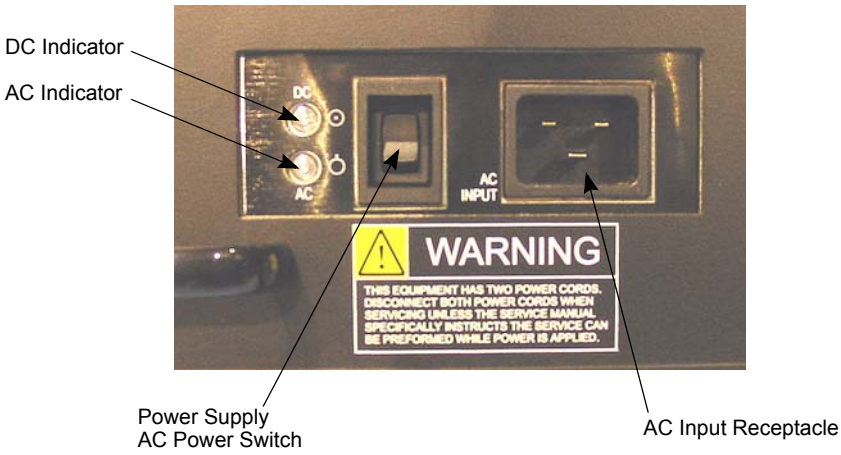

Figure 28. AC power switch

The following events will occur:

- The power supply fans begin to rotate.
- The three sets of upper fans and two side fans for each chassis begin to rotate.
- The following initial power on indications should occur on the SAN256N director:
  - All TFIO, TCM and TSW power LEDs are On. All of the other LEDs are Off.
- After 60 seconds:
  - All module Heartbeat LEDs flash amber.
  - Primary TCM (PB1 Top (TCM0)) the following display scrolls around: [Name: SAN256N] [Primary] [Ex. IP. 0.0.192.168.2.150] [OK]
  - Secondary TCM (PB1 Lower (TCM1)) the following display scrolls around: [Name: SAN256N] [Ex. IP. 0.0.192.168.2.151] [OK]
- After 150 seconds:
  - All port 'L' (Link) LEDs flash on all TFIO blades for 60 seconds then go OFF.
- After 4 minutes:
  - All modules go online (Online LED ON) with the Heartbeat LED flashing.

4. Using the graphic below, check the output airflow of the three upper fan assemblies, the two side fan assemblies, and the power supplies, which should all be blowing the air outward, by placing a strip of paper in front of each fan assembly. The paper strip should be blowing away from the fan assemblies if the airflow is correct.
5. Check the inward airflow of the chassis at the intake vents indicated in the graphic below, by placing a strip of paper in front of each intake vent. The paper strip should be drawn towards the air intake vents if the airflow is correct.

SAN256N director system errors

TCM display error codes and TFIO/TSW error codes are listed and defined in , Data collection and troubleshooting.

Attention: Refer to safety notices before starting an installation.

If an error code indicates that a module failed the Power Up Diagnostic Tests, then do the following:

1. Unscrew and unlatch the failed module card ejectors and slide the module out of the chassis slot.
2. Install the replacement module by sliding it into the chassis slot until the rear connectors are firmly seated into the midplane connectors. Secure the module into position by latching the card ejectors and tightening the screw to the chassis frame.
3. Run the power up diagnostics again to confirm that the modules are operating properly. Repeat step through step as needed.
4. The keys for the front and rear panel doors are kept by IBM Field Service personnel, or by IBM certified Third Party Field Service Organization personnel, at all times.
5. Close and lock the rear panel door (if applicable) and remove the key from the panel door lock. The front panel door may remain unlocked and open at this time.

Performing an AC power redundancy check

Before bringing the SAN256N director online, you must ensure the AC power redundancy is configured correctly. Use the following procedure to perform an AC power redundancy check

Note: The SAN256N director must be powered on and in its present operating state, as well as the Power supply assembly switches must be On and AC present on both inputs for this test.

1. Set the customer's circuit breaker that supplies AC power to Line A to Off. All LEDs should remain lit, except for the power supply LEDs associated with that power input.
2. Set the customer's circuit breaker that supplies AC power to Line A to On; then set the customer's circuit breaker that supplies AC power to Line B to Off. All LEDs should remain lit, except for the power supply LEDs associated with that power input.
3. Set the customer's circuit breaker that supplies AC power to Line B to On.

Installing the Enterprise Manager workstation PC and external modem

If you have not unpacked all shipping boxes, unpack all shipping boxes associated with the Enterprise Manager workstation PC, which contains the monitor, keyboard, mouse, desktop/tower PC, interconnecting cables, and manufacturer's installation/operation manuals, if not previously done. IBM recommends that the manufacturer's installation/ operation manuals supplied with the PC be used as the reference source in setting up and configuring the workstation.

Power on the Enterprise Manager workstation PC

1. Verify that the Enterprise Manager workstation PC (computer and monitor) AC Power switch is in the **OFF** position.
2. Plug the Enterprise Manager workstation PC power cord into the customer's AC power receptacle.
3. Power on the Enterprise Manager workstation PC. Ensure the PC boots up, and Windows operating system is functioning properly.
4. Set any other controls on the Enterprise Manager workstation PC as appropriate, e.g., monitor brightness, contrast.

External modem installation

Note: The external modem, connected to COM 1 on the workstation, is used for RSM applications. The internal modem, installed inside the workstation, is used for the Call Home feature of the SAN256N director. Both modems are operational using only one customer-supplied phone connection. Two external modem installations are shown in this section:

- MultiTech Systems MultiModem MT5634ZBA - Global
- MultiTech Systems MultiModem MT5600BA - Global

MultiTech Systems MultiModem MT5634ZBA - global external modem (North American/International Usage)

Use the following procedures to install the MultiTech Systems MultiModem MT5634ZBA - global external modem, modem driver, and global wizard utility.

Installing the MultiTech MT5634ZBA - global external modem

1. Unpack the contents of the modem packing box.
2. Verify that the workstation is turned **OFF** during this modem installation.
3. Install the four plastic feet onto the bottom of the modem. Peel the feet from the paper carrier strip and press the feet into the recesses on the bottom of the modem.
4. Using a DB-25 to DE-9 RS-232 serial cable, plug the DB-25 connector end into the modem.
5. Plug the DE-9 connector end of the cable into Serial Port A (COM 1) of the workstation.
6. Insert the barrel-shaped power plug into the power jack on the modem. Plug the power module into a standard AC power wall outlet.
7. Connect the customer's supplied phone line to the line port of the external modem.

8. Using the external modem's supplied phone cord, connect a line between the external modem's phone port and the workstation's internal modem line port.

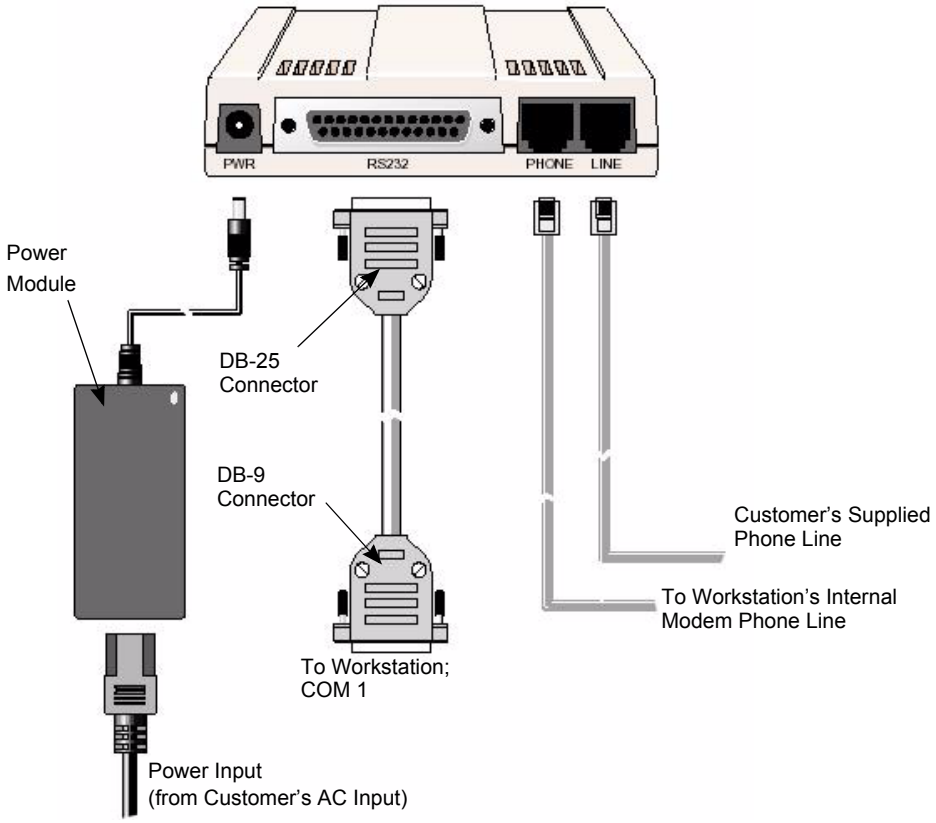

Figure 29. External modem connections

9. Turn on the external modem (the power switch is located on the right side of the case), and the workstation. Proceed with installing the modem driver.

Installing the modem driver

1. Upon startup of the workstation, Windows should detect the new modem and open the **Install New Modem** wizard.
2. In the **Install New Modem** wizard, select **Don't detect my modem; I will select it from a list**, and then click **Next**. A dialog box with a list of manufacturers and a list of modem models is displayed.
3. Insert the system CD into the CD-ROM drive, and then click **Have Disk**.
4. In the **Install from Disk** dialog box, select the CD-ROM drive the system CD is in, and then click **OK**.
5. A list of modems appears. Select **MultiTech MT5634ZBA - Global External Modem** from the list, and then click **Next**.
6. Select the port the modem is connected to (COM 1), and then click **Next**.
7. Windows will install and configure the modem.
8. Click **Finish** to exit.
9. Proceed with configuring the modem for the destination country.

Configuring the modem for a destination country

Different countries have different requirements for how modems must function. Therefore, you must configure the modem to match the communication defaults of the country it will be used.

Using the global wizard utility

1. Insert the MT5634ZBA System CD into the CD-ROM drive. The **Autorun** dialog box appears.
2. Click **Initial Setup and Country Selection**. The **Global Wizard** dialog box appears. Click **Next**.
3. View the Global Wizard as it searches for the modem and identifies it. Click **Next**.
4. Select the country in which the modem will be used, and then click **Next**.
5. Review the choice of country. If it is correct, click **Next** to configure the modem.
6. When the Global Wizard message states the parameters have been set, click **Finish** to exit.

MultiTech Systems MultiModem MT5600BA modem (North American/ International usage)

Use the following procedures to install the MultiTech Systems MultiModem MT5600BA external modem, modem driver, and global wizard utility.

Installing the MultiTech MT5600BA modem

1. Unpack the contents of the modem packing box.
2. Verify that the workstation is turned **Off** during this modem installation.
3. Using a DB-25 to DE-9 RS-232 serial cable, plug the DB-25 connector end into the modem.
4. Plug the DE-9 connector end of the cable into Serial Port A (COM 1) of the workstation.
5. Insert the barrel-shaped power plug into the power jack on the modem. Plug the power module into a standard AC power wall outlet.
6. Connect the customer's supplied phone line to the line port of the external modem.
7. Using the external modem's supplied phone cord, connect a line between the external modem's phone port and the workstation's internal modem line port (see Figure 29.).
8. Turn on the external modem (the power switch is located on the front of the case), and the workstation. Proceed with installing the modem driver.

Installing the modem driver

1. Upon startup of the workstation, Windows should detect the new modem and open the **Install New Modem** wizard.
2. In the **Install New Modem** wizard, select **Don't detect my modem; I will select it from a list**, and then click **Next**. A dialog box with a list of manufacturers and a list of modem models is displayed.
3. Insert the system CD into the CD-ROM drive, and then click **Have Disk**.

4. In the **Install from Disk** dialog box, select the CD-ROM drive the system CD is in, and then click **OK**.
5. A list of modems appears. Select **MultiTech MT5600BA** from the list, and then click **Next**.
6. Select the port the modem is connected to (COM 1), and then click **Next**.
7. Windows will install and configure the modem.
8. Click **Finish** to exit.
9. Proceed with configuring the modem for the destination country.

Configuring the modem for a destination country

Different countries have different requirements for how modems must function. Therefore, you must configure the modem to match the communication defaults of the country it will be used.

Using the global wizard utility

1. Insert the MT5600BA System CD into the CD-ROM drive. The **Autorun** dialog box appears.
2. Click **Initial Setup and Country Selection**. The **Global Wizard** dialog box appears. Click **Next**.
3. View the Global Wizard as it searches for the modem and identifies it. Click **Next**.
4. Select the country in which the modem will be used, and then click **Next**.
5. Review the choice of country. If it is correct, click **Next** to configure the modem.
6. When the Global Wizard message states that the parameters have been set, click **Finish** to exit.

Installing Enterprise Manager

This section contains cross-references to procedures that describe how to install the Enterprise Manager Server and Client software, discover a fabric, and enter fabric settings. It also includes startup procedures and a procedure used to assign and enable Enterprise Manager features that are licensed to the customer.

This section assumes a working knowledge of the Windows operating system, including its window principles and operations, command key structures, and file organization. Windows 2000® should already be installed on the machine to which you wish to install the Enterprise Manager Server, the Enterprise Manager Client, and the Java Runtime Environment (JRE) required to support the Client platform. It provides information to assist you in installing the Enterprise Manager, logging on, and defining the Enterprise Manager Network.

Note: If you purchased an Eneterprise Manager workstation from IBM, the software will be installed on the PC. Refer to the *IBM TotalStorage SAN n-type Director Family Enterprise Manager Installation and Operator Guide (GC26-7720)* for more information.

Installing and setting up Enterprise Manager 9.x on an existing FC/9000 platform

This section describes the steps to upgrade an existing Enterprise Manager workstation from Enterprise Manager version 8.3.x to version 9.x to allow operation of the SAN256N director within the FC/9000 fabric.

Note: Enterprise Manager versions earlier than 8.3.x are not supported.

The primary requirements for SAN256N director and FC/9000 operation are:

- Enterprise Manager version 9.x
- SAN256N director system operating version 1.x firmware
- FC/9000 system operating version 5.x firmware

Install Java Runtime Environment (JRE) Software

Use this procedure to install the Java Runtime Software.

Note: IBM recommends that previous versions of Java and Java Webstart are uninstalled prior to the installation of the Java Software.

1. Insert the Enterprise Manager version 9.x CD into the CD drive of the workstation. Open Windows Explorer and select the CD drive.
2. Run **j2re1-4-2-04-windows-i586-p.exe** from the Enterprise Manager CD to install the Java software. Click **Yes** on the **ConfigSave** screen to save the existing configuration. Java creates a file of the current configuration.
3. Run the Java installation wizard and accept all default settings. After the program loads, click **Finish** to exit the installation wizard. Perform a restart of the workstation to complete the Java installation.

Installing Enterprise Manager 9.x software

Use this procedure to install version 9.x of the Enterprise Manager.

1. Run **Setup.exe** from the Enterprise Manager CD.
2. Click **Yes** to the configuration snapshot question.
3. Click **Next** at the **Enterprise Manager installation** startup screen.
4. Select **I Agree**, then click **Next** on the **License Agreement** screen.
5. Click **Next** to accept English on the **Local Language** screen.
6. Accept the default directory for the Enterprise Manager installation, click **Next**.

Note: In an Enterprise Manager upgrade installation, all configuration database files are already established in this directory path. IBM does not recommend selecting a new directory path with existing database files.

7. Click **Next** on the **Enterprise Manager Installation Location** screen to start the installation.

8. When the Enterprise Manager installation is finished, click **Next** to continue the installation wizard.
9. Click **Finish** on the **Installation Finished** screen.

On the Windows Desktop, four program icons are now added to support version 9.x Enterprise Manager. Remove the Enterprise Manager CD from the workstation. Now you can start Enterprise Manager.

Start Enterprise Manager Manager and update the configuration database

Use this procedure to start version 9.x of the Enterprise Manager and update the existing configuration database.

1. Double-click on the **Enterprise Manager** icon.
2. Click **Yes** to migrate the existing database to the new version of Enterprise Manager.
3. Click **OK** at the **Database Migration** screen.

Now you can start Enterprise Manager - Client.

Start Enterprise Manager Client

Use this procedure to start version 9.x of Enterprise Manager Client.

Note: The server to which you want to connect should be running before you attempt to connect to it.

1. Double-click the **Enterprise Manager Client URL** icon. The **Enterprise Manager** browser screen appears. Click **Launch**.
2. The Java Web startup application loads. Click **Start** when you see the **Java Client Security Warning** screen.
3. Click the **X** in the top right corner of the **Java Enterprise Manager Client to MILAN - Desktop Integration** screen.
4. Type your user name and password in the appropriate fields, and then click **OK**.

Enter IP Address of SAN256N director from Enterprise Manager Client

Use this procedure to enter the SAN256N director IP address into Enterprise Manager Client.

1. Record the TCM IP addresses installed in the SAN256N director. The IP addresses are displayed by reading the IP information from the scrolling displays on each TCM.
2. Enter the IP addresses into the **IP Address #1** (primary TCM) and **IP Address #2** (secondary TCM) fields on the **Enterprise Manager Client Director** display.
3. Select **SAN256N** from the **Type** drop-down menu, and click **Save**.
4. Click **Save**.
5. Click **OK** to the “IP Addresses Saved” message.

The SAN256N director is now shown on the Directors tree listing, indicating that the SAN256N director is connected to the fabric.

Creating an ISL between the SAN256N director and the FC/9000

To connect a SAN256N director with an FC/9000 you need to use an Inter Switch Link (ISL). Use this procedure to install an ISL.

Note: You can only attach an ISL to an XFIO or XFIO2 on an FC/9000.

Note: When attaching multiple ISLs to an FC/9000 it is recomended that you use port 0 and spread the ISLs across multiple boards.

1. Using the Enterprise Manager, take the ports off-line that you are going to attach the ISL to on both the SAN256N director and FC/9000.
2. Using an appropriate fiber optic cable, insert one end into a port on a TFIO board on the SAN256N director, and the other into a port on a XFIO or XFIO2 board on the FC/9000.
3. Bring the ports back on-line using the Enterprise Manager that you previously took off-line.
4. After a few seconds, the Enterprise Manager will detect the ISL and will appear in the **fabric** view area of the Enterprise Manager.

Enabling license features

The License Manger manages the access of Enterprise Manager and features based upon the license type purchased by the customer. License Manager ensures the license features are only executed on the licensed SAN256N director. When the product or feature is executed, License Manager verifies the validity of the license and enables the feature(s).

Assigning and enabling licensed features

Use the following steps to assign or enable licensed features for the customer.

1. Execute Enterprise Manager Server.
2. Invoke the License Client from the Enterprise Manager Client Director **License** menu option. This will list all of the SAN256N directors controlled by Enterprise Manager and their current licensed features.
3. IBM service personnel must have the License Manager application installed on their machine. They will execute the License Manager via batch file InvsnLm.bat.
4. IBM service personnel will need to check the features that are licensed for the user and click the **Generate License Key** button and enter the WWN of the SAN256N director. This will generate the license key(s) for the user.

Note: The license key(s) may also be exported to a text file e.g. UserLicense.txt and sent to the customer.

5. On the License Client at Customer machine, check the features that are licensed and enter the corresponding license keys. Click **Apply** and then click **OK** at the License Key Required prompt. The License Client will verify the license keys on the machine and enable the authenticated features.
6. Click **Close** to save the settings.

Note: The settings take effect immediately; there is no need to restart Enterprise Manager to invoke them.

Frequently Asked Questions

1. Can the same license be valid on another PC?

Yes. The license keys are director based, and as long as a director is licensed, the features can be used from any Enterprise Manager.

2. Do Enterprise Manager Clients need a license?

No. Enterprise Manager Server controls all licensing; the Enterprise Manager Clients will reflect Server based licenses.

3. Can you execute License Manger on the Customer's Machine?

No. The License Manager is not supplied with the installation files and must not be executed at customer's site. The License Manager is made available to IBM support personnel who will administer the licensing of the inVSN products/features.

Entering director IP addresses via the Enterprise Manager for fabric discovery

See *t*he *IBM TotalStorage SAN n-type Director Family Enterprise Manager Installation and Operator Guide (GC26-7720)* for information on how to enter an IP address of a director/switch for fabric discovery purposes.

Editing IP Addresses via the Enterprise Manager for fabric discovery

See the *IBM TotalStorage SAN n-type Director Family Enterprise Manager Installation and Operator Guide (GC26-7720)* for more information. Click the old IP number and highlight it to change it. Or you can click behind the number and use the backspace key to erase numbers one at a time if you are only going to change a portion of the number. Then click the **Save** button.

Establishing Ethernet connections

An Ethernet connection must be established between the SAN256N director and the Enterprise Manager workstation PC. To do this, you need to edit the IP addresses of the TCMs and the Enterprise Manager workstation PC, and you need to physically connect them all to the same Ethernet network.

Entering, editing, or changing IP addresses

An IP address is defined as a range of number values assigned as an Internet Protocol (IP) address of the selected SAN256N director. These number values are indicated in the following format: X. X. X. X, where each X equals a number value between 0 and 255. An example of an IP address is 10.7.5.7.2.

Note: Do not use or assign any IP addresses beginning with 10.1.X.X.X, 10.2.X.X.X or 192.168.1.X. These IP address numbers are reserved for internal switch use.

Note: The default (factory assigned) IP addresses for the TCMs are 192.168.2.150 (TCM-0) and 192.168.2.150 (TCM-1).

IBM assigns and sets a range of IP address values for each TCM and for server bundles sold by IBM. The customer assigns each peripheral device IP address value according to network structures and configurations.

The IP addresses for the server bundles (IBM or customer provided) and customer peripheral devices are edited through either the Enterprise Manager (Enterprise Manager) PC or a workstation PC connected to the TCM Ethernet port.

The SAN256N director TCM and Enterprise Manager workstation IP addresses, subnet mask IP addresses, and gateway IP addresses must be configured in the same network. This allows each TCM and Enterprise Manager Server PC workstation to communicate with each other in the network configuration.

The IP addresses of the TCM modules must be entered in the following order:

- TCM Primary (TCM-0)
- TCM Secondary (TCM-1)

Changing preassigned TCM IP addresses via Enterprise Manager

The factory set or customer-provided preassigned IP addresses of the TCM modules may be physically changed via the Enterprise Manager workstation.

Use the following procedure to change the TCM IP addresses.

1. Start the Enterprise Manager manager by double-clicking the desktop **inVSN Enterprise Manager** Icon.
2. Start the Enterprise Manager client by double-clicking the **inVSN Client URL** icon on the desktop. Logon to the Enterprise Manager using the Maintenance User ID and password.
3. Double-click the **Director** link in the directory tree, and then click the desired director. A physical graphic view of the SAN256N director is now displayed.
4. Right-click the graphic and select **IP Configuration**. This will display the IP configuration box for both TCM's.
5. Edit the IP configuration information for each TCM module, and then click **OK**.

Note: Modify the Gateway address for each TCM to the Enterprise Manager server IP address if no other gateway is present.

6. Click **Yes** to confirm the new IP address change. The Enterprise Manager will lose connectivity to the SAN256N director and you will need to reconfigure it with the new IP addresses.
7. Click the **SAN** link in the Enterprise Manager client directory tree.
8. In the Director's screen, edit the SAN256N director IP address to the new SAN256N director address and click **Save**.

9. The Enterprise Manager will now discover the SAN256N and will update the screen. This will take a few seconds. Double-click the **Director** link in the directory tree, and then click the **SAN256N** director. The graphic view of the SAN256N director will now be displayed.

Changing preassigned IP addresses of the Enterprise Manager Server PC workstation

The factory set or customer-provided preassigned IP address of the Enterprise Manager workstation may be physically changed via the Enterprise Manager workstation itself.

Use the following procedure to change the Enterprise Manager workstation IP address.

1. From the Windows desktop, click **Start** | **Settings | Control Panel**.
2. Double-click the **Network** icon within the **Control Panel** menu. The **Network** menu is displayed.
3. Select the **Protocols** tab, select **TCP/IP**, and then click **Properties**. The **TCP/IP Properties** menu and **IP Address** tab are displayed.
4. Specify an IP address window, change the IP address as applicable, and then click **OK**.
5. Restart the Enterprise Manager workstation to accept and save the new IP address configuration.

Installing the network hub

IBM provides an Ethernet hub for connecting the Ethernet cables from the TCMs and the Enterprise Manager workstation PC. The network can be a private LAN, or part of a public LAN.

Installing a private LAN

To install the network hub (Intel InBusiness 8-Port Hub) for a private LAN:

1. Unpack the contents of the network hub packing box.
2. Using customer-supplied Category 5 network cables with RJ-45 network connectors, connect the following:
   - SAN256N director TCM 1 to hub port #1
   - SAN256N director TCM 2 to hub port #2
   - Workstation network card to hub port #3
3. Attach the power module to the network hub, and then plug the other end of the adapter into a standard AC power wall outlet.
4. Turn on the hub by pressing the Power switch located on the front panel.
5. On the front panel of the hub, each hub port with an active connection will be lit (in this case, hubs 1, 2, and 3 should be lit).
6. Snap the cable keeper clamp into the mounting slot on the rear of the hub, and rotate the clamp to a vertical position. Draw the network cables and power cord through the clamp.

Installing a public LAN

To install the network hub (Intel InBusiness 8-port hub) for a public LAN:

1. Unpack the contents of the network hub packing box.
2. Using customer-supplied Category 5 network cables with RJ-45 network connectors, connect the following:
   - SAN256N TCM 1 to hub port #1
   - SAN256N TCM 2 to hub port #2
   - Workstation network card to hub port #3
   - Out to hub to customer's LAN
3. Attach the power module to the network hub, and then plug the other end of the adapter into a standard AC power wall outlet.
4. Turn on the hub by pressing the Power switch located on the front panel.
5. On the front panel of the hub, each hub port with an active connection will be lit (in this case, hubs 1, 2, and 3 should be lit).
6. Snap the cable keeper clamp into the mounting slot on the rear of the hub, and rotate the clamp to a vertical position. Draw the network cables and power cord through the clamp.
7. Route the Ethernet data cable through the SAN256N chassis horizontal or vertical cable troughs (as applicable); connect to the 10/100 BASE -T connector on TCM 1 or TCM 2 (as applicable).
8. Check to ensure the designated Enterprise Manager workstation PC is cabled to the customer's Ethernet network.

Verify Ethernet connectivity

1. Verify the designated Enterprise Manager Server PC is connected to the customer's Ethernet network, and an Ethernet data cable is connected between the customer's network hub and the SAN256N 100 BASE-T connector on the appropriate TCM module.
2. Ping the TCM module from the Enterprise Manager to test the connection.

Connecting the workstation PC directly to the SAN256N director (No Hub)

1. Route the Enterprise Manager workstation PC AC power cord to the customer's AC power receptacle; connect AC power cord plug to the receptacle.
2. Route the customer supplied Ethernet crossover cable (50 ft. maximum length, Category 5, Twisted Pair) from the designated Enterprise Manager workstation PC to the SAN256N chassis.
3. Route the Ethernet crossover cable through the SAN256N chassis horizontal or vertical cable troughs (as applicable); connect to the 100 BASE -T connector on TCM 1 or TCM 2 (as applicable).

SFPs

Small Form Factor Pluggable transceivers (SFPs) are hot-swappable modules that convert electrical signals to optical signals, and vice versa. They provide the physical interface for the fiber optic cables.

Small Form Factor Pluggable (SFP) Transceivers

The SAN256N director Fibre Channel interface and mirror ports on the TFIO blades are served by fiber optic SFPs. An SFP contains a transmitter and a receiver that sends and receives electronic data to and from other switches and devices. The fiber optic SFP converts the electrical signals to and from laser signals. With an SFP of matching capacity, a port is capable of transmitting data at 1 Gbps or 2 Gbps.

SFPs plug into the TFIO ports, using keyed guides to ensure proper insertion. Fiber optic cables from other devices plug into LC connectors of the SFPs.

The SFPs are hot-swappable, therefore you can remove or install an SFP while the switch is operating without harming the switch or the SFP. However, communication with the connected device will be interrupted.

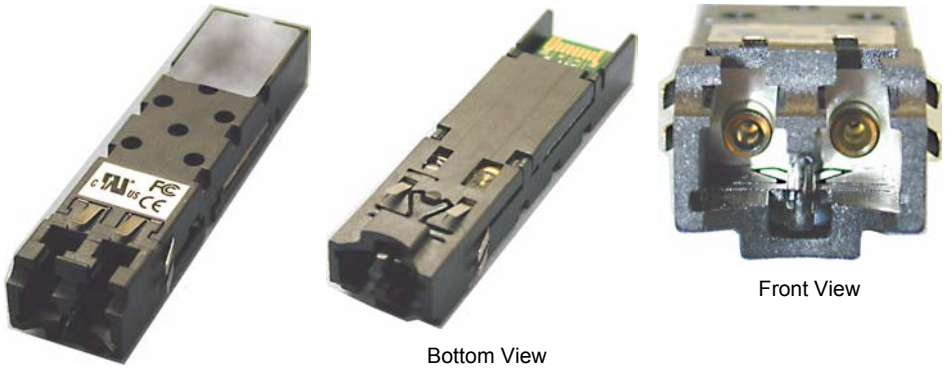

Figure 30. SFP LC-type transceivers

Installing the SFPs

1. Locate the shipping carton that contains the SFPs contained in a protective static shield bag and remove the SFPs from carton.
2. Open the protective static shield bag and verify that the media type and number of SFPs is correct for this installation. Refer to the Port Configuration section of the SAN256N director Site Configuration Worksheet and install the SFPs in accordance with this worksheet. This worksheet was completed during the site planning process.
3. Orient the SFP having the wide hinge tab facing toward the bottom of the module (or left side with “RX” at the top, when looking from the front).
4. Slide the SFP into the port opening until it clicks into place.

Removing an SFP

1. Grasp the plastic tab at the bottom of the SFP, and pull the tab down and toward you to loosen it from its seat.
2. Pull the SFP out of its receptacle using your thumb and forefinger.

Verifying TFIO port and module operation

You can verify the operation of the TFIO ports and modules by running the External Port Link Rate Test after the initial installation of a SAN256N director is complete.

Required Tools: Loopback plugs

When a system is powered on, each of the modules runs a Power On Self Test (POST). If each I/O port has a loopback plug attached, the modules will execute an extended POST to include running data out of the port(s). To test the system, install 16 loopback plugs on the first TFIO, run POST, then move the 16 loopback plugs to the next TFIO in the system. Do this until each I/O port is tested with a loopback plug installed.

External Port Link Rate Test procedure

To run the External Port Link Rate Test, after initial system power up, refer to the *IBM TotalStorage SAN n-type Director Family Enterprise Manager Installation and Operator Guide (GC26-7720)* for information on running the test.

Fiber optic cables

A fiber optic cable is made up of three basic elements:

- *Glass fiber*, which is the inner core,
- *Cladding*, which is a special reflective material covering the inner core, and
- A *buffer*, which is the outer protection layer(s) for the inner core and cladding.

The glass fiber provides the light path, the cladding covers the glass fiber, and the optical properties of the glass fiber and the cladding junction cause the light to stay within the glass fiber.

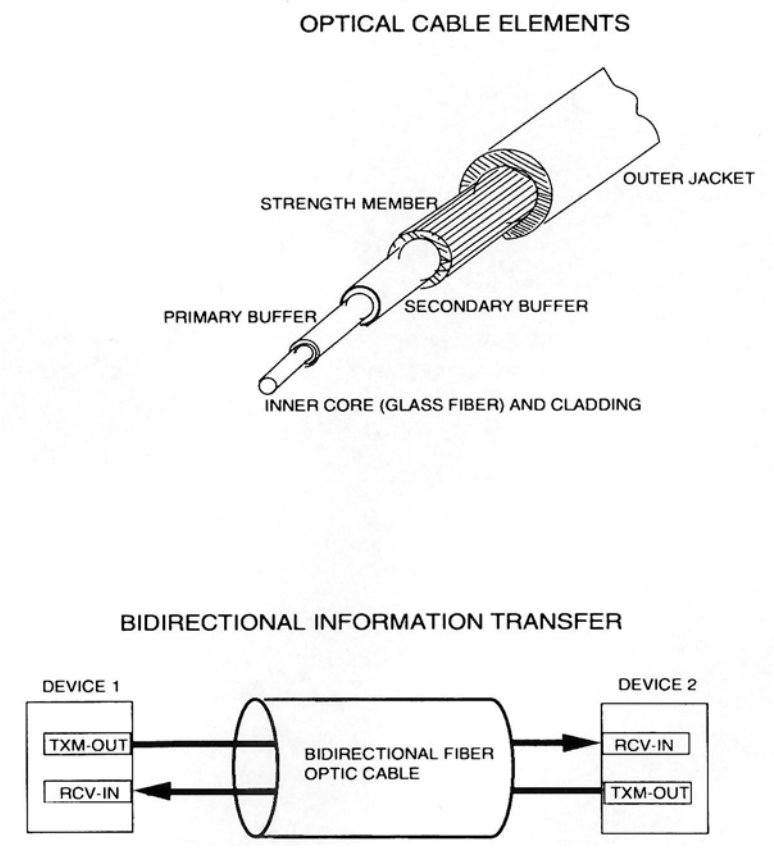

Figure 31. Fiber optic cable diagrams

The inner core and cladding diameters, defined in microns, are used to describe an optical cable and indicate the physical size of the fiber elements.

The glass fiber and cladding are covered by other layers called primary and secondary buffers, a strength member, and an outer jacket that provides strength and environmental protection.

Single-mode (SM) and *multi-mode* (MM) are terms used to describe the optical fiber and cable types. SM fiber is used to transfer information in one light dispersion path over greater distances; while MM fiber provides multiple light dispersion paths to transfer information at a lower bandwidth over shorter distances.

The typical fiber optic cable sizes are:

- MM, which are 62.5/125, or 50/125 microns
- SM, which are 9/125 to 10/125 microns

The first number represents the inner core and the second number represents the cladding.

The fiber optic cable sizes used for the physical link to the channel director can be the MM 50/125 or 62.5/125. When using the 50/125 size fiber optic cables, the cable length (maximum or up to) is 2 km from channel to director, or director to control unit. When using the 62.5/125 size fiber optic cable, the cable length (maximum or up to) is 3 km from channel to director or director to control unit.

For SM, the fiber optic cable sizes used for the physical link to the channel director can be the SM 9/125 or 10/125. When using the SM 9/125 or 10/125 size fiber optic cables, the cable length (maximum or up to) is 10 km from channel to director or director to director.

Handling fiber optic cables

Attention: Refer to safety notices before starting an installation.

To prevent damage, discontinuity, or contamination to the optical components, use the following precautions when handling the fiber optic cables:

- Use extreme care when removing or installing connectors to prevent damage to the housing or scratching the fiber optic ends.
- Always install protective covers (dust covers) on unused or disconnected components to prevent contamination, especially when routing fiber optic cables to their final destination.
- Always clean the fiber optic connectors before attaching them to the applicable device connectors.

Cleaning the connectors

Before installing any type of cable or connector, use a lint-free alcohol pad from the cleaning kit to clean the ferrule, which is the protective white tube around the fiber. Also clean the end-face surface of the fiber.

Connecting the cable assembly connector

Note: Perform only one connection at a time. Do not remove the dust cover until immediately prior to connection.

1. Clean the coupling by wiping the inside of the sleeve with a lint-free swab that has been slightly moistened in alcohol. Then blow dry the coupling using compressed air.
2. Insert the connector into the coupling in such a manner that any connection/coupling keying features are observed and properly mated.
3. Perform step and step with the second connector. If the second connector is not to be installed, cover the open end of the coupling with a clean dust cap.

Disconnecting the cable assembly connector

1. Grasp the connector housing and disconnect the housing from the coupling.
2. Cover the connector and coupling ends with clean dust caps when not in use.

Port connection general information

This section contains general information about the port connections, fiber optic connections, and copper connections to the SAN256N director.

N_Port connections

Connect Fiber Channel N_Ports to F_Ports on the switch. All 16 ports on the switch may function as F_Ports. The switch automatically discovers which N_Port is connected to which F_Port during the Fibre Channel login process as each N_Port is powered up.

Fiber Optic Connections

- Connect the transmit connector on the N_Port to the receive connector on the assigned F_Port. Connect the receive connector on the N_Port to the transmit connector on the assigned F_Port.
- Keys on “duplex” cable assemblies (a connector-pair containing both transmit and receive fastened together in one unit), prevent you from connecting them incorrectly.
- On the HBA or device end consult the appropriate adapter or device manual to determine the location of the transmit and receive connectors.

Fiber optic cable connection procedures

Attention: Refer to safety notices before starting an installation.

The following procedures describe how to connect the fiber optic cables to the SAN256N director. These procedures must be performed in the order presented.

Before installing the fiber optic cables, verify that the SAN256N director power on self test diagnostics ran successfully. You can do this by checking the TCM 16-character display code. Refer to Appendix A. Data collection and troubleshooting on page 101 for a list of display codes.

Fiber optic cable routing and connection for cabinet installations

To install the fiber optic cables to the SAN256N chassis TFIO blades (in cabinet):

1. Open the cabinet front panel door.
2. Review the SAN256N director Site Configuration Worksheet and SAN256N director Fiber Channel Director Port Server/Device Configuration Worksheet to confirm port assignments and fiber optic cable connections to the ports. These worksheets were completed during the site planning process.
3. Route the fiber optic cables, that have been designated for ports 0 through 15 on the **top shelf** TFIO blades located in chassis slots 0 through 3, through the chassis left vertical cable trough. The cables are then run up to the top horizontal cable trough and down to the TFIO ports.
4. Route the fiber optic cables, that have been designated for ports 0 through 15 on the **top shelf** TFIO blades located in chassis slots 4 through 7, through the chassis right vertical cable trough. The cables are then run up to the top horizontal cable trough and down to the TFIO ports.
5. Route the fiber optic cables, that have been designated for ports 0 through 15 on the **bottom shelf** TFIO blades located in chassis slots 0 through 3, through the chassis left vertical cable trough. The cables are then run up to the middle horizontal cable trough and down to the TFIO ports.
6. Route the fiber optic cables, that have been designated for ports 0 through 15 on the **bottom shelf** TFIO blades located in chassis slots 4 through 7, through the chassis right vertical cable trough. The cables are then run up to the middle horizontal cable trough and down to the TFIO ports.

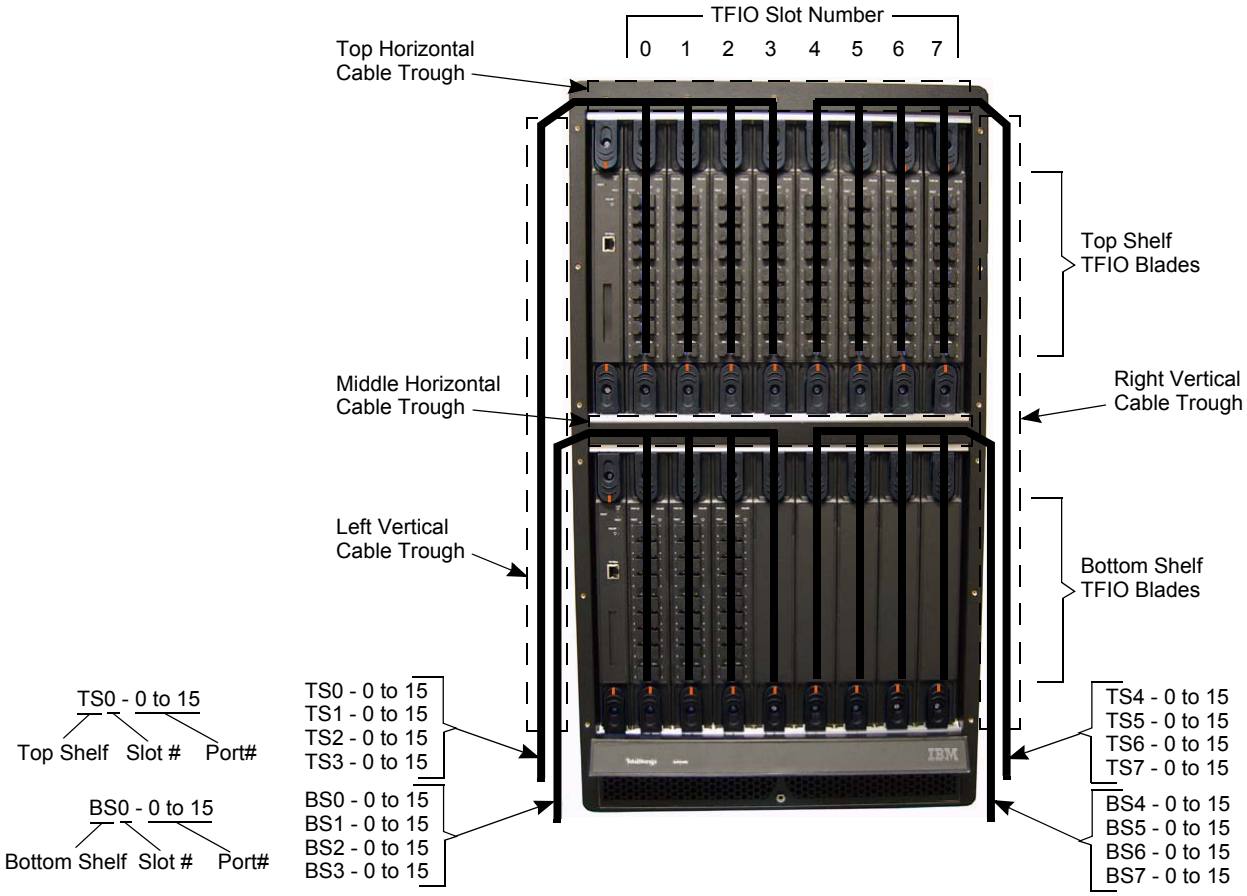

Figure 32. Fiber optic cable assignments

Attention: Use a properly attached ESD wrist strap when connecting the fiber optic cable plug to the TFIO or TSW module connector; otherwise damage to equipment may result because of being ESD sensitive equipment.

7. Remove the fiber optic cable connector dust cover and TFIO port dust cover. Plug the cable connector into the assigned TFIO blade port connector. Verify that the fiber optic cable plug is locked into position. Retain the dust covers for future use.
8. Pull any excess fiber optic cable back out from chassis and cabinet to leave room for future cable installations.
9. Close the cabinet front panel door.

Base installation complete

The IBM Customer Service Engineer will verify that:

- The Enterprise Manager Server and Client are operational and communicating with the SAN256N director and peripheral attaching device.
- All ID assignments and IP addresses have been configured, if provided.
- The Phone Home feature is tested and operational, if a phone line is made available for this feature.
- The customer is informed of the phone number for placing service requests.
- The passwords have been changed, if desired, and that the new passwords are in effect.

  Note: Before final turn-over, IBM recommends that Enterprise Manager passwords be changed from the factory settings.

  Note: After new Enterprise Manager passwords are assigned, the System Administrator must log out to allow the new passwords to take effect.

Upon restarting the Enterprise Manager, the IBM Customer Service Engineer can turn over the SAN256N director to the Customer Service Administrator.

Cycling power off and on

Before turning the SAN256N director power off, verify that the Enterprise Manager is powered down.

Turning off power at the SAN256N director

Set the power supply switches to the **Off** position. The following indications should occur in the SAN256N director:

- Both LEDs on the Power Supply Status Indicator panels should go off.
- All module LEDs should go off; the 16-character display on the TCM should go blank.
- The chassis upper fan assemblies, side fan assemblies, and power supply fan assemblies should stop rotating.

Turning on power at the SAN256N director

Refer to “Powering on the SAN256N director” on page 42 for instructions.

Verifying the hardware configuration

The following topics explain how to verify that the customer’s hardware configuration was completed successfully.

Verifying the logical path between server and peripheral devices

Request that the customer verify that their server is connected to and can communicate with the attached peripheral device.

1. Connect one end of the fiber channel cable to the customer’s Host Bus Adapter (HBA) applicable port connector.
2. Route and connect the other end of the fiber channel cable to the designated port connector on the front of the applicable SAN256N TFIO blade.
3. Display the front panel of the applicable TFIO blade and verify that the Online LED is lit green. At this time, the **L** (Link) LED should be lit yellow (1Gbps) or green (2Gbps) to indicate data is passing through the TFIO blade.

Verifying peripheral device logon

Display the front panel of the applicable TFIO blade and verify that the Online LED is lit green. At this time, the **L** (Link) LED should not be lit. After the device logs into the fabric, the **L** LED will be lit.

Verifying name service entry

Use the following procedure to verify that a name service entry is valid.

1. Log on to the Enterprise Manager Client. Click **OK**.
2. Click the **Fabrics** directory.
3. Select **Name Service**; verify that the Name Service entry is valid for the attached peripheral device.

Director verifications

After determining that the software is operational and running on all chassis and modules, take the following steps:

1. Select **Version** from the Enterprise Manager display screen to acquire the serial numbers of each module (TFIO, TSW, TCM) in the SAN256N chassis. Refer to the *IBM TotalStorage SAN n-type Director Series Site Planning Guide (GC26-7715)* that came with this system. This manual contains all of the site planning records for this system. Record the serial numbers on the SAN256N director Site Configuration Worksheet (*Component Locations/Serial Numbers*) located in Chapter 3.
2. Select **Version** from the Enterprise Manager display screen to verify the software version levels of each module (TFIO, TSW, TCM) in the SAN256N chassis. If the software levels indicated are not the current released versions, the software must be upgraded. Refer to the Software CD ReadMe files for code upgrade procedures.

3. Continue with the port setup and configuration procedures for the SAN256N director in accordance with the instructions in the *IBM TotalStorage SAN n-type Director Family Enterprise Manager Installation and Operator Guide (GC26-7720)*.

Chapter 4. Feature installation and configuration

This chapter provides installation, configuration, and setup procedures for the following features:

Symantec pcAnywhere

Symantec pcAnywhere provides IBM support personnel with remote access to the SAN256N director. pcAnywhere is factory installed on SAN256N systems purchased with Enterprise Manager. pcAnywhere uses the external modem supplied with the SAN256N.

Note: You should supply the pcAnywhere remote dial-In support telephone number to IBM during the site planning stage. Refer to *IBM TotalStorage SAN n-type Director Series Site Planning Guide (GC26-7715)*.

Workstation requirements and standards for pcAnywhere

The following conditions are required when operating pcAnywhere on a host or remote workstation:

- Configure the Enterprise Manager workstation with Power Options standby and hibernation disabled, otherwise a connection with pcAnywhere cannot occur:

  Start | Control Panel | Power Options | System standby and **System hibernates** = **Never**

- Two separate com ports are required to use pcAnywhere. The program can not share a com port with phone home. Having a connection or waiting for a connection ties up the com port.
- The default pcAnywhere login name is defined as **admin**.
- Passwords are assigned by IBM, following current standards and definition criteria
- A Host session must be started for IBM to gain access on demand. If not, the customer has to enable the Host session before engaging IBM Technical Support.
- IBM configures pcAnywhere encryption level "pcAnywhere encoding" as a standard
- IBM configures pcAnywhere to "Launch with Windows" as a standard
- IBM configures File Transfer Compression = Off as a standard (since the debug backup is already compressed). When downloading a specific code set, the file transfer compression setting is set to On.

- TCP/IP ports 5631 (data port) and 5632 (status port) are used for internet connections.

Use the following procedures to install and configure pcAnywhere for host and remote connections.

Install pcAnywhere

Use the following procedure to install the full product version of pcAnywhere.

1. Insert the pcAnywhere CD into the CD-ROM drive.
2. In the pcAnywhere installation window, click Symantec pcAnywhere. This selects the full installation option.
3. Click **Next** on the InstallShield Wizard screen.
4. Click the **Accept** button, then **Next** on the License Agreement screen.
5. Type a users name and an organization name in the Customer Information screen, click **Next**.
6. Accept the default file destination folder for installing pcAnywhere, click **Next**.
7. Click **Next** in the Custom Setup screen to accept the program default settings.
8. Select the pcAnywhere desktop shortcut option in the Ready to Install Program screen, click **Install**.
9. The program installation status screen monitors the installation and time remaining to complete the installation.
10. Click **Next** in the LiveUpdate screen to get any program updates to pcAnywhere.
11. After LiveUpdate has looked for, and installed any updates to pcAnywhere, click **Finish** in the LiveUpdate screen.
12. You will see a series of screens giving you the option of registering pcAnywhere. Skip through each screen until you see a screen asking to end or skip the pcAnywhere registration process, click **Yes**.
13. A final screen appears indicating that the installation of pcAnywhere is complete. Click **Finish** to exit the installation wizard.
14. Launch pcAnywhere by double-clicking the pcAnywhere icon on the Windows desktop.

File transfer compression

Use the following procedure to enable and disable compression for file transfers.

1. From the **Edit** pull down menu on the main screen, select **Preferences**.
2. In the File Transfer tab, check or uncheck the **Use compression** box. If the file to be transferred is compressed uncheck the box. If the file to be transferred is uncompressed check the box.

Configure a dial-up host connection

Use the following procedure to configure dial-up (modem) connectivity to the host workstation.

Note: The pcAnywhere application finds all installed and functional modems attached to the workstation. If an attached modem is not found, it will need to be determined what the problem is prior to moving forward with the configuration.

1. From the main screen, right-click the **Modem** remote connection and select **Properties**.
2. Check the appropriate modem from the device list. Select **Low bandwidth (modem connection)** in the Optimized for listing. Select the **Settings** tab.
3. From Host startup, select **Launch with Windows** and **Run minimized**. Click on the **Callers** tab.
4. Define a caller by selecting the **New Item** icon. It is the left most icon below the Caller List.
5. Input the Login name of admin and the customer specific password. Click **OK**.

   The user name of **admin** is now listed in the caller list.
6. Click on the **Security Options** tab.
7. Select **pcAnywhere encoding** in the Encryption Level pull down menu. Select the **Apply** and **OK** buttons to save the configuration.

Start a dial-up host session

Use the following procedure to start a dial-up (modem) session to the host (local) workstation.

1. From the main screen, right-click the **Modem** host connection and select **Start Host**.
2. The left most icon shows where pcAnywhere is waiting for a connection. If the workstation has been rebooted prior to starting a communications session, this icon should be displayed since the Launch with Windows option was selected.

Configure a dial-up remote connection

Use the following procedure to configure dial-up (modem) connectivity to the remote workstation.

Note: The pcAnywhere application finds all installed and functional modems attached to the workstation. If an attached modem is not found, it will need to be determined what the problem is prior to moving forward with the configuration.

1. From the main screen, right-click the **Modem** remote connection and select **Properties**.
2. Check the appropriate modem from the device list. Select **Remote Control** from the Start mode listing. Select the **Settings** tab.
3. Enter the phone number of the host PC and the correct country. Entering the login information is optional. If it is not defined in the modem profile, the host PC will prompt the user at the time of connection. Select the Security Options tab.
4. Select **pcAnywhere encoding** in the Encryption Level pull down menu. Select the **Apply** and **OK** buttons to save the configuration.

Establishing a remote dial-up connection

Use the following procedure to establish a remote dial-up (modem) connection to the host (local) workstation.

1. From the remotes screen, double click on **Modem**.
2. A connectioning screen opens, indicating that pcAnywhere is dialing to the host workstation.
3. Once connected, the login screen appears.
4. Enter the correct User name and password. Once authenticated, the desktop of the customer's workstation should be displayed.
5. Once a connection is established, the user can control the host workstation. To do a file transfer, select **File Transfer** from the Session Manager options on the left side of the screen.

   A screen will come up that displays the file structure of the remote and host workstations. To transfer files using your mouse, left click the file and move it over to the other screen.

Configure an Internet host connection

Use the following procedure to configure TCP/IP connectivity to the host (local) workstation.

1. After starting pcAnywhere, select **Hosts** from the left navigation bar on the pcAnywhere Manager screen.
2. Select and right-click **Network, Cable, DSL** from the Hosts Properties screen. A drop-down menu opens, select **Properties**. The Host Properties screen opens.
3. Select **TCP/IP** from the Device list, and **Optimized for High Bandwidth** at the Connection Info tab.
4. Select **Launch with Windows** and **Run minimized** from the Settings tab.
5. Select **pcAnywhere encoding** from the Security Options tab. Click **Apply**.
6. Select **pcAnywhere** as the Authentication type from the Callers tab. Click the **Caller list** icon to add a new caller/item.
7. Enter the assigned Login name and Password for this workstation at the Identification tab. Click **OK** when finished.
8. Login names and passwords are maintained and controlled by IBM Technical Support.
9. The new login name is displayed under the Caller list of the Callers tab. Click **OK**.

   After the host setup is complete, reboot the host workstation to activate the setup changes to pcAnywhere. After the reboot is finished, the host workstation is now able to accept connection from a remote workstation.

Start an Internet host session

Use the following procedure to start an Internet (TCP/IP) session to the host (local) workstation.

1. From the Hosts main screen, right-click the **Network, Cable, DSL** host connection and select **Start Host**.
2. The left most icon shows where pcAnywhere is waiting for a connection. If the workstation has been rebooted prior to starting a communications session, this icon should be displayed since the Launch with Windows option was selected.

Configure a remote Internet connection

Use the following procedure to configure TCP/IP connectivity to the remote workstation.

1. After starting pcAnywhere, select **Remotes** from the left navigation bar on the pcAnywhere Manager screen.
2. Select and right-click **Network, Cable, DSL** from the Remotes Properties screen. A drop-down menu opens, select **Properties**. The Remote Properties screen opens.
3. Select **TCP/IP** from the Device list, and **Remote Control** at the Connection Info tab.
4. Enter the Host IP address from the Settings tab.
5. Select **pcAnywhere encoding** from the Security Options tab. Click **Apply**.

   This completes the Remote workstation configuration. You can now connect to the Host workstation.

Establish a remote Internet connection

Use the following procedure to start a remote TCP/IP connection to the host workstation.

1. From the Remote workstation, after starting pcAnywhere, observe the Remotes Properties screen. Locate the field **Network, Cable, DSL**. You will see the device connection (TCP/IP), Connect to Host IP address (xxx.xxx.xxx.xxx), and Start Mode (Remote Control). Double-click on **Network, Cable, DSL** to connect to the Host workstation.

   A screen indicating a connection attempt to the Host workstation will appear.
2. When a connection is established, you will see a Host Login screen. Enter the previously assigned (by IBM) User name and Password for the Host workstation. Click **OK** to continue.

   You will now see a pcAnywhere Session Manager screen with the Windows desktop screen of the Host workstation shown in the Remote Control screen. From here you have full control of the Host workstation.

3. Once a connection is established, the user can control the host PC. To do a file transfer, select **File Transfer** from the Session Manager options on the left side of the screen.

   A screen will come up that displays the file structure of the remote and host workstations. To transfer files using your mouse, left click the file and move it over to the other screen.

TFTP Turbo

This software is required to download firmware code residing on the SAN256N director workstation into an FC/9000 system. Install TFTP Turbo on each Enterprise Manager Manager PC from which code will be loaded after the installation of the Enterprise Manager.

Use the following procedure to install TFTP Turbo:

1. To install the software, use the installation CD-ROM labeled 5710637-001 S/W, CD, REnterprise ManagerOTE LINK,FC9K.
2. Execute the setup program “tftpt_fs.exe”.
3. The **Select Startup Type** screen appears. Select **No, I will start the service when I need it**.
4. After completion, go to the Control Panel and find the **TFTP Turbo** icon and double-click it.
5. Change the default directory to where the SAN256N director Enterprise Manager is installed.

Note: On existing/updated FC/9000 Enterprise Manager workstations, the default directory is C:\Inrange\FC9000. On new SAN256N director installations, the default directory is C:\Program Files\IBM\SAN256N.

6. Check mark **Logged file transfers** and location of log file to “C:\ftps.log”.
7. Click **OK** to accept the changes.

Starting and stopping TFTP

TFTP Turbo must be started prior to downloading code from the Enterprise Manager to the SAN256N director. When the download is complete, TFTP Turbo should be stopped. Stopping TFTP Turbo frees system resources for use by other programs.

1. Open the Control Panel by clicking the Windows **Start** button, pointing to **Settings**, and then clicking **Control Panel**.
2. Double-click the **Services** icon.
3. Select the **Weird Solutions TFTP Turbo** service.
4. Click **Start** to start the service.

   Return to this section to **Stop** the service when it is no longer need. This service is automatically disabled when the PC is booted.

Call Home feature

The purpose of the call home feature is to notify the IBM field support staff that a serious condition may exist at one of their customer sites. A IBM field support person then dials into the reporting Enterprise Manager using pcAnywhere and determines what problem(s) exist. Hexidecimal and decimal event codes are used to represent the triggering events. Currently, call home pages are received for the following events:

Table 2. Call Home feature event descriptions

Event	Severity	Description	Message (Hexidecimal)	Message (Decimal)
FI REPLACE FRU FAN	Error	Individual fan failure	0x6	6
FI REPLACE FRU POWER SUPPLY	Critical	Power supply failure	0x7	7
FI FAN MAINTENANCE	Critical	Fan assembly failure	0x8	8
FI CABINET OVERHEAT	Critical	Cabinet overheat	0x9	9
FI REPLACE FRU BOARD	Critical	TCM reports TFIO/TSW board failure	0xBBC	3004
OVER HEAT CONDITION	Error	TCM/TFIO/TSW board overheat condition	0xBBE	3006
FI RPLACE FRU SFP	Critical	SFP failure	0xFAA	4010

Setting up Call Home

Use the following procedure to set up the call home feature.

1. At the Enterprise Manager Client screen, select the **Notification Preferences** feature from the **File** menu. The **Notification Preferences** screen is displayed.
2. From this screen you can enter the following information:
   - Enterprise Manager ID
   - Enterprise Manager ID code
   - Customer ID
   - Customer ID code
   - Site ID
   - Site contact name
   - Site contact phone
   - Wait Before Next Notification (in minutes)
   - RSM (pcAnywhere) Callback Number
3. After entering all the information, check the system by clicking the **Test** button.
4. If the test is successful, click the **Apply** button and then click the **OK** button.
5. If the test is not successful, recheck the information that was entered.

You can now select and configure the **Alphanumeric**, **Numeric**, and **E-mail** paging options.

Alphanumeric Page Home

This feature allows an alphanumeric page to be sent to a designated number. This feature also allows for an additional phone number to be sent an authorization string.

Two separate alphanumeric page configuration screens are available, allowing for the creation of two distinct profiles.

Use the following procedure to enable the alphanumeric page home feature.

1. At the **Notification Preferences** screen, select the **Alphanumeric Page-1** (or -2) tab. The **Alphanumeric Page Home Settings** information screen is displayed.
2. Fill in the information boxes. The **Additional Information, Paging System Phone Number, Pager PIN,** and **Additional Information** boxes provide site information for IBM field support personnel. The **Paging System Phone Number, Pager PIN, Comm Port,** and **Modem Initialization String** are used for dialing the pager service. **Enable Additional Notification** (optional) activates a secondary paging phone number in the event the primary number is inactive.
3. Select the **Enable Alphanumeric Page home** box. A checkmark should now appear in the box.
4. Click the **Test** button. If the test is successful, click the **Apply** button to save the configuration. The ”Alphanumeric Page Enabled” message should appear at the bottom of the screen. If it does not, repeat the steps you took to configure the Alphanumeric Page. If it does not enable correctly again, call IBM field support.

Repeat the above steps to configure the second alphanumeric page if required.

Numeric Page Home

The numeric page home function allows IBM field support personnel to receive warnings from the Enterprise Manager about alarm conditions that need immediate attention. A IBM field support person then dials into the reporting Enterprise Manager using pcAnywhere and determine what problem(s) exist.

Use the following procedure to enable the numeric page home feature.

1. At the **Notification Preferences** screen, select the **Numeric Page** tab. The **Numeric Page** information screen is displayed.
2. Fill in the information boxes. The **Comm Port** field defines the location of the external modem. The **Dial String** and **Modem Initialization String** are used for dialing the pager service.
3. Select the **Enable Numeric Page** box. A checkmark should now appear in the box.
4. Click the **Test** button. If the test is successful, click the **Apply** button to save the configuration. The”Alphanumeric Page Enabled” message should appear at the bottom of the screen. If it does not, repeat the steps you took to configure the Numeric Page. If it does not enable correctly again, call IBM field support.

E-Mail Page Home

This feature allows an e-mail message to be sent to a designated address. Up to four e-mail addresses can be assigned.

Use the following procedure to enable the e-mail paging feature.

1. At the **Notification Preferences** screen, select the **E-mail** tab. The **E-mail** information screen is displayed.
2. Fill in the information boxes. The **SMNP Server** field defines the primary communication address of the SAN256N director workstation. The **E-mail Address 1** through **4** fields are used to list the e-mail addresses.
3. Select the **Log** box next to each entered e-mail addrerss. A checkmark should now appear in each selected box.
4. Enter any other information in the **Additional Info** box.
5. Select the **Enable E-mail Notification**box. A checkmark should now appear in the box.
6. Click the **Test** button. If the test is successful, click the **Apply** button to save the configuration. The”Alphanumeric Page Enabled” message should appear at the bottom of the screen. If it does not, repeat the steps you took to configure the E-mail Notification. If it does not enable correctly again, call IBM field support.

FTP files to the Enterprise Manager

With the FTP feature found at the toolbar, you can FTP files from the Enterprise Manager to a PC on which a client is running. Note that a client running on a PC which is directly attached to the Enterprise Manager may simply perform the tasks using the Enterprise Manager supplied FTP server, which is running automatically. Remote clients will have to supply, install and run an FTP server to perform the FTP functionality.

1. Click the FTP button at the toolbar, and the FTP window appears..
2. Select from which component you wish to draw the file.
3. Select the type of file you wish to download to the PC on which the client is running.
4. Select the folder to which you want the files downloaded.
5. Click the refresh button at the Director Files window to list the available files at the SAN256N director.
6. You may then copy files over to the local Folder Files area by clicking the right pointing arrow.

Chapter 5. Hardware maintenance procedures

This chapter contains information about SAN256N director hardware maintenance, including the following:

Preventive maintenance

There is no scheduled preventive maintenance required for the SAN256N director.

During regular service calls, always:

- Verify that the perforated floor tiles at the front and back of the SAN256N chassis and/or cabinet are free and clear of dust and dirt; clean, as necessary, to remove any dust or dirt, which may have accumulated.
- Inspect to ensure that each of the power supply assembly’s grids are free and clear of dust and dirt; clean, as necessary, to remove any dust or dirt, which may have accumulated.
- Verify that the fan module assembly’s grids, especially the EMI screen located behind the upper fan assemblies, are free of dust and dirt; clean, as necessary, to remove any dust or dirt, which may have accumulated.
- Inspect, on a random basis, the various modules, especially around the heat sink components, to ensure that the modules and their components are free of dust and dirt; clean, as necessary, to remove any dust or dirt, which may have accumulated.

Fiber optic maintenance

The ferrules and end-face surfaces of fiber components must be kept clean and free of contamination. Dirty fiber connectors are a common cause of light loss. As a general rule, whenever there is a significant, unexplained light loss, clean the connectors.

The following cleaning guidelines should be adhered to when cleaning fiber connectors:

- Use extreme care when removing or installing connectors so that you do not damage the housing or scratch the end-face surface of the fiber.
- Always install protective covers on unused or disconnected components to prevent contamination.
- Always clean fiber optic connectors before installing them.

Refer to “Cleaning the connectors” on page 58 in Chapter 3 of this manual for detailed cleaning instructions.

Tools and Test Equipment

Tools and test equipment are required to service the SAN256N director, and to test and services fiber optic cables and components.

Fibre Channel Director Tools

The tools contained in the standard Field Service Tool Kit are sufficient. An ESD wrist strap is shipped with the chassis.

Fiber Optic Tools and Test Equipment

The following list of tools and test equipment is required to test and service the fiber optics:

- Fiber Optic Power Meter - Fotec 712A or equivalent
- Fiber Optic Power Source - Fotec S770A or equivalent
- Associated Adapters
- SC Test Connectors
- SC Test Analyzers
- LC Test Connectors
- LC Test Analyzers

Field Replaceable Units (FRUs)

The SAN256N director FRUs are defined as designated assemblies that can be removed and installed by trained Field Service personnel at the customer's site. The following graphics show FRU locations on the SAN256N.

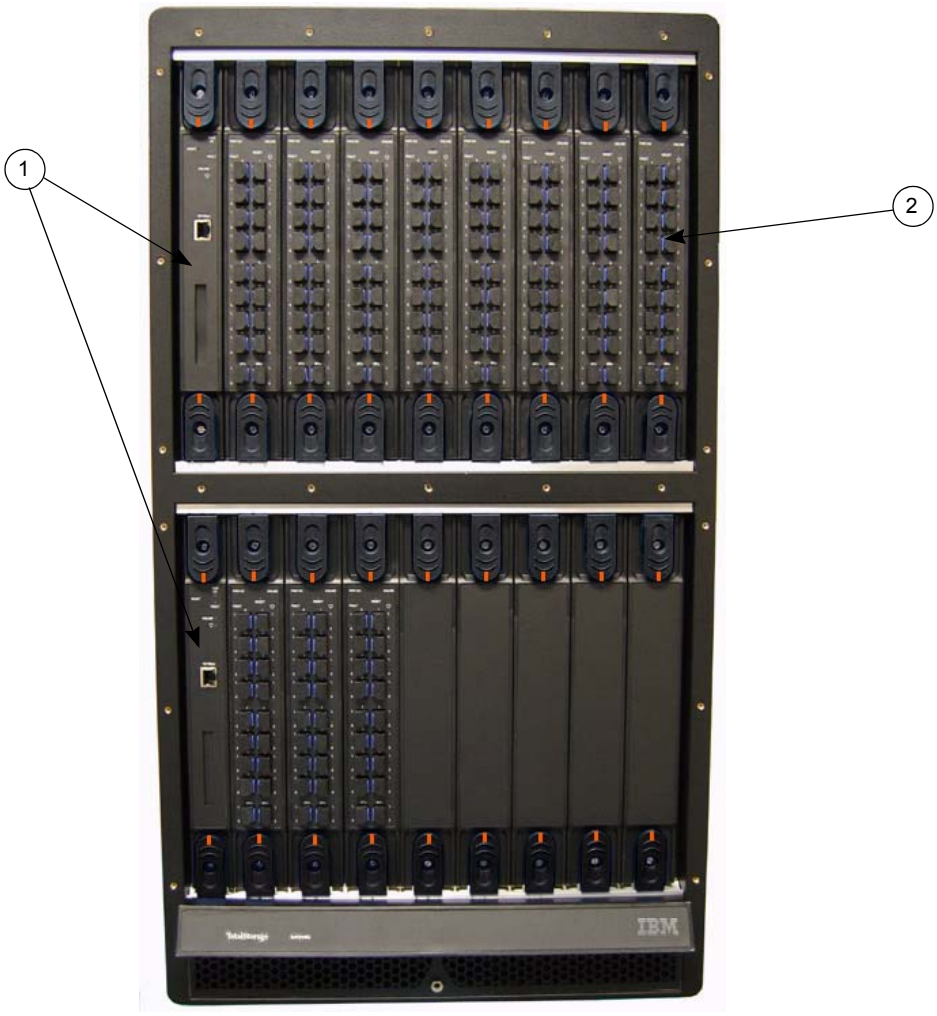

Figure 33. SAN256N director front chassis FRU locations

Figure 34. SAN256N director rear chassis FRU locations

FRU removal and replacement procedures

This section provides the necessary step-by-step procedures needed by Field Service personnel to remove and replace the FRU assemblies in the SAN256N director.

Any special tools required to be used during the removal and replacement procedure are specified prior to the step-by step procedure. Otherwise, the tools contained in the standard field service toolbox can be used.

All removal and replacement procedures must be followed in the step-by step sequence given unless otherwise specified. Any special procedures will be indicated by **Boldface Type**.

Upon the completion of each FRU removal and replacement procedure, the defective assembly must be returned to IBM.

FRU categories

The SAN256N director FRUs are divided into two categories: (1) hot-swappable FRUS and (2) not hot-swappable FRUs.

FRUs that are hot-swappable

FRU removal and replacement procedures which do not require that the AC power be turned off:

- “TCM board replacement procedures” on page 80
- “TFIO blade replacement procedures” on page 82
- “TSW module replacement procedures” on page 85
- “Upper fan assembly replacement procedure” on page 87
- “Side fan assembly replacement procedure” on page 88
- “Power supply assembly replacement procedure” on page 91

FRUs that are not hot-swappable

FRU removal and replacement procedures which require that AC power be turned off:

Attention: Refer to safety notices before an installation.

- “TMF/TFD replacement procedure” on page 90
- “NEMA L6-20P AC power plug replacement procedure (SANC40N cabinet-North American)” on page 93
- “International (7K25) AC power plug replacement procedure (SANC40N cabinet-International)” on page 95

FRU precautions

Attention: Refer to safety notices before starting an installation.

Whenever removing and replacing assemblies or subassemblies in the SANC40N cabinet, always keep in mind and practice the following precautions:

- When touching fiber, TFIO blades, TCM boards, TSW boards, TMF/TFD modules, or power supply assemblies, always wear ESD wrist straps.
- When installing any TSW board, if online, resetting or replacing any TSW board can cause the passing data to be interrupted.
- When removing or installing fan assemblies, do not turn AC power off to remove and replace a faulty fan assembly.
- When installing a TFIO board or removing a single fiber connection from a specific port, always verify that the TFIO retainer clamps are secured in position.

DANGER: When removing or installing a power supply assembly, high energy and shock hazards exist when AC power cables are connected.

Connecting a PC to the TCM Ethernet port

Before replacing any board, a PC must be connected to the primary TCM Ethernet port, or, if the primary TCM has failed, to the secondary TCM Ethernet port. This PC is used to capture system information and diagnostic data.

1. Set up a HyperTerminal connection on a PC Ethernet network port to communicate with the TCM.
2. Connect the PC Ethernet network port configured for use by the HyperTerminal program to the TCM Ethernet port with an Ethernet cable.
3. Start HyperTerminal, and activate the **HyperTerminal Capture Text** facility to capture the entire debug port session.
4. Log on to the Ethernet port as a maintenance level user (exclusive user).

   Refer to Appendix C. on page 125 if you are unfamiliar with HyperTerminal.

TCM board replacement procedures

This section describes procedures for replacing TCMs.

Attention: Refer to safety notices before starting an installation.

Attention: Use a properly attached ESD wrist strap when handling any TFIO, TSW, or TCM module, otherwise damage to equipment may result.

Attention: Be sure the ONLINE LEDs on both TCMs are lit before removing and TCM from the system. This ensure system redundancy and no loss of data or improper operation of the system.

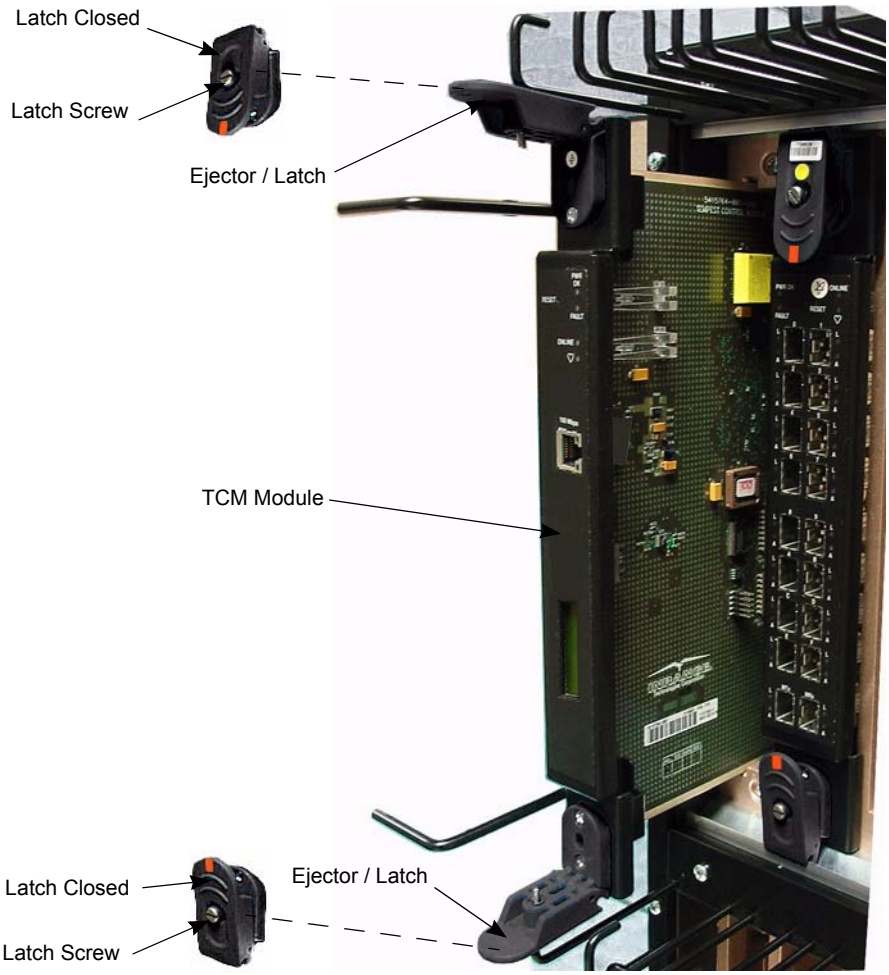

Figure 35. TCM board replacement

1. Loosen the spring-loaded captive screw from the top and bottom TCM card ejector latches.
2. Grasp both the top and bottom card ejector latches; pull the card ejector latch tabs forward to unlatch the TCM board from the midplane.
3. Using the card ejector latch tabs, pull and slide the TCM board out from the SAN256N chassis slot guides.

Installing a TCM module

1. Remove the new TCM board from plastic antistatic bag and place defective TCM in the plastic antistatic bag.
2. Align the edge of TCM board with chassis slot guides; carefully push and slide the board into SAN256N chassis but do not seat the TCM into the backplane connector.
3. Connect any cable previously removed from the failed TCM board.
4. Secure the TCM by pushing the board forward until it connects firmly against the backplane.

5. On the Entperprise Manager Client, select the **Boards** tab and then right click the previously inserted board. Select **Versions** from the drop down menu.
6. Scroll over to the **Valid** column on the far right to confirm that the code is valid.
7. If the Flash version and Firmware Version do not match, perform a code load from the **Code Load** button on the toolbar.To put the board online, right click the appropriate board and then select **Configuration** from the drop down menu.
8. Select the **Online** radio button then click **OK**.
9. You will see the following message:

   Do you want to set the Admin mode?
10. Select **Yes**. Admin mode change may take about one minute.
11. You will see the following message:

    Are you sure you want to continue.
12. Select **Yes**.
13. You will see the following message:

    Changes were applied successfully.
14. Click **OK.** You will be returned to the Boards tab and the Navigation Tree menu.
15. Check the following indicators on the TCM modules:
    - Check the Heartbeat LED blinking pattern to verify that blinking pattern is normal (normal is on/off once per second.)
    - The green Online LED is ON.
    - Ensure there are no OFLN (Offline) messages in the scrolling displays.
    - On the Boards Tab ensure that the TCM module has a status of Online.

TFIO blade replacement procedures

Use the following procedures to do a hot swap replacement of a TFIO blade. Figure 36 on page 83 provides a visual reference.

Attention: Refer to safety notices before starting an installation.

Attention: Use a properly attached ESD wrist strap when handling any TFIO, TSW, or TCM module, otherwise damage to equipment may result.

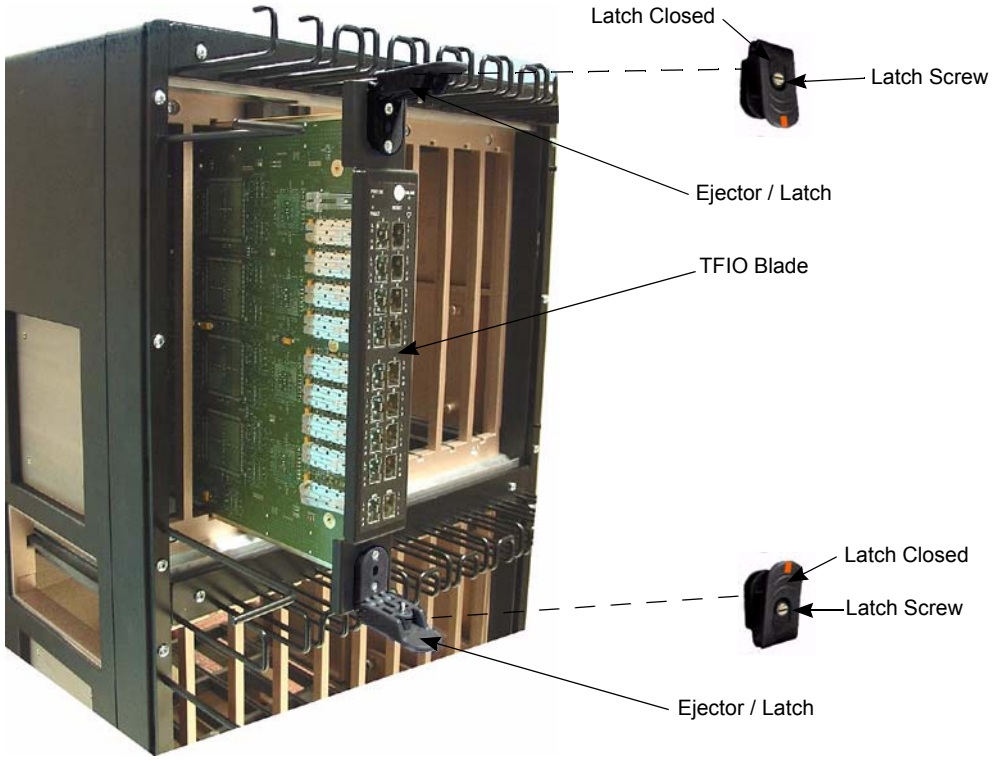

Figure 36. TFIO blade; replacing

Removing a TFIO blade

1. At the Enterprise Manager client, go to the **Navigation Tree** menu and under the Directors Link select the desired **Director** you will be working with.
2. Select the **Board** tab and then the applicable board.
3. Right click the appropriate TFIO board. This will select the board and create a drop down menu. Select Configuration. This will display the **General Tab**.
4. Select **Offline**, then click **Apply**. The following dialog box will appear:

   Do You Want To Set The Admin Mode?

   Yes or No
5. Select **Yes**. The next dialog box is:

   Admin mode change my take about one minute.

   Are you sure you want to continue?

   [Yes] [No]
6. Select **Yes**.
7. You will get one more dialog box that says:

   Setting a board offline will disrupt existing traffic through the ports on the board.

   Are you sure you want to continue?

   [YES] [NO]
8. Select **Yes**.

9. After about 90 seconds you will see the following message:

   The changes were applied successfully

   [OK]

10. This will take you back to the **General** tab display.
11. Click **OK** to return to the Navigation Tree Menu.
12. Verify that the applicable board has been taken offline in the **Boards** display.
13. You should also check that the Online LED on the TFIO board is not lit. A final place you can check the status is on the 8 character display on the TCM Module. You should see the following:

    [OFLN]IOnn (nn is the IO slot number)

14. Remove all connected data cables from ports on the TFIO card and label each cable as they are removed.
15. Install dust covers in TFIO board port connectors where fiber optic cables have been removed.
16. Loosen the spring-loaded captive screws from the top and bottom TFIO card ejector latches. Grasp both card ejector latches and pull the latch tabs forward to unlatch the board.
17. Using the card ejector latches, pull and slide the board out from the SAN256N director chassis slot guides.
18. Place the removed TFIO in a plastic antistatic bag.

Attention: A TFIO blank panel air baffle must be installed in any TFIO chassis slot if the removed board is not being replaced, otherwise damage to equipment may result.

Installing a TFIO blade

1. Remove the new TFIO blade from the plastic antistatic bag.
2. Refer to the front and rear chassis views as a reference on where the TFIO blades are located on the SAN256N director.
3. Carefully push and slide the module into the SAN256N chassis until firmly seated against backplane connector.
4. Push and lock card ejector tabs closed to secure the TFIO blade into position in SAN256N chassis. Secure the board by tightening the spring loaded screws in the top and bottom card ejector latches.
5. On the Enterprise Manager Client select the **Boards** tab then right click the previously inserted board. Select **Versions** from the drop down menu.
6. Scroll over to the **Valid** column on the far right to confirm that the code is valid.

   Note: If the Flash version and Firmware Version do not match, perform a code load from the **Code Load** button on the toolbar.

7. To Online the board right click the appropriate board then select **Configuration** from the drop down menu.

8. Select the **Online** radio button then click **OK**.

   You will see the following message:

   Do you want to set the Admin mode?

9. Select **Yes**.

   Admin mode change may take about one minute.

   Are you sure you want to continue.

10. Select **Yes**.

    Changes were applied successfully.

11. Click **OK**. You will be returned to the Boards tab and the Navigation Tree menu.
12. Check the Heartbeat LED blinking pattern to verify that blinking pattern is normal (normal is on/off once per second).
13. Re-install the cables back into their appropriate ports to return to the system to its original configuration.

TSW module replacement procedures

Use the following procedures to do a hot swap replacement of a TSW board. Figure 37 on page 85 provides a visual reference.

Attention: Refer to safety notices before starting an installation.

Attention: Use a properly attached ESD wrist strap when handling any TFIO, TSW, or TCM module, otherwise damage to equipment may result.

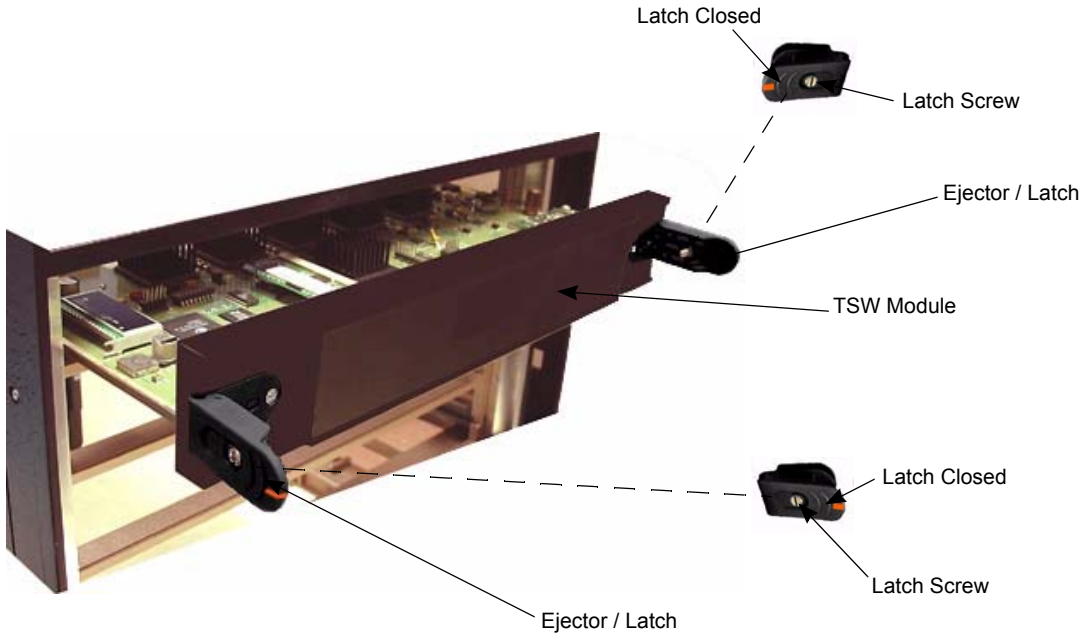

Figure 37. TSW Module; replacing

Removing a TSW module

1. At the EM client, go to the **Navigation Tree** menu and under the Directors Link select the desired **Director** you will be working with
2. Select the **Board tab** and select the applicable board.
3. Right click the appropriate TSW board. This will select the board and create a drop down menu. Select Configuration. This will display the **General Tab**.
4. Select **Offline**, then click **Apply**. The following dialog box will appear.

   Do You Want To Set The Admin Mode?

   [Yes] or [No]
5. Select **Yes**. The next dialog box you see is:

   Admin mode change my take about one minute.

   Are you sure you want to continue?

   [Yes] or [No]
6. Select **Yes**.
7. You will get one more dialogue box that says:

   Are you sure you want to continue?

   [YES] [NO]
8. Select **Yes**.
9. After about 90 seconds you will see the following message:

   The changes were applied successfully

   [OK]
10. This will take you back to the **General** tab display.
11. Click **OK** to return to the Navigation Tree Menu.
12. Verify that the applicable board has been taken offline in the Boards display.
13. You should also check the Online LED on the TSW board. A final place you can check the status is on the TCM 8 character display. You should see the following:
14. [OFLN]TSWn n (is the TSW slot number)
15. Loosen the spring-loaded captive screws from the left and right TSW card ejector latches. Grasp both card ejector latches and pull the latch tabs forward to unlatch the board.
16. Using the card ejector latches, pull and slide the board out from the SAN256N director chassis slot guides.
17. Place the removed TSW board in a plastic antistatic bag.

    Attention: A TSW blank panel air baffle must be installed in any TSW chassis slot if the removed board is not being replaced, otherwise damage to equipment may result.

Installing a TSW module

1. Remove the new TSW board from the plastic antistatic bag.

2. Refer to the front and rear chassis views as a reference on where the TSW modules are located on the SAN256N director.
3. Carefully push and slide the module into the SAN256N chassis until firmly seated against the Midplane connector.
4. Push and lock card ejector tabs closed to secure the TSW module into position in the SAN256N chassis. Secure the board by tightening the spring loaded screws in the top and bottom card ejector latches.
5. On the Enterprise Manager Client, select the **Boards** tab and then right click the previously inserted board. Select **Versions** from the drop down menu.
6. Scroll over to the **Valid** column on the far right to confirm that the code is valid.

   Note: If the Flash version and Firmware Version do not match, perform a **One Button Codeload** from the **Code Load** button on the toolbar.

7. To Online the board right click the appropriate board then select **Configuration** from the drop down menu.
8. Select the **Online** radio button then click **OK**. You will see the following message:

   Do you want to set the Admin mode?

   [Yes] or [No]

9. Select **Yes**.

   Admin mode change may take about one minute.

   Are you sure you want to continue.

10. Select **Yes**.

    Changes were applied successfully.

11. When you click **OK** you will be returned to the **Boards** tab and the Navigation Tree menu.
12. Check the Heartbeat LED blinking pattern to verify that blinking pattern is normal (normal is on/off once per second).

Upper fan assembly replacement procedure

Use the following procedure to replace an upper fan assembly in the SAN256N chassis.

Attention: Refer to safety notices before starting an installation.

Attention: Do not turn AC power off to remove, replace, or install a fan assembly. Fan replacement must not be delayed. Increased heating inside the chassis will occur due to reduced system cooling whenever a fan assembly is not present.

Removing an upper fan assembly

1. Unlatch and open the rear cabinet door, if applicable.
2. Locate the fan assembly to be replaced; the fan status indicator of the defective fan assembly will be lit red or Off.

3. Unlatch the fan assembly from the chassis frame by pressing UP on the latch located at the bottom center of the fan housing. While pressing on the latch, grasp the handle and pull the lower portion of the fan housing towards you to disconnect the housing from the midplane connector, and to clear the chassis frame. Once the lower portion of the housing is clear of the frame, pull the fan housing slightly downward to allow the two mounting tabs, located at the top of the fan housing, to clear the mounting holes in the top frame of the chassis.

Installing an upper fan assembly

Attention: Refer to safety notices before starting an installation.

Attention: Do not turn AC power off to remove, replace, or install a fan assembly. Fan replacement must not be delayed. Increased heating inside the chassis will occur due to reduced system cooling whenever a fan assembly is not present.

1. Remove the new upper fan assembly from its packaging, and position the new fan assembly with the handle and locking latch facing downward.
2. Position and guide the the top portion of the fan assembly into the chassis frame so that the mounting tabs at the top of the fan housing slide into the two mounting holes in the top frame of the chassis.
3. Press the locking latch UP and using the handle, push the lower portion of the fan assembly housing into the lower portion of the frame, making sure that the fan assembly connector mates with the corresponding midplane fan connector. The fan assembly will start operating immediately and the Fan Status LED will be lit green.
4. Release the latch to lock the fan assembly into place in the chassis frame.
5. Close and latch the cabinet rear door, if applicable.

Side fan assembly replacement procedure

Use the following procedures to replace a side fan assembly in a SAN256N chassis. Figure 38 on page 89 may be used as a visual reference.

Attention: Refer to safety notices before starting an installation.

Attention: Do not turn AC power off to remove, replace, or install a fan assembly. Fan replacement must not be delayed. Increased heating inside the chassis will occur due to reduced system cooling whenever a fan assembly is not present.

Removing a side fan assembly

1. Unlatch and open the rear cabinet door, if applicable.
2. Locate the fan assembly to be replaced; the fan status indicator of the defective fan assembly will be lit red or Off.

3. Unlatch the fan assembly from the chassis frame by sliding the latch to the left of the fan housing. While pressing on the latch, using the handle, pull the fan housing towards you to disconnect from the midplane connector, and to clear the chassis frame.

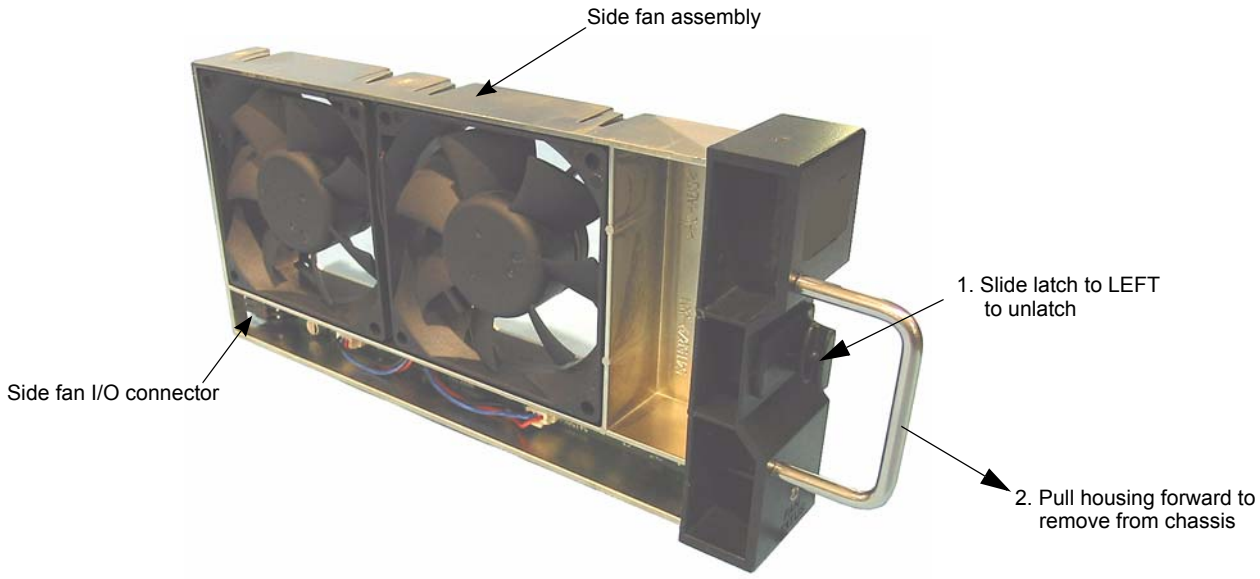

Figure 38. Side fan assembly removal

Installing a side fan assembly

Attention: Refer to safety notices before starting an installation.

Attention: Do not turn AC power off to remove, replace, or install a fan assembly. Fan replacement must not be delayed. Increased heating inside the chassis will occur due to reduced system cooling whenever a fan assembly is not present.

1. Remove the new side fan assembly from its packaging, and align the new fan assembly with the open slot in the chassis rear. Make sure that the fan housing is oriented so that the fan I/O connector is located on the lower side of the fan housing, otherwise, the fan assembly cannot connect with the chassis midplane connector.
2. While pressing the locking latch to the left, using the handle, slide the fan assembly housing into the chassis, making sure that the fan assembly connector mates with the corresponding midplane fan connector. The fan assembly will start operating immediately and the Fan Status LED will be lit green.
3. Release the latch to lock the fan assembly into place in the chassis frame. Verify the latch is locked to the frame by manually sliding the latch to the right.

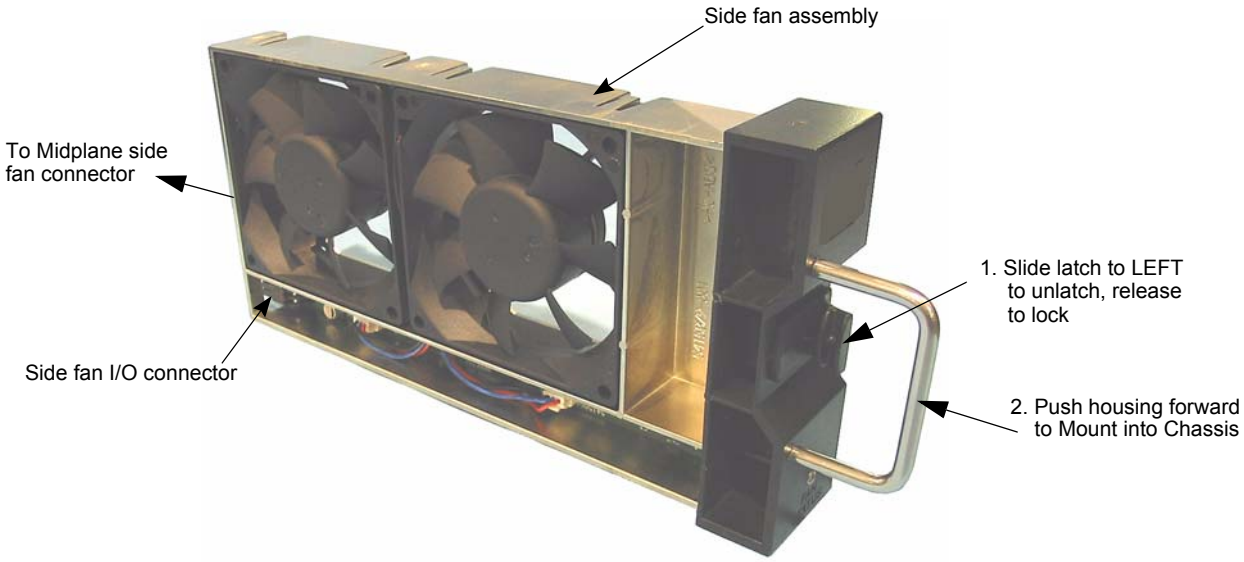

Figure 39. Side fan assembly replacement

4. Close and latch the cabinet rear door, if applicable.

TMF/TFD replacement procedure

Use the following procedure to replace the TMF/TFD module in a SAN256N director.

Attention: Refer to safety notices before starting an installation.

Attention: This procedure requires that all Upper Fan assemblies (and if installed, external cabinet fans) are removed from the SAN256N director chassis. The SAN256N system must be shut down during the TMF/TFD module replacement to prevent the internal SAN256N modules (TFIO, TCM, and TSW) from being subjected to higher than recommended operating temperatures.

Attention: Use a properly attached ESD wrist strap when handling the TMF/TFD module, otherwise damage to equipment may result.

Removing the TMF/TFD module

1. Shut down the SAN256N director. Refer to “Powering off the SAN256N director” on page 98.
2. Remove the three upper fan assemblies to allow access to the TMF/TFD module. Refer to “Upper fan assembly replacement procedure” on page 87.
3. If external top cabinet fans are installed in the SANC40N cabinet, disconnect the cables from the TMF/TFD module DB9F connectors.

4. Loosen the two captive screws securing the TMF/TFD module to the chassis frame.

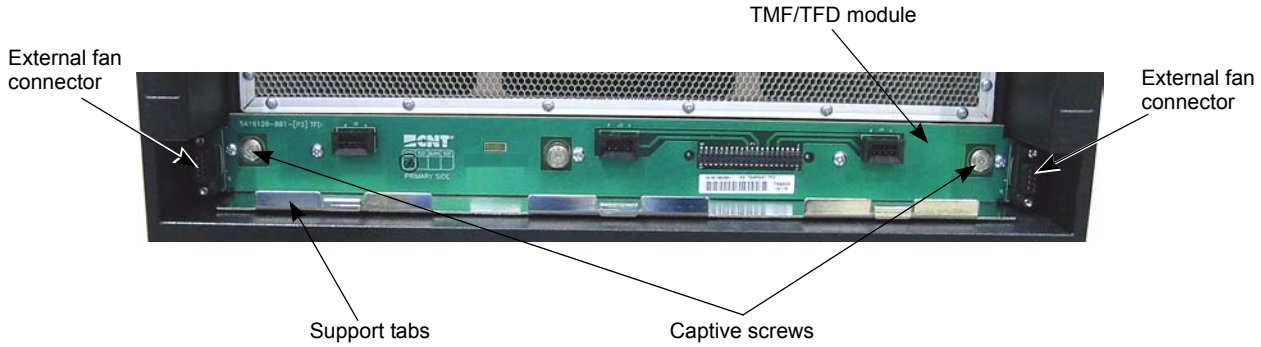

Figure 40. TMF/TFD module captive screws

5. Grasp the support tabs, located in the front of the TMF/TFD module, and pulling forward, remove the module from the chassis frame. There may be some initial resistance removing the module until the five connectors on the TMF/TFD disconnect from the Midplane connectors. Place the removed TMF/TFD module ina secure location for later disposition.

Installing a TMF/TFD module

1. Remove a TMF/TFD module from its packaging and position the module, with the five connectors facing the Midplane, at the guide rails for the TMF/TFD module.
2. Carefully slide the TMF/TFD module into the chassis opening until the TMF/TFD module's five connectors are completely mated with the Midplane connectors.
3. Tighten the two captive screws to secure the TMF/TFD module to the chassis frame.
4. Reinstall the three upper fan assemblies, earlier removed, to the chassis frame and the TMF/TFD module. Refer to "Upper fan assembly replacement procedure" on page 87.
5. If external top cabinet fans are installed in the SAN256N director, reconnect the cables to the TMF/TFD module DB9F connectors.
6. Power up the SAN256N director. Refer to "Applying AC power" on page -41.
7. Close and latch the cabinet rear door, if applicable.

Power supply assembly replacement procedure

Use the following procedures to replace a power supply assembly. If you are installing an additional power supply assembly when increasing the port count, or to add power supply redundancy in existing systems, skip ahead to "Installing the Power Supply Assembly."

Attention: Refer to safety notices before starting an installation.

CAUTION: Turn off the main AC input power to the power supply being replaced.

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Attention: Use a properly attached ESD wrist strap when handling any of the power supply assemblies; otherwise damage to equipment may result.

Removing the power supply assembly

1. Verify that the main AC input power to the power supply being replaced is Off.
2. Verify that the power supply's power switch is set to Off.
3. Remove the AC power cord from the AC inlet connector on the front of the power supply.
4. Loosen the four captive screws securing the power supply assembly to the chassis.
5. Grasping the power supply handle, pull and slide the power supply assembly out of the power supply chassis.

   Note: The connector on the rear of the power supply must disengage from the Midplane connector, so there may be some initial resistance when first pulling the power supply from the chassis.

Installing the power supply assembly

Attention: Refer to safety notices before starting an installation.

Attention: Use a properly attached ESD wrist strap when handling any of the power supply assemblies; otherwise damage to equipment may result.

Attention: Do not over tighten the power supply captive screws to secure the power supply assembly to the chassis. Damage to the captive screws could result, causing the power supply assembly to be locked into the chassis.

1. Check the connector pins, located on the rear panel, of the new power supply assembly to ensure that there are no loose, bent, or broken pins.
2. Align the power supply assembly in front of the designated power supply chassis opening.
3. Slide the power supply assembly into the chassis opening until the power supply assembly is firmly seated into the connector located on the Midplane.

4. Tighten the four (4) captive screws to secure the power supply assembly to the chassis.
5. Reconnect the power cord to the AC inlet connector on the power supply front panel.
6. Set the power supply's power switch to ON.

   The **AC** and **DC** LEDs, located on the front panel of the power supply assembly, should light green, and the power supply fans should be rotating. If the LEDs do not light, or if either of the LEDs light red, or the fans do not rotate, refer to "Power system troubleshooting" in Appendix A.
7. Close and latch the cabinet rear door, if applicable.

NEMA L6-20P AC power plug replacement procedure (SANC40N cabinet-North American)

Use the following procedures to replace a NEMA L6-20P power plug. Figure 41 on page 95 provides a visual reference.

Attention: Refer to safety notices before starting an installation.

Removing the NEMA L6-20P AC power plug

1. Power off the SAN256N director.
2. Set the customer's circuit breakers to the Off position that supply AC power to the SAN256N power cord being replaced.
3. Disconnect the AC power cable to be replaced from the customer's AC receptacles.
4. Disconnect the power receptacle end of the cord from the SAN256N power supply AC input receptacle.
5. Loosen, but do not remove, the two cable clamp screws that secure the power cable in position at the rear of the power plug.
6. Loosen the three retaining screws on the front of the plug module and slide the black housing away from the front of the plug module to expose terminal screws.
7. Remove the black wire from the pin marked "X" by loosening the slotted screw that secures the wire to the plug pin.
8. Remove the white wire from the pin marked "Y" by loosening the slotted screw that secures the wire to the plug pin.
9. Remove the green wire from the green color threaded screw by loosening the slotted screw that secures the green (ground) wire to the plug pin.
10. Pull the cable assembly leads out from the X, Y, and ground terminal access holes and remove them from the plug module.

Installing an NEMA L6-20p AC power plug

Note: Use specified AC power plugs only.

1. Remove the new NEMA L6-20P plug assembly from its packaging, and loosen the three assembly screws, located on the front of the plug.
2. Remove the plug module from the housing.

3. Loosen, but do not remove, the two cable clamp screws that secure the cable clamp to the housing.
4. Route the AC power cable wires and a portion of the cable through the small opening in the rear of the housing.
5. Strip the ends of the power cable wires in accordance with the manufacturer's instruction sheet shipped with the plug.
6. Check the color coded wire use before connecting the wires to the plug module terminals. Ensure that the correct color-coded wire is being connected to the Line, Neutral, and Ground terminals on the plug module.
7. Connect the stripped wire ends to the terminals of the plug module as follows:
   - Green wire to the green threaded screw (Ground) and tighten the slotted screw to secure the wire to the pin; torque the screw to 18 pounds/inch.
   - Black wire to the pin marked "X" (Line-1) and tighten the slotted screw to secure the wire to the pin; torque the screw to 18 pounds/inch.
   - White wire to the pin marked "Y" (Line-2) and tighten the slotted screw to secure the wire to the pin; torque the screw to 18 pounds/inch.
8. Slide the housing up to the plug module; align the housing black tab with the indented slot in the white plastic plug assembly.
9. Push the plug assembly into the housing; ensure that the black tab is properly seated in the indented cutout on the white plug assembly. Mounting screws will automatically align in position with the threaded mounting holes.
10. Tighten three retaining assembly screws to secure the plug module to the housing; torque the assembly screws to 10 pounds/inch.
11. Tighten two retaining cord clamp screws to secure the cable to the plug assembly; torque the cable clamp screws to 10 pounds/inch. Perform the following electrical tests:
    - Use an Ohmmeter to make continuity checks of wiring to verify that the correct phasing and grounding connections have been made.
    - Check insulation resistance to verify that the cable does not have any short circuits or unwanted grounds.
12. Reconnect the power receptacle end of the cord to the SAN256N power supply AC input receptacle.
13. Reconnect the AC power plug end of the cord to the customer's AC power receptacles.
14. Set the customer's circuit breakers to the On position that supply AC power to the SAN256N director.
15. Power on the SAN256N chassis.

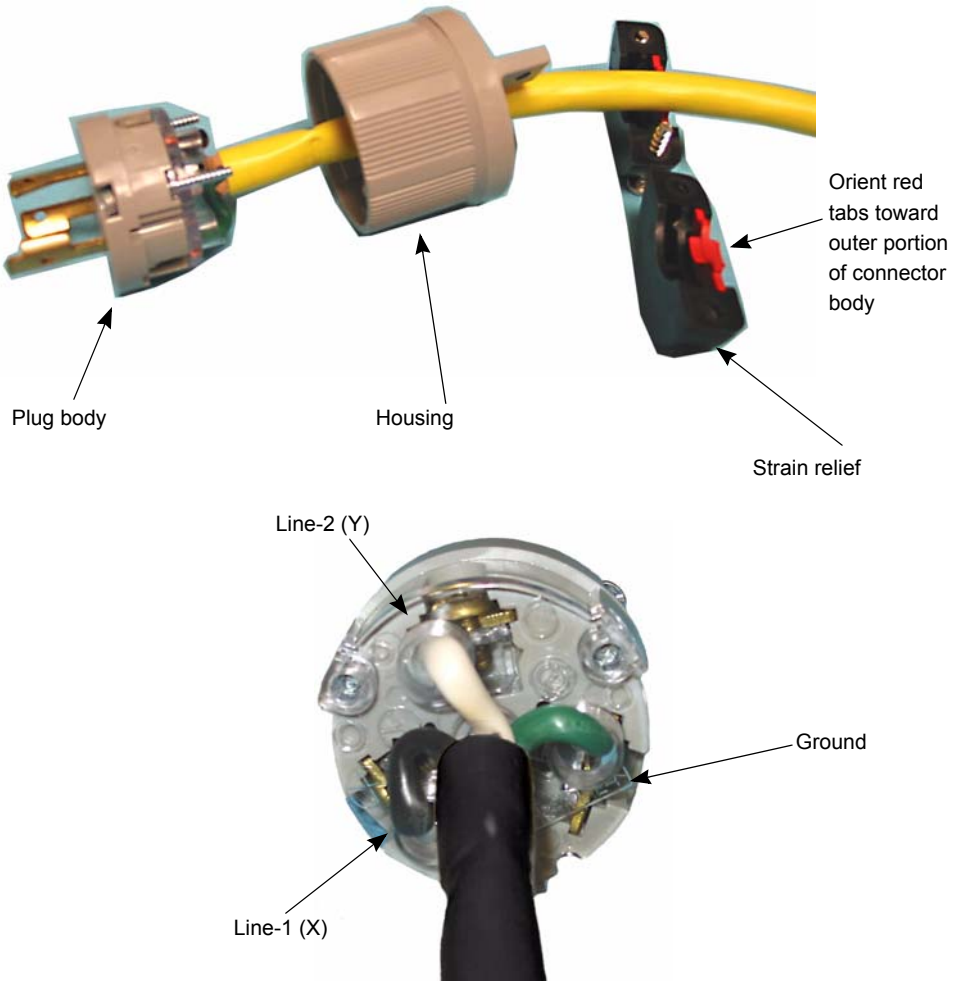

Figure 41. NEMA L6-20P AC power plug

International (7K25) AC power plug replacement procedure (SANC40N cabinet-International)

Use the following procedures to replace an international 7K25 AC power plug. Figure 42 on page 98 provides a visual reference.

Attention: Refer to safety notices before starting an installation.

Removing the 7K25 AC power plug

1. Power off the SAN256N director.
2. Set the customer's circuit breakers to the Off position that supply AC power to the SAN256N director power cord being replaced.
3. Disconnect the AC power cable to be replaced from the customer's AC receptacles.
4. Disconnect the power receptacle end of the cord from the SAN256N power supply AC input receptacle.

5. Unscrew the external cable clamp that secures the power cable in position at the rear of power plug.
6. Loosen the two retaining screws on the front of the plug module; pull and separate the two housing halves away from each other to expose the terminal screws.
7. Remove the brown wire from the pin marked “L/+” by loosening the slotted screw that secures the wire to the plug pin.
8. Remove the blue wire from the pin marked “BLUE” by loosening the slotted screw that secures the wire to the plug pin.
9. Remove the green/yellow wire, “Ground”, from the threaded screw by loosening the slotted screw that secures the wire to the plug pin.
10. Loosen, but do not remove, the two internal cable clamp screws that secure the power cable.
11. Pull the cable assembly leads out from the L/+, BLUE, and Ground terminal access holes and remove them from the plug module.

Installing the 7K25 AC Power Plug

Note: Use specified AC power plugs only.

1. Remove the new 7K25 plug assembly from its packaging, and loosen the two assembly screws, located on the front of the plug.
2. Remove the plug module from the housing.
3. Loosen, but do not remove, the two internal cable clamp screws that secure the cable clamp to the housing.
4. Loosen and remove the rear external cable clamp (with the black compression washer and flat washer).
5. Route the AC power cable wires and a portion of cable through the external clamp, flat washer, compression washer, and connection housing rear opening.
6. Strip the ends of the power cable wires in accordance with the manufacturer’s instruction sheet shipped with the plug.
7. Verify the color-coded wire use before connecting the wires to the plug module terminals. Ensure that the correct color-coded wire is being connected to the Line (“L/+”), Neutral (“BLUE”), and Ground terminals on the plug module.
8. Connect the stripped wire ends to the terminals of the plug module as follows:
   - Attach the green/yellow wire to the threaded screw (Ground) and tighten the slotted screw to secure the wire; torque the screw to 18 pounds/inch.
   - Attach the brown wire to the pin marked L/+ (Line) and tighten the slotted screw to secure the wire to the pin; torque the screw to 18 pounds/inch.
   - Attach the blue wire to the pin marked BLUE (Neutral) and tighten the slotted screw to secure the wire to the pin; torque the screw to 18 pounds/inch.
9. Tighten the two internal cable clamp screws to secure the cable to the plug assembly; torque the cable clamp screws to 10 pounds/inch. Perform the following electrical tests:
   - Use an Ohmmeter to make continuity checks of wiring to verify that the correct phasing and grounding connections have been made.

– Check insulation resistance to verify that the cable does not have any short circuits or unwanted grounds.

10. Slide the housing up to the plug module; align the housing halves so that the rear angle tab is positioned opposite the plug body tabs.
11. Push the plug assembly into the housing; ensure that the plug assembly is properly seated in the rear plug assembly. Mounting screws will automatically align in position with the threaded mounting holes.
12. Tighten the two retaining assembly screws to secure the plug module to the housing; torque the assembly screws to 10 pounds/inch.
13. Tighten the external retaining cord clamp to secure the cable to the plug assembly.
14. Reconnect the power receptacle end of the cord to the SAN256N director power supply AC input receptacle.
15. Reconnect the AC power plug end of the cord to the customer's AC power receptacles.
16. Set the customer's circuit breakers to the On position that supply AC power to the SAN256N director.
17. Power on the SAN256N director chassis.

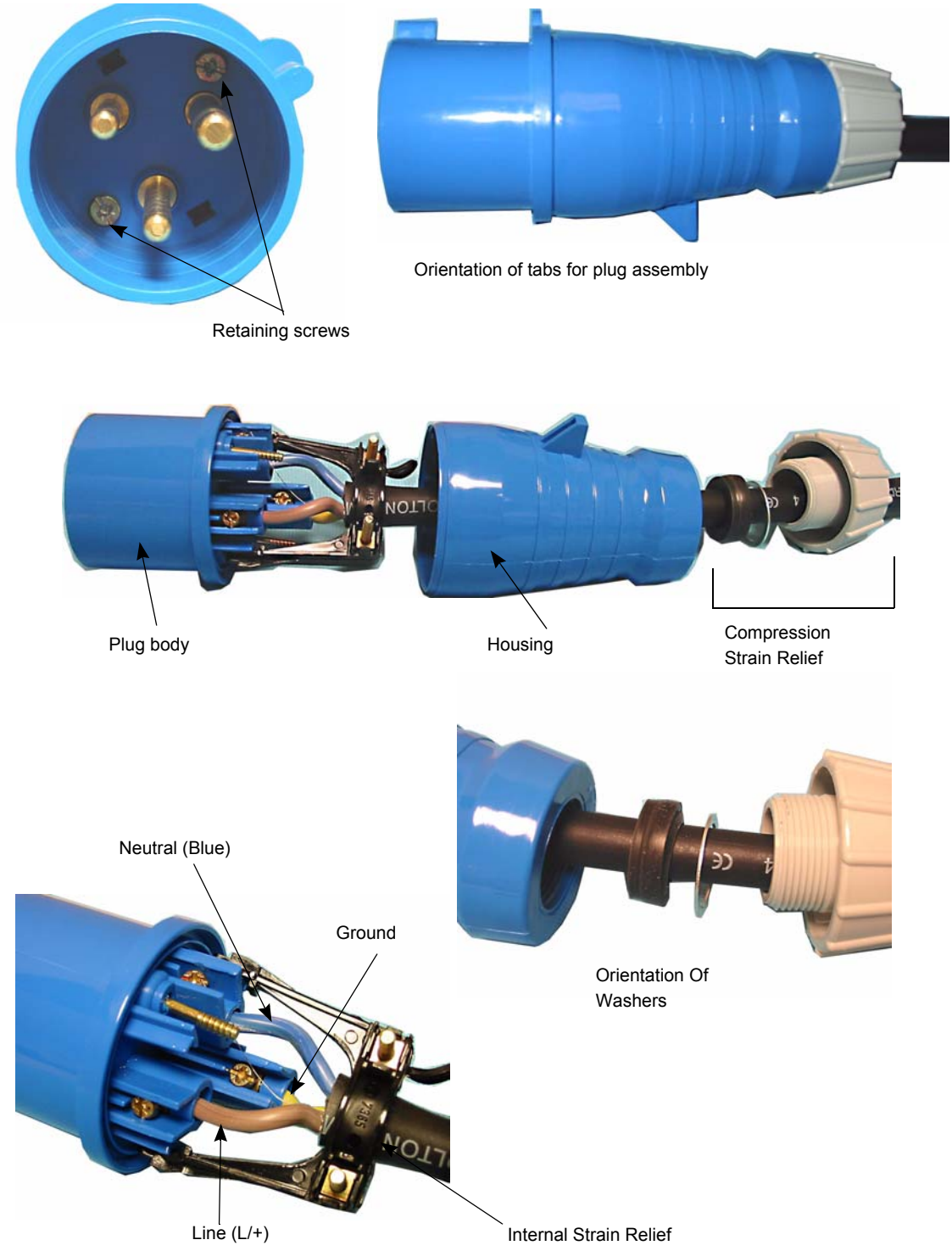

Figure 42. 7K25 International AC power plug

Powering off the SAN256N director

Use the following procedure to shut down the SAN256N director.

1. Power off the inVSN Enterprise Manager before powering off the SAN256N director. To power off the inVSN EM applications and Workstations with SAN256N director active:
2. Close all inVSN EM Client applications (**File** | **Exit)**
3. Close all inVSN EM Server applications (**File** | **Exit**)
4. Set the inVSN EM Workstation(s) AC power On/Off switch to Off

   See the *IBM TotalStorage SAN n-type Director Family Enterprise Manager Installation and Operator Guide (GC26-7720)* for the detailed step-by-step power down procedure.
5. Power off the SAN256N by setting the power supply switches to the **Off** position.

Attention: Refer to safety notices before starting an installation.

CAUTION: AC power voltages are still present after setting the power supply switches to OFF.

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The following indications should occur in the SAN256N director:

- Both LEDs on each Power Supply Status Indicator panel should go off.
- All module LEDs should go off; the 16-character display on the TCM should go blank.
- The chassis upper fan assemblies, side fan assemblies, and power supply fan assemblies should stop rotating.

Scheduled power outages

When scheduling computer room power outages, the SANC40N cabinet can just be powered off. The TCM boards keep all the port specific data stored in the battery-backed non-volatile memory for up to 10 years. However, the dynamic data will be lost.

Unscheduled power outages

If an unexpected power outage is experienced, the SANC40N cabinet can be left in the state it was when the power loss occurred. *It is recommended to set the AC Power Supply switches to the **0** (Off) position before power resumes if not an inconvenience or if time permits.*

If the power loss continues past 48 hours, then set the AC Power Supply switches to **0** (Off).

Appendix A. Data collection and troubleshooting

This appendix describes requirements for collecting data that can be used for problem analysis, and provides guidelines and procedures for troubleshooting and problem determination.

Collecting data for problem analysis

Before submitting any problem to IBM technical support for analysis, gather as much information as possible with as much detail as possible. Field engineers must have access to at least one TCM Ethernet port for attachment of a PC. The PC must have HyperTerminal configured to access the TCM module, and the HyperTerminal Capture Text facility must be active. This interface is required for accessing and gathering information requested by IBM technical support. Refer to Appendix C. on page 125 if you are unfamiliar with HyperTerminal.

The gathered troubleshooting information must be kept available for reference, especially when talking to technical support personnel and performing the troubleshooting procedures. The following topics address information requirements for problem reporting.

Problem description

Provide a detailed description of the problem, including the following:

- The IBM problem number, and, if applicable, the partner problem number
- The customer name and location
- The date and time of the problem
- A detailed list of the events that lead up to the problem. Include user actions and times and any other events that seem relevant. Include times and symptoms if possible.
- Your analysis of the problem

System configuration information

Provide as much system configuration information as possible, including the following:

- Servers, HBAs, and devices attached to the SAN256N director by vendor name and operating system
- HBA and device information, including drivers, code, and micro-code levels
- Zoning information
- If you are using a fibre channel analyzer, such as the Finisar, provide the capture of every frame, including lower level ordered set information
- If possible, supply a configuration diagram showing server/device connections to the SAN256N director

Debug port capture and debug backup files

Enterprise Manager is used to collect debug port and debug backup information, as described below.

Using Enterprise Manager 9.0

Use the following procedure to gather information for IBM technical support.

1. From the Enterprise Manager server screen, click **Maintenance** on the tool bar and select **Debug Backup**.
2. A window appears asking about data collection. Select all of the installed directors.

   Note: Depending on the number of installed directors on the Enterprise Manager, the operation may take up to 20 minutes to complete.

3. Collect the resultant **Debugbackup.zip** file.

SAN256N director general information

The following information may be gathered from the Enterprise Manager, from observation of SAN256 LEDs, and from the TCM 16-character display.

- Chassis/cabinet physical configuration, consisting of:
  - Chassis or cabinet serial number
  - Number of TFIO boards
  - Number of TSW boards
  - Number of TCM boards
  - Physical/slot locations of boards in chassis
- Logical SAN256N configuration, consisting of:
  - Physical configuration/ports attached
  - List of active/inactive ports
  - System log files
- Enterprise Manager version installed.
- Code levels in SAN256 maintenance screen under EM software.
- Check the Alarm debug log files to check if an error had occurred before, and for the location of the error.
- Determine the Fabric ID and Chassis ID settings of all switches being controlled by the Enterprise Manager.
- Verify the Enterprise Manager Workstation Operating System and version.
- Check the LEDs on the front of the TFIO, TSW, and TCM boards to check which LEDs are lit, and which LEDs are not lit, or the flashing pattern of the Heartbeat LEDs.
- Check the TCM 16-character display for any displayed error codes and record the codes for future use.

Troubleshooting TCM boards

Indications of problems with TCM boards may come from three sources:

- LEDs on the TCM board.
- The 16-character scrolling display near the bottom of the board.
- The Enterprise Manager alarm log.

Normal TCM operation

During normal operation, the TCM LEDs and 16-character display provide the following information:

- The PWR OK LED is green, indicating that DC power to the module is within tolerances and the module is not in a power on reset condition.
- The ONLINE LED is green, indicating that the TCM is active and online.
- The HEARTBEAT LED is flashing yellow, indicating that the module is functioning correctly.
- The FAULT LED is not lit.
- The System Power A and System Power B LEDs are not lit
- The System Fan LED is not lit.
- The Ethernet Connector LEDs display the following:
  - The Link LED is yellow, indicating an Ethernet connection is established
  - The Activity LED is flashing green, indicating data is being transmitted across the Ethernet connection
- The 16-character display continuously scrolls [Name:xxx] [Ex. IP. y.y.yyy.yyy.yyy.yyy] [OK], where:
  - xxx = SAN256N name
  - yyy = the IP address of the TCM

TCM alphanumeric display codes

The TCM 16-character alphanumeric display is used to display system fault codes. Each code references a Field Replaceable Unit (FRU) and a specific fault. Messages are scrolled across the display until the entire text message has been shown. At that point, the string is refreshed based on the current conditions, and the process of displaying the new text string repeats again continuously. If there are multiple significant errors to be reported, each error scrolls through at an interval of no more than 4 characters per second, or 5 seconds per fault.

Status display level definitions

List 1: Status - System Level

[OK] => Normal functioning

[POWR]x,x… => Power Supply failure (X denotes the POWR id 0-3)

[FANS]x,x… => Fan is not functioning normally (X denotes the FAN id 0-19)

[LOAD] => system is loading code.

List 2: Status - Board Level

[FAIL] b,b… => Module is present, but not functioning. (b is from List 3, FRUs)

[TEnterprise ManagerP] b,b… => Temperature is not normal. (b is from List 3, FRUs)

[OFLN] b,b… => Module is in offline state. (b is from List 3, FRUs)

List 3: FRUs

TCMx => TCM (0 to 4) board (Decimal notation)

IOxx => TIO (00 to 31) board (Decimal notation)

TSWx => TSW (0 to 7) board (Decimal notation)

The display string consists of the following:

Name: User configured Platform Name for the SAN256N director.

IP Address: External IP address of this TCM.

System Status: FAN / POWR status are displayed for such failures followed by the FRU identifier. (An absent fan or power supply is considered a failure). If the system is under code load, then the additional word LOAD is added to the system status string. If there is no LOAD or FAN / POWR status to report – then OK is displayed.

Board Status: If there are no boards offline or failures, then the board status is non-existent. However, if any of the statuses of FAIL, TEnterprise ManagerP, or OFFL are present, these keywords along with the affected boards are displayed. The boards are represented from the FRU list (3).

End of Sentence string '… '

Note: Exceptions: When the system is initializing – the LCD will display 'Sys Init' and does not scroll.

Examples of scrolling displays:

- System with no errors:

  Name: SAN256N [Ext. IP: 192.168.1.1] [OK] . . . . . .

- System with fan 1 and 2 failed and power supply 3 failure:

  [Name: SAN256N] [Ext. IP 192.168.1.1] [POWR 3] [FAN 1,2] ...

- System with a IO 12 board administratively offline:

  [Name: SAN256N] [Ext. IP 192.168.1.1] [OFFL IO12] ...

- System with power supply failure 2 and an over-temp condition on TCM 2:

  [Name: SAN256N] [Ext. IP 192.168.1.1] [POWR 2] [TEnterprise ManagerP TCM2] ...

- System with power supply failure 2 loading code and an over-temp condition on TCM 2:

  [Name: SAN256N] [Ext. IP 192.168.1.1] [LOAD] [POWR 2] [TEnterprise ManagerP TCM2] ...

TCM problem indications and solutions

The following is a list of possible TCM problem indications descriptions of the problems, a probable cause, and an action to take.

Table 3. TCM problem indications, solution 1

Fault LED is lit, TCM failed hardware diagnostics	
Problem Summary	The TCM is non-functional.
Probable Cause	The TCM board is not properly installed, or is faulty.

Table 3. TCM problem indications, solution 1 (Continued)

Fault LED is lit, TCM failed hardware diagnostics	
Action	Remove and reseat the board, and verify that the mounting screws are tightened to the proper torque. If the fault persists, try substituting another TCM.

Table 4. TCM problem indications, solution 2

Fault LED is lit, TCM passed hardware diagnostics	
Problem Summary	The TCM is non-functional.
Probable Cause	Hardware failure.
Action	Replace the TCM board.

Table 5. TCM problem indications, solution 3

TCM failure alarm at the Enterprise Manager	
Problem Summary	The TCM is non-functional.
Probable Cause	Hardware failure.
Action	Replace the TCM board.

Table 6. TCM problem indications, solution 4

Heartbeat LED blink interval is not normal	
Problem Summary	There has been a hardware failure.
Probable Cause	The board may not be seated properly, or it may be faulty.
Action	Remove and reseat the board. Verify that the latch mounting screws are tightened to the proper torque. If the fault persists, try to determine the source of the fault by interpreting the interval pattern of the Heartbeat LED (see **TCM/TFIO/TSW PROM boot blink codes** and **TCM/TFIO/ TSW board boot blink codes**). Error conditions on the board are indicated by a three-second delay when the LED is not lit, followed by a specific distinctive rapid blink interval rate pattern. Document your findings, and then replace the board. Place the failed board in an antistatic bag, and return it to IBM.

TFIO board troubleshooting

Indications of problems with TFIO boards may come from three sources:

- LEDs on the TFIO board.
- The 16-character scrolling display near the bottom of the TCM board.
- The Enterprise Manager alarm log.

Normal TFIO operation

During normal operation, the TFIO Status LEDs provide the following information:

- The PWR OK LED is green, indicating that DC power to the module is within tolerances and the module is not in a power on reset condition.
- The ONLINE LED is green, indicating that the TFIO is active and logged into the fabric.
- The HEARTBEAT LED is flashing yellow, indicating that the module is functioning correctly.
- The FAULT LED is not lit.

During normal operation, the TFIO Port LEDs provide the following information:

- The LINK (L) LEDs will be solid yellow if a device is logged into the TFIO as a 1.0625 Gbps device but there is no data activity on the port. The LED will flash yellow as 1.0625 Gbps data streams into or out of the port. If the device attached and logged in is 2.125 Gbps, then the LED will be lit green. It will blink green if 2.125 Gbps data is transmitted or received for that port.
- The ERROR (E) LEDs are not lit.

During normal operation, the TFIO Mirror Ports MTx and MRx (if utilized) LEDs provide the following information:

- The LINK (L) LEDs will be solid yellow if a device is logged as a 1.0625 Gbps device but there is no data activity on the port. The LED will flash yellow as 1.0625 Gbps data streams out of the port. If the device is attached and logged in at 2.125 Gbps, then the LED will be solid green. It will blink green if 2.125 Gbps data is transmitted at that port.
- The ERROR (E) LEDs are not lit.

TFIO problem indications and solutions

The following is a list of possible TFIO problem indications, descriptions of the problems, a probable cause, and an action to take.

Table 7. TFIO problem indications, solution 1

Power OK LED is not lit	
Problem Summary	Hardware diagnostics have failed.
Probable Cause	The board may not be seated properly, or it may be faulty.
Action	Remove and reseat the board. Verify that the latch mounting screws are tightened to the proper torque. If the fault persists, try replacing it with another board. If this works, it verifies that the board you replaced is faulty. Place the failed board in an antistatic bag, and return it to IBM.

Table 8. TFIO problem indications, solution 2

Heartbeat LED blink interval is not normal	
Problem Summary	There has been a hardware failure.
Probable Cause	The board may not be seated properly, or it may be faulty.

Table 8. TFIO problem indications, solution 2 (Continued)

Heartbeat LED blink interval is not normal	
Action	Remove and reseat the board. Verify that the latch mounting screws are tightened to the proper torque. If the fault persists, try to determine the source of the fault by interpreting the interval pattern of the Heartbeat LED (see **TCM/TFIO/TSW PROM boot blink codes** and **TCM/TFIO/ TSW board boot blink codes**). Error conditions on the board are indicated by a three-second delay when the LED is not lit, followed by a specific distinctive rapid blink interval rate pattern. Document your findings, and then replace the board. Place the failed board in an antistatic bag, and return it to IBM.

Table 9. TFIO problem indications, solution 3

Error LED is Blinking on a Port	
Problem Summary	An error condition has occurred with a port connection. An error condition is reported on the Enterprise Manager.
Probable Cause	A port may be faulty, the board may not be seated properly.
Action	Verify that the SPF installed in the port is firmly connected. Verify that the fiber cable is firmly connected to the SFP. Remove and reseat the board. Verify that the latch mounting screws are tightened to the proper torque. If the fault persists, try to determine the source of the fault by interpreting the interval pattern of the Error LED associated with the port (see **TFIO Port Blink Codes**). Error conditions on the board are indicated by a three-second delay when the LED is not lit, followed by a specific distinctive rapid blink interval rate pattern.

TSW board troubleshooting

Indications of problems with TSW boards may come from three sources:

- LEDs on the TSW board.
- The 16-character scrolling display near the bottom of the TCM board.
- The Enterprise Manager alarm log.

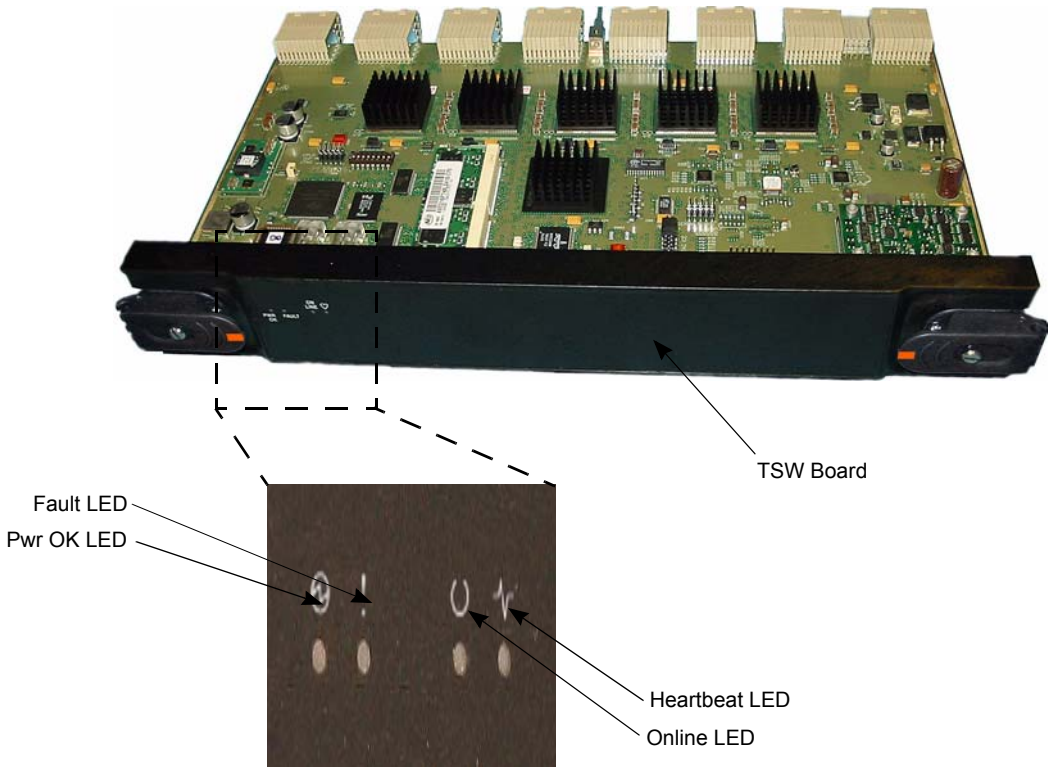

Figure 43. TSW Board LED Locations

Normal TSW operation

During normal operation, the TSW Status LEDs provide the following information:

- The PWR OK LED is green, indicating that DC power to the module is within tolerances and the module is not in a power on reset condition.
- The ONLINE LED is green, indicating that the TSW is active and logged into the fabric.
- The HEARTBEAT LED is flashing yellow, indicating that the module is functioning correctly.
- The FAULT LED is not lit.

TSW problem indications and solutions

The following is a list of possible TSW problem indications, descriptions of the problems, a probable cause, and an action to take.

Table 10. TSW problem indications, solution 1

PWR OK LED is not lit	
Problem Summary	Hardware diagnostics have failed.
Probable Cause	The board may not be seated properly, or it may be faulty.

Table 10. TSW problem indications, solution 1 (Continued)

PWR OK LED is not lit	
Action	Remove and reseat the board. Verify that the latch mounting screws are tightened to the proper torque. If the fault persists, try replacing it with another board. If this works, it verifies that the board you replaced is faulty. Place the failed board in an antistatic bag, and return it to IBM.

Table 11. TSW problem indications, solution 2

Heartbeat LED Blink Interval is Not Normal (Normal is On/Off Once per Second)	
Problem Summary	There has been a hardware failure.
Probable Cause	The board may not be seated properly, or it may be faulty
Action	Remove and reseat the board. Verify that the latch mounting screws are tightened to the proper torque. If the fault persists, try to determine the source of the fault by interpreting the interval pattern of the Heartbeat LED (see **TCM/TFIO/TSW PROM boot blink codes** and **TCM/TFIO/ TSW board boot blink codes**). Error conditions on the board are indicated by a three-second delay when the LED is not lit, followed by a specific distinctive rapid blink interval rate pattern. Document your findings, and then replace the board. Place the failed board in an antistatic bag, and return it to IBM.

TFIO Port Blink Codes

Table 12. TFIO port blink codes

Error LED Blink Count Pattern	Error Code	Description
Note: These blink codes appear on the red Error LEDs associated with the TFIO ports. The blink codes are in decimal format with a 3 second pause between code restarts. Using 3 as an example, the blink pattern would be: 3 blinks, followed by a 3 second pause, then restart; using 14 as an example, the blink pattern would be: 14 blinks, followed by a 3 second pause, then restart.		
0 (Fault LED is Off)	FCPORT_FAULT_NONE	Normal (no failure)
1	FCPORT_FAULT_ISOLATION_ELP_MISMATCH	E-port has become isolated. ELP parameters in E-port initialization do not match (an example could be ED_TOV or RA_TOV mismatch).
2	FCPORT_FAULT_ISOLATION_ZONE_MISMATCH	E-port has become isolated. Zone set on the switches connected via this E-port do not match.
3	FCPORT_FAULT_ISOLATION_DOMAIN_MISMATCH	E-port has become isolated. There is a Domain conflict between the switches connected via this ISL. (Both the switches have the same domain).
4	FCPORT_FAULT_ISOLATION_RSVD_1	reserved
5	FCPORT_FAULT_ISOLATION_RSVD_2	reserved
6		The port is looped-back (transmitter connected to receiver) or connected to another port on the same switch.
7	FCPORT_FAULT_INVALID_ATTACHMENT	E-port is in invalid attachment state. This happens when the fabric security database on both the connected switches do not match.
8		Generic blink code for fault isolation that has not been specifically addressed by any specific fault isolation blink code.
9	FCPORT_FAULT_ISO_CRC_INBOUND_TH	CRC error threshold has been exceeded on this port. Fault isolation has shutdown the port.
10	FCPORT_FAULT_ISO_DECODE_TH	Decode error threshold has been exceeded on this port. Fault isolation has shutdown the port.
11	FCPORT_FAULT_ISO_FRAMING_TH	Framing error threshold has been exceeded on this port. Fault isolation has shutdown the port.
12	FCPORT_FAULT_ISO_SYNC_LOSS_TH	Loss of Synchronization error threshold has been exceeded on this port. Fault isolation has shutdown the port.
13	FCPORT_FAULT_ISO_FRAME_DISCARDS_TH	Frame discard threshold has been exceeded on this port. Fault isolation has shutdown the port.
14	FCPORT_FAULT_ISO_F_PORT_LOGI_TH	F-port login threshold has been exceeded on this port. Fault isolation has shutdown the port.

Table 12. TFIO port blink codes (Continued)

Error LED Blink Count Pattern	Error Code	Description
15	FCPORT_FAULT_ISO_EPORT_LOGI_TH	E-port login threshold has been exceeded on this port. Fault isolation has shutdown the port.
16	FCPORT_FAULT_ISO_RSVD_1_TH	reserved
17	FCPORT_FAULT_ISO_RSVD_2_TH	reserved
18	FCPORT_FAULT_TRANSMITTER_FAILED	SFP transmitter is working erratically or has failed.
19		POST-3 failure on a port.

TCM/TFIO/TSW PROM boot blink codes

Table 13. TCM/TFIO/TSW PROM boot blink codes

Heartbeat LED Blink Count Pattern	Error Code	Description
Note: These codes appear on the Heartbeet LED while the red Fault LED is illuminated. The blink codes are in decimal format with a 3 second pause between code restarts. Using 22 as an example, the blink pattern would be: 2 blinks, pause, 2 blinks, long pause, repeat.		
11	UNKNOWN ERROR	Unknown exception
12	MACHINE_CHECK	Machine check exception
13	DATA_CHECK	Data check exception
14	INST_ACCESS	Instruction access exception
15	EXT_INT	External interrupt while PROM is running
16	ALIGNMENT	Alignment exception
17	PROG_EXP	Program exception
18	NO_FP	Floating point unavailable exception
19	DECREnterprise ManagerENTER	Decrementer exception
21	SYSTEnterprise Manager_CALL	System call exception
22	TRACE	Trace exception
23	INST_MISS	Instruction translation miss exception
24	DATA_LOAD_MISS	Data load miss exception
25	DATA_STORE_MISS	Data store miss exception
26	INST_ACCESS_BREAK	Instruction access breakpoint exception
27	SYSTEnterprise Manager_MGNT_INT	System management interrupt exception

Table 13. TCM/TFIO/TSW PROM boot blink codes (Continued)

Heartbeat LED Blink Count Pattern	Error Code	Description
31	I2C Error	I2C error detected at board bringup; prevents memory configuation
32	CPLD Error: Invalid Board Type	Board type invalid (0xff); caused by unseated board
33	CPLD Error: Invalid Geo Slot Address	Slot address invalid (0xff); caused by unseated board
34	RAM Post Diagnostic Test Failed	Preliminary RAM test failed
41		Comprehensive DRAM Test (3.5 minutes)
42		Comprehensive Boot Flash Checksum
43		Comprehensive FCC1 Eth PHY Loopback
44		Comprehensive FCC2 Eth PHY Loopback
51		Boot Full DRAM Test
52		Boot Checksum Test (Board Boot) 52

TCM/TFIO/TSW board boot blink codes

Table 14. TCM/TFIO/TSW board boot blink codes

Heartbeat LED Blink Count Pattern	Error Code	Description
Note: The blink codes are in decimal format with a 3 second pause between code restarts. Using 127 as an example, the blink pattern would be: 1 blink, pause, 2 blinks, pause, 7 blinks, long pause, repeat.		
111	BCUB	Boot - Inti UPM B Settings
111	CCUB	Run Comprehensive Test - Init UPM B Settings
112	BCPF	Boot - Program TCM FPGA
112	CCPF	Run Comprehensive Test to Program TCM FPGA
113	BCRF	Boot - Init TCM FPGA
113	CCRF	Run Comprehensive Test - Init TCM FPGA
114	BRUN	Boot - Jump to Application
115	BTPF	Boot - Program TFIO FPGA
115	CTPF	Run Comprehensive - Program TFIO FPGA
116	BTIF	Boot - Init TFIO FPGA
116	CTIF	Run Comprehensive - Init TFIO FPGA
116		Run Comprehensive - Init TFIO ASIC
117	BBTF	Run TFIO Cyclone Autoboot

Table 14. TCM/TFIO/TSW board boot blink codes (Continued)

Heartbeat LED Blink Count Pattern	Error Code	Description
117	CBTF	Run Comprehensive TFIO Cyclone Autoboot
118	BBTS	Run TSW Cyclone Autoboot
119	BPSN	Boot - Serial # to DPRAM
123	BTUB	Boot - Init TFIO UPM B Settings
124	BTIF	Boot - Init TFIO3 ASIC
125	CFE3	Run Comprehensive FCC3 Eth PHY Loopback
126	DMAN	Mem-to-Mem DMA Test
127	DMAT	Mem-to-TFIO & TFIO-to-Mem DMA Test (FPGA or ASIC)

Power system troubleshooting

Indications of problems with the power system may come from four sources:

- LEDs on the power supplies.
- Sys Pwr A / Sys Pwr B LEDs on the TCM board
- The 16-character scrolling display near the bottom of the TCM board.
- The Enterprise Manager alarm log.

Power system problem indications and solutions

The following is a list of possible problem indications, descriptions of the problems, a probable cause, and an action to take

Table 15. Power system problem indications, solution 1

No AC Power to the Power Supplies	
Problem Summary	AAC power is not available at the SAN256N power supply AC input receptacles. AC and DC LEDs are Off. Enterprise Manager indicates “installed state”.n error condition has occurred with a port connection. An error condition is reported on the Enterprise Manager.
Probable Cause	Customer circuit breakers may be Off, the SAN256N director power supplies may not be plugged in to the customer’s power receptacles, the SAN256 power supply line cords may not be fully plugged into the power supply AC inlet receptacles, or the SAN256 power cords, customer’s circuit breakers, or customer’s power receptacles may be faulty.

Table 15. Power system problem indications, solution 1 (Continued)

No AC Power to the Power Supplies	
Action	Verify that all circuit breakers are set to On, the power cords are plugged in to the right receptacles, and the power cords are fully plugged into the power supplies. If everything is set up properly, disconnect the SAN256 from the customer's power receptacles, and verify that the power cords, receptacles, and circuit breakers are OK. If a problem is found, replace the component.

Table 16. Power system problem indications, solution 2

AC power is present, but no DC output	
Problem Summary	AC power is available. AC LED is lit red. DC LED is not lit. Enterprise Manager indicates "AC Fail".
Probable Cause	AC input power is less than 190V, or the power supply is faulty.
Action	Verify that the AC input voltage from the customer's power receptacles for the SAN256 is between 200 VAC to 240 VAC. If the voltage is within range, replace the power supply.

Table 17. Power system problem indications, solution 3

AC Power is present, but the SAN256N director does not power up	
Problem Summary	AC power is available. AC LED is lit green. DC LED is lit red. Enterprise Manager indicates DC Fail.
Probable Cause	DC power switch is Off, or the power supply is faulty.
Action	Verify that the DC power switch is On. If the switch is On and the supply does not operate, replace the power supply.

Cooling system troubleshooting

Indications of problems with the cooling system may come from five sources:

- Fan Status indicators on the Upper and Side fan assemblies.
- Sys Fan LED on TCM.
- FAN OK indicator on TCM.
- The 16-character scrolling display near the bottom of the TCM board.
- The Enterprise Manager alarm log.

Cooling system problem indications and solutions

The following is a list of possible problem indications, descriptions of the problems, a probable cause, and an action to take.

Table 18. Cooling system problem indications, solution 1

A fan alarm message is received in the Enterprise Manager alarm log	
Problem Summary	The fan LED is lit red. Enterprise Manager indicates “fan failure”. TCM display indicates fan failure. System Fan LED on TCM is lit red.
Probable Cause	A fan assembly may not be installed correctly, or may be faulty.
Action	Verify the condition of the fan assemblies. The three upper fan assemblies should be blowing air out of the rear of the chassis, and the two side fan assemblies should be blowing air out of the right side (facing the rear) of the chassis. If any of the upper fan assemblies are not operational, verify that the assemblies are firmly seated into the upper fan I/O connectors on the TMF/TFD module, and the upper fan assembly housings are latched to the rear chassis frame. If any of the side fan assemblies are not operational, verify that the assemblies are firmly seated into the side fan I/O connectors on the Midplane, and the side fan assembly housings are latched to the chassis frame. If all connections and connectors are OK, and any of the fans are still not operating, replace the defective fan assembly.

Table 19. Cooling system problem indications, solution 2

A fan alarm message is received, but the fan is not faulty	
Problem Summary	The Enterprise Manager generated an alarm for a working fan. This condition is also indicated on the TCM 16-character display, and TCM System Fan LED is lit red.
Probable Cause	The fan sensor is not receiving voltage. This may be due to a fault in the fan assembly connector, a fault in the Midplane connections, or TMF/TFD module.
Action	Verify that the three upper fan assemblies are firmly seated into the upper fan I/O connectors on the TMF/TFD module, and the upper fan assembly housings are latched to the rear chassis frame. Verify that the side fan assemblies are firmly seated into the side fan I/O connectors on the Midplane, and the side fan assembly housings are firmly latched to the chassis frame. If all of the fans are operating and a fan alarm message is still present, potential problems with the TCM module, TMF/TFD, or the midplane could exist. Attempt to isolate the problem by replacing (one at a time) the following: TCM module(s); if the alarm still exists, replace the TMF/TFD module. If the alarm still exists, possible fault could be in the Midplane connectors. The midplane cannot be replaced on site. The chassis would have to be sent back to IBM.

Troubleshooting link level errors

Link-level errors are caused by abnormal conditions that affect data sent or received over a communications link. These errors can impact the capability of a channel, control unit, or director, to correctly route the data. Therefore, a link subject to link errors cannot be brought online. The integrity of the information sent over the link can be affected.

A link-level error can be associated with the following conditions:

- The link header or link trailer of a frame
- Validity or use of transmission characters
- The integrity of the link or the signal sent over the link
- The structure of the link
- The link address used

For a channel or control unit, errors are classified into two categories. These categories depend on the Cyclical Redundancy Checking (CRC) checking process. A link error detected *before* CRC checking has priority over one detected *after* the CRC checking process, because the data contained in the frame cannot be read or interpreted by the link-level facility.

Link-level errors reported on Enterprise Manager

The following link-level errors are displayed on the Enterprise Manager Director View:

- CRC errors
- Frames without End of Frame (EOF) delimiters
- Frames with disparity errors
- Loss of synchronization
- Loss of signal
- Address I/O errors
- Primitive sequence protocol errors
- Link reset in
- Link reset out
- OLS in
- OLS out
- Invalid Tx words
- Link failures

Link level errors before CRC checking

Link-level errors before CRC checking are mainly related to the quality of the signal that the receiver gets over the link. They also deal with the ability of the receiver to decode existing characters and interpreting the frame delimiters Start of Frame (SOF) and End of Frame (EOF). The link-level errors consist of the following:

- Connection errors:

  - A connection error affects the ability of a link-level facility or a director port to maintain the connection. In most cases, improper delimiters make the frame unusable. For example, two consecutive frames transmitted with a SOF character.
- Link-signal-violation errors:
  - Loss of signal - The receiver does not get any signal, or the signal is below the minimum level to be read.
  - Loss of synchronization - The receiver is not able to distinguish the synchronization characters.
- Code violation error - occurs when a received character is recognized as invalid.

CRC errors

When a frame is received at a link-level facility, its contents (including the CRC field) are read. The result of this operation must correspond to a specific value; if a mismatch occurs, a CRC error is raised.

Determining the source of link level errors

If statistically significant amounts of the above errors are viewed on the Enterprise Manager, the first level of troubleshooting involves the following:

1. Replace the SFP on the suspect link.
2. Replace the channel or device on the suspect link.
3. Replace the interface cable on the suspect link.
4. Run an internal diagnostic on the TFIO if a failure occurs.

Fiber link testing

Testing the fiber link checks the power level, and power loss, of a fiber optic link used to connect the TFIO ports to other ports. These test procedures consist of measuring the power level at the Tx output and the Rx input of the TFIO port.

Equipment required

The test equipment required for fiber optic link testing is:

- Optical Power Meter AT & T 938A Optical Loss Set or equivalent
- LC to ST Jumper Cable
- LC to ST Breakout Cable
- LC to ST adapter

Measuring the Transmitter (Tx) output power at the TFIO port

1. Disconnect the fiber optic cable from the TFIO port Tx connector to be tested.
2. Clean the tips of the fiber optic test cable prior to connecting the test cable to the TFIO port Tx connector and the power meter.
3. Connect fiber optic test cable to the TFIO port Tx connector and the power meter connector.
   - For single mode TFIO ports (duplex LC connectors), use a single mode jumper cable one meter in length.

– For multi- mode TFIO ports (duplex LC connectors), use a multi- mode jumper cable one meter in length.

4. Power on the power meter and the SAN256N director (if not previously powered on). Observe that the reading on the power meter is within the minimum and maximum values, depending upon the type of fiber link, as specified below:

Table 20. Power meter levels

Type of Fiber	**Minimum Power Level**	**Maximum Power Level**
Single-mode	-10.0 dBm	3.0 dBm
Multi-mode	-10.0 dBm	4.0 dBm

Note: A smaller numerical value indicates a greater power level, e.g., a power level -17.0 dBm is greater than a power level of -20.5 dBm.

If a correct reading cannot be obtained, disconnect the test cable and use another fiber test cable and take a second measurement. If the measured power level is still not within specification, call IBM Technical Support.

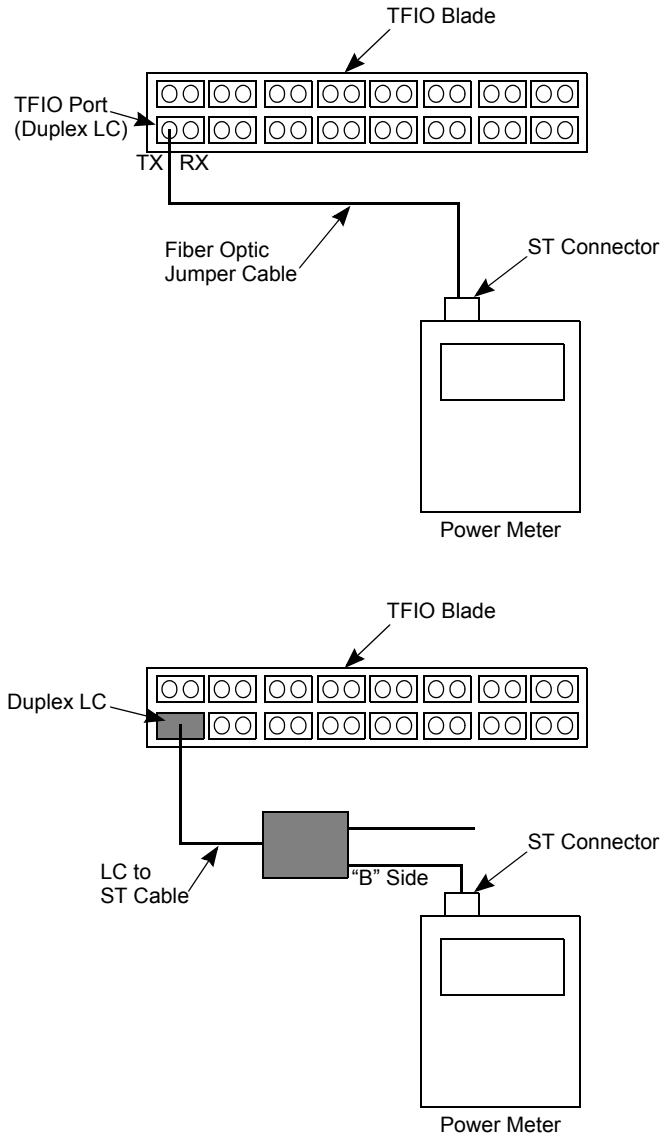

Figure 44. Transmitter output power level test setup

Measuring the receiver (Rx) input power at the TFIO port

1. Disconnect the fiber optic test cable from the TFIO port Tx connector.
2. Reconnect the original fiber optic cable to the TFIO port Tx connector.
3. Disconnect the fiber optic cable from the TFIO port Rx connector.
4. Connect the receiver fiber optic cable to the power meter
5. Connect fiber optic test cable to the TFIO port Rx connector and the power meter.

6. For multi-mode cable, use an LC to ST adapter and a short ST to ST jumper cable.
7. Power on the power meter and the SAN256N director (if not previously powered on).
8. Observe that the reading on the power meter is within the minimum and maximum values, depending upon the type of fiber link, as specified below:

Table 21. Fiber power levels

Type of Fiber	**MinimumPower Level**	**Maximum Power Level**
Single-mode	-20.0 dBm	-3.0 dBm
Multi-mode	-17.0 dBm	- 0 dBm

9. If a correct reading cannot be obtained, disconnect the test cable and use another fiber test cable and take a second measurement. If the measured power level is still not within specification, call IBM Technical Support.

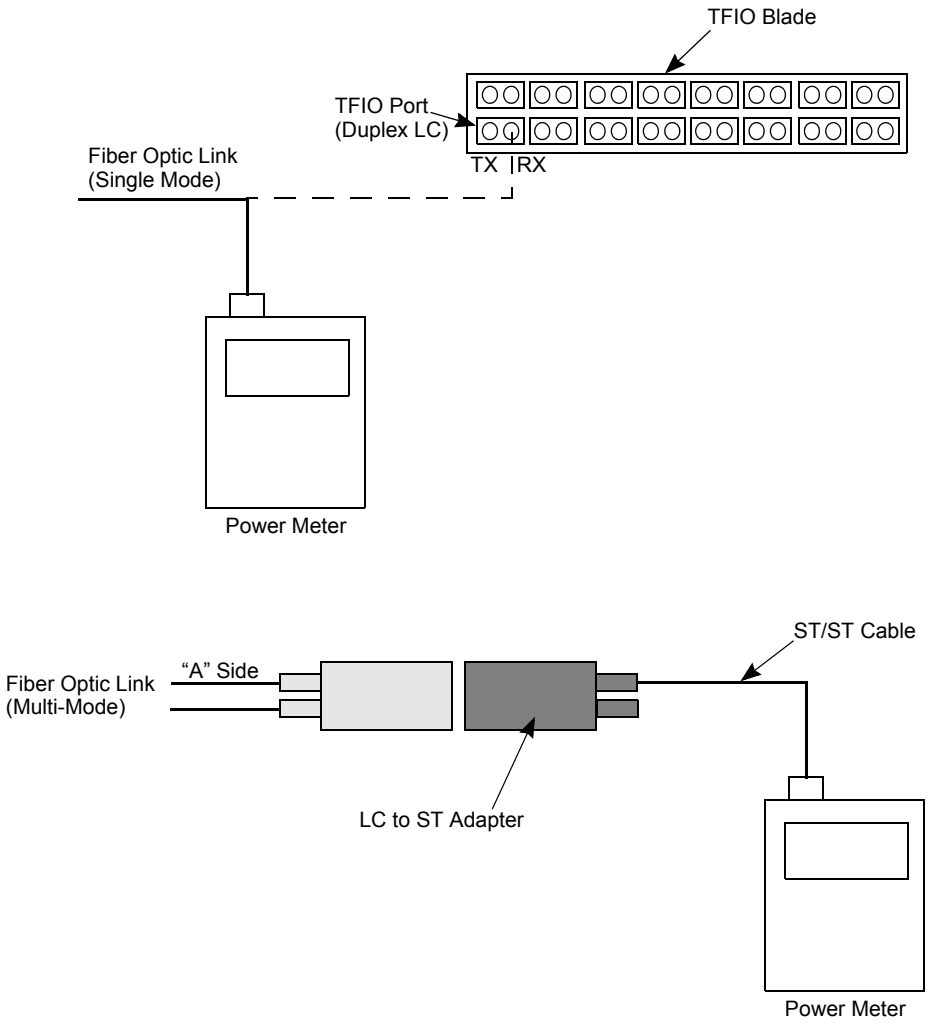

Figure 45. Receiver Input Power Level Test Setup

SAN256N director system traps

A trap, as defined for use in the SAN256N director, is a configurable software function that will send out an alarm when a particular event or condition occurs. Traps are used to notify an end node, either an Ethernet or Fibre Channel node, that a particular event has occurred.

There are a number of traps resident on the Director, some of which can be controlled by the Administrator. If a trap is enabled and the corresponding event occurs, an alarm message with all corresponding information will be constructed to report the trap.

There are several different trap types:

- Chassis hardware traps, which indicate a chassis hardware problem such as a power supply or fan failure
- Fabric traps, which indicate a problem in the fabric, most likely between the director and one or more N/NL_Ports
- Internal hardware traps, which indicate a potentially serious internal hardware error condition relating to the routing of frames within the director
- Switch traps, which indicate director-specific actions
- Port traps, which indicate port-specific actions

The following table lists the possible traps:

Table 22. SAN256N director system traps

Definition	Trigger Method	Type
CRC Inbound	Counter	Fabric
Decode Error	Counter	Fabric
Framing Error	Counter	Fabric
Sync Loss Error	Counter	Fabric
Frame Discards	Counter	Internal H/W
E-port login/out	Counter	n/a
N-port login/out	Counter	n/a

Appendix B. AC power reference

This appendix provides information about AC power cables for the SAN256N director.

AC power cables

The power service provided to each SAN256N chassis and SANC40N cabinet AC power cable connections must be a minimum 10 Amp, 200 to 240 Volt AC rated circuit.

It is recommended that you use the pre-wired AC power cables available from IBM. Refer to the AC Power Cable Assembly parts list in Table 23. below and the examples of cables shown in Figure 46.

Table 23. AC Power Cable Assembly Part Numbers for SAN256N directors

AC Power Cable Assembly	Part Numbers
North American	1012315-001
International	1012315-002

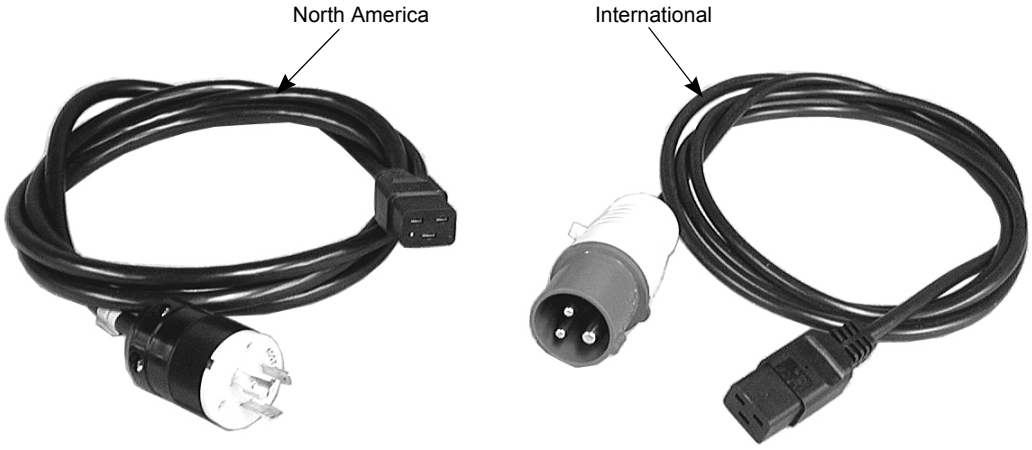

Figure 46. North America and International AC power cables

If the AC power cable and plug received with the SAN256N director is not compatible with the electrical requirements in your region, consult a person trained in the electrical wiring requirements and knowledgeable with the electrical codes (rules) in your region.

Appendix C. HyperTerminal setup

This appendix provides the necessary information to set up and use the HyperTerminal application program on the SAN256N director workstation.

Setting up HyperTerminal

Before replacing any SAN256N board, a PC must be connected to the primary TCM Ethernet port, or, if the primary TCM has failed, to the hot standby secondary TCM Ethernet port. This PC is used to capture system information and diagnostic data. Access to the TCM is enabled by setting up the HyperTerminal program to communicate with the TCM over the Ethernet port.

Selecting HyperTerminal

1. From the desktop, select **Start**, **Program**, **Accessories**, and **HyperTerminal**.
2. The **Connection Description** window appears.
3. Type **SAN256N** in the **Name** field, select an Icon, and then click the **OK** button. The **Connect To** window appears.

Configure an Ethernet connection

1. From the **Connect Using** drop-down list, select TCP/IP (Winsock).
2. From the **Connect To** screen, enter the IP address in the **Host address** field.
3. Click the **Settings** tab.
4. Verify that **Terminal keys** and **Ctrl+H** are selected. Emulation is **Auto detect**, Telenet terminal ID is **ANSI**, and Backscroll buffer lines is set at **500**.
5. .Click on **ASCII Setup**.
6. Verify that only two blocks are checked: **Send line ends with line feeds** and **Wrap lines that exceed terminal width**. Click **OK**.
7. .Click **OK** to save SAN256N/HyperTerminal Properties.
8. Save the settings by selecting **Save** from the **File** menu.

Connecting to the TCM debug port

1. Connect a CAT-5 network cable to the Ethernet port configured for HyperTerminal.
2. Route the interface cable through the top cable trough of the SAN256N chassis and connect the RJ49 connector to the Ethernet connector located on the front panel of the Primary TCM.
3. Start the HyperTerminal program. If you selected an icon for your desktop, click the icon you assigned, or select **Start | Programs | Accessories | HyperTerminal | SAN256N.**
4. To maintain a copy of all actions that are performed in HyperTerminal, set the capture settings in HyperTerminal.

Maintain a copy of HyperTerminal actions

1. Select **Capture Text** from the **Transfer** menu.
2. Enter a file name so that the file will be located in the C:\IBM\SAN256N directory with a file name that will describe from which TCM module the capture is coming from and include a date.
3. After the procedure has been completed using HyperTerminal, the capture must be halted. To stop the capture select **Stop** from the Menu Bar:

   Transfer | Capture Text | Stop

   Note: Place a shortcut to SAN256N HyperTerminal connection on the Desktop by performing a right button drag it off the menu to the Desktop for a shortcut and selecting **Copy Here**.

4. Set the screen capture by selecting **Capture Text** from the **Transfer** menu.
5. Set the file destination to an adequate drive and format the name of the file CompanyDateStamp_Sequence. Example: C:\IBM090100_1.txt.

Appendix D. Troubleshooting the SAN256N workstation

This appendix provides the following information.

- Procedures to restore the Windows Operating System onto a SAN256N director workstation.
- References to the Diagnostic Utility Program, contained on the IBM Product Recovery CD-ROM, that comes with each SAN256N director workstation.
- Descriptions of Dr. Watson.

Workstation recovery procedures

Note: All databases and system/device drivers from the workstation must be backed-up before restoring the operating system.

Before you begin:

- Locate the IBM Product Recovery CD-ROM for your workstation model.
- Locate the Enterprise Manager license number for the workstation and write it down. This number is usually located on the right side of the workstation.
- Backup all databases and system/device drivers from the workstation.
- Backup or write down any workstation system configurations, i.e.:
  - Computer name
  - IP addresses
  - User name
  - Company name, etc.
- Locate your supplied copy of the Enterprise Manager Software package.
- Locate your supplied copy of Turbo TFTP NT (if this workstation is used as an Enterprise Manager and Server).
- Locate your supplied copy of Windows Service Pack (latest version).

Restoring the Windows operating system

1. Turn on the workstation and press the **F1** key when the “Configuration/Setup Utility” prompt appears on the screen.
2. From the **Configuration/Setup** menu, select **Start Options**.
3. Select **Startup Sequence**.
4. Write down the current startup sequence so that it can be restored later.
5. From the **Startup Sequence** menu, select the sequence that allows the CD-ROM drive to start up *before* the hard drive.
6. Press the **ESC** key twice to return to the main menu, and select **Save Settings**. Follow the prompts to **EXIT** from the Configuration/Setup Utility. After selecting **EXIT**, the workstation will begin the reboot process.

7. Immediately insert the IBM Product Recovery CD-ROM into the CD-ROM drive. The workstation will locate the CD-ROM and begin the recovery program.
8. From the main menu, select the required recovery option.
9. Remove the CD-ROM, restart the workstation, and follow the startup prompts.

   The system will install the Windows operating system, then automatically boot and reboot the workstation. After the second reboot is complete, you will see the **Windows Setup** screen. Use the following names as the default values:

   – Name: **IBM**

   – Company: (leave blank)

   – Computer: (Use the serial number located on the front bottom right of the workstation.)

   – User: **Administrator**

   – Password: (leave blank)
10. Using the **User** and **Password** names from step 9, logon onto the Windows workstation.
11. Install the Windows Service Pack (latest version).
12. Restore any system drivers.
13. Restore any network configurations.
14. Set up the monitor display resolution, via the **Control Panel**/**Display**. Set the resolution to **1280 x 1024 x 65536 Colors at 85 Hertz**.

    Note: The actual color and frequency settings will depend on the monitor used, and the video display module installed in the workstation.
15. Install the Turbo TFTP for Windows software (if the workstation is used as an Enterprise Manager and Server).
16. Install the Enterprise Manager Software Package.
17. Restore the workstation's boot-up sequence (i.e.; floppy drive/hard drive/CD-ROM), making sure that the CD-ROM boots-up *last*, after the hard drive.

Dr. Watson error

DRWTSN32.EXE is a debugger tool that runs on the Windows operating system. It captures application errors and logs them for diagnosis and analysis. Use the following procedure to gathering error logs after an application error has occurred.

1. To run Doctor Watson, open either a command prompt or the **Run** dialog box from the **Start** menu, type in **`DRWTSN32`**, and click the **OK** button.
2. The **Dr. Watson for Windows** screen should appear.
3. Highlight the last entry in the **Application Errors** list at the bottom of the screen. This will be the most current error. Click the **View** button.
4. The **Log File Viewer** is displayed. Next you need to copy the text to a file.
5. Select the text and copy it to the clipboard.

   – Press the CTRL+HOME key. The mouse pointer moves to the top of the **Log File Viewer** window.

- Press the SHIFT+CTRL+END keys. All text in the **Log File Viewer** window is highlighted.
- Press the CTRL+C keys. The highlighted text is copied to the clipboard.

6. Save the text in the clipboard to a file.
   - Open Notepad by selecting **Start**, **Program**, **Accessories**, and **Notepad**.
   - Select **Edit Paste** or press CTRL+V to paste the clipboard to Notepad.
   - Save the Notepad page by selecting **File Save As ...**
   - Set the file destination to an adequate drive and format the name of the file DR_CompanyDatestamp_Sequence. Example: C:\DR_IBM090100_1.txt

DIAGNOSTIC UTILITY OPTIONS

System Utilities	
Run diagnostics:	Run diagnostics on your computer hardware.
Create a diagnostic diskette:	Creates a startable diagnostic diskette.
System information:	Display information about your computer configuration.

Diagnostics	Interactive Tests	Hardware Info	Utility	Quit	F1= Help
q Run Normal Test q Run Quick Test q CPU/Coprocessor q Systemboard q Video Adapter q Serial Ports q Parallel Ports q Fixed Disks q Diskette Drives q Other Devices q Interactive Tests q ZIP Drive q LS-120 Drive q CD-ROM/DVD Drive q Memory Test-Full q Memory Test-Quick q Fixed Disk Optimized Test	q Keyboard q Video q Internal Speaker q Mouse q Joystick Test q Diskette q System Load q Printer Test q CD-ROM/DVD Test q Stereo Speaker	q System Configuration q Memory Contents q IRQ and DMA Use q Device Drivers q COM and LPT Ports q Physical Disk Drivers q Logical Disk Drivers q VGA Information q Software Interrupts q SCSI Devices q I/O Use IDE Drive Info PCT Information SMBIOS Info DIMM/RIMM Info Asset EEPROM Info	q Run External Tests q Surface Scan Hard Drive q Benchmark System q DOS Shell q Tech Support Form q View Test Log q Print Log q Save Log q Full Erase Hard Drive q Quick Erase Hard Drive Asset EEPROM Backup View Stored Results	q Exit Diags q Park HD q Reboot About	
PC-DOCTOR 2.0 Copyright 1999 Watergate Software. All Rights Reserved					
Use the cursor keys and ESC to move in menus. Press ENTER to select.					

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Readers' Comments — We'd Like to Hear from You

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2045-N16 Installation and Maintenance Guide

Publication No. GC26-7714-00

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