Netra™ t 1400 / 1405 Installation and User's Guide

THE NETWORK IS THE COMPUTER™

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Preface

This manual comprises two parts:

- Part I, *Installation*, describes the installation and basic maintenance procedures for the Netra t 1400 and Netra t 1405 systems and is intended to be read by installation engineers, software support engineers and service personnel.
- Part II, *User Guide*, provides information about the system administration and software operation of the Netra t 1400/1405 and is intended for system users and administrators.

How This Book Is Organized

Chapter 1 describes the key features of the Netra t 1400/1405 computer system.

Chapter 2 covers the environmental and site requirements.

Chapter 3 describes the electrical supply requirements.

Chapter 4 provides information about external I/O connectors.

Chapter 5 describes the steps required to install a software release.

Chapter 6 describes how to replace the air filters.

Chapter 7 provides a description of the power on and power off procedures, the systes LEDs and connectors.

Chapter 8 describes the procedure for booting the Netra t 1400/1405.

Chapter 9 explains the changes that have been made to the Open Boot Prom (OBP) for the Netra t 1400/1405.

Chapter 10 describes the LOMlite facility.

Chapter 11 describes the procedure for shutting down the Netra t 1400/1405 system cleanly and safely.

Typographic Conventions

TABLE P-1 Typographic Conventions

Typeface	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output	`% su` `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this.
	Command-line variable; replace with a real name or value	To delete a file, type `rm` *filename*.

Shell Prompts

TABLE P-2 Shell Prompts

Shell	Prompt
C shell	*machine_name*%
C shell superuser	*machine_name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Related Documentation

TABLE P-3 Related Documentation

Application	Title	Part Number
Compliance Safety	*Netra t 1400/1405 Compliance and Safety Manual*	806-0574-10
Service System Reference	*Netra t 1400/1405 Service and System Reference Manual*	806-0576-10

Note – It is essential that you read the Netra t 1400/1405 Compliance and Safety manual before proceeding.

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PART I Installation

CHAPTER 1

Product Overview

The Netra t 1400/1405 computer system is a one- to four-processor device that uses the family of UltraSPARC™ II processors. Housed within a rack-mounting enclosure, the Netra t 1400/1405 provides the following:

- High performance processors
- Extensive I/O expansion and a wide range of options
- Modular internal design
- High performance disk, system, memory and I/O subsystems
- High performance peripheral component interconnect (PCI) I/O
- Redundant hot swap power supply units
- Rack mounting options available
- Alarms functionality for remote management

The Netra t 1400 is powered by –48V / –60V DC supplies. The Netra t 1405 is powered by standard AC supplies. This is the only difference between the systems.

FIGURE 1-1 and FIGURE 1-2 on page 3 illustrate the front and rear, respectively, of the Netra t 1400; FIGURE 1-3 and FIGURE 1-4 on page 4 illustrate the front and rear, respectively, of the Netra t 1405. The following sections provide a brief description of the Netra t 1400/1405 I/O devices and a detailed overview of the system unit features.

System Unit Features

System unit components are housed in a rack-mounting enclosure. Overall enclosure dimensions (width x depth x height) are 431.8mm x 477.3mm x 264mm (17.00in. x 18.79in. x 10.39in. (6U)). System unit electronics are contained on a single printed circuit board (motherboard). The motherboard contains the CPU module(s), memory, system control application-specific integrated circuits (ASICs) and I/O ASICs.

The system unit has the following features:

- Rack mounting enclosure with n + 1 redundant hot swap –48VDC / –60VDC (Netra t 1400) or AC (Netra t 1405) power supplies
- support for up to four modular 440MHz UltraSPARC II processors with 4Mbyte cache
- UltraSPARC Port Architecture (UPA) coherent memory interconnect
- use of DIMMs, with an interleaved memory system. Each pair of DIMM slots (four rows of two pairs each) accepts 64 or 256 tMbyte DIMM modules. Populating with two pairs of identical capacity DIMMs enables the memory controller to interleave and overlap, providing optimal system performance. There are a total of 16 DIMM slots supplying a minimum of 256Mbyte (4 x 64Mbyte) and a maximum of 4Gbyte (16 x 256Mbyte) of memory.
- Four PCI slots:
  - two 33MHz, 64- or 32-bit, 5VDC slots
  - one 33MHz 32-bit only 5VDC slot
  - one 66MHz or 33MHz, 64- or 32-bit, 3.3VDC slot

  Universal PCI cards can be used in any of the four PCI slots.
- 10/100 Megabit per second (Mbps) Ethernet
- 40Mb/s Fast-20 (UltraSCSI) disk subsystem supporting up to four 18Gbyte disk drives
- Two RS232/423 DB-25 serial ports (asynchronous protocols)
- Parallel port
- External Fast-20 (UltraSCSI) 68-pin port
- Up to two SCSI removable media drives (CD-ROM or DAT or both)
- Alarms card implementing Lights Out Management

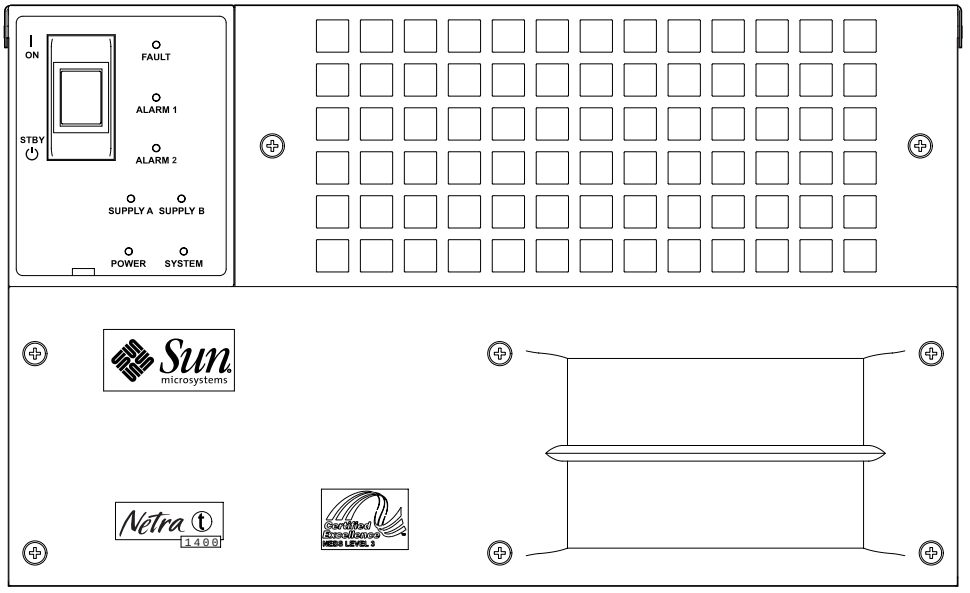


FIGURE 1-1 Netra t 1400 System Unit Front View

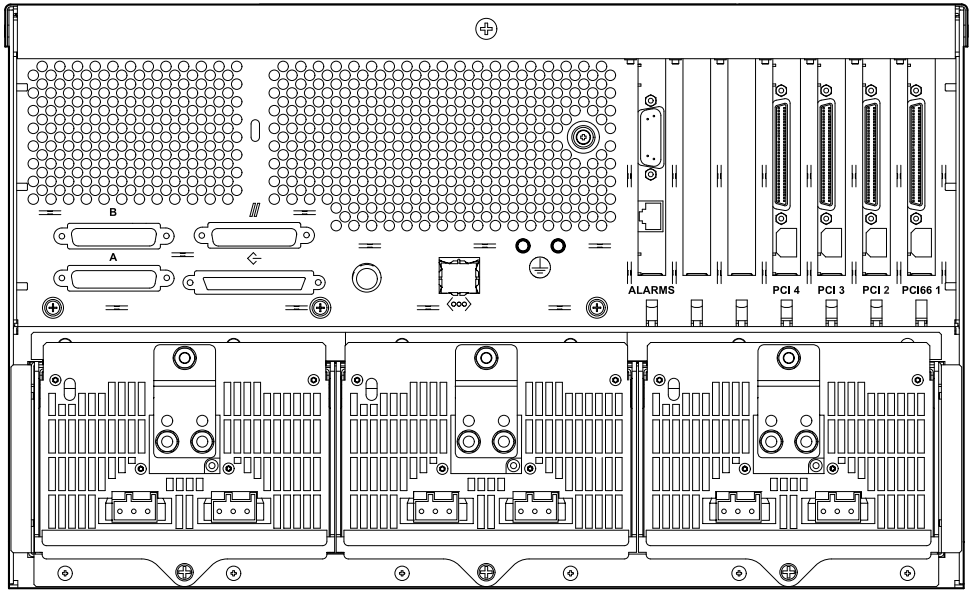


FIGURE 1-2 Netra t 1400 System Unit Rear View

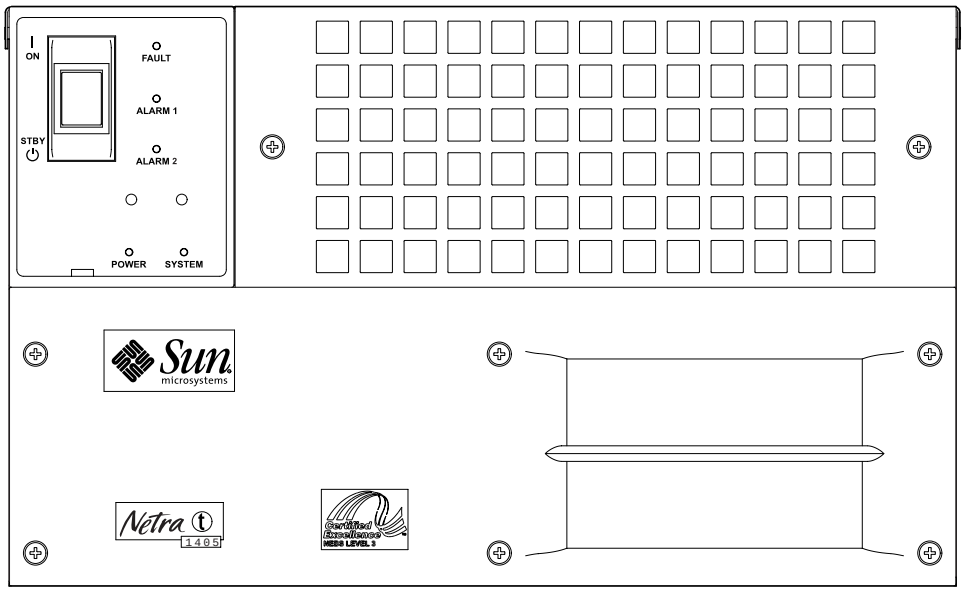


FIGURE 1-3 Netra t 1405 System Unit Front View

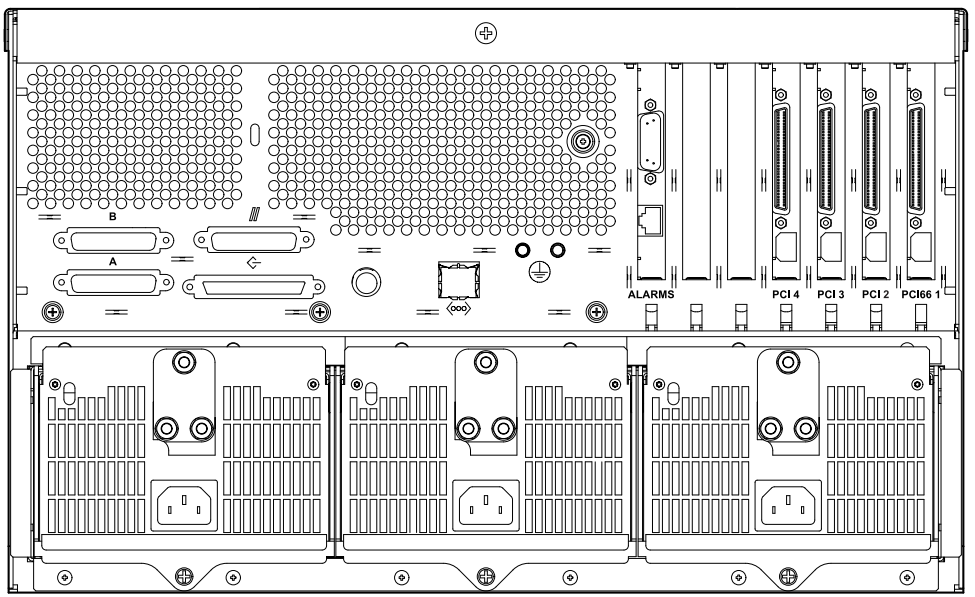


FIGURE 1-4 Netra t 1405 System Unit Rear View

CHAPTER 2

Installing the System

Before you install the system, confirm that the correct power supply is available. Refer to Chapter 3, "Installing the Electrical Supply", for further information.

Environmental Considerations

The system can be installed in an environment with the following specific parameter ranges:

- Ambient temperature
  - operating: 5˚ to 40˚C
  - exceptional operating limit: –5˚ to 55˚C[1, 2]
  - storage: –40˚ to 70˚C
- Relative humidity
  - operating: 5 to 85% non-condensing[3]
  - storage: 10 to 95% non-condensing
- Elevation
  - operating: –300 to +3000 meters
  - storage: –300 to +12000 meters

Dimensions

- Height: 264 mm (10.39 in.) 6U nominal
- Width: 431.8 mm (17.00 in.)
- Depth: 477.3 mm (18.79 in.)
- Weight (unpackaged): maximum 32 kg (71 lb)

1. Error-free operation of the removable media devices is from 0° to 40°C.
2. No more than 96 hours duration at extremes and at elevations less than 1800m.
3. Subject to a maximum absolute humidity of 0.024kg of water per kg of dry air.

Flanges can be fitted to accommodate the equipment in 19-inch, 23-inch 24-inch and 600-mm racks (see FIGURE 2-3 on page 8).

Forced Air Cooling Requirements

1. Adequate airflow through the host equipment frame must be ensured.
2. The air is drawn through the front of the Netra t 1400/1405 enclosure and expelled from the rear of the enclosure.
3. The inlet and exhaust ventilation areas must be a minimum of 200 sq cm each.

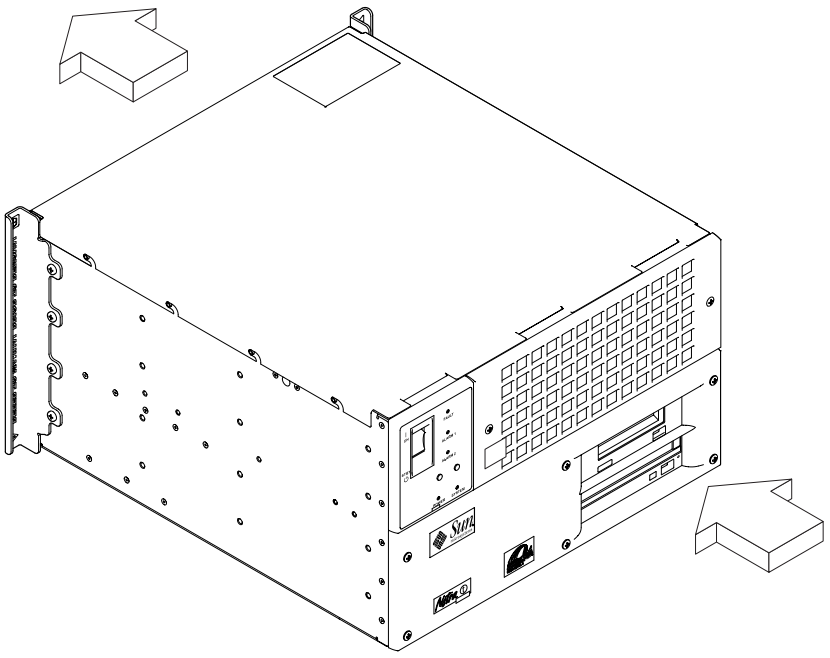


FIGURE 2-1 Netra t 1400/1405 Airflow

4. To maintain adequate airflow we strongly recommend that you inspect and, if necessary, replace the air filter on a regular basis. See Chapter 6, "Replacing the Air Filter", for further information.
5. If the Netra t 1400/1405 computer system is fully enclosed by its host equipment rack, the host rack must have ventilation openings in the front door. This permits unrestricted access to an external air source.

Mechanical Considerations

Caution – The Netra t 1400/1405 system, when fully loaded, can weigh up to 38kg (84lb); hence mechanical assistance may be required if installing a fully-loaded unit.

Removing the Sacrificial Shipping Plates

Where possible, the four sacrificial shipping plates should only be removed *after* mounting the system in a rack. Remove the four M5 screws securing each plate to the system.

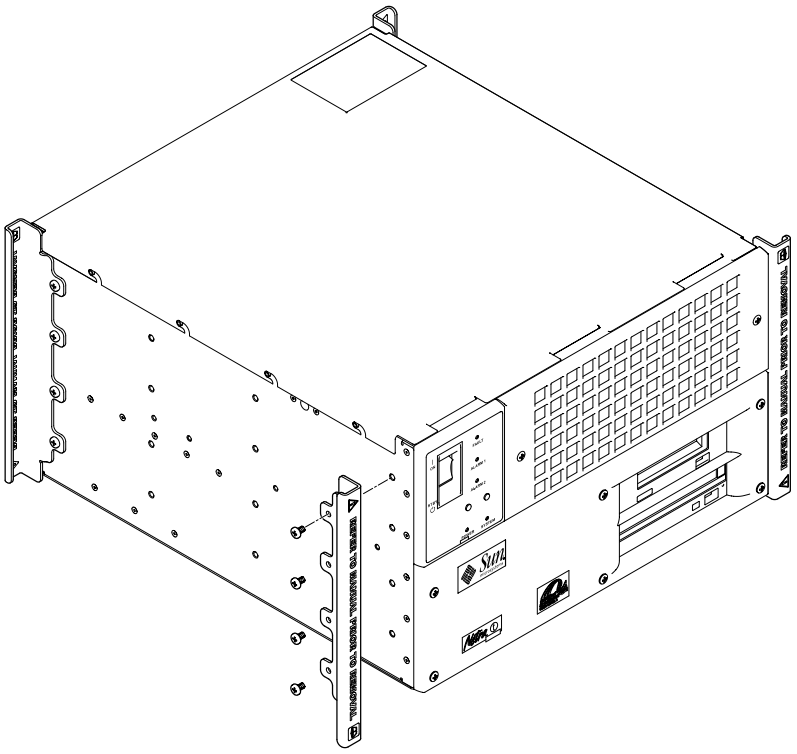
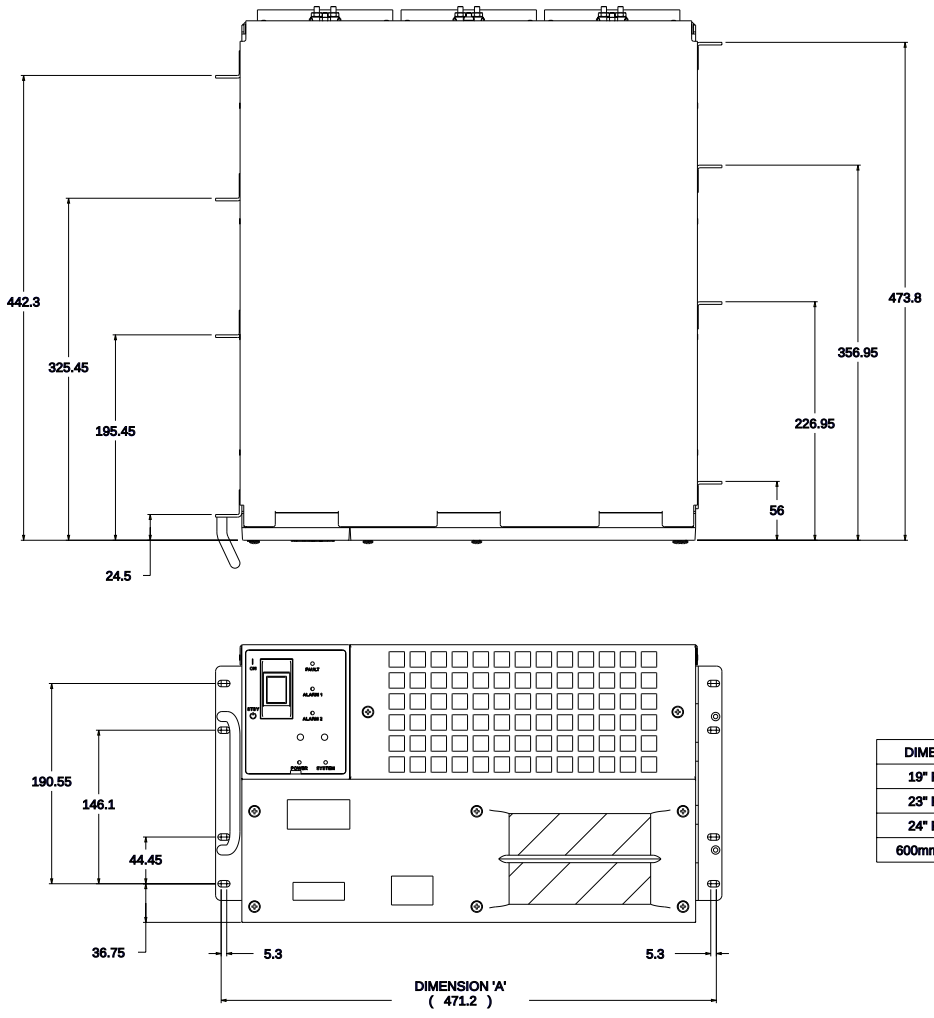


FIGURE 2-2 Sacrificial Shipping Plates

Note – Please retain the plates and system packaging for future use.

Mounting Flanges

The Netra t 1400/1405 chassis has been designed for a wide variety of mounting options and rack sizes. One set of 19-inch flanges (four) and handles (two) is included with each system. Mounting flanges to suit 23-inch, 24-inch or 600-mm nominal frame widths can be ordered as required:



DIMENSION 'A'	
19" FLANGES	471.2
23" FLANGES	572.1
24" FLANGES	596.6
600mm FLANGES	519

FIGURE 2-3 Netra t 1400/1405 Flange Options and Dimensions

Optional Components

TABLE 2-1 Optional Mounting Flange Kits

Mounting Option	Part Number
19-inch configuration	X7071A
23-inch configuration	X7072A
24-inch configuration	X7073A
600-mm configuration	X7074A

Select the mounting position most suitable for the rack type (see FIGURE 2-3). There are four fixing locations provided on a Netra t 1400 / 1405; one at the front, two in the centre and one at the rear. If the front location is required, first ensure that, if fitted, the sacrificial shipping plates have been removed (see FIGURE 2-2 on page 7). Where possible, the four sacrificial shipping plates should only be removed *after* mounting the system in a rack.

Fit the mounting flanges in the selected position using the four M5 countersunk screws per flange provided with the mounting kit and a Phillips No. 1 screwdriver. If required, you can fit the supplied handles to the mounting flanges before fitting flanges to the system or, alternatively, fit them to the mounted flanges.

FIGURE 2-4 on page 10 shows how to connect the Flange Mount assembly to the Netra t 1400 / 1405 system.

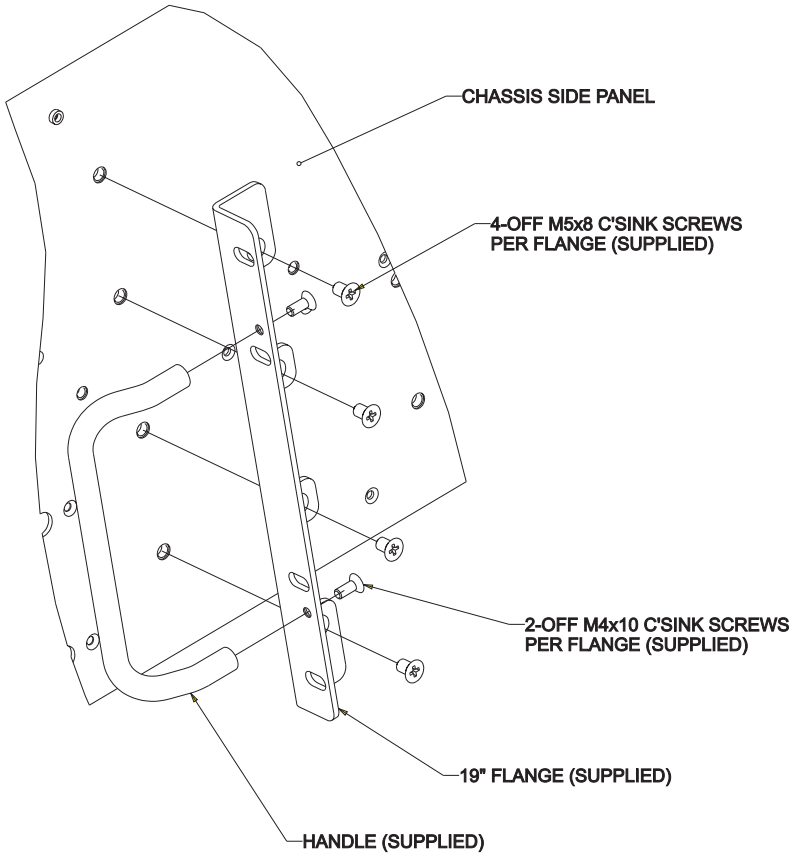


FIGURE 2-4 Flange Mount Assembly

The chassis must be secured within the rack frame using screws suitable for the equipment frame. They must be a minimum size of M5 (10/32) depending on the frame requirement. All screws must be fitted; there are positions provided for a total of 16 screws (four per flange). The recommended tightening torque value for M5 recess head screws is 4.0 Nm (3.0 lbf-ft).

Caution – For flange mounted installations, always fit four flanges.

CHAPTER 3

Installing the Electrical Supply

This chapter provides information about electrical supply installation.

Note – All supply connections, wiring, wire protection, and wire routing must be made in accordance with applicable sections and requirements of national electrical code and local electrical authorities.

System Switch

Caution – The system switch does not isolate the equipment.

The system switch of the Netra t 1400/1405 system functions as a standby device enabling and disabling the power module outputs. The system switch is a rocker, momentary switch.

The system does not contain any integral circuit breakers. The system can be isolated from the power only by using external circuit breakers.

1400

All connections must be broken to isolate the system. To isolate the system, open all external circuit breakers.

Note – The ON/STBY switch handles low voltage signals only; the high-power circuits do not pass through this switch.

Connectors

1400

The Netra t 1400 has a pair of 3-position Wago connectors per power supply. The mating connectors are specified in the section “DC Source Site Requirements” on page 12.

1405

The Netra t 1405 has an IEC 320 appliance coupler for connection to mains power. The mating connectors are specified in the section “AC Source Site Requirements” on page 23.

1400

DC Source Site Requirements

TABLE 3-1 DC Power Requirements[1]

Electrical Element	Requirement
Voltage	-48VDC / -60VDC
Max. operating current	10A @ -48VDC / 12 @ -60VDC
Max. inrush current	24A @ -48VDC / 30A @ -60VDC

1. The DC power supply range is -40 VDC to -75 VDC.

The DC source must be:

- –48VDC or –60VDC nominal centralized DC power system
- Electrically isolated from any AC power source
- Reliably connected to earth (that is, the battery room positive bus is connected to the grounding electrode)
- Rated for a minimum of 15A per feed pair

Note – The Netra t 1400 must be installed in a *restricted access location*. Per the intent of the National Electrical Code, a restricted access location is an area intended for qualified or trained personnel only and has access controlled by a locking mechanism, such as a key lock or an access card system.

Overcurrent Protection Requirements

- Overcurrent protection devices must be provided as part of each host equipment rack.
- Two 15 A single-pole, fast trip, DC-rated circuit breakers (one per ungrounded supply conductor) must be located in the negative supply conductor between the DC power source and the Netra t 1400 system.
- Circuit breakers must not trip when presented with inrush current of 20 A lasting 250 ms.

Note – Overcurrent devices must meet applicable national and local electrical safety codes and be approved for the intended application.

Connection Materials

Grounding

- One Thomas & Betts two-hole lug (part number: 54204-UB) suitable for 8 AWG conductor or UL / CSA approved equivalent having 5 / 8-inch pitch. Torque value: 3.5 Nm maximum. Two M5 studs and cupwasher nuts are supplied on the rear of the chassis for connection.
- A Thomas & Betts crimping tool (part number: TBM 5-S), or approved equivalent is required to secure the lug on to the cable.
- An earthing bus bar that is near the equipment and easily accessible.

Caution – External filtering and / or surge suppression devices may be required on the power feeds where branch circuit electromagnetic characteristics are unknown.

DC Supply and Ground Conductor

The requirements are:

- Suitable conductor material: tinned copper only
- Conductors: 12 AWG maximum (between the Netra t 1400 and circuit breaker). There are three conductors:
  - -48VDC / -60VDC Supply (pin 1)
  - Ground connection to power supply (pin 2)
  - -48VDC / -60VDC Return (pin 3)

- System ground conductor: 8 AWG
- Cable insulation rating: minimum 75˚C, low smoke fume (LSF), flame retardant
- Cable must conform to GR63CORE fire resistance requirements
- Branch circuit cable insulation color: per applicable National Electrical Codes
- Grounding cable insulation color: green / yellow

Power and Grounding Connections

The following DC connection materials are provided in the DC input connector kit:

- Six Wago DC input connectors
- Six Wago strain relief housings
- One cage clamp operating lever
- Six wire ties

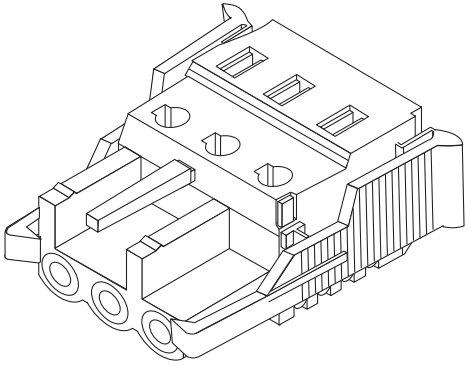


FIGURE 3-1 DC input connector

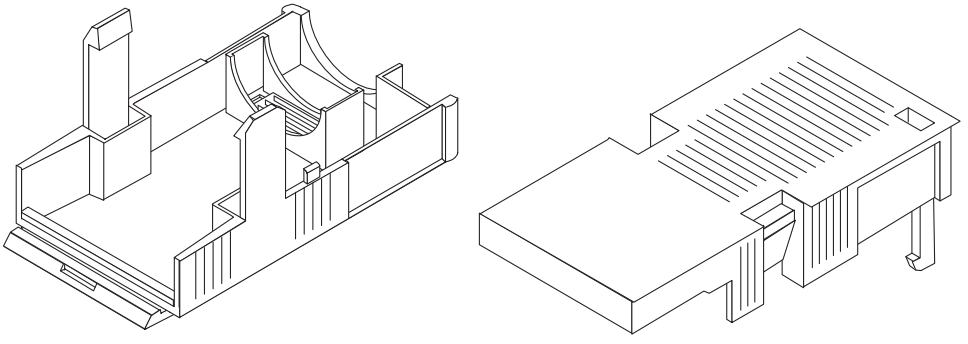


FIGURE 3-2 Strain Relief Housings

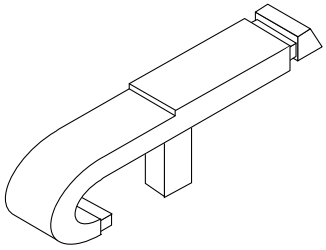


FIGURE 3-3 Cage Clamp Operating Lever

The following figure shows the power connector on the DC power supply on your system.

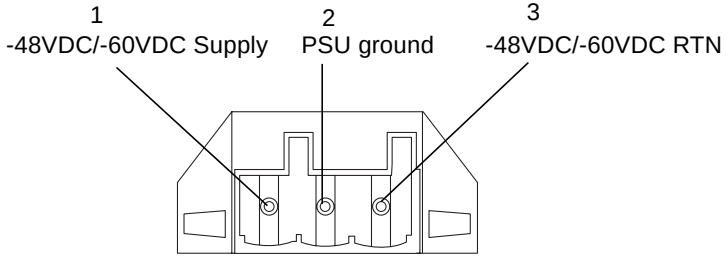


FIGURE 3-4 Power Connector on the DC Power Supply

▼ To Wire the DC Input Power Connector

1. **Turn off power to the DC power source by opening the circuit breakers.**

Caution – Do *not* proceed with these instructions until you have turned off the power to the DC power source through the circuit breakers.

2. **Strip 8mm (0.31 inches) of insulation from each of the wires to be fitted to the connector.**

   Do not strip more than 8mm (0.31in.) from each wire. Doing so will leave uninsulated wire exposed from the DC input connector after the assembly is complete.

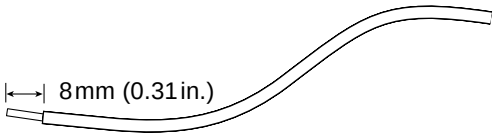


FIGURE 3-5 Stripping the Insulation From the Wire

3. **Using a DC connector from the kit, insert the tip of a cage clamp operating lever into the rectangular hole directly above the hole in the DC connector where you want to insert the first wire and press down on the cage clamp operating lever.**

   This opens the cage clamp for this section of the DC input connector.

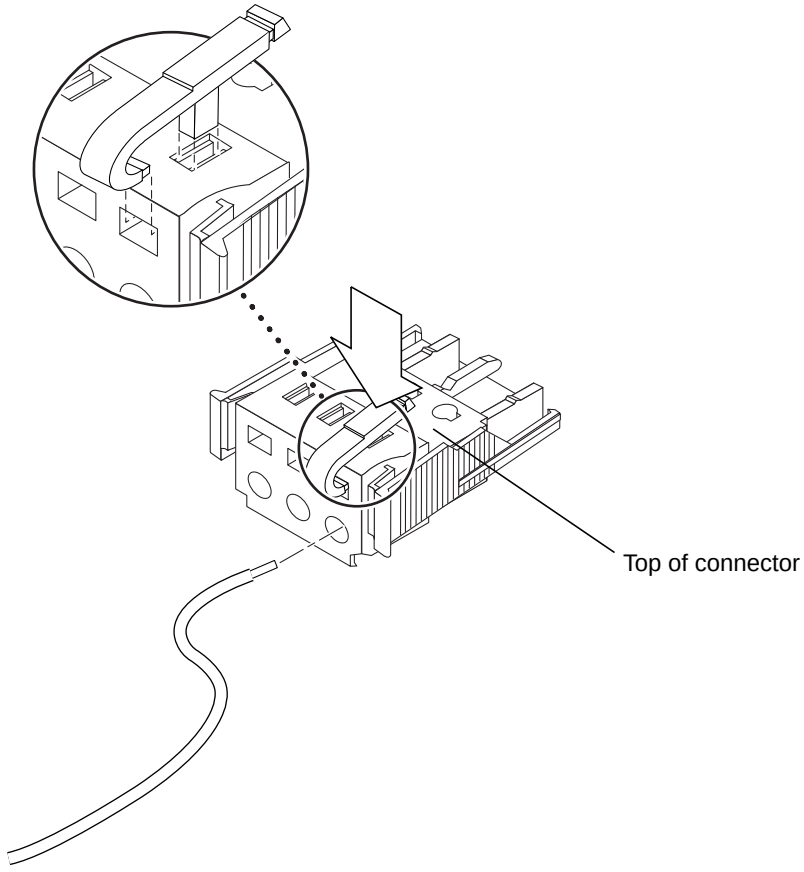


FIGURE 3-6 Opening the DC Connector Cage Clamp Using the Cage Clamp Operating Lever

You can also open the DC connector cage clamp by inserting a small slotted screwdriver into the rectangular hole directly above the hole in the DC connector where you want to insert the first wire and pressing down on the screwdriver.

4. **Feed the stripped end of each wire into the appropriate hole in the DC input connector.**

   FIGURE 3-7 shows which wires should be inserted into each hole in the DC input connector.

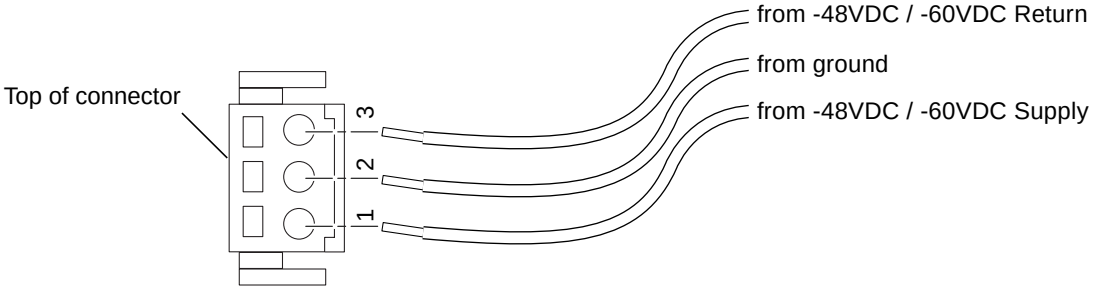


FIGURE 3-7 Assembling the DC Input Power Cable

5. **Repeat Step 3 and Step 4 for the other two wires to complete the assembly of the DC input power cable.**

6. **If you are not using the optional strain relief housing, secure the wires together with a wire tie.**

7. **Repeat Step 2 through Step 6 to wire the other five DC input power connectors.**

   Note that you will require a separate DC power source for each DC input.

   If you need to remove a wire from the DC input connector, insert the cage clamp operating lever or a small screwdriver into the slot directly above the wire to free the wire from the cage clamp, and press down (FIGURE 3-6).

▼ To Install the Optional Strain Relief Housings

1. **Take the DC input connector and insert the bottom portion of the strain relief housing into the notch on the DC input connector until it snaps into place.**

   Make sure the strain relief housing snaps into place on the DC input connector; you will not be able to complete the assembly correctly if the strain relief housing is not snapped into place.

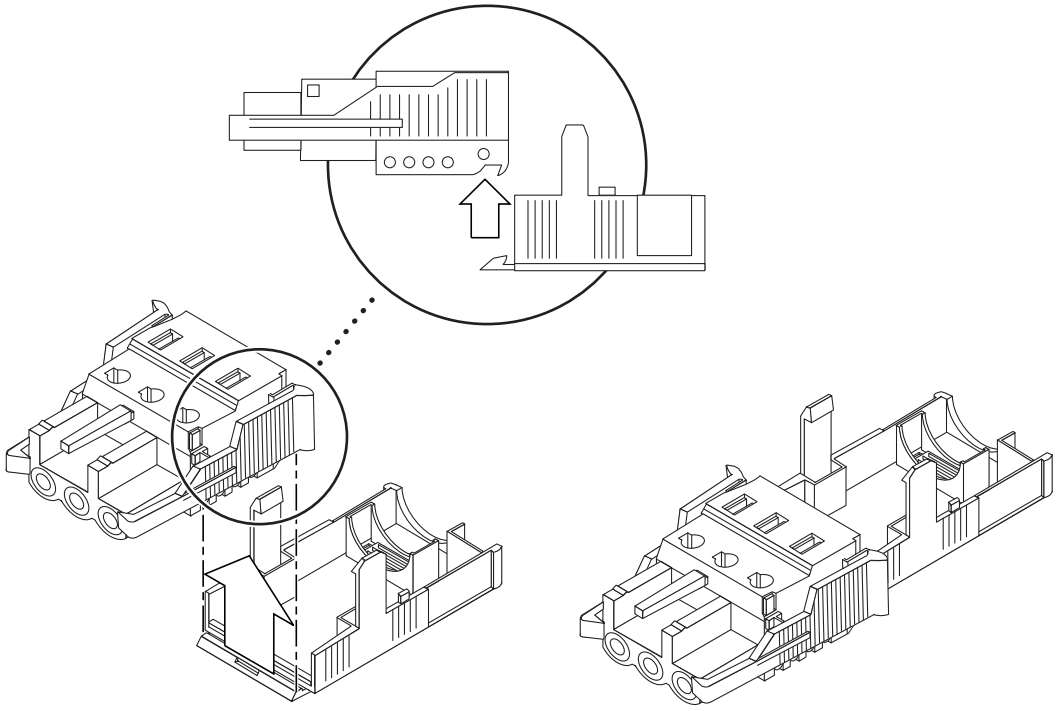


FIGURE 3-8 Inserting the Bottom Portion of the Strain Relief Housing

2. **Route the three wires coming from the DC power source through the opening at the end of the bottom portion of the strain relief housing.**

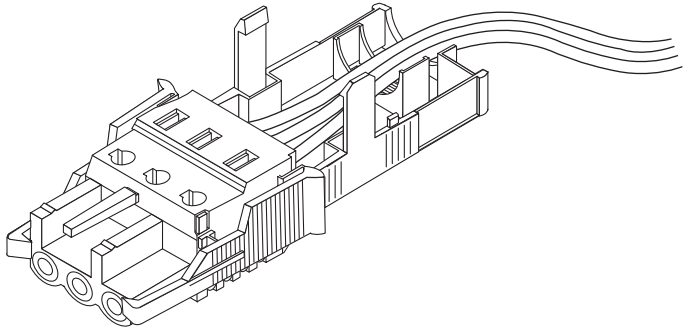


FIGURE 3-9 Routing the Wires Out of the Bottom Portion of the Strain Relief Housing

3. **Insert the wire tie into the bottom portion of the strain relief housing.**

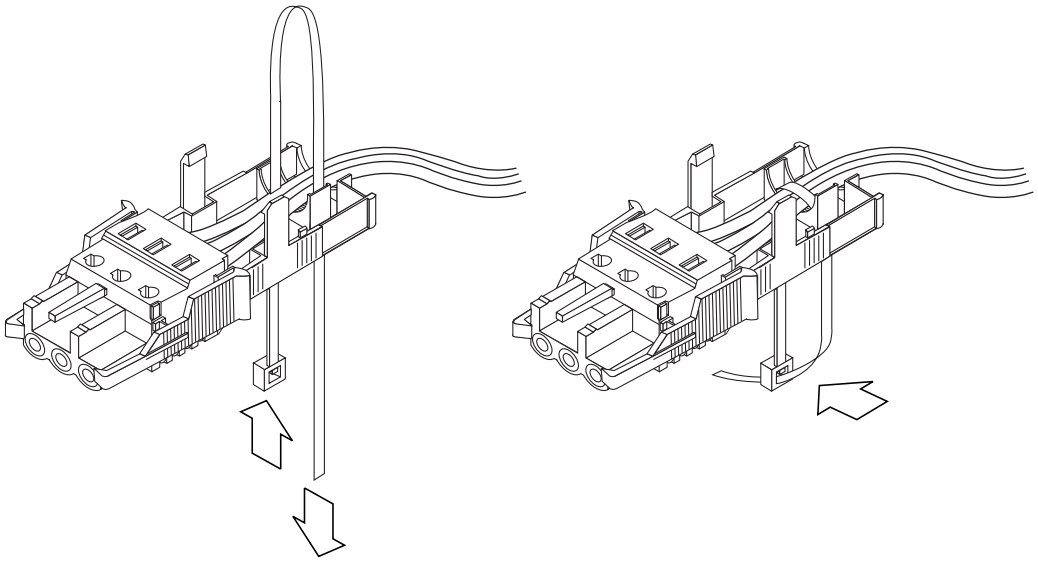


FIGURE 3-10 Securing the Wires to the Strain Relief Housing

4. **Loop the wire tie over the wires and back out of the strain relief housing, then tighten the wire tie to secure the wires to the strain relief housing (**FIGURE 3-10**).**

5. **Lower the three prongs on the top portion of the strain relief housing into the openings in the DC input connector, then push the top portion and bottom portion of the strain relief housing together until they snap into place.**

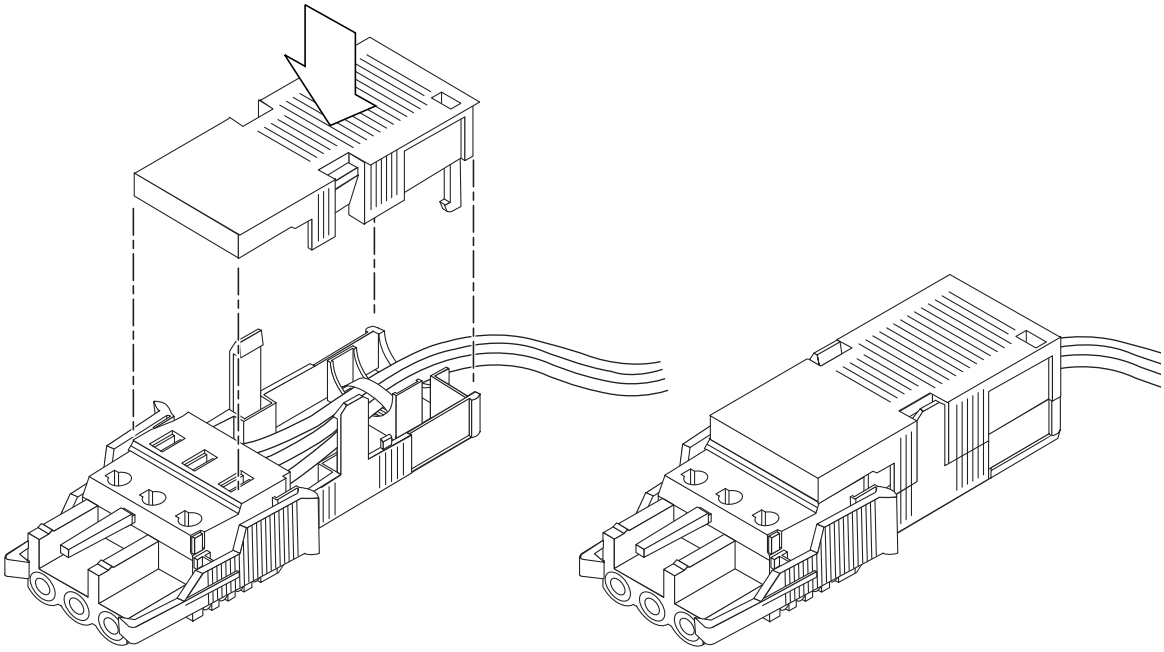


FIGURE 3-11 Assembling the Strain Relief Housing

The DC input power cables for your system are now completely assembled. FIGURE 3-12 shows how the DC input power cable will connect to the DC inlet connector.

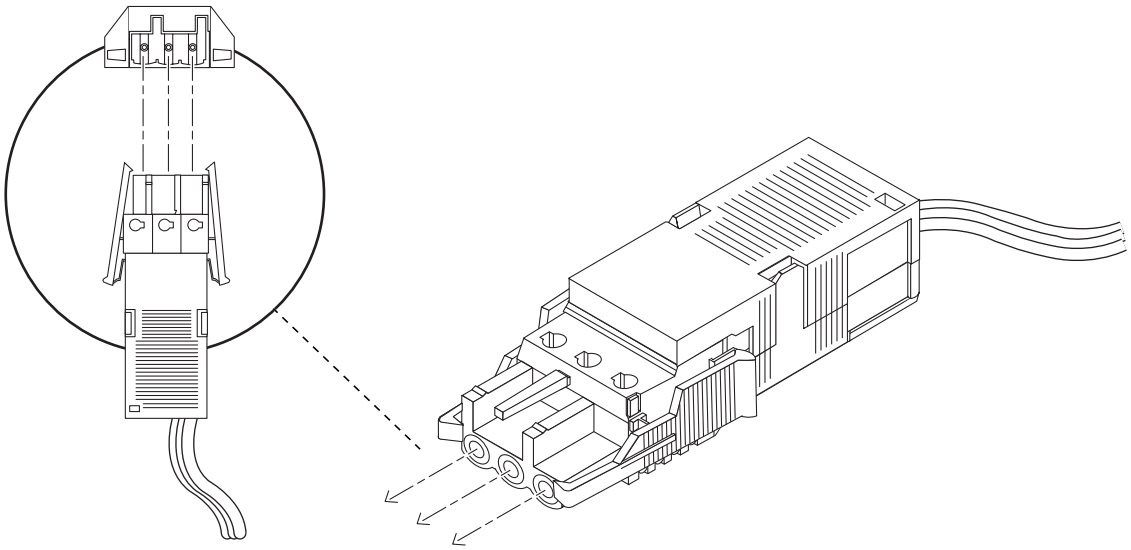


FIGURE 3-12 Connecting the DC Power Cable to the Netra DC Power Supply

1405

AC Source Site Requirements

Note – As part of the installation, overcurrent devices meeting applicable national and local electrical safety codes shall be provided.

The disconnect device for servicing is defined as any one of the following:

- The appliance inlet on the rear of the system
- The circuit breakers in the rack in which the system is mounted
- The mains plug

It must be ensured that these remain accessible after installation.

Caution – External filtering and/or surge suppression devices may be required on the power feeds where branch circuit electromagnetic characteristics are unknown.

Chassis Enclosure Grounding

- One Thomas & Betts two-hole lug (part number: 54204-UB) suitable for 8 AWG conductor or UL/CSA approved equivalent having 5/8-inch pitch. Torque value: 3.5 Nm maximum. Two M5 studs and cupwasher nuts are supplied on the rear of the chassis for connection.
- A Thomas & Betts crimping tool (part number: TBM 5-S), or approved equivalent is required to secure the lug on to the cable.
- An earthing bus bar that is near the equipment and easily accessible.

The safety earth path is established by the connection of the grounding conductor within the AC power cord to a *reliably* earthed socket outlet located near the equipment.

▼ To Power On the System

1400

1. **Prior to powering on, inspect the supply conductors for correct polarity and mechanical security.**
2. **Activate the external circuit breaker(s).**
3. **Set the front panel ON/STBY system switch to the ON | position and hold it until the system starts to power up.**

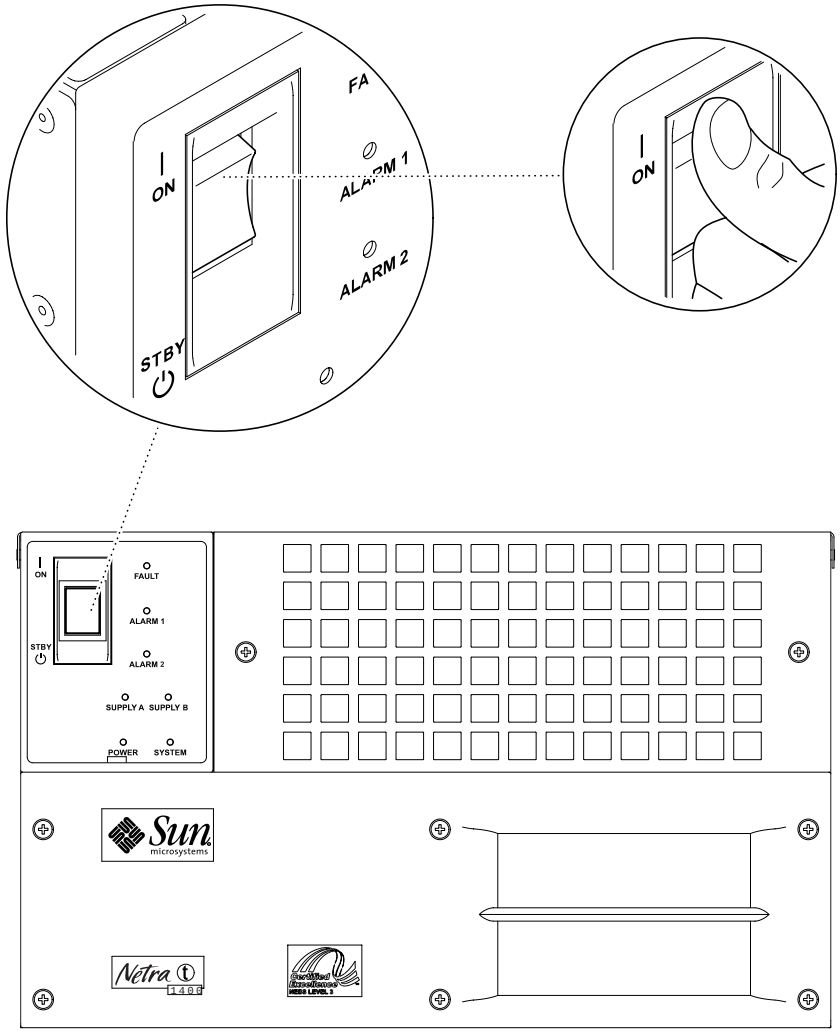


FIGURE 3-13 System Power-On (Front Panel)

▼ To Power Off the System

Caution – Prior to turning off system power, exit from the operating system. Failure to do so may result in data loss.

1. **Where necessary, notify the users that the system is going down.**
2. **Back up system files and data.**
3. **Halt the operating system.**
4. **Continue with step a. or b., as appropriate.**
   a. **Set the ON/STBY switch at the front of the system cabinet to the STBY position and release it immediately to initiate a clean shut down followed by a power off.**
   b. **Set the ON/STBY switch at the front of the system cabinet to the STBY position and hold it for five seconds to shut the system down immediately.**
5. **Verify that the System LED is off.**
6. **Disconnect the AC or DC power connector(s) from the rear of the system, or open the external circuit breaker(s).**
7. **Verify that the Power LED is off.**

Caution – Regardless of the position of the ON/STBY switch, where an AC power cord remains connected to the system, potentially dangerous voltages are always present within the power supply.

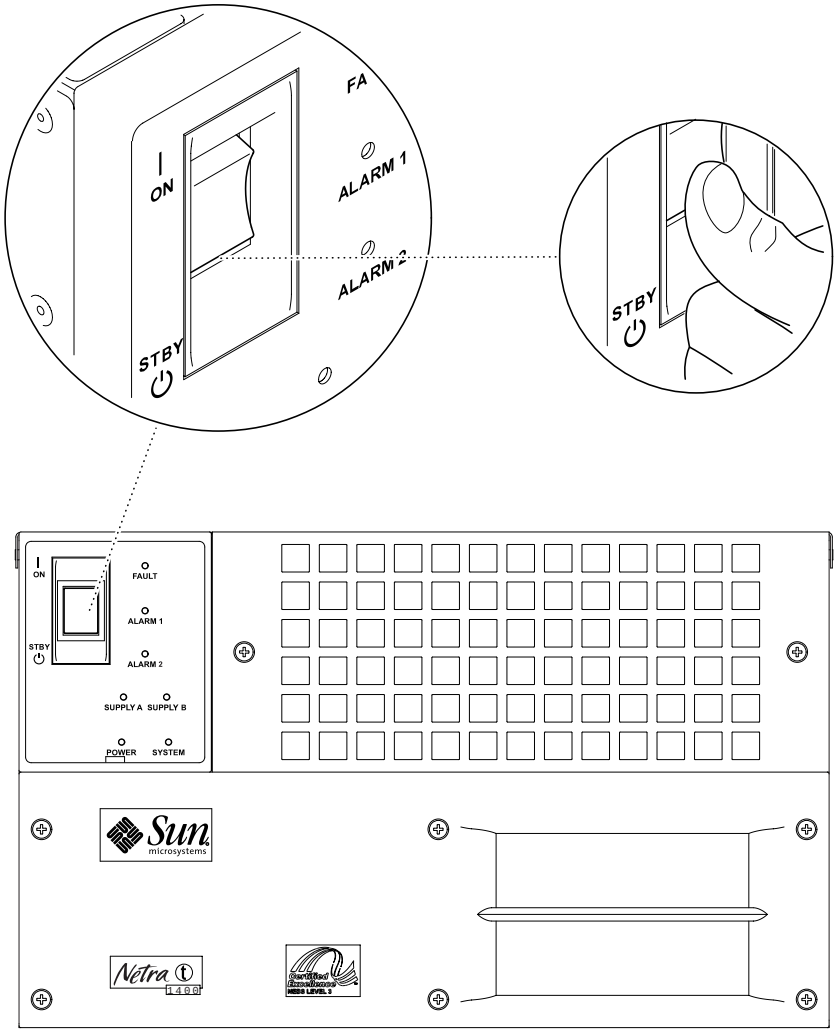


FIGURE 3-14 System Power-off (Front Panel)

CHAPTER 4

External I/O Connections

This chapter provides information about external I/O connections.

Connector Layout

FIGURE 4-1 shows the locations of the Netra t 1400/1405 system back panel connectors.

Note – The figure shows the Netra t 1405. However, the layout of the connectors is identical on the Netra t 1400.

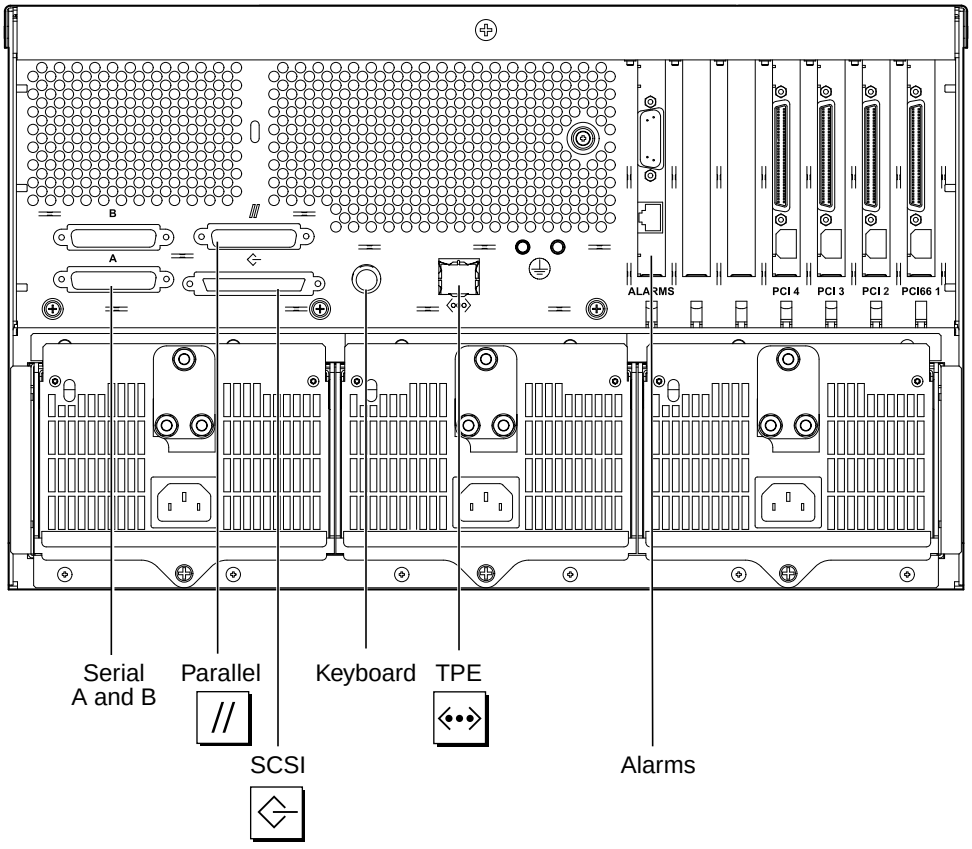


FIGURE 4-1 Back Panel Connectors

Parallel Interface

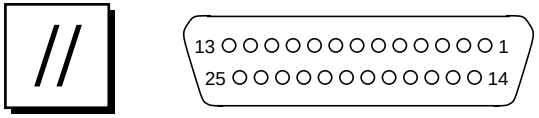


FIGURE 4-2 DB-25 Parallel Connector

TABLE 4-1 Parallel Connector Pinout

Pin	Signal Name	I/O	Service
1	DATA_STROBE_L		Data Strobe (actibe LOW)
2	DAT(0)		Data Bit 0
3	DAT(1)		Data Bit 1
4	DAT(2)		Data Bit 2
5	DAT(3)		Data Bit 3
6	DAT(4)		Data Bit 4
7	DAT(5)		Data Bit 5
8	DAT(6)		Data Bit 6
9	DAT(7)		Data Bit 7
10	ACK_L		Acknowledge (active LOW)
11	BSY		Busy (active HIGH)
12	PERROR		Paper End (active HIGH)
13	SELECT_L		Select (active ???)
14	AFXN_L		Auto Line Feed (active LOW)
15	ERROR_L		Error (active LOW)
16	RESET_L		Initialize Printer (prime active LOW)
17	IN_L		Select Input (active LOW)
18	GND		Ground
19	GND		Ground
20	GND		Ground
21	GND		Ground

TABLE 4-1 Parallel Connector Pinout *(Continued)*

Pin	Signal Name	I/O	Service
22	GND		Ground
23	GND		Ground
24	GND		Ground
25	GND		Ground

Serial Connectors

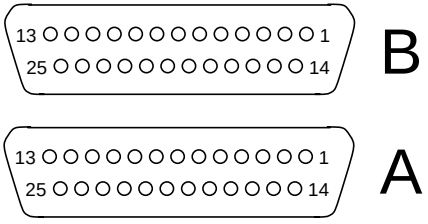


FIGURE 4-3 DB-25 Serial Connectors

TABLE 4-2 Serial Connector Pinout, RS423/RS232

Pin	Function	I/O	Signal Description
1	none	none	Not connected
2	TxD	O	Transmit Data
3	RxD	I	Receive Data
4	RTS	O	Ready To Send
5	CTS	I	Clear To Send
6	DSR	I	Data Set Ready
7	Gnd		Signal Ground
8	DCD	I	Data Carrier Detect
9–14	none	none	Not connected
15	TRxC	I	Transmit Clock
16	none	none	Not connected
17	RTxC	I	Receive Clock

TABLE 4-2 Serial Connector Pinout, RS423/RS232 *(Continued)*

Pin	Function	I/O	Signal Description
18–19	none	none	Not connected
20	DTR	O	Data Terminal Ready
21-23	none	none	Not connected
24	TxC	O	Transmit Clock
25	none	none	Not connected

Note: For information about serial port jumpers on the Netra t 1400/1405 system main logic board, see the *Netra t 1400/1405 System Reference Manual.*

Twisted-Pair Ethernet (TPE) Connector

FIGURE 4-4 RJ45 TPE Socket

TABLE 4-3 TPE Connector Pinout

Pin	Description	Pin	Description
1	Transmit Data +	5	Common Mode Termination
2	Transmit Data –	6	Receive Data –
3	Receive Data +	7	Common Mode Termination
4	Common Mode Termination	8	Common Mode Termination

TPE Cable-Type Connectivity

The following types of twisted-pair Ethernet cable can be connected to the 8-pin TPE connector:

- For 10BASE-T applications, shielded twisted-pair (STP) cable:
  - Category 3 (STP-3, *voice* grade)
  - Category 4 (STP-4)
  - Category 5 (STP-5, *data* grade)
- For 100BASE-T applications, shielded twisted-pair category 5 (STP-5, *data* grade) cable.

TABLE 4-4 TPE STP-5 Cable Lengths

Cable Type	Application(s)	Max Length (Metric)	Max Length (Imperial)
Shielded twisted pair category 5 (STP-5, *data* grade)	10BASE-T	1000 m	3282 ft
Shielded twisted pair category 5 (STP-5, *data* grade)	100BASE-T	100 m	327 ft

SCSI Connector

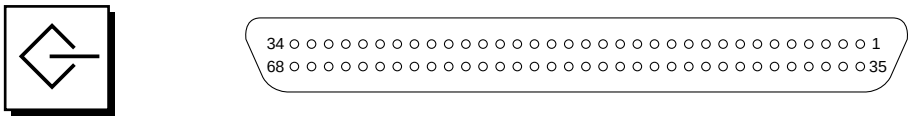


FIGURE 4-5 68-Pin SCSI Connector

TABLE 4-5 68-Pin SCSI Connector Pinout

Pin	Signal Name	Pin	Signal Name
1	GND	21	GND
2	GND	22	GND
3	GND	23	GND
4	GND	24	GND
5	GND	25	GND
6	GND	26	GND
7	GND	27	GND
8	GND	28	GND
9	GND	29	GND
10	GND	30	GND
11	GND	31	GND
12	GND	32	GND
13	GND	33	GND
14	GND	34	GND

TABLE 4-5 68-Pin SCSI Connector Pinout *(Continued)*

Pin	Signal Name	Pin	Signal Name
15	GND	35	–DB<12>
16	GND	36	–DB<13>
17	TERMPWR	37	–DB<14>
18	TERMPWR	38	–DB<15>
19	Not connected	39	–PAR<1>
20	GND	40	–DB<0>
41	–DB<1>	55	–ATN
42	–DB<2>	56	GND
43	–DB<3>	57	–BSY
44	–DB<4>	58	–ACK
45	–DB<5>	59	–RST
46	–DB<6>	60	–MSG
47	–DB<7>	61	–SEL
48	–PAR<0>	62	–CD
49	GND	63	–REQ
50	TERM.DIS	64	–IO
51	TERMPWR	65	–DB<8>
52	TERMPWR	66	–DB<9>
53	Reserved	67	–DB<10>
54	GND	68	–DB<11>

Note – All signals shown in TABLE 4-5 on page 32 are active low.

SCSI Implementation

- SCSI-3 Fast-20 (UltraSCSI) parallel interface
- 16-bit SCSI bus
- 40Mbps data transfer rate
- Support for 16 SCSI addresses:
  - Target 0 to 6 and 8 to F for devices
  - Target 7 reserved for SCSI host adapter on main logic board

- Support for up to seven internal SCSI devices (including the host adapter):
  - Fast-20 SCSI disk drive target 0 (left-most drive slot)
  - Fast-20 SCSI disk drive target 1
  - Fast-20 SCSI disk drive target 2
  - Fast-20 SCSI disk drive target 3 (right-most drive slot)
  - Fast-10 SCSI removable media device target 4
  - Fast-10 SCSI removable media device target 6
- Support for external 8-bit and 16-bit SCSI devices via 68-pin SCSI connector mounted on an adapter board

SCSI Cabling and Configuration

The SCSI-3 Fast-20 (UltraSCSI) specification requires that the external SCSI bus length be limited to 3m (10ft) for less than five devices (internal and external), and 1.5m (5ft) for five to eight devices. When SCSI-3 and SCSI-2 devices are connected to the Netra t 1400/1405 system SCSI bus, the system enables each device to operate at its respective data transfer rate. The last external SCSI device in a daisy-chain must be terminated internally (active termination) or with an external terminator according to Forced-Perfect Termination (FPT) technology.

SCSI Cabling Procedure

1. **Count the number of SCSI devices on the system SCSI bus. Be sure to count the host adapter as a SCSI device.**
2. **Determine the total SCSI bus length.**

TABLE 4-6 Determining SCSI Bus Length

SCSI Implementation	Bus Width	DataTransfer Rate, Mb/s	Number of Devices	SCSI Bus Length
SCSI-2, Fast	8 bits	10	1–8	6.0m
SCSI-2, Fast/Wide	16 bits	20	1–8	6.0m
SCSI-3 Parallel Interface, Fast-20 Wide (UltraSCSI) (WideUltra)	16 bits	40	1–4	3.0m
SCSI-3 Parallel Interface, Fast-20 Wide (UltraSCSI) (WideUltra)	16 bits	40	5–8*	1.5m

* The maximum number of single-ended / differential SCSI devices is 16.

3. **Verify the cable type used to connect external SCSI devices. You must use Fast-20 SCSI cable(s).**

   Ensure that the total SCSI cable length does not exceed the permissible total SCSI bus length.

SCSI-2 (Fast Wide SCSI) External Devices

If you connect SCSI-2 (Fast Wide SCSI, 20 Mbyte data transfer rate) external devices to a Netra t 1400/1405 system, follow these cabling and configuration guidelines (as shown in FIGURE 4-6) to ensure proper device addressing and operation:

- If all external mass storage devices use 68-pin connectors, connect all non-Sun devices to the Netra t 1400/1405 system first and follow them with Sun devices. Sun devices use auto-termination.
- If external mass storage devices consist of 68-pin Sun devices and 50-pin devices, connect the Sun 68-pin devices to the Netra t 1400/1405 system first and terminate the daisy chain with the 50-pin device and its terminator.
- The total SCSI bus length for all external SCSI devices is 6.0m (19.7ft).

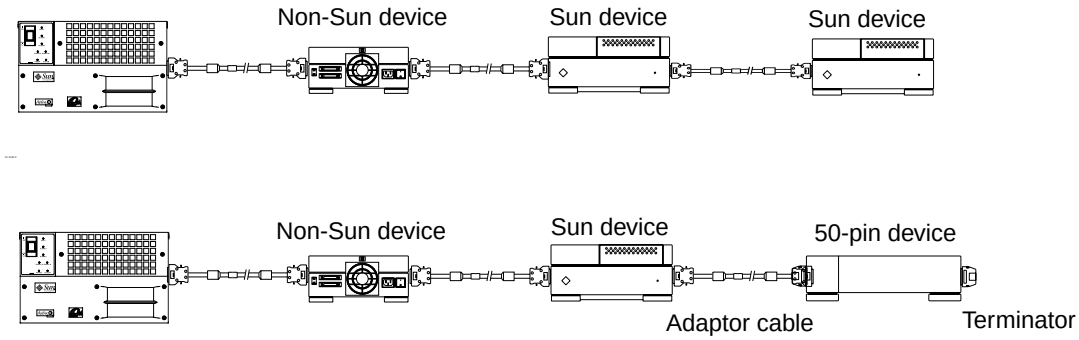


FIGURE 4-6 Connecting External Mass Storage Devices

Alarms Ports

The alarms service port connector is located on the alarms card. This connector is a male DB-15 and TABLE 4-7 lists each connector pin assignment.

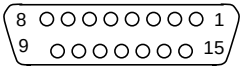


FIGURE 4-7 DB-15 (Male) Alarms Service Port Connector

TABLE 4-7 Alarms Service Port Connector Pinout

Pin	Signal Name	Pin	Signal Name
1	Not connected	9	ALARM1_NC
2	Not connected	10	ALARM1_COM
3	Not connected	11	ALARM2_NO
4	Not connected	12	ALARM2_NC
5	ALARM3_NO	13	ALARM2_COM
6	ALARM3_NC	14	Not connected
7	ALARM3_COM	15	Not connected
8	ALARM1_NO	Shell	CHGND

The remote Lights Out Management serial port is located below the alarms port. The connector is a shielded RJ45 and TABLE 4-8 lists the connector pin assignments.

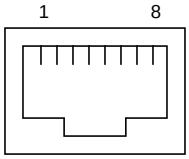


FIGURE 4-8 RJ45 Lights Out Management Serial Connector

TABLE 4-8 Lights Out Management Serial Connector Pinout

Pin	Signal Name	Pin	Signal Name
1	RTS	5	REF (0V)
2	DTR	6	RXD
3	TXD	7	DSR
4	REF (0V)	8	CTS
Shell	CHGND		

CHAPTER 5

Installing the Alarms Software

This chapter describes the procedure for installing a Netra t 1400/1405 LOMlite alarms software release. In order to do this you should be familiar with the Solaris operating environment. Procedures for local and network installation are provided.

The release software consists of a CD-ROM containing the following packages:

`SUNWlomm`, `SUNWlomr`, `SUNWlomu`

`SUNWtsvts`, `SUNWtsvtx`

Local Installation

To perform a local installation, your Netra t 1400/1405 must be equipped with a CD-ROM drive.

▼ Installation Procedure

1. **Log on as root.**
2. **Insert the Lights Out Management release CD-ROM in the drive.**
3. **Add the packages to the system:**

```
% pkgadd -d /cdrom/cdrom0/Product SUNWlom*
```

4. **Verify that the packages have been installed successfully.**

```
% pkgchk -v SUNWlom[m|r|u]
```

▼ Network Installation Procedure

To perform a network installation, your server must be equipped with a CD-ROM drive.

▼ Installation Procedure

1. **Log on to the server as root.**
2. **Insert the Lights Out Management release CD-ROM in the drive.**
3. **Create a directory in** `/export`**.**

   For example:

```
% mkdir /export/lom_software
```

Note – The directory `/export` should be visible to the machines on the network.

4. **Copy the contents of the Lights Out Management CD-ROM into the new directory.**

   For example:

```
% cp -r /cdrom/cdrom0/* /export/lom_software
```

5. **On the client, mount the lom_software directory on a suitable directory:**

```
% mount -F nfs -o ro <server name>:/export/lom_software /mnt
```

6. **Add the packages to the system:**

```
% pkgadd -d /mnt/Product SUNWlom*
```

7. **Verify that the packages have been installed successfully:**

```
% pkgchk -v SUNWlom[m|r|u]
```

SunVTS Software

Note – You must install the SunVTS software, SUNWvts and SUNWvtstk, before installing the Netra t 1400/1405 vts files. For 64-bit support, you must also install the SUNWvtsx and SUNWvtstx packages.

▼ Installation Procedure

1. **Install the SunVTS software according to the instructions given in the appropriate** *SunVTS User's Guide***.**
2. **Log on as root.**
3. **Insert the Lights Out Management CD-ROM in the drive.**
4. **Add the packages to the system:**

```
% pkgadd -d /cdrom/cdrom0/Product SUNWtsvts
```

5. **If 64-bit support is required add the additional packages:**

```
% pkgadd -d /cdrom/cdrom0/Product SUNWtsvtx
```

6. **Verify that the packages have been installed successfully:**

```
% pkgchk -v SUNWtsvt[s|x]
```

CHAPTER 6

Replacing the Air Filter

To maintain adequate airflow, regularly inspect and, if necessary, clean or replace the air filter. A Phillips No. 1 screwdriver is required for this task.

▼ To Replace the Air Filter

1. **Remove the upper (fan) front cover of the Netra t 1400/1405 system by turning the two quarter-turn screws anti-clockwise through 90˚, lift off the cover and remove it from the immediate vicinity of the system.**

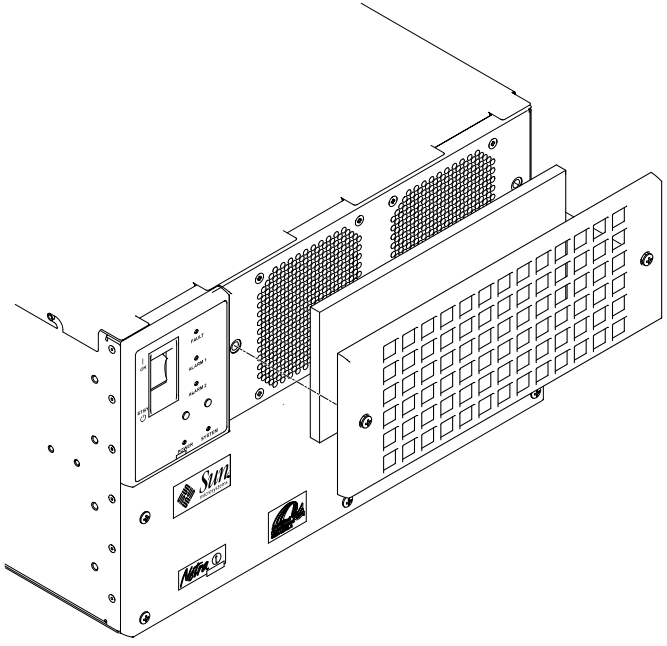


FIGURE 6-1 Replacing the Air Filter

2. **Remove the existing air filter and replace it with the new filter (part number X7075A). Ensure that the edges of the filter are tucked under the filter retainers.**

3. **Replace the upper front cover of the system and secure it in place by turning the two catches quarter-turn screws clockwise through 90˚.**

PART II User Guide

CHAPTER 7

LEDs and Controls

This chapter describes the LEDs and the procedure for powering the system on and off.

LEDs

The LEDs on the front of the Netra t 1400/1405 indicate the current status of the system.

Note – The System, Alarm and Fault LEDs can also be forced on or off by a LOM command.

Netra t 1400

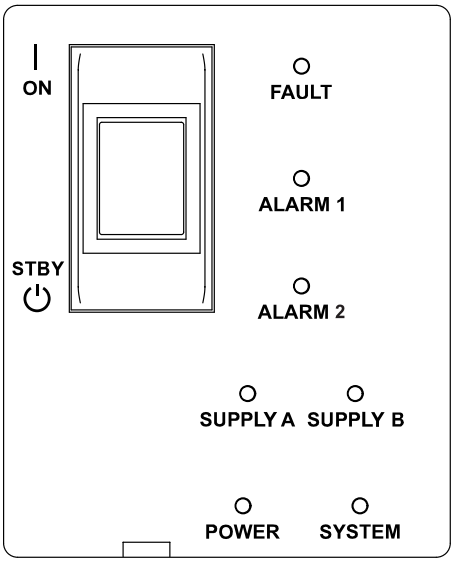


FIGURE 7-1 Netra t 1400 System LEDs

TABLE 7-1 Netra t 1400 System LED Functions

POWER	Green	Illuminated at all times when the system is on
SUPPLY A	Green	Illuminated whenever DC input A is present on all fitted PSUs
SUPPLY B	Green	Illuminated whenever DC input B is present on all fitted PSUs
SYSTEM	Green	Off (or reset) during power up procedures Illuminated whenever UNIX is running and the alarms driver is installed This LED is reset by a hardware watchdog timeout, or whenever the user-defined Alarm 3 is asserted.
ALARM 1	Amber	Illuminated whenever the user-defined Alarm 1 is asserted
ALARM 2	Amber	Illuminated whenever the user-defined Alarm 2 is asserted
FAULT	Amber	Flashes when a fan or PSU has failed Illuminated continuously when the ASR watchdog has timed out or when it is manually switched on

Netra t 1405

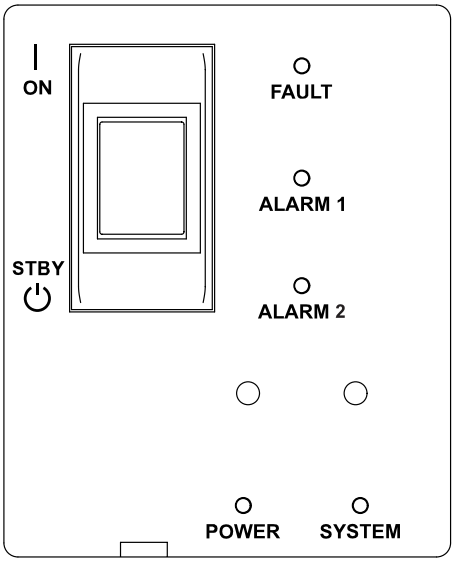


FIGURE 7-2 Netra t 1405 System LEDs

TABLE 7-2 Netra t 1405 System LED Functions

POWER	Green	Illuminated at all times when the system is on
SYSTEM	Green	Off (or reset) during power up procedures Illuminated whenever UNIX is running and the alarms driver is installed This LED is reset by a hardware watchdog timeout, or whenever the user-defined Alarm 3 is asserted.
ALARM 1	Amber	Illuminated whenever the user-defined Alarm 1 is asserted
ALARM 2	Amber	Illuminated whenever the user-defined Alarm 2 is asserted
FAULT	Amber	Flashes when a fan or PSU has failed Illuminated continuously when the ASR watchdog has timed out or when it is manually switched on

System ON/STBY Switch

The system switch of the Netra t 1400/1405 is a rocker, momentary switch which functions as a standby device only, controlling logic circuits which enable power module output.

▼ To Power On the System

1400
1405

1. **Prior to powering on, inspect the supply conductors for correct polarity and mechanical security.**
2. **Activate the external circuit breaker(s), or plug it into the mains supply.**
3. **Set the front panel ON/STBY system switch to the ON | position and hold it until the system starts to power up.**

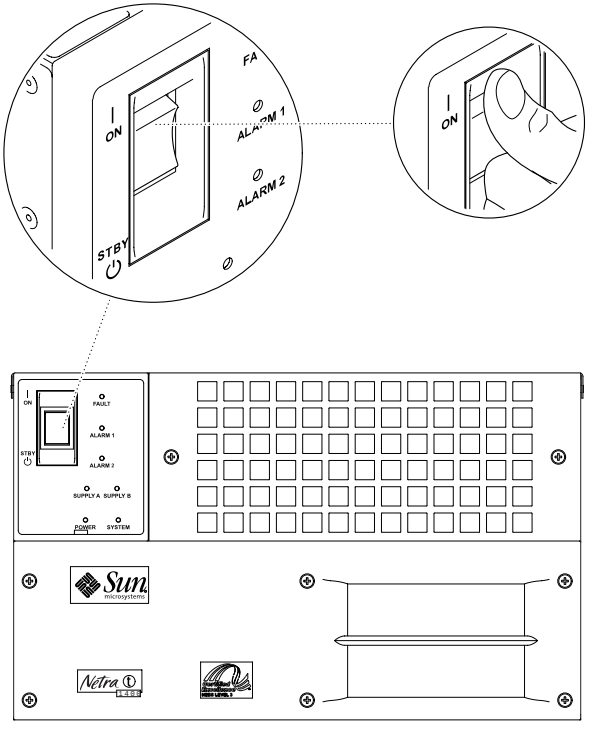


FIGURE 7-3 System Power-On (Front Panel)

▼ To Power Off the System

Caution – Prior to turning off system power, exit from the operating system. Failure to do so may result in data loss.

1. **Where necessary, notify the users that the system is going down.**
2. **Back up system files and data.**
3. **Halt the operating system.**
4. **Continue with step a. or b., as appropriate.**
   a. **Set the ON/STBY switch at the front of the system cabinet to the STBY position and release it immediately to initiate a clean shut down followed by a power off.**
   b. **Set the ON/STBY switch at the front of the system cabinet to the STBY position and hold it for five seconds to shut the system down immediately.**
5. **Verify that the System LED is off.**
6. **Disconnect the AC or DC power connector(s) from the rear of the system, or open the external circuit breaker(s).**
7. **Verify that the Power LED is off.**

Caution – Regardless of the position of the ON/STBY switch, where an AC power cord remains connected to the system, potentially dangerous voltages are always present within the power supply.

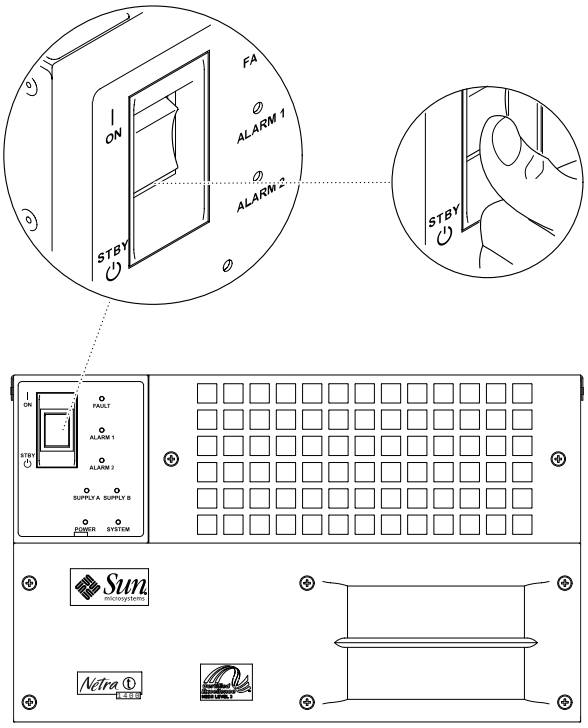


FIGURE 7-4 System Power-Off (Front Panel)

Caution –

1400 Regardless of the position of the ON/STBY switch, when a DC power cord remains connected to the system, DC voltage is always present within the power supply.

1405 Regardless of the position of the ON/STBY switch, when an AC power cord remains connected to the system, hazardous voltage is always present within the power supply.

CHAPTER 8

System Start-up and Operation

The Netra t 1400/1405 is shipped ready for a jumpstart installation.

If the system is registered with the local install server, it will automatically boot from the network and install Solaris to the local hard disk when you power on for the first time.

If the system is not registered with the local install server, insert a Solaris install CD in the CD-ROM drive and type

```
boot cdrom
```

at the ok prompt. The system will then boot from the CD-ROM and install Solaris on the local hard disk.

CHAPTER 9

Open Boot PROM

This chapter describes where changes have been made to the Open Boot PROM (OBP).

NVRAM Configuration Parameters

TABLE 9-1 lists the NVRAM configuration parameters supported by a Netra t 1400/1405 system.

TABLE 9-1 NVRAM Configuration Parameters

Parameter	Typical Default	Description
`auto-boot`	`true`	If `true`, boot automatically after power on or reset.
`boot-device`	`disk`	Device from which to boot.
`boot-file`	`empty string`	File to boot (an empty string lets secondary booter choose the default).
`diag-device`	`net`	Diagnostic boot source device.
`diag-file`	`empty string`	File from which to boot in diagnostic mode.
`diag-switch`	`false`	If `true`, run in diagnostic mode.
`fcode-debug?`	`false`	If `true`, include name fields for plug-in device FCodes.
`hardware-revision`	`no default`	System version information.
`input-device`	`ttya`	Power-on device (usually `keyboard`, `ttya` or `ttyb`).

TABLE 9-1 NVRAM Configuration Parameters *(Continued)*

Parameter	Typical Default	Description
keyboard-click?	false	If true, enable keyboard click.
last-hardware-update	no default	System update information.
local-mac-address?	false	If true, network drivers use their own MAC address, not the system's.
mfg-switch?	false	If true, repeat system self-tests until interrupted with a Break command.
nvramrc	empty	Contents of NVRAMRC.
oem-banner	empty string	Custom OEM banner (enabled by oem-banner? true).
oem-banner?	false	If true, use custom OEM banner.
oem-logo	no default	Byte array custom OEM logo (enabled by oem-logo? true).
oem logo?	false	If true, use custom OEM logo (else, use Sun logo).
output device	ttya	Power-on output device (usually screen, ttya, or ttyb).
security-#badlogins	no default	Number of incorrect security password attempts.
security-mode	none	Firmware security level (options: none, command, or full).
security-password	no default	Firmware security password (never displayed). *Do not set this directly.*
selftest-#megs	1	Megabytes of RAM to test. Ignored if diag-switch? is true.
testarea	0	One-byte scratch field, available for read / write test.
ttya-mode	9600,8,n,1,–	TTYA (baud rate, #bits, parity, #stop, handshake).
ttyb-mode	9600,8,n,1,–	TTYB (baud rate, #bits, parity, #stop, handshake).
ttya-ignore-cd	true	If true, operating system ignores carrier-detect on TTYA.
ttyb-ignore-cd	true	If true, operating system ignores carrier-detect on TTYB.

TABLE 9-1 NVRAM Configuration Parameters *(Continued)*

Parameter	Typical Default	Description
`ttya-rts-dtr-off`	`false`	If `true`, operating system does not assert TTYB and RTS and DTR.
`ttyb-rts-dtr-off`	`false`	If `true`, operating system does not assert TTYB and RTS and DTR.
`use-nvramrc?`	`false`	If `true`, execute commands in NVRAMRC during system start-up.

Emergency Procedures

Use the Break command from a terminal to perform the abort function.

Running Diagnostics

The following information, as documented in the *Solaris OpenBoot Command Reference* manual, is Sun machine-specific and therefore applies to a Netra t 1400/1405 system.

- Running Diagnostics
- Testing the SCSI Bus
- Testing Memory
- Testing the Ethernet Controller
- Testing the Clock
- Monitoring the Network
- Preserving Data After a System Crash
- SCSI Problems—probe SCSI
- System boots from the wrong device
- System will not boot from Ethernet

New Devices in the OBP Device Tree

The following device has been added to the OBP device tree:

- `/pci@1f,4000/ebus@1/SUNW,lom@14,200000`
  This is the LOMlite device. It has an FCode PROM, which allows it to identify itself to the system during probing. The FCode PROM defines the name of the device and the `reg` property, which describes the address space used.

CHAPTER 10

Using LOMlite

LOMlite is supplied on a card as part of the system and provides *lights out management* or remote management of the system over a serial connection. While the system is running, LOMlite also provides event reporting via the Solaris operating environment.

LOMlite Functionality

The alarms card implementing the LOMlite functionality can report errorconditions in a number of ways:

- The fault LED on the front panel will flash if any fan or PSU fails.
- On the Netra t 1400, the current state of the supply A and supply B is indicated by LEDs on the front panel.
- Any fan failure or change of PSU state is reported on the LOMlite console and is entered into the LOMlite's event log. The first fatal error is preserved as a possible root cause of subsequent failures.

  The event log may be displayed using either the LOMlite console `show` command, or the Solaris utility `lominfo events` utility. Once a fault has been cleared, the event log can be cleared using the Solaris `lomctl clearevents` utility.
- As events are entered into the LOMlite's event log, they are also recorded by the Solaris daemon, `lomlited`, in the system log files, according to the configuration of `syslogd`. Typically, such messages are reported to the console.
- The LOMlite console `environment` commands can be used to show the current state of the fans and PSUs in the system.
- The Solaris `lominfo` utility can be used to display the current state of the fans and PSUs in the system.

Diagnosing PSU Faults

If a PSU suffers an internal failure (that is, its output fails while input power is still applied), the Fault LED will flash and the event will be recorded as described above.

For example, the message

```
LOM event: PSU 2 Output failed
```

may be displayed on the LOMlite console and

```
Sep 7 11:44:20 hostname lomlited: LOMlite PSU 1 Output failed
```

may be displayed on the Solaris console. Note that an event will be issued if the Fault LED is not already on, indicating that the LED has been set to flash. If a PSU output failure occurs, the PSU should be replaced.

If the PSU suffers an external failure (that is, one or more of its inputs fail), the Fault LED will not flash as the fault is external to the system but the fault will still be reported as, for example:

```
LOM event: PSU 2 InA failed
```

In the Netra t 1400 system, the LED corresponding to the failed supply (A or B) will go off.

Once the fault has been corrected, you can clear the event log using the Solaris `lomctl clearevents` command. This will automatically extinguish the Fault LED if it is lit. You can also turn off the Fault LED using either the LOMlite console command `faultoff`, or the Solaris utility `lomctl faultoff`.

To display the current status of the PSUs, use the LOMlite console `environment` command or the Solaris utility `lominfo psu`.

Diagnosing Fan Faults

If the speed of a monitored fan drops below a pre-defined limit, the Fault LED will flash and the event will be reported as described above. For example, the message

```
LOM event: Fan 3 failed
```

may be displayed on the LOMlite console, and

```
Sep 7 11:44:20 hostname lomlited: LOMlite: Fan 3 failed
```

may be displayed on the Solaris console. Note that an event will be issued if the Fault LED is not already on, indicating that the LED has been set to flash. If a fan failure occurs, the fan should be replaced.

Once a fan has been reported to have failed, any subsequent recovery and repeated failure will not be reported; that is, only one event is generated for the failure of each fan. This is to prevent the event log being rapidly filled should the fan speed fall very close to the failure threshold.

Once the fault has been corrected, you can clear the event log using the Solaris `lomctl clearevents` command. This will automatically extinguish the Fault LED if it is lit and re-enable checking of all fans. To re-enable checking of all fans and extinguish the Fault LED without clearing the event log, use the LOMlite console `check` command or Solaris utility `lomctl check`.

To display the current status of the fans, use the LOMlite console environment command or the Solaris utility `lominfo fan`. These display both the current fan speeds, expressed as a percentage of expected maximum, and the state `OK` or `FAULT`. Note that reported speeds slightly in excess of 100% should not be considered to be a problem.

Power

The LOMlite device is powered by auxiliary power. It functions even when the rest of the system is powered down.

Serial Connection

You access LOMlite by a terminal connected to the serial port as follows:

Connector:	LOM
Rate:	9600 baud
Parity:	No
Stop bits:	1
Data bits:	8

Controlling LOMlite

The following commands can be sent to LOMlite when it is connected:

TABLE 10-1 LOMlite Commands

Command	Use
`alarmoff` *n*	Set alarm *n* off. *n* can be 1, 2 or 3
`alarmon` *n*	Set alarm *n* on. *n* can be 1, 2 or 3
`check`	Reset monitoring to report all failures
`console`	Not applicable to the Netra t 1400/1405
`environment`	Display the status of the fans, power supply, alarms and fault LED
`faulton`	Set the Fault light to on
`faultoff`	Set the Fault light to off
`help`	Display the list of LOMlite commands
`poweron`	Power the system on
`poweroff`	Power the system off
`reset`	Reset the system
`show model`	Show the system model
`show hostname`	Show the system name (equivalent to `uname -n`)
`show eventlog`	Show the event log
`show`	Show all the information available with the show command
`version`	Show the version number of the LOMlite device

Commands can be abbreviated to a minimum of two unique characters.

Configuring LOMlite

LOMlite has as an associated configuration file, `lom.conf`, in which you can set the following parameters:

TABLE 10-2 LOMlite Configuration File Parameters

Field	Format	Use
`wdog_enabled`	Boolean	Enable the LOMlite system watchdog when driver loads.
`wdog_reset`	Boolean	Reset the system after a watchdog timeout.
`wdog_alarm3`	Boolean	Turn fault LED on after a watchdog timeout.
`wdog_timeout`	Integer	Set the timeout for the LOMlite system watchdog. Value is in seconds.
`serial_events`	Boolean	Report LOMlite events over the serial connection.
`disable_wdog_on_break`	Boolean	Not applicable to the Netra t 1400/ 1405
`disable_wdog_on_panic`	Boolean	Try to disable the LOMlite watchdog after a system panic. In some cases, this can fail and the watchdog can time out anyway.

Each field must be on a separate line, and be followed by an equals sign (=) and a value, without spaces. In Boolean fields, 1 means true and 0 means false.

Fault LED

LOMlite drives the amber fault LED on the system. The amber fault LED flashes when a fan or PSU has failed. The LED is lit continuously when the watchdog has timed out, or when the LED has been turned on manually for verification with the LOMlite command `faulton`.

System Watchdog

LOMlite includes a watchdog timer, which by default controls the system alarm.

The watchdog process, `tsdog`, is enabled at boot time by an rc script, `/etc/init.d/tsaldog`. You can edit this script to configure the watchdog timeout, the reset intervals, and wether ASR is enabled. See the `tsdog`(1M) man page for details.

Alternatively, you can disable the script, edit the driver configuration file `lom.conf` to enable the watchdog, and use your own process to reset the watchdog to monitor the functioning of an application. See the `lom`(7d) man page for details of the interface that you use to set up this process.

If the watchdog expires, by default the system alarm and the fault LED are switched on.

System Monitoring

When the system is booted, a LOMlite monitoring daemon is started by the rc script, `/etc/init.d/lomlited`. This daemon reports any state change for the fans, power supply, alarms or fault LED, including restoration of service. All events are reported to `syslogd` with an identifier string `lomlited`. They are then handled according to the `syslogd` configuration.

You can use the LOMlite utilities to perform more advanced configuration and monitoring if necessary. For details, see the man pages for `lomctl`(1M), `lominfo`(1M), `lomprog`(1M), `tsdog`(1M), `tsctl`(1M), `tsstate`(1M) and `tsunlock`(1M).

CHAPTER 11

System Shut-down

The `shutdown` or `init` command is executed by the super user to change the operational state of the machine. By default, it brings the system to a state where only the console has access to the operating system.

The `shutdown` command sends a warning message and a final message before it begins shutdown activities. Refer to `shutdown`(1M) and `init`(1M) for further information.

You can also use the following commands:

TABLE 11-1 Commands for Shutting Down the System

Command	Effect
`shutdown -i0` or **`init 0`**	Halt the operating system and enter the Open Boot PROM (OBP).
`shutdown -i5` or **`init 5`**	Halt the operating system and power the system down.
`shutdown -i6`	Return to interactive mode and immediately reboot from the default kernel/unix (the `reboot` command has the same effect).
`init s` or **`init S`**	Halt the operating system and enter maintenance mode.

After shutting down the system, move the ON/STBY switch at the front of the system cabinet to the STBY ⏻ position and immediately release it.

To start the system again and begin the automatic booting sequence, you must set the ON/STBY switch to the ON | position and immediately release it.

If you have an emergency requiring an immediate system power down, switch off the system with the ON/STBY switch by holding it in the STBY position for five seconds.

This does not shut down the operating system cleanly, and is likely to corrupt your file system.

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