CONFIGURATION OF SILVER BOX AND RACK MOUNT PERIPHERALS

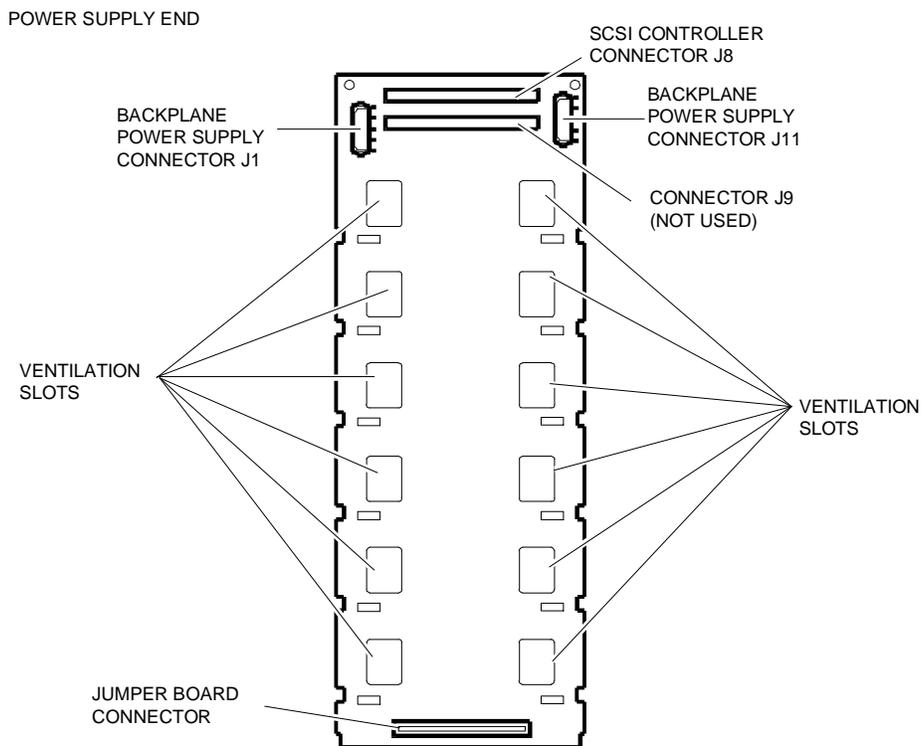## HOT SWAPPING STRUCTURE ON THE SNX 160/RS SYSTEMA

This structure is integrated in the SNX 160/RS Systema and makes it possible to handle the Hot Swapping feature with the help of the PCI RAID SCSI controller (GO2061 or GO2098). Hot swapping consists of automatically replacing a faulty hard disk drive without halting system activities, and rebuilding the data on the new hard disk.
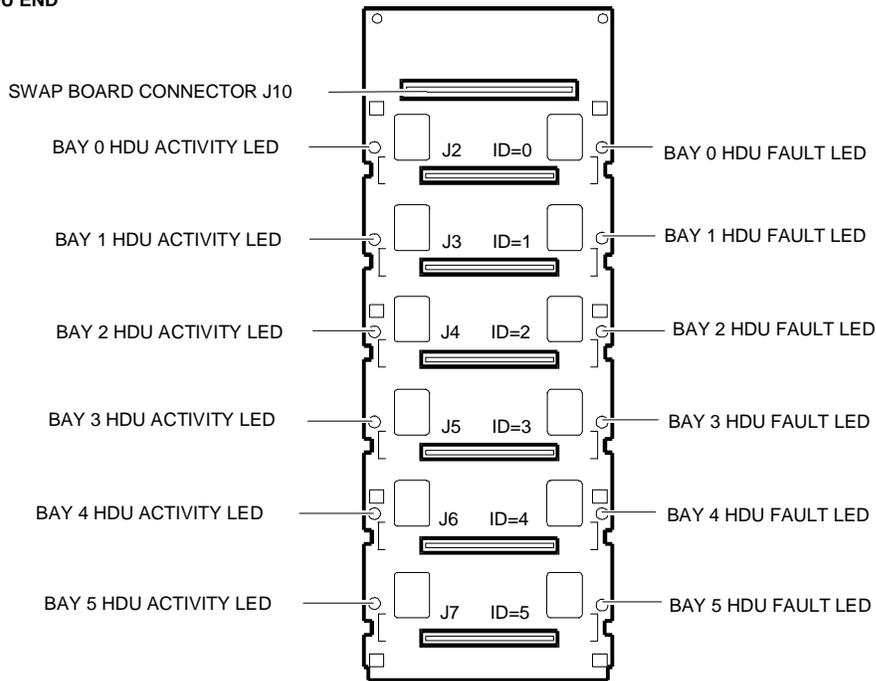This structure consists of the following modules:

- SCSI Narrow IF2019 backplane (on the SNX 160/RS 100 and 133) or
  SCSI Wide IF2046 backplane (on the SNX 160/RS 133 W)

- Swap board IF557.

- Mechanical structure.

- HDU support frame.

SCSI NARROW BACKPLANE IF2019

J

POWER SUPPLY END

SCSI CONTROLLER
CONNECTOR J8

BACKPLANE
POWER SUPPLY
CONNECTOR J11

BACKPLANE
POWER SUPPLY
CONNECTOR J1

CONNECTOR J9
(NOT USED)

VENTILATION
SLOTS

VENTILATION
SLOTS

JUMPER BOARD
CONNECTOR

HDU END

SWAP BOARD CONNECTOR J10

BAY 0 HDU ACTIVITY LED — J2 ID=0 — BAY 0 HDU FAULT LED

BAY 1 HDU ACTIVITY LED — J3 ID=1 — BAY 1 HDU FAULT LED

BAY 2 HDU ACTIVITY LED — J4 ID=2 — BAY 2 HDU FAULT LED

BAY 3 HDU ACTIVITY LED — J5 ID=3 — BAY 3 HDU FAULT LED

BAY 4 HDU ACTIVITY LED — J6 ID=4 — BAY 4 HDU FAULT LED

BAY 5 HDU ACTIVITY LED — J7 ID=5 — BAY 5 HDU FAULT LED

SCSI connectors J5, J6, J7, J8 and J9 are where the HDUs are connected. These connectors make it possible to directly connect the backplane to the hard disk drive. They are 80-pin connectors that, besides supplying the standard signals, also supply power, the SCSI ID and some control signals. An identifier (SCSI ID) for each HDU is set on the backplane in increasing order from top to bottom (J2=ID0, J3=ID1, J4=ID2, J5=ID3, J6=ID4, J7=ID5). This ID cannot be changed.

The backplane is equipped with two separate SCSI buses which can be either joined by means of the Jumper Board or terminated by means of the Terminator Board. On these systems the two buses are joined by the jumper board since the Duplexing feature is not available.

In each disk area there are two LEDs, one green indicating HDU activity and one yellow indicating HDU failure. In non-resilience configurations (with the Dagger controller), the HDU Fault LEDs are not operational and are therefore always off.

In each disk area there are two springs which guarantee connection to reference ground and allow the generation of a Swap signal when an HDU is inserted or removed.
Disks which are not connected to the SCSI backplane must be completely removed from the system. Even though disconnected from the bus, the disks maintain their ground connection as long as they are installed in the peripheral rack.

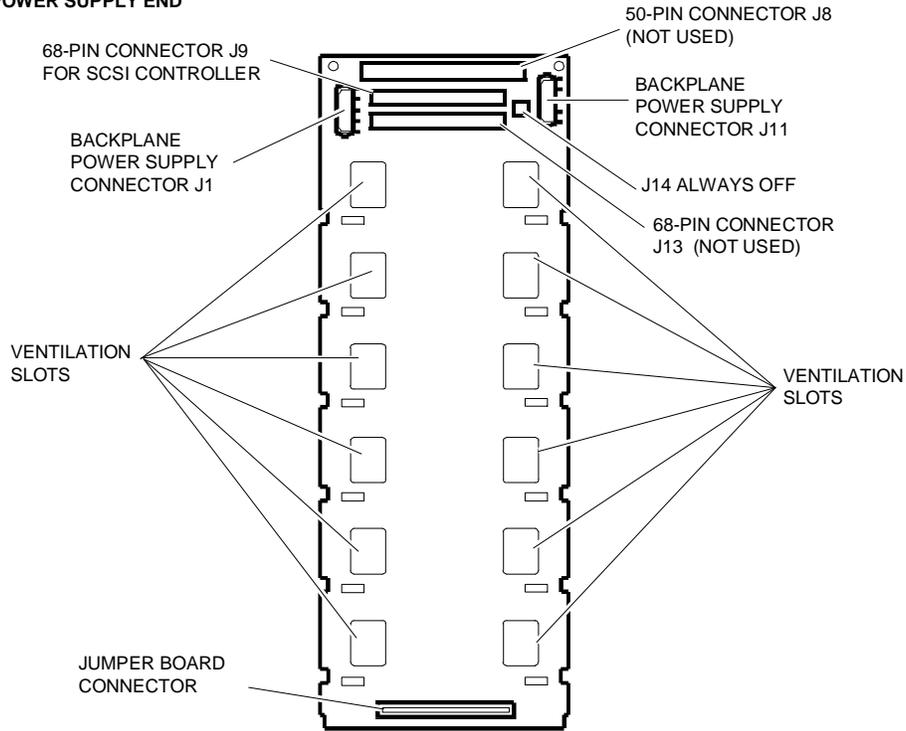### BOARD IF2019 (P.c.b. Code 654326 F) EVOLUTION

DATE	LEV.	VIMO CODE	REASON FOR CHANGE	APPLIC.
4/95	Nasc	562221 S	The board is introduced.	Factory

SCSI WIDE BACKPLANE IF2046

SCSI Wide backplane IF2046 performs the same functions as the 8-bit SCSI Narrow backplane IF2019 from which it differs as follows:

- 50-pin SCSI Narrow connector (J8) for SCSI Narrow compatibility (not used).
- 68-pin SCSI Wide connector (J9) for connection to the first SCSI Wide controller.
- 68-pin SCSI Wide connector (J13) for connection to the second SCSI Wide controller in Duplexing or Dual Host configurations (not used on this system).
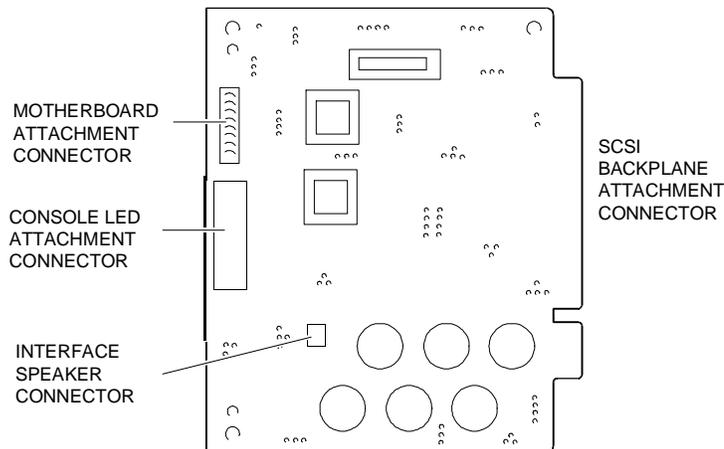- Jumper J14 which must always be set to OFF.

POWER SUPPLY END

68-PIN CONNECTOR J9
FOR SCSI CONTROLLER

BACKPLANE
POWER SUPPLY
CONNECTOR J1

50-PIN CONNECTOR J8
(NOT USED)

BACKPLANE
POWER SUPPLY
CONNECTOR J11

J14 ALWAYS OFF

68-PIN CONNECTOR
J13 (NOT USED)

VENTILATION
SLOTS

VENTILATION
SLOTS

JUMPER BOARD
CONNECTOR

Note: *The HDU side of the IF2046 backplane for the connection of the Hot Swap hard disks is identical to the IF2019 backplane.*

BOARD IF2046 (P.c.b. Code 654480 F) EVOLUTION

DATE	LEV.	VIMO CODE	REASON FOR CHANGE	APPLIC.
2/96	Nasc	210830 C	The board is introduced.	Factory

SWAP BOARD IF557

MOTHERBOARD
ATTACHMENT
CONNECTOR

CONSOLE LED
ATTACHMENT
CONNECTOR

INTERFACE
SPEAKER
CONNECTOR

SCSI
BACKPLANE
ATTACHMENT
CONNECTOR

This board has the following functions:

- **Management of the Bus Fault Signals** - These signals control the hot-swapping between the SCSI controller and the swap board. The four signals are: MSWAP (pin 20); MSHOK (pin 22); MFCLK (pin 30); MFDAT (pin 34).

- **Temperature Control** - The swap board detects the temperature of the disk area (by means of a sensor on the swap board) and of the board area (by means of a sensor on the motherboard), and signals any error to the operator through the SYS FAULT LED on the console.
  The system's Starter Kit contains two diskettes with the drivers that control the temperature sensor. When the sensor detects a high temperature in the board or disk areas, the drivers will carry out the following operations:

  - Send messages to the user indicting an overtemperature condition.
  - Store the error condition in an error log file.
  - Automatically shutdown the system.

  If the system is also equipped with an external UPS and the software PowerChute plus 4.2 or later, besides shutdown the system is also powered off to prevent the hardware from getting damaged.

- **Console LED Control** - There are four LEDs on the front of the box:

  – SYS ON: This green LED indicates when the system is powered on.

  – SCSI BUSY: This green LED indicates SCSI channel activity.

  – HDU FAULT: This yellow LED indicates when a disk is faulty. The faulty disk is identified by the corresponding yellow LED on the backplane.

Note: *The HDU FAULT LED does not work in non-resilience systems equipped with a Dagger SCSI controller and is therefore always off.*

  – SYS FAULT: This yellow LED indicates an incorrect temperature in the board and disk areas.

- **SCSI Bus Termination** - The swap board provides an active SCSI bus termination which is always present and which cannot be disabled.

BOARD IF557 (P.c.b. Code 794125 K)

DATE	LEV.	VIMO CODE	REASON FOR CHANGE	APPLIC.
7/94	Nasc	936006 N	The board is introduced.	Factory
10/94	01		Incorrect Disk Fault indications are signalled: make a few wirings and interruptions.	Factory
3/95	02		Addition of a two-way J6 speaker connector, required for SNX 160/RS systems.	Factory

JUMPER BOARD IF2022

HANDLE TO EXTRACT THE
BOARD FROM THE BACKPLANE

BACKPLANE CONNECTOR
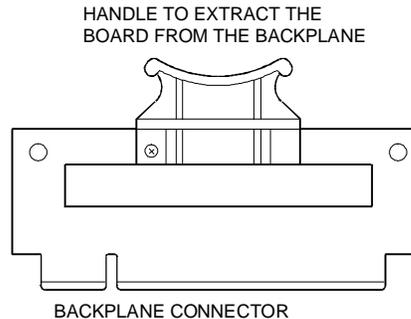
This Jumper Board is a jumper joining the two SCSI buses on the IF2019 backplane and is pluged into an appropriate connector on the backplane. On this system, the two SCSI buses on the backplane must always be joined and therefore the Jumper Board must always be connected.

BOARD IF2022 (P.c.b. Code 654330 P) EVOLUTION

DATE	LEV.	VIMO CODE	REASON FOR CHANGE	APPLIC.
4/95	Nasc	562232 V	The board is introduced.	Factory

MECHANICAL STRUCTURE

The mechanical structure assembly consists of a rack capable of accomodating up to six 1" or 1.6" high 3.5" HDUs, the swap board and the console LED support. The backplane is fixed at the rear of the rack while the panel which prevents unauthorized access to the disk area is fixed on the front. Access to the disk area is protected by a lock located on the system front door.
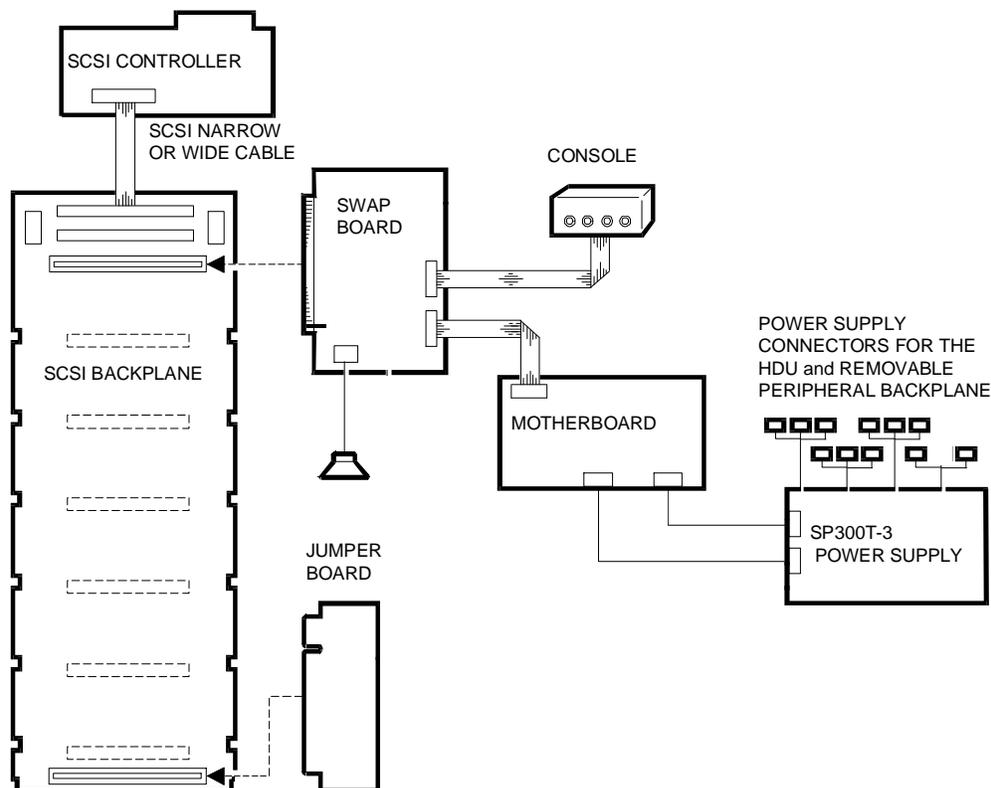
HDU SUPPORT FRAME

HDU support consists of a metal box capable of accomodating a 3.5" hard disk with an 80-pin SCA (Single Connector Attachment) connector designed to be directly connected to the backplane. This support has two light conveyors which are used to route the light signals from the LEDs on the backplane to the front of the box. It is equipped with a handle that simplifies disk insertion and removal.

FAULTY HARD DISK REPLACEMENT PROCEDURES

- The RAID SCSI controller finds a faulty hard disk and sends the swap board a command to light the HDU FAULT LED on the console.

- From the hard disk area the operator removes the HDU whose corresponding yellow LED is on, without powering off the system nor interrupting any activity underway.

- The swap board generates the swap signal and sends this to the SCSI controller.

- The operator inserts the new hard disk which must have the same capacity and physical characteristics as the one removed. In other words it must be a 1" high 3.5" drive and have an 80-pin SCA interface.

- The swap board generates the swap signal and sends this to the SCSI controller.

- If the faulty HDU was part of a fault tolerant disk aray (RAID 1 or RAID 5), the SCSI controller will begin to reconstruct the data of the old hard disk onto the new one. The HDU FAULT LED flashes during this data reconstruction phase.

- Upon completion of data reconstruction the SCSI controller sends the swap board a command to turn off the HDU FAULT LED on the system console.

Note: *When adding or replacing a system HDU with one which has already been used on another system equipped with a RAID controller, make sure that the hard disk is clear of all logic RAID markers, in other words the hard disk must be cancelled (ZAPPED).*
To cancel a hard disk, boot the system from the Storage Manager Utility diskette and press the CTRL-C key sequence to prevent the bootstrapping routine from automatically loading the utility. Manually activate the utility by typing the "dptmgr / ZAP" command at the DOS prompt. The utility will display the list of drives connected and will ask which one needs to be ZAPPED. Another method of cancelling one or more hard disks is by activating the CLEANHDU Utility. This utility comes on diskette and makes it possible to recover via software hard disks considered as being unrecoverable (see Appendix M).
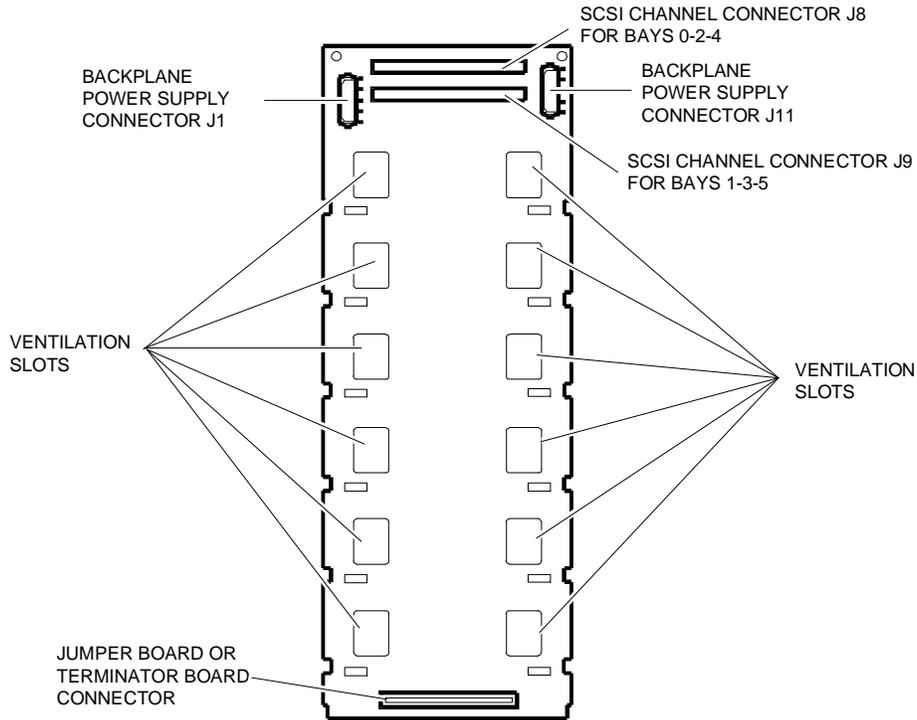
HOT SWAPPING CONNECTIONS

HOT SWAPPING STRUCTURE ON THE SNX 200/400/RS/RM, SNX 460/RS/RM, SNX 160/RS/RM NEW, NETSTRADA 5000/7000

A structure integrated in the RS and RM models makes it possible to handle the Hot swapping feature with the help of the RAID DPT SCSI controller (GO2061, GO2098, GO2173). Hot swapping involves automatically replacing a faulty hard disk drive without halting system operations, and automatically rebuilding the lost data on the new hard disk. This structure consists of the following modules:

- SCSI Narrow backplane IF2019 (on the SNX 200/400/RS/RM 100 and 133) or SCSI Wide backplane IF2046/2067 (on the SNX 400/RS/RM 133 W, 166 W, SNX 460/RS/RM, SNX 160/RS/RM NEW, NetStrada 5000/7000).
- Swap Board IF2012 / IF2031.
- Jumper board IF2022 or Terminator board IF2024.
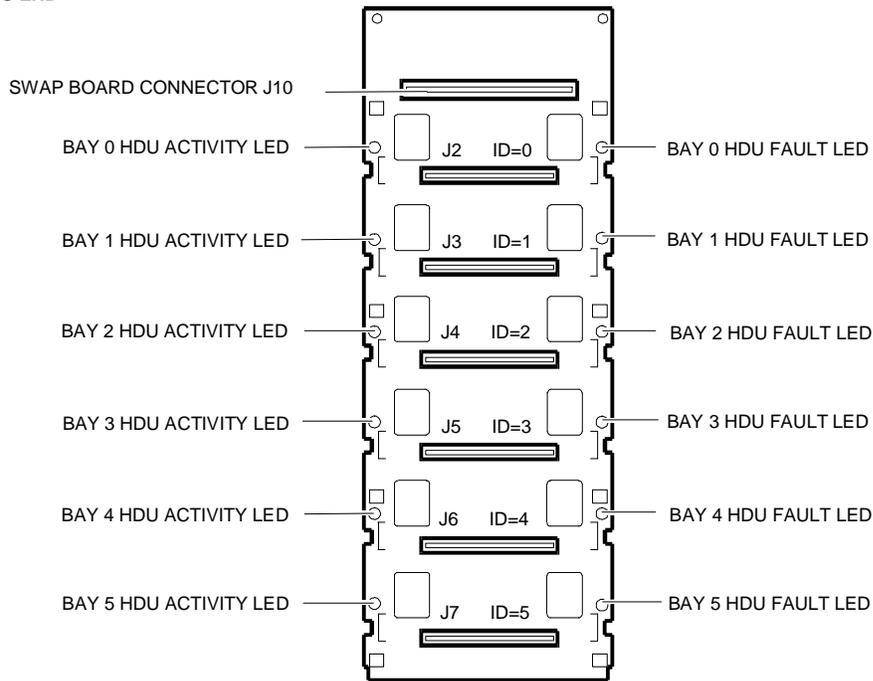- Mechanical structure.
- HDU support frame.

SCSI NARROW BACKPLANE IF2019

HDU END

SWAP BOARD CONNECTOR J10

BAY 0 HDU ACTIVITY LED   J2   ID=0   BAY 0 HDU FAULT LED

BAY 1 HDU ACTIVITY LED   J3   ID=1   BAY 1 HDU FAULT LED

BAY 2 HDU ACTIVITY LED   J4   ID=2   BAY 2 HDU FAULT LED

BAY 3 HDU ACTIVITY LED   J5   ID=3   BAY 3 HDU FAULT LED

BAY 4 HDU ACTIVITY LED   J6   ID=4   BAY 4 HDU FAULT LED

BAY 5 HDU ACTIVITY LED   J7   ID=5   BAY 5 HDU FAULT LED

SCSI connectors J5, J6, J7, J8 and J9 are where the HDUs are connected. These connectors make it possible to directly connect the backplane to the hard disk drive. They are 80-pin connectors that, besides supplying the standard signals, also supply power, the SCSI ID and some control signals. An identifier (SCSI ID) for each HDU is set on the backplane in increasing order from top to bottom (J2=ID0, J3=ID1, J4=ID2, J5=ID3, J6=ID4, J7=ID5). This ID cannot be changed.

The backplane is equipped with two separate SCSI buses which can be either joined by means of the Jumper Board or terminated by means of the Terminator Board. A jumper board is present on all systems, which can be optionally replaced by a terminator board on systems involved in Duplexing configurations.

In each disk area there are two LEDs, one green indicating HDU activity and one yellow indicating HDU failure. In non-resilience configurations (with the Dagger controller), the HDU Fault LEDs are not operational and are therefore always off.

In each disk area there are two springs which guarantee connection to reference ground and allow the generation of a Swap signal when an HDU is inserted or removed. Disks which are not connected to the SCSI backplane must be completely removed from the system. Even though disconnected from the bus, the disks maintain their ground connection as long as they are installed in the peripheral rack.

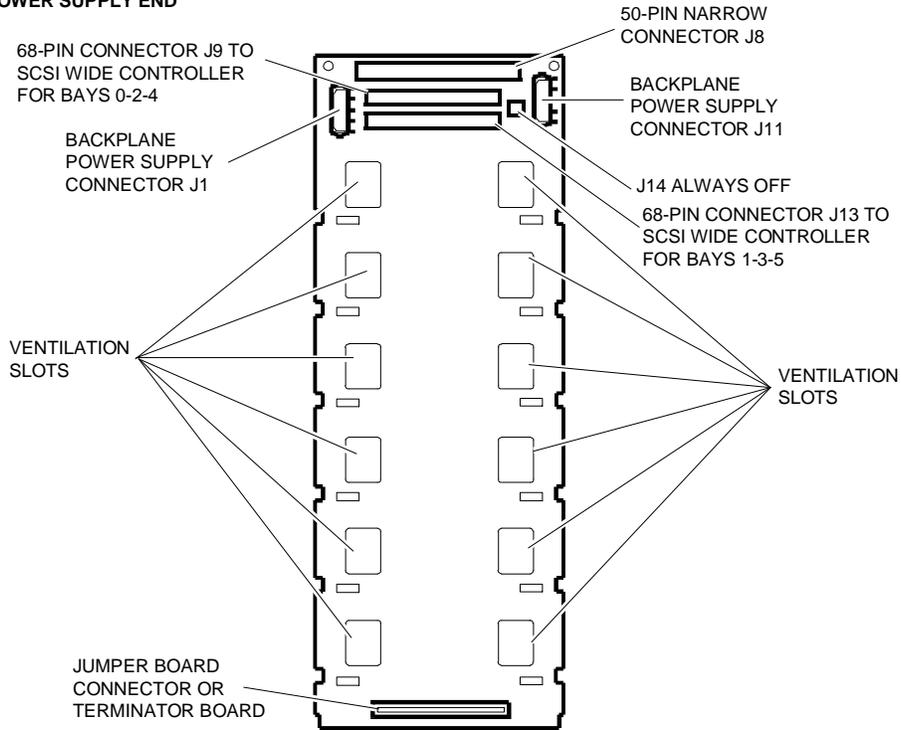### BOARD IF2019 (P.c.b. Code 654326 F) EVOLUTION

DATE	LEV.	VIMO CODE	REASON FOR CHANGE	APPLIC.
4/95	Nasc	562221 S	The board is introduced	Factory

SCSI WIDE BACKPLANE IF2046/2067

SCSI Wide backplane IF2046/2067 performs the same functions as the 8-bit SCSI Narrow backplane IF2019 from which it differs as follows:

- 50-pin SCSI Narrow connector (J8) for SCSI Narrow compatibility (used only in some Dual Host configurations where the system is booted from the Dagger controller).

- 68-pin SCSI Wide connector (J9) for connection to the first SCSI Wide controller.

- 68-pin SCSI Wide connector (J13) for connection to the second SCSI Wide controller (in Duplexing configuration only).

- Jumper J14 which must always be set to OFF.

POWER SUPPLY END

68-PIN CONNECTOR J9 TO SCSI WIDE CONTROLLER FOR BAYS 0-2-4

BACKPLANE POWER SUPPLY CONNECTOR J1

VENTILATION SLOTS

JUMPER BOARD CONNECTOR OR TERMINATOR BOARD

50-PIN NARROW CONNECTOR J8

BACKPLANE POWER SUPPLY CONNECTOR J11

J14 ALWAYS OFF

68-PIN CONNECTOR J13 TO SCSI WIDE CONTROLLER FOR BAYS 1-3-5

VENTILATION SLOTS

J

Note: *The HDU side of the IF2046/2067 backplane for the connection of the Hot Swap hard disks is identical to the IF2019 backplane.*

BOARD IF2046 (P.c.b. Code 654480 F) EVOLUTION

DATE	LEV.	VIMO CODE	REASON FOR CHANGE	APPLIC.
2/96	Nasc	210830 C	The board is introduced.	Factory

BOARD IF2067 (P.c.b. Code 654544 A) EVOLUTION

DATE	LEV.	VIMO CODE	REASON FOR CHANGE	APPLIC.
3/97	Nasc	212866 S	New board replacing the IF2046. This backplane is compatible with the new family of Fujitsu HDUs that require a pre-charge circuit on the +12 VDC and +5 VDC to avoid power drops during insertions. Will be used when the IF2046 is no longer in stock.	Factory

SWAP BOARD IF2012 / IF2031
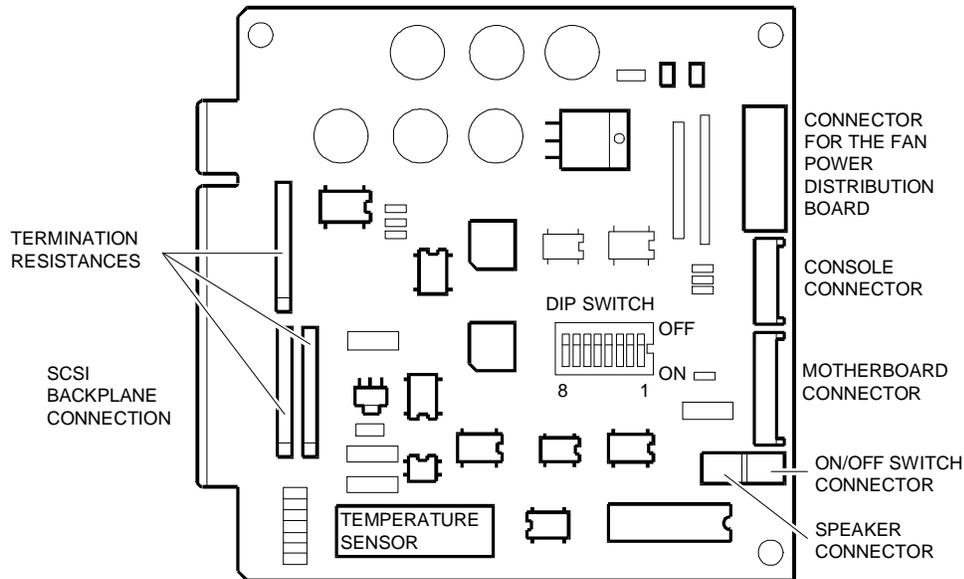
This board has the following functions:

- **Management of Bus Fault Signals** -These signals control the hot-swapping between the SCSI controller and the swap board. The four signals are: MSWAP (pin 20); MSHOK (pin 22); MFCLK (pin 30); MFDAT (pin 34).

- **Redundancy Management -** A circuit on this board allows the management of redundant systems, meaning systems with a double power supply and fan assembly.

- **Console LED Control** - There are four LEDs on the front of the box:

    – SYS ON: This green LED indicates when the system is powered on.

    – SCSI BUSY: This green LED indicates SCSI channel activity.

    – HDU FAULT: This yellow LED indicates when a disk is faulty. The faulty disk is identified by the corresponding yellow LED on the backplane.

Note: *The HDU FAULT LED does not work in non-resilience systems equipped with a Dagger SCSI controller and is therefore always off.*

    – SYS FAULT: This yellow LED indicates an incorrect temperature in the board and disk areas.

- **SCSI Bus Termination -** The SCSI channel is terminated directly on the swap board. Termination is active and is provided by three termination resistances R31, R32 and R33 fitted in a socket. These are always present, but must be removed in Duplexing configurations only.

- **Speaker Interface and ON/OFF Switch.**

DIP-SWITCH	FUNCTION	SETTING
1	Disk area (HDU) temperature sensor	ON Disabled OFF Enabled (on each Main Box and PEM)
		Setting for board IF2012 Lev. 03S1 and IF2031 Lev. 01 with fans B26; ON Disabled (on redundant PEM) OFF Enabled (on redundant and non-redundant main boxes and non-redundant PEMs)
2	Logic OR in the occurrence of box failures (fans, power supplies, temperature sensors)	ON Enabled - sent to the SCSI controller by means of the SHELF OK signal (on redundant and non-redundant PEMs) OFF Disabled (on redundant and non-redundant main boxes)
3	Enables (fail) the second fan in the motherboard area	ON Enabled (on redundant and non-redundant main boxes) OFF Disabled (on redundant and non-redundant PEMs)
4	Enables (fail) the third fan in the motherboard area	ON Enabled (on redundant and non-redundant main boxes) OFF Disabled (on redundant and non-redundant PEMs)
5	Enables (fail) the second redundant fan in the motherboard area	ON Enabled (on redundant main boxes) OFF Disabled (on non-redundant main boxes, redundant and non-redundant PEMs)
6	Enables (fail) the third redundant fan in the motherboard area	ON Enabled (on redundant main boxes) OFF Disabled (on non-redundant main boxes, redundant and non-redundant PEMs)
7	Reserved	**Setting for board IF2012 Lev. Nasc. with fans B29 (fast);** the redundant fans are usually not powered: OFF Disabled (always use this setting)
	Enables (fail) the redundant fan in the disk area	**Setting for board IF2012 Lev. 01 or IF2031, with fans B19 (slow);** the fans are always powered: ON Enabled (on redundant main boxes and redundant PEMs with the swap board in the right-hand rank) OFF Disabled (on non-redundant main boxes, non-redundant PEMs and redundant PEMS with the swap board in the left-hand rank)
		Setting for board IF2012 Lev. 03S1 or IF2031 Lev. 01 with fans B26; ON Enabled (on redundant main boxes and on redundant PEM 241W/RS with a swap board in the right rank) OFF Disabled (on non-redundant main boxes, redundant and non-redundant PEM RS/RM, non-redundant PEM 241W/RS and redundant PEM 241W/RS with a swap board in the left rank)
8	Temperature sensor in the motherboard area	ON Enabled (on redundant and non-redundant main boxes) OFF Disabled (on redundant and non-redundant PEMs)

J

BOARD IF2012 (P.c.b. Code 654287-02 H) EVOLUTION

| DATE	LEV.	VIMO CODE	REASON FOR CHANGE	APPLIC.
3/95	Nasc	588890 Z	The board is introduced. Only fast fans B29 are handled at this board level; the main fans are always powered while the three redundant fans are only powerd when one of the main fans no longer works.	Factory
4/95	01		Fans B29 are replaced by slower fans B19, resulting with a change in which failures are managed. Only slow fans B19 are handled at this board level; redundant and main fans are always powered. The swap board will signal fan failures to the operating system which will, in turn, signal this condition to the operator so that the faulty fan can be replaced. Carry out four cuts and six wirings, transistor Q1 is no longer used. All the IF2012 boards installed in the PEM must be updated in this way regardless of the type of fans installed.	Factory
8/95	02		PEM power down disable acting by means of the basic module driven OFFPEM signal: make 1 wiring to connect the signal to ground.	Factory
1st return	03		Fans B19 replaced by fans B26 whose fault signal acts differently than before. Replace two resistors, mount two capacitors make one trim and two wirings. This modification allows fans B19 to be also connected. Board no longer manufactured, modification to be made at the first return or when installing fans B26.	Field
1st return	03S1		Correct management of fans B26. In redundant PEM configurations, during HIGH TEMPERATURE indications the SHELF OK signal does not comply with specifications; it oscillates instead of remaining at "0". Make two witings and three cuts. Set thermostat RT1 to a vertical position. Note: Dip-Switch 1 (SW1 pins 1-16) has the following meaning: ON (closed) = redundant PEM OFF (open) = non-redundant PEM This modification does not have to be made on the Swap boards installed in the basic module; it is used to align the IF2012 to the IF2031 lev. 01. Board no longer manufactured, modification to be made at first return or during repair.	Field

BOARD IF2031 (P.c.b. Code 654396 E) EVOLUTION

DATE	LEV.	VIMO CODE	REASON FOR CHANGE	APPLIC.
5/95	Nasc	562384 W	Replaces board IF2012 to implement the cuttings and wirings made. This board can only handle slow B19 fans, and it offers the same functions as board IF2012 lev. 01.	Factory
10/95	01		Correct management of fans B26. In non-redundant PEM configurations, during HIGH TEMPERATURE indications the SHELF OK signal does not comply with specifications; it oscillates instead of remaining at "0". Make two witings and three cuts. Set thermostat RT1 to a vertical position. **Note:** Dip-Switch 1 (SW1 pins 1-16) has the following meaning: ON (closed) = redundant PEM OFF (open) = non-redundant PEM This modification does not have to be made on the Swap boards installed in the basic module; it is mandatory on the PEM from the first unit manufactured.	Factory
11/95	02		Interference between the components on the board and faults on the new lot of ELMA box structures for the SNX 200/400/RM. Mount thermostat RT1 in a vertical position, replace the 16 V capacitors with 10 V capacitors.	Factory
6/96	01AG		Optimization in the supply of the parts for the subject board; introduction of a strategic B.O.M.	Factory

Note: *From March 1996, the assy using fans B19 (code 589375G) is replaced by the assy using fans B26 (code 564151W).*

J

JUMPER BOARD IF2022

HANDLE TO EXTRACT THE
BOARD FROM THE BACKPLANE

BACKPLANE CONNECTOR
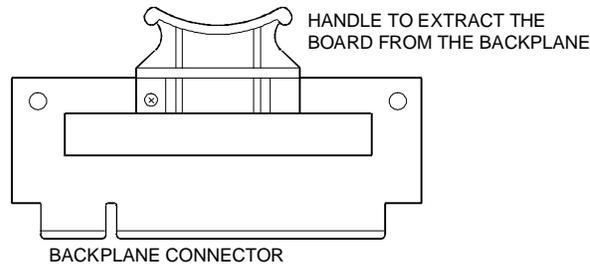
The Jumper Board is a jumper which joins the two SCSI buses on backplane and is inserted in the appropriate backplane connector. This board is present in all non-duplexing configurations. If the jumper board is present then the bus on the swap board must be terminated by terminators R31, R32 and R33.

BOARD IF2022 (P.c.b. Code 654330 P) EVOLUTION

DATE	LEV.	VIMO CODE	REASON FOR CHANGE	APPLIC.
4/95	Nasc	562232 V	The board is introduced.	Factory

TERMINATOR BOARD IF2024

HANDLE TO EXTRACT THE BOARD
FROM THE BACKPLANE

FIXED
TERMINATION
RESISTANCES

BACKPLANE CONNECTOR
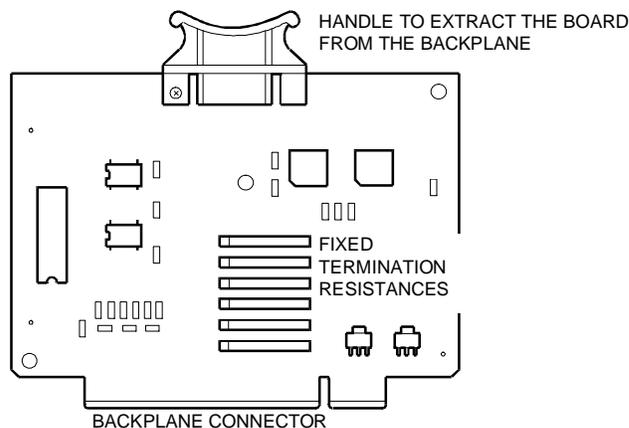
The Terminator Board is a active terminator for the SCSI bus. It is used only in duplexing configurations to terminate the two SCSI buses on backplane. This board is inserted in a backplane connector, in place of the Jumper Board. When the terminator board is installed, terminators R31, R32 and R33 must be removed from the swap board.

BOARD IF2024 (P.c.b. Code 654333 E) EVOLUTION

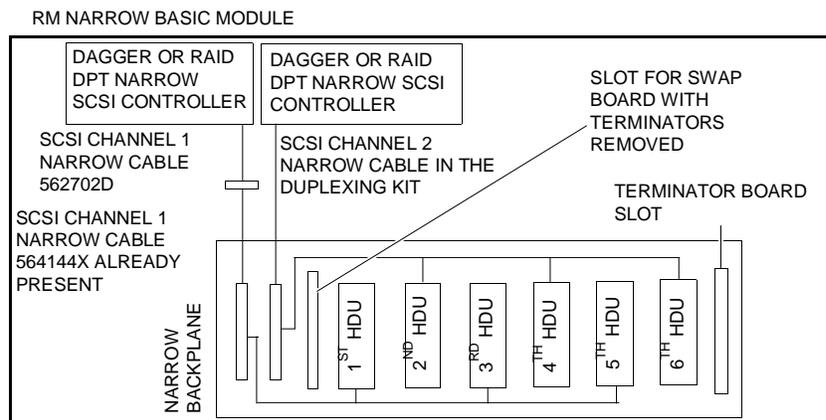| DATE	LEV.	VIMO CODE	REASON FOR CHANGE	APPLIC.
4/95	Nasc	562237 S	The board is introduced.	Factory

DUPLEXING CONFIGURATION

Duplexing is a specific mirroring configuration controlled by the operating system. Its hardware configuration consists of two separate SCSI channels to which the same number of HDUs must be connected (from 1 to 3 in the basic module), in addition to a SCSI controller for each channel. Since duplexing is obtained in the PEM by using these two separate SCSI channels (6+6 HDUs), there is no need for the Duplexing Kit. The HDUs of each channel contain the same data and perform the same operations, thus offering the maximum degree of redundancy.
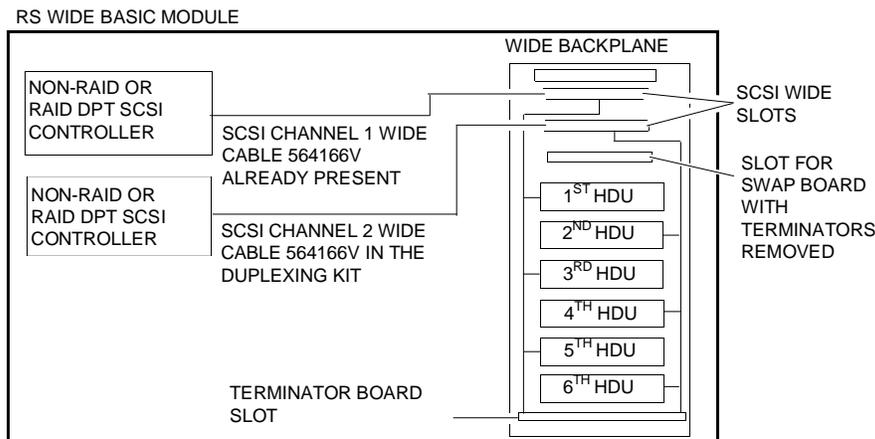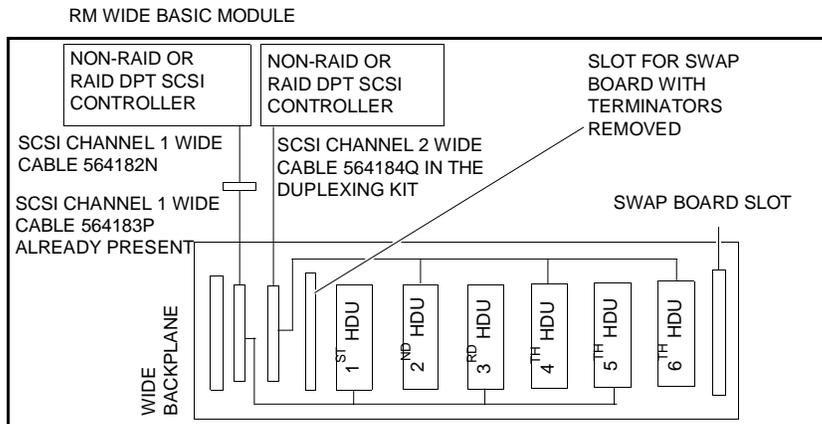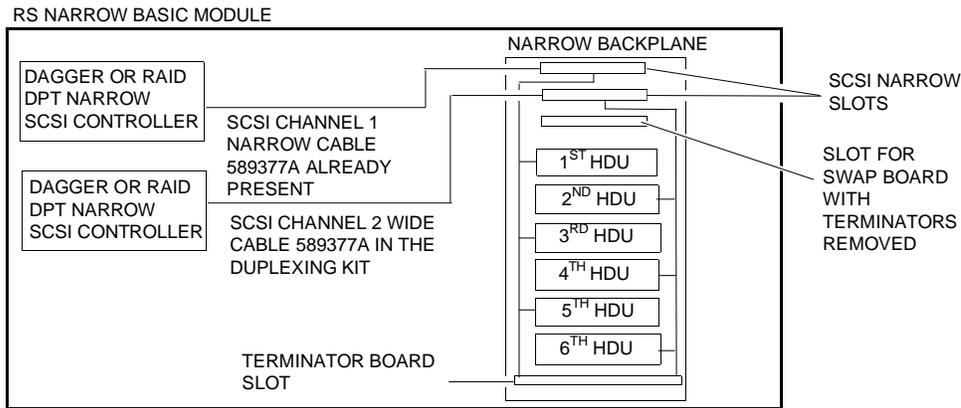Listed below is the required hardware:

- Two SCSI controllers which must be terminated and have a SCSI ID of 7; depending on the system, the controllers can be:

  – SNX 200/400/RS/RM Narrow: can be two Dagger controllers, one of which also capable of handling the removable SCSI peripherals, or two RAID DPT GO2061 controllers.

  – SNX 400/RS/RM Wide: can be two GO2109 controllers, one of which also capable of handling the removable SCSI peripherals, or two RAID DPT GO2098 controllers.

  – SNX 460/RS/RM and SNX 160/RS/RM NEW: one controller can be the onboard Lance controller to which also the removable SCSI peripherals can be connected, the second controller is the Lance GO2109 controller. Otherwise, they can be two GO2109 controllers or two RAID DPT GO2098/2173 controllers.

  – NetStrada 5000: can be two GO2172 controllers or two RAID DPT GO2173 controllers.

  – NetStrada 7000: can only be two RAID DPT GO2173 controllers.

- A Duplexing kit, which differs depending on whether the system is in a Silver or Rack box, and whether it is Narrow or Wide. The kit for Silver Narrow systems is called DUP KIT240 and contains a terminator board and an internal SCSI Narrow cable. The kit for Rack Narrow systems is called DUP KIT240RM and contains a terminator board and an internal SCSI Narrow cable. The kit for Silver Wide is called DUP KIT240W and contains a terminator board and an internal SCSI Wide cable. The kit for Rack Wide systems is called DUP KIT240RM/W and contains a terminator board and an internal SCSI Wide cable. The internal SCSI cable for Rack systems is longer than the one for Silver systems. Without terminators on the Swap board, the terminator board allows the creation of two separate 3 HDU-bay SCSI channels in the basic module.

- An equivalent number of HDUs connected to the two channels.

Note: *The installation of a Duplexing Kit causes a change in the configuration of the system in which case the system needs to be reconfigured.*

Note: *Duplexing can only be used with the Windows NT 3.5 and NetWare 3.12 and 4.1 operating systems.*

RM NARROW BASIC MODULE

RS NARROW BASIC MODULE

NARROW BACKPLANE

DAGGER OR RAID DPT NARROW SCSI CONTROLLER

SCSI CHANNEL 1 NARROW CABLE 589377A ALREADY PRESENT

DAGGER OR RAID DPT NARROW SCSI CONTROLLER

SCSI CHANNEL 2 WIDE CABLE 589377A IN THE DUPLEXING KIT

SCSI NARROW SLOTS

SLOT FOR SWAP BOARD WITH TERMINATORS REMOVED

1ST HDU
2ND HDU
3RD HDU
4TH HDU
5TH HDU
6TH HDU

TERMINATOR BOARD SLOT

RM WIDE BASIC MODULE

NON-RAID OR RAID DPT SCSI CONTROLLER

NON-RAID OR RAID DPT SCSI CONTROLLER

SLOT FOR SWAP BOARD WITH TERMINATORS REMOVED

SCSI CHANNEL 1 WIDE CABLE 564182N

SCSI CHANNEL 2 WIDE CABLE 564184Q IN THE DUPLEXING KIT

SCSI CHANNEL 1 WIDE CABLE 564183P ALREADY PRESENT

SWAP BOARD SLOT

WIDE BACKPLANE

1ST HDU
2ND HDU
3RD HDU
4TH HDU
5TH HDU
6TH HDU

RS WIDE BASIC MODULE

WIDE BACKPLANE

NON-RAID OR RAID DPT SCSI CONTROLLER

SCSI CHANNEL 1 WIDE CABLE 564166V ALREADY PRESENT

NON-RAID OR RAID DPT SCSI CONTROLLER

SCSI CHANNEL 2 WIDE CABLE 564166V IN THE DUPLEXING KIT

SCSI WIDE SLOTS

SLOT FOR SWAP BOARD WITH TERMINATORS REMOVED

1ST HDU
2ND HDU
3RD HDU
4TH HDU
5TH HDU
6TH HDU

TERMINATOR BOARD SLOT

MECHANICAL STRUCTURE

The mechanical structure assembly consists of a rack capable of accomodating up to six 1" or 1.6" high HDUs, the swap board and the console LED support. The backplane is fitted at the rear of the rack while the panel which prevents unauthorized access to the disk area is fitted on the front. Access to the disk area is protected by a lock located on the system front door.

HDU SUPPORT FRAME

HDU support consists of a metal box capable of accomodating a 3.5" hard disk with an 80-pin SCA (Single Connector Attachment) connector designed to be directly connected to the backplane. This support has two light conveyors which are used to route the light indications from the LEDs on the backplane to the front of the box. It is equipped with a handle that simplifies disk insertion and removal.
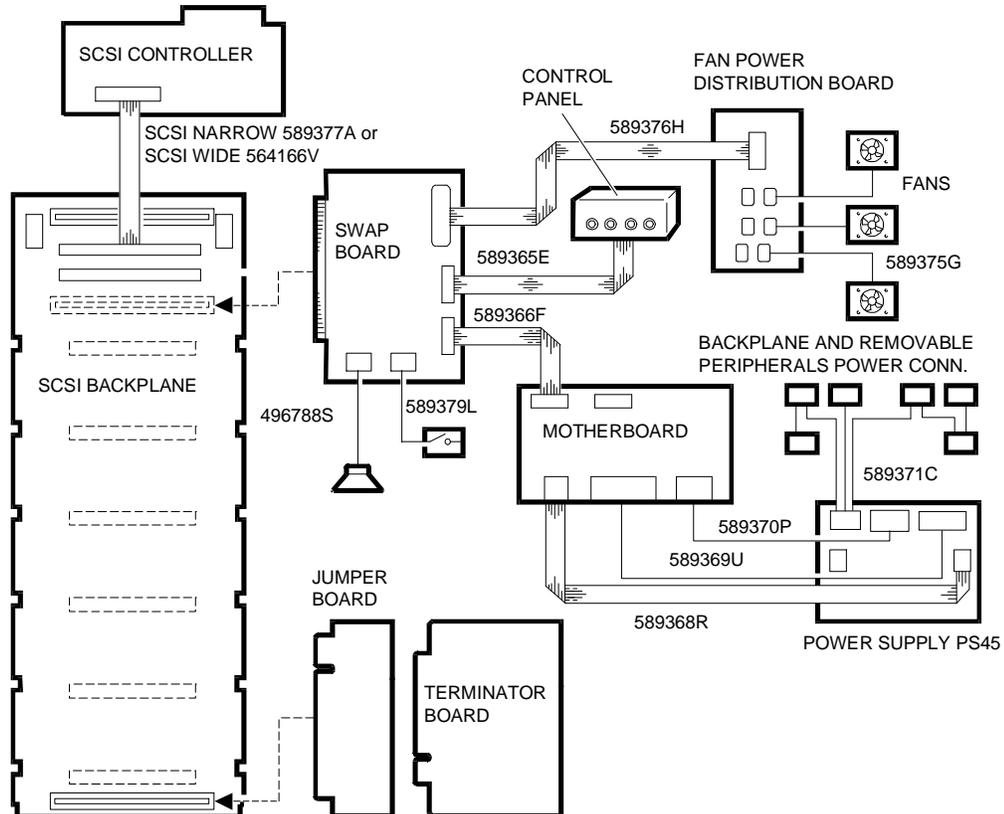
FAULTY HARD DISK REPLACEMENT PROCEDURES

- The RAID SCSI controller finds a faulty hard disk and sends the swap board a command to light the HDU FAULT LED on the console.

- From the hard disk area the operator removes the HDU whose corresponding yellow LED is on, without powering off the system nor interrupting any activity underway.

- The swap board generates the swap signal and sends this to the SCSI controller.

- The operator inserts the new hard disk which must have the same capacity and physical characteristics as the one removed. In other words it must be a 1" or 1.6" high 3.5" narrow, wide or ultra wide drive and have an 80-pin SCA interface.

- The swap board generates the swap signal and sends this to the SCSI controller.

- If the faulty HDU was part of a fault tolerant disk aray (RAID 1 or RAID 5), the SCSI controller will begin to reconstruct the data of the old hard disk onto the new one. The HDU FAULT LED flashes during this data reconstruction phase.

- Upon completion of data reconstruction the SCSI controller sends the swap board a command to turn off the HDU FAULT LED on the system console.
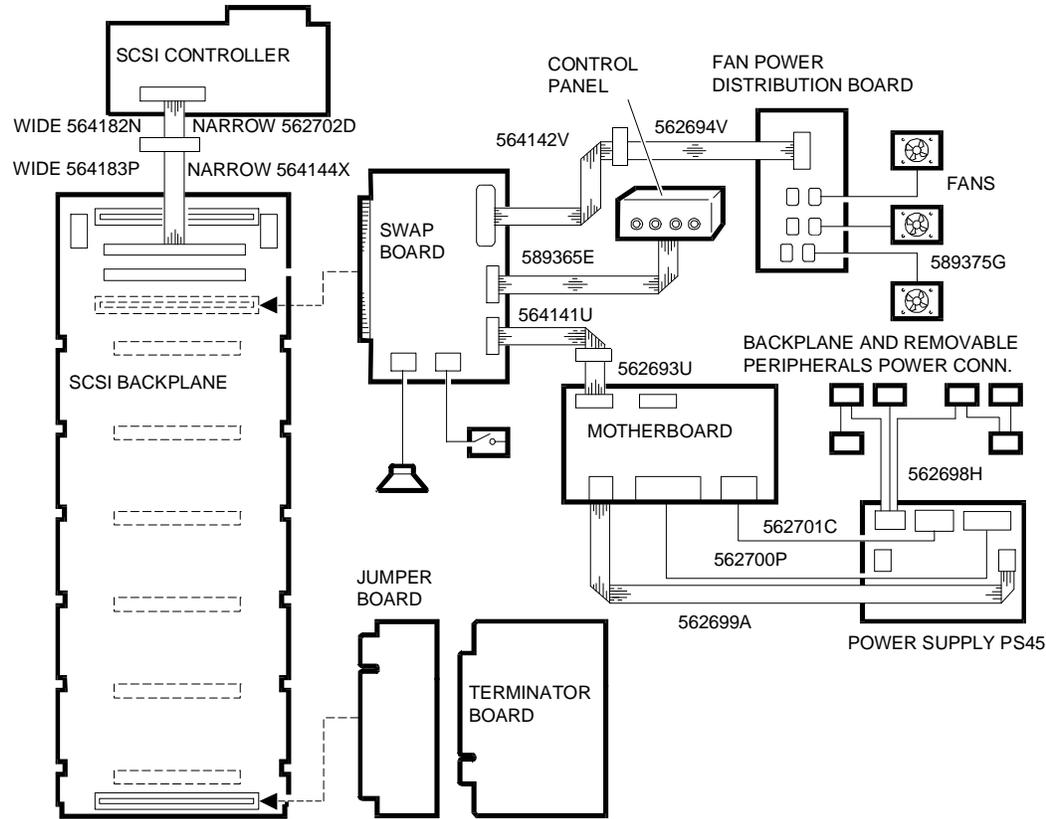
Note: *When adding or replacing a system HDU with one which has already been used on another system equipped with a RAID controller, make sure that the hard disk is clear of all logic RAID markers, in other words the hard disk must be cancelled (ZAPPED).To cancel a hard disk, boot the system from the Storage Manager Utility diskette and press the CTRL-C key sequence to prevent the bootstrapping routine from automatically loading the utility. Manually activate the utility by typing the "dptmgr / ZAP" command at the DOS prompt. The utility will display the list of drives connected and will ask which one needs to be ZAPPED.Another method of cancelling one or more hard disks is by activating the CLEANHDU Utility. This utility comes on diskette and makes it possible to recover via software hard disks considered as being unrecoverable (see Appendix M).*

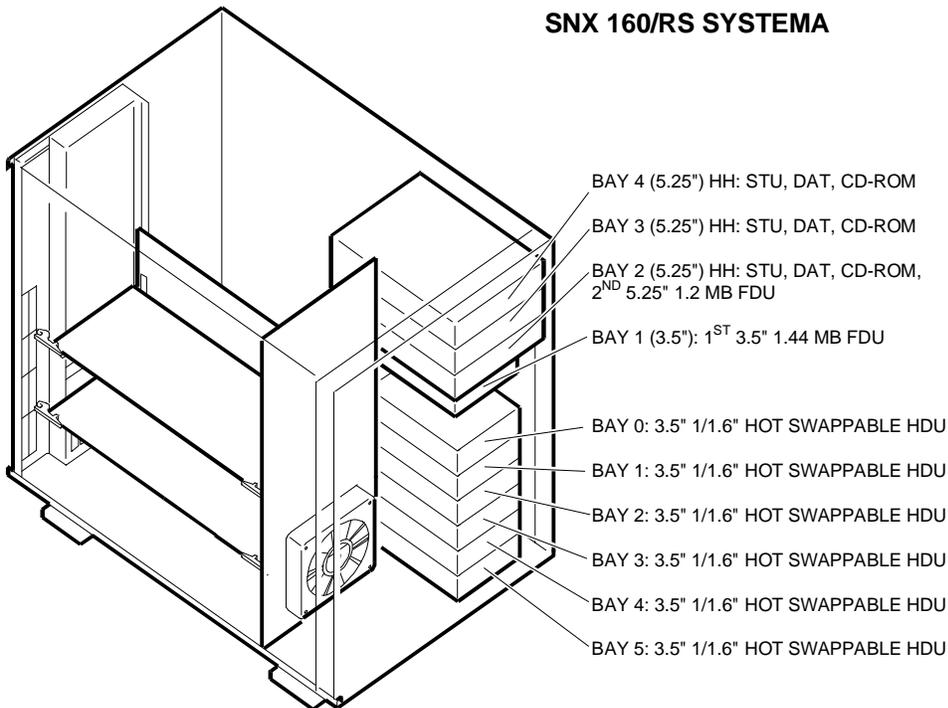## HOT SWAPPING CONNECTIONS ON SILVER SYSTEMS
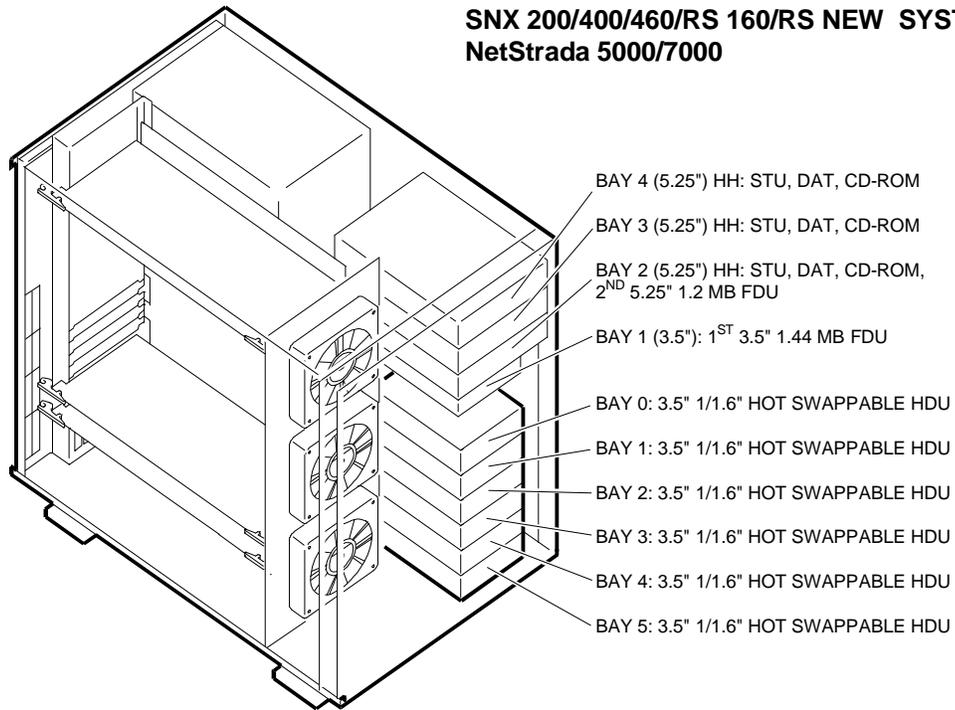
HOT SWAPPING CONNECTIONS ON RACK SYSTEMS

SCSI CONTROLLER

WIDE 564182N   NARROW 562702D

WIDE 564183P   NARROW 564144X

CONTROL PANEL

FAN POWER DISTRIBUTION BOARD

564142V   562694V

SCSI BACKPLANE

SWAP BOARD

589365E

564141U

FANS

589375G

BACKPLANE AND REMOVABLE PERIPHERALS POWER CONN.

562693U

MOTHERBOARD

562698H

562701C

562700P

JUMPER BOARD

562699A

POWER SUPPLY PS45

TERMINATOR BOARD

PERIPHERALS INSTALLABLE IN THE BASIC MODULE

SNX 160/RS SYSTEMA

BAY 4 (5.25") HH: STU, DAT, CD-ROM

BAY 3 (5.25") HH: STU, DAT, CD-ROM

BAY 2 (5.25") HH: STU, DAT, CD-ROM, 2ND 5.25" 1.2 MB FDU

BAY 1 (3.5"): 1ST 3.5" 1.44 MB FDU

BAY 0: 3.5" 1/1.6" HOT SWAPPABLE HDU

BAY 1: 3.5" 1/1.6" HOT SWAPPABLE HDU

BAY 2: 3.5" 1/1.6" HOT SWAPPABLE HDU

BAY 3: 3.5" 1/1.6" HOT SWAPPABLE HDU

BAY 4: 3.5" 1/1.6" HOT SWAPPABLE HDU

BAY 5: 3.5" 1/1.6" HOT SWAPPABLE HDU

**SNX 200/400/460/RS 160/RS NEW SYSTEMA
NetStrada 5000/7000**

BAY 4 (5.25") HH: STU, DAT, CD-ROM

BAY 3 (5.25") HH: STU, DAT, CD-ROM

BAY 2 (5.25") HH: STU, DAT, CD-ROM,
2ND 5.25" 1.2 MB FDU

BAY 1 (3.5"): 1ST 3.5" 1.44 MB FDU

BAY 0: 3.5" 1/1.6" HOT SWAPPABLE HDU

BAY 1: 3.5" 1/1.6" HOT SWAPPABLE HDU

BAY 2: 3.5" 1/1.6" HOT SWAPPABLE HDU

BAY 3: 3.5" 1/1.6" HOT SWAPPABLE HDU

BAY 4: 3.5" 1/1.6" HOT SWAPPABLE HDU

BAY 5: 3.5" 1/1.6" HOT SWAPPABLE HDU

J

**SNX 160/200/400/460/RM SYSTEMA
NetStrada 5000/7000**

BAY 4 (5.25") HH:
STU, DAT, CD-ROM

BAY 3 (5.25") HH:
STU, CD-ROM

BAY 0: 3.5" 1/1.6" HOT SWAP HDU

BAY 1: 3.5" 1/1.6" HOT SWAP HDU

BAY 2: 3.5" 1/1.6" HOT SWAP HDU

BAY 3: 3.5" 1/1.6" HOT SWAP HDU

BAY 4: 3.5" 1/1.6" HOT SWAP HDU

BAY 5: 3.5" 1/1.6" HOT SWAP HDU

BAY 1 (3.5"): 1ST 3.5" 1.44 MB FDU

BAY 2 (5.25") HH: STU, DAT,
CD-ROM, 2ND 5.25" 1.2 MB FDU
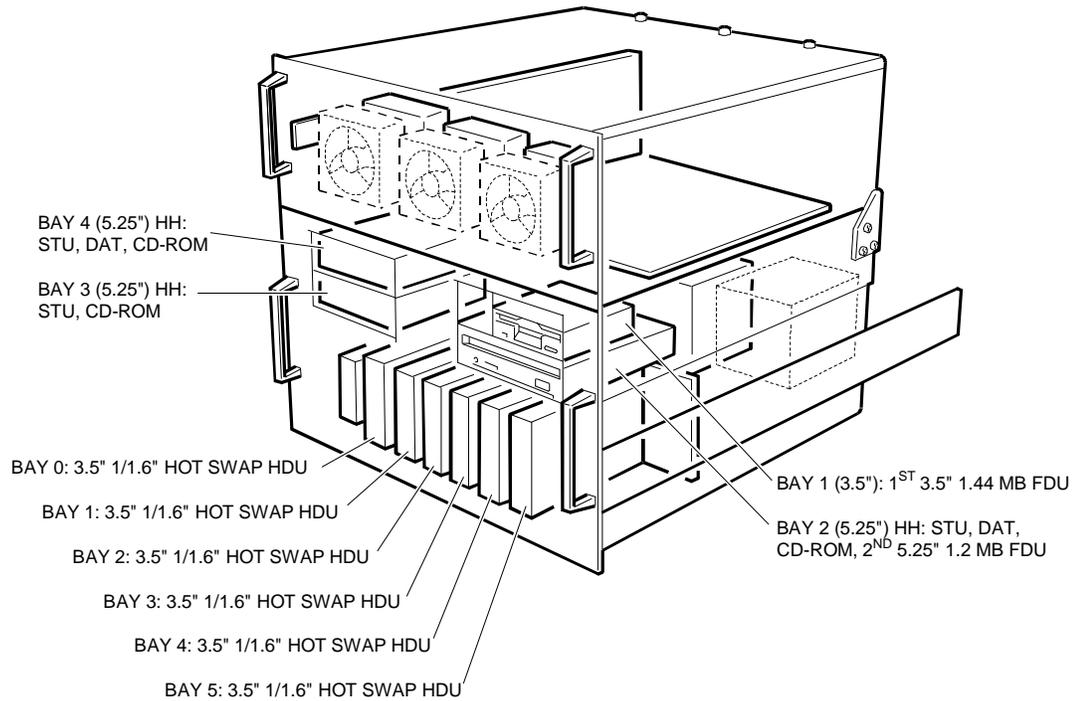
BAYS	INSTALLABLE PERIPHERALS	NOTES
BAY 1 (3.5")	1.44 MB (3.5") FDU	3.5" bay 1 always hosts the first 3.5" 1.44 MB FDU.
BAY 2 (5.25")	1.2 MB (5.25" HH) FDU or STU (5.25" HH) or CD-ROM (5.25" HH) or DAT (3.5")	5.25" HH bay 2 can only host removable peripherals. This is the only bay that can accomodate the second 5.25" 1.2 MB FDU. A 1.2 MB FDU is not installed on the SNX 160/460/RS/RM and on the NetStrada 5000/7000, while a CD-ROM is installed in all configurations.
BAY 3 (5.25") BAY 4 (5.25")	STU (5.25" HH) or CD-ROM (5.25" HH) or DAT (3.5")	5.25" HH bays 3 and 4 can only host removable peripherals. Together, these two bays can also accomodate a single full-size drive. In RM systems, if bay 2 is occupied by another peripheral, for form factor purposes the DAT must be installed in bay 4 and not in bay 3.
BAY 0 (3.5") BAY 1 (3.5") BAY 2 (3.5") BAY 3 (3.5") BAY 4 (3.5") BAY 5 (3.5")	Hot Swappable HDU (3.5"x1/1.6")	3.5" bays 0, 1, 2, 3, 4 and 5 can only host 3.5"x1/1.6" hot swappable SCSI HDUs. The HDUs can have different capacities except in RAID arrays where paired HDUs must have the same capacity. Hot spare and replacement HDUs can have a higher capacity than the replaced HDU.

BAY FILLING SEQUENCE

In the basic module, the first FDU is installed in the 3.5" bay 1. The second FDU, which can only be a 1.2 MB drive, is installed in 5.25" bay 2.

The first 5.25" SCSI removable peripheral (STU, CD-ROM, DAT), is installed in bay 2 or, if this bay contains a second FDU, in bay 3. The other removable SCSI peripherals are to be installed in the next bays.

In practice, the filling sequence for removable peripherals starts from bay 1 and proceeds upwards to bay 4. The filling sequence for the HDUs in the subrack has no specific rule. Several conditions, however, do exist: for example, if the SCO operating system is in a channel shared by HDUs and removable peripherals, HDU bays 2 and 5 (ID=2 and ID=5) must be kept free since the IDs associated to these bays are assigned to the STU and to the CD-ROM, if present.

Usually, the bay filling sequence starts from bay 0 and proceeds to bay 5.

SCSI CHANNEL CONFIGURATION

This system is available in resilience and non-resilience (not for the NetStrada 7000) versions. The mechanical structure is set for resilience configurations where the HDU, if connected to a RAID DPT SCSI controller, can be replaced without interrupting system activities (hot swapping).

A non-RAID DPT SCSI controller (Dagger, GO2109, GO2172 or onboard Lance) is used in non-resilience configurations. Removable peripherals and HDUs can be connected to these controllers; to avoid reducing system performance it is suggested that two Dagger controllers be installed in the system, one dedicated to removable peripherals and the other dedicated to HDUs. In any case the PEM cannot be connected to these controllers, and configurations which use these controllers cannot benefit from the hard disk hot swapping feature.

Resilience systems are configured with the PCI RAID DPT SCSI Narrow, Wide or Ultra Wide controller which is capable of handling up to three SCSI channels. The Wide and Ultra Wide controllers are only dedicated to HDUs and therefore a non-RAID controller is required for the management of removable peripherals. The DPT Narrow controller is dedicated to HDUs but can also connect removable peripherals; to avoid reducing system performance, in addition to the HDU-dedicated DPT Narrow controller it is suggested that the system be also equipped with a Dagger controller dedicated to removable peripherals. In particular cases, such as when other slots on the PCI bus are not available to host the Dagger controller board, one of the DPT Narrow controller channels can be dedicated to the management of removable peripherals. In any case external SCSI peripherals other than the PEM cannot be connected to the DPT controllers; these type of connections require a non-RAID DPT controller board.

The rules for configuring the SCSI channel are that all the connected devices (up to eight, controller included) must have a different identifier (SCSI ID) and that the bus be terminated at its ends only (on the first and last device on the bus). The terminator must therefore be removed from all intermediate peripherals.
The maximum length of six meters allowed for the SCSI channel must be complied with in all configurations where the peripherals are connected to the SCSI bus.

RULES FOR SETTING A SCSI ID

Besides assigning a different address to the peripherals connected to the bus, the SCSI ID assigns their priority. The ID is checked when the device with the highest priority is satisfied following simultaneous requests for access to the SCSI bus.
In an 8-bit SCSI Narrow system, the device with ID=7 has the highest priority while the one with ID=0 has the lowest.
In a 16-bit SCSI Wide system, ID priority is given in the following order: 7, 6, 5, 4, 3, 2, 1, 0, 15, 14, 13, 12, 11, 10, 9, 8. Since IDs ranging from 8 to 15 always have the lowest priority with repect to an 8-bit device, this will allow an 8-bit device that is unable to recognize IDs from 8 to 15, to coexist with a 16-bit device on the SCSI bus. If the Wide SCSI controller handles an 8-bit device, the controller cannot be configured with ID from 8 to 15 since the device is unable to recognize the controller. However, IDs from 8 to 15 are not used on these systems.

The specific structure of this system allows that the SCSI ID be automatically assigned to the HDUs according to the bays they occupy in the HDU rack. Usually the system's first HDU is installed in bay 0 and therefore has a SCSI ID of 0 while the SCSI controller has a SCSI ID of 7. If the removable SCSI peripherals are connected to the same channel as the HDUs, according to the bay filling sequence they will be assigned a decreasing SCSI ID starting from ID 6. On the other hand, if the removable peripherals are connected to a separate SCSI channel, the SCSI ID for these peripherals can be assigned randomly.

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Note: *When the same kind of SCSI controllers are installed (Dagger, GO2109, onboard Lance and GO2172), in order to be installed the SCO 3.2.4.2 and SCO Open Server 5.02 operating systems require that the removable peripheral used for their installation (CD-ROM or STU) be connected to the same channel as the boot HDU and that the STU be assigned an ID=2 and the CD-ROM an ID=5, with the consequent loss of the related HDU bays. If, instead, the removables and the HDUs are connected to two different kind of SCSI controllers (for example the removables to the Lance and the HDUs to the RAID DPT), only the STU and CD-ROM must have IDs of 2 and 5, respectively.*

The table below gives a typical example on the setting of SCSI IDs on resilience systems:

SCSI ID	0	1	2	3	4	5	6	7
Peripherals	1st HDU	2nd HDU	3rd HDU	4th HDU	5th HDU	6th HDU		RAID SCSI Controller
	1st REM. PER.	2nd REM. PER.	3rd REM. PER.	1st EXT. PER.	2nd EXT. PER.	3rd EXT. PER.	4th EXT. PER.	Non-RAID SCSI Controller

This condition also applies for the optional controllers; for the RAID DPT controller in particular, this condition is valid for all three channels.

For HDUs the SCSI ID is assigned automatically while for removable peripherals it is assigned by manually setting the jumpers or DIP-switches on each peripheral. Since the SCSI firmware will automatically recognize the ID for a determined peripheral, there is no need to reassign this value via software.
The SCSI controller ID is, on the other hand, set only via software through EISA Configuration Utility in the case of the non-RAID DPT controllers or through the DPT Configuration Utility in the case of the RAID controllers; the default value for all the controllers is ID 7, which must not be changed unless in Dual Host configurations in which only the RAID DPT GO2098 and GO2173 controllers are used.

TERMINATION RULES

The SCSI channel must be terminated at its ends only (on the first and last device on the bus) and the terminators removed from all devices in between. On these systems, the SCSI terminator for HDUs is always present on the swap board while it cannot be removed from the SNX 160/RS; on other systems it is removed only in duplexing configurations.
If the system has only one SCSI controller (Dagger or RAID DPT Narrow) dedicated to HDUs and internal removable peripherals, and thus no external connections, the HDUs and SCSI controller must always be terminated.
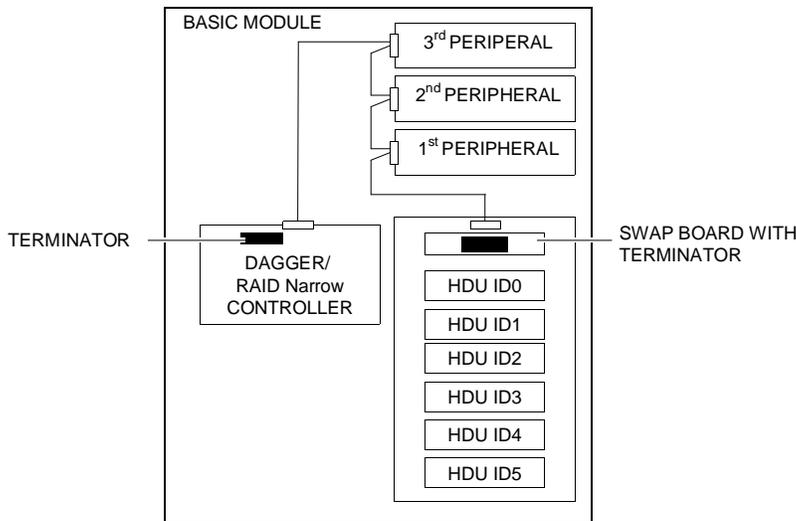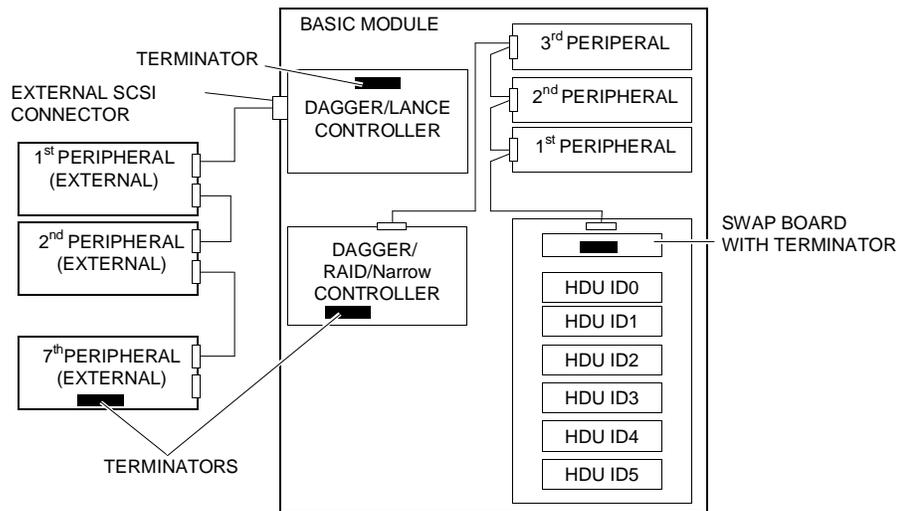
If in the system there is only one SCSI controller (onboard Lance or GO2109) dedicated to HDUs and to internal removable peripherals, thus no external connections, the terminator must be disabled from the controller and inserted on the HDUs and at the end of the SCSI cable by means of an external active terminator.
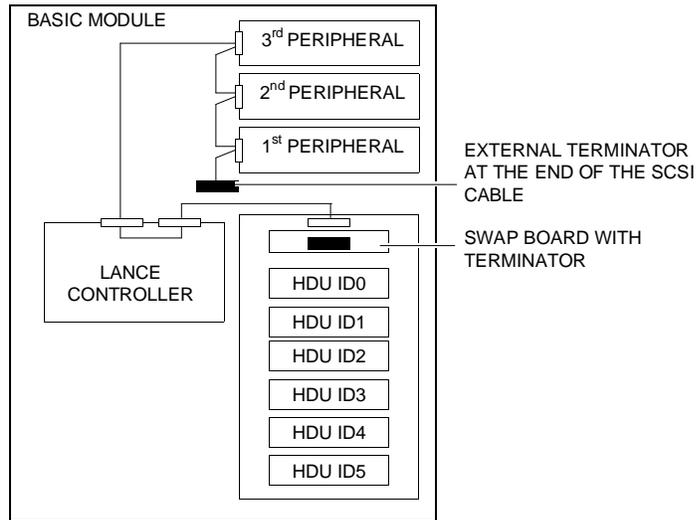

If the system has 2 SCSI controllers or 2 separate SCSI channels, 1 for HDUs and 1 for internal, no external, removable peripherals, the HDU channel is terminated on the swap board and on the SCSI controller while the channel for removable peripherals is terminated on the SCSI controller and on the SCSI cable by means of an external active terminator.

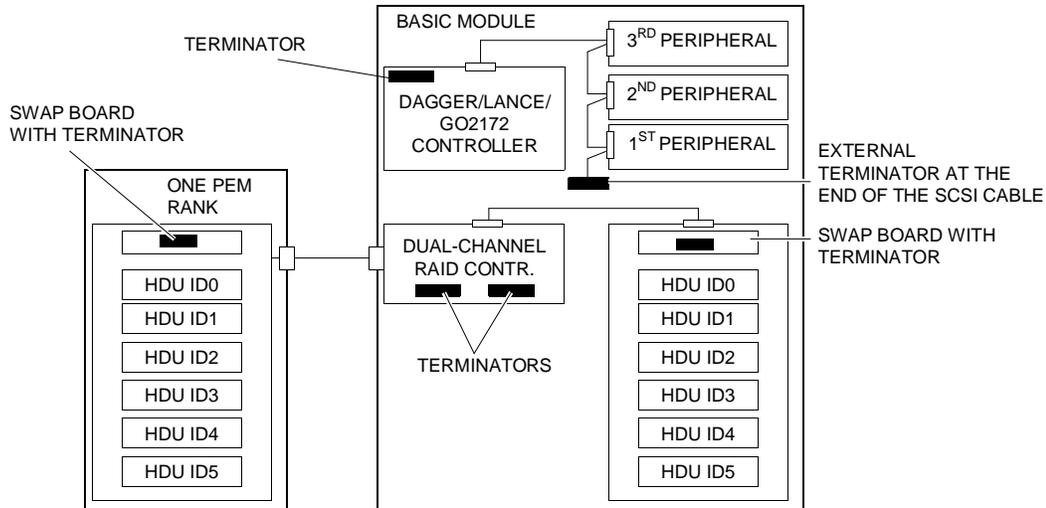CONFIGURATION OF SILVER BOX AND RACK MOUNT PERIPHERALS   J-23
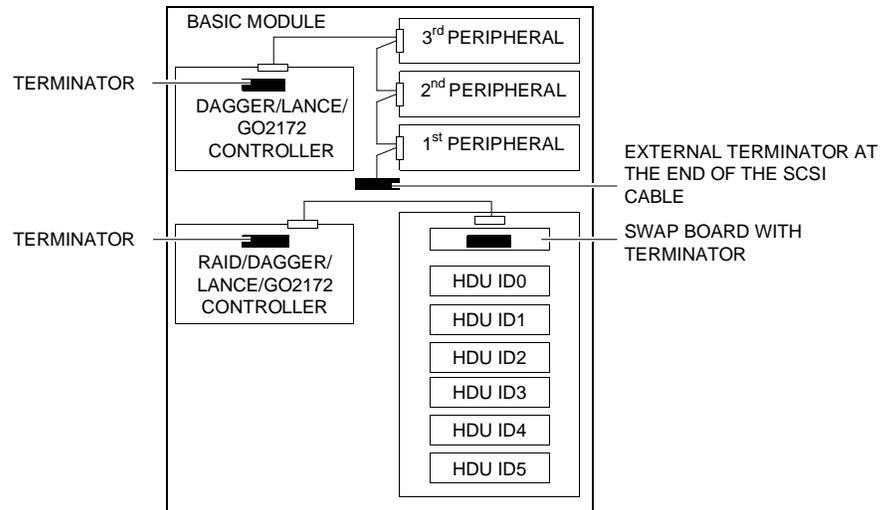
For connections to external, non PEM, SCSI peripherals and to a dedicated non-RAID controller, the terminator must be present on both the controller and on the last peripheral connected to the system.

For connections to extenal, non PEM, SCSI peripherals and to a non-RAID controller which also manages internal removable peripherals, the terminator must be removed from the controller and installed on the last external peripheral connected to the system, and on the internal SCSI cable via an external active terminator. This reduces the transfer rate over the SCSI channel from 10 to 5 MB/sec.
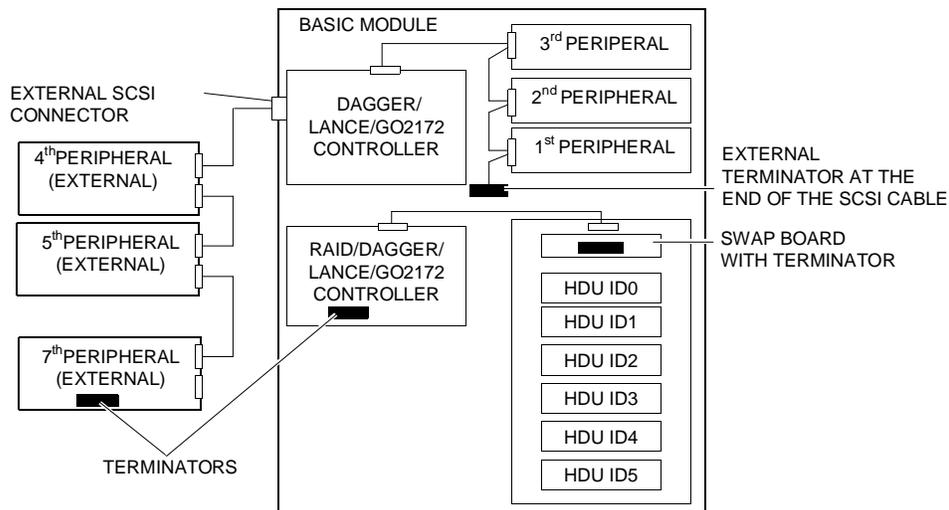
One channel of the RAID DPT controller is required for connection to the PEM. The terminator must be installed on both PEM controller and swap board.

```
                                    BASIC MODULE
                                                        ┌──────────────────┐
                                                        │  3RD PERIPHERAL  │
        TERMINATOR                                      └──────────────────┘
                                                        ┌──────────────────┐
                                ┌────────────────┐      │  2ND PERIPHERAL  │
SWAP BOARD                      │  DAGGER/LANCE/ │      └──────────────────┘
WITH TERMINATOR                 │     GO2172     │      ┌──────────────────┐
                                │   CONTROLLER   │      │  1ST PERIPHERAL  │      EXTERNAL
      ┌──────────────┐          └────────────────┘      └──────────────────┘      TERMINATOR AT THE
      │  ONE PEM     │                                                            END OF THE SCSI CABLE
      │  RANK        │          ┌────────────────┐      ┌──────────────────┐
      │  ┌────────┐  │          │  DUAL-CHANNEL  │      │                  │      SWAP BOARD WITH
      │  │        │  │          │  RAID CONTR.   │      │                  │      TERMINATOR
      │  ├────────┤  │          └────────────────┘      ├──────────────────┤
      │  │ HDU ID0│  │                                  │  HDU ID0         │
      │  ├────────┤  │              TERMINATORS         ├──────────────────┤
      │  │ HDU ID1│  │                                  │  HDU ID1         │
      │  ├────────┤  │                                  ├──────────────────┤
      │  │ HDU ID2│  │                                  │  HDU ID2         │
      │  ├────────┤  │                                  ├──────────────────┤
      │  │ HDU ID3│  │                                  │  HDU ID3         │
      │  ├────────┤  │                                  ├──────────────────┤
      │  │ HDU ID4│  │                                  │  HDU ID4         │
      │  ├────────┤  │                                  ├──────────────────┤
      │  │ HDU ID5│  │                                  │  HDU ID5         │
      │  └────────┘  │                                  └──────────────────┘
      └──────────────┘
```

Note: *From August 1995, the active external AMP terminator code 578397G has been replaced by the active external terminator IF2032 code 562385X.*

The Dagger SCSI controller is terminated on the board. This termination consists of constantly enabled active terminators but which can be automatically disabled in case there is a temporary connection on both internal and external SCSI connectors.

The Lance SCSI controllers (GO2109 and integrated on the motherboard) and the GO2172 Ultra Wide SCSI controller are terminated on the board. This termination consists of continuously enabled active terminators that can, however, be automatically disabled in case there is a simultaneous connection on two of the three connectors available (the two internal or the internal and external). Connection cannot be made simultaneously on all three connectors.

The RAID DPT SCSI controller is terminated on the board. This termination consists of active terminators which are enabled or disabled for each of the channels present on the controller via the DPT Configuration Utility. The default setting for all the channels is "SCSI Termination Enabled".

As far as SCSI terminations of the HDU assembly are concerned, on both the system and PEM the termination is always present on the Swap Board and it cannot be removed from SNX 160/RS systems; on other systems it is only removed in the case of duplexing configurations while it is only removed from the PEM in the case of dual host configurations. Internal removable peripherals are always terminated at the end of the internal SCSI cable by means of an external terminator. Therefore during the installation of each internal SCSI peripheral, it is important to make sure that the drive's internal terminators are removed.

Terminators are not installed on SCA SCSI HDUs. Any external SCSI peripheral connected to the system is terminated internally and directly on the peripheral itself (refer to the documentation supplied with the peripheral for terminator locations).

CABLING OF PERIPHERALS

The motherboard has a channel which allows the management of up to two floppy interface peripherals. The interface cable is a flat cable with 3 connectors that links up on one side (J03) to motherboard connector and ends with two female sockets for the connection of up to two FDUs.

The third connector (J01) is for the 1.44 MB primary FDU, the intermediate connector (J02) is for the optional 1.2 MB second FDU (on the SNX 160/200/400 only); this intermediate connector is card-edge type already prepared for 1.2 MB FDU connection and therefore does not require an adapter cable.
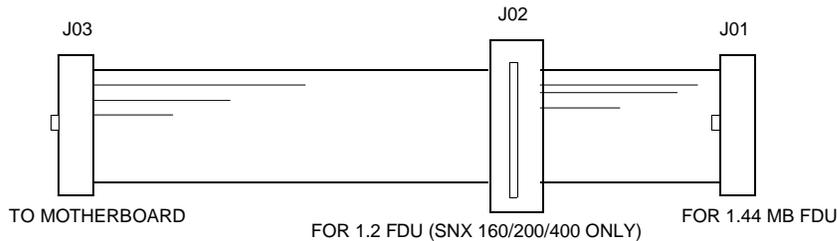
As far as the connection of SCSI peripherals is concerned, the cables differ depending on whether a Silver or Rack system is used:

- On Silver systems there are two internal cables present in all configurations:

  – A twin connector SCSI Narrow cable, on all Narrow systems, for connecting the SCSI Narrow controller to the SCSI Narrow backplane. Otherwise, a twin connector SCSI Wide cable, on all Wide systems, for connecting the SCSI Wide or Ultra Wide controller to the SCSI Wide backplane. Only the HDU assembly can be connected to this cable.
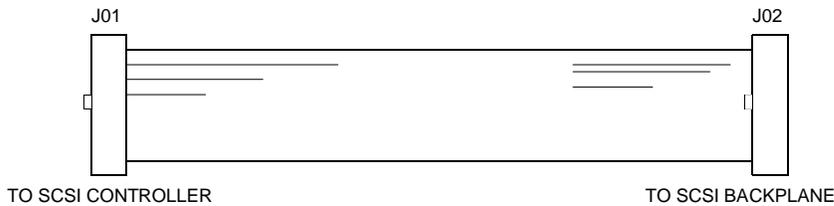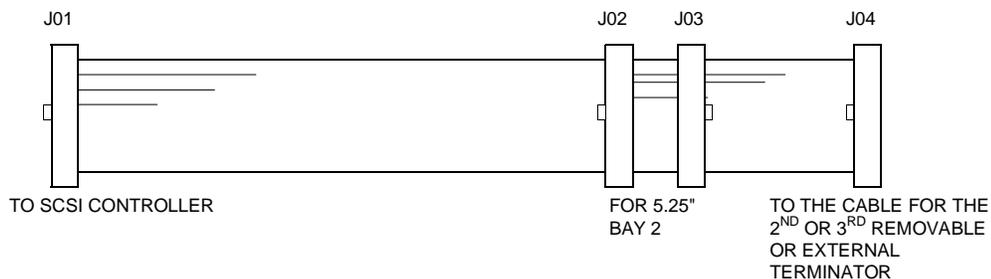

One SCSI Narrow cable with six connectors that allows, on Narrow systems, the SCSI controller to be connected to the SCSI backplane and to three internal removable peripherals, while on Wide systems it only allows the connection of internal removable peripherals. Since to avoid reducing system performance it is suggested to connect removable peripherals and HDUs on the same SCSI channel even on Narrow systems, this cable should only be used for connecting removable peripherals. In this case, if the channel is only dedicated to removable peripherals, an external terminator must be connected at the end of the cable. Connector J05 simplifies the installation in the 5.25" bay 2 of peripherals whose SCSI connector has an inverted polarization notch.
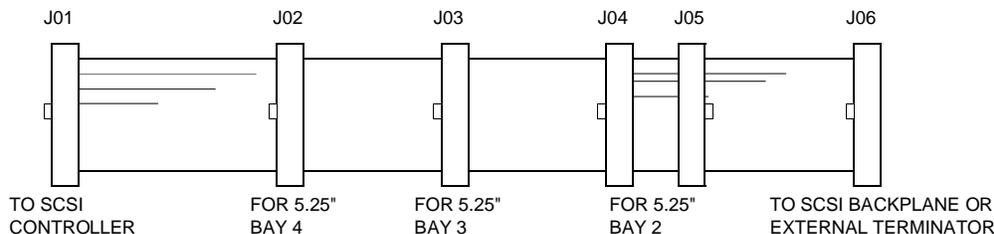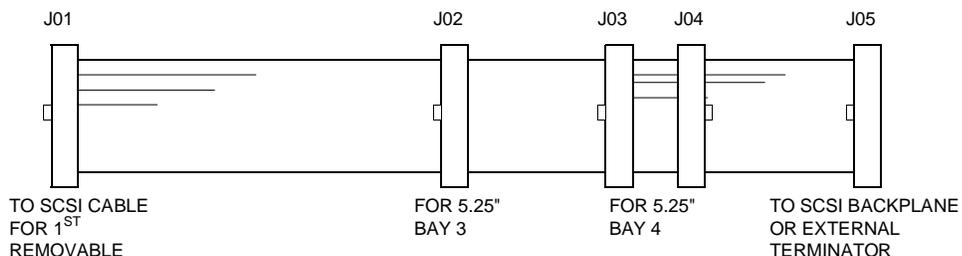
- The following cables are available on Rack systems and are present in every configuration:

  - Twin connector SCSI Narrow cable, on Narrow systems, for connecting the SCSI Narrow controller to the SCSI Narrow backplane. Otherwise, a twin connector SCSI Wide cable, on Wide systems, for connecting the SCSI Wide controller to the SCSI Wide backplane. Only the HDU assembly can be connectd to this cable. In the middle of both Narrow and Wide cables there is a male-female connector which is used to separate the top and bottom modules.

J01   J02

TO SCSI CONTROLLER   TO SCSI BACKPLANE
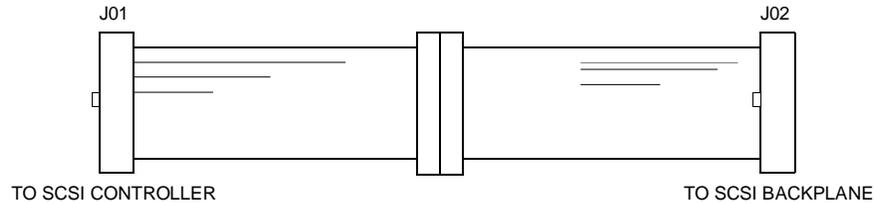
  - A SCSI Narrow cable with four connectors for connecting the SCSI controller to the first removable internal peripheral installed in bay 2. Connector J04 at the end of the cable allows the connection of the external terminator or of the SCSI cable for the second and third internal removable peripheral.
    Connector J03 simplifies the connection in 5.25" bay 2 of peripherals whose SCSI connector has an inverted polarization notch.

J

J01   J02   J03   J04

TO SCSI CONTROLLER   FOR 5.25"   TO THE CABLE FOR THE
                                       BAY 2   2ND OR 3RD REMOVABLE
                                                    OR EXTERNAL
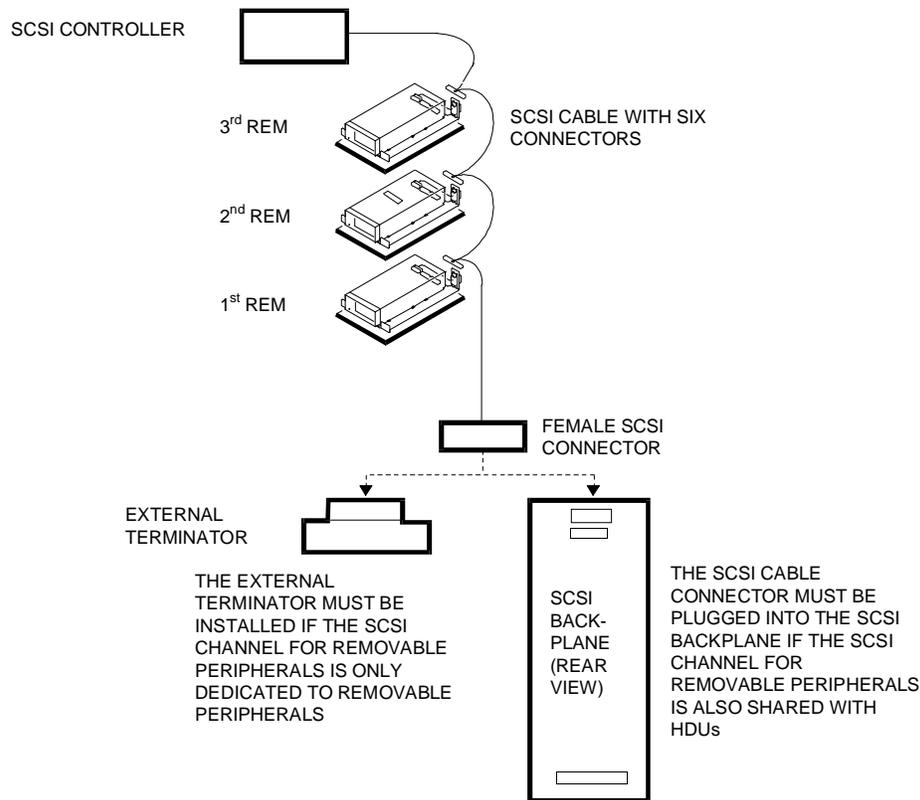   TERMINATOR

  - A SCSI Narrow cable with 5 connectors which, on Narrow systems, is used for connecting the second and third internal removable peripheral or for connection to the SCSI Narrow backplane when HDUs and removables are connected to the same channel. On Wide systems this cable is used only for connecting the second and third internal removable peripheral. This cable is not used in other cases and is found in the basic module box. If the cable is used for connecting removable peripherals, remove the external terminator from the previous four-connector SCSI Narrow cable and attach it to connector J05. Connector J04 simplifies the connection in 5.25" bay 4 of peripherals whose SCSI connector has an inverted polarization notch.

J01   J02   J03   J04   J05

TO SCSI CABLE   FOR 5.25"   FOR 5.25"   TO SCSI BACKPLANE
FOR 1ST BAY 3   BAY 4   OR EXTERNAL
REMOVABLE   TERMINATOR

If the Narrow system is equipped with only a single-channel SCSI controller, only the six-connector Narrow SCSI cable is used (Silver systems), or the four-/five-connector cable (Rack systems), which allows all the peripherals to be connected, while the twin connector cable is not used.

If instead the system is configured with a dual-channel RAID SCSI Narrow controller, or an additional SCSI controller is installed, the twin connector cable is used to connect a controller or a channel to the HDUs while the cable with six connectors is used to connect the second controller or the second channel to the removable peripherals. For this operation, you will need to:

• Disconnect the six-connector SCSI Narrow cable (Silver systems) or five-connector cable (Rack systems) from the backplane and attach an external terminator to the end of this cable.

• Even though unused, a twin connector SCSI Narrow cable is always available in the basic module together with the other cables. This cable is not needed in the minimum system configuration, but is used when one channel is to be dedicated to the HDUs and one to the removable peripherals. In this case the SCSI cable must be connected to both the backplane and to the SCSI controller.

SCSI CONTROLLER

3rd REM

SCSI CABLE WITH SIX CONNECTORS

2nd REM

1st REM

FEMALE SCSI CONNECTOR

EXTERNAL TERMINATOR

THE EXTERNAL TERMINATOR MUST BE INSTALLED IF THE SCSI CHANNEL FOR REMOVABLE PERIPHERALS IS ONLY DEDICATED TO REMOVABLE PERIPHERALS

SCSI BACK-PLANE (REAR VIEW)

THE SCSI CABLE CONNECTOR MUST BE PLUGGED INTO THE SCSI BACKPLANE IF THE SCSI CHANNEL FOR REMOVABLE PERIPHERALS IS ALSO SHARED WITH HDUs

On Wide systems and in every configuration, the twin connector SCSI Wide cable is always used for connecting the HDUs to the controller and the six-connector SCSI Narrow cable (Silver systems) or four-/five-connector cable (Rack systems) is always used for connecting internal removable SCSI peripherals.

A non-PEM external peripheral connects to the Dagger controller's high density SCSI-2 external connector on the rear of the system by means of SCSI cable CBL 5365. The additional peripherals are daisy-chained with the same cable, and comply with the maximum 6 meter length allowed for SCSI channels.
The Narrow PEM connects to the external high density SCSI Narrow connector of the RAID DPT Narrow controller, on the rear of the system, by means of the CBL 5350 Narrow SCSI cable; the Wide PEM connects to the external high density SCSI Wide connector of the RAID DPT Wide or Ultra Wide controller, on the rear of the system, by means of SCSI Wide cable CBL 5350W.
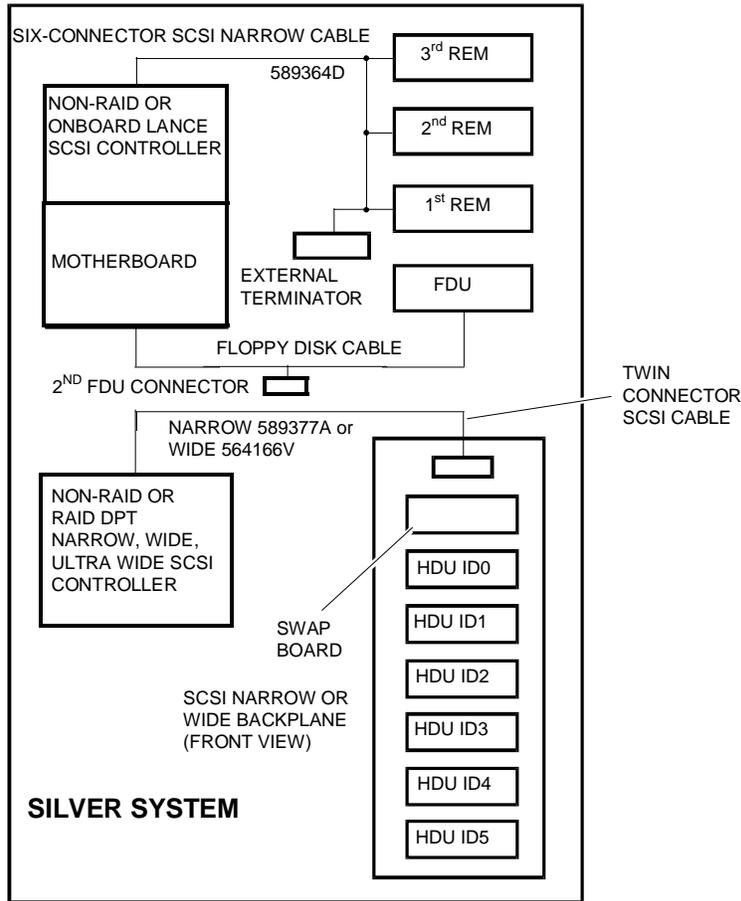
SCSI CABLES

PDG	VAR.	DESCRIPTION	LENGTH (m)
CBL 5365		External SCSI cable which adapts high density 50-pin SCSI connectors to low density 50-pin connectors.	1.5
CBL 5350	CAV 231	Not used on the Silver or Rack PEMs	0.75
	CAV 232	External SCSI Narrow cable used for connecting the system basic module to the third or fourth PEM Narrow. This cable has two high density 50-pin SCSI connectors.	1.1
	CAV 265	External SCSI Narrow cable used for connecting the system basic module to the third, fourth, fifth or sixth PEM Narrow. This cable has two high density 50-pin SCSI connectors.	1.5
CBL 5350W	CAV 232	External SCSI Wide cable for connecting the system basic module to the first or second PEM Wide, code 564180 Y. This cable has two 68-pin high density connectors.	1.1
	CAV 265	External SCSI Wide cable for connecting the system basic module to the remaining PEM Wide, code 564172 T. This cable has two 68-pin high density connectors.	1.5

Note: *The internal SCSI Wide cable for the additional channels of the GO2098/2173 controller has code 564173 V and is provided in the second SCSI channel expansion kit EXP 2NDSCSIW and in the second and third SCSI channel expansion kit EXP 2&3SCSIW, EXP 2&3SCSIUW.*

The following figures shows the internal cabling of magnetic peripherals with two SCSI controllers.
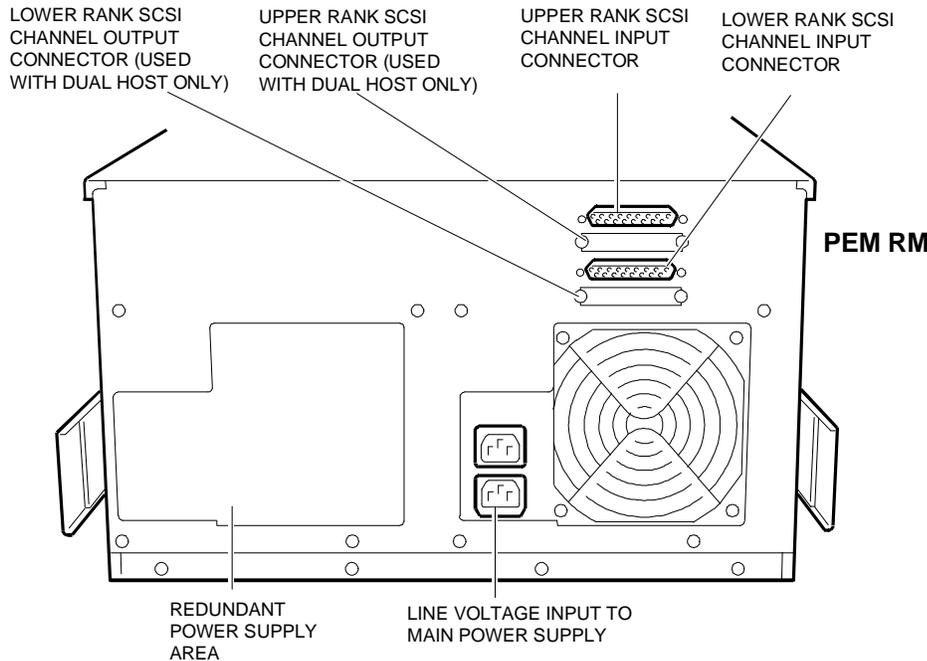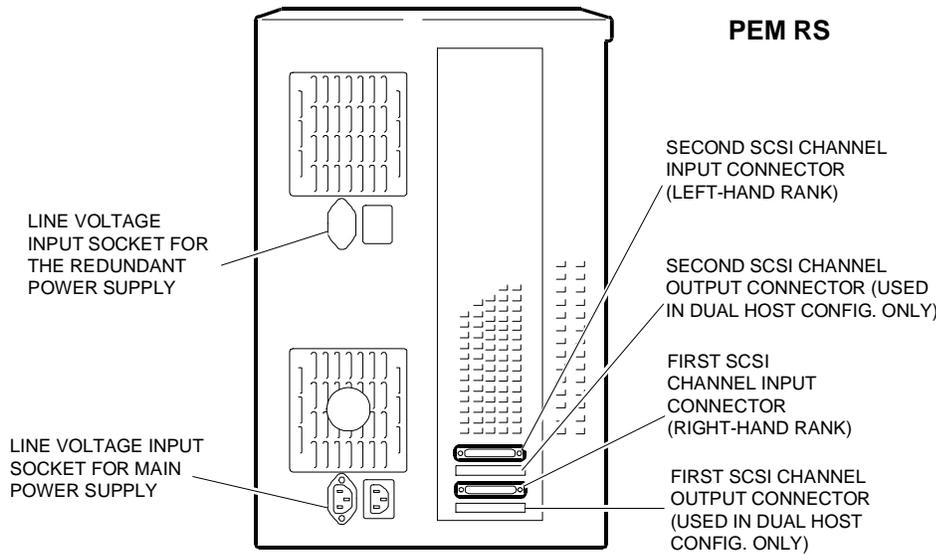
SIX-CONNECTOR SCSI NARROW CABLE

589364D

3rd REM

2nd REM

1st REM

NON-RAID OR ONBOARD LANCE SCSI CONTROLLER

MOTHERBOARD

EXTERNAL TERMINATOR

FDU

FLOPPY DISK CABLE

2ND FDU CONNECTOR

NARROW 589377A or WIDE 564166V

TWIN CONNECTOR SCSI CABLE

NON-RAID OR RAID DPT NARROW, WIDE, ULTRA WIDE SCSI CONTROLLER

SWAP BOARD

HDU ID0

HDU ID1

HDU ID2

HDU ID3

HDU ID4

HDU ID5

SCSI NARROW OR WIDE BACKPLANE (FRONT VIEW)

SILVER SYSTEM

NON-RAID OR RAID DPT NARROW, WIDE OR ULTRA WIDE SCSI CONTR.

NON-RAID OR ONBOARD LANCE SCSI CONTR.

MOTHERBOARD

NARROW 562702D
WIDE 564182N

TWIN CONNECTOR SCSI CABLE

EXTERNAL TERMINATOR

1ST REM. SCSI CABLE 562696X

FLOPPY CABLE 562697Y

3^a REM

2ND, 3RD REM.SCSI CABLE 564143W

FDU

2^a REM

1ST REM

2ND FDU CONNECTOR

NARROW 564144X
WIDE 564183P

UPPER AND LOWER MODULE SEPARATION CONNECTORS

TERMINATOR OR 2ND and 3RD REM. SCSI CABLE CONNECTOR

SWAP BOARD

HDU ID0

HDU ID1

HDU ID2

HDU ID3

HDU ID4

HDU ID5

SCSI NARROW OR WIDE BACKPLANE (FRONT VIEW)

RACK SYSTEM

STORAGE PEM (PERIPHERAL EXPANSION MODULE)

The Storage PEM is an optional, external, self-powered cabinet that cannot be remotely powered on and that makes it possible to increase the number of HDUs available to the system. It is connected to the basic module by means of an external SCSI cable. The PEM comes in a minitower, floor-standing cabinet called Silver, for connection to Silver systems, or in a 19" Rack mount cabinet for connection to Rack systems. The particular structure of Silver and Rack cabinets, in association with redundancy (RAID-1 and RAID-5), provided by the SCSI controller, allows HDU resilience (hot swapping). Hot swapping is the replacement of faulty HDUs without powering off the system, and the automatic reconstruction of the data on the new hard disk. The PEM's resilience configuration allows the installation of hot swappable SCSI HDUs only, in other words HDUs equipped with an SCA connector. These drives are fitted on a specific support and are the same as the ones that can be used on the basic module. Up to 12 HDUs can be installed in the PEM. The controller that manages the HDUs is installed in the basic module and can only be a RAID DPT SCSI controller that allows the management of RAID-0, RAID-1 and RAID-5 arrays; the PEM cannot be connected to other SCSI controllers. Being equipped with two separate SCSI channels with six HDUs each, the PEM is set to support disk duplexing. This feature consists of the possibility of connecting the two SCSI channels, with the same number of HDUs, to two SCSI controllers in order to create two mirrored HDU/controller channels. Software support is provided by the operating system. The PEM is also required in order to create dual host configurations where there are two basic modules connected to one or two PEMs; in case one of the two systems fails, the other can take control of the HDUs that are shared in the PEM.
As the basic module, also the PEM can be configured for redundancy, in other words it can be equipped with two power supply units and two fan assemblies so that if one of the primary modules fails the system can still continue with its normal operations.
The PEM is available in several versions that connect to different types of RAID DPT SCSI controllers and to different systems; the following table shows the correspondence and the major characteristics of the different models.

PEM Model	PEM 200/RS	PEM 200/RRS	PEM 240W/RS	PEM 241W/RS	PEM 200/RM	PEM 240W/RM
Cabinet	Silver	Silver	Silver	Silver	19" Rack	19" Rack
SCSI Interface	8-bit Narrow	8-bit Narrow	16-bit Wide	16-bit Wide	8-bit Narrow	16-bit Wide
Max. transfer rate	10 MB/sec	10 MB/sec	20 MB/sec	20 MB/sec	10 MB/sec	20 MB/sec
Compatible system	SNX 160/ 200/400/RS 100/133	SNX 200/ 400/RS 100/133	SNX 160/ 200/400/RS 100/133	SNX 460/RS	SNX 200/ 400/RM 100/133	SNX 200/ 400/RM 100/133
			SNX 160/ RS 133 W	SNX 140/160/S		SNX400/RM 133/166 W
			SNX400/RS 133/166 W	SNX160/RS NEW		SNX 460/RM
			SNX 460/RS	NetStrada 3000/5000/ 7000 Silver		SNX160/RM NEW
			SNX 140/160/S			NetStrada 3000/5000/ 7000 Rack
			SNX160/RS NEW			
RAID DPT SCSI Controller	GO2061 Narrow	GO2061 Narrow	GO2098 Fast Wide	GO2098 Fast Wide	GO2061 Narrow	GO2098 Fast Wide
				GO2173 UltraWide		GO2173 UltraWide

PEM Model	PEM 200/RS	PEM 200/RRS	PEM 240W/RS	PEM 241W/RS	PEM 200/RM	PEM 240W/RM
Redundant	No	Yes	No	No	No	No
Redundancy Kit	RED KIT 200PEM	-	RED KIT 200PEM	RED KIT 241PEM	RED KIT 240PEM RM	RED KIT 240PEM RM
Fans	1 inside the power supply	1 inside the power supply	1 inside the power supply	1 inside P.S. + 1 on fan support	1 inside the power supply	1 inside the power supply
SCSI Cable	CBL 5350	CBL 5350	CBL 5350W	CBL 5350W	CBL 5350	CBL 5350W
SCA SCSI HDU	Narrow	Narrow	Fast Wide	Fast Wide	Narrow	Fast Wide
				Ultra Wide		Ultra Wide

Note: *Models PEM 241W/RS and PEM 240W/RM are currently in production.*

PEM RS

SECOND SCSI CHANNEL INPUT CONNECTOR (LEFT-HAND RANK)

LINE VOLTAGE INPUT SOCKET FOR THE REDUNDANT POWER SUPPLY

SECOND SCSI CHANNEL OUTPUT CONNECTOR (USED IN DUAL HOST CONFIG. ONLY)

FIRST SCSI CHANNEL INPUT CONNECTOR (RIGHT-HAND RANK)

LINE VOLTAGE INPUT SOCKET FOR MAIN POWER SUPPLY

FIRST SCSI CHANNEL OUTPUT CONNECTOR (USED IN DUAL HOST CONFIG. ONLY)

LOWER RANK SCSI CHANNEL OUTPUT CONNECTOR (USED WITH DUAL HOST ONLY)

UPPER RANK SCSI CHANNEL OUTPUT CONNECTOR (USED WITH DUAL HOST ONLY)

UPPER RANK SCSI CHANNEL INPUT CONNECTOR

LOWER RANK SCSI CHANNEL INPUT CONNECTOR

PEM RM

REDUNDANT POWER SUPPLY AREA

LINE VOLTAGE INPUT TO MAIN POWER SUPPLY

NOTES AND LIMITATIONS

- The PEM must be in its non-redundant configuration when the basic module is non-redundant, and must be in its redundant configuration when the basic module is redundant; no other configuration is allowed.

- The PEM must be connected to the RAID DPT SCSI controller, it cannot be connected to any other SCSI controller. Even though correctly handling HDUs, the different SCSI controllers are unable to signal temperature and power supply problems through the console LEDs.

- Dual Host configurations can only be created on Wide systems equipped with the RAID DPT GO2098 or GO2173 SCSI controller connected to a PEM Wide. Dual Host configurations can currently be implemented on SNX 400/RS/RM 133 W and 166 W, SNX 460/RS/RM, SNX 160/RS/RM NEW, NetStrada 7000 systems.

- In the case of the PEM Narrow, the BIOS can only count up to 8 HDUs even in cases where there are more drives. The HDUs beyond the 8th are recognized at the POD as Disks and not as Drives. In any case all the HDUs are managed correctly.

- From September 1996, the PEM 240W/RS is replaced by the PEM 241W/RS which differs from the previous model as it has an internal fan B26 located on the fan support. This fan allows additional hard disks to be installed in the PEM that could cause the temperature inside the PEM to rise above the current ratings. This additional fan is not required for the Rack mount PEM.

- In the case of a main system + RAID PEM whose disks are distributed among several channels of the same controller (RAID DPT), all power ons and power offs must be made on the UPS that supports the main system and PEM; it is therefore suggested to lock the ON/OFF button of the two boxes to the ON position by using the keys provided.

J

PEM COMPOSITION

With respect to the Silver and Rack basic modules, the PEM RS/RM differs in the following ways:

- **Resilience Structure -** The structure which allows the hot swapping of HDUs is double on the PEM with respect to the basic module; in other words the HDU structure in the right-hand rank is also available in the left-hand rank (on the PEM RS) or the HDU structure in the lower rank is also available in the upper rank (on the PEM RM), in the place of the board area. The PEM is capable of hosting 6 + 6 HDUs, six in the right-hand or lower rank and another six in the left-hand or upper rank. The following components are present:

  – Two IF2019 Narrow SCSI backplanes (PEM Narrow) or two IF2046/2067 Wide SCSI backplanes (PEM Wide), one per rank, where the swap boards, jumper boards and HDUs are installed.

  – Two IF2012/IF2031 swap boards. The swap board in the right-hand or upper rank carries out normal operations while the one in the left-hand or lower rank does not handle redundancy, the ON/OFF switch and the speaker.

  – Two IF2022 jumper boards, always present. The jumper board is not replaced by the terminator board since the PEM is already equipped with two separate SCSI channels for duplexing.

  The SCSI backplanes and the SCSI controller are connected by means of an external Narrow SCSI cable CBL 5350 for the Narrow PEM or Wide SCSI cable CBL 5350W for the Wide PEM. Two SCSI cables inside the PEM (Narrow or Wide) connect the SCSI backplanes to the two high density external SCSI connectors.
  The bay filling sequence for the two ranks is from top to bottom as on the basic module, starting from the HDUs with an ID=0. For top performance it is suggested that both ranks have the same number of HDUs installed so as to balance the number of hard disks connected to the two channels.

- **Console** - This PEM has two consoles: the one to the right or upper has an ON/OFF switch and four LEDs and is identical to the one on the basic module, while the one to the left or lower has only four LEDs. The SYS ON LED (PEM powered) function is the same on both consoles, the SCSI BUSY and HDU FAULT LEDs indicate the activities or failures of the HDUs in the right or left racks while the SYS FAULT LED indicates power supply or fan failures.

- **Power Supply** - This PEM uses the PS45 power supply, the same one used in the basic module. This unit is connected internally to only the two SCSI backplanes and to the right or upper swap board, while the external monitor connector is not used. If the PEM is redundant, a second PS45 will be fitted above the main power supply. These two power supplies are connected through the power supply parallelism board (IF2025/35 for the PEM RS, IF2034 for the PEM RM) by means of the current share cable.

- **Fans** - The PEM RS Narrow, PEM 240W/RS and all PEM RM are adequately cooled down by the fan contained in the power supply and therefore with respect to the basic module there are no fans in the board area. On the PEM RS Narrow and PEM 240W/RS, the fan support is present and plastic caps are fitted in place of the fans. The PEM 241W/RS, in production from September 1996, is equipped with one of the basic module's three fans while the support, besides hosting a fan, is also fitted with fan power supply distribution board IF2015. The non-redundant PEM RS Narrow, PEM 240W/RS and PEM RM that have only one power supply are equipped with only one fan, while the redundant versions that have two power supplies are equipped with two fans. The non-redundant PEM 241W/RS has two fans, one in the power supply and one, B26, on the fan support. The redundant version of this PEM has four fans, two in the power supplies and two B26 models.

- **Front Bays** - The only peripherals that can be installed in the PEM are hard disks compatible with resilience systems. Therefore since no other peripheral will be installed on the PEM, the front bays of this module are empty, whereas the font bays on the basic module contain removable magnetic peripherals.
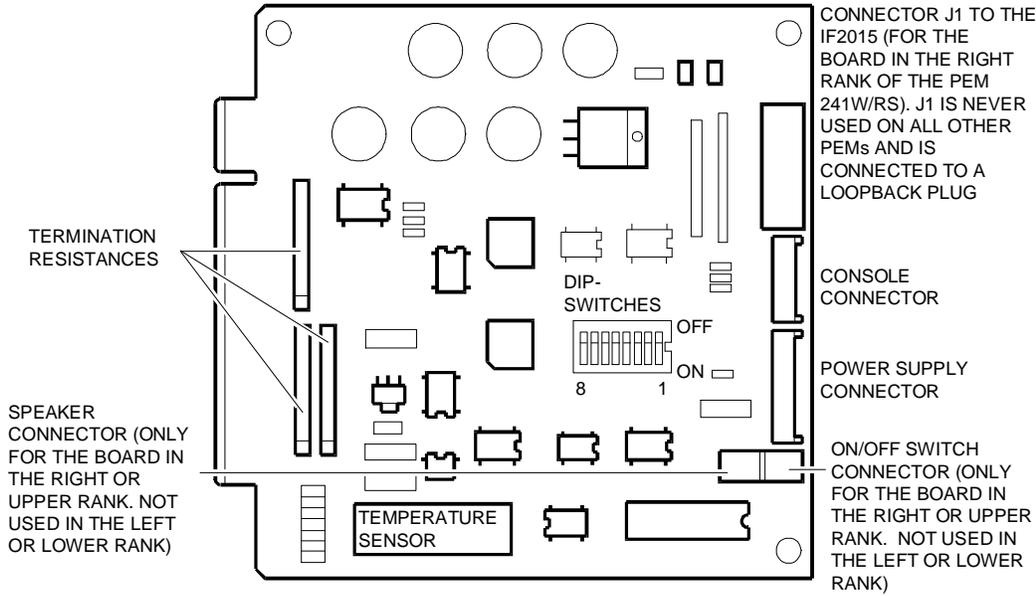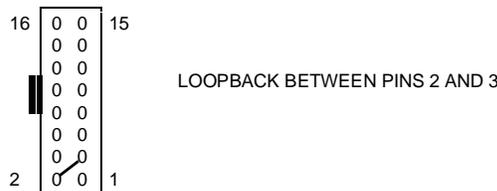
PEM RS

REDUNDANT PS45 POWER SUPPLY + FAN (REDUNDANT PEM ONLY)

POWER SUPPLY DISTRIBUTION BOARD IF2025/35 (REDUNDANT PEM ONLY)

MAIN PS45 POWER SUPPLY + FAN

SWAP BOARD

EXTERNAL SCSI CONNECTORS

CONSOLE

BAY 0 HDU ID0

INTERNAL SCSI CABLES

RIGHT-HAND RANK WITH SIX BAYS FOR HOT SWAPPABLE HDUs

FAN POWER SUPPLY DISTRIBUTION BOARD IF2015 (PEM 241W/RS ONLY)

BAY 5 HDU ID5

MAIN FAN (PEM 241W/RS ONLY). THE OTHER PEM RS ARE ONLY EQUIPPED WITH THE FAN SUPPORT; PLASTIC CAPS ARE FITTED IN THE PLACE OF THE FANS

LEFT-HAND RANK WITH SIX BAYS FOR HOT SWAPPABLE HDUs

REDUNDANT FAN (REDUNDANT PEM 241W/RS ONLY)

PEM RM

UPPER RANK WITH SIX BAYS FOR HOT SWAPPABLE HDUs

PS45 MAIN POWER SUPPLY + FAN

INTERNAL SCSI CABLES

EXTERNAL SCSI CONNECTORS

POWER SUPPLY DISTRIBUTION BOARD IF2034 (REDUNDANT PEM ONLY)

SWAP BOARD

BAY 0 HDU ID0

LOWER RANK WITH SIX BAYS FOR HOT SWAP HDUs

BAY 5 HDU ID5

REDUNDANT POWER SUPPLY PS45 + FAN (REDUNDANT PEM ONLY)

SWAP BOARD IF2012 / IF2031

Note: *The termination resistances must be removed in dual host configurations, while they must be present in all others.*

SWAP BOARD INSTALLED IN THE:	DIP-SWITCHES							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
All non-redundant PEMs (both swap boards)	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
Redundant PEM 241W/RS (left-hand swap board) and all other redundant PEMs (both swap boards)	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
Redundant PEM 241W/RS (right-hand swap board)	ON	ON	OFF	OFF	OFF	OFF	ON	OFF

Note: *The above DIP-switch settings are valid on swap board IF2012 from lev. 03S1 and for the IF2031 from level 01.*
If the IF2012 is at Nasc level, DIP-Switch 7 must always be OFF.
If the IF2012 is at level 01 and the IF2031 at level Nasc, DIP-switch 1 must always be set to OFF.

Swap board connector J1, reserved for the fan power supply distribution board IF2015, is not used on all PEMs (except PEM 241W/RS) and therefore loop back plug code 562666G must be inserted on the swap boards in the right or upper and left or lower ranks. On the PEM 241W/RS, if the swap board is inserted in the left-hand rank, connector J1 is attached to board IF2015; if the swap board is inserted in the right-hand rank, J1 is not used and a loopback plug needs to be inserted. By grounding the fan's Failure signal, this loopback plug simulates the presence of the fan in order to prevent the system from indicating a fan failure condition.

LOOPBACK BETWEEN PINS 2 AND 3

CONNECTIONS OF THE NON-REDUNDANT PEM RS HOT SWAPPING STRUCTURE

INTERNAL SCSI NARROW CABLE (562655D) OR WIDE (564174V) FOR CONNECTION TO THE BASIC MODULE SCSI CONTROLLER
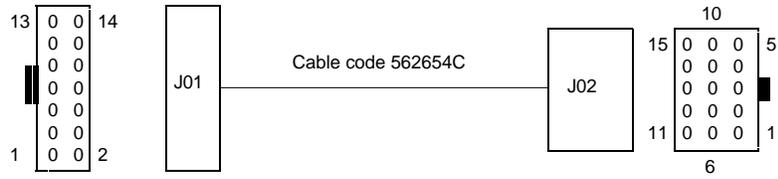
SCSI SLOT USED IN DUAL HOST CONFIG. ONLY

LOOPBACK PLUG 562666G

LEFT CONSOLE

589365E

NARROW OR WIDE SCSI BACKPLANE IN THE LEFT-HAND RANK

SWAP BOARD IN THE LEFT-HAND RANK

JUMPER BOARD

FAN POWER SUPPLY DISTRIBUTION BOARD IF2015 AND FAN (PEM 241W/RS ONLY). LOOPBACK PLUG 562666G IS FITTED ON THE SWAP BOARD OF THE OTHER PEM RSes AS ON THE ONE TO THE LEFT

INTERNAL SCSI NARROW CABLE (562655D) OR WIDE (564174V)

SWAP BOARD IN RIGHT HAND RANK

589376H

589365E

NARROW OR WIDE SCSI BACKPLANE IN THE RIGHT-HAND RANK

RIGHT CONSOLE

CONNECTORS FOR POWER SUPPLY TO BACKPLANE IN LEFT AND RIGHT RANK

589379L

562653B

562654C

PS45 POWER SUPPLY

JUMPER BOARD

J

CONNECTIONS OF THE NON-REDUNDANT PEM RM HOT SWAPPING STRUCTURE

INTERNAL SCSI NARROW CABLE (564178H) OR WIDE (564185R) FOR CONNECTION TO THE BASIC MODULE SCSI CONTROLLER

SCSI SLOT USED IN DUAL HOST CONFIG. ONLY

LOOPBACK PLUG 562666G

LOWER RANK CONSOLE

589365E

SWAP BOARD IN THE LOWER RANK

NARROW OR WIDE SCSI BACKPLANE IN THE LOWER RANK

JUMPER BOARD

INTERNAL SCSI NARROW CABLE (564178H) OR WIDE (564185R) FOR CONNECTION TO THE BASIC MODULE SCSI CONTROLLER

SWAP BOARD IN THE UPPER RANK

LOOPBACK PLUG 562666G

UPPER RANK CONSOLE

589365E

POWER SUPPLY CONNECTORS TO THE BACKPLANE IN THE UPPER AND LOWER RANK

589379L

NARROW OR WIDE SCSI BACKPLANE IN THE UPPER RANK

562653B

562654C

PS45 POWER SUPPLY

JUMPER BOARD

CONNECTIONS OF THE REDUNDANT PEM RS HOT SWAPPING STRUCTURE

INTERNAL SCSI NARROW CABLE
(562655D) OR WIDE (564174V)
FOR CONNECTION TO THE
BASIC MODULE SCSI
CONTROLLER

SCSI SLOT USED IN DUSL
HOST CONFIG. ONLY

LOOPBACK 562666G

LEFT
CONSOLE

589365E

SWAP BOARD IN
THE LEFT RANK

SCSI
NARROW OR
WIDE
BACKPLANE
IN THE LEFT
RANK

JUMPER
BOARD

FAN POWER SUPPLY DISTRIBUTION BOARD IF2015
AND FAN (PEM 241W/RS ONLY). LOOPBACK PLUG
562666G IS FITTED ON THE SWAP BOARD OF THE
OTHER PEM RSes AS ON THE ONE TO THE LEFT

POWER SUPPLY PARALLELISM
BOARD IF2025/35

SCSI NARROW
CABLE (562655D)
OR WIDE (564174V)

SWAP BOARD IN
RIGHT RANK

589376H

REDUNDANT
POWER SUPPLY

562667H

SCSI
NARROW OR
WIDE
BACKPLANE
OF THE
RIGHT RANK

562653B

MAIN POWER
SUPPLY

JUMPER
BOARD

CONNECTORS
FOR POWER
SUPPLY TO THE
BACK PLANE OF
THE LEFT AND
RIGHT RANK

J

CONNECTIONS OF THE REDUNDANT PEM RM HOT SWAPPING STRUCTURE

INTERNAL NARROW (564178H)
OR WIDE (564185R) SCSI CABLE
FOR CONNECTION TO BASIC
MODULE SCSI CONTROLLER

OUTPUT SCSI CHANNEL
CONNECTOR (USED FOR
DUAL HOST ONLY)

LOOPBACK
PLUG
562666G

LOWER RANK
CONSOLE

589365E

LOWER RANK
SWAP BOARD

SCSI NARROW
OR WIDE
BACKPLANE IN
THE LOWER
RANK

JUMPER
BOARD

CURRENT
SHARE CABLE

POWER SUPPLY
PARALLELISM
BOARD IF2034

AUXILIARY
POWER SUPPLY

SCSI NARROW
CABLE (564178H) OR
WIDE (564185R)

UPPER RANK
SWAP BOARD

LOOPBACK
PLUG
562666G

UPPER RANK
CONSOLE

564177Y

THE DOTTED CONNECTORS
INDICATE SOLDERED CABLES

562653B

MAIN POWER
SUPPLY

SCSI NARROW
OR WIDE
BACKPLANE IN
THE UPPER
RANK

JUMPER
BOARD

CONNECTORS FOR
POWER SUPPLY TO
THE BACKPLANE
HDUs

POWER SUPPLY/SWAP BOARD SIGNALS CABLE FOR NON-REDUNDANT CONFIGURATIONS

J01	CONNECTOR SIGNALS	J02
PIN 1	DC ENABLE	PIN 15
PIN 2	GND	PIN 2
PIN 3	POFF-H	PIN 7
PIN 5	POK-H	PIN 8
PIN 7	GND	PIN 10

PARALLELISM BOARD/SWAP BOARD SIGNALS CABLE FOR REDUNDANT CONFIGURATIONS

Code 562667H for PEM RS

Code 564177Y for PEM RM
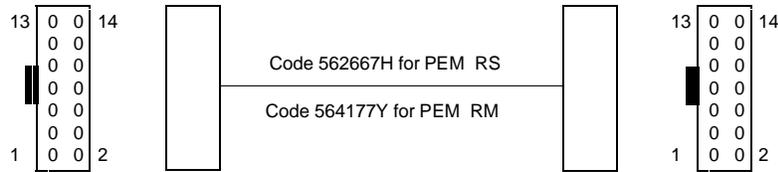
POWER SUPPLY CABLE FOR THE TWO SCSI BACKPLANES

Color	Voltage
Red	+5 V
Black	GND
Orange	+12 V
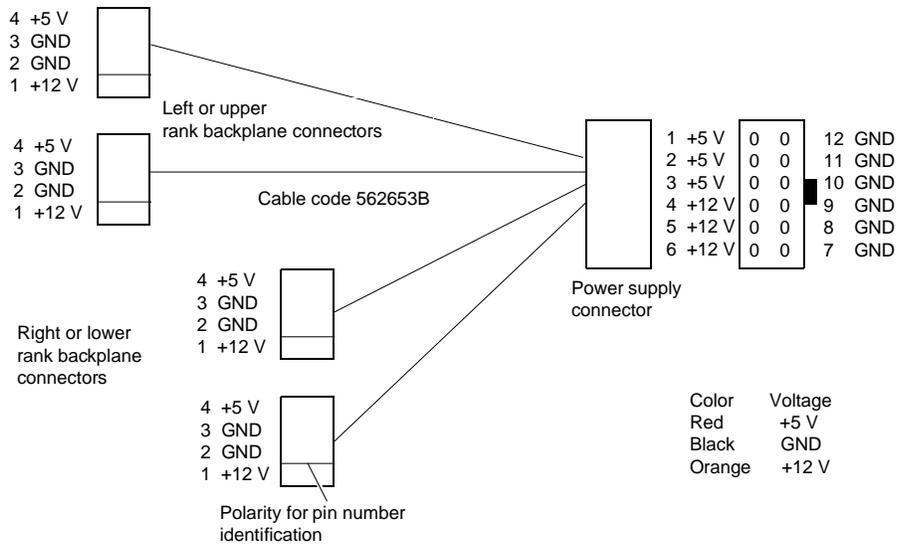
SINGLE HOST CONFIGURATION

The basic module can handle the maximum configuration (from four to six PEMs depending on the system), with transfer rates of 10 MB/sec for the Narrow PEMs or 20 MB/sec for the Wide PEMs. A channel of the RAID DPT SCSI controller is dedicated to each PEM rank and the connection between the external SCSI cables, the PEM and basic module is made using external SCSI Narrow cables CBL 5350 or SCSI Wide cables CBL 5350W. The PEM RS cabinets are not physically connected to the basic module, but due to the length of the external SCSI connection cable the PEM must be positioned along side the basic module. In the maximum configuration, the basic module is positioned at the center and the PEMs are at its sides.

Note: *If the channel of the DPT controller is used for the connection of the HDUs inside the basic module, it cannot also be used externally for the connection of the PEM.*

PEM RMs are inserted in the Rack cabinet and therefore the number of PEMs that can be installed depends on the height of this module; in any case, the maximum configuration can only be obtained by using two Rack cabinets positioned next to each other. SCSI cables CBL 5350 and CBL 5350W are available in two versions: CAV 232 and CAV 265. CAV 232 is 1.1 meters long and is used to connect the PEMs that are closest to the basic module, the first and second, while CAV 265 is 1.5 meters long and is used to connect the other PEMs.
In all other single host configurations the SCSI channel must be terminated at its ends by means of termination resistances R31, R32, R33 on the swap board and by enabling the terminators on the DPT board by means of the "DPT Configuration Utility".

As far as the possible array configurations are concerned, refer to Appendix F which describes the Storage Manager Utility.
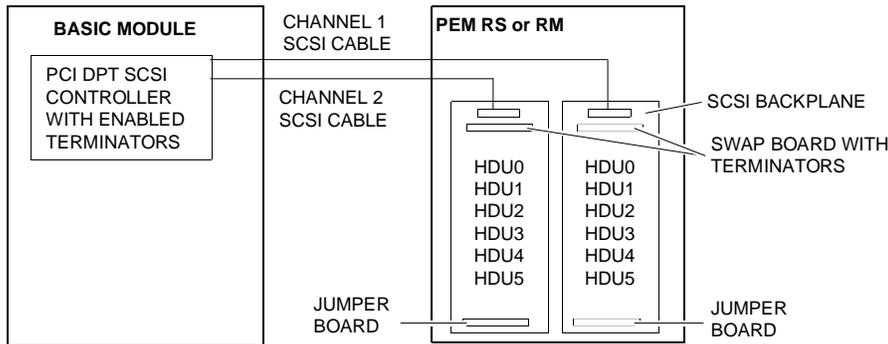
EXAMPLES OF RAID CONFIGURATIONS IN THE BASIC MODULE AND PEM
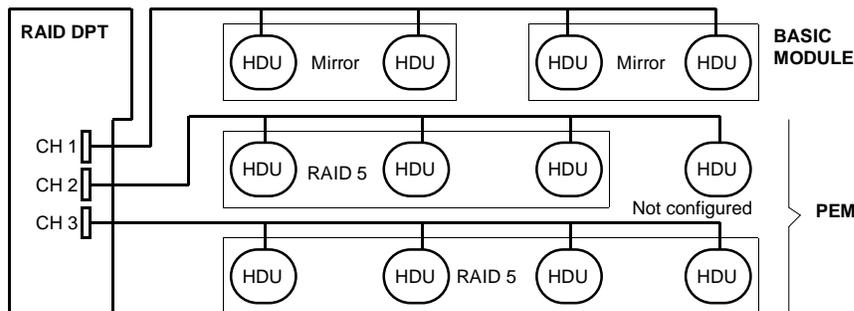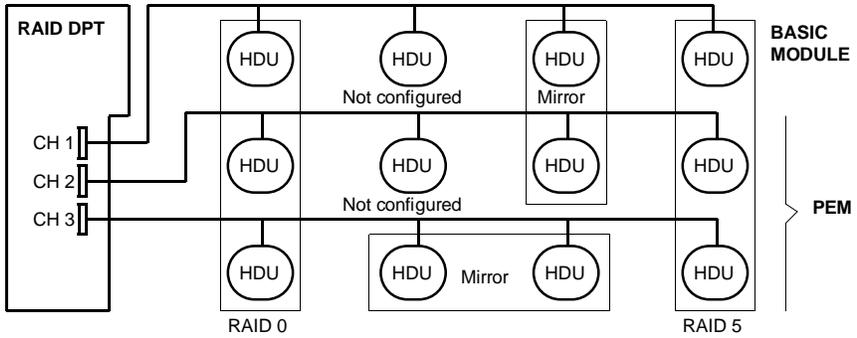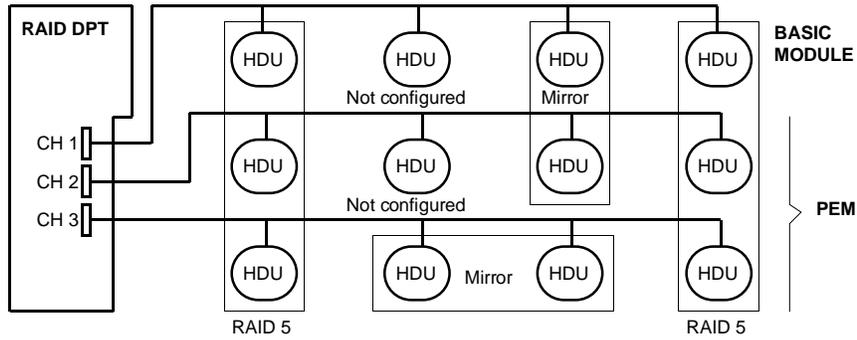
DUPLEXING CONFIGURATION

Duplexing is a particular SCSI controller mirroring configuration controlled by the operating system software. The PEM's hardware configuration consists of two separate SCSI channels; the hard disks in the right or upper rank are connected to a RAID DPT SCSI controller while those in the left or lower rank are connected to another RAID DPT SCSI controller. The two channels of each rank are terminated on the swap board and on the SCSI controllers.

SCSI cable connections are the same as those on single-host configurations. For top performance in terms of speed, it is suggested to connect the same number of HDUs on the two channels.
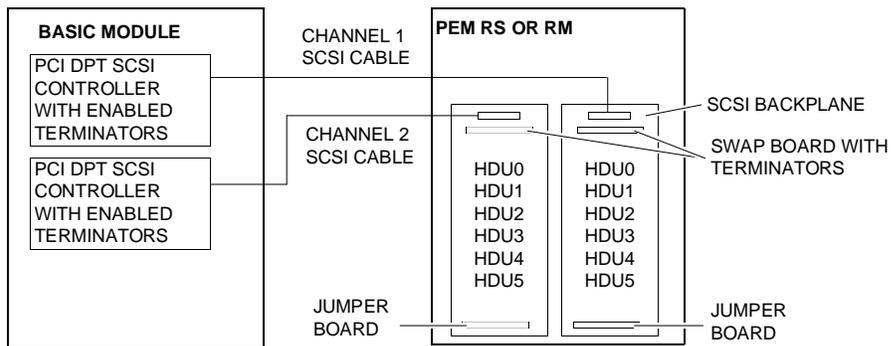
DUAL HOST CONFIGURATION

Note: *The Dual Host configuration is only available for the SNX 400/RS/RM 133 W and 166 W, SNX 460/RS/RM, SNX 160/RS/RM NEW and NetStrada 7000.*
ADHA rel. 2.0 is currently released for the SNX 400, with firmware rel. 7GK3 (dual host only) of the RAID DPT GO2098 and firmware rel. 2.2.1 of the UPS APC.

Dual Host is a hardware and software environment in which two systems can access the same disks: in this configuration two Hosts (two Wide systems) and up to two PEM Wide can be connected. The disks contained in the PEM are usually managed by only one Host, called the processor Host, but can also be managed by the other Host in case the processor Host crashes or is damaged. The purpose of Dual/multi Host configurations is therefore to guarantee the operation of the I/O subsystem in the event a Host crashes, malfunctions or does not work as normal. The Dual Host management software is called ADHA (Automatic Dual Host Activation) and is currently only supported by the UnixWare 2.x operating system. This Dual Host configuration allows the damaged Host to be repaired online without interrupting the activities underway; to service the Host simply disconnect the SCSI cable which attaches it to the PEM. Once the damaged Host is repaired reconnect the SCSI cable that was disconnected before servicing, power the Host and inform the system operator that the Host is available again.

HARDWARE AND SOFTWARE PREREQUISITES

The following hardware and software components are required:

- Two equivalent systems (same name, Silver or Rack), for which this feature is available. The two systems must be redundant and each configured with:

  – One Dagger SCSI controller, for the SNX 400, used to connect the system's removable peripherals and, in some configurations, also the system's internal HDUs (boot HDUs).
    On the SNX 460 and 160 NEW, the onboard Lance SCSI controller is used for the same functions.
    On the NetStrada 7000, the onboard Lance controller is only used for connecting the removable peripherals since the HDUs cannot be connected to this controller.

  – Up to two RAID DPT SCSI Wide GO2098 or Ultra Wide GO2173 controllers with 1, 2 or 3 channels each. Channel 0 can connect the system's internal HDUs or those in the external PEM, channels 1 and 2 can only connect the PEM's shared HDUs. In the maximum configuration three channels are on the first board and two are on the second.

  – One LAN controller used for connecting the Hosts to a network.

- Up to two redundant PEM Wide configured with two external SCSI connectors for each channel.

- External, terminated, Dual Host SCSI cables provided in the Dual Host kits.

- Two UPSes to backup the two systems and the PEMs in the event of a power failure. The UPS must be equipped with a LAN controller by means of which the UPS can be connected to a network, the PowerChute Plus software, the serial cables for connecting the two UPSes to the COM1 serial ports of the Hosts and the power supply cables of the systems and PEMs for connection to the UPSes (intermodular CBL 2307-125 code 564179A)

- RS232 serial cable for Dual Host automatic activation, CBL ADHA, which connects the COM2 serial ports to the two Hosts.

- Dual Host management software ADHA, only available for use with the UnixWare 2.x operating system (ADHA UXW R2K).

## RULES AND LIMITATIONS FOR DUAL HOST SYSTEM CONFIGURATIONS

- Even though the hardware can support up to six PEMs connected to four DPT boards and 12 SCSI channels for each Host, the maximum Dual Host configuration supported is 2 PEMs with up to 4 SCSI channels connected to the disks shared by each Host.

- Only symmetrical configurations are allowed; the number of SCSI channels connected to the shared disks of the PEM must be the same for each Host, each SCSI channel must be connected to the rank which is shared by the channel of the controller on the other Host. Both Hosts must be configured in the same way: they must have the same memory capacity, and the DPT boards connected to a determined SCSI channel must be plugged into the same PCI slots on both Hosts.

- In all configurations with the SNX 400, the PCI slot 1 is occupied by the Dagger controller. In configurations where booting is performed by the Dagger, these controllers will manage all the internal peripherals while the last removable peripheral is connected to the 50-pin SCSI Narrow connector of the Wide backplane. In configurations where booting is performed by the RAID DPT SCSI Wide controller, the internal HDUs are connected to the RAID controller and the removable peripherals to the Dagger.

- In configurations with the SNX 460 and 160 NEW where the system is booted from the onboard Lance controller, these controllers manage all the peripherals inside the systems while the last removable peripheral is connected to the Wide backplane in the 50-pin SCSI Narrow connector. In configurations where the system is booted from the Wide/Ultra Wide RAID DPT SCSI controller, the internal HDUs are connected to the RAID controller, the removable peripherals to the Lance controller.

- In configurations with the NetStrada 7000, the system is always booted from the Ultra Wide RAID DPT SCSI controller and therefore the internal HDUs are connected to the RAID controller, the removable peripherals to the onboard Lance controller.

- Since the Dual Host configuration uses the connection of the PEM to the system, 40 MB/sec Ultra Wide mode operation is not supported and therefore the Ultra Wide RAID DPT SCSI controllers must be configured to work in the 20 MB/sec Fast Wide mode.

- All the SCSI channels of the DPT boards, dedicated to the shared disks of the PEM Wide, in system A (primary) must have the same ID set to 7; the corresponding SCSI channels in system B (secondary) must have ID6.

- Hot spare is not supported in Dual Host configurations.

- The disks shared in the PEM must be configured in RAID 1 (mirroring) or RAID 5 arrays; mixed configurations between the two types of Array are not allowed.

- Both Hosts must have their RAID DPT controllers installed in the motherboard PCI slots in the order indicated in the figure, and also the related external connectors.
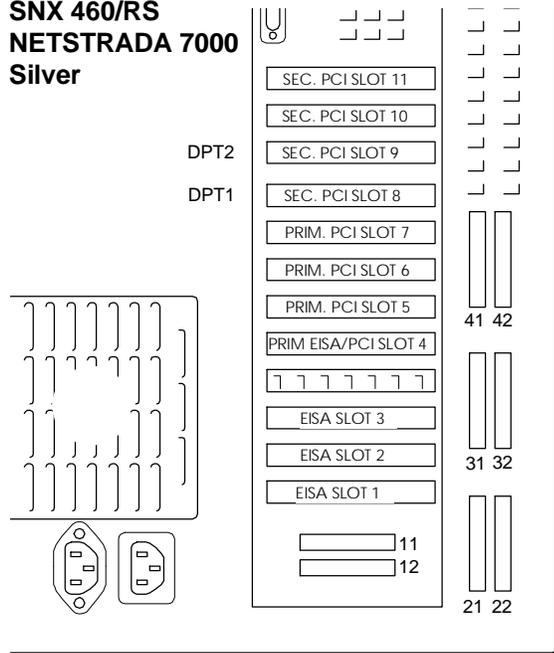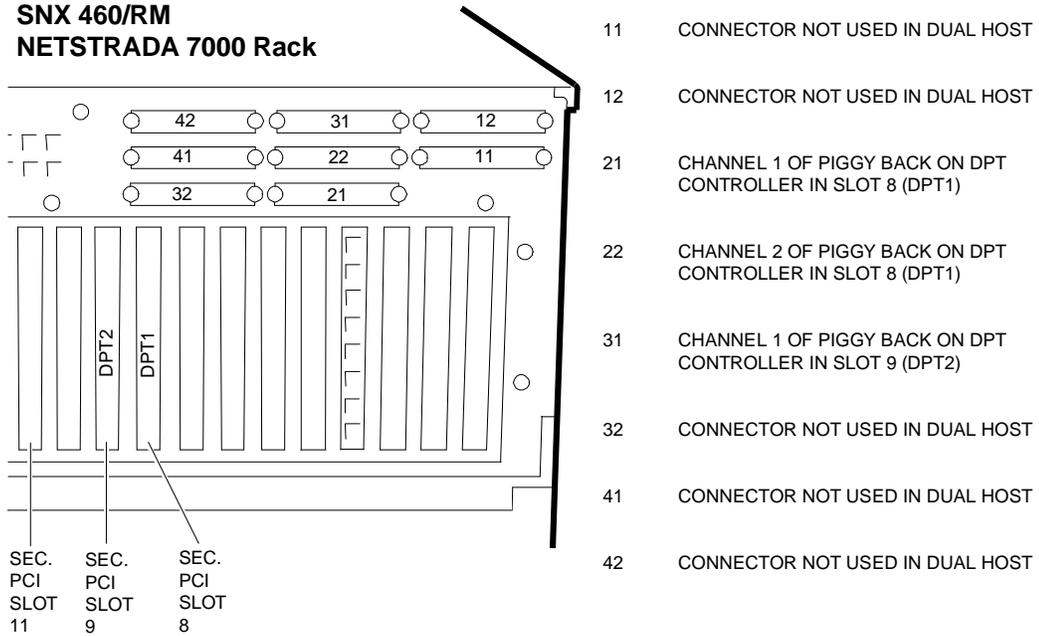
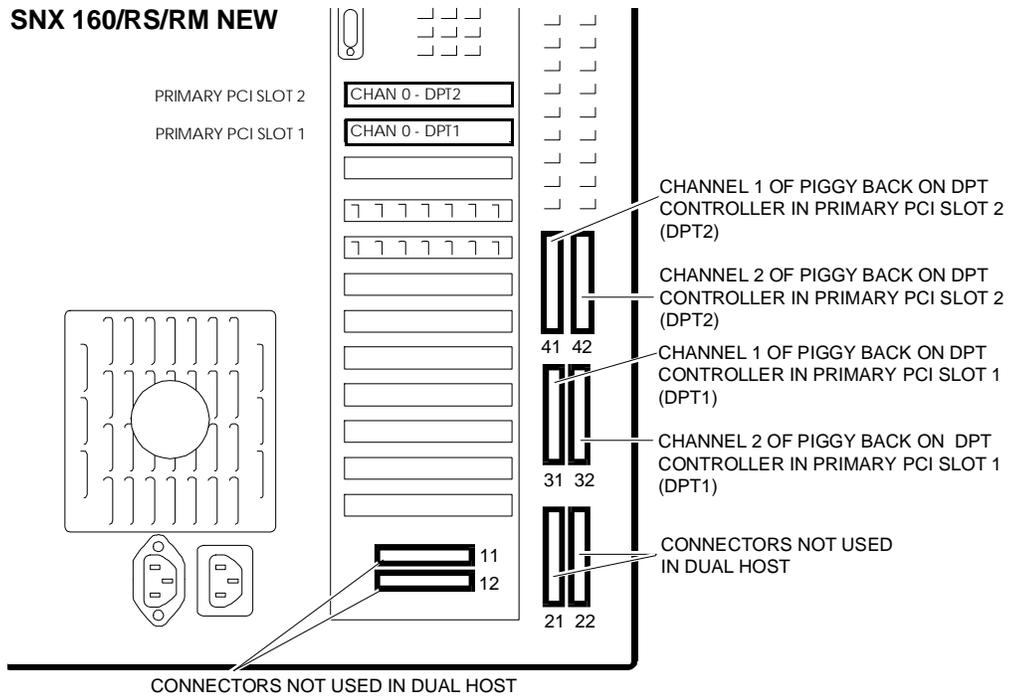**SNX 400/RS**
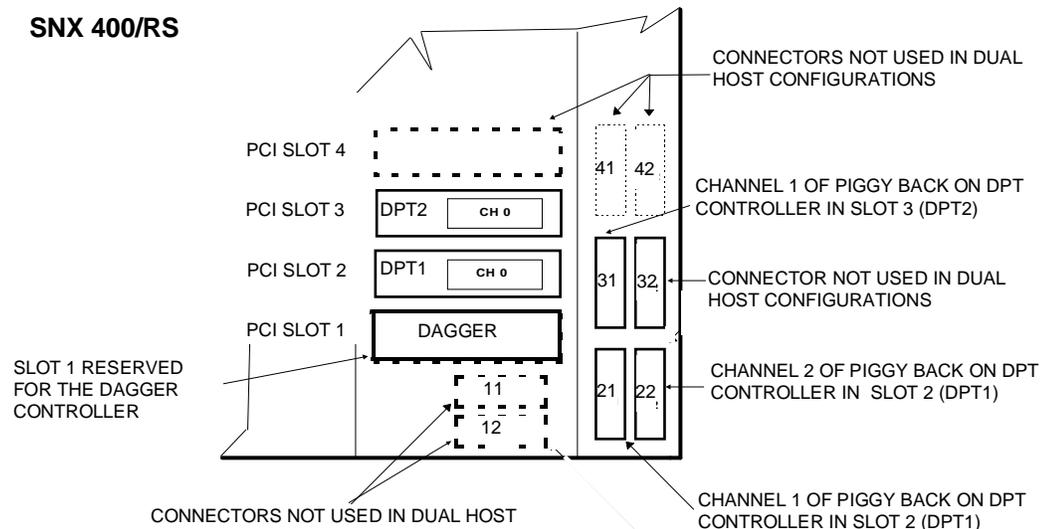
SNX 400/RM
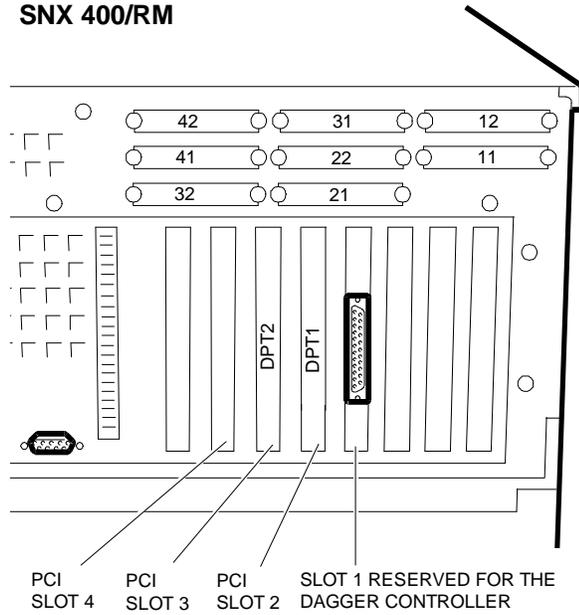
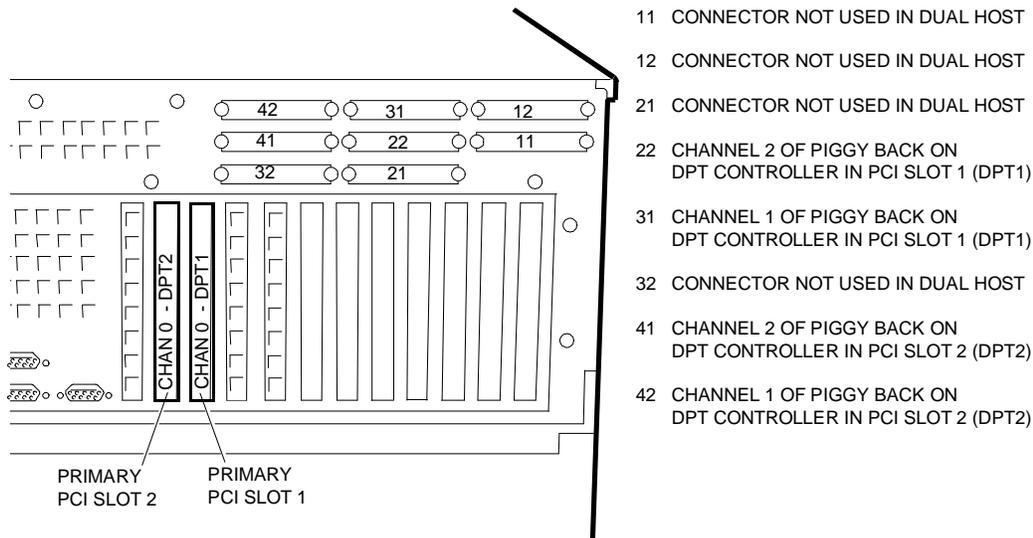|	
11	CONNECTOR NOT USED IN DUAL HOST
12	CONNECTOR NOT USED IN DUAL HOST
21	CHANNEL 1 OF PIGGY BACK ON DPT CONTROLLER IN SLOT 2 (DPT1)
22	CHANNEL 2 OF PIGGY BACK ON DPT CONTROLLER IN SLOT 2 (DPT1)
31	CHANNEL 1 OF PIGGY BACK ON DPT CONTROLLER IN SLOT 3 (DPT2)
32	CONNECTOR NOT USED IN DUAL HOST
41	CONNECTOR NOT USED IN DUAL HOST
42	CONNECTOR NOT USED IN DUAL HOST

42   31   12
41   22   11
32   21

DPT2   DPT1

PCI SLOT 4   PCI SLOT 3   PCI SLOT 2   SLOT 1 RESERVED FOR THE DAGGER CONTROLLER

SNX 460/RS
NETSTRADA 7000
Silver

SEC. PCI SLOT 11
SEC. PCI SLOT 10
DPT2   SEC. PCI SLOT 9
DPT1   SEC. PCI SLOT 8
PRIM. PCI SLOT 7
PRIM. PCI SLOT 6
PRIM. PCI SLOT 5
41 42
PRIM EISA/PCI SLOT 4

EISA SLOT 3
EISA SLOT 2   31 32
EISA SLOT 1

11
12
21 22

11	CONNECTOR NOT USED IN DUAL HOST
12	CONNECTOR NOT USED IN DUAL HOST
21	CHANNEL 1 OF PIGGY BACK ON DPT CONTROLLER IN SLOT 8 (DPT1)
22	CHANNEL 2 OF PIGGY BACK ON DPT CONTROLLER IN SLOT 8 (DPT1)
31	CHANNEL 1 OF PIGGY BACK ON DPT CONTROLLER IN SLOT 9 (DPT2)
32	CONNECTOR NOT USED IN DUAL HOST
41	CONNECTOR NOT USED IN DUAL HOST
42	CONNECTOR NOT USED IN DUAL HOST

**SNX 460/RM
NETSTRADA 7000 Rack**

11	CONNECTOR NOT USED IN DUAL HOST
12	CONNECTOR NOT USED IN DUAL HOST
21	CHANNEL 1 OF PIGGY BACK ON DPT CONTROLLER IN SLOT 8 (DPT1)
22	CHANNEL 2 OF PIGGY BACK ON DPT CONTROLLER IN SLOT 8 (DPT1)
31	CHANNEL 1 OF PIGGY BACK ON DPT CONTROLLER IN SLOT 9 (DPT2)
32	CONNECTOR NOT USED IN DUAL HOST
41	CONNECTOR NOT USED IN DUAL HOST
42	CONNECTOR NOT USED IN DUAL HOST

SEC. PCI SLOT 11   SEC. PCI SLOT 9   SEC. PCI SLOT 8

J

SNX 160/RS/RM NEW

PRIMARY PCI SLOT 2   CHAN 0 - DPT2

PRIMARY PCI SLOT 1   CHAN 0 - DPT1

CHANNEL 1 OF PIGGY BACK ON DPT CONTROLLER IN PRIMARY PCI SLOT 2 (DPT2)

CHANNEL 2 OF PIGGY BACK ON DPT CONTROLLER IN PRIMARY PCI SLOT 2 (DPT2)

41 42

CHANNEL 1 OF PIGGY BACK ON DPT CONTROLLER IN PRIMARY PCI SLOT 1 (DPT1)

CHANNEL 2 OF PIGGY BACK ON DPT CONTROLLER IN PRIMARY PCI SLOT 1 (DPT1)

31 32

CONNECTORS NOT USED IN DUAL HOST

21 22

11
12

CONNECTORS NOT USED IN DUAL HOST

11	CONNECTOR NOT USED IN DUAL HOST
12	CONNECTOR NOT USED IN DUAL HOST
21	CONNECTOR NOT USED IN DUAL HOST
22	CHANNEL 2 OF PIGGY BACK ON DPT CONTROLLER IN PCI SLOT 1 (DPT1)
31	CHANNEL 1 OF PIGGY BACK ON DPT CONTROLLER IN PCI SLOT 1 (DPT1)
32	CONNECTOR NOT USED IN DUAL HOST
41	CHANNEL 2 OF PIGGY BACK ON DPT CONTROLLER IN PCI SLOT 2 (DPT2)
42	CHANNEL 1 OF PIGGY BACK ON DPT CONTROLLER IN PCI SLOT 2 (DPT2)

PRIMARY PCI SLOT 2
PRIMARY PCI SLOT 1

SCSI BUS TERMINATION

The normal SCSI channel termination rules, where termination is made on the controller and on the PEM HDU array, cannot be applied in Dual Host since the channel does not end on the PEM but on the SCSI controller of the other Host. The SCSI channel can therefore be correctly terminated by enabling the terminators on the SCSI controllers, or by using the cables with internal termination. Since the termination on the controller is not active when the system is powered off, special SCSI cables equipped with a terminator in the place of one of the two connectors are used. This allows the cable to be disconnected from the Host that needs to be repaired, while the other Host continues to operate correctly and manages the PEM disk subsystem. The terminators must therefore be removed from the PEM swap board and disabled on the DPT controllers.

Note: *The diagram in the following figure refers to a single SCSI channel but applies to any channel where the PEM resources are shared between the two Hosts.*
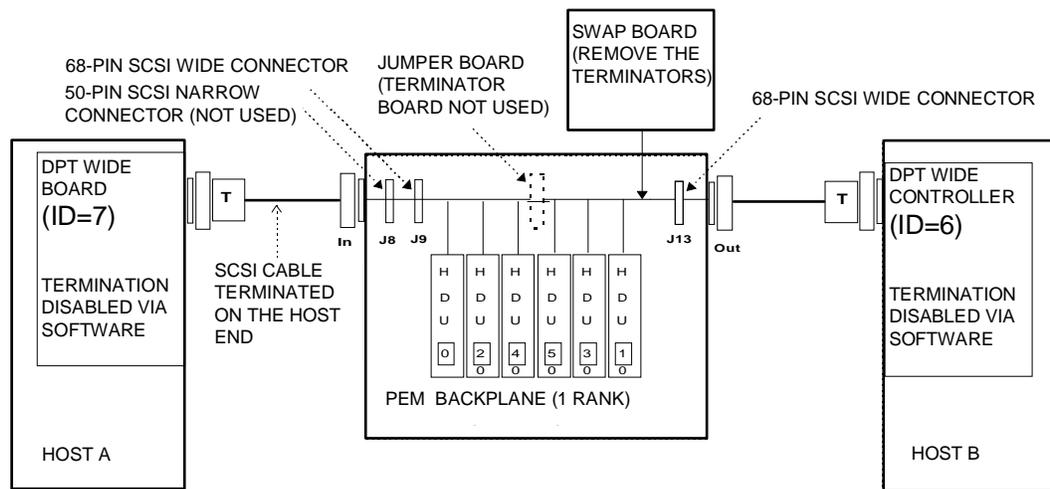
Note: *If the termination of the channel has been disabled via software by means of the DPT Configuration Utility, the system will crash during bootstrap if the PEM connection cable with terminator is not attached. This can be avoided by inserting a jumper between pins 1 and 2 of P4 on the DPT Wide board. In this way the board can be reconfigured and the SCSI channels set according to the hardware configuration.*
Correctly reconfigure the ID and terminators before reattaching the cables.

DUAL HOST KIT

Two Dual Host kits are available depending on whether one PEM is connected to two Hosts or two PEMs to two Hosts.
The Dual Host kit for the single PEM (DHO SY240-1W) allows the connection of a PEM rank and therefore to connect both PEM ranks two kits are required. Each kit includes:

- Two external SCSI Wide cables (564181M 1.1 meters long) equipped with a terminator in the largest connector to attach a PEM rank to Host A or B

- SCSI Wide cable inside the PEM, connecting the connector flush with the case (OUT) and the SCSI Wide backplane (code 564174V)

The Dual Host kit for two PEMs (DHO SY240-2W) allows the connection of a PEM rank, so four kits are needed to connect the two ranks of the two PEMs. Each kit includes:

- External SCSI Wide cable (564181M 1.1 meters long) equipped with a terminator in the largest connector to attach a PEM rank to the closest host

- External SCSI Wide cable (564175W 1.5 meters long) equipped with a terminator in the largest connector to attach a PEM rank to the other host

- SCSI Wide cable inside the PEM, connecting the connector flush with the case (OUT) and the SCSI Wide backplane (code 564174V).

J

INTERNAL PEM CONNECTIONS

PEM RS
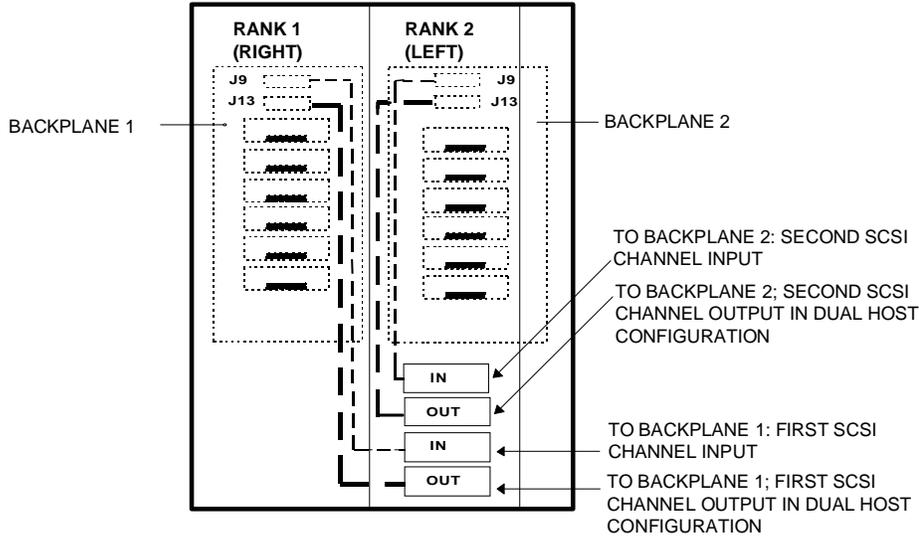
RANK 1 (RIGHT)   RANK 2 (LEFT)

J9   J9
J13   J13

BACKPLANE 1   BACKPLANE 2

TO BACKPLANE 2: SECOND SCSI CHANNEL INPUT

TO BACKPLANE 2; SECOND SCSI CHANNEL OUTPUT IN DUAL HOST CONFIGURATION

IN
OUT
IN
OUT

TO BACKPLANE 1: FIRST SCSI CHANNEL INPUT

TO BACKPLANE 1; FIRST SCSI CHANNEL OUTPUT IN DUAL HOST CONFIGURATION

- - - - Internal SCSI cable attached to the backplane upper J9 connector; this cable is always present in the PEM regardless of the configuration

▬ ▬ ▬ Optional internal SCSI cable (code 564174 V) connected to the backplane lower J13 connector; supplied with the Dual Host kit only

| IN | SCSI Wide input connector used for connecting the primary host (HOST A) |

| OUT | SCSI output connector used for connecting the secondary host (HOST B); as shown in the figure this connector shares the same disk rank as input |

PEM RM

IN
OUT
IN
OUT

UPPER RANK 1 BACKPLANE

J13   J9

LOWER RANK 2 BACKPLANE

J13   J9

——— Internal SCSI cable attached to the backplane upper J9 connector; this cable is always present in the PEM regardless of the configuration

▬▬▬ Optional internal SCSI cable (code 564174 V) connected to the backplane lower J13 connector; supplied with the Dual Host kit only

| IN | SCSI Wide input connector used for connecting the primary host (HOST A) |

| OUT | SCSI output connector used for connecting the secondary host (HOST B); as shown in the figure this connector shares the same disk rank as input |

SUPPORTED CONFIGURATIONS WITH SNX 400/RS/RM 133 W AND 166 W

ONE DUAL HOST SCSI CHANNEL WITH DAGGER BOOT
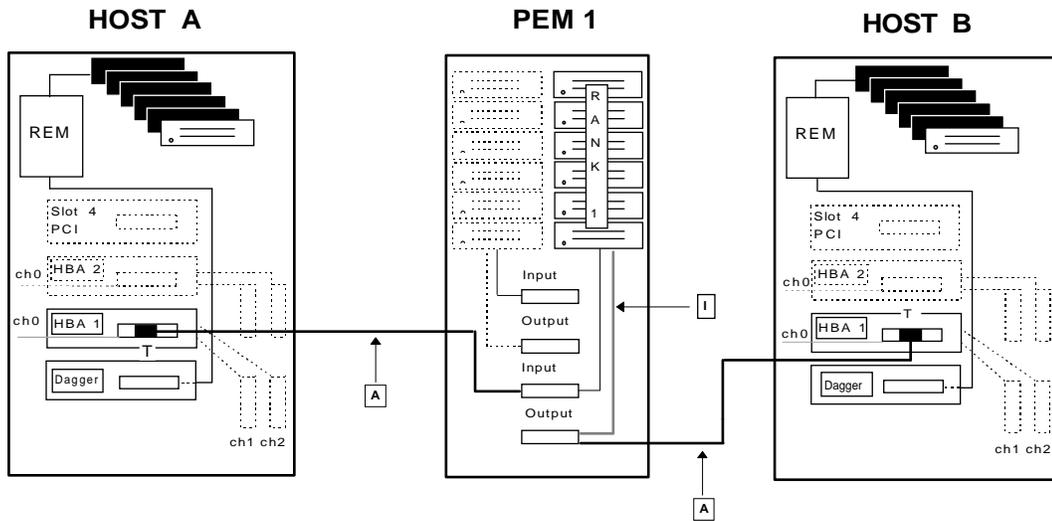
HOST A   **PEM 1**   **HOST B**
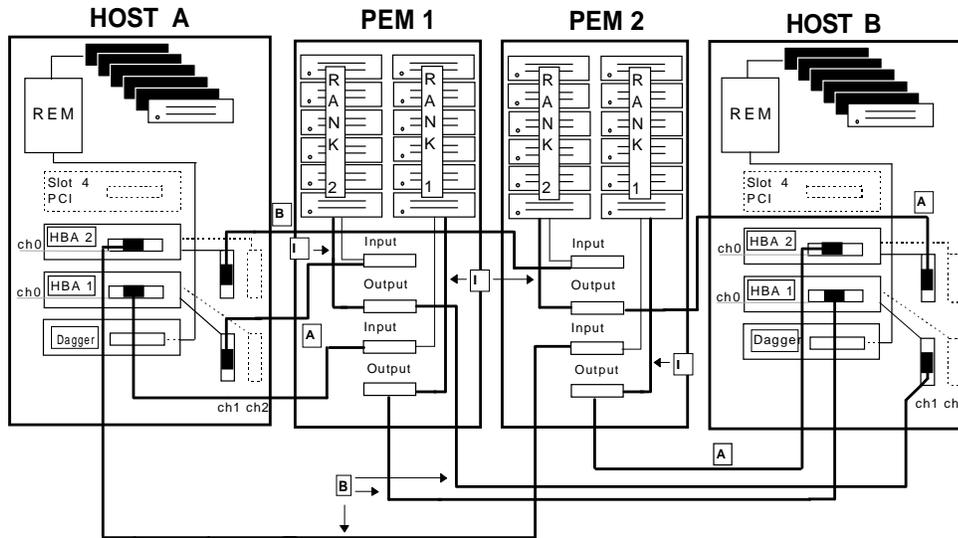
- ■ Terminated connector end
- A 1.1 meter long cable (code 564181M)
- I Internal SCSI cable (code 564174V)
- REM Internal removable SCSI peripheral

HARDWARE CONFIGURATION

- 1 DHO SY240-1W KIT for the connection of 1 PEM rank
- 2 Dagger controllers for HDUs and the Host internal removables
- 2 RAID DPT Wide controllers without piggy back boards, for the HDUs of one PEM rank

ONE DUAL HOST SCSI CHANNEL WITH DPT CHANNEL 0 BOOT
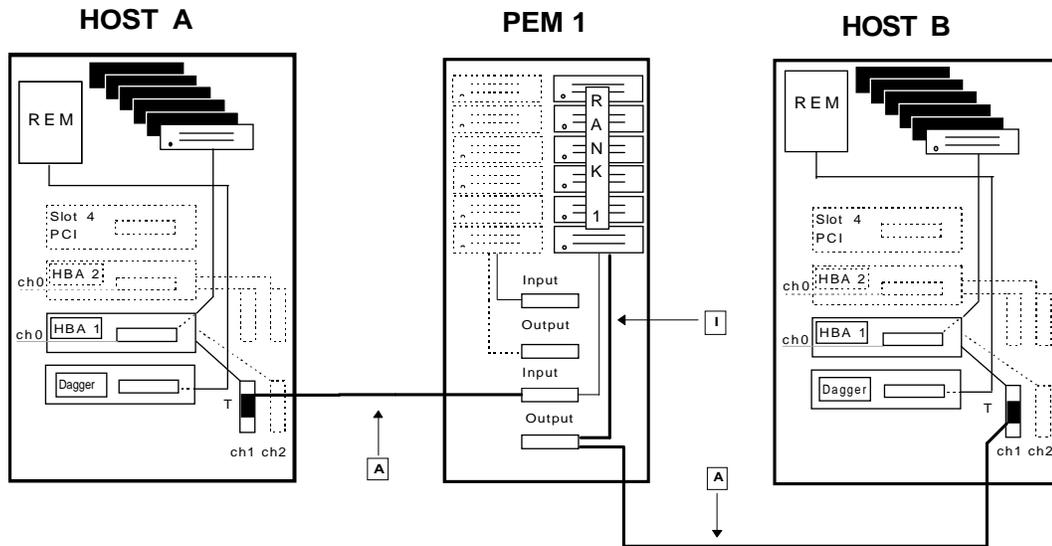
HOST A   **PEM 1**   **HOST B**

- ■ Terminated connector end
- A 1.1 meter long cable (code 564181M)
- I Internal SCSI cable (code 564174V)
- REM Internal removable SCSI peripheral

HARDWARE CONFIGURATION

- 1 DHO SY240-1W kit for the connection of 1 PEM rank
- 2 Dagger controllers for the Host internal removables
- 2 RAID DPT Wide controllers with SX4030W/1 piggy back; channel 0 is dedicated to the HDUs inside the Host, channel 1 to the HDUs in a PEM rank
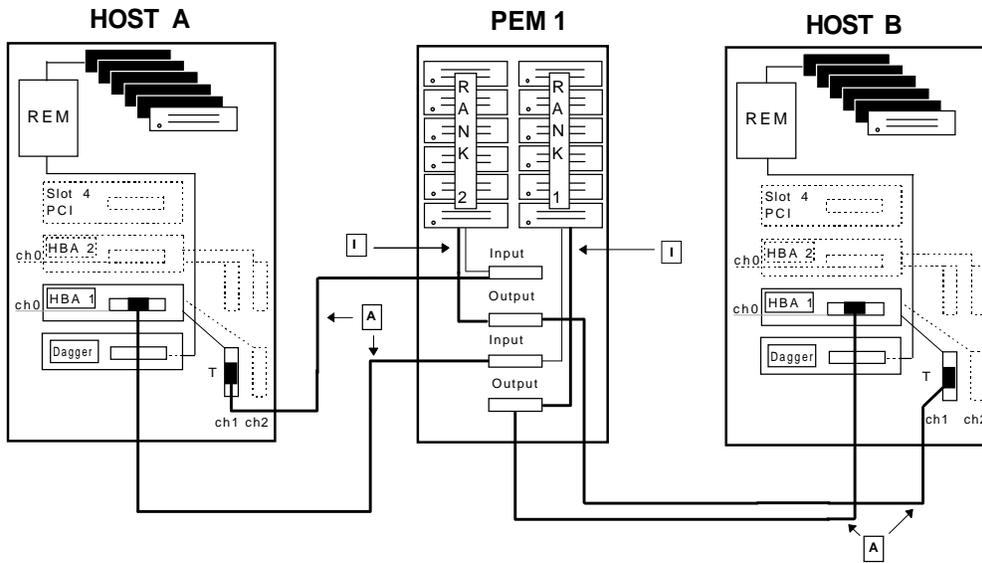
TWO DUAL HOST SCSI CHANNELS WITH DAGGER BOOT

HARDWARE CONFIGURATION

- 2 DHO SY240-1W kits for the connection of the two PEM ranks

- 2 Dagger controllers for the Host HDUs and internal removables

- 2 RAID DPT Wide controllers with SX4030W/1 piggy back;
  channel 0 and channel 1 manage the HDUs of the two PEM ranks

■ Terminated connector end
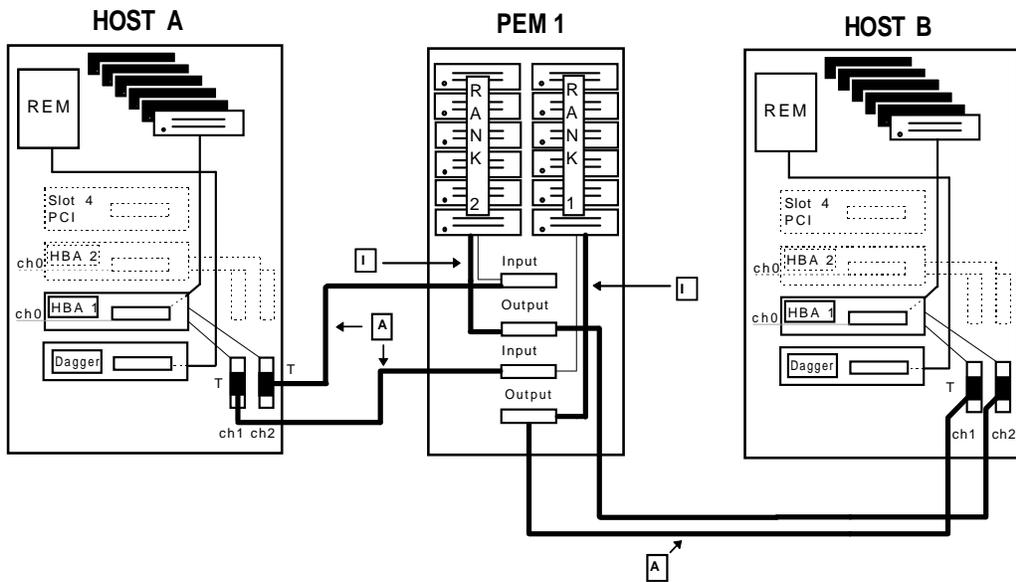
A 1.1 meter long cable (code 564181M)

I Internal SCSI cable (code 564174V)

REM Internal removable SCSI peripheral

TWO DUAL HOST SCSI CHANNELS WITH DPT CHANNEL 0 BOOT

HARDWARE CONFIGURATION

- 2 DHO SY240-1W kits for the connection of the 2 PEM ranks

- 2 Dagger controllers for the Host internal removables

- 2 RAID DPT Wide controllers with SX4030W/2 piggy back board;
  channel 0 is dedicated to the HDUs inside the Host, channels 1
  and 2 of the piggy back to the HDUs in the two PEM ranks

■ Terminated connector end

A 1.1 meter long cable (code 564181M)

I Internal SCSI cable (code 564174V)

REM Internal removable SCSI peripheral

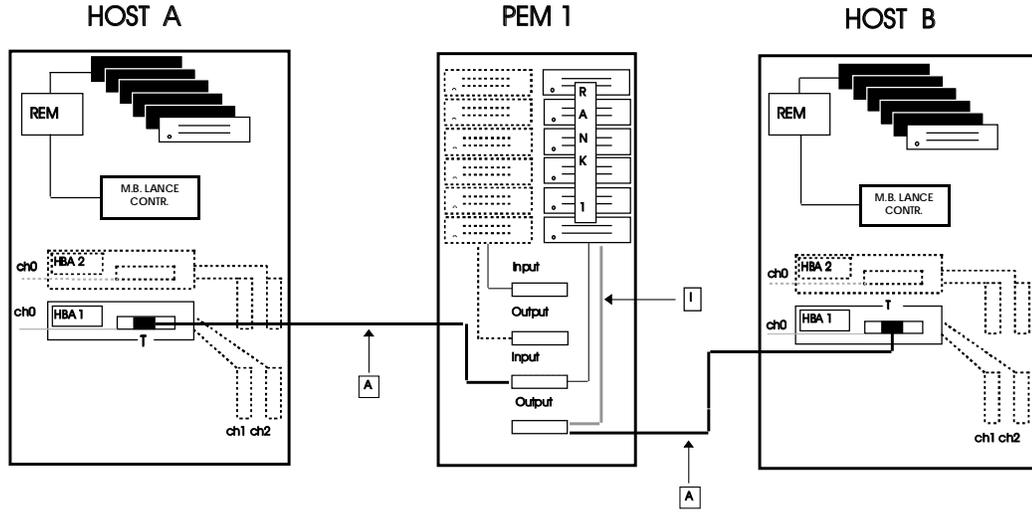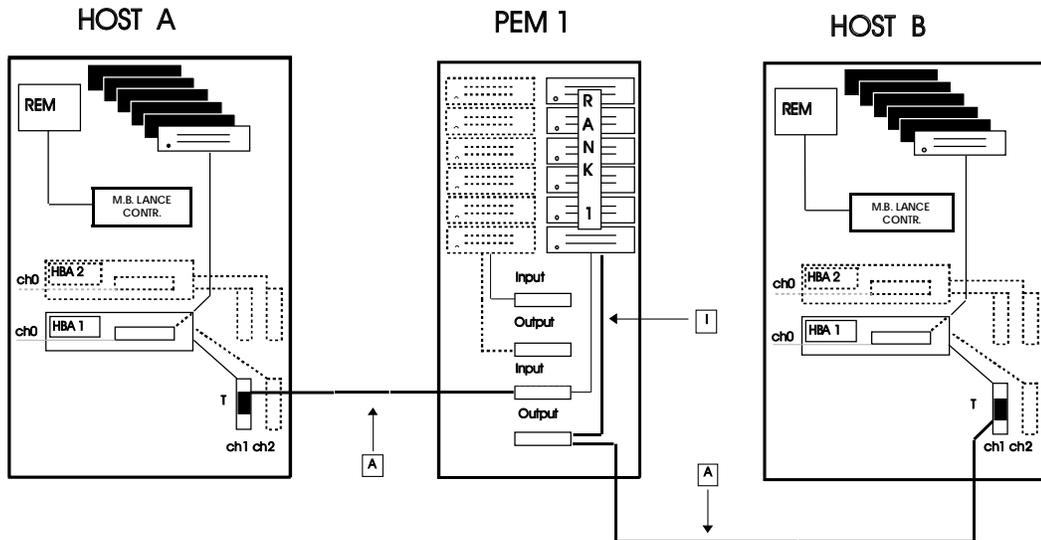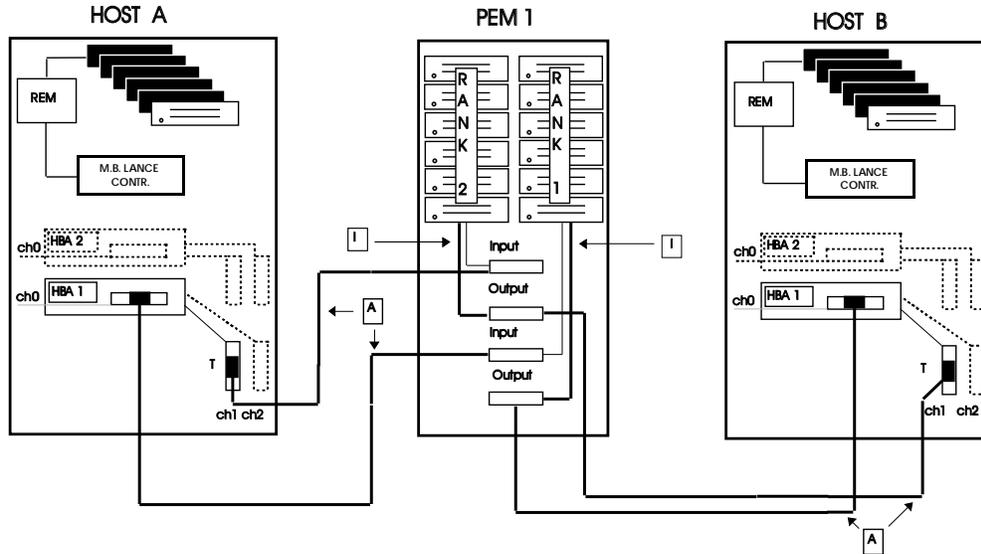## FOUR DUAL HOST SCSI CHANNELS WITH DAGGER BOOT

HARDWARE CONFIGURATION

■ Terminated connector end

A 1.1 meter long cable (code 564181M)

B 1.5 meter long cable (code 564175W)

I Internal SCSI cable (code 564174V)

REM Internal removable SCSI peripheral

- · 4 DHO SY240-2W kits for connection of the 2 ranks of the 2 PEMs

- 2 Dagger controllers for HDUs and Host internal removables

- 4 RAID DPT Wide controllers with SX4030W/1 piggy back board; channels 0 and 1 of the first controller manage the HDUs of the 2 ranks of the first PEM, channels 0 and 1 of the second controller manage the HDUs of the two ranks of the second PEM,
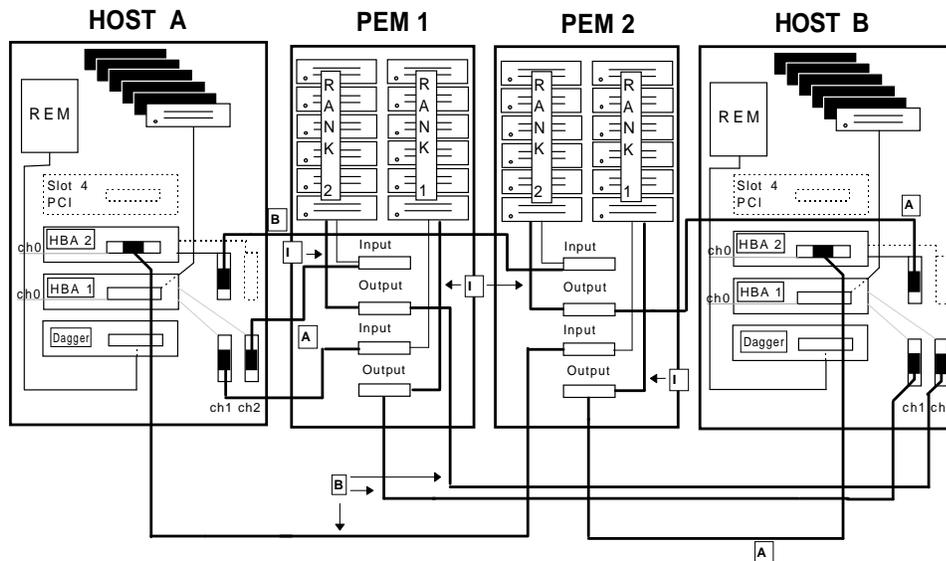
FOUR DUAL HOST SCSI CHANNELS WITH DPT CHANNEL 0 BOOT

HARDWARE CONFIGURATION

■ Terminated connector end

A 1.1 meter long cable (code 564181M)

B 1.5 meter long cable (code 564175W)

I Internal SCSI cable (code 564174V)

REM Internal removable SCSI peripheral

- 4 DHO SY240-2W kits for the connection of the 2 ranks of the 2 PEMs

- 2 Dagger controllers for the Host internal removables

- 2 RAID DPT Wide controllers with SX4030W/2 piggy back board; channel 0 is dedicated to the Host internal HDUs, channels 1 and 2 of the piggy back to the HDUs of the two ranks of PEM1

- 2 RAID DPT Wide controllers with SX4030W/1 piggy back board; channels 0 and 1 of the piggy back board manage the HDUs of the two ranks of PEM2

THREE DUAL HOST SCSI CHANNELS WITH DAGGER BOOT
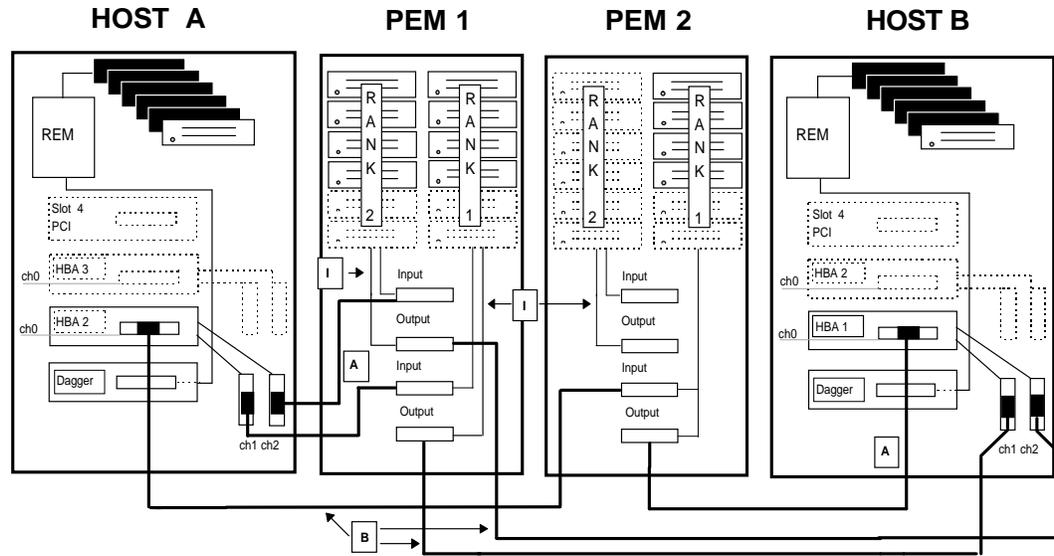
Terminated connector end

A   1.1 meter long cable (code 564181M)

B   1.5 meter long cable (code 564175W)

I   Internal SCSI cable (code 564174V)

REM   Internal removable SCSI peripheral

HARDWARE CONFIGURATION

- 3 DHO SY240-2W kits for the connection of the 2 PEM1 ranks and of one rank of PEM2

- 2 Dagger controllers for the HDUs and Host internal removables

- 2 RAID DPT Wide controllers with SX4030W/2 piggy back board; channel 0 manages the HDUs of a rank of PEM2, channels 1 and 2 of the piggy back board manage the HDUs of the two ranks of PEM1

SUPPORTED CONFIGURATIONS WITH SNX 460/RS/RM, 160/RS/RM NEW, NETSTRADA 7000

ONE DUAL HOST SCSI CHANNEL WITH ONBOARD LANCE BOOT (NOT FOR THE NETSTRADA 7000)
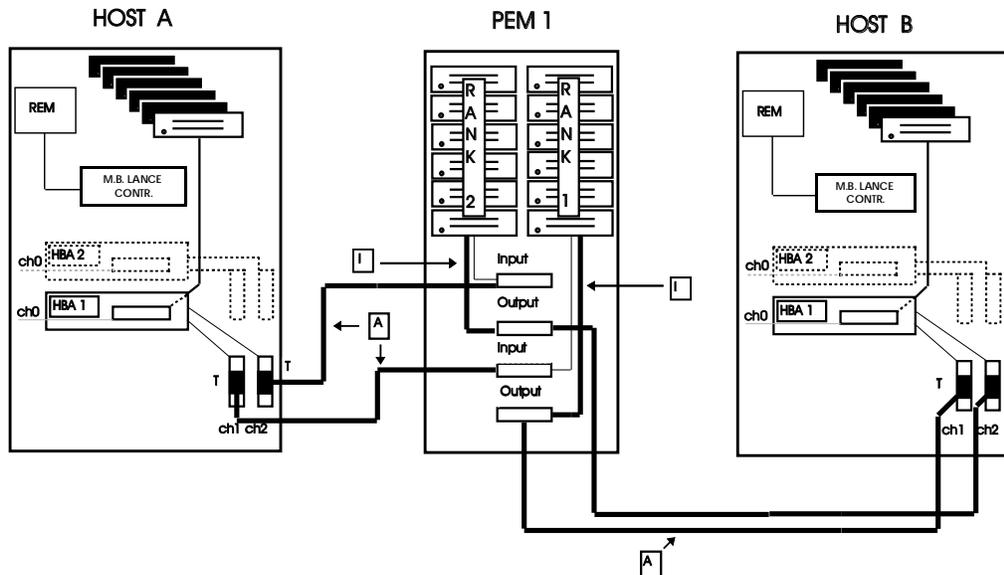

■ Terminated connector end

Ⓐ 1.1 meter long cable (code 564181M)

Ⓘ Internal SCSI cable (code 564174V)

REM Internal removable SCSI peripheral

HARDWARE CONFIGURATION

- One DHO SY240-1W kit for the connection of 1 PEM rank

- Onboard Lance SCSI controllers for the HDUs and removables inside the Hosts

- Two RAID DPT Wide / Ultra Wide controllers without piggy backs for the HDUs in a PEM rank

ONE DUAL HOST SCSI CHANNEL WITH DPT CHANNEL 0 BOOT
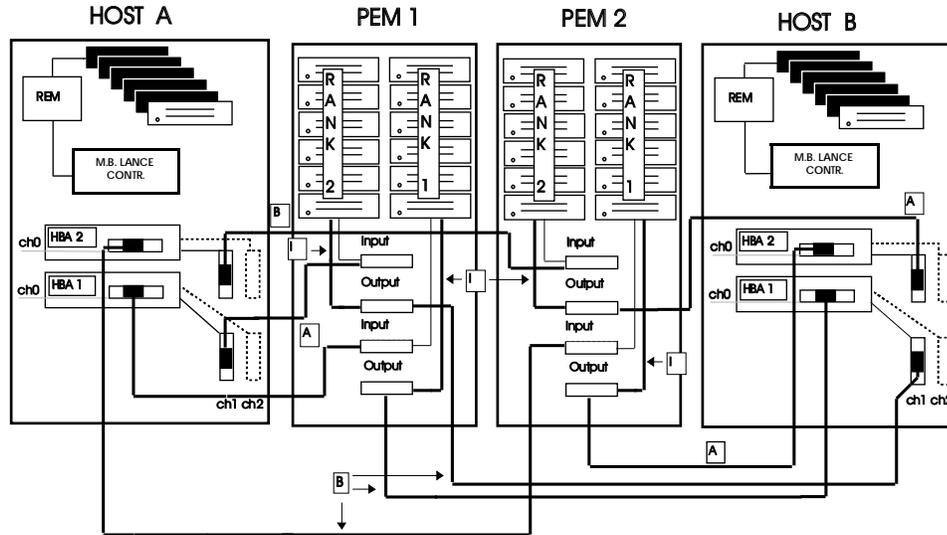

■ Terminated connector end

Ⓐ 1.1 meter long cable (code 564181M)

Ⓘ Internal SCSI cable (code 564174V)

REM Internal removable SCSI peripheral

HARDWARE CONFIGURATION

- One DHO SY240-1W kit for the connection of 1 PEM rank

- Onboard Lance SCSI controllers for the HDUs and removables inside the Hosts

- Two RAID DPT Wide / Ultra Wide controllers with piggy back board SX4030W/1 or two RAID DPT Ultra Wide controllers and SX4030UW/1. Channel 0 is reserved for the HDUs inside the host while channel 1 for the HDUs in a PEM rank

## TWO DUAL HOST SCSI CHANNELS WITH ONBOARD LANCE BOOT (NOT FOR THE NETSTRADA 7000)

HARDWARE CONFIGURATION

- Two DHO SY240-1W kits for the connection of 2 PEM ranks

- Onboard Lance SCSI controllers for the HDUs and removables inside the Hosts

- Two RAID DPT Wide / Ultra Wide controllers with single-channel piggy back; channel 0 and channel 1 manage the HDUs in the two PEM ranks

Terminated connector end

A 1.1 meter long cable (code 564181M)

I Internal SCSI cable (code 564174V)

REM Internal removable SCSI peripheral

TWO DUAL HOST SCSI CHANNELS WITH DPT CHANNEL 0 BOOT

HARDWARE CONFIGURATION

- Two DHO SY240-1W kits for the connection of 2 PEM rank**s**

- Onboard Lance SCSI controllers for the HDUs and removables inside the Hosts

- Two RAID DPT Wide controllers with piggy back board SX4030W/2 or two RAID DPT Ultra Wide controllers and SX4030UW/2. Channel 0 is reserved for the HDUs inside the host while channel 1 for the HDUs in the two ranks of the PEM

Terminated connector end

A 1.1 meter long cable (code 564181M)

I Internal SCSI cable (code 564174V)

REM Internal removable SCSI peripheral

FOUR DUAL HOST SCSI CHANNELS WITH ONBOARD LANCE CONTROLLER BOOT (NOT FOR THE NETSTRADA 7000)

HARDWARE CONFIGURATION

■	Terminated connector end
A	1.1 meter long cable (code 564181M)
B	1.5 meter long cable (code 564175W)
I	Internal SCSI cable (code 564174V)
REM	Internal removable SCSI peripheral

- Four DHO SY240-2W kits for the connection of 2 ranks of 2 PEMs
- Onboard Lance SCSI controllers for the HDUs and removables inside the Hosts
- Four RAID DPT Wide / Ultra Wide controllers with single-channel piggy back; channel 0 and channel 1 of the first controller manage the HDUs in the two ranks of the first PEM, channel 0 and channel 1 of the second controller manage the HDUs in the two ranks of the second PEM
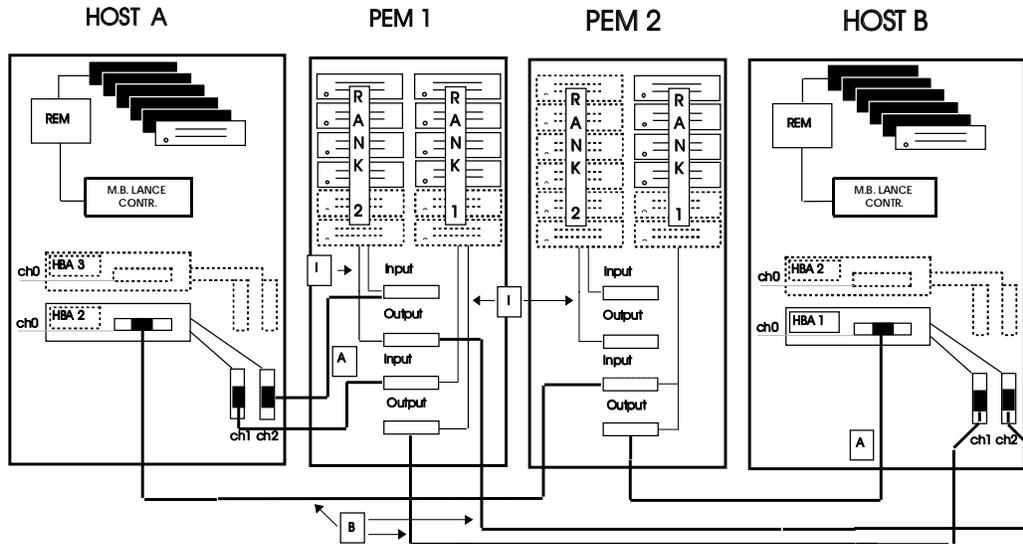
FOUR DUAL HOST SCSI CHANNELS WITH DPT CHANNEL 0 BOOT
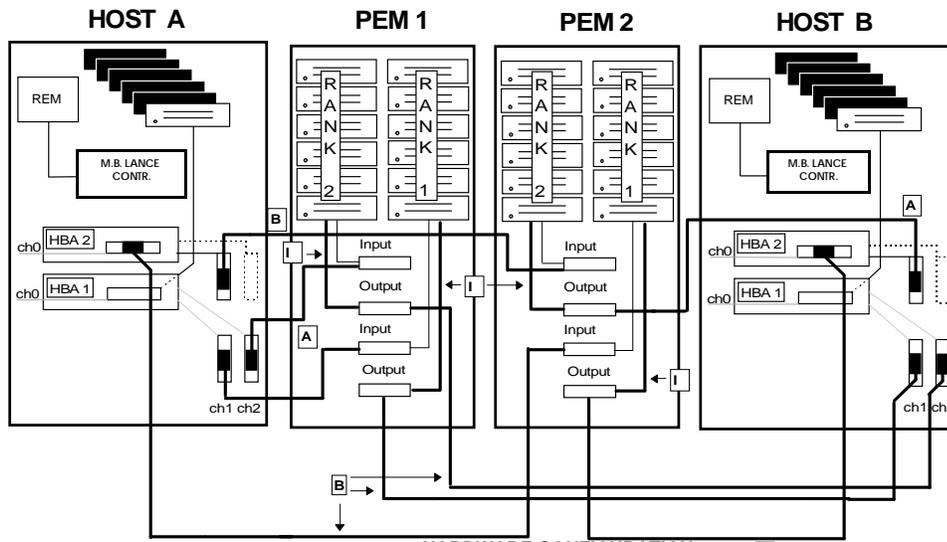
HARDWARE CONFIGURATION

■	Terminated connector end
A	1.1 m external SCSI cable (code 564181M)
B	1.5 m external SCSI cable (code 564175W)
I	Internal SCSI cable (code 564174V)
REM	Internal removable SCSI peripheral

- 4 DHO SY240-2W kits for the connection of the 2 ranks of the 2 PEMs
- Onboard Lance SCSI controllers for the removables inside the Hosts
- Two RAID DPT Wide controllers with piggy back board SX4030W/2 or two RAID DPT Ultra Wide controllers and SX4030UW/2. Channel 0 is reserved for the HDUs inside the host, piggy back channels 1 and 2 for the HDUs in the two ranks of PEM1
- Two RAID DPT Wide controllers with piggy back board SX4030W/1 or two RAID DPT Ultra Wide controllers and SX4030UW/1. Channel 1 and channel 2 of the piggy back manages the HDUs in the two ranks of PEM2

THREE DUAL HOST SCSI CHANNELS WITH ONBOARD LANCE BOOT (NOT FOR THE NETSTRADA 7000)

Terminated connector end

A 1.1 m external SCSI cable (code 564181M)

B 1.5 m external SCSI cable (code 564175W)

I Internal SCSI cable (code 564174V)

REM Internal removable SCSI peripheral

HARDWARE CONFIGURATION

- Three DHO SY240-2W kits for the connection of 2 ranks of PEM1 and of one rank of PEM2

- Onboard Lance SCSI controllers for the HDUs and removables inside the Hosts

- Two RAID DPT Wide / Ultra Wide controllers with dual-channel piggy back; channel 0 manages the HDUs in one rank of PEM2, channel 1 and channel 2 of the piggy back board manage the HDUs in the two ranks of PEM1

CONNECTION WITH UPSes

Each host handles its own UPS with the COM1 serial line and the PowerChute Plus software, and handles also another UPS through a LAN controller; if host B is powered off, host A powers off UPS B via the LAN connection.

The following LAN boards can be used in this basic module:

- OC 2122/II - Ethernet 10 base 5 Controller, ISA Interface
- OC 2123/II - Ethernet 10 base T Controller, ISA Interface
- OC 3138 - Token Ring Controller, ISA Interface
- 3Com 3C509 - Ethernet 10 base T Controller, ISA Interface.

Note: *In order to be able to support a LAN connection, the UPS must be equipped with the Ethernet 10 base T or Token Ring SNMP adapter board.*

To connect the UPS to the electrical power outlet use one of the basic module or PEM power cords; the remaining cables are not used. The power cables connecting the UPS to the modules (basic module and PEM) are intermodular power cords, meaning that they are equipped with a connector suitable for connection to the UPS.

The UPS comes with two intermodular power cords, the third and fourth cable must be ordered separately using code CBL 2307, COR 125 variant, code 564179 A.

CONFIGURATION WITH 1 PEM
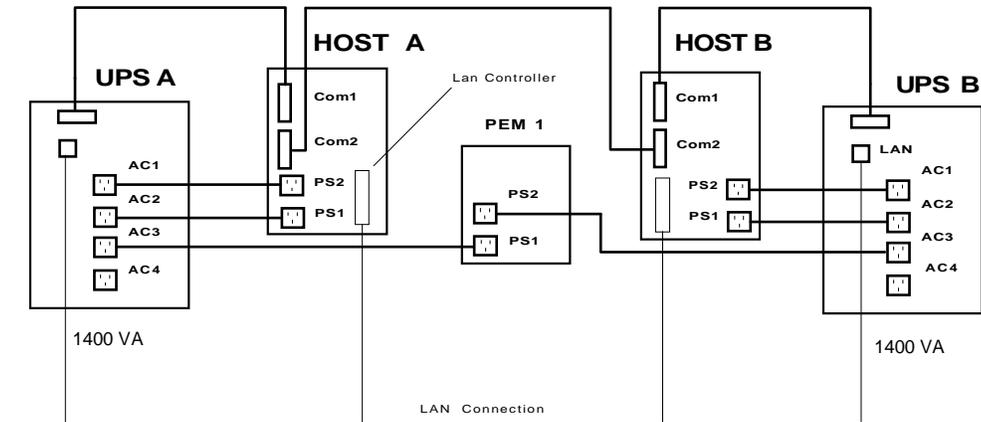
CONFIGURATION WITH 2 PEMs
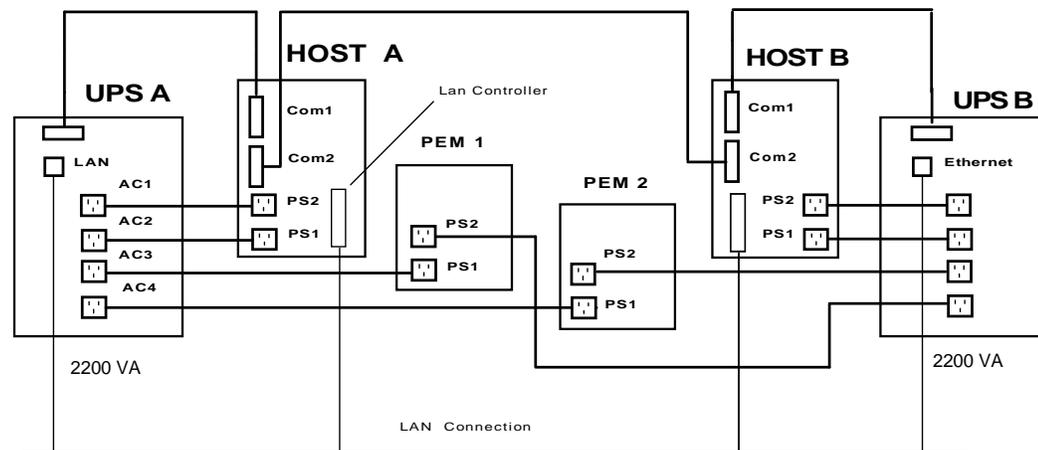
DUAL HOST SOFTWARE MANAGEMENT

In case one of the two systems fails, the automatic backup feature is managed by the ADHA (Automatic Dual Host Activation) software available under the UnixWare 2.x operating system.

The ADHA software can be installed once the following configurations are made:

- Hardware configuration by means of the User Disk
- HDU RAID environment configuration by means of Storage Manager
- UNIX operating system UnixWare 2.x installation.

ADHA uses the network (LAN) connection and the COM2 serial line to find out the status of the systems. The COM2 serial ports of the two systems are connected between themselves by means of serial cable CBL ADHA cav. 260 (code 934123D).
If Host A crashes, through the UPS Host B will automatically order for Host A to be powered off (stopping of system activities to avoid interferences on the SCSI bus which is now under the control of Host B). The first operation that the field engineer must do is to disconnect the SCSI cable from the host end of the faulty system, currently powered off, to avoid interference on the SCSI bus during servicing.

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