# 1 Mechanical Design & Packaging

## Overview of the System

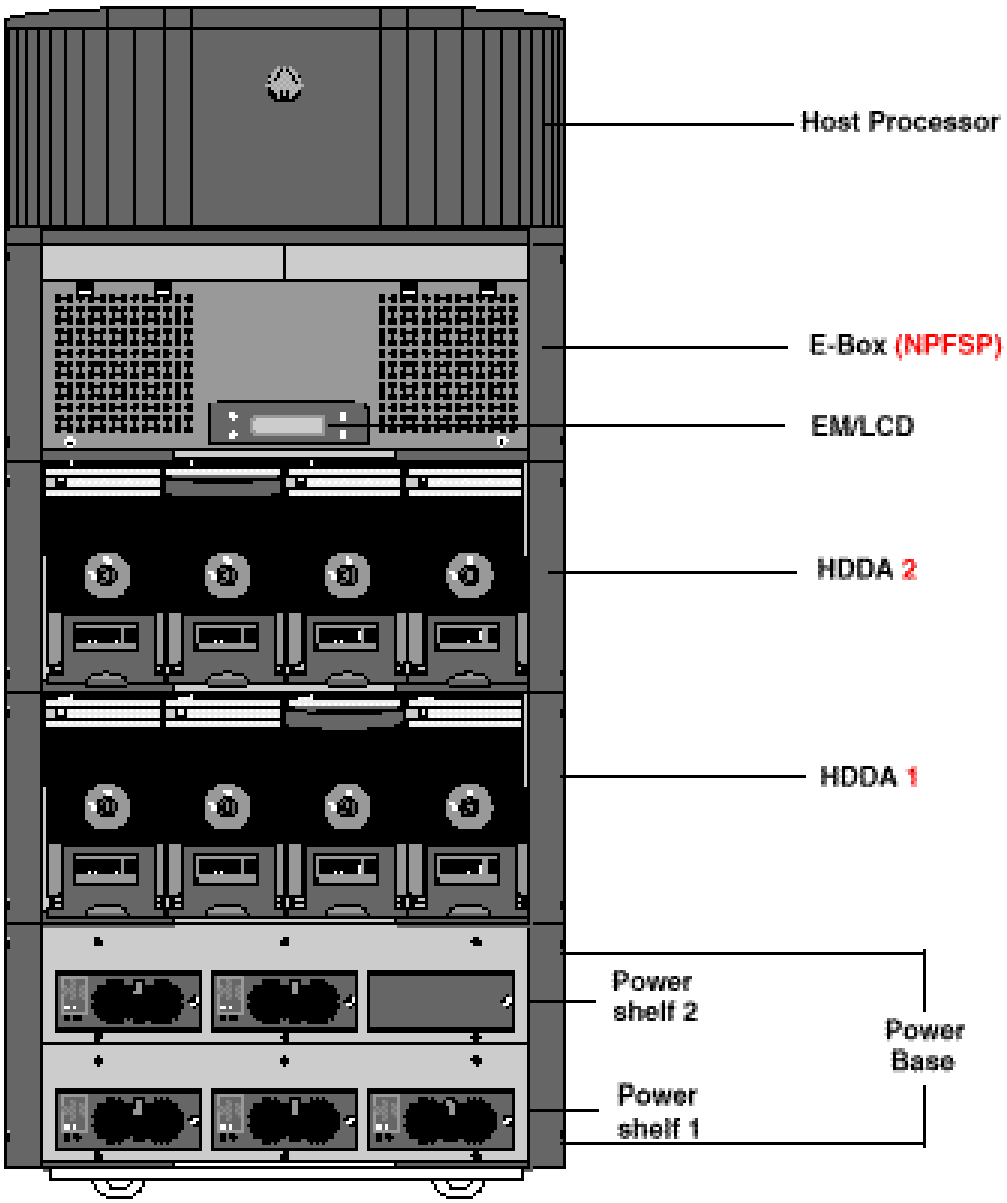
- Layout
- AC and DC power distribution

## FRUs

- PCI Cards
- Assemblies
- Cables

## Standard / Supported Configurations

## System Cabling




**M2000 Subassemblies**

**M2000 System Layout**

# Overview of the System

Power Base

- ▲ One or two Power Shelves
- ▲ AC power distribution
- ▲ Bulk Power Supplies (same as NS8000 and NS7000/800)
  - – Convert AC power to -48 VDC for distribution to local DCCs (**DC C**onverters)

HDDAs

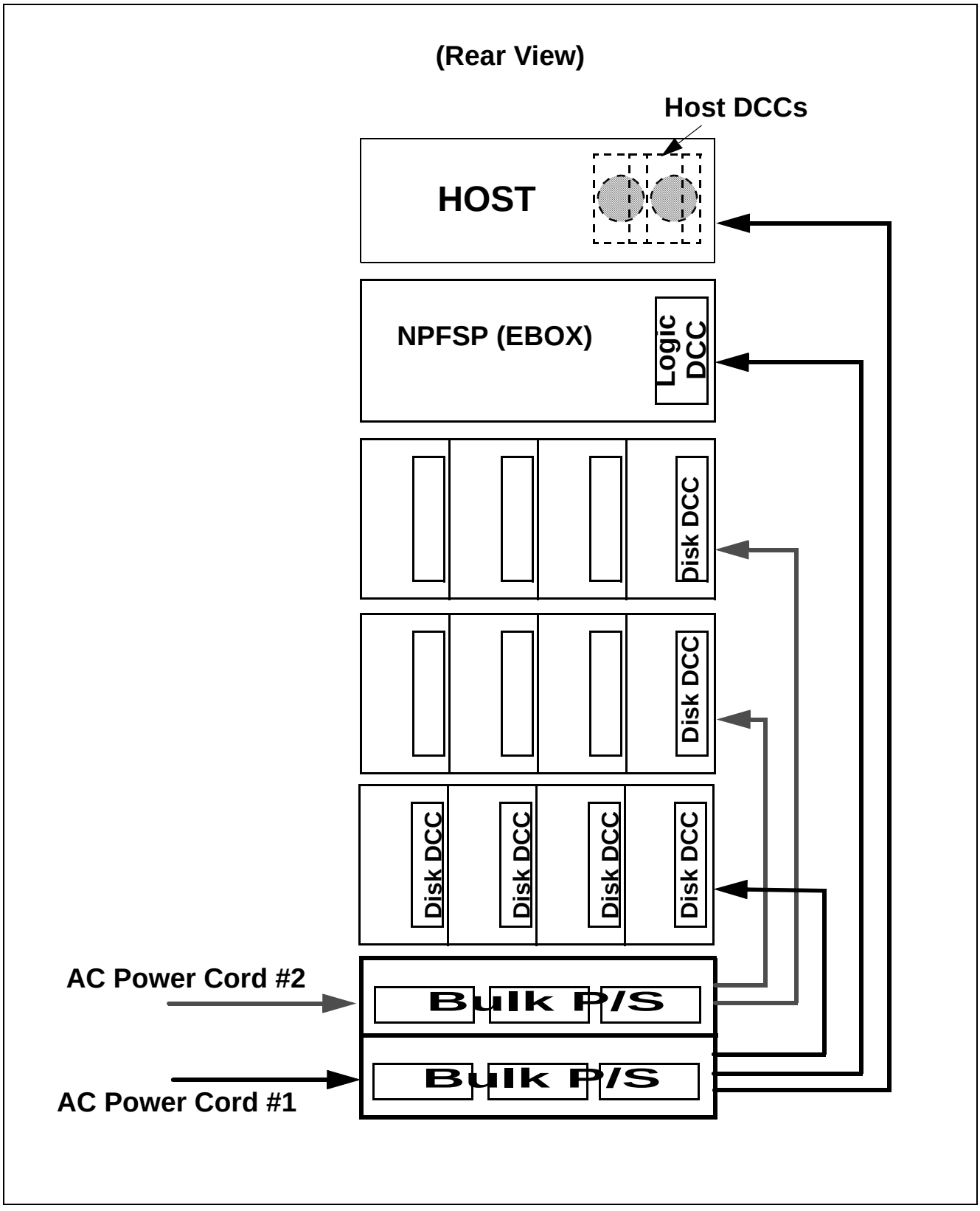
- ▲ Same HDDA as NS8000 and NS7000/800
- ▲ New disk drawer with daisy-chain capability
- ▲ Environmental Monitoring
  - – HDDA LON card in rear
  - – PIC microcontroller in disk drawer

E-Box (NPFSP)

- ▲ Custom Intel-architecture motherboard
- ▲ 7 PCI Card slots / 2 PCI buses
- ▲ Environmental Monitoring & display panel
- ▲ Logic DCC (local power supply)

Host Processor

- ▲ Third-party assembly
- ▲ Sun AXi motherboard w/ 270 MHz Ultra-Sparc IIi CPU module
- ▲ Host DCCs (redundant DC power supplies with -48 VDC input)
- ▲ Sun OpenBoot Prom Environment Monitor




**AC & DC Power Distribution**

# AC and DC Power Distribution

## Two Power Shelves (most configurations)

AC Power Input, -48 Volts DC output

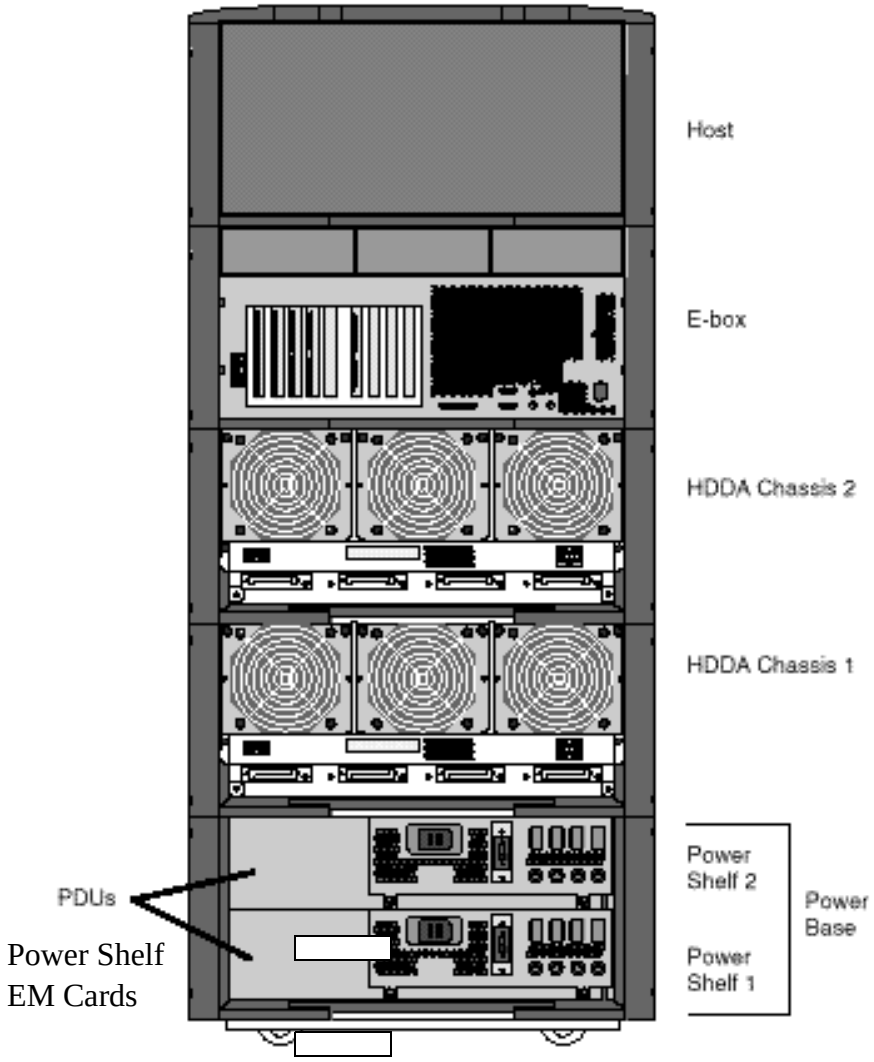
▲ **Bottom Power Shelf:**

- Input is AC Power Cord #1
- Output is to Host, EBox, HDDA #1 (i.e., Bottom HDDA)
- Three Bulk Power Supplies
- N+1 Redundancy

▲ **Top Power Shelf:**

- Only needed if more than one HDDA
- Input is AC Power Cord #2
- Output is to HDDAs #2 and #3
- # of Bulk P/S = (# of HDDAs connected to output) + 1
- N+1 Bulk Power Supply Redundancy

▲ **48 VDC power cables do not cross stack boundaries**




**M2000 Rear View**

# Back of System

Power Shelves

- PDUs
  - AC Power Cord Inlet Connector (mates with IEC 320-C19 cordset)
  - AC Main Circuit Breakers (One per PDU)
  - AC Power Distribution to Bulk Power Supplies
  - DC Ouput Connectors (each is individually fused)
- Power Shelf EM LON card

HDDAs

- Same chassis as NS8000
- HDDA LON EM card

NPFSP (a.k.a. E-Box)

- EM Transceivers
- PCI Slots
- Serial Ports
- Logic DCC
- “Cable Cubby”
  - Modem hideaway
  - Service loop storage

Host Processor

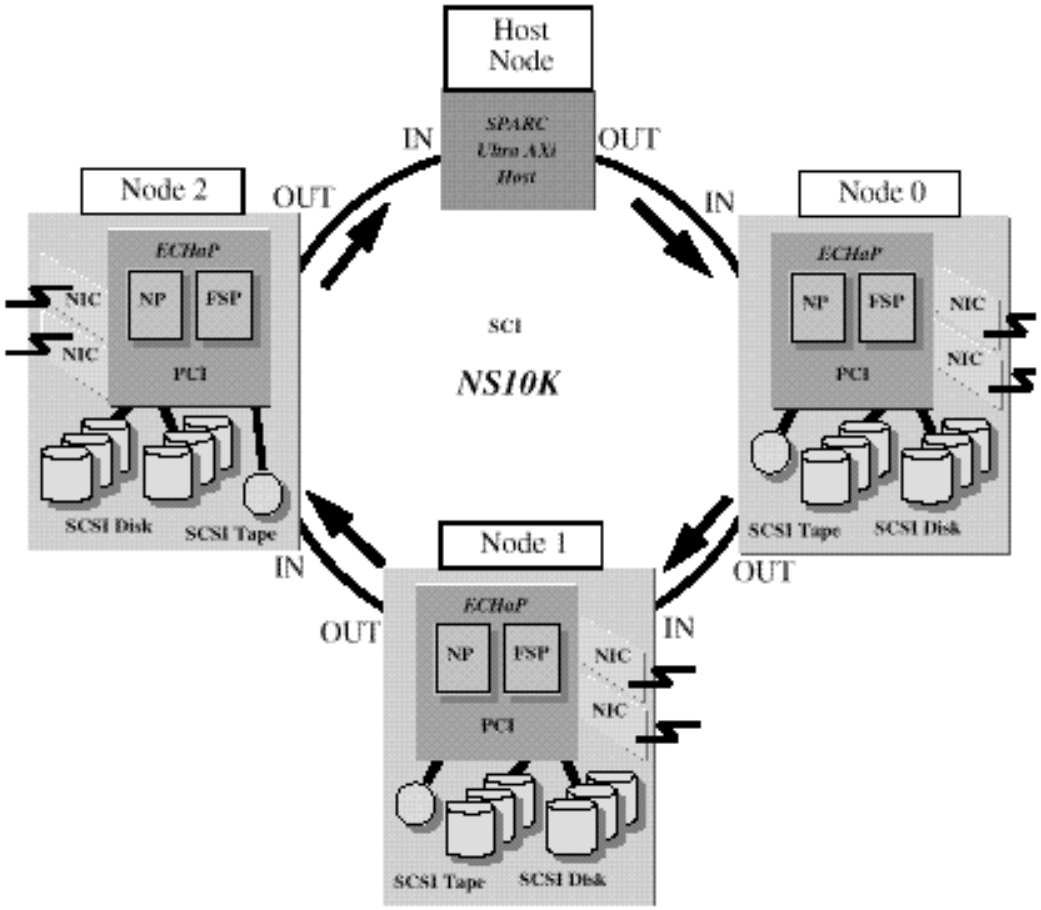



Figure 2-15. SCI cabling ring

## SCI Ring

# SCI Ring Cabling

**1 meter long cable (450326): Used within a stack**

**5 meter long cable (450369): Used between any 2 stacks**

**Cable from “SCI OUT” of one SCI Node to “SCI IN” of next SCI Node.**

# PCI Cards

**E-Box**:

PCA, PCI QUAD ENET ADAPTER
PCA,PCI,3CH,64MB,U2,RAID
PCA,PCI-SCI,CLUSTER ADAPTER 2
PCA,PCI,DUAL,U-SCSI,DIFF,ADPTR
PCA,PCI-FDDI,SAS-FIBRE
PCA,PCI-FDDI,DAS-FIBRE
PCA,PCI,GIGABIT E-NET

**Host:**

PCA,PCI,4MBSVGA,ADPTR
PCA,PCI-SCI,CLUSTER ADAPTER 2
PCA,PCI,DIFF, U-SCSI 1-CH

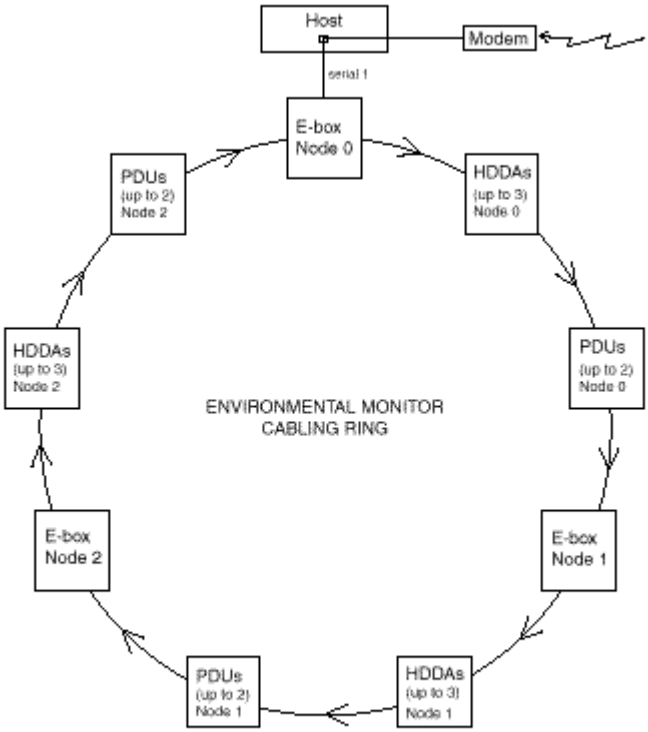



**Figure 2-21. EM-Net cabling ring**

# Environmental Monitor Cabling

## Ring topology

All EM Nodes in a ring

E-Box to Host via serial cable (Y-Cable)

“EM Master Node” in M2000 Node 0

“EM Slave Nodes” in all other M2000 Nodes

| Revision H | 10/30/98 | FRU INFORMATION |
|---|---|---|
| | MFG | |
| PART NUMBER | REV | DESCRIPTION |
| | | EBox/POWER/Misc. PARTS |
| 500817 | | ASSY, ECHAP W/EBOX ENCL |
| 650025 | | POWER SUPPLY, LOGIC DCC-2 |
| 600063 | | PCA,VRM8,P6, DC-DC,5V,IN |
| 600077 | | PCA,DIMM,DRAM,16x72,60NS,3.3V (128MB) |
| 600080 | | PCA, PCI QUAD ENET ADAPTER |
| 600098 | | PCA,PCI,3CH,64MB,U2,RAID |
| 600093 | | PCA,PCI-SCI,CLUSTER ADAPTER 2 |
| 600086 | | PCA,PCI,DUAL,U-SCSI,DIFF,ADPTR |
| 670013 | | ASSY,FAN,4.687x1.5 W/CONN,9"W |
| 600104 | | PCA,PCI-FDDI,SAS-FIBRE |
| 600105 | | PCA,PCI-FDDI,DAS-FIBRE |
| 600101 | | PCA,PCI,GIGABIT E-NET |
| 100176 | | ASSY,PCA,AFX8000 |
| 640154 | | POWER SUPPLY,CHASSIS,3-SLOT |
| 650024 | | POWER SUPPLY MODULE,48VDC,600W |
| 690006 | | PDU,115/230 VAC,20A/10A |
| 380082 | | BATTERY,1.5V,ALKALINE,AA |
| 640185 | | MONITOR,SVGA, 17 INCH |
| 640160 | | KEYBOARD,104KEY,PS/2 |
| 640161 | | MOUSE,3BUTTON,PS/2 |
| | | HDDA PARTS |
| 500705 | | ASSY, CHASSIS, HDDA |
| 500913 | | ASSY,DRAWER, HDDA |
| 500782 | | ASSY,DISK DRIVE,9GB,HH,HDDA |
| 500880 | | ASSY,DISK DRIVE,18GB,HDDA |
| 500783 | | POWER SUPPLY, DC/DC,130W |
| 500706 | | ASSY,FAN,HDDA |
| 360013 | | FUSE,5A,125V,SUBMINIATURE |
| | | ENVIRONMENTAL MONITOR PARTS |
| 100158 | | PCA,DRV ARRAY ENV MON LON |
| 500749 | | LCD MOUNT, NP EBOX |
| 500866 | | ASSY,LCD MOUNT EBOX EXP |
| 100166 | | PCA,E-LP,TRANSCEIVER |
| 100157 | | PCA,ECHAP,TRANSCEIVER |
| 100165 | | PCA,POWER SHELF,LON ASSY |

**M2000 FRU List**

# FRUs

FRU Listing

| | | CABLES |
|---|---|---|
| 450321 | | PWR CORD,16A,IEC309 |
| 450322 | | PWR CORD,2.5M,NEMA 5-20 |
| 450323 | | PWR CORD,2.5M,16A,CEE7/7" |
| 450324 | | PWR CORD,2.5M,13A,UK |
| 450373 | | ASSY,CA,68P,VHDC,INDIR,49.2 IN |
| 450361 | | ASSY,CA,68P,VHDC,2 METER |
| 450314 | | ASSY,CA,PWR,HDDA,1M |
| 450315 | | ASSY,CA,PWR,EBOX,1M |
| 450326 | | CA,SCI,50P,VHDCI,1 METER |
| 450369 | | CA,SCI,50P,VHDCI,5 METER |
| 450376 | | CA,SCSI,68P TO VHDC,75FT |
| 450377 | | CA,SCSI,68P TO VHDC,12FT |
| | | |
| 450370 | | CA,RJ45,CT5,14FT,BLK |
| 450372 | | ASSY,CA,PWR,HDDA,75 CM |
| 450330 | | CA,RJ45,CT5,2FT,BLK |
| | | HOST PARTS |
| 790131 | | SUBASSY,AXI,HOST,FRU |
| 650029 | | POWER SUP MOD,48DC,300W |
| 600099 | | PCA,DIMM.60NS,8x72,EDO |
| 600097 | | PCA,PCI,4MBSVGA,ADPTR |
| 670018 | | ASSY,CPU,HOST,10K |
| 500933 | | ROOT DRIVE ASSY |
| 500936 | | CD-ROM ASSY |
| 670019 | | FAN.CHASSIS |
| 450374 | | ASSY,CA,PWR,HOST,1.5M |
| 450375 | | CABLE,Y-SERIAL |
| 640188 | | MODEM,56B,EXTERNAL |
| 600107 | | PCA,PCI,DIFF, U-SCSI 1-CH |

**M2000 FRU List**

# Supported Configurations:

| Supported NIC Combinations | | |
|---|---|---|
| Max E-Net NICs | Max Gbit NICs | Max FDDI NICs |
| 0 | 0 | 3 |
| 1 | 2 | 0 |
| 1 | 0 | 2 |
| 2 | 1 | 0 |
| 2 | 0 | 1 |
| 3 | 0 | 0 |

| **Capacity Tradeoffs: Storage vs Networks** | | | |
|---|---|---|---|
| NICs | | | |
| Mylex SCSI | 1 | 2 | 3 |
| 1 | 28 disk<br>504 GB<br>1 NIC | 28 disk<br>504 GB<br>2 NICs | 28 disk<br>504 GB<br>3 NICs |
| 2 | 56 disk<br>1 TB<br>1 NIC | 56 disk<br>1 TB<br>2 NICs | |
| 3 | 84 disks<br>1.5 TB<br>1 NIC | | |

**1. NS10 K Power Configuration Rules:**

| Stack Contents | | | | Power Base Configuration | | | | |
|---|---|---|---|---|---|---|---|---|
| Host 790114 | Ebox 500757 | HDDA | | Crate w/casters | Power Shelf 640154 | PDU 3-Slot 690006 | Power Cords | Bulk P/S 650024 |
| 0 or 1 | 1 | 1 | | 1 | 1 | 1 | 1 | 3 |
| 0 or 1 | 1 | 2 | | 1 | 2 | 2 | 2 | 5 |
| 0 or 1 | 1 | 3 | | 1 | 2 | 2 | 2 | 6 |

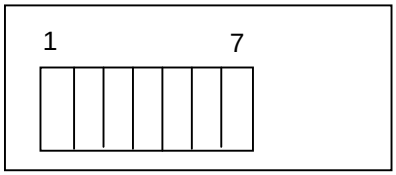
Each stack has power configured independently, according to the above rules.

**2. Mylex RAID Controller STANDARD Configurations:**

| Number of HDDAs in Stack | | Mylex Cards | SCSI point-point cables | SCSI daisy chain cables |
|---|---|---|---|---|
| | | p/n 600098 | 450361 | 450348 Rev 2 |
| 1 | | 1 | 2 | 1 |
| 2 | | 2 | 4 | 2 |
| 3 | | 3 | 6 | 3 |

**3. ECHaP PCI Card Configuration Standards**

| SLOT | CARD | | PCI Bus |
|---|---|---|---|
| 1 | Diff SCSI (Tape) | | 1 |
| 2 | Mylex 3 or NIC 2 | | 1 |
| 3 | Mylex 2 or NIC3 | | 1 |
| 4 | Mylex 1 | | 1 |
| 5 | AFX8000 | | 0, 1 |
| 6 | SCI | | 0 |
| 7 | NIC 1 | | 0 |




PCI Card Slot Layout
Ebox Rear View

* Every system must have at least one of each of the following cards: Mylex, NIC, SCI, AFX 8000
Diff-SCSI tape card is optional on the Ebox and/or Host.

## Configuration Standards

**4. Memory Options:**

| **ECHaP** | MB | Qty | DIMM Size | P/N |
|---|---|---|---|---|
| Standard | 256 | 2 | 128 MB | 600077-001 |
| Option 1 | 512 | 4 | 128 MB | 600077-001 |
| Option 2 | 1024 | 8 | 128 MB | 600077-001 |

| **Host** | MB | Qty | DIMM Size | P/N |
|---|---|---|---|---|
| Standard | 128 | 2 | 64 MB | 600099 |
| Option 1 | 256 | 4 | 64 MB | 600099 |
| Option 2 | 512 | 8 | 64 MB | 600099 |

| | |
|---|---|
| **Mylex** | 64MB only |
| **AFX8000** | 128 MB only |

**NOTE:** ECHaP requires at least 512MB for multi-node operation.

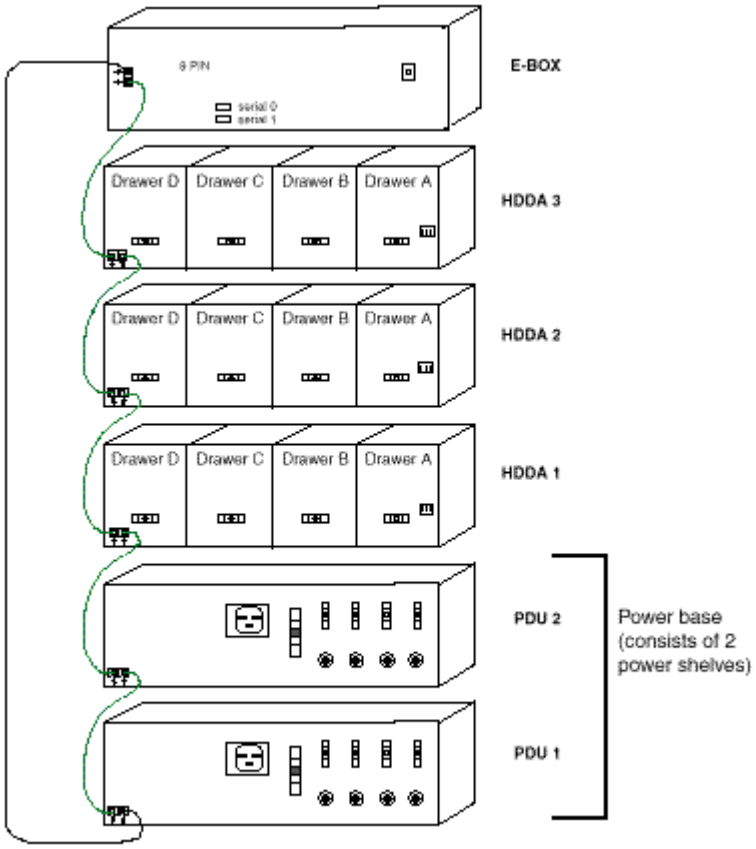



Figure 2-22. EM-Net cable connections—single node (rear view)

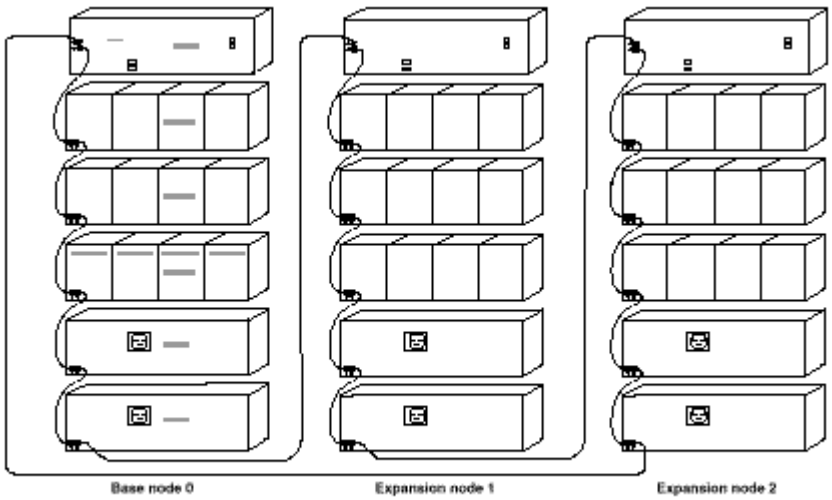



Figure 2-23. EM-Net cable connections—multi-node (rear view)

## EM Cables

# Cables

## EM-Network cables

Cables connect in “waterfall” fashion - from top to bottom

Bottom EM port cables to top of stack to complete the ring

(Multi-node systems: bottom of one stack to top of the next stack)

## Host Serial Y-Cable

Service Modem connection (Host TTY-A)

Serial Connection to E-Box for EM Data

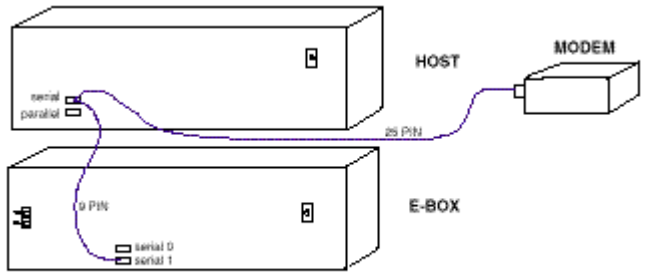



Figure 2-27. Modem Y-cable connections (rear view)


Figure 2-16. SCI cable connections—single node (rear view)

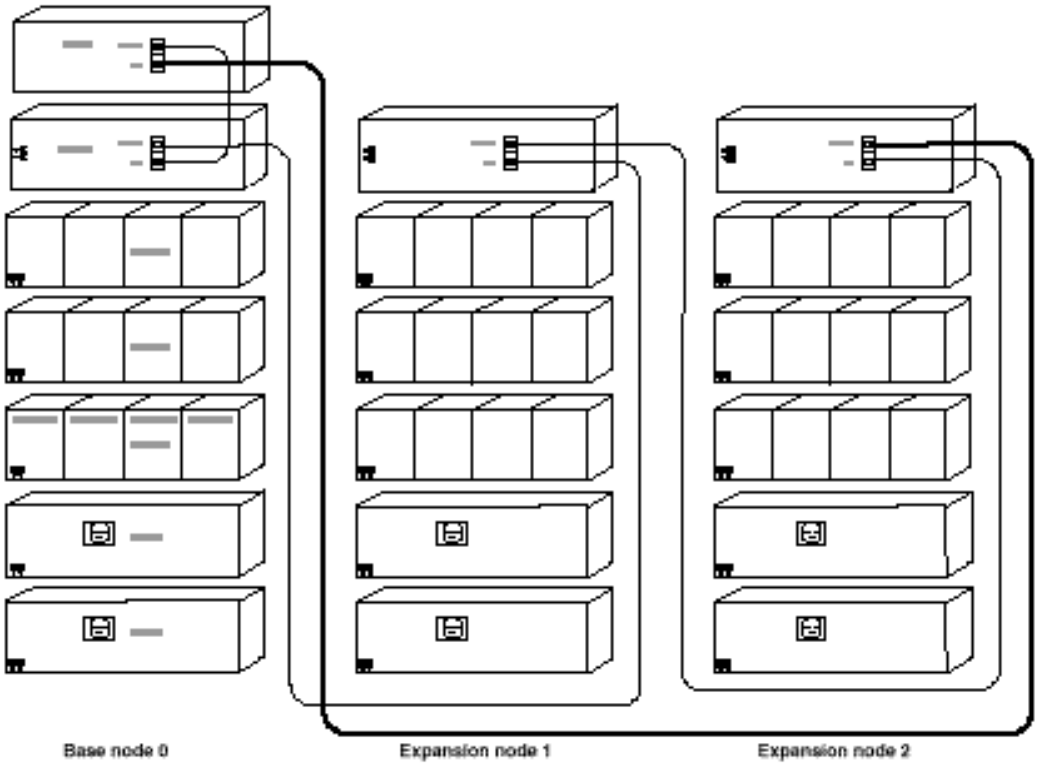



Figure 2-17. SCI cable connections—multi-node (rear view)

## SCI Ring Cabling

# SCI Cables:

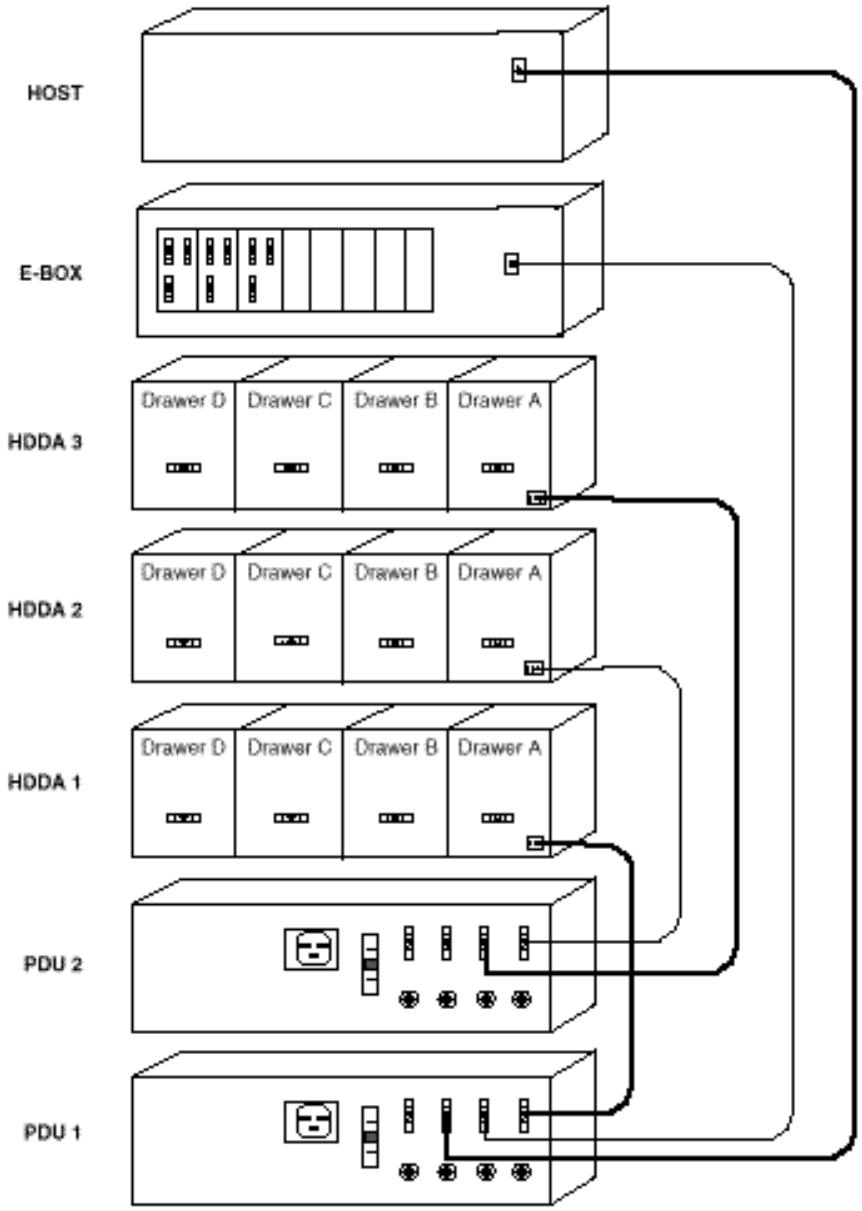



Figure 2-10. Power cable connections with three HDDA chassis (rear view)

## DC Power Cables

# DC Power Cables

450314 Power Cable, 50 cm (Bottom 2 HDDAs)

450372 Power Cable, 75 cm (3rd HDDA only)

450315 Power Cable (E-Box)

450374 Power Cable, Host

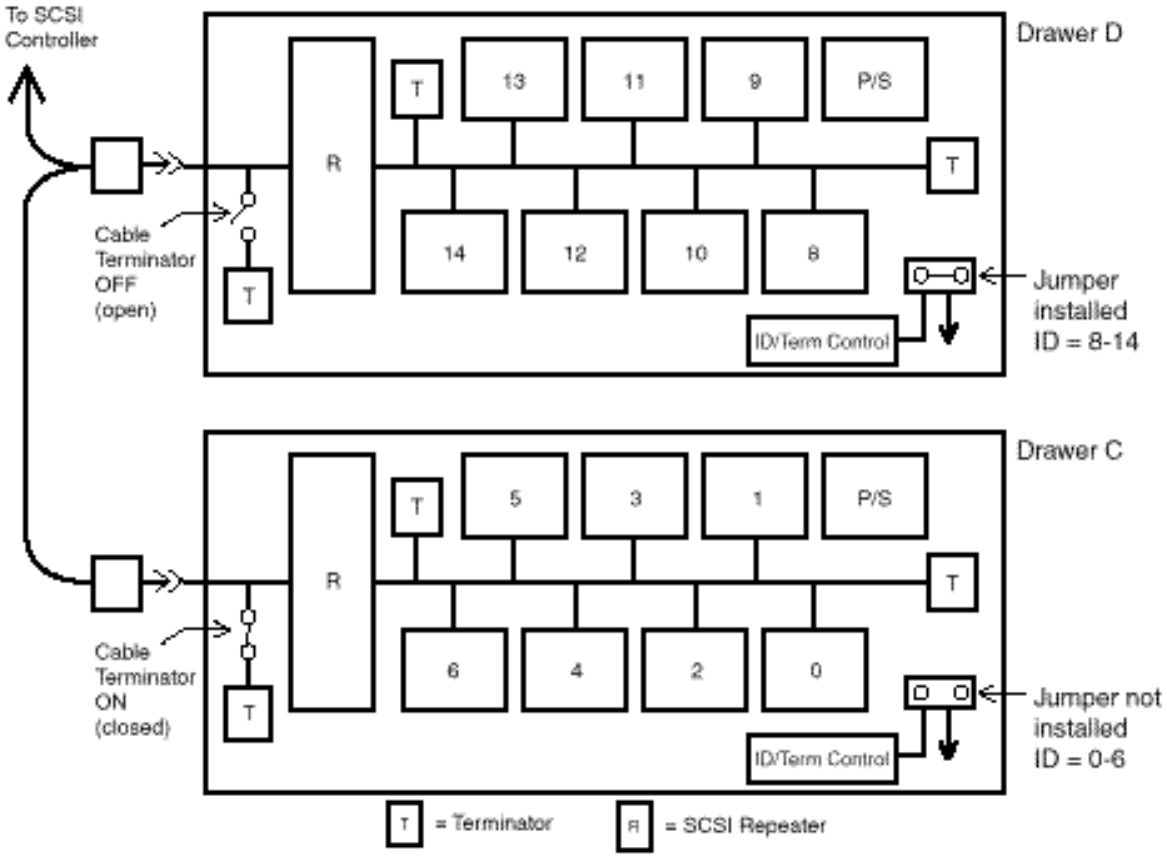



Figure 2: Daisy-chain SCSI ID and termination

**SCSI Daisy-Chain**

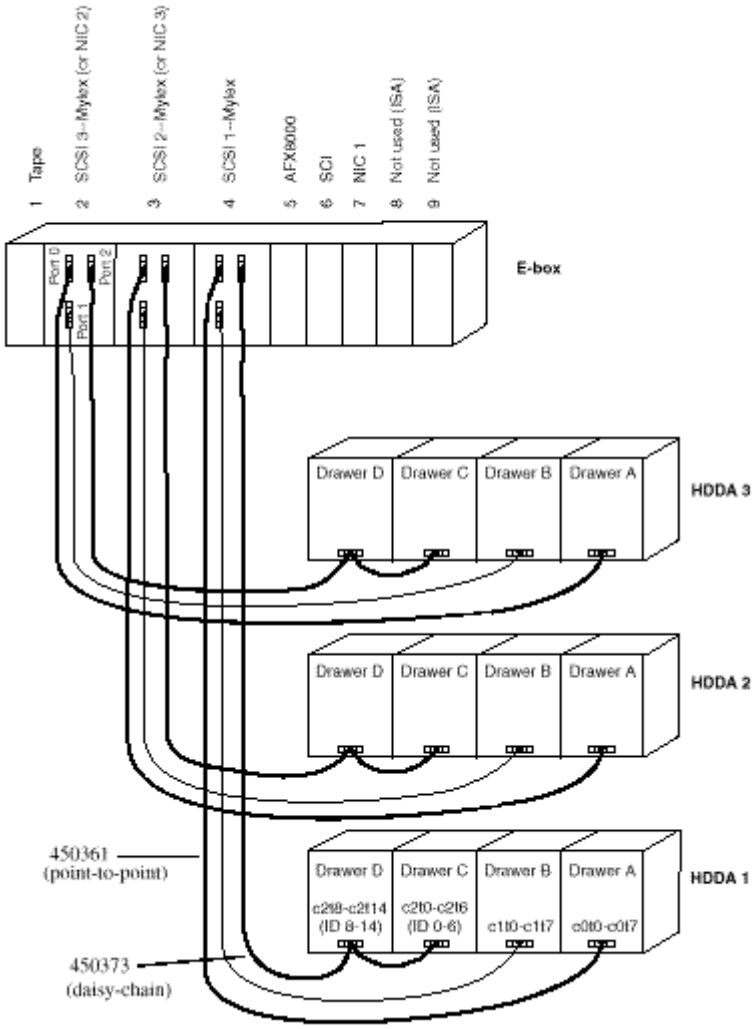
# SCSI Cables

Daisy-Chained Disk Drawers

▲ New Disk Drawer p/n 500913 is daisy-chain capable

- Jumper = High SCSI Addresses (8-14)
- No Jumper = Low SCSI Addresses (0-6)

Standard Controller to HDDA cabling method




**Standard HDDA SCSI Cabling**