Meridian 1

Fiber Network Fabric
Reference Guide

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Standard 2.00. This is a global document and is up-issued for content changes for X11 Release 25.0x.

April 2000

Standard 1.00.

Contents

Introduction

Content list

The following are the topics in this section:

Reference list

The following are the references in this section:

- *System Installation Procedures* (553-3001-210)

- "Option 81 upgrade to Fiber Network" on page 71

About this document

This document is a global document. Contact your system supplier or your Nortel Networks representative to verify that the hardware and software described is supported in your area.

This manual contains instructions to upgrade a Meridian 1 Option 81 or Option 81C system to Fiber Network Fabric. It also contains instructions to upgrade an Option 61C with NT5D21 Core/Net Modules to a two-group Option 81C with Fiber Network Fabric.

Note: For new Option 81C systems shipped with Fiber Network Fabric, refer to *System Installation Procedures* (553-3001-210) for Fiber Network Fabric new system installation instructions.

Content summary

- **"Introduction"** describes Fiber Network Fabric (Fiber Network) and the basic hardware and software requirements needed for an upgrade.

- **"System architecture" on page 31** describes the hardware configuration and features of Fiber Network. This section includes a description of the Dual Ring Fiber Network architecture.

- **"Prepare for upgrade" on page 47** describes the steps that must be performed before an upgrade. This section also describes the minimum requirements for an upgrade.

- **"Option 81 upgrade to Fiber Network" on page 71** contains detailed procedures to upgrade a Meridian 1 Option 81 system to Fiber Network.

- **"Option 81C upgrade to Fiber Network" on page 103** contains detailed procedures to upgrade a Meridian 1 Option 81C system to Fiber Network.

- **"Option 61C upgrade to Option 81C with Fiber Network" on page 129** contains detailed procedures to upgrade a Meridian 1 Option 61C with NT5D21 Core/Net Modules to a two-group Option 81C with Fiber Network Fabric.

- **"Add a Network Group" on page 177** contains instructions to add additional capacity to a system that has been upgraded to Fiber Network.

- **"Replace equipment" on page 201** contains instructions to remove and replace hardware.

Product description

Fiber Network allows the expansion of Meridian 1 Option 81 and 81C systems from five Network groups to eight Network groups, a 60% increase in port and trunk capacity.

The Intergroup cards and Intergroup module in current Meridian 1 systems are replaced by a Dual Ring fiber optic network. This Fiber Network provides complete non-blocking communication between the network groups, eliminating the incidence of busy signals for calls switched between groups.

A Fiber Network of eight Network groups provides 7680 timeslots for 3840 simultaneous conversations.

Upgrades

Upgrades are achieved by replacing the Intergroup cards in the Core/Net and Network modules with Fiber Junctor Interface (FIJI) cards (Figure 1 and Figure 2). These FIJI cards are connected with fiber optic cable to form a Dual Ring Fiber Network. In this new configuration, the Intergroup module is no longer used. The module can be left in place, or removed. The Intergroup module can also be converted into an IPE module with the IPE Expansion kit.

Existing CNI cards are replaced with CNI-3 cards to increase the maximum number of Network groups to eight (Figure 1). Each CNI-3 card connects to a maximum of three Network groups. A combination of two port CNI cards and three port CNI-3 cards can be used in a system.

CNI-3 cards can be installed in Motorola based Core or Core/Net modules. These cards are not used in Call Processor PII (CP PII) Core/Net systems.

X11 Release 25 is required. Software Option 365 must be activated.

See "System architecture" on page 31 for a detailed description of Fiber Network configuration. Refer to "Option 81 upgrade to Fiber Network" on page 71 and "Option 81C upgrade to Fiber Network" on page 103 for instruction to perform an actual upgrade.

Figure 1
Card upgrades in NT5D21 Core/Net modules

FIJI

CNI-3

IGS or DIGS
is replaced by
a FIJI card

CNI (2 port) card
is replaced by a
CNI-3 (3 port) card

553-9106
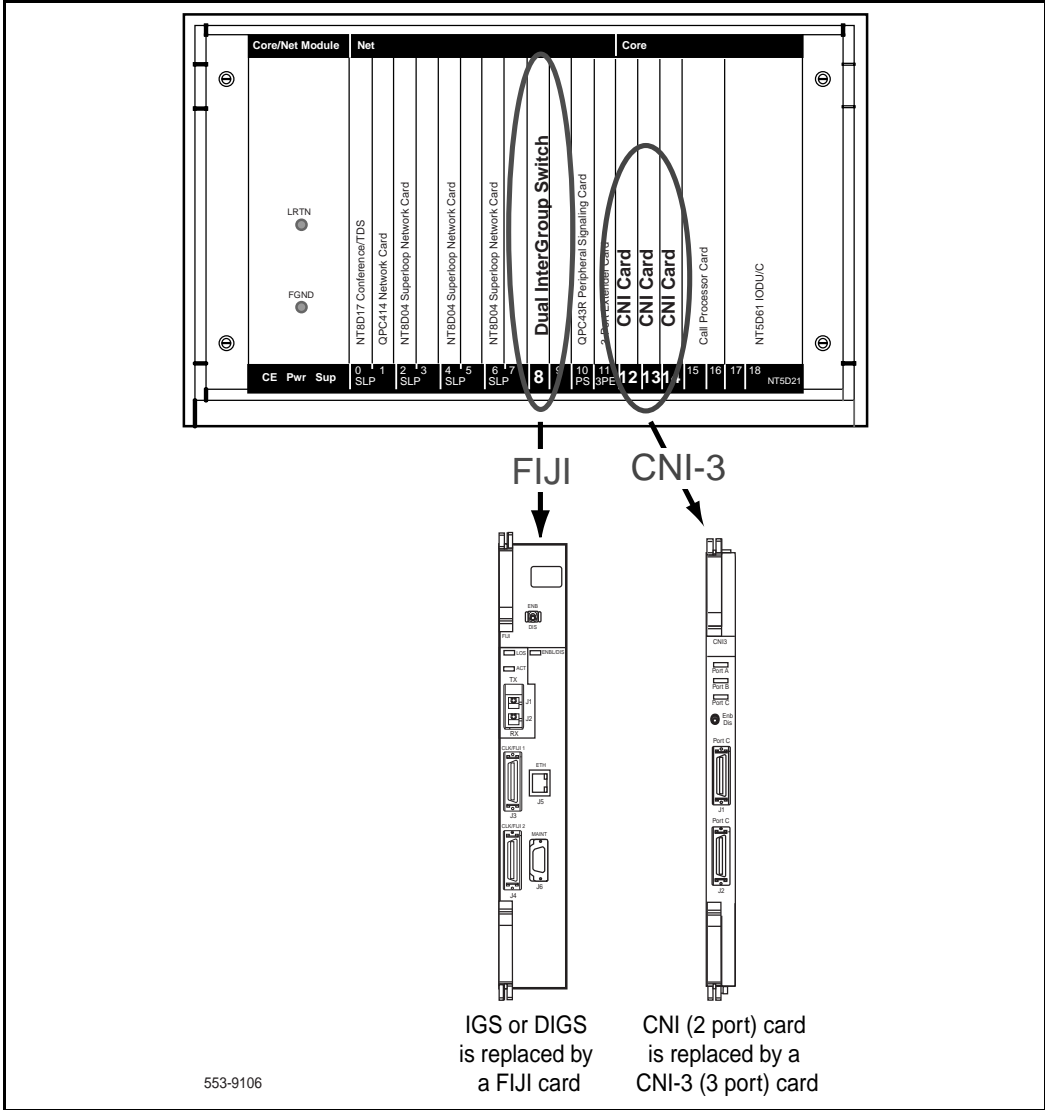
Figure 2
Card upgrades in NT8D35 Network modules

OCMC card
is installed to
store excess
fiber optic cable

IGS or DIGS
card is replaced
by a FIJI card

553-9551
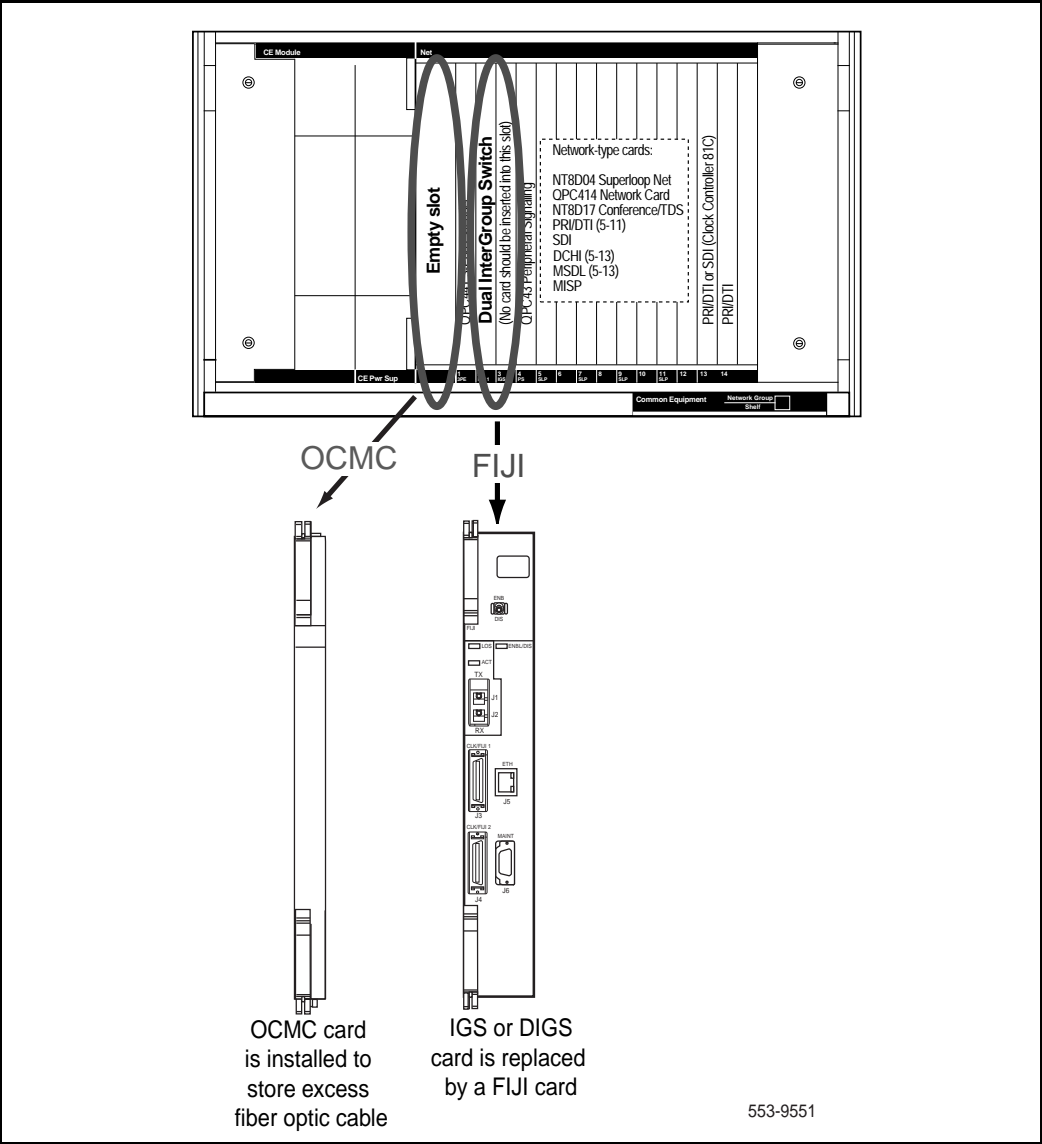
Fiber Network in new systems

For new Option 81C systems shipped with Fiber Network Fabric, refer to *System Installation Procedures* (553-3001-210). The *System Installation Procedures* (553-3001-210) document includes instructions for installation of new systems with Fiber Network Fabric.

Requirements

Meridian 1 systems can be configured with only one type of network fabric: either 100% IGS/IGM or 100% Fiber Network. A combination of IGS/IGM and Fiber Network equipment within a Meridian 1 system is not supported. If a system is upgraded to Fiber Network, FIJI cards and related equipment must be installed in ALL Network groups

Required software

X11 Release 25 or higher is required for Fiber Network. Software Package 365 must be activated.

All systems must have a CD-ROM drive since release 25 software is only shipped on CD-ROM media. In Motorola based systems, the CD ROM is part of the IODU/C unit (NT5D61AB).

Required hardware

The number of circuit cards required by each system depends on system capacity and module placement.

Table 1
Fiber Network cards and minimum vintage requirements

Quantity	Part number	Description
1 per Network module	NTRB33	Fiber Junctor Interface (FIJI) card
1 per Network module, as needed	NTRE39	Optical Cable Management Card (OCMC)
6 per Motorola based system (3 per Core), as needed	NTRB34	Core Network Interface 3 (CNI-3) cards
1 per Network, Core or Core/Net module (DC powered systems only)	NT6D40 NT6D41	DC Power Supplies NT6D40 and NT6D41 must be AD vintage.
2 per system	QPC471*	Clock Controller cards (USA) must be vintage H or later.
2 per system	QPC775*	Clock Controller cards (all countries except USA) must be vintage E or later.
As required	NT5D12	Dual Density PRI (DDP) cards must be either: • vintage AD or earlier • vintage AG or later ***Note:*** Vintages AE and AF are not compatible with FNF.
* Either Clock Controller can be installed, but QPC471 and QPC775 Clock cards cannot be combined in one system.		

Required cables

Table 2
Required cables

Cable type	Description	Quantity	Part number	Length
Fiber Ring cable	Fiber optic cable to connect the FIJI cards together in the Dual Ring Fiber Network.	1 per FIJI card	NTRC48AA NTRC48BA NTRC48CA NTRC48DA NTRC48EA NTRC48FA NTRC48GA NTRC48HA	6 ft. 10 ft. 12 ft. 14 ft. 19 ft. 26 ft. 32 ft. 50 ft.
CNI to 3PE cable (CNI and CNI-3 backplane)	Used to connect CNI and CNI-3 backplane connectors to 3PE cards	2 per CNI or CNI-3 card (2 cables per Network group)	NTND14	
CNI-3 to 3PE cable (CNI-3 faceplate)	Used to connect the "C" faceplate port on CNI-3 cards to 3PE cards.	2 per CNI-3 card	NT9D89CA NT9D89DA NT9D89EA NT9D89FA NT9D89GA	8 ft. 10 ft. 12 ft. 25 ft. 50 ft.
Clock to FIJI	Connects from the Clock to Clock card to the FIJI cards in Network group 0.	2 per system	NTRC46AA NTRC46BA NTRC46CA	4 ft.-4.5 ft.* 5.5 ft. - 8 ft.* 22 ft.-22 ft.*
Clock to Clock	Connects from Clock 0 to Clock 1. Also contains the connectors for the Clock to FIJI cables.	1 per system	NTRC49AA NTRC49BA	6 ft. 20 ft.

Table 2
Required cables

Cable type	Description	Quantity	Part number	Length
FIJI to FIJI Sync	Connects between the FIJI cards in shelf 0 and shelf 1 of each Network group (except group 0).	1 per network group (except group 0)	NTRC47AA	5 ft.
* indicates the lengths of the two "Y" terminations.				

Table 1
Equipment required for Option 61C upgrade to Option 81C with Fiber Network Fabric (Part 1 of 3)

Order number	Description	Quantity per system
NTRB33AA	Fiber Junctor Interface Card (FIJI)	4
NT4N50AA	Power Distribution Unit DC [2]	2
NT6D40BA	Peripheral Equipment Power Supply, DC [2]	2
NT6D41AD	Common Equipment Power Supply, DC [2]	2
NT7D00AA	Top Cap, AC [1]	1
NT7D00BA	Top Cap, DC [2]	1
NT7D06AA	Filler Panel	2
NT7D09CA	Pedestal, DC [2]	1
NT8D01BC	Controller - Four Card	1
NT8D04BA	SuperLoop Network Card	1
NT8D06AB	Peripheral Equipment Power Supply AC [1]	1
NT8D17FA	Conference/TDS Card	2

Table 1
Equipment required for Option 61C upgrade to Option 81C with Fiber Network Fabric (Part 2 of 3)

Order number	Description	Quantity per system
NT8D22AC	System Monitor	1
NT8D27BB	Pedestal AC [1]	1
NT8D29AB	Common Equipment Power Supply AC [1]	2
NT8D35BA	Network Module AC [1]	2
NT8D35EA	Network Module DC [2]	2
NT8D37BA	Intelligent Peripheral Module AC [1]	1
NT8D37EC	Intelligent Peripheral Equipment Module DC [2]	1
NT8D46AL	System Monitor Serial Link Cable (7 ft.)	1
NT8D52AB	Pedestal Blower Unit AC [1]	1
NT8D52DD	Pedestal Blower Unit DC [2]	1
NT8D53CA	Power Distribution Unit AC [1]	2
NT8D91AE	Network to Controller Cable (8 ft.)	1
NT8D99AB	Network to Network Cable (2 ft.)	5
NTND14BA	CNI to 3PE Cable (6 ft.)	2
NTND14BB	CNI to 3PE Cable (8 ft.)	2
P0712003	Instruction Package	1
P0738686	Meridian 1 Pallet Ramp Set	1
QPC43R	Peripheral Signaling	2
QPC441F	Three-port Extender	2
NTRC49AA	Clock-Clock Synchronization Cable	1
NTRC46BA	Clock to FIJI Cable (5.5 ft. - 8 ft./1.7m - 2.4m)	2

Table 1
**Equipment required for Option 61C upgrade to Option 81C with Fiber Network Fabric
(Part 3 of 3)**

Order number	Description	Quantity per system
NTRC47AA	FIJI to FIJI Synch Cable	1
NTRC48AA	FIJI Fiber Ring Cable - 6 ft./2 m.	2
NTRC48CA	Fiber Ring Cables (12 ft./3.7 m)	2
NT4R39AA	Optical Cable Management Card (OCMC)	2
[1] Required for AC Systems only.		
[2] Required for DC Systems only.		

Compatible hardware

Fiber Network Fabric is supported by Option 81 and 81C systems that include the hardware below:

Systems and related hardware

- All Motorola 68040, 68060, and 68060 Enhanced Call Processor cards.

- Call Processor Pentium II (CP PII) systems.

- All Network and Peripheral Equipment except equipment listed in "Incompatible hardware" on page 29. Fiber Network does not support equipment related to the Intergroup cards or Intergroup module.

- All Desktop and Applications Equipment.

- DC Power Supplies NT6D40 and NT6D41 must be AD vintage.

- QPC43 Peripheral Signaling cards must be minimum vintage R or later.

- QPC471 Clock Controller cards must be vintage H or later.

- QPC775 Clock Controller cards must be vintage E or later.

Note: QPC471 and QPC775 Clock cards cannot be combined in one system.

- QPC441 3-Port Extender (3PE) cards must be vintage F or later.

Minimum memory requirements

Meridian 1 systems with Fiber Network must meet the minimum Release 25 memory requirements listed in Table 3.

- Fiber Network systems must contain either the CP2 (68040), CP3 (68060), CP 4 (68060E) or CP PII (Pentium) Core processor cards.

- Systems that do not contain these cards (such as the XT) must upgrade to either the CP4 or CP PII cards.

DRAM memory can be upgraded by the customer. See "Memory upgrade guidelines" on page 27 for information on DRAM upgrades.

Flash memory cannot be upgraded by the customer.

Table 3
Minimum memory requirements[1]

System configuration	Flash memory requirements	DRAM memory requirements	Total Memory requirements
Two to five Network groups	32 MB	64 MB	96 MB
Six to eight Network groups	32 MB	80 MB	112 MB
New 68060E systems or systems upgraded to 68060E call processor	64 MB	96 MB	160 MB
CP PII Core processors			128 MB[2]

Note 1: In addition to the memory requirements stated above, the call processor must have sufficient real time capacity. Consult your Nortel Networks representative after the upgrade process is complete to determine whether a call processor has sufficient real time capability.

Note 2: CP PII systems are only shipped in a 128 MB configuration. This memory cannot be upgraded in the field.

Memory upgrade guidelines

Follow the instructions in Table 4 to upgrade the memory in systems with two to five Network groups.

Follow the instructions in Table 5 to upgrade the memory in systems with six to eight Network groups

These guidelines are for Option 81 or 81C systems with X11 Release 25 and Fiber Network. These guidelines are also for XT and single Core systems that are upgraded to dual Core systems:

Table 4
Memory upgrades for two to five Network groups

Motorola call processor	Current flash memory	Current DRAM memory	Upgrade process
68040, 68060, 68060E	32 MB	32 MB	Upgrade the DRAM memory to 64 MB. Add one 32 MB DRAM SIMM per processor card.
68040, 68060, 68060E	32 MB	48 MB	Upgrade the DRAM memory to 80 MB. Add one 32 MB DRAM SIMM per processor card.
68040, 68060, 68060E	64 MB	48 MB	Upgrade the DRAM memory to 80 MB. Add one 32 MB DRAM SIMM per processor card.
68060E	64 MB	64 MB	No upgrade required.

Note 1: The NTZC75AA DRAM memory upgrade kit contains one 32 MB SIMM for the upgrades described above.

Note 2: The NTZC77AA kit contains the anti-static mat and ESD wrist-strap required to perform a memory upgrade.

Table 5
Memory upgrade guidelines for six to eight Network groups

Motorola call processor	Current flash memory	Current DRAM memory	Upgrade process
68060, 68060E	32 MB	32 MB	Upgrade the DRAM memory to 96 MB. Add two 32 MB DRAM SIMMs per processor card.
68060, 68060E	32 MB	48 MB	Upgrade the DRAM memory to 112 MB. Add one 32 MB DRAM SIMM per processor card.
68060, 68060E	64 MB	48 MB	Upgrade the DRAM memory to 80 MB. Add one 32 MB DRAM SIMM per processor card.
68060E	64 MB	64 MB NT5D03FA	Upgrade the DRAM memory to 80 MB. Remove one 16 MB DRAM SIMM and add one 32 MB DRAM SIMM. Repeat this process for both processor cards.
68060E	64 MB	64 MB NT5D03FB	Upgrade the DRAM memory to 96 MB. Add one 32 MB DRAM SIMM per processor card.

Note 1: The NTZC75AA DRAM memory upgrade kit contains one 32 MB SIMM for the upgrades describes above.

Note 2: The NTZC77AA kit contains the anti-static mat and ESD wrist-strap required to perform a memory upgrade.

SL-1 cabinet support

Fiber Network supports "mixed network" systems that include a combination of SL-1 cabinets and Network modules. Such "mixed networks" are *not* supported on IGS/IGM based systems.

Incompatible hardware

- InterGroup Switch (IGS) card (QPC412)
- Dual InterGroup Switch (DIGS) card (NT5D30)
- Intergroup module (NT8D36)
- Junctor Board (QPC417)
- All marketing packages that contain the above items.

System architecture

Content list

The following are the topics in this section:

- Three group CNI-3 cards 43

- Two group cCNI cards (Call Processor PII) 45

To upgrade a system to Fiber Network Fabric, the Intergroup cards and Intergroup module are replaced with Fiber Junctor Interface (FIJI) cards and the Dual Ring Fiber Network.

FIJI card description

Fiber Network is enabled by the installation of one NTRB33 FIJI card in each Core/Net or Network module of an Option 81 or 81C Meridian 1 system (Figure 3 on page 33).

Configuration

- FIJI cards replace the Intergroup (IGS and DIGS) cards.

- FIJI cards require two slots; they are installed in slots 2 and 3 of each Network module, or in slots 8 and 9 of each Core/Net module.

- The FIJI cards are connected with fiber optic cable to form the Dual Ring Fiber Network described below.

- The FIJI cards in Group 0 are connected to the Clock Controllers in the Network modules.

- A maximum of 16 FIJI cards can be installed in a system.

Cables

- 1 FIJI Fiber Ring cable (NTRC48) for each FIJI card.

- 1 FIJI to FIJI Synchronization cable (NTRC47) for each Network Group except Group 0. These cables connect the two FIJI cards together to form a Network Group.

- 2 Clock to FIJI cables (NTRC46) for each system.

- 1 Clock to Clock cable (NTRC49AA) for each system..

Faceplate port and display descriptions

LCD display

The LCD display shows the Network Group and shelf. If an error occurs, this window displays an Alarm code.

Figure 3
FIJI card faceplate

553-8649
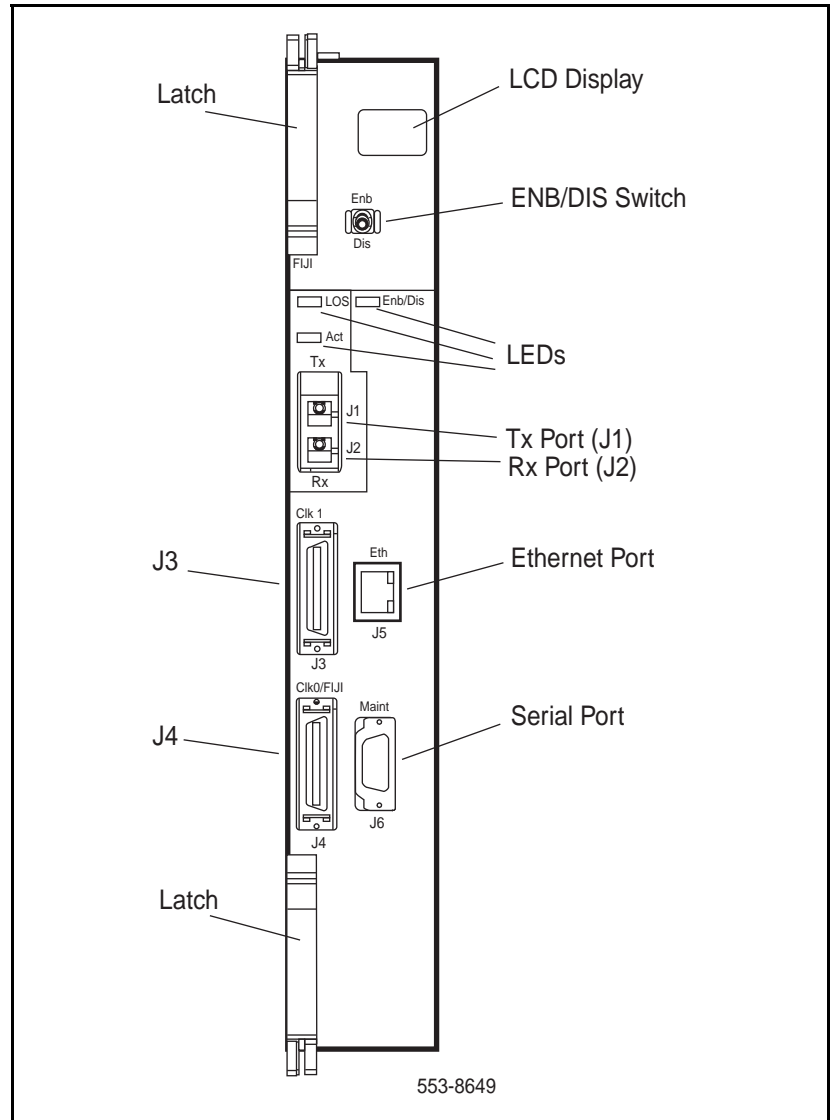
The ENB/DIS switch

This switch is used to manually enable or disable the FIJI card.

LED lights

The three LED lights indicate the following:

- ENL/DIS (off/red): this LED is OFF when the card is enabled. The LED is RED when the card is disabled.

- LOS (yellow): indicates a LOSS of the Fiber Ring signal.

- ACT (green): indicates that the Fiber Ring signal is ACTIVE.

Tx (J1) and Rx (J2) ports

These ports are used to connect the FIJI cards with fiber optic cable in the Dual Ring Fiber Network. See "Fiber optic cable configuration" on page 36.

J3 (Clk 1) port

- The J3 port is only used in Network Group 0 to connect the **Group 0 FIJI cards to the Clock 1 cable.** See "Clock Controller configuration" on page 41.

- The J3 port is not used in Network Groups 1 through 7.

J4 (Clk0/FIJI) port

- In Network **Group 0**, the J4 port is used to connect the **Group 0 FIJI cards to the Clock 0 cable.** See "Clock Controller configuration" on page 41.

- In Network **Groups 1 through 7** the J4 port is used to connect shelf 0 to shelf 1 in each Network Group (except Group 0). See "FIJI to FIJI connections (shelf 0 to shelf 1)" on page 39.

Ethernet and serial ports

These ports are used for factory testing only.

Dual Ring Fiber Network

The FIJI cards in the Network modules are connected with fiber optic cables to form a Dual Ring Fiber Network. This network replaces the Intergroup module and consists of two separate Rings: one Ring connects all the Network shelf 0's while the second Ring connects all the Network shelf 1's. This network communicates on a subset of the Sonet OC12c protocol (622 Mb bandwidth on each Ring).

Intergroup switching

The Dual Ring fiber optic cable configuration provides complete non-blocking communication between the Network Groups. This configuration eliminates the incidence of busy signals for calls switched between groups. Each FIJI card handles 32 PCM links. A system of eight Network Groups provides 7680 timeslots for 3840 simultaneous conversations.

Redundancy

The Dual Ring Fiber Network is fully redundant. Each of the fiber optic cable Rings is capable of handling the traffic for an entire eight group network. If a fault in one Ring is detected, the other Ring automatically takes over call processing. No calls are lost during the switchover.

Ring states

The Dual Ring Fiber Network operates under four states:

Drives Half (normal state)

- Both Rings share call processing functions.

- Traffic is shared between the two Rings.

- Each FIJI card drives 480 timeslots.

Drives Full

- All traffic is handled by a single Ring.

- Each FIJI card in the active Ring drives 960 timeslots.

Drives None

- The Ring is inactive and does not support call processing.

Survival

- The available FIJI cards in both Rings are used to maintain intergroup traffic.

  Note: Only one Ring at a time can be under Drives Full or Drives None. These Ring states occur when a fault is found in one of the Rings.

  The Rings can also be manually switched to "Full" or "None". If one Ring is put into "Full", the other automatically switches to "None".

Fiber optic cable configuration

The Dual Ring Fiber Network is comprised of two separate Rings of NTRC48 fiber optic cable: one Ring between the FIJI cards in all Network shelf 0's and a second Ring between the FIJI cards in all Network shelf 1's.

Shelf 0 fiber optic Ring (ascending)

Connect the FIJI cards in each Network shelf 0 in *ascending* order (Figure 4). Start with the Tx (J1) port in Group 0, shelf 0. Connect the cable to the Rx (J2) port in Group 1, shelf 0. Connect the remaining FIJI cards in an *ascending* daisy chain configuration (from Tx to Rx ports). To complete the Ring, connect a final cable from Tx in the highest number group, shelf 0 to Rx in Group 0, shelf 0.

Figure 4
Shelf 0 *ascending* **fiber optic Ring (Option 81C example)**

NTRC48xx fiber optic cable

553-9553
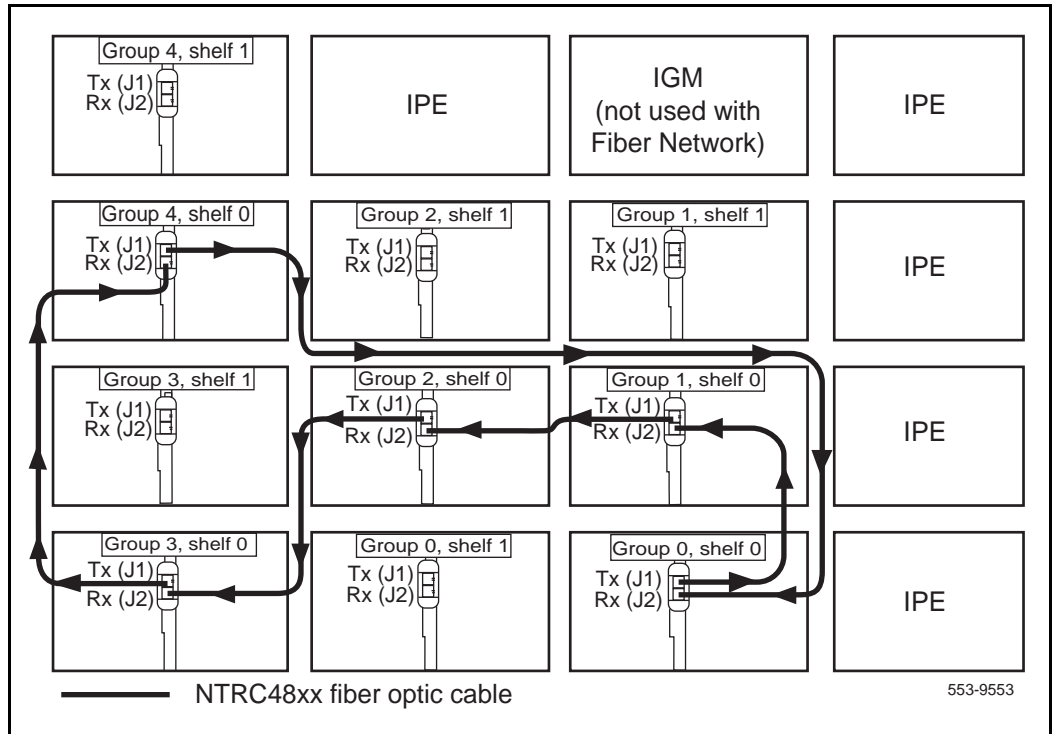
Shelf 1 fiber optic Ring (descending)

Connect the FIJI cards in each Network shelf 1 in *descending* order
(Figure 5). Start with the Tx (J1) port in Group 0, shelf 1. Connect the
cable to the Rx (J2) port in the highest Network Group, shelf 1. Connect
the remaining FIJI cards in a *descending* daisy chain configuration (from
Tx to Rx FIJI ports). To complete the Ring, connect a final cable from Tx
in Group 1, shelf 1 to Rx in Group 0, shelf 1.

Figure 5
Shelf 1 *descending* fiber optic Ring (Option 81C example)
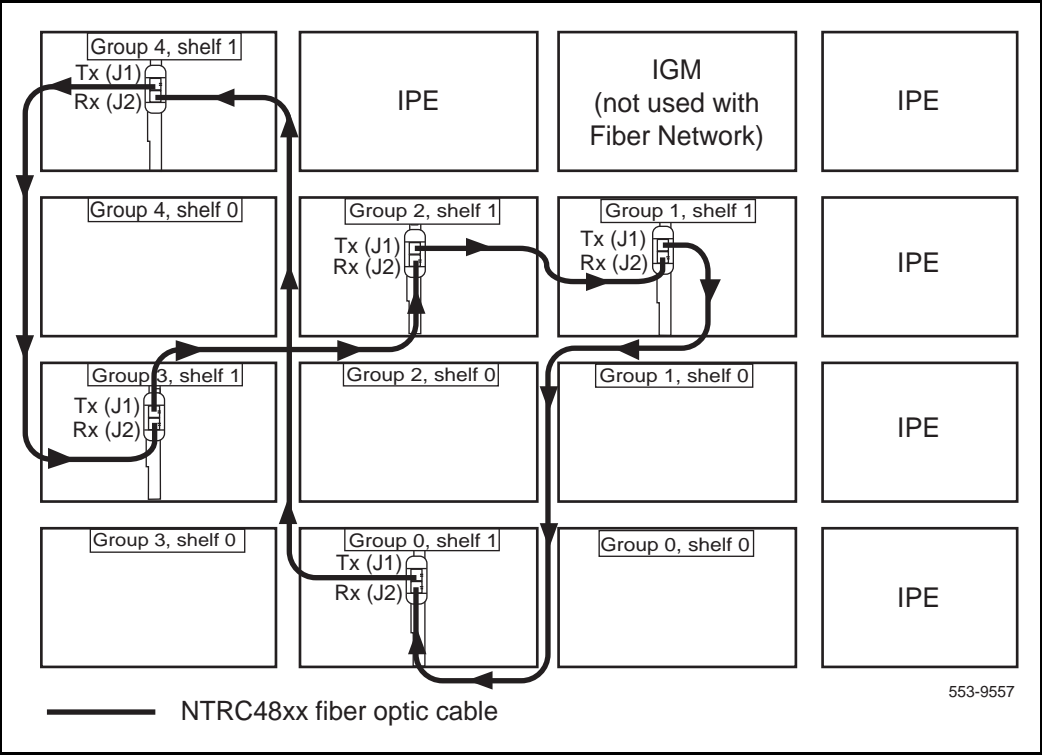
FIJI to FIJI connections (shelf 0 to shelf 1)

One cable is required for each Network Group (one cable for every two FIJI cards).

The FIJI cards in shelf 0 and shelf 1 of each Network Group (except Group 0) must be directly connected with a NTRC47AA FIJI to FIJI Synch cable.

Connect a NTRC47AA cable from J4 to J4 of the FIJI cards in each Network Group, except Group 0. The FIJI to FIJI connection in Group 0 is made as part of the Clock Controller connection described on page 41.

Figure 6
FIJI shelf 0 to FIJI shelf 1 connections (Option 81C example)
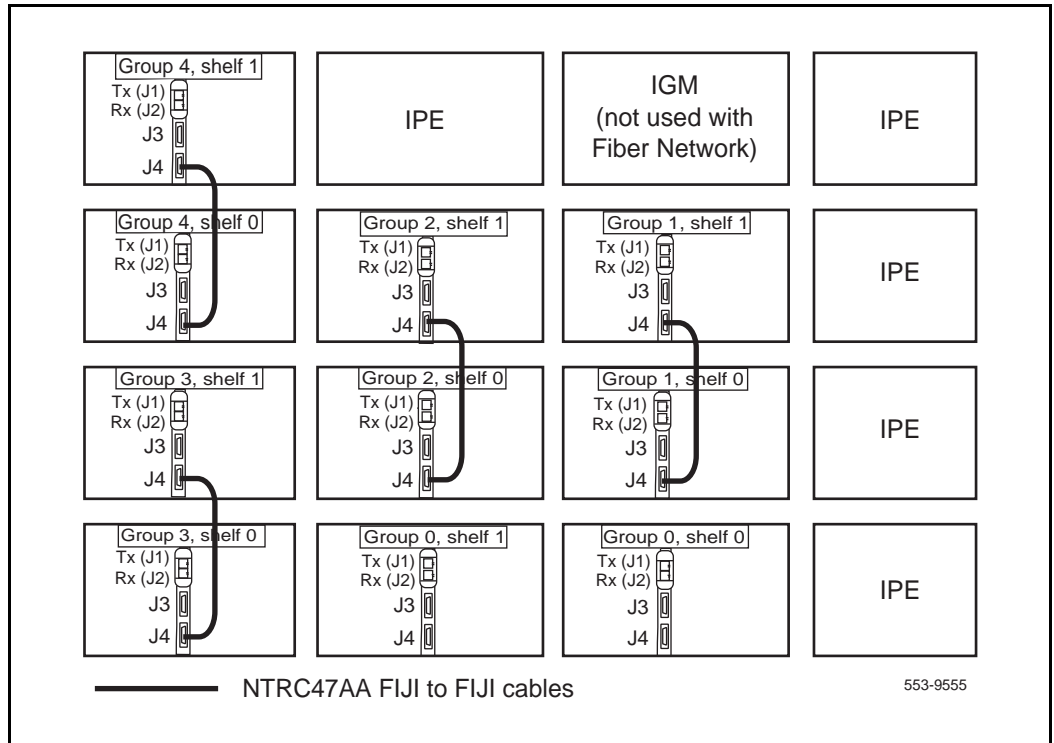
Optical Cable Management Card (OCMC)

Because fiber optic cable is easily damaged if bent, the NTRE39 Optical Cable Management Card (OCMC) is installed in Network modules to store and protect excess cable length. The OCMC card ensures that the fiber cable is not bent beyond a 30 mm bend radius (Figure 7).

The OCMC contains no electronic components and is not powered by the backplane. This card is used primarily in upgrades where the intergroup cable distances vary greatly.

OCMC is a single width card installed between the power supply and slot 1 of a Network module.

Figure 7
OCMC: the Optical Cable Management Card

553-8586
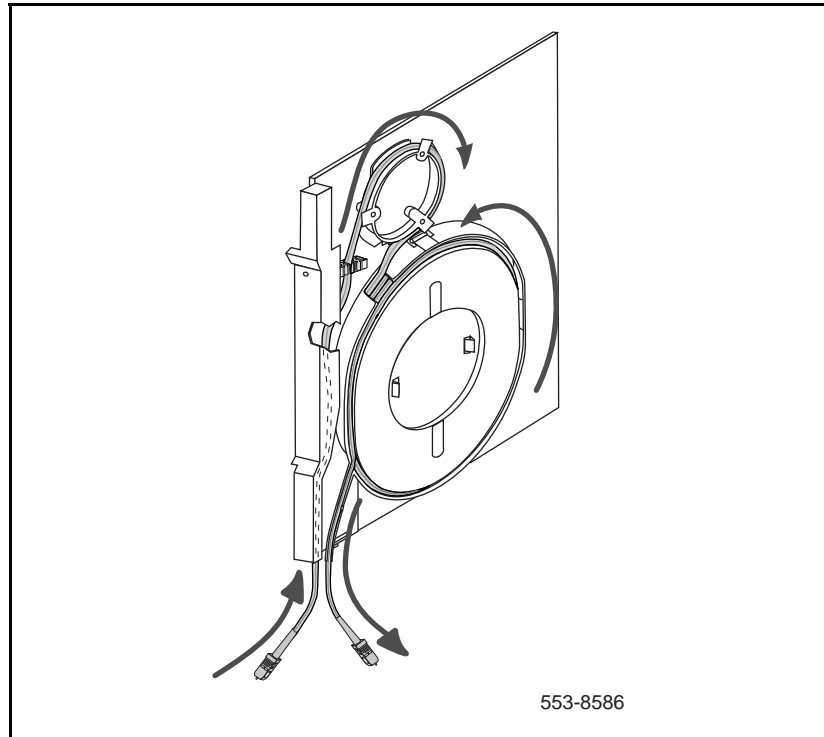
Clock Controller configuration

Two Clock Controller cards are required in each Fiber Network system. These cards synchronize the network and are the same as those in existing Meridian 1 Option 81 and 81C systems.

Figure 8 displays the cable connections between the Clock Controllers and the FIJI cards. These connections also complete the FIJI to FIJI connections in Group 0.

Card placement

- The two Clock Controllers must be installed in Slot 13 of any Network module.

- Clock Controller 0 must be installed in a Network shelf 0. Clock Controller 1 must be installed in a Network shelf 1.

- Clock Controllers cannot be placed in Core/Net modules due to space limitations. In Option 81C Core/Net systems, the Clocks must be placed in Network modules.

- In existing Option 81 Core systems, the Clocks are currently located in the Core shelves. These Clock Controllers MUST be moved to Network shelves.

- In Option 61C systems upgraded to Option 81C systems with Fiber Network Fabric, the Clocks are currently located in the Core/Net modules. These Clock Controller MUST be moved to Network shelves.

- If possible, install each Clock Controller in a different Network Group.

- If possible, install the Clock Controllers in separate columns for power and cooling redundancy.

Hardware compatibility

- QPC471 Clock Controller cards must be vintage H or later.

- QPC775 Clock Controller cards must be vintage E or later.

- QPC471 and QPC775 Clock cards cannot be combined in one system.

Cable configuration

The NTRC49 is a Clock to Clock cable with a pigtail at each end. The cable connects between the J3 ports in Clock 0 and Clock 1. The pigtail connectors provide the connection to the NTRC46AA cables that connect to the FIJI cards in Group 0 (Figure 8).

Figure 8
Clock Controller cable configuration (example)

553-9121
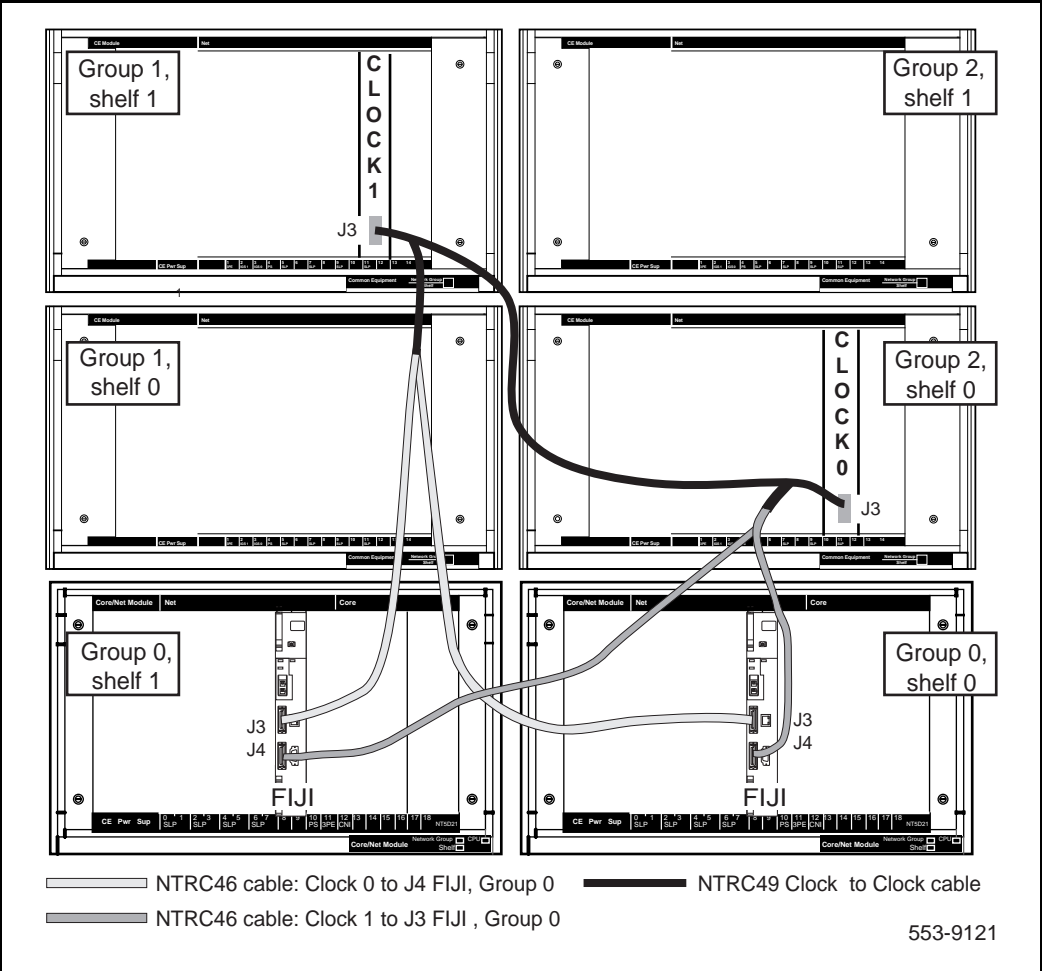
Core to Network connections (CNI cards)

The 3PE card in each Network shelf is connected to CNI cards in the Core shelves. This connection provides the communication link between the Network Groups and the Core call processing components.

Three versions of CNI cards are available. Each of these cards provide the same functions. The type of CNI card installed in each system depends on the configuration of that system.

CNI and CNI-3 cards are used in Motorola based systems. cCNI cards (compact Core to Network) are used in CP PII based systems. All require X11 Release 25 software to work with Fiber Network.

An equal number of CNI, CNI-3 or cCNI cards must be installed in each Core shelf. If a mixture of CNI and CNI-3 cards is installed, the same mix and placement must be used in both Core shelves.

Two group CNI cards

Two group CNI cards (NT6D65) already installed in Motorola X11 R25 Option 61C, 81, and 81C systems are compatible with Fiber Network.

Three group CNI-3 cards

Three group CNI-3 cards (NTRB34) are installed to increase Meridian 1 capacity (Figure 9). Each CNI-3 card can connect to three Network Groups. A mixture of CNI and CNI-3 cards can be used, but the same mixture and placement must be used in both Core or Core/Net modules.

The backplane ports are connected with two NTND14 CNI to 3PE cables per port. The third port connects from the faceplate of the CNI-3 card with two NT9D89 CNI-3 to 3PE cables. When a CNI card is upgraded to a CNI-3 cards, the original NTND14 backplane cables are left in place; only the NT9D89 CNI-3 to 3PE faceplate cables must be added.

Figure 9
CNI-3 faceplate

553-8645
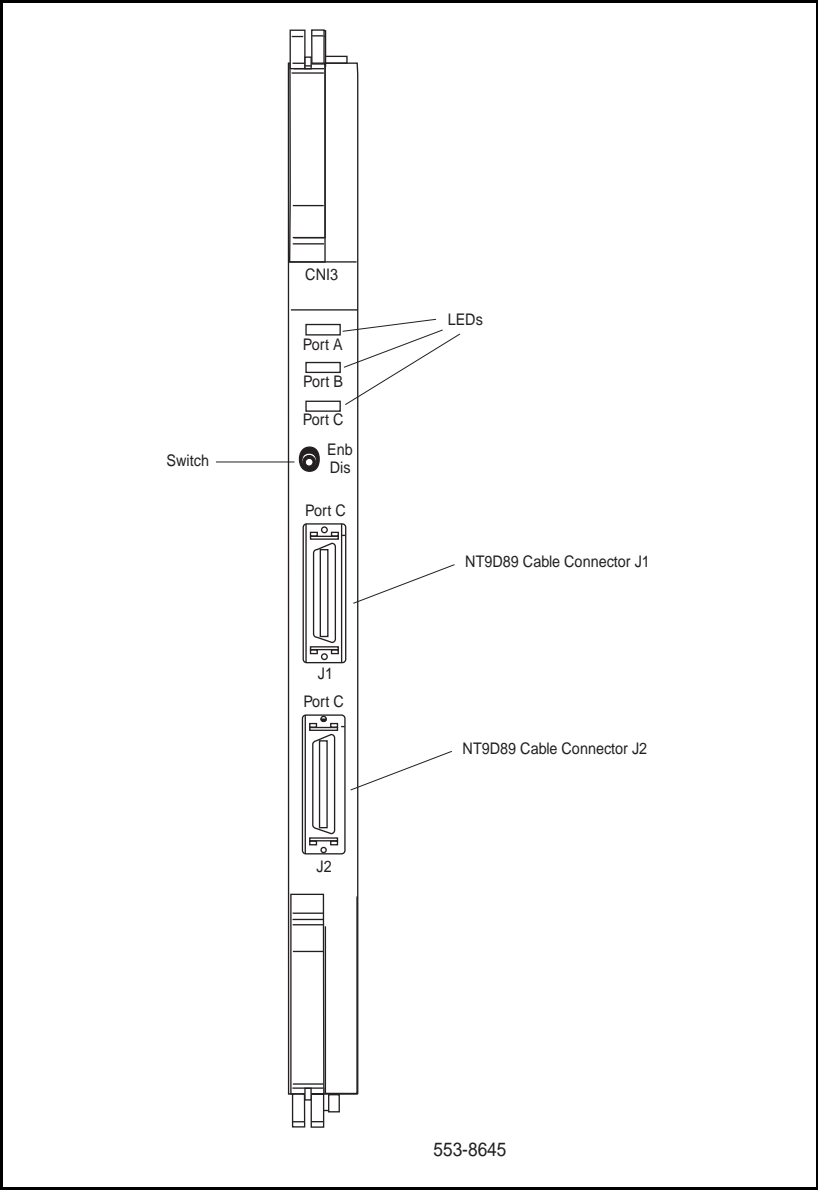
Two group cCNI cards (Call Processor PII)

Meridian 1 systems with Call Processor PII Core/Net shelves require two group cCNI cards (compact Core to Network). Up to four cCNI cards are installed in each CP PII Core shelf (for a maximum of eight Network Groups). In the CP PII Core/Net shelves, cCNI 3PE to cCNI cables are connected at the Termination Panel on the backplane. These cards and cables are installed as part of the Call Processor PII upgrade.

Prepare for upgrade

Content list

The following are the topics in this section:

Reference list

The following are the references in this section:

The tasks in this section must be performed prior to upgrading Option 81 and 81C systems to Fiber Network Fabric. These tasks are also performed when upgrading and Option 61C to 81C with Fiber Network Fabric.

Failure to perform the tasks in this section will result in increased downtime and possible system failure.

Task summary

Check power supply version (DC power only)

DC Power Supplies NT6D40 and NT6D41 must be AD vintage.

Note: AC power supplies do not need to be upgraded.

Table 6 lists the DC power supplies that must be replaced with AD vintage cards.

Table 6
DC Power supply vintages

Power Supply	Type	Upgrade to new vintage
NT6D40AA, all vintages	PE Power Supply, DC power	vintage AD release 1
NT6D40AB, vintages 1 to 12	PE Power Supply, DC power	vintage AD release 1
NT6D41AA, all vintages	CE Power Supply, DC power	vintage AD release 1
NT6D41AB, vintages 1 to 8	CE Power Supply, DC power	vintage AD release 1

Check minimum system requirements

Refer to "Requirements" on page 19 for detailed hardware and software requirements. All the requirements must be implemented for the system to operate correctly.

Check 3PE settings

3PE card switches must be set to reflect the Network group number and Core module to which they belong. Follow the instructions below to verify that the 3PE cards are correctly configured:

- All 3PE cards must be vintage F or later.

- Jumper RN27 must also be set to "A".

- If new groups are added or if a 3PE card is moved, the switches must be reset.

- The settings for 3PE cards in shelves NT5D21, NT6D39, NT6D60, and NT9D11 are different from those in all other shelves.

- Figure 10 on page 51 shows a side view of the 3PE card and the location of the switch settings.

- Table 7 shows the 3PE settings for cards installed in **NT5D21, NT6D39, NT6D60, and NT9D11 Modules**.

- Table 8 and Table 9, "QPC441 3PE Card installed in shelf 1 of modules or shelves other than NT5D21, NT6D39, NT6D60, and NT9D11," on page 53 show the 3PE settings for 3PE cards installed in all other modules (all modules *except* NT5D21, NT6D39, NT6D60, and NT9D11).

The 3PE switches and jumpers can be set before or during the upgrade.

3PE cards must be removed from the system to be configured. Since the removal of these cards will disrupt the system, reconfigure the 3PE cards when the impact to the site is minimal.

Figure 10
3PE card: side view

Switches are enlarged to show detail

553-8592
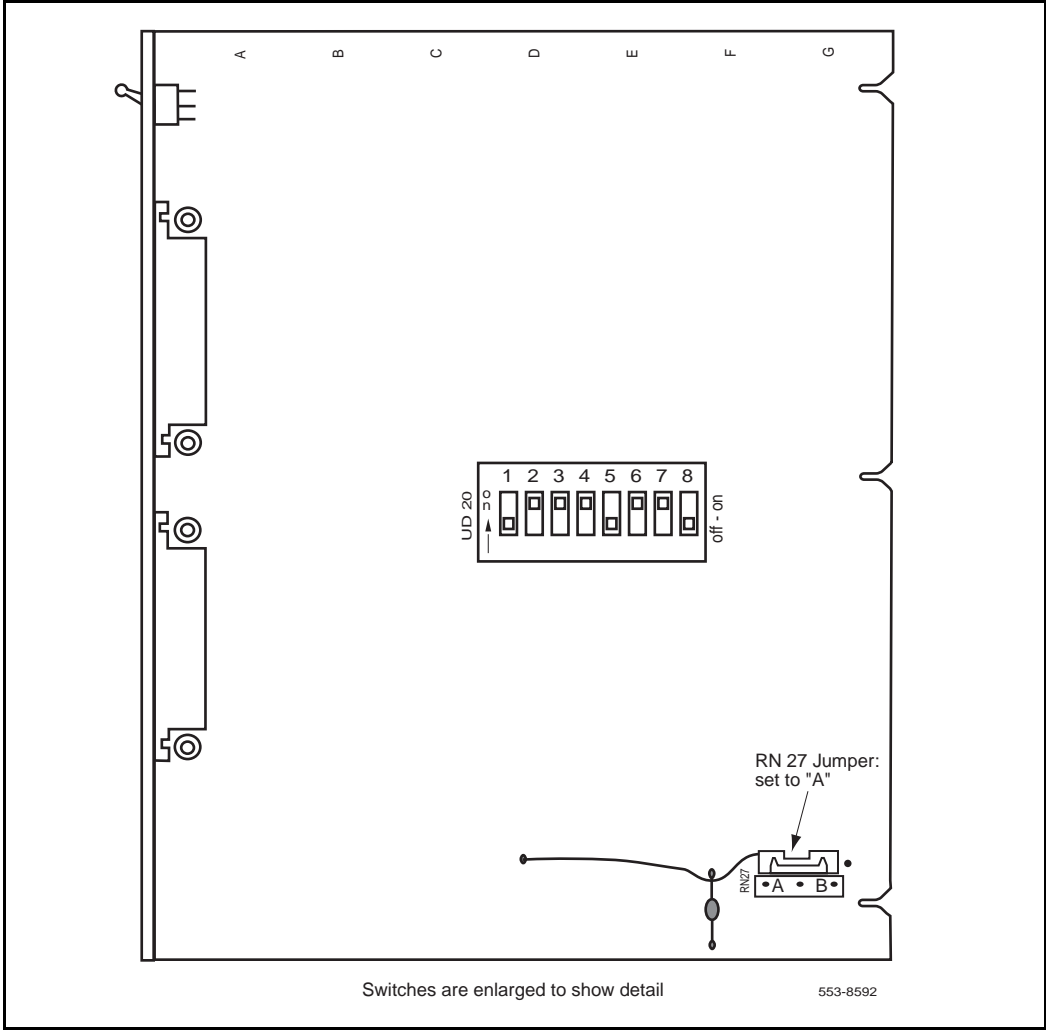
Table 7
QPC441 3PE Card installed in the NT5D21, NT6D39, NT6D60, and NT9D11 Modules

Jumper Settings: Set Jumper RN27 at E35 to "A".									
Switch Settings									
Module		D20 switch position							
NT6D60 (Option 81)		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Core 0		off	on	on	off	off	on	off	on
Core 1		off	on	on	off	off	on	off	off
NT5D21 (Option 81C)		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Core/Net 0 (Shelf 0)	Group 0	off	on	on	off	on	on	on	on
	Group 1	off	on	on	off	on	on	off	on
	Group 2	off	on	on	off	on	off	on	on
	Group 3	off	on	on	off	on	off	off	on
	Group 4	off	on	on	off	off	on	on	on
	Group 5	off	on	on	off	off	on	off	on
	Group 6	off	on	on	off	off	off	on	on
	Group 7	off	on	on	off	off	off	off	on
Core/Net 1 (Shelf 1)	Group 0	off	on	on	off	on	on	on	off
	Group 1	off	on	on	off	on	on	off	off
	Group 2	off	on	on	off	on	off	on	off
	Group 3	off	on	on	off	on	off	off	off
	Group 4	off	on	on	off	off	on	on	off
	Group 5	off	on	on	off	off	on	off	off
	Group 6	off	on	on	off	off	off	on	off
	Group 7	off	on	on	off	off	off	off	off

Table 8
QPC441 3PE Card installed in shelf 0 of modules or shelves *other than* NT5D21, NT6D39, NT6D60, and NT9D11

Group	1	2	3	4	5	6	7	8
0	off	on	on	on	on	on	on	on
1	off	on	on	on	on	on	off	on
2	off	on	on	on	on	off	on	on
3	off	on	on	on	on	off	off	on
4	off	on	on	on	off	on	on	on
5	off	on	on	on	off	on	off	on
6	off	on	on	on	off	off	on	on
7	off	on	on	on	off	off	off	on

Table 9
QPC441 3PE Card installed in shelf 1 of modules or shelves *other than* NT5D21, NT6D39, NT6D60, and NT9D11

Group	1	2	3	4	5	6	7	8
0	off	on	on	on	on	on	on	off
1	off	on	on	on	on	on	off	off
2	off	on	on	on	on	off	on	off
3	off	on	on	on	on	off	off	off
4	off	on	on	on	off	on	on	off
5	off	on	on	on	off	on	off	off
6	off	on	on	on	off	off	on	off
7	off	on	on	on	off	off	off	off

Prepare to move the Clock Controllers
(Option 81 and 61C to 81C with Fiber Network Fabric)

During an Option 81 upgrade, the two Clock Controller cards must be relocated from the NT6D60 Core modules to the NT8D35 Network modules.

During an Option 61C upgrade to Option 81C with Fiber Network Fabric, the two Clock Controller cards must be relocated from the NT5D21 Core/Net modules to the NT8D35 Network modules.

Before the upgrade, determine where the Clock Controllers will be moved based on the following rules:

- The two Clock Controllers must be installed in Slot 13 of any Network module. If another card is already located in slot 13, relocate the card prior to the upgrade.

- One Clock must be installed in a Network shelf 0. The second Clock Controller must be installed in a Network shelf 1.

- If current Clock Controller Reference cables are the wrong length after the Clock is moved, **new NT8D79xx or NTCG03xx PRI/DTI to Clock Controller cables must be ordered separately.**

   Note: QPC720 PRI cards require NT8D79xx cables. NT5D12 Dual PRI/DTI cards require NTCG03xx cables.

- If possible, install each Clock Controller in a different Network group.

- If possible, install the Clock Controllers in separate columns for power and cooling redundancy.

   Note: Either two QPC471 (vintage H or later) or two QPC775 (vintage E or later) Clock Controllers can be installed in a system. These two types of Clock cards cannot be combined in one system.

Connect a terminal

A maintenance terminal is required to access the Core or Core/Net modules during the upgrade procedure. Connect a terminal to the J25 port on the I/0 panel in the *inactive* Core or Core/Net module. The settings for the terminal are:

9600 Baud, 7 data, space parity, 1 stop bit, full duplex, XOFF

If only one terminal is used for both Core or Core/Net modules, the terminal will have to be connected from side to side to access each module. A "A/B" switch box can also be installed to switch the terminal from side to side.

Print site data

Print site data to preserve a record of the system configuration (Table 10). Verify all information is correct. Make corrections if necessary.

Note: Items marked with an asterisk (*) are required. Other items are recommended for a total system status.

Table 10
Print site data (Part 1 of 2)

Site data	Print command	
Terminal blocks for all TNs	LD 20	
	REQ	PRT
	TYPE	TNB
	CUST	<cr>
Directory Numbers	LD 20 (LD 22 prior to Release 16)	
	REQ	PRT
	TYPE	DNB
	CUST	<cr>
Attendant Console data block for all customers	LD 20	LD 20
	REQ	PRT
	TYPE	ATT, 2250
	CUST	<cr>
*Customer data block for all customers	LD 21	LD 21
	REQ	PRT
	TYPE	CDB
	CUST	<cr>
Route data block for all customers	LD 21	
	REQ	PRT
	TYPE	RDB
	CUST	Customer number
	ROUT	<cr>
	ACOD	<cr>
*Configuration Record	LD 22	
	REQ	PRT
	TYPE	CFN

Table 10
Print site data (Part 2 of 2)

Site data	Print command	
*Software packages	LD 22	
	REQ	PRT
	TYPE	PKG
*Software issue, ROM and tape ID	LD 22	
	REQ	ISS
	REQ	ROM
	REQ	TID
* Peripheral software versions	LD 22	
	REQ	PRT
	TYPE	PSWV
ACD data block for all customers	LD 23	
	REQ	PRT
	TYPE	ACD
	CUST	Customer Number
	ACDN	ACD DN (or <CR>)
Superloop card IDs and software version (peripheral controller, superloop network and controller cards)	LD 32	
	.	IDC loop
Multi-purpose ISDN Signaling Processor (MISP) card	LD 27	
	REQ	PRT
	TYPE	MISP
	LOOP	loop number (0-158)
	APPL	<cr>
	PH	<cr>
DTI/PRI data block for all customers	LD 73	
	REQ	PRT
	TYPE	DDB

Note: Items marked with asterisks (*) are required printout for conversion. Other items are recommended for a total system status.

Pre-route cables

To minimize system downtime during the upgrade, all cables should be routed before the upgrade is begun.

Review the information in "System architecture" on page 31 to determine how the cables will be routed for your system. Use the information below to plan the exact path and placement of each cable.

CAUTION
Be careful not to dislodge existing cables when routing new cables.

---

1   Label all cables at both ends.

2   Remove all module trim panels where cables will be routed.

3   Do not excessively bend or cinch the Fiber Ring cables. These cables are easily damaged. Use the Optical Cable Management Card (OCMC) to manage and protect the Fiber Ring cables. See page 40 a description of this card.

4   Route all cables based on the descriptions and diagrams in "System architecture" on page 31.

Task summary

1   "Route the FIJI Fiber Ring cables" on page 59.

2   "Route FIJI to FIJI cables" on page 65.

3   "Route the Clock Controller cables" on page 66.

4   "Route CNI to 3PE cables if necessary" on page 68.

Route the FIJI Fiber Ring cables

The Dual Ring Fiber Network is comprised of two separate Rings of NTRC48 fiber optic cable: one Ring between the FIJI cards in all Network shelf 0's and a second Ring between the FIJI cards in all Network shelf 1's.

Carefully route the NTRC48 cables before installation. Always label both ends of each cable to simplify installation, reduce confusion and assist in troubleshooting.

Route the shelf 0 fiber optic cables (ascending)

Route the NTRC48 cables between the FIJI cards in each Network shelf 0 in *ascending* order (Figure 11 and Table 11):

Note: Each end of the NTRC48xx cable is labeled "Tx" or Rx" in the factory.

1   Start with group 0, shelf 0.

2   Route a NTRC48xx FIJI Fiber Ring cable of the appropriate length from the FIJI card in **Group 0, shelf 0** to the FIJI card in **Group 1, shelf 0**.

3   Route a NTRC48xx FIJI Fiber Ring cable of the appropriate length from the FIJI card in **Group 1, shelf 0** to the FIJI card in **Group 2, shelf 0**.

4   Continue to route NTRC48xx FIJI Fiber Ring cables of the appropriate length between the shelf 0 of each Network group. Route these cables in **ascending** order of Network groups.

5   To complete the Ring, route a final cable from the **highest number group** back to **Group 0, shelf 0**.

Figure 11
Shelf 0 *ascending* fiber optic Ring (example)

NTRC48xx fiber optic cable

553-9553
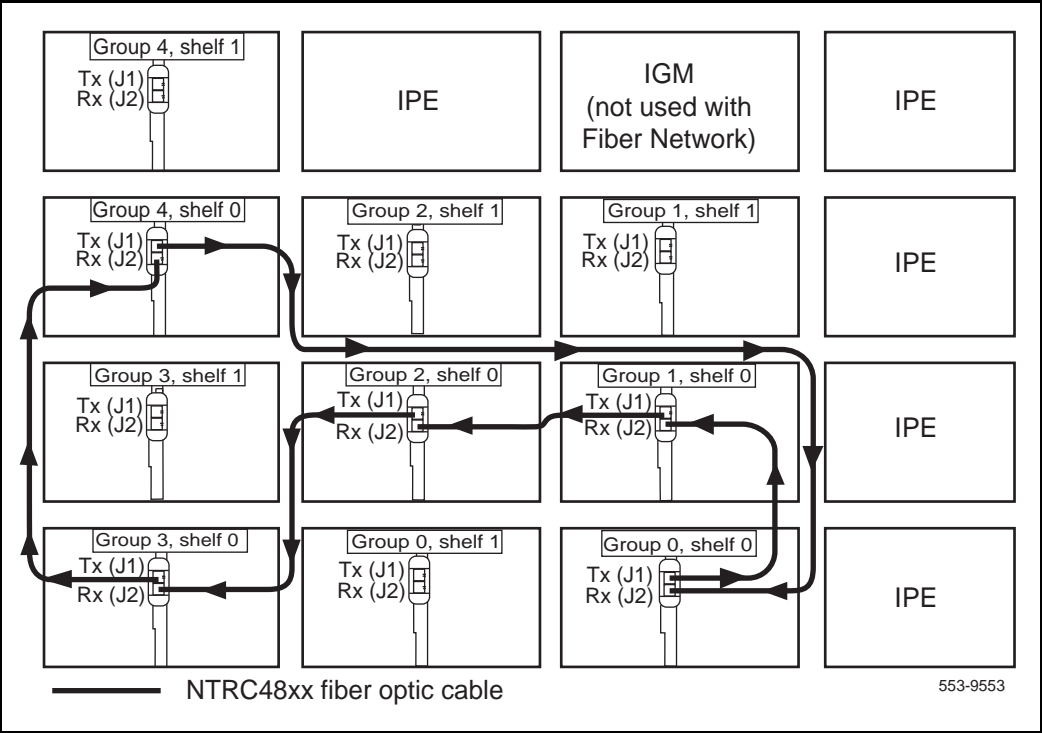
Table 11
FIJI Ring 0 connections

Groups X - 0 are cabled in ascending order		
Group/shelf	NTRC48 fiber cable connector	FIJI card connector
0/0	P1	Tx - J1
1/0	P2	Rx - J2
1/0	P1	Tx - J1
2/0	P2	Rx - J2
2/0	P1	Tx - J1
3/0	P2	Rx - J2
3/0	P1	Tx - J1
4/0	P2	Rx - J2
4/0	P1	Tx - J1
5/0	P2	Rx - J2
5/0	P1	Tx - J1
6/0	P2	Rx - J2
6/0	P1	Tx - J1
7/0	P2	Rx - J2
7/0	P1	Tx - J1
0/0	P2	Rx - J2

Route the shelf 1 fiber optic cables (descending)

Route the NTRC48 cables between the FIJI cards in each Network shelf 1 in *descending* order (Figure 12 and Figure 12).

Note: Each end of the NTRC48xx cable is labeled "Tx" or Rx" in the factory.

1   Start with the Tx (J1) port in group 0, shelf 1.

2   Route a NTRC48xx FIJI Fiber Ring cable of the appropriate length from the FIJI card in **Group 0, shelf 1** to the FIJI card in the **highest Network group, shelf 1**.

3   Route a NTRC48xx cable from the FIJI card in the **highest Network group, shelf 1** to the FIJI card in the **second highest Network group, shelf 1**.

4   Continue to route NTRC48xx FIJI Fiber Ring cables of the appropriate length between shelf 1 of each Network group. Route these cables in **descending** order of Network Groups.

5   To complete the Ring, route a final cable from **Group 1, shelf 1** to Group 0, shelf 1.

Figure 12
Shelf 1 _descending_ fiber optic Ring (example)

NTRC48xx fiber optic cable

553-9557
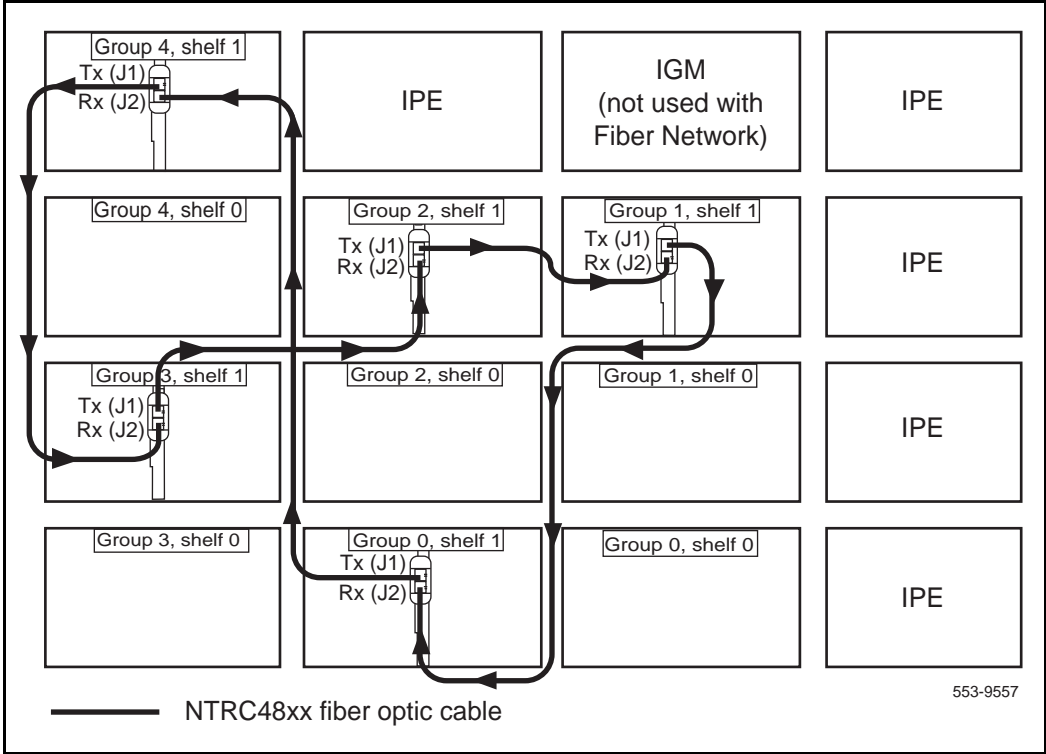
Table 12
FIJI Ring 1 connections

Groups 0 - X are cabled in descending order		
Group/shelf	NTRC48 fiber cable connector	FIJI card connector
0/1	P1	Tx - J1
7/1	P2	Rx - J2
7/1	P1	Tx - J1
6/1	P2	Rx - J2
6/1	P1	Tx - J1
5/1	P2	Rx - J2
5/1	P1	Tx - J1
4/1	P2	Rx - J2
4/1	P1	Tx - J1
3/1	P2	Rx - J2
3/1	P1	Tx - J1
2/1	P2	Rx - J2
2/1	P1	Tx - J1
1/1	P2	Rx - J2
1/1	P1	Tx - J1
0/1	P2	Rx - J2

Route FIJI to FIJI cables

The FIJI cards in shelf 0 and shelf 1 in each Network group (*except group 0*) must be directly connected with a NTRC47AA FIJI to FIJI Synch cable.

Note: Route the cables only at this time. **DO NOT connect the cables until the appropriate time during the installation.**

Route a NTRC47AA cable between the FIJI cards in shelf 0 and shelf 1 of Network groups 1 through 7. These cables are connected to the J4 ports of the FIJI cards during the installation process.

DO NOT route a cable in group 0. The FIJI to FIJI connection in group 0 is part of the Clock Controller connection described on page 66.

Figure 13
Route the FIJI to FIJI cables (Option 81C example)

NTRC47AA FIJI to FIJI cables

553-9556
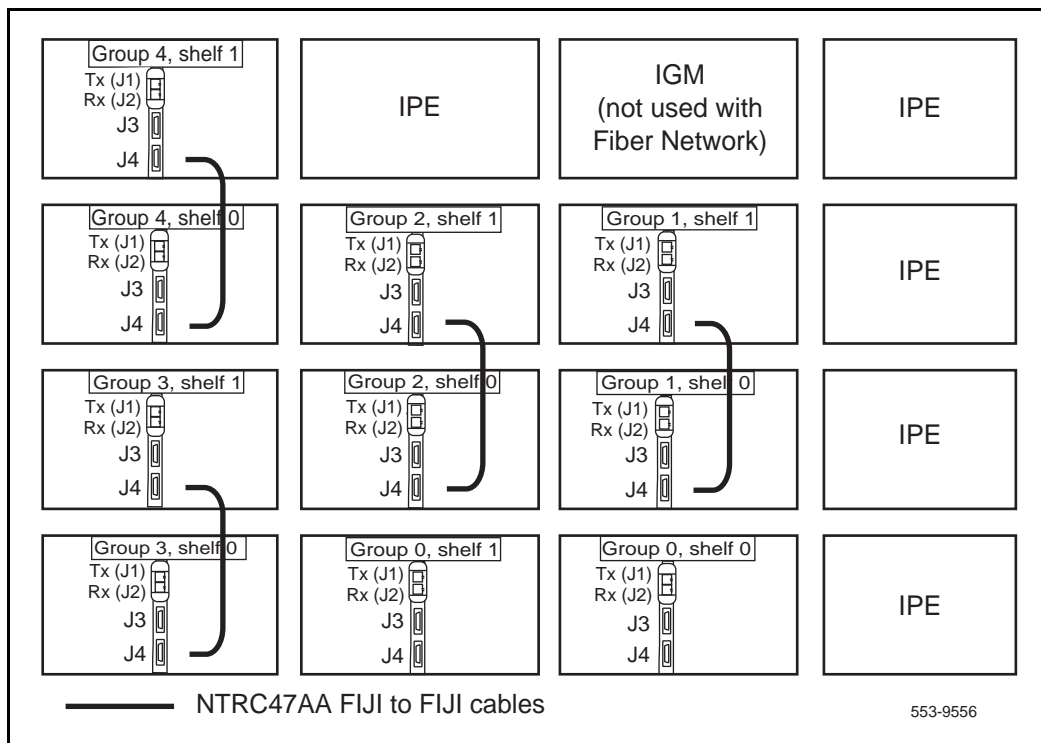
Route the Clock Controller cables

Clock to Clock (NTRC49) and Clock to FIJI (NTRC46) cables must be in place before the upgrade (Figure 14). **Do not connect the cables to the FIJI cards or Clock Controller cards. Route the cables only.** The cables are not connected until the actual upgrade is performed.

Route the Clock to Clock cable

1   Route a NTRC49 Clock to Clock cable between Clock 0 and Clock 1. Route the **P1 end to Clock 0** and the **P2 end to Clock 1**. Do not connect the cable to the Clock Controllers.

   Note 1: If the Clock Controllers need to be moved, route the cables to the new Clock locations. See "Prepare to move the Clock Controllers (Option 81 and 61C to 81C with Fiber Network Fabric)" on page 54 for more information.

Connect the Clock to FIJI cables (Clock end)

2   From Clock 0: Connect the "**J1 Clock** " end of a Clock to FIJI cable (NTRC46Ax) to the **J1** end of the Clock to Clock cable.

3   From Clock 1: Connect the "**J1 Clock** " end of a second Clock to FIJI cable (NTRC46Ax) to the **J2** end of the Clock to Clock cable.

Route the Clock 0 to FIJI cables (FIJI end)

4   From Clock 0: Route the **P1** end of the Clock to FIJI cable (NTRC46Ax) to **Group 0, shelf 0**.

   Do not connect the cable to the FIJI card.

5   From Clock 0: Route the **P2** end of the Clock to FIJI cable (NTRC46Ax) to **Group 0, shelf 1**.

   Do not connect the cable to the FIJI card.

Route the Clock 1 to FIJI cables (FIJI end)

6   From Clock 1: Route the **P1** end of the Clock to FIJI cable (NTRC46Ax) to **Group 0, shelf 0**.

   Do not connect the cable to the FIJI card.

7   From Clock 1: Route the **P2** end of the Clock to FIJI cable (NTRC46Ax) to **Group 0, shelf 1**.

   Do not connect the cable to the FIJI card.

Figure 14
Clock Controller cable configuration

553-9496
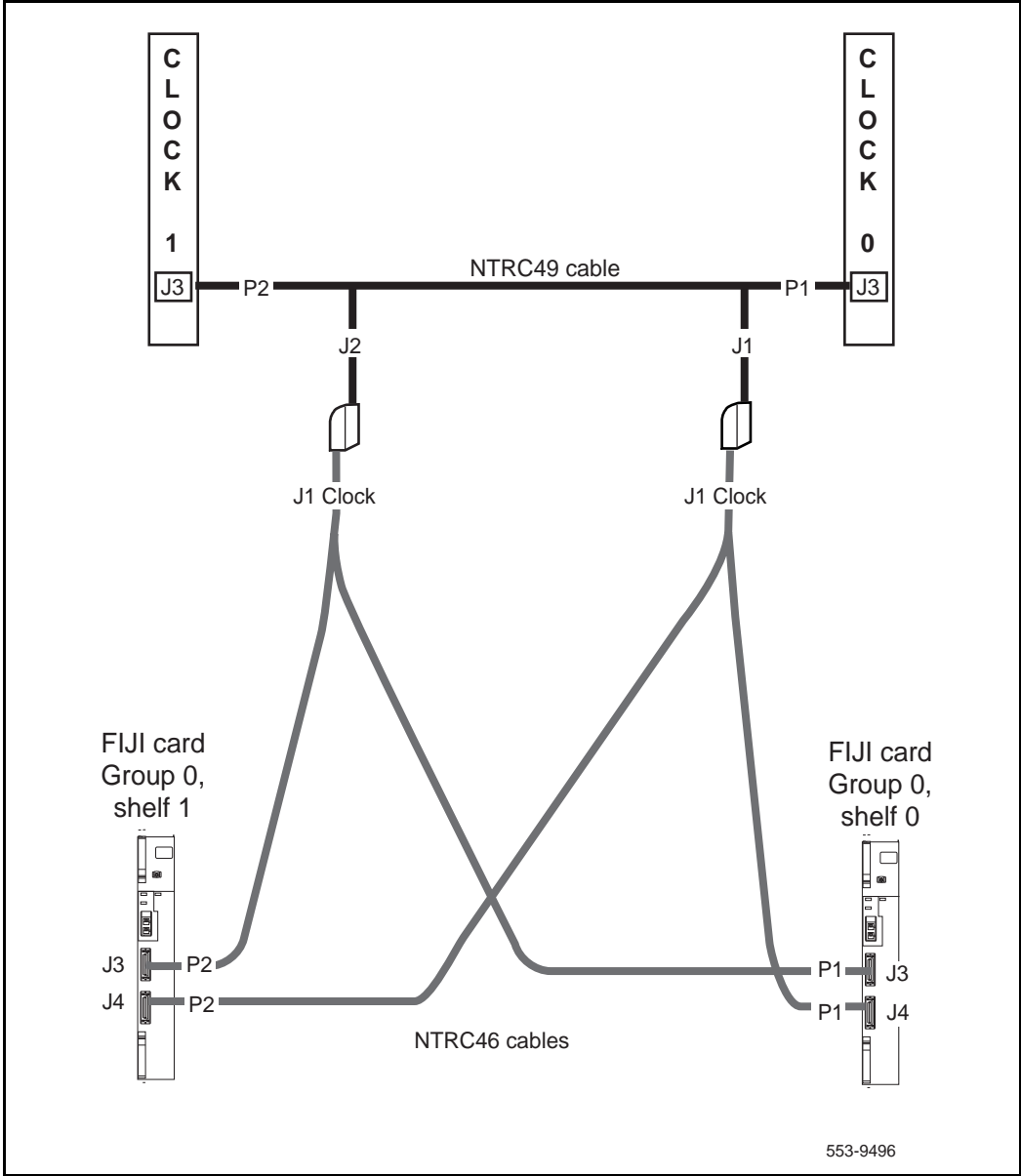
Route CNI to 3PE cables if necessary

The original NTND14 3PE to CNI cables are used with NCE.

When CNI-3 cards are installed in place of two port CNI cards, the original NTND14 cables can be left in place; only the NT9D89 CNI-3 to 3PE faceplate cables must be added.

Route two NT9D89 CNI-3 to 3PE cables from the faceplate of the 3PE card to the faceplate of the CNI3 card.

Perform a template audit

A template audit (LD 01) reviews the templates in your system. Corrupted and duplicate templates are cleaned up.

An example of the information generated during the audit is listed below.

Note: **The template audit may take an extended period of time on large systems**. Run the audit during a low traffic period.

WARNING

Do not abort this overlay until the audit is complete. If the overlay is interrupted, data will be corrupted.

LD 01   The audit begins as soon as LD 01 is entered.
TEMPLATE AUDIT
STARTING PBX TEMPLATE SCAN
TEMPLATE 0001 USER COUNT LOW   CHECKSUM OK
TEMPLATE 0002 USER COUNT HIGH   CHECKSUM OK
TEMPLATE 0003 NO USERS FOUND

STARTING SL1 TEMPLATE SCAN
TEMPLATE 0001 USER COUNT OK   CHECKSUM OK
•
•
TEMPLATE 0120 USER COUNT OK   CHECKSUM OK
TEMPLATE AUDIT COMPLETE

Backup the database

To back up the data on the system, complete the two part procedure described below:

- Perform a **data dump** to save all system memory to the hard disk.

- Perform a **BKO (unattended backup)** to save the database to a spare set of floppy disks.

Perform a data dump

1   Log into the system.

2   Load the Equipment Data Dump Program (LD 43). At the prompt, enter

LD 43   to load the program

3   When "EDD000" appears on the terminal, enter

EDD   to begin the data dump

4   The messages "DATADUMP COMPLETE" and "DATABASE BACKUP COMPLETE" will appear once the data dump is complete

****   to exit the program

CAUTION

If the data dump is not successful, do not continue; contact your technical support organization. A data dump problem must be corrected before the system is upgraded to Fiber Network.

Perform a BKO (save the database to floppies)

1   Insert floppy diskettes into BOTH floppy disk drives in each Core or Core/Net IODU/C.

Note: If the file is too large to fit on a single floppy disk, the BKO command will compress the data. If the compressed data is still too large to fit on a single disk, both floppy disks in the two IODU/C drives will be used. Be sure to insert floppy disks into BOTH IODU/C drives before the BKO backup is begun.

2   Run the BKO backup (LD 43):

BKO   to run the backup

3   If the backup is successful, a message will state that the database backup is complete. A report will also indicate which floppy drives were used by the procedure.

4   If there are validation errors, repeat the procedure.

CAUTION

If the backup is not successful, do not continue; contact your technical support organization. Any backup problems must be corrected before the system is upgraded to Fiber Network.

---

5   Once the backup is complete, type:

****   to exit the program

Option 81 upgrade to Fiber Network

Content list

The following are the topics in this section:

Reference list

The following are the references in this section:

- "Prepare for upgrade" on page 47

- "Connect a terminal" on page 54

- "Check 3PE settings" on page 50

- "Connect a terminal" on page 54

- *X11 Administration* (553-3001-311)

- *X11 Maintenance* (553-3001-511)

Once the steps in "Prepare for upgrade" on page 47 are complete, follow the procedures listed below in sequence.

CAUTION

All tasks in the "Prepare for upgrade" section on page 47 must be completed before the upgrade is begun:

✔ "Check power supply version (DC power only)"

✔ "Check minimum system requirements"

✔ "Check 3PE settings"

✔ "Prepare to move the Clock Controllers (Option 81 and 61C to 81C with Fiber Network Fabric)"

✔ "Connect a terminal"

✔ "Print site data"

✔ "Pre-route cables"

✔ "Perform a template audit"

✔ "Backup the database"

Failure to complete these tasks will result in increased downtime and possible system failure.

Task summary

Verify Core 0 is active

1   Get the status of the CPUs. Verify that all common equipment is
enabled.

LD 135   to load the program

STAT CPU   to get the status of both Cores

2   Ensure Core 0 is active.

If Core 1 is active, switch Cores.

STAT CPU   to get the status of the Cores

SCPU   to switch to Core 0

****   to exit the program

3   Ensure Clock Controller 0 is active and tracking.

LD 60   to load the program

SSCK 0   to get the status of Clock 0

SSCK 1   to get the status of Clock 1

SWCK   if necessary, to switch to Clock 0

Split the Cores

1   Be sure Core 0 is active and Core 1 is standby. You may need to
switch Cores:

LD 135   to load the program

STAT CPU   to get the status of both Cores

****   exit program

2   Verify that IODU/C 0 is active. You may need to switch IODU/Cs.

LD 137

STAT   Get the status of IODU/C

SWAP   Switch IODU/Cs if necessary

****   exit program

3 Connect a terminal to the CPSI port in Core 1 to J25 of the I/O panel at the back of the Core. Be sure it is configured as follows. The recommended baud rate is 9600, to be the same as the CPSI port.

7 data bits, 1 stop bit, Space parity, Full duplex, XON protocol

4 Place Core 0 in Maintenance by setting the MAINT/NORM switch to MAINT.

5 In Core 1, disable the NT6D65 or NTRB34 Core to Network Interface (CNI) cards by setting the ENB/DIS faceplate switches to DIS.

Upgrade Side 1

Core 1 must be *inactive* to complete these procedures. A terminal must be connected to the J25 port on Core 1. See "Connect a terminal" on page 54.

Upgrade the Core 1 software

Complete the steps below to install new software in Core/Net 1.

1 Place the CP Install disk that corresponds with the installed CP card type into the IODU/C in Core/Net 1.

2 Install the CD-ROM into the CD drive:

    a press the button on the CD-ROM drive to open the CD-ROM disk holder

    b place the CD-ROM disk into the holder with the disk label showing

    c use the four tabs to secure the CD-ROM drive

    d press the button again to close the CD-ROM disk holder (don't push the holder in by hand)

3 In Core/Net 1, perform the following three steps in uninterrupted sequence:

    a press and hold the MAN RST button on the CP card

    b set the MAINT/NORM switch on the CP card to MAINT

    c release the MAN RST button

A sysload will begin (cold start). Wait for the Main Menu to appear on the terminal before proceeding.

Note 1: If the CD-ROM is not in the CD drive of the IODU/C, the installation procedure will not continue. Insert the CD-ROM into the drive to continue.

Note 2: If a problem is detected during the system verification, Install stops, prints an error message, and aborts the installation. If the verification is not successful, do not continue; contact your technical support organization.

4   Press <CR> to continue.

5   Remove the CP Install Program diskette and insert the Keycode diskette, when prompted.

   <a>   to continue with keycode validation

   <y>   to confirm that the keycode matches the CD-ROM release

6   When the Install Menu is displayed, select the following options in sequence when you are prompted to do so

   <a>   to install software, CP-BOOT ROM, and IOP-ROM

   <a>   to verify that the CD-ROM is now in drive

   The Installation Status Summary screen appears that lists the options to be installed.

   <y>   Yes, start Installation

   <a>   Continue with Upgrade

7   Select a PSDL file to install. The PSDL file contains the loadware for all downloadable cards in the system and loadware for M3900 series sets.

Select one of the six psdl files

<1>   Global 10 Languages <default>

<2>   Western Europe 10 Languages

<3>   Eastern Europe 10 Languages

<4>   North America 6 Languages

<5>   Rls24 up-issue

<6>   North America 6 Languages:

The languages contained in each selection are outlined as follows:

1   English, French, German, Spanish, Swedish, Italian, Norwegian, Brazilian, Portuguese, Finnish, Japanese Katakana.

2   English, French, German, Spanish, Swedish, Norwegian, Danish, Finnish, Italian, Brazilian Portuguese.

3   English, French, German, Dutch, Polish, Czech, Hungarian, Russian, Latvian, Turkish.

4   English, Spanish, French, Brazilian Portuguese, Japanese Katakana, German.

5   English, French, German, Spanish, Swedish, Italian, Norwegian, Portuguese, Finnish, Japanese Katakana.

6   English, French, German, Spanish, Brazilian Portuguese, Japanese Katakana.

8   When the ROM installation screen appears, select the following
       prompts in sequence:

<a>   Continue with ROM Upgrade

The following message appears:

Software Release XXXX was installed successfully on Core 1.
All files were copied from CDROM to the hard disk.

Please press <CR> to continue when ready...

<a>   Continue with ROM upgrade

<a>   Yes, start Installation

<a>   Continue with ROM upgrade

When the Installation Status Summary screen appears, press
<CR> when ready...

<cr>   Are you sure you want to continue with IOP ROM

<a>   to install the IOP-ROM from hard disk

<y>   Yes, start installation

<a>   to continue with ROM upgrade

The Installation Status Summary screen appears. Verify that CD
to disk, disk to ROM, CP-BOOTROM, and IOP-ROM were
installed.

<cr>   press return to continue

<q>   to quit (remove any diskettes from the floppy drive)

<y>   Yes, to confirm quit

<a>   to reboot the system

The system will automatically perform a sysload during which
several messages will appear on the system terminal. Wait for
"DONE" and then "INI" messages to be displayed before
continuing.

Software installation on Core 1 is complete.

Note: If the system fails to load, or system messages indicate data
corruption, back out of the parallel reload process by performing the
steps in "Back out of a system software upgrade" on page 79.

Back out of a system software upgrade

1   Place the original **Install disk** 1 into the IODU/C in Side 1.

2   In Side 1, press the MAN RST button.

3   Select <u> to initiate the Install Tool.

4   Remove the CP Install diskette and insert the source keycode diskette.

5   Select <a> to continue with keycode validation.

6   When the install screen appears, select the following options in sequence, and insert the **source** database diskette when you are prompted to do so.

    <b>   to install software, database, CP-BOOT ROM, and IOP-ROM

    <a>   to start installation

    <a>   continue with upgrade

7   When the database installation screen appears, select the following:

    <a>   to install customer database (choose this option if the database was sent to Nortel Networks for conversion)

    <a>   to continue with the database install

8   When the ROM installation screen appears, select the following:

    <a>   to continue with the ROM upgrade

9   Following the database installation, upgrade the ROMs:

    <a>   to continue with ROM upgrade (CP-BOOT)

    <y>   to start installation

    <a>   to continue with ROM upgrade (IOP-ROM)

10   Remove the disk from the IODU/C in Side 1.

11   From the main menu, select the following options to quit and reload the system:

    <q>   to quit

    <y>   to confirm quit

12   Remove any diskettes from the floppy drive, and type

    <a>   to reboot the system

13   In Side 1, perform the following steps:

    a   enable the NT6D65 CNI cards by setting the ENB/DIS faceplate switches to ENB

b   press and release the MAN RST button on the CP card

c   When SYS700 messages appear on the CP 1 LCD display

d   set CP 1 MAINT/NORM switch to NORM.

Within 60 seconds, the LCD will display the following messages, confirming the process.

> **RUNNING ROM OS**
> **ENTERING CP VOTE**

An "HWI534" message from the CPSI or SDI port indicates the start of memory synchronization. Within 10 minutes, an "HWI533" message on Side 0 CPSI or SDI TTY indicates the memory synchronization is complete. Wait until the memory synchronization is complete before continuing.

14   In Side 0, set the MAINT/NORM switch on the CP card to NORM.

15   Perform a redundancy sanity test.

LD 135
TEST CPU	Test the standby (inactive) Side.
SCPU	Switch the Cores.
CDSP	Clear display.
TEST CPU	Test the standby (inactive) Side.
SCPU	Switch the Cores.

16   Testing the CPs can take up to 20 minutes for each test. When the test is complete, the memories are automatically synchronized.

17   Load LD 137 and synchronize hard disks. Synchronization may take up to 50 minutes. To be sure the contents of CMDU 0 are copied to CMDU 1, use the STAT command to verify that CMDU 1 is disabled.

LD 137
STAT CMDU	Get the status of both CMDUs.
SYNC	Synchronize disks.
TEST CMDU	Performs hard and floppy disk test.

You are now out of the parallel reload process, and have returned to the **Source** software.

Upgrade Side 1 hardware

Follow the procedures below in sequence:

1   Software disable the IGS/DIGS cards in Side 1 (IGS/DIGS odd-numbered cards, 1 - 19):

LD 39   to load the program

DISI IGS xx   xx is the IGS card number 1 - 19

Note: See the *X11 Maintenance* (553-3001-511) for more information on overlay 39 commands.

2   Faceplate disable the IGS/DIGS cards in Side 1.

3   Tag and disconnect the IGS/DIGS cables.

4   Remove the IGS/DIGs cards from Side 1.

Note: If you did not check the 3PE switch settings previously, check the 3PE switch settings now. See "Check 3PE settings" on page 50.

5   Faceplate enable the FIJI cards.

6   Insert the FIJI cards in Side 1. **DO NOT seat the FIJI cards.**

Note: FIJI cards are installed in slots 2 and 3 of the Network modules, and slots 8 and 9 of the Core modules.

Connect the shelf 1 FIJI Ring cables

To create the shelf 1 fiber optic loop, connect the FIJI cards in each Network shelf 1 in **descending** order, from Tx to Rx (Figure 15 and Table 13).

Remove the black cap from the end of each cable before it is connected.

Note: Each end of the NTRC48 cable is labeled "Tx" or Rx" in the factory.

a   Start with Network Group 0, shelf 1.

b   Connect a NTRC48 FIJI Fiber Ring cable of the appropriate length from the Tx (J1) port of the FIJI card in **Group 0, shelf 1** to the Rx (J2) port of the FIJI card in the **highest Network Group, shelf 1**.

c   Connect a NTRC48 cable from the Tx (J1) port of the FIJI card from the Tx (J1) port in the **highest Network Group, shelf 1** to the Rx (J2) port in the **second highest Network Group, shelf 1**.

d   Continue to connect NTRC48 FIJI Fiber Ring cables of the appropriate length from the Tx (J1) port to the Rx (J2) port in shelf 1 of each Network Group. Connect these cables in **descending** order of Network Groups.

e   To complete the Ring, connect a final cable from Tx in **Group 1, shelf 1** to Rx in Group 0, shelf 1.

Figure 15
Shelf 1 *descending* fiber optic Ring (Option 81 example)
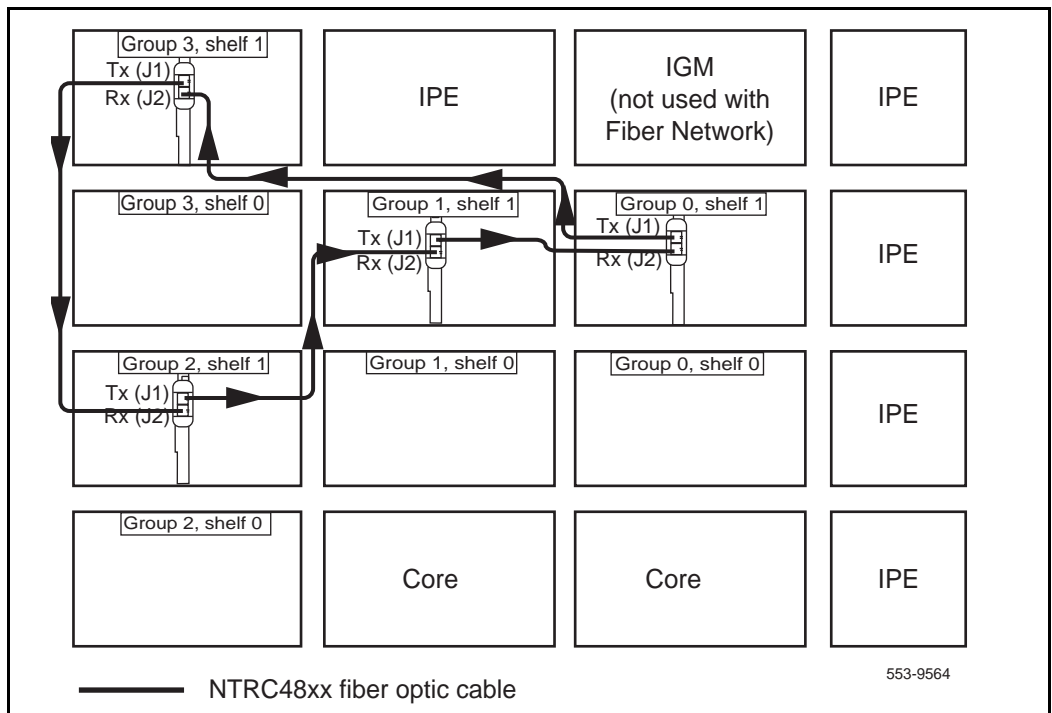
Note: **Connect the Side 1 FIJI Ring cables only. DO NOT connect the Side 0 cables.**

Table 13
FIJI Ring 1 connections

Groups 0 - X are cabled in descending order		
Group/shelf	NTRC48 fiber cable connector	FIJI card connector
0/1	P1	Tx - J1
7/1	P2	Rx - J2
7/1	P1	Tx - J1
6/1	P2	Rx - J2
6/1	P1	Tx - J1
5/1	P2	Rx - J2
5/1	P1	Tx - J1
4/1	P2	Rx - J2
4/1	P1	Tx - J1
3/1	P2	Rx - J2
3/1	P1	Tx - J1
2/1	P2	Rx - J2
2/1	P1	Tx - J1
1/1	P2	Rx - J2
1/1	P1	Tx - J1
0/1	P2	Rx - J2

Turn module power off

> **WARNING**
>
> Call processing will be interrupted for approximately 30 minutes while the procedures are completed.
>
> To reduce downtime, verify that all cables are pre-routed. See "Pre-route cables" on page 58.

Power down the modules with the module power switch. DO NOT power down the columns at the PDU:

1   Power down Core Module 0.

2   Power down Core Module 1.

3   Power down all Network Modules.

Seat the FIJI cards in Side 1

The FIJI cards in side 1 can now be seated. Push the faceplate latches forward to lock the cards in place. Verify that the cards are faceplate *enabled*.

Upgrade Side 0

Install Side 0 FIJI cards

1   Tag and disconnect the IGS/DIGS cables.

2   Remove the IGS/DIGs cards from Side 0.

3   Insert and seat the FIJI cards in Side 0.

4   Faceplate enable the FIJI cards.

Connect the FIJI to FIJI cables

1   Connect P2 of a NTRC47 FIJI to FIJI cable to J4 of the FIJI cards in each Network shelf 0, **except Group 0**.

2   Connect P1 of a NTRC47 FIJI to FIJI cable to J4 of the FIJI cards in each Network shelf 1, **except Group 0**.

Note: The FIJI cards in Group 0 do not receive a FIJI to FIJI cable.

Figure 16
FIJI to FIJI cable connections (Option 81 example)
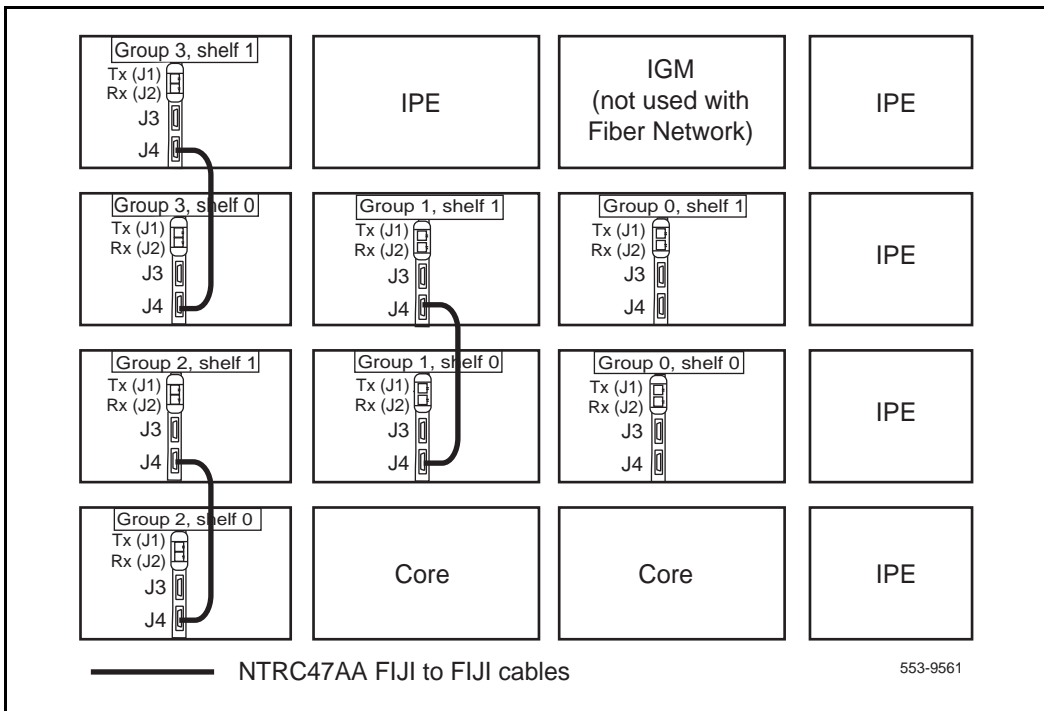
Connect the shelf 0 FIJI Ring cables

To create the shelf 0 fiber optic loop, connect the FIJI cards in each Network shelf 0 in **ascending** order, from Tx to Rx ports (Figure 17 and Table 14).

Remove the black cap from the end of each cable before it is connected.

Note: Each end of the NTRC48 cable is labeled "Tx" or Rx" in the factory.

a   Start with Group 0, shelf 0.

b   Connect a NTRC48 FIJI Fiber Ring cable of the appropriate length from the Tx (J1) port of the FIJI card in **Group 0, shelf 0** to the Rx (J2) port of the FIJI card in **Group 1, shelf 0**.

c   Connect a NTRC48 FIJI Fiber Ring cable of the appropriate length from the Tx (J1) port of the FIJI card in **Group 1, shelf 0** to the Rx (J2) port of the FIJI card in **Group 2, shelf 0**.

d   Continue to connect NTRC48 FIJI Fiber Ring cables of the appropriate length from the Tx (J1) port to the Rx (J2) port in shelf 0 of each Network Group. Connect these cables in **ascending** order of Network Groups.

e   To complete the Ring, connect a final cable from the Tx (J1) port in the **highest number group** back to the Rx (J2) port in **Group 0, shelf 0.**

Figure 17
Shelf 0 *ascending* fiber optic Ring (Option 81 example)

553-9563

NTRC48xx fiber optic cable
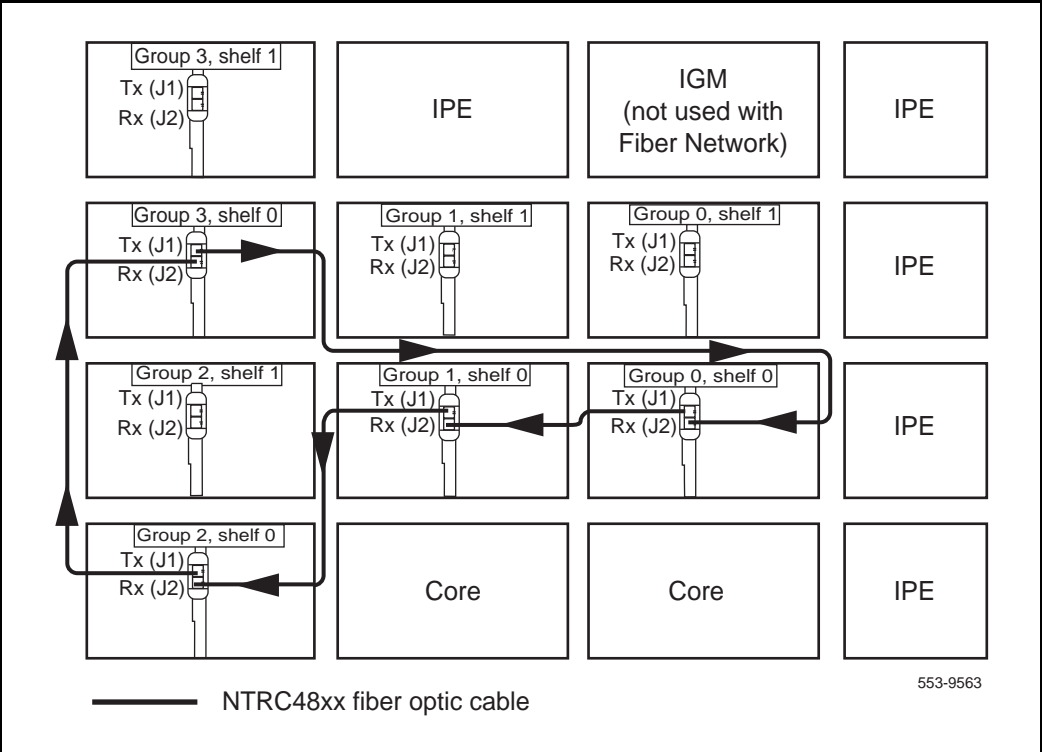
Table 14
FIJI Ring 0 connections

Groups X - 0 are cabled in ascending order		
Group/shelf	**NTRC48 fiber cable connector**	**FIJI card connector**
0/0	P1	Tx - J1
1/0	P2	Rx - J2
1/0	P1	Tx - J1
2/0	P2	Rx - J2
2/0	P1	Tx - J1
3/0	P2	Rx - J2
3/0	P1	Tx - J1
4/0	P2	Rx - J2
4/0	P1	Tx - J1
5/0	P2	Rx - J2
5/0	P1	Tx - J1
6/0	P2	Rx - J2
6/0	P1	Tx - J1
7/0	P2	Rx - J2
7/0	P1	Tx - J1
0/0	P2	Rx - J2

Move the Clock Controllers

Move Clock Controller 0

1   Faceplate disable Clock Controller 0.

2   Label and disconnect the cable from the J11 connector in the NT8D36 Intergroup Module at the junctor board.

3   Disconnect the cable from the faceplate connector on the Clock Controller card.

Primary and secondary Clock reference cables that are connected to the faceplate should be disconnected next and labeled.

4   Remove Clock Controller 0 from the Core module.

5   Set the Clock Controller 0 switch settings (see Table 15 on page 91).

   Note: Option 81 systems equipped with Fiber Network must use the Option 81C switch settings to enable Clock Hunt software.

6   Install Clock Controller 0 on a Network shelf 0, slot 13.

   Note: The Clock Controller can be installed in any Network Group, however Nortel Networks recommends that Clock Controller 0 and 1 be located in different Network Groups.

7   Reconnect the Clock 0 Reference cables.

8   Faceplate enable the Clock Controller.

Move Clock Controller 1

1   Faceplate disable Clock Controller 1.

2   Label and disconnect the cable from the J12 connector in the NT8D36 Intergroup Module at the junctor board.

3   Disconnect the cable from the faceplate connector on the Clock Controller card.

Primary and secondary Clock reference cables that are connected to the faceplate should be disconnected next and labeled.

4   Remove Clock Controller 1 from the Core module.

5   Set the Clock Controller 0 switch settings (see Table 15 on page 91).

   Note: Option 81 systems equipped with Fiber Network must use the Option 81C switch settings to enable Clock Hunt software.

6   Install Clock Controller 1 on a Network shelf 1, slot 13.

Note: The Clock Controller can be installed in any Network Group, however Nortel Networks recommends that Clock Controller 0 and 1 be located in different Network Groups.

7   Reconnect the Clock 0 Reference cables.

8   Faceplate enable the Clock Controller.

Option 81 systems equipped with Fiber Network must use Option 81C switch settings to enable Clock Hunt software.

Table 15
Clock Controller switch settings

Option 81 systems equipped with Fiber Network must use the Option 81C switch settings to enable Clock Hunt software. DO NOT use the Option 81 switch settings.											
SW1				**SW2**				**SW4**			
1	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
on	off	off	off	off	off	off	off	**	on	*	*
*Cable length between the J3 faceplate connectors:											
0–4.3 m (0–14 ft.)										off	off
4.6–6.1 m (15–20 ft.)										off	on
6.4–10.1 m (21–33 ft.)										on	off
10.4–15.2 m (34–50 ft.)										on	on
* If there is only one Clock Controller card in the system, set to OFF. If there are two Clock Controller cards, determine the total cable length between the J3 connectors (no single cable can exceed 25 ft.) and set these two switch positions for this cable length, as shown above. The maximum total (combined) length is 50 ft. Set the switches on both cards to the same settings. ** Set to ON for Clock Controller 0. Set to OFF for Clock Controller 1. *Note:* For FNF based-systems, the total clock path length is equal to the length of the NTRC49 cable used to connect between the two clock controller cards.											

Cable the Clock Controllers

Connect the cables to the Clock Controllers as shown in Figure 18:

1   **Connect the Clock to Clock cable:**

a   Connect P1 of the NTRC49 cable to port J3 of Clock Controller 0.

b   Connect P2 of the NTRC49 cable to port J3 of Clock Controller 1.

2   **Connect the Clock 0 to FIJI cable:**

a   Connect P1 of the NTRC46 cable from Clock 0 to **J4** of the FIJI card in Group 0, **shelf 0**.

b   Connect P2 of the NTRC46 cable from Clock 0 to **J4** of the FIJI card in Group 0, **shelf 1**.

3   **Connect the Clock 1 to FIJI cable:**

a   Connect P1 of the NTRC46 cable from Clock 1 to **J3** of the FIJI card in Group 0, **shelf 0.**

b   Connect P2 of the NTRC46 cable from Clock 1 to **J3** of the FIJI card in Group 0, **shelf 1**.

Figure 18
Clock Controller cable configuration

553-9496
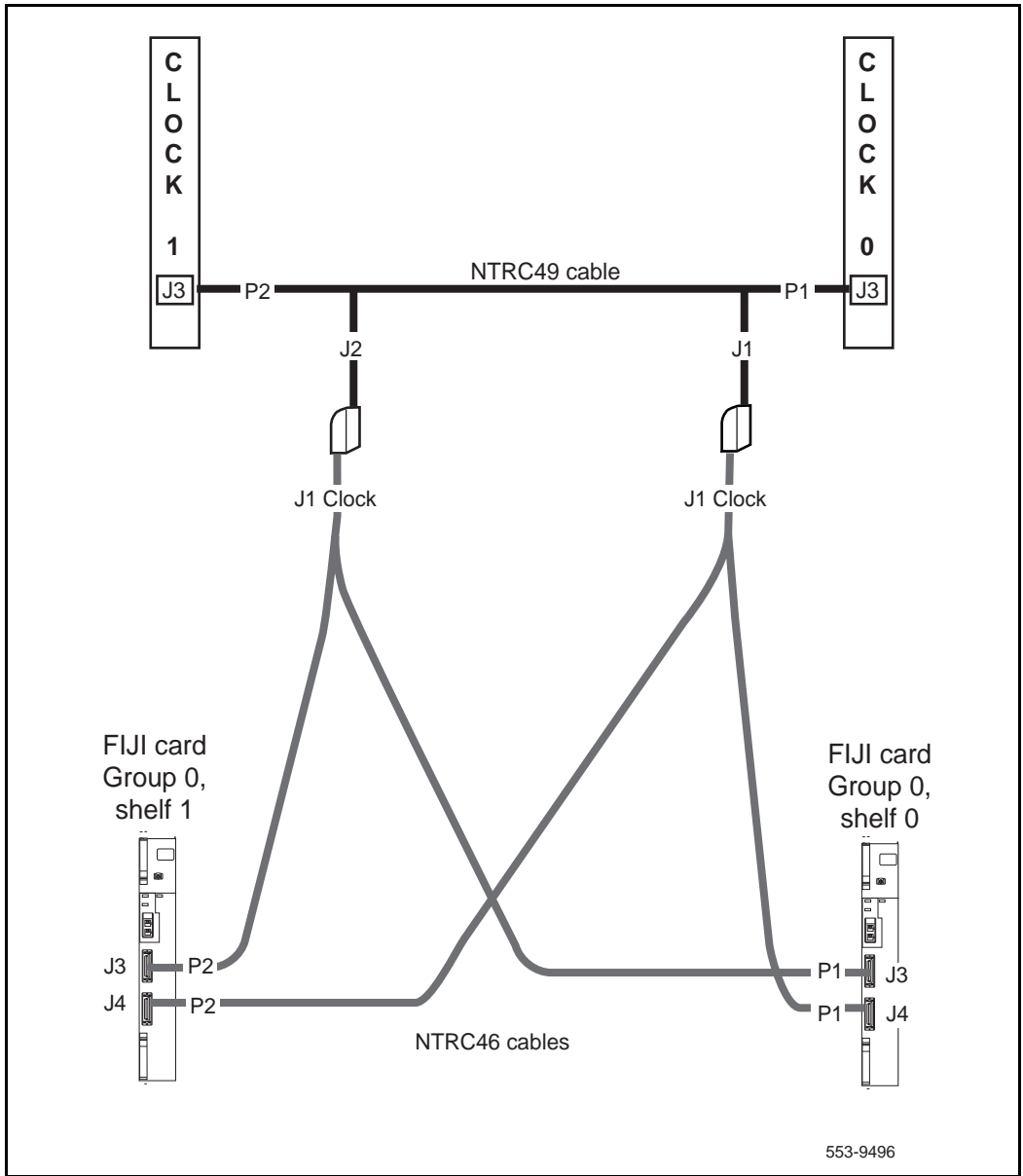
Remove the 3PE card in the Core shelves

In Option 81 systems, the 3PE card must be removed from the Core shelves. This 3PE card (in the Core shelves) is no longer used with Fiber Network.

Note: This procedure is for Option 81 systems with Core shelves. This procedure is NOT necessary for Option 81C systems with Core/Net shelves.

To remove the 3PE card from both Cores:

1   In Core 1, hardware disable the 3PE card.

2   In Core 0, hardware disable the 3PE card.

3   Remove the 3PE faceplate cable.

4   Remove the 3PE cards from Core 1 and 0.

Prepare Core cards for power-up

1   Verify that a terminal is connected to the J25 I/O panel connector on Core 1. See "Connect a terminal" on page 54.

2   Verify that both CP cards in the Core modules are in MAINT position.

3   Unseat the CP card in Core 0

4   Faceplate *disable* the CNI cards in Core 0.

5   Faceplate *disable* the IODU/C in Core 0.

6   Unseat the IODU/C in Core 0.

7   Faceplate *enable* the CNI cards in Core 1.

Restore power

Restore power to the modules below:

1   Restore power to Core 1.

2   Restore power to Core 0.

3   Restore power to the Network modules.

4   Wait for the system to load/init.

5   Re-initialize Core 1.

Note: Re-initializing Core 1 stops the midnight routines from running.

Verify the Fiber Ring status

See the *X11 Maintenance* (553-3001-511) for more information on
Overlay 39 commands. Also see "Appendix A: Fiber Network Fabric
Application Notes" on page 207 for additional information on FIJI cards.

1   Check that Fiber Ring 1 operates correctly:

   LD 39   to load the program

   STAT RING 1   to check the status of Ring 1

2   Reset the Rings:

   RSET   to reset the Rings and prepare them for
                      redundancy

   RSTR   to restore both Rings to normal state (Drives
                      half)

3   Check that the Rings operate correctly:

   STAT RING 0   to check the status of Ring 0

   STAT RING 1   to check the status of Ring 1

4   If any Ring problems occur, correct them now.

   STAT ALRM <X> <Y>   to check the alarm status of individual
                           FIJI cards or all FIJI cards. See *X11
                           Administration* (553-3001-311) for more
                           information.

5   Verify that call processing operates correctly: this includes, but is not
   limited to the following:

   • Check for dial tone.

   • Make internal, external, and network calls.

   • Check attendant console activity.

   • Check DID trunks.

   • Check any auxiliary processors.

Upgrade Core 0 software

1   Seat the IODU/C. Verify the status on the display (A1).

2   Faceplate enable the IODU/C.

3   Insert the CP Install Program diskette into IODU/C floppy drive in Core 0.

4   Verify that the CP card in Core 0 is in MAINT mode.

5   Seat the CP card.

6   Connect a terminal to the J25 port on the I/O panel in Core 0.

7   Press the MAN RST button on the CP card in Core 0 to reboot the system and start the Software Installation Tool. (The terminal displays SYSLOAD messages during file loading. When SYSLOAD is completed, the NT logo appears.)

8   Initiate the installation by selecting the following prompt from the menu:

<cr> <u>>   to Install menu

9   Remove the CP Install Program diskette and insert the Keycode diskette, when prompted.

<a>   continue with keycode validation

10   Remove the Keycode diskette and re-insert the CP Install Program diskette into the IODU/C floppy drive in Core 0.

11   When the main menu appears, select the following option to copy the software form Core 1 to Core 0 and exit the Main Menu:

<o>   to copy system software from the other Core

12   When the software is installed successfully, press **<CR>** to install CP-software from the hard disk to Flash EEPROM, and install CP-BOOT ROM. Follow the screen directions until the Main Menu returns.

13   From the Main Menu, select the prompts in the following sequence to install the IOP-ROM:

<f>   to install IOP-ROM only

<cr> <a>   to install the IOP-ROM from hard disk

\<y\>	Yes, start installation
\<cr\> \<a\>	to continue with ROM upgrade

Follow the screen directions until the Main Menu returns.

14   From the Main Menu, select the following options in sequence to copy the customer database from Core 1 to Core 0.:

\<d\>	to go to the Database menu
\<d\>	to copy the database from Core 1 to Core 0
\<y\>	to confirm the installation status summary
\<a\>	to confirm database copy

15   From the Main Menu, select the following options to quit and reload the system:

\<q\>	to quit
\<y\>	to confirm quit

16   Reboot the Core 0 CPU:

\<a\>	to reboot the system

Wait for "DONE" and then "INI" messages to be displayed before continuing.

Complete the upgrade

Follow the procedures below in sequence. If an error occurs at any time, resolve the problem before continuing.

Exit split mode

1   Perform the following in uninterrupted sequence:

- Press and release the MAN RST button in Core 0.

- When SYS700 messages appears on LCD display on Core 0, set the MAINT/NORM switch to NORM in Core 0.

In 60 seconds, the LCD will display and confirm your processes with:

RUNNING ROM OS
ENTERING CP VOTE

2   An HWI534 message indicates the start of memory synchronization. In 10 minutes, an HWI533 message on Core 1 CSPI or SDI terminal indicates the memory synchronization is complete.

Note: The HWI messages are displayed on the TTY device connected to the active core.

3   Once the synchronization is complete, enable the CNI cards in Core 0 (set the ENB/DIS faceplate switch to ENB).

4   Check the status of the CPU and CNI cards in Core 1:

LD 135
STAT CPU	Get status of CPU and memory
STAT CNI	Get status of CNI cards

5   Enable the CNI ports if necessary:

ENL CNI *c s p*   Enable the CNI in *core, slot, port*

6   In Core 1, set the MAINT/NORM switch on the CP card to NORM.

Synchronize the hard disks

1   Load LD 137 and synchronize the hard disks. Synchronization may take up to seven minutes. To be sure that the contents of IODU/C 1 are copied to IODU/C 0, verify that IODU/C 0 is disabled.

    LD 137

STAT	Get the status of the IODU/C and redundancy
SYNC	Enter "Yes" to synchronize disks. Wait until the memory synchronization successfully completes before continuing.
TEST CMDU	Performs hard and floppy disk test.

2   Get the status of the IODU/Cs and be sure IODU/C 0 is active. Switch if necessary.

STAT	Get the status of IODU/C and redundancy
SWAP	Switch CMDU if necessary
STAT CMDU	Get the status of the IODU/Cs. Be sure the same IODU/C and CPU are active.
****	exit program

Verify Core redundancy

To verify redundancy, switch the active Cores back and forth to verify that both sides operate without problems.

    LD 135

SCPU	to switch the active Core
SCPU	to switch the active Core again

Test Core 1 and Core 0

1   Perform a redundancy sanity test using the following sequence:

LD 135

STAT CNI	Get status of CNI cards
STAT CPU	Get status of CPU and memory
TEST CPU	Test the inactive Core
TEST CNI c s	Test each inactive CNI card

2   Switch Cores and test the other side (Core 0)

SCPU	Switch Cores
TEST CPU	Test the inactive Core
TEST CNI c s	Test each inactive CNI card

Note: Testing the CP and CNI cards and synchronizing memory can take up to 20 minutes for each test. When the CP test is complete, the CP memory is automatically synchronized.

3   Clear the display and minor alarms on both Cores.

CDSP	Clear the displays on the Cores
CMAJ	Clear major alarms
CMIN ALL	Clear minor alarms

4   Get the status of the Cores, CNIs, and memory.

STAT CPU	Get the status of both Cores
STAT CNI	Get the status of all configured CNIs and memory

Note: You may need to execute the STAT CNI command twice before receiving a response from the system.

****	exit program

Switch the Clocks

1   Verify that the clock controller is assigned to the *active* Core.

LD 60	to lead the program
SSCK *x*	to get the status of the clock controllers (*x* is "0" or "1" for Clock 0 or Clock 1.
SWCK	to switch the Clock if necessary
****	exit program

2   Verify that the Clock Controllers are switching correctly:.

LD 60	to load the program
SWCK	to switch the Clock
SWCK	to switch the Clock again

Check Fiber Ring Status

See the *X11 Maintenance* (553-3001-511) for more information on overlay 39 commands. Also see "Appendix A: Fiber Network Fabric Application Notes" on page 207 for additional information on FIJI cards.

1   Check that the Fiber Rings operate correctly:

LD 39	to load the program
STAT RING 0	to check the status of Ring 0
STAT RING 1	to check the status of Ring 1

2   If necessary, restore the Rings to Normal State:

RSET	to reset the Rings
RSTR	to restore both Rings to Normal state

3   Check that the Rings operate correctly:

STAT RING 0	to check the status of Ring 0
STAT RING 1	to check the status of Ring 1

4   Check the status of the FIJI alarms

STAT ALRM	to query the alarm condition for all FIJI cards in all Network Groups

Backup the database

1   Log into the system.

2   Load the Equipment Data Dump Program (LD 43). At the prompt, enter

LD 43   to load the program

3   When "EDD000" appears on the terminal, enter

EDD   to begin the data dump

4   When "DATADUMP COMPLETE" and "DATABASE BACKUP COMPLETE" appears on the terminal, enter

****   to exit the program

CAUTION

If the data dump is not successful, do not continue; contact your technical support organization. A data dump problem must be corrected before proceeding.

Removal of unused Intergroup cables and module

Once the system is operating and stable with Fiber Network, the unused Intergroup cables and Intergroup module can be removed if desired. **Removal of the Intergroup cables and module is not required.** Unused Intergroup equipment can be left in place.

CAUTION

If the Intergroup cables and module are removed from the Fiber Network system, be careful not to dislodge or damage any working cables or equipment.

The Intergroup (IGS) module can also be converted into an IPE module with the IPE Expansion kit.

Option 81C upgrade to Fiber Network

Content list

The following are the topics in this section:

Reference list

The following are the references in this section:

- "Prepare for upgrade" on page 47

- "Connect a terminal" on page 54

- "Back out of a system software upgrade" on page 79

- "Check 3PE settings" on page 50

- "Pre-route cables" on page 58

- *X11 Administration* (553-3001-311)

- *X11 Maintenance* (553-3001-511)

CAUTION

All tasks in the "Prepare for upgrade" section on page 47 must be completed before the upgrade is begun:

✔ "Check power supply version (DC power only)"

✔ "Check minimum system requirements"

✔ "Check 3PE settings"

✔ "Prepare to move the Clock Controllers (Option 81 and 61C to 81C with Fiber Network Fabric)"

✔ "Connect a terminal"

✔ "Print site data"

✔ "Pre-route cables"

✔ "Perform a template audit"

✔ "Backup the database"

Failure to complete these tasks will result in increased downtime and possible system failure.

Once the steps in "Prepare for upgrade" on page 47 are complete, follow the procedures listed below in sequence.

Task summary

1   "Verify Core/Net 0 is active" on page 106.

2   "Split the Core/Nets" on page 106.

3   "Upgrade Side 1" on page 107.

4   "Turn module power off" on page 114.

5   "Seat the FIJI cards in Side 1" on page 114.

6   "Upgrade Side 0" on page 114.

7   "Cable the Clock Controllers" on page 119.

8   "Prepare Core cards for power-up" on page 121.

9   "Restore power" on page 121.

10   "Verify the Fiber Rings" on page 121.

11   "Upgrade Core/Net 0 software" on page 122.

12   "Complete the upgrade" on page 124.

13   "Removal of unused Intergroup cables and module" on page 128

Verify Core/Net 0 is active

1   Get the status of the CPUs. Verify that all common equipment is
enabled.

LD 135   to load the program

STAT CPU   to get the status of both Core/Nets

2   Ensure Core/Net 0 is active.

If Core/Net 1 is active, switch Core/Nets.

STAT CPU   to get the status of the Core/Nets

SCPU   to switch to Core/Net 0

****   to exit the program

3   Ensure Clock Controller 0 is active and tracking.

LD 60   to load the program

SSCK 0   to get the status of Clock 0

SSCK 1   to get the status of Clock 1

SWCK   if necessary, to switch to Clock 0

Split the Core/Nets

1   Be sure Core/Net 0 is active and Core/Net 1 is standby. You may need
to switch Cores:

STAT CPU

****   exit program

2   Verify that IODU/C 0 is active. You may need to switch IODU/Cs.

LD 137

STAT   Get the status of IODU/C

SWAP   Switch IODU/Cs if necessary

****   exit program

3   Connect a terminal to the CPSI port in Core/Net 1 to J25 of the I/O panel at the back of the Core/Net. Be sure it is configured as follows. The recommended baud rate is 9600, to be the same as the CPSI port.

7 data bits, 1 stop bit, Space parity, Full duplex, XON protocol

4   Place Core/Net 0 in Maintenance by setting the MAINT/NORM switch to MAINT.

5   In Core/Net 1, disable the NT6D65 Core to Network Interface (CNI) cards by setting the ENB/DIS faceplate switches to DIS.

Upgrade Side 1

Core/Net 1 must be *inactive* to complete these procedures. A terminal must be connected to the J25 connector on Core/Net 1 to complete this procedure. See "Connect a terminal" on page 54.

Upgrade the Core/Net 1 software

Complete the steps below to install new software in Core/Net 1.

1   Place the CP Install disk that corresponds with the installed CP card type into the IODU/C in Core/Net 1.

2   Install the CD-ROM into the CD drive:

a   press the button on the CD-ROM drive to open the CD-ROM disk holder

b   place the CD-ROM disk into the holder with the disk label showing

c   use the four tabs to secure the CD-ROM drive

d   press the button again to close the CD-ROM disk holder (don't push the holder in by hand)

3   In Core/Net 1, perform the following three steps in uninterrupted sequence:

a   press and hold the MAN RST button on the CP card

b   set the MAINT/NORM switch on the CP card to MAINT

c   release the MAN RST button

A sysload will begin (cold start). Wait for the Main Menu to appear on the terminal before proceeding.

Note 1: If the CD-ROM is not in the CD drive of the IODU/C, the installation procedure will not continue. Insert the CD-ROM into the drive to continue.

Note 2: If a problem is detected during the system verification, Install stops, prints an error message, and aborts the installation. If the verification is not successful, do not continue; contact your technical support organization.

4 Press <CR> to continue.

5 Remove the CP Install Program diskette and insert the Keycode diskette, when prompted.

<a> to continue with keycode validation

<y> to confirm that the keycode matches the CD-ROM release

6 When the Install Menu is displayed, select the following options in sequence when you are prompted to do so

<a> to install software, CP-BOOT ROM, and IOP-ROM

<a> to verify that the CD-ROM is now in drive

The Installation Status Summary screen appears that lists the options to be installed.

<y> Yes, start Installation

<a> Continue with Upgrade

7   Select a PSDL file to install. The PSDL file contains the loadware for all downloadable cards in the system and loadware for M3900 series sets.

Select one of the six psdl files

<1>   Global 10 Languages <default>

<2>   Western Europe 10 Languages

<3>   Eastern Europe 10 Languages

<4>   North America 6 Languages

<5>   Rls24 up-issue

<6>   North America 6 Languages:

The languages contained in each selection are outlined as follows:

1   English, French, German, Spanish, Swedish, Italian, Norwegian, Brazilian, Portuguese, Finnish, Japanese Katakana.

2   English, French, German, Spanish, Swedish, Norwegian, Danish, Finnish, Italian, Brazilian Portuguese.

3   English, French, German, Dutch, Polish, Czech, Hungarian, Russian, Latvian, Turkish.

4   English, Spanish, French, Brazilian Portuguese, Japanese Katakana, German.

5   English, French, German, Spanish, Swedish, Italian, Norwegian, Portuguese, Finnish, Japanese Katakana.

6   English, French, German, Spanish, Brazilian Portuguese, Japanese Katakana.

8   When the ROM installation screen appears, select the following prompts in sequence:

    \<a\>   Continue with ROM Upgrade

The following message appears:

Software Release XXXX was installed successfully on Core 1. All files were copied from CDROM to the hard disk.

Please press \<CR\> to continue when ready...

    \<a\>   Continue with ROM upgrade

    \<a\>   Yes, start Installation

    \<a\>   Continue with ROM upgrade

When the Installation Status Summary screen appears, press \<CR\> when ready...

    \<cr\>   Are you sure you want to continue with IOP ROM

    \<a\>   to install the IOP-ROM from hard disk

    \<y\>   Yes, start installation

    \<a\>   to continue with ROM upgrade

The Installation Status Summary screen appears. Verify that CD to disk, disk to ROM, CP-BOOTROM, and IOP-ROM were installed.

    \<cr\>   press return to continue

    \<q\>   to quit (remove any diskettes from the floppy drive)

    \<y\>   Yes, to confirm quit

    \<a\>   to reboot the system

The system will automatically perform a sysload during which several messages will appear on the system terminal. Wait for "DONE" and then "INI" messages to be displayed before continuing.

Software installation on Core/Net 1 is complete.

Note: If the system fails to load, or system messages indicate data corruption, back out of the parallel reload process by performing the steps in "Back out of a system software upgrade" on page 79.

Upgrade Side 1 hardware

Follow the procedures below in sequence:

1   Software disable the IGS/DIGS cards in Side 1 (IGS/DIGS odd-numbered cards, 1 - 19):

LD 39   to load the program

DISI IGS xx   xx is the IGS card number 1 - 19

Note: See the *X11 Maintenance* (553-3001-511)for more information on overlay 39 commands.

2   Faceplate disable the IGS/DIGS cards in Side 1.

3   Tag and disconnect the IGS/DIGS cables.

4   Remove the IGS/DIGs cards from Side 1.

Note: If you did not check the 3PE switch settings before, check the 3PE switch settings now. See "Check 3PE settings" on page 50.

5   Faceplate enable the FIJI cards.

6   Insert the FIJI cards in Side 1. **DO NOT seat the FIJI cards.**

Note: FIJI cards are installed in slots 2 and 3 of the Network modules, and slots 8 and 9 of the Core/Net modules.

Connect the shelf 1 FIJI Ring cables

To create the shelf 1 fiber optic loop, connect the FIJI cards in each Network shelf 1 in **descending** order, from Tx to Rx (Figure 19 and Table 16).

Remove the black cap from the end of each cable before it is connected.

Note: Each end of the NTRC48 cable is labeled "Tx" or Rx" in the factory.

a   Start with Network Group 0, shelf 1.

b   Connect a NTRC48 FIJI Fiber Ring cable of the appropriate length from the Tx (J1) port of the FIJI card in **Group 0, shelf 1** to the Rx (J2) port of the FIJI card in the **highest Network Group, shelf 1.**

   c   Connect a NTRC48 cable from the Tx (J1) port of the FIJI card from the Tx (J1) port in the **highest Network Group, shelf 1** to the Rx (J2) port in the **second highest Network Group, shelf 1**.

   d   Continue to connect NTRC48 FIJI Fiber Ring cables of the appropriate length from the Tx (J1) port to the Rx (J2) port in shelf 1 of each Network Group. Connect these cables in **descending** order of Network Groups.

   e   To complete the Ring, connect a final cable from Tx in **Group 1, shelf 1** to Rx in Group 0, shelf 1.

Figure 19
Shelf 1 *descending* fiber optic Ring (Option 81C example)
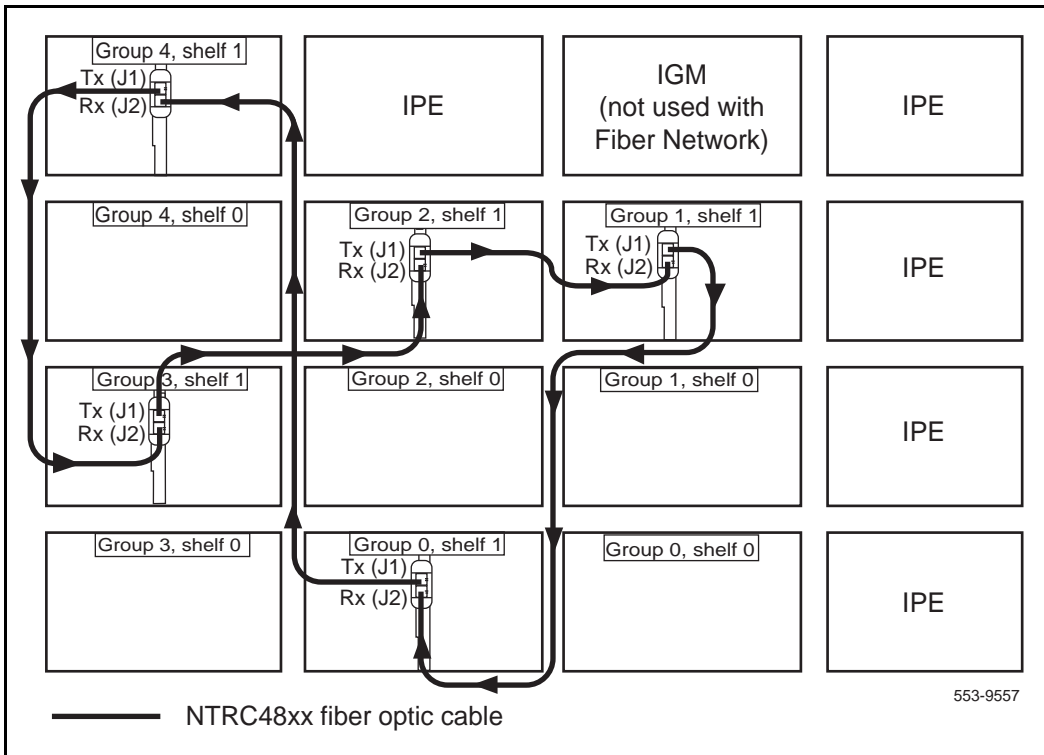
Note: Connect the Side 1 FIJI Ring cables only.

Table 16
FIJI Ring 1 connections

Groups 0 - X are cabled in descending order		
Group/shelf	**NTRC48 fiber cable connector**	**FIJI card connector**
0/1	P1	Tx - J1
7/1	P2	Rx - J2
7/1	P1	Tx - J1
6/1	P2	Rx - J2
6/1	P1	Tx - J1
5/1	P2	Rx - J2
5/1	P1	Tx - J1
4/1	P2	Rx - J2
4/1	P1	Tx - J1
3/1	P2	Rx - J2
3/1	P1	Tx - J1
2/1	P2	Rx - J2
2/1	P1	Tx - J1
1/1	P2	Rx - J2
1/1	P1	Tx - J1
0/1	P2	Rx - J2

Turn module power off

WARNING

Call processing will be interrupted for approximately 30 minutes while the procedures are completed.

To reduce downtime, verify that all cables are pre-routed. See "Pre-route cables" on page 58.

Power down the modules with the module power switch. DO NOT power down the columns at the PDU:

1   Power down Core/Net Module 0.

2   Power down Core/Net Module 1.

3   Power down all Network Modules.

Seat the FIJI cards in Side 1

The FIJI cards in side 1 can now be seated. Push the faceplate latches forward to lock the cards in place. Verify that the cards are faceplate *enabled*.

Upgrade Side 0

Install Side 0 FIJI cards

1   Tag and disconnect the IGS/DIGS cables.

2   Remove the IGS/DIGs cards from Side 0.

3   Insert and seat the FIJI cards in Side 0.

4   Faceplate enable the FIJI cards.

Connect the FIJI to FIJI cables

1 Connect P2 of a NTRC47 FIJI to FIJI cable to J4 of the FIJI cards in each Network shelf 0, except Group 0.

2 Connect P1 of a NTRC47 FIJI to FIJI cable to J4 of the FIJI cards in each Network shelf 1, except Group 0.

Note: The FIJI cards in Group 0 do not receive a FIJI to FIJI cable.

Figure 20
FIJI shelf 0 to FIJI shelf 1 connections (Option 81C example)
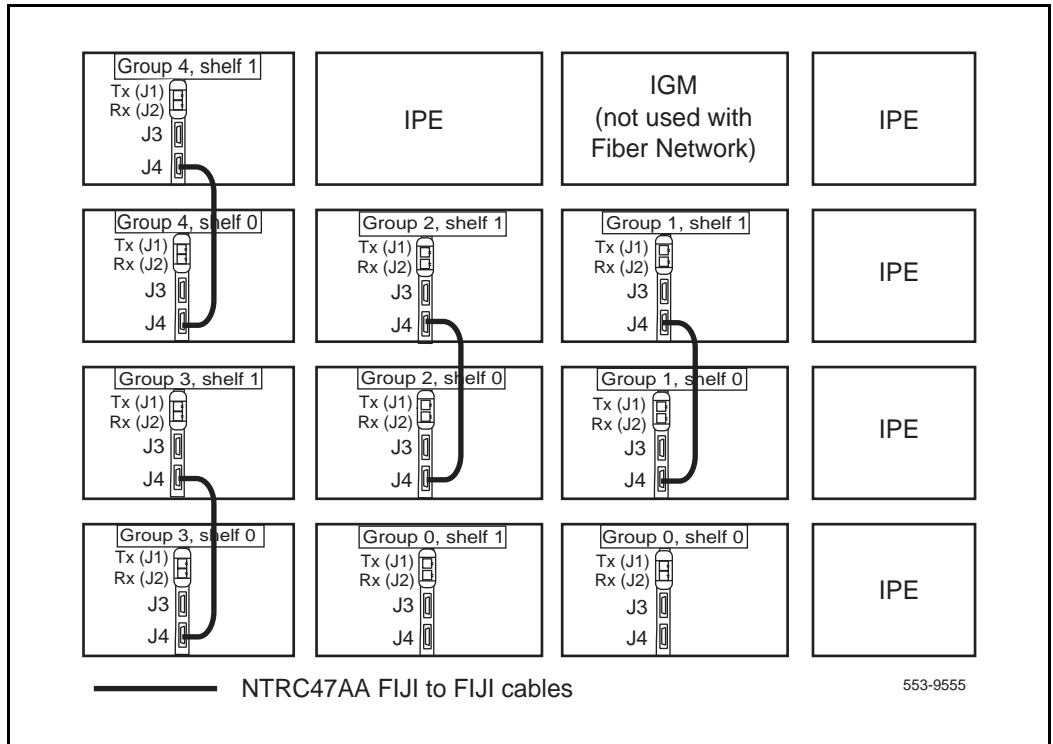
NTRC47AA FIJI to FIJI cables

553-9555

Connect the shelf 0 FIJI Ring cables

To create the shelf 0 fiber optic loop, connect the FIJI cards in each Network shelf 0 in **ascending** order, from Tx to Rx ports (Figure 21 and Table 17).

Remove the black cap from the end of each cable before it is connected.

Note: Each end of the NTRC48 cable is labeled "Tx" or Rx" in the factory.

a   Start with Group 0, shelf 0.

b   Connect a NTRC48 FIJI Fiber Ring cable of the appropriate length from the Tx (J1) port of the FIJI card in **Group 0, shelf 0** to the Rx (J2) port of the FIJI card in **Group 1, shelf 0**.

c   Connect a NTRC48 FIJI Fiber Ring cable of the appropriate length from the Tx (J1) port of the FIJI card in **Group 1, shelf 0** to the Rx (J2) port of the FIJI card in **Group 2, shelf 0**.

d   Continue to connect NTRC48 FIJI Fiber Ring cables of the appropriate length from the Tx (J1) port to the Rx (J2) port in shelf 0 of each Network Group. Connect these cables in **ascending** order of Network Groups.

e   To complete the Ring, connect a final cable from the Tx (J1) port in the **highest number group** back to the Rx (J2) port in **Group 0, shelf 0.**

Figure 21
Shelf 0 ascending fiber optic Ring (Option 81C example)
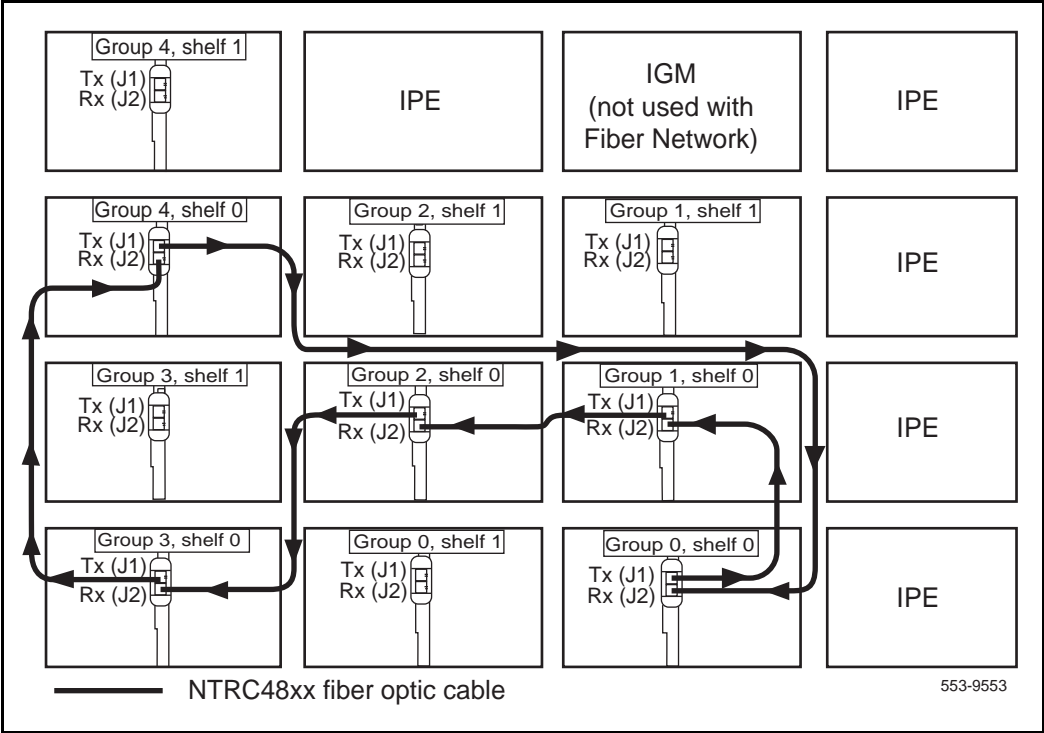
Table 17
FIJI Ring 0 connections

Groups X - 0 are cabled in ascending order		
Group/shelf	**NTRC48 fiber cable connector**	**FIJI card connector**
0/0	P1	Tx - J1
1/0	P2	Rx - J2
1/0	P1	Tx - J1
2/0	P2	Rx - J2
2/0	P1	Tx - J1
3/0	P2	Rx - J2
3/0	P1	Tx - J1
4/0	P2	Rx - J2
4/0	P1	Tx - J1
5/0	P2	Rx - J2
5/0	P1	Tx - J1
6/0	P2	Rx - J2
6/0	P1	Tx - J1
7/0	P2	Rx - J2
7/0	P1	Tx - J1
0/0	P2	Rx - J2

Cable the Clock Controllers

Connect the cables to the Clock Controllers as shown in Figure 22:

1   **Connect the Clock to Clock cable:**

    a   Connect P1 of the NTRC49 cable to port J3 of Clock Controller 0.

    b   Connect P2 of the NTRC49 cable to port J3 of Clock Controller 1.

2   **Connect the Clock 0 to FIJI cable:**

    a   Connect P1 of the NTRC46 cable from Clock 0 to **J4** of the FIJI card in Group 0, **shelf 0**.

    b   Connect P2 of the NTRC46 cable from Clock 0 to **J4** of the FIJI card in Group 0, **shelf 1**.

3   **Connect a Clock 1 to FIJI cable:**

    a   Connect P1 of the NTRC46 cable from Clock 1 to **J3** of the FIJI card in Group 0, **shelf 0.**

    b   Connect P2 of the NTRC46 cable from Clock 1 to **J3** of the FIJI card in Group 0, **shelf 1**.

Figure 22
Clock Controller cable configuration

Prepare Core cards for power-up

1   Verify that a terminal is connected to the J25 I/O panel connector on Core/Net 1. See "Connect a terminal" on page 54.

2   Verify that both CP cards in the Core modules are in MAINT position.

3   Unseat the CP card in Core/Net 0.

4   Faceplate *disable* the CNI cards in Core/NET 0.

5   Faceplate *disable* the IODU/C in Core/Net 0.

6   Unseat the IODU/C in Core/Net 0.

7   Faceplate *enable* the CNI cards in Core/Net 1.

Restore power

Restore power in the order below:

1   Restore power to Core/Net 1.

2   Restore power to Core/Net 0.

3   Restore power to the Network modules.

4   Wait for the system to load/init.

5   Re-initialize Core/Net 1.

   Note: Re-initializing Core/Net 1 stops the midnight routines from running.

Verify the Fiber Rings

See the *X11 Maintenance* (553-3001-511) for more information on Overlay 39 commands. Also see "Appendix A: Fiber Network Fabric Application Notes" on page 207 for additional information on FIJI cards.

1   Check that Fiber Ring 1 operates correctly:

LD 39	to load the program
STAT RING 1	to check the status of Ring 1

2   Reset the Rings:

RSET	to reset the Rings and prepare them for redundancy
RSTR	to restore both Rings to Normal state

3   Check that the Rings operate correctly:

STAT RING 0   to check the status of Ring 0

STAT RING 1   to check the status of Ring 1

4   If any Ring problems occur, correct them now.

STAT ALRM <X> <Y>   to check the alarm status of individual FIJI cards or all FIJI cards. See *X11 Administration* (553-3001-311) for more information.

5   Verify that call processing operates correctly: this includes, but is not limited to the following:

- Check for dial tone.

- Make internal, external, and network calls.

- Check attendant console activity.

- Check DID trunks.

- Check any auxiliary processors.

Upgrade Core/Net 0 software

1   Seat the IODU/C. Verify the status on the display (A1).

2   Faceplate enable the IODU/C.

3   Insert the CP Install Program diskette into IODU/C floppy drive in Core/Net 0.

4   Verify that the CP card in Core/Net 0 is in MAINT mode.

5   Seat the CP card.

6   Connect a terminal to the J25 port on the I/O panel in Core/Net 0.

7   Press the MAN RST button on the CP card in Core/Net 0 to reboot the system and start the Software Installation Tool. (The terminal displays SYSLOAD messages during file loading. When SYSLOAD is completed, the NT logo appears.)

8   Initiate the installation by selecting the following prompt from the menu:

<cr> <u>>   to Install menu

9   Remove the CP Install Program diskette and insert the Keycode
        diskette, when prompted.

        \<a\>   continue with keycode validation

10   Remove the Keycode diskette and re-insert the CP Install Program
        diskette into the IODU/C floppy drive in Core/Net/Net 0.

11   When the main menu appears, select the following option to copy the
        software form Core//Net 1 to Core/Net/Net 0 and exit the Main Menu:

        \<o\>   to copy system software from the other Core/Net

12   When the software is installed successfully, press **\<CR\>** to install
        CP-software from the hard disk to Flash EEPROM, and install
        CP-BOOT ROM. Follow the screen directions until the Main Menu
        returns.

13   From the Main Menu, select the prompts in the following sequence to
        install the IOP-ROM:

        \<f\>   to install IOP-ROM only

        \<cr\> \<a\>   to install the IOP-ROM from hard disk

        \<y\>   Yes, start installation

        \<cr\> \<a\>   to continue with ROM upgrade

Follow the screen directions until the Main Menu returns.

14   From the Main Menu, select the following options in sequence to copy
        the customer database from Core/Net/Net 1 to Core/Net/Net 0.:

        \<d\>   to go to the Database menu

        \<d\>   to copy the database from Core/Net 1 to Core/Net
                            0

        \<y\>   to confirm the installation status summary

        \<a\>   to confirm database copy

15   From the Main Menu, select the following options to quit and reload the
        system:

        \<q\>   to quit

        \<y\>   to confirm quit

16   Reboot the Core/Net/Net 0 CPU:

<a>   to reboot the system

Wait for "DONE" and then "INI" messages to be displayed before continuing.

Complete the upgrade

Follow the procedures below in sequence. If an error occurs at any time, resolve the problem before continuing.

Exit split mode

1   Perform the following in uninterrupted sequence:

- Press and release the MAN RST button in Core/Net 0.

- When SYS700 messages appears on LCD display on Core/Net 0, set the MAINT/NORM switch to NORM in Core/Net 0.

In 60 seconds, the LCD will display and confirm your processes with:

RUNNING ROM OS

ENTERING CP VOTE

2   An HWI534 message indicates the start of memory synchronization. In 10 minutes, an HWI533 message on Core/Net 1 CSPI or SDI terminal indicates the memory synchronization is complete.

Note: The HWI messages are displayed on the TTY device connected to the active core.

3   Once the synchronization is complete, enable the CNI cards in Core/Net 0 (set the ENB/DIS faceplate switch to ENB).

4   Check the status of the CPU and CNI cards in Core/Net 1:

LD 135

STAT CPU   Get status of CPU and memory

STAT CNI   Get status of CNI cards

5   Enable the CNI ports if necessary:

ENL CNI *c s p*   Enable CNI on *core, slot, port*

6   In Core/Net 1, set the MAINT/NORM switch on the CP card to NORM.

Synchronize the hard disks

1   Load LD 137 and synchronize the hard disks. Synchronization may take up to seven minutes. To be sure that the contents of IODU/C 1 are copied to IODU/C 0, verify that IODU/C 0 is disabled.

LD 137

STAT	Get the status of the IODU/C and redundancy
SYNC	Enter "Yes" to synchronize disks. Wait until the memory synchronization successfully completes before continuing.
TEST CMDU	Performs hard and floppy disk test.

2   Get the status of the IODU/Cs and be sure IODU/C 0 is active. Switch if necessary.

STAT	Get the status of IODU/C and redundancy
SWAP	Switch CMDU if necessary
STAT CMDU	Get the status of the IODU/Cs. Be sure the same IODU/C and CPU are active.
****	exit program

Verify Core/Net redundancy

To verify redundancy, switch the active Cores back and forth to verify that both sides operate without problems.

LD 135

SCPU	to switch the active Core/Net
SCPU	to switch the active Core/Net again

Test Core/Net 1 and Core/Net 0

1   Perform a redundancy sanity test using the following sequence:

LD 135

STAT CNI	Get status of CNI cards
STAT CPU	Get status of CPU and memory
TEST CPU	Test the inactive Core/Net/Net
TEST CNI c s	Test each inactive CNI card

2   Switch Core/Nets and test the other side (Core/Net 0)

SCPU	Switch Core/Nets
TEST CPU	Test the inactive Core/Net/Net
TEST CNI c s	Test each inactive CNI card

Note: Testing the CP and CNI cards and synchronizing memory can take up to 20 minutes for each test. When the CP test is complete, the CP the memory is automatically synchronized.

3   Clear the display and minor alarms on both Core/Nets.

CDSP	Clear the displays on the Core/Nets
CMAJ	Clear major alarms
CMIN ALL	Clear minor alarms

4   Get the status of the Core/Nets, CNIs, and memory.

STAT CPU	Get the status of both Core/Nets
STAT CNI	Get the status of all configured CNIs and memory

Note: You may need to execute the STAT CNI command twice before receiving a response from the system.

****	exit program

Switch the Clocks

1   Verify that the clock controller is assigned to the *active* Core.

LD 60	to lead the program
SSCK *x*	to get the status of the clock controllers (*x* is "0" or "1" for Clock 0 or Clock 1.
SWCK	to switch the Clock if necessary
****	exit program

2   Verify that the Clock Controllers are switching correctly:.

SWCK	to switch the Clock
SWCK	to switch the Clock again

Check Fiber Ring status

See the *X11 Maintenance* (553-3001-511) for more information on overlay 39 commands. Also see "Appendix A: Fiber Network Fabric Application Notes" on page 207 for additional information on FIJI cards.

1   Check that the Fiber Rings operate correctly:

LD 39	to load the program
STAT RING 0	to check the status of Ring 0
STAT RING 1	to check the status of Ring 1

2   If necessary, restore the Rings to Normal State:

RSTR	to restore both Rings to Normal state

3   Check that the Rings operate correctly:

STAT RING 0	to check the status of Ring 0
STAT RING 1	to check the status of Ring 1

4   Check the status of the FIJI alarms

STAT ALRM	to query the alarm condition for all FIJI cards in all Network Groups

Backup the database

1   Log into the system.

2   Load the Equipment Data Dump Program (LD 43). At the prompt, enter

   LD 43   to load the program

3   When "EDD000" appears on the terminal, enter

   EDD   to begin the data dump

4   When "DATADUMP COMPLETE" and "DATABASE BACKUP COMPLETE" appears on the terminal, enter

   ****   to exit the program

CAUTION

If the data dump is not successful, do not continue; contact your technical support organization. A data dump problem must be corrected before proceeding.

Removal of unused Intergroup cables and module

Once the system is operating and stable with Fiber Network, the unused Intergroup cables and Intergroup module can be removed if desired. **Removal of the Intergroup cables and module is not required.** Unused Intergroup equipment can be left in place.

CAUTION

If the Intergroup cables and module are removed from the Fiber Network system, be careful not to dislodge or damage any working cables or equipment.

The Intergroup (IGS) module can also be converted into an IPE module with the IPE Expansion kit.

Option 61C upgrade to Option 81C with Fiber Network

Content list

The following are the topics in this section:

Reference list

The following are the references in this section:

- "Prepare for upgrade" on page 47

- "Connect a terminal" on page 54

- "Back out of a system software upgrade" on page 79

- "Check 3PE settings" on page 50

- "Pre-route cables" on page 58

- *X11 Administration* (553-3001-311)

- *X11 Maintenance* (553-3001-511)

Overview of Option 61C to Option 81C with Fiber Network Fabric upgrade

An Option 61C system with NT5D21 Core/Net modules can be upgraded to an Option 81C system with Fiber Network Fabric. This upgrade takes a 61C to an Option 81C with two (2) groups. Once the upgrade procedure is completed, additional groups may be added to the Option 81C by following the procedure to "Add a Network Group" on page 177.

To upgrade an Option 61C to an Option 81C with Fiber Network Fabric:

- A new column is installed next to the existing Option 61C column with the Core/Net modules.

- The new column contains one IPE module and two Network modules.

- The two new Network modules provide the new system with a minimum of two full Network groups.

- The existing Clock Controllers are moved from the Core/Net modules to the Network shelves.

- New cards for Fiber Network Fabric are added: NTRB33 Fiber Junctor Interface (FIJI) card and the NTRE39 Optical Cable Management Card (OCMC).

- An additional IPE module may be installed on the top of the new column.

Figure 23 shows the upgrade from Option 61C to Option 81C with Fiber Network Fabric.

Prepare for upgrade

Complete the first six tasks defined in the "Prepare for upgrade" section on page 47. These tasks include:

- Check power supply version (DC power only)

- Check minimum system requirements

- Check 3PE settings

- Prepare to move the Clock Controllers

- Connect a terminal

- Print site data

Figure 23
Upgrade from Option 61C to Option 81C with Fiber Network Fabric
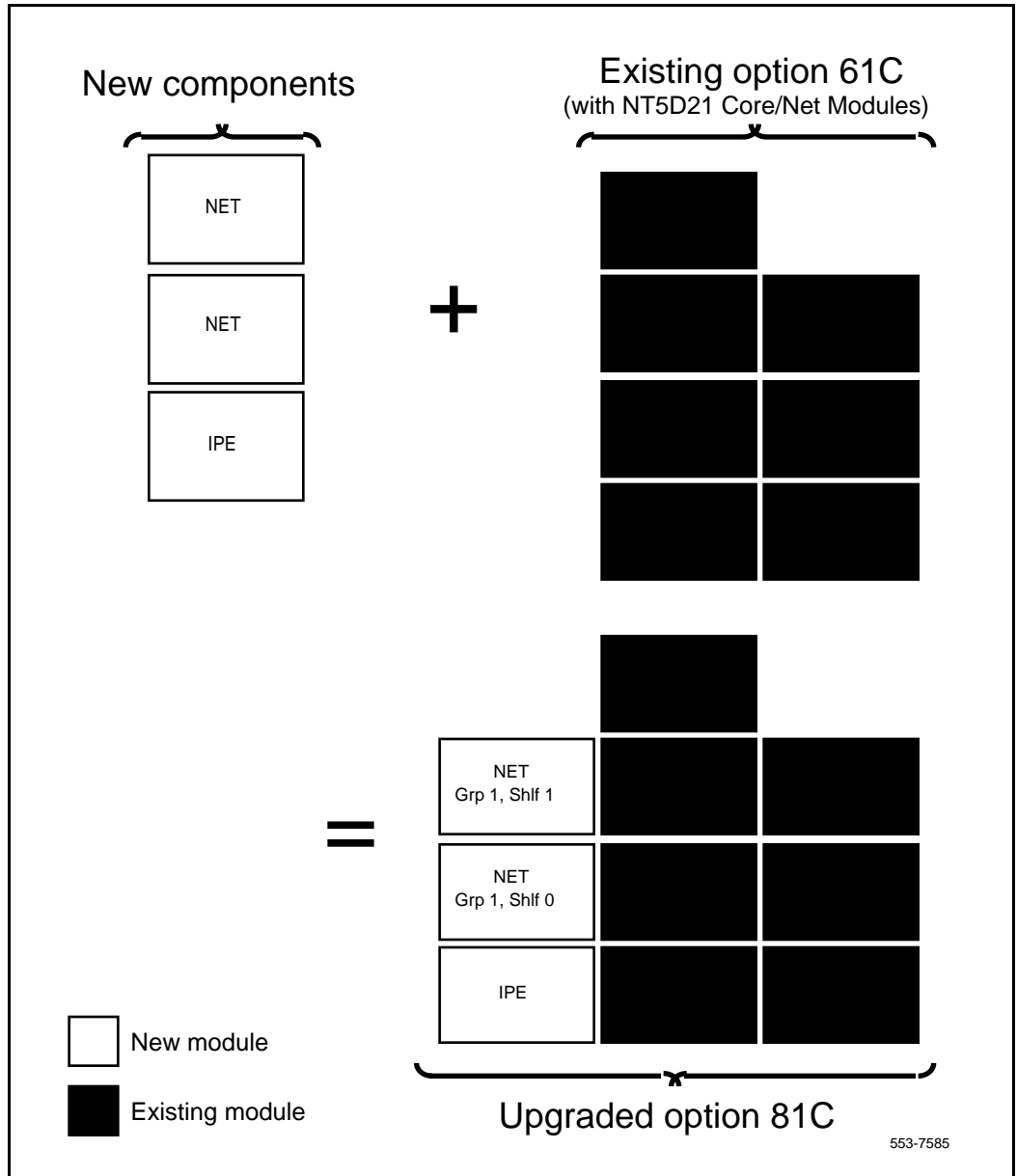
Add Network Group 1

Follow the procedures in this section to add the new Network Group 1.

Task Summary

1   "Install the new column" on page 132.

2   "Pre-route CNI to 3PE cables" on page 132.

3   "Install and enable the 3PE cards" on page 134.

4   "Install and enable the Peripheral Signaling (Per Sig) cards" on page 136.

5   "Disable and insert the FIJI cards" on page 136.

6   "Disable and insert the Conf/TDS cards, if necessary" on page 136.

Install the new column

After completing the first six steps in "Prepare for upgrade" on page 47, you must install the new column. Follow the instructions in *System Installation Procedures* (553-3001-210) to correctly install the column and configure the power and System Monitor connections.

Pre-route CNI to 3PE cables

The CNI backplane ports are connected to the 3PE cards with two NTND14 CNI to 3PE cables per port. The third port connects from the CNI-3 faceplate to the 3PE card with two NT9D89 cables.

When a CNI card is upgraded to a CNI-3 card, the original NTND14 backplane cables are left in place; only the NT9D89 CNI-3 to 3PE faceplate cables must be added.

1   Label the cables with Network Group, CNI port and connection information.

2   Route the new CNI to 3PE cables according to the port assignments in Table 18. **Do NOT attach the cables**.

Table 18
Option 81C CNI group assignments

Group	CNI slot connections	3PE faceplate connection	Cable
1	12D (Core/Net backplane)	J3	NTND14
1	12F (Core/Net backplane)	J4	NTND14
2	12 J1 (CNI-3 faceplate)	J3	NT9D89
2	12 J2 (CNI-3 faceplate)	J4	NT9D89
3	13A (Core/Net backplane)	J3	NTND14
3	13C (Core/Net backplane)	J4	NTND14
4	13D (Core/Net backplane)	J3	NTND14
4	13F (Core/Net backplane)	J4	NTND14
5	13 J1 (CNI-3 faceplate)	J3	NT9D89
5	13 J2 (CNI-3 faceplate)	J4	NT9D89
6	14A (Core/Net backplane)	J3	NTND14
6	14C (Core/Net backplane)	J4	NTND14
7	14D (Core/Net backplane)	J3	NTND14
7	14F (Core/Net backplane)	J4	NTND14

Note 1: Group 0 is hard-wired through the Core/Net module backplane; no cable is required.

Note 2: The default assignments in this table can be reconfigured with Overlay 17 (LD 17) if necessary.

Install and enable the 3PE cards

Three steps are required to install the 3PE cards:

1   Verify the 3PE card settings:

The group and shelf number of each Network module is determined by the switch settings on the 3PE card. Use the information in Table 19 to verify that the 3PE cards in the new Network modules have the correct switch and jumper settings.

This group and shelf setting is displayed on the FIJI card display.

2   Install a 3PE card in slot 1 of each new Network module. Push the latches forward to lock the card in place.

3   Faceplate *enable* each 3PE card.

Table 19
Switch and jumper settings for 3PE cards in NT8D35 Network modules

Jumper Settings									
Set Jumper RN27 at E35 to "A".									
Switch Settings									
D20 switch position:		**1**	**2**	**3**	**4**				
81, 81C (Note)		off	on	on	on				
Shelf	**Group**	D20 switch position:				**5**	**6**	**7**	**8**
0 (3PE cards connected to the a CNI in Core or Core/Net 0)	0					on	on	on	on
	1					on	on	off	on
	2					on	off	on	on
	3					on	off	off	on
	4					off	on	on	on
	5					off	on	off	on
	6					off	off	on	on
	7					off	off	off	on
1 (3PE cards connected to the a CNI in Core or Core/Net 1)	0					on	on	on	off
	1					on	on	off	off
	2					on	off	on	off
	3					on	off	off	off
	4					off	on	on	off
	5					off	on	off	off
	6					off	off	on	off
	7					off	off	off	off
Note: For option 81C systems, QPC441 vintage F or later must be used in all modules.									

Install and enable the Peripheral Signaling (Per Sig) cards

1   Install a Per Sig card into slot 4 of each new Network module. Push the latches forward to lock the card in place.

2   Faceplate *enable* the cards.

Disable and insert the FIJI cards

1   Faceplate *disable* the FIJI cards.

2   Insert the FIJI cards into slots 2 and 3 of each new Network module.

DO NOT plug the card into the backplane.

Disable and insert the Conf/TDS cards, if necessary

If Conf/TDS cards are used in the system, follow the procedures below.

1   Faceplate *disable* the Conf/TDS cards.

2   Insert a Conf/TDS card into each new Network module.

DO NOT plug the card into the backplane.

Complete upgrade preparation tasks

Follow the procedures in this section to complete the remaining upgrade preparation tasks.

Task Summary

Pre-route cables

To minimize system downtime during the upgrade, all cables should be routed before the upgrade is begun.

Review the information in "System architecture" on page 31 to determine how the cables will be routed for your system. Use the information below to plan the exact path and placement of each cable.

CAUTION

Be careful not to dislodge existing cables when routing new cables.

---

1   Label all cables at both ends.

2   Remove all module trim panels where cables will be routed.

3   Do not excessively bend or cinch the Fiber Ring cables. These cables are easily damaged. Use the Optical Cable Management Card (OCMC) to manage and protect the Fiber Ring cables. See page 40 for a description of this card.

4   Route all cables based on the descriptions and diagrams in "System architecture" on page 31.

Route the FIJI Fiber Ring cables

The Dual Ring Fiber Network is comprised of two separate Rings of NTRC48 fiber optic cable: one Ring between the FIJI cards in all Network shelf 0's and a second Ring between the FIJI cards in all Network shelf 1's.

Carefully route the NTRC48 cables before installation. Always label both ends of each cable to simplify installation, reduce confusion and assist in troubleshooting.

Route the shelf 0 fiber optic cables (ascending)

Route the NTRC48 cables between the FIJI cards in each Network shelf 0 in *ascending* order (Table 20):

> *Note:* Each end of the NTRC48xx cable is labeled "Tx" or Rx" in the factory.

1   Start with group 0, shelf 0.

2   Route a NTRC48xx FIJI Fiber Ring cable of the appropriate length from the FIJI card in **Group 0, shelf 0** to the FIJI card in **Group 1, shelf 0**.

3   To complete the Ring, route a final cable from **Group 1, shelf 0** back to **Group 0, shelf 0**.

Table 20
FIJI Ring 0 connections

Groups X - 0 are cabled in ascending order		
Group/shelf	**NTRC48 fiber cable connector**	**FIJI card connector**
0/0	P1	Tx - J1
1/0	P2	Rx - J2
1/0	P1	Tx - J1
2/0	P2	Rx - J2
2/0	P1	Tx - J1
3/0	P2	Rx - J2
3/0	P1	Tx - J1
4/0	P2	Rx - J2
4/0	P1	Tx - J1
5/0	P2	Rx - J2
5/0	P1	Tx - J1
6/0	P2	Rx - J2
6/0	P1	Tx - J1
7/0	P2	Rx - J2
7/0	P1	Tx - J1
0/0	P2	Rx - J2
Note: Groups 2 through 7 are shown for reference only.		

Route the shelf 1 fiber optic cables (descending)

Route the NTRC48 cables between the FIJI cards in each Network shelf 1 in *descending* order (Table 21).

Note: Each end of the NTRC48xx cable is labeled "Tx" or Rx" in the factory.

1   Start with the Tx (J1) port in group 0, shelf 1.

2   Route a NTRC48xx FIJI Fiber Ring cable of the appropriate length from the FIJI card in **Group 0, shelf 1** to the FIJI card in **Group 1, shelf 1**.

3   To complete the Ring, route a final cable from **Group 1, shelf 1** to **Group 0, shelf 1**.

Table 21
FIJI Ring 1 connections

Groups 0 - X are cabled in descending order		
Group/shelf	**NTRC48 fiber cable connector**	**FIJI card connector**
0/1	P1	Tx - J1
7/1	P2	Rx - J2
7/1	P1	Tx - J1
6/1	P2	Rx - J2
6/1	P1	Tx - J1
5/1	P2	Rx - J2
5/1	P1	Tx - J1
4/1	P2	Rx - J2
4/1	P1	Tx - J1
3/1	P2	Rx - J2
3/1	P1	Tx - J1
2/1	P2	Rx - J2
2/1	P1	Tx - J1
1/1	P2	Rx - J2
1/1	P1	Tx - J1
0/1	P2	Rx - J2
Note: Groups 2 through 7are shown for reference only.		

Route the Clock Controller to FIJI cables

Clock to FIJI (NTRC46) cables must be in place before the upgrade (Figure 24). **Do not connect the cables to the FIJI cards or Clock Controller cards. Route the cables only.** The cables are not connected until the actual upgrade is performed.

Route the Clock 0 to FIJI cables (FIJI end)

1   From Clock 0: Route the **P1** end of the Clock to FIJI cable (NTRC46Ax) to **Group 0, shelf 0**.

Do not connect the cable to the FIJI card.

2   From Clock 0: Route the **P2** end of the Clock to FIJI cable (NTRC46Ax) to **Group 0, shelf 1**.

Do not connect the cable to the FIJI card.

Route the Clock 1 to FIJI cables (FIJI end)

1   From Clock 1: Route the **P1** end of the Clock to FIJI cable (NTRC46Ax) to **Group 0, shelf 0**.

Do not connect the cable to the FIJI card.

2   From Clock 1: Route the **P2** end of the Clock to FIJI cable (NTRC46Ax) to **Group 0, shelf 1**.

Do not connect the cable to the FIJI card.

Figure 24
Clock Controller cable configuration

Perform a template audit

A template audit (LD 01) reviews the templates in your system. Corrupted and duplicate templates are cleaned up.

An example of the information generated during the audit is listed below.

Note: **The template audit may take an extended period of time on large systems**. Run the audit during a low traffic period.

WARNING

Do not abort this overlay until the audit is complete. If the overlay is interrupted, data will be corrupted.

LD 01   The audit begins as soon as LD 01 is entered.
TEMPLATE AUDIT
STARTING PBX TEMPLATE SCAN
TEMPLATE 0001 USER COUNT LOW   CHECKSUM OK
TEMPLATE 0002 USER COUNT HIGH   CHECKSUM OK
TEMPLATE 0003 NO USERS FOUND

STARTING SL1 TEMPLATE SCAN
TEMPLATE 0001 USER COUNT OK   CHECKSUM OK
•
•
TEMPLATE 0120 USER COUNT OK   CHECKSUM OK
TEMPLATE AUDIT COMPLETE

Backup the database

To back up the data on the system, complete the two part procedure described below:

- Perform a **data dump** to save all system memory to the hard disk.

- Perform a **BKO (unattended backup)** to save the database to a spare set of floppy disks.

Perform a data dump

1   Log into the system.

2   Load the Equipment Data Dump Program (LD 43). At the prompt, enter

    LD 43   to load the program

3   When "EDD000" appears on the terminal, enter

    EDD   to begin the data dump

4   The messages "DATADUMP COMPLETE" and "DATABASE BACKUP COMPLETE" will appear once the data dump is complete

    ****   to exit the program

CAUTION

If the data dump is not successful, do not continue; contact your technical support organization. A data dump problem must be corrected before the system is upgraded to Fiber Network.

Perform a BKO (save the database to floppies)

1   Insert floppy diskettes into BOTH floppy disk drives in each Core or Core/Net IODU/C.

Note: If the file is too large to fit on a single floppy disk, the BKO command will compress the data. If the compressed data is still too large to fit on a single disk, both floppy disks in the two IODU/C drives will be used. Be sure to insert floppy disks into BOTH IODU/C drives before the BKO backup is begun.

2   Run the BKO backup (LD 43):

    BKO   to run the backup

3   If the backup is successful, a message will state that the database backup is complete. A report will also indicate which floppy drives were used by the procedure.

4   If there are validation errors, repeat the procedure.

CAUTION

If the backup is not successful, do not continue; contact your technical support organization. Any backup problems must be corrected before the system is upgraded to Fiber Network.

---

5   Once the backup is complete, type:

    ****   to exit the program

Perform the upgrade

To complete the Option 61C to Option 81C with Fiber Network Fabric upgrade, follow the procedures listed below in sequence.

Task summary

Verify Core/Net 0 is active

1   Get the status of the CPUs. Verify that all common equipment is
enabled.

LD 135   to load the program

STAT CPU   to get the status of both Core/Nets

2   Ensure Core/Net 0 is active.

If Core/Net 1 is active, switch Core/Nets.

STAT CPU   to get the status of the Core/Nets

SCPU   to switch to Core/Net 0

****   to exit the program

3   Ensure Clock Controller 0 is active and tracking.

LD 60   to load the program

SSCK 0   to get the status of Clock 0

SSCK 1   to get the status of Clock 1

SWCK   if necessary, to switch to Clock 0

Split the Core/Nets

1   Be sure Core/Net 0 is active and Core/Net 1 is standby. You may need
to switch Cores:

STAT CPU

****   exit program

2   Verify that IODU/C 0 is active. You may need to switch IODU/Cs.

LD 137

STAT   Get the status of IODU/C

SWAP   Switch IODU/Cs if necessary

****   exit program

3   Connect a terminal to the CPSI port in Core/Net 1 to J25 of the I/O
panel at the back of the Core/Net. Be sure it is configured as follows.
The recommended baud rate is 9600, to be the same as the CPSI port.

7 data bits, 1 stop bit, Space parity, Full duplex, XON protocol

4   Place Core/Net 0 in Maintenance by setting the MAINT/NORM switch to MAINT.

5   In Core/Net 1, disable the NT6D65 Core to Network Interface (CNI) cards by setting the ENB/DIS faceplate switches to DIS.

Upgrade the Core/Net 1 software

Core/Net 1 must be *inactive* to complete these procedures. A terminal must be connected to the J25 connector on Core/Net 1 to complete this procedure. See "Connect a terminal" on page 54.

Complete the steps below to install new software in Core/Net 1.

1   Place the CP Install disk that corresponds with the installed CP card type into the IODU/C in Core/Net 1.

2   Install the CD-ROM into the CD drive:

    a   press the button on the CD-ROM drive to open the CD-ROM disk holder

    b   place the CD-ROM disk into the holder with the disk label showing

    c   use the four tabs to secure the CD-ROM drive

    d   press the button again to close the CD-ROM disk holder (don't push the holder in by hand)

3   In Core/Net 1, perform the following three steps in uninterrupted sequence:

    a   press and hold the MAN RST button on the CP card

    b   set the MAINT/NORM switch on the CP card to MAINT

    c   release the MAN RST button

A sysload will begin (cold start). Wait for the Main Menu to appear on the terminal before proceeding.

Note 1: If the CD-ROM is not in the CD drive of the IODU/C, the installation procedure will not continue. Insert the CD-ROM into the drive to continue.

Note 2: If a problem is detected during the system verification, Install stops, prints an error message, and aborts the installation. If the verification is not successful, do not continue; contact your technical support organization.

4   Press <CR> to continue.

5   Remove the CP Install Program diskette and insert the Keycode
           diskette, when prompted.

   <a>   to continue with keycode validation

   <y>   to confirm that the keycode matches the CD-ROM release

6   When the Install Menu is displayed, select the following options in
           sequence when you are prompted to do so

   <a>   to install software, CP-BOOT ROM, and IOP-ROM

   <a>   to verify that the CD-ROM is now in drive

   The Installation Status Summary screen appears that lists the
   options to be installed.

   <y>   Yes, start Installation

   <a>   Continue with Upgrade

7   Select a PSDL file to install. The PSDL file contains the loadware for
all downloadable cards in the system and loadware for M3900 series
sets.

Select one of the six psdl files

<1>   Global 10 Languages <default>

<2>   Western Europe 10 Languages

<3>   Eastern Europe 10 Languages

<4>   North America 6 Languages

<5>   Rls24 up-issue

<6>   North America 6 Languages:

The languages contained in each selection are outlined as follows:

1   English, French, German, Spanish, Swedish, Italian,
Norwegian, Brazilian, Portuguese, Finnish, Japanese
Katakana.

2   English, French, German, Spanish, Swedish, Norwegian,
Danish, Finnish, Italian, Brazilian Portuguese.

3   English, French, German, Dutch, Polish, Czech,
Hungarian, Russian, Latvian, Turkish.

4   English, Spanish, French, Brazilian Portuguese,
Japanese Katakana, German.

5   English, French, German, Spanish, Swedish, Italian,
Norwegian, Portuguese, Finnish, Japanese Katakana.

6   English, French, German, Spanish, Brazilian Portuguese,
Japanese Katakana.

8   When the ROM installation screen appears, select the following prompts in sequence:

<a>   Continue with ROM Upgrade

The following message appears:

Software Release XXXX was installed successfully on Core 1. All files were copied from CDROM to the hard disk.

Please press <CR> to continue when ready...

<a>   Continue with ROM upgrade

<a>   Yes, start Installation

<a>   Continue with ROM upgrade

When the Installation Status Summary screen appears, press <CR> when ready...

<cr>   Are you sure you want to continue with IOP ROM

<a>   to install the IOP-ROM from hard disk

<y>   Yes, start installation

<a>   to continue with ROM upgrade

The Installation Status Summary screen appears. Verify that CD to disk, disk to ROM, CP-BOOTROM, and IOP-ROM were installed.

<cr>   press return to continue

<q>   to quit (remove any diskettes from the floppy drive)

<y>   Yes, to confirm quit

<a>   to reboot the system

The system will automatically perform a sysload during which several messages will appear on the system terminal. Wait for "DONE" and then "INI" messages to be displayed before continuing.

Software installation on Core/Net 1 is complete.

Note: If the system fails to load, or system messages indicate data corruption, back out of the parallel reload process by performing the steps in "Back out of a system software upgrade" on page 79.

Enable the Core 1 CNI cards

Follow these procedures to connect and activate the Core 1 CNI ports.

Note: CNI cards can be enabled and connected on the *inactive* Core only.

1   Verify that the cables are correctly routed and labeled. See "Pre-route CNI to 3PE cables" on page 132.

2   Attach the cables to the *inactive* 3PE faceplates.

3   Attach the cables to the *inactive* CNI cards.

See Table 18, "Option 81C CNI group assignments," on page 133 for connection information.

WARNING

The backplane connector pins are easily bent. Install backplane cables with extreme caution to ensure that these pins are not damaged.

- Carefully line up the cable and press it into place.
- Never force a cable into the slot. If the cable gets stuck, remove it and try again. Damage to the backplane connector pins can make installation of CNI cables impossible.

---

4   Add CNI group:

LD 17   to load the program.

CNI *s p g*   *(slot port group)* to add a CNI group.

5   Software enable the *new* CNI port on the *inactive* Core:.

LD 135   to load the program.

ENL CNI *c s p*   *(core slot port)* to enable the card and ports.

Enable new loops in Group 1

1   Define the loops in the new group:

For example:

LD 17	to load the program
REQ	**CHG**
TYPE	**CEQU**
....	
XCT	**xxx (enter the new loop)**
	xxx
....	

2   Enable the new loops.

LD 34	to load the program
ENLX	to enable the newly defined loop
****	to exit the program

Upgrade Side 1 hardware to FIJI

Follow the procedures below in sequence:

1   Software disable the IGS/DIGS cards in Side 1 (IGS/DIGS odd-numbered cards, 1 - 19):

LD 39	to load the program
DISI IGS xx	xx is the IGS card number 1 - 19

Note: See the *X11 Maintenance* (553-3001-511)for more information on overlay 39 commands.

2   Faceplate disable the IGS/DIGS cards in Side 1.

3   Tag and disconnect the IGS/DIGS cables.

4   Remove the IGS/DIGs cards from Side 1.

Note: If you did not check the 3PE switch settings before, check the 3PE switch settings now. See "Check 3PE settings" on page 50.

5   Faceplate enable the FIJI cards.

6   Insert the FIJI cards in Side 1. **DO NOT seat the FIJI cards.**

Note: FIJI cards are installed in slots 2 and 3 of the Network modules, and slots 8 and 9 of the Core/Net modules.

Connect the shelf 1 FIJI Ring cables

To create the shelf 1 fiber optic loop, connect the FIJI cards in each Network shelf 1 in **descending** order, from Tx to Rx (Table 22).

Remove the black cap from the end of each cable before it is connected.

Note: Each end of the NTRC48 cable is labeled "Tx" or Rx" in the factory.

a   Start with Network Group 0, shelf 1.

b   Connect a NTRC48 FIJI Fiber Ring cable of the appropriate length from the Tx (J1) port of the FIJI card in **Group 0, shelf 1** to the Rx (J2) port of the FIJI card in **Group, shelf 1**.

c   To complete the Ring, connect a final cable from Tx in **Group 1, shelf 1** to Rx in **Group 0, shelf 1**.

Note: Connect the Side 1 FIJI Ring cables only.

.

Table 22
FIJI Ring 1 connections

Groups 0 - X are cabled in descending order		
Group/shelf	**NTRC48 fiber cable connector**	**FIJI card connector**
0/1	P1	Tx - J1
7/1	P2	Rx - J2
7/1	P1	Tx - J1
6/1	P2	Rx - J2
6/1	P1	Tx - J1
5/1	P2	Rx - J2
5/1	P1	Tx - J1
4/1	P2	Rx - J2
4/1	P1	Tx - J1
3/1	P2	Rx - J2
3/1	P1	Tx - J1
2/1	P2	Rx - J2
2/1	P1	Tx - J1
1/1	P2	Rx - J2
1/1	P1	Tx - J1
0/1	P2	Rx - J2
Note: Groups 2 through 7are shown for reference only.		

Turn module power off

> **WARNING**
>
> Call processing will be interrupted for approximately 30 minutes while the procedures are completed.
>
> To reduce downtime, verify that all cables are pre-routed. See "Complete upgrade preparation tasks" on page 137.

Power down the modules with the module power switch. DO NOT power down the columns at the PDU:

1   Power down Core/Net Module 0.

2   Power down Core/Net Module 1.

3   Power down all Network Modules.

Seat the Side 1 FIJI cards

The FIJI cards in side 1 can now be seated.

1   Push the faceplate latches forward to lock the cards in place.

2   Verify that the cards are faceplate *enabled*.

Seat the Side 0 FIJI cards

1   Tag and disconnect the IGS/DIGS cables.

2   Remove the IGS/DIGs cards from Side 0.

3   Insert and seat the FIJI cards in Side 0.

4   Faceplate enable the FIJI cards.

Connect the shelf 0 FIJI Ring cables

To create the shelf 0 fiber optic Ring 0, connect the FIJI cards in each Network shelf 0 in **ascending** order, from Tx to Rx ports (Table 23).

Remove the black cap from the end of each cable before it is connected.

Note: Each end of the NTRC48 cable is labeled "Tx" or Rx" in the factory.

a   Start with Group 0, shelf 0.

b   Connect a NTRC48 FIJI Fiber Ring cable of the appropriate length from the Tx (J1) port of the FIJI card in **Group 0, shelf 0** to the Rx (J2) port of the FIJI card in **Group 1, shelf 0**.

c   To complete the Ring, connect a final cable from the Tx (J1) port in **Group 1, shelf 0** back to the Rx (J2) port in **Group 0, shelf 0.**

Table 23
FIJI Ring 0 connections

Groups X - 0 are cabled in ascending order		
Group/shelf	**NTRC48 fiber cable connector**	**FIJI card connector**
0/0	P1	Tx - J1
1/0	P2	Rx - J2
1/0	P1	Tx - J1
2/0	P2	Rx - J2
2/0	P1	Tx - J1
3/0	P2	Rx - J2
3/0	P1	Tx - J1
4/0	P2	Rx - J2
4/0	P1	Tx - J1
5/0	P2	Rx - J2
5/0	P1	Tx - J1
6/0	P2	Rx - J2
6/0	P1	Tx - J1
7/0	P2	Rx - J2
7/0	P1	Tx - J1
0/0	P2	Rx - J2
Note: Groups 2 through 7 are shown for reference only.		

Connect the Group 1 FIJI to FIJI cables

1   Connect P2 of a NTRC47 FIJI to FIJI cable to J4 of the FIJI cards in each Network shelf 0, **except Group 0**.

2   Connect P1 of a NTRC47 FIJI to FIJI cable to J4 of the FIJI cards in each Network shelf 1, **except Group 0**.

Note: The FIJI cards in Group 0 do not receive a FIJI to FIJI cable.

Move Clock Controller 0

1   Faceplate disable Clock Controller 0.

2   Disconnect the cable from the faceplate connector on the Clock Controller card.

Primary and secondary Clock reference cables that are connected to the faceplate should be disconnected next and labeled.

3   Remove Clock Controller 0 from the Core/Net module.

4   Set the Clock Controller 0 switch settings (see Table 24, "Clock Controller switch settings," on page 162).

5   Install Clock Controller 0 in Network Group 1, shelf 0, slot 13.

Note: Clock Controllers may be installed in any Network Group. However, a two-group Option 81C has only two Network Modules. In this case, both Clock Controllers must be installed in Group 1. If in the future the Option 81C is upgraded to more than two Network Groups, Nortel Networks recommends that Clock Controller 0 and 1 be located in different Network Groups.

6   Reconnect the Clock 0 Reference cables.

7   Faceplate enable the Clock Controller.

Move Clock Controller 1

1   Faceplate disable Clock Controller 1.

2   Disconnect the cable from the faceplate connector on the Clock Controller card.

Primary and secondary Clock reference cables that are connected to the faceplate should be disconnected next and labeled.

3   Remove Clock Controller 1 from the Core/Net module.

4   Set the Clock Controller 0 switch settings (see Table 24, "Clock Controller switch settings," on page 162).

5   Install Clock Controller 1 in Network Group 1, shelf 1, slot 13.

Note: Clock Controllers may be installed in any Network Group. However, a two-group Option 81C has only two Network Modules. In this case, both Clock Controllers must be installed in Group 1. If in the future the Option 81C is upgraded to more than two Network Groups, Nortel Networks recommends that Clock Controller 0 and 1 be located in different Network Groups.

6   Reconnect the Clock 0 Reference cables.

7   Faceplate enable the Clock Controller.

Table 24
Clock Controller switch settings

Option 81C switch settings must be used to enable Clock Hunt software. DO NOT use the Option 81 switch settings.											
SW1				**SW2**				**SW4**			
1	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
on	off	off	off	off	off	off	off	**	on	*	*

*Cable length between the J3 faceplate connectors:		
0–4.3 m (0–14 ft.)	off	off
4.6–6.1 m (15–20 ft.)	off	on
6.4–10.1 m (21–33 ft.)	on	off
10.4–15.2 m (34–50 ft.)	on	on

*   If there is only one Clock Controller card in the system, set to OFF. If there are two Clock Controller cards, determine the total cable length between the J3 connectors (no single cable can exceed 25 ft.) and set these two switch positions for this cable length, as shown above. The maximum total (combined) length is 50 ft. Set the switches on both cards to the same settings.

**   Set to ON for Clock Controller 0. Set to OFF for Clock Controller 1.

Note: For FNF based-systems, the total clock path length is equal to the length of the NTRC49 cable used to connect between the two clock controller cards.

Cable the Clock Controllers

Connect the cables to the Clock Controllers as shown in Figure 25:

1   **Connect the Clock to Clock cable:**

    a   Connect P1 of the NTRC49 cable to port J3 of Clock Controller 0.

    b   Connect P2 of the NTRC49 cable to port J3 of Clock Controller 1.

2   **Connect the Clock 0 to FIJI cable:**

    a   Connect P1 of the NTRC46 cable from Clock 0 to **J4** of the FIJI card in Group 0, **shelf 0**.

    b   Connect P2 of the NTRC46 cable from Clock 0 to **J4** of the FIJI card in Group 0, **shelf 1**.

3   **Connect the Clock 1 to FIJI cable:**

    a   Connect P1 of the NTRC46 cable from Clock 1 to **J3** of the FIJI card in Group 0, **shelf 0.**

    b   Connect P2 of the NTRC46 cable from Clock 1 to **J3** of the FIJI card in Group 0, **shelf 1**.

Figure 25
Clock Controller cable configuration

Prepare Core cards for power-up

1   Verify that a terminal is connected to the J25 I/O panel connector on Core/Net 1. See "Connect a terminal" on page 54.

2   Verify that both CP cards in the Core modules are in MAINT position.

3   Unseat the CP card in Core/Net 0.

4   Faceplate *disable* the CNI cards in Core/NET 0.

5   Faceplate *disable* the IODU/C in Core/Net 0.

6   Unseat the IODU/C in Core/Net 0.

7   Faceplate *enable* the CNI cards in Core/Net 1.

Restore power

Restore power in the order below:

1   Restore power to Core/Net 1.

2   Restore power to Core/Net 0.

3   Restore power to the Network modules.

4   Wait for the system to load/init.

5   Re-initialize Core/Net 1.

Note: Re-initializing Core/Net 1 stops the midnight routines from running.

Verify the Fiber Rings

See the *X11 Maintenance* (553-3001-511) for more information on
Overlay 39 commands. Also see "Appendix A: Fiber Network Fabric
Application Notes" on page 207 for additional information on FIJI cards.

1   Check that Fiber Ring 1 operates correctly:

LD 39	to load the program
STAT RING 1	to check the status of Ring 1

2   Reset the Rings:

RSET	to reset the Rings and prepare them for redundancy
RSTR	to restore both Rings to Normal state

3   Check that the Rings operate correctly:

STAT RING 0	to check the status of Ring 0
STAT RING 1	to check the status of Ring 1

4   If any Ring problems occur, correct them now.

STAT ALRM <X> <Y>	to check the alarm status of individual FIJI cards or all FIJI cards. See *X11 Administration* (553-3001-311) for more information.

5   Verify that call processing operates correctly: this includes, but is not
limited to the following:

- Check for dial tone.
- Make internal, external, and network calls.
- Check attendant console activity.
- Check DID trunks.
- Check any auxiliary processors.

Enable the Peripheral Signaling (Per Sig) card

1   Enable the Per Sig card in Group 1:

LD 32	to load the program
ENPS x (slot)	to enable the Peripheral Signalling card
****	to exit the program

For example:

ENPS 12	to enable slot 12 (Group 6)
ENPS 13	to enable slot 13 (Group 6)

See Table 18, "Option 81C CNI group assignments," on page 133 for slot and Group assignments.

Enable the Conference/TDS card

1   Plug in the Conf/TDS card in Group 1. Push the latches forward to lock the card in place.

2   Faceplate enable the Conf/TDS cards.

3   Enable the Conf/TDS cards:

LD 34	to load the program
ENLX x (loop)	to enable the Conf/TDS card
****	to exit the program

Upgrade Core/Net 0 software

1 Seat the IODU/C. Verify the status on the display (A1).

2 Faceplate enable the IODU/C.

3 Insert the CP Install Program diskette into IODU/C floppy drive in Core/Net 0.

4 Verify that the CP card in Core/Net 0 is in MAINT mode.

5 Seat the CP card.

6 Connect a terminal to the J25 port on the I/O panel in Core/Net 0.

7 Press the MAN RST button on the CP card in Core/Net 0 to reboot the system and start the Software Installation Tool. (The terminal displays SYSLOAD messages during file loading. When SYSLOAD is completed, the NT logo appears.)

8 Initiate the installation by selecting the following prompt from the menu:

<cr> <u>> to Install menu

9 Remove the CP Install Program diskette and insert the Keycode diskette, when prompted.

<a> continue with keycode validation

10 Remove the Keycode diskette and re-insert the CP Install Program diskette into the IODU/C floppy drive in Core/Net/Net 0.

11 When the main menu appears, select the following option to copy the software form Core//Net 1 to Core/Net/Net 0 and exit the Main Menu:

<o> to copy system software from the other Core/Net

12 When the software is installed successfully, press **<CR>** to install CP-software from the hard disk to Flash EEPROM, and install CP-BOOT ROM. Follow the screen directions until the Main Menu returns.

13   From the Main Menu, select the prompts in the following sequence to install the IOP-ROM:

\<f\>	to install IOP-ROM only
\<cr\> \<a\>	to install the IOP-ROM from hard disk
\<y\>	Yes, start installation
\<cr\> \<a\>	to continue with ROM upgrade

Follow the screen directions until the Main Menu returns.

14   From the Main Menu, select the following options in sequence to copy the customer database from Core/Net/Net 1 to Core/Net/Net 0.:

\<d\>	to go to the Database menu
\<d\>	to copy the database from Core/Net 1 to Core/Net 0
\<y\>	to confirm the installation status summary
\<a\>	to confirm database copy

15   From the Main Menu, select the following options to quit and reload the system:

\<q\>	to quit
\<y\>	to confirm quit

16   Reboot the Core/Net/Net 0 CPU:

\<a\>	to reboot the system

Wait for "DONE" and then "INI" messages to be displayed before continuing.

Enable the Core 0 CNI cards

Follow these procedures to connect and activate the Core 0 CNI ports.

Note: CNI cards can be enabled and connected on the *inactive* Core only.

1   Verify that the cables are correctly routed and labeled. See "Pre-route CNI to 3PE cables" on page 132.

2   Attach the cables to the *inactive* 3PE faceplates.

3   Attach the cables to the *inactive* CNI cards.

See Table 18, "Option 81C CNI group assignments," on page 133 for connection information.

WARNING

The backplane connector pins are easily bent. Install backplane cables with extreme caution to ensure that these pins are not damaged.

• Carefully line up the cable and press it into place.

• Never force a cable into the slot. If the cable gets stuck, remove it and try again. Damage to the backplane connector pins can make installation of CNI cables impossible.

---

4   Add CNI group:

LD 17   to load the program.

CNI *s p g*   *(slot port group)* to add a CNI group.

5   Software enable the *new* CNI port on the *inactive* Core:.

LD 135   to load the program.

ENL CNI *c s p*   *(core slot port)* to enable the card and ports.

Complete the upgrade

Follow the procedures below in sequence to complete the upgrade. If an error occurs at any time, resolve the problem before continuing.

Task Summary

1   "Exit split mode" on page 171.

2   "Synchronize the hard disks" on page 172.

3   "Verify Core/Net redundancy" on page 172.

4   "Test Core/Net 1 and Core/Net 0" on page 173.

5   "Switch the Clocks" on page 174.

6   "Check Fiber Ring status" on page 174.

7   "Backup the database" on page 175.

Exit split mode

1   Perform the following in uninterrupted sequence:

- Press and release the MAN RST button in Core/Net 0.

- When SYS700 messages appears on LCD display on Core/Net 0, set the MAINT/NORM switch to NORM in Core/Net 0.

In 60 seconds, the LCD will display and confirm your processes with:

RUNNING ROM OS

ENTERING CP VOTE

2   An HWI534 message indicates the start of memory synchronization. In 10 minutes, an HWI533 message on Core/Net 1 CSPI or SDI terminal indicates the memory synchronization is complete.

Note: The HWI messages are displayed on the TTY device connected to the active core.

3   Once the synchronization is complete, enable the CNI cards in Core/Net 0 (set the ENB/DIS faceplate switch to ENB).

4   Check the status of the CPU and CNI cards in Core/Net 1:

LD 135

STAT CPU	Get status of CPU and memory
STAT CNI	Get status of CNI cards

5   Enable the CNI ports if necessary:

ENL CNI *c s p*   Enable CNI on *core, slot, port*

6   In Core/Net 1, set the MAINT/NORM switch on the CP card to NORM.

Synchronize the hard disks

1   Load LD 137 and synchronize the hard disks. Synchronization may take up to seven minutes. To be sure that the contents of IODU/C 1 are copied to IODU/C 0, verify that IODU/C 0 is disabled.

LD 137

STAT	Get the status of the IODU/C and redundancy
SYNC	Enter "Yes" to synchronize disks. Wait until the memory synchronization successfully completes before continuing.
TEST CMDU	Performs hard and floppy disk test.

2   Get the status of the IODU/Cs and be sure IODU/C 0 is active. Switch if necessary.

STAT	Get the status of IODU/C and redundancy
SWAP	Switch CMDU if necessary
STAT CMDU	Get the status of the IODU/Cs. Be sure the same IODU/C and CPU are active.
****	exit program

Verify Core/Net redundancy

To verify redundancy, switch the active Cores back and forth to verify that both sides operate without problems.

LD 135

SCPU	to switch the active Core/Net
SCPU	to switch the active Core/Net again

Test Core/Net 1 and Core/Net 0

1   Perform a redundancy sanity test using the following sequence:

LD 135

STAT CNI	Get status of CNI cards
STAT CPU	Get status of CPU and memory
TEST CPU	Test the inactive Core/Net/Net
TEST CNI c s	Test each inactive CNI card

2   Switch Core/Nets and test the other side (Core/Net 0)

SCPU	Switch Core/Nets
TEST CPU	Test the inactive Core/Net/Net
TEST CNI c s	Test each inactive CNI card

Note: Testing the CP and CNI cards and synchronizing memory can take up to 20 minutes for each test. When the CP test is complete, the CP the memory is automatically synchronized.

3   Clear the display and minor alarms on both Core/Nets.

CDSP	Clear the displays on the Core/Nets
CMAJ	Clear major alarms
CMIN ALL	Clear minor alarms

4   Get the status of the Core/Nets, CNIs, and memory.

STAT CPU	Get the status of both Core/Nets
STAT CNI	Get the status of all configured CNIs and memory

Note: You may need to execute the STAT CNI command twice before receiving a response from the system.

****	exit program

Switch the Clocks

1   Verify that the clock controller is assigned to the *active* Core.

LD 60	to lead the program
SSCK *x*	to get the status of the clock controllers (*x* is "0" or "1" for Clock 0 or Clock 1.
SWCK	to switch the Clock if necessary
****	exit program

2   Verify that the Clock Controllers are switching correctly:.

SWCK	to switch the Clock
SWCK	to switch the Clock again

Check Fiber Ring status

See the *X11 Maintenance* (553-3001-511) for more information on overlay 39 commands. Also see "Appendix A: Fiber Network Fabric Application Notes" on page 207 for additional information on FIJI cards.

1   Check that the Fiber Rings operate correctly:

LD 39	to load the program
STAT RING 0	to check the status of Ring 0
STAT RING 1	to check the status of Ring 1

2   If necessary, restore the Rings to Normal State:

RSTR	to restore both Rings to Normal state

3   Check that the Rings operate correctly:

STAT RING 0	to check the status of Ring 0
STAT RING 1	to check the status of Ring 1

4   Check the status of the FIJI alarms

STAT ALRM	to query the alarm condition for all FIJI cards in all Network Groups

Backup the database

1   Log into the system.

2   Load the Equipment Data Dump Program (LD 43). At the prompt, enter

LD 43   to load the program

3   When "EDD000" appears on the terminal, enter

EDD   to begin the data dump

4   When "DATADUMP COMPLETE" and "DATABASE BACKUP COMPLETE" appears on the terminal, enter

****   to exit the program

CAUTION

If the data dump is not successful, do not continue; contact your technical support organization. A data dump problem must be corrected before the upgrade is complete.

Add a Network Group

Content list

The following are the topics in this section:

Reference list

The following are the references in this section:

- *System Installation Procedures* (553-3001-210)

- "System architecture" on page 31

The procedures in this section are for systems that have already been upgraded to Fiber Network. Follow the procedures in order.

Task summary

1 "Prepare for installation" on page 179.

    a "Verify removal of 3PE cards from Option 81 Core shelves".

    b "Add the new Network modules".

    c "Add CNI cards if necessary".

    d "Pre-route CNI to 3PE cables".

    e "Pre-route the FIJI cables".

2 "Install cards in the Network modules" on page 191.

    a "Install and enable the 3PE cards".

    b "Install and enable the Peripheral Signaling (Per Sig) cards".

    c "Disable and insert the FIJI cards".

    d "Disable and insert the Conf/TDS cards, if necessary".

3 "Enable the CNI cards" on page 193.

4 "Enable the FIJI cards" on page 194.

5 "Connect the new groups to the Fiber Network" on page 196.

Prepare for installation

Complete these steps before installation of the new Network Groups. Follow the steps in order.

Task summary

1   "Verify removal of 3PE cards from Option 81 Core shelves" (below).

2   "Add the new Network modules" (below).

3   "Add CNI cards if necessary" on page 180.

4   "Pre-route CNI to 3PE cables" on page 181.

5   "Pre-route the FIJI cables" on page 184.

Verify removal of 3PE cards from Option 81 Core shelves

In Option 81 systems, the 3PE card must be removed from the Core shelves. This card should have been removed during the upgrade procedure (page 94).

If this card was not removed during the upgrade process, remove it now.

Note: This procedure is for Option 81 systems with Core shelves. This procedure is NOT necessary for Option 81C systems with Core/Net shelves.

To remove the 3PE card from both Cores:

1   In Core 1, hardware disable the 3PE card.

2   In Core 0, hardware disable the 3PE card.

3   Remove the 3PE faceplate cable.

4   Remove the 3PE cards from Core 1 and 0.

Add the new Network modules

The new Network modules must be connected to the system. Follow the instructions in *System Installation Procedures* (553-3001-210) to correctly configure the power and System Monitor connections.

Add CNI cards if necessary

CNI-3 cards are added only if additional ports are required. CNI-3 cards can only be installed in an *inactive* Core module.

Port assignments

The default port assignments for CNI cards in Option 81 and 81C systems are shown in Table 25 and Table 26. These assignments can be modified in overlay 17 (LD 17) if necessary.

When a two port CNI card is replaced with a three port CNI-3 card, the original port assignments for the backplane connections remain the same.

Install the CNI-3 cards

1   On the *inactive* Core, software disable the CNI slots where the new cards will be installed:.

    LD 135   to load the program.

    DIS CNI *c s p*   *(core slot port)* to disable the card and ports.

2   Faceplate disable the CNI cards to be replaced on the *inactive* Core.

3   Remove the CNI cards to be replaced, if necessary.

4   Install the new CNI-3 cards. The CNI-3 cards must be faceplate disabled before installation.

5   Faceplate enable all CNI cards on the *inactive* Core.

Add a CNI group

1   Add CNI group(s).

    LD 17   to load the program.

    CNI *s p g*   *(slot port group)* to add a CNI group.

2   Software enable the *original* CNI ports on the *inactive* Core. Do NOT activate the CNI ports for the new Network Groups:.

    LD 135   to load the program.

    ENL CNI *c s p*   *(core slot port)* to enable the card and ports.

3   Switch active Cores:

    SCPU   *t*o switch Cores

4   Follow steps 2 through 8 to install the CNI cards on the second Core. Be sure to make the second Core *inactive*.

5   Verify the status of the CNI cards:

    STAT CNI   to check the status of the cards and ports.

Pre-route CNI to 3PE cables

The CNI backplane ports are connected to the 3PE cards with two NTND14 CNI to 3PE cables per port. The third port connects from the CNI-3 faceplate to the 3PE card with two NT9D89 cables.

When a CNI card is upgraded to a CNI-3 card, the original NTND14 backplane cables are left in place; only the NT9D89 CNI-3 to 3PE faceplate cables must be added.

1   Label the cables with Network Group, CNI port and connection information.

2   Route the new CNI to 3PE cables according to the port assignments in Table 25 and Table 26. **Do NOT attach the cables**.

.

Table 25
Option 81 CNI group assignments

Group	CNI connection	3PE faceplate connection	Cable
5	8A (Core backplane)	J3	NTND14
5	8C (Core backplane)	J4	NTND14
0	8D (Core backplane)	J3	NTND14
0	8F (Core backplane)	J4	NTND14
1	9A (Core backplane)	J3	NTND14
1	9C (Core backplane)	J4	NTND14
2	9D (Core backplane)	J3	NTND14
2	9F (Core backplane)	J4	NTND14
3	10A (Core backplane)	J3	NTND14
3	10C (Core backplane)	J4	NTND14
4	10D (Core backplane)	J3	NTND14
4	10F (Core backplane)	J4	NTND14
6	9 J1 (CNI-3 faceplate)	J3	NT9D89
6	9 J2 (CNI-3 faceplate)	J4	NT9D89
7	10 J1 (CNI-3 faceplate)	J3	NT9D89
7	10 J2 (CNI-3 faceplate)	J4	NT9D89
Note: The default assignments in this table can be reconfigured with Overlay 17 (LD 17) if necessary.			

Table 26
Option 81C CNI group assignments

Group	CNI slot connections	3PE faceplate connection	Cable
1	12D (Core/Net backplane)	J3	NTND14
1	12F (Core/Net backplane)	J4	NTND14
2	12 J1 (CNI-3 faceplate)	J3	NT9D89
2	12 J2 (CNI-3 faceplate)	J4	NT9D89
3	13A (Core/Net backplane)	J3	NTND14
3	13C (Core/Net backplane)	J4	NTND14
4	13D (Core/Net backplane)	J3	NTND14
4	13F (Core/Net backplane)	J4	NTND14
5	13 J1 (CNI-3 faceplate)	J3	NT9D89
5	13 J2 (CNI-3 faceplate)	J4	NT9D89
6	14A (Core/Net backplane)	J3	NTND14
6	14C (Core/Net backplane)	J4	NTND14
7	14D (Core/Net backplane)	J3	NTND14
7	14F (Core/Net backplane)	J4	NTND14

Note 1: Group 0 is hard-wired through the Core/Net module backplane; no cable is required.

Note 2: The default assignments in this table can be reconfigured with Overlay 17 (LD 17) if necessary.
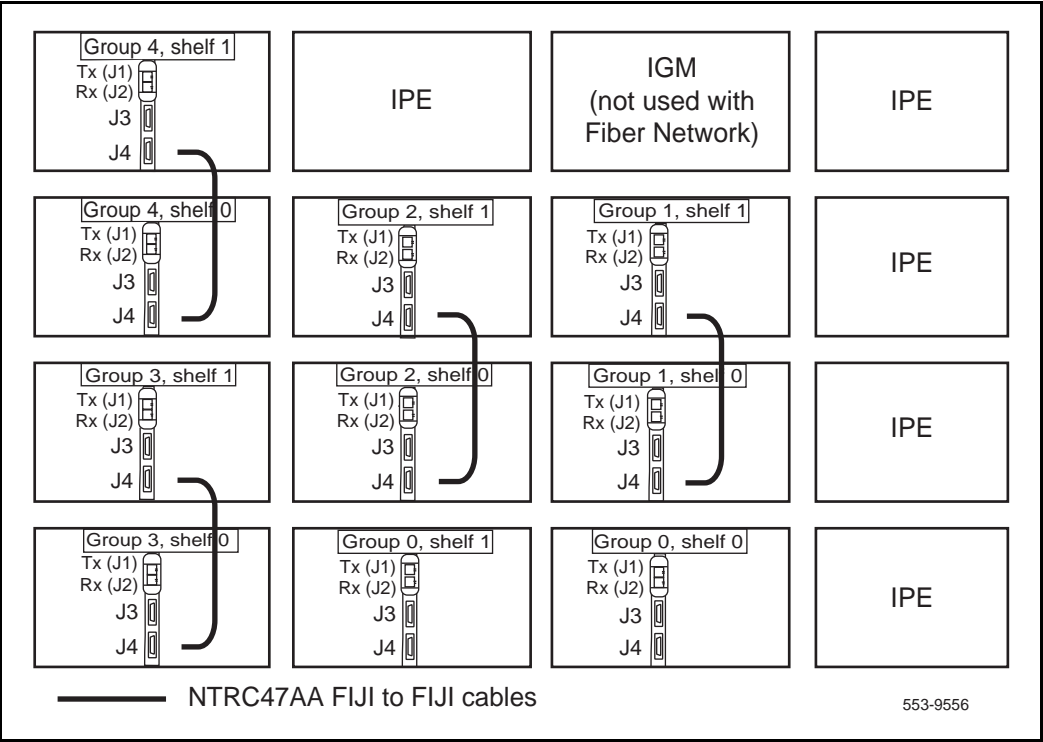
Pre-route the FIJI cables

To minimize system downtime during the upgrade, all FIJI cables must be in place before the new Network Groups are added. See "System architecture" on page 31 for an overview of FIJI cable configuration.

Route FIJI to FIJI cables

Route a NTRC47AA cable between the FIJI cards in shelf 0 and shelf 1 of each new Network Group.

Figure 26
Route FIJI to FIJI cables (Option 81C example)

NTRC47AA FIJI to FIJI cables

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Label and route the shelf 0 fiber optic cables (ascending)

Route the NTRC48 cables between the FIJI cards in each new Network shelf 0 in *ascending* order (Figure 27):

CAUTION

Do not excessively bend or cinch the Fiber Ring cables. These cables are easily damaged. Use the Optical Cable Management Card (OCMC) to manage and protect the Fiber Ring cables. See page 40 for a description of this card.

---

1   Start with shelf 0 in the current highest Network Group.

2   Label each cable on both sides with the appropriate connection information from Table 27.

3   Route a NTRC48 FIJI Fiber Ring cable of the appropriate length from the FIJI card in **shelf 0 of the current highest Network Group,** to the FIJI card in shelf **0 of the new Network Group**.

4   If more than one Network Group is to be added, route a second NTRC48 cable of the appropriate length to **shelf 0 of the second new group**.

5   Continue to route NTRC48 cable of the appropriate length in *ascending* order between shelf 0 of each new Network Group.

6   To complete the Ring, route a final cable from the **highest number group** back to **Group 0, shelf 0**.
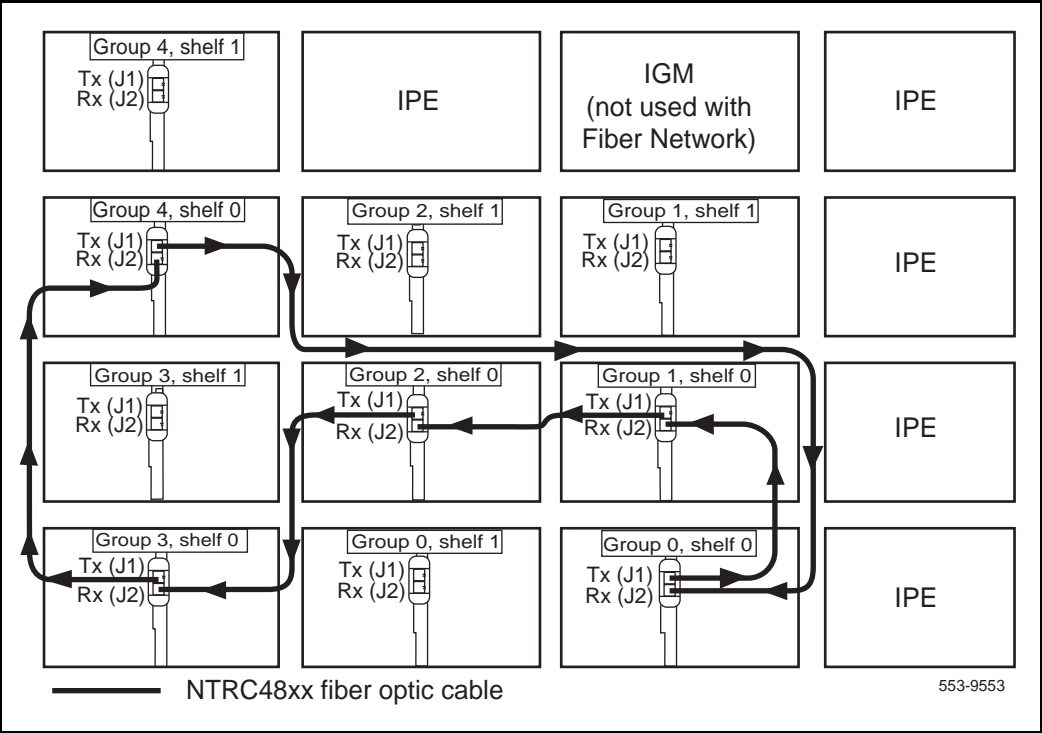
Figure 27
Shelf 0 *ascending* fiber optic Ring (example)

Group 4, shelf 1 Tx (J1) Rx (J2)	IPE	IGM (not used with Fiber Network)	IPE
Group 4, shelf 0 Tx (J1) Rx (J2)	Group 2, shelf 1 Tx (J1) Rx (J2)	Group 1, shelf 1 Tx (J1) Rx (J2)	IPE
Group 3, shelf 1 Tx (J1) Rx (J2)	Group 2, shelf 0 Tx (J1) Rx (J2)	Group 1, shelf 0 Tx (J1) Rx (J2)	IPE
Group 3, shelf 0 Tx (J1) Rx (J2)	Group 0, shelf 1 Tx (J1) Rx (J2)	Group 0, shelf 0 Tx (J1) Rx (J2)	IPE

NTRC48xx fiber optic cable

553-9553

Table 27
FIJI Ring 0 connections

Groups X - 0 are cabled in ascending order		
Group/shelf	NTRC48 fiber cable connector	FIJI card connector
0/0	P1	Tx - J1
1/0	P2	Rx - J2
1/0	P1	Tx - J1
2/0	P2	Rx - J2
2/0	P1	Tx - J1
3/0	P2	Rx - J2
3/0	P1	Tx - J1
4/0	P2	Rx - J2
4/0	P1	Tx - J1
5/0	P2	Rx - J2
5/0	P1	Tx - J1
6/0	P2	Rx - J2
6/0	P1	Tx - J1
7/0	P2	Rx - J2
7/0	P1	Tx - J1
0/0	P2	Rx - J2

Label and route the shelf 1 fiber optic cables (descending)

Route the NTRC48 cables between the FIJI cards in each Network shelf 1 in *descending* order (Figure 28).

CAUTION

Do not excessively bend or cinch the Fiber Ring cables. These cables are easily damaged. Use the Optical Cable Management Card (OCMC) to manage and protect the Fiber Ring cables. See page 40 for a description of this card.

Note: Each end of the NTRC48 cable is labeled "Tx" or Rx" in the factory.

1   Start with Group 0, shelf 1.

2   Label each cable on both sides with the appropriate connection information from Table 28.

3   Route a NTRC48 FIJI Fiber Ring cable of the appropriate length from **shelf 1** of the FIJI card in **Group 0,** to the FIJI card in the **new highest Network Group, shelf 1**.

4   Route a NTRC48 cable from the FIJI card in the **new highest Network Group, shelf 1** to the FIJI card in the **second highest Network Group, shelf 1**.

5   Continue to route NTRC48 FIJI Fiber Ring cables of the appropriate lengths between shelf 1 of each new Network Group. Route these cables in *descending* order of Network Groups.

6   Route a final cable to the current highest Network Group, shelf 1.

Figure 28
Shelf 1 descending fiber optic Ring (example)

Group 4, shelf 1
Tx (J1)
Rx (J2)

IPE

IGM
(not used with
Fiber Network)

IPE

Group 4, shelf 0

Group 2, shelf 1
Tx (J1)
Rx (J2)

Group 1, shelf 1
Tx (J1)
Rx (J2)

IPE

Group 3, shelf 1
Tx (J1)
Rx (J2)

Group 2, shelf 0

Group 1, shelf 0

IPE

Group 3, shelf 0

Group 0, shelf 1
Tx (J1)
Rx (J2)

Group 0, shelf 0

IPE

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——— NTRC48xx fiber optic cable
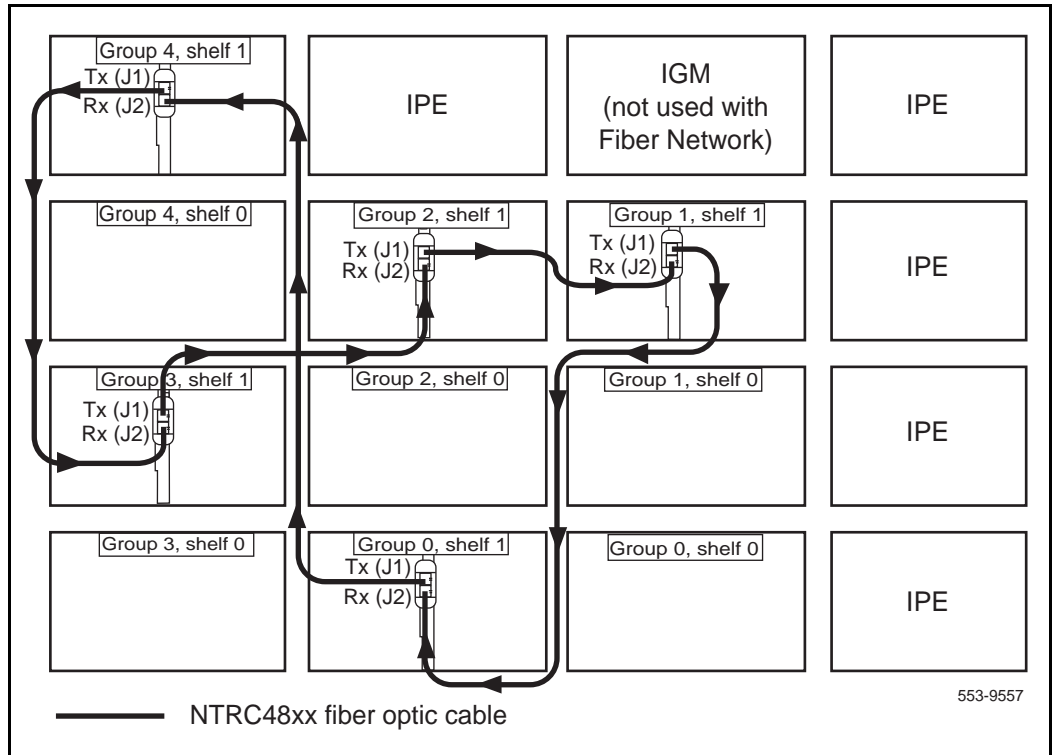
Table 28
FIJI Ring 1 connections

Groups 0 - X are cabled in descending order		
Group/shelf	NTRC48 fiber cable connector	FIJI card connector
0/1	P1	Tx - J1
7/1	P2	Rx - J2
7/1	P1	Tx - J1
6/1	P2	Rx - J2
6/1	P1	Tx - J1
5/1	P2	Rx - J2
5/1	P1	Tx - J1
4/1	P2	Rx - J2
4/1	P1	Tx - J1
3/1	P2	Rx - J2
3/1	P1	Tx - J1
2/1	P2	Rx - J2
2/1	P1	Tx - J1
1/1	P2	Rx - J2
1/1	P1	Tx - J1
0/1	P2	Rx - J2

Install cards in the Network modules

Network cards must be installed in the new Network modules as described below. Each card must be installed and enabled or disabled as indicated.

1   "Install and enable the 3PE cards" (below).

2   "Install and enable the Peripheral Signaling (Per Sig) cards" on page 193.

3   "Disable and insert the FIJI cards" on page 193.

4   "Disable and insert the Conf/TDS cards, if necessary" on page 193.

Install and enable the 3PE cards

Three steps are required to install the 3PE cards:

1   Verify the 3PE card settings:

The group and shelf number of each Network module is determined by the switch settings on the 3PE card. Use the information in Table 29 to verify that the 3PE cards in the new Network modules have the correct switch and jumper settings.

This group and shelf setting is displayed on the FIJI card display.

2   Install a 3PE card in slot 1 of each new Network module. Push the latches forward to lock the card in place.

3   Attach the cables to the *inactive* 3PE faceplates.

4   Faceplate *enable* each 3PE card.

Table 29
Switch and jumper settings for 3PE cards in NT8D35 Network modules

Jumper Settings									
Set Jumper RN27 at E35 to "A".									
Switch Settings									
D20 switch position:		**1**	**2**	**3**	**4**				
81, 81C (Note)		off	on	on	on				
Shelf	**Group**	D20 switch position:				**5**	**6**	**7**	**8**
0 (3PE cards connected to the a CNI in Core or Core/Net 0)	0					on	on	on	on
	1					on	on	off	on
	2					on	off	on	on
	3					on	off	off	on
	4					off	on	on	on
	5					off	on	off	on
	6					off	off	on	on
	7					off	off	off	on
1 (3PE cards connected to the a CNI in Core or Core/Net 1)	0					on	on	on	off
	1					on	on	off	off
	2					on	off	on	off
	3					on	off	off	off
	4					off	on	on	off
	5					off	on	off	off
	6					off	off	on	off
	7					off	off	off	off
Note: For option 81C systems, QPC441 vintage F or later must be used in all modules.									

Install and enable the Peripheral Signaling (Per Sig) cards

1   Install a Per Sig card into slot 4 of each new Network module. Push the latches forward to lock the card in place.

2   Faceplate *enable* the cards.

Disable and insert the FIJI cards

1   Faceplate *disable* the FIJI cards.

2   Insert the FIJI cards into slots 2 and 3 of each new Network module.

DO NOT plug the card into the backplane.

Disable and insert the Conf/TDS cards, if necessary

If Conf/TDS cards are used in the system, follow the procedures below.

1   Faceplate *disable* the Conf/TDS cards.

2   Insert a Conf/TDS card into each new Network module.

DO NOT plug the card into the backplane.

Enable the CNI cards

Note: If you are adding more than one Network Group, it is recommended that you add one group at a time in software. Follow all the remaining procedures in this chapter to complete the addition of one group before starting to add another group.

If new CNI-3 cards are required, they must be installed before the cards are enabled. See "Add CNI cards if necessary" on page 180 to install the cards.

Note: CNI cards can be enabled and connected on the *inactive* Core only.

Follow these procedures to connect and activate the new CNI ports:

1   Verify that the cables are correctly routed, labeled, and connected to the 3PE cards. See "Pre-route CNI to 3PE cables" on page 181.

2   Attach the cables to the *inactive* CNI cards.

See Table 25, "Option 81 CNI group assignments," on page 182 and Table 26, "Option 81C CNI group assignments," on page 183 for connection information.

WARNING

The backplane connector pins are easily bent. Install backplane cables with extreme caution to ensure that these pins are not damaged.

- Carefully line up the cable and press it into place.
- Never force a cable into the slot. If the cable gets stuck, remove it and try again. Damage to the backplane connector pins can make installation of CNI cables impossible.

---

3   Software enable the *new* CNI ports on the *inactive* Core:.

LD 135   to load the program.
ENL CNI *c s p*   *(core slot port)* to enable the card and ports.

4   Switch active Cores:

SCPU   *t*o switch Cores

5   Repeat steps 1 through 5 to attach the CNI to 3PE cables on the second Core side. Make sure that the second Core is now *inactive*.

Enable the FIJI cards

The FIJI cards are placed but not inserted and connected in slots 2 and 3 of each new Network shelf. Follow the procedures below to enable the cards:

1   Verify that the faceplate switch on each new FIJI card is *disabled.*

2   Plug the FIJI cards into the Network module backplane. Push the latches forward to lock the card in place.

3   Enable the faceplate switch.

Note: The card will not enable until a loop in that Network shelf is defined as described below.

4   Wait for the FIJI LED panel to display the Network Group and shelf of the card. This information is based on the 3PE switch settings. Verify that this information matches the printed label on the outside of the module case.

Note 1: The time required for the FIJI cards to display group and shelf information will vary.

Note 2: For 3PE switch settings, see "Install and enable the 3PE cards" on page 191.

5   Define the loops in the new group:

For example:

LD 17	to load the program
REQ	**CHG**
TYPE	**CEQU**
....	
XCT	**xxx (enter the new loop)**
	xxx
....	

6   Enable the new loops.

LD 34	to load the program
ENLX	to enable the newly defined loop
****	to exit the program

7   Wait for the FIJI card to enable. The time to enable will vary.

Connect the new groups to the Fiber Network

> **WARNING**
>
> The Fiber Network Rings must be in Normal mode to complete this procedure. Resolve any faults and restore the Rings to Normal mode before Network Groups are added.

See "Appendix A: Fiber Network Fabric Application Notes" on page 207 for additional information on FIJI cards.

1   In each new Network Group, connect a NTRC47AA cable from J4 to J4 of the FIJI cards (see Figure 29).

Figure 29
FIJI shelf 0 to FIJI shelf 1 connections (Option 81C example)
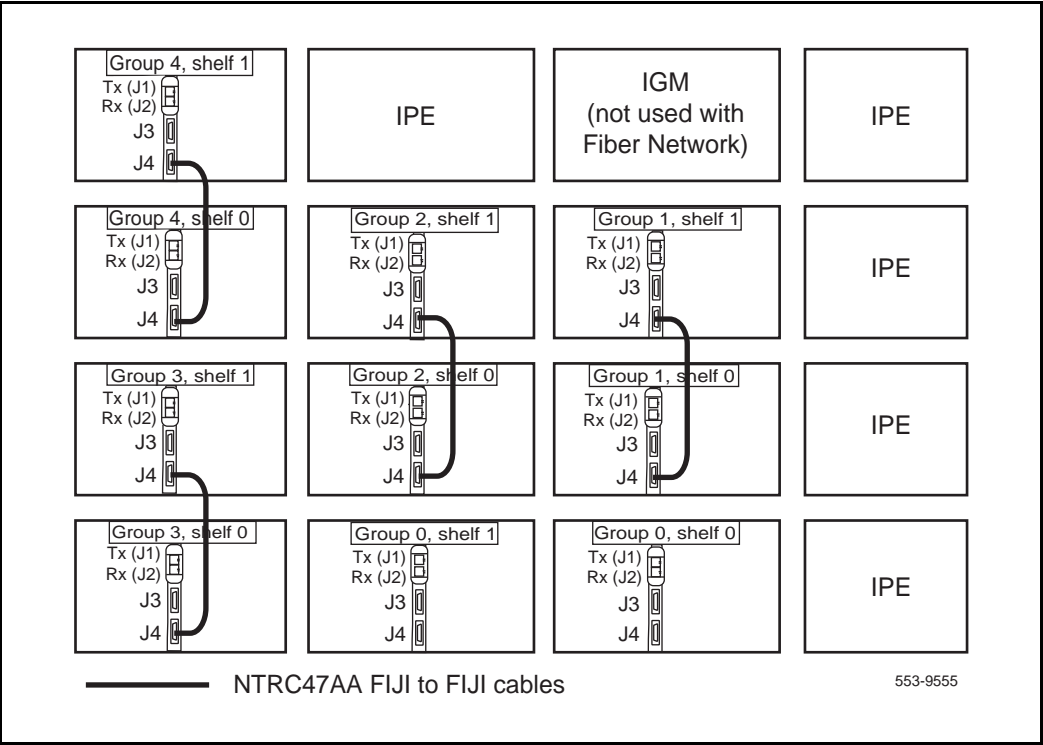
2   Stat the Rings.

LD 39	to load the program
STAT RING 0	Ring state should be NORMAL STATE
STAT RING 1	Ring state should be NORMAL STATE
****	to exit the program

3   Verify that Clock 1is *active*. Switch clocks if necessary.

LD 60	to load the program
SSCK 0	to check if Clock 0 is active or standby
SWCK	to switch clocks if necessary
****	to exit the program

4   Verify that all cables are labeled and in place. Failure to pre-route cables will result in increased downtime and possible system failure. See "Pre-route the FIJI cables" on page 184 if the cables are not already routed.

5   Break Ring 0 by removing the cable from the current highest Network Group P1 to Group P2. The Rings will switch to SURVIVAL STATE once the Ring is broken.

6   Attach the new Ring 0 cables in the correct configuration.

7   Make Clock 0 active.

LD 60	to load the program
SSCK 0	to check if Clock 1 is active or standby
SWCK	to switch to clock 0
****	to exit the program

8   Break Ring 1 by removing the cable from Group 0 P1 to the current highest Network Group P2.

9   Attach the new Shelf 1 Fiber Ring cables in the correct configuration.

10   Verify that the Rings are in Survival State and FIJI cards are enabled:

LD 39	to load the program
STAT RING 0	to check the status of Ring 0
STAT RING 1	to check the status of Ring 1

Note: The readout will specify the state of the Rings and which FIJI cards are enabled or disabled.

11   Reset the Rings:

LD 39	to load the program
RSET	to reset the Rings
RSTR	to restore the Rings

12   Check that the Rings operate correctly:

LD 39	to load the program
STAT RING 0	to check the status of Ring 0
STAT RING 1	to check the status of Ring 1

Note 1: Each Ring should now be in one of three States: None, Full or Half. The Rings should NOT be in Survival state.

Note 2: All FIJI cards should be enabled.

13   Enable the Per Sig card:

LD 32	to load the program
ENPS x (slot)	to enable the Peripheral Signalling card
****	to exit the program

For example:

ENPS 12	to enable slot 12 (Group 6)
ENPS 13	to enable slot 13 (Group 6)

See Table 25, "Option 81 CNI group assignments," on page 182 or Table 26, "Option 81C CNI group assignments," on page 183 for slot and Group assignments.

14   Plug in the Conf/TDS cards. Push the latches forward to lock the card in place.

15   Faceplate enable the Conf/TDS cards.

16   Enable the Conf/TDS cards:

LD 34	to load the program
ENLX x (loop)	to enable the Conf/TDS card
****	to exit the program

17   Add additional Network cards as required.

The upgrade procedure is complete. The FIJI Ring States should be in Half mode. Verify that phone calls can be made in the new group.

Replace equipment

Content list

The following are the topics in this section:

Reference list

The following are the references in this section:

- *X11 Maintenance* (553-3001-511)

NTRB33 Fiber Junctor Interface card

Use this procedure to replace a Fiber Junctor Interface (FIJI) card.

See the *X11 Maintenance* (553-3001-511) for a description of all maintenance commands and interpretation of system messages.

> **WARNING**
> Module covers are *not* hinged; do not let go of the cover. Lift the cover away from the module and set it out of your work area.

Remove the FIJI card

Before a FIJI card is disabled and removed, the Ring that contains the card must be made inactive. The Clock Controller on that Ring must also be inactive. See "Appendix A: Fiber Network Fabric Application Notes" on page 207 for additional information on FIJI cards.

Follow the procedures below in order to remove and replace a FIJI card:

1   Switch traffic to the Ring that DOES NOT contain the FIJI card:

LD 39

ARCV OFF   to turn off Auto Recovery

SWRG x   to switch the Ring that DOES NOT contain the FIJI card to the Drives Full Ring state. "x" is the Ring that will be switched to Drives Full.

When the opposite Ring is switched to Drives Full, the Ring containing the malfunctioning FIJI will be in the Drives None state. The Drives Full Ring will operate all call switching. The Drives Non Ring will be inactive.

STAT RING x   to check the status of the Ring. Verify that the Ring containing the FIJI card to be replaced is in the "Drives None" state.

****   to exit

2   Switch the Clock, if necessary.

   Note: The Clock Controller on the Ring that contains the faulty FIJI card must be inactive:

   LD 60
   SSCK x   to check the status of the Clock Controller. "x" is the Clock 0 or Clock 1.
   SWCK   to switch the active Clock, if necessary
   ****   to exit

3   Software disable the FIJI card:

   LD 39
   DIS FIJI xx   "xx" is the FIJI group and shelf number, which is displayed on the FIJI front panel.

4   Set the ENB/DIS switch on the FIJI card to DIS.

CAUTION

To avoid interrupting service, set ENB/DIS switches to DIS before disconnecting or connecting cables.

---

5   Tag and disconnect cables to the card you are removing.

6   Unhook the locking devices on the card; pull it out of the card cage.

Install the new FIJI card

1   Set the ENB/DIS switch to DIS on the replacement card.

2   Insert the replacement card into the vacated slot and hook the locking devices.

3   Connect cables to the replacement card.

4   Set the ENB/DIS switch to ENB on the replacement card.

5   Software enable and test the FIJI in LD 39:

   ENL FIJI x y   xx is the FIJI group and shelf number, which is displayed on the FIJI front panel. A delay of up to 2 minutes may be required.

   STAT RING x   to check the status of the Ring. Verify that the new FIJI card is enabled

   A system response indicates when the process is complete.

   If a problem occurs, a FIJI system message is generated and the red LED lights on the FIJI card.

6   Reset the Rings to return the to the "Drives Half" state:

   ARCV ON   to turn on Auto Recovery

   RSET   to reset the rings to Drives Half (normal state).

7   If the procedure is successful, exit LD 39:

   ****   to exit the program

8   Test the FIJI cards:

   ****   to exit the program

   Tag defective equipment with a description of the problem and package it for return to a repair center.

NTRB34 Core Network Interface 3 (CNI-3) card

Move the CNI-3 card to a new slot

Before replacing a Core to Network Interface 3 (CNI-3) card, you can test it in an unused CNI slot (in case, for example, there is a bent pin on the backplane). If the card works correctly in the new slot, you can leave it there.

To move the CNI-3 card to an unused slot:

1   Ensure the associated CPU is inactive. Switch CPUs, if required:

LD 135
SCPU   to switch CPU

2   Set the NORM/MAINT switch to MAINT on the *active* CP card.

3   Software disable the CNI-3 card:

DIS CNI c s   "c" is the CPU (0 or 1), "s" is the card slot
****   exit LD 135

4   Software configure the new slot:

LD 17
EXT x 3PE   "x" is the number (0–4) of the associated 3PE
                       card(s)
CNI s p x   delete the group(s) associated slot
CNI s p g   add group(s) to new slot
****   exit LD 17
LD 43
EDD   datadump the new configuration
****   exit LD 43

5   Insert the CNI-3 card in the new slot. Move the cables to the shrouds on the backplane to the connectors for the new slot.

6   Enable the CNI-3 card and switch the CP cards.

LD 135
ENL CNI c s   to enable the CNI-3 card
SCPU   to switch CPs
****   to exit the program

Replace the CNI-3 card

1   Ensure the associated CPU is inactive. Switch CPUs, if required:

LD 135
SCPU   to switch CPUs
****   to exit

2   Set the NORM/MAINT switch to MAINT on the *active* CP card.

3   Set the ENB/DIS switch to DIS on the CNI-3 card you are replacing.

4   Unhook the locking devices on the card, and remove it from the card cage.

5   Set the ENB/DIS switch to DIS on the replacement card.

6   Insert the replacement card into the vacated slot and hook the locking devices.

7   Set the ENB/DIS switch to ENB on the replacement card.

8   Set the NORM/MAINT switch to NORM on the *active* CP card.

9   Software enable and test the CNI-3 card and its configured ports.

ENL CNI c s   to enable the card
TEST CNI c s   to test the card
SCPU   to switch CPUs
****   to exit

Note: Due to the need to reestablish memory shadowing and contents, the test command may take a minute or more depending on memory size. The LED on the CNI card flashes as the test runs.

If there is a problem, a CCED system message is generated (LEDs on the CNI cards stay lit on the inactive Core).

Note: If the network loop corresponding to a CNI port is not enabled, the LED for that port may not go out.

10   Tag defective equipment with a description of the problem and package it for return to a repair center.

Appendix A: Fiber Network Fabric Application Notes

This appendix provides information about FIJI card loadware and explains how to perform automatic and manual loadware download procedures.

FIJI card loadware version

The FIJI card loadware will be minimum loadware version 01310011 for release 25.10. All new FIJI cards shipped after April 17, 2000 include this loadware version. Verify the firmware release by issuing the STAT FIJI x y FULL command in LD 39.

Automatic FIJI loadware download

If there is a version change on any of the FIJIs, the automatic download will be triggered by INIT. It will start about two minutes after INIT. The automatic download will occur on up to four FIJI cards (on the same ring) in parallel. The automated download is almost four times faster than the manual method.

Manual FIJI loadware download

If for any reason the automatic download does not complete successfully, you can perform a manual download of the FIJI firmware. If the automatic download is not successful, a FIJI006 (Ring Recovery Failure) message will be displayed. This message indicates that the download has stopped and that the ring being downloaded was unable to complete. If this occurs, issue the STAT FIJI x y FULL command in LD 39 to verify that the firmware version matches on all FIJI cards. If the firmware version does not match, proceed with the manual download process as described below.

There are two ways to manually download FIJI card loadware:

1   download to an individual card

2   download to an entire ring

> *Note:*   A FIJI card cannot be upgraded while the ring that the FIJI card is in carries traffic. You must move all traffic to the other ring before any download can be done to an individual card or a whole ring.

Following either download method will cause the FIJI cards to be upgraded one at a time. It takes approximately 15 minutes to upgrade one FIJI card. Downloading to an entire ring causes each FIJI card in the ring to be upgraded in sequence one at a time. For a four-group ring, it would take approximately one hour. An eight-group ring would take approximately two hours.

The total amount of time to manually download all 16 FIJI cards on an eight-group system (both rings) would be approximately four hours.

Download one FIJI card in Overlay 39

1   ARCV OFF.

2   SWRG s (s the other ring).

3   STAT SCG s

4   If clock active on side s go to next step, otherwise, SCLK.

5   DIS FIJI x y (x-group#, y-ring#).

6   ENL FIJI x y [FDL] (FDL is needed only if there's no version change).

7   ARCV ON.

Download an entire ring in Overlay 39

1   ARCV OFF.

2   SWRG x ("x" the other ring).

3   STAT SCG x

4   If clock active on side "x" go to next step, otherwise, SCLK

5   DIS RING y

6   ENL RING y (will not download if there's no version change).

Note: This step could take approximately two hours to complete.

7   To download other ring repeat steps 2-6 when S is current ring.

8   ARCV ON.

Download to both rings in Overlay 39

1   ARCV OFF.

2   SWRG 1 (Ring status will now be NONE/FULL).

3   STAT SCG 1.

4   If clock active on side 1 go to next step, otherwise, SCLK. The active clock must be on side 1, while side 0 is being upgraded.

5   DIS RING 0.

6   ENL RING 0 (will not download if there is no version change).

Note: This step could take approximately two hours to complete.

7   SWRG 0 (Ring status will now be FULL/NONE).

8   SCLK.

9   DIS RING 1.

10   ENL RING 1(will not download if there's no version change).

Note: This step could take approximately two hours to complete.

11   ARCV ON (within one minute Ring status will go to HALF/HALF).

New Information Messages for FIJI Automated Download

The following new messages related to the automated download of firmware to the FIJI card for Fiber Network Fabric have been introduced with Release 25.

FIJI061 RING r: STARTING AUTOMATIC DOWNLOAD

FIJI062 FIJI g s: ENABLING FIJI CARD

FIJI063 FIJI g s: DOWNLOAD DONE. TESTING CARD

FIJI064 FIJI g s: SELFTEST DONE

where:

r = ring number (0 or 1)

g = group (0 - 7)

s = side (0 or 1)

Note: These messages are for information only, and are not alarms.

List of Terms

3PE

Three-Port Extender card QPC441F. Extends Meridian CPU data, address, and control signals between the CNI and the network. Use one per Core/Net or Network module.

3-Port Extender

see 3PE.

BKO (LD 43)

The BKO command in LD 43 performs an unattended backup. Unattended backup saves the system database to two floppies on both IODU/C drives in a redundant system. A technician does not need to be present during these backups. They can be scheduled for a midnight routine or performed by remote operation. The archived files are compressed if the database is larger than the capacity of a single floppy (1.44 MB). If a single floppy is still not large enough to contain even the compressed data, both floppy drives are used on redundant systems to provide a total capacity of 2.88MB. Note: the second floppy is used only if the compressed data base does not fit on a single floppy.

Call Processor Pentium II (CP PII)

A circuit card having a Pentium II chip that provides logic and control functions. Executes Call Processing software, interfaces with the IPB, provides on-board main and cache memory, a system time-of-day clock, and a pair of serial data ports for maintenance. Cabling the CP cards allows memory shadowing and dual CPU operation. One is required per Core/Net module.

Clock Controller

Clock Controller card in all Meridian 1 options; QPC471H. Synchronizes Meridian 1 network to an external source clock and generates and transmits timing signals to the CPU for administering voice and data signals.

CC

see Clock Controller

Clock Hunt software

Feature of X11 release 25 software that automatically locates Clock Controller cards in the system.

cCNI card

Compact Core to Network interface card. Same function as the CNI card (below). Used only with CP PII Option 81C systems.

CNI card

Core to Network Interface card NT6D65. Provides interface between IPB and the network shelves, and also between the Call Processor Card and the 3PE cards on the Network shelf. Each CNI card provides two ports. Each port connects to one 3PE card.

CNI-3 card

Same functions as the CNI card. The CNI-3 card provides three ports to connect to three 3PE cards. The first two ports connect via the backplane. The third port connect at the CNI-3 card faceplate.

Core Network Interface (CNI) card

see CNI card

Core Network Interface 3 (CNI-3) card

see CNI-3 card

CP card

Call Processor, NT6D66. A circuit card having a Motorola 68030 chip that provides logic and control functions to options 51C, 61C, 81, and 81C. Executes Call Processing software, interfaces with the IPB, provides on-board main and cache memory, a system time-of-day clock, and a pair of serial data ports for maintenance. Cabling the CP cards allows memory

shadowing and dual CPU operation. Available in 24 MB and 48 MB versions. Combines the CPU, CPU/IF, CMA, Memory, and ROM card functions in some systems. One is required per Core or Core/Network module; each CP occupies two card slots.

CP PII

see Call Processor Pentium II

SDI devices

Serial Data Interface devices. For Meridian 1, the SDI hardware communicates with the CPU through the network addresses C000 to C3C0.

Data dump

A data dump copies and stores the entire contents of memory to a file on a disk, a printer, or another magnetic storage medium.

DRAM

Dynamic Random Access Memory. DRAM is a type of semi-conductor memory that is characterized by its high density (smaller packages for a given amount of memory). It typically has slower access time as compared with SRAM and requires external memory refresh circuitry. Used by some Meridian 1 processors for data store.

FIJI card

Fiber Junctor Interface card for use with Fiber Network. The FIJI cards (one per Network shelf) provides the switching capability between Network groups. These cards are connected with fiber optic cable to form the Dual Ring Fiber Network.

Flash memory

Electrically erasable memory that is not affected by power disruptions.

IGS card

InterGroup Switch card QPC412, for options 71, 81, and 81C. Provides speech path and space switching between network groups in multigroup systems. These cards must be removed during an upgrade to Fiber Network.

InterGroup Module

Used in options 71, 81, and 81C; NT8D36; One per system; houses the QPC417 Junctor Board. This module is not used with Fiber Network.

Loop

A service-type network loop that consists of a group of 32 timeslots shared by line and trunk cards or a bi-directional path between network equipment and peripheral equipment (telephones). Listed in the X11 software database as TERM, TERD, or TERQ. More generally, a loop is a pair of wires from a central office to a subscriber's telephone, or an ordinary closed circuit (i.e., the "go" and "return" conductors of an electric circuit). Also, the connection between a customer's terminal and a switching center, a bi-directional path provided by the network for speech transmission.

PDU

Power Distribution Unit for Meridian 1 systems. A panel located in the pedestal that distributes power to the module and top cap. Contains a circuit breaker and power distribution components optimized for single-module operation. Quantity: one per system.

Port

1   In data communication, the part of a data processor that is dedicated to a single data channel for the purpose of receiving data from or transmitting data to, one or more external remote devices.

2   A functional unit of a node through which data can enter or leave a data network.

3   An access point (for example, on a circuit card) for data entry or exit.

4   A line or trunk access point (entrance or exit) for a computer, multiplexer, device, or network, such as a peripheral device containing a jack for connecting a cable or fiber cable. At a port, signals also may be supplied, extracted, or observed. A port is an interface between a process or program and a communications or transmission facility. Finally, a port is another term for a TN (Terminal Number).

Terminal

An input/output device linked to a processor. Typically contains a screen and a keyboard.

Timeslot

Pertains to a multiplexing system. A defined, recognizable period of time (cyclic time interval) during which eight digital bits of voice or data at a time is passed between phones over a shared transmission path. Each telephone or

trunk in use requires a time slot so that each eight-bit portion of its voice, video, or data signals can be interspersed with those from other messages for sequential transmission. Each time slot may be called a speech path, although it may carry data or be left blank.

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