Meridian 1

XN, XT

Network Module expansion

Document Number: 553-2201-156
Document Release: Standard 5.00
Date: July 1995

© 1993, 1995
All rights reserved

Printed in the United States of America

Information is subject to change without notice. Northern Telecom reserves the right to make changes in design or components as progress in engineering and manufacturing may warrant. This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC rules.

SL-1 and Meridian 1 are trademarks of Northern Telecom.

Revision history

January 31, 1993

Standard, release 1.0.

April 1, 1993

Standard, release 2.0.

April 1, 1994

Standard, release 3.0. Reissued to include editorial changes.

December 1994

Standard, release 4.0. Reissued to include editorial changes and indexing. Due to the extent of the changes, revision bars are not used.

July 1995

Standard, release 5.00. Reissued to include minor edits.

Contents

General description 1
Product description 2
Engineering considerations 3
Hardware requirements 6

Installation procedures 9
Installing the Network Module column 9
Connecting the column system monitor 9
Installing network group cables 12

List of figures

Figure 1
A comparison of network expansion schemes 2

Figure 2
System monitor cross-connections at the MDF 11

Figure 3
Network expansion cabling path 13

Figure 4
QCA55 cabinet top view—connector housing locations 14

Figure 5
Location for ferrite ring on QCAD110 cables 17

Figure 6
I/O panel orientation and connector mounting 18

Figure 7
NT8D76AD and NTND28BA connections to the module I/O panel . 20

List of tables

Table 1
Ordering—module method 6

Table 2
Ordering—AS1078 Network Group Expansion Interface Assembly 7

Table 3
Contents of the NTND33BA Network Group Expansion Interface Kit 7

Table 4
Ordering—individual items 8

Table 5
System monitor switch settings for Network Module expansion 10

Table 6
Intercabinet cables—Group 3 and Group 4 19

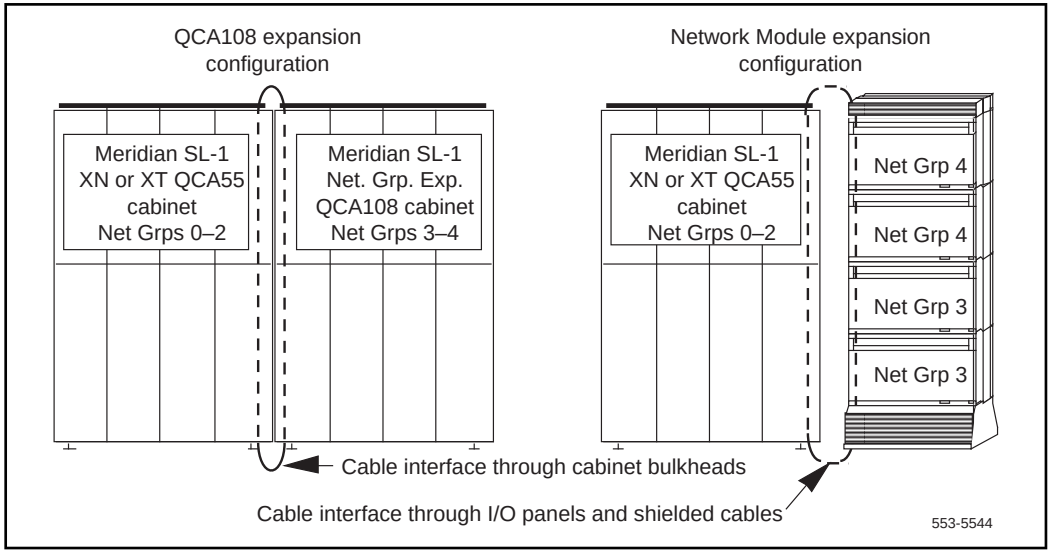
General description

Meridian SL-1 XN and XT systems are multi-group systems— they can support from one to five network groups (numbered Group 0 through Group 4). If the common equipment (CE) for the XN or XT system is housed in QCA55 cabinets, you can add the AS1078 Network Group Expansion Interface Assembly to the system. This assembly allows you to house one or two of the network groups in Meridian 1 Network Modules, in place of a QCA108 Network/PE Cabinet (see Figure 1). There is still a maximum of five groups per system.

Connections to network circuit cards housed in Network Modules are electrically identical to connections to any network group within a QCA55 or QCA108 cabinet. In accordance with FCC regulations for electromagnetic and radio frequency interference (EMI/RFI), shielded cables are used between the QCA55 cabinet and the Network Modules.

Each network group housed in the Network Module requires one Network Group Expansion Interface Assembly to extend segmented bus extender (SBE) and junctor connections between the existing cabinet and the modules.

Figure 1
A comparison of network expansion schemes



Product description

One AS1078 Network Group Expansion Interface Assembly is required for each network group housed in Network Modules (maximum of two groups). Each AS1078 assembly includes the following four major components:

— Sixteen cables attach to a connector housing mounted on the input/output (I/O) panel on the top of the QCA55 cabinet:

- Eight of these cables (four NTND29AA CPU Interface Cables and four NTND30AA Junctor to I/O Cables) connect to the SBE and junctor cards in the QCA55 cabinet.
- Eight NTND28BA Intercabinet Cables connect the QCA55 I/O panel and the I/O panels in the rear of the Network Modules.

— Two module I/O panels, with pre-mounted connectors, replace existing I/O panels in the Network Modules. One panel is replaced in each of the modules for the network group (for network shelf 0 and network shelf 1).

— Two ferrite rings are installed on the existing QCAD110 cables near the faceplate of the QPC411 System Clock Generator (SCG) or QPC471 Clock Controller (CC) Cards in the XN or XT central processing unit (CPU) shelves.

— Eight NT8D76AD cables connect the new I/O panels in the Network Modules to the faceplates of the QPC441 3-Port Extender (3PE) and QPC412 InterGroup Switch (IGS) Cards in the modules.

Engineering considerations

The following engineering guidelines provide an overview of the new hardware components, switchroom space, and general cabling requirements needed to expand network groups into the Network Modules:

— System software is unaffected by placing network groups in Network Modules. No software changes are needed unless you add additional lines (terminal numbers) to a system operating currently with X11 release 15 and later, or if new software features are required as part of the network group expansion task.

— The Network Group Expansion Interface Assembly is designed specifically for the QCA55 cabinet used to house XN or XT common equipment. If the existing XN or XT system is housed in any other type of cabinet, the use of this assembly is not supported. For systems with other cabinet types, you must transfer all of the existing common and network equipment to Meridian 1 modules.

— Grounding requirements for AC- or DC-powered modules follow the requirements and recommendations outlined in the Meridian 1 Northern Telecom Publications (NTPs).

— The existing DC power source can supply power to DC-powered Network Modules, assuming sufficient amperage exists. If required, you can add additional DC rectifiers in accordance with the existing power plant requirements and specifications.

— If the existing system is not operated on battery backup, you can use AC-powered Network Modules. You must supply and engineer additional AC-power outlets according to Meridian 1 power and grounding recommendations.

— Alarm connections between the QCA55 cabinet and the Network Modules are detailed in the installation procedures in this document. If the existing system is operating on X11 release 15 or later, additional software controlled and monitored capabilities are possible through the system monitor in the pedestal of the Meridian 1 column.

— You must arrange Network Modules correctly in the column (refer to Figure 1). Group 3 must be at the bottom of the column, with network shelf 0 below shelf 1. If Group 4 is equipped, the two modules go on top of the Group 3 modules, with network shelf 0 below shelf 1.

— The cable routing arrangement for connections from the common equipment in the QCA55 cabinet and the circuit cards in the Network Modules consists of “intracabinet” and “intercabinet” cables.

- Cables at the QCA55 cabinet:
  Intracabinet cables connect the faceplate of a card or the junctor board to a connector housing installed on the top of the cabinet. The intracabinet cables connect with the intercabinet cables at the connector housing.

  Each network group in Network Modules requires one I/O opening at the top of the QCA55 cabinet for a connector housing. If an opening is not available, relocate the ground window assembly on the cabinet and rewire it to provide the opening.

- Intercabinet cables:
  Connections between the QCA55 cabinet and the Network Modules require specially designed shielded cables (NTND28BA). Because this cable is 13 ft long, you must place the Network Modules next to the QCA55 cabinet.

  You should place the Network Modules within 6 in. of the side panel (either side) of the QCA55 cabinet. If this is not possible, perform an engineering study to determine if you can route the shielded cables differently and still conform to the 13 ft limit. With modified cable routing, it is possible to extend the distance between the cabinet and the modules a maximum of 36 in.

  The use of cable extenders is not supported for EMI and signaling reasons. You may have to modify existing cable support facilities to accommodate the total number of modules you are adding. Some engineering of this requirement is needed before installation.

- Cables at the Network Modules:
  The module end of the intercabinet cable connects to the I/O panel at the rear of the Network Modules. From this point, the intercabinet cables are connected to the intracabinet cables that are routed to the faceplates of circuit cards in the Network Modules.

  You must replace one of the factory installed I/O panels with an I/O panel provided with the Network Group Expansion Interface Assembly. Replacing the factory installed I/O panel with a new one reduces by half the total quantity of I/O connections possible from each Network Module.

— If any of the network shelves in the QCA55 cabinet are used exclusively for Primary Rate Interface (PRI) or Digital Trunk Interface (DTI) cards, these groups are considered network groups and are part of the maximum of five groups, even though there are no common equipment connections. If you encounter these conditions and you need more traffic loops in the system, you can move the DTI/PRI equipment into additional Network Modules that are not connected to the common equipment in the QCA55 cabinet.

Hardware requirements

Table 1 lists the order codes and quantities for the hardware required to add network groups in Network Modules. The table is divided by network group (Group 3 or Group 4) and the type of power input used (AC or DC power). Based on customer requirements, you must also order any circuit cards required in the Network Modules, such as the following:

— conference cards

— tone and digit switch (TDS) cards

— network cards

— serial data interface (SDI) cards

Table 3 lists the contents of the AS1078 Network Group Expansion Interface Assembly package; Table 3 lists the contents of the NTND33BA Network Group Expansion Interface Kit, which is part of the AS1078 package. Table 4 lists items you can order separately to use as spares.

Table 1
Ordering—module method

Order code	Description	Network Group 3 —quantity		Network Group 4 —quantity	
		AC	DC	AC	DC
AS1078	Network Group Expansion Interface Assembly	1	1	1	1
AS1006A	Network Group Assembly AC	1		1	
AS1006D	Network Group Assembly DC		1		1
AS1081A	Pedestal/Top Cap Assembly AC	1		1	
AS1081D	Pedestal/Top Cap Assembly DC		1		1
P0699851	Top Cap Egress Panel	1	1		
NTND21AA	Side Panel Kit	4	4	4	4

Table 2
Ordering—AS1078 Network Group Expansion Interface Assembly

Order code	Quantity	Description
see Note	1	System installation and maintenance guide (NTP)
see Note	1	XN, XT Network Module expansion (NTP)
NT8D76AD	8	InterGroup Switch to InterGroup Monitor Cable (6 ft)
NTND33BA	1	Network Group Expansion Interface Kit (see Table 3)

Note: These order codes are subject to change. The most current version will be included when the assembly is shipped.

Table 3
Contents of the NTND33BA Network Group Expansion Interface Kit

Order code	Quantity	Description
A0360683	16	50-Pin Connectors
A0376837	2	Ferrite Ring with Clamp
NTND28BA	8	Intercabinet Cable (13 ft)
NTND29AA	4	CPU Interface Cable (6 ft)
NTND30AA	4	Junctor to I/O Cable (6 ft)
P0610791	16	Self-Tapping Screw
P0633701	8	Cable Tie
P0637212	8	50-Pin Connector Cover Plates
P0660436	1	Connector Housing
P0699726	2	Universal Module I/O Panel
P0738865	1	Bracket, Connector Housing
P0738866	1	Cable Identification Label Kit
P0738867	1	Label, Connector Housing
P097R189	3	Machine Head Screw

Table 4
Ordering—individual items

Order code	Description
NT8D76AD	InterGroup Switch to InterGroup Monitor Cable (6 ft)
NTND28BA	Intercabinet Cable (13 ft)
NTND29AA	CPU Interface Cable (6 ft)
NTND30AA	Junctor to I/O Cable (6 ft)

Installation procedures

Installing the Network Module column

1. Position the Meridian 1 column within 6 in. of the QCA55 cabinet.
2. Follow all applicable procedures in *Meridian 1 system installation procedures* (553-3001-210) to install the modules and to connect ground and power cabling. However, do not power-up the column at this point.

Connecting the column system monitor

CAUTION

To avoid service interruptions, exercise extreme care while working on or in an in-service QCA55 cabinet.

1. Verify that the alarm and power failure transfer cables (P10 and PFJ5, respectively) are extended from the QCA55 cabinet and terminated at the main distribution frame (MDF). If necessary, for XT systems see NTP 553-2411-210 (DP1402), and for XN systems see 553-2231-210 (DP1402).
2. Remove the grill on the rear of the pedestal.

3 Remove the NT8D22 System Monitor from the pedestal. Set the option switches on the system monitor to operate as slave unit 1 (see Table 5).

Table 5
System monitor switch settings for Network Module expansion

Switch	1	2	3	4	5	6	7	8
SW1	on	off	*	**	off	off	on	off
SW2	off	off	on	on	on	on	on	off
SW3	off	off	off	off				

*Set to ON for a DC-powered system; set to off for an AC-powered system.

**Set to ON to enable the power failure transfer unit (PFTU), if equipped, during over-temperature condition. Set to OFF to disable PFTU during over-temperature condition.

4 Reinstall the system monitor in the rear of the pedestal.

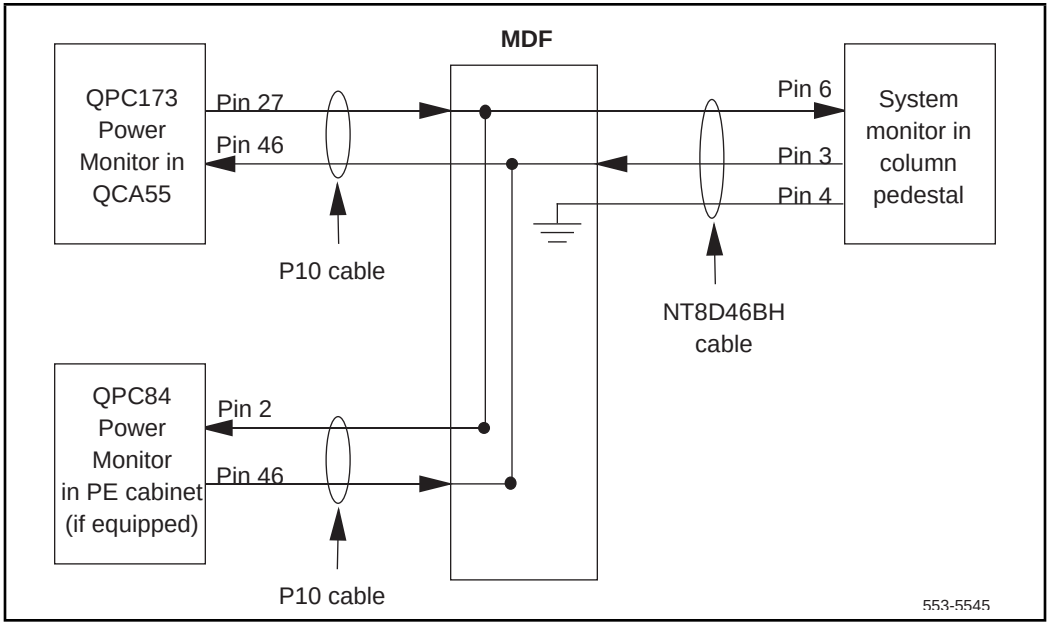
5 Connect the NT8D46BH (or DH or EH) cable from connector J3 on the system monitor to the MDF.

6 Cross connect the NT8D46BH cable to the P10 cable as follows (see Figure 2):

- Pin 6 (blue/red wire) of the NT8D46BH cable must terminate to Pin 27 of the P10 cable.
- Pin 3 (green/white wire) of the NT8D46BH cable must terminate to Pin 46 of the P10 cable.
- Pin 4 (brown/white wire) of the NT8D46BH cable must terminate to MDF return (ground).

7 Reinstall the grill on the rear of the pedestal.

Figure 2
System monitor cross-connections at the MDF



Installing network group cables

This procedure includes steps for installing cable connections for Network Groups 3 and 4 (see Figure 3 for end-to-end cabling paths). Use the following guidelines to install the connector housing(s).

> ***Note:*** For all cables, the quantity required depends on the number of groups (one or two) that you are installing.

— One connector housing is required for each network group in Network Modules. The position for each connector housing depends on available openings (cover plates) on the top of the QCA55 cabinet. The preferred location for each connector housing is shown in Figure 4.

— If all four cover plates at the front of the cabinet are already equipped with connector housings, you can use the cover plates at the rear of the cabinet, provided that there is no ground window assembly installed. If a ground window assembly is installed, consolidate the front connections into one connector housing so an additional opening can be made available. If this is not possible, relocate and rewire the ground window assembly.

— Do not secure the connector housing to the cabinet I/O panel until you have attached all NTND29AA and NTND30AA cables to the inside of the connector housing.

Figure 3
Network expansion cabling path

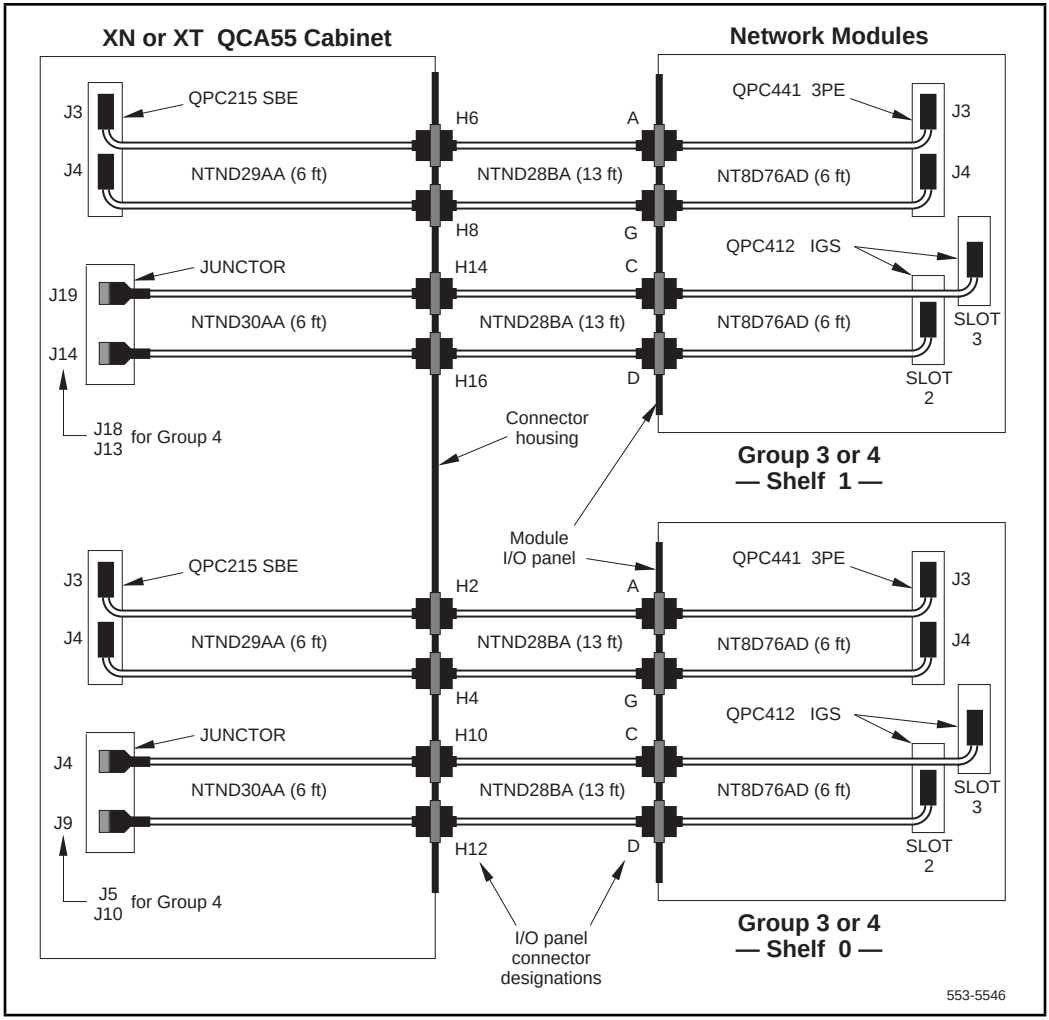
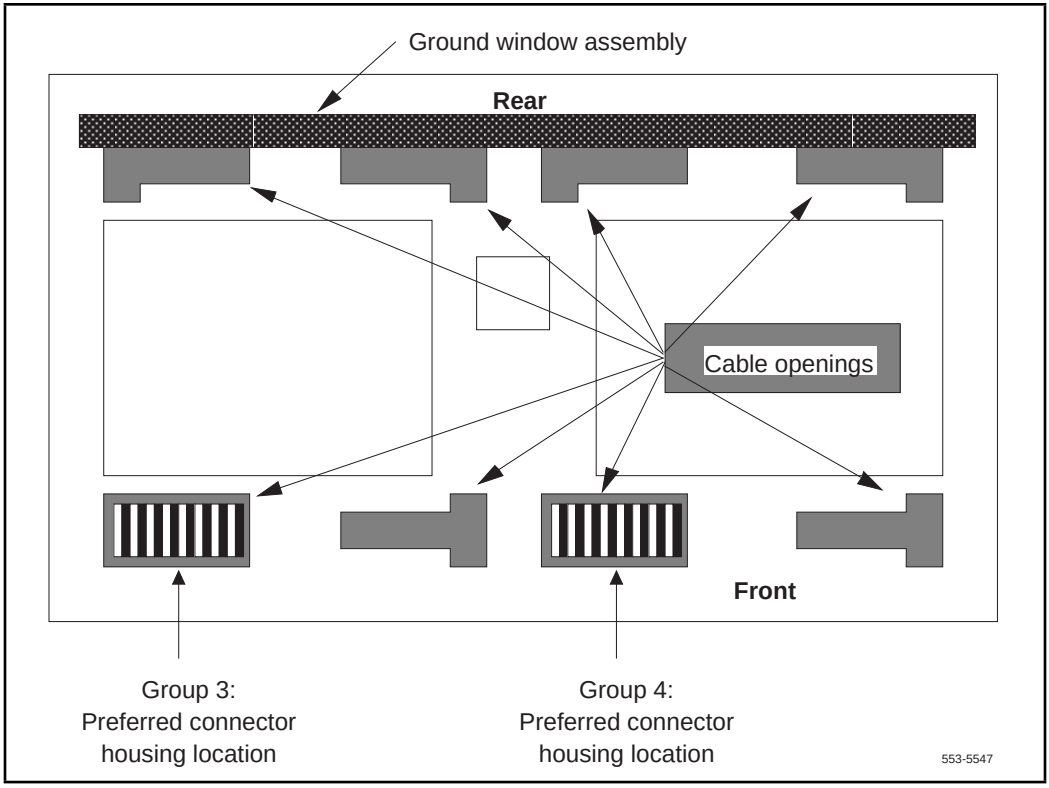


Figure 4
QCA55 cabinet top view—connector housing locations



The following procedure applies to Network Modules that house network Groups 3 and 4. Instructions for both groups are provided.

1 Using the P0738866 Label Kit, included in the NTND33BA kit, label both ends of all of the cables provided (refer to Figure 3). The labels must be identical on both ends of each cable.

Note: The cable labels indicate the "from-to" terminations for the cabling path, not the connections for the individual cable. For example, an NTND29AA, NTND28BA, and NT8D76AD cable are each labeled SBE-GRP3/0-J3 to 3PE-GRP3/0-J3.

2 Connect four NTND29AA cables for each network group, two for each network shelf, to the inside of the connector housings provided in the NTND33BA kit. Secure the cables with the bail locks in the connector housing. Do the following for both Group 3 and Group 4:

- For network shelf 0, connect NTND29AA cables to H2 and H4.
- For network shelf 1, connect NTND29AA cables to H6 and H8.

3 Connect four NTND30AA cables for each network group, two for each network shelf, to the inside of the connector housings. Secure them with the bail locks in the connector housing. Do the following for both Group 3 and Group 4:

- For network shelf 0, connect NTND29AA cables to H10 and H12.
- For network shelf 1, connect NTND29AA cables to H14 and H16.

4 Remove the cover plates on the top of the QCA55 cabinet and install the connector housings. Reuse the screws from the cover plates to install the connector housings.

5 Follow these steps to install QPC215 SBE Cards:

- See *Circuit card installation and testing* (553-3001-211) to set the option switches on each card.
- Set the Enb/Dis switches on the faceplates to Dis before installing the cards.
- Install the cards in the QCA55 cabinet and set the Enb/Dis switches to Enb.

6 Connect the NTND29AA cables from the connector housings to the QPC215 SBE cards as follows:

- Connect an NTND29AA cable to faceplate connector J3 on the SBE cards in each CPU shelf.
- Connect an NTND29AA cable to faceplate connector J4 on the SBE cards in each CPU shelf.

7 On the QPC417 Junctor Board in the QCA55 cabinet, remove the QPF36 Terminating Plugs as follows:

- For Group 3, remove the terminating plugs at connectors J4, J9, J14, and J19.
- For Group 4, remove the terminating plugs at connectors J5, J10, J13, and J18.

8 Connect the NTND30AA cables from the connector housings to the QPC417 Junctor Board as follows:

- For Group 3, connect NTND30AA cables to J4, J9, J14, and J19.
- For Group 4, connect NTND30AA cables to J5, J10, J13, and J18.

9 Wrap and secure the ferrite rings, provided in the NTND33BA kit, around the QCAD110 cables to the faceplate connector on each QPC411 or QPC471 clock card. Locate the ferrite ring near the faceplate connector (see Figure 5).

10 Connect an NTND28BA cable to each of the connectors on the outside of the connector housings. Refer to the labels attached to each cable and the label attached to the side of the connector housing as a guide. Secure the NTND28BA cables using the thumb screws provided on the cable connector.

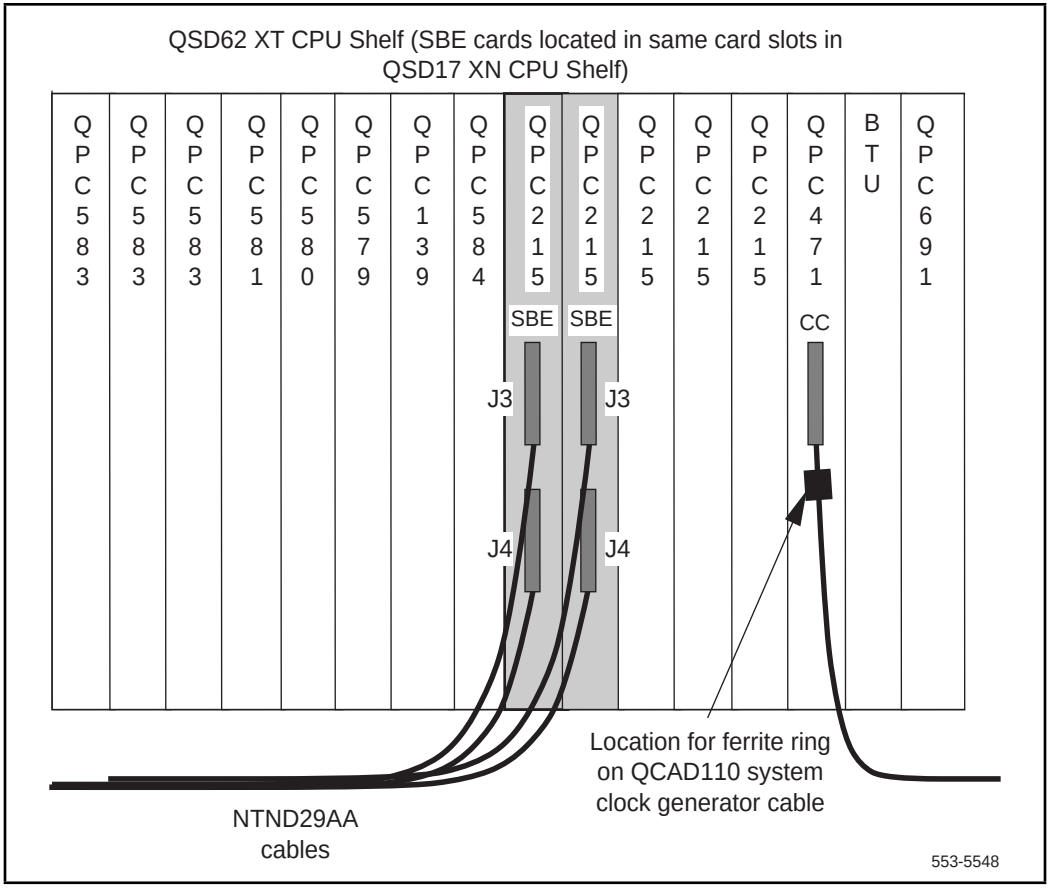
11 Using the cable ties (P0633701) provided in the NTND33BA kit, secure all of the NTND28BA cables to the metal bracket attached to the side of the connector housing.

12 Remove the front and rear covers from the Network Modules.

13 Remove the I/O safety covers at the rear of modules.

14 Remove the right I/O panel in the Network Modules. If cables are connected to these panels, tag and disconnect them at the I/O panel end.

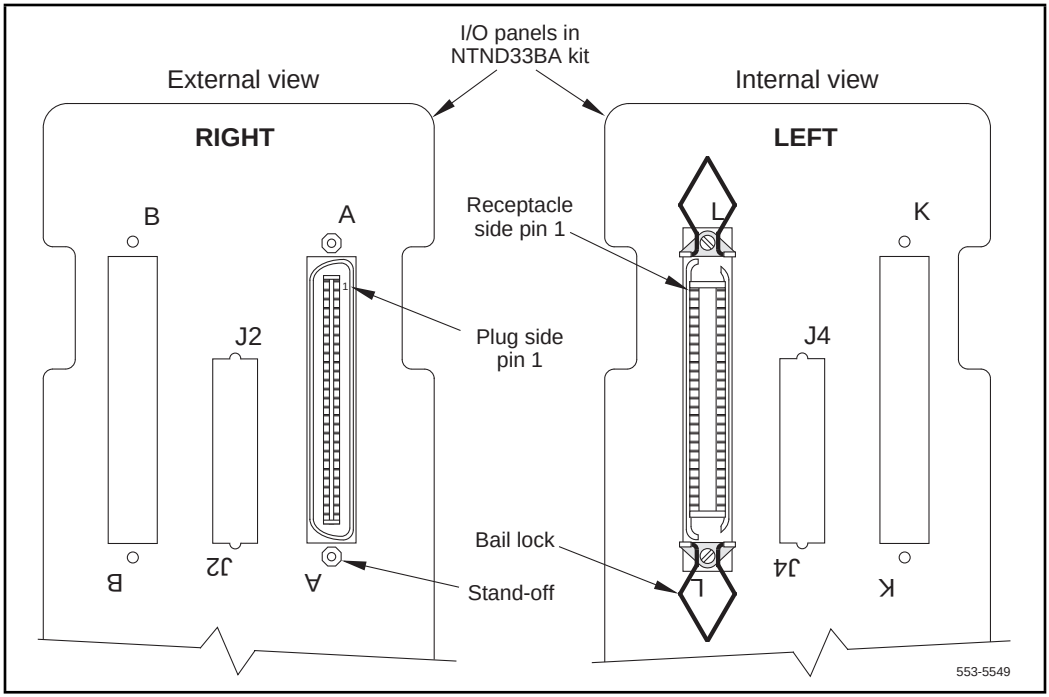
Figure 5
Location for ferrite ring on QCAD110 cables



15 Install the I/O panels provided in the NTND33BA kit and reconnect any cables that you disconnected in the previous step.

Note: When the I/O panel is oriented correctly, the word RIGHT is right side up facing the outside of the module. (The inside of the I/O panel faces the backplane.) The four pre-mounted connectors on the I/O panel are in slots A, C, D, and G; the slot numbers match the designations on the outside of the panel. (See Figure 6).

Figure 6
I/O panel orientation and connector mounting



16 Route the NTND28BA cables from the connector housings on the QCA55 cabinet to the Network Modules.

Note: This task may require routing the cables through cable rack supports that are placed between the QCA55 cabinet and the Network Modules. Refer to the installation instructions provided by the manufacturer of the cable rack supports.

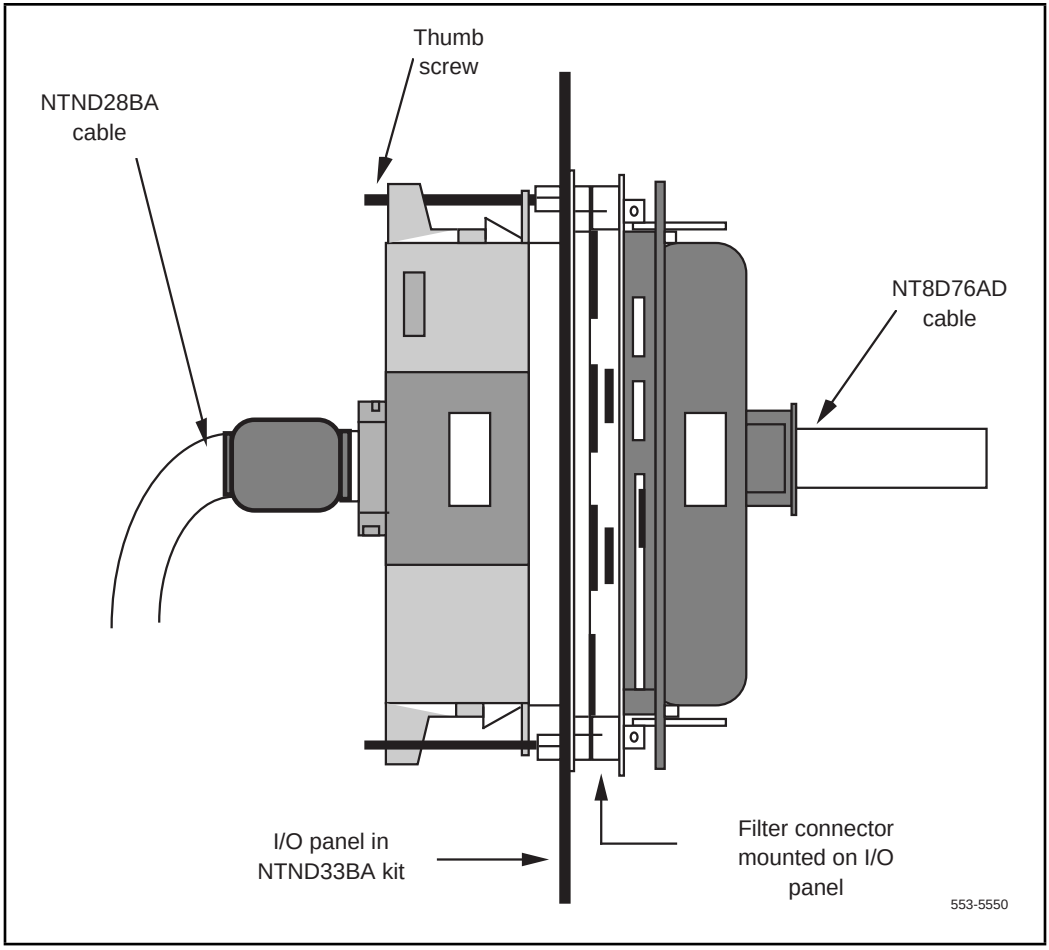
17 Route the NTND28BA cables through the cable opening in the module top panel (Top Cap Egress Panel) down to the new I/O panels.

18 Connect the NTND28BA cables from the connector housings to the connectors on the new I/O panels (see Table 6). Secure the cables using the thumb screws provided on the cable connectors (see Figure 7).

Table 6
Intercabinet cables—Group 3 and Group 4

Cable	Network shelf	Position on housing	I/O panel connector
NTND28BA	Network shelf 0	H2	A
NTND28BA	Network shelf 0	H4	G
NTND28BA	Network shelf 0	H10	C
NTND28BA	Network shelf 0	H12	D
NTND28BA	Network shelf 1	H6	A
NTND28BA	Network shelf 1	H8	G
NTND28BA	Network shelf 1	H14	C
NTND28BA	Network shelf 1	H16	D

Figure 7
NT8D76AD and NTND28BA connections to the module I/O panel



19 Follow these steps to install QPC412 IGS and QPC441 3PE Cards in the Network Modules:

- See *Circuit card installation and testing* (553-3001-211) to set the option switches on the 3PE card.
- Set the Enb/Dis switches on the faceplates to Dis before installing the cards.
- Install the cards in the Network Modules and set the Enb/Dis switches to Enb.

20 Connect the NT8D76AD cables to the faceplate connectors on the QPC412 IGS and QPC441 3PE Cards in the Network Modules as follows:

- Connect a cable to the faceplate of each QPC412 card.
- Connect a cable to J3 on each QPC441 card.
- Connect a cable to J4 on each QPC441 card.

21 Route the NTND76AD cables to the I/O panels in the rear of the modules. Connect the cables for both Group 3 and Group 4, and both network shelf 0 and shelf 1 to the inside of the I/O panel. Secure the cables with the bail locks in the connector housings as follows:

- Connect J3 on the 3PE card to I/O connector A.
- Connect J4 on the 3PE card to I/O connector G.
- Connect the IGS card in slot 3 to I/O connector C.
- Connect the IGS card in slot 2 to I/O connector D.

22 Reinstall the I/O safety covers in the rear of modules.

23 Install all other cards required in the Network Modules. See *Circuit card installation and testing* (553-3001-211) for instructions on setting option switches and installing cards.

24 Go to *Meridian 1 system installation procedures* (553-3001-210) to power-up the column.

25 See *X11 input/output guide* (553-3001-400) to program the added network groups.

Copyright Statement

© 1998 Northern Telecom
All rights reserved
Information is subject to change without notice. Northern Telecom reserves the right to make changes in design or components as progress in engineering and manufacturing may warrant. This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC rules, and the radio interference regulations of Industry Canada. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.
SL-1 and Meridian 1 are trademarks of Northern Telecom.

NORTEL
NORTHERN TELECOM