
SL-1

System options ST, RT

IPE shelf installation

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Revision history

June 20, 1990

This practice is reissued to include the installation of a upgrade IPE shelf on Meridian SL-1 ST/RT systems.

About this document

This document describes how to upgrade an existing Meridian SL-1ST/RT system to Meridian 1 through the installation of a NT9C22 IPE shelf.

The Meridian 1 upgrade shelf can adapt to three different cabinets:

- QCA136SL-1ST CE (Common Equipment) cabinet.
This cabinet includes 1 common equipment shelf and anywhere from one to five peripheral equipment shelves.
- QCA137 SL-1ST PE (Peripheral Equipment) cabinet.
This cabinet is used to expand the peripheral equipment capabilities of the SL-1ST. It attaches to the QCA136 through various cables and allows for an additional six peripheral equipment shelves.
- QCA148 SL-1RT cabinet
This is an upgrade cabinet used for expanding the capabilities of older SL-1 systems.

Contents

Upgrading method and requirements	1-1
Upgrade path	1-1
IPE upgrade shelf	1-1
Common equipment in existing cabinet	1-1
Software and memory requirements	1-2
Mass storage requirements	1-2
Network and peripheral equipment	1-2
System compatibility	1-3
Regulatory requirements	1-3
Equipment requirements	2-1
Upgrading existing Meridian SI-1 ST/RT systems	3-1
Upgrading steps	3-1
Installation of IPE upgrade shelf	4-1
Connecting power	5-1
Connecting the network cables	6-1
Re-assembling the cabinet	7-1

Upgrading methods and requirements

Upgrade path

An existing Meridian SL-1ST or RT can be upgraded to accept Meridian 1 technology by reusing and modifying most of the common and network equipment in the existing cabinet and adding a NT9C22 upgrade shelf.

The new shelf, referred to as an IPE (Intelligent Peripheral Equipment) shelf, communicates to the common equipment through a “super loop” network cable.

IPE upgrade shelf

The NT9C22 upgrade shelf is a dc powered shelf equipped with a NT6D40 dc PEPS unit. The shelf supports an optional ringing generator and sixteen peripheral (PE) card slots for the IPE circuit cards. Refer to figure 1-1 for card assignments.

MDF connections will be made to the shelf backplane through two I/O panels, each housing six MDF filter connections on either side of the backplane.

Power will be supplied through a harness supplied with the shelf. Cooling requirements will be met by the installation of cooling fans located at the top of the shelf.

Common equipment in existing cabinet

The installation of the IPE shelf will require modifications to the existing SL-1ST or RT common equipment.

Software and memory requirements

The system must be equipped with a minimum of Generic X11 release 15 software and related ROM packs. A copy of this software is provided on disks as a part of the system conversion package.

Sufficient RAM must be available to meet the requirements of the upgraded system. Information about memory calculations can be found in *System engineering* (553-3001-151) and the applicable controlled release bulletin for the version of software being used.

Mass storage requirements

Mass storage requirements must be met.

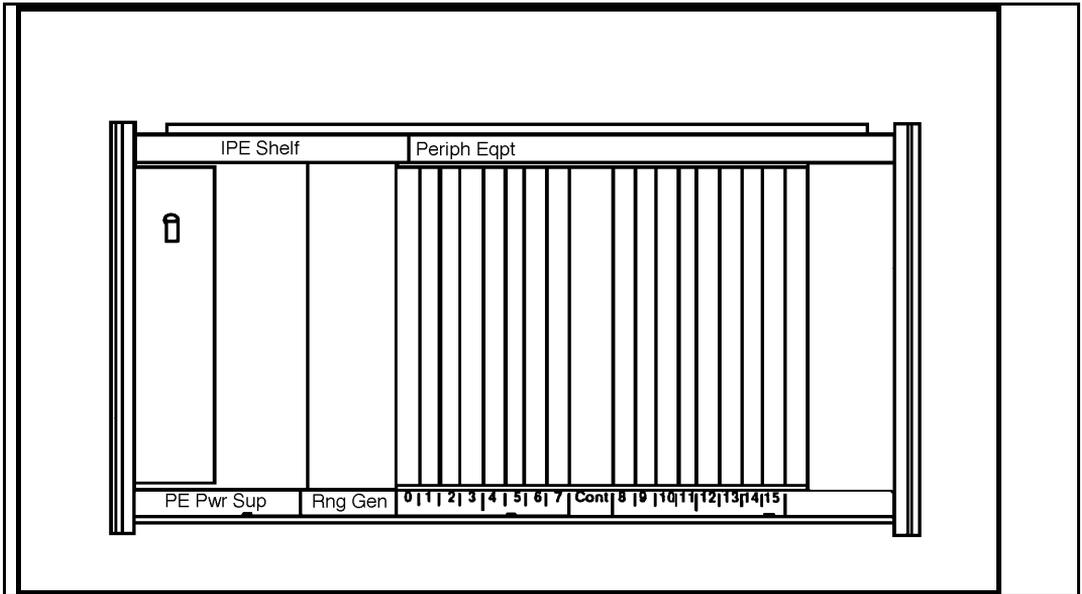
An NT8D68 Floppy Disk Unit will replace the QMM45 Floppy Disk Unit (FDU) in the existing Meridian SI-1ST system and a QMM38 MSU in an RT system.

Network and peripheral equipment

Network slots capable of supporting QPC414 Network cards are compatible with NT8D04 Superloop Network Card.

Superloops consist of conventional loops consecutively grouped in multiples of four, beginning with loop 0. The Superloop Network Card is inserted in one of the slots belonging to the group of four loops. The slot for the other two loops belonging to the superloop is not available for another Superloop or QPC414 Network Card since those loops are accessed by the Superloop Network Card through the backplane. The empty slot can be used for a Serial Data Interface (SDI) circuit card or any other card for requiring access to the network bus.

Figure 1
IPE NT9C22 front card slot assignment



System compatibility

One NT9C22 (IPE) shelf can be configured per ST and RT cabinet, and it *must* be the top tier.

The best case configuration allows for 6 ports to be shared between ENET and XNET cables.

Regulatory requirements

The NT6D40 (DCPEPS) power supply and NT7D03 (DCRG) ringing generator can be used in VDE approved systems or in the IPE-ST upgrade shelf on the SL-1ST system.

Equipment requirements

Table 2-1 lists the equipment kit required for the upgrade of a QCA136/148 cabinet.

Table 2-2 lists the equipment kit required for the upgrade of a QCA137 cabinet.

Table 2-1 Equipment Kit for QCA136/148 cabinets

Item	Quantity	Description
NT9C22	1	IPE Upgrade Shelf
NT7D03	if required	dc Ringing Generator
NT6D40	1	dc PEPS Power Supply
NT8D04	1	XNET circuit pack
NT8D01	1	XPEC-2 circuit pack
NT8D91AE	1	XNET to XPEC cable
QPC742	1	Floppy Disk Interface (must be at least vintage D)
NT8D68	1	Floppy Disk Drive
QMM42	1	FDI Cartridge
A0324048	6	S/W Diskettes
QPC687	1	CPU/SDI-1 (reuse from existing system if equipped)
– continued –		

2-2 Equipment requirements

Table 2-1
Equipment Kit for QCA136/148 cabinets (continued)

Item	Quantity	Description
QPC940	1	ROM Daughter Board
A0349406	3	Cooling Units (QUD24B)
A0332733	2	Cooling Unit Cable QCAD302A3
A0332878	1	Terminator QCAD304A3
PO633707	12	Tie Raps
P0710549	1	Cooling Unit Bracket
PO694308	3	Louvres
PO691290	6	Louvre Bolts (long)
PO599076	4	EMI Shield Screws
PO667284	1	Front Shield Cover
PO678257	1	Rear Cover
PO673395	2	Side Skins
PO673396	2	Strap (brackets)
PO678256	4	Plastic Corner Cap
PO599076	8	Tap Screws for strap brackets
PO677782	1	Spacer

Table 2-2
Equipment Kit for QCA137 cabinet

Item	Quantity	Description
NT9C22	1	IPE Upgrade Shelf
NT7D03	if required	dc Ringing Generator
NT6D40	1	dc PEPS Power Supply
NT8D04	1	XNET circuit Pack
NT8D01	1	XPEC-2 Circuit Pack
NT8D91AE	1	XNET to XPEC Cable
NT8D92AB	1	I/O to XPEC Cable
NT8D98AD	1	I/O to I/O Cable
NT9J99AD	1	XNET to I/O Cable
QPC742	1	Floppy Disk Interface (must be at least vintage D)
NT8D68	1	Floppy Disk Drive
QMM42	1	FDI Cartridge
A0324048	6	S/W Diskettes
QPC687	1	CPU/SDI-1 (reuse from existing system if equipped)
QPC940	1	ROM Daughter Board
A0349406	3	Cooling Units (QUD24B)
A0332733	2	Cooling Unit Cable QCAD302A3
A0332878	1	Terminator QCAD304A3
PO633707	12	Tie Raps
PO694308	3	Louvres
PO691290	6	Louvre Bolts (long)
PO710549	1	Cooling Unit Bracket
– continued –		

2-4 Equipment requirements

Table 2-2
Equipment Kit for QCA137 cabinet (continued)

Item	Quantity	Description
P0599076	4	EMI Shield Screws
PO667284	1	Front Shield Cover
PO678257	1	Rear Cover
PO673395	2	Side Skins
PO673396	2	Strap (brackets)
PO678256	4	Plastic Corner Cap
PO599076	8	Tap Screws for strap brackets
PO703845	1	Connector Mounting Brackets
PO687879	1	Guard
A0362050	1	Connector Hardware
PO99D465	4	Screw
PO677782	1	Spacer

Upgrading the existing SL-1 ST/RT systems

This chapter describes how to instal the NT9C22 IPE upgrade shelf in existing Meridian SL-1 ST/RT systems.

Upgrading steps

Use the following steps to upgrade an existing meridian SI-1 ST or RT system.

- 1 Configure the system through software for Meridian 1 operation. See *Disk drive upgrade procedures* (553-3001-251).
- 2 Upgrade software to minimum release 15 as described in *Software Conversion* (553-2001-320).
- 3 Modify, install and test existing and replacement common equipment as follows:
 - For ST systems: Replace existing QMM 45 floppy drive and QPC742 FDI with NT8D68 FDU QPC742D (or later) FDI. See *Disk drive upgrade procedures* (553-3001-251).
 - For RT systems: Replace existing QMM 38 MSU and QPC584 MSI with NT8D68 FDU and QPC742D (or later) FDI. See *Disk drive upgrade procedures* (553-3001-251).
- 4 Dismantle the cabinet to the stage required and install the IPE shelf and a minimum of three cooling fans. See chapter entitled *Installation of IPE upgrade shelf* (see page 4-1).

3-2 Upgrading existing SL-1 ST/RT systems

- 5 Connect the power harness NT9C22 to the appropriate cabinet. Install the required power supplies. See chapter entitled *Connecting power* (see page 5-1).
- 6 Connect the required network cables and install the network packs. See chapter entitled *Connecting the network* (see page 6-1)
- 7 Re-assemble the cabinets. See chapter entitled *Re-assemble the cabinets* (see page 7-1).
- 8 Test the equipment as described in *System installation procedures* (553-3001-210).

Installation of IPE upgrade shelf

This chapter describes the procedure used to dismantle the Meridian SL-1ST/RT cabinet and install the NT9C22 IPE shelf.

CAUTION

Do not drop screws or other hardware through the openings in the cabinet when removing the various items in this procedure.

Procedure 4-1

Power disconnection of QCA 136/137/148 cabinets

- 1 Remove all front and rear panels on the cabinets.
- 2 Turn all the breakers labelled PE1 through to PE6 on the QUX19/20 (QCA136/148 cabinets) and the QUX21(QCA137 cabinet) power distribution units to the OFF position.
- 3 Turn the breakers labelled “CAB INP” to the OFF position. This breaker is located on the QUX19 (QCA136/148 cabinets) or the QUX21 (QCA137 cabinet).
- 4 Turn the breakers labelled on the QRF12 to the OFF position.
- 5 Disconnect the AC power line that feeds all the cabinets.

4-2 Installation of IPE upgrade shelf

CAUTION

Wait 5 minutes after the QRF12 power supply has been shut off before proceeding.

Procedure 4-2

Removal of EMI shields and cabinet panels

Perform this step only if cabinet is equipped with EMI shields

- 1 Tag and disconnect MDF cables from all existing connectors A through G at the rear of the cabinets to be upgraded.
- 2 Remove the four screws securing each EMI shield to the shelf. Keep all the screws. See figure 4-1.
- 3 Lift the EMI shields away from the cabinet. Place in a safe location.
- 4 Remove the louvered top assembly from the cabinet by removing the six screws through the top of the assembly. Discard the screws. See figure 4-1.
- 5 Remove the side panels from each end of the existing shelf of the cabinet by sliding the panels upward. Place in a safe location.
- 6 Remove the four hex. screws at each end of the top shelf securing the top panel to the cabinet. Keep the four screws. See figure 4-1.

CAUTION

Ensure that the wiring to the thermostat located on the underside of the top panel is not damaged while performing this step.

- 7 Remove top panel and place toward the rear of the cabinet. Ensure that the wiring to the thermostat is routed towards the rear of the cabinet.

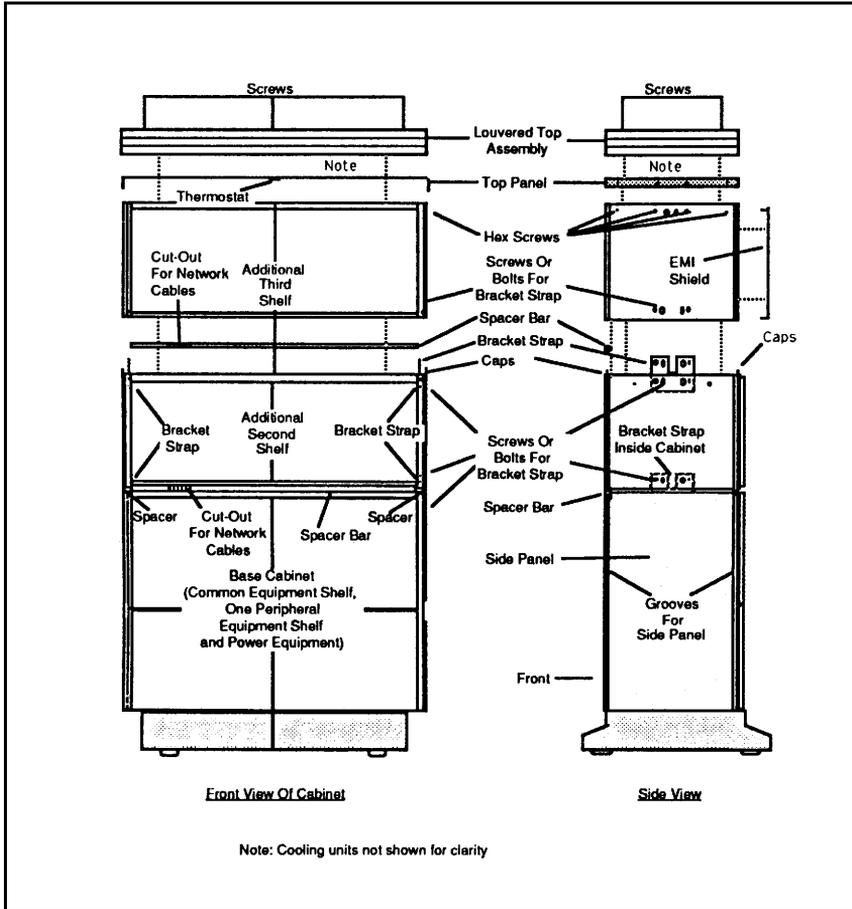
Procedure 4-3
Installation of IPE shelf

Refer to equipment list in table 2-1 or 2-2

- 1 Locate a bracket strap at each end of the existing top shelf of the cabinet and secure with two self-tapping screws per strap.
- 2 Locate plastic corner caps at the corner uprights of the cabinet. There should be a cap at each corner. See figure 4-1.
- 3 Reinstall the two cabinet side panels with the flange at the top facing inwards. Slide them down in the grooves located in the uprights at each end of the cabinet.
- 4 Set the new IPE shelf on top of the existing shelf with both ends overlapping the bracket straps.
- 5 Install a spacer bar between the bottom front rail of the IPE shelf and the top front rail of the cabinet shelf as follows. See figure 4-1.
 - Tilt the new shelf slightly backwards.
 - Position the spacer bar with the cut-out on the left and facing outward (figure 4-1) in the groove along the top front of the existing shelf.
 - Lower the IPE shelf onto the spacer bar locating the top rail of the bar in the groove at the bottom of the IPE shelf.
- 6 Align the IPE shelf with the existing shelf and secure to the bracket straps.

4-4 Installation of IPE upgrade shelf

Figure 4-1
IPE shelf assembly



Procedure 4-4
Installation of IPE shelf

CAUTION

Do not drop screws or other hardware through the openings in the cabinet when installing or assembling the various items in this procedure.

QCA 136/137/148 cabinets

- 1 Count the number of holes in the top surface of the cabinet top panel.
- 2 Perform steps 2-6 for panels with sixteen holes.
 - Remove the top panel from the system
 - Measure and drill twelve additional holes in the top panel. See figure 4-2 for hole size and positions.
 - Remove loose drill burrs.
- 3 Reinstall the top panel on the IPE shelf and secure with four screws at each end. See figure 4-3.
- 4 Position two QUD24 cooling units at the center and right hand side of the cabinet top panel and secure with mounting screws. See figure 4-3.
- 5 Position the left hand cooling unit. See figure 4-3.
- 6 Place a retaining bracket over the rear foot of the left hand cooling unit and secure with 2 mounting screws. Secure the front foot of the unit with one screw located at the right hand screw hole. See figure 4-3.
- 7 Cabinet top panels with the twenty-four holes already drilled need no further modification. Repeat steps 3, 4, 5 and 6 above to install cooling units on these top panels.

Note: Some cabinets may have been previously equipped with cooling units. Relocate the cooling units as shown in figure 4-3.

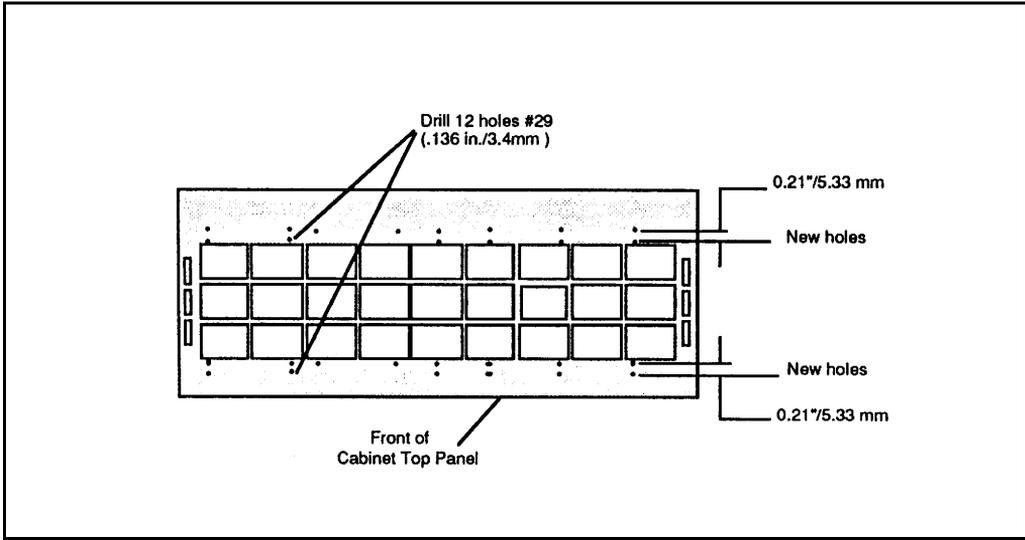
4-6 Installation of IPE upgrade shelf

Procedure 4--5

Cable Installation for cooling units

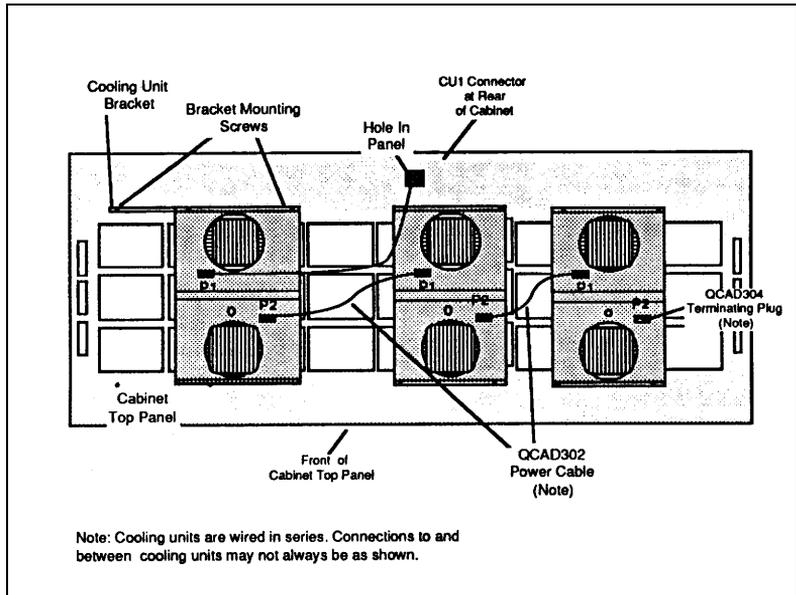
- 1** Connect a QCAD302 power cable from connector P1 on the first QUD24 unit to connector P2 on the second QUD24 unit. See figure 4-3.
- 2** Connect a QCAD302 power cable from connector P1 on the second QUD24/25 unit to connector P2 on the second QUD24 unit. See figure 4-3.
- 3** Connect the CU1 connector on the end of the cabinet power cable to connector P1 on the third QUD 24 unit. See figure 4-3.
- 4** Install a QCAD 304 terminating plug in connector P2 on the first QUD24 cooling unit. See figure 4-3.
- 5** Secure cooling unit cables to the cabinet top panel with plastic cable ties to avoid interference with the fans.

Figure 4-2
Top Panel Drill Hole Locations



4-8 Installation of IPE upgrade shelf

Figure 4-3
Cooling unit locations and connections



Connecting power harness and inserting power supplies

This chapter describes the method used to connect the NT9C22 IPE shelf power cable to the QCA136/137/148 cabinets and insertion of power supplies.

Procedure 5-1

Connecting IPE power cable to QCA136/137/148 cabinets

CAUTION

Do not drop screws or other hardware through the openings in the cabinet when installing or assembling the various items in this procedure.

- 1 Unroll the IPE shelf power harness at the rear of the IPE shelf and route the harness down the right hand side of the cabinet.
- 2 Connect the power harness to the GRD 2 bracket at the rear of the QUAA 3 power unit as follows.
 - Two black leads equipped with ring connections to terminal B
 - Black and green leads equipped with ring connections to terminal F.

- 3 Connect the power harness to the GRD 1 bracket at the rear of the QUAA 3 power unit as follows:
 - White lead equipped with ring connections to terminal B
- 4 Connect the power harness to the SL-1 ST monitoring at the rear of the QUAA 3 power unit as follows:
 - Connector P4 to J4
 - Connector P7 to J7 (Removing existing plug in J7 before installing connector).
- 5 Connect the power harness to the terminal blocks as follows:

QCA 136/148 cabinets

- Red lead to FN connection on TB2 terminal block
- Blue lead to TB3 terminal block

QCA 137 cabinet

- Remove panel at the rear of the QCA 137 cabinet. Keep the screws.
- Remove the screws securing the QUX21 distribution panel. Keep the screws.
- Slide the QUX21 panel out of the cabinet approx 5/6 inches towards the front of the cabinet, in order to access the dc breaker.
- Feed the blue lead from the power shelf harness NT9C2202 through from the rear of the cabinet to the back of the QUX21 panel.
- Connect the blue lead to the CAB INP shelf breaker located on the front left panel.
- Slide the QUX21 panel back into the cabinet and secure with screws.
- Replace panel at the rear of the cabinet and secure with screws.

- 6** Secure and dress the cables ensuring that any slack in the cables will be taken up within the upgrade shelf between the front and rear panels.

Procedure 5-2
Installing circuit packs

- 1** Insert the NT6D40 DCPEPS card into its assigned slot in the expansion shelf and hook the locking devices. See figure 1-1.
- 2** Insert the NT7D03 DCRNG Generator card (if required) into its assigned slot in the expansion shelf and hook the locking devices. See figure 1-1.

Connecting the network cables.

This chapter describes the network connections to be made in the QCA 136/137/148 cabinets.

Note: There are various combinations of cabinet types, each requiring a different network hookup. Identify the cabinet(s) (QCA136/137/148) in the installation and determine if they are EMI or EMI cabinets.

CAUTION

Do not drop screws or other hardware through the openings in the cabinet when installing or assembling the various items in this procedure.

- 1 Set the END/DIS switch on the NT8D04 XNET card to **DIS**.
- 2 Insert the NT8D04 XNET card into a vacated slot in the common equipment shelf and hook the locking devices.

Note: For every NT8D04 XNET card, two slots will be taken up in the Meridian SL1-ST common equipment shelf. The NT8D04 XNET card takes up the slot it occupies and the slot to the right (i.e. four loops). No other card may occupy the slot to the right of the XNET except those cards which do not access the network bus (e.g. SDI cards).

Procedure 6-1
Installing network cables

- 1 Refer to the work order and determine the following:
 - The loop number(s) assigned to it
 - The location of the network circuit pack(s) which provides the loop (s)
 - The location of the PE shelf/shelves assigned to the loop(s)

QCA136/148 EMI or non-EMI cabinet

- 2 Connect a NT8D91 cable from the J2 loop connector on the NT8D04 XNET network card faceplate to the SLO connection at the rear of the IPE shelf.
- 3 Route the cable from the J2 connector through the QCA136/148 shelf space bar and up the left side of the cabinet to the IPE shelf. Route the cable along the IPE shelf space bar to pass through the opening under the front right panel to the rear of the shelf. Plug this end into the SLO connector at the rear of the shelf.
- 4 If specified, repeat for additional XNET network cards to a maximum of four cards and cables.

Note: Any slack in the cables may be taken up within the IPE shelf between the front and rear panels.

QCA 136/148 EMI cabinet to QCA137 EMI cabinet

- 5 Attach the connector mounting bracket to a network cable NT8D92 using a bail lock kit and secure. See procedure 553-2431-210 DP1007. Attach this cable to the EMI shield in the back of the QCA137 cabinet.
- 6 Attach the NT8D92 cable to the EMI panel on the rear of the QCA137 cabinet. Route the cable from the back of the QCA137 cabinet towards the front through the opening in the QUX21 power distribution unit. Continue to feed the cable through the opening under the front right panel of the IPE shelf. Route the cable through the opening under the front right panel of the IPE shelf to the SLO connection on the shelf backplane.

- 7 The NT9J99 cable is routed from the J2 connector on the faceplate of the network pack NT8D04 down through the top of the QUX19. From here the cable is fed through to the back of the QCA136/148 cabinet and attached to the EMI shield.
- 8 Connect the network cable on the back of the QCA136/148 cabinet to the network cable on the back of the QCA137 cabinet using the NT8D98 I/O to I/O cable.

QCA 136/148 non-EMI cabinet to QCA137 EMI cabinet

- 9 Follow steps 5 and 6 when connecting the NT8D92 cable to the QCA137 cabinet.
- 10 Route the NT9J99 cable from the J2 connector on the faceplate of the network pack NT8D04 down through the top of the QUX19. From here the cable is fed to the middle SDI port at the rear of the QCA136/148 cabinet. See figure 6-1.

The cable attaches to the cabinet so that the connection is on the inside of the cabinet facing upwards. Fasten the cable to the cabinet using two self tapping screws through the bracket at the end of the cable. See figure 6-1.

- 11 Follow step 8 for I/O to I/O connections.

QCA 136/148 non-EMI cabinet to QCA137 non-EMI cabinet

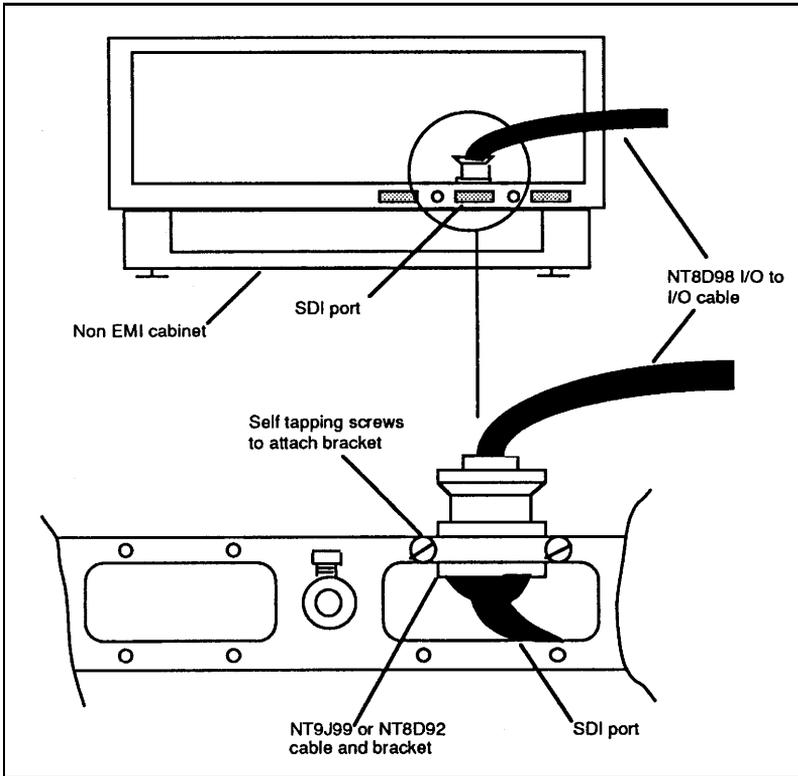
- 12 Follow step 5 to assemble the NT8D92 cable.
- 13 Route the NT8D92 cable from the rear of the QCA137 cabinet towards the front going through the opening in the QUX21 power distribution unit. Continue to feed the cable up the front right side of the QCA137 cabinet through the opening under the front right panel of the IPE shelf to the SLO connection on the shelf backplane.

- 14 Attach the other end of the NT8D92 cable to the middle SDI port at the rear of the QCA137 cabinet. See figure 6-1.

The cable attaches to the cabinet so that the connection is on the inside of the cabinet facing upwards. Fasten the cable to the cabinet using two self tapping screws through the bracket at the end of the cable. See figure 6-1.

- 15 Follow steps 10 and 11 to route the NT9J99 cable in the QCA136/148 cabinet.

Figure 6-1
Non – EMI Intercabinet connection



Re-assembling the cabinet

This chapter describes the method used to re-assemble the QCA136/137/148 cabinets.

CAUTION

Do not drop screws or other hardware through the openings in the cabinet when installing or assembling the various items in this procedure.

QCA 136, QCA 137, and QCA 148 cabinets

- 1 Install the two shelf side panels by sliding them down in the grooves located in the uprights at each end of the new shelf. The flange at the top of the panels should be positioned at the top facing towards the inside of the cabinet.
- 2 Install the EMI shields as follows:
 - On each connector with velcro-type straps, fold the straps together so as not to interfere with panel replacement.
 - Install the original EMI shields, starting at the bottom of the cabinet. Ensure the cut-outs in the shield fit over the connector sockets and terminals at the rear of the cabinet.
 - Carefully pull all velcro-type straps through each cut-out opening on the panel.
 - Secure the EMI shield in place with four screws. See figure 4-1.

- Install the EMI shield on the new IPE shelf. The shield will be a tight fit around the power harness, therefore, it will be necessary to cut the tie-wraps as required to ease assembly of the shield.
 - Secure the EMI shield in place with four screws. See figure 4-1
- 3 Locate three new louvres for a total of six louvres on top of the cabinet and replace the existing louvre and top cap. Secure with six louvre bolts.
 - 4 Install the cables to the cross-connect terminal (if required).
 - 5 Install the required circuit packs in the IPE shelf according to the system configuration record and shelf designations.
 - 6 Turn ON the DCPEPS power supply and dc ring generator (if equipped) in the new IPE shelf.
 - 7 Inspect the cabinet for the following:
 - All circuit breakers are set to OFF
 - All connections are secure
 - Circuit pack address and/or option switches are set properly.
 - All circuit packs are fully inserted and locked in place with their locking devices
 - All packs are in their proper shelf locations according to the system configuration and shelf designations.
 - 8 Set all circuit pack END/DIS switches to ENB.
 - 9 Set the “AC BRKR” breakers on the QRF12 to the ON position
 - 10 Set CAB INP breaker on the QUX19 and QUX21 (QCA137 only) unit to the ON position.

Note: A system reload (SYSLOAD) will occur. See X11 input/output guide (553-3001-400) for an interpretation of SYSLOAD codes printed by the system.

- 11 Set the PE breakers that correspond to the PE shelves in the existing system to the ON position.
- 12 Set the PE breakers for the new shelf to ON.

Note: The designations on the breakers located on the QUX20 or QUX21 power distribution unit correspond to connectors PE1 through PE6 on the power distribution cables to the shelves at the rear of the cabinet.

SL-1

System options ST, RT

IPE shelf installation

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