
Meridian 1

Upgrade engineering

Upgrading to Meridian 1 system options

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Introduction

This manual provides engineering information for system upgrades to Meridian 1 system options supported by X11 release 19 or later. This information provides a reference to all supported upgrade paths, base level upgrade package order codes, and references for any additional items that must be ordered separately to complete the system upgrade (minimum requirements). System upgrade information is arranged by system type.

Table 1 lists introduction and retirement dates of SL-1 and Meridian 1 systems and shows replacements for retired systems.

Table 1
System introduction cross-reference (Part 1 of 4)

System type	Introduction date	Upgrade equipment cabinets/modules	Retirement date	Replaced by
L	Nov 1975	QCA6, QCA7, and QCA8	1978	ST, RT, NT or 21A, 21, 51, 61, 61C
PE	Nov 1975	QCA7 and QCA8	1990	NT8D13 modules and associated pedestal, top cap, power supplies
VL	Apr 1976	QCA10, QCA14, QCA7, and QCA8	1978	RT, NT or 51, 51C, 61, 61C
VLE	Jul 1978	QCA24, QCA25, QCA7, and QCA8 (QCA10, QCA14, QCA74)	1984	XT or 71, 81, 81C
LE	Nov 1978	QCA23, QCA7, and QCA8 (QCA6 and QCA74)	1984	RT, NT or 51, 51C, 61, 61C
A	Jun 1979	QCA28 and QCA8	1982	ST, RT or 21A, 21, 51, 51C

Table 1 (Continued)
System introduction cross-reference (Part 2 of 4)

System type	Introduction date	Upgrade equipment cabinets/modules	Retirement date	Replaced by
XL	Jun 1980	QCA24, QCA25, QCA7, and QCAB (QCA10, QCA14, QCA74)	1984	XT or 71, 81, 81C
M	Aug 1982	QCA37 (QCA8, QCA28, QCA74)	1987	ST, RT or 2 A, 21, 51, 51C
S	Dec 1983	QCA60	1988	ST, RT or 21A, 21, 51, 51C
MS	May 1984	QCA109 and QCA74 (QCA8 and QCA37)	1989	ST, RT, NT or 21A, 21, 51, 51C, 61, 61C
N	May 1984	QCA58, QCA108, and QCA74 (QCA6, QCA7, QCA8, QCA23)	1986	NT or 61, 61C
XN	May 1984	QCA55, QCA108, and QCA74 (QCA7, QCA8, QCA24, QCA25)	1986	XT or 71, 81, 81C
HDPE	May 1984	QCA74	Active	
LE	Dec 1985	QCA96 and QCA74 (QCA7 and QCA8)	1988	NT or 61, 61C
XL	Dec 1985	QCA97, QCA98, and QCA74 (QCA7 and QCA8)	1988	XT or 71, 81, 81C
NT	Oct 1986	QCA58 and QCA74 (QCA7, QCA8, QCA23, QCA96)	1990	61 or 61C
XT	Oct 1986	QCA55, QCA108, and QCA74 (QCA7, QCA8, QCA24, QCA25, QCA97, QCA98)	1990	71 or 81, 81C
ST	Jun 1987	QCA136 and QCA137 (QCA7, QCA8, QCA23, QCA28, QCA37, QCA60, QCA109)	1990	STE or 21A, 21, 51C
GDPE	Jun 1987	QCA137 (QCA74 and QCA144)	Active	
RT	Jun 1988	QCA147 and QCA137 (QCA136)	1990	RTE or 61, 61C
21A	Feb 1990	NT8D11	1993	21E

Table 1 (Continued)
System introduction cross-reference (Part 3 of 4)

System type	Introduction date	Upgrade equipment cabinets/modules	Retirement date	Replaced by
21	Feb 1990	NT8D11 and NT8D37 as required (QCA7, QCA8, QCA23, QCA28, QCA37, QCA60, QCA109, QCA136, QCA137, QCA147, QCA148)	1993	21E
51	Feb 1990	NT6D39 and NT8D37 as required (QCA7, QCA8, QCA23, QCA28, QCA37, QCA60, QCA109, QCA136, QCA137, QCA147, QCA148)	Mar 1195	51C
61	Feb 1990	2-NT6D39, NT8D37 as required (QCA7, QCA8, QCA23, QCA28, QCA37, QCA58, QCA60, QCA74, QCA96, QCA108, QCA136, QCA137, QCA147, QCA148)	Mar 1195	61C
71	Feb 1990	2-NT9D34, NT8D35 as required to 5 Network Groups, NT8D37 as required (QCA7, QCA8, QCA23, QCA28, QCA37, QCA55, QCA58, QCA96, QCA97, QCA98, QCA108, QCA109, QCA136, QCA137, QCA147, QCA148)	Active	
IPE	Feb 1990	NT8D37	Active	
11	Jun 1991	NTAK11 and NTAK12	Active	
21E	Feb 1993	NT8D11 and NT8D37 as required (QCA7, QCA8, QCA23, QCA28, QCA37, QCA60, QCA109, QCA136, QCA137, QCA147, QCA148)	Active	
81	Feb 1993	2-NT6D60, NT8D35 as required to 5 Network Groups, NT8D37 as required (QCA7, QCA8, QCA23, QCA28, QCA37, QCA55, QCA58, QCA96, QCA97, QCA98, QCA108, QCA109, QCA136, QCA137, QCA147, QCA148)	Active	

Table 1 (Continued)
System introduction cross-reference (Part 4 of 4)

System type	Introduction date	Upgrade equipment cabinets/modules	Retirement date	Replaced by
61C (NT9D11)	Feb 1994	2-NT9D11, NT8D37 as required (QCA7, QCA8, QCA23, QCA28, QCA37, QCA58, QCA60, QCA74, QCA96, QCA108, QCA136, QCA137, QCA147, QCA148)	Mar 1995	61C (NT5D21)
61C (NT5D21)	Feb 1994	2-NT5D21, NT8D37 as required (QCA7, QCA8, QCA23, QCA28, QCA37, QCA58, QCA60, QCA74, QCA96, QCA108, QCA136, QCA137, QCA147, QCA148)	Current	
51C	May 1994	NT5D21, NT8D37 as required (QCA7, QCA8, QCA23, QCA28, QCA37, QCA58, QCA60, QCA74, QCA96, QCA108, QCA136, QCA137, QCA147, QCA148)	Current	
81C	March 1995	2-NT5D21, NT8D35 as required to 5 Network Groups, NT8D37 as required (QCA7, QCA8, QCA23, QCA28, QCA37, QCA55, QCA58, QCA96, QCA97, QCA98, QCA108, QCA109, QCA136, QCA137, QCA147, QCA148)	Current	

Meridian 1 system options

Most system hardware upgrades are based on adding modules in a Meridian 1 column. Each module contains the hardware required (such as backplane, card cage, power supply, and cabling) to support a specific system function (such as CPU, network, or peripheral equipment).

At the base of each Meridian 1 column is the pedestal. The pedestal houses cooling fans, air filters, a power distribution assembly (including circuit breakers) and a system monitor circuit card. At the top of each column is a top cap assembly that consists of two air exhaust grills and a thermal sensor assembly.

Each module in a Meridian 1 column contains its own multioutput power converter to supply all of the necessary voltages for that module. Both AC- and DC-powered system options are available.

Meridian 1 is available in several options. Options are selected depending on the application, line size, or other customer requirements. Options are listed below with a brief description of each:

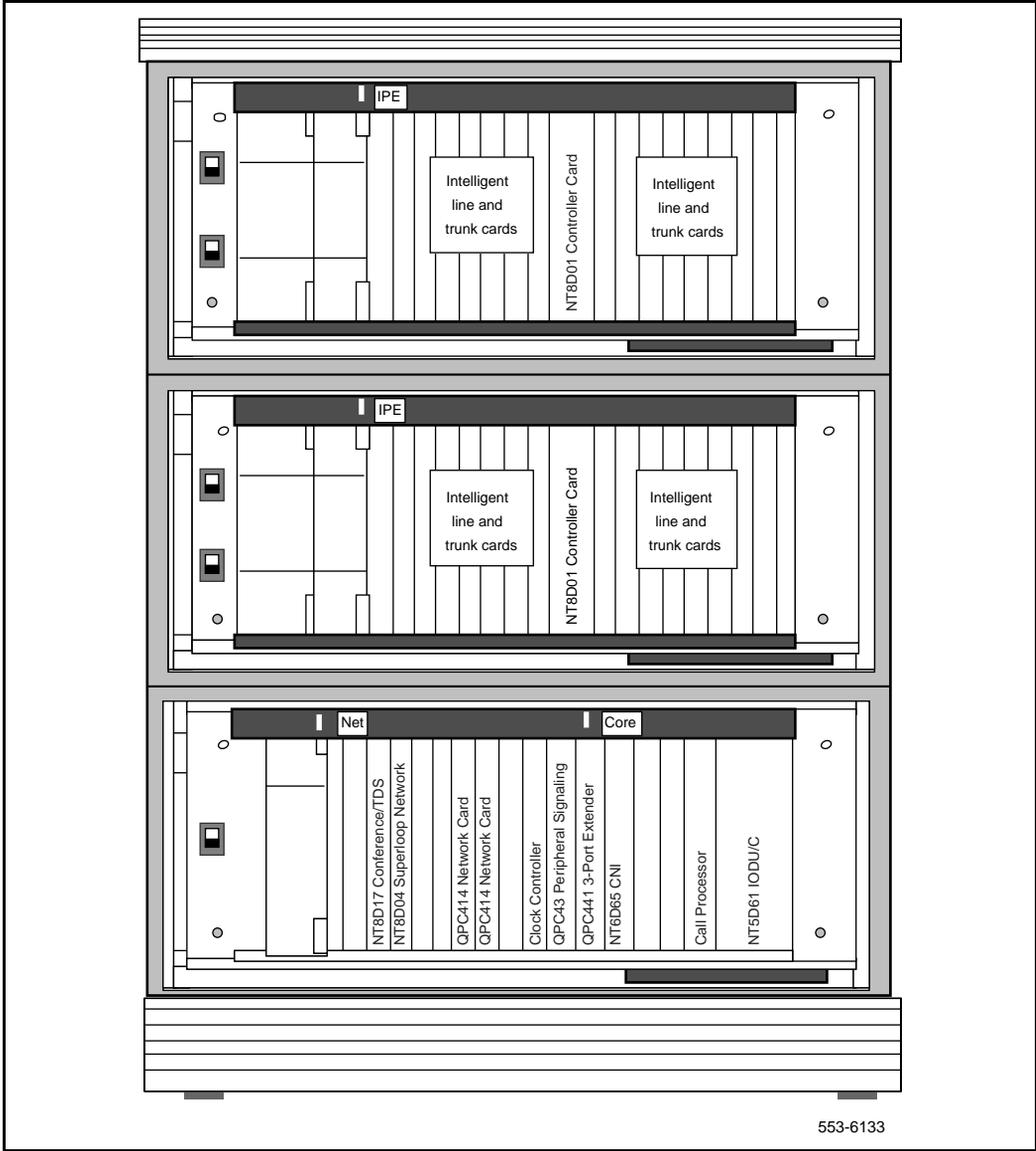
- Meridian 1 system option 51, 51C—single CPU, half-network group
- Meridian 1 system option 61, 61C—dual CPU, full-network group
- Meridian 1 system option 81C—dual CPU, multiple-network groups

System option 51C

Option 51C is a single-CPU system with a half-network group. One Core/Network Module and one IPE Module are required. Additional IPE Modules, PE Modules, RPE Modules, and application modules can be used.

Figure 1 shows an option 51C X11 release 21 or later system with one IPE Module that houses IPE cards. The NT5D21 Core/Network Modules are also used in the option 61C and option 81C. All system options are available with either AC or DC power.

Figure 1
Typical option 51C configuration



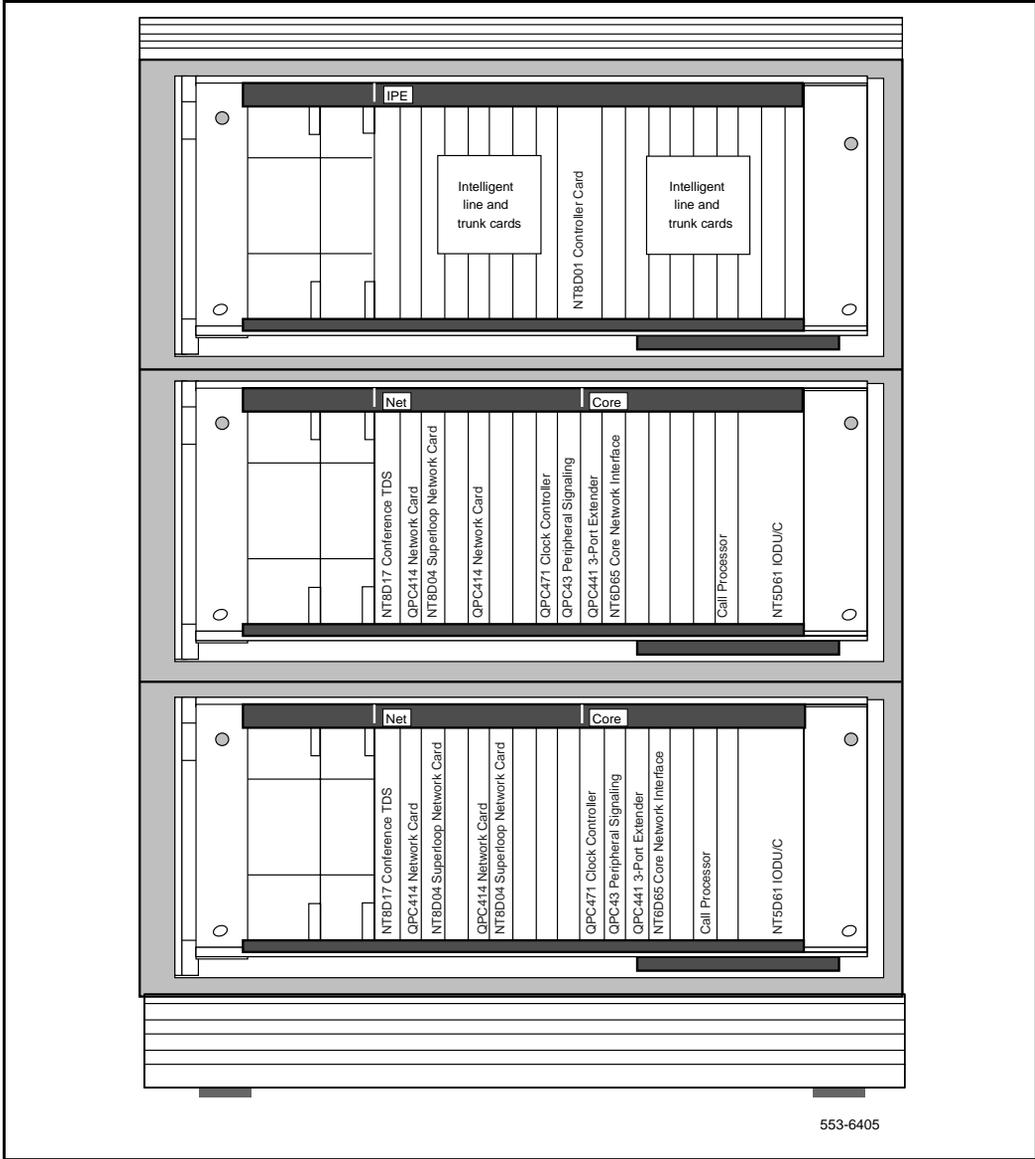
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System option 61C

System option 61C is a redundant CPU configuration capable of supporting up to 2000 ports. Both Meridian 1 dual-loop networks and associated peripherals are supported along with network superloops. A maximum of 32 loops are supported.

Figure 2 shows an option 61C X11 release 21 or later system with one IPE Module that houses IPE cards. The NT5D21 Core/Network Modules are also used in the option 51C and option 81C. It supports redundant CE and network cards. All system options are available with either AC or DC power.

Figure 2
Typical option 61C configuration



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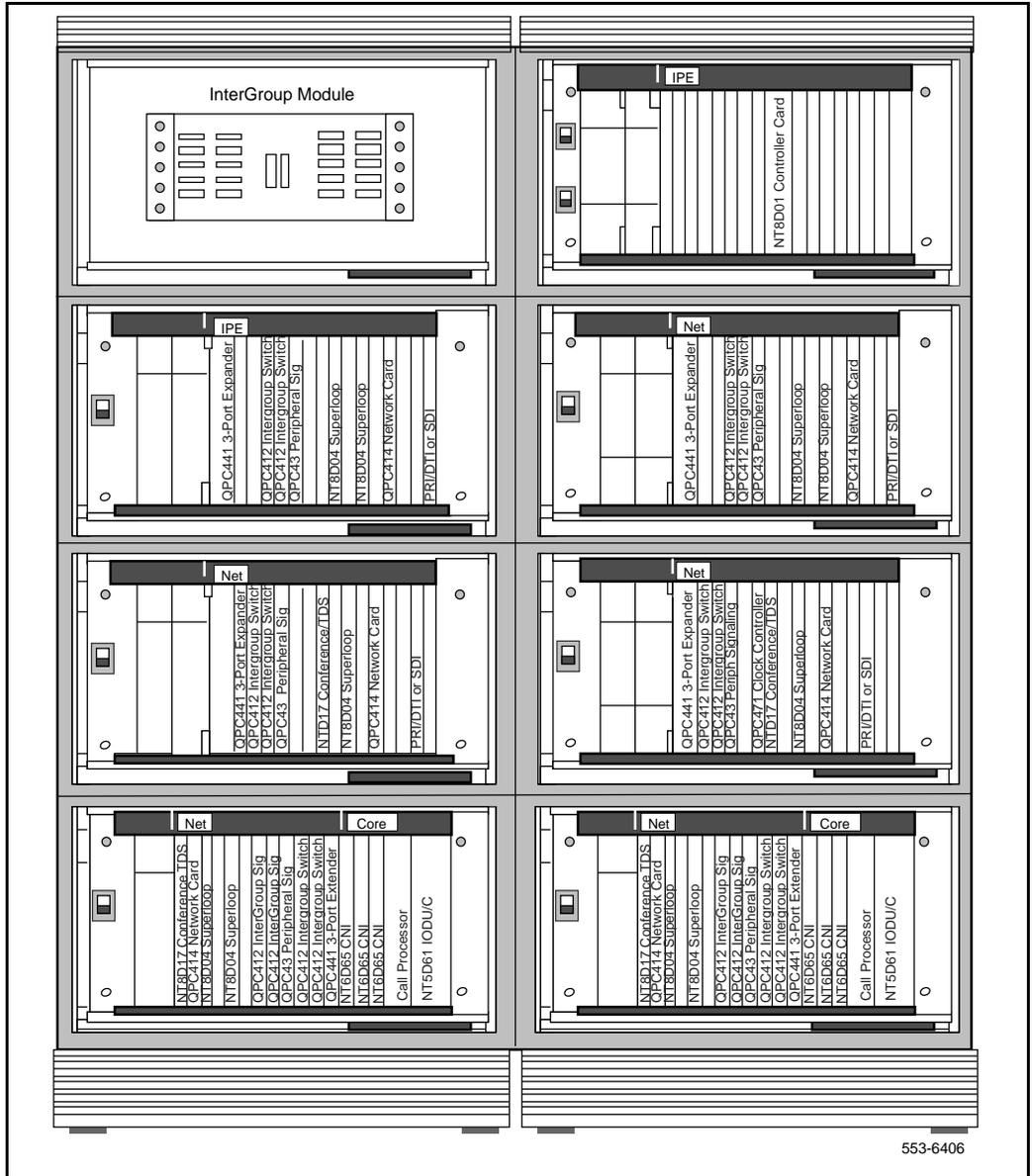
System option 81C

System option 81C is a fully redundant CPU configuration capable of supporting up to 10,000 ports connecting up to five network groups. Both Meridian 1 dual-loop networks and associated peripherals are supported along with superloop network cards. Assuming duplicated service circuits on each network group, 140 of the available 160 loops can be equipped to support voice/data requirements.

Figure 3 shows an option 81C X11 release 21 or later system with two Core/Network Modules, four Network Modules, one InterGroup Module, and one IPE Module. All system options are available with either AC or DC power.

Two NT5D21 Core/Network Modules support the CPU and network functions. Each Core/Network Module can also hold up to two Primary Rate Interface/Digital Trunk Interface (PRI/DTI) cards.

Figure 3
Typical option 81C configuration



Selecting the upgrade

This chapter describes how to audit SL-1 and Meridian 1 systems supported on hardware and software prior to X11 release 24 and how to upgrade them to Meridian 1 systems supported on X11 release 24 or later software.

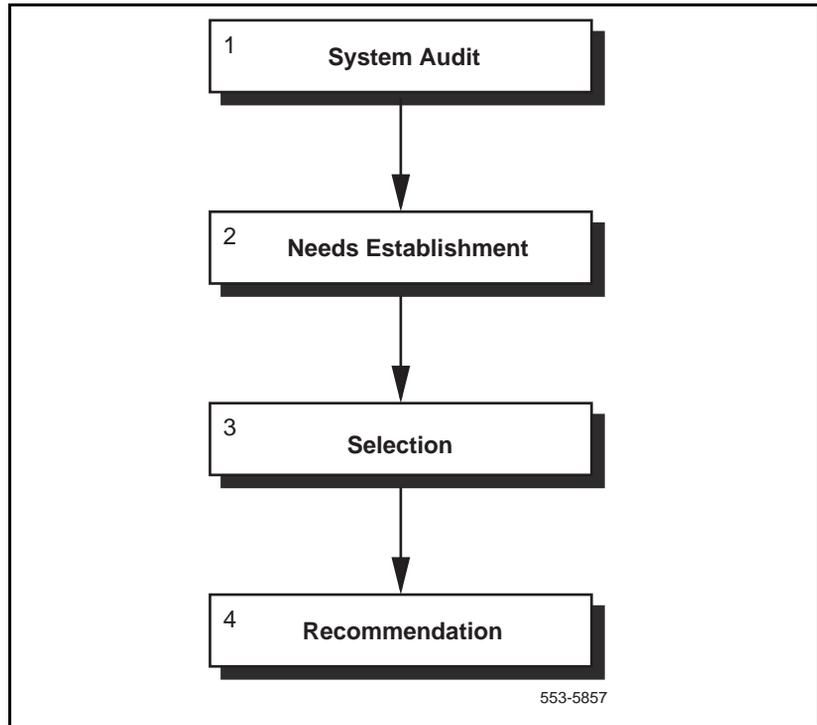
Note: X11 release 24 supports upgrades to system options 51C, 61C, and 81C only.

Upgrade selection process

There are many different upgrade options available. To help ensure that the best solution is provided and the most appropriate upgrade selected, this chapter provides an outline of recommended steps to arrive at the right choice.

Figure 4 illustrates the four selection stages to determine your system upgrade requirements.

Figure 4
System upgrade selection stages



Stage 1. System audit

Before considering which upgrade path is most suitable for your customer, the starting point must be clearly established. Therefore details about the existing system should be identified.

To help guide you through this step, the System Audit Checklist form on the following page provides a checklist to use when making the system audit.

“SL-1 cabinets” on page 351 contains a complete package of cabinet layout templates for existing systems. These can be copied and the appropriate one used for the system audit. Card types with their codes and vintages can be filled in on the diagram.

When the system audit has been completed, this diagram will provide you with an overview of the system so you can make the right choices when ordering equipment for the upgrade. For example, you may discover that because of the shelf positions, a shorter cable than first expected is adequate.

In addition to the checklist and layout diagram, the system record should be printed and attached. This will detail the system/software type, software packages, configuration, memory, and any unused peripheral cards and units.

Overlays required for this information are:

- LD 20Print Routine 1
- LD 21Print Routine 2
- LD 22Print Routine 3
- LD 81Features/Stations Print

Figure 5
System audit checklist form (Part 1 of 2)

System Audit Checklist		
System Type: _____		
Software Generic/Release: _____		
ROM Card: _____		
Software Content: Details Attached	_____	Y N

Configuration Content: Details Attached	_____	Y N

Voice Ports _____	Data Ports _____	Trunks _____
Applications (check those in use):		
Networking _____	ACD _____	Meridian Mail _____
Data Switching _____	ISDN PRI _____	Meridian Link _____
Meridian Modular Telephones _____	(Details: _____)	
Other Telephones: _____		
Other Voice Mail: _____		
Available Capacity		
Memory: _____		
PE Shelf Space: _____		

Spare PE Card Positions: _____		

Power (Loading & Unused Levels): _____		

Figure 5
System audit checklist form (Part 2 of 2)

System Audit Checklist

Available Capacity _____

Room Size: _____

EMI: _____ Which Cabinets? _____

Environmental Levels: _____

Cabling Details _____

PE to MDF Cables—Additional space Required: _____
(for example, on MDF, Ladder Rack, under floor, and so on)

Tie Cables to other floors/buildings: _____

Distribution Cable Capacities: _____

Station Cable Required?: _____ Y N

Additional Comments

Page 2 of 2

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Stage 2. Establishing needs

The most appropriate path for a system upgrade depends on a variety of factors. It's important to establish the customer's reasons for an upgrade, any factors not previously considered that may help the customer, and the customer's expected needs in the future.

A customer may simply wish to obtain an estimate of the price associated with increasing system line size, adding data, or adding an application product. When you talk to the customer, you can understand more about the true needs and justify other ideas that would be beneficial.

Possible reasons for an upgrade are:

- new applications
- system growth—line size, processor, memory, network, and so on
- redundancy—from single CPU to dual CPU

Often growth in the customer's organization is the reason for replacing or upgrading the system. Meridian 1 also offers the customer sophisticated applications that offer other reasons to upgrade to Meridian 1 even before organizational size becomes a factor.

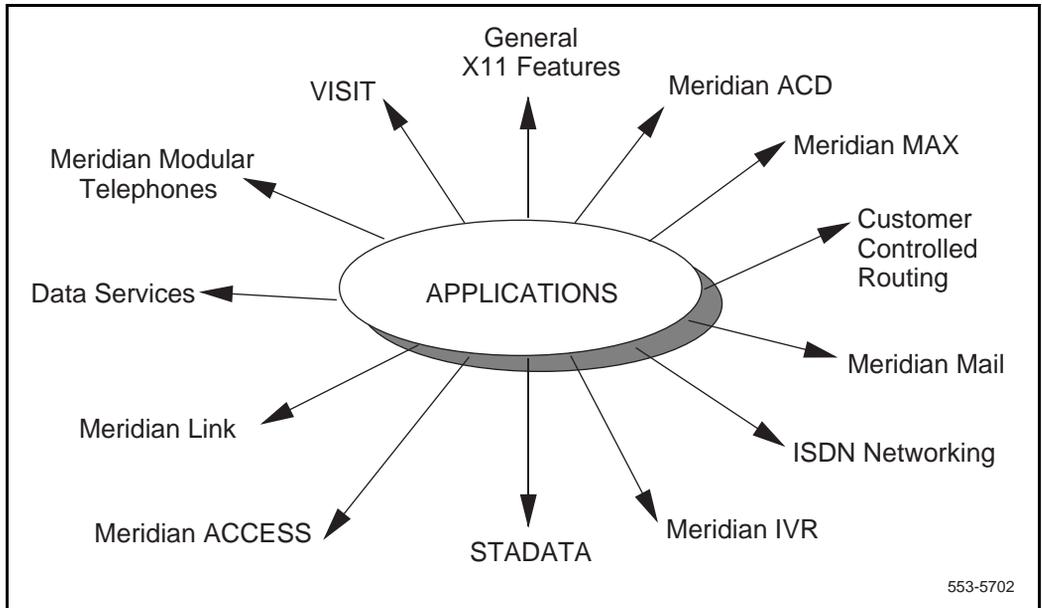
Figure 6 shows applications supported by Meridian 1 and Meridian 1 ready SL-1 systems.

You should know as much as possible about your customer's future plans. There may be a strategic plan for the business to expand in a couple of years, or perhaps telecommunications management plans to introduce ISDN between remote sites. Such information may mean that an alternative upgrade should be considered to save the customer time and money in the long term. For example, an upgrade from SL-1 MS to Meridian 1 option 61C instead of options 51C.

Station wiring may also be an issue, so any future plans for new terminals are essential to your analysis.

Once the needs of the customer are clear, the next stage is to select the correct upgrade path.

Figure 6
Meridian 1 applications



Stage 3. Upgrade selection

In the following sections, there are detailed descriptions of packages that upgrade your customer's system to the system option found to be most appropriate. This may include an upgrade package plus a selection of equipment that meets specific customer system requirements.

When the system has a software upgrade, the customer may decide to make use of some of the new features provided. These new features may require additional hardware, so any prerequisites must be checked.

Note: It may be helpful to use the cabinet templates from stage 1 to find what the final configuration should be.

With a knowledge of available common equipment, peripheral equipment, power, memory, and software options, you can verify that the planned changes can be easily accommodated.

Table 2 provides a comparison of key system capacities for all Meridian 1 and SL-1 system types.

Table 2
System capacity characteristics (Part 1 of 2)

System type	Port capacity	Busy hour calls	Traffic loops	Timeslots	Simultaneous connections
A	300	4500	6	180	90
M	400	4500	12	360	180
MS	400	6000	12	360	180
S	140	6000	3	90	45
ST	600	6400	12	360	180
STE	600	6400	12	360	180
RT	600	28000	12	360	180
L	1000	4000	12	360	180
LE	1000	4000	12	360	180
N	1200	6400	24	720	360
NT	1500	28000	24	720	360
VL	2500	8000	60	1800	900
VLE	3000	8000	60	1800	900
XL	4000	18000	60	1800	900
XN	5000	18000	120	3600	1800
XT	7000	28000	120	3600	1800

Table 2 (Continued)
System capacity characteristics (Part 2 of 2)

System type	Port capacity	Busy hour calls	Traffic loops	Timeslots	Simultaneous connections
21A	128	6000	3	90	45
21	800	7300	24	720	360
21E	1000	23000	24	720	360
51	1000	28000	12	360	180
51C	1000	32000	12	360	180
61	2000	28000	28	840	420
61C	2000	32000	28	840	420
71	10000	32000	140	4200	2100
81	10000	70000	140	4200	2100
81C	10000	70000	140	4200	2100

Stage 4. Recommendation

The final stage is to make your recommendation to the customer, giving the reasons why the solution is most suited for present and future customer system requirements.

Upgrade paths

Table 3 lists systems that have to be upgraded, upgraded systems, and upgrade methods supported for upgrading pre-X11 release 19 systems to systems running on X11 release 24 and higher.

Note: To obtain the hardware upgrade package number for the U.S.A. and the Canadian version of system upgrades, contact your Northern Telecom sales representative.

Table 3 shows the X11 release associated with each system and its available release levels. The last two digits in the “X11 system number” column indicate the software generic (X11); the first one or two digits indicate the system type. For example, the system type for system option 71 is 1211.

Table 3
Software generic by machine type (Part 1 of 2)

System type	X11 system number	Lowest supported X11 release	Highest supported X11 release
ST	1011	9	17
STE	1511	18	21
NT	1111	8	21
XT	1211	8	21
RT	1311	12	21
Option 21	1011	15	17
Option 21E	1511	18	21
Option 51	1111	15	21
Option 51C with NT6D66 CP card	1711	20	24
Option 51C with NT9D19 CP card	2211	22	24
Option 51C with NT5D10 CP or NT5D03 CP card	2411	23	24
Option 61	1111	15	21
Option 61C with NT6D66 CP card	1811	19	24
Option 61C with NT9D19 CP card	2311	22	24
Option 61C with NT5D10 CP or NT5D03 CP card	2511	23	24
Option 71	1211	15	21
Option 81 with NT6D66 CP card	1611	18	21
Option 81 with NT9D19 CP card	1911	21	24

Table 3 (Continued)
Software generic by machine type (Part 2 of 2)

System type	X11 system number	Lowest supported X11 release	Highest supported X11 release
Option 81 with NT5D10 CP or NT5D03 CP card	2611	23	24
Option 81C with NT6D66 CP card	1611	21	21
Option 81C with NT9D19 CP card	1911	21	24
Option 81C with NT5D10 CP or NT5D03 CP card	2611	23	24

Note: X11 releases 15 and 18 require new hardware. Read the conversion notes for more information.

Upgrading an SL-1 A system

This section provides engineering information for upgrading an SL-1 A system to the following system supported by X11 release 24 software:

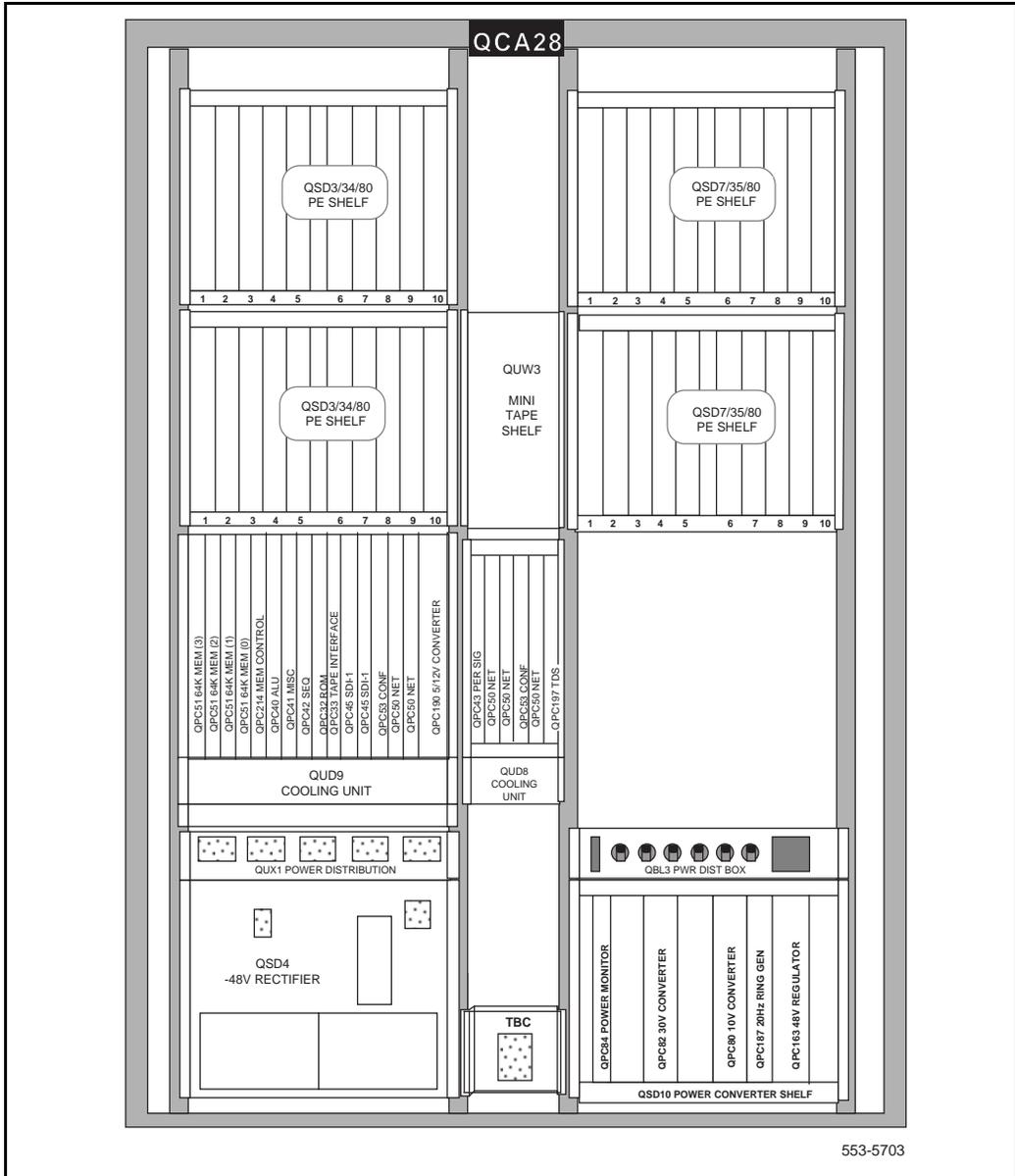
- Option 61C X11 release 24

Upgrading an A system to an option 61C requires installing a Meridian 1 column next to the SL-1 A system cabinet. This column houses CE and network equipment in the Core/Network Modules for options 51C and 61C. Optionally, it also houses IPE cards in the IPE Modules. The existing A system cabinet is used to support existing PE cards.

Some existing configurations may include QCA7 and QCA8 type peripheral cabinets used to support existing PE cards.

Figure 7 shows a typical primary SL-1 A cabinet configuration containing CE, network, and PE shelves.

Figure 7
SL-1 A system cabinet



553-5703

Upgrading an A system to option 61C

To upgrade an SL-1 A system to a Meridian 1 option 61C, identify the base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing A system or the base level upgrade package.

Base level upgrade package

The basic equipment package required to upgrade an A system to option 61C is:

— A system to Option 61C Module Package

Each package provides capacity for a dual CPU, dual memory, 28 network loops* or six network superloops** plus four extra voice/data network loops.*

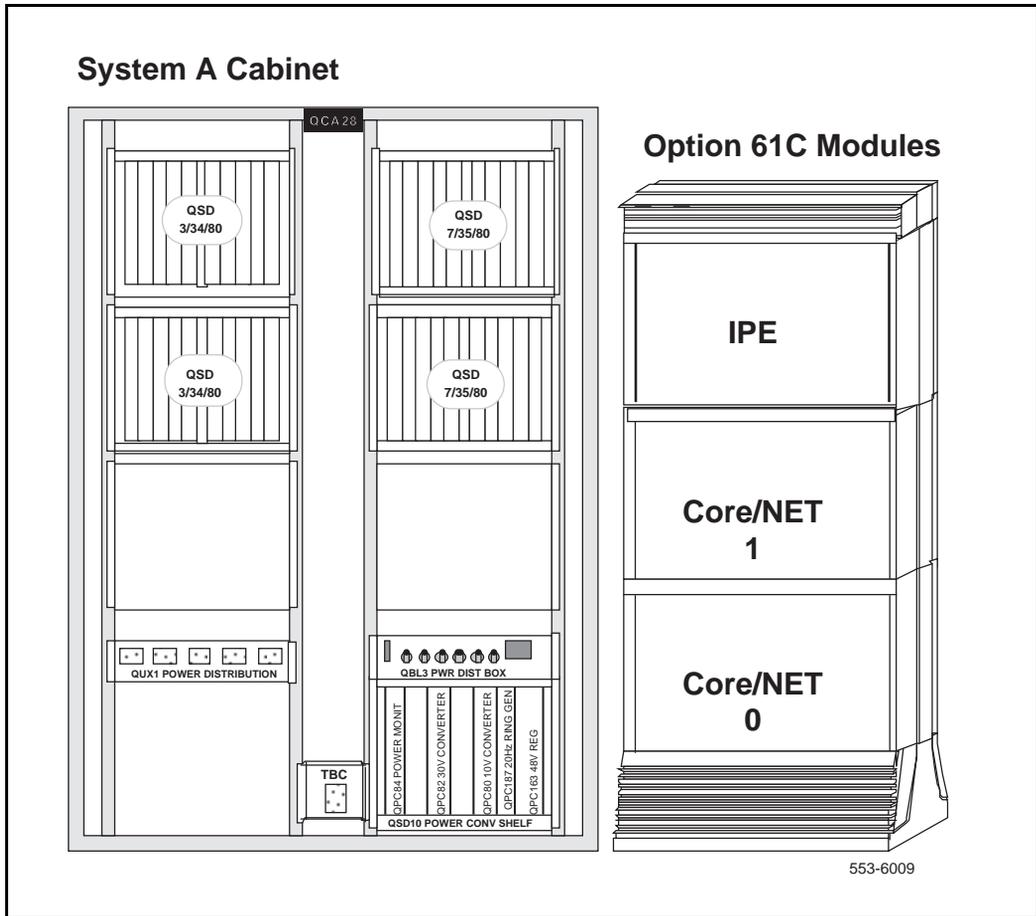
* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

The upgrade package provides one empty IPE Module with the power supply. Existing PE is reused in the existing QCA28, QCA7, and QCA8 cabinets. PE growth is accomplished from add-on PE cards in the existing cabinets or from add-on IPE Modules. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 8 shows an A system cabinet next to an option 61C column. The option 61C column consists of two Core/Network Modules and an IPE Module.

Figure 8
A system to option 61C upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM

- Included in the base level upgrade package

Call processor unit

- An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Memory and peripheral signaling

- Included in the base level upgrade package

Tone and digit switch and conference

- Included in the base level upgrade package
- QPC444 Conference cards as required (nonvoice conference applications)

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support the PE in the existing cabinets. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards and modules added to the system. One NT8D04 Superloop Network card is included in the base level upgrade package. One NT8D01 Peripheral Controller card must be added to the upgrade package to support the IPE cards in the IPE Module supplied in the base level upgrade package.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable must be determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings must be determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in the existing cabinets. Additional PE can be added to the system, but must be located in the existing cabinets. IPE growth is supported in the IPE shelf of the new base module and from add-on IPE Modules. DTI or PRI or both can be added to the upgraded system and located in the CE shelf of the new base module or, from the addition of a network expansion module, can be added to the base module. The above hardware is not included in the base level upgrade package. Consult NTP and Pricing documentation for ordering information.

Module pedestal equipment

- Included in the base level upgrade package (AC or DC)

The option 61C column is preassembled in the factory and includes the appropriate pedestal assembly.

Equipment cabinet power

- Included in the base level upgrade package (AC or DC)
- Reuse existing cabinet power rectifier (AC only)

The type of power input for each new module added to the upgraded system must be determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- MPP600 Modular Power System with NT5C07 Rectifiers as required, or
- MFA150 Modular Power System with NT5C06 Rectifiers, as required
- Batteries as required

See “Power and ground engineering” on page 305 for engineering details for multiple power combinations.

System monitor connections

See “System monitor” on page 299 for specific power monitor requirements.

Ground

See “Power and ground engineering” on page 305 for specific grounding requirements.

Upgrading an SL-1 L system

This section provides engineering information for upgrading an SL-1 L system to the following systems supported by X11 release 24 software:

- Option 61C
- Option 81C

Upgrading an L system to options 61C and 81C requires installing one or more Meridian 1 columns next to the SL-1 L system cabinet. These columns provide CE, network, and IPE equipment housing. The existing L system cabinet is used to support existing PE cards.

Some existing configurations may include QCA7 and QCA8 type peripheral cabinets used to support existing PE cards.

Figure 9 shows a typical SL-1 L primary cabinet configuration containing CE and network shelves.

Upgrading an L system to option 61C

To upgrade an SL-1 L system to a Meridian 1 option 61C, identify the base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing L system or the base level upgrade package.

Base level upgrade package

The basic equipment package required to upgrade an L system to option 61C is:

— L System to Option 61C Module Package

Each package provides capacity for a dual CPU, dual memory, 28 network loops* or six network superloops** plus four extra voice/data network loops.*

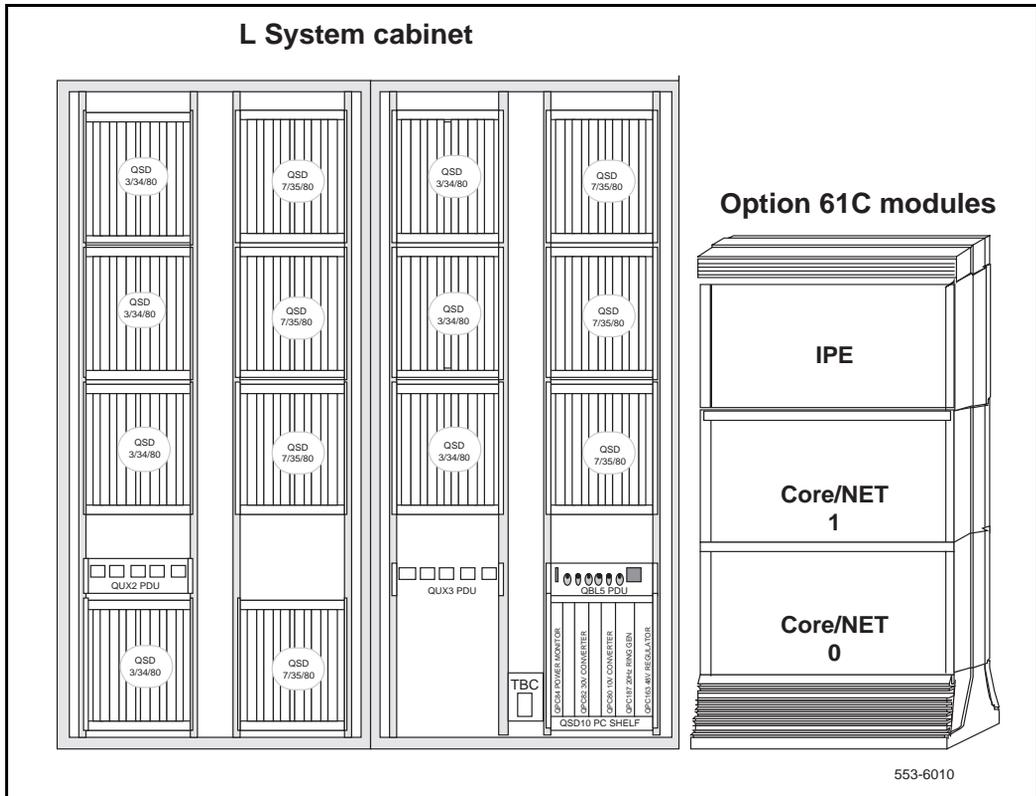
* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

The upgrade package provides one empty IPE Module with the power supply. Existing PE is reused in the existing QCA7 and QCA8 cabinets. PE growth is accomplished from add-on IPE Modules. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 10 shows L system cabinets next to an option 61C column. The option 61C column consists of two Core/Network Modules and an IPE Module.

Figure 10
L system to option 61C upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input Output Disk Unit with CD-ROM

- Included in the base level upgrade package

Call processor unit

- An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

- Included in the base level upgrade package
- QPC444 Conference cards as required (nonvoice conference applications)

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support the PE in the existing cabinets. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards and modules added to the system. One NT8D04 Superloop Network card is included in the base level upgrade package. One NT8D01 Peripheral Controller card must be added to the upgrade package to support the IPE cards in the IPE Module supplied in the base level upgrade package.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable must be determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings must be determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in the existing cabinets. Additional PE can be added to the system, but must be located in the existing cabinets. IPE growth is supported in the IPE shelf of the new base module and from add-on IPE Modules. DTI or PRI or both can be added to the upgraded system and located in the CE shelf of the new base module or, from the addition of a network expansion module, can be added to the base module. The above hardware is not included in the base level upgrade package. Consult NTP and Pricing documentation for ordering information.

Module pedestal equipment

- Included in the base level upgrade package (AC or DC)

The option 61C column is preassembled in the factory and includes the appropriate pedestal assembly.

Equipment cabinet power

- Included in the base level upgrade package (AC or DC)
- Reuse existing cabinet power rectifier (AC only)

The type of power input for each new module added to the upgraded system must be determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- System 600/48 Power Plant with NT5C07 Rectifiers as required, or
- MFA150 Modular Power System with NT5C06 Rectifiers, as required
- Batteries as required

See “Power and ground engineering” on page 305 for engineering details for multiple power combinations. |

System monitor connections

See “System monitor” on page 299 for specific power monitor requirements. |

Ground

See “Power and ground engineering” on page 305 for specific grounding requirements. |

Upgrading an L system to option 81C

To upgrade an SL-1 L system to a Meridian 1 option 81C, identify the module base level upgrade package you want to use. This package contains the minimum equipment required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing L system or the base level upgrade package.

Upgrading an L system to option 81C requires installing two or more Meridian¹ columns next to the SL-1 L system cabinet. These columns provide CE, network, and IPE housing. The existing L system cabinet is used to support PE cards.

When engineering an upgrade to option 81C, first review the appropriate upgrade procedures in *Upgrade system installation to X11 release 23* (553-3001-258) and then check the ordering package content and ordering notes in the Pricing documentation.

Base level upgrade package

The basic equipment package used to upgrade system L to option 81C X11 release 24 is:

- L System to Option 81C Core/Network and Network Module Upgrade Package

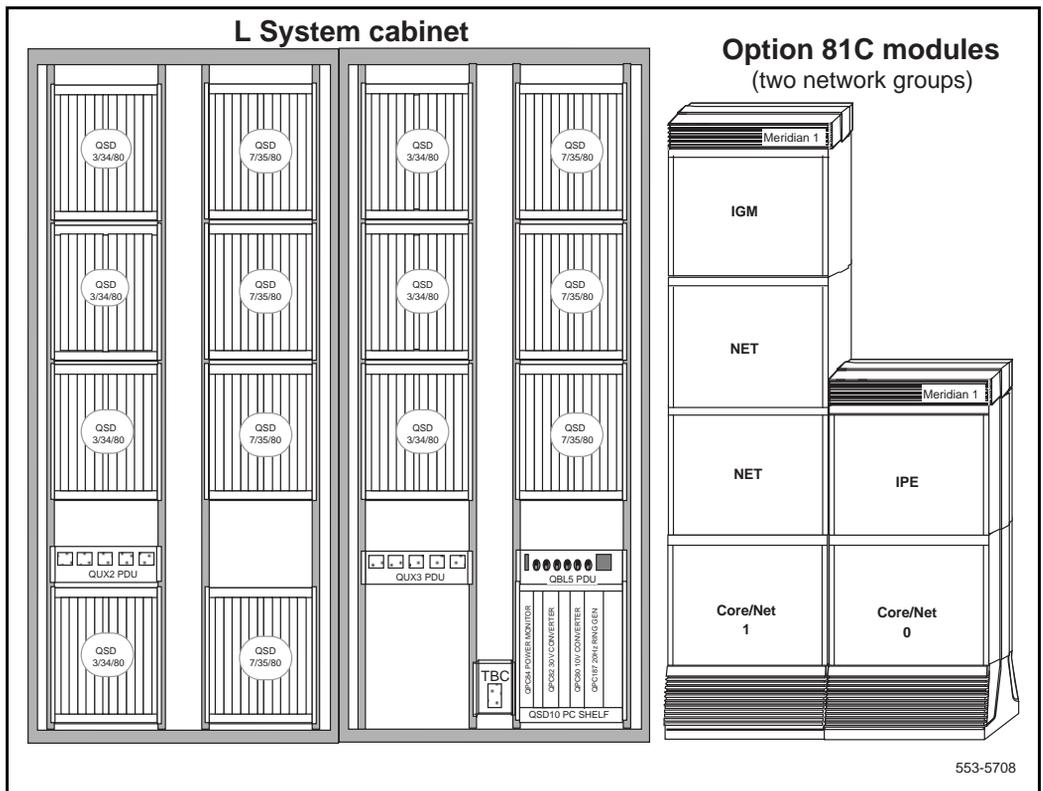
The upgrade package provides two Core/Network Modules, two Network Modules, one InterGroup Module, and one IPE Module. This package provides CNI cards and cables for one network group. Additional network groups, corresponding core to network interface (CNI) cards, and required network cable packages are not included in the base level upgrade package; however, they can be ordered separately. When upgrading the system using this Core/Network and Network Module Upgrade Package, CPU and network functions are supported in option 81C Core/Network and Network Modules and peripheral functions are supported in both the existing cabinets and option 81C IPE Modules.

To connect network equipment in option 81C columns to peripheral equipment in existing cabinets, EMI-compliant connector housings are installed on existing cabinets to connect external shielded cables between cabinets and I/O panels located at the rear of option 81C Network Modules.

PE growth is accomplished from add-on PE cards in existing cabinets. IPE growth is accomplished from add-on IPE Modules and cards. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 11 shows L system cabinets next to option 81C columns. It shows a Core/Network and Network Module upgrade configuration using the base level upgrade package, which provides Core/Network, Network, InterGroup, and IPE Modules.

Figure 11
L system to option 81C upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input/Output Disk Unit with CD-ROM

— Included in the base level upgrade package

Call processor unit

— Included in the base level upgrade package

An NT6D66 or NT9D19 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

- Add NT8D17 Conference/TDS cards as required
- QPC444 Conference cards as required (nonvoice conference applications)

Two NT8D17 Conference/TDS cards are included in the base level upgrade package. QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Peripheral signaling and intergroup switch

- Included in the base level upgrade package

Four QPC412 Intergroup Switch cards are included in the base level upgrade package to support one group. Additional cards can be provided as required.

Network group junctor

- Included in the base level upgrade package

Network equipment

- AS1039A/D Network Group Assembly as required
- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

To support additional network groups specified in AS1039A/D, additional NT6D65 Core to Network Interface (CNI) cards must be ordered. Two CNI cards are required for every two groups after the first group. Two CNI cards are included in the base level upgrade package to support the first group. To support groups 2 and 3, another pair of CNI cards must be ordered, and so on up to a maximum of five groups. Each additional group also requires four NT8D76 and four NTND14 cables of appropriate lengths.

Additional network groups can be ordered as:

- A pair of completely empty Network Modules, using the AS1007A/D package. In this case, all necessary cards from the existing network shelves in the existing cabinet are transferred to Network Modules in option 81C. This method utilizes the greatest number of existing cards; however, the upgrade process is longer causing a greater system downtime.
- Complete network groups, using the AS1039A/D package. In this case, Network Modules are already equipped with the network support cards such as IGS, 3PE, PS, and BTU, and only the actual network cards need to be transferred from the existing cabinet. This network group expansion method is strongly recommended.

Two NT8D04 Superloop Network cards are included in the base level upgrade package. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base IPE Module or any add-on IPE Modules.

The number of additional QPC414 cards must be determined based on the number of network loop connections needed to support PE cards in the existing cabinets or any PE cards in add-on PE Modules.

Network cards are not supported in the existing cabinet and the Network Modules simultaneously. These cards must be in the existing cabinet or Network Modules exclusively, depending on the base level upgrade package you selected.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable must be determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in existing cabinets. Additional PE can be added to the system, but must be located in existing cabinets. IPE growth is supported in the IPE Module included in the base level upgrade package and from add-on IPE Modules.

To connect PE cards in existing cabinets with corresponding network cards in option 81C, external shielded cables must be engineered and ordered. Sets of NT8D86, NT8D73, and NT9J96 cables along with appropriate connector housings must be ordered. Refer to “Network to peripheral I/O cables” on page 283.

PRI/DTI cards can be added to the upgraded system and located in option 81C Core/Network Modules or they can remain in the existing cabinet.

If PRI/DTI cards remain in existing cabinets, external shielded cables must be used to connect these cards to QPC414 Network cards through I/O Panel connectors on option 81C Network Modules and connector housing I/O connectors on existing cabinets.

If PRI/DTI cards are located in option 81C Core/Network Modules, appropriate internal cables must be ordered to connect PRI/DTI cards directly to QPC414 Network cards.

Module pedestal equipment

— AS1001A/D Pedestal Assembly (up to four modules)

Two pedestals are included in the base level upgrade package. The number of additional pedestal assemblies will depend on the number of modules added to the upgraded system.

Equipment cabinet power

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate. See “Power and ground engineering” on page 305 for more information.

Reserve system power equipment

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate.

System monitor connections

See “System monitor” on page 299 for specific requirements to support this type of upgrade. Also see upgrade installation procedures in *Upgrade system installation to X11 release 23* (553-3001-258).

Ground

See “Power and ground engineering” on page 305 for specific requirements to support this type of upgrade.

Upgrading an SL-1 LE system

This section provides engineering information for upgrading an SL-1 LE system to the following systems supported by X11 release 24 software:

- Option 61C
- Option 81C

Upgrading an LE system to options 61C and 81C requires installing one or more Meridian 1 columns next to the SL-1 LE system cabinet. This column provides CE and network equipment housing. The existing LE system cabinet is used to support the existing peripheral equipment including DTI cards.

Some existing configurations may include QCA7 and QCA8 type peripheral cabinets used to support existing PE cards.

Figure 12 shows a typical SL-1 LE primary cabinet configuration containing two CE, two network, and one PE shelves.

Upgrading an LE system to option 61C

To upgrade an SL-1 LE system to a Meridian 1 option 61C, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing LE system or the base level upgrade package.

Base level upgrade package

The basic equipment package required to upgrade an LE system to option 61C is:

— LE System to Option 61C Module Package

Each package provides capacity for a dual CPU, dual memory, 28 network loops* or six network superloops** plus four extra voice/data network loops.*

* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

The upgrade package provides one empty IPE Module with the power supply. Existing PE is reused in the existing QCA28, QCA7, and QCA8 cabinets. PE growth is accomplished from add-on PE cards in the existing cabinets or from add-on IPE Modules. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 13 shows LE system cabinets next to an option 61C column. The option 61C column consists of two Core/Network Modules and an IPE Module.

Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input Output Disk Unit with CD-ROM

— Included in the base level upgrade package

Call processor unit

— Included in the base level upgrade package

An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

— Included in the base level upgrade package

— QPC444 Conference cards as required (nonvoice conference applications)

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support the PE in the existing cabinets. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards and modules added to the system. One NT8D04 Superloop Network card is included in the base level upgrade package. One NT8D01 Peripheral Controller card must be added to the upgrade package to support the IPE cards in the IPE Module supplied in the base level upgrade package.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in the existing cabinets. Additional PE can be added to the system, but must be located in the existing cabinets. IPE growth is supported in the IPE shelf of the new base module and from add-on IPE Modules. DTI or PRI or both can be added to the upgraded system and located in the CE shelf of the new base module or, from the addition of a network expansion module, can be added to the base module. The above hardware is not included in the base level upgrade package. Consult NTP and Pricing documentation for ordering information.

Module pedestal equipment

- Included in the base level upgrade package (AC or DC)

The option 61C column is preassembled in the factory and includes the appropriate pedestal assembly.

Equipment cabinet power

- Included in the base level upgrade package (AC or DC)
- Reuse existing cabinet power rectifier (AC only)

The type of power input for each new module added to the upgraded system must be determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- System 600/48 Modular Power Plant with NT5C07 Rectifiers as required, or
- MFA150 Rack Assembly with NT5C06 Rectifiers as required
- Batteries as required

See “Power and ground engineering” on page 305 for engineering details for multiple power combinations. |

System monitor connections

See “System monitor” on page 299 for specific power monitor requirements. |

Ground

See “Power and ground engineering” on page 305 for specific grounding requirements. |

Upgrading an LE system to option 81C

To upgrade an SL-1 LE system to a Meridian 1 option 81C, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing LE system or the base level upgrade package.

Upgrading an LE system to option 81C requires installing two or more Meridian[®]1 columns next to the SL-1 LE system cabinet. These columns provide CE, network, and IPE housing. The existing LE system cabinet is used to support PE cards.

When engineering an upgrade to option 81C, review appropriate upgrade procedures in *Upgrade system installation to X11 release 23 (553-3001-258)* and then check the ordering package contents and ordering notes in the Pricing documentation.

Base level upgrade package

The basic equipment package used to upgrade an LE system to option 81C X11 release 24 is:

- LE System to Option 81C Core/Network and Network Module Upgrade Package

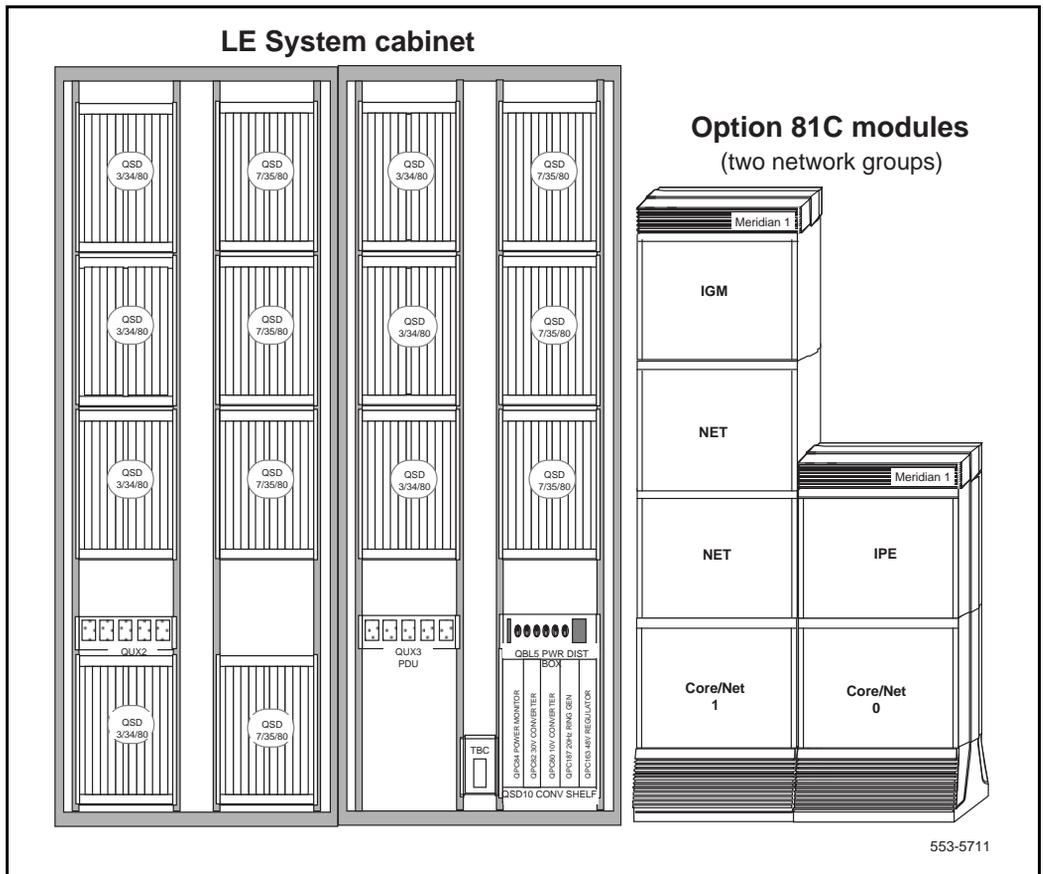
The upgrade package provides two Core/Network Modules, two Network Modules, one InterGroup Module, and one IPE Module. This package provides CNI cards for one network group. Additional network groups, corresponding Core/Network to Network Interface (CNI) cards, and required network cable packages are not included in the base level upgrade package; however, they can be ordered separately. When upgrading the system using this Core/Network and Network Module Upgrade Package, CPU and network functions are supported in option 81C Core/Network and Network Modules and peripheral functions are supported in both the existing cabinets and option 81C IPE Modules.

To connect network equipment in option 81C columns to peripheral equipment in existing cabinets, EMI compliant connector housings are installed on existing cabinets to connect external shielded cables between cabinets and I/O panels located at the rear of option 81C Network Modules.

PE growth is accomplished from add-on PE cards in existing cabinets. IPE growth is accomplished from add-on IPE Modules and cards. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 14 shows LE system cabinets next to option 81C columns. It shows a Core/Network and Network Module upgrade configuration using the base level upgrade package, which provides Core/Network, Network, InterGroup, and IPE Modules.

Figure 14
LE system to option 81C upgrade



553-5711

Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input Output Disk Unit with CD-ROM

- Included in the base level upgrade package

Call processor unit

- An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

- Add NT8D17 Conference/TDS cards as required
- QPC444 Conference cards as required (nonvoice conference applications)

Two NT8D17 Conference/TDS cards are included in base level upgrade package. QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Peripheral signaling and intergroup switch

- Included in the base level upgrade package

Four QPC412 Intergroup Switch cards are included in the base level upgrade package to support one group. Additional cards can be provided as required.

Network group junctor

- Included in the base level upgrade package

Network equipment

- AS1039A/D Network Group Assembly as required
- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

To support additional network groups specified in AS1039A/D, additional NT6D65 Core to Network Interface (CNI) cards must be ordered. Two CNI cards are required for every two groups after the first group. Two CNI cards are included in the base level upgrade package to support the first group. To support groups 2 and 3, another pair of CNI cards must be ordered, and so on up to a maximum of five groups. Each additional group also requires four NT8D76 and four NTND14 cables of appropriate lengths.

Additional network groups can be ordered as:

- A pair of completely empty Network Modules, using the AS1007A/D package. In this case, all necessary cards from the existing Network shelves in the existing cabinet are transferred to Network Modules in option 81C. This method utilizes the greatest number of existing cards; however, the upgrade process is longer causing a greater system downtime.
- Complete network groups, using the AS1039A/D package. In this case, Network Modules are already equipped with the network support cards such as IGS, 3PE, PS, and BTU, and only the actual network cards need to be transferred from the existing cabinet. This network group expansion method is strongly recommended.

Two NT8D04 Superloop Network cards are included in the base level upgrade package. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base IPE Module or any add-on IPE Modules.

The number of additional QPC414 cards is determined based on the number of network loop connections needed to support PE cards in the existing cabinets or any PE cards in add-on PE Modules.

Network cards are not supported in the existing cabinet and the Network Modules simultaneously. These cards must be in the existing cabinet or Network Modules exclusively, that depending on the base level upgrade package you selected.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable must be determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in existing cabinets. Additional PE can be added to the system, but must be located in existing cabinets. IPE growth is supported in the IPE Module included in the base level upgrade package and from add-on IPE Modules.

To connect PE cards in existing cabinets with corresponding network cards in option 81C, external shielded cables must be engineered and ordered. Sets of NT8D86, NT8D73, and NT9J96 cables along with appropriate connector housings must be ordered. Refer to “Network to peripheral I/O cables” on page 283 for details.

PRI/DTI cards can be added to the upgraded system and located in option 81C Core/Network Modules or they can remain in the existing cabinet.

If PRI/DTI cards remain in existing cabinets, external shielded cables must be used to connect these cards to QPC414 Network cards through I/O panel connectors on option 81C Network Modules and connector housing I/O connectors on existing cabinets.

If PRI/DTI cards are located in option 81C Core/Network Modules, appropriate internal cables must be ordered to connect PRI/DTI cards directly to QPC414 Network cards.

Module pedestal equipment

— AS1001A/D Pedestal Assembly (up to four modules)

Two pedestals are included in the base level upgrade package. The number of additional pedestal assemblies depending on the number of modules added to the upgraded system.

Equipment cabinet power

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate. See “Power and ground engineering” on page 305 for more information.

Reserve system power equipment

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate.

System monitor connections

See “System monitor” on page 299 for specific requirements to support this type of upgrade. Also see upgrade installation procedures in *Upgrade system installation to X11 release 23* (553-3001-258).

Ground

See “Power and ground engineering” on page 305 for specific requirements to support this type of upgrade.

Upgrading an SL-1 M system

This section provides engineering information for upgrading an SL-1 M system to the following system supported by X11 release 24 software:

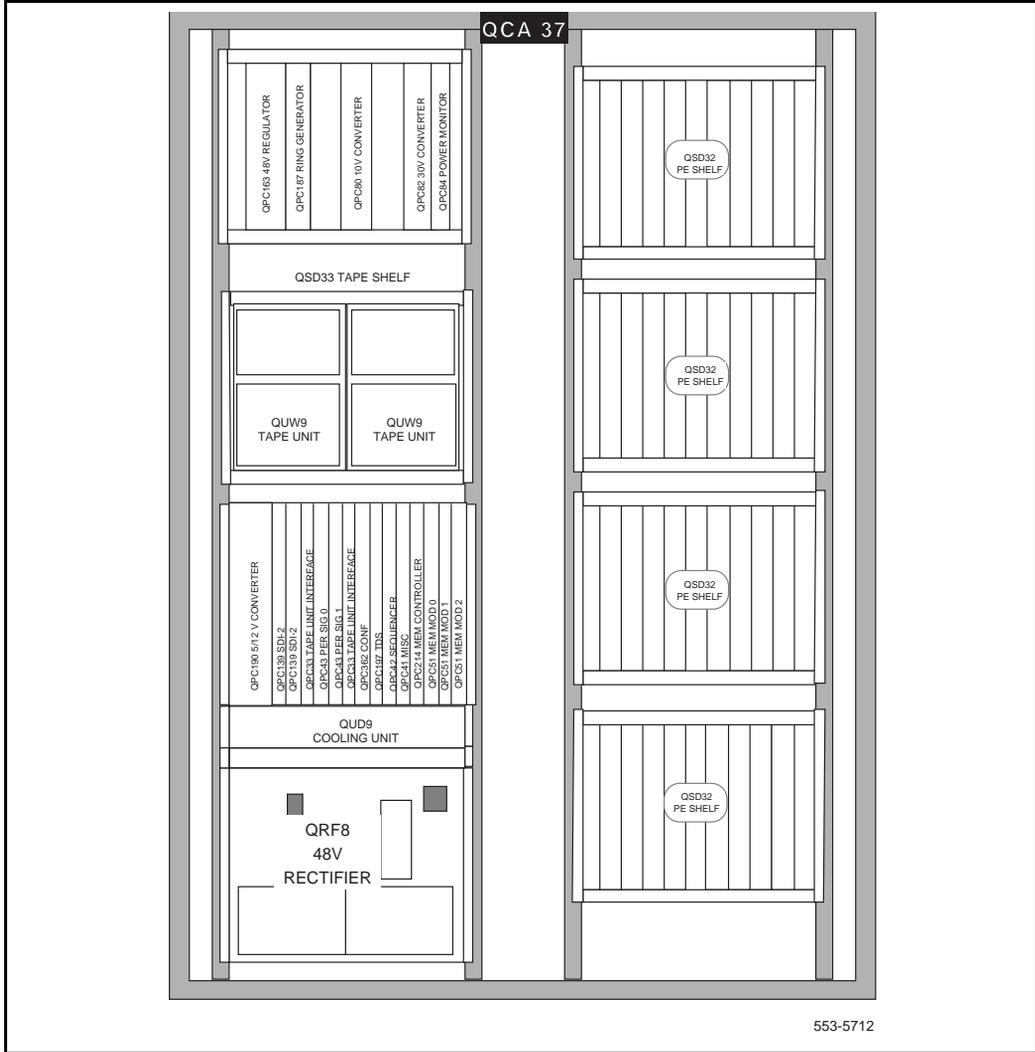
— Option 61C

Upgrading an M system to an option 61C requires installing a Meridianp1 column next to the SL-1 M system cabinet. This column provides CE and network equipment housing. The existing M system cabinet is used to support existing PE cards.

Some existing configurations may include QCA7, QCA8, or QCA37 type peripheral cabinets used to support existing PE cards.

Figure 15 shows a typical SL-1 M primary cabinet configuration containing CE, network, and PE shelves.

Figure 15
SL-1 M system cabinet



Upgrading an M system to option 61C

To upgrade an SL-1 M system to a Meridian 1 option 61C, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing M system or the base level upgrade package.

Base level upgrade package

The basic equipment package required to upgrade an M system to option 61C is:

— M System to Option 61C Module Package

Each package provides capacity for a dual CPU, dual memory, 28 network loops* or six network superloops** plus four extra voice/data network loops.*

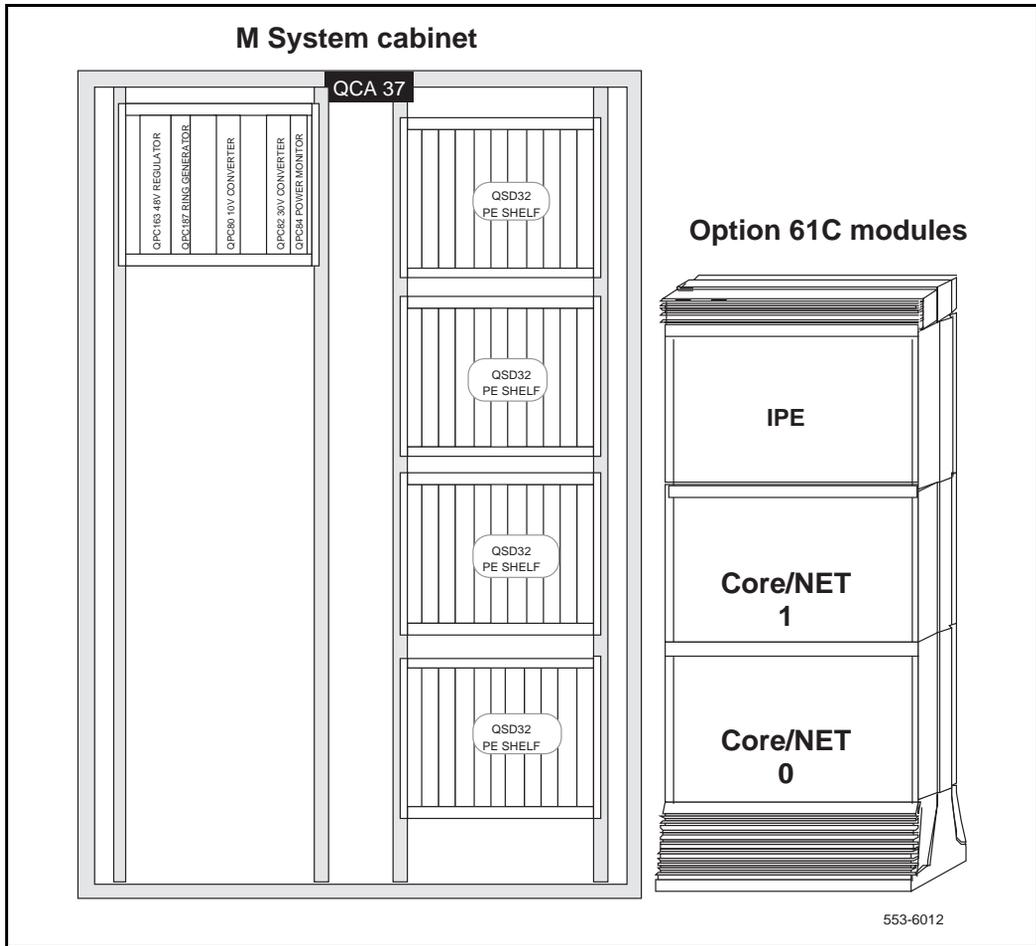
* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

The upgrade package provides one empty IPE Module with the power supply. Existing PE is reused in the existing QCA28, QCA7, and QCA8 cabinets. PE growth is accomplished from add-on PE cards in the existing cabinets or from add-on IPE Modules. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 16 shows an M system cabinet next to an option 61C column. The option 61C column consists of two Core/Network Modules and an IPE Module.

Figure 16
M system to option 61C upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM

- Included in the base level upgrade package

Call processor unit

- An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

- Included in the base level upgrade package
- QPC444 Conference cards as required (nonvoice conference applications)

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support the PE in the existing cabinets. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards and modules added to the system. One NT8D04 Superloop Network card is included in the base level upgrade package. One NT8D01 Peripheral Controller card must be added to the upgrade package to support the IPE cards in the IPE Module supplied in the base level upgrade package.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in the existing cabinets. Additional PE can be added to the system, but must be located in the existing cabinets. IPE growth is supported in the IPE shelf of the new base module and from add-on IPE Modules. DTI or PRI or both can be added to the upgraded system and located in the CE shelf of the new base module or, from the addition of a network expansion module, can be added to the base module. The above hardware is not included in the base level upgrade package. Consult NTP and Pricing documentation for ordering information.

Module pedestal equipment

- Included in the base level upgrade package (AC or DC)

The option 61C column is preassembled in the factory and includes the appropriate pedestal assembly.

Equipment cabinet power

- Included in the base level upgrade package (AC or DC)
- Reuse existing cabinet power rectifier (AC only)

The type of power input for each new module added to the upgraded system is determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- System 600/48 Power Plant with NT5C07 Switch Mode Rectifiers, or
- AMFA150 Rack Assembly with NT5C03 Rectifiers as required
- Batteries as required

See “Power and ground engineering” on page 305 for engineering details for multiple power combinations. |

System monitor connections

See “System monitor” on page 299 for specific power monitor requirements. |

Ground

See “Power and ground engineering” on page 305 for specific grounding requirements. |

Upgrading an SL-1 MS system

This section provides engineering information for upgrading an SL-1 MS system to the following system supported by X11 release 24 software:

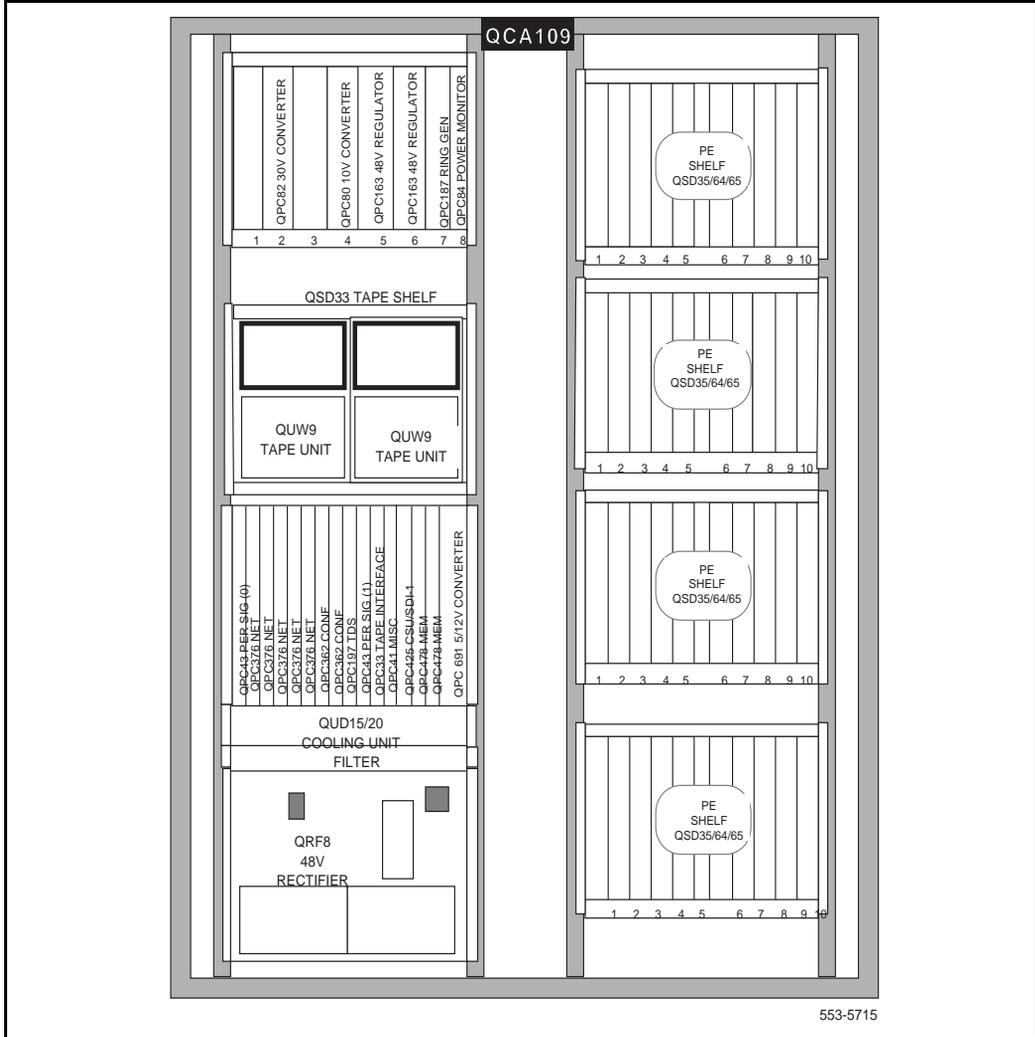
— Option 61C

Upgrading an MS system to an option 61C requires installing a Meridianp1 column next to the SL-1 MS system cabinet. This column provides CE and network equipment housing. The existing MS system cabinet is used to support PE cards including the DTI/PRI cards.

Some existing configurations may include QCA7, QCA8, or QCA37 type peripheral cabinets used to support existing PE cards.

Figure 17 shows a typical SL-1 MS primary cabinet containing CE, network, and PE shelves.

Figure 17
SL-1 MS system cabinet



Upgrading an MS system to option 61C

To upgrade an SL-1 MS system to a Meridian 1 option 61C, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing MS system or the base level upgrade package.

Base level upgrade package

The basic equipment package required to upgrade an MS system to option 61C is:

— MS System to Option 61C Module Package

Each package provides capacity for a dual CPU, dual memory, 28 network loops* or six network superloops** plus four extra voice/data network loops* with integrated IPE.

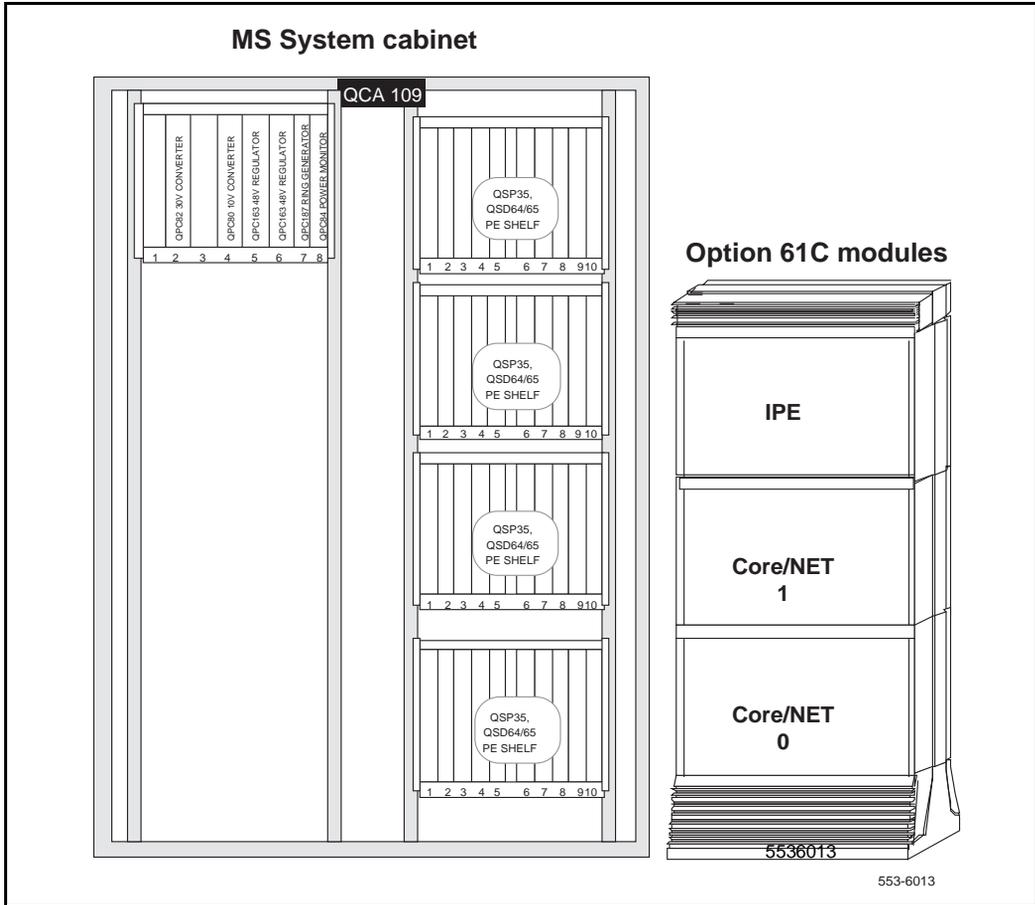
* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

The upgrade package provides one empty IPE Module with the power supply. Existing PE is reused in the existing QCA109 and QCA74 cabinets or QCA37 cabinet if the MS was previously an M system. PE growth is accomplished from add-on PE cards in the existing cabinets or from add-on IPE Modules. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 18 shows an MS system cabinet next to an option 61C column. The option 61C column consists of two Core/Network Modules and an IPE Module.

Figure 18
MS system to option 61C upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM

- Included in the base level upgrade package

Call processor unit

- An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

- Included in the base level upgrade package
- QPC444 Conference cards as required (nonvoice conference applications)

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support the PE in the existing cabinets. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards and modules added to the system. One NT8D04 Superloop Network card is included in the base level upgrade package. One NT8D01 Peripheral Controller card must be added to the upgrade package to support the IPE cards in the IPE Module supplied in the base level upgrade package.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in the existing cabinets. Additional PE can be added to the system, but must be located in the existing cabinets. IPE growth is supported in the IPE shelf of the new base module and from add-on IPE Modules. DTI or PRI or both can be added to the upgraded system and located in the CE shelf of the new base module or, from the addition of a network expansion module, can be added to the base module. The above hardware is not included in the base level upgrade package. Consult NTP and Pricing documentation for ordering information.

Module pedestal equipment

- Included in the base level upgrade package (AC or DC)

The option 61C column is preassembled in the factory and includes the appropriate pedestal assembly.

Equipment cabinet power

- Included in the base level upgrade package (AC or DC)
- Reuse existing cabinet power rectifier (AC only)

The type of power input for each new module added to the upgraded system is determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- System 600/48 Power Plant with NT5C07 Rectifiers as required, or
- MFA150 Rack Assembly with NT5C06 Rectifiers as required
- Batteries as required

See “Power and ground engineering” on page 305 for engineering details for multiple power combinations. |

System monitor connections

See “System monitor” on page 299 for specific power monitor requirements. |

Ground

See “Power and ground engineering” on page 305 for specific grounding requirements. |

Upgrading an SL-1 N system

This section provides engineering information for upgrading an SL-1 N system to the following systems supported by X11 release 24 software:

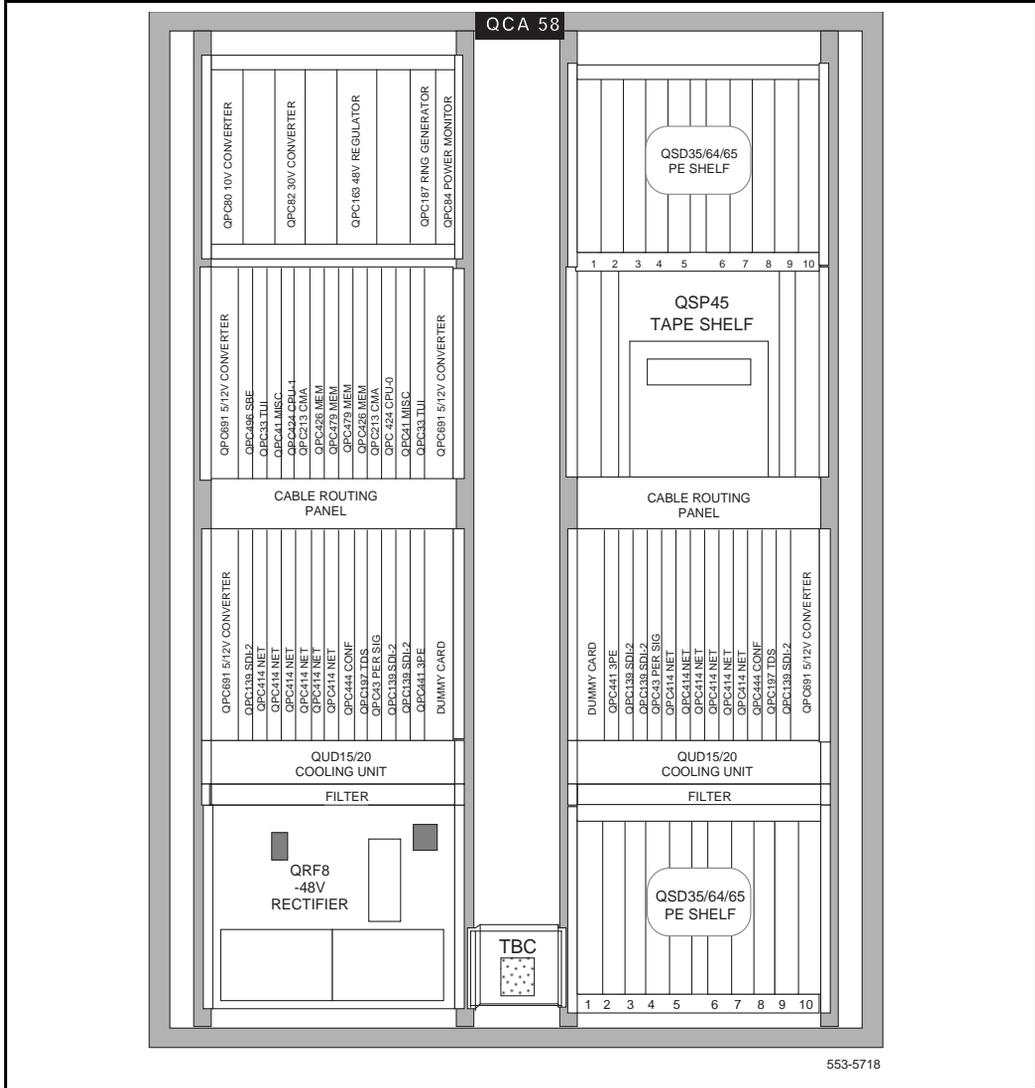
- Option 61C
- Option 81C

Upgrading an N system to options 61C and 81C requires installing one or more Meridian 1 columns next to the SL-1 N system cabinet. This column provides CE, network, and IPE equipment housing. The existing N system cabinet is used to support existing PE cards including the DTI/PRI cards.

Some existing configurations may include QCA7, QCA8, QCA74, or QCA108 type peripheral cabinets used to support existing PE cards.

Figure 19 shows a typical SL-1 N primary cabinet containing CE, network, and PE shelves.

Figure 19
SL-1 N system cabinet



Upgrading an N system to option 61C

To upgrade an SL-1 N system to a Meridian 1 option 61C, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing N system or the base level upgrade package.

Base level upgrade package

The basic equipment package required to upgrade an N system to option 61C is:

— N System to Option 61C Module Package

Each package provides capacity for a dual CPU, dual memory, 28 network loops* or six network superloops** plus four extra (voice/data) network loops* with integrated IPE.

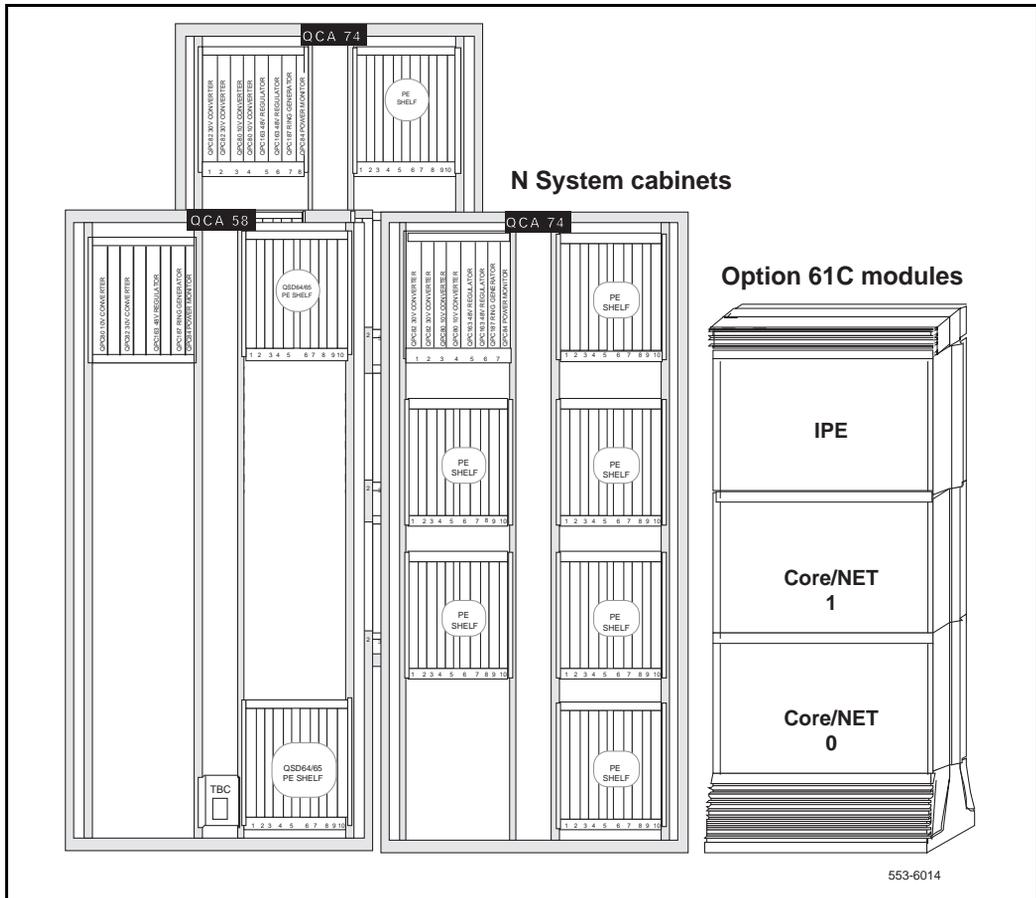
* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

The upgrade package provides one empty IPE Module with the power supply. Existing PE is reused in the existing QCA58, QCA23, QCA7, and QCA8 cabinets. PE growth is accomplished from add-on PE cards in the existing cabinets or from add-on IPE Modules. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 20 shows N system cabinets next to an option 61C column. The option 61C column consists of two Core/Network Modules and an IPE Module.

Figure 20
N system to option 61C upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM

- Included in the base level upgrade package

Call processor unit

- An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

- Included in the base level upgrade package
- QPC444 Conference cards as required (nonvoice conference applications)

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support the PE in the existing cabinets. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards and modules added to the system. One NT8D04 Superloop Network card is included in the base level upgrade package. One NT8D01 Peripheral Controller card must be added to the upgrade package to support the IPE cards in the IPE Module supplied in the base level upgrade package.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in the existing cabinets. Additional PE can be added to the system, but must be located in the existing cabinets. IPE growth is supported in the IPE shelf of the new base module and from add-on IPE Modules. DTI or PRI or both can be added to the upgraded system and located in the CE shelf of the new base module or, from the addition of a network expansion module, can be added to the base module. The above hardware is not included in the base level upgrade package. Consult NTP and Pricing documentation for ordering information.

Module pedestal equipment

- Included in the base level upgrade package (AC or DC)

The option 61C column is preassembled in the factory and includes the appropriate pedestal assembly.

Equipment cabinet power

- Included in the base level upgrade package (AC or DC)
- Reuse existing cabinet power rectifier (AC only)

The type of power input for each new module added to the upgraded system must be determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- System 600/48 Modular Power Plant with NT5C07 Switch Mode Rectifiers, or
- MFA150 Rack Assembly with NT5C06 Rectifiers as required
- Batteries as required

See “Power and ground engineering” on page 305 for engineering details for multiple power combinations. |

System monitor connections

See “System monitor” on page 299 for specific power monitor requirements. |

Ground

See “Power and ground engineering” on page 305 for specific grounding requirements. |

Upgrading an N system to option 81C

To upgrade an SL-1 N system to a Meridian 1 option 81C, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing N system or the base level upgrade package.

Upgrading an N system to option 81C requires installing two or more Meridian[®]1 columns next to the SL-1 N system cabinet. These columns provide CE, network, and IPE housing. The existing N system cabinet is used to support PE cards.

When engineering an upgrade to option 81C, review appropriate upgrade procedures in *Upgrade system installation to X11 release 23 (553-3001-258)* and then check the ordering package content and ordering notes in the Pricing documentation.

Base level upgrade package

The basic equipment package used to upgrade system N to option 81C is:

- N System to Option 81C Core/Network and Network Module Upgrade Package

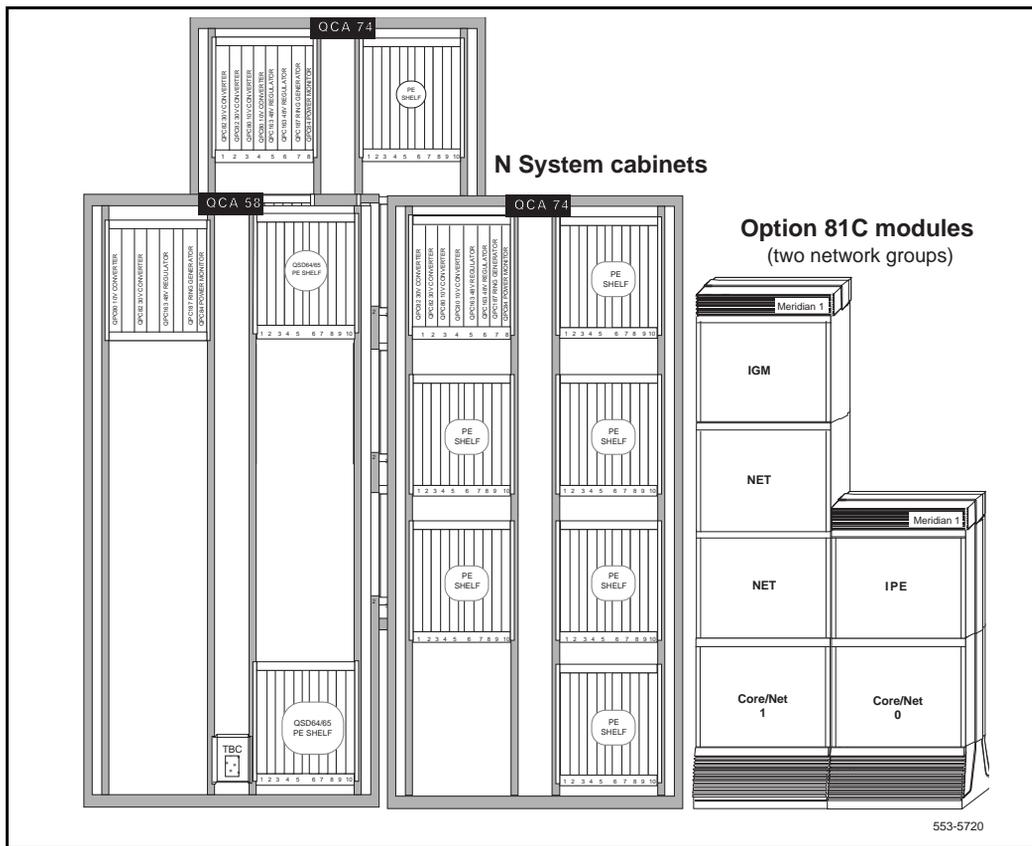
The upgrade package provides two Core/Network Modules, two Network Modules, one InterGroup Module, and one IPE Module. This package provides CNI cards and cables for one network group. Additional network groups, corresponding Core to Network Interface (CNI) cards, and required network cable packages are not included in the base level upgrade package; however, they can be ordered separately. When upgrading the system using this Core/Network and Network Module Upgrade Package, CPU and network functions are supported in option 81C Core/Network and Network Modules and peripheral functions are supported in both the existing cabinets and option 81C IPE Modules.

To connect network equipment in option 81C columns to peripheral equipment in existing cabinets, EMI-compliant connector housings are installed on existing cabinets to connect external shielded cables between cabinets and I/O panels located at the rear of option 81C Network Modules.

PE growth is accomplished from add-on PE cards in existing cabinets. IPE growth is accomplished from add-on IPE Modules and cards. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 21 shows N system cabinets next to option 81C columns. It shows a Core/Network and Network Module upgrade configuration using the base level upgrade package, which provides Core/Network, Network, InterGroup, and IPE Modules.

Figure 21
SL-1 N to option 81C upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Software storage (disk drive)

- Included in the base level upgrade package

The location for each NT5D20 IOP/CMDU is three dedicated card slots in each Core/Network Module.

Input/output processor and mass storage interface

- Included in the base level upgrade package

Data cartridges are installed in the IOP portion of the NT5D20 IOP/CMDU.

Call processor unit

- Included in the base level upgrade package

An NT6D66 or NT9D19 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

- Add NT8D17 Conference/TDS cards as required
- QPC444 Conference cards as required (nonvoice conference applications)

Two NT8D17 Conference/TDS cards are included in base level upgrade package. QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Peripheral signaling and intergroup switch

- Included in the base level upgrade package

Four QPC412 InterGroup Switch cards are included in the base level upgrade package to support one group. Additional cards can be provided as required.

Network group junctor

- Included in the base level upgrade package

Network equipment

- AS1039A/D Network Group Assembly as required
- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

To support additional network groups specified in AS1039A/D, additional NT6D65AA Core to Network Interface (CNI) cards must be ordered. Two CNI cards are required for every two groups after the first group. Two CNI cards are included in the base level upgrade package to support the first group. To support groups 2 and 3, another pair of CNI cards must be ordered, and so on, up to a maximum of five groups. Each additional group also requires four NT8D76 and four NTND14 cables of appropriate lengths.

Additional network groups can be ordered as:

- A pair of completely empty Network Modules, using the AS1007A/D package. In this case, all necessary cards from the existing network shelves in the existing cabinet are transferred to Network Modules in option 81C. This method utilizes the greatest number of existing cards; however, the upgrade process is longer causing a greater system downtime.
- Complete network groups, using the AS1039A/D package. In this case, Network Modules are already equipped with the network support cards such as IGS, 3PE, PS, and BTU, and only the actual network cards need to be transferred from the existing cabinet. This network group expansion method is strongly recommended.

Two NT8D04 Superloop Network cards are included in the base level upgrade package. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base IPE Module or any add-on IPE Modules.

The number of additional QPC414 cards is determined based on the number of network loop connections needed to support PE cards in the existing cabinets or any PE cards in add-on PE Modules.

Network cards are not supported in the existing cabinet and the Network Modules simultaneously. These cards must be in the existing cabinet or Network Modules exclusively, depending on the base level upgrade package you selected.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in existing cabinets. Additional PE can be added to the system, but must be located in existing cabinets. IPE growth is supported in the IPE Module included in the base level upgrade package and from add-on IPE Modules.

To connect PE cards in existing cabinets with corresponding network cards in option 81C, external shielded cables must be engineered and ordered. Sets of NT8D86, NT8D73, and NT9J96 cables along with appropriate connector housings must be ordered. Refer to “Network to peripheral I/O cables” on page 283 for details.

PRI/DTI cards can be added to the upgraded system and located in option 81C Core/Network Modules or they can remain in the existing cabinet.

If PRI/DTI cards remain in existing cabinets, external shielded cables must be used to connect these cards to QPC414 Network cards through I/O panel connectors on option 81C Network Modules and connector housing I/O connectors on existing cabinets.

If PRI/DTI cards are located in option 81C Core/Network Modules, appropriate internal cables must be ordered to connect PRI/DTI cards directly to QPC414 Network cards.

Module pedestal equipment

— AS1001A/D Pedestal Assembly (up to four modules)

Two pedestals are included in the base level upgrade package. The number of additional pedestal assemblies depends on the number of modules added to the upgraded system.

Equipment cabinet power

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate. See “Power and ground engineering” on page 305 for more information.

Reserve system power equipment

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate.

System monitor connections

See “System monitor” on page 299 for specific requirements to support this type of upgrade. Also see upgrade installation procedures in *Upgrade system installation to X11 release 23* (553-3001-258).

Ground

See “Power and ground engineering” on page 305 for specific requirements to support this type of upgrade.

Upgrading an SL-1 NT system

This section provides engineering information for upgrading an SL-1 NT system to the following:

- NT X11 release 21

Note: X11 release 21 is the highest supported X11 software release for SL-1 NT systems. The NT system must be upgraded to an Option 61C or 81C before installing X11 release 24.

- Option 61C X11 release 24
- Option 81C X11 release 24

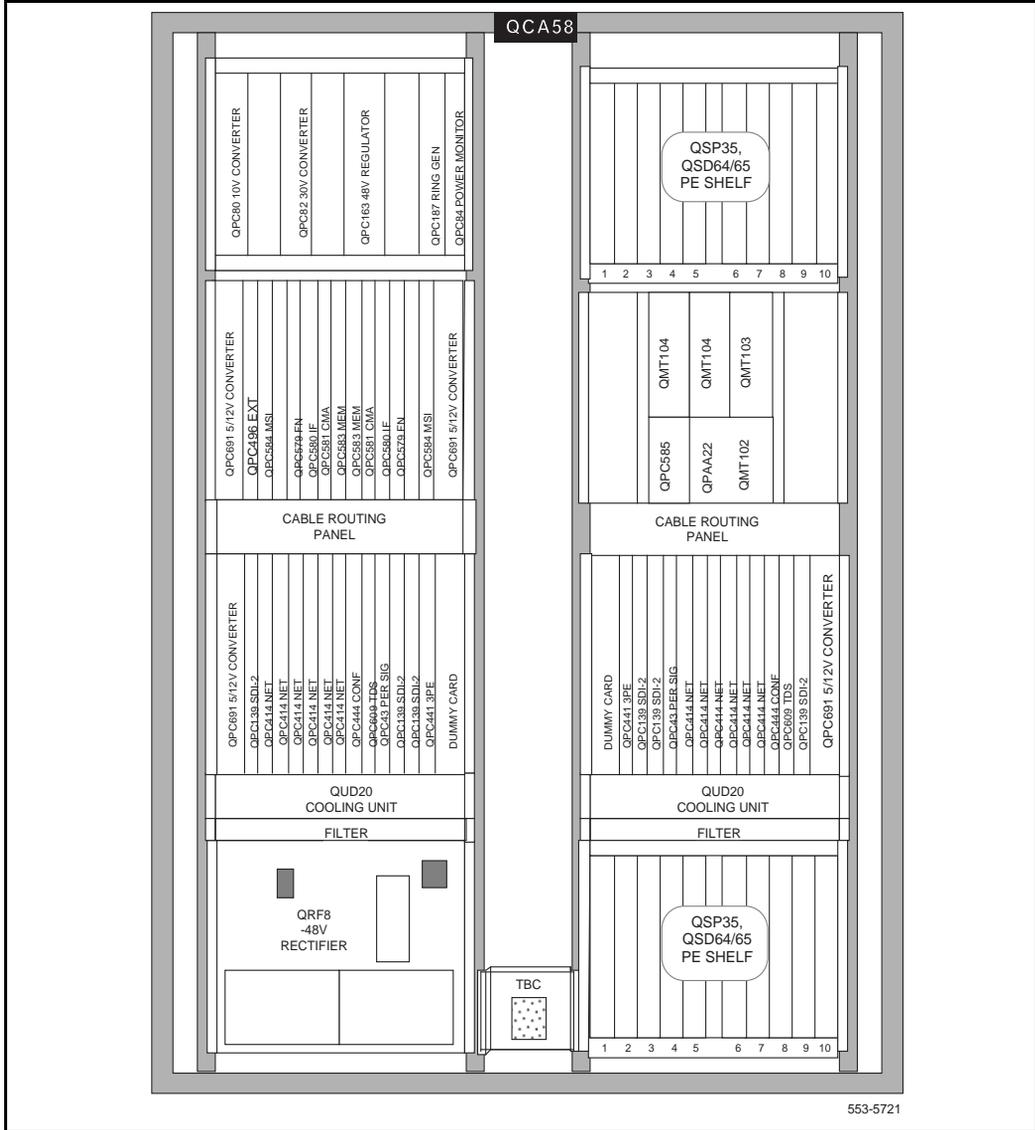
Upgrading an NT system to X11 release 21 requires replacing some of the CE cards, the disk drive unit, and the software.

Upgrading an NT system to options 61C and 81C X11 release 24 requires installing Meridian 1 columns next to the SL-1 NT system cabinet. This column provides CE and network equipment housing. The existing NT system cabinet is used to support PE cards including the DTI/PRI cards.

Some existing configurations may include QCA7, QCA8, QCA74, or QCA108 type peripheral cabinets used to support existing PE cards.

Figure 22 shows a typical SL-1 NT primary cabinet configuration containing CE, network, and PE shelves.

Figure 22
SL-1 NT system cabinet



553-5721

Upgrading an NT system to X11 release 21

To upgrade an SL-1 NT system to X11 release 21, identify the card base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing NT system or the base level upgrade package.

Note: X11 release 21 is the highest supported X11 software release for SL-1 NT systems. The NT system must be upgraded to an Option 61C or 81C before installing X11 release 24.

Base level upgrade package

The basic equipment package required to upgrade an NT system to X11 release 21 is:

— NT System to NT System X11 Release 21 Card Upgrade Package

Each package provides capacity for a dual CPU, dual memory, 28 network loops* or six network superloops** plus four extra voice/data network loops with integrated IPE.

* QPC414 type loop supports 30 timeslots

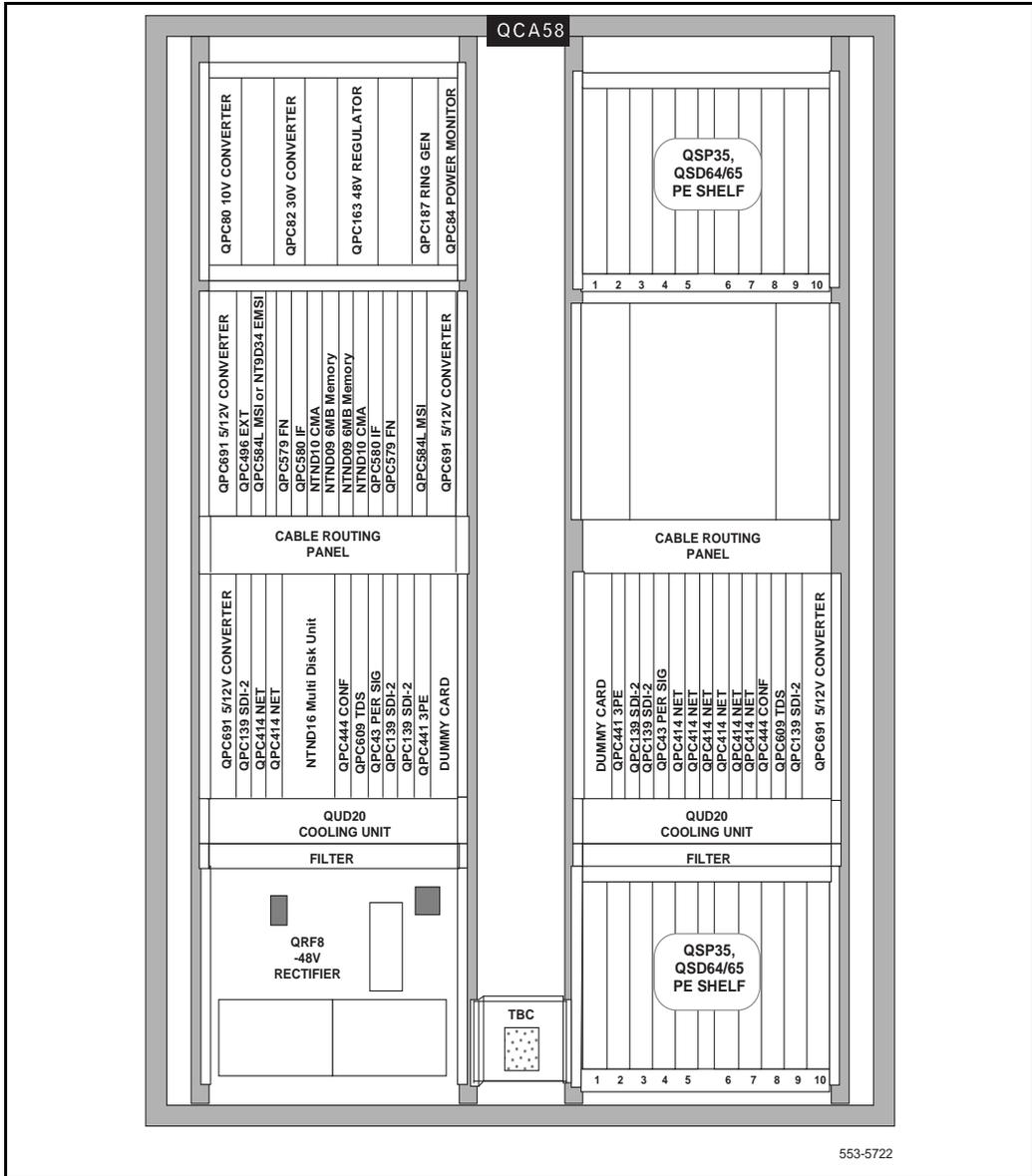
** NT8D04 type superloop supports 120 timeslots

Existing PE is reused in the existing QCA58, QCA7, QCA8, QCA74, and QCA108 cabinets, or QCA23 cabinet if the NT was previously an LE system. PE growth is accomplished from add-on PE cards in the existing cabinets or from add-on IPE Modules. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

If an IPE shelf is added to the NT system, the system becomes an option 61C.

Figure 23 shows an upgraded NT system cabinet.

Figure 23
NT system to X11 release 21 upgrade



553-5722

Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Software storage (disk drives)

- Included in the base level upgrade package
- NT7D44BA CE auxiliary shelf, as required

The primary cabinet location for the NT8D69 Multi Disk Unit (MDU) is three empty network card slots in either network shelf or three dedicated card slots in the CE auxiliary shelf, if required.

Software interface and read-only memory

- Included in the base level upgrade package

The software cartridges are installed on QPC584L Mass Storage Interface (MSI) or NT9D34 Enhanced Mass Storage Interface (EMSI) cards located in a dedicated card slot in each CPU/Memory shelf.

Each read-only memory (ROM) card is attached to a QPC579 CPU Function card that is also located in a dedicated card slot in each CPU/Network Module.

Central processor unit

- Reuse the existing CPU Function and CPU Interface cards

Memory and peripheral signaling

- Included in the base level upgrade package

Reuse existing peripheral signaling cards. One memory card for each CPU is included in the base level upgrade package.

Tone and digit switch and conference

- Reuse existing tone and digit switch and conference cards
- or
- QPC444 Conference cards as required (nonvoice conference applications)

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support the PE in the existing cabinets. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards and modules added to the system. One NT8D04 Superloop Network card is included in the base level upgrade package. One NT8D01 Peripheral Controller card must be added to the upgrade package to support the IPE cards in the IPE Module supplied in the base level upgrade package.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in the “Network to peripheral I/O cables” on page 283. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in the existing cabinets. Additional PE can be added to the system, but must be located in the existing cabinets. IPE growth is supported in the IPE shelf of the new base module and from add-on IPE Modules. DTI or PRI or both can be added to the upgraded system and located in the CE shelf of the new base module or, from the addition of a network expansion module, can be added to the base module. The above hardware is not included in the base level upgrade package. Consult NTP and Pricing documentation for ordering information.

Equipment cabinet power

- Reuse existing power equipment, as required

Add a new power system, as required, to support the addition of any IPE or application modules. See “Power and ground engineering” on page 305 for engineering details for multiple power combinations.

Reserve system power equipment

- Reuse batteries as required

Add batteries as required to support any additional IPE or application modules.

System monitor connections

See “System monitor” on page 299 for specific requirements to support the addition of IPE or application modules.

Ground

Unless a new cabinet or column is added, grounding remains unchanged. See “Power and ground engineering” on page 305 for specific requirements to support grounding changes or additions.

Upgrading an NT system to option 61C

To upgrade an SL-1 NT system to a Meridian 1 option 61C, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing NT system or the base level upgrade package.

Base level upgrade package

The basic equipment package required to upgrade an NT system to option 61C is:

— NT System to Option 61C Module Package

Each package provides capacity for a dual CPU, dual memory, 28 network loops* or six network superloops** plus four extra (voice/data) network loops* with integrated IPE.

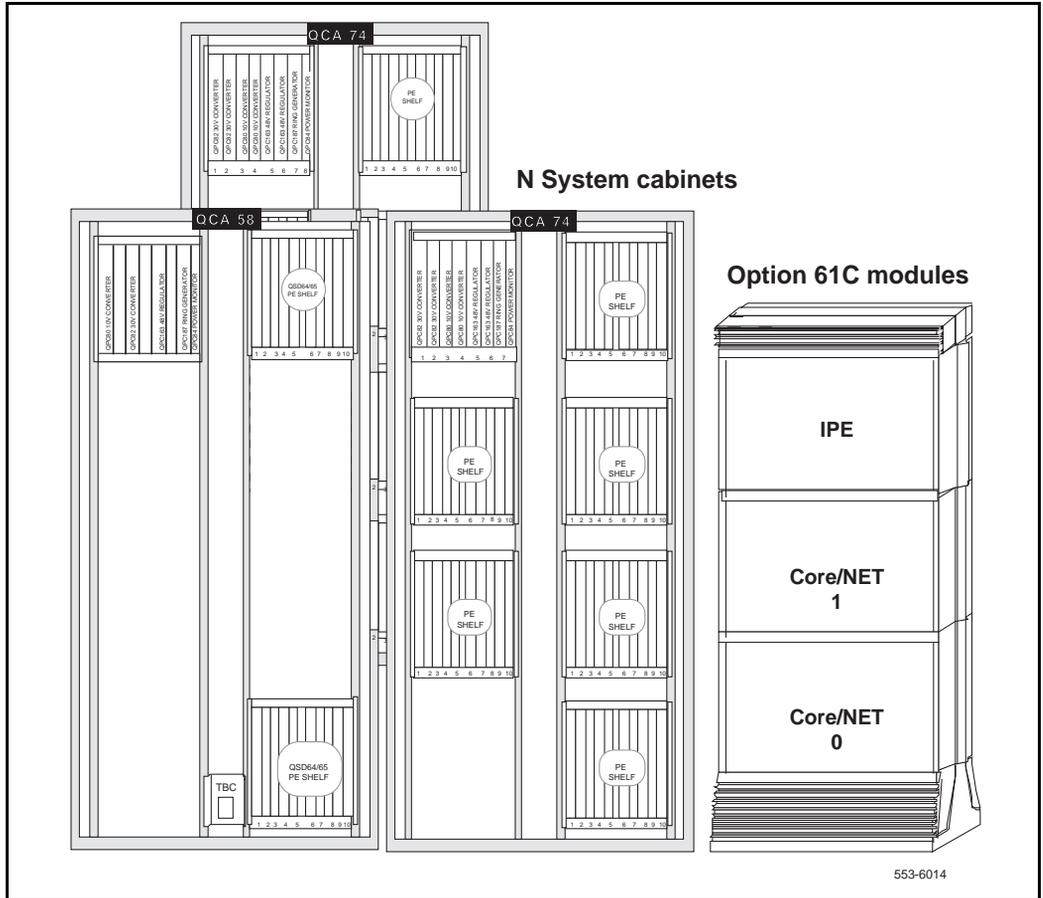
* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

The upgrade package provides one empty IPE Module with the power supply. Existing PE is reused in the existing QCA58, QCA23, QCA7, and QCA8 cabinets. PE growth is accomplished from add-on PE cards in the existing cabinets or from add-on IPE Modules. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 24 shows NT system cabinets next to an option 61C column. The option 61C column consists of two Core/Network Modules and an IPE Module.

Figure 24
NT system to option 61C upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM

— Included in the base level upgrade package

Call processor unit

— Included in the base level upgrade package

An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

— Included in the base level upgrade package

— QPC444 Conference cards as required (nonvoice conference applications)

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support the PE in the existing cabinets. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards and modules added to the system. One NT8D04 Superloop Network card is included in the base level upgrade package. One NT8D01 Peripheral Controller card must be added to the upgrade package to support the IPE cards in the IPE Module supplied in the base level upgrade package.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in the existing cabinets. Additional PE can be added to the system, but must be located in the existing cabinets. IPE growth is supported in the IPE shelf of the new base module and from add-on IPE Modules. DTI or PRI or both can be added to the upgraded system and located in the CE shelf of the new base module or, from the addition of a Network expansion module, can be added to the base module. The above hardware is not included in the base level upgrade package. Consult NTP and Pricing documentation for ordering information.

Module pedestal equipment

- Included in the base level upgrade package (AC or DC)

The option 61C column is preassembled in the factory and includes the appropriate pedestal assembly.

Equipment cabinet power

- Included in the base level upgrade package (AC or DC)
- Reuse existing cabinet power rectifier (AC only)

The type of power input for each new module added to the upgraded system must be determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- System 600/48 Power Plant with NT5C07 Switch Mode Rectifiers, or
- MFA150 Rack Assembly with NT5C06 Rectifiers as required
- Batteries as required

See “Power and ground engineering” on page 305 for engineering details for multiple power combinations.

System monitor connections

See “System monitor” on page 299 for specific power monitor requirements.

Ground

See “Power and ground engineering” on page 305 for specific grounding requirements.

Upgrading an NT system to option 81C

To upgrade an SL-1 NT system to a Meridian 1 option 81C, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing NT system or the base level upgrade package.

Upgrading an NT system to option 81C requires installing two or more Meridian 1 columns next to the SL-1 NT system cabinet. These columns provide CE, network, and IPE housing. The existing NT system cabinet is used to support PE cards.

When engineering an upgrade to option 81C, review appropriate upgrade procedures in *Upgrade system installation to X11 release 23 (553-3001-258)* and then check the ordering package content and ordering notes in the Pricing documentation.

Base level upgrade package

The basic equipment package used to upgrade an NT system to option 81C is:

- NT System to Option 81C Core/Network and Network Module Upgrade Package

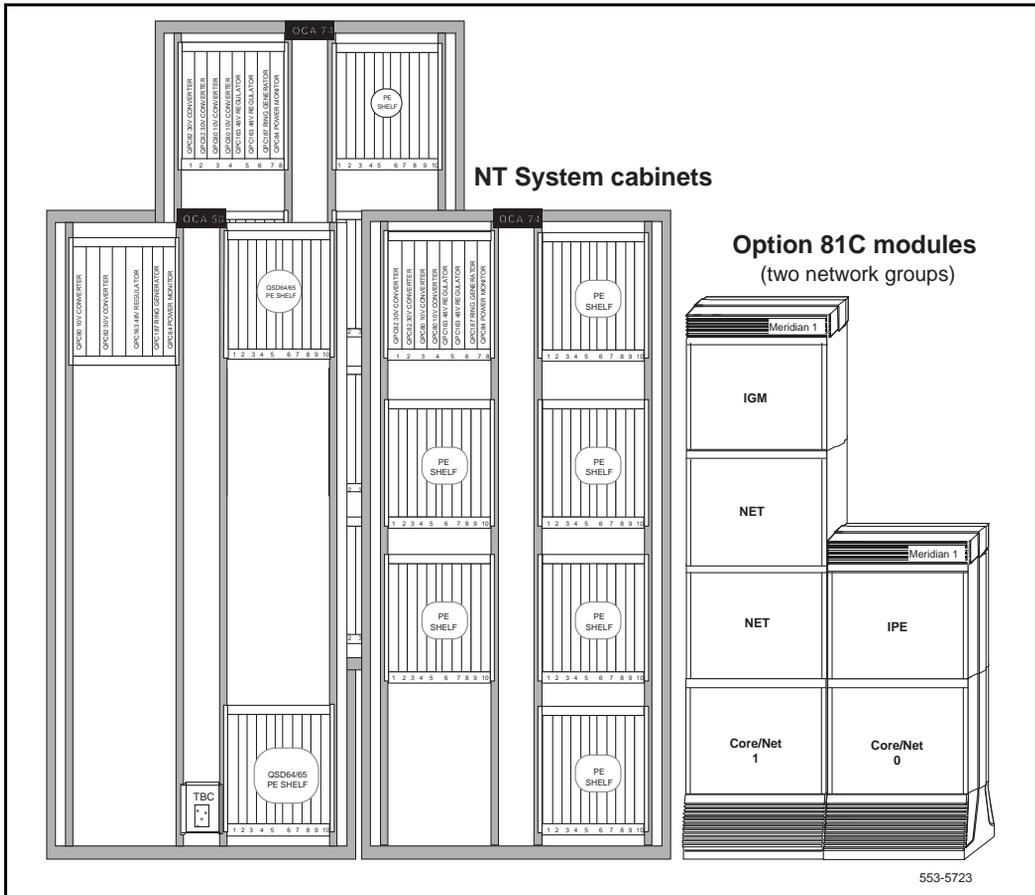
The upgrade package provides two Core/Network Modules, two Network Modules, one InterGroup Module, and one IPE Module. This package provides one network group. Additional network groups, corresponding Core to Network Interface (CNI) cards, and required network cable packages are not included in the base level upgrade package; however, they can be ordered separately. When upgrading the system using this Core/Network and Network Module Upgrade Package, CPU and network functions are supported in option 81C Core/Network and Network Modules and peripheral functions are supported in both the existing cabinets and option 81C IPE Modules.

To connect network equipment in option 81C columns to peripheral equipment in existing cabinets, EMI-compliant connector housings are installed on existing cabinets to connect external shielded cables between cabinets and I/O panels located at the rear of option 81C Network Modules.

PE growth is accomplished from add-on PE cards in existing cabinets. IPE growth is accomplished from add-on IPE Modules and cards. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 25 shows NT system cabinets next to option 81C columns. It shows a Core/Network and Network Module upgrade configuration using the base level upgrade package, which provides Core/Network, Network, InterGroup, and IPE Modules.

Figure 25
NT system to option 81C upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM

- Included in the base level upgrade package

Call processor unit

- An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

- Add NT8D17 Conference/TDS cards as required
- QPC444 Conference cards as required (nonvoice conference applications)

Two NT8D17 Conference/TDS cards are included in the base level upgrade package. QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Peripheral signaling and intergroup switch

- Included in the base level upgrade package

Four QPC412 InterGroup Switch cards are included in the base level upgrade package to support one group. Additional cards can be provided as required.

Network group junctor

- Included in the base level upgrade package

Network equipment

- AS1039A/D Network Group Assembly as required
- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

To support additional network groups specified in AS1039A/D, additional NT6D65AA Core to Network Interface (CNI) cards must be ordered. Two CNI cards are required for every two groups after the first group. Two CNI cards are included in the base level upgrade package to support the first group. To support groups 2 and 3, another pair of CNI cards must be ordered, and so on up to a maximum of five groups. Each additional group also requires four NT8D76 and four NTND14 cables of appropriate lengths.

Additional network groups can be ordered as:

- A pair of completely empty Network Modules, using the AS1007A/D package. In this case, all necessary cards from the existing Network shelves in the existing cabinet are transferred to Network Modules in option 81C. This method utilizes the greatest number of existing cards; however, the upgrade process is longer causing a greater system downtime.
- Complete network groups, using the AS1039A/D package. In this case, Network Modules are already equipped with the network support cards such as IGS, 3PE, PS, and BTU, and only the actual network cards need to be transferred from the existing cabinet. This network group expansion method is strongly recommended.

Two NT8D04 Superloop Network cards are included in the base level upgrade package. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base IPE Module or any add-on IPE Modules.

The number of additional QPC414 cards is determined based on the number of network loop connections needed to support PE cards in the existing cabinets or any PE cards in add-on PE Modules.

Network cards are not supported in the existing cabinet and the Network Modules simultaneously. These cards must be in the existing cabinet or Network Modules exclusively, depending on the base level upgrade package you selected.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in existing cabinets. Additional PE can be added to the system, but must be located in existing cabinets. IPE growth is supported in the IPE Module included in the base level upgrade package and from add-on IPE Modules.

To connect PE cards in existing cabinets with corresponding network cards in option 81C, external shielded cables must be engineered and ordered. Sets of NT8D86, NT8D73, and NT9J96 cables along with appropriate connector housings must be ordered. Refer to “Network to peripheral I/O cables” on page 283 for details.

PRI/DTI cards can be added to the upgraded system and located in option 81C Core/Network Modules or they can remain in the existing cabinet.

If PRI/DTI cards remain in existing cabinets, external shielded cables must be used to connect these cards to QPC414 Network cards through I/O panel connectors on option 81C Network Modules and connector housing I/O connectors on existing cabinets.

If PRI/DTI cards are located in option 81C Core/Network Modules, appropriate internal cables must be ordered to connect PRI/DTI cards directly to QPC414 Network cards.

Module pedestal equipment

— AS1001A/D Pedestal Assembly (up to four modules)

Two pedestals are included in the base level upgrade package. The number of additional pedestal assemblies will depend on the number of modules added to the upgraded system.

Equipment cabinet power

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate. See “Power and ground engineering” on page 305 for more information.

Reserve system power equipment

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate.

System monitor connections

See “System monitor” on page 299 for specific requirements to support this type of upgrade. Also see upgrade installation procedures in *Upgrade system installation to X11 release 23 (553-3001-258)*.

Ground

See “Power and ground engineering” on page 305 for specific requirements to support this type of upgrade.

Upgrading an SL-1 RT system

This section provides engineering information for upgrading an SL-1 RT system to the following:

- RT X11 release 21

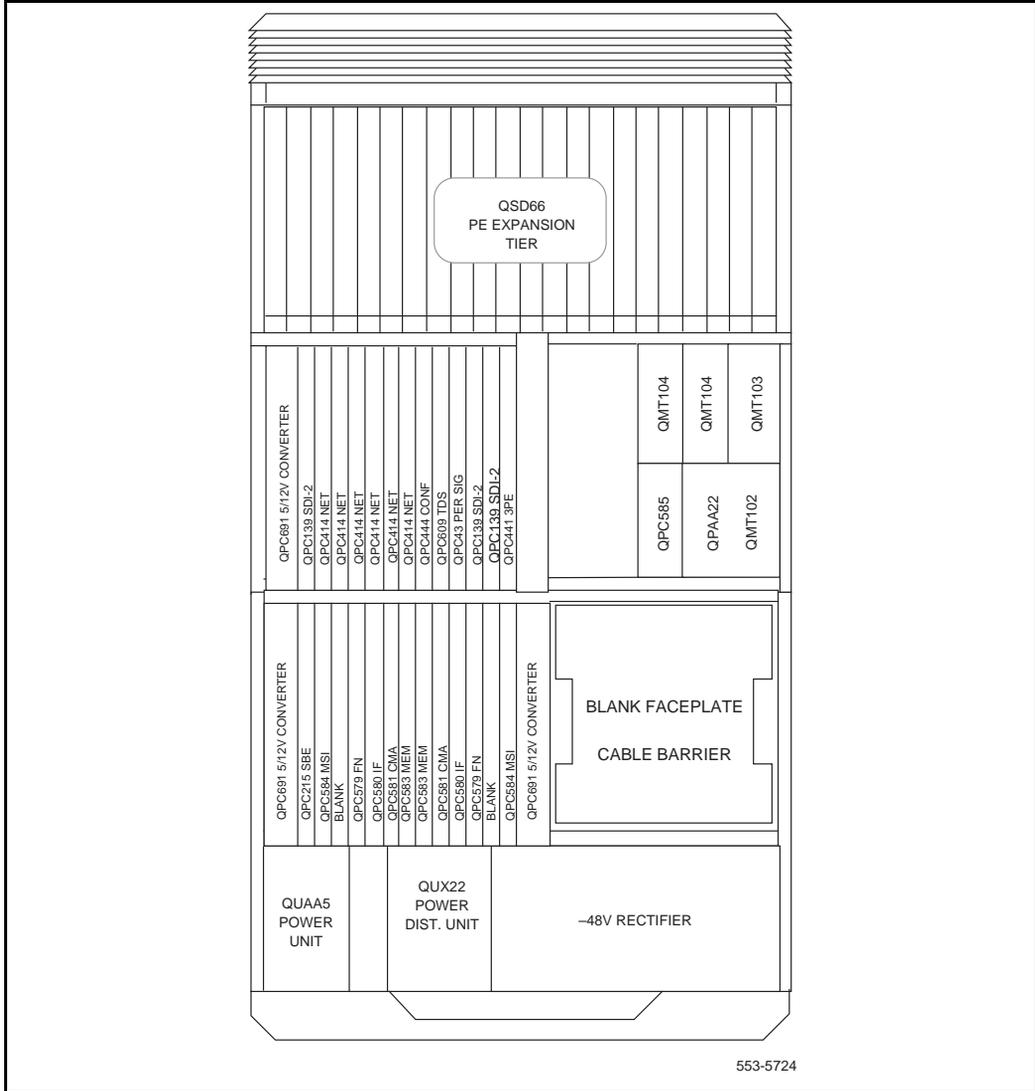
Note: X11 release 21 is the highest supported X11 software release for SL-1 RT systems. The RT system must be upgraded to an Option 61C before installing X11 release 24.

- Option 61C X11 release 24

Upgrading an RT system to option 61C requires installing a Meridian 1 column next to the SL-1 RT system cabinet. This column provides CE and network equipment housing. The existing system RT cabinet is used to support existing PE cards including the DTI/PRI cards.

Figure 26 shows a typical SL-1 RT primary cabinet configuration containing CE, network, and PE shelves.

Figure 26
SL-1 RT system cabinet



Upgrading an RT system to X11 release 21

To upgrade an SL-1 RT system to X11 release 21, use the card base level upgrade package. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing RT system or the base level upgrade package.

Note: X11 release 21 is the highest supported X11 software release for SL-1 RT systems. SL-1 RT systems must be upgraded to an Option 61C before running X11 release 24 software.

Base level upgrade package

The basic equipment package required to upgrade an RT system to X11 release 21 is:

— RT System to RT System X11 release 21 Card Upgrade Package

This package provides a dual CPU, dual memory, 14 network loops* or three network superloops** plus one extra voice/data network loop* with integrated IPE.

* QPC414 type loop supports 30 timeslots

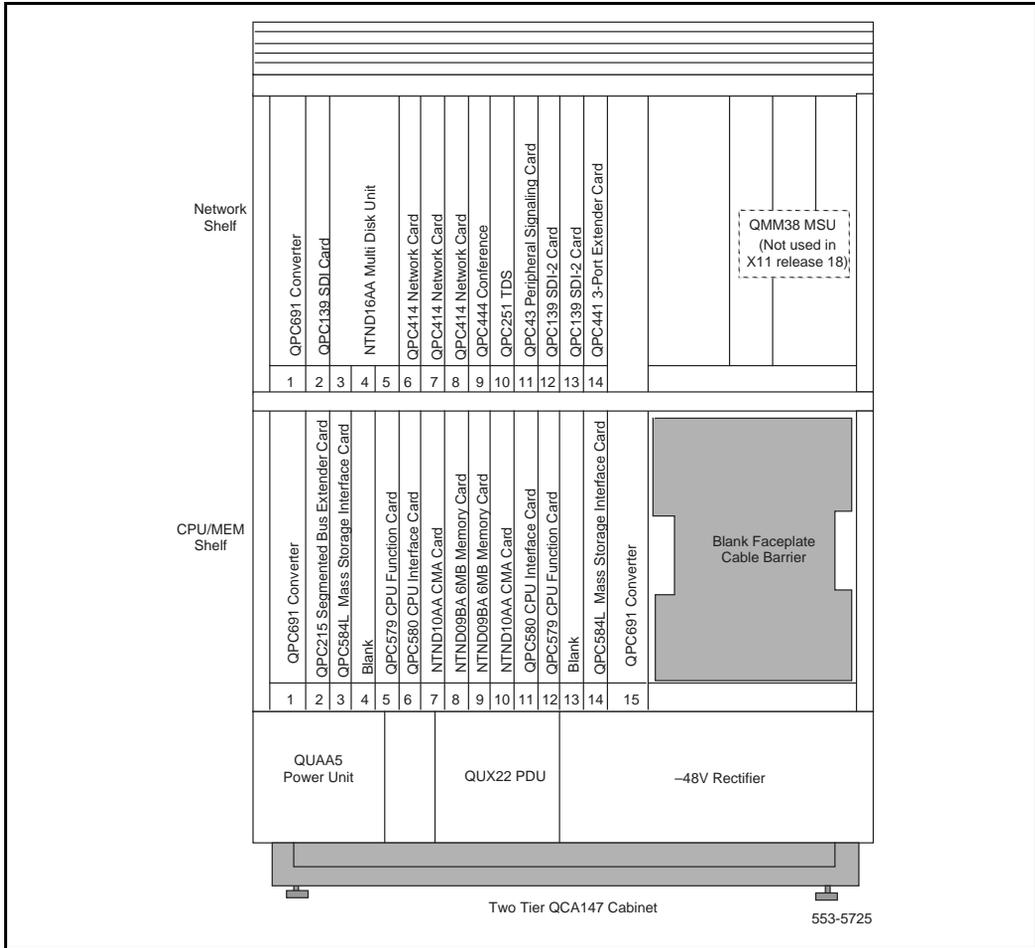
** NT8D04 type superloop supports 120 timeslots

Existing PE is reused in the existing QCA136, QCA148, and QCA137 cabinets or QCA136 cabinet if the RT was previously an ST system. PE growth is accomplished from add-on PE expansion tiers and cards on the existing cabinets or from add-on IPE Modules. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

If an IPE shelf is added to the RT system, the system becomes an option 61C.

Figure 27 shows an RT system upgraded to X11 release 21 using the card upgrade package.

Figure 27
RT system to X11 release 21 upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Software storage (disk drives)

- NTND16 Multi Disk Unit, which is included in the base level upgrade package
- or
- NTND15 Floppy Disk Unit

The primary cabinet location for the NTND15 Floppy Disk Unit (FDU) is two empty card slots next to the NTND09 Memory card slot in the first Net/CE Module. Alternate cabinet locations are two empty network card slots in the first Net/CE Module. The primary cabinet location for the NTND16 Multi Disk Unit (MDU) is three empty network card slots in either Net/CE Module.

Software interface and read-only memory

- Included in the base level upgrade package

The software floppy disk interface (FDI) cards are located in dedicated card slots in each Net/CE Module. The read-only memory (ROM) cards are attached to the CPU cards that are also located in dedicated card slots in each Net/CE Module.

Central processor unit

- Included in the base level upgrade package

Memory and peripheral signaling

- Included in the base level upgrade package

Reuse existing peripheral signaling cards. One memory card for each CPU is included in the base level upgrade package.

Tone and digit switch and conference

- Reuse existing tone and digit switch and conference cards
- QPC444 Conference cards as required

Additional QPC444 Conference cards should be added to support nonvoice conference applications.

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support the PE in the existing cabinets. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards and modules added to the system. One NT8D04 Superloop Network card is included in the base level upgrade package. One NT8D01 Peripheral Controller card must be added to the upgrade package to support the IPE cards in the IPE Module supplied in the base level upgrade package.

Network to peripheral interface

The network connection to existing PE requires interface cables and connector housing units described in “Network to peripheral I/O cables” on page 283. The length of each cable is determined based on the distance between the network card in the new module and the PE in the existing cabinets (a maximum of 50 cable feet). The number of cables and connector housing units is determined based on the number of network loops needed to support the existing PE. Network connection to IPE located in the IPE shelf of the new module does not require cables and connector housing units. Network connections between the superloop and IPE located in add-on expansion modules to the base module require interface cables (included in the base level upgrade package), but not connector housing units unless modules are separated.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in the existing cabinets. Additional PE can be added to the system, but must be located in the existing cabinets unless it is IPE. IPE growth is supported in the IPE shelf of the new base module or from add-on IPE expansion modules. DTI or PRI or both can be added to the upgraded system and located in the CE shelf of the new base module or, from the addition of a network add-on expansion module, can be added to the base module. The above hardware is not included in the base level upgrade package. Consult NTP and Pricing documentation for ordering information.

Equipment cabinet power

- Reuse existing power equipment as required

Add a new power system, as required, to support the addition of any IPE or application modules. See “Power and ground engineering” on page 305 for engineering details for multiple power combinations.

Reserve system power equipment

- Reuse batteries as required

Add batteries as required to support any additional IPE or application modules.

System monitor connections

See “System monitor” on page 299 for specific requirements to support the addition of IPE or application modules.

Ground

Unless a new cabinet or column is added, grounding remains unchanged. See “Power and ground engineering” on page 305 for specific requirements to support grounding changes or additions.

Upgrading an RT system to option 61C

To upgrade an SL-1 RT system to a Meridian 1 option 61C, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing RT system or the base level upgrade package. This package assumes that the RT system has already been upgraded to X11 release 21.

Base level upgrade package

The basic equipment package required to upgrade an RT system to option 61C is:

— RT system to Option 61C Module Package

This package provides capacity for a dual CPU, dual memory, 28 network loops* or six network superloops** plus four extra voice/data network loops* with integrated IPE.

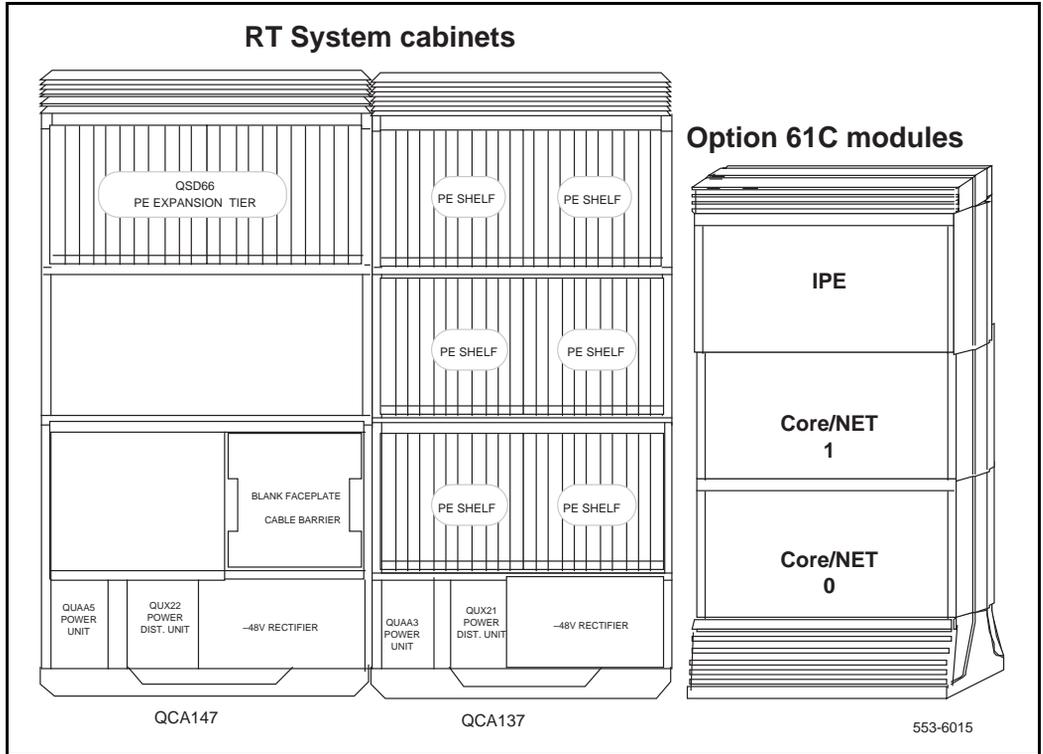
* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

Existing PE is reused in the existing QCA136, QCA148, and QCA137 cabinets or QCA136 cabinet if the RT was previously an ST system. PE growth is accomplished from add-on PE expansion tiers and cards on the existing cabinets or from add-on IPE Modules. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 28 shows RT system cabinets next to an option 61C column. The option 61C column consists of two Core/Network Modules and an IPE Module.

Figure 28
RT system to option 61C upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM

- Included in the base level upgrade package

Call processor unit

- An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

- Included in the base level upgrade package
- QPC444 Conference cards as required (nonvoice conference applications)

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support the PE in the existing cabinets. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards and modules added to the system. One NT8D04 Superloop Network card is included in the base level upgrade package. One NT8D01 Peripheral Controller card must be added to the upgrade package to support the IPE cards in the IPE Module supplied in the base level upgrade package.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in the existing cabinets. Additional PE can be added to the system, but must be located in the existing cabinets. IPE growth is supported in the IPE shelf of the new base module and from add-on IPE Modules. DTI or PRI or both can be added to the upgraded system and located in the CE shelf of the new base module or, from the addition of a network expansion module, can be added to the base module. The above hardware is not included in the base level upgrade package. Consult NTP and Pricing documentation for ordering information.

Module pedestal equipment

- Included in the base level upgrade package (AC or DC)

The option 61C column is preassembled in the factory and includes the appropriate pedestal assembly.

Equipment cabinet power

- Included in the base level upgrade package (AC or DC)
- Reuse existing cabinet power rectifier (AC only)

The type of power input for each new module added to the upgraded system is determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- System 600/48 Power Plant with NT5C07 Switch Mode Rectifiers, or
- MFA150 Modular Power System with NT5C06 Rectifiers, as required
- Batteries as required

See “Power and ground engineering” on page 305 for engineering details for multiple power combinations.

System monitor connections

See “System monitor” on page 299 for specific power monitor requirements.

Ground

See “Power and ground engineering” on page 305 for specific grounding requirements.

Upgrading an SL-1 S system

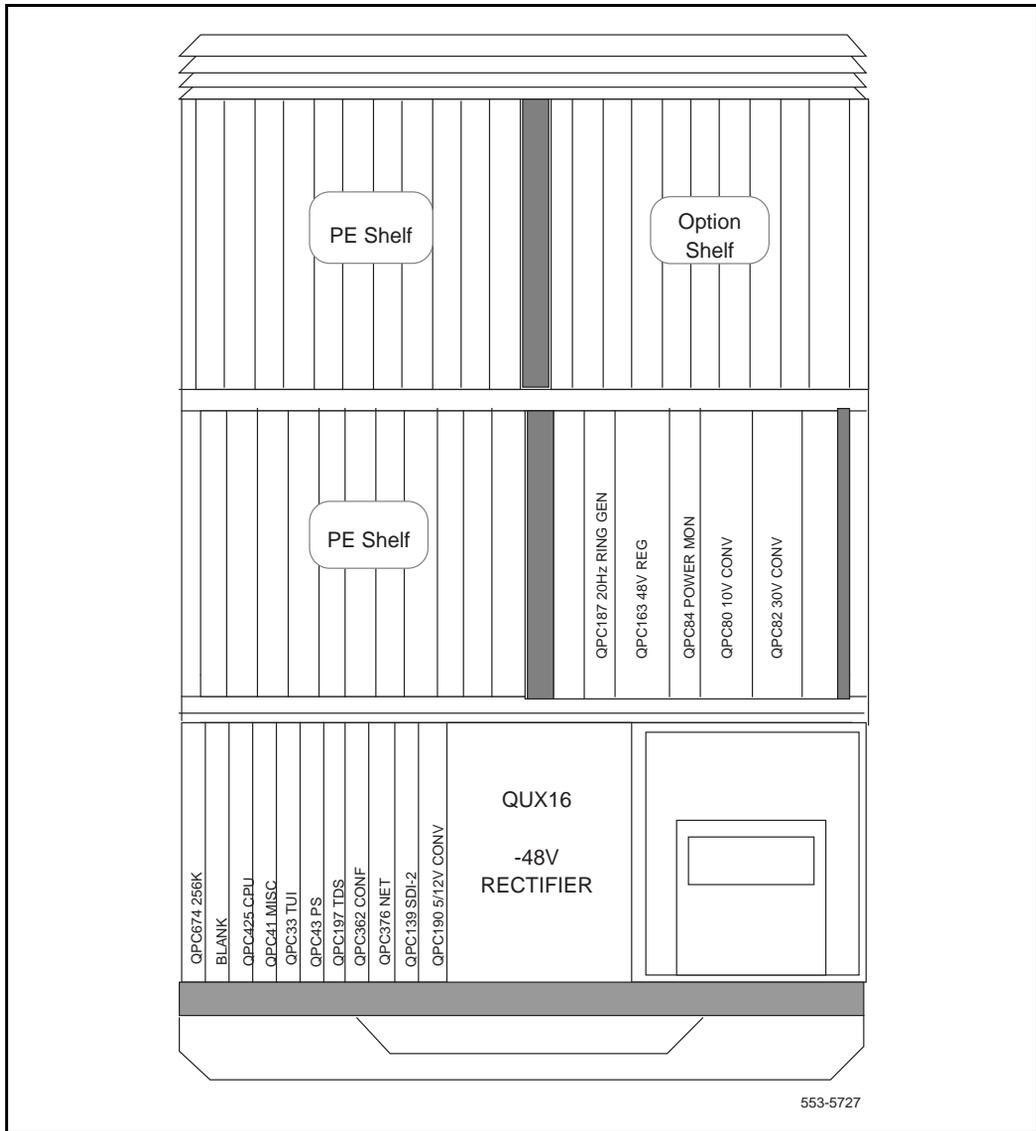
This section provides engineering information for upgrading an SL-1 S system to the following system supported by X11 release 24 software:

— Option 61C

Upgrading an S system to option 61C requires installing a Meridian 1 column next to the SL-1 S system cabinet. This column provides CE and network equipment housing. The existing S system cabinet is used to support PE cards.

Figure 29 shows a typical SL-1 S cabinet configuration containing CE, network, and PE shelves.

Figure 29
SL-1 S system cabinet



Upgrading an S system to option 61C

To upgrade an SL-1 S system to a Meridian 1 option 61C, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing S system or the base level upgrade package.

Base level upgrade package

The basic equipment package required to upgrade an S system to option 61C is:

— S System to Option 61C Module Package

Each package provides capacity for a dual CPU, dual memory, 28 network loops* or six network superloops* plus four extra voice/data network loops* with integrated IPE.

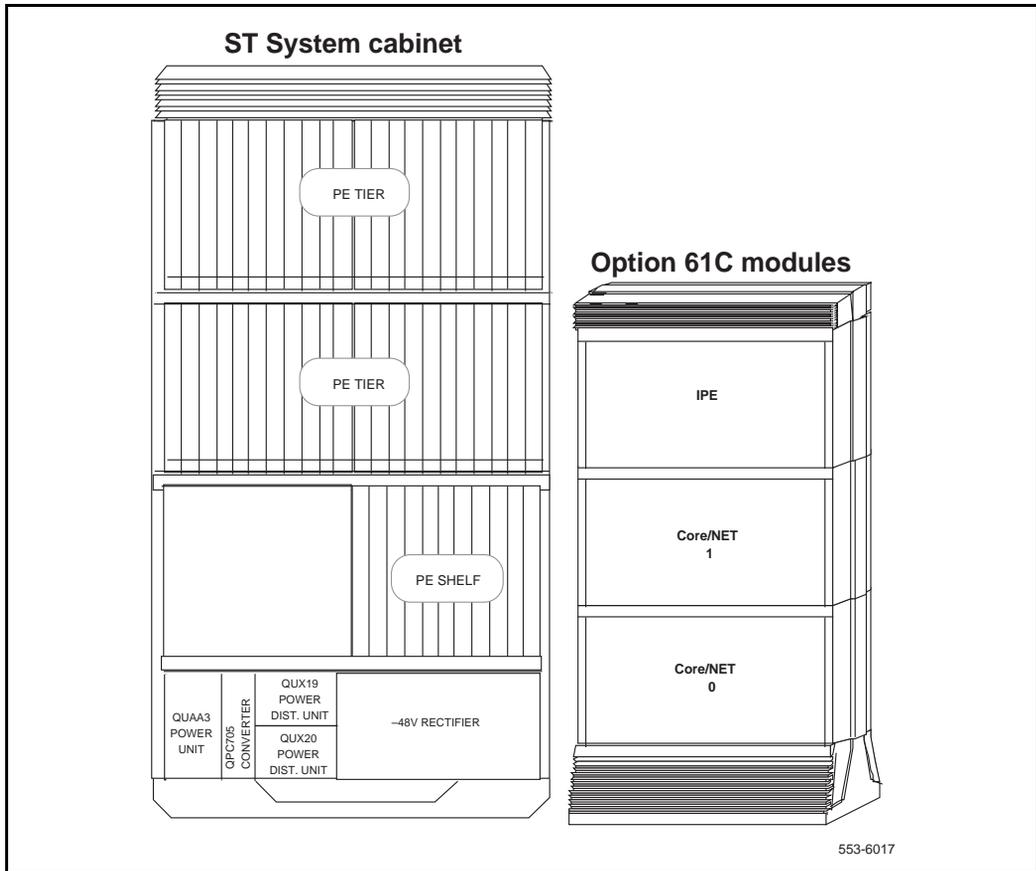
* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

The upgrade package provides one empty IPE Module with the power supply. Existing PE is reused in the existing QCA60 cabinet. PE growth is accomplished from add-on PE cards in the existing cabinet or from add-on IPE Modules. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 30 shows an S system cabinet next to an option 61C column. The option 61C column consists of two Core/Network Modules and an IPE Module.

Figure 30
S system to option 61C upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM

- Included in the base level upgrade package

Call processor unit

- An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

- Included in the base level upgrade package
- QPC444 Conference cards as required (nonvoice conference applications)

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support the PE in the existing cabinets. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards and modules added to the system. One NT8D04 Superloop Network card is included in the base level upgrade package. One NT8D01 Peripheral Controller card is added to the upgrade package to support the IPE cards in the IPE Module supplied in the base level upgrade package.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in the existing cabinets. Additional PE can be added to the system, but must be located in the existing cabinets. IPE growth is supported in the IPE shelf of the new base module and from add-on IPE Modules. DTI or PRI or both can be added to the upgraded system and located in the CE shelf of the new base module or, from the addition of a network expansion module, can be added to the base module. The above hardware is not included in the base level upgrade package. Consult NTP and Pricing documentation for ordering information.

Module pedestal equipment

- Included in the base level upgrade package (AC or DC)

The option 61C column is preassembled in the factory and includes the appropriate pedestal assembly.

Equipment cabinet power

- Included in the base level upgrade package (AC or DC)
- Reuse existing cabinet power rectifier (AC only)

The type of power input for each new module added to the upgraded system is determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- System 600/48 Power Plant with NT5C07 Switch Mode Rectifiers, or
- MFA150 Modular Power System with NT5C06 Rectifiers, as required, or
- NT0R72 Rectifiers as replacement for NT6D52 Rectifiers in the existing NT7D12 Power System, as required
- QBL15 and batteries as required

See “Power and ground engineering” on page 305 for engineering details for multiple power combinations. |

System monitor connections

See “System monitor” on page 299 for specific power monitor requirements. |

Ground

See “Power and ground engineering” on page 305 for specific grounding requirements. |

Upgrading an SL-1 ST system

This section provides engineering information for upgrading an SL-1 ST system to the following systems:

- STE system X11 release 21

Note: X11 release 21 is the highest supported X11 software release for SL-1 ST systems. The ST system must be upgraded to an Option 61C before installing X11 release 24.

- Option 61C X11 release 24

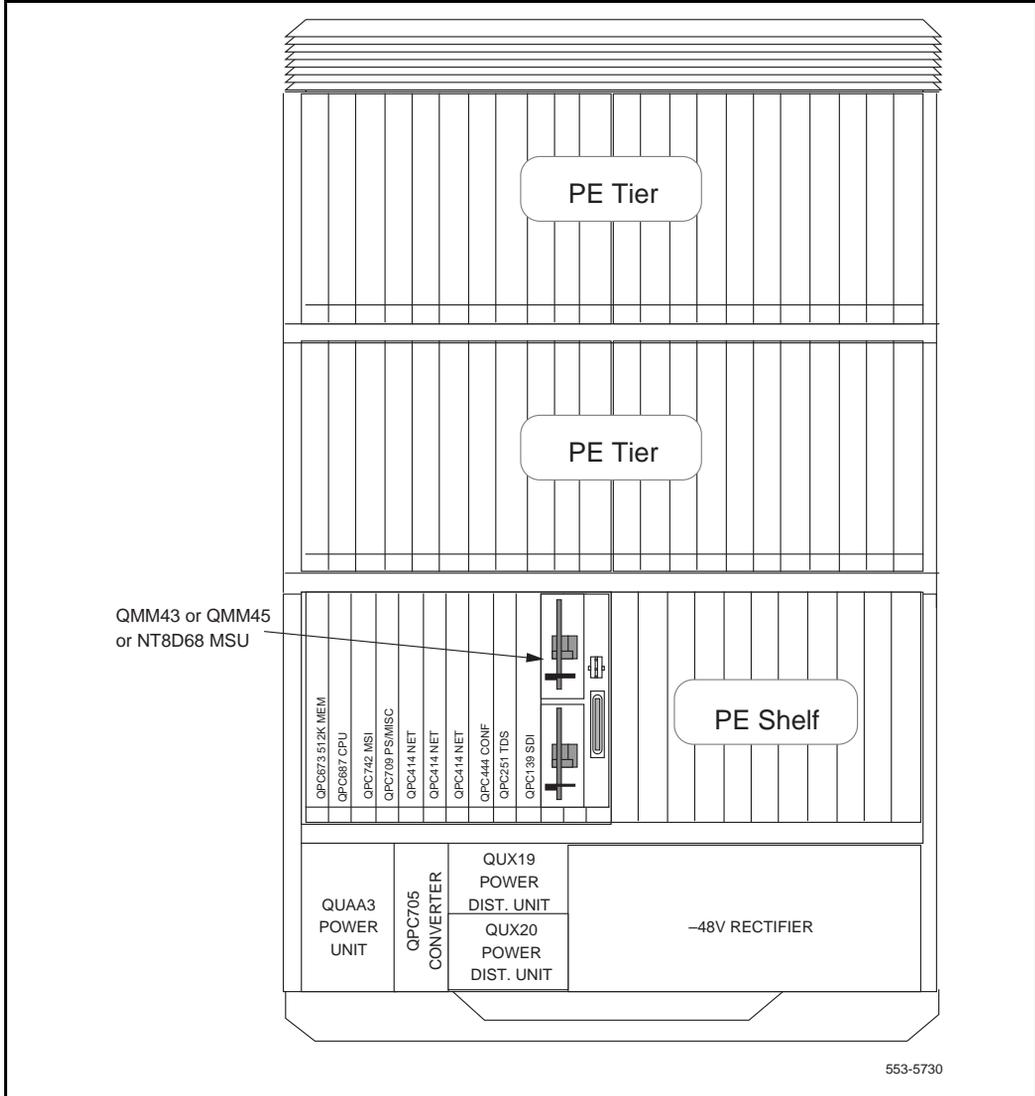
Upgrading an ST system to STE requires replacing some of the CE cards, the disk drive unit, and the software.

Upgrading an ST or an STE system to an option 61C requires installing a Meridian 1 column next to the SL-1 ST system cabinet. This column provides CE and network equipment housing. The existing ST system cabinet is used to support the PE cards including the DTI/PRI cards.

Some ST configurations may be housed in older style cabinets. The older style configurations can be upgraded to an ST, option 51C or option 61C similarly to ST configurations housed in QCA136 cabinets.

Figure 31 shows a typical SL-1 ST primary cabinet configuration containing CE, network, and PE shelves.

Figure 31
SL-1 ST system cabinet



Upgrading an ST system to an STE system

To upgrade an SL-1 ST system to an STE, identify the card base level upgrade package. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing ST system or the base level upgrade package.

Note: X11 release 21 is the highest supported X11 software release for STE systems. An STE system must be upgraded to an Option 51C or 61C before running X11 release 24.

Base level upgrade package

The basic equipment package required to upgrade an ST system to STE is:

— ST System to STE Card Upgrade Package

Each package provides capacity for a single CPU, single memory, 14 network loops* or three network superloops** plus two extra voice/data network loops* with integrated IPE.

* QPC414 type loop supports 30 timeslots

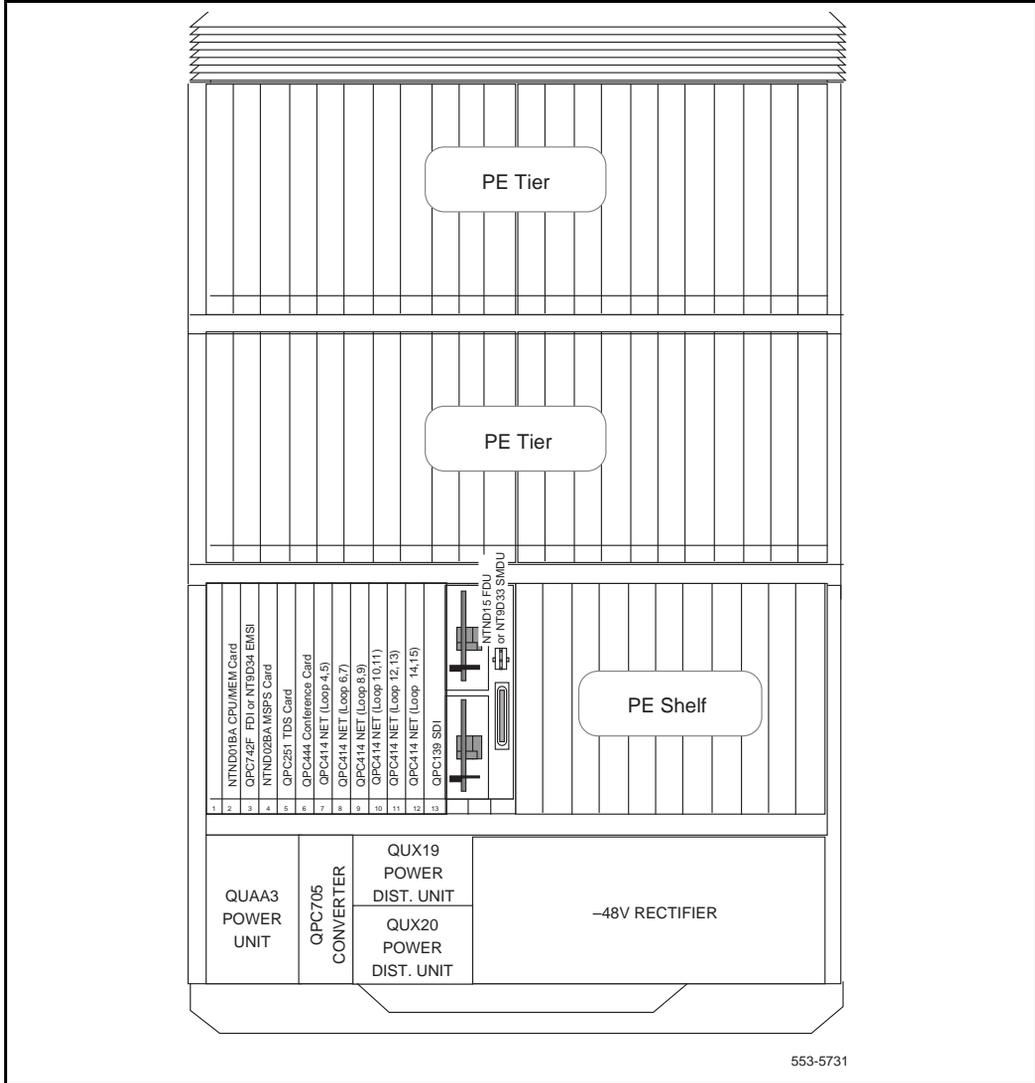
** NT8D04 type superloop supports 120 timeslots

Existing PE is reused in the existing QCA136, QCA148, and QCA137 cabinets. Alternative existing cabinets could include QCA6, QCA23, QCA28, QCA37, or QCA109 cabinets if the ST was previously an L, LE, A, M, or MS system, respectively. PE growth is accomplished from add-on PE tiers and cards on the existing cabinets or from add-on IPE Modules. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

If IPE is added to the ST system, the system becomes option 21E.

Figure 32 shows a typical STE system.

Figure 32
ST System to STE upgrade



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Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Software storage (disk drives)

— Included in the base level upgrade package

The primary location for the NT9D33 Small System Multi Disk Unit (SMDU) is the location previously occupied by QMM43/45 or NT8D68.

Software interface and read-only memory

— Included in the base level upgrade package

The software cartridge is installed on the QPC742 Floppy Disk Interface (FDI) card or NT9D34 Enhanced Mass Storage Interface (EMSI), which is located in a dedicated card slot in the CE shelf of the new base module. The NTND31 Read-Only Memory (ROM) card with 6MB or 12MB of memory is attached to the NTND01 CPU card that is also located in a dedicated card slot in the CE shelf of the new base module.

Central processor unit

— Included in the base level upgrade package

Memory and peripheral signaling

— Included in the base level upgrade package

Tone and digit switch and conference

- Reuse existing TDS and Conference cards
- QPC444 Conference cards as required (nonvoice conference applications)

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support the PE in the existing cabinets. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards and modules added to the system. One NT8D04 Superloop Network card is included in the base level upgrade package. One NT8D01 Peripheral Controller card must be added to the upgrade package to support the IPE cards in the IPE Module supplied in the base level upgrade package.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in the existing cabinets. Additional PE can be added to the system, but must be located in the existing cabinets. IPE growth is supported in the IPE shelf of the new base module and from add-on IPE Modules. DTI or PRI or both can be added to the upgraded system and located in the CE shelf of the new base module or, from the addition of a network expansion module, can be added to the base module. The above hardware is not included in the base level upgrade package. Consult NTP and Pricing documentation for ordering information.

Equipment cabinet power

- Reuse existing power equipment, as required

Add a new power system, as required, to support the addition of any IPE or application modules. See “Power and ground engineering” on page 305 for engineering details for multiple power combinations.

Reserve system power equipment

- Reuse batteries as required

Add batteries as required to support any additional IPE or application modules.

System monitor connections

See “System monitor” on page 299 for specific requirements to support the addition of IPE or application modules.

Ground

Unless a new cabinet or column is added, grounding remains unchanged. See “Power and ground engineering” on page 305 for specific requirements to support grounding changes or additions.

Upgrading an ST or STE system to option 61C

To upgrade an SL-1 ST or an STE system to a Meridian 1 option 61C, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing ST or STE system or the base level upgrade package.

Base level upgrade package

The basic equipment package required to upgrade an ST or an STE system to option 61C is:

— ST/STE System to Option 61C Module Package

Each package provides capacity for a dual CPU, dual memory, 28 network loops* or six network superloops** plus four extra voice/data network loops.*

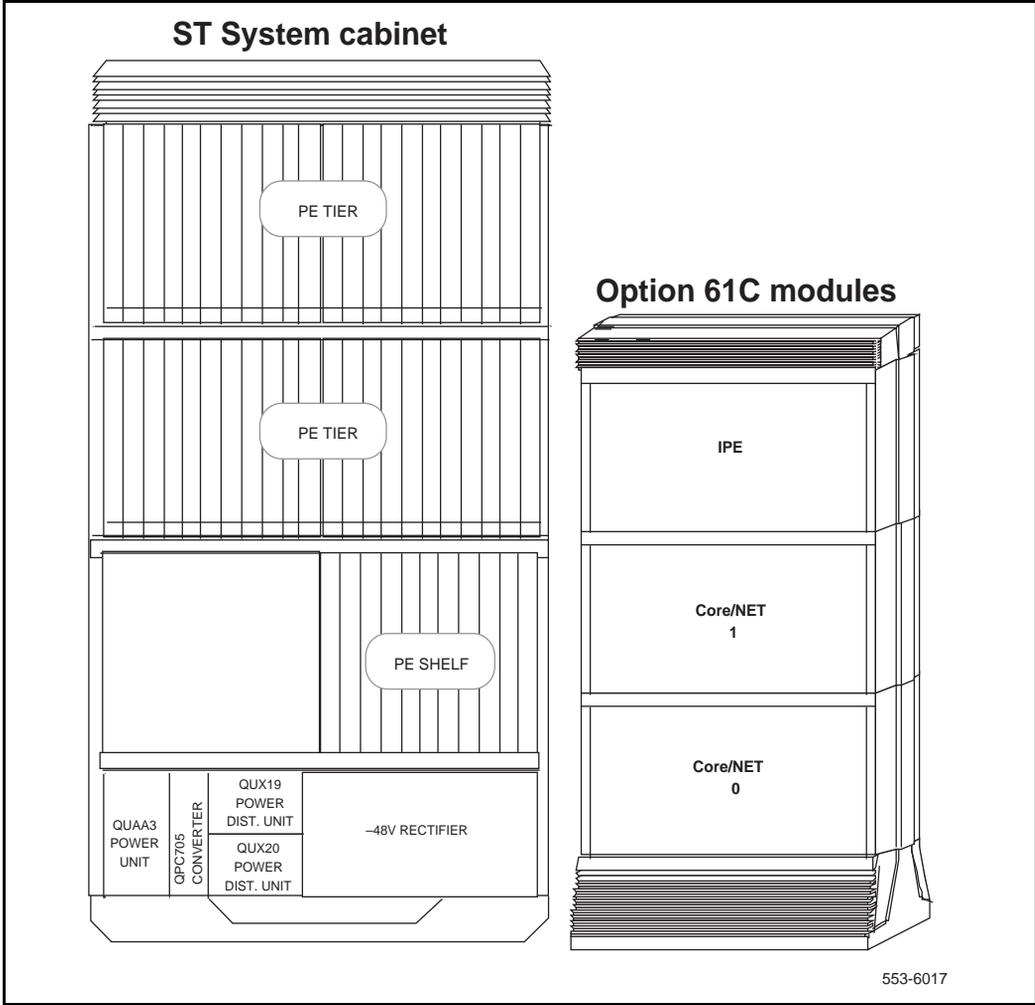
* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

The upgrade package provides one empty IPE Module with the power supply. Existing PE is reused in the existing QCA136, QCA148, and QCA137 cabinets. Alternative existing cabinets could include QCA6, QCA23, QCA28, QCA37, and QCA109 cabinets if the ST or an STE was previously an L, LE, A, M, or MS system, respectively. PE growth is accomplished from PE expansion tiers and cards on the existing cabinets or from add-on IPE Modules. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 33 shows a system ST cabinet next to an option 61C column. The option 61C column consists of two Core/Network Modules and an IPE Module.

Figure 33
ST system to option 61C upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM

— Included in the base level upgrade package

Call processor unit

— An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

— Included in the base level upgrade package

— QPC444 Conference cards as required (nonvoice conference applications)

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support the PE in the existing cabinets. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards and modules added to the system. One NT8D04 Superloop Network card is included in the base level upgrade package. One NT8D01 Peripheral Controller card must be added to the upgrade package to support the IPE cards in the IPE Module supplied in the base level upgrade package.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in the existing cabinets. Additional PE can be added to the system, but must be located in the existing cabinets. IPE growth is supported in the IPE shelf of the new base module and from add-on IPE Modules. DTI or PRI or both can be added to the upgraded system and located in the CE shelf of the new base module or, from the addition of a network expansion module, can be added to the base module. The above hardware is not included in the base level upgrade package. Consult NTP and Pricing documentation for ordering information.

Module pedestal equipment

- Included in the base level upgrade package (AC or DC)

The option 61C column is preassembled in the factory and includes the appropriate pedestal assembly.

Equipment cabinet power

- Included in the base level upgrade package (AC or DC)
- Reuse existing cabinet power rectifier (AC only)

The type of power input for each new module added to the upgraded system is determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- System 600/48 Power Plant with NT5C07 Rectifiers as required, or
- MFA150 Rack Assembly with NT5C06 Rectifiers as required
- Batteries as required

See “Power and ground engineering” on page 305 for engineering details for multiple power combinations.

System monitor connections

See “System monitor” on page 299 for specific power monitor requirements.

Ground

See “Power and ground engineering” on page 305 for specific grounding requirements.

Upgrading an SL-1 VL system

This section provides engineering information for upgrading an SL-1 VL system to option 81C supported by X11 release 24 software.

Note: It is recommended that SL-1 VL customers send the customer database diskettes to Northern Telecom for conversion; contact your Northern Telecom representative to arrange this.

Figure 34 shows typical preconversion common and network equipment VL system cabinets. After the upgrade, these cabinets will house only peripheral equipment.

Upgrading a VL system to option 81C

To upgrade an SL-1 VL system to a Meridian 1 option 81C, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing VL system or the base level upgrade package.

Upgrading a VL system to option 81C requires installing two or more Meridian 1 columns next to the SL-1 VL system cabinets. These columns provide CE, network, and IPE housing. The existing VL system cabinet is used to support PE cards.

When engineering an upgrade to option 81C, review appropriate upgrade procedures in *Upgrade system installation to X11 release 23* (553-3001-258) and then check the ordering package contents and ordering notes in the Pricing documentation.

Base level upgrade package

The basic equipment package used to upgrade a VL system to option 81C X11 release 24 is:

- VL System to Option 81C Core/Network and Network Module Upgrade Package

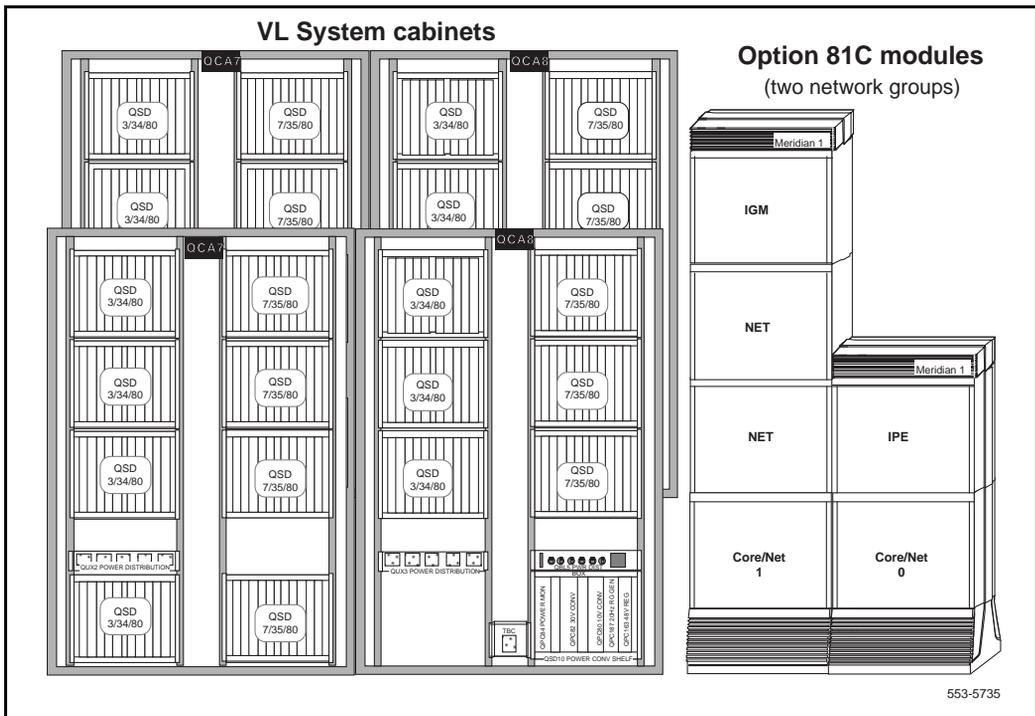
The upgrade package provides two Core/Network Modules, two Network Modules, one InterGroup Module, and one IPE Module. This package provides CNI cards and cables for one network group. Additional network groups, corresponding Core to Network Interface (CNI) cards, and required network cable packages are not included in the base level upgrade package; however, they can be ordered separately. When upgrading the system using this Core/Network and Network Module Upgrade Package, CPU and network functions are supported in option 81C Core/Network and Network Modules and peripheral functions are supported in both the existing cabinets and option 81C IPE Modules.

To connect network equipment in option 81C columns to peripheral equipment in existing cabinets, EMI-compliant connector housings are installed on existing cabinets to connect external shielded cables between cabinets and I/O panels located at the rear of option 81C Network Modules.

PE growth is accomplished from add-on PE cards in existing cabinets. IPE growth is accomplished from add-on IPE Modules and cards. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 35 shows the VL system cabinets next to option 81C columns. It shows a Core/Network and Network Module upgrade configuration using the base level upgrade package, which provides Core/Network, Network, InterGroup, and IPE Modules.

Figure 35
VL system to option 81C upgrade



553-5735

Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM

- Included in the base level upgrade package

Call processor unit

—

- An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

- Add NT8D17 Conference/TDS cards as required
- QPC444 Conference cards as required (nonvoice conference applications)

Two NT8D17 Conference/TDS cards are included in the base level upgrade package. QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Peripheral signaling and intergroup switch

- Included in the base level upgrade package

Four QPC412 InterGroup Switch cards are included in the base level upgrade package to support one group. Additional cards can be provided as required.

Network group junctor

- Included in the base level upgrade package

Network equipment

- AS1039A/D Network Group Assembly as required
- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

To support additional network groups specified in AS1039A/D, additional NT6D65 Core to Network Interface (CNI) cards must be ordered. Two CNI cards are required for every two groups after the first group. Two CNI cards are included in the base level upgrade package to support the first group. To support groups 2 and 3, another pair of CNI cards must be ordered, and so on up to a maximum of five groups. Each additional group also requires four NT8D76 and four NTND14 cables of appropriate lengths.

Additional network groups can be ordered as:

- A pair of completely empty Network Modules, using the AS1007A/D package. In this case, all necessary cards from the existing network shelves in the existing cabinet are transferred to Network Modules in option 81C. This method utilizes the greatest number of existing cards; however, the upgrade process is longer causing a greater system downtime.
- Complete network groups, using the AS1039A/D package. In this case, Network Modules are already equipped with the network support cards such as IGS, 3PE, PS, and BTU, and only the actual network cards need to be transferred from the existing cabinet. This network group expansion method is strongly recommended.

Two NT8D04 Superloop Network cards are included in the base level upgrade package. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base IPE Module or any add-on IPE Modules.

The number of additional QPC414 cards is determined based on the number of network loop connections needed to support PE cards in the existing cabinets or any PE cards in add-on PE Modules.

Network cards are not supported in the existing cabinet and the Network Modules simultaneously. These cards must be in the existing cabinet or Network Modules exclusively, depending on the base level upgrade package you selected.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in existing cabinets. Additional PE can be added to the system, but must be located in existing cabinets. IPE growth is supported in the IPE Module included in the base level upgrade package and from add-on IPE Modules.

To connect PE cards in existing cabinets with corresponding network cards in option 81C, external shielded cables must be engineered and ordered. Sets of NT8D86, NT8D73, and NT9J96 cables along with appropriate connector housings must be ordered. Refer to “Network to peripheral I/O cables” on page 283 for details.

PRI/DTI cards can be added to the upgraded system and located in option 81C Core/Network Modules or they can remain in the existing cabinet.

If PRI/DTI cards remain in existing cabinets, external shielded cables must be used to connect these cards to QPC414 Network cards through I/O panel connectors on option 81C Network Modules and connector housing I/O connectors on existing cabinets.

If PRI/DTI cards are located in option 81C Core/Network Modules, appropriate internal cables must be ordered to connect PRI/DTI cards directly to QPC414 Network cards.

Module pedestal equipment

— AS1001A/D Pedestal Assembly (up to four modules)

Two pedestals are included in the base level upgrade package. The number of additional pedestal assemblies depends on the number of modules added to the upgraded system.

Equipment cabinet power

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate. See “Power and ground engineering” on page 305 for more information.

Reserve system power equipment

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate.

System monitor connections

See “System monitor” on page 299 for specific requirements to support this type of upgrade. Also see upgrade installation procedures in *Upgrade system installation to X11 release 23* (553-3001-258).

Ground

See “Power and ground engineering” on page 305 for specific requirements to support this type of upgrade

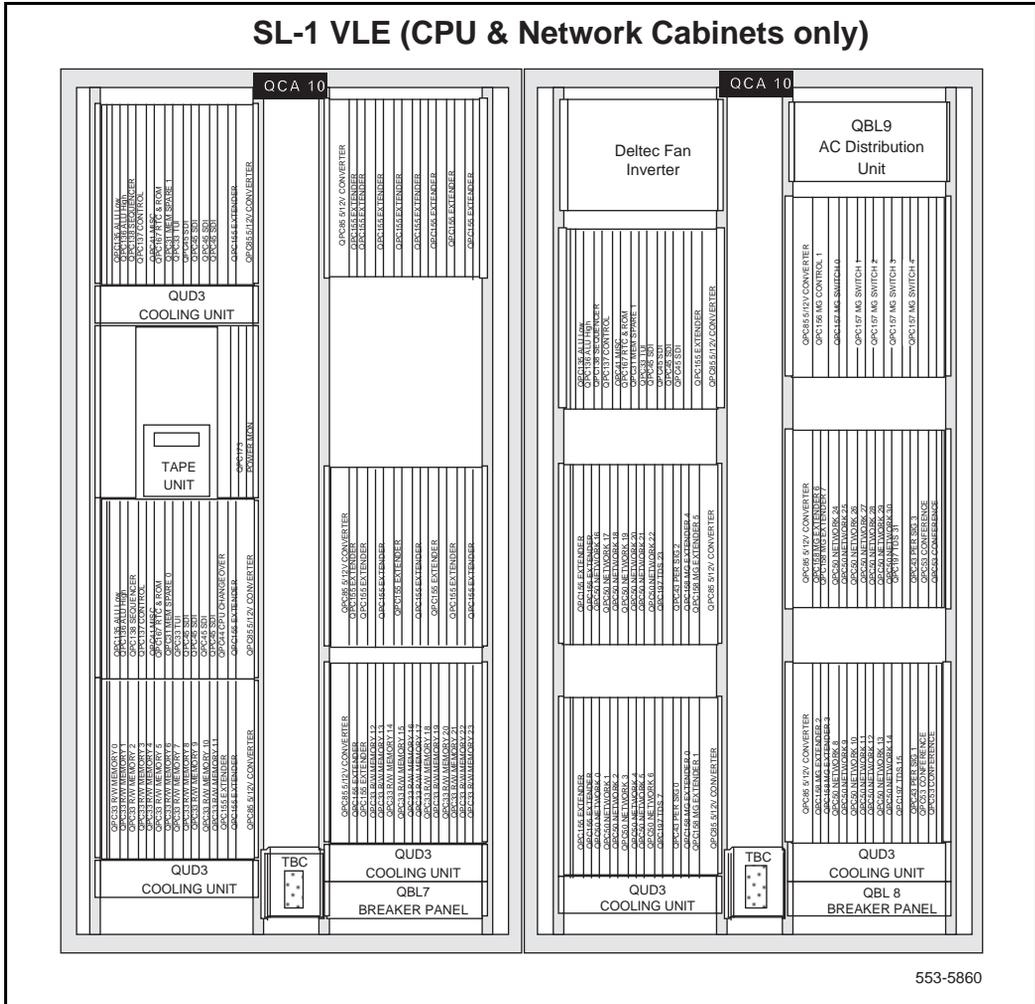
Upgrading an SL-1 VLE system

This section provides engineering information for upgrading an SL-1 VLE system to option 81C supported by X11 release 24 software.

Note: It is recommended that SL-1VLE customers send the customer database diskettes to Northern Telecom for conversion; contact your Northern Telecom representative to arrange for this.

Figure 36 shows typical preconversion common and network equipment VLE system cabinets. After the upgrade, these cabinets will house only peripheral equipment.

Figure 36
VLE system common and network equipment cabinets



Upgrading a VLE system to option 81C

To upgrade an SL-1 VLE system to a Meridian 1 option 81C, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing VLE system or the base level upgrade package.

Upgrading a VLE system to option 81C requires installing two or more Meridian 1 columns next to the SL-1 VLE system cabinets. These columns provide CE, network, and IPE housing. The existing VLE system cabinet is used to support PE cards.

When engineering an upgrade to option 81C, review appropriate upgrade procedures in *Upgrade system installation to X11 release 23 (553-3001-258)* and then check the ordering package contents and ordering notes in the Pricing documentation.

Base level upgrade package

The basic equipment package used to upgrade a VLE system to option 81C X11 release 24 is:

- VLE System to Option 81C Core/Network and Network Module Upgrade Package

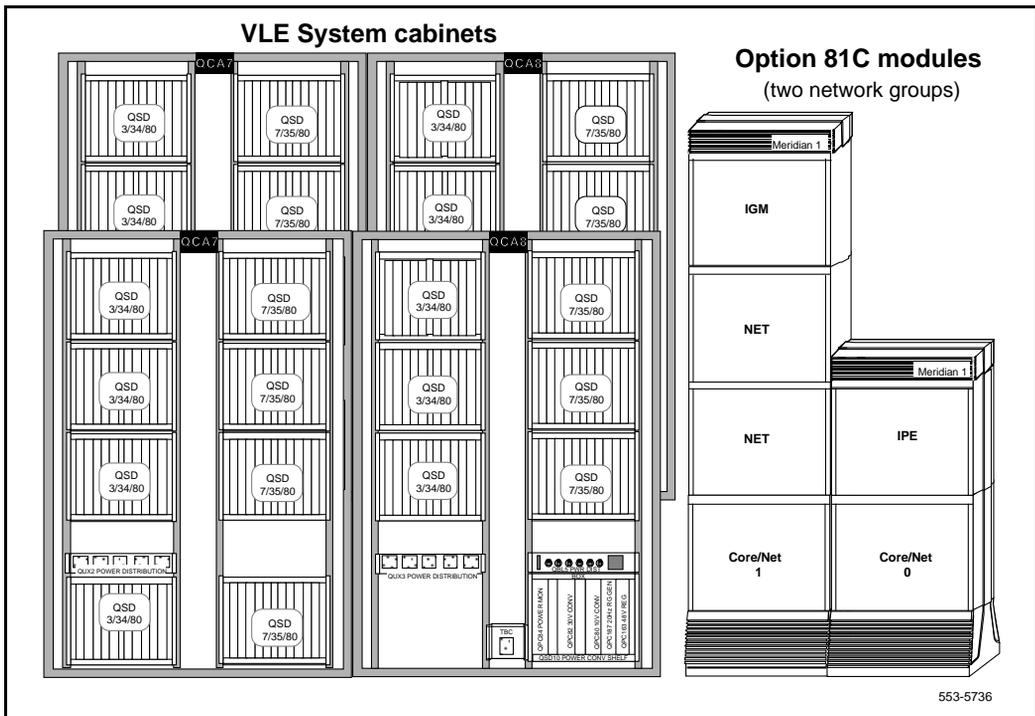
The upgrade package provides two Core/Network Modules, two Network Modules, one InterGroup Module, and one IPE Module. This package provides CNI cards and cables for one network group. Additional network groups, corresponding Core to Network Interface (CNI) cards, and required network cable packages are not included in the base level upgrade package; however, they can be ordered separately. When upgrading the system using this Core/Network and Network Module Upgrade Package, CPU and network functions are supported in option 81C Core/Network and Network Modules and peripheral functions are supported in both the existing cabinets and option 81C IPE Modules.

To connect network equipment in option 81C columns to peripheral equipment in existing cabinets, EMI-compliant connector housings are installed on existing cabinets to connect external shielded cables between cabinets and I/O panels located at the rear of option 81C Network Modules.

PE growth is accomplished from add-on PE cards in existing cabinets. IPE growth is accomplished from add-on IPE Modules and cards. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 37 shows VLE system cabinets next to option 81C columns. It shows a Core/Network and Network Module upgrade configuration using the base level upgrade package, which provides Core/Network, Network, InterGroup, and IPE Modules.

Figure 37
VLE system to option 81C upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM

- Included in the base level upgrade package

Call processor unit

- An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

- Add NT8D17 Conference/TDS cards as required
- QPC444 Conference cards as required (nonvoice conference applications)

Two NT8D17 Conference/TDS cards are included in the base level upgrade package. QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Peripheral signaling and intergroup switch

- Included in the base level upgrade package

Four QPC412 InterGroup Switch cards are included in the base level upgrade package to support one group. Additional cards can be provided as required.

Network group junctor

- Included in the base level upgrade package

Network equipment

- AS1039A/D Network Group Assembly as required
- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

To support additional network groups specified in AS1039A/D, additional NT6D65AA Core to Network Interface (CNI) cards must be ordered. Two CNI cards are required for every two groups after the first group. Two CNI cards are included in the base level upgrade package to support the first group. To support groups 2 and 3, another pair of CNI cards must be ordered, and so on up to a maximum of five groups. Each additional group also requires four NT8D76 and four NTND14 cables of appropriate lengths.

Additional network groups can be ordered as:

- A pair of completely empty Network Modules, using the AS1007A/D package. In this case, all necessary cards from the existing Network shelves in the existing cabinet are transferred to Network Modules in option 81C. This method utilizes the greatest number of existing cards; however, the upgrade process is longer causing a greater system downtime.
- Complete network groups, using the AS1039A/D package. In this case, Network Modules are already equipped with the network support cards such as IGS, 3PE, PS, and BTU, and only the actual network cards need to be transferred from the existing cabinet. This network group expansion method is strongly recommended.

Two NT8D04 Superloop Network cards are included in the base level upgrade package. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base IPE Module or any add-on IPE Modules.

The number of additional QPC414 cards is determined based on the number of network loop connections needed to support PE cards in the existing cabinets or any PE cards in add-on PE Modules.

Network cards are not supported in the existing cabinet and the Network Modules simultaneously. These cards must be in the existing cabinet or Network Modules exclusively, depending on the base level upgrade package you selected.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in existing cabinets. Additional PE can be added to the system, but must be located in existing cabinets. IPE growth is supported in the IPE Module included in the base level upgrade package and from add-on IPE Modules.

To connect PE cards in existing cabinets with corresponding network cards in option 81C, external shielded cables must be engineered and ordered. Sets of NT8D86, NT8D73, and NT9J96 cables along with appropriate connector housings must be ordered. Refer to “Network to peripheral I/O cables” on page 283 for details.

PRI/DTI cards can be added to the upgraded system and located in option 81C Core/Network Modules or they can remain in the existing cabinet.

If PRI/DTI cards remain in existing cabinets, external shielded cables must be used to connect these cards to QPC414 Network cards through I/O panel connectors on option 81C Network Modules and connector housing I/O connectors on existing cabinets.

If PRI/DTI cards are located in option 81C Core/Network Modules, appropriate internal cables must be ordered to connect PRI/DTI cards directly to QPC414 Network cards.

Module pedestal equipment

— AS1001A/D Pedestal Assembly (up to four modules)

Two pedestals are included in the base level upgrade package. The number of additional pedestal assemblies will depend on the number of modules added to the upgraded system.

Equipment cabinet power

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate. See “Power and ground engineering” on page 305 for more information.

Reserve system power equipment

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate.

System monitor connections

See “System monitor” on page 299 for specific requirements to support this type of upgrade. Also see upgrade installation procedures in *Upgrade system installation to X11 release 23 (553-3001-258)*.

Ground

See “Power and ground engineering” on page 305 for specific requirements to support this type of upgrade.

Upgrading an SL-1 XL system

This section provides engineering information for upgrading an SL-1 XL system to option 81C supported by X11 release 24 software.

Note: It is recommended that SL-1 XL customers send the customer database diskettes to Northern Telecom for conversion; contact your Northern Telecom representative to arrange for this.

Figure 38 shows typical preconversion common and network equipment XL system cabinets. After the upgrade, these cabinets will house only peripheral equipment.

Upgrading an XL system to option 81C

To upgrade an SL-1 XL system to a Meridian 1 option 81C, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing XL system or the base level upgrade package.

Upgrading an XL system to option 81C requires installing two or more Meridian[®]1 columns next to the SL-1 XL system cabinets. These columns provide CE, network, and IPE housing. The existing XL system cabinet is used to support PE cards.

When engineering an upgrade to option 81C, review appropriate upgrade procedures in *Upgrade system installation* (553-3001-250) and then check the ordering package contents and ordering notes in the Pricing documentation.

Base level upgrade package

The basic equipment package used to upgrade an XL system to option 81C X11 release 22 is:

- XL System to Option 81C Core/Network and Network Module Upgrade Package

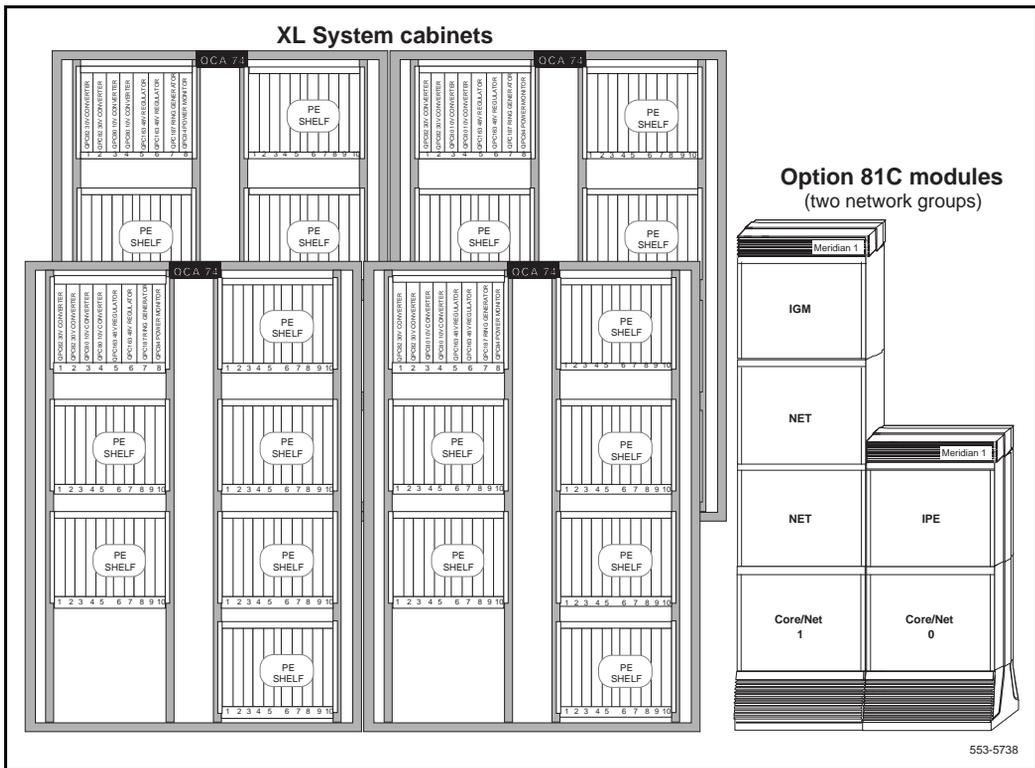
The upgrade package provides two Core/Network Modules, two Network Modules, one InterGroup Module, and one IPE Module. This package provides CNI cards and cables for one network group. Additional network groups, corresponding Core to Network Interface (CNI) cards, and required network cable packages are not included in the base level upgrade package; however, they can be ordered separately. When upgrading the system using this Core/Network and Network Module Upgrade Package, CPU and network functions are supported in option 81C Core/Network and Network Modules and peripheral functions are supported in both the existing cabinets and option 81C IPE Modules.

To connect network equipment in option 81C columns to peripheral equipment in existing cabinets, EMI-compliant connector housings are installed on existing cabinets to connect external shielded cables between cabinets and I/O panels located at the rear of option 81C Network Modules.

PE growth is accomplished from add-on PE cards in existing cabinets. IPE growth is accomplished from add-on IPE Modules and cards. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 39 shows XL system cabinets next to option 81C columns. It shows a Core/Network and Network Module upgrade configuration using the base level upgrade package, which provides Core/Network, Network, InterGroup, and IPE Modules.

Figure 39
XL system to option 81C upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM

- Included in the base level upgrade package

Call processor unit

- An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

- Add NT8D17 Conference/TDS cards as required
- QPC444 Conference cards as required (nonvoice conference applications)

Two NT8D17 Conference/TDS cards are included in the base level upgrade package. QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Peripheral signaling and intergroup switch

- Included in the base level upgrade package

Four QPC412 InterGroup Switch cards are included in the base level upgrade package to support one group. Additional cards can be provided as required.

Network group junctor

- Included in the base level upgrade package

Network equipment

- AS1039A/D Network Group Assembly as required
- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

To support additional network groups specified in AS1039A/D, additional NT6D65AA Core to Network Interface (CNI) cards must be ordered. Two CNI cards are required for every two groups after the first group. Two CNI cards are included in the base level upgrade package to support the first group. To support groups 2 and 3, another pair of CNI cards must be ordered, and so on up to a maximum of five groups. Each additional group also requires four NT8D76 and four NTND14 cables of appropriate lengths.

Additional network groups can be ordered as:

- A pair of completely empty Network Modules, using the AS1007A/D package. In this case, all necessary cards from the existing Network shelves in the existing cabinet are transferred to Network Modules in option 81C. This method utilizes the greatest number of existing cards; however, the upgrade process is longer causing a greater system downtime.
- Complete network groups, using the AS1039A/D package. In this case, Network Modules are already equipped with the network support cards such as IGS, 3PE, PS, and BTU, and only the actual network cards need to be transferred from the existing cabinet. This network group expansion method is strongly recommended.

Two NT8D04 Superloop Network cards are included in the base level upgrade package. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base IPE Module or any add-on IPE Modules.

The number of additional QPC414 cards is determined based on the number of network loop connections needed to support PE cards in the existing cabinets or any PE cards in add-on PE Modules.

Network cards are not supported in the existing cabinet and the Network Modules simultaneously. These cards must be in the existing cabinet or Network Modules exclusively, depending on the base level upgrade package you selected.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in existing cabinets. Additional PE can be added to the system, but must be located in existing cabinets. IPE growth is supported in the IPE Module included in the base level upgrade package and from add-on IPE Modules.

To connect PE cards in existing cabinets with corresponding network cards in option 81C, external shielded cables must be engineered and ordered. Sets of NT8D86, NT8D73, and NT9J96 cables along with appropriate connector housings must be ordered. Refer to “Network to peripheral I/O cables” on page 283 for details.

PRI/DTI cards can be added to the upgraded system and located in option 81C Core/Network Modules or they can remain in the existing cabinet.

If PRI/DTI cards remain in existing cabinets, external shielded cables must be used to connect these cards to QPC414 Network cards through I/O panel connectors on option 81C Network Modules and connector housing I/O connectors on existing cabinets.

If PRI/DTI cards are located in option 81C Core/Network Modules, appropriate internal cables must be ordered to connect PRI/DTI cards directly to QPC414 Network cards.

Module pedestal equipment

— AS1001A/D Pedestal Assembly (up to four modules)

Two pedestals are included in the base level upgrade package. The number of additional pedestal assemblies depends on the number of modules added to the upgraded system.

Equipment cabinet power

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate. See “Power and ground engineering” on page 305 for more information.

Reserve system power equipment

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate.

System monitor connections

See “System monitor” on page 299 for specific requirements to support this type of upgrade. Also see upgrade installation procedures in *Upgrade system installation to X11 release 23* (553-3001-258).

Ground

See “Power and ground engineering” on page 305 for specific requirements to support this type of upgrade.

Upgrading an SL-1 XN system

This section provides engineering information for upgrading an SL-1 XN system to option 81C supported by X11 release 24 software.

Note: It is recommended that SL-1 XN customers send the customer database diskettes to Northern Telecom for conversion; contact your Northern Telecom representative to arrange for this.

Upgrading an XN system to option 81C requires installing two or more Meridian 1 columns next to the SL-1 XN system cabinets. These columns provide CE, network, and PE housing. The existing system XN cabinet is used to support PE including the DTI/PRI cards.

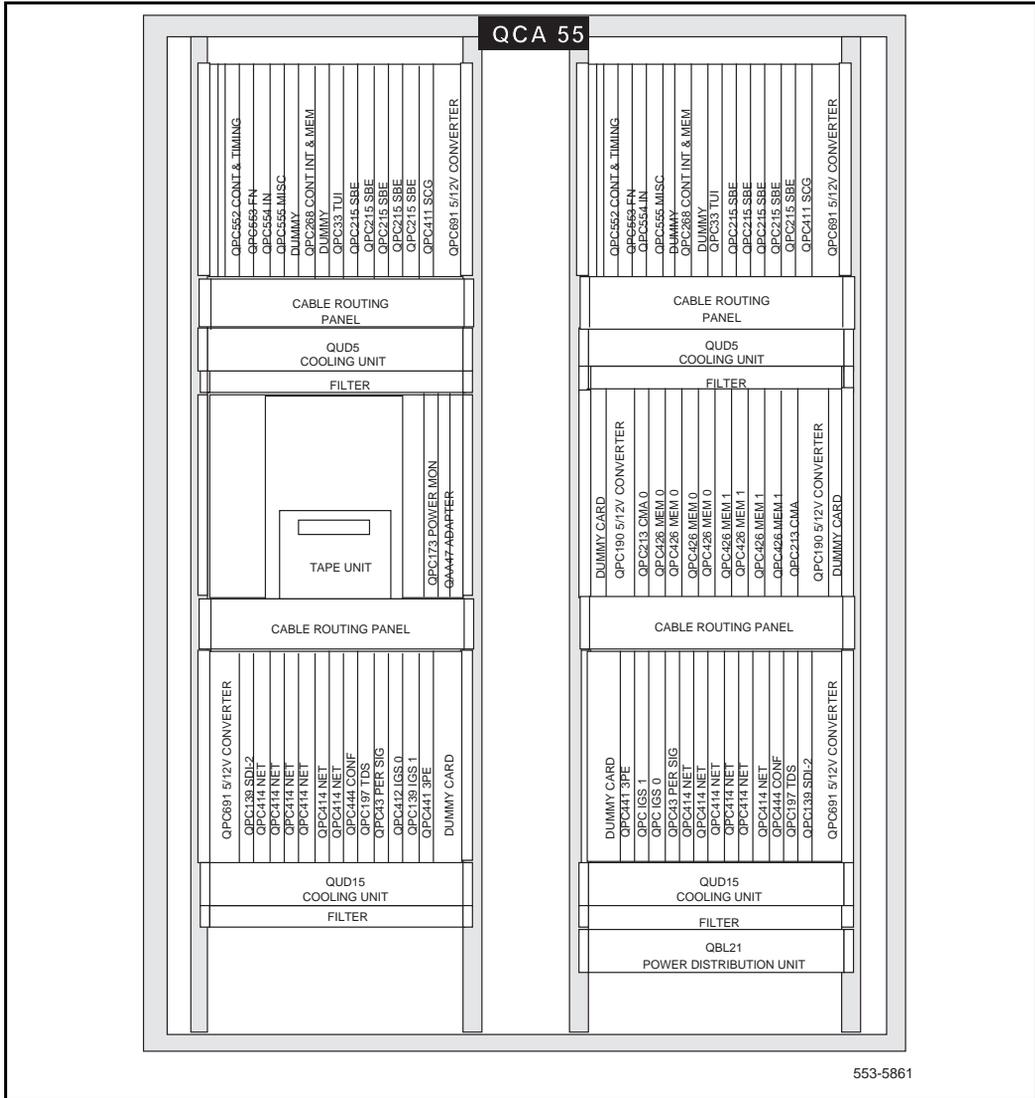
Two upgrade methods can be used to upgrade an XN system to option 81C:

- A Core/Network Module upgrade provides two Core/Network Modules to house CE cards and one IPE Module to house IPE cards. With this upgrade method, network and PE cards remain in the existing XN cabinet and CE cards are supported by Core/Network Modules included in the base level upgrade package.
- A Core/Network and Network Module upgrade provides two Core/Network Modules, two Network Modules, one IPE Module, and one InterGroup Module. With this upgrade method, PE cards remain in the existing XN cabinet and CE and network cards are supported by Core/NCORE/network and Network Modules included in the base level upgrade package.

When engineering an upgrade to option 81C, review appropriate upgrade procedures in *Upgrade system installation to X11 release 23 (553-3001-258)* and then check the ordering package contents and ordering notes in the Pricing documentation.

Figure 40 shows a typical XN system cabinet supporting CE and network cards.

Figure 40
XN SL-1 system cabinet



Upgrading an XN system to option 81C

To upgrade an SL-1 XN system to a Meridian 1 option 81C, identify the module base level upgrade package you want to use. In addition to the base level upgrade package, you can add equipment to the upgraded system to support services not provided by the existing XN system or the base level upgrade package.

Base level upgrade package

Basic equipment packages used to upgrade an XN system to option 81C X11 release 24 are:

- XN System to Option 81C Core/Network and Network Module Upgrade Package
- XN System to Option 81C Core/Network Module Upgrade Package (two columns)
- XN System to Option 81C Core/Network Module Upgrade Package (single column)

The Core/Network and Network Module upgrade package provides two Core/Network Modules, two Network Modules, one InterGroup Module, and one IPE Module. Additional network groups can be added as required. When upgrading the system using this Core/Network and Network Module Upgrade Package, CPU and network functions are supported in option 81C Core/Network and Network Modules and peripheral functions are supported in both the existing cabinets and option 81C IPE Modules.

The Core/Network Module upgrade packages provide two Core/Network Modules and one IPE Module. The network equipment and the junctor remain in existing cabinets, and existing PE cabinets remain connected to the network shelves in QCA55 and QCA108 CE cabinets. Core/Network Modules in option 81C functionally replace CPU shelves of the QCA55 cabinet. NTND33CB, NTND33CC, and Core-Cabinet Upgrade Cable kits provide a complete set of internal and external cables between Core/Network Modules and existing CE cabinets for network group 0, and network groups 1 to 4, respectively. These cables connect the Clock Controller to the junctor, the CNI card to the 3PE card, and the PRI card to the Clock Controller reference connector. For cabinets other than QCA55 and QCA108, always use the Core/Network and Network Module Upgrade Package.

To connect network equipment in option 81C columns to peripheral equipment in existing cabinets, EMI-compliant connector housings are installed on existing cabinets to connect external shielded cables between cabinets and I/O Panels located at the rear of option 81C Network Modules.

There must be more than one mounting location available for the EMI-compliant connector housings to accommodate multiple network group connections between the network equipment in option 81C modules and the existing QCA55 and QCA108 cabinets; otherwise, additional engineering of connector housing locations is required.

Additional network groups, corresponding Core/Network to Network Interface (CNI) cards, and required network cable packages are not included in the base level upgrade package; however, they can be ordered separately.

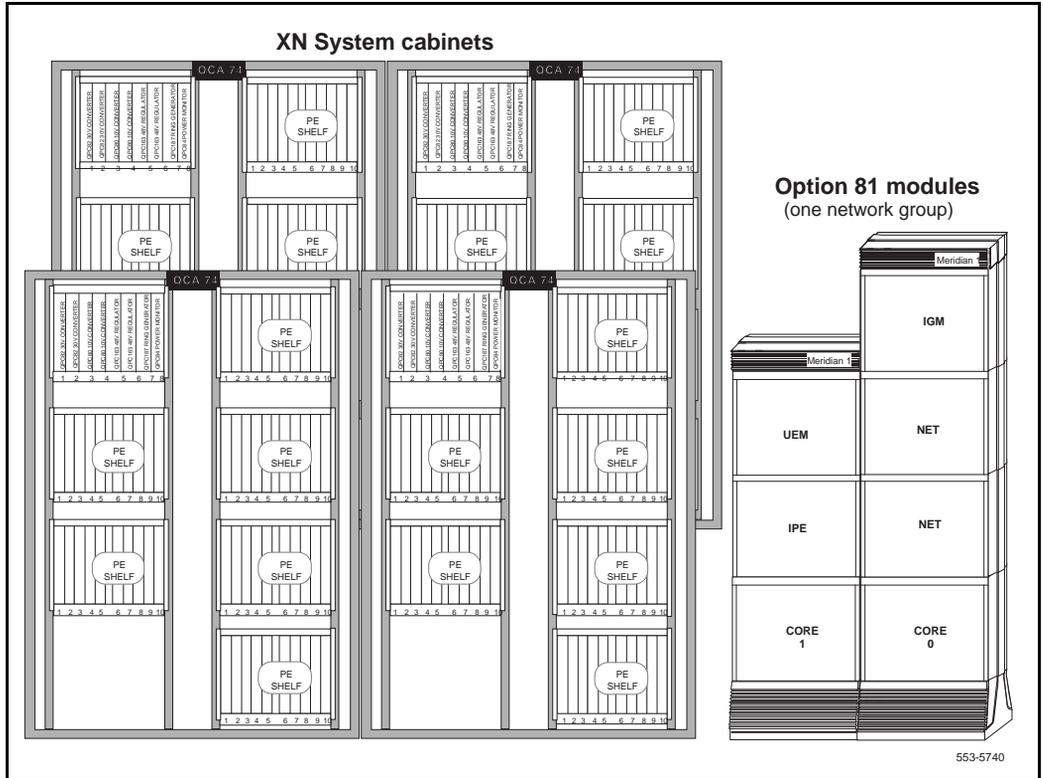
PE growth is accomplished from add-on PE cards in existing cabinets. IPE growth is accomplished from add-on IPE Modules and cards. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

The Core to Network equipment distance is limited as follows:

- From the I/O panel at the rear of each Core/Network Module to the first connector housing on top of the QCA55 cabinet should not exceed 16 feet.
- From the I/O panel at the rear of each Core/Network Module to the second connector housing on top of the QCA55 cabinet should not exceed 22 feet.
- From the I/O panel at the rear of each Core/Network Module to the connector housing on top of the QCA108 cabinet should not exceed 22 feet.

Figure 41 shows XN system cabinets next to option 81C columns. It shows a Core/Network and Network Module upgrade configuration using the base level upgrade package, which provides Core/Network, Network, InterGroup, and IPE Modules.

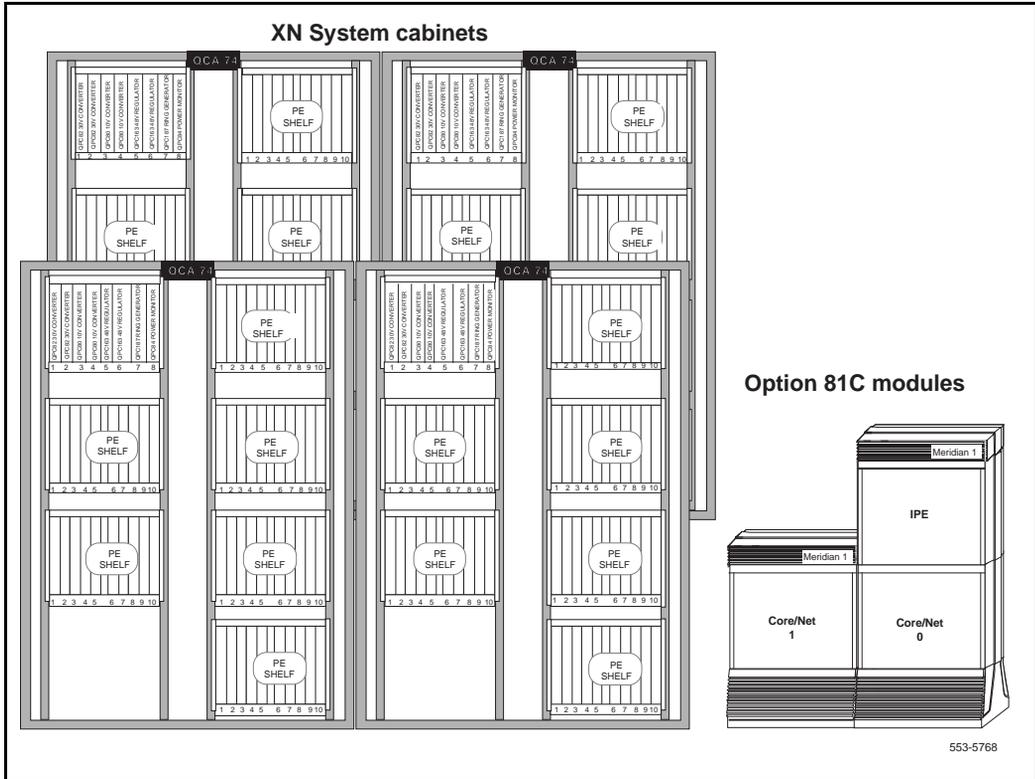
Figure 41
XN system to option 81C Core/Network and Network Module upgrade



553-5740

Figure 42 shows XN system cabinets next to option 81C side-by-side core columns. It shows a Core/Network Module upgrade configuration using the base level upgrade package, which provides Core/Network and IPE Modules. The network equipment remains in the existing XN CE/Network cabinet. The upgrade package, not shown in this figure, provides a single column core configuration.

Figure 42
XN system to option 81C Core/Network Module upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM

- Included in the base level upgrade packages

Call processor unit

- An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

- Add NT8D17 Conference/TDS cards as required
- QPC444 Conference cards as required (nonvoice conference applications)

Two NT8D17 Conference/TDS cards are included in the core and network base upgrade package. QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Peripheral signaling and intergroup switch

- Included in the core and network base level upgrade package
- Reuse the existing equipment when using the core base level upgrade package

Four QPC412 InterGroup Switch cards are included in the core and network base level upgrade package to support one group. Additional cards can be provided as required.

Network group junctor

- Included in the core and network base level upgrade package
- Reuse the existing equipment when using the core base level upgrade package

Network equipment

- AS1039A/D Network Group Assembly as required (for core and network upgrade package only)
- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

To support additional network groups specified in AS1039A/D, additional NT6D65 Core to Network Interface (CNI) cards must be ordered. Two CNI cards are required for every two groups after the first group. Two CNI cards are included in the base level upgrade package to support the first group. To support groups 2 and 3, another pair of CNI cards must be ordered, and so on up to a maximum of five groups. Each additional group also requires four NT8D76 and four NTND14 cables of appropriate lengths.

Additional network groups can be ordered as:

- A pair of completely empty Network Modules, using the AS1007A/D package. In this case, all necessary cards from the existing network shelves in the existing cabinet are transferred to Network Modules in option 81C. This method utilizes the greatest number of existing cards; however, the upgrade process is longer causing a greater system downtime.
- Complete network groups, using the AS1039A/D package. In this case, Network Modules are already equipped with the network support cards such as IGS, 3PE, PS, and BTU, and only the actual network cards need to be transferred from the existing cabinet. This network group expansion method is strongly recommended.

The number of NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base IPE Module or any add-on IPE Modules.

The number of additional QPC414 cards is determined based on the number of network loop connections needed to support PE cards in the existing cabinets or any PE cards in add-on PE Modules.

Network cards are not supported in the existing cabinet and the Network Modules simultaneously. These cards must be in the existing cabinet or Network Modules exclusively, depending on the base level upgrade package you selected. If the system is equipped with fewer than five network groups and future capacity expansion is anticipated, the core and network upgrade package should be selected to allow future system expansion.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in existing cabinets. Additional PE can be added to the system, but must be located in existing cabinets. IPE growth is supported in the IPE Module included in the base level upgrade packages and from add-on IPE Modules.

To connect PE cards in existing cabinets with corresponding network cards in option 81C, external shielded cables must be engineered and ordered. Sets of NT8D86, NT8D73, and NT9J96 cables along with appropriate connector housings must be ordered. Refer to “Network to peripheral I/O cables” on page 283 for details.

PRI/DTI cards can be added to the upgraded system and located in option 81C Core/Network Modules or they can remain in the existing cabinet.

If PRI/DTI cards remain in existing cabinets, external shielded cables must be used to connect these cards to QPC414 Network cards through I/O panel connectors on option 81C Network Modules and connector housing I/O connectors on existing cabinets.

If PRI/DTI cards are located in option 81C Core/Network Modules, appropriate internal cables must be ordered to connect PRI/DTI cards directly to QPC414 Network cards.

Module pedestal equipment

— AS1001A/D Pedestal Assembly (up to four modules)

Two pedestals are included in the base level upgrade packages. The number of additional pedestal assemblies depends on the number of modules added to the upgraded system.

Equipment cabinet power

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate. See “Power and ground engineering” on page 305 for more information.

Reserve system power equipment

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate.

System monitor connections

See “System monitor” on page 299 for specific requirements to support this type of upgrade. Also see upgrade installation procedures in *Upgrade system installation to X11 release 23* (553-3001-258).

Ground

See “Power and ground engineering” on page 305 for specific requirements to support this type of upgrade.

Upgrading an SL-1 XT system

This section provides engineering information for upgrading an SL-1 XT system or cabinet versions or the option 71 systems to the following:

- XT X11 release 21
- Option 81C X11 release 24

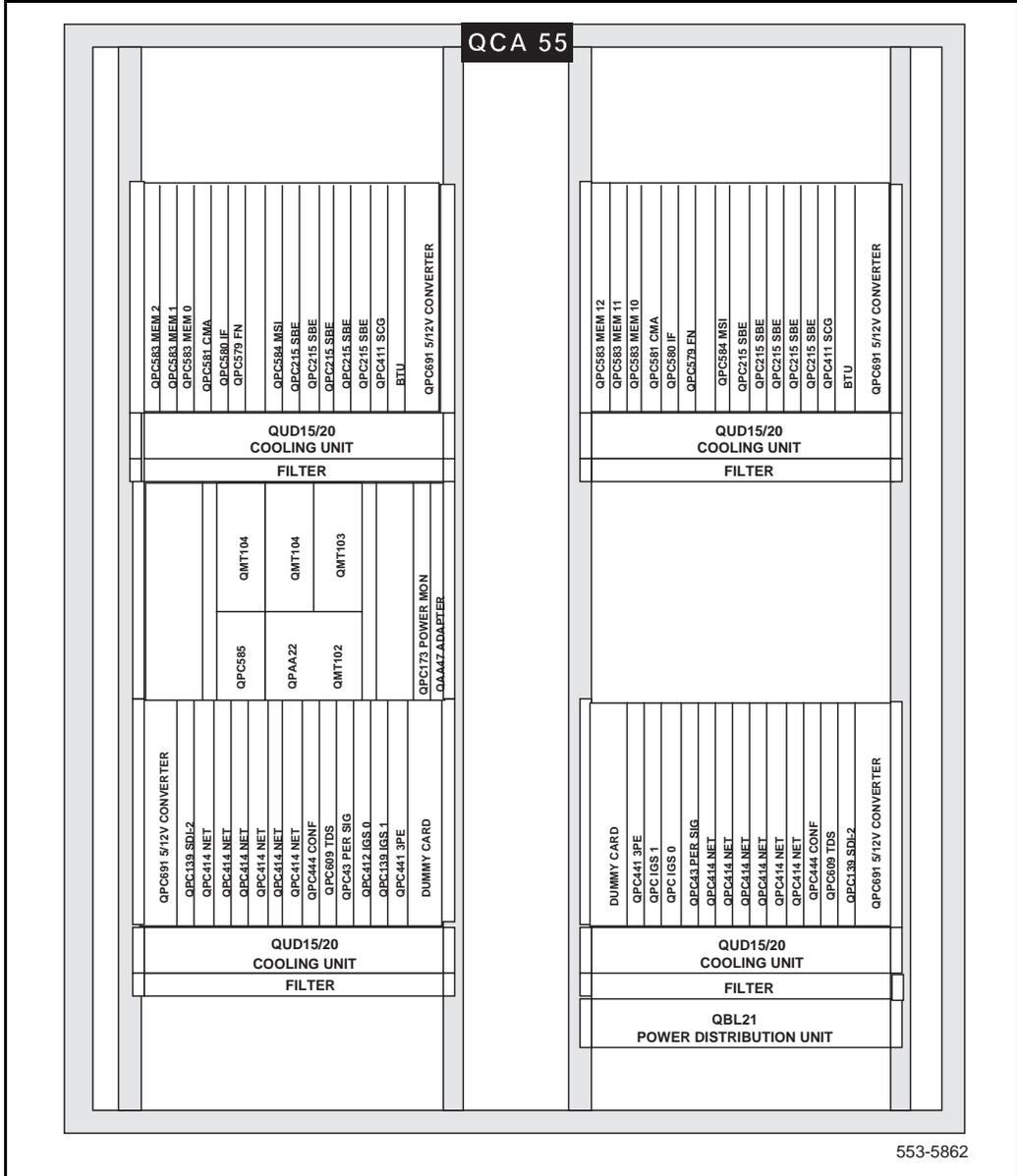
Upgrading an XT system to X11 release 21 requires replacing some of the CE cards, the disk drive unit, and the software.

Upgrading an XT system to option 81C requires installing two or more Meridian 1 columns next to the SL-1 XT system cabinet. These columns provide CE, network, and PE housing. The existing XT system cabinet is used to support PE including the DTI/PRI cards.

Some existing configurations may include QCA7 and QCA8 or QCA74 and QCA108 peripheral cabinets to support existing PE cards.

Figure 43 shows a typical XT system cabinet before it is upgraded to support X11 release 21 software.

Figure 43
XT SL-1 system cabinet



553-5862

Upgrading an XT system to X11 release 21

To upgrade an XT system to X11 release 21, select the card base level upgrade package for this system. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing XT system or the base level upgrade package.

Note: X11 release 21 is the highest supported X11 software release for SL-1 XT systems. The XT system must be upgraded to an option 81C before installing X11 release 24 software.

Base level upgrade package

The basic equipment package required to upgrade an XT system to X11 release 21 is:

— XT system to XT system release 21 Card Upgrade Package

Each package provides capacity for a dual CPU, dual memory, 146 network loops* or six network superloops** plus four extra voice/data network loops with integrated IPE.

* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

Existing PE is reused in the existing QCA58, QCA7, QCA8, QCA74, and QCA108 cabinets. PE growth is accomplished from add-on PE cards in the existing cabinets or from add-on IPE Modules. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

If an IPE shelf is added to the XT system, the system becomes an option 61.

Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Software storage (disk drives)

— Included in the base level upgrade package

The NTND16 Multi Disk Unit (MDU) primary location is three empty network card slots in the CE shelf of the new shelf. Alternative locations are three empty IPE card slots in the IPE shelf of the new base module or three empty card slots of any add-on expansion module.

Software interface and read-only memory

— Included in the base level upgrade package

The software cartridges are installed on QPC584L Mass Storage Interface (MSI) or NT9D34 Enhanced Mass Storage Interface (EMSI) cards located in a dedicated card slot in each CPU/Memory shelf.

Each read-only memory (ROM) card is attached to a QPC579 CPU Function card that is also located in a dedicated card slot in each CPU/Network Module.

Central processor unit

— Reuse the existing CPU Function and CPU Interface cards

Memory and peripheral signaling

— Included in the base level upgrade package

Reuse existing peripheral signaling cards. One memory card for each CPU is included in the base level upgrade package.

Tone and digit switch and conference

- Reuse existing tone and digit switch and conference cards
- or
- QPC444 Conference cards as required (nonvoice conference applications)

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support the PE in the existing cabinets. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards and modules added to the system. One NT8D04 Superloop Network card is included in the base level upgrade package. One NT8D01 Peripheral Controller card must be added to the upgrade package to support the IPE cards in the IPE Module supplied in the base level upgrade package.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in the existing cabinets. Additional PE can be added to the system, but must be located in the existing cabinets. IPE growth is supported in the IPE shelf of the new base module and from add-on IPE Modules. DTI or PRI or both can be added to the upgraded system and located in the CE shelf of the new base module or, from the addition of a network expansion module, can be added to the base module. The above hardware is not included in the base level upgrade package. Consult NTP and Pricing documentation for ordering information.

Equipment cabinet power

- Reuse existing power equipment as required

Add a new power system, as required, to support the addition of any IPE or application modules. See “Power and ground engineering” on page 305 for engineering details for multiple power combinations.

Reserve system power equipment

- Reuse batteries as required

Add batteries as required to support any additional IPE or application modules.

System monitor connections

See “System monitor” on page 299 for specific requirements to support the addition of IPE or application modules.

Ground

Unless a new cabinet is added, grounding remains unchanged. See “Power and ground engineering” on page 305 for specific requirements to support grounding changes or additions.

Upgrading an XT system to option 81C

To upgrade an SL-1 XT system to a Meridian 1 option 81C, identify the module base level upgrade package you want to use. In addition to the base level upgrade package, you can add equipment to the upgraded system to support services not provided by the existing XT system or the base level upgrade package.

Two upgrade methods can be used to upgrade an XT system to option 81C:

- A Core/Network Module upgrade provides two Core/Network Modules to house CE cards and one IPE Module to house IPE cards. With this upgrade method, network and PE cards remain in the existing XT cabinet and CE cards are supported by Core/Network Modules included in the base level upgrade package.
- A Core/Network and Network Module upgrade provides two Core/Network Modules, two Network Modules, one IPE Module, and one InterGroup Module. With this upgrade method, PE cards remain in the existing XT cabinet and CE and network cards are supported by Core/Network and Network Modules included in the base level upgrade package.

When engineering an upgrade, review appropriate upgrade procedures in *Upgrade system installation to X11 release 23* (553-3001-258) and then check the ordering package contents and ordering notes in the Pricing documentation.

Base level upgrade package

Basic equipment packages used to upgrade an XT system to option 81C X11 release 24 are:

- XT System to Option 81C Core/Network and Network Module Upgrade Package
- XT System to Option 81C Core/Network Module Upgrade Package (double column)
- XT System to Option 81C Core/Network Module Upgrade Package (single column)

The Core and Network package provides two Core/Network Modules, two Network Modules, one InterGroup Module, and one IPE Module. Additional network groups can be added as required. When upgrading the system using this Core/Network and Network Module Upgrade Package, CPU and network functions are supported in option 81C Core/Network and Network Modules and peripheral functions are supported in both the existing cabinets and option 81C IPE Modules.

Core upgrade packages provide two Core/Network Modules and one IPE Module. The network equipment and the junctor remain in existing cabinets and existing PE cabinets remain connected to the network shelves in QCA55 and QCA108 CE cabinets. Core/Network Modules in option 81C functionally replace CPU shelves of the QCA55 cabinet. NTND33CB, NTND33CC, and Core/Network Cabinet Upgrade Cable kits provide a complete set of internal and external cables between Core/Network Modules and existing CE cabinets for network group 0, and network groups 1 to 4, respectively. These cables connect the Clock Controller to the junctor, the CNI card to the 3PE card, and the PRI card to the Clock Controller reference connector. For cabinets other than QCA55 and QCA108, always use the Core/Network and Network Module Upgrade Package.

EMI-compliant connector housings that connect external shielded cables between cabinets and Core/Network and Network Module I/O panels are located at the top of existing cabinets.

There must be more than one mounting location available for the EMI-compliant connector housings to accommodate multiple network group connections between the network equipment in option 81C modules and the existing QCA55 and QCA108 cabinets; otherwise, additional engineering of connector housing locations is required.

Additional network groups, corresponding Core/Network to Network Interface (CNI) cards, and required network cable packages are not included in the base level upgrade package; however, they can be ordered separately.

Core to network equipment distance is limited as follows:

- From the I/O panel at the rear of each Core/Network Module to the first connector housing on top of the QCA55 cabinet should not exceed 16 feet.
- From the I/O panel at the rear of each Core/Network Module to the second connector housing on top of the QCA55 cabinet should not exceed 22 feet.
- From the I/O panel at the rear of each Core/Network Module to the connector housing on top of the QCA108 cabinet should not exceed 22 feet.

PE growth is accomplished from add-on PE cards in existing cabinets. IPE growth is accomplished from add-on IPE Modules and cards. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 44 shows XT system cabinets next to option 81C columns. It shows a Core/Network and Network Module upgrade configuration using the core and network base level upgrade package, which provides Core/Network, Network, InterGroup, and IPE Modules.

Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM

- Included in the base level upgrade packages

Call processor unit

- An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

- Add NT8D17 Conference/TDS cards as required
- QPC444 Conference cards as required (nonvoice conference applications)

Two NT8D17 Conference/TDS cards are included in the core and network base level upgrade package. QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Peripheral signaling and intergroup switch

- Included in the core and network base level upgrade package
- Reuse the existing equipment when using the core base level upgrade package

Four QPC412 InterGroup Switch cards are included in the core and network base level upgrade package to support one group. Additional cards can be provided as required.

Network group junctor

- Included in the core and network base level upgrade package
- Reuse the existing equipment when using the core base level upgrade package

Network equipment

- AS1039A/D Network Group Assembly as required (for the core and network upgrade package only)
- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

To support additional network groups specified in AS1039A/D, additional NT6D65 Core to Network Interface (CNI) cards must be ordered. Two CNI cards are required for every two groups after the first group. Two CNI cards are included in the base level upgrade package to support the first group. To support groups 2 and 3, another pair of CNI cards must be ordered, and so on up to a maximum of five groups. Each additional group also requires four NT8D76 and four NTND14 cables of appropriate lengths.

Additional network groups can be ordered as:

- A pair of completely empty Network Modules, using the AS1007A/D package. In this case, all necessary cards from the existing network shelves in the existing cabinet are transferred to Network Modules in option 81C. This method utilizes the greatest number of existing cards; however, the upgrade process is longer causing a greater system downtime.
- Complete network groups, using the AS1039A/D package. In this case, Network Modules are already equipped with the network support cards such as IGS, 3PE, PS, and BTU, and only the actual network cards need to be transferred from the existing cabinet. This network group expansion method is strongly recommended.

The number of NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base IPE Module or any add-on IPE Modules.

The number of additional QPC414 cards is determined based on the number of network loop connections needed to support PE cards in the existing cabinets or any PE cards in add-on PE Modules.

Network cards are not supported in the existing cabinet and the Network Modules simultaneously. These cards must be in the existing cabinet or Network Modules exclusively, depending on the base level upgrade package you selected. If the system is equipped with fewer than five network groups and future capacity expansion is anticipated, the core and network upgrade package should be selected to allow future system expansion.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different cabinet type (for example, single-sided to UEM, UEM to double-sided, UEM to ST, and so on) require interface cables and connector housings described in “Network to peripheral I/O cables” on page 283. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables and connector housings is determined by the number of loops needed to support peripheral equipment. Peripheral equipment located within the same cabinet type requires NT8D85, NE-A18QA, or QCAD124 cables to connect network cards to peripheral equipment.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in existing cabinets. Additional PE can be added to the system, but must be located in existing cabinets. IPE growth is supported in the IPE Module included in both base level upgrade packages and from add-on IPE Modules.

To connect PE cards in existing cabinets with corresponding network cards in option 81C, external shielded cables must be engineered and ordered. Sets of NT8D86, NT8D73, and NT9J96 cables along with appropriate connector housings must be ordered. Refer to “Network to peripheral I/O cables” on page 283 for details.

PRI/DTI cards can be added to the upgraded system and located in option 81C Core/Network Modules or they can remain in the existing cabinet.

If PRI/DTI cards remain in existing cabinets, external shielded cables must be used to connect these cards to QPC414 Network cards through I/O panel connectors on option 81C Network Modules and connector housing I/O connectors on existing cabinets.

If PRI/DTI cards are located in option 81C Core/Network Modules, appropriate internal cables must be ordered to connect PRI/DTI cards directly to QPC414 Network cards.

Module pedestal equipment

— AS1001A/D Pedestal Assembly (up to four modules)

Two pedestals are included in both base level upgrade packages. The number of additional pedestal assemblies depends on the number of modules added to the upgraded system.

Equipment cabinet power

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate. See “Power and ground engineering” on page 305 for more information.

Reserve system power equipment

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate.

System monitor connections

See “System monitor” on page 299 for specific requirements to support this type of upgrade. Also see upgrade installation procedures in *Upgrade system installation to X11 release 23* (553-3001-258).

Ground

See “Power and ground engineering” on page 305 for specific requirements to support this type of upgrade.

Upgrading Meridian 1 option 21

This section provides engineering information for upgrading a Meridian 1 option 21 or 21A system to the following systems:

- Option 21A to option 21E X11 release 21
- Option 21 to option 21E X11 release 21
- Option 21 to option 51C X11 release 24 (module or card cage)
- Option 21 to option 61C X11 release 24

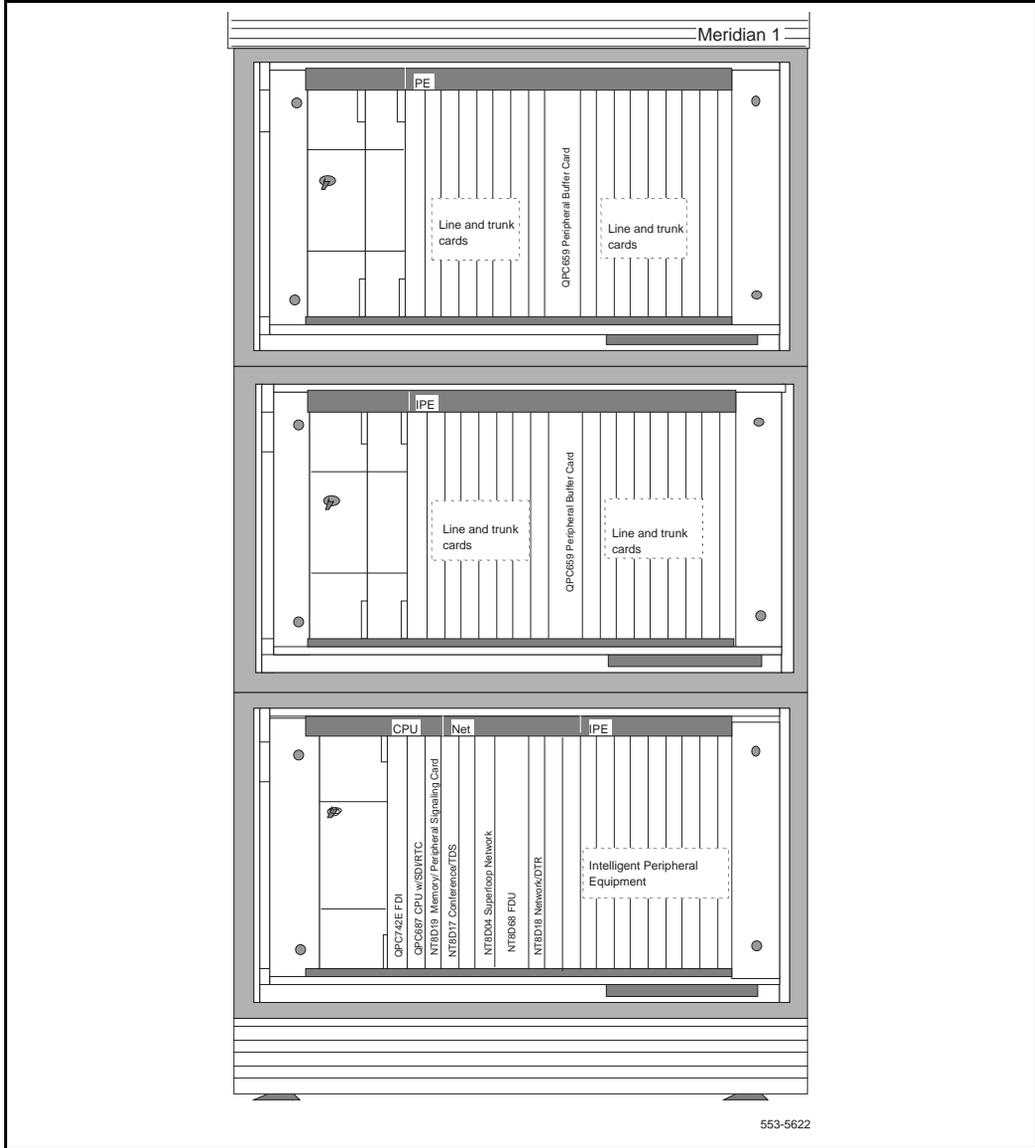
Upgrading option 21A to option 21E requires replacing the pedestal and top cap in addition to replacing circuit cards.

Upgrading option 21 to option 21E requires replacing cards in the existing option 21 column.

A modular upgrade from option 21 to option 51C or option 61C requires installing an option 51C or option 61C column next to the existing option 21 column.

Figure 46 shows a typical option 21 column with one IPE Module.

Figure 46
Meridian 1 option 21 column



553-5622

Upgrading option 21A to option 21E

To upgrade a Meridian 1 option 21A to option 21E, use a card upgrade package. This upgrade package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you have to add a pedestal assembly and a top cap to complete the minimum hardware requirements. You can also add equipment and software features to the upgraded system to support services not provided by the existing option 21A system or the base level upgrade package.

Note: X11 release 21 is the highest supported X11 software release for option 21E systems. Option 21E systems must be upgraded to an Option 51C or 61C before running X11 release 24- software.

Base level upgrade package

The basic equipment package required to upgrade option 21A to option 21E X11 release 21 is:

— Option 21A to Option 21E Card Upgrade Package

The package provides capacity for a single CPU, single memory with error correction, 14 network loops or five network superloops** plus two voice/data network loops* with integrated IPE.

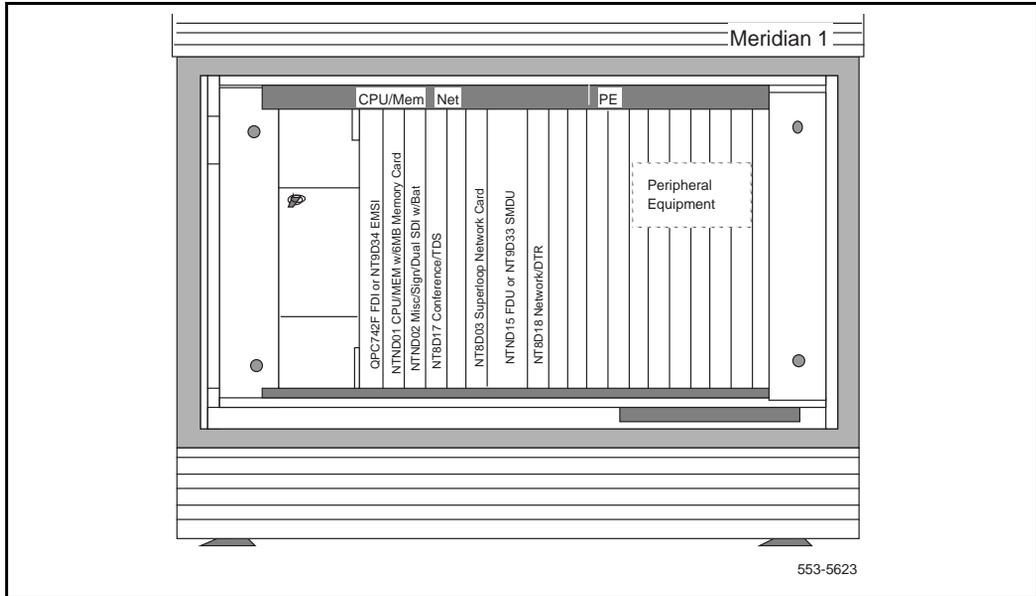
* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

IPE growth is accomplished from IPE cards added to the CE/PE Module. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 47 illustrates an option 21A system upgraded to an option 21E system.

Figure 47
Option 21A to option 21E upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Software storage (disk drives)

— Included in the base level upgrade package

The primary location of the NT9D33 Small System Multi Drive Unit (SMDU) is the location previously occupied by NT8D68 FDU in the CE/PE Module. An alternative location is two empty IPE card slots.

Software interface and read-only memory

— Included in the base level upgrade package

The software cartridge is installed onto the QPC742 Floppy Disk Interface (FDI) card or NT9D34 Enhanced Mass Storage Interface (EMSI), which is located in a dedicated card slot in the CE/PE Module. The NTND31 Read-Only Memory (ROM) card with 6MB or 12MB of memory is attached to the NTND01 CPU/Memory card that is also located in a dedicated card slot in the CE/PE Module.

Central processor unit and memory

— Included in the base level upgrade package

An NTND01 card with 6MB or 12MB memory is provided with this upgrade.

Peripheral signaling and memory battery

— Included in the base level upgrade package

Tone and digit switch and conference

- Reuse the existing TDS and conference cards
- QPC444 Conference cards as required

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support PE cards. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base module or any add-on IPE expansion modules.

Network to peripheral interface

Network loop and superloop connections are extended to peripheral equipment cards in PE/IPE Modules. The length of each cable must be determined based on the distance between the network connection and the peripheral connection. No additional cables are required if new PE or IPE Modules have not been added to the existing system. See “Network to peripheral I/O cables” on page 283.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE remain in the existing column. Additional PE cards can be added to the existing PE Modules. IPE growth is supported in an IPE Module added to the existing column or, a new column which can be added to the system as described in *Meridian 1 system installation procedures* (553-3001-210).

Module pedestal equipment

- AS1004 Top Cap and Pedestal Assembly

A top cap and pedestal assembly must be added to the base level upgrade package to upgrade option 21A to option 21E. Up to three additional IPE Modules can be added to the option 21E column.

Equipment column power

- Reuse existing column power rectifier

Unless a new column is added, the existing power source does not have to be modified. The type of input power for each new module added to the upgraded system is determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- Reuse batteries as required

Add a new power system, as required, to support the addition of any IPE or application modules. See “Power and ground engineering” on page 305 for engineering details for power combinations.

System monitor connections

See “System monitor” on page 299 for specific requirements to support the addition of IPE or application modules.

Ground

Unless a new column is added, grounding remains unchanged. See “Power and ground engineering” on page 305 for specific requirements to support grounding changes or additions.

Upgrading option 21 to option 21E

To upgrade a Meridian 1 option 21 to option 21E, use a card base level upgrade package. This upgrade package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing option 21 system or the base level upgrade package.

Base level upgrade package

The basic equipment package required to upgrade option 21 to option 21E X11 release 21 is:

— Option 21 to Option 21E Card Package

The package provides capacity for a single CPU, single memory with error correction, 14 network loops or five network superloops** plus two voice/data network loops* with integrated IPE.

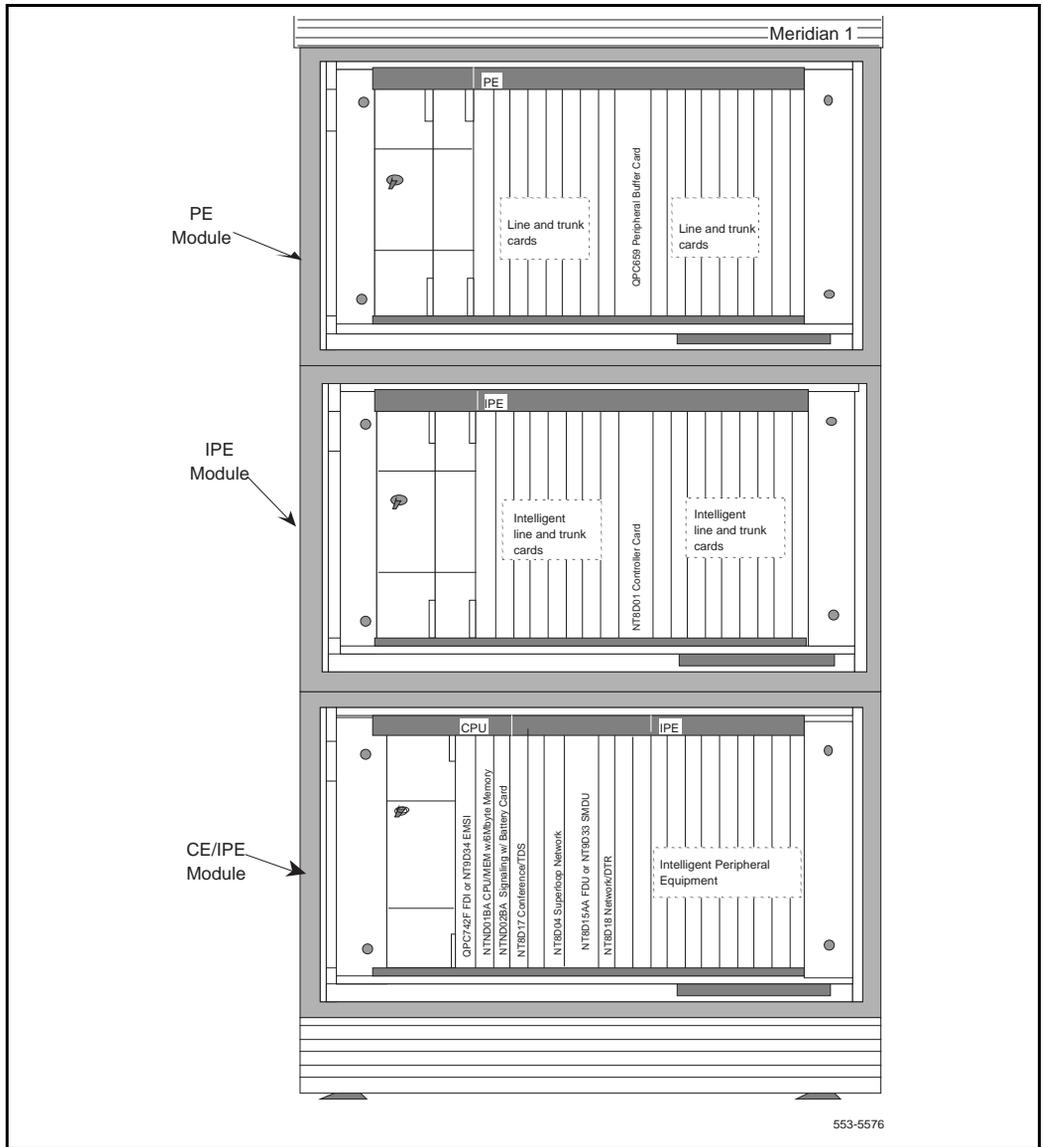
* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

IPE growth is accomplished from IPE cards added to the CE//PE Module and add-on IPE Modules. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 48 illustrates an option 21E column.

Figure 48
Option 21 to option 21E upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Software storage (disk drives)

— Included in the base level upgrade package

The primary location of the NT9D33 Small System Multi Drive Unit (SMDU) is the location previously occupied by NT8D68 FDU in the CE/PE Module. An alternative location is two empty IPE card slots.

Software interface and read-only memory

— Included in the base level upgrade package

The software cartridge is installed onto the QPC742 Floppy Disk Interface (FDI) card or NT9D34 Enhanced Mass Storage Interface (EMSI), which is located in a dedicated card slot in the CE/PE Module. The NTND31 Read-Only Memory (ROM) card with 6MB or 12MB of memory is attached to the NTND01 CPU/Memory card that is also located in a dedicated card slot in the CE/PE Module.

Central processor unit and memory

— Included in the base level upgrade package

An NTND01 CPU/Memory card is provided with this upgrade (6MB or 12MB version can be used).

Peripheral signaling and memory battery

— Included in the base level upgrade package

Tone and digit switch and conference

- Reuse the existing TDS and conference cards
- QPC444 Conference cards as required

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support PE cards. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base module or any add-on IPE expansion modules.

Network to peripheral interface

Network loop and superloop connections extended to peripheral equipment in PE/IPE Modules require interface cables. The length of each cable must be determined based on the distance between the network connection and the peripheral connection. No additional cables are required if new PE or IPE Modules have not been added to the existing system.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE remains in the existing column. Additional PE cards can be added to the existing PE Modules. IPE growth is supported in an IPE Module that added to the existing column or in a new column, which can be added to the system as described in *Meridian 1 system installation procedures* (553-3001-210).

Module pedestal equipment

- Reuse the existing pedestal and top cap

Equipment column power

- Reuse existing column power rectifier

Unless a new column is added, the existing power source does not have to be modified. The type of input power for each new module added to the upgraded system is determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- Reuse batteries as required

Add a new power system, as required, to support the addition of any IPE or application modules. See “Power and ground engineering” on page 305 for engineering details for power combinations.

System monitor connections

See “System monitor” on page 299 for specific requirements to support the addition of IPE or application modules.

Ground

Unless a new column is added, grounding remains unchanged. See “Power and ground engineering” on page 305 for specific requirements to support grounding changes or additions.

Upgrading option 21 to option 51C

To upgrade a Meridian 1 option 21 to option 51C, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing option 21 or the base level upgrade package.

Base level upgrade package

The basic equipment package required to upgrade option 21 to option 51C is:

— Option 21 to Option 51C Module Package

Each package provides capacity for a single CPU, single memory, 14 network loops* or 12 network superloops** plus two extra voice/data network loops.*

* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

The upgrade package provides one empty IPE Module with the power supply. Existing PE is reused in the existing option 21 column. IPE growth is accomplished by adding IPE cards to the IPE Module. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 50 shows an option 21 column next to an option 51C column. The option 51C column consists of a single Core/Network Module and an IPE Module.

Note: When upgrading to an option 51C, it is recommended that option 21 customers send the customer database diskettes to Northern Telecom for conversion; contact your Northern Telecom representative to arrange for this.

Figure 49
Option 21 to option 51C upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM

— Included in the base level upgrade package

Call processor unit

— An NT9D19, NT5D10 or NT5D03 Call Processor is located in the Core/Network Module. It controls call processing activities.

Memory and peripheral signaling

— Included in the base level upgrade package

Tone and digit switch and conference

— Included in the base level upgrade package

— QPC444 Conference cards as required

Additional QPC444 Conference cards can be added to support dedicated non-voice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

— QPC414 Network cards as required

— NT8D04 Superloop Network cards as required

One NT8D04 Superloop Network card is included in the base level upgrade package. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base module or any add-on IPE expansion modules. The number of QPC414 Network cards corresponds to the number of network loop connections supporting the PE in the existing column.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different column require interface cables. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables is determined by the number of loops needed to support peripheral equipment. These cables are provided in the base level upgrade package. See “Network to peripheral I/O cables” on page 283.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in the existing column. Additional PE can be added to the system, but must be located in the existing column unless it is IPE. IPE growth is supported in the IPE Module of the new base module and from add-on IPE Modules. DTI or PRI or both can be added to the upgraded system and located in the Core/Network Module of the new option 51C column or, from the addition of a network expansion module, can be added to the option 51C column. The above hardware is not included in the base level upgrade package. Consult NTP and Pricing documentation for ordering information.

Module pedestal equipment

- Included in the base level upgrade package (AC or DC)

The type of pedestal assembly is selected based on the type of input power (it must match the power input for the modules).

Equipment column power

- Included in the base level upgrade package (AC or DC)
- Reuse existing column power rectifier

The type of power input for each new module added to the upgraded system is determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- MPP600 Modular Power System with NT5C07 Rectifiers as required, or
- MFA150 Modular Power System with NT5C06 Rectifiers as required

See “Power and ground engineering” on page 305 for engineering details for multiple power combinations.

System monitor connections

See “System monitor” on page 299 for specific requirements to support power monitor systems.

Ground

See “Power and ground engineering” on page 305 for specific grounding requirements.

Upgrading option 21 to option 61C

To upgrade a Meridian 1 option 21 to option 61C, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing option 21 or the base level upgrade package.

Base level upgrade package

The basic equipment package required to upgrade option 21 to option 61C is:

— Option 21 to Option 61C Module Package

Each package provides capacity for a dual CPU, dual memory, 28 network loops* or 24 network superloops** plus four extra voice/data network loops.*

* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

Package U9639A/D provides one empty IPE Module with the power supply. Existing PE is reused in the existing option 21 column. IPE growth is accomplished by adding IPE cards to the IPE Module. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 50 shows an option 21 column next to an option 61C column. The option 61C column consists of two Core/Network Modules and an IPE Module.

Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM

— Included in the base level upgrade package

Call processor unit

— An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Memory and peripheral signaling

— Included in the base level upgrade package

Tone and digit switch and conference

— Included in the base level upgrade package

— QPC444 Conference cards as required

Additional QPC444 Conference cards can be added to support dedicated non-voice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

— QPC414 Network cards as required

— NT8D04 Superloop Network cards as required

One NT8D04 Superloop Network card is included in the base level upgrade package. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base module or any add-on IPE expansion modules. The number of QPC414 Network cards corresponds to the number of network loop connections supporting the PE in the existing column.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different column require interface cables. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables is determined by the number of loops needed to support peripheral equipment. These cables are provided in the base level upgrade package. See “Network to peripheral I/O cables” on page 283.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in the existing column. Additional PE can be added to the system, but must be located in the existing column unless it is IPE. IPE growth is supported in the IPE Module of the new base module and from add-on IPE Modules. DTI or PRI or both can be added to the upgraded system and located in the Core/Network Modules of the new option 61C column or, from the addition of a network expansion module, can be added to the option 61C column. The above hardware is not included in the base level upgrade package. Consult NTP and Pricing documentation for ordering information.

Module pedestal equipment

- Included in the base level upgrade package (AC or DC)

The type of pedestal assembly is selected based on the type of input power (it must match the power input for the modules).

Equipment column power

- Included in the base level upgrade package (AC or DC)
- Reuse existing column power rectifier

The type of power input for each new module added to the upgraded system is determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- MPP600 Modular Power System with NT5C07 Rectifiers as required, or
- MFA150 Modular Power System with NT5C06 Rectifiers as required

See “Power and ground engineering” on page 305 for engineering details for multiple power combinations.

System monitor connections

See “System monitor” on page 299 for specific requirements to support power monitor systems.

Ground

See “Power and ground engineering” on page 305 for specific grounding requirements.

Upgrading Meridian 1 option 51

This section provides engineering information for upgrading a Meridian 1 option 51 to the following systems:

- Option 51 X11 release 21
- Option 51C card cage upgrade, X11 release 24
- Option 61C X11 release 24
- Option 51C to option 61C, X11 release 24

Upgrading option 51 to X11 release 21 requires replacing some of the CE cards, the disk drive unit, and the software.

Upgrading option 51 to 51C requires replacing the card cage, the CE cards, the disk drive unit, and the software.

Upgrading option 51 to option 61C requires installing an option 61C column next to the option 51 column. This column provides CE and network equipment housing. The existing option 51 column is used to support peripheral equipment including the DTI/PRI cards.

Upgrading option 51C to option 61C requires installing a Core/Network module next to the option 51C column and installing an IPE module on top of the existing option 51C column.

Upgrading option 51 to X11 release 21

To upgrade a Meridian 1 option 51 to X11 release 21, use the card base level upgrade package. This upgrade package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing option 51 or the base level upgrade package.

Note: X11 release 21 is the highest supported X11 software release for the option 51. The option 51 must be upgraded to an option 51C before installing X11 release 24 software.

Base level upgrade package

The basic equipment package required to upgrade option 51 to X11 release 21 is:

— Option 51 to Option 51 X11 release 21 Card Upgrade Package

The package provides capacity for a single CPU, single memory with error correction, 14 network loops or five network superloops** plus two voice/data network loops* with integrated IPE.

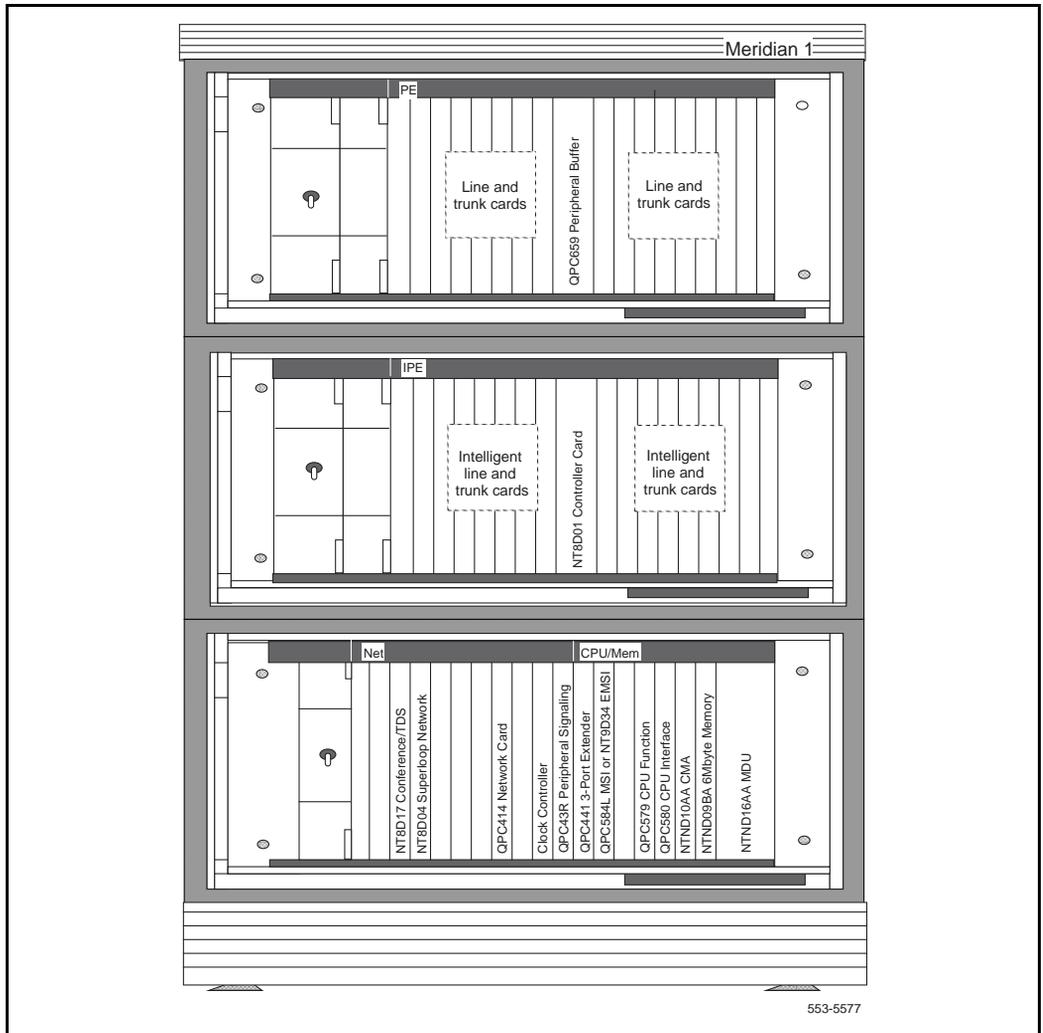
* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

Existing PE is reused in the existing option 51 column. Peripheral equipment growth is accomplished by adding PE cards to the IPE Module. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 51 illustrates an option 51 column with one CPU/Network Module, one PE Module, and one IPE Module.

Figure 51
Option 51 to option 51 X11 release 21



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Software storage (disk drives)

— Included in the base level upgrade package

The primary location of the NTND16 Multi Disk Unit (MDU) is slots previously occupied by the NT8D68 or NT8D69 disk drive unit in the CPU/Network Module.

Software interface and read-only memory

— Included in the base level upgrade package

The software cartridge is installed onto the QPC584 Mass Storage Interface (MSI) or NT9D34 Enhanced Mass Storage Interface (EMSI) card, located in a dedicated card slot in the CPU/Network Module. The NTND08 Read Only Memory (ROM) card is attached to the QPC579 CPU card that is also located in a dedicated card slot in the CPU/Network Module.

Central processor unit

— Reuse existing CPU cards

Memory and peripheral signaling

— Reuse existing peripheral signaling cards

An NTND09 6MB Memory card is used with the QPC43R Peripheral Signaling card to support X11 release 21 software.

Tone and digit switch and conference

- Included in the existing system
- QPC444 Conference cards as required

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support the PE cards. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base module or any add-on IPE expansion modules.

Network to peripheral interface

Network loop and superloop connections extended to peripheral equipment in PE and IPE Modules require interface cables. The length of each cable is determined based on the distance between the network connection and the peripheral connection. No additional cables are required if new PE and IPE Modules have not been added to the existing system. See “Network to peripheral I/O cables” on page 283.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE remain in the existing column. Additional PE can be added to the existing PE Module. IPE growth is supported in IPE Modules added to the existing column or to a new column, which can be added to the system as described in the *Meridian 1 system installation procedures* (553-3001-210).

Module pedestal equipment

- Reuse existing pedestal

Unless a new column is added, no additional pedestal equipment is required. Otherwise, the type of pedestal assembly is selected based on the type of input power (it must match the power input for the modules).

Equipment column power

- Reuse existing column power rectifier

The type of input power for each new module added to the upgraded system is determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- Reuse batteries as required

Add batteries as required to support any additional IPE or application modules.

System monitor connections

See “System monitor” on page 299 for specific requirements to support the addition of IPE or application modules.

Ground

Unless a new column is added, grounding remains unchanged. See “Power and ground engineering” on page 305 for specific requirements to support grounding changes or additions.

Upgrading option 51 to option 51C

To upgrade a Meridian 1 option 51 to option 51C, use the card cage base level upgrade package. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing option 51 or the base level upgrade package.

Base level upgrade package

The basic equipment package required to upgrade option 51 to 51C is:

— Option 51 to Option 51C Card Cage Package

The package provides one card-cage with capacity for a single CPU, memory with error correction, 14 network loops or three network superloops** plus two voice/data network loops* with integrated IPE.

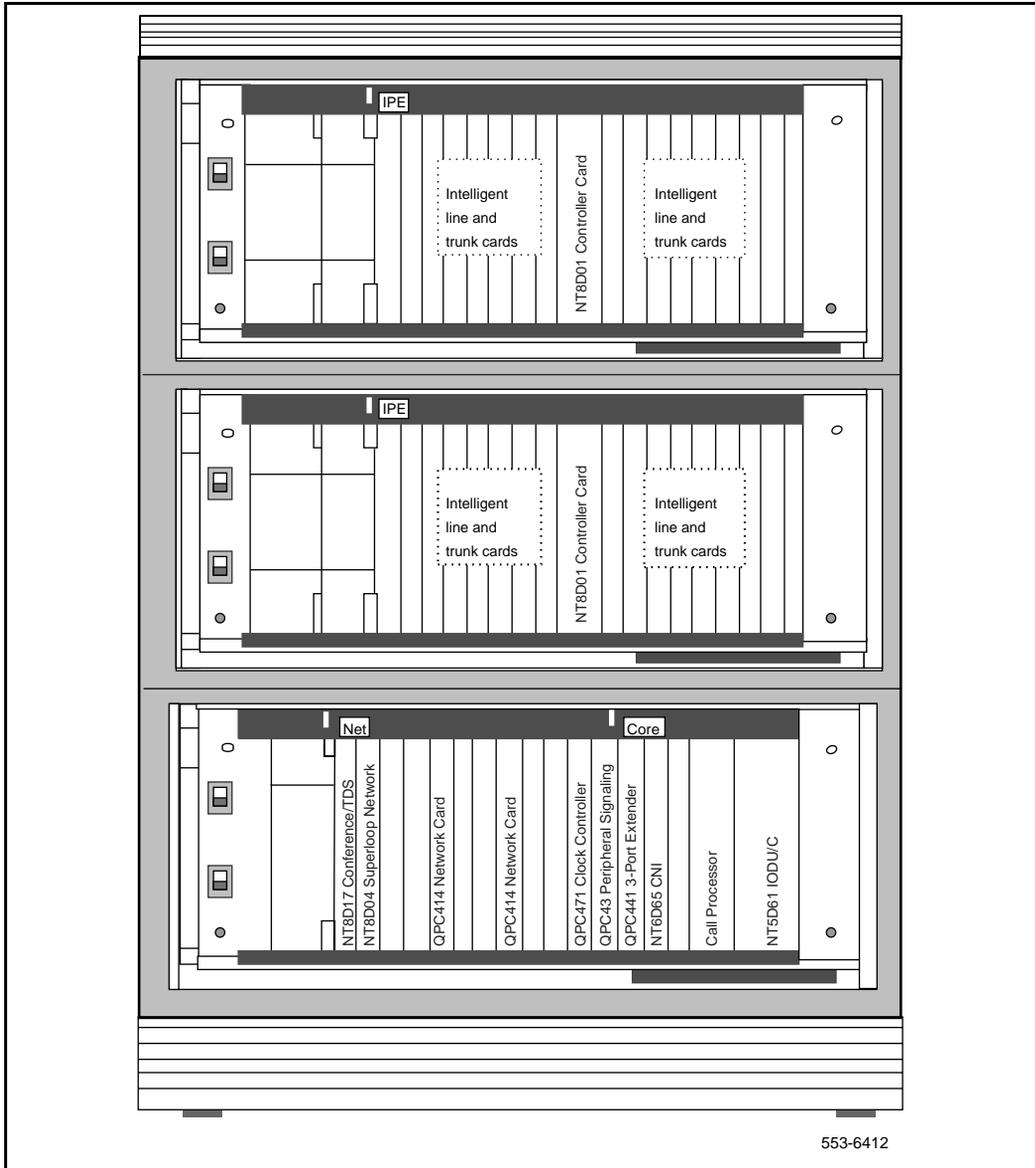
* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

Existing PE is reused in the existing option 51 column. PE growth is accomplished by adding PE cards to the IPE Module. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 52 illustrates an option 51C column with a Core/Network Module and two IPE Modules.

Figure 52
Option 51 to option 51C



553-6412

Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM

- Included in the base level upgrade package

Call processor unit

- An NT9D19, NT5D10 or NT5D03 Call Processor is located in the Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

- Included in the existing system
- QPC444 Conference cards as required

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support the PE cards. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base module or any add-on IPE expansion modules.

Network to peripheral interface

Network loop and superloop connections extended to peripheral equipment in PE and IPE Modules require interface cables. The length of each cable must be determined based on the distance between the network connection and the peripheral connection. No additional cables are required if new PE and IPE Modules have not been added to the existing system. See “Network to peripheral I/O cables” on page 283.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE remains in the existing column. Additional PE can be added to the existing PE Module. IPE growth is supported in IPE Modules added to the existing column or to a new column, which can be added to the system as described in *Meridian 1 system installation procedures* (553-3001-210).

Module pedestal equipment

- Reuse existing pedestal

Unless a new column is added, no additional pedestal equipment is required. Otherwise, the type of pedestal assembly must be selected based on the type of input power (it must match the power input for the modules).

Equipment column power

- Reuse existing column power rectifier

Unless a new column is added, the existing power source does not have to be modified. The type of input power for each new module added to the upgraded system is determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- Reuse batteries as required

Add batteries as required to support any additional IPE or application modules.

System monitor connections

See “System monitor” on page 299 for specific requirements to support the addition of IPE or application modules.

Ground

Unless a new column is added, grounding remains unchanged. See “Power and ground engineering” on page 305 for specific requirements to support grounding changes or additions.

Upgrading option 51 to option 61C

To upgrade a Meridian 1 option 51 to option 61C, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing option 51 system or the base level upgrade package.

Base level upgrade package

The basic equipment package required to upgrade option 51 to option 61C is:

— Option 51 to Option 61C Module Package

The package provides capacity for a dual CPU, dual memory, 28 network loops* or six network superloops** plus four extra voice/data network loops* with integrated IPE.

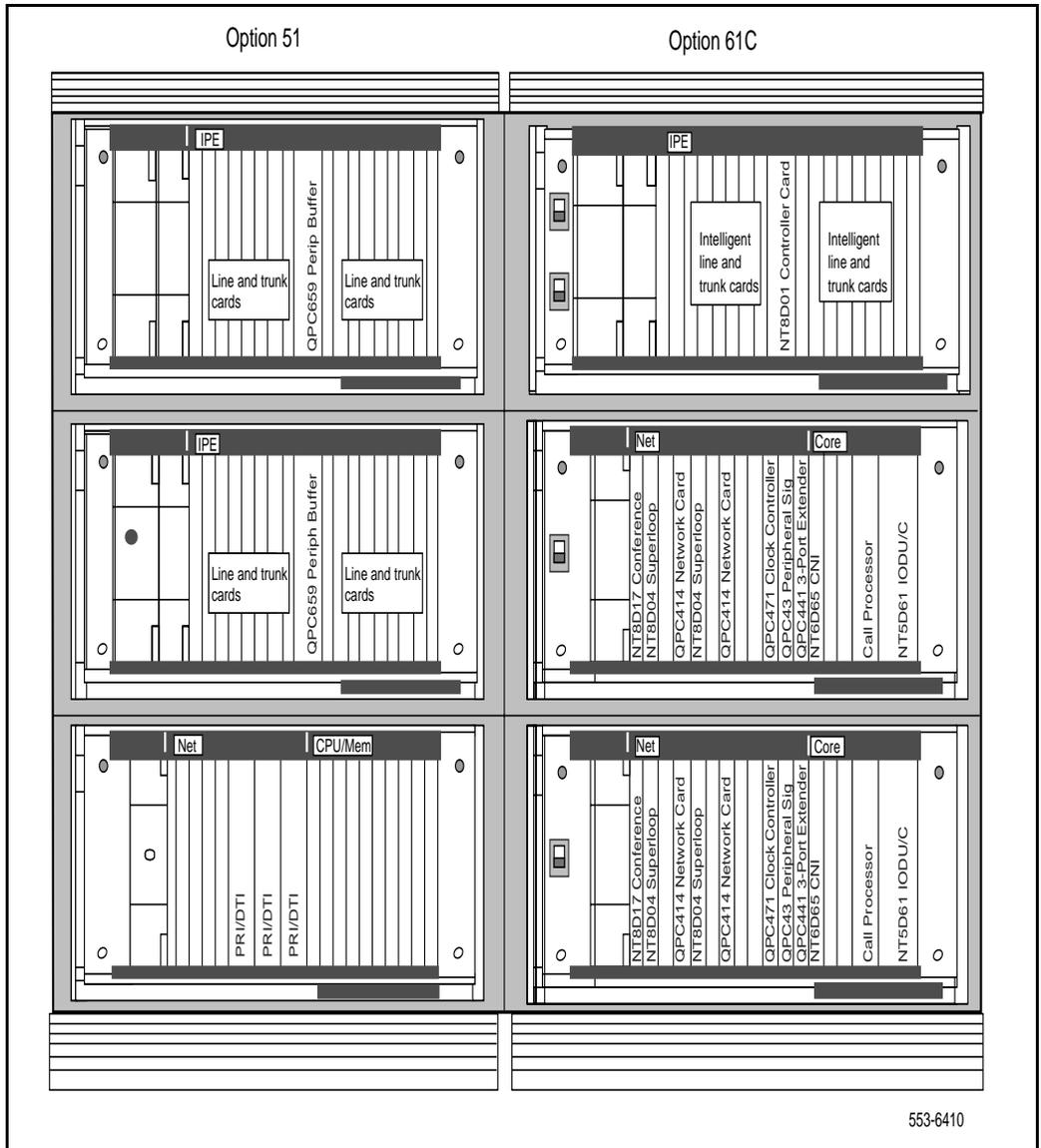
* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

Existing PE is reused in the existing option 51 column. PE growth is accomplished by adding PE cards to the IPE Module. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 53 shows an option 51 column next to an option 61C column. The option 51 column consists of a CPU/Network Module and two PE Modules; the option 61C column consists of two NT5D21 Core/Network Modules and an IPE Module.

Figure 53
Option 51 to option 61C upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM

— Included in the base level upgrade package

Call processor unit

— Included in the base level upgrade package

An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Memory and peripheral signaling

— Included in the base level upgrade package

Tone and digit switch and conference

— Included in the base level upgrade package

— QPC444 Conference cards as required

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

— QPC414 Network cards as required

— NT8D04 Superloop Network cards as required

One NT8D04 Superloop Network card is included in the base level upgrade package. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base module or any add-on IPE expansion modules. The number of QPC414 Network cards corresponds to the number of network loop connections supporting the PE in the existing column.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different column require interface cables. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables is determined by the number of loops needed to support peripheral equipment. These cables are provided in the base level upgrade package. See “Network to peripheral I/O cables” on page 283.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in the existing column. Additional PE can be added to the system, but must be located in the existing column unless it is IPE. IPE growth is supported in the IPE Module of the new base module and from add-on IPE Modules. DTI or PRI or both can be added to the upgraded system and located in the Core/Network Modules of the new option 61C column or, from the addition of a network expansion module, can be added to the option 61C column. The above hardware is not included in the base level upgrade package. Consult NTP and Pricing documentation for ordering information.

Module pedestal equipment

- Included in the base level upgrade package (AC or DC)

The type of pedestal assembly is selected based on the type of input power (it must match the power input for the modules).

Equipment column power

- Included in the base level upgrade package (AC or DC)
- Reuse existing column power rectifier

The type of power input for each new module added to the upgraded system is determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- MPP600 Modular Power System with NT5C07 Rectifiers as required, or
- MFA150 Modular Power System with NT5C06 Rectifiers as required

See “Power and ground engineering” on page 305 for engineering details for multiple power combinations.

System monitor connections

See “System monitor” on page 299 for specific power monitor requirements.

Ground

See “Power and ground engineering” on page 305 for specific grounding requirements.

Upgrading option 51C to option 61C

To upgrade a Meridian 1 option 51C to option 61C, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing option 51C system or the base level upgrade package.

Base level upgrade package

The basic equipment package required to upgrade option 51 to option 61C is:

— Option 51C to Option 61C Module Package

The package provides capacity for a dual CPU, dual memory, 28 network loops* or six network superloops** plus four extra voice/data network loops* with integrated IPE.

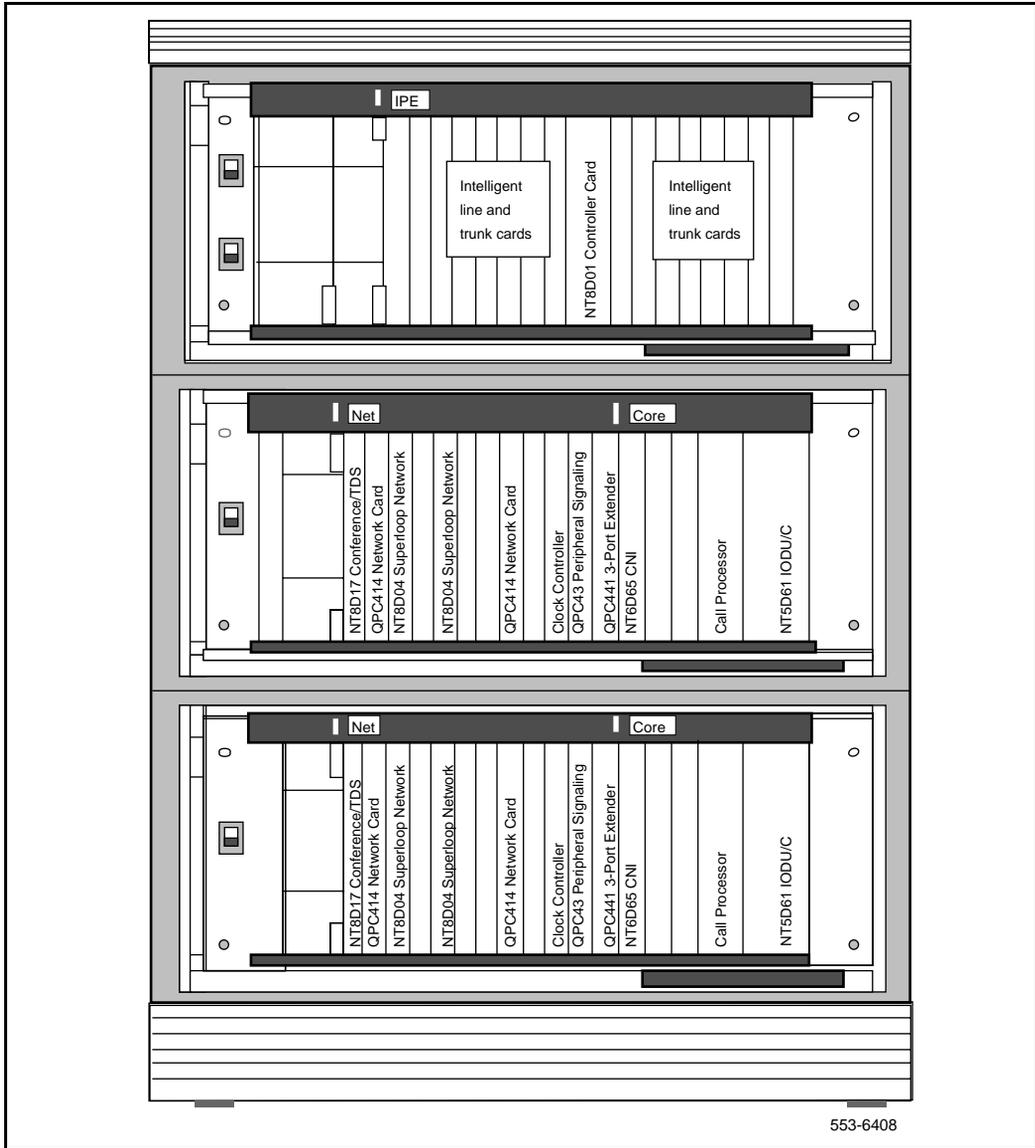
* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

Existing PE is reused in the existing option 51C column. PE growth is accomplished by adding PE cards to the IPE Module. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 54 shows an option 61C column. The option 61C column consists of two Core/Network Modules and an IPE Module. This configuration was obtained by adding a Core/Network Module on top of the existing option 51C Core/Network Module. Another possibility is to add a Core/Network Module next to the existing option 51C column and connect the two CPUs with the appropriate cables. This can be done when the option 51C column already consists of four modules.

Figure 54
Option 51C to option 61C upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

For option 51C systems with the NT5D20 IOP/CMDU card, two upgrade packages are available:

- receive one additional IOP/CMDU card in the base level upgrade package for the redundant Core/Net module
- receive two NT5D61 Input Output Disk Unit with CD-ROM (IODU/C) cards

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output processor and mass storage interface (optional)

— Included in the base level upgrade package

Data cartridges are installed in the IOP portion of the NT5D20 IOP/CMDU.

Input output disk unit with CD-ROM (optional)

— Included in the base level upgrade package

Call processor unit

— An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Memory and peripheral signaling

— Included in the base level upgrade package

Tone and digit switch and conference

— Included in the base level upgrade package

— QPC444 Conference cards as required

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

One NT8D04 Superloop Network card is included in the base level upgrade package. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base module or any add-on IPE expansion modules. The number of QPC414 Network cards corresponds to the number of network loop connections supporting the PE in the existing column.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in a different column require interface cables. The length of each cable is determined based on the distance between the network connection and the peripheral connection (a maximum of 50 cable feet). The number of cables is determined by the number of loops needed to support peripheral equipment. These cables are provided in the base level upgrade package. See “Network to peripheral I/O cables” on page 283.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in the existing column. Additional PE can be added to the system, but must be located in the existing column unless it is IPE. IPE growth is supported in the IPE Module of the new base module and from add-on IPE Modules. DTI or PRI or both can be added to the upgraded system and located in the Core/Network Modules of the new option 61C column or, from the addition of a network expansion module, can be added to the option 61C column. The above hardware is not included in the base level upgrade package. Consult NTP and Pricing documentation for ordering information.

Module pedestal equipment

- Included in the base level upgrade package (AC or DC)

The type of pedestal assembly is selected based on the type of input power (it must match the power input for the modules).

Equipment column power

- Included in the base level upgrade package (AC or DC)
- Reuse existing column power rectifier

The type of power input for each new module added to the upgraded system is determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- MPP600 Modular Power System with NT5C07 Rectifiers as required, or
- MFA150 Modular Power System with NT5C06 Rectifiers as required

See “Power and ground engineering” on page 305 for engineering details for multiple power combinations. |

System monitor connections

See “System monitor” on page 299 for specific power monitor requirements. |

Ground

See “Power and ground engineering” on page 305 for specific grounding requirements. |

Upgrading Meridian 1 option 61

This section provides engineering information for upgrading a Meridian 1 option 61 to the following:

- Option 61 X11 release 21
- Option 61C X11 release 24 (software generic 2311)
- Option 61C (NT9D11 backplane) to option 81C X11 release 24
- Option 61C (NT5D21 backplane) to option 81C X11 release 24

Upgrading option 61 to X11 release 21 requires replacing some of the CE cards, the disk drive unit, and the software.

Upgrading option 61 to option 61C requires replacing of the card cage in each CPU/Network Module with the Core/Network card cage and replacing the CE cards.

Upgrading option 61 or 61C (NT9D11) to option 81C requires installing option 81C columns next to the option 61 or option 61C (NT9D11 backplane) column. These 81C columns provide CE and network equipment housing. The existing option 61 or 61C column is used to support peripheral equipment including the DTI/PRI cards. Some common equipment from option 61C is reused in option 81C.

Upgrading option 61C (NT5D21) to option 81C requires addition of some common equipment cards and addition of IPE, Network, and InterGroup Modules.

Upgrading option 61 to X11 release 21

To upgrade a Meridian 1 option 61 to X11 release 21, use the card base level upgrade package. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing option 61 or the base level upgrade package.

Note: X11 release 21 is the highest supported X11 software release for the option 61. The option 61 must be upgraded to an option 61C or 81C before installing X11 release 24 software.

Base level upgrade package

The basic equipment package required to upgrade option 61 to X11 release 21 is:

— Option 61 to Option 61 X11 Release 21 Card Package

The package provides capacity for a dual CPU, dual memory with error correction, 28 network loops or six network superloops** plus four voice/data network loops* with integrated IPE.

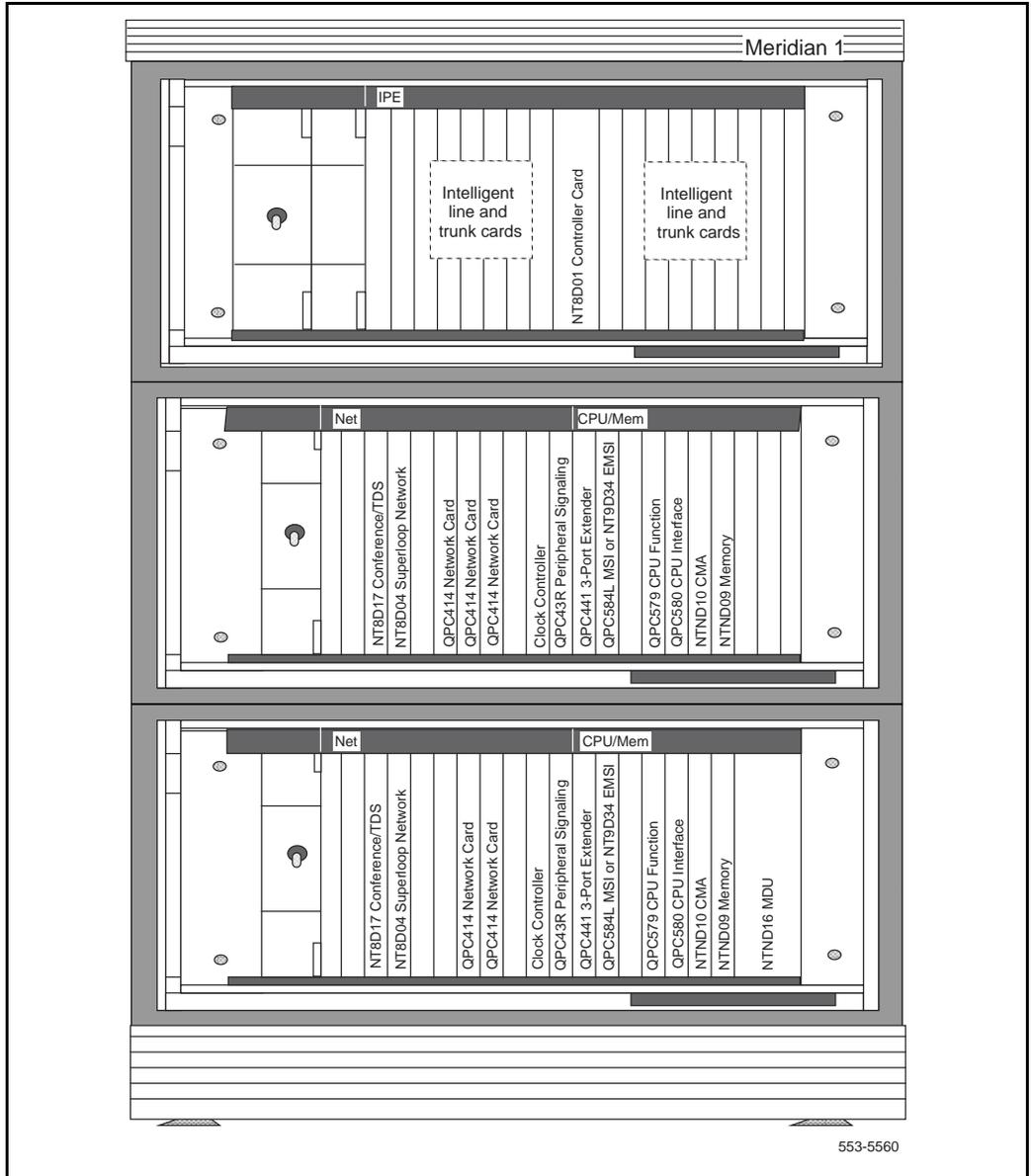
* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

Existing PE is reused in the existing option 61 column. PE growth is accomplished by adding PE cards to the IPE Module. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 55 illustrates an option 61 column with two CPU/Network Modules and an IPE Module.

Figure 55
Option 61 to option 61 X11 release 21



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Software storage (disk drives)

— Included in the base level upgrade package

The primary location for the NTND16 Multi Disk Unit (MDU) is in the disk drive unit in one of the CPU/Network Modules previously occupied by the NT8D68 or NT8D69.

Software interface and read-only memory

— Included in the base level upgrade package

The software cartridges are installed on QPC584 Mass Storage Interface (MSI) or NT9D34 Enhanced Mass Storage Interface (EMSI) cards located in a dedicated card slot in each CPU/Network Module.

The NTND08 Read-Only Memory (ROM) card is attached to the QPC579 CPU Function card that is also located in a dedicated card slot in each CPU/Network Module.

Central processor unit

— Reuse existing CPU cards

Memory and peripheral signaling

— Reuse existing peripheral signaling cards

The NTND09 6MB Memory card is used with the QPC43R Peripheral Signaling card to support X11 release 21 software.

Tone and digit switch and conference

- Included in the existing system
- QPC444 Conference cards as required

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support the PE cards. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base module or any add-on IPE expansion modules.

Network to peripheral interface

Network loop and superloop connections extended to peripheral equipment in PE and IPE Modules require interface cables. The length of each cable must be determined based on the distance between the network connection and the peripheral connection. No additional cables are required if new PE and IPE Modules have not been added to the existing system. See “Network to peripheral I/O cables” on page 283.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE remain in the existing column. Additional PE can be added to the existing PE Module. IPE growth is supported in IPE Modules added to the existing column or to a new column, which can be added to the system as described in the *Meridian 1 system installation procedures* (553-3001-210).

Module pedestal equipment

- Reuse existing pedestal

Unless a new column is added, no additional pedestal equipment is required. Otherwise, the type of pedestal assembly must be selected based on the type of input power (it must match the power input for the modules).

Equipment column power

- Reuse existing column power rectifier

Unless a new column is added, the existing power source does not have to be modified. The type of input power for each new module added to the upgraded system is determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- Reuse batteries as required

Add batteries as required to support any additional IPE or application modules.

System monitor connections

See “System monitor” on page 299 for specific requirements to support the addition of IPE or application modules.

Ground

Unless a new column is added, grounding remains unchanged. See “Power and ground engineering” on page 305 for specific requirements to support grounding changes or additions.

Upgrading option 61 to option 61C

To upgrade a Meridian 1 option 61 to option 61C, use the card cage base level upgrade package. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing option 61 or the base level upgrade package.

Base level upgrade package

The basic equipment package required to upgrade option 61 to 61C is:

— Option 61 to Option 61C Card Cage Package

The package provides two card cages and capacity for a dual CPU, dual memory with error correction, 28 network loops or six network superloops** plus four voice/data network loops* with integrated IPE.

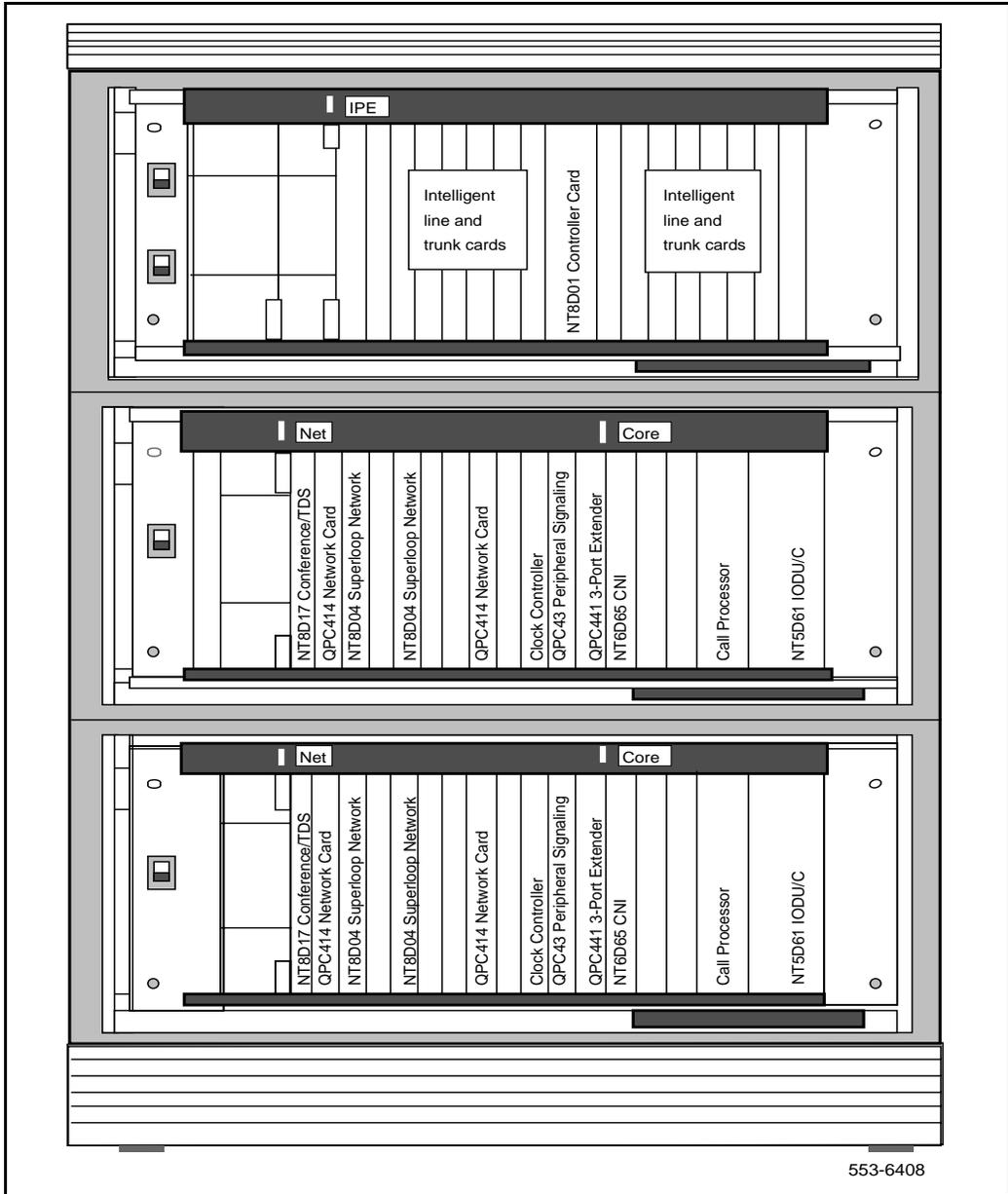
* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

Existing PE is reused in the existing option 61 column. PE growth is accomplished by adding PE cards to the IPE Module. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 56 illustrates an option 61C column with two Core/Network Modules and an IPE Module.

Figure 56
Option 61 to option 61C



553-6408

Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM (optional)

— Included in the base level upgrade package

Call processor unit

— Included in the base level upgrade package

An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

— Included in the existing system

— QPC444 Conference cards as required

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support the PE cards. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base module or any add-on IPE expansion modules.

Network to peripheral interface

Network loop and superloop connections extended to peripheral equipment in PE and IPE Modules require interface cables. The length of each cable must be determined based on the distance between the network connection and the peripheral connection. No additional cables are required if new PE and IPE Modules have not been added to the existing system. See “Network to peripheral I/O cables” on page 283.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE remains in the existing column. Additional PE can be added to the existing PE Module. IPE growth is supported in IPE Modules added to the existing column or to a new column, which can be added to the system as described in the *Meridian 1 system installation procedures* (553-3001-210).

Module pedestal equipment

- Reuse existing pedestal

Unless a new column is added, no additional pedestal equipment is required. Otherwise, the type of pedestal assembly must be selected based on the type of input power (it must match the power input for the modules).

Equipment column power

- Reuse existing column power rectifier

Unless a new column is added, the existing power source does not have to be modified. The type of input power for each new module added to the upgraded system is determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- Reuse batteries as required

Add batteries as required to support any additional IPE or application modules.

System monitor connections

See “System monitor” on page 299 for specific requirements to support the addition of IPE or application modules.

Ground

Unless a new column is added, grounding remains unchanged. See “Power and ground engineering” on page 305 for specific requirements to support grounding changes or additions.

Upgrading option 61 or 61C (NT9D11) to option 81C

To upgrade an option 61 or an option 61C with NT9D11 backplane to option 81C, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing option 61 or an option 61C with NT9D11 backplane at the base level upgrade package.

Upgrading option 61 or an option 61C with NT9D11 backplane to option 81C requires installing one option 81C column next to the option 61 or an option 61C with NT9D11 backplane. Option 81C columns provide one NT5D21 Core/Network Module, one NT5D21003 Core/Network card cage, two Network Modules, an InterGroup Module, and one IPE card cage, and the existing option 61 or an option 61C (with NT9D11 backplane) column is used to support IPE cards. The bottom CPU/Network Module or NT9D11 Core/Network Module is converted into the Core/Network Module (NT5D21) using the card-cage upgrade procedures and the top CPU/Network Module or NT9D11 Core/Network Module is converted into an IPE Module using the card cage upgrade procedures.

When engineering an upgrade to option 81C, first review appropriate upgrade procedures in *Upgrade system installation to X11 release 23 (553-3001-258)* and then check the ordering package contents and ordering notes in the Pricing documentation.

Base level upgrade package

The basic equipment package used to upgrade option 61 or an option 61C with NT9D11 backplane to option 81C X11 release 24 or later is:

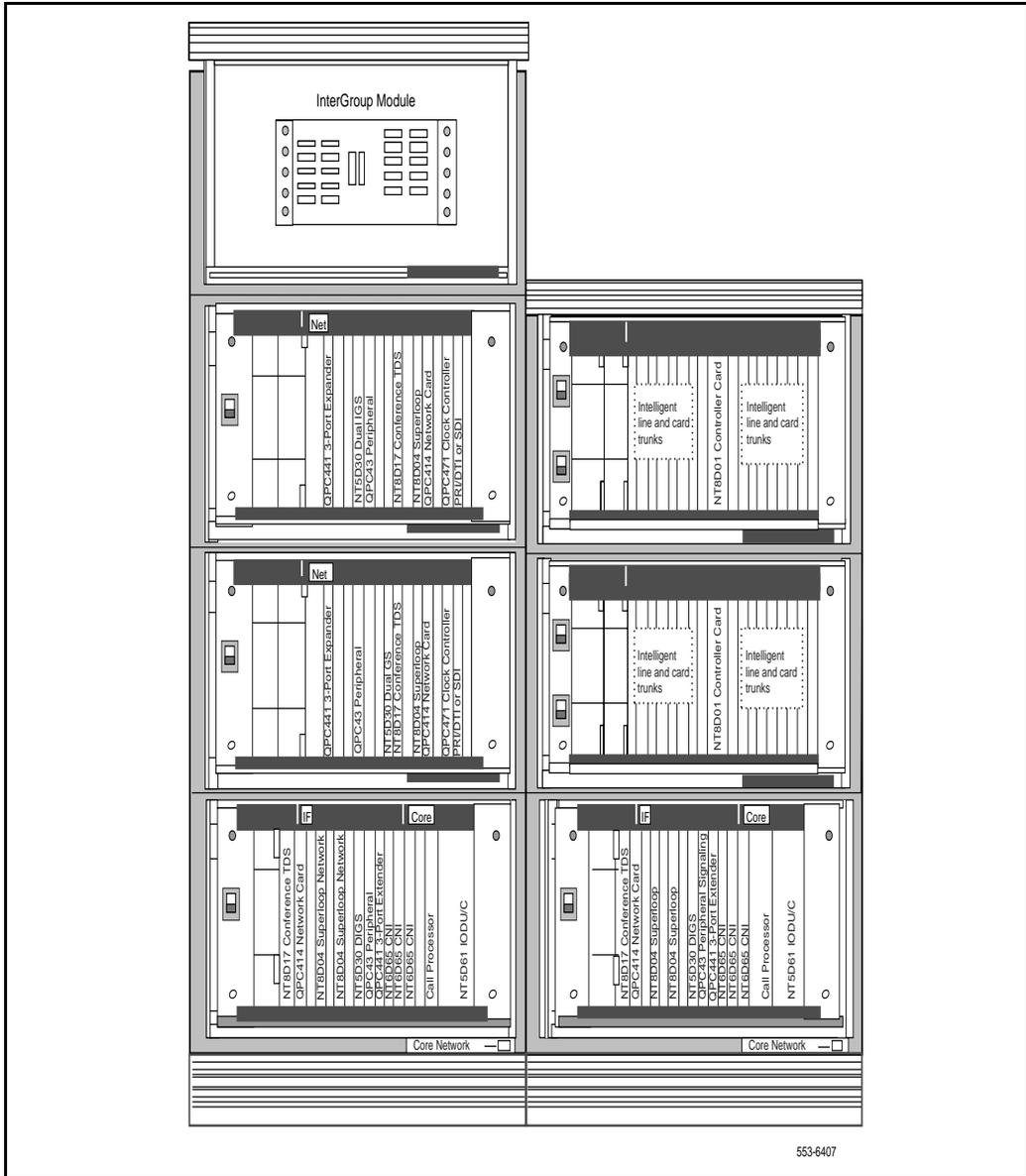
- Option 61 or 61C with NT9D11 backplane to Option 81C Core/Network Module Upgrade Package

The upgrade package provides one Core/Network Module and a Core/Network Module card-cage, two Network Modules, one InterGroup Module, and one IPE Module card cage. This package provides one network group. Additional network groups, corresponding Core to Network Interface (CNI) cards, and required network cable packages are not included in the base level upgrade package; however, they can be ordered separately. When upgrading the system using this Core/Network and Network Module Upgrade Package, CPU and network functions are supported in option 81C Core/Network and Network Modules and peripheral functions are supported in both the existing cabinets and option 81C IPE Modules.

PE growth is accomplished from add-on PE cards in existing option 61 or 61C PE Modules. IPE growth is accomplished from add-on IPE Modules and cards. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 57 shows an option 61 or 61C (with NT9D11 backplane) column next to option 81C columns. It shows the option 81C Core/Network and Network Module upgrade configuration using the base level upgrade package, which provides Core/Network, Network, InterGroup, and IPE Modules.

Figure 57
Option 61 or option 61C with NT9D11 backplane to option 81C upgrade



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Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

The option 61C to 81C upgrade supports two packages with different multi drive units. The packages provide the following options:

- reuse the option 61C IOP/CMDU cards in the option 81C (new multi drive units are not provided in the upgrade package)
- receive two new NT5D61 Input Output Disk Unit with CD-ROM (IODU/C) cards

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM (optional)

— Included in the base level upgrade package

Call processor unit

— An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

- Add NT8D17 Conference/TDS cards as required
- QPC444 Conference cards as required (nonvoice conference applications)

Two NT8D17 Conference/TDS cards are included in the base level upgrade package. QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Peripheral signaling and intergroup switch

- Included in the base level upgrade package

Four QPC412 InterGroup Switch cards are included in the base level upgrade package to support one group. Additional cards can be provided as required.

Network group junctor

- Included in the base level upgrade package

Network equipment

- AS1039A/D Network Group Assembly as required
- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

To support additional network groups specified in AS1039A/D, additional NT6D65 Core to Network Interface (CNI) cards must be ordered. Two CNI cards are required for every two groups after the first group. Two CNI cards are included in the base level upgrade package to support the first group. To support groups 2 and 3, another pair of CNI cards must be ordered, and so on up to a maximum of five groups. Each additional group also requires four NT8D76 and four NTND14 cables of appropriate lengths.

Additional network groups can be ordered as:

- A pair of completely empty Network Modules, using the AS1007A/D package. In this case, all necessary cards from the existing network shelves in the existing cabinet are transferred to Network Modules in option 81C. This method utilizes the greatest number of existing cards; however, the upgrade process is longer causing a greater system downtime.
- Complete network groups, using the AS1039A/D package. In this case, Network Modules are already equipped with the network support cards such as IGS, 3PE, PS, and BTU, and only the actual network cards need to be transferred from the existing cabinet. This network group expansion method is strongly recommended.

Two NT8D04 Superloop Network cards are included in the base level upgrade package. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base IPE Module or any add-on IPE Modules.

The number of additional QPC414 cards is determined based on the number of network loop connections needed to support PE cards in the existing cabinets or any PE cards in add-on PE Modules.

Network cards are not supported in existing Network Modules and new Core/Network and Network Modules simultaneously. These cards must be in Network Modules exclusively.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in option 61 or 61C with NT9D11 backplane and option 81C columns require interface cables. The length of each NT8D91 cable is determined based on the distance between a network card connection and a peripheral controller or buffer connection for adjacent columns. The number of cables is determined by the number of loops needed to support peripheral equipment. For network cards to peripheral equipment connections, see “Network to peripheral I/O cables” on page 283.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in option 61 or 61C with NT9D11 backplane modules. IPE growth is supported in the IPE Module included in the base level upgrade package and from add-on IPE Modules.

PRI/DTI cards can be added to the upgraded system and located in option 81C Core/Network Modules or they can remain in the existing option 61 or 61C with NT9D11 backplane modules.

If PRI/DTI cards are located in option 81C Core/Network Modules, appropriate internal cables must be ordered to connect PRI/DTI cards directly to QPC414 Network cards.

Module pedestal equipment

— AS1001A/D Pedestal Assembly (up to four modules)

Two pedestals are included in the base level upgrade package. The number of additional pedestal assemblies will depend on the number of modules added to the upgraded system.

Equipment cabinet power

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate. See “Power and ground engineering” on page 305 for more information.

Reserve system power equipment

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate.

System monitor connections

See “System monitor” on page 299 for specific requirements to support this type of upgrade. Also see upgrade installation procedures in *Upgrade system installation to X11 release 23* (553-3001-258).

Ground

See “Power and ground engineering” on page 305 for specific requirements to support this type of upgrade.

Upgrading option 61C to option 81C

To upgrade an option 61C with NT5D21 backplanes to option 81C also with the NT5D21 backplanes, identify the module base level upgrade package you want to use. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not currently provided by the existing option 61C or the base level upgrade package.

Upgrading option 61C to option 81C requires installing the IPE card cage into the top NT5D21 Core/Network Module and using the removed NT5D21003 Core/Network card cage to build the NT5D21 Core/Network Module 1. It also requires installing the two Network Modules, and an InterGroup Module to the left of the existing 61C column to form option 81C columns.

When engineering an upgrade to option 81C, first review appropriate upgrade procedures in *Upgrade system installation to X11 release 23 (553-3001-258)* and then check the ordering package contents and ordering notes in the Pricing documentation.

Base level upgrade package

The basic equipment package used to upgrade option 61C to option 81C X11 release 24 or later is:

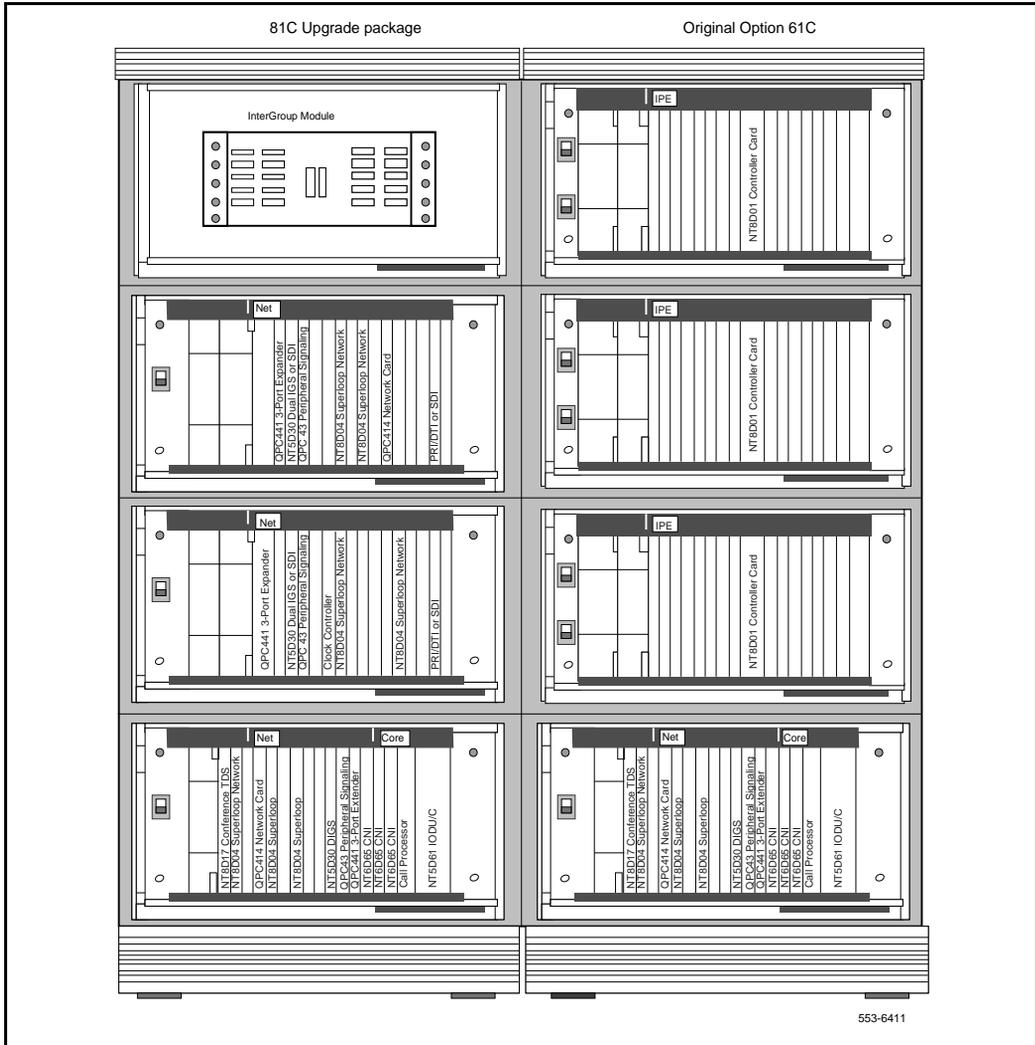
- Option 61C to Option 81C Module Upgrade Package

The upgrade package provides two Network Modules, one InterGroup Module, and one IPE Module. This package provides one network group. Additional network groups, corresponding Core to Network Interface (CNI) cards, and required network cable packages are not included in the base level upgrade package; however, they can be ordered separately. When upgrading the system using this Upgrade Package, CPU and network functions are supported in option 81C Core/Network and Network Modules and peripheral functions are supported in option 81C IPE Modules.

PE growth is accomplished from add-on PE cards in existing PE Modules. IPE growth is accomplished from add-on IPE Modules and cards. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 58 shows an option 61C column converted into option 81C columns. It shows an option 81C Core/Network and Network Module upgrade configuration using the base level upgrade package. Core/Network Modules may also be also be positioned on top of each other.

Figure 58
Option 61C to option 81C upgrade



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

The option 61C to 81C upgrade supports two packages with different multi drive units. The packages provide the following options:

- reuse the option 61C IOP/CMDU cards in the option 81C (new multi drive units are not provided in the upgrade package)
- receive two new NT5D61 Input Output Disk Unit with CD-ROM (IODU/C) cards

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM (optional)

— Included in the base level upgrade package

Call processor unit

— An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

- Add NT8D17 Conference/TDS cards as required
- QPC444 Conference cards as required (nonvoice conference applications)

Two NT8D17 Conference/TDS cards are included in the base level upgrade package. QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Peripheral signaling and intergroup switch

- Included in the base level upgrade package

Four QPC412 InterGroup Switch cards are included in the base level upgrade package to support one group. Additional cards can be provided as required.

Network group junctor

- Included in the base level upgrade package

Network equipment

- AS1039A/D Network Group Assembly as required
- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

To support additional network groups specified in AS1039A/D, additional NT6D65 Core to Network Interface (CNI) cards must be ordered. Two CNI cards are required for every two groups after the first group. Two CNI cards are included in the base level upgrade package to support the first group. To support groups 2 and 3, another pair of CNI cards must be ordered, and so on up to a maximum of five groups. Each additional group also requires four NT8D76 and four NTND14 cables of appropriate lengths.

Additional network groups can be ordered as:

- A pair of completely empty Network Modules, using the AS1007A/D package. In this case, all necessary cards from the existing network shelves in the existing cabinet are transferred to Network Modules in option 81C. This method utilizes the greatest number of existing cards; however, the upgrade process is longer causing a greater system downtime.
- Complete network groups, using the AS1039A/D package. In this case, Network Modules are already equipped with the network support cards such as IGS, 3PE, PS, and BTU, and only the actual network cards need to be transferred from the existing cabinet. This network group expansion method is strongly recommended.

Two NT8D04 Superloop Network cards are included in the base level upgrade package. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base IPE Module or any add-on IPE Modules.

The number of additional QPC414 cards is determined based on the number of network loop connections needed to support PE cards in the existing cabinets or any PE cards in add-on PE Modules.

Network cards are supported in Core/Network and Network Modules simultaneously.

Network to peripheral interface

Superloop and network loop connections extended to any peripheral equipment in option 81C columns require interface cables. The length of each NT8D91 cable is determined based on the distance between a network card connection and a peripheral controller or buffer connection for adjacent columns. The number of cables is determined by the number of loops needed to support peripheral equipment. For network cards to peripheral equipment connections, see “Network to peripheral I/O cables” on page 283.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE is reused in option 61 modules. IPE growth is supported in the IPE Module included in the base level upgrade package and from add-on IPE Modules.

PRI/DTI cards can be added to the upgraded system and located in option 81C Core/Network Modules and Network Modules.

If PRI/DTI cards are located in option 81C Core/Network Modules, appropriate internal cables must be ordered to connect PRI/DTI cards directly to QPC414 Network cards.

Module pedestal equipment

— AS1001A/D Pedestal Assembly (up to four modules)

Two pedestals are included in the base level upgrade package. The number of additional pedestal assemblies depends on the number of modules added to the upgraded system.

Equipment cabinet power

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate. See “Power and ground engineering” on page 305 for more information.

Reserve system power equipment

Calculate additional power requirements for new modules. Reuse, expand, or replace the existing power system as appropriate.

System monitor connections

See “System monitor” on page 299 for specific requirements to support this type of upgrade. Also see upgrade installation procedures in *Upgrade system installation to X11 release 23* (553-3001-258).

Ground

See “Power and ground engineering” on page 305 for specific requirements to support this type of upgrade.

Upgrading Meridian 1 option 71

This section provides engineering information for upgrading a Meridian 1 option 71 system to the following:

- Option 71 X11 release 21
- Option 81C X11 release 24

Upgrading option 71 to X11 release 21 requires replacing some CE cards, the disk drive unit, and the software.

Upgrading option 71 to option 81C using the card cage upgrade package requires replacing the CPU card cages with core card cages and replacing option 71 CE cards with option 81C core cards in the existing column.

Upgrading option 71 to X11 release 21

To upgrade a Meridian 1 option 71 to X11 release 21, use the card base level upgrade package. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing option 71 system or the base level upgrade package.

Note: X11 release 21 is the highest supported X11 software release for the option 71. The option 71 must be upgraded to an option 81C before installing X11 release 24 software.

Base level upgrade package

The basic equipment package required to upgrade option 71 to option 71 X11 release 21 is:

— Option 71 to Option 71 X11 Release 21 Card Upgrade Package

The package provides capacity for a dual CPU, dual memory, 146 network loops or 33 network superloops** plus 16 voice/data network loops* with integrated IPE.

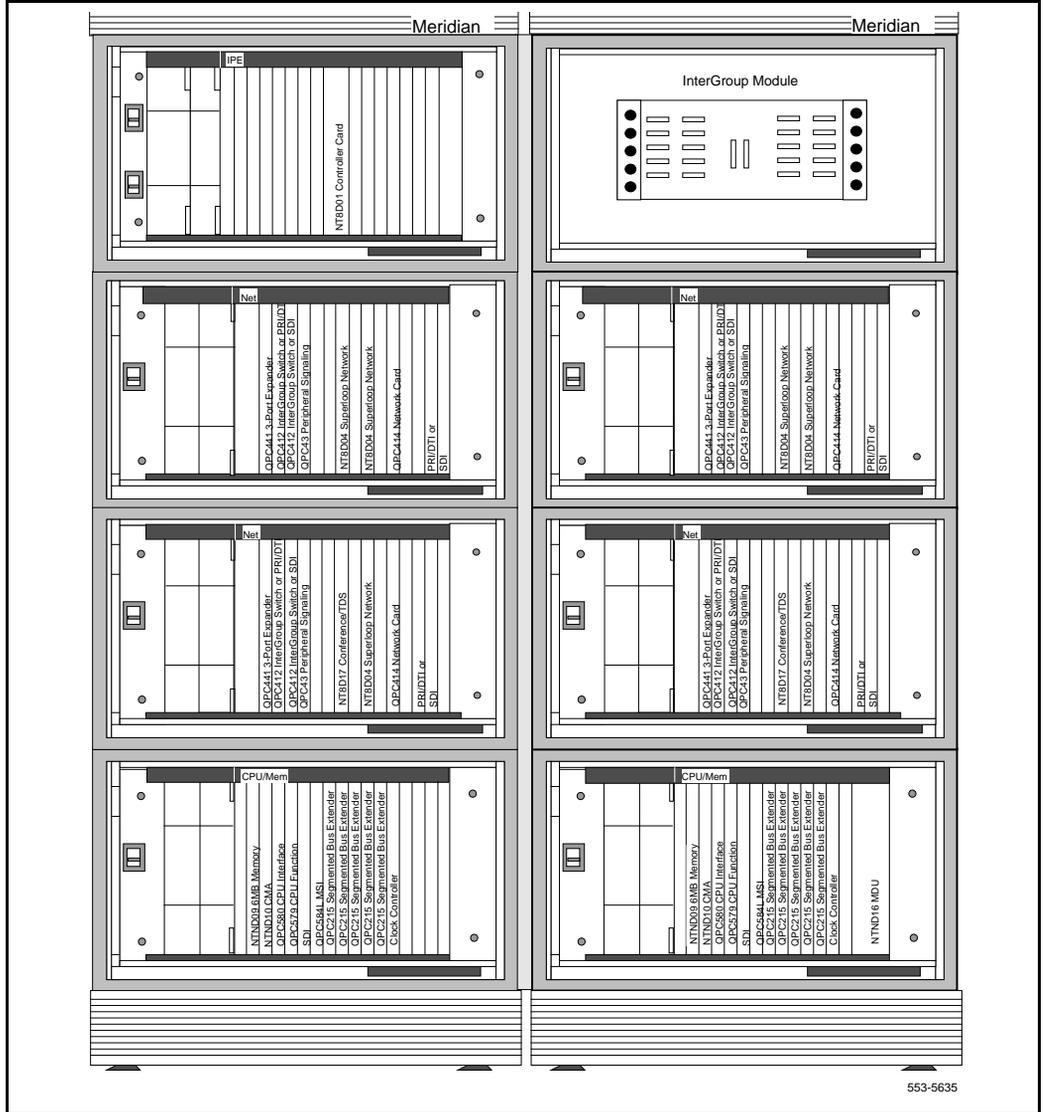
* QPC414 type loop supports 30 timeslots

** NT8D04 type superloop supports 120 timeslots

Existing PE is reused in existing option 71 columns. IPE growth is accomplished by adding IPE cards to the IPE Module. If more IPE or application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 59 illustrates option 71 columns with two CPU, four Network, InterGroup, and IPE Modules.

Figure 59
Option 71 to option 71 X11 release 21



Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Software storage (disk drives)

— Included in the base level upgrade package

The primary location for the NTND16 Multi Disk Unit (MDU) is in the slots previously occupied by the NT8D69 MDU.

Software interface and read-only memory

— Included in the base level upgrade package

Software cartridges are installed on QPC584L Mass Storage Interface (MSI) or NT9D34 Enhanced Mass Storage Interface (EMSI) cards located in a dedicated card slot in a CPU Module.

The NTND08 Read-Only Memory (ROM) card is attached to the QPC579 CPU Function card that is also located in a dedicated card slot in each CPU Module.

Central processor unit

— Reuse existing CPU cards

Memory and peripheral signaling

— Reuse existing peripheral signaling cards

An NTND09 6MB Memory card is used with the QPC43R Peripheral Signaling card to support X11 release 21 software.

Tone and digit switch and conference

- Included in the existing system
- QPC444 Conference cards as required

Additional QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Network equipment

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

The number of QPC414 Network cards is determined based on the number of network loop connections needed to support the PE cards. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support IPE cards located in the base module or any add-on IPE expansion modules.

Network to peripheral interface

Network loop and superloop connections extended to peripheral equipment in PE and IPE Modules require interface cables. The length of each cable is determined based on the distance between the network connection and the peripheral connection. No additional cables are required if new PE and IPE Modules have not been added to the existing system. See “Network to peripheral I/O cables” on page 283.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE remains in existing PE Modules. Additional PE can be added to the existing PE Module. IPE growth is supported in IPE Modules added to the existing column or to a new column, which can be added to the system as described in *Meridian 1 system installation procedures* (553-3001-210).

Module pedestal equipment

- Reuse existing pedestal

Unless a new column is added, no additional pedestal equipment is required. Otherwise, the type of pedestal assembly is selected based on the type of input power, which must match the power input for the modules.

Equipment column power

- Reuse existing column power rectifier

Unless a new column is added, the existing power source does not have to be modified. The type of input power for each new module added to the upgraded system is determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reserve system power equipment

- Reuse batteries as required

Add batteries as required to support any additional IPE or application modules.

System monitor connections

See “System monitor” on page 299 for specific requirements to support the addition of IPE or application modules.

Ground

Unless a new column is added, grounding remains unchanged. See “Power and ground engineering” on page 305 for specific requirements to support grounding changes or additions.

Upgrading option 71 to option 81C

To upgrade an option 71 to option 81C, use the card cage base level upgrade package. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing option 71 or the base level upgrade package.

Upgrading option 71 to option 81C requires replacing CPU card cages in option 71 with core card cages to upgrade CPU Modules to Core/Network Modules. Network and peripheral equipment remains in the existing modules.

When engineering an upgrade to option 81C, review appropriate upgrade procedures in *Upgrade system installation to X11 release 23 (553-3001-258)* and then check the ordering package contents and ordering notes in the Pricing documentation.

Base level upgrade package

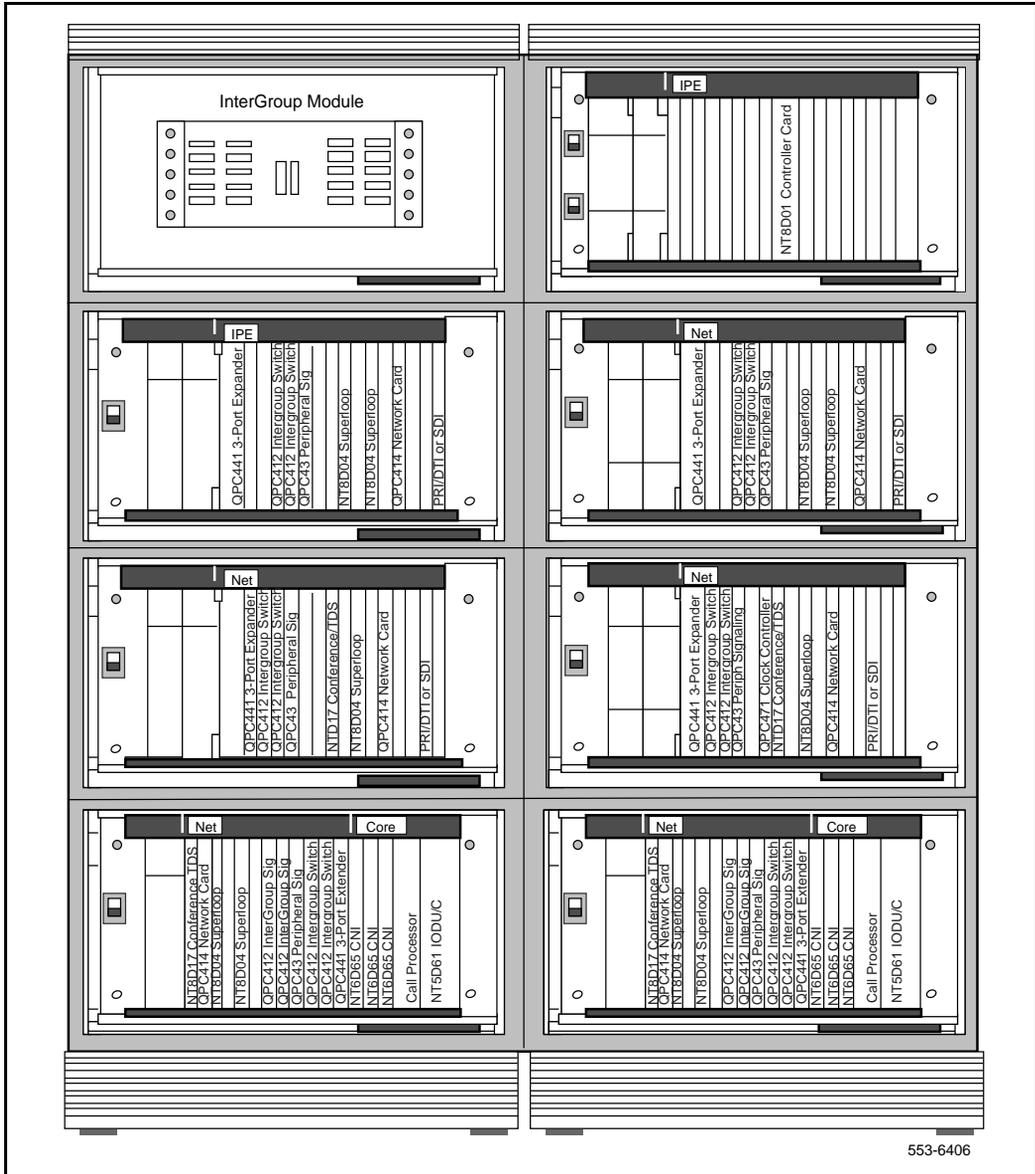
The basic equipment packages required to upgrade option 71 to option 81C X11 release 24 are:

- Option 71 to Option 81C Card Cage Upgrade Package
- Option 71 to Option 81C Module Upgrade Package

The card cage upgrade package provides two core/network card cages and common equipment cards. The module upgrade package provides two Core/Network Modules and common equipment cards. It also provides CNI cards and cables for one network group. Additional network groups, corresponding Core to Network Interface (CNI) cards, and required network cable packages are not included in the base level upgrade package, but can be ordered separately. IPE growth is accomplished from add-on IPE Modules and cards. If more IPE and application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 60 shows an option 81C system upgraded from an option 71 system by replacing CPU card cages with core card cages and installing option 81C common equipment in place of option 71 common equipment.

Figure 60
Option 71 to option 81C card cage upgrade



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Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM

— Included in the base level upgrade package

Call processor unit

— An NT9D19, NT5D10 or NT5D03 Call Processor is located in a dedicated slot in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

— Reuse the existing conference and TDS cards

QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Peripheral signaling and intergroup switch

— Reuse the existing intergroup switch and power supplies

Network group junctor

— Reuse the existing network group junctor

Network equipment

- NT6D65AA CNI cards as required
- AS1039A/D Network Group Assembly as required
- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

Two NT6D65AA Core to Network Interface (CNI) cards are included in the base level upgrade package to support the first group. To support additional network groups, additional CNI cards must be ordered. Two CNI cards are required for every two groups after the first group. To support groups 2 and 3, another pair of CNI cards must be ordered, and so on up to a maximum of five groups. Each additional group also requires four NTND14 cables of appropriate lengths.

Additional network groups can be ordered as:

- A pair of completely empty Network Modules, using the AS1007A/D package. In this case, all necessary cards from the existing network shelves in the existing cabinet are transferred to Network Modules in option 81C. This method utilizes the greatest number of existing cards; however, the upgrade process is longer causing a greater system downtime.
- Complete network groups, using the AS1039A/D package. In this case, Network Modules are already equipped with the network support cards such as IGS, 3PE, PS, and BTU, and only the actual network cards need to be transferred from the existing cabinet. This network group expansion method is strongly recommended.

An NT8D04 Superloop Network card is included in the base level upgrade package. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support new IPE cards located in the base IPE Module or any add-on IPE Modules.

The number of additional QPC414 cards is determined based on the number of network loop connections needed to support new PE cards in the existing cabinets or any PE cards in add-on PE Modules.

Network to peripheral interface

Network loop and superloop connections extended to peripheral equipment in PE/IPE Modules require interface cables. The length of each cable is determined based on the distance between the network connection and the peripheral connection. No additional cables are required if new PE or IPE Modules have not been added to the existing system. See “Network to peripheral I/O cables” on page 283.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE remain in the existing column. Additional PE cards can be added to the existing PE Modules. IPE growth is supported in an IPE Module added to the existing column or to a new column, which can be added to the system as described in *Meridian 1 system installation procedures* (553-3001-210).

Equipment column power

- Reuse the existing column power rectifier
- Reuse existing CE power supplies

Unless a new column is added, the existing power source does not have to be modified. The type of input power for each new module added to the upgraded system is determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reuse existing option 71 CE power supplies in option 81C Core/Network Modules.

Reserve system power equipment

- Reuse batteries as required

Add a new power system, as required, to support the addition of any IPE or application modules. See “Power and ground engineering” on page 305 for engineering details for power combinations.

System monitor connections

See “System monitor” on page 299 for specific requirements to support the addition of IPE or application modules.

Ground

Unless a new column is added, grounding remains unchanged. See “Power and ground engineering” on page 305 for specific requirements to support grounding changes or additions.

Upgrading Meridian 1 option 81

This section provides engineering information for upgrading a Meridian 1 option 81 system to option 81C.

Upgrading option 81 to option 81C using the card cage upgrade package requires replacing core card cages with core/network card cages.

Upgrading option 81 to option 81C

To upgrade an option 81 to option 81C, use the card cage base level upgrade package. This package contains the minimum equipment and software required for a successful upgrade. In addition to the base level upgrade package, you can add equipment and software features to the upgraded system to support services not provided by the existing option 81 or the base level upgrade package.

Upgrading option 81 to option 81C requires replacing core card cages in option 81 with core/network card cages to upgrade Core Modules to Core/Network Modules. Network and peripheral equipment remains in the existing modules.

When engineering an upgrade to option 81C, review appropriate upgrade procedures in *Upgrade system installation to X11 release 23* (553-3001-258) and then check the ordering package contents and ordering notes in the Pricing documentation.

Base level upgrade package

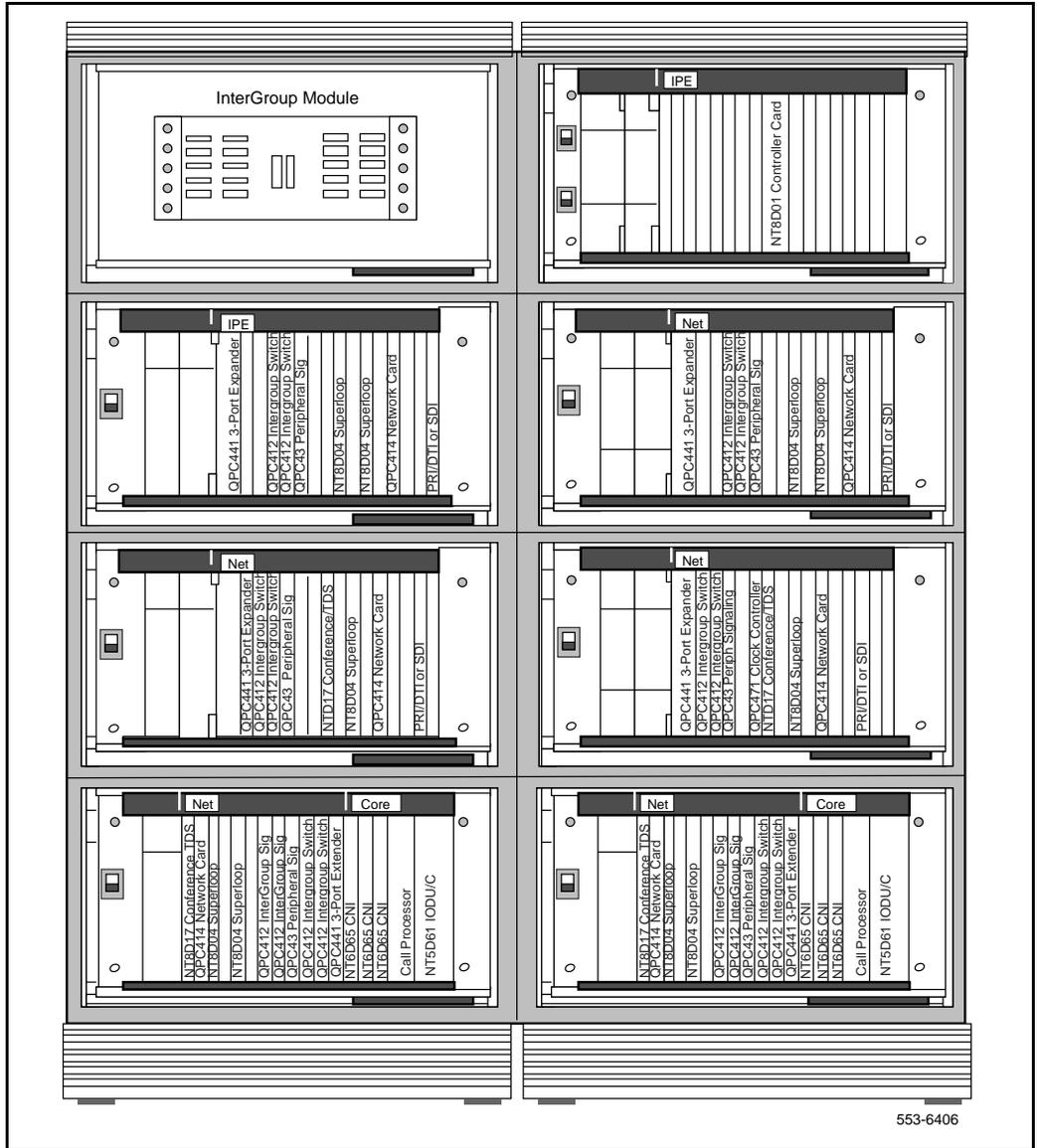
The basic equipment packages required to upgrade option 81 to option 81C X11 release 24 are:

- Option 81 to Option 81C Card Cage Upgrade Package

The card cage upgrade package provides two core/network card cages and common equipment cards. The module upgrade package provides two Core/Network Modules and common equipment cards. It also provides CNI cards and cables for one network group. Additional network groups, corresponding Core to Network Interface (CNI) cards, and required network cable packages are not included in the base level upgrade package, but can be ordered separately. IPE growth is accomplished from add-on IPE Modules and cards. If more IPE and application modules are needed as part of the upgrade, determine these requirements using NTP and Pricing documentation.

Figure 61 shows an option 81C system upgraded from an option 81 system by replacing core card cages with core/network card cages and installing option 81 common equipment into the option 81C core/network modules.

Figure 61
Option 81 to option 81C card cage upgrade



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Additions to base level upgrade package

Some items listed below are included in the base level upgrade package; however, some additional items may be required to complete the minimum hardware requirements for the initial system upgrade.

If the option 81 contains IOP/CMDU cards (rather than separate IOP and CMDU cards), the option 81 to 81C upgrade allows you to either reuse the IOP/CMDU cards in the 81C, or install two new NT5D61 Input output disk unit with CD-ROM (IODU/C) cards.

A complete review of upgrade requirements should be conducted to determine what additional items, if any, are required before ordering upgrade equipment and performing the upgrade.

Input output disk unit with CD-ROM (optional)

— Included in the base level upgrade package

Call processor unit

— An NT9D19, NT5D10 or NT5D03 Call Processor is located in each Core/Network Module. It controls call processing activities.

Tone and digit switch and conference

— Reuse the existing conference and TDS cards

QPC444 Conference cards can be added to support dedicated nonvoice conference requirements (for example, Auto Wake-Up, Music on Hold, and so on).

Peripheral signaling and intergroup switch

— Reuse the existing intergroup switch and power supplies

Network group junctor

— Reuse the existing network group junctor

Network equipment

— NT6D65AA CNI cards as required

— AS1039A/D Network Group Assembly as required

- QPC414 Network cards as required
- NT8D04 Superloop Network cards as required

Two NT6D65AA Core to Network Interface (CNI) cards are included in the base level upgrade package to support the first group. To support additional network groups, additional CNI cards must be ordered. Two CNI cards are required for every two groups after the first group. To support groups 2 and 3, another pair of CNI cards must be ordered, and so on up to a maximum of five groups. Each additional group also requires four NTND14 cables of appropriate lengths.

Additional network groups can be ordered as:

- A pair of completely empty Network Modules, using the AS1007A/D package. In this case, all necessary cards from the existing network shelves in the existing cabinet are transferred to Network Modules in option 81C. This method utilizes the greatest number of existing cards; however, the upgrade process is longer causing a greater system downtime.
- Complete network groups, using the upgrade package. In this case, Network Modules are already equipped with the network support cards such as IGS, 3PE, and PS, and only the actual network cards need to be transferred from the existing cabinet. This network group expansion method is strongly recommended.

An NT8D04 Superloop Network card is included in the base level upgrade package. The number of additional NT8D04 Superloop Network cards is determined based on the number of network connections needed to support new IPE cards located in the base IPE Module or any add-on IPE Modules.

The number of additional QPC414 cards is determined based on the number of network loop connections needed to support new PE cards in the existing cabinets or any PE cards in add-on PE Modules.

Network to peripheral interface

Network loop and superloop connections extended to peripheral equipment in PE/IPE Modules require interface cables. The length of each cable is determined based on the distance between the network connection and the peripheral connection. No additional cables are required if new PE or IPE Modules have not been added to the existing system. See “Network to peripheral I/O cables” on page 283.

Peripheral equipment

- Reuse existing peripheral equipment as required
- Add new intelligent peripheral equipment as required

Existing PE remain in the existing column. Additional PE cards can be added to the existing PE Modules. IPE growth is supported in an IPE Module added to the existing column or to a new column, which can be added to the system as described in *Meridian 1 system installation procedures* (553-3001-210).

Equipment column power

- Reuse the existing column power rectifier
- Reuse existing CE power supplies

Unless a new column is added, the existing power source does not have to be modified. The type of input power for each new module added to the upgraded system is determined based on whether reserve power is required for the entire system. If reserve power is required, see “Reserve system power equipment” for more details.

Reuse existing option 81 CE power supplies in option 81C Core/Network Modules.

Reserve system power equipment

- Reuse batteries as required

Add a new power system, as required, to support the addition of any IPE or application modules. See “Power and ground engineering” on page 305 for engineering details for power combinations.

System monitor connections

See “System monitor” on page 299 for specific requirements to support the addition of IPE or application modules.

Ground

Unless a new column is added, grounding remains unchanged. See “Power and ground engineering” on page 305 for specific requirements to support grounding changes or additions.

Network to peripheral I/O cables

This section describes input/output (I/O) cables and connector panel requirements for connecting network loops to peripheral buffers or controllers as part of a module level upgrade.

To meet EMI requirements, a shielded cable extends network loops between existing cabinets and newly installed module columns. Cables are connected at each end to connectors located:

- On the I/O panel at the rear of the module
- On the lower front cover of the QCA60 cabinet
- On the I/O panel at the rear of ST-type cabinets, such as QCA136, QCA137, and QCA147
- On connector I/O housings located on the top or side of cabinets

A summary of cables and connector housing panels is provided in Tables 4 and 5. Table 6 provides a list of cable lengths and connector housings.

Note: The requirements shown in Tables 4 and 5 are also illustrated in Figures 62 through 66.

Table 4 lists cable requirements to connect network cards to peripheral equipment, to connect cabinets to cabinets, and to connect cabinets to columns.

Table 4
Network loop cable requirements (Part 1 of 2)

From		To		Cable requirements		
Cabinet type	Network card	Cabinet type	Peripheral/controller	Network to I/O panel	I/O to I/O panel	I/O to peripheral/controller*
Module	NT8D04	Module	NT8D01	NT8D88	NT8D98	NT8D92
Module	QPC414	Module	QPC659	NT8D86	NT8D73	NT8D86
Module	QPC414	ST	QPC659	NT8D86	NT8D73	NT9J98
Module	QPC414	EMI	QPC387, 464, or 659	NT8D86	NT8D73	NT9J96
Module	QPC414	S	QPC464	NT8D86	NT8D73	NT9J96
Module	QPC414	Non-EMI	QPC64, 387, 464, or 659	NT8D86	NT8D73	NT9J96
ST	NT8D04	Module	NT8D01	NT9J99	NT8D98	NT8D92
ST	QPC414	Module	QPC659	NT9J98	NT8D73	NT8D86
ST	QPC414	EMI	QPC387, 464, or 659	NT9J98	NT8D73	NT9J96
ST	QPC414	S	QPC464	NT9J98	NT8D73	NT9J96
ST	QPC414	Non-EMI	QPC64, 387, 464, or 659	NT9J98	NT8D73	NT9J96
EMI	NT8D04	Module	NT8D01	NT9J97	NT8D98	NT8D92
EMI	QPC376 or 414	Module	QPC659	NT9J96	NT8D73	NT8D86

Table 4
Network loop cable requirements (Part 2 of 2)

From		To		Cable requirements		
Cabinet type	Network card	Cabinet type	Peripheral/controller	Network to I/O panel	I/O to I/O panel	I/O to peripheral/controller*
EMI	QPC50, 376, or 414	EMI	QPC64, 387, 464, or 659	NT9J96	NT8D73	NT9J96
EMI	QPC50, 376 or 414	Non-EMI	QPC64, 387, 464, or 659	NT9J96	NT8D73	NT9J96
Non-EMI	NT8D04	Module	NT8D01	NT9J97	NT8D98	NT8D92
Non-EMI	QPC50, 376, or 414	Module	QPC659	NT9J96	NT8D73	NT8D86

*Same cable type is used to connect to Meridian Mail and DTI/PRI cards.

Legend

S = SL-1 S type cabinet (QCA60)

ST = SL-1 ST/RT type equipment cabinet (QCA136, 137, 144, 147, 148)

Module = Meridian 1 module (NT8D11, NT8D13, NT8D34, NT8D35, NT8D37, NT6D39, NT6D44, NT8D47)

EMI = Electromagnetic interference type cabinet (QCA7, 8, 14, 23, 24, 25, 37, 55, 58, 74, 96, 97, 98, 108, 109)

Non-EMI = Nonelectromagnetic interference type cabinet (QCA6, 7, 8, 10, 14, 23, 24, 25, 28, 37)

Table 5 lists I/O connector housing types required to connect cabinets to cabinets, and to connect cabinets to columns.

Table 5
External I/O cable connector housing requirements (Part 1 of 2)

From		To		I/O connector housing	
Cabinet type	Network card	Cabinet type	Peripheral/controller	From	To
Module	NT8D04	Module	NT8D01	Module I/O panel	Module I/O panel
Module	QPC414	Module	QPC659	Module I/O panel	Module I/O panel
Module	QPC414	ST	QPC659	Module I/O panel	Part of NT9J98
Module	QPC414	EMI	QPC387, 464, or 659	Module I/O panel	P0696547, P0702380, P0704511 or P0703905/6
Module	QPC414	S	QPC464	Module I/O panel	U9620
Module	QPC414	Non-EMI	QPC64, 387, 464, or 659	Module I/O panel	P0696547
ST	NT8D04	Module	NT8D01	Part of NT9J99	Module I/O panel
ST	QPC414	Module	QPC659	Part of NT9J98	Module I/O panel
ST	QPC414	EMI	QPC387, 464, or 659	Part of NT9J98	P0696547, P0702380, P0704511 or P0703905/6
ST	QPC414	S	QPC464	Part of NT9J98	U9620
ST	QPC414	Non-EMI	QPC64, 387, 464, or 659	Part of NT9J98	P0696547
EMI	NT8D04	Module	NT8D01	P0696547, P0702380, P0704511 or P0703905/6	Module I/O panel

Table 5
External I/O cable connector housing requirements (Part 2 of 2)

From		To		I/O connector housing	
Cabinet type	Network card	Cabinet type	Peripheral/controller	From	To
EMI	QPC376 or 414	Module	QPC659	P0696547, P0702380, P0704511 or P0703905/6	Module I/O panel
EMI	QPC50, 376, or 414	EMI	QPC64, 387, 464, or 659	P0696547, P0702380, P0704511 or P0703905/6	P0696547, P0702380, P0704511 or P0703905/6
EMI	QPC50, 376, or 414	Non-EMI	QPC64, 387, 464, or 659	P0696547, P0702380, P0704511 or P0703905/6	P0696547
Non-EMI	NT8D04	Module	NT8D01	P0696547 or P0703905/6	Module I/O panel
Non-EMI	QPC50, 376, or 414	Module	QPC659	P0696547 or P0703905/6	Module I/O panel

*Same cable type is used to connect to Meridian Mail and PRI/DTI cards.

Legend

S = SL-1 S type cabinet (QCA60)

ST = SL-1 ST/RT type equipment cabinet (QCA136, 137, 144, 147, 148)

Module = Meridian 1 module (NT8D11, NT8D13, NT8D34, NT8D35, NT8D37, NT6D39, NT6D44, NT8D47)

EMI = Electromagnetic interference type cabinet (QCA7, 8, 14, 23, 24, 25, 37, 55, 58, 74, 96, 97, 98, 108, 109)

Non-EMI = Nonelectromagnetic interference type cabinet (QCA6, 7, 8, 10, 14, 23, 24, 25, 28, 37)

P0696547 = Supports up to six connectors (loops) and attaches to existing cabinet side panel

P0702380 = Supports up to six connectors (loops) and attaches to existing cabinet top panel

P0703905/6 = Supports up to 10 connectors (loops) and attaches to existing cabinet top panel (1/cabinet)

P0704511 = Supports up to three connectors (loops) and attaches beneath existing I/O panel

U9620 = Supports up to four connectors (loops) and attaches to a new cabinet front panel (1/cabinet)

Table 6 lists and describes EMI-compliant I/O connector housings, external cables, and related hardware required to connect cabinets to cabinets, and to connect cabinets to columns.

Table 6
Connector housing and cable equipment list (Part 1 of 5)

Item	Description
P0696547 connector housing	Required to suppress EMI. This housing mounts on the side of cabinets equipped with openings in their side panels. One housing can accommodate up to six connectors.
P0702380 connector housing	Required to suppress EMI. This housing mounts on the top of cabinets equipped with a top I/O panel. One housing can accommodate up to six connectors.
P0703846 adapter housing	Required with each P0703847 adapter panel. This connector housing is included in the P0704511 three-position connector housing kit.
P0703847 adapter panel	Required to suppress EMI. This panel mounts on the top of cabinets beneath an existing I/O panel. One adapter panel can accommodate up to three connectors. This adapter panel is included in the P0704511 three-position connector housing kit.
P0703905 adapter panel	Required to suppress EMI. This panel mounts on the top of cabinets equipped with a square duct opening in its top panel. One adapter panel can accommodate up to ten connectors. This panel requires a P0703906 adapter panel housing.
P0703906 adapter panel housing	Required with each P0703905 adapter panel.
P0703961 SDI adapter plate kit	Required to suppress EMI. This kit contains one P0702381 adapter plate and screws required to mount an SDI connector in any of the above connector housings.
P0703960 DTI adapter plate kit	Required to suppress EMI. This kit contains one P0702382 adapter plate and screws required to mount a DTI connector in any of the above connector housings.

Table 6
Connector housing and cable equipment list (Part 2 of 5)

Item	Description															
P0704511 three-position connector housing kit	Required to suppress EMI. This connector housing mounts on the top of cabinets equipped with a top I/O panel. It is used when there are no positions available in the I/O panel and can accommodate up to three connectors. This kit consists of the P0703846 adapter housing, the P0703847 adapter panel, and mounting hardware.															
U9620 connector mounting kit	Required to suppress EMI in a QCA60 cabinet. This kit contains two P0697550 adapter brackets, two P0697559 mounting brackets, and one P0697707 modified front panel. This kit provides connections for up to four QPC414-type network loops to the existing PE shelves in the QCA60 cabinet.															
NT8D46 cable	The NT8D46 series of cables is used in system monitor connections.															
NT8D73 cable	Required to suppress EMI. This intercabinet cable extends network loops between cabinets. It is available in the following lengths:															
	<table border="1"> <thead> <tr> <th data-bbox="425 756 734 789">Code</th> <th data-bbox="734 756 991 789">Length</th> <th data-bbox="991 756 1190 789">Equivalent</th> </tr> </thead> <tbody> <tr> <td data-bbox="425 789 734 846">NT8D73AD</td> <td data-bbox="734 789 991 846">1.8 m (6 ft)</td> <td data-bbox="991 789 1190 846">QCAD312A</td> </tr> <tr> <td data-bbox="425 846 734 902">NT8D73AF</td> <td data-bbox="734 846 991 902">3.6 m (12 ft)</td> <td data-bbox="991 846 1190 902">QCAD312B</td> </tr> <tr> <td data-bbox="425 902 734 959">NT8D73AL</td> <td data-bbox="734 902 991 959">6.1 m (20 ft)</td> <td data-bbox="991 902 1190 959">—</td> </tr> <tr> <td data-bbox="425 959 734 1008">NT8D73AS</td> <td data-bbox="734 959 991 1008">9.1 m (30 ft)</td> <td data-bbox="991 959 1190 1008">—</td> </tr> </tbody> </table>	Code	Length	Equivalent	NT8D73AD	1.8 m (6 ft)	QCAD312A	NT8D73AF	3.6 m (12 ft)	QCAD312B	NT8D73AL	6.1 m (20 ft)	—	NT8D73AS	9.1 m (30 ft)	—
Code	Length	Equivalent														
NT8D73AD	1.8 m (6 ft)	QCAD312A														
NT8D73AF	3.6 m (12 ft)	QCAD312B														
NT8D73AL	6.1 m (20 ft)	—														
NT8D73AS	9.1 m (30 ft)	—														
NT8D85 cable	Connects a QPC414 Network Card directly to a QPC659 Dual Loop Peripheral Buffer (DLB) card. It can be used within modules or between a module and an existing cabinet when suppression of EMI is not a requirement in the existing cabinet.															
NT8D86 cable	Required to suppress EMI. This intramodule cable extends from the I/O panel to the assigned QPC414 Network Card or DLB circuit card in the module.															
	<table border="1"> <thead> <tr> <th data-bbox="425 1243 734 1276">Code</th> <th data-bbox="734 1243 1190 1276">Length</th> </tr> </thead> <tbody> <tr> <td data-bbox="425 1276 734 1333">NT8D86AC</td> <td data-bbox="734 1276 1190 1333">1.5 m (5 ft)</td> </tr> <tr> <td data-bbox="425 1333 734 1395">NT8D86AD</td> <td data-bbox="734 1333 1190 1395">1.8 m (6 ft)</td> </tr> </tbody> </table>	Code	Length	NT8D86AC	1.5 m (5 ft)	NT8D86AD	1.8 m (6 ft)									
Code	Length															
NT8D86AC	1.5 m (5 ft)															
NT8D86AD	1.8 m (6 ft)															

Table 6
Connector housing and cable equipment list (Part 3 of 5)

Item	Description		
NT8D88 cable	Required to suppress EMI. This intramodule cable extends from the I/O panel to the assigned superloop network card.		
	<table border="0"> <thead> <tr> <th data-bbox="418 365 547 406">Code</th> <th data-bbox="689 365 792 406">Length</th> </tr> </thead> </table>	Code	Length
	Code	Length	
NT8D88AC	1.5 m (5 ft)		
NT8D88AD	1.8 m (6 ft)		
NT8D91 cable	Connects a superloop network card directly to a controller card. It can be used within modules or between a module and an existing cabinet when suppression of EMI is not a requirement in the existing cabinet.		
	<table border="0"> <thead> <tr> <th data-bbox="418 625 547 665">Code</th> <th data-bbox="689 625 792 665">Length</th> </tr> </thead> </table>	Code	Length
	Code	Length	
	NT8D91AC	1.2 m (4 ft)	
	NT8D91AD	1.8 m (6 ft)	
	NT8D91AE	2.4 m (8 ft)	
	NT8D91AF	3 m (10 ft)	
	NT8D91AG	3.6 m (12 ft)	
	NT8D91AJ	4.8 m (16 ft)	
NT8D91AP	7.6 m (25 ft)		
NT8D91AV	13.7 m (45 ft)		
NT8D92AB cable	This intramodule cable extends from the I/O panel to the assigned controller card in the module.		

Table 6
Connector housing and cable equipment list (Part 4 of 5)

Item	Description																					
NT8D98 cable	<p>Required to suppress EMI. This intercabinet cable extends loops between cabinets. It is available in the following lengths:</p> <table border="1"> <thead> <tr> <th data-bbox="483 375 611 402">Code</th> <th data-bbox="761 375 847 402">Length</th> </tr> </thead> <tbody> <tr> <td data-bbox="483 427 611 451">NT8D98AD</td> <td data-bbox="744 427 864 451">1.8 m (6 ft)</td> </tr> <tr> <td data-bbox="483 475 611 500">NT8D98AF</td> <td data-bbox="735 475 873 500">3.6 m (12 ft)</td> </tr> <tr> <td data-bbox="483 524 611 548">NT8D98AL</td> <td data-bbox="735 524 873 548">6.1 m (20 ft)</td> </tr> <tr> <td data-bbox="483 573 611 597">NT8D98AS</td> <td data-bbox="735 573 873 597">9.1 m (30 ft)</td> </tr> </tbody> </table>	Code	Length	NT8D98AD	1.8 m (6 ft)	NT8D98AF	3.6 m (12 ft)	NT8D98AL	6.1 m (20 ft)	NT8D98AS	9.1 m (30 ft)											
Code	Length																					
NT8D98AD	1.8 m (6 ft)																					
NT8D98AF	3.6 m (12 ft)																					
NT8D98AL	6.1 m (20 ft)																					
NT8D98AS	9.1 m (30 ft)																					
NT9J96 cable	<p>Required to suppress EMI. This intracabinet cable extends an existing network loop from the connector housing to its assigned circuit card in existing cabinets (except ST type cabinets). It is available in the following lengths:</p> <table border="1"> <thead> <tr> <th data-bbox="512 764 580 792">Code</th> <th data-bbox="761 764 847 792">Length</th> <th data-bbox="1002 764 1121 792">Equivalent</th> </tr> </thead> <tbody> <tr> <td data-bbox="486 816 606 841">NT9J96AC</td> <td data-bbox="713 816 899 841">1015 mm (40 in.)</td> <td data-bbox="993 816 1130 841">QCAD311A4</td> </tr> <tr> <td data-bbox="486 865 606 889">NT9J96AD</td> <td data-bbox="713 865 899 889">1780 mm (70 in.)</td> <td data-bbox="993 865 1130 889">QCAD311A5</td> </tr> <tr> <td data-bbox="486 914 606 938">NT9J96AE</td> <td data-bbox="713 914 899 938">2160 mm (85 in.)</td> <td data-bbox="993 914 1130 938">QCAD311A6</td> </tr> <tr> <td data-bbox="486 963 606 987">NT9J96AG</td> <td data-bbox="735 963 877 987">3.6 m (12 ft)</td> <td data-bbox="1048 963 1070 987">—</td> </tr> <tr> <td data-bbox="486 1011 606 1036">NT9J96AH</td> <td data-bbox="735 1011 877 1036">4.2 m (14 ft)</td> <td data-bbox="1048 1011 1070 1036">—</td> </tr> <tr> <td data-bbox="486 1060 606 1084">NT9J96AJ</td> <td data-bbox="735 1060 877 1084">4.8 m (16 ft)</td> <td data-bbox="1048 1060 1070 1084">—</td> </tr> </tbody> </table>	Code	Length	Equivalent	NT9J96AC	1015 mm (40 in.)	QCAD311A4	NT9J96AD	1780 mm (70 in.)	QCAD311A5	NT9J96AE	2160 mm (85 in.)	QCAD311A6	NT9J96AG	3.6 m (12 ft)	—	NT9J96AH	4.2 m (14 ft)	—	NT9J96AJ	4.8 m (16 ft)	—
Code	Length	Equivalent																				
NT9J96AC	1015 mm (40 in.)	QCAD311A4																				
NT9J96AD	1780 mm (70 in.)	QCAD311A5																				
NT9J96AE	2160 mm (85 in.)	QCAD311A6																				
NT9J96AG	3.6 m (12 ft)	—																				
NT9J96AH	4.2 m (14 ft)	—																				
NT9J96AJ	4.8 m (16 ft)	—																				

Table 6
Connector housing and cable equipment list (Part 5 of 5)

Item	Description														
NT9J97 cable	Required to suppress EMI. This intracabinet cable extends a superloop from the connector housing to its assigned circuit card in existing cabinets (except ST type cabinets). It is available in the following lengths:														
	<table border="1"> <thead> <tr> <th data-bbox="452 435 516 456">Code</th> <th data-bbox="700 435 780 456">Length</th> </tr> </thead> <tbody> <tr> <td data-bbox="423 488 542 509">NT9J97AC</td> <td data-bbox="651 488 829 509">1015 mm (40 in.)</td> </tr> <tr> <td data-bbox="423 537 542 558">NT9J97AD</td> <td data-bbox="651 537 829 558">1780 mm (70 in.)</td> </tr> <tr> <td data-bbox="423 586 542 607">NT9J97AE</td> <td data-bbox="651 586 829 607">2160 mm (85 in.)</td> </tr> <tr> <td data-bbox="423 634 542 656">NT9J97AG</td> <td data-bbox="674 634 806 656">3.6 m (12 ft)</td> </tr> <tr> <td data-bbox="423 683 542 704">NT9J97AH</td> <td data-bbox="674 683 806 704">4.2 m (14 ft)</td> </tr> <tr> <td data-bbox="423 732 542 753">NT9J97AJ</td> <td data-bbox="674 732 806 753">4.8 m (16 ft)</td> </tr> </tbody> </table>	Code	Length	NT9J97AC	1015 mm (40 in.)	NT9J97AD	1780 mm (70 in.)	NT9J97AE	2160 mm (85 in.)	NT9J97AG	3.6 m (12 ft)	NT9J97AH	4.2 m (14 ft)	NT9J97AJ	4.8 m (16 ft)
Code	Length														
NT9J97AC	1015 mm (40 in.)														
NT9J97AD	1780 mm (70 in.)														
NT9J97AE	2160 mm (85 in.)														
NT9J97AG	3.6 m (12 ft)														
NT9J97AH	4.2 m (14 ft)														
NT9J97AJ	4.8 m (16 ft)														
NT9J98 cable	Required to suppress EMI. This intracabinet cable extends an existing network loop from the I/O panel to its assigned circuit card in ST type cabinets. It is available in the following lengths:														
	<table border="1"> <thead> <tr> <th data-bbox="452 894 516 915">Code</th> <th data-bbox="700 894 780 915">Length</th> <th data-bbox="937 894 1061 915">Equivalent</th> </tr> </thead> <tbody> <tr> <td data-bbox="423 948 542 969">NT9J98AC</td> <td data-bbox="651 948 829 969">1015 mm (40 in.)</td> <td data-bbox="928 948 1070 969">QCAD311A1</td> </tr> <tr> <td data-bbox="423 997 542 1018">NT9J98AD</td> <td data-bbox="651 997 829 1018">1780 mm (70 in.)</td> <td data-bbox="928 997 1070 1018">QCAD311A2</td> </tr> <tr> <td data-bbox="423 1045 542 1066">NT9J98AE</td> <td data-bbox="651 1045 829 1066">2160 mm (85 in.)</td> <td data-bbox="928 1045 1070 1066">QCAD311A3</td> </tr> </tbody> </table>	Code	Length	Equivalent	NT9J98AC	1015 mm (40 in.)	QCAD311A1	NT9J98AD	1780 mm (70 in.)	QCAD311A2	NT9J98AE	2160 mm (85 in.)	QCAD311A3		
Code	Length	Equivalent													
NT9J98AC	1015 mm (40 in.)	QCAD311A1													
NT9J98AD	1780 mm (70 in.)	QCAD311A2													
NT9J98AE	2160 mm (85 in.)	QCAD311A3													
NT9J99 cable	Required to suppress EMI. This intracabinet cable extends a superloop from the I/O panel to its assigned circuit card in ST type cabinets. It is available in the following lengths:														
	<table border="1"> <thead> <tr> <th data-bbox="452 1203 516 1224">Code</th> <th data-bbox="700 1203 780 1224">Length</th> </tr> </thead> <tbody> <tr> <td data-bbox="423 1256 542 1278">NT9J99AC</td> <td data-bbox="651 1256 829 1278">1015 mm (40 in.)</td> </tr> <tr> <td data-bbox="423 1305 542 1326">NT9J99AD</td> <td data-bbox="651 1305 829 1326">1780 mm (70 in.)</td> </tr> <tr> <td data-bbox="423 1354 542 1375">NT9J99AE</td> <td data-bbox="651 1354 829 1375">2160 mm (85 in.)</td> </tr> </tbody> </table>	Code	Length	NT9J99AC	1015 mm (40 in.)	NT9J99AD	1780 mm (70 in.)	NT9J99AE	2160 mm (85 in.)						
Code	Length														
NT9J99AC	1015 mm (40 in.)														
NT9J99AD	1780 mm (70 in.)														
NT9J99AE	2160 mm (85 in.)														

Figure 62 illustrates network loop to peripheral equipment cable connections. It shows internal cables connecting peripheral equipment to the I/O panel and external cables connecting I/O panels between two cabinets or a cabinet and a column.

Figure 62
I/O network cable connections between two columns

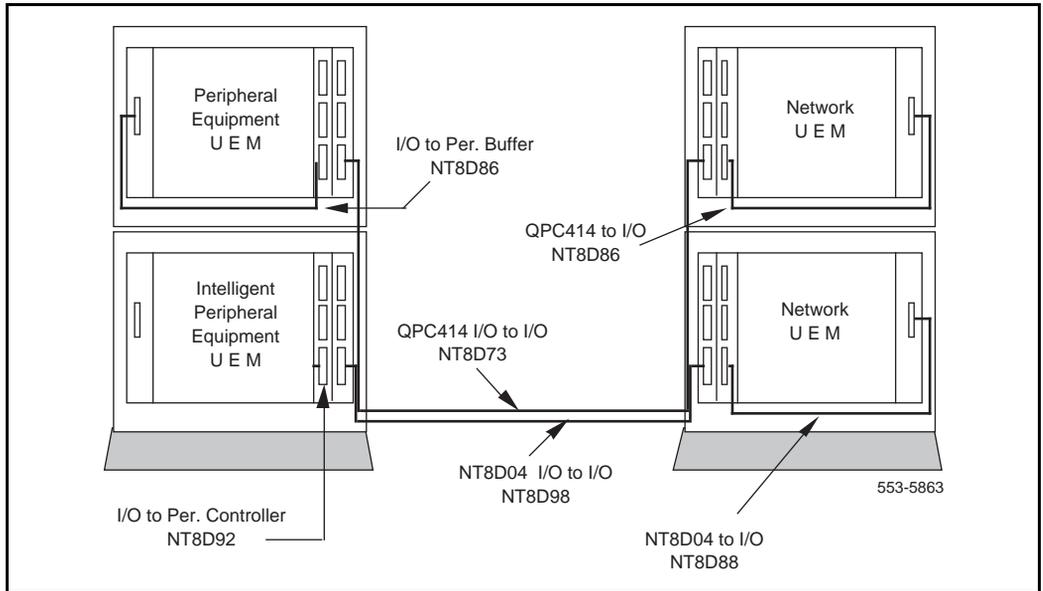


Figure 63 illustrates network loop to peripheral equipment cable connections when the I/O panel is at the rear of the cabinet. It shows external cables connecting I/O panels between a cabinet and a module column.

Figure 63
ST type cabinet rear I/O access

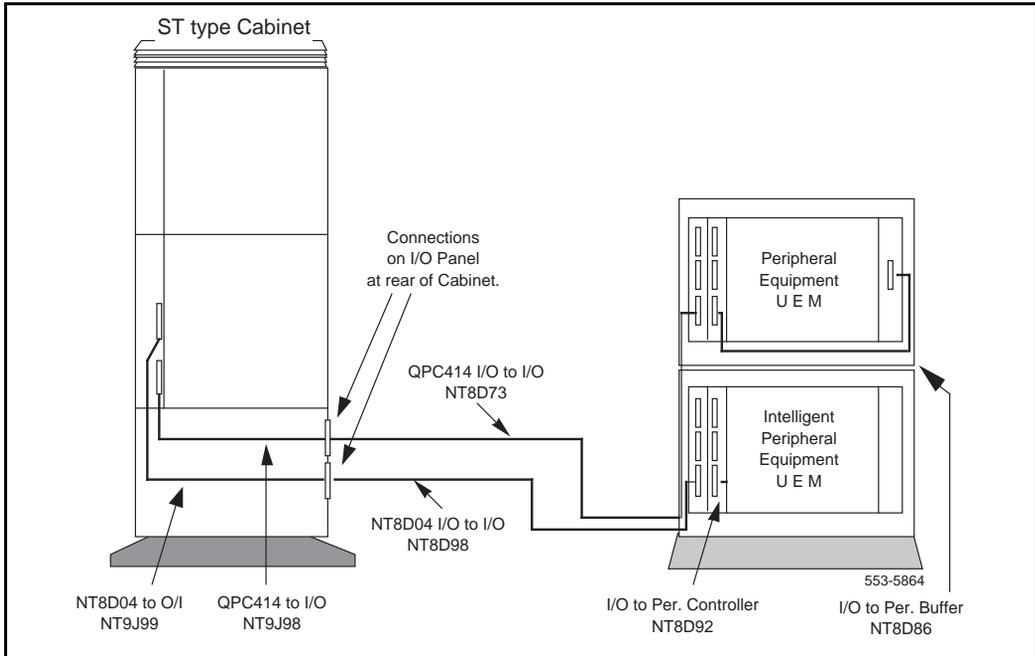


Figure 64 illustrates network loop to peripheral equipment cable connections for a modular upgrade. It shows internal cables connecting peripheral equipment to the I/O panel and external cables connecting the I/O panel of a connector housing on the cabinet and an I/O panel of a column.

Figure 64
Cabinet connector housing locations—CE in the cabinet

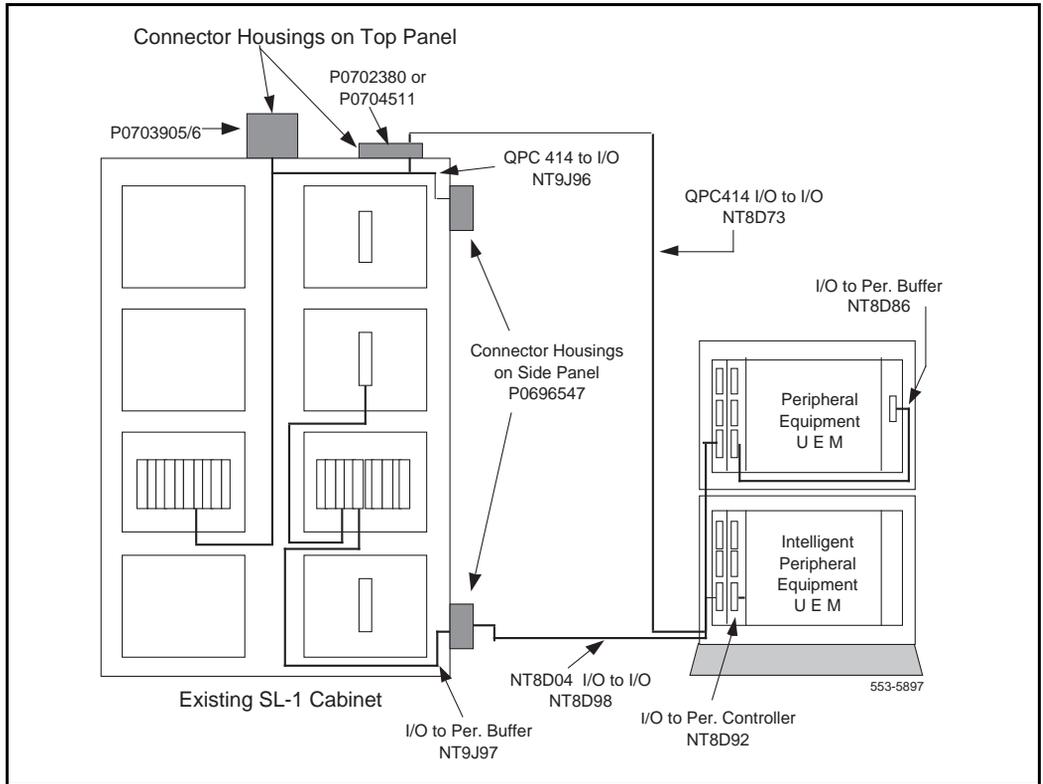


Figure 65 illustrates network loop to peripheral equipment cable connections for a shelf upgrade. It shows internal cables connecting peripheral equipment to network cards and to the I/O panel. It also shows external cables connecting an I/O panel of a connector housing on the cabinet and an I/O panel of a column.

Figure 65
Cabinet connector housing locations—CE in the module

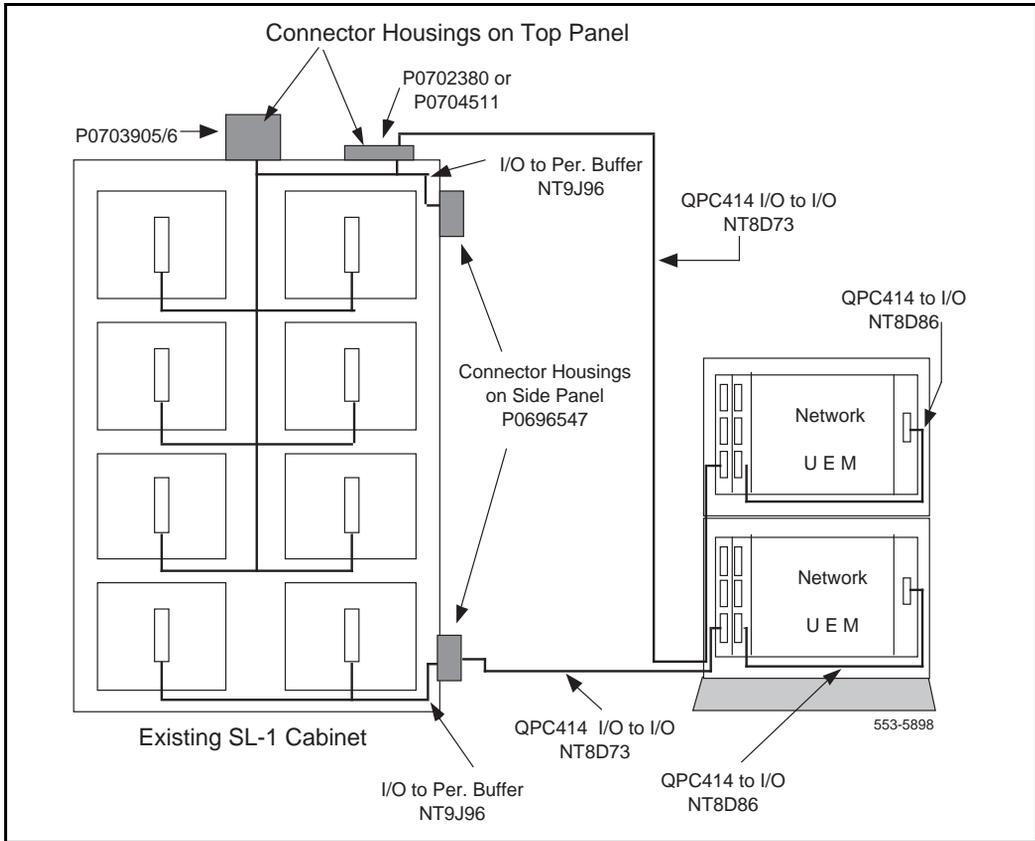
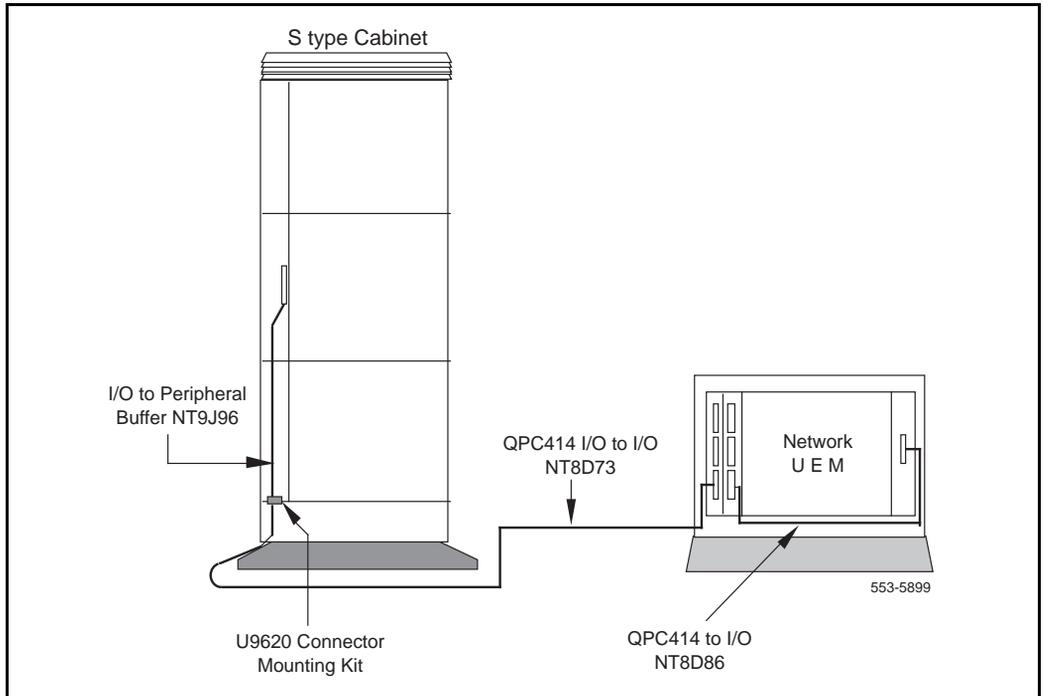


Figure 66 illustrates network loop to peripheral equipment cable connections. It shows internal cables connecting peripheral equipment to the I/O panel and external cables connecting I/O panels between a cabinet and a column. The I/O panel on the cabinet is front mounted.

Figure 66
S type cabinet front I/O access



System monitor

This section describes system monitor requirements associated with a module level upgrade. Prior to the introduction of the system monitor in the Meridian 1 system, monitoring functions were handled by the power monitor card. The QPC173 Power Monitor was used in all multi-group systems. The QPC84 Power Monitor was used in half- and single-group systems, which included peripheral equipment cabinets, and the QPC704 in ST-type and the QPC813 in RT-type cabinets. As a result, there are specific interconnections required for the upgraded system to be properly monitored.

When interfacing the system monitor and the power monitor as part of an upgrade, some additional equipment may be required based on the type of power monitor with which the system monitor is interfacing.

Systems with QPC173 or QPC84 Power Monitors

Upgrades to these systems require alarm interconnection and associated hardware.

Note: When a module upgrade results in a powering down of the CPU shelf in QPC84-equipped cabinets, the QPC84 must be a vintage S or later. QPC84 vintage S power monitor cards provide switch-selectable CE shelf monitoring. Refer to *Circuit card installation and testing* (553-3001-211) for power monitor switch settings.

Systems with QPC704 or QPC813 Power Monitors

System monitoring of the ST (QCA136), RT (QCA147), and PE expansion (QCA137) cabinets require the following:

- System monitor cables
- NT6D81AA Power Regulator card

General notes

- NT8D46BF and NT8D46BH cables are required only when system monitor connections must be extended to the main distribution frame (MDF).
- An NT6D81 Power Regulator card is required when a QCA136 cabinet is retained as part of the upgraded system. One card is required per QCA136 and it resides in any network card slot.
- An NT8D22AC System Monitor must be used with any module upgrade where a QCA136, QCA137, or QCA147 cabinet is reused as part of the upgraded system.

Table 7 shows the required hardware for the cabinet combinations listed. For the upgraded system, determine how many QCA136, QCA137, or QCA147 cabinets will be used. Based on cabinet types, quantities and CPU location determine the system monitoring hardware required for the upgraded system.

Table 7
Hardware requirements (Part 1 of 3)

Cabinet type	CPU location	Hardware required (one of each)
QCA136 and Meridian 1 module(s)	QCA136	NT8D46AY System Monitor Cable NT8D46BF System Monitor Cable (Note 1) NT8D46BH System Monitor Cable (Note 1) QCAD309 Alarm Adapter Cable (Note 2) P0678258 Filter Connector (Note 2)
	Meridian 1 module	NT8D46AX System Monitor Cable NT8D46BA System Monitor Cable NT8D46BF System Monitor Cable (Note 1) NT8D46BH System Monitor Cable (Note 1) NT6D81AA Power Regulator (Note 3) NT8D22AC System Monitor (Note 4)
QCA137 and Meridian 1 module(s)	Meridian 1 module	NT8D46AX System Monitor Cable NT8D46BF System Monitor Cable (Note 1) NT8D46BH System Monitor Cable (Note 1) QCAD310 Ground Cable (Note 5)
QCA136, QCA137, and Meridian 1 module(s)	QCA136	NT8D46BC System Monitor Cable NT8D46BE System Monitor Cable NT8D46BM System Monitor Cable NT8D46BF System Monitor Cable (Note 1) NT8D46BH System Monitor Cable (Note 1) QCAD310 Ground Cable (Note 5)
	Meridian 1 module	NT8D46BB System Monitor Cable NT8D46BC System Monitor Cable NT8D46BD System Monitor Cable NT8D46BE System Monitor Cable NT8D46BF System Monitor Cable (Note 1) NT8D46BH System Monitor Cable (Note 1) QCAD310 Ground Cable (Note 5) NT6D81AA Power Regulator (Note 3) NT8D22AC System Monitor (Note 4)

Table 7
Hardware requirements (Part 2 of 3)

Cabinet type	CPU location	Hardware required (one of each)
QCA147 and Meridian 1 module(s)	QCA147	NT8D46AY System Monitor Cable NT8D46BF System Monitor Cable (Note 1) NT8D46BH System Monitor Cable (Note 1)
	Meridian 1 module	NT8D46AX System Monitor Cable NT8D46BG System Monitor Cable NT8D46BF System Monitor Cable (Note 1) NT8D46BH System Monitor Cable (Note 1) NT8D22AC System Monitor (Note 4)
QCA147, QCA137, and Meridian 1 module(s)	QCA147	NT8D46CH System Monitor Cable NT8D46BF System Monitor Cable (Note 1) NT8D46BH System Monitor Cable (Note 1) QCAD310 Ground Cable (Note 5)
	Meridian 1 module	NT8D46BC System Monitor Cable NT8D46BD System Monitor Cable NT8D46BE System Monitor Cable NT8D46BJ System Monitor Cable NT8D46BF System Monitor Cable (Note 1) NT8D46BH System Monitor Cable (Note 1) QCAD310 Ground Cable (Note 5) NT8D22AC System Monitor (Note 4)
Two QCA137s and Meridian 1 module(s)	Meridian 1 module	NT8D46BC System Monitor Cable NT8D46BE System Monitor Cable NT8D46BK System Monitor Cable NT8D46BF System Monitor Cable (Note 1) NT8D46BH System Monitor Cable (Note 1) QCAD310 Ground Cable (Note 5)

Table 7
Hardware requirements (Part 3 of 3)

Cabinet type	CPU location	Hardware required (one of each)
QCA147, two QCA137s, and Meridian 1 module(s)	QCA147	NT8D46BC System Monitor Cable NT8D46BE System Monitor Cable NT8D46BL System Monitor Cable NT8D46BF System Monitor Cable (Note 1) NT8D46BH System Monitor Cable (Note 1) QCAD310 Ground Cable (Note 5)
	Meridian 1 module	NT8D46BJ System Monitor Cable NT8D46BC System Monitor Cable NT8D46BD System Monitor Cable NT8D46BE System Monitor Cable NT8D46BF System Monitor Cable (Note 1) NT8D46BH System Monitor Cable (Note 1) QCAD310 Ground Cable (Note 5) NT8D22AC System Monitor (Note 4)
<p>Note 1: The NT8D46BF and NT8D46BH cables are required only when extending the alarm connections to the main distribution frame (MDF).</p> <p>Note 2: ST systems consisting of a single QCA136 cabinet require the installation of a QCAD309 Alarm Adapter cable and one P0678258 Filter Connector.</p> <p>Note 3: The NT6D81AA Power Regulator Card is required when a QCA136 cabinet is retained as part of the upgraded system. Each cabinet requires one card, which resides in any network or SDI card slot.</p> <p>Note 4: The NT8D22AC System Monitor is required when a QCA136, QCA137, or QCA147 cabinet is retained as part of the upgraded system.</p> <p>Note 5: The QCAD310 Ground Cable must be installed in ST or RT systems using one or more QCA137 cabinets.</p>		

Power and ground engineering

This section is divided into two parts. The first part describes the changes or additions in power equipment of the existing system that may be required as part of the system upgrade. The second part describes ground modifications that may be required when upgrading an existing system using Meridian 1 modules.

Related documentation

Additional information can be found in the following documents:

- *Meridian 1 installation planning* (553-3001-120)
- *Meridian 1 power engineering* (553-3001-152)
- *Meridian 1 equipment identification* (553-3001-154)
- *Product compatibility* (553-3001-156)

Power engineering

Depending on the type of upgrade method and the power input selected, power equipment used by an existing system may need to be changed or expanded. The following methods are available for X11 release 19 or later upgrades:

- Card level upgrade
- Card cage level upgrade
- Shelf level upgrade
- Module level upgrade

Card level upgrades do not require power equipment changes. In most cases, card level upgrades involve replacement of existing common equipment cards and disk drive units that require the same or less power consumption as the displaced equipment.

Card cage level upgrades for option 21/21E to option 51 or 51C require replacement of the power supply located in the card cage. When upgrading from options 51 to 51C, 61 to 61C, and 71 to option 81C, however, you do not have to replace power supplies located in CPU card cages. Typically, one new power supply is provided in the upgrade package to accomplish this requirement. No other power equipment changes are required for this type of upgrade.

Shelf level upgrades are generally not supported for X11 release 19 or later upgrades. The only supported shelf upgrade is the NT7D44 Power Monitor/Auxiliary Common Equipment Shelf. This shelf requires one power converter card in the shelf and reuses the existing power supplied by the cabinet in which the shelf is contained. Refer to *Power monitor/common equipment auxiliary shelves description and installation* (553-3001-570) for power engineering requirements when using this shelf as part of a card level upgrade.

Module level upgrades can require major changes in the existing power equipment. For this reason, the remaining portion of this part is devoted to describing engineering requirements for determining what changes or additions of power equipment are needed to support the module level upgrade.

The following options are available for powering upgraded systems when using the module level upgrade method:

- Using separately powered systems
- Powering upgraded systems from existing rectifiers
- Expanding existing power systems
- Adding new power systems

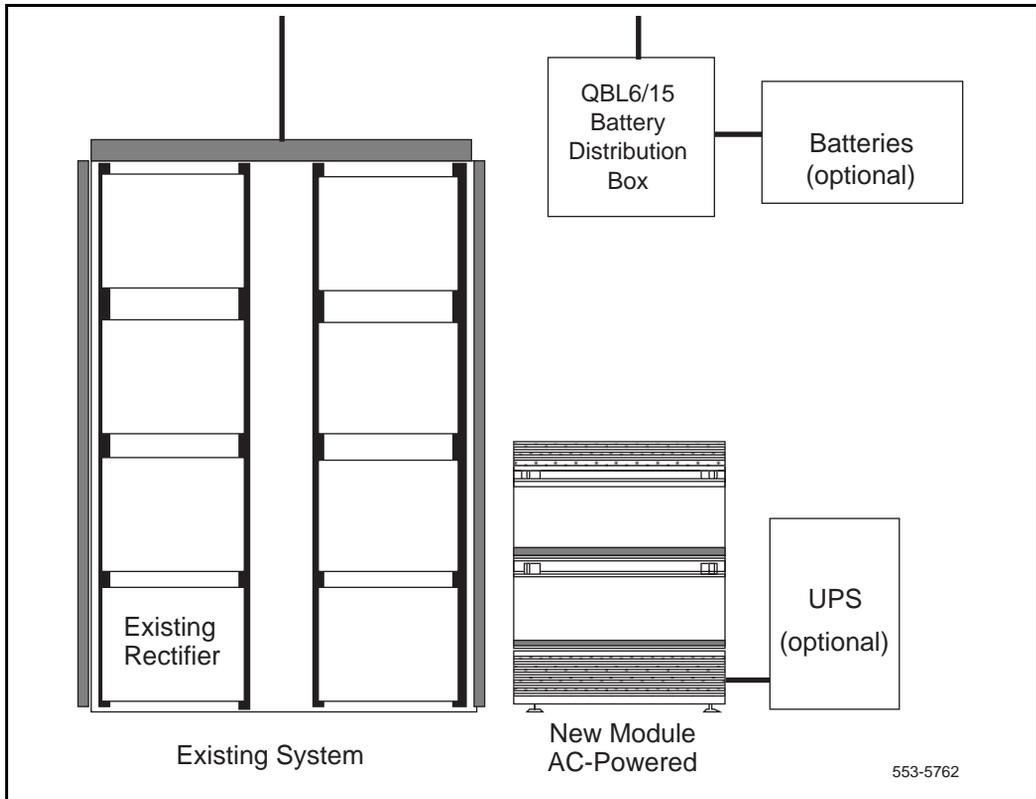
Using separately powered systems

Upgrades using the module level upgrade method can be configured for separate power operation. In this arrangement, existing system equipment continues to be powered by existing power equipment while new modules are powered by some other type of power system. Other power systems depend on the type of power input selected for new modules. These variations are:

- If new module equipment is AC powered, an uninterruptible power system (UPS) can serve as the AC power input and battery backup but will be limited to new module equipment. Existing system equipment will reuse the existing power system and batteries exclusively.
- If new module equipment is DC powered, a new DC power system must be provided. The new power system can be rectifiers provided by the customer or the addition of a DC power system provided by Northern Telecom. In either case, batteries are optional.

Figure 67 shows separately powered systems where the cabinet is DC powered and new modules are AC powered. A UPS is optional if battery backup is required for the AC-powered column.

Figure 67
Separately powered systems (AC and DC)



Adding AC-powered modules

In this configuration, new module equipment is AC powered. If battery backup is required, a UPS must be added as part of the upgrade equipment requirements.

Engineering requirements for AC-powered modules and UPS units can be found in *Meridian 1 power engineering* (553-3001-152).

Adding DC-powered modules

In this configuration, new modules are DC powered. When this type of power input is selected, a new DC power system or expansion of the existing power system is required.

Refer to “Expanding existing power systems” on page 314 or “Adding new power systems” on page 323 for engineering recommendations when DC-powered modules are selected.

Powering upgraded systems using existing rectifiers

Existing rectifiers can be reused to supply power to new modules as well as existing cabinets. Existing rectifiers can be located in the system cabinet or in the QCA13 Power Cabinet. Refer to Figures 68 and 69 for these two options.

Figure 68
Module powering from rectifier in existing system cabinet

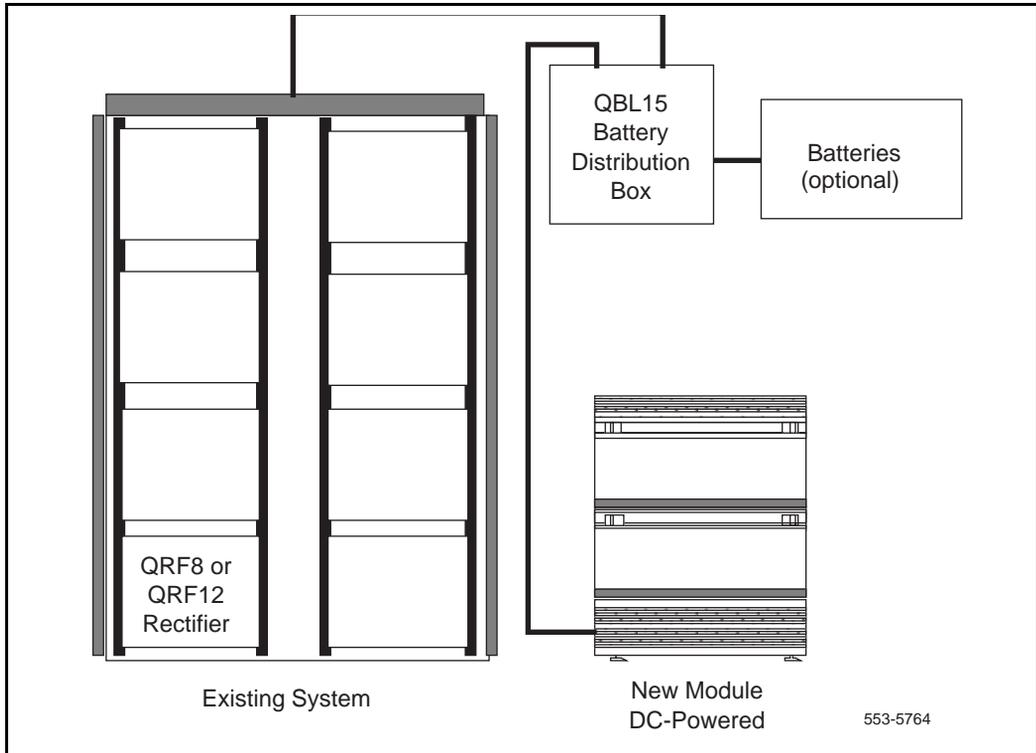
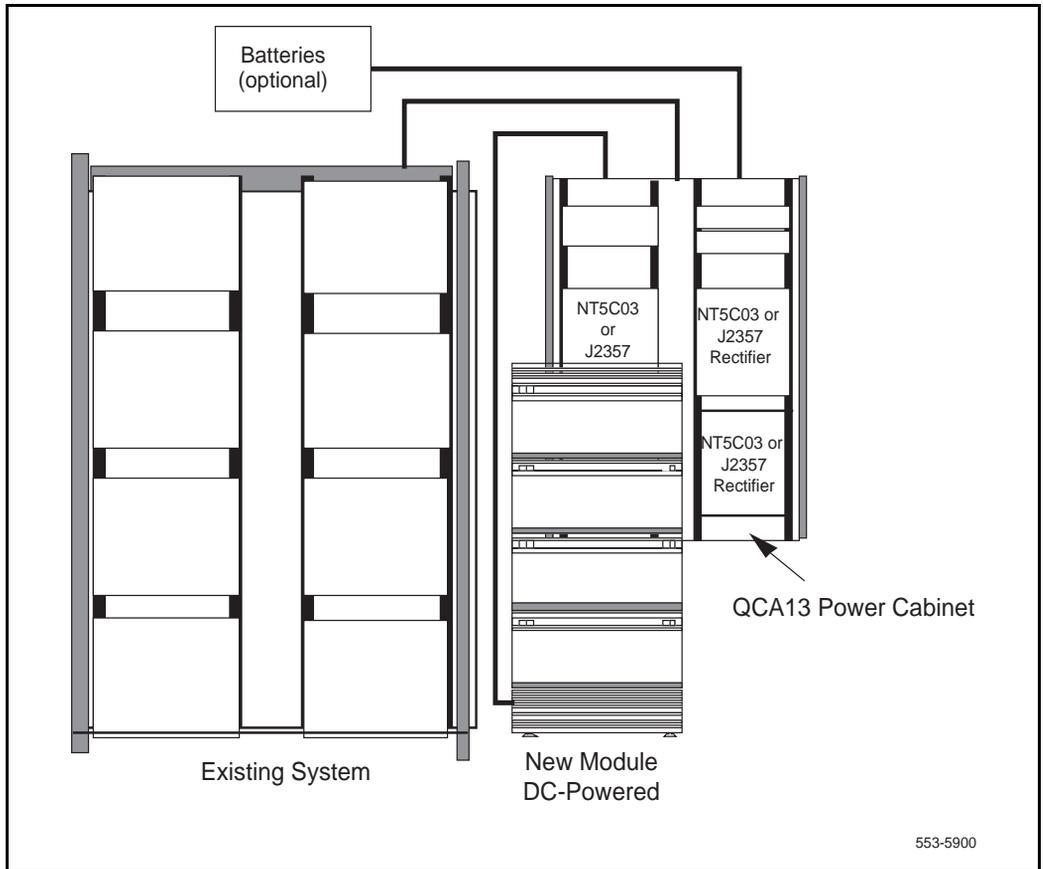


Figure 69
Module powering from QCA13 Power Cabinet



Calculating existing rectifier capacity

New DC-powered module equipment can be powered from existing rectifiers provided sufficient power is available from these rectifiers and rectifiers are compatible with new modules. The DC power consumption of the existing system and new module equipment must be carefully calculated in order to determine the total DC power required after the system is upgraded.

To determine the total power consumption of the upgraded system:

- 1 Refer to *Meridian 1 power engineering* (553-3001-152) for procedures and worksheets that explain how to calculate power consumption for equipment that will be maintained as part of the upgrade as well as new module equipment.
- 2 Use a clamp-type DC ammeter to measure the actual power consumption from each existing rectifier. This measurement should be taken at peak traffic load periods in order to read the maximum DC power consumption of the existing system. After this measurement is known, add it to power consumption requirements for new module equipment to determine the total system power consumption requirements.

Note: A minimum of 10 percent battery charging capacity is recommended to be added to the total system power consumption if batteries are not used.

After the total power consumption is known, subtract this number from the total amperage currently available from existing rectifiers to determine if existing rectifiers have sufficient power for existing cabinets as well as new module equipment. If new rectifiers are needed to support existing and new module equipment, refer to “Expanding existing power systems” on page 314.

Reusing existing rectifiers

If sufficient power is available with existing rectifiers and these rectifiers are compatible with new modules, they can be reused to power the upgraded system. This requires a power distribution panel such as a QBL15 Battery Distribution Box to facilitate power connections between existing cabinets and new module equipment.

Existing rectifier compatibility

Refer to Table 8 to determine if existing rectifiers supplied by Northern Telecom can power both existing cabinets and new modules.

Table 8
Rectifier compatibility for existing cabinets and new module equipment

Rectifier code	Description	Compatible with power modules	Note
QSD4	25 Amp Rectifier	No	Add new power system
QRF8	40 Amp Rectifier	Yes	Must use QBL15 Battery Distribution Box
QRF9	15 Amp Rectifier	No	Add new power system
QRF12	30 Amp Rectifier	Yes	Must use QBL15 Battery Distribution Box
NT6D52	30 Amp Rectifier	Yes	Must use QBL15 Battery Distribution Box. Replaced by NT0R72.
NT0R71	25 Amp Rectifier	Yes	Must use QBL15 Battery Distribution Box
NT0R72	25 Amp Rectifier	Yes	Must use QBL15 Battery Distribution Box
NT5C02	50 Amp Rectifier	Yes	Power distribution directly from QCA13 Power System
NT5C06	25 Amp Rectifier	Yes	Power distribution directly from MFA150 Power System
NT5C07	50 Amp Rectifier	Yes	Power distribution directly from MPP600 Modular Power Plant
J1357	50 Amp Rectifier	Yes	Power distribution directly from QCA13 Power System
J2427	15 Amp Rectifier	No	Add new power system
A0354954	100 Amp Rectifier	Yes	Power distribution directly from NT6D82 Power System

Using new rectifiers

Refer to “Expanding existing power systems” on page 314 when power calculations indicate that new rectifiers are required. Refer to “Adding new power systems” on page 323 when existing rectifiers are not compatible.

Ordering information

The following can be ordered from Northern Telecom:

- QBL15 Battery Distribution Box (batteries are optional)
- QCAD321 Junction Box Assembly (for upgrades to ST or RT only)

Expanding existing power systems

If the total system power consumption of the upgraded system exceeds the available amperage of existing rectifiers, the existing power system can be expanded. This assumes that existing rectifiers can load share power with new rectifiers that are added to support the total system power consumption. See Table 9 for rectifier compatibility when different types of rectifiers are used.

If AC-powered modules have been selected, this arrangement is considered a separately powered system. Refer to “Using separately powered systems” on page 307 for requirements when AC-powered modules are used.

Table 9
Rectifier compatibility when battery backup is required

Rectifier type	QSD4	QRF8D	QRF9	QRF12	NT6D52	NT0R71	NT0R72	NT5C03	NT5C07	J2357	J2427A-1
QSD4	Yes										
QRF8D		Yes		Yes	Yes	Yes	Yes				
QRF9			Yes								
QRF12		Yes		Yes	Yes	Yes	Yes				
NT6D52		Yes		Yes	Yes	Yes	Yes				
NT0R71		Yes		Yes	Yes	Yes	Yes				
NT0R72		Yes		Yes	Yes	Yes	Yes				
NT5C03								Yes		Yes (Note)	
NT5C07									Yes		
J2357								Yes (Note)		Yes	
J2427											Yes

Note: Load sharing is possible among rectifiers in the QCA13 cabinet if the control board is upgraded to a List 3 control board.

Incompatible rectifiers

If incompatible rectifiers exist based on the type of new rectifiers to be added to the upgraded system, a new power system is required. Refer to “Adding new power systems” on page 323 for engineering requirements.

Ordering information

The following rectifiers can be ordered from Northern Telecom for the following systems:

- NT7D12 Power System
- AS1088D Rectifier Rack Assembly with QBL15 Battery Distribution Box—75 Amp capacity
- AS1087D Rectifier Assembly with NT0R72 Rectifier (maximum of three NT0R72 Rectifiers per NT7D12 Power System)

Additional NT7D12 Power Systems cannot be added to a maximum of two existing NT7D12 Power Systems. When using two NT7D12s, you must also use two QBL15 Battery Distribution Boxes and two sets of backup batteries. If an NT7D12 Power System has reached its maximum capacity and more power capacity is required for the upgraded system, the NT7D12 must be replaced by a larger power system. Refer to “Adding new power systems” on page 323 for engineering requirements.

- MFA150 Power System
- AS1200D MFA150 Modular Power Assembly—75 Amp capacity (maximum of one per upgraded system), or
- AS1201D MFA150 Modular Power Assembly—150 Amp capacity (maximum of one per upgraded system)

Additional MFA150 Power Systems cannot be added to existing MFA150 Power Systems. If an MFA150 Power System has reached its maximum capacity and more power capacity is required for the upgraded system, the MFA150 must be replaced by a larger power system. Refer to “Adding new power systems” on page 323 for engineering requirements.

- QCA13 Power System
- NT5C03 Rectifier (maximum of four per QCA13 Power System)
- B0225153 Supplemental QCA13 Power System (maximum of two per QCA13 Power System)

Supplemental QCA13 Power Systems can be added to the existing QCA13 Power Cabinet to hold more rectifiers.

- NT6D82 Power System
- A0354954 Rectifier (maximum of nine per NT6D82 Power System)
- AS1102D or AS1103D Supplement Power Bay Assembly (maximum of two per NT6D82 Power System)
- MPP600 Modular Power System
- AS1202D Modular Power Package-Main Cabinet
- AS1203D Modular Power Package-Supplemental Cabinet
- NT5C07 Switching Mode Rectifier (maximum of 12 per MPP600 Modular Power System)

Figure 70 shows additional rectifiers added to the NT7D12 Power System to provide more power capacity to the upgraded system. A maximum of two NT7D12 Power Systems can be used. When using two of these power systems, you must also use two QBL15 Battery Distribution Boxes and two sets of backup batteries. This figure shows an existing cabinet. This may not exist in some upgrade configurations such as option 21 to option 51.

Figure 70
Expansion of existing NT7D12 Power System using additional rectifiers

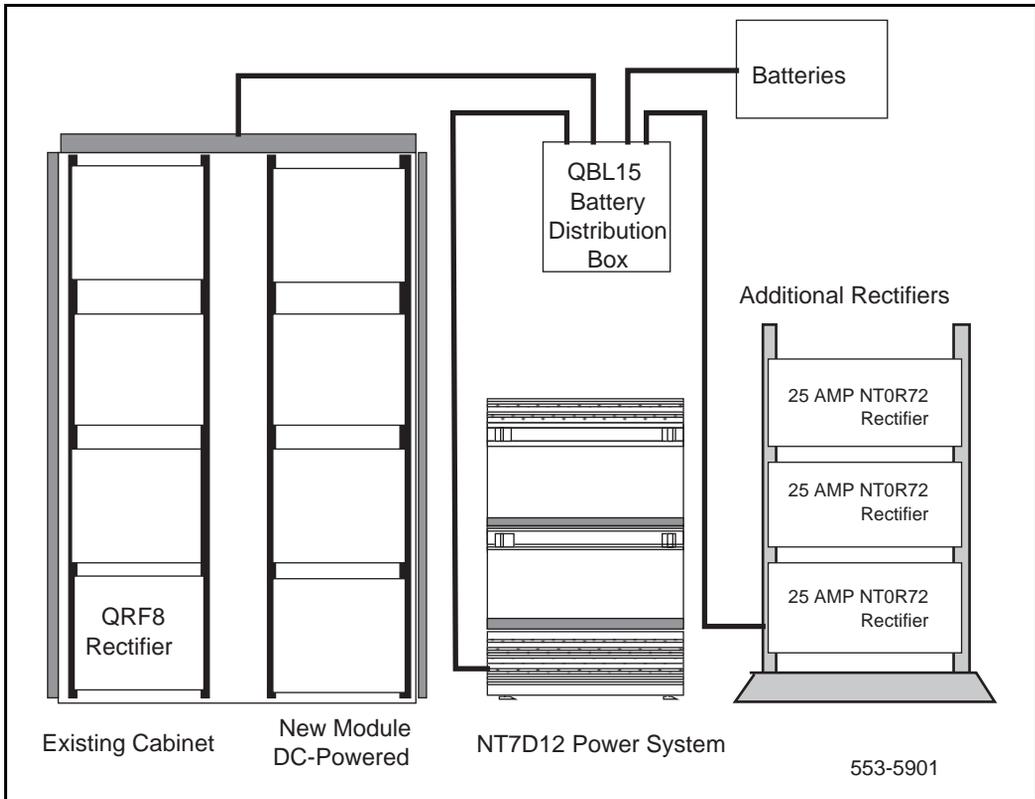


Figure 71 shows additional rectifiers added to the MFA150 Power System to provide more power capacity to the upgraded system. This figure shows an existing cabinet. This may not exist in some upgrade configurations such as option 21 to option 51.

Figure 71
Expansion of existing MFA150 Power System using additional rectifiers

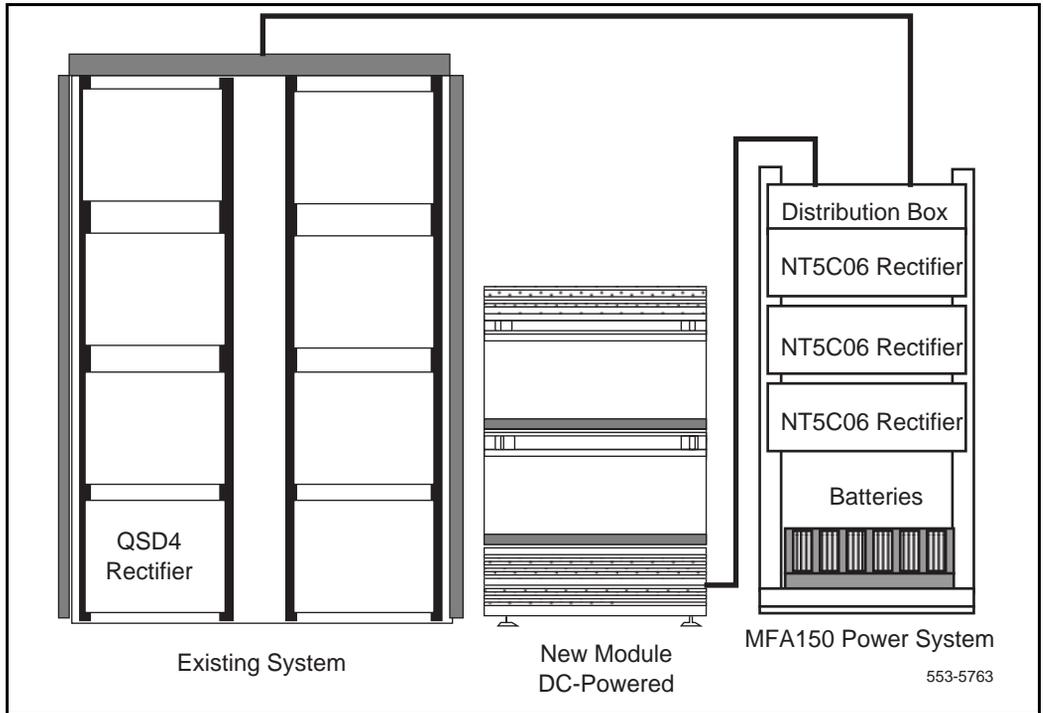


Figure 72 shows additional rectifiers added to the QCA13 Power System to provide more power capacity to the upgraded system. This figure shows an existing cabinet. This may not exist in some upgrade configurations such as option 61 to option 81 or 81C.

Figure 72
Expansion of existing QCA13 Power System using additional rectifiers

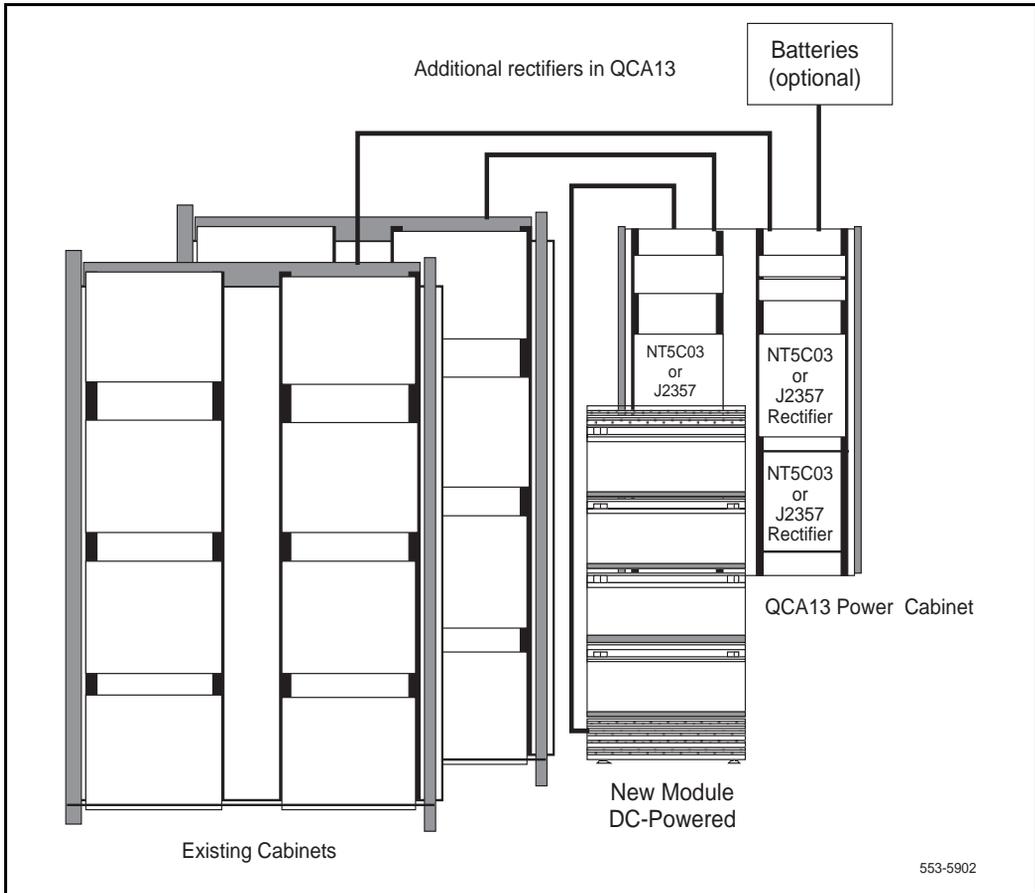


Figure 73 shows additional rectifiers added to the NT6D82 Power System to provide more power capacity to the upgraded system. This figure shows an existing cabinet. This may not exist in some upgrade configurations such as option 61 to option 81C.

Figure 73
Expansion of existing NT6D82 Power System using additional rectifiers

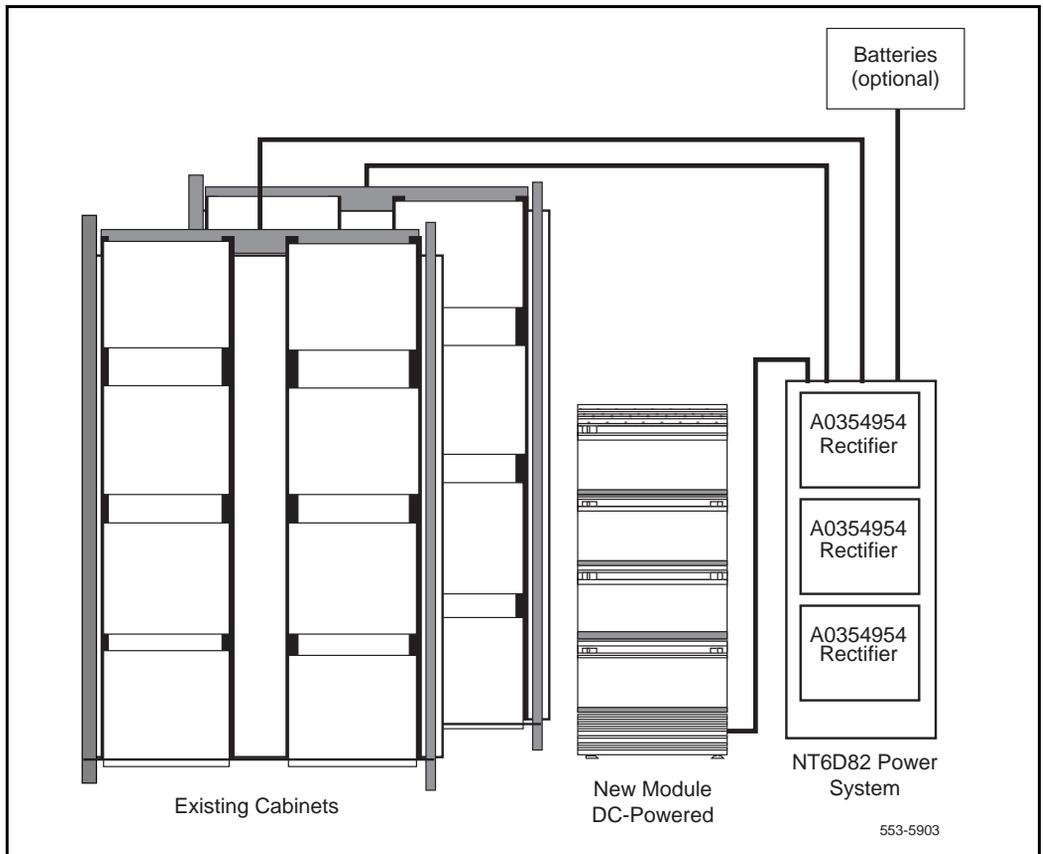
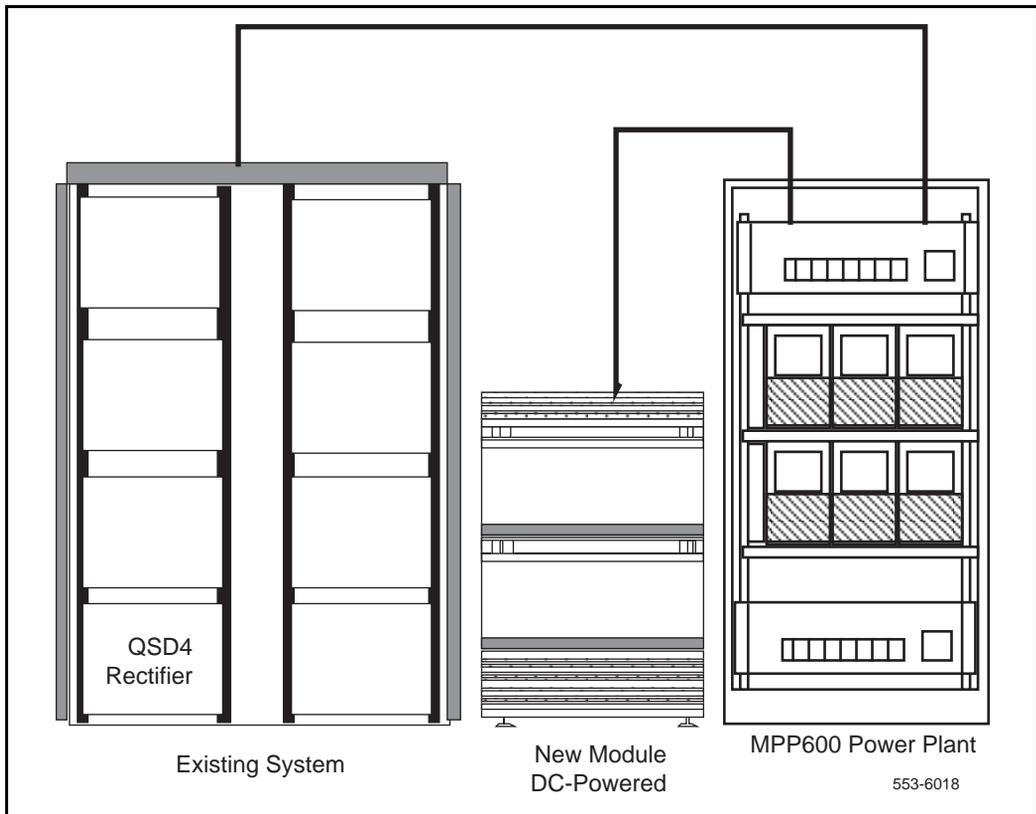


Figure 74 shows additional rectifiers added to the MPP600 Modular Power Plant to provide more power capacity to the upgraded system. This figure shows an existing cabinet. This may not exist in some upgrade configurations such as options 51C, 61, or 61C to option 81C.

Figure 74
Expansion of existing MPP600 Power Plant using additional rectifiers



Adding new power systems

If none of the three other methods can be used to upgrade the power, the old power system has to be replaced by a new one. If AC-powered modules have been selected, this arrangement is considered a separately powered system. Refer to “Using separately powered systems” on page 307 for requirements when AC-powered modules are used.

Figure 75 shows the MFA150 Power System added to power both existing cabinets and new modules.

Figure 75
New power system for capacity of up to 150 amps

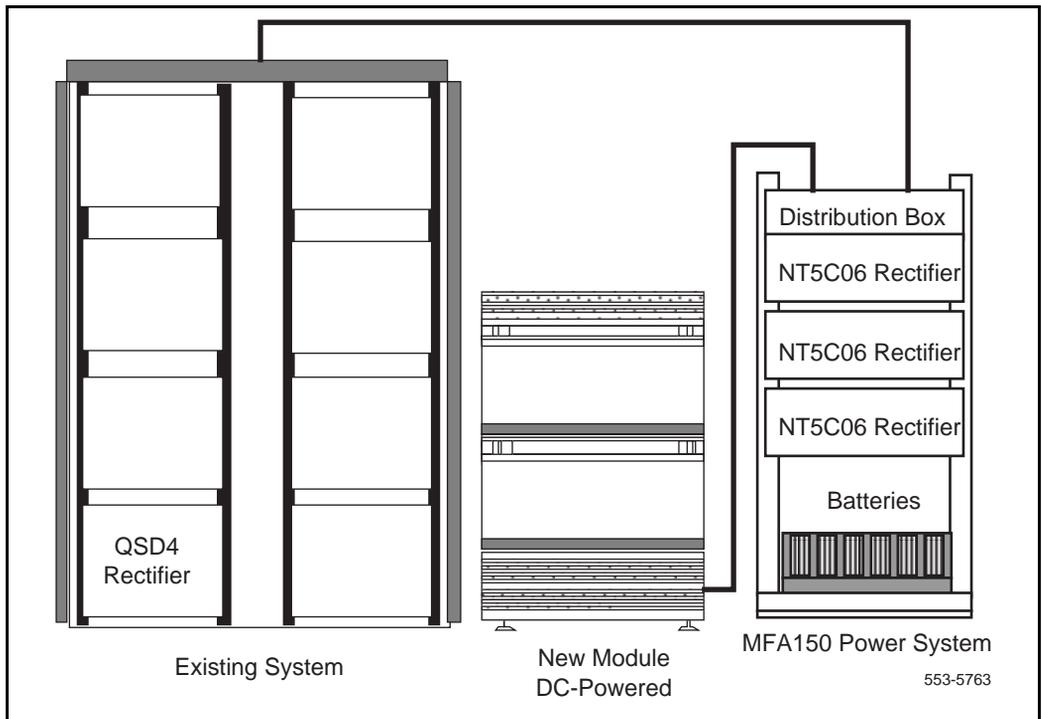


Figure 76 shows the NT6D82 Power System added to power both existing cabinets and new modules.

Figure 76
New power system for capacity of up to 900 amps

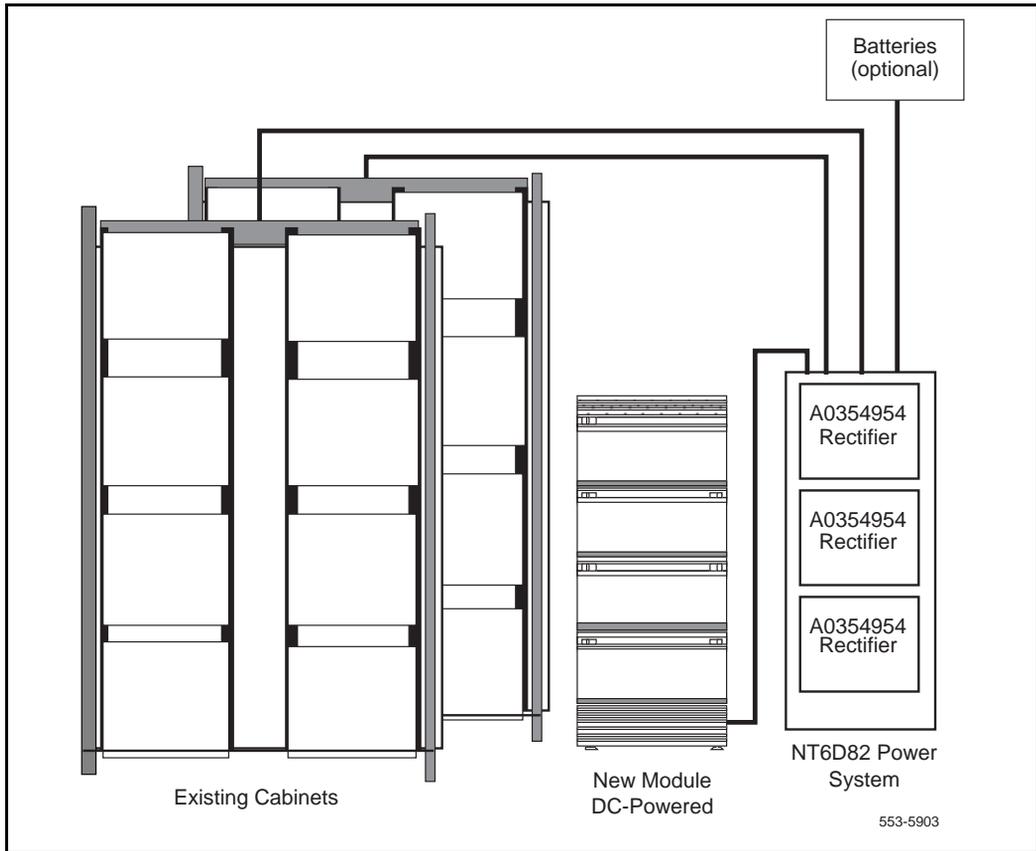
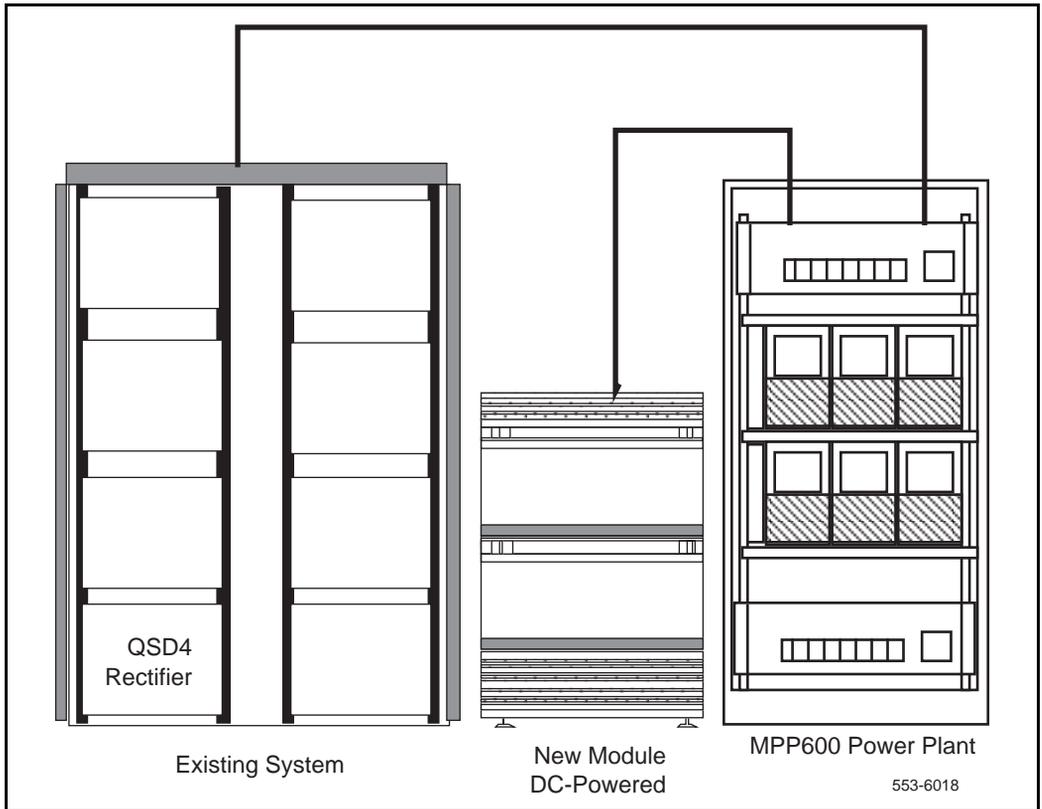


Figure 77 shows the MPP600 Modular Power System added to power both existing cabinets and new modules.

Figure 77
New power system for capacity of up to 600 amps



Ordering information

The following power systems can be ordered from Northern Telecom:

- NT7D12 Power System
- AS1088D Rectifier Rack Assembly with QBL15 Battery Distribution Box—75 amp capacity (maximum of two per upgraded system)
- AS1087D Rectifier Assembly with NT0R72 Rectifier (maximum of three NT0R72 Rectifiers per NT7D12 Power System)
- MFA150 Power System
- AS1200D MFA150 Modular Power Assembly—75 amp capacity (maximum of one per upgraded system), or
- AS1201 D MFA150 Modular Power Assembly—150 amp capacity (maximum of one per upgraded system)
- NT5C06 Rectifier (maximum of six per MFA150 Power System)
- A0354954 Rectifier (maximum of three per NT6D82 Power System)
- NT5C07AB Switching Mode Rectifier (maximum of 12 per MPP600 Modular Power System)

Ground engineering

Proper grounding is critical to SL-1 and Meridian 1 system performance. The ground not only provides an electrical zero-potential reference but also a low resistance path for electrical interference (conducted and radiated) to be carried away from the system. Proper grounding also maintains the system within EMI/RFI requirements mandated by the FCC.

For a description of Meridian 1 ground requirements including single-point grounding, see *Meridian 1 installation planning* (553-3001-120).

The following areas of grounding will be discussed:

- Existing cabinet ground
- System ground

This part discusses grounding as it applies to upgraded systems. Whether a card, card cage, or module upgrade, the existing system's ground must be examined and/or rewired to isolate the frame and logic grounds as well as meet electrical and safety codes.

Existing cabinet ground

Prior to the introduction of Meridian 1, there were three generations of cabinets introduced with different logic and frame ground schemes. It is necessary to isolate the frame and logic grounds in each cabinet of an existing system as part of the upgrade. Without this isolation, ground loops will cause hum, noise, and possibly erratic performance in the upgraded system.

To provide the required isolation, three ground packages are available for cabinet models in the field. Each of these can be installed with no interruption of service.

Table 10 lists the correct ground packages for specific cabinet models and vintages.

Table 10
Ground packages

Cabinet model	Cabinet vintage	Order code	Package number
QCA7	E1 and later	P0677580	1
QCA8	F1 and later	P0677580	1
QCA11	D1 and later	P0677580	1
QCA14	B1 and later	P0677580	1
QCA23	B1 and later	P0677580	1
QCA24	C1 and later	P0677580	1
QCA25	C1 and later	P0677580	1
QCA37	B1	P0677580	1
QCA55	A to D1	P0677588	3
QCA55	E1 and later	P0677587	2
QCA58	A to D1	P0677588	3
QCA58	E1 and later	P0677587	2
QCA74	A to D1	P0677588	3
QCA74	E1 and later	P0677587	2
QCA96	E1 and later	P0677587	2
QCA97	A and later	P0677587	2
QCA98	A and later	P0677587	2
QCA108	A to D1	P0677588	3
QCA108	E1 and later	P0677587	2
QCA109	A to B1	P0677588	3
QCA109	E1 and later	P0677587	2

Ordering information

The following ground packages can be ordered from Northern Telecom:

- P0677580 Cabinet Ground Package #1
- P0677587 Cabinet Ground Package #2
- P0677588 Cabinet Ground Package #3

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Meridian 1

Upgrade engineering

Upgrading to Meridian 1 system
options

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