

NTP 297-3601-150

DMS-10 Family

600-Series Generics

Equipment Identification

08.01

For Generic 602.20 Standard August 2006

NORTEL

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Section 1: Introduction

DMS-10 Hardware Components

The 500-Series DMS-10 switch is composed of three basic types of hardware: bays, shelves, and circuit packs. This hardware is differently assembled into various types of equipment. These different equipment types are then arranged to produce different DMS-10 system configurations. All of these types of equipment can be installed or replaced by the customer when an office grows or when the purchasing of a new software generic requires a hardware change.

Bays

The DMS-10 equipment bay is the physical structure that houses all the functional components of the switch. These components consist of shelves, equipment modules, and circuit packs. The equipment bay is constructed of welded steel, with mounting positions for a maximum of six equipment shelves and other major equipment modules. In addition, a cable duct at the top of the bay houses and channels all cabling, both within and between the various bays.

Sleek Doors

The optional Sleek Doors offers an attractive exterior for DMS-10 frames while maintaining full accessibility to packs. The doors are also provisioned with locks for added security. The doors can be opened from the center, or from the end, providing full access to packs. Row Alarm Lamps, at the end of each equipment row, indicate local failures. Frame Fail Lamps, on the Sleek Door panels, provide alarm condition notification for each specific bay .

Shelves

The DMS-10 equipment shelf is the structure that houses the individual circuit packs and, when certain circuit packs are grouped into a functional unit, various equipment modules. Each shelf has a printed circuit backplane that provides a connectorized signaling path to other circuit packs or that serves as a physical interface between each circuit pack and the signaling cables that are connected to other packs and shelves.

Circuit packs

The DMS-10 circuit packs are provisioned in slots on the DMS-10 shelves and can be one of three primary types: control equipment (CE) packs; peripheral equipment (PE) and Subscriber Carrier Equipment (SCE) packs; and Line Concentrating Equipment (LCE) line cards. A metal or plastic faceplate containing the circuit pack identification, controls, and light emitting diode (LED) indicators, where required, is riveted to the front of the PCB.

Organization of this NTP

This Nortel technical publication (NTP) is structured and written for operating company personnel as a general reference to the function and location of the major electronic components within the DMS-10 system.

This NTP contains seven sections, five of which are sections that describe the DMS-10 hardware. The hardware sections are organized according to size within the system hierarchy, from the largest components (bays) to the smallest components (circuit packs). The last descriptive section contains information about miscellaneous equipment, such as outside vendor-manufactured equipment that is provisioned with the DMS-10 system. The sections are:

- Section 1: Introduction
- Section 2: Cabinets
- Section 3: Bays
- Section 4: Shelves, Modules, and Panels
- Section 5: Circuit Packs
- Section 6: Miscellaneous Equipment
- Section 7: Index

Section 2: Cabinets

Introduction

Cabinets, used as transportable outdoor housing for remote bays, are described in this section. The descriptions are organized by Product Engineering Code (PEC) number. When appropriate, the descriptions contain information about a cabinet's function, features, dimensions, components, and quantity. The descriptions do not contain information about the shelves, packs, and other provisionable items that are located in the cabinets. For descriptions of these items, refer to the appropriate section in this manual.

J9Y01a-1 (Outside Plant Subscriber Module (OPSM))

Function:

To house a Remote Subscriber Line Module (RSLM) Type A or Type B shelf, a Frame Supervisory Panel (FSP), a power system, a battery monitoring system, and an environmental control system. The Outside Plant Subscriber Module (OPSM) is a self-contained, transportable, outdoor version of an RSLM bay housed in a cabinet that utilizes forced air ventilation. The OPSM is designed to be mounted on a concrete pedestal, which may be cast with a mounting template held in position to provide for correctly-aligned anchoring studs. (See Figures 2-1 and 2-2.)

2-2 Cabinets

Figure 2-1: OPSM (J9Y01A-1, L1) with RSLM type A shelf

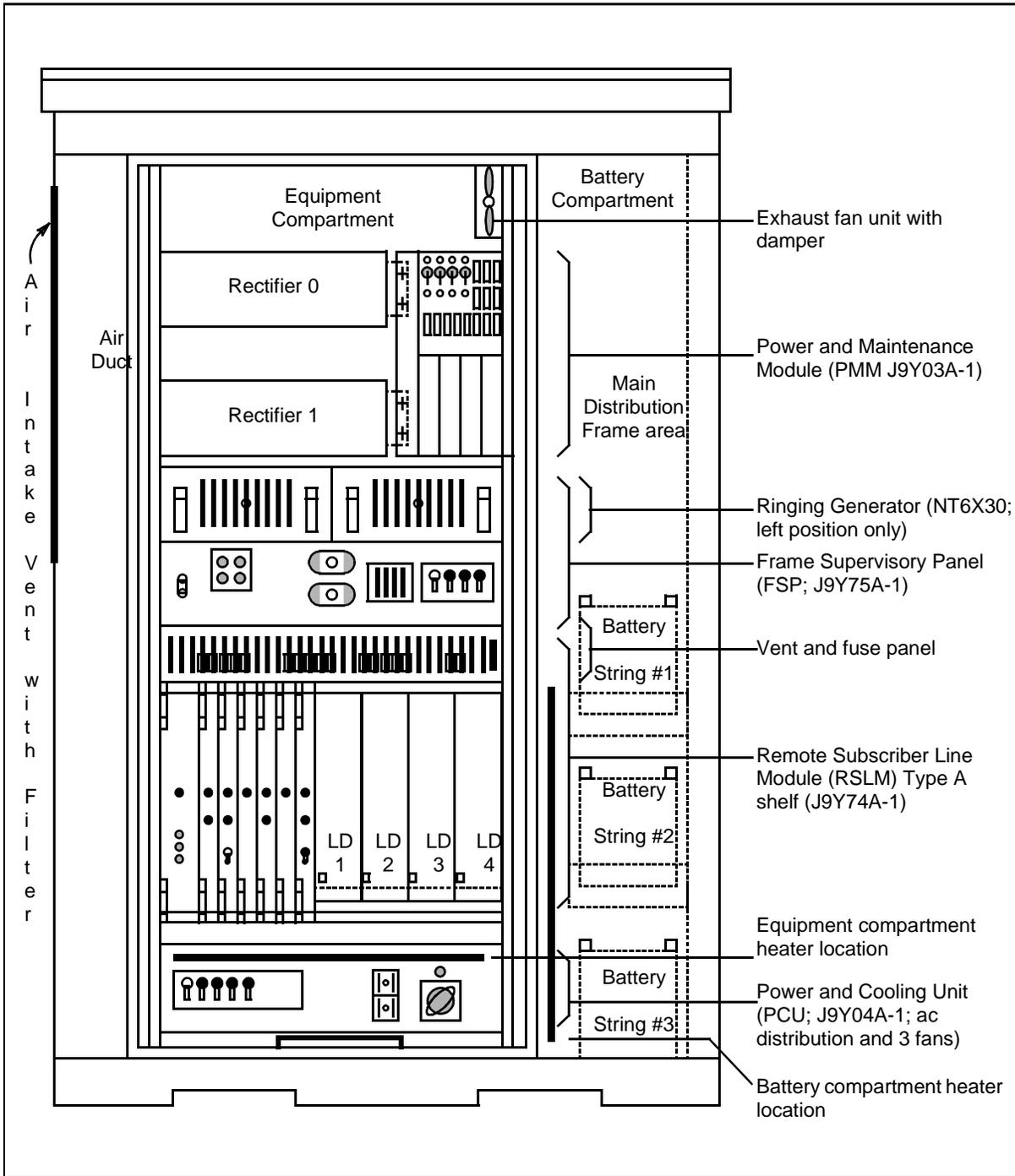
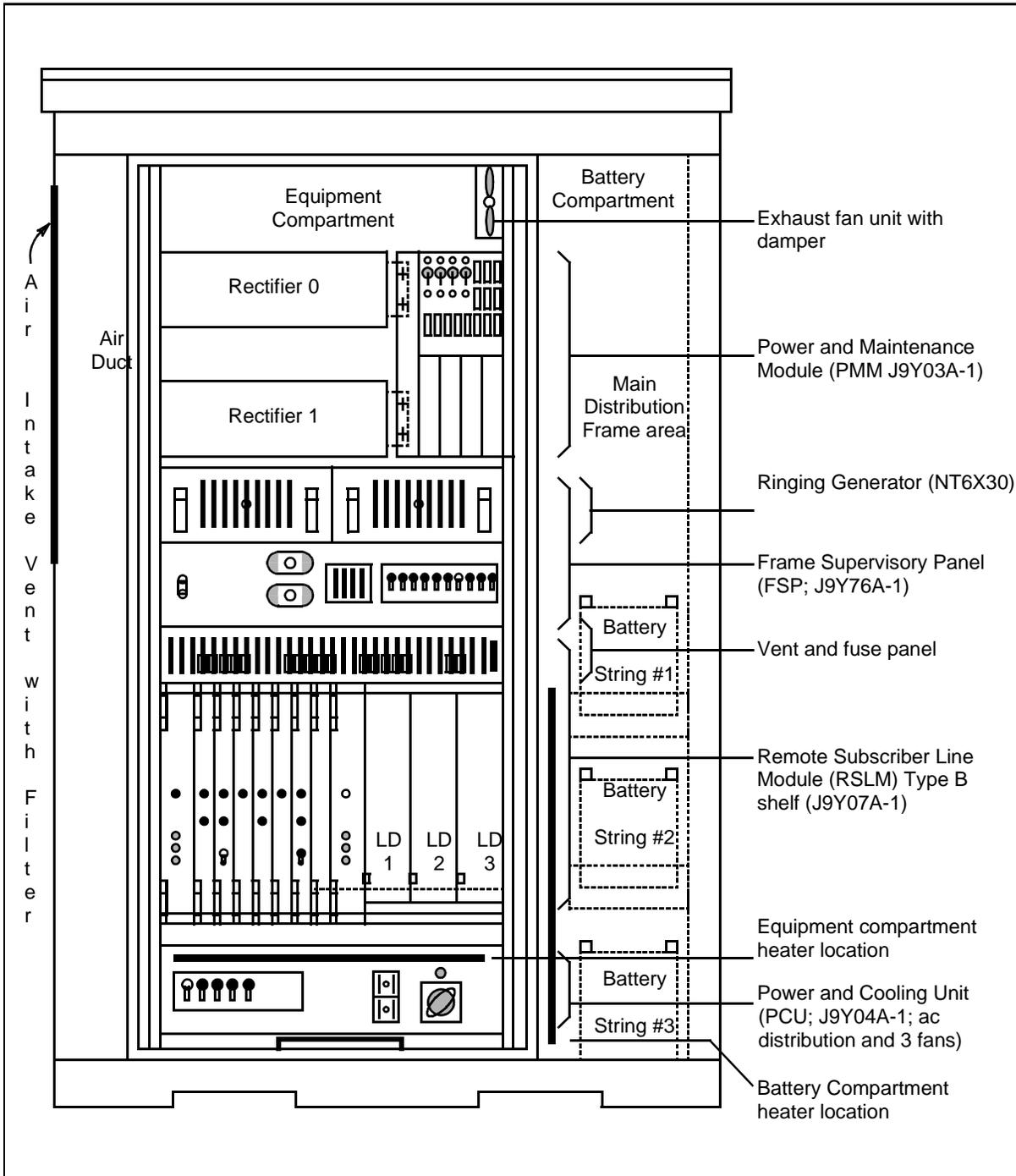


Figure 2-2: OPSM (J9Y01A-1, L2) with RSLM type B shelf



Features:

- polyurethane insulation
- dual channels in base for maneuvering with standard forklift
- separate compartments for equipment and batteries, each with its own temperature control
- separate padlocks on all three doors
- optional emergency ac generator socket with lockable watertight cover
- dual 48-V dc internal lighting fixtures (one in each compartment)

Components:

- filter unit
- Power and Cooling Unit (PCU) containing ac distribution with a 30-amp main breaker, three circulation fans (J9Y04A-1), and one 125-W heater
- RSLM Type A or Type B shelf
- Frame Supervisory Panel (FSP)
- Power and Maintenance Module (PMM)
- three racks of four batteries each (batteries are sufficient for eight hours backup)
- battery electrolyte overflow holders
- five temperature probes:
 - 1) T1: ambient air sensor, located on rear of equipment compartment ceiling
 - 2) T2: incoming air sensor, located inside PCU
 - 3) T3: battery compartment ambient air sensor, located on battery compartment ceiling
 - 4) T4: equipment heater sensor, located on PCU
 - 5) T5: battery heater sensor, located on battery heater
- two 150-W heaters, in series, in the battery compartment
- MDF frame, cables, three 100-pair Cook C-310 protector blocks, and two 128-pair Versa blocks
- input (ac) and distribution (ac and dc) wiring, PCM (T1) cables, and temperature control harness to all sensor and environmental control devices
- exhaust fan assembly, located in top right-hand rear corner of equipment compartment, with electrically-actuated damper, located on top right-hand side of battery compartment
- three environmental alarms (fan, over-temperature, and cabinet)

- two thermostats (TH1 and TH2), mounted on ceiling of equipment compartment, near rear door:
 - 1) TH1: Trips main dc circuit breaker
 - 2) TH2: Trips main ac circuit breaker
- intake and exhaust vents with filters

Quantity:

Either one OPSM or one RSLM bay is required for each RSLM software site.

NT8X01 (Outside Plant Module cabinet)**Function:**

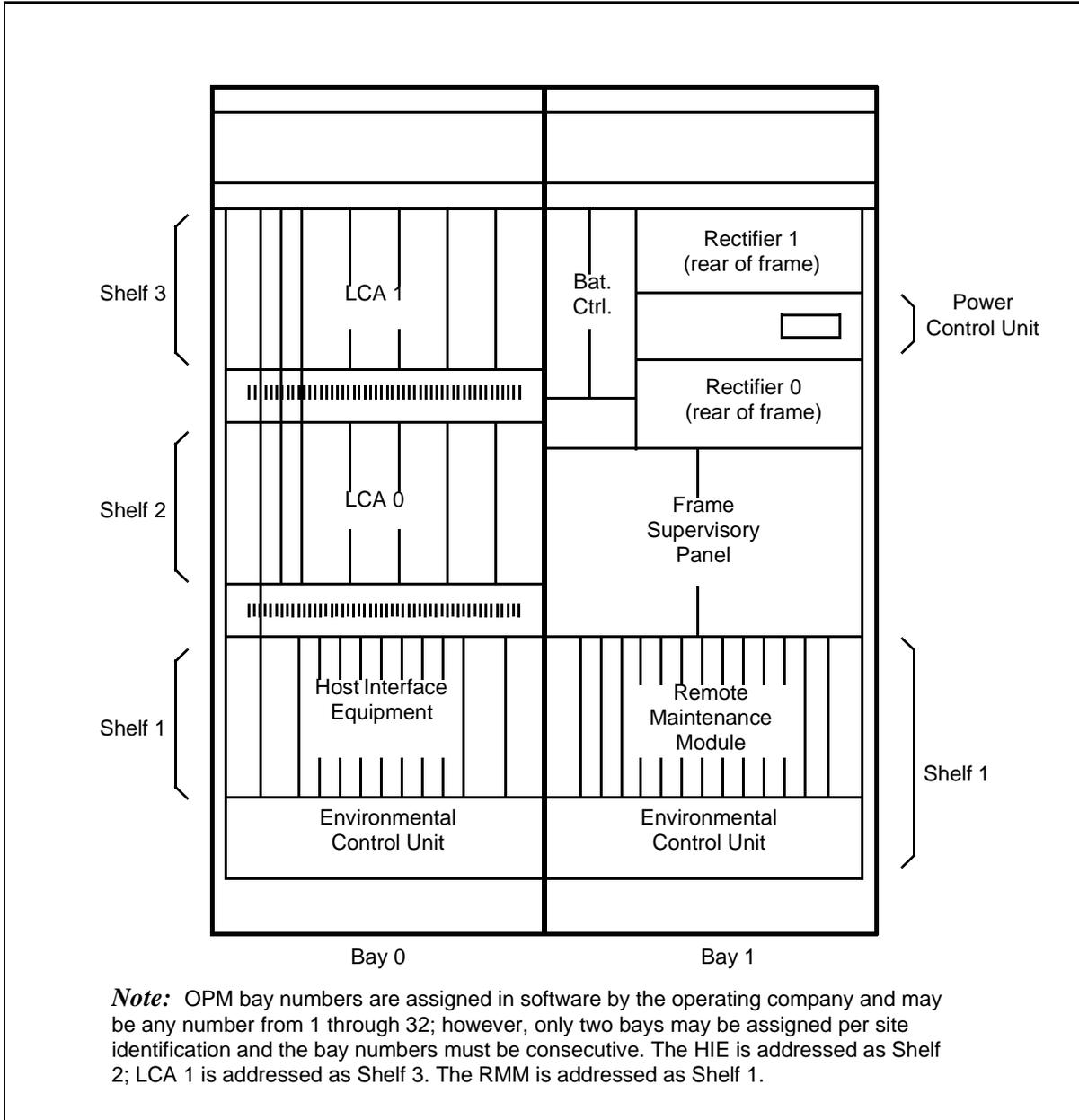
To house RLCM equipment in an external environment. (See Figure 2-3.) In addition to the RLCM equipment, the following equipment is also provided in an Outside Plant Module (OPM):

- Environmental Control Units (ECUs)
- Booster Fan Unit (BFU)
- rectifiers
- Power Control Unit (PCU) for ac power
- Battery Control Unit (BCU)

Features:

- constructed primarily of 13-gauge, cold-rolled steel
- galvanized base for corrosion resistance
- mounted on a concrete pad or railroad ties with cable entrances for buried power and OPM cables
- contains an end-access compartment that houses equipment for VF, special service, and DS-1 pair termination, protection, and rearrangement
- contains closed-cell neoprene gaskets to seal the cabinet against rain and snow
- contains air exhaust ports at the top of the cabinet

Figure 2-3: OPM (NT8X01)



- contains air intake port at the base of the cabinet. The air passes through an insect screen and a primary filter before entering the ECU.
- hinged, swinging frames for OPM shelves

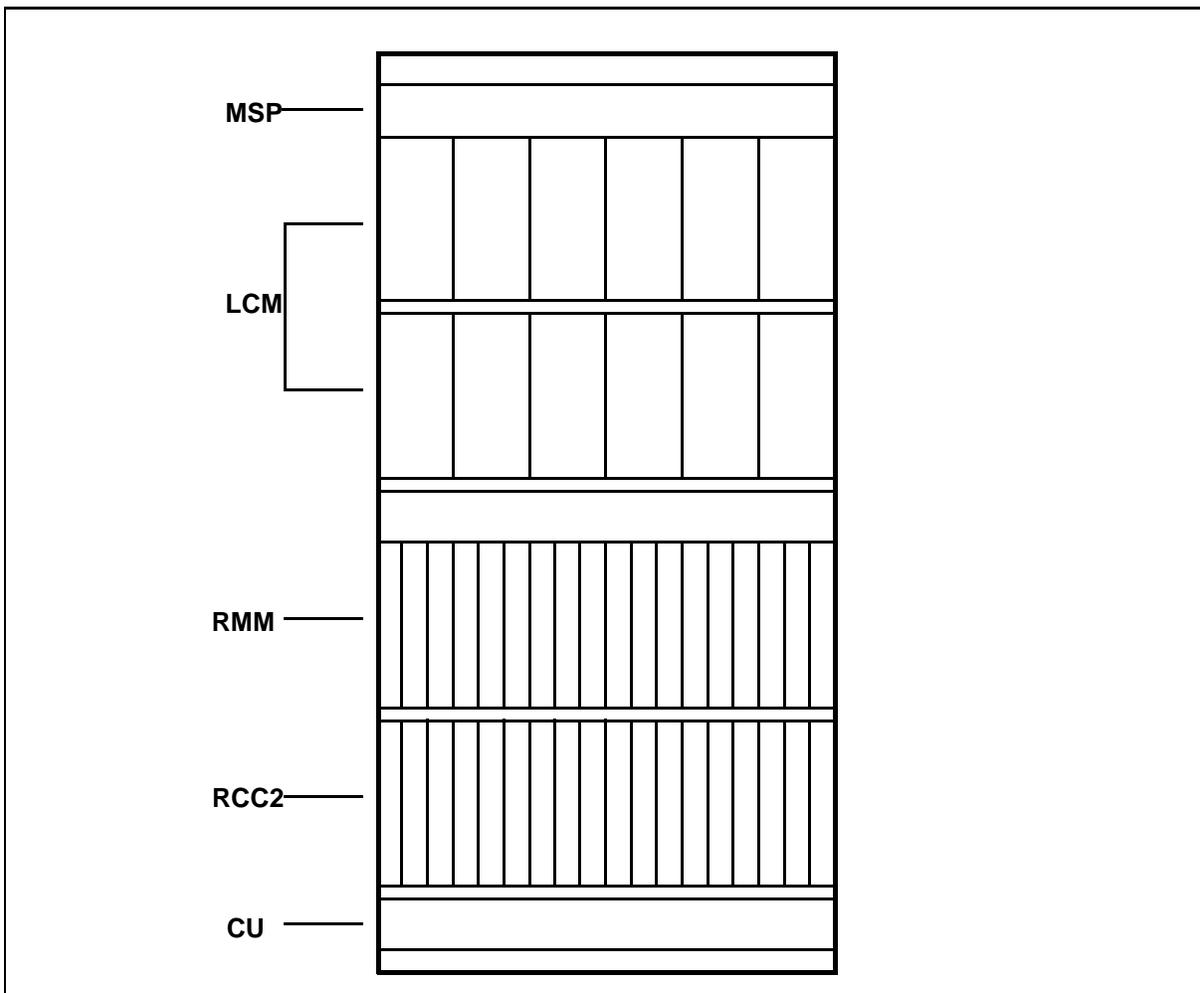
NTMX89 (Cabinetized Remote Switching Center)

Function:

To house single-cabinet Remote Switching Center (RSC-S) equipment, as illustrated in Figure 2-4. The following shelves are housed in the CRSC:

- Modular Supervisory Panel (MSP) for power, control, ringing generators, and alarm circuits
- Line Concentrating Module (LCM)
- Remote Maintenance Module (RMM)
- Enhanced Remote Cluster Controller 2 (RCC2)
- Cooling Unit (CU)

Figure 2-4: CRSC (NTMX89)



The CRSC provides facilities for the following:

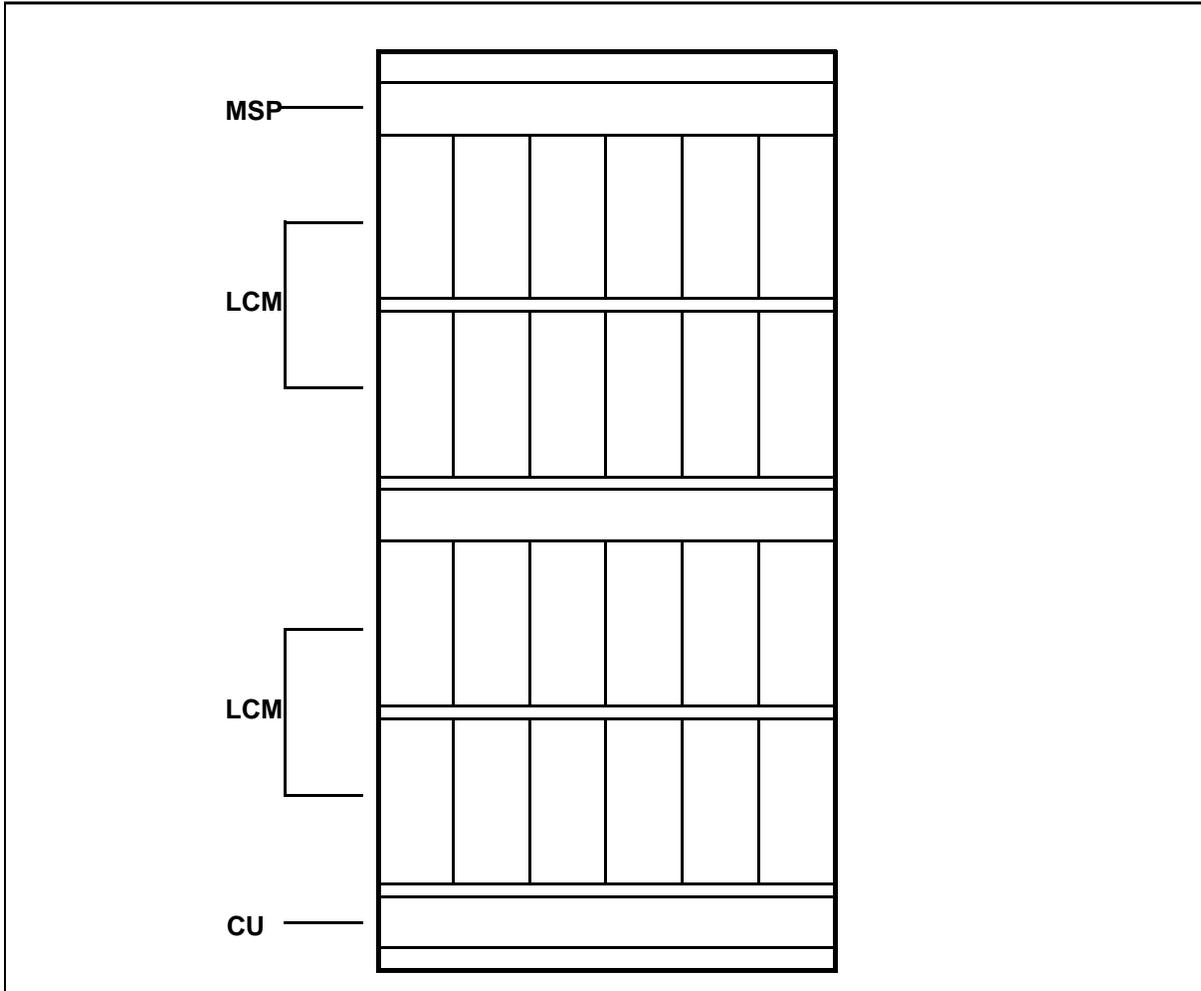
- a master controller (RCC2) which controls associated LCMs and RMMs as directed by the host
- 640 lines in the LCM capable of supporting mixed services
- maintenance and service circuits provided by the RMM
- up to 22 DS-1 links which can be used for digital trunks

NTRX30 (Cabinetized Line Concentrating Equipment)

Function:

To house up to two Remote Switching Center (RSC-S) 640-line Line Concentrating Modules (LCM), as illustrated in Figure 2-5.

Figure 2-5: CLCE (NTRX30)



The CLCE is used for POTS, CLASS, and Meridian Business Sets (MBS) applications, and is connected to the Enhanced Remote Cluster Controller 2 (RCC2) located in the Cabinetized Remote Switching Center cabinet by way of four (or eight, depending on the number of LCMs assigned) D30L links. A single RSC-S configuration can support up to three CLCEs (with a total of 7 LCMS, including the LCM provisioned in the CRSC). The following equipment is also housed in the CLCE:

- Modular Supervisory Panel (MSP) for power, control, ringing generators and alarm circuits
- Cooling Unit (CU)

NTRX31 (Cabinetized Remote Maintenance Equipment)

Function:

To house two circuit breaker shelves, each with 20 A feeds and 20 B feeds, and miscellaneous customer-provided equipment for a Remote Switching Center (RSC-S). The following equipment is normally housed in the CRME:

- Modular Supervisory Panel (MSP)
- modems
- digital recorded announcement unit
- Cooling Unit
- inverters

The CRME cabinet is required in an RSC-S configuration when the configuration supports more than 640 lines.

NTRX60 (Outside Plant Access Cabinet)

Function:

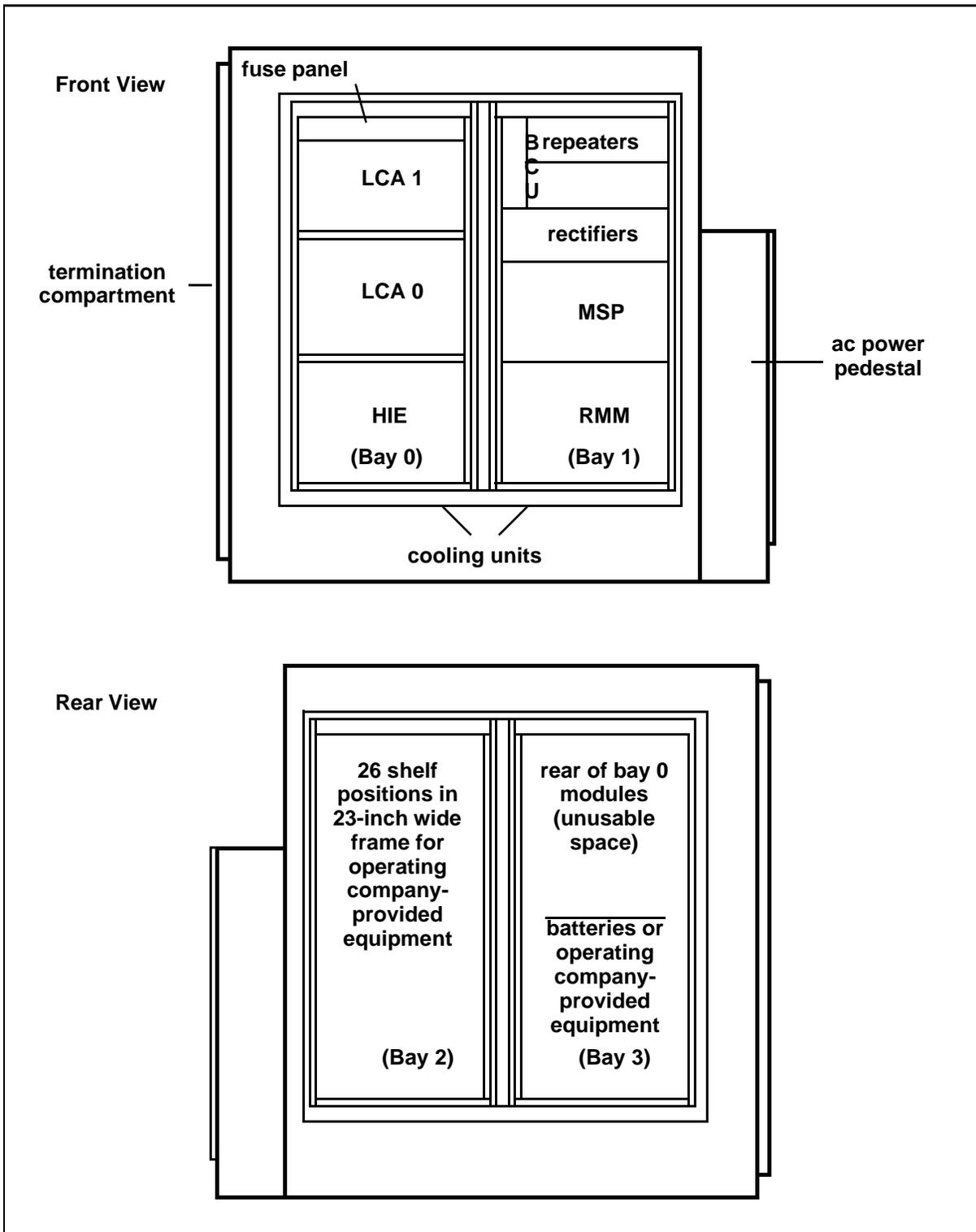
To house RLCM equipment, company-supplied equipment, Battery Control Unit (BCU), rectifier system (up to three rectifiers), environmental controls, and a Modular Supervisory Panel (MSP) in an external environment.

Features:

- controlled environment for electronics safety
- single-cabinet design for reduced equipment, installation, and maintenance costs with separate compartments for enhanced security and accessibility

Figure 2-6 shows the placement of equipment in the OPAC.

Figure 2-6: OPAC (NTRX60)



Section 3: Bays

Introduction

DMS-10 switch equipment bays are described in this section. The descriptions are organized by Product Engineering Code (PEC) number. Similar types of bays (those having the same first five alphanumeric characters, such as the two J0T76 bays or the two J0T81 bays) are represented by one figure, which is provided with the first entry for that type of bay.

Equipment lists

Within each bay description is a group of subheadings that contains basic information about each bay's function, features, dimensions, components, and quantity (when required). In addition, certain DMS-10 switch bays are available in different lists, or versions, of their PEC number. Information about a specific list of a bay is given when the new list version has been developed, and is required, for a specific software or hardware application.

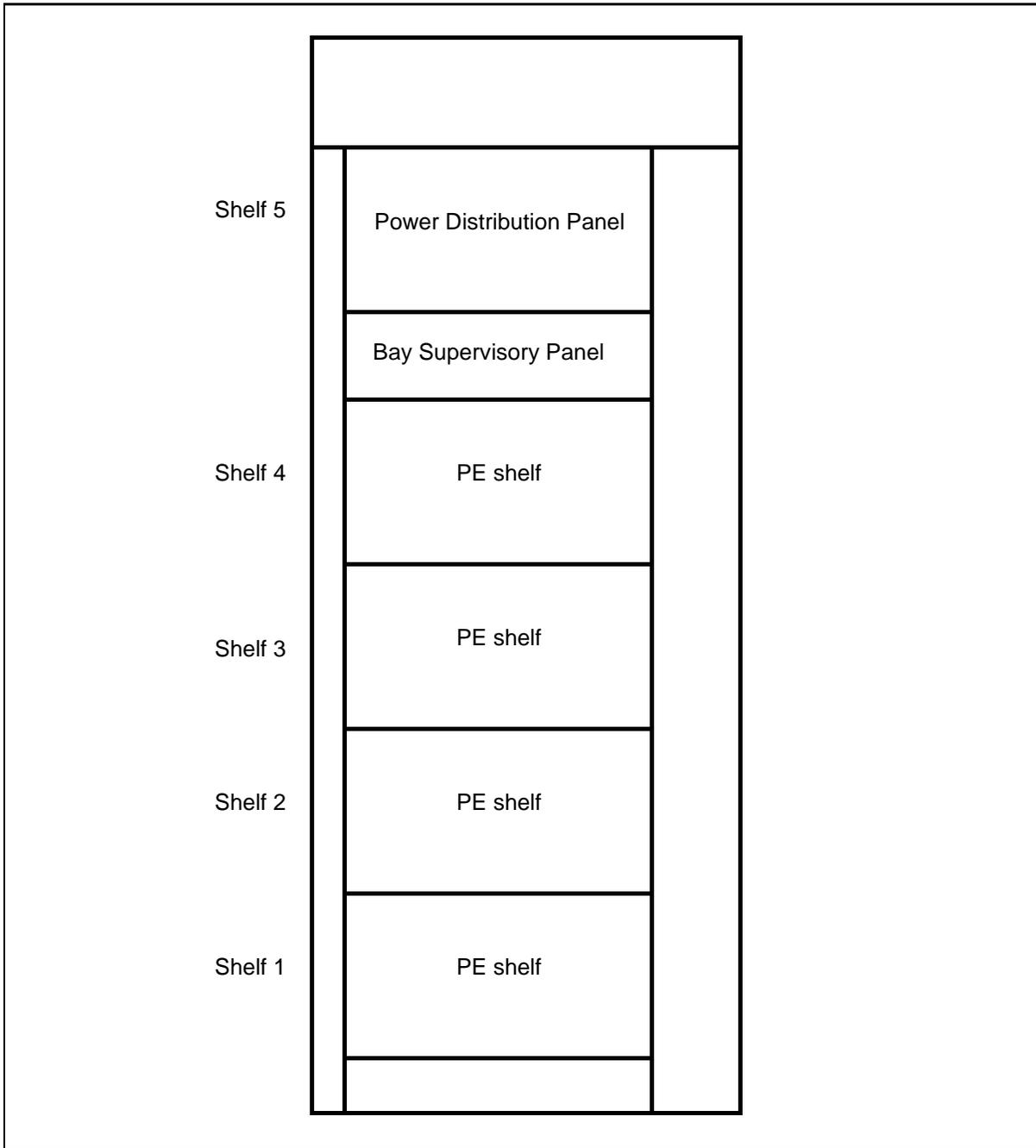
J0T30E-1 (Peripheral Equipment (PE) bay)

Function:

To house peripheral equipment shelves as shown in Table 3-A. A typical, maximally configured PE bay is shown in Figure 3-1.

Table 3-A: Peripheral Equipment bay: provisionable shelves		
Shelf Position	Shelf PEC	Shelf Name
5	J0T13A-1 J0T53 J0T75A-3 J1T65A-1 J1T80A-1 J1T81A-1	Digital Carrier shelf Remote Equipment Module Local shelf Power Distribution Panel Messaging shelf Digital Carrier Interface shelf General-Purpose Input/Output shelf
Between 5 and 4	J1T60A-1 J1T60A-2	Bay Supervisory Panel Bay Supervisory Panel
4	J0T13A-1 J0T29A-1 J0T53 J0T59A-1 J0T90A-1 J1T65A-1 J1T80A-1 J1T81A-1	Digital Carrier shelf Peripheral Equipment shelf Remote Equipment Module Local shelf Dual Peripheral Equipment shelf Dual Peripheral Equipment/Peripheral Maintenance System shelf Messaging shelf Digital Carrier Interface shelf General-Purpose Input/Output shelf
3	J0T29A-1 J0T59A-1 J0T90A-1	Peripheral Equipment shelf Dual Peripheral Equipment shelf Dual Peripheral Equipment/Peripheral Maintenance System shelf
2	J0T13A-1 J0T29A-1 J0T53 J0T59A-1 J0T90A-1 J1T65A-1 J1T80A-1 J1T81A-1	Digital Carrier shelf Peripheral Equipment shelf Remote Equipment Module Local shelf Dual Peripheral Equipment shelf Dual Peripheral Equipment/Peripheral Maintenance System shelf Messaging shelf Digital Carrier Interface shelf General-Purpose Input/Output shelf
1	J0T29A-1 J0T59A-1 J0T90A-1	Peripheral Equipment shelf Dual Peripheral Equipment shelf Dual Peripheral Equipment/Peripheral Maintenance System shelf

Figure 3-1: Fully configured J0T30E-1 PE bay (PE-01)

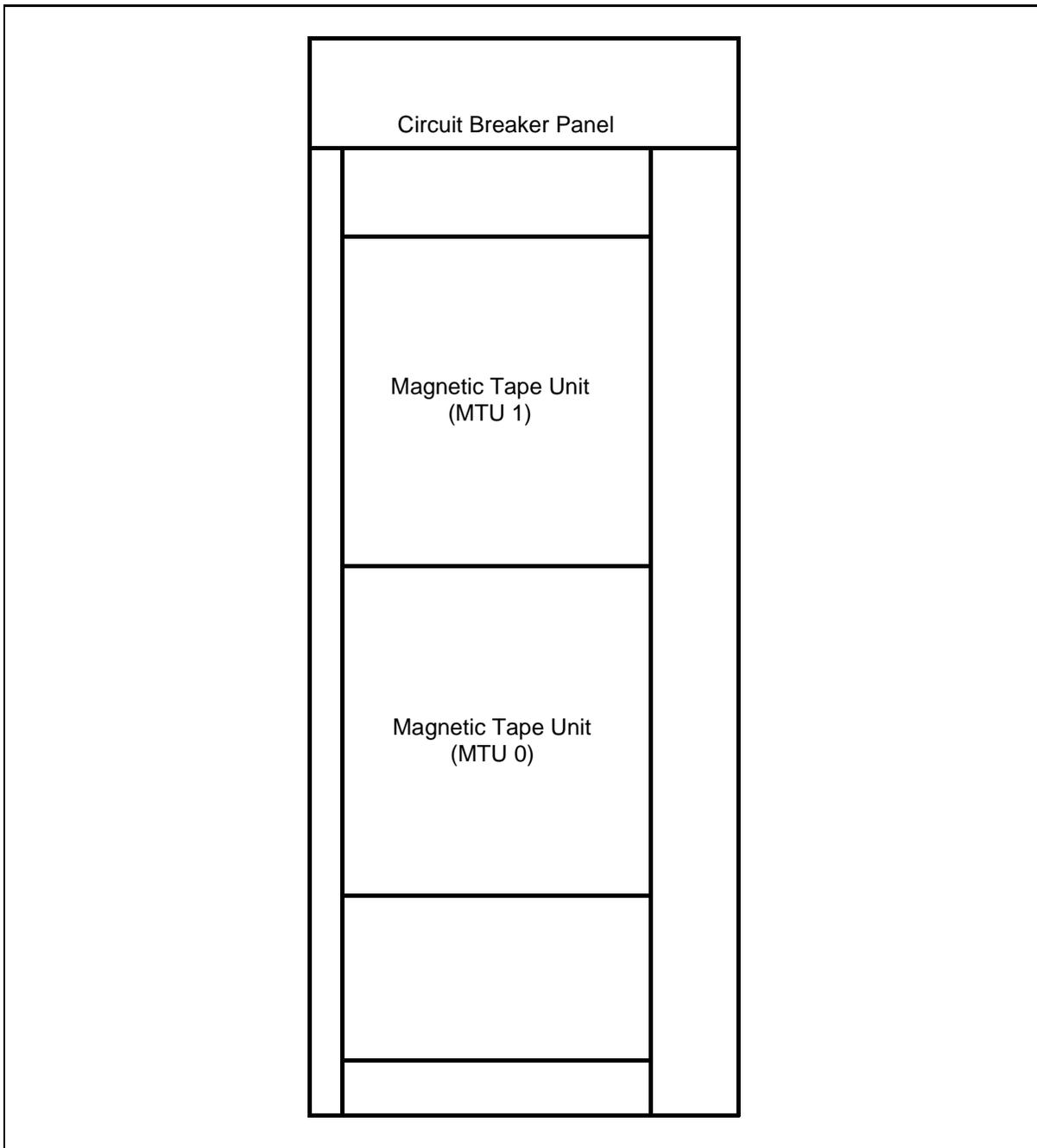


J0T57E-1 (Magnetic Tape Unit bay)

Function:

To house up to two 800 bytes-per-inch (bpi) magnetic tape units (MTUs). MTU bays are designated in the system as Miscellaneous Equipment bays (ME-*m*). For a typical configuration, see Figure 3-2.

Figure 3-2: Magnetic Tape Unit bay (J0T57E-1)



J0T76D-1 (Common Equipment bay, CE-3)**Function:**

To house control, maintenance, and ringing equipment as shown in Table 3-B. This bay is used only when upgrading a pre-existing DMS-10 switch.

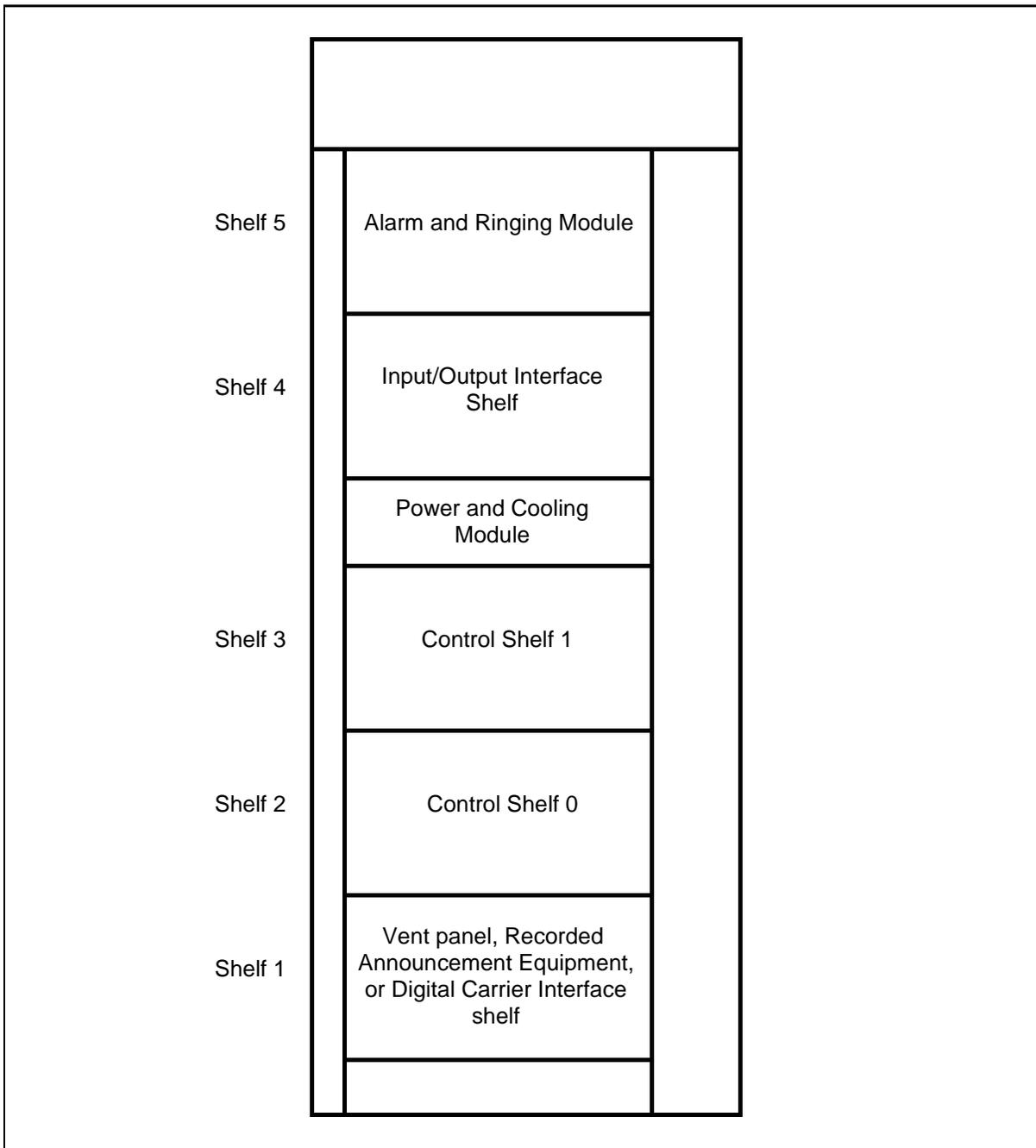
Table 3-B: J0T76D-1 Common Equipment bay: provisionable shelves		
Shelf Position	Shelf PEC	Shelf Name
6	J0T75A-2	Power Distribution Panel
5	J0T72A-1	Alarm and Ringing Module
4	J1T51A-1	Input/Output Interface shelf
Between 4 and 3	J0T98A-1	Power and Cooling Module
3	J0T93A-1	Control shelf
2	J0T93A-1	Control shelf

J0T76E-1 (Common Equipment bay, CE-3)**Function:**

To house control, maintenance, and ringing equipment as shown in Table 3-C. A sample CE-3 bay as shown in Figure 3-3.

Table 3-C: J0T76E-1 Common Equipment bay: provisionable shelves		
Shelf Position	Shelf PEC	Shelf Name
5	J0T72B-1	Alarm and Ringing Module
4	J1T51A-1	Input/Output Interface shelf
Between 4 and 3	J0T98A-1	Power and Cooling Module
3	J0T93A-1	Control shelf
2	J0T93A-1	Control shelf

Figure 3-3: CE-3 bay (J0T76E-1)



J0T80 (Peripheral Equipment Carrier Module bay)

Function:

To house a Power Distribution Panel (PDP), Digital Carrier shelves, Remote Local shelves, Subscriber Carrier shelves, DCM-30 shelves, or Messaging shelves as shown in Table 3-D.

Table 3-D: J0T80 Peripheral Equipment Carrier Module bay: provisionable shelves		
Shelf Position	Shelf PEC	Shelf Name
Top of 6	J0T17A-2	Circuit Breaker Panel
6	J0T13A-1 J0T53A-1 J0T69A-1 J1T65A-1 J1T80A-1	Digital Carrier shelf Remote Equipment Module Local shelf Subscriber Carrier shelf Messaging shelf Digital Carrier Interface shelf
4	J0T13A-1 J0T53A-1 J0T69A-1 J1T65A-1 J1T80A-1	Digital Carrier shelf Remote Equipment Module Local shelf Subscriber Carrier shelf Messaging shelf Digital Carrier Interface shelf
2	J0T13A-1 J0T53A-1 J0T69A-1 J1T65A-1 J1T80A-1	Digital Carrier shelf Remote Equipment Module Local shelf Subscriber Carrier shelf Messaging shelf Digital Carrier Interface shelf

Versions:

- A-1 (Standard Peripheral Equipment bay)
- B-1 (Earthquake-Reinforced Peripheral Equipment bay)
- C-1 (Containerized Peripheral Equipment Bay)

J0T81A-1 (Miscellaneous Equipment bay)

Function:

To provide space to house up to five shelves of miscellaneous equipment. This bay is used only when upgrading a pre-existing DMS-10 switch.

Versions:

- L11
- L12

Components:

- ED0T81-01 Alarm Isolation and Transfer Panel
- J0T14A-1 Digital Recorded Announcement Shelf Assembly
- J0T75A-3 Power Distribution Panel
- J8T76A-1 DMS-10 Application Peripheral
- Miscellaneous OEM equipment
- Storage shelves
- Supplementary fuse panels

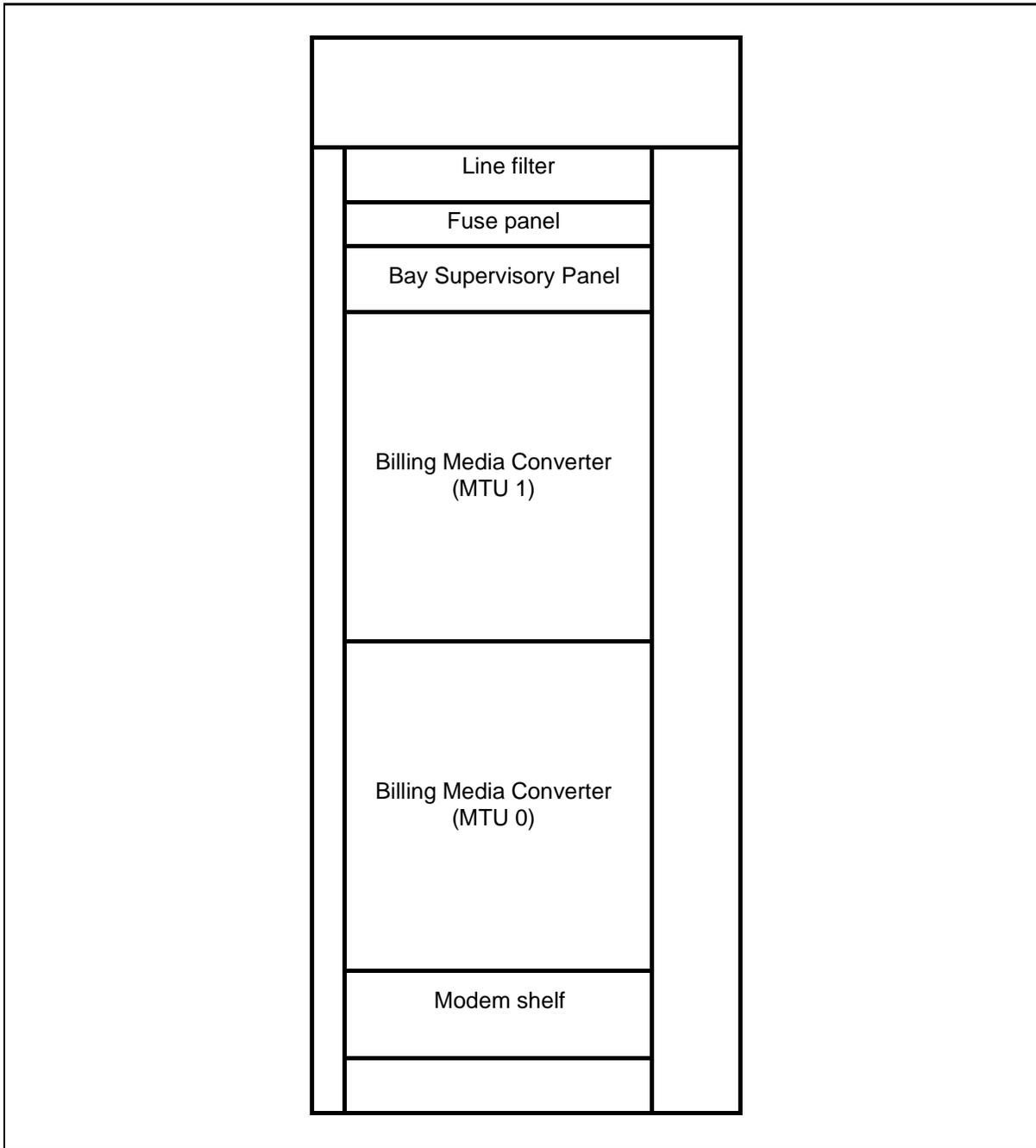
Quantity:

As required.

J0T81E-1 (Miscellaneous Equipment bay)**Function:**

To provide space to house up to five shelves of miscellaneous, non-DMS-10 equipment. A sample Miscellaneous Equipment bay is shown in Figure 3-4.

Figure 3-4: Miscellaneous Equipment bay (J0T81E-1)



J1T30D-1 (Common Equipment bay, CE-1)

Function:

To house up to four Network shelves, a Power and Cooling Module, an optional Recorded Announcement unit, General-Purpose Input/Output (GPIO) shelf, Digital Carrier Interface shelf, and a Messaging shelf as shown in Table 3-E. This bay is used only when upgrading a pre-existing DMS-10 switch.

Table 3-E: J1T30D-1 Common Equipment bay: provisionable shelves		
Shelf Position	Shelf PEC	Shelf Name
5	J1T31A-1	Network shelf
4	J1T31A-1	Network shelf
Between 4 and 3	J0T97A-3 J0T97A-2	Power and Cooling Module Power and Cooling Module
3	J1T31A-1	Network shelf
2	J1T31A-1	Network shelf
1	J1T65A-1 J1T81A-1 J1T80A-2	Messaging shelf GPIO shelf Digital Carrier Interface shelf

Quantity:

One J1T30D-1 is required in all systems not provisioned with a J1T83E-1 (CE-3) bay. One J1T30D-1 or one J1T30E-1 may be configured in systems already configured with a J1T83E-1 bay.

J1T30D-1, L4 (Common Equipment bay, CE-2 or CE-4)

Function:

To house Messaging shelves or Digital Carrier Interface (DCI) shelves as shown in Table 3-F. This bay is used either when multiple Messaging shelves are to be provisioned or when network expansion precludes provisioning Messaging shelves in the CE-1 bay. The bay is also used to house up to 2 DCI shelves.

Table 3-F: J1T30D-1, L4 Common Equipment bay: provisionable shelves		
Shelf Position	Shelf PEC	Shelf Name
5	J1T80A-2	Digital Carrier Interface shelf
4	J1T80A-2	Digital Carrier Interface shelf
Between 4 and 3	J0T97A-3	Power and Cooling Module
3	-	Card Cage Plenum
2	J1T65A-1	Messaging shelf
1	J1T65A-1	Messaging shelf

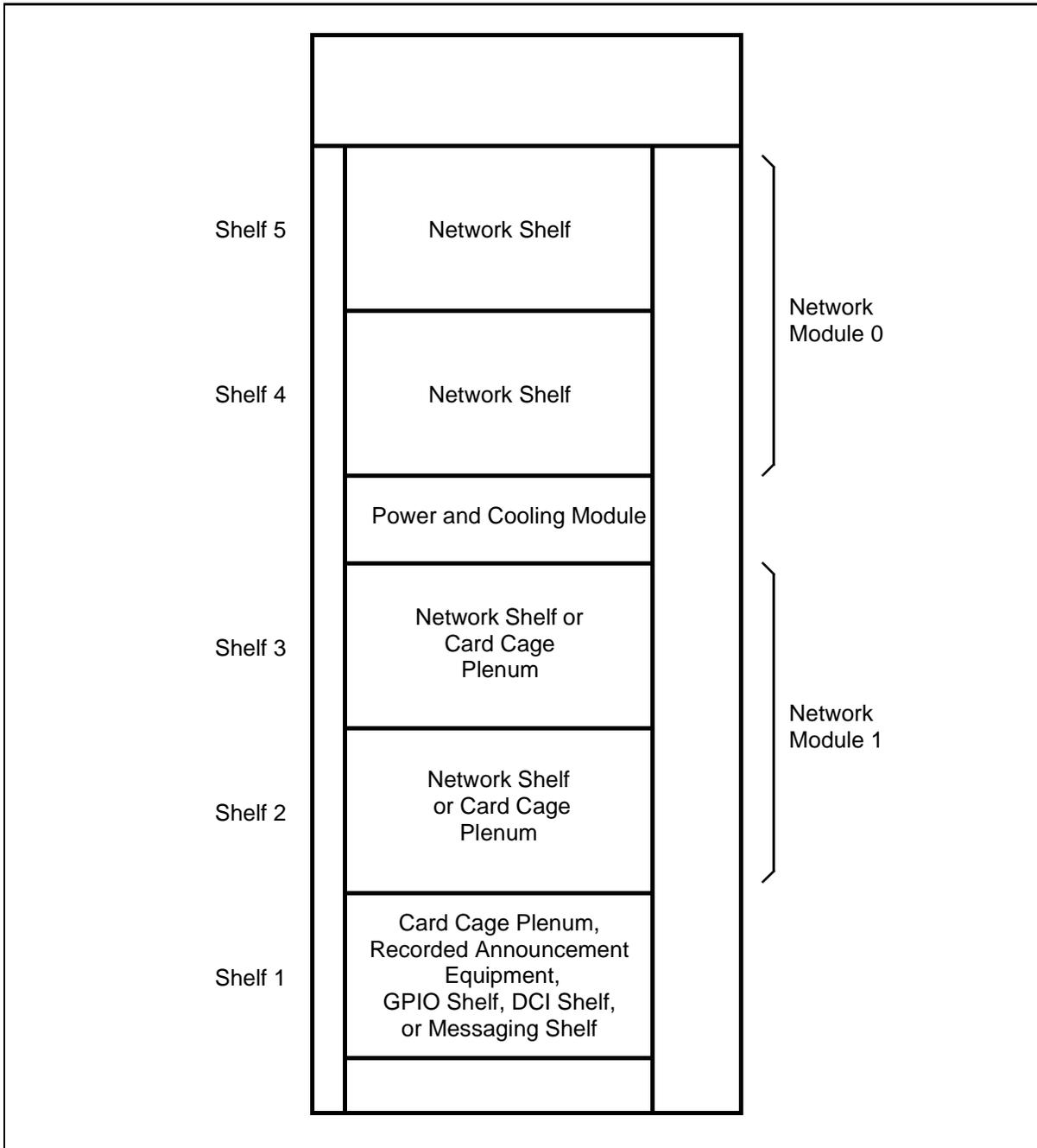
J1T30E-1 (Common Equipment bay, CE-1)

Function:

To house Network shelves, a Power and Cooling Module, an optional Recorded Announcement unit, General-Purpose Input/Output (GPIO) shelf, Digital Carrier Interface (DCI) shelves, or a Messaging shelf as shown in Table 3-G. The CE-1 bay is required for the full-size switch serving offices with more than 2,560 lines. A sample CE-1 bay is illustrated in Figure 3-5.

Table 3-G: J1T30E-1 Common Equipment bay: provisionable shelves		
Shelf Position	Shelf PEC	Shelf Name
5	J1T31A-1	Network shelf
4	J1T31A-1	Network shelf
Between 4 and 3	J0T97A-3 J0T97A-2	Power and Cooling Module Power and Cooling Module
3	J1T31A-1	Network shelf
2	J1T31A-1	Network shelf
1	J1T65A-1 J1T81A-1 J1T80A-2	Messaging shelf GPIO shelf Digital Carrier Interface shelf

Figure 3-5: CE-1 bay (J1T30E-1)



J1T30E-1, L7 (Common Equipment bay, CE-2 or CE-4)

Function:

To house Digital Carrier Interface (DCI) shelves or Messaging shelves as shown in Table 3-H. This bay is used when multiple Messaging shelves are to be provisioned or when network expansion precludes provisioning Messaging shelves in the CE-1 bay. The bay is also used to house up to 5 DCI shelves.

Table 3-H: J1T30E-1, L7 Common Equipment bay: provisionable shelves		
Shelf Position	Shelf PEC	Shelf Name
5	J1T80A-2	Digital Carrier Interface shelf
4	J1T80A-2	Digital Carrier Interface shelf
Between 4 and 3	J0T97A-3	Power and Cooling Module
3	J1T80A-2	Digital Carrier Interface shelf
2	J1T65A-1 J1T80A-2	Messaging shelf card cage plenum Digital Carrier Interface shelf
1	J1T65A-1 J1T80A-2	Messaging shelf Digital Carrier Interface shelf

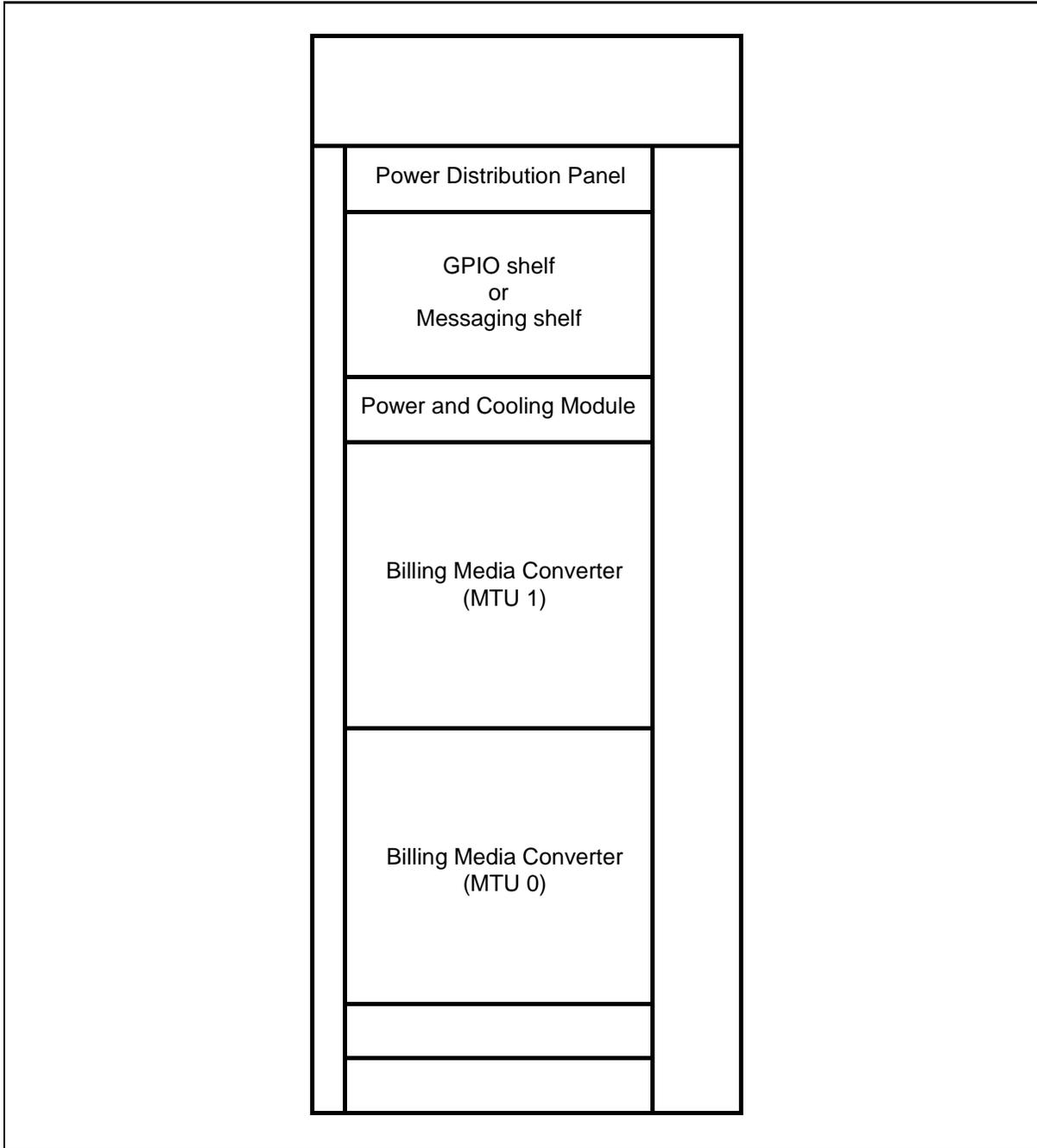
J1T30E-2 (Common Equipment bay, CE-1)

Function:

To house a Power Distribution Panel for the Large Cluster Controller (LCC), a Power Cooling Module, a General-Purpose Input/Output (GPIO) shelf or Messaging shelf, and an optional Cook Electric Billing Media Converter (BMC II) Assembly, as shown in Table 3-I. A typical CE-1 bay configured for LCC is illustrated in Figure 3-6.

Table 3-I: J1T30E-2 Common equipment bay: provisionable shelves		
Shelf Position	Shelf PEC	Shelf Name
5	J0T75A-3	Power and Cooling Module
4	J1T81A-1	GPIO shelf
Between 4 and 3	J0T97A-3	Power and Cooling Module
3	J1T65A-1 -	Messaging shelf Cook BMCII Assembly
2	J0T67A-1 -	Magnetic Tape Unit Cook BMCII Assembly
1	J0T67A-1	Magnetic Tape Unit

Figure 3-6: CE-1 bay (J1T30E-2) for Large Cluster Controller



J1T83E-1 (Common Equipment bay, CE-3)

Function:

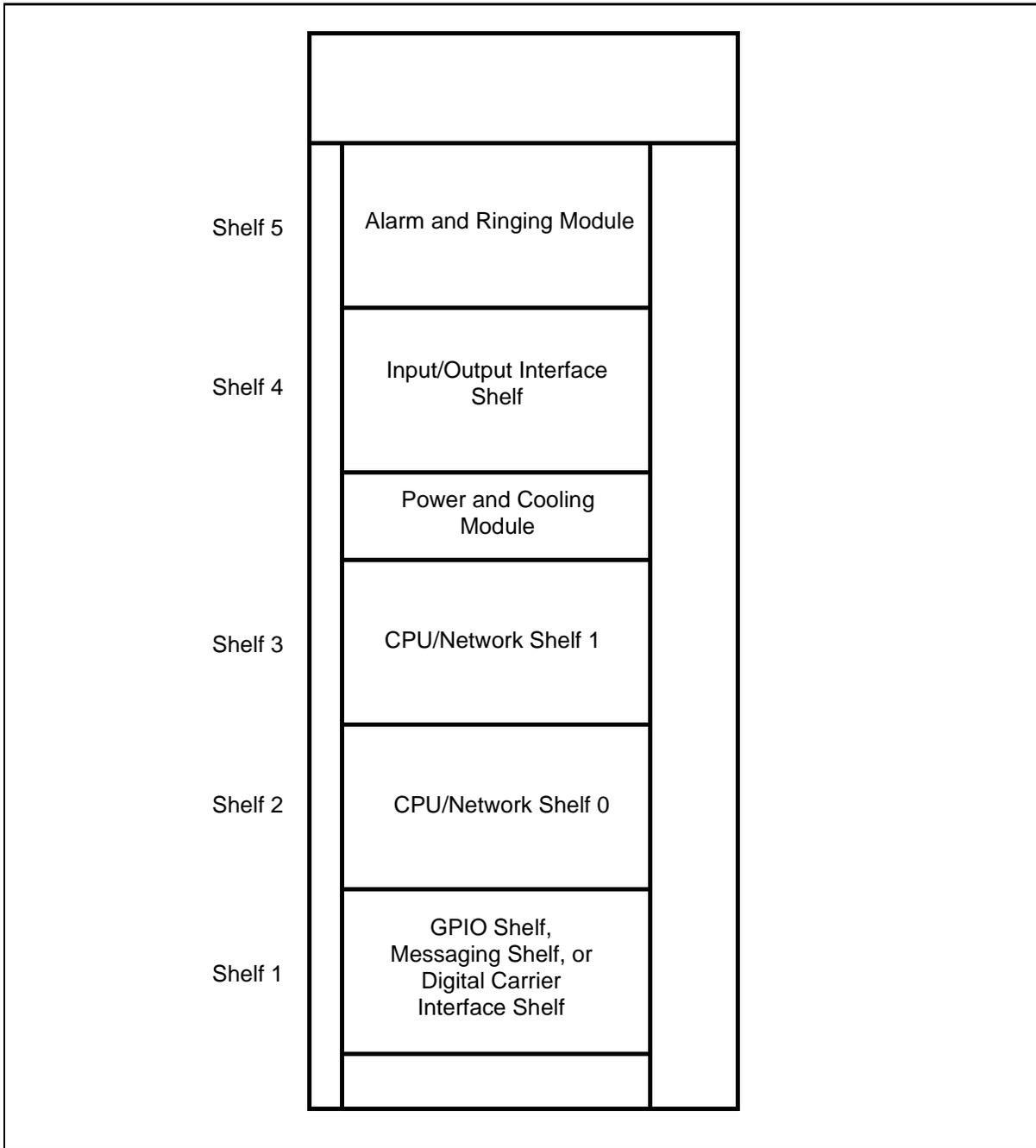
To house control, maintenance, ringing, DCI, and network equipment in the full-size switch, three-bay configuration, or the LCC as shown in Table 3-7. In the full-size DMS-10 switch, in the expanded three-bay switch, and in the LCC, the CPU/Network shelf is provisioned without any network packs because Network Equipment is configured in the CE-1 bay. A sample CE-3 bay is illustrated in Figure 3-8.

Figure 3-7: J1T83E-1 Common equipment bay: provisionable shelves		
Shelf Position	Shelf PEC	Shelf Name
5	J0T72B-1 J0T72C-1	Alarm and Ringing Module Alarm shelf
4	J1T51A-1	Input/Output Interface shelf
Between 4 and 3	J0T98A-2 J0T98A-3	Power and Cooling Module
3	J1T72A-1 J1T72B-1 J1T72C-1	CPU/Network shelf CPU/Network shelf CPU/Network shelf
2	J1T72A-1 J1T72B-1 J1T72C-1	CPU/Network shelf CPU/Network shelf CPU/Network shelf
1	J1T81A-1 J1T80A-2 J1T65A-1	GPIO shelf Digital Carrier Interface shelf Messaging Shelf

Versions:

- L1 is used in the full-size DMS-10 switch and in the three-bay switch.
- L2 is used in the LCC.

Figure 3-8: CE-3 bay (J1T83E-1) for control/network equipment

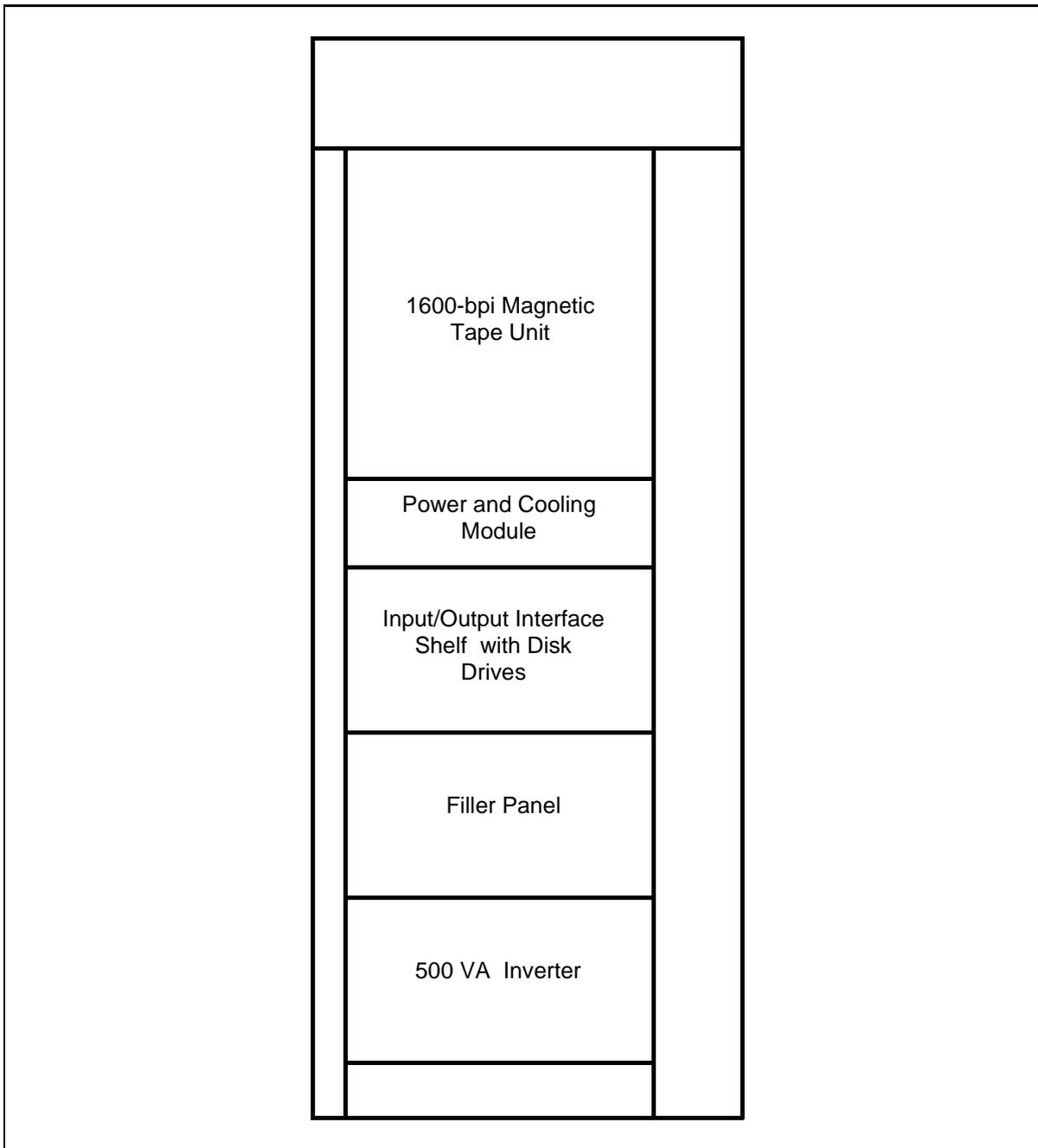


J1T85A-1 (1600-bpi AMA bay)

Function:

To house a 1600-bpi Magnetic Tape Unit (ED1T85-08), a Power and Cooling Module, an Input/Output Interface Shelf Assembly, a 500VA Inverter, and a Filter Tray Assembly. For a typical configuration, see Figure 3-9.

Figure 3-9: 1600-bpi AMA bay (J1T85A-1)



J1T92A-1 /J1T92B-1(Common Equipment Bay, CE-1)

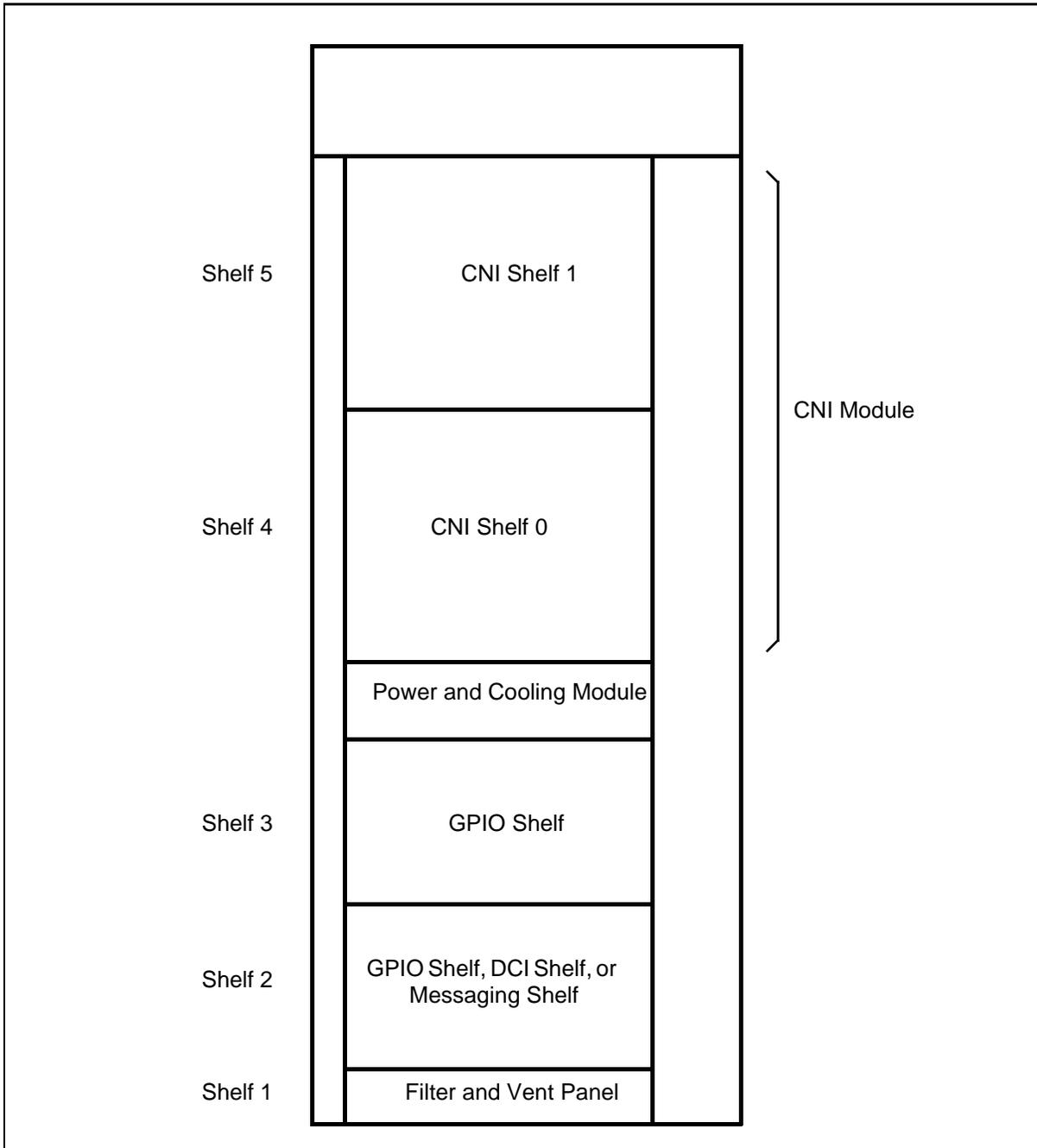
Function:

To house one DMS-10EN CNI Module, one Power and Cooling Module, at least one GPIO shelf, and either a second GPIO shelf, a Digital Carrier Interface shelf, or a Messaging shelf, as shown in Table 3-J. A sample bay configuration is shown in Figure 3-10.

Note: The J1T92B-1 is a 200/300-Series frame style.

Shelf Position	Shelf PEC	Shelf Name
5 and 4	J8M75A-1	CNI Module
Between 4 and 3	J0T97B-1	Power and Cooling Module
3	J1T81A-1	GPIO shelf
2	J1T80A-2 J1T65A-1 J1T81A-1	Digital Carrier Interface shelf Messaging Shelf GPIO shelf
1	Filler and Vent Panel	

Figure 3-10: CE-1 Common Equipment Bay (J1T92A-1)



J1T93A-1/J1T93B-1 (Common Equipment bay, CE-3)

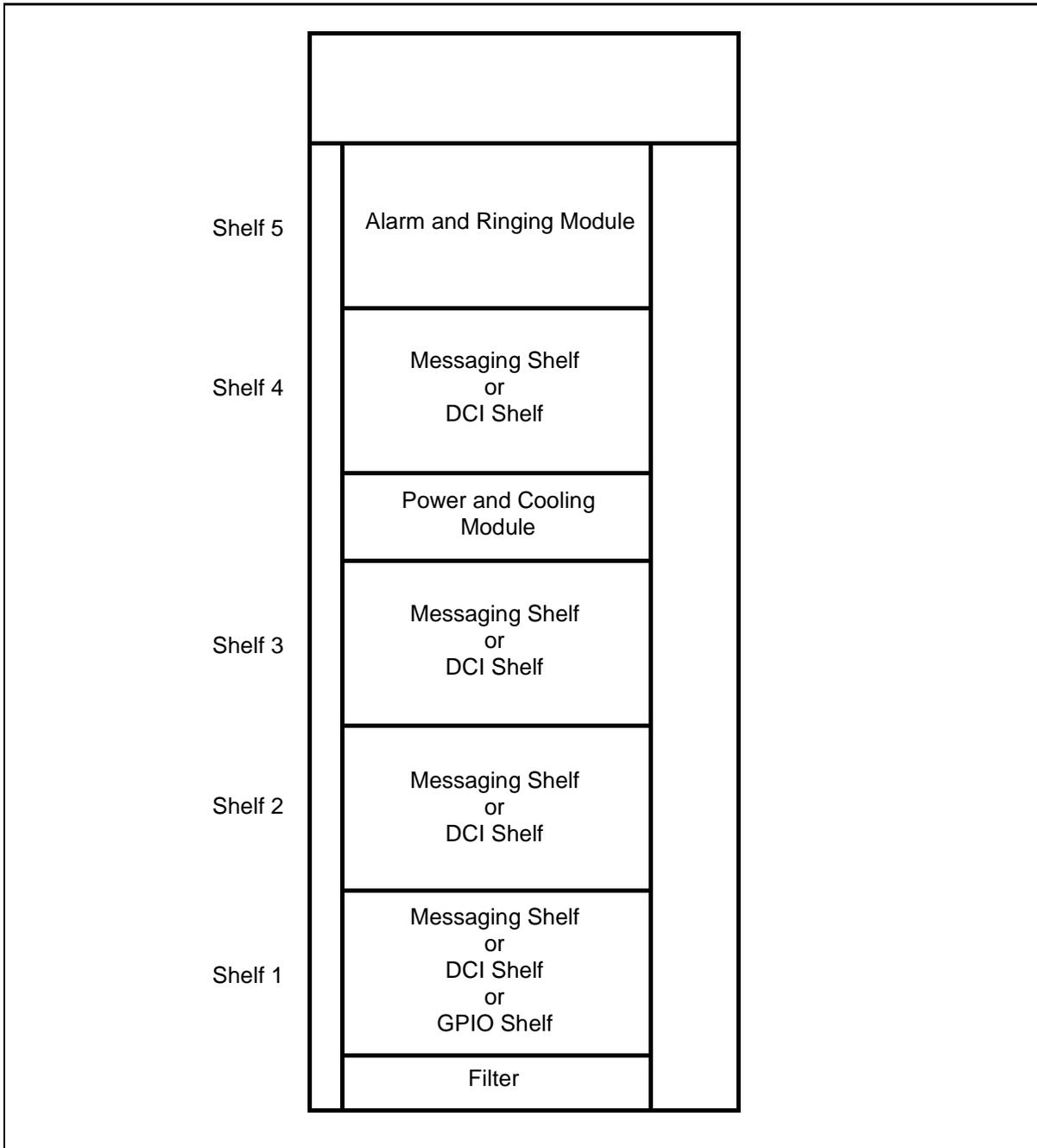
Function:

To house the Alarm and Ringing Module, Digital Carrier Interface (DCI) shelves Messaging shelves, and General Purpose Input/Output (GPIO) shelves, as shown in Table 3-K. A sample CE-3 bay is illustrated in Figure 3-11.

Note: The J1T93B-1 is a 200/300-Series frame style.

Table 3-K: J1T93A-1/J1T93B-1 Common equipment bay: provisionable shelves		
Shelf Position	Shelf PEC	Shelf Name
5	J0T72B-1	Alarm and Ringing Module
4	J1T80A-2 J1T65A-1	Digital Carrier Interface shelf Messaging Shelf (up to 3)
Between 4 and 3	J0T98B-1	Power and Cooling Module
3	J1T80A-2 J1T65A-1	Digital Carrier Interface shelf Messaging Shelf (up to 3)
2	J1T80A-2 J1T65A-1	Digital Carrier Interface shelf Messaging Shelf (up to 3)
1	J1T80A-2 J1T65A-1 J1T81A-1	Digital Carrier Interface shelf Messaging Shelf (up to 3) General Purpose Input/Output shelf

Figure 3-11: CE-3 bay (J1T93A-1)

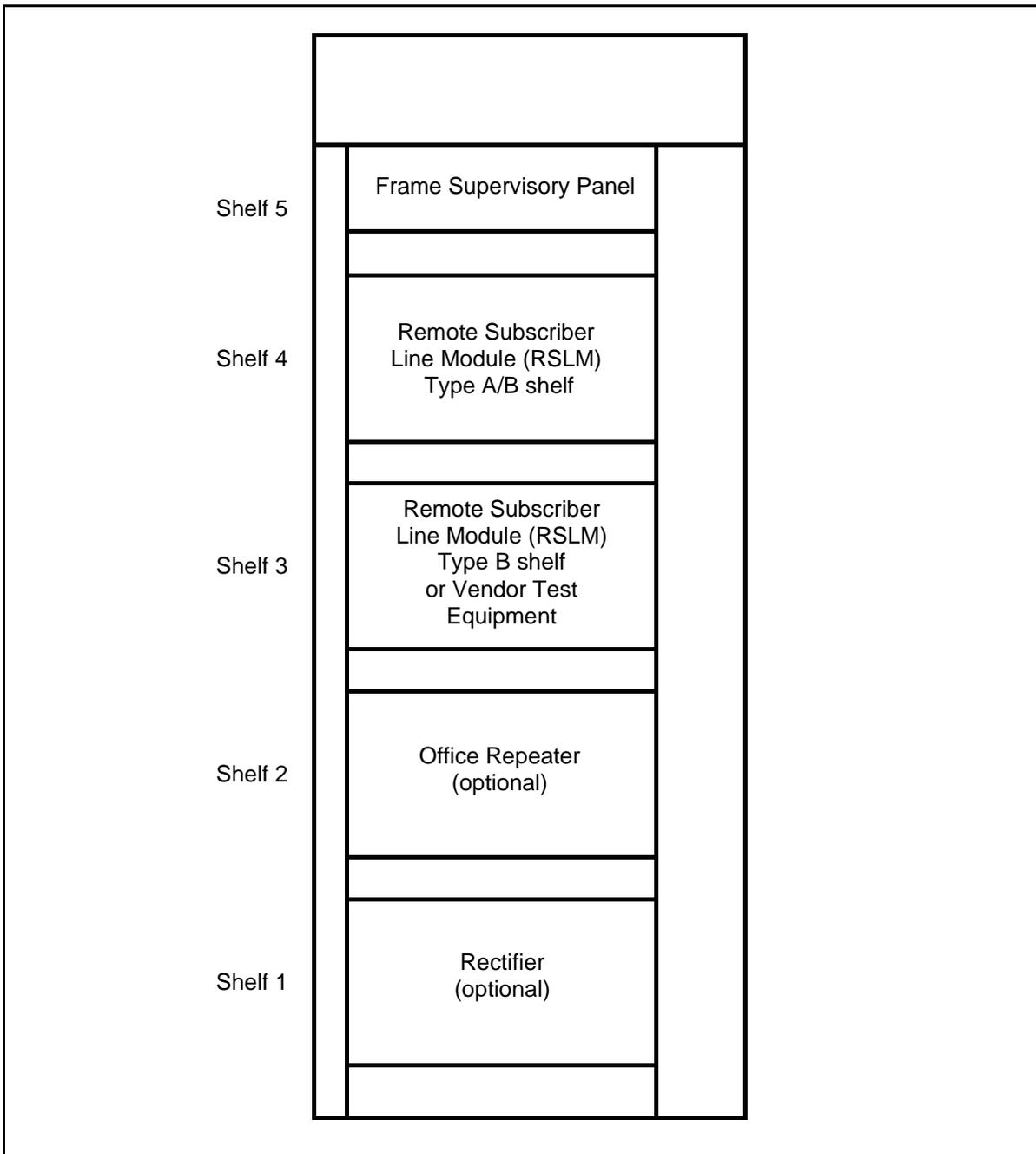


J9Y70A-1/J9Y70B-1 (Remote Subscriber Line Module (RSLM) bay)

Function:

To house two RSLM Type B shelves or one RSLM Type A shelf, and an optional DS-1 repeater shelf and an optional DC rectifier. (See Figure 3-12).

Figure 3-12: RSLM bay (J9Y70A-1) with one Type A shelf



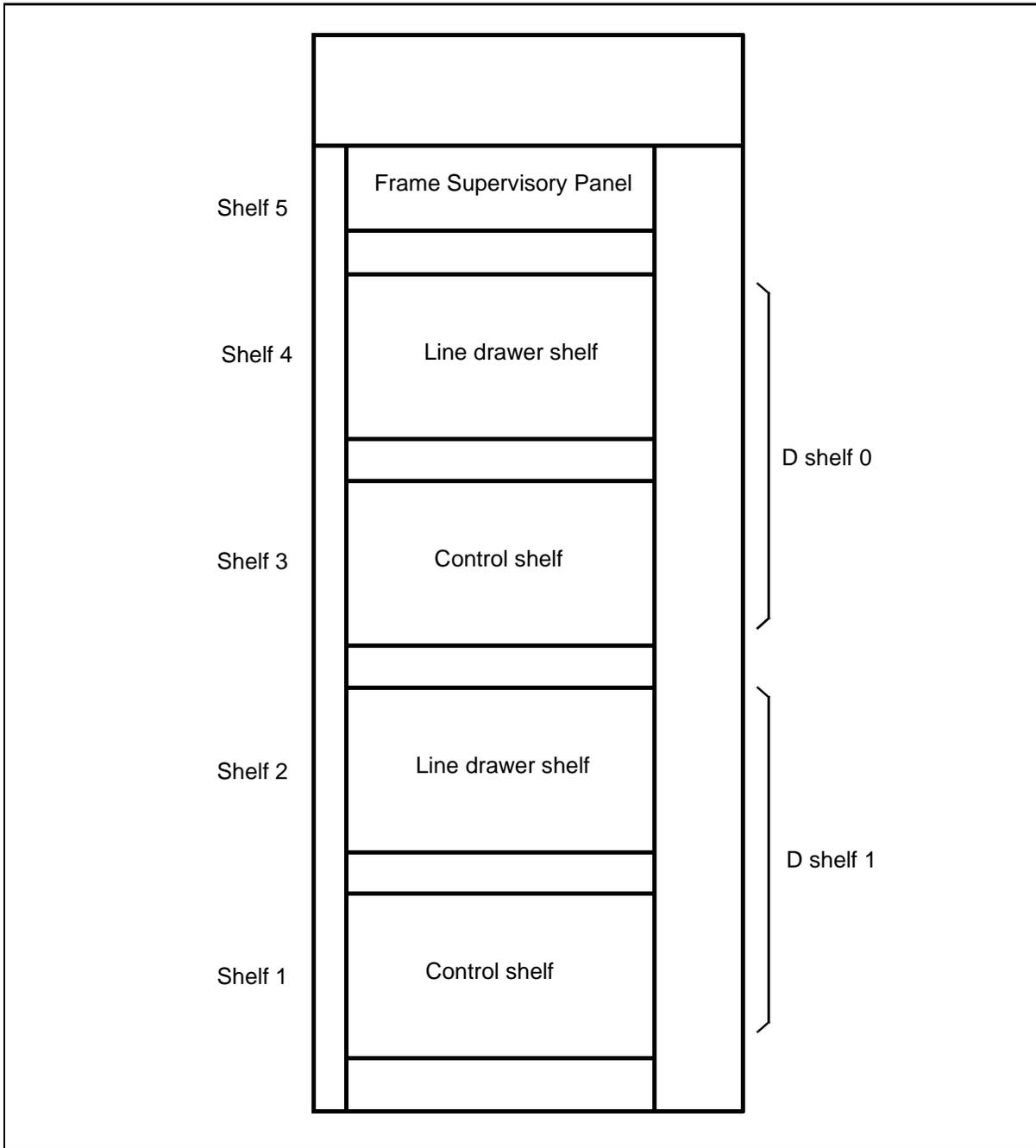
J9Y80A-1 (Remote Subscriber Line Equipment (RSLE) bay)

Function:

To house a Frame Supervisory Panel (FSP), one or two RSLE Control shelves, and one or two RSLE Line Drawer shelves, as shown in Table 3-L. The combination of one RSLE Control shelf and one RSLE Line Drawer shelf is called a “D shelf.” Figure 3-13 shows a sample RSLE bay.

Table 3-L: J9Y80A-1 Remote Subscriber Line Equipment bay: provisionable shelves		
Shelf Position	Shelf PEC	Shelf Name
5	J9Y76A-1	Frame Supervisory Panel
4	J9Y85A-1	RSLE Line Drawer shelf
3	J9Y84A-1	RSLE Control shelf
2	J9Y85A-1	RSLE Line Drawer shelf
1	J9Y84A-1	RSLE Control shelf

Figure 3-13: RSLE bay (J9Y80A-1)

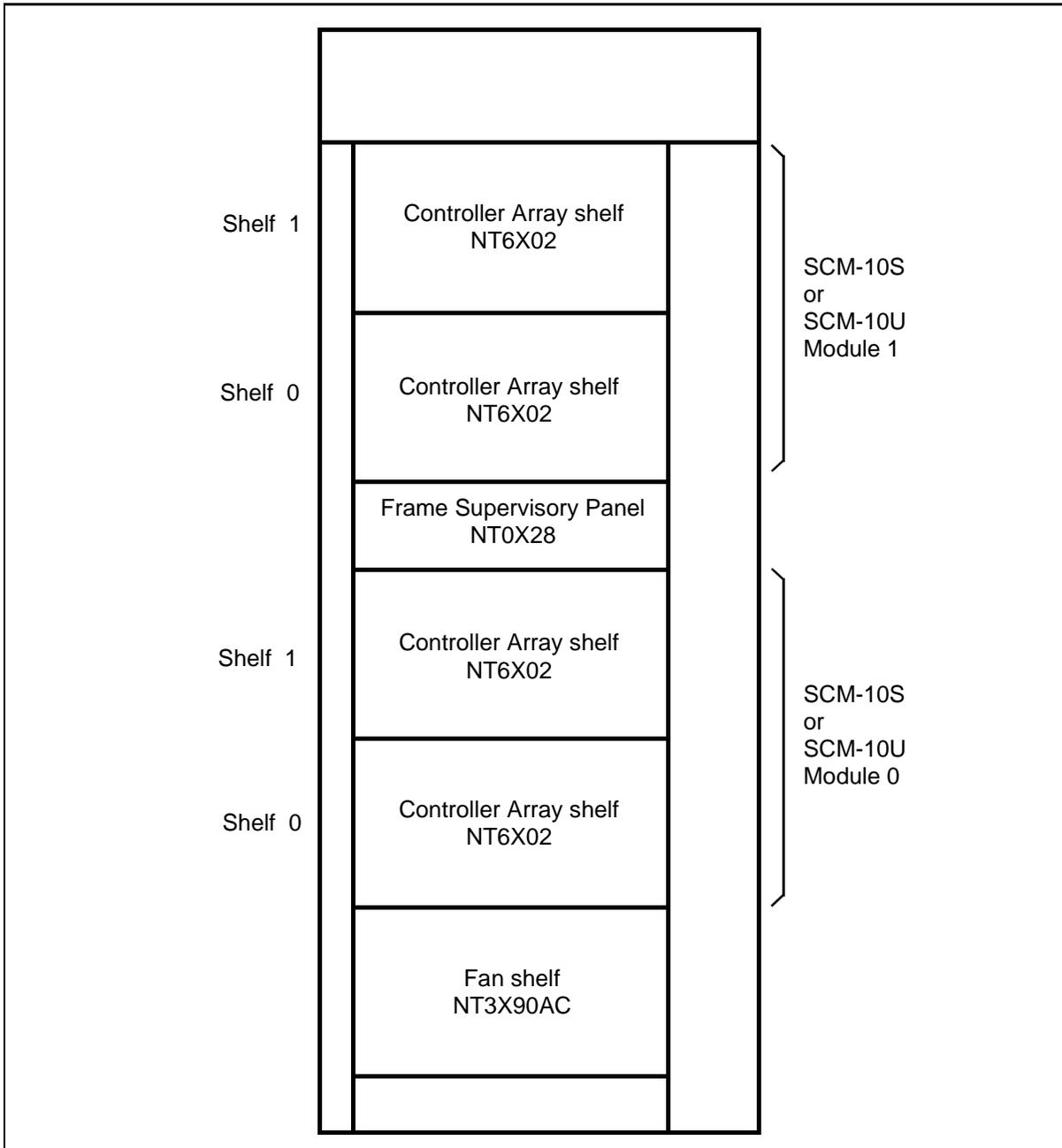


NT6X01 (Subscriber Carrier Equipment (SCE) frame)

Function:

To house a fan unit, Frame Supervisory Panel (FSP), and up to four Controller Array shelves (NT6X0201). Two Controller Array shelves constitute a single SCM-10S or SCM-10U module. Figure 3-14 shows the positions of the SCM-10S or SCM-10U modules in the SCE frame.

Figure 3-14: Subscriber Carrier Equipment (SCE) frame (NT6X01)



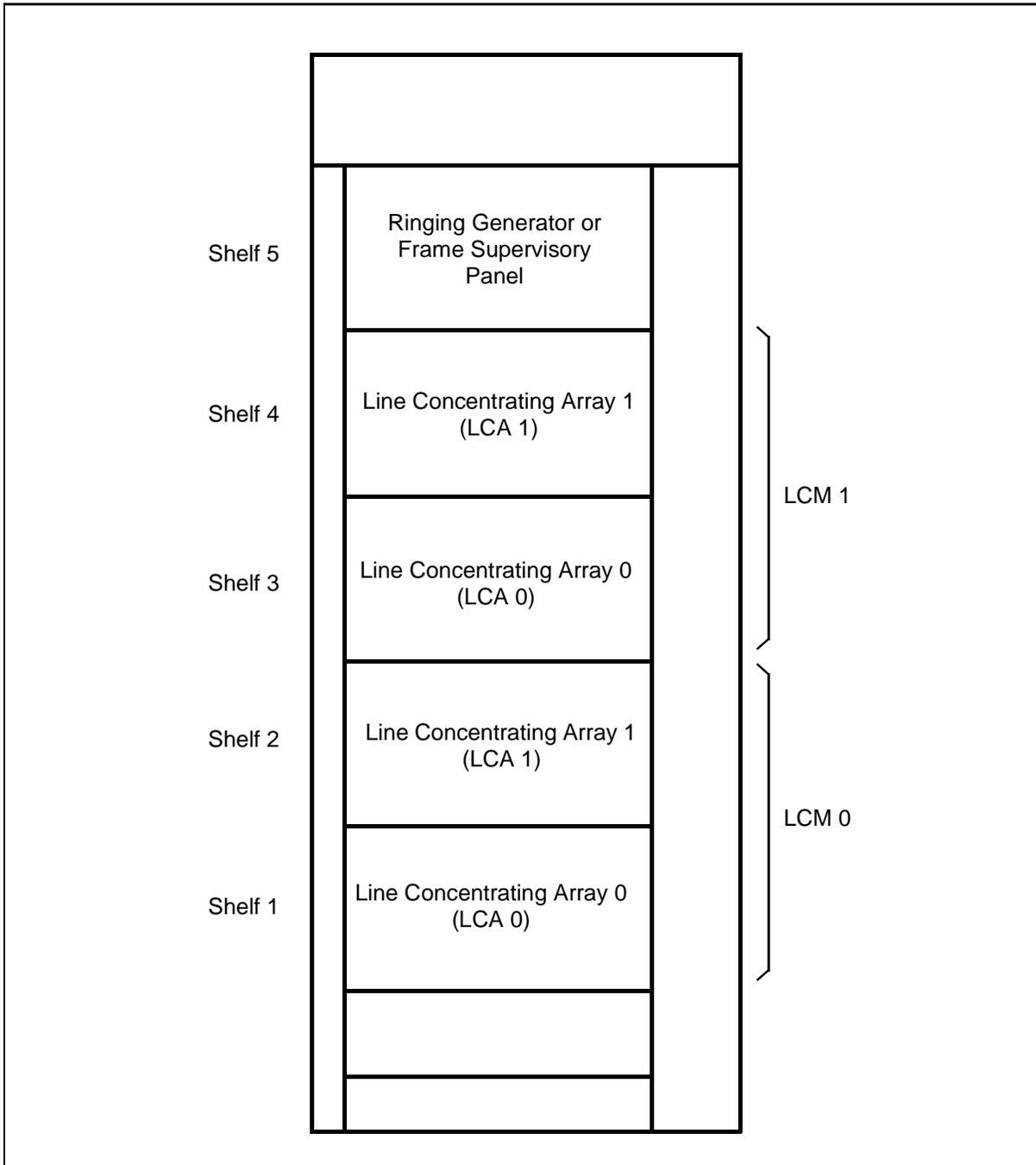
NT6X03 (Line Concentrating Equipment frame)

Function:

To house the Frame Supervisory Panel (FSP) and up to two Line Concentrating Modules (LCMs), each of which consists of two Line Concentrating Arrays (LCAs) and occupies two shelf positions. Table 3-M shows the provisionable shelves in the LCE frame. A sample LCE frame is illustrated in Figure 3-15.

Table 3-M: NT6X03 Line Concentrating Equipment frame: provisionable shelves		
Shelf Position	Shelf PEC	Shelf Name
5	NT6X35 NT6X50	Frame Supervisory Panel Ringing Generator
4	NT6X04	Line Concentrating Array shelf
3	NT6X04	Line Concentrating Array shelf
2	NT6X04	Line Concentrating Array shelf
1	NT6X04	Line Concentrating Array shelf

Figure 3-15: Line Concentrating Equipment (LCE) frame (NT6X03)



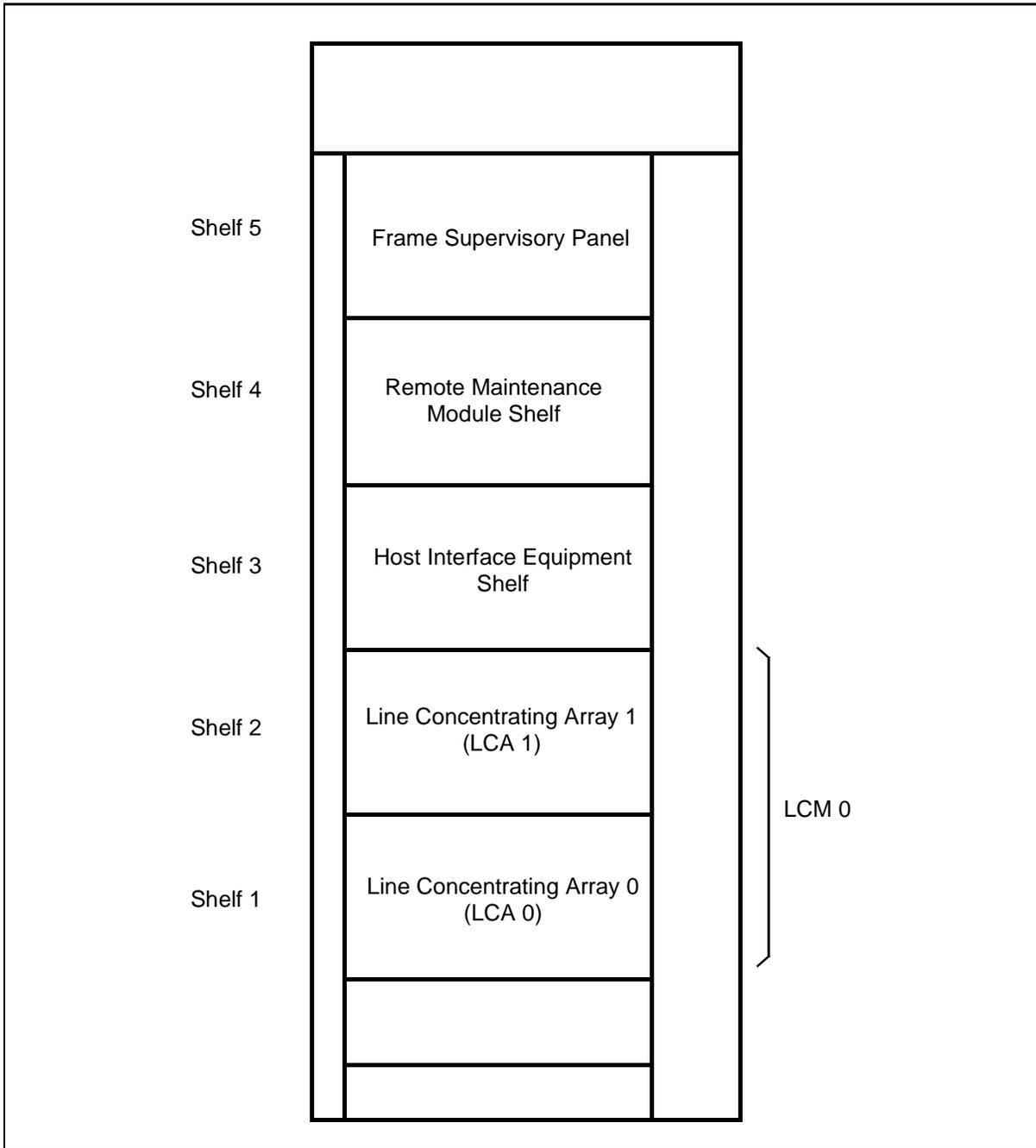
NT6X14 (Remote Line Concentrating Module frame)

Function:

To house the Frame Supervisory Panel (FSP), which contains office repeater packs; one Remote Maintenance Module (RMM) shelf; one Host Interface Equipment (HIE) shelf; and one Line Concentrating Module (LCM), which consists of two Line Concentrating Arrays (LCAs). Table 3-N shows the provisionable shelves in the RLCM bay. For an overview of a fully equipped RLCM frame, refer to Figure 3-16.

Shelf Position	Shelf PEC	Shelf Name
5	NT6X25	Frame Supervisory Panel
4	NT6X13	Remote Maintenance Module shelf
3	NT6X11	Host Interface Equipment shelf
2	NT6X04	Line Concentrating Array shelf
1	NT6X04	Line Concentrating Array shelf

Figure 3-16: RLCM frame (NT6X14) with one type A shelf



NTQX90AA (Multivendor Interface Equipment frame)

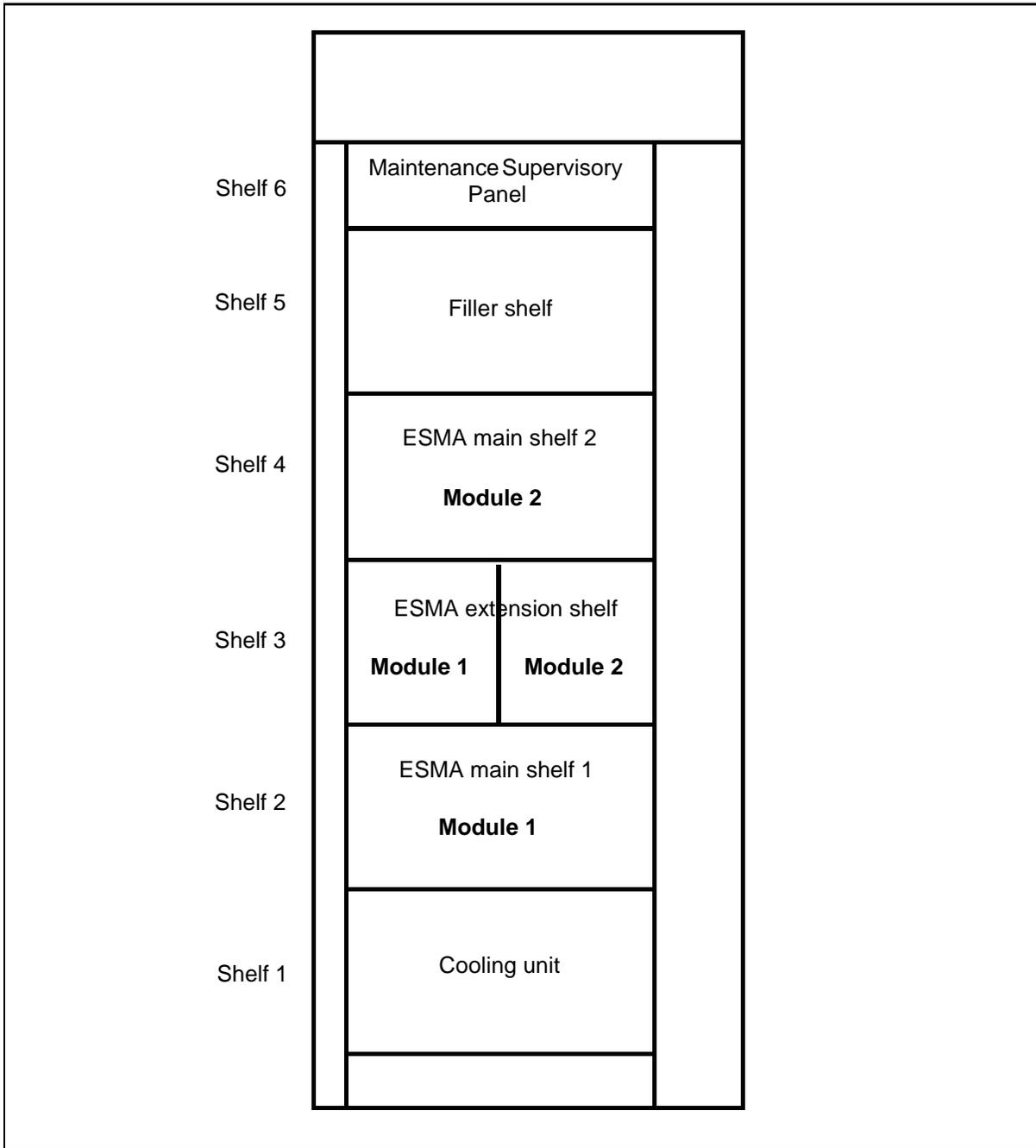
Function:

The Multivendor Interface Equipment (MVIE) bay houses two main Enhanced Subscriber Carrier Module Access (ESMA) shelves (NTMX8504) and one ESMA extension shelf (NTMX8604) in two ESMA modules. The MVIE bay supports the SCM-10A feature. One MVIE bay, configured with two ESMA modules, can support 96 P-side DS-1 links. Table 3-P shows the fixed shelves and their positions in the bay. Figure 3-16 illustrates a fully-configured MVIE bay.

Table 3-O:
NTQX90AA Multivendor Interface Equipment (MVIE): fixed shelves

Shelf Position	Shelf PEC	Shelf Name
6	NTRX40AA	Maintenance Supervisory Panel (MSP)
5	NT0X84AA	Filler shelf
4	NTMX8504	ESMA shelf
3	NTMX8604	ESMA extension shelf
2	NTMX8504	ESMA shelf
1	NTRX91AA	Cooling unit

Figure 3-17: Multivendor Interface Equipment (MVIE) bay (NTQX90AA)



NTQX90BA (Multivendor Dual Density Equipment frame)

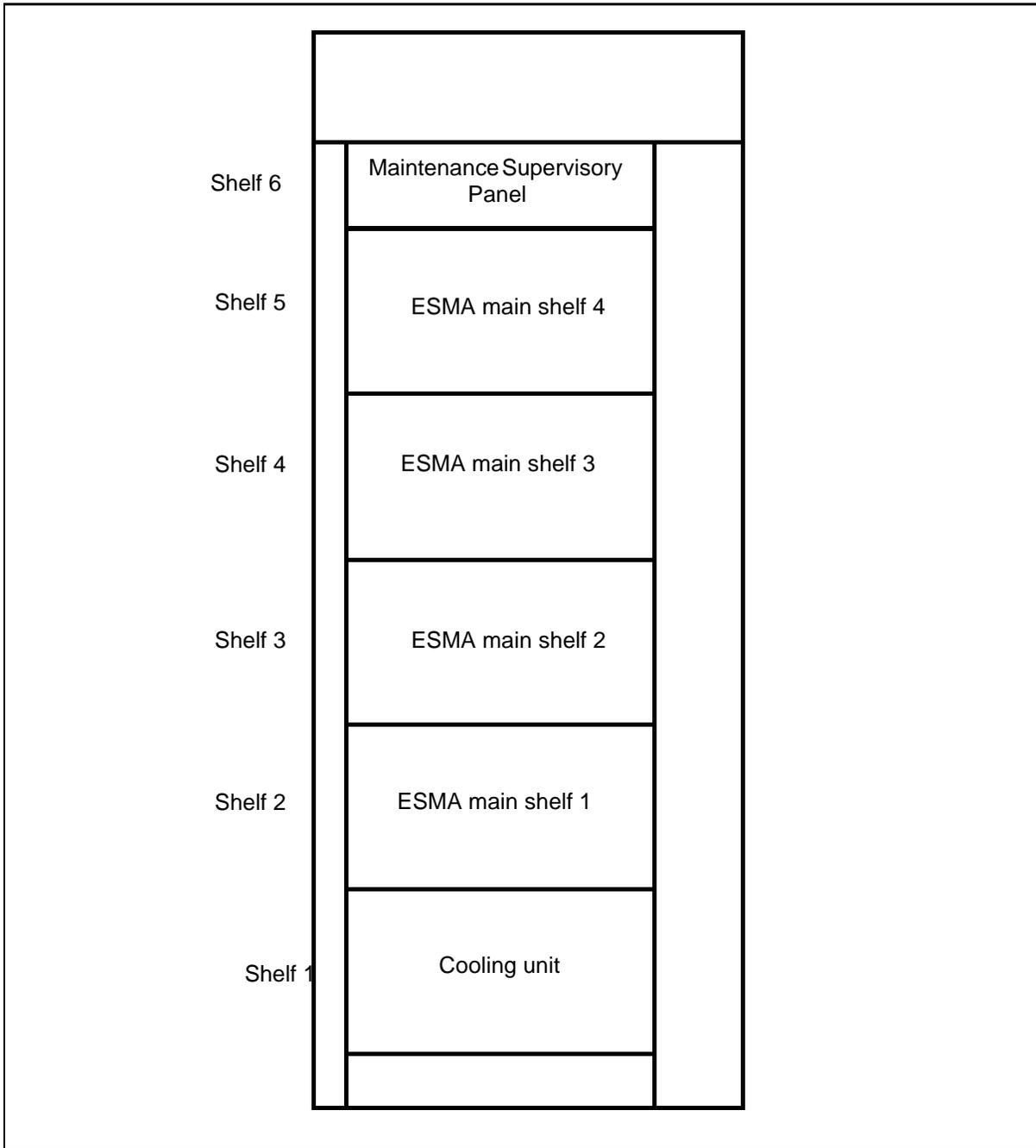
Function:

The Multivendor Dual Density Equipment (MVDD) bay houses four main Enhanced Subscriber Carrier Module Access (ESMA) shelves (NTMX8504). The MVDD bay supports the SCM-10A feature. One MVDD bay can support 96 P-side DS-1 links. Table 3-Q shows the shelves and their positions in the bay. Figure 3-17 illustrates a fully-configured MVDD bay.

Table 3-P:
NTQX90BA Multivendor Dual Density Equipment (MVDD): fixed shelves

Shelf Position	Shelf PEC	Shelf Name
6	NTRX40AA	Maintenance Supervisory Panel (MSP)
5	NTMX8504	ESMA shelf
4	NTMX8504	ESMA shelf
3	NTMX8504	ESMA shelf
2	NTMX8504	ESMA shelf
1	NTRX91AA	Cooling unit

Figure 3-18: Multivendor Dual Density Equipment (MVDD) bay (NTQX90BA)



NTTR80 (Star Hub frame)

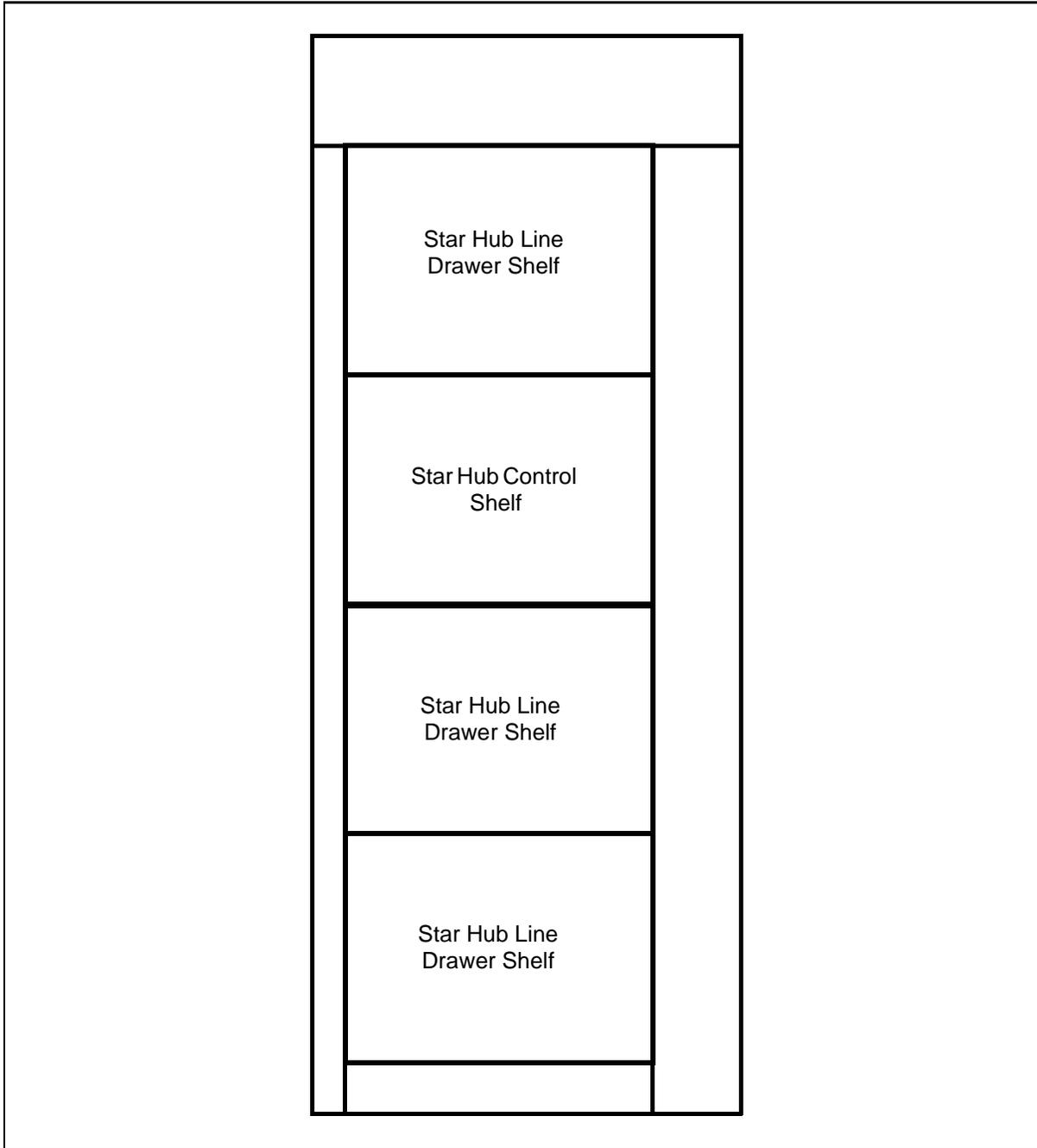
Function:

The Star Hub frame supports the Star Hub Remote system and houses the Star Hub Control shelf (NTTR8603) and three Star Hub Line Drawer shelves (one NTTR5020 upper shelf, two NTTR5010 lower shelves). Table 3-Q shows the provisionable shelves and their positions in the bay. Figure 3-18 illustrates a fully-configured Star Hub frame.

Table 3-Q:
NTTR80 Star Hub frame: provisionable shelves

Shelf Position	Shelf PEC	Shelf Name
4	NTTR5020	Star Hub Line Drawer shelf
3	NTTR8603	Star Hub Control shelf
2	NTTR5010	Star Hub Line Drawer shelf
1	NTTR5010	Star Hub Line Drawer shelf

Table 3-R: Star Hub frame (NTTR80)



Section 4: Shelves, modules and panels

Introduction

DMS-10 equipment shelves, modules, and panels are described in this section. The descriptions are strictly organized by Product Engineering Code (PEC) number. Each shelf description contains a table that lists all of the provisionable circuit packs on that shelf. Each table has three columns of information: the pack PEC number; the pack name; and the shelf location(s) of the pack. These tables show all of the circuit packs that can be provisioned on a particular shelf, not necessarily all of the packs that are provisioned on a given shelf at a specific installation site.

Modules and panels that are manufactured and installed as single hardware entities, and that have a PEC number assigned to them, are each represented by a figure. No table is provided with these types of equipment when they contain no provisionable circuit packs.

Equipment lists

Within each shelf, module, and panel description is a group of subheadings that contains basic information about equipment function, features, dimensions, components, quantity (when required), and location. Certain DMS-10 shelves, modules, and panels are available in different lists, or versions, of their PEC number. Information about a specific list of a shelf is given when the new list version has been developed, and is required, for a specific software or hardware application. A category subheading, entitled “Versions,” is then introduced under the main entry, which describes when a particular list of a shelf, module, or panel is used.

ED0T81-01 (Alarm Isolation and Transfer Panel)

Function:

The ED0T81-01 Alarm Isolation and Transfer Panel is a general-purpose relay panel used to interface alarm/control signals between systems in a central office while maintaining the grounding integrity of the DMS-10 switch in the Isolated Ground Zone (IGZ).

The panel consists of two sections. The first section of the panel is an array of seven relays that have 48V dc coils. One coil lead of each relay is connected to a common -48 V alarm battery supply pin on the panel. The other coil lead of each relay can be cross-connected to a selected alarm signal distribution (SD) point at the MDF (extended from the J0T72 Alarm shelf). When the selected SD point is operated (that is, the SD point changes from “open” to “SD ground”), the respective ED0T81-01 panel relay energizes and closes four sets of form-C contacts (of which three are available for external use). In this way, an isolated loop-closure contact signal can safely control customer equipment outside of the DMS-10 IGZ without jeopardizing the DMS-10 system grounding integrity. (SD points are often unknowingly subjected to abuse when connected directly to equipment such as back-up generator starting circuits outside of the DMS-10 IGZ.) Back-EMF suppression diodes are included in each relay circuit. Operating limits for these relays can be found in bay schematic SD0T81-01. The location of these relays on the panel is shown in drawing ED0T81-01.

The second section of the panel is an array of six independent relays. Both coil leads for each relay are available for connection from a controlling point inside or outside of the DMS-10 IGZ. Jumpers in the coil circuit of each relay are used to set the coil operation voltage at either 24V dc (18 V to 28 V), 48V dc (39 V to 62 V), or 130V dc (117 V to 186 V). Each coil circuit is equipped with bi-directional back-EMF suppression, so voltage polarity of the coil voltage connections can be neglected by the installer. When a relay is energized, four sets of form-C contacts close (of which three are available for external use). The relays can be used to create loop-closure contact alarms from miscellaneous equipment whose design offers only battery-on-alarm or ground-on-alarm. Alarm connection examples for this equipment are shown in bay schematic SD0T81-01. Operating limits for these relays can also be found in SD0T81-01. The location of these relays on the panel is shown in drawing ED0T81-01.

Location:

Rear frame uprights of the J0T81 Miscellaneous Equipment bay or, if the mounting brackets for 25.3-inch mounting centers are removed, in a standard 23-inch IGZ relay rack. All connections to the panel are made through wire-wrap pins.

J0T13A-1 (Digital Carrier shelf)

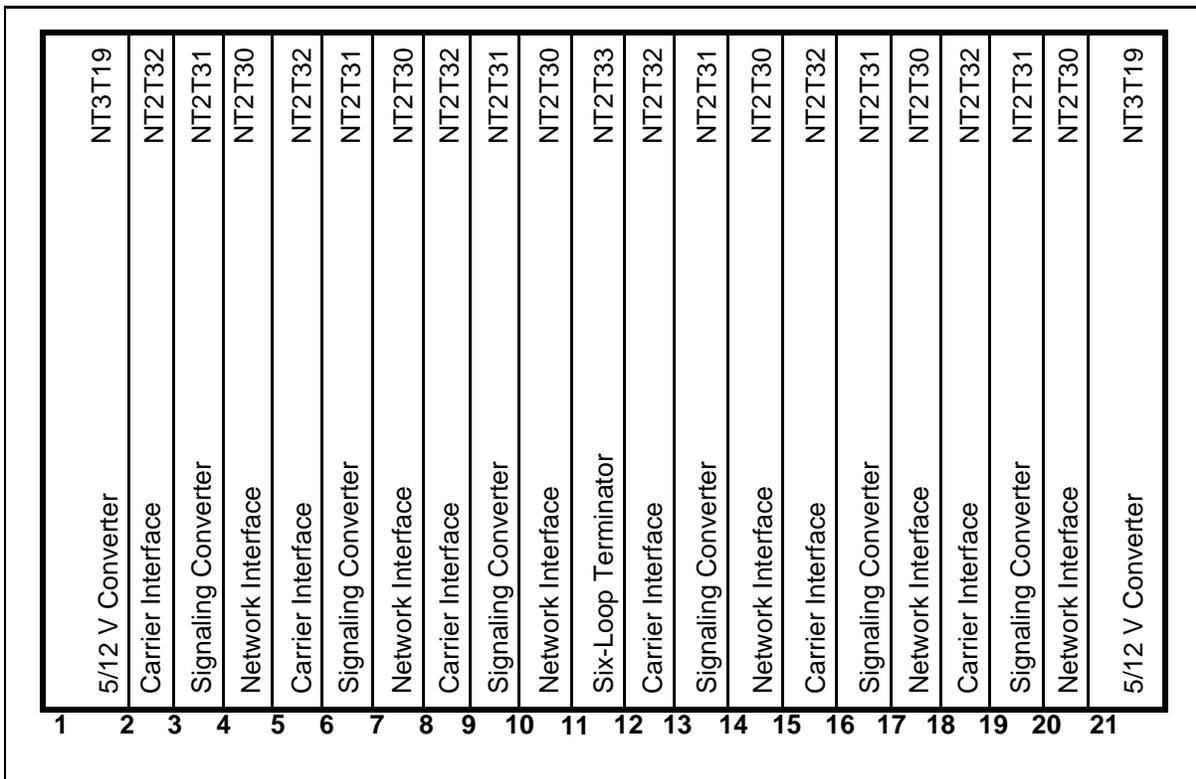
Function:

To accommodate one or two converter packs and 19 additional circuit packs, including those in Table 4-A. Figure 4-1 shows a sample J0T13A-1 pack fill. Each three-pack Digital Carrier Module (DCM) unit (that is, Network Interface pack, Signaling Converter pack, and Carrier Interface pack) provides an interface to a T-1 type digital carrier that conforms to DS-1 interface specifications.

Table 4-A: Digital Carrier shelf: provisionable circuit packs		
Pack Number	Pack Name	Pack Position
NT2T30	Network Interface	4, 7, 10, 14, 17, 20
NT2T31	Signaling Converter	3, 6, 9, 13, 16, 19
NT2T32	Carrier Interface	2, 5, 8, 12, 15, 18 (see note)
NT2T33	Six-Loop Terminator	11
NT3T19	5/12 V Converter	1, 21

Note: A Data Link Controller pack (NT3T50) cannot be connected to a Carrier Interface pack (NT2T32) that is provisioned either in position 8 or 18.

Figure 4-1: Digital Carrier shelf (J0T13A-1)



Versions:

- L1 Normal DCM applications use the List 1 Digital Carrier shelf
- L3 For the Cluster configuration, which requires communication between the Data Link Controller (DLC) pack and a DCM, a List 3 Digital Carrier shelf is required; the List 3 shelf can also function in normal DCM applications. The Cluster configuration requires Carrier Interface packs (NT2T32) with a family code of “AD” or higher.
- L5 For the Operations Support System (OSS) telemetry feature used with the Cluster configuration, a List 5 Digital Carrier shelf is required; the List 5 shelf can also function in normal DCM applications. The OSS telemetry feature requires Carrier Interface packs (NT2T32) with a family code of “AE” or higher.

Quantity:

One Digital Carrier shelf is required for every 6 (or fraction thereof) three-pack DCM units. One Digital Carrier shelf is required at each SSO to support the HSO/SSO feature.

Note: The Large Cluster Controller (LCC) contains no peripheral equipment; therefore, in digital applications, the Digital Carrier shelf resides in a co-located DMS-10 switch. The number of Digital Carrier shelves required for both simplex and duplex applications is shown in Table 4-B.

Location:

- shelves 2, 4, and 5 (shelves 1 and 3 must be vacant), J0T30E-1 (PE bay)
- shelves 4 and 5 (shelves 1 and 2 have analog PE shelves and shelf 3 must be vacant), J0T30E-1 (PE bay)
- shelf 5 (shelves 1, 2, 3 have analog PE shelves and shelf 4 must be vacant), J0T30E-1 (PE bay)
- shelves 2, 4, and 6, J0T80 (PECM bay)

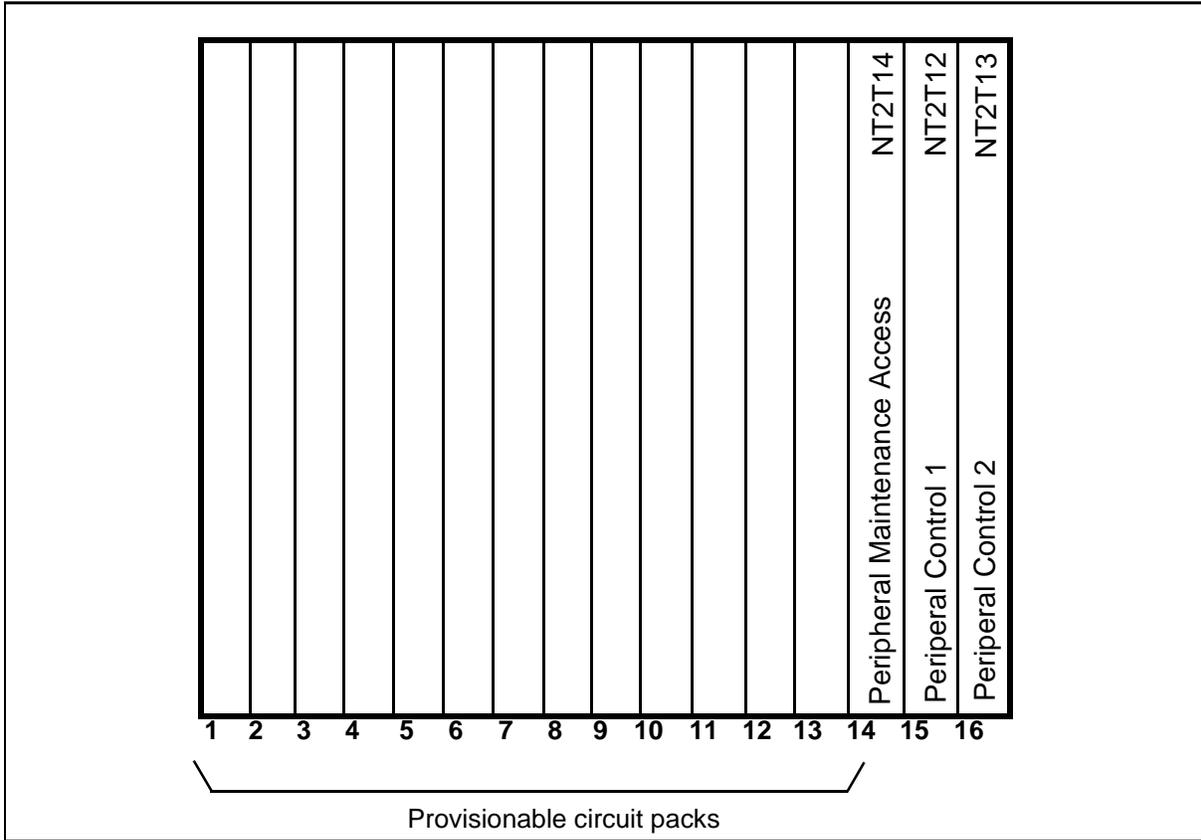
Table 4-B: Number of Digital Carrier shelves per HSO/LCC		
Number of SSOs	Number of Digital Carrier shelves per HSO/LCC	
	Simplex Links	Duplex Links
1 or 2	1	1
3 or 4	1	2
5 or 6	2	3
7 or 8	2	4
9 or 10	3	5
11 or 12	3	6
13 or 14	4	7
15 or 16	4	8

J0T29A-1 (Peripheral Equipment (PE) shelf)

Function:

To house up to 16 peripheral circuit packs. Peripheral Control 1 (NT2T12) and Peripheral Control 2 (NT2T13) packs, the shelf control and power packs, must be located in positions 16 and 15, respectively, of each PE shelf. In addition, one shelf per PE bay must contain a Peripheral Maintenance Access (PMA) pack (NT2T14) in position 14, if the bay is equipped with only PE (J0T29A-1), Dual PE (J0T59A-1 L1), and/or Dual PE/PMS (J0T90A-1 L1) shelves. E&M Trunk packs, Noller Test Trunk packs, Incoming Test Trunk packs, and Auxiliary Ringing and Tone packs must be located in positions 1 through 4. All other line and trunk packs can be installed in positions 1 through 14 per individual system requirements. Figure 4-2 illustrates the positions and pack-fill requirements of the J0T29A-1 shelf.

Figure 4-2: Peripheral Equipment (PE) shelf (J0T29A-1)



Location:

Shelves 1 through 4, J0T30E-1 (PE bay)

J0T53A-1 (Remote Equipment Module (REM) Local shelf)

Function:

To accommodate two converter packs, one Circuit Breaker pack, and four groups of Office Carrier Module (OCM) packs.

The REM Local shelf houses the circuit packs that are listed in Table 4-C. Figure 4-3 shows a sample J0T53A-1 pack fill.

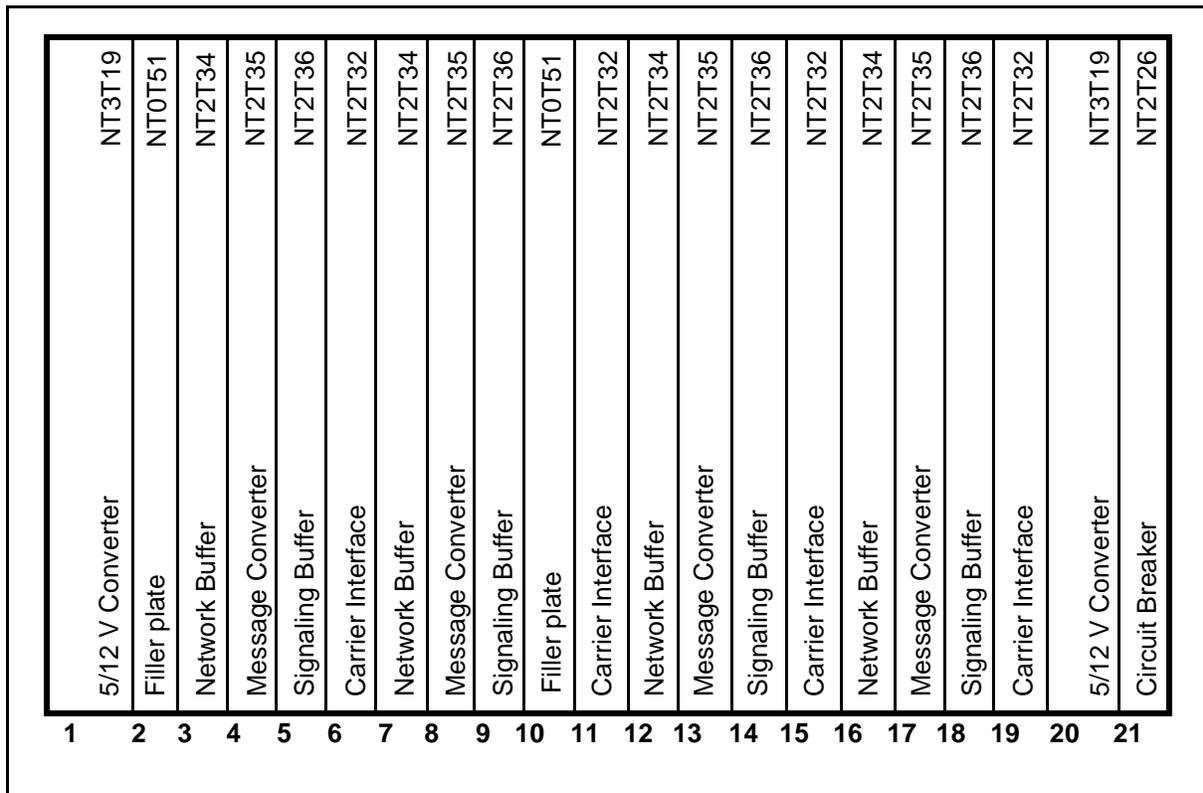
Quantity:

One REM Local shelf is required for every two multiplex loop pairs assigned to remote equipment (that is, four OCMs). The loop assigned to OCM 1 (positions 3, 4, 5, and 6) is spared by the loop assigned to OCM 2 (positions 11, 12, 13, and 14). Similarly, the loop assigned to OCM 3 (positions 7, 8, 9, and 10) is spared by the loop assigned to OCM 4 (positions 15, 16, 17, and 18).

Table 4-C: REM Local shelf: provisionable circuit packs		
Pack Number	Pack Name	Pack Position
NT2T26	Circuit Breaker ¹	21
NT2T34	OCM Packs Network Buffer	3, 7, 11, 15
NT2T35	Message Converter	4, 8, 12, 16
NT2T36	Signaling Buffer	5, 9, 13, 17
NT2T32	Carrier Interface	6, 10, 14, 18
NT3T19	5/12 V Converter	1, 20

Applies to List 1 hardware only.

Figure 4-3: Remote Equipment Module (REM) Local shelf (J0T53A-1)



Location:

- shelf 2 (Shelves 1 and 3 must be vacant), PE bay
- shelf 4 (shelf 3 must be vacant or have analog PE shelves), PE bay
- shelf 5, PE bay

- shelves 2, 4, and 6, J0T80 (PECM bay)

J0T55A-1 (Remote Equipment Module (REM) Remote shelf)

Function:

To accommodate two 5/12 V Converter packs, one Circuit Breaker pack, one Remote Alarm pack, and four groups of four Remote Carrier Module (RCM) packs.

The REM Remote shelf houses the circuit packs that are listed in Table 4-D. Figure 4-4 shows a sample J0T55A-1 pack fill.

Table 4-D: REM Remote shelf: provisionable circuit packs		
Pack Number	Pack Name	Pack Position
NT2T26	Circuit Breaker	21
NT2T47	Remote Alarm	19
	RCM Packs	
NT2T32	Carrier Interface	2, 6, 11, 15
NT2T39	Remote Signaling	3, 7, 12, 16
NT2T38	Remote Message	4, 8, 13, 17
NT2T37	Remote Network	5, 9, 14, 18
NT3T19	5/12 V Converter	1, 20

Applies to List 1 hardware only.

Figure 4-4: Remote Equipment Module (REM) Remote shelf (J0T55A-1)

	NT3T19
5/12 V Converter	NT2T32
Carrier Interface	NT2T39
Remote Signaling	NT2T38
Remote Message	NT2T37
Remote Network	NT2T32
Carrier Interface	NT2T39
Remote Signaling	NT2T38
Remote Message	NT2T37
Remote Network	NT0T51
Filler plate	NT2T32
Carrier Interface	NT2T39
Remote Signaling	NT2T38
Remote Message	NT2T37
Remote Network	NT2T32
Carrier Interface	NT2T39
Remote Signaling	NT2T38
Remote Message	NT2T37
Remote Network	NT2T47
Remote Alarm	NT3T19
5/12 V Converter	NT2T26
Circuit Breaker	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	

Quantity:

One REM Remote shelf is required per REM. When equipped with four RCMs, the Remote shelf serves eight peripheral shelves. The loop assigned to RCM 1 (positions 2, 3, 4, and 5) is spared by the loop assigned to RCM 2 (positions 11, 12, 13, and 14). Similarly, the loop assigned to RCM 3 (positions 6, 7, 8, and 9) is spared by the loop assigned to RCM 4 (positions 15, 16, 17, and 18).

Location:

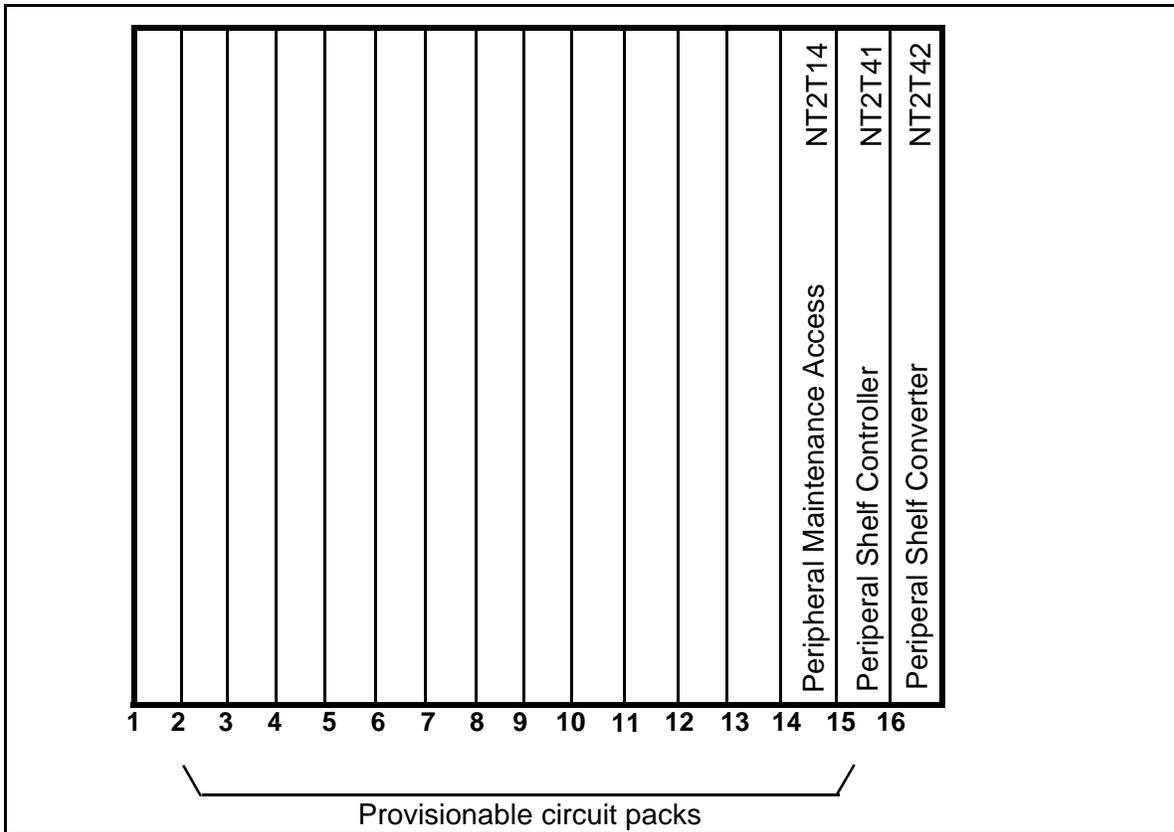
shelf 6 of a standard PE bay (J0T30A-C) at the remote site

J0T59A-1 (Dual Peripheral Equipment (PE) shelf)

Function:

To house up to 16 PE circuit packs. Peripheral Shelf Controller (NT2T41) and Peripheral Shelf Converter (NT2T42) packs, which are the shelf control and power packs, are required in positions 15 and 16, respectively, of each PE shelf. In addition, one shelf per PE bay must contain a PMA pack (NT2T14) in position 14. E&M Trunk packs, Noller Test Trunk packs, Incoming Test Trunk packs, and Auxiliary Ringing and Tone packs must be located in positions 1 through 4 in the L1 version; the packs may be provisioned in positions 1 through 13 in the L2 version. All other types of line and trunk packs may occupy positions 1 through 14. Figure 4-5 shows a sample J0T59A-1 pack fill.

Figure 4-5: Dual Peripheral Equipment (PE) shelf (J0T59A-1)



Versions:

- L1
- L2

Features:

- Each Dual PE shelf usually operates from its own power supply, but it can operate from the power supply of the adjacent mate shelf during a failure condition
- Dual PE shelves can coexist with single PE shelves
- In the L2 version, positions 1 through 13 available for expanded analog trunking capacity.

Location:

Shelves 1 through 4, J0T30E-1 (PE bay)

J0T63A-1 (Ringing shelf)**Function:**

The Ringing shelf provides mounting space for two Single-Frequency Ringing Generator packs (positions 1 and 9), two Multifrequency (MF) Ringing Generator packs (positions 3 and 7), and two Ringing Monitor packs (positions 5 and 6).

J0T69 (Subscriber Carrier Module (SCM) shelf)**Function.**

To house up to 15 circuit packs and two converter packs. The packs provisioned on the SCM shelf are listed in Table 4-E. Figure 4-6 shows a sample J0T69 pack fill.

Location:

- shelf 6, J0T30A-C (PE bay). The shelf immediately below each SCM shelf must be left vacant for cooling purposes.
- shelves 2, 4, and 6, J0T80 (PE bay). The shelf immediately below each SCM shelf must be left vacant for cooling purposes.

Table 4-E: SCM shelf: provisionable circuit packs		
Pack Number	Pack Name	Pack Position
NT2T26	Circuit Breaker	17
NT2T50	Time Switch	6, 7
NT2T51	System Processor	2, 11
NT2T52	B-Word Processor	4, 9
NT2T53	A-Bit Processor	5, 8
NT2T54	Digroup	14, 15
NT2T55	1-for-N Protection	13
NT2T56 ²	Protection Switch Failsafe	12
NT3T19	5/12 V Converter	1, 16

Not required when SCM shelf is housed in a J0T80 PE bay.

Provisioned when SCM has Protection Switching feature.

Figure 4-6: Subscriber Carrier Module (SCM) shelf (J0T69)

1	5/12 V Converter	NT3T19
2	System Processor	NT2T51
3	Filler plate	NT0T51
4	B-Word Processor	NT2T52
5	A-Bit Processor	NT2T53
6	Time Switch	NT2T50
7	Time Switch	NT2T50
8	A-Bit Processor	NT2T53
9	B-Word Processor	NT2T52
10	Filler plate	NT0T51
11	System Processor	NT2T51
12	Protection Switch Failsafe	NT2T56
13	1-for-N Protection	NT2T55
14	Digroup	NT2T54
15	Digroup	NT2T54
16	5/12 V Converter	NT3T19
17	Circuit Breaker	NT2T26

J0T72A-1 (Alarm and Ringing Module)

Function:

To accommodate circuit packs that provide visual alarms when a failure occurs, alarm-/status-indicator lamps, and switches that allow operating company personnel to: silence/reset audible alarm indicators, enable/disable remote alarm indicators, reset ringing generator, manually test alarm-/status-indicator lamps, and perform utility interrupts, CPU changeover, and System Software Reload (SYSLOAD). The Alarm and Ringing Module also provides alarm battery fusing and ringing fuses for up to 32 bays of Peripheral Equipment (PE). This module is used only when upgrading a pre-existing DMS-10 switch.

Features:

- The J0T75A-2 Power Distribution Panel (PDP) is not required if the J0T72A-1, List 3 or 4, is provisioned.
- connectorized for signal and Main Distributing Frame (MDF) cables
- field option block connections for ringing cables

Quantity:

One J0T72A-1 per system

Location:

- shelf 5, J0T76D-1 CE bay
- shelf 5, J1T93A-1/J1T93B-1 CE bay

J0T72B-1 (Alarm and Ringing Module)**Function:**

To accommodate circuit packs that provide visual alarms when a failure occurs, alarm-/status-indicator lamps, and switches that allow operating company personnel to: silence/reset audible alarm indicators, enable/disable remote alarm indicators, reset ringing generator, manually test alarm-/status-indicator lamps, and perform utility interrupts, CPU changeover, and System Software Reload (SYSLOAD). The Alarm and Ringing Module also provides alarm battery fusing and ringing fuses for up to 14 bays of Peripheral Equipment (PE).

The Alarm and Ringing Module houses the circuit packs shown in Table 4-F.

Features:

- connectorized for signal and Main Distributing Frame (MDF) cables
- field option block connections for ringing cables

Quantity:

One Alarm and Ringing Module is provisioned per DMS-10 switch.

Location:

- shelf 5, J0T76E-1, CE-3 bay
- shelf 5, J1T83E-1, CE-3 bay
- shelf 5, J1T93A-1/J1T93B-1, CE-3 bay

Pack Number	Pack Name	Pack Position
NT3T27	Ringing Monitor	7, 8
NT3T30	Fuse Alarm	behind fuse panel
NT3T53	Alarm Processor	2, 5
NT3T54	Alarm Signal Distributor	3, 4
NT3T55	Ringing and Alarm Control	5
NT3T59	Dual Ringing Generator	6, 9

J0T72C-1 (Alarm shelf)

Function:

To accommodate alarm circuit packs provisioned in the Large Cluster Controller (LCC). This configuration is the same as the J0T72B-1 module except that hardware associated with ringing is not equipped.

The following packs are provisioned for this version: the Fuse Alarm (NT3T30), Alarm Processor pack (NT3T53), Alarm Signal Distribution pack (NT3T54), and the Ringing and Alarm Control pack (NT3T55). The balance of the shelf is configured with Filler Plate packs.

Quantity:

One Alarm shelf is provisioned per Large Cluster Controller.

Location:

shelf 5, CE-3 bay.

J0T75A-3 (Power Distribution Panel (PDP))

Function:

To house power distribution equipment for the DMS-10 system.

Features:

The Power Distribution Panel provides a dual (A and B) power feed configuration: the A feed powers each lower shelf of redundant pairs of shelves, while the B feed powers the upper shelves of redundant pairs.

Versions:

- List 1 is equipped with 26 circuit breakers and 2 filter capacitors.
- List 2 is equipped with 28 circuit breakers.
- List 3 is also equipped with 28 circuit breakers.
- Lists 4 through 8 are used in upgrades. List 4 can power up to three PE bays. Lists 5 and 6 together, or Lists 7 and 8 together, can power up to 28 additional PE bays. Lists 5 and 7 are used to power PE04 through PE17; Lists 6 and 8 are used to power PE18 through PE31.

Quantity:

- One PDP, List 1, is required per system; a List 2 and a List 3 PDP can be added per system requirements.
- One PDP, List 1 or 4, is required per upgraded system. A List 5, or a List 5 and 6, may be added to List 1, depending upon system requirements. Similarly, a List 7, or a List 7 and 8, may be added to List 4.

Location:

- List 1 is located in the top third of shelf 5 of the first PE bay (PE-1)
- List 2 is located in the middle third of shelf 5 of the first PE bay (PE-1)
- List 3 is located in the bottom third of shelf 5 of the first PE bay (PE-1)
- Lists 4, 7, and 8 are provisioned in a J0T81A-1, L2 or L11, ME bay.
- Lists 5 and 6 are provisioned in a J0T30E-1 PE bay.

J0T90A-1 (Dual Peripheral Equipment/Peripheral Maintenance System (PE/PMS) shelf)**Function:**

To house up to 16 PE circuit packs. Peripheral Maintenance System (PMS) or ac Tester (ACT) circuit packs must be in positions 1, 2, and 3 of the Dual PE shelf. Positions 4 through 16 are provisioned identically to the Dual PE shelf (J0T59A-1, L1). The reserved positions must be equipped as follows:

PMS Configuration

position 1-Peripheral Circuit Test pack (NT2T71)

position 2-Peripheral Maintenance Processor pack (NT2T70)

position 3-Facility Test pack (NT2T72)

Note: The PMA pack (NT2T14) is not required in bays where PMS is installed.

ACT Configuration

position 1-Peripheral Circuit Test pack (NT2T71)

position 2-Control Processor pack (NT2T74)

position 3-Signaling Processor pack (NT2T73)

Features:

Each Dual PE/PMS shelf usually operates from its own power supply, but the PE portion can operate from the power supply of the adjacent mate shelf during a failure condition.

J0T90A-1, L2 (Dual Peripheral Equipment Trunk/ Peripheral Maintenance System (PE/PMS) shelf)

Function:

To house up to 16 PE circuit packs. Peripheral Maintenance System (PMS) or ac Tester (ACT) circuit packs must be in positions 1, 2, and 3 of the Dual PE Trunk shelf. Positions 4 through 16 are provisioned identically to the Dual PE Trunk shelf (J0T59A-1, L2). The reserved positions must be equipped as follows:

Features:

Positions 4 through 13 are available for expanded analog trunking capacity.

Quantity:

The PMS requires one set of packs (2T70, 2T71, 2T72) at the base site and one set at each REM where testing is desired. The ACT requires one set at the base site.

Location:

shelves 1 through 4 at base site and shelf 4 at each Remote Equipment Module (REM), J0T30E-1 (PE bay).

J0T93A-1 (Control shelf)

Function:

To accommodate the CPU, memory system, power, input/output interface, and support equipment, including the circuit packs shown in Table 4-G. Figure 4-7 shows a sample J0T93A-1 pack fill.

Quantity:

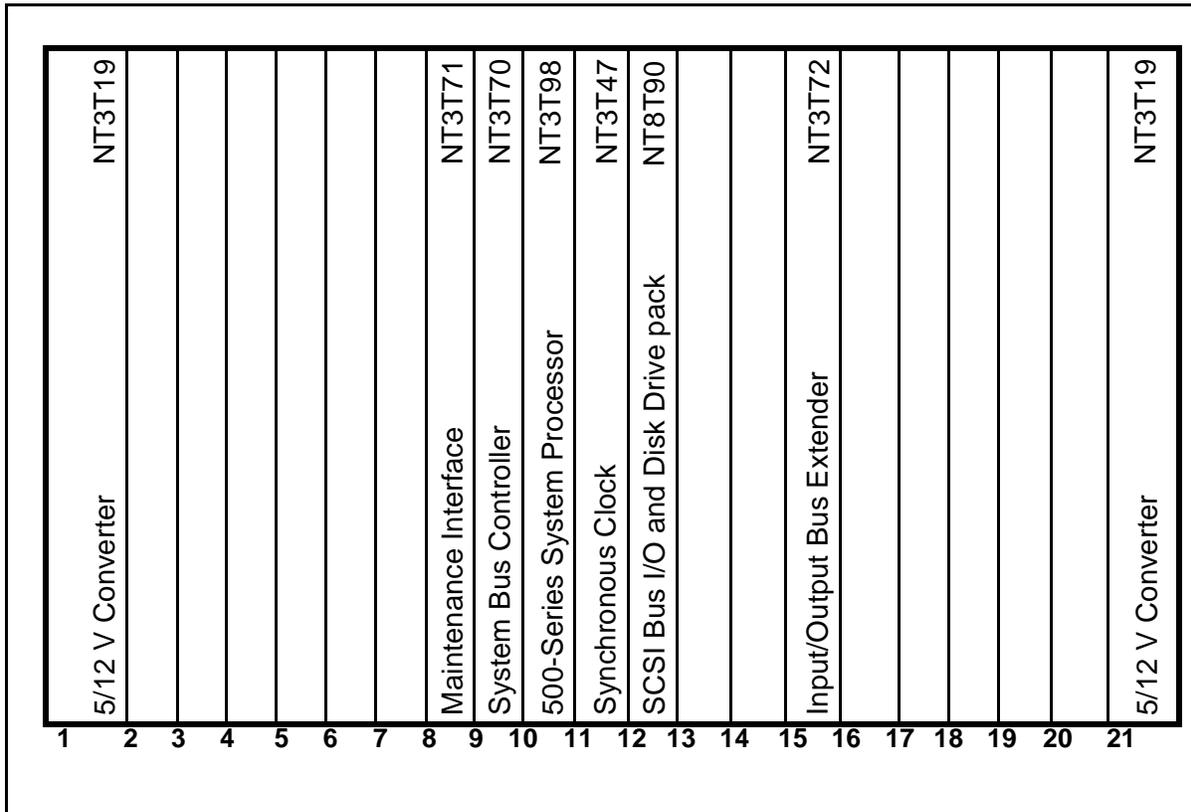
Two Control shelves are required per system.

Location:

Shelves 2 and 3, CE-3 bay.

Table 4-G: Control shelf: provisionable circuit packs		
Pack Number	Pack Name	Pack Position
NT0T51	Filler Plate	vacant slots
NT3T19	5/12 V Converter (2)	1, 21
NT3T47	Synchronous Clock	11
NT3T70	System Bus Controller	9
NT3T71	Maintenance Interface	8
NT3T72	Input/Output Bus Extender	15
NT3T80	Dual Serial Data Interface	13 or 14
NT3T98	500-Series System Processor	10
NT8T90	SCSI Bus I/O and Disk Drive	12

Figure 4-7: Control shelf (J0T93A-1)



J0T97A-2 (Power and Cooling Module)

Function:

To serve as an electrical interface point for wiring of power and alarms in a CE-1 bay, and to house miscellaneous hardware. To provide circuit breaker protection of -48 V power supplies to the network shelves. To provide a mixing chamber system and airflow control for the bay cooling.

Features:

- recessed front panel equipped with eight circuit breakers, fan, power fuses, and recorder-announcer fuses (if equipped)
- LEDs to provide bay/fuse visual alarms
- air displacement monitoring vane switches to provide fan alarms

Quantity:

One Power and Cooling Module is required in the CE-1 bay.

Location:

Between Shelves 3 and 4, CE-1 bay.

J0T97A-3 (Power and Cooling Module)

Function:

To serve as an electrical interface point for wiring of power and alarms in the CE-1, CE-2, and CE-4 bays, and to house cooling hardware. To provide circuit breaker protection of -48 V power supplies located in the bay. To provide forced air cooling for all of the equipment located in the bay.

Features:

- recessed front panel equipped with 10 circuit breakers, fan power fuses, and and recorder-announcer fuses (if equipped)
- LEDs to provide bay and fuse visual alarms
- air displacement monitoring vane switches to provide fan alarms

Lists:

- List 1 or List 3 is used in the LCC application
- List 2 or List 4 is equipped in J1T30 CE Bay applications

Quantity:

One Power and Cooling Module is always equipped in the CE-1 bay.

Location:

between equipment shelves 3 and 4 in the CE-1 bay

J0T97B-1 (Power and Cooling Module)

Function:

To serve as an electrical interface point for wiring of power and alarms in the J1T92 CE-1 bay, and to house cooling hardware. To provide circuit breaker protection of -48 V power supplies located in the bay. To provide forced air cooling for all of the equipment located in the bay.

Features:

- recessed front panel equipped with 10 circuit breakers, fan power fuses, and and recorder-announcer fuses (if equipped)
- LEDs to provide bay and fuse visual alarms
- air displacement monitoring vane switches to provide fan alarms

Quantity:

One Power and Cooling Module is always equipped in the J1T92 CE-1 bay.

Location:

immediately below the CNI Module in the J1T92A-1/J1T92B-1 CE-1 bay

J0T98A-1 (Power and Cooling Module)

Function:

To serve as an electrical interface point for wiring of power and alarms in the CE-3 bay, and to house cooling hardware. To provide circuit breaker protection of -48 V power supplies located in the bay. To provide forced air cooling for all of the equipment located in the bay.

Features:

- test panel equipped with 309- and 310-type jacks for trunk-test access
- recessed front panel equipped with four circuit breakers, and fan, tape drive, and recorder/announcer power fuses
- air displacement monitoring vane switches to provide fan alarms

Location:

between shelves 3 and 4 of the CE-3 bay

J0T98A-2 (Power and Cooling Module)

Function:

To serve as an electrical interface point for wiring of power and alarms in the CE-3 bay which is used in the three-bay configuration and to house cooling hardware. To provide circuit breaker protection of -48 V power supplies located in the bay. To provide forced air cooling for all of the equipment located in the bay.

Features:

- test panel equipped with 309- and 310-type test jacks for trunk-test access
- recessed front panel equipped with 10 circuit breakers, and fan and tape drive power fuses
- air displacement monitoring vane switches to provide fan alarms

Quantity:

One Power and Cooling Module is required in the J1T83 CE-3 bay.

Location:

between shelves 3 and 4 in the J1T83 CE-3 bay

J0T98A-3 (Power and Cooling Module)

Function:

To serve as an electrical interface point for wiring of power and alarms in the CE-3 bay used for Large Cluster Controller (LCC) systems. To provide circuit breaker protection of -48 V power supplies located in the bay. To provide forced air cooling for all of the equipment located in the bay.

Features:

- recessed front panel equipped with 10 circuit breakers, and fan and tape drive power fuses
- air displacement monitoring vane switches to provide fan alarms

Quantity:

One Power and Cooling Module is required in the J1T83 CE-3 bay.

Location:

between shelves 3 and 4 in the J1T83 CE-3 bay

J0T98B-1 (Power and Cooling Module)

Function:

To serve as an electrical interface point for wiring of power and alarms in the J1T93 CE-3 bay and to house cooling hardware. To provide circuit breaker protection of -48 V power supplies located in the bay. To provide forced air cooling for all of the equipment located in the bay.

Features:

- test panel equipped with 309- and 310-type jacks for trunk-test access
- recessed front panel equipped with 10 circuit breakers, and fan and recorder annunciator power fuses
- air displacement monitoring vane switches to provide fan alarms

Quantity:

One Power and Cooling Module is required in the J1T93 CE-3 bay.

Location:

between shelves 3 and 4 in the J1T93A-1/J1T93B-1 CE-3 bay

J1T31A-1 (Network shelf)

Function:

To accommodate up to 21 circuit packs that serve switching, scanning, and signal distribution functions. Size and configuration of the system determine the number of circuit packs required. The Network shelf houses the circuit packs listed in Table 4-H. Figure 4-8 shows a sample J1T31A-1 pack fill.

Note 1: When configuring an office as a Host Switching Office (HSO) in a Cluster, the DB25/72 Bracket assembly (ED1T27-10, G1) is required hardware on each Network shelf of the HSO. It serves as the connecting medium between the various Data Link Controller (DLC) cables (the DLC Analog cable, the DLC Digital cable, and the DLC RS-422 cable) and Network shelf cabling.

Note 2: Where empty slots occur in a shelf, a Filler Plate pack (NT0T51) must be installed for proper ventilation.

Versions:

- L1
- L2
- L3, used for the Cluster configuration with the Operations Support System (OSS) feature which requires shelves equipped with connector wings

Quantity:

Two Network shelves are required per Network module, with a minimum system configuration of one Network module (two Network shelves) and a maximum configuration of two modules (four Network shelves).

Location:

shelves 2 through 5, CE-1 bay

Pack Number	Pack Name	Pack Position
NT3T09	Serial Data Interface	4 through 7
NT3T10	Magnetic Tape Controller	4
NT3T11	Magnetic Tape Cable Interface	variable
NT3T19	5/12 V Converter	1, 21
NT3T50	Data Link Controller	4 through 7
NT3T72	Input/Output Bus Extender	2, 3
NT3T80	Dual Serial Data Interface	4 through 7
NT3T90	Input/Output Interface Pack	4
NT3T93	Dual Integrated Modem	4 through 7
NT4T00	Bus Terminator, Type 7	8
NT4T01	Tone and Digit Sender	9, 11
NT4T02	Universal Tone Receiver	10 or 12
NT4T03	Conference	11 through 13
NT4T04	DS-30A Interface	13 through 17
NT4T05	Multiplex Loop Interface	13 through 17
NT4T06	Network	18, 19
NT4T07	Bus Terminator, Type 8	20
NT4T16	LAN/CPU Interface	4 through 7

Figure 4-8: Network shelf (J1T31A-1)

1	5/12 V Converter	NT3T19
2	Input/Output Bus Extender	NT3T72
3	Input/Output Bus Extender	NT3T72
4	See Table 4-1	
5	See Table 4-1	
6	See Table 4-1	
7	See Table 4-1	
8	Bus Terminator, Type 7	NT4T00
9	See Table 4-1	
10	See Table 4-1	
11	See Table 4-1	
12	See Table 4-1	
13	See Table 4-1	
14	See Table 4-1	
15	See Table 4-1	
16	See Table 4-1	
17	See Table 4-1	
18	Network	NT4T06
19	Network	NT4T06
20	Bus Terminator, Type 8	NT4T07
21	5/12 V Converter	NT3T19

J1T51A-1 (Input / Output Interface (IOI) shelf assembly)

Function:

To house the magneto optical drive (removable media) and related Power Converter pack.

Quantity:

Optional. One, if required.

Location:

shelf 4, CE-3 bay (J0T76E-1, J1T83E-1)

J1T60A-1, A-2 (Bay Supervisory Panel (BSP))

Function:

To house equipment that provides fuses, talk filter, and alarms for the Peripheral Equipment (PE) bay (J0T30E-1) in which it resides. The BSP also serves as a central distribution point for the cabling of the PE bay and contains a vent and baffle assembly that provides a fresh-air intake for equipment above the BSP and an exhaust for heat from the four lowest PE shelves.

Features:

- Cabling and connectors to provide multiplex-loop distribution for up to four PE shelves.
- cabling to provide ringing to all four shelves
- a talk-battery filter located inside the panel
- all power circuits alarm-reported by a series of appropriately marked alarm fuses in conjunction with the Fuse Alarm pack (NT3T30)
- Front access BSP provides easy access to Fuse Alarm pack (NT3T30) by way of a hinged front panel.
- a barrier strip that provides power distribution for up to three DCM shelves; the barrier strip is located on the rear of the BSP for easy access
- a terminal strip on the rear of the BSP to terminate the power feeds from the Power Distribution Panel (PDP); the terminal strip is located on the rear of the BSP for easy access

Quantity:

One BSP is required in each PE bay.

Location:

between shelves 4 and 5, PE bay

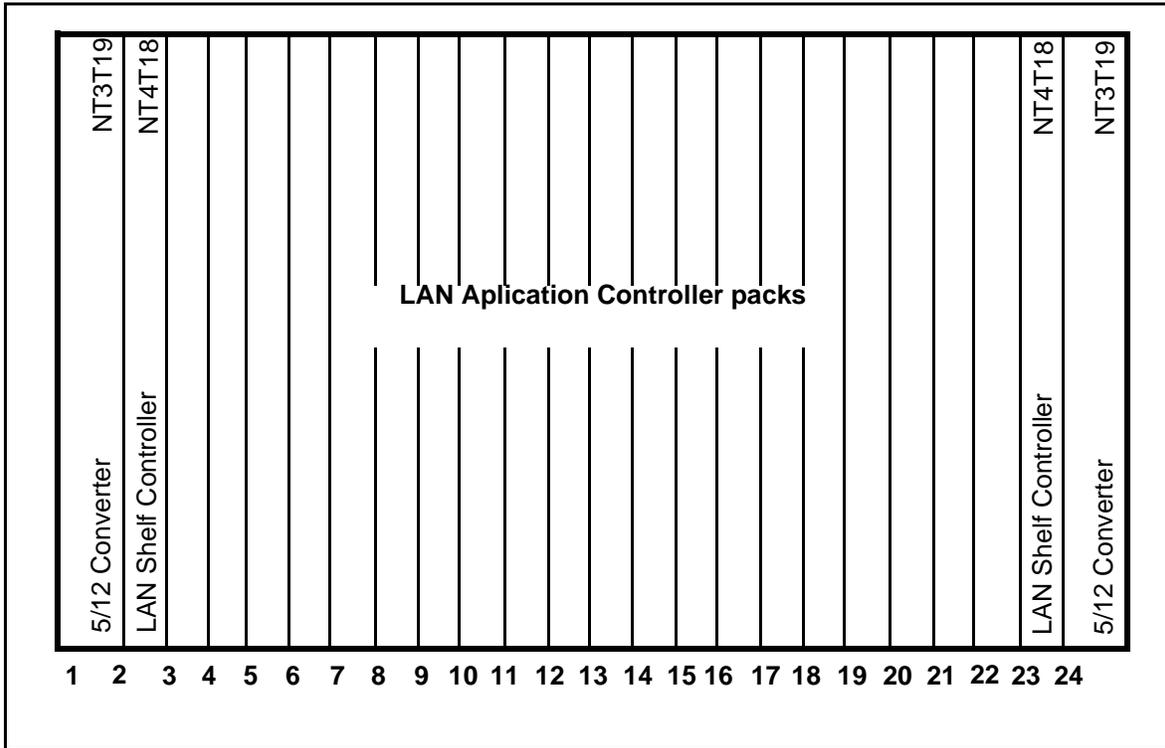
J1T65A-1 (Messaging shelf)**Function:**

To house two 5/12 V Converter packs, two LAN Shelf Controller packs, and up to 12 LAN Application Controller packs in a bay without fan cooling or up to 20 LAN Application Controller packs in a bay with fan cooling. To provide up to 10 CCS7 signaling links, depending on the application provisioning.

The Messaging shelf houses the circuit packs listed in Table 4-I. Figure 4-9 shows a sample J1T65A-1 pack fill.

Table 4-I: Messaging shelf: provisionable circuit packs		
Pack Number	Pack Name	Pack Position
NT3T19BA or NT3T19AF and later	5/12 V Converter	1, 24
NT4T18	LAN Shelf Controller	2, 23
NT4T20	LAN Application Controller	3 through 22

Figure 4-9: Messaging shelf (J1T65A-1)



Versions:

- L1, equipped with wing assembly and two 10-A circuit breakers
- L2, not equipped with wing assembly and two 10-A circuit breakers
- L3, equipped with wing assembly, but without circuit breakers

Features:

- Two 10-Mbit Local Area Networks (LANs) enable high-speed communication between Messaging shelf circuit packs.
- Circuit pack and power supply redundancy ensure system reliability.

Quantity:

One Messaging shelf is required to support the CCS7 signaling capability.

Location:

The following are optional locations for the Messaging shelf:

- shelves 2, 4, and 5, J0T30E-1 (PE bay)
- shelves 2, 4, and 6, J0T80 (PE bay)
- shelf 1, J1T30D-1 (CE-1 bay)

- shelves 1 and/or 2, J1T30D-1, L4 (CE-2 bay)
- shelf 1, J1T30E-1, (CE-1 bay)
- shelves 1 and/or 2, J1T30E-1, L7 (CE-2/CE-4 bay)
- shelf 3, J1T30E-2 (CE-1 bay)
- shelf 4, CE-3 bay of the DMS-10M switch
- shelf 1, J1T83E-1 (CE-3 bay)
- shelf 2, J1T92A-1/J1T92B-1 (CE-1 bay)
- shelves 1 through 4, J1T93A-1/J1T93B-1 (CE-3 bay)

J1T67A-1 (Bay Supervisory Panel (BSP))

Function:

To house equipment that provides fuses and alarms for the Miscellaneous Equipment bay in which it resides. The Bay Supervisory Panel (BSP) also serves as a central distribution point for the cabling of the Miscellaneous Equipment bay and contains a vent and baffle assembly that provides a fresh-air intake for equipment mounted above the BSP and an exhaust for heat generated by equipment mounted below.

Features:

- “A” and “B” -48 V feed, fused power distribution points available on the rear of the BSP for customer-specified fuse values and locations
- All power circuits alarm-reported by a series of appropriately marked alarm fuses in conjunction with the Fuse Alarm pack (NT3T30).
- easy access to NT3T30 by way of a hinged front panel

Quantity:

One Bay Supervisory Panel is required in each Miscellaneous Equipment bay.

Location:

between shelves 4 and 5, J0T81E-1, (Miscellaneous Equipment bay)

J1T72B-1 (CPU/Network shelf)

Function:

To provide space for one CPU and supporting circuit packs, and a 640-channel network and supporting circuit packs. The CPU/Network shelf is available in the three-bay configuration and in the LCC. The switching capacity of the CPU/Network shelf is limited to eight DS-30A ports and eight MLI ports, for a total of 16 peripheral loops per shelf.

The circuit packs supported by the J1T72B-1 CPU/Network shelf are shown in Table 4-J. Figure 4-10 shows a sample J1T72B-1 pack fill.

Table 4-J: CPU / Network shelf (J1T72B-1): provisionable circuit packs		
Pack Number	Pack Name	Pack Position
NT0T51	Filler Plate	vacant slots
NT3T19	5/12 V Converter	1, 21
NT3T47	Synchronous Clock	10 or 11
NT3T70	System Bus Controller	9
NT3T71	Maintenance Interface	7
NT3T72	Input/Output Bus Extender	8, 14,15
NT3T98	System Processor	12
NT4T01	Tone and Digit Sender	16
NT4T03	Conference	17
NT4T04	DS-30A Interface	18
NT4T05 ¹	Multiplex Loop Interface	19
NT4T06 ¹	Network	20
NT8T90	SCSI Bus I/O and Disk Drive	11

¹ Not provisioned for the Large Cluster Controller (LCC) or a three-bay configuration with an expanded network

Figure 4-10: CPU/Network shelf (J1T72B-1)

1	5/12 V Converter	NT3T19
2	See Table 4-J	
3	See Table 4-J	
4	See Table 4-J	
5	See Table 4-J	
6	See Table 4-J	
7	Maintenance Interface	NT3T71
8	Input/Output Bus Extender	NT3T72
9	System Bus Controller	NT3T70
10	Synchronous Clock	NT3T47
11	See Table 4-J	
12	500-Series CPU	NT3T98
13	See Table 4-J	
14	Input/Output Bus Extender	NT3T72
15	Input/Output Bus Extender	NT3T72
16	See Table 4-J	
17	See Table 4-J	
18	See Table 4-J	
19	See Table 4-J	
20	See Table 4-J	
21	5/12 V Converter	NT3T19

Note: When configuring an office as an LCC or as a three-bay configuration with an expanded network, the shelf is provisioned without the following packs: Synchronous Clock (NT3T47), Tone and Digit Sender (NT4T01), Conference (NT4T03), DS-30A Interface (NT4T04), Multiplex Loop Interface (NT4T05), Network (NT4T06), and Input/Output Bus Extender (NT3T72) in positions 14 and 15. Filler Plate packs (NT0T51) are provisioned in those pack locations.

Quantity:

- Two CPU/Network shelves are required per CE-3 bay (J1T83E-1).

Components:

- Control Bus Terminator No.10 paddleboard (NT4T13), No. 11 paddleboard (NT4T11), and No. 12 paddleboard (NT4T12)
- I/O bus cable and two paddleboards

Location:

- shelves 2 and 3, J1T83E-1 (CE-3 bay)

J1T72C-1 (CPU/Network shelf)

Function:

To accommodate the CPU and supporting circuit packs and a 640-channel network and supporting circuit packs. The CPU/Network shelf houses the Universal Tone Receiver Pack (NT4T02). The switching capacity of the CPU/Network shelf is limited to eight DS-30A ports and eight MLI ports, for a total of 16 peripheral loops per shelf. The circuit packs supported by the J1T72C-1 CPU/Network shelf are shown in Table 4-K.

Note: When configuring an office as an LCC or as a three-bay configuration with an expanded network, the shelf is provisioned without the following packs: Synchronous Clock (NT3T47), Tone and Digit Sender (NT4T01), Conference (NT4T03), DS-30A Interface (NT4T04), Multiplex Loop Interface (NT4T05), Network (NT4T06), and Input/Output Bus Extender (NT3T72) in positions 13 and 14. Filler plate packs (NT0T51) are provisioned in those pack locations.

Quantity:

- Two CPU/Network shelves are required per CE-3 bay (J1T83E-1).

Location:

- shelves 2 and 3, J1T83E-1 (CE-3 bay)

Table 4-K: CPU / Network shelf (J1T72C-1): provisionable circuit packs		
Pack Number	Pack Name	Pack Position
NT0T51	Filler Plate	vacant slots
NT3T19	5/12 V Converter	1, 21
NT3T47	Synchronous Clock	9
NT3T70	System Bus Controller	8
NT3T71	Maintenance Interface	6
NT3T72	Input/Output Bus Extender	7, 13, 14
NT3T98	System Processor	11
NT4T01	Tone and Digit Sender	15
NT4T02	Universal Tone Receiver	16
NT4T03	Conference	17
NT4T04	DS-30A Interface	18 or 19
NT4T05	Multiplex Loop Interface	18 or 19
NT4T06	Network	20
NT8T90	SCSI Bus I/O and Disk Drive	10

J1T80A-1 (Digital Carrier Interface (DCI) shelf)

Function.

To accommodate two 5/12 V Converter packs (NT3T19) and up to 10 Subscriber Remote Interface (SRI) packs (NT4T09), or 10 Digital Signal Interface (DSI) modules (each module comprising an NT4T24 Span Interface Controller pack and an NT6X50 DS-1 Interface pack) when used for interface to remotes. Table 4-L lists circuit packs equipped on the DCI shelf.

Pack Number	Pack Name	Pack Position
NT0X50	Filler Plate	vacant slots
NT3T19AF and later	5/12 V Power Converter	1, 24
NT4T09	Subscriber Remote Interface (SRI)	even numbered positions between 4 and 22
NT4T24	Span Interface Controller (SIC)	odd numbered positions between 3 and 21
NT6X50	DS-1 Interface	even numbered positions between 4 and 22

Versions:

- L1 uses the circuit breaker provided on the J0T30E-1 bay.
- L3 provides circuit breakers on the wing bracket assembly of the shelf.

Location:

- shelf 2, J0T30E-1 (PE bay) or J0T80 (Peripheral Equipment Carrier Module bay). Shelf 1 must be vacant
- shelf 4, J0T30E-1 (PE bay) or J0T80 (Peripheral Equipment Carrier Module bay). Shelf 3 must be vacant
- shelf 5, J0T30E-1 (PE bay)
- shelf 6, J0T80 (Peripheral Equipment Carrier Module bay); shelf 5 must be vacant

J1T80A-2 (Digital Carrier Interface (DCI) shelf)

Function.

To accommodate two 5/12 V Converter packs (NT3T19) and a combination of up to 10 Digital Signal Interface (DSI) and CALEA Dialed Digit Extraction Interface (DDE) modules. A DSI module comprises an NT4T24 Span Interface Controller pack and an NT6X50 DS-1 Interface pack. A DDE module comprises an NT4T50 DDE pack and an NT6X50 DS-1 Interface pack. Table 4-M lists circuit packs equipped on the DCI shelf. Figure 4-11 shows a sample J1T80A-2 pack fill.

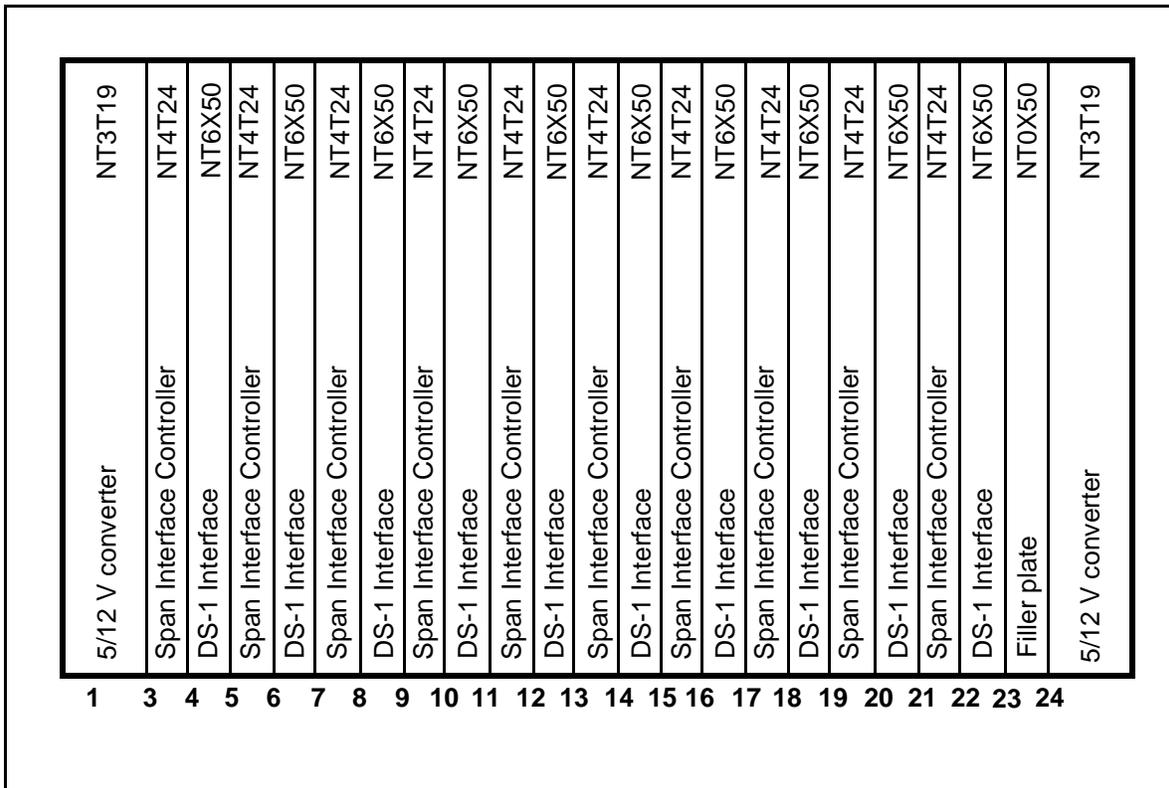
4-30 Shelves, modules and panels

DSI modules configured for ISDN PRI are provisioned only on the J1T80A-2 shelf. Although a single J1T80A-2 DCI shelf can be used for digital trunking, remote applications, and ISDN PRI, both spans of a DSI module must be used for the same function.

**Table 4-M:
DCI shelf (J1T80A-2): circuit packs**

Pack Number	Pack Name	Pack Position
NT0X50	Filler Plate	vacant slots
NT3T19AF and later	5/12 V Power Converter	1, 24
NT4T24	Span Interface Controller (SIC)	odd numbered positions between 3 and 21
NT6X50	DS-1 Interface	even numbered positions between 4 and 22
NT4T50	CALEA Dialed Digit Extraction (DDE) Interface	odd numbered positions between 3 and 21

Figure 4-11: Digital Carrier Interface (DCI) shelf (J1T80A-2)



Note: Odd numbered positions between 3 and 21 can contain either an NT4T24 or an NT4T50 pack.

Location:

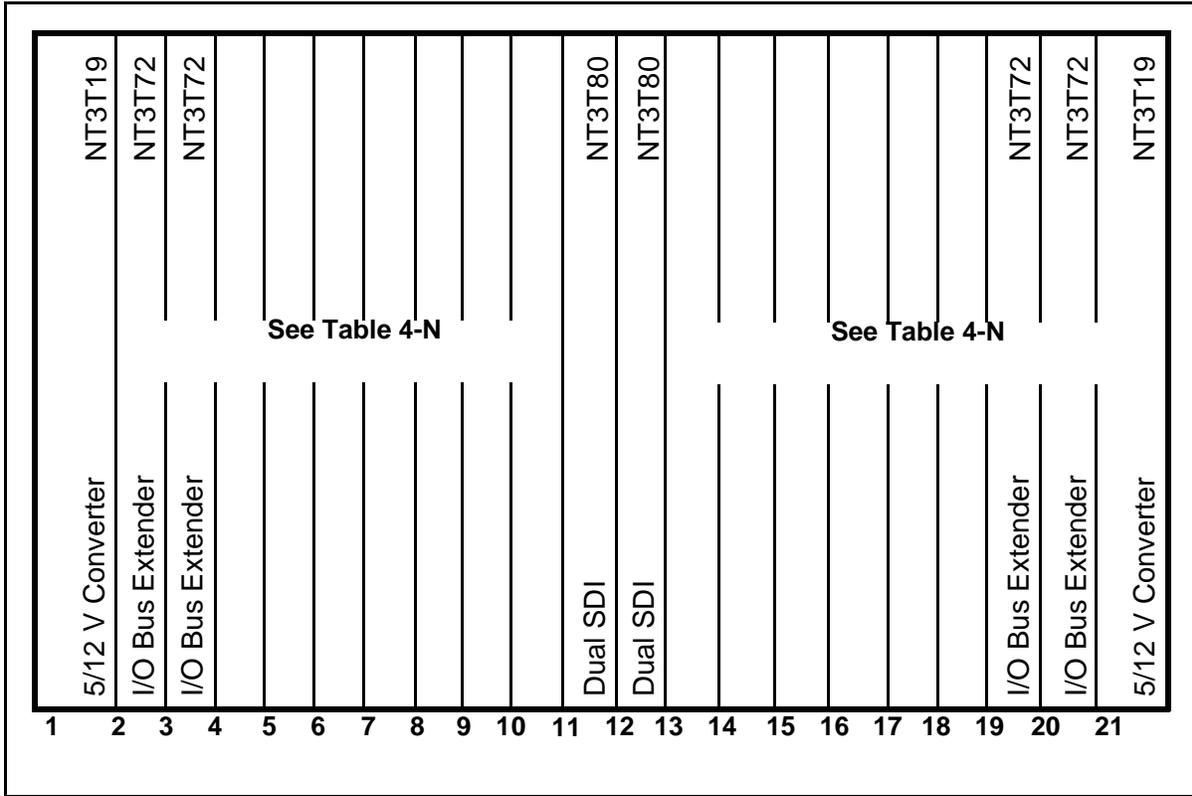
- shelf 1, J1T30D-1 or J1T30E-1 Common Equipment (CE-1) bay
- shelves 4 or 5, J1T30D-1L4 (CE-2) bay
- shelves 1 through 5, J1T30E-1L7 Common Equipment (CE-2/CE-4) bay
- shelf 1, J1T83E-1 Common Equipment (CE-3) bay
- shelf 2, J1T92A-1/J1T92B-1 Common Equipment (CE-1) bay
- shelves 1 through 4, J1T93A-1/J1T93B-1 Common Equipment (CE-3) bay

J1T81A-1 (General-Purpose Input/Output shelf)**Function:**

To provide space for up to 15 input/output interface packs in systems requiring a large number of such packs. The GPIO shelf is used in the three-bay configuration, the three-bay configuration with an expanded network, and in the LCC for configurations requiring more than 13 satellites. A list of the circuit packs found on a GPIO shelf is presented in Table 4-N. Figure 4-12 shows a sample J1T81A-1 pack fill.

Pack Number	Pack Name	Pack Position
NT3T09	Serial Data Interface	4 through 18
NT3T10	Magnetic Tape Controller	4 through 10, 13 through 18
NT3T19	5/12 V Converter	1, 21
NT3T50	Data Link Controller	3 through 10, 12 through 18
NT3T72	I/O Bus Extender	2, 3, 19, 20
NT3T80	Dual Serial Data Interface	4 through 18
NT3T90	Input/Output Interface	4 through 10, 13 through 18
NT3T93	Dual Integrated Modem	4 through 10, 13 through 18
NT4T16	LAN/CPU Interface	4 through 10, 13 through 18
NT4T32BA	Magneto Optical Mini Disk	4 through 10, 13 through 18

Figure 4-12: General Purpose Input/Output shelf (J1T81A-1)



Features:

- for LCC, supports up to 13 SSOs
- Control Bus Terminator No. 5 (NT3T45CB) includes two DB-25 connectors for SDI cables, provisioned in positions 11 and 12 (rear) and used with Dual SDI packs (NT3T80)
- SDI cable interface (NT3T45DB) includes two DB-25 connectors for SDI cables, provisioned in positions 4 through 10 and 13 through 18 (rear) and used with Dual SDI packs (NT3T80)
- DLC cable interface (NT3T45EA) includes two DB-25 connectors for DLC cables, provisioned in positions 4-10 and 13-18 (rear) and used with DLC packs (NT3T50)

Quantity:

- One GPIO shelf may be provisioned per CE-3 bay.

Location:

- shelf 1, J1T30D-1 and J1T30E-1 (CE-1 bay)
- shelf 4, J1T30E-2 (CE-1 bay)
- shelf 1, J1T83E-1 (CE-3 bay)
- shelves 2 and 3, J1T92A-1/J1T92B-1 (CE-1 bay)
- shelf 1, J1T93A-1/J1T93B-1 (CE-3 bay)

J1T89A-1 (Power-Cooling Module)**Function:**

To serve as an electrical interface point for working of power and alarms in the 1600-BPI AMA bay, to accommodate the circuit breaker panel, which provides circuit breaker protection to dual -48V power supplies to the IOI shelf, and to provide fans, an air mixing chamber, and airflow control for the bay cooling system.

Features:

- ESD banana jack to connect wrist straps to the 1600 BPI AMA bay
- recessed front panel equipped with four circuit breakers and five fan fuses
- air displacement monitoring vane switches to provide fan alarms
- AMA bay cooling fans
- bay power and alarm connections

Location:

between equipment shelves 3 and 4 in the J1T85A-1 (1600-BPI AMA bay)

J6T00A-1L1 (Packet Gateway Interface)**Function:**

Provides the interface between the DMS-10 Network Equipment and gateways. Converts G.711 audio and T.38 fax bearer packets of gateways to Pulse Code Modulation (PCM) samples used by the DMS-10 Network Equipment.

Features:

- accommodates two separate PGI controller packs (NT6T01), two PGI rear translation modules (NT6T02), and a PGI fan module (N0028085)
- includes redundant -48 Volts dc power sources
- provides interfaces for a minimum of two (2) to a maximum of sixteen (16) 32 channel DS-30a loops (assigned in multiples of 2):
 - two (2) channels reserved signaling (one per PGI controller pack)
 - supports up to 510 circuit-to-packet bearer channels: $(n * 32) - 2$, where n is the number of DS-30a loops.

- provides six (6) 10-BaseT/100-BaseT ethernet interfaces:
 - 4 ports used for internal card control (one active and one standby per PGI controller pack)
 - 2 port used for external access (messaging and bearer)
- provides two (2) external alarm points (power alarm and fan alarm)
- performs DMSX protocol handling and message processing
 - provides initial configuration (e.g., IP address)
 - provides hardware reset capability
- IP messaging protocol
 - provides call processing interface
 - connection management
 - call control message transfer
 - provides maintenance and diagnostics interface
 - transfer of download file or patch file using File Transfer Protocol (FTP)
 - maintenance messages
 - provides bearer interface
- provides protocol support for:
 - VoIP over 10-BaseT/100-BaseT ethernet
 - call control message filtering and forwarding
 - G.711 bearer channel encoding
 - T.38 fax relay
 - G.168 echo cancellation
- on-board Digital Signal Processor (DSP) to:
 - convert the bearer information from RTP packet format to DS-30A TDM format
 - support -law PCM
 - provide for DTMF in-band (G.711) or out-of-band (RFC 2833)

Quantity:

Maximum: 10.

The quantity will vary according to circuit-to-packet traffic capacity requirements and will be determined by engineering rules. The number is bound by the number of ports available on the Ethernet Switches.

Location:

Miscellaneous Equipment (ME), Peripheral Equipment (PE), or Common Equipment (CE) frames. Provisioning is done via the J0T82A-1 documentation.

J8M75A-1,L1 (CNI Module)**Function:**

To house the circuit packs of a unified CPU and Network module in the DMS-10EN network configuration. The CNI (CPU Network Interface) Module is composed of two Control shelves on a single backplane that vertically spans approximately two and one-half times the height of a conventional Control shelf. The shelves contain the system CPUs (NT3T98) and supporting packs, as well as the switching network and supporting packs. The CNI module supports up to 320 peripheral loops. The circuit packs supported by the CNI module are shown in Table 4-O. Figure 4-13 shows a sample J8M75A-1,L1 shelf pack fill; both shelves of the module have the same pack fill.

Quantity:

one CNI Module per CE-01 bay (J1T92A-1)

Location:

shelf positions 4 and 5 of the J1T92A-1/J1T92B-1 (CE-01 bay)

Pack Number	Pack Name	Pack Position
NT0T51	Filler Plate	2, 8, 13, 19, 21
NT0X50	Filler Plate	14, 16, 18, 20
NT3T19	5/12 V Converter	1, 22
NT3T47	Synchronous Clock	6
NT3T70	System Bus Controller	5
NT3T71	Maintenance Interface	4
NT3T72	Input/Output Bus Extender	9, 10, 11
NT3T80	Dual Serial Data Interface	13, 19
NT3T98	System Processor	3
NT8T90	SCSI Bus I/O and Disk Drive	7
NT8T04	Network Interface	12, 14, 16, 18, 20
NT8T06	Central Network	15, 17

Figure 4-13: Typical pack fill in a CNI module (J8M75A-1,L1) shelf

1	5/12 V Converter	NT3T19
2	Filler	NT0T51
3	500-Series CPU	NT3T98
4	Maintenance Interface	NT3T71
5	System Bus Controller	NT3T70
6	Synchronous Clock	NT3T47
7	SCSI Bus I/O and Disk Drive	NT8T90
8	Filler	NT0T51
9	Input/Output Bus Extender	NT3T72
10	Input/Output Bus Extender	NT3T72
11	Input/Output Bus Extender	NT3T72
12	Network Interface	NT8T04
13	Dual Serial Data Interface	NT3T80
14	Network Interface	NT8T04
15	Network	NT8T06
16	Network Interface	NT8T04
17	Network	NT8T06
18	Network Interface	NT8T04
19	Dual Serial Data Interface	NT3T80
20	Network Interface	NT8T04
21	Various GPIO circuit packs	
22	5/12 V Converter	NT3T19

J9Y03A-1 (Power and Maintenance Module (PMM))

Function:

To provide primary dc power distribution for all devices operated by the OPSM Cabinet Controller pack. (See Figure 4-14.)

Features:

Under control of the NT9Y00 pack, each battery string is periodically disconnected from the load bus and connected to the discharge resistor located at the top of the PMM. The NT9Y00 pack then measures the battery voltage in order to determine the status of the battery string. When the batteries are discharged below -42 V dc, dc power to the entire OPSM cabinet is shut down. An override switch is provided to enable the NT9Y00 pack to be removed without causing the OPSM power to be shut down. Power is provided to the PMM from both the Frame Supervisory Panel located above the RSLM shelf and from two points on the RSLM shelf itself.

Components:

- two Lorain A12F50 rectifiers
- two QRY18-Series Office Repeater packs
- one QPP519A Fault Locate/Order Wire Access unit
- one NT9Y00 OPSM Cabinet Controller pack
- three 25-amp circuit breakers for battery string isolation
- fuses for dc distribution (see Table 4-P for assignment)
- local cable assembly

Quantity:

One Power and Maintenance Module is configured for each OPSM.

Location:

highest shelf area in OPSM

Figure 4-14: Part of OPSM PMM (J9Y03A-1)

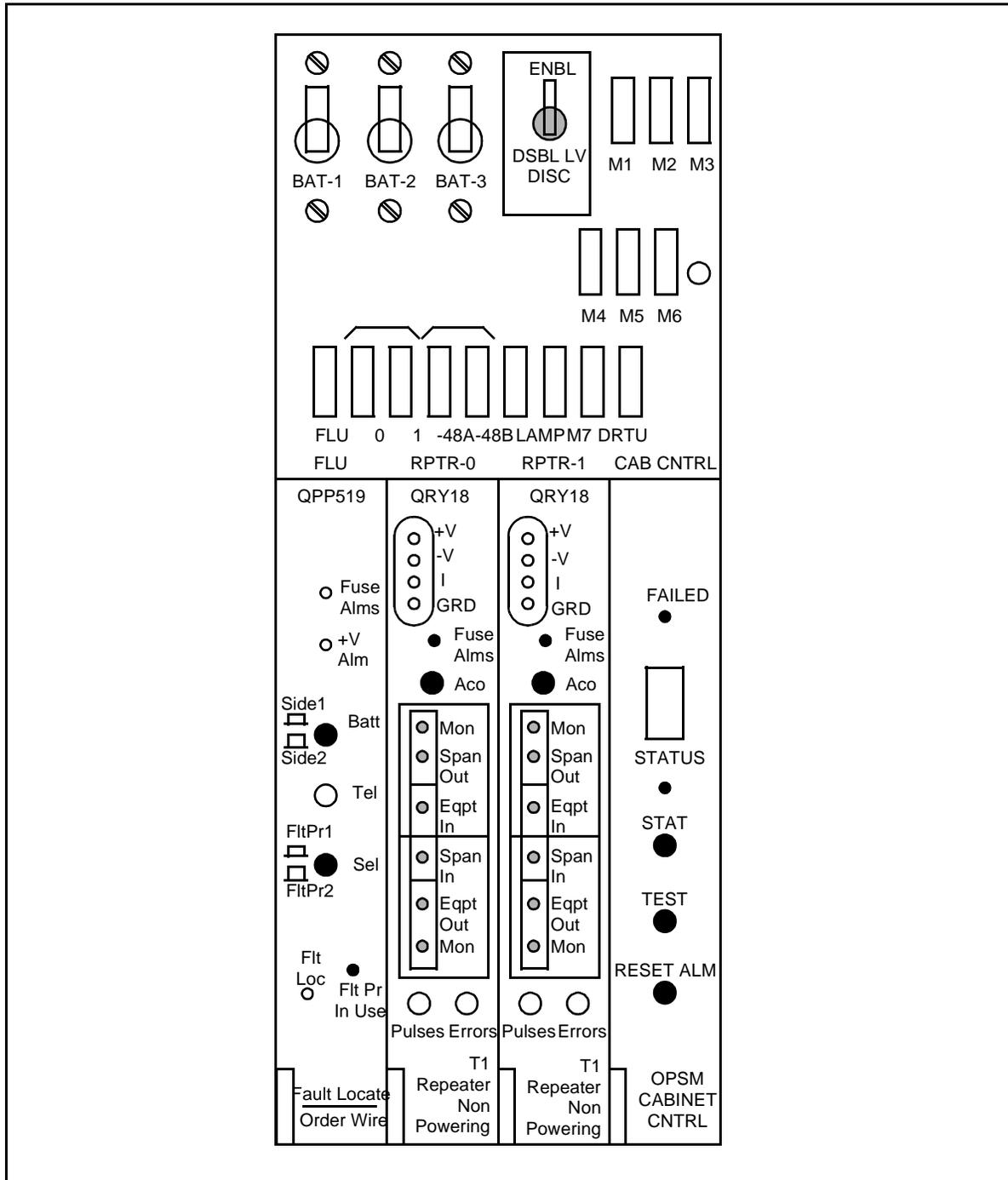


Table 4-P: PMM (J9Y03A-1) fuse assignments		
Designation	Size	Assignment
M1	0.75 Amps	Left circulation fan
M2	0.75 amps	Center circulation fan
M3	0.75 amps	Right circulation fan
M4	0.75 amps	Exhaust fan
M5	0.75 amps	Damper
M6	-	Spare
M7	-	Spare
FLU	1.3 amps	Fault Locate Unit QPP519
RPTR 0	1.3 amps	Office Repeater 0 (QRY18)
RPTR 1	1.3 amps	Office Repeater 1 (QRY18)
-48 V A	2 amps	Cabinet Controller
-48 V B	0.75 amps	Cabinet Controller
LAMP	2 amps	Interior lamps
DRTU	-	Spare

J9Y04A-1 (Power and Cooling Unit (PCU))

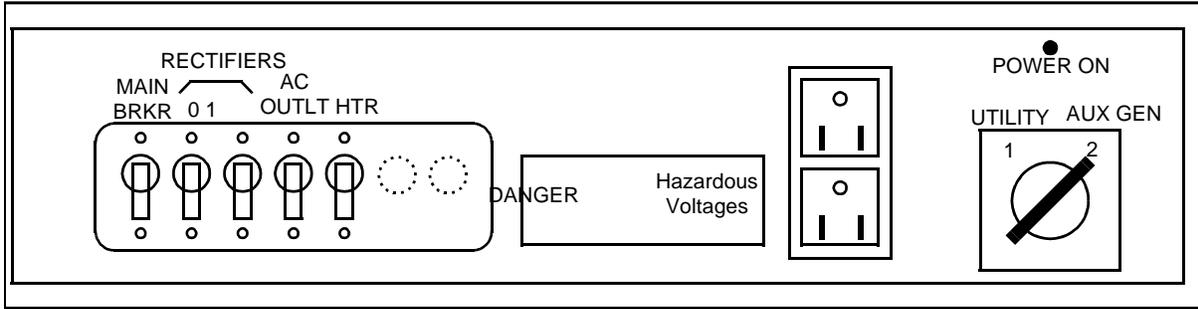
Function:

To provide primary ac power distribution and to house circulation fans (See Figure 4-15.)

Features:

- three circulation fans, permitting any one fan to be replaced with minimal degradation of cooling
- change-over switch to select either utility ac or auxiliary generator
- dual ac outlets on front of unit for maintenance and test apparatus, supplementary lighting, or a vacuum cleaner
- five circuit breakers for controlling ac power

Figure 4-15: OPSM PCU (J9Y04A-1)



Quantity:

One Power and Cooling Unit is configured for each OPSM.

Location:

lowest shelf area in OPSM

J9Y07A-1 (Remote Subscriber Line Module (RSLM) type B shelf)

Function:

To accommodate the equipment listed in Table 4-Q. This shelf contains all the digital switching packs of the OPSM or the RSLM bay except the Ringing Generator packs. The RSLM shelf also houses the fuse panel. Figure 4-16 depicts a fully-configured RSLM Type B shelf.

Code	Item	Type A Shelf	Type B Shelf
NT0X50	Filler Plate	Provisionable	Provisionable
NT6X05	Line Drawer	Provisionable; up to 4	Provisionable; up to 3
NT6X05DA	ISDN Line Drawer	Provisionable; up to 1	Provisionable; up to 1
NT6X53	LCM Power Converter pack	1	2
NT9Y12	Switching Matrix pack	2	2
NT9Y13	Remote Maintenance pack	1	1
NT9Y14	Processor pack	2	2
NT9Y15	Emergency Stand-Alone pack	Provisionable; 1	Provisionable; 1

Components:

- vent and fuse panel (see Figure 4-16 and Tables 4-R, 4-R, and 4-R)
- local cable assembly

Quantity:

- One RSLM Type B shelf may be configured for each OPSM if the RSLM Type A shelf is not configured.
- One or two RSLM Type B shelves may be configured for each J9Y70B-1 RSLM bay.

Location:

- shelf 4, or shelves 3 and 4, of the RSLM bay
- same as the RSLM Type A shelf

Figure 4-16: RSLM type B shelf (J9Y07A-1)

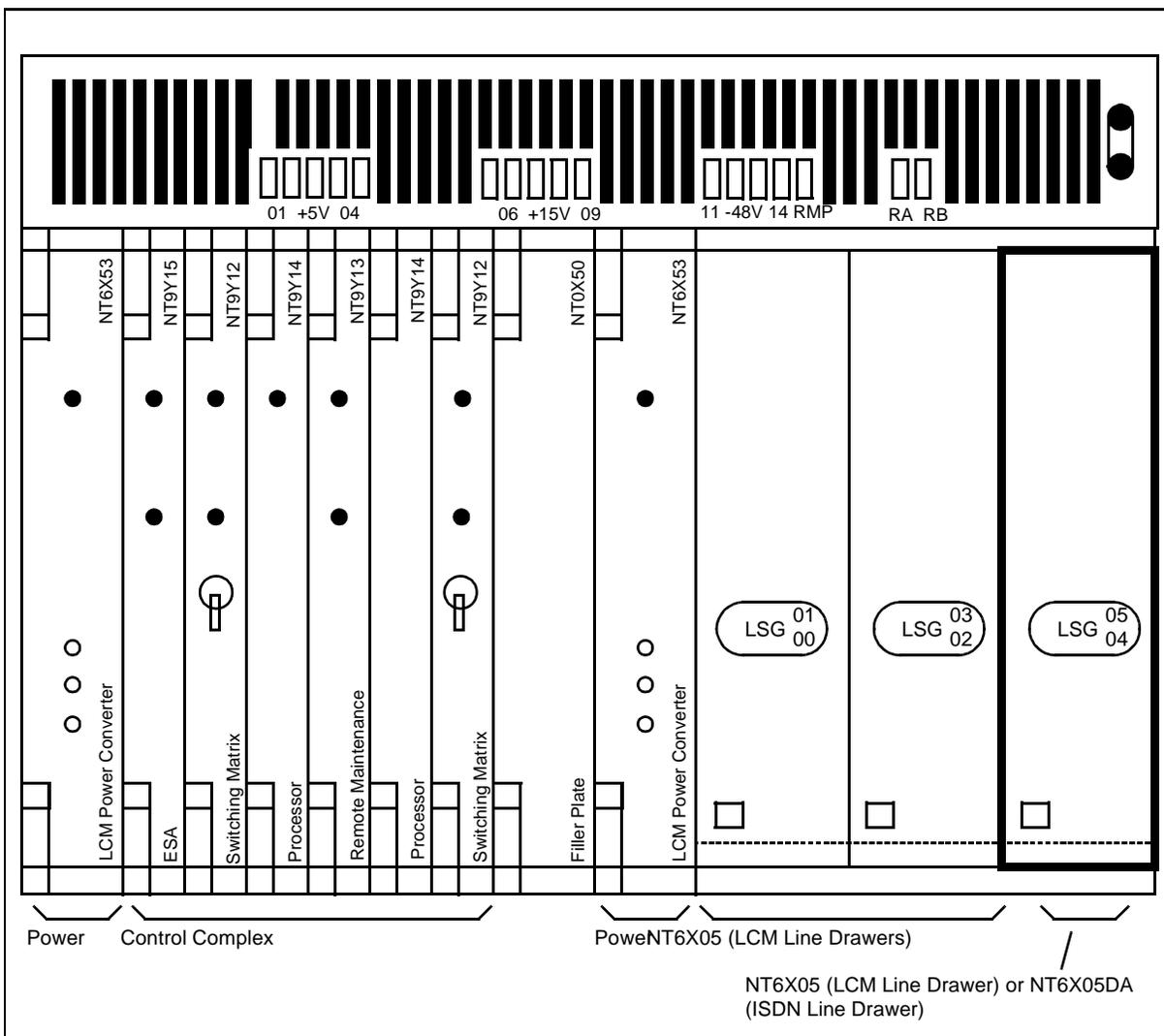


Table 4-R: RSLM type B shelf +5 V fuse assignment by line subgroup (LSG) or pack					
Fuse Label	+5 V Fuses				
	1	2	3	-	-
LSG Number	01 00	03 02	05 04	(See Note)	N/A

Note: In the OPSM only, these fuses are labeled "9Y00" and are associated with NT9Y00, the Cabinet Controller pack.

Table 4-S: RSLM type B shelf +15 V fuse assignment by line subgroup (LSG) or pack					
Fuse Label	+15 V Fuses				
	6	7	8	-	-
LSG Number	01 00	03 02	05 04	(See Note)	N/A

Note: In the OPSM only, these fuses are labeled "9Y00" and are associated with NT9Y00, the Cabinet Controller pack.

Table 4-T: RSLM type B shelf +48 V fuse assignment by line subgroup (LSG) or pack							
Fuse Label	+48 V Fuses						
	11	12	13	RMP	-	RA	RB
LSG Number	01 00	03 02	05 04	(See Note 1)	N/A	RG (See Note 2)	RG (See Note 2)

Note 1: This fuse is associated with the Remote Maintenance pack.

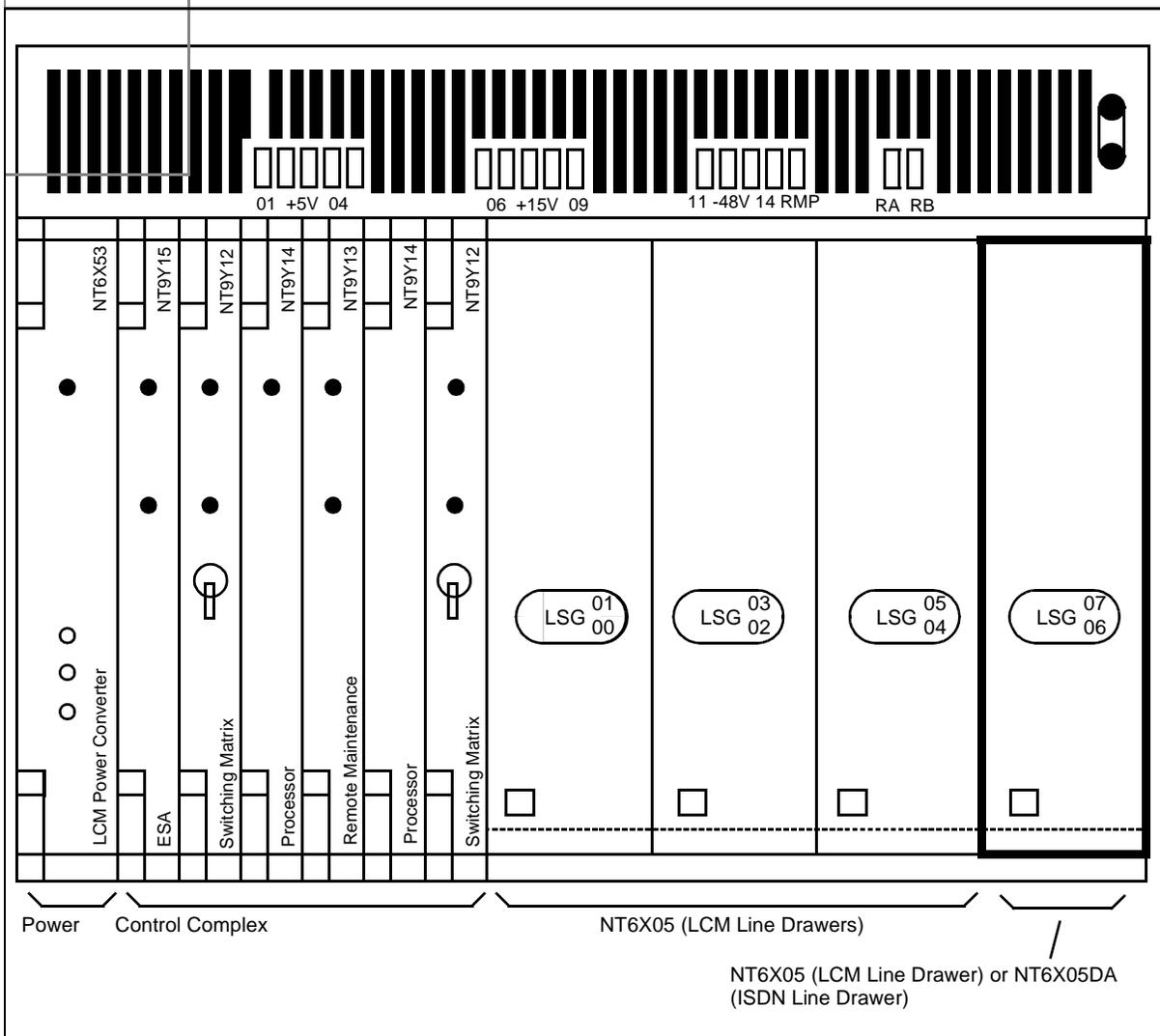
Note 2: These fuses are associated with the Ringing Generators.

J9Y74A-1 (Remote Subscriber Line Module (RSLM) type A shelf)

Function:

To accommodate the equipment listed in Table 4-Q. Figure 4-17 depicts a fully-configured RSLM Type A shelf. This shelf contains all the digital switching packs of the OPSM or the RSLM bay except the Ringing Generator pack. The RSLM shelf also houses the fuse panel.

Figure 4-17: RSLM type A shelf (J9Y74A-1)



Quantity:

- One RSLM Type A shelf may be configured for each OPSM if the RSLM Type B shelf is not configured.
- One RSLM Type A shelf may be configured for each J9Y70A-1 RSLM bay.

Components:

- vent and fuse panel (see Tables 4-U, 4-U, and 4-U)
- local cable assembly

4-44 Shelves, modules, and panels

Location:

- shelf 4 of the RSLM bay
- between the Frame Supervisory Panel and the Power and Cooling Unit in the OPSM

Table 4-U: RSLM type A shelf +5 V fuse assignment by line subgroup (LSG) or pack					
Fuse Label	+5 V Fuses				
	1	2	3	4	-
LSG Number	01 00	03 02	05 04	07 06	(See Note)

Note: In the OPSM only, these fuses are labeled "9Y00" and are associated with NT9Y00, the Cabinet Controller pack.

Table 4-V: RSLM type A shelf +15 V fuse assignment by line subgroup (LSG) or pack					
Fuse Label	+15 V Fuses				
	6	7	8	9	-
LSG Number	01 00	03 02	05 04	07 06	(See Note)

Note: In the OPSM only, these fuses are labeled "9Y00" and are associated with NT9Y00, the Cabinet Controller pack.

Table 4-W: RSLM type A shelf +48 V fuse assignment by line subgroup (LSG) or pack							
Fuse Label	+48 V Fuses						
	11	12	13	14	-	RA	RB
LSG Number	01 00	03 02	05 04	07 06	See Note 1	RG (See Note 2)	RG (See Note 2)

Note 1: This fuse is associated with the Remote Maintenance pack.

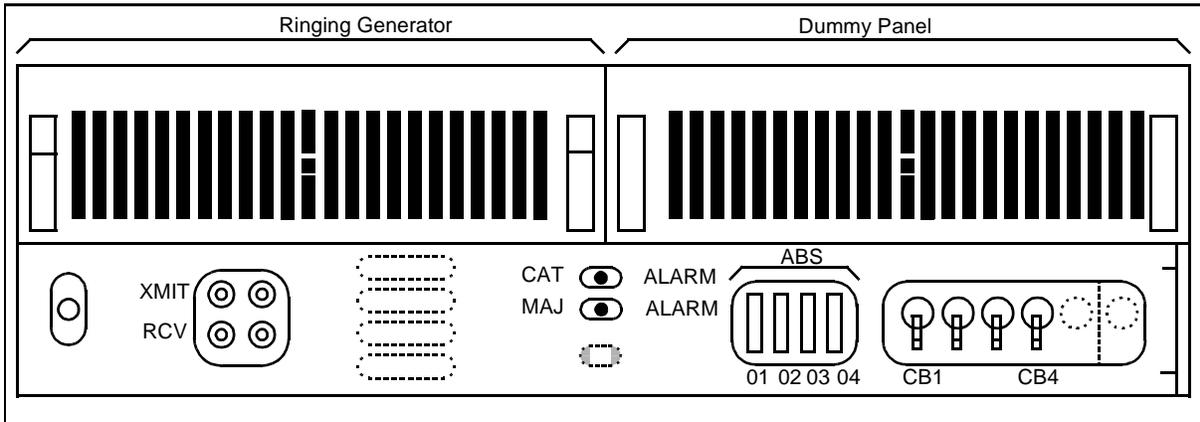
Note 2: These fuses are associated with the Ringing Generators.

J9Y75A-1 (Frame Supervisory Panel (FSP))

Function:

To house the Ringing Generator and the power-control and alarm circuits for an OPSM with an RSLM Type A shelf (see Figure 4-18).

Figure 4-18: FSP (J9Y75A-1)



Features:

- power control for one RSLM Type A shelf
- circuit breakers (CB1-CB4) on the front panel for the associated 5/15 V Converter and Ringing Generator
- fuse-guard circuits for the +5 V and +15 V supplies (from the 5/15 V Converter pack), Ringing Generator, and the alarm battery supply (ABS) fuses (see Table 4-X for the correspondence between fuse and device)
- talk battery (filtered -48 V) output to the RSLM shelf
- monitor jacks for DS-1 (T1) span lines
- major (MAJ) and catastrophic (CAT) alarm indicator lamps on the front panel. (These alarm indicators are only for equipment in the same OPSM or the same RSLM bay.)

Table 4-X:
FSP (J9Y75A-1) fuse assignments

Designation	Size	Assignment ¹
ABS/01	1.3 amps	Alarm Battery Supply (ABS)
ABS/02	1.3 amps	Major Alarm lamp
ABS/03	1.3 amps	Catastrophic Alarm lamp
ABS/04	-	Spare

¹These assignments are valid for both OPSM and RSLM bay applications.

Quantity:

- One J9Y75A-1 Frame Supervisory Panel is required for each OPSM configured with an RSLM Type A shelf.
- One J9Y75A-1 Frame Supervisory Panel is required for each J9Y70A-1 RSLM bay.

Location:

- shelf 5, J9Y70A-1 (RSLM bay)
- between the Power and Maintenance Module and the RSLM shelf in an OPSM

J9Y76A-1 (Frame Supervisory Panel (FSP))

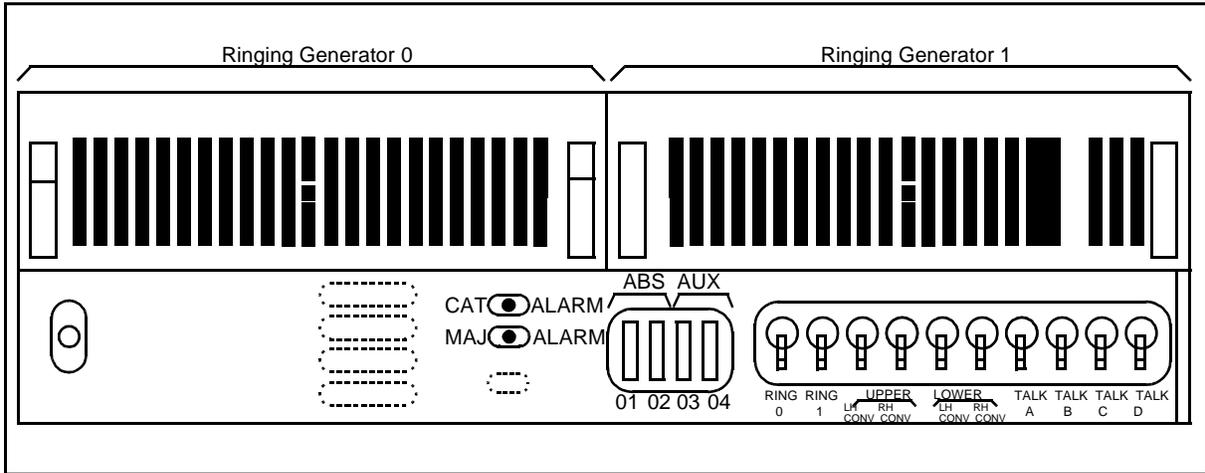
Function:

To house two Ringing Generators and the power-control and alarm circuits for any one of the following:

- an RSLE bay
- an Outside Plant Subscriber Module (OPSM) with one Remote Subscriber Line Module (RSLM) Type B shelf
- an RSLM bay with one or two RSLM Type B shelves

A J9Y76A-1, L1 is depicted in Figure 4-19.

Figure 4-19: RSLE FSP (J9Y76A-1, L1)



Features:

- power control for one RSLE bay or for one or two RSLM Type B shelves
- circuit breakers on the front panel for the associated 5/15 V Converters and Ringing Generators
- fuse-guard circuits for the +5 V and +15 V supplies from the 5/15 V Converter packs, Ringing Generators, and the alarm battery supply (ABS) fuses (see Table 4-Y for the correspondence between fuse and device)
- talk battery (filtered -48 V) output to the associated shelf or shelves
- Major (MAJ) and Catastrophic (CAT) alarm indicator lamps on the front panel (These alarm indicators are only for equipment in the same bay or in the same OPSM.)

Designation	Size	Assignment¹
ABS/01	1.3 amps	Alarm Battery Supply (ABS)
ABS/02	1.3 amps	Catastrophic and Major Alarm lamps
AUX/A2 ²	-	Spare
AUX/B	-	Spare

These assignments are valid for both RSLE bays and RSLM bays, regardless of the number of shelves in the bay, and also for OPSMs. The sole exception is described below.

In an OPSM, this position is equipped with a 5-amp fuse which is used for -48 V Auxiliary (A).

Quantity:

- One J9Y76A-1 Frame Supervisory Panel is required for each RSLE bay.
- One J9Y76A-1 Frame Supervisory Panel is required for each OPSM configured with an RSLM Type B shelf.
- One J9Y76A-1 Frame Supervisory Panel is required for each J9Y70B-1 RSLM bay.

Versions:

- L1 has two talk battery filters, two 25 A main breakers (CB9, CB10), and two 20 A talk battery breakers (CB7, CB8)
- L2 has two talk battery filters, four 10 A talk battery breakers (CB7, CB8, CB9, and CB10), and a NT9Y23 pack to implement function between the thermostat signal and all CB trip coils (for the OPSM only) .

Location:

- shelf 5; J9Y70A-1, J9Y70B-1 (RSLM bay)
- between the Power and Maintenance Module and the RSLM shelf in an OPSM
- shelf 5, J9Y80A-1 (RSLE bay)

J9Y84A-1 (RSLE Control shelf)

Function:

To accommodate the equipment listed in Table 4-Z. Figure 4-20 illustrates a fully-configured RSLE Control shelf. This shelf contains all the functional packs of the RSLE bay except the Ringing Generator packs. The RSLE Control shelf also houses two Line Drawers and a fuse panel, which provides protection for the voltages on both that Control shelf and one Line Drawer shelf.

Features:

Connectorized cables for maximum reliability and ease of installation and expansion.

Quantity:

One RSLE Control shelf is required for each RSLE bay; a second RSLE Control shelf is required to increase the RSLE bay capacity from 512 lines to 640 lines or to 1024 lines.

Components:

- vent and fuse panel (see Tables 4-Z, 4-Z, and 4-Z)
- local cable assemblies

Location:

The first RSLE Control shelf is configured on shelf 3 of the RSLE bay; the second RSLE Control shelf is configured on shelf 1 of the same bay.

Table 4-Z: RSLE Control shelf equipment quantities			
Code	Item	Positions	Quantity
NT0X50	Filler Plate	-	Provisionable
NT6X05	Line Drawer	-	Provisionable; up to 2
NT6X53	LCM Power Converter pack	1/2, 15/16	2 required
NT9Y13	Remote Maintenance pack	6, 9	2 required
NT9Y16	RSLE Matrix pack	4, 7	2 required
NT9Y17	RSLE Dual Host Interface and Clock pack	10, 11	2 required
NT9Y18	RSLE Tones pack	12	Provisionable
NT9Y19	RSLE Emergency Stand-Alone (ESA) pack	14	Provisionable
NT9Y20	RSLE Dual Host Interface pack	10, 11	Provisionable
NT9Y22	RSLE Processor pack	5, 8	2 required

The second Remote Maintenance pack is located in the second RSLE Control shelf, if it is equipped, or in the same RSLE Control shelf if only one RSLE Control shelf is equipped.

Two RSLE Dual Host Interface (DHI) and Clock packs are required for each RSLE bay. If two RSLE Control shelves are configured, the second RSLE DHI and Clock pack is configured in position 11 on the second RSLE Control shelf.

Only one RSLE ESA pack is provisionable in each RSLE bay.

This pack is used only in RSLE bays that contain two RSLE control shelves.

Figure 4-20: RSLE Control shelf (J9Y84A-1)

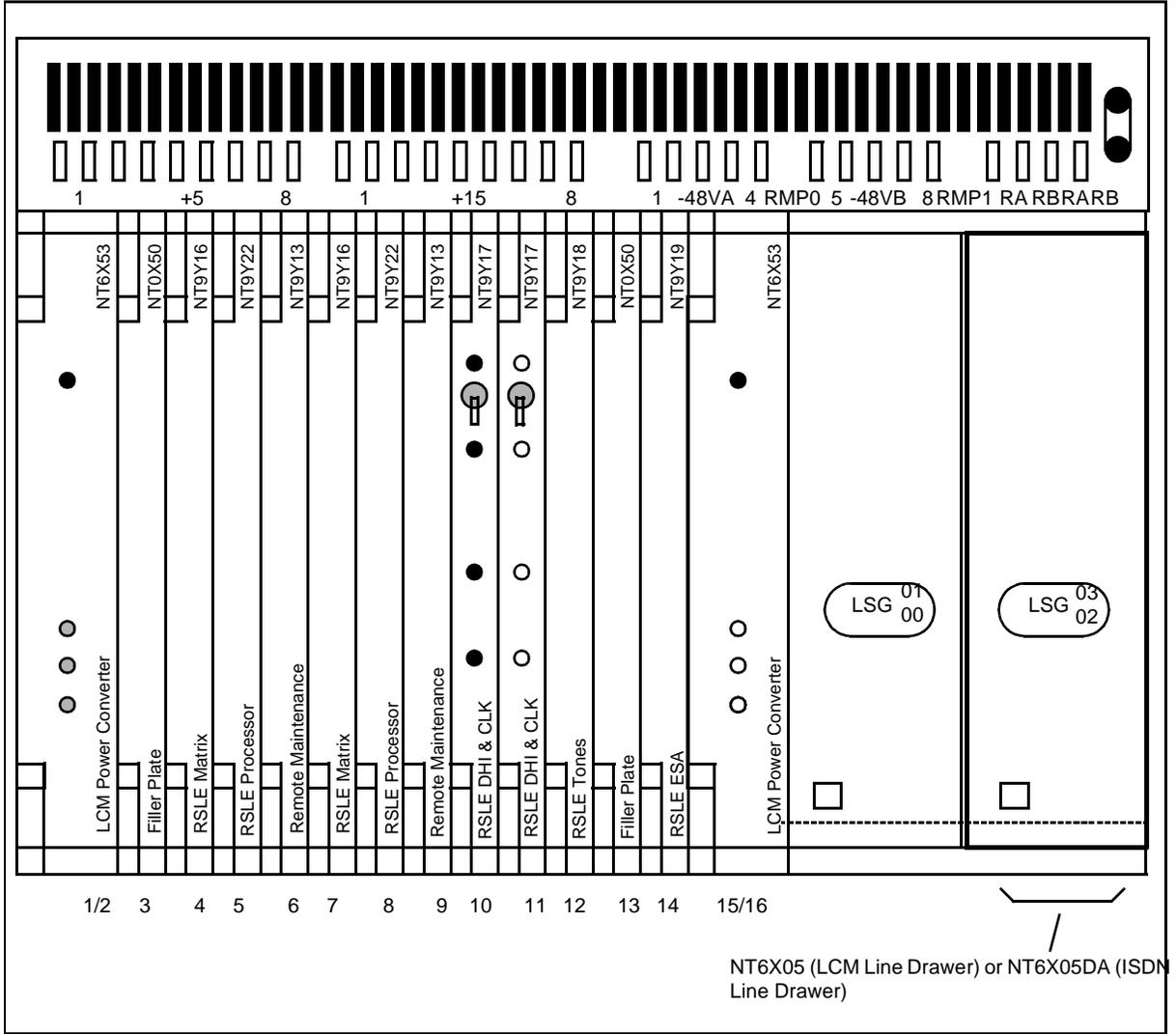


Table 4-AA: RSLE Control shelf +5 V and +15 V fuse assignment by line subgroup (LSG) or pack

Fuse Label	+5 V and +15 V Fuses									
	1	2	3	4	5	6	7	8	-	
LSG Number	01 00	03 02	05 04	07 06	09 08	11 10	13 12	15 14	Reserved for future use.	

Table 4-AB: RSLE Control shelf +48 V fuse assignment by line subgroup (LSG) or pack										
Fuse Label	+48 V Fuses									
	1	2	3	4	RMP0	5	6	7	8	RMP1
LSG Number	01	03	05	07	1	09	11	13	15	1
	00	02	04	06		08	10	12	14	

These fuses provide -48 V battery supply for the Remote Maintenance (RMP) packs.

Table 4-AC: RSLE Control shelf ringing fuse assignment by line subgroup (LSG)				
Fuse Label	RA	RB	RA	RB
LSG Number	0001	0001	0809	0809
	0203	0203	1011	1011
	0405	0405	1213	1213
	0607	0607	1415	1415

J9Y85A-1 (RSLE Line Drawer shelf)

Function:

To accommodate up to six line drawers and a vent panel.

Features:

The RSLE Line Drawer shelf contains no internal wiring. All power and signal wires are connectorized and each Line Drawer uses one cable.

Quantity:

One RSLE Line Drawer shelf may be configured for each RSLE Control shelf. One RSLE Line Drawer shelf and Control Shelf are required for the first 512 lines served by the RSLE bay; a second RSLE Line Drawer shelf and Control Shelf are required to increase the RSLE capacity from to 1024 lines.

When fully configured for ISDN, the maximum line capacity for a combined RSLE Line Drawer and Control Shelf is 348 analog lines and 56 ISDN lines.

Location:

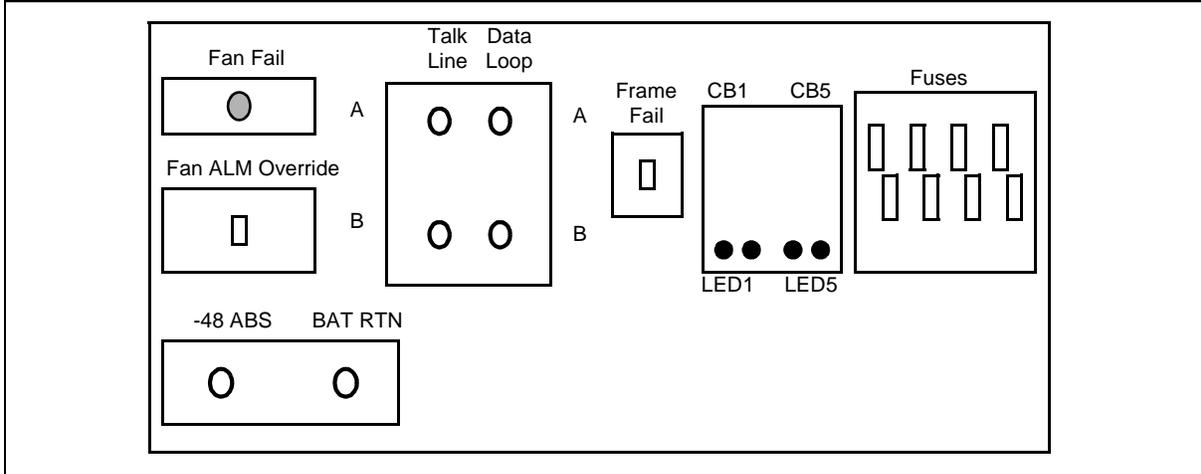
The first RSLE Line Drawer shelf in an RSLE bay is configured on shelf 4 of the bay; the second RSLE Line Drawer shelf is configured on shelf 2.

NT0X28 (Frame Supervisory Panel (FSP))

Function:

To provide power control and alarm circuits for the SCM-10S and SCM-10U modules. For a frontal view of a fully equipped FSP, see Figure 4-21.

Figure 4-21: Frame Supervisory Panel



Features:

- power control for up to two SCM-10S or SCM-10U modules (four Controller Array shelves)
- circuit breakers (CB1-CB5) on the front panel for the associated power converters
- circuit breaker LEDs to indicate failures for the associated power converters
- fuse-guard circuits of the +5 V and +15 V supplies (from the Power Converter pack) and the alarm battery supply (ABS) fuses
- frame-failure lamp on the front panel to indicate tripped breakers or blown fuses
- fan-failure LED on the front panel to indicate failure in the fan unit
- fan alarm override switch to cut alarm unit off when the fan fails
- alarm battery supply (ABS) and battery return (BAT RTN) ports to test battery power

Quantity:

One FSP is required per SCE frame.

Location:

SCE frame, between SCM-10S or SCM-10U Modules 0 and 1

NT6X0201 (Controller Array shelf)

Function:

To house the circuit packs required for an SCM-10S or for an SCM-10U. These packs are listed in Table 4-AD.

Pack Number	Pack Name	SCM-10S	SCM-10U	Pack Position
NT2X70	Power Converter Pack	yes	yes	25, 26, and 27
NT6X41	Speech Bus Formatter	yes	yes	21
NT6X42	Channel Supervision Message	yes	yes	20
NT6X43	Message Interface	yes	no	18
NT6X44	Time Switch	yes	yes	14
NT6X45	Master Processor/Signaling Processor	yes	yes	8/12
NT6X46	Signaling Processor Memory	yes	yes	11
NT6X47	Master Processor Memory	yes	yes	10
NT6X69	Message Interface and Tone	yes	yes	18
NT6X80	Ring/Pad	yes	yes	19
NT6X85	DS-1 Interface	yes	yes	1 through 5
NT6X86	A/B Derived Data Link	yes	no	13
NT7X05	Flash Memory	yes	yes	15
NT8X18	DS-30A Peripheral Interface	yes	yes	22

Features:

- operates from its own power supply and can also operate from the power supply of the mate shelf in the event its power converter fails
- two Controller Array shelves (1 SCM-10S module) support four SLC-96s in Mode I operation, six SLC-96s in Mode II operation, and various combinations of Mode I/Mode II operations
- separate talk and signal ground connections

Quantity:

Two Controller Array shelves are required per SCM-10S module or SCM-10U module (that is, up to four shelves for a fully configured SCE frame).

Location:

shelves 1 and 2 (Module 0) and Shelves 3 and 4 (Module 1), shelf pairs in an SCE frame

NT6X04 (Line Concentrating Module (LCM))

Function:

To house the equipment necessary to interface up to 640 analog lines to the DMS-10 network equipment by way of DS-30A links.

Components:

- two Line Concentrating Array (LCA) shelves (NT6X0401)
- two LCM Power Converter packs (NT6X53), one per LCA shelf
- two LCM Processor packs (NT6X51), one per LCA shelf
- two Digroup Controller packs (NT6X52), one per LCA shelf
- up to ten LCM Line Drawers (NT6X05), up to five per LCA shelf
- up to two ISDN Line Drawers (NT6X05DA), up to one per LCA shelf

Quantity:

- up to two LCMs can be equipped per LCE frame
- one LCM may be equipped per RLCM frame

Location:

- shelves 1 and 2 or 3 and 4, NT6X03 (LCE frame)
- shelves 1 and 2, RLCM frame

NT6X0401 (Line Concentrating Array (LCA) shelf)

Function:

To house three LCM Common Circuit Packs and up to five Line Drawers. The three LCM Common Circuit Packs together (NT6X04) are called an LCM Control Unit (LCMC). The LCMC comprises: one LCM Power Converter pack (NT6X53), which must be located in position 1; one LCM Processor pack (NT6X51), which must be located in position 4; and one Digroup Control pack (NT6X52), which must be located in position 5. The balance of the space on the shelf is occupied by up to five Line Drawers (NT6X05), each of which contains up to 64 analog line cards in two Line Subgroups (LSGs) of 32 cards each: or up to four Line Drawers (NT6X05) with one ISDN Line Drawer (NT6X05DA) in the fifth position which contains up to 28 ISDN line cards (NTBX27AA) in two Line Subgroups.

Features:

- Each LCA shelf usually operates from its own power supply, but can operate from the power supply of the adjacent, mate LCA shelf in the LCM during a failure condition.
- provides two DS-30A ports (60 speech channels), each of which is duplicated by ports that accept links from the mate shelf

Quantity:

- two LCA shelves are required per LCM (that is, up to four LCA shelves per LCE frame)

Location:

- shelves 1 through 4, LCE frame
- shelves 1 and 2, RLCM frame
- shelves 2 (LCA0) and 3 (LCA1), Bay 0 in the OPM or OPAC

NT6X11 (Host Interface Equipment shelf)**Function:**

to accommodate the packs listed in Table 4-AE

Quantity:

one per RLCM

Location:

- shelf 3, RLCM frame
- shelf 1, Bay 0 in the OPM or OPAC

Table 4-AE: HIE shelf (NT6X11): provisionable circuit packs		
Pack Code	Pack Name	Pack Position
NT0X50	Filler Plate	vacant positions
NT2X70	Power Converter	22, 25
NT6X45	Emergency Stand-Alone (ESA) Processor	15
NT6X47	Master Processor Memory	14
NT6X50	DS-1 Interface	19, 20, 21
NT6X60	Ringling Generator	1, 5
NT6X73	Link Control Card	17,18
NT6X75AA	Emergency Stand-Alone (ESA) Clock/Tone	16

NT6X13 (Remote Maintenance Module shelf)

Function:

To provide maintenance support for the RLCM, OPM, OPAC, and RSC-S. The RMM occupies one shelf in either the RLCM frame, OPM or OPAC cabinet, or Remote Switching Center (RSC-S). The RMM shelf provisioned in the RLCM, OPM, or OPAC accommodates the packs listed in Table 4-AF in the shelf positions shown in that table. Of these packs, the Codec and Tone (NT2X59), the RMM Control (NT6X74), the Multi-Output Power Converter (NT2X09), and the Common Feature Power Converter (NT2X06) are required. The RMM shelf provisioned in the RSC-S accommodates the packs listed in Tables 4-AF and 4-AF in the shelf positions shown in those tables.

In the RLCM, RMM shelf positions 3 through 10 are provisionable and positions 11 and 12 are reserved for the Digital 4-Channel Digitone Receiver (NT2X48) pack, which is required for the Emergency Stand-Alone feature. Positions 13 through 16 are planned for the future Digital Recorded Announcement (DRA) feature; however, these positions can be provisioned with the Miscellaneous Scan Detection pack (NT0X10), the Miscellaneous Signal Distribution pack (NT2X57), and the Incoming/Outgoing Test Trunk pack (NT2X90).

In the OPM or OPAC, RMM shelf positions 3 through 10 are pre-wired to a standard configuration and positions 11 and 12 are reserved for the Digital 4-Channel Digitone Receiver pack, which is required for the Emergency Stand-Alone feature. Positions 13 through 16 are planned for the future Digital Recorded-Announcement (DRA) feature; however, these positions can be provisioned with the Miscellaneous Scan Detection pack, the Miscellaneous Signal Distribution pack, and the Incoming/Outgoing Test Trunk pack.

Features:

- remote alarm scan point interfaces
- remote line testing interfaces
- remote signal distribution interfaces
- two channels available to communicate with the DMS-10 switch (one active and one standby)

Quantity:

One RMM shelf is required for each RLCM, OPM or OPAC configured for the Emergency Stand-Alone feature, and for the RSC-S.

Location:

- shelf 4, RLCM frame
- shelf 1, Bay 1 of the OPM or OPAC cabinet
- immediately above the Enhanced Remote Cluster Controller 2 (RCC2) shelf, NTMX89 (CRSC) bay

Table 4-AF: RMM shelf (NT6X13) in the RLCM, OPM, or OPAC: provisionable circuit packs		
Pack Code	Pack Name	Pack Position
NT0X10	Miscellaneous Scan Detection	3 through 10 (RLCM only), 7 (OPM/OPAC), 8 (OPM/OPAC, 13 through 16 (RLCM and OPM/OPAC)
NT0X50	Filler Plate	vacant positions
NT2X06	Common Feature Power Converter	20
NT2X09	Multi-Output Power Converter	17, 18
NT2X10	LTU-Analog	3
NT2X11	LTU-Digital	4
NT2X48	Digital 4-Channel Digitone Receiver	11, 13
NT2X57	Miscellaneous Signal Distribution	3 through 10 (RLCM only), 13 through 16
NT2X59	Codec and Tone	1
NT2X90	Incoming/Outgoing Test Trunk	16
NT3X09	Metallic Test Access	5 and 6 (OPM/OPAC), 3 through 10 (RLCM only), 13 through 16,
NT6X74	RMM Control	2

Table 4-AG: RMM shelf (NT6X13) in the RSC-S CRSC (NTMX89FA): provisionable circuit packs		
Pack Code	Pack Name	Pack Position
NT0X10	Miscellaneous Scan Detection	8, 13 through 16
NT0X50	Filler Plate	6, 10, 12, and vacant positions
NT2X06	Common Feature Power Converter	20
NT2X09	Multi-Output Power Converter	17
NT2X10	LTU-Analog	3
NT2X11	LTU-Digital	4
NT2X57	Miscellaneous Signal Distribution	7, 13 through 16
NT2X59	Codec and Tone	1
NT2X90	Incoming/Outgoing Test Trunk	13 through 16
NT3X09	Metallic Test Access	5, 9, 11
NT6X74	RMM Control	2

Table 4-AH: RMM shelf (NT6X13) in the RSC-S CRSC (NTMX89DA): provisionable circuit packs		
Pack Code	Pack Name	Pack Position
NT0X10	Miscellaneous Scan Detection	4, 6, 8, 12, 14, 16 (also 5, 7, 9, 11, 13, 15 if slot is not used for out-of-offices leads)
NT0X50	Filler Plate	6, 10, 12 and vacant positions
NT2X06	Common Feature Power Converter	20
NT2X09	Multi-Output Power Converter	17
NT2X10	LTU-Analog	3, 5, 7, 11
NT2X11	LTU-Digital	4, 6, 8, 12
NT2X57	Miscellaneous Signal Distribution	4, 6, 8, 12, 14, 16 (also 5, 7, 9, 11, 13, 15 if slot is not used for out-of-offices leads)
NT2X59	Codec and Tone	1
NT2X90	Incoming/Outgoing Test Trunk	3 through 16
NT3X09	Metallic Test Access	4, 6, 8, 12, 14, 16
NT6X74	RMM Control	2

NT6X25 (Frame Supervisory Panel (FSP))

Function:

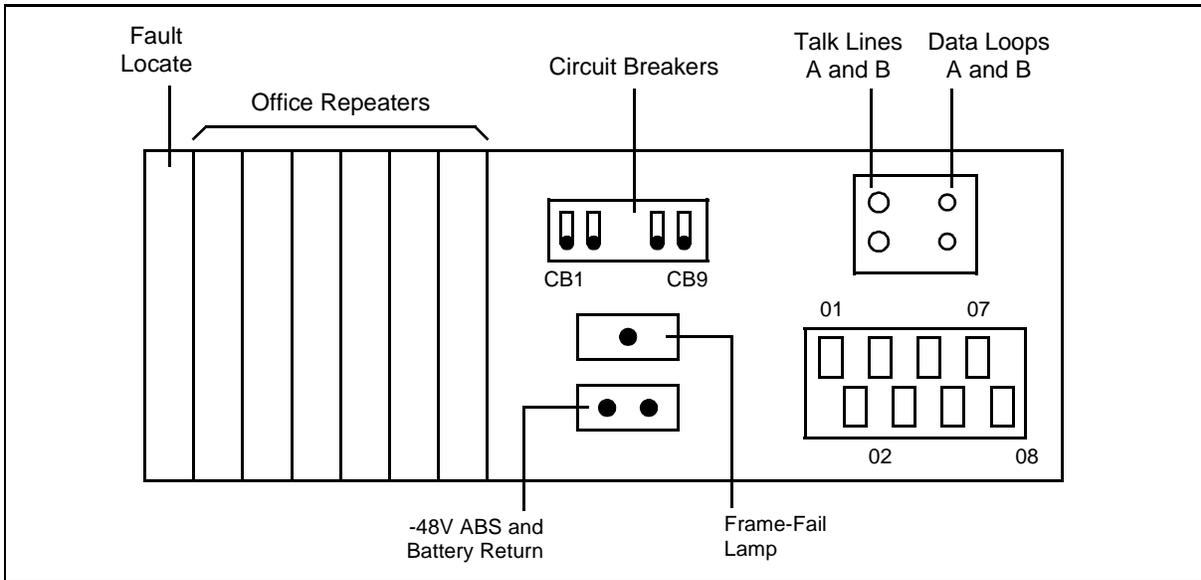
To house the power-control and alarm circuits for the LCMs in an RLCM frame. Figure 4-22 illustrates the Frame Supervisory Panel (FSP).

Features:

- power control for one LCM (two LCA shelves)
- circuit breakers (CB1-CB9) on the front panel; assignments are shown in Table 4-AI
- fuse-guard circuits of the +5 V and +15 V supplies (from the Power Converter pack) and the alarm battery supply (ABS) fuses
- frame-failure lamp on the front panel to indicate tripped breakers or blown fuses
- alarm battery supply (ABS) and battery return (BAT RTN) ports to test battery power
- up to six Office Repeater Cards (QRY18) and one Fault Locate/Order Wire Card (QPP519), located in the left side of the FSP
- NT6X25BA is used when two large 48 V feeds are provided to the RLCM and when talk battery filtering is required.

- 1CB 8 and CB 9 are not equipped on the NT6X25AA FSP

Figure 4-22: RLCM FSP (NT6X25)



Location:

- shelf 5, RLCM frame
- shelf 2, Bay 1 in the OPM

Table 4-A1: Frame Supervisory Panel (NT6X25) circuit breaker assignments

Circuit breaker	When equipped in an RLCM	When equipped in an OPM
1	Power converter, HIE shelf	Power converter, HIE shelf
2	Ring generator 0, HIE shelf	Ring generator 0, HIE shelf
3	Ring generator 1, HIE shelf	Ring generator 1, HIE shelf
4	Power converter, HIE shelf	Power converter, HIE shelf
5	Power converter, RMM shelf	RMM shelf
6	LCA 0	LCA 0
7	LCA 1	LCA 1
8	T1 repeater cards 01 - 04	T1 repeater cards 01 - 04
9	T1 repeater cards 05 - 07	T1 repeater cards 05 - 07

NT6X35 (Frame Supervisory Panel)

Function:

Houses two Ringing Generators (NT6X30) and the power control and alarm circuits for the two LCA shelves or LCM shelf equipment. See Figure 4-23.

Features:

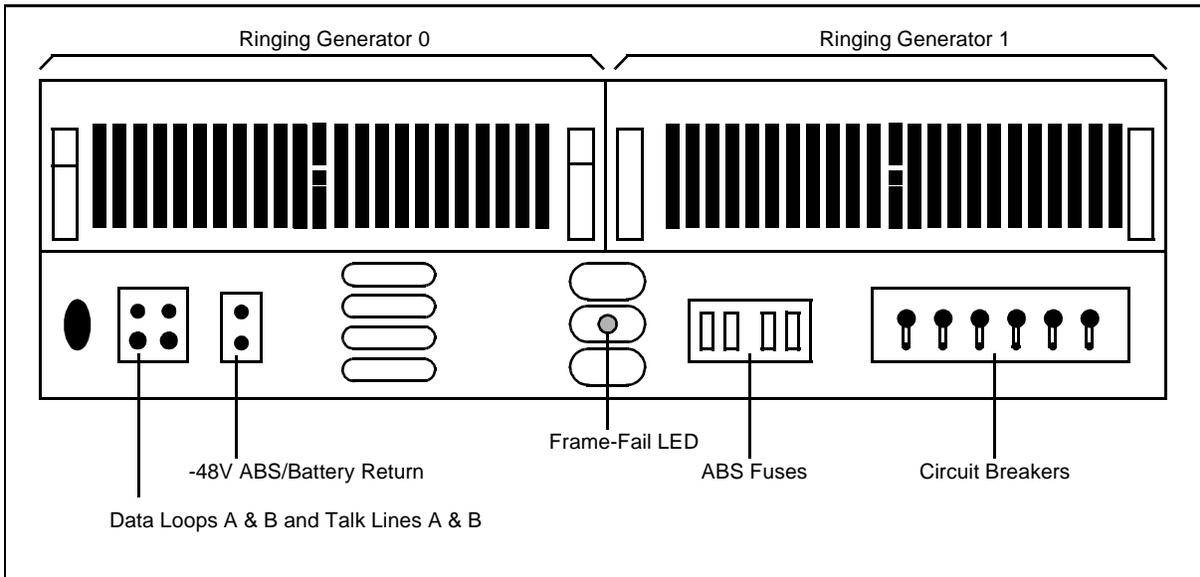
- provides power control for the LCM
- provides power control for two Ringing Generator circuits (located in the FSP)
- provides two talk-battery (filtered -48 V) outputs to the LCM line cards as well as the DAT and T&M shelf trunks
- monitors the undervoltage alarm circuits of the two Power Converter packs (NT6X53) and provides circuit breaker trip signals
- monitors the guard circuits of the Ringing Generator power-control breakers and provides circuit breaker signals
- monitors the fuse-guard circuits of the +5V and +15V supplies (from the Power Converter pack) and the alarm battery supply (ABS) fuses
- provides a “Frame Fail” lamp indication on the front panel if breakers trip or fuses blow
- provides connections for external “Aisle Alarm” circuit and “End-Aisle” alarm lamp
- contains duplicate Ringing Generators that generate standard ringing and voltages for Automatic Number Identification (ANI) and coin control on command from the LCM Processor pack (NT6X51)
- provides ABS test jacks at front and rear of FSP
- contains an internal FSP Alarm pack (NT6X36) that monitors converters for power failure and signals the alarm system of power failures
- provides power control for up to four Line Concentrating Array (LCA) shelves
- provides two talk-battery (filtered -48 V) outputs to the LCMs
- A “Converter Fail” LED indicator is located on the front panel below the associated power-feed circuit breaker.

Quantity:

- One FSP is required per LCM shelf.
- One FSP is required per LCE frame.

Location:

- shelf 5, LCE frame

Figure 4-23: Frame Supervisory Panel (NT6X35)

NT8X04 (Line Concentrating Module)

Same as in the RLCM, except that it is located in Bay 0, Shelves 2 and 3 in the OPM or OPAC. The part number for the LCM in an OPM or OPAC is NT8X04; the part number for the LCM in an RLCM is NT6X04.

NTMX8501 (Enhanced Remote Cluster Controller 2)

The Enhanced Remote Cluster Controller 2 (RCC2) acts as the master controller for all peripherals of the Remote Switching Center (RSC-S). The RCC2 controls associated LCMs, RMMs, and digital trunks as directed by the host.

The RCC2 is a 68020-based module containing two units, 0 and 1. To ensure reliability, the two units run in an active/standby mode of operation. The packs provisioned on the RCC2 are shown in Table 4-AJ.

The RCC2 houses RSC-S processor/memory cards for both normal and ESA modes, as well as time switches, tone generators, and power converters. The RCC2 also supports UTR for lines and trunks in normal and ESA modes.

In addition, the RCC2 provides local switching for the following:

- host-directed calls
- line and trunk calls internal to the RSC-S
- intraswitched calls during ESA

Quantity:

- One RCC2 is required per RSC-S.

Location:

- immediately above the Cooling Unit (NTRX91), NTMX89 (CRSC bay)

Table 4-AJ: RCC2 shelf (NTMX8501): provisionable circuit packs		
Pack Code	Pack Name	Pack Position
NT6X69	CPP Message Protocol Circuit pack	8, 20
NT6X78	Class Modem Resource	5, 23
NT6X92	Universal Tone Receiver	NT6X92AA: 6, 7, 21 NT6X92BB: 22
NTMX72	Power converter	1/2 and 26/27
NTMX73	PCM Signaling	11, 17
NTMX74	DS-30A Interface	13, 15
NTMX75	Time Switch	10, 18
NTMX77	Unified Processor	3, 25
NTMX87	PCM Quad Carrier	9, 12, 14, 16, 19

NTMX8504 (Enhanced Subscriber Carrier Module Access shelf)

The Enhanced Subscriber Carrier Module Access (ESMA) shelf is the principal component of the SCM-10A feature. The primary function of the shelf is the support of up to seven Remote Digital Terminals (RDT). In addition, the ESMA provides:

- support for 24 peripheral side (P-side) DS-1 links

Note: When provisioned with an extension shelf, support for 48 P-side DS-1 links (up to 28 per RDT) is provided.

- interface with the DMS-10 switch network through DS-30A links (maximum of 16)
- support of ISDN, POTS, CLASS, coin, and multiparty lines
- support of time-slot management channel (TMC) protocol (used to set up and disconnect calls and connect DS-1 channels to line cards for call processing)
- support of embedded operations channel (EOC) protocol (used to relay maintenance and provisioning requests between the DMS-10 switch and the RDTs)

- support of ABCD bits signaling (used to transfer line signaling information from the RDTs to the DMS-10 switch)
- support of Extended Super Frame (ESF) DS1 protocol (in order to support ABCD bits signaling)
- support of BRI ISDN lines and ISDN features

The packs provisioned on the ESMA shelf are shown in Table 4-AK. Figure 4-24 illustrates a fully-configured ESMA shelf.

Quantity:

- two ESMA shelves and 1 ESMA extension shelf (NTMX8604, provisioned to serve the main ESMA shelves) per Multivendor Interface Equipment (MVIE) bay (NTQX90AA) - or -
- four ESMA shelves per Multivendor Dual Density Equipment (MVDD) bay (NTQX90BA).

Location:

- Multivendor Interface Equipment (MVIE) bay (NTQX90AA) - or -
- Multivendor Dual Density Equipment (MVDD) bay (NTQX90BA).

Table 4-AK: ESMA main shelf (NTMX8504): provisionable circuit packs		
Pack Code	Pack Name	Pack Position
NT6X78	CLASS Modem Resource	5, 23
NT6X92	Universal Tone Receiver	6, 7, 21, 22
NT8X18	DS-30A Peripheral Interface	9, 19
NTAX74	Cellular Application Processor	3, 25
NTBX01	Enhanced ISDN Processor	4, 24
NTBX02	Enhanced D-channel Handler (EDCH)	14, 16
NTMX72	Power Converter	1/2 and 26/27
NTMX73	ESMA Signaling Processor	11, 17
NTMX75	ESMA Matrix	10, 18
NTMX76	Message and Tones	8, 20
NTMX87	PCM Quad Carrier	12, 14, 16

Quantity:

up to two NTTR5010 Star Hub Line Drawer shelves can be equipped per Star Hub frame

Location:

shelves 1 and 2 of the NTTR80 (Star Hub frame)

NTTR5020 (Star Hub Line Drawer shelf)

Function:

to house the equipment necessary to interface up to 384 analog lines

Components:

up to 6 LCM Line Drawers (NT6X05)

Quantity:

one NTTR5020 Star Hub Line Drawer shelf can be equipped per Star Hub frame

Location:

shelf 4 of the NTTR80 (Star Hub frame)

NTTR8603 (Star Hub Control shelf)

The Star Hub Control shelf, illustrated in Figure 4-26, contains the controlling packs and an integrated Frame Supervisory Panel for the Star Hub. The functions of the controlling packs provisioned on the Star Hub Control shelf are described under the entries for the individual packs in Section 5 of this NTP. The locations of the controlling packs on the Star Hub Control shelf are shown in Table 4-AM. Star Hub power distribution for -48V talk battery is shown in Table 4-AM. Star Hub +5V and +15V fuse assignments are shown in Table 4-AM.

The integrated Frame Supervisory Panel contains filters, 66 fuses, eight circuit breakers, and four alarm LEDs (catastrophic, major, minor, and -48V ABS supply). In addition, the panel is equipped with two RS-232 ports for connection to each NTTR77 Remote Controller pack, test points (-48 V and return), and two RJ11 phone jacks for phone or modem connection to the MDF. The cards provisioned in the Frame Supervisory Panel include: the NTTR74 Alarm card (which holds the alarm circuits); the NTTR75 Maintenance and Fuse card (which holds the fuses, alarm LEDs, RS-232 ports, and power test points); and the NTTR76 Circuit Breaker and Talk Battery Filter cards (which hold the -48V breakers and talk battery filters). The locations of the packs on the integrated Frame Supervisory Panel are shown in Figure 4-27.

Quantity:

one Star Hub Control shelf (NTTR8603) per Star Hub frame (NTTR80).

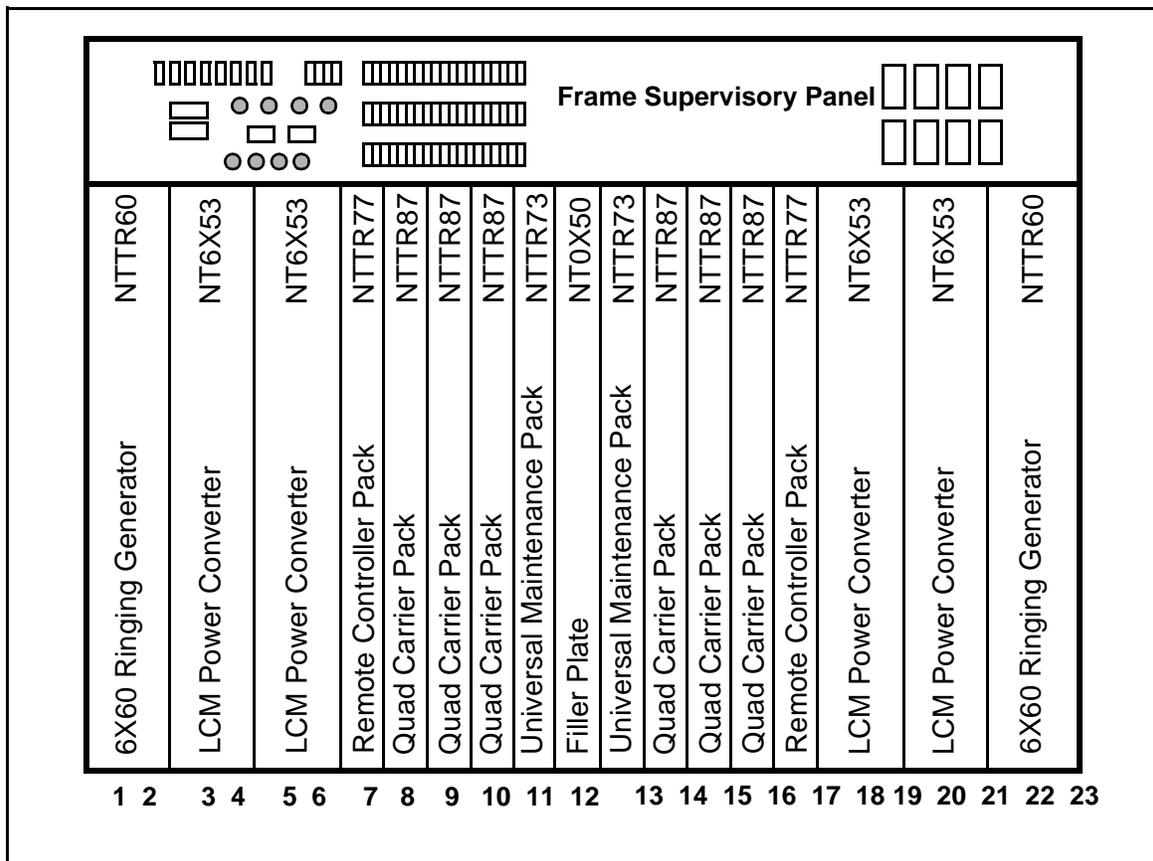
Location:

Star Hub frame (NTTR80)

Table 4-AM:
Star Hub Control shelf (NTTR86): provisionable circuit packs

Pack Code	Pack Name	Pack Position
NTTR60	6X60 Ringing Generator	1/2, 22/23
NTTR77	Remote Controller pack	7, 17
NTTR73	Universal Maintenance pack	11, 13
NTTR87	Quad Carrier pack	8, 9, 10, 14, 15, 16
NT6X53	LCM Power Converter pack	3/4, 5/6, 18/19, 20/21

Figure 4-26: Star Hub Control shelf (NTTR86)



4-68 Shelves, modules, and panels

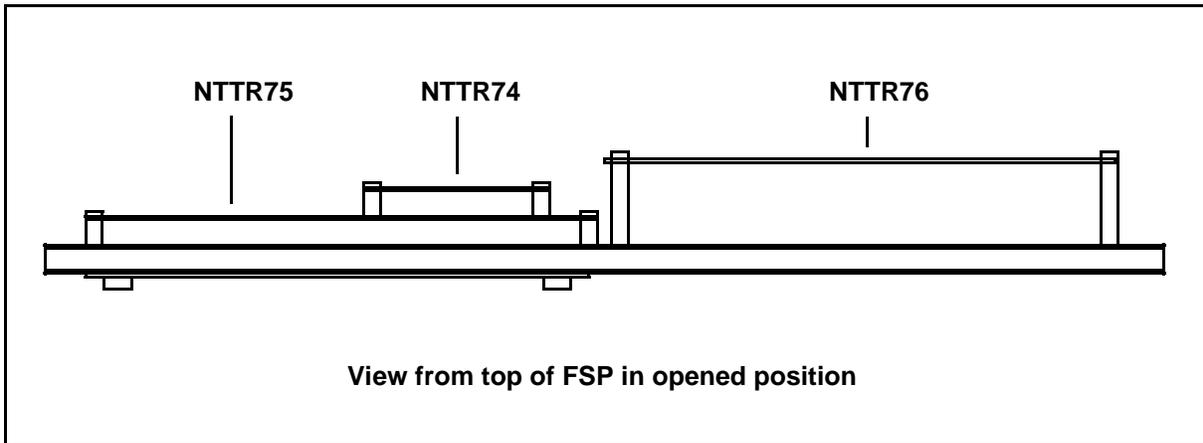
Table 4-AN: Star Hub Power Distribution for -48V Talk Battery								
Fuse #								
Shelf #	1	2	3	4	5	6	7	8
LSG #	01 00	03 02	05 04	07 06	09 08	11 10	13 12	15 14
Source	Talk A				Talk B			

Table 4-AO: Star Hub +5V and +15V Assignments								
Fuse #	1	2	3	4	5	6	7	8
Shelf #	1	2	3	4	5	6	7	8
LSG #	01 00	03 02	05 04	07 06	09 08	11 10	13 12	15 14

		11	12	13	14	15	16	17	18
9	10	11	12	13	14	15	16	17	18
17	19	21	23	25	27	29	31	33	35
16	18	20	22	24	26	28	30	32	34
Talk A					Talk B				

9	10	11	12	13	14	15	16	17	18
9	10	11	12	13	14	15	16	17	18
17	19	21	23	25	27	29	31	33	35
16	18	20	22	24	26	28	30	32	34

Figure 4-27: Star Hub Control shelf (NTTR86) - Frame Supervisory Panel NTTR74/NTTR75/NTTR76 card locations



Section 5: Circuit packs

Introduction

DMS-10 circuit packs are described in this section. The descriptions are strictly organized by Product Engineering Code (PEC) number. Within each pack description is a group of subheadings that contains basic information about each pack's function, features, components, quantity (when required), and location.

Circuit pack family codes

When a specific hardware or software application requires a particular family code version of a circuit pack (for example, NT4T04AF), the family code restriction is described within the main circuit pack entry under the subheading “Versions”. However, not every family code version of a circuit pack is separately described in this section because most of these different versions are part of normal product evolution and, therefore, do not require separate entries.

NT0T51 (Filler Plate pack)

Function:

to fill empty pack positions in order to ensure proper ventilation

Location:

vacant slot positions in most shelves. For example, in the J0T72 Alarm and Ringing Module, a filler plate is used in position 1.

NT0X10 (Miscellaneous Scan Detection pack)

Function:

to determine if an alarm condition exists for hardware components in the RLCM, OPM, OPAC, or RSC-S

Features:

- fourteen alarm scan points per pack. Configured with four packs, the RMM can support up to 56 scan points. In the OPM or OPAC, 1 through 14 are assigned and 15 through 56 are customer-assignable; 57 through 61 are customer-assignable to an NT0X10 provisioned in position 7 on the RMM. In the RLCM, 1 through 56 are customer-assignable.

- Each alarm scan detector circuit may be configured as a loop detector, ground detector, or battery detector by way of DIP switches on the pack.
- self-test mode, to allow verification of the scan detection circuits, under software control

Note: In the RLCM only, a single scan point should be customer-assigned to monitor the following: Ringing Generator Alarms, Power Converter Alarms, External/Internal Fuse Alarms, and Talk Battery Circuit Breakers.

Quantity:

- One Miscellaneous Scan Detection pack is required per RMM for the OPM or OPAC for battery and environmental alarms.
- up to four per RMM shelf

Location:

- positions 3 through 10, and 13 through 16 in the host RLCM
- positions 8 and 13 - 16 in the OPM or OPAC. An NT0X10 pack may also be provisioned in position 7.
- positions 8 and 13 - 16 in the RSC-S

NT0X50 (Filler Plate)

Function:

to fill empty pack positions in order to ensure proper ventilation

Location:

vacant slot positions on various shelves. See the pack-fill for each shelf to determine whether the NT0X50 filler plate is used.

NT2T00 (Single-Party Line pack)

Function:

to provide the interface between single-party lines and the digital network. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 14; J0T29, J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 14; J0T90A-1 L1 and L2 (PE shelves)

NT2T01 (Two-Party Line pack)

Function:

to provide the interface between two-party subscriber lines and the digital network. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 14; J0T29, J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 14; J0T90A-1 L1 and L2 (PE shelves)

NT2T02 (Four-Party ANI Line pack)

Function:

to provide the interface between four-party subscriber lines that have ANI and the digital network. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 14; J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 14; J0T90A-1 L1 and L2 (PE shelves)

NT2T03 (Miscellaneous Line pack)

Function:

to provide the interface between the digital network and PBX, single-party, two-party, or eight-party lines. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 14; J0T29, J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 14; J0T90A-1 L1 and L2 (PE shelves)

NT2T04 (Prepay Coin Line pack)

Function:

to provide the interface between prepay coin telephone lines and the digital network. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 14; J0T29, J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 14; J0T90A-1 L1 and L2 (PE shelves)

NT2T05 (Eight-Party Line pack)

Function:

to provide the interface between four- or eight-party lines and the digital network. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 14; J0T29, J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 14; J0T90A-1 L1 and L2 (PE shelves)

NT2T07 (Multifrequency Ringing Two-Party Line pack)

Function:

to provide the interface between multifrequency ringing, two-party lines and the digital network. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 14; J0T29, J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 14; J0T90A-1 L1 and L2 (PE shelves)

NT2T08 (Extended Range Two-Party Line pack)

Function:

to provide the interface between two-party lines that require more than the normal 1900 Ω range (including 200 Ω for the telephone set) and the digital network. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Quantity:

A maximum of five packs (ten circuits) can be provisioned on any one shelf.

Location:

- positions 1 through 14; J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 14; J0T90A-1 L1 and L2 (PE shelves)

NT2T09 (Extended Range Eight-Party Line pack)

Function:

to provide the interface between eight-party lines that require a range of more than 1900 Ω (including 200 Ω for the telephone set) and the digital network. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 14; J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 14; J0T90A-1 L1 and L2 (PE shelves)

Note: A maximum of five packs (ten circuits) can occupy one shelf.

NT2T10 (Multifrequency Receiver pack)**Function:**

to provide circuitry to decode standard two-out-of-six multifrequency signals on incoming trunks

Features:

two multifrequency receivers in each circuit pack

Location:

- positions 1 through 14; J0T29, J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 14, J0T90A-1 L1 and L2 (PE shelves)

Note: Nortel recommends that Multifrequency Receiver packs be distributed evenly between the DAT shelf and the T&M shelf for redundancy.

NT2T11 (Digitone Receiver pack)**Function:**

to provide the circuitry to decode Digitone signals from the telephone sets

Features:

two Digitone receivers in each circuit pack

Location:

- positions 1 through 14; J0T29, J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 14, J0T90A-1 L1 and L2 (PE shelves)

Note: Nortel recommends that Digitone Receiver packs be distributed evenly between the T&M shelf and the DAT shelf for redundancy.

NT2T12 (Peripheral Control 1 pack)**Function:**

to provide the interface between two multiplexed loop connections to different Network packs and the PE backplane

Features:

provides the manual and system enable/disable capability for the PE shelf signaling

Location:

position 16, J0T29 (PE shelf)

NT2T13 (Peripheral Control 2 pack)

Function:

to provide dc-to-dc power conversion to supply PE packs on the shelf and to provide voltage-level monitoring. In addition, maintenance relays provide connection between the PE shelf and the frame maintenance buses.

Features:

- automatic monitoring and shutdown of power to shelf if voltage exceeds specified limits
- automatic restoral of power to shelf within 15 sec. after shutdown

Location:

position 15, J0T29 (PE shelf)

NT2T14 (Peripheral Maintenance Access pack)

Function:

provides maintenance relays in order to connect the PE, LCE, RLCM, RSLE, RSLM, OPM, OPSM, SLC-96, RSC-S, and RCU maintenance buses with the common system maintenance buses

Quantity:

For provisioning requirements, see NTP 297-3601-450, *Provisioning*.

Location:

One PMA pack is required in each PE bay in the system. It must be installed in position 14 of the J0T29, J0T59A-1 L1, and J0T90A-1 L1 PE shelves; it may be installed in positions 1 through 13 of J0T59A-1 L2 and positions 4 through 13 J0T90A-1 L2 PE shelves. Additionally, the other PMA packs required for the LCE bays and remotes in the system may be installed in positions 1 through 13 of the J0T59A-1 L2 and positions 4 through 13 of the J0T90A-1 L2 PE shelves.

NT2T16 (Incoming Test Trunk pack)

Function:

to provide the interface between the DMS-10 switch and a No. 14 Local Test Desk, No. 3 Local Test Cabinet, a Model 3703 Local Test Cabinet, a Centralized Automatic Loop Reporting System (CALRS), Lordel (T 9/15 ALIT) test set, or Mechanized Loop Testing (MLT) system

Location:

- positions 1 through 4, J0T29 and J0T59A-1 L1 (PE shelves)
- positions 1 through 13, J0T59A-1 L2 (PE shelf)

- position 4, J0T90A-1 L1 (PE shelf)
- positions 4 through 13, J0T90A-1 L2

Note 1: Nortel recommends that the Incoming Test Trunk pack not be provisioned on the T&M shelf.

Note 2: The NT2T16CB version must be used when metallic line testing for remotes or a SLC-96 is required. The NT2T16CA version may be used when metallic testing for a SLC-96 is not required.

NT2T17 (Noller Test Trunk pack)

Function:

to work in conjunction with an Auxiliary Ring and Tone circuit pack (NT2T40) and a Miscellaneous Line circuit pack (NT2T03) to provide the interface between the DMS-10 switch and a Noller NP612 Remote Station for subscriber line testing

Note: The NT2T17CB version is required to support remotes configured with the office.

Location:

- positions 1 through 13, J0T59A-1 L2 (PE shelf)
- position 4, J0T90A-1 L1 (PE shelf)
- positions 4 through 13, J0T90A-1 L2 (PE shelf)
- positions 1 through 4, J0T29 and J0T59A-1 L1 (PE shelves)

NT2T19 (Line and Trunk Test pack)

Function:

to automatically test the basic functions of line and trunk circuit packs under control of the Peripheral Equipment Diagnostic (PED) overlay, including a self test

Features:

performs the following tests:

- transmission - tests for performance of the circuit in the send or receive direction. Digital and analog test tones are generated and the power content is measured. A return loss test is also performed
- dc measurement - tests for the presence of talk battery, coin control signals, and reverse battery, as applicable
- off-hook detection - eight different terminations simulate possible loop conditions
- ring trip - checks for the presence of ringing, places a termination on the line, and checks for removal of ringing

Quantity:

One Line and Test Trunk pack is required per DMS-10 system.

Location:

- positions 1 through 14 requires two adjacent positions on J0T29, J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 13, J0T90A-1, L1 and L2 (PE shelves)

Note: This pack occupies two adjacent circuit pack positions.

NT2T20 (Four-Wire E&M Trunk pack)

Function:

to provide the interface between four-wire E&M trunk facilities and the digital network. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 4, J0T29 and J0T59A-1 L1 (PE shelves)
- positions 1 through 13, J0T59A-1 L2 (PE shelf)
- position 4, J0T90A-1 L1 (PE shelf)
- positions 4 through 13, J0T90A-1 L2 (PE shelf)

NT2T21 (Two-Wire E&M Trunk pack)

Function:

to provide the interface between two-wire E&M trunk facilities and the digital network. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 4, J0T29 and J0T59A-1 L1 (PE shelves)
- positions 1 through 13, J0T59A-1 L2 (PE shelf)
- position 4, J0T90A-1 L1 (PE shelf)
- positions 4 through 13, J0T90A-1 L2 (PE shelf)

NT2T23 (Miscellaneous Loop Trunk pack)

Function:

to interface two-wire loop trunks with the digital network. The NT2T23 is used as an incoming trunk. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 14, J0T29 and J0T59A-1 L1 and L2 (PE shelves)
- position 4 through 14, J0T90A-1 L1 and L2 (PE shelf)

NT2T24 (Outgoing Loop Trunk pack)**Function:**

to interface outgoing two-wire loop trunks with the digital network. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 4, J0T29 and J0T59A-1 L1 (PE shelves)
- positions 1 through 13, J0T59A-1 L2 (PE shelf)
- positions 4 through 14, J0T90A-1 L1 and L2 (PE shelf)

NT2T26 (Circuit Breaker pack)**Function.**

to provide -48 V power to the two 5/12 V Converter packs (NT3T19) as well as circuit breaker protection

Quantity:

One Circuit Breaker pack is required in the List-1 REM Local shelf.

Location:

position 17, J0T69 (SCM shelf).

NT2T27 (Four-Wire E&M Trunk pack with pad switching)**Function:**

to provide the interface between four-wire E&M trunk facilities that require pad switching and the digital network. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 4, J0T29 and J0T59A-1 L1 (PE shelves)
- positions 1 through 13, J0T59A-1 L2 (PE shelf)
- positions 4, J0T90A-1 L1 (PE shelf)
- positions 4 through 14, J0T90A-1 L2 (PE shelf)

NT2T30 (Network Interface pack)

Function:

to provide:

- frame alignment of the received DS-1 signal and frame slippage, if signal is asynchronous with respect to the DMS-10 switch office clock
- insertion of digital pads (0, 1, 3 or 4 dB) by system software when required in the received speech timeslots
- data rate conversion from 2.048 to 1.544 Mb/s and from 1.544 to 2.048 Mb/s
- timeslot switching that allows any one of the 24 carrier timeslots to be switched to any one of the 30 network loop speech timeslots
- phase-locked clock conversion from 2.048 to 1.544 MHz
- per-channel looparound capability for testing purposes
- network loop driving and receiving
- generation of an 8-kHz office synchronization signal from the received DS-1 signal and driving this signal to the office synchronization equipment

Quantity:

One Network Interface pack is required per DCM.

Location:

- positions 4, 7, 10, 14, 17, and 20; J0T13A-1, L1, L3, or L5 (Digital Carrier shelf)

NT2T31 (Signaling Converter pack)

Function:

to provide:

- processing of the A and B signaling bits from the received DS-1 signal
- generation of the A and B signaling bits for the transmitted DS-1 signal
- DMS-10 switch timeslots 0 and 16 message processing
- storing of trunk scan and distribution points in memory
- forcing zeroes in the second bit of all channels of the transmitted DS-1 signal during a local alarm
- zero-code suppression
- framing pattern generation

Quantity:

One Signaling Converter pack is required per DCM.

Location:

- positions 3, 6, 9, 13, 16, and 19; J0T13A-1, L1, L3, or L5 (Digital Carrier shelf)

NT2T32 (Carrier Interface pack)**Function:**

to provide:

- frame-pattern detection
- clock recovery from the received DS-1 signal
- reception of the incoming DS-1 signal
- transmission of the outgoing DS-1 signal
- optional transmission of signal equalization depending on the length of cable between this pack and the office repeater bay selected by on-board DIP switches
- bipolar violation detection
- detection of zeroes in all channels of the received DS-1 signal indicating a remote alarm
- 24-channel looparound capability
- +5 and +12 V power monitoring
- initiation of message to software on power-up

Note 1: The Cluster configuration, which requires communication between the Data Link Controller (DLC) pack (NT3T50) and a DCM, requires Carrier Interface packs (NT2T32) with a family code of “AD” or higher (NT2T32AD or higher).

Note 2: The Operations Support System (OSS) telemetry feature used with the Cluster configuration requires Carrier Interface packs (NT2T32) with a family code of “AE” or higher (NT2T32AE or higher).

Note 3: Carrier Interface packs with a AF family code provide Digital Alarm Scanning signal transmission over T-1 lines and DIP-switch control of channel 1 of the DS-1 signal. See the NTP entitled *DIP-Switch Settings for Printed Circuit Packs and Balance Networks* (297-3601-316) for information on setting this DIP-switch.

Quantity:

One Carrier Interface pack is required per DCM.

Location:

positions 2, 5, 8, 12, 15, and 18; J0T13A-1, L1, L3, or L5 (Digital Carrier shelf)

NT2T33 (Six-Loop Terminator pack)

Function:

to provide cable termination and DCM multiplexed loop connections

Quantity:

One NT2T33 is required per Digital Carrier shelf.

Location:

position 11; J0T13A-1, L1, L3, or L5 (Digital Carrier shelf)

NT2T34 (Network Buffer pack)

Function:

- converts speech timeslots from 2.048 to 1.544 Mb/s and from 1.544 to 2.048 Mb/s
- detects changes in the terminal address
- generates outgoing carrier framing signals
- performs zero code suppression for the carrier
- combines speech and signaling for the outgoing carrier
- combines speech and signaling from the incoming carrier

NT2T35 (Message Converter pack)

Function:

- contains memory for storing 64 outgoing messages
- decodes the various message types from the outgoing DMS-10 switch signaling messages and directs them to the proper circuits
- contains the OCM status register, which monitors out-of-sync, bipolar errors and message buffer overflow
- converts the outgoing signaling messages to A- and B-bit carrier messages, and adds the checksum to outgoing carrier messages
- contains the LED for out-of-sync indication
- retransmits characters under fault conditions

NT2T36 (Signaling Buffer pack)

Function:

- receives A- and B-bit carrier messages and tests the checksum
- initiates repetition cycle upon receipt of a faulty carrier message
- assembles and buffers messages for transmission back to the DMS-10 switch
- performs clock conversion from 2.048 to 1.544 MHz

NT2T37 (Remote Network pack)

Function:

- produces the signals for the multiplex loop going to the PSC-1 packs
- contains the connection memory that generates the addresses for speech timeslots
- contains the message buffers for outgoing and incoming messages to the PSC-1 packs
- controls the scan circuit for retrieving messages from the PSC-1 packs
- generates master counter clock signals

NT2T38 (Remote Message pack)

Function:

- receives carrier messages and converts them to DMS-10 format
- transmits carrier messages and adds the checksum
- retransmits characters when in the repetition mode
- converts DMS-10 messages from PSC-1 to carrier format
- contains the RCM status registers that monitor the LED, bipolar errors, power and ringing alarms, and diagnostic looping

NT2T39 (Remote Signaling pack)

Function:

- performs clock conversion from 1.544 to 2.048 MHz
- converts speech timeslots from 1.544 to 2.048 Mb/s and from 2.048 to 1.544 Mb/s

NT2T40 (Auxiliary Ringing and Tone pack)

Function:

to generate four-frequency ringing by demultiplexing the DMS-10 four-frequency ringing and to generate receiver-off-hook and busy tones; used in conjunction with the Noller Test Trunk pack (NT2T17CA)

Location:

- positions 1 through 4; J0T29 and J0T59A-1, L1 (PE shelves)
- positions 1 through 13, J0T59A-1 L2 (PE shelf)
- position 4, J0T90A-1 L1 (PE shelf)
- positions 4 through 14, J0T90A-1 L2 (PE shelf)

NT2T41 (Peripheral Shelf Controller pack)

Function:

to provide the interface between two multiplex loop connections to different network packs and the peripheral shelf backplane, the DAT shelf backplane, or the T&M shelf backplane

Features:

- provides the manual and system enable/disable capability for DAT shelf trunk pack signaling
- provides the manual and system enable/disable capability for T&M shelf trunk pack signaling
- provides the manual and system enable/disable capability for PE shelf signaling

Quantity:

- One is required per T&M shelf.
- One is required per DAT shelf.

Location:

- position 15 and 16; J0T59A-1 L1, J0T59A-1 L2, J0T90A-1 L1 and L2 (PE shelves)

NT2T42 (Peripheral Shelf Converter pack)

Function:

- provides dc-to-dc conversion to supply +48, +8, ± 10 , and ± 6 V to DAT shelf trunk packs only. In addition, maintenance relays provide connection between the DAT shelf and the frame maintenance buses.
- provides dc-to-dc conversion to supply +48, +8, ± 10 , and ± 6 V to T&M shelf trunk packs only. In addition, maintenance relays provide connection between the T&M shelf and the frame maintenance buses.
- to provide dc-to-dc conversion to supply +48, +8, ± 10 , and ± 6 V to other PE packs in the shelf. In addition, maintenance relays provide connection between the PE shelf and the frame maintenance buses.

Quantity:

One is required per shelf.

Location:

position 16; J0T59A-1 L1, J0T59A-1 L2, J0T90A-1 L1 and L2 (PE shelves)

NT2T43 (0-dB General Line pack)

Function:

to provide the interface between the digital network and single-party, two-party, and multiparty lines. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 14; J0T29, J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 14, J0T90A-1 L1 and L2 (PE shelves)

NT2T44 (0-dB Miscellaneous Line pack)

Function:

to provide the interface between the digital Network and PBX, single-party, or eight-party lines. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 14; J0T29, J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 14, J0T90A-1 L1 and L2 (PE shelves)

NT2T45 (0-dB Prepay Coin Line pack)

Function:

to provide the interface between prepay coin telephone lines and the digital network. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 14; J0T29, J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 14, J0T90A-1 L1 and L2 (PE shelves)

NT2T46 (Peripheral Processor pack)

Function:

to provide the means for performing transhybrid loss (THL) measurements in the 0-dB Line and LCE Line cards and to interface with the peripheral bus for communication with the CPU. To check the status (loaded or nonloaded) of 0-dB lines.

Location:

- positions 4 through 14, J0T90A-1 L1 and L2 (PE shelves)
- positions 1 through 14, J0T59A-1 L1 and L2 (PE shelves)

Quantity:

Two Peripheral Processor packs are recommended for redundancy.

Note: A duplicate pack is required as a “hot” standby. Only one enabled Peripheral Processor pack (NT2T46) is required per DMS-10 system; two are recommended for redundancy.

NT2T47 (Remote Alarm pack)

Quantity:

One Remote Alarm is required per REM site unless more customer-assigned scan and signal distribution points are required, and quantity can be increased to one per REM Remote shelf.

NT2T48 (CAMA Position Signaling Circuit pack)

Function:

to provide the interface between CAMA positions and calls requiring operator assistance (ONI calls or ANI-fail calls)

Features:

- one circuit per pack
- 900 Ω nominal impedance
- 480 Hz $\pm 2\%$ tone supply for ONI or ANI fail indications
- precision balancing network options to match circuit to D66 or H88 loaded cable or to nonloaded cable

Location:

- positions 1 through 14; J0T29, J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 14, J0T90A-1 L1 and L2 (PE shelves)

NT2T50 (Time Switch pack)

Function:

to provide the following:

- reclocking of the bit stream between the DMS-10 switch (2.048 MHz) and the RCT (1.544 MHz)
- extraction and insertion of control messages between the DMS-10 switch and the SCM
- generation of the DMS-10 framing pulse
- monitoring of the SCM power supplies
- decoding of DMS-10 requests to restart the SCM

- loopback of the DMS-10 multiplex loop on a per-channel basis by software command at the DMS-10 switch

Features:

- terminates one multiplex loop
- operates in pairs, with one Time Switch pack active and the mate inactive
- handles half of the SCM traffic or all SCM traffic when sparing the mate pack, but at a reduced capacity

Quantity:

two per SCM

Location:

positions 6 and 7, J0T69 (SCM shelf)

NT2T51 (System Processor pack)

Function:

to control the internal operation of the SCM

Features:

- contains 32K of RAM
- contains 2K of ROM

Quantity:

two per SCM

Location:

positions 2 and 11, J0T69 (SCM shelf)

NT2T52 (B-Word Processor pack)

Function:

to extract B words from the RCT bit stream and to provide outgoing B words to the A-Bit Processor pack for transmission to the RCT. As a secondary function, the NT2T52 controls the digital test circuit card at the RCT whenever the digital subscriber line test is invoked.

Features:

- contains 16K of RAM
- contains 2K of ROM

Quantity:

two per SCM

Location:

positions 4 and 9, J0T69 (SCM shelf)

NT2T53 (A-Bit Processor pack)

Function:

to provide the following:

- A-bit signaling, which involves such aspects of system operation as ringing, coin control, on-hook/off-hook status, and ANI status
- inband signaling, which controls the polarity and side to which ringing is applied; for frequency-selective remote line circuit packs, it relays the DMS-10 multifrequency ring bus frequencies to the RCT
- combination of signals generated on different packs into a single DS-1 bit stream for transmission to the RCT
- generation of DS-1 timing signals for the SCM

Features:

operates in pairs, with one pack active and the mate inactive

Quantity:

two per SCM

Location:

positions 5 and 8, J0T69 (SCM shelf)

NT2T54 (Digroup pack)

Function:

to provide the interface between the DS-1 line and the SCM shelf. Additional functions include:

- bipolar-to-unipolar conversion of incoming signals and unipolar-to-bipolar conversion of outgoing signals
- de-jitterization of the incoming DS-1 line
- frame synchronization
- digroup synchronization
- timing generation

Features:

- terminates one DS-1 line
- line build-out switch that controls a 100 Ω attenuation network, with special shaping to compensate for dispersion in the cable connecting the Digroup pack to the Office Repeater Bay

Quantity:

two per SCM

Location:

positions 14 and 15, J0T69 (SCM shelf)

NT2T55 (1-for-n Protection Switch pack)**Function:**

to provide switchover to a third DS-1 line if either of the active DS-1 lines fails;
additional functions include:

- control of standby DS-1 line for fault recovery as directed by the System Processor pack
- application of termination and generation of PCM patterns on the idle line to allow it to be monitored for faults
- disconnection of pattern generation and line termination from the protection line, if the SCM on which it is mounted is not currently connected to the protection line
- indication to the system processor of automatic loopback

Features:

- fault-free timers that can be set at 80 or 10 s by means of two suitcase-type jumper plugs inside the pack
- indication of the automatic loopback option provided by a switch inside the pack, which is closed to indicate that the option is in effect
- line build-out switches, which are set manually to compensate for the variable distance to the Office Repeater Bay (applies to protection line only)
- two fuses inside the pack for the protection of the power changeover relay (K10) inside the pack
- normally powered by Converter A, but can draw power from Converter B if Converter A fails

Quantity:

one per SCM

Location:

position 13, J0T69 (SCM shelf)

NT2T56 (Protection Switch Failsafe pack)

Function:

to act as a backup card to the 1-for-N Protection Switch pack (NT2T55) by preventing open circuits on the digital lines from occurring if protection line switching is removed from the system; to check the integrity of the bipolar signal from the DS-1 line; and to serve as the interface to the Peripheral Maintenance Access pack of the DMS-10 switch

Features:

- four internal fuses for protection of the power changeover relays
- normally powered from Converter B but can draw power from Converter A if Converter B fails

Quantity:

one per SCM

Location:

position 12, J0T69 (SCM shelf)

NT2T67 (0-dB Superimposed Ringing Line pack)

Function:

to provide the interface between four-party selective ringing, or eight-party semi-selective ringing lines and the digital network. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 14; J0T29, J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 14, J0T90A-1 L1 and L2 (PE shelves)

NT2T69 (0-dB Single-Party Line pack)

Function:

to provide the interface between single-party lines and the digital network. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 14; J0T29, J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 14, J0T90A-1 L1 and L2 (PE shelves)

NT2T70 (Peripheral Maintenance Processor pack)

Function:

to provide function control and shelf diagnostics for the PMS

Features:

contains the microprocessor control circuitry and signaling interface to the DMS-10 switch

Location:

position 2, J0T90A-1 L1 and L2 (PE shelves)

NT2T71 (Peripheral Circuit Test pack)**Function:**

to provide the voltages required by ACT/PMS and the meter access to the appropriate maintenance bus

Features:

provides +5 V, +18 V, -18 V, +130 V, and -130 V, as well as precision resistance and voltage references for extra-fast meter calibration

Location:

position 1, J0T90A-1 L1 and L2 (PE shelves)

NT2T72 (Facility Test pack)**Function:**

to provide the PMS with metallic access to the device under test; replaces the PMA pack (NT2T14) in the bay in which the PMS is installed

Features:

contains metallic access relays and the extra-fast meter (XFM) test head

Location:

position 3, J0T90A-1 L1 and L2 (PE shelves)

NT2T73 (Signaling Processor pack)**Function:**

to provide digital test tones, programmable filters, power meters, and time switches for the ac Tester

Location:

position 3, J0T90A-1 L1 and L2 (PE shelves)

NT2T74 (Control Processor pack)**Function:**

to provide the control function and signaling interface to the DMS-10 switch for the ac Tester

Features:

contains microprocessor control circuitry

Location:

position 2, J0T90A-1 L1 and L2 (PE shelves)

NT2T75 (0-dB Eight-Party Line pack)

Function:

to provide the interface between four- or eight-party subscriber lines and the digital network. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 14; J0T29, J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 14, J0T90A-1 L1 and L2 (PE shelves)

NT2T85 (Digital Recorded Announcement pack)

Function:

to record and store standard announcements in a digital format; to provide the interface to the digital network for recorded message access by subscribers. For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

- positions 1 through 14; J0T29, J0T59A-1 L1 and L2 (PE shelves)
- positions 4 through 14, J0T90A-1 L1 and L2 (PE shelves)

NT2X06 (Common Feature Power Converter pack)

Function:

to provide a regulated, floating dc power supply with an output of 5 volts for the RMM shelf

Features:

- floating 5 V dc output
- over voltage and over current protection circuits
- low-voltage monitor circuit
- compatible with multi-point and single-point ground power supplies

Quantity:

One Common Feature Power Converter Pack is required for each RMM shelf.

Location:

Position 20, NT6X13 (RMM shelf)

NT2X09 (Multi-Output Power Converter pack)

Function:

to provide a regulated, common-ground dc power supply having five different outputs

Features:

- five outputs, +5 V, -5 V, +12 V, -15 V, +24 V, required by the shelf
- overvoltage and overcurrent protection circuits for the +5 V, -5 V, +12 V, and -15 V outputs (the 24 V output is protected by a fuse)

Quantity:

One Multi-Output Power Converter Pack is required for each RMM shelf.

Location:

positions 17 and 18, NT6X13 (RMM shelf). This is a dual-width pack.

NT2X10 (LTU Analog pack)

Function:

to perform tests and measurements on a subscriber loop or a line circuit pack. The LTU Analog pack functions in conjunction with the LTU Digital pack. Together these two packs form the LTU.

Features:

- contains circuits for measuring ac and dc voltages
- contains faceplate fuses that blow to indicate current overload on the tipping leads
- performs conversions to allow communication with the LTU digital format
- supports these LTU features:
 - dc voltage measurement T-G, R-G
 - ac voltage measurement T-G, R-G
 - resistance measurement T-G, R-G, T-R
 - capacitance measurement T-G, R-G, T-R
 - loop/ground start tests
- used as the test device for Line Insulation Testing (LIT)

Quantity:

One LTU Analog pack is required for each RMM shelf when line testing is required.

Location:

- position 3, 5, 7, 9, 11, 13, and 15, RMM shelf (NT6X13) of the host RLCM
- position 3, RMM shelf (NT6X13) of the RSC-S

Note: This pack is used with the LTU Digital pack (NT2X11). Each NT2X10 pack must be provisioned in a position adjacent to an NT2X11 pack.

NT2X11 (LTU Digital pack)

Function:

to perform tests and measurements on a subscriber loop or a line circuit pack. The LTU Digital pack functions in conjunction with the LTU Analog pack. Together these two packs form the LTU.

Features:

- type 8085 eight-bit Central Processing Unit (CPU) which provides intelligence to the buffer and manipulates commands and data
- 1K bytes of Random Access Memory (RAM) used to store data during a test of measurement
- 12K bytes of Read Only Memory (ROM) used to store all the program used in performing the LTU tests
- provides a digital interface to the LTU Analog pack

Quantity:

One LTU Digital pack is required for each RMM shelf when line testing is required.

Location:

- positions 4, 6, 8, 10, 12, 14, or 16; RMM shelf (NT6X13) of the host RLCM.
- position 4, RMM shelf (NT6X13) of the RSC-S

Note: This pack is used with the LTU Analog pack (NT2X10). Each NT2X11 pack must be provisioned in a position adjacent to an NT2X10 pack.

NT2X48 (Digital 4-Channel Digitone Receiver pack)

Function:

to receive Digitone tones in pulse-coded modulation (PCM) format and produce a decoded 8-digit binary output

Features:

- simultaneous processing of tonal data in PCM form from four channels
- requires only PCM data for it to detect tones
- output is in an 8-bit serial format

Quantity:

A minimum of one Digital 4-Channel Digitone Receiver pack is required for each RLCM/OPM/OPAC configured for the ESA feature.

Location:

positions 11/12, NT6X13 (RMM shelf); one pack occupies two positions

NT2X57 (Miscellaneous Signal Distribution pack)**Function:**

to provide the alarm interface between the DMS-10 switch and external relay controlled equipment in an RLCM, OPM, OPAC, or RSC-S

Features:

- fourteen available signal distribution points per pack
- four optional output conditions per circuit selected manually by miniature dip switches on the pack

Quantity:

Up to four Miscellaneous Signal Distribution packs can be configured for each RMM shelf.

Location:

- positions 13 through 16 in an OPM or OPAC, NT6X13 (RMM shelf)
- positions 3 through 10 and 13 through 16 in the host RLCM, NT6X13 (RMM shelf)
- positions 7 and 13 through 16 in the RSC-S, NT6X13 (RMM shelf)

NT2X59 (Codec and Tone pack)**Function:**

to provide ROM-based tone generation, VF signals, and PCM

Quantity:

One Codec and Tone Pack is required for each RMM shelf.

Location:

position 1, NT6X13 (RMM shelf)

NT2X70 (Power Converter pack)**Function:**

to provide four different voltages (± 5 V, ± 12 V) to packs located on the HIE shelf and on the Controller Array shelf

Features:

- overvoltage and overcurrent protection circuits for all outputs
- low-voltage monitor circuit

Quantity:

- two Power Converter packs are required for each HIE shelf
- one Power Converter pack (NT2X70AD) is required per Controller Array shelf

Location:

- positions 22 and 25, NT6X11 (HIE shelf). This pack requires three adjacent positions on the HIE shelf
- positions 25, 26, and 27 (three adjacent slot positions), NT6X0201 (Controller Array shelf)

NT2X90 (Incoming/Outgoing Test Trunk pack)

Function:

to provide an interface between the RMM and external test equipment. The Incoming/Outgoing Test Trunk pack is crossconnected to the Metallic Test Access pair at the MDF.

Features:

- talk/monitor feature when combined with the LTU
- test trunk interfaces supported includes:
 - No. 14 Local Test Deck (LTD)
 - No. 3 Local Test Cabinet (LTC)
 - Centralized Automatic Loop Reporting System (CALRS)

Quantity:

One Incoming/Outgoing Test Trunk pack may be provisioned on each RMM shelf.

Location:

- position 16 is recommended, NT6X13 (RMM shelf)
- positions 3 through 10 and 13 through 16 in the RLCM, NT6X13 (RMM shelf)
- positions 13 through 16 in the OPM or OPAC, NT6X13 (RMM shelf)
- positions 13 through 16 in the RSC-S, NT6X13 (RMM shelf)

NT3T09 (Serial Data Interface pack)

Function:

to enable the interchange of data between the processor and data communication or terminal equipment. The serial data format from the data equipment is converted to the parallel data format used on the I/O bus

Features:

- option switches that allow data rates of 110, 330, 1200, 2400, or 4800 baud to be selected
- one port per pack

Location:

- positions 4 through 7, J1T31A-1 (Network shelf)
- positions 4 through 18, J1T81A-1 (GPIO shelf)

Note: NT3T09 pack has been superseded by the NT3T80 pack.

NT3T10 (Magnetic Tape Controller pack)

Function:

to control a single Billing Media Converter (BMC) unit, 800-bpi nine-track Magnetic Tape Unit (MTU), or IBM AMATPS unit

Features:

- control circuitry for one MTU
- internal buffer for storing up to 2048 characters
- controls the transfer of each AMA data block into tape or to the BMC processor
- provides tape read-error and write-error detection
- provides self-diagnostic capability for the AMA recording system

Quantity:

One Magnetic Tape Controller pack (NT3T10) is required for each MTU, simplex-type (one-unit) BMC, or IBM AMATPS unit; two are required for each redundant-type (two unit) BMC.

Location:

- position 4, J1T31A-1 (Network shelf)
- positions 4 through 10 and 13 through 18, J1T81A-1 (GPIO shelf). If two packs are configured, they should be positioned so that one pack is powered by the 5/12 V Converter in position 1, and the other pack is powered by the 5/12 V Converter in position 21.

NT3T11 (Magnetic Tape Cable Interface pack)

Function:

to provide an interface between the Magnetic Tape Interface Cable (ED0T25-21) and a single Billing Media Converter unit, nine-track 800-bpi Magnetic Tape Unit, or IBM AMATPS unit

Quantity:

One Magnetic Tape Cable Interface pack is required for each 800-bpi Magnetic Tape Unit or simplex-type (one-unit) Billing Media Converter, or IBM AMATPS unit; two are required for each redundant-type (two-unit) Billing Media Converter.

Location:

varies per application

NT3T19 (5/12 V Converter pack)

Function:

to convert -48 V dc to +5 V dc and ± 12 V dc supplies as required by the digital logic in the circuit packs

Features:

- output overvoltage protection
- output current overload and short circuit protection

Location:

- positions 1 and 20, J0T13A-1, L1, L3, or L5 (Digital Carrier Module shelf)
- positions 1 and 16, J0T69 (SCM shelf)
- NT3T19AF or later version, in positions 1 and 21, J0T93A-1 (Control shelf)
- positions 1 and 21 (position 1 as auxiliary power), J1T31A-1 (Network shelf)
- two Converter packs (NT3T19BA, Release C or later; or any NT3T19AD release and later) are required per Messaging shelf, in positions 1 and 24. The 5/12 V Converter pack in position 1 of the Messaging shelf (J1T65A-1) supplies power to positions 2 through 12 on the shelf, and the 5/12 V Converter pack in position 24 supplies power to positions 13 through 23 on the shelf.
- NT3T19AF or later version, in positions 1 and 21, J1T72B-1 and J1T72C-1 (CPU/Network shelf)
- positions 1 and 24, J1T80A-1 or J1T80A-2 (DCI shelf)
- positions 1 and 21, J1T81A-1 (GPIO shelf)
- NT3T19AF or later version, in positions 1 and 22 (both on lower and upper shelves), J8M75A-1,L1 (CNI Module)

NT3T25 (Ringing Generator pack)

Function:

to provide a single-frequency or multifrequency ringing supply to the REM

Features:

decimonic, synchrononic, and harmonic ringing (see Table 5-A).

Location:

positions 1, 3, 7, and 9, J0T63A-1 (Ringing shelf)

Ringing option	Pack	Frequencies (Hz)
Decimonic	NT3T25AA	20, 30, 40, 50
	NT3T25DA	30, 40, 50, 60
	NT3T25EA	20, 40, 50, 60
	NT3T25FA	20, 30, 50, 60
	NT3T25GA	20, 30, 40, 60
Synchrononic	NT3T25BA	20, 30, 42, 54
	NT2T25HA	30, 42, 54, 66
	NT3T25JA	20, 42, 54, 66
	NT3T25KA	20, 30, 54, 66
	NT3T25LA	20, 30, 42, 66
Harmonic	NT3T25CA	16 2/3, 25, 33 1/3, 50
	NT3T25MA	25, 33 1/3, 50, 66 2/3
	NT3T25NA	16 2/3, 33 1/3, 50, 66 2/3
	NT3T25PA	16 2/3, 25, 50, 66 2/3
	NT3T25RA	16 2/3, 25, 33 1/3, 66 2/3
	NT3T25SA	16 2/3, 30, 42, 54
	NT3T25TA	30, 42, 54, 16 2/3

NT3T27 (Ringing Monitor pack)

Function:

to monitor the single-frequency and multifrequency ringing and the ± 105 V ringing of its associated ringing generators pack. If a ringing output fails, a normally operated monitor relay (located in the ringing status display panel) releases, triggering an alarm and enabling the active standby ringing system to assume the load. The Ringing Monitor pack also distributes multifrequency bus synchronization signals to PE bays.

Location:

- positions 5 and 6, J0T63A-1 (Ringing shelf)
- positions 7 and 8, J0T72 (Alarm and ringing module)

NT3T30 (Fuse Alarm pack)

Function:

to interface the fuses and locally generated alarms with the office alarm system

Features:

- handles inputs from -48 V dc, ac ringing voltages, and ground alarm conditions
- powered by -48 V from the alarm battery supply
- controls an LED fuse alarm indication plus a bay alarm LED that lights for fuse or other alarms

Location:

- behind the fuse panel located in the J0T72 Alarm and Ringing Module
- J1T60 and J1T67 Bay Supervisory Panels
- ED0T28-50 family of fuse panels

NT3T34 (CPU Bus Terminator pack, type 1)

Function:

to terminate the CPU bus on 400 CPU Control shelves

Location:

position 16 (rear), J0T93A-1 (Control shelf)

NT3T45 (TTY/DLC Interconnect Paddleboard)

Function:

Provides cable connections for Serial Data Interface (NT3T80) and Data Link Controller (NT3T50) circuit packs to associated cables. Some family codes provide GPIO shelf termination.

Features:

- Two DB-25 connectors for port access. J1T81A-1 (GPIO shelf) termination
- The NT3T45CC/DC provides ground - isolated data ports for the Serial Data Interface (NT3T80BB) pack
- The NT3T45Cx provides J1T81A-1 (GPIO shelf) termination as well as two ports for Serial Data Interface (NT3T80) connections
- NT3T45Dx provides two ports for Serial Data Interface (NT3T80) connections
- NT3T45EA provides two ports for Data Link Controller (NT3T50) connections

Quantity:

- Two 3T45Cx are required to terminate the J1T81A-1 (GPIO shelf) even if NT3T80 circuit packs are not equipped
- One 3T45Dx is required for each Serial Data Interface (NT3T80) circuit pack
- One 3T45CC/DC is required for each Serial Data Interface (NT3T80BB) circuit pack
- One 3T45EA is required for each Data Link Controller (NT3T50) circuit pack

Location:

- NT3T45Cx, behind positions 11 and 12 on J1T81A-1 (GPIO shelf)
- NT3T45Dx, behind NT3T80 in positions 4 to 7 on a J1T31A-1 (Network shelf) or behind positions 4 to 10 and 13 to 18 on J1T81A-1 (GPIO shelf)
- NT3T45EA, behind NT3T50 in positions 4 to 7 on a J1T31A-1 (Network shelf) or behind positions 4 to 10 and 13 to 18 on J1T81A-1 (GPIO shelf)

NT3T47 (Synchronous Clock pack)**Function:**

In conjunction with the active CPU, to synchronize the DMS-10 network clock source to a selected incoming 8-kHz reference carrier framing signal. The network clock may provide a reference to other Class 5 digital offices.

Features:

- voltage-controlled, temperature-compensated crystal oscillator with a nominal output frequency of 20.48 MHz
- provides 10.24-MHz clock signal to the System Bus Controller

Location:

- position 11, J0T93A-1 (Control shelf)
- position 10 or 11 (normally 10); J1T72B-1 (CPU/Network shelves)
- position 9; J1T72C-1 (CPU/Network shelf)
- position 6 (both on lower and upper shelves), J8M75A-1,L1 (CNI Module)

NT3T50 (Data Link Controller (DLC) pack)**Function:**

To provide multiprotocol, dual-port control of up to two data links between a Host Switching Office (HSO) or Large Cluster Controller (LCC) and up to two Satellite Switching Offices (SSOs). Each host, HSO, or LCC, can support up to 16 SSOs. In both the HSO or LCC and the SSO(s), the DLC pack has a direct interface to the CPU bus and an interface (by way of a cable) to either a Digital Carrier Module (DCM), modem, drop and insert system, or any other data link.

Features:

- two ports per pack
- High-Level Data Link Controller (HDLC) protocol, as defined by CCITT X.25 standards
- parallel-to-serial/serial-to-parallel message conversion
- message buffering
- control of message protocol over the data link, including message formatting, creating message headers, performing checksums, message sequencing, acknowledging received messages, and performing error recovery

Note: Version NT3T50CD is required at both the host and satellite when using drop and insert systems. Version NT3T50CD is required to support an LCC. Version NT3T50CE is required for using the Cluster Data Management System with analog data links.

Quantity:

- The number of DLCs required for both simplex and duplex applications is shown in Table 5-B.
- A minimum of two DLC packs (NT3T50) is required at the host and at each SSO for redundant links. These are configured on two separate Network shelves of the same Network module. Version NT3T50CD is required at the host and satellite when using drop and insert systems. Version NT3T50CD is required to support LCC. Version NT3T50CC is required at each SSO. Version NT3T50CE is required for using the Cluster Data Management System with analog data links.

Location:

- positions 4 through 7, J1T31A-1 (Network shelf)
- position 10, J1T72B-1 (CPU/Network shelves)
- positions 4 through 10 and 13 through 18, J1T81A-1 (GPIO shelf)
- positions 3 through 9 or 12 through 18, J1T81A-1 (GPIO shelf) of the three-bay configuration
- positions 3 through 9 or 12 through 18, J1T81A-1 (GPIO shelf) for an LCC configured with more than 13 SSOs

Table 5-B: Number of DLCs per HSO/LCC		
Number of SSOs	Number of DLCs per HSO/LCC	
	Simplex Links	Duplex Links
1 or 2	1	2
3 or 4	2	4
5 or 6	3	6
7 or 8	4	8
9 or 10	5	10
11 or 12	6	12
13 or 14	7	14
15 or 16	8	16

NT3T53 (Alarm Processor pack)

Function:

To provide a microprocessor-controlled means of reporting scan-point changes (assigned by the operating company or originating from dedicated system alarm-related scan points) to the DMS-10 CPU over a serial data link. The microprocessor also processes messages received from the DMS-10 CPU over a serial data link in order to control signal distribution points (provided on one or two Alarm Signal Distributor packs), which are located on the same shelf.

Features:

The faceplate LED indicates that the circuit pack has been disabled. The LED is activated by:

- the Enable switch on the Alarm Processor pack faceplate being in the disable position
- a maintenance terminal input message requesting that the pack be disabled

Location:

position 2 or 5, J0T72 (Alarm and Ringing Module)

NT3T54 (Alarm Signal Distribution pack)

Function:

To provide the interface for the Alarm Processor pack (NT3T53) with 32 signal distribution points, some of which have fixed assignments while others can be assigned by the operating company. When equipped in position 3, this pack converts -48 V dc to +5 V dc to power the logic circuits used in the alarm portion of the Alarm and Ringing shelf.

Features:

The faceplate test LED indicates that the circuit pack is in the test or maintenance looparound mode and is activated only through software.

Location:

positions 3 and 4, J0T72 (Alarm and Ringing Module). This pack is required in position 3 and is optional in position 4. Two packs are required in systems with the Switching Control Center System (SCCS) feature, the 1600-bpi AMA system, a CE-02 bay, a CE-04 bay, or Ethernet Switches.

NT3T55 (Ringing and Alarm Control pack)

Function:

To accommodate the following:

- timing, control, and alarm-sending circuits for the Dead System Alarm feature
- office alarm system control relays for both visual and audible indicators
- alarm detection circuits for the preset (not customer assignable) alarm functions, including:
 - alarm detectors for the office equipment rows or lineups
 - row pilot lamp control relays
 - fuse alarm detection for tape units and ringing generators
 - ringing supply alarm detection and ringing generator selection
 - power distribution panel fuse alarm detection
 - alarm battery supply failure detection
 - alarm transfer

Components:

- alarm system bus termination circuit
- electronic audible alarm device

Features:

The LED on the faceplate of the Dead System Monitor indicates the status of the Dead System Alarm Detection circuit only when the Enable switch on the Alarm and Ringing Control pack faceplate is in the disable position.

Location:

position 5, J0T72 (Alarm and Ringing Module)

NT3T59 (Dual Ringing Generator pack)

Function:

to provide up to 30 W of power for each of two generators (with a total continuous power output for both generators of 50 W): one that produces single-frequency ringing only and one that produces either single-frequency or multifrequency ringing

Features:

On the NT3T59AA pack, the mode of operation, either single-frequency or multifrequency, for the two ringing generators is determined by plugging in single-frequency program modules (NT3T57) or multifrequency program modules (NT3T58) into sockets J5 and J6 on the NT3T59 pack:

- Single-frequency ringing generation by one ringing generator only is selected by plugging in the appropriate Single-Frequency Resistor module (NT3T57) (see Table 5-C) into socket J6; single-frequency ringing generation by both ringing generators is selected by plugging in identical NT3T57 modules into both socket J5 and socket J6.
- Multifrequency ringing generation is selected by plugging in the appropriate Multifrequency Resistor module (NT3T58) (see Table 5-C) into socket J5 only.

On the NT3T59AB/AC pack, DIP-switches are used to select single-frequency or multifrequency operation and frequency.

Location:

positions 6 and 9, J0T72 (Alarm and Ringing Module)

Single-Frequency Register Module (NT3T57)	Frequency (Hz)	Multifrequency Resistor Module (NT3T58)	Switches			
			1	2	3	4
NT3T57 AA	16 2/3	NT3T58 AA	20	30	40	50
NT3T57 BA	20	NT3T58 BA	20	30	42	54
NT3T57 CA	25	NT3T58 CA	16 2/3	25	33 1/3	350
NT3T57 DA	30	NT3T58 DA	30	40	50	60
NT3T57 EA	33 1/3	NT3T58 EA	20	40	50	60
NT3T57 FA	40	NT3T58 FA	20	30	50	60
NT3T57 GA	42	NT3T58 GA	20	30	40	60
NT3T57 HA	50	NT3T58 HA	30	42	54	66
NT3T57 JA	54	NT3T58 JA	20	42	54	66
NT3T57 KA	60	NT3T58 KA	20	30	54	66
NT3T57 LA	66	NT3T58 LA	20	30	42	66

Table 5-C: (Continued)				
Ring frequency options for NT3T59AA Dual Ringing Generator pack				
Single-Frequency Register Module (NT3T57)	Frequency (Hz)	Multifrequency Register Module (NT3T58)	Switches	
			1	2 3 4
NT3T57 MA	66 2/3	NT3T58 MA	25	33 1/350 66 2/3
		NT3T58 NA	16 2/3	33 1/3 50 66 2/3
		NT3T58 PA	16 2/325	50 66 2/3
		NT3T58 RA	16 2/325	33 1/366 2/3
		NT3T58 SA	30	40 50 20
		NT3T58 TA	16 2/330	42 54
		NT3T58 UA	30	42 54 16 2/3

NT3T70 (System Bus Controller pack)

Function:

to exercise hardware control of the CPU, memory, and I/O bus configuration; to monitor the status of the hardware; and to generate and monitor system clocks.

Versions:

- NT3T70BA
- NT3T70BB
- NT3T70BC
- NT3T70BD

Features:

- network clock source selection
- clock monitoring logic
- maintenance switch for split-mode function

Location:

- position 9, J0T93A-1 (Control shelf)
- position 9, J1T72B-1 (CPU/Network shelves)
- position 8, J1T72C-1 (CPU/Network shelf)
- position 5 (both on lower and upper shelves), J8M75A-1,L1 (CNI Module)

Status:

The NT3T70BA, NT3T70BB, and NT3T70BC are manufacturing discontinued (MD).

NT3T71 (Maintenance Interface pack)

Function:

To provide two serial data interface ports to the CPU on the CPU/Network shelves. One interface enables data interchange between the CPU and data communications, data terminal, or teletype equipment; the second provides a 9600-baud serial data link between the CPU and the Alarm and Ringing Module.

Features:

- option switches that allow data rates of 110, 150, 300, 600, 1200, 2400, 4800, or 9600 baud to be selected; the AB version of the pack also allows the 19200 baud data rate to be selected
- option plug for current loop or RS-232C interface

Location:

- position 8, J0T93A-1 (Control shelf)
- position 7, J1T72B-1 (CPU/Network shelves)
- position 6, J1T72C-1 (CPU/Network shelf)
- position 4 (both on lower and upper shelves), J8M75A-1,L1 (CNI Module)

NT3T72 (I/O Bus Extender pack)

Function:

To provide the interface between the CPU system bus and the I/O bus residing on shelf locations shown below. Address, data, parity, clocks, interrupts, and miscellaneous control signals are differentially transmitted and received by the I/O Bus Extender.

Features:

- DIP switches for setting maintenance address and family code
- Differential drivers and receivers on the I/O Bus Extender packs send and terminate the 29 signals of the I/O bus.

Location:

- position 15, J0T93A-1 (Control shelf)
- positions 2 and 3, J1T31A-1 (Network shelf)
- position 8, 14, and 15, J1T72B-1 (CPU/Network shelf)
- position 7, 13, and 14; J1T72C-1 (CPU/Network shelf)
- positions 2 and 3, 19 and 20; J1T81A-1 (GPIO shelf)
- positions 9, 10, 11 (both on lower and upper shelves), J8M75A-1,L1 (CNI Module)

NT3T80 (Dual Serial Data Interface pack)

Function:

Enables the interchange of data between the processor and data communication or terminal equipment. The serial data format from the data equipment is converted to the parallel data format used on the processor Control bus.

Features:

- two ports per pack
- DIP switches that allow data rates of 110, 150, 300, 600, 1200, 2400, 4800, or 9600 baud to be independently selected for each piece of equipment. 19200 baud is available with the BA version of the pack.
- The BA version of the pack is provided with DIP switches that enable serial protocol, including the number of bits per character, stop bits, and use of parity, to be set for each port.
- The BB version of the pack is backward-compatible with the NT3T80AA or the NT3T80BA through a DIP-switch setting. The BB version also provides data buffering for each port and ground-isolated data ports (when used with an NT3T45CC/DC).

Location:

- positions 4 through 7, J1T31A-1 (Network shelves)
- position 13 or 14 J0T93A-1 (Control shelf)

Note: When dual SDI packs are provisioned on the Control shelves, the one-bus and split-CPU modes may disrupt communication with TTYs assigned to the dual SDIs on the inactive shelf. Therefore, provisioning the dual SDIs in this location is not recommended.

- positions 4 through 18, J1T81A-1 (GPIO shelf). A pair of packs should be positioned so that one pack is powered by the 5/12 V Converter in position 1, and the other pack is powered by the 5/12 V Converter in position 21. On the GPIO shelf, NT3T80 is the only pack that can be assigned in positions 11 and 12.
- positions 13 and 19 (both on lower and upper shelves), J8M75A-1,L1 (CNI Module)

NT3T81 (Bay Power/Alarm pack)**Function:**

to provide power for Power and Cooling Module (PCM) cooling fans, to control PCM faceplate LEDs, and to provide cross-connection for plug-in test jacks located on the PCM faceplate

Features:

fuses and associated circuitry to provide power to the Power-Cooling Module

Quantity:

one Bay Power/Alarm Pack per Power and Cooling Module

Location:

Power and Cooling Module (J0T97, J0T98, and J1T89)

NT3T84 (CPU Interconnect paddleboard)

Function:

provides cable connections for the inter-shelf signals cabled to the redundant CPU Interconnect paddleboard and System Processor pack (NT3T98) on the mate shelf. Provides two redundant Ethernet physical interfaces that support 10 or 100 Mb/sec Ethernet LAN connections.

Features:

Ethernet redundancy of two 10/100 Base-T LAN appearances provides connection to either of two redundant LANs, one at a time.

Quantity

Two CPU Interconnect paddleboards are required for each 500-Series switch.

Location:

back of J0T93A-1 (Control shelf) and J1T72B-1, J1T72C-1 (CPU/Network shelf);
back of J8M75A-1,L1 (CNI Module) in slot 3R of the upper and lower shelves

NT3T87 (Input/Output Interface [IOI] Paddleboard)

Function:

NT3T87BB (IOI Paddleboard): interconnects the IOI Drive cables on the backplane of the IOI or the GPIO shelf assembly.

Quantity:

One NT3T87BB pack is required for each NT4T32BA Magneto-optical Disk Drive located on an IOI or GPIO shelf.

Location:

NT3T87BB, behind positions 2 and 20 on a J1T51A-1 (IOI shelf) or behind position 10 on a J1T81A-1 (GPIO) shelf in a CNI-module system.

NT3T89 (Power Converter pack)

Function:

to convert the -48 V office battery to the 5 and 12 V power required by equipment on the IOI shelf

Features:

- high output voltage shutdown
- low output voltage monitor (with shutdown on NT3T89AD)
- high output current shutdown
- 5 V present before 12 V during power up

Quantity:

Two Power Converter packs are required per IOI shelf

Location:

positions 1 and 21, J1T51A-1 (IOI shelf)

Note 1: The 1600-bpi IOI disk drives require the provisioning of an NT3T89AC or later vintage Power Converter pack.

Note 2: The Magneto-Optical Mini-Disk Unit pack (NT4T32BA) requires the provisioning of an NT3T89AB or later vintage Power Converter pack.

NT3T90 (Input/Output Interface (IOI) pack)

Function:

1600-bpi AMA interface. Provides an interface between the DMS-10 Network / GPIO shelf and an external IOI shelf (J1T51A-1) located in a J1T85A-1 AMA Bay. Allows the DMS-10 CPU to communicate with two AMA disk drives and a 1600-bpi nine-track unit in the same frame.

Features:

- two ANSI-standard SCSI buses (A and B) per pack
- In normal applications, each bus is connected to one of a pair of redundant I/O devices; if one bus (or the device connected to it) fails, onboard firmware switches all I/O operations to the other bus without causing a CPU failure

Quantity:

- One IOI pack is required on each of two Network shelves (J1T31A-1,L1).
- Two IOI packs are required on one GPIO shelf (J1T81A-1).

Location:

- position 4, J1T31A-1 (Network shelf)
- positions 4 and 18, J1T81A-1 (GPIO shelf)

NT3T93 (Dual Integrated Modem)

Function:

to provide an interface to the DMS-10 switch for the purpose of remote TTY access. The pack is totally self-contained and replaces the existing dual SDI/modem system arrangement.

Note: The NT3T93 cannot be used for a data link, but it can be used for a dial-up port.

Features:

- consists of a main circuit board, two Bell 212A compatible modem cards, and a paddleboard with cable
- provides two ports per pack

- provides baud rates of 300 and 1200 and automatically adapts to the speed of the calling modem

Location:

- positions 4 through 7, J1T31A-1 (Network shelf)
- positions 4 through 10 and 13 through 18, J1T81A-1 (GPIO shelf)
- positions 4 through 10, 13 through 18, J1T81A-1 (GPIO shelf). If two packs are configured, they should be positioned so that one pack is powered by the 5/12 V Converter in position 1, and the other pack is powered by the 5/12 V Converter in position 21.

NT3T98 (System Processor pack)

Function:

to provide the core system processing unit for the DMS-10 system. This includes processor, boot-code, main memory, system interfaces, and other related functions.

Features:

- 32-bit 200MHz Reduced Instruction Set Computing microprocessor
- 50MHz 64-bit data bus to main memory
- separate 32kb data and instruction caches
- 128MB DRAM
- 10-BaseT/100-BaseT Ethernet controller
- serial debug port

Quantity:

one per shelf

Locations:

- position 10, J0T93A-1 (Control shelf)
- position 11, J1T72C-1 (CPU/Network shelf)
- position 12; J1T72B-1 (CPU/Network shelf)
- position 3 (both on lower and upper shelves), J8M75A-1,L1 (CNI Module)

NT3X09 (Metallic Test Access pack)

Function:

to provide a metallic connection between subscriber lines and/or battery strings and the service circuits on the RMM shelf, and to provide control signals to the Battery Charger Controller (BCC). Two versions of the pack are available.

Features:

- a two wire matrix with four horizontals and eight verticals (version AA). In the OPM or OPAC, the horizontals are wired to the -48 V BCC and Rectifier Bus; the verticals are wired to the load and charge buses or to an open circuit condition.
- a two-wire matrix with eight horizontals and eight verticals (version BA), required to support battery maintenance functions in the OPM or OPAC. In the OPM or OPAC, the verticals are wired to the LCA shelf buses; the horizontals are wired to the LTU and Metallic Test Access pair.
- one active service circuit at a time
- eight test ports

Quantity:

One Metallic Test Access pack (Version BA) is required for each RLCM. Up to four RLCMs may be configured to a single MTA pack, which allows a maximum of four RLCMs to be physically located at the same remote site (same site ID) for each RMM shelf equipped with the MTA pack. Two Metallic Test Access packs are required for each OPM or OPAC.

Location:

position 3 through 10 and 13 through 16 (NT6X13 shelf) in the host RLCM; in the OPM or OPAC, positions 5 and 6.

NT4T00 (Bus Terminator pack, type 7)**Function:**

to connect the CPU I/O bus from the NT3T72 I/O Bus Extender on the Network shelf to the Network Control bus

Location:

position 8, J1T31A-1 (Network shelf)

NT4T01 (Tone and Digit Sender (TDS) pack)**Function:**

- to provide multidigit dial pulse (DP) and multifrequency (MF) outpulsing and precise tones
- to support the Custom Local Area Signaling Services (CLASS) Calling Number Delivery (CND) and Calling Name Delivery features. The BA version of the pack (Extended TDS [XTDS]), which is not backwards compatible, is required for these features.
- to support the Meridian Business Sets feature. The BA version of the pack is required for this feature.
- to provide coin tone testing of the UTR in accordance with the CBA-RA feature. The BA version of the pack is required for this feature.

Features:

NT4T01CC, and later versions of the pack, is downloadable

Location:

- position 9 and 11, J1T31A-1 (Network shelf)
- position 15, J1T72C-1 (CPU/Network shelf)
- position 16, J1T72B-1 (CPU/Network shelf)

NT4T02 (Universal Tone Receiver (UTR) pack)

Function:

- to receive digital multifrequency tones from the Network PCM bus (by way of the Tone and Digit Sender pack), digitally filter the tones for the appropriate signaling set, decode the filter outputs to determine which (if any) valid digits are present, and interface to the network signaling bus (by way of the TDS) in order to process signaling inputs and to output the decoded result
- to detect coin tones in accordance with the CBA-RA feature. The CA version of the UTR is required for this feature.

Features:

- connection to the Tone and Digit Sender pack (NT4T01) through a maximum of 32 channels, which are selected out of a pool of 128
- receives both A-law and μ -law PCM formats
- utilizes software selectable filters

Location:

- position 10, J1T31A-1 (Network shelf); can be assigned in position 12 if the TDS is assigned in position 11
- position 16, J1T72C-1 (CPU/Network shelf)

NT4T03 (Conference pack)

Function:

to provide digital conference calling capability for a maximum of 10 simultaneous three-way conference calls

Location:

- positions 11 through 13, J1T31A-1 (Network shelf)
- position 17; J1T72B-1, J1T72C-1 (CPU/Network shelves)

NT4T04 (DS-30A Interface pack)

Function:

provides the interface between the DMS-10 Network Equipment and Line Concentrating Modules (LCMs), SCM-10S or SCM-10U Subscriber Carrier Modules, and other DS-30A compatible equipment

Features:

- provides interface for up to eight 32-channel DS-30A loops
- provides channel switching
- uses DMS-X signaling protocol
- the “AF” and later versions of the pack are required for LCM-based remotes
- the “AG” and later versions of the pack are required for the SCM-10U
- the “AJ” and later versions of the pack are required for the SCM-10S
- the “AK” and later versions of the pack are equipped with two flash memory chips to contain downloadable firmware
- the “AL” version enables up to two RSC-Ss to be configured off of a single DS30A
- the “AL,” or later version of the pack is required for the LSG BERT path
- the “AL,” or later version of the pack is required for SRLK BERT path, and for the ability to run multiple BERTs concurrently (using multiple IBERT (NT6X99) packs)
- the “AM” version is required for the ISDN, SCM-10A, and Wireless features

Location:

- positions 13 through 17, J1T31A-1 (Network shelf). Position 13 provides one-half traffic capacity.
- position 18 or 19, J1T72B-1, J1T72C-1 (CPU/Network shelves)

Note: See Table 5-D for the pack code required for various configurations.

Configuration	Pack Code
No LCE-based remotes	NT4T04AC or later
RSLE or RSLM	NT4T04AD or later
RMM (in an RLCM, OPAC, or OPM)	NT4T04AE or later

Table 5-D: DS-30A Interface pack code requirements	
Configuration	Pack Code
All LCE-based remotes (OPM, OPAC, OPSM, RLCM, RSLE, RSLM) and the SCM-10S	NT4T04AF or later
SCM-10U	NT4T04AG
SCM-10S	NT4T04AJ
RSC-S	NT4T04AL

NT4T05 (Multiplex Loop Interface (MLI) pack)

Function:

to provide the interface between the Network Equipment and Peripheral Equipment (PE)

Note 1: The NT4T05AC version is required if the office is configured as a compact.

Note 2: The NT4T05AD is required to support the Digital Signal Interface (DSI) shelf.

Features:

- provides interface for up to eight 32-channel multiplex loops
- provides channel switching, signaling, scanning, and terminal addressing
- NT4T05AE, and later versions of the pack, can be downloaded

Location:

- positions 13 through 17, J1T31A-1 (Network shelf). Position 13 provides one-half traffic capacity.
- position 18 or 19, J1T72B-1, J1T72C-1 (CPU/Network shelves)

NT4T06 (Network pack)

Function:

to provide time and space channel switching and control of the Network line interrupt signal to the CPU

Features:

- provides switching for up to 640 channels
- two packs can be interconnected to switch up to 1280 channels
- able to insert data into or read data from any of the PCM channels

Location:

- positions 18 and 19, J1T31A-1 (Network shelf)
- position 20, J1T72B-1, J1T72C-1 (CPU/Network shelves)

NT4T07 (Bus Terminator pack, type 8)**Function:**

to terminate the Network Control Bus signals and to define the Network shelf's logical address in the DMS-10 memory map

Location:

position 20, J1T31A-1 (Network shelf)

NT4T09 (Subscriber Remote Interface (SRI) pack)**Function:**

to provide the interface between the DS-30A loops of the DS-30A Interface pack (NT4T04) and the DS-1 links connected to the DMS-10 remote equipment

Features:

- data rate conversion from 2.56 to 1.544 Mb/s and from 1.544 to 2.56 Mb/s
- two DS-30A loop inputs
- two DS-1 outputs
- DS-1 loopback
- low bit-error rates on NT4T09AB or later vintage pack
- DIP switches to adjust transmit signal equalization, depending on the length of the cable between this pack and the office repeaters

Quantity:

- Two SRI packs support one four-loop remote site or two two-loop remote sites.
- One SRI pack, in conjunction with its required mate SRI pack on the T&M shelf, supports a maximum of one 4-loop RLCM (or OPM/OPAC) or two 2-loop RLCMs (or OPMs/OPACs).
- One SRI pack, in conjunction with its required mate SRI pack on the DAT shelf, supports a maximum of one 4-loop RLCM (or OPM/OPAC) or two 2-loop RLCMs (or OPMs/OPACs). In addition, other DMS-10 remote equipment will be supported by the SRI pack in the future.

Location:

even-numbered positions between position 4 and 22, J1T80A-1 (DCI shelf)

Note 1: The SRI pack requires the provisioning of an NT4T04AD or later vintage pack.

Note 2: The SRI pack requires the provisioning of an NT4T04AE or later vintage pack on the combined CPU/Network shelf.

Note 3: The NT4T09AB version is required for remotes using the BERT, ISDN, or Switched 56 kbps Services features.

NT4T16 (LAN/CPU Interface (LCI) pack)

Function:

to provide a control and messaging interface between the CPU I/O busses and one Local Area Network (LAN) used in the Message Processing Unit (MPU) subsystem. Each LCI pack controls an LSC. The LCI pack, in turn, is controlled by the active CPU through the I/O bus.

Features:

a DIP switch that is used to indicate which LAN (A or B) is associated with the pack

Quantity:

Two LCI packs are required per DMS-10 system.

Location:

- positions 4 through 7, J1T31A-1 (Network shelf)
- positions 4 through 10 and 13 through 18, J1T81A-1 (GPIO shelf). The packs should be positioned so that one pack is powered by the 5/12 V Converter in position 1, and the other pack is powered by the 5/12 V Converter in position 21.

Note: *NTI recommends that the LCI pack not be provisioned in a CPU/Network shelf.*

NT4T18 (LAN Shelf Controller (LSC) pack)

Function:

controls and monitors the activity of the LAN Application Controller (LAC) packs on the Messaging shelf. The LSC is controlled by the LAN/CPU Interface pack.

Features:

hardware registers that enable the LSC to reset the microprocessor on any LAC on the Messaging shelf and to prevent access by a LAC to the Local Area Networks

Quantity:

Two LSC packs are required per Messaging shelf.

Location:

positions 2 and 23, J1T65A-1 (Messaging shelf)

NT4T19 (LAN Shelf Controller (LSC) paddleboard)

Function:

provides the Messaging shelf address for CCS7 hardware and provides termination for DS-30 signals passed across the Messaging shelf

Features:

a DIP switch that is used to indicate the shelf location of the paddleboard

Quantity

Two LSC paddleboards are required per Messaging shelf.

Location:

positions 2 and 23 on the rear of J1T65A-1 (Messaging shelves)

NT4T20 (LAN Application Controller (LAC) pack)

Function:

The LAN Application Controller (LAC) pack can perform several functions, depending on the software downloaded to it from the CPU. These functions correspond to the first three levels of the CCS7 protocol.

Combination level 1 and 2 LAC packs perform signaling data link and signaling link functions by providing a signaling link for reliable transfer of signaling messages to the CCS7 signaling network. The LAC pack's RS-449 serial interface connects the MPU to the signaling network. Combination level 1 and 2 LAC packs are controlled by level 3 LAC packs.

Each combination level 1 and 2 LAC pack supports a single signaling link. They are usually configured in pairs so each unit in the pair can spare for the other if necessary. Up to 38 LAC packs can be configured for combination level 1 and 2 functions.

Level 3 LAC packs perform signaling network management and message handling functions. Level 3 LAC packs control combination level 1 and 2 LAC packs. Two redundant level 3 LAC packs are required for the MPU.

LAC packs can be used to support certain level 4 functions, but no DMS-10 features currently require them.

Quantity:

varies according to office requirements

Location:

positions 3 through 22, J1T65A-1 (Messaging shelf)

NT4T24 (Span Interface Controller)

Function:

Works in conjunction with the DS-1 Interface pack (NT6X50) to provide a Digital Signal Interface (DSI). An NT4T24 and NT6X50 pack combination form a single DSI module. A DSI module connected to a DS-30A loop functions as a remote interface (DS-30A/DS-60 interface) or as an ISDN PRI interface. A DSI module connected to an MLI loop functions as a digital carrier module (DCM).

Note 1: The two links in a single DSI module must be used for the same application, either remote interface, digital trunk interface, or ISDN PRI interface.

Note 2: Only the AD and later versions of the NT4T24 pack can be used for ISDN PRI.

Features:

- two DS-30A loop inputs
- one DS60 loop output (to NT6X50)
- two mux loop inputs (NT4T24AC and higher family codes)
- two RS-449 / RS-442 ports (NT4T24AC and higher family codes)

Location:

odd-numbered positions from 3 through 21, J1T80A-1 or J1T80A-2

Note: Packs on shelf J1T80A-1 must be filled consecutively and sequentially. This means that a pack must be installed first in slot 3, followed by slot 5, and so forth. For example, a pack cannot be installed in position 7, if positions 3 through 6 remain empty.

NT4T31 (Hard Disk Drive)

Function:

to serve as the primary AMA storage device for the 1600-bpi AMA System by providing centralized collection, storage, and retrieval of DMS-10 billing records on dual disk drives. Each drive will contain identical AMA records, providing redundant files.

Components:

3.5-in. (8.8 cm) hard disk. The NT4T31AA has either 80 or 105 MB formatted storage capacity. The NT4T31BA has a minimum formatted storage capacity of 1.2 GB.

Quantity:

Two NT4T31 disk drives are provisionable in the 1600-bpi J1T85A-1 AMA bay.

Location:

position 6 or 12 (on SCSI Bus A), J1T51A-1 (IOI shelf). The disk drive occupies three slots on the IOI shelf.

Note: When the NT4T31BA is provisioned, the NT3T90BE (or a later version of the NT3T90) must also be provisioned.

NT4T32BA (Magneto-Optical Mini-Disk Unit)**Function:**

removable media storage for DMS-10 generic software and office configuration data.

Features:

- rewriteable optical disk drive
- Fujitsu 3.5-inch (8.8 cm) magneto-optical hard drive with storage capacity formatted of 540 MB

Quantity:

One NT4T32BA drive may be provisioned for the basic I/O system.

Location:

- position 6, J1T51A-1 (IOI shelf), for 400-Series systems upgraded to 500-Series. The NT4T32BA occupies two slots on the shelf.

Note: When the NT4T32BA is provisioned in a 500 generic switch, the series BA or a later version of the NT8T90 must be provisioned.

NT4T50AA (CALEA DDE Interface pack)**Function:**

Works in conjunction with the DS-1 Interface pack (NT6X50) to provide a Digital Signal Interface (DSI). An NT4T50AA and NT6X50 pack combination form a single DSI module that provides CALEA dialed digit extraction (DDE) capability and call content delivery.

Features:

- one DS-60 loop output (to NT6X50)
- two mux loop inputs
- two RS-449 / RS-442 ports

Location:

odd-numbered positions from 3 through 21, J1T80A-2

Note: Packs on shelf J1T80A-2 must be filled consecutively and sequentially. This means that a pack must be installed first in slot 3, followed by slot 5, and so forth. For example, a pack cannot be installed in position 7, if positions 3 through 6 remain empty.

NT6T01AA (Packet Gateway Interface Controller)

Function:

The PGI Controller unit (NT6T01) is inserted into the PGI chassis from the front and connects with a PGI Rear Translation Module (NT6T02), which is inserted into the chassis from the back, directly behind the PGI Controller unit.

The PGI Controller unit is responsible for translating the TDM and packet forms of voice data, and forwarding call control data to and from the System Processor (NT3T98AA).

Features:

- PowerQUICC II (MPC8275) processor
- 2 TI Janus family DSPs
- 256 Mbytes SDRAM
- 64 Mbytes Flash
- TDM interface consisting of 8 - 32 channel bi-directional DS-30a loops
- 6 port 10/100 ethernet switch
- 2 10/100 PHYs

Location:

Left or Center J6T00A-1L1 (Packet Gateway Interface)

NT6T02AA (Rear Translation Module)

Function:

The PGI Rear Translation Module (NT6T02) is inserted into the PGI chassis from the back and connects with a PGI Controller unit (NT6T01), which is inserted into the chassis from the front, directly to the Rear Translation Module.

The PGI Rear Translation Module interfaces all the TDM and packet signals into and out of the PGI Controller.

Features:

- Isolated differential transceivers
- 2 RJ45 LAN connectors

- 1 RJ45 WaN connector
- DB44 DS30A (8 loop) connector

Location:

Left or Center J6T00A-1L1 (Packet Gateway Interface)

NT6X05 (Line Concentrating Module (LCM) Line Drawer)**Function:**

to house the Bus Interface Circuit (BIC) card (NT6X54) and two Line Circuit Card Subgroups (LSGs), each of which consists of up to 32 line circuit cards; this yields a total capacity of up to 64 line circuit cards per Line Drawer. For a view of a fully-equipped LCM Line Drawer, see Figure 5-1.

NTEX17 line card provisioning In support of the 1-Meg Modem Service feature, the NT6X05 also houses the Data-enhanced BIC (DBIC) card (NTEX54) and Data-enhanced DSL (xDSL) line cards (NTEX17). If NTEX17AA/BA line cards are provisioned in the drawer, a maximum of sixteen may be installed. The NTEX17AA/BA cards must be installed in the even line subgroups (two lower rows of the drawer); the odd line subgroups (top two rows of the drawer) must be left completely unpopulated. If regular (POTS) line cards are provisioned with the NTEX17AA/BA line cards, the slots located vertically above the NTEX17AA/BA cards must be left completely unpopulated. If NTEX17CA line cards are provisioned, a maximum of 31 may be installed. If POTS line cards are provisioned with the NTEX17CA line cards, no POTS line cards may be provisioned either above or below the NTEX17CA line cards. For examples of possible NTEX17 configurations, see Figures 5-2 and 5-3.

Note: Line cards are not allowed in slots closer to the DBIC than any provisioned xDSL in order to minimize temperature surrounding the DBIC.

Features:

- Flexible power and signaling cables connected to receptacles at the rear of the drawer allow it to remain in service when it is withdrawn from its fully inserted position in order to gain access to the circuit cards.
- terminates two 32-channel digroups, one from the Digroup Controller pack (NT6X52) in its own shelf, and one from the Digroup Controller pack in the mate shelf

Quantity:

- up to five LCM Line Drawers per LCA shelf
- up to four LCM Line Drawers per LCM shelf
- A maximum of 2 Line Drawers may be configured in each RSLE Control shelf.
- A maximum of 6 Line Drawers may be configured for each RSLE Line Drawer shelf.

Location:

- any position on the RSLE Line Drawer shelf
- RSLE Control shelf, to the right of position 16
- any position to the right of position 5, NT6X0401 (LCA shelf)

Figure 5-1: Line Concentrating Module drawer (NT6X05) (side view)

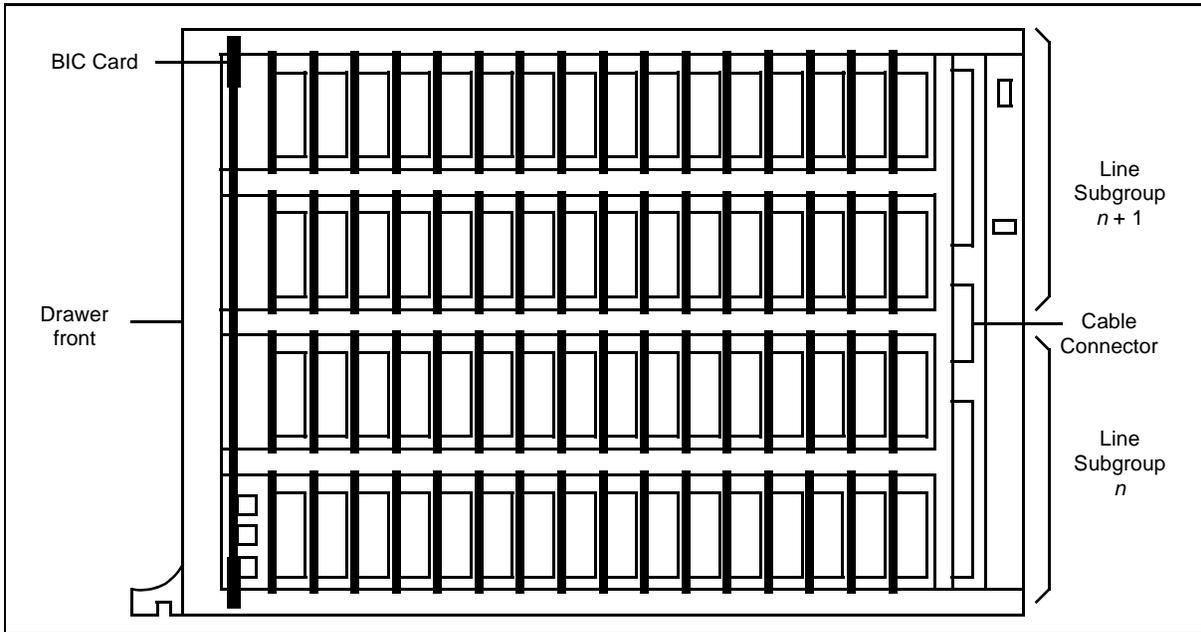


Figure 5-2: Line Concentrating Module drawer for 1-Meg Modem Service (NT6X05) (side view) populated with NTEX17AA/BA line cards

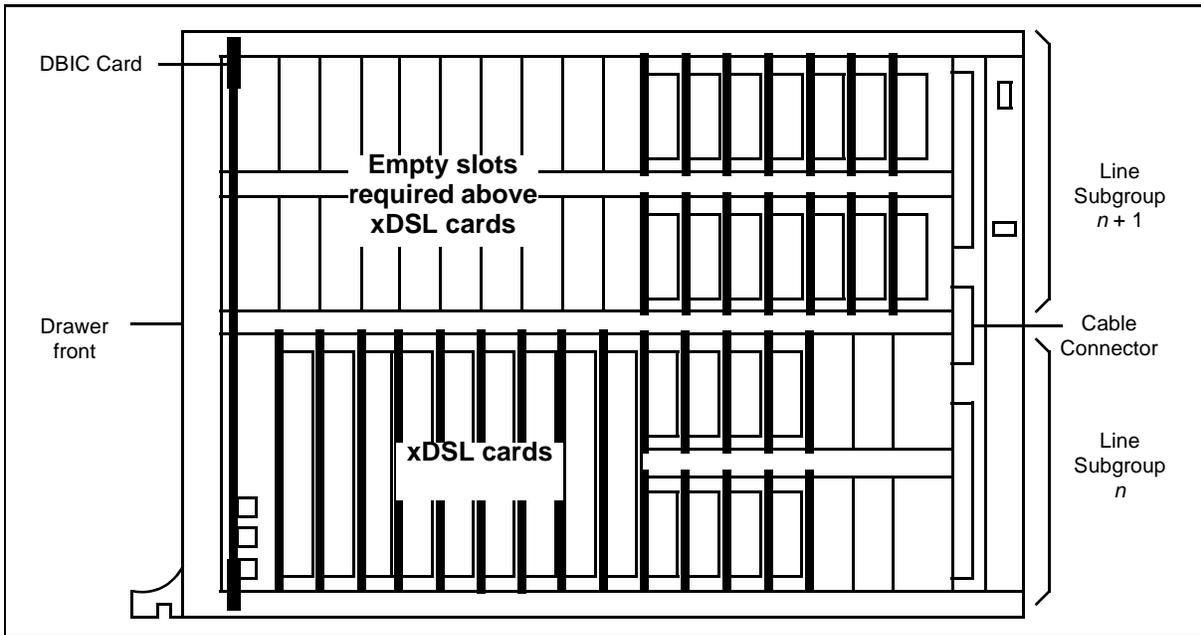
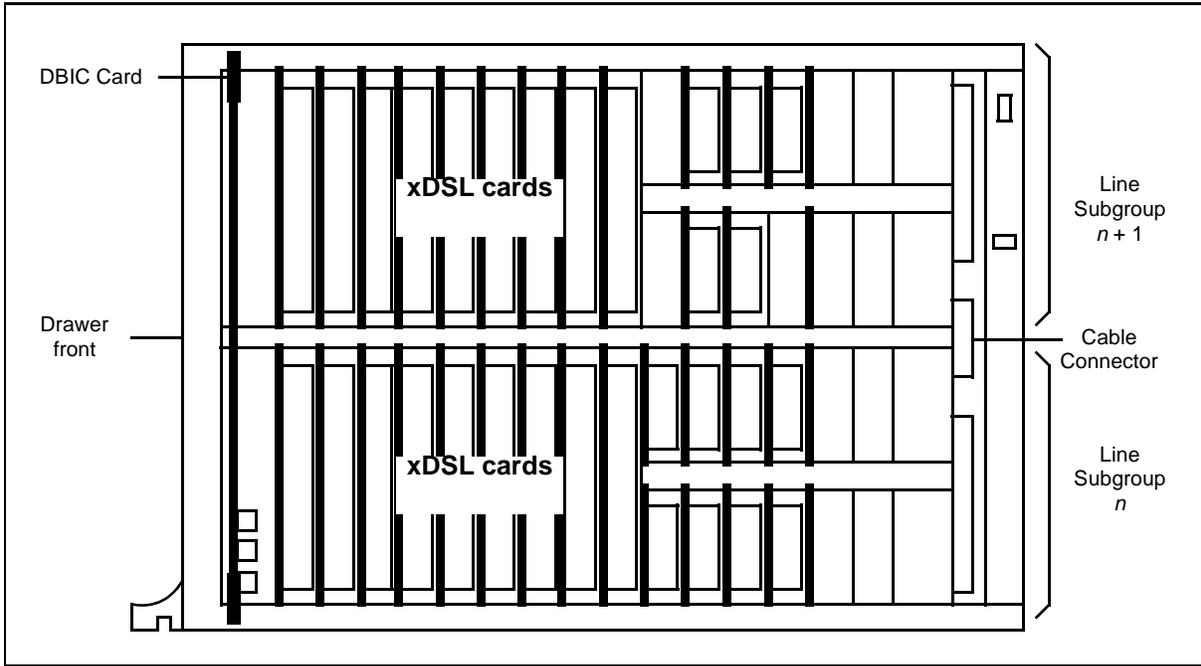


Figure 5-3: Line Concentrating Module drawer for 1-Meg Modem Service (NT6X05) (side view) populated with NTEX17CA line cards and POTS line cards



NT6X05DA (ISDN line drawer)

Function:

to house the ISDN drawer controller (IDC) card (NT6X54DA) and two ISDN Line Circuit Card Subgroups (ILSGs), each of which consists of up to 14 ISDN line circuit cards; this yields a total capacity of up to 28 ISDN line circuit cards per ISDN line drawer. For a view of a fully equipped ISDN line drawer, see Figure 5-4.

Features:

- Flexible power and signaling cables connected to receptacles at the rear of the drawer allow it to remain in service when it is withdrawn from its fully inserted position in order to gain access to the circuit cards.
- terminates two 32-channel digroups, one from the Digroup Controller pack (NT6X52) in its own shelf, and one from the Digroup Controller pack in the mate shelf

Quantity:

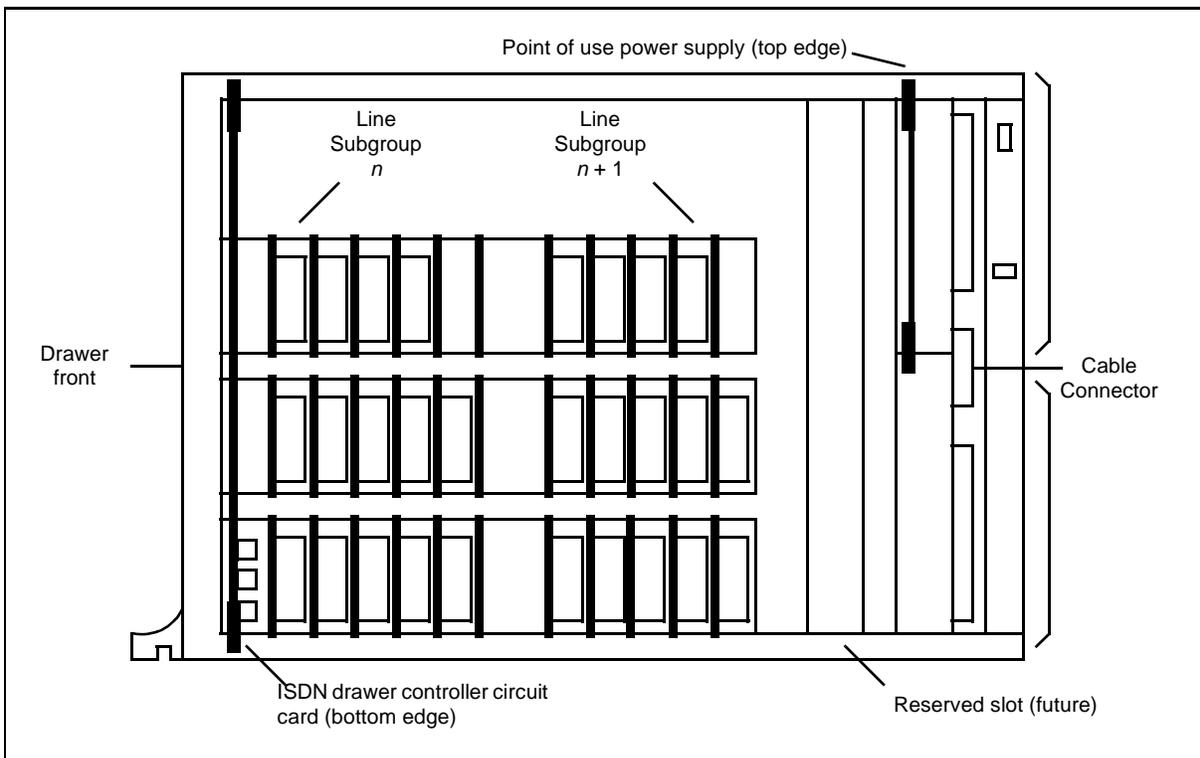
- up to 1 ISDN line drawer per LCA shelf
- a maximum of 1 ISDN line drawer may be configured in each RSLE Control shelf.
- a maximum of 1 ISDN line drawer may be configured for each RSLE Line Drawer shelf.

Components:

- Drawer assembly
- IDC card (NT6X54)
- PUPS (NTBX71)
- connectors

Location:

- any position in the LCM in an LCE or RSC
- any position in the LCM in an RLCM or an OPM
- any position on an RSLE Line Drawer shelf

Figure 5-4: ISDN line drawer (NT6X05DA) (side view)

NT6X17 (Type A Line Card and World Line Card type A)

Function:

The Type A Line card (NT6X17AA/AC) and the World Line Card type A (NT6X17BA) provide a single-, two-, or four-party voice and signaling interface between a two-wire, analog subscriber line and one channel of the four-wire, 32-channel, 2.56 Mb/s bit stream of the DMS-10 network. For additional information about this pack, refer to the Loop Disconnect feature description in section 3 and the LCE Line Card Monitor feature description in section 6 of the NTP entitled *Features and Services Description* (NTP 297-3601-105), and to Section 2 in NTP 297-3601-184, *Circuit Interfaces for Lines, Trunks, and Test Trunks*.

Location:

any of the 64 line card positions in an LCM Line Drawer

NT6X18AA/BA (Type B Line Card and World Line Card type B)

Function:

The Type B line card and the World line card type B provide a coin line, or single-, two-, four-, eight-, and 10-party voice and signaling interface between a two-wire, analog subscriber line and one channel of the four-wire, 32-channel, 2.56 Mb/s bit stream of the DMS-10 network. For additional information about this pack, refer to section 3 of the NTP entitled *Features and Services Description* (NTP 297-3601-105) and to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

any of the 64 line card positions in an LCM Line Drawer

NT6X18AB (Type B Line Card (+48 v coin))

Function:

to provide a coin line or single-, two-, or four-party voice and signaling interface between a two-wire, analog subscriber line and one channel of the four-wire, 32-channel, 2.56 Mb/s bit stream of the DMS-10 network. The Type B Line Card also is equipped with a switch-selectable method of battery reversal; battery reversal can be selected as a normal Tip-Ring reversal or as a polarity reversal from -48 V to +48 V on the *ring* lead. For additional information about this pack, refer to section 3 of the NTP entitled *Features and Services Description* (NTP 297-3601-105) and to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Location:

any of the 64 line circuit positions in an LCM Line Drawer, except line card positions 0 and 16 of the odd-numbered subgroup in the drawer, which must be equipped with +48 V Power Converter Cards

NT6X21 (P-Phone Line Card)

Function:

to provide voice and signaling interfaces between 2-wire analog subscriber lines using M5000-Series business sets and 4-wire, 32-channel, 2.56 Mb/s digital bit stream of the Line Concentrating Module (LCM). For additional information about this pack, refer to section 2 of the NTP entitled *Circuit Interfaces for Lines, Trunks, and Test Trunks* (NTP 297-3601-184).

Features:

- Each card supports one business set.
- Both the voice and signaling paths can be active simultaneously.

Quantity:

one per M5000-Series business set

Location:

any of the 64 line card positions in an LCM Line Drawer

NT6X23 (+48 V Power Converter Card)

Function:

to provide a +48 V power source for the Type B Line card (NT6X18AB) in order to implement the +48 V Coin Fraud Protection feature

Quantity:

one required in an LCM Line Drawer containing Type B Line cards (NT6X18AB) which are used for the +48 V Coin Fraud Protection feature

Location:

- any line circuit position in an LCM Line Drawer containing Type B Line cards (NT6X18AB)
- any 1 of 64 line card positions in an LCM Line Drawer that contain Type B line cards, NT6X0401 (LCA shelf)

NT6X30 (Ringing Generator pack)

Function:

to provide ringing to an LCM's line circuit cards, to generate voltages for ANI and coin control, and to serve as a redundant ringing supply in the event of a failure of its mate Ringing Generator in the LCE frame

Features:

- cadence of ringing, ringing frequency and amplitude, and dc offsets of ringing voltages that can be preset with manually operated DIP switches located on the Ringing Control circuit board (NT6X38) to meet Bell Canada, Bell USA, and Rural Electrification Administration (REA) requirements

- internal circuits monitor ringing voltage and current
- internal battery supply filter and converters provide operating voltages
- internal dc supplies are voltage-regulated and have current-limiting circuits

Components:

- Ringing Generator box assembly (NT6X30)
- Ringing Amplifier circuit board (NT6X37)
- Ringing Control circuit board (NT6X38)

Quantity:

Two Ringing Generator packs are required per FSP.

Location:

both left and right pack positions in the top half of the FSP

NT6X36 (Line Concentrating Module Frame Supervisory Panel Alarm card)

Function:

Activates the frame supervisory panel circuit breakers in response to an alarm relay release in the associated NT6X53 power converters and NT6X30 ringing operators. The NT6X36 also initiates frame fail alarms and aisle alarms in response to alarms from fuses in the frame supervisory panel.

Features:

- trip operation of up to six circuit breakers
- sensing of fuse guards from -48 V, 5 V, 15 V, and ringing generator
- activation of aisle alarms and frame fail lamp
- removal and replacement of card without tripping circuit breakers
- operates within the range of 0 to -60 V and is powered through a 1.3-A QFF1 fuse from the standard -48 V battery

Location:

NT6X35 (inside Frame Supervisory Panel)

NT6X41 (Speech Bus Formatter pack)

Function:

to handle clock generation and formatting activities for the Controller Array shelf

Features:

- generates the 10.24 MHz clock signal and other signals used by the Controller Array shelf

- performs parallel-to-serial/serial-to-parallel conversion in order to transmit/receive PCM data
- provides network plane selection and network looparound
- generates parity error and raw T-1 (DS-1) clock signals

Quantity:

One Speech Bus Formatter pack is required per Controller Array shelf.

Location:

position 21, NT6X0201 (Controller Array shelf)

NT6X42 (Channel Supervision Message pack)**Function:**

to perform channel supervision messaging between the SCM-10S and the SLC-96 or between the SCM-10U and the RCU. The Channel Supervision Message pack accommodates 16 network ports or 512 channels.

Features:

- provides an interface to the Formatter pack (NT6X41AA) on the network side
- originates an 8-bit parallel RPCM speech bus and terminates an 8-bit parallel XPCM speech bus on the peripheral side

Quantity:

One Channel Supervision Message pack is required per Controller Array shelf.

Location:

position 20, NT6X0201 (Controller Array shelf)

NT6X43 (Message Interface pack)**Function:**

The Message Interface pack consists of five functional circuits:

- network message interface
- parallel speech bus message interface
- interrupt generator
- speech bus enable connection memory
- tone generator circuit

Quantity:

One Message Interface pack is required per Controller Array shelf.

Location:

position 18, NT6X0201 (Controller Array shelf)

NT6X44 (Time Switch pack)

Function:

to switch one PCM channel to another PCM channel.

Features:

- interfaces with the DS-1 Interface pack
- interfaces with the shelf controller
- interfaces with the A/B DDL pack

Quantity:

One Time Switch pack is required per Controller Array shelf.

Location:

position 14, NT6X0201 (Controller Array shelf)

NT6X45 (Signaling Processor pack)

Function:

to provide, in conjunction with the Master Processor pack, joint SCM-10S or SCM-10U processing. The hardware for the Signaling Processor pack and the Master Processor pack is the same; the function of the pack varies according to its location on the Controller Array shelf.

Features:

- contains the following functional sections: CPU, memory management unit, sanity and clock control, A-bus interface, and onboard input/output facilities
- communicates with and controls other circuit packs in the SCM-10S or SCM-10U module over the XMS A-bus
- delegates tasks to the Master Processor pack, when appropriate, to alleviate processing load

Quantity:

One Signaling Processor pack is required per Controller Array shelf.

Location:

position 12, NT6X0201 (Controller Array shelf)

NT6X45 (Master Processor pack)

Function:

to provide, in conjunction with the Signal Processor pack, joint SCM-10S or SCM-10U processing. The hardware for the Signaling Processor pack and the Master Processor pack is the same; the function of the pack varies according to its location on the Controller Array shelf.

Features:

contains the following functional sections: central processing unit, memory management unit, sanity and clock control, A-bus interface, and onboard input/output facilities

Quantity:

One Master Processor pack is required per Controller Array shelf.

Location:

position 8, NT6X0201 (Controller Array shelf)

NT6X45 (Emergency Stand-Alone (ESA) Processor pack)

Function:

to provide CPU functions required for ESA

Features:

- 68000-based CPU
- memory management unit
- sanity and clock control
- A-bus interface
- on-board I/O facilities

Quantity:

One ESA Processor pack is required for each RLCM/OPM/OPAC configured for the ESA feature.

Location:

position 15, NT6X11 (HIE shelf)

NT6X46 (Signaling Processor Memory pack)

Function:

to provide dynamic RAM (DRAM) storage for the Signaling Processor pack

Features:

- contains 1024 kbytes of DRAM storage
- consists of two banks of 256K words, with each word composed of 16 bits plus 2 parity (that is, 256K x 18 per bank)

Quantity:

One Signaling Processor Memory pack is required per Controller Array shelf.

Location:

position 11, NT6X0201 (Controller Array shelf)

NT6X47 (Master Processor Memory pack)

Function:

to provide dynamic RAM (DRAM) storage for the Master Processor pack

Features:

- AB version contains 2 MB of DRAM storage; AC version contains 4 MB of DRAM storage.
- consists of four banks of 256K words, with each word composed of 16 bits plus 2 parity bits (256K 1 DRAM)

Quantity:

- One Master Processor Memory pack is required for each RLCM/OPM/OPAC configured for the ESA feature.
- One Master Processor Memory pack is required per Controller Array shelf.

Location:

- position 10, NT6X0201 (Controller Array shelf)
- position 14, NT6X11 (HIE shelf)

NT6X50 (DS-1 Interface pack)

Function:

to provide the interface between the 32-channel, 2.56Mbit/s bit stream of the Link Control Card (LCC) (NT6X73) and the 24 channel, 1.544 Mbit/s bit stream of standard DS-1 office repeaters. In the Digital Signal Interface (DSI) module, the NT6X50AB operates with the NT4T24 Span Interface Controller pack to provide two DS-1 spans (each running at 1.544 Mbit/s); the module may serve either as a Subscriber Remote Interface or as a digital trunk interface.

Features:

- data rate conversion from 2.56 to 1.544 Mb/s and from 1.544 to 2.56 Mb/s
- two DS-1 outputs
- looparound circuit for each DS-1 port to allow isolation of faults

- transmits local alarms and detects remote alarms
- detects loss of synchronization, bipolar errors, and frame slips on DS-1 links
- DIP switches to adjust transmit signal equalization, depending on the length of the cable between this pack and the office repeaters

Quantity:

A minimum of four DSI modules must be provisioned on a J1T80A-1 or J1T80A-2 shelf when the shelf is provisioned with an NT3T19AD Power Converter pack; when an NT3T19AE or later is provisioned, there is no minimum number of DSI modules that must be provisioned.

Location:

- even-numbered positions from 4 through 22, J1T80A-1 (NT4T24AA or NT4T24AB) or J1T80A-2 (NT4T24AB or NT4T24AD)
- positions 19, 20, and 21, NT6X11 (HIE shelf)

NT6X51 (LCM Processor pack)**Function:**

to provide an interface between the DMS-10 Control Equipment and the LCM Line Drawers. The LCM Processor pack performs scanning, ringing control, and message handling.

Quantity:

- Two LCM Processor packs are required per LCM shelf, one for each two of four Line Drawers.
- One LCM Processor pack is required per LCA shelf.

Features:

- The AB version of the pack (XLCM) has 32K of ROM memory and 256K of RAM memory. This pack is required for the Custom Local Area Signaling Services (CLASS) Calling Number Delivery (CND), Calling Name Delivery (CNAM) and Integrated Services Digital Network (ISDN) features. For more information about the CND feature, see the NTP entitled *Features and Services Description* (297-3601-105).
- The DA XLCM version of the pack is required at the remote to support a 64 kbps data communication rate for an RLCM, OPAC and OPM. The DA XLCM version does not support a remote 56 kbps data communication rate.

CAUTION: To avoid possible service outage, the NT6X51DA should never be provisioned in the host DMS-10 switch LCA shelf.

Location:

position 4, NT6X0401 (LCA shelf)

NT6X52 (Digroup Control pack)

Function:

provides an interface between the incoming DS-30A ports from either the CPU/ Network shelf or the Network shelf and the LCM Line Drawers. To perform this function, the Digroup Control pack contains a time switch and connection memory that are under control of the LCM Processor pack (NT6X51). By manipulating the data in the connection memory, any channel on any one of the incoming DS-30A ports can be connected to any channel of any one of the LSGs in the LCM.

Quantity:

- Two Digroup Control packs are required per LCM shelf, one for each two of four Line Drawers.
- One Digroup Control pack is required per LCA shelf.

Location:

- positions 1/2 and 15/16, J9Y84A-1 (RSLE Control shelf)
- position 5, NT6X0401 (LCA shelf)

NT6X53 (LCM Power Converter pack)

Function:

to provide regulated dc outputs at +5 V and +15 V and switching of ringing and ANI/ coin-control voltages. Input to the converter is from the nominal -48 V office battery. The dc outputs provide power for the circuit cards in the LCA or LCM shelf in which the Power Converter is located.

Features:

- +5 V and +15 V, common-ground dc outputs
- precisely regulated and filtered outputs
- current limiters for protection against short circuits
- undervoltage (U/V) detectors trip the primary (-48 V) power circuits in the event of a full or partial short circuit
- *Crowbar* circuits sense overvoltage and trip the primary power if regulation fails
- power-switching circuits either can be synchronized from an external source or can be free-running
- primary source-select circuit enables two converters to be operated in parallel, with one converter carrying the load, and the other as a backup
- independent relay multiplexer circuit provides switching for external ringing and ANI/coin-control voltages.

Quantity:

One LCM Power Converter pack is required per LCA shelf.

Location:

position 1, NT6X0401 (LCA shelf)

NT6X54AA (Bus Interface Circuit (BIC) card)**Function:**

to act as the interface between two 32-channel digroups and the 64 line circuit cards in the LCM Line Drawer (NT6X05). Functionally, the BIC card is divided into two similar parts, called scan chips, one for each digroup. The main functions of each scan chip are:

- multiplexing/demultiplexing a 32-channel, 2.56 Mb/s Pulse Code Modulation (PCM) link onto 32 line circuit card buses
- receiving control messages (and responses) to line circuit cards and storing them until they can be output in Channels 0 or 16
- scanning 32 line circuit cards for changes in supervision bits; a message is stored whenever a change-of-state is detected
- writing new information to a ring multiplexer in the scan chip

Quantity:

One BIC card is required per LCM Line Drawer.

Location:

immediately behind the faceplate of each LCM Line Drawer (NT6X05).

NT6X54DA (ISDN drawer controller (IDC) card)**Function:**

provides an interface between the LCM Digroup controller card (NT6X52) and the ISDN line cards (NTBX27). Functions include call processing, D- and B-channel handling, performance monitoring, connection management (RCTON/TCON), idle tone sourcing and IBERT maintenance generation/detection.

Features:

The ISDN drawer controller is a quad-width size card with four 2x20 circuit I/O connectors and supports the following :

- Two DMS-X C-side messaging channels
- Twenty eight ISDN lines
- Two RCON/TCON control interfaces
- Two 64 kbps D-channel packet interfaces
- Fifty six B-channel supported

Quantity:

One IDC card is required per ISDN Line Drawer (NT6X05DA).

Location:

immediately behind the faceplate of each ISDN Line Drawer.

NT6X60 (Ringing Generator pack)

Function:

to provide ringing to the LCM's line circuit cards, to generate Automatic Number Identification (ANI) and coin-control voltages, and to serve as a redundant ringing supply in the event of a failure of its mate Ringing Generator in the HIE shelf

Features:

- cadence of ringing, ringing frequency and amplitude, and dc offsets of ringing voltages that can be preset with manually operated DIP switches located on the Ringing Control circuit board (NT6X38) to meet Bell Canada, Bell USA, and Rural Electrification Administration (REA) requirements
- internal circuits monitor ringing voltage and current
- internal battery supply filter and converters provide operating voltages.
- internal dc supplies are voltage-regulated and have current-limiting circuits.

Quantity:

Two Ringing Generator packs are required for each RLCM.

Location:

positions 1 and 5, NT6X11 (HIE shelf). This pack requires four adjacent positions on the HIE shelf.

NT6X69 (Message Interface and Tone pack)

Function:

The AC version decodes SCM-10U DMS-X messages received from the DMS-10 switch or RCUs and passes them to the Signaling Processor pack (NT6X45); the AB version decodes SCM-10S DMS-X messages received from the DMS-10 switch or SLC-96s and passes them to the NT6X45.

Location:

position 18, NT6X0201 (Controller Array shelf)

NT6X69 (CPP Message Protocol Circuit pack)

Function:

The Common Peripheral Processor (CPP) Message Protocol Circuit (MPC) interprets and transfers signaling and control messages exchanged between the network and the RCC2.

Location:

position 8 and 20 of the RCC2 shelf

NT6X71AB/BA (Data Line Card)

Function:

The Data Line Card provides transport for digital data over the subscriber loop to a Datapath terminal using Time Compression Multiplexing (TCM) transmission. The Data Line Card provides two types of full-duplex channels between the Datapath terminal and the DMS-10 switch: one channel is a 64 kbps data channel; the other channel is an 8 kbps signaling channel. The Data Line Card communicates with the Datapath terminal through the 8 kbps signaling channel by a full-duplex hand shaking protocol to set up calls, take down calls, and access DMS-10 features.

Note: The Data Line Card may be used only for data unit applications.

Features:

Switch-activated line card maintenance support including:

- TCM synchronization status
- Bit Error Rate (BERT) performance monitoring of TCM line

Location:

the NT6X71AB occupies two vertically adjacent line card positions and can be provisioned in any slot through position 15; the NT6X71BA occupies one line card position and can be provisioned in any of the 64 line card positions in an LCM Line Drawer except slot 0, LSG 0.

NT6X73 (Link Control Card (LCC) pack)

Function:

to provide an interface between the DS-1 Interface pack (NT6X50) and the LCM devices at the remote site and to provide 1.544 and 2.56-MHz system clocks

Location:

positions 17 and 18, NT6X11 (HIE shelf)

NT6X74 (RMM Control pack)

Function:

provides interfaces to the codec and tone pack and trunk/service packs by way of a common bus and DS-30A link. Provides digital pad control of speech samples, a trunk message controller, and clock recovery and generation

Quantity:

One RMM Control pack is required for each RMM shelf.

Location:

position 2, NT6X13 (RMM shelf)

NT6X75AA (Emergency Stand-Alone (ESA) Clock/Tone pack)

Function:

to provide a clock and tone source during ESA operation, as well as an interface between the RLCM PCM message paths and the ESA processor

Features:

- four serial interfaces to the LCC
- A-bus interface
- 64K-bit EPROM to store tone samples
- Voltage Control Crystal Oscillator (VCXO) which provides sync pulses to the LCC

Quantity:

one ESA Clock/Tone pack is required for each RLCM/OPM/OPAC configured for the ESA feature

Location:

position 16, NT6X11 (HIE shelf)

NT6X78 (CLASS Modem Resource (CMR) card)

Function:

to support the Calling Number Delivery (CND) feature in the RSC-S. The card generates PCM samples of 202 modem signals, based on messaging from the XPM signaling processor. These samples are passed on to the POTS line card in the LCM, where they are converted to analog modem signals and sent along the loop to the CLASS subscriber. The CMR card also identifies the ringing intervals on the subscriber loops, to determine when to transmit the modem signals.

Location:

- positions 5 and 23 of the RCC2 shelf of the RSC-S
- positions 5 and 23 of the ESMA shelf

NT6X80 (Ring/Pad pack)

Function:

provides required adjustment for pad loss

Features:

- provides pad loss values from 0 dB to 7 dB, selectable in 1-dB increments
- contains 1 kbyte of static RAM
- performs ring/pad diagnostics

Quantity:

One Ring/Pad pack is required per Controller Array shelf.

Location:

position 19, NT6X0201 (Controller Array shelf)

NT6X85 (DS-1 Interface pack)

Function:

to provide a direct digital interface between the SCM-10S and the SLC-96 or between the SCM-10U and the RCU. The DS-1 pack supports two bidirectional DS-1 links from the DMS-10 switch to the SLC-96s or RCUs.

Features:

- includes two 32-channel, 10-bit serial buses to transfer data over the DS-1 links between either the SCM-10S and the SLC-96 or the SCM-10U and the RCU
- performs data rate conversion to/from 2.56 Mb/s (DS-30A) to/from 1.544 Mb/s (DS-1)
- transmits local alarms and detects remote alarms
- monitors for error detection, frame slips, and loss of synchronization
- recognizes A, B, and DDL bits and acts as an interface between the A/B DDL Message pack
- provides switch-selectable settings to handle equalization for various cable lengths from DS-1 to other equipment

Quantity:

One DS-1 Interface pack is required per Controller Array shelf; up to five may be configured per shelf.

Location:

positions 1 through 5, NT6X0201 (Controller Array shelf)

NT6X86 (A/B Derived Data Link pack)

Function:

to relieve the Signal Processor pack (NT6X45) of intensive input/output message operations using A bits, B bits, and Derived Data Link (DDL) messages, which are required by the SLC-96. The A/B DDL pack is a microprocessor-based circuit pack that consists of two major circuits: the A-bit/B-bit circuit and the DDL message circuit.

Features:

- stores A/ bits and DDL messages for each SLC-96
- formats and synchronizes A/B bits for insertion into the DS-1 lines
- formats and synchronizes DDL messages for insertion into the parallel speech bus
- receives multiplexed signals and outputs incoming A/B bits to the Signal Processor
- receives, reformats, and outputs incoming DDL messages to the Signal Processor
- performs error detection and reporting of the DDL
- performs self-diagnostics on A/B bit and DDL message circuits

Quantity:

One A/B DDL pack is required per Controller Array shelf.

Location:

position 13, NT6X0201 (Controller Array shelf)

NT6X92 (Universal Tone Receiver)

Function:

to detect, process, and identify valid DTMF and MF tones received from the voice channels of the parallel speech bus of the common peripheral controller (CPC)

Location:

- NT6X92BB: positions 6, 7, 21 of the RCC2 shelf of the RSC-S;
NT6X92AA: position 22 of the RCC2 shelf of the RSC-S
- NT6X92EA: positions 6, 7, 21, and 22 of the ESMA shelf

NT6X99 (Integrated Bit Error Rate Tester [IBERT] pack)

Function:

- to interface the DMS-10 switch and the Datapath Extension card (DPX) in a Switched 56 kbps Services feature configuration. The IBERT pack performs Bit Error Rate Tests (BERT) on the DPX/DLC/DU facility.

- to perform bit error rate tests on various data paths defined in the Bit Error Rate Testing (BERT) feature.

Note 1: For more information about bit error rate testing in the Switched 56 kbps Services feature configuration, refer to command BERT in overlay TLT, in NTP 297-3601-506, *Maintenance Diagnostic Input Manual*.

Note 2: For more information the Bit Error Rate Testing feature, see Section 9 of the NTP 297-3601-500, *General Maintenance Information*.

Quantity:

variable

Location:

positions 1 through 15 of each line subgroup (because a BERT occupies two vertically adjacent card slots)

Note 1: The NT6X99 pack cannot be provisioned in position 0.

Note 2: Because the NT6X99 pack can cause interference on packs provisioned in two horizontally adjacent positions located on either side of the pack, it is recommended that nothing be provisioned in those positions. To reduce the number of positions that must remain empty, it is also recommended that the NT6X99 be provisioned only in position 15, thus requiring that only positions 13, 14, 29, and 30 be left vacant.

NT7X05 (Flash Memory pack)

Function:

stores the download file for an SCM-10S or SCM-10U XPM. The CA version of the pack is required for the XPM Fast Download feature.

Features:

up to 32 Mbytes of local flash memory storage that can be provisioned in 8-Mbyte blocks

Quantity:

two packs per XPM module (1 pack per XPM unit)

Location:

slot 15 on each NT6X0201 Controller Array shelf

NT8T04 (Network Interface pack)

Function:

to provide the interface between the network matrix on the CNI shelf and the DS-30A and MLI peripheral equipment. The pack can be configured to operate with either a DS-30A application or an MLI application. The pack can also be configured to provide Global Tone Services (GTS), which provides tones and conference services.

The NT8T04 pack can support up to 32 peripheral loops when GTS is not enabled. When GTS is enabled, the NT8T04 can support 28 peripheral loops.

Quantity:

two through five packs per J8M75A-1,L1 (CNI Module)

Location:

positions 12, 14, 16, 18, 20 (both on lower and upper shelves), J8M75A-1,L1 (CNI Module)

NT8T06 (Network pack)

Function:

to provide time and space channel switching in the DMS-10 switch network. Two NT8T06 packs are provisioned in each CNI shelf, providing two network planes. Each call is redundantly switched in both network planes, thus enabling the switch to provide full network capacity if a network pack fails. Each NT8T06 pack terminates 20 DS256 loops from up to five NT8T04 Network Interface packs on the same CNI shelf, enabling an NT8T06 pack to access 5120 available timeslots and providing a switching matrix of 20,480 timeslots into the network pack to 5120 timeslots out of the pack.

The NT8T06 packs are connected to NT8T06 packs on the same plane on the other CNI shelves provisioned in the switch, through an Interlink. Each of these receive connections carries all of the 5120 receive timeslots of the NT8T04 packs on that shelf. Thus, each network pack can receive every timeslot in the switch.

Quantity:

two packs per J8M75A-1,L1 CNI Module

Location:

positions 15 and 17 (both on lower and upper shelves), J8M75A-1,L1 CNI Module

NT8T31 (Power Terminator)

Function:

provides power termination for intra-CNI network bus

Location:

rear of the CNI module (J8M75A-1,L1) backplane, between the upper and lower shelves

NT8T44 (Terminating I/O Bus paddleboard)

Function:

terminates connection of the I/O busses on the GPIO (J1T81A-1) shelf

Location:

slots 19R and 20R, at the rear of the GPIO shelf (J1T81A-1) located in shelf position 3 of a CE-01 bay (J1T92). When a second GPIO shelf is equipped, the NT8T44 paddleboards must be installed, instead, in slots 19R and 20R at the rear of that GPIO shelf.

NT8T57 (DS-30A/MLI paddleboard)**Function:**

provides interface means to the CNI module (J8M75A-1,L1) for the peripheral loops (PELP). The NT8T57 consists of two boards, NT8T58 and NT8T59, joined together.

Location:

slots 12R, 14R, 16R, 18R, 20R of each (upper and lower) shelf of the J8M75A-1,L1 (CNI module)

NT8T72 (Local I/O Bus Terminator)**Function:**

provides CPU-end termination to the I/O bus

Location:

slot 9R on each shelf (upper and lower) of the J8M75A-1,L1 (CNI module)

NT8T79 (Non-terminating I/O Bus paddleboard)**Function:**

provides a daisy-chained connection of the I/O bus to the GPIO (J1T81A-1) shelves

Location:

slots 2R and 3R, at the rear of the two GPIO shelves; can also be installed in slots 19R and 20R when those slots are not occupied by NT8T44 paddleboards

NT8T88 (SCSI Bus I/O and Disk Drive pack paddleboard)**Function:**

to carry signals from the NT8T90 packs to the two IOI SCSI buses.

Quantity:

One is required for each NT8T90 SCSI Bus I/O and Disk Drive pack.

Location:

at the rear of the NT8T90 pack. See the NT8T90 pack description for locations.

NT8T90 (SCSI Bus I/O and Disk Drive pack)

Function:

to provide an interface between the CPU and an integrated hard disk drive. Also allows the DMS-10 CPU to communicate by a small computer systems interface (SCSI) bus with a magneto-optical drive. The NT8T90 hard disk drive has a minimum formatted storage capacity of 9.1 GB.

Note: NT8T90BB is required for IBSR.

Quantity:

- One NT8T90 is required per Control shelf or CPU/Network shelf in systems configured with the DMS-10 Classic Network.
- One NT8T90 pack is required on each of two shelves of a CNI module (J8M75A-1,L1) in systems configured with the DMS-10 Expanded Network.

Location:

- position 12, J0T93A-1 (Control shelf)
- positions 11, J1T72B-1 (CPU/Network shelf)
- positions 10, J1T72C-1 (CPU/Network shelf)
- position 7 (both on lower and upper shelves), J8M75A-1,L1 (CNI Module)

NT8X02 (Battery Charge Controller pack)

Function:

To control up to four battery strings in the RMM. The battery strings are connected to the OPM load or charge bus through two Battery Charge Controller (BCC) packs. Together these packs form the BCU.

Features:

- provides monitor outputs proportional to the string voltages
- powered entirely from the -52.5 V bus
- converter to provide the -57.5 V for charging

Quantity:

two packs per BCU

Location:

in front of the rectifiers in the right frame in the OPM or OPAC

NT8X18 (DS-30A Peripheral Interface pack)

Function:

To interface the SCM-10S or SCM-10U with the DS-30A Interface packs in the Network, providing DS30-A loops for interface between the network and the SCM-10S or SCM-10U.

In support of the SCM-10A feature, provides the C-side interface to the DMS-10 switch for the ESMA shelf. Connection between the ESMA NT8X18 pack and the NT4T04 packs on the DMS-10 Network shelf is through an ED1T60-02 cable set.

Features:

- enables SCM-10S or SCM-10U to use a DS-30A interface
- performs channel data extraction
- Versions of the pack earlier than NT8X18BB support up to two DS30-A loops.
- NT8X18BB and later versions of the pack support up to eight DS30-A loops.

Quantity:

One DS-30A Peripheral Interface pack is required per Controller Array shelf. Two DS-30A packs are required per ESMA shelf (NTMX8504).

Location:

- position 22, NT6X0201 (Controller Array shelf)
- positions 9 and 19, NTMX8504 (ESMA shelf)

NT9Y00 (OPSM Cabinet Controller pack)

Function:

to control the fans, heaters, and damper for environmental control within the OPSM. This pack also performs periodic automatic battery testing and provides Low Voltage Disconnect circuitry to protect batteries when they are exhausted.

Features:

functions controlled by 8085 microprocessor

Quantity:

One OPSM Cabinet Controller pack is configured for each Power and Maintenance Module (PMM).

Location:

right-hand pack position in Power and Maintenance Module of OPSM

NT9Y12 (Switching Matrix pack)

Function:

- to provide an interface for the DS-1 line linking the RSLM bay or the OPSM to the DMS-10 office
- to provide DS-1 alarm indicators and detectors
- to provide all the clock facilities using a PLL, and to recover the clock from the incoming 1.544 Mb/s DS-1 line
- to provide conversion from the external 1.544 Mb/s clock to the internal 2.56 Mb/s clock
- to provide a non-blocking switching matrix for all the devices associated with the RSLM bay or the OPSM; that is, the DS-1 line, the six or eight LSGs, and so on

Quantity:

Two Switching Matrix packs are required for each RSLM shelf.

Location:

positions 4 and 8; J9Y07A-1, J9Y74A-1 (RSLM shelf)

NT9Y13 (Remote Maintenance pack)

Function:

- to provide circuitry for 8 alarm scan points (6 customer-assignable and 2 fixed) and 5 signal distribution points (3 customer-assignable and 2 fixed)

Note 1: In an RSLE bay with one control shelf, a total of 6 customer-assignable signal distribution points are available. In an RSLE bay with two control shelves, 4 of the 5 signal distribution points on each pack are fixed, leaving a total of 2 customer-assignable signal distribution points per RSLE bay.

Note 2: When the Power Alarms for RSLE feature is installed in the switch, one of the alarm scan points is pre-wired and assigned and one is pre-wired with the SRCE and class assignable by the customer.

Note 3: The NT9Y13DB version is required for Remote Power alarm enhancement operation.

- to perform tests on line cards and subscriber loops
- to provide simultaneous application of two metallic test devices:
 - a three-wire interface between the remote equipment and a mechanized loop testing (MLT) system or comparable system
 - a two-wire interface for a metallic bypass pair

Note: This capability is only operational when the NT9Y13 pack is installed in an RSLE bay (J9Y80A-1), RLCM bay (J9Y70B-1), or OPSM cabinet (J9Y01A-1) of the following vintages:

- J9Y80A-1, L1, vintage D
 - J9Y80A-1, L2, vintage B
 - J9Y80A-1, L3, vintage B
 - J9Y70B-1, L1, vintage C
 - J9Y70B-1, L2, vintage C
 - J9Y01A-1, L1, vintage B
 - J9Y01A-1, L2, vintage B
 - J9Y01A-1, L3, vintage A
- to provide tone generation for RSLM bays and the OPSM in the Emergency Stand-alone (ESA) mode

Note: The NT9Y13DC is required for ESA P-Phone operation.

- to provide a test head for measuring transmission performance, voltage, resistance, and capacitance. (This test head performs functions that are similar to the functions of the LTT and the PMS in a DMS-10 switch.) Resistance and capacitance are measured only in the presence of foreign voltage <16 V ac or <4 V dc. Tip-to-ring resistance and capacitance may exceed $\pm 10\%$ accuracy if both tip-to-ground and ring-to-ground impedances are also present.

Features:

In an RSLE bay, each Remote Maintenance Pack (RMP) is controlled by a separate RSLE Processor (RSLC) pack. In the upper RSLE shelf, the RSLC in position 5 controls the RMP in position 6. In either shelf, the RSLC in position 8 controls the RMP in position 9.

Quantity:

- Two Remote Maintenance (RMP) packs are required for each RSLE bay.

Note: The NT9Y13DB is required if an NT6X17BA or an NT6X18BA is equipped in the RSLE bay.

- One Remote Maintenance pack is provisionable for each RSLM shelf.

Note: The NT9Y13DB is required if an NT6X17BA or an NT6X18BA is equipped in the RSLM or OPSM bay.

Location:

- position 6, J9Y74A-1, J9Y07A-1 (RSLM shelf)
- In an RSLE bay, the first RMP is always located in position 6 on shelf 3. The second RMP is always located in position 9 on either the same shelf or, if two RSLE Control shelves are configured, on shelf 1.

NT9Y14 (Processor pack)

Function:

to provide an interface between the DMS-10 Control Equipment and the Line Drawers in the RSLM bay or the OPSM. The Processor pack performs scanning, ringing control, DMSX protocol handling and message processing.

Features:

Each Processor pack provides, under normal conditions, service for up to four Line Subgroups (LSGs). (Each Line Drawer contains two LSGs.) On the Type A RSLM shelf, Processor pack 0 (position 5) serves the four lower (LSGs): 00, 02, 04, and 06; Processor pack 1 (position 7) serves the four upper LSGs: 01, 03, 05, 07. On the Type B RSLM shelf, Processor pack 0 (position 5) serves the three lower (LSGs): 00, 02, and 04; Processor pack 1 (position 7) serves the three upper LSGs: 01, 03, and 05. Under fault conditions, a Processor can serve up to eight LSGs; that is, all the lines in all drawers on that shelf. A red LED on the faceplate indicates a failure or a man-made-busy condition.

Quantity:

Two Processor packs are required for each RSLM shelf.

Location:

positions 5 and 7; J9Y74A-1, J9Y07A-1 (RSLM shelf)

NT9Y15 (Emergency Stand-Alone pack)

Function:

to provide minimal service to subscribers connected to either an RSLM or OPSM when T1 connections with the DMS-10 switch are lost

Features:

four DTMF receivers (DTRs)

Quantity:

One Emergency Stand-Alone pack is provisionable for each RSLM shelf.

Location:

position 3; J9Y74A-1, J9Y07A-1 (RSLM shelf)

NT9Y16 (RSLE Matrix pack)

Function:

- to provide a non-blocking switching matrix for all the devices associated with the RSLE bay
- to provide, for any channel, a read-write function, which enables the Processor packs to pass messages between the various modules of the RSLE
- to provide a broadcasting facility

Features:

- capacity of 18 links, each of which has a total of 32 channels with a bit rate of 64kbit/s
- send and receive circuitry for the 18 links

Quantity:

Two RSLE Matrix packs are required for each RSLE Control shelf.

Location:

positions 4 and 7, J9Y84A-1 (RSLE Control shelf)

NT9Y17 (RSLE Dual Host Interface and Clock pack)

Function:

- to provide an interface for two of the DS-1 lines linking the RSLE bay to the DMS-10 switch
- to provide DS-1 alarm indicators and detectors
- to provide conversion from the external 1.544 Mb/s clock to the internal 2.56 Mb/s clock
- to provide clock recovery from the incoming 1.544 Mb/s DS-1 line and to generate all clock signals required for the RSLE
- to provide clock selection circuitry

Quantity:

Two RSLE Dual Host Interface (DHI) and Clock packs are required for each RSLE bay.

Location:

positions 10 and 11, J9Y84A-1 (RSLE Control shelf). However, if two RSLE Control shelves are configured, the first RSLE DHI and Clock pack is located in position 10 on shelf 3 and the second RSLE DHI and Clock pack is located in position 11 on shelf 1.

NT9Y18 (RSLE Tones pack)

Function:

- to provide call-progress tones for the Emergency Stand-Alone (ESA) mode (tones will be connected in the broadcast mode to line packs requiring tone service)
- to provide DTMF receivers for use in the ESA mode
- to provide two links: one for each RSLE Matrix pack on the same RSLE Control shelf

Note 1: The NT9Y18AB version is required for ESA P-Phone operation.

Note 2: An RSLE bay configured with two RSLE Control shelves will contain two RSLE Tone packs, but only the Tone pack located on Shelf 3 will supply tones for ESA operation; the primary function of the Tones pack located on shelf 1 is to provide DTMF receivers.

Features:

- call progress tones (dial tone, busy tone, re-order tone, ringback tone, and quiet tone)
- three TMS-320 Digital Signaling Processors (DSPs), each of which contains two Digitone Receivers (DTRs)/Dualtone Multifrequency (DTMF) receivers. In an RSLE bay equipped with two RSLE shelves, twelve DTRs are available to service subscribers. The DTRs in shelf 0 (shelf 3 in hardware) are numbered 0 through 5; the DTRs in shelf 1 (shelf 1 in hardware) are 6 through 11.

Quantity:

One RSLE Tone pack is required for each RSLE Control shelf.

Location:

position 12, J9Y84A-1 (each RSLE Control shelf)

NT9Y19 (RSLE Emergency Stand-Alone pack)

Function:

to provide minimal service to RSLE subscribers when T1 connections with the DMS-10 switch are lost

Features:

- advanced 68000-series processor
- communication controller for handling message channels to all other RSLE processors

Quantity:

One RSLE ESA pack is provisionable for each RSLE bay.

Location:

position 14, J9Y84A-1 (RSLE Control shelf)

NT9Y20 (RSLE Dual Host Interface pack)**Function:**

- to provide an interface for two of the DS-1 lines linking the RSLE bay to the DMS-10 office
- to provide DS-1 alarm indicators and detectors

Features:

Two red LEDs on the faceplate, one for each DS-1 circuit, indicate loss of synchronization for both incoming and outgoing DS-1 lines.

Quantity:

Two RSLE Dual Host Interface packs are required for each RSLE bay if the bay is equipped with two RSLE Control shelves.

Location:

position 11, J9Y84A-1 (RSLE Control shelf) and position 10, J9Y84A-1 (RSLE Control shelf)

NT9Y22 (RSLE Processor pack)**Function:**

to provide an interface between the DMS-10 Control Equipment and the Line Drawers in the RSLE bay. The Processor pack performs scanning, ringing control, DMSX protocol handling and message processing.

Features:

Each Processor pack provides, under normal conditions, service for up to eight Line Subgroups (LSGs). (Each Line Drawer contains two LSGs.) Processor pack 0 (position 5) serves the eight lower (LSGs): 00, 02, 04, 06, 08, 10, 12, and 14; Processor pack 1 (position 8) serves the eight upper LSGs: 01, 03, 05, 07, 09, 11, 13, and 15. Under fault conditions, a Processor can serve up to sixteen LSGs; that is, all the lines in all drawers on the RSLE Control shelf and on the RSLE Line e Drawer shelf. A red LED on the faceplate indicates a failure or a man-made-busy condition.

Quantity:

Two Processor packs are required for each RSLE Control shelf.

Location:

positions 5 and 8, J9Y84A-1 (RSLE Control shelf)

NTAX74 (Cellular application processor)

Function:

The Cellular Application Processor (CAP) provides overall call processing functions such as digit collection (pulse), channel assignment, and message processing. Real-time call processing functions include sending and receiving messages, controlling the enhanced time switch, and supervising channels. The CAP provides dynamic random access memory (DRAM) and a direct memory access (DMA) from the Enhanced ISDN processor (EISP).

Location:

positions 3 and 25 of the ESMA shelf

NTBX01 (Enhanced ISDN processor)

Function:

The Enhanced ISDN processor (EISP) provides LAP-D protocol for the EOC and TMC protocols and, in conjunction with the EDCH pack, supports ISDN lines.

Features:

The EISP pack has 32 LAP-D (Q.921) channels that can be used either for providing TR-303 protocols or for ISDN use. Since each Remote Digital Terminal requires 4 LAP-D channels (EOC, TMC, and respective protection channels), 7 RDTs can be supported per ESMA. If ISDN is required, each Enhanced D-channel handler (EDCH) pack (NTBX02) requires a single EISP channel; a maximum of 10 EDCHs can be supported in a single ESMA shelf. This leaves between 22 and 30 free channels for RDT use; thus, if ISDN support is required, only 7 RDTs can be supported (depending on the number of EDCH packs provisioned).

Location:

positions 4 and 24 of the ESMA shelf

NTBX02 (Enhanced D-channel handler)

Function:

The Enhanced D-channel Handler (EDCH) provides 32 LAP-D channels for the support of ISDN lines. Channel 0 of the EDCH pack is reserved for connection to and Enhanced ISDN processor (EISP) pack (NTBX01), and channels 1 through 31 can be used for ISDN lines or connections to packet handlers (Bd connections). Since TR-303 protocol requires ISDN to be supported using the 4:1 TDM method, each channel supports 4 ISDN loops. Thus, an EDCH supports a maximum of 124 ISDN loops.

Quantity:

At least one EDCH pack must be provisioned to act as a spare. Thus a minimum of two (one active and one backup) or a maximum of 10 (nine active and one backup) packs may be provisioned.

Location:

positions 14 and 16 of an ESMA shelf and positions 3, 5, 7, 8, 9, 10, 11, 12, 15, 16, 17, 18, 19, 20, 22, and 24 of the ESMA extension shelf

NTBX27 (2B1Q U-Interface ISDN line card)**Function:**

to provide an ISDN basic rate access (BRA) subscriber interface

Features:

The two-binary one-quaternary (2B1Q) U-interface ISDN line card is a single size card with a 2x10 circuit I/O connector and supports the following four subsystems:

- L-bus subsystem provides an interface between the ISDN line drawer and the IDC
- U-subsystem provides access to the L-bus and maintenance subsystems, and an interface to the two-wire metallic U-loop
- maintenance subsystem provides an interface between the L-bus subsystem and the U-subsystem
- reset circuitry provides a hardware reset signal to the L-bus subsystem, which internally resets and generates a stretched reset output signal to the U-subsystem and the maintenance subsystem

Quantity:

Up to 28 line cards per ISDN Line Drawer (NT6X05DA)

Location:

positions 0 through 13 of each LSG of the ISDN line drawer

NTBX71 (point-of-use power supply (PUPS) card)**Function:**

to provide power to a drawer of ISDN line cards. The PUPS is a power converter that operates from the normal -48V office battery and provides a +5V output.

Features:

- current sense transformer samples the minimum load to determine load current level. If the output load approaches the lower limit of an acceptable minimum load, a dummy load is progressively switched in until the converter is operating at a zero external load current
- pulse width modulator (PWM) and control circuit control the FET switching input and provide other features including limiting and shutdown.

- output overvoltage shutdown samples the output voltage and checks for an overvoltage condition. If it detects an overvoltage, it sends back a signal to the PWM top shut down the PUPS. To reset the card, power must be removed and then re-applied.

Quantity:

One PUPS card is required per ISDN Line Drawer (NT6X05DA).

Location:

immediately behind the connector of each ISDN Line Drawer

NTEX17BA/CA (Data-enhanced Digital Subscriber Line card)

Function:

The Data-enhanced Digital Subscriber Line (xDSL) card (NTEX17) provides high-speed data communication with the customer's 1-Meg modem, while also providing full POTS service. For additional information about this pack, refer to Section 2 in NTP 297-3601-184, *Circuit Interfaces for Lines, Trunks, and Test Trunks*.

Quantity:

31 NTEX17CA xDSLs can be provisioned in a line drawer.

Location:

The NTEX17CA xDSL can be provisioned in positions 0 through 15 of the lower sub-group and in positions 1 through 15 of the upper sub-group of a line drawer.

Note: No regular line cards, or other xDSL line cards, may be provisioned in the slots located vertically above an xDSL line card or closer to the DBIC card than any of the xDSL cards provisioned in the drawer.

NTEX54BA (Data-enhanced Bus Interface Circuit (BIC) card)

Function:

The Data-enhanced BIC (DBIC) acts as the interface between two 32-channel digroups and the line circuit cards in the LCM Line Drawer (NT6X05). In support of the 1-Meg Modem Service feature, the DBIC performs the concentrating function for the voice and data connections in the LCM. The card also separates the voice and data traffic for routing within a packet-switched network (for data) or circuit-switched network (for voice). The DBIC provides a 10Base-T/100Base-T ethernet connection to the Access Network for all line cards in the LCM.

Quantity:

One DBIC card is required per LCM Line Drawer.

Location:

immediately behind the faceplate of each LCM Line Drawer (NT6X05)

Note: No card is allowed in the slot adjacent to the top of the DBIC (slot 16, odd line subgroup) due to physical interference with the DBIC's RJ-45 connector. Thus, NT6X18AB line cards or other cards that require that the Power Converter +48 V card be provisioned in this slot cannot be provisioned in a 1-Meg Modem Service line drawer.

NTMX45 (Emergency Stand-Alone (ESA) Processor Pack)**Function:**

The NTMX45AA is a Motorola 68020-based processor card that provides Emergency Stand-Alone (ESA) capability to the RLCM/OPM/OPAC remotes. The NTMX45 replaces the NT6X45 in position 15 and the NT6X47 in position 14 of the NT6X11 (HIE shelf).

Features:

- CPU 68020
- Clock generation
- Timing state machine
- Decoder
- Data strobe acknowledge signal (DSACK) generation
- Memory management unit (MMU)
- Dynamic RAM (DRAM)
- Programmable read-only memory (PROM)
- Identification PROM
- E2PROM
- Address-bus (A-bus) interface
- Direct memory access (DMA)
- Dual universal asynchronous receiver transmitter (DUART)
- Programmable timers
- Status register
- Activity control
- Interrupts
- Sanity timers
- Reset

Quantity:

One ESA Processor pack is required for each RLCM/OPM/OPAC configured for the ESA feature.

Location:

Position 15, NT6X11 (HIE shelf).

NTMX72 (Power converter)

Function:

to provide power for central processor and memory (CPM) digital equipment of the RSC-S.

This pack is also used as the power supply for the ESMA (NTMX8504) shelf. The pack receives 48 V (minimum 42 V) from the DMS-10 power distribution panel and provides +5 V (40 A) and +/-12 V (1.25 A each) to all ESMA shelf packs that require it.

Quantity:

There are two NTMX72 packs per ESMA shelf or RCC2 shelf.

Location:

- positions 1/2 and 26/27 of the RCC2 shelf of the RSC-S
- positions 1/2 and 26/27 of the ESMA shelf

NTMX73 (PCM Signaling pack)

Function:

to control all low-level PCM and DS-1 signaling tasks, and to generate the system clock in the RSC-S. The PCM and DS-1 signaling tasks include link maintenance, receiving and sending derived data link (DDL), and receiving and sending ABCD bits. The pack supports DS-1 and PCM30 trunks on both the core side (C-side) and the peripheral side (P-side).

This pack, provisioned on the ESMA (NTMX8504) shelf, is also used to support the SCM-10A feature.

Location:

- positions 11 and 17 of the RCC2 shelf of the RSC-S
- positions 11 and 17 of the ESMA shelf

NTMX74 (DS-30A Interface pack)

Function:

to convert data that comes from the matrix in DS60 format into balanced DS30A format for the LCM, and to convert balanced DS30A signals from the LCM into DS60 format for the matrix

Location:

positions 13 and 15 of the RCC2 shelf of the RSC-S

NTMX75 (Time Switch pack)

Function:

to perform all speech channel switching functions for the Common Peripheral Module (CPM) family of peripheral shelves. The pack:

- provides digital connections between all C- and P-side channels
- moves ABCD bits from the DS1 ports to the SIGP pack
- supports the parallel buses for service circuits
- selects C-side input and output links and channels
- selects P-side link connections
- support for 28 VT1.5 in P-side for SONET applications
- hardware facilities designed to ensure the diagnostics of the STS-1 pack
- interface to the DS-60 Extender pack (NTMX79)
- increased number of C-bits used for defining P-side configurations, for greater P-side flexibility in assignment of DS-1 and EDCH (Enhanced D-channel handler) ports
- support for FDL and DDL
- global loop testing

Location:

- positions 10 and 18 of the RCC2 shelf of the RSC-S
- positions 10 and 18 of the ESMA shelf

NTMX76 (CSM and Messaging pack)

Function:

The pack provides support for the following:

- CSM
- DS-30A protocol
- ROM and RAM tone generator including ADSI tones

- DMSX messaging
- HDLC messaging interface

Location:

positions 8 and 20 of the ESMA shelf and position 11 of the RCC2 shelf of the RSC-S

NTMX77 (Unified Processor pack)

Function:

controls all service packs, and the trunks and lines, and communicates with the central control on the RCC2 shelf

Features:

Flash downloading of the pack software is supported. For additional information about the NTMX77 Flash Download feature, refer to NTP 297-3601-105, *Features and Services Description*.

Location:

positions 3 and 25 of the RCC2 shelf of the RSC-S

NTMX79 (DS-60 Extension pack)

Function:

provides the power and DS-60 interface for the ESMA extension shelf. The pack provides:

- support for equal switching delay
- 42 V through 60 V
- support for up to 24 DS-1s and/or 8 EDCH (Enhanced D-channel handler) packs (NTBX02)

Location:

positions 2 and 13, and 14 and 25 of the ESMA extension shelf

NTMX81 (Dual DS-1 Interface pack)

Function:

provides an interface between Common Peripheral Module (CPM), Enhanced Subscriber Carrier Module Access (ESMA), or Star Hub Control shelves and local transmission equipment, such as office repeaters and channel banks

Location:

Because of their small size, up to four NTMX81AA packs can be inserted into a PCM Quad Carrier pack (NTMX87) or a Quad Carrier pack (NTTR87).

NTMX87 (PCM Quad Carrier pack)

Function:

holds up to four NTMX81AA Dual DS-1 Interface packs or NTMX83AA filler packs. Slots not equipped with NTMX81AA packs must be provisioned with NTMX83AA packs.

Location:

- positions 9 and 16 of an RCC2 shelf for C-side; positions 12, 14, and 16 for P-side
- positions 12, 14, and 16 of the ESMA shelf or positions 4, 6, 8, 19, 21, and 23 of the ESMA extension shelf

NTTR60 (6X60 Ringing Generator pack)

Function:

The pack provides all types of ringing and ANI/COIN voltage generation.

Quantity:

There are two NTTR60 packs per Star Hub Control shelf (NTTR8603)

Location:

- positions 1/2 and 22/23 of the Star Hub Control shelf

NTTR73 (Universal Maintenance pack)

Function:

The pack performs the following functions for the Star Hub:

- metallic loop testing
- tone generation and DTMF reception while the Star Hub is in ESA mode
- provides interface to external test equipment
- provides user-defined scan and distribution point handling

Quantity:

There are two NTTR73 packs per Star Hub Control shelf (NTTR8603)

Location:

positions 11 and 13 of the Star Hub Control shelf

NTTR77 (Remote Controller pack)

Function:

The pack performs the following functions for the Star Hub:

- processing (CPU, memory)

- clock synchronization, generation, and distribution
- speech switching
- provides interface to local line drawers

Quantity:

There are two NTTR77 packs per Star Hub Control shelf (NTTR8603)

Location:

positions 7 and 17 of the Star Hub Control shelf

NTTR87 (Quad Carrier pack)

Function:

holds up to four NTMX81AA Dual DS-1 Interface packs or NTMX83AA filler packs. Slots not equipped with NTMX81AA packs must be provisioned with NTMX83AA filler packs.

Location:

positions 8, 9, 10, 14, 15, and 16 of a Star Hub Control shelf (NTTR8603)

QPP519 (Fault Locate/Order Wire Card)

Function:

to provide termination and access to fault locate and order-pair wires

Features:

- provides pulse correction for use with the Central Office switching equipment; includes jack access for both a 2-W telephone and 4-W headset
- provides a -48 V alarm output to detect blown fuse; contains an LED on the faceplate to indicate a blown fuse alarm

Quantity:

- One Fault Locate/Order Wirer Card may be provisioned in each Frame Supervisory Panel.
- One QPP519 Fault Locate/Order Wire Card is provisionable for each OPSM Power and Maintenance Module.

Location:

- left-hand pack position in the OPSM Power and Maintenance Module
- left side of the Frame Supervisory Panel

QRY18 (Office Repeater Card)

Function:

to boost the power level of a digital signal before the signal enters a DS-1 span line

Features:

- QRY18A provides dc power to the line repeater
- QRY18B provides dc power to the line repeater; contains error monitor feature
- QRY18C does not provide power
- QRY18D does not provide power; contains error monitor feature
- QRY18F provides -48 V input voltage; generates up to a -130 V output voltage for the span line
- QRY18G provides -48 V input voltage; generates up to a -130 V output voltage for the span line; contains error monitor feature

Quantity:

- Up to six Office Repeater Cards may be provisioned in each Frame Supervisory Panel.
- Two QRY18 Office Repeater Cards are provisionable for each OPSM Power and Maintenance Module.

Location:

- center two pack positions in the OPSM Power and Maintenance Module
- left side of the Frame Supervisory Panel

Section 6: Miscellaneous equipment

Introduction

This section contains descriptions of vendor-supplied equipment and equipment not described in other sections in this document. Because not all equipment in this section has an associated part number, the descriptions are organized as follows: descriptions of equipment without part numbers are arranged alphabetically and precede descriptions of equipment with part numbers, which are arranged alphanumerically by Product Engineering Code (PEC) number.

Baystack 470

Function:

In the DMS-10 packet network architecture, two Ethernet Switch 470 models will be used to implement a low cost LAN. The dual Ethernet Switch configuration provides high speed (10/100 Mbps Ethernet) connectivity and power redundancy.

The Ethernet Switch 470 will be tested for inter-operability with the DMS-10 communications server and is the only Ethernet Switch recommended for use in the DMS-10 circuit-to-packet gateway interface product.

Features:

- 24 10/100 Base-T RJ-45 ports
- Equipped with a -48 Volts dc power source
- Resilient connectivity for minimal network downtime
- Network availability with QoS features
- Secure access and data traffic protection

Quantity:

Two (2) per DMS-10 Central Office Local Area Network (CO LAN).

Location:

Miscellaneous Equipment (ME), Peripheral Equipment (PE), or Common Equipment (CE) bays. Provisioning is done via the J0T82A-1 documentation.

Cook Billing Media Converter II Assembly

Function:

To record AMA data on a Winchester-type sealed disk. For the Large Cluster Controller (LCC) the CE-1 bay can be provisioned with the Billing Media Converter (BMC) II Assembly. The BMC II contains fully duplicated recording and communications units (designated "A" and "B"), each of which has its own CPU, I/O ports, and Winchester-type, sealed hard-disk drive. The BMC II is polled periodically by an Electronic Data Processing Center (EDPC) by way of a data link that uses either dial-up or dedicated modems. When the BMC II is polled, it sends the requested data to the EDPC, where they can be converted into the operating company's billing format.

Features:

- separate alarm output circuits for interfacing with DMS-10 alarm system to indicate unpolled records reaching 70, 90, and 100 percent of storage-medium capacity
- interface with a range of compatible data exchange devices and formats for EDPC communication
- complete data availability until eventual overwriting
- DMS-10 input/output system interface for reporting control
- different levels of password access, offering full system security
- over 300,000 call records per hour input capacity with simultaneous polling
- self-diagnostic capability, background assignable
- polling rate accommodation from 1200 to 9600 baud
- remotely downloadable and programmable
- a variety of storage capacities to match current and future requirements
- chassis compliance with FCC Part 15 requirements for EMI emissions

Location:

CE-1 bay in the LCC.

Cook Electric model 2200 magnetic tape unit (MTU)

Function:

to record 800-bpi AMA data on nine-track magnetic tapes. Tapes are periodically sent to a processing facility so the raw data can be converted into the operating company's billing format. Magnetic tape unit part numbers vary according to data format and storage capacity.

Features:

- redundant logic for prevention of accidental erasure
- dual gap head for simultaneous write and read operations; this permits virtual real time read checking of written data
- Remote Latch and Power Latch capabilities for prevention of accidental front panel operation
- IBM tape format for compatibility with IBM Series 2400 and 3400 transports

Components:

- one Cook Electric, Model 2200, 800-bpi nine-track tape transport
- one Magnetic Tape Interface pack (NT3T11), to interface between the MTU bay interface cable and the MTU; this pack includes a loop-around facility for continuity testing of the interface cable and associated drivers/receivers
- MTU interface hardware (ED0T67-50)

Location:

Magnetic Tape Unit bay

Digicept 2002 Application Processing Platform

Function:

to provide telco-standard and/or user-constructed messages from a digitally stored speech vocabulary set. Contact the manufacturer, Electronic Tele-Communications, Inc. (ETC), for supporting documentation for this unit.

Features:

- Advanced Intelligent Network messages
- interactive voice response capability
- multi-lingual message capabilities
- Custom Local Area Signaling Services (CLASS) announcements
- changed number and referral number announcements
- Automatic Number Announcements (ANA)
- remotely-upgradable software
- T1 interface (two T1 spans maximum per enclosure)
- offers T1, alarm, and maintenance terminal adaptor cables to supersede existing applications of J0T14A-2 (ETC System-3Jr.)

Components:

- complete platform equipped with one or two T1 interface cards
- 5A alarm indicating fuse, and input power conductors
- mounting brackets and mounting hardware for a standard 26-inch DMS frame mounting and optional 23-inch relay rack mounting (19-inch relay rack mounting standard with no supplementary mounting brackets)
- T1 span cables, alarm cable, and serial data adapter kit (for interface of RJ-45 ports to DB9 and/or DB25 interface ports of mini-computers, maintenance terminals, and modems)

Location:

J0T81 Miscellaneous bay

Eagle Picher batteries

Function:

to provide backup power to the Outside Plant Access Cabinet (OPAC) or Outside Plant Module (OPM) during an ac power failure

Features:

- valve-regulated lead acid cells equipped with a plug-in connector for ease of maintenance
- nominal lifetime of 8 years, at 25 C

Location (OPAC):

A maximum of 6 strings (8 batteries per string) can be located inside the OPAC cabinet. Up to 38 batteries can be located on the floor. Ten batteries can be located in the rear right gate (bay 3) using two optional battery shelves.

Note: The batteries in the base of the cabinet are installed on a steel battery tray that helps to neatly position the batteries and to prevent shifting during vibration or handling. The tray and battery cables are factory-installed; the batteries themselves are shipped separately and installed at the site.

Location (OPM):

A maximum of 3 string pairs (4 batteries per string) can be located inside the OPM cabinet.

YUASA batteries

Function:

to provide backup power to the Outside Plant Module (OPM) and Outside Plant Subscriber Module (OPSM) during an ac power failure

Note: To insure maintenance of adequate battery charge, store batteries as recommended by supplier.

Features:

- sealed lead-acid maintenance-free 12 V batteries
- 12 V, 25-A-hr capacity
- two, four, six, or eight 24-cell battery strings. (Each string is charged on a battery rotation basis at 57.5 V dc.)
- up to 8 hours of backup power during an ac outage. (Each battery string provides approximately 1 hour of backup.)

Quantity:

Three strings of four 12 V batteries each are required for each OPSM.

Location:

- lower portion of the MDF/battery compartment of the OPSM
- back wall of the OPM cabinet; access to the batteries requires swinging the frames out of the cabinet

A12F50(Lorain rectifier)

Function:

to convert a commercial 120 V ac or 240 V ac power supply to a -48 V dc supply. The -48 V dc supply powers the OPSM equipment and charges the batteries.

Features:

- 12 amps, high-frequency, switched-mode
- adjustable voltage from 48.3 V dc to 58.8 V dc
- selective high-voltage shutdown
- emergency restoration

For additional information about the Lorain Rectifier, consult the vendor's documentation.

Quantity:

Two Lorain A12F50 Rectifiers are required for each OPSM.

Location:

left-hand section of the Power and Maintenance Module

AUD-H9034-G9 (Audichron HQ1-112 recorder/announcer)

Function:

to provide the recorded announcement facility for unilingual messages in the DMS-10 system. Features:

- six 14-s channels
- easy changing of messages on any channel
- visual voice alarm signals

Components:

- recording-medium drive mechanism
- cam slot and microswitch system
- magnetic head mounting assembly
- control circuits and power switch
- recording-medium and lubrication-application assembly
- audio-distribution circuit
- control-pulse distribution and test circuit
- channel and mode selector switch assemblies
- playback amplifiers and associated voice alarm circuits
- erase/record amplifier

Location:

CE-3 bay, Shelf 1

AUD-H9034-G10 (Audichron HQ1-112 recorder/announcer)

Function:

to provide the recorded announcement facility for bilingual messages

Features:

- three 28-s channels
- easy changing of messages on any channel
- visual voice-alarm signals

Components:

In addition to the components of the AUD-H9034-G9 (listed above), the AUD-H9034-G10 is equipped with track-switching circuits that allow two 14-s tracks to be combined for one 28-s audible-message channel.

Location:

CE-3 bay, Shelf 1

ED0T03-11 (Audible Alarm Panel)**Function:**

to provide audible alarm bells or tones

Description:

The alarm panel assembly consists of a 17-in. (43.2 cm) by 37-in. (94-cm) wall-mounted backboard on which the alarm bells and tone bar are mounted. The alarm signals are as follows:

- power failure-NS-5595 L10 bell
- alarm battery-NE-687A subset equipped with two NE-56A gongs and one NE-59A gong
- minor alarm-NE-687A subset equipped with two NE-57A gongs
- major alarm-NS-5594 L8, 60-ipm tone bar

Location:

per local instructions

ED0T03-11,G1 (Exit Pilot Light)**Function:**

to provide a visual alarm; the light is illuminated when any alarm condition exists in the office

Location:

An exit pilot lamp assembly is located near the main exit doors of the DMS-10 office, approximately 6 in. (15.2 cm) from the edge of the door.

ED0T03-11,G6 (Audible Alarm Panel)**Function:**

to provide audible alarm bells or tones

Description:

The alarm panel assembly consists of a 7-in. (17.8 cm) by 26-in. (66-cm) panel on which Mallory sonalert alarms are mounted for installation in a bay or on a wall. The alarms signals are as follows:

- power alarm-SC648 Mallory sonalert alarm
- major alarm-SC648AN Mallory sonalert alarm
- minor alarm-NE-687A subset equipped with two NE-57A gongs

- alarm battery-NE-687A subset equipped with two NE-56A gongs and one NE-59A gong

Location:

per local instructions

ED0T07-10,G2 (Modem shelf)

Function:

contains modems for connecting BMCs to remote polling equipment

Location:

Billing Media Converter (BMC) bay

ED1T85-02,G1 (ac Power Connector Assembly)

Function:

to connect the output of the 500 VA Inverter Assembly (ED1T85-07,G1) to the power input of the ac-powered 1600-bpi AMA Tape Drive Assembly (ED1T85-08)

Description:

one 72 inch (182.88 cm) length of 3-wire, 14 AWG power cable equipped with a conduit connector at one end for connection to the 500 VA Inverter Assembly; the other end of the cable is equipped with a conduit connector for connecting to the AMA Tape Drive Assembly (tape drive power cord is included with the drive)

Quantity:

One ac Power Connector Assembly is required per installation.

ED1T85-07,G1 (500 VA Inverter Assembly)

Function:

to house the 500 VA Inverter, one Inverter Alarm and dc Power cable, one Inverter ac Power cable, one Inverter ac Power cable, one grounding cable, Filler Panel, and associated mounting hardware in the 1600-bpi AMA bay

Features:

to provide isolated ac input to the 1600-bpi AMA tape backup system

Quantity:

One 500 VA Inverter Assembly is required per 1600-bpi AMA bay.

Location:

shelf 1, 1600-bpi AMA bay

ED1T85-08 (1600-bpi AMA Tape Drive Assembly)

Function:

contains a 1600-bpi, nine-track magnetic tape unit that serves as a secondary AMA storage device in the 1600-bpi AMA System. The tape drive provides periodic backups of the AMA billing records that are stored on the Disk Drive Assemblies. The tapes are transported to the downstream processing center, processing the AMA billing records.

Features:

- Control Data Keystone II SCSI or Hewlett-Packard HP88781A SCSI tape drive that operates at 1600-bpi and 25 or 100 inches per second
- hinged, smoked plexiglas door provides easy access to tapes, tape-transport mechanism, and recording heads
- Power, Load, On-Line, Rewind, Forward, Reverse, and Write-enable control/indicators directly accessible on the front of the unit
- isolated ac power through ED1T85-07 Inverter Assembly
- front panel LED readout for operator diagnostics

Note: A warning label on the door of the tape drive indicates that loss of billing data will occur if the tape drive door is opened while the drive is online.

Quantity:

One 1600-bpi AMA Tape Drive Assembly is required in the 1600 bpi AMA Bay.

Location:

shelf 5, 1600-bpi AMA bay

ED1T85-09,G1 (1600 bpi AMA Tape Drive Mounting Kit)

Function:

contains hardware required for installing the 1600-bpi AMA tape drive assembly

Description:

a tape drive rear guard, standoff insulators, associated brackets, and hardware necessary to complete the installation

Quantity:

One 1600-bpi AMA Tape Drive Mounting Kit is required per installation.

Location:

shelf 5, 1600-bpi AMA bay

J0T14A-1 (Digital Recorded Announcement Shelf Assembly)

Function:

The J0T14A-1 is a rack-mounted, multi-channel intelligent announcement system, designed for expanded announcement and number change intercept services.

Features:

- can accommodate both analog and digital trunks
- Recorded announcement assembly and modification are performed at either a local or remote terminal.

Note: For additional information, consult the installation documentation supplied by the manufacturer, Cognitronics.

- supports POTS, Wireless, AIN, and CLASS announcements

Components:

- Cognitronics McIAS 1607/IP digital recorded announcement unit, which supports a single digital (T1 or E1) span or an analog line card providing 24 (T1) or 30 (E1) or eight E & M loop or subscriber line voice ports
- Cognitronics McIAS 1610/IP digital recorded announcement unit, which supports up to three digital spans or analog line cards, providing a high-end capacity of 72 (T1) or 90 (E1) digital, or 24 analog, voice ports
- Cognitronics McIAS 1623/IP digital recorded announcement unit, which supports up to four digital spans for a high-end capacity of 96 (T1) or 120 (E1) voice ports

Note: For additional information, consult the documentation supplied by the manufacturer, Cognitronics.

Location:

The unit can be mounted in a standard DMS-10 frame.

J0T99A-2 (Ground Bar Assembly)

Function:

to provide equipment grounding for the Common Equipment housed in the CE-3 and CE-1 bays

Components:

- ground bar
- insulator
- ground bar mounting brackets (two) for attaching ground bar to the rear of the bay frame
- associated hardware for connecting ground cables to the ground bar

Location:

usually mounted on the rear of the CE-1 bay. The ground bar is always located between the two CE bays.

J0T99A-3 (Ground Bar Assembly)**Function:**

- to provide a single-point logic ground connection for AMA storage and communication devices housed in the 1600-bpi AMA bay
- to provide equipment ground for the Common Equipment housed in the CE-1 bay. Allows for the use of connector wings on any shelf of the CE-1 bay

Features:

The J0T99A-3 is smaller and easier to handle, prior to installation, than the J0T99A-2. Its smaller size also permits the use of connector wings on any shelf and provides more equipment access.

Components:

- ground bar
- two insulators
- ground plate bracket
- ground bar cable assembly
- associated hardware for connecting ground cables to the ground bar

Quantity:

One Ground Bar Assembly is required per 1600-bpi AMA bay, or per DMS-10 switch.

Locations:

- mounted on the rear of the CE-1 bay
- mounted on the rear of the 1600-bpi AMA bay

J2427A-1 (Rectifier)**Function:**

to convert a commercial 110 V or 220 V ac power supply to a -48 V dc supply. The -48 V dc supply powers the OPM equipment and charges the batteries.

Features:

- 25-A, switched-mode rectifier
- adjustable voltage from -44 V to -56 V
- fins located in back of the rectifiers (front of the OPM) for cooling

6-12 Miscellaneous equipment

For additional information concerning the J2427A-1 rectifier, refer to the NTP entitled *J2427A-1 Switching Mode Rectifier -48V/25A - Descriptions, Maintenance, and Ordering Information* (169-2011-200).

Quantity:

Two rectifiers are required for each OPM if the J2427B-1 rectifiers are not provisioned.

Location:

rear of the top two shelves of the right-hand OPM frame

J2427B-1 (Rectifier)

Function:

to convert a commercial 110 V or 220 V ac power supply to a -48 V dc supply. The -48 V dc supply powers the OPM equipment and charges the batteries.

Features:

- remote inhibit-enable
- contactor status
- current limiting alarm
- ac out-of-limits alarm

For additional information concerning the J2427B-1 rectifier, refer to the NTP entitled *J2427B-1 Switching Mode Rectifier for Remotes -48V/25 - Descriptions, Maintenance, and Ordering Information* (169-2021-200).

Quantity:

Two rectifiers are required for each OPM if the J2427A-1 rectifiers are not provisioned.

Location:

rear of the top two shelves of the right-hand OPM frame

J8T76A-1 (Application Peripheral)

Function:

to provide database services for use in a CCS7 network. The Application Peripheral, formerly known as the DMS-10 Application Peripheral, supersedes the LDBS and CNAM/DB products. The Application Peripheral equipped with software release 3.1 and later also provides Vendor Digital Recorded Announcement (VDRA) features.

Versions:

- L1, L2, L3 - discontinued
- L4 - consolidates features offered by L1, L2, and L3 (discontinued upon release of L5)

- L5 (maple brown) and L6 (grey) - offer all of the L4 features and also supports DS-1 interface for VDRA capabilities

Features:

The J8T76A-1 consists of paired redundant Application Peripheral units (unit 0 and unit1), mounted together. Each unit interfaces to the DMS-10 switch with separate ED1T27-13 cables to NT4T20 LAC packs, through NT4T21 LAC paddleboards, residing on the J1T65A-1 Messaging shelf. The J8T76A-1 must be located within the central office Isolated Ground Zone (IGZ). Although the J8T76A-1 is normally mounted in the J0T81E-1 Miscellaneous bay, mounting brackets are available for alternate mounting in a 19-inch or 26-inch IGZ relay rack. Since the J8T76A-1 units feature side-cooling, the paired units (0 and 1) require only a 9-inch vertical rack space for mounting.

Unit 1 is powered by -48A distribution, and Unit 0 is powered by -48B distribution, from the J0T81E-1 bay. One major, and one minor, alarm from each unit are paralleled onto two respective customer-definable alarm points at the MDF.

Unit 0 and Unit 1 each contain identical site-specific databases. The database is administered with an IBM-compatible personal computer (PC) using menu-driven software provided with the J8T76A-1 unit.

User manuals provided with the J8T76A-1 provide complete details concerning unit engineering, administration, installation, and maintenance requirements. Features available with the J8T76A-1 are described in Section 2, "Subscriber services," of NTP 297-3601-105, *Features and Services Description*.

Location:

J0T81E-1 Miscellaneous Bay, or IGZ relay rack

NT5C06CA (Rectifier)**Function:**

25A MPR25E rectifier accepts ac power from the power compartment and delivers ac power to operate the installed equipment, fans, and Battery Control Unit (BCU) in the Outside Plant Access Cabinet (OPAC). Output voltage is adjustable from -44 V to -56 V dc and is nominally adjusted to provide an output of -52.5 V.

Quantity:

up to three per OPAC

Location:

bay 1 in the OPAC

NT8X03 (battery control unit)

Function:

to terminate, on the backplane of the battery control unit (BCU), up to eight battery strings in the OPM and up to six battery strings in the OPAC. The BCU is comprised of two Battery Charge Controllers which control up to eight battery strings in the OPM and up to six battery strings in the OPAC.

Quantity:

one per OPM or OPAC

Location:

in front of the rectifiers in the right frame in the OPM; top of bay 1 in the OPAC

NT8X05 (Power Control Unit)

Function:

to distribute ac power in the OPM

Features:

- two 15-A, double-pole 240 V circuit breakers, which feed the rectifiers
- one 7-A, single-pole 120 V circuit breaker, which feeds two heaters in each Environmental Control Unit
- one 15-A, single-pole 120 V circuit breaker, which feeds the duplex ground-fault receptacle
- one 30-A, triple-pole double-throw 120 V/240 V switch to select the source of input power: Position 1 for local utility, Position 2 for emergency power generator
- one duplex ground-fault ac receptacle

Location:

top right-hand side of the right-hand frame in the OPM

NT8X06 (Environmental Control Unit)

Function:

to maintain acceptable temperature and humidity within the OPM

Features:

- fans that circulate air to cool or warm the cabinet
- two 120 V ac, 300-W flat heating elements
- secondary filter for incoming air

- temperature sensors and scan points that allow the detection of the following control and fault conditions:
 - ECU/BFU failure
 - extremely high temperature (EHT)
 - extremely low temperature (ELT)

Location:

bottom front of both frames in an OPM

NT8X06 (Booster Fan Unit (BFU))**Function:**

to provide additional cooling for the line cards

Quantity:

One Booster Fan Unit is required for each OPM.

Location:

directly above the LCM

NTRX40 (Modular Supervisory Panel (MSP))**Function:**

to provide alarm control, power circuit protection, and talk battery filtering to the Outside Plant Access Cabinet (OPAC) and Remote Switching Center (RSC-S)

Note: This unit is used in place of the Frame Supervisory Panel provisioned in the Outside Plant Module.

The MSP is provisioned with the following modules:

- Alarm Module (NTRX41): provides alarm monitoring and reporting, alarm indicators, and basic maintenance interface ports (telephone, data, and ABS); occupies 2 slot positions and is provisioned in slots 5 and 6 in the OPAC, CRSC, and CLCE, and in slots 5 - 6, 7 - 8, and 15 - 16 in the CRME
- Circuit Breaker Modules (NTRX42): each circuit breaker provides 2 breakers and 2 power feeds at the module's rating (using 10A, 15A, or 20A breakers, in any combination), over-current protection, converter monitoring, ARLB, and an alarm output; provisioned in slots 10 - 14 in the OPAC, slots 10 - 16 in the CRSC, slots 8 - 13 in the CLCE, and slot 14 in the CRME

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- Fuse Module (NTRX43): provides up to 8 current limited power feeds at any of the available fuse ratings (ranging from 0.18 to 5.0A) and an alarm output; provisioned in slots 7 - 9 in the OPAC, slot 7 in the CRSC and CLCE, and slots 13, 18 - 19 in the CRME
- Talk Battery Filter Module (NTRX44): provides filtered battery feed of up to 20A (with “soft start”, to limit inrush current) and an alarm output; occupies 2 slot positions and is provisioned in slots 1 - 2 and 3 - 4 in the OPAC, in the CRSC, and in the CLCE
- Fan Power Control card (NTRX54): provides power feed for the 48 V (dc) fans as well as an alarm output; occupies 2 slot positions and is provisioned in slots 19 - 20 in the CRSC and CLCE
- Fan Alarm Module (NTRX66): monitors the fans in the roof and in the auxiliary cooling unit, and determines if a fan failure has occurred; provisioned in slot 20 in the OPAC

Figure 6-1 illustrates MSP provisioning in the OPAC. Figure 6-2 illustrates MSP provisioning in the CRSC. Figure 6-3 illustrates MSP provisioning in the CLCE. Figure 6-4 illustrates MSP provisioning in the CRME. Table 6-A shows circuit breaker assignments for the MSP in an OPAC.

Location:

- middle shelf of bay 1 in the OPAC
- top shelf of the Cabinetized Remote Switching Center (CRSC) (NTMX89), Cabinetized Line Concentrating Equipment (CLCE) (NTRX30), and Cabinetized Remote Miscellaneous Equipment (CRME) (NTRX31) cabinets

Figure 6-1: MSP (NTRX40) in the OPAC

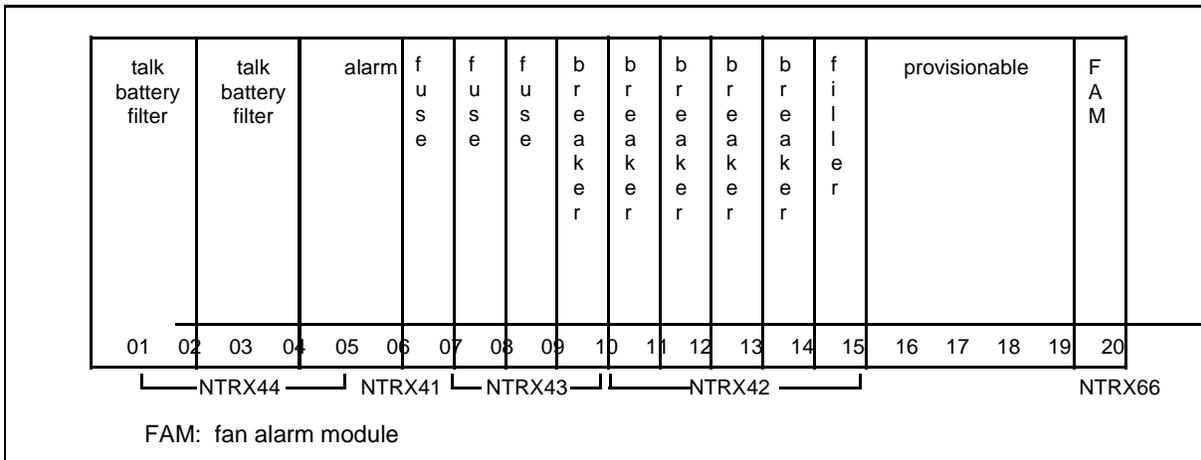


Figure 6-2: MSP (NTRX40) in the CRSC

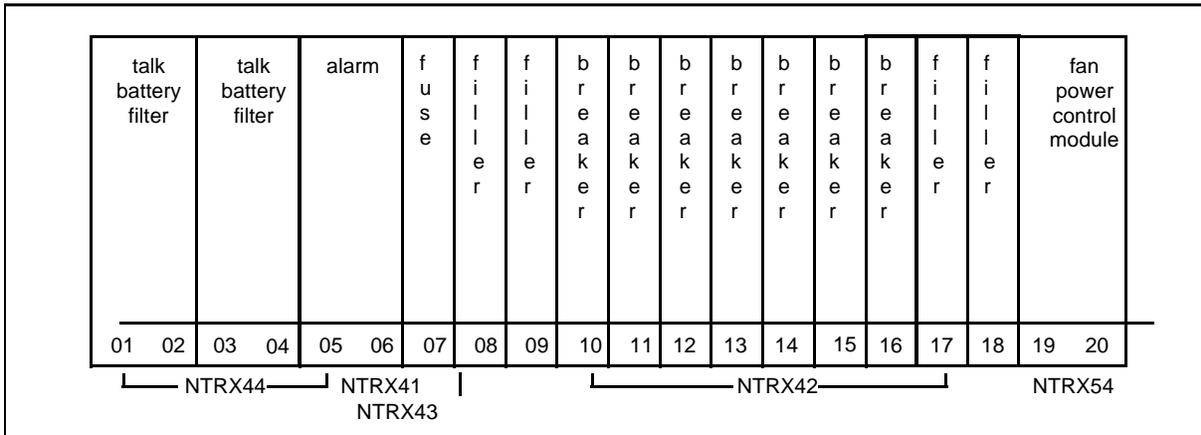
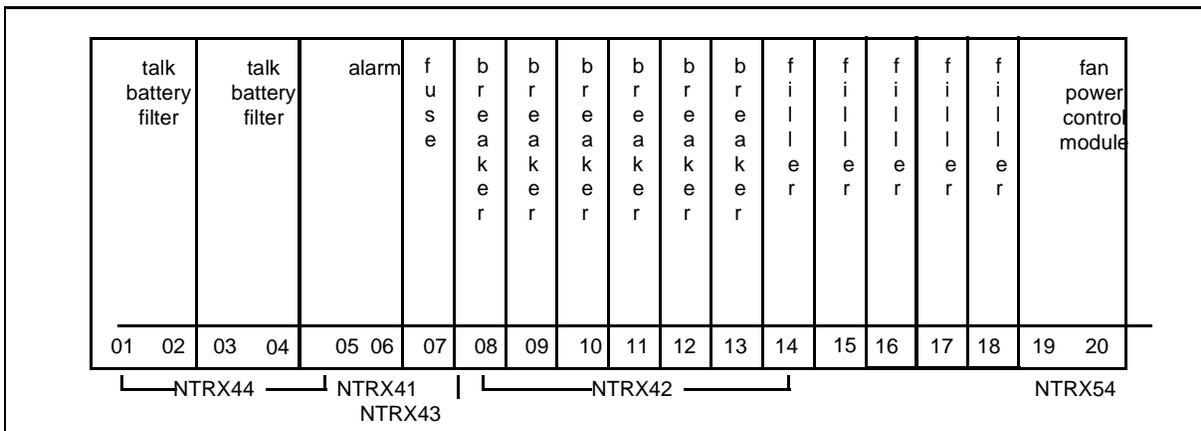


Figure 6-3: MSP (NTRX40) in the CLCE



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Figure 6-4: MSP (NTRX40) in the CRME

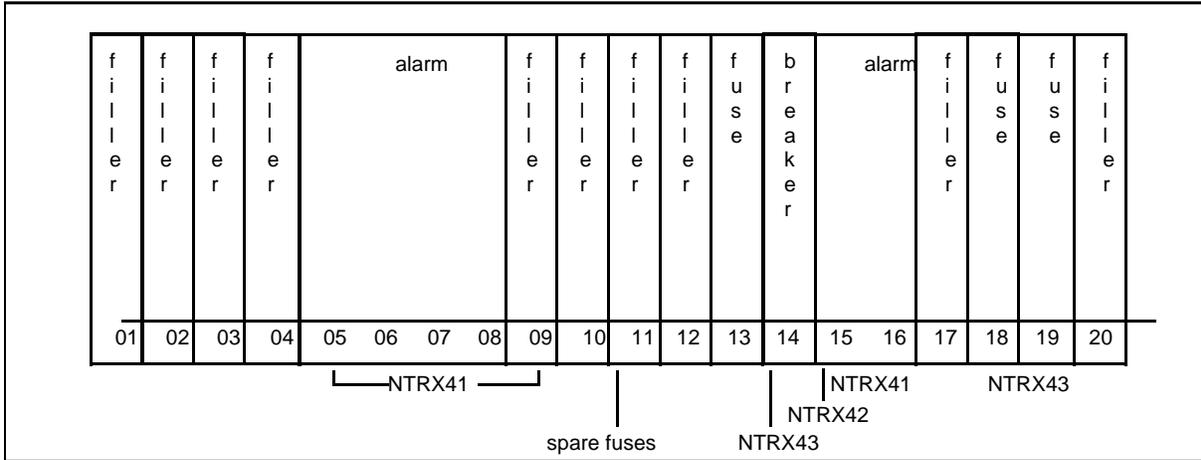


Table 6-A:
MSP (NTRX40): circuit breaker assignments in an OPAC

Circuit Breaker	Assignment	Location in OPAC
CB01	Line Concentrating Array (LCA) power converter	LCA 0
CB02	talk battery	LCA 0 talk battery/RMM talk battery
CB03	LCA power converter	LCA 1
CB04	talk battery	LCA 1 talk battery
CB05	Host Interface Equipment (HIE) power converter	HIE slot 22
CB06	ringing generator 0	HIE slot 01
CB07	HIE power converter	HIE slot 25
CB08	ringing generator 1	HIE slot 05
CB09	RMM power converter	RMM slot 17
CB10		Main breaker for equipment in slots 16 through 19

NTRX91 (10-Inch Cooling unit)**Function:**

equipped with three 6-inch diameter tube axial fans, provides cool air for the Cabinetized Remote Switching Center (CRSC) cabinets in a Remote Switching Center (RSC-S)

Location:

bottom of the CRSC (NTMX89) cabinets in the RSC-S configuration

NTRX93 (16-Inch Cooling unit)**Function:**

equipped with three 6-inch diameter tube axial fans, provides cool air for the Cabinetized Line Concentrating Equipment (CLCE) cabinets in a Remote Switching Center (RSC-S)

Location:

bottom of the CLCE (NTRX30) cabinets in the RSC-S configuration

212800-101 (Cook Electric Billing Media Converter (redundant type))**Function:**

to record 800-bpi AMA data on Winchester-type sealed disks. The redundant-type Billing Media Converter (BMC) II contains fully duplicated recording and communications units, each of which has its own CPU, I/O ports, and Winchester-type, sealed hard-disk drive. The BMC is polled periodically by an Electronic Data Processing Center (EDPC) by way of a data link that uses either dial-up or dedicated modems. When the BMC is polled, it sends the requested data to the EDPC, where they can be converted into the operating company's billing format.

Features:

- separate alarm output circuits for interfacing with DMS-10 alarm system to indicate unpolled records reaching 70, 90, and 100 percent of storage-medium capacity
- interface with a range of compatible data exchange devices and formats for EDPC communication
- complete data availability until eventual overwriting
- DMS-10 Input/Output System interface for reporting control
- different levels of password access, offering full system security
- over 300,000 call records per hour input capacity with simultaneous polling
- self-diagnostic capability, background assignable
- polling rate accommodation from 1200 to 9600 baud
- remotely downloadable and programmable

- a variety of storage capacities to match current and future requirements
- chassis compliance with FCC Part 15 requirements for EMI emissions

Location:

Billing Media Converter (BMC) bay

213420 (Cook Digital Announcer)

Function:

to provide the recorded announcement facility for unilingual or bilingual messages. Applications include intercept announcements and PBX automatic call distribution.

Features:

- four synchronous channels
- varying message length up to 128 s, in 8-s increments, with messages longer than 40 s requiring a Memory Adder board (213323)
- 100-percent solid state engineering (recording is stored on DRAMs)
- requires Test and Distribution Interface (215000-101, 215000-105 for exchanges configured with 4, 8, or 12 channels, respectively. This part fits into shelf 1, next to the recorded announcer
- remote recording option (remote Digitone phone can be used to change the recording). This is a future development.

Location:

CE-3 bay, shelf 1

Glenayre MVP (Modular Voice Processor)

Function:

to provide basic call answering, voice messaging, fax messaging, voice dialing, and single number service on a single platform. The MVP is housed in a single, free-standing cabinet (24 inches wide, 26 inches deep, 51 inches tall) that provides support for 128 trunks, fourteen disk drives, and eighteen serial ports supporting TCP/IP.

Features:

- enables the service provider to combine features in order to offer customized applications to customers
- through MVP Call Flow programming, enables the service provider flexibility in defining outbound call processes to ensure efficient and accurate delivery of messages, calls, and information sent to digital hand sets, numeric and alphanumeric pagers, and landline telephones
- through an MVP Application Programming Interface, allows service providers to develop information services, fax-on demand applications, automated call routing applications, and voice dialing user interfaces

- supports industry-standard protocols and bus structures
- redundant capabilities for key system areas including power supplies, system disk, voice disks, T-1/E1 interface cards, and SCSI controller, provides system reliability and maximum system availability

For a complete description of the Glenayre MVP, and for complete administration/maintenance information for the Glenayre MVP, consult the manufacturer's documentation.

Location:

manned or un-manned DMS-10 switching office

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DMS-10 Family

600-Series Generics

Equipment Identification

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Date: August 2006

