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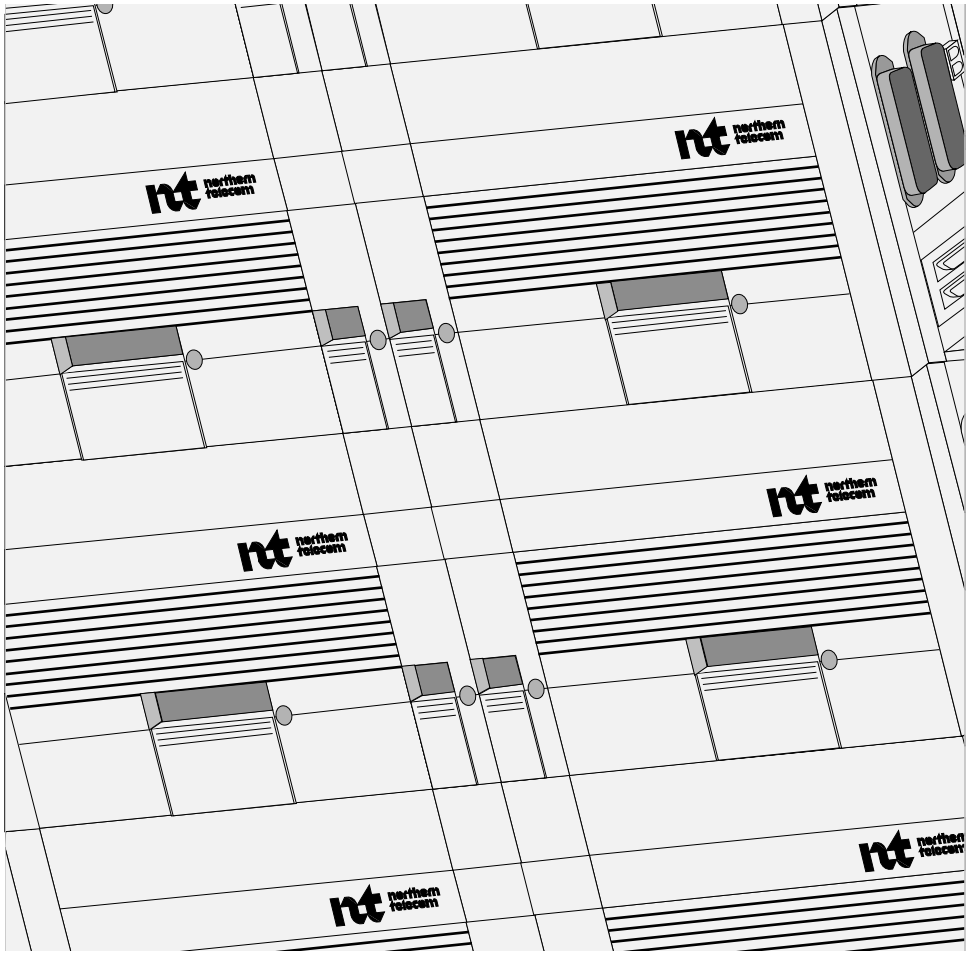
SONET Products

AccessNode

Modular Cabinet Description

Issue 1.0 February 1999



NORTEL NETWORKS™

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Modular Cabinet Description

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About this document

This document describes the Nortel Networks AccessNode modular cabinet (ModCab). This chapter describes how to use this document.

Audience

This document is intended for the following groups:

- strategic and current planners
- provisioners
- transmission engineers
- network administrators
- outside plant personnel

How to use this document

Use this document as a reference to become familiar with the ModCab configurations, equipment layout, technical specifications, and local requirements for cabinet installation.

Also, use this document when planning and engineering a ModCab site.

Contents of the document

This document contains high-level, nontechnical descriptions of the ModCab system and general information on AccessNode equipment.

Some of the topics in this manual are covered in greater detail in other parts of the AccessNode documentation set. If so, this document references the appropriate document.

References in this document

This document refers to the following documents:

Engineering, Configuration, and Ordering Guide, Volume 1

- *Engineering and Ordering Information*, 323-3001-032

Description, Volume 2A

- *Configuration and Equipment Description*, 323-3001-100
- *Features and Services Description*, 323-3001-101
- *Signal Flow and Circuit-Pack Description*, 323-3001-102

Commissioning and Testing, Volume 3

Separately bound documents

- *AccessNode Modular Cabinet Installation*, 323-3001-211

Miscellaneous documents and drawings

- *MPR-25/MPR-15 Series Single Phase -48V 25A Switched Mode Rectifier (M5C06) Equipment Installation and Maintenance Manual*, 169-2071-500

Abbreviations for the colors of conductor insulation in cables

In this document, a uniform system of abbreviations is used to represent the colors of the conductor insulation used in equipment cables. These abbreviations take the form:

<pair_color> <group_marker_type> <group_marker_color>

Item	Abbreviation		
<pair_color>	This is the background color of the conductor insulation which indicates the pair color.		
	BL	blue	(pair 1 of the binder group)
	O	orange	(pair 2 of the binder group)
	G	green	(pair 3 of the binder group)
	BR	brown	(pair 4 of the binder group)
	S	slate	(pair 5 of the binder group)
<group_marker_type>	This is the type of group marker used on the conductor insulation.		
	1	single dots spaced about 18 mm (3/4 in.) apart	
	2	two dots spaced about 3 mm (1/8 in.) apart with about 18 mm (3/4 in.) between each pair of dots	
	3	dashes about 3 mm (1/8 in.) long spaced about 18 mm (3/4 in.) apart	
	none	one colored stripe on conductor jacket	
<group_marker_color>	This the color of the dot, dots or the stripe used as the group marker on the conductor insulation.		
	W	white	(binder group 1)
	R	red	(binder group 2)
	BK	black	(binder group 3)
	Y	yellow	(binder group 4)
	V	violet	(binder group 5)

For example, the abbreviation BL 2W (representing Pair 1 of the second 25-pair binder) means that the conductor has a blue insulation background with two white dots spaced 18 mm (3/4 in.) apart. The abbreviation BL W (representing Pair 1 of the first 25-pair binder) means that the conductor has a blue insulation background with a single white stripe.

Introduction

This chapter describes the Nortel Networks AccessNode modular cabinet (ModCab).

Chapter contents

This chapter includes the following topics:

Topic	See
ModCab description	page 1-1
AccessNode system	page 1-2
Cabling	page 1-3
Regulatory compliance	page 1-4

ModCab description

The ModCab design is the next generation, high-capacity outside plant enclosure with integrated voice frequency (VF) and T1 access and fiber transport services.

A ModCab package has modular outdoor cabinets that house an AccessNode system and supporting peripheral equipment. The cabinets are used in an outdoor environment and mounted on a concrete pad. See Chapter 4, “Site selection” for pad options and layouts.

The modular cabinets can be combined in optional configurations which are described in Chapter 3, “Cabinet structure.”

The ModCab is environmentally controlled and supplies ancillary services normally handled by a central office or a large remote terminal enclosure such as a hut or a controlled environment vault (CEV). All cabinet modules comply with UL/CSA safety, National Electrical Code (NEC) electrical, and Federal Communications Commission (FCC) emissions regulations as well as Bellcore specifications.

AccessNode system

The AccessNode family of equipment, as installed in the ModCab, provides a carrier service area (CSA) configuration for AccessNode product line configurations.

The AccessNode service delivery system offers the following benefits:

- simplifies networks
- enhances survivability
- packages cost-effective integrated subscriber services management in a remotely located outdoor cabinet

For detailed information regarding the AccessNode family of equipment, see *Configuration and Equipment Description,* 323-3001-100*,* in *Description*, Volume 2A.

Radio frequency emissions notice

The following regulatory notice applies to AccessNode equipment and ModCab cabinets:

"This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a normal commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case the user is required to correct the interference at the user's own expense."

Applications

The AccessNode is a next generation access platform that supports narrowband and wideband services in a flexible modular equipment package using the following topologies:

- point-to-point
- add-drop
- hub and/or ring feeder

The ModCab delivers the flexible solutions and comprehensive services required for a wide range of concentrated residential and commercial serving areas such as the following:

- residential and multi-family complexes
- high traffic commercial areas that require:
  - special service lines
  - high-capacity digital service
  - direct fiber access
- industrial business parks
- high-tech business corridors and retail malls

Services

AccessNode offers a full range of services, including the following:

- Plain Old Telephone Service (POTS)
- Meridian Digital Centrex
- Custom local area signaling services (CLASS)
- special services
- T1 services
- Integrated services digital network (ISDN)
- Digital data services (DDS)
- OC-3/OC-3C tributaries

For detailed information regarding AccessNode applications, see *Features and Services Description*, 323-3001-101, in *Description*, Volume 2A.

Cabling

ModCab has factory-installed cables on one end. When the cabinet configuration is installed, the cables are routed through cable ports in the side and rear of the modules to adjacent modules for termination on the other end.

Outside plant (OSP) cables are routed into the cabinets on-site during initial installation procedures.

For cabling information, see *AccessNode Modular Cabinet Installation Guide*, 323-3001-211.

Regulatory compliance

The ModCab product meets or exceeds the regulatory requirements of the regulatory agencies and documents listed in Table 1-1.

Table 1-1
Regulatory compliance

Item	Requirement
ESD	Bellcore TR-NWT-001089, section 2 (System Level Electrostatic Discharge)
EMC emissions	FCC 47 CFR, Part 15,sub-part B Unintentional Radiators, Class A
Lightning/surge	Bellcore TR-EOP-000001 and TR-TSY-000057
Dielectric	UL 1459
Grounding	NEC Nortel Networks Corporate Standard 4122, section 6 UL 4122, section 6
Supply voltage	Bellcore TR-TSY-000057 Bellcore TR-EOP-000001
Thermal shock	Bellcore TR-TSY-000487, section 5.1.3.3
Water intrusion	REA 345-79 PE-69, section 5.12
Wind	Bellcore TR-TSY-000487, section 5.1.4.5
Solar radiation	Bellcore TR-TSY-000487, section 5.1.3.9
Sand and dust	Bellcore TR-TSY-000487, section 5.1.4.7
Transportation shock	Bellcore TR-TSY-000487, section 5.1.4.10
Drop tests	Bellcore TR-TSY-000487, section 5.1.4.10
Vibration	Bellcore TR-TSY-000487, section 5.1.4.11

—continued—

Table 1-1 (continued)
Regulatory compliance

Item	Requirement
Impact resistance	Bellcore TR-TSY-000487, section 5.1.4.3 ASTM D-2197, ASTM D2794
Earthquake	Bellcore TR-EOP-000063, section 4.5.2
Corrosion	Bellcore TR-TSY-000487, section 5.1.3.6
Acoustic noise	US Law 49 CFR Part 325 Bellcore TR-TSY-000487
Fungus	ASTM G-21, section 5.1.3.5
Ballistic shot	Bellcore TR-TSY-000487, section 5.1.4.4
Sunlight	Bellcore TR-TSY-000487, section 5.1.3.8
Outdoor equipment	Canadian Standards Association: CSA 22.2 No. 0-M1982, General requirements - Canadian Electrical Code, Part III CSA 22.2 No. 14-M1985, Industrial Control Equipment CSA 22.2 No. 94-1976, Special Purpose Enclosures 2, 3, 4 and 5 Underwriter Laboratories: UL 94, Test for Flammability of Plastic Materials UL 1459, Telephone Equipment UL 508, Cabinets and Boxes
Polymeric materials	ASTM D-2863
—end—	

ModCab cabinet configurations

This chapter describes the optional ModCab configurations and layouts.

Chapter contents

This chapter includes the following topics:

Topic	See
Cabinet modules	page 2-2
Configurations	page 2-10
Selecting your configuration	page 2-13

Cabinet modules

The ModCab configurations consist of cabinet modules that contain S/DMS AccessNode equipment and peripheral supporting equipment. The cabinet modules are as follows:

- ac power pedestal
- NT3W01 dc power module
- NT3W02 copper-distribution module
- NT3W03 common-equipment module
- NT3W04 termination module
- NT3W05 optional equipment module

The cabinet modules are described in detail in this document. For installation information, see *AccessNode Modular Cabinet Installation Guide*, 323-3001-211.

AC power pedestal

The AC power pedestal is designed and manufactured by Evergood Corp. The ac power pedestal circuit schematic is attached to the inside of the entrance door.

The ac power pedestal contains the following:

- the main power circuit breaker (200 A) and power transfer circuit breaker (100 A). The latter is provides power from an auxiliary ac power generator.
- the ac surge protector
- the branch circuit connectors. Two connectors, protected by 50 A circuit breakers CB1 and CB2, are used for two common feed rectifier shelves. The other four are ac duplex receptacles used for heaters. The connectors are protected by two 15 A circuit breakers CB3 and CB4.
- the duplex 15 A GFI receptacle which powers service equipment.

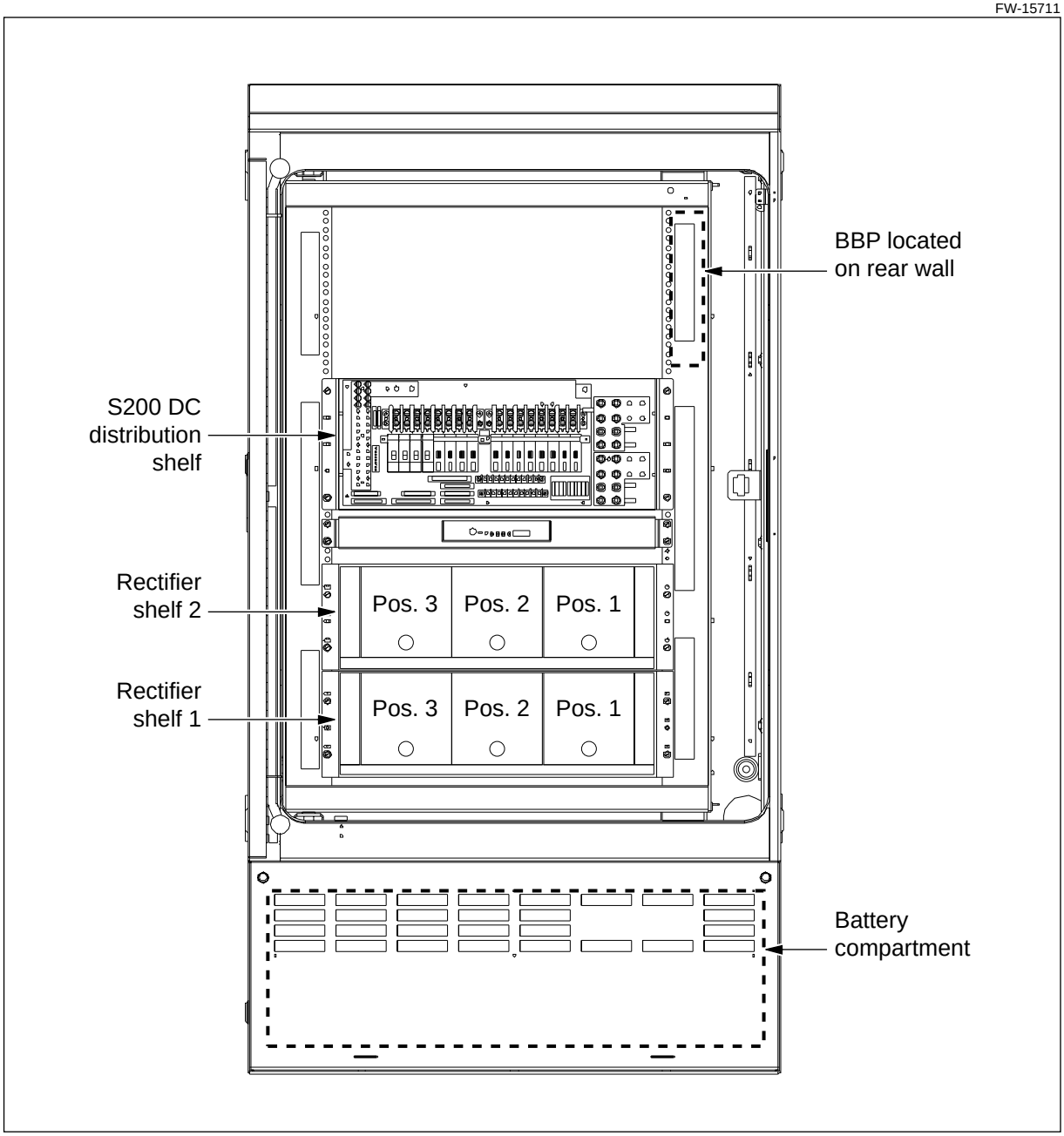
DC power module

The dc power module (DCP) (see Figure 2-1) contains the following:

- up to two NorTel MPS75 rectifier shelves for up to six Nortel Networks MPR25 rectifiers convert 208/240 V ac into -48 V dc power source. The rectifier shelves are equipped with ac power monitor circuit that sends an ac fail alarm to the system.
- a 200 dc distribution shelf (S200) that distributes power to the load, protects the power feeders, controls and monitors system power operation, and interconnects the backup battery supply wired from the battery breaker panel (BBP).
- the S200, which contains the low voltage disconnect (LVD). The circuit disconnects the batteries from the system if their voltage reaches the set threshold. This protects the batteries from irrecoverable discharge condition.
- the optional battery temperature compensator (BTC) that controls rectifier output voltage as a function of the ambient temperature monitored in the battery compartment of the DCP module
- the BBP, which supplies circuit breaker protection to the battery strings for every cabinet module
- an optional battery compartment containing one string (48 V) of Johnson Control TEL12-90 batteries and an ac powered heater

Figure 2-1
DC power module

FW-15711



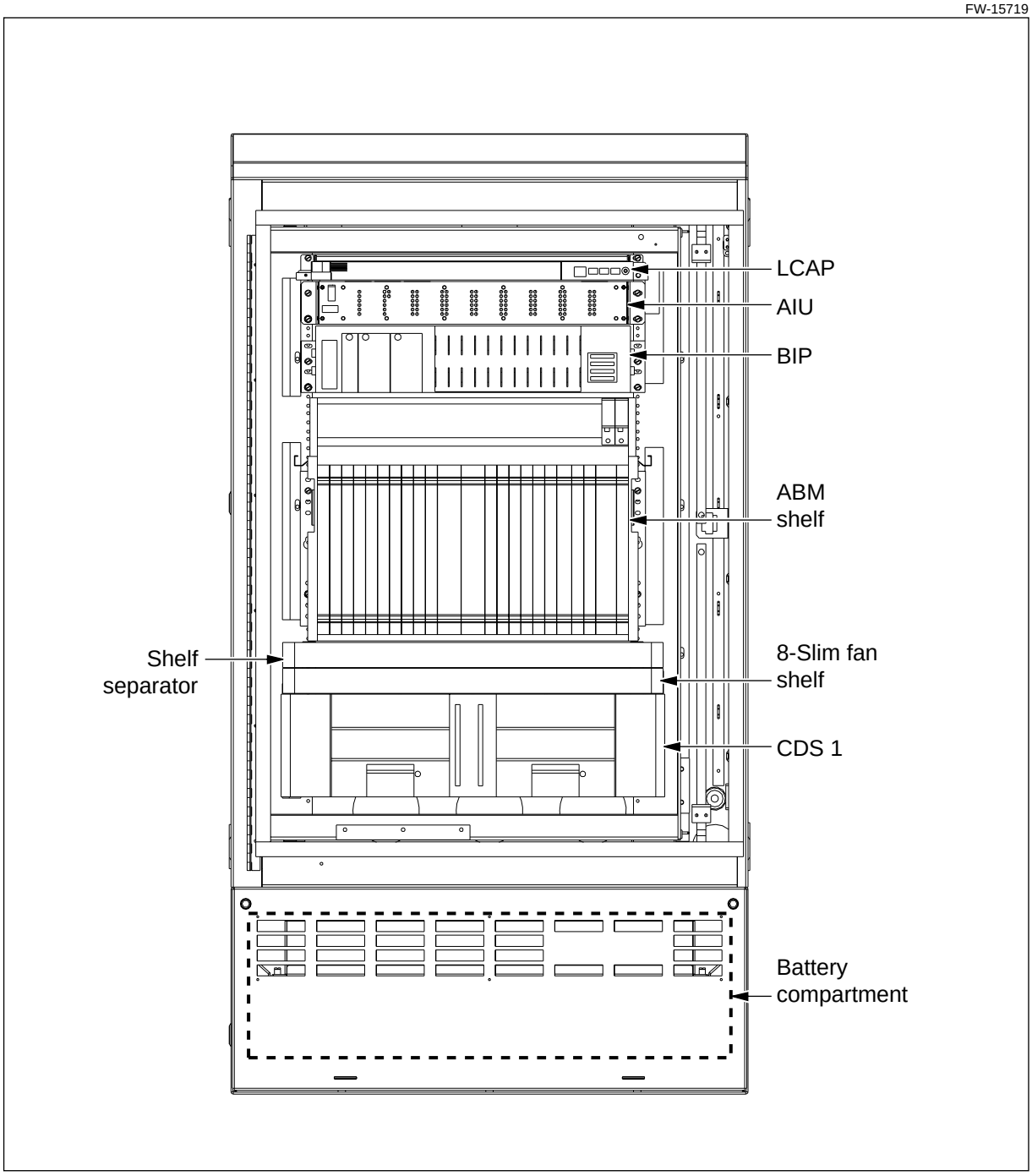
Common equipment module

The common equipment module (CEM) (see Figure 2-2) contains the following:

- the access bandwidth manager (ABM) common equipment shelf
- the breaker interface panel (BIP) for powering and power fault protection of the S/DMS AccessNode equipment
- the local crafts access panel (LCAP)
- one copper distribution shelf to provide up to 96 2-wire line card services
- the stationary cabinet cooling unit - heat exchanger (HE). It is a part of all cabinet modules except the large termination module and ac power pedestal
- the auxiliary 8-fan shelf cooling system
- the alarm interface unit (AIU) for collecting and identifying environmental and power status alarm information from all modules and interfacing with the ABM shelf for further processing and communicating to the central office
- an optional battery compartment containing one string (48 V) of Johnson Control TEL12-90 batteries and an ac powered heater.

Figure 2-2
Common equipment module

FW-15719



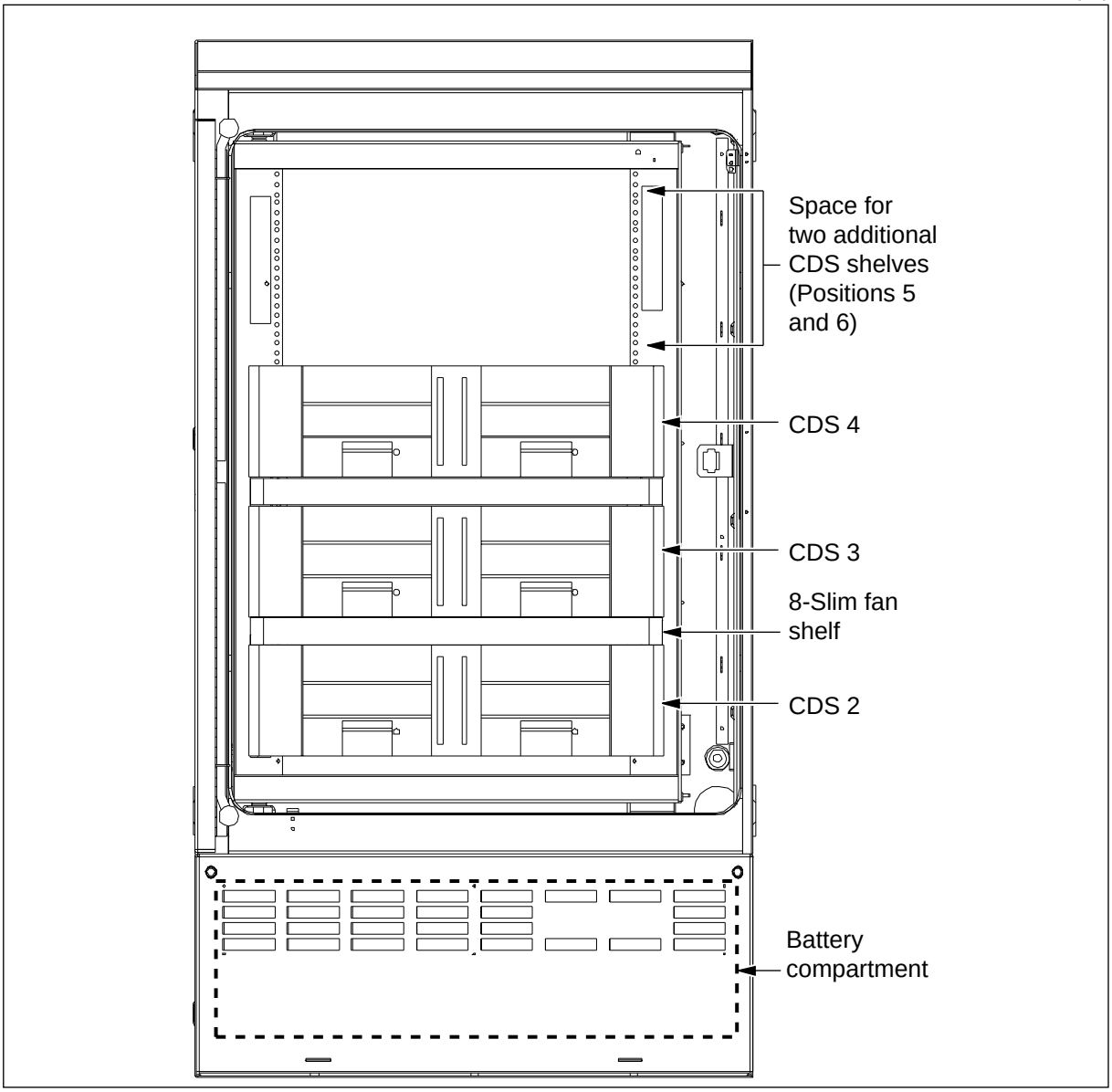
Copper distribution module

The copper distribution module (CDM) (see Figure 2-3) contains the following:

- up to five A/N copper distribution shelves (CDS). The CDS count is from bottom up
- the auxiliary 8-fan shelf cooling system
- an optional battery compartment containing one string (48 V) of Johnson Control TEL12-90 batteries and an ac powered heater.

Figure 2-3
Copper distribution module

FW-15715

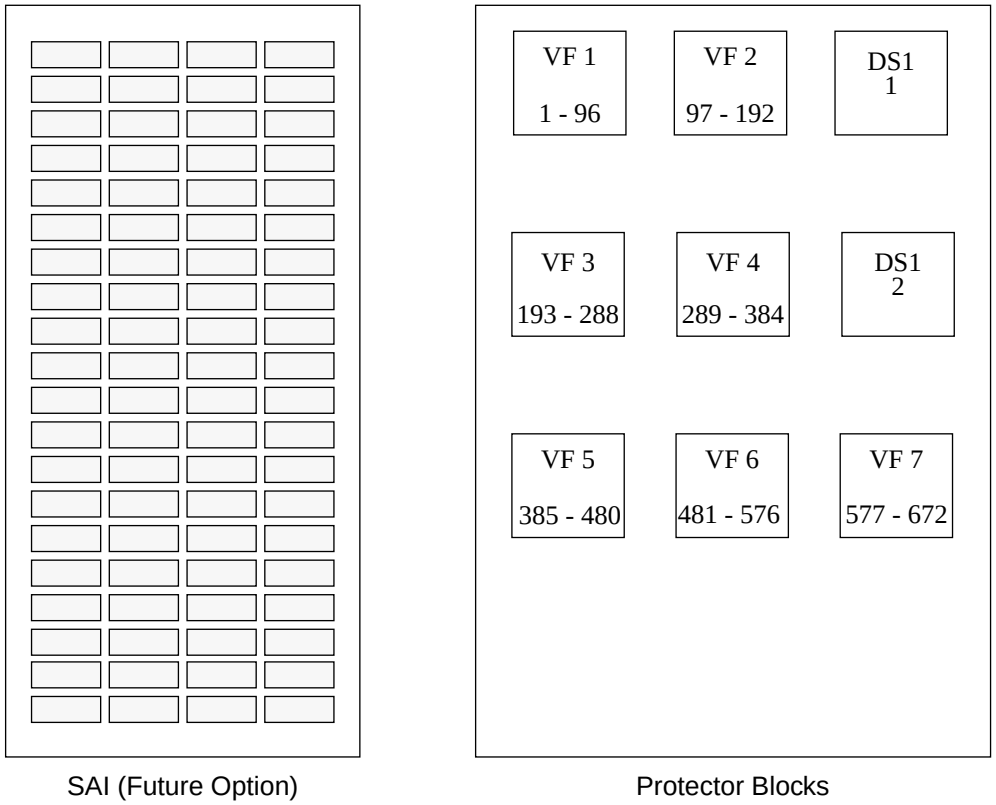


Large termination module

The large termination module (LTM) (see Figure 2-4) contains the following:

- up to seven 100-pair VF and up to two 100-pair DS1 protector blocks
- an optional 2:1 service area interface (SAI) providing cross-connection of the subscriber line to the system.

Figure 2-4
Termination Module



Note 1: The LTM does not have the battery compartment and heat exchanger

Note 2: Each “brick” shown in SAI serves 25 line pairs. However, the configurations vary based on termination type (BIX or Binding Post).

Note 3: The protector blocks show line numbers for each block.

Optional equipment module

The optional equipment module (OEM) can do the following:

- contain any customer equipment, assuming it is mounted on 23" rack
- dissipate a maximum of 1000 W
- can be fed from a -48 V supply
- not significantly obstruct the normal air flow through the equipment stack

The OEM has a heat exchanger and an optional battery compartment. The optional 8-SSF or 3-SSF can be installed to provide additional air flow.

Configurations

The ModCab can be arranged in either of the following configurations:

- NT3W00AA back-to-back, basic
- NT3W00BA side-by-side

Figure 2-5 and Figure 2-6 show possible cabinet configurations.

Back-to-back, configuration

The back-to-back (B-B) configuration is characterized by cabinets having other cabinets bolted on to the rear side. See Figure 2-5 on page 2-11.

The B-B configuration contains a minimum of four modular cabinets: a LTM, a CEM, a CDM, and a DCP. An ac power pedestal is attached to the DCP to handle commercial ac power. The system can contain up to nine modules. Two of these modules are for line termination only.

Side-by-side configuration

The side-by-side (SXS) configuration is characterized by cabinets being bolted on adjacent sides. See Figure 2-6 on page 2-12.

Figure 2-5
NT3W00AA back-to-back configuration

FW-16100

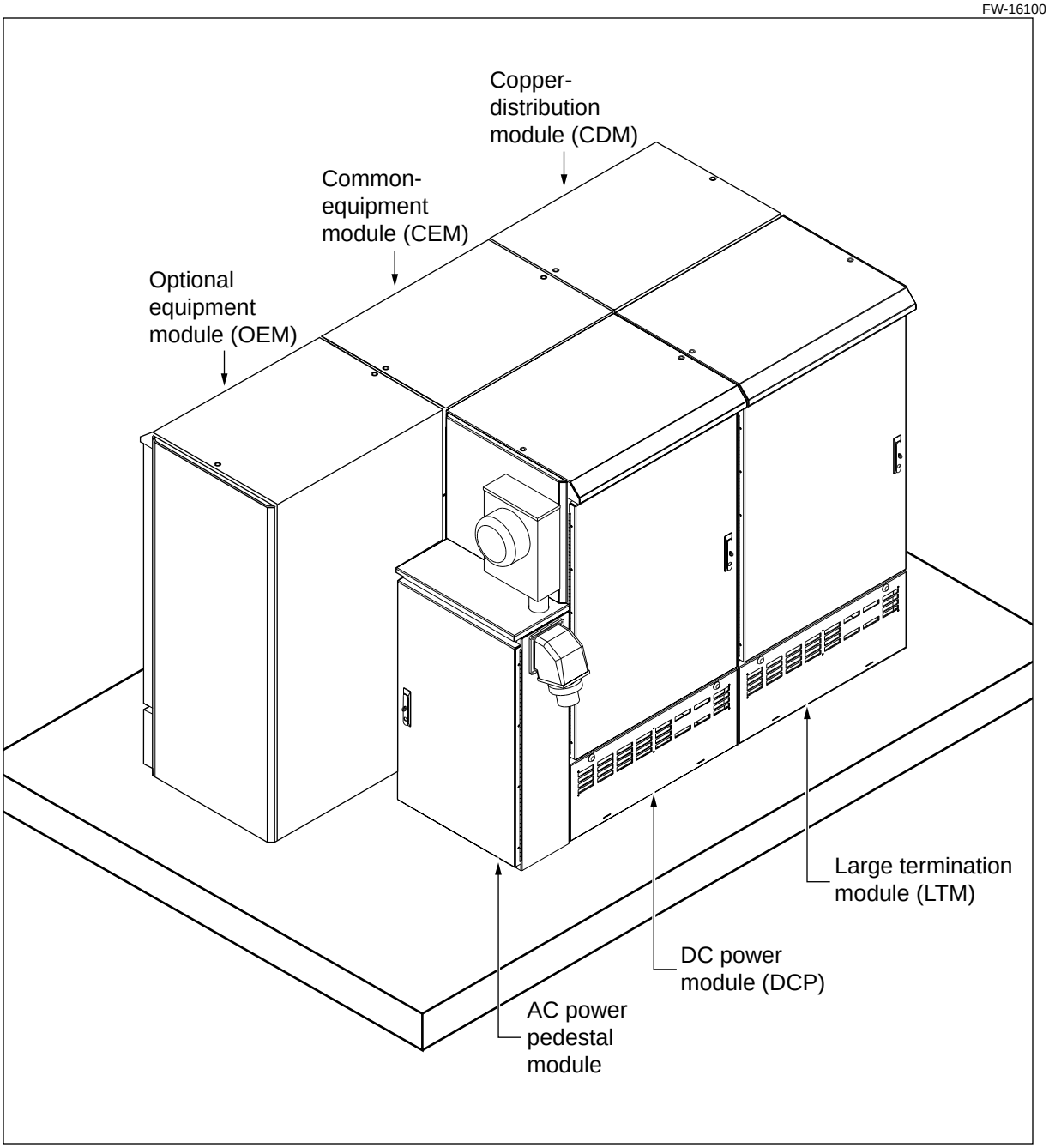
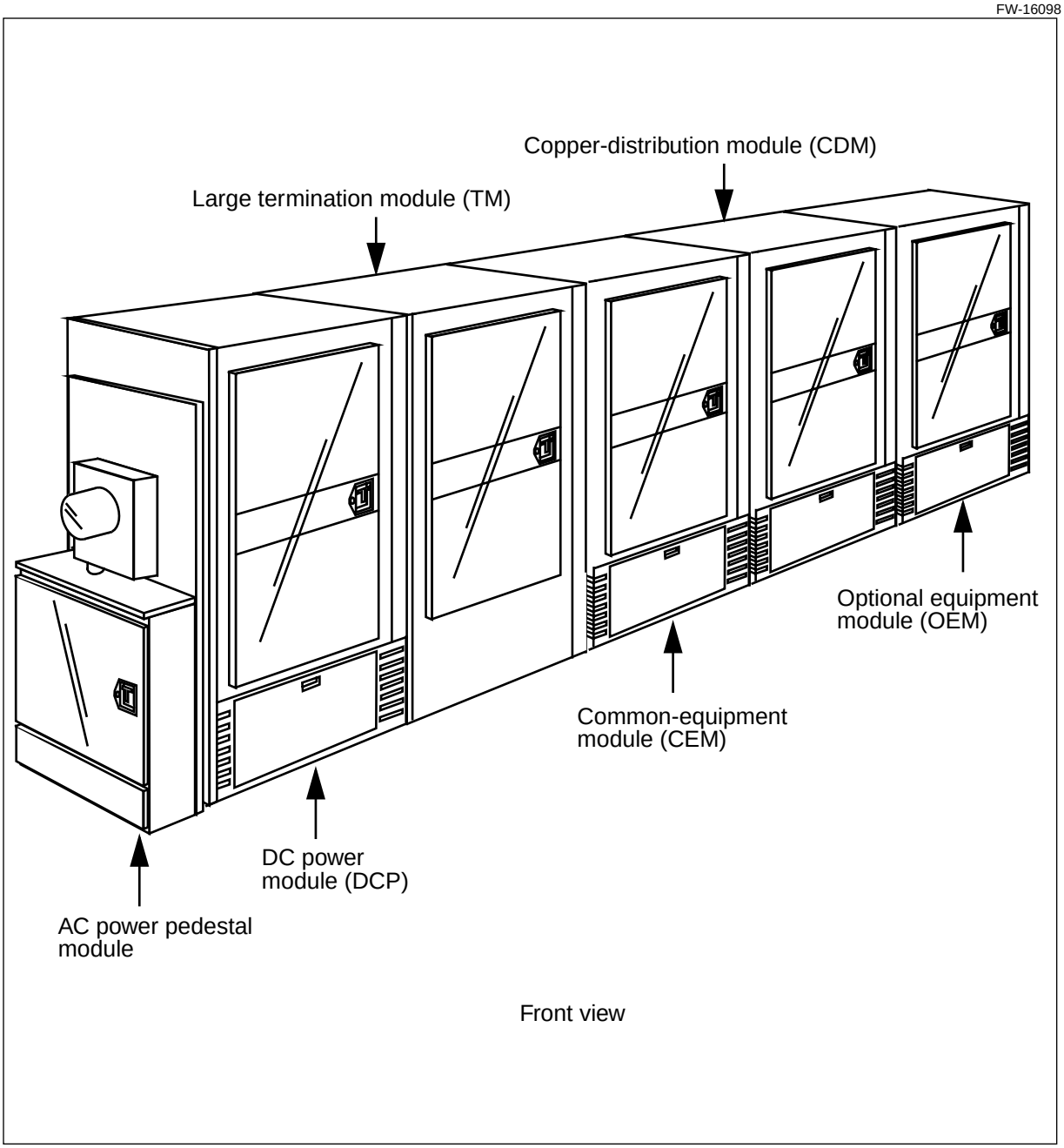


Figure 2-6
NT3W00BA side-by-side configuration

FW-16098



Selecting your configuration

Site location is the prime determinant for deciding which configuration meets your current and future needs. Location of the site may impose restrictions or limitations on the selection of a cabinet configuration.

Site selection is the responsibility of the customer.

Land area

Land area considerations are determined by the amount of space available at the site. Figure 2-7 on page 2-14 and Figure 2-8 on page 2-15 show the maximum land area required for a fully configured, 672-line ModCab with either the B-B or the SXS configuration.

Figure 2-7
Back-to-back pad layout, 5 cabinets and an ac pedestal

FW-16077

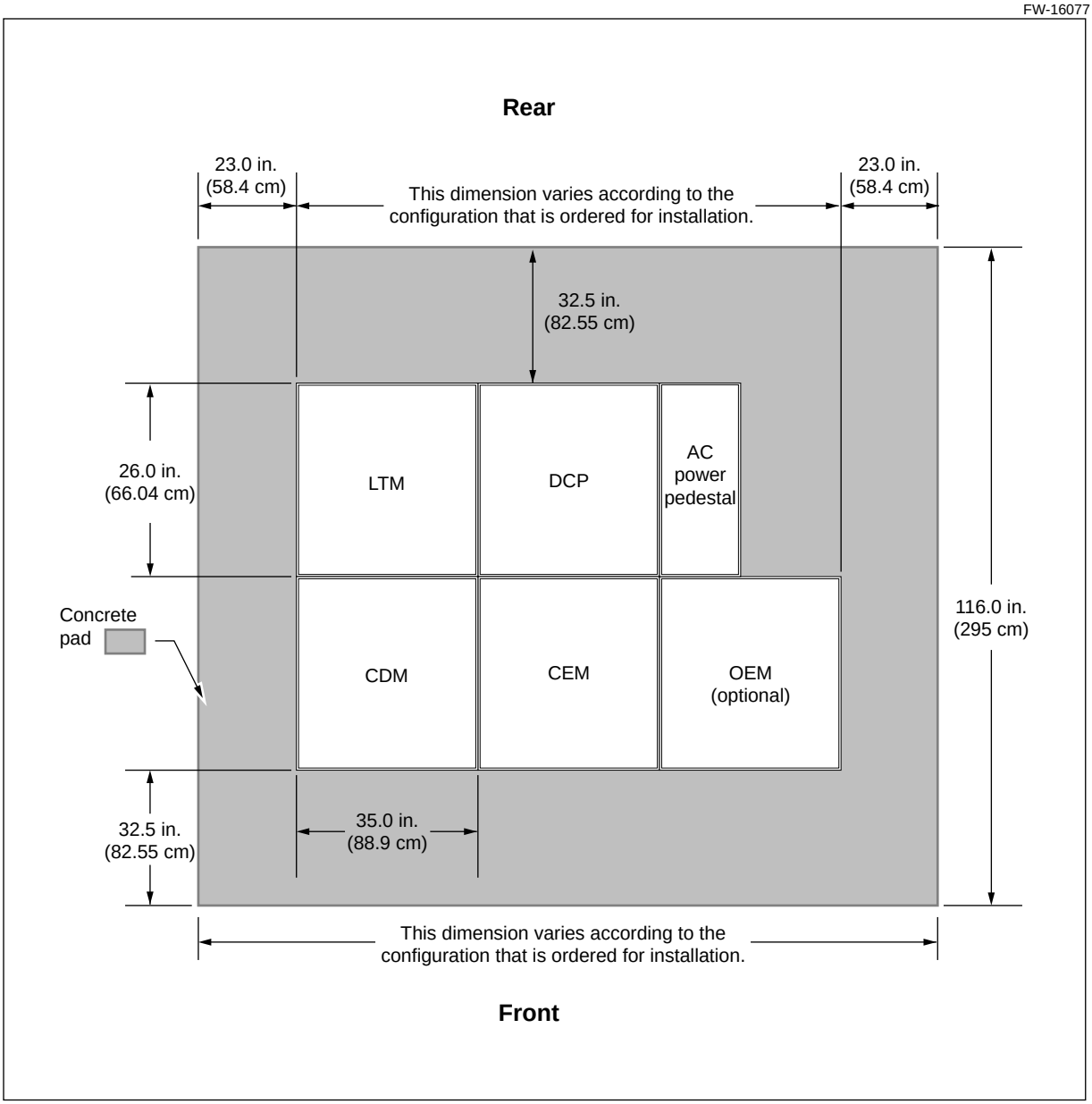
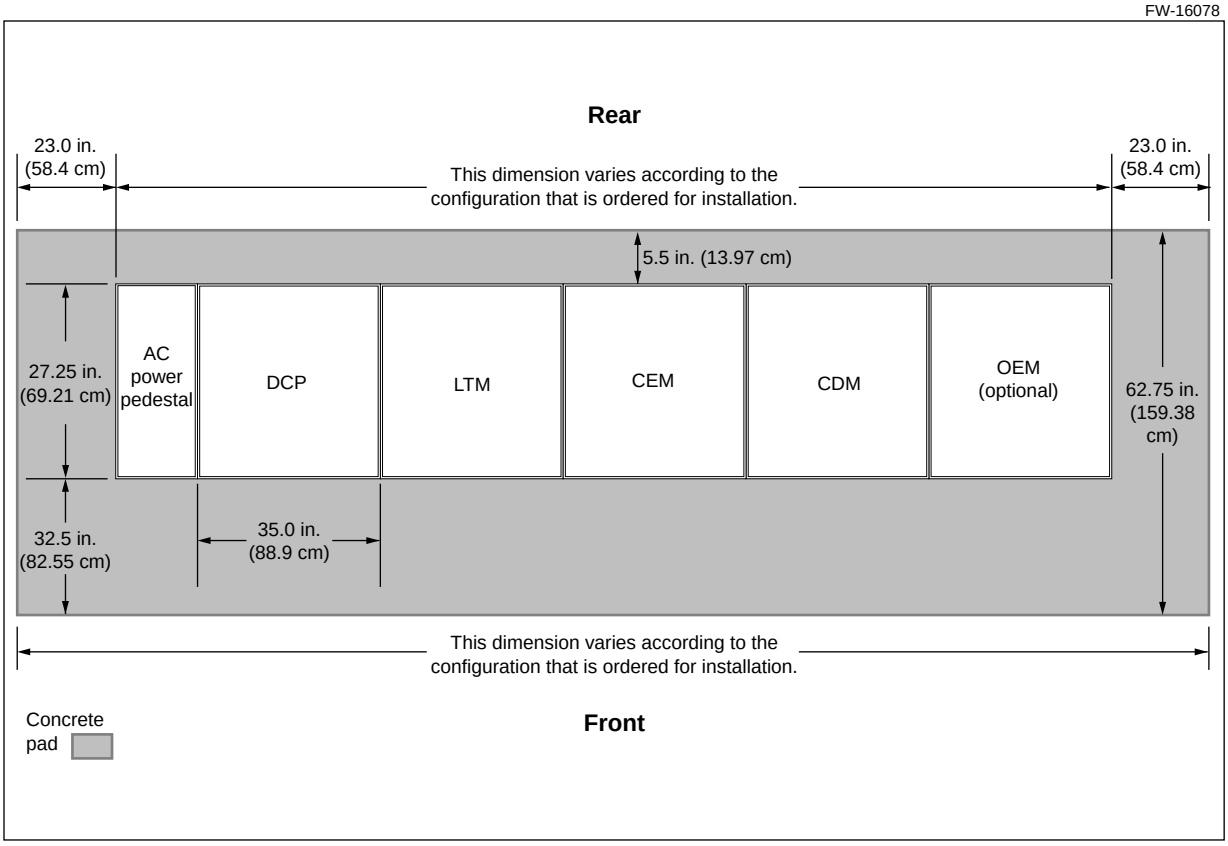


Figure 2-8
Side-to-side pad layout, 5 cabinets and ac pedestal



Cabinet structure

This chapter describes the general mechanical structure of the ModCab.

Chapter contents

This chapter includes the following topics:

Topic	See
Basic cabinet structure description	page 3-2
Cabinet physical design description	page 3-4
Environmental control equipment	page 3-7

Basic cabinet structure

The modular cabinets consist of two basic cabinet designs that are factory-equipped to form up to five different cabinet modules. The two basic cabinet designs are as follows:

- equipment cabinet
- termination cabinet

Equipment cabinet design

The equipment cabinet contains the working AccessNode and all supporting peripheral equipment. These cabinets provide the 23 in. rack mounting space for the equipment shelves and panels.

Termination cabinet design

The termination cabinet contains the outside plant cable termination and cross-connect facilities.

Cabinet features

The basic equipment cabinet and termination cabinet designs have the following features:

All cabinets

- aluminum construction
- universal pad mounting template
- weather-proof gasketing
- exterior side- and rear-mounted heat reduction panels
- optional key- or tool-lockable doors with provisions for padlocks
- universal cable routing knock-outs on the rear and sides
- universal mounting provisions for an ac pedestal
- ivory-colored powder coat finish

Equipment cabinets

- electro-magnetic interference (EMI) gasketing
- environmental controls for internal temperature and humidity
- interior swing frames
- roll-out battery trays
- a closed-loop heat exchanger

Termination cabinets

- bottom outside plant (OSP) cable entry
- equipment-side voice frequency (VF) and DS1 termination facilities
- OSP termination and cross-connect facilities

Cabinet modules

The two basic cabinet designs are factory-installed with the features and equipment that define the five different cabinet modules. The cabinet modules are as follows:

- common equipment module (CEM)
- copper distribution module (CDM)
- large termination module (LTM)
- DC power module (DCP)
- outside equipment manufacturer module (OEM)

Common equipment module

The CEM contains the S/DSM AccessNode system. It also contains a copper distribution shelf for the first 96 VF lines. A detailed CEM module description is in Chapter 5, “Common equipment module”.

Copper distribution module

The CDM contains additional copper distribution shelves. Up to 3 copper distribution shelves can be mounted in the swing frame of the CDM for an additional 288 VF lines. A detailed CDM module description is in Chapter 6, “Large termination module”.

Large termination module

The LTM contains the OSP cable entry and cross-connect facilities. OSP cabling is brought into the module through the bottom cable entry ports and spliced as follows:

- to the pigtails of up to seven 100-pair VF protector blocks
- to the pigtails of up to two DS1 protector blocks
- to an internally mounted fiber management facility

A detailed LTM description is in Chapter 6, “Large termination module”.

DC power module

The DCP contains the rectifiers and dc distribution equipment. It also provides the mounting location for an ac power pedestal that contains the ac feeder entrance, ac protection components and an emergency power connection. A detailed DCP module description is in Chapter 7, “DC power module and ac power pedestal”.

The commercial ac power enters the ac power pedestal, feeds a circuit breaker box that, in turn, feeds rectifiers in the DCP, environmental equipment, and ac outlet boxes.

AC power pedestal

An ac power pedestal can be installed on the right side of the DCP to provide an entry point and circuit breaker protection for commercial ac power. Also, a connection point for an emergency-power generator is provided as part of the ac power pedestal.

Optional equipment module

The OEM contains miscellaneous, optional, or other customer-provided equipment. A detailed OEM module description is in Chapter 8, Optional equipment module.

The ModCab modules are mounted on a concrete pad.

Cabinet physical design

The cabinet physical design consists of the exterior cabinet and the interior cabinet components that are standard features of the cabinets.

Construction

The cabinets are constructed of 0.125-in. welded/fastened aluminum that provides a rust-free cabinet life expectancy of approximately thirty years.

> ***Note:*** The cabinet and its components are tested and approved by the defined regulatory agencies and requirements listed in Chapter 1, “Introduction”.

Each cabinet is fitted with removable lifting eye bolts that support the load during site installation.

> ***Note:*** After you mount the cabinet on its pad, each lifting eye is removed and replaced with a nylon top plug that is included with the cabinet.

Color

The ModCab modular cabinets are protected with and ivory-colored powder coat finish.

Dimensions

The cabinet exterior dimensions are as follows:

- height: 165.1 cm (65.0 in.)
- width: 88.9 cm (35.0 in.)
- depth: 65.3 cm (25.7 in.)

Doors

Each cabinet has a single left-hinged, lockable access door. Each door is hinged with concealed, locked pins and the cabinet is locked by a three-point latching mechanism.

Gasketing

Gaskets with built-in EMI protection, seal the inner perimeter of the doors and roof area to keep moisture, dirt, and other contaminants out of the cabinet. An alarm switch is activated when equipment doors are opened.

Locking mechanisms

When the doors are locked, they can be opened with a 7/16 in. tamperproof hex key tool. The outside plant termination module may be opened with a 216-type socket tool. Each door locking mechanism is disabled at the factory prior to shipment. The locking mechanisms are enabled in the field during the initial installation.

Anchor plates

Precast, inter-locking universal anchor plates are set in the concrete pad during the pad installation process before the cabinet is installed. The design of the pads is modular to fit the common footprint of the cabinet modules. Anchor plate arrangement depends on the cabinet configuration and should be engineered to accommodate future growth of the system. The anchor plates align the cabinet module bottom-access openings and the pad mounting bolts to the concrete pad. The pad mounting bolts secure the cabinet to the concrete pad.

> ***Note:*** See *AccessNode Modular Cabinet Installation Guide*, 323-3001-211, for detailed information on the anchor plate installation.

Cable entry ports

The cabinets all have left-side, right-side and rear cable entry ports for routing inter-cabinet cabling into and out of the cabinets. The termination cabinet also has OSP cable access holes in the bottom of the cabinet. The equipment cabinets do not.

Swing frames

The equipment cabinets contain a left-hinged, swing-out equipment mounting frame that meets all Zone 4 earthquake requirements. The termination cabinets do not have swing frames.

Each frame is held in position with a locking latch located at the lower part of the frame and pivots on hinges to swing out and allow rear access to the equipment.

The equipment cabinet swing frame dimensions are as follows:

- total height: 105.4 cm (41.5 in.)
- total width: 68.6 cm (27.0 in.)
- rackmount height: 96.5 cm (38.0 in.)
- rackmount width: 56.6 cm (22.3 in.), center-to-center
- rackmount spacing: 4.445 cm (1.75 in.)

Battery trays

Equipment cabinets have a roll-out battery tray located at the bottom of the cabinet. The battery tray houses two battery strings. The LTM does not have a battery tray.

Note: A battery string consists of four 12 V dc batteries connected in series. Battery strings are connected in parallel to supply sufficient current to power the system during ac power outages.

Battery heater strips

Each battery tray has electric heater strips that have integrated sensors to protect the batteries in extreme cold conditions.

The heater strips are ac power fed from the heat exchanger.

The units are flat elements that provide uniform surface heating throughout the battery tray.

DANGER
Fire hazard
Remove all paper and any other combustible materials from inside the cabinet before powering up the cabinet.

Failure to comply with this warning can cause a fire.

Environmental control equipment

The equipment cabinets contain interior temperature and humidity control equipment. The environmental control equipment includes the following:

- exterior solar radiation reduction panels
- closed-loop heat exchanger
- high and low temperature thermo-sensors

Solar radiation reduction panels

All cabinets have exterior solar radiation reduction panels mounted on the left, right and rear exterior walls of the cabinet. These panels reduce the amount of direct sunlight on the exterior walls.

The panels are removed when another cabinet module is mounted next to it. Underneath the panels and on the cabinet walls are the cable routing ducts and cabinet-to-cabinet mounting bolt holes for securing adjacent cabinets together. Gaskets on the solar panels provide a tight seal to keep water from leaking in when the panels are securely mounted on the cabinet.

Heat exchanger

The equipment cabinets have a 120 V ac power fed, closed-loop heat exchanger (HE) mounted inside the cabinet on the rear wall. The LTM does not have a heat exchanger.

The HE uses convoluted aluminum counter-flow technology and dissipates up to 700 W of equipment heat and exhausts it outside of the cabinet. The HE is a thin-line design and its measurements are as follows:

- 44 in. (111.7 cm) high
- 24 in. (60.9 cm) wide
- 5 in. (12.7 cm) deep

Three 120 V ac tube-axial fans pull the internal air through the HE while two fans circulate the external air. External air enters the HE through the front grilles on the cabinet, circulates upward through the HE core, and is exhausted through the roof to the top-front air vents. Internal air is circulated through the equipment and into the HE in the opposite direction.

Thermostatic controls

Temperature sensors monitor the interior cabinet and generate alarms when the interior temperature exceeds preset parameters.

The HE unit is controlled by two thermo-sensors that regulate HE fans ON/OFF according to the internal air temperature. Additional sensors provide for High/Low temperature alarming. See Table 3-1 on page 3-8.

Table 3-1
Temperature sensors

Temperature	Affect
60^{o} C (140^{o} F)	Fans ON
0^{o} C (-32^{o} F)	Fans OFF
60^{o} C (140^{o} F) ^{o}	High temp alarm
0^{o} C (-32^{o} F)	Low temp alarm

Site selection

This chapter describes selecting a location to mount the ModCab.

Chapter contents

This chapter includes the following topics:

Topic	See
Site information	page 4-1
Environmental considerations	page 4-1

Site information

When you are choosing your site location, you must consider the climate, noise, ventilation, and power accessibility.

Environmental considerations

The ModCab is suitable for both normal and extreme environmental conditions. When the ModCab is mounted in areas with extreme environmental conditions, maintenance intervals are shortened based on the location system requirements.

Extreme conditions

Areas with extreme conditions include, but are not limited to, the following:

- dusty areas (substantial airborne particles from natural wind conditions, automobile traffic, farm equipment, moisture, railroad rights-of-way, and similar locations and conditions), for example:
  - dirt roads with daily or weekly vehicular traffic
  - paved roads that have road dirt and exhaust emissions
  - paved areas maintained with municipal sweeping equipment
  - farm land that is seasonally or regularly turned or harvested
  - industrial areas such as paint-spraying, concrete or stone working, grain handling, wood cutting, or metal working facilities
  - locations that support air traffic activities

- dirty areas (water and dirt mixtures resulting in mud and/or suspended heavy particles in water), for example:
  - — active landfills
  - — paved roads where there can be rain spray from passing vehicles
- high moisture (direct water spray or splash on the cabinets, excluding normal rainfall), for example:
  - — paved roads where there can be direct rain splash from passing vehicles
  - — areas that are regularly watered with sprinkler systems that can spray directly at the cabinet
  - — water cooling towers such as those used for air conditioning, quenching of industrial processes, or wet collectors

Common equipment module

This chapter describes the components of the ModCab NT3W03 common equipment module (CEM).

Chapter contents

This chapter includes the following topics:

Topic	See
Common equipment module description	page 5-2
Common equipment module equipment description	page 5-2
Common equipment module peripheral equipment description	page 5-9

Common equipment module description

The CEM is the main equipment cabinet that houses the AccessNode common equipment. It contains one 96-line copper distribution shelf, peripheral system maintenance and access equipment, environmental controls, and a battery tray.

> ***Note:*** Environmental controls are common to all equipment cabinets. Chapter 3, “Cabinet structure” describes the environmental controls.

Swing frames

The CEM contains a swing frame for mounting the AccessNode and peripheral equipment. Each frame is held in position with a locking latch on the lower part of the frame. The frame swings out on hinges to allow rear access to the equipment.

The equipment cabinet swing frame dimensions are as follow:

- total height: 41.5 in. (105.4 cm)
- total width: 27.0 in. (68.6 cm)
- rackmount height: 38.0 in. (96.5 cm)
- rackmount width: 22.3 in. (56.6 cm), center-to-center
- rackmount spacing: 1.75 in. (4.445 cm)

Grounding

The CEM contains a ground bus bar for equipment and cabinet grounding. A grounding cable (6 AWG) is factory-installed on the bus bar and coiled up inside in the cabinet. At installation, it is daisy-chained to the ground bus bar in an adjacent cabinet.

Common equipment module equipment description

The CEM contains the AccessNode equipment (see Figure 5-1). The AccessNode system consists of the following equipment shelves and panels:

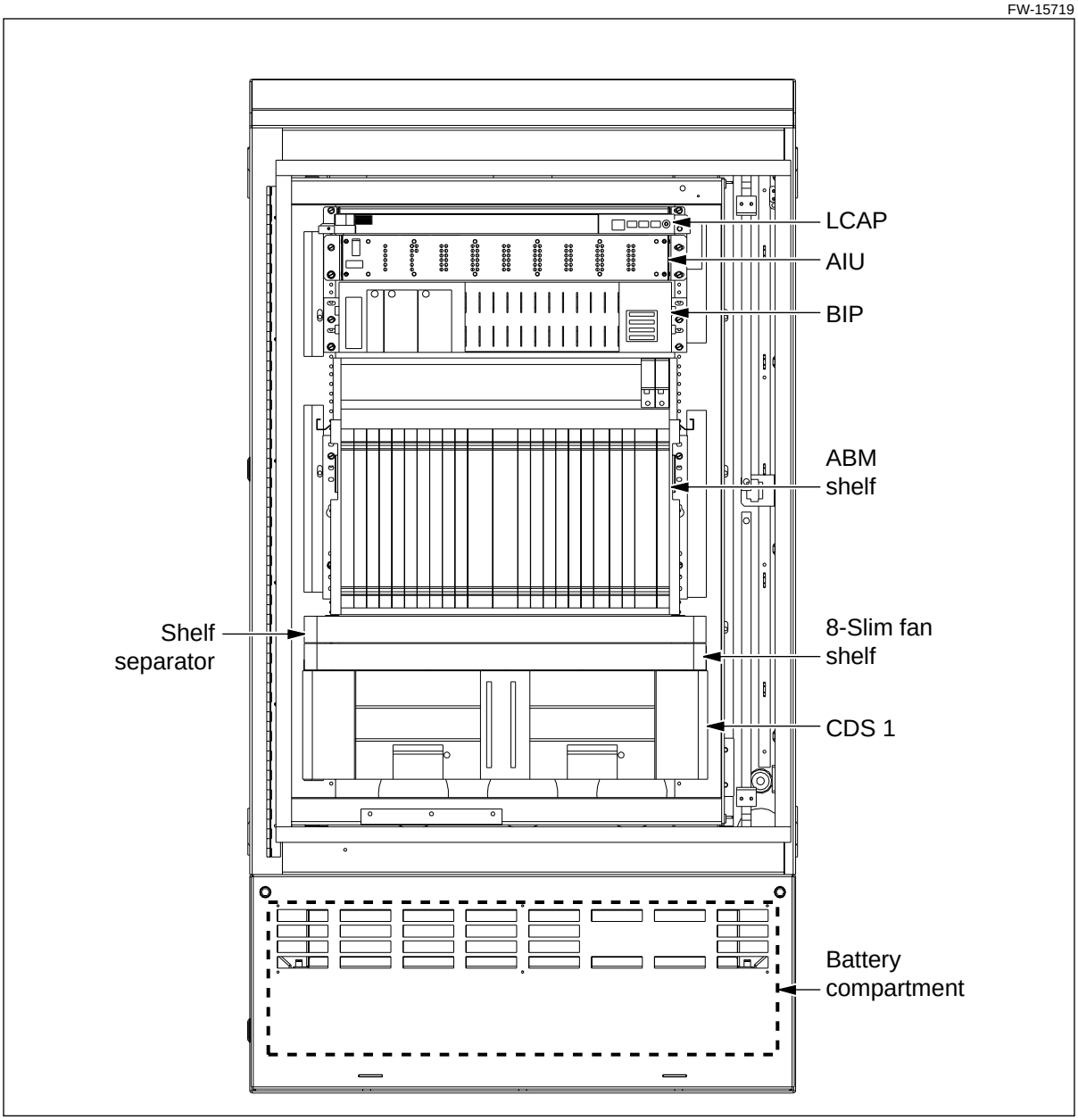
- access bandwidth manager shelf (ABM)
- copper distribution shelf (CDS)
- local craft access panel (LCAP)
- breaker interface panel (BIP)

Figure 5-1 shows the equipment layout in the swing frame of the CEM.

> ***Note:*** The alarm interface unit and 8-fan shelf are described in “Common equipment module peripheral equipment description” beginning on page 5-9.

Figure 5-1
CEM equipment layout in the swing frame

FW-15719



Access bandwidth manager shelf

The AccessNode access bandwidth manager (ABM) equipment shelf supports the system common equipment. The ABM common equipment includes the following units:

- primary optics interface units
- secondary optics interface units
- DS1 input/output (I/O) and mapper circuit packs
- DS3 input/output (I/O) and mapper circuit packs
- DS0 access interface circuit packs
- maintenance interface circuit packs
- equipment signaling interface circuit packs

The ABM shelf circuit pack layout is very flexible. That is, circuit pack locations and slot assignments can be different from one application to another depending on the type and quantity of services required.

For detailed information on the AccessNode equipment configurations, see *Configuration and Equipment Description,* 323-3001-100*,* in *Description*, Volume 2A.

Primary optics interface

The primary optics interface cards connect the system to a fiber optic SONET ring running at OC-3 or OC-12 rates.

> ***Note:*** OC-12 is the normal fiber ring signal rate for ModCab applications. Full AccessNode services are provided at OC-12 rates whereas OC-3 primary optics rates limit the capabilities of the system. This document focuses on systems operating at the OC-12 rate.

The OC-12 units terminate the light signal from the optical ring. Fiber patch cords or pigtails, with or without variable optical attenuators, connect the actual ring fiber to the OC-12 cards.

Secondary optics interface

The secondary optics interface cards connect the system to a fiber optic SONET route running at the OC-3 rate. This optical connection allows optical feeder routes from the ModCab to external customer equipment. OC-3 secondary optic functionality is not available when the primary system optics is running at less than OC-12 rates.

DS1 I/O and mapper circuit packs

The ABM shelf provides DS1 services to and from local business or central office facilities. The DS1 I/O cards interface the external facilities and route DS1 signals to the system. DS1 mapper cards route the DS1 traffic according to system parameters defined and setup by the operating company through the AccessNode system software.

DS3 I/O and mapper circuit packs

The ABM shelf also supplies DS3 services to and from local business or central office facilities. The DS3 I/O cards interface the external facilities and route DS3 signals to the system. DS3 mapper cards route the DS1 traffic according to system parameters defined and set-up by the operating company through the AccessNode system software.

DS0 access interface circuit packs

Line interface circuit packs (line cards) located in the copper distribution shelf provide DS0 access to the system. The access interface circuit pack (AIC) unit in the ABM shelf interfaces the system with the CDS shelves and routes DS0 traffic to the CDS shelves according to system parameters defined and set-up by the operating company through the AccessNode system software.

Maintenance unit circuit pack

Access to the system for maintenance and testing activities is provided through the maintenance unit circuit pack. This unit controls system testing, line testing, and other system maintenance activities.

Equipment interface circuit packs

The ABM shelf communicates with the other components of the system through the following two signalling interface circuit packs:

- side interconnect left (SIL)
- side interconnect right (SIR)

These units, mounted on the extreme left and right sides of the ABM shelf, contain an array of cable connectors designated for signaling paths to AccessNode system components.

Copper distribution shelves

The copper distribution shelf (CDS) contains the line cards that are the interface check between the ModCab and the outside plant cables for local customer services (see Figure 5-2). It also contains the system units that interface the line cards to the AccessNode system. The CDS line cards can provide 2-, 4-, or 6/8-wire services to your local customers.

Copper distribution shelf power (CDSP) units supply power for the line cards and services.

Each CDS can supply up to 96 lines of DS0 services. Up to seven CDSs can be connected to an AccessNode system. In the ModCab cabinet application, one CDS mounts in the CEM and the remaining six mount in the copper distribution cabinet modules. Copper Distribution cabinet modules are described in Chapter 6, “Copper Distribution module description”.

For detailed information regarding the AccessNode family of equipment, refer to *Configuration and Equipment Description*, 323-3001-100, in *Description*, Volume 2A.

Figure 5-2
Copper Distribution shelf

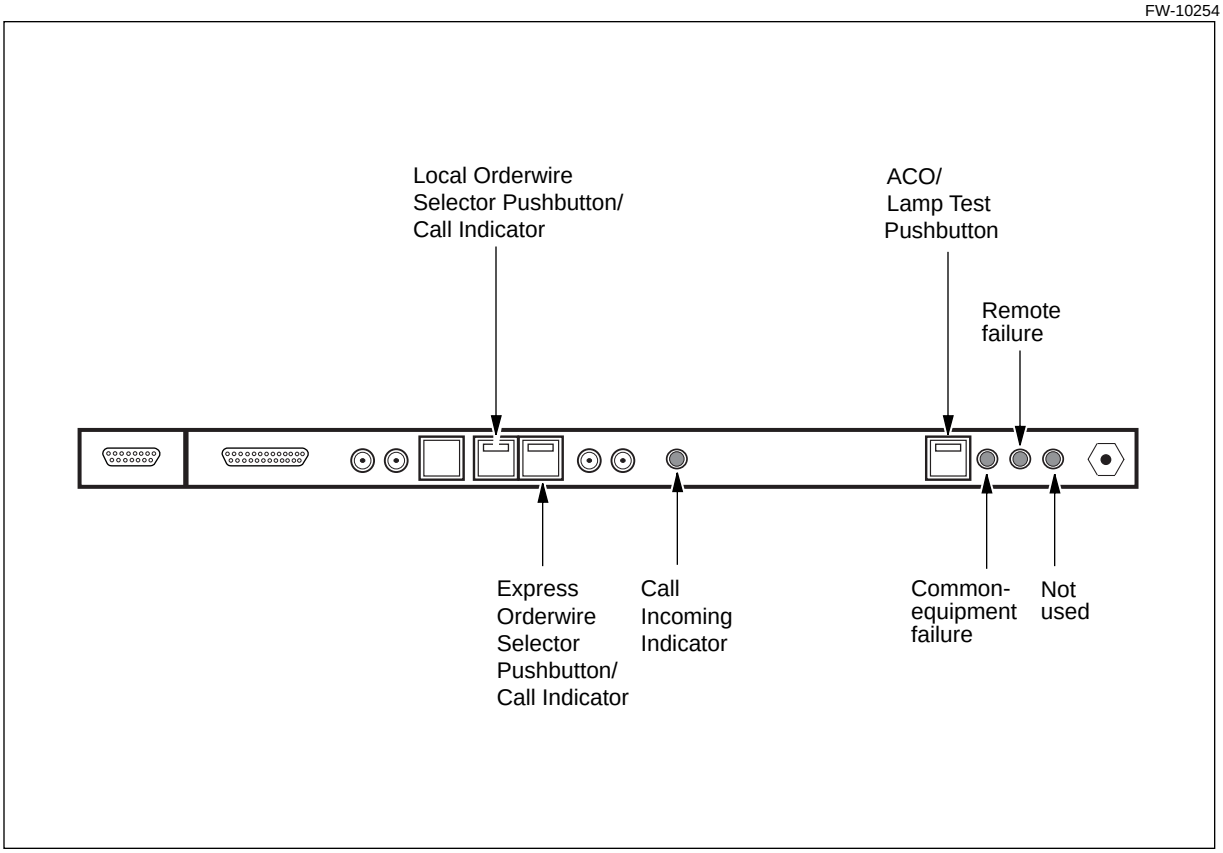
FW-15046

Local craft access panel

The local craft access panel (LCAP) allows the craftperson to access the system orderwire and equipment testing facilities. It is mounted in the CEM directly above the ABM shelf. Figure 5-3 show the LCAP.

Figure 5-3
Local craft access panel (LCAP)

FW-10254

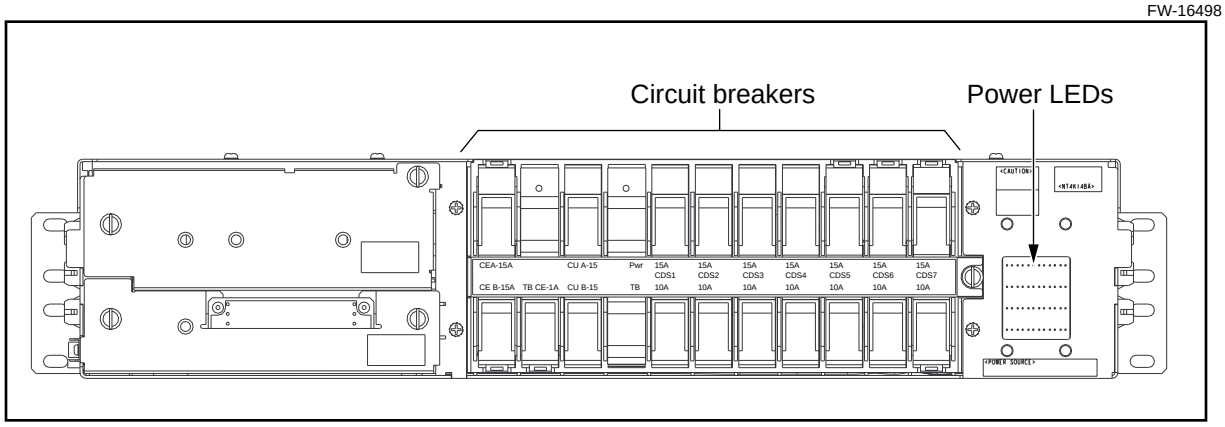


Breaker interface panel

The breaker interface panel (BIP) supplies over-voltage and high-current protection for the -48 V dc power provided by the rectifiers and batteries. The BIP contains circuit breakers (see Figure 5-4) for each power circuit.

Figure 5-4
Breaker interface panel

FW-16498



Common equipment module peripheral equipment description

The common equipment module (CEM) also contains peripheral equipment that supports the AccessNode system as shown in Figure 5-1 on page 5-3. These peripheral units are as follows:

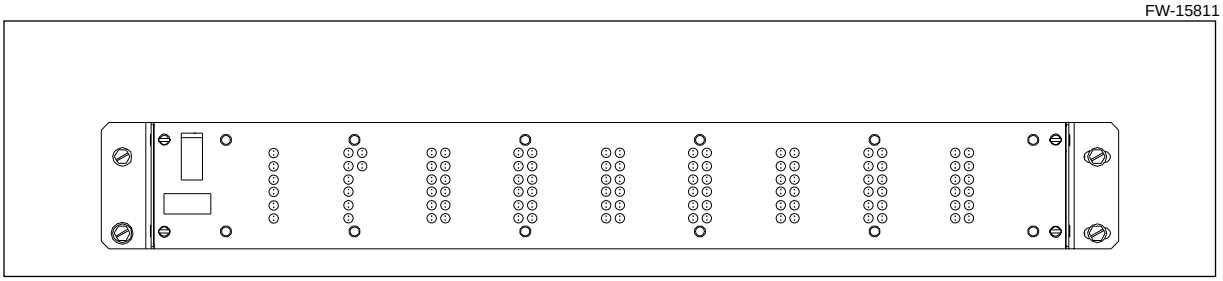
- alarm interface unit (AIU)
- 8-Fan shelf
- batteries

Alarm interface unit

The alarm interface unit (AIU) monitors system and environmental conditions and reports alarms to the AccessNode system. Figure 5-5 shows the AIU unit.

Figure 5-5
Alarm interface unit

FW-15811

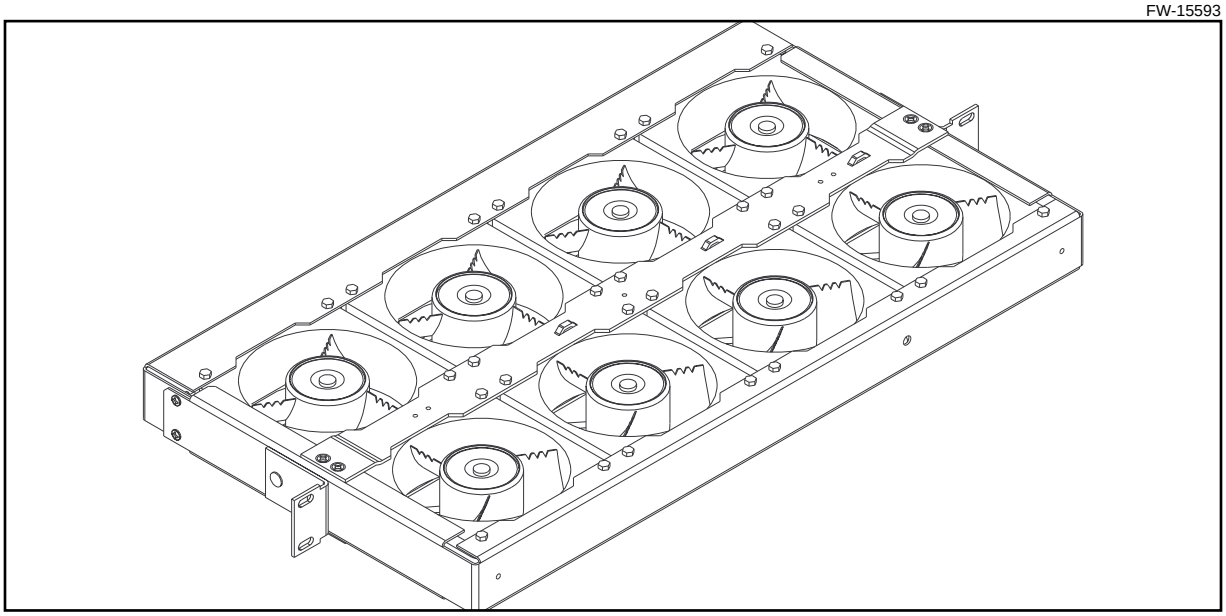


8-Fan shelf

A fan shelf is mounted below the ABM shelf. It consists of eight tube-axial fans in a mounting frame. The fans blow interior air up through the equipment in the swing frame to help circulate air to the heat exchanger.

Figure 5-6
8-Fan shelf

FW-15593



Batteries

The CEM has a roll-out battery tray located at the bottom of the cabinet that houses 1 battery string of four of Johnson Controls TEL 12-90 batteries.

Note: Battery strings are connected in parallel to battery strings in other equipment cabinets to provide sufficient current to power the system during ac power outages.

Figure 5-7
Battery tray layout

FW-15802

Large termination module

This chapter describes the components of the ModCab NT3W04 large termination module (LTM).

Chapter contents

This chapter includes the following topics:

Topic	See
Large termination module description	page 6-2
Cable entry ports	page 6-2
Large termination module equipment description	page 6-4
Grounding facilities	page 6-5

Large termination module description

The large termination module (LTM) is the interface between the AccessNode equipment and the outside plant (OSP) cabling. It houses the termination, protection, and cross-connect equipment for the ModCab configuration.

The LTM contains the following:

- OSP cable entry ports
- OSP cable termination facilities
- OSP cable cross-connect facilities
- voice frequency (VF) termination block options
- DS1 termination block options
- VF and DS1 protector modules
- fiber cable entrance
- cable ladder tie brackets
- grounding facility

Note: The LTM does not contain a swing frame or environmental control equipment.

Figure 6-1 on page 6-3 shows the conduit openings in the LTM. The conduit openings come factory equipped with removable cap plugs that are removed during the installation process.

Cable entry ports

Outside plant voice frequency (VF), miscellaneous, and ground cabling enters the LTM through cable entry ports located in the bottom of the module.

Note: All trade sizes listed are based on Schedule 40 PVC.

When pulling VF cable into the left side of the LTM, use the rear conduit first, then the middle, and the front conduit last. Be sure to pull enough cable into the LTM so slack is available for splicing, routing, and dressing the VF cables.

Figure 6-1 on page 6-3 shows where to pull the OSP cables into the LTM and Table 6-1 on page 6-3 lists how much slack to pull for cable routing.

Figure 6-1
Conduit entry ports in the LTM

FW-15781

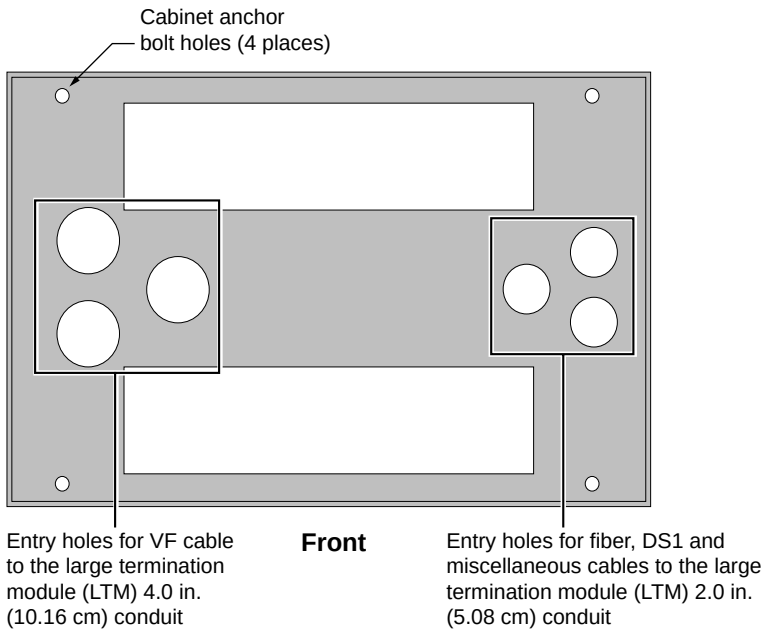


Table 6-1
OSP cable entry locations and lengths

When you pull cable for	Then pull this much slack into the TM
VF pairs 1–1400	3.7 m (12 ft)
Miscellaneous pairs	7.6 m (25 ft)
DS1 distribution and maintenance pairs	1.5 m (5 ft)
Fiber	7.6 m (25 ft)

Large termination module equipment description

The LTM provides equipment and options for termination and lightning protection for the OSP fiber, VF, DS1, and miscellaneous cables entering the cabinet. The service protection center connects the AccessNode equipment with the OSP cabling entering the cabinet.

- outside plant (OSP) cable cross-connect facilities
- voice frequency (VF) termination block options
- DS1 termination block options
- VF and DS1 protector modules
- fiber cable entrance
- cable ladder tie brackets

Service protection center

The service protection center (SPC) modules are mounted on the rear wall of the LTM. These modules provide termination and lightning protection for a maximum of 1000 pairs.

All VF and DS1 signal connections to the LTM are made through the SPCs, which also house the VF and DS1 protector modules.

Protector blocks

The following SPC protector blocks are available:

- VF: 100-pair
- DS1: 50-pair transmit/50-pair receive DS1s

Connectors

A 2:1 VF cross-connect option is available for up to 1400 pairs, or, optionally, an external cross-connect cabinet can be provided. The following OSP connector configurations are available for VF and DS1 protector blocks:

- AT&T 710
- 3M MS^2
- Nortel Networks BIX

Mounting

The SPC units are mounted on the rear wall of the LTM from left to right. The first 500 pairs are mounted on the left side. The second 500 pairs are mounted on the right

Protector modules

Five-pin gas tube or solid state protector modules, rated 7X or better, protect the cabinet from lightning and ac surges as follows:

- Two-electrode gas tubes are used for VF lines.
- Three-electrode modules are used for the DS1 and maintenance pairs.

Solid-state modules can be used for all pairs.

> ***Note:*** To maintain UL listing, the SPC should use UL listed, 5-pin protector modules. Nortel recommends the use of solid state protectors in all outside applications. The voltage limitations of the station protectors significantly impact voltages impressed on the electronics of the system. Solid state protectors offer faster reaction times, a more predictable operating voltage, longer service life, and an increased safety factor.

Grounding facilities

The earth ground bar in the LTM can be connected to the customer preferred earth grounding option. It is the connection point for the OSP cable sheathing.

The LTM contains a ground bus bar for equipment and cabinet grounding. A grounding cable (6 AWG) is factory-installed on the bus bar and coiled up inside in the cabinet. At installation, it is daisy-chained to the ground bus bar in an adjacent cabinet.

DC power module and ac power pedestal

This chapter describes the components of the ModCab NT3W01 dc power (DCP) module cabinet.

Chapter contents

This chapter includes the following topics:

Topic	See
DC power module description	page 7-2
DC power module equipment description	page 7-2
AC power pedestal description	page 7-3

DC power module description

The DC power (DCP) module houses the rectifier shelves, rectifiers and the dc distribution shelf. The DCP also provides the mounting arrangement for an attached ac power pedestal. A standard 60 A, single phase, 230 volt, 3-wire ac commercial power supply provides power to the DCP.

One rectifier shelf, with three rectifiers, and the dc distribution shelf can support AccessNode and peripheral equipment for up to 672 lines. An additional rectifier shelf can be provisioned to handle the additional power required to expand the system up to 1344 lines.

Swing frames

The DCP contains a swing frame for mounting the rectifier and distribution equipment. Each frame is held in position with a locking latch on the lower part of the frame. The frame swings on hinges to allow rear access to the equipment.

The DCP cabinet swing frame dimensions are as follows:

- total height: 41.5 in. (105.4 cm)
- total width: 27.0 in. (68.6 cm)
- rackmount height: 38.0 in. (96.5 cm)
- rackmount width: 22.3 in. (56.6 cm), center-to-center
- rackmount spacing: 1.75 in. (4.445 cm)

Grounding

The DCP contains a ground bus bar for equipment and cabinet grounding. A grounding cable (6 AWG) is factory-installed on the bus bar and coiled up inside in the cabinet. At installation, it is daisy-chained to the ground bus bar in an adjacent cabinet.

DC power module equipment description

The DCP contains the following equipment:

- up to two NT5C10CC 3-position rectifier shelves
- up to three MPR-75 rectifiers per shelf
- one NT6C16FB dc distribution panel
- one NT6C18HA temperature compensator module (TCM)
- one copper-distribution shelf (optional)
- one fiber management facility (optional)
- one ac power pedestal attached externally (optional)

Rectifier shelves

The DCP has one rectifier shelf. It can support AccessNode and peripheral equipment for up to 672 lines. A second rectifier shelf is provisional to expand services up to 1344 lines.

Each rectifier shelf requires a commercial ac input of 190–253 V ac (between Line 1 and Line 2, standard setting) with a frequency range of 55–65 Hz.

The rectifier shelf can contain up to three MPR-75 rectifiers.

MRP-75 rectifiers

The rectifiers convert the commercial ac power input feed to a dc voltage output to the dc distribution shelf. Each rectifier is rated at 75 A.

DC distribution shelf

The dc distribution shelf provides circuit breaker over-voltage protection for the AccessNode and peripheral equipment. DC distribution shelf circuit breakers feed the following equipment:

- AccessNode breaker interface panel (BIP)
- provisionable cross-connect shelves
- provisionable repeater shelves

Temperature compensator module

An optional temperature compensator module (TCM) can be mounted in the DCP. The TCM is mounted on the right side of the rectifier shelf.

The TCM adjusts the charging rate of the rectifiers relative to changes and fluctuations in temperature thereby optimizing the life expectancy of the batteries.

AC power pedestal description

A cabinet ac power compartment-mounted interface panel allows the modular attachment of the ac power pedestal that houses all the elements of an ac service equipment deadfront switch. The optional ac power pedestal is attached on the left-hand side of the DCP cabinet. The ac power pedestal distributes ac power to the rectifier shelves and to duplex convenience outlets.

The ac power pedestal is a fully enclosed compartment that houses the:

- ac input
- ac circuit breakers
- emergency power transfer provisions
- optional emergency generator connections

AC power requirements

The cabinets operate within specification with voltage range variations of 190 to 253 V ac (measured between Line 1 (L1) and Line 2 (L2) of the ac input leads) and a frequency variation range of 55 to 65 Hz.

Table 7-1 shows the commercial ac power requirements for the ModCab.

Table 7-1
AC power requirements

Voltage	Amperage	Phase	Frequency
Basic configurations			
208–230 V ac	100 A	Three-wire, 1-phase	55-60 Hz
Back-to-back, plus configuration			
208–230 V ac	200 A	Three-wire, 1-phase	55-60 Hz

Cable conduit entry ports

The ModCab ac power pedestal is constructed with cable conduit entry ports located in the bottom. AC power and earth ground enters the ac power pedestal through the conduits and routes to the load box and ground points.

Note: All conduit trade sizes listed are based on Schedule 40 PVC.

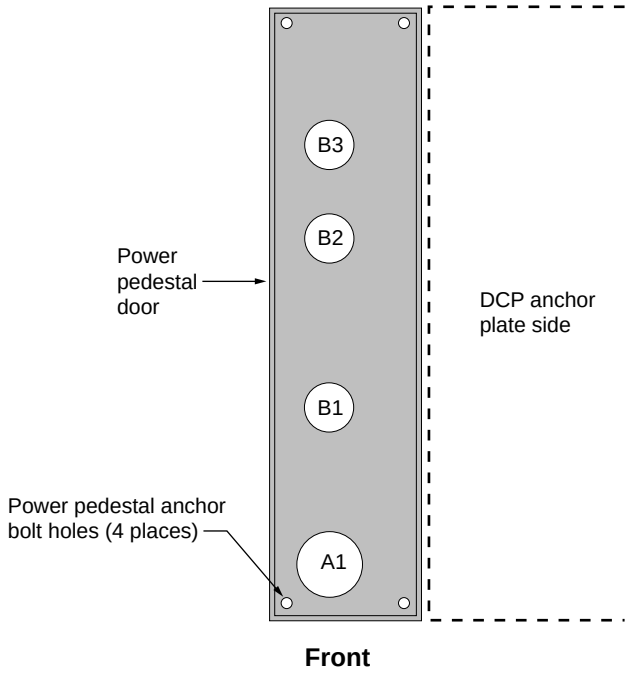
Figure 7-1 and Table 7-2 describe the conduit openings in the ac power pedestal. Figure 7-2 shows the exterior of the ac power pedestal. Figure 7-3 shows the interior view of the ac power pedestal.

Table 7-2
AC power pedestal conduit openings

	Opening size	Conduit trade size	Function
A1	8.89 cm (3.50 in.)	6.35 cm (2.50 in.)	Commercial ac cable entrance (LINE)
B1	5.08 cm (2.00 in.)	3.18 cm (1.25 in.)	Earth ground cable entrance
B2	5.08 cm (2.00 in.)	3.18 cm (1.25 in.)	Outside plant (OSP) cable entrance
B3	5.08 cm (2.00 in.)	3.18 cm (1.25 in.)	OSP DC cable entrance

Figure 7-1
Conduit designations in the ac power pedestal

FW-16076



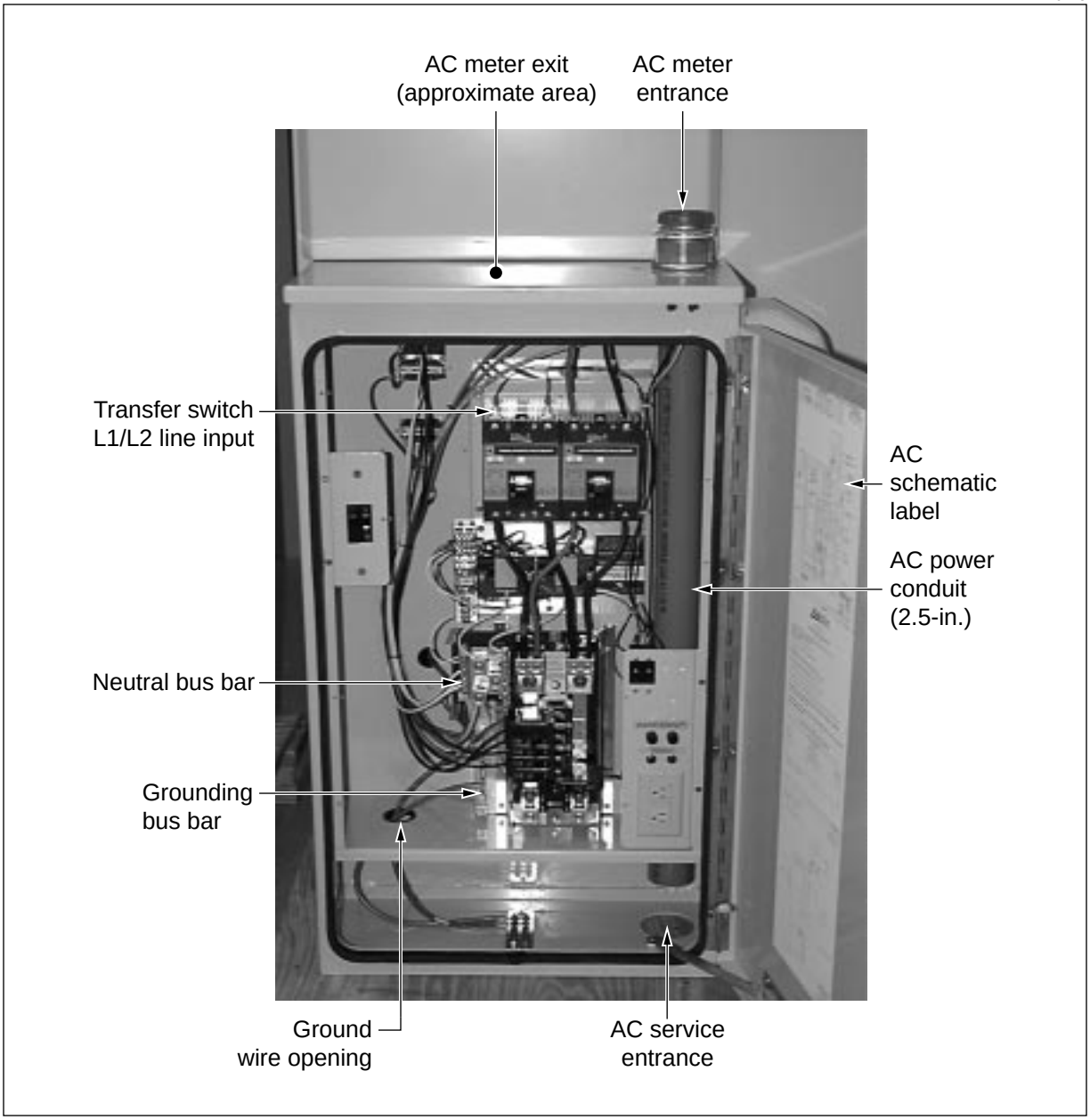
Note: The power pedestal anchor plate always mounts to the left of the DCP anchor plate.

Figure 7-2
AC power pedestal exterior view

FW-15814

Figure 7-3
AC power pedestal interior view (for North American market only)

FW-16228



AC circuit breakers

Table 7-3 lists the ac load box circuit breakers and their ratings.

Table 7-3
AC load box circuit breaker designations and ratings

Designation	Amperage
Main	200 A
Emergency	60A/100 A
CB1 (Rectifier #1)	50 A
CB2 (Rectifier #2)	50 A
CB3 (Heater duplex #1)	15 A
CB4 (Heater duplex #2)	15 A
CB5 (Heater duplex #3)	15 A
CB6 (Heater duplex #4)	15 A
CB7 (GFI)	15 A

Manual transfer

For extended power failures, ac power can be supplied through the manual transfer of power from commercial ac (or battery backup) to generator supplied ac power.

Manual transfer is done using one of two options:

- a positive locking knife switch provided as part of the power pedestal option
- a circuit breaker mechanical interlock device offered as part of the ac load box option

Note: Both types of mechanical power transfer devices have a positive walking beam interlock feature to prevent having both the ac line and emergency power on at the same time.

Emergency generator connectors

Emergency generator connectors are accessible from the ac power pedestal. All ac power options and wiring conform to National Electric Code standards.

The ac power pedestal options offer a choice of either of two emergency generator connector styles that are both configured with an internally mounted knife switch:

- a 60 amp connector—Hubbell part number 460B12W
- a 100 amp connector—Hubbell part number 4100B

Optional equipment module

This chapter describes the components of the ModCab NT3W05 optional equipment module (OEM) cabinet.

Chapter contents

This chapter includes the following topics:

Topic	See
Optional equipment module description	page 8-1

Optional equipment module description

The OEM houses the miscellaneous, customer-supplied peripheral equipment. It is a standard equipment cabinet equipped with a swing frame, a grounding bus bar, and environmental control equipment. Environmental controls are common to all equipment cabinets. Chapter 3, “Cabinet structure” describes the environmental controls.

Swing frames

The OEM contains a swing frame for mounting the customer-supplied peripheral equipment. Each frame has a locking latch on the lower part of the frame. It pivots on hinges to allow rear access to the equipment.

The equipment cabinet swing frame dimensions are as follows:

- total height: 105.4 cm (41.5 in.)
- total width: 68.6 cm (27.0 in.)
- rackmount height: 96.5 cm (38.0 in.)
- rackmount width: 56.6 cm (22.3 in.), center-to-center
- rackmount spacing: 4.445 cm (1.75 in.)

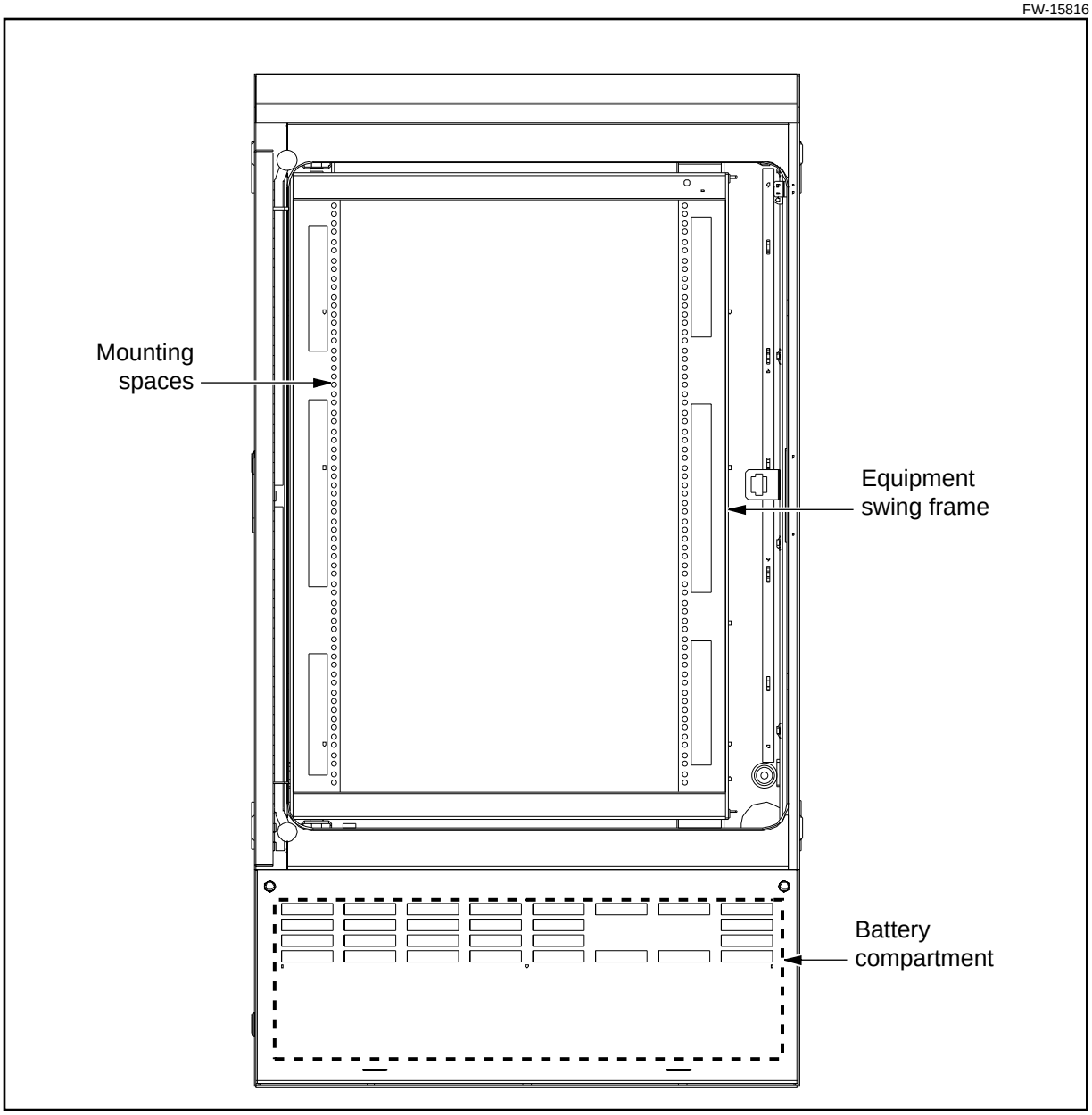
Grounding

The OEM contains a ground bus bar for equipment and cabinet grounding. A grounding cable (6 AWG) is factory-installed on the bus bar and coiled up inside in the cabinet. At installation, it is daisy-chained to the ground bus bar in an adjacent cabinet.

Figure 8-1 shows the interior view of the OEM as shipped.

Figure 8-1
OEM module interior view

FW-15816



Electrical features and requirements

This chapter describes the electrical features and power requirements of the ModCab cabinet.

Chapter contents

This chapter includes the following topics:

Topic	See
Electrical features	page 9-1

Electrical features

The ModCab has the following electrical features:

- ac interface and distribution
- ac generator/alternator transfer switch
- dc distribution shelf
- rectifier/charger
- batteries
- associated cabling and ground strips.

DANGER
Fire Hazard
Remove all paper and any other combustible materials from inside the cabinet before powering up the cabinet.

Failure to comply with this warning can cause a fire.

AC power requirements

The cabinets operate within specification with voltage range variations of 190 to 253 V ac (measured between Line 1 (L1) and Line 2 (L2) of the ac input leads) and a frequency variation range of 55 to 65 Hz.

Table 9-1 shows the commercial ac power requirements for the ModCab.

Table 9-1
AC power requirements

Voltage	Amperage	Phase	Frequency
208–230 V ac	100 A	Three-wire, 1-phase	55-60 Hz

DC power requirements

The ModCab cabinet powering system can support up to three 75 A rectifier modules to power several different equipment and system configurations.

A fully loaded 672-line system equipped with 42 repeaters requires the following:

- 300 amp-hours battery reserve to maintain stand-by power
- two 25 amp, 56 V dc rectifier modules

Note: A third rectifier can be installed to provide n+1 redundancy.

Table 9-2 lists the commercial supply features.

Table 9-2
Commercial power features

Power features	Description
Source	Single phase, 3-wire commercial power, 230 V ac nominal at 60 A to 100 A
Surge arrestor	Metal oxide, varistor (solid state)
Outlets	Total of four: two dedicated for ac heaters and two 120 V ac convenience outlets equipped with either a standard ground fault circuit interrupt or optional 15 A duplex device.
Rectifier(s)	Up to three Nortel Networks MPR75 75 A rectifier modules.
Battery backup	Up to 300 Ah provide 8 hours minimum reserve under maximum power drain.
Emergency power	Up to two rectifier modules require a 30 A emergency generator connector. Three rectifier modules require a 60 A or 100 A emergency generator connector.
Emergency transfer options	• An internal mechanical interlock transfer switch, equipped with a double-pole, double-throw (DPDT) knife switch. • An attached ac power pedestal equipped with a DPDT knife switch. Both transfer options are available with either Hubbell or Crouse-Hinds generator connectors. -Hubbell part number 2715-WP -Crouse-Hinds part number ARRH3482-522

Grounding

All metal parts of the cabinet are grounded for safety and operating performance requirements.

The cabinet operates with a maximum ground-to-earth resistance of 25Ω.

A grounding bus bar for connection to the customer-supplied ground option is included in the termination module and the ac power pedestal. Outside plant (OSP) cables must be grounded using QCM2A cable bond clamps or equivalent on the grounding bar in the termination.

Ground bus bars, located on the right wall of the ModCab cabinet modules and connected by a 6 AWG cable, collect the ground wires coming from the following:

- doors and swing frames
- SPCs
- ac power supply
- outside plant cables

The bars provide superior cabinet bonding as they are “sandwiched” for secure metal-to-metal contact. The bars have additional lugs to allow for special customer applications and connections to a customer-supplied ground.

Cabinet specifications

This chapter describes the mechanical, electrical and environmental specifications of the ModCab and AccessNode system.

Chapter contents

This chapter includes the following topics:

Topic	See
Mechanical specifications	page 10-2
Electrical specifications	page 10-3
Environmental specifications	page 10-4

See Chapter 1, “Introduction” for regulatory compliance information.

Mechanical specifications

Table 10-1 lists the mechanical specifications for the ModCab cabinet.

Table 10-1
Mechanical specifications

Feature	**Specification**
Construction	0.125 welded/fastened aluminum
Colors	Ivory
Exterior dimensions - width - height - depth	 89 cm (35.0 in.) 165 cm (65.0 in.) 65 cm (25.6 in.)
Mechanicals	
Door locks - equipment cabinet - termination cabinet - ac pedestal	 216-type socket tool/padlock 7/16 in. hex-key tamper-resistant locking mechanism Padlock
Swing frame rack mounting space - height - width - spacing	 96.52 cm (38.0 in.) 58.42 cm (23.0 in.) 4.445 cm (1.75 in.)
Cable ports - equipment cabinet - termination cabinets	 Six 7.62 cm (3.0 in.) internal cabling ports in each module Six 7.62 cm (3.0 in.) internal cabling ports Four 9 cm (4.0 in.) external cabling ports One 5.08 cm (2.0 in.) external cabling port
Emergency power transfer	one positive-interlock emergency breaker transfer switch, rated at 100 A in the ac power pedestal

Electrical specifications

Table 10-2 lists the electrical specifications for the ModCab system.

Table 10-2
Electrical specifications

Feature	Specifications
Supply voltage - 672-lines - 1344-lines	 100A, 190 to 253 V ac, 55 to 65 Hz, 3-wire service 200A, 190 to 253 V ac, 55 to 65 Hz, 3-wire service
Grounding	25 ohms (maximum) ground-to-earth resistance
Power dissipation -dc power module - common equipment module - copper distribution module	Maximums: 670 watts (3 rectifiers, 1 repeater shelf) 540 watts 418 watts
Low voltage disconnect threshold	-42.0 V dc
Float voltage	-54.5 V dc
Equalize voltage	-55.0 V dc
High voltage shut down	-56.0 V dc
Battery backup	Number of CDSs / Line cards / Battery modules / System power / Current per battery string / Backup time (hours) 1 / 96 / 2 / 1,047 W / 10.9 A / 7.8 2 / 192 / 3 / 1,298 W / 8.9 A / 10.2 3 / 288 / 3 / 1,424 W / 9.9 A / 8.8 4 / 384 / 3 / 1,571 W / 10.9 A / 7.8 5 / 480 / 4 / 1,800 W / 9.4 A / 9.1 6 / 576 / 4 / 1,948 W / 10.1 A / 8.5 7 / 672 / 4 / 2,095 W / 10.9 A / 7.8
Service outlets	two GFI duplex convenience outlets rated at 120 V ac, 15 A in the DCP four GFI duplex heater outlets rated at 120 V ac, 15 A in the DCP

—continued—

Table 10-2
Electrical specifications

Feature	Specifications
Emergency power	100 A via an emergency breaker transfer switch in the ac power pedestal
AC fail alarming	Form-C dry relay contact
Rectifier input and protection	240 V ac, two-pole 50 A slo-blow circuit breaker
—end—	

Environmental specifications

Environmental specifications meet or exceed the requirements of the regulatory agencies and documents listed in Chapter 1, “Introduction”.

Table 10-3 lists the environmental specifications for the ModCab.

Table 10-3
Environmental specifications

Feature	Specification
Environmental controls	Heat exchanger, (up to 700 watts per module)
Operating environment - outside operating temperature - inside operating temperature	 -40° C to +46° C (-40° F to +115° F) 0° C to +60° C (32° F to +140° F)
Non-operating environment	-40° C to +70° C (-40° F to +158° F)
Relative humidity	5% to 95%
Temperature sensors	high temp alarm generated at 60° C (140° F) low temp alarm generated at 0° C (-32° F)
Acoustical noise	57 dBa (maximum) at 35 ft
Ice and snow loading	up to 295 kg/sq. m (60 lb/sq. ft)
Wind	100 mph perpendicular to the largest area
Altitude	200 ft below sea level to 13,000 ft above sea level

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SONET Products

AccessNode

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