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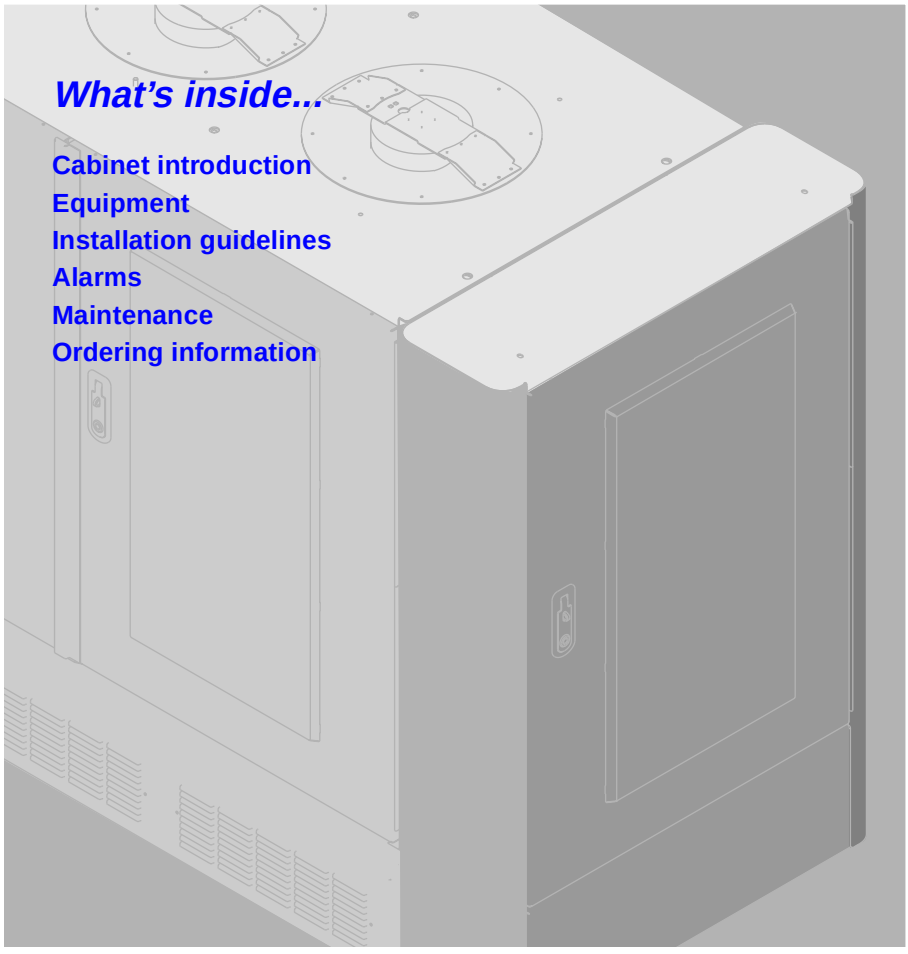
AccessNode Products

AN2016 Cabinet

User Guide

Standard Rel 1.0 May 1999



NORTEL NETWORKS™

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Contents

About this document

This document describes the following aspects of the Nortel Networks AccessNode 2016 outside plant (OSP) cabinet (AN2016 Cabinet):

- cabinet introduction
- equipment
- installation
- alarms
- maintenance
- ordering information

Audience

The audience for this document includes the following groups:

- maintenance technicians and experienced installers
- strategic and current planners
- facility and circuit provisioners
- transmission engineers
- network administrators
- outside plant personnel for the AN2016 Cabinet

How to use this document

It is recommended that you first read this section, then read Chapter 1, “Cabinet introduction,” and Chapter 2, “Equipment.” These chapters will give you a good understanding of the cabinet.

Then, you can read the other chapters according to your needs and interests to learn about the cabinet specifications and other features of the AN2016 OSP Cabinet.

References in this document

This document refers to these documents from the following product libraries:

- AccessNode, Release AN16 or later:
  - — *Engineering and Ordering Information*, 323-3001-032
  - — *Ordering Spare Parts*, 323-3001-151
  - — *Configuration and Equipment Description*, 323-3001-100
  - — *Features and Services Description*, 323-3001-101
  - — *Signal Flow and Circuit Pack Description*, 323-3001-102
- Helios System 200/48, Release 4.0 or later:
  - — *Description, Installation, Operation and Maintenance Manual*, 167-9021-109
- MPR25/MPR15 Series, Single Phase -48 V, 25A Switch Mode Rectifier NT5C06B/C, Release 7.0 or later:
  - — *Description, Installation, Operation and Maintenance Manual*, 169-2071-500
- Bellcore standards:
  - — FR-440, *Functional criteria for digital loop carrier systems*, Issue 02, January 1997, TR-NWT-000057
  - — GR-63-CORE, *NEBS requirements for physical protection*, Issue 01, October 1995
  - — GR-487-CORE, *Generic requirements for electronic equipment cabinets*, Issue 01, June 1996
  - — GR-1089-CORE, *Electromagnetic compatibility and electric safety generic criteria for network telecommunications equipment*

Warnings and safety precautions

To avoid injury, follow all danger warnings provided with this product and safety procedures established by your company.

To avoid damage to equipment or service interruptions, follow all caution warnings provided with this product and safety procedures established by your company.

Samples of danger and caution warnings follow.

DANGER
Risk of personal injury
A danger warning highlights a risk of personal injury.

CAUTION
Risk of service interruption or equipment damage
A caution warning highlights a risk of service interruption or equipment damage.

DANGER
Risk of electric shock
This warning highlights a possible electrical hazard. Proceed with care to avoid personal injury.

Static electricity

Static electricity can accumulate on the body if you walk a short distance. This static electricity damages some circuit packs and cards if you do not discharge it. Always place or package circuit packs and cards in antistatic material.

CAUTION
Risk of equipment damage
To avoid damaging electronic parts, wear a grounded antistatic wrist strap or equivalent protection when you handle circuit packs or cards.

Storing and transporting circuit packs or cards

When you store or transport circuit packs or cards, follow these rules:

- Always place the circuit packs or cards in their antistatic material before transporting or stacking them.
- Do not store circuit packs or cards where the relative humidity can exceed 95% and temperature can exceed 70° C.

Cabinet introduction

This chapter introduces you to the AN2016 AccessNode outside plant cabinet and includes the following topics:

- AN2016 cabinet description
- Applications
- Basic cabinet configuration

AN2016 cabinet description

The AN2016 AccessNode cabinet is the next generation, high-capacity outside plant enclosure with integrated voice frequency (VF) and T1 access and fiber transport services.The AN2016 system delivers termination and protection facilities for remote access applications ranging from 672 to 2016 voice frequency lines and up to 100 DS-1 lines for each cabinet.

The cabinet is environmentally controlled where outside cooling air and batteries are totally isolated from the electronic equipment. The cabinet provides ancillary services normally handled by a central office or large remote terminal enclosures such as a hut or controlled environment vault (CEV).

The AN2016 cabinet features four separate compartments to promote ease of installation and improved craftsperson access. The cabinet is designed for use in an outdoor environment and mounting on a concrete pad.

The cabinet complies with the Underwriters Laboratories (UL), the Canadian Standard Association (CSA) safety regulation, the National Electrical Code (NEC), and Bellcore specifications.

The system limits radio frequency (RF) emissions to meet the Federal Communications Commission (FCC) Class A requirements.

Table 1-1 shows the compartments and the contents of each.

Table 1-1
AN2016 compartments

Compartment	Contents
Equipment	AccessNode system, dc power distribution facilities, fiber termination facilities, environmental controls and the miscellaneous optional/custom equipment.
Surge protection center (SPC) and termination	Copper outside plant VF/DS1 termination, cross connect and fiber splice closures.
AC	AC power distribution box, battery distribution panel, voice frequency protection
Battery	Eight strings of front terminal 12 V batteries options, factory equipped foil-type battery heater

Applications

The AN2016 cabinet is designed for a wide range of serving areas such as:

- residential and multi-family complexes
- high traffic commercial areas that require
  - — special service lines
  - — high-capacity digital service
  - — direct fiber access

The cabinet delivers flexible solutions and comprehensive services required for concentrated commercial growth areas such as:

- commercial and industrial business parks
- high-tech business corridors and retail malls

Basic cabinet configuration

The basic AN2016 cabinet system consists of the following items:

- AccessNode fiber-optic based network system
- ac and dc power distribution
- environmental controls
- a rectifier/battery charger
- optional battery backup
- surge protection center (SPC) that provides primary protection for VF (DS0 lines) and high frequency (HF) pairs (DS1 lines).

Equipment

This chapter describes the AN2016 Cabinet enclosure and the equipment in the cabinet under the following headings:

See Figure 2-1, Figure 2-2 and Figure 2-3 for illustrations of the AN2016 Cabinet enclosure.

Figure 2-1
AN2016 Cabinet enclosure (front view)

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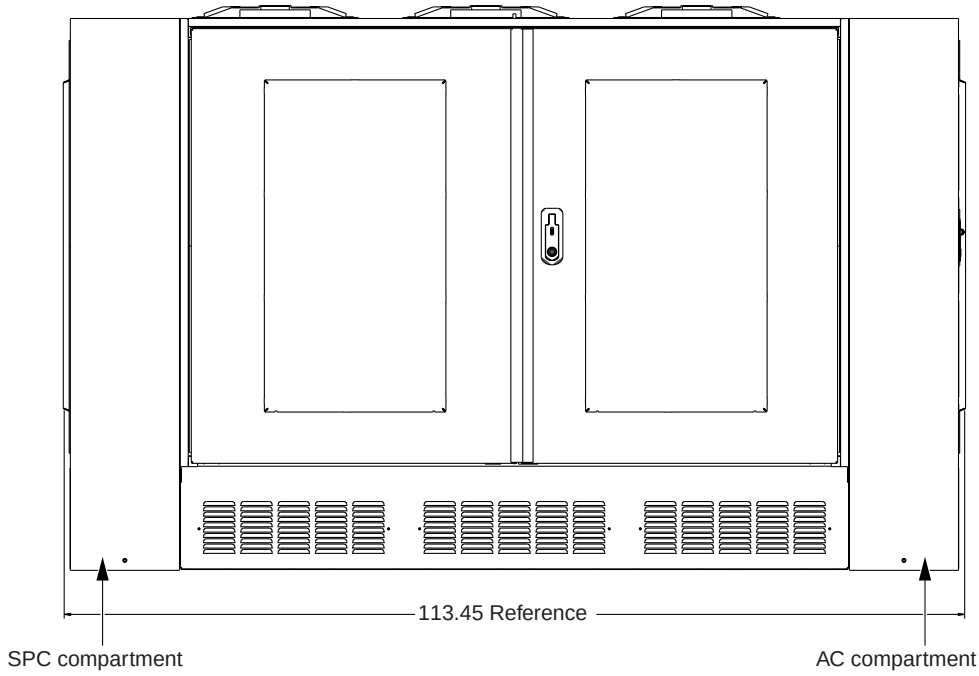

Front view of cabinet

Figure 2-2
AN2016 Cabinet enclosure (rear view)

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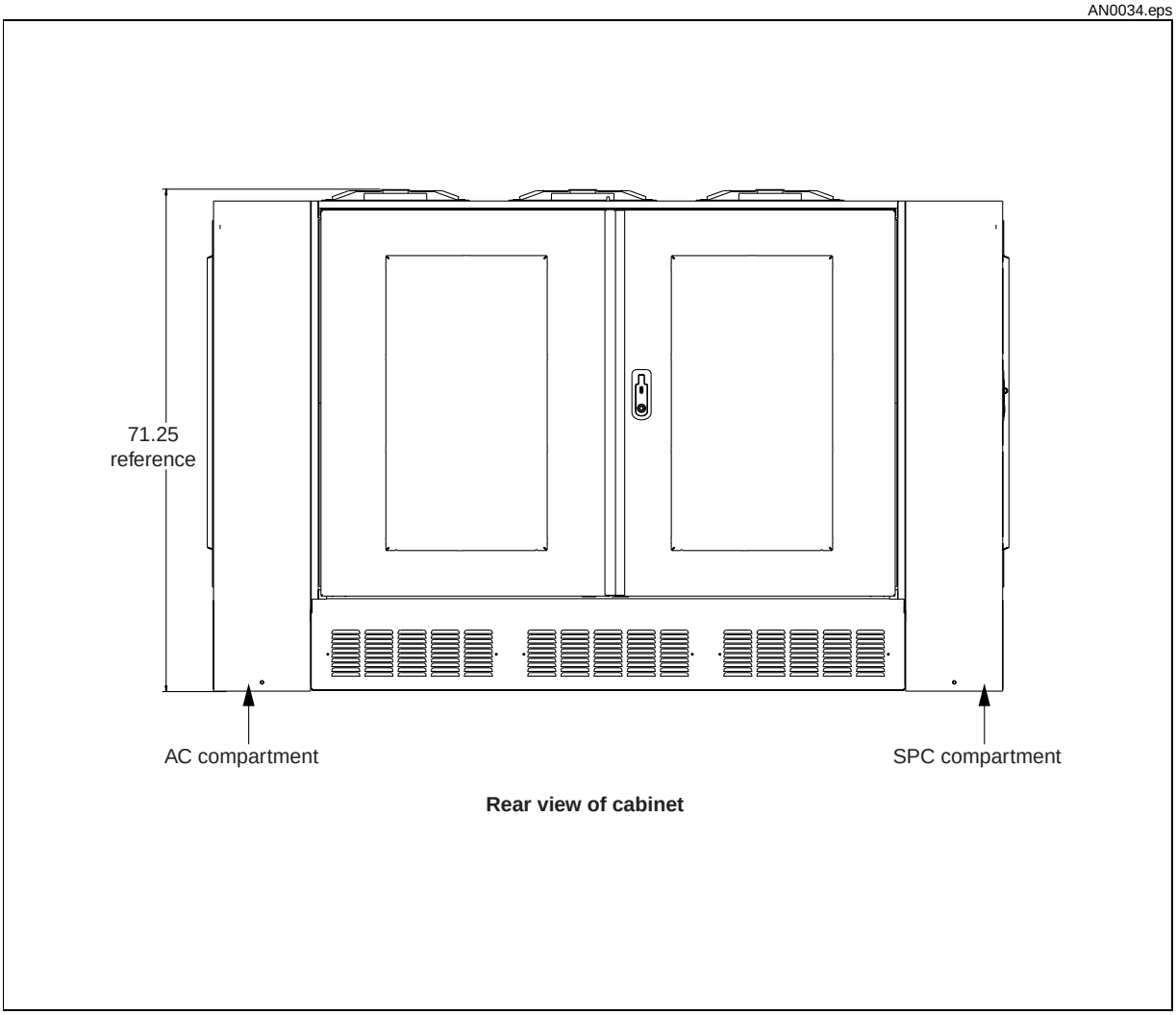

Figure 2-3
AN2016 Cabinet enclosure (side view)

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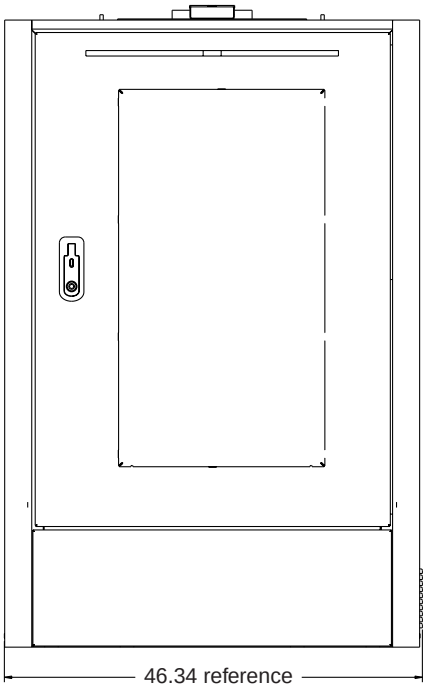
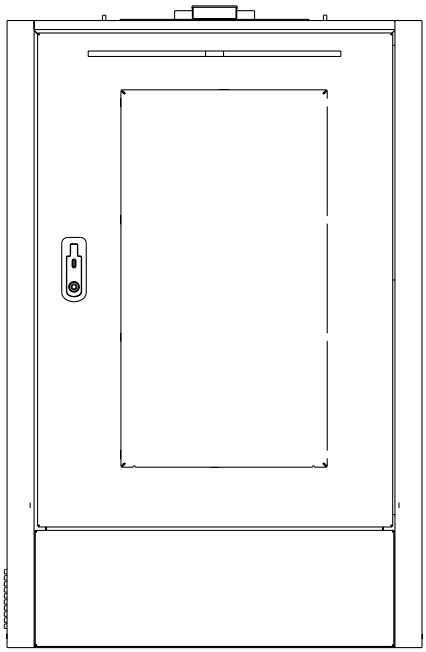


Left side view (SPC) of cabinet



Right side view (AC) of cabinet

AN2016 cabinet structure

The basic NTNR01AA AN2016 cabinet structure consists of the following items:

- cabinet physical design
  - — exterior
  - — doors and door locks
  - — cable access ports
- heat exchangers
- environmental control unit (ECU)
- cable routing brackets
- equipment compartment
- AC compartment
  - — battery distribution and disconnect panel
- surge protection center (SPC) and termination compartment
  - — VF and DS-1 protection blocks
- Battery compartment
  - — battery heater pad

Cabinet physical design

This cabinet can house up to three 672-line systems of Nortel Networks AccessNode equipment. The four supported configurations are described in the following sections of this chapter. The cabinet features an enclosed equipment compartment with separate compartments for the outside plant cable termination and commercial power entrance. The AN2016 cabinet has a split base assembly designed to house the batteries for the battery backup.

A mounting template aligns the cabinet openings and the mounting bolts to a concrete pad. Pad mounting bolts secure the cabinet to the concrete pad and are accessible by opening the SPC and AC compartments.

> ***Note:*** The pad mounting template is a required separate kit which you must order ahead of time for site preparation.

Exterior

The exterior structure of the AN2016 cabinet, including the shell, exterior walls, and floor is primarily constructed of powder-coated 1/8-inch thick aluminum measuring 113.45 in. (288.16 cm) wide by 46.34 in. (117.7 cm) deep and 71.25 in. (180.97 cm) high. Other parts, such as the equipment frames, use thicker materials.

Doors

Six doors enable you to access the AN2016 cabinet:

- one each for the SPC and AC compartments
- two sets of double doors for the equipment compartment

The equipment compartment is accessible through overlapped hinged outside doors. You can access the battery compartments and end compartment kickplates from the equipment compartment or the end compartment.

Door locks

All hinged exterior doors are designed to be locked through a multi-point locking mechanism to ensure that all door corners and edges are secure. The locking mechanism contains a padlock hasp that can accept a 1/4 inch diameter padlock shackle.

When the door locks are enabled, the front and rear equipment, the AC, and the SPC and termination compartment doors can be opened with a 216-type socket tool.

> ***Note:*** Each door locking mechanism is disabled at the factory prior to shipment.

The door locking mechanism prevents water intrusion into the cabinet. Intrusion and system failure alarms are provided to a remote alarm monitoring center. A local intrusion alarm is provided to work in conjunction with the remote alarm.

Cable access ports

Four cable access ports are provided in the base of the surge protection center (SPC) and termination compartment. These ports have 4 inch (10.16 cm) inside diameter split-sleeve openings which facilitate the entrance of metallic and optical fiber cables. One 1/2 inch (12.7 mm) grommet opening is also provided for grounding purpose.

Two additional cable access ports are provided in the base of the AC compartment. These ports have 4 inch (10.16 cm) inside diameter split-sleeve openings. One 2 1/2 inch (63.5 mm) opening is provided for ac conduit.

Cable entrance seals prevent water intrusion into the compartments.

Heat exchanger system

The equipment compartment is equipped with the air to air heat exchanger system. The system operate in a closed loop cooling method with separate field replaceable fans for the internal and external flow paths.

Three heat exchangers provide a total cooling capacity of 4800 watts. Each heat exchanger is equipped with internal and external fans which are powered independently of one another. The external fans draw exterior air through the bottom of the cabinet and exhaust it out into the air chamber in the cabinet top. The internal fans draw interior air from the top of the equipment compartment and exhaust it out the bottom of the chamber (see Figure 2-4).

Environmental control unit

One environmental control unit (ECU) is provided as part of the cabinet to sense, control and report the internal climate of the cabinet (see Figure 2-5). The ECU monitors and controls thermistor input for up to seven fan shelves, ECU alarms outputs for high temperature, intrusion and system failures.

The system controller regulates each fan shelf and each heat exchanger internal and external fan group independently. Fans can be individually enabled or disabled using dip switches to allow normal operation, even if the system does not contain all the fans. Each fan group can have different temperature set points using a single thermistor input. If the ECU fails to operate, the external thermostat activates the fans.

The ECU has 12 bicolor light-emitting diodes (LEDs) to indicate the status of the ECU and attached accessories. When all LEDs are green, the system is running in the temperature control mode with no failures. Except for High Temp, Intrusion and Mode LEDs, a red LED indicates failure of the labeled device. If the high temp LED is Red, the thermistor is reporting a temperature in excess of the set point. If the Intrusion LED is Red, a door has been opened. If the Mode led is Red, the system has been overridden and the fans should be on. The ECU is mounted on the lower baffle in frame/bay F.

The ECU has a start up and initialization routine when:

- The reset switch is pressed, which is located next to the heat exchanger (HX) fan 1 LED on the front panel. This will cause a restart.
- The software locks up and the watchdog timer (WDT) times out and forces a reset and a restart.
- When power is first applied, the power on reset causes a reset and start up begins.

To verify the operation of the ECU, refer to the start up and initialization routine, see Procedure 5-7,”Starting up the ECU”.

Figure 2-4
Heat exchanger air flow

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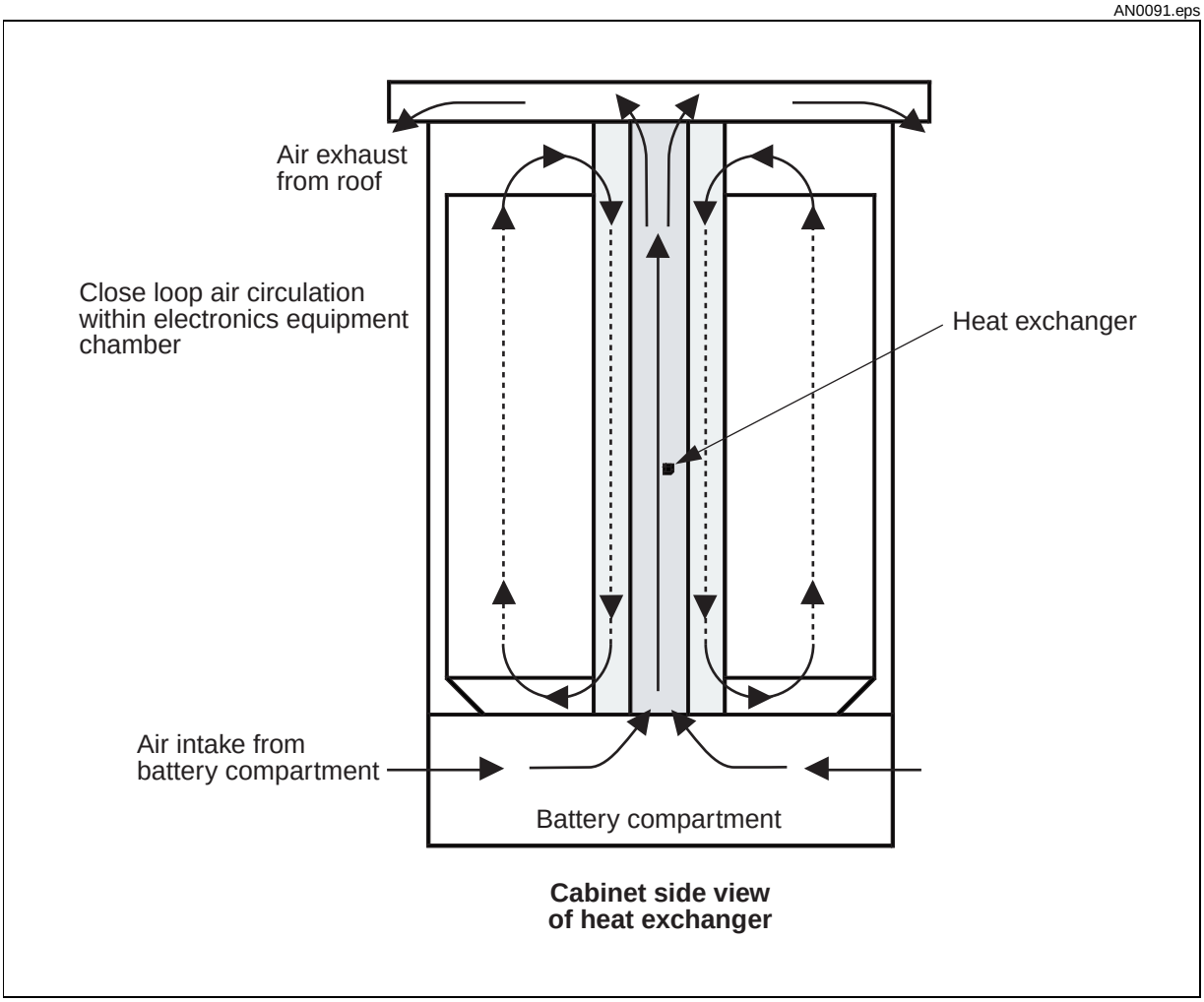

Figure 2-5
Environmental control unit

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Cable routing brackets

Several types of brackets are provided to neatly route and dress the various cables:

- L brackets mounted in pairs at the top of each frame/bay in the equipment compartment
- metal conduit raceway to route the SPC cables
- inside protection mounting brackets
- outside protection mounting brackets
- U-channel protection mounting brackets to mount the SPC blocks inside the SPC and termination compartment
- splice bars

Equipment compartment

The equipment compartment houses the equipment shelves and is the only portion of the cabinet that is environmentally controlled. The compartment is accessible through the front and rear doors of the cabinet.

The equipment compartment has six 23 inch wide equipment frame/bays. Frame/bays A, B, C, E and F have 1.75 inch electronic industries association (EIA) hole spacing. Frame/bays D has 1/2 inch hole spacing. Each frame/bay accepts 47.25 inches of equipment vertically for each rack, totaling 27 mounting space available.

A frame/bay can accommodate an additional mounting space, to increase to 49 in. of equipment vertically for each rack. You can use the additional mounting space if the top component is not equipped with a drawer.

The equipment compartment is divided in two sections:

- The front side provides mounting space for the AccessNode system in frame/bay A,B and C.
- The rear side provides space for the AccessNode system in frame/bay E and F. Frame/bay D provides space for power and optional or custom equipment.

  Note: The ECU is mounted on frame/bay F.

Equipment

The equipment compartment houses the:

- AccessNode equipment
- frames for the equipment
- DS1 cross connect shelves
- fiber distribution shelves

- miscellaneous optional/custom equipment
- dc power plant
- dc power distribution facility
- cooling facilities including fan shelves and temperature alarm sensors

For an illustration of the frame/bay layout, see Figure 2-6 and Figure 2-7.

Figure 2-6
Frame/bay layout (front view)

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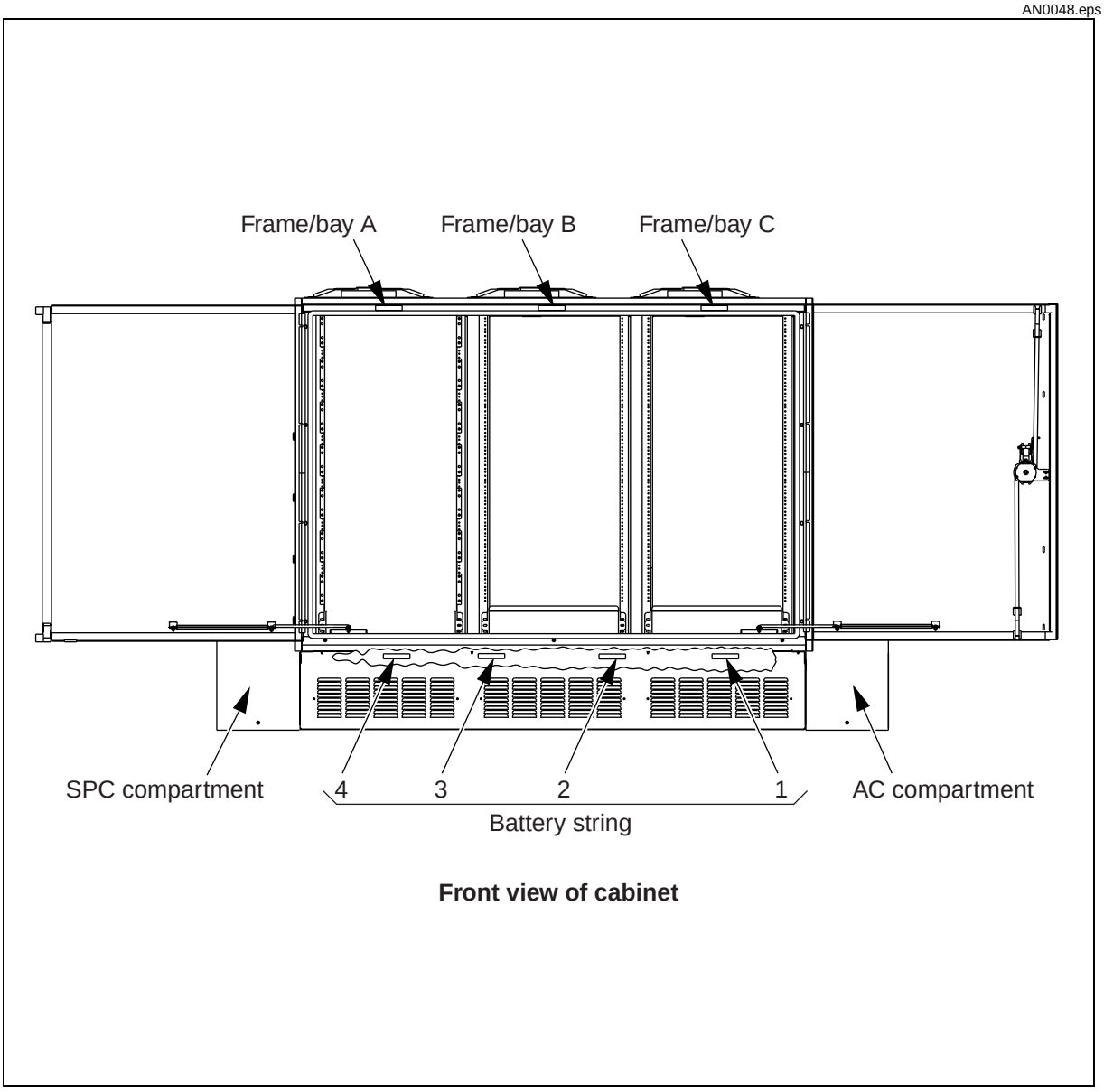

Front view of cabinet

Figure 2-7
Frame/bay layout (rear view)

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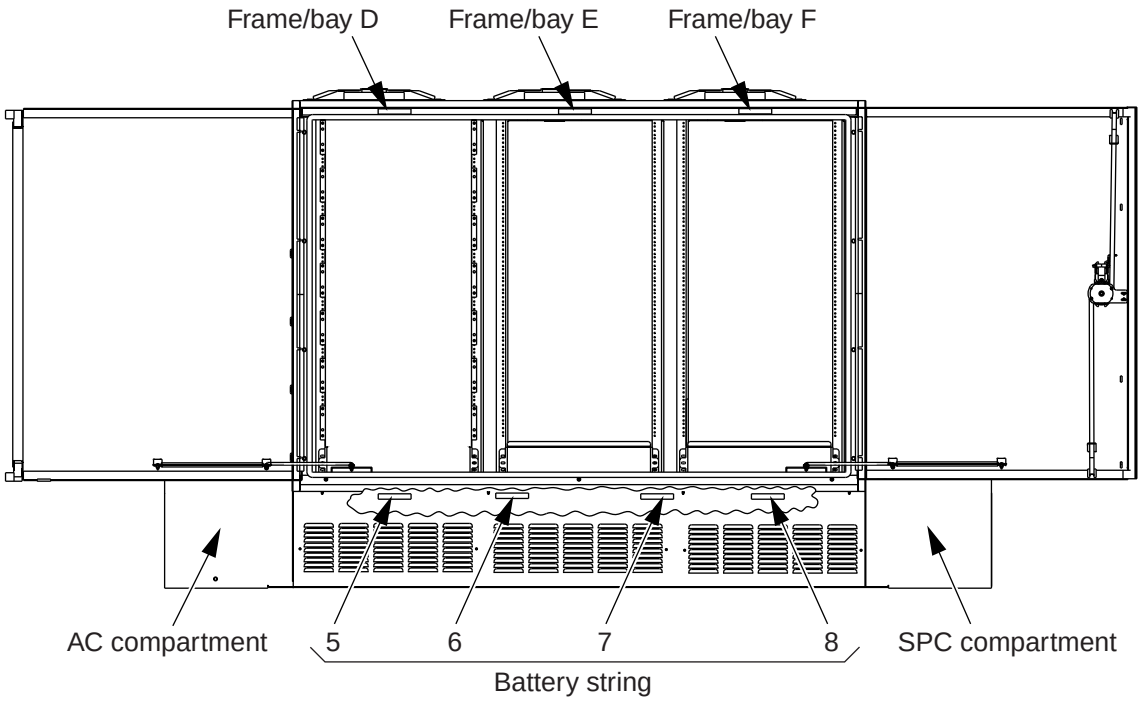

Rear view of cabinet

AC compartment

The AC compartment provides access to an AC load center, a battery distribution and disconnect panel, a ground bar, VF protection and optical fiber cable entrance.

AC load center

The AN2016 cabinet is equipped with an eight position AC load center with one 100 A back fed main 2-pole circuit breaker, two 2-pole 40 A circuit breakers with 8 american wire gauge (AWG) in 3/4 inch conduit for dc power plant, one 15 A 1-pole circuit breaker for convenience outlets, and one 20 A 1-pole circuit breaker for battery heater pads.

Table 2-1 lists the AC load center circuit breakers and their ratings.

Table 2-1
Circuit breakers designations and ratings

Designation	Amperage
Main	100
CB2 (Rectifier #1)	40
CB3 (Rectifier #2)	40
CB4 (GFI)	15
CB5 (Heaters)	20

For an illustration of the front view of the AC load center, see Figure 2-8.

Figure 2-8
AC load center

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Battery distribution and disconnect panel

The battery distribution and disconnect panel provides circuit breaker protection for up to eight battery strings, with eight 30 A dc circuit breakers. Rack-mounted underneath the AC load center, the panel provides monitoring of the battery plant current for every battery strings. The panel contains a circuit breaker trip alarm led indicator (see Figure 2-9).

VF protection

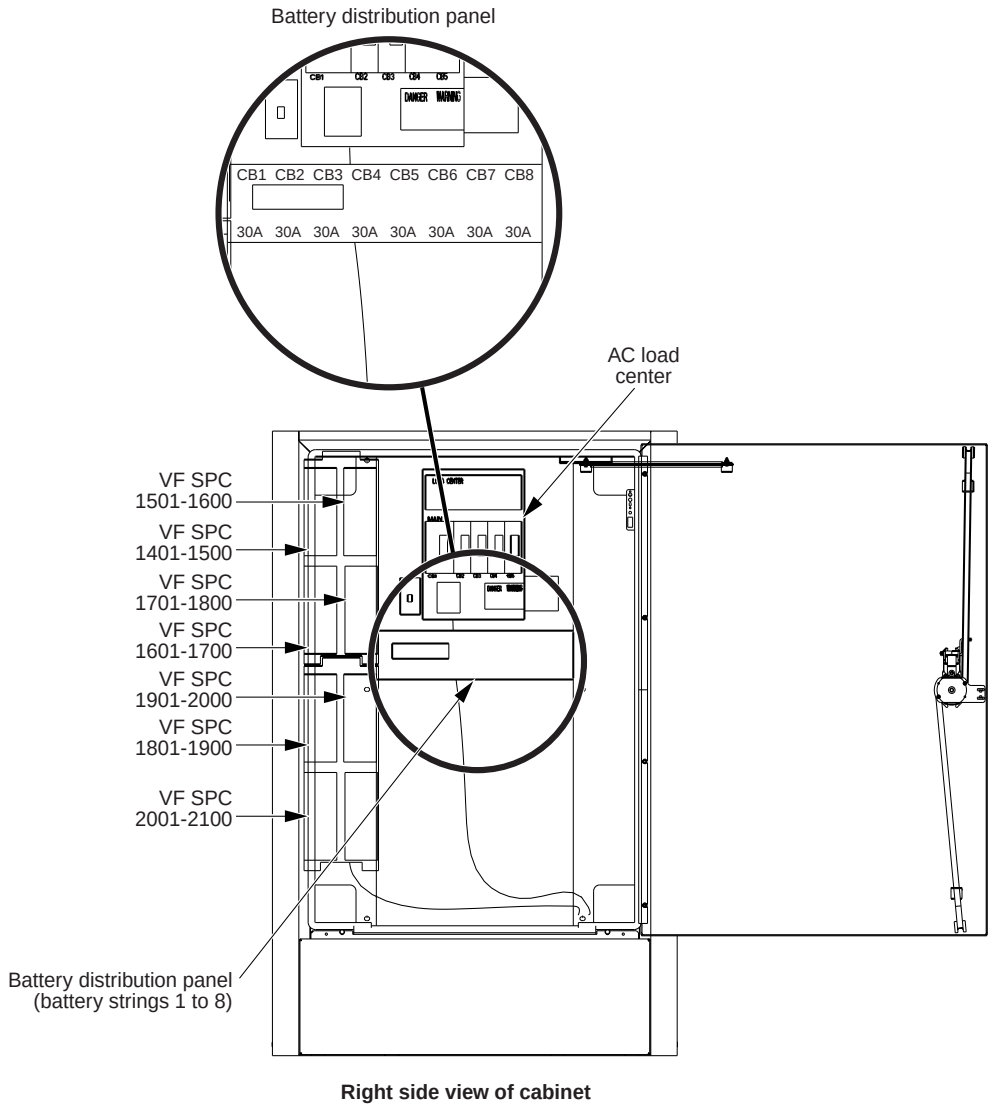
To accommodate spacing restriction, there are two quad panels in the AC compartment. One quad panel accommodates four 100-pair R325 blocks and the other quad panel has three 100-pair R325 blocks (see Figure 2-9).

Ground bar

A ground bar is located in the AC compartment and serves as a main ground for the AC load center.

Figure 2-9
AC compartment

AN0036



Right side view of cabinet

Optical fiber cable entrance

Optical fibers are brought directly into the equipment compartment for termination at a rack mounted fiber distribution panel. The fibers enter the AC compartment in a flexible conduit.

The fibers are routed to the equipment compartment through a small opening in the AC compartment, above the ground bar (see Figure 2-11). The fibers enter the equipment compartment and follow the upright to the fiber distribution panel (see Figure 2-12).

Note: Maintain at least the minimum bend radius 3.0 in. (76mm) for the optical fiber cable.

Surge protection center and termination compartment

The outside plant (OSP) surge protection center and termination compartment provide the interface between the electronics equipment and the OSP cables (see Figure 2-10).

VF, HF, miscellaneous and ground cabling enters the SPC and termination compartment by way of conduit holes located in the bottom of the compartment.

The SPC and termination compartment is a fully enclosed compartment that houses the:

- VF termination block
- DS1 termination block
- VF protector modules
- DS1 protector modules
- ground bar

SPC and termination compartment equipment

The SPC and termination compartment provides equipment and options for lightning protection and for terminating the VF and DS1 cable pairs that enter the cabinet.

VF and DS1 termination is provided by the 3M 4005 connector system on the field side and by the specified AMP 50 pin connector on the equipment side.

There are four quad panels on the sides of the SPC and termination compartment (see Figure 2-10). Each quad panel accommodates four 100-pair R325 blocks for VF protection. At the top, there are four 50-pair R305 blocks that provide digital protection. Both R325 blocks and R305 blocks accommodate standard 5-pin protection modules.

Note: To accommodate spacing restriction, there are two quad panels in the AC compartment. One quad panel accommodates four 100-pair 325 blocks and the other has three 100-pair 325 blocks (see Figure 2-9).

Ground bar

A ground bar within the compartment connects to the customer preferred earth ground system as described in Procedure 3-9, “Connecting the earth ground to the cabinet”. The ground bar serves as the connection point for the OSP cable sheathing.

Battery compartment

Note: The battery compartment is designed in a split base assembly to accommodate up to eight strings of front terminal 12 V batteries for a total capacity of 800 ampere-hour (Ah). Each string contains four batteries and is independently fused with a 30 A breaker.

One Anderson quick disconnect is provided for each string. This connector is wired and terminated to the battery distribution and disconnect panel.

The battery distribution and disconnect panel is located in the AC compartment (see Figure 2-9).

Battery heater pad

Each battery compartment has a fused, thermostatically controlled heater pad underneath a painted aluminum plate. The pad will activate at 4.4° C (40° F) and deactivate at 15.5° C (60° F). A momentary bypass switch is provided for periodic testing.

External battery vault

If you decide to use an external battery vault, the cabinet is equipped with two 2 in. (5.08 cm) of diameter knockout in the wall between the AC compartment and the battery compartment. To install battery cables through the knockouts, see Procedure 3-13, “Installing battery cables from an external vault”.

Note: Battery vaults are provided by the customer.

Figure 2-10
Surge protection center and termination compartment

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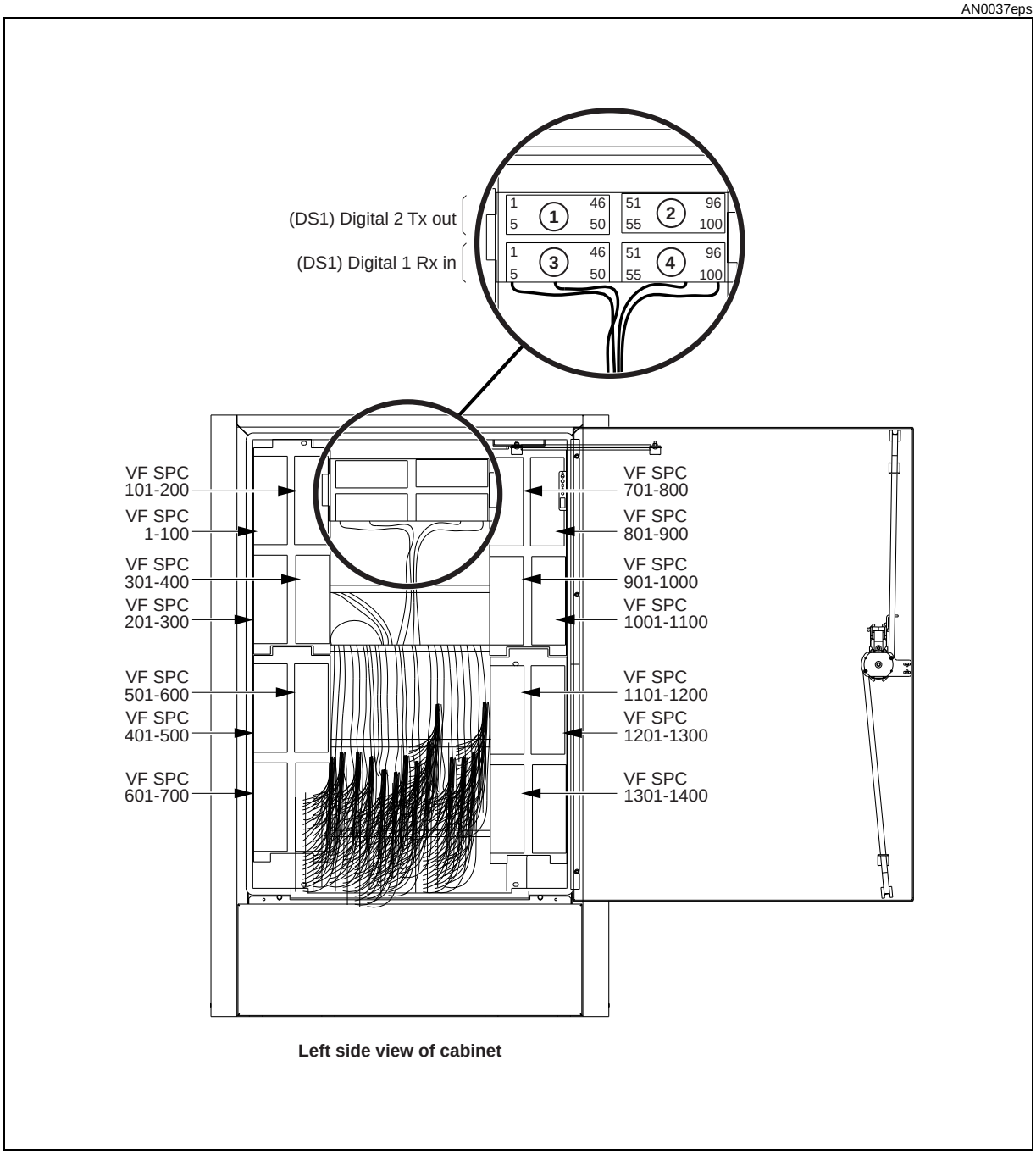

Left side view of cabinet

Figure 2-11
Optical fiber cable entrance

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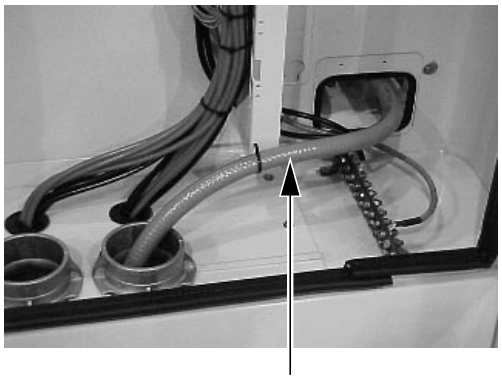

Figure 2-12
Fiber routing to fiber distribution panel

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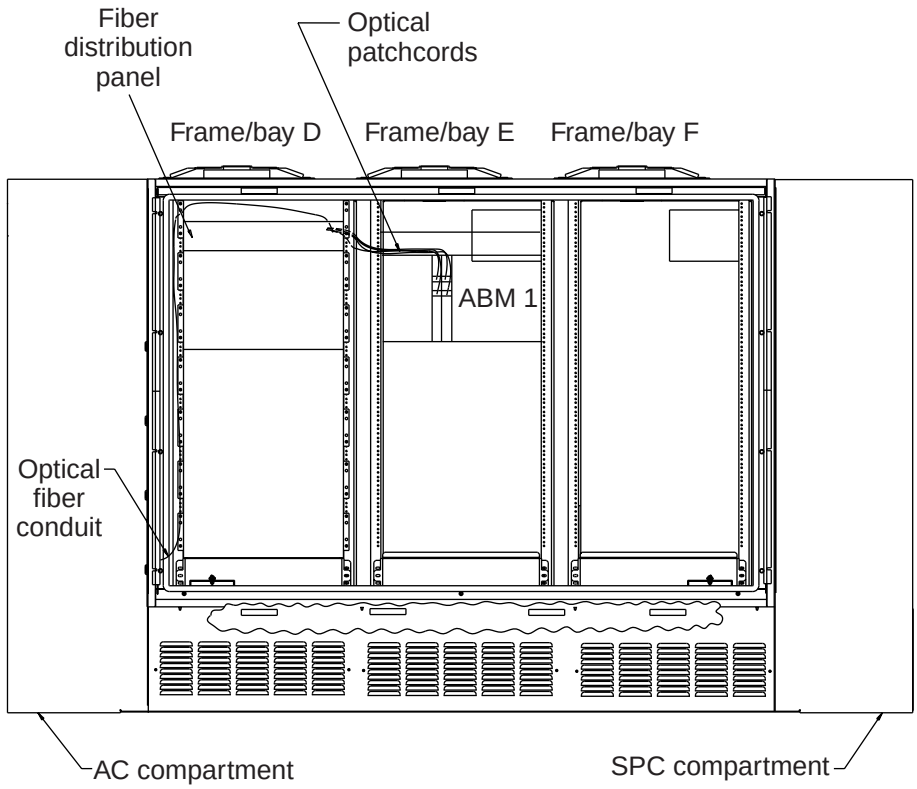

Rear view

Equipment application and configuration

The AN2016 cabinet is a field upgradable, 672-2016 line AccessNode system base that is housed in the existing AN2016 cabinet.

The AccessNode family of equipment, as installed in the AN2016 cabinet, provides a carrier service area configuration for the AccessNode product line configurations for subnetworks that have point-to-point topology.

The AccessNode service delivery system:

- 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, refer to *Configuration and Equipment Description*, 323-3001-100, in Description, Volume 2A.

Applications

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

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

AccessNode offers a full range of services, including:

- plain old telephone service (POTS)
- Meridian Digital Centrex
- residential services; that is, 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, refer to *Features and Services Description*, 323-3001-101, in Description, Volume 2A.

Basic equipment configuration

The AN2016 AccessNode system consists of the:

- AccessNode fiber-optic based network system
- ac and dc power distribution
- a rectifier/charger
- battery backup
- surge protection center (SPC) that provides primary protection for VF and T1 pairs

The basic system can be enhanced and configured as needed to meet a wide variety of application requirements.

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

Configurations of the AN2016 AccessNode cabinet include the following:

- 672-line AccessNode system
- 864-line AccessNode system
- 1344-line AccessNode system
- 2016-line AccessNode system

672-line AccessNode system

This configuration is the basic AccessNode system providing in a modular structure a 672 lines capacity. One access bandwidth manager (ABM) shelf is required to support the system capacity. The AccessNode system is equipped with 7 copper-distribution shelves that provide up to 96 lines each.

The 1–672 VF lines are routed from the system out to the surge protection center (SPC). You can splice the VF lines directly into the outside plant (OSP) cables.

The system configuration provides two feeders: optical fiber and DS-1. The optical fiber feeder uses the virtual tributary bandwidth manager (VTBM) OC-12 for interface with the central office.

Optical fiber lines from the outside plant are brought into the cabinet, spliced into the optional optical fiber manager and then routed to the ABM#1 shelf. The outbound optical fiber use either the optional Soneplex or DDM+ loop extender shelf.

DS-1 lines from the outside plant that are brought into the cabinet and terminated by the 3M 4005 connector system are conducted through the surge protection center. Then the DS-1 lines are routed into the optional Sonoplex or

DDM+ and to the DSX-1 cross connect to interface with the AccessNode ABM#1 shelf. The outbound DS-1 use the same equipment in the opposite direction.

See Figure 2-13 and Figure 2-14 for a view of the equipment frame/bay layout.

Figure 2-13
672-line configuration (front view)

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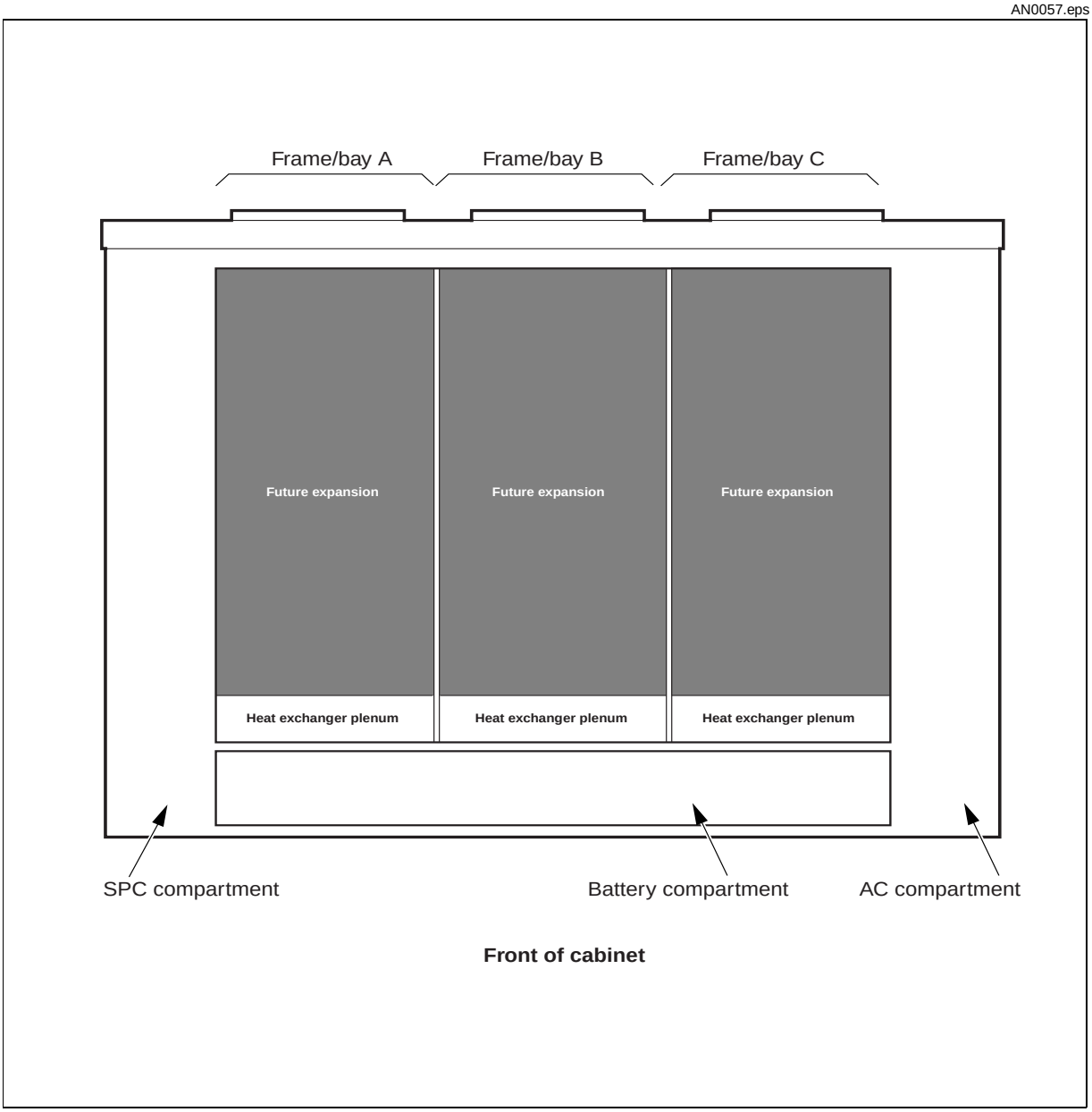

Figure 2-14
672-line configuration (rear view)

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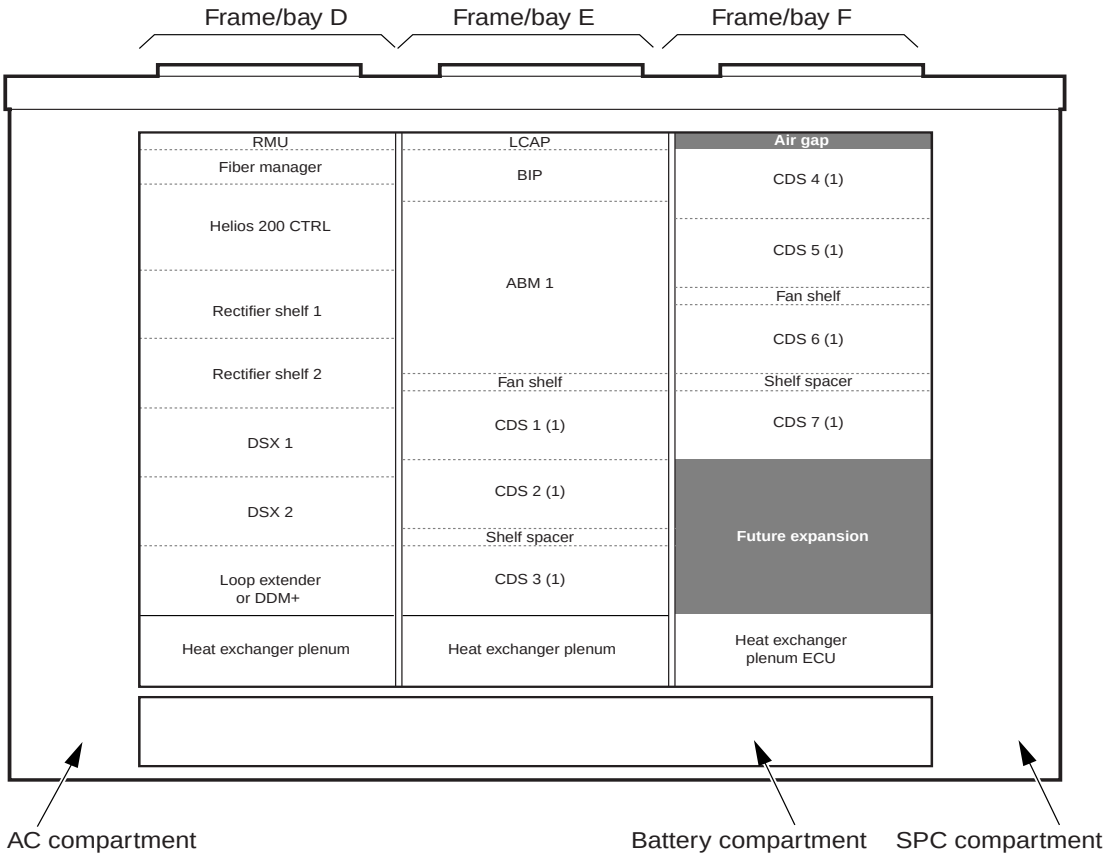

864-line AccessNode system

This configuration consists of 864-line AccessNode system. Two ABM shelves are required to support the system capacity. The AccessNode system is equipped with 9 copper-distribution shelves that provide up to 96 lines each.

The extended system configuration is equipped with a DSX-1 cross connect shelf to feed DS-1 lines from the primary ABM shelf to the second ABM shelf.

The 1–864 VF lines are routed from the system out to the surge protection center (SPC). You can splice the VF lines directly into the outside plant (OSP) cables.

See Figure 2-15 and Figure 2-16 for a view of the equipment frame/bay layout.

Figure 2-15
864-line configuration (front view)

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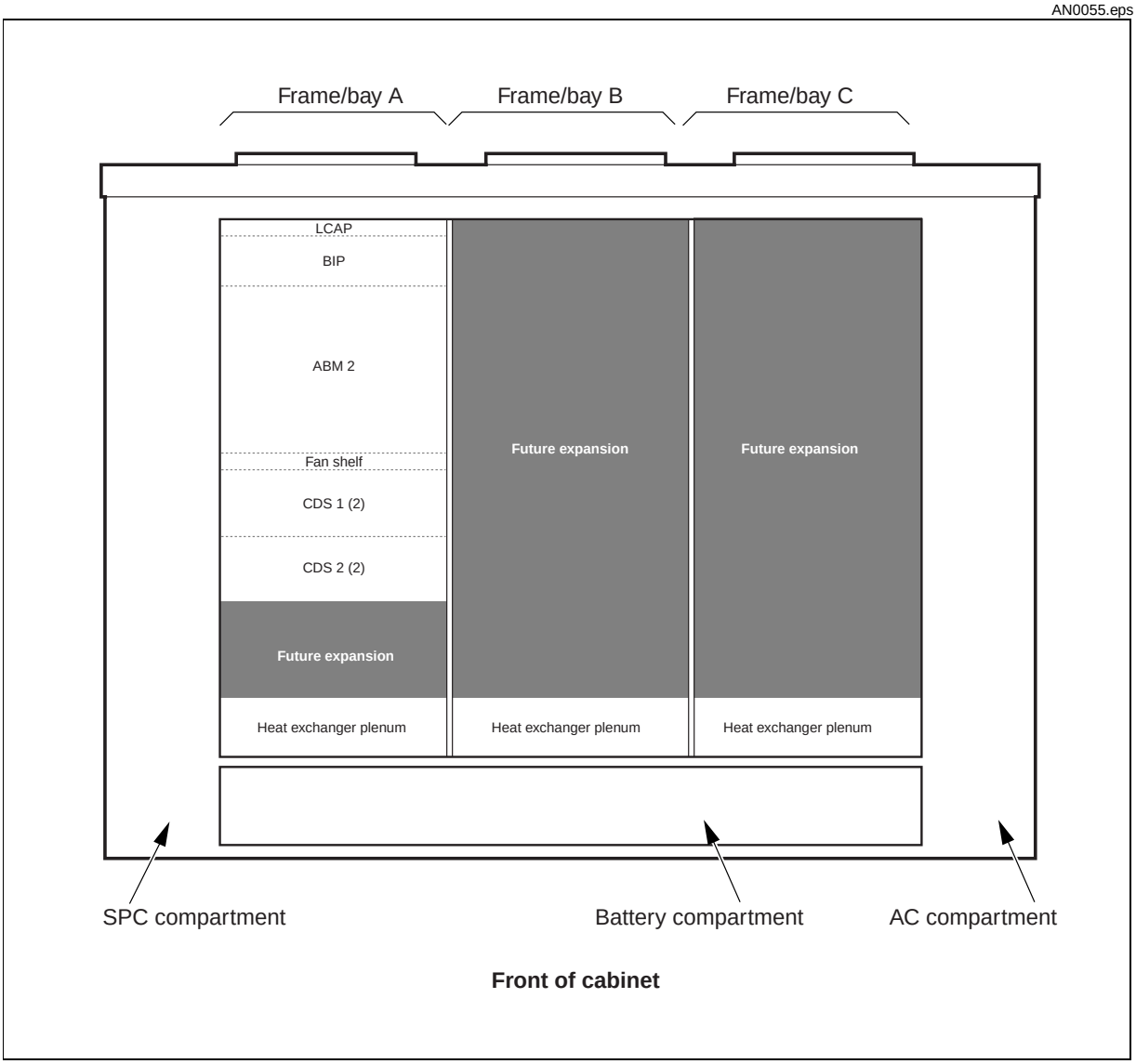

Figure 2-16
864-line configuration (rear view)

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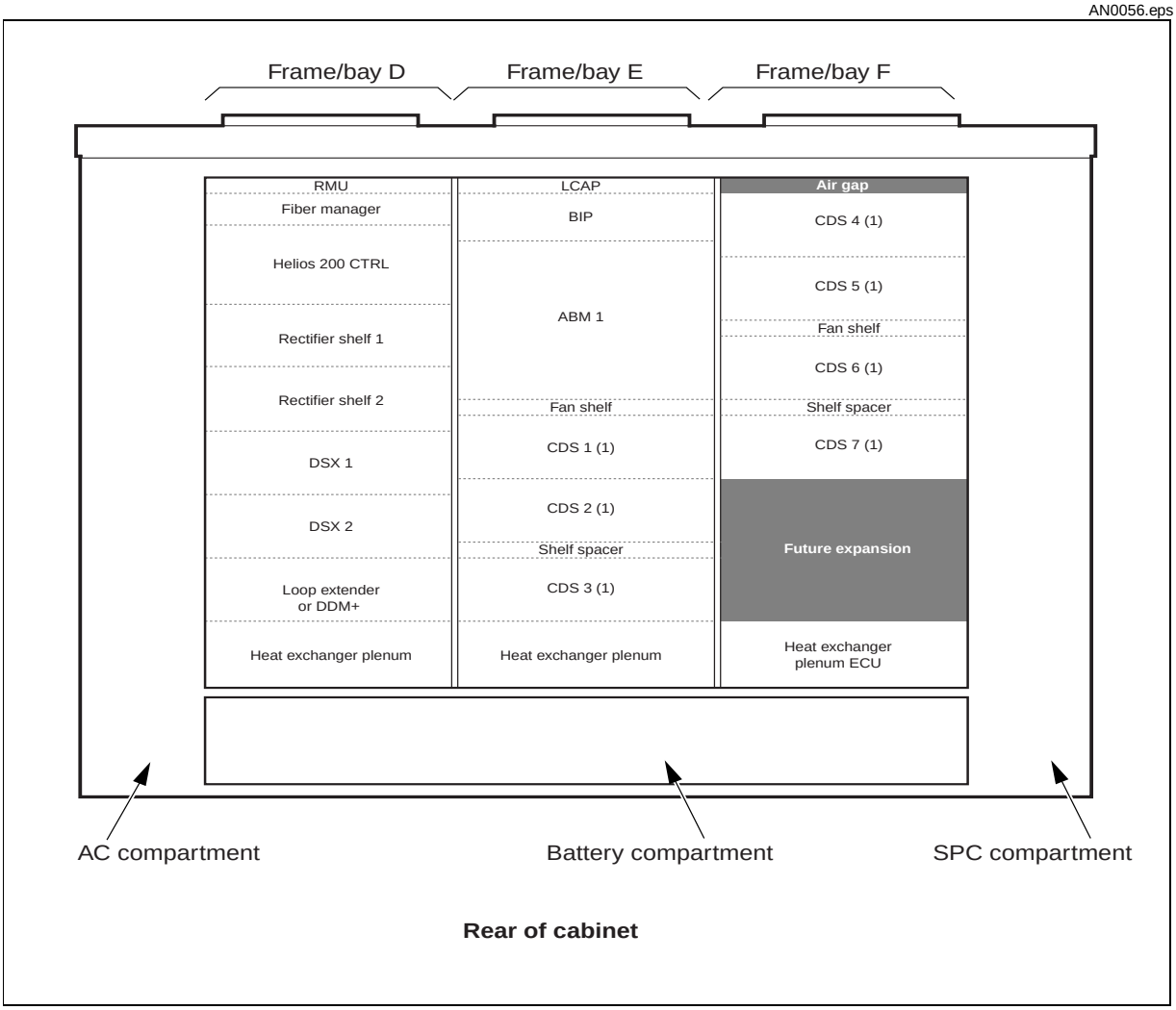

1344-line AccessNode system

This configuration consists of 1344-line AccessNode system. Two ABM shelves are required to support the system capacity. The AccessNode system is equipped with 14 copper-distribution shelves that provide up to 96 lines each.

The extended system configuration is equipped with a DSX-1 cross-connect shelf to feed DS-1 lines from the primary ABM shelf to the second ABM shelf.

The 1–1344 VF lines are routed from the system out to the surge protection center (SPC).You can splice the VF lines directly into the outside plant (OSP) cables.

See Figure 2-17 and Figure 2-18 for a view of the equipment frame/bay layout.

Figure 2-17
1344-line configuration (front view)

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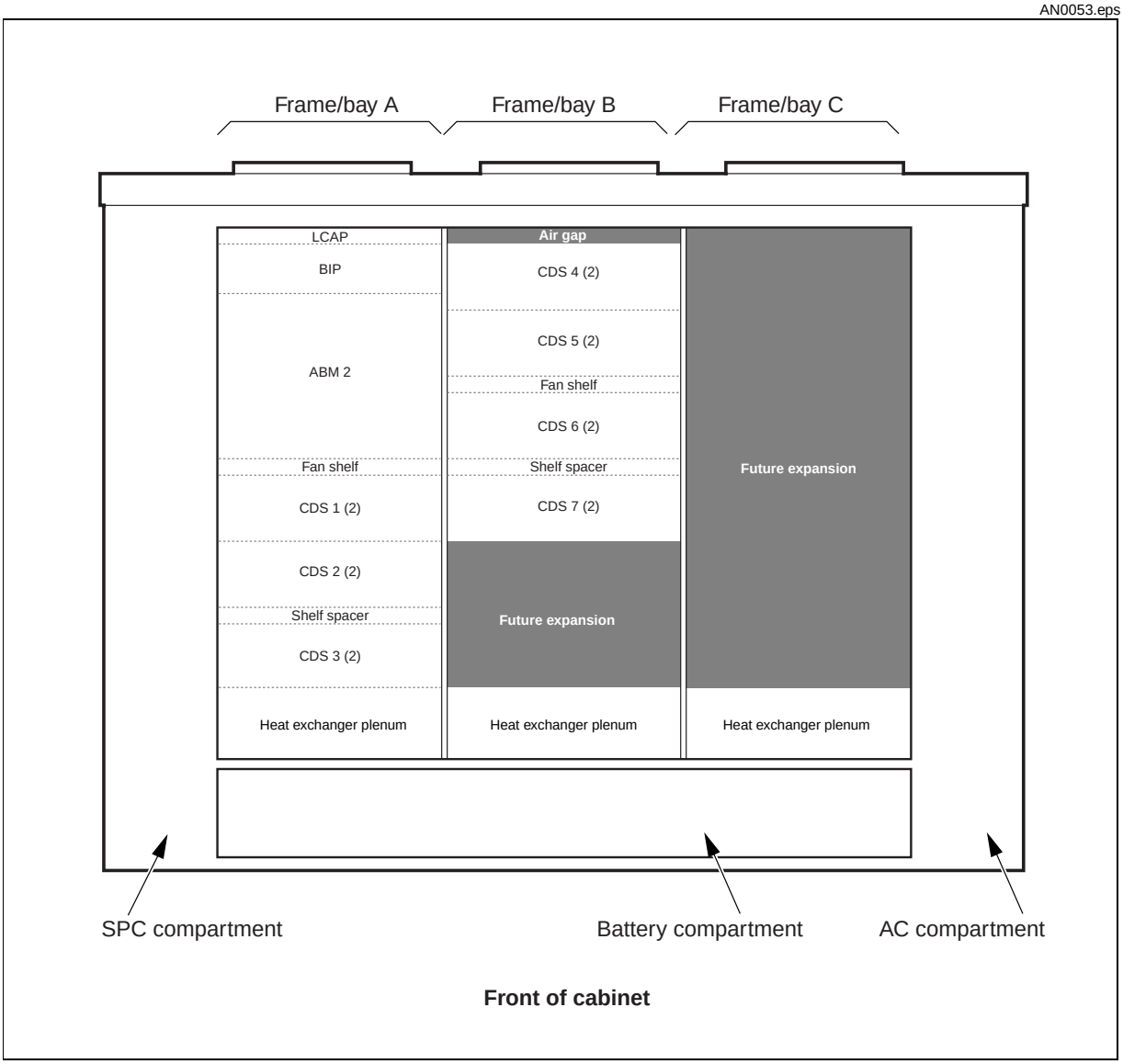
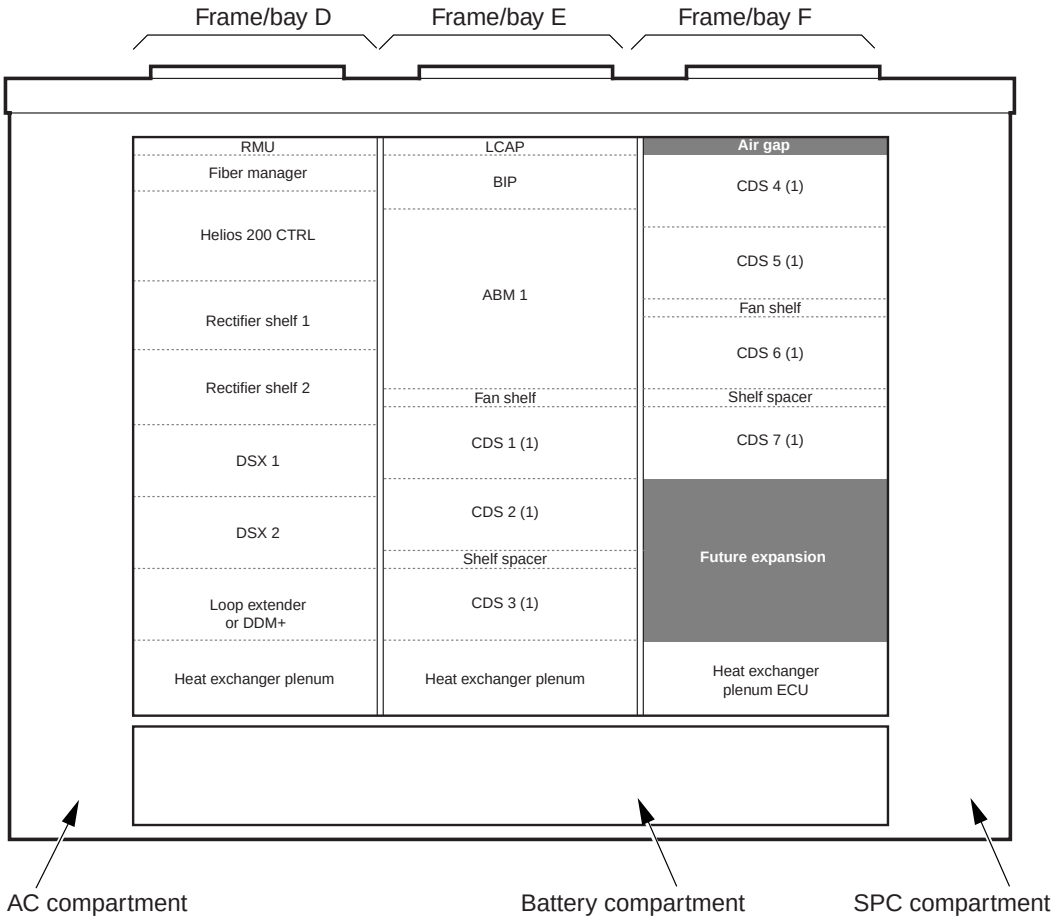


Figure 2-18
1344-line configuration (rear view)

AN0054.eps



2016-line AccessNode system

This configuration consists of 2016-line AccessNode system. Three ABM shelves are required to support the system capacity. The AccessNode system is equipped with 21 copper-distribution shelves that provide up to 96 lines each.

The extended system configuration is equipped with a DSX-1 cross-connect shelf to feed DS-1 lines from the primary ABM shelf to the second ABM shelf and to the third ABM shelf.

The 1–2016 VF lines are routed from the system out to the surge protection center (SPC). You can splice the VF lines directly into the outside plant (OSP) cables.

See Figure 2-19 and Figure 2-20 for a view of the equipment frame/bay layout.

Figure 2-19
2016-line configuration (front view)

AN0050.eps

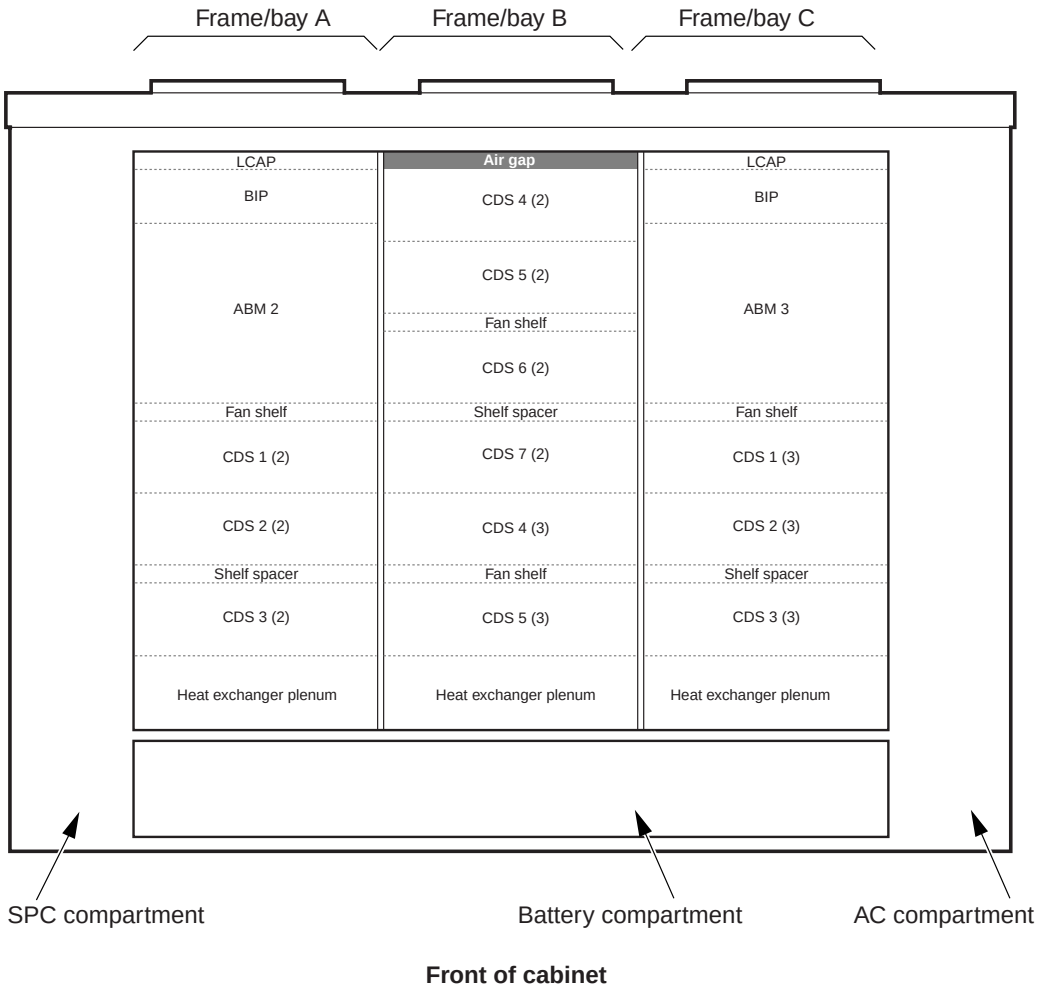
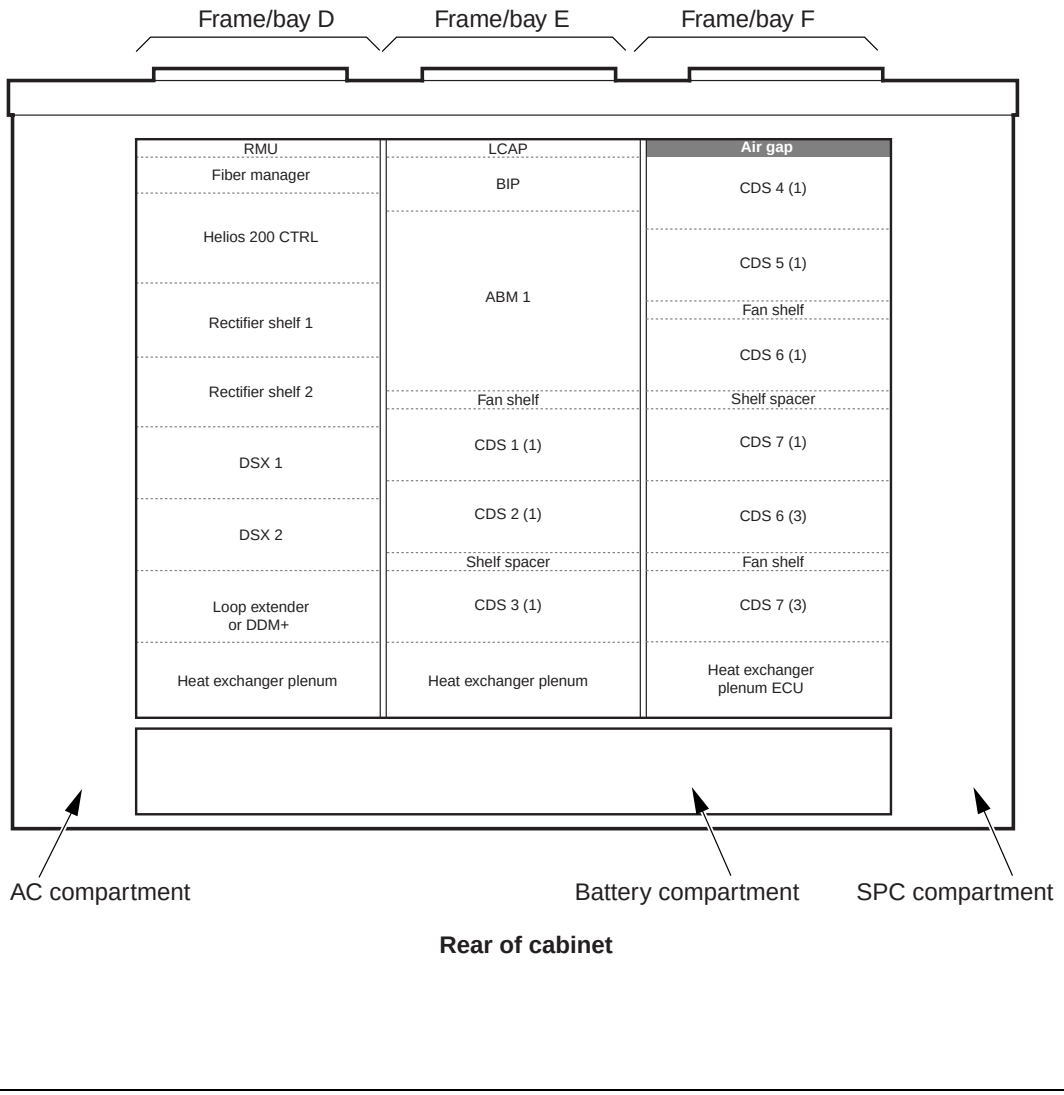


Figure 2-20
2016-line configuration (rear view)

AN0051.eps



AccessNode equipment descriptions

The AccessNode equipment can be configured to any Access application. The flexibility is achieved by configuring any combination of the following equipment shelves:

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

- copper-distribution shelf (CDS)
- fan shelf

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

The following sections describe the AccessNode equipment.

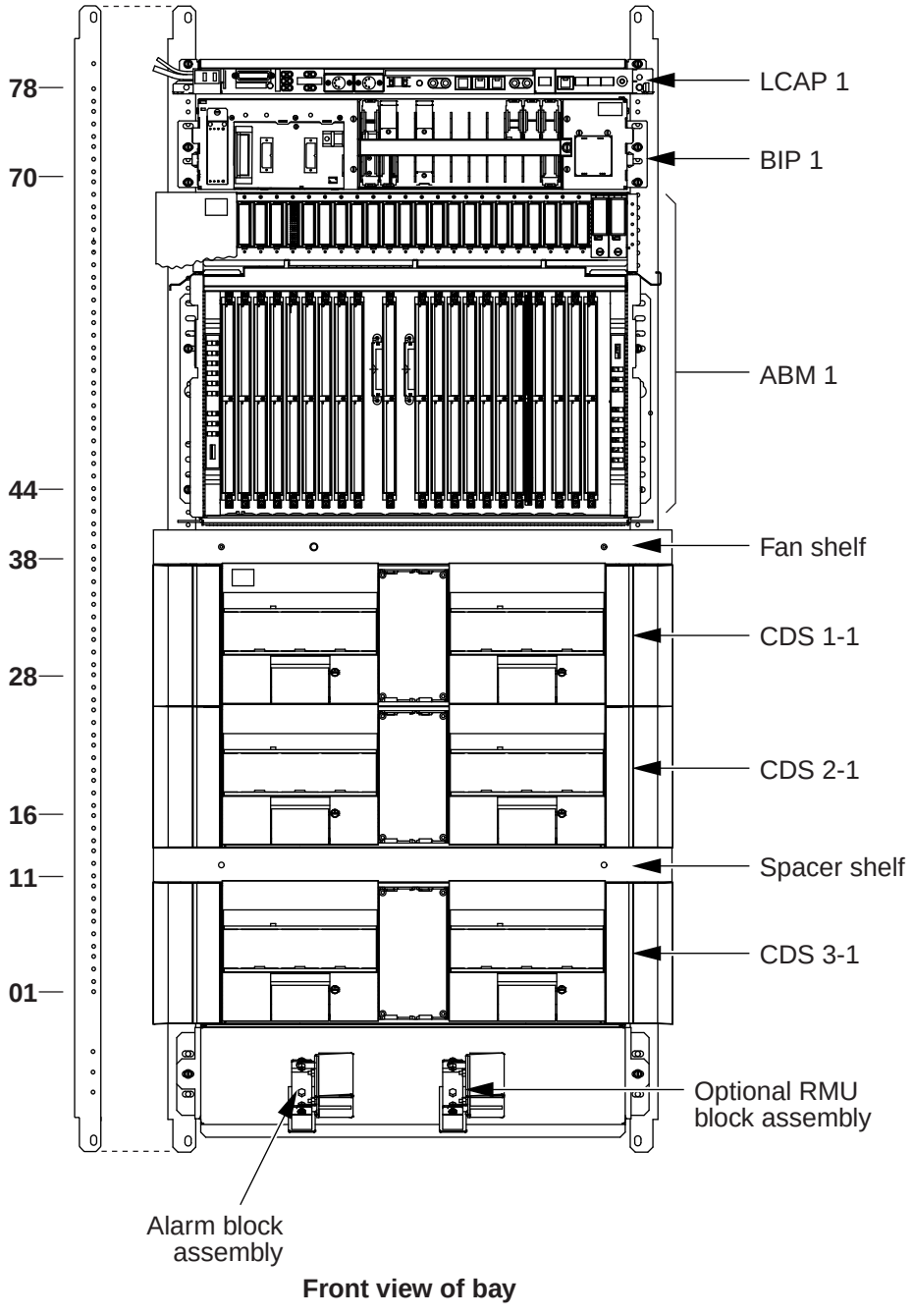
Equipment layout

The equipment shelves described in this section mount in the front-side of the frame/bays (A, B, C, D, E and F).

Figure 2-21 shows the equipment layout and shelf positions of frame/bay E in the cabinet equipment compartment.

Figure 2-21
Frame/bay equipment layout front view

AN0038.EPS



Legend:

RMU = Remote Monitoring Unit

Access bandwidth manager shelf

The NT4K10 access bandwidth manager (ABM) shelf supports up to seven copper-distribution shelves installed with wideband interface units providing up to 672 VF lines (see Figure 2-22).

The ABM also performs bandwidth management at the DS0 level and routes portions of the SONET payload to the copper-distribution shelves.

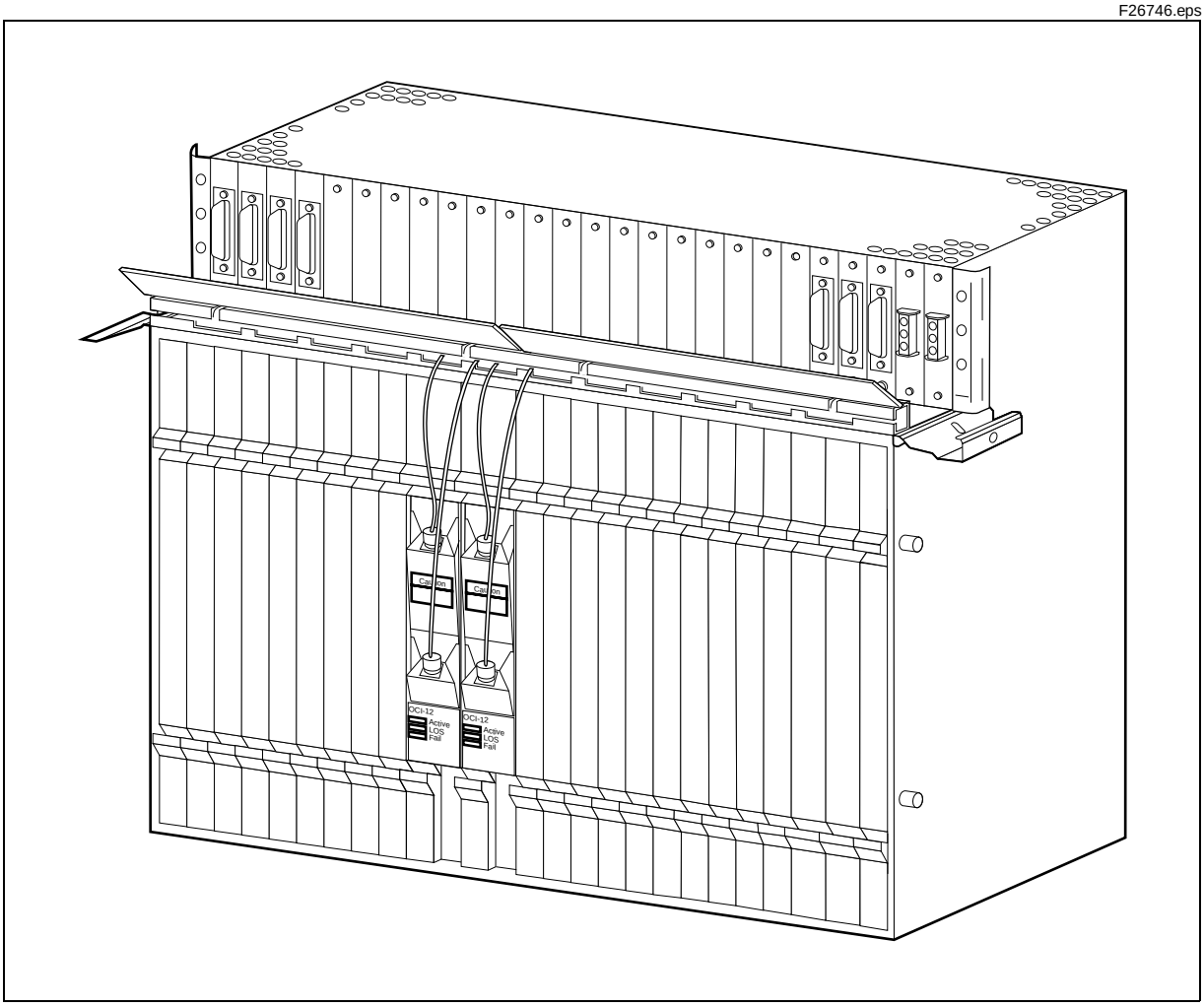
The ABM shelf is designed for full front access to the internally mounted circuit packs. The layout of the ABM shelf includes slots for:

- side interconnect circuit packs (left and right)
- tributary interface circuit pack positions
- primary interface circuit pack positions
- secondary interface circuit pack positions
- access circuit pack positions
- control circuit pack positions

For detailed information regarding the ABM shelf and circuit pack descriptions, reference *Configuration and Equipment Description*, 323-3001-100, in Description, Volume 2A.

Figure 2-22
ABM shelf (close-up view)

F26746.eps



Breaker interface panel

The NT4K14 breaker interface panel (BIP) is the power distribution unit for the AccessNode equipment (see Figure 2-23). The BIP distributes battery power to the ABM shelf and the copper-distribution shelf (CDS).

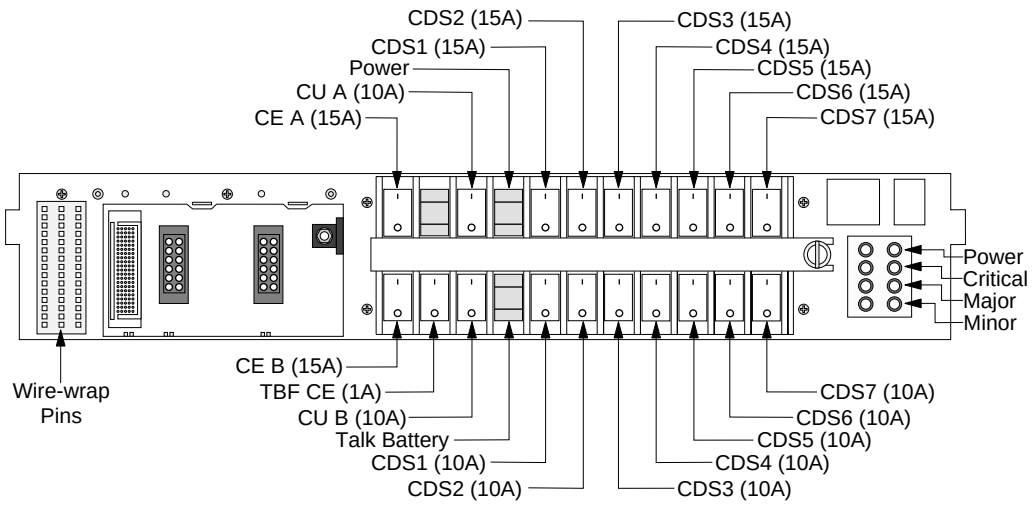
The BIP contains provisions for up to 19 circuit breakers to:

- protect talk-battery and logical-battery feeds to the CDS
- protect the A and B power feeds to the ABM
- protect the test access card used for testing the line interface units in the CDS

For detailed information regarding the breaker interface panel description, reference *Configuration and Equipment Description*, 323-3001-100, in Description, Volume 2A.

Figure 2-23
Breaker interface panel

FW-15002



Note: For the NT4K14AB BIP product releases 03 and below, CU A and CU B are 10 A breakers. For the NT4K14AB BIP product releases 04 and above, CU A and CU B are 15 A breakers.

Local craft access panel

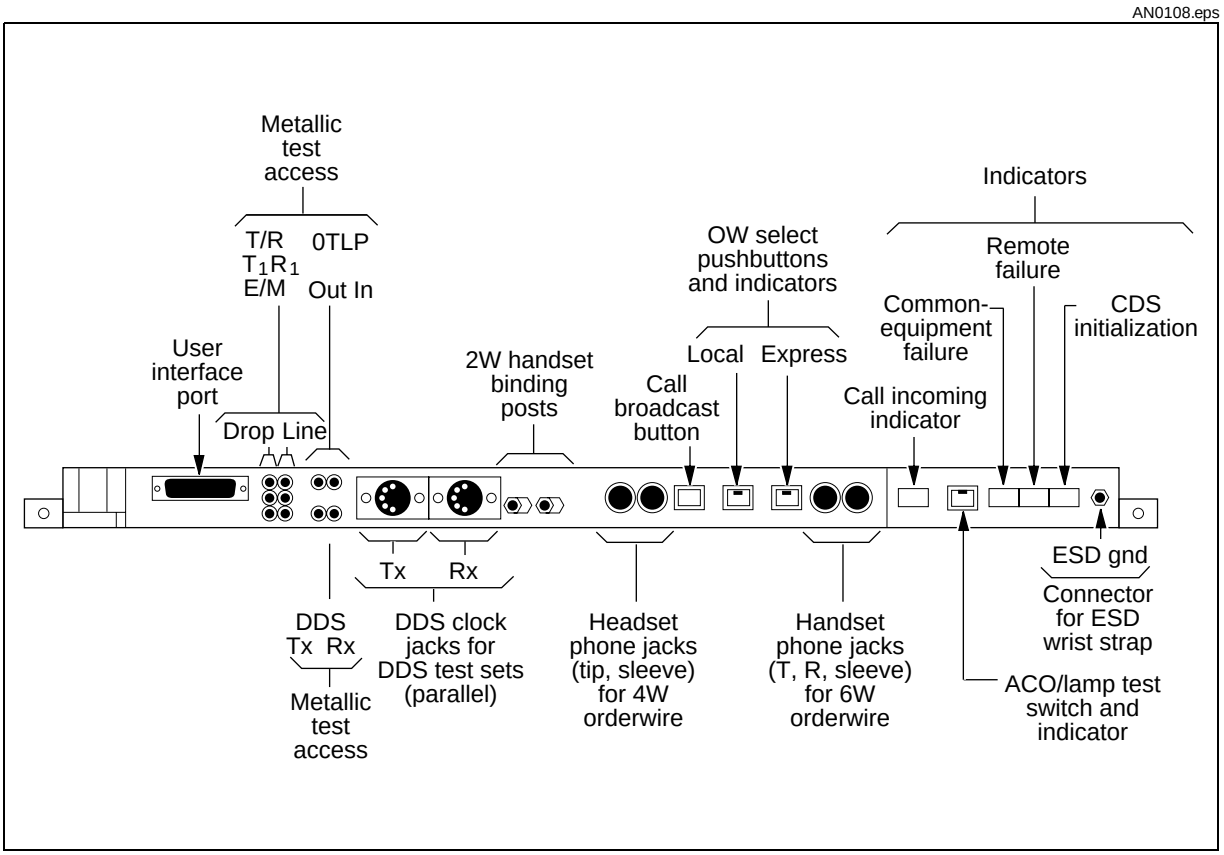
The NT4K16 local craft access panel (LCAP) provides the craftsperson with access to the ABM shelf status information, alarms and the local test access bus (see Figure 2-24).

Functions available through the LCAP include:

- orderwire
- line test access
- RS-232C interface for system configurations
- DDS clock access
- alarm cutoff (ACO)
- alarm indicator LEDs
- electrostatic discharge (ESD) grounding

For detailed information regarding the local craft access panel description, refer to *Configuration and Equipment Description*, 323-3001-100, in Description, Volume 2A.

Figure 2-24
Local craft access panel



Copper-distribution shelf

The NT4K12 copper-distribution shelf (CDS) provides copper interfaces to serve subscribers on loops of up to 1900 ohms (including the telephone set). Five different types of line interface units support a full range of copper-based services.

CAUTION
Risk of damage to equipment
During initial setup of the AccessNode, Nortel Networks recommends that the equipment side remain disconnected from the outside plant subscriber loops (at the protector modules) until the line cards are installed and powered up.

For example, when you use five-pin protector modules, pull the modules out slightly to the first detent position.

The CDS is divided into two drawers each containing 48 line interface slots for:

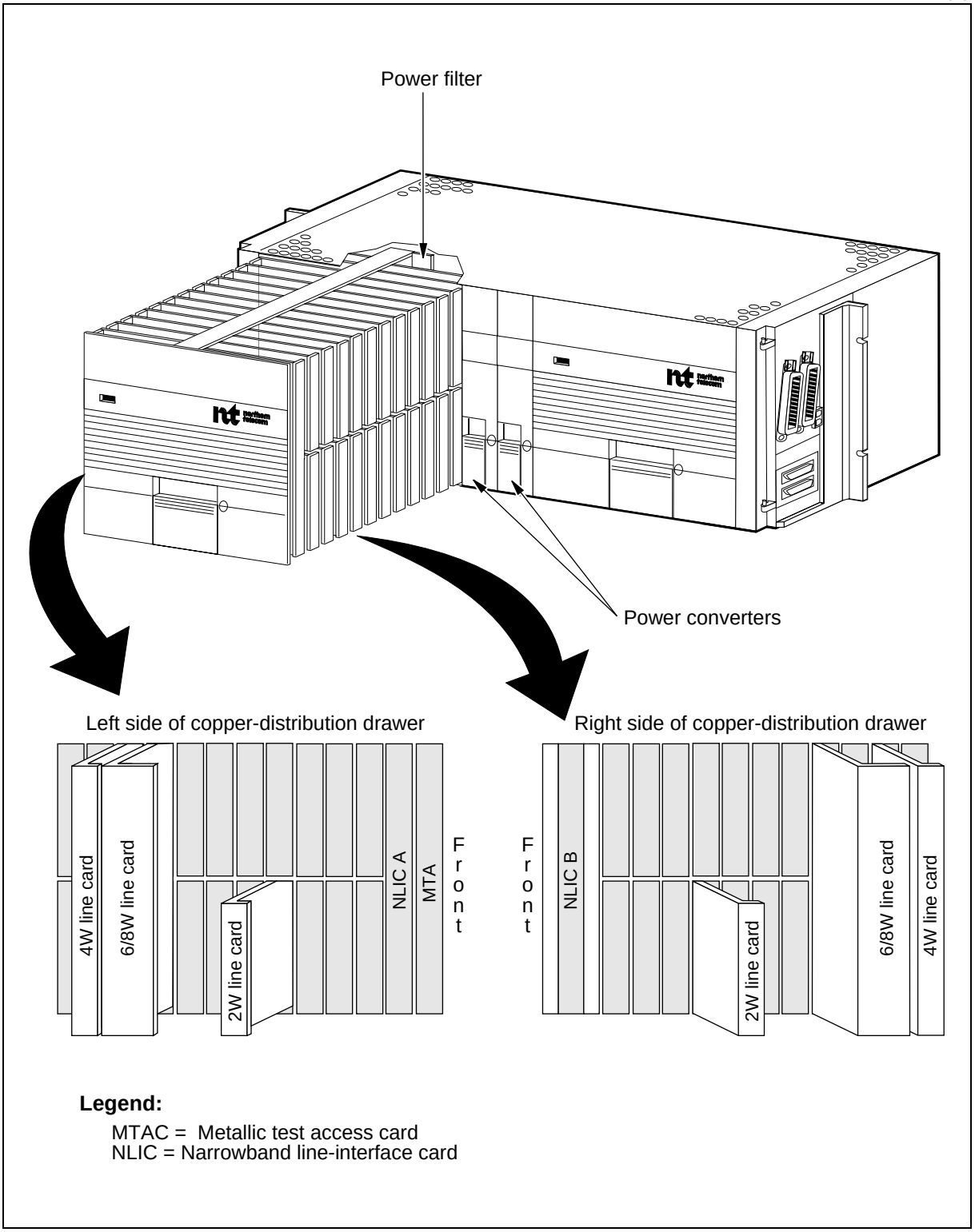
- 2-wire services
- 4-wire services
- 6- or 8-wire services

Mounted between the two drawers are two redundant power converters that supply power to the line interface units (see Figure 2-25).

For detailed information regarding the copper-distribution shelf and circuit pack descriptions, refer to *Signal Flow and Circuit Pack Description*, 323-3001-102, in Description, Volume 2A.

Figure 2-25
CDS (close-up view)

AN0101



Legend:

MTAC = Metallic test access card
NLIC = Narrowband line-interface card

Equipment fan shelves

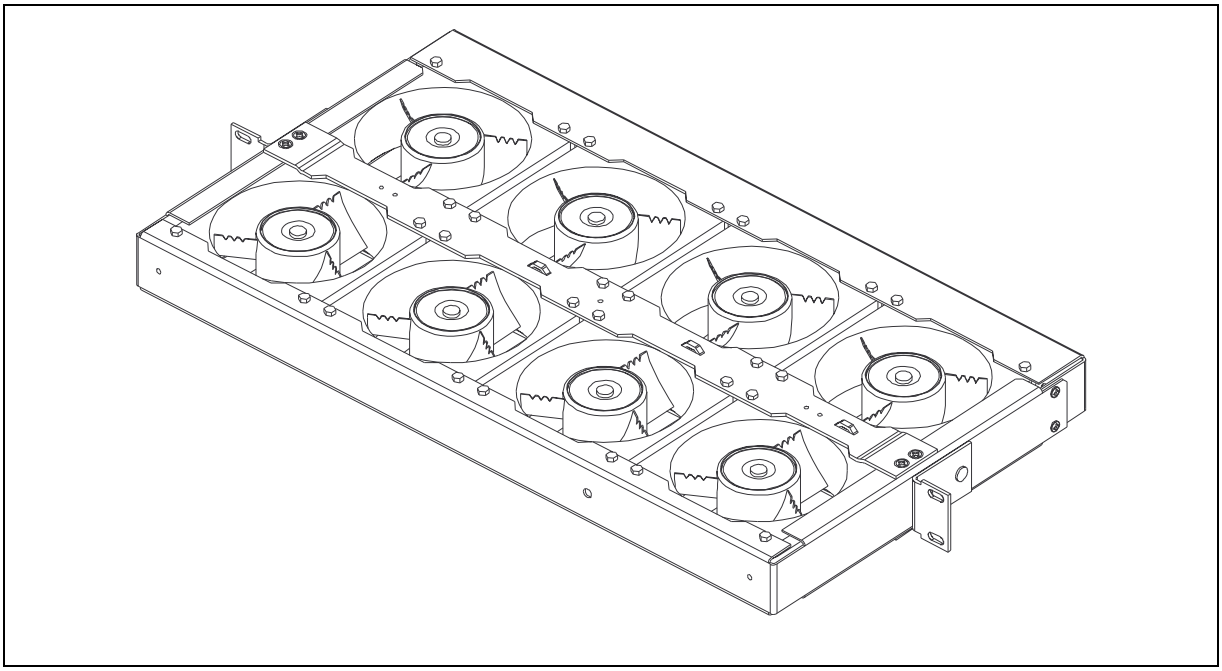
In addition to the cabinet roof fans, there are equipment fan shelf assemblies mounted in the equipment frame/bay in the interior of the equipment compartment. Equipment fan shelves enhance equipment cooling.

Up to two fan shelves, can be mounted in each frame/bay. One NT4K0610 8-fan shelf is demonstrated (see Figure 2-26).

The NT4K0610 8-fan shelf consists of eight 4-inch, -48 V dc, 110 cubic feet per minute (CFM) fans in a 1-position mounting framework. Each individual fan unit is thermally fused for protection against overheating.

Figure 2-26
NT4K0610 8-fan shelf

FW-15607



Fan alarms

The environmental control unit (ECU) generates high temperature alarms when interior temperatures exceed 149° F (65° C) ± 2° C.

The fan equipment shelves generate a major fan fail alarm (FFA) and the front panel red LED illuminates when at least one fan unit fails in the shelf. The fan shelves provide connection points for fan failure alarm reporting to the ECU.

Peripheral equipment descriptions

External to, and working in conjunction with, the AccessNode system, are other equipment shelves and options that provide extended flexibility in meeting customer needs.

Other cabinet equipment and options include:

- rectifiers
- batteries
- fiber patching facilities
- DC distribution shelf
- DSX-1 cross-connect facilities
- repeater/span termination facilities

The cabinet equipment and options as listed above are described in the sections that follow.

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

Failure to comply with this warning can result in a fire.

Rectifiers

The AN2016 cabinet offers the MPR25 25A rectifier in combinations of one to five plug-in modules mounted in the NT5C10CP-61 rectifier shelves (see Figure 2-27).

The rectifiers provide n+1 redundancy.

The rectifiers perform the following:

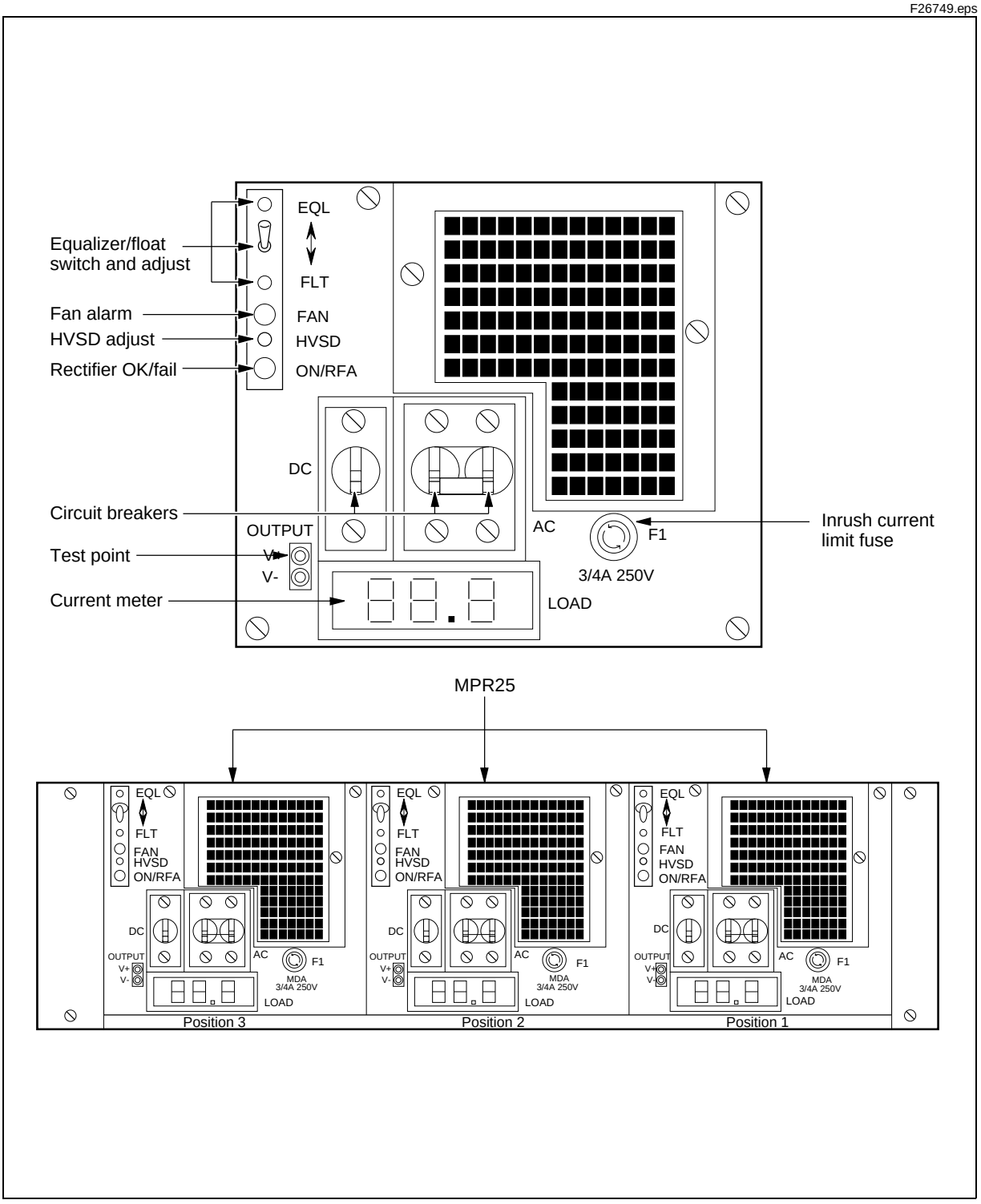
- power the installed equipment
- power the cabinet fans
- provide battery charge current

The output voltage of the MPR25 25A rectifier is adjustable from -44 V dc to -56 V dc and is nominally adjusted to provide an output of -55 V dc.

The voltage must be adjusted according to the type of battery selected. To adjust the output voltage regarding the MPR25 25A rectifier, refer to "*Description, Installation, Operation and Maintenance Manual*", 169-2071-500.

Figure 2-27
NT5C10CP-61 rectifier shelf e/w three MPR25 rectifiers

F26749.eps



Batteries

The AN2016 cabinet offers a variety of battery options. Eight hours of battery reserve power can be delivered at up to a maximum of 800 Ampere-hours (Ah) (refer to Table 6-19 for ordering).

The following battery options are available:

Manufacturer	Voltage	Rating
C&D Power	12 V dc	100 Ah
DEKA Unigy	12 V dc	100 Ah
Power Battery Company	12 V dc	100 Ah

Note: The customer can select an external battery vault instead of the provided battery compartment. If so, the use of other batteries delivering up to 800 Ampere-hours (Ah) are required to maintain a battery reserve of eight hours.

DC distribution shelf

The AN2016 cabinet is equipped with the NT6C28FB-61 dc distribution shelf. The unit distributes -48 V dc power to the AN2016 equipment. The dc distribution shelf performs all the supervisory and control functions required for a reliable and continuous power supply see (Figure 2-28).

Reference material for the shelves include:

- Helios System 200/48, Release 4.0 or later:
  - — *Description, Installation, Operation and Maintenance Manual*, 167-9021-109

Functional features

The unit provides the following service features:

- 300 A battery bus bars capacity
- 200 A system discharge capacity
- integrated distribution and control/monitoring facilities
- battery or operation without batteries
- circuit breaker protection for equipment
- low voltage disconnect (LVD) facilities for battery protection
- battery connection for battery backup switching
- fully connectorized back panel for ease of installation and operations

NT6C28FB-61 dc distribution shelf

The NT6C28FB-61 dc distribution shelf serves as a dc power distribution point for the rectifiers and batteries in the AN2016 equipment. Figure 2-29 provides circuit breaker and fuse assignments.

Functional features of the NT6C28FB-61 include:

- two 50 A circuit breakers to protect the power output to the ECU
- twelve 30 A circuit breakers to protect the power output to the BIP for the AccessNode equipment load
- two 15 A circuit breaker designated as spare for optional equipment DDM+ or Soneplex loop extender
- three 2 A GMT fuse designated for DSX cross-connect and optional RMU unit

Figure 2-28
NT6C28FB-61 dc distribution shelf

AN0077.eps

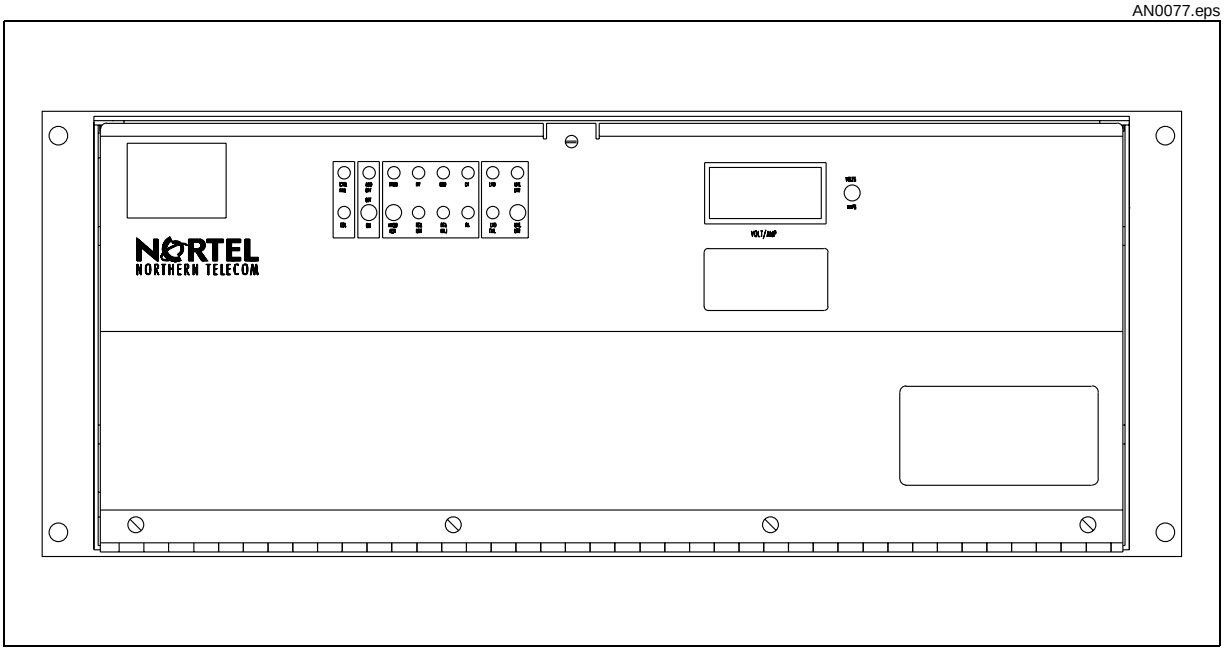
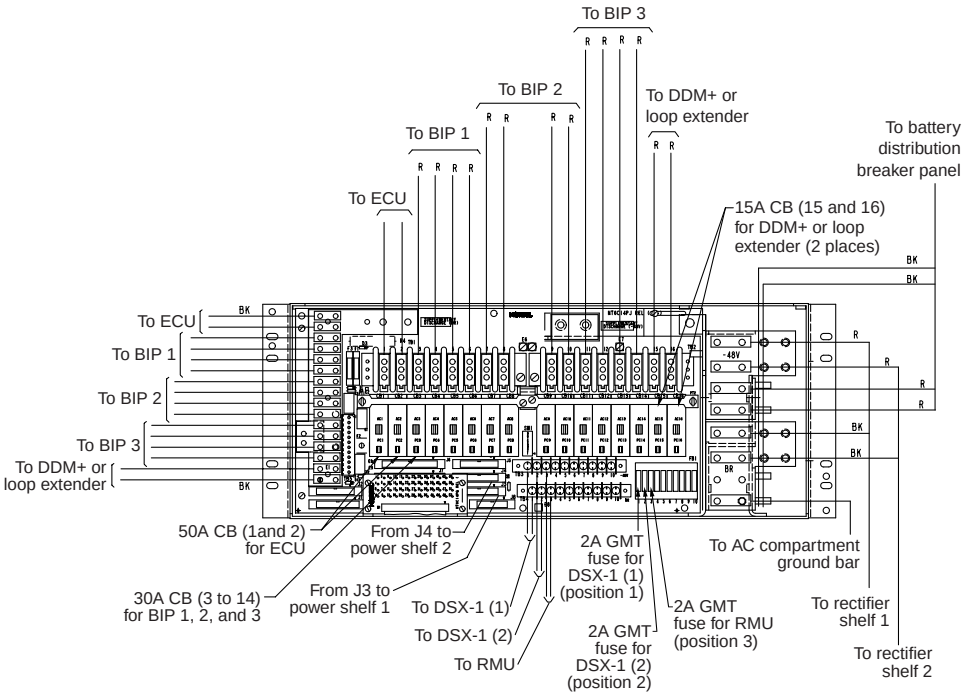


Figure 2-29
NT6C28FB-61 dc distribution shelf functional feature

AN0052.eps



DSX-1 cross-connect facilities

The DSX-1 panel interconnects the span termination and the ABM shelves, installed in the frame/bay D in the rear of the AN2016 cabinet. DSX cross-connect facilities are available in one optional configuration. A 56-circuit panel provides bantam jack access ports for testing and cross-connecting DS1 lines.

The AN2016 cabinet can be equipped with one or two DSX-1 panels. The panels are designated as DSX-1 #1 and DSX-1 #2. The DSX-1 #1 panel interconnects the ABM #1 shelf with ABM #2 and #3 shelves. The DSX-1 #2 interconnects the ABM #1 shelf and the outside equipment manufacturer (OEM) equipment DDM+ or Soneplex loop extender shelf.

Configurations of the DSX-1 #1 include the following:

- 864-1344 line AccessNode system
- 2016-line AccessNode system

In a 864-1344 line AccessNode system, the ABM #1 shelf is interconnected with the ABM # 2 through the cross-connect DSX-1 #1 (see Figure 2-30 and Figure 2-31).

Figure 2-30
DS1 wiring diagram 864 and 1344 line system

AN0100.eps

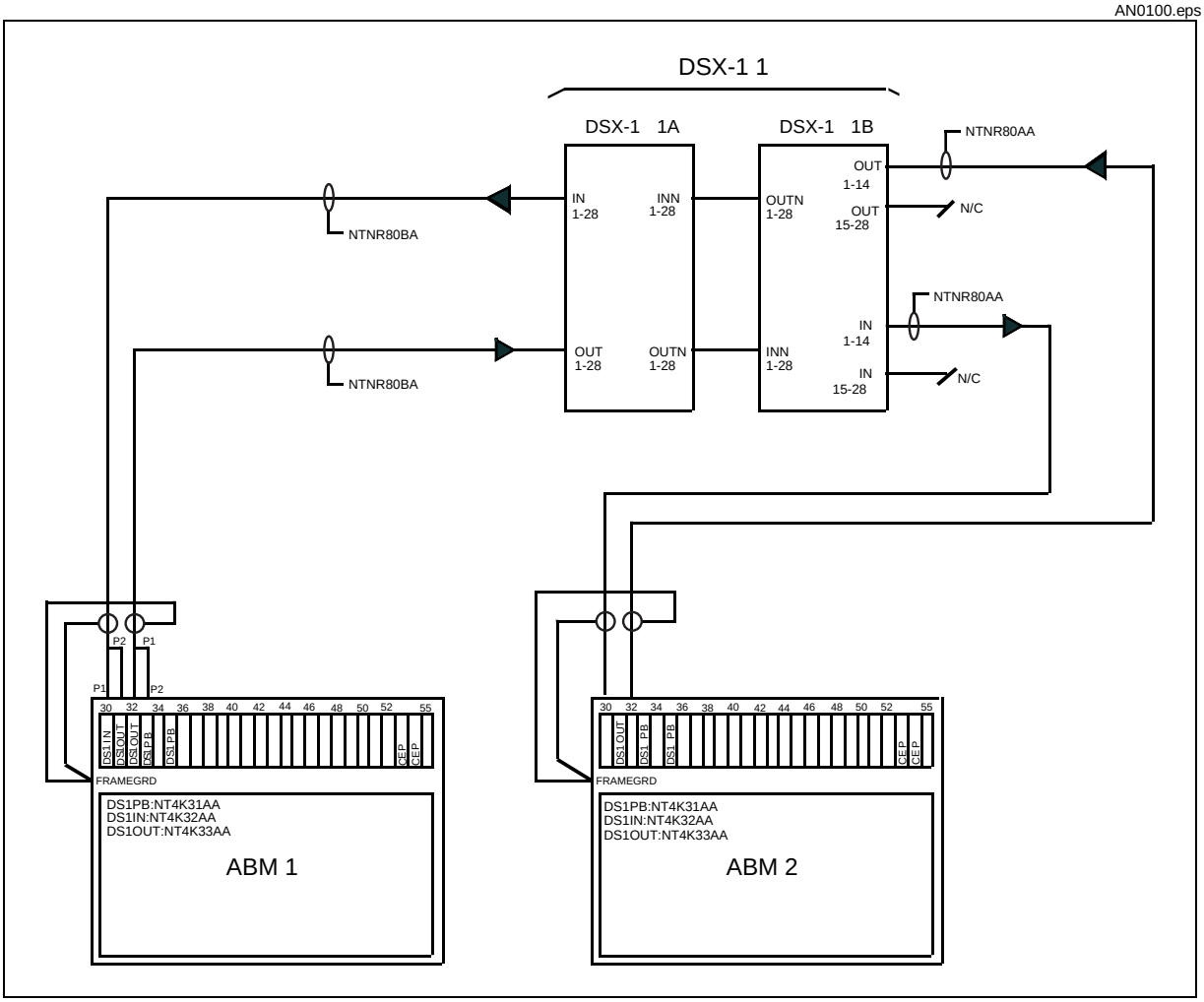
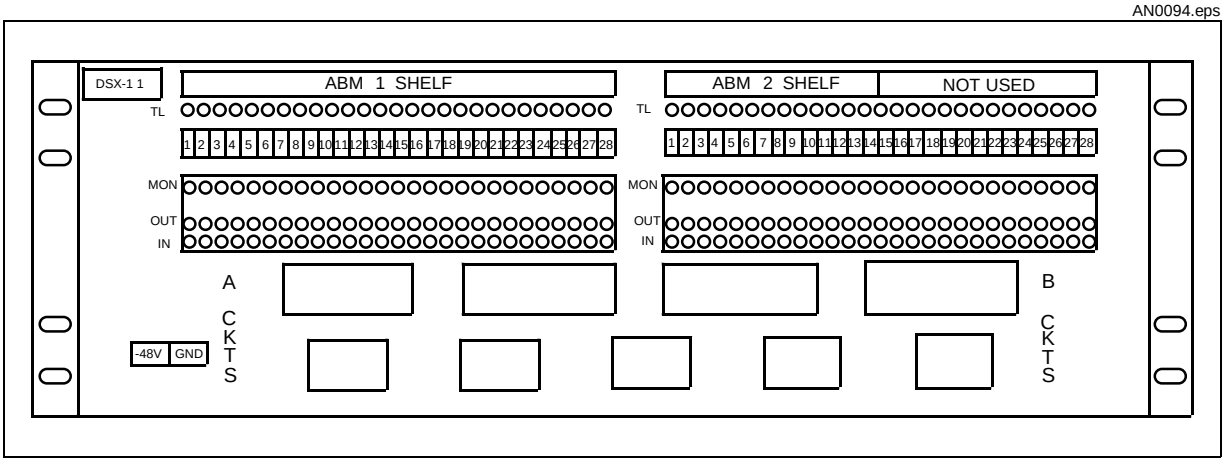


Figure 2-31
DSX-1 #1 layout for 864 and 1344 line system

AN0094.eps



In a 2016 line AccessNode system, the ABM #1 shelf is interconnected with the ABM # 2 and the ABM # 3 through the cross-connect DSX-1 #1 (see Figure 2-32 and Figure 2-33).

Figure 2-32
DS1 wiring diagram 2016 line system

AN0093.eps

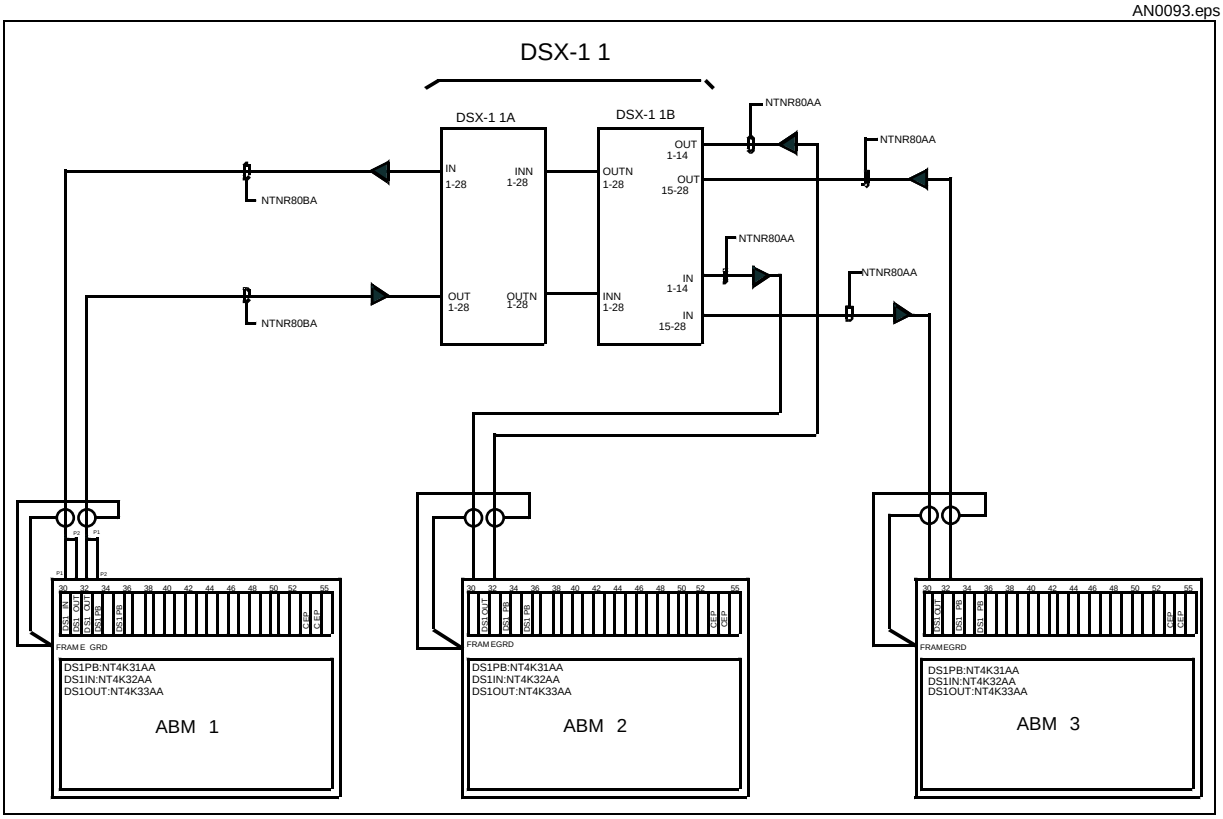
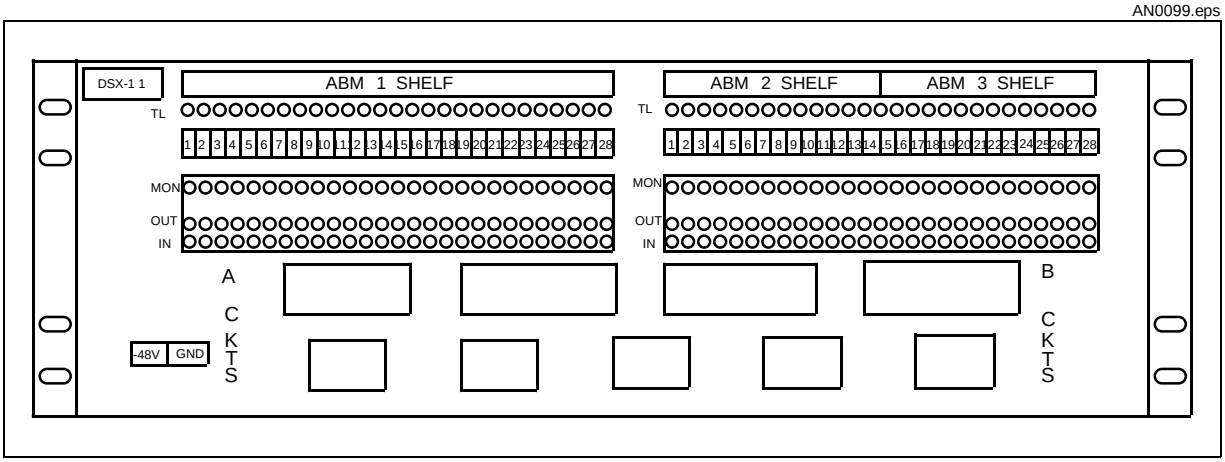


Figure 2-33
DSX-1 #1 layout for 2016 line system

AN0099.eps



Configurations of the DSX-1 #2 includes one of the following:

- DDM+ shelf
- Soneplex loop extender shelf

In a configuration providing the DDM+ shelf the ABM #1 shelf is interconnected with the DDM+ shelf through the cross-connect DSX-1 #2 (see Figure 2-34 and Figure 2-35).

Figure 2-34
DS1 wiring diagram DDM+ and ABM #1 shelf

AN0095.eps

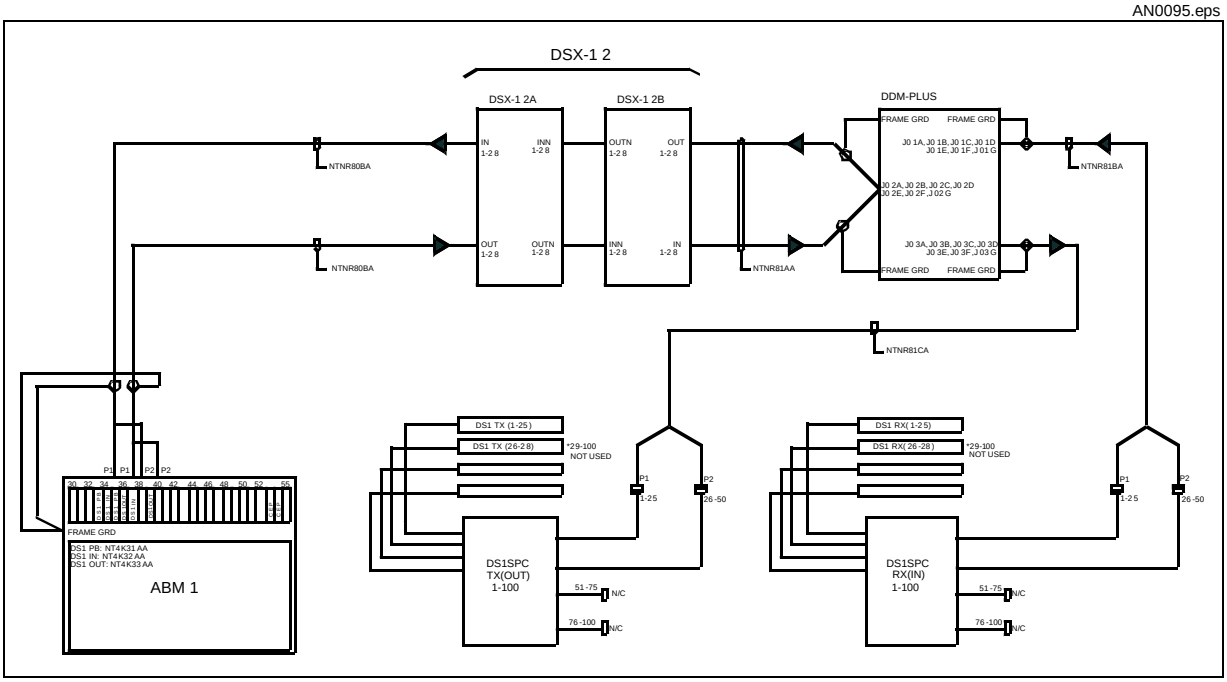
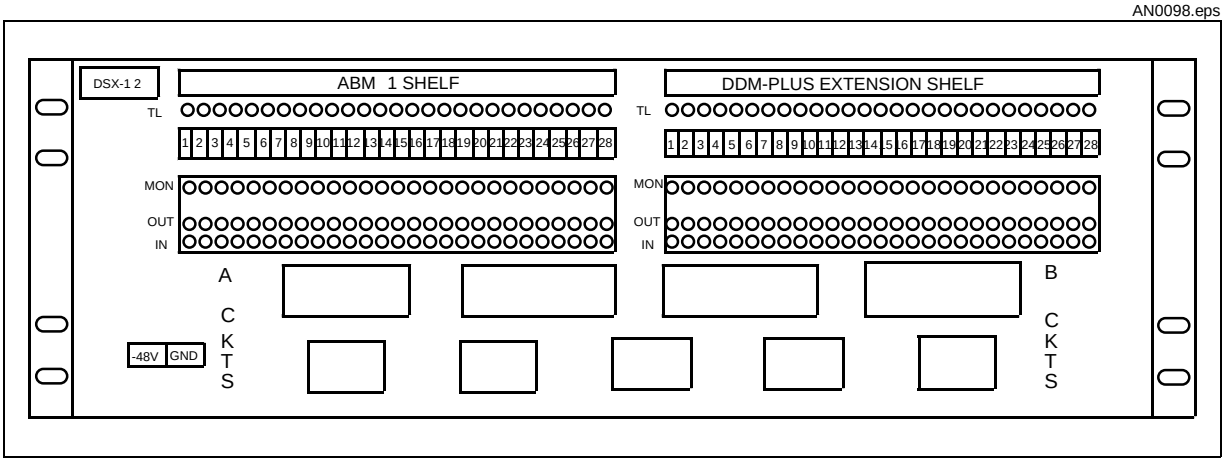


Figure 2-35
DSX-1 #2 layout for DDM+ and ABM #1 shelf

AN0098.eps



In a configuration providing the Soneplex loop extender shelf the ABM #1 shelf is interconnected with the Soneplex shelf through the cross-connect DSX-1 #2 (see Figure 2-36 and Figure 2-37).

Figure 2-36
DS1 wiring diagram Soneplex and ABM #1 shelf

AN0097.eps

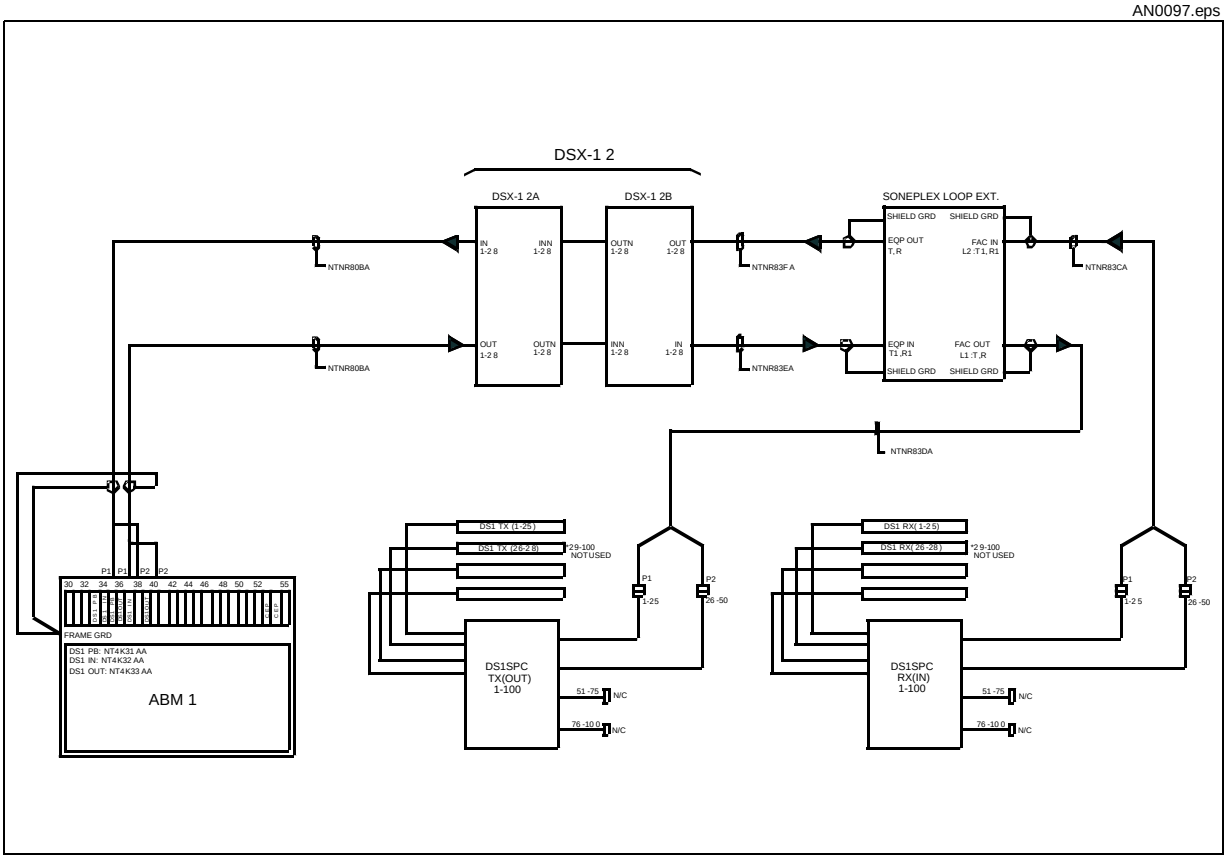
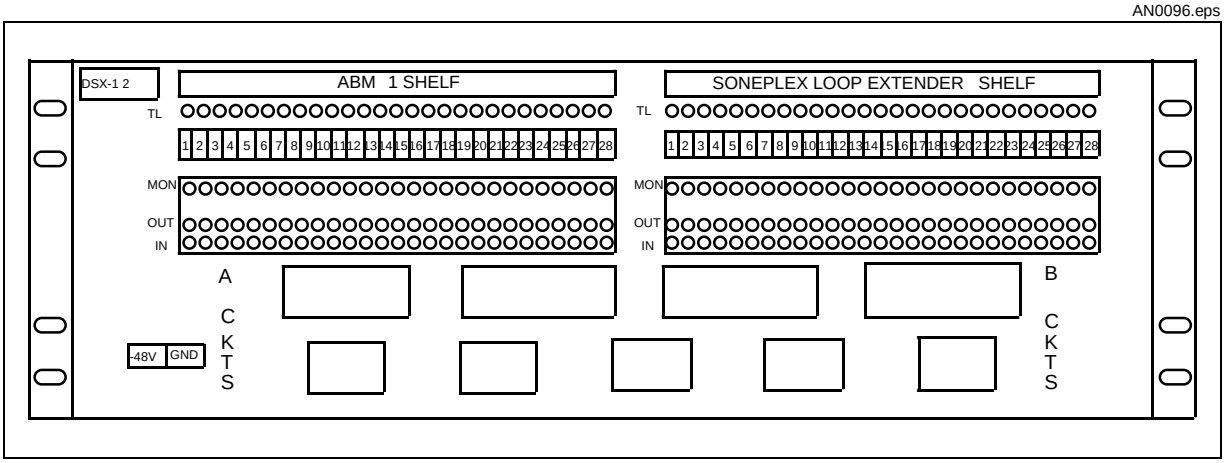


Figure 2-37
DSX-1 #2 layout for Soneplex and ABM #1 shelf

AN0096.eps



Repeater/span DS1 termination facilities

DS1 termination facilities are provided by up to two 28-position repeater shelves.

DS1 lines IN are terminated with powering or bridging repeater modules or cut-through repeater modules as required.

The repeater shelves are equipped with a fuse and alarm module for power protection of the modules and fuse alarm generation/transport to the alarm reporting section of the BIP.

Mechanical specifications

Table 2-2 lists the mechanical specifications for the AN2016 Cabinet.

Table 2-2
Mechanical specifications

Feature	Specification
Construction	folded aluminum of 0.125 inch thick, allow 5052 with TGIF polyester powder coat finish
Colors & Finish	TGIC polyester powder coat with a textured finish, off-white paint, per Munsell Y 7.3 8.1
Access	• double front door • double rear door • side door to SPC and termination compartment • side door to AC compartment • battery compartment ***Note 1:*** The doors have concealed hinge pins. ***Note 2:*** The doors are weather sealed.
Cable entry	by openings in the bottom of the cabinet ***Note:*** You must seal cable conduits to prevent water entry. You must apply a plug compound on and around all conduit openings.
Door locks	a multi-point locking mechanism operated by a handle and equipped with padlock
Roof	equipped with four steel eye bolts for lifting and installing cabinet

Operational specifications

The following tables list the site specifications for

- environmental control
- acoustic noise
- temperature
- relative humidity
- altitude
- regulatory requirements

Environmental control

Table 2-3 lists the environmental control specifications for the AN2016 Cabinet.

Table 2-3
Environmental control specifications

Feature	Specification
Heater pad for batteries	687 W / 120 V ac, fused, thermostatically controlled, located underneath a painted aluminum plate. The heater pad activates at 40° F (4.4° C) and deactivates at 60° F (15.5° C) ***Note:*** It is recommended that the heater pads be activated at least once every year to ensure proper functionality.
Closed loop cooling heat exchanger	air to air, closed loop system with separate field replaceable fans for the internal and external flow paths. Total capacity is 4800 Watts.
Gas concentration	hydrogen gas concentration not greater than 1% in battery compartment or any other cabinet compartment according to Bellcore GR-487-CORE
Heat exchanger fans	six heat exchanger fans. Minimum service life of 10 years, greater than 40,000 hrs at 40° C. Easily replaceable, connectorized. Each heat exchanger is equipped with an internal and external fan which turn on at 38° C and turn off at 27° C.

Acoustic noise

Table 2-4 lists the acoustic noise specifications for a cabinet equipped with telecommunication equipment and associated cooling fans. The cabinet suppresses acoustical noise as stated with doors closed during times of maximum noise generation within the cabinet.

Table 2-4
Acoustic noise specifications

Acoustic noise condition	Specification (measured in dBA for hard site)
Measured at 1.5 meter (5 ft) from the cabinet:	≤ 65

Temperature

Table 2-5 lists the temperature specifications for the AN2016 Cabinet.

Table 2-5
Temperature specifications

Temperature condition	Specification
Normal operating temperature outside cabinet	-40° F to +115° F (-40° C to +46° C)
Non-operating temperature (storage or transport)	-40° F to +158° F (-40° C to +70° C)

Relative humidity

Table 2-6 lists the relative humidity specifications for the AN2016 Cabinet.

Table 2-6
Humidity specifications

Humidity condition	Specification
Normal operating relative humidity outside cabinet	5% to 95%
Non-operating relative humidity (storage or transport)	5% to 95%

Altitude

Table 2-7 lists the unpressurized operating altitude specifications for the AN2016 Cabinet.

Table 2-7
Altitude specifications

Altitude	Specification
Minimum	197 ft (61 m) below sea level
Maximum	5905 ft (1800 m) above sea level

Altitude conditions and limits

Table 2-8 lists the conditions and limits where all equipment shall be functional when installed at elevations between 60 meters (197 ft) below sea level and 1800 meters (5905 ft) above sea level.

Table 2-8
Altitude conditions and limits

Conditions	Limits
Operating temperature	41° F to +104° F (5° C to +40° C)
Short term temperature	23° F to +122° F (-5° C to +50° C)
Rate of temperature change	54° F / hour (30° C / hour)
Operating relative humidity	5% to 85%
Short term relative humidity	5% to 90% but not to exceed 0.024 kg. water/kg of dry air

Regulatory specifications

Table 2-9 lists the Bellcore and regulatory specifications met by the AN2016 Cabinet. For more information, refer to Bellcore GR-487 CORE, *Generic requirements for electronic equipment cabinets*, Issue 01, June 1996.

Table 2-9
Applicable specifications

Item	Specification	Exceptions
UL-50 (Generic cabinet)	Type 3R	
UL-1459	AN2016 with AccessNode, 3rd edition	
UL-1950	3rd edition	
UL-67	Type 3R	
UL-891(Generic power)		
Safety and reliability	GR-487-CORE, section 3.3	
Quality of components	GR-487-CORE, section 3.4 and 3.5	
Finish	GR-487-CORE, section 3.6	
Screens	GR-487-CORE, section 3.7	
Door restrainers	GR-487-CORE, section 3.8	
Cabinet lifting	GR-487-CORE, section 3.10	

—continued—

Table 2-9
Applicable specifications (continued)

Item	Specification	Exceptions
Security	GR-487-CORE, section 3.11	CR3-66
Alarms (See Note 1)	GR-487-CORE, section 3.12	CR3-68
Condensation	GR-487-CORE, section 3.13	R3-72
Fans	GR-487-CORE, section 3.14	
Grounding	GR-487-CORE, sections 3.15	
Alternating current power	GR-487-CORE, sections 3.16.1,	R3-84,O3-85,R3-87, R3-88
Splicing compartment	GR-487-CORE, sections 3.17	
Equipment compartment	GR-487-CORE, sections 3.18	CR3-102
Battery compartment	GR-487-CORE, sections 3.19	R3-112
Cabinet installation	GR-487-CORE, sections 3.20	
Documentation	GR-487-CORE, sections 3.21	
Marking & shipping	GR-487-CORE, section 3.22	
Installation & Maintenance	GR-487-CORE, section 3.23	O3-140,O3-141
Quality	GR-487-CORE, section 3.24	
Thermal	GR-487-CORE, section 3.25 (Method 1)	
Thermal shock	GR-487-CORE, section 3.26	
Rain intrusion (See Note 2)	GR-487-CORE, section 3.27 and 3.30 NEMA 3R level	IP65
Acoustical noise	GR-487-CORE, section 3.28	
Weather tightness	GR-487-CORE, section 3.29	
Wind resistance	GR-487-CORE, section 3.31	
Impact resistance	GR-487-CORE, section 3.32	
Shotgun bullet resistance	GR-487-CORE, section 3.33	
Corrosion resistance	GR-487-CORE, section 3.35 and 3.36	
Transportation shock	GR-487-CORE, section 3.37	
Transportation vibration	GR-487-CORE, section 3.39	
Installation shock	GR-487-CORE, section 3.40	

—continued—

Table 2-9
Applicable specifications (continued)

Item	Specification	Exceptions
Environmentally induced vibration	GR-487-CORE, section 3.41	
Electromagnetic interference (EMI) for ECU	GR-1089-CORE, section 3 (all, see also Note 2), Class A devices	
Electrostatic discharge for ECU	GR-1089-CORE, section 2	
Radiated emissions for AN2016	FCC, part 15, class A	
Note 1: The alarms include door intrusion and high temperature alarms. ***Note 2:*** Section 3.27 applies to sealed cabinets only.		
—end—		

Additional information

For more information about AccessNode operating specifications, refer to *Configuration and Equipment Description*, 323-3001-100, in the AccessNode library.

Power and grounding

The AN2016 Cabinet operates from a standard 120/240 V ac, 100 A, single-phase, 3-wire commercial power supply. All ac wiring must conform to National Electric Code standards.

Alternating current power entrance

The AN2016 Cabinet meets all specifications required by a commercial or emergency power source. These specifications support ac voltage variation of 190–253 V ac (between Line 1 and Line 2, standard setting), with a frequency of 55–65 Hz. For more information, refer to Bellcore Family of Requirements, FR-440, *Functional criteria for digital loop carrier systems*, Issue 02, January 1997, TR-NWT-000057.

Direct current power requirements

A modular power rectifier provides power to the AN2016 Cabinet. The rectifier features extensive alarm monitoring and an LVD unit.

Battery backup

In the event of temporary power failure, an optional battery reserve of up to 800 Ah powers the system for up to eight hours of uninterrupted operation.

> ***Note:*** To operate with battery backup, you must install the correct number of battery strings for the number of VF lines connected to the cabinet (see Table 3-3).

Power consumption

Table 2-10 lists the power consumption for the equipment in accordance with the AN2016 cabinet configuration.

Table 2-10
Power consumption

Configuration	Typical power consumption (in watts)
672 Lines	2350 W
864 Lines	2950 W
1344 Lines	3550 W
2016 Lines	4750 W

Grounding

The ground bar connects to a ground rod in accordance with utility codes. For an illustration of the ground bar, see Procedure 3-9 on page 3-28, “Connecting the earth ground to the cabinet”.

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 25 Ω.

For an illustration of the AN2016 system ground block diagram (see Figure 3-5 on page 3-11).

Installation guidelines

The procedures in this chapter describe how to install the AN2016 Cabinet.

Procedures in this chapter

Table 3-1 lists the installation procedures in the order in which you must perform them.

Table 3-1
Installation procedures

Action	Details
Unpacking the cabinet	Procedure 3-1 on page 3-2
Selecting the site	Procedure 3-2 on page 3-3
Preparing a concrete mounting pad for the cabinet	Procedure 3-3 on page 3-4
Preparing the cabinet for installation	Procedure 3-4 on page 3-12
Routing the cables to the mounting pad	Procedure 3-5 on page 3-18
Mounting the cabinet on the pad	Procedure 3-6 on page 3-21
Leveling the cabinet	Procedure 3-7 on page 3-24
Installing the cable in the split sleeve	Procedure 3-8 on page 3-26
Connecting the earth ground to the cabinet	Procedure 3-9 on page 3-28
Installing the surge arrestor	Procedure 3-10 on page 3-32
Connecting ac power	Procedure 3-11 on page 3-34
Installing batteries	Procedure 3-12 on page 3-38
Installing battery cables from an external vault	Procedure 3-13 on page 3-43

Procedure 3-1
Unpacking the cabinet

Use this procedure to unpack the AN2016 Cabinet.

Requirements

You need the following tools and materials:

- claw hammer or ripping bar to remove crating material

Risk of cabinet tipping
Before opening the front or rear door, ensure that the other door is locked. Open both doors at the same time only when the cabinet is secure on the mounting pad.

CAUTION
Equipment damage
Take special care not to damage the paint finish of the cabinet.

Action

Step	Action
1	Check the packing notes to confirm that you have all listed items. Report any discrepancies immediately.
2	Inspect the shipping containers for possible damage during shipment. Report any damage immediately for investigation and possible damage claims.
3	Carefully remove all packaging material from around the cabinet and pallet. ***Note:*** Keep the crating material to protect the cabinet during transfer to the mounting site.

—end—

Procedure 3-2
Selecting the site

Use this procedure to select the best location for the AN2016 Cabinet. Consider the following recommendations when engineering the site.

Action

Step	Action
1	Obtain the rights-of-way from landowner and other permits or approvals from public authorities.
2	Place AN2016 cabinets in servitudes, on dedicated (recorded) easements, or on property owned by the company. Avoid any unrecorded easements.
3	Use public safety road and street rights-of-way only when there is adequate space to place the closure and provide safe working conditions.
4	Select locations that will minimize accidental or intentional vandalism. Consider the use of protective posts when the cabinet is located near parking areas where vehicles may back into the cabinet.
5	Make sure that the site is not anywhere near a flood plain or near in ground sprinklers.
6	Choose a site free of heaving, if an area is subject to frost.
7	Place the cabinet at least 42 inches away from any obstruction, fence, or hedge.
8	Make sure that commercial power is available for single phase, 120/240 V ac deployment.
9	Place the cabinet where it will not create a visual or physical obstruction to either vehicles or pedestrians. ***Note:*** The choice of the site and compliance with regulations are the responsibility of the operating company. The provisioning of commercial power and outside plant (OSP) cables are also the responsibility of the operating company, including compliance with the applicable electrical codes for the site.

—end—

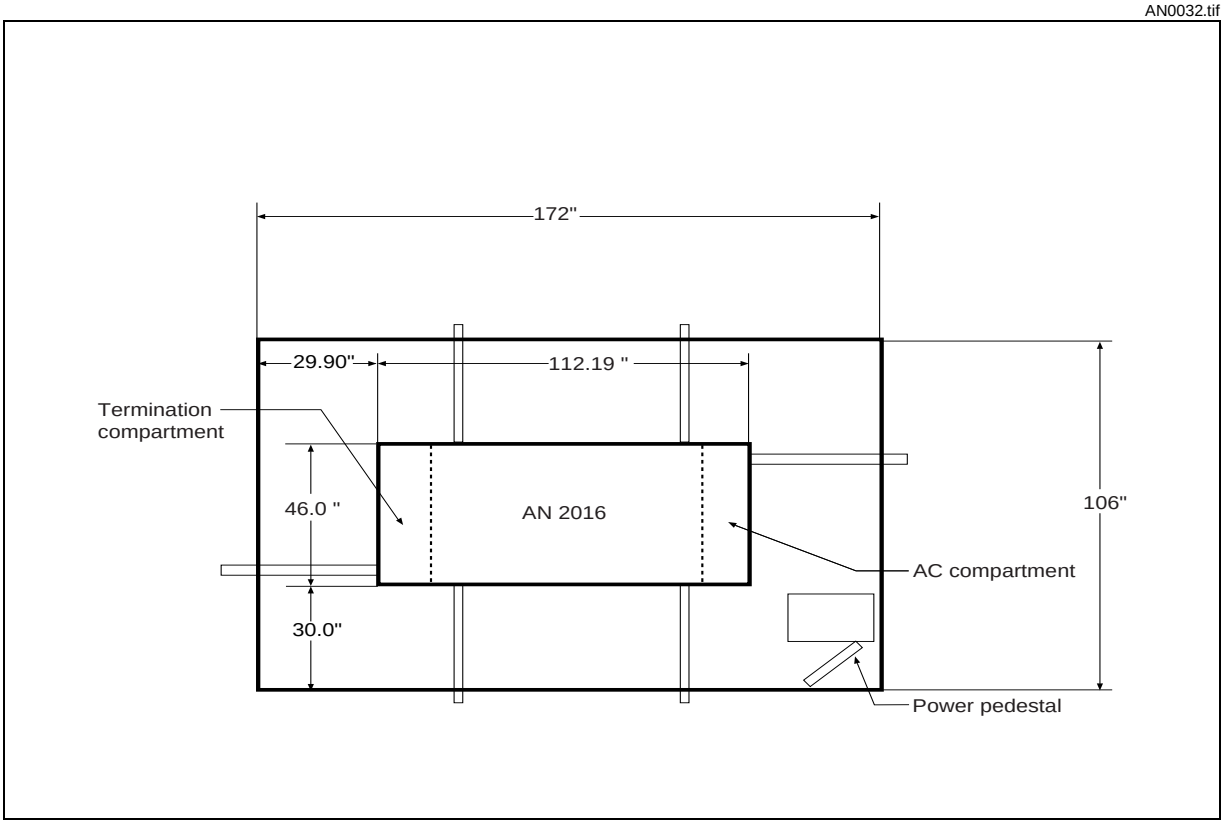
Procedure 3-3
Preparing a concrete mounting pad for the cabinet

Use this procedure to prepare a concrete mounting pad.

Place the AN2016 Cabinet on a concrete pad, which is either poured in place or precast. Install a power transfer pedestal on the mounting pad or mounted on a pole near the cabinet. Figure 3-1 shows the general position of the AN2016 cabinet and power transfer pedestal on the concrete pad.

Figure 3-1
Concrete mounting pad with optional power transfer pedestal

AN0032.tif



—continued—

Procedure 3-3 (continued)
Preparing a concrete mounting pad for the cabinet

Use the following recommendations before you prepare the cabinet mounting site:

- Use concrete only for the foundation pad. Do not use substitute materials, such as reinforced plastics (which lack the rigidity required for cabinet placement).
- Use a AN2016 pad mounting template, part no. A0774668 (see Figure 3-2) to orient the mounting bolts and access conduits in the pad. The template consists of galvanized metal mounting plates with anchor bolts and support rails. A rubber gasket is installed in two sections between the mounting pad and the cabinet to prevent corrosion. Use a separate template when you install a Reltec power transfer pedestal on the pad. Order either the AN2016 or power transfer template separately when you issue the engineering work.
- Locate the AN2016 cabinet on a site above the 100-yard flood plain. Make sure that the site is not subject to water runoff or flash flooding during heavy rains.
- Assemble the mounting template (cast-in-place) on a firm location that is level to within 1/4-inch over the entire length and width.
- Excavate a hole for the mounting pad and cable conduits as described in the engineering work prints. Dig to a depth of 30 inches for a standard applications and 60 inches for areas where there is heavy frost.
- Use a minimum of six inches of sand or gravel as a base for the foundation pad. This levels the location to accept the pad.
- See Figure 3-3 for the arrangement and size of the reinforcing mesh and the template in the form prior to pouring concrete. The overall dimensions of the concrete mounting pad are 172 in. x 106 in. (4368.8 mm x 2692.4 mm).
- Use a high-early strength concrete mix so that you can place the cabinet three days after concrete pouring. Coarse aggregate used in the concrete is graded from 3/4-inch to No. 4 only.
- Select a concrete with a minimum compression strength of 4000 psi as determined by American Society for Testing and Materials (ASTM) C39 test of compression strength of concrete cylinders. The slump of the concrete must be 2 to 4 inches as determined by ASTM test method C143. Do not crown the pad.
- Place the cable, conduit, ground rods and ground wires before constructing the mounting pad (cast-in-place). Refer to local electrical codes for specific information on grounding procedures (see Figure 3-5).

—continued—

Procedure 3-3 (continued)
Preparing a concrete mounting pad for the cabinet

- Mount the power transfer pedestal to the same mounting pad as the AN2016 cabinet, a separate pad, or on a pole. Install the power transfer pedestal according to the recommendations provided by the manufacturer.
- Route the 1¾ inch electrical conduit from the AC end compartment to a point beyond the mounting pad near the pole location. Follow this recommendation when you use a pole-mounted power transfer switch,
- The top surface of the mounting pad must be approximately 2 inches above the final grade.

Action

Step	Action
1	To prepare the cabinet mounting site, follow these instructions: **a.** Make sure that the area selected for the mounting pad is firm and level. ***Note:*** If the soil is not firm, compact it. **b.** Clear an area for the mounting pad and cable conduits in accordance with the engineering work prints. **c.** Excavate the foundation hole to a depth of 12 to 16 inches.
2	Build a level base for the mounting pad, use a minimum of six inches (152 mm) of sand or gravel.
3	Dig a trench to the area where the cable and electrical conduit will rise into the AN2016 cabinet (see Figure 3-3).
4	Excavate the trenches to a depth of 30 inches for a standard installation, and 60 inches for areas where there is heavy frost. **a.** If using a separate power transfer pedestal, dig a trench for the electrical conduit going from the AN2016 cabinet to the power transfer pedestal. ***Note:*** Nortel Networks recommends you use the 10 in. x 17 in. cable entry box for routing your ac cables (see Figure 3-3 and Procedure 3-11, “Connecting ac power”). **b.** If using a pole-mounted AC source, dig a trench for the electrical conduit from the AN2016 cabinet to the pole.
5	Place the conduits, cables, ground rod(s), and ground wire(s) as indicated on the engineering work prints. ***Note:*** At the SPC and termination compartment, place the conduits to hold the four 4-inch conduits in a 2-by-2 pattern. If required, at the AC compartment end, place two 4-inch conduits side by side.
6	Install a ground ring system around the proposed foundation mounting pad according to local electrical codes (see Figure 3-5).

—continued—

Procedure 3-3 (continued)
Preparing a concrete mounting pad for the cabinet

Step	Action
7	Lay the AN2016 template on the ground, placing it over the conduits. Slip the conduits into the template holes to position them. Back fill and tamp the trench to hold the conduit firmly in place (see Figure 3-4). ***Note 1:*** Be sure the conduit ends extending through the template are aligned vertically (perpendicular to the template surface). ***Note 2:*** The mounting pad top surface should be approximately six inches (152 mm) above the gravel base, and two inches (51 mm) above the final grade.
8	If a power transfer template will be mounted to the mounting pad, place the power transfer template in one corner of the pad. Route the 1.75 in. conduit from the AC compartment end side of the cabinet template to the power transfer pedestal template. Remove the template. Backfill and tamp the trench to hold the conduits in position.
9	Remove the template(s). Add the wooden stakes (see Figure 3-2 and Figure 3-3). Level them.
10	Place the wire mesh (6 x 6, 4 gauge) in the form as shown in Figure 3-3. Be sure the wire mesh is centered vertically. ***Note:*** No. 3 (3/8-inch) or larger reinforcing rod, placed on 15-inch centers, may be used in place of wire mesh.
11	Place the AN2016 template in the form and over the conduits. If used, place the template into the form and over the 1.75 in. conduit.
12	Fasten the template(s) to wooden stakes.
13	Square and level the template(s) on the stakes so the tops of the mounting plates are flush with, or no more than 1/4-in. above, the top of the pad (see Figure 3-4). Square the template(s) so the diagonal measurement between the anchor bolts is equal. ***Note:*** The cabinet must clear the finished concrete surface so that you can remove the base panel below the cabinet end chamber.
14	The conduit must extend approximately two in. (51 mm) above the template (see Figure 3-4). Cover the conduits at the top to keep concrete from entering them during the pour. ***Note:*** Make sure the conduit ends extend vertically through the template (perpendicular to the template surface).
15	Before you pour the concrete, be sure that all four 1/2 in. x 13 anchor bolts in the AN2016 template are threaded all the way down in the anchor nuts.

—continued—

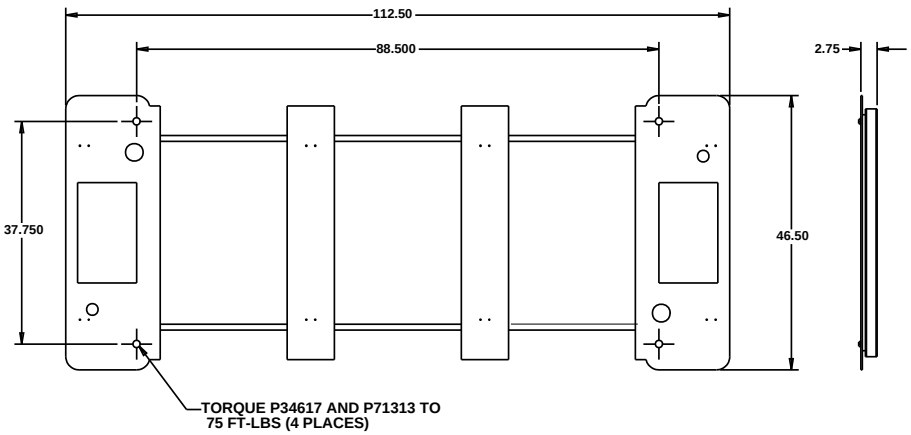
Procedure 3-3 (continued)
Preparing a concrete mounting pad for the cabinet

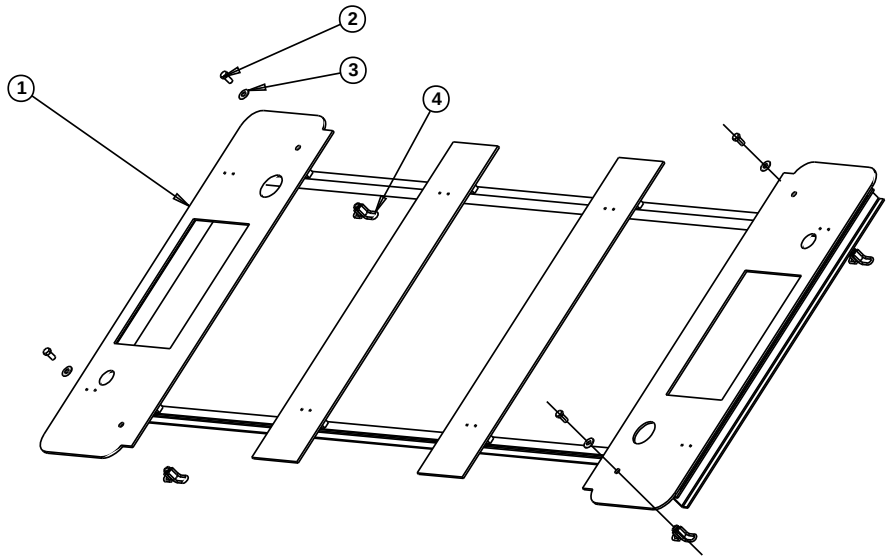
Step	Action
16	Be sure that all the wire mesh or reinforcing bars are set approximately two inches (51 mm) off the bottom of the form.
17	If required, use local practices to treat the area below the mounting pad and for two feet around the perimeter against insect infestation.
18	Use a high-early strength concrete mix so that you can place the cabinet three days after concrete pouring. Coarse aggregate used in the concrete is graded from 3/4-in. to No. 4 only. The compression strength of the concrete must be a minimum of 4000 psi as determined by ASTM C39 test of compression strength of concrete cylinders.
19	Pour the concrete. Finish the concrete so that the entire surface is flush with or 1/4 inch below the top of the template mounting plates. ***Note:*** Do not put a crown in the concrete surface.
20	Wait for a minimum of three days for the concrete to cure before cabinet installation, or according to the type of concrete used and local practices.

—end—

Figure 3-2
Cabinet mounting template

AN0005.tif





Note: All dimensions are in inches.

No.	Qty.	Description
1	1	Pad template, weldment
2	4	Bolt, 1/2-13x1 HH
3	4	Washer,1/2” plain
4	4	Nut, wing

Figure 3-3
Foundation pad

AN0008.eps

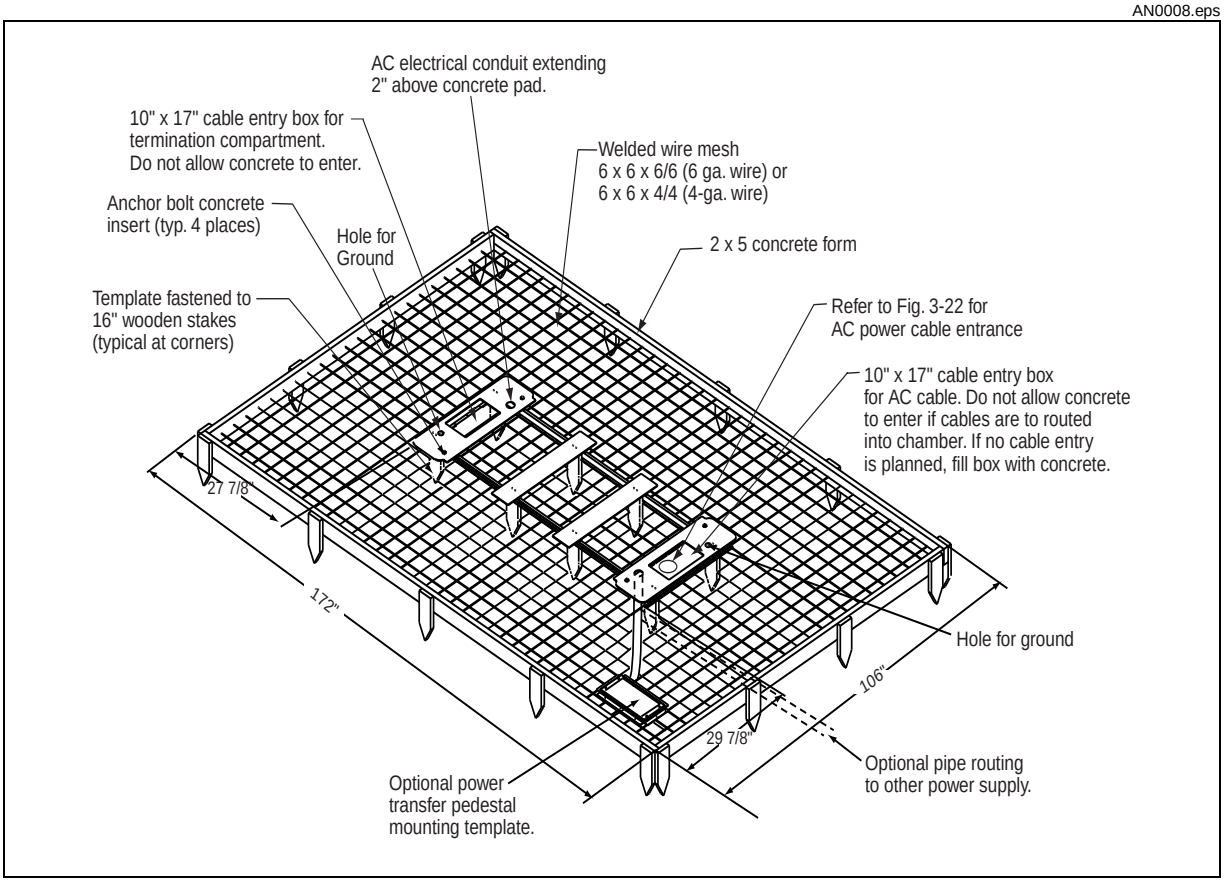


Figure 3-4
Position of conduit in template

AN0029.eps

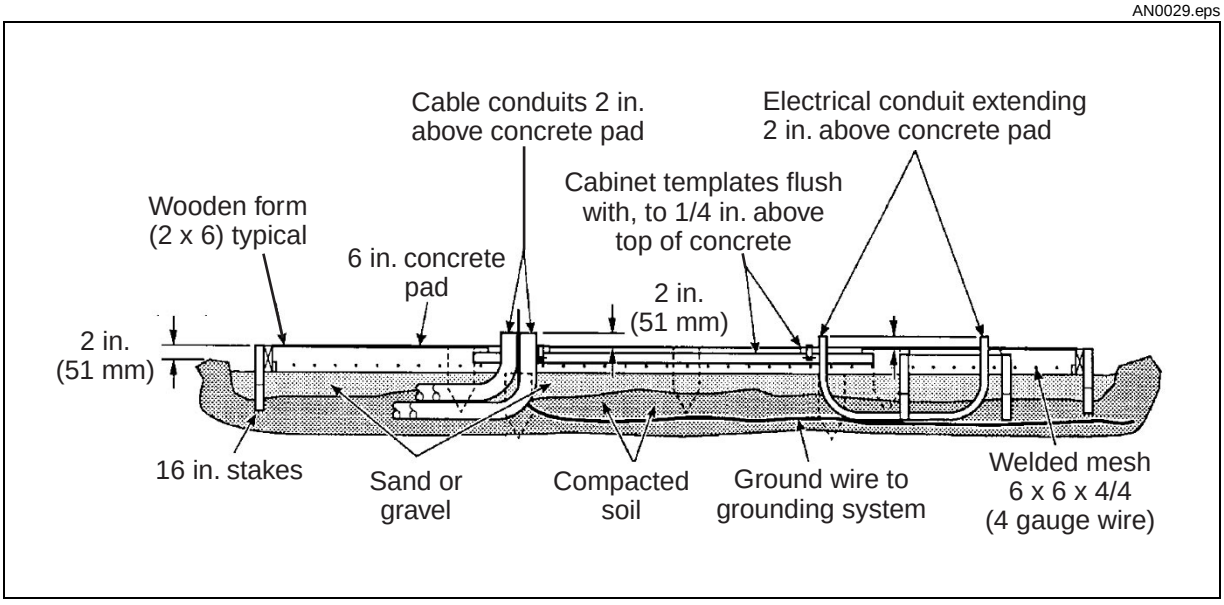
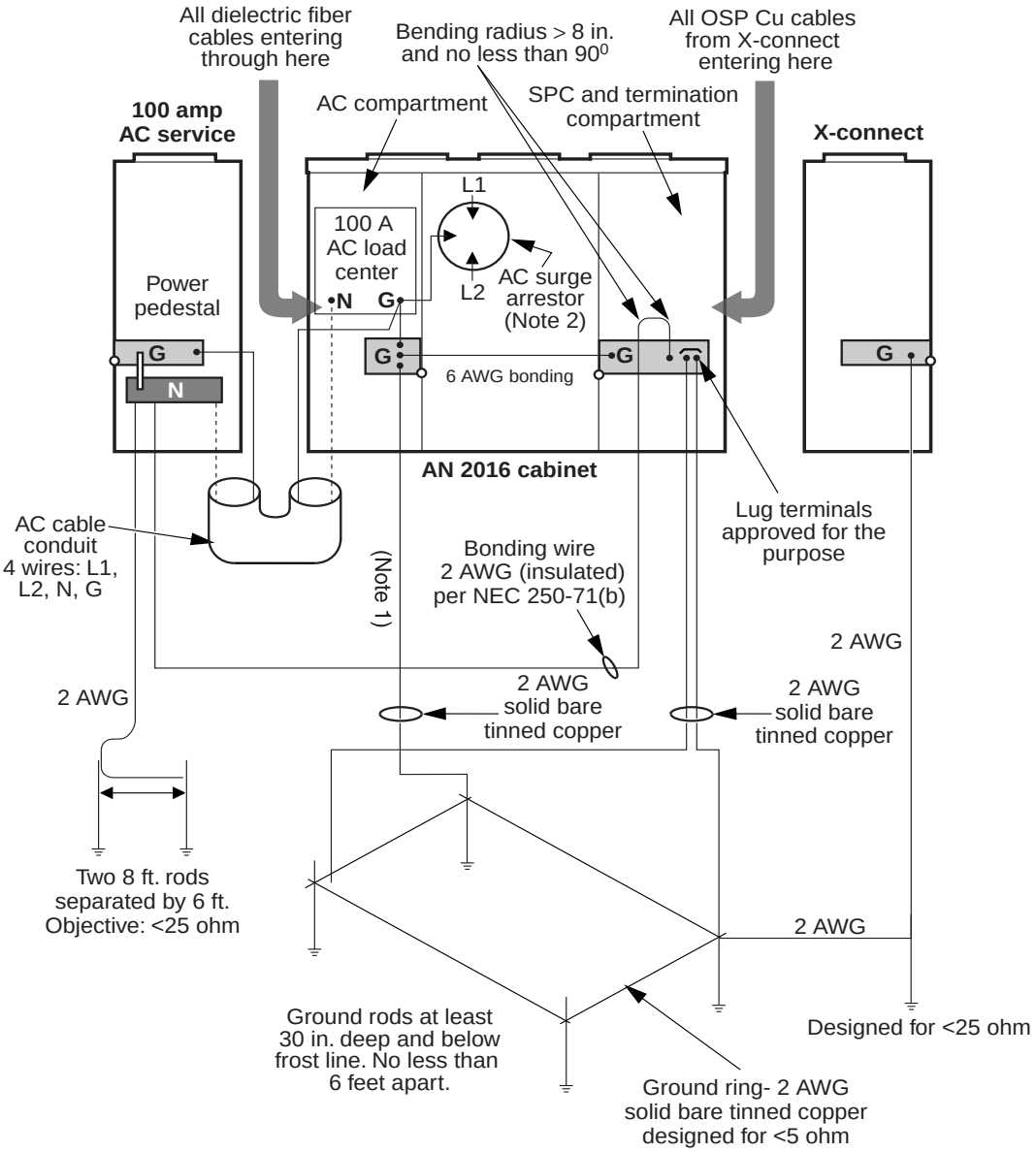


Figure 3-5
AN2016 system ground block diagram

AN0104.eps



Note 1: This ground wire must be added only when the power pedestal is more than 5 feet away from the cabinet.

Note 2: Connect a UL Listed and/or CSA Certified AC surge arrestor to the AC load center in the following conditions: when no surge arrestor installed in the power pedestal or when power pedestal is more than 5 feet from the cabinet.

Procedure 3-4
Preparing the cabinet for installation

Use this procedure to install the AN2016 cabinet.

DANGER
Risk of injury or death
Improper hoisting equipment and procedures can result in serious injury of death.

Follow the following safety measures when you perform this procedure.

- Keep the equipment and the cabinet away from any power lines.
- Keep bystanders away from work area at all times.
- Use trained operators to operate the equipment for lifting and setting the cabinet.
- Do not suspend loads over people. No person must work, stand, or pass under a suspended load.
- Wear standard safety gear according to local practices, including, but not limited to, safety helmets, steel-toes shoes, eye protection, and insulating gloves.
- Do not lift the pallet and cabinet from the ends when you use a forklift; lift from the sides of the pallet only.
- Do not operate the crane until all stabilizers are extended and in firm contact with the ground or adequate support structure. Do not try to retract or extend the stabilizers while a load is suspended from the crane.
- Be alert for overhead obstructions that can interfere with movement of the crane.
- Lift the cabinet with a forklift vehicle placed at the long side of the pallet, if the cabinet is to be moved while it is attached to the pallet. The forklift must be rated at 4,000 lb (1,809 kg) and have a minimum fork length of 30 inches (762 mm).

—continued—

Procedure 3-4 (continued)
Preparing the cabinet for installation

Requirements

You need the following tools and materials:

- one derrick (crane) capable of lifting 4,000 lbs (1,809 kg)
- two, 8-ft long (minimum) wire rope slings (each with 4,000 lbs [1,809 kg] capacity)
- four connecting links to attach wire rope slings to the cabinet lifting eye bolts
- 5/8 in. diameter rope, approximately 75-ft long (used as a tag line)
- standard hex-type security tool or 216-type tool

Action

Step	Action
1	Open the doors of the main and of the end compartments. To open the latches on the cabinet main and end doors, insert the tamper-proof wrench into the cup seams hex bolt (see Figure 3-6).
2	Turn the wrench a few degrees clockwise to release the latch (see Figure 3-7). ***Note:*** Do not over-rotate.
3	Secure the wind latch (see Figure 3-8).
4	Inspect the inside of the cabinet to make sure there is no damage to equipment.
5	Clean all debris from the concrete pad.
6	Remove the battery tray cover.
7	Remove the two rubber gasket sections from the supplied installation kit.
8	Place each section into position on the foundation pad. Make sure that the gasket is under the bottom of the cabinet when it is in placed (see Figure 3-9).
9	Close and latch the main compartment doors in preparation for cabinet placement.
10	Keep the SPC and termination compartment door open and secured with the wind latch. ***Note:*** If outside plant (OSP) cables are already installed through the pad surface (see Procedure 3-5, “Routing the cables to the mounting pad”).

—continued—

Procedure 3-4 (continued)
Preparing the cabinet for installation

Step	Action
11	Insert the lifting cable sling connecting links securely through all four lifting eye bolts (see Figure 3-10).
12	Take up the slack with the crane to prevent the cabinet from tipping when you remove the pallet brackets. ***Note 1:*** Do not tighten the cables so that the pallet lifts. The weight of the pallet will make it difficult to remove the bracket bolt.
13	Remove the lower front base panel of the termination end compartment (see Figure 3-11).
14	Remove the bolts from the pallet mounting brackets that secure the cabinet to the pallet (see Figure 3-12).
15	Continue the cabinet installation process (see Procedure 3-6, “Mounting the cabinet on the pad”).

—end—

Figure 3-6
Tamper resistant wrench

AN0009.tif

Figure 3-7
Latch lifted

AN0011.tif

Figure 3-8
Wind latch

AN0012.tif

Figure 3-9
Rubber gasket

AN0013.tif

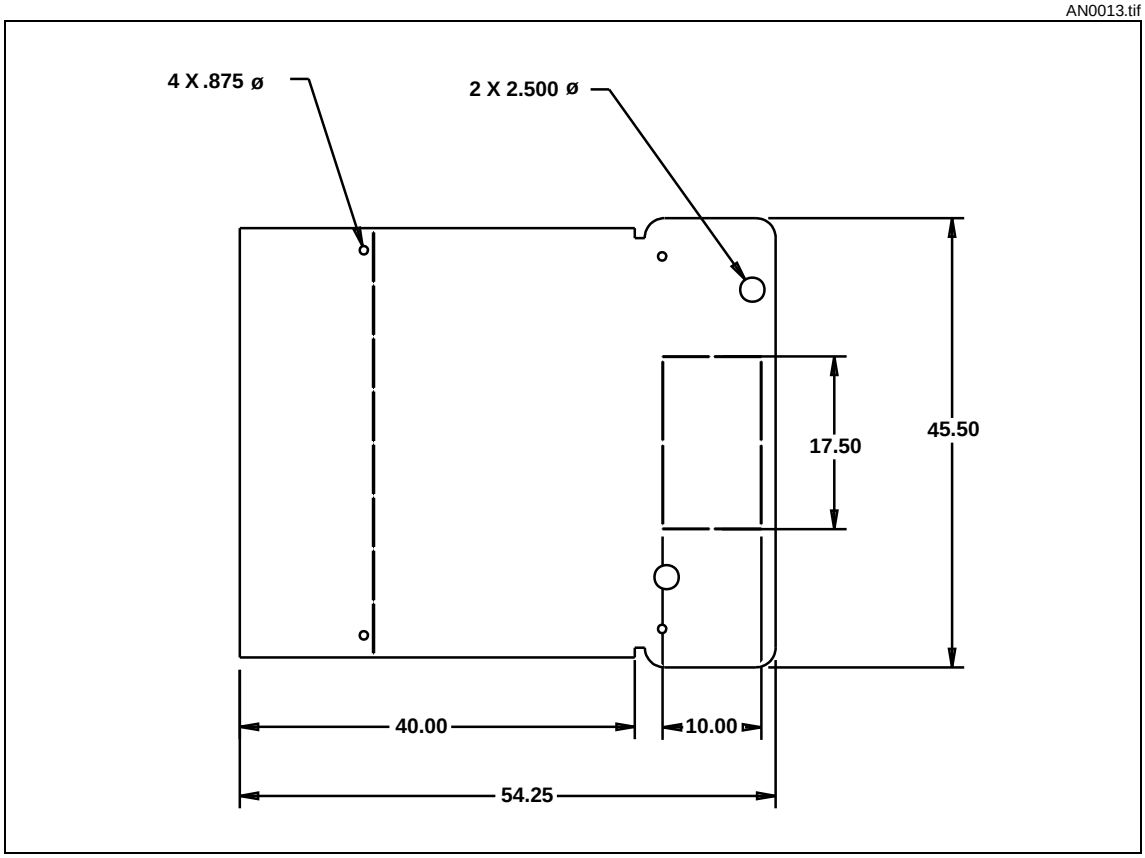


Figure 3-10
Slings in eye bolts

AN0014.tif

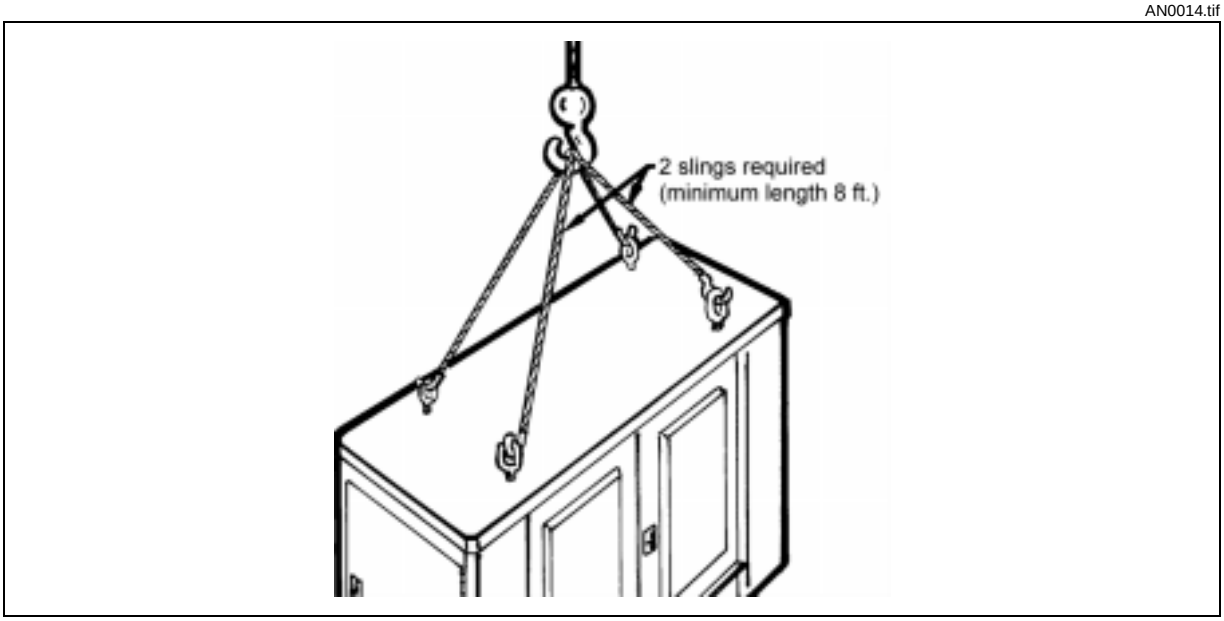


Figure 3-11
Front base panel

AN0023.tif

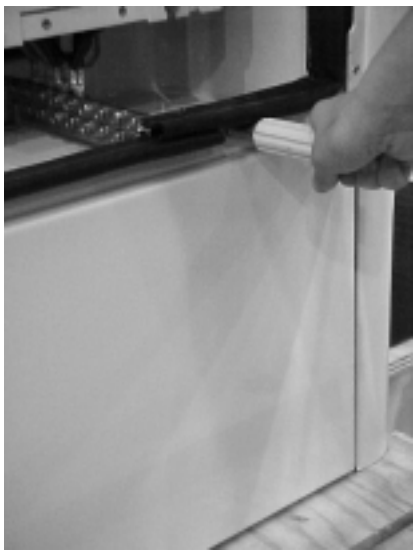


Figure 3-12
Pallet mounting bracket

AN0028.tif

Procedure 3-5
Routing the cables to the mounting pad

Use this procedure to route the AN2016 Cabinet cables to the mounting pad. For an illustration of the cabinet termination end compartment, see Figure 3-13.

Requirements

You need the following tools and materials:

- socket wrench set

Action

Step	Action
1	Remove each nozzle from the cable conduits by loosening the upper hose clamps (see Figure 3-14).
2	Slip the clamps down the nozzle and remove them.
3	Set the nozzles and hose clamps safely aside for later reattachment.
4	Separate the front half of the front split cable sleeve plate by removing the hex head bolts.
5	Pull the base plate toward you to remove it (see Figure 3-15).
6	Separate the front half of the rear split cable sleeves by removing the two hex head bolts securing the center base plate (see Figure 3-16). ***Note:*** Do not disturb the rear half of the rear split cable sleeve as it was installed and sealed at the factory.
7	Dress the cables toward the near end of the pad to prepare for installation of the cabinet.

—end—

Figure 3-13
Termination end compartment

AN0090.tif

Figure 3-14
Nozzle removal

AN0016.tif

Figure 3-15
Front cable sleeve plate

AN0017.tif

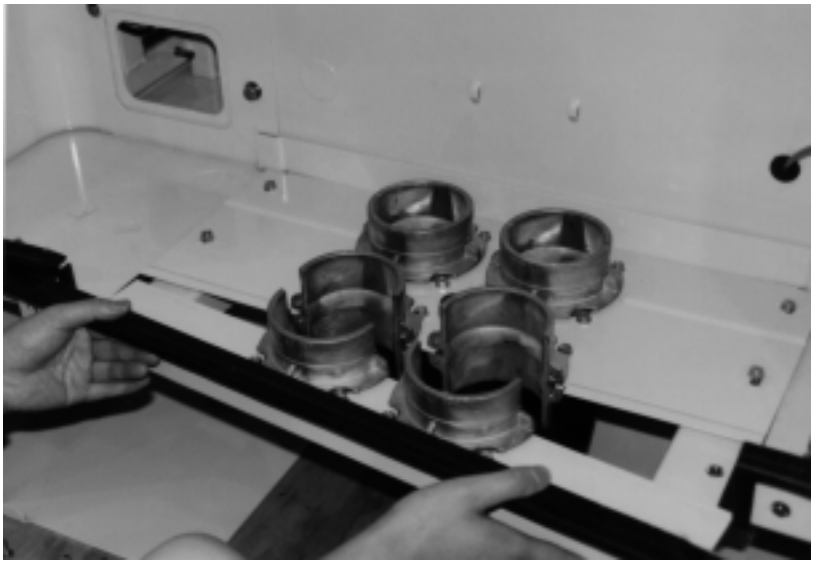
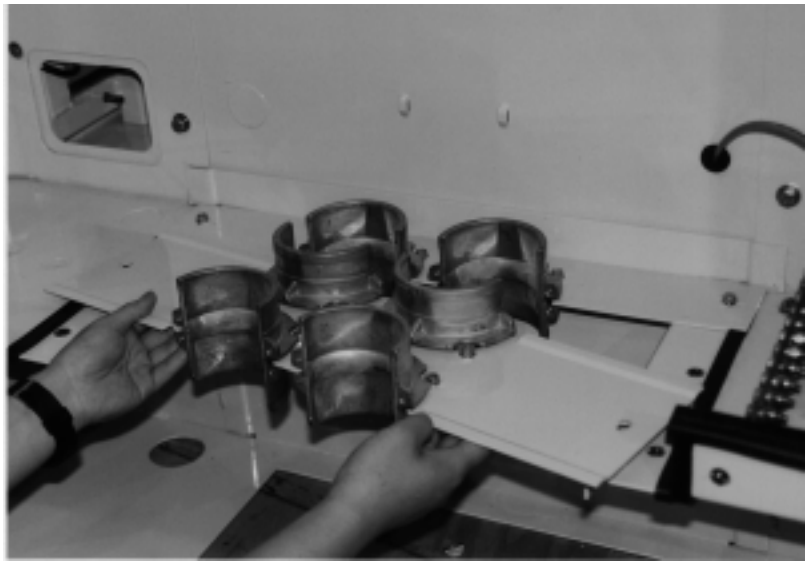


Figure 3-16
Center base plate

AN0018.tif



Procedure 3-6
Mounting the cabinet on the pad

Use this procedure to install the AN2016 Cabinet on a concrete pad.

Requirements

You need the following tools and materials:

- hammer
- pinch bar, 30 in. (750 mm)
- tin snips
- socket wrench set
- screwdriver, 3/8 in. (11 mm)
- heavy duty straps, or ropes, as required
- extra-deep socket, 7/8 in., for standard anchoring
- spirit level, 24 in. (610 mm)

Risk of cabinet tipping
Before opening the front or rear door, ensure that the other door is locked. Open both doors at the same time only when the cabinet is secure on the pad.

CAUTION
Risk of doors misalignment
Use spacers to level the cabinet to prevent the doors from becoming misaligned.

—continued—

Procedure 3-6 (continued)
Mounting the cabinet on the pad

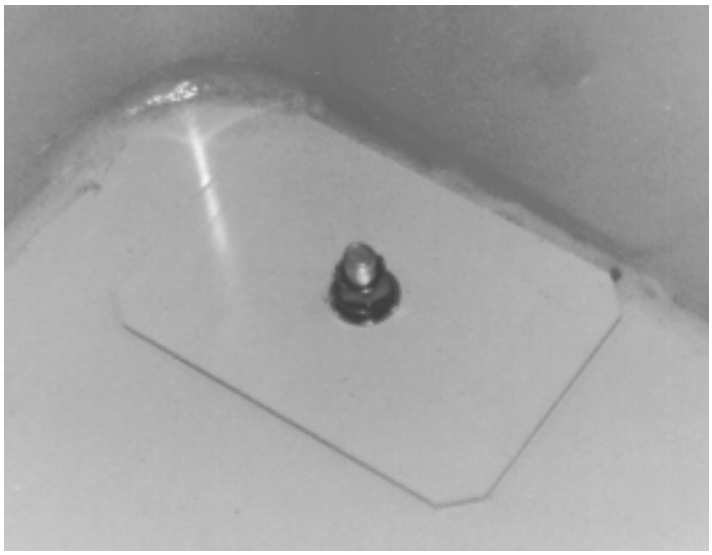
Action

Step	Action
1	Remove the anchor bolts and washers from the concrete pad. ***Note:*** Save the bolts to attach the cabinet to the concrete pad.
2	Make sure that hard hats are worn by all personnel during the lift.
3	Lift the cabinet using the crane.
4	Position the cabinet above the concrete pad. ***Note 1:*** If OSP cables are already installed through the pad surface, route the cables through the appropriate openings before you set the cabinet completely down on the pad. ***Note 2:*** The cabinet must be lowered onto the pad in a level position parallel with the surface of the pad. The cabinet must be in alignment with the anchoring bolts and conduits protruding from the pad.
5	Lower the cabinet over the anchoring bolts.
6	Observe the cabinet to pad alignment as the cabinet is lowered to the pad. ***Note:*** The rubber pads must extend about 1/4-in. around the base edge of the cabinet end compartments.
7	Check leveling with a spirit level, with the electronic compartment doors still closed. ***Note 1:*** If doors are out of alignment at the top edge by more than 1/16 inch, use spacers to level the cabinet and refer to Procedure 3-7, “Leveling the cabinet” for cabinet leveling. ***Note 2:*** If doors are in alignment, proceed with the installation.
8	Reinstall the four anchor bolts from the concrete pad, the four large square mounting washers and round flat washers (see Figure 3-17).
9	Tighten the nuts to 75 ft-lb torque.
10	Disconnect the lifting cable sling from the lifting eyebolts.
11	Remove the tag line and the four lifting eyebolts and discard.
12	Replace the eyebolts with the nylon hex head bolts that are included with each cabinet. ***Note:*** Do not remove the desiccant pouches from the bottom of the compartments until commercial power is connected.
13	Caulk any gaps between the cabinet bottom and rubber pads with locally approved compound.
14	Continue the cabinet installation process (see Procedure 3-8, “Installing the cable in the split sleeve”).

—end—

Figure 3-17
Anchor bolt

AN0019.tif



Procedure 3-7
Leveling the cabinet

Use this procedure to level the AN2016 Cabinet and align the doors.

Requirements

You need the following tools and materials:

- socket wrench set
- spirit level, 24 in. (610 mm)

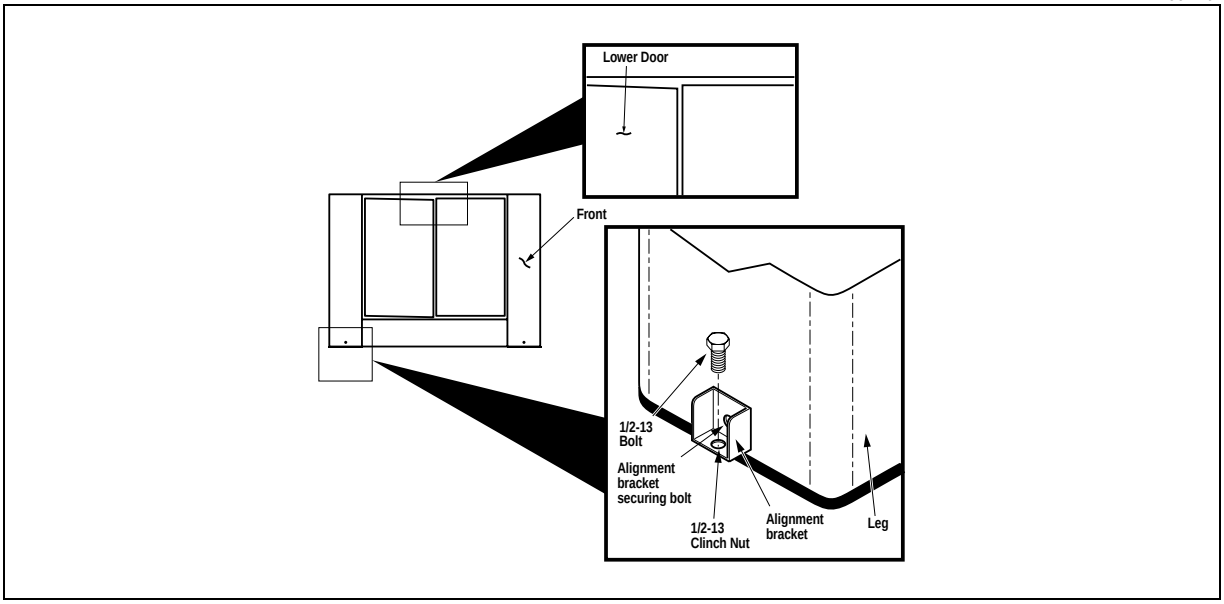
Action

Step	Action
1	Open the cabinet doors and locate the spacer kit supplied with the cabinet in the battery compartment. Set the spacer kit aside.
2	Close and secure all cabinet doors.
3	Remove the alignment bracket and spacers from the spacer kit.
4	Attach the bracket to the insert on the cabinet base nearest the lower hanging door (see Figure 3-18).
5	Use a spacer as a supporting plate for the adjustment bolt. Turn the adjustment bolt on the alignment bracket to raise the cabinet base and door.
6	Determine the correct number of spacers. Fit spacers between the cabinet base and the rubber base pad until the doors are evenly aligned.
7	Raise the cabinet a turn or two higher to create clearance for the spacers. Insert the correct number of spacers under the corner of the cabinet base adjacent to the alignment bracket.
8	Insert the long spacers under the battery compartment where required.
9	Put the spacers in position and turn the adjustment bolt on the alignment bracket to lower the cabinet on to the spacers. Make sure the doors maintain their alignment.
10	Repeat the previous steps until the doors are aligned. When the doors are aligned, remove the alignment bracket.
11	Check the alignment of the other doors. If the doors are not aligned, attach the alignment bracket to the insert as described in this procedure and add spacers as necessary.
12	Verify that each door switch operates normally.
13	Continue the cabinet installation process (see Procedure 3-6, “Mounting the cabinet on the pad”, step 7).

—end—

Figure 3-18
Alignment bracket and spacer

AN0024.tif



Procedure 3-8
Installing the cable in the split sleeve

Use this procedure to install the AN2016 Cabinet cables in the split sleeve located in the termination end compartment.

Requirements

You need the following tools and materials:

- socket wrench set

Action

Step	Action
1	Open the SPC and termination compartment door.
2	Remove each nozzle from its split cable sleeve by loosening the upper hose clamps (see Figure 3-14). Slip the clamps down the nozzle and remove them. Set the nozzles and hose clamps safely for later reattachment.
3	Separate the front half of the outer split cable sleeve by removing the two hex head bolts holding it in position. Pull the base up and toward you to remove it (see Figure 3-15).
4	To separate the front half of the rear split cable sleeve plate. Remove the two hex head bolts securing the center base plate. Do not disturb the rear half of the rear split cable sleeve. The rear half has been installed and sealed at the factory (see Figure 3-16).
5	Pull all cables at least 15 feet beyond the end of the conduit.
6	Cut the small end of each nozzle so you can slip it onto a cable (small end first). Slide the nozzle onto the cable to a point just above the pad. Prepare the remaining cables in the same manner.
7	Replace any unused nozzles. ***Note:*** If more than one cable enters the same split sleeve, cut the nozzle to fit all cables. The opening in each nozzle must be small enough to allow the nozzles to fit securely on the cables. Use sealing tape and B sealant to fill the gaps between the cables and to fit the nozzle opening.
8	Place the cables in the rear split cables sleeves (left rear split sleeve first).
9	Install the center base plate, which closes the rear split cable sleeves, by replacing and tightening the two hex head bolts.
10	Slide the nozzles up over the two rear split cable sleeves, then install and tighten the upper and lower hose clamps.

—continued—

Procedure 3-8 (continued)
Installing the cable in the split sleeve

Step	Action
11	Apply locally approved sealing compound around the opening in the split base panel. Place sealing compound along the joint between the front and rear split panel and around the split cable sleeve seam.
12	Install any remaining cables in the front split cable sleeves.
13	Install the front split cable sleeve plate removed previously. Slide nozzles up over the two front split cable sleeves, then install and tighten the upper and lower hose clamps.
14	Continue the cabinet installation process (see Procedure 3-9, “Connecting the earth ground to the cabinet”).

—end—

Procedure 3-9
Connecting the earth ground to the cabinet

Use this procedure to connect the earth ground to the AN2016 Cabinet. The ground ring system of the cabinet is normally buried in the ground around the cabinet. Follow local electrical codes for buried grounding techniques and requirements. For an illustration of the ground ring system, see Figure 3-5.

Requirements

You need the following tools and materials:

- voltmeter
- one medium flat blade screwdriver
- one small flat blade screwdriver
- one wire stripper for 2 AWG wire
- 2 AWG insulated wire
- 2 AWG solid bare tin copper wire
  (see note in Figure 3-5 and note in step 9 below).
- lug terminals approved for the purpose
- ground ring system is in position
- earth ground wires are in position

Action

Step	Action
1	Open the SPC and termination compartment door.
2	Pull the bonding wire through the grommet in the center of the split sleeve cluster. Route the wire in a smooth curve to the ground bar (see Figure 3-19). ***Note:*** The bending radius must be greater than eight in. with an angle greater than 90 degrees.
3	Connect the bonding wire to the ground bar (see Figure 3-20). Tighten the connection according to Table 3-2.
4	Connect the 2 AWG solid bare tinned copper wire to the ground bar. Tighten the connection according to Table 3-2. ***Note 1:*** Ground wire terminals must be CSA and UL approved for the purpose and installed according to manufacturers instructions. ***Note 2:*** You can use screw lug type terminals with either stranded or solid wires with proper AWG and torque values. ***Note 3:*** Use compression lug terminals with stranded wires only.

—continued—

Procedure 3-9 (continued)
Connecting the earth ground to the cabinet

Step	Action
5	Connect the earth ground wires (2 AWG solid bare tinned copper) from the ground ring to the ground bar (see Figure 3-5 and Figure 3-20). ***Note:*** The ground-to-earth resistance must be less than or equal to 25 Ohms.
6	Reinstall the front base cover of the SPC and termination compartment by attaching it with the two 1/4 in. tamper-proof screws.
7	Install the bulb-seal gasket around the SPC and termination compartment door as follows: **a.** Locate the bulb-seal gasket previously secured in the cabinet. **b.** Install each of the two ends of the bulb-seal gasket around the edge of the front cover plate. ***Note:*** Start at the lower corners when you install the gasket. **c.** Join the two ends of the bulb-seal gasket together to form a continuous seal. ***Note:*** At the edge of the cover plate at the butt joint.
8	Open the AC compartment door.
9	Install a 2 AWG solid tinned copper wire from the AC compartment ground bar to the ground ring. ***Note:*** Add this bonding wire when the power pedestal ground is installed at a distance greater than 5 ft away from the cabinet.
10	Continue the cabinet installation process (see Procedure 3-10, “Installing the surge arrestor”).

—end—

Procedure 3-9 (continued)
Connecting the earth ground to the cabinet

Figure 3-19
Bonding wire 2 AWG

AN0106.eps

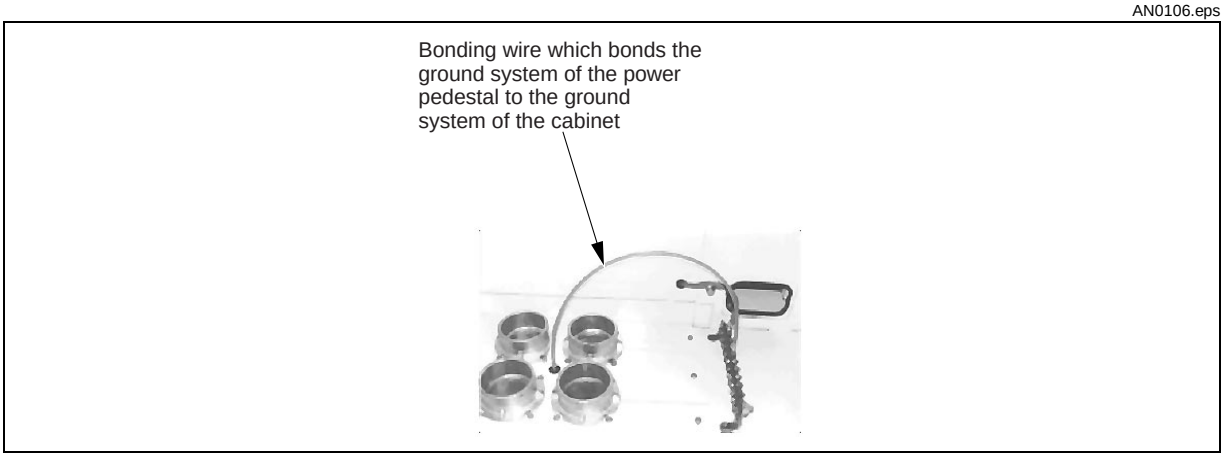
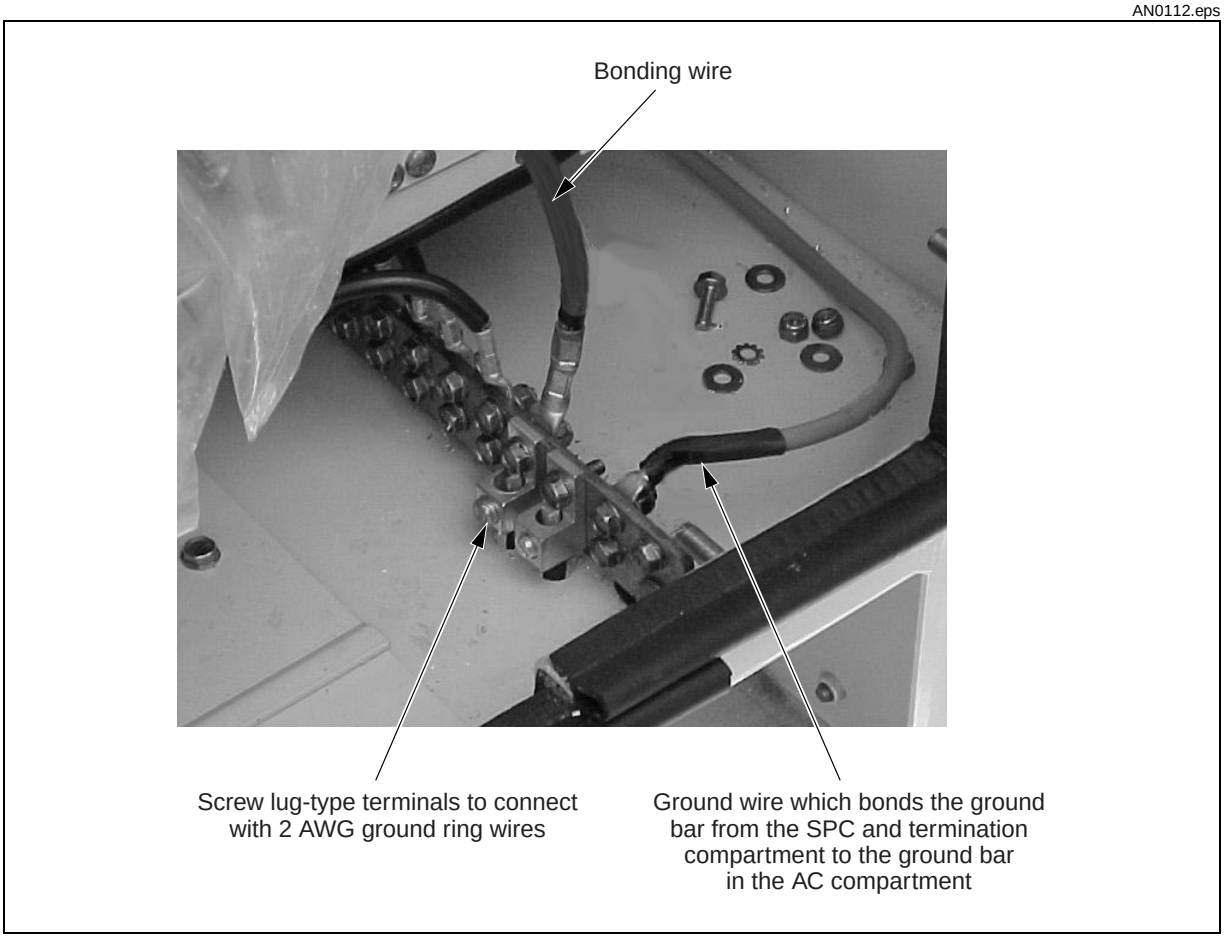


Figure 3-20
Ground bar

AN0112.eps



Procedure 3-9 (continued)
Connecting the earth ground to the cabinet

Table 3-2 lists the minimum torque for bonding and ground connections using different nut sizes.

Table 3-2
Minimum torque for bonding and ground connections

Nut size	Torque (in-lb)	Torque (ft-lb)	Torque (n-m)
6-32	7.5	0.6	0.9
8-32	9.0	0.8	1.0
10-32	12	1.0	1.4
12-24	16	1.3	1.8
1/4 in-20	32	2.7	3.6
5/16 in-20	60	5.0	6.8

Procedure 3-10
Installing the surge arrestor

Use this procedure to install the secondary surge arrestor to the AC load center in the AN2016 Cabinet. Install the surge arrestor to the AC load center in the following conditions only:

- when no UL Listed/CSA Certified surge arrestor is installed in the power pedestal
- when the power pedestal is more than five feet away from the cabinet.

For an illustration of the surge arrestor and the AC wiring diagram, see Figure 3-21 and Figure 3-23.

CAUTION
System ground
The electrical system must be correctly grounded for the secondary surge arrestor to work properly (see Figure 3-5).

CAUTION
Insulation resistance or dielectric strength tests are invalid when a secondary AC surge arrestor is connected.
Turn main breaker off and disconnect the secondary AC surge arrestor before conducting these tests.

Action

Step	Action
1	Have a qualified person with training in the operation and maintenance of electrical power systems install the surge arrestor.
2	Make sure the electrical system is grounded in accordance with article 250 of the national electrical code (NEC).
3	Turn off all power to the electrical equipment where the secondary surge arrestor will be installed.
4	Install the surge arrestor to the AC load center as outlined in the following steps.
5	Open the AC compartment door.

—continued—

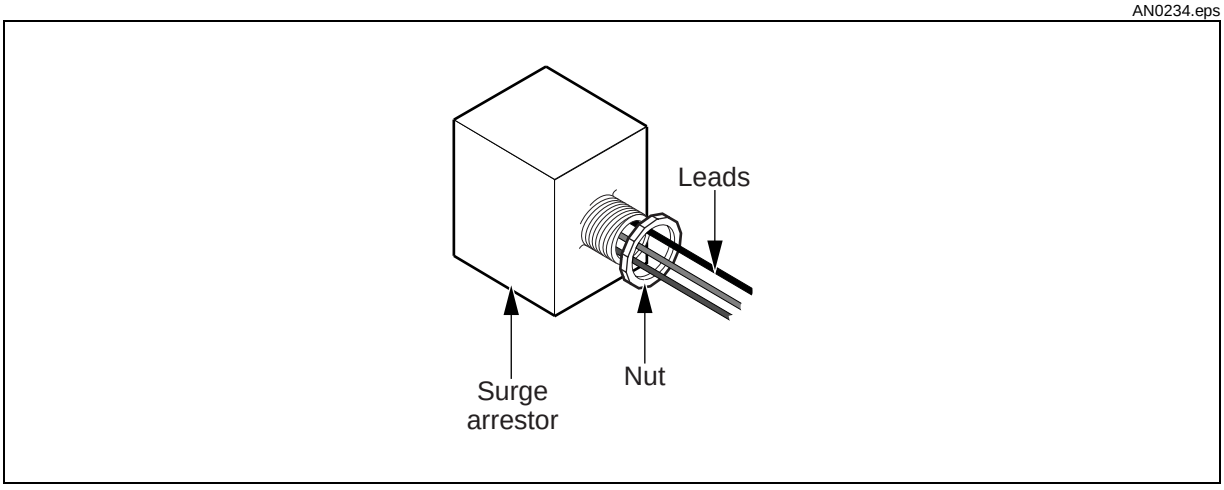
Procedure 3-10 (continued)
Installing the surge arrestor

Step	Action
6	Locate the knockout in the lower right side of the AC load center, for mounting the surge arrester (see Figure 2-8). ***Note:*** For maximum surge protection keep leads as short as possible when you install the surge arrestor.
7	Remove the nut on the surge arrestor (see Figure 3-21).
8	Remove the 1/2 in. (12.7 mm) enclosure knockout on the selected mounting location on the AC load center.
9	Insert the surge arrestor wires through the knockout hole. Do not damage insulation on the wires.
10	Install and tighten the nut to secure the surge arrestor to the AC load center enclosure.
11	Keep the wires as short as possible for maximum surge protection. Avoid sharp bends.
12	Cut wires for minimum length needed and strip insulation from ends of wires.
13	Connect the white wire to the neutral bus bar according to local practices (see Figure 3-23).
14	Connect the black wires to the equipment phase terminals according to local practices (see Figure 3-23).
15	Replace the cover.
16	Tighten the screw.
17	Close and secure the AC compartment door.
18	Continue the cabinet installation process (see Procedure 3-11, “Connecting ac power”).

—end—

Figure 3-21
Surge arrestor

AN0234.eps



Procedure 3-11
Connecting ac power

Use this procedure to connect commercial power to the AN2016 Cabinet. Each AN2016 cabinet can accept a separately protected 120/240 V ac single phase, 60 Hz circuit with a maximum 100A load. For an illustration of the AC wiring diagram, see Figure 3-23.

Requirements

You need the following equipment:

- flat head screwdriver
- single phase, 3-wire, 120/240 V ac, 30 A, 60 Hz power source

DANGER
Electrical hazard
Observe all safety precautions as specified by local building codes and the National Electrical Code (NEC). All procedures should be performed by a licensed electrician. If local building codes specify procedures different from those in this section, follow local codes.

DANGER
Electrical shock hazard
Before installation, the ac grounding electrode system must be bonded to an ac main service power neutral/ground bus. Contact your local power company or local practices for information about codes or restrictions for your installation.

Action

Step	Action
1	Install the ac power to the AC load center as outlined in the following paragraphs.
2	Open the AC compartment door. ***Note 1:*** If not done previously, route the power and ground wires from the external commercial power source through the conduit in the base of the AC compartment (see Figure 3-22). ***Note 2:*** Pull at least 10 feet of wire beyond the concrete base.

—continued—

Procedure 3-11 (continued)
Connecting ac power

Step	Action
3	Make sure all the breakers on the ac distribution box are in the OFF position.
4	Remove the breaker box cover by removing the screw.
5	Verify that the power is not present on the ac power leads.
6	Route the ac power leads (L1, L2, N, and Gnd) from the external ac power source though the conduit at the bottom of the ac distribution box.

CAUTION
Ensure that the screw or jumper intended to connect the neutral bar to the ground bar in the AC load center is removed and discarded.

7	Connect the L1 and L2 leads on the L1/L2 line lugs.
8	Connect the N lead to the neutral bus bar.
9	Connect the Gnd lead to the ground bus bar.
10	Replace the cover.
11	Tighten the screw.
12	Fill the opening around the commercial power cables at the cutout, use B sealant tape or other filler according to local practices.
13	Close and secure the power AC compartment door.
14	Continue the cabinet installation process (see Procedure 3-12, “Installing batteries”).

—end—

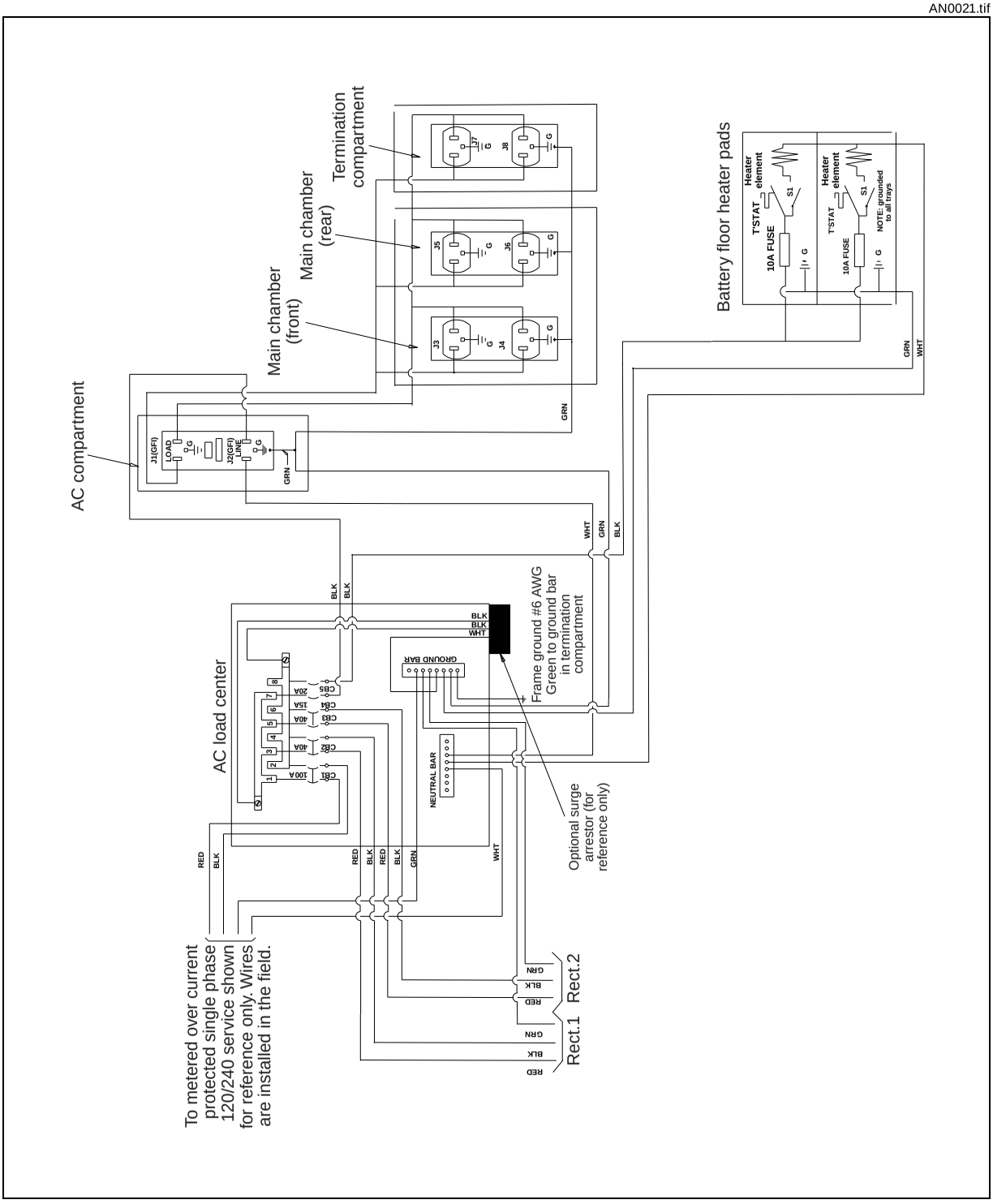
Figure 3-22
AC compartment knockout

AN0107.eps

Knockout for routing the AC power source through the 10 in. x 17 in. cable entry box in a conduit

Figure 3-23
AC wiring diagram

AN0021.tif



Procedure 3-12
Installing batteries

Use this procedure to install the batteries in the battery compartment of the AN2016 Cabinet. You can mount batteries in the AN2016 cabinet or inside a battery vault.

The battery compartment can hold 32 batteries, divided in eight 100 Ah strings of 12V dc batteries. Four batteries make one string. Install the batteries in the compartment in two rows of 16 batteries (4 strings) each.

DANGER

Electrical and explosion hazard

Batteries can be a lethal source of electrical power under certain conditions. Follow all battery manufacturer's and locally approved safety procedures.

Follow the following safety measures when you perform this procedure.

- Use extreme care when handling the batteries and connecting them to the string.
- Wear heavy gloves and safety glasses while lifting the batteries.
- Do not wear rings, metallic wrist bands, or bracelets when working on batteries.
- Do not allow metal objects to rest on the batteries or to fall across the terminals.
- Handle each battery only by its lifting slot or an appropriate lifting tool, keeping hands away from the connector pins.
- Consider possible arcing during battery connection procedures.
- Use heavy gloves during all procedures involving the batteries, to prevent injury.
- Do not touch the connector posts.
- Do not lift the cabinet with batteries installed.

—continued—

Procedure 3-12 (continued)
Installing batteries

Battery options

Table 3-3 lists the battery options

Table 3-3
Battery options

PEC	Description	Quantity
A0734525	Battery single block C&D FA-12-100	See Note 1 and 2
A0774151	Battery string hook up cable	1 for each string
A0773445	Battery single block East Penn 12AVR100-3ET	See Note 1 and 2
A0774150	Battery string hook up cable	1 for each string
A0773443	Battery single block Power Battery CSL-12100	See Note 1 and 2
A0774150	Battery string hook up cable	1 for each string
Note 1: One string must contain 4 single battery blocks. ***Note 2:*** 672 lines provided: 4 strings are required. 864 lines provided: 5 strings are required. 1344 lines provided: 6 strings are required. 2016 lines provided: 8 strings are required.		

You can use your own external battery vault instead of the provided battery compartment underneath the equipment compartment. The cabinet is equipped in the AC compartment with knockout panels. To install battery cables through the knockouts (see Procedure 3-13, “Installing battery cables from an external vault”).

Action

Step	Action
1	Install the batteries into the front and rear partitions of the battery compartment (see Figure 3-24, Figure 3-25, and Figure 3-26). ***Note:*** The cabling color designation is RED = negative (-) and BLACK = positive (+).

—continued—

Procedure 3-12 (continued)
Installing batteries

Step	Action
2	Remove the battery cover according to battery manufacturer 's instructions.
3	Slide the first string of batteries lengthwise with terminals facing front, into the battery compartment.
4	Push the batteries all the way into the back of the battery compartment until the battery touches the divider wall.
5	Leave a gap between each battery from 1/4-in. to 3/8- in.
6	Install the intercell connectors (supplied by the battery manufacturer) according to Figure 3-26. **a.** Install one intercell connector from the POSITIVE (+) terminal of Battery #1 to the NEGATIVE (-) terminal of Battery #2. **b.** Install one intercell connector from the POSITIVE (+) terminal of Battery #2 to the NEGATIVE (-) terminal of Battery #3. **c.** Install one intercell connector from the POSITIVE (+) terminal of Battery #3 to the NEGATIVE (-) terminal of Battery #4.
7	Install the Anderson connectors shipped in the battery cable kit as follows: **a.** Connect the BLACK POSITIVE (+) lead to the POSITIVE (+) terminal of Battery #4. **b.** Connect the RED NEGATIVE (-) lead to the NEGATIVE terminal of Battery #1.
8	Plug in the Anderson connector into the mating Anderson connector directly above the string. ***Note:*** Verify the polarity of the connectors and battery terminals match.
9	Install the next string of batteries into the battery compartment. Repeat steps 3 through 8.

—end—

Figure 3-24
Batteries installed in compartment

AN0022.tif

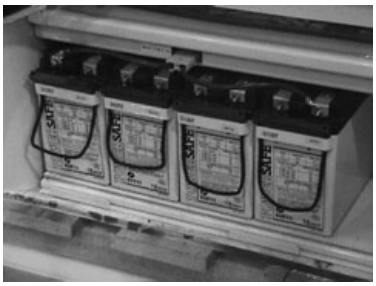
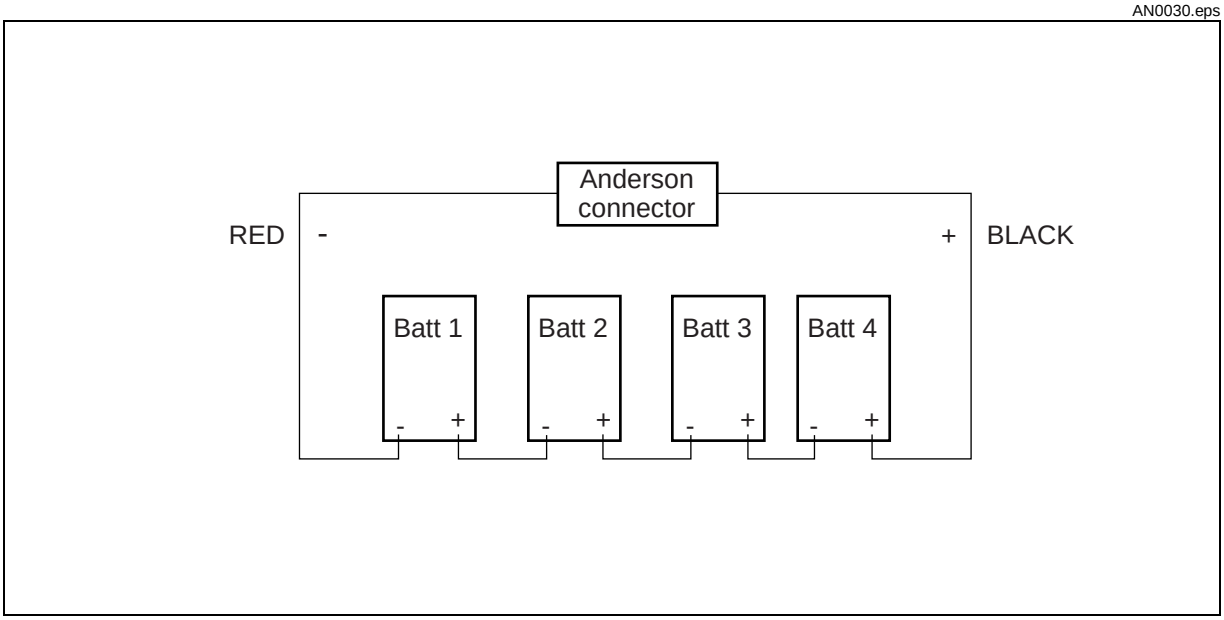


Figure 3-25
DC disconnect panel

AN0031.tif

Figure 3-26
Battery string arrangement

AN0030.eps



Procedure 3-13
Installing battery cables from an external vault

Use this procedure to install the battery cables through the knockouts and to connect these cables in the battery compartment. Different lengths of cable harness are required for the routing of the cables in the battery compartment.

Nortel Networks recommends you prepare your battery cables as described in Table 3-4.

Requirements

You need the following tools and materials:

- hammer and chisel
- one Anderson connector model SB50 for each battery string

Action

Step	Action
1	Open the equipment compartment doors and remove the panels to have access to the battery compartment.
2	Open the AC compartment door.
3	Remove the cable entrance nozzles in the AC compartment.
4	Use a hammer and chisel to punch out the two, 2 in. knockouts (see Figure 3-27).
5	Locate the two 2 in. grommets in the loose parts package. Install one grommet in each of the two knockout holes.
6	Feed the battery cables through the grommets. ***Note 1:*** Different lengths of cable harness are required for the routing of the cables in the battery compartment (see Table 3-4). ***Note 2:*** You must determine the cable length from the external vault to the cabinet.
7	Terminate each battery string with the Anderson connector model SB50.
8	Plug in the SB50 connectors into the Anderson connectors in the battery compartment. ***Note:*** Labels provide identification of each strings in the battery compartment.
9	Route the terminal end of the battery cables into the conduit that extends to the external battery vault. ***Note:*** The size of the external battery vault must accommodate the full capacity of 800 Ah to provide full growth of the AN2016 cabinet system.

—continued—

Procedure 3-13 (continued)
Installing batteries

Step	Action
10	Install the batteries into the external vault according to local practices and battery manufacturer's recommendations.

—end—

Figure 3-27
Knock out for external battery vault

AN0084.tif

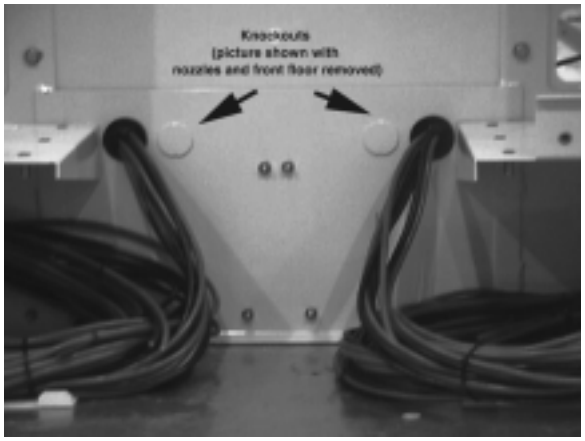


Table 3-4
Battery cable length for each string in the cabinet

Battery string	Length
1 and 5	76 in.
2 and 6	88 in.
3 and 7	106 in.
4 and 8	124 in.
Note 1: You must provide the Anderson connector. ***Note 2:*** You must determine the cable length from the external vault to the cabinet.	

Alarms

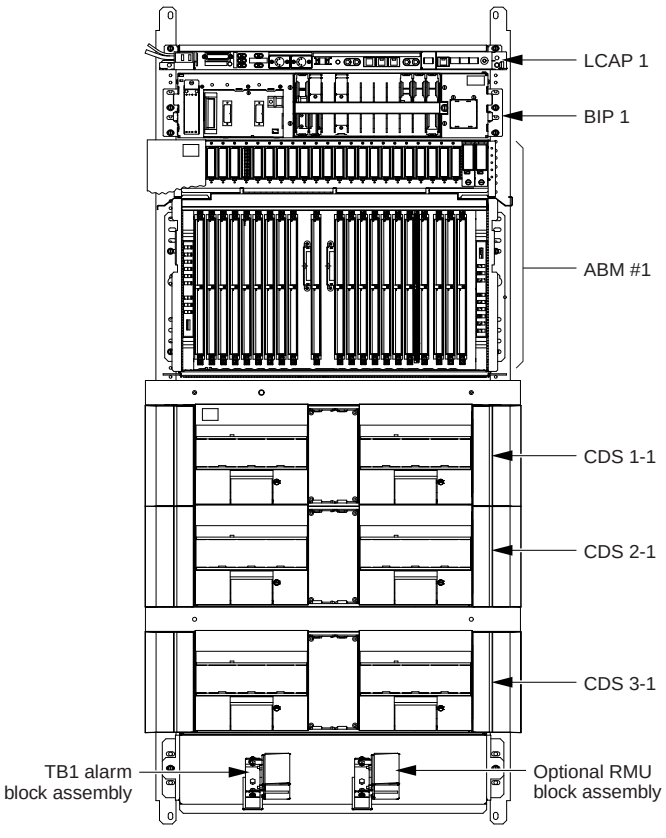
This chapter provides information about AN2016 Cabinet AccessNode alarms.

Alarm block location and description

Figure 4-1 shows the location of alarm block TB1 which is accessed in this chapter.

Figure 4-1
TB1 alarm block location

AN0067.eps



Front view of bay (frame bay E)

Table 4-1 lists the pin descriptions of the TB1 alarm block

Table 4-1
TB1 alarm block description

Pin	Description	Pin	Description
A1	Telemetry input #1	A5	High voltage shut down (HVSD) alarm
B1	Telemetry input #2	B5	Rectifier fail alarm minor (RFA Min)
C1	Telemetry input #3 ACO (alarm cutoff)	C5	Rectifier fail alarm major (RFA Maj)
D1	Telemetry input #4	D5	Battery distribution panel alarm
A2	Telemetry input #5	A6	Environmental control unit (ECU) system alarm
B2	Telemetry input #6	B6	High temp alarm
C2	Telemetry input #7	C6	Door intrusion alarm
D2	Telemetry input #8	D6	Spare
A3	Telemetry input #9	A7	DDM+ or Soneplex minor alarm
B3	Telemetry input #10	B7	DDM+ or Soneplex major alarm
C3	Telemetry input #11	C7	Soneplex critical alarm
D3	Spare	D7	Remote measurement unit (RMU) alarm
A4	AC fail alarm	A8-B8	Spare
B4	Battery on discharge (BOD) alarm	C8-D8	Spare
C4	Fuse alarm (FA)	A9 to D9	Common (ground)
D4	Low voltage alarm (LVA)	A10 to D10	Common (ground)

Note 1: The alarms listed in this table are connected on the alarm block TB1 at the factory.

Note 2: All alarms listed are normally open contacts.

Note 3: If there is more than one piece of equipment of the same type, the alarms from that equipment can be wired in parallel. Alarms wired in parallel maximize the number of alarms that can be reported.

Alarms definitions

This section describes the equipment alarms listed in Table 4-1.

AC fail alarm

An ac fail alarm is generated when the circuit detects a ac power failure.

Battery on discharge alarm

The battery on discharge (BOD) alarm is generated when the batteries are supplying the current to the equipment.

Fuse alarm

The fuse alarm (FA) is generated when one or mores fuses blown or circuit breakers tripped on the dc distribution shelf.

Low voltage alarm

The low voltage alarm (LVA) is generated when the battery voltage is below -47.0 V dc.

High voltage shutdown alarm

The high voltage shutdown (HVSD) alarm is generated when the voltage rises over a preset threshold (set with SW1-6 switch).

Rectifier failure alarm minor

The rectifier failure alarm (RFA) minor is generated when one rectifier module fails.

Rectifier failure alarm major

The rectifier failure alarm (RFA) major is generated when two or more rectifier modules fail.

Battery distribution panel alarm

The battery distribution panel alarm is generated when a circuit breaker is tripped on the battery distribution panel.

High temp alarm

The high temp alarm is generated when the inside temperature of the cabinet reaches 65°C.

Door intrusion alarm

The door intrusion alarm is generated when a door is open on the cabinet.

Remote measurement unit alarm

The remote measurement unit (RMU) alarm is generated when the RMU unit fails.

DDM + alarm

The DDM+ alarm is generated when a minor or a major alarm is detected.

Soneplex loop extender alarm

The Soneplex loop extender alarm is generated when a minor, major or critical alarm is detected.

Alarm connections

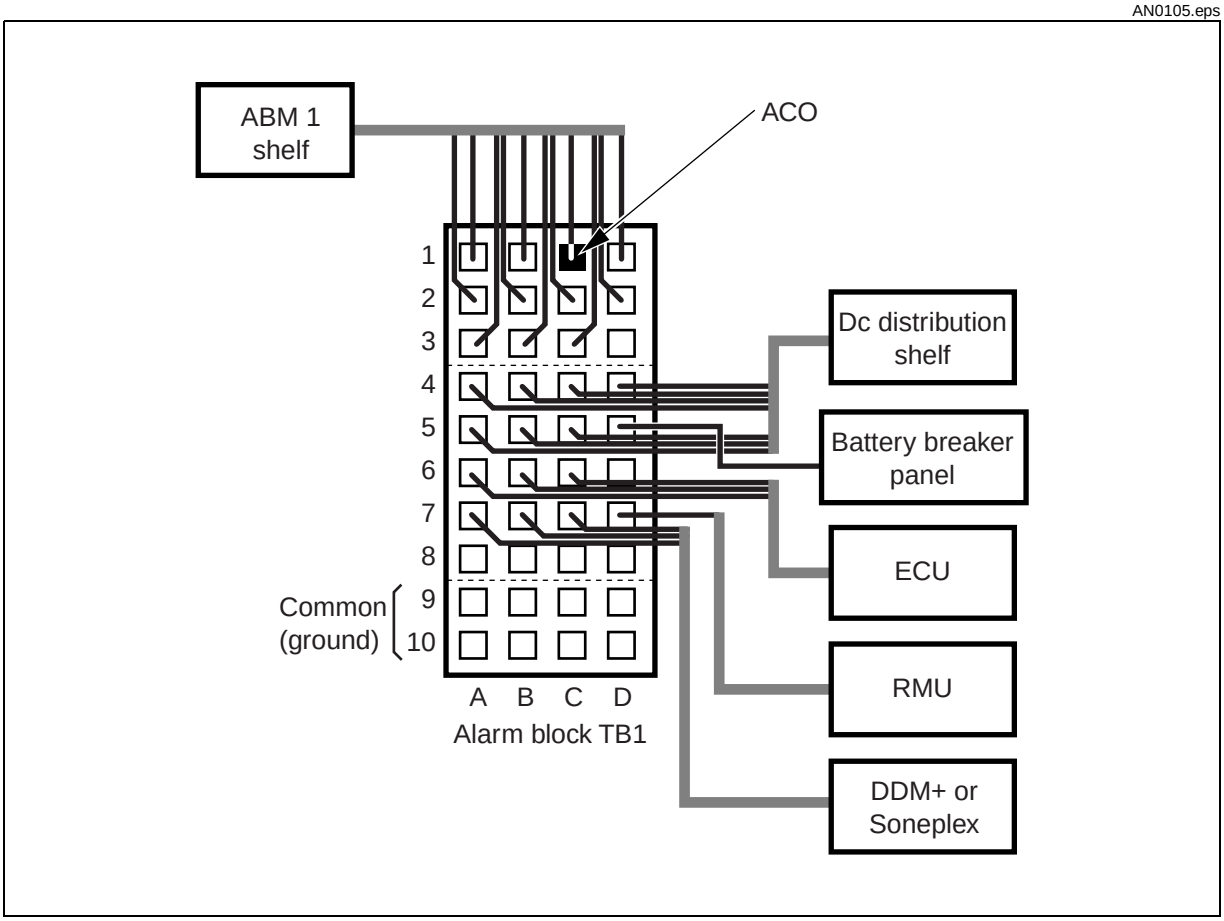
All of the above alarms are precabled to a four by ten wire wrap block (TB1). Eleven pins on the wire wrap block are prewired to the eleven telemetry input alarms on the ABM shelf # 1. The telemetry input #3 is reserved for the ACO.

To select an alarm, cross connect any 15 of the equipment alarms to the telemetry input alarm (see Table 4-1 and Figure 4-2).

To connect the alarms, follow Procedure 4-1, “Connecting the alarms”.

Figure 4-2
ABM shelf telemetry input alarms

AN0105.eps



Procedure in this chapter

Table 4-2 lists the procedure contained in this chapter.

Table 4-2

Action	Details
Connecting the alarms	Procedure 4-1 on page 4-6

Procedure 4-1
Connecting the alarms

Use this procedure to connect the alarms to be reported to the ABM #1 shelf.

Requirements

You need the following tools and materials:

- wire-wrap tool
- solid wire 24 AWG

Action

Step	Action
1	Select the alarms to be reported to the ABM #1 shelf and the input telemetry points to be used (see Table 4-1 and Figure 4-2).
2	Refer to procedure 9.6, ”Changing the telemetry input description”, (NTP 323-3001-032). The Engineering and Ordering Information is part of AccessNode, Release AN16 or later.
3	Use the solid wire 24 AWG to wire wrap the alarms from the input telemetry. ***Note:*** After you connect the alarms, provision them so that the appropriate label shows up at the alarm monitoring facility.

—end—

Maintenance

This chapter provides maintenance procedures for the AN2016 Cabinet.

Note: When any one of the doors of the cabinet are opened, the "Door Intrusion" alarm will be raised and visible at the central office. To disable the alarm during maintenance activities, you must pull carefully on the door switch until it is in the complete outward position.

Procedures in this chapter

Table 5-1 lists the maintenance procedures in the order in which you perform them.

Table 5-1
Maintenance procedures

Action	Details
Installing the rectifiers	Procedure 5-1 on page 5-2
Control card replacement	Procedure 5-2 on page 5-4
Replacing a rectifier	Procedure 5-3 on page 5-5
Heat exchanger maintenance	Procedure 5-4 on page 5-6
Replacing the fan	Procedure 5-5 on page 5-7
Replacing the ECU	Procedure 5-6 on page 5-13
Starting up the ECU	Procedure 5-7 on page 5-17
Connecting the fan shelves to the ECU	Procedure 5-8 on page 5-19

Procedure 5-1
Installing the rectifiers

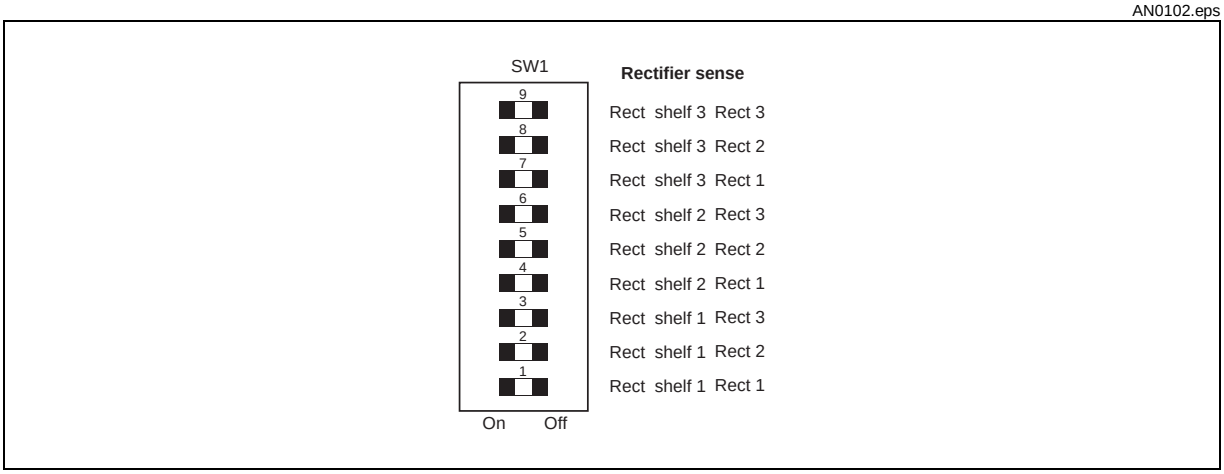
Use this procedure to add a rectifier in the Helios System 200/48. The system is equipped with 25 A plug-in rectifiers. The alarm and dc output cabling is installed and verified at the factory.

Action

Step	Action
1	Release the rectifier retaining bar(s) on the rectifier shelf by loosening the captive screws that hold them in place.
2	Remove the blank rectifier face plates.Place the face plate at the bottom of the shelf, under the rectifiers to be installed, for storage. ***Note:*** If you remove a rectifier, reinstall the blank panel to meet the safety regulations.
3	Verify that the ac cabling for the shelf has already been performed.
4	Verify that the dc output cabling and the alarm cabling has already been performed on the shelf.
5	Verify that the breakers on the front of the rectifiers are turned off.
6	Slide the rectifiers into the appropriate position in the rectifier shelf.
7	Replace the retaining bar(s) to secure the rectifiers in position.
8	To connect the sensing leads to the reference, switch the associated sense switches to the ON position.The switches are on the back plane of the control and distribution panel (see Figure 5-1). ***Note:*** For detailed information regarding MPR25 rectifiers, refer to *Description, Installation, Operation and Maintenance Manual* 169-2071-500. **—end—**

Figure 5-1
Rectifier sensing lead switches

AN0102.eps



Procedure 5-2
Control card replacement

Use this procedure to replace the control card. You can replace the control card without taking the System 200 power plant out of service and generating alarms.

CAUTION
Risk of equipment damage
The control card contains some discrete and micro electronics solid state devices. These devices can be subject to permanent damage due to the electrostatic potentials which can occur during handling and installation unless precautions are observed.

Action

Step	Action
1	Open the front door of the control and distribution panel.
2	Disconnect the cable from the J2 connector on the backplane.
3	Disconnect the cable from the J1 connector on the backplane.
4	Remove the eight screws holding the control card to the front door.
5	Replace the control card by the new one and reinstall the eight screws.
6	Connect the cable to the J1 connector on the backplane.
7	Verify the meter calibration and select the proper alarm levels.
8	Connect the cable to the J2 connector on the backplane. ***Note:*** For detailed information regarding Helios System200/48 applications, refer to *Description, Installation, Operation and Maintenance Manual* 167-9021-109.

—end—

Procedure 5-3
Replacing a rectifier

Use this procedure to replace rectifiers.

Action

Step	Action
1	Notify the Alarm Center of incoming alarms during this procedure.
2	Turn off the ac and dc circuit breakers on the rectifier being replaced. Open the associated sense switch on SW1 on the back plane.
3	Release the rectifier retaining bar by loosening the screws.
4	Slide the rectifier out of the shelf carefully. Reuse the shipping carton of the new rectifier to store or ship the removed unit.
5	Ensure that the ac and dc circuit breakers on the new rectifier about to be plugged-in are in the OFF position (down). Slide the unit firmly into the shelf, resting it on top of the stored blank panel.
6	Replace the retaining bar and secure she screws.
7	Operate the ac circuit breaker of the rectifier to the ON position.
8	With the dc breaker in the OFF position, adjust the float and equalize voltage levels to the same level (approx.) as that of the other rectifiers.
9	Operate the dc circuit breaker to the ON position and close the associated sense switch (SW1 on the backplane).
10	Set the SLS/FS switch to the same position as that of the other rectifiers.
11	Verify that the replacement rectifier is sharing the load by observing its ammeter. It should display approximately the same value as the ammeter on the other rectifiers. If not, adjust its float and equalize voltage levels.
12	Notify the Alarm Center when you complete this procedure. ***Note:*** For detailed information regarding MPR25 rectifiers, refer to *Description, Installation, Operation and Maintenance Manual* 169-2071-500. **—end—**

Procedure 5-4
Heat exchanger maintenance

The heat exchangers are designed to run for years without any routine maintenance. If a fan unit fails, you can replace without removing the heat exchanger (see Procedure 5-5, “Replacing the fan”).

DANGER

Electrical hazard mechanical hazard.

Risk of electric shock or being cut by moving fan blades. Before replacing any fan unit, be sure that the power is shut off.

Procedure 5-5
Replacing the fan

Use this procedure to replace the cabinet fans. You must replace the fans from the front of the cabinet (termination compartment on the left and the AC compartment on the right). Follow the fan sequence one, three, and five from left to right on the top. Apply the fan sequence two, four, and six from left to right on the bottom.

Action

Step	Action

Bottom Fan Replacement

1 Remove fan fuses on the ECU related to the damaged fan.

2 Disconnect power to the fan to be replaced. Verify that power is off before proceeding.

3 Use 216-type tool to remove the middle bolts from each side of the front baffle on the bottom heat exchanger fan assembly (see Figure 5-2). Set the baffle safely aside for reinstallation.

4 Use the 216-type tool to remove the two bolts, one on each side, of the air deflector. Set safely aside (see Figure 5-3).

5 Use the 216-type tool to unbolt the fan assembly. Slide out the fan assembly.

6 Pull out the harness assembly behind the duct and disconnect the power plug. Set the fan assembly hardware aside for later reinstallation. Use the 216-type tool to remove the two bolts, one on each side, of the fan tray assembly. Remove the old fan assembly (see Figure 5-4) and handle according to local practices.

7 Install the replacement fan assembly using the hardware removed previously. Connect the power plug and place it behind the duct.

8 Reinstall the air deflector using the hardware removed in step 4.

9 Reinstall the front baffle using the hardware set aside in step 3.

CAUTION
Tighten all interior and exterior cover plate bolts to 25 in-lb (230-288 Newton-cm) to ensure a proper gasket.

10 When all work is complete, apply power to the fans and verify fan operation.

—continued—

Procedure 5-5 (continued)
Replacing the fan

Step	Action

Top Fan Replacement

11 Disconnect power to the fan you are replacing. Verify that power is off before proceeding.

12 You can access top fans through a top cap in the solar shield. To remove and replace one of the top fans, use a 216-type tool. Remove the bolts securing the top cap of the fan to be replaced (see Figure 5-5). Lift the top cap and set it aside for later reattachment.

13 Remove the six bolts from the interior fan mounting plate (see Figure 5-6). Set the hardware for use again later. The top fan is attached to this plate.

Note: Additional screws are supplied in case screws are misplaced.

14 Pull out the harness assembly under the frame.Disconnect the power plug and remove the fan plate assembly (see Figure 5-7 and Figure 5-8).

15 Remove the old fan assembly (see Figure 5-9). To install the new fan-plate assembly, place the new inner fan-plate over the appropriate fan opening.

16 Secure the interior fan-mount plate assembly using the hardware set aside in step 4. Tighten all bolts.

17 Connect the power plug and secure it between the bridge walls and under the frame of the top cap. Ensure the power plug or cable does not interfere with fan operation.

18 Secure the top cap using the hardware set aside in step 3.

19 When all work is complete, apply power to the fans and verify fan operation.

—end—

Figure 5-2
Removing front baffle

AN0059.tif

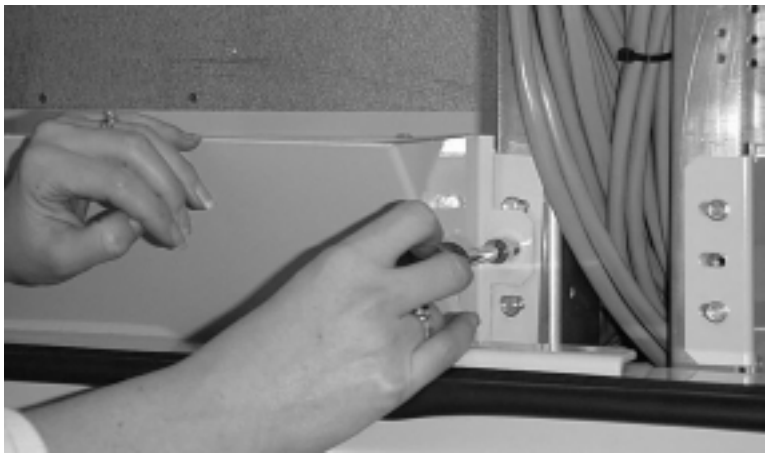


Figure 5-3
Removing the front air deflector

AN0060.tif

Figure 5-4
Removing the fan assembly

AN0061.tif

Figure 5-5
Removing the top cap

AN0062.tif

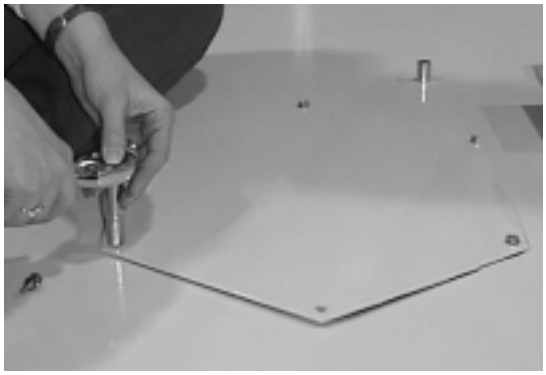


Figure 5-6
Removing screws from the fan mounting plate

AN0063.tif

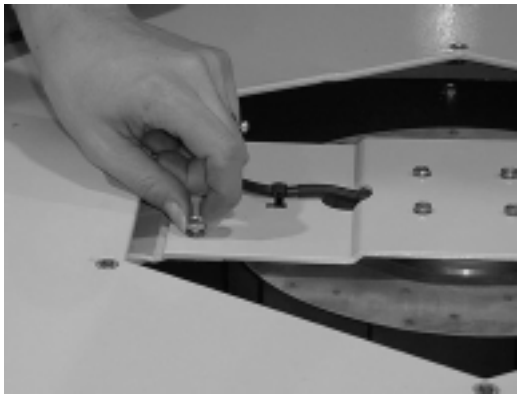


Figure 5-7
Fan power plug

AN0064.tif

Figure 5-8
Disconnecting the fan power plug

AN0065.tif

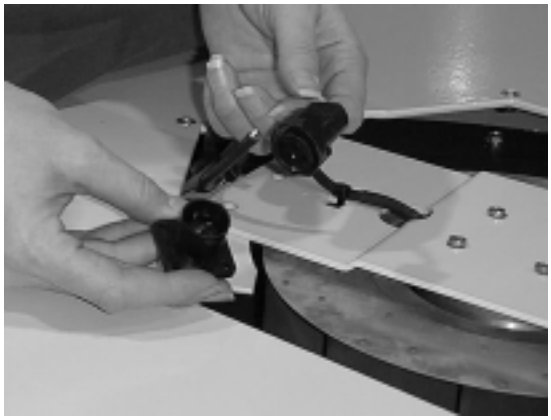


Figure 5-9
Removing the fan

AN0066.tif

Procedure 5-6
Replacing the ECU

Use this procedure to replace the environmental control unit (ECU).

Action

Step	Action
1	Turn off power to the ECU by turning the appropriate circuit breakers to the off position (see Figure 2-29).
2	Make sure there is no power supplied to the ECU.
3	Remove the screws that connect the ECU to the heat exchanger vent.
4	Lift the ECU with caution up away from the vent. Disconnect and remove the ECU (see Figure 5-10).
5	Disconnect the connectors J1 through J20 on the ECU.
6	Put away the damaged ECU with a label which indicates the failure report.
7	Install a new ECU.
8	Connect J1 through J20 (see Figure 5-11 and Table 5-2).
9	Put back the screws that connect the ECU to the heat exchanger vent.
10	When all work is complete, apply power to the ECU.
11	To verify the operation of the ECU, refer to the start up and initialization routine, see Procedure 5-7,”Starting up the ECU”.

—end—

Figure 5-10
Environmental control unit diagram

AN0109.eps

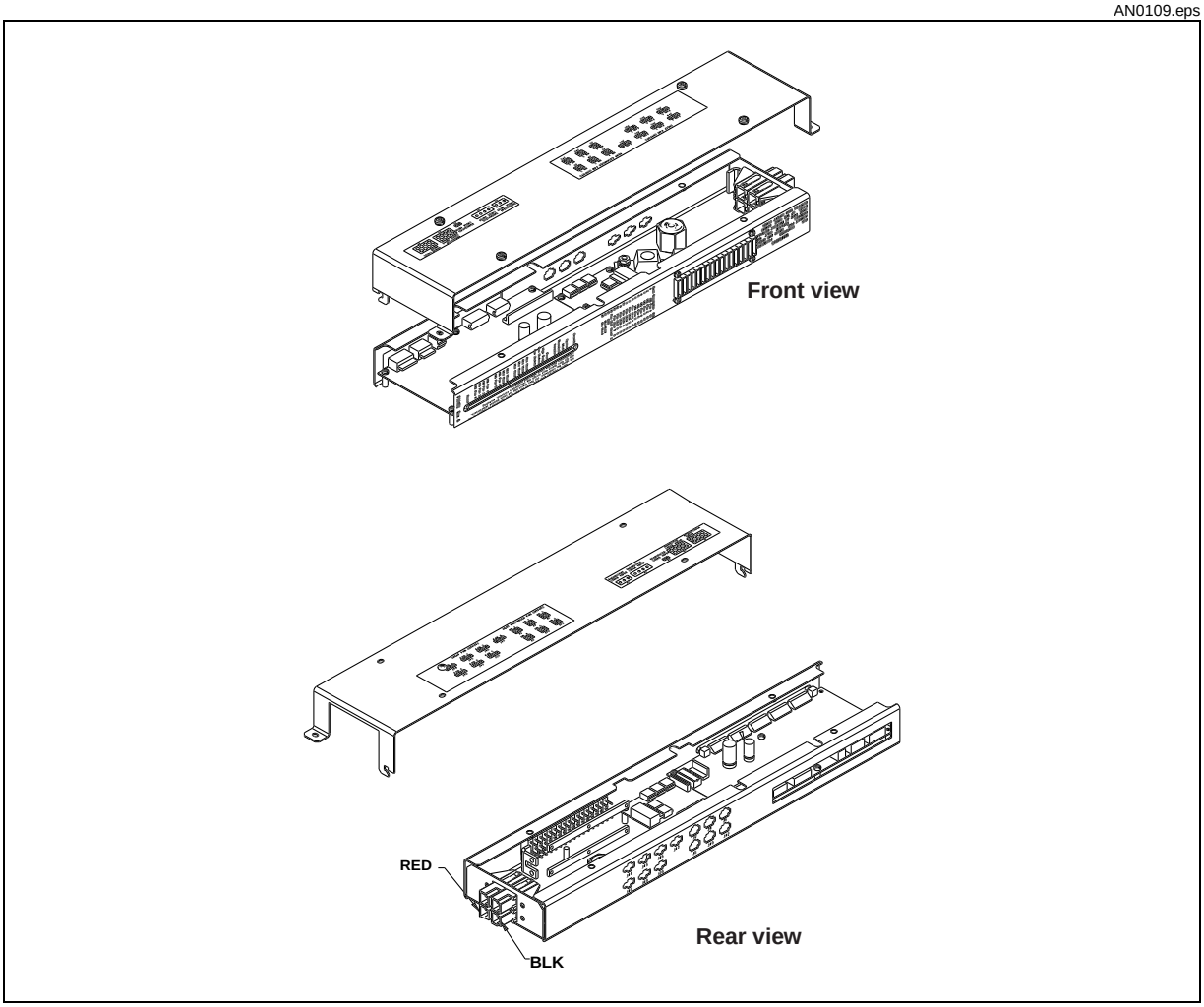


Figure 5-11
ECU connections

AN0110.eps

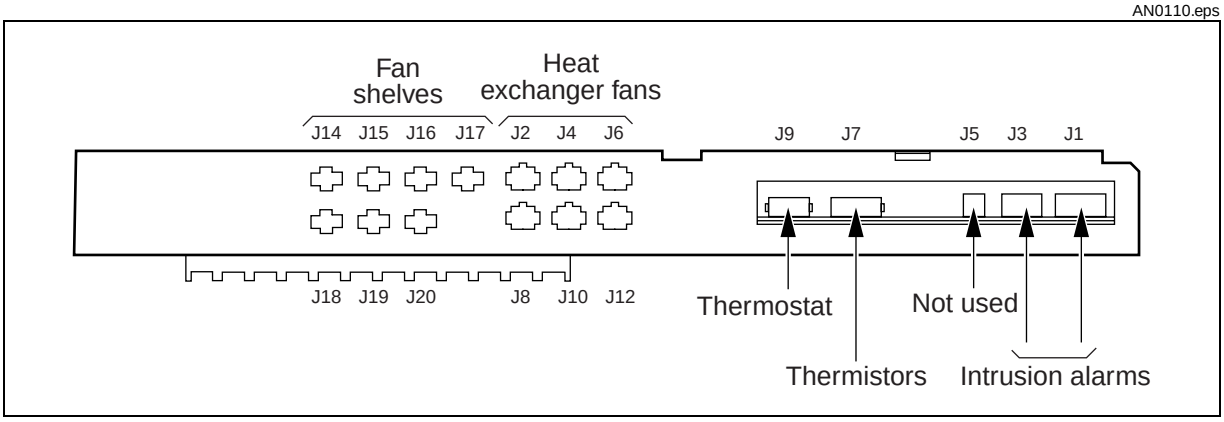


Table 5-2 lists the connector description of J1 through J20 located on the environmental control unit.

Table 5-2
Connector Description J1 through J20

Connector Designation	Pin Number	Pin Description
J1	1 2 3 4 5 6 7 8 9 10	System Alarm System Alarm High Temperature Alarm High Temperature Alarm Intrusion Alarm Intrusion Alarm Not Used Not Used Not Used Not Used
J3	1 2 3 4 5 6 7 8	Door Switch Door Switch Momentary Switch Momentary Switch Switch Common Switch Common Switch Common Switch Common
J5	1 2	Speaker Negative Speaker Positive
J7	1 2 3 4	Thermistor 1 Thermistor 2 Thermistor Common Thermistor Common
J9	1 2 3	External Reset External Reset Not Used
J2	1 2 3 4	Ground -48 Vdc Tachometer Control
J6	1 2 3 4	Ground -48 Vdc Tachometer Control
—continued—		

Table 5-2 (continued)
Connector Description J1 through J20

J8	1 2 3 4	Ground -48 Vdc Tachometer Control
J10	1 2 3 4	Ground -48 Vdc Tachometer Control
J12	1 2 3 4	Ground -48 Vdc Alarm Control
J14	1 2 3	Ground -48 Vdc Alarm
J15	1 2 3	Ground -48 Vdc Alarm
J16	1 2 3	Ground -48 Vdc Alarm
J17	1 2 3	Ground -48 Vdc Alarm
J18	1 2 3	Ground -48 Vdc Alarm
J19	1 2 3	Ground -48 Vdc Alarm
J20	1 2 3	Ground -48 Vdc Alarm
—end—		

Procedure 5-7
Starting up the ECU

Use this procedure to verify the environmental control unit (ECU) start up sequence. The ECU has a start up and initialization routine which begins if any of the following three procedures are performed:

- The reset switch is pressed, which is located next to the heat exchanger (HX) fan 1 LED on the front panel. This will cause a restart.
- The software locks up and the watchdog timer (WDT) times out and forces a reset and a restart.
- When power is first applied, the power on reset causes a reset and start up begins.

During start up, the processor begins an initialization procedure to control all ECU functions (see Figure 5-12) and steps below.

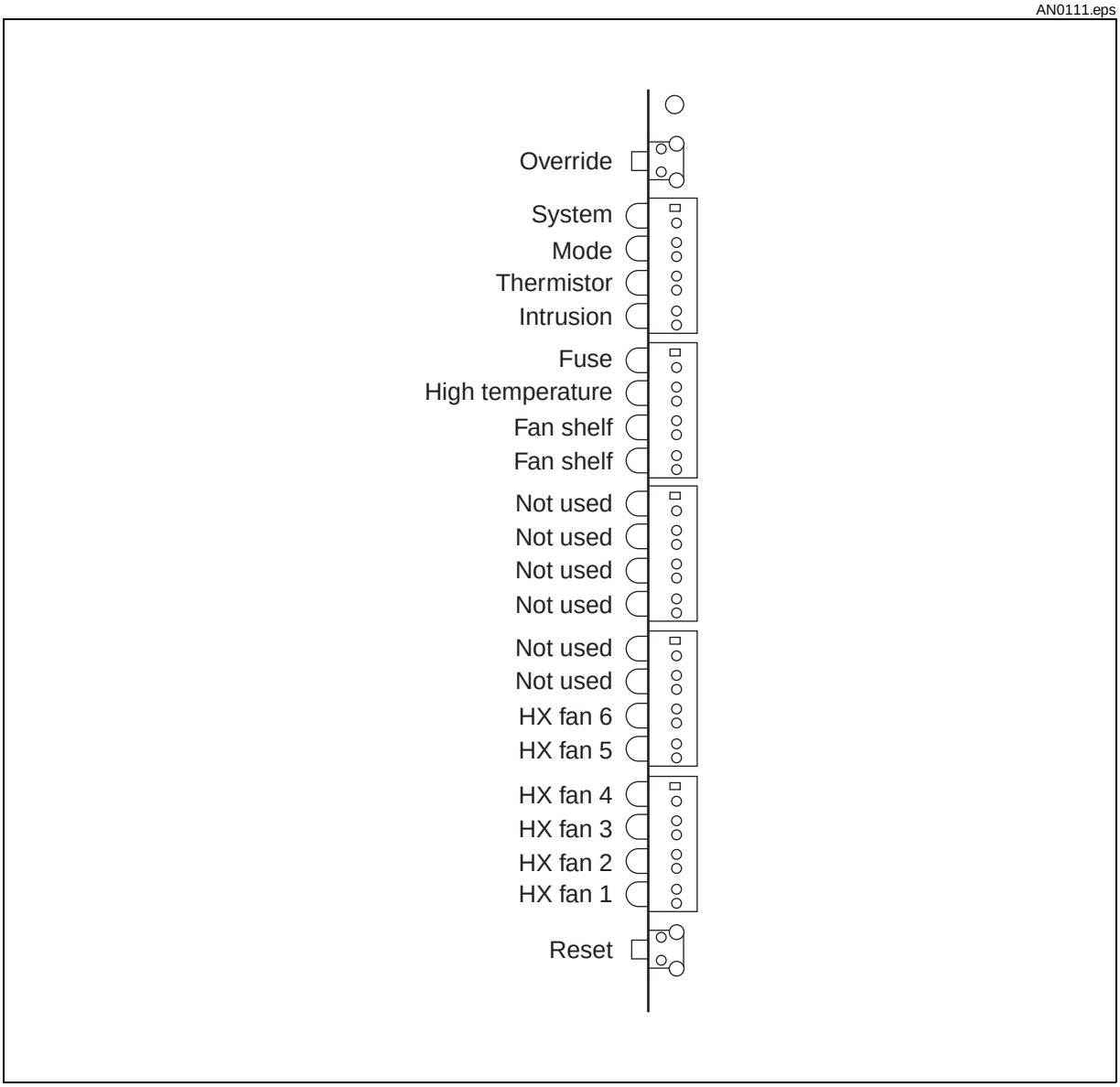
Action

Step	Action
1	Check that the following start up occurs in sequence.
2	Check that all LEDs will first light red.
3	Check that all LEDs will light green.
4	Check that all LEDs will turn off.
5	Check that all LEDs will cycle one at a time to indicate individual control.
6	Check that all LEDs will light in a chasing sequence, first green and then red.
7	Check the LED array will display a green led to indicate an on dip switch.
8	Check the LED array will not light to indicate an off dip switch. ***Note 1:*** While the ECU is displaying the dip switch sequence, all fans that are enabled will cycle on and off. ***Note 2:*** After all fans are turned off, the ECU will enter the main control loop and begin operating based on temperature.

—end—

Figure 5-12
LED functions

AN0111.eps



Procedure 5-8
Connecting the fan shelves to the ECU

Use this procedure to connect the fan shelves to the environmental control unit (ECU).

Action

Step	Action
1	Turn off power to the ECU by turning the appropriate circuit breaker to the off position (see Figure 2-29).
2	Make sure there is no power supplied to the ECU.
3	Remove the screws that connect the ECU to the heat exchanger vent.
4	Lift the ECU with caution up away from the vent. Disconnect and remove the ECU (see Figure 5-10).
5	Connect the fan shelf connectors to the ECU (see Figure 5-11 and table 5.2).
6	Reinstall the ECU.
7	When all work is complete, apply power to the ECU.
8	To verify the operation of the ECU, refer to the start up and initialization routine, see Procedure 5-7, ”Starting up the ECU”.

—end—

Ordering information

This chapter lists the ordering codes for the AN2016 Cabinet.

To order a cabinet, you must order the following:

- cabinet equipment includes (all standard equipment and expansion kits in appropriate tables)

  Note: The tables of standard equipment list the major pieces of equipment and all cable assemblies. The lists do not include, for example, ground wires and loose hardware associated with individual pieces of equipment.

- required options (includes necessary equipment to operate the cabinet in appropriate table)
- optional equipment for the
  - — cabinet (for example, power pedestal, battery back up for the battery compartment)
  - — transport option (for example, digital cross-connect panel, fiber manager kit and DDM+ transport system kit)
- recommended replacement parts (includes necessary equipment to maintain functionality of equipment while emphasizing a preventive maintenance approach)

CAUTION
Risk of service interruption or equipment damage.
To provide ventilation within requirements, do not remove the plate covering the heat exchanger plenum until you install new equipment.

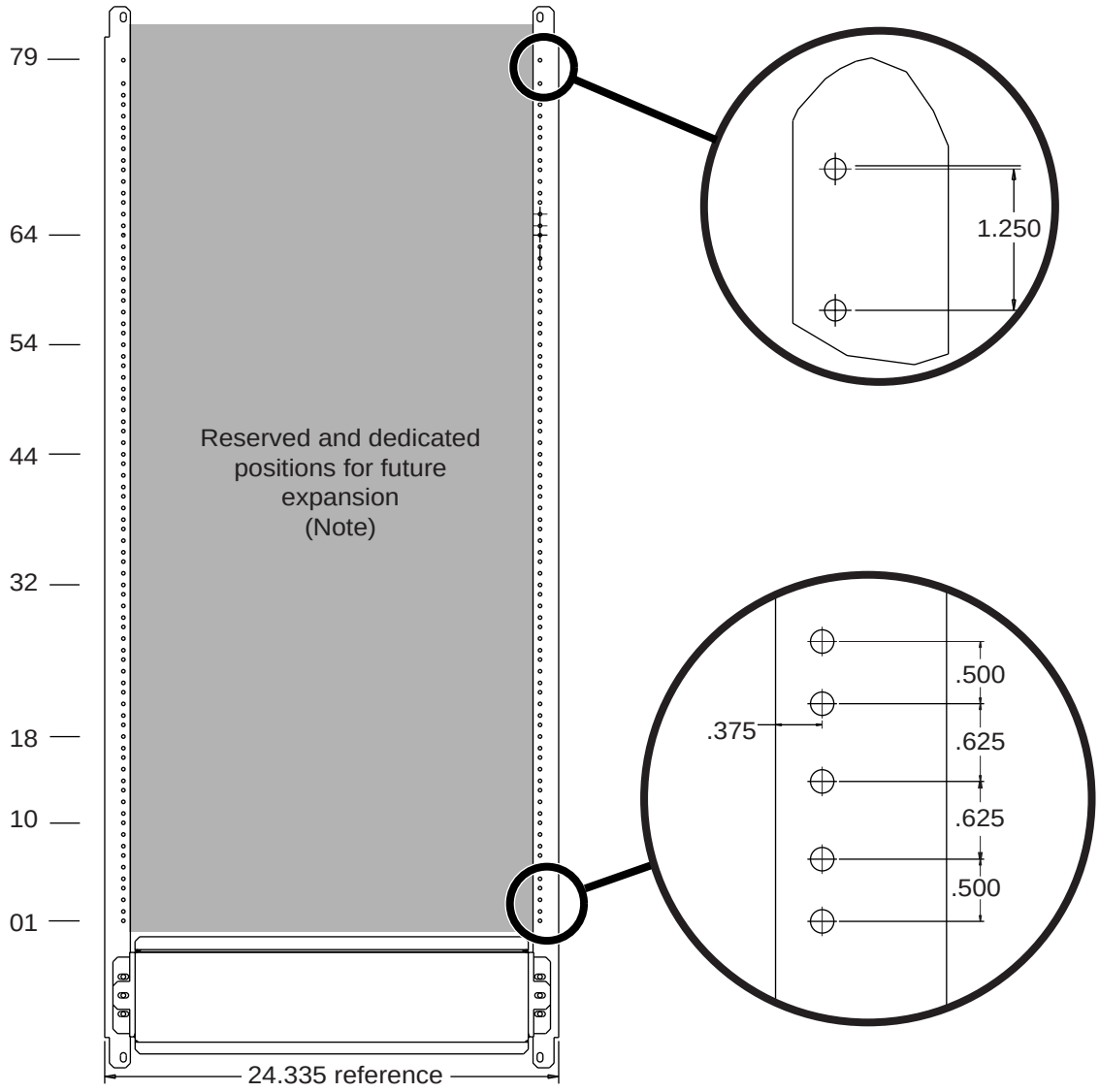
Standard equipment (672 lines)

This section lists the standard equipment for an AN2016 Cabinet with connections for 672 voice frequency (VF) lines. Table 6-1 on page 6-14 lists the standard equipment and Table 6-2 on page 6-16 lists required options for a 672-line AN2016 Cabinet.

For a front view of frame/bay A, B, C, D, E and F, the equipment frame/bay layouts and mounting positions, see Figure 6-1, Figure 6-2, Figure 6-3, Figure 6-4, Figure 6-5 and Figure 6-6.

Figure 6-1
672-line configuration (front view frame/bay A)

AN0089.eps

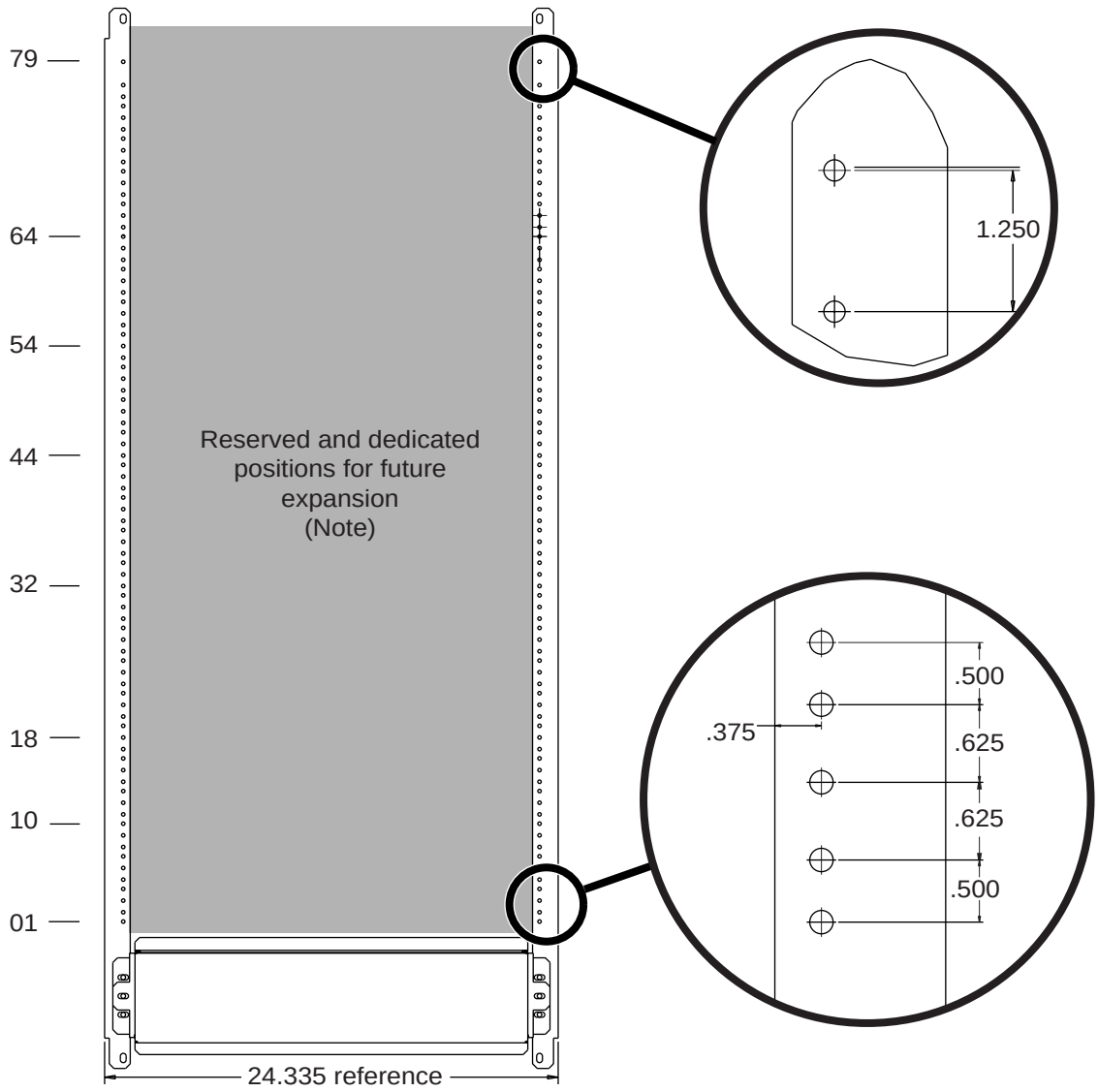


Front view

Note: The following empty spaces are reserved and dedicated only for future expansion using CDS shelves or future UE 9000 shelves.

Figure 6-2
672 and 864-line configuration (front view frame/bay B)

AN0089.eps

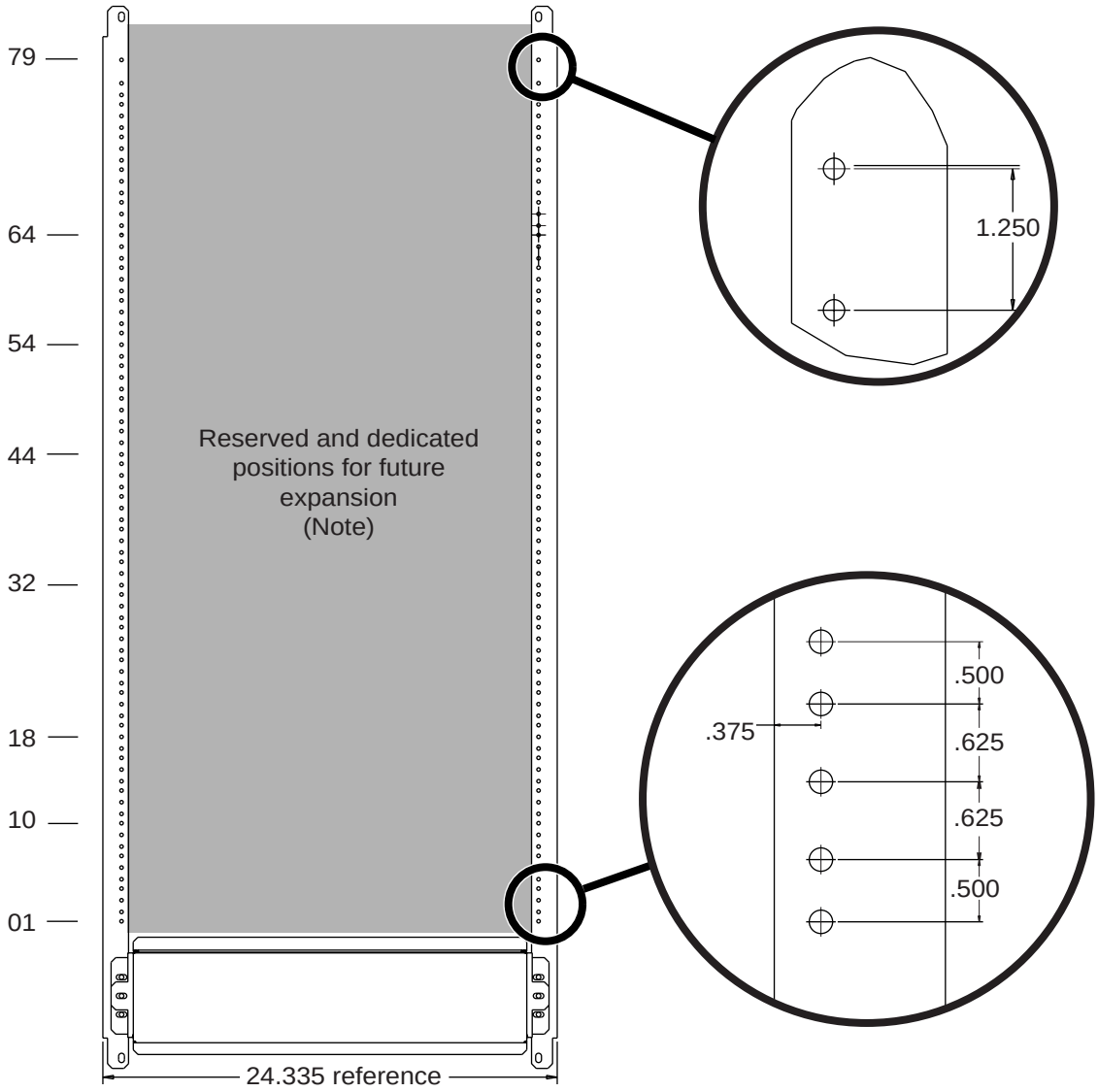


Front view

Note: The following empty spaces are reserved and dedicated only for future expansion using CDS shelves or future UE 9000 shelves.

Figure 6-3
672, 864 and 1344-line configuration (front view frame/bay C)

AN0089.eps

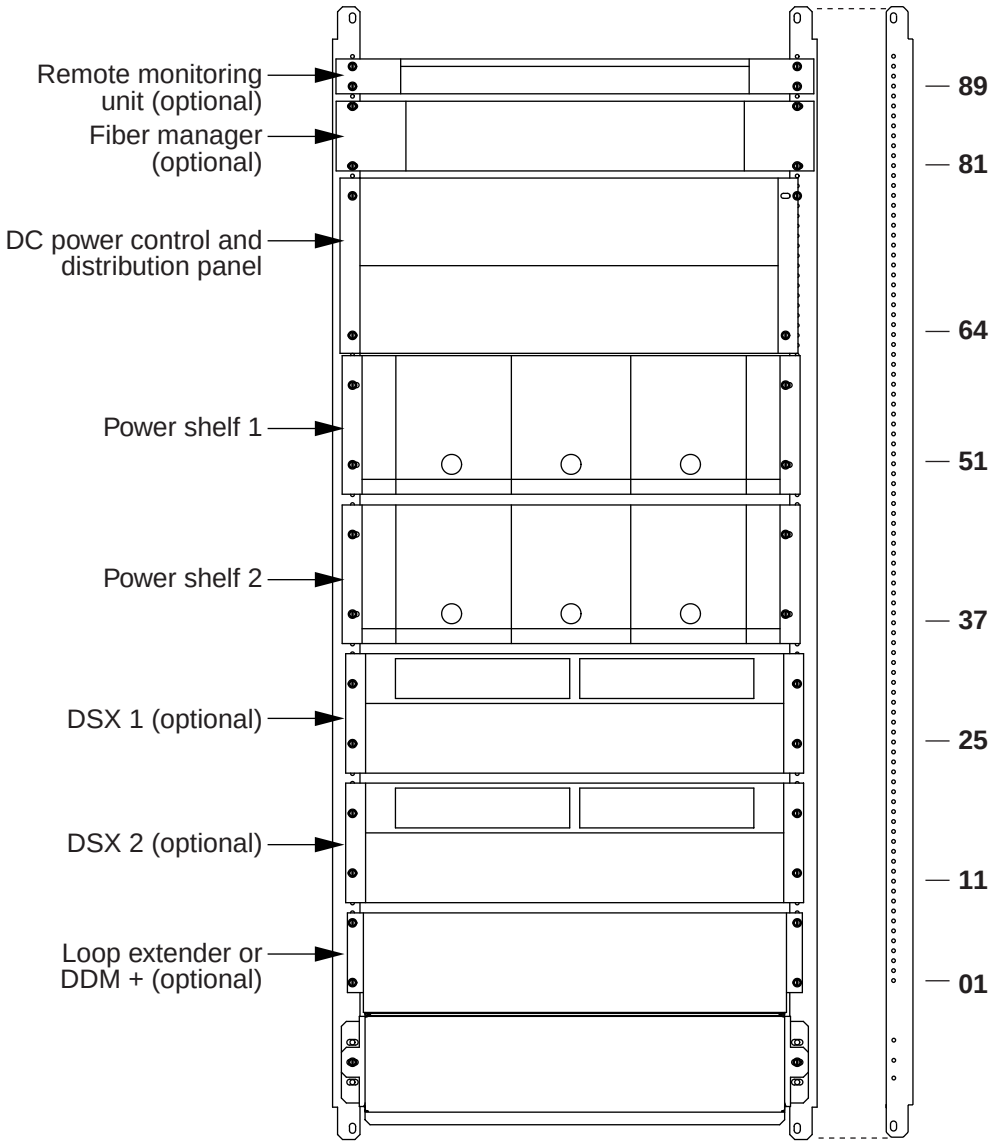


Front view

Note: The following empty spaces are reserved and dedicated only for future expansion using CDS shelves or future UE 9000 shelves.

Figure 6-4
672, 864, 1344 and 2016-line configuration (front view frame/bay D)

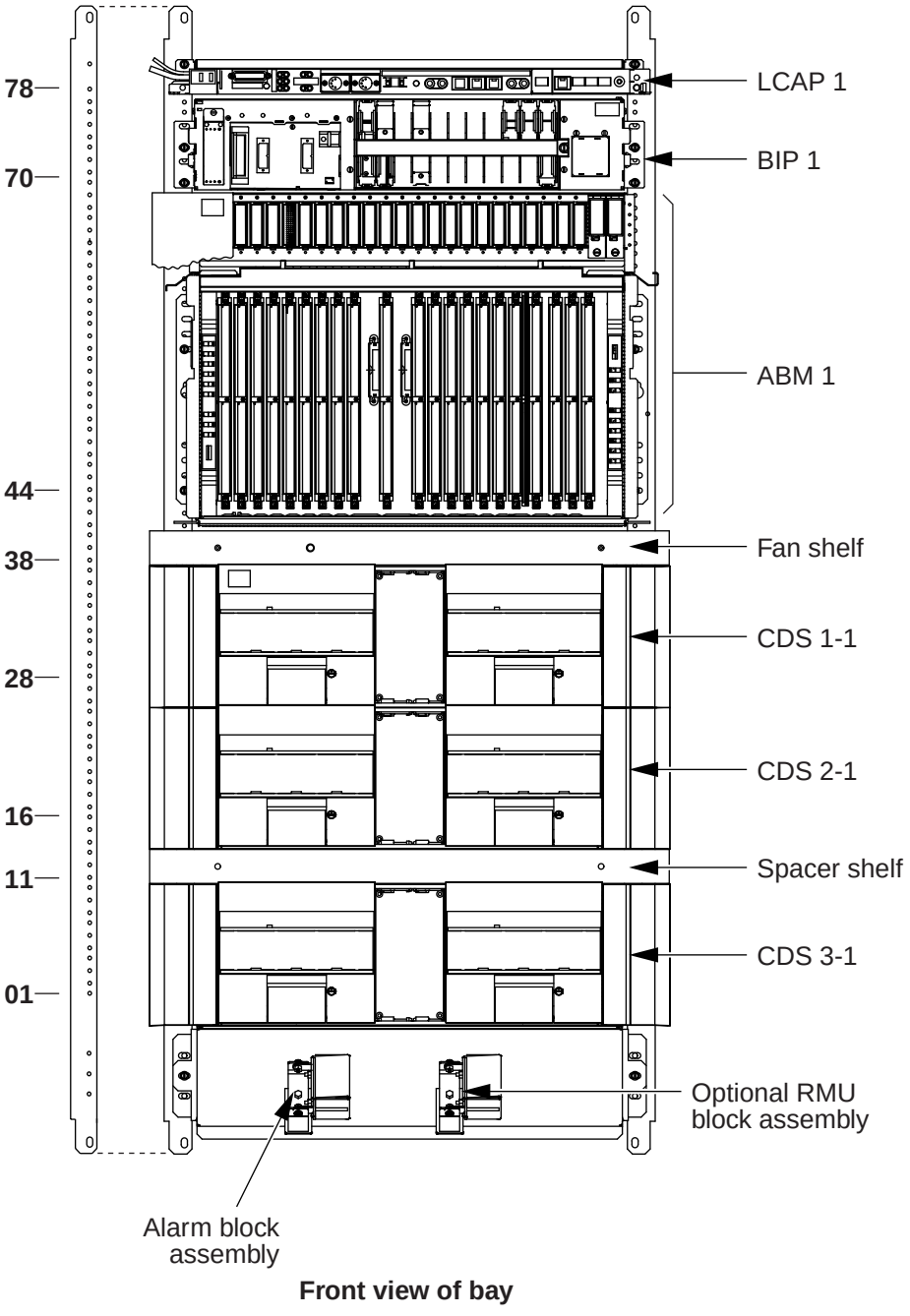
AN0040.eps



Front view of bay

Figure 6-5
672, 864, 1344 and 2016-line configuration (front view frame/bay E)

AN0038.eps



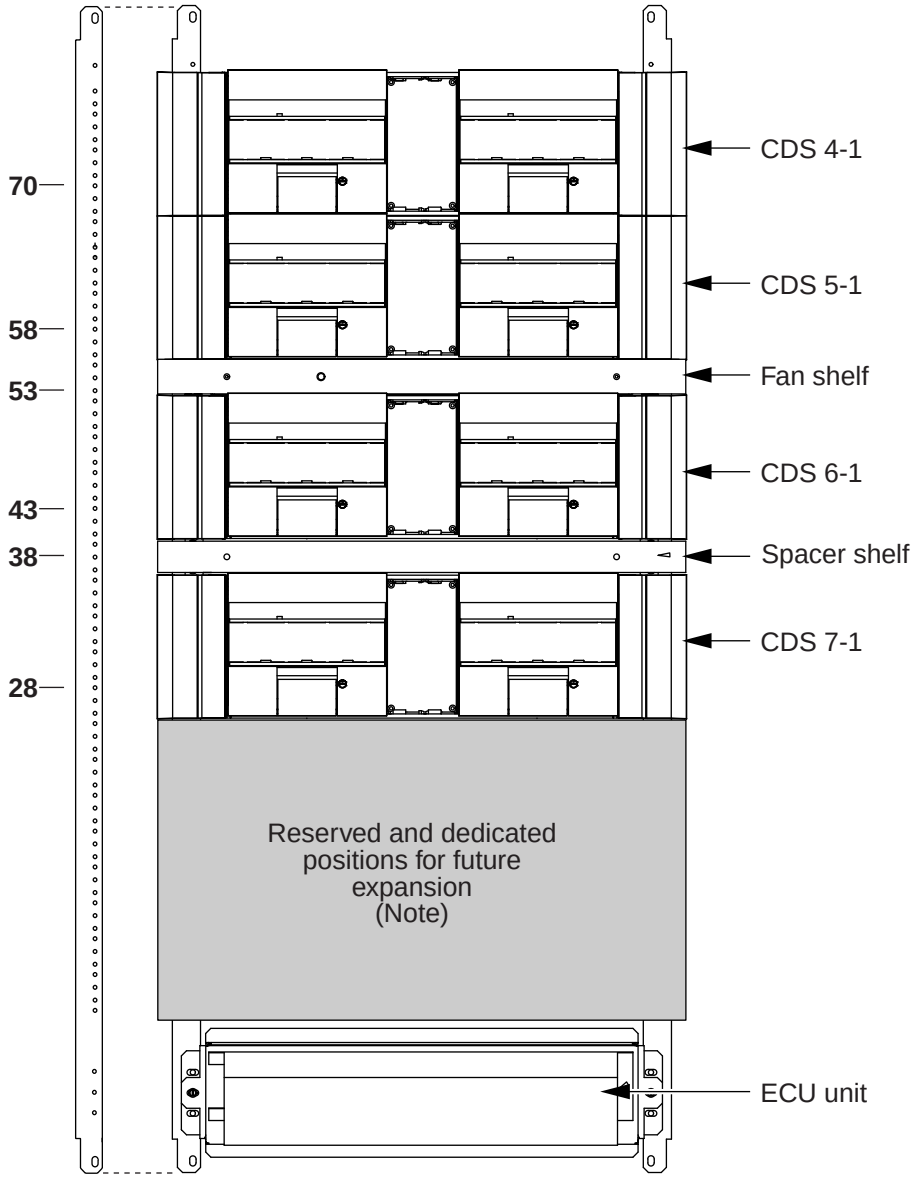
Front view of bay

Legend:

RMU = Remote Monitoring Unit

Figure 6-6
672, 864 and 1344-line configuration (front view frame/bay F)

AN0039.eps

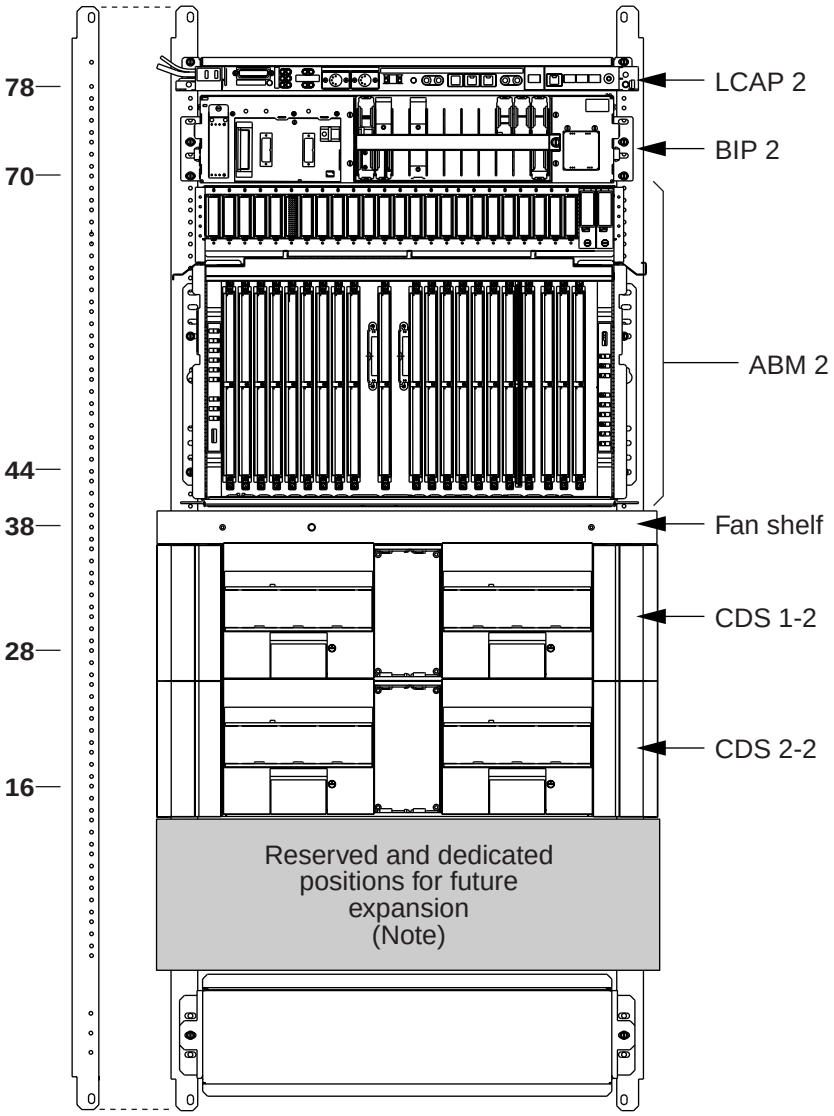


Front view of bay

Note: The following empty spaces are reserved and dedicated only for future expansion using CDS shelves or future UE 9000 shelves.

Figure 6-7
864-line configuration (front view frame/bay A)

AN0041.eps

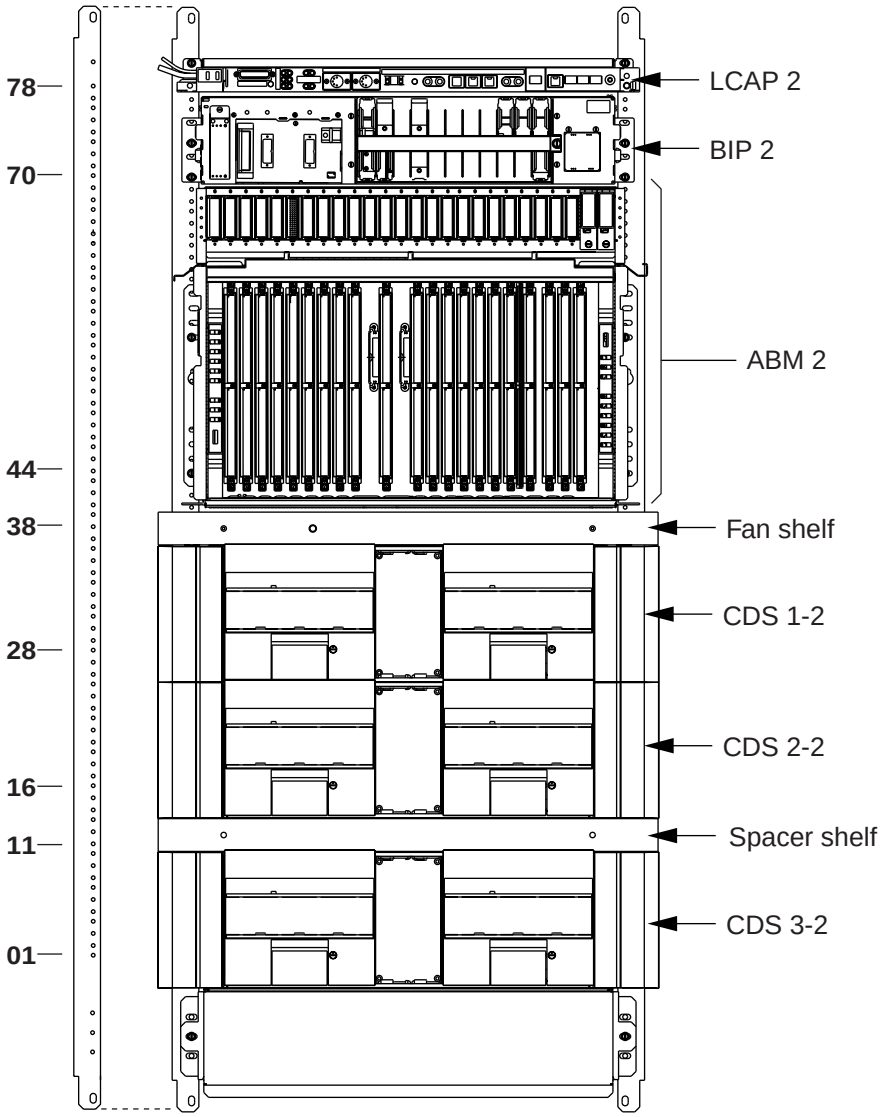


Front view of bay

Note: The following empty spaces are reserved and dedicated only for future expansion using CDS shelves or future UE 9000 shelves.

Figure 6-8
1344 and 2016-line configuration (front view frame/bay A)

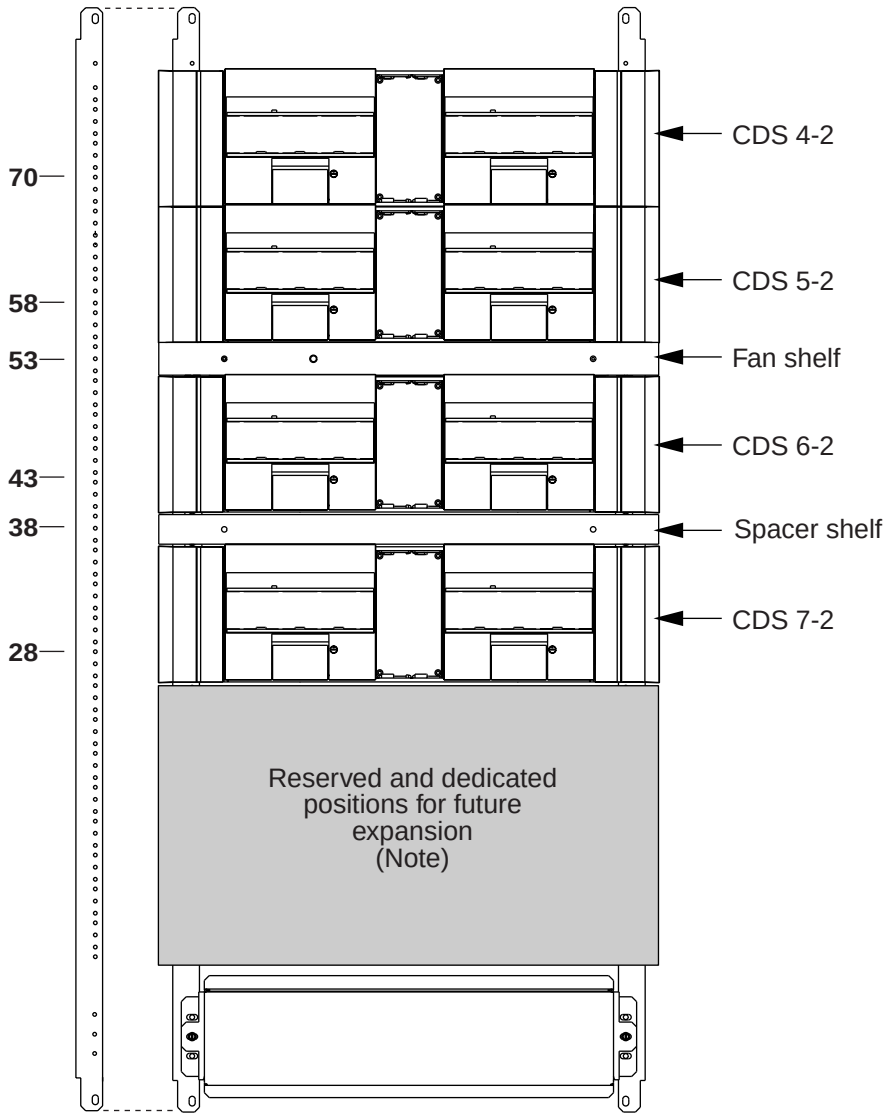
AN0042.eps



Front view of bay

Figure 6-9
1344-line configuration (front view frame/bay B)

AN0043.eps

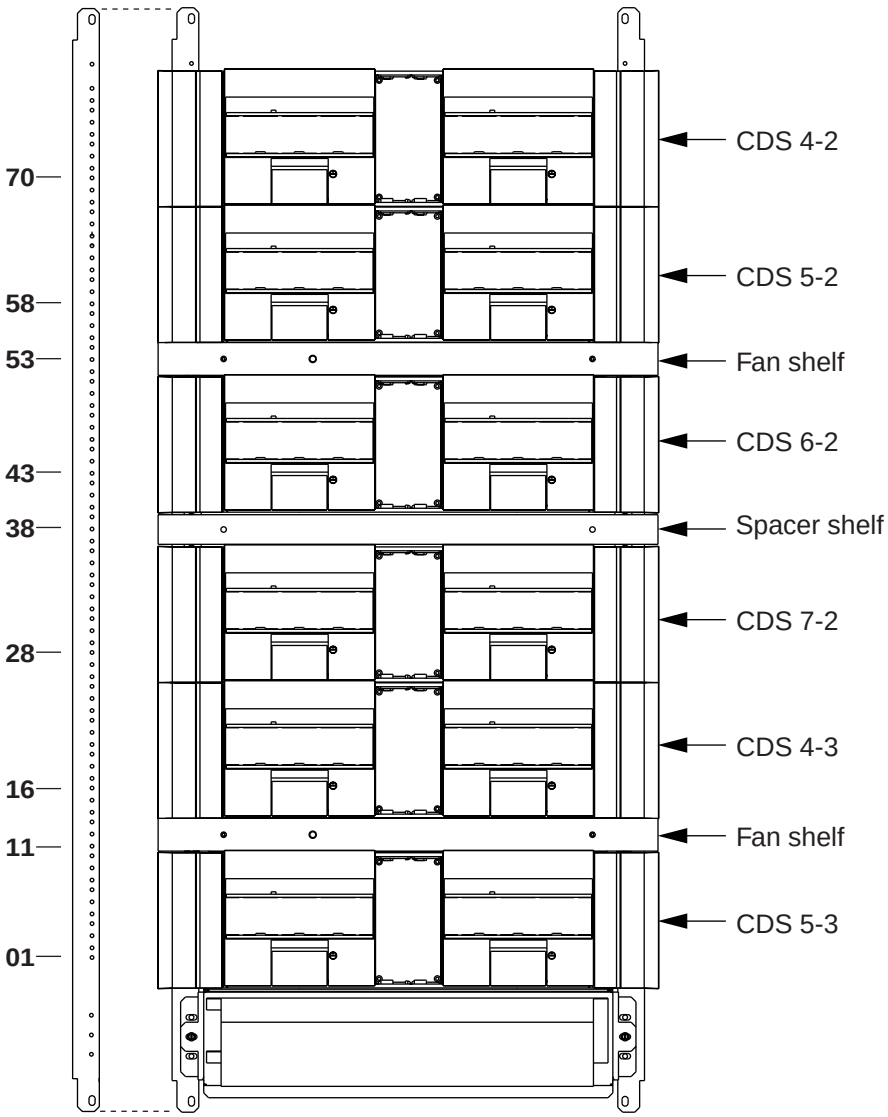


Front view of bay

Note: The following empty spaces are reserved and dedicated only for future expansion using CDS shelves or future UE 9000 shelves.

Figure 6-10
2016-line configuration (front view frame/bay B)

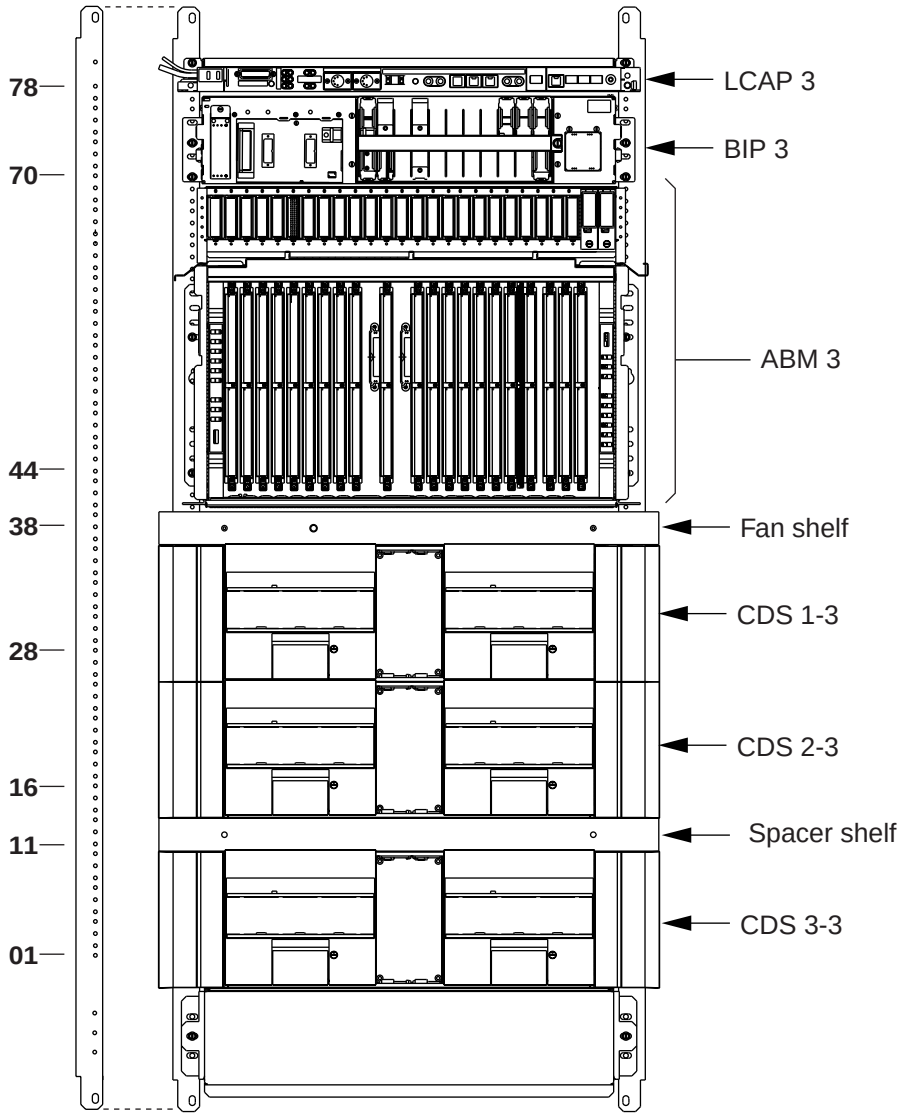
AN0044.eps



Front view of bay

Figure 6-11
2016-line configuration (front view frame/bay C)

AN0046.eps



Front view of bay

Figure 6-12
2016-line configuration (front view frame/bay F)

AN0045.eps

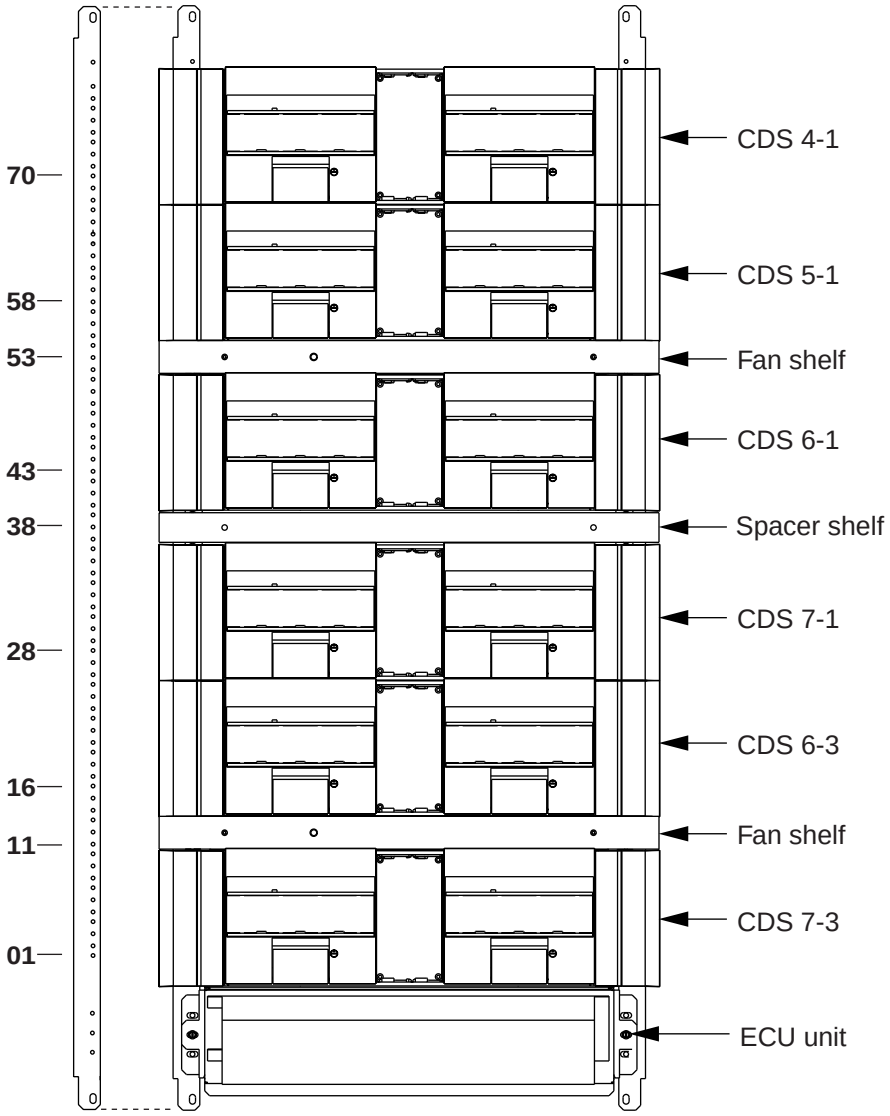


Table 6-1 on page 6-14 lists the standard equipment for a 672-line AN2016 Cabinet

Table 6-1
AN2016 Cabinet 672-line equipment (standard)

PEC		Description	Quantity
A0774668	A0774668	Pad mounting template ***Note:*** To be ordered ahead of time for site preparation.	1
NTNR01AA includes		AN2016 outside plan (OSP) cabinet with heaterpad (3M)	1
	A0768446	400 pair VF, 5 pins, field side 26 AWG, 8 ft long	1
	A0768447	300 pair VF, 5 pins, field side 26 AWG, 6 ft long	1
	A0768448	400 pair VF, 5 pins, field side 26 AWG, 8 ft long	1
	A0768449	300 pair VF, 5 pins, field side 26 AWG, 6 ft long	1
	A0768450	400 pair VF, 5 pins, field side 26 AWG, 16 ft long	1
	A0768451	300 pair VF, 5 pins, field side 26 AWG, 16 ft long	1
	A0768452	100 pair Digital, 5 pins, 19 inch mount, field side 24 AWG, 8 ft long	2
	A0769355	Power system, battery disconnect panel with eight 30 A dc circuit breakers	1
	A0769072	Inside protection mounting brackets	4
	A0769076	Outside protection mounting brackets	3
	A0769077	U-channel protection mounting brackets	9
	A0769087	Splice bars	4
	A0769099	Metal conduit raceway	1
NTNR10AA includes		AccessNode hardware kit	1
	NT4K14AB	Breaker interface panel	1
	NT4K1490	Breaker interface front cover assembly	1
	NT4K16CA	Local craft access panel, modular business package	1
	NT4K10AB	Access common equipment shelf	1
	NT4K1033	ABM front shelf cover	1
	NT4K0610	Fan shelf assembly, eight fans	1
	P0846202	Fan shelf assembly cover	1
	NT4K84BA	Power cable common equipment	2
	NT4K1024	ABM english label kit	1
	NT4K1422	Breaker interface panel english label kit	1
	P0732671	Product label identification	1
	NT4K85JB	Termination, cooling unit interface	1

—continued—

Table 6-1 (continued)
AN2016 Cabinet 672-line equipment (standard)

PEC		Description	Quantity
	NT4K85KA	BIP control cable assembly	1
	A0630076	Circuit breaker 30 A 80 V dc	4
NTNR11AA includes		Copper distribution shelf kit	1
	NT4K12AB	Copper distribution shelf	7
	NT4K1222	Line shelf label kit	7
	NT4K82DA	Cable assembly, A/B link VF/T/D, CDS 1	1
	NT4K82DB	Cable assembly, A/B link VF/T/D, CDS 2	1
	NT4K82DC	Cable assembly, A/B link VF/T/D, CDS 3	1
	NT4K82DD	Cable assembly, A/B link VF/T/D, CDS 4	1
	NT4K82DE	Cable assembly, A/B link VF/T/D, CDS 5	1
	NTNR82DF	Cable assembly, A/B link VF/T/D, CDS 6	1
	NTNR82DG	Cable assembly, A/B link VF/T/D, CDS 7	1
	NT4K86NA	Shelf metallic test pair cable assembly, 2 ft long	6
	NT4K86NC	Shelf metallic test pair cable assembly, 8 ft long	1
	NT4K0610	Fan shelf assembly, eight fans	1
	NT1W10AA	Shelf separator assembly	2
	P0891308	Fan shelf faceplate	1
NTNR19AA includes		Miscellaneous parts kit for AN2016	1
	NTNR91AA	BIP # 1 power cable assembly	1
	NT7E5072	CNet termination connector assembly	2
	NT4K85GE	Parallel telemetry cable assembly 50 ft	1
	NTNR60AA	Mounting kit for alarm block	1
	A0630082	Circuit breaker 50 A 80 V dc	2
	P0902425	AN2016 cabinet identification label	2
	P0902424	AN2016 OPC layout label	2
	P0902427	AN2016 cabinet label kit	1
NTNR21AA includes		Helios 200 rectifier kit	1
	NT6C28FB-61	Helios System 200/48 dc control and distribution shelf	1
	NT5C10CP-61	Rectifier shelf for system 200, gray	2
	NT5C10KC	AC fail assembly	2

—continued—

Table 6-1 (continued)
AN2016 Cabinet 672-line equipment (standard)

PEC		Description	Quantity
	P0805660	Cable assembly used on NT6C28FB-61	2
	NTNR93AA	Rectifier dc power cable assembly	2
	NTNR93BA	Rectifier ground wire assembly	1
	P0832887	DC distribution shelf mounting bracket	2
	P0835511	Cable assembly	2
Cables, assemblies and kits to order			
	NTNR90AA	Distribution power cable used to power up the CDS shelves	1
	NTNR90BA	Cable kit to power up the CDS shelves 1-7 talk batteries	1
—end—			

Table 6-2 lists the required options for a 672-line cabinet.

Table 6-2
AN2016 Cabinet 672-line required options

CPC	PEC	Description	Quantity
B01231144	NT5C06CA-3	MPR 25 rectifier module (see Notes 1 and 2)	2 or 3
Note 1: Insert appropriate number of modules into rectifier shelves NT5C10CP-61 part of NTNR21AA.			
Note 2: Order (1) MPR 25 for each AN hardware (672L) + (1) for each OEM stack + (1) for redundancy.			
Note 3: Refer to "Optional battery backup" on page 6-45 for ordering battery string hook up cables, required when the battery compartment holds the battery backup.			

Table 6-3 lists the standard equipment for an expansion kit from 672- to 864-line cabinet. For the equipment frame/bay layouts and mounting positions, see Figure 6-7.

Table 6-3
672- to 864-line expansion kit equipment (standard) for AN2016 Cabinet

PEC		Description	Quantity
NTNR10AA includes		AccessNode hardware kit	1
Note: A second ABM is required to support the additional CDS shelves.			
	NT4K14AB	Breaker interface panel	1
	NT4K1490	Breaker interface front cover assembly	1
	NT4K16CA	Local craft access panel, modular business package	1
—continued—			

Table 6-3 (continued)
672- to 864-line expansion kit equipment (standard) for AN2016 Cabinet

PEC		Description	Quantity
	NT4K10AB	Access common equipment shelf	1
	NT4K1033	ABM front shelf cover	1
	NT4K0610	Fan shelf assembly, eight fans	1
	P0846202	Fan shelf assembly cover	1
	NT4K84BA	Power cable common equipment	2
	NT4K1024	ABM english label kit	1
	NT4K1422	Breaker interface panel english label kit	1
	P0732671	Product label identification	1
	NT4K85JB	Termination, cooling unit interface	1
	NT4K85KA	BIP control cable assembly	1
	A0630076	Circuit breaker 30 A 80 V dc	4
NTNR12AA includes		AccessNode copper distribution shelf (CDS) kit	2
	NT4K12AB	Copper distribution shelf	1
	NT4K1222	Line shelf label kit english	1
NTNR30AA includes		DSX 56 kit front access	1
	A0764662	Digital cross-connect panel 56 terminations	1
	NTNR92AA	DSX power cable assembly	1
Cables, assemblies and kits to order			
	NTNR91AB	BIP # 2 power cable assembly	1
	NT7E44JC	CNet bay cable provides communication links between ABM shelves	1
	NTNR80AA	14 pair cable assembly provides DS1 connectivity between AccessNode and DSX panel	2
	NTNR80BA	28 pair cable assembly provides DS1 connectivity between AccessNode and DSX panel	2
	NT4K86NA	Shelf metallic test pair cable assembly, 2 ft long	2
	NT4K82DA	Cable assembly, A/B link VF/T/D, CDS 1	1
	NT4K82DB	Cable assembly, A/B link VF/T/D, CDS 2	1

—continued—

Table 6-3 (continued)
672- to 864-line expansion kit equipment (standard) for AN2016 Cabinet

PEC		Description	Quantity
	NTNR90AA	Distribution power cable used to power up the CDS shelves	1
	NTNR90BA	Cable kit to power up the CDS shelves 1-7 talk batteries	1
	P0902427	Cabinet label kit	1
	A0108992	Fuse GMT 2 Amp	1
Required options to order			
B01231144	NT5C06CA-3	MPR 25 rectifier module (see Notes 1 and 2)	1 or 2
Note 1: Insert appropriate number of modules into rectifier shelves NT5C10CP-61 part of NTNR21AA. ***Note 2:*** Three modules total are required for 864 lines + (1) for redundancy. ***Note 3:*** Refer to "Optional battery backup" on page 6-45 for ordering battery string hook up cables, required when the battery compartment holds the battery backup. ***Note 4:*** Refer to" Optional remote monitoring unit" on page 6-44 for ordering RMU test access path cable when optional RMU NTNR35AA is selected. A cable must be ordered for each additional AN ABM NTNR10AA.			
—end—			

Table 6-4 lists the standard equipment for an expansion kit from 672- to 1344-line cabinet. For the equipment frame/bay layouts and mounting positions, see Figure 6-8 and Figure 6-9.

Table 6-4
672- to 1344-line expansion kit equipment (standard) for AN2016 Cabinet

PEC		Description	Quantity
NTNR10AA includes		AccessNode hardware kit	1
Note: A second ABM is required to support the additional CDS shelves.			
	NT4K14AB	Breaker interface panel	1
	NT4K1490	Breaker interface front cover assembly	1
	NT4K16CA	Local craft access panel, modular business package	1
	NT4K10AB	Access common equipment shelf	1
	NT4K1033	ABM front shelf cover	1
	NT4K0610	Fan shelf assembly, eight fans	1
	P0846202	Fan shelf assembly cover	1
	NT4K84BA	Power cable common equipment	2
—continued—			

Table 6-4 (continued)
672- to 1344-line expansion kit equipment (standard) for AN2016 Cabinet

PEC		Description	Quantity
	NT4K1024	ABM english label kit	1
	NT4K1422	Breaker interface panel english label kit	1
	P0732671	Product label identification	1
	NT4K85JB	Termination, cooling unit interface	1
	NT4K85KA	BIP control cable assembly	1
	A0630076	Circuit breaker 30 A 80 V dc	4
NTNR11AA includes		Copper distribution shelf kit	1
	NT4K12AB	Copper distribution shelf	7
	NT4K1222	Line shelf label kit	7
	NT4K82DA	Cable assembly, A/B link VF/T/D, CDS 1	1
	NT4K82DB	Cable assembly, A/B link VF/T/D, CDS 2	1
	NT4K82DC	Cable assembly, A/B link VF/T/D, CDS 3	1
	NT4K82DD	Cable assembly, A/B link VF/T/D, CDS 4	1
	NT4K82DE	Cable assembly, A/B link VF/T/D, CDS 5	1
	NTNR82DF	Cable assembly, A/B link VF/T/D, CDS 6	1
	NTNR82DG	Cable assembly, A/B link VF/T/D, CDS 7	1
	NT4K86NA	Shelf metallic test pair cable assembly, 2 ft long	6
	NT4K86NC	Shelf metallic test pair cable assembly, 8 ft long	1
	NT4K0610	Fan shelf assembly, eight fans	1
	NT1W10AA	Shelf separator assembly	2
	P0891308	Fan shelf faceplate	1
NTNR30AA includes		DSX 56 kit front access	1
	A0764662	Digital cross-connect panel 56 terminations	1
	NTNR92AA	DSX power cable assembly	1
Cables, assemblies and kits to order			
	NTNR91AB	BIP # 2 power cable assembly	1

—continued—

Table 6-4 (continued)
672- to 1344-line expansion kit equipment (standard) for AN2016 Cabinet

PEC		Description	Quantity
	NT7E44JC	CNet bay cable provides communication links between ABM shelves	1
	NTNR80AA	14 pair cable assembly provides DS1 connectivity between AccessNode and DSX panel	2
	NTNR80BA	28 pair cable assembly provides DS1 connectivity between AccessNode and DSX panel	2
	NTNR90AA	Distribution power cable used to power up the CDS shelves	1
	NTNR90BA	Cable kit to power up the CDS shelves 1-7 talk batteries	1
	P0902427	Cabinet label kit	1
Required options to order			
B01231144	NT5C06CA-3	MPR 25 rectifier module (see Notes 1 and 2)	1 or 2
Note 1: Insert appropriate number of modules into rectifier shelves NT5C10CP-61 part of NTNR21AA.			
Note 2: Three modules total are required for 1344 lines + (1) for redundancy.			
Note 3: Refer to "Optional battery backup" on page 6-45 for ordering battery string hook up cables, required when the battery compartment holds the battery backup.			
Note 4: Refer to " Optional remote monitoring unit" on page 6-44 for ordering RMU test access path cable when optional RMU NTNR35AA is selected. A cable must be ordered for each additional AN ABM NTNR10AA.			
—end—			

Table 6-5 lists the standard equipment for an expansion kit from 672- to 2016-line cabinet. For the equipment frame/bay layouts and mounting positions, see Figure 6-8, Figure 6-10, Figure 6-11 and Figure 6-12.

Table 6-5
672- to 2016-line expansion kit equipment (standard) for AN2016 Cabinet

PEC		Description	Quantity
NTNR10AA includes		AccessNode hardware kit	2
Note: A second ABM is required to support the additional CDS shelves.			
	NT4K14AB	Breaker interface panel	1
	NT4K1490	Breaker interface front cover assembly	1
	NT4K16CA	Local craft access panel, modular business package	1
	NT4K10AB	Access common equipment shelf	1
—continued—			

Table 6-5 (continued)
672- to 2016-line expansion kit equipment (standard) for AN2016 Cabinet

PEC		Description	Quantity
	NT4K1033	ABM front shelf cover	1
	NT4K0610	Fan shelf assembly, eight fans	1
	P0846202	Fan shelf assembly cover	1
	NT4K84BA	Power cable common equipment	2
	NT4K1024	ABM english label kit	1
	NT4K1422	Breaker interface panel english label kit	1
	P0732671	Product label identification	1
	NT4K85JB	Termination, cooling unit interface	1
	NT4K85KA	BIP control cable assembly	1
	A0630076	Circuit breaker 30 A 80 V dc	4
NTNR11AA includes		Copper distribution shelf kit	1
	NT4K12AB	Copper distribution shelf	7
	NT4K1222	Line shelf label kit	7
	NT4K82DA	Cable assembly, A/B link VF/T/D, CDS 1	1
	NT4K82DB	Cable assembly, A/B link VF/T/D, CDS 2	1
	NT4K82DC	Cable assembly, A/B link VF/T/D, CDS 3	1
	NT4K82DD	Cable assembly, A/B link VF/T/D, CDS 4	1
	NT4K82DE	Cable assembly, A/B link VF/T/D, CDS 5	1
	NTNR82DF	Cable assembly, A/B link VF/T/D, CDS 6	1
	NTNR82DG	Cable assembly, A/B link VF/T/D, CDS 7	1
	NT4K86NA	Shelf metallic test pair cable assembly, 2 ft long	6
	NT4K86NC	Shelf metallic test pair cable assembly, 8 ft long	1
	NT4K0610	Fan shelf assembly, 8 fans	1
	NT1W10AA	Shelf separator assembly	2
	P0891308	Fan shelf faceplate	1
NTNR13AA includes		Copper distribution shelf kit for 2016 line	1
	NT4K12AB	Copper distribution shelf	7

—continued—

Table 6-5 (continued)
672- to 2016-line expansion kit equipment (standard) for AN2016 Cabinet

PEC		Description	Quantity
	NT4K1222	Line shelf label kit	7
	NT4K82DA	Cable assembly, A/B link VF/T/D, CDS 1	1
	NT4K82DB	Cable assembly, A/B link VF/T/D, CDS 2	1
	NT4K82DC	Cable assembly, A/B link VF/T/D, CDS 3	1
	NT4K86NA	Shelf metallic test pair cable assembly, 2 ft long	5
	NT4K0610	Fan shelf assembly, eight fans	2
	P0891308	Fan shelf faceplate	2
	NT1W10AA	Shelf separator assembly	1
	NTNR90CA	BIP #3 power distribution cable assembly, shelf 1-7	1
	NTNR90DA	BIP #3 Talk battery cable assembly, shelf 1-7	1
	NTNR82ED	ABM #3 CDS 4 A/B link cable assembly	1
	NTNR82EE	ABM #3 CDS 5 A/B link cable assembly	1
	NTNR82EF	ABM #3 CDS 6 A/B link cable assembly	1
	NTNR82EG	ABM #3 CDS 7A/B link cable assembly	1
	NT4K86NB	Shelf metallic test pair cable assembly, 3 ft long	1
	NT4K86NC	Shelf metallic test pair cable assembly, 8 ft long	1
NTNR30AA includes		DSX 56 kit front access	1
	A0764662	Digital cross-connect panel 56 terminations	1
	NTNR92AA	DSX power cable assembly	1
Cables, assemblies and kits to order			
	NTNR91AB	BIP # 2 power cable assembly	1
	NTNR91AC	BIP # 3 power cable assembly	1
	NT7E44JC	CNet bay cable provides communication links between ABM shelves	2
	NTNR80AA	14 pair cable assembly provides DS1 connectivity between AccessNode and DSX panel	4
	NTNR80BA	28 pair cable assembly provides DS1 connectivity between AccessNode and DSX panel	2

—continued—

Table 6-5 (continued)
672- to 2016-line expansion kit equipment (standard) for AN2016 Cabinet

PEC		Description	Quantity
	NTNR90AA	Distribution power cable used to power up the CDS shelves	1
	NTNR90BA	Cable kit to power up the CDS shelves 1-7 talk batteries	1
	P0902427	Cabinet label kit	1
Required options to order			
B01231144	NT5C06CA-3	MPR 25 rectifier module (see Notes 1 and 2)	2 or 3
Note 1: Insert appropriate number of modules into rectifier shelves NT5C10CP-61 part of NTNR21AA. ***Note 2:*** Four modules total are required for 2016 lines + (1) for redundancy. ***Note 3:*** Refer to "Optional battery backup" on page 6-45 for ordering battery string hook up cables, required when the battery compartment holds the battery backup. ***Note 4:*** Refer to " Optional remote monitoring unit" on page 6-44 for ordering RMU test access path cable when optional RMU NTNR35AA is selected. A cable must be ordered for each additional AN ABM NTNR10AA.			
—end—			

Standard equipment (864 lines)

This section lists the standard equipment for an AN2016 Cabinet with connections for 864 VF lines.

Table 6-6 on page 6-23 lists the standard equipment and Table 6-7 on page 6-27 lists required options for a 864-line AN2016 Cabinet.

For a front view of frame/bay A, B, C, D, E and F, the equipment frame/bay layouts and mounting positions, see Figure 6-7, Figure 6-2, Figure 6-3, Figure 6-4, Figure 6-5 and Figure 6-6.

Table 6-6
AN2016 Cabinet 864-line equipment (standard)

PEC		Description	Quantity
A0774668	A0774668	Pad mounting template ***Note:*** To be ordered ahead of time for site preparation.	1
NTNR01AA includes		AN2016 outside plant (OSP) cabinet with heaterpad (3M)	1
	A0768446	400 pair VF, 5 pins, field side 26 AWG, 8 ft long	1
	A0768447	300 pair VF, 5 pins, field side 26 AWG, 6 ft long	1
	A0768448	400 pair VF, 5 pins, field side 26 AWG, 8 ft long	1
—continued—			

Table 6-6 (continued)
AN2016 Cabinet 864-line equipment (standard)

PEC		Description	Quantity
	A0768449	300 pair VF, 5 pins, field side 26 AWG, 6 ft long	1
	A0768450	400 pair VF, 5 pins, field side 26 AWG, 16 ft long	1
	A0768451	300 pair VF, 5 pins, field side 26 AWG, 16 ft long	1
	A0768452	100 pair Digital, 5 pins, 19 inch mount, field side 24 AWG, 8 ft long	2
	A0769355	Power system, battery disconnect panel with eight 30A dc circuit breakers	1
	A0769072	Inside protection mounting brackets	4
	A0769076	Outside protection mounting brackets	3
	A0769077	U-channel protection mounting brackets	9
	A0769087	Splice bars	4
	A0769099	Metal conduit raceway	1
NTNR10AA includes		AccessNode hardware kit	2
	NT4K14AB	Breaker interface panel	1
	NT4K1490	Breaker interface front cover assembly	1
	NT4K16CA	Local craft access panel, modular business package	1
	NT4K10AB	Access common equipment shelf	1
	NT4K1033	ABM front shelf cover	1
	NT4K0610	Fan shelf assembly, eight fans	1
	P0846202	Fan shelf assembly cover	1
	NT4K84BA	Power cable common equipment	2
	NT4K1024	ABM english label kit	1
	NT4K1422	Breaker interface panel english label kit	1
	P0732671	Product label identification	1
	NT4K85JB	Termination, cooling unit interface	1
	NT4K85KA	BIP control cable assembly	1
	A0630076	Circuit breaker 30 A 80 V dc	4
NTNR11AA includes		Copper distribution shelf kit	1

—continued—

Table 6-6 (continued)
AN2016 Cabinet 864-line equipment (standard)

PEC		Description	Quantity
	NT4K12AB	Copper distribution shelf	7
	NT4K1222	Line shelf label kit	7
	NT4K82DA	Cable assembly, A/B link VF/T/D, CDS 1	1
	NT4K82DB	Cable assembly, A/B link VF/T/D, CDS 2	1
	NT4K82DC	Cable assembly, A/B link VF/T/D, CDS 3	1
	NT4K82DD	Cable assembly, A/B link VF/T/D, CDS 4	1
	NT4K82DE	Cable assembly, A/B link VF/T/D, CDS 5	1
	NTNR82DF	Cable assembly, A/B link VF/T/D, CDS 6	1
	NTNR82DG	Cable assembly, A/B link VF/T/D, CDS 7	1
	NT4K86NA	Shelf metallic test pair cable assembly, 2 ft long	6
	NT4K86NC	Shelf metallic test pair cable assembly, 8 ft long	1
	NT4K0610	Fan shelf assembly, eight fans	1
	NT1W10AA	Shelf separator assembly	2
	P0891308	Fan shelf faceplate	1
NTNR12AA includes		AccessNode copper distribution shelf CDS kit	2
	NT4K12AB	Copper distribution shelf	1
	NT4K1222	Line shelf label kit english	1
NTNR30AA includes		DSX 56 kit front access	1
	A0764662	Digital cross-connect panel 56 terminations	1
	NTNR92AA	DSX power cable assembly	1
NTNR19AA includes		Miscellaneous parts kit for AN2016	1
	NTNR91AA	BIP # 1 power cable assembly	1
	NT7E5072	CNet termination connector assembly	2
	NT4K85GE	Parallel telemetry cable assembly 50 ft	1
	NTNR60AA	Mounting kit for alarm block	1
	A0630082	Circuit breaker 50 A 80 V dc	2
	P0902425	AN2016 cabinet identification label	2

—continued—

Table 6-6 (continued)
AN2016 Cabinet 864-line equipment (standard)

PEC		Description	Quantity
	P0902424	AN2016 OPC layout label	2
	P0902427	AN2016 cabinet label kit	1
NTNR21AA includes		Helios 200 rectifier kit	1
	NT6C28FB-61	Helios System 200/48 dc control and distribution shelf	1
	NT5C10CP-61	Rectifier shelf for system 200, gray	2
	NT5C10KC	AC fail assembly	2
	P0805660	Cable assembly used on NT6C28FB-61	2
	NTNR93AA	Rectifier dc power cable assembly	2
	NTNR93BA	Rectifier ground wire assembly	1
	P0832887	DC distribution shelf mounting bracket	2
	P0835511	Cable assembly	2
Cables, assemblies and kits to order			
	NTNR91AB	BIP # 2 power cable assembly	1
	NT7E44JC	CNet bay cable provides communication links between ABM shelves	1
	NTNR80AA	14 pair cable assembly provides DS1 connectivity between AccessNode and DSX panel	2
	NTNR80BA	28 pair cable assembly provides DS1 connectivity between AccessNode and DSX panel	2
	NT4K86NA	Shelf metallic test pair cable assembly, 2 ft long	2
	NT4K82DA	Cable assembly, A/B link VF/T/D, CDS 1	1
	NT4K82DB	Cable assembly, A/B link VF/T/D, CDS 2	1
	NTNR90AA	Distribution power cable used to power up the CDS shelves	2
	NTNR90BA	Cable kit to power up the CDS shelves 1-7 talk batteries	2
—end—			

Table 6-7 lists the required options for a 864-line cabinet.

Table 6-7
AN2016 Cabinet 864-line required options

CPC	PEC	Description	Quantity
B01231144	NT5C06CA-3	MPR 25 rectifier module (see Notes 1 and 2)	3 or 4
Note 1: Insert appropriate number of modules into rectifier shelves NT5C10CP-61 part of NTNR21AA.			
Note 2: Order (1) MPR 25 for each AN hardware (672L) + (1) for each OEM stack + (1) for redundancy.			
Note 3: Refer to "Optional battery backup" on page 6-45 for ordering battery string hook up cables, required when the battery compartment holds the battery backup.			
Note 4: Refer to " Optional remote monitoring unit" on page 6-44 for ordering RMU test access path cable when optional RMU NTNR35AA is selected. A cable must be ordered for each additional AN ABM NTNR10AA.			

Table 6-8 lists the standard equipment for an expansion kit from 864- to 1344-line cabinet. For the equipment frame/bay layouts and mounting positions, see Figure 6-8 and Figure 6-9.

Table 6-8
864- to 1344-line expansion kit equipment (standard) for AN2016 Cabinet

PEC		Description	Quantity
NTNR12AA includes		AccessNode copper distribution shelf CDS kit	5
Note: Refer to "Optional battery backup" on page 6-45 for ordering battery string hook up cables, required when the battery compartment holds the battery backup.			
	NT4K12AB	Copper distribution shelf	1
	NT4K1222	Line shelf label kit english	1
Cables, assemblies and kits to order			
	NT4K86NA	Shelf metallic test pair cable assembly, 2 ft long	4
	NT4K86NC	Shelf metallic test pair cable assembly, 8 ft long	1
	NT4K82DC	Cable assembly, A/B link VF/T/D, CDS 3	1
	NT4K82DD	Cable assembly, A/B link VF/T/D, CDS 4	1
	NT4K82DE	Cable assembly, A/B link VF/T/D, CDS 5	1
	NTNR82DF	Cable assembly, A/B link VF/T/D, CDS 6	1
	NTNR82DG	Cable assembly, A/B link VF/T/D, CDS 7	1
	NT4K0610	Fan shelf assembly, eight fans	1
	NT1W10AA	Shelf separator assembly	2
	P0902427	Cabinet label kit	1

Table 6-9 lists the standard equipment for an expansion kit from 864- to 2016-line cabinet. For the equipment frame/bay layouts and mounting positions, see Figure 6-8, Figure 6-10, Figure 6-11 and Figure 6-12.

Table 6-9
864- to 2016-line expansion kit equipment (standard) for AN2016 Cabinet

PEC		Description	Quantity
NTNR10AA includes		AccessNode hardware kit	1
Note: A second ABM is required to support the additional CDS shelves.			
	NT4K14AB	Breaker interface panel	1
	NT4K1490	Breaker interface front cover assembly	1
	NT4K16CA	Local craft access panel, modular business package	1
	NT4K10AB	Access common equipment shelf	1
	NT4K1033	ABM front shelf cover	1
	NT4K0610	Fan shelf assembly, eight fans	1
	P0846202	Fan shelf assembly cover	1
	NT4K84BA	Power cable common equipment	2
	NT4K1024	ABM english label kit	1
	NT4K1422	Breaker interface panel english label kit	1
	P0732671	Product label identification	1
	NT4K85JB	Termination, cooling unit interface	1
	NT4K85KA	BIP control cable assembly	1
	A0630076	Circuit breaker 30 A 80 V dc	4
NTNR12AA includes		AccessNode copper distribution shelf CDS kit	5
	NT4K12AB	Copper distribution shelf	1
	NT4K1222	Line shelf label kit english	1
NTNR13AA includes		Copper distribution shelf kit for 2016 line	1
	NT4K12AB	Copper distribution shelf	7
	NT4K1222	Line shelf label kit	7
	NT4K82DA	Cable assembly, A/B link VF/T/D, CDS 1	1
	NT4K82DB	Cable assembly, A/B link VF/T/D, CDS 2	1

—continued—

Table 6-9 (continued)
864- to 2016-line expansion kit equipment (standard) for AN2016 Cabinet

PEC		Description	Quantity
	NT4K82DC	Cable assembly, A/B link VF/T/D, CDS 3	1
	NT4K86NA	Shelf metallic test pair cable assembly, 2 ft long	5
	NT4K0610	Fan shelf assembly, eight fans	2
	P0891308	Fan shelf faceplate	2
	NT1W10AA	Shelf separator assembly	1
	NTNR90CA	BIP #3 power distribution cable assembly, shelf 1-7	1
	NTNR90DA	BIP #3 Talk battery cable assembly, shelf 1-7	1
	NTNR82ED	ABM #3 CDS 4 A/B link cable assembly	1
	NTNR82EE	ABM #3 CDS 5 A/B link cable assembly	1
	NTNR82EF	ABM #3 CDS 6 A/B link cable assembly	1
	NTNR82EG	ABM #3 CDS 7A/B link cable assembly	1
	NT4K86NB	Shelf metallic test pair cable assembly, 3 ft long	1
	NT4K86NC	Shelf metallic test pair cable assembly, 8 ft long	1
Cables, assemblies and kits to order			
	NTNR91AC	BIP # 3 power cable assembly	1
	NT7E44JC	CNet bay cable provides communication links between ABM shelves	1
	NTNR80AA	14 pair cable assembly provides DS1 connectivity between AccessNode and DSX panel	2
	NT4K86NA	Shelf metallic test pair cable assembly, 2 ft long	4
	NT4K86NC	Shelf metallic test pair cable assembly, 8 ft long	1
	NT4K82DC	Cable assembly, A/B link VF/T/D, CDS 3	1
	NT4K82DD	Cable assembly, A/B link VF/T/D, CDS 4	1
	NT4K82DE	Cable assembly, A/B link VF/T/D, CDS 5	1
	NTNR82DF	Cable assembly, A/B link VF/T/D, CDS 6	1
	NTNR82DG	Cable assembly, A/B link VF/T/D, CDS 7	1
	NT4K0610	Fan shelf assembly, eight fans	1
	NT1W10AA	Shelf separator assembly	1

—continued—

Table 6-9 (continued)
864- to 2016-line expansion kit equipment (standard) for AN2016 Cabinet

PEC		Description	Quantity
	P0902427	Cabinet label kit	1
Required options to order			
B01231144	NT5C06CA-3	MPR 25 rectifier module (see Notes 1 and 2)	1 or 2
Note 1: Insert appropriate number of modules into rectifier shelves NT5C10CP-61 part of NTNR21AA. ***Note 2:*** Four modules total are required for 2016 lines + (1) for redundancy. ***Note 3:*** Refer to "Optional battery backup" on page 6-45 for ordering battery string hook up cables, required when the battery compartment holds the battery backup. ***Note 4:*** Refer to " Optional remote monitoring unit" on page 6-44 for ordering RMU test access path cable when optional RMU NTNR35AA is selected. A cable must be ordered for each additional AN ABM NTNR10AA.			
—end—			

Standard equipment (1344 lines)

This section lists the standard equipment for an AN2016 Cabinet with connections for 1344 VF lines.

Table 6-10 on page 6-30 lists the standard equipment and Table 6-11 on page 6-33 lists required options for a 1344-line AN2016 Cabinet.

For a front view of frame/bay A, B, C, D, E and F, the equipment frame/bay layouts and mounting positions, see Figure 6-8, Figure 6-9, Figure 6-3, Figure 6-4, Figure 6-5 and Figure 6-6.

Table 6-10
AN2016 Cabinet 1344-line equipment (standard)

PEC		Description	Quantity
A0774668	A0774668	Pad mounting template ***Note:*** To be ordered ahead of time for site preparation.	1
NTNR01AA includes		AN2016 outside plant (OSP) cabinet with heaterpad (3M)	1
	A0768446	400 pair VF, 5 pins, field side 26 AWG, 8 ft long	1
	A0768447	300 pair VF, 5 pins, field side 26 AWG, 6 ft long	1
	A0768448	400 pair VF, 5 pins, field side 26 AWG, 8 ft long	1
	A0768449	300 pair VF, 5 pins, field side 26 AWG, 6 ft long	1
—continued—			

Table 6-10 (continued)
AN2016 Cabinet 1344-line equipment (standard)

PEC		Description	Quantity
	A0768450	400 pair VF, 5 pins, field side 26 AWG, 16 ft long	1
	A0768451	300 pair VF, 5 pins, field side 26 AWG, 16 ft long	1
	A0768452	100 pair Digital, 5 pins, 19 inch mount, field side 24 AWG, 8 ft long	2
	A0769355	Power system, battery disconnect panel with eight 30A dc circuit breakers	1
	A0769072	Inside protection mounting brackets	4
	A0769076	Outside protection mounting brackets	3
	A0769077	U-channel protection mounting brackets	9
	A0769087	Splice bars	4
	A0769099	Metal conduit raceway	1
NTNR10AA includes		AccessNode hardware kit	2
	NT4K14AB	Breaker interface panel	1
	NT4K1490	Breaker interface front cover assembly	1
	NT4K16CA	Local craft access panel, modular business package	1
	NT4K10AB	Access common equipment shelf	1
	NT4K1033	ABM front shelf cover	1
	NT4K0610	Fan shelf assembly, eight fans	1
	P0846202	Fan shelf assembly cover	1
	NT4K84BA	Power cable common equipment	2
	NT4K1024	ABM english label kit	1
	NT4K1422	Breaker interface panel english label kit	1
	P0732671	Product label identification	1
	NT4K85JB	Termination, cooling unit interface	1
	NT4K85KA	BIP control cable assembly	1
	A0630076	Circuit breaker 30 A 80 V dc	4
NTNR11AA includes		Copper distribution shelf kit	2
	NT4K12AB	Copper distribution shelf	7

—continued—

Table 6-10 (continued)
AN2016 Cabinet 1344-line equipment (standard)

PEC		Description	Quantity
	NT4K1222	Line shelf label kit	7
	NT4K82DA	Cable assembly, A/B link VF/T/D, CDS 1	1
	NT4K82DB	Cable assembly, A/B link VF/T/D, CDS 2	1
	NT4K82DC	Cable assembly, A/B link VF/T/D, CDS 3	1
	NT4K82DD	Cable assembly, A/B link VF/T/D, CDS 4	1
	NT4K82DE	Cable assembly, A/B link VF/T/D, CDS 5	1
	NTNR82DF	Cable assembly, A/B link VF/T/D, CDS 6	1
	NTNR82DG	Cable assembly, A/B link VF/T/D, CDS 7	1
	NT4K86NA	Shelf metallic test pair cable assembly, 2 ft long	6
	NT4K86NC	Shelf metallic test pair cable assembly, 8 ft long	1
	NT4K0610	Fan shelf assembly, eight fans	1
	NT1W10AA	Shelf separator assembly	2
	P0891308	Fan shelf faceplate	1
NTNR30AA includes		DSX 56 kit front access	1
	A0764662	Digital cross-connect panel 56 terminations	1
	NTNR92AA	DSX power cable assembly	1
NTNR19AA includes		Miscellaneous parts kit for AN2016	1
	NTNR91AA	BIP # 1 power cable assembly	1
	NT7E5072	CNet termination connector assembly	2
	NT4K85GE	Parallel telemetry cable assembly 50 ft	1
	NTNR60AA	Mounting kit for alarm block	1
	A0630082	Circuit breaker 50 A 80 V dc	2
	P0902425	AN2016 cabinet identification label	2
	P0902424	AN2016 OPC layout label	2
	P0902427	AN2016 cabinet label kit	1
NTNR21AA includes		Helios 200 rectifier kit	1
	NT6C28FB-61	Helios System 200/48 dc control and distribution shelf	1

—continued—

Table 6-10 (continued)
AN2016 Cabinet 1344-line equipment (standard)

PEC		Description	Quantity
	NT5C10CP-61	Rectifier shelf for system 200, gray	2
	NT5C10KC	AC fail assembly	2
	P0805660	Cable assembly used on NT6C28FB-61	2
	NTNR93AA	Rectifier dc power cable assembly	2
	NTNR93BA	Rectifier ground wire assembly	1
	P0832887	DC distribution shelf mounting bracket	2
	P0835511	Cable assembly	2
Cables, assemblies and kits to order			
	NTNR91AB	BIP # 2 power cable assembly	1
	NT7E44JC	CNet bay cable provides communication links between ABM shelves	1
	NTNR80AA	14 pair cable assembly provides DS1 connectivity between AccessNode and DSX panel	2
	NTNR80BA	28 pair cable assembly provides DS1 connectivity between AccessNode and DSX panel	2
	NTNR90AA	Distribution power cable used to power up the CDS shelves	2
	NTNR90BA	Cable kit to power up the CDS shelves 1-7 talk batteries	2
—end—			

Table 6-11 lists the required options for a 1344-line cabinet.

Table 6-11
AN2016 Cabinet 1344-line required options

CPC	PEC	Description	Quantity
B01231144	NT5C06CA-3	MPR 25 rectifier module (see Notes 1 and 2)	3 or 4
Note 1: Insert appropriate number of modules into rectifier shelves NT5C10CP-61 part of NTNR21AA.			
Note 2: Order (1) MPR 25 for each AN hardware (672L) + (1) for each OEM stack + (1) for redundancy.			
Note 3: Refer to “Optional battery backup” on page 6-45 for ordering battery string hook up cables, required when the battery compartment holds the battery backup.			
Note 4: Refer to “ Optional remote monitoring unit” on page 6-44 for ordering RMU test access path cable when optional RMU NTNR35AA is selected. A cable must be ordered for each additional AN ABM NTNR10AA.			

Table 6-12 lists the standard equipment for an expansion kit from 1344- to 2016-line cabinet. For the equipment frame/bay layouts and mounting positions, see Figure 6-10, Figure 6-11 and Figure 6-12.

Table 6-12
1344- to 2016-line expansion kit equipment (standard) for AN2016 Cabinet

PEC		Description	Quantity
NTNR10AA includes		AccessNode hardware kit	1
Note: A second ABM is required to support the additional CDS shelves.			
	NT4K14AB	Breaker interface panel	1
	NT4K1490	Breaker interface front cover assembly	1
	NT4K16CA	Local craft access panel, modular business package	1
	NT4K10AB	Access common equipment shelf	1
	NT4K1033	ABM front shelf cover	1
	NT4K0610	Fan shelf assembly, eight fans	1
	P0846202	Fan shelf assembly cover	1
	NT4K84BA	Power cable common equipment	2
	NT4K1024	ABM english label kit	1
	NT4K1422	Breaker interface panel english label kit	1
	P0732671	Product label identification	1
	NT4K85JB	Termination, cooling unit interface	1
	NT4K85KA	BIP control cable assembly	1
	A0630076	Circuit breaker 30 A 80 V dc	4
NTNR13AA includes		Copper distribution shelf kit for 2016 line	1
	NT4K12AB	Copper distribution shelf	7
	NT4K1222	Line shelf label kit	7
	NT4K82DA	Cable assembly, A/B link VF/T/D, CDS 1	1
	NT4K82DB	Cable assembly, A/B link VF/T/D, CDS 2	1
	NT4K82DC	Cable assembly, A/B link VF/T/D, CDS 3	1
	NT4K86NA	Shelf metallic test pair cable assembly, 2 ft long	5
	NT4K0610	Fan shelf assembly, eight fans	2

—continued—

Table 6-12 (continued)
1344- to 2016-line expansion kit equipment (standard) for AN2016 Cabinet

PEC		Description	Quantity
	P0891308	Fan shelf faceplate	2
	NT1W10AA	Shelf separator assembly	1
	NTNR90CA	BIP #3 power distribution cable assembly, shelf 1-7	1
	NTNR90DA	BIP #3 Talk battery cable assembly, shelf 1-7	1
	NTNR82ED	ABM #3 CDS 4 A/B link cable assembly	1
	NTNR82EE	ABM #3 CDS 5 A/B link cable assembly	1
	NTNR82EF	ABM #3 CDS 6 A/B link cable assembly	1
	NTNR82EG	ABM #3 CDS 7A/B link cable assembly	1
	NT4K86NB	Shelf metallic test pair cable assembly, 3 ft long	1
	NT4K86NC	Shelf metallic test pair cable assembly, 8 ft long	1
Cables, assemblies and kits to order			
	NTNR91AC	BIP # 3 power cable assembly	1
	NT7E44JC	CNet bay cable provides communication links between ABM shelves	1
	NTNR80AA	14 pair cable assembly provides DS1 connectivity between AccessNode and DSX panel	2
	P0902427	Cabinet label kit	1
Required options to order			
B01231144	NT5C06CA-3	MPR 25 rectifier module (see Notes 1 and 2)	1 or 2

Note 1: Insert appropriate number of modules into rectifier shelves NT5C10CP-61 part of NTNR21AA.

Note 2: Four modules total are required for 2016 lines + (1) for redundancy.

Note 3: Refer to "Optional battery backup" on page 6-45 for ordering battery string hook up cables, required when the battery compartment holds the battery backup.

Note 4: Refer to " Optional remote monitoring unit" on page 6-44 for ordering RMU test access path cable when optional RMU NTNR35AA is selected. A cable must be ordered for each additional AN ABM NTNR10AA.

—end—

Standard equipment (2016 lines)

This section lists the standard equipment for an AN2016 Cabinet with connections for 2016 VF lines.

Table 6-13 on page 6-36 lists the standard equipment and Table 6-14 on page 6-40 lists required options for a 2016-line AN2016 Cabinet.

For a front view of frame/bay A, B, C, D, E and F, the equipment frame/bay layouts and mounting positions, see Figure 6-8, Figure 6-10, Figure 6-11, Figure 6-4, Figure 6-5 and Figure 6-12.

Table 6-13
AN2016 Cabinet 2016-line equipment (standard)

PEC		Description	Quantity
A0774668	A0774668	Pad mounting template ***Note:*** To be ordered ahead of time for site preparation.	1
NTNR01AA includes		AN2016 outside plant (OSP) cabinet with heaterpad (3M)	1
	A0768446	400 pair VF, 5 pins, field side 26 AWG, 8 ft long	1
	A0768447	300 pair VF, 5 pins, field side 26 AWG, 6 ft long	1
	A0768448	400 pair VF, 5 pins, field side 26 AWG, 8 ft long	1
	A0768449	300 pair VF, 5 pins, field side 26 AWG, 6 ft long	1
	A0768450	400 pair VF, 5 pins, field side 26 AWG, 16 ft long	1
	A0768451	300 pair VF, 5 pins, field side 26 AWG, 16 ft long	1
	A0768452	100 pair Digital, 5 pins, 19 inch mount, field side 24 AWG, 8 ft long	2
	A0769355	Power system, battery disconnect panel with eight 30A dc circuit breakers	1
	A0769072	Inside protection mounting brackets	4
	A0769076	Outside protection mounting brackets	3
	A0769077	U-channel protection mounting brackets	9
	A0769087	Splice bars	4
	A0769099	Metal conduit raceway	1
NTNR10AA includes		AccessNode hardware kit	3
	NT4K14AB	Breaker interface panel	1

—continued—

Table 6-13 (continued)
AN2016 Cabinet 2016-line equipment (standard)

PEC		Description	Quantity
	NT4K1490	Breaker interface front cover assembly	1
	NT4K16CA	Local craft access panel, modular business package	1
	NT4K10AB	Access common equipment shelf	1
	NT4K1033	ABM front shelf cover	1
	NT4K0610	Fan shelf assembly, eight fans	1
	P0846202	Fan shelf assembly cover	1
	NT4K84BA	Power cable common equipment	2
	NT4K1024	ABM english label kit	1
	NT4K1422	Breaker interface panel english label kit	1
	P0732671	Product label identification	1
	NT4K85JB	Termination, cooling unit interface	1
	NT4K85KA	BIP control cable assembly	1
	A0630076	Circuit breaker 30 A 80 V dc	4
NTNR11AA includes		Copper distribution shelf kit	2
	NT4K12AB	Copper distribution shelf	7
	NT4K1222	Line shelf label kit	7
	NT4K82DA	Cable assembly, A/B link VF/T/D, CDS 1	1
	NT4K82DB	Cable assembly, A/B link VF/T/D, CDS 2	1
	NT4K82DC	Cable assembly, A/B link VF/T/D, CDS 3	1
	NT4K82DD	Cable assembly, A/B link VF/T/D, CDS 4	1
	NT4K82DE	Cable assembly, A/B link VF/T/D, CDS 5	1
	NTNR82DF	Cable assembly, A/B link VF/T/D, CDS 6	1
	NTNR82DG	Cable assembly, A/B link VF/T/D, CDS 7	1
	NT4K86NA	Shelf metallic test pair cable assembly, 2 ft long	6
	NT4K86NC	Shelf metallic test pair cable assembly, 8 ft long	1
	NT4K0610	Fan shelf assembly, eight fans	1
	NT1W10AA	Shelf separator assembly	2

—continued—

Table 6-13 (continued)
AN2016 Cabinet 2016-line equipment (standard)

PEC		Description	Quantity
	P0891308	Fan shelf faceplate	1
NTNR13AA includes		Copper distribution shelf kit for 2016 line	1
	NT4K12AB	Copper distribution shelf	7
	NT4K1222	Line shelf label kit	7
	NT4K82DA	Cable assembly, A/B link VF/T/D, CDS 1	1
	NT4K82DB	Cable assembly, A/B link VF/T/D, CDS 2	1
	NT4K82DC	Cable assembly, A/B link VF/T/D, CDS 3	1
	NT4K86NA	Shelf metallic test pair cable assembly, 2 ft long	5
	NT4K0610	Fan shelf assembly, eight fans	2
	P0891308	Fan shelf faceplate	2
	NT1W10AA	Shelf separator assembly	1
	NTNR90CA	BIP #3 power distribution cable assembly, shelf 1-7	1
	NTNR90DA	BIP #3 Talk battery cable assembly, shelf 1-7	1
	NTNR82ED	ABM #3 CDS 4 A/B link cable assembly	1
	NTNR82EE	ABM #3 CDS 5 A/B link cable assembly	1
	NTNR82EF	ABM #3 CDS 6 A/B link cable assembly	1
	NTNR82EG	ABM #3 CDS 7A/B link cable assembly	1
	NT4K86NB	Shelf metallic test pair cable assembly, 3 ft long	1
	NT4K86NC	Shelf metallic test pair cable assembly, 8 ft long	1
NTNR19AA includes		Miscellaneous parts kit for AN2016	1
	NTNR91AA	BIP # 1 power cable assembly	1
	NT7E5072	CNet termination connector assembly	2
	NT4K85GE	Parallel telemetry cable assembly 50 ft	1
	NTNR60AA	Mounting kit for alarm block	1
	A0630082	Circuit breaker 50 A 80 V dc	2
	P0902425	AN2016 cabinet identification label	2
	P0902424	AN2016 OPC layout label	2

—continued—

Table 6-13 (continued)
AN2016 Cabinet 2016-line equipment (standard)

PEC		Description	Quantity
	P0902427	AN2016 cabinet label kit	1
NTNR30AA includes		DSX 56 kit front access	1
	A0764662	Digital cross-connect panel 56 terminations	1
	NTNR92AA	DSX power cable assembly	1
NTNR21AA includes		Helios 200 rectifier kit	1
	NT6C28FB-61	Helios System 200/48 dc control and distribution shelf	1
	NT5C10CP-61	Rectifier shelf for system 200, gray	2
	NT5C10KC	AC fail assembly	2
	P0805660	Cable assembly used on NT6C28FB-61	2
	NTNR93AA	Rectifier dc power cable assembly	2
	NTNR93BA	Rectifier ground wire assembly	1
	P0832887	DC distribution shelf mounting bracket	2
	P0835511	Cable assembly	2
Cables, assemblies and kits to order			
	NTNR91AB	BIP # 2 power cable assembly	1
	NTNR91AC	BIP # 3 power cable assembly	1
	NT7E44JC	CNet bay cable provides communication links between ABM shelves	2
	NTNR80AA	14 pair cable assembly provides DS1 connectivity between AccessNode and DSX panel	4
	NTNR80BA	28 pair cable assembly provides DS1 connectivity between AccessNode and DSX panel	2
	NTNR90AA	Distribution power cable used to power up the CDS shelves	2
	NTNR90BA	Cable kit to power up the CDS shelves 1-7 talk batteries	2
—end—			

Table 6-14 lists the required options for a 2016-line cabinet.

Table 6-14
AN2016 Cabinet 2016-line required options

CPC	PEC	Description	Quantity
B01231144	NT5C06CA-3	MPR 25 rectifier module (see Notes 1 and 2)	4 or 5
Note 1: Insert appropriate number of modules into rectifier shelves NT5C10CP-61 part of NTNR21AA.			
Note 2: Order (1) MPR 25 for each AN hardware (672L) + (1) for each OEM stack + (1) for redundancy.			
Note 3: Four modules total are required for 2016 lines + (1) for redundancy.			
Note 4: Refer to "Optional battery backup" on page 6-45 for ordering battery string hook up cables, required when the battery compartment holds the battery backup.			
Note 5: Refer to " Optional remote monitoring unit" on page 6-44 for ordering RMU test access path cable when optional RMU NTNR35AA is selected. A cable must be ordered for each additional AN ABM NTNR10AA.			

Optional equipment

The AN2016 Cabinet CDS configuration allows popular options to be installed.

Table 6-15 lists the optional cross- connect equipment for an AN2016 Cabinet.

Table 6-16 lists the optional transport and loop extender kits for the AN2016 Cabinet.

Table 6-17 lists the optional fiber manager kits for the AN2016 Cabinet.

Table 6-18 lists the optional remote monitoring unit (RMU) and associated cable assembly for the AN2016 Cabinet.

Table 6-19 lists the optional battery backup and associated cable assembly for the AN2016 Cabinet.

Table 6-20 lists the optional 100 Amp power pedestals and associated mounting templates for the AN2016 Cabinet.

Table 6-21 lists the optional optical patchcord assemblies and protector modules for the AN2016 Cabinet.

The options listed Table 6-15 in through Table 6-21 are fully packaged to fit the cabinet and include a cable harness. The following kits can be ordered separately based on the engineering rules provided with the table.

> ***Note:*** All OEM equipment can be installed as required, however, special configurations out of the ones provided or other OEM equipment request must be confirmed to allow future expansions of the cabinet, especially with copper distribution shelves.

Table 6-15 lists the optional cross- connect equipment for an AN2016 Cabinet.

Table 6-15
Optional cross-connect equipment

CPC	PEC	Description	Quantity
NTNR30AA includes		DSX 56 kit front access	1
Note 1: If a DDM+ or loop extender is ordered, one DSX kit is required. ***Note 2:*** One DSX can drive 28 DS1 when adding a second ABM, or 14 DS1 for each additional AN ABM. ***Note 3:*** When increasing the number of lines, (which requires more ABM shelves), a second DSX is required. ***Note 4:*** For a 2016 line cabinet fully configured with CDS shelves, a maximum of two DSX kits can be installed.			
A0764662	A0764662	Digital cross-connect panel 56 terminations	1
A0768154	NTNR92AA	DSX power cable assembly	1

Table 6-16 lists the optional transport and loop extender kits for the AN2016 Cabinet.

Table 6-16
Optional transport and loop extender kits

CPC	PEC	Description	Quantity
NTNR31AA includes		Lucent DDM+ transport system kit	1
Note 1: If a DDM+ is required, order one DSX kit NTNR30AA as well. ***Note 2:*** The ADC Soneplex loop extender kit must be discarded since only one or the other can be provided. ***Note 3:*** For a 2016 line cabinet fully configured with CDS shelves, only one DDM+ kit maximum can be installed.			
A0672034	NPS51133-01L03	DDM-2000 extension shelf	1
A0768142	NTNR80BA	28 pair DS1 cable assembly	2
A0768143	NTNR81AA	DDM+ shelf DSX-1 cable	1
A0768144	NTNR81BA	DDM+ shelf T1 IN cable	1
A0768145	NTNR81CA	DDM+ shelf T1 OUT cable	1
A0768146	NTNR81DA	DDM+ shelf alarm cable	1
A0768147	NTNR81EA	DDM+ shelf FLT-LOC cable	1
A0672041	A0672041	External shelf power cord	1
A0630072	QBS55S1X015DH2	Circuit breaker 15.0 Amps 80 V dc	2
NTNR32AA includes		ADC Soneplex loop extender kit	1
Note 1: If an ADC Soneplex loop extender is required, order one DSX kit NTNR30AA as well. ***Note 2:*** The DDM+ kit must be discarded since only one or the other can be provided. ***Note 3:*** For a 2016 line cabinet fully configured with CDS shelves, only one ADC Soneplex loop extender kit maximum can be installed.			
A0748019	A0748019	Soneplex loop extender chassis	1
A0772259	NTNR83AA	Soneplex loop extender power cable	1
A0772260	NTNR83BA	Soneplex loop extender alarm cable	1
A0772261	NTNR83CA	Soneplex loop extender T1 IN cable	1
A0772262	NTNR83DA	Soneplex loop extender T1 OUT cable	1
A0772263	NTNR83EA	Soneplex loop extender DSX-1 IN cable	1
A0772264	NTNR83FA	Soneplex loop extender DSX-1 OUT cable	1
A0630072	QBS44S1X015DH2	Circuit breaker 15.0 Amps 80 V dc	2

Table 6-17 lists the optional fiber manager kits for the AN2016 Cabinet.

Table 6-17
Optional fiber manager kits

CPC	PEC	Description	Quantity
NTNR34AA includes		Siecor CMIC fiber manager kit (see Notes)	1
Note 1: The SC A0768567 will be supplied if the customer does not select a connector from the list of the three types available listed below. ***Note 2:*** Six fiber pigtails and connector panels are provided with the kit once the selection is made. ***Note 3:*** The customer must provide at least 15 feet of fiber with the protective conduit raceway to reach the connection inside the cabinet to the AN ABM # 1 from the pad mounting template ***Note 4:*** The NTNR36AA kit must be discarded since only one or the other can be provided.			
A0768555	A0768555	Fiber cabinet interconnect center, 24 fibers	1
A0351643	NPS51068-01L01	Fiber optic splice tray organizer	1
		Type ST connector: A0768569 (see Note 1)	
		Type FC connector: A0768568 (see Note 1)	
		Type SC connector: A0768567 (see Note 1)	
NTNR36AA includes		Reltec COFO fiber manager kit (see Notes)	1
Note 1: Four panels of six ST connectors are provided with the kit once the selection is made. ***Note 2:*** The customer must provide at least 15 feet of fiber with the protective conduit raceway to reach the connection inside the cabinet to the AN ABM # 1 from the pad mounting template. ***Note 3:*** The NTNR34AA kit must be discarded since only one or the other can be provided.			
A0782851	A0782851	Fiber cabinet interconnect center, 24 fibers	1
A0781535	A0781535	Adapter panel 6 ST connectors	4
A0784352	A0784352	115 feet, ST pigtail non armored 24 fibers, provided with connectors at one end	1

Table 6-18 lists the optional remote monitoring unit (RMU) and associated cable assembly for the AN2016 Cabinet.

Table 6-18
Optional remote monitoring unit

CPC	PEC	Description	Quantity
NTNR35AA includes		Remote monitoring unit (RMU) harness kit	1
Note: Type of RMU must be specified by customer prior to ordering			
A0769199	NTNR94AA	RMU power cable	1
A0769200	NTNR94BA	RMU signal cable	1
A0401060	NT4K85ED	Test access path cable assembly	1
A0771905	NTNR60AA	Mounting kit for alarm block	1
A0108992	NSQ4088L9	NSQ4088L9	1
		Cable assembly to order	
NTNR85AA		RMU test access path cable assembly (see Notes)	1 or 2
Note 1: A cable NTNR85AA must be ordered for each additional A/N ABM NTNR10AA when expanding the cabinet configuration. ***Note 2:*** One is already included in the NTNR35AA kit. The following rules apply:			
		672 Line: already supplied	
		864 Line & 1344 Line: one NTNR85AA must be ordered	
		2016 Line: two NTNR85AA must be ordered	

Table 6-19 lists the optional battery backup and associated cable assembly for the AN2016 Cabinet.

Table 6-19
Optional battery backup

CPC	PEC	Description	Quantity
A0734525	A0734525	C&D FA-12-100 battery backup, single block kit (see Notes)	1
A0774151	NTNR95BA	Battery string hook-up cable with 5/16 inch lugs used with A0734525	See Note 2
A0773445	A0773445	East Penn 12AVR100-3ET battery backup, single block kit (see Notes)	1
A0774150	NTNR95AA	Battery string hook-up cable with 1/16 inch lugs used with A0773445	See Note 2
A0773443	A0773443	Power Battery CSL-12100 battery backup, single block kit (see Notes)	1
A0774150	NTNR95AA	Battery string hook-up cable with 1/16 inch lugs used with A0773443	See Note 2
Note 1: The kit includes one battery block and one solid intercell jumper with washers and nuts to provide continuous operation for 8 hours backup. The kit can also be ordered as spare or replacement. ***Note 2:*** Hook-up cables must be ordered for linking the battery strings in the cabinet battery compartment, one for each strings. These (Y) cables include an Anderson connector and two lugs of the appropriate size to fit the battery terminals. ***Note 3:*** One string consists of four individual battery blocks. Use the following guidelines for ordering:			
		672 Lines equipped: four strings are required	
		864 Lines equipped: five strings are required	
		1344 Lines equipped: six strings are required	
		2016 Lines equipped: eight strings are required	

Table 6-20 lists the optional 100 Amp power pedestals and associated mounting templates for the AN2016 Cabinet.

Table 6-20
Optional 100 Amp power pedestals and accessories

CPC	Description	Quantity
A0773730	Mounting template used with A0773658 (see Note)	1
A0773658 includes	Reltec GRPEIL-2715I Power pedestal, 100 Amp, UL configuration, Hubbell, single phase, Ivory (see Note)	1
Note: If this option is chosen, the template must be ordered for locating conduits and mounting J bolts.		
	100 Amp Commercial / 30 Amp Generator walking beam breaker assembly	1
	Joslyn 1265-88A surge arrestor	1
	Hubbell 30 Amp #2715	1
	Meter hubs and support plate kit.	1
A0773730	Mounting template used with A0773661 (see Note)	1
A0773661includes	Reltec GRPEIL-2715IMI Power pedestal, 100 Amp, UL configuration, Hubbell, single phase, Ivory (see Note)	1
Note: If this option is chosen, the template must be ordered for locating conduits and mounting J bolts.		
	100 Amp Commercial / 30 Amp Generator walking beam breaker assembly	1
	Joslyn 1265-88A surge arrestor	1
	Hubbell 30 Amp #2715	1
	Durham 200 Amp #1005647 meter socket provision	1
A0773737	Mounting template use with A0773663 (see Note)	1
A0773663includes	Reltec AP3082RPEIL1-1-ARI Power pedestal, 100 Amp, UL configuration, Crouse-Hind, single phase, Ivory (see Note)	1
Note: If this option is chosen, the template must be ordered for locating conduits and mounting J bolts.		
	100 Amp Commercial / 100 Amp Generator walking beam breaker assembly	1
	Joslyn 1265-88 surge arrestor	1
	Crouse-Hind #AR1042S22	1

—continued—

Table 6-20 (continued)
Optional 100 Amp power pedestals and accessories

CPC	Description	Quantity
A0784389	Voltage surge arrestor for AN2016, ac load center in AC compartment ***Note 1:*** Order if power pedestal is not equipped with Surge arrestor. ***Note 2:*** Order if power pedestal is located more than five feet away from the AN2016 cabinet.	1
—end—		

Table 6-21 lists the optional optical patchcord assemblies and protector modules for the AN2016 Cabinet.

Table 6-21
Optional optical patchcord and protector modules

CPC	PEC	Description	Quantity
A0365303	NT7E46BA	Optical patchcord cable assembly, FC-FC type	2
A0351099	NT7E46CA	Optical patchcord cable assembly, ST-ST type	2
A0408374	NT7E46FA	Optical patchcord cable assembly, SC-SC type	2
Note 1: Provide two NT7E46BA, CA OR FA depending of connector type per Optical circuit pack provided in the AN ABM shelf, when connecting to a fiber manager kit NTNR34AA. ***Note 2:*** Length of 5 meter, MVOA is not required.			
A0358876	NT7E47BA	Optical patchcord cable assembly, FC-FC type	2
A0358877	NT7E47CA	Optical patchcord cable assembly, ST-ST type	2
A0408379	NT7E47FA	Optical patchcord cable assembly, SC-SC type	2
Note 1: Provide two NT7E47BA, CA OR FA depending of connector type per Optical circuit pack provided in the AN ABM shelf, when connecting to a fiber manager with MVOA required. ***Note 2:*** Length of 5 meter, MVOA is provided.			
A0341959	303M-11A1GO	Protector module VF 5 pins gold plated, black, solid state OVP, 300 V	1 per VF line see Note
A03411961	303M-11A1TO	Protector module VF 5 pins tin plated, black, less heat coils	1 per VF line see Note
A0353718	303M-12A1TA	Protector module VF 5pins tin plated, solid state, 350 mA heat coils	1 per VF line see Note
Note: Provide one per VF: 672 for 7 CDS, 864 for 9 CDS, 1344 for 14 CDS and 2016 for 21 CDS.			
—continued—			

Table 6-21 (continued)
Optional optical patchcord and protector modules

CPC	PEC	Description	Quantity
A0341960	303M-11A3GO	Protector module DS1, gold plated pin, red, less heat coils	2 per DS1 line see Note
A0341962	303M-11A3TO	Protector module DS1, tin plated pin, red, less heat coils	2 per DS1 line see Note
A0353719	303M-12A3TA	Protector module DS1, 5 pins tin plated, solid state, 350 mA heat coils.	2 per DS1 line
Note: Provide two per DS1: example a quantity of 56 for ADC Soneplex or DDM+ shelves.			
—end—			

Recommended replacement parts

Table 6-22 lists the recommended replacement parts for the AN2016 Cabinet.

Table 6-22
Replacement parts

CPC	PEC	Description	Quantity
A0341959	303M-11A1GO	Protector module VF 5 pins gold plated, black, solid state OVP, 300 V	10
A0341960	303M-11A3GO	Protector module DS1, gold plated pin, red, less heat coils	10
A0341961	303M-11A1TO	Protector module VF 5 pins tin plated, black, less heat coils	10
A0341962	303M-11A3TO	Protector module DS1, tin plated pin, red, less heat coils	10
A0353718	303M-12A1TA	Protector module VF 5 pins tin plated, solid state, 350 mA heat coils	10
A0353719	303M-12A3TA	Protector module DS1, 5 pins tin plated, solid state, 350 mA heat coils	10
A0108992		Fuse 2 A GMT, used in DSX cross-connect NTNR30AA, environmental control unit (ECU) main circuit and fan circuit	As required
A0108995		Fuse 5 A GMT, fan shelves fuses	As required
A0109762		Fuse 10 A GMT, heat exchanger fuses	As required
P0622488		Fuse cover, used for the above fuses	As required
—continued—			

Table 6-22
Replacement parts (continued)

CPC	PEC	Description	Quantity
P0902427		Cabinet label kit, various equipment identification and caution labels	As required
A0784388		Environmental control unit (ECU)	As required
A0784386		Heat exchanger fan, top	As required
A0784387		Heat exchanger fan, bottom	As required
—end—			

AccessNode Products

AN2016 Cabinet

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