

NT2H57UG

323-3221-291

Broadband Access & Video Networks

Video Codec Enclosure (VCE)

Installation Manual

Standard Rel 1.0 July 1995



NORTEL

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Video Codec Enclosure (VCE) Installation Manual

Publication number: 323-3221-291

Product release: Rel 1.0

Publication status: Standard

PEC: NT2H57UG

Date: July 1995

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Publication history

July 1995

Standard issue for general release.

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Introducing a VCE

This chapter introduces a video codec enclosure (VCE) in terms of:

- what it is
- the regulations used to manufacture it
- its physical characteristics
- its internal components
- ordering a VCE.

What is a VCE?

A video codec enclosure (VCE) is a low-cost cabinet used to house Northern Telecom's Digital Video Codec (DV-45) products. A typical application for a VCE is Digital Video Learning Network (DVLN) applications and other similar broadband products. The enclosure is spill proof and is cooled by natural convection. The cabinet frame is supplied with an Oxford dark grey (S-30497) finish and the cover is finished in light BTS dolphin grey (S-30480).

Regulations

A VCE meets all regulatory requirements for the Underwriters Laboratories (UL), Canadian Standards Association (CSA), and the Federal Communication Commission (FCC) when equipped with the standard application configurations provided by Northern Telecom (Nortel).



CAUTION

Equipment within a VCE has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

Equipment within a VCE generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of equipment within a VCE in a residential area is likely to cause harmful interference; users will be required to correct the interference at their own expense.

In addition, when equipped with standard application configurations, a VCE meets the following non-regulatory requirements:

- Earthquake Zone 4 upper floor—Bellcore NEBS TR-NWT-000063
- Office vibration—Bellcore NEBS TR-NWT-000063
- Transportation vibration—Bellcore NEBS TR-NWT-000063
- Drop test—Bellcore NEBS TR-NWT-000063
- Thermal performance—NT corporate standard 1524.00 and 1523.01

Physical characteristics

The physical characteristics of a VCE are presented in terms of its weight, dimensions, mounting options, and external alarm indicators.

Cabinet weight

A VCE is mounted on a cardboard-protected, palletized platform for transportation. A VCE weighs 134 lbs (61 kg) when empty. It can be hand-trucked or hand-carried by two people to any location.

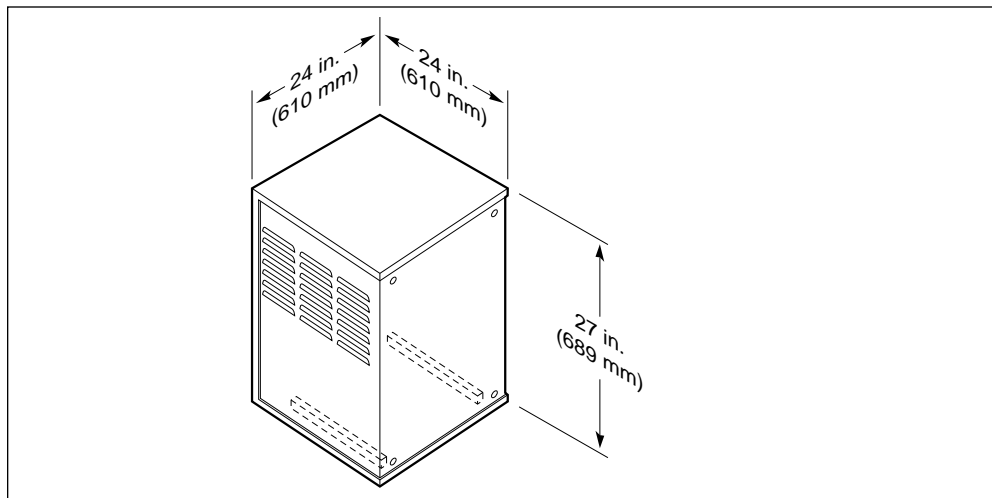
External dimensions

The overall dimensions of the unit (see Figure 1-1) are:

- Height 27 in. (689 mm)
- Width 24 in. (610 mm)
- Depth 24 in. (610 mm).

To provide access to the transversely-mounted equipment and to the connections on the VCE, the enclosure should be mounted with 3 ft (914 mm) clearance on the sides and front.

Figure 1-1
Cabinet dimensions



Cabinet cover

A one-piece, three-sided cover is used on a VCE. The cover is secured by four hex-socket screws on the front of the VCE and is designed to slide completely off of the unit. Slots are provided in the lower-rear corners of the cover to facilitate removal with a standard screwdriver.

Mounting options

A VCE may be installed: free-standing on the floor; with an optional Floor Mounting Kit (Zone 2 to 4 earthquake); or with an optional Wall Mounting Kit. A VCE is equipped with integral leveling feet for free-standing installations.

Alarm indicators

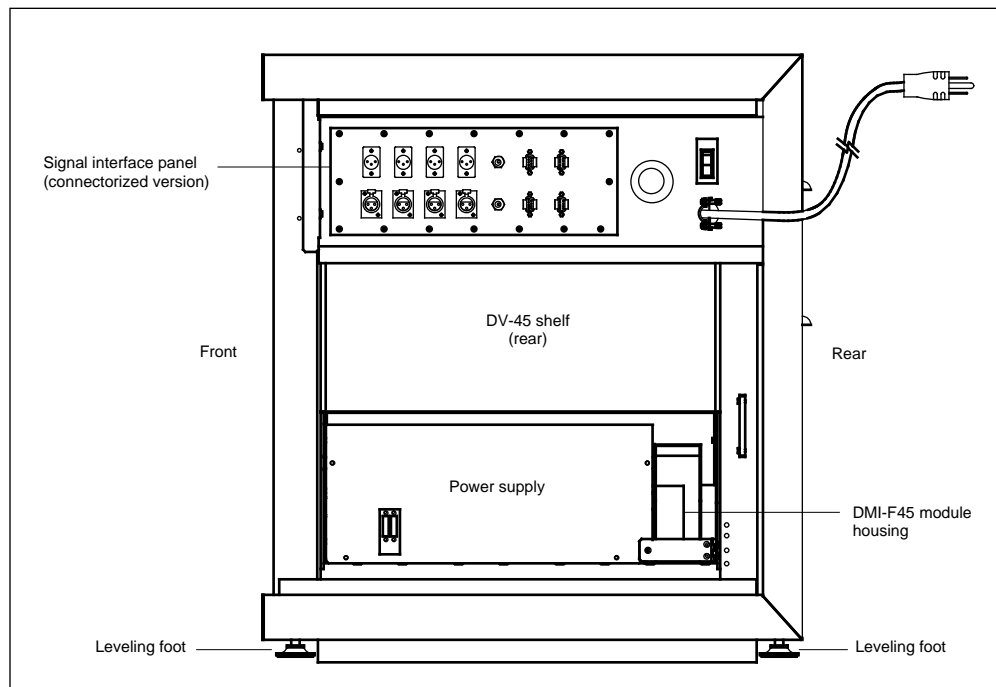
No external alarm indicators are provided on a VCE to indicate the state of equipment mounted within a VCE, except for the 120 Vac breaker; the breaker state can be seen on the interface panel. To view any other indications on equipment mounted within a VCE, the cabinet cover must be removed.

VCE components

A VCE has the following internal components (see Figure 1-2):

- DV-45 shelf
- power supply
- signal and power interface panel.

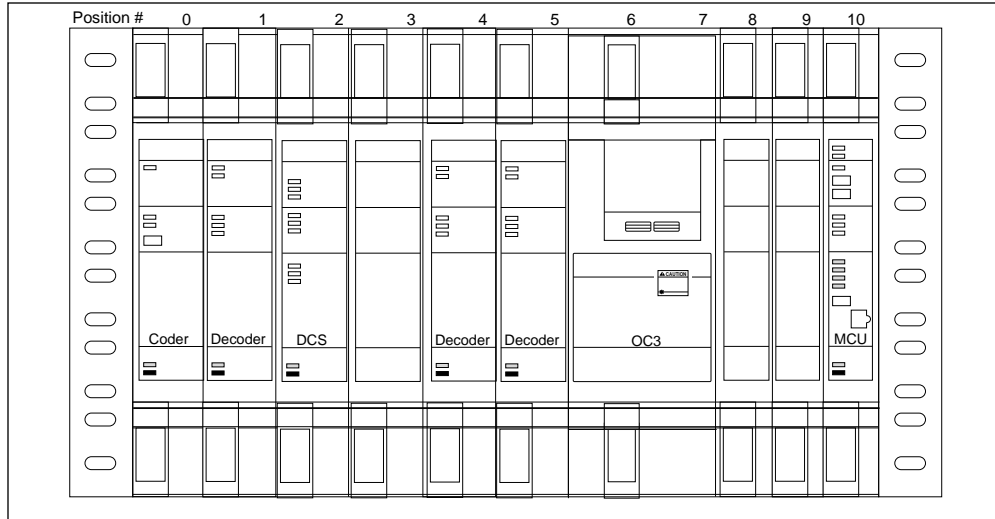
Figure 1-2
VCE with cover removed



DV-45 shelf

The DV-45 shelf has eleven slots for equipment. All cards are inserted into the DV-45 shelf from the left side of the VCE (after the cover is removed). A typical card configuration for a basic Digital Video Learning Network (DVLN) room application is shown in Figure 1-3. The power supply is located underneath the DV-45 shelf.

Figure 1-3
Typical DV-45 shelf configuration for a DVLN room application



Power supply

A VCE is provided with a 120 Vac/-48 Vdc 300W switch-mode power supply. A VCE is delivered with a 10 ft (3.1 m) power cord that is prewired through the interface plate. This is attached to a 7.5 A breaker on the interface plate (see Figure 1-2 on page 1-3).

Note: If a VCE is bolted to the floor or wall, local electrical practices specify that the flexible power cord must be replaced with a conduit or armored cable entry and that the supply is connected to a 120 Vac, 15 A power source with a double-pole breaker/isolator.

Power is distributed to the equipment in the DV-45 shelf through a distribution board mounted on the right-rear panel.

No battery backup or location for a switch unit to provide backup power is furnished with the standard configuration.

Note: If a DMI-F45 optical module is used, it is installed next to the power supply (see Figure 1-2 on page 1-3).

Signal and power interface panel

A signal and power interface panel is provided on the top-right side of the VCE (see Figure 1-2 on page 1-3). There are two versions of the signal interface panel (see Figure 1-4 and Figure 1-5). See Table 1-1 for connector pinouts.

Figure 1-4

Knockout interface panel (included in PEC NT2H57AA)

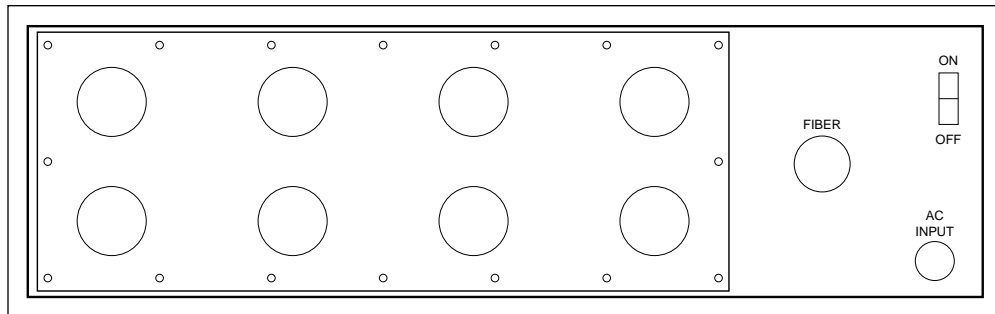


Figure 1-5

Connectorized interface panel (included in PEC NT2H57AB)

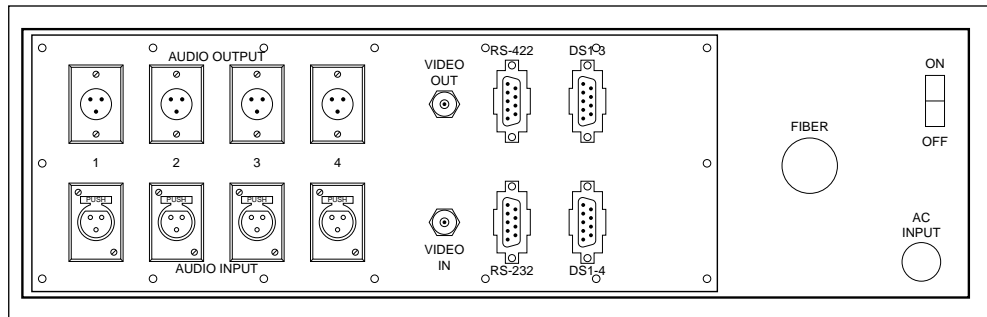


Table 1-1
Connectorized interface panel—connector pinouts

Connector	Pin #	Signal (DV-45 connection)	Cable Color
Audio Outputs 1-4 Cable NT2H5726	1	Ground (Decoder/Program Ch1 G)	Ground lead
	2	Signal (Decoder/Program Ch1 +)	Red
	3	Signal (Decoder/Program Ch1 -)	Black
Audio Inputs 1-4 Cable NT2H5728	1	Ground (Coder/Program Ch1 G)	Ground lead
	2	Signal (Coder/Program Ch1 +)	Red
	3	Signal (Coder/Program Ch1 -)	Black
RS-232 Cable NT2H5730	1	not connected	
	2	Rx (DCS/Monitor Ch1 -)	Blue-White
	3	Rx (DCS/Monitor Ch2 -)	Orange-White
	4-5	not connected	
	6	Ground (DCS/Monitor Ch1 G)	Ground lead
	7	Tx (DCS/Monitor Ch1 +)	White-Blue
	8	Tx (DCS/Monitor Ch2 +)	White-Orange
	9	not connected	
	RS-422 Cable NT2H5730	1	not connected
2		Tx- (DCS/Monitor Ch3 -)	Blue-White
3		Rx- (DCS/Monitor Ch4 -)	Orange-White
4-5		not connected	
6		Ground (DCS/Monitor Ch3/4 G)	Ground lead
7		Tx+ (DCS/Monitor Ch3 +)	White-Blue
8		Rx+ (DCS/Monitor Ch4 +)	White-Orange
9		not connected	
DS1-3 Cable NT2H5730		1	not connected
	2	Tx3R (DCS/Program Ch1 -)	Blue-White
	3	Rx3R (DCS/Program Ch2 -)	Orange-White
	4-5	not connected	
	6	Ground (DCS/Program Ch1/2 G)	Ground lead
	7	Tx3T (DCS/Program Ch1 +)	White-Blue
	8	Rx3T (DCS/Program Ch2 +)	White-Orange
	9	not connected	
	DS1-4 Cable NT2H5730	1	not connected
2		Tx4R (DCS/Program Ch3 -)	Blue-White
3		Rx4R (DCS/Program Ch4 -)	Orange-White
4-5		not connected	
6		Ground (DCS/Program Ch3/4 G)	Ground lead
7		Tx4T (DCS/Program Ch3 +)	White-Blue
8		Rx4T (DCS/Program Ch4 +)	White-Orange
9		not connected	

Ordering VCE components

Table 1-2 shows the standard equipment, kits, and optional equipment available with a VCE. We recommend that you carry at least one spare power supply. For ordering other DV-45 equipment, refer to the *DV-45 Reference Manual*, PEC NT2H7902. For ordering application-specific equipment, refer to the application-specific documentation (for example, for DVLN Rel 3.1 equipment refer to the *DVLN System Documentation*, PEC NT2H65AC).

Table 1-2
VCE parts list

Description		PEC code	CPC code
VCE cabinet with knockout interface panel, DV-45 shelf, power supply, and 10 ft ac-power cord		NT2H57AA	A0626349
VCE cabinet with connectorized interface panel, DV-45 shelf, power supply, and 10 ft ac-power cord		NT2H57AB	A0636399
Optional parts:			
	Wall mounting kit	NT2H57KB	A0626353
	Floor mounting kit, Zone 2 to 4 earthquake	NT2H57KC	A0626354
	BNC/BNC coaxial cable assembly (for internal DCS, Decoder, Coder connections)	NT2H5720	A0626359
	BNC/Snap-on coaxial cable assembly (for internal DMI-F45 connections)	NT2H5722	A0626360
Spare part:			
	Power supply, 120 Vac / 48 Vdc	NPS50376L119	A0626954

Note: A VCE does not come equipped with DV-45 cards.

Ordering examples

Example	Ordering codes
Free-standing VCE with knockout interface panel	NT2H57AA
Floor-mounted VCE with knockout interface panel	NT2H57AA, NT2H57KC
Wall-mounted VCE with connectorized interface panel	NT2H57AB, NT2H57KB
Cables for VCE with DCS, Decoder, Coder	2 x NT2H5720
Cables for VCE with DCS, 3 Decoders, Coder	4 x NT2H5720
Cables for VCE with DCS, Decoder, Coder, OC3 unit	4 x NT2H5720
Cables for VCE with DCS, Decoder, Coder, DMI-F45	2 x NT2H5720; 2 x NT2H5722

Installing a VCE

Installing a video codec enclosure (VCE) involves receiving it, locating it, and mounting it.

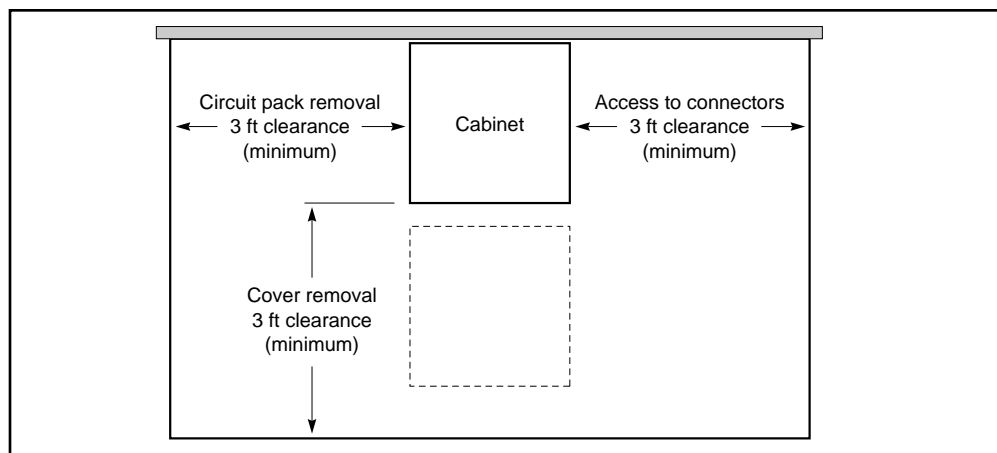
Receiving a VCE

The VCE and any optional packages ordered are delivered on a transport pallet. To verify the shipment before moving the equipment to its final location, open or remove the cardboard carefully. You may want to reuse the packaging to transfer the equipment to the installation site. If there are any packages missing from the shipping order, contact your shipping agent or Northern Telecom (Nortel) immediately (the phone numbers are on the shipping order). The cabinet may be transported to the installation site by hand-truck or carried by two people.

Locating a VCE

A VCE is designed for indoor use and should be installed in a location which provides a minimum of 3 ft (914 mm) clearance on both sides and the front of the unit. Additionally, a 1 in. (25 mm) clearance on the top of the cabinet is required; see Figure 2-1. Access to 120 Vac power and signal cabling must be considered according to local procedures. A VCE cannot be mounted with any type of top attachment or side-by-side mounting provision.

Figure 2-1
Clearances



Mounting a VCE

A VCE must only be installed by trained service personnel and all electrical connections to the main ac-supply must be made by a licensed electrician following all the relevant local electrical codes. Where a direct connection is made to the main ac-power supply, a double-pole manual disconnect device must be used. Read through the appropriate procedure before proceeding with the installation.

A VCE may be installed:

- free-standing on the floor (see Procedure 2-1 on page 2-3)
- floor mounted in a zone 2-4 earthquake area (see Procedure 2-2 on page 2-5)
- wall mounted (see Procedure 2-3 on page 2-10)

Note: Connecting the DV-45 equipment and setting DV-45 card options is application specific and is not detailed in this document. Refer to the application documentation for specific information (for example, for the DVLN Rel 3.1 application, refer to the *DVLN System Documentation*, PEC NT2H65AC).

Procedure 2-1 Free-standing installation

Use this procedure to install a VCE free-standing on the floor; see Figure 2-1 on page 2-1 for clearances. This procedure assumes that the VCE is close to a standard 120 Vac 15 A power outlet and is connected to it by the attached 10 ft ac-power cord.

Note: Prior to shipping the cabinet to the site, determine the availability of a suitable ac-power outlet. Check where power and signal cables are to be run. Arrange for any site preparation work to be done prior to installation of the VCE.

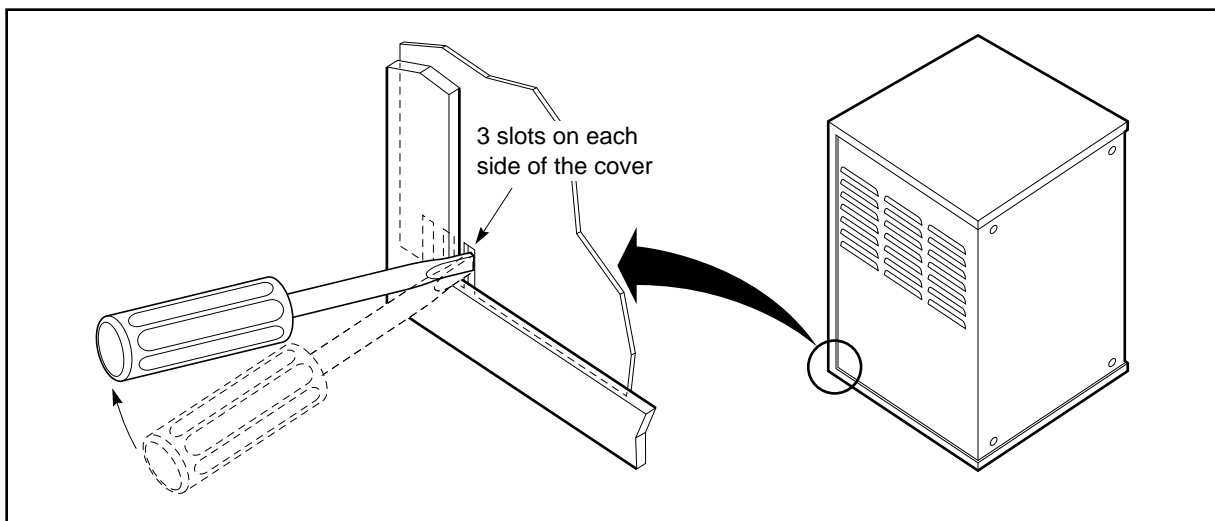
Tools

- 1 Level
- 1 5/32 in. Allen key
- 1 Flat-bladed screwdriver

Action

Step	Action
1	Remove the cardboard protection from the VCE. Using a 5/32 in. Allen key, remove the 4 cover-retaining screws and slide the cover off; see Figure 2-2. Note: If the cover does not come off freely, insert a flat-bladed screwdriver into the slots located in the lower rear corners of the VCE cover and jog the cover loose.

Figure 2-2
Removing the VCE cover



—continued—

2-4 Installing a VCE

Procedure 2-1 (continued) Free-standing installation

Step	Action
2	Unbolt the VCE from its transport pallet.
3	Move the VCE to its final position in the equipment lineup and level the unit by adjusting the levelling feet.
4	Connect the power cable to the 120 Vac 15 A power outlet. Note: The power should be disconnected at the power supply breaker panel.
5	Connect the DV-45 equipment. See the application-specific documentation.
6	Put on an antistatic bracelet to protect the DV-45 cards.



CAUTION

Risk of damaging electrostatic sensitive devices

Avoid touching any components on the printed circuit board. Electrostatic sensitive devices can be damaged by electrostatic discharge. Always ground yourself before handling a circuit pack.

- 7 Unpack all the DV-45 circuit packs.
- 8 Insert the cards in the DV-45 shelf (for a typical application, see Figure 1-2 on page 1-3) but do not insert them into the backplane. That is, leave the latches closed.
- 9 Check that the option switches on each card have been set correctly. The correct settings are application specific (for example, see *DVLN Classroom Site Equipment Installation*, 323-1411-301, for the DVLN application).
- 10 Push the card into the backplane and close the latches on each card.
- 11 Install the locking bar when the last card has been installed.
- 12 Replace the VCE cover and the four cover-retaining screws.
- 13 Turn on the ac-power supply.

—end—

Procedure 2-2

Cabinet installation (Zone 4 earthquake)

Use this procedure to install a VCE where Zone 4 earthquake protection is required, that is, the VCE is bolted to the floor; see Figure 2-1 on page 2-1 for clearances and location information.

Note 1: Prior to shipping the cabinet to the site, determine the type of electrical distribution panel and the availability of a suitable 120 Vac, 15 A power supply with a double-pole breaker/isolator. Check where power cable and signal cables are to be run. Arrange for any outside contract work to be completed prior to the installation of the cabinet.

Note 2: A VCE must be bolted to the floor for Zone 4 earthquake protection using the Floor Mounting Kit (PEC NT2H57KC) option. A VCE must be connected to the local power through a conduit or armoured cable.

Note 3: The Floor Mounting Kit (PEC NT2H57KC) must be used for this option. Although the leveling feet may be used to initially level the cabinet, the entire weight of the cabinet must rest on the support shims provided in the kit, and not on the leveling feet.

Tools

- 1 Floor Mounting Kit (PEC NT2H57KC)
- 1 Drill, electric (hammer-type if drilling concrete)
- 1 Drill bit suitable for drilling holes for the floor anchors
- 1 Socket set, 1/2 in. drive
- 1 Torque wrench
- 1 Wire strippers
- 1 Flat-bladed screwdriver
- 1 Electrician standard tools
- 1 Level
- 1 5/32 in. Allen key

Action

Step	Action
1	Before positioning and securing the VCE, mark all references and layout lines on the floor in accordance with the building floor plan drawing and the job specifications.

—continued—

2-6 Installing a VCE

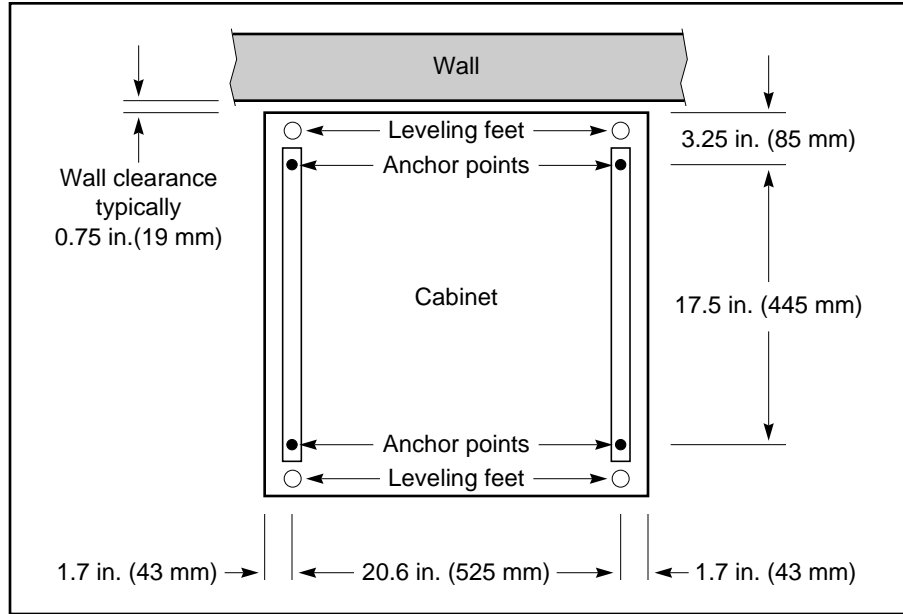
Procedure 2-2 (continued)

Cabinet installation (Zone 4 earthquake)

Step Action

- 2 Mark the VCE anchor points as shown in Figure 2-3.

Figure 2-3
VCE anchor points



- 3 Drill the floor anchor holes in accordance with one of the following:
- **Concrete floor** Use an electric drill with a masonry drill bit. Drill holes at least 3.25 in. (83 mm) deep. Use a vacuum cleaner to remove cement particles from the holes.
 - **Wood/steel floor** Drill appropriate pilot holes for lag bolts in wood, or clearance holes for machine bolts in steel.

Note: If the VCE is not installed immediately after drilling the anchor holes, cover the anchor holes with adhesive tape.

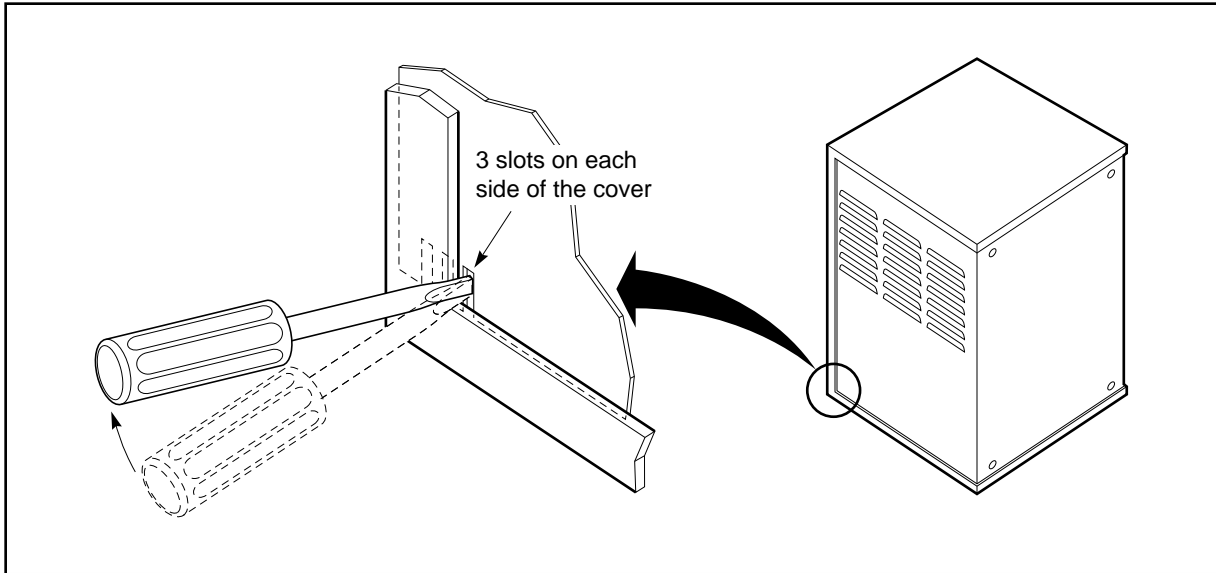
- 4 Remove the cardboard protection from the VCE. Using a 5/32 in. Allen key, remove the four cover-retaining screws and slide the cover off the VCE; see Figure 2-4.

Note: If the cover does not come off freely, insert a flat-bladed screwdriver into the slots located in the lower rear corners of the VCE cover and jog the cover loose.

—continued—

Procedure 2-2 (continued)
Cabinet installation (Zone 4 earthquake)

Figure 2-4
Removing the VCE cover



Step	Action
5	Unbolt the enclosure from its transport pallet.
6	Move the VCE to its final position in the equipment lineup and level the unit by adjusting the levelling feet.
7	Install the anchor bolts (provided with the associated installation kit) through the VCE base, into the floor holes.
8	Insert the shims between the floor and the cabinet base (see Figure 2-5). Turn the leveling feet counter clockwise so that the entire weight of the cabinet is supported by the shims.

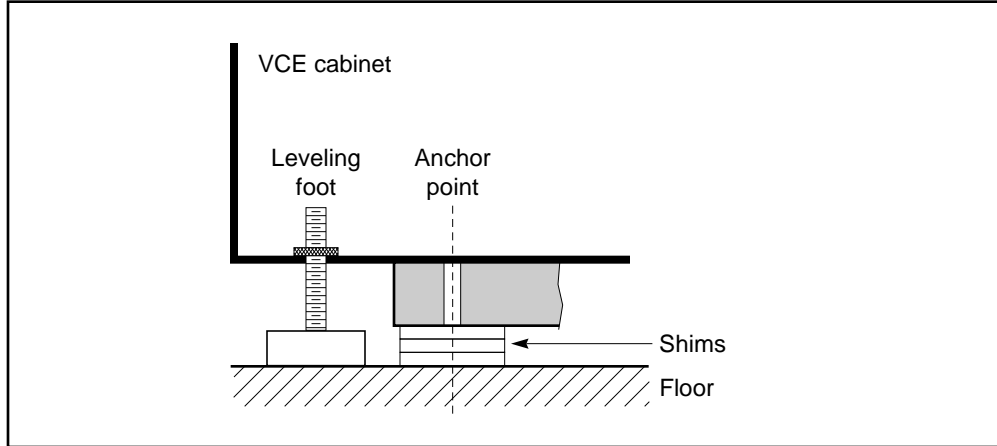
—continued—

2-8 Installing a VCE

Procedure 2-2 (continued)

Cabinet installation (Zone 4 earthquake)

Figure 2-5
Levelling the cabinet



Step Action

- 9 Tighten the anchor bolts using a socket wrench and extension handle. Torque the bolts to 18 ft lbs.
- 10 Remove the flexible power cable from the enclosure. In addition, remove the cable clamp from the interface plate.
Note: Before removing the flexible power cable from the VCE power terminal block (TB2), note the terminal where each wire is connected.
- 11 Connect a power cable between a suitable fused isolator on the customer premises and the VCE power block through conduit or armoured cable. Northern Telecom recommends the use of TECH 90 cable. The supply should be from a 15 A breaker with an associated double-pole manual disconnect.



DANGER

Danger of electrical shock

All electrical connections must be made by a licensed electrician and follow all relevant local electrical codes.

Note 1: Ensure that the ac-power is disconnected from the 15 A breaker.

Note 2: Be sure to connect the leads correctly to VCE power block TB2. Connect the black (live) wire to L1; the white (neutral) wire to N; and the bare or green (ground) wire to GRD. Ensure that the conduit or armoured cable is properly secured to the side of the VCE.

Note 3: A VCE must be grounded using the ground wire in the electrical power cable (connect the cable ground wire to the cabinet GRD stud).

—continued—

Procedure 2-2 (continued)

Cabinet installation (Zone 4 earthquake)

Step	Action
12	Connect the DV-45 equipment. See the application-specific documentation.
13	Put on an antistatic bracelet to protect the DV-45 cards.



CAUTION

Risk of damaging electrostatic sensitive devices

Avoid touching any components on the printed circuit board. Electrostatic sensitive devices can be damaged by electrostatic discharge. Always ground yourself before handling a circuit pack.

- | | |
|----|---|
| 14 | Unpack all the DV-45 circuit packs. |
| 15 | Insert the cards in the DV-45 shelf (for a typical application, see Figure 1-2 on page 1-3) but do not insert them into the backplane. That is, leave the latches closed. |
| 16 | Check that the option switches on each card have been set correctly. The correct settings are application specific (for example, see <i>DVLN Classroom Site Equipment Installation</i> , 323-1411-301, for the DVLN application). |
| 17 | Push the card into the backplane and close the latches on each card. |
| 18 | Install the locking bar when the last card has been installed. |
| 19 | Replace the VCE cover and the four cover-retaining screws. |
| 20 | Turn on the ac-power supply. |

—end—

Procedure 2-3 Cabinet installation (wall mount)

Use this procedure to install a VCE on a wall; see Figure 2-1 on page 2-1 for clearance and location information.

Note 1: Prior to shipping the cabinet to the site, determine the type of electrical distribution panel and the availability of a suitable 120 Vac, 15 A power supply with a double-pole breaker/isolator. Check where the power cable and signal cables are to be run. Arrange for any outside contract work to be completed prior to the installation of the cabinet.

Note 2: If a VCE is bolted to a wall, it must be connected to the local power through a conduit or armoured cable.

Note 3: A VCE cabinet can only be mounted to a wood-stud or cement wall using the Wall Mounting Kit (PEC NT2H57KB) option. Do not mount the cabinet on a metal-stud wall. A minimum of 1 in. (25 mm) clearance is required between the top of the cabinet and any overhead obstruction (for example, the ceiling).

Tools

- 1 Wall Mounting Kit (PEC NT2H57KB)
- 1 Drill, electric (hammer-type if drilling concrete or masonry)
- 1 Drill bit suitable for drilling holes for wall anchors
- 1 Socket set, 1/2 in. drive
- 1 Wire strippers
- 1 Flat-bladed screwdriver
- 1 Electrician standard tools
- 1 5/32 in. Allen key

Action

Step	Action
1	Before positioning and securing the VCE, mark all references and layout lines on the wall in accordance with the building plan drawing and the job specifications.
2	Mark the 16 anchor points using the wall mounting bracket as a template, see Figure 2-6.

—continued—

2-12 Installing a VCE

Procedure 2-3 (continued)

Cabinet installation (wall mount)

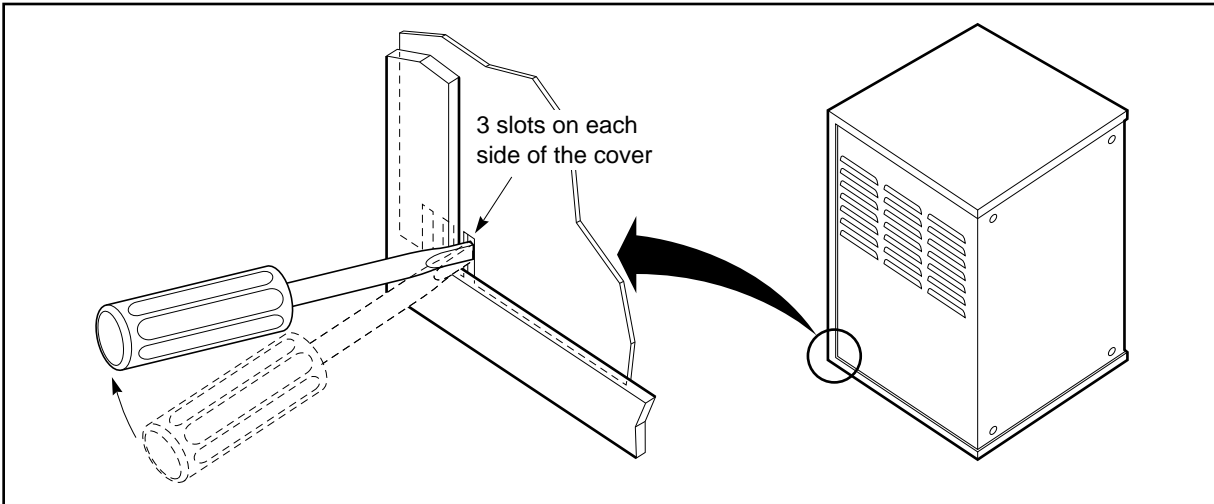
Step Action

Note: In order to support the weight of the VCE, the anchor holes must be into a wood stud. If a wood stud is not present in the required position, add a cross-stud between adjacent vertical studs.

- 4 Attach the wall bracket to the wall using 16, 3.00 in. (76 mm), 1/4 in. (6.4 mm) hex-head lag screws. When attaching the bracket ensure that the bracket is flush with the wall. The three flanges protruding from the wall bracket are used to temporarily hang the VCE during installation.
- 5 Before final tightening of the screws, ensure that the upper face of the wall bracket is level.
- 6 Remove the cardboard protection from the VCE. Using a 5-32 in. Allen key, remove the four cover-retaining screws and slide the cover off the VCE; see Figure 2-7.

Note: If the cover does not come off freely, insert a flat-bladed screwdriver into the slots located in the lower rear corners of the VCE cover and jog the cover loose.

Figure 2-7
Removing the VCE cover



- 7 Unbolt the enclosure from its transport pallet.
- 8 With two people or a jack lift, raise the VCE and temporarily hang it, using the rear louvres, onto the three flanges protruding from the wall bracket.
- 9 Fasten the VCE to the wall bracket using the 9, 3/8 in., bolts supplied with the kit.
- 10 Tighten the bolts using a socket wrench and extension handle.
- 11 Remove the flexible power cable from the enclosure. In addition, remove the cable clamp from the interface plate.

—continued—

Procedure 2-3 (continued)
Cabinet installation (wall mount)

Step	Action
	<p>Note: Before removing the flexible power cable from the VCE power terminal block (TB2), note the terminal where each wire is connected.</p>
12	<p>Connect a power cable between a suitable fused isolator on the customer premises and the VCE power block through conduit or armoured cable. Northern Telecom recommends the use of TECH 90 cable. The supply should be from a 15 A breaker with an associated double-pole manual disconnect.</p>
<div style="border: 1px solid black; padding: 10px;">  <p>DANGER Danger of electrical shock All electrical connections must be made by a licensed electrician and follow all relevant local electrical codes.</p> </div>	
	<p>Note 1: Be sure to connect the leads correctly to VCE power block TB2. Connect the black (live) wire to L1; the white (neutral) wire to N; and the bare or green (ground) wire to GRD. Ensure that the conduit or armoured cable is properly secured to the side of the VCE.</p> <p>Note 2: A VCE must be grounded using the ground wire in the electrical power cable (connect the cable ground wire to the cabinet GRD stud).</p>
13	<p>Connect the DV-45 equipment. See the application-specific documentation.</p>
14	<p>Put on an antistatic bracelet to protect the DV-45 circuit packs.</p>
<div style="border: 1px solid black; padding: 10px;">  <p>CAUTION Risk of damaging electrostatic sensitive devices Avoid touching any components on the printed circuit board. Electrostatic sensitive devices can be damaged by electrostatic discharge. Always ground yourself before handling a circuit pack.</p> </div>	
15	<p>Unpack all the DV-45 circuit packs.</p>
16	<p>Insert the cards in the DV-45 shelf (for a typical application, see Figure 1-2 on page 1-3) but do not insert them into the backplane. That is, leave the latches closed.</p>
17	<p>Check that the option switches on each card have been set correctly. The correct settings are application specific (for example, see <i>DVLN Classroom Site Equipment Installation</i>, 323-1411-301, for the DVLN application).</p>
18	<p>Push the card into the backplane and close the latches on each card.</p>
19	<p>Install the locking bar when the last card has been installed.</p>
20	<p>Replace the VCE cover and the four cover-retaining screws.</p>
21	<p>Turn on the ac-power supply.</p>

—end—

Installing VCE components

This chapter provides the information required to:

- connect the DS3 or optical carrier facilities to units within a VCE
- install DV-45 cards into a DV-45 shelf within a VCE
- replace a VCE power supply.

This chapter does not include information on setting DV-45 card options. For information on setting DV-45 card options and system testing, refer to the application-specific documentation (for example, see the *DVLN System Documentation*, PEC NT2H65AC for the DVLN Rel 3.1 application).

Procedures are provided for:

Task	See...
Connecting DS3 carrier facilities to a DCS card	page 3-2
Connecting optical carrier facilities to a DMI-F45	page 3-4
Connecting optical carrier facilities to a DV-OC3 unit	page 3-6
Installing cards in a DV-45 shelf	page 3-11
Replacing a power supply	page 3-15

Procedure 3-1

Connecting DS3 carrier facilities to a DCS card

This procedure details the steps required to connect DS3 carrier facilities to a data communication synchronization (DCS) card in a DV-45 shelf within a VCE.

Requirements

- Termination to DS3 carrier facilities is carrier or site dependent and can only be determined at the installation site itself
- Cable from the DS3 carrier facility has already been routed into the VCE

Tools

Wire strippers
BNC crimping tool
Antistatic bracelet

Materials

- 2 BNC, male connectors

Action

Step	Action
1	Cut the cables to the appropriate length. Consider cable dressing requirements before cutting the cable.
2	Following a standard procedure for BNC cable assembly, strip the DV-45 shelf ends of the cables and install male BNC connectors on both.
3	Remove the 4 cover-retaining screws and slide off the VCE cover.
4	Put on an antistatic bracelet to protect the DV-45 cards from damage. Refer to "Observing safety guidelines" on page 4-1.
5	In the VIDEO & DS3 INPUT/OUTPUT FIELD at the rear of the DV-45 shelf, locate the CODER/DECODER section that serves the DCS card. Refer to Figure 3-1 and Figure 3-2.
6	Connect one of the BNC-terminated cables to the DS3 IN/OUT (Line In) terminal. This terminal accepts the incoming DS3 signal from the carrier.
7	Connect the other BNC-terminated cable to the DS3 MONITOR (Line Out) terminal. This terminal transmits the outgoing DS3 signal to the carrier.
8	Record the DV-45 shelf and slot numbers and the signal source and destination for configuration purposes.
9	Mark the cables so that the installer at the DS3 carrier end will know which carries the incoming signal and which carries the outgoing signal.
10	Complete installation at the carrier end as per DS3 carrier procedures.

—continued—

Procedure 3-1 (continued)
Connecting DS3 carrier facilities to a DCS card

Figure 3-1
Rear view of DV-45 shelf

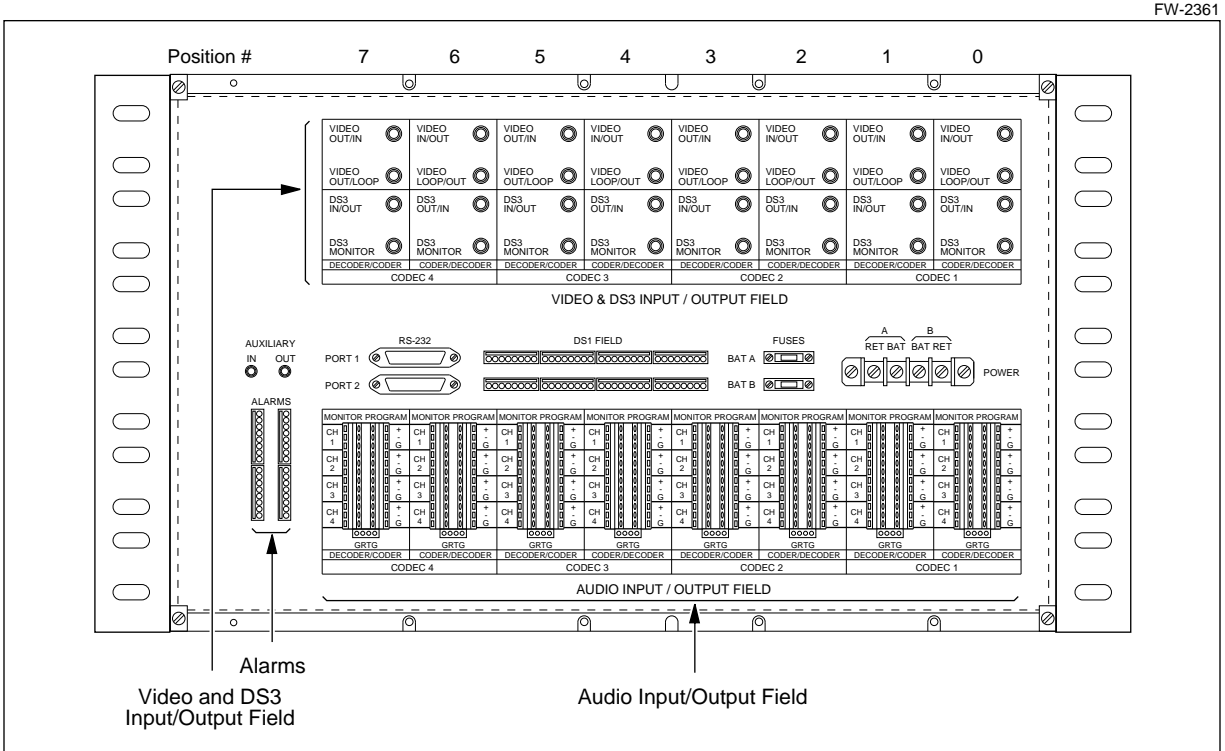
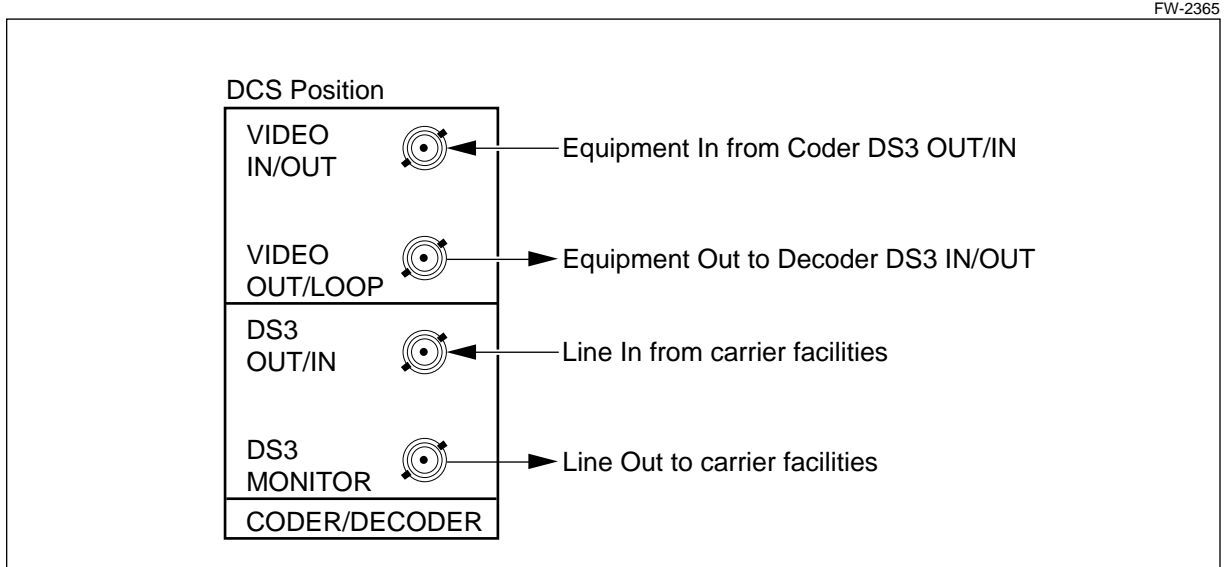


Figure 3-2
Connections to the Coder/Decoder section of a DCS card



—end—

Procedure 3-2 Connecting optical carrier facilities to a DMI-F45

A VCE can be equipped with an optional DMI-F45 optical interface module. This module will transmit and receive an optically-coded DS3 to and from a corresponding DMI-F45 optical interface module. This procedure describes how to install the DMI-F45 module and make the DS3 and optical carrier facility connections.

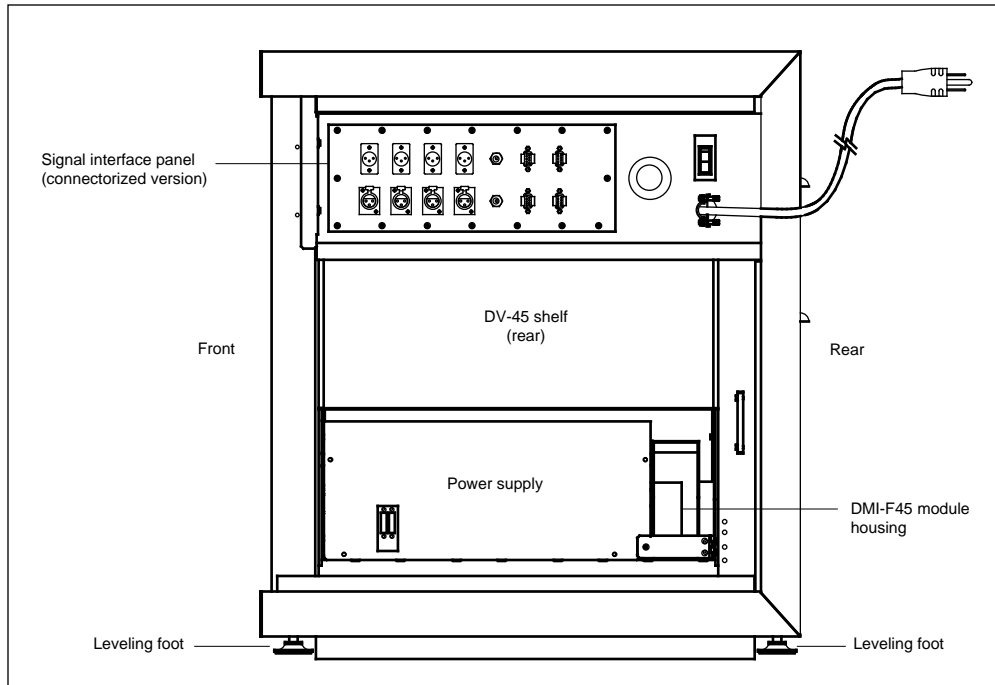
Requirements

The VCE has already been installed, see “Installing a VCE” on page 2-1.

Action

Step	Action
1	Observe all precautions in “Observing safety guidelines” on page 4-1.
2	Ensure that the VCE power supply On/Off switch is in the “Off” position. Also disconnect the VCE from the ac-power source.
3	Remove the VCE cover. Insert the DMI-F45 module into the DMI-F45 housing located below and to the rear of the DV-45 shelf (see Figure 3-3).

Figure 3-3
VCE with cover removed



—continued—

Procedure 3-2 (continued)

Connecting optical carrier facilities to a DMI-F45

- | Step | Action |
|-------------|---|
| 4 | Connect the DS3 cables running from the DV-45 shelf to the DS3 in and out connectors on the front of the DMI-F45 module. Each cable is labeled to indicate whether it is DS3 in or DS3 out. |
| 5 | Connect the fiber cables to the Transmit and Receiver connectors of the DMI-F45 module. |



DANGER

Potential personal injury situation

Never look directly into an open optical connector, as eye damage may occur from exposure to the laser.

- | | |
|----|---|
| 6 | Connect the connectorized power cable already installed in the VCE, which runs from the power supply unit to the DMI-F45 module. |
| 7 | After reconnecting the power, verify that power is being supplied to the DMI-F45 module by ensuring that the Power On LED (green) located on the front of the DMI-F45 module is on. |
| 8 | Flip the VCE power supply On/Off switch to the "Off" position. |
| 9 | Reattach the cover of the VCE. |
| 10 | Flip the VCE power supply On/Off switch to the "On" position. |

—end—

Procedure 3-3

Connecting optical carrier facilities to a DV-OC3 unit

A VCE can be equipped with an optional DV-OC3 optical interface unit. This unit will transmit and receive optically-encoded OC3 signals. Input and output OC3 fiber optic connections are made using optical connectors at the front of a DV-OC3 unit. Connecting the optical signals involves cleaning and assembling FC, ST, or SC type connectors. For more information on the DV-OC3 unit, see the *DV-45 DV-OC3 Reference Manual*, PEC NT2H7908.

Note: When errors occur during testing or in-service operation, clean the DV-OC3 unit optical connectors.

Requirements

Prior to carrying out this procedure on an in-service system, you must:

- ensure that traffic has been removed from the optical interface, as this procedure requires disconnecting the fiber from the DV-OC3 unit.

Tools and materials

Can of compressed air (CG Electronics “Airjet II” or equivalent using a designated CFC replacement)

Alcohol dispenser (Lenline SD-18 or equivalent)

Fiberscope with 200X magnification (Seikoh Gikens “Clearfocus”, Bausch & Lomb eye loupe or equivalent)

Long-nose pliers

Antistatic bracelet

Nonabrasive, low-lint, disposable cloth or tissue (Texwipe Absorbond lint-free cloth or Kimwipes)

Lens paper (Fisher Scientific #11-995 or equivalent)

Lint-free pipe cleaners

Alcohol, reagent grade (99.9% pure), ethanol (denatured), or isopropyl alcohol



DANGER

Risk of eye injury

At all times when handling optical fibers, follow the safety procedures in “Observing safety guidelines” on page 4-1 of this document, and those recommended by your company.

Avoid direct exposure to laser beam or fiber. Invisible light that can blind is present. Keep all optical connectors capped.

—continued—

 Procedure 3-3 (continued)

Connecting optical carrier facilities to a DV-OC3 unit

Action

Step	Action
1	Remove the 4 cover-retaining screws and slide off the VCE cover.
2	Observe all the precautions described in “Observing safety guidelines” on page 4-1. Put on an antistatic bracelet and attach it to ground.
Cleaning optical connectors mated to the DV-OC3 unit	
3	Loosen one of the fiber patchcords from the shelf fiber guide to provide sufficient slack.
4	Disconnect the optical patchcord from the DV-OC3 unit.
5	Cover the exposed connector sleeve end with a clean dust cap. Do not use dust caps that have been in a dusty location, such as on the floor or in pockets.
Cleaning optical connectors on new patchcords or testcords	
6	Insert the connector that requires cleaning into the magnifier and assess the cleanliness of the connector.
7	Remove the connector from the magnifier.
8	Holding the can of compressed air in an upright position, apply a short burst of air perpendicular to the ferrule of the connector, that is, across the end face.
9	Moisten a new, low-lint cloth with alcohol. Note: Never reuse cleaning cloths. Use new material for each connector.
10	Applying moderate pressure, wipe the ferrule —by rotating the connector along the barrel—and the ferrule tip until the ferrule squeaks. <i>This removes any contaminants on the ferrule.</i>
11	Immediately, apply a short burst of air perpendicular to the ferrule, to evaporate the alcohol.
12	Polish the ferrule tip by wiping it on a new, clean piece of lens tissue using one or two figure-eight patterns. This polishes off any residue remaining on the ferrule tip.
13	Finally, apply a short burst of air perpendicular to the ferrule tip. This removes any remaining airborne particles.
14	Reinsert the connector into a fiberscope and assess the cleanliness of the connector. <i>If the connector still looks dirty, remove the connector from the magnifier and repeat steps 11 through 14.</i>
15	Remove the connector from the fiberscope, making sure that the connector end face and ferrule do not come into contact with any contaminants (dust, lint, or hands).

—continued—

3-8 Installing VCE components

Procedure 3-3 (continued)

Connecting optical carrier facilities to a DV-OC3 unit

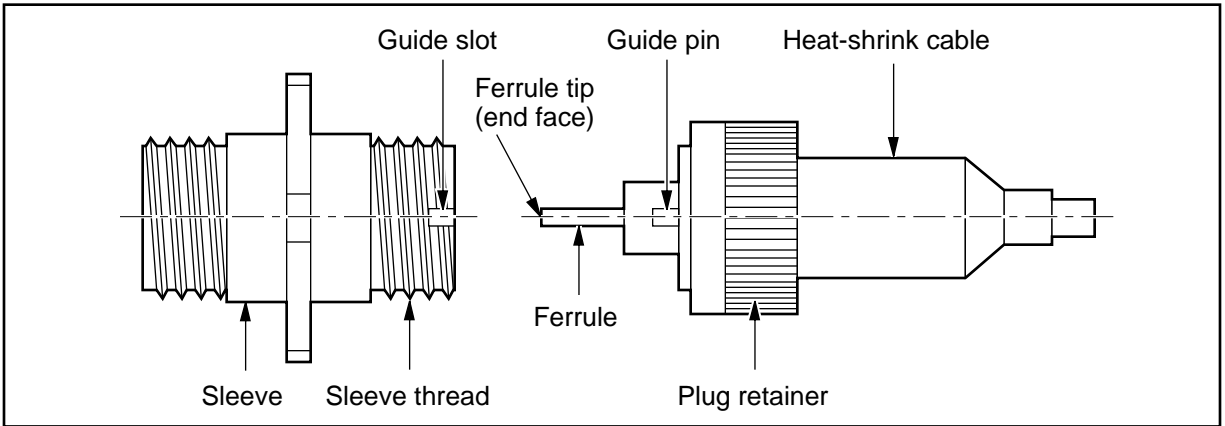
Step	Action								
16	<p>Locate the desired subtask:</p> <table border="1"> <thead> <tr> <th>If you are:</th> <th>Then</th> </tr> </thead> <tbody> <tr> <td>Replacing a patchcord or performing a test</td> <td>Remove the existing patchcord from the DV-OC3 unit. If you are performing a test, cover the end of the patch cord with a clean dust cap as soon as the patchcord has been disconnected.</td> </tr> <tr> <td>Cleaning an existing patchcord connector</td> <td>Remove the dust cap on the connector sleeve.</td> </tr> </tbody> </table>	If you are:	Then	Replacing a patchcord or performing a test	Remove the existing patchcord from the DV-OC3 unit. If you are performing a test, cover the end of the patch cord with a clean dust cap as soon as the patchcord has been disconnected.	Cleaning an existing patchcord connector	Remove the dust cap on the connector sleeve.		
If you are:	Then								
Replacing a patchcord or performing a test	Remove the existing patchcord from the DV-OC3 unit. If you are performing a test, cover the end of the patch cord with a clean dust cap as soon as the patchcord has been disconnected.								
Cleaning an existing patchcord connector	Remove the dust cap on the connector sleeve.								
17	<p>Assemble the optical patchcord (or test cord) to the DV-OC3 unit:</p> <table border="1"> <thead> <tr> <th>If you are connecting a:</th> <th>Then go to:</th> </tr> </thead> <tbody> <tr> <td>FC connector</td> <td>step 18</td> </tr> <tr> <td>SC connector</td> <td>step 22</td> </tr> <tr> <td>ST connector</td> <td>step 26</td> </tr> </tbody> </table>	If you are connecting a:	Then go to:	FC connector	step 18	SC connector	step 22	ST connector	step 26
If you are connecting a:	Then go to:								
FC connector	step 18								
SC connector	step 22								
ST connector	step 26								

Assembling an FC connector

- 18 Gently insert the ferrule into the sleeve. Ensure that the guide pin enters the guide slot. See Figure 3-4.
- 19 Grasp the heat-shrink cable to keep the ferrule from rotating, while you gently screw the plug retainer onto the sleeve threads. Tighten the connection finger-tight.
- 20 Seat the tips of the fiber cables by gently pushing the heat shrink cable onto the plug.
- 21 Repeat steps 6 through 17 for the second connector. Then go to step 29.

**Figure 3-4
FC connector assembly**

FW-10808



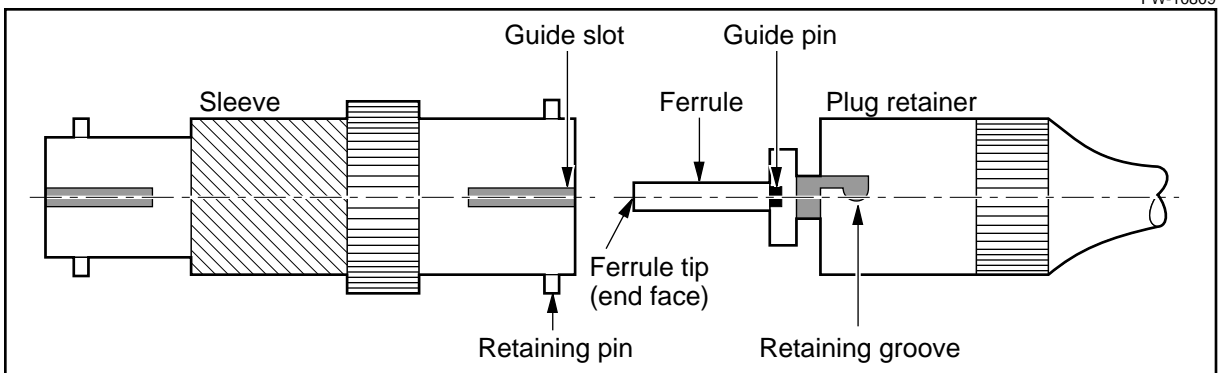
—continued—

Procedure 3-3 (continued)

Connecting optical carrier facilities to a DV-OC3 unit

Step	Action
Assembling an ST connector	
22	Gently insert the ferrule into the sleeve so that the guide pin enters the guide slot, as shown in Figure 3-5.
23	Rotate the plug retainer so that the retaining pin enters the retaining groove.
24	Push the connectors together and seat the tips of the fiber cables by gently pushing the heat-shrink cable.
25	Repeat steps 6 through 17 for the second connector. Then go to step 29.

Figure 3-5
ST connector assembly



Assembling an SC connector	
26	Gently insert the ferrule into the sleeve so that the guide pin enters the guide slot, as shown in Figure 3-6
27	Grasp the plug retainer and gently push it into the connector to lock it in.
28	Repeat steps 6 through 17 for the second connector. Then go to step 29.

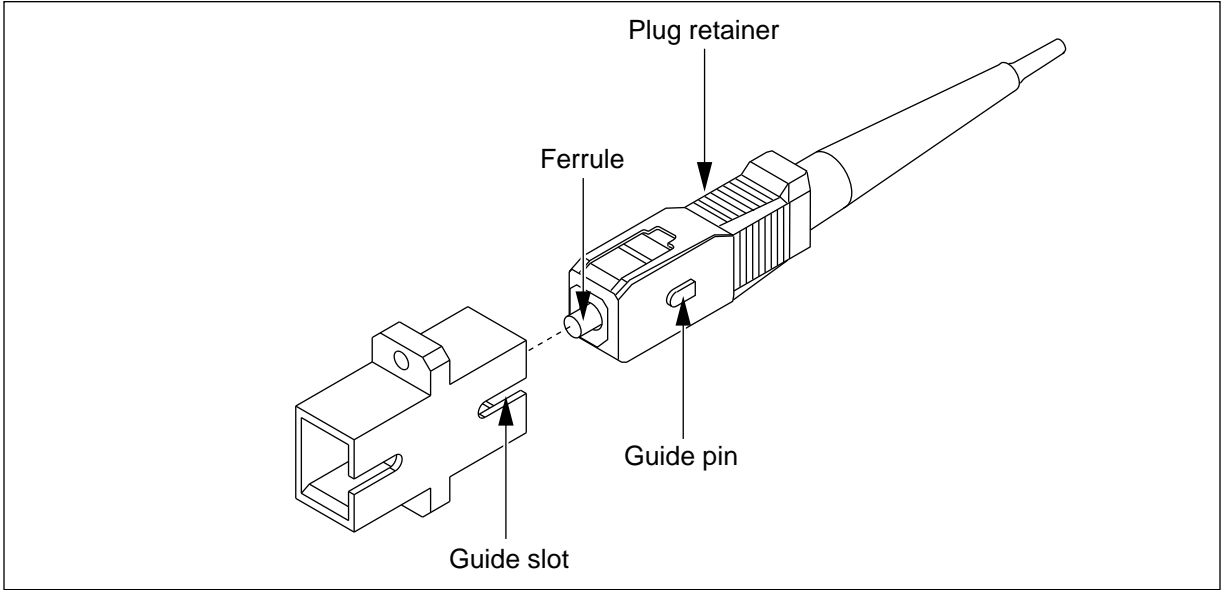
—continued—

3-10 Installing VCE components

Procedure 3-3 (continued)

Connecting optical carrier facilities to a DV-OC3 unit

Figure 3-6
SC connector assembly



FW-2968

Step	Action
29	Insert each patchcord into the shelf fiber guide.
30	Check the optical output power and the integrity of the optical cables using standard optical testing procedures.
31	If the optical output power or optical cable integrity are not satisfactory, remove the patchcord connectors from the DV-OC3 unit and cover the ends with clean dust caps (see procedure steps 2 to 5).
32	Replace the DV-OC3 unit.
33	Repeat this procedure from step 16. If problems persist after replacing the DV-OC3 unit, contact your next level of support.
34	Replace the VCE cover and the 4 cover-retaining screws.

—end—

Procedure 3-4 Installing cards in a DV-45 shelf

This procedure describes how to install DV-45 cards in a DV-45 shelf within a VCE after the option switches have been set. Card option switch settings are application specific (refer to the *DV-45 Reference Manual*, PEC NT2H7902).

Typically, a DV-45 shelf can be provisioned to support:

- one room with 1 Coder, 1 Decoder, 1 DCS, and 1 MCU
- two rooms with 2 Coders, 2 Decoders, 2 DCS, and 1 MCU
- three separate video signals, optically encoded as a single OC3 signal, into one room

In general, DV-45 Coder, Decoder, or DCS cards can be installed in any of the slots labelled **CODER** or **DECODER** on a DV-45 shelf. The DV-45 MCU is installed in slot 10. Care must be taken to ensure that the cards are properly seated in the backplane connector.

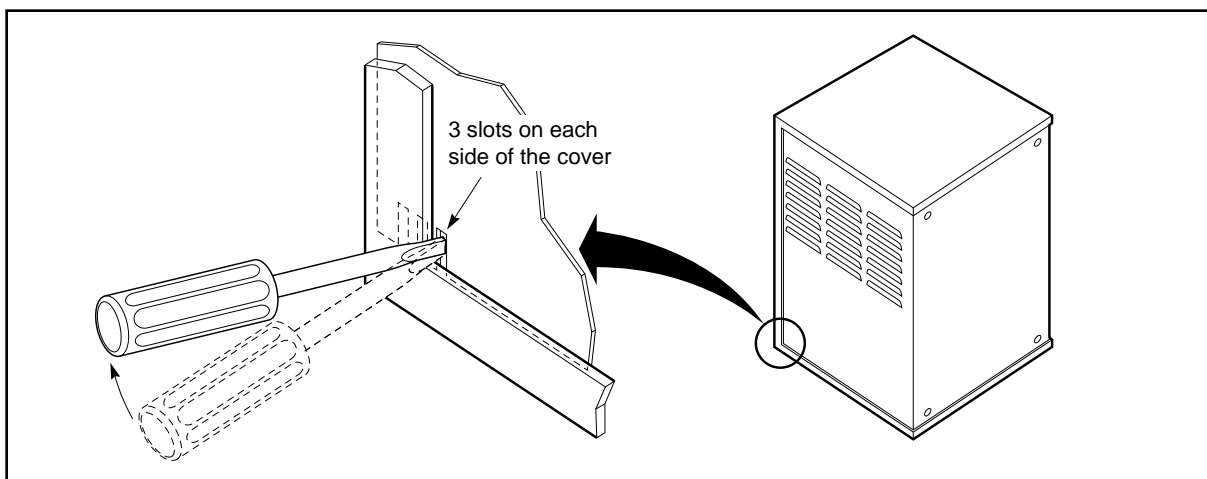
Tools

Antistatic bracelet

Action

Step	Action
1	Using a 5/32 in. Allen key, remove the 4 cover-retaining screws and slide off the VCE cover (see Figure 3-7).

Figure 3-7
Removing the VCE cover



—continued—

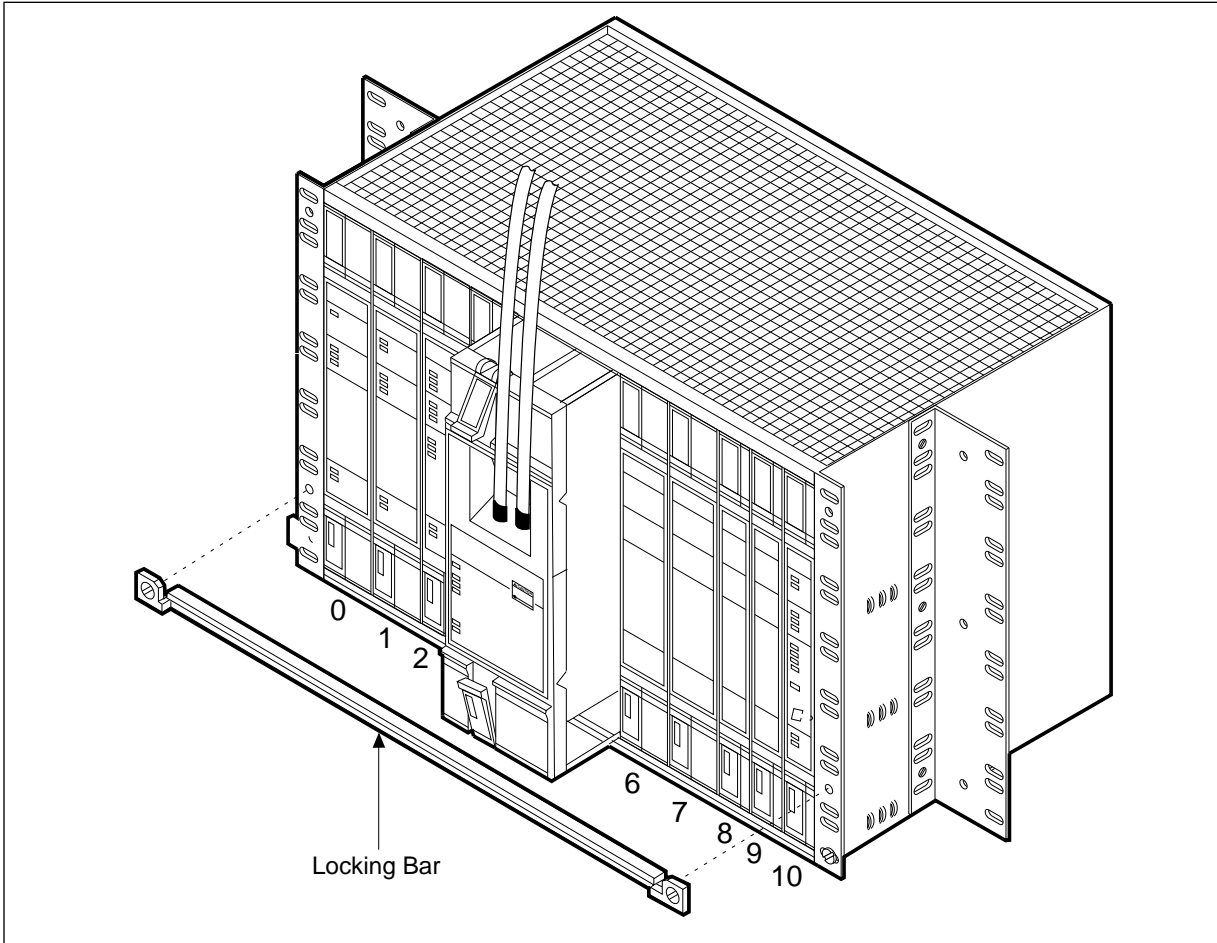
3-12 Installing VCE components

Procedure 3-4 (continued)
Installing cards in a DV-45 shelf

Step	Action
2	Attach the antistatic bracelet to ground or use an antistatic mat.
3	On the left side of the VCE, remove the locking bar from the DV-45 shelf as shown in Figure 3-8.
4	Use Figure 3-9, Figure 3-10, or Figure 3-11 to determine the card position in the DV-45 shelf.
5	Align the card with the slot and insert part way into the slot.
6	Open the latches on the card as shown in Figure 3-8 by squeezing lightly.
7	Insert the card the remainder of the way into the slot. Use the latches to fully seat the card in the backplane connector.
8	Replace the locking bar when the last card has been installed.

Figure 3-8
DV-45 shelf showing locking bar

FW-3103.1



—continued—

Procedure 3-4 (continued)
Installing cards in a DV-45 shelf

Figure 3-9
Card positions in a DV-45 shelf with a single drop/insert configuration

FW-2483.2

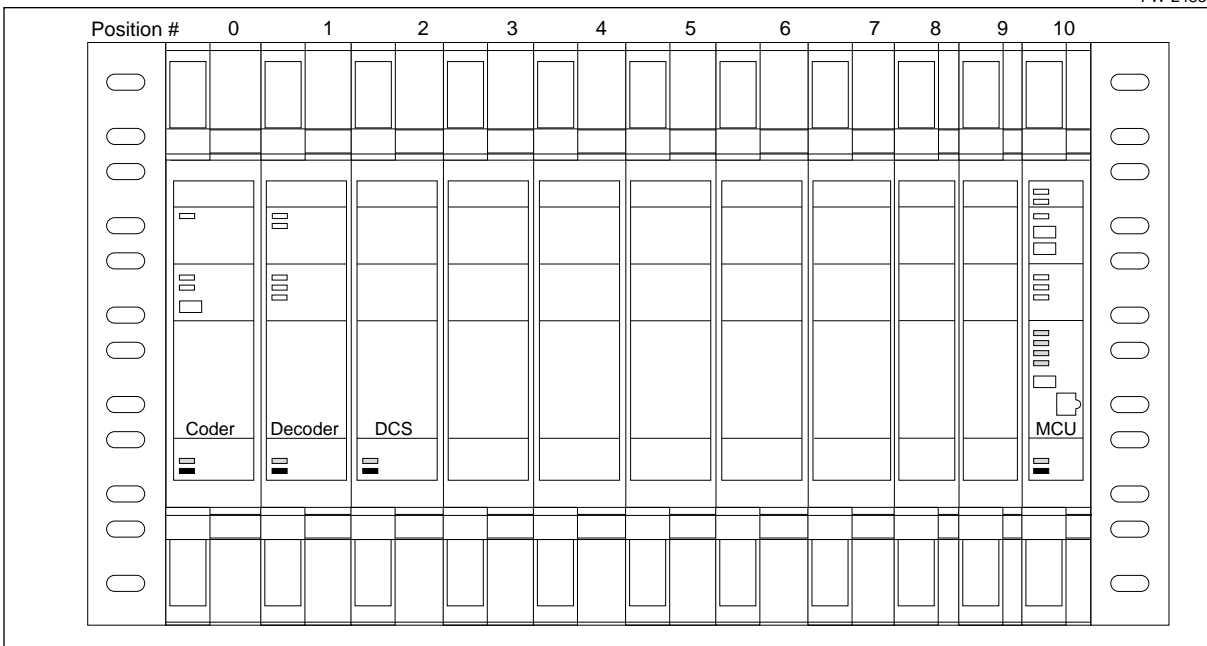
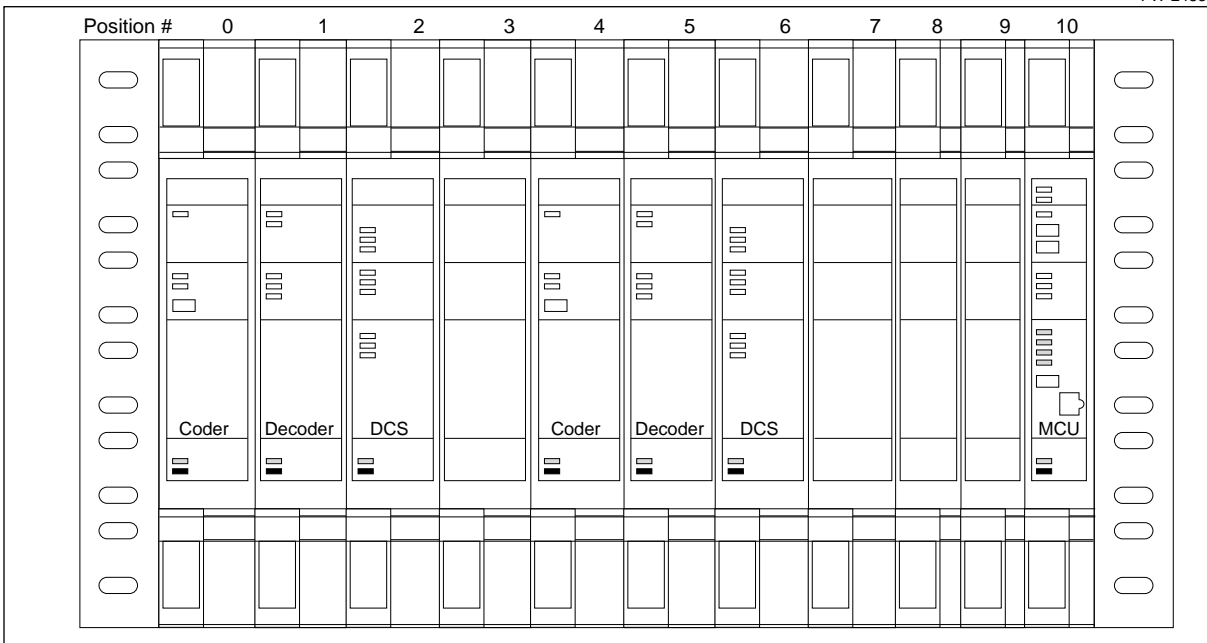


Figure 3-10
Card positions in a DV-45 shelf with a dual drop/insert configuration

FW-2483.7

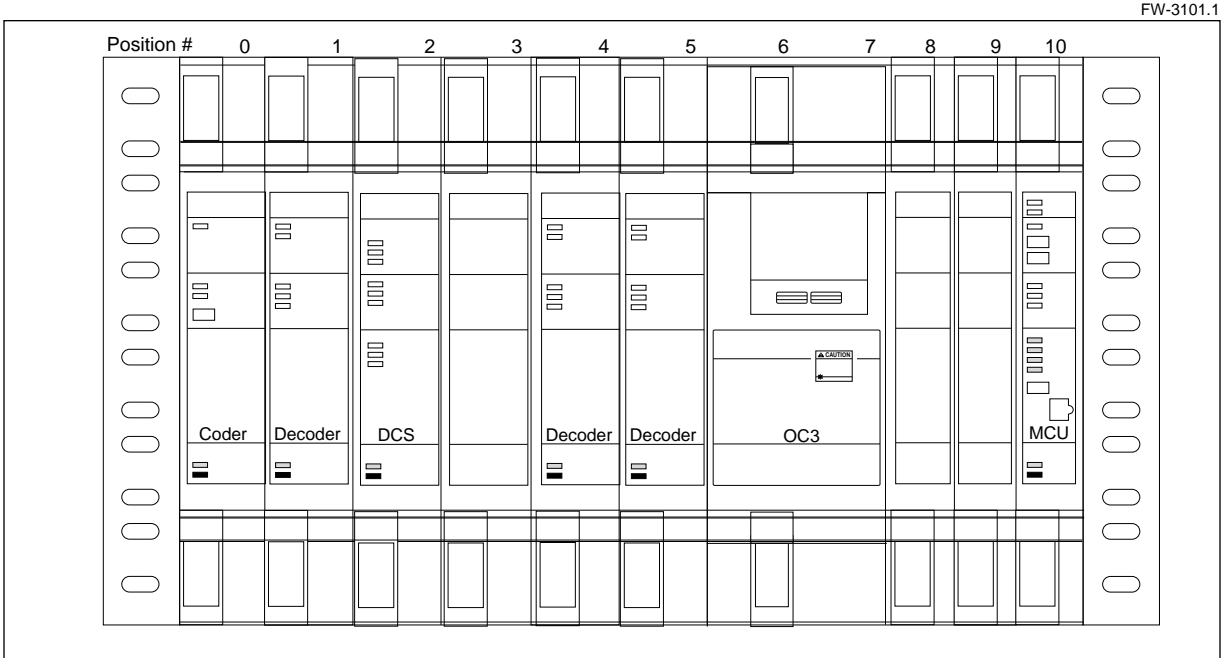


—continued—

3-14 Installing VCE components

Procedure 3-4 (continued) Installing cards in a DV-45 shelf

Figure 3-11
Card positions in a DV-45 shelf with a single drop/insert, two unidirectional video channels, and an OC3 connection configuration



—end—

Procedure 3-5

Replacing a power supply

Use this procedure to replace the VCE power supply. The power supply is accessed from the right side of the VCE and below the DV-45 shelf.

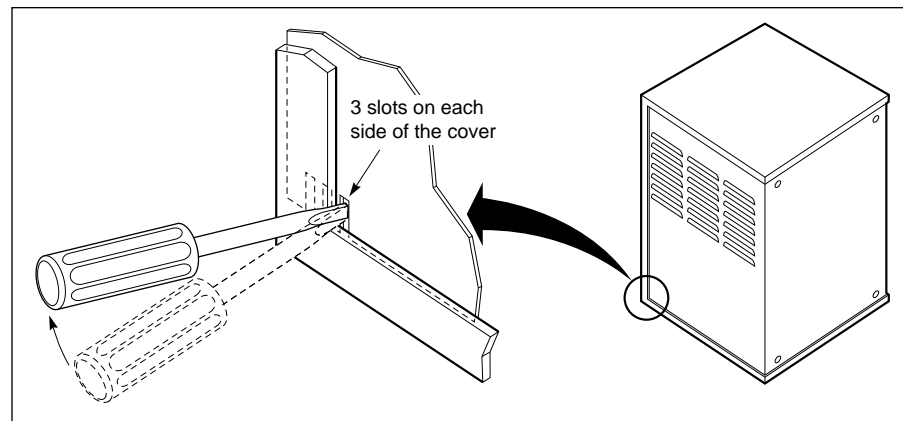
Tools

- 1 5/32 in. Allen key
- 1 Flat-bladed screwdriver
- 1 Antistatic bracelet

Action

Step	Action
1	Disconnect and isolate the VCE from its ac-power source—switch off the VCE power supply breaker and disconnect the VCE from the 120 Vac power source.
2	Remove the 4 cover-retaining screws (using a 5/32 in. Allen key) and slide the cover off the VCE; see Figure 3-12. Note: If the cover does not come off freely, insert a flat-bladed screwdriver into the slots located in the lower-rear corners of the VCE cover and jog the cover loose.

Figure 3-12
Removing the VCE cover



—continued—

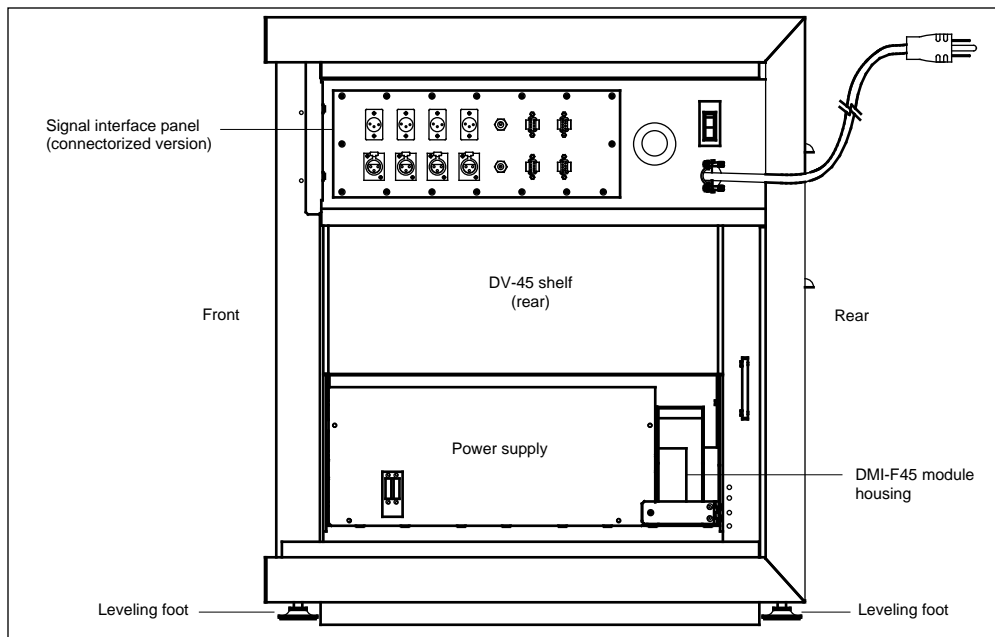
3-16 Installing VCE components

Procedure 3-5 (continued)

Replacing a power supply

Step	Action
3	Remove the 4 retaining screws and lift off the power supply cover (see Figure 3-13).
4	Remove the 5 screws that secure the power supply unit to the VCE.
5	Lift the power supply out of the VCE.
6	Place the new power supply in the same location as the old one and secure it to the VCE using the 5 screws supplied.
7	Reconnect all cables to the power supply. This involves making 7 connections: <ol style="list-style-type: none">Connect the red wires to - and -S (connected to fuses F1 and F2)Connect the white-red wires to +S and + (connected to TB1/3)Connect the green wire to GRD (connected to TB2/1)Connect the white wire to N/L2 (connected to TB2/3)Connect the black wire to L1 (connected to TB2/4).
8	Replace the power supply cover and the 4 cover-retaining screws (see Figure 3-13).
9	Replace the VCE cover and the 4 cover-retaining screws.
10	Reconnect the VCE ac-power supply.
11	Turn on the VCE power switch.

Figure 3-13
VCE with cover removed



—end—

Observing safety guidelines

This chapter describes the precautions that should be observed for the following:

- handling and working with DV-45 shelves
- handling, storing, installing, and replacing DV-45 units
- handling, splicing, and repairing optical fibers

DV-45 shelf

The following precaution must be taken when handling and working with a DV-45 shelf (this includes the external DLT or VCE cabinet, the DV-45 shelf that is mounted inside the cabinet, and DV-45 units).

Wear a skin-contact antistatic bracelet when handling and working with a DV-45 shelf. This bracelet consists of an expandable wrist strap and grounding cord; its function is to rapidly dissipate charges to ground. Alternative personnel ground methods can be used; for example, conductive carpeting, conductive shoes, or heel grounding assemblies. An electrostatic discharge jack is located on the front of all DV-45 shelves.

DV-45 units

Damage to units, particularly those that are sensitive to static electricity, may occur at any time. DV-45 units that are sensitive to static electricity are shipped in antistatic shipping bags and are marked with the following symbol:

**CAUTION****Electrostatic sensitive devices**

Avoid touching any components on the printed circuit board. Electrostatic sensitive devices can be damaged by electrostatic discharge. Always ground yourself before handling a board.

Note: All DV-45 units must be installed or extracted by using the unit latches to ensure a secure mating with the backplane.

Handling units

The following precautions must be taken when handling DV-45 units:

- Wear a skin-contact antistatic bracelet when handling all units that are sensitive to static electricity. This bracelet consists of an expandable wrist strap and grounding cord; its function is to dissipate charges to ground.
- At all times, handle the units by the faceplate or stiffener.
- Do not touch the solder side, pin connector, or components.
- Do not stack units on top of, or against each other.
- Do not force units into the packaging material.
- Ensure that the transmit and receive optical connectors of optical units are protected by dust caps at all times.

Note: Alternative personnel grounding methods can be used; for example, conductive carpet, conductive shoes, or heel grounding assemblies.

Storing units

Spare units must be left in the original shipping container until required.

To prevent damage to DV-45 units while they are in storage, necessary precautions must be observed, to avoid:

- accumulation of dirt or dust on the gold-plated contact
- defacing of printed wiring areas
- board warpage if stored in an area of high humidity and temperature.

Installing or replacing units

To prevent electrostatic damage, the following conditions apply during the installation or replacement of DV-45 units that are sensitive to static electricity:

- all units must be enclosed in static shielding bags for transportation
- upon reaching the trouble location, maintenance personnel must attach a antistatic bracelet before removing shelf covers
- suspect units must be removed and immediately placed in a static shielding bag
- all safety precautions listed under “Handling units” should be followed during installation and replacement of units.

Whenever possible use the original static shielding bag, padding, and box in which the DV-45 unit was received. If the original material is lost, use other suitable packing.

Optical fibers

Optical fibers are either single or multiple strand. The following information and precautions apply to all fibers.

Laser radiation

All Northern Telecom optical products and associated optical test sets use laser sources that emit light energy into fiber cables. This energy is within the red (visible) and infrared (invisible) regions of the electromagnetic spectrum.

Laser products are subject to federal regulations, state or provincial regulations, and local practices. Regulation 21CFR 1040 of the U.S. Bureau of Radiological Health requires manufacturers to certify each laser product as Class I, II, III, or IV depending on the characteristics of the laser radiation emitted. In terms of health and safety, Class I products present the least hazard (none at all), while class IV products present the greatest hazard.

All Northern Telecom S/DMS transmission products comply with 21 CFR 1040, Chapter 1, subchapter J as a Class I laser product as set forth by the U.S. Bureau of Radiological Health. These regulations ensure that there are no personnel hazards from the laser transmitter when the system is in its operating configuration. A label similar to this is located on all optical interface packs, near the optical connector.

Caution
Avoid direct exposure to beam. Invisible light can blind. Keep all optical connectors capped.

During testing and maintenance, some procedures require the handling of optical fibers and transmitters with the dust caps removed. Under these circumstances, laser radiation within the limits of Class IIIb might be present.

This level of radiation is of sufficient magnitude to cause injury to personnel and caution must therefore be exercised to avoid exposure. This precaution applies to any point in the system where the laser signal can be accessed (for example, at the optical connectors on the front of DV-OC3 units).

Bending optical fibers

There is a risk of damaging optical fibers if they are bent too much. A minimum bending diameter of 76 mm (3 in.) is recommended. In addition, all optical connections to optical units should only be finger-tightened.

Handling optical fibers

When working with optical fibers, you must observe the following precautions:

- Wear safety glasses when installing optical fibers.
- Avoid direct exposure to fiber ends or optical connector ends where the laser signal can be accessed.

- Wipe clean or wash your hands after handling optical fibers. Small bits of glass are almost invisible and can damage your eyes.



DANGER

Risk of eye injury

If there is any suspicion of a glass chip in your eye, seek medical attention at once.

- Do not handle pieces of optical fiber with your bare fingers. Use tweezers or the sticky side of a piece of vinyl tape to pick up and discard any loose fiber ends.
- Place all optical fiber cuttings in a plastic bottle provided for that purpose.
- Handle optical fibers with care. Position them in a safe and secure location during installation.
- Protect all optical fiber connectors with dust caps at all times.
- Follow the manufacturer's instructions when using an optical test set. Incorrect calibration or control settings could result in hazardous levels of radiation.

Splicing optical fibers

During the splicing of any fiber, you might be required to look at the fiber using an eye loupe (a small magnifier). Observe the following precautions:

- Before starting the splicing, power off all laser sources to the fiber or disconnect the remote fiber end from the laser sources.
- Ensure that the laser sources stay disconnected or powered off, whether the sources are located in a central office, subscriber premises, or a remote location.
- Before starting the splicing, disconnect any optical test sets from the fiber (whether locally or remotely connected).
- Use only the optical instruments approved by your company.

Repairing optical fibers

When there is an accidental break in the fiber, you must do the following:

- Notify both central-office and field-repair personnel of the problem.
- Identify to the central-office personnel where the fibers have been damaged.
- Power off all laser sources to the fiber or disconnect remote fiber end from the laser sources, whether the sources are located in a central office, subscriber premises, or a remote location.

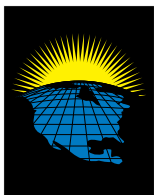
Broadband Access & Video Networks

Video Codec Enclosure (VCE) Installation Manual

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NTP number: 323-3221-291
PEC: NT2H57UG

Rel 1.0 Standard
July 1995
Printed in Canada



NORTEL