Installing Synchronous Net Modules in an ASN Platform

BNX Software Version <x.x>

Part No. Test Part Number
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Bay Networks

4401 Great America Parkway
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Electromagnetic Emissions

Meets requirements of:

FCC Part 15, Class A
EN 55 022 (CISPR 22:1985), Class A <and Class B>
VCCI Class 1 ITE

Canada Requirements Only

Canada CS-03 Rules and Regulations

Note: The Canadian Department of Communications label identifies certified equipment. The certification means that the equipment meets certain telecommunications network protective operations and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent the degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

Canada CS-03 -- Règles et règlements

Note: L’étiquette du ministère des Communications du Canada indique que l’appareillage est certifié, c’est-à-dire qu’il respecte certaines exigences de sécurité et de fonctionnement visant les réseaux de télécommunications. Le ministère ne garantit pas que l’appareillage fonctionnera à la satisfaction de l’utilisateur.

Avant d’installer l’appareillage, s’assurer qu’il peut être branché aux installations du service de télécommunications local. L’appareillage doit aussi être raccordé selon des méthodes acceptées. Dans certains cas, le câblage interne du service de télécommunications utilisé pour une ligne individuelle peut être allongé au moyen d’un connecteur certifié (prolongateur téléphonique). Le client doit toutefois prendre note qu’une telle installation n’assure pas un service parfait en tout temps.

Les réparations de l’appareillage certifié devraient être confiées à un service d’entretien canadien désigné par le fournisseur. En cas de réparation ou de modification effectuées par l’utilisateur ou de mauvais fonctionnement de l’appareillage, le service de télécommunications peut demander le débranchment de l’appareillage.

Pour leur propre sécurité, les utilisateurs devraient s’assurer que les mises à la terre des lignes de distribution d’électricité, des lignes téléphoniques et de la tuyauterie métallique interne sont raccordées ensemble. Cette mesure de sécurité est particulièrement importante en milieu rural.

Attention: Les utilisateurs ne doivent pas procéder à ces raccordements eux-mêmes mais doivent plutôt faire appel aux pouvoirs de réglementation en cause ou à un électricien, selon le cas.

Canada Requirements Only *(continued)*

D. O. C. Explanatory Notes: Equipment Attachment Limitations

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Notes explicatives du ministère des Communications: limites visant les accessoires

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Canada Requirements Only *(continued)*

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About This Guide

Read this guide if you are responsible for installing a Dual or Quad Sync net module in a Bay Networks™ Access Stack Node (ASN™) platform. This guide describes how to

- Install a net module (Chapter 1)
- Interpret the LEDs on the net module (Chapter 2)

This guide also describes requirements for cabling a net module (Appendix A) and for operating it in Europe (Appendix B).

Conventions

ellipsis points	Horizontal (. . .) and vertical (⋮) ellipsis points indicate omitted information.
italic text	Indicates variable values in command syntax descriptions, new terms, file and directory names, and book titles.
quotation marks (“ ”)	Indicate the title of a chapter or section within a book.
separator (>)	Separates menu and option names in instructions and internal pin-to-pin wire connections. Example: Protocols > AppleTalk identifies the AppleTalk option in the Protocols menu. Example: Pin 7 > 19 > 20

Acronyms

LED	light emitting diode
SELV	safety extra-low voltage
TNV	telecommunications network voltage
WAN	wide area network

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Chapter 1
Installing a Net Module

This chapter describes tasks that you perform to install a net module in an ASN. Each of the synchronous net modules requires the ASN to be running a specific version of router software as follows:

- The Dual Sync net module requires Version 8.00 or later.
- The Quad Sync net module requires Version 11.00 or later.

To install a net module:

1. Remove the ASN component tray.
2. Attach the antistatic wrist strap.
3. Remove the filler brackets.
4. Remove the net module you want to replace from the ASN (if necessary).
5. Install the new net module.
6. Replace the filler brackets.
7. Disconnect the antistatic wrist strap.
8. Replace the component tray.

Note: Experienced network operators can safely perform the user-serviceable procedures that are described in this book.

Removing the Component Tray

You need a Phillips screwdriver to complete this procedure.

To remove the component tray:

1. **Power off the ASN.**
2. **Detach all cables, including the power cable, from the ASN back panel.**
3. **Using a Phillips screwdriver, loosen the two captive screws that fasten the tray to the chassis (Figure 1-1).**
   a. **Pull the two captive screws and gently slide the tray out of the chassis a few inches (Figure 1-1).**
   b. **Hold the sides and bottom of the tray to support it as you slide it out.**

      Try to keep the tray level as you slide it out.
4. **Place the tray on a sturdy work surface.**

Caution: Do not touch any components or boards in the ASN until you have attached an antistatic wrist strap. See the next section, “Attaching the Antistatic Wrist Strap.”

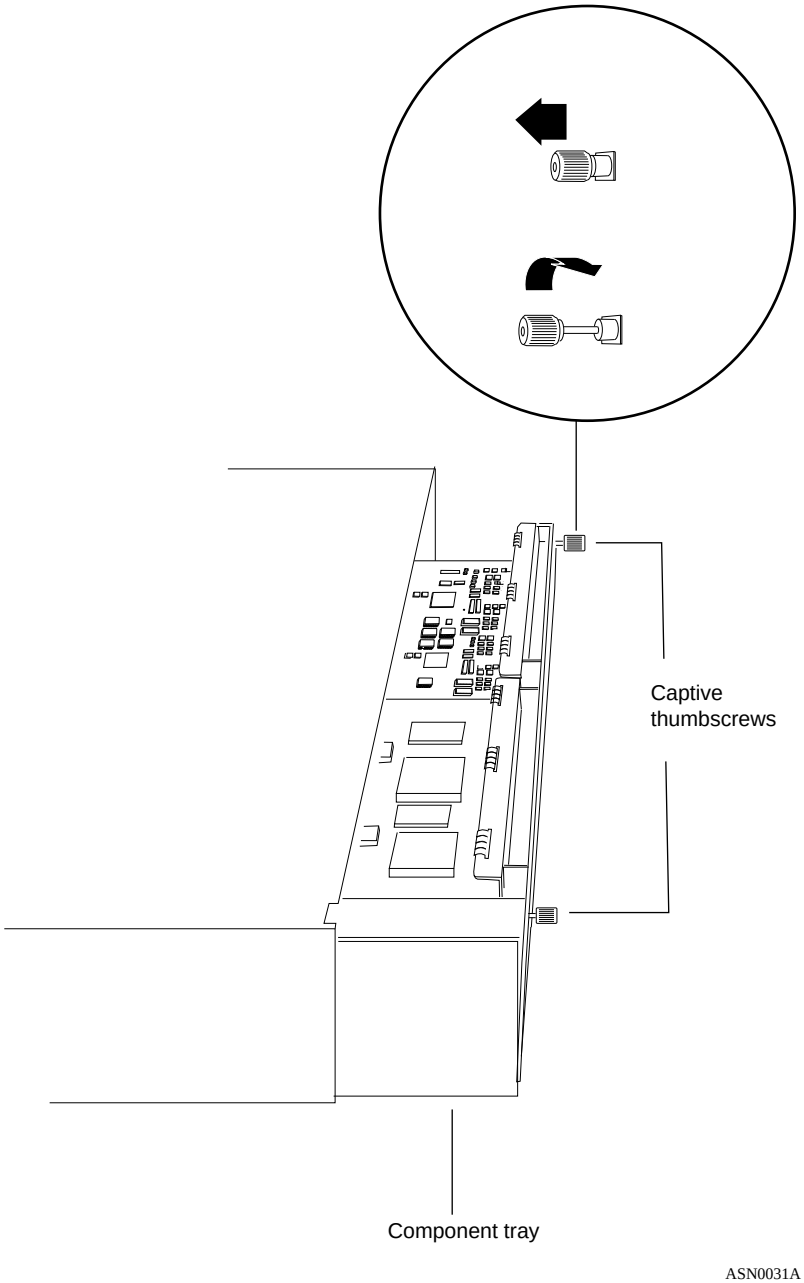


Figure 1-1. Removing the Component Tray

Attaching the Antistatic Wrist Strap

Your ASN comes with an antistatic wrist strap. An antistatic wrist strap directs the discharge of static electricity from your body to the chassis of the router, thereby avoiding discharge to sensitive electronic components. You must wear an antistatic wrist strap whenever you remove, install, or handle the net module.

Caution: Electrostatic discharge can damage hardware. Follow the procedure in this section to protect your equipment from damage.

Attach the antistatic wrist strap as follows:

1. **Remove the wrist strap from its package.**
2. **Place the looped end of the strap around your wrist.**
3. **Adjust the strap so that it fits snugly around your wrist and makes good contact with your skin.**
4. **Attach the alligator clip at the other end of the wrist strap to any unpainted, metal surface on the component tray.**

Removing Filler Brackets

Filler brackets cover empty ASN net module positions and the openings above positions 1 and 3 (Figure 1-2). When you install a net module, you must remove the filler brackets from the openings above positions 1 and 3, and also from the position in which you want to install the net module.

Note: This manual refers to the end of the component tray where the net module ports are exposed as the "back end" of the tray. To perform maintenance tasks on the ASN components, you face the back end of the tray.

To remove a filler bracket, grasp its top edges. Then lift the bracket up and toward the front of the tray to release the metal tabs. (Remember that the net module ports are exposed at the back of the tray.)

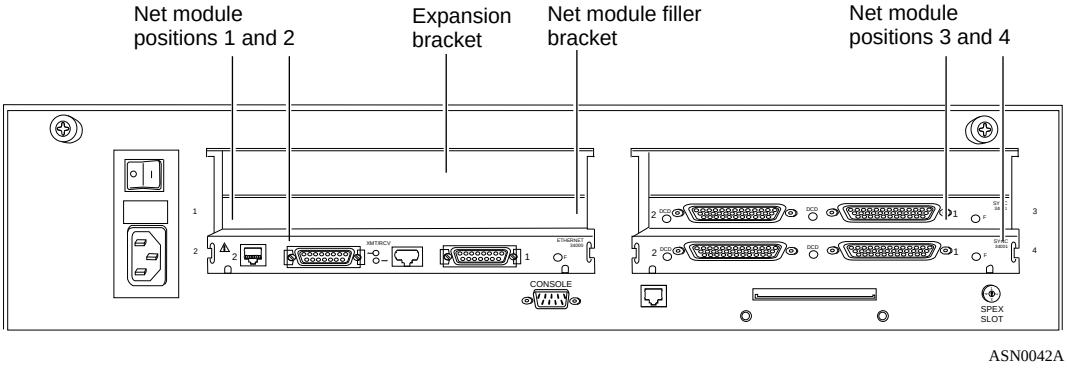


Figure 1-2. Locating Net Modules and Filler Brackets

Removing a Net Module

Read this section if you need to install the net module in a slot that already contains one. To remove a module from position 2 or 4 (Figure 1-2), you must first remove the filler bracket and net module (if any) above it. See the previous section, "Removing Filler Brackets."

Caution: Do not touch any components or boards in the ASN until you have attached the antistatic wrist strap.

To remove a net module:

1. **Grasp the handle on the net module. Use your thumb to push back the white retaining tab (Figure 1-3).**

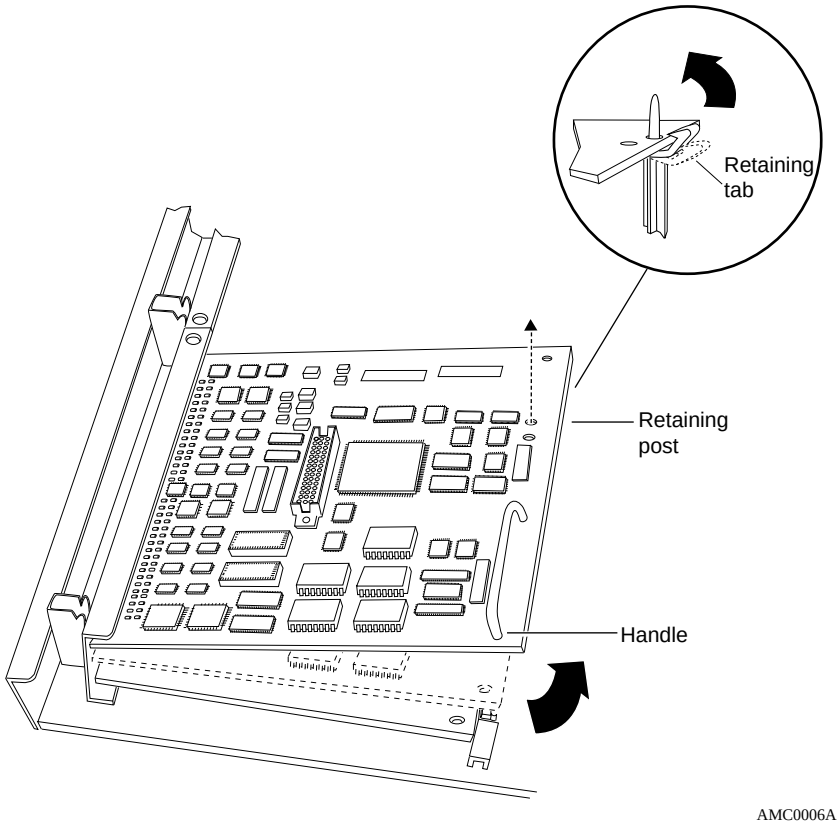


Figure 1-3. Preparing to Remove a Net Module

2. **Pull up to release the module from the connector (Figure 1-4).**

Caution: You must lift the module straight up. If you rock the module back and forth or side to side, you can bend the connector pins. Attempting to reinstall a net module with bent connector pins can damage the power supply.

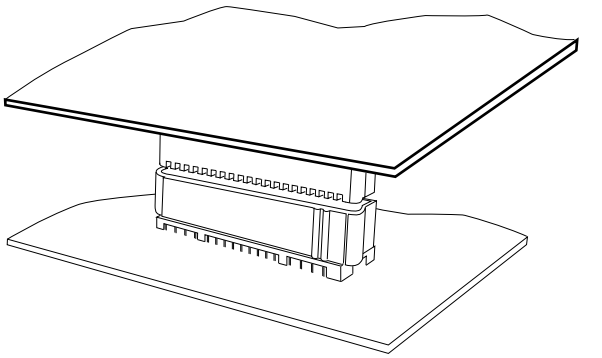


Figure 1-4. Removing a Net Module from the Connector

3. **Lift the module bracket up and toward the front of the tray to release it from the metal tabs that hold it in place (refer to Figure 1-3).**

Installing a Net Module

Before you install the net module, note that

- To access position 2 or 4, you must remove the filler bracket and net module (if any) above it. See the earlier sections “Removing Filler Brackets” and “Removing a Net Module.”
- To install a net module in a position from which you just removed a net module of a different type, you must first delete the old net module from the router’s configuration file. Then install the new module in the chassis. See *Configuring Routers* for information.

To install a net module:

1. **Align the slots in the module bracket with the metal tabs in the net module position that you want to use (Figure 1-5).**

   Do not rest the module bracket on the metal tabs; doing so makes it difficult to align the module connector with the connector on the system board.

2. **Align the module connector with the connector on the system board. Make sure that the white retaining post on the system board aligns through the hole in the net module (Figure 1-5).**

Note: If you accidentally turn the white retaining post on the system board, it will not align through the hole in the net module. In this case, turn the post so that its rectangular base is perpendicular to the net module connectors on the system board.

3. **Firmly press the handle on the net module so that the net module is secure in its connector on the system board. Make sure that the white retaining tab snaps into place.**
4. **Press down on the module bracket so that it rests on the metal tabs.**

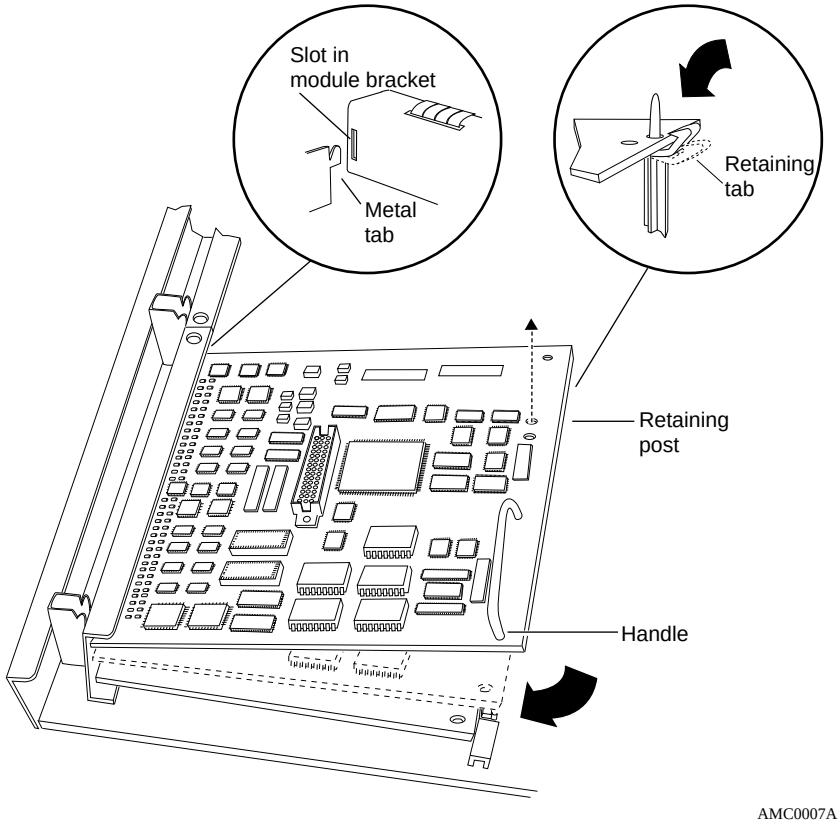


Figure 1-5. Aligning a Net Module

Installing a Filler Bracket

Install filler brackets in any unused net module positions. You must replace the filler brackets that fill the openings above positions 1 and 3.

Note: The filler brackets you use above positions 1 and 3 are different from the brackets that fill unused net module positions 1 through 4. To fill the openings above positions 1 and 3, make sure that you use the brackets labeled "Expansion Filler" (refer to Figure 1-2). The filler brackets for net module positions are not labeled.

To install a filler bracket:

1. **Align the slots at each end of the bracket with the metal tabs of the position where you are installing the bracket (Figure 1-6).**

   Make sure that the edge of the bracket labeled “Top Surface” faces up.

2. **Position the bracket so that it rests on the metal tabs.**

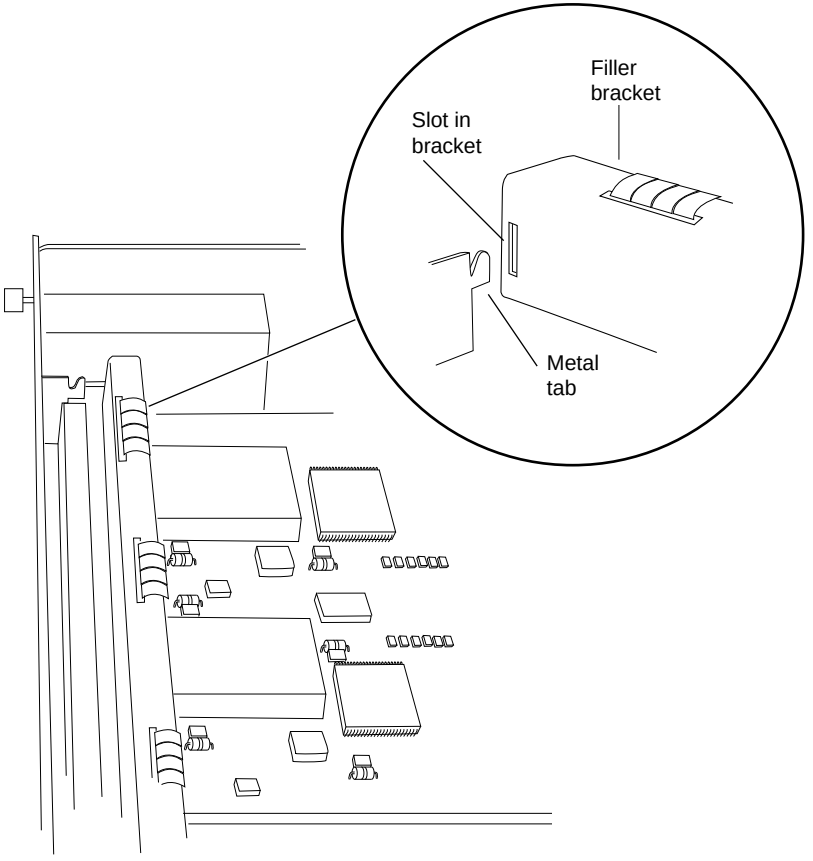


Figure 1-6. Installing a Filler Bracket

Replacing the Component Tray

Before you replace the component tray, remove the alligator clip of the antistatic strap from the chassis. Then remove the antistatic wrist strap from your wrist.

To replace the component tray:

1. **Gently slide the tray into the chassis.**
2. **Use a Phillips screwdriver to tighten the two captive screws that fasten the tray to the chassis (refer to Figure 1-1).**
3. **Reattach the cables to the proper connectors on the back panel.**

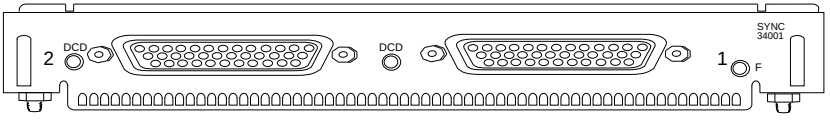
See Chapter 2 for information about the LEDs on the net module.

Chapter 2
Checking the Net Module LEDs

This chapter describes the LEDs on the Dual and Quad Sync net modules.

Dual Sync Net Module LEDs

The Dual Sync net module has three LEDs. Figure 2-1 shows the LEDs on the Dual Sync net module. Table 2-1 describes the function of each LED.



ASN0021A

Figure 2-1. Dual Sync Net Module LEDs

Table 2-1. Functions of the Dual Sync Net Module LEDs

LED	Function
DCD1	Indicates that data carrier detect is present on the COM1 port.
DCD2	Indicates that data carrier detect is present on the COM2 port.
F (FAIL)	Lights during power up, and can flash during diagnostic testing. The FAIL LED turns off once the diagnostics complete successfully and the router boots. The LED remains lit if the net module or any connector on the net module fails diagnostics. In this case, the DIAG LED on the ASN front panel will also be lit.

Quad Sync Net Module LED

The Quad Sync net module has one LED. Figure 2-2 shows the LED on the Quad Sync net module. Table 2-2 describes the function of the LED.

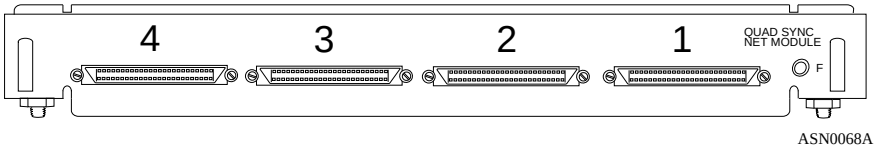


Figure 2-2. Quad Sync Net Module LED

Table 2-2. Functions of the Quad Sync Net Module LED

LED	Function
F (FAIL)	Lights during power up, and can flash during diagnostic testing. The FAIL LED turns off once the diagnostics complete successfully and the router boots. The LED remains lit if the net module or any connector on the net module fails diagnostics. In this case, the DIAG LED on the ASN front panel will also be lit.

Appendix A
Cabling Requirements for the Net Modules

This appendix provides technical information about the cabling requirements for the net modules. Tables A-1 and A-2 summarize the compliance and dial-up cabling requirements for the net modules including the following:

- Required cable and its order number
- Page number for the cable's pin-to-pin and connector information
- Industry interface type

Table A-1. Summary of Compliance Cabling Requirements for the Net Modules

Compliance	Net Module	Required Cable	Order No.	Pin-to-Pin and Connector Information	Industry Interface Type
RS-232	Dual	44-pin D-Sub to RS-232	7826	Page A-3	RS-232-C
	Quad	50-pin to RS-232	7934	Pages A-4 and A-5	RS-232-C
RS-422*	Dual	44-pin D-Sub to RS-422	7318	Pages A-6 and A-7	RS-449/RS-422
	Quad	50-pin to RS-422	7937	Pages A-8 and A-9	RS-449/RS-422
V.28	Dual	44-pin D-Sub to V.28	7837	Pages A-10 and A-11	V.28 (V.10)
	Quad	50-pin to V.28	AA0018023	Pages A-12 and A-13	V.28 (V.10)
V.35	Dual	44-pin D-Sub to V.35	7220	Pages A-14 and A-15	V.35 (V.10, V.11)
	Quad	50-pin to V.35	7932	Pages A-16 and A-17	V.35 (V.10, V.11)
X.21	Dual	44-pin D-Sub to X.21	7224	Pages A-18 and A-19	X.21 (V.11)
	Quad	50-pin to X.21	7936	Page A-20	X.21 (V.11)

*. For high data rates, Bay Networks recommends a V.35 interface.

Table A-2. Summary of Dial-Up Services Cabling Requirements for the Net Modules

Remote Device Type	Net Module	Required Cable: Raise DTR	Order No.	Pin-to-Pin and Connector Information	Industry Interface Type
RS-232	Dual	44-pin D-Sub to RS-232	7138	Page A-22	RS-232-C
	Quad	50-pin to RS-232	7935	Page A-23	RS-232-C
RS-422*	Dual	44-pin D-Sub to RS-422	7139	Pages A-24 and A-25	RS-449/RS-422
V.35	Dual	44-pin D-Sub to V.35	7137	Pages A-26 and A-27	V.35 (V.10, V.11)
	Quad	50-pin to V.35	7933	Pages A-28 and A-29	V.35 (V.10, V.11)

*. For high data rates, Bay Networks recommends a V.35 interface.

RS-232 Compliance

RS-232 compliance for the net modules is as follows:

- The Dual Sync net module requires a 44-pin D-Sub to RS-232 cable, Order No. 7826 (Table A-3 and Figure A-1).
- The Quad Sync net module requires a 50-pin to RS-232 cable, Order No. 7934 (Table A-4 and Figure A-2).

Table A-3. Pin-to-Pin Connections for the 44-Pin D-Sub to RS-232 Cable (Order No. 7826)

Bay Networks Termination		Remote Termination	
Signal	**Pin to Pin**		**Signal**
Frame Ground	1	1	Frame Ground
Send Data+	2	2	Send Data
Receive Data+	3	3	Receive Data
Request to Send+	4	4	Request to Send
Clear to Send+	5	5	Clear to Send
Data Set Ready+	6	6	Data Set Ready
Data Terminal Ready+	8	20	Data Terminal Ready
Data Carrier Detect+	9	8	Data Carrier Detect
Send Timing+	10	15	Send Timing
Receive Timing+	11	17	Receive Timing
Transmitter Signal Element Timing+	12	24	Transmitter Signal Element Timing
Signal Ground	7	7	Signal Ground
Internal Wire Connections			
Pin 7 > 19 > 20 > 23			
Pin 13 > 28			
Pin 14 > 29			

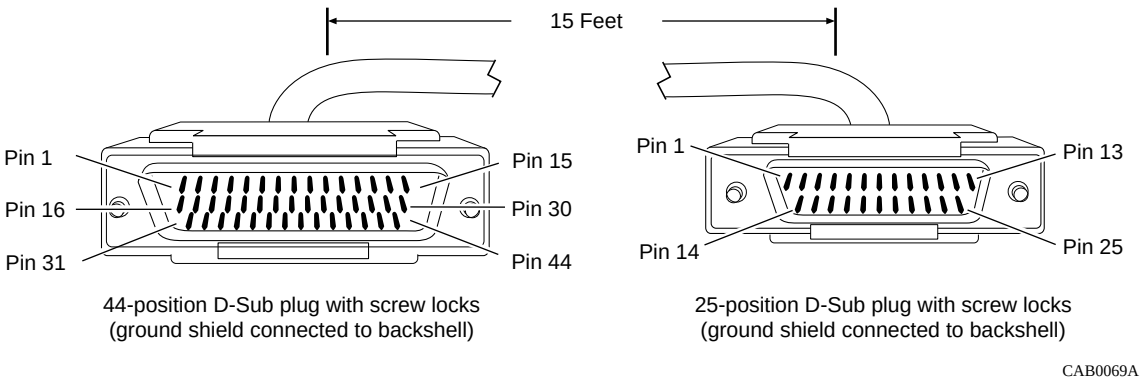


Figure A-1. 44-Pin D-Sub to RS-232 Cable (Order No. 7826)

Table A-4. Pin-to-Pin Connections for the 50-Pin to RS-232 Cable (Order No. 7934)

Bay Networks Termination		Remote Termination	
Signal	**Pin to Pin**		**Signal**
Frame Ground	1	1	Frame Ground
Send Data+	2	2	Send Data
Receive Data+	3	3	Receive Data
Request to Send+	4	4	Request to Send
Clear to Send+	5	5	Clear to Send
Data Set Ready+	6	6	Data Set Ready
Signal Ground	7	7	Signal Ground
Data Terminal Ready+	8	20	Data Terminal Ready
Data Carrier Detect+	9	8	Data Carrier Detect
Send Timing+	10	15	Send Timing
Receive Timing+	11	17	Receive Timing
Terminal Timing+	12	24	Terminal Timing
Internal Connections			
Pin 7 > 30 > 31 > 34			
Pin 13 > 38			
Pin 14 > 39			

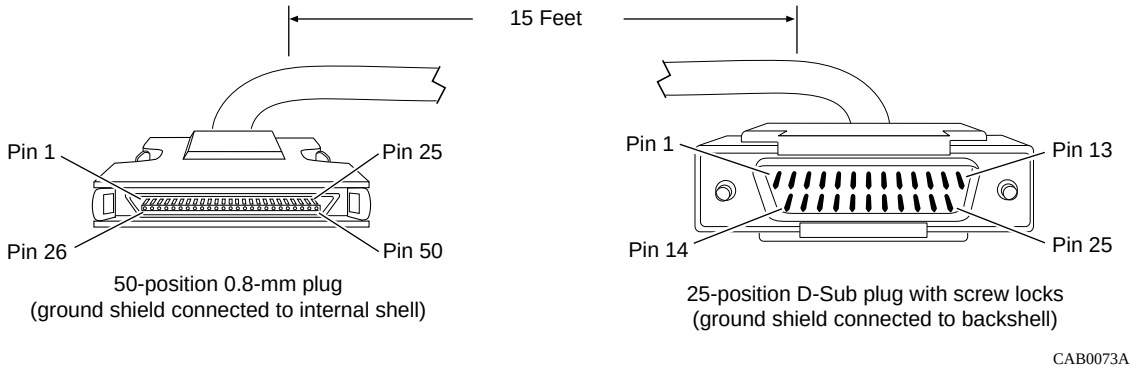


Figure A-2. 50-Pin to RS-232 Cable (Order No. 7934)

RS-422 Compliance

RS-422 compliance for the net modules is as follows:

- The Dual Sync net module requires a 44-pin D-Sub to RS-422 cable, Order No. 7318 (Table A-5 and Figure A-3).
- The Quad Sync net module requires a 50-pin to RS-422 cable, Order No. 7937 (Table A-6 and Figure A-4).

Table A-5. Pin-to-Pin Connections for the 44-Pin D-Sub to RS-422 Cable (Order No. 7318)

Bay Networks Termination		Remote Termination	
Signal	**Pin to Pin**		**Signal**
Data Carrier Detect-	23	31	Receiver Ready B
Data Carrier Detect+	9	13	Receiver Ready A
Send Data+	2	4	Send Data A
Send Data-	16	22	Send Data B
Receive Timing+	11	8	Receive Timing A
Receive Timing-	25	26	Receive Timing B
Send Timing+	10	5	Send Timing A
Send Timing-	24	23	Send Timing B
Receive Data+	3	6	Receive Data A
Receive Data-	17	24	Receive Data B
Clear to Send-	19	27	Clear to Send B
Clear to Send+	5	9	Clear to Send A
Request to Send+	4	7	Request to Send A
Request to Send-	18	25	Request to Send B
Data Set Ready+	6	11	DM A
Data Set Ready-	20	29	DM B
Terminal Ready+	8	12	Terminal Ready A
Terminal Ready-	22	30	Terminal Ready B

(continued)

Table A-5. Pin-to-Pin Connections for the 44-Pin D-Sub to RS-422 Cable (Order No. 7318) *(continued)*

Bay Networks Termination			**Remote Termination**
Signal	**Pin to Pin**		**Signal**
Terminal Timing+	12	17	Terminal Timing A
Terminal Timing-	26	35	Terminal Timing B
Send Common	44	37	Send Common
Signal Ground	41	19	Signal Ground
Internal Wire Connections			
Pin 41 > 43			Pin 20 > 37
Pin 13 > 28			
Pin 14 > 29			

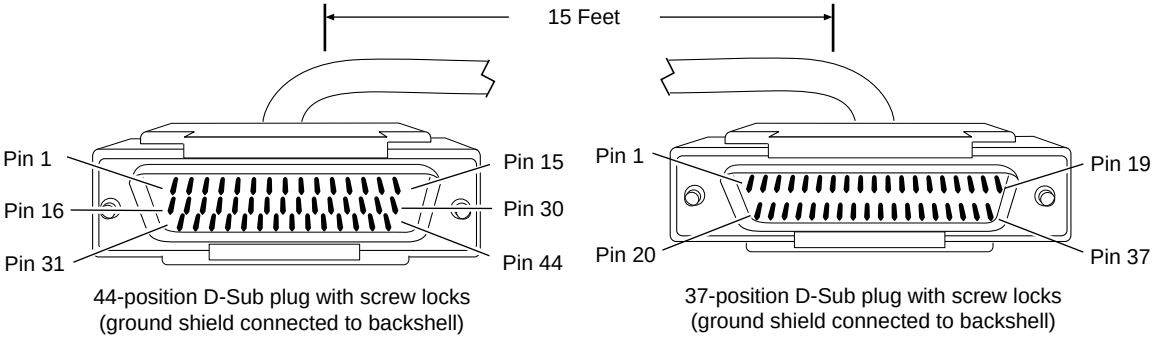


Figure A-3. 44-Pin D-Sub to RS-422 Cable (Order No. 7318)

Table A-6. Pin-to-Pin Connections for the 50-Pin to RS-422 Cable (Order No. 7937)

Bay Networks Termination		**Remote Termination**	
Signal	**Pin to Pin**		**Signal**
Data Carrier Detect-	34	31	Receiver Ready B
Data Carrier Detect+	9	13	Receiver Ready A
Send Data+	2	4	Send Data A
Send Data-	27	22	Send Data B
Receive Timing+	11	8	Receive Timing A
Receive Timing-	36	26	Receive Timing B
Send Timing+	10	5	Send Timing A
Send Timing-	35	23	Send Timing B
Receive Data+	3	6	Receive Data A
Receive Data-	28	24	Receive Data B
Clear to Send-	30	27	Clear to Send B
Clear to Send+	5	9	Clear to Send A
Request to Send+	4	7	Request to Send A
Request to Send-	29	25	Request to Send B
Data Set Ready+	6	11	Data Mode A
Data Set Ready-	31	29	Data Mode B
Terminal Ready+	8	12	Terminal Ready A
Terminal Ready-	33	30	Terminal Ready B
Terminal Timing+	12	17	Terminal Timing A
Terminal Timing-	37	35	Terminal Timing B
Send Common	49	37	Send Common
Signal Ground	48	19	Signal Ground
Internal Wire Connections			
Pin 46 (UNBE) > 48 (SGRD)		Pin 20 > 37	
Pin 13 > 38			
Pin 14 > 39			

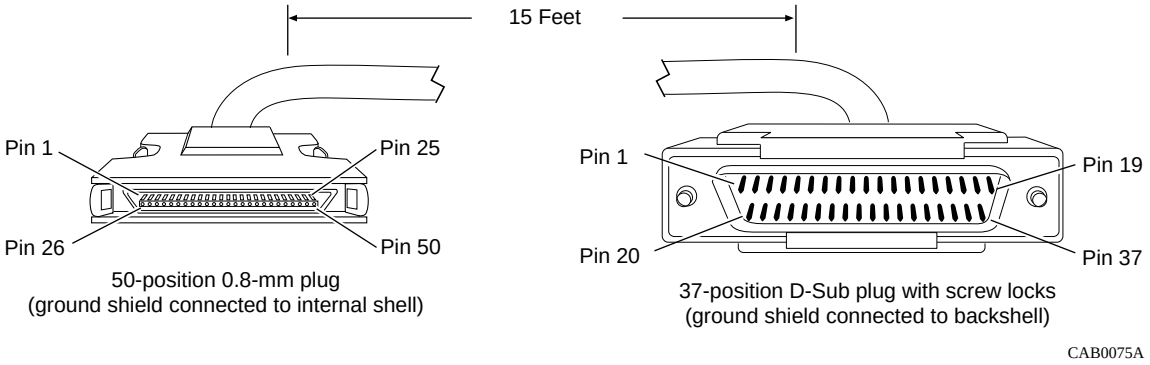


Figure A-4. 50-Pin to RS-422 Cable (Order No. 7937)

V.28 Compliance

V.28 compliance for the Dual Sync net module requires a 44-pin D-Sub to V.28 cable, Order No. 7837 (Table A-7 and Figure A-5).

V.28 compliance for the Quad Sync net module requires a 50-pin to V.28 cable, Order No. AA0018023 (Table A-8 and Figure A-6).

Table A-7. Pin-to-Pin Connections for the 44-Pin D-Sub to V.28 Cable (Order No. 7837)

Bay Networks Termination		**Remote Termination**	
Signal	**Pin to Pin**		**Signal**
Frame Ground	1	1	Frame Ground
Send Data+	2	2	Send Data
Receive Data+	3	3	Receive Data
Request to Send+	4	4	Request to Send
Clear to Send+	5	5	Clear to Send
Data Set Ready+	6	6	Data Set Ready
Data Terminal Ready+	8	20	Data Terminal Ready
Data Carrier Detect+	9	8	Data Carrier Detect
Send Timing+	10	15	Send Timing
Receive Timing+	11	17	Receive Timing
Transmitter Signal Element Timing+	12	24	Transmitter Signal Element Timing
Signal Ground	7	7	Signal Ground
Internal Connections			
Pin 7 > 19 > 20 > 23			
Pin 13 > 28			
Pin 14 > 29			

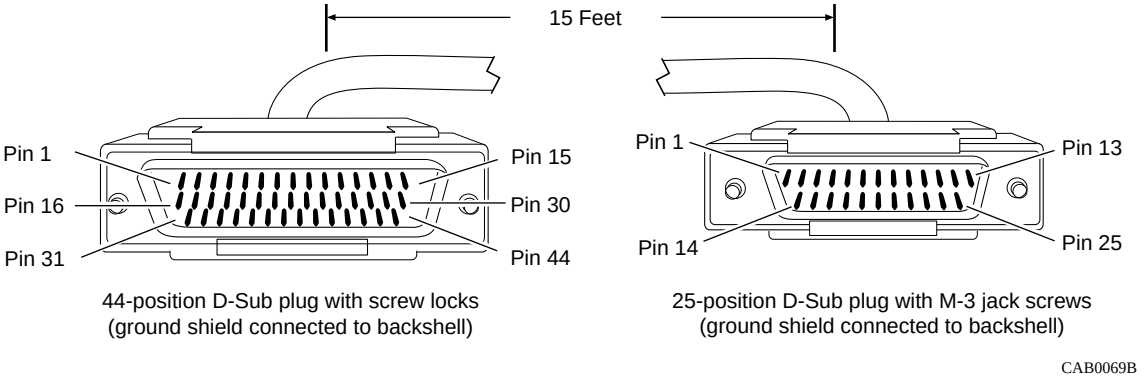


Figure A-5. 44-Pin D-Sub to V.28 Cable (Order No. 7837)

Table A-8. Pin-to-Pin Connections for the 50-Pin to V.28 Cable (Order No. AA0018023)

Bay Networks Termination		Remote Termination	
Signal	**Pin to Pin**		**Signal**
Frame Ground	1	1	Frame Ground
Send Data+	2	2	Send Data
Receive Data+	3	3	Receive Data
Request to Send+	4	4	Request to Send
Clear to Send+	5	5	Clear to Send
Data Set Ready+	6	6	Data Set Ready
Signal Ground	7	7	Signal Ground
Data Terminal Ready+	8	20	Data Terminal Ready
Data Carrier Detect+	9	8	Data Carrier Detect
Send Timing+	10	15	Send Timing
Receive Timing+	11	17	Receive Timing
Terminal Timing+	12	24	Terminal Timing
Internal Connections			
Pin 7 > 30 > 31 > 34			
Pin 13 > 38			
Pin 14 > 39			

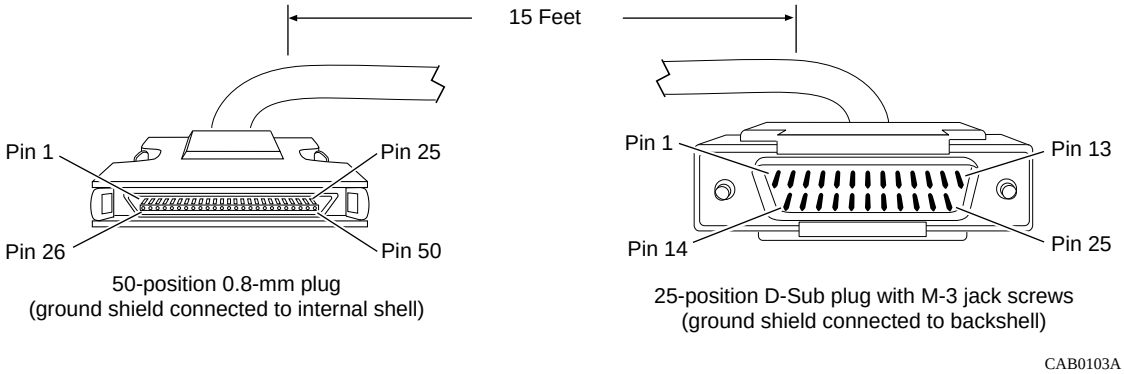


Figure A-6. 50-Pin to V.28 Cable (Order No. AA0018023)

V.35 Compliance

V.35 compliance for the net modules is as follows:

- The Dual Sync net module requires a 44-pin D-Sub to V.35 cable, Order No. 7220 (Table A-9 and Figure A-7).
- The Quad Sync net module requires a 50-Pin to V.35 cable, Order No. 7932 (Table A-10 and Figure A-8).

Table A-9. Pin-to-Pin Connections for the 44-Pin D-Sub to V.35 Cable (Order No. 7220)

Bay Networks Termination			Remote Termination
Signal	**Pin to Pin**		**Signal**
VSD+	38	P	Send Data A
VSD-	36	S	Send Data B
VRT+	34	V	Receive Timing A
VRT-	33	X	Receive Timing B
VST+	32	Y	Send Timing A
VST-	31	AA	Send Timing B
VRD+	37	R	Receive Data A
VRD-	35	T	Receive Data B
Data Set Ready+	6	E	Data Set Ready
Data Terminal Ready+	8	H	Data Terminal Ready
Request to Send+	4	C	Request to Send
Clear to Send+	5	D	Clear to Send
VTT+	40	U	Terminal Timing A
VTT-	39	W	Terminal Timing B
Frame Ground	1	A	Frame Ground

(continued)

Table A-9. Pin-to-Pin Connections for the 44-Pin D-Sub to V.35 Cable (Order No. 7220) *(continued)*

Bay Networks Termination		Remote Termination	
Signal	**Pin to Pin**		**Signal**
Data Carrier Detect+	9	F	Data Carrier Detect
Signal Ground	7	B	Signal Ground
Internal Wire Connections			
Pin 7 > 19 > 20 > 23			
Pin 41 > 42 > 43			
Pin 13 > 28			
Pin 14 > 29			

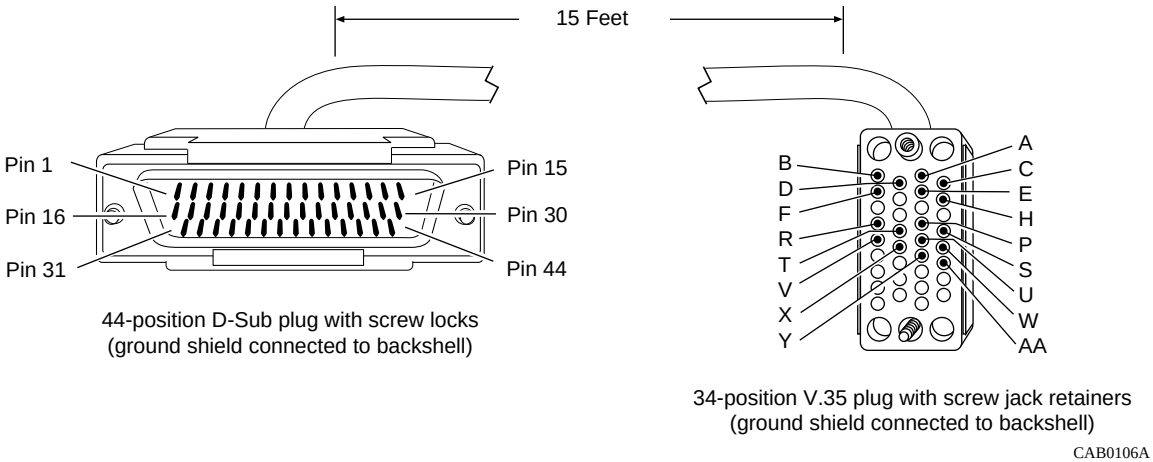


Figure A-7. 44-Pin D-Sub to V.35 Cable (Order No. 7220)

Table A-10. Pin-to-Pin Connections for the 50-Pin to V.35 Cable (Order No. 7932)

Bay Networks Termination			Remote Termination
Signal	**Pin to Pin**		**Signal**
VSD+	44	P	Send Data A
VSD-	19	S	Send Data B
VRT+	42	V	Receive Timing A
VRT-	17	X	Receive Timing B
VST+	41	Y	Send Timing A
VST-	16	AA	Send Timing B
VRD+	43	R	Receive Data A
VRD-	18	T	Receive Data B
Data Set Ready+	6	E	Data Set Ready
Data Terminal Ready+	8	H	Data Terminal Ready
Request to Send+	4	C	Request to Send
Clear to Send+	5	D	Clear to Send
VTT+	45	U	Terminal Timing A
VTT-	20	W	Terminal Timing B
Frame Ground	1	A	Frame Ground
Data Carrier Detect	9	F	Data Carrier Detect
Signal Ground	7	B	Signal Ground
Internal Wire Connections			
Pin 30 > 31 > 7 > 34			
Pin 46 > 47 > 48			
Pin 13 > 38			
Pin 14 > 39			

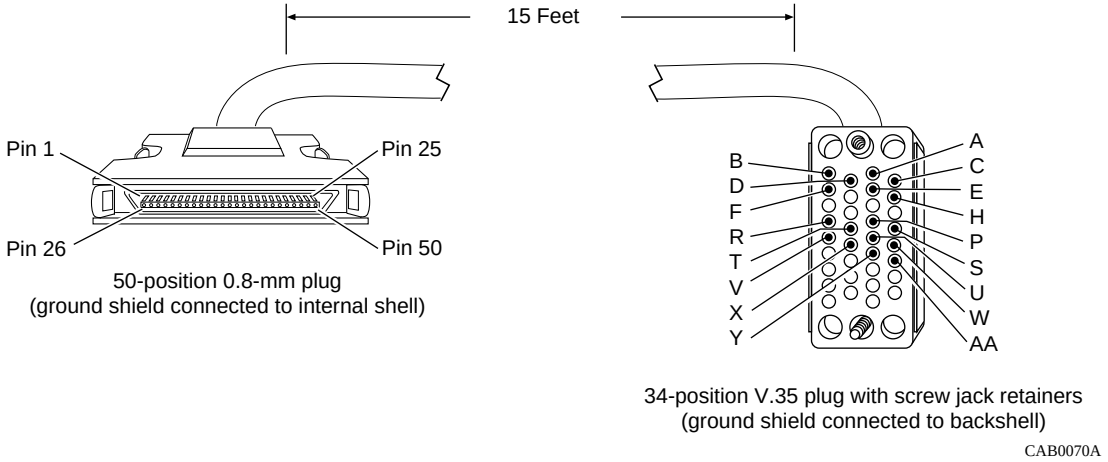


Figure A-8. 50-Pin to V.35 Cable (Order No. 7932)

X.21 Compliance

X.21 compliance for the net modules is as follows:

- The Dual Sync net module requires a 44-pin D-Sub to X.21 cable, Order No. 7224 (Table A-11 and Figure A-9).
- The Quad Sync net module requires a 50-pin to X.21 cable, Order No. 7936 (Table A-12 and Figure A-10).

Table A-11. Pin-to-Pin Connections for the 44-Pin D-Sub to X.21 Cable (Order No. 7224)

Bay Networks Termination			**Remote Termination**
Signal	**Pin to Pin**		**Signal**
Send Data+	2	2	Transmitted Data A
Send Data-	16	9	Transmitted Data B
Request to Send+	4	3	Control A
Request to Send-	18	10	Control B
Receive Data+	3	4	Receive Data A
Receive Data-	17	11	Receive Data B
Data Carrier Detect+	9	5	Indication A
Data Carrier Detect-	23	12	Indication B
Send Timing+	10	6	Timing A
Send Timing-	24	13	Timing B
Signal Ground	7	8	Signal Ground
Frame Ground	1	1	Frame Ground
Internal Wire Connections			
Pin 14 > 15			
Pin 28 > 30			
Pin 41 > 43			

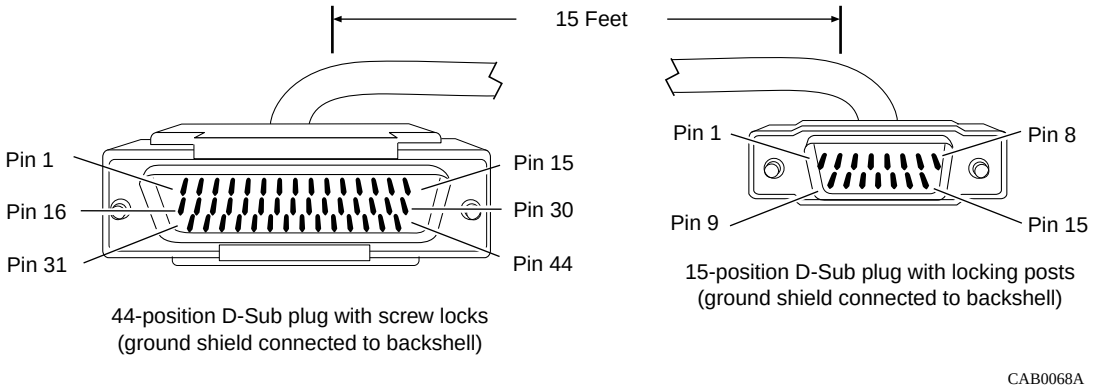


Figure A-9. 44-Pin D-Sub to X.21 Cable (Order No. 7224)

Table A-12. Pin-to-Pin Connections for the 50-Pin to X.21 Cable (Order No. 7936)

Bay Networks Termination		Remote Termination	
Signal	**Pin to Pin**		**Signal**
Send Data+	2	2	Transmitted Data A
Send Data-	27	9	Transmitted Data B
Request to Send+	4	3	Control A
Request to Send-	29	10	Control B
Receive Data+	3	4	Receive Data A
Receive Data-	28	11	Receive Data B
Data Carrier Detect+	9	5	Indication A
Data Carrier Detect-	34	12	Indication B
Timing+	10	6	Timing A
Timing-	35	13	Timing B
Frame Ground	1	1	Frame Ground
Signal Ground	7	8	Signal Ground
Internal Connections			
Pin 46 > 48 (GRD)			
Pin 38 > 40			
Pin 14 > 15			

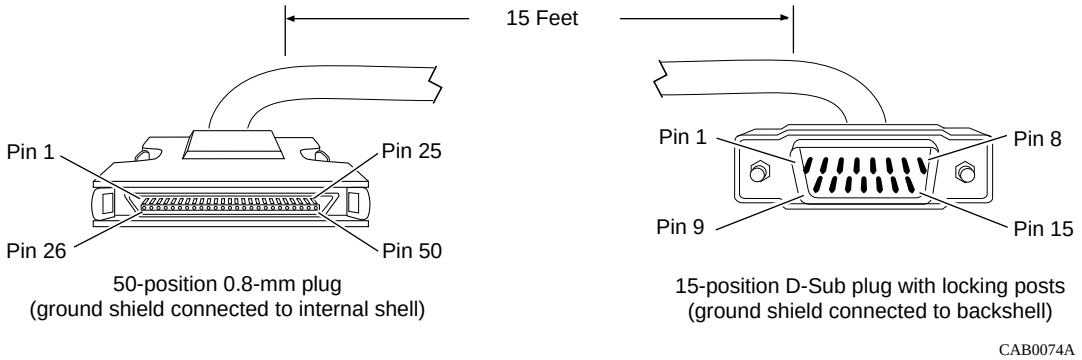


Figure A-10. 50-Pin to X.21 Cable (Order No. 7936)

Dial-Up Services Cabling Requirements

This section identifies the dial-up services cables necessary for linking the Dual and Quad Sync net modules to the following types of WAN dial-on-demand and dial backup devices:

- RS-232
- RS-422
- V.35

Net Module to an RS-232 Dial-on-Demand and Dial Backup Device

The cabling requirements for a net module to an RS-232 WAN dial-on-demand and dial backup device are as follows:

- A Dual Sync net module requires a 44-pin D-Sub to RS-232: Raise DTR cable, Order No. 7138 (Table A-13 and Figure A-11).
- A Quad Sync net module requires a 50-pin to RS-232: Raise DTR cable, Order No. 7935 (Table A-14 and Figure A-12).

Table A-13. Pin-to-Pin Connections for the 44-Pin D-Sub to RS-232: Raise DTR Cable (Order No. 7138)

Bay Networks Termination		Remote Termination	
Signal	**Pin to Pin**		**Signal**
Frame Ground	1	1	Frame Ground
Send Data+	2	2	Send Data
Receive Data+	3	3	Receive Data
Request to Send+	4	4	Request to Send
Clear to Send+	5	5	Clear to Send
Data Set Ready+	6	6	Data Set Ready
Signal Ground	7	7	Signal Ground
Data Terminal Ready+	8	20	Data Terminal Ready
Data Carrier Detect+	9	22	Ring Indicator
Send Timing+	10	15	Send Timing
Receive Timing+	11	17	Receive Timing
Transmitter Signal Element Timing+	12	24	Transmitter Signal Element Timing
Internal Wire Connections			
Pin 7 > 19 > 20 > 23			
Pin 13 > 28			
Pin 14 > 29			

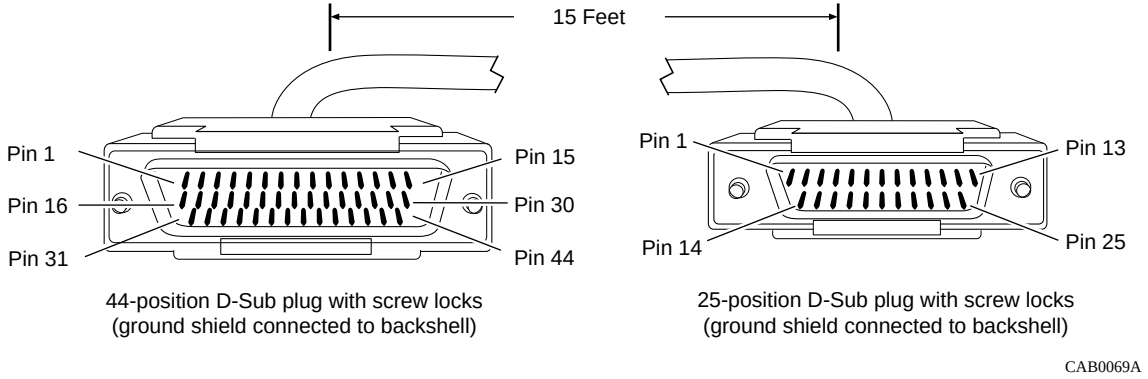


Figure A-11. 44-Pin D-Sub to RS-232: Raise DTR Cable (Order No. 7138)

Table A-14. Pin-to-Pin Connections for the 50-Pin to RS-232: Raise DTR Cable (Order No. 7935)

Bay Networks Termination		Remote Termination	
Signal	**Pin to Pin**		**Signal**
Frame Ground	1	1	Frame Ground
Send Data+	2	2	Send Data
Receive Data+	3	3	Receive Data
Request to Send+	4	4	Request to Send
Clear to Send+	5	5	Clear to Send
Data Set Ready+	6	6	Data Set Ready
Data Terminal Ready+	8	20	Data Terminal Ready
Data Carrier Detect+	9	22	Ring Indicator
Send Timing+	10	15	Send Timing
Receive Timing+	11	17	Receive Timing
Terminal Timing+	12	24	Terminal Timing
Signal Ground	7	7	Signal Ground
Internal Wire Connections			
Pin 7 > 30 > 31 > 34			
Pin 13 > 38			
Pin 14 > 39			

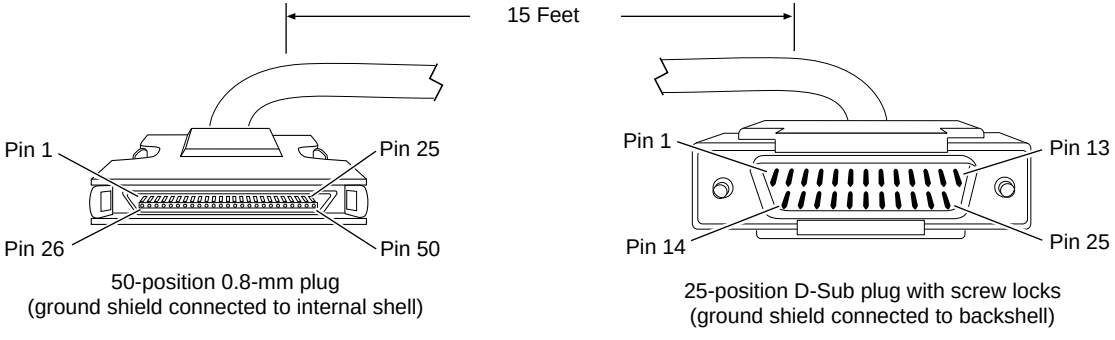


Figure A-12. 50-Pin to RS-232: Raise DTR Cable (Order No. 7935)

Net Module to an RS-422 Dial-on-Demand and Dial Backup Device

The cabling requirement for a Dual Sync net module to an RS-422 WAN dial-on-demand and dial backup device is a 44-pin D-Sub to RS-422: Raise DTR cable, Order No. 7139 (Table A-15 and Figure A-13).

Table A-15. Pin-to-Pin Connections for the 44-Pin D-Sub to RS-422: Raise DTR Cable (Order No. 7139)

Bay Networks Termination		Remote Termination	
Signal	**Pin to Pin**		**Signal**
Send Data+	2	4	Send Data A
Send Data-	16	22	Send Data B
Receive Data+	3	6	Receive Data A
Receive Data-	17	24	Receive Data B
Request to Send+	4	7	Request to Send A
Request to Send-	18	25	Request to Send B
Clear to Send+	5	9	Clear to Send A
Clear to Send-	19	27	Clear to Send B
Data Set Ready+	6	11	Data Mode A
Data Set Ready-	20	29	Data Mode B
Terminal Ready+	8	12	Data Terminal Ready A
Terminal Ready-	22	30	Data Terminal Ready B
Data Carrier Detect+	9	15	Ring Indicator
Send Timing+	10	5	Send Timing A
Send Timing-	24	23	Send Timing B
Receive Timing+	11	8	Receive Timing A
Receive Timing-	25	26	Receive Timing B
Terminal Timing+	12	17	Terminal Timing A
Terminal Timing-	26	35	Terminal Timing B

(continued)

Table A-15. Pin-to-Pin Connections for the 44-Pin D-Sub to RS-422: Raise DTR Cable (Order No. 7139) *(continued)*

Bay Networks Termination			Remote Termination
Signal	**Pin to Pin**		**Signal**
Send Common	44	37	Send Common
Signal Ground	41	19	Signal Ground
Internal Wire Connections			
Pin 13 > 28			
Pin 14 > 29			
Pin 23 > 41 > 43			

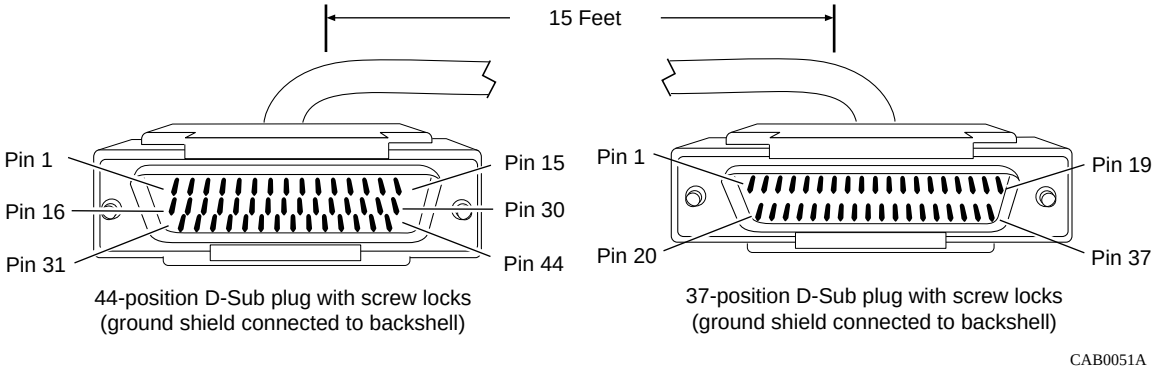


Figure A-13. 44-Pin D-Sub to RS-422: Raise DTR Cable (Order No. 7139)

Net Module to a V.35 Dial-on-Demand and Dial Backup Device

The cabling requirements for a net module to a V.35 WAN dial-on-demand and dial backup device are as follows:

- A Dual Sync net module requires a 44-pin D-Sub to V.35: Raise DTR cable, Order No. 7137 (Table A-16 and Figure A-14).
- A Quad Sync net module requires a 50-pin to V.35: Raise DTR cable, Order No. 7933 (Table A-17 and Figure A-15).

Table A-16. Pin-to-Pin Connections for the 44-Pin D-Sub to V.35: Raise DTR Cable (Order No. 7137)

Bay Networks Termination		Remote Termination	
Signal	**Pin to Pin**		**Signal**
Frame Ground	1	A	Frame Ground
Request to Send+	4	C	Request to Send
Clear to Send+	5	D	Clear to Send
Data Set Ready+	6	E	Data Set Ready
Data Terminal Ready+	8	H	Data Terminal Ready
Data Carrier Detect+	9	J	Ring Indicator
VTT+	40	U	Terminal Timing A
VTT-	39	W	Terminal Timing B
Signal Ground	7	B	Signal Ground
VST+	32	Y	Send Timing A
VST-	31	AA	Send Timing B
VRT+	34	V	Receive Timing A
VRT-	33	X	Receive Timing B
VRD+	37	R	Receive Data A
VRD-	35	T	Receive Data B

(continued)

Table A-16. Pin-to-Pin Connections for the 44-Pin D-Sub to V.35: Raise DTR Cable (Order No. 7137) *(continued)*

Bay Networks Termination			Remote Termination
Signal	**Pin to Pin**		**Signal**
VSD+	38	P	Send Data A
VSD-	36	S	Send Data B
Internal Wire Connections			
Pin 7 > 19 > 20 > 23			
Pin 41 > 42 > 43			
Pin 13 > 28			
Pin 14 > 29			

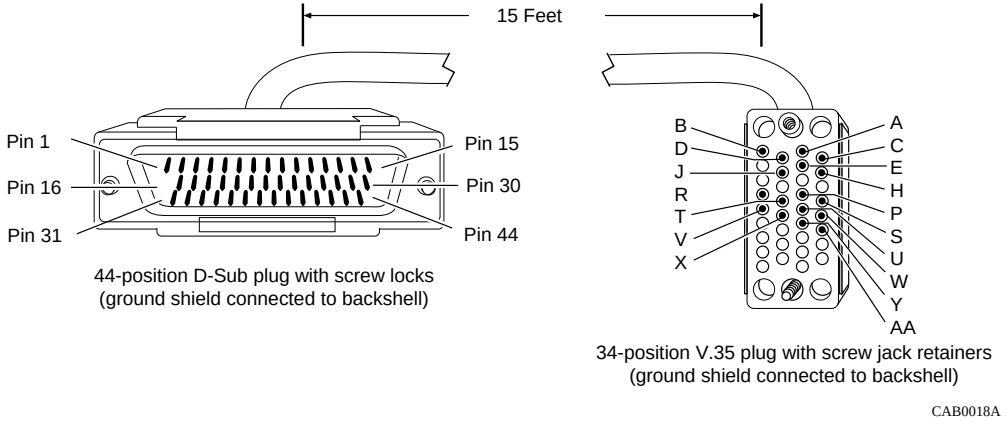


Figure A-14. 44-Pin D-Sub to V.35: Raise DTR Cable (Order No. 7137)

Table A-17. Pin-to-Pin Connections for the 50-Pin to V.35: Raise DTR Cable (Order No. 7933)

Bay Networks Termination		Remote Termination	
Signal	**Pin to Pin**		**Signal**
VSD+	44	P	Send Data A
VSD-	19	S	Send Data B
VRT+	42	V	Receive Timing A
VRT-	17	X	Receive Timing B
VST+	41	Y	Send Timing A
VST-	16	AA	Send Timing B
VRD+	43	R	Receive Data A
VRD-	18	T	Receive Data B
Data Set Ready+	6	E	Data Set Ready
Data Terminal Ready+	8	H	Data Terminal Ready
Request to Send+	4	C	Request to Send
Clear to Send+	5	D	Clear to Send
VTT+	45	U	Terminal Timing A
VTT-	20	W	Terminal Timing B
Frame Ground	1	A	Frame Ground
Data Carrier Detect+	9	J	Ring Indicator
Signal Ground	7	B	Signal Ground
Internal Wire Connections			
Pin 30 > 31 > 7 > 34			
Pin 46 > 47 > 48			
Pin 13 > 38			
Pin 14 > 39			

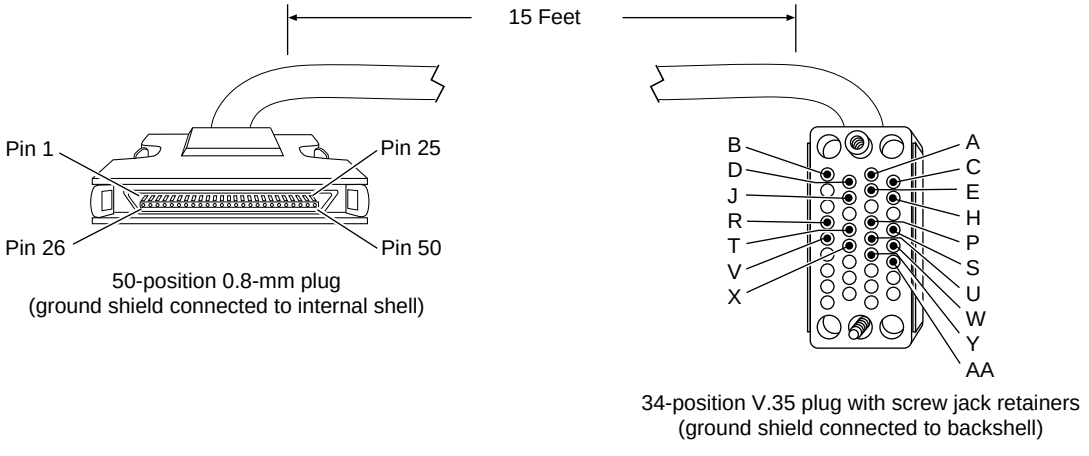


Figure A-15. 50-Pin to V.35: Raise DTR Cable (Order No. 7933)

Appendix B
Requirements for European Operation

This appendix provides technical specifications and notes about operating the following net modules in Europe:

- Dual Sync net module (Order No. 34001, Part No. 107287)
- Quad Sync net module (Order No. AF2111005, Part No. 112499)

Installation Requirements

The net modules are approved only for installation in a host, and with host attachments, which are either type approved for such apparatus or, if supplied after March 1, 1989, are marked with or supplied with a statement that the host is supplied under the terms of General Approval No. NS/G/1234/J/100003.

Installation of the net modules in an ASN will satisfy the conditions stated in this appendix. The ASN is supplied under the terms of General Approval No. NS/G/1234/J/100003.

Power Requirements

The net modules are powered from the host chassis and have the power requirements shown in Table B-1.

Table B-1. Net Module Power Requirements

Voltage	Amperage
+5 V	5 A
+12 V	0.75 A
-12 V	0.75 A

The power drawn from the host chassis combined with that required for any other net modules and accessories must be within the power rating of the host chassis.

You must install the net modules so as not to impair the integrity of the network protection from hazardous voltages used or generated internally by the host chassis.

Clearances and Creepage Distances

You must maintain the clearances and creepage distances (shown as X and Y, respectively, in Table B-2 and Figure B-1) between the net module and

- The host chassis in which it is installed
- Any adjacent net modules installed in the host chassis

The exception to this rule is the edge connector, which is located in the host chassis backplane, where no minimum distance applies.

Table B-2. Net Module Clearances and Creepage Distances

Clearance (X)	Creepage (Y)	Voltage Used or Generated by Other Parts of the Host or Expansion Card
2.0 mm	2.4 (3.8) mm	Up to 50 V rms or V dc
2.6 mm	3.0 (4.8) mm	Up to 125 V rms or V dc
4.0 mm	5.0 (8.0) mm	Up to 250 V rms or V dc
4.0 mm	6.4 (10.0) mm	Up to 300 V rms or V dc

The creepage distances apply to the normal office environment. When the local environment within the host chassis is subject to conductive pollution or dry nonconductive pollution that could become conductive due to condensation, the creepage distances shown in parentheses in Table B-2 will apply.

The clearance and creepage distance between adjacent points should be checked as follows (Figure B-1):

- The clearance distance (X) is the shortest distance between two points measured through the air.
- The creepage distance (Y) is the shortest distance between two points measured across a surface.

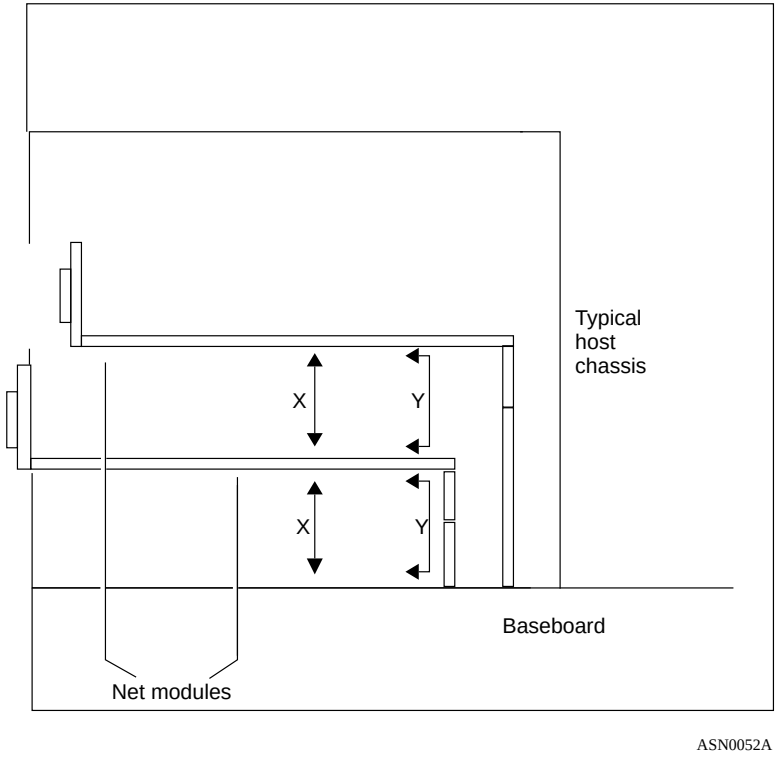


Figure B-1. Net Module Clearances and Creepage Distances

You should obtain advice from a competent telecommunications safety engineer if in doubt.

Failure to install a net module according to these instructions will invalidate the Approval.

Safety Status

Table B-3 lists the safety status of interconnection points to the connection of other equipment.

Table B-3. Net Module Safety Status

Sync Net Module	Port Location	Port Description	Type of Circuit
Dual or Quad	COM1	V.28, X.21, V.35	TNV (telecommunications network voltage)
Dual or Quad	COM2	V.28, X.21, V.35	TNV
Quad	COM3	V.28, X.21, V.35	TNV
Quad	COM4	V.28, X.21, V.35	TNV
Dual or Quad	P1	Host Port	SELV (safety extra-low voltage)
Dual	P2	Host Port	SELV

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