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DSX-3 (DSX-4U-24) Rear Cross-Connect System Installation Guide

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REVISION HISTORY

ISSUE	DATE	REASON FOR CHANGE
1	01/1998	Original
2	08/2002	Non-technical update.

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ABOUT THIS MANUAL

This Installation Guide describes ADC's DSX-3 (DSX-4U-24) Rear Cross-Connect System and provides all instructions necessary to install the system.

RELATED PUBLICATIONS

Listed below are related manuals and their publication numbers. Copies of these publications can be ordered by contacting the Technical Assistance Center at 1-800-366-3891, extension 73475 (in U.S.A. or Canada) or 952-917-3475 (outside U.S.A. and Canada).

Title	ADCP Number
DS3 Digital Signal Cross-Connect (DSX-3) System Applications Guide	80-323
Unequal Flange Rack Installation Instructions	80-345

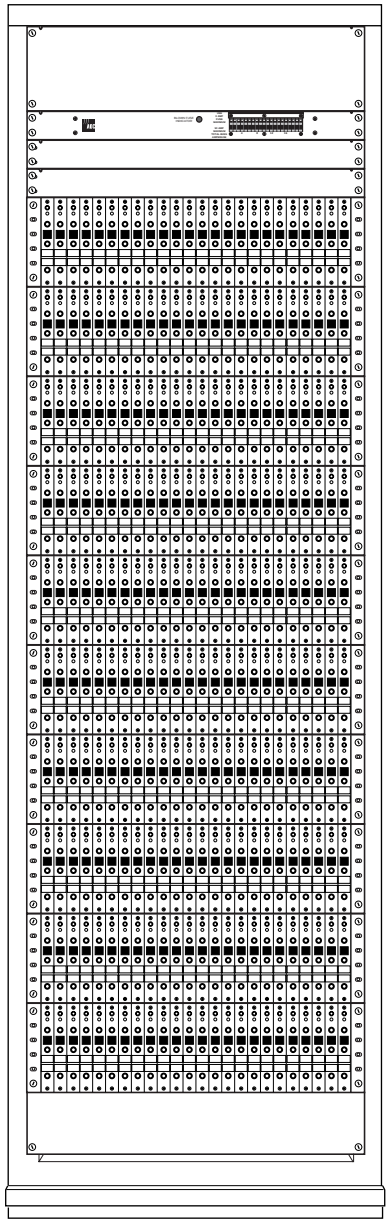
ADMONISHMENTS

Important safety admonishments are used throughout this manual to warn of possible hazards to persons or equipment. An admonishment identifies a possible hazard and then explains what may happen if the hazard is not avoided. The admonishments — in the form of Dangers, Warnings, and Cautions — must be followed at all times. These warnings are flagged by use of the triangular alert icon (seen below), and are listed in descending order of severity of injury or damage and likelihood of occurrence.

Danger: *Danger is used to indicate the presence of a hazard that* ***will*** *cause severe personal injury, death, or substantial property damage if the hazard is not avoided.*

Warning: *Warning is used to indicate the presence of a hazard that* ***can*** *cause severe personal injury, death, or substantial property damage if the hazard is not avoided.*

Caution: *Caution is used to indicate the presence of a hazard that* ***will*** *or* ***can*** *cause minor personal injury or property damage if the hazard is not avoided.*



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DSX-3 (DSX-4U-24) REAR CROSS-CONNECT SYSTEM

SECTION 1: DESCRIPTION

1 GENERAL

This section describes ADC's DSX-3 (DSX-4U-24) Rear Cross-Connect System and its applications in large and small offices, digital loop carriers, and customer premises. The system provides for test access, patch, cross-connect, and monitor functions in 75 ohm digital transmission systems operating with a common signal format and bit rate. Bit rates of digital systems in which this cross-connect system may be used are:

- 2.048 megabits per second.
- 8.448 megabits per second.
- 34.368 megabits per second.
- 51.84 megabits per second.
- 139.264 megabits per second.
- 155.52 megabits per second.

The DSX-3 (DSX-4U-24) Rear Cross-Connect System is typically used between multiplexing/demultiplexing or digital switch equipment and a transmission medium such as digital coaxial cable, microwave radio, or fiber optics. It is recommended that signals from all digital equipment are maintained at an equal level at the cross-connect system by means of office-provided pads and equalizers which compensate for the various cable lengths. This allows for testing, patching, and rearranging of compatible equipment at the cross-connect system without having to readjust signal levels.

2 FEATURES AND BENEFITS

2.1 Modularity

The DSX-3 (DSX-4U-24) Rear Cross-Connect System is modular for easy expansion at the user's site, and may provide any number of bi-directional cross-connects in multiples of 120 (up to 240 equipment terminations) per 2.13 meter (7 foot) bay. This allows for installation of a minimal system configuration to meet the immediate needs of a site, and then expanding it as necessary by adding individual DSX-4U circuit modules. Each cross-connect system consists of up to 240 DSX-4U circuit modules (two per cross-connect) plugged into a 2.13 m × 48.26 cm × 30.48 cm (7 foot × 19 inch × 12 inch) equipment bay.

2.2 Connectors

The DSX-3 (DSX-4U-24) Rear Cross-Connect System has BNC connectors for terminating coaxial cross-connect (XO and XI) and equipment IN/OUT (O and I) cabling, and pin jacks for interconnecting of tracer lamps. Patching and monitoring is accomplished by means of standard or midsize coaxial jacks located on the front of the module.

2.3 Tracer Lamps

A red flashing light emitting diode (LED) tracer lamp is located at the top of each DSX-4U circuit module for quick and easy identification of cross-connected circuits.

2.4 Cable Management

Unequal flange (duct type) racks and spacers provide space for routing office/equipment cables to and from the various shelves in the cross-connect system bay. Cable brackets are provided on each side at the rear for fastening of the cables to the bay. Vertical and horizontal rings are provided at the rear of the bay for orderly routing of cross-connect cables between circuit modules on the bay, and cable troughs at the top and bottom allow for orderly cross-connect cabling between bays.

Note: ADC recommends spacing of 25.4 cm (10.0 inches) between bays to avoid the possibility of cable congestion.

3 FUNCTIONAL DESCRIPTION

The DSX-3 (DSX-4U-24) Rear Cross-Connect System consists of up to 240 individual DSX-4U circuit modules, two of which are shown schematically in Figure 1-1. Each circuit module accommodates the input and output of one digital equipment unit, and two circuit modules are required for each cross-connect.

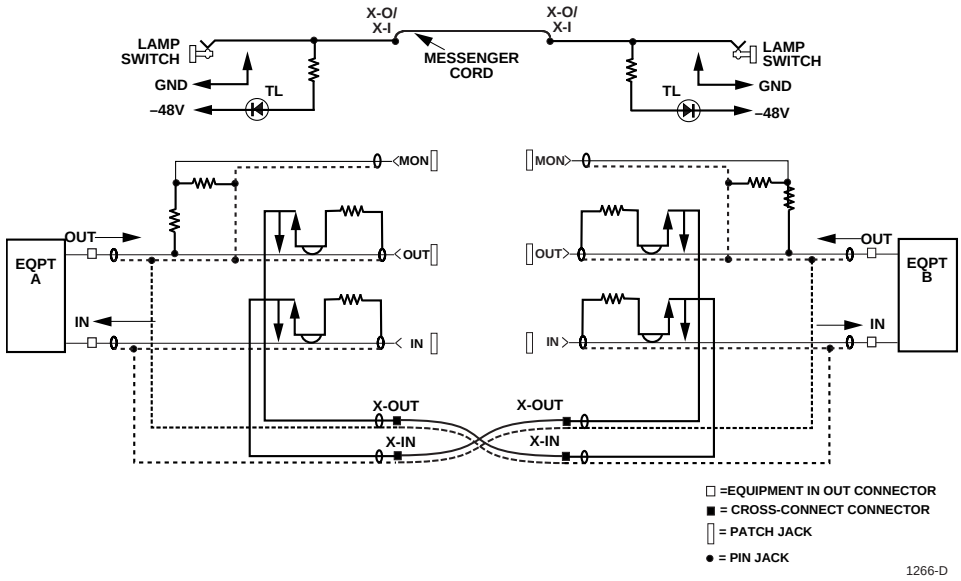

Figure 1-1. Two DSX-4U Circuits

Each circuit module has connectors and jacks for terminating office/equipment cables and for cross-connecting and patching the various office/equipment units together. Cabling from office equipment is connected to DSX-4U equipment IN/OUT connectors, and any equipment input or output may then be connected to any other equipment input/output by means of jumpers connected to the cross-connect connectors. Equipment inputs and outputs may also be tested or temporarily patched to other equipment inputs and outputs by means of patch cords plugged into the DSX-4U patch jacks.

A typical DSX-4U circuit arrangement is shown in Figure 1-2. Office equipments A, B, and C are connected to the IN/OUT connectors of three different DSX-4U circuit modules. Office equipments A and B are then connected together at the DSX-4U circuit modules by temporary patch cords. The corresponding tracer lamp (TL) terminals are also jumpered together by the messenger cord in the cross-connect cable. Cross-connected equipments A and B can now be identified, monitored, and tested as follows:

1. **Circuit Identification** - Pulling any lamp switch (LS) outward causes the tracer lamp at each end of the corresponding cross-connect cable to flash for approximately 30 seconds and then remain lit until the lamp switch (LS) is pushed back in. This gives a visual indication of the equipment units that are cross-connected together.
2. **Bridged Monitoring and Testing** - Monitor or test equipment patched into the MON jack of either circuit module allows testing without interrupting the signals between the A and B equipment.
3. **Split-Circuit Testing** - Test equipment patched into an IN or OUT jack splits the A-to-B equipment circuit for direct access testing of either equipment unit.

In addition, patch cables can be used to split cross-connected equipment units, and connect either of the two units to a third unit. In Figure 1-2, equipment B is temporarily patched to equipment C.

As seen in Figure 1-2, numerous testing and patch-around configurations are possible, all of which are established permanently or temporarily at the centrally located cross-connect system.

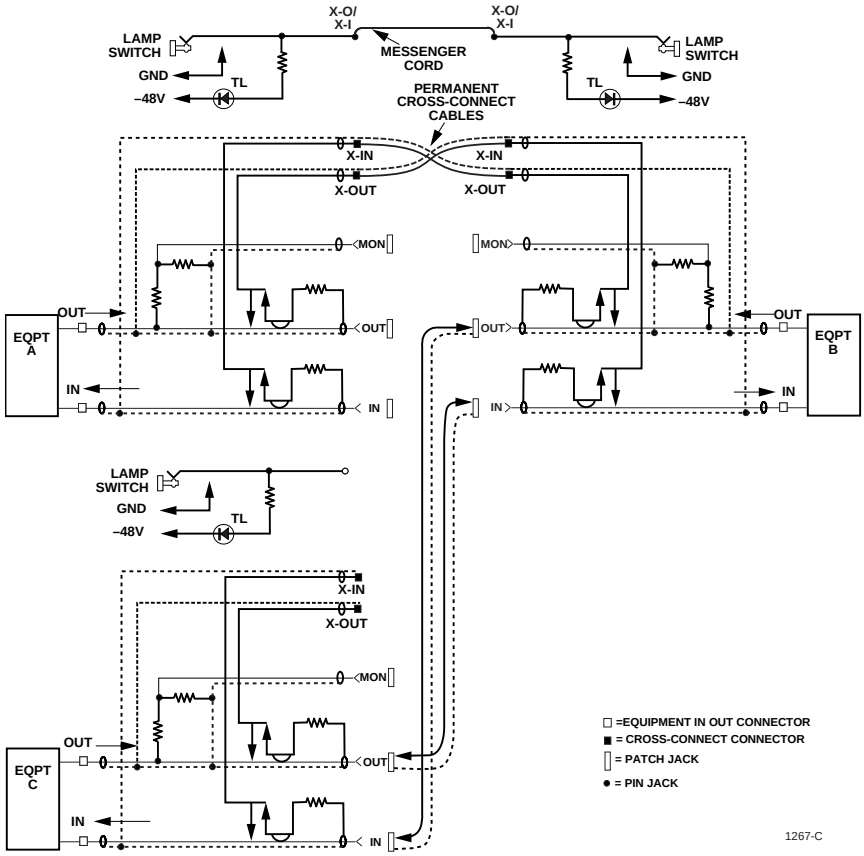

Figure 1-2. Typical DSX-3 (DSX-4U-24) Circuit Arrangement

4 PHYSICAL DESCRIPTION

Front and rear views of a typical fully configured DSX-3 (DSX-4U-24) Rear Cross-Connect System bay are shown in Figure 1-3 and Figure 1-4. The bay is comprised of up to ten module chassis, each capable of holding up to 24 DSX-4U circuit modules. A fuse panel located near the top of the bay supplies power to each chassis. Provision for an AC outlet is located at the bottom of the bay. Rings and brackets at the back of the bay allow for routing and securing equipment in/out cables and cross-connect jumpers.

Equipment and cross-connect cabling to the cross-connect system bay is by means of BNC coaxial connectors located on the back of the circuit module. Each circuit module also has midsize coaxial jacks on the front for patching and monitoring.

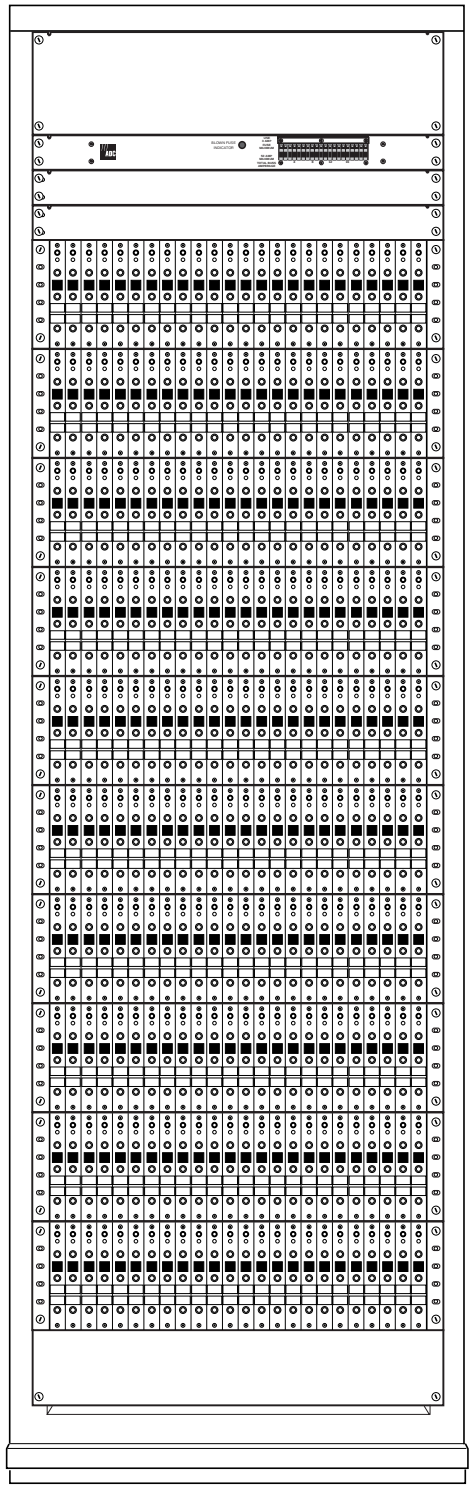

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Figure 1-3. DSX-3 (DSX-4U-24) Rear Cross-Connect System Bay (Front View)

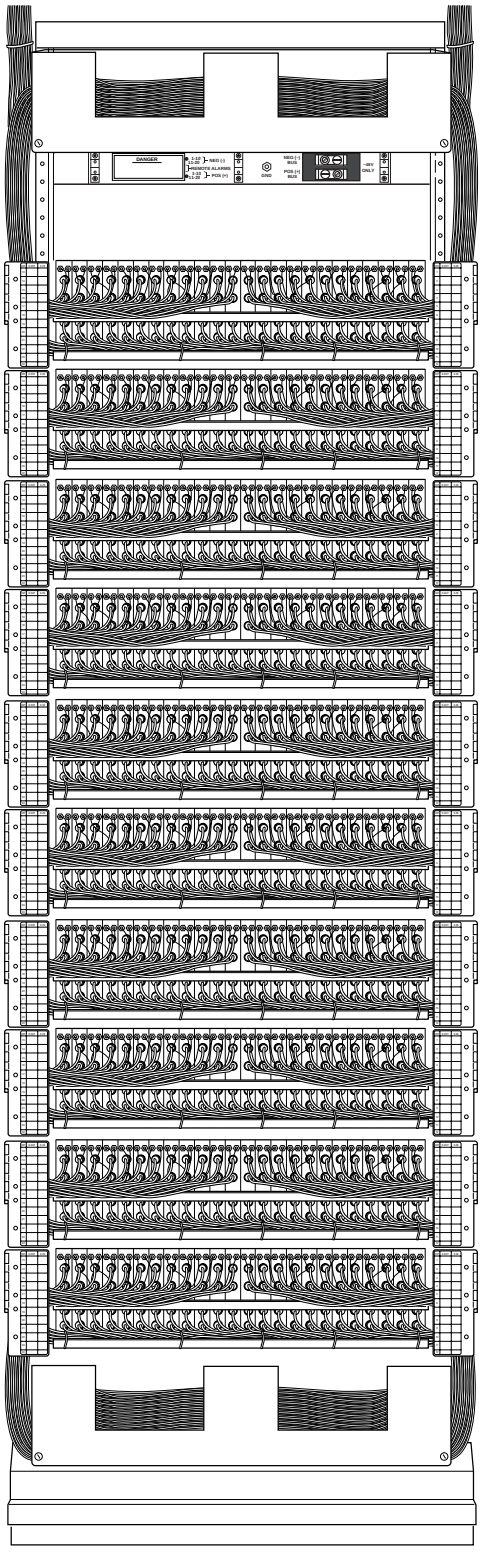


Figure 1-4. DSX-3 (DSX-4U-24) Rear Cross-Connect System Bay (Rear View)

4.1 DSX-4U Circuit Modules

Each DSX-4U circuit module, shown in Figure 1-5, provides access to the input and output of one digital office equipment unit. The unit dimensions are approximately 15.02 × 1.78 × 23.04 cm (6.00 × 0.70 × 9.02 inches).

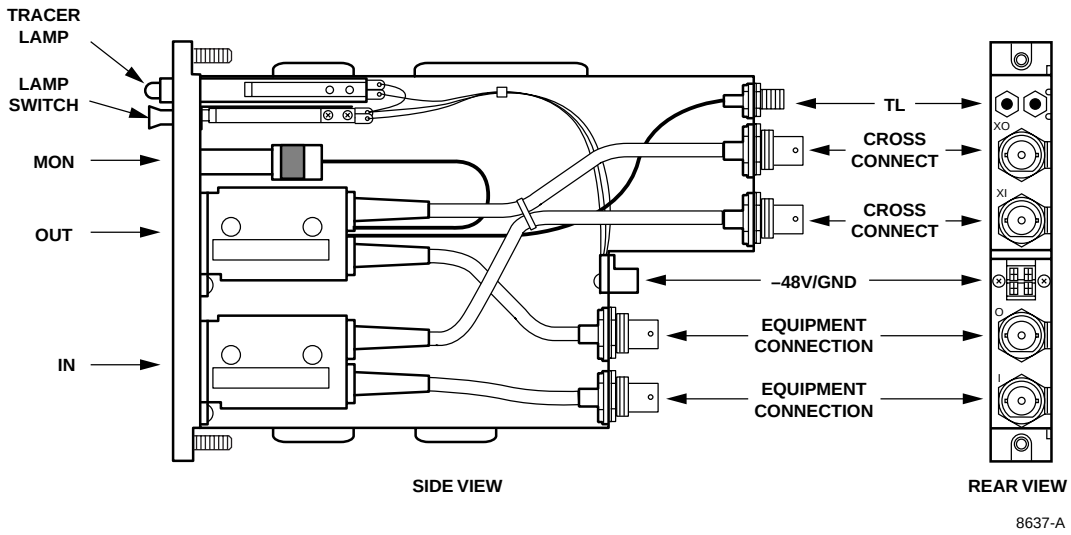


Figure 1-5. DSX-4U Circuit Module

The DSX-4U module is designed for use with either E1, E3, E4 or STM-1 interfaces; however, only one type of interface should be terminated at any one cross-connect system bay. The module has standard or midsize coaxial jacks for testing and patching. BNC coaxial connectors at the back of the module are used for connecting the equipment in/out cables and cross-connect jumpers. Specific functions of the circuit module components are defined in Table 1-1.

Table 1-1. DSX-3 (DSX-4U-24) Circuit Module Components

NAME	TYPE	LOCATION	FUNCTION
Tracer Lamp (TL)	Red LED Indicator	Front	Used to identify the opposite end of a cross-connect. The tracer lamp flashes for approximately 30 seconds whenever the tracer lamp switch is pulled out, and remains lit while the tracer lamp switch is left pulled out. If the module is cross-connected to another module, the tracer lamp on that module will also flash approximately 30 seconds and then remain lit.
Lamp Switch (LS)	Push/Pull Switch	Front	Provides bridged access to the output signal of connected office equipment to allow monitoring without interruption.
MON (Monitor)	Midsize Coaxial Jack	Front	Provides bridged access to the output signal of connected office equipment to allow monitoring without interruption.
OUT	Midsize Switching Coaxial Jack	Front	Provides test or patch access to digital equipment output terminations. Any cross-connect to the X-O jack is disabled and terminated to 75 ohm ground whenever a plug is in the OUT jack.
IN	Midsize Switching Coaxial Jack	Front	Provides test or patch access to digital equipment input terminations. Any cross-connect to the X-I jack is disabled and terminated to 75 ohm ground whenever a plug is in the IN jack.
XO and XI	BNC Connector	Rear	Provides direct access to the digital equipment output (XO) or input (XI) termination for cross-connecting to any digital equipment output or input termination via the cross-connect system.
O and I	BNC Connector	Bottom Rear	Provides for connection from the digital equipment output (O) or input (I) termination.
(Not marked)	Pin Jacks	Top Rear	Provides for interconnecting of the tracer lamps for the corresponding cross-connects to allow tracer lamp operation as described above. The connections between the circuit modules should correspond exactly to the XO or XI cross connect jumpers. Cross-connect jumpers are available with messenger cords which accommodate both the cross-connect and the corresponding lamp connection.

4.2 DSX-4U Chassis

The DSX-4U chassis, as shown in Figure 1-6, provides the mounting for up to 24 circuit modules. It is 15.2 cm (6 inches) high, 48.26 cm (19 inches) wide and is designed for installation in bays with mounting holes spaced at 2.54 cm (1.0 inch).

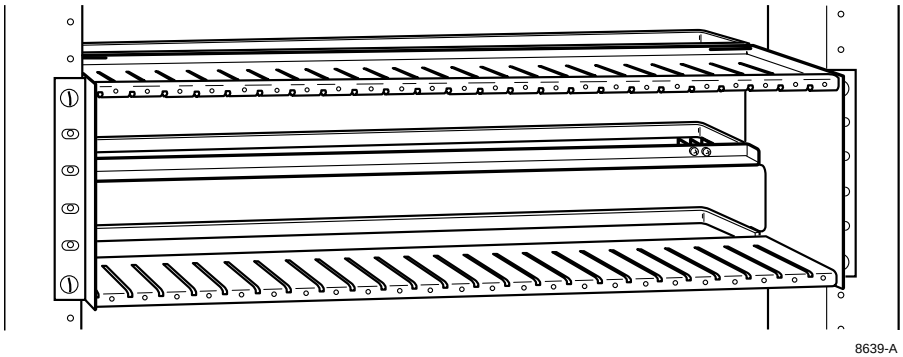


Figure 1-6. DSX-4U Chassis

White adhesive-backed designation labels are shipped with the chassis for application at the user's site. These labels may be pre-printed to customer request or they may be blank to allow designations to be added during installation.

4.3 Fuse Panel

The fuse panel, as shown in Figure 1-7, provides –48 Vdc power protection for all cross-connect system tracer lamp LED circuitry in the bay. Power for each DSX-4U chassis is supplied through a separate 0.5 Amp fuse. (Each LED draws 0.01 Amp, 24 LEDs in a chassis, equates to a 0.24 Amp load.) The GMT fuse has a colored tab which is displayed when the fuse is blown. The fuse panel also has a LED indicator which lights whenever any fuse on the panel is blown. The fuse panel may also be connected to an external alarm system.

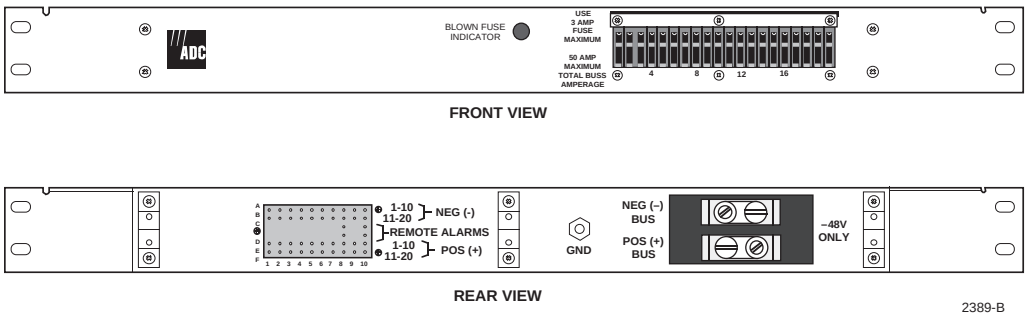


Figure 1-7. Fuse Panel

4.4 Cable Rings and Troughs

Vertical cable rings at the rear of the bay allow for routing of cross-connect jumpers up and down each side of the bay. Cable troughs at the top and bottom of the bay provide for the routing of cross-connect jumpers between bays.

4.5 Cable Brackets

The cables are brought in at the sides of the bay and tied to the cable brackets.

4.6 Cross-Connect System

The cross-connect system bay is an unequal flange type, 213 × 65.88 × 30.48 cm (84 × 25.94 × 12 inches). Shelf mounting holes are spaced at 2.54 cm (1 inch). An AC outlet may be provided at the bottom front of the bay as an auxiliary source of 110 Vac primary power.

5 SYSTEM SPECIFICATIONS

Specifications for the DSX-3 (DSX-4U-24) Rear Cross-Connect System are shown in Table 1-2.

Table 1-2. System Specifications

PARAMETER	SPECIFICATION
Physical	
Height:	2.13 m (7.0 feet)
Width:	55.72 cm (21.94 inches)
Depth:	30.48 cm (12 inches)
Weight:	163 kg (360 pounds) (fully equipped)
Power	
Voltage:	–48 Vdc
Current:	10 mA for each lit LED tracer lamp
Environmental	
Operating Temperature:	–40° to 65° C (–40° to +149° F)
Storage Temperature:	–55° to +85° C (–67° to +185° F)
Operating and Storage Humidity:	0% to 95% without condensation
Functional	
Characteristic Impedance:	75 ohms unbalanced.
Insertion Loss:	Less than 0.8 dB at 22.368 mHz and less than 1.9 dB at 137.088 mHz with up to 27 feet (8.23 m) of cross-connect cable.
Crosstalk:	Better than 60 dB.
Return Loss:	Greater than 20 dB (DC to 300 mHz).
Monitor Level:	21.5 dB ±1.5 dB below signal level (DC to 300 mHz).

SECTION 2: INSTALLATION

1 GENERAL

This section provides complete instructions for installing the DSX-3 (DSX-4U-24) Rear Cross-Connect System. It is recommended that the entire section be read and understood before beginning installation.

2 OFFICE REQUIREMENTS

2.1 Space and Floor Loading

The cross-connect system consists of up to 240 circuit modules mounted in a standard 2.13 m × 48.26 cm (7-foot × 19-inch) unequal flange equipment bay. Maximum width of the bay is 55.72 cm (21.94 inches), and maximum depth is 30.47 cm (12 inches). A fully configured unwired/uncabled cross-connect system bay weighs approximately 163 kg (360 pounds).

2.2 Environment

2.2.1 Shipping and Storage

The cross-connect system must be shipped and stored in ambient temperatures and humidities which do not exceed the following:

- Temperature: –55° to +85° C (–67° to +185° F).
- Relative Humidity: 0% to 95% without condensation.

2.2.2 Operational

The DSX-3 (DSX-4U-24) Rear Cross-Connect System must be operated in ambient temperatures and humidities which do not exceed the following:

- Temperature: –40° to +65° C (–40° to +149° F).
- Relative Humidity: 0% to 95% without condensation.

2.3 Power

The cross-connect system operates on –48 Vdc filtered office battery, fused or breakered at the office distribution panel. Approximate current requirements can be calculated based on 10 milliamps for each lit LED tracer lamp. The number of tracer lamps lit at any one time will depend on local patching and testing procedures. The fuse panel, just below the upper wire trough, at the top of the bay provides a 0.5 Amp. fuse for each DSX-4U chassis in the bay.

2.4 Cable Types and Lengths

All coaxial cables should be 75 ohm coaxial with tinned copper shield (735A/734A or equivalent).

The digital equipment terminated at the cross-connect system bay must have equalizers and/or pads which are adjusted for the particular cable lengths to maintain the proper transmission levels. The maximum length between digital equipment and the bay is governed by the specific item of equipment and cable type. See Figure 2-1 and Table 2-1 for detailed cable length information.

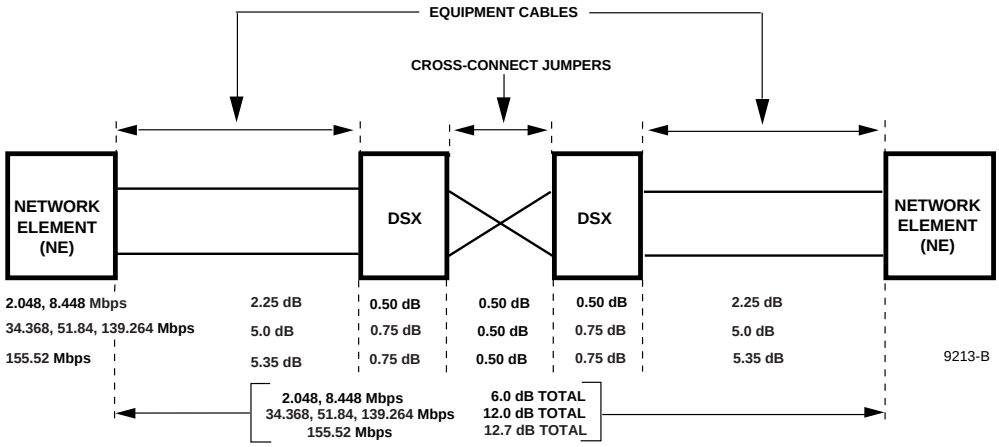


Figure 2-1. Coaxial Cable Lengths and Losses

Table 2-1. IN/OUT Equipment Cable and Cross-Connect Jumper Lengths by Cable Type

EQUIPMENT CABLES		
TRANSMISSION RATE	**734A TYPE**	**735A TYPE**
2.048	252.2 m (827.2 feet)	118.2 m (387.9 feet)
8.448	135.6 m (444.7 feet)	58.1 m (190.7 feet)
34.368	158.2 m (518.8 feet)	77.3 m (253.6 feet)
139.264	73.6m (241.5 feet)	36.2 m (118.8 feet)
51.84	128 m (420 feet)	64 m (210 feet)
155.52	74.5 m (244.3 feet)	36.6 m (119.9 feet)
CROSS-CONNECT JUMPERS		
TRANSMISSION RATE	**735A TYPE**	**RG59 TYPE**
2.048	26.3 m (86.2 feet)	38.6 m (126.7 feet)
8.448	12.9 m (42.4 feet)	19 m (62.4 feet)
34.368	7.4 m (24.2 feet)	9.4 m (30.9 feet)
139.264	3.6 m (11.9 feet)	4.7 m (15.4 feet)
51.84	6.1 m (20.0 feet)	7.7 m (25.2 feet)
155.52	3.4 m (11.2 feet)	4.4 m (14.5 feet)

3 INSTALLATION

3.1 Bay Installation/Expansion

Installation of cross-connect system hardware may consist of installation of an entire new cross-connect system bay or expansion of an existing bay. Location of a new bay must take into consideration its distance to other equipment, other system bays, and cable type.

Note: The recommended spacing between bays is 25.4 cm (10.0 inches) when using 734A or equivalent and 12.7 cm (5.0 inches) when using 735A or equivalent cables for cross-connect and equipment IN/OUT cabling.

3.1.1 Positioning and Mounting of New Bay

Caution: *A crated DSX-3 (DSX-4U-24) Rear Cross-Connect System bay weighs approximately 265 kg (585 pounds). An adequately rated and secured block and tackle or overhead hoist must be used while uncrating, positioning, and securing the bay.*

Set the bay in its assigned position, and secure it to the floor and to adjacent bays using appropriate hardware. Also secure it to overhead support if required. Refer to the Unequal Flange Rack Installation Instructions (ADCP-80-345).

3.1.2 Adding Chassis to Existing Bay

Existing bays should be expanded from the bottom up if office cables are brought into the bay from above, or from the top down if office cables are brought into the bay from below. Mount each chassis as follows:

1. Identify hole locations for mounting the chassis in a typical 2.13 m × 48.26 cm (7-foot × 19-inch) unequal flange 2-inch equipment bay.
2. Position chassis on bay in the selected location. Secure chassis to the bay using one #12-24 × 9.5 mm (0.375 inch) machine screw in the bottom hole on each side of the chassis.
3. Secure the vertical cable rings over the chassis mounting flanges with #12-24 × 9.5 mm (0.375 inch) machine screws in the top hole and the fourth hole down on the chassis.
4. Using 22 AWG wire, connect –48 V and GND from the fuse panel to the respective –48 V and GND terminals on the back of the chassis. Each chassis is fused separately. Fuses from left to right (as viewed from the front) correlate to chassis from bottom to top with one fuse for each chassis.
5. Using 22 AWG wire connect the chassis ground terminal to the bay ground wire or bay ground posts, whichever is provided.

3.2 Circuit Module Installation

Install all DSX-4U circuit modules in the chassis as shown in Figure 2-2. Press each module into the chassis and install the two module retaining screws.

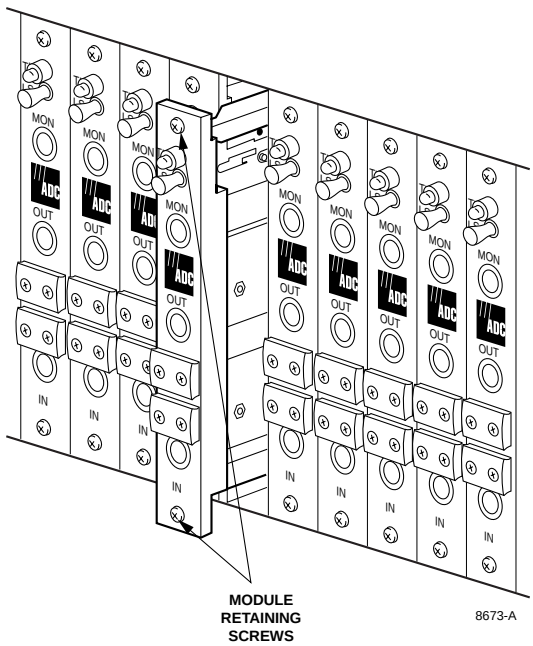


Figure 2-2. DSX-4U Circuit Module Installation

3.3 Installation of Office/Equipment Cabling

3.3.1 Cable Routing Guidelines

Office/equipment cabling to the cross-connect system are brought in at the sides of the bay either from above or below. Typical system cabling is shown in Figure 2-3.

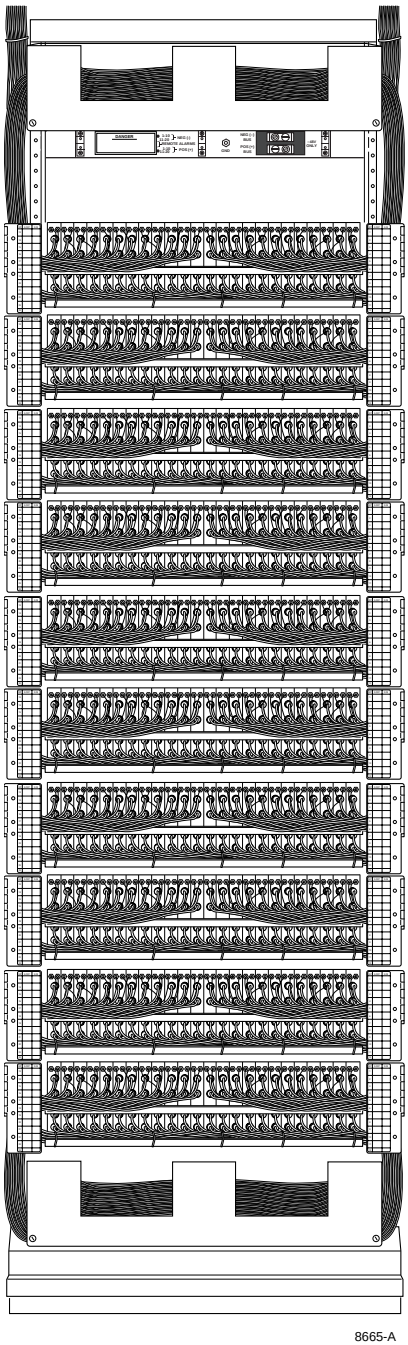


Figure 2-3. Typical Cross-Connect System Cabling

When bringing the cables into the bay, make sure that all cables carrying digital signals away from the bay are run vertically along the right side of the bay (as viewed from the front), and all cables carrying signals to the bay are run vertically along the left side. The cables should be run in the rack duct and attached to appropriate cable tie brackets in the duct using nylon tie-wraps or cable lacing. Any cables not contained in the duct should be secured to the cable brackets on the rear of the bay. If the cables are coming into the bay from above, cable attachment should start at the bottom and work up (refer to Figure 2-4).

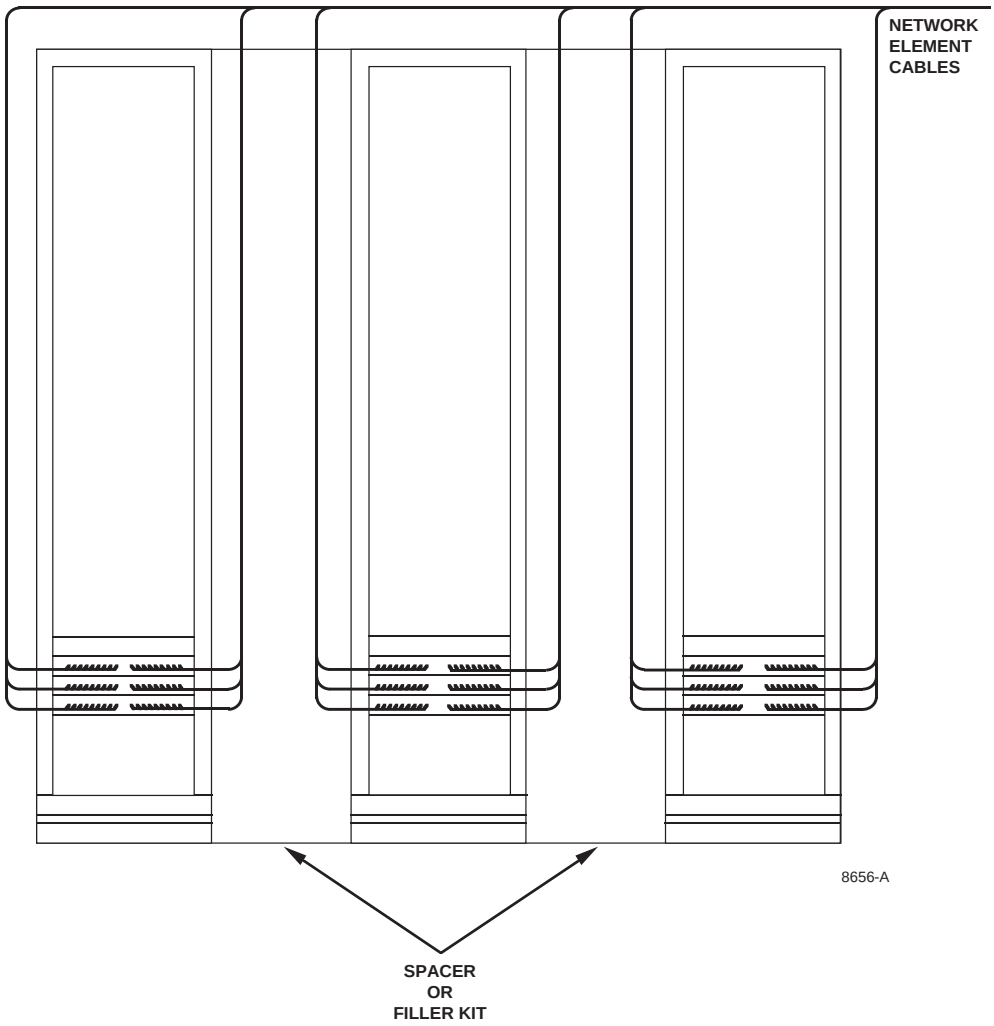


Figure 2-4. Cable Routing from Top to Bottom

If the cables are coming in from below, cable attachment should start at the top and work down (refer to Figure 2-5).

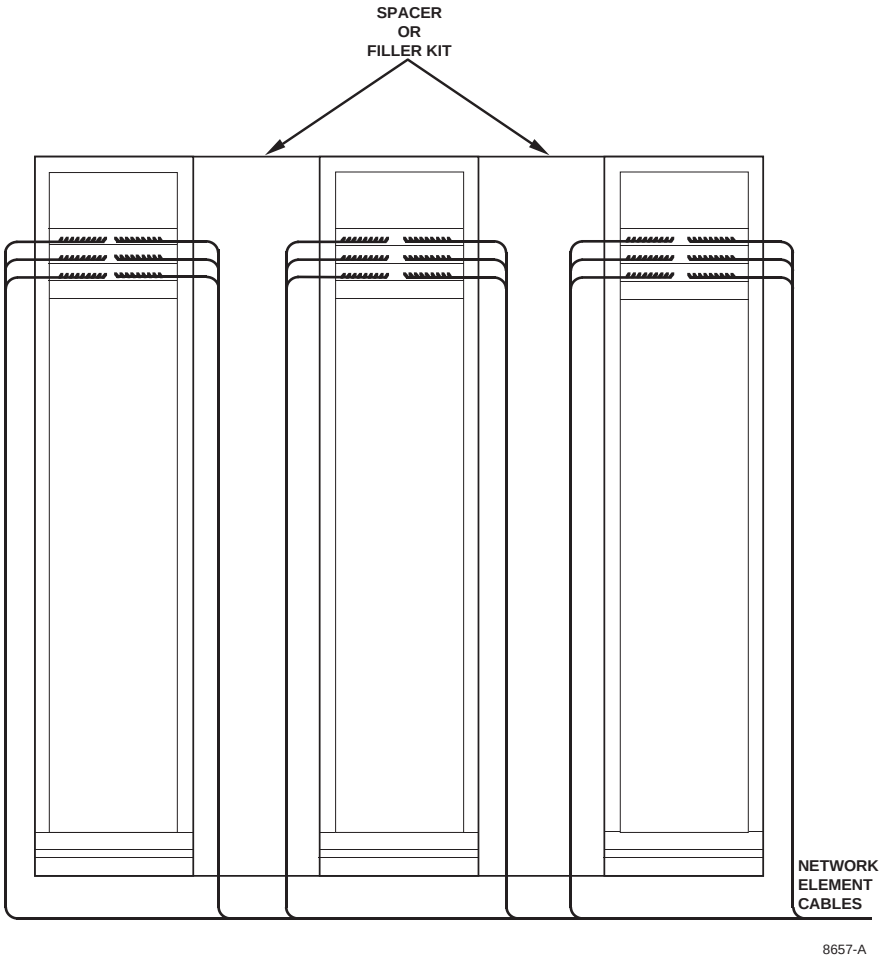


Figure 2-5. Cable Routing from Bottom to Top

3.3.2 Cable-To-Bay Termination

Office/equipment cables should be terminated to BNC connectors at the back of the DSX-4U circuit modules. A rear view of a DSX-4U chassis with all circuit modules in place is shown in Figure 2-6.

Terminate each pair of cables from any one office equipment unit to the IN and OUT connectors on any one circuit module. Terminate the cable carrying signals to the bay (left side of bay as viewed from front) to the OUT connector and the cable carrying signals away from the bay to the IN connector. Secure all cables to the cable bar on the rear of the chassis by use of tie-wraps. Record all equipment terminations on the labels provided on the front of each module. Record cross-connect terminations on the adhesive-backed designation labels provided on the back of the chassis.

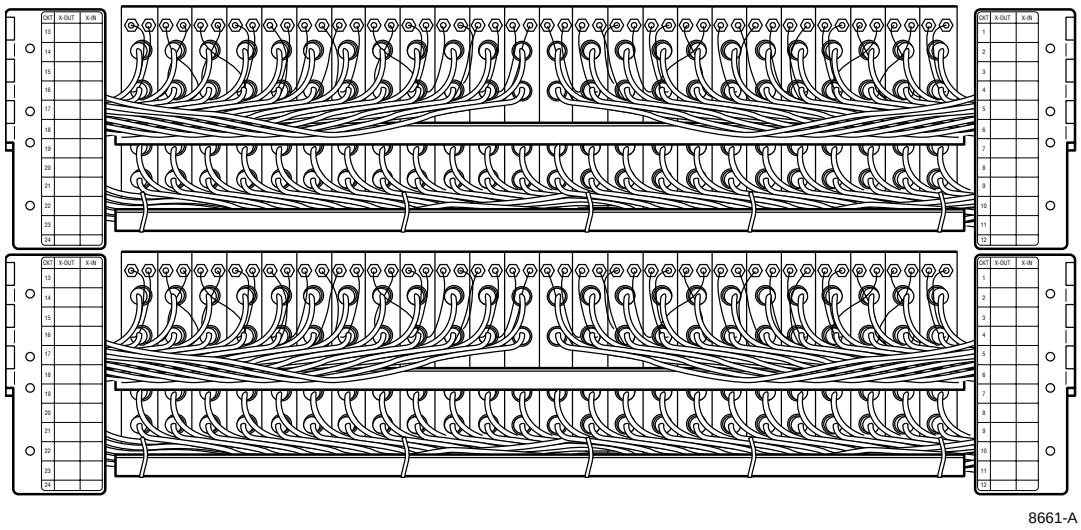


Figure 2-6. DSX-4U Chassis with Circuit Modules Installed (Rear View)

3.3.3 Office Power To Bay Wiring

The power to the bay fuse panel is supplied, through overhead power supply feeders, from the Battery Distribution Fuse Bay (BDFB). The local Detail Power Engineer must specify the power feeder conductor size. Each site has many variables that must be considered when determining the size of power supply feeders.

- Local Electrical Codes
- Distance between the Battery Distribution Fuse Bay (BDFB) and the farthest bay powered.
- Maximum power load on each bay.
- Number of bays to be powered.
- Allowable voltage drop of power cables between BDFB and equipment bay.

Connect the office power to the bay fuse panel as follows:

⚠ **Warning:** *To avoid the danger of shock, burns or fire, REMOVE power from working power supply circuits before making any connections. If establishing a new power supply circuit do NOT install the fuse until all connections are completed and tested.*

1. Determine the conductor length from the overhead power supply feeders to the fuse panel power terminals.
2. Using 14 AWG (minimum size) wire, make parallel connections at the overhead supply feeders for –48 Vdc and Ground. (Number 6 compression lug is provided with DSX-FP20F fuse panel.)
3. Complete the connection (step 2) to the –48 V (NEG(–)BUS) and ground (POS(+)BUS) terminals on the fuse panel. See Figure 2-7.

The REMOTE ALARMS terminals at the back of the fuse panel provide a closed loop for connecting cross-connect system fuse failure alarm circuitry to an external alarm system. The alarm will be triggered upon failure of any fuse in the fuse panel. Each GMT fuse also has a colored indicator which is displayed when the fuse is blown, and the fuse panel has an LED indicator which lights when any fuse on the panel is blown.

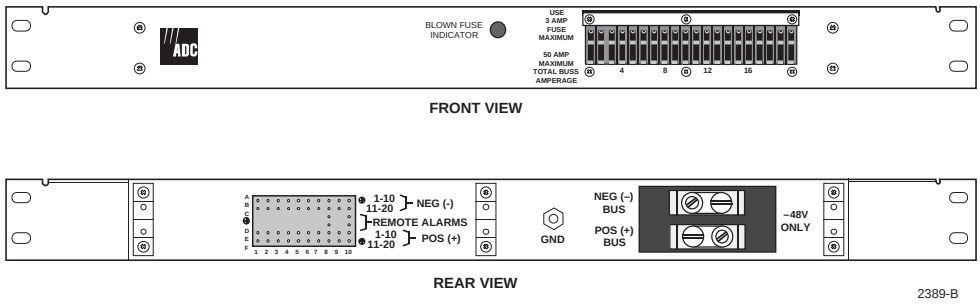


Figure 2-7. Fuse Panel

3.4 Cross-Connect Jumpers

When installing cross-connect jumpers it is important that congestion be held to a minimum. This will not only simplify installation, but will also provide optimal jumper tracing and ease of system expansion and maintenance.

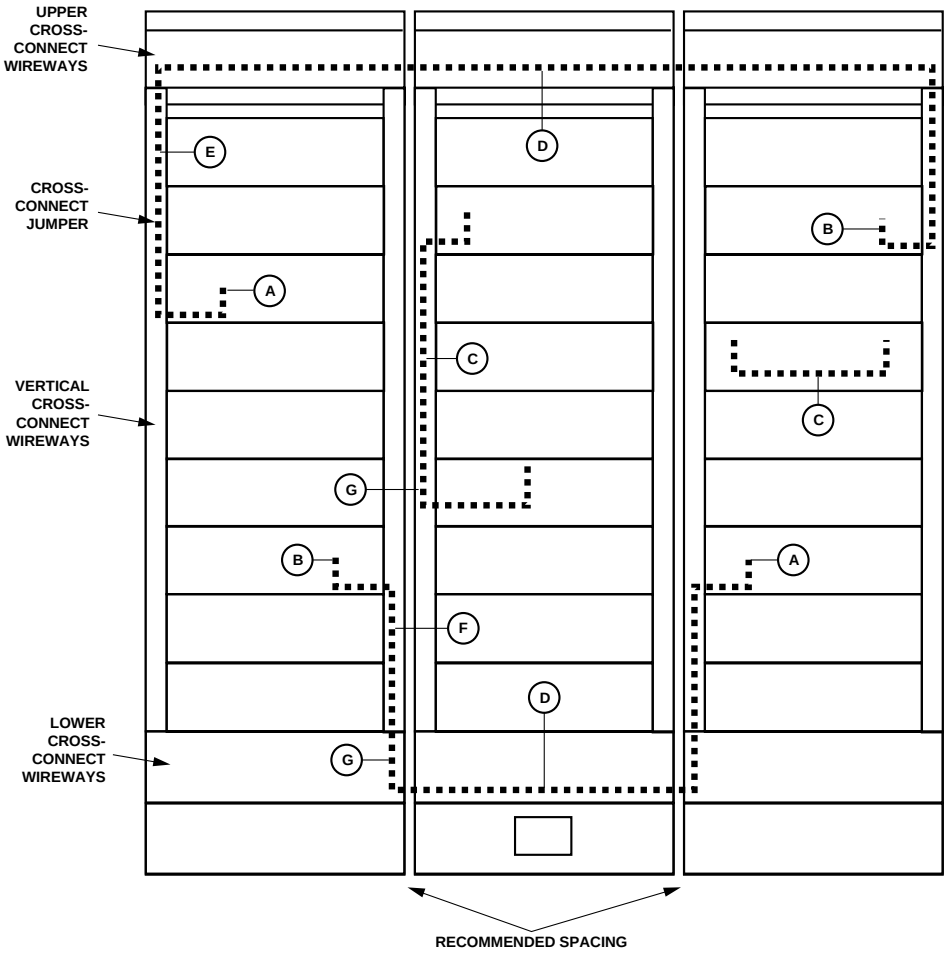
The recommended rules of jumper routing are defined in Figure 2-8. The figure shows a three-bay system; however, the same basic rules apply for any number of bays. Cross-connect jumpers should not exceed lengths as described earlier in this section. To prevent unnecessary buildup and congestion, all discontinued cross-connects should be removed from the wireways.

Using cross-connect jumpers with accompanying messenger wires, cross-connect all necessary DSX-4U circuits as shown in Figure 2-9.

1. Connect the cross-connect OUT (XO) of the first termination to the cross-connect IN (XI) of the second termination. Connect the messenger wire pins of this cross-connect to tracer lamp pin jacks on each termination. Messenger wire pins may be inserted in either of the pin jacks. The two pin jacks on each module are internally connected together.
2. Connect the cross-connect IN (XI) of the first termination to the cross-connect OUT (XO) of the second termination. Connect the messenger wire pins of this cross connect to the remaining tracer lamp pin jack on each termination.

ADC DSX-4U cross-connect jumpers are available in various lengths from 0.3 to 8.23 m (1 to 27 feet). It is important to select the proper cable length to prevent congestion. Cross-connect jumpers are also available with one connector factory terminated and one connector kit which is terminated on site. This method allows jumpers to be cut to the exact length required, eliminating excess jumper buildup.

Disconnect any discontinued cross-connect jumpers at each end and remove them from the wireways.



NOTE: BASED ON THE TYPE OF CABLE SELECTED FOR EQUIPMENT IN/OUT CABLING AND CROSS-CONNECT JUMPER, THE ADC RECOMMENDED SPACING IS AS FOLLOWS:

APPLICATION		
EQUIPMENT I/O	X-CONN	SPACERS REQUIRED FOR UEF BAYS
735A/734A	735A OR RG59	ONE 10-INCH (25.4 CM) BETWEEN BAYS WITH ONE 5-INCH (12.7 CM) ON THE ENDS

ROUTING RULES

A. All jumpers in the left-hand side of the cross-connect field should enter and leave the bay from the left vertical wireways.

B. All jumpers in the right-hand side of the cross-connect field should enter and leave the bay from the right vertical wireways.

C. All intrabay cross-connects should use the vertical rings except when terminations are in the same panel.

D. All interbay cross-connects should use the horizontal wireways.

E. All jumpers originating in the upper half of the cross-connect field should route via the upper horizontal wireways.

F. All jumpers originating in the lower half of the cross-connect field should route via the lower horizontal wireways.

G. Whenever a jumper changes direction, it should do so at a ring or wireway.

9202-A

Figure 2-8. Recommended Cross-Connect Routing

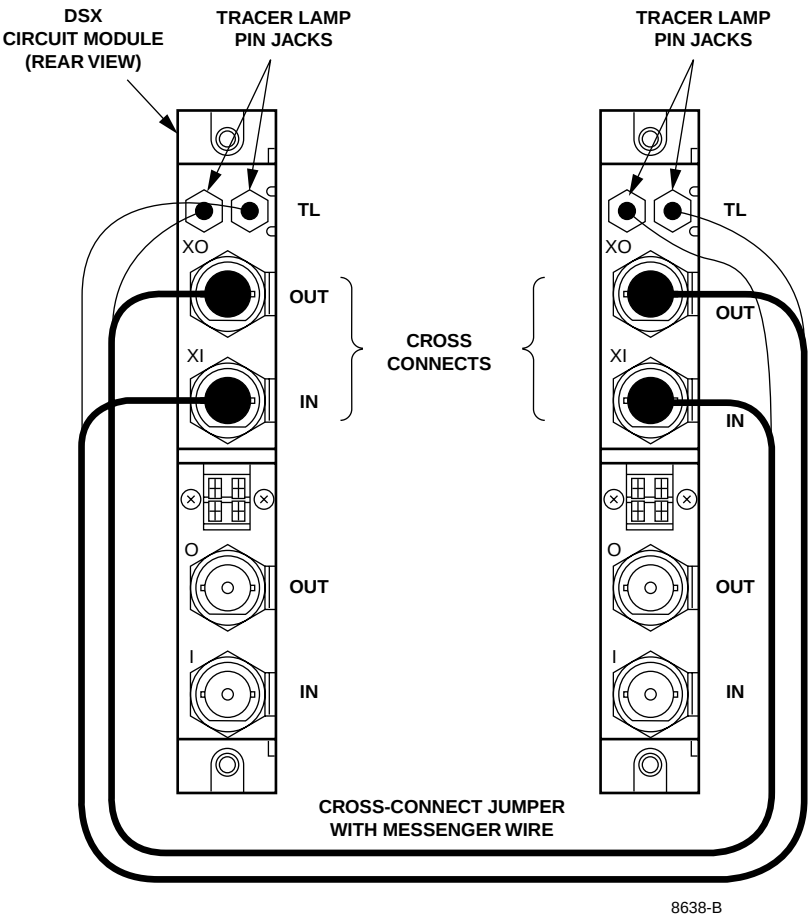


Figure 2-9. DSX-4U-24 Cross Connection

4 POWER APPLICATION AND SYSTEM CHECKOUT

Ensure that a 0.5 Amp fuse is in place in the fuse panel for each DSX-4U chassis in the bay. Fuses from left to right (as viewed from the front) correlate to chassis from bottom to top, with one fuse for each chassis. Apply –48 Vdc office battery at the office distribution panel.

Cross-connect wiring can be checked as necessary by pulling the tracer lamp switch button on any DSX-4U circuit module. Pulling of this button should cause the corresponding tracer lamp and the tracer lamp at the other end of the cross connect to flash for approximately 30 seconds and then remain lit until the button is pushed back in.

SECTION 3: GENERAL INFORMATION

Content Page

1 WARRANTY/SOFTWARE

The Product and Software warranty policy and warranty period for all ADC Products is published in ADC's Warranty/Software Handbook. Contact the Technical Assistance Center at 1-800-366-3891, extension 73475 (in U.S.A. or Canada) or 952-917-3475 (outside U.S.A. and Canada) for warranty or software information or for a copy of the Warranty/Software Handbook.

2 SOFTWARE SERVICE AGREEMENT

ADC software service agreements for some ADC Products are available at a nominal fee. Contact the Technical Assistance Center at 1-800-366-3891, extension 73475 (in U.S.A. or Canada) or 952-917-3475 (outside U.S.A. and Canada) for software service agreement information.

3 REPAIR/EXCHANGE POLICY

All repairs of ADC Products must be done by ADC or an authorized representative. Any attempt to repair or modify ADC Products without written authorization from ADC voids the warranty.

If a malfunction cannot be resolved by the normal troubleshooting procedures, call the Technical Assistance Center at 1-800-366-3891, extension 73475 (in U.S.A. or Canada) or 952-917-3475 (outside U.S.A. and Canada). A telephone consultation can sometimes resolve a problem without the need to repair or replace the ADC Product.

If, during a telephone consultation, ADC determines the ADC Product needs repair, ADC will authorize the return of the affected Product for repair and provide a Return Material Authorization number and complete return shipping instructions. If time is critical, ADC can arrange to ship the replacement Product immediately. In all cases, the defective Product must be carefully packaged and returned to ADC.

4 REPAIR CHARGES

If the defect and the necessary repairs are covered by the warranty, and the applicable warranty period has not expired, the Buyer's only payment obligation is to pay the shipping cost to return the defective Product. ADC will repair or replace the Product at no charge and pay the return shipping charges.

Otherwise, ADC will charge a percentage of the current Customer Product price for the repair or NTF (No Trouble Found). If an advance replacement is requested, the full price of a new unit will be charged initially. Upon receipt of the defective Product, ADC will credit Buyer with 20 percent of full price charged for any Product to be Out-of-Warranty. Products must be returned within thirty (30) days to be eligible for any advance replacement credit. If repairs necessitate a visit by an ADC representative, ADC will charge the current price of a field visit plus round trip transportation charges from Minneapolis to the Buyer's site.

5 REPLACEMENT/SPARE PRODUCTS

Replacement parts, including, but not limited to, button caps and lenses, lamps, fuses, and patch cords, are available from ADC on a special order basis. Contact the BCG Technical Assistance Center at 1-800-366-3891, extension 73475 (in U.S.A. or Canada) or 952-917-3475 (outside U.S.A. and Canada) for additional information.

Spare Products and accessories can be purchased from ADC. Contact Sales Administration at 1-800-366-3891, extension 73000 (in U.S.A. or Canada) or 952-938-8080 (outside U.S.A. and Canada) for a price quote and to place your order.

6 RETURNED MATERIAL

Contact the ADC Product Return Department at 1-800-366-3891, extension 73748 (in U.S.A. or Canada) or 952-917-3748 (outside U.S.A. and Canada) to obtain a Return Material Authorization number prior to returning an ADC Product.

All returned Products must have a Return Material Authorization (RMA) number clearly marked on the outside of the package. The Return Material Authorization number is valid for 90 days from authorization.

7 CUSTOMER INFORMATION AND ASSISTANCE

PHONE:

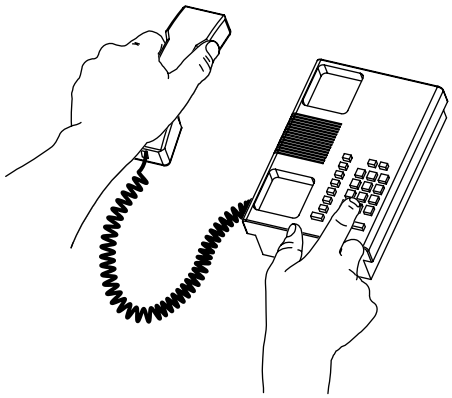
EUROPE
Sales Administration: +32-2-712-65 00
Technical Assistance: +32-2-712-65 42

EUROPEAN TOLL FREE NUMBERS
Germany: 0180 2232923
UK: 0800 960236
Spain: 900 983291
France: 0800 914032

U.S.A. OR CANADA
Sales: 1-800-366-3891 Extension 73000
Technical Assistance: 1-800-366-3891 Extension 73475

ASIA/PACIFIC
Sales Administration: +65-6294-9948
Technical Assistance: +65-6393-0739

ELSEWHERE
Sales Administration: +1-952-938-8080
Technical Assistance: +1-952-917-3475

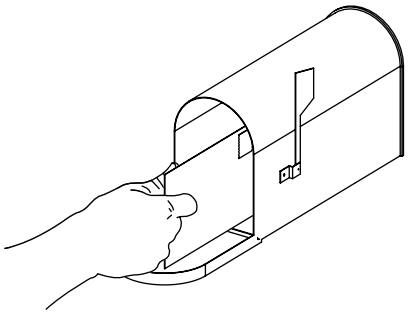


WRITE:

ADC TELECOMMUNICATIONS, INC
PO BOX 1101,
MINNEAPOLIS, MN 55440-1101, USA

ADC TELECOMMUNICATIONS (S'PORE) PTE. LTD.
100 BEACH ROAD, #18-01, SHAW TOWERS.
SINGAPORE 189702.

ADC EUROPEAN CUSTOMER SERVICE, INC
BELGICASTRAAT 2,
1930 ZAVENTEM, BELGIUM



PRODUCT INFORMATION AND TECHNICAL ASSISTANCE:

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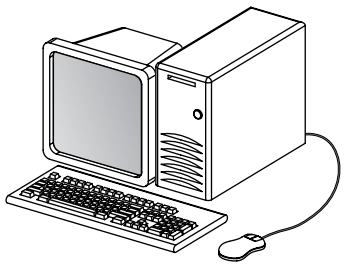
euro_tac@adc.com

asiapacific_tac@adc.com



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