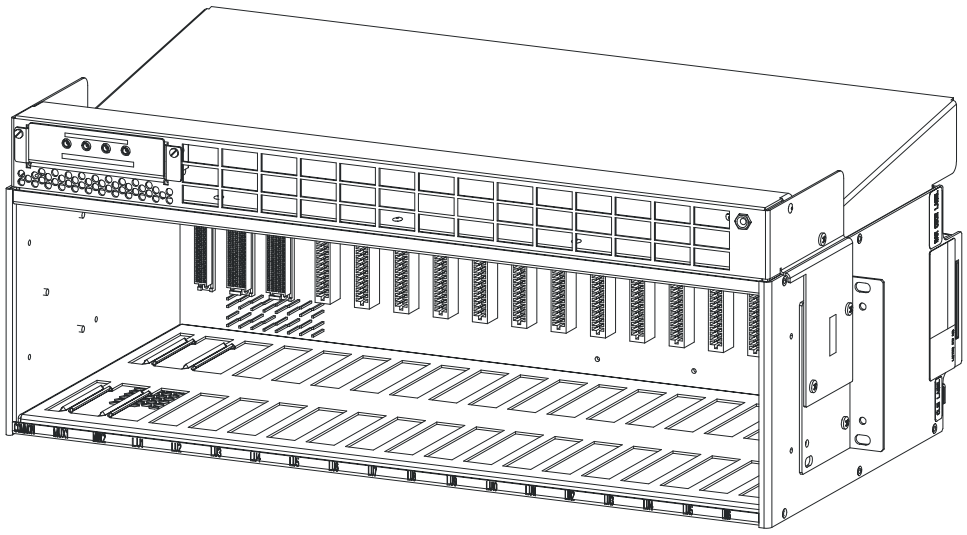
PG-Plus/PG-Flex*Plus*/Edge

PCS-719 23” Central Office Terminal/ Remote Terminal Shelf

Installation and Turn-up/Technical Practice



Model	List	CLEI Code
PCS-719	1A	S9MTCB0A~~
	3	S9MTEB0B~~
ASU-945	1	VAC2H90L~~

Section SCP-PCS719-030-03H

REVISION HISTORY

Revision	Release Date	Revisions Made
01	June 23, 2003	Initial Release
02	August 6, 2003	Updated external alarms
03	March 1, 2004	Updated DB-25 alarm information

USING THIS TECHNICAL PRACTICE

The following style conventions and terminology are used throughout this guide.

Reader Alert	Meaning
	Alerts you to supplementary information
	Alerts you to supplementary information that is essential to the completion of a task
	Alerts you to possible equipment damage from electrostatic discharge
CAUTION	Alerts you to possible data loss, service-affecting procedures, or other similar type problems
WARNING	Alerts you that failure to take or avoid a specific action might result in hardware damage or loss of service
DANGER	Alerts you that failure to take or avoid a specific action might result in personal harm

INSPECTING YOUR SHIPMENT

Upon receipt of the equipment:

- Unpack each container and visually inspect the contents for signs of damage. If the equipment has been damaged in transit, immediately report the extent of damage to the transportation company and to ADC. Order replacement equipment, if necessary.
- Check the packing list to ensure complete and accurate shipment of each listed item. If the shipment is short or irregular, contact ADC as described in Product Support on page 49. If you must store the equipment for a prolonged period, store the equipment in its original container.

Table of Contents

List of Figures

List of Tables

OVERVIEW

The PCS-719 is a versatile chassis that supports numerous application-specific configurations. The shelf can accommodate a common management or alarm unit, two multiplexer units and up to 16 universal or integrated line units or up to eight PG-Flex*Plus*™ integrated line units. The shelf and all associated plugs are hardened and suitable for deployment in a remote cabinet, CEV, or other suitable location. Depending on the application, the PCS-719 can be configured as a Central Office Terminal (COT) or a Remote Terminal (RT) Shelf.

The List 1A and List 3 COT Shelves are identical except the List 3 shelf includes the ASU-945 DS3 splitter bracket for use with the AMX-944 (Figure 1).

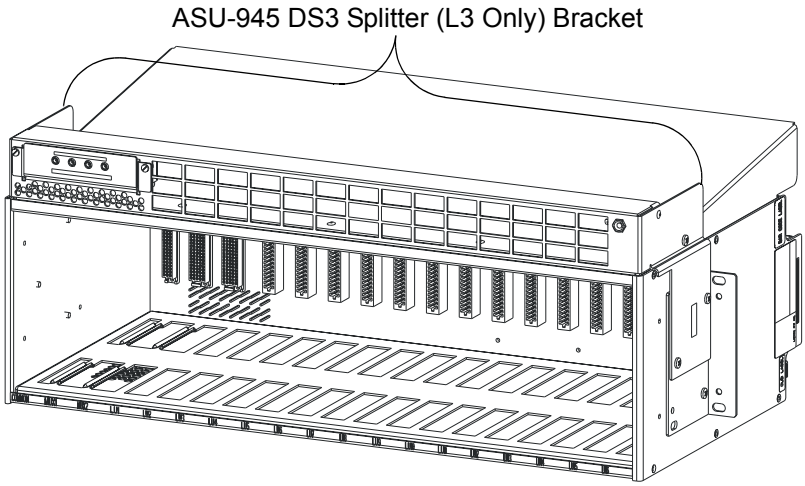


Figure 1. PCS-719 Shelf with ASU-945 DS3 Splitter

PCS-719 SUPPORTED SYSTEM CONFIGURATIONS

Refer to Table 1 for PCS-719 supported system configurations.

Table 1. PCS-719 Supported System Configurations

System Configuration	Narrowband	Broadband ATM
96-Channel Universal Digital Added Main Line (DAML) COT 2, 4, 6	✔	
192-Channel Integrated PG-Flex*Plus* COT	✔	
96-Channel Universal DLC COT to PG-Plus RT	✔	
192-Channel Distributed DLC RT	✔	
Edge Remote Access Multiplexer (RAM)		✔
Edge Integrated Access Device (IAD)	✔	✔

The PCS-719 List 3 supports all of the system configurations; whereas, the PCS-719 List 1A supports all except when deployed with the AMX-944 DS3 Multiplexer Unit. The AMX-944 must be installed in a PCS-719 List 3 shelf to support a DS3 ATM interface.

ADC Recommendation: For maximum system flexibility, ADC recommends use of the PCS-719 List 3 for all system configurations.

96-Channel Universal DAML COT

The 96-Channel Universal DAML configuration includes:

- Shelf typically deployed in a CO environment
- Analog tip/ring input from switch
- Supports up to 96 DS0s
- Each slot supports up to 6 DS0s per a single pair High-bit-rate Digital Subscriber Line (HDSL) except Dual 2 POTS supports 2 each single pair HDSL
- Configuration supports POTS
- Configuration supports Enhanced Business Service (EBS) (P-Phone)
- Configuration supports Integrated Services Digital Network (ISDN)
- Shelf provides line powering for various Network Interface Devices (NIDs)
- Local powering not required at NID

Refer to Figure 2 for the 96-Channel Universal DAML system configuration.

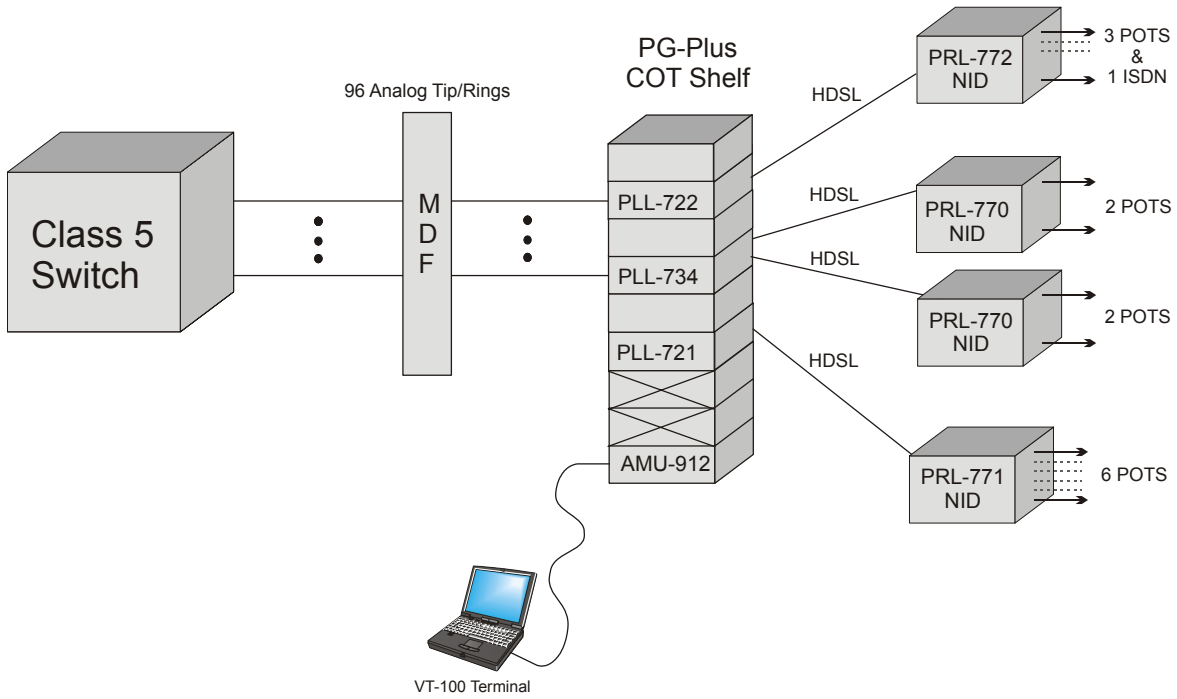


Figure 2. 96-Channel Universal DAML COT

192-Channel Integrated PG-Flex*Plus* COT

The 192-Channel Integrated configuration includes:

- Shelf typically deployed in a CO environment
- Can be deployed remotely, if desired
- DS1 input from switch
- Supports up to 192 DS0s
- Each slot supports up to 12 DS0s via dual single pair HDSL
- Configuration supports POTS services
- Supports Loop Start/Ground Start (LS/GS) services
- Shelf provides line powering for various NIDs and RTs
- Local powering not required at RT
- Local powering option with 24-channel PG-FlexPlus Remotes

Refer to Figure 3 for the 192-Channel Integrated COT system configuration.

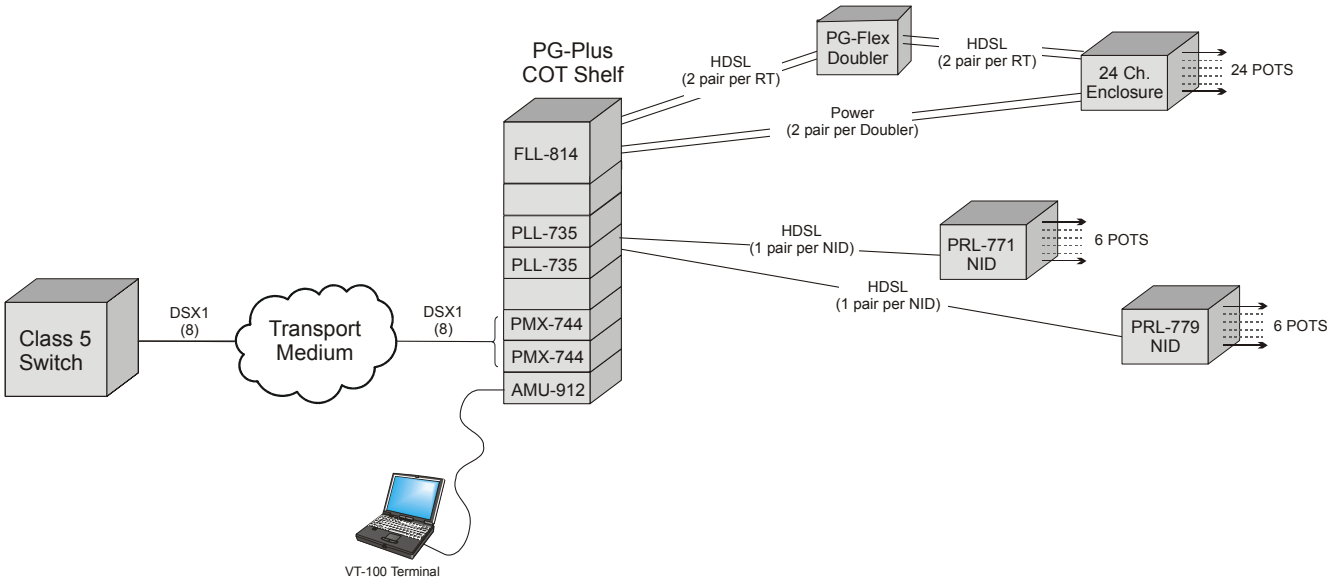


Figure 3. 192-Channel Integrated COT

96-Channel Universal DLC COT to Plus RT

The 96-Channel Universal DLC configuration includes:

- Shelves deployed at the CO and remote location
- Analog tip/ring input from switch
- DS1 input to Remote Shelf
- Supports up to 96 DS0s
- Each slot supports up to 6 DS0s
- Supports POTS services
- Supports up to 4 DS1s with a 5th for protection

Refer to Figure 4 for the 96-Channel Universal DLC COT system configuration.

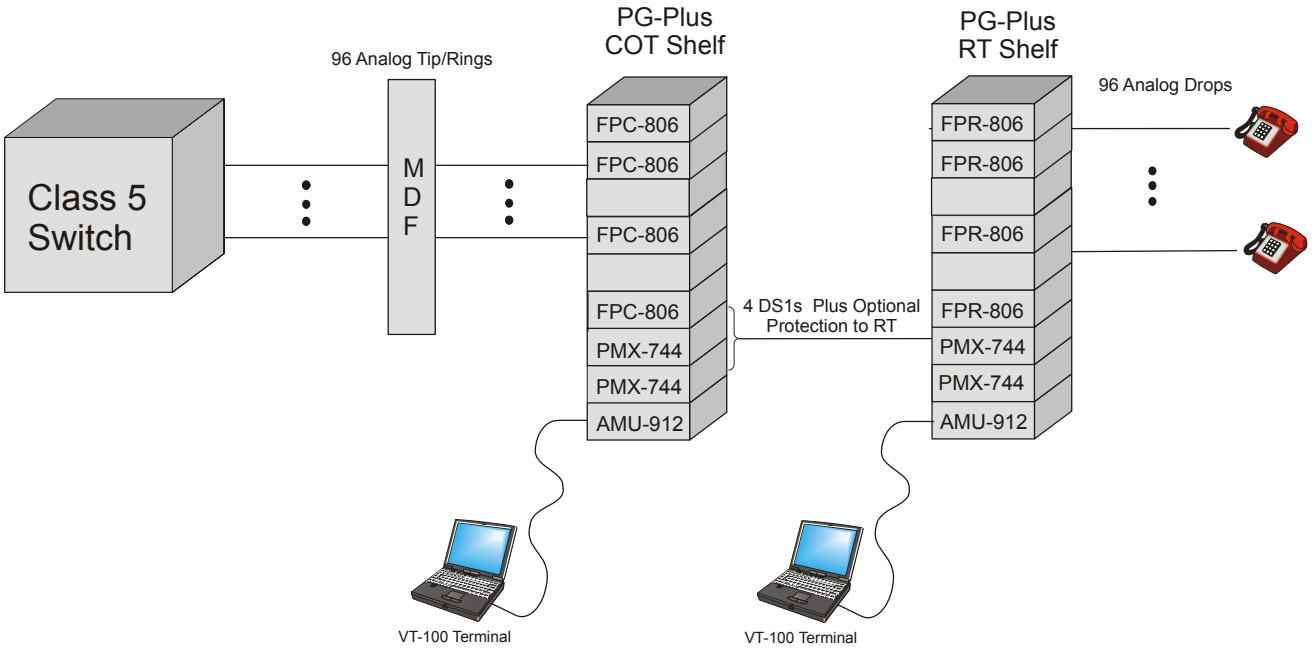


Figure 4. 96-Channel Universal DLC COT

192-Channel Distributed DLC RT

The 192-Channel Distributed DLC configuration includes:

- Shelf typically deployed in the field (CEV or outdoor Cabinet)
- DS1 input from switch
- Supports up to 192 DS0s
- Each slot supports up to 12 DS0s
- Supports TR-08 Mode 1, SF, or ESF Integrated Channel Bank (ICB) interfaces
- DS0s dropped off via FPR-806 or distributed to line-powered, micro-DLC remotes

Refer to Figure 5 for the 192-Channel Distributed DLC RT system configuration.

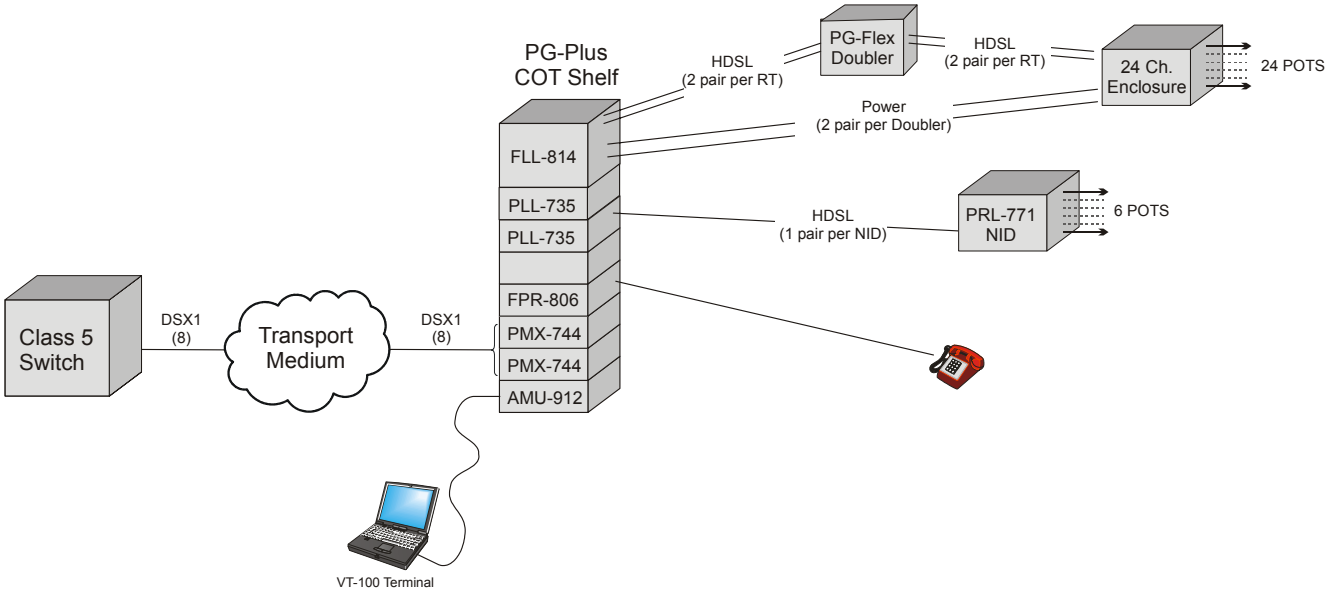


Figure 5. 192-Channel Distributed DLC RT

Edge RAM

The Edge RAM configuration includes:

- Redundant multiplexers provide DS1 circuit protection
- ASU-945 splitter provides DS3 circuit protection
- Shelf supports up to 16 ALU-935s
- DS1 (AMX-943) or DS3 (AMX-944) ATM interface options
- AMX-944 supports 8 TDM DS1s for up to 192 DS0s
- AMX-944 supports ATM DS3 interface for up to 256 PVCs
- AMX-944 supports up to 11 Crossbox RTs (24 ADSLs each)
- AMX-943 supports 4 TDM DS1s for up to 96 DS0s
- AMX-943 supports 4 ATM DS1s for up to 128 PVCs
- AMX-943 supports up to 6 Crossbox RTs (24 ADSLs each)
- Uses Symmetric High-bit-rate Digital Subscriber Line (SHDSL) circuits between RAM and COT Shelf
- Extends Asynchronous Digital Subscriber Line (ADSL) services beyond the normal ADSL range
- Provides ADSL drops to the subscriber
- Crossbox RT combines POTS and ADSL over a single copper pair
- Crossbox RT supports up tp 3 SHDSL circuits
- Each SHDSL supports up to 8 ADSL circuits
- Crossbox RT supports 3 ARL-942s and 3 ASU-940s (24 ADSL subscribers)
- Analog POTS circuits terminating in Crossbox RT are provided over copper pairs from switch/DLC and combined in ASU-940 with the ADSL circuits originating from the ARL-942

Refer to Figure 6 on page 7 and Figure 7 on page 7 for the Edge RAM system configuration.

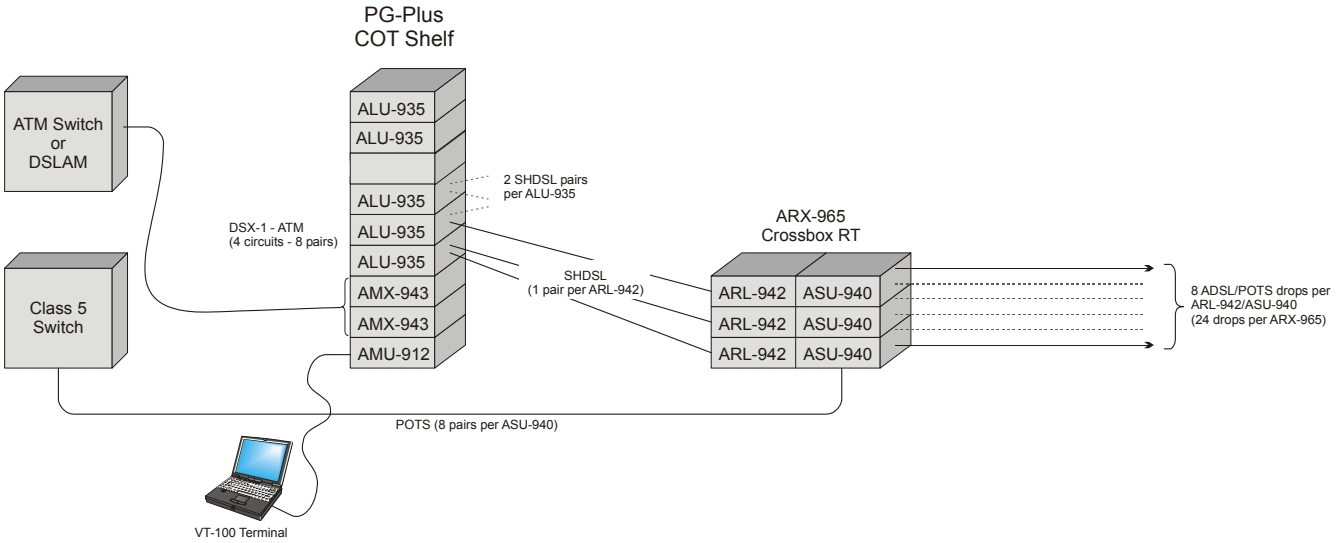


Figure 6. Edge RAM System Configuration – AMX-943

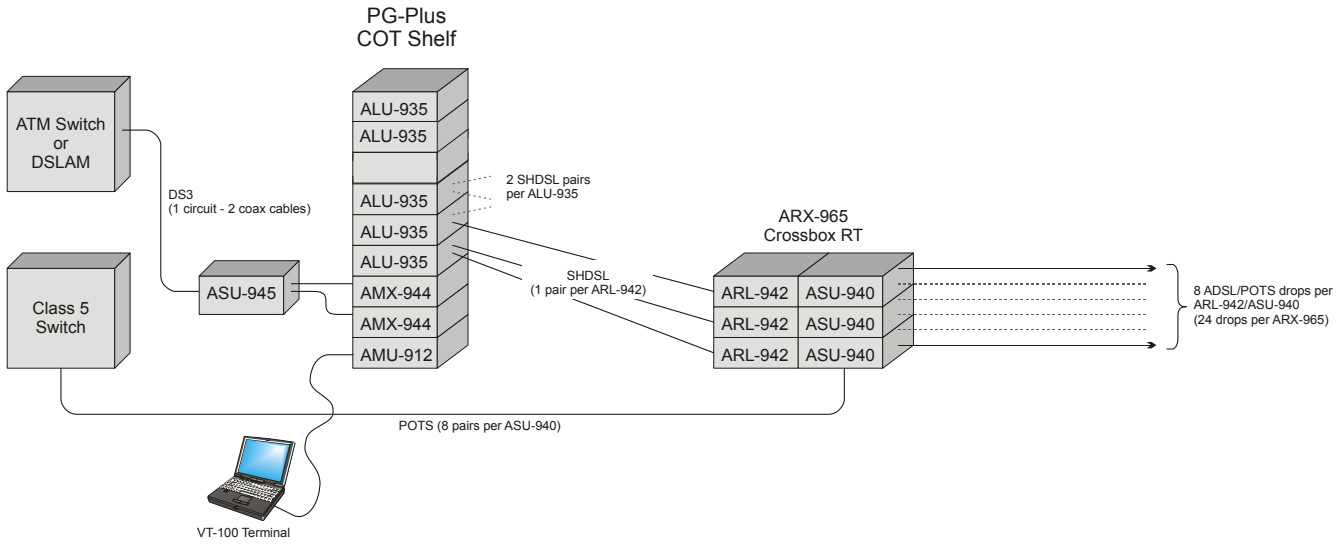


Figure 7. Edge RAM System Configuration – AMX-944

Edge IAD

The Edge IAD configuration includes:

- Redundant multiplexers provide DS1 circuit protection
- ASU-945 splitter provides DS3 circuit protection
- Shelf supports up to 16 ALU-935s
- AMX-944 supports 8 TDM DS1s for up to 192 DS0s
- AMX-944 supports ATM DS3 interface for up to 256 PVCs
- AMX-943 supports 4 TDM DS1s for up to 96 DS0s
- AMX-943 supports 4 ATM DS1s for up to 128 PVCs
- IAD provides ADSL services to multi-line subscribers over a single copper pair
- SHDSL circuits transport ADSL and POTS between COT Shelf and NID
- NID provides 1 ADSL and 3 or 6 Universal Voice Grade (UVG) POTS circuits to the subscriber
- Each ALU-935 supports 2 ARB-96x NIDs
- 3 and 6 POTS NIDs can be mixed on the same ALU-935
- ARB-963 NIDs can be ordered with or without built-in splitters

Refer to Figure 8 on page 9 and Figure 9 on page 9 for the Edge IAD system configuration.

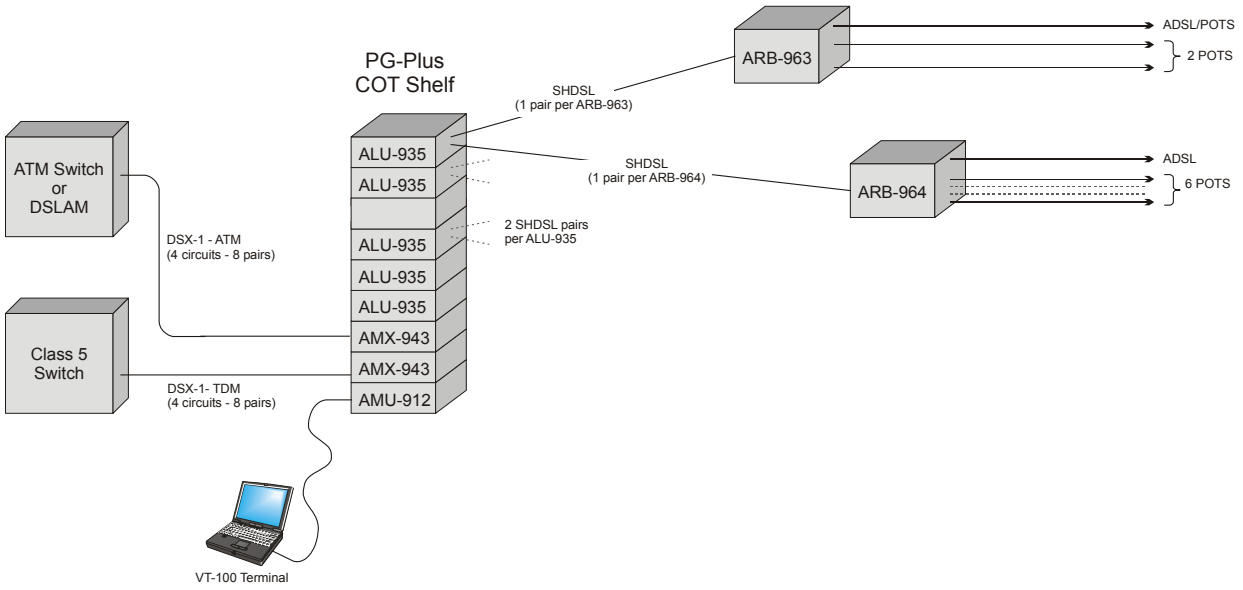


Figure 8. Edge IAD System Configuration – AMX-943

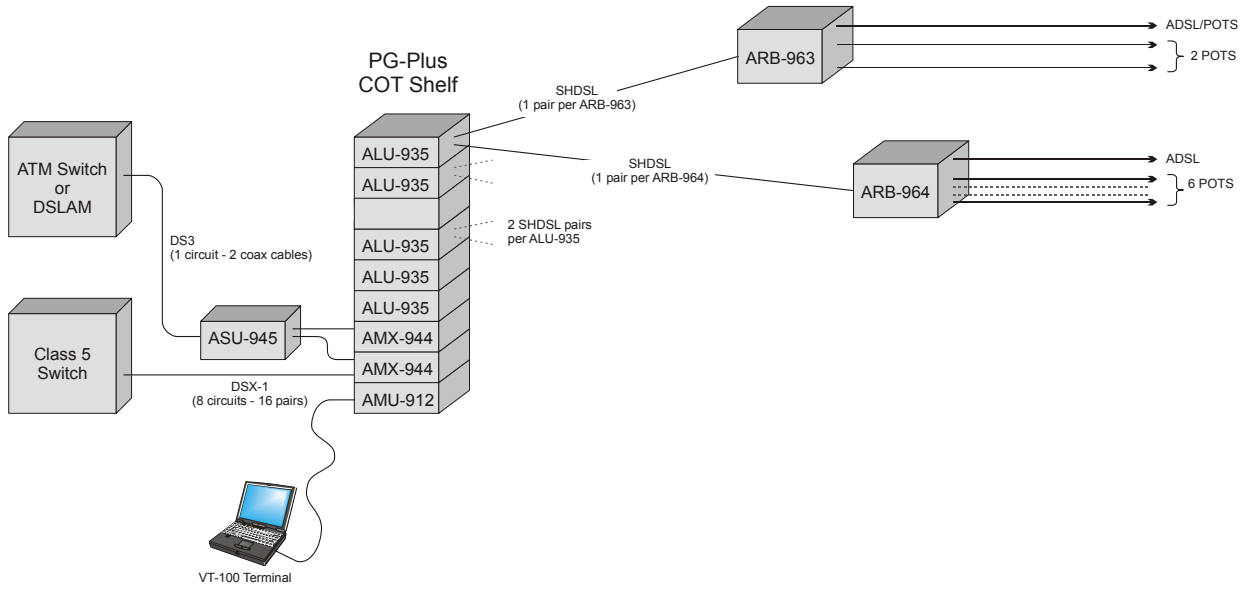


Figure 9. Edge IAD System Configuration – AMX-944

DESCRIPTION AND FEATURES

The PCS-719 provides convenient mounting of a common management or alarm unit, two multiplexer units and line units. Termination points for DS1s, subscriber circuits, alarm, power, and metallic test access are located on the backplane on the rear of the shelf. All circuit boards are installed from the front. The shelf accommodates the following units (Figure 10).

- 16 universal, integrated, or Edge line units or 8 Flex integrated line units
- Two multiplexer units
- One management or alarm unit

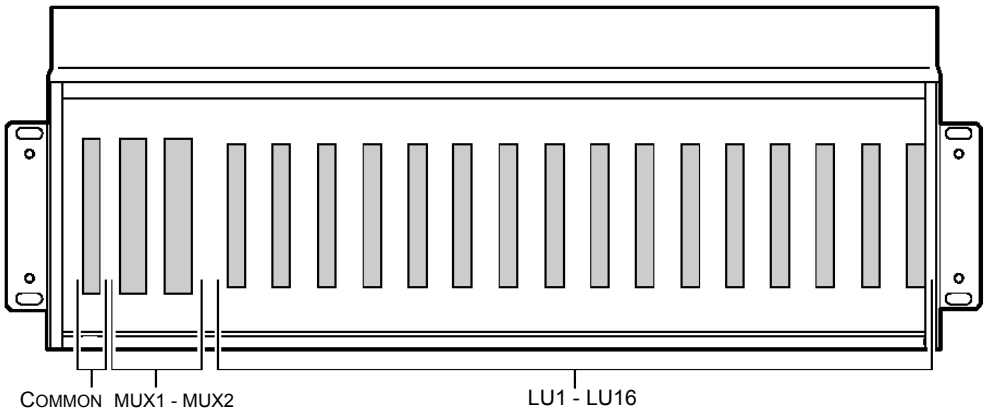


Figure 10. PCS-719 Card Placement

FEATURES

The PCS-719 shelf features include:

- Mounting brackets for 23-inch equipment rack installation
- Wire-wrap pins for HDSL, alarm cutoff, alarm relays, DSX-1, composite clock
- Screw terminals for frame ground and Central Office (CO) battery
- DB-25 connector for network communications
- BNC connector for inter-shelf communications
- 25-pair Telco connectors for two-wire service connections
- 32-pair Telco connector – Reserved

BACKPLANE CONNECTIONS

The backplane of the PCS-719 contains the connectors shown in Figure 11 and Table 2. Wiring external to the COT shelf should conform to local practices.

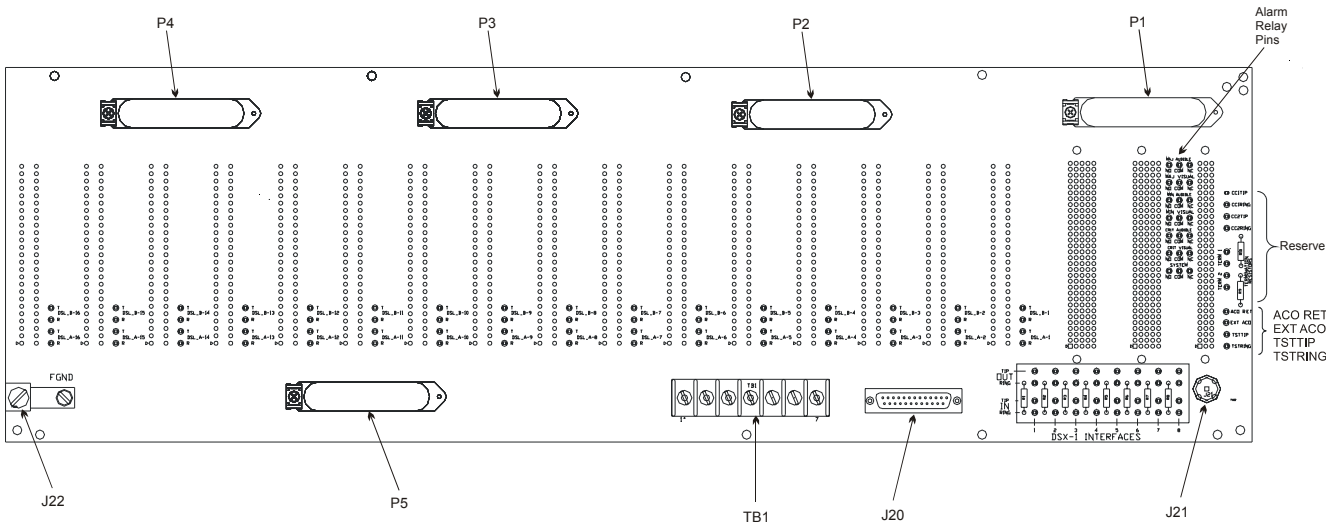


Figure 11. PCS-719 Shelf Backplane

Table 2. Backplane Connectors

Connector	Description
J20	DB-25 (craft port or external alarm input)
J21	LAN
J22	Frame Ground
P1 – P4	25-pair Telco
P5	Reserved
TB1	Seven-position power-terminal strip

CONNECTOR BY TYPE AND FUNCTION

Power

The shelf backplane has a seven-position power terminal strip (TB1) that provides connections for dual –48 Vdc, common battery return, and frame ground. The shelf can be wired for redundant, split, or single-source powering.

DS1

Eight transmit and receive pairs per shelf are required to provide terminations for central office DSX-1 signals if the shelf is used in Integrated Mode. The input (side 1) DSX-1 wire-wrap connections include 100 Ω line termination resistors on the PCS-719 backplane. Each DSX-1 circuit is connected to the PCS-719 backplane.

DS3

The DS3 circuit connects the ATM switch or Digital Subscriber Line Access Module (DSLAM) to the DS3 splitter mounted on the top of the List 3 COT shelf. The DS3 connections to the Asynchronous Transfer Mode (ATM) switch or DSLAM are made on the rear of the splitter.

HDSL

Each line unit slot is equipped with 2 sets of 2 wire-wrap pins for xDSL wiring.

Two-Wire Subscriber Circuits

Four 50-pin Telco-ended (female) cables per system are required for connecting the shelf to the switch subscriber line circuits at the distribution frame. Dress the cables along the sides of the frame per local practices.

Subscriber lines from the CO are connected to the COT shelf by way of 50-pin Telco connectors (P1, P2, P3, and P4). Table 14 on page 36 through Table 17 on page 37 list the Telco connector pinouts. A total of 96 subscriber lines terminate at the 25-pair Telco connectors (P1, P2, P3, and P4) on the shelf backplane. Pairs 1-24 on each connector are used. Pair 25 is not used. Six pairs route to each of the 16 line unit slots.

ALARM CUTOFF

The shelf backplane provides a wire-wrap pin for connection to an external alarm cutoff circuit.

EXTERNAL ALARM RELAY CONTACTS

The shelf provides access to the management/alarm unit alarm relays by way of wire-wrap pins on the backplane. Normally open (NO) and normally closed (NC) relay operation is supported. Figure 12 shows the configuration of the alarm relays.

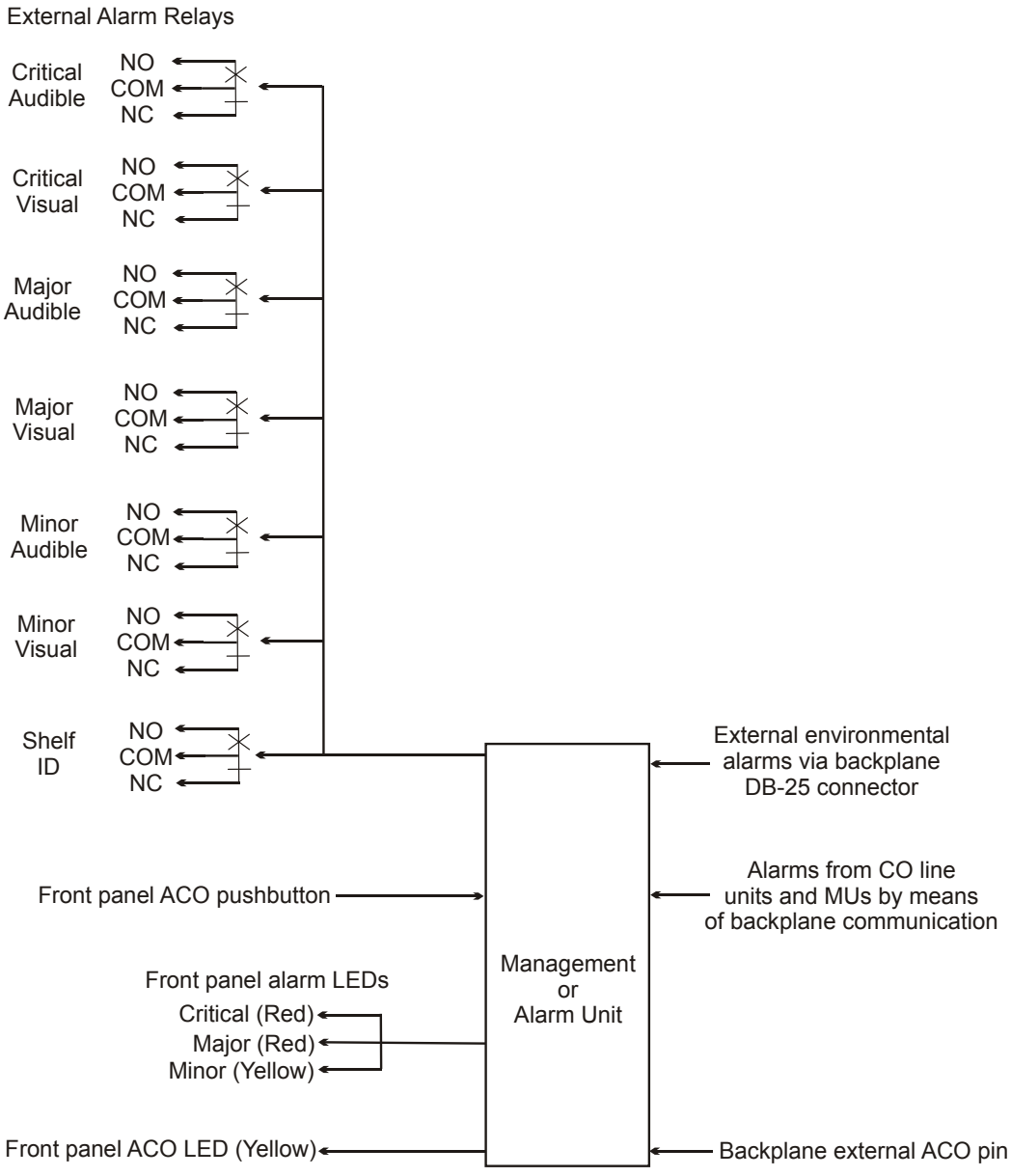


Figure 12. Alarm Relay Contacts and Alarm Block Diagram

Relay contacts are shown when alarm is not active.

External Environmental Alarm Contact Alarm Inputs/Outputs

The Management Unit allows the rear craft port to be provisioned as either a craft port (RS-232) or environmental alarm input (Figure 13). When the rear craft port is provisioned for environmental alarm inputs, the conductors operate as dry input contacts. An alarm is considered active when certain pins are pulled to +8 volts. Note that the functionality of the DB-25 must be changed to ENV-ALARMS setting rather than the default setting of CRAFT-PORT. Refer to the Management Unit Technical Practice, CONFIG|Shelf Options| DB25 Setting. There are a total of four Environmental Alarms: ENV1, ENV2, ENV3, and ENV4 (Table 3 on page 15). In addition to the Environmental Alarms being reported through screens, they are also reported through the DDL of the TR08 Shelf A DS1. There can be up to three shelf alarm relay settings: Standard, Telemetry and Environmental. Refer to Figure 13 and Table 4 on page 15 for proper wiring of customer supported DB-25 alarm cable.

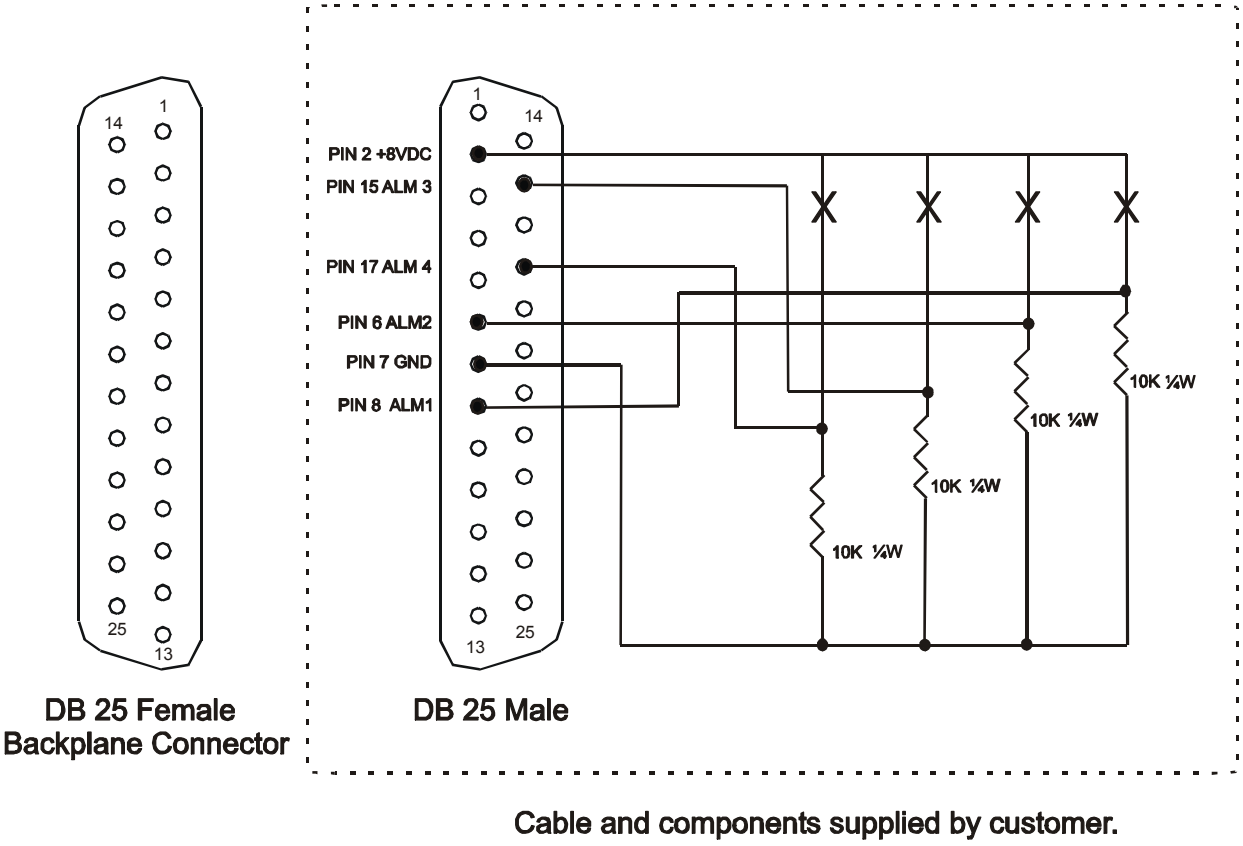


Figure 13. ENV Alarm Input Pinouts

CAUTION ***Connections other than those shown in Figure 13 will damage the PMU/AMU and will not be covered under the warranty.***

Table 3. Environmental Alarm Input Definitions

Alarm Input Type	Management Unit in CO Shelf (TR-08 Alarm Defaults)	Management Unit in Field Shelf (TR-08 Alarm Defaults)
ENV1	ENV1 (SYS1-PWRMISC)	AC Power Fail (SYS1-PWRMISC)
ENV2	ENV2 (SYS2-PWRMISC)	Door Alarm (COM MN)
ENV3	ENV3 (COM MN)	Fan Alarm (COM MN)
ENV4	ENV4 (COM MJ)	MISC (COM MJ)

Table 4. DB-25 Alarm Cable Pinouts

Environmental Alarm	Common	Normally Open
Alarm 1	2	8
Alarm 2	2	6
Alarm 3	2	15
Alarm 4	2	17

SUPPORTED NID/RT SERVICE TYPES

Refer to Table 5 for PCS-719 supported NID/RT service types.

Table 5. Supported NID/RT Service Types

Services	NID/Module	96-Ch. Universal DAML	192-Ch. Integrated COT	96-Ch. Universal DLC COT	192-Ch. Distributed DLC RT	Edge RAM	Edge IAD
4 POTS	PRL-770	✔	✔		✔		✔
4 POTS UVG	PRL-780[1]	✔	✔		✔		✔
6 POTS	PRL-771	✔	✔		✔		✔
6 POTS UVG	PRL-779[1]	✔	✔		✔		✔
3 POTS/ 1 ISDN	PRL-772	✔					
2 ISDN	PRL-773	✔					
1 POTS/1 ISDN	PRL-774	✔					
4 EBS (P-Phone)	PRL-783	✔					
24 Channel RT	FRL-842		✔		✔		✔
Edge IAD	ARB-963						✔
	ARB-964						✔
Edge RAM	ARL-942					✔	
RPOTS	FPR-806		✔		✔		✔
CPOTS	FPC-806			✔			

NOTE:

[1] Groundstart services are not supported in 96-Channel Universal DAML system configuration

FUSING AND HEAT DISSIPATION

Refer to Table 6 on page 16 through Table 10 on page 19 for fuse and heat dissipation requirements for all system configurations.

Fusing 192-Channel Integrated COT or 192-Channel Distributed DLC RT Systems

Table 6 summarizes the shelf powering requirements and heat dissipation for the shelf. Table 6 also provides the average current drawn from a fully populated shelf under these conditions.

The conditions in Table 6 assume all lines are off hook. The configuration used for computing the shelf current and heat dissipation includes two multiplexer units and one management or alarm unit.

Table 6. PCS-719 Shelf Power and Heat Dissipation for Integrated Systems

Service	Models	Split Powering		Single or Redundant Powering		CO Heat Dissipation (Watts)
		CO Input Current[1] (Amps)	Shelf Fuse[2] (Amps)	CO Input Current[1] (Amps)	Shelf Fuse[2] (Amps)	
Single HDSL						
4 POTS	PLL-735	2.50	3.00	4.74	7.50	78
6 POTS	PLL-735	3.06	5.00	5.86	10.00	85
Dual HDSL						
4 POTS	PLL-735	4.54	7.50	8.74	12.00	120
6 POTS	PLL-735	5.66	7.50	10.98	15.00	135
24 POTS[3] (No Doublers)	FLL-814	6.42	10.00	12.51	20.00	136
24 POTS[3] (1 Doubler)	FLL-814	7.01	10.00	13.67	20.00	144
24 POTS[3] (2 Doublers)	FLL-814	7.87	10.00	15.41	20.00	159
24 POTS[4] (No Doublers)	FLL-814	4.63	7.50	8.88	12.00	106
24 POTS[4] (1 Doubler)	FLL-814	5.22	7.50	10.04	15.00	130
24 POTS[4] (2 Doublers)	FLL-814	5.70	10.00	11.04	15.00	130

[1] Indicates the current when all lines are off hook with all DSL lines at maximum length with -48 Vdc battery.

[2] Indicates the recommended fuse for -42.5 Vdc battery and 15% fuse margin.

[3] Indicates the subscriber drop set for LONG is ≤ 960 Ω.

[4] Indicates the subscriber drop set for SHORT is ≤ 830 Ω.

Fusing Universal DAML Systems

Table 7 summarizes the shelf powering requirements and heat dissipation for the shelf. Table 7 also provides the average current drawn from a fully populated shelf under the these conditions.

The conditions in Table 7 assume all lines are off hook. The configuration used for computing the shelf current and heat dissipation includes two multiplexer units and one management or alarm unit.

Table 7. PCS-719 Shelf Power and Heat Dissipation for Universal Systems

Service	Models	Split Powering		Single or Redundant Powering		CO Heat Dissipation (Watts)
		CO Input Current[1] (Amps)	Shelf Fuse[2] (Amps)	CO Input Current[1] (Amps)	Shelf Fuse[2] (Amps)	
4 POTS	PLL-720	2.58	5.00	5.11	7.50	132
6 POTS	PLL-721	3.18	5.00	6.32	10.00	162
3 POTS/1 ISDN	PLL-722	2.47	3.00	4.89	7.50	121
2 ISDN	PLL-723	1.98	3.00	3.92	7.50	84
1 LS POTS/1 ISDN	PLL-724	2.14	3.00	4.23	7.50	96
3 POTS/1 DDS	PLL-726	2.62	5.00	5.19	7.50	111
6 POTS UVG	PLL-729	3.46	5.00	6.86	10.00	152
4 EBS (P-Phone)	PLL-733	2.10	3.00	4.15	7.50	119
Dual 2 POTS	PLL-734	2.96	5.00	5.88	10.00	154

[1] Indicates the current when all lines are off hook with all DSL lines at maximum length with -48 Vdc battery.

[2] Indicates the recommended fuse for -42.5 Vdc battery and 15% fuse margin.

Fusing CPOTS Systems

Table 8 summarizes the shelf powering requirements and heat dissipation for the shelf. Table 8 also provides the average current drawn from a fully populated shelf under these conditions.

The conditions in Table 8 assume all lines are off hook. The configuration used for computing the shelf current and heat dissipation includes two multiplexer units and one management or alarm unit.

Table 8. PCS-719 Shelf Power and Heat Dissipation for CPOTS

Service	Models	Split Powering		Single or Redundant Powering		CO Heat Dissipation (Watts)
		CO Input Current[1] (Amps)	Shelf Fuse[2] (Amps)	CO Input Current[1] (Amps)	Shelf Fuse[2] (Amps)	
CPOTS	FPC-806	.74	1.00	1.01	1.5	114

[1] Indicates the current when all lines are off hook with -48 Vdc battery.

[2] Indicates the recommended fuse for -42.5 Vdc battery and 15% fuse margin.

Fusing RPOTS Systems

Table 9 summarizes the shelf powering requirements and heat dissipation for the shelf. Table 9 also provides the average current drawn from a fully populated shelf under these conditions.

The conditions in Table 9 assume all lines are off hook. The configuration used for computing the shelf current and heat dissipation includes two multiplexer units and one management or alarm unit.

Table 9. PCS-719 Shelf Power and Heat Dissipation for RPOTS

Service	Models	Split Powering		Single or Redundant Powering		CO Heat Dissipation (Watts)
		CO Input Current[1] (Amps)	Shelf Fuse[2] (Amps)	CO Input Current[1] (Amps)	Shelf Fuse[2] (Amps)	
RPOTS	FPR-806	8.2	10.00	15.7	20.00	246

[1] Indicates the current when all lines are off hook with -48 Vdc battery.

[2] Indicates the recommended fuse for -42.5 Vdc battery and 15% fuse margin.

Fusing Edge RAM and Edge IAD Systems

Table 10 summarizes the shelf powering requirements and heat dissipation for the shelf. Table 10 also provides the average current drawn from a fully populated shelf under these conditions.

The conditions in Table 10 assume a fully populated Edge RAM or Edge IAD system and all lines are off hook (Edge IAD only). The configuration used for computing the shelf current and heat dissipation includes two multiplexer units and one management or alarm unit.

Table 10. PCS-719 Shelf Power and Heat Dissipation for Edge RAM and Edge IAD

Service	Models	Split Powering		Single or Redundant Powering		CO Heat Dissipation (Watts)
		CO Input Current[1] (Amps)	Shelf Fuse[2] (Amps)	CO Input Current[1] (Amps)	Shelf Fuse[2] (Amps)	
RAM	ARL-942	6.6	7.5	12.6	15.0	163
IAD	ARB-963	5.8	7.5	11.1	15.0	154
	ARB-964	6.6	7.5	12.6	15.0	163

[1] Indicates the current when all lines are off hook with all xDSL lines at maximum length with -48 Vdc battery.

[2] Indicates the recommended fuse for -42.5 Vdc battery and 15% fuse margin.

NETWORK INTERFACE

The shelf supports RS-232 X.25 interfaces through a backplane-mounted DB-25 connector. The rear backplane DB-25 is a female connector wired as a Data Terminal Equipment (DTE) interface. The signals and pin assignments for this connector are listed in Table 11. This connector is for communication with a DCE device such as a modem. Figure 14 shows the cable connections between the backplane connector and a DCE DB-25 connector. To connect to a DTE device from the backplane connector, a null modem cable is required. Figure 15 on page 21 shows the wiring for the required null modem cable. This feature requires a management unit installed in the shelf. Refer to the management unit documentation for additional information on this interface.

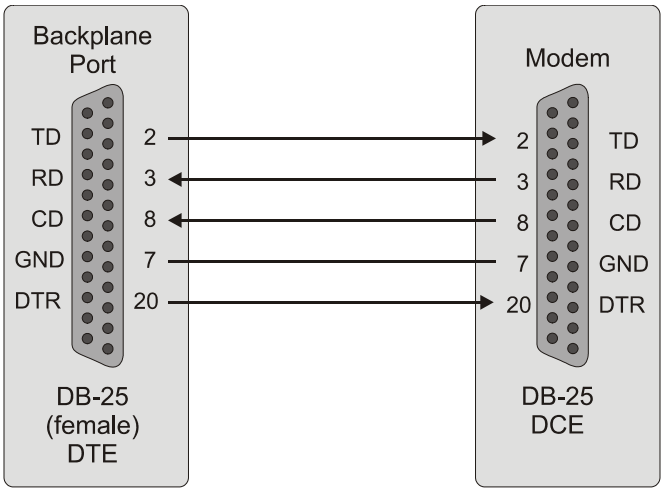


Figure 14. Modem Connection for PCS-719 Backplane

Table 11. PCS-719 Backplane DB-25 Connector Pinouts

DB-25 Pin	Signal
2	Transmitted Data
3	Received Data
8	Carrier Detect
7	Signal Carrier
20	Data Terminal Ready

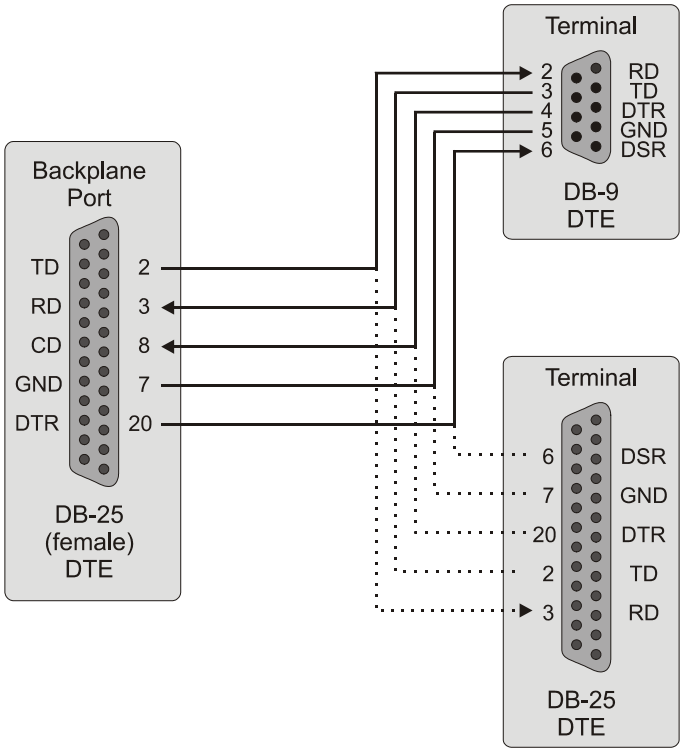


Figure 15. Null Modem Connection for PCS-719 Backplane

LAN INTERFACE

The shelf supports communications between multiple shelves by means of a 10Base2 BNC LAN connector. This feature requires a Management Unit installed in the shelf. Refer to the Management Unit documentation for additional information on this interface. Figure 16 shows the 10Base2 LAN connector.

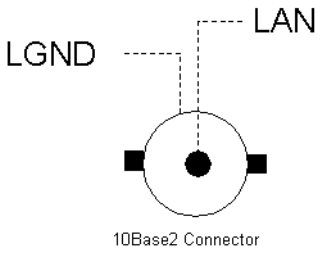


Figure 16. LAN Connector

DSX-1 CONNECTIONS

The shelf provides terminations for eight Digital Signal One (DS1) inputs from the DSX-1 cross-connect by way of wire-wrap pins located at the bottom right hand side of the shelf backplane. The DS1 inputs are bridged to both multiplexer unit slots to allow for 1:1 equipment protection. The 100 Ω termination resistors are included on each of the DSX-1 IN connections.

DS3 Connections (for AMX-944 only)

The DS3 ATM data connections are connected to the ASU-945 DS3 splitter. The ASU-945 allows one DS3 interface to be connected to the active and standby AMX-944 multiplexer units.

Specifications

Table 12 lists the specifications for the PCS-719.

Table 12. Specifications

Category	Item	Value
Power	Voltage	-48 Vdc
	Fuse Rating	Application specific (refer to Table 6 on page 16 through Table 10 on page 19)
Environmental	Elevation	-200 ft. to 13,000 ft. -60 m to 4,000 m
	Temperature	-40° F to +150° F -40° C to +65° C
	Humidity	5% to 95% (non-condensing)
Compliance	NEBS	SR-3580 Level 3
	Human Safety	UL-1950 for Restricted Access
	Emissions Radiation and Immunity	GR-1089-CORE for Class A equipment
Physical	Height	8.75 in. (22.2 cm.)
	Width	23.0 in. (58.4 cm.)
	Depth	11.75 in. (29.8 cm.)
	Weight	22.5 lbs. (10.2 kg.)

UPGRADING THE PCS-719 L1A TO L3

You will need to have available the ASU-945 L1 DS3 Splitter before starting this procedure.

The PCS-719 shelf may pivot during the upgrade, so be careful to hold the shelf steady.

REQUIRED TOOL

A No. 2 Phillips-head screwdriver is required for this installation.

Installing the ASU-945 DS3 Splitter

Checkoff ❑

1. Remove the two screws and lock washers from **both** sides of the PCS-719 shelf (Figure 17 - only one side shown).

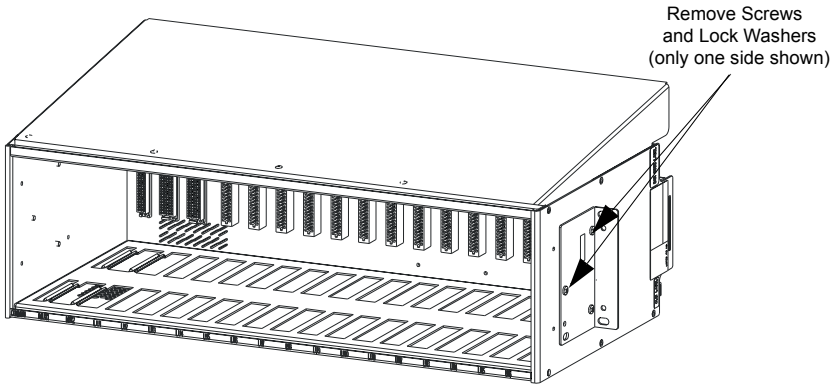


Figure 17. Remove Screws and Lock Washers

2. Place the ASU-945 DS3 Splitter bracket on the PCS-719 shelf (Figure 18).
3. Replace the two screws and lock washers on **both** sides of the PCS-719 shelf (Figure 18 - only one side shown). Make sure you are securing the ASU-945 DS3 Splitter bracket.

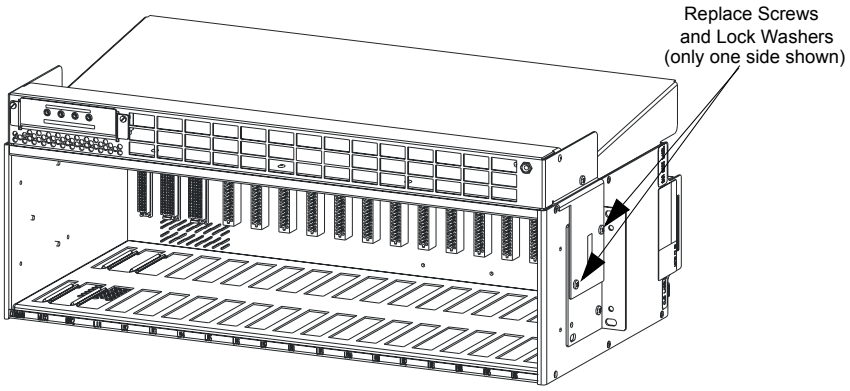


Figure 18. Replace the Screws and Lock Washers

INSTALLATION AND TEST

REQUIRED TOOLS AND TEST EQUIPMENT

The tools and test equipment required for the installation of the shelf are:

- Wire-wrap tool for .045-inch square pins
- No. 2 Phillips-head screwdriver
- Flat-head screwdriver
- Wire-strippers
- Side-cutters
- Volt-ohmmeter

REQUIRED FOR ALL SHELF INSTALLATIONS

All wiring to the shelf is done on the backplane (Figure 11 on page 11 and Table 2 on page 11). Remove the clear Plexiglas™ cover to access the backplane.

The following tasks must be performed on all shelf installations:

- Mounting
- NEBS Compliance
- J22 Connection
- TB1 FGND Connection
- Power Connections
- Alarm Connections
- Test Connections
- External ACO Connections

Mounting

Checkoff ❑

Mount the shelf to the selected position in the 23-inch equipment frame using the supplied hardware.

The PCS-719 shelf is intended for installation on or above concrete or other non-combustible surfaces only.

NEBS Compliance

Checkoff ❑

The Network Equipment Building Standard (NEBS) limits the maximum dissipation in a 12-inch deep individual CO equipment frame, with open-faced mounting and natural convection cooling, to 946 W. Refer to each individual line unit technical practice to determine the maximum number of units that can occupy any bay with the 946 W limit.

GROUND CONNECTIONS

Two frame ground termination points are provided on the shelf. The J22 and TB1 FGND Frame Ground termination points are electrically equivalent. To ground the shelf, do one of the following ground connection options:

J22 Connection

Checkoff ❑

Frame ground must be connected to provide a discharge path for outside plant protection circuits.

The preferred termination point is at J22, located on the lower left corner of the backplane. This ground lug will accept wire in the range of 6 to 12 AWG.

Use this connection only if the equipment frame has a common equipment ground wire running along the vertical member of the frame.

1. Using a wire gauge of the same size as the common equipment frame ground wire, remove 5/8-inch of insulation and insert the stripped wire into the ground lug J22.
2. Using a flat-head screwdriver, secure the wire in the lug.
3. Attach the other end to the common equipment frame ground using locally approved methods.

TB1 FGND Connection

Checkoff ❑

The TB1 termination point is located on the backplane. A minimum of 12 AWG wire should be used for this connection.

1. Using minimum 12 AWG wire, attach a spade lug connector to terminate the ground wire on the FGND terminal of TB1.
2. Connect the other end of the frame ground wire to the CO frame ground termination point using locally approved methods.

Power Connections

Checkoff ❑

The TB1 termination point on the shelf backplane provides connections for dual –48 Vdc, common battery return, and frame ground by way of screw terminals. The shelf can be wired for redundant, split, or single-source powering depending upon requirements. The following sections describe the three powering options available on this shelf. Redundant shelf powering is the preferred method for powering the shelf.

1. Prior to performing any power connections, remove all fuses in the equipment bay's fuse panel for the circuit(s) where the –48 Vdc power leads will be terminated until the shelf is wired and ready for turn-up.
2. Run the battery and battery return lines from the fuse panel to the shelf using a minimum of 12 AWG wire.
   a. For single source powering, refer to Single Source Powering on page 26
   b. For redundant shelf powering, refer to Redundant Shelf Powering on page 27
   c. For split shelf powering, refer to Split Shelf Powering on page 28
3. Connect to a reliably grounded –48 Vdc source that is electrically isolated from the AC source.
4. Shelf should be fused according to Table 6 on page 16 through Table 10 on page 19.

Single Source Powering

In this configuration, the entire shelf is powered from a single source of –48 Vdc power fused according to Table 6 on page 16 through Table 10 on page 19.

A four-position jumper is in place on the TB1 block. This jumper shorts all of the 48 VDC inputs together to prevent an alarm condition when only one input feed wire is connected. To provide single source powering:

1. Ensure that the ground connection is in place.
2. Connect a wire from the –48A-LOW terminal at TB1 (Figure 19) to the battery supply at the fuse panel.
3. Connect a wire from the Battery Return terminal in position 6 of TB1 to the battery return of the battery supply at the fuse panel.
4. The four-position jumper from the –48A-LOW terminal of TB1 to the –48B-HIGH terminal of TB1 should be installed as shown in Figure 19.

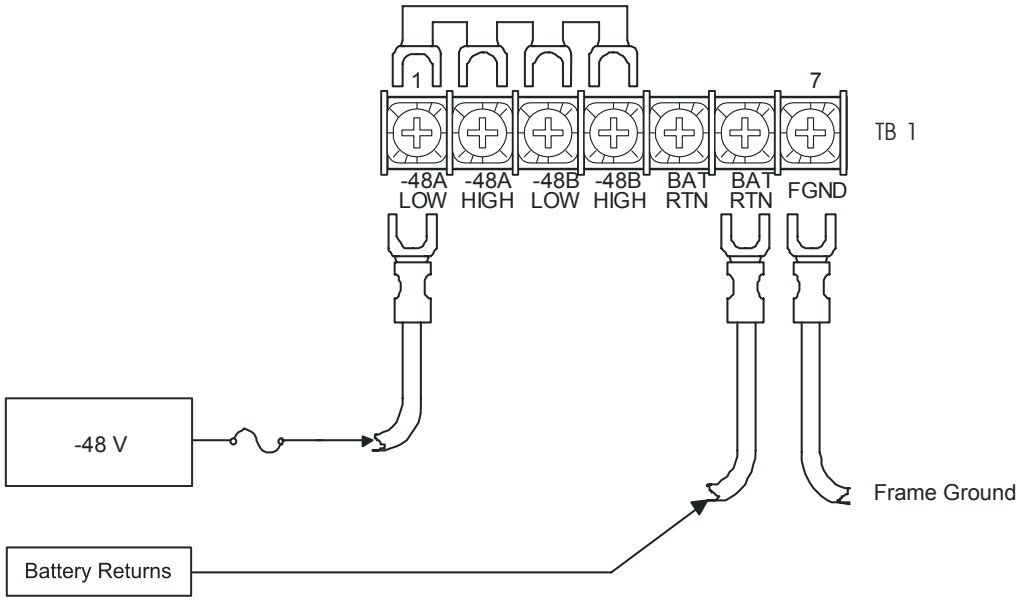


Figure 19. Single Source Power Wiring

If the –48HIGH and the –48LOW terminals are not jumpered, the CO Line Unit power LED blinks because one of the power rails is missing.

Redundant Shelf Powering

In this configuration, each circuit card in the shelf receives power from two –48 Vdc sources. If one –48 Vdc source is lost, the other –48 Vdc source provides power to the shelf circuit cards. Each –48 Vdc source should be fused according to Table 6 on page 16 through Table 10 on page 19.

A four-position jumper is in place on the TB1 block (Figure 20). This jumper shorts all of the 48 VDC inputs together to prevent an alarm condition when only one input feed wire is connected. To provide redundant shelf powering:

1. Ensure that the ground connection is in place.
2. Remove the four-position jumper from TB1.
3. Cut the four-position jumper in half, snipping out a small strip to ensure a gap between the two pieces when they are replaced.
4. Replace the two pieces on the TB1 block, connecting TB1-1 to TB1-2 with one piece; then TB-3 to TB-4 with the second piece.
5. Connect a wire from the –48A-LOW terminal of TB1 to the A battery supply terminal at the fuse panel.
6. Connect a wire from the –48B-HIGH terminal of TB1 to the B battery supply terminal at the fuse panel.
7. Connect a wire from the Battery Return terminal in position 5 of TB1 to the A battery return at the fuse panel.
8. Connect a wire from the Battery Return terminal in position 6 of TB1 to the B battery return at the fuse panel.

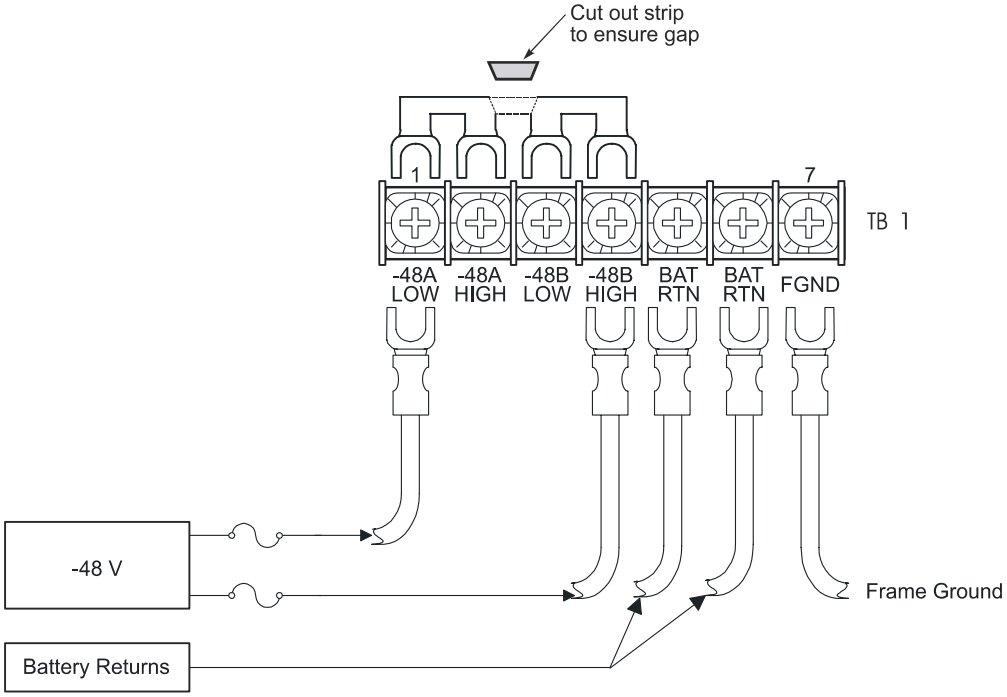


Figure 20. Redundant Shelf Power Wiring

Split Shelf Powering

In this configuration, one half of the shelf is powered from one –48 Vdc source, the other half is powered from another –48 Vdc source. Common equipment circuit cards are powered from both sources. If one power supply should fail, one-half of the shelf maintains power. Each –48 Vdc source should be fused according to Table 6 on page 16 through Table 10 on page 19.

A four-position jumper is in place on the TB1 block. This jumper shorts all of the 48 VDC inputs together to prevent an alarm condition when only one input feed wire is connected. To provide split shelf powering:

1. Ensure that the ground connection is in place.
2. Remove the four-position jumper (Figure 20 on page 27) and discard.
3. Connect a wire from the –48A-LOW terminal of TB1 to the A battery supply at the fuse panel (Figure 21).
4. Connect a short jumper from -48 A-LOW terminal to -48 B-LOW terminal of TB1. Make this connection at the top of the terminal block as shown in Figure 21.
5. Connect a short jumper from -48 A-HIGH terminal to -48 B-HIGH terminal of TB1. Make this connection at the top of the terminal block as shown in Figure 21.
6. Connect a wire from the –48B-HIGH terminal of TB1 to the B battery supply at the fuse panel.
7. Connect a wire from the Battery Return terminal in position 5 of TB1 to the A battery return at the fuse panel.
8. Connect a wire from the Battery Return terminal in position 6 of TB1 to the B battery return at the fuse panel.

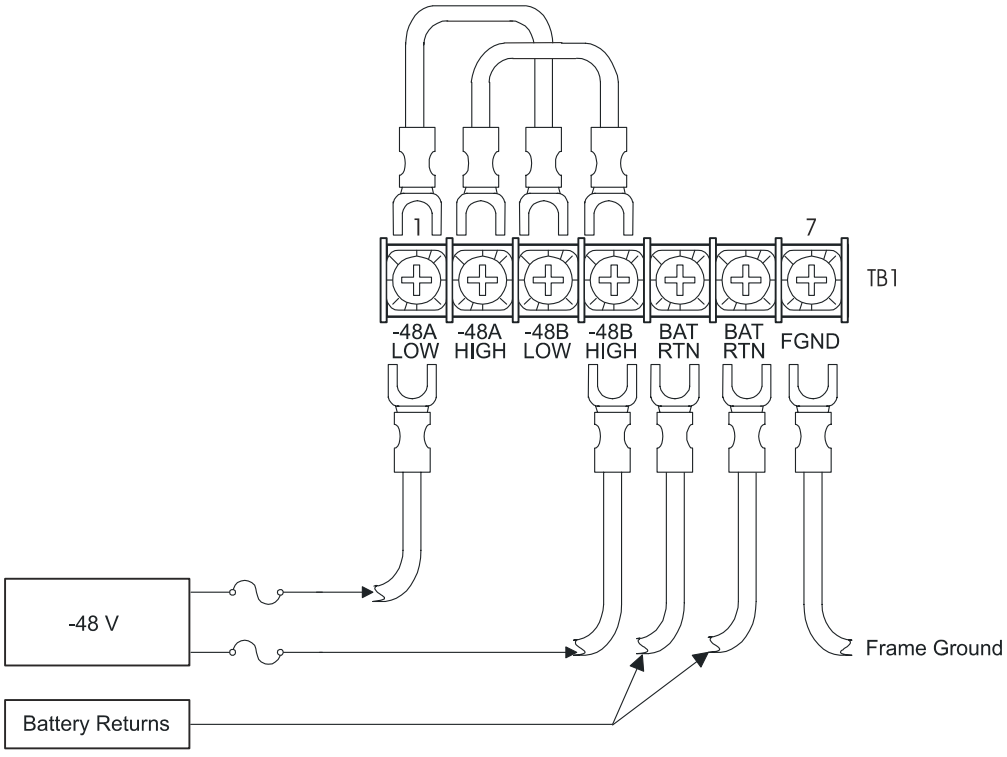


Figure 21. Split-Shelf Wiring

Alarm Output Connections

Checkoff ❑

Use a wire-wrap tool to terminate the alarm leads from the external alarm equipment on the alarm relay wire-wrap field. See Figure 22 for the location of the alarm relay wire-wrap field. Table 13 shows the functions of the alarm pins on the shelf backplane.

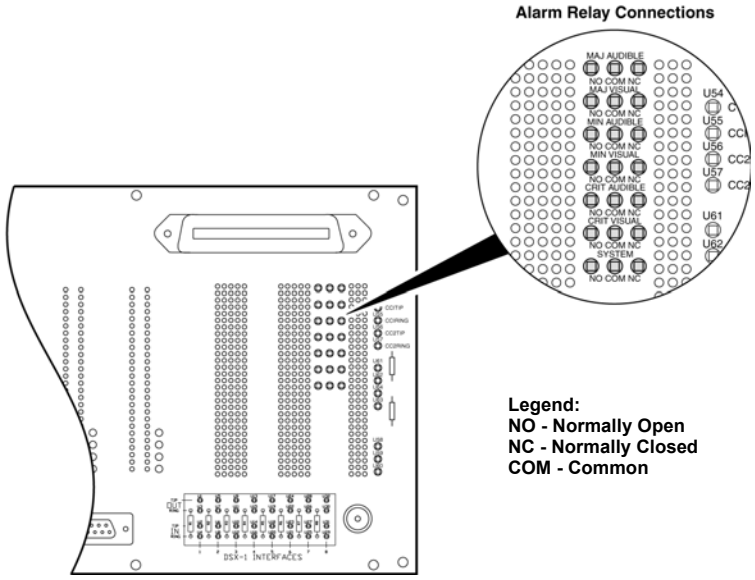


Figure 22. Connecting the Alarm Relays

Table 13. Alarm Terminations

Posts	Function[1]
MAJ AUDIBLE	Indicates a major alarm. Connect this relay to the major alarm audible indicator of the alarm system. The alarm can be silenced using the ACO button.
MAJ VISUAL	Indicates a major alarm. Connect this relay to the major alarm visual indicator of the alarm system.
MIN AUDIBLE	Indicates a minor alarm. Connect this relay to the minor alarm audible indicator of the alarm system. The alarm can be silenced using the ACO button.
MIN VISUAL	Indicates a minor alarm. Connect this relay to the minor alarm visual indicator of the alarm system.
CRIT AUDIBLE	Indicates a critical alarm. Connect this relay to the critical alarm audible indicator of the alarm system. The alarm can be silenced using the ACO button.
CRIT VISUAL	Indicates a critical alarm. Connect this relay to the critical alarm visual indicator of the alarm system.
SYSTEM	System indicates a critical, major, minor alarm is active on the shelf. Connect this relay to the equipment bay alarm indicator.
[1] All relays provide form “C” contacts.	

Test Connections

Checkoff ❑

This section is required only if the PCS-719 is to support IDLC applications.

The test connection is located to the left side of the pins labeled TSTTIP and TSTRING on the lower right side of the shelf (Figure 23). Use a wire-wrap tool to connect the test pair to the Tip and Ring wire-wrap pins marked TSTTIP and TSTRING (respectively).

This connection should be made between the shelf and the central office test system only when configured for integrated digital loop carrier applications. This connection should not be made when the shelf is supporting universal digital loop carrier applications.

For COs that use MLT, this connection should be made to the Test Bus Control Unit (TBCU) port assigned to the shelf.

External ACO Connection

Checkoff ❑

The Alarm Cut Off (ACO) connection is located to the left handed side of the pin labeled EXT ACO (Figure 23). To control the ACO remotely, connect the ACO to GROUND through a Normally Open, momentary contact switch.

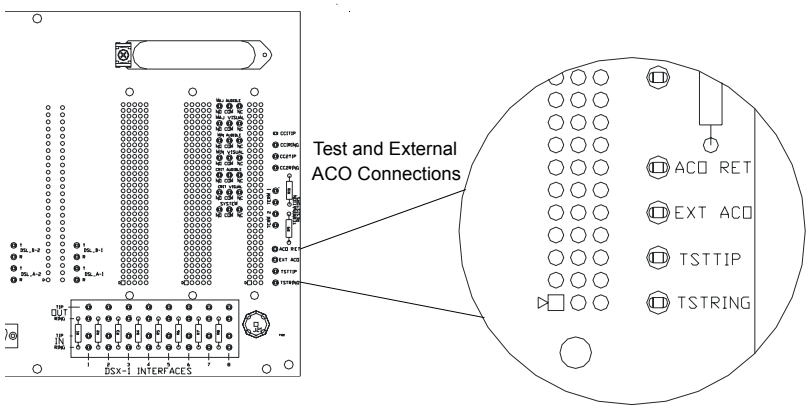


Figure 23. Connecting the Test Pair and External ACO Switch

Optional For All Applications

External Environmental Alarm Input Cable

A customer provided DB-25 male connector and associated wiring is required in order to provide external environmental alarm inputs into the Shelf. Construct the DB-25 connector with cable using locally approved procedures. Refer to Figure 13 on page 14 and Table 4 on page 15 which shows the proper pin connections to the DB-25 connector.

WARNING

Connecting alarm inputs to any other voltage will permanently destroy the Management Unit's transceiver circuits and render rear panel craft access and EXT ALM inputs inaccessible. Connecting alarm inputs to any other input voltage will void Management Unit's warranty.

APPLICATION-SPECIFIC SHELF INSTALLATIONS

The following sections describe installation instructions to support specific applications.

96-Channel Universal DAML

Checkoff ❑

Refer to the following sections for detailed installation instructions. Also refer to 96-Channel Universal DAML COT on page 2.

- DS0 Wiring – page 34
- HDSL Wiring – page 34

192-Channel Integrated COT

Checkoff ❑

Refer to the following sections for detailed installation instructions. Also refer to 192-Channel Integrated PG-FlexPlus COT on page 3.

- DSX-1 Connections – page 32
- HDSL Wiring – page 34

96-Channel Universal DLC COT/RT

Checkoff ❑

Refer to the following sections for detailed installation instructions. Also refer to 96-Channel Universal DLC COT to Plus RT on page 4.

- Office End DS0 Wiring – page 34
- DSX-1 Connections – page 32
  - Please note special office timing instructions in the Important note on page 32.
- Remote End DS0 Wiring – page 34

192-Channel Distributed DLC RT

Checkoff ❑

Refer to the following sections for detailed installation instructions. Also refer to 192-Channel Distributed DLC RT on page 5.

- DSX-1 Connections – page 32
- HDSL Wiring – page 34
- DS0 Wiring – page 34

Edge RAM

Checkoff ❑

Refer to the following sections for detailed installation instructions. Also refer to Edge RAM on page 6.

- DSX-1 Connections – page 32
- DS3 Wiring (AMX-944 only) – page 34
- SHDSL Wiring – page 34

Edge IAD

Checkoff ❑

Refer to the following sections for detailed installation instructions. Also refer to Edge IAD on page 8.

- DSX-1 Connections – page 32
- DS3 Wiring (AMX-944 only) – page 34
- SHDSL Wiring – page 34

DS0 Connections

Subscriber lines from the CO are connected to the shelf by way of 50-pin Telco connectors (P1, P2, P3, and P4). Table 14 on page 36 through Table 17 on page 37 list the Telco connector pinouts. These connections are used for:

- 96-Channel Universal DAML (Figure 2 on page 2)
- 96-Channel Universal DLC COT (Figure 4 on page 4)
- 192-Channel Distributed DLC RT (Figure 5 on page 5)

Table A-1 on page A-2 through Table A-4 on page A-5 show the subscriber service assignments from each card slot location to the Telco connectors.

Table 14 on page 36 through Table 17 on page 37 apply when universal line units are installed in the shelf.

Refer to Figure 11 on page 11 for the location of P1-P4 connections.

DSX-1 Connections

Eight transmit and receive pairs per shelf are required to provide terminations for central office DSX-1 signals if the shelf is used in Integrated Mode. These connections are used for:

- 96-Channel Universal DLC COT/RT (Figure 4 on page 4)
- 192-Channel Integrated PG-Flex^{Plus} COT (Figure 3 on page 3)
- 192-Channel Distributed DLC RT (Figure 5 on page 5)
- Edge RAM (Figure 6 on page 7 and Figure 7 on page 7)
- Edge IAD (Figure 8 on page 9 and Figure 9 on page 9)

IMPORTANT

96 Channel Office Timing Criteria

In 96 channel universal DLC COT applications, an office Building Integrated Timing Source (BITS) clock must be used to prevent COT to RT loop timing in both directions. A single or redundant clocking scheme can be employed. Regardless of which scheme is employed, an office clock source must be wired to the 6, 7 or 8 DSX-1 receive wire wrap positions of the CO located shelf. The remote located shelf does not require an external timing source as it will be loop timed from the COT.

The input (side 1) DSX-1 wire-wrap connections include 100 Ω line termination resistors on the PCS-719 backplane. Each DSX-1 circuit is connected to the PCS-719 backplane (Figure 24):

1. Use a wire-wrap tool to terminate the input (side 1) DSX-1 pair to the Tip and Ring wire-wrap pins marked IN Tip and IN Ring (respectively) for the circuit being terminated.
2. Use a wire-wrap tool to terminate the output (side 2) DSX-1 pair to the Tip and Ring wire-wrap pins marked-OUT Tip and OUT Ring (respectively) for the circuit being terminated.
3. Repeat steps 1 and 2 for each DSX-1 circuit connected to the backplane.

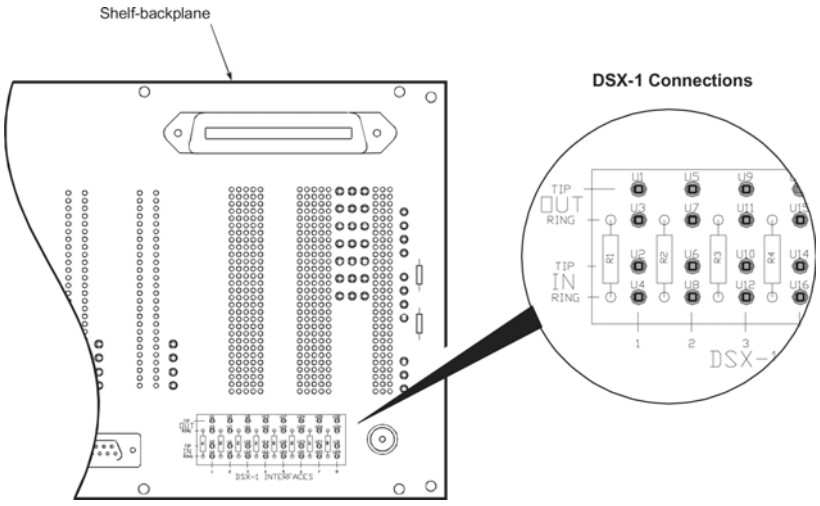


Figure 24. DSX-1 Backplane Terminations

DS3 Connections (For PCS-719 List 3 Only)

These connections are used for:

- Edge RAM (Figure 6 on page 7 and Figure 7 on page 7)
- Edge IAD (Figure 8 on page 9 and Figure 9 on page 9)

The DS3 circuit is only used with the AMX-944s in the Edge RAM and Edge IAD system configurations (Figure 7 on page 7 and Figure 9 on page 9).

The DS3 circuit connects the ATM switch or DSLAM to the DS3 splitter mounted on the top of the List 3 shelf (Figure 25). The DS3 connections to the ATM switch or DSLAM are made on the rear of the splitter.

The IN termination is on the DS3 signal from the ATM Switch or DSLAM. The OUT termination is the DS3 signal to the ATM Switch or DSLAM.

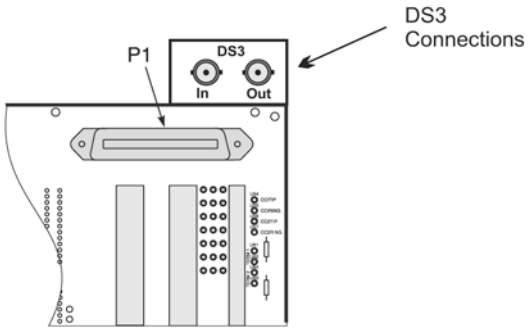


Figure 25. DS3 Terminations

HDSL Wiring

Depending on the type of line unit being installed, one or two pairs from the shelf to the HDSL Tip and Ring at the distribution frame must be provided for each system in the shelf. These leads should be dressed along the side of the frame per local practices.

These connections are used for:

- 96-Channel Universal DAML (Figure 2 on page 2)
- 192-Channel Integrated PG-Flex*Plus* COT (Figure 3 on page 3)
- 192-Channel Distributed DLC RT (Figure 5 on page 5)

J4 - J19 on the backplane correspond to line unit slot numbers LU1 to LU16. Figure 26 on page 35 shows HDSL connections for LU5 and LU6. The primary HDSL connection is made to the DSL_A-x wire-wrap pins while the secondary connection is made to the DSL_B-x pins. For example, in 192-Channel Integrated COT applications, both the A and B sides would be wired out to termination blocks.

To make the wire-wrap terminations on the HDSL using one pair leads:

1. Use a wire-wrap tool to terminate HDSL pair #1 onto the T (Tip) and R (Ring) wire-wrap pins labeled DSL_A-1.
2. Terminate the remainder of the required HDSL pairs onto the T and R wire-wrap pins on terminals DSL_A-2 (LU2) through DSL_A-16 (LU16):

To make the wire-wrap terminations on the HDSL using two pair leads:

1. Use a wire-wrap tool to terminate HDSL pair #1 onto the T (Tip) and R (Ring) wire-wrap pins labeled DSL_A-1.
2. Use a wire-wrap tool to terminate HDSL pair #2 onto the T (Tip) and R (Ring) wire-wrap pins labeled DSL_B-1.
3. Terminate the remainder of the required HDSL pairs onto the T and R wire-wrap pins on terminals DSL_A-2 (LU2) through DSL_A-16 (LU16) and DSL_B-2 (LU2) through DSL_B-16 (LU16).

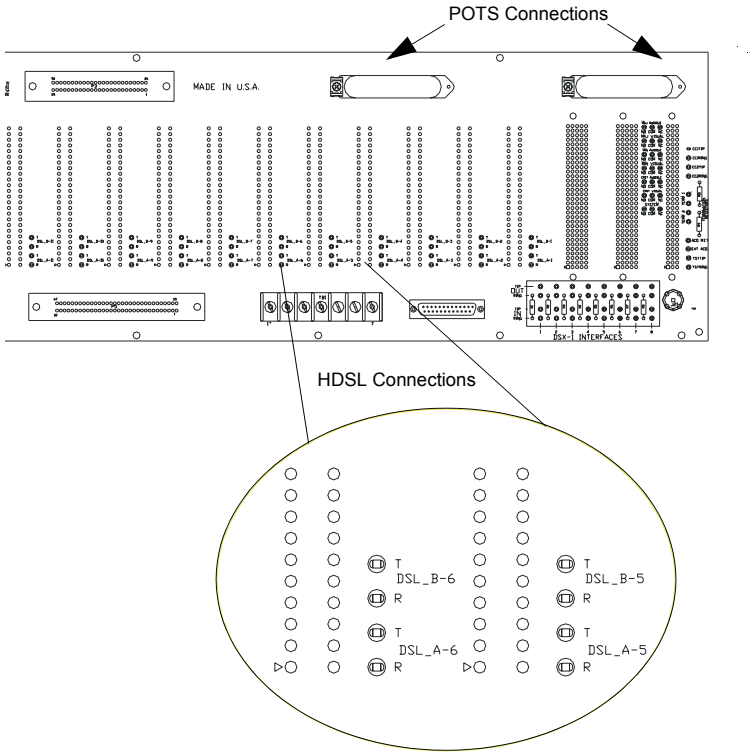


Figure 26. Connecting the HDSL Pairs

Table 14 on page 36 through Table 18 on page 38 shows the assignment of each card slot location to the HDSL terminations on the COT shelf backplane.

Table 14. P1 Telco Connector Pinouts

PIN #	Assignment	Assignment	PIN #
1	RING1	TIP1	26
2	RING2	TIP2	27
3	RING3	TIP3	28
4	RING4	TIP4	29
5	RING5	TIP5	30
6	RING6	TIP6	31
7	RING7	TIP7	32
8	RING8	TIP8	33
9	RING9	TIP9	34
10	RING10	TIP10	35
11	RING11	TIP11	36
12	RING12	TIP12	37
13	RING13	TIP13	38
14	RING14	TIP14	39
15	RING15	TIP15	40
16	RING16	TIP16	41
17	RING17	TIP17	42
18	RING18	TIP18	43
19	RING19	TIP19	44
20	RING20	TIP20	45
21	RING21	TIP21	46
22	RING22	TIP22	47
23	RING23	TIP23	48
24	RING24	TIP24	49
25	FGND	FGND	50

Table 15. P2 Telco Connector Pinouts

PIN #	Assignment	Assignment	PIN #
1	RING25	TIP25	26
2	RING26	TIP26	27
3	RING27	TIP27	28
4	RING28	TIP28	29
5	RING29	TIP29	30
6	RING30	TIP30	31
7	RING31	TIP31	32
8	RING32	TIP32	33
9	RING33	TIP33	34
10	RING34	TIP34	35
11	RING35	TIP35	36
12	RING36	TIP36	37
13	RING37	TIP37	38
14	RING38	TIP38	39
15	RING39	TIP39	40
16	RING40	TIP40	41
17	RING41	TIP41	42
18	RING42	TIP42	43
19	RING43	TIP43	44
20	RING44	TIP44	45
21	RING45	TIP45	46
22	RING46	TIP46	47
23	RING47	TIP47	48
24	RING48	TIP48	49
25	FGND	FGND	50

Table 16. P3 Telco Connector Pinouts

PIN #	Assignment	Assignment	PIN #
1	RING49	TIP49	26
2	RING50	TIP50	27
3	RING51	TIP51	28
4	RING52	TIP52	29
5	RING53	TIP53	30
6	RING54	TIP54	31
7	RING55	TIP55	32
8	RING56	TIP56	33
9	RING57	TIP57	34
10	RING58	TIP58	35
11	RING59	TIP59	36
12	RING60	TIP60	37
13	RING61	TIP61	38
14	RING62	TIP62	39
15	RING63	TIP63	40
16	RING64	TIP64	41
17	RING65	TIP65	42
18	RING66	TIP66	43
19	RING67	TIP67	44
20	RING68	TIP68	45
21	RING69	TIP69	46
22	RING70	TIP70	47
23	RING71	TIP71	48
24	RING72	TIP72	49
25	FGND	FGND	50

Table 17. P4 Telco Connector Pinouts

PIN #	Assignment	Assignment	PIN #
1	RING73	TIP73	26
2	RING74	TIP74	27
3	RING75	TIP75	28
4	RING76	TIP76	29
5	RING77	TIP77	30
6	RING78	TIP78	31
7	RING79	TIP79	32
8	RING80	TIP80	33
9	RING81	TIP81	34
10	RING82	TIP82	35
11	RING83	TIP83	36
12	RING84	TIP84	37
13	RING85	TIP85	38
14	RING86	TIP86	39
15	RING87	TIP87	40
16	RING88	TIP88	41
17	RING89	TIP89	42
18	RING90	TIP90	43
19	RING91	TIP91	44
20	RING92	TIP92	45
21	RING93	TIP93	46
22	RING94	TIP94	47
23	RING95	TIP95	48
24	RING96	TIP96	49
25	FGND	FGND	50

Table 18. PCS-719 HDSL Connections

COT Shelf		COLU		
Card Slot	HDSL Terminations	Single 4/6 Channel COLU	Dual 2/4/6 Channel COLU	Single 24 Channel Integrated COLU
LU 1	DSL_A – 1	1 – HDSL	1 – HDSL (1A)	1 – PWR 1
	DSL_B – 1		2 – HDSL (1B)	1 – PWR 2
LU 2	DSL_A – 2	2 – HDSL	3 – HDSL (2A)	1 – HDSL 1
	DSL_B – 2		4 – HDSL (2B)	1 – HDSL 2
LU 3	DSL_A – 3	3 – HDSL	5 – HDSL (3A)	2 – PWR 1
	DSL_B – 3		6 – HDSL (3B)	2 – PWR 2
LU 4	DSL_A – 4	4 – HDSL	7 – HDSL (4A)	2 – HDSL 1
	DSL_B – 4		8 – HDSL (4B)	2 – HDSL 2
LU 5	DSL_A – 5	5 – HDSL	9 – HDSL (5A)	3 – PWR 1
	DSL_B – 5		10 – HDSL (5B)	3 – PWR 2
LU 6	DSL_A – 6	6 – HDSL	11 – HDSL (6A)	3 – HDSL 1
	DSL_B – 6		12 – HDSL (6B)	3 – HDSL 2
LU 7	DSL_A – 7	7 – HDSL	13 – HDSL (7A)	4 – PWR 1
	DSL_B – 7		14 – HDSL (7B)	4 – PWR 2
LU 8	DSL_A – 8	8 – HDSL	15 – HDSL (8A)	4 – HDSL 1
	DSL_B – 8		16 – HDSL (8B)	4 – HDSL 2
LU 9	DSL_A – 9	9 – HDSL	17 – HDSL (9A)	5 – PWR 1
	DSL_B – 9		18 – HDSL (9B)	5 – PWR 2
LU 10	DSL_A – 10	10 – HDSL	19 – HDSL (10A)	5 – HDSL 1
	DSL_B – 10		20 – HDSL (10B)	5 – HDSL 2
LU 11	DSL_A – 11	11 – HDSL	21 – HDSL (11A)	6 – PWR 1
	DSL_B – 11		22 – HDSL (11B)	6 – PWR 2
LU 12	DSL_A – 12	12 – HDSL	23 – HDSL (12A)	6 – HDSL 1
	DSL_B – 12		24 – HDSL (12B)	6 – HDSL 2
LU 13	DSL_A – 13	13 – HDSL	25 – HDSL (13A)	7 – PWR 1
	DSL_B – 13		26 – HDSL (13B)	7 – PWR 2
LU 14	DSL_A – 14	14 – HDSL	27 – HDSL (14A)	7 – HDSL 1
	DSL_B – 14		28 – HDSL (14B)	7 – HDSL 2
LU 15	DSL_A – 15	15 – HDSL	29 – HDSL (15A)	8 – PWR 1
	DSL_B – 15		30 – HDSL (15B)	8 – PWR 2
LU 16	DSL_A – 16	16 – HDSL	31 – HDSL (16A)	8 – HDSL 1
	DSL_B – 16		32 – HDSL (16B)	8 – HDSL 2

TURN-UP AND TEST

The following steps should be performed before any circuit cards are installed in the shelf.

1. Verify correct termination of all the HDSL lines on the shelf backplane wire wrap field.
2. Install the fuse(s) in the fuse panel for the circuits providing power to the shelf.
3. Verify that there is between –42 Vdc and –56 Vdc between each of the –48 Vdc terminals and GND on the shelf backplane TB1 terminal strip.
4. Measure the dc voltage across the HDSL terminations. Ensure that there is 0 Vdc between the Tip and Ring, Tip and Ground, and Ring and Ground of each HDSL circuit terminated on the shelf.
5. Measure the resistance across the HDSL terminations. Ensure that there is at least 100 kΩ of resistance between the Tip and Ring, Tip and Ground, and Ring and Ground of each HDSL circuit terminated on the shelf.
6. Replace the clear Plexiglas cover on the back of the shelf.

Appendix A

Table 19 on page 42 through Table 22 on page 45 show the subscriber service assignments from each card slot location to the Telco connectors. Refer to Table 14 on page 36 through Table 17 on page 37 for P1 through P4 Telco connector pinouts.

For Example: Assume deployment of multiple PLL-734s in LU positions 1 and 2.

- Dial tone would be present on the pairs 1, 2, 3, 4 (1/26, 2/27, 3/28, 4/29)
- Dial tone would not be present on pairs 5 and 6 (5/30, 6/31)
- Dial tone would be found again on pairs 7, 8, 9,10 (7/32, 8/33, 9/34, 10/35), etc.

Table 14 on page 36 through Table 17 on page 37 apply when universal CO Line Units are installed in the COT Shelf.

Table 19. P1 Tip and Ring Pin Assignments

COT Shelf Card Slot	CO Line Unit Type							COT Shelf Connector Assignments	
	PLL-720	FPC-806 FPR-806 PLL-721	PLL-722	PLL-723	PLL-724	PLL-733	PLL-734*	Tip	Ring
LU 1	POTS1	POTS1	POTS1		POTS	EBS1	POTS1A	P1-26	P1-1
	POTS2	POTS2	POTS2			EBS2	POTS2A	P1-27	P1-2
	POTS3	POTS3	POTS3			EBS3	POTS1B	P1-28	P1-3
	POTS4	POTS4	ISDN	ISDN1	ISDN	EBS4	POTS2B	P1-29	P1-4
		POTS5		ISDN2				P1-30	P1-5
		POTS6						P1-31	P1-6
LU 2	POTS1	POTS1	POTS1		POTS	EBS1	POTS1A	P1-32	P1-7
	POTS2	POTS2	POTS2			EBS2	POTS2A	P1-33	P1-8
	POTS3	POTS3	POTS3			EBS3	POTS1B	P1-34	P1-9
	POTS4	POTS4	ISDN	ISDN1	ISDN	EBS4	POTS2B	P1-35	P1-10
		POTS5		ISDN2				P1-36	P1-11
		POTS6						P1-37	P1-12
LU 3	POTS1	POTS1	POTS1		POTS	EBS1	POTS1A	P1-38	P1-13
	POTS2	POTS2	POTS2			EBS2	POTS2A	P1-39	P1-14
	POTS3	POTS3	POTS3			EBS3	POTS1B	P1-40	P1-15
	POTS4	POTS4	ISDN	ISDN1	ISDN	EBS4	POTS2B	P1-41	P1-16
		POTS5		ISDN2				P1-42	P1-17
		POTS6						P1-43	P1-18
LU 4	POTS1	POTS1	POTS1		POTS	EBS1	POTS1A	P1-44	P1-19
	POTS2	POTS2	POTS2			EBS2	POTS2A	P1-45	P1-20
	POTS3	POTS3	POTS3			EBS3	POTS1B	P1-46	P1-21
	POTS4	POTS4	ISDN	ISDN1	ISDN	EBS4	POTS2B	P1-47	P1-22
		POTS5		ISDN2				P1-48	P1-23
		POTS6						P1-49	P1-24

* The PLL-734 Dual POTS Channel Unit uses both HDSL-A and HDSL-B.

Table 20. P2 Tip and Ring Pin Assignments

COT Shelf Card Slot	COLU Type							COT Shelf Connector Assignments	
	PLL-720	FPC-806 FPR-806 PLL-721	PLL-722	PLL-723	PLL-724	PLL-733	PLL-734*	Tip	Ring
LU 5	POTS1	POTS1	POTS1		POTS	EBS1	POTS1A	P2-26	P2-1
	POTS2	POTS2	POTS2			EBS2	POTS2A	P2-27	P2-2
	POTS3	POTS3	POTS3			EBS3	POTS1B	P2-28	P2-3
	POTS4	POTS4	ISDN	ISDN1	ISDN	EBS4	POTS2B	P2-29	P2-4
		POTS5		ISDN2				P2-30	P2-5
		POTS6						P2-31	P2-6
LU 6	POTS1	POTS1	POTS1		POTS	EBS1	POTS1A	P2-32	P2-7
	POTS2	POTS2	POTS2			EBS2	POTS2A	P2-33	P2-8
	POTS3	POTS3	POTS3			EBS3	POTS1B	P2-34	P2-9
	POTS4	POTS4	ISDN	ISDN1	ISDN	EBS4	POTS2B	P2-35	P2-10
		POTS5		ISDN2				P2-36	P2-11
		POTS6						P2-37	P2-12
LU 7	POTS1	POTS1	POTS1		POTS	EBS1	POTS1A	P2-38	P2-13
	POTS2	POTS2	POTS2			EBS2	POTS2A	P2-39	P2-14
	POTS3	POTS3	POTS3			EBS3	POTS1B	P2-40	P2-15
	POTS4	POTS4	ISDN	ISDN1	ISDN	EBS4	POTS2B	P2-41	P2-16
		POTS5		ISDN2				P2-42	P2-17
		POTS6						P2-43	P2-18
LU 8	POTS1	POTS1	POTS1		POTS	EBS1	POTS1A	P2-44	P2-19
	POTS2	POTS2	POTS2			EBS2	POTS2A	P2-45	P2-20
	POTS3	POTS3	POTS3			EBS3	POTS1B	P2-46	P2-21
	POTS4	POTS4	ISDN	ISDN1	ISDN	EBS4	POTS2B	P2-47	P2-22
		POTS5		ISDN2				P2-48	P2-23
		POTS6						P2-49	P2-24

* The PLL-734 Dual POTS Channel Unit uses both HDSL-A and HDSL-B.

Table 21. P3 Tip and Ring Pin Assignments

COT Shelf Card Slot	COLU Type							COT Shelf Connector Assignments	
	PLL-720	FPC-806 FPR-806 PLL-721	PLL-722	PLL-723	PLL-724	PLL-733	PLL-734*	Tip	Ring
LU 9	POTS1	POTS1	POTS1		POTS	EBS1	POTS1A	P3-26	P3-1
	POTS2	POTS2	POTS2			EBS2	POTS2A	P3-27	P3-2
	POTS3	POTS3	POTS3			EBS3	POTS1B	P3-28	P3-3
	POTS4	POTS4	ISDN	ISDN1	ISDN	EBS4	POTS2B	P3-29	P3-4
		POTS5		ISDN2				P3-30	P3-5
		POTS6						P3-31	P3-6
LU 10	POTS1	POTS1	POTS1		POTS	EBS1	POTS1A	P3-32	P3-7
	POTS2	POTS2	POTS2			EBS2	POTS2A	P3-33	P3-8
	POTS3	POTS3	POTS3			EBS3	POTS1B	P3-34	P3-9
	POTS4	POTS4	ISDN	ISDN1	ISDN	EBS4	POTS2B	P3-35	P3-10
		POTS5		ISDN2				P3-36	P3-11
		POTS6						P3-37	P3-12
LU 11	POTS1	POTS1	POTS1		POTS	EBS1	POTS1A	P3-38	P3-13
	POTS2	POTS2	POTS2			EBS2	POTS2A	P3-39	P3-14
	POTS3	POTS3	POTS3			EBS3	POTS1B	P3-40	P3-15
	POTS4	POTS4	ISDN	ISDN1	ISDN	EBS4	POTS2B	P3-41	P3-16
		POTS5		ISDN2				P3-42	P3-17
		POTS6						P3-43	P3-18
LU 12	POTS1	POTS1	POTS1		POTS	EBS1	POTS1A	P3-44	P3-19
	POTS2	POTS2	POTS2			EBS2	POTS2A	P3-45	P3-20
	POTS3	POTS3	POTS3			EBS3	POTS1B	P3-46	P3-21
	POTS4	POTS4	ISDN	ISDN1	ISDN	EBS4	POTS2B	P3-47	P3-22
		POTS5		ISDN2				P3-48	P3-23
		POTS6						P3-49	P3-24

* The PLL-734 Dual POTS Channel Unit uses both HDSL-A and HDSL-B.

Table 22. P4 Tip and Ring Pin Assignments

COT Shelf Card Slot	COLU Type							COT Shelf Connector Assignments	
	PLL-720	FPC-806 FPR-806 PLL-721	PLL-722	PLL-723	PLL-724	PLL-733	PLL-734*	Tip	Ring
LU 13	POTS1	POTS1	POTS1		POTS	EBS1	POTS1A	P4-26	P4-1
	POTS2	POTS2	POTS2			EBS2	POTS2A	P4-27	P4-2
	POTS3	POTS3	POTS3			EBS3	POTS1B	P4-28	P4-3
	POTS4	POTS4	ISDN	ISDN1	ISDN	EBS4	POTS2B	P4-29	P4-4
		POTS5		ISDN2				P4-30	P4-5
		POTS6						P4-31	P4-6
LU 14	POTS1	POTS1	POTS1		POTS	EBS1	POTS1A	P4-32	P4-7
	POTS2	POTS2	POTS2			EBS2	POTS2A	P4-33	P4-8
	POTS3	POTS3	POTS3			EBS3	POTS1B	P4-34	P4-9
	POTS4	POTS4	ISDN	ISDN1	ISDN	EBS4	POTS2B	P4-35	P4-10
		POTS5		ISDN2				P4-36	P4-11
		POTS6						P4-37	P4-12
LU 15	POTS1	POTS1	POTS1		POTS	EBS1	POTS1A	P4-38	P4-13
	POTS2	POTS2	POTS2			EBS2	POTS2A	P4-39	P4-14
	POTS3	POTS3	POTS3			EBS3	POTS1B	P4-40	P4-15
	POTS4	POTS4	ISDN	ISDN1	ISDN	EBS4	POTS2B	P4-41	P4-16
		POTS5		ISDN2				P4-42	P4-17
		POTS6						P4-43	P4-18
LU 16	POTS1	POTS1	POTS1		POTS	EBS1	POTS1A	P4-44	P4-19
	POTS2	POTS2	POTS2			EBS2	POTS2A	P4-45	P4-20
	POTS3	POTS3	POTS3			EBS3	POTS1B	P4-46	P4-21
	POTS4	POTS4	ISDN	ISDN1	ISDN	EBS4	POTS2B	P4-47	P4-22
		POTS5		ISDN2				P4-48	P4-23
		POTS6						P4-49	P4-24

* The PLL-734 Dual POTS Channel Unit uses both HDSL-A and HDSL-B.

ACRONYMS

A

ACO – Alarm Cutoff
ADSL – Asynchronous Digital Subscriber Line
ATM – Asynchronous Transfer Mode
AWG – American Wire Gauge

B

BITS – Building Integrated Timing Source

C

CLEI – Common Language Equipment Identifier
CO – Central Office
COT – Central Office Terminal

D

DAML – Digital Added Main Line
DDL – Derived Data Link
DDS – Digital Data Service
DLC – Digital Loop Carrier
DS0 – Digital Signal Level 0
DS1 – Digital Signal Level 1
DS3 – Digital Signal Level 3
DSL – Digital Subscriber Line
DSLAM – Digital Subscriber Line Access Module
DTE – Data Terminal Equipment

E

EBS – Enhanced Business Service (EBS) (P-Phone)
ESD – Electrostatic Discharge

H

HDSL – High-bit-rate Digital Subscriber Line

I

IAD – Integrated Access Device
ICB – Integrated Channel Bank
ISDN – Integrated Services Digital Network

L

LED – Light Emitting Diode

M

MDF – Main Distribution Frame
MU – Management Unit
MUX – Multiplexer Unit

N

NC – Normally Closed

NEBS – Network Equipment Building Services

NID – Network Interface Device

NO – Normally Open

P

POTS – Plain Old Telephone Service

R

RAM – Remote Access Multiplexer

RMA – Return Material Authorization

RT – RemoteTerminal

S

SHDSL – Symmetric High-bit-rate Digital Subscriber Line

T

TBCU – Test Bus Control Unit

TDM – Time Division Multiplexer

U

UVG – Universal Voice Grade

X

xDSL – Digital Subscriber Line

PRODUCT SUPPORT

TECHNICAL SUPPORT

Technical Assistance is available 24 hours a day, 7 days a week by the contacting Customer Service Engineering group at:

Telephone:	800.366.3891 The 800 telephone support line is toll-free in the U.S. and Canada.
Email:	wsd_support@adc.com
Knowledge Base:	http://adc.com/Knowledge_Base/index.jsp
Web:	www.adc.com

LIMITED WARRANTY

Product warranty is determined by your service agreement. Refer to the ADC Warranty/Software Handbook for additional information, or contact your sales representative or Customer Service for details.

RETURNS

To return equipment to ADC:

1. Locate the number of the purchase order under which the equipment was purchased. To obtain a return authorization number, you need to provide the original purchase order number to ADC's Return Material Authorization (RMA) Department.
2. Call or write ADC's RMA Department to ask for an RMA number and any additional instructions. Use the telephone number, fax number or email address listed below:
   - Telephone: 800.366.3891
   - Email Address: rma@adc.com
3. Include the following information, in writing, along with the equipment you are returning:
   - Company name and address
   - Contact name and telephone number
   - Shipping address to which ADC should return the repaired equipment
   - Original purchase order number
   - Description of the equipment that includes the model and part number of each unit being returned, as well as the number of units that you are returning.
   - Reason for the return. For example:
     – The equipment needs an ECO/ECN upgrade.
     – The equipment is defective.

If the equipment is defective, please tell us what you observed just before the equipment malfunctioned. Be as detailed in your description as possible.

If there is any other reason for returning the equipment, please let us know so we can determine how best to help you.

4. Pack the equipment in a shipping carton.

5. Write ADC's address and the RMA Number you received from the RMA Department clearly on the outside of the carton.

All shipments are to be returned prepaid. ADC will not accept any collect shipments.

FCC CLASS A COMPLIANCE

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

MODIFICATIONS

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by ADC voids the user's warranty.

All wiring external to the product(s) should follow the provisions of the current edition of the National Electrical Code.

World Headquarters:
ADC Telecommunications, Inc.
PO Box 1101
Minneapolis, Minnesota USA 55440-1101

For Technical Assistance:
800.366.3891

ISO 9001
DNV
DNV Certification, Inc.
Certificated Firm

1284586