PG-Flex^{Plus}® Field Cabinet Provisioning Guide

This document describes the procedures for turning up a PCS-719 DLC system chassis mounted in a PG-Flex^{Plus} Field Cabinet as an Remote Terminal (RT) or mounted in a CO as a Central Office Terminal (COT). Refer to **Cabinet Module Installation and Provisioning** on page 3 for details.

PG-Flex^{Plus} System

The PG-Flex^{Plus} Digital Loop Carrier system supports up to 6 DS0s on a single copper pair or 24 DS0s on two copper pairs. Services include Plain Old Telephone Service (POTS – Loop Start/Ground Start [LS/GS] and Universal Voice Grade [UVG]). CLASS features, MLT testability, and network management are also supported.

The cabinet can be deployed in either ***Integrated*** or ***Universal*** mode. In some cases, no chassis provisioning is required at the CO. This occurs when a cabinet is deployed with an ***Integrated*** Switch configuration. In other words, the DS-1 signal comes directly out of a switch port for transport to the RT cabinet. In ***Universal*** Switch applications, the individual DS0s from the switch are presented to a PG-Flex^{Plus} system in the CO that multiplexes them to a DS-1 signal for transport to the Field cabinet's PG-Flex^{Plus} system. Be sure you understand which application is being used.

Sixteen PLL-735 or 8 FLL-814 line units can be installed in the cabinet located shelf. High-bit-rate Digital Subscriber Line (HDSL) circuits transport these services between the Shelf and the remote enclosures. All remote enclosures are line powered from either the PLL-735 or FLL-814 line units.

Subscriber services to the cabinet are transported between the Class 5 switch or CO located shelf over T1 or HDSL transport circuits supporting the TR-08 framing format. Equipment protection is provided through the shelf backplane; the backplane terminates these circuits on both PMX-744 Multiplex Units.

The AMU-912 Management Unit provides shelf management, performance monitoring, alarm, and test interface functions.

Doublers can be used to extend the range of the 24 channel systems. Two additional copper pairs are required between the cabinet located shelf and remote enclosure for each doubler installed.

Versions of the remote enclosures are environmentally hardened and can be mounted externally or internally at the subscriber location.

PCS-719 Shelf

The field cabinet shelf has been pre-wired at the factory. Detailed wiring and fusing information can be found on the labels located on the inside of the cabinet door.

-48 Battery

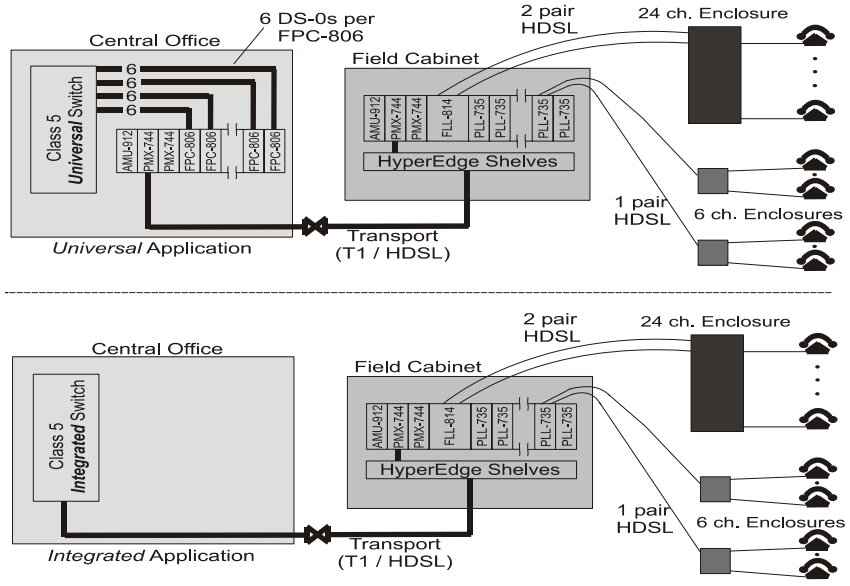
The PCS-719 Shelf has been pre-wired at the factory for redundant -48 VDC battery powering. Battery wiring for the Shelf goes directly to the equipment fuse panel located inside the right door cover on the Valare Power System. The cabinet must be provided with standard 240 volt AC service.

Alarms

All cabinet and shelf alarms have been pre-wired at the factory. These alarms, when active, send an alarm signal to the AMU. The AMU processes the alarm and sends it to the PMX for transport to the NOC. There are four environmental alarms associated with the cabinet (Table 1).

Table 1. Environmental Alarms

Alarm	Description
Intrusion	Open door alarm. Pull door plunger to the OUT position to retire when performing maintenance.
Fan Failure	One or more fans have failed.
Power Major	Two or more rectifiers have failed, low voltage disconnect contactor has opened, or battery on discharge.
Power Minor	One rectifier has failed, circuit breaker or fuse has opened, or rectifiers not load sharing



Subscriber Drop Testing/MLT Termination

Test results on POTS subscriber drops can be displayed through a maintenance screen in the AMU-912 or as three-terminal resistive signatures on the TSTTIP and TSTRING terminations on the 25th pair located on the 710 D connector.

The TSTTIP and TSTRING leads will connect to a metallic by-pass pair to the CO or to an MCU in an adjacent cabinet, if available. Consult your work order for proper connections. Table 2 shows the resistive signatures that are presented to the CO test system for various line conditions.

Table 2. Resistive Signatures

Test	Failure Condition	TR (kΩ)	TG,RG (kΩ)
RT Equipment Failure	RT detected, but no response from RT	17.8	90.9
Foreign Voltage on Drop	TG or RG > 10 V_{rms} TG or RG > 6 Vdc	27.8	90.9
All Tests OK	No failures Detected	38.3	90.9
Ringer Test	REN > 5.0 or < 0.2	48.3	90.9
Resistive Fault on Drop	TG, RG, or TR ≥ 150 KΩ	58.0	90.9
Receiver Off-hook	Phone is off-hook	68.0	90.9
Hazardous Potential on Drop	TG or RG > 50 V_{rms} TG or RG > 135 Vdc	78.5	90.0
COT-RT Facility Failure	RT not detected	≥1,000	90.9

NOTE: The signatures for the AMU-912 L1 are biased to -14 Vdc.

Network T1/HDSL Assignments

The T1/HDSL cable assignments are shown in Table 3. Note that these circuits are terminated to the HyperEdge shelf located below the PG-Flex^{Plus} chassis. The DS-1 interfaces between these shelves are hard-wired and are not field accessable.

Table 3. Network T1/HDSL Cable Assignments

Protector Socket	Tip	Ring	Description	Conn
1	White	Blue	Receive/Loop 1 HyperEdge 1/1	
2	White	Orange	Receive/Loop 1 HyperEdge 1/2	
3	White	Green	Receive/Loop 1 HyperEdge 1/3	
4	White	Brown	Receive/Loop 1 HyperEdge 1/4	
5	White	Slate	Receive/Loop 1 HyperEdge 1/5	
6	Red	Blue	Receive/Loop 1 HyperEdge 1/6	7

Table 3. Network T1/HDSL Cable Assignments

Protector Socket	Tip	Ring	Description	Conn
7	Red	Orange	Receive/Loop 1 HyperEdge 2./1	1
8	Red	Green	Receive/Loop 1 HyperEdge 2/2	0
9*	Red	Brown	Receive/Loop 1 HyperEdge 2/3	A
10*	Red	Slate	Receive/Loop 1 HyperEdge 2/4	
11*	Black	Blue	Receive/Loop 1 HyperEdge 2/5	
12*	Black	Orange	Receive/Loop 1 HyperEdge 2/6	
13-25			Not Used	
26	White	Blue	Transmit/Loop 2 HyperEdge 1/1	
27	White	Orange	Transmit/Loop 2 HyperEdge 1/2	
28	White	Green	Transmit/Loop 2 HyperEdge 1/3	
29	White	Brown	Transmit/Loop 2 HyperEdge 1/4	7
30	White	Slate	Transmit/Loop 2 HyperEdge 1/5	1
31	Red	Blue	Transmit/Loop 2 HyperEdge 1/6	0
32	Red	Orange	Transmit/Loop 2 HyperEdge 2./1	B
33	Red	Green	Transmit/Loop 2 HyperEdge 2/2	
34*	Red	Brown	Transmit/Loop 2 HyperEdge 2/3	
35*	Red	Slate	Transmit/Loop 2 HyperEdge 2/4	

Table 3. Network T1/HDSL Cable Assignments

Protector Socket	Tip	Ring	Description	Conn
36*	Black	Blue	Transmit/Loop 2 HyperEdge 2/5	
37*	Black	Orange	Transmit/Loop 2 HyperEdge 2/6	
38-50			Not Used	

* Wired for future use

HDSL and Auxiliary Power Assignments

HDSL and auxiliary power pairs are hard-wired between the PG-Flex^{Plus} shelf and the 'C' and 'D' 710 cables located in the side splice chamber. Refer to Table 4 for FLL-814 cable pair assignments and Table 5 for PLL-735 cable pair assignments

Table 4. PG-Flex^{Plus} FLL-814 Cable Assignments

Protector Socket	Tip	Ring	Description	Connector
51	White	Blue	Loop 1 Power 1	
52	White	Orange	Loop 1 HDSL1	
53	White	Green	Loop 1 Power 2	
54	White	Brown	Loop 1 HDSL2	
55	White	Slate	Loop 1 Power 3	
56	Red	Blue	Loop 1 HDSL 3	
57	Red	Orange	Loop 1 Power 4	7
58	Red	Green	Loop 1 HDSL 4	1
59	Red	Brown	Loop 1 Power 5	0
60	Red	Slate	Loop 1 HDSL 5	C
61	Black	Blue	Loop 1 Power 6	

Table 4. PG-Flex^{Plus} FLL-814 Cable Assignments

Protector Socket	Tip	Ring	Description	Connector
62	Black	Orange	Loop 1 HDSL 6	
63	Black	Green	Loop 1 Power 7	
64	Black	Brown	Loop 1 HDSL 7	
65	Black	Slate	Loop 1 Power 8	
66	Yellow	Blue	Loop 1 HDSL 8	
67-75			Not Used	
76	White	Blue	Loop 2 Power 1	
77	White	Orange	Loop 2 HDSL 1	
78	White	Green	Loop 2 Power 2	
79	White	Brown	Loop 2 HDSL 2	
80	White	Slate	Loop 2 Power 3	
81	Red	Blue	Loop 2 HDSL 3	7
82	Red	Orange	Loop 2 Power 4	1
83	Red	Green	Loop 2 HDSL 4	0
84	Red	Brown	Loop 2 Power 5	D
85	Red	Slate	Loop 2 HDSL 5	
86	Black	Blue	Loop 2 Power 6	
87	Black	Orange	Loop 2 HDSL 6	
88	Black	Green	Loop 2 Power 7	
89	Black	Brown	Loop 2 HDSL 7	
90	Black	Slate	Loop 2 Power 8	

Table 4. PG-Flex^{Plus} FLL-814 Cable Assignments

Protector Socket	Tip	Ring	Description	Connector
91	Yellow	Blue	Loop 2 HDSL 8	
92-99			Not Used	

Table 5. PG-Flex^{Plus} PLL-735 Cable Assignments

Protector Socket	Tip	Ring	Description	Connector
51	White	Blue	DSL_A-1	
52	White	Orange	DSL_A-2	
53	White	Green	DSL_A-3	
54	White	Brown	DSL_A-4	
55	White	Slate	DSL_A-5	
56	Red	Blue	DSL_A-6	
57	Red	Orange	DSL_A-7	7
58	Red	Green	DSL_A-8	1
59	Red	Brown	DSL_A-9	0
60	Red	Slate	DSL_A-10	C
61	Black	Blue	DSL_A-11	
62	Black	Orange	DSL_A-12	
63	Black	Green	DSL_A-13	
64	Black	Brown	DSL_A-14	
65	Black	Slate	DSL_A-15	
66	Yellow	Blue	DSL_A-16	
67-75			Not Used	
76	White	Blue	DSL_B-1	
77	White	Orange	DSL_B-2	
78	White	Green	DSL_B-3	
79	White	Brown	DSL_B-4	
80	White	Slate	DSL_B-5	
81	Red	Blue	DSL_B-6	7
82	Red	Orange	DSL_B-7	1
83	Red	Green	DSL_B-8	0
84	Red	Brown	DSL_B-9	D

Table 5. PG-Flex^{Plus} PLL-735 Cable Assignments

Protector Socket	Tip	Ring	Description	Connector
85	Red	Slate	DSL_B-10	
86	Black	Blue	DSL_B-11	
87	Black	Orange	DSL_B-12	
88	Black	Green	DSL_B-13	
89	Black	Brown	DSL_B-14	
90	Black	Slate	DSL_B-15	
91	Yellow	Blue	DSL_B-16	
92-99			Not Used	

Cabinet Module Installation and Provisioning

This section describes the procedures for installing and provisioning the AMU-912 and PMX-744. It also includes instructions for installing an FLL-814 and/or PLL-735.

Before you began, information is required to determine how the central office and remote terminal are to be provisioned. In some cases, no provisioning is required at the CO. This occurs when a cabinet is deployed with an ***Integrated*** Switch configuration. In other words, the DS-1 signal comes directly out of a switch port for transport to the RT cabinet. In ***Universal*** Switch applications, the individual DS-0s are presented to a chassis in the CO that multiplexes them to a DS-1 signal for transport to the RT cabinet. Be sure you understand which application is being used. This procedure is generic in nature **EXCEPT** when configuring the multiplexer units. In ***Universal*** mode, the MUX Configuration option must be set to **CB-RT**. In ***Integrated*** mode, the MUX Configuration option must be set to **NORMAL**. See the last option in Table 11 and refer back to the first section under **PG-Flex^{Plus} System** on page 1 for a description of each configuration.

NOTE: The following procedures assume that all network T1/HDSL circuits and Flex^{Plus} HDSL circuits are in place and fully operational.

Install the RT AMU-912 Management Unit

1. Install AMU-912 Management Unit in the Shelf slot labeled “COMMON”.

After installing the AMU-912, the front panel LEDs will cycle upwards in pairs, and then go off. The PWR LED will remain on. Table 6 provides a description of the AMU-912 LEDs. Some alarms may be active and should be ignored until provisioning is completed.

Table 6. AMU-912 Management Unit LED Indicators

LED	Color	State	Description
PWR	Green	On Flashing Off	BAT A and BAT B present BAT A or BAT B missing Unit not powered
EXTCLK	Green	On Flash Off	Both clocks present One clock present No clcok present
CRIT	Red	On Off	Critical alarm(s) active No critical alarms active
MAJ	Red	On Off	Major alarm(s) active No major alarm(s) active
MIN	Yellow	On Off	Minor alarm(s) active No minor alarm(s) active
ACO	Yellow	On Off	ACO active ACO not active
Fault	Red	On Off	Fault in unit No fault in unit
COM	Green	On Off	Multi-shelf mgmt active Multi-shelf mgmt idle

Table 7 lists the LED indications for the AMU-912/PMX-744 diagnostic and maintenance modes.

Table 7. AMU-912/PMX-744 Diagonostic Indicators

Indicator	Description	Action
PWR LED On, all other LEDs flashing	AMU-912 is running in Boot Mode	Application software must be re-installed. Contact Technical Support for additional information

Table 7. AMU-912/PMX-744 Diagonostic Indicators

Indicator	Description	Action
PWR LED on, all other LEDs sequencing downward	Software download to AMU-912	Wait for download to complete and AMU-912 to restart.

Install the RT PMX-744 Multiplexer Units

1. Install the 1st PMX-744 Multiplexer Unit in the COT Shelf slot labeled “MUX 1”.
2. After installing the PMX-744, the front panel LEDs will turn on, and then go off. The PWR LED will remain on.
3. After approximately 10 seconds, the DSX LEDs will indicate the status of the DSX circuits and the ACTIVE LED will be on.
4. Install the 2nd PMX-744 Multiplexer Unit in the COT Shelf slot labeled “MUX 2”.
5. After installing the PMX-744, the front panel LEDs will turn on, and then go off. The PWR LED will remain on.
6. After approximately 10 seconds, the DSX LEDs will indicate the status of the DSX circuits and the ACTIVE LED will be off.

If the PMX-744 is not indicating the correct status of the DS1 circuits, there may be a problem with the transmission circuits or with the PMX-744. Problems must be cleared before proceeding with the turn-up of the COT Shelf.

Table 8 provides a description of the PMX-744 LEDs.

Table 8. PMX-744 Multiplexer Unit LED Indicators

LED	Color	State	Description
POWER	Green	On Flashing Off	BAT and BAT B present BAT A or BAT B missing Unit is not powered
ACTIVE	Green	On Off	Carrying traffic Standby
TEST	Yellow	On Off	DS1(s) in loopback DS1(s) not in loopback

Table 8. PMX-744 Multiplexer Unit LED Indicators

LED	Color	State	Description
FAULT	Red	On Off	Fault in unit No fault in unit
DSX	Green	On Flashing Off	Good DS1 detected LOF detected No DS1 signal present

Refer to Table 7 for diagnostic and maintenance modes for both the AMU-912 and PMX-744.

RT PROVISIONING

NOTE: It is assumed that the central office side of the circuit has been provisioned and network facilities are in place and fully operation. CO side configuration procedures are provided later in this guide.

Log in to the System

1. Start terminal emulator program on your laptop or other device. Hyper Terminal or ProComm are two of many programs you can use.
2. Set baud rate to 9600, 8 data bits, no parity bits, and 1 stop bit (8-N-1).
3. Connect laptop to front panel craft access of the AMU-912 using a serial DB-9 male to DB-9 female cable.
4. Press the space bar a number of times to start the autobaud feature.
5. Login page should appear. Type in the password. Default password is **password#1**. Press <**enter**>.
6. You should now be at the main AMU-912 screen. Confirm by looking at the top banner. It should read **PG-FlexPlus Advanced Management Unit.**

Provision the RT AMU-912

1. Right arrow to the **CONFIG** column and arrow down to **SHELF OPTIONS** and press <**enter**>. Arrow down to the **DB-25 SETTING** and use the space bar to toggle to **ENV-ALARMS**. Arrow down to **ACCEPT SHELF OPTIONS** and press <**enter**>. You will be prompted to save changes. Type '**y**' to confirm.
2. (Optional) You may assign a shelf ID at this time. Arrow up to PG-Flex^{Plus} **Shelf ID** and type in a system ID with 20 characters maximum. Arrow down to **ACCEPT SHELF OPTIONS** and press <**enter**>. You will be prompted to save changes. Type '**y**' to confirm.
3. Press the ESC key once to exit **SHELF OPTIONS**. The **CONFIG** column should still be highlighted. Press the arrow down key until **ENVIRONMENTAL ALARMS SETUP** is highlighted and press <**enter**>. Use the arrow keys to navigate to each SETUP option and then use the space bar to toggle through the options. Set the options as shown in Table 9.
4. Arrow down to **ACCEPT ENVIRONMENTAL ALARM SETUP CHANGES** and press <**enter**>. You will be prompted to save changes. Type '**y**' to confirm.
5. Press the ESC key once to exit **ENVIRONMENTAL ALARMS SETUP**. The **CONFIG** column should still be highlighted. Press the arrow down key until **ENVIRONMENTAL ALARM TYPES** is highlighted and press <**enter**>. Use the arrow keys to navigate to each TYPE option and then use the space bar to toggle through the options. Set the options as shown in Table 10.
6. Arrow down to **ACCEPT ENVIRONMENTAL ALARM TYPE CHANGES** and press <**enter**>. You will be prompted to save changes. Type '**y**' to confirm.
7. Press the ESC once to return to CONFIG. You are now ready to provision the PMX-744.

Table 9. ENVIRONMENTAL ALARMS SETUP

ENV Alarm Setup	TR-08 Datalink ALM
Environmental alarm 1	COM-PWRMISC
Environmental alarm 2	COM-PWRMISC
Environmental alarm 3	COM-MJ
Environmental alarm 4	COM-MN

Table 10. ENVIRONMENTAL ALARM TYPES

Environmetal Alarms	Type
Environmental Alarm 1 (ENV1)	MN
Environmental Alarm 2 (ENV2)	MN
Environmental Alarm 3 (ENV3)	MJ
Environmental Alarm 4 (ENV4)	MN

Provision the RT PMX-744

You should still be logged in and the CONFIG column should be highlighted under the PG-Flex^{Plus} Advanced Management Unit banner as described in step 1 under Provision the AMU-912.

NOTE: You must provision the ACTIVE MUX. Provisioning information will be copied to the stand-by MUX once accepting changes is completed.

1. Left arrow to the **SELECT** column and arrow down to **MUX 1**. This assumes **MUX 1** is the active MUX. If not, arrow down to **MUX 2**, and press <**enter**>. Note the banner now reads **PG-FlexPlus CO MUX Unit # n** where **n** is the MUX unit that is active.
2. Right arrow to **CONFIG** and press the down arrow. The **Equipment Options** menu item should be highlighted. Press <**enter**>.
3. Use the arrow keys to navigate to each option and then use the space bar to toggle through the options. Set the options as shown in Table 11. Note the difference with a ***Universal*** versus ***Integrated*** application under the **MUX Configuration** option.
4. Arrow down to **ACCEPT EQUIPMENT OPTION CHANGES** and press <**enter**>. You will be prompted to save changes. Type '**y**' to confirm.
5. Press ESC three times to return to the main AMU logout screen and press '**y**' to logout and return to the password screen.

Table 11. PMX-744L1B Configuration

Option	Setting
TDM Cross Connect Mode	12 DS0/SLOT
Primary Timing Source	DS1-1*
Secondary Timing Source	DS1-1*
MUX Protection Switching	ENABLED
TDM DS1 Frame Format	TR-08
TDM DS1 Line Code	AMI
TR-08 Alarm Format	16 FRAME
TR-08 Facility Protection	DISABLED
MUX Configuration	See Note

*The RT MUX must loop time off of the incoming DS1-1 signal. The provisioning shown assumes a single DS1 input. If a second DS1 input is used, set the secondary timing source to DS1-2.

NOTE: In *Universal* mode the MUX Configuration option must be set to CB-RT. In *Integrated* mode, the MUX Configuration option must be set to NORMAL. Refer back to the first section under **PG-Flex^{Plus} System** on page 1 for a description of each configuration.

Install the PLL-735 and FLL-814 Line Unit

NOTE: The following procedures assume the transmission circuits between the CO and the Cabinet Shelf are configured correctly and fully operational (Table 11) and the HDSL circuits between the Cabinet and remote enclosures are wired correctly and equipment is placed at the remote locations.

Table 12 describes the LED indicator status on the front panel of the PLL-735. Refer to Table 14 for fault isolation and troubleshooting procedures.

Table 12. PLL-735 LED Indicators

LED	Color	State	Description
PWR	Green	On Flash Off	HDSL in sync HDSL not in sync Unit not powered
SYNC	Green	On Flash Off	HDSL in sync to RT HDSL attempting to sync No RT detected
MARGIN	Yellow	On Flash Off	CO margin below threshold RT margin below threshold CO and RTmargins above threshold
TEST	Yellow	On Off	Subscriber drop test in progress No drop test in progress
FAULT	Red	On Flash Off	Fault in unit Alarm in unit No fault in unit

Table 13 describes the LED indicator status on the front panel of the FLL-814. Refer to Table 15 for fault isolation and troubleshooting procedures.

Table 13. FLL-814 LED Indicators

LED	Color	State	Description
PWR	Green	On Flash Off	Unit is powered Unit attempting to power RT or doubler Unit is not powered
SYNC *n*	Green	On Flash Off	HDSL Loop *n* is in sync with RT or doubler HDSL Loop *n* is attempting to sync with RT or doubler No RT or doubler detected
MARGIN *n*	Yellow	On Flash Off	HDSL Loop *n* CO margin below threshold HDSL Loop *n* RT margin below threshold CO and RT margins above threshold
TEST	Yellow	On Off	Subscriber drop test in progress No drop test in progress

Table 13. FLL-814 LED Indicators

LED	Color	State	Description
ALARM	Red	On Flash Off	CO alarm condition exists RT alarm condition exists No alarm condition exists
FAULT	Red	On Off	Fault in unit No fault in unit

FAULT ISOLATION AND TROUBLESHOOTING

This section provides information on fault isolation and troubleshooting based on front panel LED indicators. Additional information on system performance and alarms can be found by connecting a VT-100 terminal or PC running VT-100 emulation software to the RS-232 connector on the front panel of the AMU-912 and viewing the screens for each of the units. Refer to the technical documentation for each unit for detailed information on accessing and interpreting these screens. If you need additional assistance, contact Technical Support
(see page 11).

PLL-735 Fault Isolation and Troubleshooting

Table 14 provides fault isolation and troubleshooting procedures for the PLL-735.

Table 14. PLL-735 Troubleshooting and Fault Isolation

Indicator	Probable Cause	Solution
All LEDs off	No input power, PLL-735 fuse blown, or PLL-735 processor stopped	Verify fuses on bay fuse panel. Check input power in the COT shelf battery terminations. Remove and re-insert the PLL-735. Verify that no alarms exist on the PLL-735 main screen. If you cannot view the main screen, replace the PLL-735 Replace the PLL-735
PWR LED Flashing	HDSL loop open or HDSL ground fault detected	Check HDSL loop continuity and length. PLL-735 power supply or RT fault. Replace PLL-735, then RT.
FAULT LED on	PLL-735 fault detected	Remove and re-insert the PLL-735. Replace the PLL-735.
FAULT LED Flashing	PLL-735 has detected an alarm condition	Clear the alarm(s) displayed on the pll-735 main screen.

Table 14. PLL-735 Troubleshooting and Fault Isolation

Indicator	Probable Cause	Solution
MARGIN LED on	HDSL distance linit exceeded, HDSL loop fault, PLL-735 fault, or RT fault	Verify that no alarms exist on the PLL-735 main screen.If you cannot view the main screen, replace the PLL-735 Check engineering records for distancebetween PLL-735 abd RT. Check HDSL loss on PLL-735 HDSL performance screen to ensure maximum attenuation has not been exceeded Replace the PLL-735, then RT.
MARGIN LED flashing	HDSL distance limit exceeded, HDSL loop fault, or RT fault	Verify that no alarms exist on the PLL-735 main screen. If you cannot view the screen, replace the PLL-735. Check engineering records for distance between PLL-735 and RT. Check HDSL loss on PLL-735 HDSL performance screen to ensure maximum attenuation has not been exceeded. Replace PLL-735, then RT.

Table 14. PLL-735 Troubleshooting and Fault Isolation

Indicator	Probable Cause	Solution
SYNC LED off	HDSL loop has lost synchronization with RT, HDSL distance limit exceeded, HDSL loop fault, or PLL-735 or RT fault.	Verify that no alarms exist on the PLL-735 main screen. If you cannot view the screen, replace the PLL-735. Check engineering records for distance between PLL-735 and RT. Check HDSL loss on PLL-735 HDSL performance screen to ensure maximum attenuation has not been exceeded. Replace PLL-735, then RT.

FLL-814 Fault Isolation and Troubleshooting

Table 15 provides fault isolation and troubleshooting procedures for the FLL-814.

Table 15. FLL-814 Troubleshooting and Fault Isolation

Indicator	Probable Cause	Solution
All LEDs off	No input power, FLL-814 fuse blown, or FLL-814 processor stopped	Verify fuses on bay fuse panel. Check input power in the COT shelf battery terminations. Remove and re-insert the FLL-814. Verify that no alarms exist on the FLL-814 main screen. If you cannot view the main screen, replace the FLL-814 Replace the FLL-814

Table 15. FLL-814 Troubleshooting and Fault Isolation

Indicator	Probable Cause	Solution
FAULT LED on	FLL-814 fault detected	Remove and re-insert the FLL-814. Replace the FLL-814
ALARM LED on	FLL-814 alarm condition exists.	On the FLL-814 main screen, display alarm conditions that exist and correct the causes. Replace the FLL-814
ALARM LED Flashing	RT alarm condition exists.	On the FLL-814 main screen, display alarm conditions that exist and correct the causes. Replace the RT Line unit.
MARGIN LED On	HDSL distance linit exceeded, HDSL loop fault, PLL-735 fault, or RT fault	Verify that no alarms exist on the FLL-814 main screen.If you cannot view the main screen, replace the FLL-814 Check engineering records for distancebetween FLL-814 and RT. Check HDSL loss on FLL-814 HDSL performance screen to ensure maximum attenuation has not been exceeded Replace the FLL-814, then RT line unit.

Table 15. FLL-814 Troubleshooting and Fault Isolation

Indicator	Probable Cause	Solution
MARGIN LED Flashing	HDSL distance limit exceeded, HDSL loop fault, or RT fault	Verify that no alarms exist on the FLL-814 main screen. If you cannot view the screen, replace the FLL-814. Check engineering records for distance between FLL-814 and RT. Check HDSL loss on FLL-814 HDSL performance screen to ensure maximum attenuation has not been exceeded. Replace FLL-814, then RT line unit.
SYNC LED Off	HDSL loop has lost synchronization with RT, HDSL distance limit exceeded, HDSL loop fault, or PLL-735 or RT line unit fault.	Verify that no alarms exist on the FLL-814 main screen. If you cannot view the screen, replace the FLL-814. Check engineering records for distance between FLL-814 and RT. Check HDSL loss on FLL-814 HDSL performance screen to ensure maximum attenuation has not been exceeded. Replace FLL-814, then RT line unit.

Subscriber Fault Isolation

Table 16 provides fault isolation procedures for the PG-Flex^{Plus} system. Problems are listed in decreasing order of probability. It is assumed that the system has successfully powered up, the HDSL circuits are synchronized end-to-end, there are no ES, UAS, or margin errors occurring, and no Fault LEDs are illuminated.

Table 16. Subscriber Fault Isolation

Indicator	Probable Cause	Solution
All subscriber circuits cannot draw dial tone, telephones will not ring.	Incorrect provisioning of the PMX-744s, and/or PLL-735 or FLL-814.	PMX: Verify system options are set correctly. Line units: Verify timeslots are correctly assigned and enabled for all mapped circuits.
	Problems with DS1 signals	Verify the presense and integrity of the DS1 signals.
	Undetected Harware problem	Replace the following units with known good units in the following order: - PLL-735/FLL-814 - RT/RT line unit - PMX-744 - RT channel units
One or more subscriber circuits on an RT or single RT channel unit cannot draw dial tone, telephones will not ring.	Undetected hardware problem.	Replace the following units with known good units in the following order: - PLL-735/FLL-814 - RT/RT line unit - PMX-744 - RT channel units

Central Office Module Installation and Provisioning

The section describes the COT shelf provisioning options in a ***Universal*** application. Refer back to the first section under **PG-Flex^{Plus} System** on page 1 for a description of each configuration. Since the COT installation and provisioning is nearly identical to the RT provisioning, numerous references will be made to earlier sections of this guide.

NOTE: It is assumed the COT shelf has been installed, wired, and network facilities are in place and ready to receive signalling (i.e., office repeater bay is equipped with modules, word document issued by engineering, etc.).

Install the COT AMU-912 Management Unit

Refer to the section labeled **Install the RT AMU-912 Management Unit** on page 5, perform step 1 and observe the LED indicators as shown in Table 6. Table 7 lists the LED indications for the AMU-912/PMX-744 diagnostic and maintenance modes.

Install the COT PMX-744 Multiplexer Units

Refer to the section labeled **Install the RT PMX-744 Multiplexer Units** on page 5, perform step 1 through 6 and observe the LED indicators as shown in Table 8. Table 7 lists the LED indications for the AMU-912/PMX-744 diagnostic and maintenance modes.

Install the COT FPC-806 Channel Units

You can install the FPC-806 in any slot except the three positions labeled COMMON, MUX1 and MUX 2. Each FPC-806 supports up to 6 analog dial tone signals from the switch. These analog signals are digitized and multiplexed onto the carrier. Four FPC-806s fill an entire DS1 for 24 channel transport.

1. Install FPC-806 in correct slot location.

Observe that all LEDs briefly blink on and then off, with the exception of the PWR LED that remains On. Table 17 provides a description of the FPC-806 LEDs.

Table 17. FPC-806 Front Panel LEDs

LED	Color	State	Function
PWR	Green	On	Receiving power
		Off	Not receiving power
TEST	Yellow	Flash	Subscriber Drop Testing is in progress
		Off	No Subscriber Drop Testing in progress
FAULT	Red	On	Fault in the FPC-806
		Flashing	PMX-744 removed
		Off	No fault is detected

Table 17. FPC-806 Front Panel LEDs

LED	Color	State	Function
POTS# (# = 1 – 6)	Green	On	Off Hook
		Ring Cadence Flash	Channel is ringing
		Slow Flash	Channel is in test
		Off	Channel is idle

Table 18 lists the LED indications for the FPC-806 diagnostic and maintenance modes.

Table 18. FPC-806 Diagnostic Indicators

Indicator	Description	Action
PWR LED On, all other LEDs flashing	FPC-806 is running in Boot Mode	Application software must be reinstalled. Contact Product Support for additional information.
PWR LED On, all other LEDs sequencing downward	Software download to FPC-806	Wait for download to complete and FPC-806 to restart
Fault LED On, All other LEDs Off	FPC-806 hardware failure	Replace FPC-806

COT Provisioning

Log in to the COT System

Refer to the section labeled **Log in to the COT System** on page 4 and perform steps 1 through 6 to successfully log in to the system.

Provision the COT AMU-912

The AMU-912, when located in the Central Office, requires no provisioning and can be used in its default condition. However, if you would like to create a system ID, perform step 2 as shown in the section labeled **Provision the RT AMU-912** on page 5. Press the ESC key once to back up to the CONFIG column

Provision the COT PMX-744

You should still be logged in and the CONFIG column should be highlighted under the PG-Flex^{Plus} Advanced Management Unit banner as described in step 1 under **Provision the RT AMU-912** on page 5.

Refer to the section labeled **Provision the RT PMX-744** on page 5 and follow steps 1 through 4 only. Use those options specified in Table 19. After accepting changes, press the ESC key once.

NOTE: You must provision the ACTIVE MUX. Provisioning information will be copied to the stand-by MUX once accepting changes is completed.

Table 19. PMX-744L1B Configuration

Option	Setting
TDM Cross Connect Mode	6 DS0/SLOT
Primary Timing Source	DS1-6*
Secondary Timing Source	DS1-7*
MUX Protection Switching	ENABLED
TDM DS1 Frame Format	TR-08
TDM DS1 Line Code	AMI
TR-08 Alarm Format	16 FRAME
TR-08 Facility Protection	DISABLED
MUX Configuration	CB-COT

*The COT MUX requires an office timing source that is input to DS1s 6, 7, or 8. DS1s 6 and 7 are used in this example.

Provision the COT FPC-806

1. Press the **ESC** button to return to the **PG-Flex^{Plus} Advanced Management Unit** screen.
2. Right arrow to **SELECT** and press the down arrow until **COLU 1** is highlighted. Press <**enter**>. Note the banner now reads **PG-Flex^{Plus} CPOTS Line Unit #1**.
3. Right arrow to **CONFIG** and press the down arrow. The **System Options** menu item should be highlighted. Press <**enter**>.
4. Use the arrow keys to navigate to each option and then use the space bar to toggle through the options. Set the options as shown in Table 20.
5. Arrow down to **ACCEPT SYSTEM OPTION CHANGES** and press <**enter**>. You will be prompted to save changes. Type '**y**' to confirm.
6. Repeat steps 2 through 5 for each COLU that is installed in the system. However, in step 2, select the next available COLU until all COLUs have been configured and changes have been saved.
7. Press ESC three times to return to the main AMU logout screen and press '**y**' to log out and return to the password screen.

Table 20. FPC-806 Provisioning Options

Option	Setting
Subscriber Drop Test Compatibility	MLT
POTS DID Mode	DISABLE
PG-Plus System ID (24 chars max)	Optional

Switch Provisioning

This section describes the typical switch provisioning required to successfully turn up a PG-Flex^{Plus} Field Cabinet operating in ***Integrated*** mode. Refer back to the first section under **PG-Flex^{Plus} System** on page 1 for a description of this application.

The PG-Flex^{Plus} cabinet can be deployed with multiple DS-1 (T1/HDSL fed) inputs. However, it has been demonstrated that in most cases, a less than full roll-out of the cabinet is experienced during the initial installation. As new shelves are required, additional switch ports are added. In some instances; however, all switch ports have been configured while only the 'A' shelf (or 'A' and 'B', etc) is active at the cabinet. In situations like this, although there is nothing technically wrong, the switch will report an 'A' shelf, 'major', and 'minor' TR-08 alarm to the cabinet system. This is a false alarm that can lead to confusion by the craft personnel. There are two methods in which to suppress these alarms.

In the case where all switch ports have been configured, the simplest method is to throw up a hard-wire loopback back toward the switch. This is done either with a loopback plug or jumper at the DSX. In most cases, you should not need to place a loopback into the system towards the cabinet as those

DS-1s that have not had a valid input will remain in an 'in service, standby' state and will not generate any alarms towards the switch.

The correct method for provisioning a switch that will not use all of the shelves is to partially build out the tuple. The following is in reference to a DSM-100. Provisioning of a 5ESS would be similar in scope; however, different in implementation. Since only the middle line of the tuple is of importance for correct single (or less than 4) shelf provisioning, the first and third lines have been omitted.

Assume the following for the first example: port 1 will be used for the 'A' shelf and it is located in SMS 6. 'B', 'C', and 'D' shelves are not used. The ACU type will always be WP1B as the PG-Flex^{Plus} system does not support 13-bit alarm operation over the datalink. The second line of the tuple will read as follows:

SMS 6 MODE 1 (1) $ NILMODE $ S WP1B

Note that port 1 (1) is located in SMS 6 and is operating in mode 1. The 'B' shelf is assigned a $ as unassigned. The 'C' and 'D' shelves are set to NILMODE and are both unassigned ($). Ringer type is S (2 seconds on, four seconds off) and the ACU alarm field is set to 16 bits (WP1B).

In the following example, the same system now uses the 'A', 'B', and 'C' shelves. The SMS and port 'A' remain the same. However, port 3 is used for the 'B' shelf and port 6 is used for the 'C' shelf.

SMS 6 MODE 1 (1) (3) MODE 1 (6) $ S WP1B

Note that the ABSHELF datafill now includes both ports 1 and 3 and the CDSHELF datafill only includes port 6 for shelf 'C' and unassigned ($) for shelf 'D'.

Common Switch Provisioning Issues

DMS-100

For each integrated TR-08 Digroup, Systems 1 - 4 and Systems 5 - 8 must be in the same SMS Module Number and RT Number. For example: A Switch programmer may assign PG Flex^{Plus} Integrated Systems 1 - 4 as SMS Module #11 RT Unit #2 Digroup 0,1,2,3. Each Digroup would have circuit members assigned as 00-23.

PG Flex^{Plus} Integrated COT shelf system 1-4 must be in the same SMS module. Each SMS module has 20 ports to assign to the IDLC referenced. System 5-8 must also be in a same SMS module but not necessarily the same module as system 1-4.

Make sure that the SMS RCS Inventory is not in an "off-lined" state. You may have to busy-out the shelf and bring it back "on-line" in order to communicate with the PG Flex^{Plus} cabinet located shelf.

5ESS

Systems 1-4 and 5-8 need to be assigned to the same switch module. The TR08, System 1-4 shelf A,B,C,D must be assigned as one RT #. A common mistake made within the switch is to try and assign the PG Flex^{Plus} System 1-4 or 5-8 as individual RT#s with the Switch Module and IDCU number.

An example of a correct 5ESS IDLC assignment might be:

Switching Module 72, RT# 02, Line Number within RT 000-0096, DS-1 Port Numbers 04-07, TR008, System # 161 Cable ID 46, IPG Pair Count 101-196.

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.

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.

Technical Support

Technical assistance is available 24 hours a day, 7 days a week by contacting the ADC Technical Assistance Center (TAC) at:

Telephone:	800.366.3891 (toll-free in the U.S. and Canada)
E-mail:	wsd.support@adc.com
Knowledge Base:	www.adc.com/Knowledge_Base/index.jsp
Web:	www.adc.com

Revision History

Rev	Date	Revisions
01	11/15/2004	Initial Release

PG-FlexPlus® Field Cabinet Provisioning Guide

Section SCP-CAB001-010-01G
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This document applies to the following products:

Model	CLEI	Description
PCS-719 L1A	S9MTCB0A~~	23" shelf
AMU-912 L1	VAC2Z7HL~~	Management Unit
PMX-744 L1B	VAPHCCGD~~	8 DS1 Multiplex Unit
PLL-735 L3	S9L1ARFB~~	6 Channel Line Unit
FLL-814 L1B	VACJK88E~~	24 Channel Line Unit
FPC-806 L1	VAL4T20F~~	6 Channel CO Line Unit
PG-CAB001	VABA1Z0N~~	PG-FlexPlus Field Cabinet