PG-FLEX

8 CHANNEL POTS
CENTRAL OFFICE CHANNEL UNIT

Model	List Number	Part Number	CLEI Code
FLC-703	3A	150-1303-31	VACHCDVC--

PAIRGAIN TECHNOLOGIES, INC.
ENGINEERING PLANT SERIES TECHNICAL PRACTICE

SECTION 363-703-131-01

PAIRGAIN

Revision History of This Practice

Revision	Release Date	Revisions Made
01	July 30, 1999	Initial Release

USING THIS TECHNICAL PRACTICE

Three types of messages, identified by icons, appear in the text.

Notes indicate information about special circumstances.

Cautions indicate the possibility of equipment damage or the possibility of personal injury.

Electrostatic Discharge (ESD) Susceptibility symbols indicate that a device or assembly is susceptible to damage from electrostatic discharge.

INSPECTING YOUR SHIPMENT

Upon receipt of the equipment:

- Unpack each container and visually inspect it for signs of damage. If the equipment has been damaged in transit, immediately report the extent of damage to the transportation company and to PairGain. 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 PairGain as described in the Warranty. If you must store the equipment for a prolonged period, store the equipment in its original container.

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OVERVIEW

The PairGain® PG-Flex® FLC-703 List 3A POTS Central Office Channel Unit provides eight loop start interfaces for POTS service between a PG-Flex Central Office Terminal (COT) and the Central Office (CO) switch.

DESCRIPTION AND FEATURES

The FLC-703 unit provides metallic test access to the subscriber line connection through an optional metallic bypass pair. Perform metallic bypass testing either manually or through the Pair Gain Test Controller (PGTC).

Features of the FLC-703 COT Channel Unit are:

- eight loop start POTS subscriber interfaces
- 64 kbps m-Law Pulse Code Modulation (PCM) encoding
- front panel ACTIVE LEDs
- front panel FAULT LED
- PGTC compatibility
- Custom Local Area Signaling Services (CLASS) support (for example, caller ID)
- forward disconnect
- distinctive ringing
- connection for a subscriber loop to a metallic bypass test pair

FRONT PANEL

Figure 1 shows the FLC-703 front panel. Table 1 lists the different states and indications for the FLC-703 Channel Unit front panel LEDs.

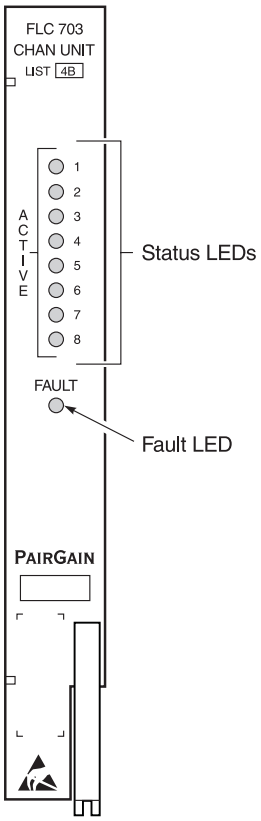

Figure 1. *FLC-703 Front Panel*

Table 1. *Front Panel LEDs*

LEDs	LEDs State	Indicates
ACTIVE (1 through 8)	Solid green	Channel is off hook.
	Fast flashing green	Channel is in test.
	Slow flashing green	Channel is ringing.
	Off	Channel is on hook.
FAULT	Red	Fault detected by the unit.
	Off	No faults detected.

SPECIFICATIONS

Electrical Characteristics

Analog Impedance	900 Ω
Loop Length	100 Ω (CO switch to COT)
End-to-End Loss	-2.5 dB ± 1.0 dB

Channel Signature of Loop Start Lines

Tip-Ring	Open
Tip-Ground	162 kΩ, 1%
Ring-Ground	226 kΩ, 1%

Environmental

Operating 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 percent (noncondensing)

Physical Characteristics

Weight	0.8 lb. (0.4 kg)
Height	6.75 in. (17.2 cm)
Width	1.00 in. (2.5 cm)
Depth	10.50 in. (26.7 cm)

APPLICATIONS

The FLC-703 provides service to eight independent loop start subscriber lines. Figure 2 shows a typical system with loop start and ground start services.

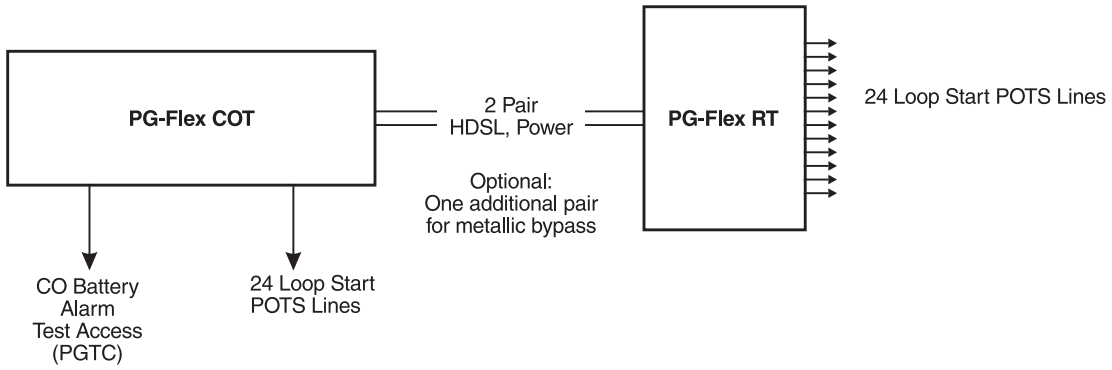

Figure 2. *Typical PG-Flex Configuration*

FLC-703 FUNCTIONS

The FLC-703 Channel Unit provides eight POTS channel interfaces to the CO switch. Each FLC-703 detects:

- forward battery
- ringing voltage

CIRCUIT OPERATION

The following paragraphs define the FLC-703 circuit operation. Each FLC-703 circuit has an associated LED that indicates when the line is off-hook, idle, ringing, or under test. See Figure 1 on page 2.

Loop start idle condition is a Ring lead negative and Tip lead positive from the Central Office Terminal (COT) with the same conditions out of the RT toward the subscriber. The following occurs when the calling line goes off-hook:

- loop current flows and is detected by the FRC-753
- FLC-703 receives an off-hook signal from the RT
- FLC-703 generates an off-hook signal to the Central Office (CO) to begin current flow
- CO sends dial tone
- FRC-753 recognizes dial pulses or Dual Tone Multi Frequency (DTMF) signaling, from the subscriber and forwards these as loop current breaks, dialing or DTMF signaling, at the CO.

The following occurs for an incoming call:

- FLC-703 detects a ringing signal from the CO
- FLC-703 signals the FRC-753 which then connects ringing to the subscriber
- subscriber line goes off-hook and the FRC-753, by means of the FLC-703, signals the CO to disconnect ringing and establish an audio path

When caller ID (a CLASS feature) is activated, the CO generates a signal to the subscriber between the first and second bursts of the ringing signal only (for example, PG-Flex supports on-hook transmission).

The forward-disconnect function releases a called line that was left on hold or an answering set that requires a loop open to be able to turn off.

INSTALLATION AND TEST

INSTALL THE FLC-703

Observe normal electrostatic discharge precautions when handling electronic equipment. Do not hold electronic plug-ins by their edge. Do not touch components or circuitry.

Insert the FLC-703 into the shelf and observe that all LEDs:

- turn ON for approximately 2 seconds
- scan from top to bottom
- turn OFF

If the LEDs do not follow the above sequence, see Table 1 on page 2.

VERIFY OPERATION

Verify the following after the system is powered up and HDSL communication is synchronized:

1 Observe the front panel ACTIVE indicators are all OFF and the FAULT indicator is off (no calls are in progress).

2 Test circuits for loop start:

1 Place an outgoing call for each subscriber circuit provisioned and observe that the appropriate ACTIVE LED tracks the progress of the call (see Table 1 on page 2).

a Place an incoming call for each subscriber circuit provisioned and observe that the appropriate ACTIVE LED tracks the progress of the call.

SUBSCRIBER DROP TESTING

For PG-Flex subscriber drop testing from the CO, select and connect any subscriber drop to a metallic test pair at the RT. PG-Flex extends this connection to the COT where it can be switched onto the test access bus or to the corresponding subscriber line on the COT channel card.

Activate test access through the RS-232 maintenance port located on the front of the COT Line Unit using an ASCII terminal.

Table 1 on page 2 provides PG-Flex system troubleshooting procedures based on indications displayed by the FLC-703 Channel Unit front panel LEDs or customer reported problems.

Indication	Problem	Action
FAULT LED On	The FLC-703 processor has detected a fault.	Remove and re-insert the CU. If the FAULT LED does not extinguish, replace the CU.
Troubleshooting based on customer-originated trouble reports		
No dial tone, can not dial	• faulty RT or COT CU • facility short/open • CO switch problem	**1** Lift the subscriber pair at the network interface. If dial tone is present and you can place a call, refer the problem to the customer per local practice. **2** If you cannot hear dial tone or place a call at the network interface (with the subscriber pair lifted), check for dial tone at the RT. If dial tone is present, check the pair between the RT and the network interface. If no dial tone is present, replace the RT CU. **3** If the problem still exists, re-insert the original RT CU and replace the COT CU. Test for operation. **4** If the problem still exists, refer the problem to the CO switch.
Phone does not ring	• high-resistance subscriber line short • faulty RT or CO CU • loop length too long	**1** Lift the subscriber pair at the network interface. If ringing is present, refer the problem to the customer per local practice. **2** If ringing is not present, check for ringing at the RT. If ringing is present, check the pair between the RT and the network interface. If no ringing is present, replace the RT CU. If ringing is still not present, check a circuit on another CU. If ringing is still not present, replace the LU. **3** If ringing is still not present at the RT, re-insert the original CU and LU. Test for ringing at the COT. **4** Test for ringing into the COT from the CO switch. If no ringing is present, refer the trouble to the CO switch. If ringing is present, replace the COT CU. Test again for ringing at the network interface. If ringing is still not present, contact PairGain technical assistance (see "Product Support" on Inside back cover). **5** Verify the resistance of the copper loop between the RT Enclosure and the network interface is less than 530 Ω.
Phone does not stop ringing	• faulty subscriber instrument • faulty RT CU • loop length too long	**1** Test for ring trip at the network interface. If the ringing is tripped, refer the trouble to the customer per local practice. **2** If the ringing is not tripped, test for tripping at the RT. If ring trip does occur, check the loop for excessive length. If ring trip does not occur, replace the RT CU. If ring trip still does not occur, contact PairGain technical assistance (see "Product Support" Inside back cover). **3** Verify the resistance of the copper loop between the RT Enclosure and the network interface is less than 530 Ω.
Can not hear, Can not be heard	• subscriber problem • faulty RT or COT Channel Unit (CU)	**1** Lift the subscriber line at the network interface and check the signal level. If correct, refer trouble to the customer per local practice. **2** 2 If the level is too low, check the level at the RT. If the level is correct at the RT, check the pair between the RT and the network interface. If the level is too low at the RT, replace the RT CU. **3** 3 If the level is still too low, re-insert the original RT CU. **4** 4 Check the level at the COT coming from the CO switch. If it is correct, replace the COT CU. If it is not correct, refer the problem to the CO regarding the switch. **5** 5 If the level is still not correct, re-insert the original COT CU. Contact PairGain technical assistance (see "Product Support" Inside back cover).

ABBREVIATIONS

CLASS	Custom Local Area Signaling Services
CO	Central Office
COT	Central Office Terminal
CU	Channel Unit
DTMF	Dual Tone Multi Frequency
LU	Line Unit
MLT	Mechanized Loop Testing
PCM	Pulse Code Modulation
PGTC	Pair Gain Test Controller
POTS	Plain Old Telephone Service
RMA	Return Material Authorization
RT	Remote Terminal

PRODUCT SUPPORT

TECHNICAL SUPPORT

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

Telephone: (800) 638-0031 or (714) 832-9922

Fax: (714) 832-9924

During normal business hours (8:00 AM to 5:00 PM, Pacific Time, Monday - Friday, excluding holidays), technical assistance calls are normally answered directly by a Customer Service Engineer. At other times, a request for technical assistance is handled by an on-duty Customer Service Engineer through a callback process. This process normally results in a callback within 30 minutes of initiating the request.

WARRANTY

PairGain Technologies warrants this product to be free of defects and to be fully functional for a period of 60 months from the date of original shipment, given proper customer installation and regular maintenance. PairGain will repair or replace any unit without cost during this period if the unit is found to be defective for any reason other than abuse or improper use or installation.

Do not try to repair the unit. If it fails, replace it with another unit and return the faulty unit to PairGain for repair. Any modifications of the unit by anyone other than an authorized PairGain representative voids the warranty.

If a unit needs repair, call PairGain for a Return Material Authorization (RMA) number at (800) 638-0031.

Return the defective unit, freight prepaid, along with a brief description of the problem, to:

PairGain Technologies, Inc.
14352 Franklin Avenue
Tustin, CA 92780
ATTN: Repair and Return Dept.

PairGain continues to repair faulty modules beyond the warranty program at a nominal charge. Contact your PairGain sales representative for details and pricing.

FCC 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 user 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 PairGain Technologies, Inc. may void the user's authority to operate the equipment.

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

Corporate Office

14402 Franklin Avenue
Tustin, CA 92780

Tel: (714) 832-9922
Fax: (714) 832-9924

For Technical Assistance:

(800) 638-0031

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