GDC 086R607-001-02
Issue 2, 10/17/97

Installation and Operation

Metroplex™ 6000

FXS Octet
Model MP 6380

General DataComm

Manual Revision History

Shown below is a chronological listing of revisions to this manual. The issue number, date, and synopsis of revised materials are included to provide the reader with a comprehensive manual history.

Note *In keeping with the policy of continuing development carried out by General DataComm Inc., the information in this manual is subject to revision without notice.*

Issue	Date	Description
1	June/97	First issue.
2	Oct/97	General updates and added E1 updates

Compatibility

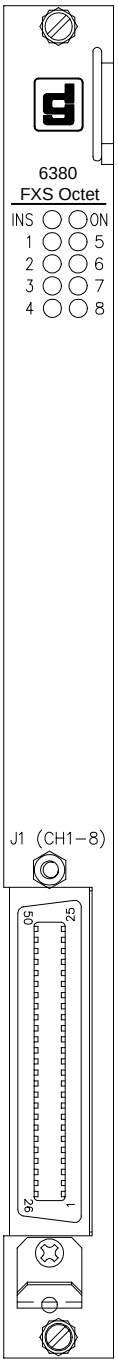
Check that you have the required revision of Platform Card firmware and FXS Octet card firmware.
See “Compatibility” on page 1-3.

FXS Octet

Table of Contents

FXS Octet Card

The FXS (Foreign eXchange Station) Octet Card provides eight 2-wire VF (Voice Frequency) interfaces to telephone equipment such as a telephone set or a PBX trunk. Each voice channel appears to the T1 network as a 64 kbps Mu-law encoded PCM channel with robbed-bit signaling. In an E1 network each channel is a 64 kbps A-law encoded PCM channel with CAS (Channel Associated Signaling) in timeslot 16. Each channel can be assigned to any timeslot on either LIU. Each channel on the FXS Octet Card has the same features as those on the Dual OB Option Card for the Flexi-Voice Plus basecard.



Features

- Supports forward disconnect
- Passes Caller-ID tones

Configuration

- Interface Type

  FXS/LS - for a loop start application

  FXS/GS - for a ground start application

  DPO (Dial Pulse Originate)

- Signaling Mode

  Standard - for FXS/LS, FXS/GS, and DPO interface types

  E&M conversion - for FXS/LS and FXS/GS interface types

  PLAR (Private Line Automatic Ringdown) - for FXS/LS interface type

- LIU Assignment

  any channel can be assigned to either LIU A or B

- Timeslot

  any channel can be assigned to any unused timeslot on either LIU.

- Three selectable default TLPs (Transmission Level Point) adjustable in 0.1dB increments from the default.

  Default 1: Tx +3.0dB, Rx -9.0dB

  Default 2: Tx +3.0dB, Rx -3.0dB

  Default 3: Tx + 0.0dB, Rx -6.0dB

Diagnostics

- Supports a Card Self-Test
- Supports Conditioning

  can force a channel busy.

  can force busy on next idle.

  can force idle.

Initiated from Manager:

- supports loopback to the network
- supports a digital milliwatt test tone in a system with a CSU or DSX-1 LIU.

  a 1000 Hz, 0 dBm0 test tone is transmitted towards the voice channel interface.

  If the channel is also in loopback, this test tone can be transmitted in the timeslot to the network

Status

Front panel Indication:

- Idle/Busy status per channel

  channel LED is off for Idle (on-hook) condition

  channel LED lights green for Busy (off-hook) condition
- Diagnostic status per channel

  channel LED lights red when in a diagnostic condition
- In Service status

  INS (in service) LED lights green when any channel has a timeslot assigned

Displayed on Local Management screen:

- Interface Type
- Signaling Mode
- LIU Assignment
- Timeslot
- Idle/Busy

Alarms

The FXS Octet does not generate any alarms. It responds to network alarms (LOS, OOF, RAI, AIS) and network loopbacks by conditioning the voice channels.

- In a E1 system the FXS Octet will also respond to timeslot 16 alarms (TS16 OOF, TS16 AIS, TS16 RAI)

Front Panel Indicators and Connections

Table 1 describes the front panel indicators and electrical connections.

Table 1 Front Panel Indicators and Connectors

Indicators	
LED	**Use**
ON	Power on. OFF = No power to base card. Green - Has power, and passed its own self-test. Red - Has power but failed its own self-test.
INS	In Service. OFF = Card not in service. No channels assigned to timeslots. Green = Card in service. One or more channels are assigned to timeslots.
CH1 - 8	Channel 1 through 8. OFF = Channel idle. Green = Channel busy. Red = Channel in diagnostic test mode.
Connections	
Connector	**Description**
J1 (CH1-8)	50-pin Amphenol connector, RJ21X female.

Compatibility

The FXS Octet Card requires a certain revision level of firmware on the Platform Card for correct operation. To check the firmware revision levels, go to the System Utilities screen on the Local Manager. Select `Card Revisions`. Read the firmware revision level of the Platform Card and the FXS Octet Card under the `F/W` column. The revision level starts at `--` and proceeds in the order A-, B-, C-, etc.

If the FXS Octet Card is not supported by your Platform Card firmware, the card name will appear as `Unknown` in the `Card Type` heading on the various screens.

If the firmware revision level of the FXS Octet Card is not compatible with the Platform Card firmware revision level, a `Communication Error` message may appear. If this occurs, check that the Platform Card and/or the FXS Octet Card have up-to-date firmware.

Platform Card E- or later firmware is required to support the FXS Octet.

Installation of FXS Octet Basecard

There are no switches or jumpers on the basecard to configure. See *Figure 1*.

Before handling a card, make sure that you are grounded with an ESD wriststrap, to prevent ESD damage to the card.

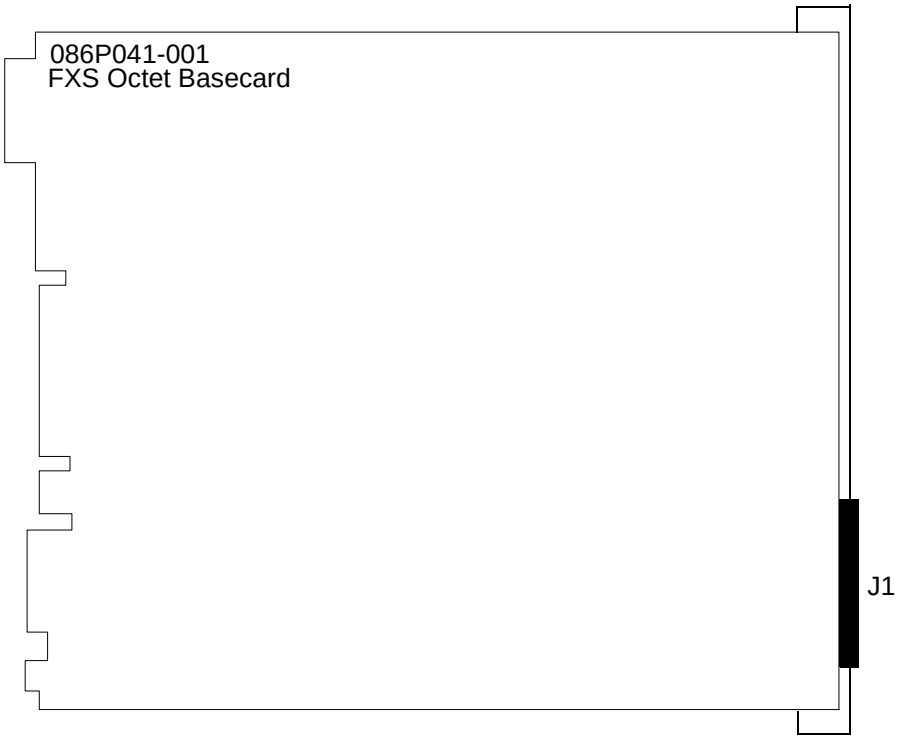


Figure 1 FXS Octet Basecard

Once you are properly grounded for ESD, insert the FXS Octet basecard into the card guides, pushing on the front panel until the backplane connector mates. Tighten the two captive screws at the top and bottom of the front panel.

To remove a card, loosen the top and bottom captive screws and pull the ring located near the top of the front panel.

Once you insert a card into a powered system (or when you first power the system up), the card automatically performs a simple power-on self-test (POST). This test allows you to check the front panel LEDs by turning them red and then green; and it checks that the card's firmware checksum is correct. If the self-test passes, the ON LED is turned green; if the test fails, it remains red. The status is also reported in the `Status` column of the Manager's Monitor, Diagnostic, and Configuration Slot Selection screens. Since a channel card cannot access the backplane unless configured by the Platform Card, the power-on self-test does not check the data path through the card.

If you are installing a new card in a system, perform a complete self-test on the card by going to the Manager's Diagnostics screen for that card and selecting `Card Selftest`. The Platform Card then configures the card with a test configuration, performs a ToNet loopback on the card, and sends a test pattern across the backplane to the card, where it is looped back to the Platform Card and checked for errors. Both the data and signaling paths are tested. The result of the self-test is reported on the Diagnostics screen.

Note that you can run a self-test on all of the cards in the system by selecting `Shelf Self-Test` in the Diagnostic Slot Selection screen.

Connect a terminal to the TERM port of the Platform Card and configure the FXS Octet Card. Refer to *Local Management - 6.*

Front Panel Connector Retaining Hardware

This hardware consists of a retaining plate and screw attached to a dust cover on the front panel connector, and a captive screw screwed into the standoff just above the connector.

Remove the captive screw and use it to replace the long screw on the cable connector as shown in *Figure 2*. Remove the screw and retaining plate from the dust cover, discard the dust cover, and attach the plate to the cable connector as shown.

The Retaining Plate and the front panel connector clip secure the bottom of the connector and the short screw at the top of the connector screws into the standoff to secure the top.

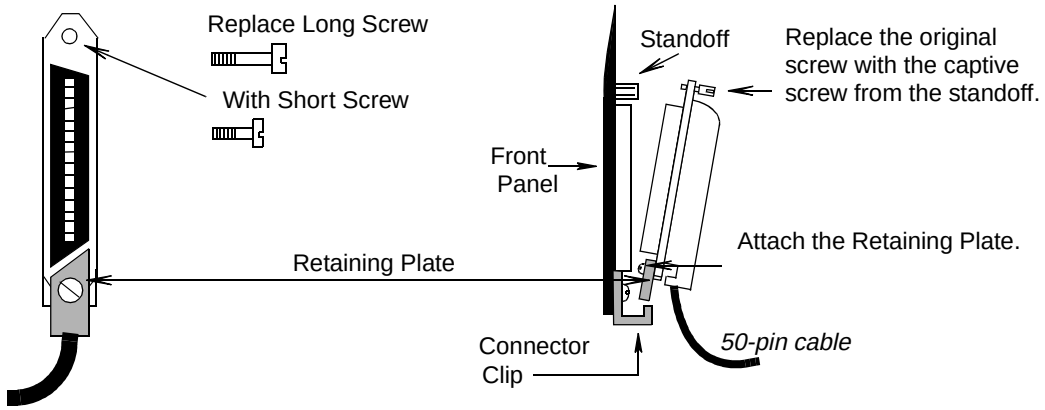


Figure 2 50-Pin Connector Retaining Kit

Application Information

The FXS Octet Card connects with telephone equipment for loop start and ground start applications. It is fully compatible with North American T1 standards. It may also be used in an E1 environment internationally with some limitations. Different countries may require variations in the analog interface, which are not supported. The FXS Octet supports E1 timeslot 16 Channel Associated Signaling (CAS) when the Platform Card is equipped with an E1 LIU. However the signaling protocol used on the A and B signaling bits is the same as North American T1 (AT&T Pub 43801, ANSI T1.403-1995), and so in general cannot be terminated in the E1 public network. The FXS Octet Card automatically selects Mu-law PCM coding for T1 and A-law PCM coding for E1. Channels may be assigned to timeslots in the ranges 1-24 for T1, and 1-15 and 17-31 for E1.

Note *Do not connect the FXS Octet Card to lines that go outside the building. It is intended for connection to on-premise equipment only.*

Busy/Idle Indication

The Busy or Idle state of the channel is indicated on the front panel LED for that channel, and on the Local Manager's FXS Octet Monitor screen.

The FXS channel is busy when an off-hook phone causes loop current to flow and initiates an outgoing call towards the network; or for an incoming call, when ringing is being applied to the phone. The channel LED will follow the ringing cadence, i.e. it turns off during the silent interval between rings. The channel is idle when no loop current flows and there is no ringing.

The DPO channel is busy when the loop is seized or when battery polarity is reversed, otherwise it is idle.

Battery Feed

The FXS Octet provides a battery feed to the telephone loop. When the phone is off-hook, this battery feed provides a constant current of approximately 25 mA from a nominal source of 24 VDC. This is called Talk Battery. Refer to *Table 3* of this manual for maximum loop length. When the phone is on-hook, the battery feed changes to a higher voltage of about 52 VDC, called Standby Battery.

The lower Talk Battery voltage reduces power consumption in the off-hook state, and the higher Standby Battery voltage provides compatibility with devices such as some answering machines which require a certain minimum on-hook loop voltage.

TLP Values

The TLP values are entered through the Manager's FXS Octet Configuration screen.

Default 1 (Tx: +3.0dB, Rx: -9.0dB) is used for terminating PSTN service. This is the setting to use when a telephone or analog PBX trunk is connected to the FXS Octet Card over a 2-wire loop with essentially zero cable loss.

When the voice channel receives a network test tone equal to a digital milliwatt it outputs into the analog voice frequency interface a -9 dBm level. When an analog signal with a level of +3 dBm is injected into the voice frequency interface it transmits into the network a digital milliwatt.

You can adjust these default TLP values from +9 through -3 dB (transmit) and from -3 through -15 dB (receive) in increments of 0.1 dB.

Default 2 (Tx: +3.0dB, Rx: -3.0dB) is used for dedicated Point-to-Point links where the far end is an FXO. This essentially provides a 2-wire to 2-wire extension through the digital network.

When the voice channel receives a network test tone equal to a digital milliwatt it outputs into the analog voice frequency interface a -3 dBm level. When an analog signal with a level of +3 dBm is injected into the voice frequency interface it transmits into the network a digital milliwatt.

You can adjust these default TLP values from +9 through -3 dB (transmit) and from +3 through -9 dB (receive) in increments of 0.1 dB.

Default 3 (Tx: 0dB, Rx:-6.0dB) is used for terminating PSTN service. This is the setting to use when a telephone or analog PBX trunk is connected to the FXS Octet Card over a 2-wire loop with 3 dB of cable loss.

When the voice channel receives a network test tone equal to a digital milliwatt it outputs into the analog voice frequency interface a -6 dBm level. When an analog signal with a level of 0 dBm is injected into the voice frequency interface it transmits into the network a digital milliwatt.

You can adjust these default TLP values from +6 through -6 dB (transmit) and from 0 through -12 dB (receive) in increments of 0.1 dB.

Standard Loop Start

Standard Loop Start is selected through the Manager's FXS Octet Configuration screen.

```
INTERFACE TYPE:---------> FXS/LS

SIGNALING MODE:-------> STND
```

This mode of operation is used when the far end is an FXO loop start card or is network compatible with 43801 signaling.

When the loop is in an idle state (subscriber end equipment is on-hook) standby battery is applied to the loop.

When the subscriber end initiates a call it seizes the loop (equipment in off-hook state - battery current flows) which signals the network to send dial tone.

When the far end initiates a call it signals the network telling the FXS Octet Card to apply ringing voltage across Tip and Ring. The FXS Octet Card waits for the detection of loop current (Tip and Ring closure by the subscriber equipment going off-hook) to signal the call connection.

Standard Ground Start

Standard Ground Start is selected through the Manager's FXS Octet Configuration screen.

```
INTERFACE TYPE:---------> FXS/GS

SIGNALING MODE:-------> STND
```

This mode of operation is used when the far end is an FXO ground start card or is network compatible with 43801 signaling.

When the loop is in an idle state the subscriber end equipment's Ring lead is not grounded and there is no battery potential across Tip and Ring (open circuit).

When the subscriber end initiates a call it grounds the Ring lead which is detected by the FXS Octet Card. The FXS Octet Card then applies battery potential across Tip and Ring. This is detected by the subscriber end equipment, which then removes the Ring ground, and provides loop closure. This signals the network to send dial tone.

When the far end initiates a call it signals the network telling the FXS Octet Card to close the Tip lead and so provide battery potential across Tip and Ring. It also applies ringing voltage to the loop. The FXS Octet Card waits for the detection of loop current (Tip and Ring closure by the subscriber equipment going off-hook) to signal the call connection.

When the far end hangs up a call, the FXS Octet will open the Tip lead after a delay of two seconds. This removes Talk Battery from the loop. The Tip lead will remain open for at least one second until the next call is initiated.

Loop Start With E&M Conversion

Loop Start With E&M Conversion is selected through the Manager's FXS Octet Configuration screen.

```
INTERFACE TYPE:---------> FXS/LS

SIGNALING MODE:-------> CNVSN
```

This mode of operation is used when the far end is an AT&T 4ESS exchange or uses network compatible E&M signaling. In this E&M-like mode, there is only a two-state condition of either on-hook or off-hook.

When the loop is in the idle state (subscriber end equipment is on-hook) standby battery is applied to the loop.

When the subscriber end initiates a call, it seizes the loop (equipment in the off-hook state - battery current flows) which signals the network which returns dial tone.

When the far end initiates a call, it signals the network telling the FXS Octet Card to apply the cadenced (2 seconds On, 4 seconds Off) ringing voltage across Tip and Ring and also to apply Ringback tone to the network. The FXS Octet Card waits for the detection of loop current (Tip and Ring closure by the subscriber equipment going off-hook) to signal the call connection.

When the far end hangs up a call, after a delay of two seconds the FXS Octet will remove Talk Battery from the loop for a duration of one second and then restore it. This Forward Disconnect indicates to the subscriber end equipment (modems, answering machines, etc.) that the call is terminated.

Ground Start With E&M Conversion

Ground Start With E&M Conversion is selected through the Manager's FXS Octet Configuration screen.

```
INTERFACE TYPE:---------> FXS/GS

SIGNALING MODE:-------> CNVSN
```

This mode of operation is used when the far end is an AT&T 4ESS exchange or uses network-compatible E&M signaling. In this E&M-like mode, there is only a two-state condition of either on-hook or off-hook.

When the loop is in an idle state, the subscriber end equipment's Ring lead is not grounded and there is no battery potential across Tip and Ring (open circuit).

When the subscriber end initiates a call it grounds the Ring lead which is detected by the FXS Octet Card. The FXS Octet Card then applies battery potential across Tip and Ring which is detected by the subscriber end equipment, which then removes the Ring ground and provides loop closure.

When the far end initiates a call it signals the network telling the FXS Octet Card to apply the cadenced (2 seconds On, 4 seconds Off) ringing voltage across Tip and Ring and also to apply Ringback tone to the network. The FXS Octet Card waits for the detection of loop current (Tip and Ring closure by the suscriber equipment going off-hook) to signal the call connection.

When the far end hangs up a call, the FXS Octet will open the Tip lead after a delay of two seconds. This removes Talk Battery from the loop. The Tip lead will remain open for at least one second until the next call is initiated.

PLAR Loop Start

PLAR (Private Line Automatic Ringdown) Loop Start is selected through the Manager's FXS Octet Configuration screen.

```
INTERFACE TYPE:---------> FXS/LS

SIGNALING MODE:-------> PLAR
```

This mode of operation is used when the far end is an FXS type card with a phone connection. This mode provides a hot-line or ringdown application.

When the loop is in the idle state, subscriber end equipment is on-hook and standby battery is applied to the loop.

When the subscriber end initiates a call, it seizes the loop (equipment in the off-hook state - battery current flows) which signals the far end to ring the phone.

When the far end initiates a call it signals the network telling the FXS Octet Card to apply the cadenced (2 seconds On, 4 seconds Off) ringing voltage across Tip and Ring and also to apply Ringback tone back to the far end phone. The FXS Octet Card waits for the detection of loop current (Tip and Ring closure by the subscriber equipment going off-hook) to signal the call connection.

When the far end hangs up a call, after a delay of two seconds the FXS Octet will remove Talk Battery from the loop for a duration of one second and then restore it. This Forward Disconnect indicates to the subscriber end equipment (modems, answering machines, etc.) that the call is terminated.

DPO Loop Start

DPO (Dial Pulse Originate) Loop Start is selected through the Manager's FXS Octet Configuration screen.

```
INTERFACE TYPE:---------> DPO

SIGNALING MODE:-------> STND
```

When the loop is in the idle state, the subscriber end equipment is on-hook and the battery polarity is such that Tip is at ground potential and Ring is at battery potential.

When the subscriber end connects, it seizes the loop (equipment in off-hook state - battery current flows) which signals the far end equipment to seize the loop. Answer supervision is passed back by means of signaling the FXS Octet to reverse the battery polarity. The call is terminated when either end goes back on-hook which causes battery polarity to be returned to the normal state.

Caller-ID

The FXS Octet Card passes Caller-ID tones, which are sent from the network between ringing signals.

Diagnostics

You can perform a card self-test, perform a loopback test, generate a digital test tone, or force the voice channel signaling to a known state in order to verify the functionality of the voice channel. See *Figure 3*.

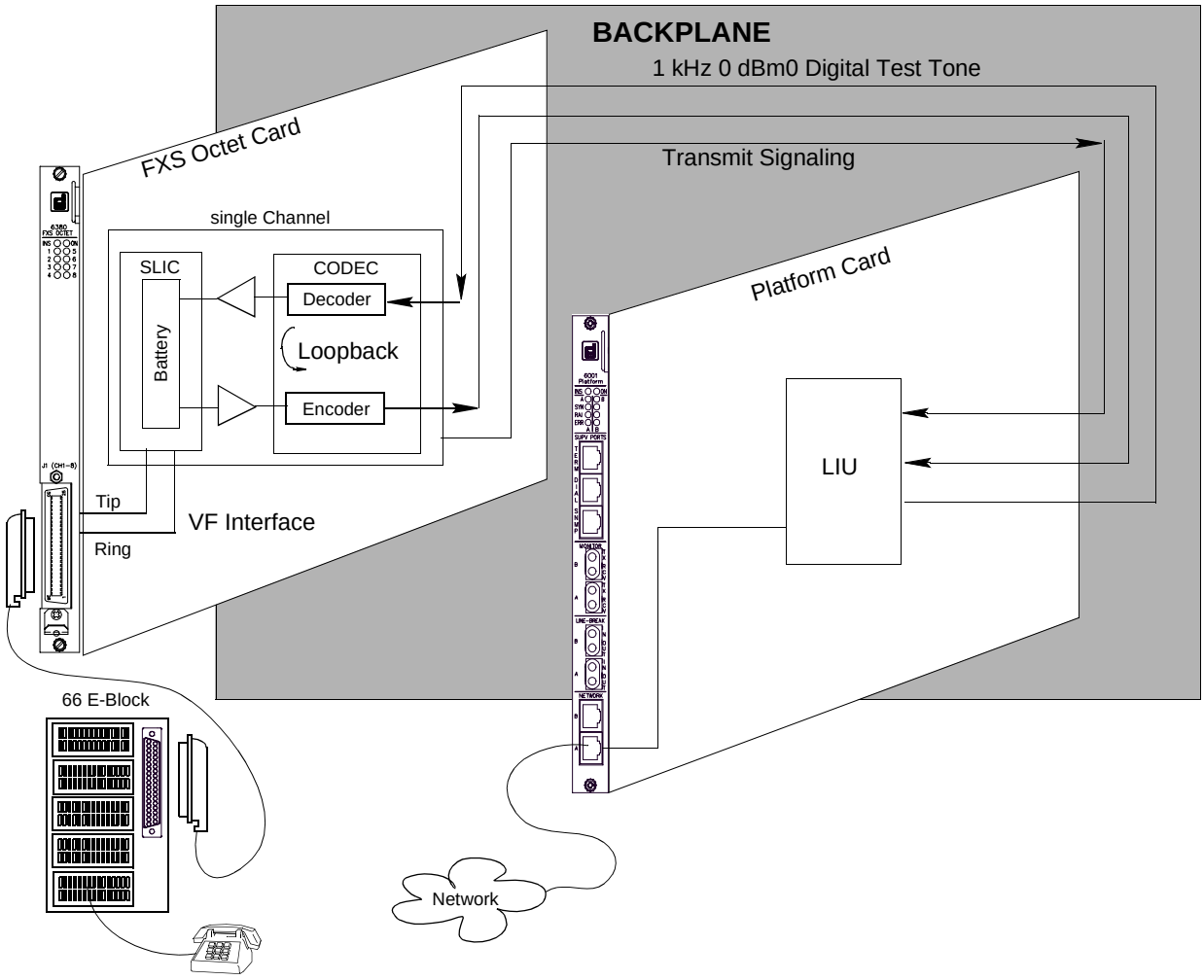


Figure 3 Flow Diagram - FXS Octet Card (Channel Flow From the Platform Card to the VF Interface)

Card Self-test

Select `Card Selftest` on the Manager's FXS Octet Diagnostics screen. The Platform Card generates a test pattern which it sends in turn to each channel of the FXS Octet Card. Each channel is looped back and the Platform Card checks for the correct return of the pattern. This self-test tests both the PCM data and signaling paths and verifies the integrity of the FXS Octet Card and backplane. The pass or fail results are displayed on the screen.

Loopback Test

The Loopback test loops back the signal received from the network back to the network. Connect test equipment at the far end to generate and receive a test tone. Correct receipt of the test tone verifies the entire voice path from the far end to the FXS Octet channel.

Activate the loopback through the Manager's FXS Octet Diagnostic screen.

`Local Loopback:----------> ToNet`

During the loopback test, the channel is set to a Forced Idle state for two seconds, followed by a

Forced Busy state. Forced Idle causes the signaling towards the network to be the Idle (on-hook) condition which will terminate any call in progress. Forced Idle also causes Standby Battery to be applied to the loop. Forced Busy causes the signaling towards the network to be the Busy (off-hook) state which will prevent new calls from being set up. Forced Busy also ignores any receive signaling and causes Talk Battery to be applied to the loop. You can change the state from Forced Busy to Forced Idle after the loopback test is in progress by setting `Conditioning` to `FIdle`.

Digital Milliwatt

The Digital milliwatt test generates a 1000 Hz 0 dBm0 digital test tone in the Platform Card, and sends it to the selected FXS Octet channel where it appears on the VF interface. The test tone can only be generated by a Platform Card with CSU or DSX-1 LIUs.

Activate the digital milliwatt test through the Manager's FXS Octet Diagnostic screen.

`Dig. MWatt:--------> On`

The level of the test tone at the VF interface is equal to the receive TLP level. For example, if the receive TLP is -3 dB, the level of the test tone will be -3 dBm. Use external test equipment to verify the correct TLP level. When you activate the test, the channel is forced Busy. You can change the state from Forced Busy to Forced Idle after the test is in progress by setting `Conditioning` to `FIdle`.

Loopback With Digital Milliwatt

On the Manager's FXS Octet Diagnostic screen select

`Local Loopback:----------> ToNet`

and

`Dig. MWatt:--------> On`

to loop the test tone towards the network to the far end. You can use test equipment connected to the channel at the far end to verify the level. The test tone still appears at the local VF interface, but at a fixed level of -15 dBm, independent of the receive TLP setting for the channel. The level of the test tone towards the network is at a fixed level of -15 dBm0, independent of the transmit TLP setting. The conditioning is the same as with the Loopback test.

Force Busy Next Idle Condition

Use this test to remove an FXS Octet Card's channel from service without disrupting any calls in progress.

Select the Force Busy Next Idle condition through the Manager's FXS Octet Diagnostic screen.

`Conditioning:------> FBNI`

After the FXS Octet Card's channel has remained in the Idle state (no incoming calls or off-hook requests) for 2 seconds, it is placed in a Forced Busy state.

Forced Busy Condition

Use this test to cause the channel to be in a busy condition, independent of receive signaling or the actual on-hook or off-hook state of the loop.

Select the Forced Busy condition through the Manager's FXS Octet Diagnostic screen.

`Conditioning:--------> FBusy`

Forced Busy causes the signaling towards the network to be the Busy (off-hook) state which will prevent new calls from being set up. Forced Busy also ignores any receive signaling and causes Talk Battery to be applied to the loop.

Forced Idle Condition

Use this test to cause the channel to be in a idle condition, independent of receive signaling or the actual on-hook or off-hook state of the loop.

Select the Forced Idle condition through the Manager's FXS Octet Diagnostic screen.

```
Conditioning:--------> FIdle
```

Forced Idle causes the signaling towards the network to be the Idle (on-hook) condition which will terminate any call in progress. Forced Idle ignores any receive signaling and also causes Standby Battery to be applied to the loop.

Wiring Diagram

Figure 4 shows examples of wiring for the FXS Octet Card. *Figure 5* shows the cable and the pinout of the FXS Octet J1 connector.

Use a harmonica adapter (GDC Part No. 209-036-024) to break out the eight channels onto eight individual 6-position modular jacks. These jacks are wired as RJ-11 jacks with Tip on pin 4 and Ring on pin 3.

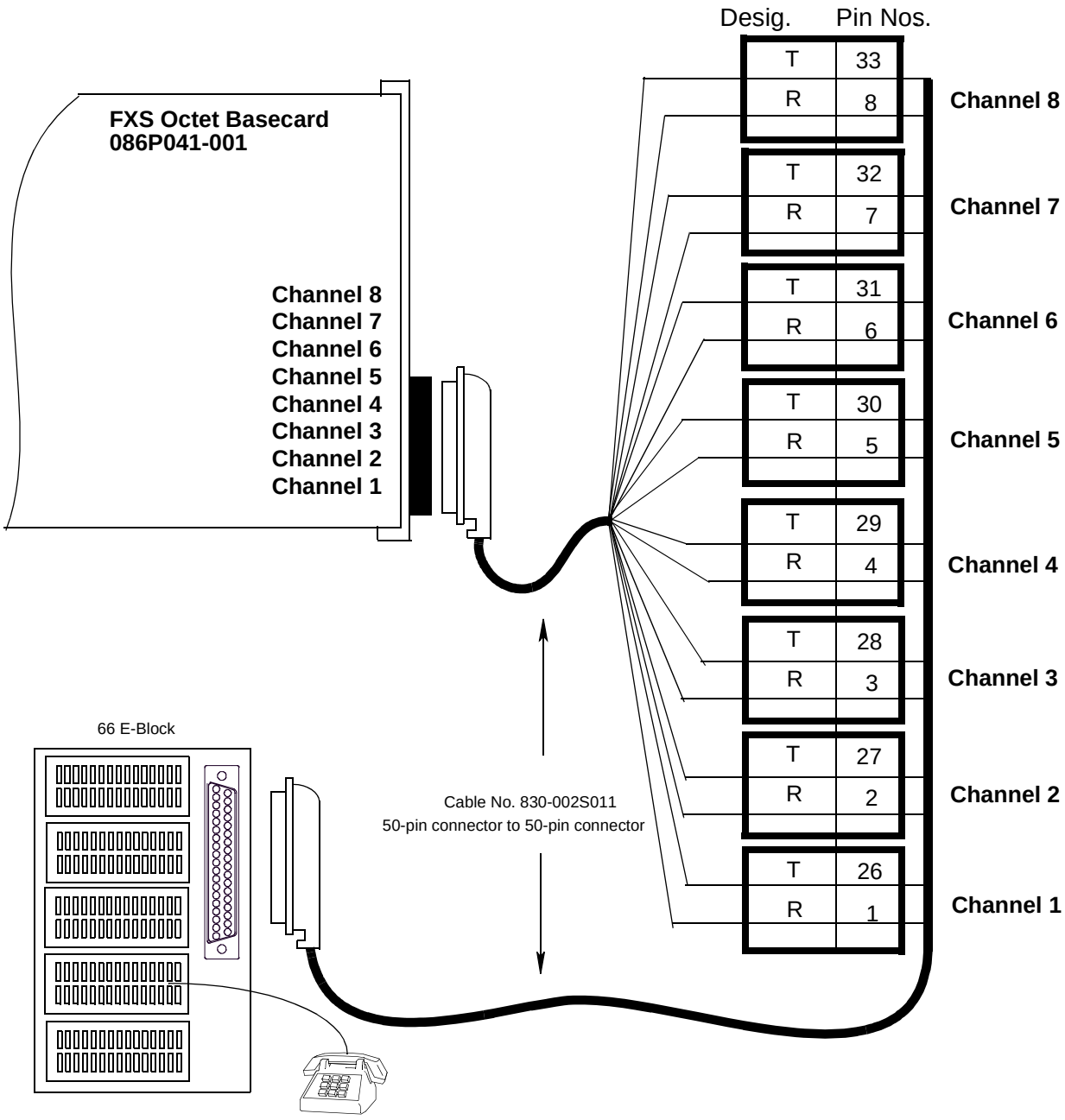


Figure 4 Wiring for FXS Octet Basecard

Pinouts

Figure 5 illustrates the cable and describes the pinout of the J1 connector of the FXS Octet Card.

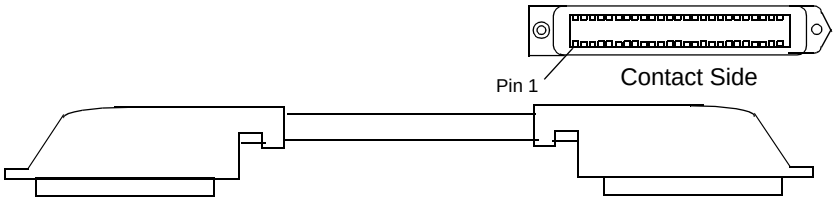


Figure 5 830-002S011 (10ft), S008 (25ft), S012 (50ft) - 50-pin (M) to 50-pin (M)

NOTE: T, R = 2-wire Tip/Ring (transmit/receive pair)

Table 2 FXS Octet Cable and J1 Pinout

Pin	Color Code Band/Stripe	Channel	FXS (RJ21X)	Pin	Color Code Band/Stripe	Channel	FXS (RJ21X)
26	WHT/BLU	1	T	13	GRN/BLK	Not Used	-
1	BLU/WHT	1	R	39	BLK/BRN	Not Used	-
27	WHT/ORG	2	T	14	BRN/BLK	Not Used	-
2	ORG/WHT	2	R	40	BLK/SLT	Not Used	-
28	WHT/GRN	3	T	15	SLT/BLK	Not Used	-
3	GRN/WHT	3	R	41	YEL/BLU	Not Used	-
29	WHT/BRN	4	T	16	BLU/YEL	Not Used	-
4	BRN/WHT	4	R	42	YEL/ORG	Not Used	-
30	WHT/SLT	5	T	17	ORG/YEL	Not Used	-
5	SLT/WHT	5	R	43	YEL/GRN	Not Used	-
31	RED/BLU	6	T	18	GRN/YEL	Not Used	-
6	BLU/RED	6	R	44	YEL/BRN	Not Used	-
32	RED/ORG	7	T	19	BRN/YEL	Not Used	-
7	ORG/RED	7	R	45	YEL/SLT	Not Used	-
33	RED/GRN	8	T	20	SLT/YEL	Not Used	-
8	GRN/RED	8	R	46	VIO/BLU	Not Used	-
34	RED/BRN	Not Used	-	21	BLU/VIO	Not Used	-
9	BRN/RED	Not Used	-	47	VIO/ORG	Not Used	-
35	RED/SLT	Not Used	-	22	ORG/VIO	Not Used	-
10	SLT/RED	Not Used	-	48	VIO/GRN	Not Used	-
36	BLK/BLU	Not Used	-	23	GRN/VIO	Not Used	-
11	BLU/BLK	Not Used	-	49	VIO/BRN	Not Used	-
37	BLK/ORG	Not Used	-	24	BRN/VIO	Not Used	-
12	ORG/BLK	Not Used	-	50	VIO/SLT	Not Used	-
38	BLK/GRN	Not Used	-	25	SLT/VIO	Not Used	-

Specifications and Parts List

Table 3 Specifications and Parts List

Physical	
Card Assembly Height Width Depth Weight	 10.4 in. (264 mm) 0.85 in. (22 mm) 10.75 in. (273 mm) 1 lb. 2oz (0.54 kg)
Temperature	
Operating	0 to 50 °C (32 to 122 °F) (derate by 1 C/1000 ft above sea level)
Non-Operating	-40 to 85 °C (-40 to 185°F)
Humidity	
Operating	5% to 95%, without condensation
Altitude	
Operating	0 to 10,000 ft (0 to 3,048 m)
Non-Operating	0 to 40,000 ft (0 to 12,192 m)
Electrical	
Power Requirements	Power may be either 22 VAC, -24 VDC, or -48 VDC
Fusing	One 3.0A, 125V, SB (GDC Part No. 215-311W300)
Electrical	
Signaling types supported	Loop start and ground start with and without E&M conversion, PLAR, DPO
Subscriber interface	Foreign eXchange Station (FXS), Dial Pulse Originate (DPO)
Forward Disconnect	FXS with E&M conversion supports forward disconnect feature by removing Talk Battery for one second when far end hangs up. Does not support ANSI T1.403 Loop Current Feed Open (LCFO) signaling state.
Battery feed	Internal -24 VDC Talk battery Internal -52 VDC Standby battery
Max. loop resistance	575 ohms (includes 430 ohms for telephone) at 25mA 750 ohms (includes 430 ohms for telephone) at 20mA
Max. loop length	2,500 fet of 24 AWG at 25mA 5,600 feet of 24 AWG at 20mA
Loop current	25 mA
Ringer feed	Internal 56 Vrms 20 Hertz
Ringer drive capability	2.0 REN (2 - 2500 type phones)
Ringer cadence	2 seconds on, 4 seconds off or transparent (FXO to FXS)

Table 3 Specifications and Parts List (Continued)

Ringback tone	-15dBm0 440, 480 hertz tone, 2 seconds on, 4 seconds off
Impedance	600 ohms
Return loss	>12 dB, 200-3400 Hz
ERL	>25 dB
SRL	>25 dB
Maximum input level	+3 dBm
Maximum output level	-3 dBm
Longitudinal Balance	> 60 dB, 200-1000Hz; > 40 dB, 1500-4000 Hz. Meets FCC Part 68
Transmit Frequency Response	-2.0, +0.2 dB from 200-3400 Hz; referenced to 1000 Hz 0 dB
Receive Frequency Response	-2.0, +0.2 dB from 200-3400 Hz; referenced to 1000 Hz 0 dB
Idle Channel Noise	< 20 dBrnC0
Ring Ground Detection	Detects up to 2000 ohms
Transmit TLP Values	Default 1: +3.0 dB (Range from +9.0 dB to -3.0 dB) Default 2: +3.0 dB (Range from +9.0 dB to -3.0 dB) Default 3: 0.0 dB (Range from +6.0 dB to -6.0 dB)
Receive TLP Values	Default 1: -9.0 dB (Range from -3.0 dB to -15.0 dB) Default 2: -3.0 dB (Range from +3.0 dB to -9.0 dB) Default 3: -6.0 dB (Range from 0.0 dB to -12.0 dB)
Parts List	
FXS Octet Basecard (MP6380)	086P041-001
Cables	
50-pin Amphenol (male) to 50-pin Amphenol (male) shielded	830-002S011 (10 ft.) 830-002S008 (25 ft.) 830-002S012 (50 ft.)
50-pin Amphenol (male) to 50-pin Amphenol (female) shielded	830-002S016 (5 ft.) 830-002S007 (25 ft.)
50-pin Amphenol (male) to eight 6-position modular jacks, RJ11 pinout (Harmonica Adapter)	209-036-024
66M Punch-down block to 50-pin female Amphenol connector	SYS=326P032

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