



FDN 6131A

Data Over Voice Multiplexer Installation and Operation Manual

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This equipment has been tested and found to comply with the limits of the 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 the 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.

Warning per EN 55022

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

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Chapter 1

Introduction

1.1 Overview

General

FDN 6131A is a data over voice multiplexer, which provides an easy and inexpensive means of using an existing telephone network for simultaneous transmission of voice and data.

FDN 6131A transmits data over standard telephone lines, which are carrying normal voice and signaling traffic, without affecting telephone communications. With the FDN 6131A, an existing twisted pair cable becomes an effective medium for high-speed data access. Standard CO (Central Office) lines and PBX lines can be used with no impact on voice services, providing an additional independent data line.

Versions

FDN 6131A is available in the following versions:

- **FDN 6131A** standalone unit
- **FDN 6131A/R**: a plug-in card for installation in the ASM-MN-214 19" card cage, holding up to 14 cards.

Power Supply Options

The FDN 6131A power supply options are:

- 115V or 230V AC
- -48V or 24V DC

Bandpass Filters

The LDV-BP, bandpass filter cards, are available for direct installation into the MDF (Main Distribution Frame).

Application

Figure 1-1 shows a typical FDN 6131A application. The telephone line coming from the subscriber normally runs through a cable block at the MDF, and then through the Central Office (CO) block to the switch. When a Data Over Voice (DOV) device is installed, the line is routed from the cable block to the data block, and from there to the central DOV unit.

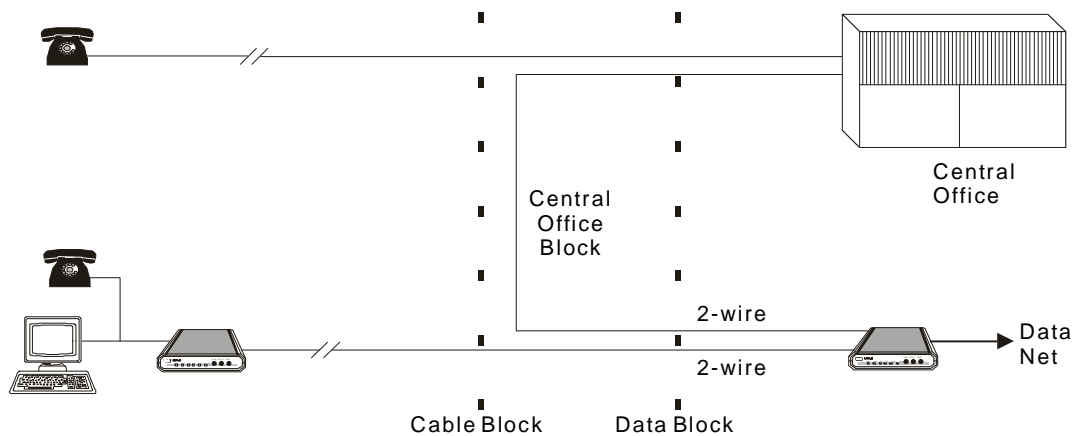


Figure 1-1. Typical FDN 6131A Application

Features

FDN 6131A converts data into an analog signal using CP-FSK modulation. The data is then multiplexed with the voice channel, using the bandpass filters.

FDN 6131A can operate with all types of telephones and all types of signaling (touchtone or rotary dial) without interfering with telephone functions. Even in the event of FDN 6131A failure, the telephone continues to function. FDN 6131A operates at full or half duplex with synchronous or

asynchronous transmission format over unconditioned telephone lines at selectable data rates up to 19.2 kbps.

FDN 6131A has an extended range of 9 km (5.6 miles) and can operate with almost any existing telephone line. *Table 1-1* lists the FDN 6131A transmission ranges over 22, 24 or 26 gauge wires.

Table 1-1. FDN 6131A Transmission Ranges

Data Rate (kbps)	22 AWG (0.6 mm)		24 AWG (0.5 mm)		26 AWG (0.4 mm)	
	km	miles	km	miles	km	miles
0-9.6	9.0	5.6	7.3	4.5	4.8	3.0
19.2	7.2	4.5	6.0	3.8	4.2	2.7

The carrier transmission can be controlled by the DTE (using RTS signal) or remotely by detecting the received carrier. The RTS/CTS delay is jumper-selectable to 0, 8 or 68 msec. The transmit timing can be set to internal, external or receive clock.

Diagnostics

The FDN 6131A diagnostic capabilities include V.54 local digital loopback, remote loopback and Data Clamp /Loop 1 test, which can be activated via the front panel push-buttons.

1.2 Physical Description

FDN 6131A is available as a standalone desktop unit or as a card for the

ASM-MN-214 card cage. *Figure 1-2* shows the 3D view of the FDN 6131A standalone unit.



Figure 1-2. FDN 6131A Standalone Unit

(Note) Actual appearance of device may differ from drawing

The front panel includes six LEDs, which display the status of power, data flow, control signals and diagnostics. Three front-panel switches control the three loopback modes. For detailed description of the front panel, see Chapter 3, *Operation*.

The back panel includes an AC power connector, fuse, an interface connector, and a line and a telephone connectors. The FDN 6131A rear panel is described in greater detail, in Chapter 2, *Installation and Setup*.

The internal switches and jumpers can be configured to support a variety of modes for operating the FDN 6131A unit. Refer to *Setting the Internal Jumpers* in Chapter 2 for details on jumper location and setting.

1.3 Technical Specifications

Data Channel	<i>Data Rates</i>	Asynchronous: 0 to 19.2 kbps Synchronous: 0.9, 1.2, 1.8, 2.4, 3.6, 4.8, 7.2, 9.6, 14.4 or 19.2 (jumper-selectable)
	<i>Transmission Timing</i>	Internal, external or receive clock
	<i>Transmission Range</i>	See <i>Table 1-1</i>
	<i>Transmission Line</i>	2-wire, unloaded telephone line
	<i>Transmission Mode</i>	Full or half duplex
	<i>Modulation</i>	Continuous Phase Frequency Shift Keying (CP-FSK)
	<i>Carrier Frequencies</i>	Local unit: 38.4 kHz, 44.3 kHz Remote unit: 76.8 kHz, 88.6 kHz
	<i>Output Level</i>	Local unit: 6 dBm, -9 dBm, -12 dBm (±1 dBm) Remote unit: 0 dBm, -3 dBm, -6 dBm (±1 dBm)
	<i>Received Carrier Threshold</i>	-50 dBm, -40 dBm, -30 dBm (±4 dBm) at 9.6 kbps
	<i>Line Impedance</i>	135Ω
	<i>RTS/CTS Delay</i>	0, 8 or 68 msec
	<i>Interface</i>	RS-232 (V.24)
	<i>Connector</i>	25-pin D-type female
	Voice Channel	<i>Bandwidth</i>
<i>Line Impedance</i>		600Ω
<i>Added Loop Resistance</i>		Less than 20Ω
<i>Insertion Loss</i>		Less than 0.5 dB at 1004 Hz
<i>Longitudinal Balance</i>		60 dB
<i>Ringer Equivalence</i>	0.6 REN	

Line Connector

RJ-11 female

Telephone Connector

RJ-11 female

Carrier Control	<i>Continuous Mode</i>	Constant carrier
	<i>RTS-controlled Mode</i>	Transmits carrier only when RTS signal exists; enables half-duplex operation
	<i>Carrier-Detect Mode</i>	Transmits carrier only when carrier is detected from the other FDN 6131A
Diagnostics	<i>Local Digital Loopback</i>	Activated by the front panel push-button
	<i>Remote Loopback</i>	Activated by the front panel push-button or via pin 21 of the RS-232 interface
	<i>Data Clamp/Loop 1</i>	Activated by the front panel push-button or via pin 18 of the RS-232 interface
Indicators	<i>PWR (green)</i>	Power
	<i>RTS (yellow)</i>	Request to Send
	<i>TD (yellow)</i>	Transmit Data
	<i>RD (yellow)</i>	Receive Data
	<i>DCD (yellow)</i>	Data Carrier Detect
	<i>TEST (red)</i>	Diagnostics
Physical	<i>LVD-2 Standalone</i>	
	<i>Height</i>	40 mm / 1.7 in (1U)
	<i>Width</i>	193 mm / 7.6 in
	<i>Depth</i>	243 mm / 9.6 in
	<i>Weight</i>	1.4 kg / 3.1 lb
	<i>LVD-2/R Card</i>	Fits a single slot in ASM-MN-214 card cage
Power	<i>AC Source</i>	115V or 230V AC (+10%, -15%), 47 to 63 Hz
	<i>DC Source</i>	-48V or 24V DC

	<i>Power Consumption</i>	3.5W
	<i>Fuses</i>	<ul style="list-style-type: none">• 0.2A for 115V AC• 0.1A for 230V AC
Environment	<i>Temperature</i>	0 to 50°C (32 to 122°F)
	<i>Humidity</i>	Up to 95%, non-condensing

Chapter 1

Installation and Setup

This chapter describes installation and setup procedures for the standalone FDN 6131A unit.

FDN 6131A is delivered completely assembled. It is designed for tabletop or 19" rack installation. For instructions on installation of a single unit in a 19" rack, refer to *Appendix B*.

After installing the unit, refer to *Chapter 3* for operation instructions.

In case a problem is encountered, refer to *Chapter 4* for the diagnostics instructions.



Internal settings, adjustment, maintenance, and repairs may be performed only by a skilled technician who is aware of the hazards involved.

Always observe standard safety precautions during installation, operation, and maintenance of this product.

2.1 Site Requirements and Prerequisites

An AC-powered FDN 6131A unit should be installed within 1.5m (5 ft) of an easily accessible grounded AC outlet. The outlet should furnish 115V or 230V AC.

A DC-powered FDN 6131A unit requires –48V or 24V DC power source, which must be adequately isolated from the mains supply. In order to prevent a fire hazard, a suitable fuse should be installed in the DC line.

Allow at least 90 cm (36") of frontal clearance for operating and maintenance accessibility. Allow at least 10 cm (4") clearance at the rear of the unit for signal lines and interface cables.

The ambient operating temperature of FDN 6131A is 0 to 50°C (32 to 122°F) at relative humidity of 90%, non-condensing.

2.2 Package Contents

The FDN 6131A package includes the following items:

- One FDN 6131A unit
 - FDN 6131A **Installation and Operation Manual**
 - AC power cord or DC power supply connector kit.
-

2.3 Installation and Setup

FDN 6131A is a standalone device intended for tabletop or bench installation. It is delivered completely assembled. No provision is made for bolting the unit on the tabletop. For installation of the unit in a 19" rack, see *Appendix B*.

➤ To install FDN 6131A:

1. Determine the required configuration of FDN 6131A, according to your application, and set the internal jumpers accordingly.
2. Connect the DTE, the line and the telephone unit, if necessary.
3. Connect power to the unit.

Setting the Internal Jumpers

This section provides information on the functions of the internal jumpers and switches, and gives step-by-step instructions for performing the internal settings. The default settings are also listed.

All the other configuration actions can be performed from the front panel or a control terminal after the installation is completed. Information and detailed instructions for these operations appear in *Chapter 3* and *Chapter 4*.

➤ **To set the FDN 6131A internal jumpers:**

1. Open the FDN 6131A case.
 2. Set the FDN 6131A internal jumpers, referring to *Figure 2-3*.
 3. Reinstall the FDN 6131A cover.
-



Warning

Access to the inside of the equipment is permitted only to the authorized and qualified personnel.

To avoid accidental electric shock, always disconnect the interface cables and the power cord before removing the unit from its casing.

Line voltages are present inside FDN 6131A when it is connected to power and/or to the lines. Moreover, under certain fault conditions, dangerous voltages may appear on the lines connected to the unit.

Any adjustment, maintenance and repair of the opened instrument under voltage should be avoided as much as possible and, when inevitable, should be carried out only by a skilled technician who is aware of the hazard involved.

Capacitors inside the unit may still be charged even after the unit has been disconnected from its source of power.

Caution

FDN 6131A contains components sensitive to electrostatic discharge (ESD). To prevent ESD damage, avoid touching the internal components, and before moving jumpers, touch the FDN 6131A frame.

Opening the FDN 6131A Case

To reach the internal jumpers and switches of FDN 6131A, it is necessary to open its case.

➤ **To open the FDN 6131A case:**

1. Disconnect all the cables connected to FDN 6131A.
2. Loosen the screws located at the rear panel of the unit.
3. Slide out the unit interior to gain access to the internal jumpers and switches.

Setting the Internal Jumpers and Switches

The internal jumpers and switches located on the FDN 6131A printed-circuit board (PCB) are identified in *Figure 2-3*. The functions of jumpers are described in *Table 2-2*.

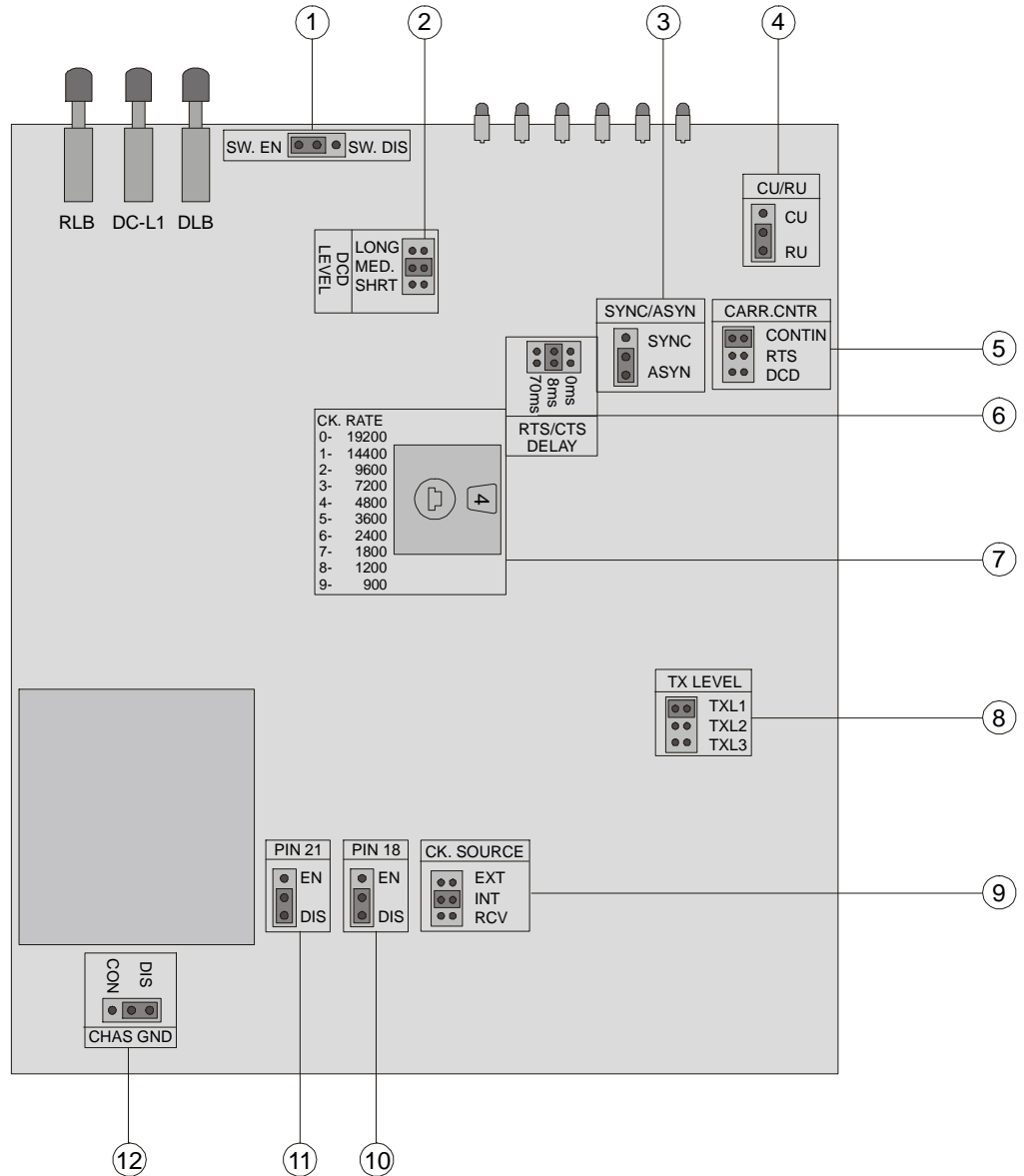


Figure 2-3. FDN 6131A PCB Layout

Table 2-2. FDN 6131A Internal Jumpers and Switches

Item	Jumper	Description	Values	Factory Setting
1	SW.EN/SW.DIS	Controls front panel push-buttons	SW.EN: Front panel push-buttons are enabled	SW.EN

		operation.	SW.DIS: Front panel push-buttons are disabled	
2	DCD LEVEL	Selects the DCD level depending on the distance between the two FDN 6131A units.	LONG: Long distance (-30) MED: Medium distance (-40) SHRT: Short distance (-30)	MED
<i>Note: When operating FDN 6131A in the long distance applications, set the DCD Level jumper to LONG if the front panel DCD indicator turns off.</i>				
3	SYNC/ASYNC	Selects synchronous or asynchronous operation.	SYNC: Synchronous operation ASYNC: Asynchronous operation	ASYNC
4	CU/RU	Configures the unit as local or remote.	CU: FDN 6131A is configured as local RU: FDN 6131A is configured as remote	RU
5	CARR. CNTR	Selects the transmit carrier.	CONTIN: FDN 6131A continuously transmits carrier RTS: FDN 6131A transmits carrier only when the RTS signal (pin 4 of RS-232) is active DCD: FDN 6131A transmits carrier only when carrier from the opposite FDN 6131A is detected.	CONTIN
6	RTS/CTS DELAY	Selects the delay between the RTS and the CTS signals.	0: 0 msec 8: 8 msec 68: 68 msec	8
7	CK. RATE	Selects the required baud rate (in bps)	0: 19200 1: 14400 2: 9600 3: 7200 4: 4800 5: 3600	4800

6: 2400

7: 1800

8: 1200

9: 900

Table 2–2. FDN 6131A Internal Jumpers and Switches (Cont.)

Item	Jumper	Description	Values	Factory Setting
8	TX LEVEL	Selects the signal transmission level	Local FDN 6131A: TXL1: +0 dBm TXL2: –3 dBm TXL3: –6 dBm Remote FDN 6131A: TXL1: –6 dBm TXL2: –9 dBm TXL3: –12 dBm	TXL1
9	CK.SOURCE	Selects the FDN 6131A timing reference in the synchronous mode.	EXT: External, FDN 6131A receives clock from the DTE via pin 24 of the RS–232 connector INT: Internal, FDN 6131A receives clock from its internal source RCV: Receive, FDN 6131A derives clock from the received data	INT
Note: When operating FDN 6131A in the asynchronous mode, set the CK. SOURCE jumper to INT in order to provide the timing reference during the RLB activation.				
10	PIN 18	Controls the Loop 1/Data Clamp loopback activation via the DTE pin 18	EN: The Loop 1/Data Clamp loopback activation from the DTE is enabled DIS: The Loop 1/Data Clamp loopback activation from the DTE is disabled	DIS
11	PIN 21	Controls the remote loopback activation via the DTE pin 21	EN: The remote loopback activation from the DTE is enabled DIS: The remote loopback activation from the DTE is disabled	DIS
12	CHAS GND	Controls the connection between the FDN 6131A signal	CON: Signal ground is connected to the frame ground	CON

ground (RS-232 pin 7) and the frame (chassis) ground	DIS: Signal ground is disconnected from the frame ground
------------------------------------------------------------	-----------------------------------------------------------------------

Note: *Disconnecting the signal ground from the frame ground may render the unit unsafe for connection to unprotected telecommunication networks in some locations.*

Closing the FDN 6131A Case

After completing the internal settings, close the unit case.

➤ To close the FDN 6131A case:

1. Slide the unit's interior into the casing along internal grooves.
2. Secure the unit's interior using the two rear panel screws.

Configuring the LDV-BP Card

The LDV-BP bandpass card contains two-jumper block, one per each wire of the 2-wire twisted pair, as shown in *Figure 2-4*. Both jumpers should be set to the same position: CON or OFF. The jumper settings depend on the FDN 6131A application: Independent Filter Connection or Internal Filter Connection (refer to *Chapter 6* for the detailed applications description).

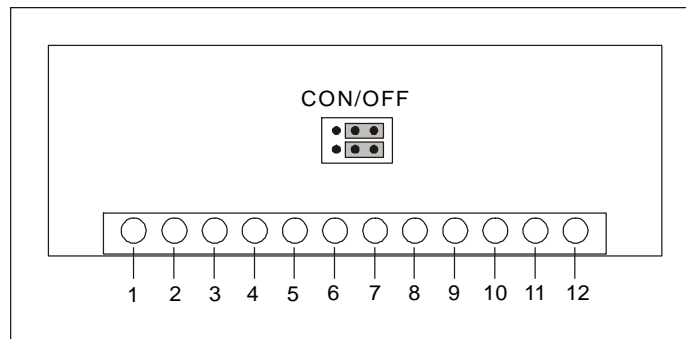


Figure 2-4. LDV-BP Card Settings

Connecting the Interfaces

Figure 2-5 illustrates the rear panel of an AC-powered FDN 6131A unit.

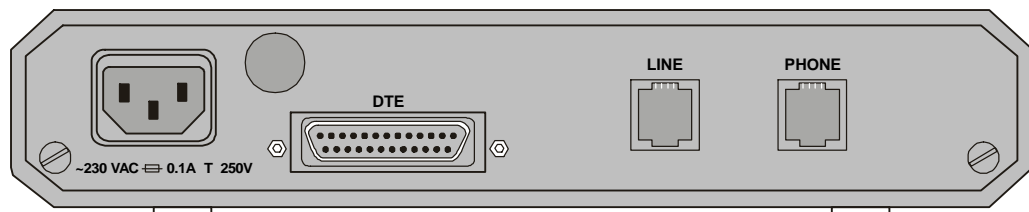


Figure 2-5. FDN 6131A Rear Panel

Connecting the Line

The FDN 6131A line interface terminates in a 6-pin RJ-11 female connector, which uses pin 3 and pin 4 for the operation.

➤ **To connect the line:**

- Use a 2-wire cable terminated in RJ-11 male connector and connect it to the FDN 6131A rear panel socket designated LINE.

Connecting the DTE

The FDN 6131A DTE interface terminates in a 25-pin female connector supporting RS-232 (V.24) standard. Refer to *Appendix A* for the DTE connector pin assignment.

➤ **To connect the DTE:**

1. Use a standard RS-232 cable terminated in 25-pin male connector and connect it to the FDN 6131A rear panel connector designated DTE.
2. Attach the other side of the cable to the appropriate DTE connector.

Connecting the Telephone

The FDN 6131A phone interface terminates in a 6-pin RJ-11 female connector, which uses pin 3 and pin 4 for the operation.

➤ **To connect the telephone:**

1. Use a 2-wire cable terminated in RJ-11 male connector and connect it to the FDN 6131A rear panel socket designated PHONE.
2. Connect the other side of the cable to a telephone unit.

Connecting the LDV-BP Card

The LDV-BP card contains two separate filters; each of the filters should be connected via the card terminal block.

Figure 2-4 illustrates the LDV-BP terminal block connector. *Table 2-3* lists the connector pin assignment.

Table 2-3. LDV-BP Connector Pin Assignment

Terminal	Function
1, 2	LINE-1
3, 4	DOV-1
5, 6	CO-1
7, 8	LINE-2
9, 10	DOV-2

➤ **To connect the LDV-BP filters:**

1. Connect the remote FDN 6131A to the LINE terminal.
2. Connect the PBX or CO telephone service to the CO terminal.
3. Connect the local FDN 6131A to the DOV terminal.

Connecting the Power

AC Power Connection

AC power should be supplied to the FDN 6131A unit through the 1.5m (5 ft) standard power cable terminated with a standard 3-prong plug. The cable is provided with the unit.



Before switching on this instrument, the protective earth terminals of this instrument must be connected to the protective ground conductor of the power cord. The power plug shall only be inserted in a power outlet provided with a protective earth contact. The protective action must not be negated by use of an extension cord (power cable) without a protective conductor (grounding).

Make sure that only fuses with the required rated current, as marked on the FDN 6131A rear panel, are used for replacement. The use of repaired fuses and the short-circuiting of fuse holder is forbidden.

Whenever it is likely that the protection offered by fuses has been impaired, the instrument must be made inoperative and be secured against any unintended operation.

➤ **To connect AC power to FDN 6131A:**

1. Connect the power cable to the connector on the FDN 6131A rear panel.
2. Connect the power cable to the mains outlet.

The unit is turned on automatically upon connection to the mains.

➤ **To connect DC power to FDN 6131A:**

- Refer to *DC Power Supply Connection Supplement*.

Chapter 2

Operation

This chapter provides the following information for the FDN 6131A standalone model:

- FDN 6131A front-panel indicators and controls
- Operating procedures (turn-on, front-panel indications, performance monitoring and turn-off)

Installation procedures given in *Chapter 2* must be completed and checked before attempting to operate FDN 6131A.

3.1 Front Panel Controls and Indicators

Figure 3-6 shows the FDN 6131A front panel. Table 3-4 lists the FDN 6131A controls and indicators, located on the unit's front panel.

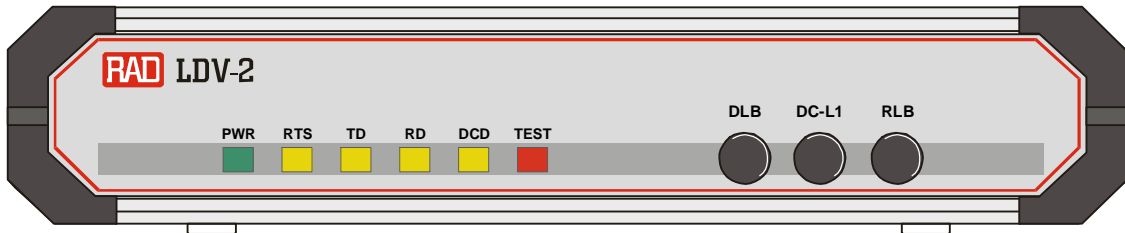


Figure 3-6. FDN 6131A Front Panel

Table 3-4. FDN 6131A Front Panel Control and Indicators

Name	Type	Function
PWR	Green	On when power is on.
RTS	Yellow	On when the DTE activates Request to Send.
TD	Yellow	On when steady SPACE is being transmitted. Blinks when data is transmitted.
RD	Yellow	Steady SPACE is being received. Blinks when data is received.
DCD	Yellow	On when a valid receive signal is present.
TEST	Red	On when a test is active.

3.2 Operating Instructions

Turning FDN 6131A On

FDN 6131A is turned on as soon as power is connected. When power is connected, the PWR indicator lights up and remains lit as long as FDN 6131A receives power.

Normal Indications

If the local and remote FDN 6131A units are in operation and transmitting/receiving data, the following indicator conditions exist:

- PWR – On
- TD – Blinks or Off
- RD – Blinks or Off
- RTS – On
- DCD – On
- TEST – Off.

If the above LED indications are not obtained following initial power turn-on, check that none of the three test push buttons is pressed. If none of the push buttons is pressed, refer to *Chapter 4* for the diagnostic test instructions.

Turning FDN 6131A Off

To turn off FDN 6131A, simply remove the power cord from the power source.

Chapter 3

Tests and Diagnostics

4.1 General

This chapter describes how to perform diagnostics tests on FDN 6131A.

The purpose of diagnostic tests on FDN 6131A is to:

- Check that the system is operating normally
- Isolate faulty equipment or cables
- Identify other sources of system malfunction

Tests are activated by the FDN 6131A front-panel buttons or appropriate RS-232 connector pins and monitored via the FDN 6131A front-panel LED indicators.

4.2 Loopback Tests

FDN 6131A supports several types of loopbacks for evaluating the operation of the data system equipment and line circuits. Using these loopbacks, you can test communication between the attached equipment, internal circuitry of the local FDN 6131A and remote FDN 6131A.

The following loopbacks are available:

- Remote loopback
- Data Clamp and Loopback 1
- Local digital loopback.

Before testing the operation of the data system equipment and line circuits, ensure that all units are powered up and configured normally.

Remote Loopback

The Remote Loopback (RLB) test checks the performance of the local and the remote FDN 6131A units and their connecting lines. The Remote Loopback sets a loop at the remote FDN 6131A unit from the DTE coupled to the local unit (see *Figure 4-7*).

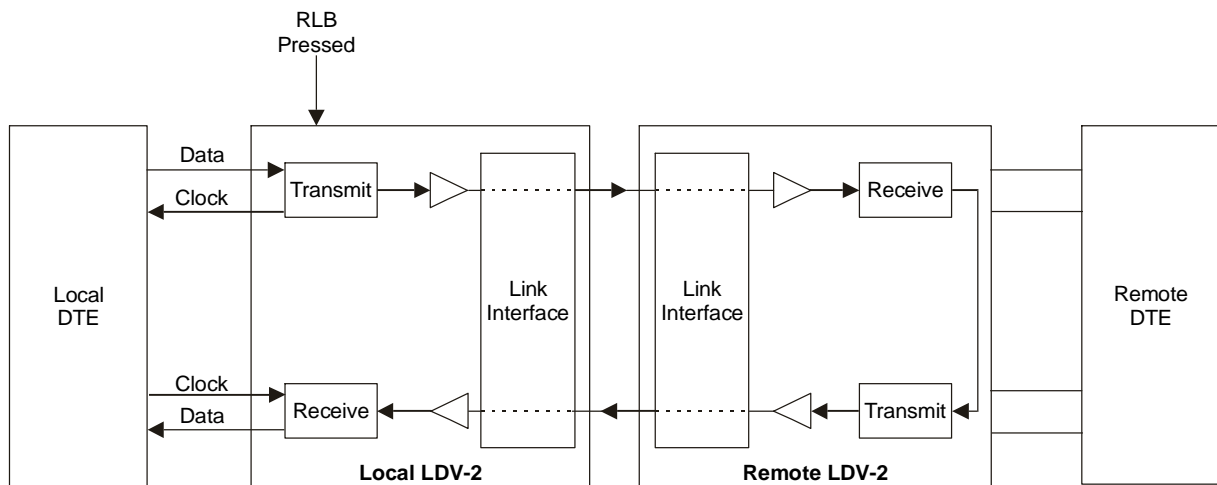


Figure 4-7. Remote Loopback

➤ To activate the Remote Loopback:

- Press the RLB push-button of the local FDN 6131A.

The TEST LEDs on the local and remote FDN 6131A units light up.

Note *You can also activate the Remote Loopback via pin 21 of the DTE interface.*

After completing the test, press the RLB push-button again to restore it to the Off position.

Data Clamp and Loop 1 Test

The Data Clamp and Loop 1 test (DC-L1) is a combination of the bit error test and local loopback. When the DC-L1 test is activated, the local FDN 6131A transmits a specific bit pattern to the remote FDN 6131A, which loops the pattern back for the comparison. In addition, FDN 6131A performs a local loopback, connecting the transmit output to its own receiver (see *Figure 4-8*).

➤ **To perform the Data Clamp/Loop 1 test:**

- Press the DC-L1 push-button on the local FDN 6131A front panel.

The DCD LED blinks if any errors detected.

Note *You can also activate the DC-L1 test via pin 18 of the DTE interface.*

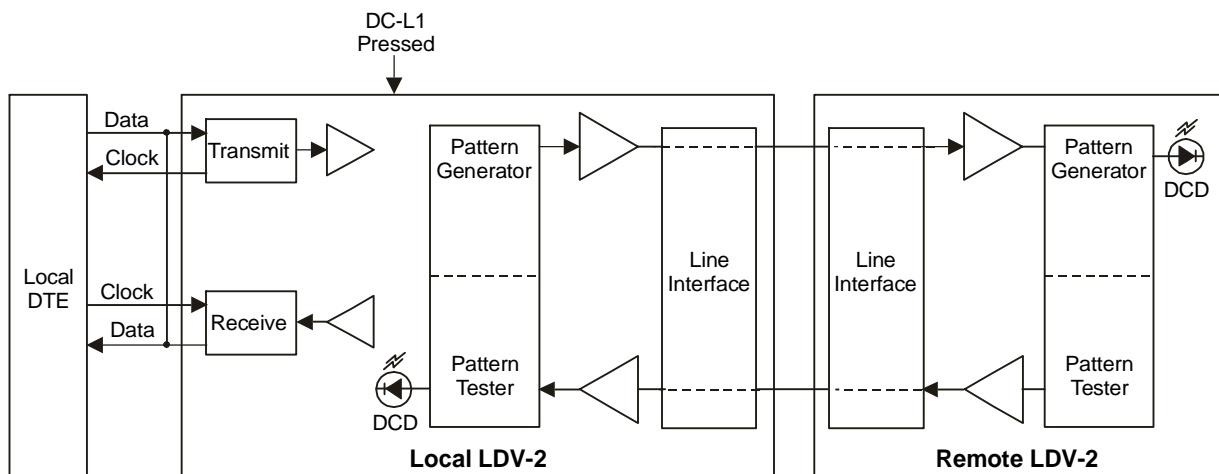


Figure 4-8. Data Clamp and Loop 1 Test

After completing the test, press the DC-L1 push-button again to restore it to the Off position.

Local Digital Loopback

The Local Digital Loopback (DIG) test allows the operator at the remote end to check the performance of the local and remote FDN 6131A units, and their connecting lines. The DIG test loops the received data back to the remote FDN 6131A (see *Figure 4-9*). The Local Digital Loopback test is equivalent to activating the remote loopback from the remote FDN 6131A.

➤ **To activate the Local Digital Loopback:**

- Press the DLB push-button on the local FDN 6131A front panel.

The TEST LED lights up.

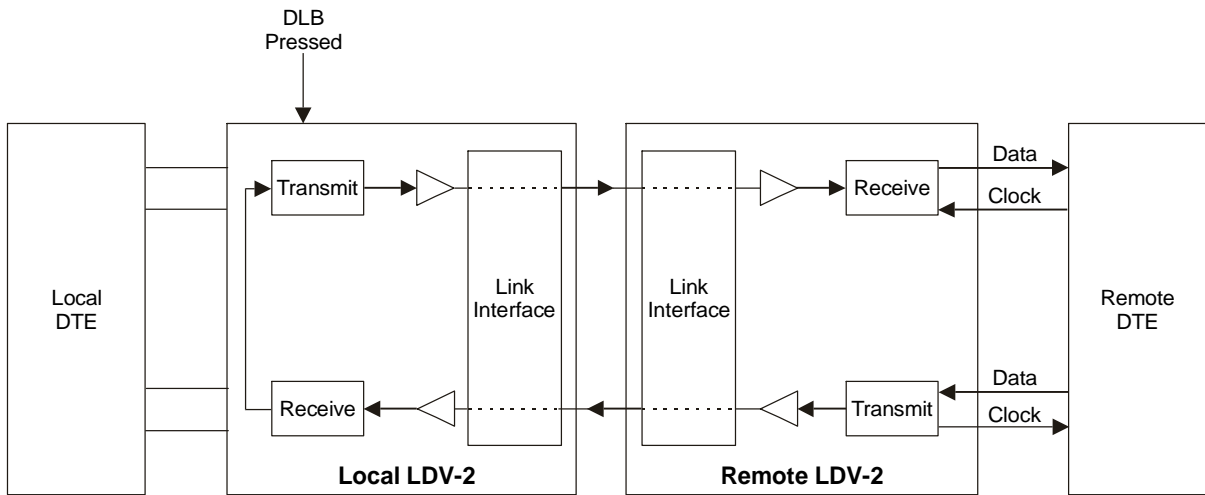


Figure 4-9. Local Digital Loopback

After completing the test press the DLB push-button again to restore it to the Off position.

Chapter 4

Card Cage Version

This chapter describes the FDN 6131A/R card version, designed for installation in the ASM-MN-214 card cage. The chapter contains the following sections:

- The ASM-MN-214 card cage
- The FDN 6131A/R card version
- Power supply to FDN 6131A/R card
- Installing the FDN 6131A/R card

5.1 ASM-MN-214 Card Cage

The ASM-MN-214 card cage contains one or two power supplies and up to 14 plug-in cards. The card types can be FDN 6131A/R or other MOBAT rack version modems/converters - any combination of up to 14 plug-in cards.

For each of the 14 cards, the rear panel (see *Figure 5-10*) contains a male connector for the terminal block and a DB-25 connector. A protection cover protects the terminal block connectors.

The terminal block (see *Figure 5-10*) is to be attached to the rear panel terminal block connectors. It contains screws for connecting the transmit and receive pairs and ground, if present.

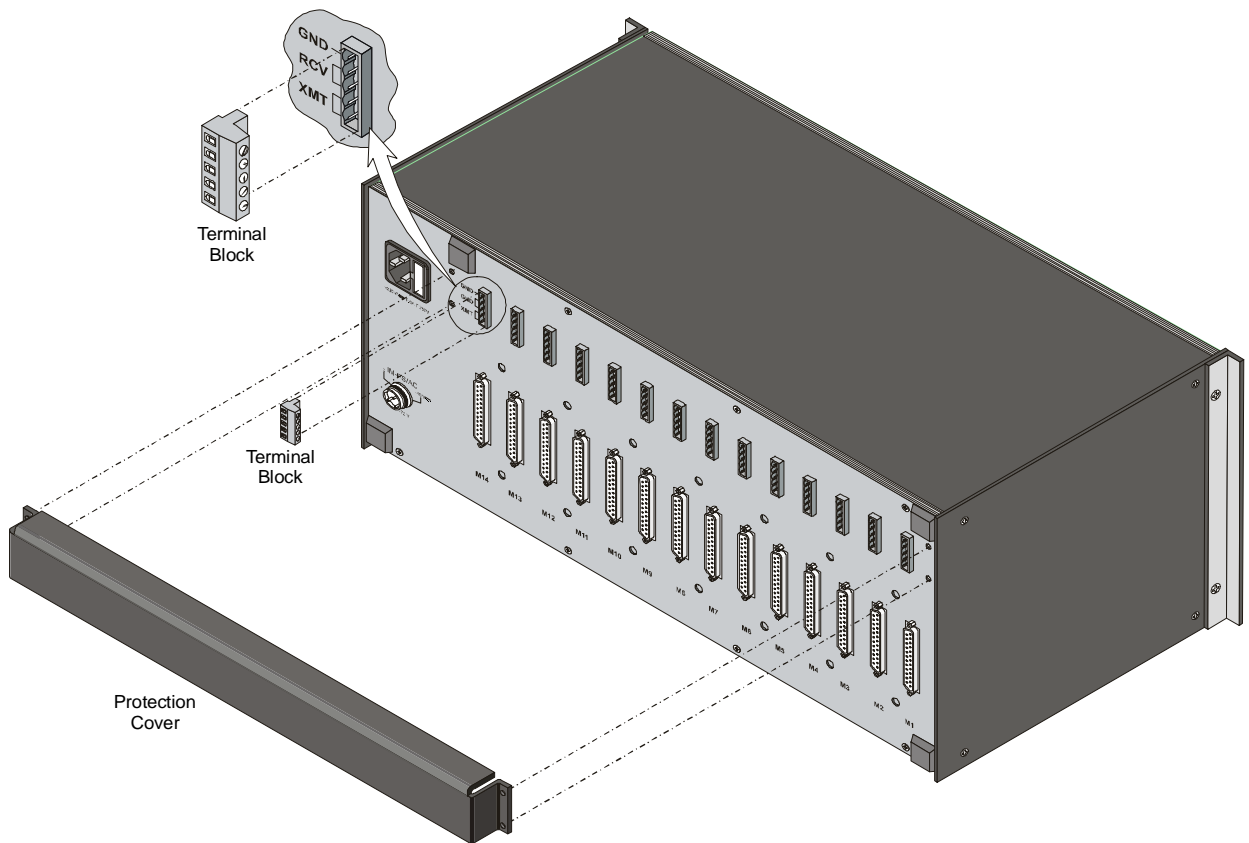


Figure 5-10. ASM-MN-214 Rear Panel

5.2 FDN 6131A/R Card Version

Figure 5-11 shows the FDN 6131A/R card front panel. The LEDs and push-buttons of the card version are identical in their functionality to those of the standalone device. For this information, refer to *Front Panel Controls and Indicators* in Chapter 3.

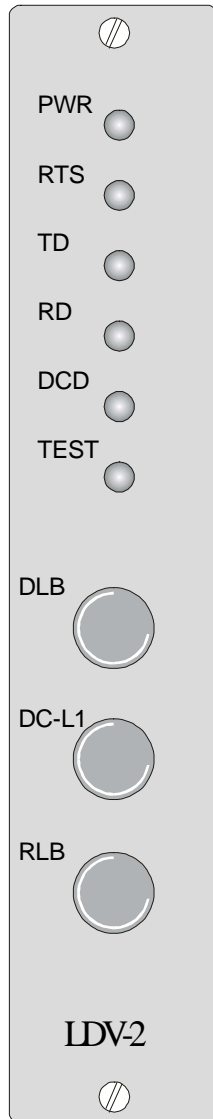


Figure 5-11. FDN 6131A/R Front Panel

5.3 Power Supply

Power is supplied to the FDN 6131A/R card from the ASM-MN-214 power supply via the chassis. Each FDN 6131A/R card has two fuses, which protect the entire system against power failure resulting from a short circuit in one card.

The ASM-MN-214 card cage can accept AC or DC power supplies. LED indicators located on the ASM-MN-214 front panel (see *Figure 5-12*) show activity when the power supply is connected to the mains plug. The power supply supports the full card cage with any combination of cards.

AC Supply (100V, 115V or 230V AC)

The AC power supply of the ASM-MN-214 is 100V, 115V, or 230V AC, $\pm 10\%$,
47 to 63 Hz.

DC Supply (24V or 48V DC)

The DC power supply is 24V DC (18V to 32V DC) or 48V DC (36V to 72V DC). It uses a DC/DC converter module to provide the power required for the cards.

Power Supply with Redundancy

This special ordering option is equipped with two separate power supplies, operating together and sharing the load of the whole card cage. If either of the power supplies fails, the other one will continue to supply power to the full card cage.

Two LED indicators show activity of each power supply. They should both light when mains power is provided.

Note *It is possible to combine AC and DC power supplies in the same cage.*

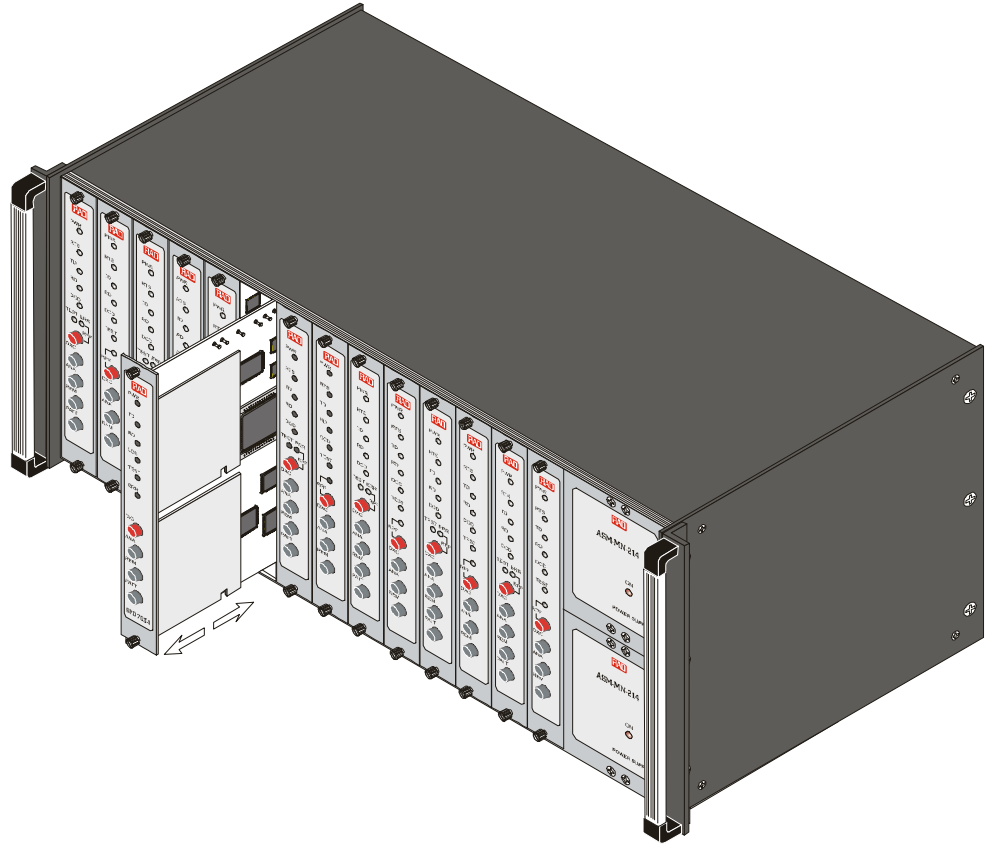


Figure 5-12. ASM-MN-214 Front Panel

5.4 Installing the FDN 6131A/R Card

- To install the FDN 6131A/R card in the ASM-MN-214 card cage:
3. Install the ASM-MN-214 card cage in the 19" rack.
 4. Adjust the jumpers and switches on the card as required (see *Figure 2-1* and *Table 2-1* in Chapter 2).
 5. Insert the FDN 6131A/R card into one of the ASM-MN-214 slots. Push the bottom of the card into the cage until it is fully inserted into the edge connector inside the rack. Tighten the screws on the top and on the bottom of each card.
 6. Remove the protection cover from the terminal block connectors.
 7. Connect the terminal block to the ASM-MN-214 terminal block connector.
 8. Connect the line to the terminal block as follows: connect transmit pair to the terminals marked XMT, the receive pair to the terminals marked RCV, and the fifth screw to ground (optional).
 9. Connect the DTE cable to the DB-25 connector.
 10. Connect power to the ASM-MN-214 card cage:
 - To connect AC power, connect the power cable to the mains supply.
 - To connect DC power, refer to *DC Power Supply Connection Supplement* of the ASM-MN-214 Installation and Operation Manual.



The ASM-MN-214 card cage has no power switch. Operation starts when the power is applied to the rear panel POWER connector. When applying power, first connect the plug of the power cord to the ASM-MN-214 POWER connector and then to the mains power source (outlet).

Chapter 5

Applications

This chapter describes the basic applications for the FDN 6131A data over voice multiplexer.

6.1 Voice and Data Separation

FDN 6131A is normally operated with its own built-in filters. Additional, external bandpass filters can be added to an existing application as shown in *Figure 6-13*.

The advantages of an extra bandpass filter configuration are:

- The telephone line is not disconnected if the local FDN 6131A is removed, for example, for maintenance.
- No need for extra wiring. A built-in configuration (in the FDN 6131A local unit) would require an extra twisted pair cable from the local unit to the MDF.

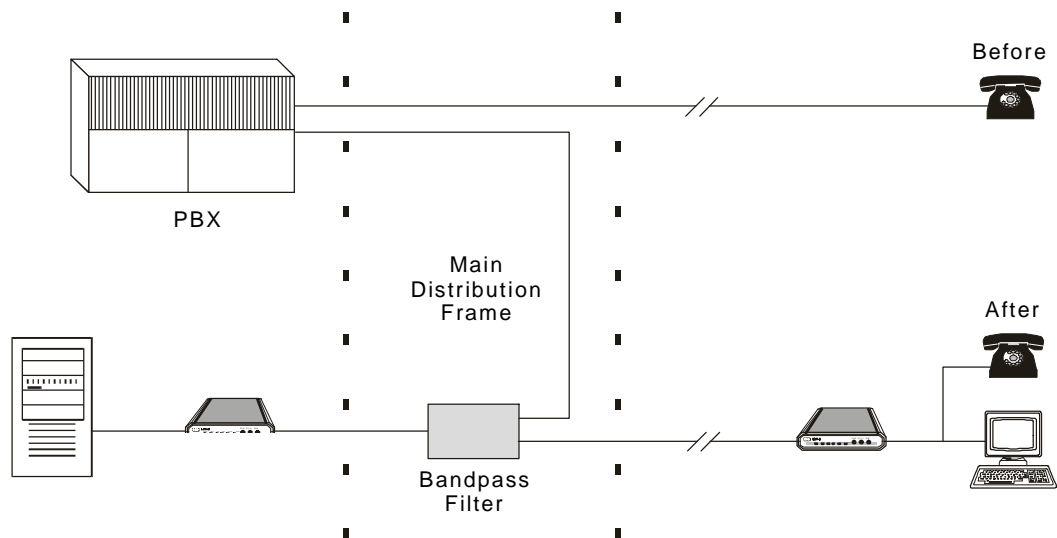


Figure 6-13. Voice and Data Separation with External Bandpass Filter

6.2 Interconnecting Data Independently of Voice

Figure 6-14 shows FDN 6131A application, in which the bypass filters enable two DTEs to communicate over the dial-up lines, with only one FDN 6131A unit per user. In this application data lines are interconnected independent of the voice stream.

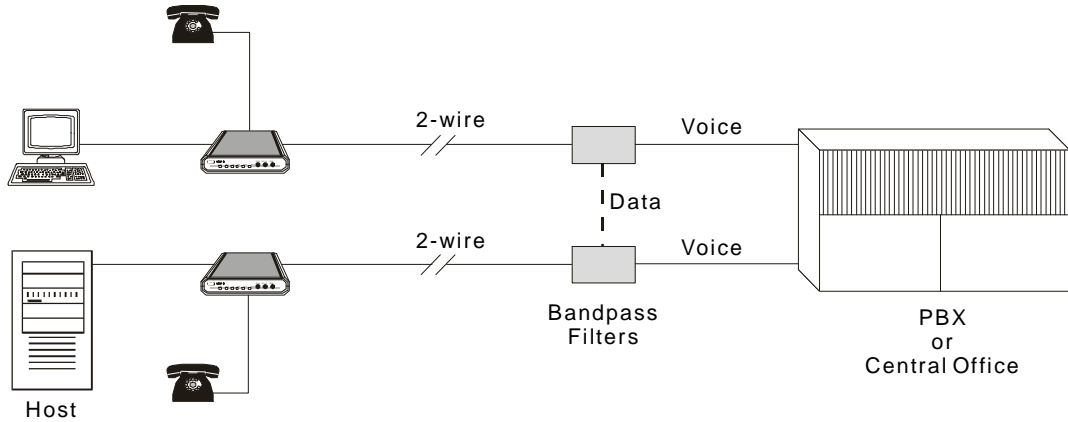


Figure 6-14. FDN 6131A Application with Data Line Interconnection

6.3 PABX Bypass

Figure 6-15 illustrates FDN 6131A PBX bypass application. In this application any PBX user can be connected to the central office, using the LDV-BP bandpass filter. Both extension and trunk are used for data transmission, while the PBX is bypassed.

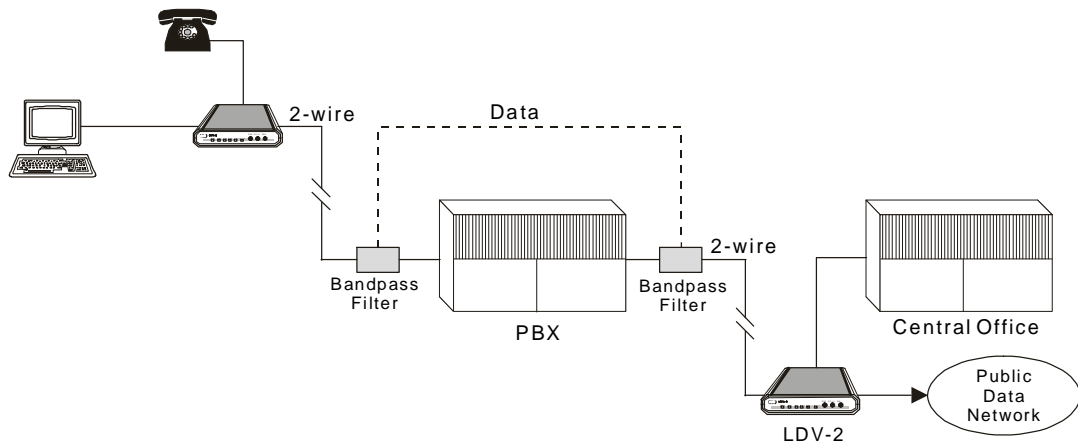


Figure 6-15. FDN 6131A PBX Bypass Application

6.4 Multidrop Application Using LDV-BP Cards

Figure 6-16 shows the FDN 6131A multidrop application. The FDN 6131A units, with bandpass filters at each subscriber site provide a cost-effective multidrop system. The data ports of all LDV-BP cards are bypassed directly at the MDF.

The host broadcasts to all terminals, but only the addressed DTE responds. The number of FDN 6131A units required for this application is reduced by half, while telephone function remains unaffected.

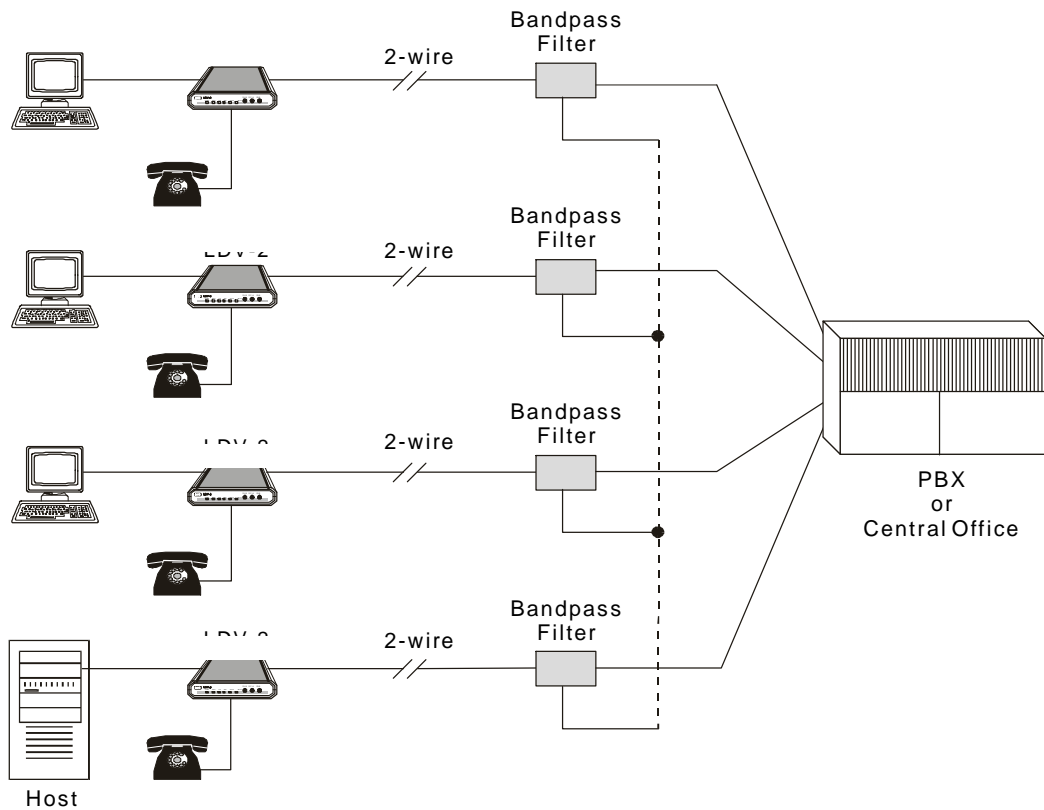


Figure 6-16. FDN 6131A Multidrop Application

6.5 Independent Filter Connection

The two LDV-BP filters are used for independent connections to two remote FDN 6131A units as shown in *Figure 6-17*. The card filters jumpers should be set to OFF.

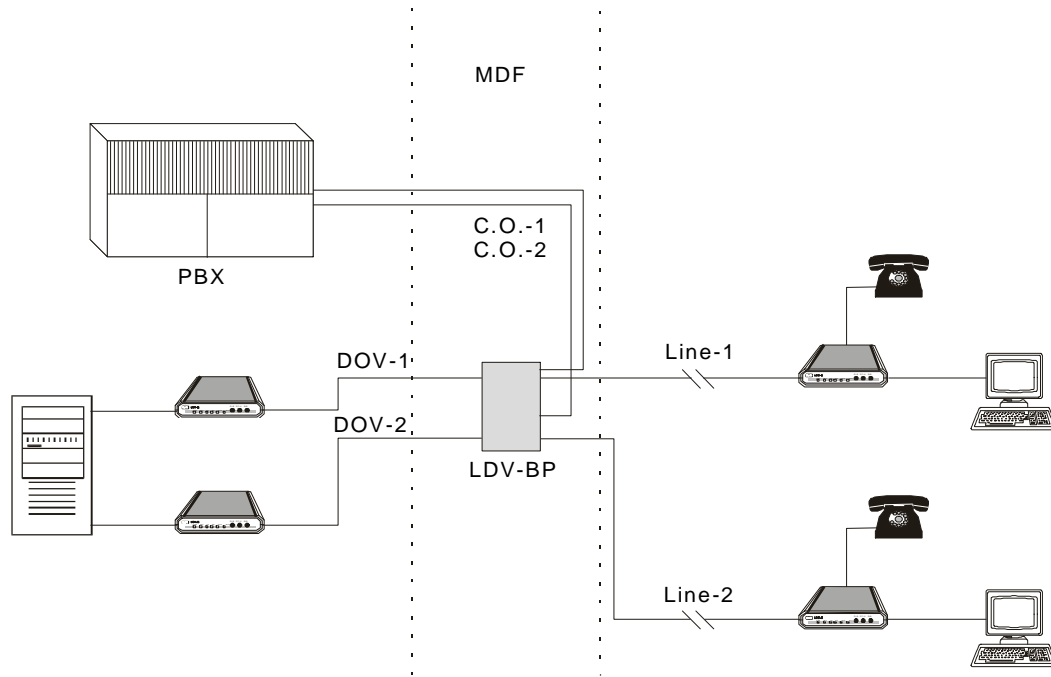


Figure 6-17. Independent Filter Connection

6.6 Internal Filter Connection

The two filter cards are used in the same link connecting one remote FDN 6131A and one local FDN 6131A as shown in *Figure 6-18*. In this case, card filters jumpers should be set to ON, and DOV-1 and DOV-2 connections become redundant.

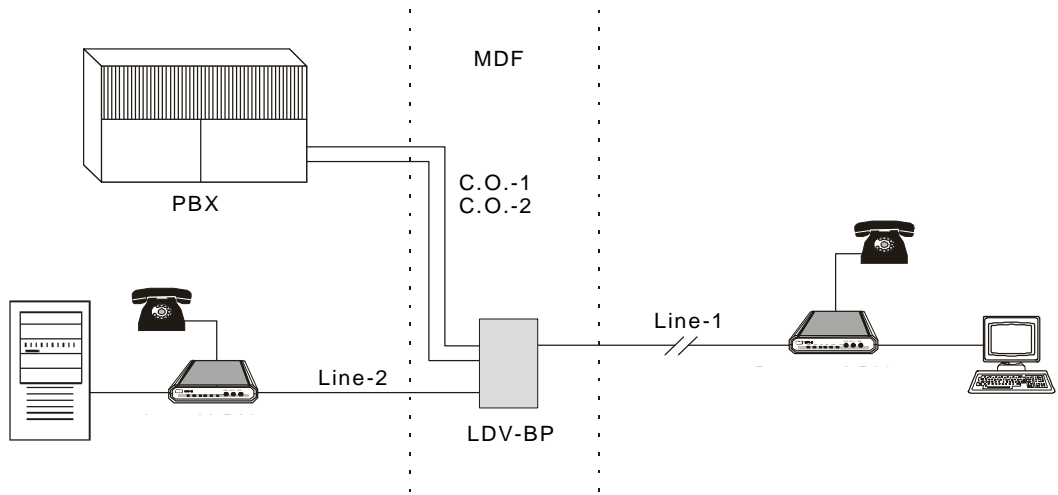


Figure 6-18. Internal Filter Connection

Appendix 6

Connector Wiring

The DTE RS-232 interface of the FDN 6131A unit terminates in 25-pin D-type female connector, wired in accordance with *Table 7-5*.

Table 7-5. FDN 6131A DTE Connector Pin Assignment

Pin	RS-232	V.24	Function	Direction	Notes
1	AA	101	Protective GND	-	Can be connected to the signal GND (pin 7).
2	BA	103	Transmit Data	Input	
3	BB	104	Receive Data	Output	
4	CA	105	Request to Send	Input	
5	CB	106	Clear to Send	Output	
6	CC	107	Data Set Ready	Output	
7	AB	102	Signal GND	-	
8	CF	109	Data Carrier Detect	Output	
9	-	-	+8V	-	
10	-	-	-8V	-	
15	DB	114	Transmit Clock (DCE)	Output	
17	DD	115	Receive Clock (DCE)	Output	
18	-	-	Data Clamp/Loop 1	Input	Not standard
21	-	140	Remote Loopback	Input	Loop 2
24	-	113	Transmit Clock (DTE)	Input	
25	-	142	Test	Output	