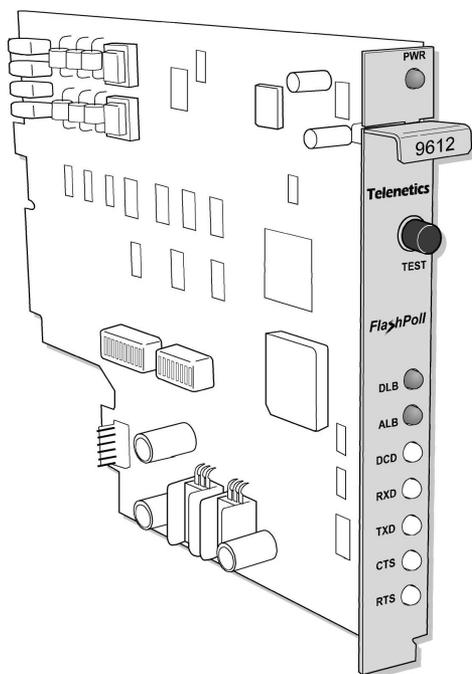# Telenetics

DSP9612RM Flash Poll
Rack-Mount Modem
User's Guide

ARC Electronics 800-926-0226 www.arcelect.com

0049–0519–000 Rev. A

Compliances

This device complies with Part 15A of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15A of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

❖ Reorient or relocate the receiving antenna.

❖ Increase the separation between the equipment and the receiver.

❖ Connect the equipment to an outlet on a circuit other than the one to which the receiver is connected.

❖ Consult the dealer or an experienced radio/TV technician for help.

If none of these actions resolves the problem, consult your distributor or an experienced radio/television technician for additional suggestions.

Additionally, Section 15.838, paragraph d), of the FCC Rules and Regulations states: "Where special accessories, such as shielded cables, are required in order to meet FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications to this equipment without the approval of the manufacturer could void the user's authority to operate this equipment.

Contents

Contents

NOTES

Chapter 1
Introduction

Congratulations for purchasing the finest industrial-grade fast-poll rack-mount modem available.

The Telenetics DSP9612RM (Flash Poll) modem is a 9600/4800/0-1800 bps rack-mount modem designed for 4-wire, full-duplex or 2-wire, half-duplex operation over a voice-band leased line. The modem is designed utilizing the latest digital-signal processing (DSP) technology to achieve high performance. The modem employs Telenetics' proprietary modulation and encoding scheme to achieve fast modem training time. It is also backward compatible with Bell 202 modems.

The modem can be installed in either a Telenetics or a Motorola/UDS RM16M Universal Data Shelf™. The modem occupies only one rack slot, eliminating the hassle of equipment trays and power bricks required for "Plastic Box" modems. The modem is powered from the Universal Data Shelf.

The DSP9612RM modem is ideally suited for multi-point communication systems that require fast response time, short training time, and low throughput delay. The DSP9612RM is the most technologically advanced rack-mount modem on the market.

This User's Guide is designed to let you get your modem "up and running" as quickly as possible. It contains all the information you need to install and configure your modem. It also contains troubleshooting information in the unlikely event you encounter a problem with your modem.

Introduction

Features

Though functionally similar to commercial modems, the DSP9612RM provides the following unique features that make it well suited for utility and industrial applications.

❖ Requires only one rack slot in a Telenetics or a Motorola/UDS RM16M Universal Data Shelf.

❖ Operates over voice-band conditioned or unconditioned leased line and pilot wires.

❖ Operates without human intervention, making it ideal for unmanned locations.

❖ Works within an extended temperature range of -40ºC to +85ºC.

❖ Designed with coupling transformers for high-voltage isolation and common mode noise rejection in industrial and commercial environments.

❖ Asynchronous data rates (selectable) of 9600, 4800, and 0-1800 bps.

❖ Easily accessible DIP switches for user configuration and option selection.

❖ Local analog, local digital, and remote digital loopback diagnostics.

Applications

The DSP9612RM modem is designed for point-to-point and multipoint data communications. Figure 1-1 shows a typical multipoint configuration.
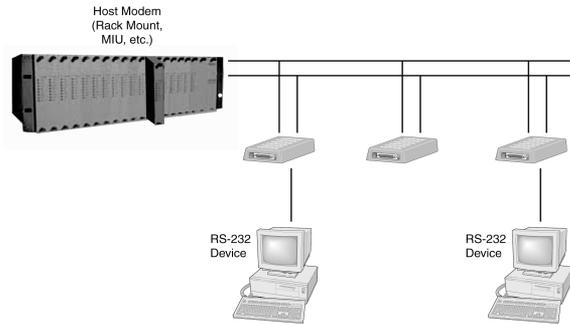
Figure 1-1. Network of Multipoint Configuration

There are a number of factors that can affect the network's and modem's operation and performance. These include:

❖ Operating speed

❖ 2-wire or 4-wire configuration

❖ Transmission line characteristics, noise, and line impairments

❖ Network configuration (point-to-point or multipoint)

❖ Number of nodes on the network

Ancillary Documentation

For information about the Telenetics RM16M Universal Data Shelf, refer to the Telenetics RM16M Installation and Operation Manual for the Universal Data Shelf version you have.

Introduction

Chapter 2
Installation

T his chapter describes how to install the modem.

Unpacking Your Hardware

Your package should include:

❖ At least one DSP9612RM modem

❖ This User's Guide

If your package contents are damaged or missing, please contact your place of purchase immediately.

Additional Items You Need

To use your modem, you need the following additional items:

❖ A Telenetics or Motorola/UDS RM16M Universal Data Shelf

❖ A two- or four-wire transmission line or leased line

Hardware Overview

Front View

Figure 2-1 shows a front view of the DSP9612RM modem. Starting from the top, this view shows:

❖ A loopback test switch. See page 28.

❖ A set of eight LEDs. See page 27.
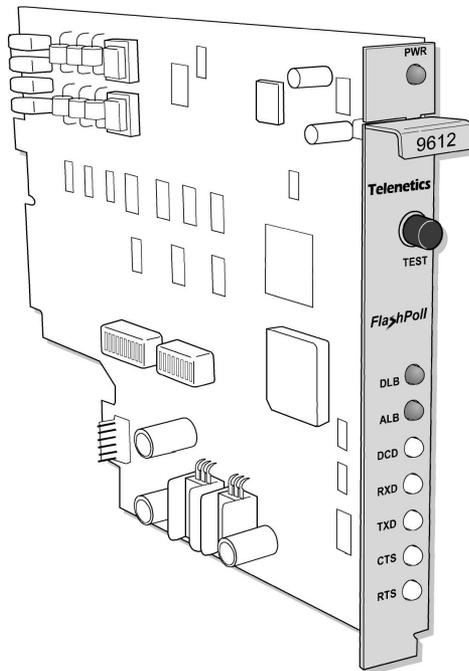
Figure 2-1. Front View of Modem

Component View

Figure 2-2 shows the component view of the modem. This view shows:

❖ Two configuration switch blocks, designated **SW1** and **SW2**. See page 12.

❖ Jumpers located in various positions on the modem. Do not change or remove the straps from these jumpers.

❖ Edge connectors at the back of the modem, which plug into the backplane of a Telenetics or Motorola/UDS RM 16M Universal Data Shelf.

Figure 2-2. Component View of Modem

Installation Summary

The modem installation involves the following steps:

1. Configuring the modem. See the section below.

2. Connecting to a transmission line. See page 25.

3. Connecting an RS-232 device. See page 26.

Configuring the Modem

You configure the modem using the two sets of DIP switches on the component side of the modem, near the center. The switches can have one of two functions, depending on how switch SW2-1 is set.

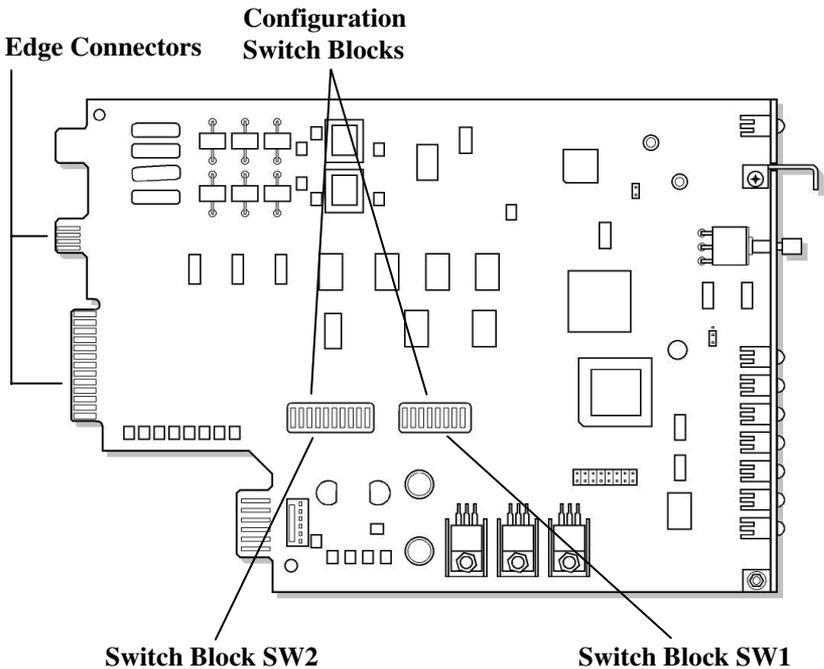❖ Setting switch SW2-1 to OFF configures the modem for high-speed (Fast Poll) mode. In this mode, the switches correspond to the functions in Table 2-1 (see page 13).

❖ Setting switch SW2-1 to ON configures the modem for low-speed (FSK) mode. In this mode, the switches correspond to the functions in Table 2-3 (see page 18).

Note: The modem has several jumpers. Do not change or remove the straps from the jumpers.

High-Speed (Fast Poll) Mode

Table 2-1 shows the modem switch settings that can be used when the modem is configured for high-speed (Fast Poll) mode. This mode is enabled when switch SW2-1 is set to OFF. Following this table is an explanation of these settings.

Table 2-1. Modem Switch Settings for High-Speed Mode

Switches	Switch Settings	
	ON	**OFF (Default)**
SW 1-1 − 1-4: Transmit Level (page 14)	(see Table 2-2 on page 14)	
SW 1-5: Receiver Dynamic Range (page 15)	−10 to −43 dBm	+3 to −30 dBm
SW 1-6: TX Cable Equalizer (page 15)	Enabled	Disabled
SW 1-7: RX Cable Equalizer (page 15)	Enabled	Disabled
SW 1-8: Anti-streaming (page 15)	Active	Inactive

Switches	ON	OFF (Default)
SW 2-1: High-Speed/Low-Speed Mode (page 16)	Low-Speed Mode (FSK)	High-Speed Mode (Fast Poll)
SW 2-2: Data Rate in Fast Poll Mode	4800 bps	9600 bps
SW 2-3: Async Character	11 bits	10 bits
SW 2-4: Auto RTS (page 16)	Enabled	Disabled
SW2-5: Reserved		
SW 2-6: Production Test Only (page 16)	Test	Normal
SW 2-7: 2- or 4-wire (page 16)	2-wire, half-duplex	4-wire, full-duplex
SW 2-8: Carrier Control (page 17)	Constant	Switched
SW 2-9: Rx Termination (page17)	Disabled	Enabled
SW 2-10: Ground Options (page 17)	Chassis Ground-Signal Ground Connected	Chassis Ground-Signal Ground Disconnected

Installation

SW1-1 through SW1-4 – Transmit Level (high- & low-speed modes)

Switches SW1-1 through SW1-4 adjust the modem's transmit level.
Table 2-2 shows the transmit levels you can select using these switches.

Table 2-2. Transmit Levels (High-Speed and Low-Speed Modes)

Transmit Level	SW1 through SW4 Switch Settings			
	SW1-1	SW1-2	SW1-3	SW1-4
0 dBm	OFF	OFF	OFF	OFF
−1 dBm	OFF	OFF	OFF	ON
−2 dBm	OFF	OFF	ON	OFF
−3 dBm	OFF	OFF	ON	ON
−4 dBm	OFF	ON	OFF	OFF
−5 dBm	OFF	ON	OFF	ON
−6 dBm	OFF	ON	ON	OFF
−7 dBm	OFF	ON	ON	ON
−8 dBm	ON	OFF	OFF	OFF
−9 dBm	ON	OFF	OFF	ON
−10 dBm	ON	OFF	ON	OFF
−11 dBm	ON	OFF	ON	ON
−12 dBm	ON	ON	OFF	OFF
−13 dBm	ON	ON	OFF	ON
−14 dBm	ON	ON	ON	OFF
+3 dBm	ON	ON	ON	ON

SW1-5 – Receiver Dynamic Range (high- & low-speed modes)

SW1-5	ON = −10 to −43 dBm
	OFF = +3 to −30 dBm

For a low receive signal level, set SW1-5 to ON (−43 dBm). For short distances or to select a strong receive signal, set SW1-5 to OFF.

SW1-6 and SW1-7 – Cable Equalizer (high-speed mode only)

SW1-6	ON = Enable TX Cable Equalizer
	OFF = Disable TX Cable Equalizer
SW1-7	ON = Enable RX Cable Equalizer
	OFF = Disable RX Cable Equalizer

To improve or extend the modem's polling performance, use the fixed Compromise Cable Equalizer when polling on long metallic circuits. The cable equalizer is active only when the modem is in high-speed mode (SW2-1 set to OFF).

SW1-8 – Anti-streaming (high- & low-speed modes)

SW1-8	ON = Anti-streaming active
	OFF = Anti-stream inactive

Typically, anti-streaming is used in multi-point applications to prevent a malfunctioning slave modem from occupying the line indefinitely. When anti-streaming is active, the modem can transmit data for a maximum of 27 seconds before the transmitter turns off automatically. The modem then looks for an ON-to-OFF Request To Send (RTS) transition before proceeding with normal operation. Anti-streaming can be selected in either high-speed or low-speed mode.

Installation

SW2-1 – Fast Poll/FSK (high- & low-speed modes)

SW2-1   ON = Low-Speed Mode (FSK)
         OFF = High-Speed Mode (Fast Poll)

SW2-1 configures the modem for either low-speed (FSK) mode or high-speed (Fast Poll) mode. As a result, the SW2-1 setting you choose determines the switch definitions for the other switches.

❖   For high-speed mode, the configuration switches follow the definitions in Table 2-1.

❖   For low-speed mode, the configuration switches follow the definitions in Table 2-3.

SW2-4 – Auto RTS (high-speed mode only)

SW2-4   ON = Enable Auto RTS
         OFF = Disable Auto RTS

For data terminals that do not support hardware RTS, set SW2-4 to ON to enable buffer mode. In this mode, TXD is detected at the modem and internal RTS is turned ON. After training completes, the TXD is transmitted to the remote modem. The transmitter turns off if no TXD is detected after 1 character length of idle time.

SW2-6 – Production Test Only (high- & low-speed modes)

SW2-6   Must be OFF

SW2-6 must be in the OFF position for normal operation.

SW2-7 – 2-/4-Wire Operation (high- & low-speed modes)

SW2-7   ON = 2-Wire, Half-Duplex Mode
         OFF = 4-Wire, Full-Duplex Mode

SW2-7 configures the modem for 4-wire full-duplex or 2-wire half-duplex operation.

SW2-8 – Carrier Control (high- & low-speed modes)

SW2-8	ON = Constant
	OFF = Switched

SW2-8 selects either constant or switched carrier. Constant carrier allows DTEs, such as asynchronous dumb terminals or RTUs, to operate with modems, without the input RTS signal. When constant carrier mode is enabled (SW2-8 set to ON), the modem forces the transmit carrier active and the RTS-CTS delay is minimum (<0.5 ms.).

You can use constant carrier in 4-wire, point-to-point or multi-point applications (from master to slave modems).

In switched-carrier mode (SW2-8 set to OFF), the RTS/CTS delay is 23 ms.

SW 2-9 – RX Termination (high- & low-speed modes)

SW2-9	ON = Disable Rx Termination
	OFF = Enable Rx termination

SW2-9 selects whether RX termination is enabled for a modem. If you set this switch OFF, the receiver is terminated with 600 Ω. If you set this switch ON, the receiver is not terminated.

SW 2-10 – Ground Option (high- & low-speed modes)

SW2-10	ON = Modem signal ground is connected to chassis ground
	OFF = Modem signal ground and chassis ground disconnected

SW2-10 determines the grounding option for the modem. Setting this switch ON connects the modem signal ground to chassis ground. Setting this switch OFF disconnects the modem signal ground from chassis ground.

Low-Speed (FSK) Mode

Table 2-3 shows the modem switch settings that can be used when the modem is configured for low-speed (FSK) mode. This mode is enabled when switch SW2-1 is set to ON. Following this table is an explanation of these settings.

Table 2-3. Modem Switch Settings for Low-Speed Mode

Switches	Switch Settings	
	ON	**OFF**
SW 1-1 − 1-4: Transmit Level (page 19)	(see Table 2-4 page 19)	
SW 1-5: Receiver Dynamic Range (page 20)	−10 to −43 dBm	+3 to −30 dBm
SW 1-6 − SW1-7: RTS-CTS Delay (page 20)	(see Table 2-5 page 20)	
SW 1-8: Anti-streaming (page 20)	Active	Inactive

SW 2-1: High-Speed)/Low-Speed Mode (page 21)	Low-Speed (FSK) Mode	High-Speed (Fast Poll) Mode
SW 2-2: CD Delay (page 21)	23 ms.	6 ms.
SW 2-3: Turnaround SQ (page 21)	0 ms.	8 ms.
SW 2-4: Not Used	—	—
SW2-5: Soft Carrier (page 22)	Disabled	Enabled
SW 2-6: Production Test Only (page 22)	Test	Normal
SW 2-7: 2- or 4-wire (page 22)	2-wire	4-wire
SW 2-8: Carrier Control (page 22)	Constant	Switched
SW 2-9: Rx Termination (page23)	Disabled	Enabled
SW 2-10: Ground Options (page 23)	Chassis Ground-Signal Ground Connected	Chassis Ground-Signal Ground Disconnected

SW1-1 through SW1-4 – Transmit Level (high- & low-speed modes)

Switches SW1-1 through SW1-4 adjust the modem's transmit level.
Table 2-4 shows the transmit levels you can select using these switches.

Table 2-4. Transmit Levels (High-Speed and Low-Speed Modes)

Transmit Level	SW1-1 through SW1-4 Switch Settings			
	SW1-1	SW1-2	SW1-3	SW1-4
0 dBm	OFF	OFF	OFF	OFF
−1 dBm	OFF	OFF	OFF	ON
−2 dBm	OFF	OFF	ON	OFF
−3 dBm	OFF	OFF	ON	ON
−4 dBm	OFF	ON	OFF	OFF
−5 dBm	OFF	ON	OFF	ON
−6 dBm	OFF	ON	ON	OFF
−7 dBm	OFF	ON	ON	ON
−8 dBm	ON	OFF	OFF	OFF
−9 dBm	ON	OFF	OFF	ON
−10 dBm	ON	OFF	ON	OFF
−11 dBm	ON	OFF	ON	ON
−12 dBm	ON	ON	OFF	OFF
−13 dBm	ON	ON	OFF	ON
−14 dBm	ON	ON	ON	OFF
+3 dBm	ON	ON	ON	ON

Installation

SW1-5 – Receiver Dynamic Range (high- & low-speed modes)

SW1-5	ON = −10 to −43 dBm
	OFF = +3 to −30 dBm

For a low receive signal level, set SW1-5 to ON (−43 dBm). For short distances or to select a strong receive signal, set SW1-5 to OFF.

SW1-6 and SW1-7 – RTS-CTS Delay (low-speed mode only)

Switches SW1-6 and SW1-7 determine the duration of the RTS-CTS delay. Table 2-5 shows the RTS-CTS delays you can select using these switches.

Table 2-5. RTS-CTS Delays

RTS-CTS Delay	SW1-6 and SW1-7 Switch Settings	
	SW1-6	**SW1-7**
8 ms. delay	OFF	OFF
33 ms. Delay	OFF	ON
59 ms. Delay	ON	OFF
219 ms. delay	ON	ON

SW1-8 – Anti-streaming (high- & low-speed modes)

SW1-8	ON = Anti-streaming active
	OFF = Anti-stream inactive

Typically, anti-streaming is used in multi-point applications to prevent a malfunctioning slave modem from occupying the line indefinitely. When anti-streaming is active, the modem can transmit data for a maximum of 27 seconds before the transmitter turns off automatically. The modem then looks for an ON-to-OFF Request To Send (RTS) transition before proceeding with normal operation. Anti-streaming can be selected in either high-speed or low-speed mode.

SW2-1 – Fast Poll/FSK (high- & low-speed modes)

SW2-1	ON = Low-Speed Mode (FSK) OFF = High-Speed Mode (Fast Poll)

SW2-1 configures the modem for either low-speed (FSK) mode or high-speed (Fast Poll) mode. As a result, the SW2-1 setting you choose determines the switch definitions for the other switches.

❖ For high-speed mode, the configuration switches follow the definitions in Table 2-1.

❖ For low-speed mode, the configuration switches follow the definitions in Table 2-3.

SW2-2 – CD Delay (low-speed mode only)

SW2-2	ON = 23 milliseconds OFF = 6 milliseconds

SW2-2 controls the Carrier Detect (CD) delay and is valid for low-speed mode only. Setting this switch to ON configures the modem to turn on CD 23 milliseconds after it detects a valid carrier signal. Setting this switch to OFF configures the modem to turn on CD 6 milliseconds after it detects a valid carrier signal.

SW2-3 – Turnaround Squelch Delay (low-speed mode only)

SW2-3	ON = 0 milliseconds OFF = 8 milliseconds

SW2-3 controls the turnaround squelch delay and is valid for low-speed mode only. Setting this switch to ON configures the modem to enable its receiver immediately after the Request To Send (RTS) signal is turned off. When this switch is set to OFF and the modem is configured for 2-wire mode (SW2-7 set to ON), the modem squelches the receiver for 8 milliseconds after RTS is turned off to prevent far-end echoes from causing data errors.

Installation

SW2-5 – Soft Carrier (low-speed mode only)

```
SW2-5    ON = Disabled
         OFF = Enabled
```

SW2-5 controls the soft carrier and is valid for low-speed mode only. Setting this switch to OFF configures the modem to transmit a 900 Hz soft carrier to the remote modem after RTS is turned off. Setting this switch to ON prevents the modem from transmitting a soft carrier after RTS is turned off.

SW2-6 – Production Test Only (high- & low-speed modes)

```
SW2-6    Must be OFF
```

SW2-6 must be in the OFF position for normal operation.

SW2-7 – 2-/4-Wire Operation (high- & low-speed modes)

```
SW2-7    ON = 2-Wire, Half-Duplex Mode
         OFF = 4-Wire, Full-Duplex Mode
```

SW2-7 configures the modem for 4-wire full-duplex or 2-wire half-duplex operation.

SW2-8 – Carrier Control (high- & low-speed modes)

```
SW2-8    ON = Constant
         OFF = Switched
```

SW2-8 selects either constant or switched carrier. Constant carrier allows DTEs, such as asynchronous dumb terminals or RTUs, to operate with modems, without the input RTS signal. When constant carrier mode is enabled (SW2-8 set to ON), the modem forces the transmit carrier active and the RTS-CTS delay is minimum (<0.5 ms.).

You can use constant carrier in 4-wire, point-to-point or multi-point applications (from master to slave modems).

In switched-carrier mode (SW2-8 set to OFF), the RTS/CTS delay is 23 ms.

SW 2-9 – RX Termination (high- & low-speed modes)

> SW2-9 ON = Disable Rx Termination
> OFF = Enable Rx termination

SW2-9 selects whether RX termination is enabled for a modem. If you set this switch OFF, the receiver is terminated with 600 Ω. If you set this switch ON, the receiver is not terminated.

SW 2-10 – Ground Option (high- & low-speed modes)

> SW2-10 ON = Modem signal ground is connected to chassis ground
> OFF = Modem signal ground and chassis ground disconnected

SW2-10 determines the grounding option for the modem. Setting this switch ON connects the modem signal ground to chassis ground. Setting this switch OFF disconnects the modem signal ground from chassis ground.

Installing the Modem in the Universal Data Shelf

After you set the modem's configuration switches, you can install it in a slot within a 19- or 23-inch Telenetics or Motorola RM16M Universal Data Shelf. The modem is installed or replaced from the front of the Universal Data Shelf, without disturbing the cable connections on the back of the Shelf. The modem can be installed and removed without having to remove power from the Shelf. Special tools or test equipment are not required for installing the modem.

1. Wear an antistatic wrist strap over your wrist on your bare skin (not over a shirt or jacket).

2. Remove the wrapping protecting the modem.

Installation

3. Remove the front panel of the Universal Data Shelf and pick an empty slot.

4. Hold the modem so the front panel LEDs are facing you and the edge connectors are pointing to the backplane of the Universal Data Shelf.

5. Install the modem into the selected slot in the Universal Data Shelf (see Figure 2-3).

6. Push firmly on the modem to seat it properly into the slot and backplane. The back of the Universal Data Shelf contains the connectors for interfacing to the Date Terminal Equipment and communications line. Figure 2-4 shows how the modems look when installed in the rack.
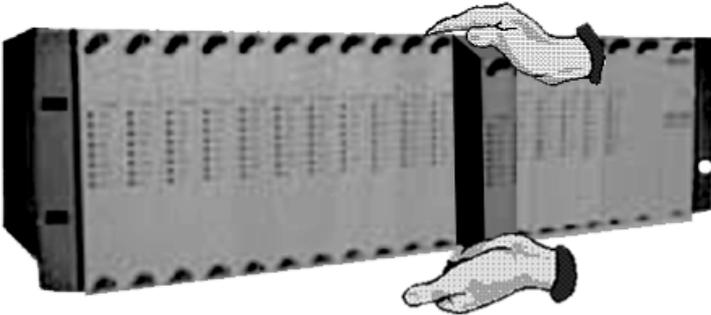
7. Replace the front panel of the Universal Data Shelf.

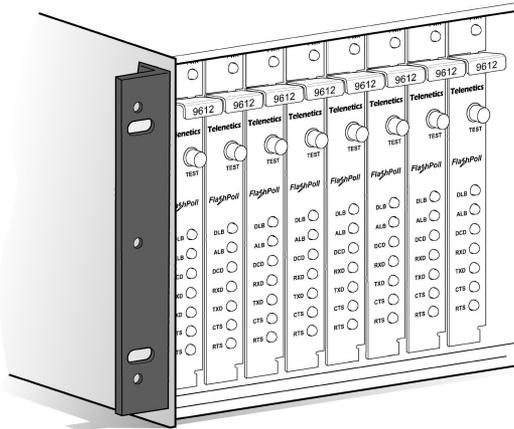
Figure 2-3. Installing the Modem

Figure 2-4. Modems Installed in the Rack

Connecting to a Transmission Line

The Universal Data Shelf has different Telco options. Your version may have 16 8-pin modular jack connectors, one for each slot in the Shelf. It may also have an optional 50-pin mass-termination Telco connector.

To connect your modem to a leased line using the modular jack connectors, refer to "Modular Jack Connectors," below. To use the 50-pin mass-termination connector, refer to "Mass Termination Connector" on page 26.

Modular Jack Connectors

The rear panel of the Universal Data Shelf has an 8-pin RJ-45 jack for each slot in the Shelf. After you install the modem into a slot, connect the slot's corresponding RJ-45 jack to a leased line.

Leased lines have four contacts: a transmit (Tx) pair and a receive (Rx) pair. For communication to occur:

❖ The Rx line of the Shelf's RJ-45 jack must connect to the Tx line of the other modem.

Installation

❖ The Tx line of the Shelf's RJ-45 jack must connect to the Rx line of the other modem.

For more information, refer to the Telenetics RM16M Installation and Operation Manual for the Universal Data Shelf version you have.

Mass Termination Connector

As an option, a 50-pin mass-termination connector can be used as the Telco connection for the modem(s). For more information, refer to the Telenetics RM16M Installation and Operation Manual for the Universal Data Shelf version you have.

Connecting an RS-232 Device

The Universal Data Shelf has different RS-232 options for accepting an attached RS-232 (RTU) device. Your version may have a female, 25-pin RS-232 connector for each slot in the Shelf. It may also have an optional 50-pin mass-termination Telco connector. For more information, refer to the Telenetics RM16M Installation and Operation Manual for the Universal Data Shelf version you have.

LEDs

The front panel of the modem provides the LEDs shown in Table 2-7.

Table 2-7. Modem LEDs

LED	Color	Description
Power	Green	Power
RTS	Yellow	Request To Send
CTS	Yellow	Clear To Send
TxD	Yellow	Transmit Data
RxD	Yellow	Receive Data
DCD	Yellow	Carrier Detect
ALB	Red*	Analog Loopback
DLB	Red*	Digital Loopback
* When the modem is in remote loopback, both the **ALB** and **DLB** LEDs go ON.		

Loopback Control Switch

The front panel of the modem has a push button for initiating the following loopback diagnostic tests:

❖ Local analog loopback — started by pressing the button one time.

❖ Local digital loopback — started by pressing the button two times.

❖ Remote digital loopback — set the local modem's RTS signal to low. Then press the remote modem's diagnostics button three times and raise the local modem's RTS signal to start the test. The **ALB** and **DLB** LEDs go ON when the modem is in remote digital loopback. This test is only available in Fast Poll mode only.
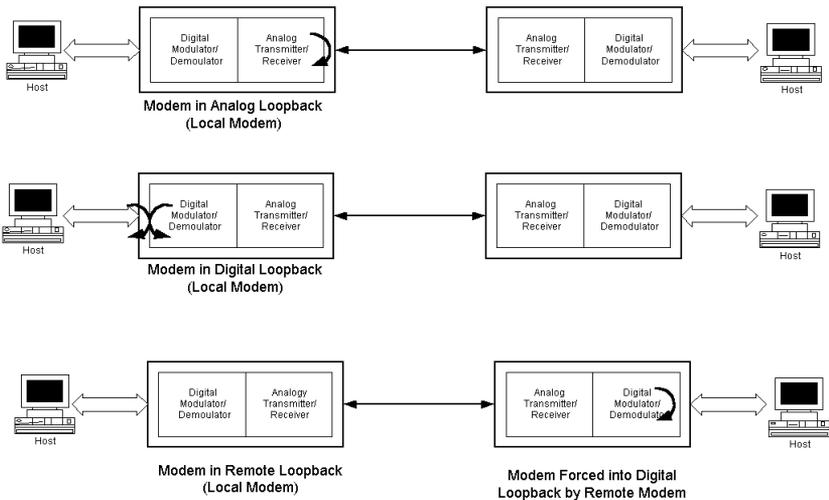
Figure 2-6 illustrates these three diagnostics.

Figure 2-6. Loopback Diagnostics

Appendix A
Troubleshooting

n the event you encounter a problem using your Telenetics modem, refer to the troubleshooting information in this appendix. To troubleshoot the power supply and backplane on the Universal Data Shelf, refer to the Telenetics RM16M Installation and Operation Manual for the Universal Data Shelf version you have.

✋ **IMPORTANT**	If you encounter a problem with your modem, be sure the modem switches are set to the appropriate positions. If a switch is halfway between an on and off setting, the modem will not operate properly.

Problem Solving

Table A-1 offers troubleshooting solutions for modem problems.

Table A-1. Troubleshooting Suggestions

If…	Perform These Procedures…
Modem does not respond and all LEDs are off.	Check the Universal Data Shelf's power supply module(s).
Modem does not receive data, and the **DCD** and **RxD** LEDs are off.	The receive line pair may be disconnected from the modem. Make sure the transmission line connection to the rear panel of the Universal Data Shelf is accurate and secure. The receive signal level may be below the CD threshold. Set SW1-5 ON to see whether configuring the modem for a −43 dBm threshold resolves the problem.

Page 29

Troubleshooting

Table A-1. Troubleshooting Suggestions

If…	Perform These Procedures…
The **RTS**, **CTS**, and **TxD** LEDs do not blink.	The attached terminal or DTE may not be sending data to the modem. Verify that data is being transmitted. If data is being transmitted, make sure the RS-232 cable is sound and securely connected to the modem and terminal or DTE.

Appendix B
Specifications

General Specifications

Data rate: 9600, 4800, or 0-1800 bps asynchronous

Data format: 8 or 9 data bits with 1 or more stop bits

DTE interface: EIA RS-232 or V.24 compatible

Line conditions: TELCO Voice band 4- or 2-wire leased line, conditioned or unconditioned

                          Private metallic circuits up to 9.5 miles (24 AWG) without cable equalizer. Up to 15.0 miles (24 AWG) with TX and RX cable equalizer

Operating modes: 2-wire half-duplex or 4-wire full-duplex

Modulation: High-speed fast poll – Telenetics proprietary FSK, Bell 202T compatible

- Mark = 1200 Hz

- Space = 2200 Hz

- Soft Carrier = 900 Hz

Equalizer: Automatic, adaptive

RTS-CTS Delay: 23 ms. (fast poll)
                          8, 33, 59, or 219 ms (FSK)

Specifications

**Receiver
dynamic range:**   0 to –30 dBm or –10 to –43 dBm

**Operating
temperature:**   -40°C to +85°C

Surge protection: Leased line, up to 15KV

Carrier Control: Constant or switched, DIP switch selectable

**Carrier loss
recovery**:   Train on Data

Throughput delay: Less than 10 milliseconds for fast polling.

Auto RTS: Support DTE without hardware RTS
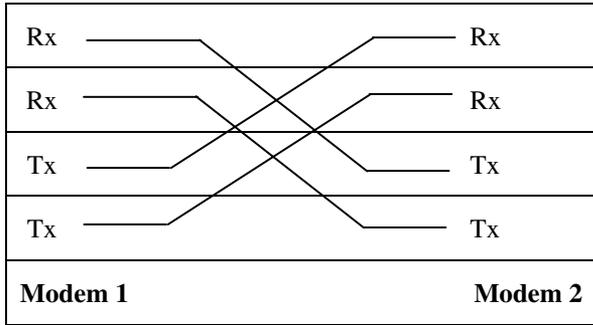(high speed only)

Anti-Streaming: 27-second timer to prevent transmitter lock-up
network

Mechanical Specifications

Dimensions: 9 inches deep x 6.25 inches high x .87 inches
thick

Weight: 8 ounces (card only)

Back-to-Back Connections to a Second Modem

RS-232 (RTU) Interface

Signal Name	Modem Input/Output	DB25 Pin	Description
Earth GND	───	1	Earth Ground
TXD	Input	2	Transmit Data
RXD	Output	3	Receive Data
RTS	Input	4	Request To Send
CTS	Output	5	Clear To Send
DSR	Output	6	Data Set Ready (Modem Ready)
SG	-	7	Signal Ground
DCD	Output	8	Data Carrier Detected
DTR	Input	20	Data Terminal Ready (Host Ready)

Specifications

Environmental Specifications

Operating temperature: -40 to + 85$^\mathrm{o}$ C

Storage temperature: -40 to +125$^\mathrm{o}$ C

Operating humidity: 5 to 95 %, non-condensing.

Isolation: 3750 V RMS

Surge protection: Leased line up to 15K VA

Compliances

The modem is designed to meet the following agency requirements:

EMI/RFI:

FCC part 15 for Class A computing device

Industry Canada. (Emissions)

Appendix C
Limited Product Warranty

Telenetics warrants that the Product sold will be free from defects in material and workmanship and perform to Telenetics' applicable published specifications for a period of 18 months from the date of delivery to Customer or 12 months from placement into service, whichever occurs first. The liability of Telenetics hereunder shall be limited to replacing or repairing, at its option, any defective Products which are returned F.O.B., Telenetics' facility, Lake Forest, California (or, at Telenetics' option refunding the purchase price of such products). In no case are Products to be returned without first obtaining permission and a customer return order number from Telenetics. In no event shall Telenetics be liable for any consequential or incidental damages.

Products which have been subject to abuse, misuse, accident, alteration, neglect, unauthorized repair or installation are not covered by the warranty. Telenetics shall make the final determination as to the existence and cause of any alleged defect. No liability is assumed for expendable items such as lamps and fuses. No warranty is made with respect to custom products or Products produced to Customer's specifications except as specifically stated in writing by Telenetics in the agreement for such custom products.

This warranty is the only warranty made by Telenetics with respect to the goods delivered hereunder, and may be modified or amended only by a written instrument signed by a duly authorized officer or Telenetics and accepted by Customer.

This warranty and limitation extends to customer and to users of the product and is in lieu of all warranties with respect to the product whether express, implied, or statutory, including without limitation the implied warranties of merchantability and fitness for a particular purpose.

Appendix D
RMA Procedure

Return Merchandise Authorization (RMA) Procedure

Before returning any Telenetics product, an RMA number must be obtained. Before asking for an RMA number, ascertain that the product was purchased from Telenetics. If you bought the product from a Distributor or Systems Integrator, the product should be returned to that vendor.

The most convenient method to obtain an RMA number for a product purchased from Telenetics is to send an email to support@telenetics.com. Information required must include

Your Company Name, address, the actual address that we would use to return the product to you. Please include any Mail Stop or specific delivery information. The City, State, and zip code are all required. Your phone and FAX numbers. Your email address.

If the above information is on your letterhead, that format is acceptable.

For each item you wish to return: List the product model number, usually found on the serial number tag, the serial number for each item you wish to return, a description of the problem you are encountering, and the cause of the problem (if known).

A product support specialist may call to verify that the product is properly installed or may ask you to perform tests to insure that the product has actually failed.

After review of the problem, an RMA number will be assigned, you will be notified by email or FAX.

The product must be properly packed and returned to:

Telenetics
25111 Arctic Ocean
Lake Forest, CA 92630

The RMA number must be legibly displayed on the shipping carton.

No RMA's will be issued without a product review, Telenetics will not be responsible for any product returned without an RMA number.

In the near future the RMA form will be available on our Web site Telenetics.com/support/rma. Fill in all blanks and click on the "Submit" button.

If you think the product may be out of warranty, include a method of payment for repairs, either a Purchase Order number, or Credit card number, Card Holder Name, Date of Expiration on the RMA request. Repairs currently require 5 – 10 working days, and are returned UPS second day air.

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