DDS/MR1
Manual

For Sales or Service Contact:

Data Connect Enterprise

301-924-7400

http://www.data-connect.com/

sales@data-connect.com

If no error occurs the LCD advances to one of two displays:

NO SIGNAL
RATE*

In the DDS mode NO SIGNAL means there is no connection to the DDS network. When used as a limited distance modem NO SIGNAL means there is no data connection to another modem. Press HOME. The LCD advances to the first option selection.

Rate means the DDS/MR1 is connected to another unit. Press HOME. The LCD advances to the first option selection.

*The word "RATE" does not actually display. What displays is the bps rate of the connection.

CONFIGURATION OPTION DESCRIPTIONS

Configuration options available through the front panel are as follows:

Timing

TIMING - Transmitter timing may be slaved to

- DDS received data timing
- EXTERNAL timing provided by DTE
- INTERNAL timing provided by the DDS/MR1 for LDM applications

Normal operation uses DDS received data timing.

Autobaud

AUTBD OPT - The autobaud option is available only when DDS timing is selected. When autobauding is enabled, the DDS/MR1 automatically determines the line rate each time the unit is powered up. When this option is disabled, the rate must be set from the front panel using the RATE option. When INTERNAL or EXTERNAL timing is selected, this option does not apply and is not displayed.

NOTE

The DDS/MR1 will not autobaud to 64 kbps. To run 64 kbps in DDS timing, the autobaud option must be disabled and the rate set to 64 kbps using the RATE option.

Rate

RATE - The rate option is selectable to 1.2, 2.4, 4.8, 9.6, 19.2, 56 or 64 kbps. When the AUTBD OPT is enabled, the rate is automatically determined by the received signal and the RATE option is not displayed.

Sync / Async

SYN / ASYN - The sync / async option is used to configure the DDS/MR1 to operate either synchronously or asynchronously. The data rate must be 19.2 kbps or lower for this option. The 56 and 64 kbps rates are synchronous only, so this option does not apply and is not displayed.

Bits Per Word

BITS / WORD - The bits / word option is used to select the asynchronous word size. The word size is computed by adding the number of data bits, the number of stop bits, the number of parity bits (0 to 1), and one start bit. The Bits / Word option can be 8, 9, 10, or 11. The previous option SYN / ASYN must be selected to ASYN for this option. If SYN is selected this option does not apply and is not displayed.

RTS Control

RTS CONT - The RTS control options are as follows:

- Permanent: Provides a permanent RTS and CTS.
- Normal: Normal DTE controlled RTS.
- 35 sec AS: 35 second antistreaming terminal disconnect. In this mode, if RTS is on from the DTE for 35 continuous seconds, the DDS/MR1 turns CTS off.
- SIM SW CR: Simulated switched carrier. Provides a permanent RTS to the DSU/CSU. CTS to the DTE is controlled by and follows RTS from the DTE. This option selection is only available when an EIA-232 interface card is installed. With any other interface card, it does not apply and is not displayed.

> **NOTE**
> The behavior of CTS once RTS is raised by the DTE may depend on the status of the Circuit Assurance (CA OPT). Refer to Circuit Assurance.

Buffer

BUFF OPT (ELASTIC BUFFER) - The BUFF option, used to buffer externally-clocked transmitted data, can be on (enabled) or off (disabled). The option is used mainly with a crossover cable in tail circuit applications. When enabled, transmit data from the DTE is clocked into the buffer using the external clock from the DTE. Data is clocked from the buffer to the DDS line using the clock from the DDS/MR1 (usually in DDS timing). The RTS CONT option should be set for normal. This option is intended for use in a polled system (RTS is toggled). If the TIMING option is selected for EXTERNAL, this option does not apply and is not displayed.

Loopback

LB OPTS (LOOPBACK OPTIONS) - The loopback options are as follows:

- BIL LB (BILATERAL RT): THE RT loopback provides a loopback for the local DTE. EN enables and DS disables the DTE loopback without affecting the DDS loopback.
- RMT LB (REMOTE LOOPBACK): The Remote Loopback feature may be EN or DS to avoid accidental activation.

DSR

DSR OPT - DSR can be on or off during loopback modes.

System Status

SS OPT - With this option on, RLSD must be on for DSR to be on. This means that DSR will turn off while receiving Idle or Out-of-Service codes.

With this option off, DSR does not depend on the state of the DDS/MR1 receiver. This option can be used when the remote DDS/MR1 maintains a permanent RTS to verify a complete link.

Circuit Assurance

CA OPT - When on, RLSD must be on for CTS to be on. This means that CTS will turn off while receiving of Idle or Out-of-Service codes. When this option is off CTS does not depend on the state of the DDS/MR1 receiver. This option can be used when the remote DDS/MR1 maintains a permanent RTS to verify a complete link before sending data.

> **NOTE**
> When using DDS/MR1 units for multi-point links, the master unit must have both the CA and SS options disabled.

Network Status

NET STAT - This option allows the user to select either NS (No Signal) or NS/OS (No Signal or Out-of-Service) to be output to the DTE pin labeled NS.

> **NOTE**
> This option is only valid if the NS dip switch on the DTE interface board is set to IN. Refer to Hard Option Selection.

RTS/CTS

RS-CS DLY - Certain applications and DTE devices require longer RTS-CTS delay time than others. The RTS on to CTS on delay time selections are

- 24 ms
- 30 ms
- 60 ms
- Normal - The delay is dependent on the rate. Refer to Table 3-5.

> **NOTE**
> This option is available with the EIA-232 interface card installed. With any other interface card, this option does not apply and is not displayed.

DTE Tests

DTE TESTS - The DTE test inputs can be controlled by the front panel. The RT, LL, TP, and RL inputs from the DTE connector can be EN or DS. Refer to Test Signals in Chapter 3.

OPTION SELECTION

Front Panel Option Selection

The DDS/MR1 operates in either DATA or SET mode. DATA mode is for normal operation. SET mode allows the user to initiate tests or select soft strap configuration options. DATA mode displays one of the following:

Data Rate:
- 1200 BPS
- 2400 BPS
- 4800 BPS
- 9600 BPS
- 19200 BPS
- 56K BPS
- 64K BPS

DTE Test:
- DTE RT
- * DTE TP
- * DTE LL
- DTE RL
- * DTE LL/TP
- * DTE RL/TP

Remote Test:
- TELCO RT
- TELCO LL
- REMOTE RT

* If an error occurs during a test, the appropriate ERROR message is displayed.

To change from DATA mode to SET mode, press HOME. SET mode is divided into two sections:

- Front panel tests
- Configuration options

Front Panel Initiated Tests

"TEST?" is the first question of SET mode. If NO is pressed the DDS/MR1 proceeds to the configuration options menu. If YES is pressed the DDS/MR1 enters into the tests menu. Test choices are displayed with a question mark. To enter a desired test press YES. The DDS/MR1 performs the selected test and the question mark is removed. Press NO to bypass or exit a test. Press HOME to return to DATA mode. The following is a list of the available tests:

RL/TP	Remote Loopback with Test Pattern
LL/TP	Local Loopback with Test Pattern
TP	End to End Test Pattern Test
RT	Remote Terminal Loopback
LL	Local Loopback
RL	Remote Loopback

Chapter 5, Diagnostics provides further information.

Configuration Option Menu

To scroll through the option menu, answer the displayed questions with YES or NO. Scrolling through by pressing YES causes the option question to appear, followed by the current selected option. Scrolling through by pressing NO causes only the option questions to be displayed.

When an option question is answered YES, that option becomes active and flashes, the question mark goes away, and the display advances to the next option. The user can scroll through all other options, which are displayed with a question mark, by pressing NO. When the next desired option is displayed the same YES action is taken as just described. A list of option questions and option settings are shown in Table 4-1.

Table 4-1
Option Menu

Option	Option Setting	Exceptions
TIMING?	DDS INTERNAL EXTERNAL	
AUTBD OPT?	AUTBD EN AUTBD DIS	Used only when timing is set for DDS
RATE?	RATE = 64k RATE = 56k RATE = 19.2k RATE = 9600 RATE = 4800 RATE = 2400 RATE = 1200	Not used when autobaud is enabled
SYN/ASYN?	SYNC ASYNC	Not available when rate is 64 or 56 kbps
BITS/WORD?	8 BTS/WD 9 BTS/WD 10 BTS/WD 11 BTS/WD	Used only when SYNC/ASYN option is ASYNC
RTS CONT?	NORMAL PERMANENT 35 SEC AS SIM SW CR	SIM SW CR is only available when an RS-232 interface card is installed
BUFF OPT?	BUFF ON BUFF OFF	Not used when timing is external
LB OPTS?	BIL LB EN BIL LB DS RMT LB EN RMT LB DS	
DSR OPT?	DSR ON DSR OFF	
SS OPT?	SS ON SS OFF	
CA OPT?	CA ON CA OFF	
NET STAT	NS NS/OS	—
RS-CS DLY?	24 mSEC 30 mSEC 60 mSEC NORMAL	Available only when RS-232 interface card is installed

Table 4-1, continued
Option Menu

Option	Option Setting	Exceptions
DTE TESTS?	DTE RL EN	
	DTE RL DS	
	DTE TP EN	
	DTE TP DS	
	DTE LL EN	
	DTE LL DS	
	DTE RT EN	
	DTE RT DS	

To exit SET mode, press HOME. If the current settings are different from the previously saved settings, "SAVE?" is displayed. To save the current settings into nonvolatile memory, press YES. IF NO is pressed "RESET?" is displayed. To reset the settings to what was last saved press YES; otherwise the current settings are used. After the user saves the settings, resets the settings, or uses the current settings, the DDS/MR1 returns to DATA mode.

HARD OPTION SELECTION

```
CAUTION
Turn the power off and unplug the
power cord before removing the
cover.
```

STRAP / SWITCH CONFIGURATION

Options are available through hard straps located on the DDS/MR1 main board and a dip switch located on the DTE interface board.

Cover Removal

□ Place the unit on its side on a flat surface. Insert a screwdriver blade in one of the rear latch slots (Figure 4-1).

□ Gently push the screwdriver while twisting lightly back and forth.

□ Assist removal by prying the cover from the chassis with your fingers on the units rear edges.

□ Repeat this procedure on the remaining three latch slots.

OPTION STRAPS

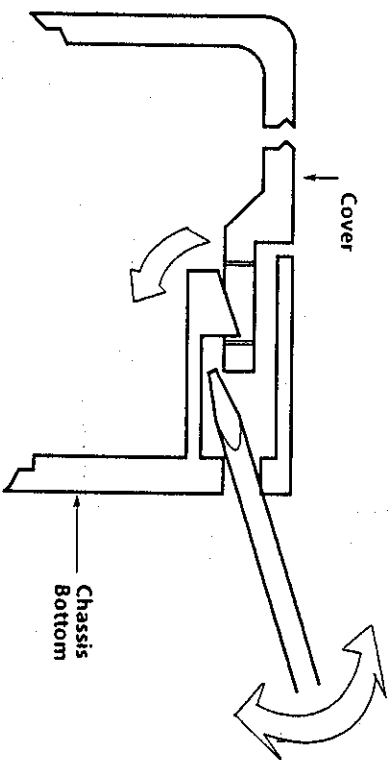Option straps are illustrated in Figure 4-2.

**Figure 4-1
Cover Removal**

Cover

Chassis Bottom

Figure 4-2
Option Straps

Front Panel

SIG GND

CH GND

EN
DIS

DTE Board

dip switch
mounted
underneath
DTE board

OPEN
(OFF)

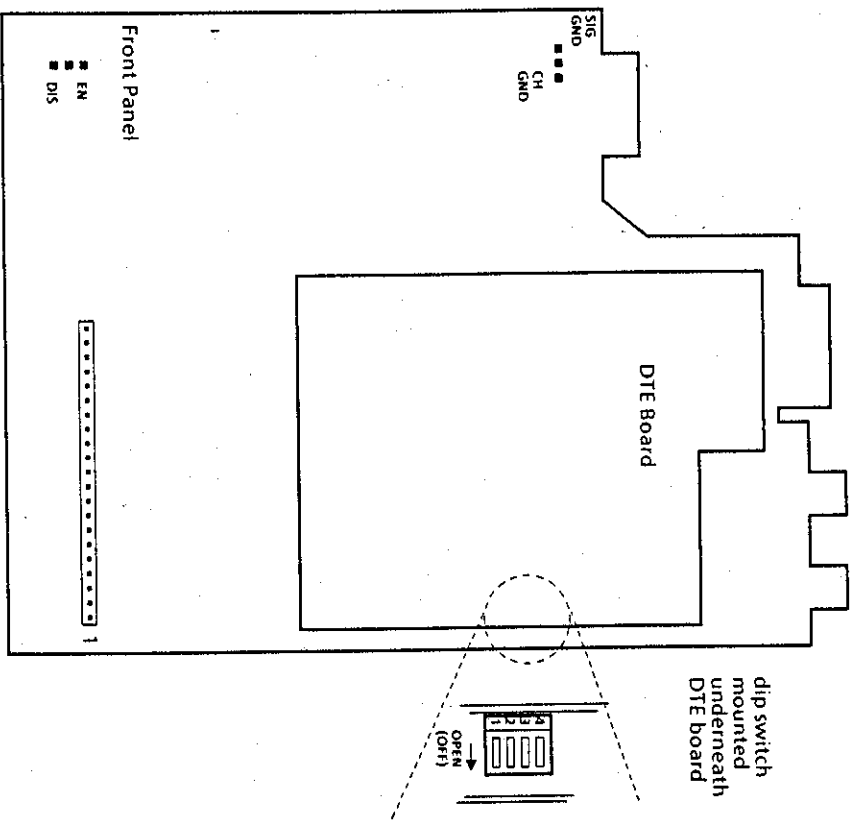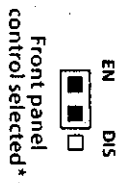**Front Panel Option**

EN enables control of all soft strap options via the front panel pushbuttons.

DIS disables the front panel pushbuttons to prevent changing the options currently selected. The operator is limited to scrolling through and viewing those options.

EN   DIS

Front panel
control selected*

Chassis Signal Ground

CH GND connects signal ground to chassis ground. This option helps eliminate some interference problems.

SIG GND separates signal ground from chassis ground.

CH GND

SIG GND

Signal ground connected
to chassis ground
selected*
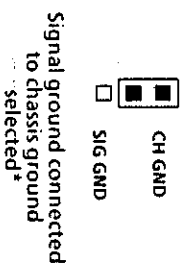
*factory

DTE INTERFACE

A four or seven position dip switch mounted on the bottom of the piggyback board on the right side (Figure 4-3) provides interface options. The four position switch is installed on EIA-530 / EIA-449 and V.35 boards. The seven position switch is installed on EIA-232 boards. Positions one through four are common to all the boards. Position five on the seven position switch is for the EIA-232 interface. Positions six and seven are not used.
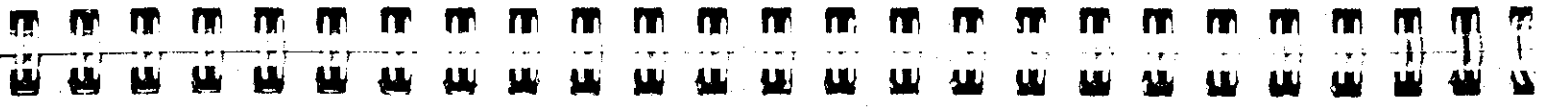
```
+--------------------------------------+
|              CAUTION                  |
|  Switch positions six and seven must be |
|  off.                                 |
+--------------------------------------+
```


ON
OFF

7 6 5 4 3 2 1
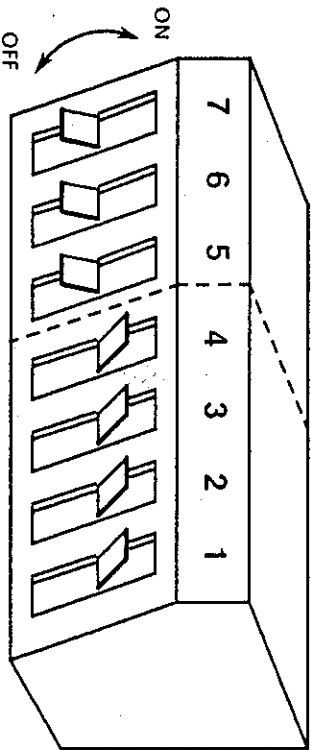
Factory setting shown

Figure 4-3
DTE Interface Dip Switch

Switch 1
TM

ON connects and OFF disconnects Test Mode output to the DTE connector in EIA-232 and V.35. In EIA-530/EIA-449, ON connects No Signal; OFF connects Test Mode output to the DTE connector.

Switch 2*
NS

ON connects and OFF disconnects the No Signal output to the DTE connector.

Switch 3*
+ 12V

ON connects + 12V and OFF removes the + 12V to the DTE connector.

Switch 4*
– 12V

ON connects – 12V and OFF removes the – 12V to the DTE connector.

Switch 5†
No Signal
Clock Option

ON, the receive clock to the DTE interface will stay in a mark state if the DSU is in a No Signal state. OFF, the receive clock is always provided to the DTE regardless of the No Signal state.

* Not applicable with EIA-530/EIA-449.
† EIA-232 only.

TEST FEATURES

By selecting various tests available through the front panel options, the operators can send test signals or patterns through the different loopback paths checking the operation of components in the network. These tests can be activated from several different locations or from a single location depending on the test option selected. During any test TM is on constant for locally initiated tests and blinks for remote initiated tests.

**Remote Terminal
Loopback
RT**

This test causes the local DDS/MR1 to loopback a remotely generated test signal to check the remote unit (Figure 5-1). An incoming signal from the remote unit over the DDS network is looped through the local DDS/MR1 and back to the source. If the signal returns unchanged, the remote unit and the DDS network are OK.

A bilateral option test lets the local DTE loop a signal through the DTE interface. This tests the DTE transmit and receive circuits.

**Local Line
Loopback
LL**

This test checks the transmit and receive logic components in one loop circuit and the transmit and receive line components in another loop circuit (Figure 5-2). The DDS/MR1 loops a signal originating from the DTE through the logic components and back to the DTE. If the signal does not change, the logic components are OK.

At the same time, the DDS/MR loops a signal through the transmit and receive line components. If the signal does not change, the line components are OK.
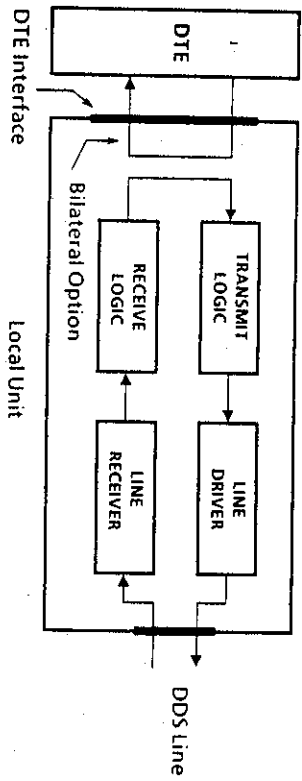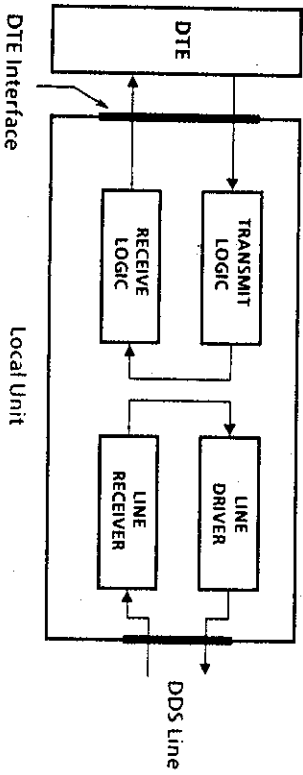
Figure 5-1
Remote Terminal Loopback (RT)

DTE

DTE Interface

Bilateral Option

Local Unit

TRANSMIT LOGIC

RECEIVE LOGIC

LINE DRIVER

LINE RECEIVER

DDS Line

Figure 5-2
Local Line Loopback (LL)

DTE

DTE Interface

Local Unit

TRANSMIT LOGIC

RECEIVE LOGIC

LINE DRIVER

LINE RECEIVER

DDS Line

Remote Loopback with Test Pattern RL/TP

This test checks the local DDS/MR1, DDS network, and remote unit (Figure 5-3). The local DDS/MR1 sends a signal to the remote unit causing it to go to the RT configuration. In RL/TP a test signal is then sent from the local DDS/MR1 and looped back through the remote unit. If the signal returns unchanged, the local DDS/MR1, DDS network, and remote unit is functional and the local unit displays "RLTP OK."

Local Line Loopback with Test Pattern LL/TP

Two TP tests are available. TP tests the local and remote units plus the DDS network (Figure 5-4). LL/TP tests the local logic circuits (Figure 5-5). TP causes the DDS/MR1 to generate and transmit a 511 bit test pattern over the DDS network to the remote unit. Errors display the appropriate message.

The remote unit must either loopback the test pattern or generate its own test pattern to the local DDS/MR1 for error checking.

In LL/TP the test pattern is looped through the local logic circuits only. The returned signal is scanned in a similar way to the previous test.
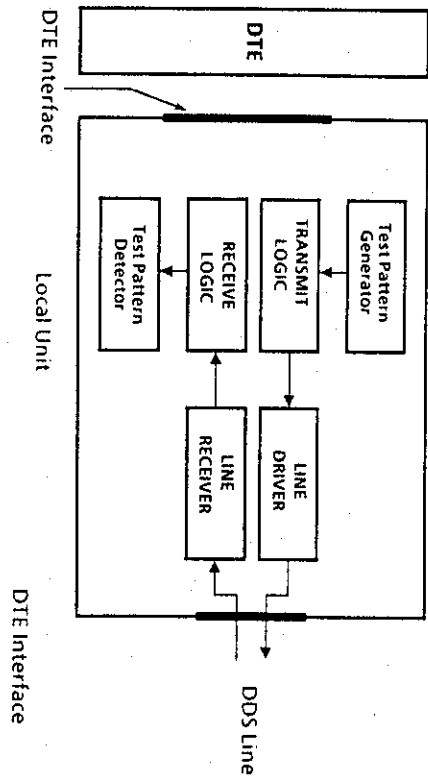
DTE

DTE Interface

Local Unit

Test Pattern Generator

TRANSMIT LOGIC

RECEIVE LOGIC

Test Pattern Detector

LINE DRIVER

LINE RECEIVER

DDS Line

Figure 5-3
Remote Loopback with Test Pattern (RL/TP)

Remote Unit

LINE RECEIVER

LINE DRIVER

RECEIVE LOGIC

TRANSMIT LOGIC

DDS Line

Bilateral Option

DTE Interface

DTE

DTE

DTE Interface
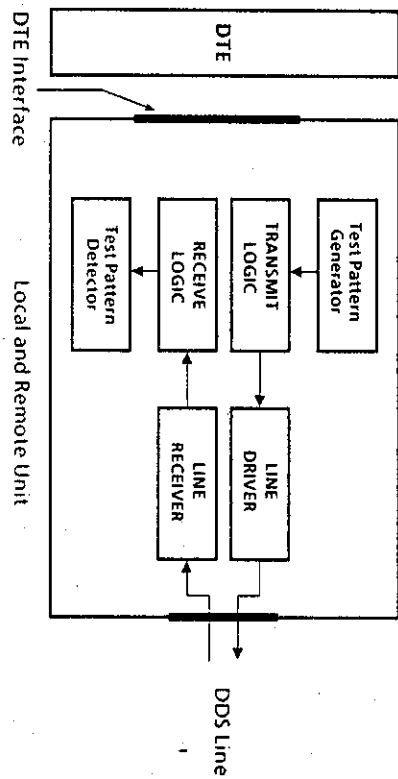
Local and Remote Unit

Test Pattern Generator

TRANSMIT LOGIC

RECEIVE LOGIC

Test Pattern Detector

LINE DRIVER

LINE RECEIVER

DDS Line

Figure 5-4
Test Pattern (TP)

DTE

DTE Interface

Local Unit

Test Pattern Generator

TRANSMIT LOGIC

RECEIVE LOGIC

Test Pattern Detector

LINE DRIVER

LINE RECEIVER

DDS Line

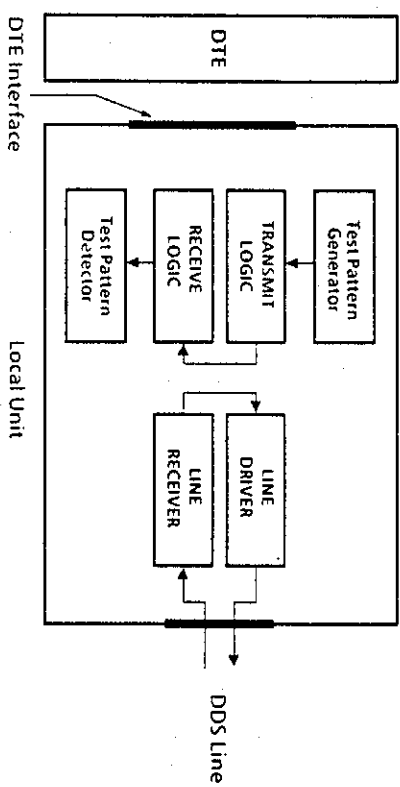**Figure 5-5**
Local Line Loopback with Test Pattern (LL/TP)

GENERAL

If the unit appears to malfunction, verify the following before further troubleshooting:

- Telco cable is connected
- DTE cable is connected
- Power is on
- Timing is selected to DDS

NS LED ON

- Recheck for proper Telco line connection.

OS LED ON

- Check remote unit power and proper Telco line connection.
- If remote unit is set up properly, report the problem of "out-of-service" code on the DDS circuit to the telephone company.

TM LED ON

- Ensure unit is in DATA mode.
- Disable all DTE test functions with the front panel.
- Disconnect the DTE from unit.
- Disconnect Telco cable.
- Toggle power on, off, on.
- If TM remains on, refer to Chapter 8 Maintenance.

TM LED FLASHING

- If Telco LL or Telco RT appears on the LCD, remove the Telco cable. If TM LED stops flashing, report to the telephone company that the DDS circuit is in a test configuration. If the TM LED continues flashing, refer to Chapter 8 Maintenance.

• If Remote RT appears on the LCD, remove the Telco cable. If TM LED stops flashing, the remote unit is in a test configuration. If the TM LED continues flashing, refer to Chapter 8 Maintenance.

If the troubleshooting procedures performed so far have not resolved the problem, continue.

> **NOTE**
>
> To use the diagnostic and test features built into the modem, the Front Panel Option must be strapped EN.

SELF TEST
LL/TP

Using the front panel pushbuttons, place the unit in LL/TP. LL/TP ERROR should flash once and LL/TP OK should be displayed. If LL/TP ERROR is continuously displayed refer to Chapter 8 Maintenance.

END-TO-END TEST
TP

Using the front panel pushbuttons, place both local and remote units into TP. NS and OS LEDs should be off. TP OK should be displayed. If TP ERROR is displayed, refer to Chapter 8 Maintenance.

LOCAL LOOPBACK
TEST
LL

Using the front panel pushbuttons, place the unit in LL. All data sent from local DTE is looped back. This will test DTE equipment, cable, interface, and local DDS/MR1. If data is not the same, refer to Chapter 8 Maintenance. This test is not applicable for DTE devices without display terminals.

REMOTE LOOPBACK
TEST
RL

Ensure - Power is on for both units
Timing option is on DDS
Remote unit in DATA mode

Using the front panel pushbuttons, place the unit in RL. RL is displayed on the local unit and REMOTE RT is displayed on the remote unit. Also the local TM LED will be on constant and blinking on the remote unit. All data sent from the local DTE is looped back through the remote unit. This tests DTE equipment, cable, interface, the local DDS/MR1, DDS circuit, and remote unit. If data is not the same refer to Chapter 8 Maintenance.

REMOTE LOOPBACK
WITH TEST PATTERN
RL/TP

Using the front panel pushbuttons, place the unit in RL/TP. SENDING RL is displayed on the local unit until the remote unit is placed into RT. If the remote unit does not respond, the local DDS/MR1 displays RLTP UNREC. Otherwise RLTP OK or RLTP ERROR is displayed on the local unit and REMOTE RT is displayed on the remote unit. This tests local DDS/MR1, DDS circuit, and the remote unit. If RLTP ERROR or RLTP UNREC is displayed, refer to Chapter 8 Maintenance.
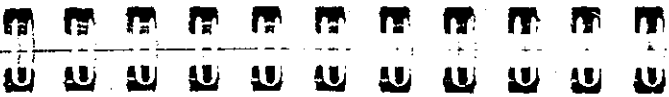
GENERAL

In addition to offering DDS operation, the DDS/MR1 can operate as a limited distance modem providing full-duplex, serial data communication at rates of 1.2 to 64 kbps over privately owned cables. The cable system must consist of an ordinary unloaded 4-wire twisted pair.

The maximum distance between units is a function of data rate and wire size (refer to Table 7-1).

Data Rate (bps)	Wire Gauge	Distance (in thousands of feet)	dB
64000	19	54	40
	26	16	40
56000	19	61	43
	26	18	43
19200	19	77	43
	26	27	43
9600	19	90	40
	26	33	40
4800	19	116	40
	26	43	40
2400	19	150	40
	26	57	40
1200	19	158	35
	26	60	35

Table 7-1
Maximum Operating Distance

INSTALLATION

To install units, connect the receive pair (T, R) of unit A to transmit pair (T1, R1) of unit B. Likewise, connect transmit pair of unit A to receive pair of unit B (Figure 7-1). Refer to Table 3-6 for pin assignments of the modular jack.
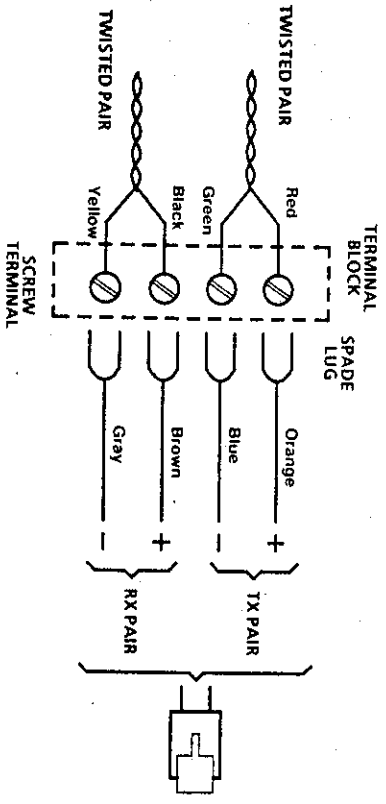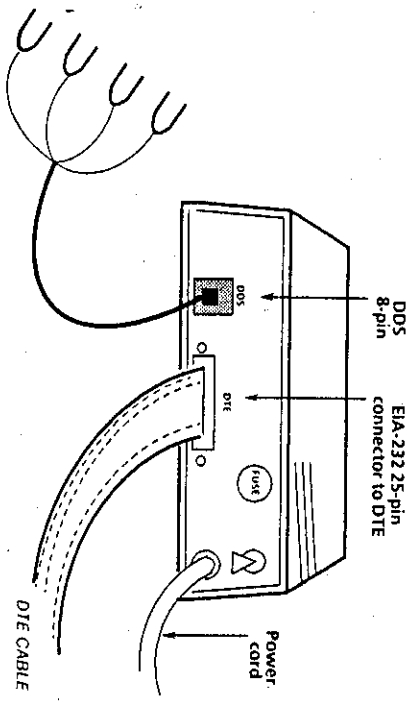

Figure 7-1
Connection as Limited Distance Modem

TIMING

Set the timing option of one unit to INTERNAL or EXTERNAL and the other unit to DDS. The unit set to INTERNAL or EXTERNAL provides the master timing for the circuit. Set to EXTERNAL only if it is desired for the DTE connected to that unit to provide timing using pin 24 of the DTE connector. If the unit selected for DDS timing has AUTBD ENabled the setting should be saved and the unit powered off and powered on after the remote unit. This allows the DDS/MR1 to correctly choose the data rate while in DDS timing.

OPTIONS

Set the remaining options as described in Chapter 4 of this manual.

TESTS

The master unit should not be put into RT, LL, or in a loopback using RL from the remote unit. To do so causes the circuit to loose its timing reference and errors to be created. To test the circuit, put unit with DDS timing in desired loopback and send test patterns from the master unit.

WARNING

Disconnect power before performing maintenance. Although dangerous voltage levels are not exposed, disconnecting power will ensure no electric shock hazard is present.

GENERAL

The unit contains no internal electronic components that can be serviced or replaced by the user. Repairs should not be attempted by the user.

FUSE

If a fuse fails, replace it with one of equal rating. Repeated failure indicates a more serious problem. If this happens, refer to the section on maintenance.

MAINTENANCE

The unit provides maintenance free service. Periodically it is necessary to remove dust that has collected on internal components. Remove dust with a soft bristle brush and low pressure air or vacuum.

Before attempting diagnostic tests, check that all connectors and plugs are firmly inserted. The test procedures will identify the faulty component in a bad communications link.

If the unit appears faulty, contact UDS for service and assistance. Do not return the unit without prior instructions.

GENERAL

With the optional rate adapter piggyback card installed, the DDS/MR1 can also be configured to transmit 19.2 kbps synchronous or asynchronous data over a 56 kbps DDS or LDM link, or 1.2 kbps synchronous or asynchronous data over a 2.4 kbps DDS or LDM link. This mode of operation is called rate adapted 19.2k or rate adapted 1.2k. The card interface conforms to EIA-232. Several operating characteristics and options are different from the standard format.

Rate adapted 19.2k can be run by the DDS/MR1 when the rate adapter is enabled by either autobauding when the receive signal from the DDS Network is 56 kbps, or by setting the DDS/MR1 to 19.2k rate when autobaud is disabled. However, rate adapted 1.2k can only be run by disabling autobaud and selecting 1.2k with the rate option.

FRONT PANEL DISPLAY

During data mode, the LCD displays the same messages as for the other piggyback interface cards with the following exceptions:

Data Rate: 1.2K BPS   DDS/MR1 is operating
                           at rate adapted 1.2
                           kbps.

             1200 BPS   DDS/MR1 is operating
                           at true 1.2 kbps rate.

             19.2K BPS   DDS/MR1 is operating
                           at rate adapted 19.2
                           kbps.

             19,200 BPS   DDS/MR1 is operating
                           at true 19.2 kbps rate.

RTS/CTS Delay

If the unit is running rate adapted 19.2 kbps, the normal RTS on to CTS on delay time is 0.4 ms (± 0.02 ms). If the unit is running rate adapted 1.2k, the normal RTS on to CTS on delay time is 8 ± 0.4ms. All other delay times are not affected.

Operating Distance

When the unit is running rate adapted 19.2k, the maximum distance between units is 18,000 feet with 26 gauge wire and 61,000 feet with 19 gauge wire. When the unit is running rate adapted 1.2k, the maximum distance between units is 57,000 feet over 26 gauge wire and 150,000 feet with 19 gauge wire. All other operating distances are not affected.
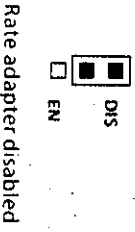
HARD OPTION SELECTION

Options are available on the rate adapter interface card through one hard strap and a dip switch located on the DTE board (Figure A-1).

Rate Adapter Option

EN allows the DDS/MR1 unit to run the rate adapted 19.2 or 1.2k. Since the 56 kbps link is used to transmit 19.2 kbps data, the unit cannot be configured to transmit data at 56 or 64 kbps. However, the subrates of 2.4, 4.8, and 9.6 kbps can be selected and in these cases the piggyback card operates as a normal EIA-232 interface card. If 1.2 kbps rate is selected, the unit will run rate adapted 1.2k.

DIS allows the user to select through the front panel (configuration options) whether the 19.2 kbps rate can be transmitted over a 56 kbps link (rate adapted) and whether the 1.2 kbps rate can be transmitted on a 2.4 kbps link. This option is discussed further in the configuration option rate adapter section.
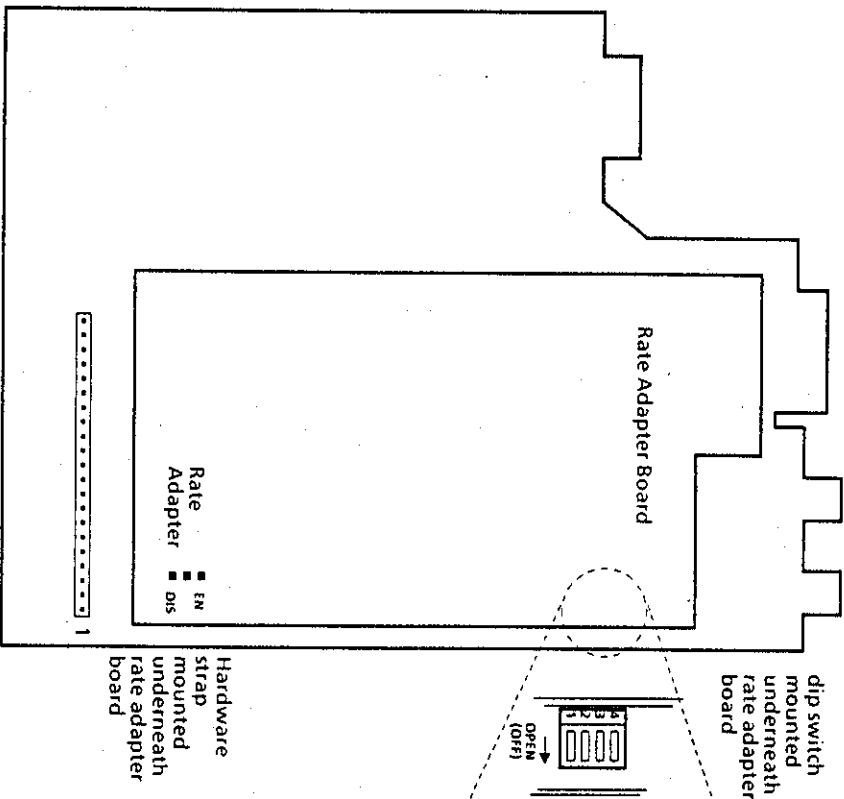
Rate adapter disabled

**Figure A-1
Rate Adapter Card Hard Option**

Rate Adapter Board

Rate
Adapter
■ EN
■ DIS

dip switch
mounted
underneath
rate adapter
board

Hardware
strap
mounted
underneath
rate adapter
board

Dip Switches

Switches 1 through 4 on the dip switch operate identically to those on the other piggyback boards. Refer to the DTE INTERFACE section in Chapter 4, Configuration.

RATE ADAPTER CARD CONFIGURATION OPTIONS

Most options available for the other three piggyback cards are available for the rate adapter card. Configuration options different on the rate adapter card include the following:

Rate Adapter

RATE ADPT - This option is available only when the rate adapter hard option strap is disabled. The RATE ADPT option determines whether the unit runs true or rate adapted 19.2k and 1.2 kbps when these rates are selected.

- RTE AD EN allows the unit to run rate adapted 19.2 or 1.2k. Since a 56 kbps link is used to transmit 19.2 kbps data, the unit cannot be configured to transmit 56 kbps or 64 kbps. However, the subrates of 2.4, 4.8, and 9.6 kbps can be selected and in these cases the piggyback card operates like a normal EIA-232 interface card. If 1.2k rate is selected, the unit will run rate adapted 1.2k.

- RTE AD DS does not allow the unit to run rate adapted 19.2 or 1.2k. When 19.2 kbps rate is selected, the unit runs data over a true 19.2 kbps data link and when 1.2 kbps is selected, the unit runs data over a true 1.2 kbps data link. In this mode, the unit operates like a normal EIA-232 interface card.

If the rate adapter option strap is enabled, the option is always enabled and is not displayed.

Timing

TIMING - If the rate adapter card is running rate adapted 19.2k, the standard timing options are not used. Alternate timing options are

NET TIME - Network transmitter timing can be slaved to

- DDS received data timing for normal operation
- INTERNAL timing for limited distance modem option.

DATA TIME - The rate adapter card circuitry can be slaved to

- INTERNAL timing for normal operation
- EXTERNAL DTE provided timing.

Autobaud

AUTBD OPT - When the rate adapter is disabled by either hard option or configuration selection, this option always operates the same as for other piggyback cards. When the rate adapter is enabled by either hard option or configuration selection, this option operates the same as for other piggyback cards with the following exceptions:

- EN - If the receive signal from the DDS Network is 56 kbps, the DDS/MR1 unit automatically sets and runs rate adapted 19.2k. If the receive signal from the DDS Network is 19.2 kbps, the DDS/MR1 sets and runs true 19.2 kbps. Rate adapted 1.2k is not available with autobaud enabled.

- DIS - True 19.2 kbps rate is not available. Rate adapted 19.2k can be selected by choosing 19.2k in the RATE option. True 1.2 kbps rate is not available. Rate adapted 1.2k can be selected by choosing 1.2k in the rate option.

A
Rate Adapter Card

Rate

RATE - This option is the same as for the other piggyback cards except that while the rate adapter is enabled (by either hard or configuration option), choosing 1.2 or 19.2k runs rate adapted 1.2 or 19.2k. True 1.2, 19.2, 56, or 64 kbps rates are not available.

Buffer

BUFF (elastic buffer) - The buffer option is not used and is not displayed when the unit is running rate adapted 19.2k.

Rate Adapter Card Configuration Menu

Table A-1 lists the options and settings used by the DDS/MR1 when the rate adapter card is installed.

Option	Option Setting	Comments
TIMING?	DDS INTERNAL EXTERNAL	
NET TIME?	DDS INTERNAL	Used only if running rate adapted 19.2k
RATE ADPT?	RTE AD EN RTE AD DS	Used only when rate adapter strap is disabled
AUTBD OPT?	AUTBD EN AUTBD DIS	Used only when timing is set for DDS
RATE?	RATE = 64k RATE = 56k RATE = 19.2k RATE = 9600 RATE = 4800 RATE = 2400 RATE = 1200	Not used when autobaud is enabled; 64 and 56 kbps are not available when rate adapter is enabled (either by hard option or RATE ADAPT configuration option).
SYN/ASYN?	SYNC ASYNC	Not available when rate is 64 or 56 kbps
BITS/WORD?	8 BTS/WD 9 BTS/WD 10 BTS/WD 11 BTS/WD	Used only when SYNC/ASYN option is ASYNC

Table A-1
Rate Adapter Card Option Menu

Option	Option Setting	Comments
RTS CONT?	NORMAL PERMANENT 35 SEC AS SIM SW CR	
BUFF OPT?	BUFF ON BUFF OFF	Not used when timing is external Not used if running rate adapted 19.2k
DATA TIME?	INTERNAL EXTERNAL	Used only when unit is running rate adapted 19.2k
LB OPTS?	BIL LB EN BIL LB DS RMT LB EN RMT LB DS	
DSR OPT?	DSR ON DSR OFF	
SS OPT?	SS ON SS OFF	
CA OPT?	CA ON CA OFF	
NET STAT	NS NS/OS	
RS-CS DLY?	24 mSEC 30 mSEC 60 mSEC NORMAL	
DTE TESTS?	DTE RL EN DTE RL DS DTE TP EN DTE TP DS DTE LL EN DTE LL DS DTE RT EN DTE RT DS	

Table A-1, continued
Rate Adapter Card Option Menu

POWER REQUIREMENTS

Typical power requirements for the DDS/MR1 are as follows:

+ 5 Vdc	165 mA
+ 12 Vdc	105 mA
–12 Vdc	105 mA

To supply this power, the DDS/MR1 contains an internal power supply with the following characteristics:

Volts (rms)	117 ± 10%
Hertz	60 ± 5%
Watts	5 maximum
Cooling	Convection

Fuse protection is provided for the ac input.

The DDS/MR1 is equipped with a 6-foot captive power cord.

INTERFACE TECHNICAL CHARACTERISTICS

Transmit Pair

Output Impedance:	135 ohm ± 10%
Output Pulse:	50 ± 5% duty cycle
Output Amplitude:	1.4 ± 0.1V across 135 ohms (.785 ± .05V at 9600 bps)
Output Power:	+ 6 dBm with 135 ohm load (0 dBm at 9600 bps)

Receive Pair

Impedance:	135 ohms ± 10%
Input Levels:	+ 6 to – 38 dBm

Appendix C
Abbreviations and Acronyms

This appendix contains terms commonly used in the data communications field.

GENERAL

A
ABT — Abort Timer OR Answer
Back Tone
ac — Alternating Current
ACK — Acknowledgment, positive
ACR — Abort Call, Retry
ACU — Automatic Call Unit
A/D — Analog-to-Digital
ADD — Address Field
ADDR — Address
AGC — Automatic Gain Control
ASCII — American Standard Code
for Information
Interchange (7 level)
AT&T — American Telephone and
Telegraph

B
BCD — Binary Coded Decimal
BER — Bit Error Rate
BERT — Bit-Error-Rate-Test (set)
Bit LB — Bilateral Loopback
Bit — Binary Digit
bps — Bits Per Second
BSC — Binary Synchronous
Communications
BUFF — Elastic Buffer

C
C — Celsius
CA — Circuit Assurance
CBX — Computerized Private
Branch Exchange
CC — Carrier Control
CCITT — International Consultative
Committee for Telegraph
and Telephone
CCU — Communications Control
Unit
CD — Carrier Detect

CFICB — Call Failure Indication -
Local DCE Busy
CFIDT — Call Failure Indication - No
Dial Tone
CFINT — Call Failure Indication - No
Answer Back Tone
CFIRT — Call Failure Indication -
Ringback Detected
Ch Gnd — Chassis Ground
CIC — Connect Incoming Call
CMOS — Complementary Metal
Oxide Semiconductor
CNX — Connect Complete
COM — Computer Output Microfilm
CO — Central Office
COS — Call Originate Status
CPE — Customer Premise
Equipment
CPH — Characters Per Hour
CPU — Central Processing Unit
CR — Carriage Return
CRC — Cyclic Redundancy Check
CRQ — Call Request
CSA — Canadian Standards
Association
CSDC — Circuit Switched Digital
Capability
CSU — Channel Service Unit
CSULL — Channel Service Unit Local
Loopback
CTRL — Control Field
CTS, CS — Clear to Send

D
DAA — Data Access Arrangement
(AT&T)
Dataset — Synonym for Modem (see
Modem)
dB, db — Decibel
dc — Direct Current OR Digital
Connection

Abbreviations and Acronyms

Abbreviation	Meaning
DCE	Data Circuit Terminating Equipment OR Data Communications Equipment
DCD	Data Carrier Detect
DCPSK	Differentially Coherent Phase-Shift Keying
DDD	Direct Distance Dialing
DDS	Digital Data Service OR Dataphone Digital Service (AT&T)
DDS/MR	Digital Data Service / Multi Rate
DIC	Disregard Incoming Call
Dip	Dual Inline Package
DIS, DS	Disable
DLE	Data Link Escape
DLO	Data Line Occupied
DMS	Digital Multiplexer System
DOC	Department of Communications (Canada)
DOS	Disk Operating System
DPR	Digit Present
DRS	Data Rate Select
DSR	Data Set Ready
DSU	Data Service Unit
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi Frequency
DTN	Dial Tone Detected
DTR	Data Terminal Ready
E	
EBCDIC	Extended Binary Coded Decimal Interchange Code (8 level)
EIA	Electronic Industries Association
EIA-232C, EIA-232D	Interface between DTE and Data Interchange Communication Equipment employing serial binary data
EN	Enabled
ENQ	Enquiry
EOA	End of Address
EOM	End of Message
EON	End of Number
EOT	End of Text OR End of Transmission
EPROM	Erasable Programmable Read Only Memory
ER	Error
ESC	Escape (key)
ETB	End of Block
ETC	External Transmit Clock
ETX	End of Text
EXT	External
F	
FA	Feature Activator
FB	Fallback
FCC	Federal Communications Commission
FDX	Full-Duplex Transmission
FF	Form Feed
FGND	Frame Ground
FL	Flag
FLL	Fixed loss loop
FM	Frequency Modulation
Fox message	Test message (The quick brown fox jumps over the lazy dog) 0123456789
FSK	Frequency-Shift Keying
FX	Foreign Exchange
H	
HDLC	High Level Data Link Control
HDX	Half-Duplex Transmission
Hz	Hertz (cycles per second)
I	
INC	Incoming Call
INV	Invalid
INVCU	Invalid Command - Command Unknown
INVMS	Invalid Command - Message Syntax Error
INVPS	Invalid Command - Parameter Syntax Error
INVPV	Invalid Command - Parameter Value Error
I/O	Input / Output
IS	International Standard
ISDN	Integrated Services Digital Network
K	
KBD	Keyboard
kbps	Kilobits Per Second
L	
LAL	Local Analog Loopback
LAPD	Link Access Procedure - D Channel
LB OPTS	Loopback Options

Abbreviations and Acronyms

Abbreviation	Meaning
LCD	Liquid Crystal Display OR Line Current Disconnect
LDL	Local Digital Loopback
LDM	Limited-Distance Modem
LED	Light Emitting Diode
LF	Line Feed
LO	Local Loopback
LL	Line Occupancy
LRC	Longitudinal Redundancy Check
LSD	Line-Sharing Device OR Line Signal Detector
LSI	Large-Scale Integrated (circuit)
LSO	List of Stored Options
LSV	List Version
LT	Loop or Link Termination
M	
mA	Milliamps
MHz	MegaHertz
Modem	Modulator / Demodulator
MR	Modem Ready
MR/RI	Modem Ready / Ring Indicate
ms	Millisecond
MUX	Multiplexer
N	
NAK	Negative Acknowledgment
NET STAT	Network Status
NRZ	Non Return to Zero
NS	No Signal
NT	Network Termination
O	
OH	Off Hook
OS	Out-of-Service
P	
PBX	Private Branch Exchange
PC	Personal Computer
pc	Printed circuit (board)
PIW	Power Indication
PN	Pseudorandom
PND	Present Next Digit
POTS	Plain Old Telephone Service
PRI	Primary
PRO	Program Option
PROG, PR	Programmable
PROM	Programmable Read Only Memory
PRP	Restored Factory Straps
PR/TM	Power / Test Mode / Error
PSK	Phase Shift Keying
PSTN	Public Service Telephone Network
PWI	Power Indication
Q	
QAM	Quadrature Amplitude Modulation
R	Reference Designator
RAD	Random Access Method
RAL	Remote Analog Loopback
RAM	Random Access Memory
RC	Receive Clock
RCD	Receiver-Carrier Detector
RCV, RCVR	Receiver
RD	Receive Data
RD/ER	Receive Data / Error
RDI	Receive Data Inhibit
RDL	Remote Digital Loopback
RI	Ring Indication
RL	Remote Loopback
RLO	Request List of Stored Options
RLSD	Received Line Signal Detector
RLV	Request List of Version
rms	Root-Mean Square
RMT LB	Remote Loopback
RNG	Ringback Detection
RO	Receive Only
ROM	Read Only Memory
RT	Remote Terminal
RTS, RS	Request to Send
RX	Receive
S	
S or S/T	Reference Designator Serial (or Satellite)
SCC	Communications Controller
SD	Send Data
SDLC	Synchronous Data Link Control (IBM)
SGND, SG	Signal Ground
SH	Switch Hook
SIM SW CR	Simulated Switched Carrier
SNR	Signal / Noise Ratio
SPID	Service Profile Identifier
SQD	Signal Quality Detector
SQM	Signal Quality Monitor
SS	Systems Status
STX	Start of Text

C
Abbreviations and Acronyms

SYN	Synchronization Character
T	Reference Designator
TA	Terminal Adapter
TC	Transmit Clock
TD	Transmit Data
TE	Terminal Equipment
TEI	Terminal Endpoint Identifier
TELCO	Telephone Company
TELSET	Telephone Set
TM	Test Mode
TP	Test Pattern
TR	Terminal Ready
TST	Test
TTD	Temporary Text Delay
TTL	Transistor-to-Transistor Logic
TX	Transmit
U	Reference Designator
UART	Universal Asynchronous Receiver / Transmitter
USOC	Universal Service Ordering Code
V.	Reference Designator
V.24	CCITT Code Designation List of definitions for interchange circuits between data terminal equipment and data circuit-terminating equipment (and provisional amendments, May 1977)
Vac	Volts Alternating Current
VAC	Value Added Carrier
VAL	Valid
Vdc	Volts Direct Current
W	
WATS	Wide Area Telecommunications Access Method (AT&T)
X	CCITT Recommendation
X.	Designation
XMIT	Transmit
XOFF	Transmitter Off
XON	Transmitter On
XTC	External Transmit Clock

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PLEASE CALL US. WE'RE HERE TO HELP YOU.