

# Link1 TADIL-B Modem

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## **1. DESCRIPTION**

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The Link1 TADIL-B modem operates at 600 and 1200 bps, synchronous or asynchronous, with V.23 modulation. The modem accepts external transmit clock on pin 24. The modem operates in DFSK mode (differential frequency shift key) at 600 and 1200 bps. Full 13.5" PC card, 7.25" half card size, and standalone configurations are available. The pc card uses the internal pc ISA bus only for power. The serial terminal interface is RS-232, DB-25. The phone line connector is an RJ-11 for 4-wire leased line operation. Transmit is on positions 2 and 3, receive 1 and 4 of the 4 position RJ-11 connector.

The modem has DIP switch controls for the TADIL-B or LINK1 mode, 1200 or 600 bps operation, 4 or 8 ms RTS/CTS delay, constant carrier (RTS forced on) or terminal controlled RTS, and transmit level settings of +3, 0, -16 and -30 dBm. The modem has a pushbutton switch for local digital loop on or off. The DIP switch is located on the PC card and is accessible behind the front panel of the standalone modem. The loopback switch is located on the rear of the unit, next to the DB-25 terminal connector.

The TADIL-B modem is available in a PC card version for an ISA bus and in a standalone version. The ISA PC card version uses only power and ground from the PC bus. The standalone unit is powered by either a 9 VDC external wall mount power supply or can be powered by 9 to 18 VDC customer supplied power source.

A 20 slot chassis is available for the PC card modem, or the modem can be placed in a standard ISA bus PC chassis. A 3 unit wide by 1U high 19" rack fixture is available for the standalone modems.

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## **2. SPECIFICATIONS**

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### **2.1 Modem**

Analog full duplex

4-wire, 600 ohm balanced

Frequency Shift Keying with the following logic:

Mark 1300 hertz at 600 and 1200 bps

Space 1700 hertz at 600 bps  
2100 hertz at 1200 bps

Differential Frequency Shift Keyed (DFSK)

600 and 1200 bps

Transmit and Receive clock supplied by modem

Modem supplies transmit clock and recovered received clock,  
allowing the modem to run sync or async without a switch.

Transmit level control from +3 dBm to -30 dBm, implement as +3, 0  
-16 and -30

The modem operates with no errors when signal interruptions occur  
at less than 1/4 of a bit length (300 microseconds) at the selected  
bit rate

The modem operates with no errors when the signal level changes up  
to 25 dBm

The modem will drive a minimum of 100 meters of 26 AWG cable,  
and typically will drive several kilometers of cable

Switched carrier or constant carrier operation (RTS forced on or  
terminal controlled)

### **2.2 Digital Interface**

RS-232, DB-25S

Signals are Tx, Rx, RTS, CTS, DSR, DCD, TxClock, RxClock, Ext  
TxClock

RTS/CTS delay is 4 or 8 ms in switched carrier mode. In constant  
carrier mode, RTS/CTS is forced on.

Rx data is clamped to mark when no receive carrier detect is present.  
Rx clock continues to run when carrier detect is off.

### **2.3 Loopback**

Digital loop via rear panel switch or DIP switch #8. Test LED lights  
during test.

## 2.4 Switches

Controlled carrier (with RTS/CTS delay) or constant carrier with  
RTS/CTS on  
RTS/CTS delay of 4 or 8 ms  
Analog Loop or normal operation  
Internal timing or external transmits timing  
Synchronous speeds of 600 or 1200 bps  
Transmit level of +3 db, 0 db, -16db or -30db  
L1 (DFSK Mode) or TADIL-B (V.23 mode)

## 2.5 Indicators

Power, Tx Data, Rx Data, RTS, CTS, DCD, Test

## 2.6 Environmental

Operation: -35 to 70° C, 0 to 95% relative humidity, non-  
condensing

## 2.7 Physical / Electrical

PC ISA bus format  
Half size pc card.  
PC bus is used for power and ground only  
20 slot rack chassis for 19" rack mounting: 16.5"W x 16"D x 7"H  
Standalone: 5.5" W x 1.5" H x 7.5" D (13.97 x .3.81 x 19.05 cm)  
A 1-U high bezel is available to accommodate up to 3 standalone  
modems  
9 to 18 volt DC power supply for standalone modem. Standalone is  
shipped with 9 VDC power supply or power cord with 5.5 x 2.5  
mm connector

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### **3. INSTALLATION**

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#### **3.1 Unpacking**

The following is included with each Link 1 Modem:

- Modem – Standalone is shipped with 9 VDC external power supply or power cord with 2.5 x 5.5 mm connector
- Cable for connection to phone line, RJ11 to RJ11 4 wire
- Manual

#### **3.2 Location**

Place the standalone modem in a clear area where you can see the front panel indicators and reach the rear panel to connect the cables.

When installing in the rack, clearance should be allowed in the rear for the phone line and RS-232 cables. Clearance should be allowed in the front to pull the rack forward, as the rack has slides on the side to allow it to be pulled forward while attached to the rack rails. Because the rack can be pulled forward (to insert and remove modem cards), it is advisable to harness the phone line and power cables with sufficient slack to accommodate sliding the rack forward.

## 4. CONTROLS AND INDICATORS

### 4.1 Controls

#### 4.1.1 DIP Switches

The options for the DIP switch functions are as follows:

Switch	DOWN	UP
1 Mode	TADIL-B mode	LINK1 mode
2 Speed	1200 bps	600 bps
3 RTS/CTS delay	4 ms	8 ms
4 Carrier	Constant	RTS controlled
5 Clocking	Internal TxClock	External (pin 24)
6 Tx Level	see table below	
7 Tx Level	see table below	
8 Digital Loop	Loop ON	Loop OFF

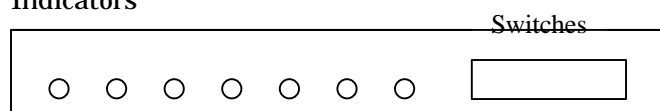
#### Transmit Audio Level Settings

Level (dBm)	Switch 6	Switch 7
+3	UP	UP
0	UP	DOWN
-16	DOWN	UP
-30	DOWN	DOWN

#### 4.1.2 Local Digital Loopback Switch

Activate by either the loopback switch on the rear of the modem or DIP switch position 8. The Test LED is on when in loopback.

### 4.2 Indicators



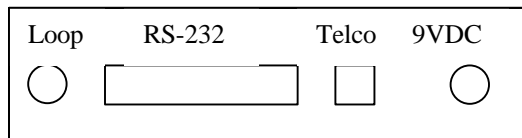
Indicator	Condition	DS # on Ckt board	Meaning
POWER	ON	DS 1	Unit has power
TXD	ON	DS 2	Transmitting data
RXD	ON	DS 3	Receiving data
RTS	ON	DS 4	Terminal RTS
CTS	ON	DS 5	Modem response
DCD	ON	DS 6	Signal from remote
TEST	ON	DS 7	Unit is in loopback

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## 5. INTERFACE SIGNALS

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### 5.1 Connector Location and Pin Reference



### 5.2 Port Interface

#### 5.2.1 RS-232 Port

<u>Pin</u>	<u>Signal</u>	<u>In/Out</u>
2	Transmit Data	IN
3	Receive Data	OUT
4	Request to Send	IN
5	Clear to Send	OUT
6	Data Set Ready	OUT
7	Signal Ground	-----
8	Data Carrier Detect	OUT
15	Transmit Clock	OUT
17	Receive Clock	OUT
20	Data Terminal Ready	IN
24	External Transmit Clock	IN

#### 5.2.2 TELCO, RJ-11

<u>Pin</u>	<u>Signal</u>	<u>In/Out</u>
1	Receive Tip	IN
2	Transmit Ring	OUT
3	Transmit Tip	OUT
4	Receive Ring	IN

### 5.3 POWER

Rack-Mount ISA card: Power is supplied by the ISA BUS.

Stand-alone unit: Operates on 9 to 18 volts DC. DC external power unit is supplied via a 2.5 X 5.5 mm. coaxial connector mounted on the rear panel. The center pin is positive. US units are normally provided with a 9 VDC wall-mount power supply rated at 120VAC @500ma.

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## 6. TROUBLESHOOTING

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### 6.1 General Approach

When troubleshooting problems, a rational plan can save you many hours of frustration. The following is a brief outline of standard troubleshooting procedures.

1. Gather the facts to determine the exact nature of the problem.
2. Draw a picture of the system showing the equipment at both the host and remote ends and the phone lines or in-house wiring. Use this as a reference to note your observations, test steps and test results. A picture keeps you focused and often saves duplicate effort.
3. Record the front panel indications before changing anything. This is an important part of fact gathering
4. If you change anything, change only one thing at a time.
5. Use the built-in test functions, especially the loopback tests. Record your results.
6. Typical troubleshooting includes taking the following steps:
  - Make certain the power LED is on
  - When 2 modems are on line to each other, both should have the Carrier Detect LED on.
  - The transmit and receive data LED's should flash when data is being sent and received.
  - Use the loopback switch to loop data from the terminal device to the modem and back. The loopback is local only.
  - The phone line can be looped by connecting the transmit pair to the receive pair. If data can be sent from the modem and back to itself error free with the line looped, it usually indicates a good modem.
  - Make sure that the transmit phone line pair at one end is connected to the receive phone line pair at the other end, and the receive pair to the transmit pair. The pairs are not polarity sensitive, i.e. you can connect transmit tip to receive tip or receive ring.



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**7. WARRANTY**

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All HDT products are warranted to be free of defects in materials and workmanship for one year. HDT Communications will repair or replace any equipment proven to be defective within the warranty period. All warranty work is F.O.B. destination. This warranty is exclusive of abuse, misuse, accidental damage, acts of God or consequential damages, etc. HDT liability shall not exceed the original purchase price.

All equipment returned for warranty repair must be accompanied by a Returned Material Authorization (RMA) number. To receive an RMA number, call (909)371-1390 between 8 AM and 5 PM Pacific time. Equipment must be shipped prepaid to HDT and will be returned at HDT's expense.

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