

Modem I

Catalog Number 26-1172

Radio Shack

TRS-80

**MICRO
COMPUTER
SYSTEM**

HARDWARE



CUSTOM MANUFACTURED IN U.S.A. BY RADIO SHACK, A DIVISION OF TANDY CORPORATION

TERMS AND CONDITIONS OF SALE AND LICENSE OF RADIO SHACK COMPUTER EQUIPMENT AND SOFTWARE
PURCHASED FROM A RADIO SHACK COMPANY-OWNED COMPUTER CENTER, RETAIL STORE OR FROM A
RADIO SHACK FRANCHISEE OR DEALER AT ITS AUTHORIZED LOCATION

LIMITED WARRANTY

I. CUSTOMER OBLIGATIONS

- A. CUSTOMER assumes full responsibility that this Radio Shack computer hardware purchased (the "Equipment"), and any copies of Radio Shack software included with the Equipment or licensed separately (the "Software") meets the specifications, capacity, capabilities, versatility, and other requirements of CUSTOMER.
- B. CUSTOMER assumes full responsibility for the condition and effectiveness of the operating environment in which the Equipment and Software are to function, and for its installation.

II. RADIO SHACK LIMITED WARRANTIES AND CONDITIONS OF SALE

- A. For a period of ninety (90) calendar days from the date of the Radio Shack sales document received upon purchase of the Equipment, RADIO SHACK warrants to the original CUSTOMER that the Equipment and the medium upon which the Software is stored is free from manufacturing defects. THIS WARRANTY IS ONLY APPLICABLE TO PURCHASES OF RADIO SHACK EQUIPMENT BY THE ORIGINAL CUSTOMER FROM RADIO SHACK COMPANY-OWNED COMPUTER CENTERS, RETAIL STORES AND FROM RADIO SHACK FRANCHISEES AND DEALERS AT ITS AUTHORIZED LOCATION. The warranty is void if the Equipment's case or cabinet has been opened, or if the Equipment or Software has been subjected to improper or abnormal use. If a manufacturing defect is discovered during the stated warranty period, the defective Equipment must be returned to a Radio Shack Computer Center, a Radio Shack retail store, participating Radio Shack franchisee or Radio Shack dealer for repair, along with a copy of the sales document or lease agreement. The original CUSTOMER'S sole and exclusive remedy in the event of a defect is limited to the correction of the defect by repair, replacement, or refund of the purchase price, at RADIO SHACK'S election and sole expense. RADIO SHACK has no obligation to replace or repair expendable items.
- B. RADIO SHACK makes no warranty as to the design, capability, capacity, or suitability for use of the Software, except as provided in this paragraph. Software is licensed on an "AS IS" basis, without warranty. The original CUSTOMER'S exclusive remedy, in the event of a Software manufacturing defect, is its repair or replacement within thirty (30) calendar days of the date of the Radio Shack sales document received upon license of the Software. The defective Software shall be returned to a Radio Shack Computer Center, a Radio Shack retail store, participating Radio Shack franchisee or Radio Shack dealer along with the sales document.
- C. Except as provided herein no employee, agent, franchisee, dealer or other person is authorized to give any warranties of any nature on behalf of RADIO SHACK.
- D. Except as provided herein, **RADIO SHACK MAKES NO WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**
- E. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation(s) may not apply to CUSTOMER.

III. LIMITATION OF LIABILITY

- A. EXCEPT AS PROVIDED HEREIN, RADIO SHACK SHALL HAVE NO LIABILITY OR RESPONSIBILITY TO CUSTOMER OR ANY OTHER PERSON OR ENTITY WITH RESPECT TO ANY LIABILITY, LOSS OR DAMAGE CAUSED OR ALLEGED TO BE CAUSED DIRECTLY OR INDIRECTLY BY "EQUIPMENT" OR "SOFTWARE" SOLD, LEASED, LICENSED OR FURNISHED BY RADIO SHACK, INCLUDING, BUT NOT LIMITED TO, ANY INTERRUPTION OF SERVICE, LOSS OF BUSINESS OR ANTICIPATORY PROFITS OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OR OPERATION OF THE "EQUIPMENT" OR "SOFTWARE". IN NO EVENT SHALL RADIO SHACK BE LIABLE FOR LOSS OF PROFITS, OR ANY INDIRECT, SPECIAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF ANY BREACH OF THIS WARRANTY OR IN ANY MANNER ARISING OUT OF OR CONNECTED WITH THE SALE, LEASE, LICENSE, USE OR ANTICIPATED USE OF THE "EQUIPMENT" OR "SOFTWARE".
NOTWITHSTANDING THE ABOVE LIMITATIONS AND WARRANTIES, RADIO SHACK'S LIABILITY HEREUNDER FOR DAMAGES INCURRED BY CUSTOMER OR OTHERS SHALL NOT EXCEED THE AMOUNT PAID BY CUSTOMER FOR THE PARTICULAR "EQUIPMENT" OR "SOFTWARE" INVOLVED.
- B. RADIO SHACK shall not be liable for any damages caused by delay in delivering or furnishing Equipment and/or Software.
- C. No action arising out of any claimed breach of this Warranty or transactions under this Warranty may be brought more than two (2) years after the cause of action has accrued or more than four (4) years after the date of the Radio Shack sales document for the Equipment or Software, whichever first occurs.
- D. Some states do not allow the limitation or exclusion of incidental or consequential damages, so the above limitation(s) or exclusion(s) may not apply to CUSTOMER.

IV. RADIO SHACK SOFTWARE LICENSE

RADIO SHACK grants to CUSTOMER a non-exclusive, paid-up license to use the RADIO SHACK Software on **one** computer, subject to the following provisions:

- A. Except as otherwise provided in this Software License, applicable copyright laws shall apply to the Software.
- B. Title to the medium on which the Software is recorded (cassette and/or diskette) or stored (ROM) is transferred to CUSTOMER, but not title to the Software.
- C. CUSTOMER may use Software on one host computer and access that Software through one or more terminals if the Software permits this function.
- D. CUSTOMER shall not use, make, manufacture, or reproduce copies of Software except for use on **one** computer and as is specifically provided in this Software License. Customer is expressly prohibited from disassembling the Software.
- E. CUSTOMER is permitted to make additional copies of the Software **only** for backup or archival purposes or if additional copies are required in the operation of **one** computer with the Software, but only to the extent the Software allows a backup copy to be made. However, for TRSDOS Software, CUSTOMER is permitted to make a limited number of additional copies for CUSTOMER'S own use.
- F. CUSTOMER may resell or distribute unmodified copies of the Software provided CUSTOMER has purchased one copy of the Software for each one sold or distributed. The provisions of this Software License shall also be applicable to third parties receiving copies of the Software from CUSTOMER.
- G. All copyright notices shall be retained on all copies of the Software.

V. APPLICABILITY OF WARRANTY

- A. The terms and conditions of this Warranty are applicable as between RADIO SHACK and CUSTOMER to either a sale of the Equipment and/or Software License to CUSTOMER or to a transaction whereby RADIO SHACK sells or conveys such Equipment to a third party for lease to CUSTOMER.
- B. The limitations of liability and Warranty provisions herein shall inure to the benefit of RADIO SHACK, the author, owner and/or licensor of the Software and any manufacturer of the Equipment sold by RADIO SHACK.

VI. STATE LAW RIGHTS

The warranties granted herein give the **original** CUSTOMER specific legal rights, and the **original** CUSTOMER may have other rights which vary from state to state.

Introduction

The Modem I is a self-contained, FSK (Frequency Shift Keying) telephone interface. It enables your computer to communicate with other computers via ordinary telephone lines. The Modem I is compatible with all TRS-80 models (except Level I versions of the Model I and Model III) and with other RS-232-C standard devices.

Its special features include:

- Sends/receives at 0-300 baud for compatibility with most time-shared computer systems.
- Selectable originate/answer mode for operation in "remote" or "host" terminal applications.
- Full duplex operation allows simultaneous communication between modems.
- Direct (non-acoustic) connection to phone lines helps ensure a low error rate.
- NORMAL/CASSETTE switch lets you use RS-232-C equipped computers and TRS-80 Model I Level II computers which do *not* have an RS-232-C interface. Select NORM for RS-232-C use; CASS for use with the cassette interface of Model I Level II Computers. Cassette use requires optional/extra "Cassette-Comm" software (Radio Shack Cat. No. 26-1139) and a cassette cable (26-3009).
- Bell 103 compatible.

Note: When using the Cassette Comm software, communications will not be in a true full duplex mode. For further details, see the Cassette Comm instruction manual.

Important Note

Before connecting your Modem I to the phone lines, you must notify your local telephone company of the:

Manufacturer: Radio Shack

Model: Modem I, #26-1172

USOC Number: RJ11C

FCC Number: AAO99R-69525-DM-N

Ringer Equivalence Number (REN): 0.0B

This information also appears on the bottom of the Modem.

The Modem I must not be connected to:

- ☒ Coin-operated phones
- ☒ Party-line phones
- ☒ Multiple-line phones

Installation

Modem/Telephone Connection

Figure 1 shows the connection of a Modem I to telephone lines using the new modular connectors. If your telephone has this type of connection, attach your Modem I as shown.

If your telephone has the older style four-prong connection (see **Figure 2**), you will need an adapter which allows the Modem I to be used in parallel with your telephone. Radio Shack sells this type of adapter, Cat. No. 279-360.

If your telephone is wired directly to the wall as in **Figure 3**, you must contact the telephone company and have them install modular connections. Be aware however, that you will be charged for this service.

After connecting the telephone, make sure that the MODE switch on the Modem is OFF. Your telephone should be operating normally now.

AC Connection

Connect the AC adapter to the AC jack on the Modem's rear panel and to an electrical wall outlet.

Note: Use only the supplied, UL-listed adapter. The use of any other adapter could damage the Modem.

Modem/Computer Connection via RS-232-C Interface

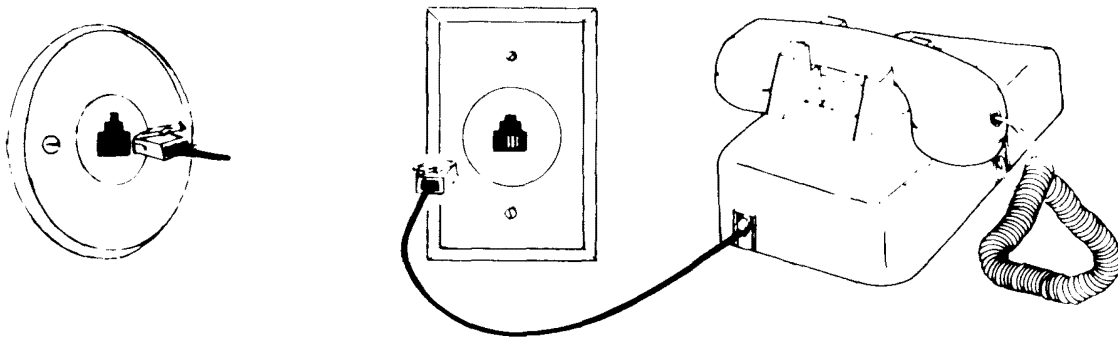
For most applications, you will use an RS-232-C equipped computer. **Table 1** summarizes the cable and connection requirements for RS-232-C equipped TRS-80's. Using the table, select the appropriate connector for your computer. Connect the computer's RS-232-C interface to the specified connection point on the Modem.

TRS-80 Model	Cable	Connection Point	
		TRS-80	Modem I
Model I, Level II	26-1145 *	Card-Edge on Exp/Int	DB-25 "RS232C"
Model II	26-4403	DB-25 "CHANNEL A/B"	DB-25 "RS232C"
Model III	26-1408	DB-25 Serial I/O	DB-25 "RS232C"
Color Computer	26-3020	DIN Serial I/O	DIN "RS232/CASS"

*This is the RS-232-C interface board. The cable is included.

Table 1. RS-232-C Cable Identification and Connection

If your telephone hook-up looks like this:



Connect like this:

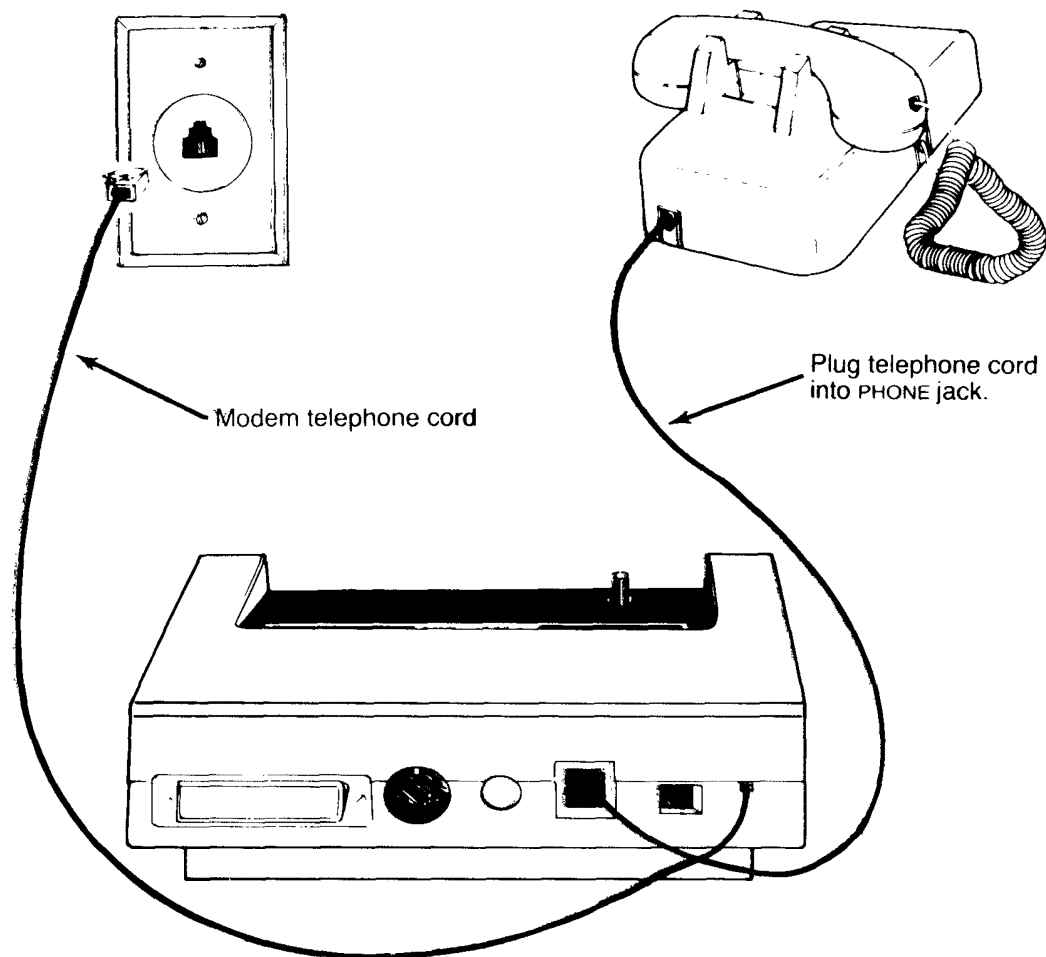


Figure 1. Connection to Modular Phone Jacks.

Modem/Computer Connection via Cassette Interface

Note: When using the Cassette Comm software, communications will not be in a true full duplex mode. For further details, see the Cassette Comm instruction manual.

If you have a Model I Level II computer which is *not* equipped with an RS-232-C interface board, you may use the cassette interface of your computer for serial communications with the Modem. To do this, you will need to buy the "Cassette-Comm" software and the appropriate cable (Cat. Nos. 26-1139 and 26-3009, respectively).

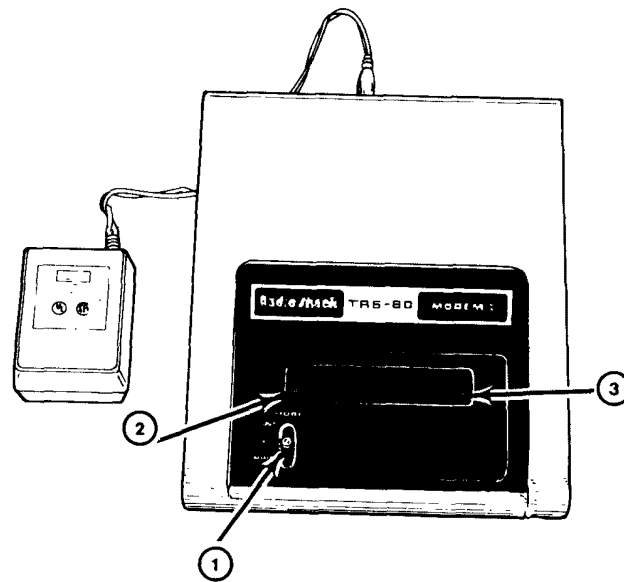
Connect the cable to the TAPE connector on your computer and to the RS-232/CASS connector on the Modem.

Note: The Model III cassette circuitry cannot be used for serial communications with the Modem.

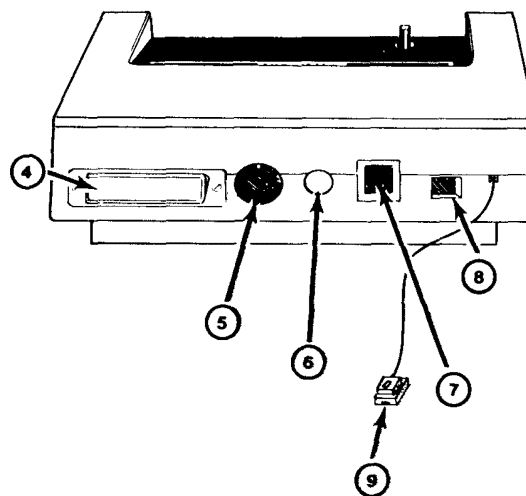
Controls and Connectors

Refer to **Figure 4**.

- ① **MODE Switch** Selects either ORIGINATE or ANSWER mode. **Note:** With the Modem connected, your phones are available for conversational use only when the MODE switch is OFF. So be sure to select MODE OFF when you are not using the Modem.
- ② **On Power Light** Remains lit while the Modem is "on."
- ③ **CD.(Carrier Detect) Light** Lights and remains lit while a "carrier tone" is being received via phone lines from another modem.
- ④ **RS-232C** Standard DB-25 jack for connection to RS-232-C interface of Models I, II and III.
- ⑤ **RS-232/CASS** This four-pin DIN jack allows connection to the RS-232-C interface of the TRS-80 Color Computer, or to the Model I Level II cassette interface.
- ⑥ **POWER** AC adapter plug goes here.
- ⑦ **PHONE** Modular-type jack for telephone line cord.
- ⑧ **NORMAL/CASSETTE Switch** For use with RS-232-C equipped computers, use NORM position. For use with cassette interface of Model I Level II computer, use CASS position.
- ⑨ **TO WALL** This modular-type plug connects to the telephone wall jack in place of the telephone cord.



Top View



Rear View

Figure 4. Identification of Controls and Connectors.

General Operation

The Modem I accepts digital data from your computer and generates tones which can be sent over the telephone lines to another Modem. The Modem I can also receive tones from the telephone line and change them back to digital data. (The Frequency Shift Keying method is used. For details, see Specifications.)

Baud Rate

The speed at which the Modem receives and transmits these tones is called the baud rate. The Modem I can send and receive at baud rates from 0-300. 300 baud is standard for most time-shared systems, but some may use 110, 150, or other rates. Before using the Modem, be sure your computer and the host computer are set to the same baud rate (0-300).

Originate vs. Answer

The Modem I can operate in either originate or answer mode. Electrically, the MODE switch determines which set of receive and transmit tones the Modem will respond to. For communications to take place, one modem must be in the originate mode and the other in the answer mode.

Normally, when you dial a "host" computer, your Modem should be in the originate mode. When you receive a call from a "remote" computer, your Modem should be in the answer mode. See **Figure 5**.

RS-232 Communications

For communication between computers and computer-related equipment, the most widely used standard is the RS-232-C. This allows use of cables of up to 50 feet in length between the Modem and the computer. The Modem has two RS-232-C connectors: a standard DB-25 connector (labeled RS-232C) which is used with the majority of computers, and the four-pin DIN connector (labeled RS-232), for use with the TRS-80 Color Computer.

Cassette Communications

The Modem I contains special circuitry for communications with the cassette interface of Model I Level II computers. To use this method, you'll need the "Cassette-Comm" software and a special cable (see Installation).

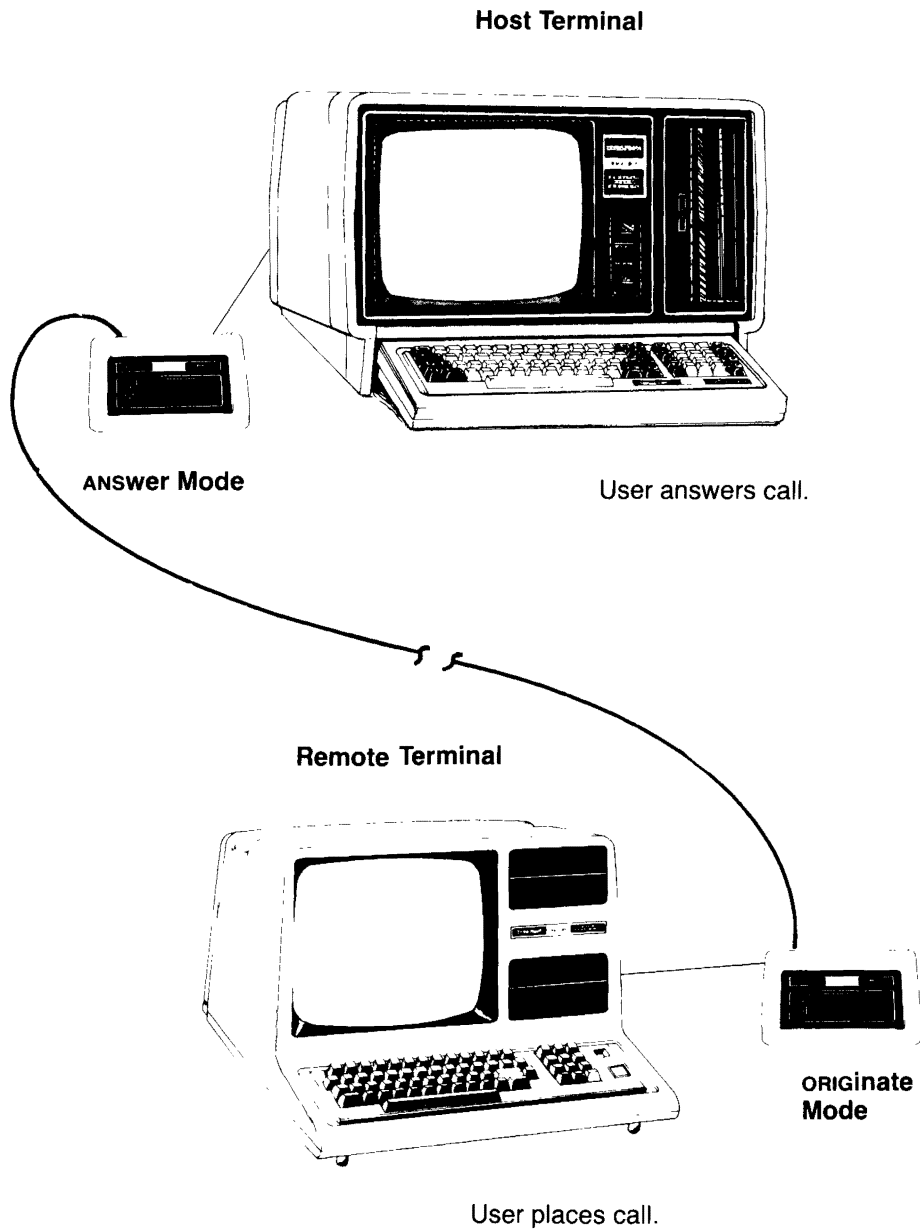


Figure 5. Originate/Answer Mode Difference.

Operating Procedures

First find out the communications conventions of the computer or other device with which you are going to communicate. In particular, find out the:

- ☐ Baud Rate
- ☐ Word Length
- ☐ Parity
- ☐ Number of Stop Bits
- ☐ Who will use originate mode, who will use answer mode

Set up your computer accordingly, and set the Modem's MODE switch accordingly.

A. Originate Mode

1. With the **MODE** switch **OFF**, dial the number of the "host" computer.
2. When you **hear** the carrier tone, flip the **MODE** switch to **ORIGINATE** and hang up the phone.
3. When the Carrier Detect (CD) light comes on, you may start communicating. When communications are finished, be sure to sign off. (The sign-off will depend on the "host" computer, however, **BYE** or **GOODBYE** is commonly used.)
4. After signing off, wait until the Carrier Detect light (CD) goes off, then flip the **MODE** switch to **OFF**.

B. Answer Mode

1. Wait for the "remote" computer operator to call you.
2. Upon receiving the call, flip the **MODE** switch to **ANSWER** and hang up the phone.
3. When the Carrier Detect (CD) light comes on, begin data communications.
4. When finished with the data transfer, set the **MODE** switch to **OFF**.

When Something Goes Wrong

If you have trouble (garbled data, intermittent errors, etc.), check for the following:

1. The phone connection should be clean and noise-free.
2. There should be no one talking on the telephone line.
3. The phone and all extension phones should be on-the-hook.
4. The baud rate of the terminal should be less than or equal to 300.

Troubleshooting Chart

Symptom	Problem/Solution
Carrier Detect light off	AC Adapter is not plugged in; plug in.
	Telephone connections; check connections and refer to the Installation section.
	MODE switch is not in proper position; refer to the General Operation section.
	Modem at other end is not compatible; modem should be a Bell 103 or equivalent.
Garbled Display	Phone not hung up; hang up phone.
	Communications protocol may be set incorrectly (baud rate, word length, parity, stop bits); check and change if necessary.

Specifications

Receive Frequencies	A. Answer Mark 1270 Hz; Space 1070 Hz B. Originate Mark 2225 Hz; Space 2025 Hz
Transmit Frequencies	A. Answer Mark 2225 Hz; Space 2025 Hz B. Originate Mark 1270 Hz; Space 1070 Hz
Transmit Power	- 10 dBm, \pm 1 dB

Receive Sensitivity	- 45 dBm
Baud Rate	300
Operating Temperature	55°F-85°F (12.8°C-29.4°C)
Electrical Requirements	15 VAC at 300ma supplied by UL listed AC adapter
Size	6.5" x 7.5" x 2" (16.5 x 19.1 x 5.1 cm)

RADIO SHACK, A DIVISION OF TANDY CORPORATION

U.S.A.: FORT WORTH, TEXAS 76102
CANADA: BARRIE, ONTARIO L4M 4W5

TANDY CORPORATION

AUSTRALIA	BELGIUM	U. K.
91 KURRAJONG ROAD MOUNT DRUITT, N.S.W. 2770	PARC INDUSTRIEL DE NANINNE 5140 NANINNE	BILSTON ROAD WEDNESBURY WEST MIDLANDS WS10 7JN