silent 700
electronic data terminals

Model 707 Data Terminal

User's Manual

TEXAS INSTRUMENTS

Changes may be made periodically to the information in this publication. Such changes will be incorporated in new editions of this manual.

Your suggestions and comments on this product and the publications are welcomed. Please use the Product Comment Sheets provided in the back of this manual to send us your comments.

Record the serial number and purchase date in the spaces provided below. The serial number is on the label mounted on the bottom of the terminal. All correspondence concerning your terminal should include both the serial number and the date you purchased it.

Model 707 Data Terminal _____ _____
Serial Number Purchase Date

Model 707 Data Terminal User's Manual
TI Part No. 2310452-0001
Original Issue: 15 June 1983
Revision A: 30 November 1983

WARNING

This data terminal generates and uses radio frequency energy. If not installed and used properly, that is in accordance with this user's manual, it may cause interference to radio or television reception. It has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential environment. However, there is no guarantee that interference will not occur in a particular installation. If this data terminal does cause interference to radio or television reception, which can be determined by turning it off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- **Reorient the receiving antenna with respect to the data terminal.**

- **Relocate the data terminal with respect to the receiver.**

- **Plug the data terminal into a different outlet so that the receiver and the data terminal are on different branch circuits.**

If necessary the user should also consult the data terminal supplier or an experienced radio/television technician for additional suggestions. The user may find the following booklet, prepared by the Federal Communications Commission, helpful: *How to Identify and Resolve Radio-TV Interference Problems.* **This booklet is available from the U.S. Government Printing Office, Washington, DC 20402. Stock No. 004-000-00345-4.**

Preface

This manual will help you learn to set up, operate, and provide routine care for your Texas Instruments Silent 700* Model 707 Data Terminal. Even if you have no experience operating a data terminal, you will find that your Model 707 is easy to operate and understand.

We realize that much of the information in this manual is old news to the experienced data terminal user. For that reason we've put a table of contents at the beginning of each chapter. If you use these contents pages to move selectively through the manual, you'll get your terminal into use as rapidly as possible.

Chapter 1 — Getting Started. This chapter describes how to prepare your terminal for operation. The options that are available on the Model 707 are also described here.

Chapter 2 — Using Your Terminal. This chapter shows you how to set up and use your terminal to communicate with another data terminal, a computer, or some other computer-based device. The chapter also discusses the operation of the terminal when it is not communicating with another device.

Chapter 3 — Learning More About Your Terminal. This chapter reviews the keyboard and terminal controls, explains the status lights and audible status indications, and shows you how to set the operating variables.

Chapter 4 — Care and Cleaning. This chapter provides adjustment and cleaning procedures for your terminal.

Chapter 5 — Before Calling for Service. A Problem-Solving Guide is provided in this chapter to help you decide what to do when the terminal is not performing as expected.

*Silent 700 is a registered trademark of Texas Instruments Incorporated.

Appendix A — ASCII Code. This appendix shows the USASCII code for each printable character and each control character.

Appendix B — Specifications. This appendix presents mechanical, electrical, and environmental specifications for the Model 707 Data Terminal.

Appendix C — International Keyboards. This appendix presents keyboard layouts for international versions of the Model 707 Data Terminal.

Glossary — The glossary defines many of the technical words and phrases in this manual.

At certain times in the text we will use the following symbol in the margins:

Pay particular attention to the information next to these keys. They're used to denote "key" information.

The following additional publications are available for the Model 707 Data Terminal.

Model 703/707 Maintenance Manual (TI Part No. 2310453-0001) provides installation and basic operating instructions, theory of operation, communication interface and problem solving information, parts lists, assembly drawings, and schematics required to maintain the Model 707 Data Terminal and the Model 703 Data Terminal.

Model 703/707 Quick Reference Card (TI Part No. 2310461-0001) provides handy reference data for the operator.

Contents

1

Getting Started

INTRODUCTION

This chapter shows you how to prepare your new Texas Instruments Model 707 Data Terminal for operation, and introduces five available options.

2310451-1

UNPACKING

The shipping carton contains this manual, the terminal, a 30 m (100 ft) roll of thermal printing paper, and a power cord with a calculator-type transformer for connection to an ac power outlet. A second cable that you'll find packed with the terminal is the direct-connect cable (TI Part No. 2211801-0002). This cable allows you to connect the terminal directly to a standard telephone wall jack. An unpacking procedure is printed on the shipping carton.

We recommend that you save the shipping carton and packing material for return shipment, in case repair becomes necessary.

Options (battery pack, acoustic coupler, Auto-Access Cartridge, and carrying case) are packed separately.

FINDING A PLACE FOR YOUR TERMINAL

Here are some things to consider when you're deciding where you want to locate your terminal.

- Generally speaking, your terminal can be operated in any room where the temperature and humidity are comfortable enough for you to work.

- Locate your terminal (and your supply of thermal paper) away from direct sunlight. In extreme cases, the heat generated by long periods of direct sunlight can damage thermal paper.

- The terminal should sit on a flat surface (a desk or table).

- Locate the terminal near an appropriate ac power outlet, unless you are planning to power the terminal with the optional battery pack.

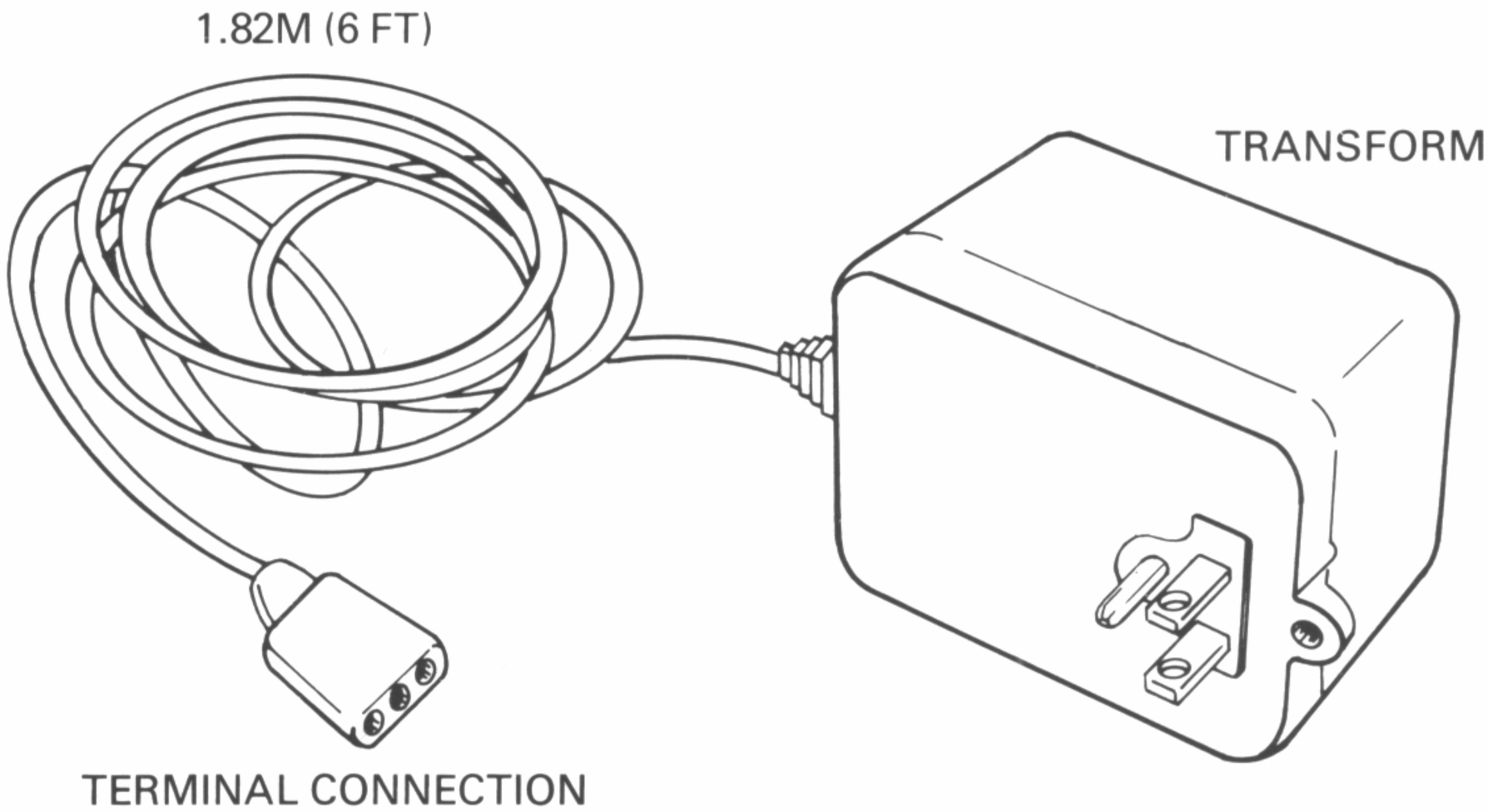
- Locate the terminal close enough to the telephone wall jack to allow the direct-connect cable to reach.

- If you plan to use the optional acoustic coupler, locate your terminal near the telephone that you'll be using.

PROVIDING POWER TO THE TERMINAL

The Model 707 that is marketed in the US uses a power cord wall transformer to plug into a 120-Vac (90 to 134 Vac) power outlet. The international version of the terminal (Model 709) uses either of two power cord wall transformers. One allows it to plug into a 220-Vac (187-230 Vac) power outlet. The other allows it to plug into a 230/240-Vac (196-264 Vac) power outlet. An optional, rechargeable, battery pack (TI Part No. 2310446-0001) is available as an alternate source of power for the terminal. The battery pack is automatically recharged while the terminal is plugged into an ac power source. Refer to the "Options" section of this chapter for battery pack installation and removal procedures.

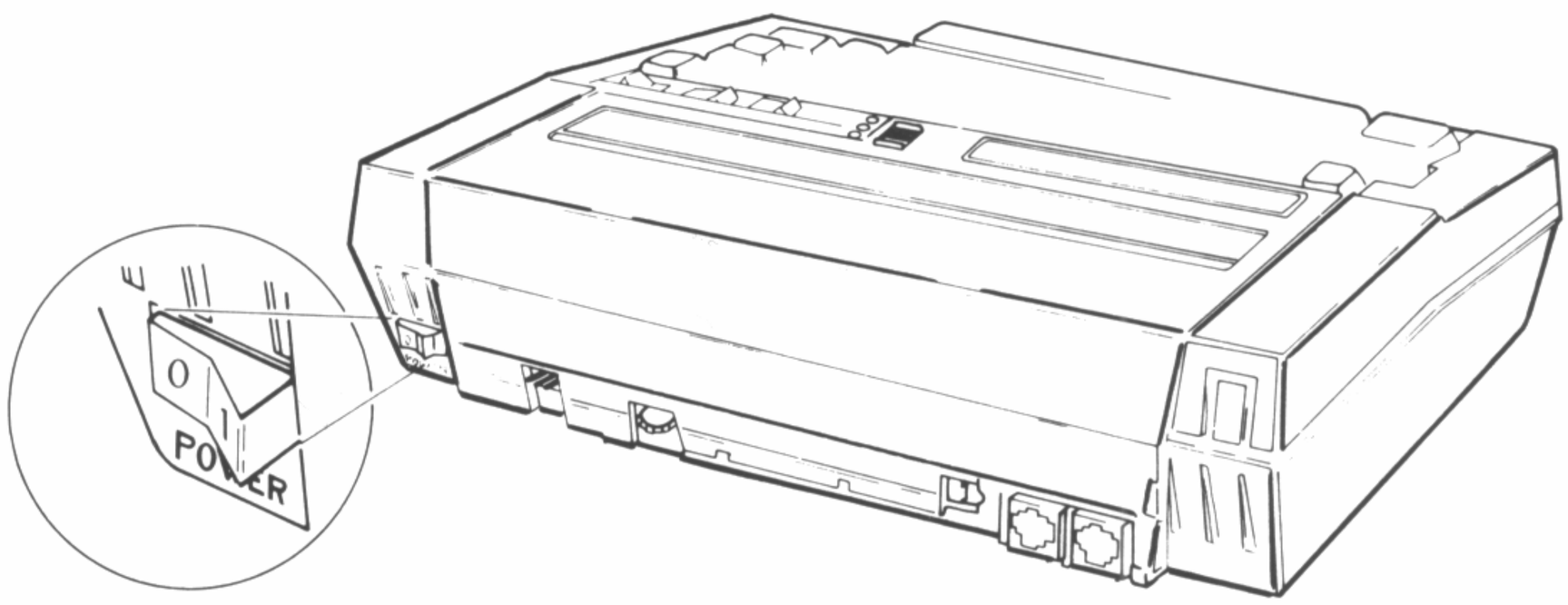
Check the power cord wall transformer. Ensure that the ac input voltage specified on the transformer matches the voltage available at the power outlet.



2310451-2

To install the power cord, use the following procedure.

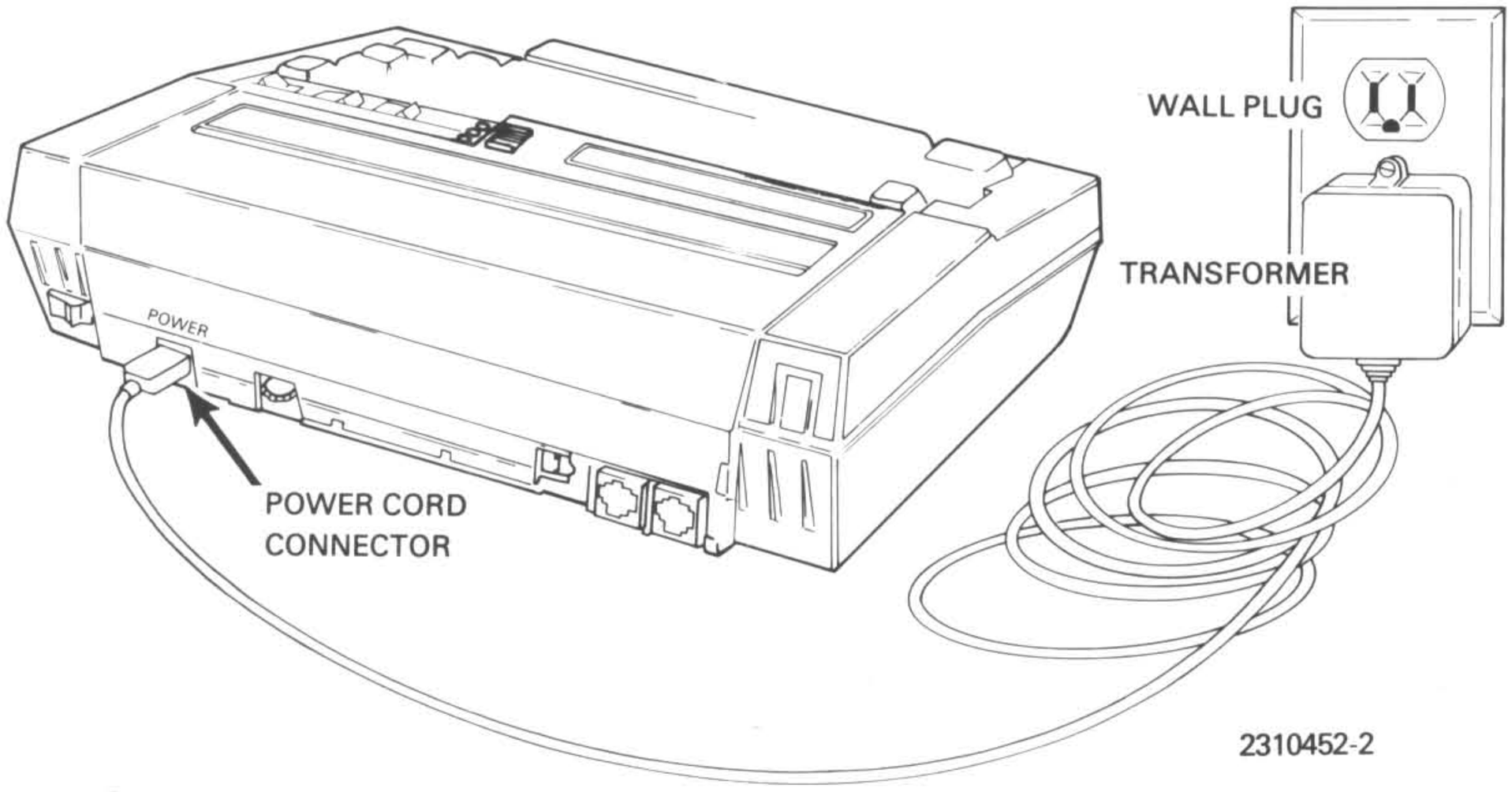
1. Place the **POWER** switch in the off position while connecting the power cord. The **POWER** switch positions are labeled **0** and **1**; the **0** position is off, and the **1** position is on.



2310452-1

2. Plug the power cord into the connector at the rear of the terminal.

3. Plug the transformer into an appropriate ac power outlet.



CHECKING YOUR TELEPHONE EQUIPMENT

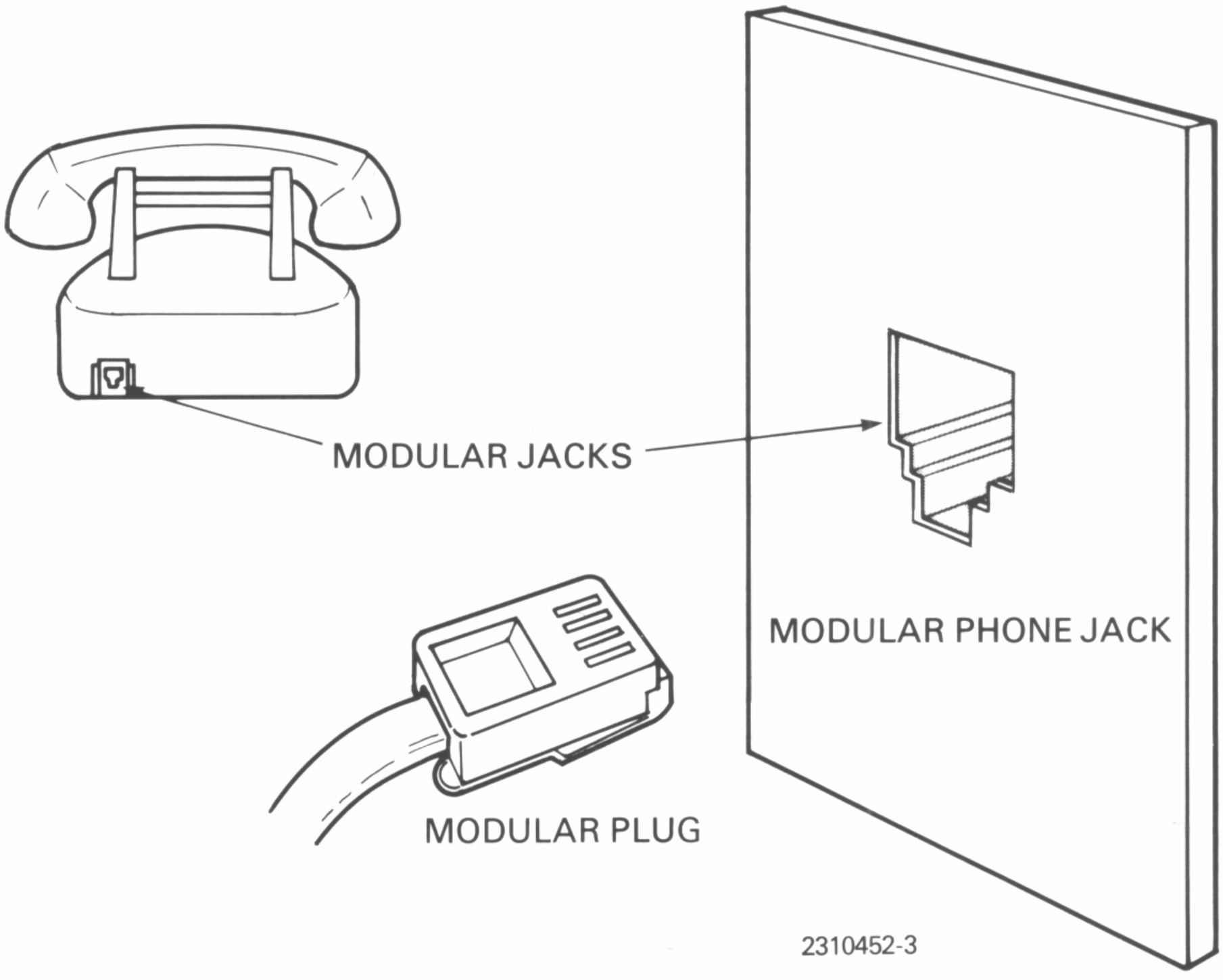
To ensure good data communications, make sure you have the right telephone equipment. The following paragraphs describe this equipment.

The Telephone

If you connect a telephone to your terminal it should be a single-line phone. A multiline telephone must be modified to provide a modular telephone jack outlet for one of the incoming telephone lines and will require slight changes to normal telephone operating procedures. (If, for example, another handset is switched onto the active line while the terminal is online, data errors or a disconnect may occur. This is not a data terminal malfunction.)

The Phone Jack

The Model 707 requires a standard voice (RJ-11C or equivalent) modular telephone jack for both connections. Refer to your telephone book for instructions on how to connect and disconnect the modular connectors.



If you do not have a modular connector then you must order one from your telephone company, or pick one up at a local phone supply or hardware store before connecting your terminal.

FCC REQUIREMENTS

The Federal Communications Commission (FCC) has established rules that permit the Model 707 internal modem to be directly connected to the telephone network.

- This terminal cannot be connected to a party line, or to a coin-operated telephone unless the optional acoustic coupler (TI Part No. 2310518-0001) is used.

- The telephone company must be notified that an FCC registered device is being installed.

- Any corrective service that is performed on this terminal's modem must be performed by Texas Instruments Incorporated or an authorized agent of Texas Instruments. If this is not done the terminal's FCC registration will be invalidated and the telephone company can temporarily disconnect service.

- If the modem is malfunctioning, it may also cause harm to the telephone network. The terminal should be disconnected until the source of the problem can be determined and repair has been made.

- The telephone company can make changes in its technical operations and procedures. If such changes affect the compatibility or use of the modem, the telephone company is required to give adequate notice of the changes.

- *The telephone company must be notified before you connect any nontelephone company equipment to your telephone.* Call the business office in your city and tell them you are installing an FCC-registered device on your telephone line. Give them the following information:

- Your telephone number

  If you plan to use the terminal at different telephones (at different locations in your office, for example), give the telephone company each telephone number. You *do not* need to notify them each time you move the equipment to one of these numbers. The telephone company also needs to know when you are *permanently* removing the terminal from service.

- The FCC registration number

  The Model 707 registration number is found on the serial number label on the bottom of the terminal.

- The ringer equivalence number

  The Model 707 ringer equivalence number is found on the serial number label on the bottom of the terminal.

  If necessary, you can order USOC-RJ-11C modular telephone jacks from the phone company, while providing the above information.

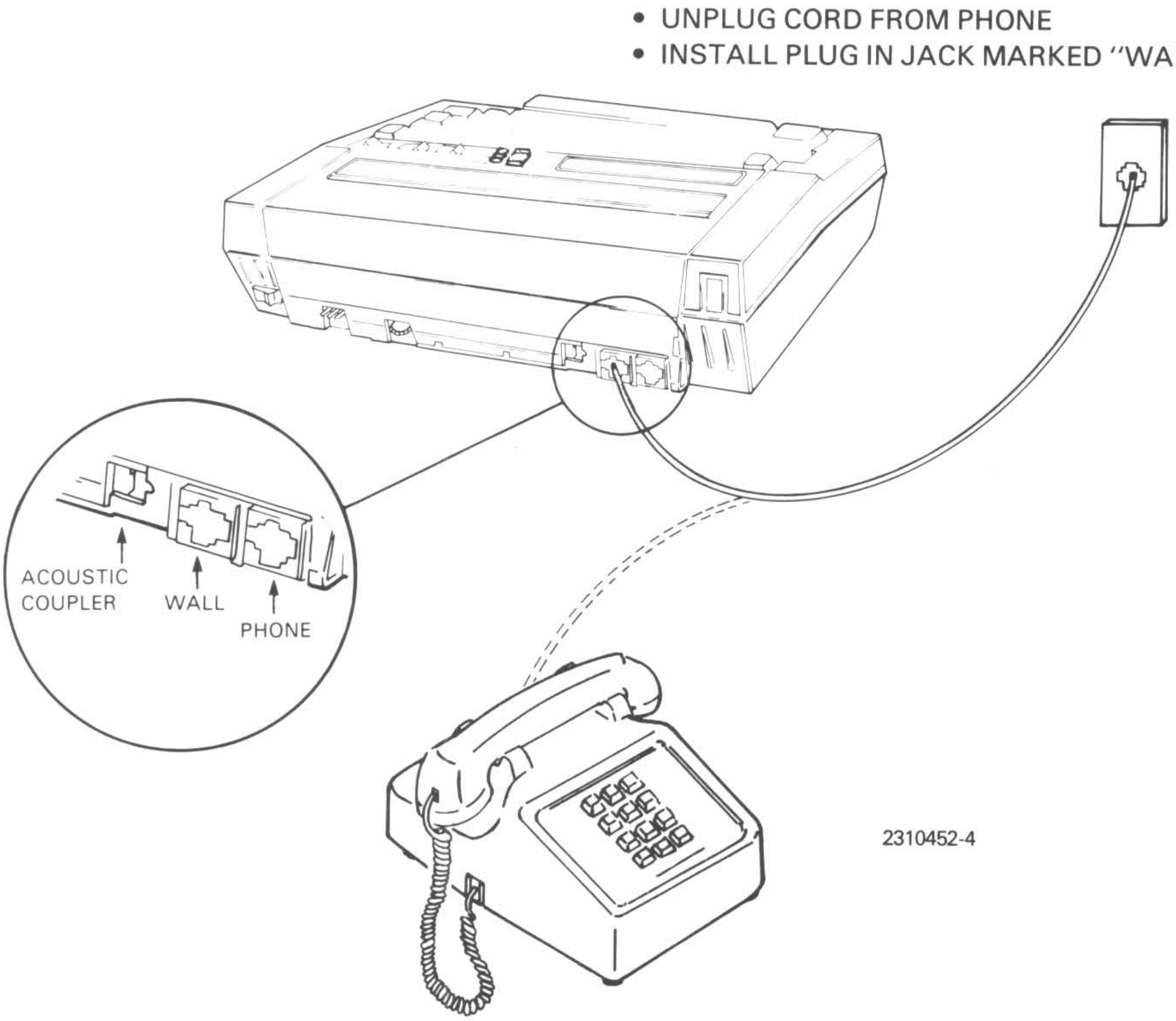
CONNECTING THE DATA INTERFACE

You can set up the Model 707 Data Terminal to interface directly with the telephone network (direct-connect), or through an optional acoustic coupler (TI Part No. 2310518-0001). Refer to the "Options" section of this chapter for acoustic coupler installation instructions.

When you set up the terminal for direct-connect operation, make sure the optional acoustic coupler is NOT connected. The terminal will not operate in the direct-connect configuration while the acoustic coupler is plugged into its connector.

To set up the Model 707 direct-connect interface:

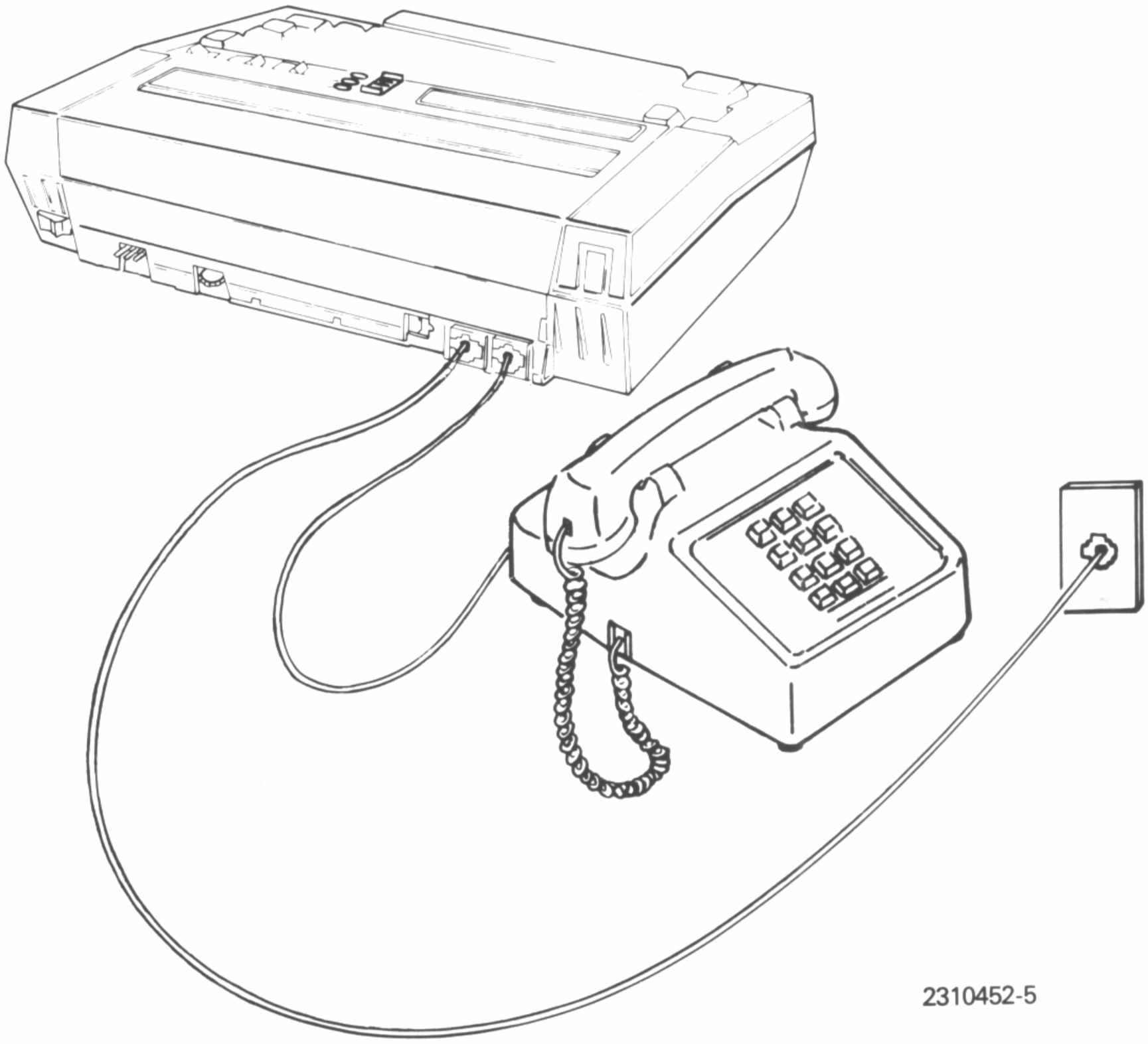
1. Unplug the modular telephone connector from the telephone and plug it into the jack labeled **WALL** on the rear of the terminal.



When the terminal is connected to the wall, as it is after this first step, it can automatically answer calls and receive or transmit data. If you need a telephone connected, to enable voice communication, complete the next two steps.

2. Connect one end of the direct-connect cable (TI Part No. 2211801-0002), supplied with the terminal, to the connector labeled **PHONE** on the rear of the terminal.

3. Connect the other end of the direct-connect cable to the telephone.



LOADING PAPER

The Model 707 Data Terminal can use any commercially available, 215.9 mm (8.5 in) wide, thermographic printing paper.

For optimal print quality, use Texas Instruments thermal printing paper. This paper is available in single 30 m (100 ft) rolls, case or pallet lots, as TI Part No. 972603.

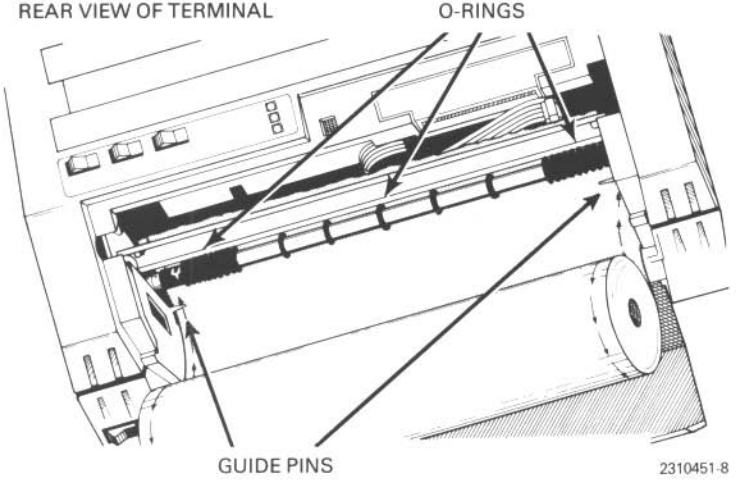
1. Place the **POWER** switch in the on position.

2. Slide the paper compartment latch to the rear and open the paper compartment cover. If there is no paper in the terminal go to step 4.

3. To unload paper remaining in the terminal, lift the used roll from the paper compartment and pull it evenly toward the rear of the terminal.

4. Rest the new paper roll on the inside of the paper compartment cover. *Be sure that the paper feeds from the bottom of the roll toward the front of the terminal.*

5. Feed the leading edge of the paper under the plastic guide pins and into the nip of the O-rings on the paper feed roller.



6. Press the **PAPER ADV** key until the paper is even with the top of the printhead.

7. Place the paper roll in the paper compartment. Reroll any excess paper onto the paper roll to remove slack between the paper roll and the paper feed roller. Make sure the paper is rerolled evenly.

8. Close the paper compartment cover. Slide the paper compartment latch toward the front to secure the cover.

OPTIONS

The following paragraphs introduce you to five options available on your Model 707 terminal.

Battery Pack Option

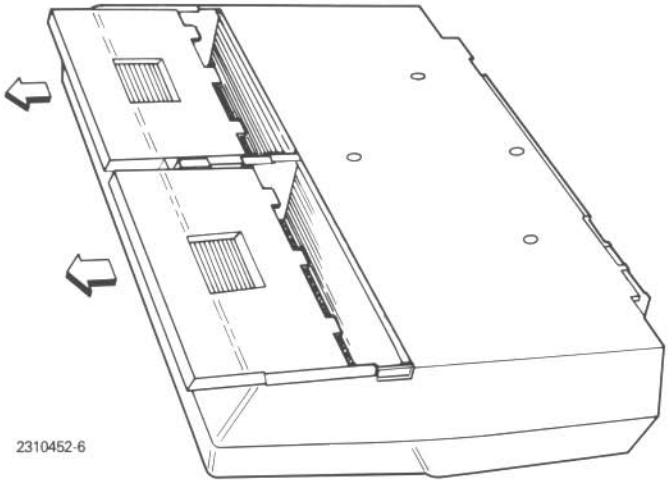
The battery pack option consists of two four-cell packs. A two-wire cable with a connector is attached to each pack.

Battery Pack Installation

Before you install the battery pack, plug the terminal into an ac power outlet and place the **POWER** switch in the off (0) position.

1. Place the terminal upside down.

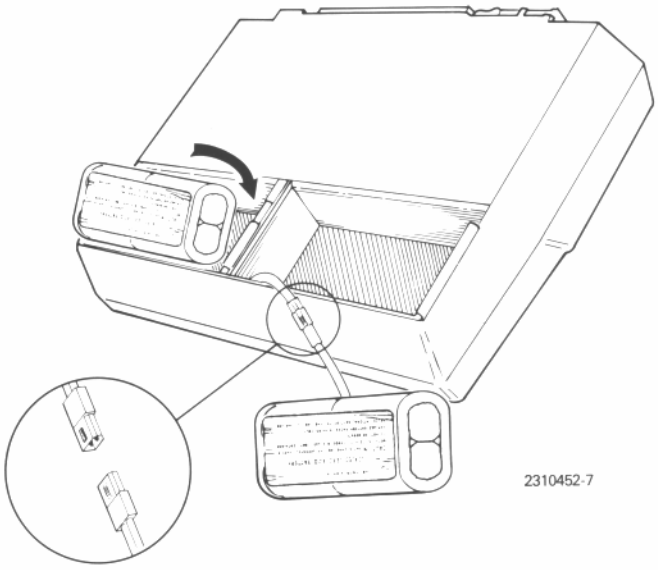
2. Remove the two battery compartment doors by pushing down slightly on the ribbed area on each door, and sliding the doors toward the front of the terminal.



3. Connect the connector of each battery unit to the connector in each battery compartment.

The battery connectors mate easily if they are oriented properly. Damage to the terminal may result from forcing either connection.

4. To install the batteries, tip the terminal on its front edge and pivot each battery pack into its battery compartment. Make sure the wires are pushed down so they don't get in the way.



5. Lay the terminal down and reinstall the battery doors.

6. Turn the terminal right side up.

Battery Pack Removal

The procedure for removal of the batteries is the reverse of the installation procedure *with one exception*. We recommend that you disconnect the power cord from the terminal before removing the batteries.

Auto-Access Cartridge Option

The Auto-Access Cartridge option is a user-installed, plug-in cartridge designed to enhance and extend the Model 707's standard features. It allows you to:

- Automatically dial and log onto a computer

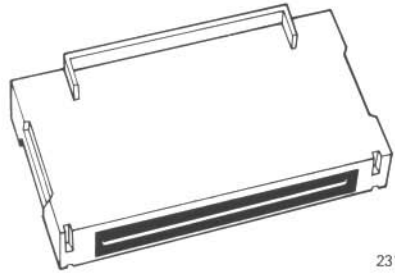
- Store multiple telephone numbers and log-on sequences
- Set up the terminal's configuration
- Print a report on the terminal's configuration

The cartridge connector is located beneath the paper compartment cover, near the left center of the terminal.

Here's a brief example of one way you can use the Auto-Access Cartridge. You can program the cartridge to remember a list of your commonly used phone numbers, a short reference name for each number, and the user identifier and password used for each. When you use the Dial command and type the reference name on the keyboard, the number is automatically dialed, and you are logged onto the host system. If you forget a reference name, the terminal prints a list of the names and their assigned numbers, when you press the RTN key.

This is just one use for the optional Auto-Access Cartridge. The option kit (TI Part No. 2310530-0001) includes a user's manual that explains the setup procedure and gives other examples of applications.

AUTO-ACCESS CARTRIDGE

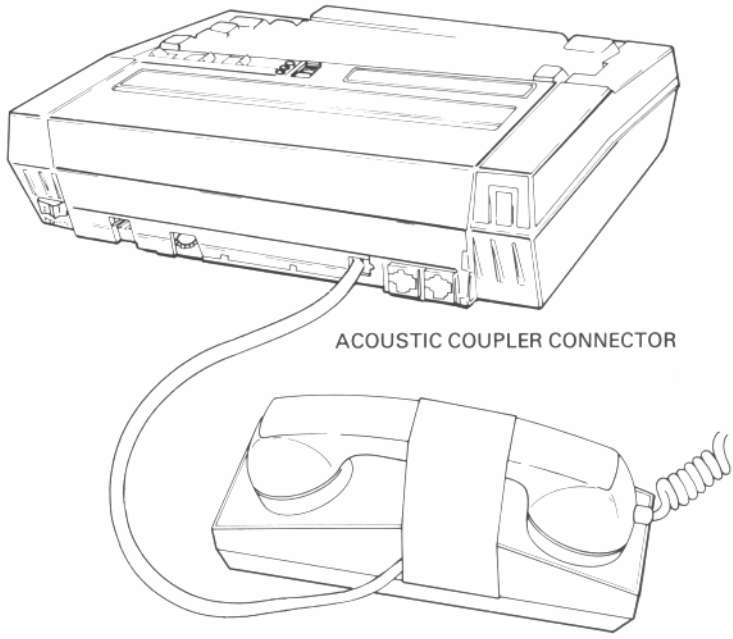


2310451-9

Acoustic Coupler Option

The acoustic coupler allows you to interface with the telephone network when a direct-connect interface cannot be used.

Plug the acoustic coupler into the jack labeled ACST CPLR on the rear of the terminal.



Refer to "Using the Optional Acoustic Coupler" in Chapter 2.

When you use an acoustic coupler to transmit data, the conventional carbon microphone in your telephone handset may cause transmission problems.

Carrying Case Option

The Model 707 fits easily in most standard 76.2 mm (3 in) and 127 mm (5 in) briefcases.

A specially designed carrying case (TI Part No. 2310470-0001) is available as an option if you prefer to carry the terminal separately. The carrying case holds the terminal, the power transformer, an extra roll of thermal paper, this user's manual, and the optional acoustic coupler.

Data Mike Linear Microphone Option

When you use an acoustic coupler to transmit data, the conventional, nonlinear, carbon microphone in your telephone handset may cause transmission problems.

The Texas Instruments Data Mike Kit (TI Part No. 2266038-0001) contains a linear microphone that replaces the carbon microphone that is currently on your telephone handset. You can easily make this replacement yourself by following the instructions in the Data Mike Installation Guide.

The Data Mike offers two key advantages over carbon microphones.

- The output level of the transmitted signal is more consistent over time.

- The superior linearity of the Data Mike reduced distortion. Lower distortion means less overall system noise. This allows for better transmission and reception of data.

CONCLUSION

The best way to ensure that your data terminal will give you reliable service is to provide it with an adequate environment, a proper source of power, a proper communication interface, and quality thermal paper. Each of these elements are important now, the first time you prepare your terminal for operation, and throughout its life. In Chapter 2, "Using Your Terminal," you will learn how to configure your terminal and how to use it to send or receive information.

2

Using Your Terminal

INTRODUCTION

This chapter provides general information on setting up and operating your terminal. The information in this chapter must be used in conjunction with the instructions provided for the device or system that your terminal is communicating with.

Let's begin with some basic assumptions:

- Your terminal is either plugged into a proper ac voltage source, or the optional battery pack is installed.

- You have an ample supply of quality thermal paper installed.

- Your terminal is connected to the proper type of telephone jack (RJ-11C modular jack) if you're using the standard direct-connect interface feature. If you're using the optional acoustic coupler, it is connected to the jack labeled **ACST CPLR** on the back of the terminal.

CONFIGURING THE TERMINAL

Five operating variables must be set up before you operate your terminal.

- Online or offline mode of operation

- Uppercase or lowercase printing

- Local copy or no local copy

- Even, odd, mark, or space parity

- Standard or compressed printing

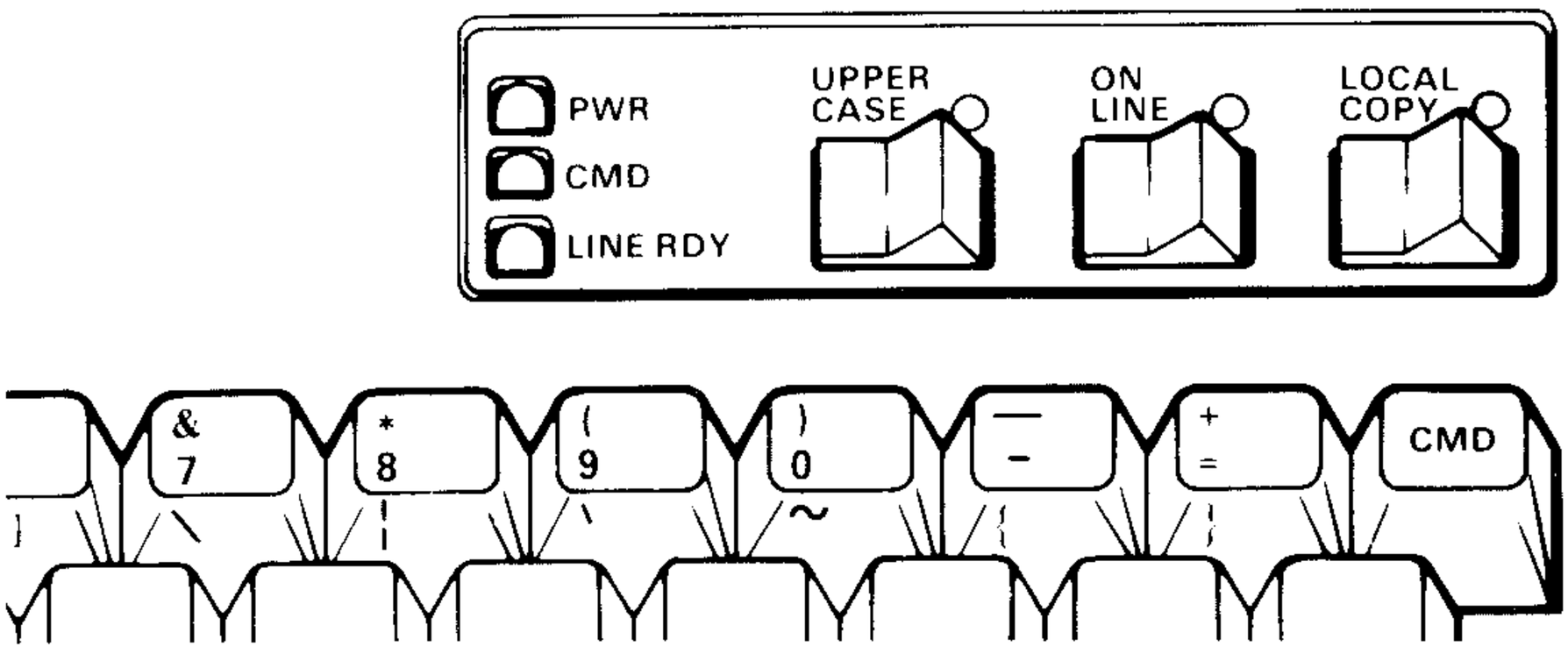
Online/Offline Mode of Operation

The **ONLINE** switch is in the middle of the group of three switches above the keyboard.

Simply stated, you *go online* to communicate with another device, and *go offline* to operate your terminal like a typewriter. When the **ONLINE** switch is moved toward the position marked with a dot, the terminal is in the online mode. When the switch is moved away from the dot, the terminal is in the offline mode. (This is also called the local mode.)

When a telephone is connected to the terminal, and the terminal is offline, you can operate the telephone normally. When the terminal is switched online, outgoing calls are not affected, but incoming calls are automatically answered by the terminal.

Set the **ONLINE** switch to the offline position until you're ready to establish communication with another device.



2310451-10

Uppercase or Lowercase Printing

The **UPPER CASE** switch is the leftmost switch in the group of three switches above the keyboard.

The **UPPER CASE** switch operates very much like the shift lock key on a typewriter, except that it only affects the alphabetic characters (a through z) on your keyboard. When this switch is moved toward the position marked with a dot, alphabetic characters are encoded to uppercase. When this switch is moved away from the dot alphabetic characters are encoded to lowercase, unless the **SHIFT** key is pressed. Set the **UPPER CASE** switch as needed for your particular application.

Local Copy of Transmitted Data

The **LOCAL COPY** switch is the rightmost switch in the group of three switches above the keyboard.

Moving the switch toward the position marked with a dot enables local copy. Moving the switch away from the dot disables local copy. When **LOCAL COPY** is selected while you're online, every letter, number, or symbol that you enter on the keyboard is simultaneously printed on your terminal's printer. If **LOCAL COPY** is not selected, the printer only prints information that you receive from another device.

The **LOCAL COPY** switch only needs to be enabled if you are sending data to a computer system that *does not* use echo-plex. (Echo-plex is defined in the glossary.) If the terminal doesn't print what you type, or if you see two of each character you type, change the position of the **LOCAL COPY** switch. When the terminal is offline, local copy is automatic.

Setting Parity

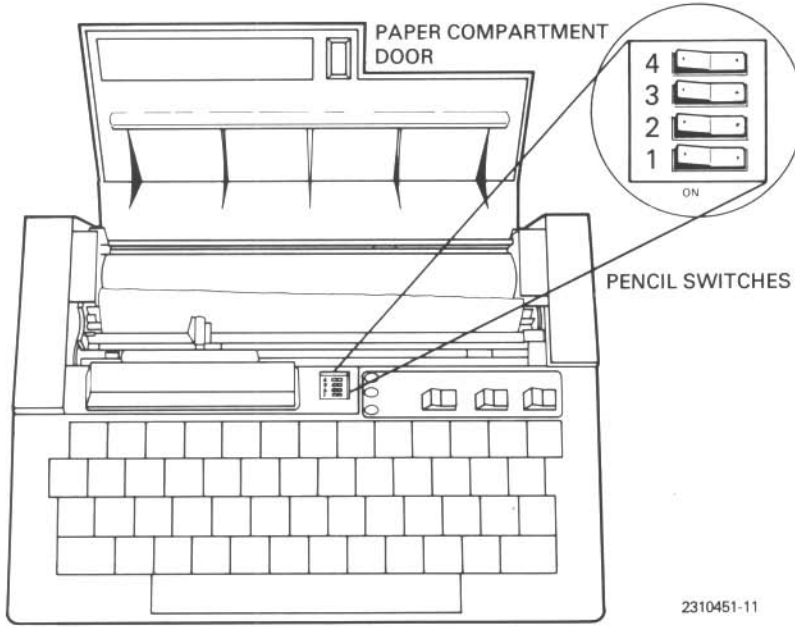
Parity is set with two of the four *pencil switches* (the switches labeled 1 and 2) located beneath the paper compartment cover, to the right of the cartridge slot. Pencil switches are so called because their position is selected with a pointed object, like the point of a pencil or a bent paper clip.

The Model 707 terminal transmits data with even, odd, mark, or space parity. A label in the paper tray shows the switch settings for each type of parity. The switch settings are also shown in the following table.

Parity Pencil Switch Settings

Parity Selected	Switch 1	Switch 2
Even	Off	Off
Odd	On	Off
Space	Off	On
Mark	On	On

The Model 707 does not check the parity of the data it receives, but many devices do; so always set parity to meet the need of the device or system that you're communicating with. When in doubt, try even parity first; it's the most common.



Selecting the Print Configuration

The Model 707 terminal prints 10.2 characters per inch (cpi) (80 characters per line) in its standard print configuration. In its compressed print configuration, the terminal prints 17.0 cpi (132 characters per line).

The terminal's print configuration can be selected three ways:

- With the default print configuration switch before power-up
- With a control sequence from the keyboard
- With an escape sequence from the communications line

Default Print Configuration Switch

The default print configuration switch is switch number 3 in the group of four pencil switches located beneath the paper compartment cover. Default means that if this switch is placed in its on position before power-up, the terminal will go into a compressed print configuration when it is powered up. If the switch is placed in its off position before power-up, the terminal will go into a standard print configuration when it is powered up.

Print Configuration Control Sequence

After power-up the print configuration can be changed from its default configuration by pressing and holding the **CTRL** key and the **SHIFT** key and then pressing the **RTN** key.

You can do this while the terminal is online or offline.

Print Configuration Escape Sequence

When the terminal is online, the print configuration can be changed by the device you're communicating with. To do this the device sends one of the following *escape sequences*. An escape sequence is a command, received over the communication line, that begins with the **ESC** (escape) character.

To select 10.2 cpi:

[ESC] [P] [C] [ESC] [\] or [ESC] [P] [C] [\]

To select 17.0 cpi:

[ESC] [P] [D] [ESC] [\] or [ESC] [P] [D] [\]

The brackets ([ ]) are not part of the escape sequences; they are only shown to separate the characters in each sequence.

Note that two escape sequences are given for each print configuration selection. They are identical except for the second **ESC** character in the first sequence. This option was provided to make the terminal compatible with certain other devices.

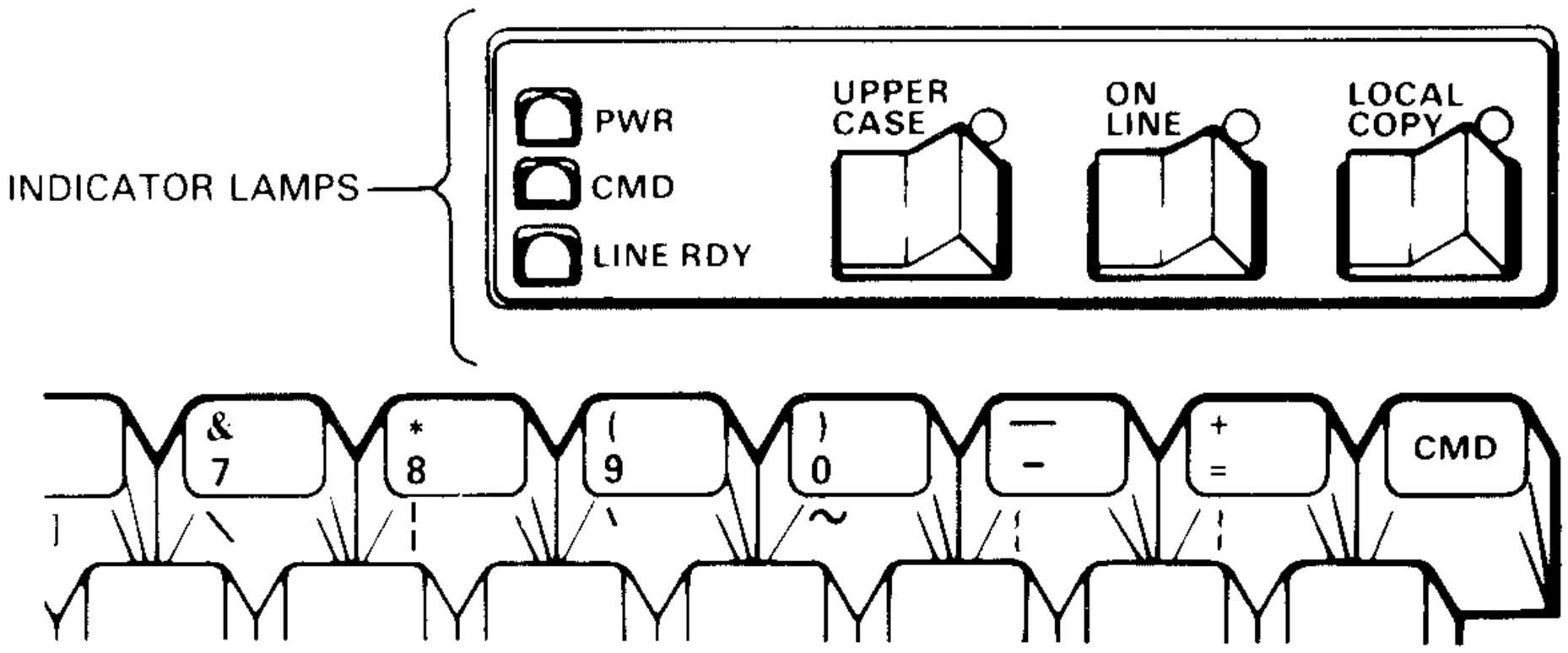
Your terminal's print configuration affects only your printer, so the setting is only a consideration for received data.

TURNING ON YOUR TERMINAL

When you place the terminal's **POWER** switch in the on position, the terminal performs a test of its memory. During this self-test, as during every other terminal operation, there are certain sights and sounds that you can associate with normal performance.

Sights and Sounds

Three status lights are located above the keyboard, to the left of the **UPPER CASE** switch. These lights are labeled **PWR** (power), **CMD** (command), and **LINE RDY**. While operating your terminal, these lights, along with audible beeps from the terminal, are your primary indications that everything is (or is not) working properly. Each of the visual and audible indications are explained in Chapter 3.



2310451-12

Power-Up Self-Test

If your terminal power is already on, place the **POWER** switch in the off position. To verify the visual and audible indications that accompany a successful self-test, return the **POWER** switch to the on position and observe the following.

This entire test sequence takes only a few seconds. Watch the status lights while you are operating the **POWER** switch so you don't miss an indication.

1. As soon as you turn the **POWER** switch on all three of the status lights go on. This indicates that the power-up self-test is in progress.

2. The **CMD** and **LINE RDY** lights go out and the **PWR** light remains lit.

3. The printhead mechanism moves against the left margin and momentarily chatters (the chattering is normal) against its stop.

4. The terminal prints its model number 707.

5. At the successful completion of the test, the terminal beeps a short audible tone.

6. The printhead moves to the left side of the paper and the paper advances to the next line.

A failed test is usually indicated by the three status lights remaining lit. If this happens, or if you observe another improper indication:

1. Make sure the terminal is plugged into a good power source.

2. Repeat the self-test to verify the bad indication(s).

3. Check the Problem-Solving Guide in Chapter 5.

4. Contact your service representative.

LAST CHARACTER VISIBILITY

As you use your terminal you'll notice that every time you type a character and don't immediately continue typing, the printhead moves to the right, to allow you to see the last character you entered. We call this feature last character visibility. When you resume typing, the printhead will move back into place. The next character you type will be entered next to the last character.

COMMUNICATION REQUIREMENTS

There are two requirements to consider before you try to communicate with another device.

Communication Mode

The Model 707 operates in a *full-duplex* communication mode (data can be transmitted and received simultaneously), and is compatible with a Bell 103-type modem. The device you're communicating with must also be compatible with a Bell 103-type modem.

Transmission Speed

The Model 707 transmits and receives data at the rate of 300 bits per second (bps). This is also called 300 *baud*. The device that receives data from you must be able to receive data at this speed, and all data that your terminal receives must be transmitted at this speed.

TYPICAL DATA TERMINAL OPERATION

There are three parts to every data communication link:

- Establishing the communication link
- Sending or receiving data
- Terminating the communication link

Establishing the Communication Link

The telephone link may be established by either party. If your application requires you to establish it, use the Dial or Originate command (refer to the "Command Mode Description" in this chapter). If the communication link is established by the operator of the other device, your terminal will automatically answer the call if it is online or placed online when the phone rings. If voice communication has already been established, the Answer command can be used to establish a data communication link.

Sending or Receiving Data

Once the communication link is established, it is normally maintained only long enough to log on, transfer the desired data, and log off. Logging on and off is different for every computer system.

Terminating the Communication Link

The telephone link is normally disconnected by the party that initiated the call. There is no single method used to terminated a call. Some applications require the operator to type a word (BYE, for example), and others require the operator to place the terminal offline.

Later in this chapter you will see an example of how to establish a telephone link with a computerized information service. First, however, we will describe the set of commands that are available on your terminal. Some of these commands are used to establish the communication link we've talked about here.

COMMAND MODE DESCRIPTION

The command mode is entered when the **CMD** key is pressed, while the terminal is in either the online or offline mode. The Model 707 responds to four basic commands; three of these establish the communication link with another device and the fourth performs a test of the printer mechanism.

If the terminal is online when you enter the command mode, you interrupt any communication that was about to take place. If the printer is operating, the **CMD** light flashes until the printer is finished printing the information that the terminal has already received. When the printer has finished, the **CMD** light stays lit. The terminal is not able to receive or print any new information while in the command mode.

Press the **CMD** key, and verify the following sequence of events.

1. The **CMD** light is lit.

2. The paper advances to the next line.

3. The printhead moves to the left side of the paper.

4. A question mark (?) is printed.

5. A short audible tone is heard.

6. The printhead moves one space beyond the "?".

7. The terminal waits for the appropriate command mnemonic.

The terminal remains in the command mode until it receives a valid command mnemonic. Press the **ESC** key to exit the command mode, or press the **RTN** key to list commands.

A valid command mnemonic causes the command to execute. An invalid command causes a long audible beep (an error indication) and the above sequence to be repeated. The following are the only valid command mnemonics.

		Mode	
Command Name	**Mnemonic***	**Online**	**Offline**
Dial	D	X	
Originate	O	X	
Answer	A	X	
Test	T	X	X

To use the Dial, Originate, or Answer command, the terminal *must be* placed online. If the Dial, Originate, or Answer commands are attempted while the terminal is in the offline mode, a long audible beep sounds and the command prompt (?) is reprinted.

*The command mnemonic (also known as the syntax) can be entered in either uppercase or lowercase.

Test

Use the Test command to test the terminal mechanism and printhead. Initiate the Test command as follows:

1. Press the **CMD** key.

2. Press the **T** key.

The Test command initiates the *barberpole test* which prints a pattern of every printable character in every position across the paper.

To stop the barberpole test, press the **ESC** key.

```
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHI
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJ
"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKL
$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLM
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOP
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQ
)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQR
*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRS
+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRST
```

BARBERPOLE TEST PATTERN

2310451-15

Dial

When the terminal is online and you're using the direct-connect interface, you can use the Dial command to dial a telephone number from the keyboard. While the Dial command is in progress you will see the **LINE RDY** light either lit or flashing. You'll notice the **LINE RDY** light go out if the telephone connection is broken for any reason.

To use the Dial command press **CMD**, and then press **D**.

When you enter the Dial command, the terminal prints the word DIAL, the **CMD** light is lit, and the **LINE RDY** light flashes. Next the terminal goes offhook, similar to removing a telephone handset from its receiver, and you hear a dial tone in the terminal's speaker. When you hear the dial tone, enter the telephone number by using the numeric keys on the top row of the keyboard.

The method for dialing in the terminal is pulse dialing. As you enter each digit, by pressing the corresponding numeric key, the number is simultaneously printed and dialed. The Dial command accepts a phone number of any length, but it only remembers 16 digits at a time. To enter a phone number with more than 16 digits:

1. Enter the first 16 digits.

2. Wait until the first digit is printed before entering the 17th digit.

3. Wait until the second digit is printed before entering the 18th digit, and so on.

In most cases the numbers are printed (dialed) as fast as you can enter them on the keyboard.

When the connection is made between your terminal and the host the **LINE RDY** light will be lit.

Terminate the Dial command by any of the following.

- When the modem on the other end of the telephone link answers the call

- When you press the **ESC** key before the call is answered

- When you press the **CMD** key before the call is answered

- When you move the **ONLINE** switch to the offline position

Originate

The Originate command is used when you want to dial a telephone number manually (in some cases using a Touch-Tone™ phone may be faster than using the Dial command). While the Originate command is in progress the **LINE RDY** light is either lit or flashing. You'll notice the **LINE RDY** light go out if the telephone connection is broken for any reason. A call is initiated manually as follows.

1. Place the terminal online.

2. Lift the telephone handset and dial the desired telephone number.

3. Wait for the answer tone.

4. Press the **CMD** key.

5. Press the **O** key.

   a. The **LINE RDY** light flashes. At this point the terminal takes control and completes the connection.

   b. When the connection is made the **LINE RDY** light is lit.

6. Hang up the telephone receiver.

Answer

If a call is received when the terminal is online (and no connection is currently in effect) the terminal automatically goes offhook and sends an answer tone to the caller. This is called auto-answer. The Answer command simulates the auto-answer feature *after voice communication has been established.*

Touch-Tone is a trademark of American Bell.

While the Answer command is in progress, the **LINE RDY** light is either lit or flashing. You'll notice the **LINE RDY** light go out if the telephone connection is broken for any reason.

Use the Answer command as follows.

1. Establish voice communication.
2. Place the **ONLINE** switch in the online position.
3. Press the **CMD** key.
4. Press the **A** key (to send the answer tone).
   a. The **LINE RDY** light begins to flash.
   b. When the connection is made, the **LINE RDY** light is lit.
5. Hang up the telephone receiver.

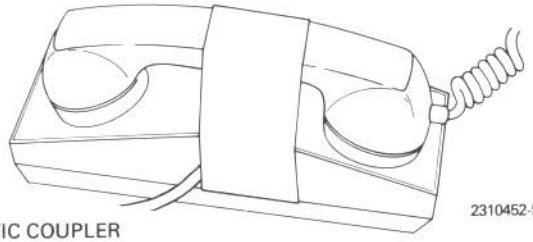
USING THE OPTIONAL ACOUSTIC COUPLER

When the acoustic coupler is connected (as shown in Chapter 1), the Model 707 is automatically in the originate mode.

To make a call with the acoustic coupler:

1. Place the terminal online.
2. Lift the telephone handset and dial the desired telephone number.
3. Wait for the answer tone.

4. Place the telephone handset on the acoustic coupler and strap it in place with the Velcro™ strap. When placing the handset on the acoustic coupler, orient it so that the earpiece is on the long end of the coupler.



ACOUSTIC COUPLER

5. At this point the terminal takes control and completes the connection. When the connection is made the **LINE RDY** light is lit.

USING A COMPUTERIZED INFORMATION SERVICE

Data terminal users commonly subscribe to computerized information services for services such as:

- News, weather, and sports information
- Financial information
- Entertainment information
- Electronic mail services
- Personal computing services

This list could go on, and more items are added to it everyday. For just this reason we want to give you an idea of how to connect your data terminal to one of the large information computers. Bear in mind that exact procedures differ for each information service. The following can be considered typical.

Velcro is a trademark of Velcro USA Incorporated.

Documentation

Once you have registered as a subscriber to an information service, you receive a booklet with the exact procedures that allow you to access that service. You also receive a *password* or identification word or number that will be requested as part of your log-on procedure.

Logging On and Off

1. Place your terminal online.

2. Dial or enter the telephone number for the service you want to use. (Use the Dial command, Originate command, or optional acoustic coupler.) When you use the Dial or Originate command the **LINE RDY** light begins to flash.

3. When the host answers you hear an answer tone. When the connection is made the **LINE RDY** light is lit. The host may send a message to your terminal. Messages may request the identification number or letter of your terminal, your identification number, or your password. After keying in any requested information, press the **RTN** key to enter it if required.

4. When the computer verifies that you are a registered user, it sends a message to tell you that you are connected, and can begin using the system.

5. The computer often sends a *menu* that gives you a choice of accessing a particular area of information. For instance, you may type a letter or number from the menu to select a current stock market quotation. The computer would then send a message asking which stock quotation you want to see. Your reply would be the abbreviated name (the symbol) of the stock.

6. After you have received the desired information, log off the system. Again, each system has its own procedure. On some systems you may be requested to go offline; on others you may be required to type a word such as OFF, BYE, EXIT, or DISC.

7. Many services send back a final message that says THANK YOU, the date, and how much computer time you are charged with.

CONCLUSION

System dependencies (the needs of the other device) are a very large factor in the operation of a data terminal. For that reason the information in this chapter is general in nature and must be used in conjunction with the instructions provided for the device or system that your terminal is communicating with. The next chapter in this manual gives you additional information about your terminal's keyboard and controls.

3
Learning More About Your Terminal

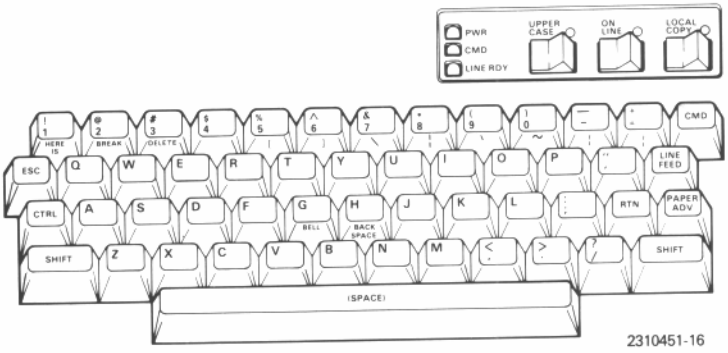
INTRODUCTION

This chapter familiarizes you with your terminal's keyboard and controls. You'll learn about key and switch functions, status lights, and audible tones. Becoming thoroughly familiar with the information in this chapter helps you to better understand the operation of your Model 707 Data Terminal.

THE OPERATOR'S PANEL

The operator's panel consists of a 52-key keyboard, 3 dual-position switches, and 3 status lights.

The figure below shows the standard US keyboard layout for the Model 707 Data Terminal. Eight international versions of the Model 707 (called the Model 709 in international applications) keyboard are found in Appendix C.



The Model 707 Operator's Panel

THE FULL-ASCII KEYBOARD

The Model 707 has a full-ASCII keyboard that generates all 128 codes that make up the USASCII Code System. There are 47 code-generating keys: the alphabet, numerals, symbols, space, **ESC** (escape), **LINE FEED**, and **RTN** (return) keys. Three keyboard-control keys govern the code-generating keys, these are the two **SHIFT** keys and the **CTRL** (control) key. The **UPPER CASE** switch, above the keyboard, also performs a keyboard-control function.

Keyboard Color-Coding

The Model 707 keyboard is color-coded as follows.

- Each key has a tan background color.
- Legends on regular character-generating keys are dark brown.
- The legend on the **CTRL** key is blue. Each of the other blue-labeled keys are used in conjunction with the **CTRL** key.
- Legends on the **ESC**, **CMD**, and **RTN** keys are orange.

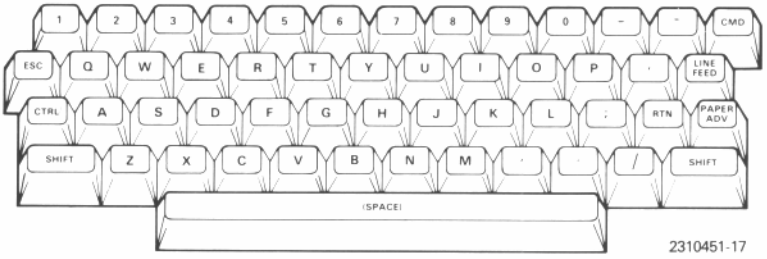
Keyboard Operation

The keyboard-control keys, **SHIFT** and **CTRL**, and the **UPPER CASE** switch, control the operation of the keyboard in the following ways.

Uppercase

With the **UPPER CASE** rocker switch in the uppercase position, alphabetic keys are encoded as uppercase characters. This is similar to the shift

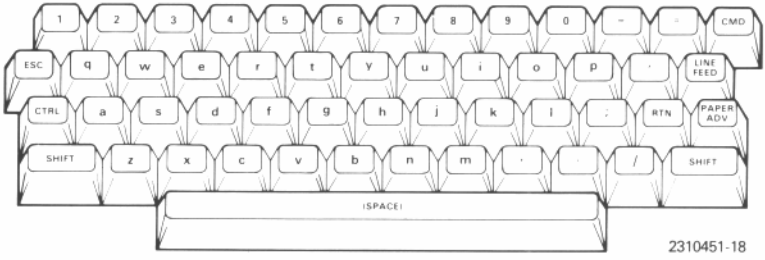
lock key on a typewriter, except that the **SHIFT** key is needed to print or transmit the upper character on double character keys, like the % symbol.



Uppercase Characters

Unshifted

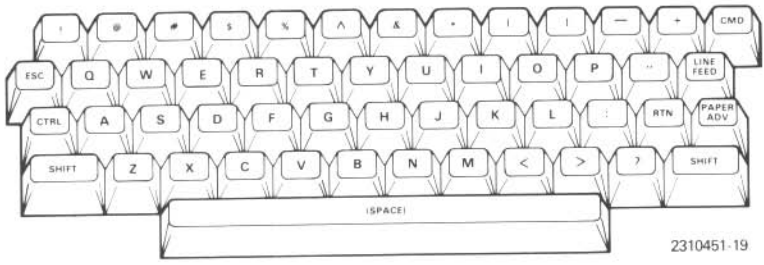
When the **SHIFT** key is not used, and the **UPPER CASE** switch is not in the uppercase position, the alphabetic keys are encoded as lowercase letters.



Unshifted Characters

Shifted

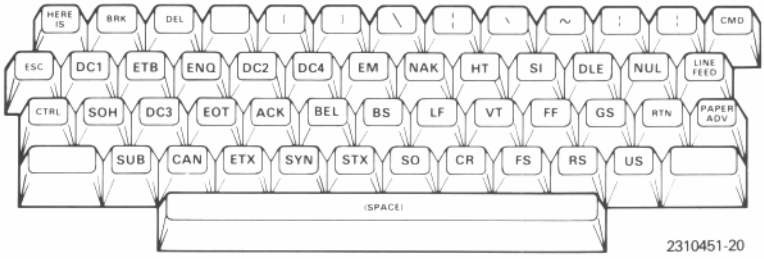
When the **UPPER CASE** rocker switch is not in the uppercase position, either **SHIFT** key may be pressed to encode the alphabetic keys as uppercase letters. This also encodes the symbols, instead of the numerals, on the top row of keys.



Shifted Characters

Control

The ASCII control characters, these eight symbols: [,], \, ¦, `, ~, {, }, plus **HERE IS**, and **BREAK** are encoded by pressing and holding the **CTRL** key while pressing the appropriate character key. The **CTRL** key, and each of the labeled keys that are used in conjunction with the **CTRL** key, are color-coded light blue. Your terminal can transmit each of the ASCII control characters shown below. The most frequently used control characters and symbols are labeled on the keyboard.



Control Characters

Note that the character-generating keys **ESC**, **LINE FEED**, **RTN**, and the space bar generate the same codes for all keyboard configurations.

Keyboard Configuration Priorities

If more than one keyboard-control key is pressed, the following priority is maintained.

- The **CMD** key has precedence over **CTRL**, **SHIFT**, and **UPPER CASE**.
- The **CTRL** key has precedence over **SHIFT** and **UPPER CASE**.
- The **SHIFT** key has precedence over **UPPER CASE**.

Automatic Character Repeat

All keys except **CTRL**, **SHIFT**, **HERE IS**, and **CMD** have an automatic character-repeat feature. This means that each one repeats its function, at ten characters per second, when it is held down for more than one-half second. The repeat feature of the **PAPER ADV** key allows the paper to advance at approximately thirty lines per second when it is held down for more than one-half second.

SPECIAL KEYS

The following is a description of each of the special keys on the Model 707 keyboard.

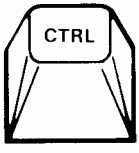
CMD

When the **CMD** (Command) key is pressed, with the terminal online or offline, the terminal goes into the command mode. If the terminal is online when you enter the command mode you interrupt any communication that was about to take place. If the printer is operating, the **CMD** light flashes until the printer is finished printing the information that the terminal has already received. When the printer is finished, the **CMD** light stays lit. The terminal is not able to receive or transmit any new data while in the command mode.

The Command Key 2310451-21

CTRL

The **CTRL** (Control) key is always used in combination with another key to transmit characters that perform special functions. It must always be pressed first, *and held down*, while the character key is pressed. Refer also to the "Keyboard Operation" section in this chapter for a description of the **CTRL** key operation. The following labeled characters on your keyboard are used in conjunction with the **CTRL** key.



The Control Key 2310451-22

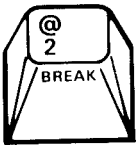
HERE IS

HERE IS is a communication control action. If the Auto-Access Cartridge is installed, and the answerback memory (ABM) has been programmed in the cartridge, the contents of the answerback memory are transmitted over the communication line when the **HERE IS** key is pressed while the **CTRL** key is held down.

The Here Is Key 2310451-23

BREAK

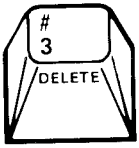
BREAK is a communication control action. When the **BREAK** key is pressed, while the **CTRL** key is pressed, the terminal transmits a "space" communication control character (*not* the same as pressing the space bar), until the keys are released. The break function lasts one-quarter second (minimum), or as long as **CTRL** and **BREAK** are held down.



The Break Key 2310451-24

DELETE

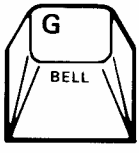
DELETE is an ASCII control character. When the **DELETE** key is pressed while the **CTRL** key is held pressed, the **DELETE** control character is transmitted. The reaction of the other device depends on how it is set up to react to the **DELETE** character.



The Delete Key 2310451-25

BELL

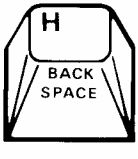
BELL is an ASCII control character. When the terminal is offline, or online with an echoplex system, and the **BELL** key is pressed while the **CTRL** key is held, the bell (a short audible tone) sounds on your terminal. If the terminal is online the ASCII bell character is transmitted. This sounds a bell on the other device if the device has that capability.



The Bell Key 2310451-26

BACK SPACE

BACK SPACE is an ASCII control character. When the terminal is offline, or online with an echoplex system, and the **BACK SPACE** key is pressed while the **CTRL** key is held, the printhead backs up one space. The next printed character "overstrikes" (prints over) the last character. If the terminal is online the ASCII **BACK SPACE** character is transmitted. The other device's reaction to the **BACK SPACE** character is dependent on its setup.



The Back Space Key 2310451-27

ESC

The ESC (Escape) key is used to transmit the escape control character. This key is also used to terminate the command mode.

The Escape Key 2310451-28

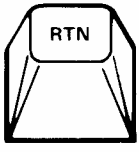
LINE FEED

When your terminal is online, the **LINE FEED** key transmits the line feed character. If local copy is selected, the terminal is offline, or the terminal is online with an echoplex system, the paper on your terminal advances vertically one line when you press the **LINE FEED** key.

The Line Feed Key 2310451-29

RTN

When your terminal is online, the **RTN** (Return) key transmits the CR (carriage return) control character. If local copy is selected, the terminal is offline, or the terminal is online with an echo-plex system, the printhead on your terminal is moved to the left margin when you press the **RTN** key.



The Return Key 2310451-30

PAPER ADV

When the **PAPER ADV** (Paper advance) key is pressed for less than one-half second, the thermal paper is advanced one line. When pressed for more than one-half second, paper advances at thirty lines per second, until the key is released. This key does not transmit a character to the other device.

The Paper Advance Key 2310451-31

STATUS LIGHTS

The three status lights, located to the left of the **UPPER CASE** switch, indicate the status of power to the terminal, the command mode, and the communication line signals.

PWR

The **PWR** (Power) light shows the status of power to the terminal.

On — When the **PWR** light is on, power is applied to the terminal; either ac power from the plug-in transformer or dc power from the optional battery pack.

Off — When the ac transformer is plugged into an ac power outlet and the **PWR** light is off, it indicates that the **POWER** switch is in the off position. The only power applied to the terminal is to the battery recharging circuit. With the optional battery pack in use, when the **PWR** light is off while the **POWER** switch is on, it indicates that the minimum battery operating voltage has been reached. The terminal automatically stops its operation when this condition exists. The **POWER** switch should be placed in the off position as soon as possible after that.

Flashing — With the battery pack in use, a flashing **PWR** light means that the battery pack output voltage is nearing the minimum acceptable operating voltage. When the **PWR** light begins to flash you have at least four minutes to log off before the power supply shuts down automatically to prevent damage to the batteries.

Without the battery pack in use a flashing **PWR** light indicates that the ac input power to the terminal is low (brown-out condition).

CMD

The **CMD** (Command) light shows the status of the command mode.

On — The **CMD** light is on when the **CMD** key is pressed, and the terminal goes into the command mode. The light stays on until the command mode is terminated.

Off — The **CMD** light is off when the terminal is not in the command mode, and you have not requested to enter the command mode by pressing the **CMD** key.

Flashing — When the **CMD** light is flashing, it is indicating that your request to enter the command mode is pending. The light continues flashing until the terminal enters the command mode.

LINE RDY

The **LINE RDY** light shows the condition of the data interface.

On — When the **LINE RDY** light is on, it indicates that the terminal is online and a carrier signal from the other device is present.

Off — When the **LINE RDY** light is off, it indicates that a carrier signal from the other device is not present, or the terminal is offline.

Flashing — When the **CMD** light is on and the **LINE RDY** light is flashing it indicates that the terminal is in the process of either originating or answering a call, or the terminal is in the command mode while connected to the line.

AUDIBLE TONES

The Model 707 produces two audible tones to indicate the completion of activities.

Short tone: A tone of 80 to 100 milliseconds indicates the normal termination of an operation.

Long tone: A one-second tone indicates that an error or an abnormal operating condition has been detected.

The table describes the operating conditions that cause a tone to occur.

Audible Tones

Signal	Cause
Short tone	1) An ASCII **BEL** character has been received. 2) The command mode has been entered. 3) The power-up test has been completed successfully. (This test is described in Chapter 2.)
Long tone	1) One of the following errors has been detected: a) Receive buffer overflow error b) Keyboard buffer overflow error 2) An invalid keyboard entry has been detected in the command mode.

Error Definitions

Receive Buffer Overflow

The receive buffer in your terminal is a storage area for received data. Normally, as your terminal receives data, it removes the data from this buffer and prints it. If anything prevents the printer from operating, or if the buffer is filling faster than the printer can empty it, a receive buffer overflow occurs. Some data may be lost.

Keyboard Buffer Overflow

The keyboard buffer in your terminal stores keyboard data that is being transmitted to another device or printed. If your terminal is prevented from transmitting data while you are entering data, a keyboard buffer overflow occurs.

Invalid Keyboard Entry

Four commands are recognized by the Model 707 terminal: Dial, Originate, Answer, and Test. If these commands are not entered properly (as explained in Chapter 2), the terminal indicates an error.

CONCLUSION

After reading Chapters 1, 2, and 3, you should have a good understanding of your terminal's capabilities. This understanding, combined with the flexibility of the Model 707, makes your terminal a powerful communication tool.

The next chapter of this manual is an important one. Here you'll learn what you can do to keep your terminal operating properly.

4

Care and Cleaning

CLEANING OUTSIDE SURFACES

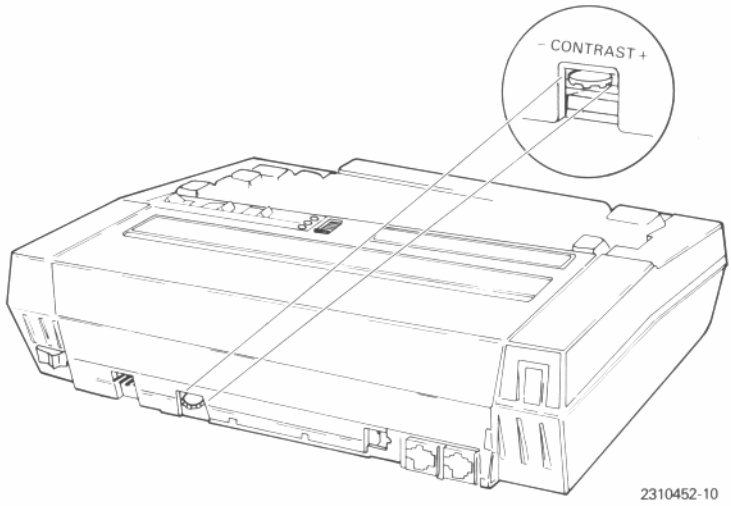
1. Turn the **POWER** switch off, unplug the power cord, and disconnect the communication cable(s).

2. Clean the exterior surfaces of the case with a soft, damp cloth or sponge and any nonabrasive household-type detergent.

Spilling liquids on the keyboard can cause severe damage to electrical components.

PRINT CONTRAST ADJUSTMENT

1. Locate the thumbwheel labeled **CONTRAST** on the back of the terminal.



2. For *darker* print, rotate the thumbwheel as indicated (toward +) while printing, until the character image is dark enough.

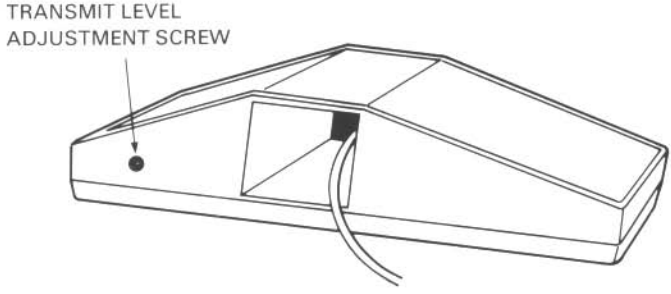
   If the print blurs, you have rotated the thumbwheel too far. Turn it in the opposite direction.

3. For *lighter* print, rotate the thumbwheel as indicated (toward —) while printing, until the character image is light enough.

ACOUSTIC TRANSMIT LEVEL ADJUSTMENT

The acoustic transmit level is factory-calibrated. Adjustment is required only to compensate for unusual conditions in the telephone handset or telephone network.

You can adjust the transmit level with a small flat-bladed screwdriver, through an access hole on the side of the acoustic coupler. To correct connection problems, increase the transmit level by turning the adjustment screw clockwise. To reduce data errors, decrease the transmit level by turning the screw counterclockwise. When making either adjustment, turn the screw by a measured amount, and remember how far you turned it. If making an adjustment doesn't resolve your problem, return the screw to its original position.



2310452-11

REPLACING THE PRINTHEAD

Your Model 707 Data Terminal is equipped with a printhead that you can remove and replace, if damaged.

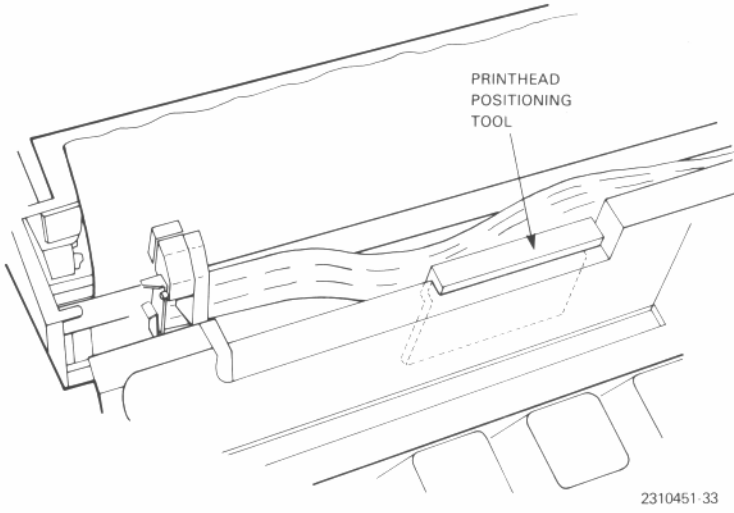
To replace the printhead follow this procedure.

1. Unlatch and open the paper compartment door.

2. If a software cartridge is installed in the terminal, move the printhead to the middle of the carriage, turn the terminal power off, remove the cartridge, and turn the power back on. If a cartridge is not installed, make sure the printhead is at the left margin by pressing the **RTN** key.

3. Remove the plastic printhead positioning tool from the package that contains the new printhead.

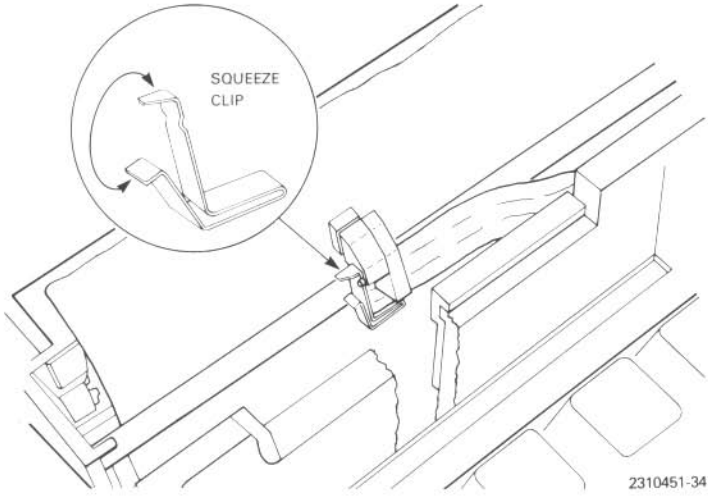
4. Install the printhead positioning tool in the cutout behind the cartridge slot, as shown.



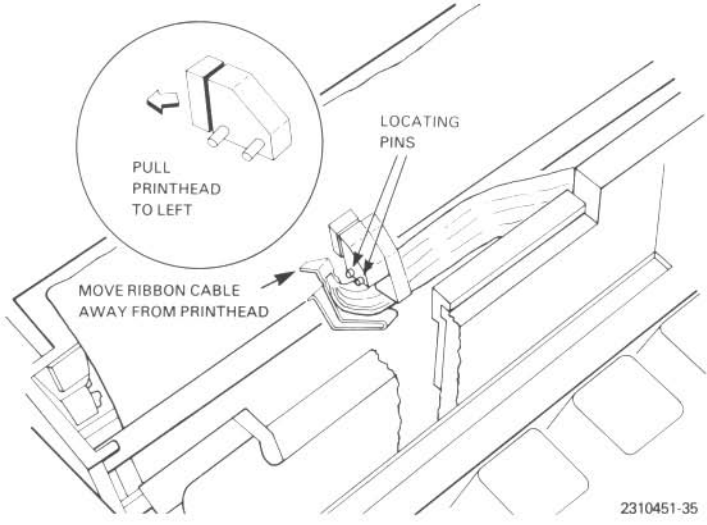
5. Press and hold the space bar until the printhead is stopped by the printhead positioning tool.

6. Place the **POWER** switch in the off position.

7. Locate the metal retaining clip on the left side of the printhead. Squeeze the clip to release it, then move the clip and ribbon cable away from the printhead.



8. Slide the printhead to the left, off of its two locating pins.

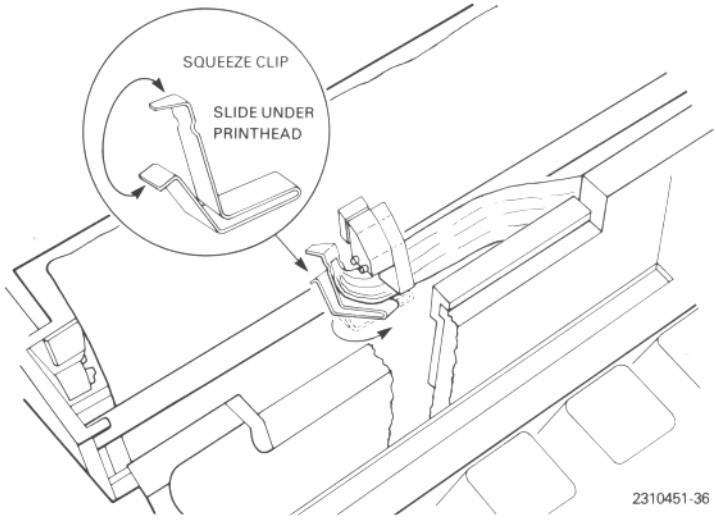


9. Slide a new printhead on the locating pins. The locating pins are more accessible if the printhead assembly is slightly pulled away from the paper.

10. Replace the retaining-clip/ribbon-cable as follows:

    a. Squeeze the clip and slide it under the printhead assembly.

    b. Line up the locating pins with the grooves on the clip while installing it.



11. Press against the vertical portion of the clip to assure the ribbon cable is in full contact with the printhead.

12. Place the **POWER** switch in the on position. This moves the printhead to the left, away from the positioning tool.

13. Remove and discard the printhead positioning tool.

14. Feed the paper through the slot in the paper compartment cover and close and latch the cover.

15. Perform the barberpole test (see Chapter 2) to verify that the printhead makes contact across the entire width of the paper.

RECHARGING THE BATTERY PACK

If the power cord transformer is used to power the terminal, and the battery pack is installed as a backup source of power, the battery is maintained in a fully charged condition. The charge is maintained at the proper level with the terminal **POWER** switch on or off, as long as the power cord is connected.

A fully charged battery pack allows the terminal to print continuously for 1.5 hours. This should provide a normal working day of use. The useful life of the batteries should last longer than three years when they are properly cared for.

Battery Storage

A battery pack should be stored in a cool, dry place. Poor charge retention will result if the battery pack is subjected to high temperatures. If the battery pack does not hold a charge and/or seems to discharge too rapidly, it may be defective.

Recharging for Extreme Battery Use

There are two types of extreme battery use.

- Batteries that are discharged and charged on a daily basis.

  For these applications we recommend that the batteries be recharged for at least 8 hours, and for 48 hours or more every fifth time they are recharged.

- Batteries that are used exclusively as a backup source of power, in a terminal that is constantly powered on.

  This type of usage can reduce battery life to approximately two years. We recommend that the **POWER** switch on the rear of the terminal be switched off whenever the terminal is not in use. This maintains the battery charge; but it reduces the charge voltage and keeps the average temperature inside the terminal at a lower level.

5

Before Calling for Service

INTRODUCTION

If your terminal does not operate properly, your first action should be an attempt to determine if the problem is being caused by your terminal, or by a device that is interfaced with your terminal. To make this determination, test the terminal's operation by running the terminal self-test (refer to "Turning On Your Terminal" in Chapter 2), and the barberpole test (refer to "Command Mode Description" in Chapter 2). These tests are summarized here.

The Power-Up Self-Test Sequence

1. Turn the **POWER** switch off
2. Turn the **POWER** switch on
   a. Three status lights go on
   b. Short audible tone
   c. Printhead moves to left
   d. Paper advances one line
   e. **CMD** and **LINE RDY** lights off
   f. **PWR** light remains lit
   g. Terminal prints: 707

The Barberpole Test Sequence

1. Turn the **POWER** switch on
2. Set **ONLINE** switch to offline
3. Press the **CMD** key
4. Press the **T** key
5. Barberpole is printed
6. Press **ESC** key to stop the test
7. Printout is legible

If the terminal operates properly during these tests, the problem may be in the other device. If the terminal does not operate properly during the testing, use the Problem-Solving Guide as follows.

1. Find the problem in the Symptom column.

2. Follow the steps in the Possible Cause and Corrective Action column.

3. If using an acoustic coupler, refer to the Acoustic Coupler Problem-Solving Guide in this chapter.

4. If the suggested corrective actions don't correct the problem, or if the problem symptom is not listed, return the terminal to your retailer or to a local service representative.

Problem-Solving Guide

Symptom	Possible Cause and Corrective Action
PWR light is not lit	• Power cord is loose. — Ensure power cord is securely inserted in the terminal. — Ensure power cord is securely inserted in the wall outlet. • Bad wall outlet. — Check for power at the wall outlet by plugging a lamp into the outlet, or trying a different wall outlet. • Battery pack needs recharging. — Recharge battery pack (refer to Chapter 4).

Symptom	Possible Cause and Corrective Action
Terminal has failed the power-up self-test	• Isolated failure? — Rerun the power-up self-test. • Repetitive failure? — Contact service.
Paper does not advance	• Paper is not loaded properly. — Load paper as described in Chapter 1.
Audible error indication (long tone)	• An improper command mnemonic has been entered. — Enter a proper command mnemonic (refer to Chapter 2). • A receive buffer overflow error or a keyboard buffer overflow error has occurred. — Isolated failure? No corrective action is necessary. Check, however, to see if received or transmitted data has been lost. — Repetitive failure, while transmitting to or receiving data from a particular host? Notify your contact at the host.
Poor print quality	• Print too light or dark. — Adjust contrast (refer to Chapter 4). — Replace the printhead.

Symptom	Possible Cause and Corrective Action
	• No visible characters while printing. — Check that paper is loaded properly (refer to Chapter 1).
	• Missing dots in the printed characters. — Check the ribbon cable and clip for proper installation. — Replace the printhead. — Contact Service.
	• Adding dots to each printed character. — Contact Service. — Replace the printhead.
Cannot connect with host computer	• Host never answers or phone is answered but you hear no answer tone. — Verify the number you dialed. — Call your contact at the host site to see if system is operative. — Ensure host modem is compatible with a Bell 103-type modem. — Ensure **ONLINE** switch is in online position. — Ensure your parity setting meets the host's requirements.
	• Host carrier is not loud enough.

Symptom	Possible Cause and Corrective Action
	— Try redialing the phone number. — Try another phone line outside of a switchboard. — Try another phone number or a different host. — Notify your contact at the host site.
	• Using the Originate command, you waited too long before pressing CMD and O keys. — Try again.
Data sent to host is not printed but received data is OK	• Local copy is required. — Select local copy.
Each character sent to host is being printed twice	• Local copy is not required. — Deselect local copy.
Printing unintelligible data when offline	• Adding or missing character dots. — Check that ribbon cable and printhead are properly installed. — Replace the printhead. • Data terminal malfunction. — Contact Service

Symptom	Possible Cause and Corrective Action
Printing unintelligible data only when online	• Problems with phone line or switching system. — Try redialing the phone number. — Try another phone that doesn't go through a switchboard. • Someone is on an extension phone or call-waiting feature is interfering. — Use a dedicated telephone.
Error messages or other unexpected responses that are not defined in this manual	• Your terminal only acts as a communications interface to a larger host computer. It sends the characters you type, and prints data that is sent to you. If you can send and receive intelligible information, your terminal is working properly. Difficulties with your application should be discussed with your contact at your host computer. • If you are using an optional cartridge, refer to the *Auto-Access Cartridge User's Manual,* TI Part No. 2310462-0001.

The phone company does not guarantee data communication over voice grade phone lines (that is, those using an RJ-11C voice grade jack). In some rare cases it may be necessary to order a data line with an RJ-45S programmable data jack, or an RJ-41S switched to programmable. This ensures data integrity and/or telephone company support.

Acoustic Coupler Problem Solving Guide

Printing unintelligible information	• Phone not seated properly. — Seat the phone with a Velcro strap. • Transmit level needs adjustment (refer to Chapter 4 for adjustment). • Terminal is in a noisy location. — Move the terminal. — Use the direct-connect interface if possible.
Cannot connect with host computer	• Transmit level needs adjustment (refer to Chapter 4). • Carbon granules in the telephone mouthpiece are packed. — Tap the telephone mouth piece in your hand to unpack the carbon granules. • Carrier signal is too weak. — Try redialing the phone number. — Use a direct-connect interface if possible.

A linear microphone can be installed in a telephone handset to increase the strength of the signal and eliminate some acoustic coupling problems. The Texas Instruments Data Mike linear microphone is available as TI Part No. 2266038-0001.

A

ASCII Code

MSB / LSB	0	1	2	3	4	5	6	7
0	NUL	DLE	SP	0	@	P		p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3	#	3	C	S	c	s
4	EOT	DC4	$	4	D	T	d	t
5	ENQ	NAK	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	'	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
A	LF	SUB	*	:	J	Z	j	z
B	VT	ESC	+	;	K	[	k	{
C	FF	FS	,	<	L	\	l	|
D	CR	GS	-	=	M	]	m	}
E	SO	RS	.	>	N	^	n	~
F	SI	US	/	?	O	_	o	DEL

Printable Characters

Remote Command Control

Printer Control Characters

Codes Generated and Transmitted by the terminal

2310451-37

Control Characters
(From USA Standards Institute Publication X3.4—1968)

ACK	acknowledge	FF	form feed
BEL	bell	FS	file separator
BS	backspace	GS	group separator
CAN	cancel	HT	horizontal tabulation
CR	carriage return	LF	line feed
DC1	playback ON	NAK	negative acknowledge
DC2	record ON	NUL	null
DC3	playback OFF	RS	record separator
DC4	record OFF	SI	shift in
*DEL	delete	SO	shift out
DLE	data link escape	SOH	start of heading
EM	end of medium	STX	start of text
ENQ	enquiry	SUB	substitute
EOT	end of transmission	SYN	synchronous idle
ESC	escape (used for EDC)	US	unit separator
ETB	end of transmission block	VT	vertical tabulation
EXT	end of text		

*Not strictly a control character.

The Model 707 can transmit all 33 USASCII control characters. Six of these are recognized when received:

- BS
- CR
- LF
- BEL
- ENQ
- ESC

B

Specifications

PRINTER

Method:	Nonimpact, thermal paper printing
Character set:	95 printable characters in normal mode with 33 ASCII or CCITT control characters
Printhead:	Thermal with nine elements arranged in a column, electronically heated
Paper:	Thermographic Printing Paper, TI Part No. 972603 (white); 216 mm (8.5 in) x 30 m (100 ft); last 3.0 m (10 ft) color-coded
Printing rate:	45 cps
Printing direction:	Bidirectional
Line length:	Selectable as 80 cpl (10.2 cpi) or 132 cpl (17 cpi)
Horizontal character spacing, center to center ...	
Standard print:	2.49 mm (0.098 in)
Compressed print:	1.49 mm (0.059 in)
Lines per inch:	6 lpi

Vertical line spacing:

Center to center:	4.24 mm (0.166 in) ±0.38 mm (0.014 in)
Carriage return:	Automatic at column 81 or 133
Character size:	5 x 7 matrix with true descenders and underlining
Acoustic noise:	Not to exceed 50 dB (A-weighted)

PHYSICAL DIMENSIONS

Size:	298 mm (11.73 in) wide 215 mm (8.46 in) deep 70 mm (2.71 in) high
Weight: (includes one roll of thermal paper)	2.04 kg (4.5 lb) Wall transformer: 0.64 kg (1.4 lb) Batteries: 1.59 kg (3.5 lb) Maximum total weight: 4.27 kg (9.4 lb)

POWER REQUIREMENTS

Nominal voltage:	Domestic: 120 (90-134) Vac International: 220 (187-230) Vac 230/240 (196-264) Vac
Input frequency:	Domestic: 60 Hz, Single-phase International: 50 Hz, Single-phase
Power consumption:	Domestic: 35 W maximum at 90 Vac International: 35 W maximum at 187 Vac

TRANSIENT RESPONSE

Short-term transients:	±2000 Vdc pulse of 100 ns or less rise time and a duration of 1 μs maximum applied at any point on the input sine wave.
Long-term transients:	±500 Vdc pulse of 1 μs or less rise time and a duration of 10 μs maximum applied at any point on the input sine wave

OPERATING ENVIRONMENT

Temperature:	10°C to 40°C (50°F to 104°F)
Relative humidity:	10% to 95% without condensation
Maximum altitude:	3000 m (10 000 ft)
Vibration:	0.5 G peak-to-peak @ 10 to 60 Hz
Shock:	0 G
Temperature shock:	Operate at 25°C (77°F), 50% relative humidity within 30 minutes after being stored for 2 hours at −30°C (22°F), 50% relative humidity

STORAGE ENVIRONMENT

The terminal, exclusive of the thermal paper, meets the physical and functional requirements of this specification.

With shipping container

Temperature:	−30°C to 70°C (−22°F to 158°F)
Relative humidity:	10% to 95% without condensation
Maximum altitude:	15 000 m (50 000 ft)
Cargo bounce:	Per Mil-Std-810B

Without shipping container

Temperature:	−30°C to 70°C (−22°F to 158°F)
Relative humidity:	10% to 95% without condensation
Shock:	40 G peak for 18 ms duration

DATA TRANSMISSION

Code specification:	ASCII
Standard:	ANSI Standard X3.4−1977

CHARACTER STRUCTURE

Standard:	ANSI Standard for Character Structure and Parity Sense, X3.16−1976. ANSI Standard for Bit Sequency of the USASCII code, X3.15−1976.
Transmitted characters:	One start bit, always 0 or spacing; seven data bits; one parity bit; two stop bits, always 1 or marking

Received characters:	One start bit, always 0 or spacing; seven data bits; one parity bit, one or two stop bits

PARITY STRUCTURE

Transmitted parity:	Selectable for even, odd, mark, or space parity
Received parity:	Not checked

INTERNAL MODEM

Direct-Connected

In a direct-connect configuration, the internal modem is able to receive data, in echo-plex format, with an error rate of less than one bit in error for every 100 000 bits, under the following conditions.

Received signal strength:	> or = −38 dBm
Received signal SNR*:	> or = 15 dB with white or pink noise
Line characteristics:	Back-to-back, C notch filter or average long-haul filter
Transmitter level:	−10 dBm maximum, −18 dBm minimum

Acoustically-Coupled

When using the optional acoustic coupler, the internal modem is able to receive data with a (worst case) Western Electric 500 Series handset, at an error rate of less than 1 bit in error for every 100 000 bits, under the following conditions.

*SNR = Signal-to-noise ratio

Received signal strength:	> or = −36 dBm at TIP and RING
Received signal SNR:	> or = 15 dBm with white or pink noise
Line characteristics:	Back-to-back, C notch filter or average long haul filter
Transmitter level:	100 dB SPL maximum, 95 dB SPL minimum

REGULATORY CODE COMPLIANCE

The terminal meets the requirements of the specifications that apply at the point of sale. Following is a list of the specifications that may apply.

- UL Standard 478 (safety)
- IEC 380 (safety)
- CSA Bulletin 154 (safety), and DOC (communications)*
- VDE Specifications 871/B (EMI), and 800/804 (communications)*
- British Post Office — Datel Services Guide, Technical Guide 2*
- FCC Part 15, Subpart J, docket 20780 (EMI level B), and FCC Part 68 (communications)

*With appropriate transformer in use.

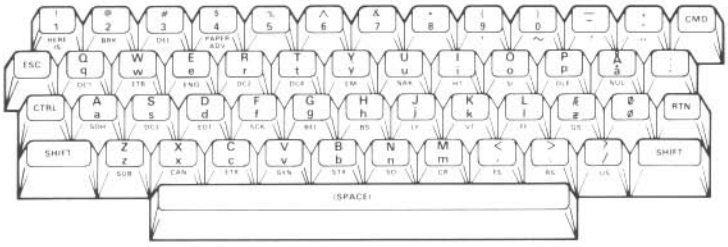
C

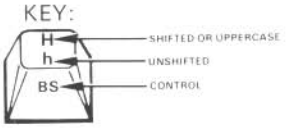
International Keyboards

The Model 709 (International Model 707) can be ordered in the following international versions for operation with character sets and ac power which are standard for the country listed.

- Denmark/Norway
- Germany
- France (Data Processing)
- France (Word Processing)
- Spain
- Sweden/Finland
- Switzerland
- United Kingdom

This appendix shows the keyboard configuration and an ASCII code chart for each international version of the terminal. The keyboard drawings show every character associated with each key; this is not intended to reflect the keyboard's labeling.





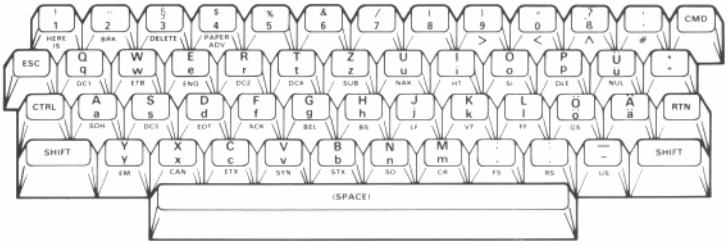
2310451-38

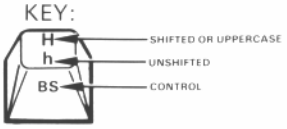
Denmark/Norway Keyboard Configuration

Denmark/Norway Keyboard ASCII Code

COLUMN / ROW	0	1	2	3	4	5	6	7
0	NUL	DLE	SP	0	@	P	`	p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3	#	3	C	S	c	s
4	EOT	DC4	$	4	D	T	d	t
5	ENQ	NAK	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	'	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
A	LF	SUB	*	:	J	Z	j	z
B	VT	ESC	+	;	K	Æ	k	æ
C	FF	FS	,	<	L	Ø	l	ø
D	CR	GS	-	=	M	Å	m	å
E	SO	RS	.	>	N	^	n	~
F	SI	US	/	?	O	_	o	DEL

2310451-39





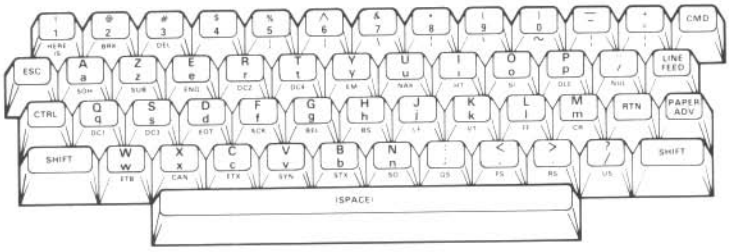
2310451-44

Germany Keyboard Configuration

Germany Keyboard ASCII Code

COLUMN / ROW	0	1	2	3	4	5	6	7
0	NUL	DLE	SP	0	§	P	`	p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3	#	3	C	S	c	s
4	EOT	DC4	$	4	D	T	d	t
5	ENQ	NAK	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	'	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
A	LF	SUB	*	:	J	Z	j	z
B	VT	ESC	+	;	K	Ä	k	ä
C	FF	FS	,	<	L	Ö	l	ö
D	CR	GS	-	=	M	Ü	m	ü
E	SO	RS	.	>	N	^	n	ß
F	SI	US	/	?	O	_	o	DEL

2310451-45



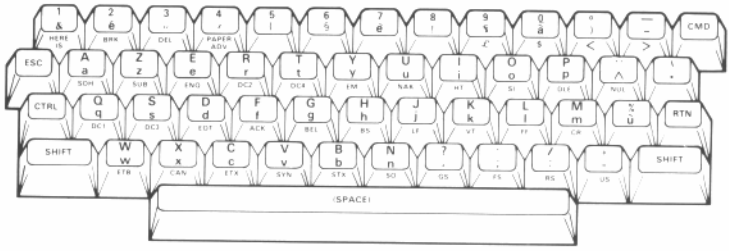
2310451-40

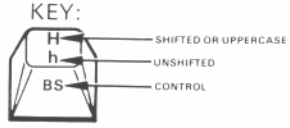
France DP (Data Processing) Keyboard Configuration

France DP (Data Processing) Keyboard ASCII Code

COLUMN / ROW	0	1	2	3	4	5	6	7
0	NUL	DLE	SP	0	@	P	`	p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3	#	3	C	S	c	s
4	EOT	DC4	$	4	D	T	d	t
5	ENQ	NAK	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	'	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
A	LF	SUB	*	:	J	Z	j	z
B	VT	ESC	+	;	K	[	k	{
C	FF	FS	,	<	L	\	l	|
D	CR	GS	-	=	M	]	m	}
E	SO	RS	.	>	N	^	n	~
F	SI	US	/	?	O	_	o	DEL

2310451-41





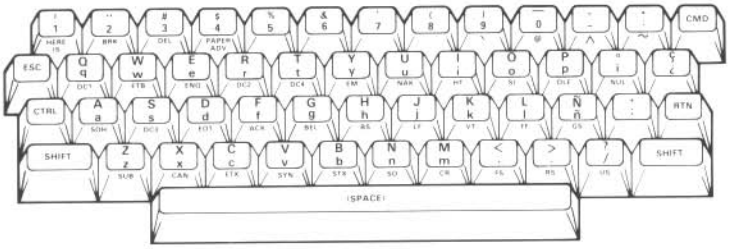
2310451-42

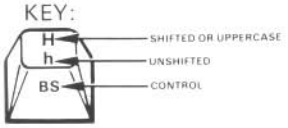
France WP (Word Processing) Keyboard Configuration

France WP (Word Processing) Keyboard ASCII Code

COLUMN / ROW	0	1	2	3	4	5	6	7
0	NUL	DLE	SP	0	à	P	`	p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3	£	3	C	S	c	s
4	EOT	DC4	$	4	D	T	d	t
5	ENQ	NAK	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	'	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
A	LF	SUB	*	:	J	Z	j	z
B	VT	ESC	+	;	K	°	k	é
C	FF	FS	,	<	L	ç	l	ù
D	CR	GS	-	=	M	§	m	è
E	SO	RS	.	>	N	^	n	¨
F	SI	US	/	?	O	_	o	DEL

2310451-43





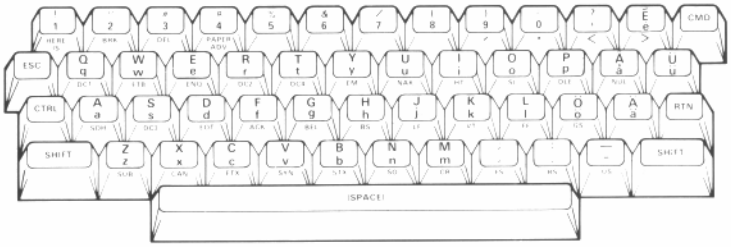
2310451-46

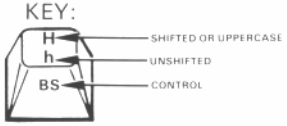
Spain Keyboard Configuration

Spain Keyboard ASCII Code

COLUMN / ROW	0	1	2	3	4	5	6	7
0	NUL	DLE	SP	0	@	P	`	p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3	#	3	C	S	c	s
4	EOT	DC4	$	4	D	T	d	t
5	ENQ	NAK	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	'	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
A	LF	SUB	*	:	J	Z	j	z
B	VT	ESC	+	;	K	¡	k	º
C	FF	FS	,	<	L	Ñ	l	ñ
D	CR	GS	–	=	M	¿	m	ç
E	SO	RS	.	>	N	^	n	~
F	SI	US	/	?	O	_	o	DEL

2310451-47





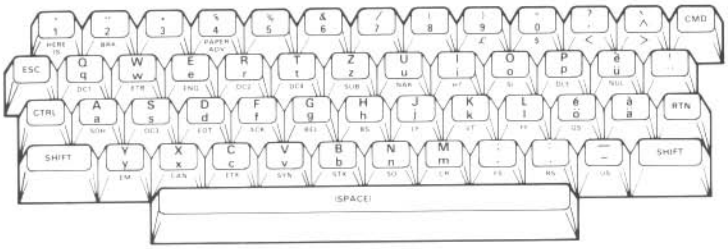
2310451-48

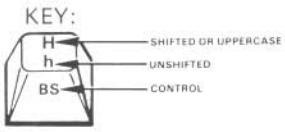
Sweden/Finland Keyboard Configuration

Sweden/Finland Keyboard ASCII Code

COLUMN / ROW	0	1	2	3	4	5	6	7
0	NUL	DLE	SP	0	É	P	é	p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3	#	3	C	S	c	s
4	EOT	DC4	¤	4	D	T	d	t
5	ENQ	NAK	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	'	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
A	LF	SUB	*	:	J	Z	j	z
B	VT	ESC	+	;	K	Å	k	ä
C	FF	FS	,	<	L	Ö	l	ö
D	CR	GS	–	=	M	Ä	m	å
E	SO	RS	.	>	N	Ü	n	ü
F	SI	US	/	?	O	_	o	DEL

2310451-49





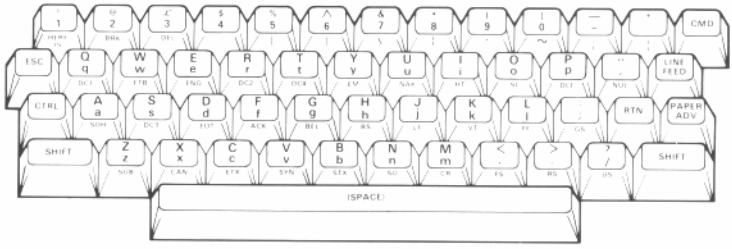
2310451-50

Switzerland Keyboard Configuration

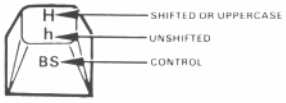
Switzerland Keyboard ASCII Code

COLUMN / ROW	0	1	2	3	4	5	6	7
0	NUL	DLE	SP	0	à	P	`	p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3	£	3	C	S	c	s
4	EOT	DC4	$	4	D	T	d	t
5	ENQ	NAK	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	'	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
A	LF	SUB	*	:	J	Z	j	z
B	VT	ESC	+	;	K	é	k	ä
C	FF	FS	,	<	L	ç	l	ö
D	CR	GS	–	=	M	è	m	ü
E	SO	RS	.	>	N	^	n	¨
F	SI	US	/	?	O	_	o	DEL

2310451-51



KEY:



2310451-52

United Kingdom Keyboard Configuration

United Kingdom Keyboard ASCII Code

COLUMN / ROW	0	1	2	3	4	5	6	7
0	NUL	DLE	SP	0	@	P	`	p
1	SOH	DC1	!	1	A	Q	a	q
2	STX	DC2	"	2	B	R	b	r
3	ETX	DC3	£	3	C	S	c	s
4	EOT	DC4	$	4	D	T	d	t
5	ENQ	NAK	%	5	E	U	e	u
6	ACK	SYN	&	6	F	V	f	v
7	BEL	ETB	'	7	G	W	g	w
8	BS	CAN	(	8	H	X	h	x
9	HT	EM	)	9	I	Y	i	y
A	LF	SUB	*	:	J	Z	j	z
B	VT	ESC	+	;	K	[	k	{
C	FF	FS	,	<	L	\	l	|
D	CR	GS	-	=	M	]	m	}
E	SO	RS	.	>	N	^	n	~
F	SI	US	/	?	O	_	o	DEL

2310451-53

Glossary

acoustic coupler — a device for transmitting data through a telephone handset by converting electrical signals into audio signals, and vice versa.

answerback — a station's specific identifying code, automatically transmitted when a special request signal (the ENQ control character) is received or when the terminal's HERE IS function is initiated.

answerback memory (ABM) — the memory device that retains the terminal's answerback code.

ASCII — (**A**merican **S**tandard **C**ode for **I**nformation **I**nterchange) an 8 level (7 bits + parity) binary code. The ASCII code represents each letter, number, and symbol as a binary number.

baud, baud rate — a measure of signaling speed, equal to the number of discrete conditions or signal events per second.

beep — a short audible tone that alerts the operator of the occurrence of a particular event.

bit — (**bi**nary dig**it**) in the binary notation, a bit is either the character 0 or 1.

buffer — a device or area of memory which is used to hold something temporarily. For example, the *keyboard buffer* contains the ASCII coded data that is entered from the keyboard.

character — one symbol of a set of elementary symbols, such as a letter of the alphabet; a character is made up of a group of seven bits in the ASCII code.

code — a system of symbols (bits) for representing data (characters).

computer — a data processor that can perform substantial computation, including numerous arithmetic operations, or logic operations, without human intervention during the run.

control character — a character whose occurrence in a particular context initiates, modifies, or stops a control function. In the ASCII code, any of the 32 characters in the first two columns of the standard code table.

data — a general term for any type of information.

data communications — the movement of computer-encoded information by means of communication transmission systems.

data link — the communication lines, modems, and communications controls of the stations connected to the line, used in the transmission of information between two stations.

data set — see modem.

duplex — two operations, such as transmitting and receiving; full-duplex means simultaneous transmission and reception, half duplex means transmission or reception, but not both at the same time. Half-duplex is also used (erroneously) to mean the absence of echo-plex, requiring the enabling of local copy.

echo-plex — a communication procedure wherein characters typed by the operator do not print directly on his/her printer, but are sent to a computer which echoes the characters back for printing. This procedure requires full-duplex communication facilities.

EIA — (Electronic Industries Association) the EIA Standard RS-232-C defines interconnection interfaces for terminals. The international counterpart of the EIA is the CCITT (Comite Consultatif Internationale de Telegraphie et Telephonie). The CCITT V24 interface standard is similar to the EIA Standard RS-232-C.

even parity — a system in which a parity bit is added to a word so that the total number of bits set is an even number. Compare with odd parity .

FCC — (Federal Communications Commission) a board of commissioners having the power to regulate all interstate and foreign electrical communications systems originating in the US.

firmware — the terminal's basic instruction set. The firmware program guides the terminal through the series of elementary tasks that make up each terminal operation. This program is contained in the microcomputer.

hardware — physical equipment, as opposed to a computer program or method of use, that is mechanical, electrical, magnetic, or electronic devices. Compare with software.

host computer — (also just host) the primary or controlling computer to which the terminal is connected by cable for communications.

interface — interconnection between two pieces of equipment having different functions.

keyboard — a group of keys on a pad used to input information into a computer system.

line, communications — cables, telephone lines, and so forth, over which data is transmitted to, and received from, the terminal. Also referred to as the "line."

mark — presence of a signal. In telegraphy, mark represents the closed condition or current flowing. It is equivalent to a binary one condition.

mark parity — a system in which the parity bit transmitted with a word is always set to 1.

memory — a storage area for binary data and programs. Also, any device which can store information.

menu — a displayed list of options from which the user selects an action to be performed by typing specified character.

modem — (**mo**dulator/**dem**odulator) a device which modulates and demodulates signals transmitted over communications facilities. The modulator is included for transmission and the demodulator for reception. Also called a data set.

mnemonic — symbol or symbols used instead of terminology more difficult to remember. Usually a mnemonic has one to three letters.

modulation — the process by which some characteristic of one signal is varied in accordance with another signal. This technique is used in modems to make computer signals compatible with communication facilities.

network — a series of points connected by a communication channel.

odd parity — a system in which a parity bit is added to a word so that the total number of 1 bits is odd. Compare with even parity.

offline — (local) refers to equipment or devices not connected to the communications line.

online — refers to equipment or devices connected to the communication lines under control of a processor either directly or through a communication system.

parity check — addition of noninformation bits to data, making the number of 1 bits in each grouping either always odd for odd parity or always even for even parity.

password — a word or string of characters that is recognizable by automatic means and permits a user access to protected storage, files, or input or output devices.

press — to momentarily push down on the designated key and release it. *Press and hold* means push down a key and hold it down while performing some other stated action (similar to the SHIFT key on a standard typewriter).

printer — the device that produces a paper copy of a document (hard-copy output).

software — a set of computer programs, procedures, rules, and associated documentation concerned with the operation of network computers, for example, compilers, monitors, editors, and utility programs. Compare with hardware.

space — usually equivalent to a binary zero condition.

space parity — a system in which the parity bit transmitted with a word is always set to 0.

terminal — a device or computer which may be connected to a local or remote host system, and for which the host system provides computational and data-access services.

USASCII — see ASCII.

Index

PLEASE GIVE US A FEW MOMENTS OF YOUR TIME

This user's manual has been prepared with one major objective in mind; we want to make it easy for you to learn to use your Model 707 Data Terminal.

Please help us to accomplish this objective by taking a few moments to fill in this response sheet. Your honest appraisal of this manual will help us continue to provide you with the most effective possible documentation.

After completing the response sheet, fold it on the two lines (on the reverse side). Staple and mail it.

No postage necessary if mailed in the U.S.A.

1. How much experience have you had with data terminals before using the Model 707?
   ☐ Considerable experience ☐ Some experience
   ☐ No experience

2. In general, how much of this manual was easy to understand and use?
   ☐ All of it ☐ Most of it ☐ Only some of it
   ☐ None of it

   What parts were difficult? _____

   _____

   What improvements would you suggest? _____

   _____

3. How would you rate the illustrations?
   ☐ Excellent ☐ Good ☐ Fair ☐ Poor

   Please explain: _____

   _____

4. Was the manual organized logically?
   ☐ Yes ☐ No

   For example: _____

   _____

5. Any other comments, please.

   _____

   _____

   _____

   _____

THANK YOU FOR YOUR HELP

FOLD

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 6189 HOUSTON, TX

POSTAGE WILL BE PAID BY ADDRESSEE

Texas Instruments Incorporated
Attn: Marketing M/S 7896
P.O. Box 1444
Houston, TX 77251

FOLD

TEXAS INSTRUMENTS

Printed in U.S.A.