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Colin Hinson

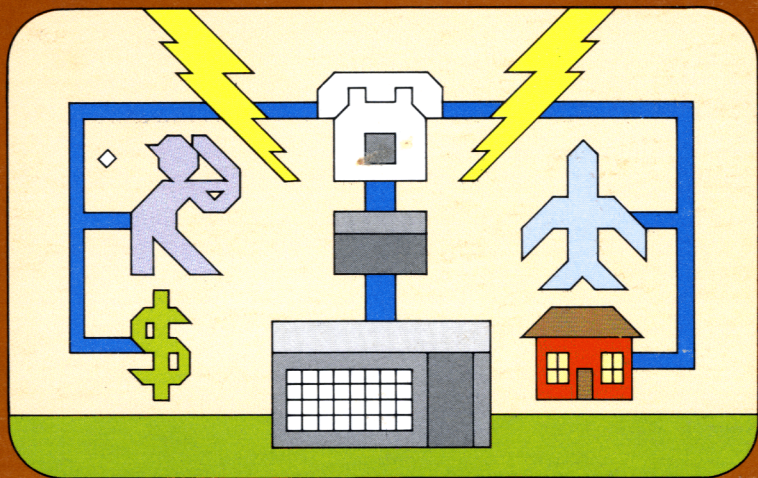
In the village of Blunham, Bedfordshire.



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Terminal Emulator I

Links your Home Computer to the telecommunications world through special data-accessing programs. Lets you select options that make your computer compatible with other systems.



This module requires use of a Texas Instruments RS232 Interface (Model PHP1700 or an equivalent future device) — not included (details inside).

Quick Reference Guide

Communication Characteristics:

<u>Parameter</u>	<u>Acceptable Values</u>	<u>Default</u>
DEVICE	RS232/1,RS232/2 MODEM/1,DSK1, DSK2,DSK3, CS1,OTHER	RS232/1
BAUD RATE	110,300,600	300
DATA BITS	7,8	7
PARITY	ODD,EVEN,NONE	ODD
DUPLEX	FULL,HALF	FULL
ERROR CHK	ON,OFF	OFF

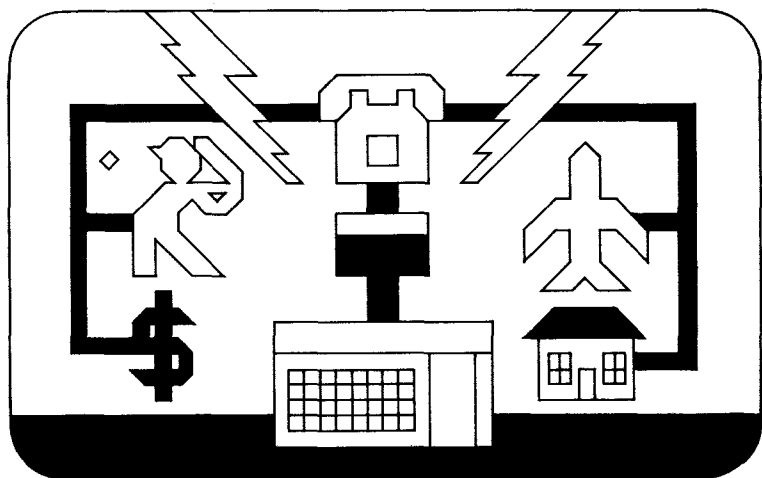
Command Functions:

<u>Command</u>	<u>Keystroke</u>
CMD-1 / CASE	Press SHIFT V (CMD), and then press 1 .
CMD-2 / CNTRL	Press SHIFT V (CMD). Next press 2 , and then press the key for the appropriate control character.
CMD-3 / F6 OUTPUT	Press SHIFT V (CMD). Next press 3 , and then select the output device from the selection list displayed.
CMD-4 / WRAP	Press SHIFT V (CMD), and then press 4 .
CMD-5 / DELETE	Press SHIFT V (CMD), and then press 5 .
CMD-6 / BREAK OR NEW PAGE	Press SHIFT V (CMD), and then press 6 .
CMD-7 / CLOSE DISK	Press SHIFT V (CMD), and then press 7 . <i>Note:</i> All data not saved on a mass-storage device will be lost.



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HOME COMPUTER

Terminal Emulator I



This *Solid State Software*™ Command Module is designed to be used with the Texas Instruments Home Computer. Its preprogrammed solid-state memory expands the power, versatility, and capability of your Home Computer.

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Command Module program and data base contents
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See important warranty information at back of book.

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Today's subscription data base services offer a tremendous amount of information previously available only to large commercial computer systems. Now the Terminal Emulator I *Solid State Software*[™] Command Module can link your Home Computer to the exciting world of telecommunications. Whether you're writing a research paper or cooking a gourmet meal, balancing your checkbook or playing computer games, preparing your company payroll or planning a family vacation, you'll find that subscription data services can be a valuable resource for you and your family.

In addition, the Terminal Emulator I Command Module makes it easier to communicate with other Home Computers and large remote systems. All programming necessary to exchange information is built into the module, eliminating any need for you to develop and enter special data-accessing programs. Not only does this programming save you time and effort, but it also leaves more of your computer's Random Access Memory (RAM) free to receive data.

Note: To activate the Terminal Emulator I Module, a TI RS232 Interface (Model PHP1700* or equivalent future device*) must be attached to your computer. If you are contacting a remote computer via telephone, a TI Telephone Coupler (Modem)* is required in addition to the TI RS232 Interface.

*sold separately



The Terminal Emulator I module includes these features:

- Buffers up to 256 characters of incoming data to allow time to store data, make corrections, or send transmissions without loss of incoming information.
- Transmits control characters that signal the remote computer to perform predefined functions.
- Retains data transmissions for review at your convenience, thus reducing "on-line" time.
- Sends either upper or lower case characters.
- Displays 24 lines of 40 characters per line on the Home Computer.
- Displays data on the screen from top to bottom.
- Scrolls displayed information by page or line and shifts it by five or forty columns.
- Saves received data on a mass-storage device for later use.

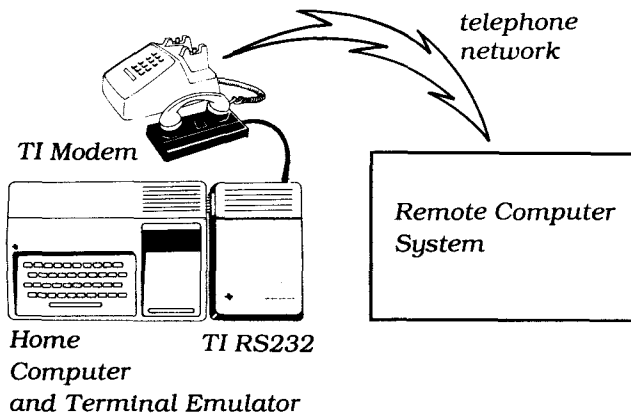
A keyboard overlay is provided to help you identify the keys used with the module. These special keys and their functions are explained in the appropriate sections of this manual.

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SUGGESTED METHODS OF ACCESS

You have access to a variety of computer systems depending on the accessories used with the Home Computer and Terminal Emulator I Command Module. The following diagrams illustrate two typical arrangements.

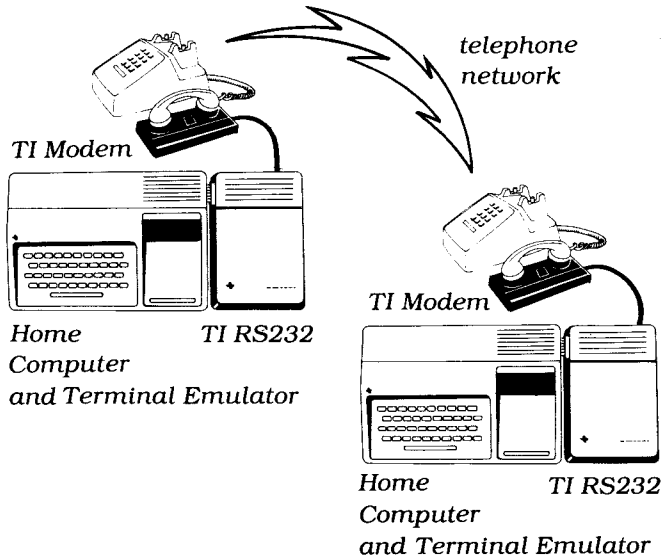
Accessing Subscription Data Services or a Remote Computer System



If your Home Computer is located near the other system, the units can be connected by direct cable, eliminating the need for modems and telephone calls. (See the owner's manual for the TI RS232 Interface or the TI Modem for more information.) To access a data base, you must subscribe to the appropriate service and pay any required fees. Most computer-related magazines include information on available data base subscriptions.



Communicating with a Remote Home Computer



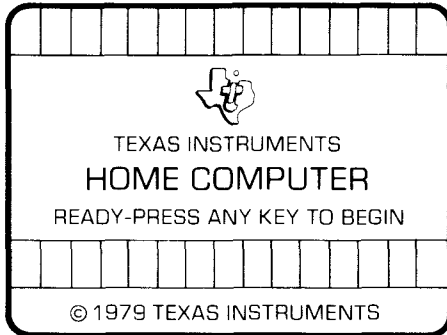
If the two Home Computers are in the same location, they can be connected by direct cable, without modems. In either case, both Home Computers need the Terminal Emulator I module to simplify direct communication and eliminate the need for data-accessing programs.

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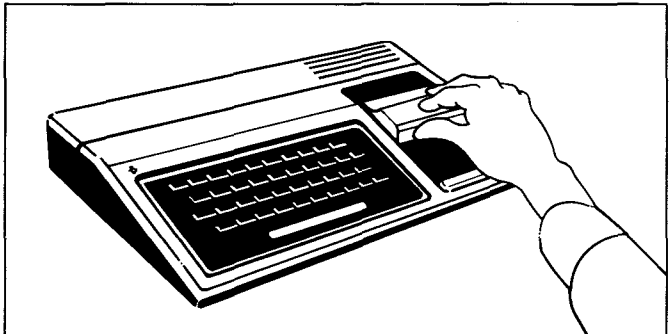
USING THE SOLID STATE SOFTWARE™ COMMAND MODULE

An automatic reset feature is built into the computer. When a module is inserted into the console, the computer returns to the master title screen. All data or program material you have entered will be erased.

Note: Be sure the module is free of static electricity before plugging it into the computer (see page 30).



1. Turn the computer ON and wait for the master title screen to appear. Then slide the module into the slot on the console.





2. Press any key to make the master selection list appear. The title, **TERMINAL EMULATOR I**, is on this list. To select the module, press the key corresponding to the number next to **TERMINAL EMULATOR I**.

(Note: To remove the module, *first* return the computer to the master title screen by pressing **SHIFT Q**. Then remove the module from the slot. If you have any problem inserting the module, or if it is accidentally removed from the slot while in use, please see "In Case of Difficulty" on page 31.)

A SAMPLE APPLICATION

When you select Terminal Emulator I, the title screen appears. Press any key at this time to go immediately to the **COMMUNICATION DEVICE DESCRIPTION** display. (If you wait a few moments, this screen automatically appears.)

COMMUNICATION DEVICE DESCRIPTION

DEVICE = RS 232/1
BAUD RATE = 300
DATA BITS = 7
PARITY = ODD
DUPLEX = FULL
ERROR CHK = OFF

PRESS

ENTER FOR NO CHANGE
1 TO CHANGE DEVICE
2 TO CHANGE BAUD RATE
3 TO CHANGE DATA BITS
4 TO CHANGE PARITY
5 TO CHANGE DUPLEX
6 TO CHANGE ERROR CHK

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For demonstration purposes, suppose that you have subscribed to the "XYZ" Data Service. Before you can communicate with XYZ, a TI RS232 Interface and a TI Telephone Coupler (Modem) must be attached to the Home Computer. (To properly set the modem options, refer to the modem owner's manual.) Then you need to specify certain communication characteristics which are necessary for proper data exchange with the other system. This procedure has the effect of making the Home Computer compatible with the XYZ computer. By referring to the manuals supplied by XYZ, you determine that the Home Computer is to be set at these values:

DEVICE = RS232/1
BAUD RATE = 300
DATA BITS = 7
PARITY = NO PARITY
DUPLEX = FULL
ERROR CHK = OFF

Notice that all these values except PARITY agree with the values shown in the top half of the display. You only have to change those values that are different from the ones displayed. To change PARITY, press 4. The next display shows the acceptable values for PARITY.

PLEASE SELECT THE PARITY
USED FOR ERROR DETECTION

PRESS FOR
1 ODD PARITY [NORMAL]
2 EVEN PARITY
3 NO PARITY



Press **3** for *No Parity* . The module then returns to the COMMUNICATION DEVICE DESCRIPTION display. Parity is now set as NO PARITY. Since all of the parameters are correct, press the **ENTER** key.

The display now shows only the cursor in the upper left-hand corner of the screen. To begin actual communication with XYZ, dial its telephone number, listen for a high-pitched tone, and then correctly place the telephone receiver in the modem cradle.

Next enter the appropriate codes (obtained in advance) to signal XYZ to begin transmission. For example, the code could be "SEND ME SOME INFORMATION." When XYZ receives this message, its computer sends data that is then displayed on the Home Computer screen. To select the desired topic, refer to the instructions supplied by XYZ.

When you have received the information you want, you can stop the transmission using the proper code (again provided by XYZ). In this case, suppose the XYZ instruction manual says to enter "BYE." Use the proper command function (see page 18) and then type BYE and press **ENTER**.

When communicating with a subscription service, it is best to get the data you want as quickly as possible and then end the transmission. This avoids charges for lengthy "on-line" time. With the Terminal Emulator I Command Module, you can access the data base, receive the desired information, "sign off" from the data service, and

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then review the data in the computer's memory at your convenience. Once you've reviewed the data, you can save any information you want on a mass-storage device and then "sign on" again for more.

The remainder of this manual explains how to specify and use the various options included in the Terminal Emulator I module. The section on "Preparing to Send/Receive Data" explains each of the communication characteristics and tells you how to set up the Home Computer for proper data exchange. After the preparations are complete, the section on "Sending/Receiving Data" provides instructions for beginning data exchange, a description of what is displayed on the screen, and information on terminating data exchange. The "Command Mode" section illustrates the keyboard overlay and explains the function of, and procedure for using, each of the six commands. The last section, "Reviewing Data with the Arrow Keys," describes the available methods which can be used to review data in the computer's memory.

PREPARING TO SEND/RECEIVE DATA

To prepare the Home Computer for data exchange, begin by describing the communication characteristics (parameters) of the accessory or computer system with which you're communicating. The module is programmed to assume a certain value for each parameter. These "default" values are shown in the top half of the display. Check these values against the list of required specifications provided with your accessory, remote computer, or data service subscription.



If no change is required, press **ENTER**. If you need to change any of the parameters, press the corresponding number key, as shown in the bottom half of the display. For each option you choose, the display shows a list of all possible selections. The acceptable values for each parameter are listed here.

<i>Parameter</i>	<i>Acceptable Values</i>	<i>Default Value</i>
DEVICE	RS232/1,RS232/2, MODEM/1,DSK1, DSK2,DSK3, CS1,OTHER	RS232/1
BAUD RATE	110,300,600	300
DATA BITS	7,8	7
PARITY	ODD,EVEN,NONE	ODD
DUPLEX	FULL,HALF	FULL
ERROR CHK	ON,OFF	OFF

Device

Device refers to the accessory or mass-storage device to be used for communication. (Only one device can be specified at a time.)

- RS232/1 and RS232/2 refer to the first and second ports on the TI RS232 Interface. Either of these ports can be used to communicate with another computer system or an RS232C compatible accessory.
- MODEM/1 refers to a future TI Modem and is also used to communicate with another computer system.

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- **DSK1, DSK2, and DSK3** refer to TI Disk Memory Drives and are used to load previously saved data into the computer's memory. When you select one of these, the display asks for the file name. (Refer to the disk owner's manual for the correct format.) The next display shows the device name and file name. You can either press **ENTER** if the information is correct or press **1** to change the device name. After you press **ENTER**, the computer searches the disk for the specified file name. If the computer locates the file, the information is loaded into memory. If the file is not located, the error message **ERROR-PLEASE RECHECK** is displayed.
- **CS1** refers to an audio cassette recorder and is also used to load previously saved data. With this option, the display shows the device name and then prompts you through the loading procedure.
- **OTHER** refers to any future device which is compatible with and attached to the TI Home Computer. Any device specified here is used to load previously saved data into the computer's memory. The device description must be provided according to the instructions given in the manual for the device.

Baud Rate

Baud Rate, option 2, is the data transmission speed in bits per second. The higher the Baud Rate, the faster the transmission. The speeds you can specify here are 110, 300, or 600. For remote transmissions over telephone lines, the Baud Rate is determined by the modem. The maximum rate allowed for proper operation of the TI Telephone Coupler (Modem) or a TI Modem is 300.

**Data
Bits**

Data bits are the number of bits (either 7 or 8) used to represent a single character of data. Since the number of data bits required is usually controlled by the remote computer, set this parameter according to the instructions provided by the other system.

Parity

Parity (ODD, EVEN, or NONE) is the means for detecting any errors which might occur during data transmission. To ensure proper reception of data, the computer adds the value of the bits transmitted for each character. This sum should be odd for ODD PARITY and even for EVEN PARITY.

The type of parity you choose usually depends on the other system. Check the system's manual for proper selection. If the remote computer does not require a parity bit, select NO PARITY.

Duplex

The duplex setting is a means of transmission between systems which echoes characters back to the Home Computer display. The other system's requirements control the duplex setting. Check the other computer system's instruction manual for proper selection. *Note:* The TI Telephone Coupler (Modem) or TI Modem should always be set on FULL to assure proper display of the echoed characters.

FULL duplex means the other system echoes all characters you type back to your display. The HALF duplex setting instructs the TI RS232 or the TI Modem to echo the characters you type back to your display as they are transmitted to the other system. For proper communication between two Home Computers, both should specify HALF duplex.

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Error Chk

The ERROR CHECK option is only displayed when an RS232 Interface, or the TI Modem, and 7 data bits are selected. Specify ON to check for EVEN or ODD parity (and framing errors, which occur if the actual transmission, or Baud, rate from the other system does not correspond to the Baud Rate you specified for the Home Computer). When the computer detects an error, a solid square appears in the character position where the error occurred.

If you specify NO PARITY, the error check is automatically OFF and cannot be changed.

After you make all necessary changes to the Communication Device Description, press the **ENTER** key to indicate that your Home Computer is ready to communicate with the other computer system.



SENDING/RECEIVING DATA

The display showing only the cursor in the upper left-hand corner indicates that the computer is now ready for data exchange. Check the other system's instructions to determine the proper procedure for starting data exchange. If you are using a modem and the telephone network to communicate over a longer distance, include the following steps to begin communication:

1. Dial the telephone number of the remote computer system.
2. Verify that the remote computer is ready to communicate (usually signalled by a high-pitched tone).
3. Place the telephone receiver in the modem cradle. (If necessary, refer to the modem manual for detailed instructions.)
4. Begin communication with the remote computer by typing in the codes or other information it requires. These inputs are included with the remote system's instructions.

Data Reception Features

After you have properly accessed the other system, the display shows the data your computer is receiving. The lines appear on the screen one at a time from top to bottom. When the cursor reaches the end of the bottom line, the first two lines at the top of the display are erased. The cursor then returns to the top of the screen to display the next line of data. Otherwise, one blank line is always displayed between the new and old data.

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At times, the system transmitting data to the Home Computer display may decide to clear the display. If the other system sends a control L, the Home Computer recognizes the signal and clears the screen. The cursor moves to the upper left-hand corner of the display.

If the other system wants to move the cursor to the upper left-hand corner of the display ("home" position) and sends a control A, the Home Computer repositions the cursor. The next data received begins at this position.

Important Note: The Terminal Emulator I Command Module sequentially stores incoming data in the Home Computer's available Random Access Memory (RAM). As the data is received, it is added to the end of the most recently received information. When the available RAM is filled, the next data received replaces the oldest data stored. *The Home Computer gives you no warning of full memory.* With 16K bytes of RAM and 40-character line lengths, about 18 pages can be stored before the first page is replaced by new data.



Changing Screen Colors

You can change the foreground and background colors on the Home Computer display. At first, the module automatically displays white characters on a green background. To change one or both of these colors, follow this sequence:

- 1) Hold down the **SHIFT** key and press **V**.
- 2) Press **2**.
- 3) Hold down the **SHIFT** key and press **F** ([, the ASCII character for "escape").
- 4) Press **C**.
- 5) Press a character corresponding to the desired foreground (character) color.
- 6) Press a character corresponding to the desired background (screen) color.

Appendix B lists the characters assigned to each of the 16 available colors.

Note: If the other system requires that **DUPLEX** be set to **FULL** and does not accept the control [(escape) code, screen colors cannot be changed. The other computer system can change the screen colors at any time.

Ending Data Exchange

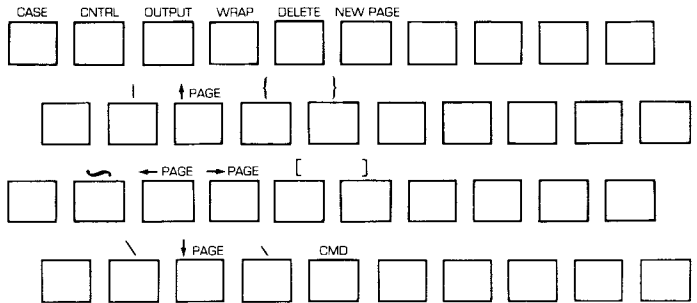
After receiving your desired information, you usually have several methods available for terminating the data exchange. If you are using a modem, you can switch off the modem and hang up the telephone to end the output from the other system. For detailed instructions on the proper sign-off procedure, always refer to the other system's instruction manual.

When you have completed the data exchange, the last information received is still displayed. At this point, you may want to review the pages of information, or you may want to store the data on a mass-storage device. Both of these alternatives are explained in the following sections.

COMMAND MODE

When exchanging information, you may find it necessary to send various instructions to the other system. For example, you may want to correct a typing error or change the case of the characters (if you are sending data), or to access a mass-storage device or send a signal to stop the transmission (if you are receiving data).

A keyboard overlay is provided to help you identify the keys used with the module. Below is a picture of the keyboard with the overlay in place.



The number keys **1** through **6** are labeled for the various Command functions available with the **SHIFT V** (CMD) key. (Command 6 also functions as a BREAK key as explained on page 25.) The arrow keys — **SHIFT E** (↑ PAGE), **SHIFT S** (← PAGE), **SHIFT D** (→ PAGE), **SHIFT X** (↓ PAGE) — scroll and shift the information shown on the display allowing you to review all of the data stored in memory. The other keys labeled on the overlay are members of the standard ASCII Character Set which are not included in the Home Computer's resident character set, but are active for use with the Terminal Emulator I Command Module.



You can select a command at any time after you have finished specifying the communication parameters. To access any of the command functions, first hold down the **SHIFT** key and press **V** (CMD). The cursor blinks to indicate that you can select a command. Then press the appropriate arrow key or number from 1 through 6 (see below). For best results, select command options when the remote computer pauses while sending data. The Home Computer stores incoming data in a *temporary* 256-character buffer. This allows about eight seconds of transmission (at 300 Baud) in Command Mode before the buffer overflows and the first data received is lost.

After a command is completed and the cursor stops blinking, the information stored in the buffer is quickly displayed. When the display catches up to the remote system's transmissions, the characters appear at normal speed. If some of the information seems to be missing, the data transmitted probably exceeded the buffer's limit.

If you press **SHIFT V** (CMD) and then decide not to select a command, press **SHIFT V** (CMD) again to leave the Command Mode.

The six available commands are:

CMD-1 CASE

Command 1 controls the case of the characters to be sent to the remote system. The module automatically begins sending upper case letters. To change to lower case, press **SHIFT V** and then **1**. To send upper case again, press **SHIFT V** and **1** again. *Note:* The remote computer controls the case of the characters you receive.

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CMD-2 CNTRL

Command 2 prepares the computer to send *control characters*. These signal a remote computer or device to perform a predefined function. To send a control character, press **SHIFT V** and then **2**. The screen and character colors then reverse to indicate that the next character to be sent is a control character. (For example, if the screen is green with white characters, pressing CMD-2 changes the screen to white with green characters.)

The character sent depends upon your desired signal. The standard ASCII control characters are listed at the end of this manual (see page 28).

Note: Since the meaning of the control characters is determined by the remote computer or device, check the necessary manual to select the characters to be sent. After a control character is sent, the screen and characters return to their previous colors, and the computer leaves Command Mode.

CMD-3 OUTPUT

Command 3 allows you to output data currently stored in the Home Computer RAM. This data could have been input to the memory in several ways, such as from another computer system via the RS232 or from a cassette tape or disk. Then with Command 3 you can transmit a page of currently displayed data to another computer, printer, or mass-storage device.



To activate this command, press **SHIFT V** and then **3**. The **OUTPUT DEVICE SELECTION** list replaces the data shown on the display.

OUTPUT DEVICE SELECTION	
PRESS	FOR
1	TP
2	CS1
3	CS2
4	DSK1
5	DSK2
6	DSK3
7	OTHER
8	PREVIOUS
PREVIOUS =	

Select the output device by pressing its corresponding number key.

- TP refers to the TI Solid State Thermal Printer.
- CS1 and CS2 refer to cassette tape recorders attached to the Home Computer via the Cassette Interface Cable.
- DSK1, DSK2, and DSK3 refer to TI Disk Memory Drives. If you select one of these, you are prompted for the file name. *Note:* After output to a disk is completed, you need to close the file by selecting an output device other than the disk, even one that is not attached to the computer. If you select a device which is not attached, an error message is displayed, but the file is still closed. Then when you leave the Command Module, no data is lost. Pressing **SHIFT V (CMD)** and then **7** also closes the disk file. In this case, the computer returns to the master title screen and any data not saved on a mass-storage device is lost. If you do not close the file with one of these methods, all of the data on the disk is lost when you terminate the session.

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- **OTHER** refers to any accessories attached to the TI RS232 Interface or any other future device not included here. With **OTHER**, the display asks for the device name. Consult the appropriate user's manual for device name format and options.

For example, suppose you want to output data loaded into the computer's memory from a cassette tape (**DEVICE = CS1**), and the device or system to receive the information is connected to the TI RS232 Interface. When the display prompts you for the device name, **RS232/1.BA = 300.DA = 7.PA = O** would be a typical input, specifying not only the device name but the optional parameters as well. See the TI RS232 owner's manual for a more detailed explanation of the unit's specifications.

- **PREV** refers to any previously specified output device. The device name you specified is listed after **PREVIOUS =**. This option saves time since it's not necessary to reenter the device name.

If you select a device which is not attached to the Home Computer or which is not properly specified, the screen displays the error message, **ERROR-PLEASE RECHECK**. The module then leaves Command Mode.

After you select a proper device name and supply any additional information requested, the display shows the message **PLEASE WAIT WHILE WRITING DATA**. For any device except the TI Thermal Printer, the module outputs each line exactly as the other system transmitted it to the Home Computer's memory. If the first or last line shown on the screen is only part of the line as stored in memory, the module outputs the entire line. If the specified device is the Thermal Printer,



the module automatically reformats the data in memory and prints 32 characters per line.

When the computer finishes writing a page, the module leaves Command Mode. To store or print additional data, use the arrow keys to position the required data on the display. Then press **SHIFT V** and **3**.

CMD-4 WRAP

Command 4 controls the status of the wrap-around feature. As you view previously stored data, WRAP determines the length of the displayed lines. The module always begins with WRAP automatically ON. With the wrap-around feature ON, the module continues long lines of text on the next line instead of extending the text beyond the right screen boundary. When you press **SHIFT V** and **4**, the WRAP feature changes to OFF. With the wrap-around OFF, the text is displayed as transmitted by the other system and may extend beyond the right screen boundary.

When printing or storing data, select ON for 40-character lines and OFF for lines with a maximum of 132 characters. With the wrap-around feature OFF, you can print or store greater amounts of material with Command 3. The longer line is also desirable if the text is in tabular form.

When you are receiving data and WRAP is ON, the module automatically displays the information in a 40-character line format. Words are not usually divided on the screen. When the input reaches the end of a 40-character line, all characters after the last space are moved to the next line. Occasionally, more than 40 characters may appear without any spaces. In this case, the final word on the line is automatically divided, and part of it is displayed on the next line.

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If WRAP is OFF and you are receiving data, the module displays the first 39 characters of the incoming line of information. The 40th character position shows the rest of the transmitted line one character at a time. The information is stored in memory in the same line lengths in which it was transmitted and may extend beyond the right display boundary. To view the data which extends beyond the screen boundaries, use the arrow keys as explained in the section, "Reviewing Data with the Arrow Keys." Since many systems pause after sending 24 lines of data, you might wish to review the data at the end of each page.

CMD-5 DELETE

Command 5 transmits a DELETE (ASCII 127) to the remote computer. This is useful if you are transmitting a code or other information to another system. If that computer accepts the command, it deletes the most recent character you sent. You can use this feature to correct typing errors. Press **SHIFT V** and then **5** each time you want to erase a character. Repeat this command as needed to erase entire words.

CMD-6 BREAK/ NEW PAGE

Command 6 functions in two different ways, depending on the device selected from the COMMUNICATION DEVICE DESCRIPTION display. This command is used to either signal the other computer to stop transmitting data (BREAK), or to load data that you've previously saved on a mass-storage device (NEW PAGE) for review, retransmission, etc.



BREAK: When you prepare the computer to send/receive data and specify the device as RS232/1, RS232/2 or MODEM/1, CMD-6 functions as a BREAK signal. Press **SHIFT V** and **6** to get the attention of the other computer. Some of the meanings for BREAK are: all data transmission is terminated, all transmission is delayed until you send a message, or a selection list is displayed for changing topics. The results obtained by pressing CMD-6 (BREAK) depend on the other computer system.

NEW PAGE: When you specify any device other than RS232/1, RS232/2 or MODEM/1, the definition of CMD-6 changes to NEW PAGE. This command is useful when you load data from a file that exceeds the RAM capacity of your computer. When the memory is full (or when the end of the data record is reached), the computer beeps. (You can then use the arrow keys to scroll and shift the data for review.)

If your file contains additional data not yet stored in the computer's memory, pressing **SHIFT V** and then **6** loads the next 24 lines (as formatted by the original sending system) of the saved data. These lines replace the oldest data in RAM. After the information is loaded, the display returns to the point in the data where you pressed CMD-6. (Again, use the arrow keys to scroll and shift the information.)

Press **SHIFT V** and **6** each time you want to load an additional 24 lines into the computer's memory. If you press CMD-6 after you reach the end of a data file, the computer beeps and leaves Command Mode.

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CMD-7 CLOSE DISK

Command 7 closes output to a TI Disk Memory Drive and returns the display to the master title screen. If you are saving data in the computer's memory onto a disk with CMD-3, you need to close the file or all of the data on the disk is lost when you terminate the session. *Note:* When you close a file with CMD-7, all data not saved on a mass-storage device is lost.

REVIEWING DATA WITH THE ARROW KEYS

In certain instances, your data may be displayed on lines containing more than 40 characters or stored on more than one page. With the arrow keys indicated on the overlay, you have several ways to view stored data. Each time you use an arrow key, the computer leaves Command Mode.

SHIFT V (CMD) AND SHIFT E (↑ PAGE) OR SHIFT X (↓ PAGE)



To scroll text upward to view the next page or downward to view the preceding page, use CMD or CMD . Press **SHIFT V (CMD)** followed by **SHIFT E (↑ PAGE)** or **SHIFT X (↓ PAGE)** to scroll the text one page at a time.

SHIFT E (↑ PAGE) SHIFT X (↓ PAGE)

Using the up and down arrow keys without first pressing **SHIFT V (CMD)** scrolls the text vertically one line at a time. Press **SHIFT E (↑ PAGE)** to view the next line or **SHIFT X (↓ PAGE)** to view the preceding line.



SHIFT V
(CMD)
AND
SHIFT S
(← PAGE)
OR
SHIFT D
(→ PAGE)

CMD  or CMD  shifts the text to the left or right, forty columns at a time, for viewing longer lines. These keys are useful for viewing text in tabular form. Press **SHIFT V** followed by **SHIFT S** (← PAGE) or **SHIFT D** (→ PAGE). Note, this feature can be used only when the wrap-around feature is OFF.

SHIFT S
(← PAGE)
SHIFT D
(→ PAGE)

To shift text five columns at a time, press **SHIFT S** (← PAGE) or **SHIFT D** (→ PAGE). In this case the arrow keys are *not* preceded by **SHIFT V** (CMD). This may help you maintain continuity when viewing lines with more than 40 characters. The wrap-around feature must be OFF before shifting text left or right.

If you press any arrow key which would shift or scroll the display beyond the text boundary, the computer gives a warning beep and leaves Command Mode.

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Appendix A

Standard ASCII Control Characters

The first 32 members of the ASCII Character Set are the control characters recognized by many computer systems. Always refer to the instructions provided by the other system for a complete list of its control characters. The first column on this table gives the decimal value of the control character. The mnemonic code column gives abbreviated meanings to aid you in remembering the characters. The third column lists the control characters. The comments column explains the standard meaning of each character as used by most computer systems. For example, to send an "end of transmission," you would press **SHIFT V**, then **2**, and then **D**.

<i>Decimal</i>	<i>Mnemonic Code</i>	<i>Control Character</i>	<i>Comments</i>
0	NUL	@	Null
1	SOH	A	Start of heading
2	STX	B	Start of text
3	ETX	C	End of text
4	EOT	D	End of transmission
5	ENQ	E	Enquiry
6	ACK	F	Acknowledge
7	BEL	G	Bell
8	BS	H	Backspace
9	HT	I	Horizontal tabulation
10	LF	J	Line feed
11	VT	K	Vertical tabulation
12	FF	L	Form feed
13	CR	M	Carriage return
14	SO	N	Shift out
15	SI	O	Shift in
16	DLE	P	Data link escape
17	DC1	Q	Device control 1 (X-ON)
18	DC2	R	Device control 2
19	DC3	S	Device control 3 (X-OFF)
20	DC4	T	Device control 4
21	NAK	U	Negative acknowledge
22	SYN	V	Synchronous idle
23	ETB	W	End of transmission block
24	CAN	X	Cancel
25	EM	Y	End of medium



Decimal	Mnemonic Code	Control Character	Comments
26	SUB	Z	Substitute
27	ESC		Escape
28	FS	\	File separator
29	GS]	Group separator
30	RS	^	Record separator
31	US	—	Unit separator

Appendix B

Characters for Specifying Colors

Four characters are assigned to each of the 16 Home Computer colors, as listed below. Press **SHIFT V (CMD)**, **2**, **SHIFT F (|)**, **C**, and then two of the following characters to change the foreground and background screen colors.

Color	Space Key	Possible Characters
Transparent		0 @ P
Black	!	1 A Q
Medium Green	"	2 B R
Light Green	#	3 C S
Dark Blue	\$	4 D T
Medium Blue	%	5 E U
Dark Red	&	6 F V
Cyan	'	7 G W
Medium Red	(8 H X
Light Red)	9 I Y
Dark Yellow	*	: J Z
Light Yellow	+	; K [
Dark Green	,	< L \
Magenta	-	= M]
Gray	.	> N ^
White	/	? O —

Now you can link your Home Computer to the exciting world of telecommunications without having to develop and enter special data-accessing programs. Whether you're learning to play backgammon or balancing a checkbook, preparing a company payroll or buying a home, the Terminal Emulator I Command Module gives you access to subscription data services, other Home Computers, and large remote systems.

Terminal Emulator I module enables you to specify certain communication characteristics to make your Home Computer compatible with other computer systems. Some of the module features are:

- Buffers up to 256 characters of incoming data
- Transmits control characters that signal the remote computer to perform predefined functions
- Retains data transmissions for review at your convenience, thus reducing "on-line" time
- And much more

Note: To activate the Terminal Emulator I Command Module, a TI RS232 Interface (Model PHP1700 or equivalent future device) must be attached to your computer. If you are contacting a remote computer via telephone, a TI Telephone Coupler (Modem) is required in addition to the TI RS232 Interface. These accessories are sold separately.

Adds 12K bytes of active memory with stored program to your TI Home Computer.

Command Module program and data base contents
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