TEXAS INSTRUMENTS
COMPUTER 99/8

Getting
Started

Section title
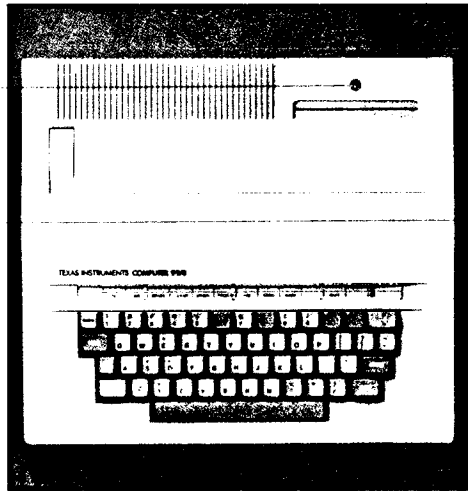
General Information

Photography

Specific Information

TEXAS INSTRUMENTS COMPUTER 99/8

Helpful Tips

Tip: Notice that some of the mathematical operation keys are used in combination with the SHIFT key and some are not.

Major Section Divisions

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Mathematical Operation Keys

The mathematical operation keys instruct the computer to add, subtract, multiply, divide, raise a number to a power (exponentiation), and compare values.

Example	Operation Performed
A + B	Adds A and B
A − B	Subtracts B from A
A * B	Multiplies A and B
A / B	Divides A by B
A = B	Compares A and B for equality
A>B	Checks to see if A is greater than B
A<B	Checks to see if A is less than B
A> B	Checks to see if A is greater than or equal to B
A< B	Checks to see if A is less than
A<>B	Checks to see if A is not e
A^B	Raises A to the pow

Tour of the Keyb

Texas Instruments
Computer 99/8

Getting Started

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The Texas Instruments Computer 99/8 generates and uses radio frequency (RF) energy. **If not installed and used properly** (as outlined in the instructions provided by Texas Instruments), this equipment may cause interference to radio and television reception.

This equipment has been tested and found to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of FCC Rules. These rules are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause interference to radio or television reception (which you can determine by turning the equipment off and on), try to correct the interference by one or more of the following measures.

• Reorient the receiving antenna (that is, the antenna for the radio or television that is "receiving" the interference).

• Change the position of the computer with respect to the radio or television equipment that is receiving interference.

• Move the computer away from the equipment that is receiving interference.

• Plug the computer into a different wall outlet so that the computer and the equipment receiving interference are on different branch circuits.

If these measures do not eliminate the interference, please consult your dealer or an experienced radio television technician for additional suggestions. Also, the Federal Communications Commission has prepared a helpful booklet, "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from

The US Government Printing Office
Washington, D.C. 20402

Please specify Stock Number 004-000-00345-4 when ordering copies.

Warning: This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

In order to prevent possible interference with other television sets in your area, please observe the following FCC restrictions:

1. DO NOT add any extra lead-in wire to the television interconnect cable when attaching the Video Modulator to your television set.

2. DO NOT connect the Video Modulator to more than one television set at a time.

3. DO NOT attach the television interconnect cable from the Video Modulator to any television antenna lead-in wire or cable television outlet.

4. DO NOT connect any wires other than the Video Modulator cables to your television set and/or antenna when you are using the computer system.

- **Software Availability—** The Computer 99/8 is supported by a large library of TI computer software. Software packages in Information Management, Education, Entertainment, and Computer Programming are available on Solid State Cartridge, diskette, and cassette media.

- **Keyboard—**The Computer 99/8 has a full-size, easy-to-use 54-key keyboard.

- **Display—**The 99/8 displays program lines in a 24-row, 40-column format (Text Mode), using a handsome character set with true lower-case letters. The computer can use either a monitor or a television as a display unit.

- **Color and Graphics—**The 99/8 displays in 16 colors and uses subprograms to control graphics. A few of the graphics features are "sprites" (smoothly moving graphics), character definition, and 6 separate graphics modes, including a High-Resolution Mode of 192×256 pixels.

- **Sound and Speech**—The 99/8 can generate sound from 110 cycles per second (the second A below middle C) to beyond the highest range of human hearing. Built-in *Solid State Speech*™ synthesis reproduces human speech electronically, accurately, and realistically.

- **Memory—**The 99/8 has 220 kilobytes of built-in ROM (225,280 bytes of Read-Only Memory). In addition, the computer has 80 kilobytes of RAM (81,920 bytes of Random-Access Memory—64K of CPU RAM, 16K of VDP RAM), which eliminates the need for memory expansion for most applications. If you need more memory, the 99/8 can access up to 15 megabytes (approximately 15 million bytes) of total RAM.

- **Built-In Programming Language—**TI Extended BASIC II, a versatile and powerful version of the BASIC programming language, is resident in the computer console.

- **Additional Programming Languages—**The built-in p-System,* the Universal Operating System,* allows other programming languages, such as UCSD Pascal† and TI PILOT (both on diskette, sold separately) to be used. You can also use preprogrammed software packages written for the p-System.

- **Joysticks—**An outlet is provided for the Joystick Controllers, which are principally used for arcade games.

- **Expandability—**The built-in *HEX-BUS* ™ Interface enables you to use the low-cost *HEX-BUS* peripherals; outlets for connecting a cassette recorder and future peripheral devices are also included.

- **Technology—**The Computer 99/8 uses the 16-bit TMS9995 microprocessor for fast program execution.

* p-System and Universal Operating System are trademarks of SofTech Microsystems, Inc.

†UCSD Pascal is a trademark of the Regents of the University of California.

Features

The Computer 99/8 is easy to set up, as illustrated on the following pages. The photograph above gives you an overview of the parts of the computer system and how they fit together.
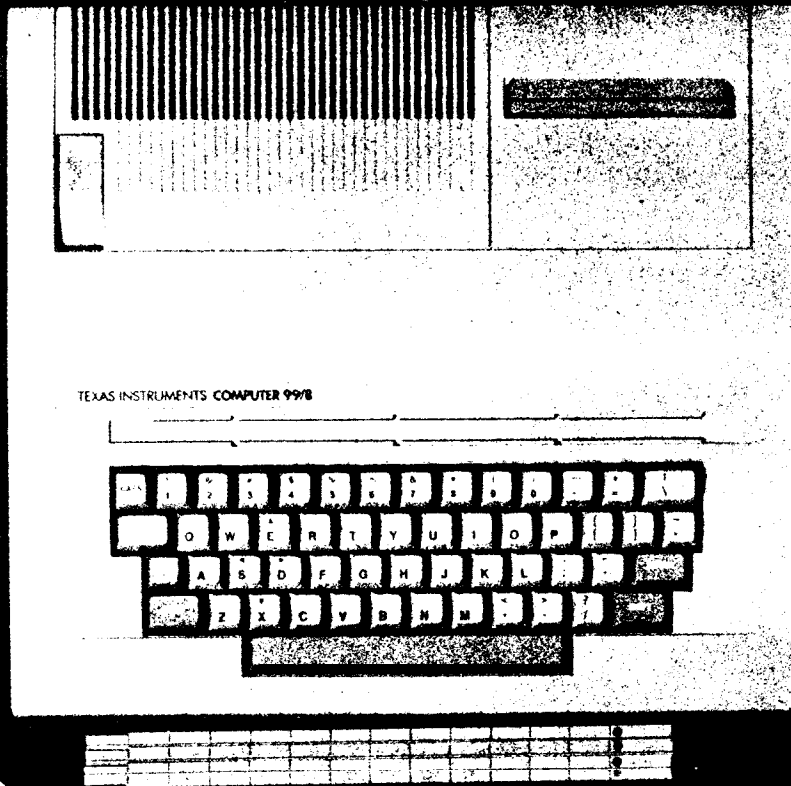
As you unpack the computer, you will find the following items:

Documentation—The documentation is separated into three parts.

1. *Getting Started* (this book)
   • Set-Up Instructions
   • Tour of the Keyboard
   • Peripherals
   • Cassette Recorder Information
   • Service and Warranty Information
2. *Programmer's Guide*
   • General Information—TI Extended BASIC II
   • Reference Guide—TI Extended BASIC II
   • p-System
   • Appendices
3. *Quick Reference Guide*

Computer 99/8—The Computer 99/8 consists of a keyboard and the electronic components of the computer including the TI Extended BASIC II programming language and the p-System.

Slip-in Overlays—The slip-in overlays slide into the slot above the keyboard. They identify function and control keys. There is one overlay for TI Extended BASIC II and one for the p-System. Some blank overlays are also included. Only one overlay is used at a time.

Video Modulator—The Video Modulator connects the Computer 99/8 to your television set. Set the switch to "MODULATOR" to use

the computer or to "TV ANTENNA" for television viewing.

Power Cord with Transformer—The power cord with transformer connects the computer to a "live" electrical outlet.

Additional Equipment—(Not included with computer):

A Monitor or Television (Required)—You can use either a monitor or a television set as the display unit for the computer. The display is in color if a color monitor or a color TV is used; if a black-and-white monitor or TV is used, the display is in black and white.

Extra Accessories or Peripherals (Optional)—These are presented in detail on page 42.

Tip: Find a good location for your computer—a desk or table that allows room for all the parts of the computer system. To allow proper ventilation, do not place the computer on a carpet or other soft surface.

Tip: Record the serial number of your computer and the date of purchase in the box provided on page 60.

Setting Up

If you purchased a monitor to use with your computer, follow the directions in this section. If you plan to use a television with your computer, go on to the next section, "Important Information Concerning Your Television."

If you are using a monitor, you will not use the Video Modulator that is packed with the computer. Save the modulator in case you decide to use a television with your computer sometime in the future.

Unpack the monitor, the monitor cable, and the owner's manual. Notice that the monitor cable has different connectors at each end.

Find a good location for the monitor in relation to the computer so that the screen is easily visible. Then follow the two steps below.
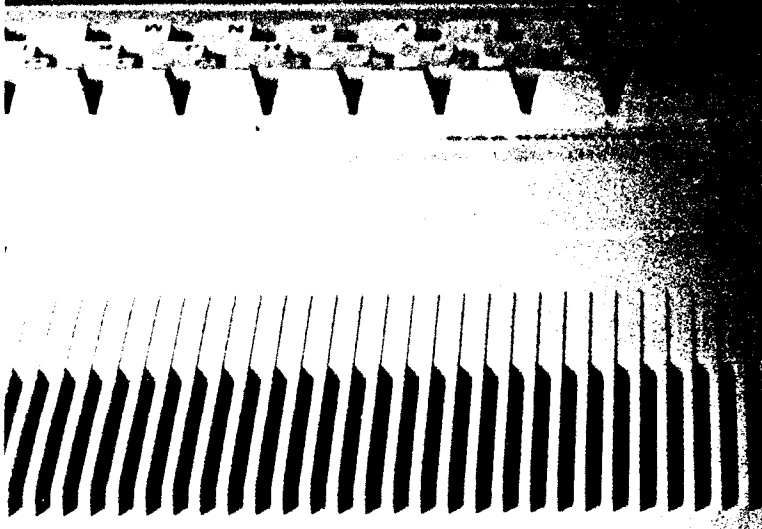
Locate the two-plug end of the monitor cable. This end connects to your monitor.

1. Connect the smaller plug to the outlet labeled "AUDIO" on the back of your monitor as shown.

2. Connect the larger plug to the outlet labeled "VIDEO" on the back of your monitor as shown.

Make sure the switch on the back of the monitor is set to "75Ω," not to "HIZ."

Note: Do not attach the computer directly to a television set with the monitor cable unless your television has a special direct video input. In most cases, the Video Modulator must be used when connecting the computer to a television set.

Refer to the owner's manual that accompanies the monitor for information about obtaining the best possible picture.

VHF screw terminals

Coaxial connector
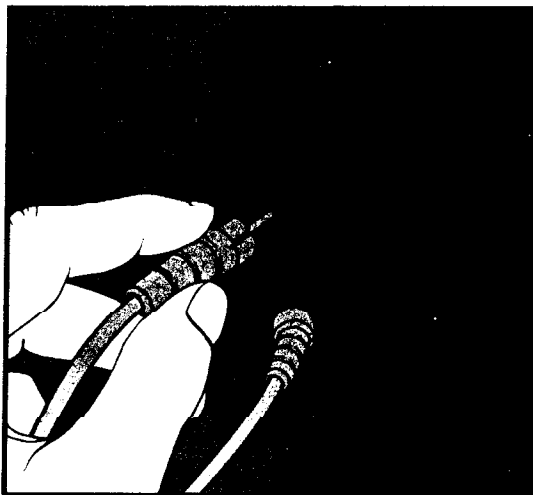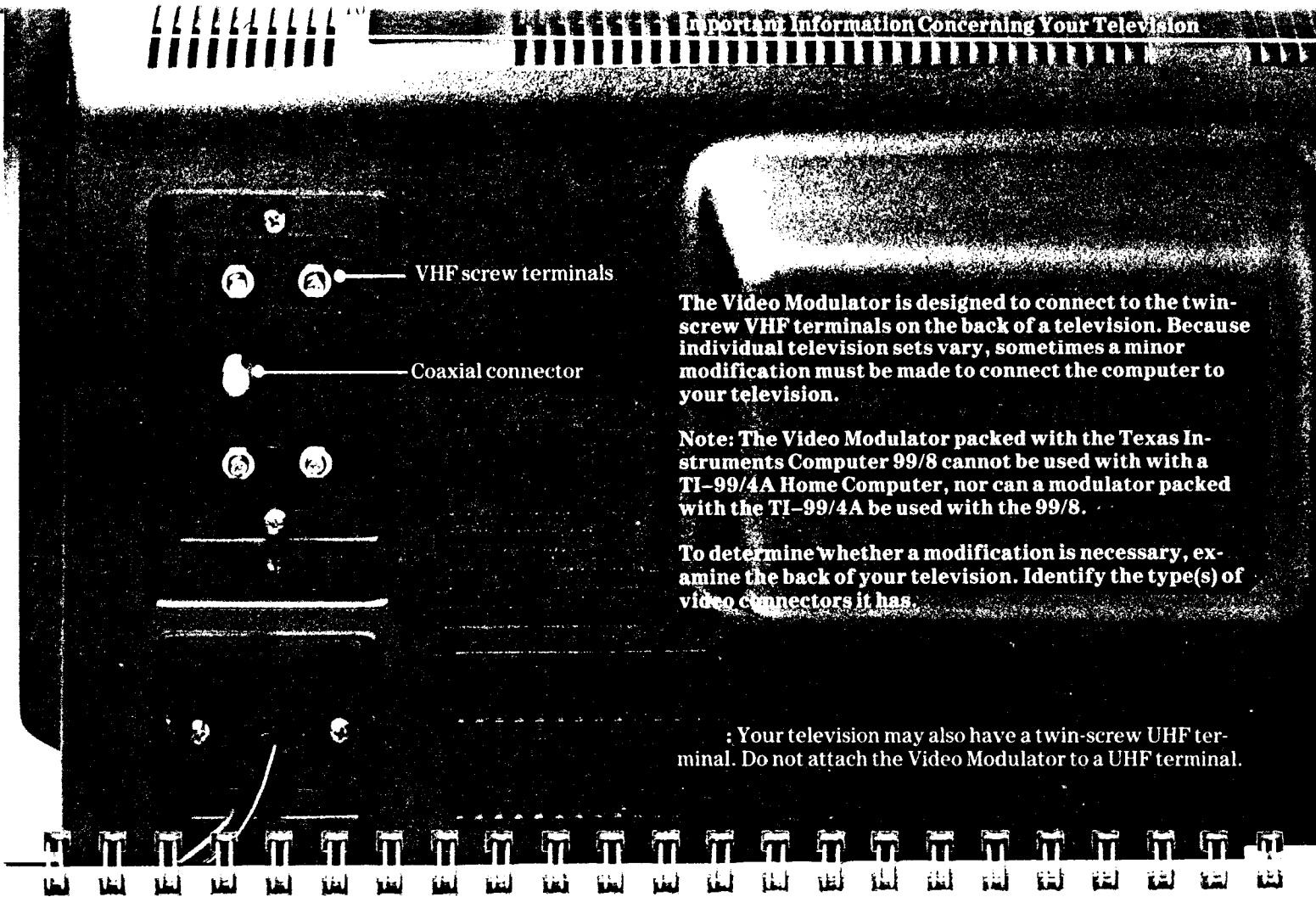
The Video Modulator is designed to connect to the twin-screw VHF terminals on the back of a television. Because individual television sets vary, sometimes a minor modification must be made to connect the computer to your television.

Note: The Video Modulator packed with the Texas Instruments Computer 99/8 cannot be used with with a TI–99/4A Home Computer, nor can a modulator packed with the TI–99/4A be used with the 99/8.

To determine whether a modification is necessary, examine the back of your television. Identify the type(s) of video connectors it has.

: Your television may also have a twin-screw UHF terminal. Do not attach the Video Modulator to a UHF terminal.

Now determine which of the following cases applies to you.

Case A—Your TV has VHF screw terminals but does not have a direct coaxial connector, OR

Your TV has both types of connectors, but you are not currently using the coaxial connector (for cable TV, a video cassette recorder, antenna system, etc.).
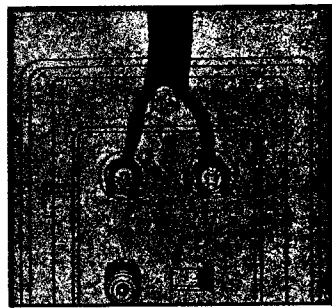
Guide A—No modification is necessary; skip to the next section, "Connecting The Video Modulator to Your Television."

Case B—Your TV has both types of connectors and you are currently using the coaxial connector (for cable TV, a video cassette recorder, antenna system, etc.).

For additional details, check with the store where you purchase the transformer. Proceed to "Connecting the Video Modulator to Your Television."
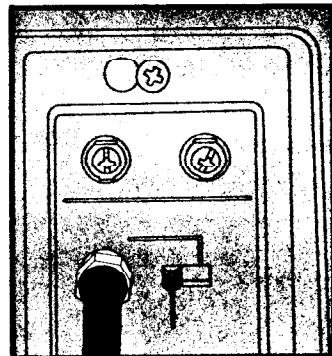
Guide B—A slight modification is necessary. The coaxial cable must be attached to the Video Modulator.

You will need to purchase a "Balun matching transformer" (also called a "splitter") from a local television or electronics shop. This transformer changes the signal from low to high impedance.
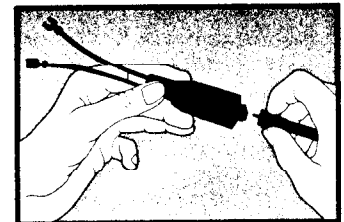
Attach your coaxial cable to the splitter as shown.

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Setting Up

Case C—Your TV has only a direct coaxial connector, and does not have VHF screw terminals.
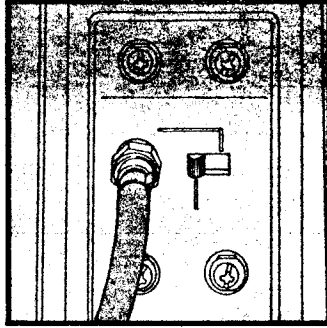
Guide C—A slight modification is necessary, assuming that you are currently using the coaxial connector (for cable TV, an antenna, or a video cassette recorder).

You will need to purchase two "Balun matching transformers" from a local television or electronics shop. One transformer (called a "splitter") changes the signal from low to high impedance. The other transformer changes the signal from high to low impedance. The object is to use Balun transformers, when needed, to match impedance levels.
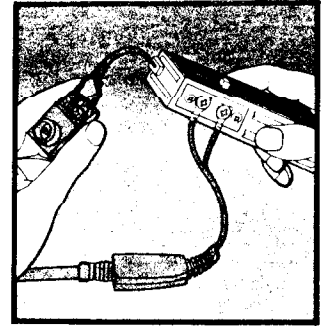
Attach the transformers to the Video Modulator as shown. For additional details, check with the store where you purchase the transformers. Then proceed to "Connecting the Video Modulator to Your Television."

Connecting the Video Modulator to Your Television

Important: Turn the television set OFF before connecting the Video Modulator.
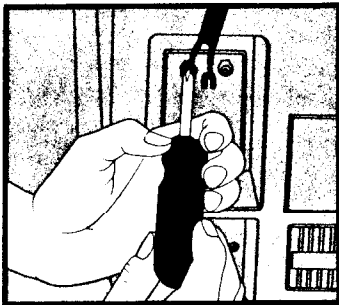
1. Disconnect the twin-lead antenna cable from the VHF screw terminals on the television (if applicable).
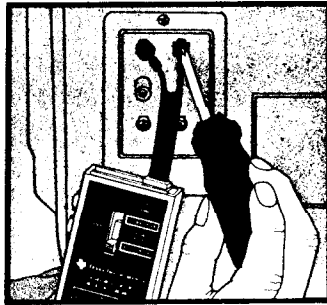
2. Connect the Y-connector branching from the Video Modulator to the VHF screw terminals on your television.(If using a matching transformer, plug it into the coaxial connector on the television.)
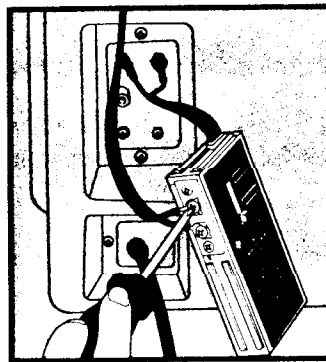
3. Connect the twin-lead cable that you just removed from your television (or from the splitter transformer) to the Video Modulator screw terminals (marked "TV ANTENNA IN").

4. To mount the Video Modulator on the television, peel off the paper backing on the back of the modulator. Press the unit against a flat surface on the television. The adhesive material supports the modulator's weight and relieves strain on the cable connections.

Setting Up

HEX-BUS™ { Cassette { Motor — Out — In   Joystick   Video   Power In
                        Black   Red   White
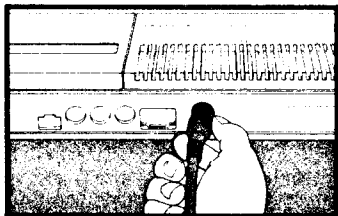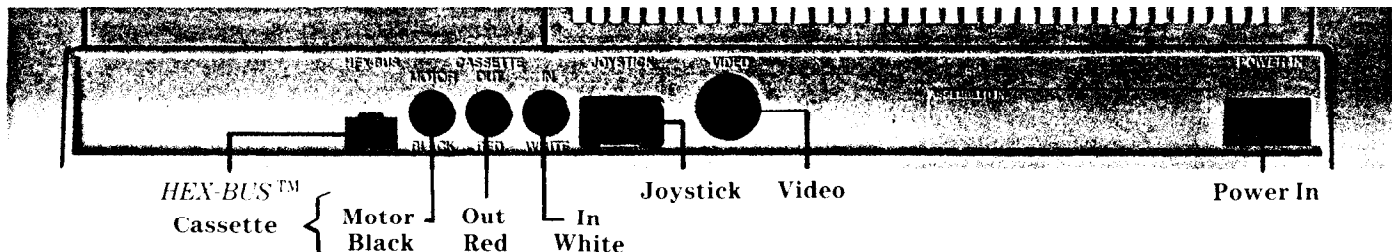
1. Connect the free end of the cable (a 5-pin connector) to the computer console at the port marked "VIDEO." The connector will insert easily when properly aligned.
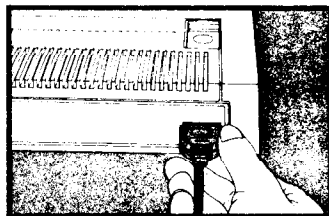
2. Connect the power cord (with transformer) to the back of the console at the port marked "POWER IN." This connector will fit only one way.

3. Plug the other end of the power cord to a grounded AC electrical outlet.

Note: The openings on the back of the computer, which enable you to attach accessories and peripherals, are called "ports."

HEX-BUS™ **Port**—Connect *HEX-BUS* peripherals, such as the Disk Drive Controller 5102, Printer Plotter, RS232, Modem, etc., to expand the capabilities of your computer system.

Cassette Ports (Motor, Out, and In)—Connect a cassette recorder to these ports for loading and saving programs.

Joystick Port—Connect the Joystick Controllers (joysticks) to this 9-pin connector.

Video Port—Connect the display unit (either a monitor or a television) to this port.

Power In Port—Connect the power cord (with transformer) to this port.

Other physical features of the computer are:
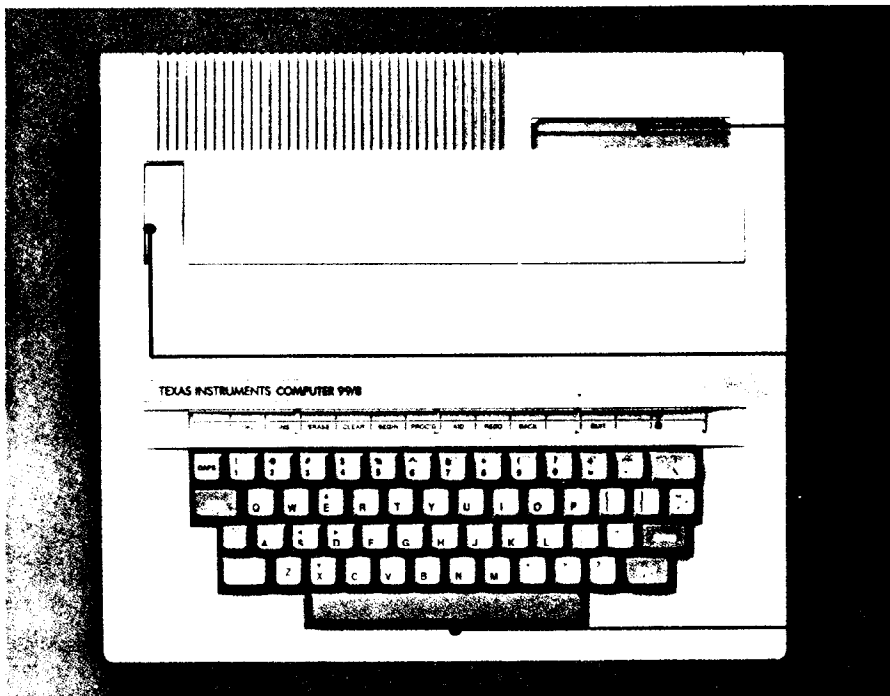
Solid State Cartridge Port—Plug in Solid State Cartridges here.

50-pin Peripheral Port—This port is for memory expansion and future peripherals.

Power Switch—To turn the computer ON, push down on the back of the rocker-style switch.

To turn the computer OFF, push down on the front of the rocker-style switch.

Keyboard—This is used to type information into the computer.

Setting Up

The final stage in setting up your computer is to set several switches. (If you are using a Video Modulator and a television, begin on this page.)

2. Set the channel selector on your television to either 3 or 4 (whichever one is not being used for broadcasting in your area).
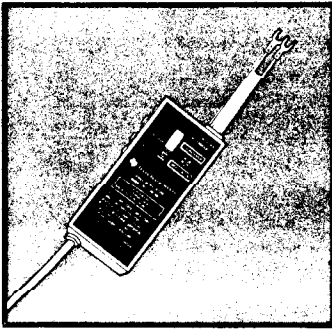
1. Set the big switch on the face plate of the Video Modulator to "MODULATOR."
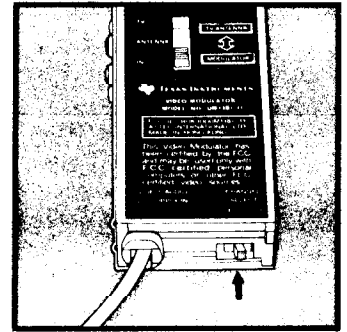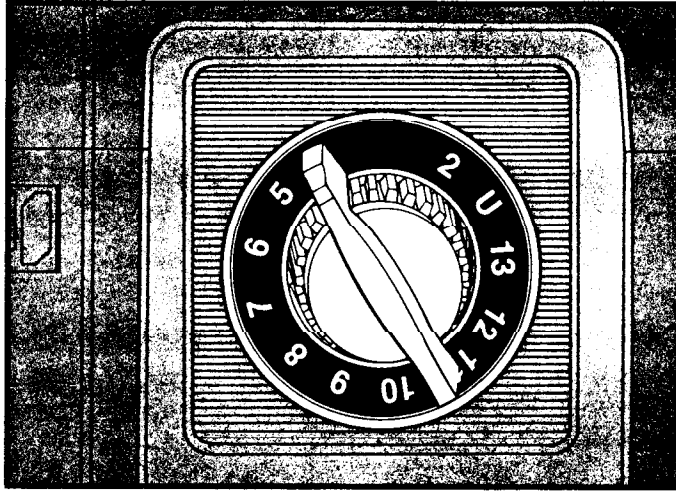
3. Set the CHANNEL SELECT switch on the edge of the Video Modulator to the same channel number that you selected on your television.

(If you are using a monitor, begin on this page.)

1. Turn on the display unit (television set or monitor).

2. Press down on the POWER switch on the top of your computer. This turns the computer on.
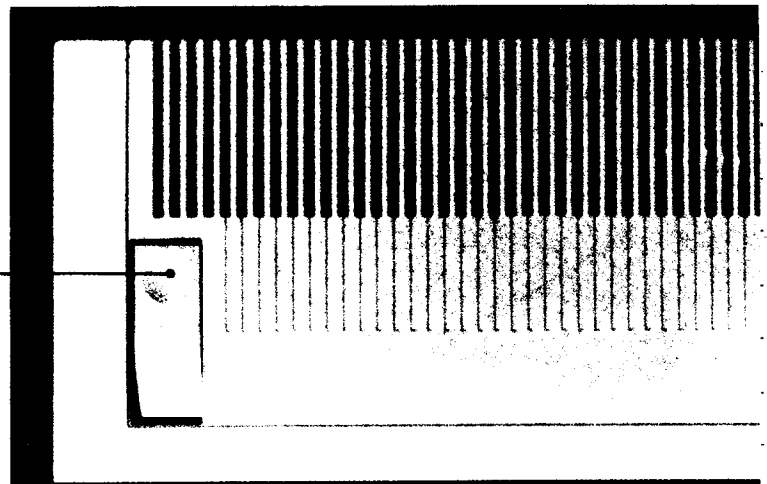
When you turn the computer on, the master title screen
appears. When you see this screen, you know that you
have connected everything correctly. If the master title
screen is not displayed, go back to the set-up instructions
on page 6 and check to see that you have followed each
step.

```
TEXAS INSTRUMENTS
COMPUTER
READY-PRESS ANY KEY TO BEGIN

© 1983 TEXAS INSTRUMENTS 3.0
```
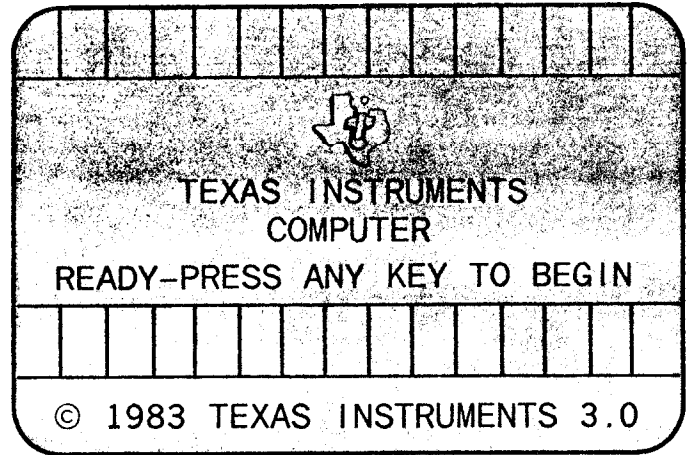
Press any key to proceed to
the next screen. This is the
main selection list or the
main "menu."

```
TEXAS INSTRUMENTS
COMPUTER

PRESS
[A] FOR TI EXTENDED BASIC II
[B] FOR P-SYSTEM
[C] FOR SET SPEED
```
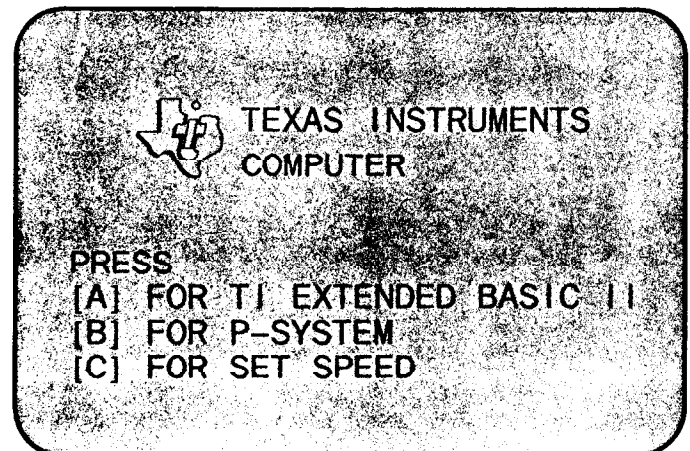
If you have a Solid State Car-
tridge plugged into the slot at
the top of the computer con-
sole, the name of that pro-
gram usually appears as
selection D on this screen. (If
the cartridge program is in
several languages, the
English version is usually
selection D, with other
languages following.)

If the cartridge program is a
p-System application, the
name of that program ap-
pears as selection C, with the
SET SPEED option
following.

TI Extended BASIC II— This option enables you to access the programming language built into the Computer 99 8. When you select TI Extended BASIC II, the computer automatically executes at full speed.

P-SYSTEM— This option enables you to access an operating system that is built into your computer. The p-System, which uses an intermediate language called P-code, enables you to use other programming languages such as UCSD Pascal and TI PILOT, as well as applications software packages for the p-System. See the section on the p-System for more information.

SET SPEED— This option enables you to change the speed at which the computer "runs" programs contained in certain prerecorded software packages. When the computer is turned on, it is automatically set to run at 99 4A speed. Thus, if you want to use a cartridge program at 99 4A speed, you need not use the SET SPEED option.

Generally, this option is used only with software programs that you want to run at either full speed or slow speed. If this option is selected, this screen will appear:

```
SET  SPEED
[A]  SLOW
[B]  99/4A  SPEED  FOR  GAMES
[C]  FULL  SPEED
```

Many arcade games are designed to run at 99 4A speed, though some games play well at the slow speed (selection A). Because a game is usually easier at a slow speed, you might use this speed when you are first learning the game. Most other programs can be run at full speed (selection C).

After you select the speed you want, the computer

returns you to the main selection list again. The speed selected remains in effect until it is changed. TI Extended BASIC II is selected, the cartridge is removed, or the computer is turned off.

To proceed to the next section, "A Tour of the Keyboard," select TI Extended BASIC II by pressing the **A** key.

```
TI  EXTENDED  BASIC  II  Ready
62720  Bytes  free
>■
```

The number of "bytes free" indicates the amount of memory that your computer has available at a given time. After you press **A**, the computer is ready to accept your programs or commands in the TI Extended BASIC II programming language.

Note: The small "prompting" symbol (>) and the cursor (a flashing rectangle) indicate that it's your turn to type something on the screen.

The keyboard is similar to that of a standard typewriter. Experimenting and practice will help you learn about the keyboard as you read through this section.

TI Extended BASIC II is designed with an automatic repeat feature. If you hold down any character key (including the **SPACE BAR**) for more than one second, that character is repeated until you release the key.

Note: Here are two important differences between this keyboard and some typewriter keyboards:

- The letter "I" cannot be substituted for the number 1 (one).

- The letter "O" cannot be substituted for the number 0 (zero).

TEXAS INSTRUMENTS COMPUTER 99/8
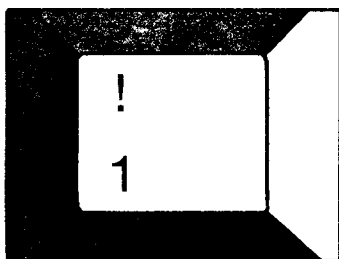
Each of the alphabetic keys has one character on it. (The E, S, D, and X keys also have arrow symbols on them, which are not displayable characters. These are discussed under "Function Keys.") Other keys have both a top character and a bottom character.

Top character

Bottom character

CONTROL operations

FUNCTION operations

There are other keys that perform specific computer operations, as indicated by the TI Extended BASIC II slip-in overlay packed with the computer.

Tip: Locate the slip-in overlay strip for TI Extended BASIC II, which is included with your computer. (The first word printed on this overlay, at the far left, is "DEL.") Slip the overlay into the notched slot at the top right of the keyboard, and slide it to the left so that you can see it through the window above the top row of keys.

Tour of the Keyboard
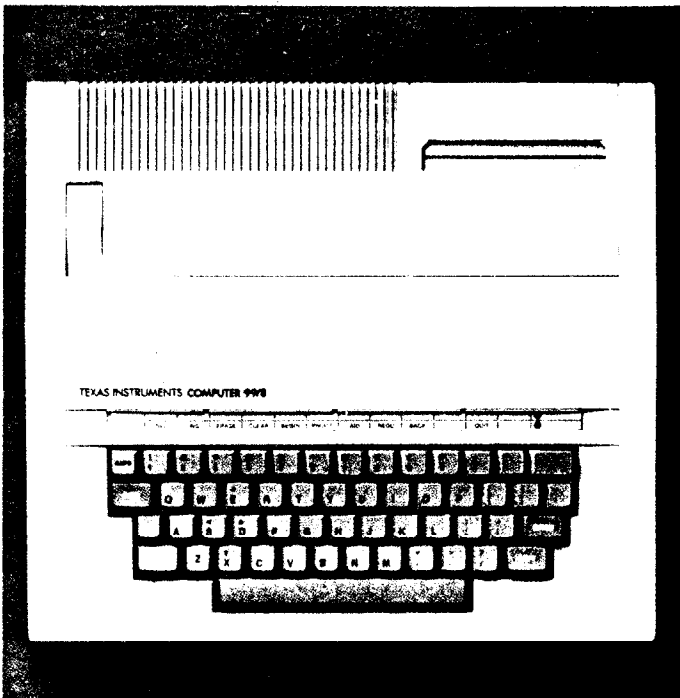
To type a lower-case letter, simply press that key. For example, press the **A** key to display a lower-case letter a. (If a lower-case letter is not displayed, press the **CAPS** key once. This key is discussed later under "The **CAPS** and **ENTER** Keys.")

To type the bottom character on a key, simply press that key. For example, press the semicolon key (;) to display a semicolon on the screen, press the 2 key to display the numeral 2.

Space Bar—The SPACE BAR is the long bar at the bottom of the keyboard. Each time you press the **SPACE BAR**, the cursor moves one position to the right, leaving a blank space. If you move the cursor over a character with the **SPACE BAR**, that character is replaced by a blank space.

Upper-Case Letters and Top Characters

To type an upper-case letter, hold down the **SHIFT** key and press the letter key. For example, hold down the **SHIFT** key and press the **A** key to display an upper-case letter A.

To type the top character on a key, hold down the **SHIFT** key and press the character key. For example, hold down the **SHIFT** key and press the " key (the top character on the ' key) to display a quotation mark on the screen. Hold down the **SHIFT** key and press the ? key (the top character on the / key) to display a question mark.

Tour of the Keyboard
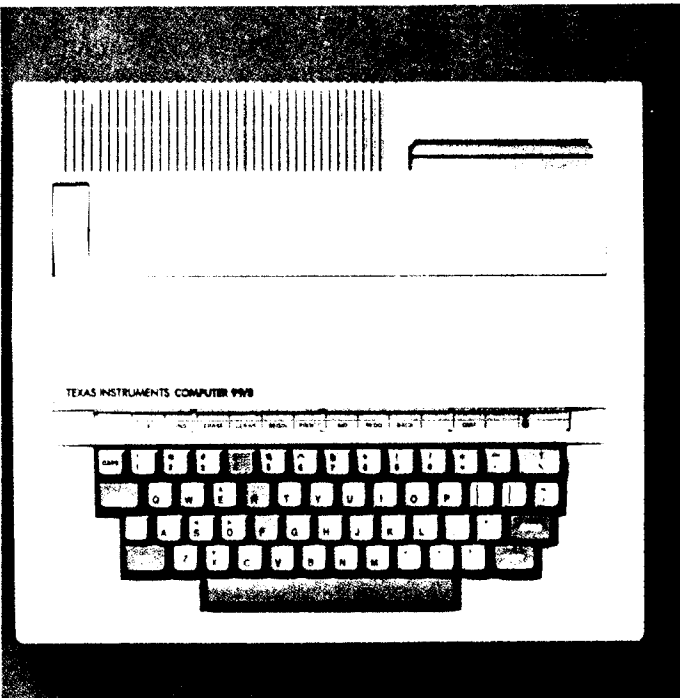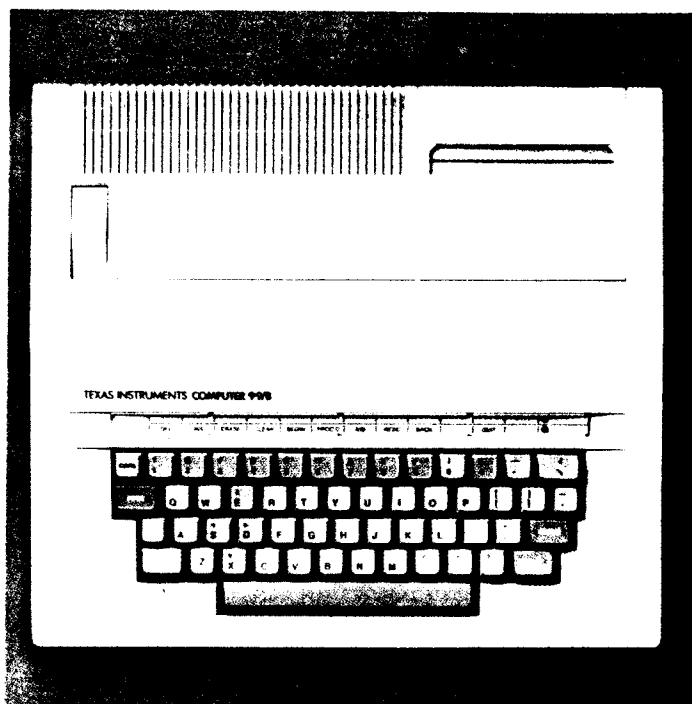
The **FCTN** (function) key, used in combination with certain other keys, instructs the computer to perform specific computer functions.

To perform a keyboard function, hold down the **FCTN** key and simultaneously press the key for the appropriate function.

The slip-in overlay at the top of the keyboard serves as a guide for using the **FCTN** key with the numeric keys (1 through 9) and the = key on the top row of keys. The overlay identifies the special function performed when you use one of these key combinations.

Note: The special functions discussed in this section apply to TI Extended BASIC II and most software applications. The overlay name, key combination, or operation

may vary when using the p-System or certain software packages.

Cursor-Control Keys—The top symbols on four keys (E, S, D, and X) indicate cursor-control keys; these symbols cannot be displayed on the screen. ← (**FCTN S**) and → (**FCTN D**) move the cursor across the screen in the appropriate direction. Moving the cursor over displayed characters does not erase them. (← and → also have the automatic repeat feature.)

Both ↑ (**FCTN E**) and ↓ (**FCTN X**) can be used in place of the **ENTER** key when entering an instruction to the computer. ↑ and ↓ have special uses in Edit Mode (discussed in detail in "General Information—TI Extended BASIC II") and with software applications.
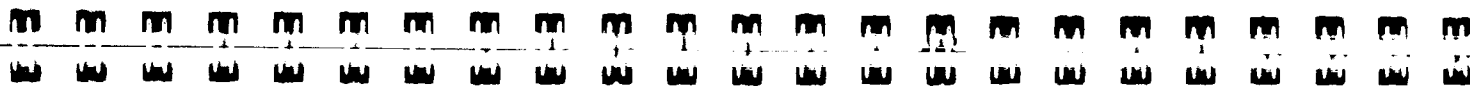
Function Name	Key Combination	Operation
↑	**FCTN E**	Tells the computer to accept and/or perform the information or line you have just finished typing. In Edit Mode, the previous line is then displayed.
←	**FCTN S**	Moves the cursor to the left (backspace).
→	**FCTN D**	Moves the cursor to the right.
↓	**FCTN X**	Tells the computer to accept and/or perform the information or line you have just finished typing. In Edit Mode, the next line is then displayed.
DEL (delete)	**FCTN 1**	Deletes a character from the lines you type.
INS (insert)	**FCTN 2**	Inserts one or more characters into the lines you type.
ERASE	**FCTN 3**	Erases the line you are typing if you haven't pressed **ENTER**.
CLEAR	**FCTN 4**	Stops a program in progress. Also, **CLEAR** cancels a line you are typing; the line moves up on the screen and is not accepted.
REDO	**FCTN 8**	Recalls the line previously entered; you can correct it using Edit Mode features.
QUIT	**FCTN =**	Returns the computer to the master title screen. **Note:** When you press **QUIT**, all data and program material you have entered are erased.

Tour of the Keyboard

Function Name	Key Combination	Operation
		The other special functions have certain uses in software applications. Their general uses are:
BEGIN	FCTN 5	**BEGIN** usually returns a program to its starting point.
PROC'D	FCTN 6	**PROC'D** (proceed) generally advances a program to its next segment.
AID	FCTN 7	**AID** usually causes a program to present some helpful information about the program itself.
REDO	FCTN 8	**REDO** generally enables you to go back and correct information on the screen you are currently using.
BACK	FCTN 9	**BACK** usually returns you to the beginning of the program section you are currently using.
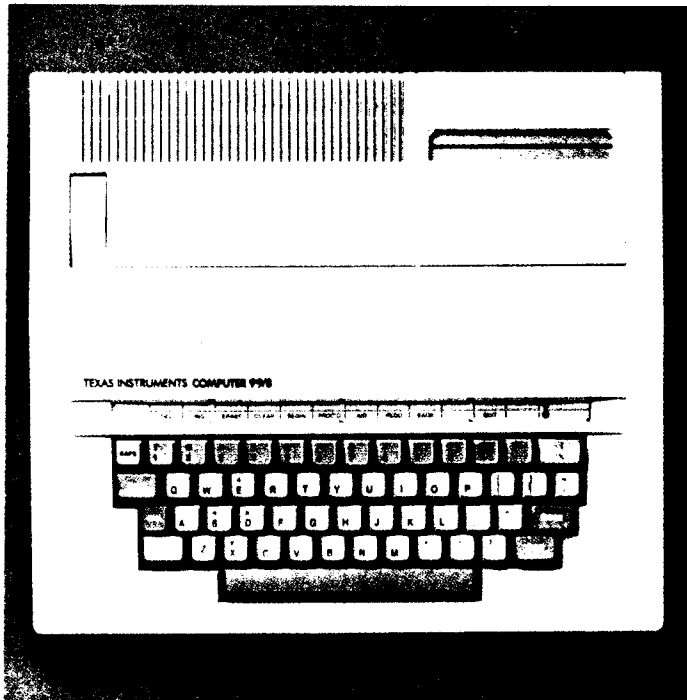
CTRL Operations

The **CTRL** (control) key, used in combination with certain other keys, instructs the computer to perform specific computer operations. There are no predefined control operations in TI Extended BASIC II. **CTRL** operations are used primarily for telecommunications and other software applications. These uses are explained in the manuals accompanying the appropriate software packages.

To perform a control operation, hold down the **CTRL** key and simultaneously press one of the top-row keys.

Tip: If you are using a program that requires **CTRL** operations, label the top-row keys by writing the names of the CTRL operations in the blank spaces on the CTRL line of the slip-in overlay.

TEXAS INSTRUMENTS COMPUTER 99/8

Tour of the Keyboard
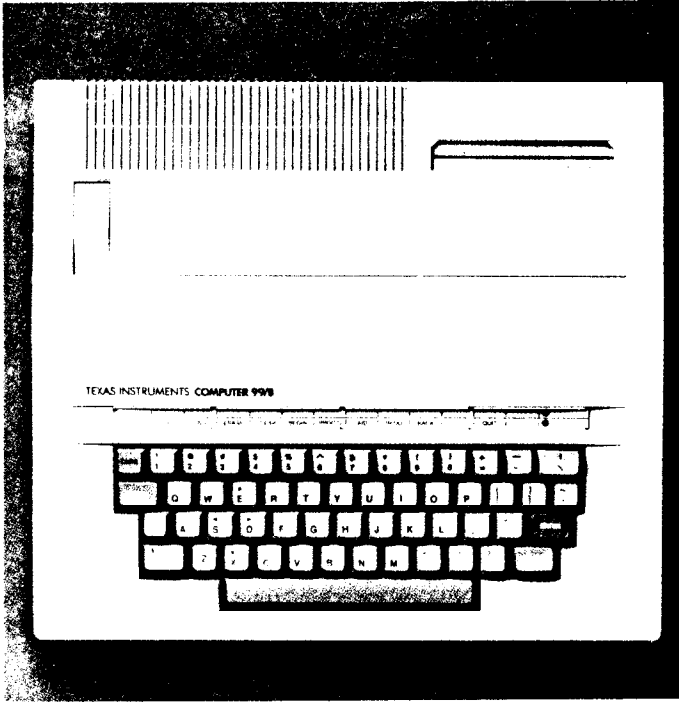
The **ENTER** key has important uses in TI Extended BASIC II, some software packages, and other applications.

ENTER—In most cases, pressing **ENTER** tells the computer to accept and/or perform the information or line you have just finished typing. Additional functions for particular software applications are explained in the appropriate manuals.

CAPS—The **CAPS** key works as a SHIFT lock for alphabetic keys only. Pressing the **CAPS** key enables you to switch between upper- and lower-case modes. In upper-case mode, you can type all upper-case letters; other keys, such as number and punctuation keys, are unaffected. Thus you can type numbers along with upper-case letters without having to press a SHIFT key.

Note: When you first turn on the computer, it is in upper-case mode.

Mathematical Operation Keys

The mathematical operation keys instruct the computer to add, subtract, multiply, divide, raise a number to a power (exponentiation), and compare values.

Example	Operation Performed
A + B	Adds A and B
A – B	Subtracts B from A
A*B	Multiplies A and B
A B	Divides A by B
A = B	Compares A and B for equality
A>B	Checks to see if A is greater than B
A<B	Checks to see if A is less than B
A> = B	Checks to see if A is greater than or equal to B
A< = B	Checks to see if A is less than or equal to B
A<>B	Checks to see if A is not equal to B
A^B	Raises A to the power of B

Tip: Notice that some of the mathematical operation keys are used in combination with the SHIFT key and some are not.

Tour of the Keyboard

TI EXTENDED BASIC II Ready
62720 Bytes free
>CALL CLEER■

There are several ways to correct a typing error before you press ENTER. Each method may apply to one situation better than another—find the one that works best for the kind of error you need to correct. Other error-correction methods are discussed in detail in the *Programmer's Guide* beginning on page 16. An easy method for correcting errors before you press ENTER is illustrated here.

What you see:

TI EXTENDED BASIC II Ready
62457 Bytes free
>CALL CLEER■

TI EXTENDED BASIC II Ready
62457 Bytes free
>CALL CLE■R

TI EXTENDED BASIC II Ready
62457 Bytes free
>CALL CLEAR;

>■
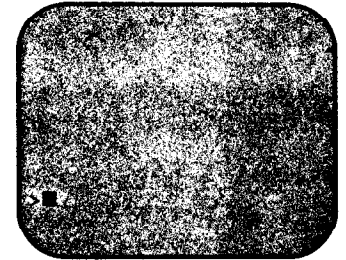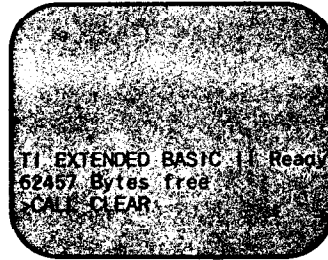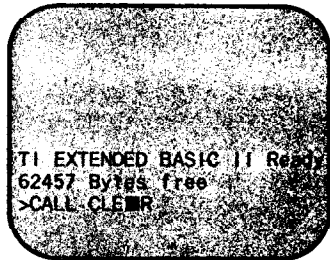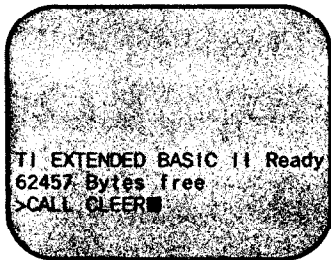
What you do:
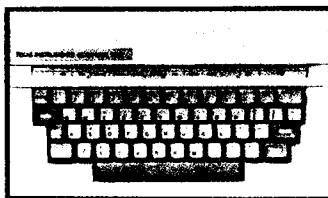
1. Use the ← key combination (FCTN S) to move the cursor back to the first character you want to change.
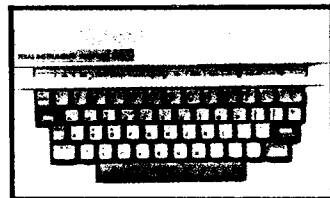
2. Retype the correct character(s).
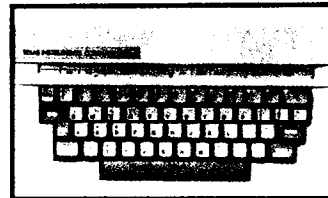
3. Press ENTER to instruct the computer to accept and perform the corrected line.

Tip: You can erase incorrect characters by using the
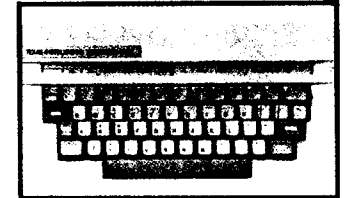
SPACE BAR. Use the ‹ key combination to move the cursor back to the first character you want to erase. Then press the SPACE BAR to move the cursor over the character(s).

Here are several lines for you to practice typing and entering. These samples can help you familiarize yourself with the computer and give you a brief preview of the TI Extended BASIC II programming language.

Type: NEW

```
>NEW■
```

NEW erases the computer's memory and prepares it to accept new data.

Press: ENTER

```
TI EXTENDED BASIC II Ready
62457 Bytes free
>■
```

The ENTER key instructs the computer to accept and perform the line you have just typed.

Type: PRINT "HELLO THERE"

```
TI EXTENDED BASIC II Ready
62457 Bytes free
>PRINT "HELLO THERE"■
```

The PRINT statement tells the computer to display characters on the screen.

Press: ENTER

```
TI EXTENDED BASIC II Ready
62457 Bytes free
>PRINT " HELLO THERE"
HELLO THERE
>■
```

The computer "prints" HELLO THERE on the screen.

More Practice

Type: PRINT 10 + 28

```
TI EXTENDED BASIC II Ready
62457 Bytes free
>PRINT "HELLO THERE"
HELLO THERE
>PRINT 10+28■
```

PRINT can also be used to perform mathematical operations on the computer.

Press: ENTER

```
TI EXTENDED BASIC II Ready
62457 Bytes free
>PRINT " HELLO THERE"
HELLO THERE
>PRINT 10+28
 38
>■
```

The computer "prints" the answer on the screen and waits for you to type something else.

Type: PRINT 70/5

```
TI EXTENDED BASIC II Ready
62457 Bytes free
>PRINT "HELLO THERE"
HELLO THERE
>PRINT 10+28
 38
>PRINT 70/5■
```

The / key instructs the computer to divide. Notice that you do not enclose mathematical operations in quotation marks.

Press: ENTER

```
TI EXTENDED BASIC II Ready
62457 Bytes free
>PRINT "HELLO THERE"
HELLO THERE
>PRINT 10+28
 38
>PRINT 70/5
 14
>■
```

The computer "prints" the answer on the screen and waits for your next entry.

Practice
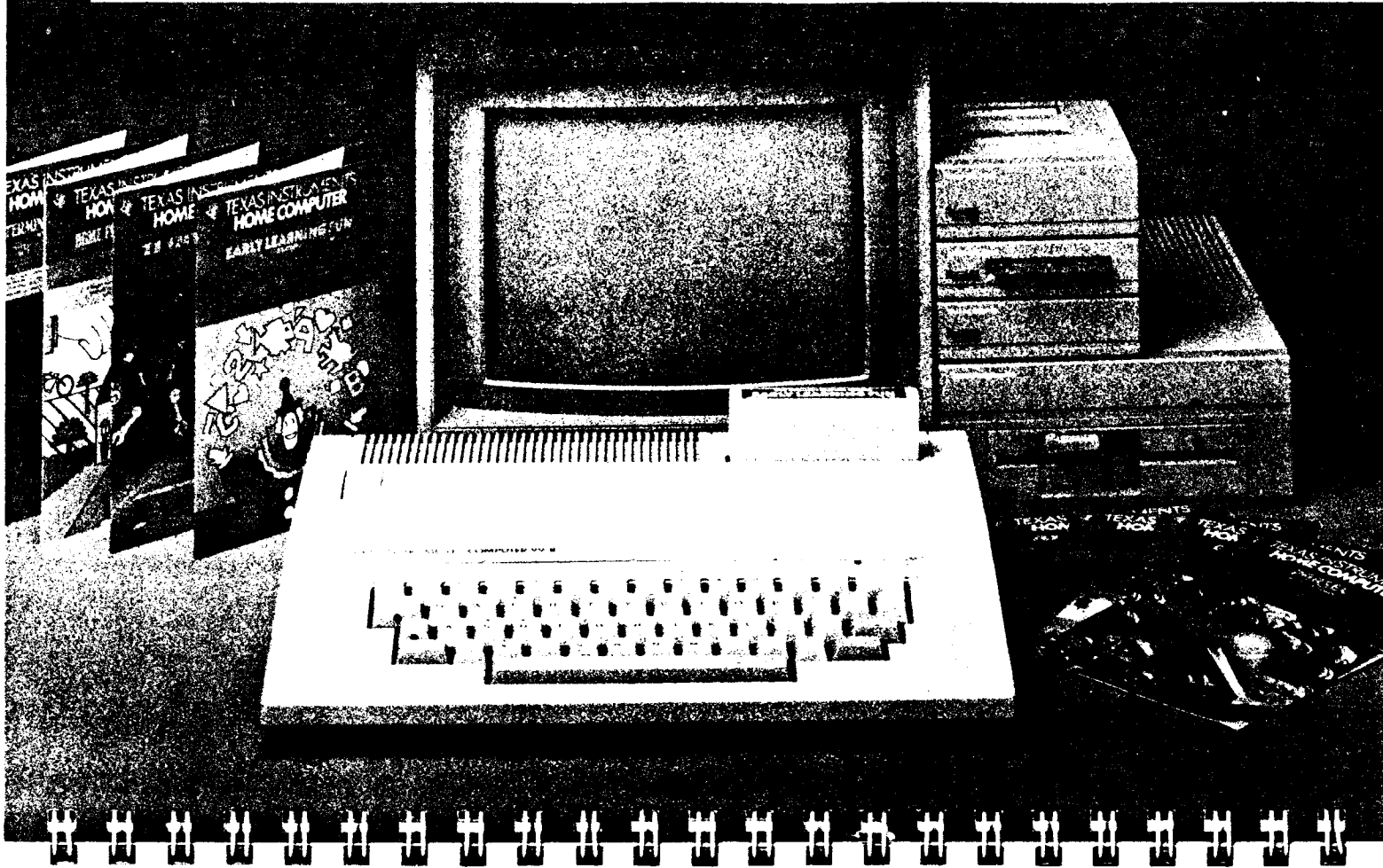
Like other people with special interests, computer owners and programmers speak a language of their own, with terms like hardware and software. This short glossary can help to introduce you to this exciting—but sometimes confusing—world of computers.

Computer	A network of electronic circuits and memories that process data.
Computer System	The computer and any accessory (peripheral) units attached to it.
Console	The major part of a small computer (microcomputer) system, usually consisting of electronic circuitry and a keyboard contained in a single unit.
Cursor	A small flashing block or rectangle that shows where a typed character will appear on the screen.
Data	Information that you enter (by typing on the keyboard, for example) for processing or computation by the computer.
Hardware	The physical equipment that makes up your computer system, such as the computer console, a display unit, cassette recorder, printer, etc.

Speaking of Computers...

Memory	The information-storage capacity of a computer. ROM (Read-Only Memory) stores most of the computer's operational procedures. RAM (Random-Access Memory) is the space allocated to store the programs and data you enter and the results generated by the computer.
Monitor	A television-like display unit that enables you to see on the screen your input and the computer's output.
Peripherals	Accessory equipment that extends the computer system's capabilities, such as a printer, monitor, disk drive and cassette recorder.
Program	An ordered series of instructions for the computer to perform; also called software. The instructions in a program are written in a programming language, a set of commands and statements that the computer can understand and perform. TI Extended BASIC II is a programming language understood by the Computer 99 8.
Software	A program or collection of programs entered from the keyboard, built into the computer, or stored on tape, disk, or cartridge.

A peripheral is an accessory that expands the capabilities of your computer system. For example, a display unit (either your television set or a monitor) is a required peripheral that enables you to see the input to and output from your computer.

The Computer 99/8 has built into its console the TI *HEX-BUS* ™ Interface, which enables you to use the *HEX-BUS* peripherals. These peripherals are low in cost and are generally small and stackable so that they do not take up much room on your work surface.

Peripheral	Capabilities
TI 99/4 Impact Printer A dot-matrix printer that prints in 80 columns on form-feed paper. Features include compressed, expanded, and dot-graphics modes and can use either serial or parallel inputs. The RS232 interface must be used with this printer.	• Prints paper copies of your programs. • Prints copies of text or worksheets from software packages such as TI-Writer or Multiplan.* *Multiplan is a trademark of the Microsoft Corporation.
RS232 (HX–3000 or HX–3000/P) A *HEX-BUS* peripheral with a serial output (HX–3000) or both a serial output and a parallel output (HX–3000/P).	• Provides the interface between your computer and a compatible printer or modem (telephone coupler).

Peripheral	Capabilities
TI Color Monitor This compact unit has a 10-inch screen that is ideal for up-close viewing. The color and high-resolution display provide a better picture than you can get with many television sets.	• Displays the input and output to and from your computer.
Joystick Controllers These "joysticks," normally used with video games, can also be used with TI Extended BASIC II programs that use the CALL JOYST subprogram.	• Adds an exciting dimension to video games. • Serves as an additional input device for your own programs.
TI Program Recorder A program-quality cassette recorder with digital counter that uses standard audio cassettes as a storage medium.	• Saves programs or data files on cassette tapes. • Uses preprogrammed software on cassette tape.

Speaking Of Computers

Peripheral	Capabilities
Printer/Plotter (HX-1000) A *HEX-BUS* peripheral that prints or plots with colored pens. The Printer/Plotter prints in either 18 columns or 36 columns (compressed). The RS232 interface is not required.	• Prints programs and files or plots charts and diagrams on paper in four colors.
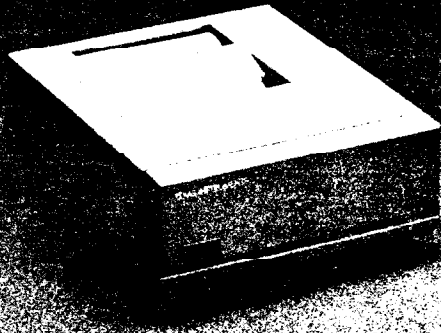
Peripheral	Capabilities
Modem (HX-3100) A *HEX-BUS* ™ peripheral that enables you to transmit or receive information over the telephone lines. The Modem does not require an RS232 interface.	• Transmits information to another computer. • Receives information from another computer. • Receives information from a data base such as The Source^{SM} or Dow Jones. (Requires telecommunications software.)
Disk Drive/Controller 5102 A *HEX-BUS* peripheral that uses 5 ¼ inch diskettes, finds files quickly, and allows either sequential or random file access. With its double-sided, double-density capablities, the Disk Drive/Controller can store up to 320K of information on one diskette.	• Saves programs or files on diskettes. • Accesses data quickly and accurately. • Uses preprogrammed software on diskette. • Uses p-System; program in UCSD Pascal or TI PILOT. • Controls up to three additional disk drives.
Disk Drive 5202 Up to three of these additional disk drives can be used with the Disk Drive/Controller.	• Gives your system added capabilities and convenience, especially when using the p-System or when using both a program diskette and a storage diskette at the same time.

Speaking of Computers . . .

Follow these directions for attaching a cassette recorder to the Computer 99/8.

Some standard cassette recorders work well with the computer; others do not. If you already own a cassette recorder, try using it according to the directions below. If you do not have a cassette recorder, we recommend the TI Program Recorder, which is compatible with the computer and is accompanied by a complete instruction manual.

: The cassette cable included with the Program Recorder is not designed to be used with the computer 99/8; however, the correct cable is available as an accessory. If you are unable to find this item locally, call Texas Instruments toll free at (800) 858-4075 for information.
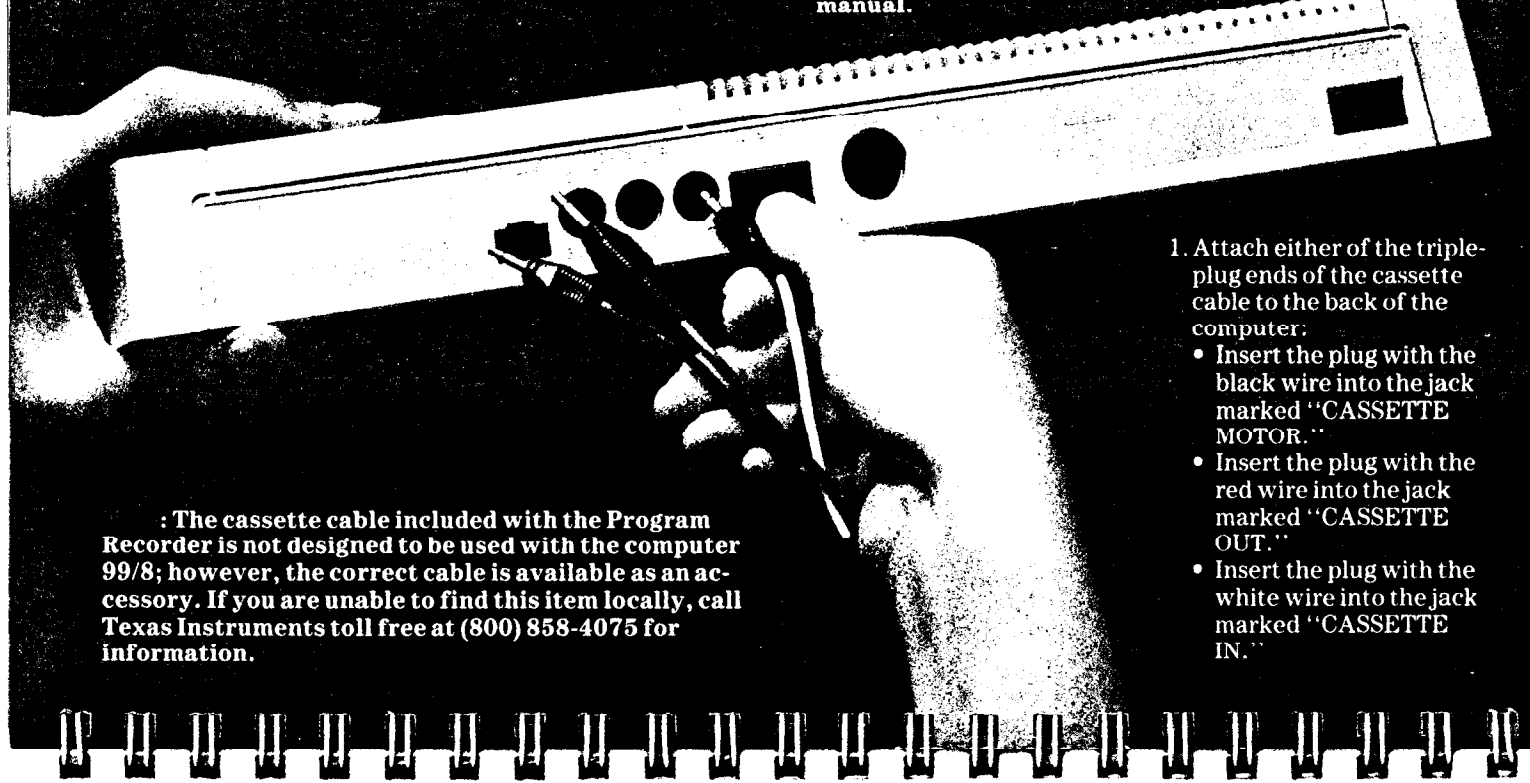
1. Attach either of the triple-plug ends of the cassette cable to the back of the computer:
   - Insert the plug with the black wire into the jack marked "CASSETTE MOTOR."
   - Insert the plug with the red wire into the jack marked "CASSETTE OUT."
   - Insert the plug with the white wire into the jack marked "CASSETTE IN."

Follow these directions for attaching a cassette recorder to the Home Computer 99/8.

2. Attach the remaining triple-plug end of the cable to the cassette recorder:
   - Insert the plug with the white wire into the earphone jack.
   - Insert the plug with the red wire into the microphone jack.
   - Insert the plug with the black wire into the remote jack.
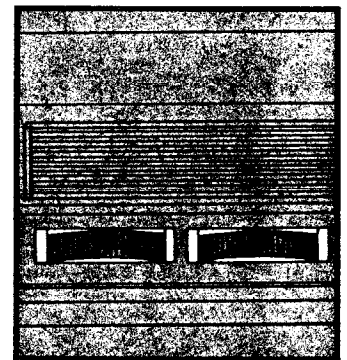
3. Plug the power cord from the cassette recorder into an AC power outlet, or check to see that the recorder has fresh batteries.

4. Place the cassette recorder and all cassette tapes at least two feet away from your television set to minimize magnetic field interference.

Tip: Tone and Volume Control Settings—After the cable is connected, set the tone and volume controls on your cassette recorder to a midrange level (turned halfway up). You may need to experiment with tone and volume settings until you find the best settings for proper data storage and retrieval.

The Cassette Recorder

To insert a cassette into your recorder, follow these steps:

1. Press the **STOP** button if any of the other function buttons are presently depressed.

2. Press the **EJECT** button to open the cassette compartment door.

3. Insert the cassette with the printed label up, and then close the cassette compartment door.

Program	
Blank	
Program	
Blank	
Program	
Blank	
Program	

Determining the Location of Programs on Cassette

1. Rewind your tape, and then reset the counter to zero (if your recorder is equipped with one).

2. Disconnect the interface cable from your recorder.

3. Press **PLAY**.

4. A blank section of tape precedes each program on TI's prerecorded cassette software.

When the recorder reaches a program, you can hear "electronic noise" generated by the program stored on the tape. When you first hear this sound, note and write down the position of the counter beside the program name. You may want to subtract 1 or 2 from the counter reading to ensure that when you load the program the beginning of your program loads properly.

5. Reconnect the interface cable to your recorder. Use these counter settings in the future to load cassette tape programs quickly.

Tip: This process can be speeded by alternating between **PLAY** and **FAST FORWARD** as you listen.

The Cassette Recorder

Refer to the Reference Guide for TI Extended BASIC II
under OLD and SAVE.

```
ERROR  NO  DATA  FOUND
PRESS  R  TO  READ
PRESS  C  TO  CHECK
PRESS  E  TO  EXIT
```

Error Messages During Program Loading

If your computer returns an error message after attempting to load data into the computer's memory with the current volume and tone control settings, follow the steps below to correct the problem. Be sure to note which of the two error messages is displayed; the correct procedure depends on the type of problem you encounter.

If your computer returns the error message

```
ERROR  NO  DATA  FOUND
PRESS  R  TO  READ
PRESS  C  TO  CHECK
PRESS  E  TO  EXIT
```

increase the volume and the tone by turning the controls approximately 1 16 of a turn. Then press R to read the data again. Keep repeating this procedure until the program is loaded correctly.

If the computer returns the error message

```
ERROR  DETECTED  IN  DATA
PRESS  R  TO  READ
PRESS  C  TO  CHECK
PRESS  E  TO  EXIT
```

decrease the volume and tone by approximately 1 8 of a turn. Then press R to read the data again. Continue to repeat this procedure until the program is loaded.

In Case of Difficulty

Should you have difficulty with your computer, the following instructions may help you to analyze the problem. You may be able to correct the problem without returning your computer to a service facility. If the suggested solutions are not successful, contact the Consumer Relations Department by mail or telephone (refer to "If You Have Questions or Need Assistance" later in this section). Please describe in detail the problems with your computer.

If one of the following problems occurs while you are using a peripheral or accessory, remove the device. If the problem stops, refer to the manual for the peripheral or accessory in question.

Problem	Solution
No picture (on the Color Monitor)	Verify that: • Both power cords (for the monitor and the computer) are plugged into a "live" AC power outlet. • Power switches on both the computer and the monitor are turned on. • All cables and connectors are properly connected. (Refer to the Color Monitor Operating Guide and Warranty.) • Screen controls are set for optimum picture. (Refer to the Color Monitor Operating Guide and Warranty.)
No picture (on your television).	Check to make sure that: • The television works when used alone (for television reception). • Both power cords (for the television and the computer) are plugged in to a "live" AC power outlet. • All cables and connectors are properly connected. • Power switches on both the computer and the television are turned on. • Screen controls are set for optimum picture. (Refer to the operating guide for your television.) • The Video Modulator is connected correctly and switched to "MODULATOR." • The channel selector on the television is set to the same channel as the CHANNEL SELECT switch on the edge of the Video Modulator. Both the modulator and the television should be set to either channel 3 or 4.
No Sound.	• See that the volume control (on the monitor or television) is turned to proper level. • Check connection of cables.
Joystick Controllers will not operate.	• Check connection of cables. • Remember that only certain software is designed for use with the Joystick Controllers.

Maintenance and Service Information

BASIC program is cleared by insertion of a cartridge.	• This is a normal reset procedure designed to protect your color screen.
Stray characters appear, other erratic operation occurs, or computer will not respond to keyboard input.	• Static electricity discharges from the user to the computer can alter program data stored in the internal memory. To correct this problem turn the computer off and then on.

If your cassette recorder does not appear to be working properly, check the following:

• **Power**—Be sure all devices are plugged in and connected properly. Remember that the cassette motor is controlled by the computer. Refer to the Program Recorder manual or to pages XX-XX of this manual.

• **Cassette Interface Cable**—Verify that the proper cable is being used. Check the cable for loose or broken leads. Check to see that the cable is properly connected.

• **Tone and Volume Control Settings**—Check to make sure that the volume and tone control settings are correct. See "Tone and Volume Control Settings" on page 47.

• **Cassette Tape**—Make sure that you are using high-quality tape in good condition. The tape should not be longer than C–60 (not longer than 30 minutes per side).

• **Magnetic Fields**—Be sure that the cassette recorder and the cassette tape are not located within two feet of the television set, an electric motor, or any other source of strong magnetic fields (to avoid accidental erasure of your data).

• **Location**—Make sure that the system (computer console, cassette unit, and television set) is not located on a continuous metallic surface (to minimize conducted noise).

• **Device or Filename**—Be sure that you refer to your cassette recorder as CS1 (upper-case letters) when you load or save data.

• **Tape Heads**—Make sure that the tape heads are clean.

• **PAUSE Switch**—If your recorder is equipped with one, make sure the PAUSE switch is off when saving or loading data.

Maintenance and Service Information

For General Information

If you have questions concerning repair, please call our Consumer Relations Department at (800) 858-4565 (toll free within the contiguous United States). If you wish to make peripheral or software purchases and are unable to find these items locally, you may call our Software Sales Department toll free at (800) 858-4075. The representatives at these numbers cannot provide programming assistance.

For Technical Assistance

For technical questions about programming, specific applications, etc., you can call (806) 741-2663. Please note that this is not a toll-free number, and we cannot accept collect calls.

As an alternative, you can write to:

Consumer Relations Department
Texas Instruments Incorporated
P.O. Box 53
Lubbock, Texas 79408

Because of the number of suggestions which come to Texas Instruments from many sources containing both new and old ideas, Texas Instruments will consider such suggestions only if they are freely given to Texas Instruments. It is the policy of Texas Instruments to refuse to receive any suggestions in confidence. Therefore, if you wish to share your suggestions with Texas Instruments, or if you wish us to review any BASIC language program which you have developed, please include the following statement in your letter:

"All of the information forwarded herewith is presented to Texas Instruments on a nonconfidential, nonobligatory basis; no relationship, confidential or otherwise, expressed or implied, is established with Texas Instruments by this presentation. Texas Instruments may use, copyright, distribute, publish, reproduce, or dispose of the information in any way without compensation to me."

Returning Your Computer for Service

Before returning your computer for service, you may want to call Consumer Relations at (800) 858-4565 to discuss the problem and possible solutions. If the problem continues, return the unit to our Service Facility for repair or replacement. Send shipments to the appropriate Texas Instruments Service Facility listed in the warranty.

Enclose a written explanation of the problem with your product. Be sure to include your name and return address.

Wrap the unit in tissue or similar soft packing material and enclose it in a strong, crushproof mailing carton. If you use the original packing material, it cannot be returned to you.

For your protection, the computer should be sent insured; Texas Instruments cannot assume any responsibility for loss or damage to the computer during shipment.

If the computer is in warranty, it will be repaired or replaced under the terms of the Limited Warranty. Out-of-warranty units in need of service will be repaired or replaced with reconditioned units (at TI's option), and service rates in effect at the time of return will be charged. Because our Service Facility serves the entire United States, it is not feasible to hold units while providing service estimates. For advance information concerning our flat-rate service charges, please call our toll-free General Information number on the previous page.

Customer Service Centers (Local Service Options)

If your computer requires service, instead of returning it to your dealer or to a service facility for repair or replacement, you may elect to exchange it for a factory-reconditioned unit of the same model (or equivalent specified by TI) by bringing it in person to one of the Customer Service Centers which has been established across the United States. A handling fee will be charged by the Customer Service Center for in-warranty exchanges. Out-of-warranty exchanges will be charged at the rates in effect at the time of the exchange.

To determine if there is a Customer Service Center in your locality, look for Texas Instruments Incorporated Customer Service Center in the white pages of your telephone directory or under one of the following two headings in the yellow pages: "Calculator and Adding Machines" or "Computers—Service and Repair." Please call the Customer Service Center for availability and exchange fee information. Write the Consumer Relations Department for further details and the location of the nearest Customer Service Center.

Maintenance and Service Information

This Texas Instruments Computer console warranty extends only to the original consumer purchaser of the console.

Warranty Duration

This Computer console is warranted for a period of one (1) year from the date of the original purchase by the consumer.

Warranty Coverage

This Computer console is warranted against defective materials or workmanship. **This warranty is void if the console has been damaged by accident, unreasonable use, neglect, improper service or other causes not arising out of defects in materials or workmanship.**

Warranty Disclaimers

Any implied warranties arising out of this sale, including but not limited to the implied warranties of merchantability and fitness for a particular purpose, are limited in duration to the above one-year period. Texas Instruments shall not be liable for loss of use of the product or other incidental or consequential costs, expenses, or damages incurred by the consumer or any other user.

Some states do not allow the exclusion or limitation of implied warranties or consequential damages, so the above limitations or exclusions may not apply to you.

Legal Remedies

This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

Warranty Performance

Please first contact the retailer from whom you purchased the console and determine the exchange policies of the retailer.

During the above one-year period, your TI Computer Console will be repaired or replaced with a new or reconditioned console of the same or equivalent model (at TI's option) when the console is returned either in person or by prepaid shipment to a Texas Instruments Service Facility listed below.

Texas Instruments strongly recommends that you insure the unit for value, prior to shipment.

The repaired or replacement console will be warranted for one year from date of repair or replacement. Other than the cost of postage or shipping the unit to Texas Instruments, no charge will be made for the repair or replacement of in-warranty consoles.

Texas Instruments Consumer Service Facilities

U.S. Residents
Texas Instruments Service Facility
2303 North University
Lubbock, Texas 79415

Canadian Residents
Geophysical Services Incorporated
41 Shelley Road
Richmond Hill, Ontario, Canada L4C5G4

Consumers in California and Oregon may contact the following Texas Instruments offices for additional assistance or information.

Texas Instruments Consumer Service
831 South Douglas Street
El Segundo, California 90245
(213) 973-1803

Texas Instruments Consumer Service
6700 Southwest 105th
Kristin Square, Suite 110
Beaverton, Oregon 97005
(503) 643-6758

Important Notice of Disclaimer Regarding the Programs

The following should be read and understood before purchasing and/or using the TI Computer 99/8.

TI does not warrant that the programs contained in this computer and accompanying book materials will be free from error or will meet the specific requirements of the consumer. The consumer assumes complete responsibility for any decision made or actions taken based on information obtained using these programs and book materials. Any statements made concerning the utility of TI's programs and book materials are not to be construed as express or implied warranties.

Texas Instruments makes no warranty, either express or implied, including but not limited to any implied warranties of merchantability and fitness for a particular purpose, regarding these programs or book materials or any programs derived therefrom and makes all programs available solely on an "as is" basis.

In no event shall Texas Instruments be liable to anyone for special, collateral, incidental, or consequential damages in connection with or arising out of the purchase or use of the programs and the sole and exclusive liability of Texas Instruments, regardless of the form of action, shall not exceed the purchase price of this computer. Moreover, Texas Instruments shall not be liable for any claim of any kind whatsoever against the user of the programs or book materials by any other party.

Some states do not allow the exclusion or limitation of implied warranties or consequential damages, so the above limitations or exclusions may not apply to you.