

(title page)

Texas Instruments
Basic Computer 99/2

(GRAPHIC OR PHOTO OF PRODUCT)

Getting Started
with the Basic Computer 99/2

The system software for the Basic Computer 99/2
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How to Set Up Your Basic Computer 99/2 System

[Illustration of all components packed in box, with optional system components screened back—"pack list" approach.]

The Basic Computer 99/2 is easy to set up, and the steps for doing so are detailed on the following pages. The photograph above gives you an overview of the parts of the computer system and how they fit together.

When you unpack the computer, you will find the following items:

User's Books The user's books include *Getting Started* (this book), *Reference Guide*, and the *Reference Card*.

Basic Computer 99/2 The Basic Computer 99/2 consists of a keyboard and the electronic components of the computer, including the TI-99/2 BASIC programming language. **Tip:** Record the serial number of your computer and the date of purchase in the box provided on page XX.

Slip-in Overlay The slip-in overlay slides into the slot at the top right of the keyboard. It identifies function and control keys.

Switch Box The switch box connects to your television set. Switch to "COMPUTER" to use the computer or to "TV" for television viewing.

Switch Box Cable The switch box cable connects the computer to the switch box on the television. You may leave the computer connected to the television.

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

Demonstration Cassette The demonstration cassette (used with a cassette recorder--not included) provides three sample programs for use with the computer.

Recorder Interface Cable The recorder interface cable connects a cassette recorder to the computer for loading or saving programs on cassettes.

Other Equipment:

Your Television (Required) Your television set is used as the display unit for the computer. A color or a black-and-white television set may be used, but the computer displays only in black and white.

Cassette Recorder (Optional) The cassette recorder is an optional piece of equipment that can be used for loading and saving programs on cassette.

****BASIC Tutorial Books****

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 carpet or other soft surfaces.

Connecting the Switch Box to Your Television Set

[Illustration showing back of t.v. and switch box]

***NOTE:** If you have a coaxial antenna system that connects directly to your television set with a round screw-on connection, you have a low-impedance antenna system (typically 75 ohms). To comply with Federal Communications Commission guidelines, you will need to purchase a "Balun matching transformer" from a local television or electronics shop to permit connection of the antenna cable to the switch box. If your television has a low impedance antenna system and receives UHF stations (channels 14 and up), be sure to obtain a Balun matching transformer with both VHF and UHF leads to the television set. Connect the transformer and check your television for normal reception of all channels before connecting the switch box.

Important: Turn the television set OFF before connecting the switch box.

1. Disconnect the VHF antenna cable from your television set.

[Illustration]

2. Connect the Y-connector branching from the switch box to the VHF terminals on your television set.

[Illustration]

3. Connect the VHF antenna cable that you just removed from your television set to the switch box terminals.

[Illustration]

4. Connect one end of the TV connector cable (a phono plug) to the switch box (the input marked "COMPUTER").

[Illustration]

Connecting the Computer

[Illustration of back of console with call-outs of ports]

Solid State Cartridge port
TV port
ON-OFF Channel Select switch
CASSETTE IN and OUT ports
POWER port
CC PORT

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

When you have attached the switch box to the television set, you are ready to connect the computer. Follow these steps:

1. Connect the other end of the TV Connector Cable (a phono plug) to the computer console at the port marked "TV."

[Illustration]

2. Connect the power cord (with transformer) to the back of the console at the port marked "POWER." This connector is keyed to fit only one way.

[Illustration]

3. Plug the other end of the power cord to a grounded, continuously "live" wall outlet.

Other openings on the back of the computer are:

Solid State Cartridge port—plug in Solid State Cartridges here.

ON-OFF Channel Select Switch—to turn the computer ON, set the switch to either channel 3 (CH3) or channel 4 (CH4), depending on which is not an active broadcast channel in your area.

CASSETTE IN and OUT ports—connect a cassette recorder to these ports for loading and saving programs.

CC PORTTM—connect HEX-BUSTM peripherals, such as the Printer/Plotter, RS232, and Wafertape Drive, to expand the capabilities of your computer system.

Setting the Switches

The final stage in setting up your computer is to set three switches.

1. Set the switch box to "COMPUTER."

[Illustration of switch box computer-t.v. switch]

2. Set the channel selector on your television to either 3 or 4 (whichever one is not being used for broadcasting in your area).

[Illustration of channel t. v. channel selector with channels 3 & 4 showing]

3. Turn the television set ON.
4. Set the ON-OFF/Channel Select switch on the back of the computer to the same channel number that you selected on your television. This turns the computer on.

[Illustration of channel select switch on console set to either 3 or 4]

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 XX and check to see that you have followed each step.

TEXAS INSTRUMENTS
TI-99/2
BASIC COMPUTER

READY--PRESS ANY KEY TO BEGIN

1983 TEXAS INSTRUMENTS

Press any key to proceed to the next screen.

TI-99/2
BASIC COMPUTER

PRESS
1 FOR TI-99/2 BASIC

TI-99/2 BASIC is the programming language built into the Basic Computer 99/2. Select TI-99/2 BASIC by pressing the 1 key.

After you press 1, the computer is ready to accept your programs or commands in the TI-99/2 BASIC programming language.

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

A Tour of the Keyboard

[Photograph of whole keyboard]

The keyboard is similar to that of a standard typewriter. Feel free to experiment with the keyboard as you read through this section.

TI-99/2 BASIC 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.

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

- !o! The letter "L" cannot be substituted for the number "1".
- !o! The letter "O" cannot be substituted for the number zero. The screen displays the zero with a slash through it to help you tell them apart.

Most of the keys on the keyboard have a character at the top and one at the bottom of the key face.

[Illustration of key with call-outs]

Top character
Bottom character

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

[Illustration of overlay with call-outs]

CONTROL operations
FUNCTION operations

Tip: 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.

Bottom Characters

[Illustration of whole keyboard with bottom characters highlighted and space bar outlined/highlighted]

To type the bottom character on a key, simply press that key. For example, press the A key to display an upper-case A on the screen; press the 2 key to display the numeral 2.

Tip: The Basic Computer 99/2 normally displays upper-case letters only.

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.

Top Characters

[Illustration of whole keyboard with top characters and SHIFT key highlighted and E, S, D, X keys outlined]

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 **2** key) to display quotation marks on the screen. Hold down the **SHIFT** key and press the **?** key (the top character on the **1** key) to display a question mark.

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. **LEFT ARROW** (**SHIFT S**) and **RIGHT ARROW** (**SHIFT D**) move the cursor (the flashing underline) across the screen in the appropriate direction. Moving the cursor over displayed characters does not erase them.

UP ARROW (**SHIFT E**) and **DOWN ARROW** (**SHIFT X**) have special uses with the **EDIT** command and software applications.

Function Keys

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

[Illustration of whole keyboard with FCTN key, top-row function keys, and overlay highlighted]

The slip-in overlay at the top of the keyboard serves as a guide for using the **ECIN** key with the numeric keys (1 through 8) and the **=** key on the top row of keys. The overlay indicates the special function obtained when you use one of these key combinations.

To perform a keyboard function, hold down the **ECIN** key and simultaneously press one of the top-row keys.

Overlay Name	Key Combination	Operation
DEL	ECIN 1	(The DELETE function) Use this key combination to delete a character from the lines you type.
INS	ECIN 2	(The INSERT function) Use this key combination to insert one or more characters into the lines you type.
ERASE	ECIN 3	Press ERASE before pressing ENTER to erase the line you are typing.
CLEAR	ECIN 4	Use this key combination to stop a program in progress (the same effect as using the BREAK key). Use ECIN 4 (CLEAR) also to cancel a line you are typing (before pressing ENTER); the line moves up on the screen and is not entered.
QUIT	ECIN 5	Press this key combination at any time to return the computer to the master title screen. Note: When you press QUIT , all data and program material you have entered are erased.

The other special functions have certain uses in software applications. Their general uses are:

BEGIN	ECIN 5	BEGIN usually returns a program to its starting point.
PROC'D	ECIN 6	PROC'D (Proceed) generally advances a program to its next segment.
AID	ECIN 7	AID usually causes a program to present some helpful information about the program itself.
REDQ	ECIN 8	REDQ generally enables you to go back and correct information on the screen you are currently using.
BACK	ECIN 9	BACK usually returns you to the beginning of the program segment you are currently using.

Tip: For all but the top row of keys (the number keys), the **ECIN** key can be used in place of the **SHIFT** key to type the top characters. **ECIN** can also be used in conjunction with the cursor-control keys.

CTRL Operations

[Illustration of keyboard with CTRL key and top row of keys highlighted]

The CTRL (control) key, used in combination with certain other keys, instructs the computer to perform specific computer operations. 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.

The BREAK and ENTER Keys

[Illustration of keyboard with BREAK and ENTER highlighted]

The BREAK and ENTER keys have important uses in TI-99/2 BASIC, some cartridge or cassette software, 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.

BREAK--The BREAK key is used to stop a program in progress (the same effect as pressing CLEAR). When you stop a program with the BREAK key, the message BREAKPOINT AT line-number is displayed. The program line designated by the line number has not been performed.

Mathematical Operation Keys

[Illustration of keyboard with math operators and SHIFT key highlighted]

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
$A\geq B$	Checks to see if A is greater than or equal to B
$A\leq B$	Checks to see if A is less than or equal to B
$A\neq B$	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.

Correcting Errors
(After Pressing ENTER)

[Illustration of screen showing lines with error and error message]

```
-----  
TI-99/2 BASIC READY  
CALL CLEAR  
*INCORRECT STATEMENT  
-----
```

If you type a line incorrectly and press ENTER without correcting the line, the computer gives you one of several error messages. These messages indicate the type of error the entered line contains.

When an error message is displayed because of an incorrectly typed line, the easiest way to correct the error is to retype the line properly and then press **ENTER**.

What you see:

[Screen illustrations showing error and steps for correcting]

What you do:

1. Retype the line correctly.
2. Press **ENTER** to instruct the computer to accept and perform the corrected line.
3. The computer performs the command you have entered.

The other error-correction methods, especially those that apply to editing a program, are discussed in detail in the **Reference Guide** on pages XX. See the **EDIT Command**, pages XX.

Correcting Errors
(Before Pressing **ENTER**)

[Illustration of screen showing lines with error]

TI-99/2 BASIC READY
CALL CLEAR__

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. An easy method for correcting errors before you press **ENTER** is illustrated here.

What you see:

[Screen illustrations showing error and steps for correcting]

What you do:

1. Use the **LEEI ARROW** key combination (**SHIEL S**) to move the cursor back to the character you want to change.
2. Repeat Step 1.
3. Retype the correct character (or characters).
4. Press **ENTER** to instruct the computer to accept and perform the corrected line.

All of the error-correction methods are discussed in detail in the **Reference Guide** on pages XX.

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

Practicing With the Keyboard

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-99/2 BASIC programming language.

Type: NEW [Screen illustration]

NEW_

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

Press: ENTER [Screen illustration]

TI-99/2 BASIC READY

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

Type: PRINT "HELLO THERE" [Screen illustration]

TI-99/2 BASIC READY
PRINT "HELLO THERE" _

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

Press: ENTER [Screen illustration]

TI-99/2 BASIC READY
PRINT "HELLO THERE" _
HELLO THERE

The computer "prints" HELLO THERE on
the screen.

More Practice

Type: PRINT 10+28

[Screen illustration]

```
TI-99/2 BASIC READY
PRINT "HELLO THERE"_
HELLO THERE
PRINT 10+28_
```

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

Press: ENTER

[Screen illustration]

```
TI-99/2 BASIC READY
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

[Screen illustration]

```
TI-99/2 BASIC READY
PRINT "HELLO THERE"_
HELLO THERE
PRINT 10+28_
38
PRINT 70/5_
```

The \angle key instructs the computer to divide. Notice that you do not enclose mathematical operations in parentheses.

Press: ENTER

[Screen illustration]

```
TI-99/2 BASIC READY
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.

1. THE FIRST SECTION

Speaking of computers . . .

[Illustration of computer hardware/software system]

Like other people with special interests, computer owners and operators 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 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 underline which shows where a typed character will appear on the screen.

Data: Information that you enter (for example, by typing on the keyboard) for processing or computation by the computer.

Hardware: The physical equipment that makes up your computer system, such as the computer console, the cassette recorder, and printers.

Memory: The data storage capacity of a computer, which is generally of two major types: ROM (Read-Only Memory) and RAM (Random-Access Memory). ROM can only be read by the computer, and most of the computer's operational procedures are stored in ROM. RAM is the storage space allocated to hold the programs and data you enter and the results generated by the computer.

Monitor: A television or television-like display unit that allows you to see on the screen your input and the computer's output.

Peripherals: Accessory equipment that extends the computer's capabilities, such as printers and memory storage devices (disk drives and cassette recorders).

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, which is a set of commands and statements that the computer can understand and perform. TI-99/2 BASIC is the programming language understood by the Basic Computer 99/2.

Software: A program or collection of programs stored on tape or disk, entered from the keyboard, or stored permanently in the computer's memory.

What Accessories and Peripherals Are Available for Your Computer?

A **peripheral** is simply an accessory to be used with your computer. Peripherals give your system added capabilities. For example, your television set is a required peripheral that enables you to see the input and output from your computer.

	Peripheral	Capabilities
[Illustration of Program Recorder]	II Program Recorder	!o! Save programs or data files on cassette tapes
	A program-quality cassette recorder with digital counter that uses standard cassettes for a storage medium. The cassette interface cable (necessary for attaching a cassette recorder to your computer) is packed with the Basic Computer 99/2.	!o! Use preprogrammed software on cassette tape.

TM

The Basic Computer 99/2 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 small and "stackable" so that they do not take up much room on your work surface.

	Peripheral	Capabilities
[Illustration of stacked HEX-BUS peripherals]	Printer/Plotter (HX-1000) TM	!o! Print programs and files
	A HEX-BUS peripheral that enables you to print programs or files or to plot charts and diagrams.	or plot charts and diagrams on paper in four colors.
	Wafertape Digital Tape Drive (HX-2000) TM	!o! Save programs or files on microcassettes.
	A tape drive that uses small, "stringy-floppy" microcassettes and has search capabilities for finding files quickly. The Wafertape drive can store more information and access it faster than the Program Recorder.	!o! Access data quickly and accurately.
	RS232C (HX-3000 or HX-3000/T) A HEX-BUS peripheral with a serial output (HX-3000) or both a serial output and an optional parallel output (HX3000/T).	!o! Interface between your computer and a compatible printer or modem (telephone coupler).

How to Connect Your Computer to a Cassette Recorder

[Illustration of console and program recorder]

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.

Follow these directions for attaching a cassette recorder to the Basic Computer 99/2.

[Illustration]

1. Attach either of the double-plug ends of the cassette cable (included with your computer) to the back of the computer:
 - A. Insert the red plug into the jack marked "CASSETTE OUT."
 - B. Insert the white plug into the jack marked "CASSETTE IN."

[Illustration]

2. Attach the remaining double-plug end of the cable to the cassette recorder:
 - A. Insert the red plug into the microphone jack.
 - B. Insert the white plug into the earphone jack.
3. Plug the power cord from the cassette recorder into a wall 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 will have to experiment with tone and volume settings until you find the best settings for proper data transmission.

[Illustration]

Inserting a Cassette Tape

[Detail of hand inserting tape]

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

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

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.

[diagram of tape]

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. Use these counter settings in the future to quickly load cassette tape programs.

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

Loading a Cassette Program

The Demonstration Cassette packed with the computer gives you an example of preprogrammed cassette software available for the Basic Computer 99/2. The cassette contains three programs: a game, a math activity, and a loan program. You can use the Demonstration Cassette to practice loading and running software.

First, locate the start of each program on the cassette, following the directions given on page XX. Write the program-counter positions for the beginning of each program here:

Cannon Blast (game)	_____
Addition Tutor (math)	_____
Loans	_____

Attach your cassette recorder, insert the Demonstration Cassette, and turn the computer on. Press any key, and then press 1 for TI-99/2 BASIC. Then follow the directions on the screen to load the programs.

[Screen illustrations]

TI-99/2 BASIC READY
OLD CS1

TI-99/2 BASIC READY
OLD CS1
REWIND CASSETTE
THEN PRESS ENTER

1. Type OLD CS1 and press ENTER.

2. Rewind the cassette tape, or position it to the correct location for the program you want to load, and then press ENTER.

TI-99/2 BASIC READY
OLD CS1
REWIND CASSETTE
THEN PRESS ENTER
PRESS CASSETTE PLAY
THEN PRESS ENTER

3. Press PLAY on the recorder, and then press ENTER.

4. The screen goes blank while the computer is loading the program.

TI-99/2 BASIC READY
OLD CS1
REWIND CASSETTE
THEN PRESS ENTER
PRESS CASSETTE PLAY
THEN PRESS ENTER
DATA OK
PRESS CASSETTE STOP
THEN PRESS ENTER

5. The computer tells you that the program has been loaded into its memory and is ready to run. Press **STOP** on the recorder and then press **ENTER**.
6. Type **RUN** and press **ENTER** to start the program.

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 simple 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, after you attempt to load data, 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.

[Illustration of volume and tone controls]

If the computer returns the error message

ERROR IN DATA DETECTED
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.

Tip: Saving a program or data on cassette tape is very similar to loading from cassette tape. Instead of entering **OLD CS1**, enter **SAVE CS1** to store a program or data on a cassette tape. (See the **SAVE** command in the Reference Guide for a full discussion.)

Running a Program

[Illustration]

```
-----  
TI-99/2 BASIC READY  
OLD CS1  
REWIND CASSETTE  
THEN PRESS ENTER  
PRESS CASSETTE PLAY  
THEN PRESS ENTER  
DATA OK  
PRESS CASSETTE STOP  
THEN PRESS ENTER  
RUN_  
-----
```

After loading a program, you are ready to run it—that is, to start the program's operation.

Type RUN and press ENTER. When the computer asks for input, type the appropriate numbers or letters and press ENTER. If you change your mind before you press ENTER, you can backspace with the LEFT ARROW key (SHIFT S) and type the desired characters.

When you are ready to stop the program, press BREAK. You can then run the program again or type NEW, press ENTER, and load another program.

The page below describes the three programs on the Demonstration Cassette.

Cannon Blast

You are the commander of an artillery battery defending an ammunition dump from nearby enemy tanks. You must destroy the tanks with your cannon fire before you run out of ammunition or the tanks wipe out your ammo dump.

[Screen]

Challenge levels range from 1 through 10. The higher the level, the greater the number of tanks and the fewer rounds of ammunition you may use. To begin, type 1 (for level 1) and press ENTER.

[Screen]

The screen shows the number of targets (tanks) within range, the number of ammunition rounds you have, and the range (distance in yards) of your first target. (Both the tank and your cannon are stationary.) To aim your cannon at a tank, enter the elevation (in degrees) from 0 through 45. You can achieve maximum range (10,000 yards) with an elevation of 45 degrees.

[Screen]

As each round is fired, the computer reports whether your shot fell short (MISSED--TOO CLOSE), went beyond the target (MISSED--TOO HIGH), or destroyed the tank (TANK DESTROYED). If your shot falls short, increase the elevation on the next shot. If your shot goes beyond the target, decrease the elevation.

For example, if an elevation of 24 degrees falls short and 25 degrees falls beyond the target, enter an elevation with one decimal place (such as 24.5). Use the period key (.) for the decimal point. The digit to the right of the decimal point may range from 1 through 9.

As you fire on the tanks, they return your fire and try to hit your ammunition dump. If they succeed, part or all of your ammunition may be lost.

[Screen]

The game ends when you destroy all of the targets or run out of ammunition. To play again, enter Y (for Yes). To quit, enter N (for No).

Addition Tutor

This program is designed to give children practice with addition skills. There are 8 levels of challenge, with the addition of eight-digit numbers at the highest level. The computer addresses your child by name and gives praise for success. A progress report is given after ten problems.

[Screen]

To begin, type your child's name (up to 9 letters) and press **ENTER**. Then type 1 (for level 1) and press **ENTER**. When the first addition problem appears, enter the correct answer. (Be sure to enter all answers from left to right.)

[Screen]

If the answer is correct, the computer responds with **RIGHT!** If the answer is incorrect, the computer responds with **NO, TRY AGAIN.** Your child is given three tries on each problem. If the problem is not answered correctly after three tries, the answer is displayed.

After ten problems have been worked, your child's score is displayed with the option to continue. Enter **Y** for Yes or **N** for No. If **Y** is entered, your child can select another challenge level for the next set of problems.

Loans

This program provides easy solutions to questions about loans. Four factors are involved: interest rate (simple annual rate), mortgage term, loan amount, and monthly payment amount. You supply the data for any three of these factors, and the computer displays the fourth.

To begin, let's find the amount of your monthly payment if you borrow \$500 at a rate of 18% for a period of 1 year. (Take care not to enter the letter "O" for the number zero.)

[Screen]

When the computer asks for INTEREST RATE, type 18 and press ENTER.

[Screen]

For MORTGAGE TERM, enter 1 for YEARS and 0 (zero) for MONTHS.

[Screen]

For LOAN AMOUNT, enter 500. For payment, enter 0.

[Screen]

The computer then displays the monthly payment amount of \$45.83.

Try another problem of your choice. Simply enter a zero for whichever category you want the computer to find. If you want the computer to find the MORTGAGE TERM, you must enter zero for both YEARS and MONTHS.

Do not include a comma within a number; for example, 7,000 should be entered as 7000. Also, do not enter percent signs (%) or dollar signs (\$). When you are ready to stop the program, press BREAK.

Maintenance and Service Information

In Case of Difficulty

If your computer does not appear to be working properly, first check to make sure that your television works properly when used for television viewing (without the computer). Ensure that the screen controls are set for optimum picture.

If your television alone works properly but your computer still does not appear to be working properly, go through the set-up procedure on page XX again, making sure that:

1. All cables and connectors are properly connected.
2. The power cord is plugged in to a "live" wall outlet.
3. The switch box is switched to "COMPUTER."
4. The channel selector on the television is set to the same channel as the ON-OFF/Channel Select switch on the back of the computer console. Both the computer and the television should be set to either channel 3 or channel 4.

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

1. **Power**--Be sure all devices are plugged in and connected properly.
2. **Cassette Interface Cable**--Check that the proper cable is being used. Check the cable for loose or broken leads. Check to see that the cable is properly connected.
3. **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 XX.
4. **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).
5. **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).
6. **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).
7. **Device or Filename**--Be sure that you refer to your cassette recorder as CSI when you load or save data.
8. **Tape Heads**--Make sure the tape heads are clean.
9. **PAUSE Switch**--If your recorder is equipped with one, make sure the PAUSE switch is off when saving or loading data.

If You Have Questions or Need Assistance

For General Information

If you have questions concerning computer repair, or peripheral, accessory, or software purchase, please call our Consumer Relations Department at (800) 858-4565 (toll free within the contiguous United States). The operators at this number cannot provide technical assistance.

For Technical Assistance

For technical questions about programming, specific applications, etc., you can call (806) 741-2643. Please note that this is not a toll-free number, and collect calls cannot be accepted.

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

When returning your computer for repair or replacement, return the computer console, power cord, and switch box used when the difficulty occurred. For your protection, the computer should be sent insured; Texas Instruments cannot assume any responsibility for loss or damage to the computer during shipment.

It is recommended that the computer be shipped in its original container to minimize the possibility of shipping damage. Otherwise, the computer should be carefully packaged and adequately protected against shock and rough handling. Send shipments to the appropriate Texas Instruments Service Facility listed in the warranty. Please include information on the difficulty experienced with the computer as well as return address information including name, address, city, state, and zip code.

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 number listed below.

Exchange 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 exchange centers which has been established across the United States. A handling fee will be charged by the exchange 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 an exchange center in your locality, look for Texas Instruments Incorporated Exchange 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 exchange center for availability and exchange fee information. Write the Consumer Relations Department for further details and the location of the nearest exchange center.

THREE-MONTH LIMITED WARRANTY

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 three (3) months 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, NEGLIGENCE, 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 THREE-MONTH 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 three-month 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 three months 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

Canadian Residents

Texas Instruments Service Facility Geophysical Services Incorporated
2303 North University 41 Shelley Road
Lubbock, Texas 79415 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 Texas Instruments Consumer Service
831 South Douglas Street 6700 Southwest 105th
El Segundo, California 90245 Kristin Square, Suite 110
(213) 973-1803 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 Basic Computer 99/2.

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.

Federal Communications Commission Requirements Concerning Radio Frequency Interference

The Texas Instruments Basic Computer 99/2 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.

- !o! Reorient the receiving antenna (that is, the antenna for the radio or television that is "receiving" the interference).
- !o! Change the position of the computer with respect to the radio or television equipment that is receiving interference.
- !o! Move the computer away from the equipment that is receiving interference.
- !o! 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 switch box to your television set.
 2. DO NOT connect the switch box to more than one television set at a time.
 3. DO NOT attach the television interconnect cable from the switch box to any television antenna lead-in wire or cable television outlet.
 4. DO NOT connect any wires other than the switch box cables to your television set and/or antenna when you are using the computer system.
-

How to Use these Books

These books are designed to be informative and easy to use whether you are a novice, intermediate, or experienced computer user. Your Basic Computer 99/2 is a valuable computing tool at any of these levels.

To get started, determine your level of experience according to the following criteria:

- !o! NOVICE--little or no experience with computer programming.
- !o! INTERMEDIATE--limited experience with computer programming; familiar with loops, branching, decision statements, and variables.
- !o! EXPERIENCED--substantial experience with computer programming; familiar with the above concepts plus arrays, functions, subroutines, file processing, and subprograms.

Whatever your level, you should read Book 1 for general information, set-up instructions, a tour of the keyboard, and information on software (programs) and peripherals (accessories).

THEN,

If you are a novice, begin with Book 2: BASIC for Beginners.

This book introduces you to programming in TI-99/2 BASIC. If you have never programmed a computer before, Book 2 is the place to start.

If you are an intermediate, begin with Book 3: Advanced BASIC Programming.

If you have some programming experience, try Book 3 to brush up on some of the more advanced capabilities of TI-99/2 BASIC.

If you are experienced, begin with Book 4: BASIC Reference Guide.

Book 4 is the complete reference guide to TI-99/2 BASIC. If you are an experienced programmer, you are ready for Book 4.

(flowchart directing user to correct book)

READ THIS FIRST! Set-up instructions and an overview of your Basic Computer 99/2 system and its capabilities.

What Preprogrammed Software is Available for Your System?

The term **software**, as mentioned earlier, simply indicates the programs that instruct a computer to do things. Software is to your computer what records are to your record player. Even if you know little or nothing about programming your computer, you can use a software program to play a game, learn a skill, or make a financial decision.

There is a wide range of preprogrammed software available for the Basic Computer 99/2. Software programs are organized into several categories: Entertainment, Education, Information Management, and Computer Programming. The demonstration cassette included with your computer gives you a sample program from the first three of these categories.

Preprogrammed software for your computer is recorded on two types of media: cassette tapes and Solid State Cartridges. To use cassette software, you need the TI Program Recorder or another compatible cassette recorder. To use Solid State Cartridge software, you simply plug a cartridge into the back of the computer console.

Ask your retail dealer about the many different software programs available for the Basic Computer 99/2.

Before Connecting the Switch Box to Your Television

The switch box is designed to be connected to a VHF terminal on the back of your television set. Because individual television sets vary, sometimes a minor modification must be done before connecting the switch box to your television.

The back of your television will have one or both of the following types of VHF terminals.

[Illustrations: twin-screw terminal & coaxial terminal]

Tip: Your television may also have a twin-screw UHF terminal. Do not attach the switch box to a UHF terminal.

Decide which one of the following diagrams applies to the back of your television set. Follow the step listed below the appropriate diagram.

[Detail of twin-screw terminal with flat antenna attached]

IF your television has a flat antenna cable attached to a VHF twin-screw terminal:

1. Go to "Connecting the Switch Box to Your Television" (page XX)

[Detail of twin-screw terminal with flat antenna attached and a round coaxial terminal--no cable]

IF your television has a flat antenna cable attached to a VHF twin-screw terminal and a round coaxial-cable VHF terminal with no cable attached:

1. Go to "Connecting the Switch Box to Your Television" (page XX)

[Detail of twin-screw terminal with no cable attached and a round coaxial terminal with coaxial cable attached]

IF your television has a round coaxial-cable VHF terminal with a cable attached and also has a VHF twin-screw terminal:

1. Go to "The Impedance Switch" (page XX)

[Detail of round coaxial terminal with coaxial cable attached]

IF your television has a round coaxial cable attached to the coaxial VHF terminal and does not have a VHF twin-screw terminal:

1. Go to "The Matching Transformer" (page XX)

The Impedance Switch

If your television has a coaxial cable attached to the coaxial VHF terminal and also has a twin-screw VHF terminal, you have both low-impedance (75 ohm) and high-impedance (300 ohm) inputs on your television.

Look at the back of your television again to see if there is a switch that changes the impedance. It might be marked like this:

[Illustration]
300 ohms (switch) 75 ohms

If you have an impedance switch, you will use the impedance switch in place of the switch on the switch box. Leave the switch on the switch box set to "COMPUTER," and change the impedance switch to "300 ohms" for computer use and to "75 ohms" for television viewing.

Tip: You may want to label the impedance switch as shown here.

[Illustration—]

300_ohms	[switch]	75_ohms
computer use		coaxial input (cable TV, VCR, antenna)

If you have an impedance switch, go to "Connecting the Switch Box to Your Television" (page XX).

If you don't have an impedance switch, go to "The Matching Transformer" (below).

The Matching Transformer

[Detail of twin-screw terminal with no cable attached and a round coaxial terminal with coaxial cable attached]

If your television looks like this and you don't have an impedance switch, you will need to buy a "Balun matching transformer" ("splitter") from a local television or electronics shop in order to connect the switch box to your television.

[Detail of twin-screw terminal with no cable attached and a round coaxial terminal with coaxial cable attached]

If your television looks like this, you will need to buy two types of "Balun matching transformers." One transformer (called a "splitter") changes the antenna signal from low to high impedance. The other transformer changes the signal from high to low impedance.

[Illustration of "splitter" and other transformer]

Connect the transformer(s) to the switch box and then connect the switch box to your television as described in the following section.

For additional details, check with the store where you purchase the transformers. Then proceed to "Connecting the Switch Box to Your Television."

Interfacing the Computer with Your Television

The switch box is designed to connect to the two VHF screw terminals on the back of a television. Because individual television sets vary, sometimes a minor modification must be done to connect the computer to your television.

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

[Illustration of back of TV with callouts:] VHF screw terminals
Coaxial 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 terminal.

OR

Your TV has both types of terminals, but you are not currently using the coaxial terminal (for cable TV, a video cassette recorder, antenna system, etc.)

What You Do No modification is necessary; skip to the next section, "Connecting The Switch Box to Your Television."

CASE B-- Your TV has both types of terminals and you are currently using the coaxial terminal (for cable TV, a video cassette recorder, antenna system, etc.)

What You Do You have both low- and high-impedance inputs on your TV.

Look at the back of your television again to see if there is a switch that changes the impedance. It might be marked like this:

[Illustration]
300 ohms (switch) 75 ohms

If you have an impedance switch--

No modification is necessary; however, you must use this switch when changing the use of your TV. Proceed to the next section, "Connecting the Switch Box to Your Television." You will use the impedance switch in place of the switch on the switch box. Leave the switch on the switch box set to "COMPUTER."

[Illustration--] 300 ohms (switch) 75 ohms
computer use coaxial input
(cable TV, VCR, antenna)

If you ~~do not~~ have an impedance switch--

A slight modification is necessary. The coaxial cable must be attached to the switch box.

You will need to purchase a "Balun matching transformer" ("splitter") from a local television or electronics shop. This transformer changes the signal from low to high impedance.

[Illustration of splitter connecting to cable]

Attach your coaxial cable to the splitter as shown. For additional details, check with the store where you purchase the transformer. Proceed to "Connecting the Switch Box to Your Television."

CASE C--

Your TV has only a direct coaxial terminal, and does not have VHF screw terminals.

What You Do

A slight modification is necessary. It is assumed that you are currently using the coaxial terminal for cable TV, 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.

[Illustration of one transformer connected on either end of the switch box.]

Attach the transformers to the switch box as shown. For additional details, check with the store where you purchase the transformers. Then, proceed to "Connecting the Switch Box to Your Television."

Coaxial Cable Hook-ups

[Illustration of screw-type terminals and coaxial terminal, with coaxial cable attached to coaxial terminal.]

If your set has both types of terminals and you are using the coaxial terminal, check the back of your television to see if you have an impedance-selection switch, looking something like this:

[Illustration]
300 ohms [switch] 75 ohms

This switch lets you change from a low-impedance (75 ohm) antenna system to a high-impedance (300 ohm) system. Connect the switch box to the television as described in the following section; no modification is necessary. However, you must use this switch when changing the use of your TV. Leave the switch on the switch box set to "COMPUTER," and use the impedance switch in place of the switch on the switch box to change from computer use to television viewing.

[Illustration--]

300 ohms	[switch]	75 ohms
computer use		coaxial input (cable TV, video recorder/player, antenna)

[Illustration of "Splitter"]

If you are using a coaxial-cable antenna system (for cable TV, a video recorder/player, etc.) and your television set has both kinds of antenna terminals but no impedance-selector switch, you will need to purchase a "Balun matching transformer" ("splitter") from a local television or electronics shop in order to connect the switch box to your television.

[Illustration of "splitter" and other transformer]

If your television set has only a direct coaxial terminal and does not have VHF screw terminals, you will need to purchase two types of "Balun matching transformers." One transformer (called a "splitter") changes the signal from low to high impedance. The other transformer changes the signal from high to low impedance.

Connect the transformer(s) to the switch box and then connect the switch box to your television as described in the following section.