

# ***Texas Instruments***

## ***Home Computer***

### ***Accessory***

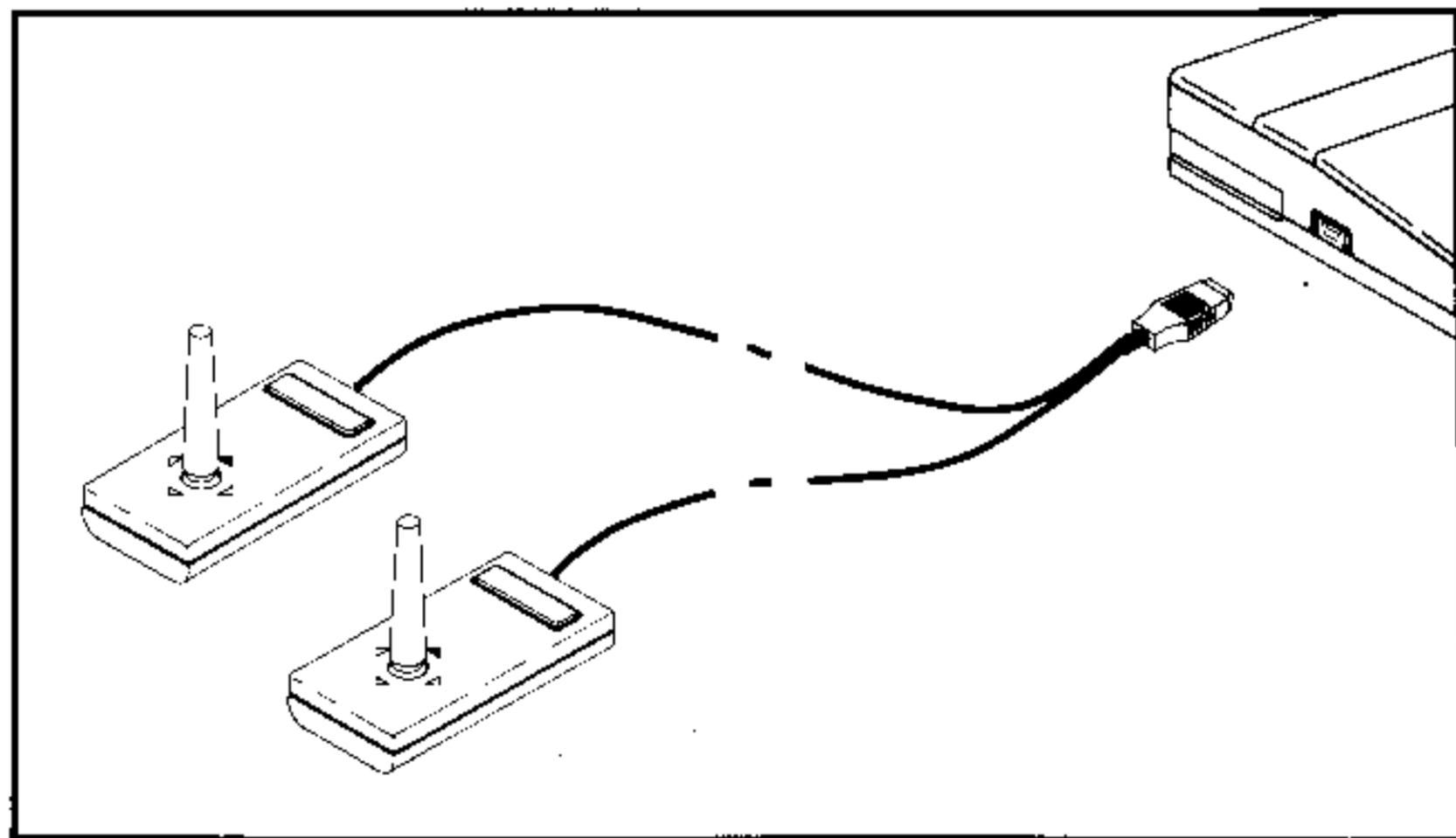
# **Wired Remote Controllers**

The lightweight, compact Wired Remote Controllers add greater freedom and versatility to games, graphics, and sound applications on the Texas Instruments Home Computer. The unit allows you to control movement, sound, speech, and color without keyboard interaction. You can use the Remote Controller units with certain *Solid State Software*<sup>™</sup> Command Modules or with your own TI Home Computer BASIC programs.



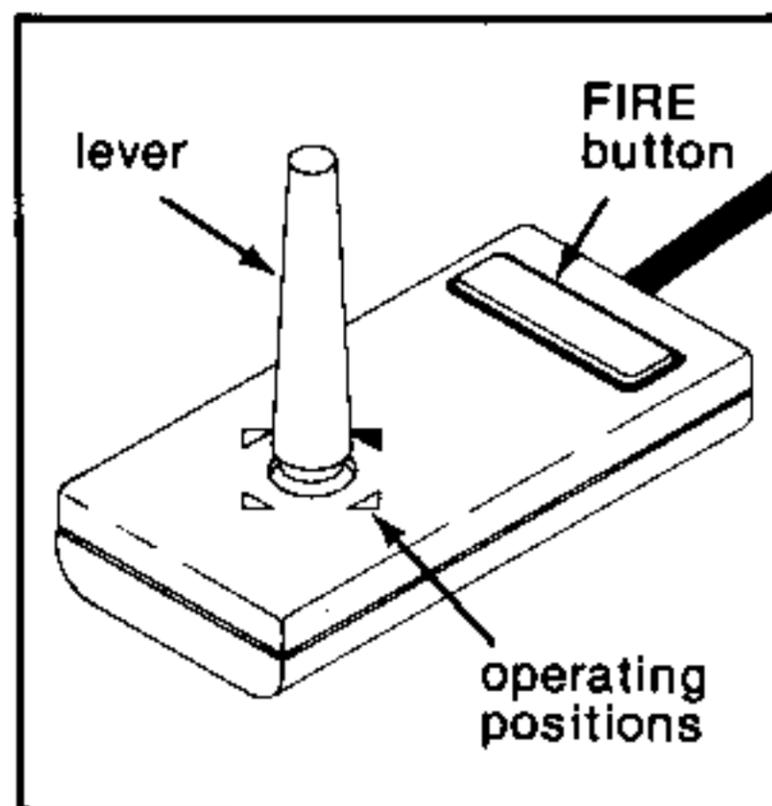
## Attaching the Wired Remote Controllers

The unit has two handheld control boxes joined by cables to a single connector. This connector plugs directly into the nine-pin outlet on the left side of the console (not on the back).



The cable can be plugged in at any time without disturbing the module activity or TI BASIC program in progress. Some applications require both handheld units, while other activities use only one.

Each handheld unit has two operating controls, the lever and the FIRE button. The lever has four marks around its base, indicating the four main positions available in addition to the center and diagonal positions.



## Using the Wired Remote Controllers

### *With Command Modules*

Some Command Modules contain built-in programs that accept input from both the keyboard and the Remote Controllers. However, if you are using a TI-99/4A Home Computer and the ALPHA LOCK key is pressed down, the up (or north) position on the Wired Remote Controllers does not work. For proper operation of the controller unit, be sure ALPHA LOCK is in the *up* (off) position. For information on using the handheld units, refer to the module manuals.

### *With TI Home Computer BASIC Programs*

Two special subprograms in TI Home Computer BASIC make it possible for you to write your own programs that use the Wired Remote Controllers. These subprograms are CALL JOYST and CALL KEY. Two sample programs are included in this manual to help you get started. Additional details are provided in the "BASIC Reference Section" of the *User's Reference Guide*.

### **CALL JOYST**

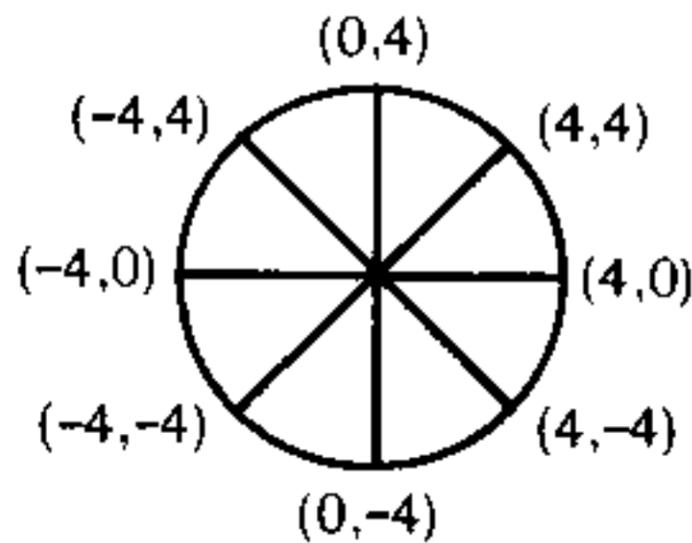
The lever on the Remote Controller unit returns information to your program via the CALL JOYST subprogram. The format for CALL JOYST is:

CALL JOYST (*unit-number, x-variable, y-variable*)

The *unit number* specifies which handheld unit you are using and must be 1, 2, or a numeric variable or expression that evaluates to a 1 or 2.

Each position of the lever has an X value and a Y value

assigned to it as shown here. The center position is (0,0).



When the CALL JOYST statement is performed, integer values of  $-4$ ,  $+4$ , or  $0$  are automatically assigned to the *X*- and *Y*-variables, based on the position of the lever.

### CALL KEY

The FIRE button on the Remote Controller unit returns information to your program via the CALL KEY subprogram. To use CALL KEY, the following format is required:

CALL KEY (*unit-number*, *key-variable*, *status-variable*)

The *unit-number* specifies which handheld unit you are using and must be 1, 2, or a numeric variable or expression that evaluates to 1 or 2.

When the CALL KEY subprogram is performed, the computer assigns the value 18 to the *key-variable* if the FIRE button is pressed and the value 0 if it is not pressed.

The computer assigns a value to the *status-variable* to indicate what has happened in the program since the last CALL KEY statement was performed. The value is:

- $+1$  if the FIRE button was not pressed during the last performance of CALL KEY, but is now pressed.
- $-1$  if the FIRE button was pressed during the last performance of CALL KEY and is still pressed.
- $0$  if the FIRE button is not pressed at the time the CALL KEY statement is performed.

The following programs show how to use the Wired Remote Controllers with the CALL JOYST and CALL KEY subprograms. Please note these important points:

- The values returned in *X-variable* and *Y-variable* should be used in additional calculations if you want to place characters anywhere on the screen (see lines 230-260 of the Color Designs program) or generate tones (see lines 250-280 of the Music Player program).
- For graphics design, use the *Y-variable* to calculate a row position on the screen and the *X-variable* to calculate a column position when using the Remote Controllers with HCHAR or VCHAR (see line 270 of Color Designs).
- When you are using the Wired Remote Controllers with the 24 x 32 "grid" for graphics designs, the row numbers begin with 1 at the top and increase to 24 at the bottom. Since the Remote Controllers are designed for values to increase as the lever is moved up, the sign of the *Y-variable* must be reversed when defining a row position for graphics programs (see line 240 of Color Designs).

### **Sample Programs**

#### *Color Designs:*

This program draws a line of blocks on the screen as you move the Wired Remote Controller lever. You can change the color of the block from blue to red and back again by pressing the FIRE button. A single handheld unit is needed.

First, turn on the computer and select TI BASIC on the master selection list. Then enter the following program.

```
>NEW
>100 SWITCH=1
>110 X=15
>120 Y=13
>130 CALL CLEAR
>140 CALL COLOR(1,11,11)
>150 CALL COLOR(2,5,5)
>160 CALL JOYST(1,DX,DY)
>170 CALL KEY(1,KEY,STATUS)
>180 IF KEY<>18 THEN 230
>190 SWITCH=SWITCH*-1
>200 CALL COLOR(2,9,9)
>210 IF SWITCH=-1 THEN 230
>220 CALL COLOR(2,5,5)
>230 X=X+DX/4
>240 Y=Y-DY/4
>250 X=INT(32*((X-1)/32-INT((X-1)/32)))+1
>260 Y=INT(24*((Y-1)/24-INT((Y-1)/24)))+1
>270 CALL HCHAR(Y,X,42)
>280 GOTO 160
```

Now enter the RUN command to begin your drawing. Move the lever in any direction to draw blocks. Press the **FIRE** button to change its color.

*Program Explanation:* Line 140 specifies a yellow screen color. The color block is defined as blue in line 150 (foreground and background colors the same).

The CALL JOYST statement (line 160) inputs values based on the position of the lever. These values are used to compute a screen position for the display character (lines 230-260). The calculations in lines 250 and 260 ensure that the screen position for the block will not exceed the screen boundary. This wrap-around feature keeps the program from ending in an error. The block is placed on the screen by the CALL HCHAR statement (line 270).

Lines 170 and 180 determine if the FIRE button has been pressed. If so, the program uses the variable SWITCH to determine which color to use for the block. If SWITCH equals +1, a blue block is displayed (line 200); if it equals -1, a red block appears (line 220).

Line 280 creates a loop so that you can continue to draw blocks and change colors as long as you want. Remember to press **CLEAR** on the console to stop the program.

### *Music Player:*

This program uses both Wired Remote Controllers to produce two independent musical tones. Eight lever positions on each unit correspond to each note of a C-major scale. The names of the notes are displayed on the screen as they are played.

After selecting TI BASIC from the master selection list, enter the following program.

```
>NEW
>100 A$="CDEFGABC "
>110 DIM NOTE(9),M(8,8)
>120 FOR I=1 TO 9
>130 READ NOTE(I)
>140 NEXT I
>150 DATA 262,294,330,349,392
,440,494,524,40000
>160 FOR I=1 TO 9
>170 READ X,Y,INDEX
>180 M(X,Y)=INDEX
>190 NEXT I
>200 DATA 8,4,1,8,8,2,4,8,3
>210 DATA 0,8,4,0,4,5,0,0,6
>220 DATA 4,0,7,8,0,8,4,4,9
>230 CALL JOYST(1,X1,Y1)
>240 CALL JOYST(2,X2,Y2)
>250 X1=X1+4
>260 Y1=Y1+4
>270 X2=X2+4
>280 Y2=Y2+4
>290 CALL SOUND(-1000,NOTE(M(
X1,Y1)),0,NOTE(M(X2,Y2)),0).
>300 PRINT SEG$(A$,M(X1,Y1),1
);SEG$(A$,M(X2,Y2),1)
>310 GOTO 230
```

Now enter the RUN command and begin to make music! Move the levers on each unit to the various positions to create tone combinations. When the levers are in the center position you won't hear a tone, since the frequency generated (40,000 Hz) is beyond human hearing range.

*Program Explanation:* Line 100 defines a string of note names from which the appropriate note is selected and displayed in line 300. In lines 120-150 the C-scale frequencies are assigned to an array called NOTE. A 9-by-9 array (M) is established in lines 160-220 (using subscripts 0-8). Nine values (1-9) are read and stored in M at the locations which correspond to the lever positions on the Wired Remote Controllers, incremented by +4. These values are used in line 290 to select the proper frequency from the NOTE array.

Lines 230 and 240 activate the two Remote Controllers. The returned X and Y values are modified in lines 250-280 to correspond to locations in array M. Tones are generated in line 290, and the corresponding note names are displayed in line 300.

Line 310 creates a loop so that you can play tunes as long as you wish. Remember to press **CLEAR** on the console to stop the program.

## **MAINTENANCE AND SERVICE INFORMATION**

### *Care of Unit*

Observe the following precautions when the Wired Remote Controllers are not in use. First, take care to ensure that no pressure is exerted on the FIRE button. Second, do not store the handheld units near a heat source, such as a hot water heater, an oven, a furnace.

If the Remote Controller unit becomes soiled, disconnect it from the computer, wipe it gently with a damp, soft cloth, and dry it with a soft towel before reattaching it to the computer. Do not spray the unit with any cleaning agents.

*Note:* Before inserting the Remote Controller cable into the outlet on the console, touch it to some metal object to ensure that it has not built up a static charge. See the *User's Reference Guide* for further details.

### *In Case of Difficulty*

If you have problems with the performance of your Wired Remote Controllers unit, check the following before having the unit serviced.

- Be sure the unit is connected to the nine-pin outlet on the *left* side of the console (not on the back).
- Read the manual included with the module you're using to see if it's designed to work with the Wired Remote Controllers. Remember, not all modules use the handheld unit.

### **Three-Month Limited Warranty**

**THIS TEXAS INSTRUMENTS WIRED REMOTE CONTROLLERS WARRANTY EXTENDS TO THE ORIGINAL CONSUMER PURCHASER OF THE ACCESSORY.**

### **WARRANTY DURATION**

This Wired Remote Controllers unit is warranted for a period of three (3) months from the date of the original purchase by the consumer.

## **WARRANTY COVERAGE**

This Wired Remote Controllers unit is warranted against defective materials or workmanship. **THIS WARRANTY IS VOID IF THE ACCESSORY 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 WIRED REMOTE CONTROLLERS 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**

During the above three-month warranty period, your TI Wired Remote Controllers will be repaired or replaced with a new or reconditioned unit of the same or equivalent model (at TI's option) when the unit 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 unit will be warranted for three months from date of repair or replacement. Other than the cost of shipping the unit to Texas Instruments or postage, no charge will be made for the repair or replacement of in-warranty units.

## **TEXAS INSTRUMENTS CONSUMER SERVICE FACILITIES**

### *U.S. Residents*

Texas Instruments Service Facility  
2303 North University  
Lubbock, Texas 79415

### *Canadian Residents*

Texas Instruments Service Facility  
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



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# **ADDENDUM**

## **Wired Remote Controllers**

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### **Notice**

When using the Wired Remote Controllers with the TI-99/4A Computer, you will find that you cannot move an object upward (North) if the **ALPHA LOCK** key is on. If you experience this situation, simply turn the **ALPHA LOCK** key off, and your Wired Remote Controllers will function properly.