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# TV Typewriter II

## manual cursor board

Add this optional plug-in board to the TV Typewriter II and you can manually position the cursor anywhere on the TV screen.

by ED COLLE

IF YOU HAVE BUILT THE TV TYPEWRITER II that has recently appeared in **Radio Electronics** (see Feb. 1975 issue), you've probably been waiting for the manual cursor plug-in option. This board allows you to manually, with pushbutton switches, move the cursor one space left, right, up or down as well as home-up, erase to end of line (EOL) and erase to end of frame (EOF). The last three options, home-up, erase EOL and erase EOF do not require the cursor board but it is recommended.

The circuitry provides the switch debouncing necessary to prevent multiple cursor counting thus insuring the cursor jumps only one position each time a directional button is depressed. The control switches themselves are SPST normally open pushbutton switches that should be mounted on an aluminum strip just in front of the keyboard. The debouncing delay provided is 100 milliseconds, but longer delays can be achieved by increasing the capacitance of C1 (see Fig. 1). The entire circuit is built on a 3-1/16 in. x 4-1/2 in. fiberglass circuit board that plugs into the main board of the TV Typewriter II on connector strips J3 and J4 just behind the memory board. Switch connections to the cursor board are provided on the nine pin connector attached to the circuit board.

### How it works

Since all of the pushbutton control switches are normally open, the switch inputs are all tied high with resistors

### PARTS LIST

All resistors are 1/4 watt, 10%, unless noted.

R1-R7, R10, R12, R13—1000 ohms  
R8, R9—5600 ohms  
R11—2200 ohms

C1—33- $\mu$ F, 6 volts, electrolytic  
C2, C3—100-pF polystyrene  
C4—0.1- $\mu$ F, 12 volts

D1—1N914 silicon diode  
IC1, IC5—7403 quad NAND gate  
IC2—74123 dual one-shot multivibrator  
IC3—7430 eight-input NAND gate  
IC4—7404 hex inverter  
Q1—2N5129 transistor.

R1-R7. The input commands are directed to the output NAND gates (IC1, IC5-a, IC5-b and IC5-c) through inverters IC4 and IC5. Note that none of the control switches affect the output gates unless the logic signal from pin 5 of IC2-b is high. IC3 monitors the control switches and its output goes high when any one of the seven switches are depressed. This forces the  $\bar{Q}$  output of IC2-a low where it will remain for ap-

proximately 100 ms. After the 100-ms delay, the  $\bar{Q}$  output of IC2-a goes high again. This triggers IC2-b forcing its  $\bar{Q}$  output high for 1  $\mu$ s. This gates the appropriate control command into the TV Typewriter II circuitry.

### Assembly and use

It's not very difficult to assemble the unit, just be sure to orient the integrated circuits, diode, electrolytic capacitor,

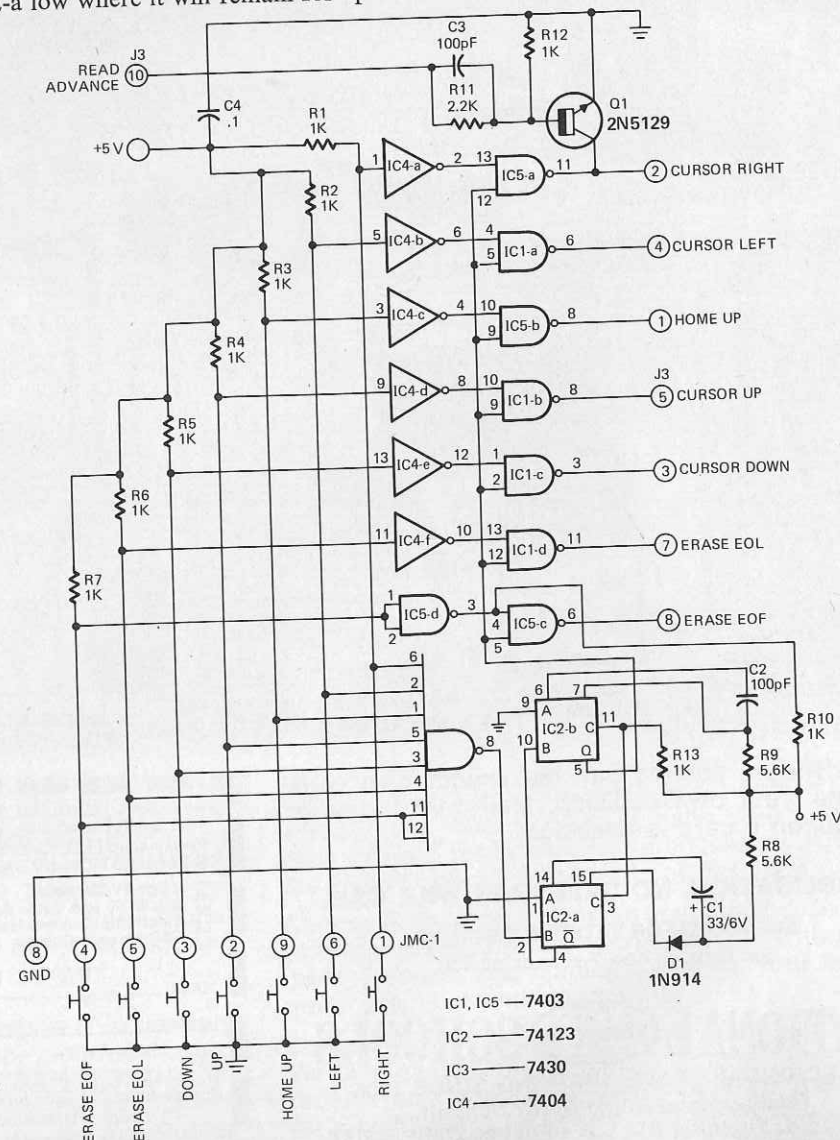


FIG. 1—MANUAL CURSOR BOARD schematic.

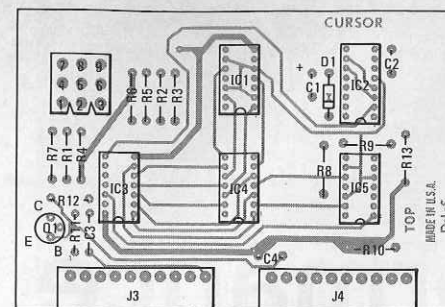
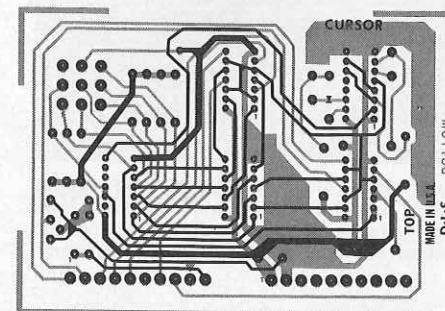
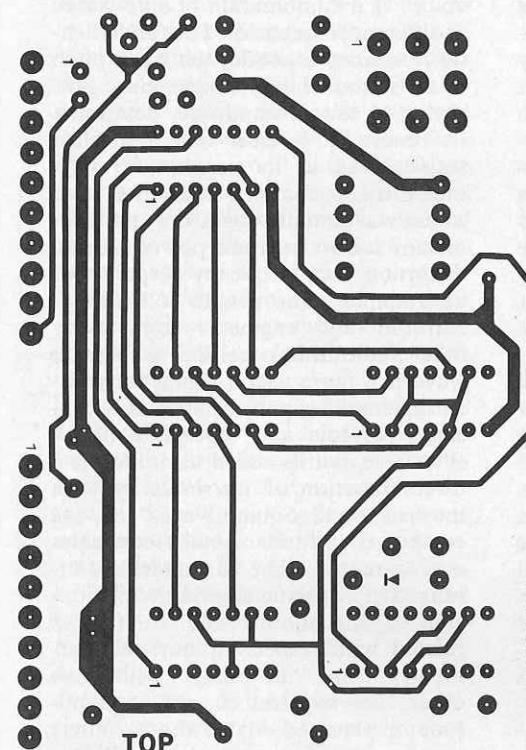


FIG. 2—COMPONENT PLACEMENT diagram.



X-RAY VIEW of the double-sided printed circuit board.



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FIG. 3—FOIL PATTERN of component side of double-sided board shown full size.

transistor and connector correctly. Figure 2 shows the component layout. The connector is notched and must be installed exactly as shown in the component side of the foil pattern (Fig. 3). There is a provision for an indexing key on the mounting connectors, J3 and J4, so after soldering the connectors insert a nylon plug in J3 pin 9. This pin is marked with an arrow on the foil side of the board (See Fig. 4). If you have

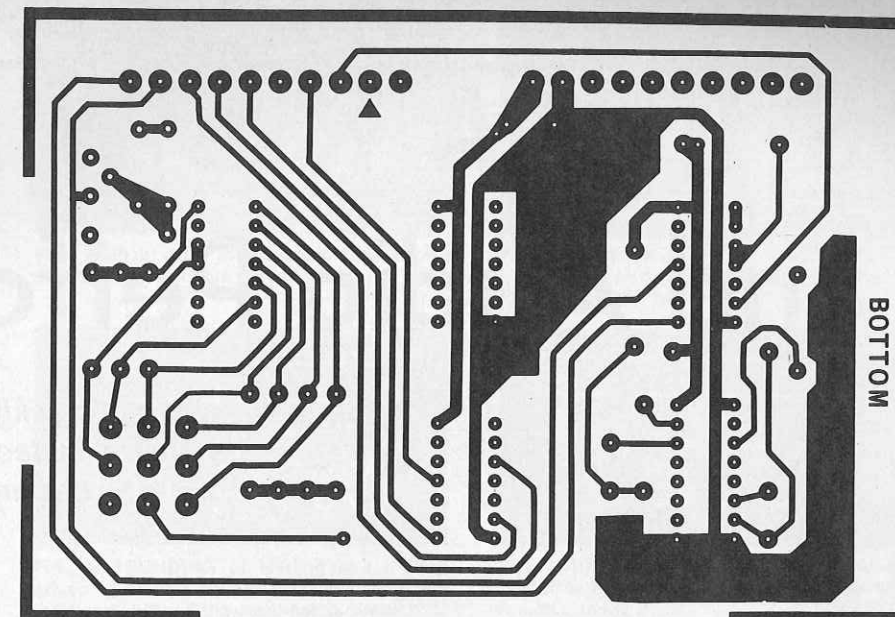


FIG. 4—FOIL PATTERN of foil side of double-sided board shown full size.

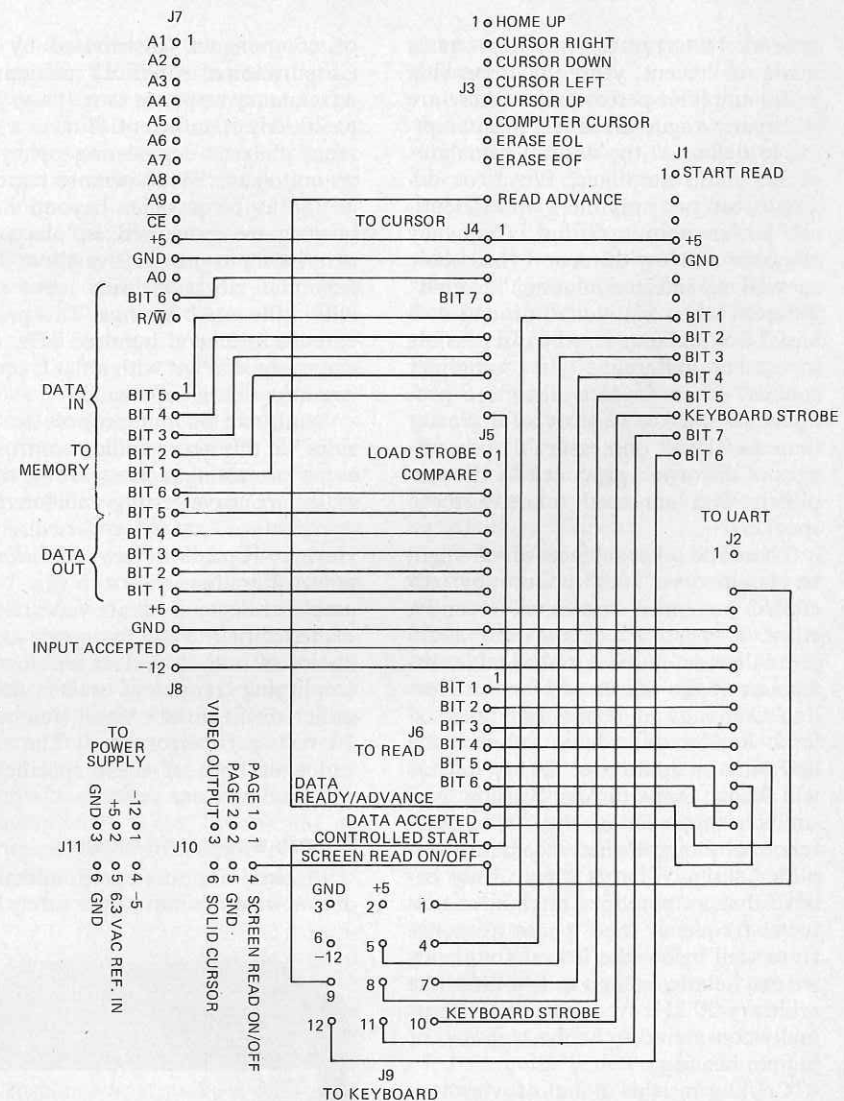


FIG. 5—JACK INTERCONNECTION DIAGRAM of TV Typewriter II.

any problems, check to see if the cursor board is working correctly by checking it with a voltmeter and scope. If your TV Typewriter II has never been used, be sure to check it out first without the

cursor board. The cursor board should not be plugged in until the main board has been thoroughly checked out. The jack interconnection diagram of TV Typewriter II is shown in Fig. 5. R-E