Make Yourself

This EPROM COPIER Using Microprocessor Kit

By M. Kathiresan

The 2716 (2K × 8) is an Erasable and Programmable Read Only Memory (EPROM) chip. Programming or copying is not a complicated procedure. For programming the chip, 25V supply is to be applied to pin 21 of the 2716 and 5V pulse of 5 ohms has to be applied to the programing pin 18. The IC 2716 operates from a single supply. So, it is ideal for use with microprocessor kits.

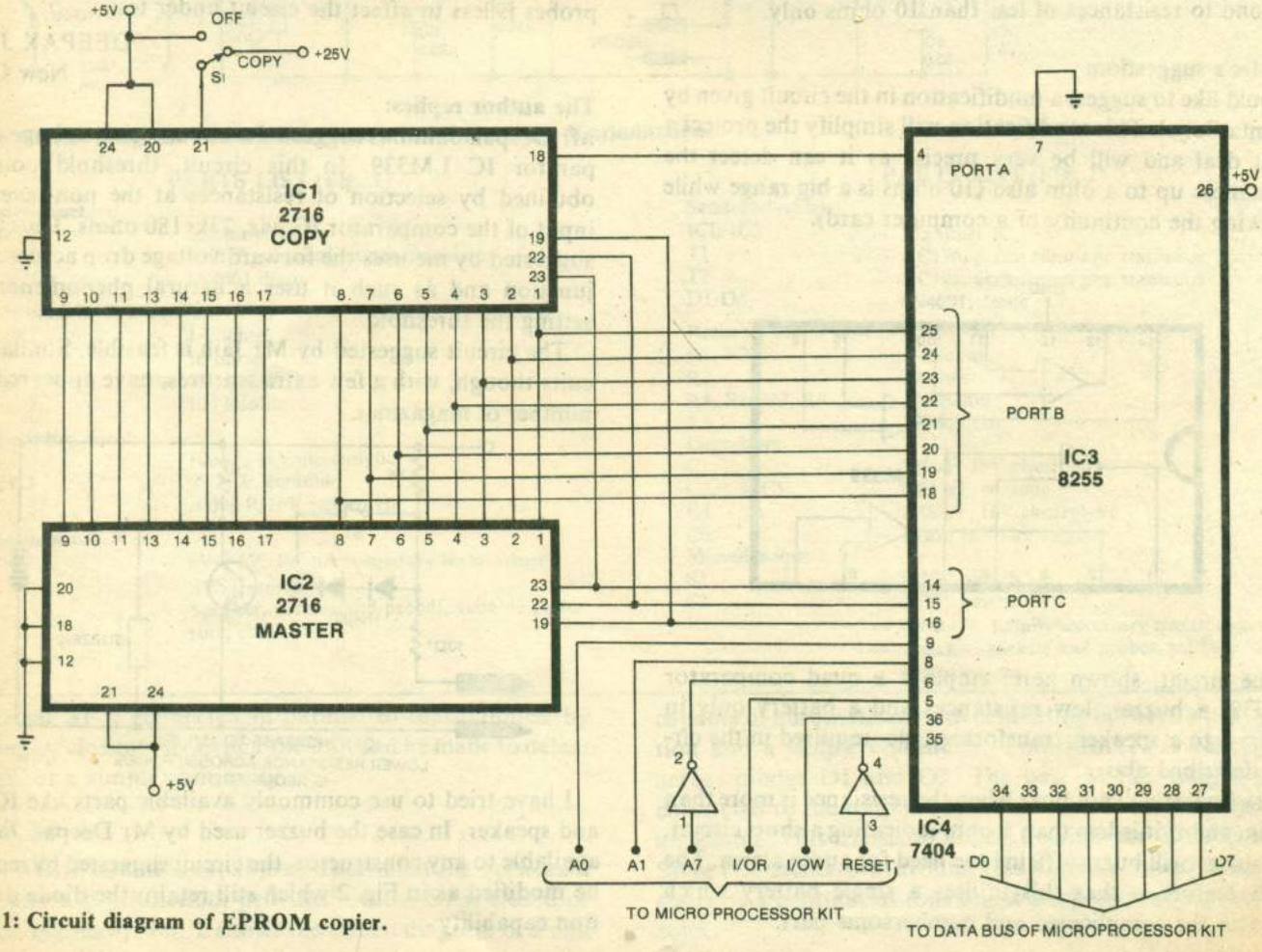


Fig. 1: Circuit diagram of EPROM copier.

The 8085 kit described earlier in a serial by Prof. K. Padmanabhan together with the interfacing circuit described here, can be used to copy all the data from all pages of master EPROM 2716 to the relevant pages of copy EPROM. Thus, one can conveniently copy all the programs from one EPROM onto another by using this circuit and the kit.

Circuit description

Two sockets are required, one for the EPROM being copied onto (marked as 'Copy EPROM') and one for the chip being copied from (marked as 'Master EPROM'). The data pins of both EPROMS are connected in parallel. The address locations of the both are connected to port B and port C of IC 8255.

The low address pins and high address pins are connected to port B and port C respectively. Pin 18 of copy EPROM is connected to port A of 8255. Pin 21 of copy EPROM is connected to +25V supply via the changeover switch S1.

The circuit incorporates programmable input/output IC 8255. Here, all the ports are used as output ports by outputting the control word 80 in the control register. After apply-

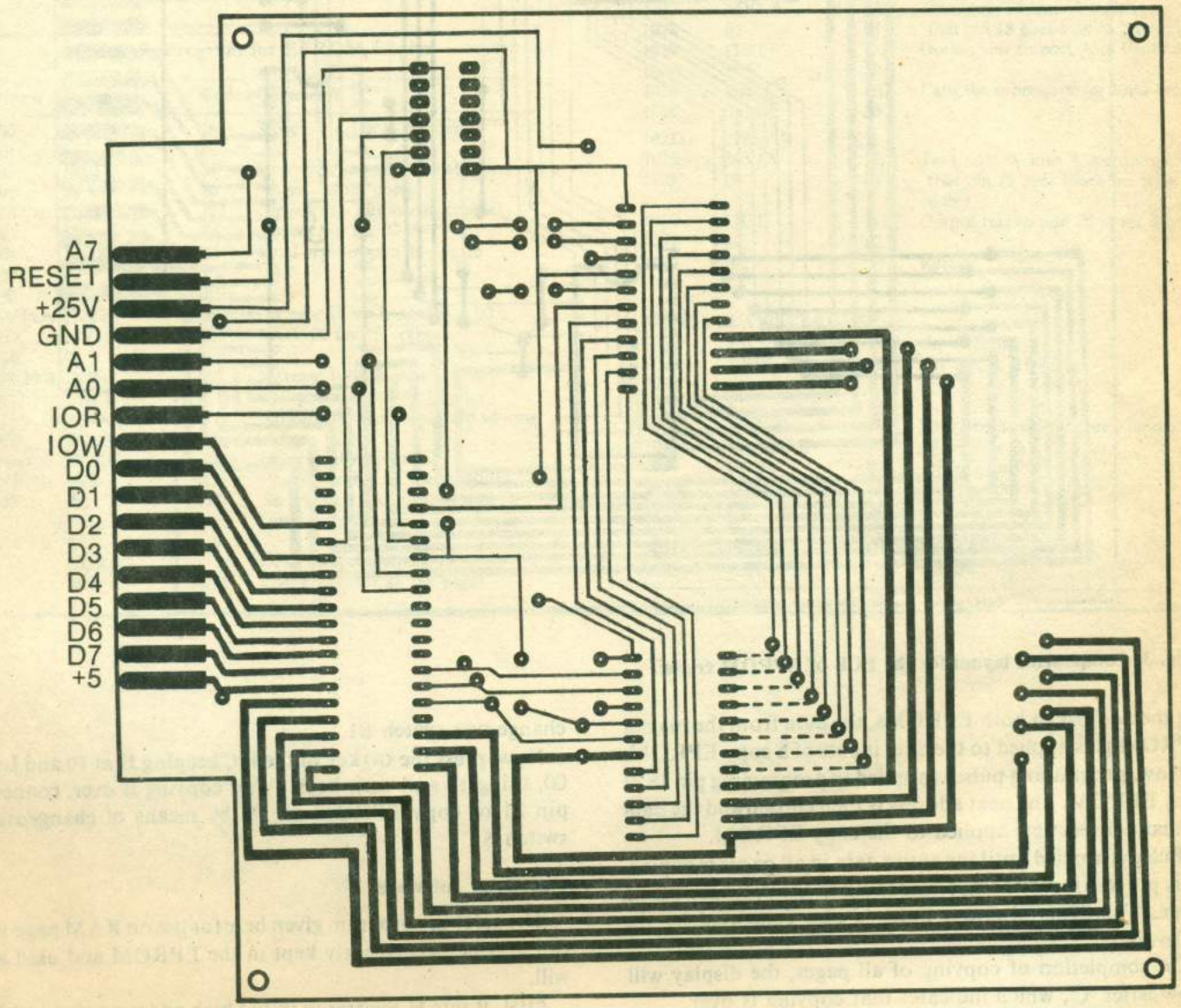


Fig. 2: Actual-size PCB layout for the EPROM copier.

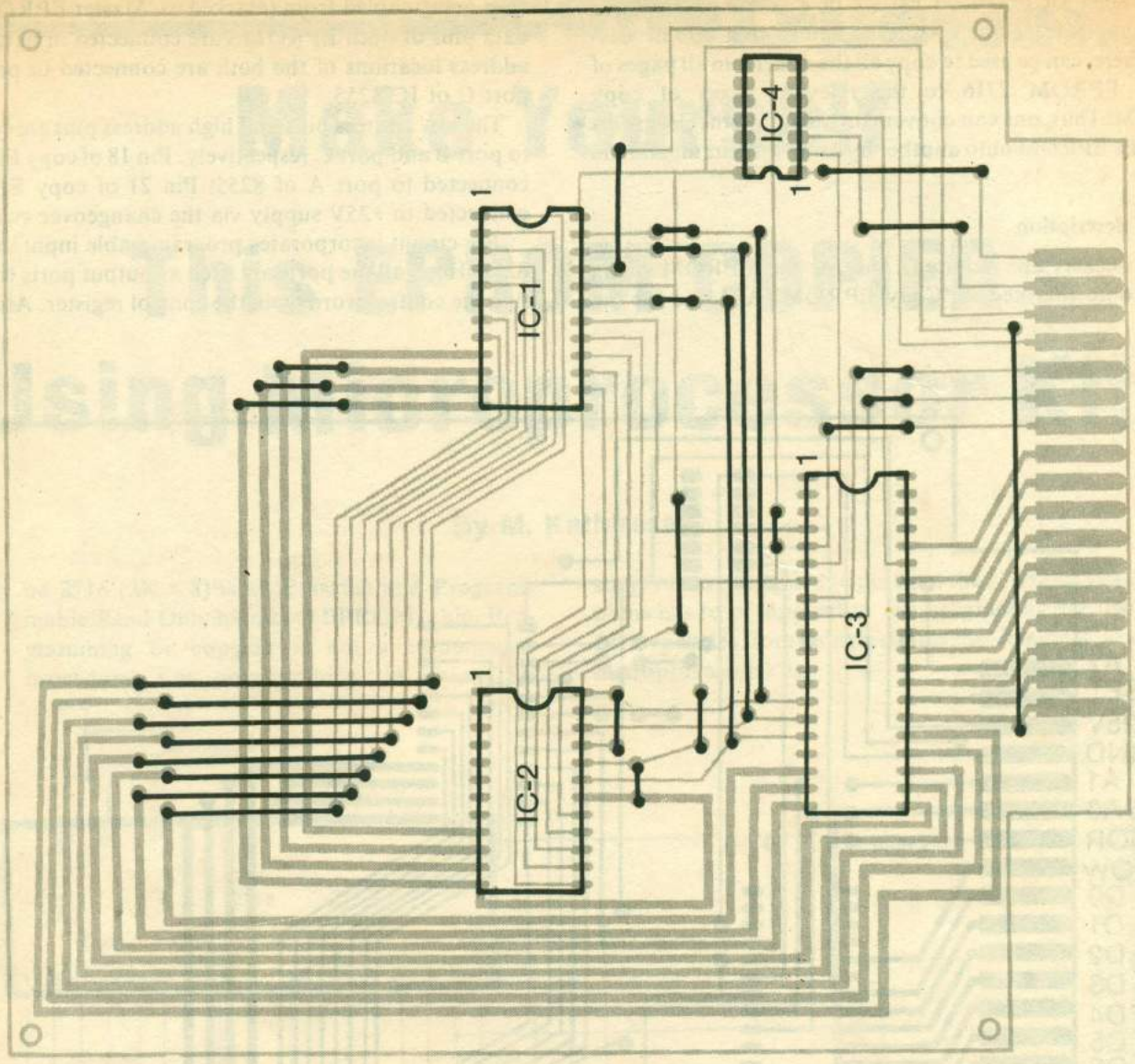


Fig. 3: Components layout for the PCB of EPROM copier.

ing the address to both EPROMs, the data from the master EPROM gets applied to the data inputs of a copy EPROM.

Now, programing pulse is applied to programing pin 18 of copy EPROM. The next address is then chosen and the data at that address gets applied to the copy EPROM.

Pulse is applied until the entire data in all pages is copied. This process is carried out according to the software listing given. The 50ms program pulse is also generated by the software.

On completion of copying of all pages, the display will show letter 'C', which indicates that copying is over.

The program starts from locations 10 00 to 10 3E. After inserting master EPROM and copy EPROM in the relevant sockets, apply +25V to pin 21 of copy EPROM 2716 through changeover switch S1.

Now, press the GO key of the kit, keeping H at 10 and L at 00, using HI and LOW keys. After copying is over, connect pin 21 of copy EPROM to 5V by means of changeover switch S1.

Details of software

The software program given here for use on RAM page 10 can also be permanently kept in the EPROM and used at will.

First, it sets H register to initial high address value and L register to low address value. Then program subroutine is called for copying and the low address and high address values are incremented. Program subroutine is then called

again. This sequence continues till all the pages are copied.

The program subroutine outputs the high address value and low address value to the address inputs of both EPROMs via ports B and C of 8255. After setting up the address, 50ms pulse is applied via port A when it returns to the main program. After copying all data from all pages, the program executes the instruction at location 1018 for displaying letter 'C' in all displays.

The complete PCB pattern is given in Fig. 2. A ribbon cable can be used for connecting databus, the address lines A0, A1 and A7 and the I/OR and I/OW lines.

The +5V supply used in the kit would be enough for this board as well. A separate supply of 25V is used for pin 21 of copy EPROM. □

Software Program for EPROM Copier

Address	Mnemonic	Code	Comments
1000	MVID	16	Store 08 in the D register
1001	08	08	
1002	MVIA	3E	80 is code for 8255 for all ports
1003	80	80	to be output ports
1004	OUT	D3	Output this number to control
1005	83	83	register in the 8255
1006	LXIH	21	Load register pair H-L with
1007	FF	FF	H = FF, L = FF
1008	FF	FF	
1009	PtA INRH	24	Increase H by 1, now H = 00
100A	MVIE	1E	MOV 00 into E register
100B	00	00	
100C	PtB INRL	2C	Increase L by 1, now L = 00
100D	CALL	CD	Call program subroutine for
100E	PROG	21	copying data in the relevant address
100F	SUBROUTINE	10	
1010	DCRE	1D	Decrement register E.
1011	JNZ	C2	Check whether all the locations
1012	Pt	0C	in a page are copied? If not, jump to point B
1013	B	10	
1014	DCRD	15	Otherwise, decrement D
1015	JNZ	C2	Check whether all the pages
1016	Pt	09	in the master are copied?
1017	A	10	If not, jump to point A.
1018	MVIA	3E	Move the data 72 into A register
1019	72	72	
101A	OUT	D3	Output this to port 2
101B	02	02	
101C	MVIA	3E	Move the data 00 into A register
101D	00	00	
101E	OUT	D3	Output this to port 1
101F	01	01	
1020	HALT	76	Halt, if necessary
PROGRAM SUBROUTINE			
1021	MOVA, H	7C	Take high address value into A
1022	OUT	D3	Output this to port C of the 8255
1023	82	82	
1024	MOVA, L	7D	Take low address value into A
1025	OUT	D3	Output this to port B of the 8255
1026	81	81	
1027	MVI A	3E	Take data 01 into A register so
1028	01	01	that pin 18 goes high to give pulse
1029	OUT	D3	Output this to port A of the 8255
102A	80	80	
102B	CALL	CD	Calls the subroutine for 50ms delay
102C	TIME	33	
102D	DELAY	10	
102E	MVIA	3E	Take data 00 into A register so
102F	00	00	that pin 18 goes low after 50ms delay
1030	OUT	D3	Output this to port A of the 8255
1031	80	80	
1032	RET	C9	Return
TIME DELAY SUBROUTINE:			
1033	PUSH B	C5	Save registers
1034	LXIB	01	Set B-C to 11 FF
1035	FF	FF	
1036	Pt C 11	11	
1037	DCX B	0B	Decrement register pair B and C
1038	MOVA, B	78	Move it to A
1039	ORAC	B1	OR it with C
103A	JNZ	C2	Jump to point C if not zero
103B	Pt	37	
103C	C	10	
103D	POP B	C1	Restore registers
103E	RET	C9	Return

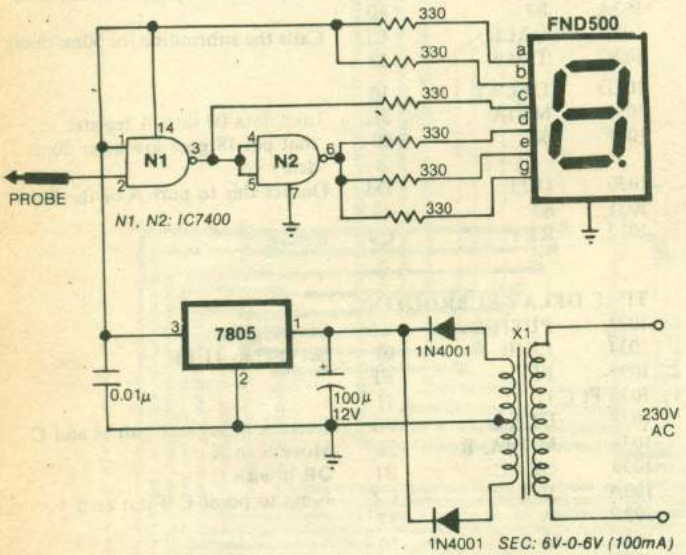
Simple Logic Probe

Quite a few, if not many, circuits of logic probe have appeared in EFY. But the one detailed under is peculiar because of its simplicity and economy. Also it is easy to understand in the sense that it involves only NAND gates.

With the probe not connected to any point, the display shows H —indicating that the unit is on. Once connected, it shows either L or H, depending on the state of the circuit. It consumes very little power.

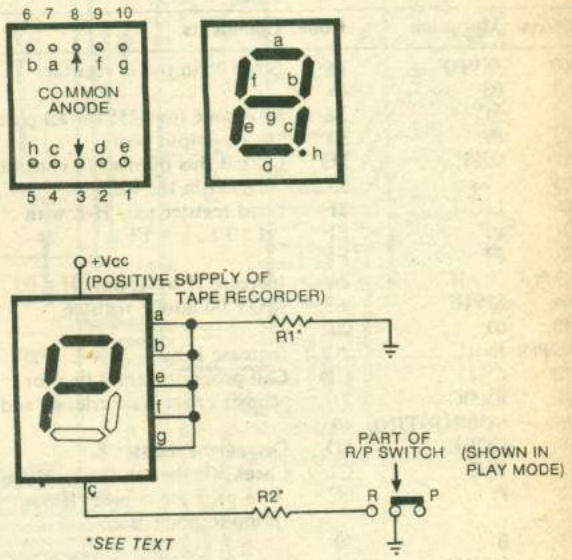
This circuit can be powered using just two 1.5V pen cells but with sacrifice of brightness. One who encounters logic circuit quite frequently can well adopt the power supply shown in the circuit with little extra cost.

SHASHIKANTH S.



and 'g' segments of the display. For R, segment 'a', 'b', 'e', 'f', 'g' and 'c' of the display should glow.

Since segments 'a', 'b', 'e', 'f' and 'g' are common to both 'P' and 'R', we may keep these five segments lit all the time. So, as shown in the diagram, terminals 'a', 'b', 'e', 'f' and 'g' of the display are joined together and connected to ground through resistance R1 but terminal 'c' is grounded through resistor R2 and R/P switch, so that whenever R/P switch is depressed, terminal 'c' of the display gets grounded—lighting up segment 'c' so that R is indicated on the display. In all other cases the display indicates P whenever power is on.



Resistors R1 and R2 are used to limit the current. If V_{cc} = 9 volts then R1 = 68 ohms, and R2 = 330 ohms. If V_{cc} = 6 volts, then R1 = 47 ohms and R2 = 220 ohms.

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Recording/Play Indicator for Cassette Tape Recorders

You can get alphabetical display of recording/play with this simple circuit. Generally all the poles of a R/P switch of a cassette tape recorder are not used. So, if you find any such unused pole in your tape recorder's R/P switch, you may use it to build this unit with the help of a 7-segment LED display and just two resistors.

Pin configuration of common-anode type 7-segment LED display (such as FND 507) is shown in the diagram. The display will be used to indicate either P (play) or R (recording). To indicate P, it is required to light 'a', 'b', 'e', 'f',

Slave Flash Unit

Many hobbyists who are also fond of photography will certainly appreciate this circuit for a slave flash unit. The slave flash unit flashes or switches on the bulb as soon as, or practically at the same time, the main flash glows. The lamp is switched off automatically when the main flash goes out, which is usually in a fraction of a second.

The photo darlington 2N5777 has a particular resistance in ambient light. So the preset (10k) is adjusted such that the 230V lamp used for slave flash unit just goes off. This means that if the resistance of the 2N5777 becomes any lower, the lamp will be switched on. So, as soon as the main flash

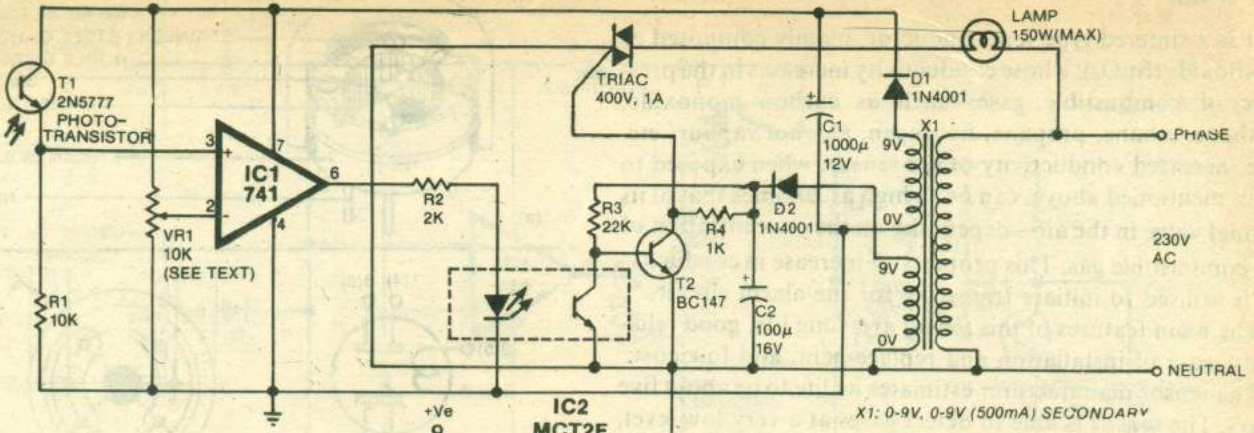

Fig. 1

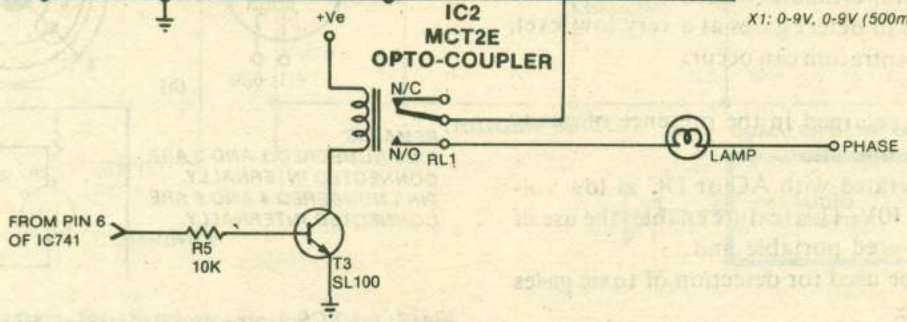

Fig. 2

glows, the positive input of the 741 becomes high, causing the LED inside the opto-coupler to glow. Immediately the BC147 is cut off and the triac gets the required gate current and switches on the lamp.

The triac is not working in a zero-voltage mode. To replace the triac by a relay, if necessary, the circuit given in Fig. 2 may be used.

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