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HEATHKIT GC-1005 DIGITAL READOUT CLOCK

The new Heathkit GC-1005 digital read-out clock makes a nice addition to the modern hamshack, since you can use it to indicate 24 hour time, local or GMT, and can synchronize it with WWV quite easily.

However, the readability of the face leaves something to be desired, since there is only a narrow space between the hours and minutes, and another space of the same width between minutes and seconds. That is, an indicated time of 12:34 plus 56 seconds would be displayed: 12 34 56. What is needed, obviously, is some means of separating the hours and minutes from the seconds.

It would be a major project, and probably somewhat doubtful of success, to try to move the display tubes apart any appreciable distance to achieve this condition.

The problem can be solved, or at least improved upon, by attacking it from another direction with a relatively simple modification.

It was done in my shack by mounting a pair of Motorola HEP type P2001 Light Emitting Diodes on a small piece of per-forated fiberglass board and wiring them into the low voltage B+ circuit, via a pair of limiting resistors. This assembly was then inserted into the space between the display tubes for the hours and the minutes.

The result was 12:34 56 instead of 12 34 56.

The P2001 LED is rated by the manufac-turer at a maximum current of 40 mA, and emits a reddish light at an intensity depend-
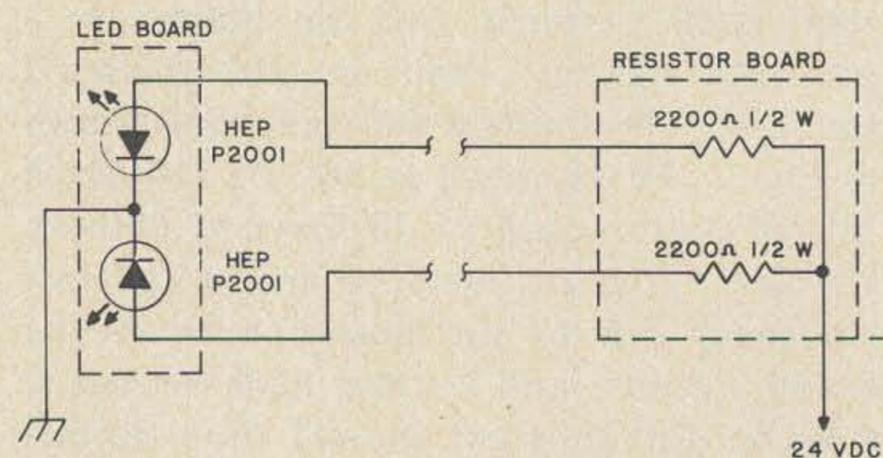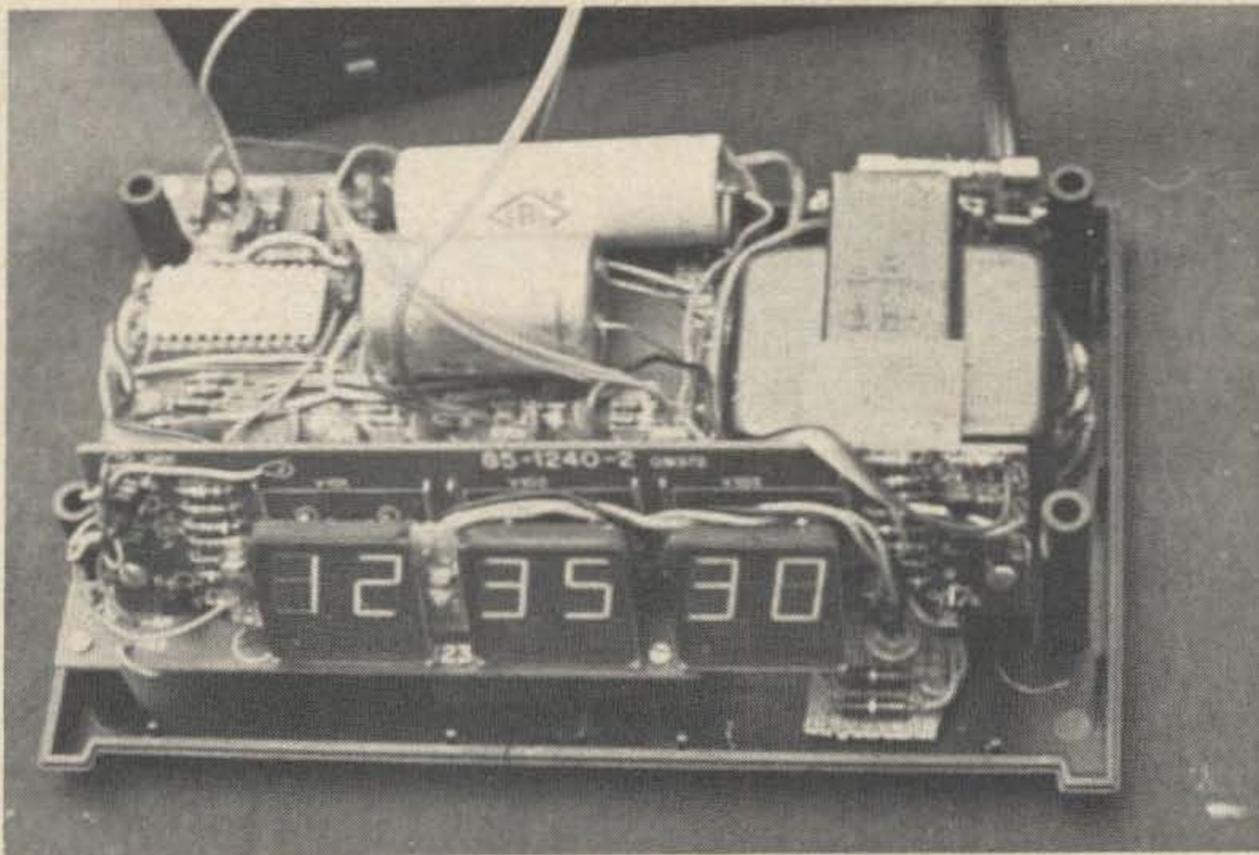

Fig. 1. Schematic used in adding the LED's to the clock.

The LED board is visible between the display tubes for the hours and minutes. The resistor board is visible at the lower right hand corner of the chassis, directly underneath the right side of the seconds display tube.

ing upon the amount of current passing through it.

After experimenting with different values of limiting resistors I finally settled on a current of about 9 mA, flowing through a 2.2 kΩ half watt resistor. This combination yields a light intensity approximately equal to that of the numerals on the clock, although slightly redder in color, and is well within the ratings of the LED.

The LED's are mounted on a piece of perforated fiberglass circuit board approximately 2.5 cm long by 0.75 cm wide, and are offset slightly so they assume a slanted attitude of about the same angle as the numerals. They are mounted vertically about 0.75 cm apart.

The edges of the board were carefully shaved down with a small file until it could be pressed into place between the adjacent edges of the hour and minute display tubes. A drop or two of epoxy glue was used to secure the board, once positioning was satisfactory. Be sure to position the board so the LED's are vertically centered with respect to the numerals.

The cathode leads of the diodes are connected together, and a single wire runs from this point to ground. In addition, a lead runs from each diode's anode to its limiting resistor, both of which are mounted on another piece of circuit board.

Since this is entirely a dc circuit, there is nothing critical about the layout or lead dress. The positive leads can be simply run along the back of the top of the minute and second display tubes and down to the floor of the clock, where they are connected to the resistors.

The resistors are mounted on a piece of circuit board about 2.5 cm by 2.5 cm in size which is secured to the same bolt which holds down one end of the power transformer.

From this point a single lead runs to the source of voltage, about +24V dc, which is tapped by connecting directly to the exposed positive lead of the 1200 μF filter capacitor.

Be sure you connect to the right capacitor, as 230V is present on the other one. If in doubt, use a voltmeter.

The ground lead from the LED board is dressed with the positive leads until they connect to the resistor board, at which point it separates and goes back along the top of the chassis to a ground point. Any exposed ground point can be used, but I grounded the wire by connecting to the negative lead of the filter capacitor, since it is also exposed and convenient to solder to.

In use, the two LED's are lit at all times the clock is in use, and form a double dot between hours and minutes. Their intensity is approximately the same as the numerals, but the color is slightly redder, although not enough to be objectionable.

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