

big ben 95

Nowadays both mechanical and electronic doorbells playing complete melodies are commercially available. The Big Ben plays a striking and well-known melody.

Figure 1 shows the circuit diagram of this Big Ben. When bell button Dr_1 is depressed, RS flip-flop N_6, N_7 is set. The pulse on the output of N_7 changing from '1' to '0' is passed on via C_7 to a second RS flip-flop N_3, N_4 . Consequently a logical '1' appears at the serial input of IC_1 . This '1' is shifted onwards at the first clock pulse and arrives at the A output of IC_1 . The result is that RS flip-flop N_3, N_4 is reset via N_5 . Now the serial input is '0' again. The '1' fed into the shift register now moves forward through shift registers $IC_1 \dots IC_3$ at the frequency of the clock pulse.

After 12 clock pulses the D output of IC_3 will become '1'. Via N_8 this '1' resets RS flip-flop N_6, N_7 , so that the circuit returns to its steady state.

The clock pulses are obtained from an astable multivibrator comprising N_1 and N_2 which oscillates continuously. The frequency (tempo of the Big Ben melody) can be adjusted to personal taste by means of C_5 and C_6 .

The output voltages of shift registers $IC_1 \dots IC_3$ are supplied to a voltage-controlled oscillator T_1, T_2 via the trimming potentiometers $P_1 \dots P_{12}$ and $D_1 \dots D_{12}$.

If so desired, P_5, P_{10}, D_5 and D_{10} may be omitted to obtain the required rests in the Big Ben melody.

Potentiometers $P_1 \dots P_{12}$ govern the frequencies of the voltage-controlled oscillator T_1, T_2 .

To prevent this oscillator from oscillating if none of the shift-register outputs is '1' (in its steady state), capacitors C_3 and C_4 are included in the circuit.

The oscillation signal of the voltage-controlled oscillator is applied to a loudspeaker via T_3 . As the latter only switches, it does not dissipate much power, so that no additional cooling is required. Figures 2 and 3 show the layout and arrangement of the components on the print. The potentiometers are conveniently arranged, so that final trimming to obtain the correct melody is an easy job.

1

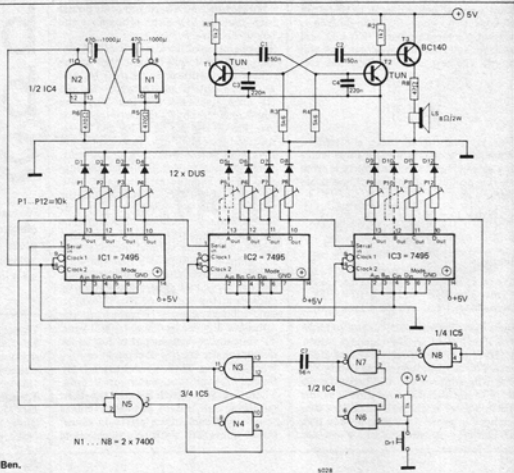


Figure 1. The circuit diagram of Big Ben.

2

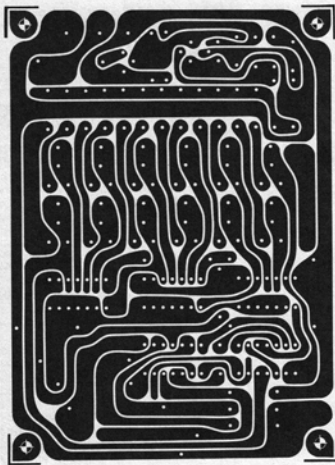


Figure 2. The p.c. board for figure 1.

3

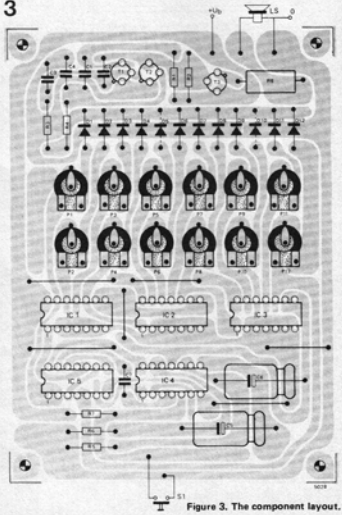


Figure 3. The component layout.