Universal Crystal Test Circuit Using CA4007

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Crystal oscillators may fail to operate due to faulty design or faulty crystals. The circuit shown in figure 1 works well as a crystal tester for a wide variety of crystals and ceramic resonators over the 40-kHz to 20-MHz range.

Circuit Description of Universal Crystal Test Circuit Using CA4007

The oscillator in figure 1 is a Pierce type that operates at the crystal's parallel resonant frequency and present about 30 pF capacitance to the crystal. The IC_1 (CA4007 A) contains three pairs of complementary MOSFETs with the first (input at pin 6) functioning as a Pierce oscillator. The second (input at pin 3) drives a micro-ampere meter movement. The resistor $R_5$is selected to provide about 90% deflection with an active (good) crystal. The "tuning" meter from a discard stereo is usually ideal for this application. The other complementary pair (input at pin 10) provides a low-impedance output that can drive a frequency counter or provide a connection for an oscilloscope.

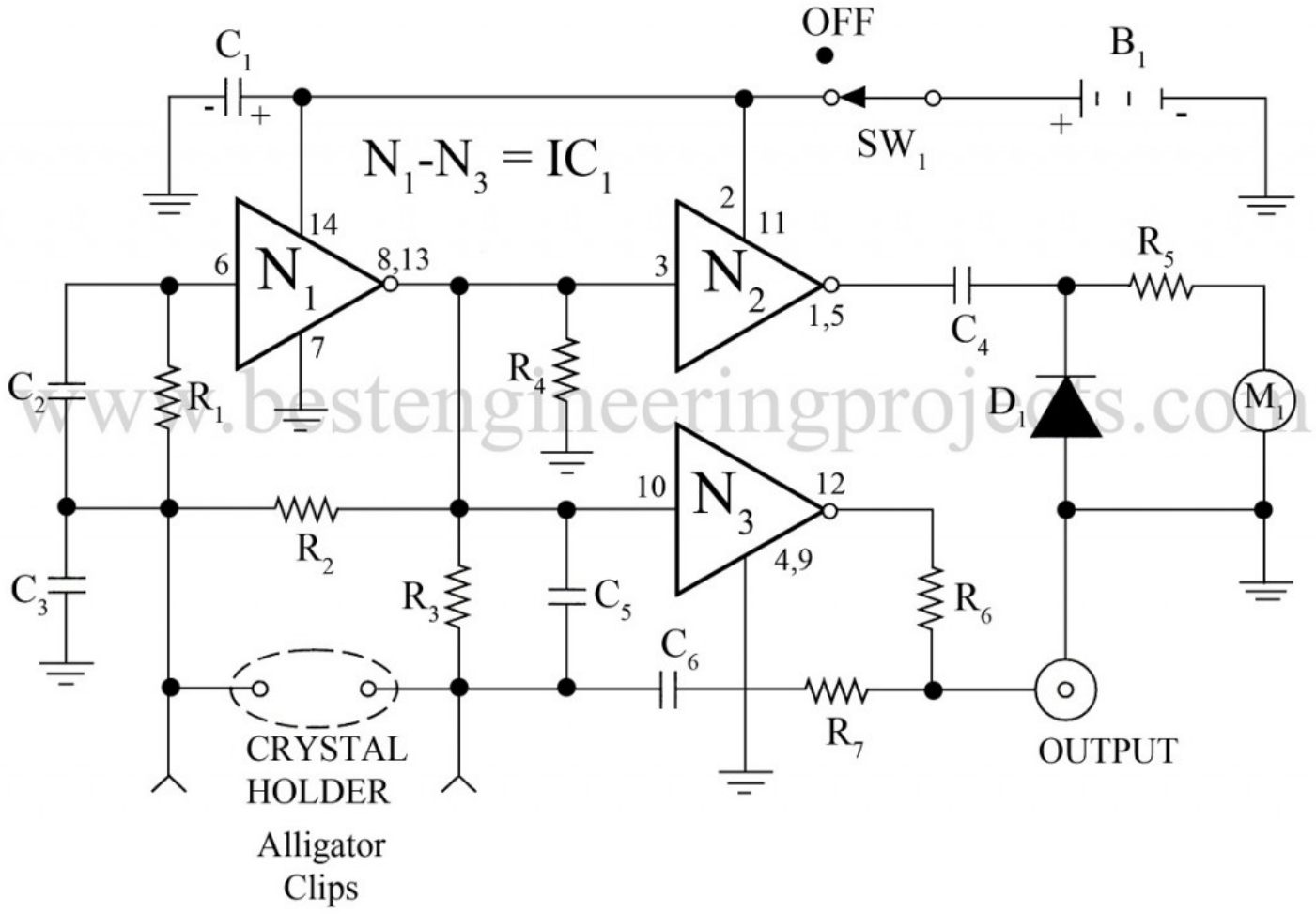

Figure 1: Circuit Diagram of Crystal Test Circuit

The crystal being tested can be inserted in the crystal holder or connected with alligator clip. The input MOSFETs are well protected from electrostatic and leakage damage.

Check out other various testing circuit posted in bestengineeringprojects.com

PARTS LIST OF UNIVERSAL CRYSTAL TEST CIRCUIT

Resistor (all ¼-watt, ± 5% Carbon)
R_1 = 220 KΩ R_2 = 22 MΩ R_3 = 15 KΩ R_4 = 100 KΩ R_5 = refer to text R_6 = 10 KΩ R_7 = 220Ω
Capacitors
C_1 = 0.1 µF, 25V (Electrolytic Capacitor) C_2 = 100 pF (Ceramic Disc) C_3, C_5, C_6 = 47 pF (Ceramic Disc) C_4 = 30 pF (Ceramic Disc)
Semiconductors
IC_1 = CA 4007A (Complementary Pair Plus Inverter IC) D_1 = 1N4001 (Rectifier Diode)
Miscellaneous
M_1 = 200 – 500 µA meter Crystal holder B_1 = 9V Battery Output jack SW_1 = ON/OFF switch