



**SCHEMATIC OF THE  
HEATHKIT®  
FREQUENCY COUNTER  
MODEL IM-2420**

**NOTES:**

1. ALL RESISTOR VALUES ARE IN OHMS: K=1,000; M=1,000,000.
2. ALL RESISTORS ARE 1/4 WATT 5%, UNLESS MARKED OTHERWISE.
3. UNLESS MARKED OTHERWISE, CAPACITOR VALUES GREATER THAN 1.0 ARE IN PICOFARADS, AND VALUES LESS THAN 1.0 ARE IN MICROFARADS.
4.  $\frac{1}{2}$  THIS SYMBOL INDICATES CHASSIS GROUND.
5.  $\nabla$  THIS SYMBOL INDICATES CIRCUIT BOARD GROUND.
6.  $\ominus$  THIS SYMBOL SHOWS THAT THE INDICATED COMPONENT IS MOUNTED ON THE CHASSIS.
7.  $\text{A}$  THIS SYMBOL INDICATES WHICH OF THE WAVEFORMS SHOWN WILL BE FOUND AT THE INDICATED POINT. WAVEFORMS ARE TAKEN WHILE ACTUALLY MEASURING AN INPUT (ANY ACCEPTABLE FREQUENCY).
8.  $\text{O}$  THIS SYMBOL INDICATES A DC VOLTAGE TAKEN WITH A HIGH INPUT IMPEDANCE VOLTMETER BETWEEN THE POINT INDICATED AND GROUND WITH NO INPUT SIGNAL. VOLTAGES MAY VARY  $\pm 10\%$ .

9.  $\diamond$  THIS SYMBOL IS USED TO INDICATE WHICH IC'S ARE POWERED BY U43.
10. OVEN HEATER CONTROL VOLTAGES ARE MEASURED WITH THE STYROFOAM COVER IN PLACE.
11. VOLTAGES MEASURED ON THE INPUT A AND INPUT B CONVERTERS MAY BE EITHER OF THE TWO VALUES SHOWN. THESE ARE ESSENTIALLY TWO-POSITION DEVICES, AND MAY CHANGE STATE WHEN THE VOLTMETER PROBE IS INTRODUCED.
12. TRIGGER CONTROL R9-SW1 IS SHOWN IN MID POSITION (NOT PRESSED).
13. THERMISTOR RESISTANCE: ABOUT 20K $\Omega$  AT 25°C AND 3900 $\Omega$  AT 75°C.
14. PARTS IN SHADED AREA ARE CRITICAL FOR CONTINUED SAFETY. REPLACE THEM ONLY WITH PARTS OF THE SAME RATING OR WITH THE PROPER HEATH PARTS.

**WAVEFORM NOTES**

1. WAVEFORMS ARE TAKEN WITH THE RANGE SWITCH IN THE FULLY CW POSITION. TURNING THE SWITCH IN THE CCW DIRECTION WILL ALTER THESE TIMES TO: 100 $\mu$ SEC, 1 SEC, AND 10 SEC.
2. WAVEFORMS ARE TAKEN WITH A HIGH QUALITY, HIGH IMPEDANCE OSCILLOSCOPE. WAVEFORM D MAY ONLY BE SEEN WITH AN OSCILLOSCOPE THAT IS CAPABLE OF 30MHz OR MORE RESPONSE.
3. WAVEFORMS A AND B ARE TAKEN WITH A TYPICAL 1MHz, 200mV P-P INPUT APPLIED TO INPUT A.
4. WAVEFORM J IS TAKEN WITH A TYPICAL (40MHz, 200mV P-P) INPUT APPLIED TO INPUT B.
5. WAVEFORM E1 IS TAKEN WITH THE RANGE SWITCH IN THE FULLY CCW POSITION. WAVEFORM E2 SHOWS HOW THIS WAVEFORM WILL CHANGE WHEN THE RANGE SWITCH IS TURNED ONE POSITION IN THE CW DIRECTION.