

### BENCH TEST

#### MATERIALS REQUIRED:

- 1 - VOM (Simpson 260 or equal)
- 1 - 115V AC Power Source
- 1 - Clip lead

1. Set all switches in the "Down" position.
2. Compare relay continuity with the following list:

	Continuity	Open Circuit
Terminals	17-15	16-15
Terminals	14-12	13-12
Terminals	4-2	3-2
Terminals	10-8	9-8
Terminals	7-5	6-5

3. Set 1P and 2P to 50% and jumper terminal 20 to terminal 11.
4. Apply 115V AC to terminal 19 and 20 and note the following:
  - A. 1, 2, 3 CR energized
  - B. 1, 2, 3 LED on

5. Compare relay continuity with the following list:

	Continuity	Open Circuit
Terminals	16-15	17-15
Terminals	13-12	14-12
Terminals	3-2	4-2
Terminals	9-8	10-8
Terminals	6-5	7-5

6. Remove the jumper from terminal 11 to terminal 20, 3LED should turn off and 3CR should deenergize.
7. Jumper terminal 20 to terminal 18. After approximately 5 seconds 1CR should deenergize and 1LED will go out. This is shown on the timing table (Figure 2).
8. Repeat step 7 for each of the switch combinations listed in the timing table. NOTE: Switches 1SW and 2SW control 1CR and 3SW and 4SW control 2CR.
9. Jumper terminal 20 to terminal 1. After approximately 5 seconds 2CR should deenergize and 2LED will go out. This is shown in the timing table.
10. Repeat step 9 for each of the switch combinations listed in the timing table.
11. The timing range for 1CR and 2CR is 0.2 seconds to 10 seconds and can be varied by turning 1P and 2P respectively. Full CCW = 0.2 seconds and CW = 10 seconds.

# REFLEX® MODEL 248 UNIVERSAL RELAY ASSEMBLY

PART NUMBER 12M03-00138-01  
SCHEMATIC DIAGRAM 12M03-00138-01

## I. SPECIFICATIONS

### SUPPLY:

- 120 Volts AC  $\pm$  10%
- 50/60 Hz, single phase

### AMBIENT TEMPERATURE:

- 0° to 40°C (32° to 104°F)
- 50°C in cabinet

### LOGIC INPUTS:

- 115V AC to terminals 18 (1CR), 1 (2CR) or 11 (3CR) with respect to terminal 19 (common)

### OUTPUTS:

- 1CR – Relay contact closure. Two form C, rated 2A at 115V AC and 3A at 26V AC. Red LED indicating relay energized.
- 2CR – Relay contact closure. One form C, rated 2A at 115V AC and 3A at 26V AC. Red LED indicating relay energized.
- 3CR – Relay contact closure. Two form C, rated 2A at 115V AC and 3A at 26V AC. Red LED indicating relay energized.

### TIMING FUNCTIONS

- Relays 1CR and 2CR each can be configured in a number of timing sequences or as an instantaneous relay depending on the position of Timing Sequence Selector Switches.

The available timing sequences include a “one-shot” variable width pulse, a timed on energization and a timed on de-energization. Details of the sequences are shown in Figure 2.

### TIMING RANGE:

- 0.2 Sec to 10 Sec

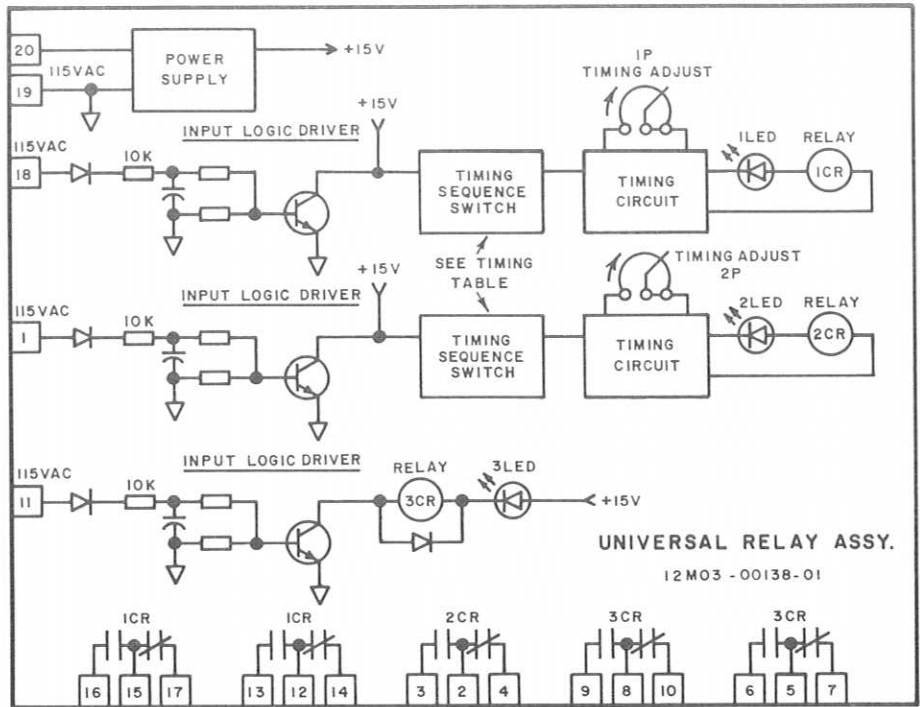


FIGURE 1. SIMPLIFIED SCHEMATIC

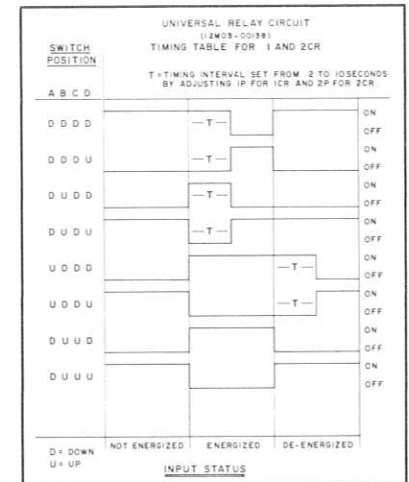


FIGURE 2

## II. THEORY OF OPERATION

The REFLEX® Model 248 Universal Relay Assembly consists of three separate relay circuits. Two provide time on, time off, one shot or straight relay operation and the third is a straight relay.

It consists of the following elements as shown in the Simplified Schematic Diagram (Figure 1).

1. Power Supply
2. Input Logic Drivers
3. Timing Circuits
4. Relay

1. **Power Supply** — The power supply uses a center-tapped transformer with 10 volts on each side of center together with two diodes and a 470 MF filter capacitor to provide a nominal positive unregulated 15 volts DC with respect to the transformer center tap, which is connected to circuit common.

- Input Logic Driver** — The Input Logic Driver for 1CR receives a 115V AC signal, rectifies it with 3D, provides a filter consisting of 1R and 2C to eliminate effects of input contact bounce. The filtered DC is used to provide an "On" signal to transistor 1Q.

The collector of transistor 1Q provides a logic signal to switch 1SW. Depending on the position of 1SW and 2SW, either 2Q or 3Q can be turned on by this logic signal. An additional logic signal appears at the positive end of 2C which is an inverse of the logic signal at the collector of 1Q.

- Timing Circuit** — The basic timing circuit is a standard 556 integrated circuit that provides a time equal to the time it takes capacitor 5C to charge to approximately 10 volts. The charging time is controlled by the setting on Timing Adjustment, 1P.

The function of 3Q is to discharge 5C or to keep it from charging, and 2Q serves to inhibit the timing function of 1IC so that its output at pin 5 remains low.

Operation of 2CR is the same, and 3CR is driven directly by the Input Logic Driver to function as a non-timed relay.

- Relay** — To allow the relay to be energized or de-energized by an input signal, section D of 2SW connects one end of the relay coil to either the negative or positive of the Power Supply.

A red LED indicates that the relay coil is energized. This should not be confused with the energization of the input terminal, since coil energization can be selected by switch to be the same or opposite as the input energization for "fail-safe" applications.

### VOLTAGE CHECK

- The primary voltage of transformer 1T, leads 1 and 2 (terminals 20 and 19) should be 115V AC.
- The secondary voltage of 1T leads 3 to 4 and leads 5 to 6 should be 10V AC.
- +15V DC nominal between the positive end of capacitor 1C and terminal 19 (common).

### COMPONENT LIST — ASSEMBLY #12M03-00138-01

Symbol	Part #	Description (Acceptable Substitute)*
1T	04P01-00001	Transformer - 120V AC PRI, two 10V AC SEC @ 220mA (Signal-PC20-220)
1, 2REC	05P01-00003	Rectifier Bridge - 50V, 1A (EDC-PF50)
1-3CR	06P01-00002	Relay, 12V, DPDT (PB-R10E1Y2S)
1-4SW	09P01-00006	Switch, DIP, 4-SPDT (Grayhill 78J02)
1, 2P	02P04-50401-01	Potentiometer - 500K, 25 Turn (Bourns 3299P-1-504)
1-10D	05P01-00001	Diode-Medium Power, 1A, 400PIV (1N4004)
1-7Q	05P04-00002	Transistor-NPN, Small Signal (2N3392)
1-3LED	07P04-00003	Diode, Light emitting (Litronix-RL-4403)
1IC	05P08-00008	Timer-Dual (National LM556)
1C	03P01-47102-01	Capacitor, 470MF, 25V, Electrolytic
2-4C	03P01-25001-00	Capacitor - 25MF, 15V, Electrolytic
5, 6C	03P03-22601-00	Capacitor - 22MF, 15V, Tantalum
7, 8C	03P06-01305-00	Capacitor - .01MF, 50V, Ceramic
1-3R	01P01-10303-03	Resistor - 10K, 2W, 5%
4-8R	01P01-33200-02	Resistor - 3.3K, ¼W, 5%
9-15R	01P01-68300-02	Resistor - 68K, ¼W, 5%
16-22R	01P01-10400-02	Resistor - 100K, ¼W, 5%
23, 24R	01P01-47200-02	Resistor - 4.7K, ¼W, 5%
25, 26R	01P01-82200-02	Resistor - 8.2K, ¼W, 5%

\* OR EQUAL

