A1 OPTION for MODEL 2500 (Low Level Option)

GENERAL

The A1 Option provides the user with a manually selected 0.1V range as a direct reading display of the Model 2500 multimeter for DC voltage readings. This 3-page supplement describes the circuit changes, the theory of operation, calibrating procedures, and includes schematics of the circuit modifications. The modified schematics are identified with the same basic figure number as appears in the manual.

FUNCTIONAL OPERATION (Refer to para 4.10, 4.12, and 4.14)

The 0.1V range display is accomplished by changing the resistors in the feedback path of the A/D converter amplifier so that the gain during the integration of the unknown signal input integration is 10 times that during the reference integration. The signal conditioning configuration for the 1-volt scale is used during 0.1V range operation, and the decimal point has been shifted one decade to the left. The resulting displayed count will be direct reading for .1V (or 100mV) full scale.

Remote operation of the decimal point is accomplished by grounding the appropriate line for the 0.1V scale at the rear connector.

DETAILED OPERATION

a. Display (See Ranging Logic Modification, Figure 6-4A)

The 0.1V range is chosen by pushing front panel button marked ".1". This action closes S1B, completing the circuit from emitter Q31 to ground, thereby operating the 0.1 decimal point indication. Grounding S1B also grounds pin X on the rear connector for remote 0.1 decimal point indication. For remote control, externally grounding pin 5 results in 0.1V range operation when all front panel buttons are in the open, released, position.

b. Tri-Phasic A/D Converter (See A/D Converter Modification, Figure 4-10C)

When the 0.1V range is selected, the A/D Converter gain is controlled during the three phases of the conversion cycle by the FET switches according to the tabular listing below. The revised schematic of figure 4-10C shows the location of the switches and their effect on the circuit.

	Q1	Q2	Q3	Q4
During Phase 1 (Auto-Zero)	OPEN	CLOSED	CLOSED	CLOSED
During Phase 2 (Integrate Unknown)	CLOSED	OPEN	CLOSED	OPEN
During Phase 3 (Integrate Ref)	OPEN	OPEN	OPEN	CLOSED

The resistor components R9, R10, R15 are factory selected so that R10 is exactly nine time R15, and as a result, the gain of the buffer amplifier stage during phase 2 is 10 times the gain during phase 3. During phase 2 the integrator capacitor stores 10 times as much charge as would otherwise be discharged during phase 3. (Therefore, when in 0.1V full scale, the count will take ten times as long as on the 1 volt scale.) Because the decimal point has been positioned one decade to the left of the one volt scale location, the resulting display is direct reading for 0.1V full scale.

CALIBRATION

Calibration of Series 2500 DMM with A1 Option in the DC Voltage Measurement Mode is detailed in this supplement as paragraph 3.6A. It replaces paragraph 3.6 of the basic manual. All other calibrating procedures remain unchanged.

3.6A DC VOLTAGE MEASUREMENT MODE, MODEL 2500/A1

Depress "ON" switch; wait one hour for calibration.

a. Zero Adjust: R45, R46

1. Select DC Volts Mode
2. Set range to .1V Full Scale
3. Connect shorting bar across input, Vx
4. Adjust R300 for ± 0.00000 display value
5. Set range to 10V Full Scale
6. Connect (approx.) 10 megohm resistance across input Vx
7. Adjust R45 for ±0.00000 display value
8. Connect shorting bar across input Vx
9. Adjust R46 for ±0.00000 display value
10. Repeat steps 6 through 10 as necessary

b. Balance Adjust: R83

1. Set Range to 1V Full Scale
2. Apply approximately 1V to input Vx
3. Read display. Record
4. Reverse input polarity. Record. Compare with step 3. above
5. Adjust R83 until values of 3. and 4. are exactly same on display
6. Repeat steps 3. through 5. as necessary

c. Reading Adjustments

For each full scale range, apply positive full scale voltage and adjust the appropriate potentiometer for full scale value on the display.

Set F.S. Range to	Adjust	For Reading of
1) 1-Volt Range	R87	+1.00000
2) .1-Volt Range	R17	+0.10000
3) 10-Volt Range	R51	+10.0000
4) 100-Volt Range	R43	+100.000

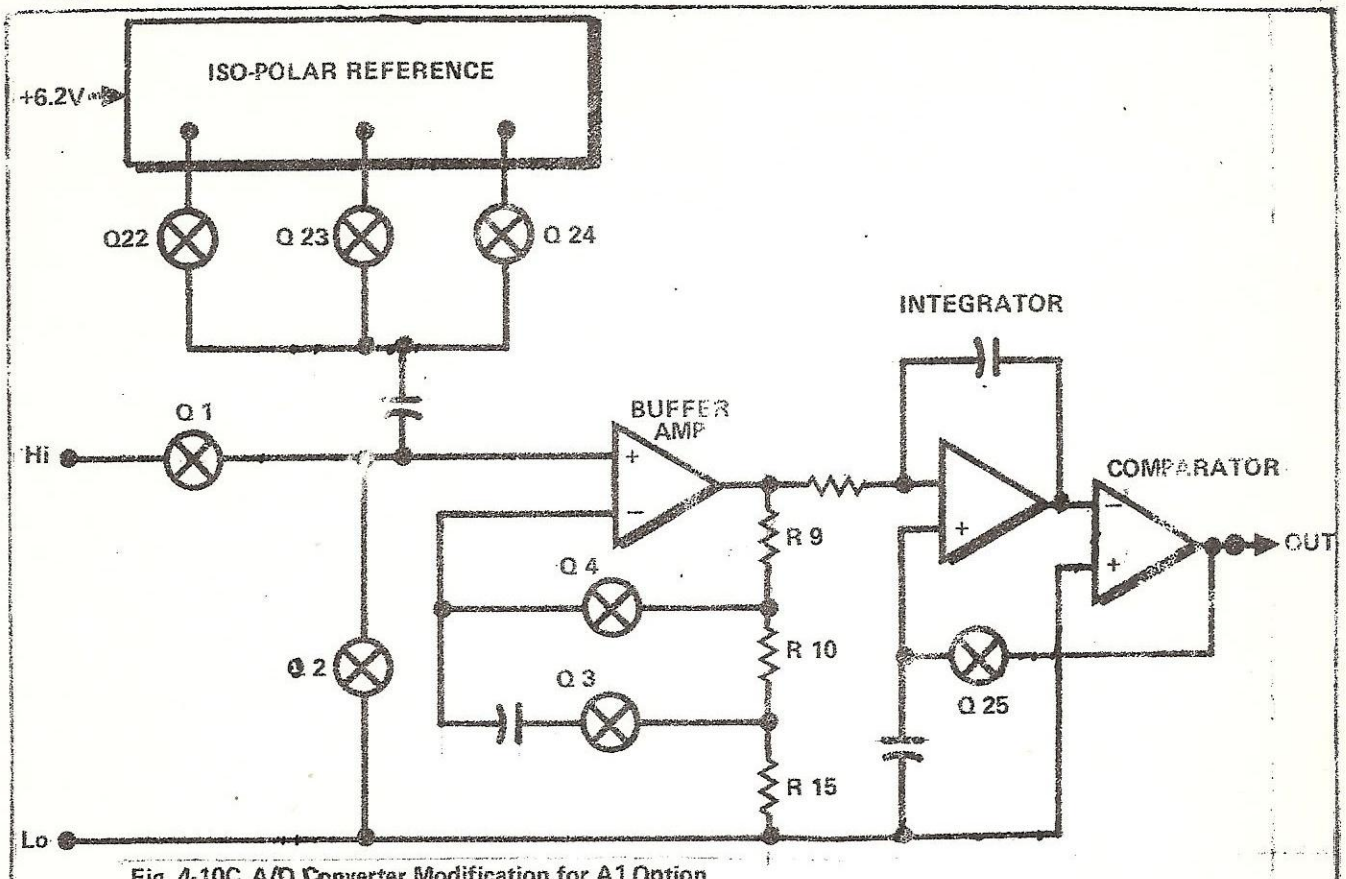

Fig. 4-10C A/D Converter Modification for A1 Option

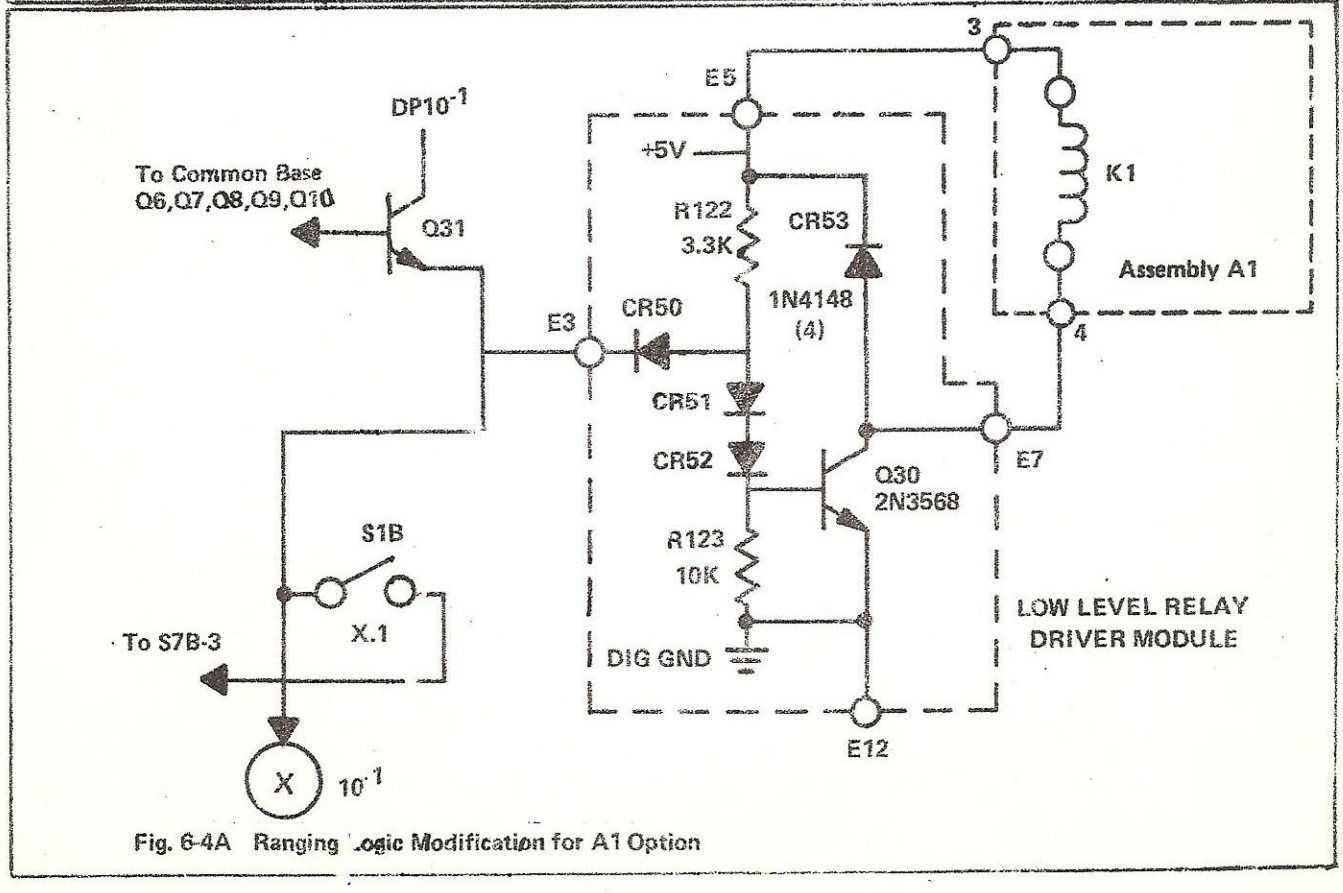

Fig. 6-4A Ranging Logic Modification for A1 Option