

# **05/06 OPTION**

**06258**

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06527 Schematic Diagram

06526AY-01 PCBAD, 2XX, Analog Bilevel

## 1.0 RECEIVING AND INSPECTION

### 1.1 UNPACKING AND INSPECTION

Your 05 and/or 06 Option was fully inspected and tested, then carefully packed before shipment. Unpack the option carefully and inspect it for obvious shipping damage.

If the option is received and assembled in a Model 204, 204A, 204B, 258, 267B, 268, 2003B, or 2004 proceed to Section 2.3 and/or 3.3 for connector hookup.

### 1.2 FIELD INSTALLATION (see Figure 1)

#### 1.2.1 Required Equipment

- 1.2.1.1 Soldering iron and solder.
- 1.2.1.2 Hookup wire (#24 gage teflon insulated).
- 1.2.1.3 Phillips and common screwdrivers.
- 1.2.1.4 Newport Model panel meter designated to accept the 05 and 06 options.
- 1.2.1.5 Millivolt source.
- 1.2.1.6 Digital voltmeter with 2 V range and 100 V resolution.

#### 1.2.2 Installation Procedure

- 1.2.2.1 Remove power source from the unit in which the 05 and/or 06 option is to be installed.
- 1.2.2.2 Remove two screws, clamp rings and slide retainers shown in outline and mounting drawings.
- 1.2.2.3 Remove top half of case.
- 1.2.2.4 Carefully remove meter from case.
- 1.2.2.5 Locate appropriate 'E' points and/or solder switches on main P.C. board as listed in Table 1 and install teflon insulated #24 wires as necessary or open (cut) or close (solder) the solder switches.
- 1.2.2.6 Refer to Figure 2 for modification of display board.
- 1.2.2.7 Re-assemble meter into lower case half.
- 1.2.2.8 Install option board into upper case half and re-assemble meter. Refer to Figure 1.
- 1.2.2.9 Proceed to Section 2.3 and/or 3.3 connector hookup.

TABLE 1

258 ④	267B	268 ①	204 ②
Close "E"	E2 to E9	E2 to E6	E2 to E20
Close "A"	E3 to E10	E3 to E7	E3 to E21
Close "P"			E22 to E28
Close "C"			E26 to E27
Close "H"			E8 to E9
Open "D"			E6 to E7
Open "F"			E23 to E25
Open "R"			E23 to E25
Open "J"			E37 to E1
Cut jumper at E10			

204B ②	2003B ③	2004 ③
E1 to E10	E14 to E30	E14 to E30
E3 to E31	E13 to P3 Pin 5	E13 to P3 Pin 5
E5 to E32	E23 to E12	E23 to E12
E7 to E33	E27 to E11	E27 to E11
E8 to E25	E3 to E31	E3 to E31
E21 to E34	E1 to P3 Pin 8	E1 to P3 Pin 8
E13 to E14		
E15 to E16		
Open 'A'		
Open 'B'		

- ① 1. Cut open solder blob 'W' on component side of board (between U5 and transformer).
2. Cut trace on circuit side of board that connects between U6 Pin 10 and feedthrough located under U5. (Cut near the feedthrough.)
3. Add a 220 ohm, 1/4W, Carbon resistor (8045221) from U5 Pin 10 to U6 Pin 10 on circuit side of board. Sleeve leads as required.
4. Add insulated wire from feedthrough connecting to J1-S (edge finger located next to E16) to U5 Pin 10 on component side of board.

- ② Model 204A and 204B must have a D4 Option for installation of 05 and/or 06 option (XXX.X D.P. now available at J1-A).
- ③ Model 2003B and 2004 must have a D4 option for installation of 06 option. 05 option not available on these models.
- ④  $\overline{\text{Hold}}$  function no longer available. Read rate is 4 readings/sec. If faster read rates are required, they must be internally programmed by moving jumper E11 to the appropriate read rate output.

### 1.3 INTERCONNECT CABLE OPTION

An option cable is available with all the necessary connections to operate the 05 and/or 06 options except those connections normally programmed by a customer's application.

The following are the option cable connections: (see Figure 3 for location.)

SIGNAL	FROM 05/06 OPTION	TO					
		204A/B	258	267B	268	2003B	2004
5 V ac Output	J5-14	J1-C	J1-14	J1-C	J1-C	None	None
5 V ac Output	J5-17	J1-2	J1-T	J1-2	J1-2	None	None
Digital Gnd	J5-16	J1-T	J1-T	J1-T	J1-T	J1-T	J1-T
+5 V	J5-U	J1-15	J1-15	J1-15	J1-15	J1-A	J1-A
$\overline{\text{CONV}}$	J5-10	J1-U	J1-U	J1-U	J1-U	J1-2	J1-2
REF	J5-P	J1-18	J1-S	J1-V	J1-V	J1-U	J1-U
+POL	J5-S	J1-N	J1-N	J1-N	J1-N	J1-N	J1-N
SIG	J5-12	J1-6	J1-18	J1-6	J1-6	J1-18	J1-18
COMP	J5-13	J1-5	J1-V	J1-5	J1-5	J1-14	J1-14
$\overline{\text{OL}}/\text{TEST}$	J5-R	J1-S	J1-R	J1-S	J1-S	J1-S	J1-S

TABLE 2

Figure 1

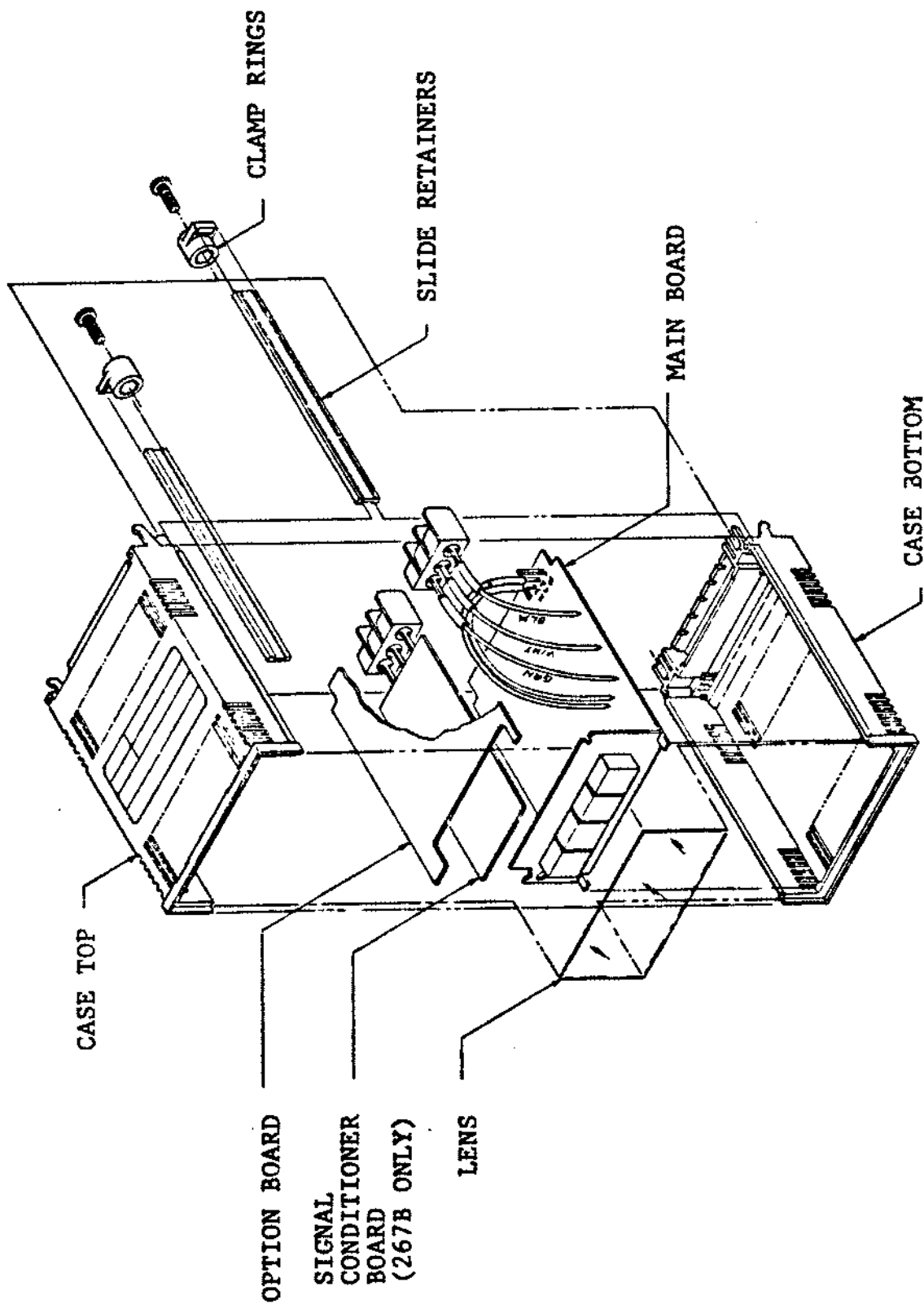
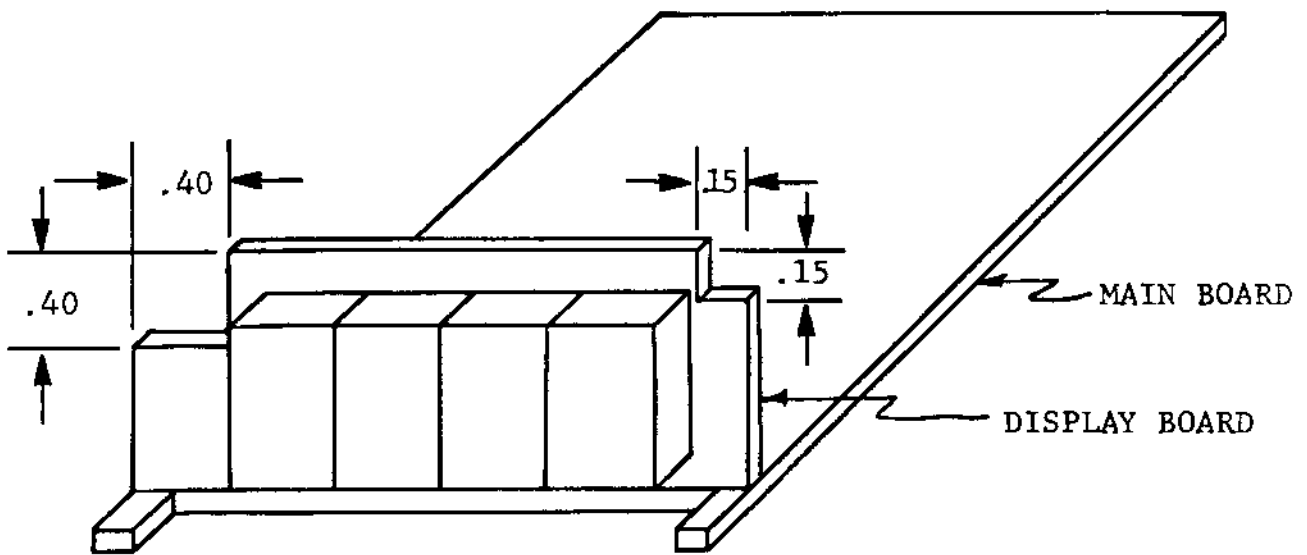
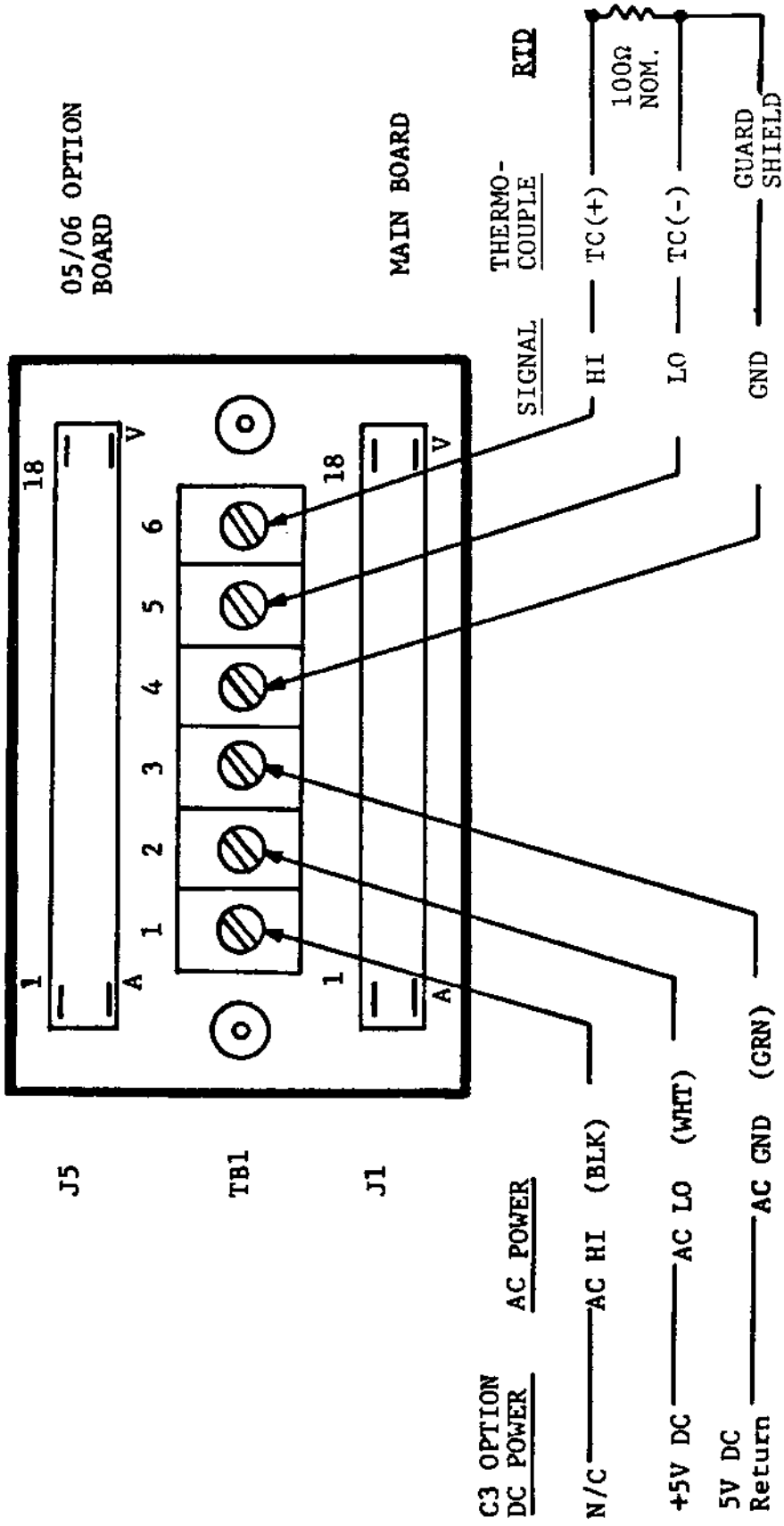


Figure 2



DISPLAY BOARD MODIFICATIONS FOR INSTALLATION OF 05/06 OPTION

Figure 3



## 2.0 ANALOG OUTPUT OPTION

### 2.1 GENERAL DESCRIPTION

The 05 option is contained on a second printed circuit board parallel to the main board (See Figure 1). A precalibrated linearized analog output of  $\pm 2$  volts maximum capable of driving a 1 mA load is available for conventional analog recording and controlling instruments.

### 2.2 SPECIFICATIONS

#### 2.2.1 Analog Output

	204A/B	267B	268	258
Output Voltage Range	$\pm 2$ Volts	$\pm 2$ Volts	$\pm 2$ Volts	$\pm 2$ Volts
Output Voltage Sensitivity	0.5 mV/Ct.	0.25 mV/Ct.	1.0 mV/Ct.	1.0 mV/Ct.
Output Impedance	10 Ohms	10 Ohms	10 Ohms	10 Ohms
Output Current	1 mA Max.	1 mA Max.	1 mA Max.	1 mA Max.
Output Signal Ground	5 V Digital Ground	5 V Digital Ground	5 V Digital Ground	5 V Digital Ground
Accuracy @ 25°C @ Nominal Line Voltage	$\pm 0.1\%$ of Full Scale $\pm 1/2$ Ct.	$\pm 0.3\%$ of Full Scale $\pm 1/2$ Ct.	$\pm 0.6\%$ of Full Scale $\pm 1/2$ Ct.	$\pm 0.1\%$ of Full Scale $\pm 1/2$ Ct.
Line Voltage Influence	$\pm 1.5$ mV Max. Over a Span of 103 V to 127 V.	$\pm 1.5$ mV Max. Over a Span of 103 V to 127 V.	$\pm 1.5$ mV Max. Over a Span of 103 V to 127 V.	$\pm 1.5$ mV Max. Over a Span of 103 V to 127 V.
Temperature Coefficient 0 - 40°C	.1%/°C	100 ppm/°C	500 ppm/°C	.1%/°C

NOTE: 05 Option is not available on units with C3 Option (5 V Powered)

### 2.3 PIN ASSIGNMENTS

The following connections are required between connectors J1 and J5: (See Figure 3).

SIGNAL	FROM 05 OPTION	TO			
		204A/B	258	267B	268
5 V ac Output	J5-14	J1-C	J1-14	J1-C	J1-C
5 V ac Output	J5-17	J1-2	J1-T	J1-2	J1-2
Digital GND	J5-16	J1-T	J1-T	J1-T	J1-T
+5 V	J5-U	J1-15	J1-15	J1-15	J1-15
CONV	J5-10	J1-U	J1-U	J1-U	J1-U
REF	J5-P	J1-18	J1-S	J1-V	J1-V
+POL	J5-S	J1-N	J1-N	J1-N	J1-N

The analog output is available between J5-18 (HI) and J5-V (LO).

NOTE: If connection J1-N to J5-S is removed and J5-S is connected to J5-U, an absolute value function (positive output independent of polarity) is obtained from the 05 option.

### 2.4 CALIBRATION

The 05 Option is factory calibrated. If your 05 Option was field installed, some recalibration may be needed.

If calibration is required, three adjustment potentiometers are available: Zero (R19), Negative Full Scale (R6), and Positive Full Scale (R5).

#### 2.4.1 Field Calibration Procedure

2.4.1.1 If the meter received doesn't have the optional interconnect cable between J1 and J5, perform the required cabling per Section 2.3.

2.4.1.2 Connect a jumper wire between TB1-4 and TB1-5. Connect the millivolt source between TB1-5 (-) and TB1-6 (+). (See Figure 3).

2.4.1.3 Remove 05 option board from meter and plug into J5 connector. See meter assembly instructions in model manual.

Place top half of case back on the meter to hold TB1 connector in place while calibrating 05 option.

2.4.1.4 Apply power source listed on meter label.

2.4.1.5 Adjust millivolt input to obtain a display of zero with the polarity sign toggling.

- F. Monitor voltage between J5-18 (HI) and J5-V (LO). Adjust zero pot R19 on option board for zero volts output. (See Assembly Diagram 06526).
- G. Apply a positive input voltage of sufficient magnitude to cause meter to just overload.

For the Model 267B, adjust R5 (See Assembly Diagram 06526) for an output voltage of .25 millivolts times reading.

EXAMPLE:

$$0.00025 \text{ V} \times 4000 = 1 \text{ volt}$$

For the Model 204A/B, adjust R5 for an output voltage of .5 millivolt per count times reading.

NOTE: It may be necessary to trim R11 for full scale.

EXAMPLE:

$$0.0005 \text{ V} \times 4000 = 2 \text{ volts}$$

For the Models 258 and 268, adjust R5 for an output voltage of 1 millivolt times reading.\*

EXAMPLE:

$$0.001 \text{ V} \times 2000 = 2 \text{ volts}$$

- H. Apply a negative input voltage of sufficient magnitude to cause meter to just overload, and adjust R6 (See Assembly Diagram) for 0.25 millivolt times reading for the Model 267B, 0.5 millivolt times reading for Model 204A/B, and 1 millivolt times reading for the Model 258 and Model 268.

- I. Re-assemble meter with 05 Option Board installed in the top half of case. (See Figure 1).

\*NOTE: Verify that R11, 9.76 k ohms, 1%, mF, has been installed on the 05/06 board to provide the proper output voltage on the Model 258.

### 3.0 TWO POSITION CONTROLLER OPTION

#### 3.1 DESCRIPTION

The 06 Option is a two-position digital controller or alarm which accepts up to 4 digits of BCD with polarity. It's outputs are a Form 'C' relay, a TTL output, and a front panel LED which flashes when the meter reading is in the ALARM ZONE.

The ALARM ZONE can be above or below any selected point.

The controller outputs go true whenever the meter reading is in the ALARM ZONE and reset as soon as the meter reading returns to the operation zone.

For alarm applications, the outputs may be set to latch true whenever the meter reading enters the ALARM ZONE and remain true even though the meter reading has returned to the operating zone. It may be reset either externally or by pressing the front panel button.

The TTL alarm output is HI when the alarm is true. The relay can be energized when the alarm is true or can be externally controlled. The front panel LED flashes when the alarm is true. The LED can be made to go on continuously or can be inhibited. Pressing the front panel button causes the switching point to be displayed on the meter, and resets the alarm if latching operation is being used. It also inhibits the alarm output for about 1 second after the button has been released.

### 3.2 INPUTS

a. +5 volts @ 60 mA	Fan In
b. 12 BCD Bits	1 TTL Load
c. Polarity	2 TTL Loads
d. External Relay Control	1 TTL Load
e. External Reset	2 TTL Loads
f. Alarm Zone	2 TTL Loads
g. Latch	2 TTL Loads
h. Comp.	1 TTL Load

### 3.3 OUTPUTS

a. Form "C" relay contacts rated for 5 watts @ .5A or 200 V dc max.	Fan Out
b. Alarm	1 TTL Load
c. (-) Polarity	1 TTL Load
d. $\overline{OL}$ /TEST	5 TTL Loads
e. HI Alarm	2 TTL Loads
f. LO Alarm	2 TTL Loads
g. Reset	2 TTL Loads

### 3.4 PIN ASSIGNMENTS

#### 05/06 Option Pin Assignments (J5)

<u>FUNCTION</u>	<u>PIN</u>	<u>FUNCTION</u>	<u>PIN</u>
BCD Input	A	BCD Input	1
BCD Input	B	BCD Input	2
BCD Input	C	BCD Input	3
BCD Input	D	BCD Input	4
BCD Input	E	BCD Input	5
(-) Pol Output	F	BCD Input	6
Pol Bit In	H	BCD Input	7
Relay Common	J	HI Pulse	8
Relay N.C.	K	Relay N.O.	9
LATCH	L	CONV	10
ALARM ZONE	M	LO Pulse	11
ALARM	N	SIG	12
REF	P	COMP	13
$\overline{OL}$ /TEST	R	5 V ac *	14
(+) POL	S	Reset	15
Ext Relay Control	T	Power GND	16
+5 Volts Power In	U	5 V ac *	17
Analog Output (LO)*	V	Analog Output (HI)*	18

\*NOTE: 05 Option only.

#### 3.4.1 Required Connections

##### CAUTION

Disconnect power source from  
meter before doing any wiring!!!

3.4.1.1 The following connections must be permanently wired for proper operation of the 06 Option:

SIGNAL	FROM 06 OPTION	TO					
		204A/B	258	267B	268	2003B	2004
Digital GND	J5-16	J1-T	J1-T	J1-T	J1-T	J1-T	J1-T
+5 V	J5-U	J1-15	J1-15	J1-15	J1-15	J1-A	J1-A
CONV	J5-10	J1-U	J1-U	J1-U	J1-U	J1-2	J1-2
REF	J5-P	J1-18	J1-S	J1-V	J1-V	J1-U	J1-U
SIG	J5-12	J1-6	J1-18	J1-6	J1-6	J1-18	J1-18
COMP	J5-13	J1-5	J1-V	J1-5	J1-5	J1-14	J1-14
OL/TEST	J5-R	J1-S	J1-R	J1-S	J1-S	J1-S	J1-S

3.4.1.2 The following connections vary according to your application:

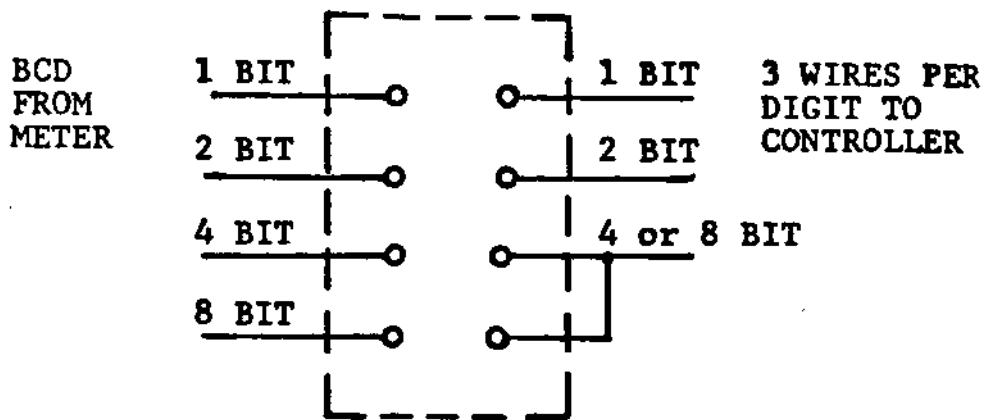
A. Switching Point

Those BCD Bits which are HI (Positive true logic) for the desired switching point must be wired to any of the following pins on J5: 1, A, 2, B, 3, C, 4, D, 5, E, 6 or 7.

1. Wire length must be kept under 6 inches for proper meter operation. (See 3.)

For example: A switching point of 873 requires connecting the 800, 40, 20, 10, 2 and 1 Bits. All other BCD Bits on J5 should be left open, or connected to J5-Pin U through a single 10 k resistor.

2. For applications where the operator must change the switching point, an external BCD thumbwheel switch can be connected between the BCD outputs and the controller inputs as shown:



**Thumb Wheel Switch**

(EECO #177646G or EQUIVALENT)  
 (4 POLE BCD WITH COMPLEMENT 1-2-4-8)

Combining the 4 and 8 Bits in this way is possible since the 4 and 8 Bits are never both true for any digit. Mini Dip SPST Switch packages can also be used to reduce costs. (Amp. 7000 series or equivalent).

3. If wire lengths greater than 6 inches total are needed, 100 ohm, 1/8 watt resistors may be used at J1 in series with each BCD Bit.

**B. Polarity**

1. For a positive polarity switching, connect J5-Pin S and J5-Pin H to J1-Pin N.
2. For a negative polarity switching point, connect J5-Pin H to J5-Pin F. Also, connect J5-Pin S to J1-Pin N.
3. For a switching point which ignores polarity (absolute value), connect J5-Pin H to J5-Pin U. (If your meter has an 05 Option also: connecting J5-Pin S to J1-Pin N will allow the 05 to function with normal polarity, while the 06 functions with absolute value.

**4. Alarm Zone**

1. For a HI alarm zone: (The alarm is true for all meter readings equal to or greater than the switching point.) Connect J5-Pin M (ALARM ZONE) to J5-Pin 8 (HI).
2. For a LO alarm zone: (The alarm is true for all meter readings less than the switching point.) Connect J5-Pin M (ALARM ZONE) to J5-Pin 11 (LO).

### 3.5 LATCHING OPERATION

If it is desirable for an alarm condition to remain true after the meter reading has returned from the ALARM ZONE to the operating zone, connect J5-Pin L (LATCH) to J5-Pin 15 (Reset). This provides a reset when the front panel button is depressed. The meter may be reset externally by connecting J5-Pin L momentarily to ground. (For 1 TTL Load, a 27 k pullup to +5 V is necessary, and is provided internally at J5-Pin 15.

### 3.6 CONTROLLER OPERATION

If it is desired that the alarm resets when the meter reading returns from the alarm zone to the operating zone, make the connection specified:

3.6.1 If the ALARM ZONE is HI: connect J5-Pin L (LATCH) to J5-Pin 11 (LO).

3.6.2 If the ALARM ZONE is LO: connect J5-Pin L (LATCH) to J5-Pin 8 (HI).

#### 3.6.3 Outputs

3.6.3.1 LED on the front panel will flash when the alarm is true. No connections are required.

NOTE: If it is desired that the front panel LED not flash when the alarm is true, cut the wire from J5-Pin 12 to J1-Pin 6 (J1-Pin 18 on 258, 2003B, and 2004). This will cause the LED simply to go on in an alarm true state. The LED may be inhibited entirely by connecting J5-Pin 12 to J5-Pin 16. J1-Pin 6, (J1-Pin 18 on 258, 2003B, and 2004) must be left open if this is done.

3.6.3.2 The alarm output (J5-Pin N) can source 1.5 TTL Loads or sink 9.9 TTL Loads. It is HI when the alarm is true. (If additional source capability is desired, a 3.3 k pullup can be added to J5-Pin 15. This will allow the alarm output to source or sink 9 TTL Loads.)

3.6.3.3 The relay (Form 'C' contacts) is driven through J5-Pin T (@ 1 TTL Load); to use the relay as an alarm indicator or as a controller; connect J5-Pin T to J5-Pin N.

A. The relay contacts are closed from J5-J to J5-9 when the alarm is true (J5-Pin T HI).

B. The relay contacts are closed from J5-J to J5-K when the alarm is false.

C. The relay contacts are rated at 2 Amps at 28 Volts dc or 1 Amp at 115 Volts ac.

D. Shielded wire may be necessary when using the relay to avoid coupling noise into the meter or 06 Option.

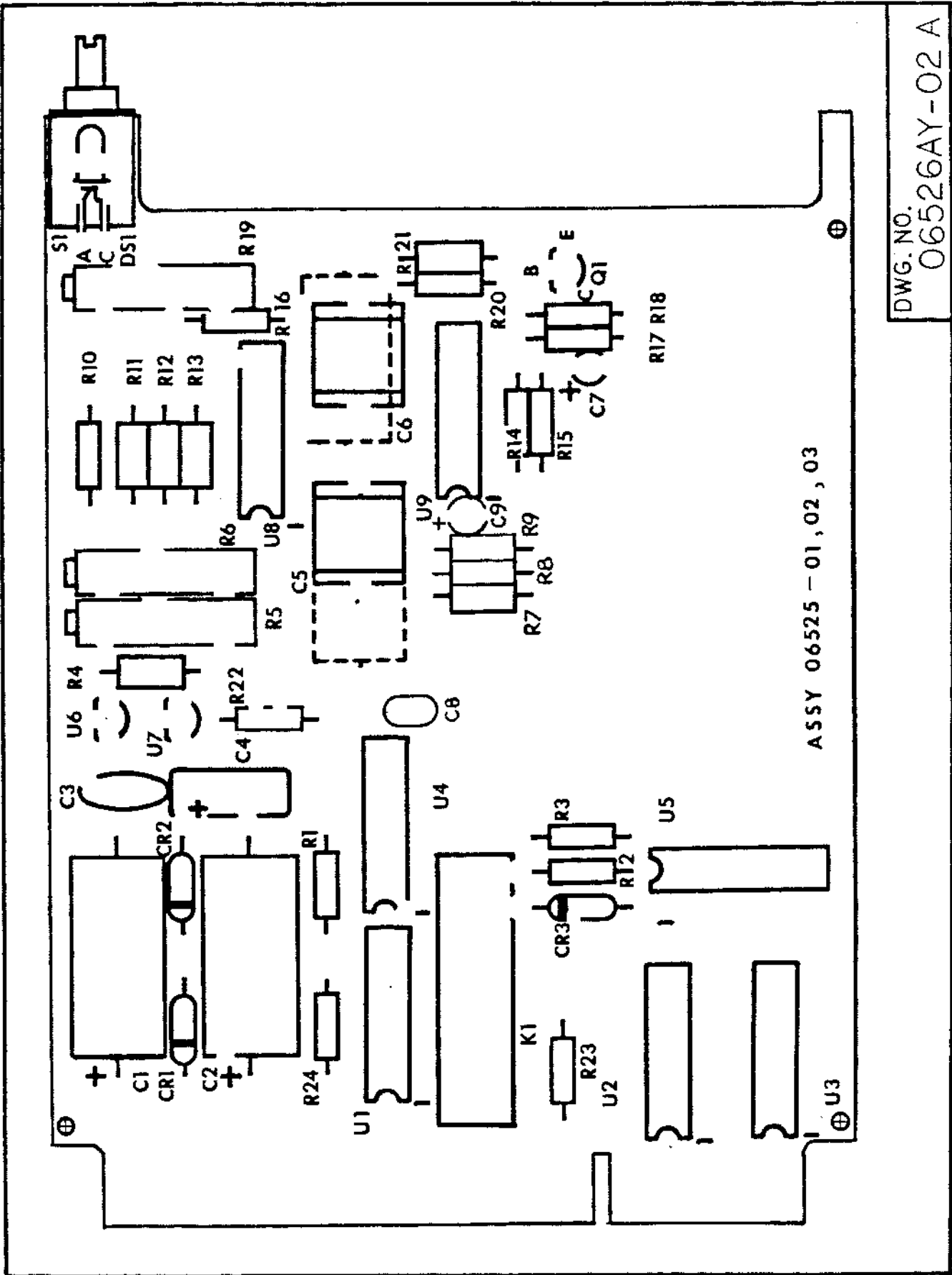
3.6.3.4 Testing and Operation - After the 06 Option has been wired per Section 3.4.1 and the 05 Option, if any, has also been wired, apply power to the meter. The meter reading should be normal.

Press the front panel button. The switching point should be displayed.\* Release the button. After at least 1 second, apply an input in the ALARM ZONE (avoid overloading the meter). The outputs should go true. Return the meter input to the operating range. The outputs should return to a false condition. (If you are using latching operation, press the front panel button momentarily and the alarm should then reset.)

The meter is now ready for use in your application. When the meter reading is in the operating range, the meter reads normally and the alarm is false. When meter readings enter the ALARM ZONE, the front panel LED begins flashing (unless inhibited) and the alarm goes true. Pressing the front panel button recalls the switching point, which is displayed. It also resets the alarm if latching operation is being used. It also inhibits the alarm for about 1 second after it is released.

\*NOTE: The switching point has been wired in accordance with Section 3.4.1 for plus, minus or absolute number. If plus or minus has been selected, the input to the meter must also be in this polarity in order to display the switching point. If the input polarity is different from the selected switching point polarity, the unit will flash overrange.

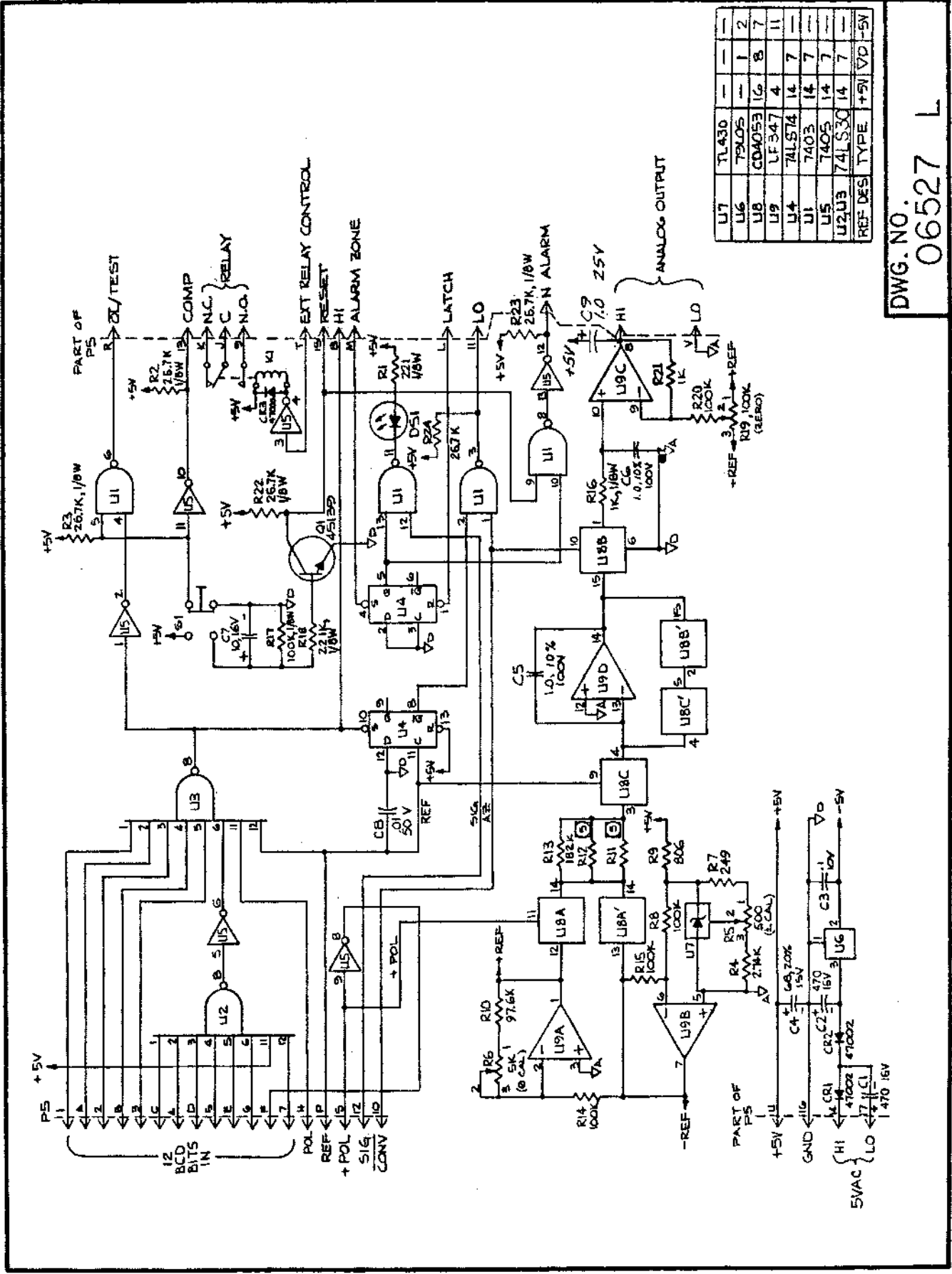
ASSEMBLY DIAGRAM



ASSY 06525 - 01, 02, 03

DWG. NO.  
06526AY-02 A

SCHEMATIC DIAGRAM



U7	TL430	—	1	2
U6	74LS00	—	1	2
U8	CD4053	16	8	7
U9	LF347	4	4	11
U4	74LS74	14	7	—
U1	7403	14	7	—
U5	7405	14	7	—
U2UB	74LS30	14	7	—
REF DES	TYPE	+5V	VD	-5V

DWG. NO. 06527 L