TECHNICAL MANUAL

OPERATOR'S, AVIATION UNIT AND AVIATION INTERMEDIATE MAINTENANCE MANUAL (INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

FOR

TESTER, EXHAUST GAS TEMPERATURE MODEL BH112JB-53 (NSN 4920-00-372-4593)

HEADQUARTERS, DEPARTMENT OF THE ARMY

15 NOVEMBER 1979

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TESTER, EXHAUST GAS TEMPERATURE
BH112JB-53 (NSN 4920-00-372-4593)
BH112JB-79 (NSN 4920-01-209-0664)

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TESTER, EXHAUST GAS TEMPERATURE

MODEL BH112JB-53

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2-1 and 2-2	2-1 and 2-2
- - - -	2-2.1/2-2.2
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TESTER, EXHAUST GAS TEMPERATURE

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i and ii	i and ii
1-45 and 1-46	1-45 and 1-46
3-1 and 3-2	3-1 and 3-2
4-1 and 4-2	4-1 and 4-2
A-1/A-2	A-1/A-2

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A-1/A-2	A-1/A-2
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MODEL BH112JB-53

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WARNING

Personnel performing operations, procedures, and practices which are included or implied in this technical manual shall observe the following warnings. Disregard of these warnings and precautionary information can cause serious injury, death, or destruction of material.

Operate the tester using a grounded three-wire power source.

Stop operation immediately if a defect is noted that could cause damage to the tester by continuing operation.

Do not tow the tester behind a vehicle,use as a step, or place it under aircraft dump valve.

Wear protective gloves while handling hot thermocouple heater probes.

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No. 55-4920-401-13&P WASHINGTON, D.C., 15 November 1979

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You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, U.S. Army Aviation and Troop Command, ATTN: AMSAT-I-MP, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. A reply will be furnished directly to you.

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Chapter 1

INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE. The purpose of the BH112JB-53 and BH112JB-79 Exhaust Gas Temperature Tester (fig. l-l) is to provide ground support for gas turbine aircraft engines. When the appropriate cables and accessories are used with the tester, it can perform any of the following functions

a. Test Engine thermocouple harness for error.

b. Test continuity of thermocouples in parallel engine harness.

c. Test aircraft temperature indicator.

d. Test resistance of aircraft temperature circuit.

e. Test insulation of aircraft temperature circuit.

f. Verify accuracy of aircraft rpm system.

g. Verify accuracy of aircraft temperature indicating system.

h. Monitor temperature during engine trimming.

i. Monitor rpm during engine trimming.

j. Check cockpit instruments directly by using portable trim module in cockpit.

k. Automatically correct temperature and rpm to standard day conditions.

l. Test temperature spread.

m. Test individual thermocouples on bench.

n. Test thermal switches on aircraft or bench.

1-2 FORMS AND RECORDS. Maintenance forms, records and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by DA PAM 738-751.

Section II. DESCRIPTION AND LEADING PARTICULARS

1-3. PHYSICAL DESCRIPTION. The BH112JB-53 and BH112JB-79 Exhaust Gas Temperature Tester consists of an instrument ease assembly (2 fig. 1-1) and an accessory case assembly (1, fig. 1-1). The instrument case latches to the lop of the accessory case and contains two assemblies-a portable trimmer assembly (3, fig. 1-1) and a probe controller assembly. Two wheels, a support post, and a handle provide mobility for the tester. Cables and accessories needed to operate the tester are housed in the accessory case.

1-4. ELECTRICAL DESCRIPTION.

a. General Theory of Operation.

(1) ***Block Diagram.*** Figure 1-2 is a block diagram of the tester. All circuitry is located in the probe controller and trimmer. Input power distribution is shown with two lines. AU other power and signal connections are shown with single lines for simplicity. Function switching is omitted for the same reason. Board and cable connectors reference designations are shown in parentheses.

(2) ***Digital Indicators.*** The trimmer contains two solid state indicators (analog-to -digital converters) for measuring temperature and engine speed (% rpm). Each indicator circuit is on a printed circuit board (temperature board or tachometer board) that plugs into the mother board. Displays for the indicators are located on the display and counter board which also plugs into the mother board. Brightness of the displays is adjusted with the DISPLAY potentiometer. Two calibration signals for the indicators are generated by the calibrator board. One is an equivalent 600ºC chromelalumel signal and the other is a crystal-controlled 70 Hz signal. External calibration adjustments of an indicator are made with its respective CAL ADJ potentiometer.

(3) ***Standard Day Measurements.*** For the Purpose of comparing an engin's performance against the manufacturer's specifications, engine temperature and speed measurements are corrected to standard day conditions. During the engine trimming procedure, egt and % rpm measurements, corrected to standard day condition, arc obtained by turning the AMB TEMP potentiometer to display ambient temperature and the STD DAY switch on ON.

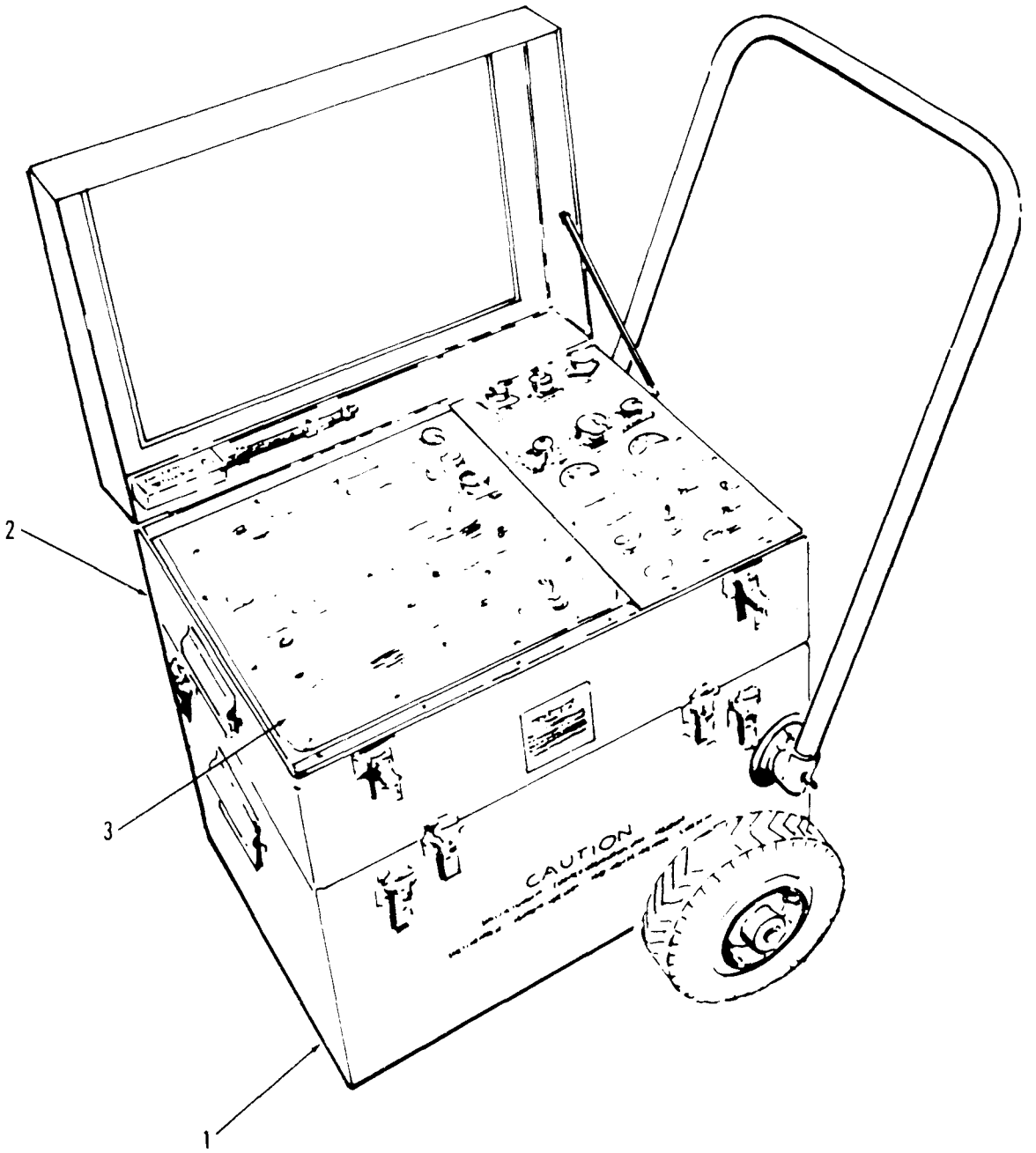


Figure 1-1. BH112JB-53 and BH112JB-79 Exhaust Gas Temperature Tester

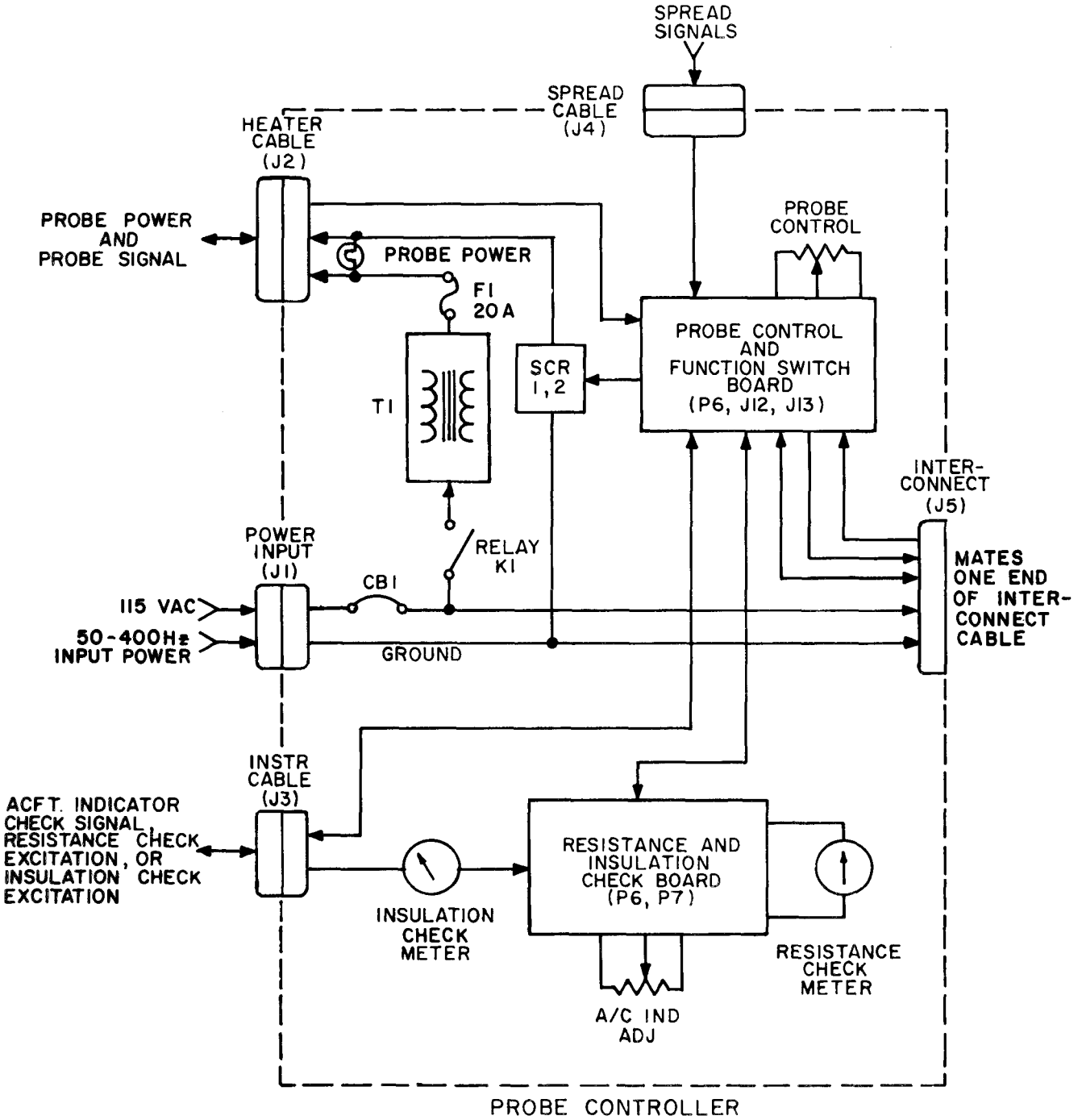


Figure 1-2. Tester Block Diagram (Sheet 1 of 2).

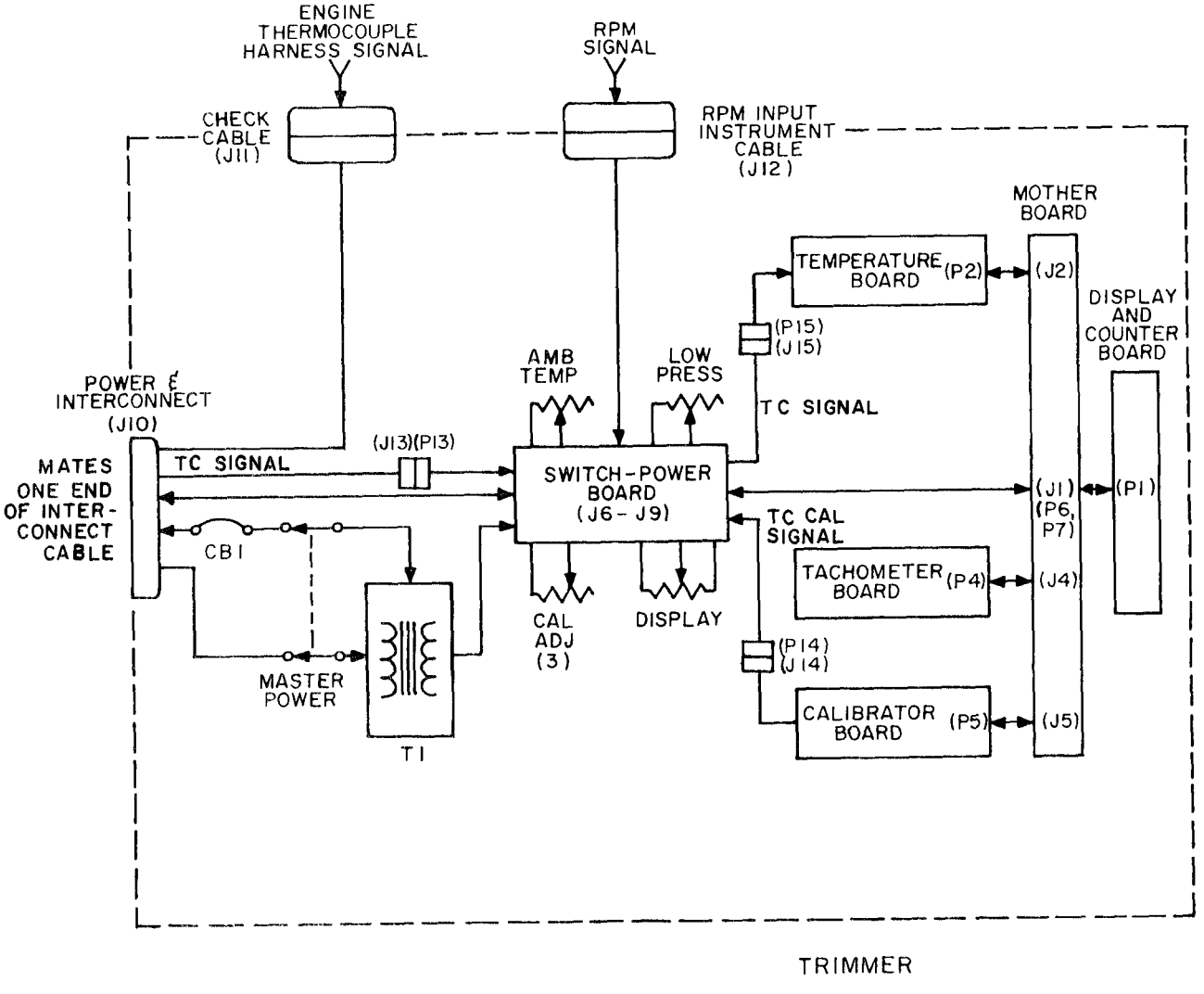


Figure 1-2. Tester Block Diagram (Sheet 2 of 2).

(4) Probe Controller. The probe controller portion of the tester contains circuitry that contyrols the heating of various types of temperature probes. The temperature to which a probe is to be heated is set using the PROBE CONTROL while observing the setting on the TEMP ºC indicator. Precision thermocouples in the temperature probes accurately measure the probe temperature which is displayed by the TEMP ºC indicator. Both the set temperature signal and the measured temperature signal are appplied to a voltage comparator in the probe control circuit. This circuit drives the gates of SCR's 1 and 2 and controls the application of full-wave power from transformer T1 to the heater probes. The PROBE POWER lamp burns continously when continuous power is applied to the probes. It extinguishes when power is removed from the probes and flahses when their temperature is regulating.

(5) Insulation Check Circuit. This circuit measures the insulation resistance between the aircraft thermocouple harness and aircraft ground. The INSULATION CHECK meter is an ohmmeter having two ranges-RX100 and RX1000. The circuit is powered by a 9 vdc supply on the probe control and function switch board.

(6) Resistance Check Circuit. The resistance check circuit is used to check and adjust the resistance of the aircraft thermocouple circuit. The RESISTANCE CHECK meter is the galvanometer of a Wheatstone bridge. One leg of the bridge contains a precision wirewound resistor selected with the RESISTANCE & A/C INDICATOR CHECK switch. The other leg contains the aircraft thermocouple circuit (less the indicator). Correct resistance is obtained in aircraft circuit by adjusting resistance spool while observing galvanometers.

(7) Aircraft Indicator Check Circuit. This circuit may be used to check the calibration of both D-Arsonval and null-balance type egt indicators. The appropriate aircraft indicator circuit is selected with the RESISTANCE and A/C INDICATOR CHECK switch. Calibration signals are adjusted with the A/C IND ADJ while they are read on the TEMP °C indicator. Calibration signals are compared with aircraft indicator readings to determine the error in the aircraft indicator.

b. Detailed Theory of Operation. The detailed theory of operation will be discussed in the following order:

(1) A/d conversion.

(2) Temperature indicator.

(3) Temperature signal circuits.

(4) % rmp indicator.

(5) % rpm signal circuits.

(6) Standard day correction circuit.

(7) Heater probe control circuit.

(8) Insulation check circuit.

(9) Resistance check circuit.

(10) Power supplies and power distribution.

(11) Logic circuitry.

Logic levels and integrated circuits used in the tester are described in paragraph **1-4b, 1-11 *c*** and following.

(1) A/D Conversion.

(a) An Overview. Figure 1-3 is a block diagram of circuitry common to both tester A/D converters. The A/D converters use the “dual-slope integration” technique. The slopes refer to the charge and discharge curves of intergrating capacitor C, figure 1-3. C is charged by the integrator during a fixed interval of time called the signal integration period when the amplified input signal is allowed to pass through the signal field-effect transistor (FET) switch and drive the integrator. The signal integration period is controlled by the continuously running clock oscillator, BCD decade counters, BCD-DAC decoding, and FET switch control. At the conclusion of the signal integration period, which is the beginning of the reference integration period, the counters are reset, the signal FET switch is opened, and the appropriate reference FET switch (+ or - reference) is closed. During the reference integration period, the integrating capacitor is discharged by the integrator. The discharging voltage is a +5 vdc if the input signal is negative and it is the output of a precision negative reference voltage divider if the input signal is positive. If the input signal is in-range, the comparator detects the instant the capacitor is completely discharged and clocks flip-flop FF1A, causing the generation of a transfer-to-memory pulse, ending the reference integration period. Transfer-to-memory (TRANSFER, fig. 1-3) shifts the “reference integration period” count, which represents the digitized input signal, into the latches of the counter-latch-decoders, updating the display. If the input signal is negative, this fact is detected by FF2A at the start of the reference integration period and FF2A causes FF1A to be cleared, generating transfer-to-memory. If the input signal exceeds the range of the indicator, out-of-range decoding causes FF1A to be cleared and generate transfer-to-memory. A positive or nega-

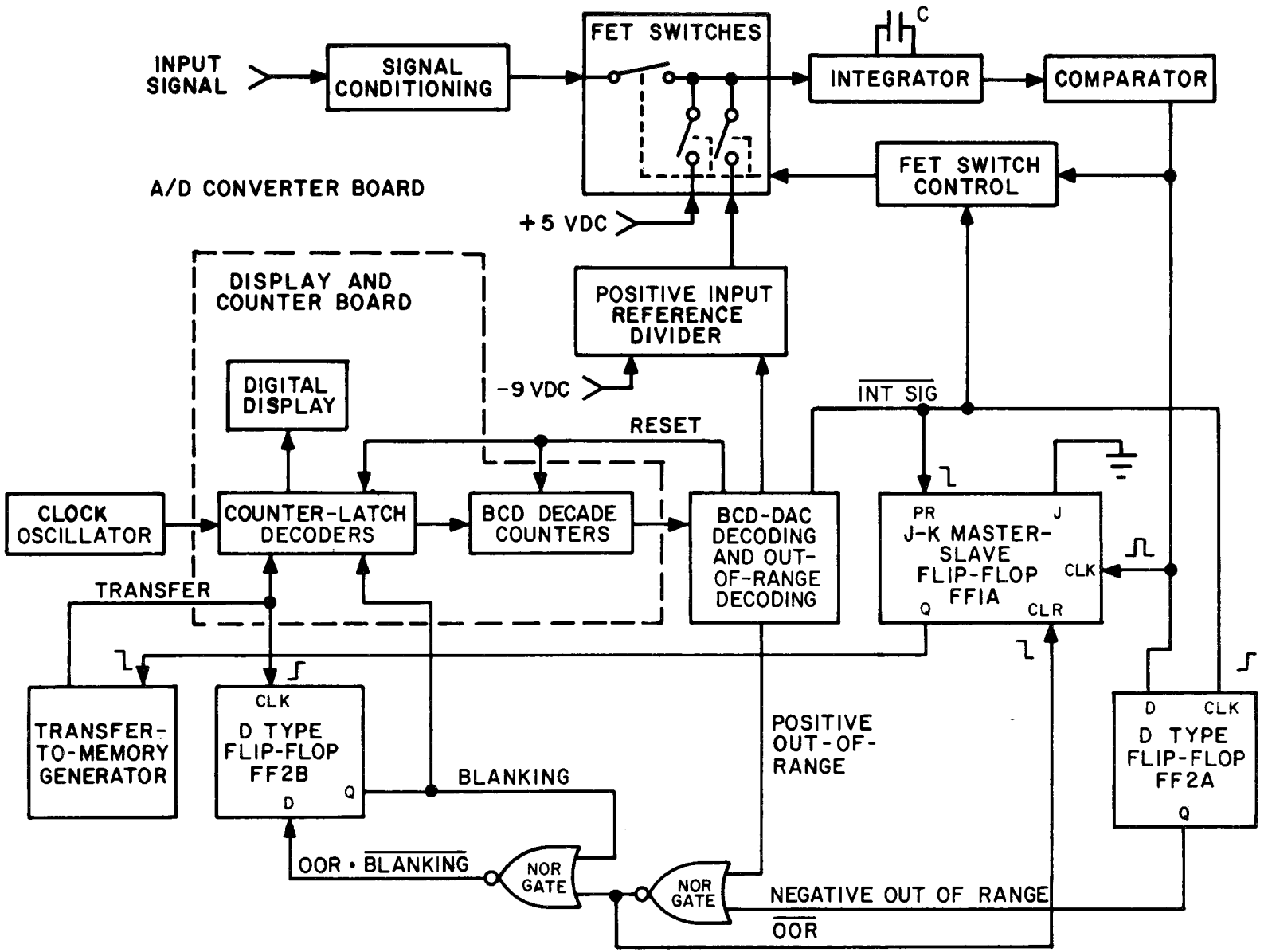


Figure 1-3. Block Diagram of A/D Converter.

tive out-of-range input signal causes an indicator's display to flash on and off through the action of the blanking signal.

(b) Equations. Dual-slope integration of a linear A/D) converter, like the % rpm converter, is defined by the following equation:

V (amplified signal) x ر signal counts = V (reference) x ر reference counts.

A linear A/D converter uses a constant reference voltage. A non-linear A/D converter, like the temperature converter, uses a stepped (shaped) reference voltage. Nonlinear dual-slope integration is defined by the following equation:

V (amplified signal) x ر signal counts = V (reference 1) x reference 1 counts + V (reference 2) x ر reference 2 counts +. . . .

(c) Integrator. The integrator (fig. 1-4) charges and discharges the integrating capacitor with current that is proportional to the integrator input voltage. Since the input voltage is applied to the inverting (-) input, the integrator charges the capacitor negatively when a positive voltage is applied, and positively when a negative voltage is applied. Figure 1-5 shows typical charge-discharge curves of a linear A/D converter and figure 1-6 illustrates curves of a nonlinear converter. Both figures have two sets of curves representing positive readings R1 and R2. Note in figure 1-5 that the discharge rate of a linear A/D converter is a constant. Hence, a constant reference voltage is used by linear A/D converters, such as the % rpm indicator, when standard day measurements are not being made. On the other hand, note in figure 1-6 that the discharge rate of a nonlinear A/D converter, such as the temperature indicator, varies in increments (S1, S 2 . . .) as the reference count increases. The discharge curve is an "amplified reflection" of the

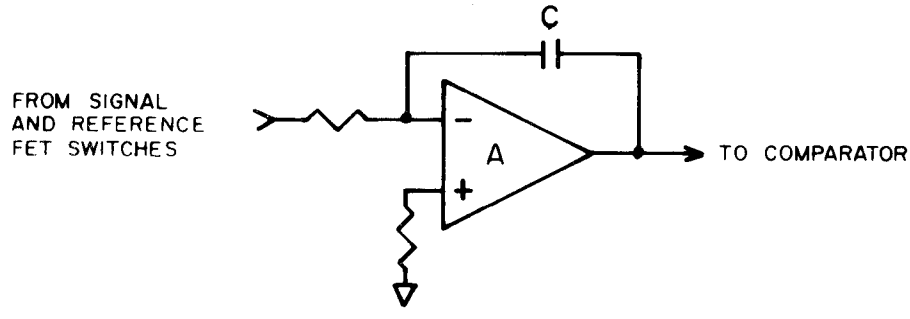


Figure 1-4. Integrator.

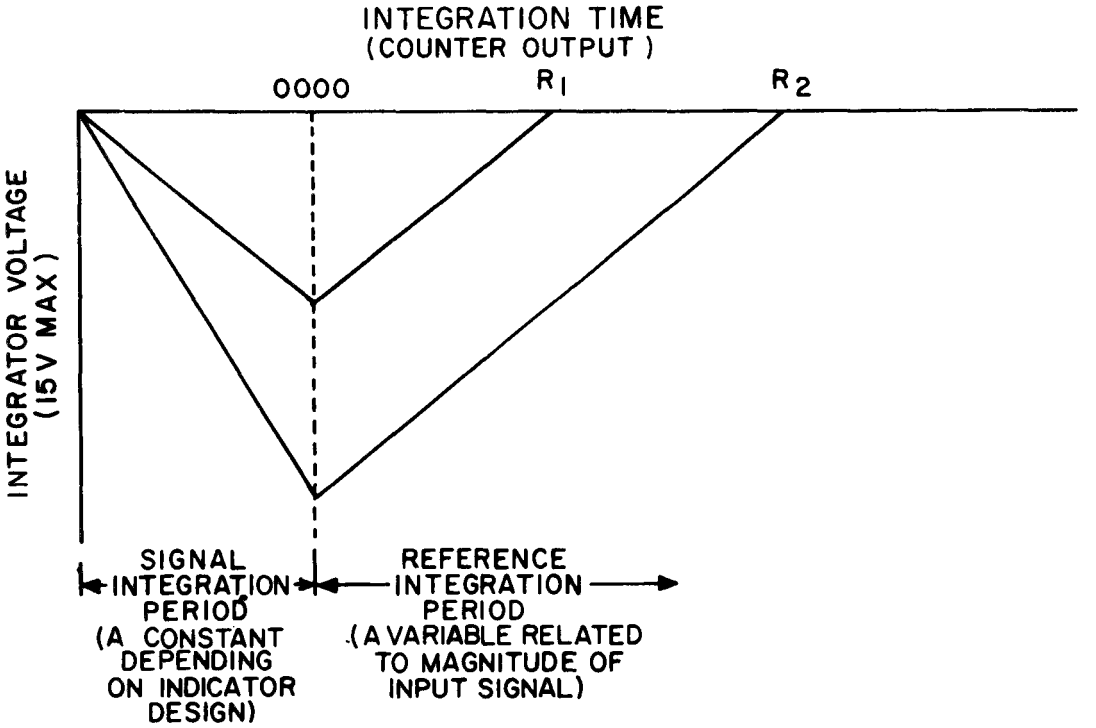


Figure 1-5. Charge-Discharge Curves of Linear A/D Converter.

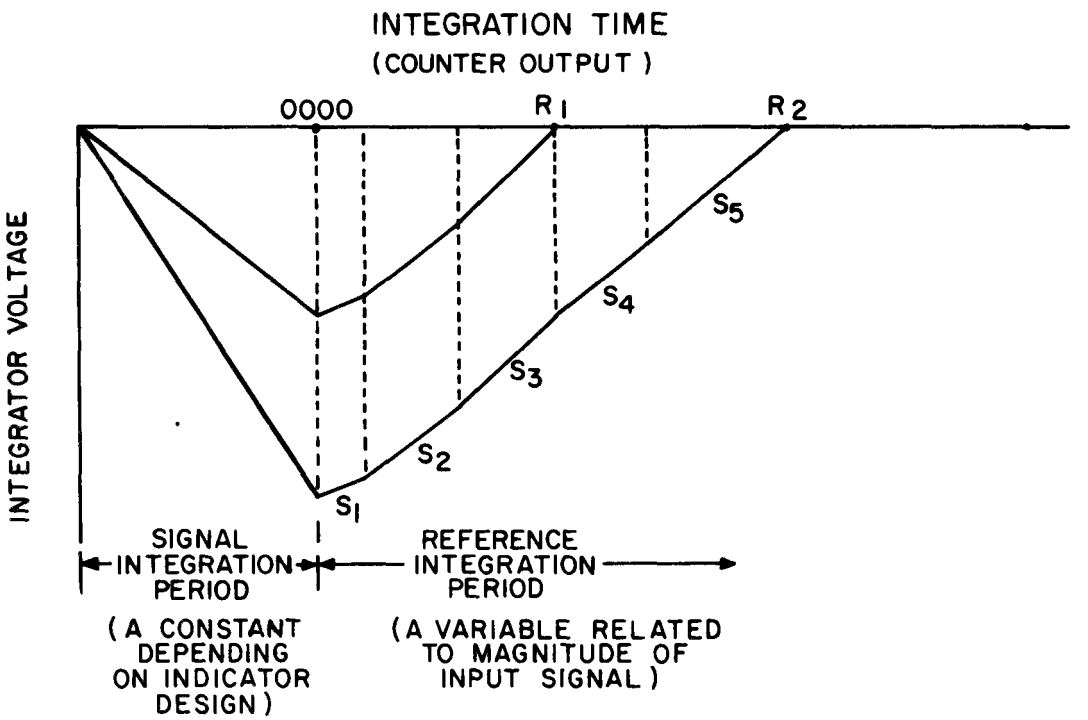


Figure 1-6. Charge-Discharge Curves of Nonlinear A/D Converter.

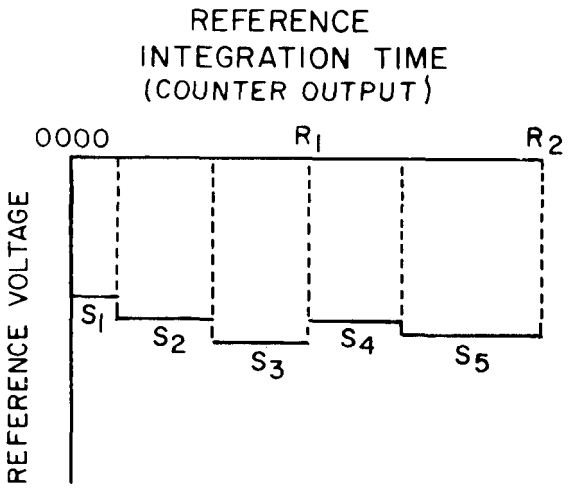


Figure 1-7. Typical Reference Voltage Shaping.

(d) Comparator. The output of the integrator is applied to the noninverting (+) input of the comparator (fig. 1-8). The output of the comparator swings to 0 vdc when a positive voltage is applied to the integrator and to +5 vdc when a negative voltage is applied to the integrator.

(e) FET Switch Control. Three junction field-effect transistors (Q5-Q7, fig. 1-9) control the input to the integrator. The output of the signal amplifier is controlled by Q5, the positive reference voltage is controlled by Q6, and the negative reference voltage is controlled by Q7. The FET controlling signals are the comparator output and a decoded signal, INTEGRATE SIGNAL, which is low during its active period.

1. At the beginning of the signal integration period, INTEGRATE SIGNAL goes to logic 0, turning Q1 on and Q2 off. The values of R1 and R3 are such that Q2 remains off even if the comparator output goes to 0 vdc. Q3 and Q4 turns on. Plus 15 vdc from Q3 turns on Q5. Minus 15 vdc from Q4 turns off Q6. Minus 15 vdc also turns off Q7.

2. At the beginning of the reference integration period, INTEGRATE SIGNAL goes to logic 1, turning off Q1, Q3, and Q5. At the same time, Q2 is enabled so that 0 vdc from the comparator can turn on Q2. If the input signal is positive, the comparator will have a 0 vdc output at the end of the signal integration period and will turn on Q2. Logic 1 voltage from Q2 will turn on both Q4 and Q7. Q4 holds Q6 off, keeping the positive reference voltage off. The negative reference voltage is turned on by Q7. If the input signal to the A/D converter is negative, then the output of the comparator will be +5 vdc at the end of the signal integration period. Q2 will turn off, reversing the sequence for a negative input signal. The positive reference voltage will be turned on and the negative reference will be turned off.

3. The period from the conclusion of the reference integration period to the beginning of the subsequent signal integration period is referred to as the oscillate period. During the oscillate period, the integrator output it kept close to 0 vdc by rapidly and alternately turning on and off the positive and negative reference voltage FET's. This high frequency oscillation ends when INTEGRATE SIGNAL goes low.

(f) Generation of Transfer-to-Memory. At the conclusion of the reference integration period, transfer-to-memory transfers the contents of the counter-latch-decoder counters on the display-counter board into the latches, updating the numerical display. Transfer-to-memory is

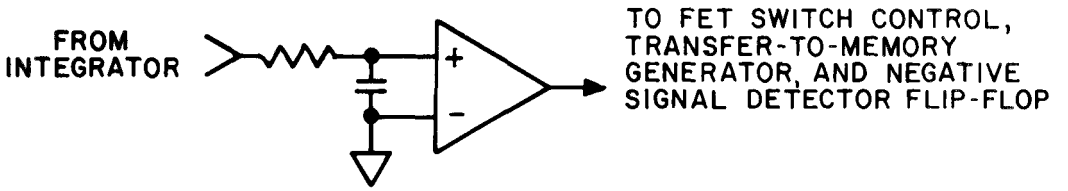


Figure 1-8. Comparator.

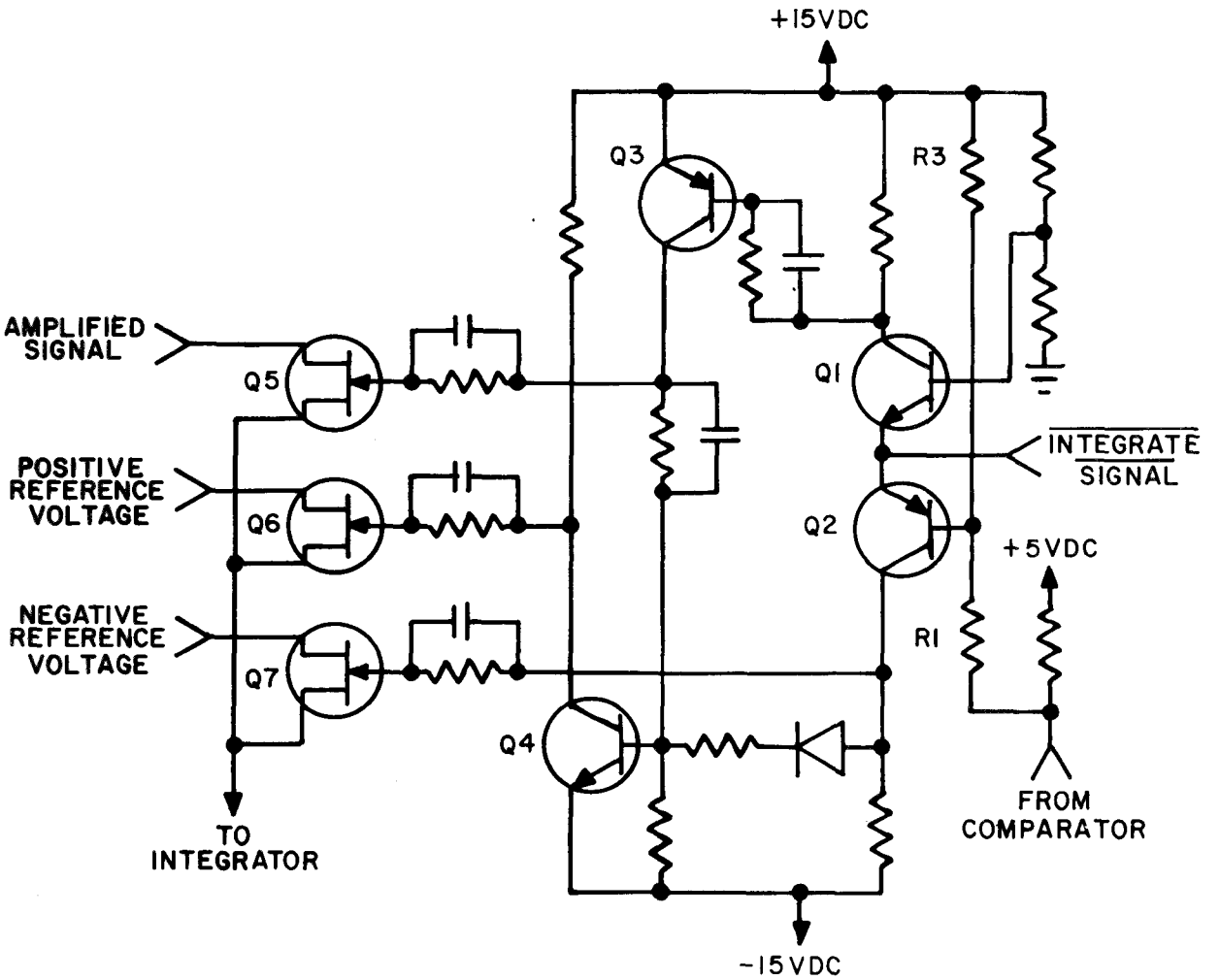


Figure 1-9. FET Switch Control.

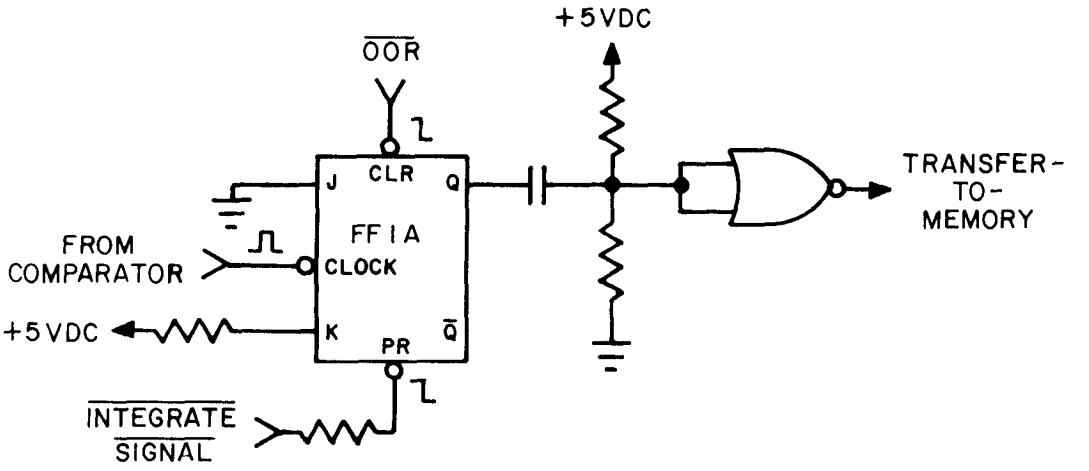


Figure 1-10. Circuitry That Generates Transfer-to-Memory.

generated when FF1A (fig. 1-10) is cleared. FF1A may be cleared in one of two ways: (1) when it is clocked by the comparator at the conclusion of the reference integration period of an in-range signal, and (2) by the out-of-range signal (OOR) when the input signal is detected to be negative or positive out-of-range. Positive out-of-range signals are detected by out-of-range decoding (fig. 1-3) and negative out-of-range signals cause the comparator to set FF2A at the conclusion of the signal integration period. FF1A (fig. 1-10) is preset at the beginning of the signal integration period.

(g) Clock Oscillator. The clock oscillator (fig. 1-11) provides the time base for the signal and reference integration periods. It consists of a relaxation oscillator and pulse amplifier transistor. Oscillator frequency is determined by the type of input signal and indicator range.

(h) Display and Counter Board. The clock oscillator signal (CLOCK) from each A/D converter is applied to a string of counter-latch-decoder (CLD) integrated circuits (fig. 1-12) on the display and counter board. The counter-latch-decoders drive resistor devices (RD's) which in turn drive the dis-

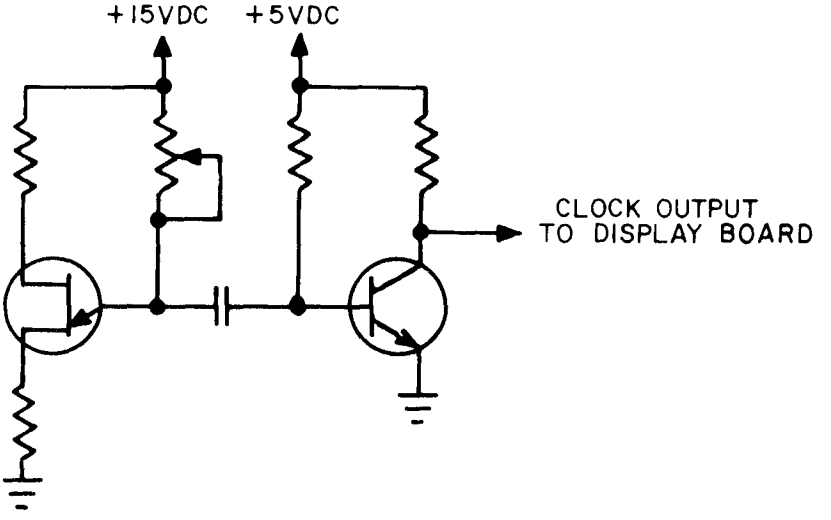


Figure 1-11. Clock oscillator.

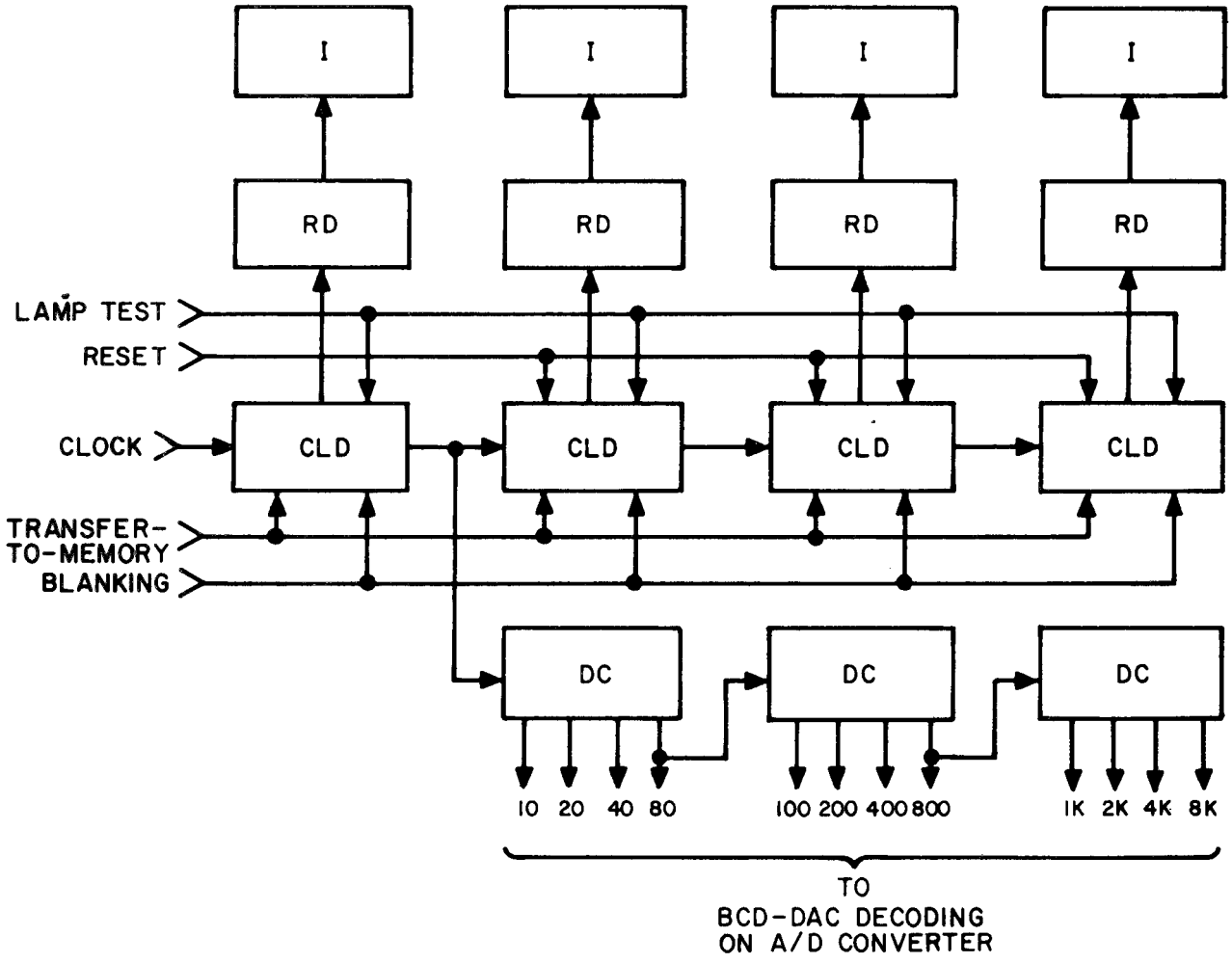


Figure 1-12. Typical Display and Counter Board Circuitry.

plays (I's). Since the CLD's have no BCD decade counter output; for BCD-DAC decoding, BCD decade counters (DC's) are added to the display and counter board for this purpose. LAMP TEST, generated by the PRESS TO TEST switch, lights all segments in the displays. RESET, from the A/D converter, resets the counter-latch-decoders at the beginning of the reference integration period. TRANSFER-TO-MEMORY, from the A/D converter, transfers the CLD count into the CLD latches at the conclusion of the reference integration period to update the display. The blanking input of the CLD's is controlled by FF2B (fig. 1-3) and goes high to blank an indicator display on every other reading when the input signal to the indicator is out-of-range.

(2) Temperature Indicator. The following subparagraphs describe circuitry that is unique to the temperature indicator.

(a) Temperature Signal Conditioning. A thermocouple circuit is formed when the thermocouple wire of the measuring junction is connected to the copper wiring of the A/D converter at the Compensator (fig. 1-13). The junction at the

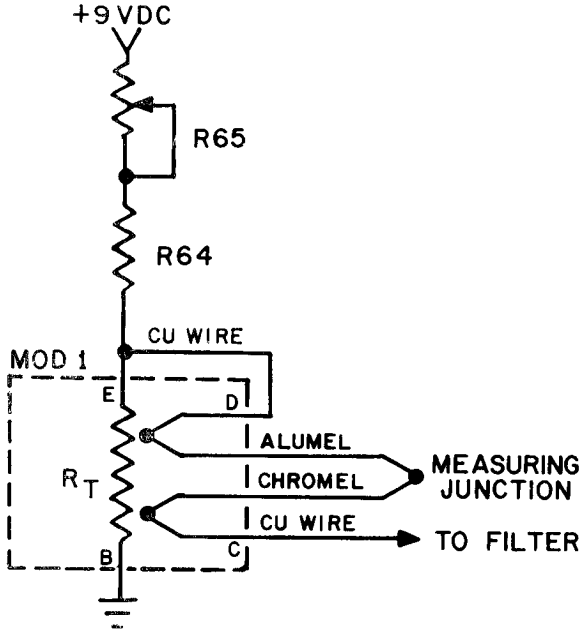


Figure 1-13. Temperature Indicator Compensator.

compensator is called the reference junction. Any variation in the temperature of the reference junction will cause either an increase or decrease in the signal voltage. To measure temperature accurately, the reference junction must either be held at a constant temperature or referenced to a voltage which varies with temperature and in relation to the thermocouple curve. The compensator generates a reference voltage through the use of a thermal resistor, RT. The negative thermocouple lead is connected with copper wire to the higher potential end of this resistor. The thermal resistor, having a positive temperature coefficient, modifies the reference voltage when the ambient temperature increases. To assure that their temperatures are the same, the reference junction and thermal resistor are encapsulated.

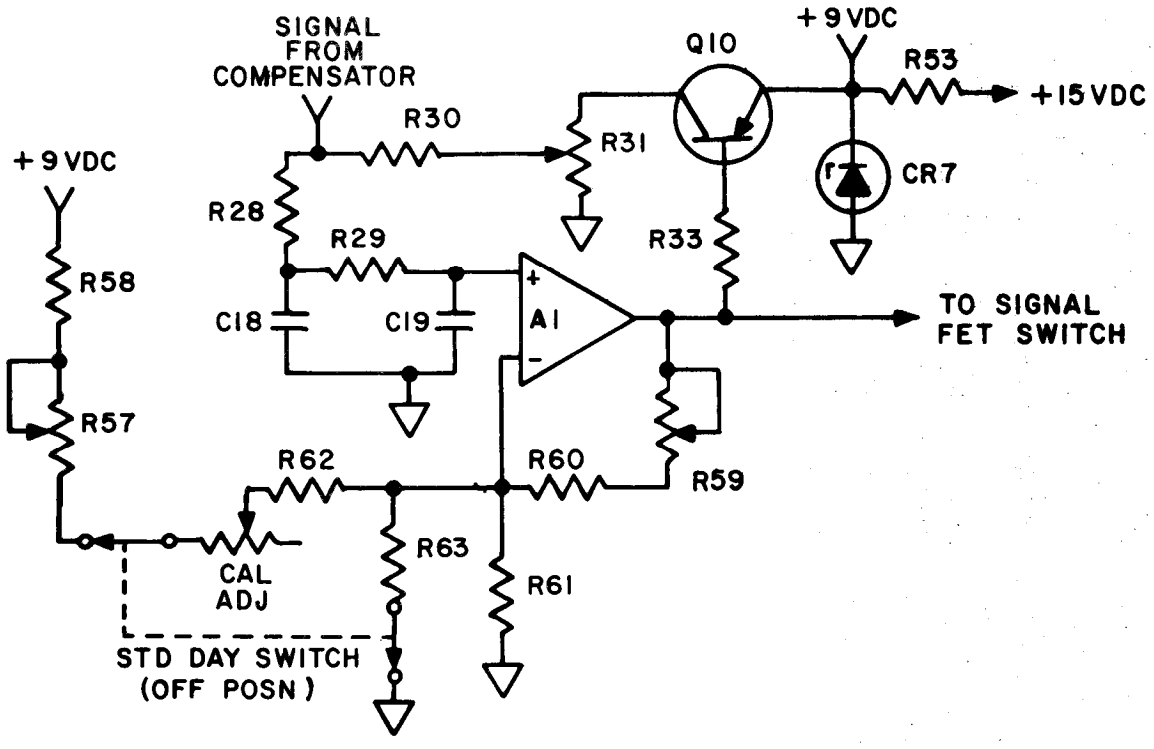


Figure 1-14. Temperature Indicator Amplifier Circuit.

1. The input signal is filtered by an R-C network consisting of R28, C18, R29, and C19 (fig. 1-14). A voltage divider incorporating a potentiometer (R31) makes it possible to adjust the indicator so it will drift upscale, downscale, or remain constant when the input is open. The voltage divider supply (9 vdc) is controlled by Q10 which in turn is driven by the output of amplifier Al. Q10 limits the voltage on the filter capacitors when the potentiometer is adjusted for upscale drift.

2. The input signal is applied to the noninverting input of amplifier Al. A full-scale signal is amplified to approximately 8.8 vdc. Applied to the inverting input is the signal from a zero adjust circuit that has the configuration shown in figure 1-14 when the STD DAY switch is off. The zero adjust circuit balances out the fixed compensator output and amplifier offset voltages. R59 controls the gain of the amplifier and calibrates the A/D converter at the high end of the range.

(b) Reference Voltage Divider. The precision reference voltage divider consisting of resistors R46-R52 is shown in figure 1-15. Transistors Q11-Q15 ground different points of the divider during the reference integration period and "shape" the reference voltage, generating a reference voltage curve that closely approximates the input signal curve. A transistor turns on when the cathode of one of biasing zener diodes CR1-CR5 (2.6v) goes to logic 0. The biasing circuits are controlled by flip-flops on the temperature A/D converter board. Note in figure 1-15 that all transistors are off during reference count 0-99. Transistor Q14 turns on during counts 100-299, etc. The STD DAY switch grounds the gate of Q17 in OFF position and turns Q17 on.

(3) Temperature Signal Circuits. The following subparagraphs explain all temperature input signal circuitry except the standard day circuitry. Figures 1-16 and 1-17 show the temperature input circuits. No attempt has been made to show the circuits in detail, but merely to show the course of each signal path so that a circuit can be traced easily when troubleshooting. A single broken line is shown for each path, whereas in reality, a circuit contains two leads and passes through two sets of switch poles and two sets of switch contacts. Copper-constantan thermocouple wire is used to wire the thermocouple input circuits because it is easier to solder and its thermal characteristics are identical to chromel-alumel wire at normal ambient temperatures.

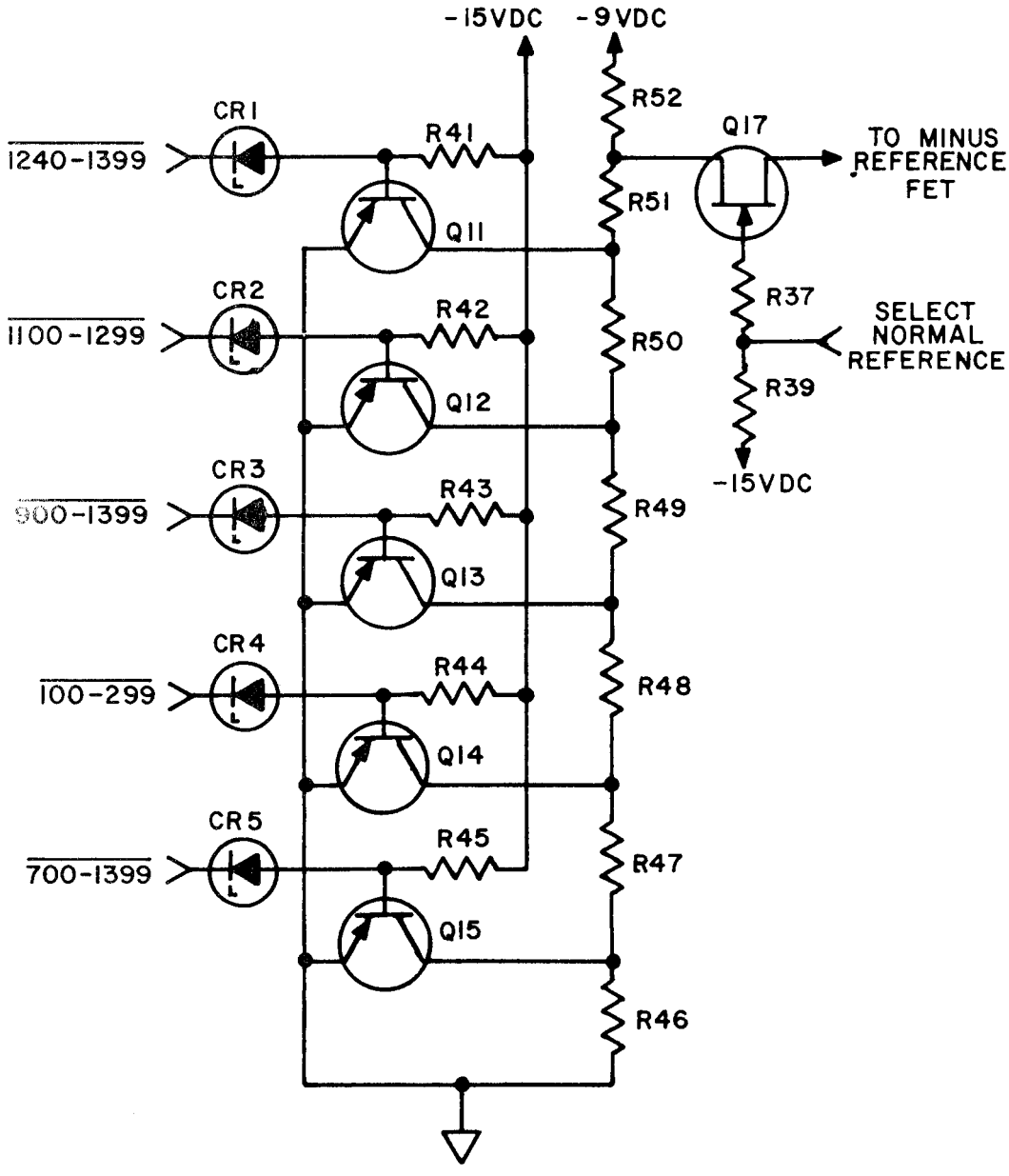


Figure 1-15. Temperature Indicator Reference Voltage Divider.

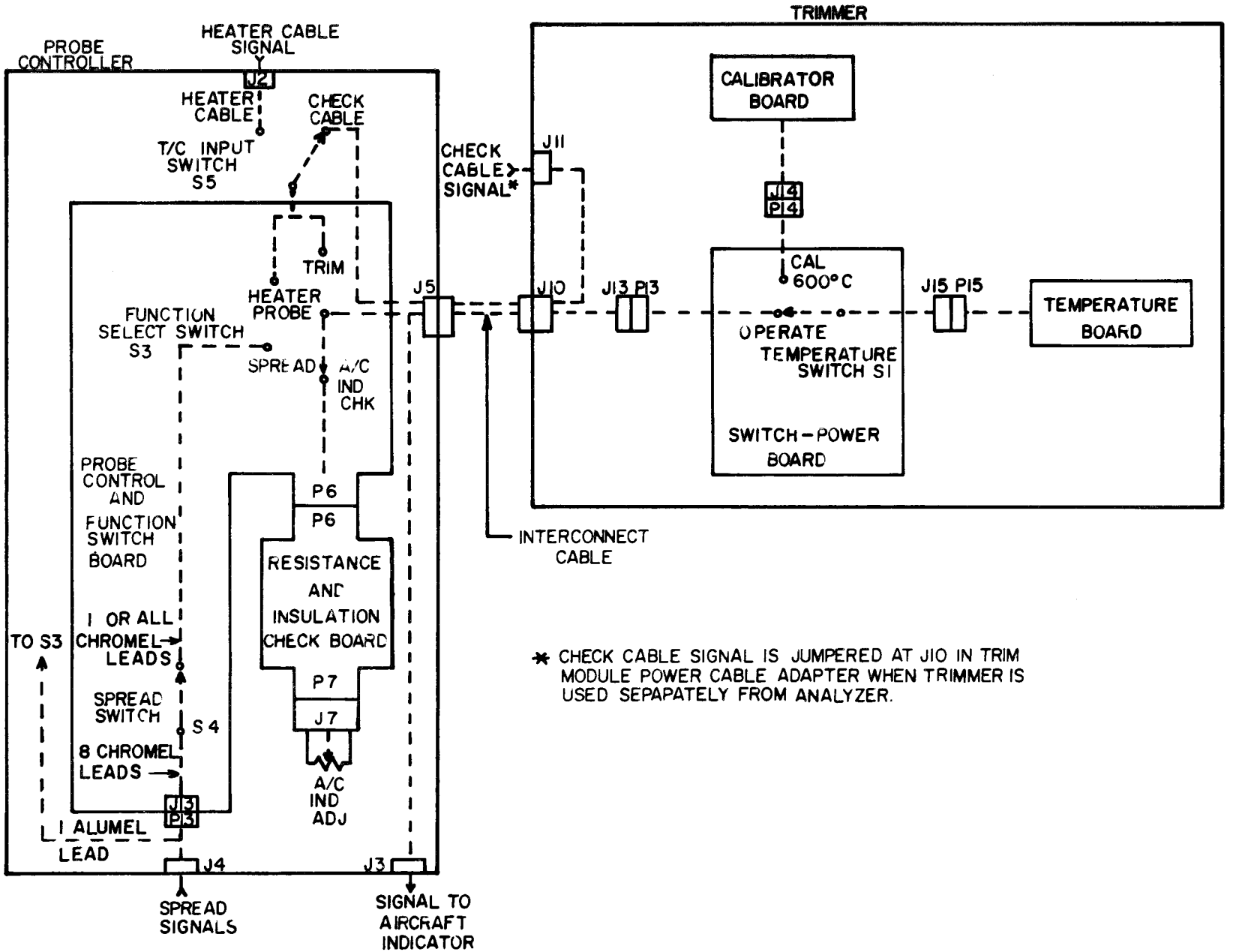
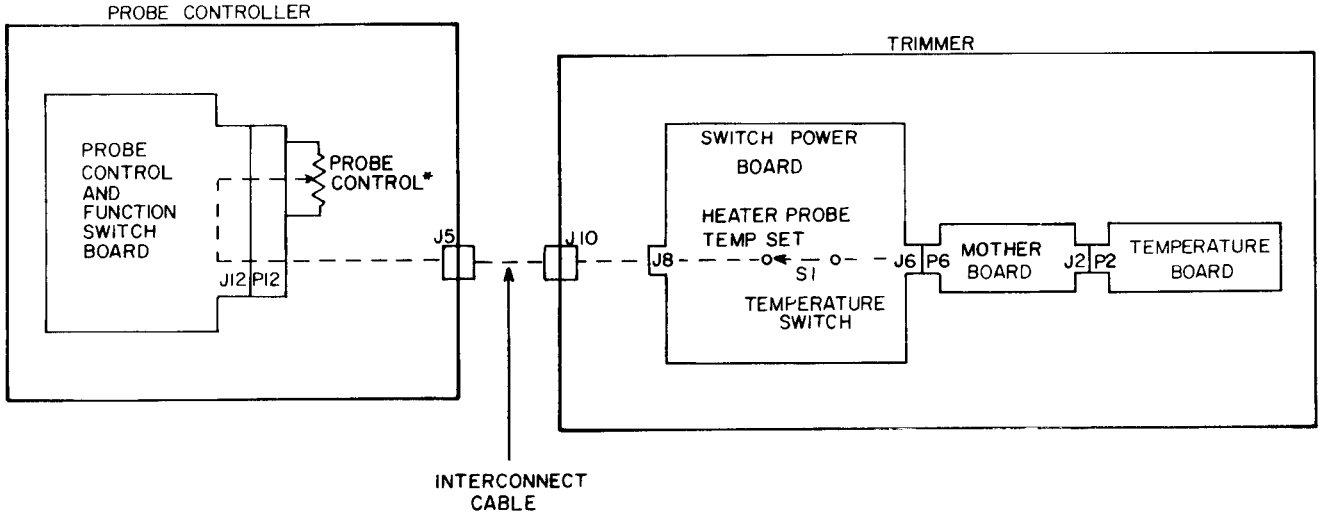


Figure 1-16. Temperature Signal Flow Diagram (for Aircraft Indicator Check, Spread, Heater Probe, Trim, and Calibrator Signals).



* PROBE CONTROL IS NOT EXCITED UNLESS FUNCTION SELECT SWITCH IS IN HEATER PROBE POSITION.

Figure 1-17. Temperature Signal Flow Diagram (for Heater Probe Temp Set Signal).

(a) Aircraft Indicator Check Circuits. The aircraft indicator check circuits (figs. 1-18 and 1-19), located in the probe control section of the analyzer/trimmer, supply calibration check signals to the TEMP indicator and to the aircraft indicater simultaneously. Switch poles are identified in these figures and poles of the same switch are joined with broken lines. When checking a D'Arsonval type indicator, the appropriate resistance (R21-R25, fig. 1-18) is selected with the RESISTANCE & A/C INDICATOR CHECK switch. Since null-balance indicators do not draw current when they are balanced, R19 in figure 1-19 assures that the A/C IND ADJ has approximately the same range as it does in the circuit of fig. 1-18.

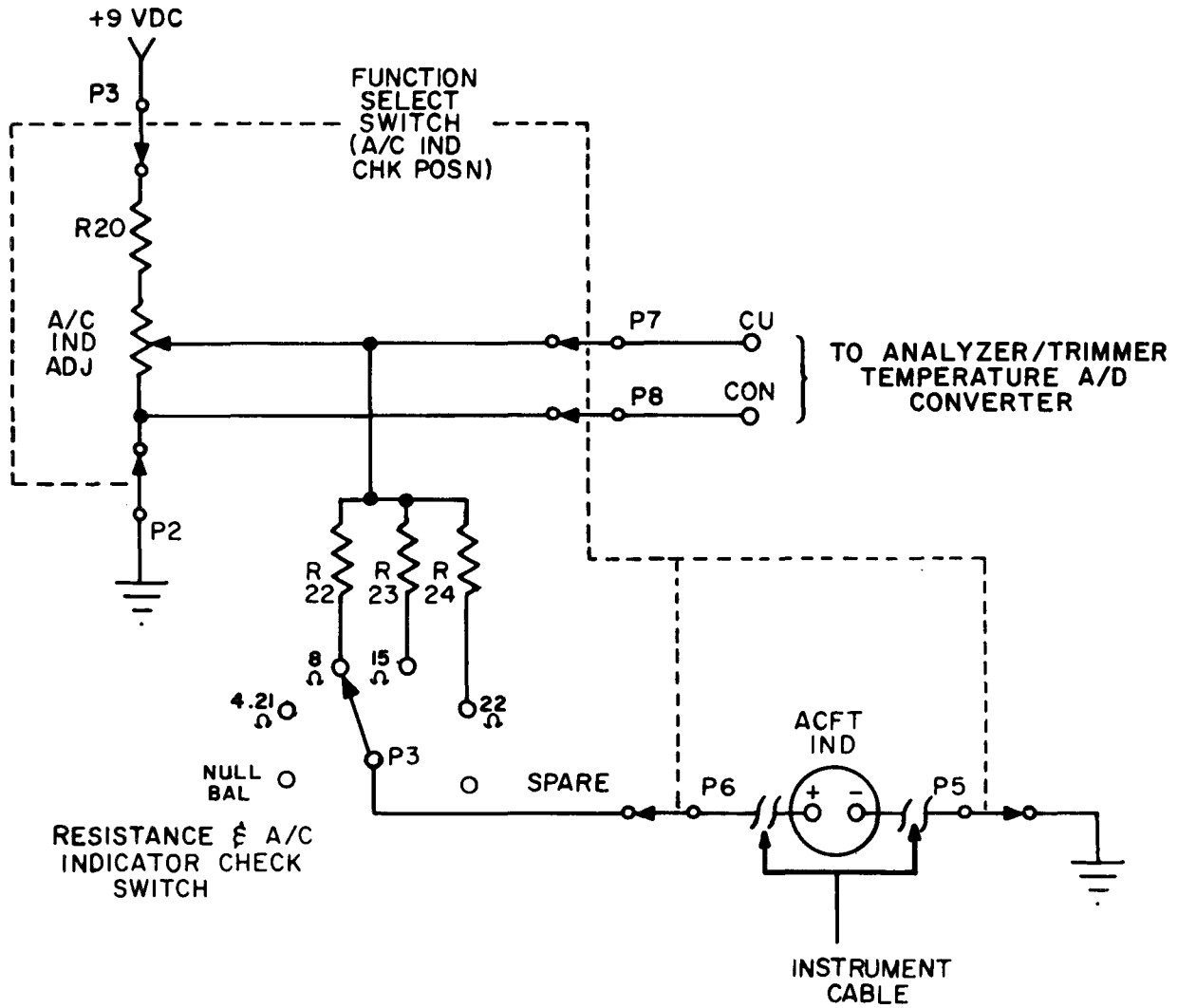


Figure 1-18. Aircraft Indicator Check Circuit for D'Arsonval Indicators.

(b) Spread Circuit. Spread signals (fig. 1-16) are applied through the spread cable to the SPREAD CABLE receptacle on the probe control. Eight chromel signals are applied to eight poles of the SPREAD switch on the probe control and function switch board. Each pole supplies its signal through a different contact position corresponding to one of eight engine thermocouples. In any position of S4, except ALL, one of the chromel leads is connected to the SPREAD position of deck 7 of the FUNCTION SELECT switch. In the ALL position, all chromel leads are connected to the SPREAD position of deck 7. The alumel lead is common to all the alumel leads and is connected to the SPREAD position of deck 8 of the FUNCTION SELECT switch.

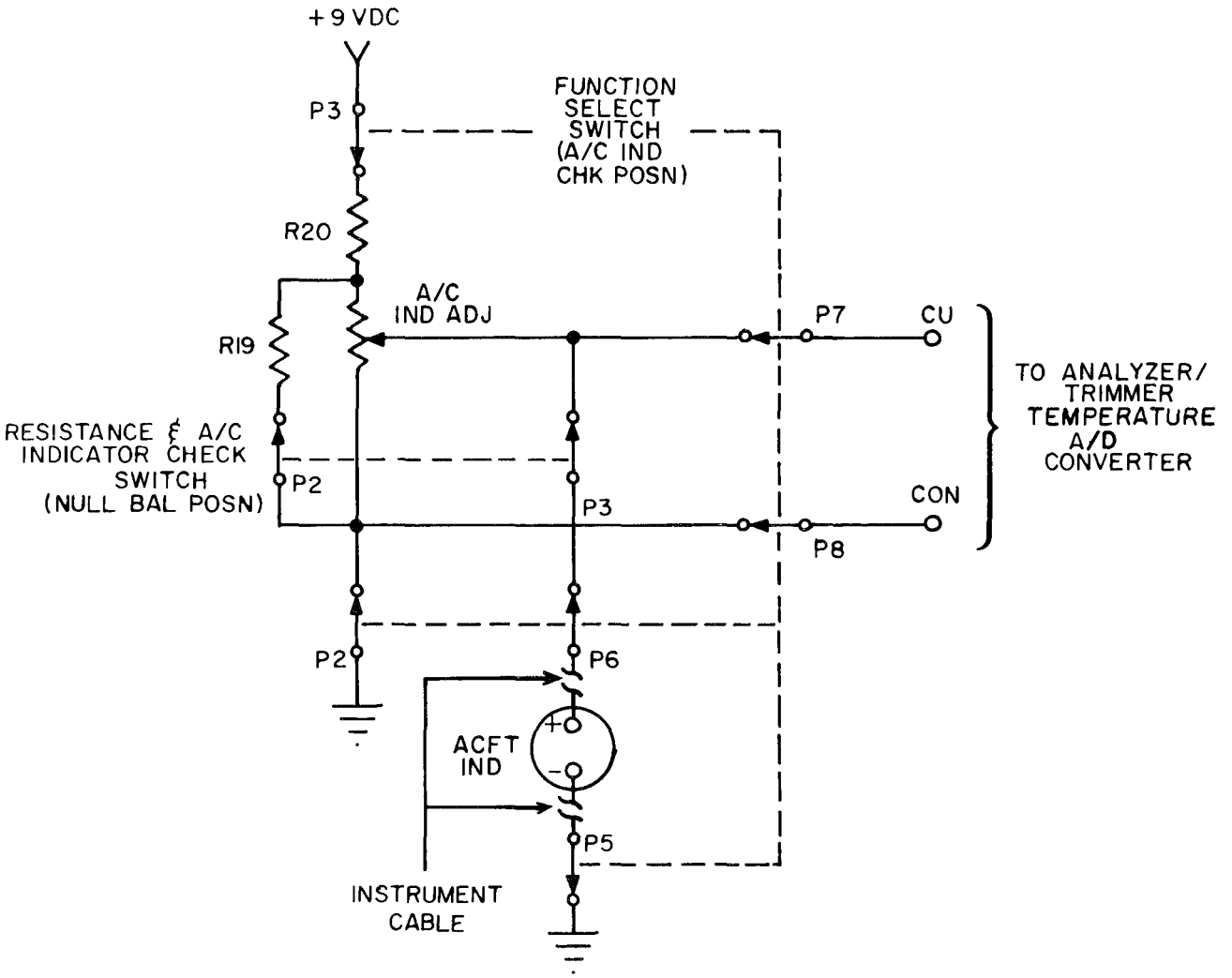


Figure 1-19. Aircraft Indicator Check Circuit for Null-Balanc Indicators.

(c) Heater Probe Temperature Circuit. The averaged heater probe temperature signal of the precision thermocouples in the heater probes is applied through the heater cable (fig. 1-16) to the HEATER CABLE receptacle. This signal is selected by the T/C INPUT switch and applied to the "heater probe" contacts of decks 7 and 8 of the FUNCTION SELECT switch.

(d) Trim Circuit. The averaged egt signal from the engine thermocouple harness is applied through the check cable (fig. 1-16) to the CHECK CABLE receptacle on the trimmer. This signal is selected by the T/C INPUT switch and applied to the "trim" contacts of decks 7 and 8 of the FUNCTION SELECT switch.

(e) Temperature Indicator Calibration Circuit. The temperature indicator calibration signal generator is on the calibrator board (fig. 1-16) in the trimmer. A2 and A3 on this board form an isolated power source that generates approximately 22 vdc at C14. This power source drives A4 which provides a source of constant current for 9 vdc zener diode CR11. The 9 vdc from CR11 powers compensator MOD-1, which is identical to the compensator in the temperature indicator. Since the compensator outputs are series opposed, the thermocouple effect is cancelled. R3 on the calibrator board adjusts the calibration signal to an equivalent 600° C.

(f) Heater Probe Temperature Set Circuit. The heater probe temperature set circuit (fig.

1-17) sets the temperature to which heater probes are heated. Eighteen and one-half vac from a secondary winding of transformer T1 in the trimmer is half-wave rectified by CR12 on the probe control and function switch board. This rectified voltage is filtered by C11 and C12 and voltage regulated to 9 vdc by R27, R28, CR13, and CR14. The 9 vdc passes through deck 3 of the FUNCTION SELECT switch when it is in HEATER PROBE position and excites the PROBE CONTROL potentiometer. Current from the PROBE CONTROL wiper passes through R19 and R20 on the probe control circuit. The voltage developed across R20 represents the heater probe set temperature and is applied directly to the input filter of the temperature indicator,

(4) % RPM Indicator. The following is a description of circuitry that is unique to the % RPM indicator. The indicator measures the rotational speed (% rpm) of the low pressure (N1) and high pressure (N2) compressors. The selected tachometer signal is applied through C17 and R30 on the tachometer board to the inverting input of amplifier A3. Connected to the noninverting input is the common signal return. Diodes CR2 and CR3 clamp the input signal level to 0.7 vdc. The output of A3 is adjusted to a symmetrical square wave by R26. Negative half-cycles of the input signal cause optical coupler OC1 to conduct and turn on Q13. Plus 15 vdc from Q13 turns on Q12 (fig. 1-20) during the negative half-cycle. During the positive half-cycle, Q13 turns off and -15 vdc through R37 turns on Q11. When Q12 turns on, C19 is charged by +9 vdc through two precision resistance paths. One path contains R47 and the other path contains R48, R49, and R50. When Q12 turns off andQ11 turns on, C19 discharges through two precision resistance paths. One path contains R48 and the other path contains R47, R49, and R50. Since resistors R47 and R48 are equal (3.7K), the resistance path containing R50 is equal for both charge and discharge current. Both the charge and discharge currents develop equal positive pulses across resistor R50. These pulses charge filter capacitors C20 and C21 at the input of amplifier A4. The gain of A4 is adjusted with R44 and R45 and the zero calibration point is adjusted with R41 when the % RPM indicator CAL ADJ pot is set to the center of its range.

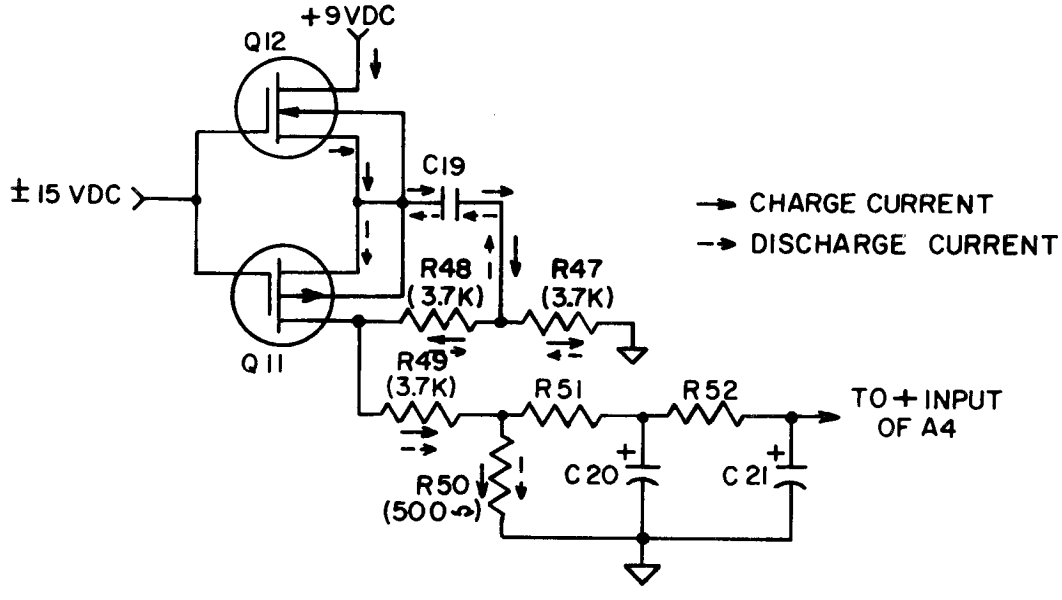


Figure 1-20. Partial Schematic of Tach Converter.

(5) % RPM Signal Circuits. The % rpm signal circuits are shown in figure 1-21. The % RPM indicator calibration signal generator is on the calibrator board in the trimmer. The circuitry of crystal XT1 and gates G2B, C, D forms a crystal controlled oscillator with a frequency of 455K Hz. Binary counters BC1 and BC2 and gates G1A,B and G2A divide the frequency by 3250 to 140 Hz and FF1 divides the frequency by 2 to 70 Hz.

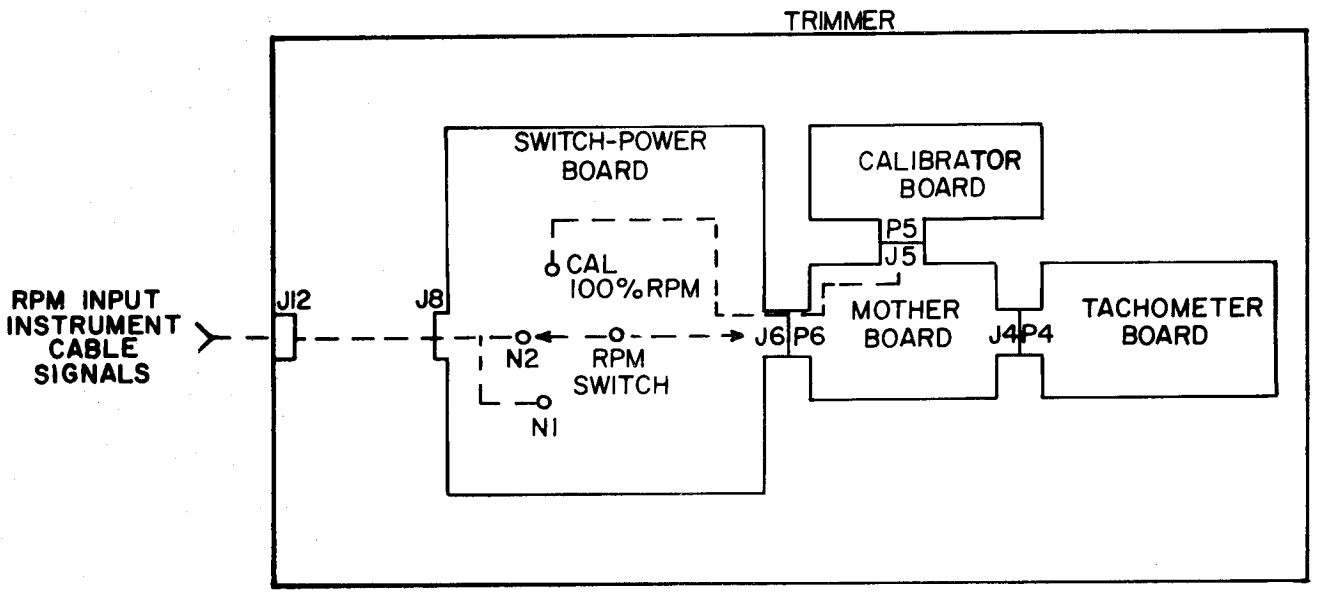


Figure 1-21. % RPM Signal Flow Diagram.

(6) Standard Day Correction Circuitry. The standard day circuit, when activated, corrects temperature and % rpm readings to standard day conditions during engine trim. To activate the circuitry, set ambient temperature on the AMB TEMP potentiometer, turn the FUNCTION SELECT switch to TRIM, the TEMPERATURE switch to OPERATE, the RPM switch to N1 or N2, and the STD DAY lamp burns continuously if the other switches are in their correct positions. If one or more of the other switches named above are not "in position", the STD DAY lamp flashes.

(a) STD DAY lamp Circuit. The circuitry that controls the STD DAY lamp is located on the switch-power board. Q16 drives the STD DAY lamp when the STD DAY switch is on. When all above named switches are in the proper position, Q17 turns on Q16. The STD DAY lamp burns continuously. If a switch is "out-of-position", the base circuit of Q18 is returned to ground through the switch. Q18 turns on, turning off Q17 and Q16. C12 and C13 charge until the emitter-base junction of Q17 becomes forward biased, at which point Q17 and Q16 turn on again.

(b) Standard Day Equations. Standard day corrections are made according to the following equations:

$$\text{Corrected temperature (°C)} = \text{uncorrected temperature (°C)} + 273\left(\frac{\theta}{519} - 1\right)$$

$$\text{Corrected percent rpm} = \text{uncorrected percent rpm};$$

where θ = observed ambient temperature (°F) + 460

or θ = observed ambient temperature (°C) + 273

An investigation of these equations will show that standard day readings are lower than uncorrected readings when the ambienet temperature is above standard day temperature (59° F or 15° C) and higher than uncorrected readings when the ambient temperature is below standard day temperature.

(c) Standard Day Correction Circuit Schematic. Figure 1-22 is a schematic diagram of the standard day correction circuit. Note that when the STD DAY switch is on, Q17 on the temperature board turns off, removing the "uncorrected" reference divider from the temperature converter, and Q18 turns on. Likewise, Q8 on the tachometer board turns off and Q9 turns on. Note also that when standard day corrections are being made, temperature amplifier A1 becomes referenced to the combined effects of two voltage sources, -9 vdc and the output of A1 on the calibrator board. The AMB TEMP potentiometer adjusts the gain of A1 on the calibrator board in relation to ambient temperature. If ambient temperature increases, the gain of A1 is increased and causes higher negative reference voltages to be generated by A4 on the temperature board and A7 on the tachometer board. Higher reference voltages decrease the reference integration period for a given input signal and consequently create lower readings. The circuitry of A5 and Q10 on the tachometer board increases the slope of the corrected % rpm curve above 49° F (9.4° C) ambient temperature setting. Q10 turns on at the 49° F ambient temperature setting and parallels resistors R63 and R64.

(7) Heater Probe Control Circuit. The bestir probe control circuit regulates the application of power to heater probes and allows them to be heated to the set temperature.

(a) When the FUNCTION SELECT switch (fig. FO-1) is turned to HEATER PROBE position, 28 vdc from the switch energizes K1, applying input power to transformer TB1. T1B steps up the voltage to 135 vat. This 135 vac heats the probes and is controlled by SCR's 1B and 2B.

(b) It is desirable to apply heater voltage to the heater probes when the voltage is passing through 0 vac in order to prevent the generation of voltage spikes and the accompanying radio frequency interference. This is accomplished by controlling the inputs of comparator A2 with 18.5 vac (test point 42), which is in phase with the heater probe excitation voltage.

(c) Setting the desired probe temperature with the PROBE CONTROL adjusts the dc level at the inverting (-) input of comparator A1. Porbes are heated when this level is more positive than the heater probe thermocouple signal level at the non-inverting (+) input. Added to the dc level at the - input is an exponential voltage of approximately 3 Hz generated by unijunction oscillator Q3. This voltage, having an amplitude equivalent to approximately 10° C, provides the time base for the heater duty cycle when the set temperature is being approached and lessens probe temperature overshoot and undershoot.

(d) When the circuit is requesting heat, the output of A1 goes to -15 vdc, back biasing diode CR1. Test point 4.2 (table 4-13) alternates between +0.7 vdc and -1.4 vdc and Q1 turns on when the test point becomes -0.7 vdc or more negative. Q1 assures that Q2 is off at the beginning of the next positive alternation after the output of A1 goes to -15 vdc. When Q2 is off, comparator A2 is allowed to generate trigger pulses in transformer T1A and trigger SCR2A. The + input (test point 42) of A2 momentarily is more positive than the - input (test point 44) when the + input passes through the -0.7 vdc level at the leading edge of the positive alternations of 18.5 vac (test point 43). When the + input of A2 exceeds the - input, the output of A2 goes to +15 vdc and generatest a pulse in T1A. See tes point 45 waveform in table 4-13.

(e) When a trigger pulse is generated in T1A, conduction through the heater probes continues for one or more complete cycles depending on the heat demand. The trigger pulse from T1A turns on SCR2A. SCR2A triggers SCR2B, a power SCR mounted on a heat sink inside the probe control. Current from T1B flows through the heater probes and SCR2B during the positive half-cycle of heater voltage. Also during the positive half-cycle, C9 charges through CR10, R23, and SCR2B. When the heater voltage passes through 0 vac at the leading edge of the negative alternation, SCR2B turns off. The positive voltage on C9 (approximately 75 vdc) turns on SCR1A through R22 and CR11. SCR1A triggers SCR1B, the other power SCR. SCR1B allows current to flow through the probes during the negative half-cycle. During the negative half-cycle, C9 discharges through CR8, CR9, and R23.

(8) Insulation Check Circuit. This circuit (fig. 1-23), located in the probe controller, measures the insulation resistance between the aircraft thermocouple harness and aircraft ground. The INSULATION CHECK meter is the ohmmeter of a calibrated ohmmeter circuit having two ranges, RX100 and RX1000. The circuit is powered by 9 vdc from a supply on the probe control and function switch

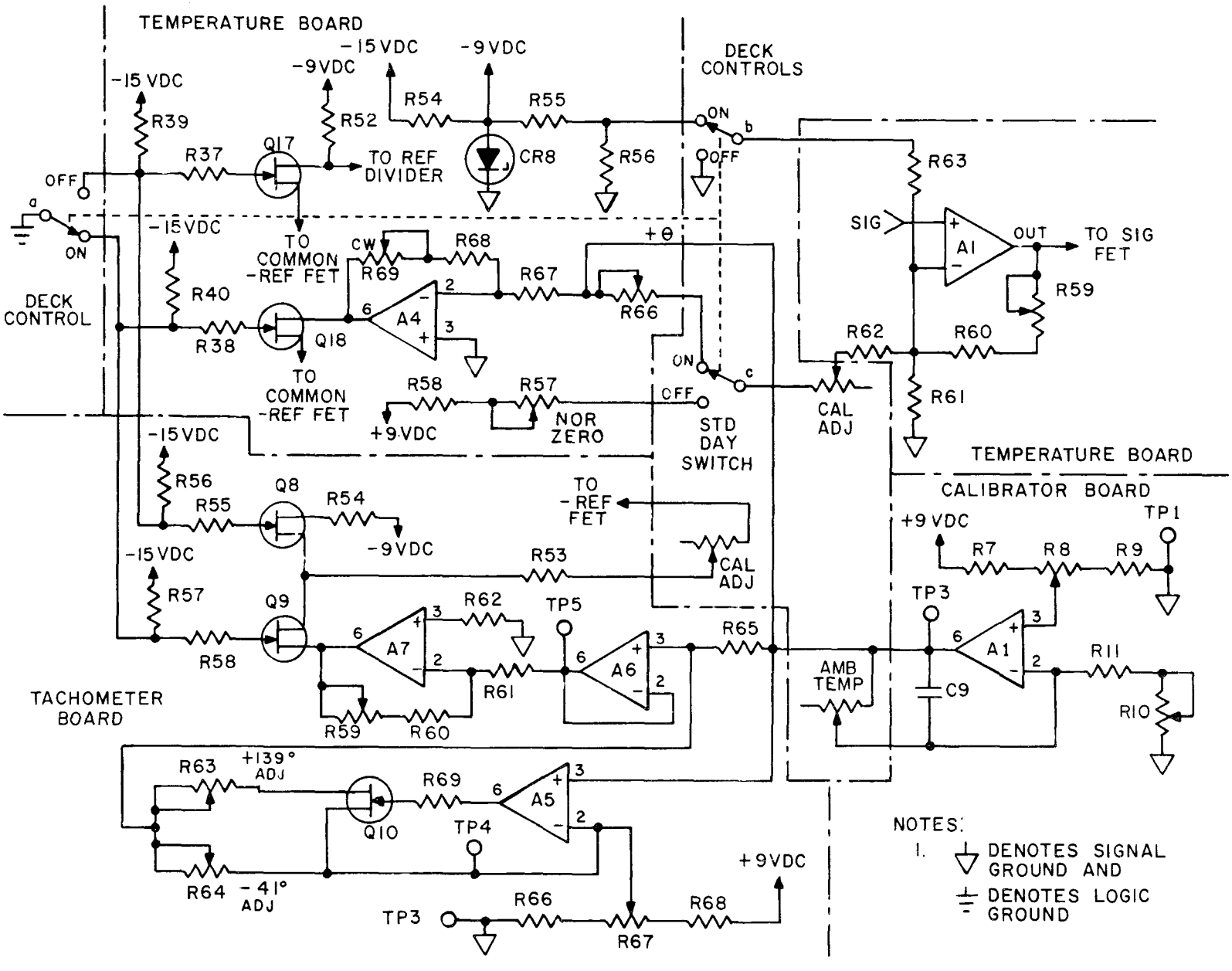


Figure 1-22. Schematic Diagram of Standard Day Correction Circuit.

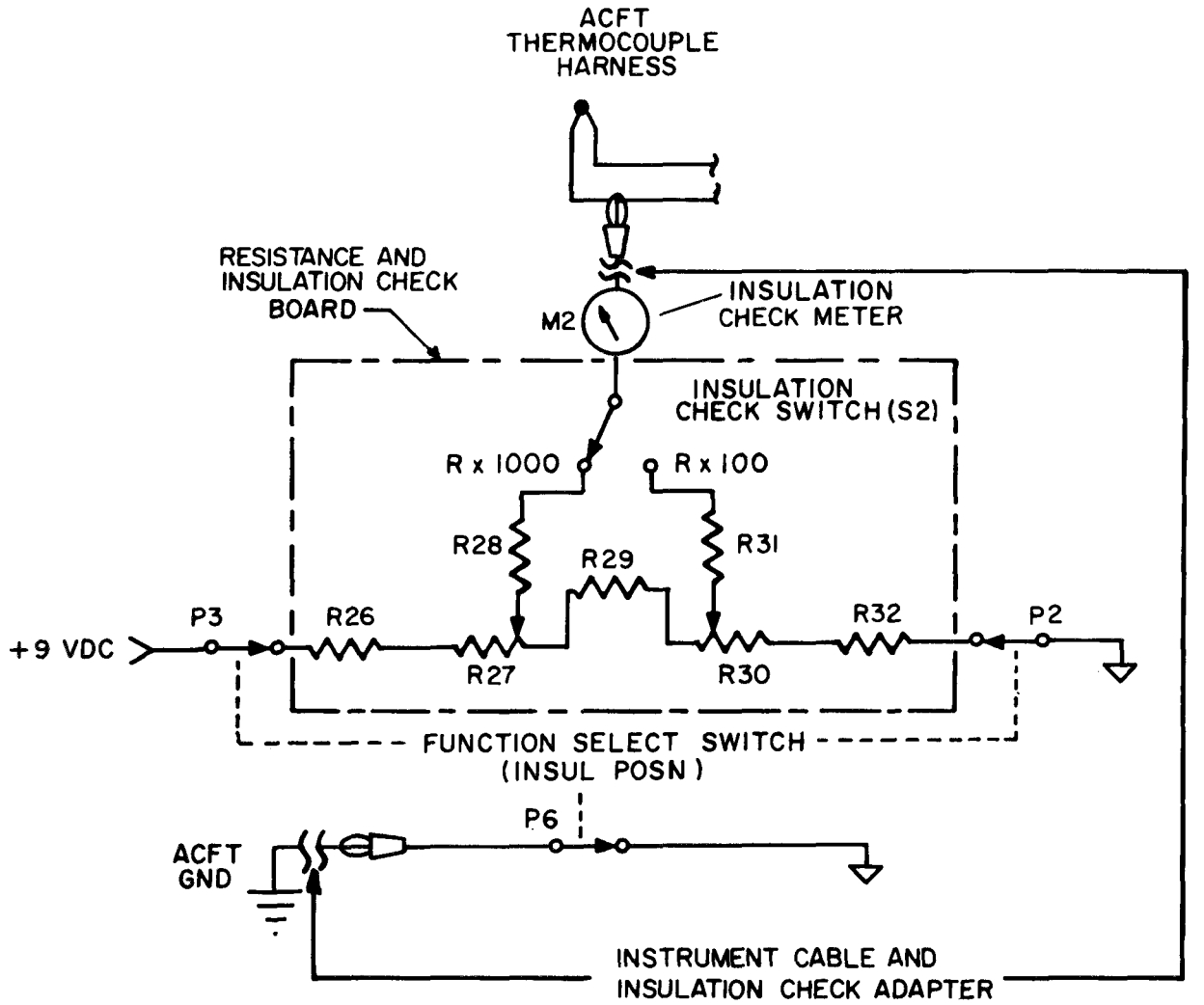


Figure 1-23. Insulation Check Circuit (Simplified Schematic)

board.

(9) Resistance Check Circuit. This circuit (fig. 1-24), located in the probe controller, is used to check and adjust the resistance of the aircraft thermocouple circuit. It consists of a Wheatstone bridge with the RESISTANCE CHECK meter serving as the galvanometers. One leg of the bridge contains a precision wirewound resistor that is selected with the RESISTANCE % A/C INDICATOR CHECK switch. The aircraft thermocouple circuit (less the indicator) is placed in the other leg of the bridge. The aircraft resistance spool is then adjusted until the galvanometer is balanced.

(10) Power Supplies and Power Distribution. Primary line voltage (115 vat. 50-400 Hz) is applied to the POWER INPUT receptacle on the probe controller. The voltage is applied through the interconnect cable and the MASTER POWER switch to the primary windings of T1 in the trimmer. There are five secondary windings on transformer T1 (fig. 1-25). All secondary windings are center-tapped. Only switch positions that switch power are shown in figure 1-25.

(a) Twenty-Eight VDC Supply. This supply consists of the circuitry of CR9, CR10, and Q10-Q12 on the switch-power board. It is referenced to the -15 vdc supply. The 28 vdc supply excites the STD DAY lamp and its control circuit. It is also switched by the FUNCTION SELECT switch to the

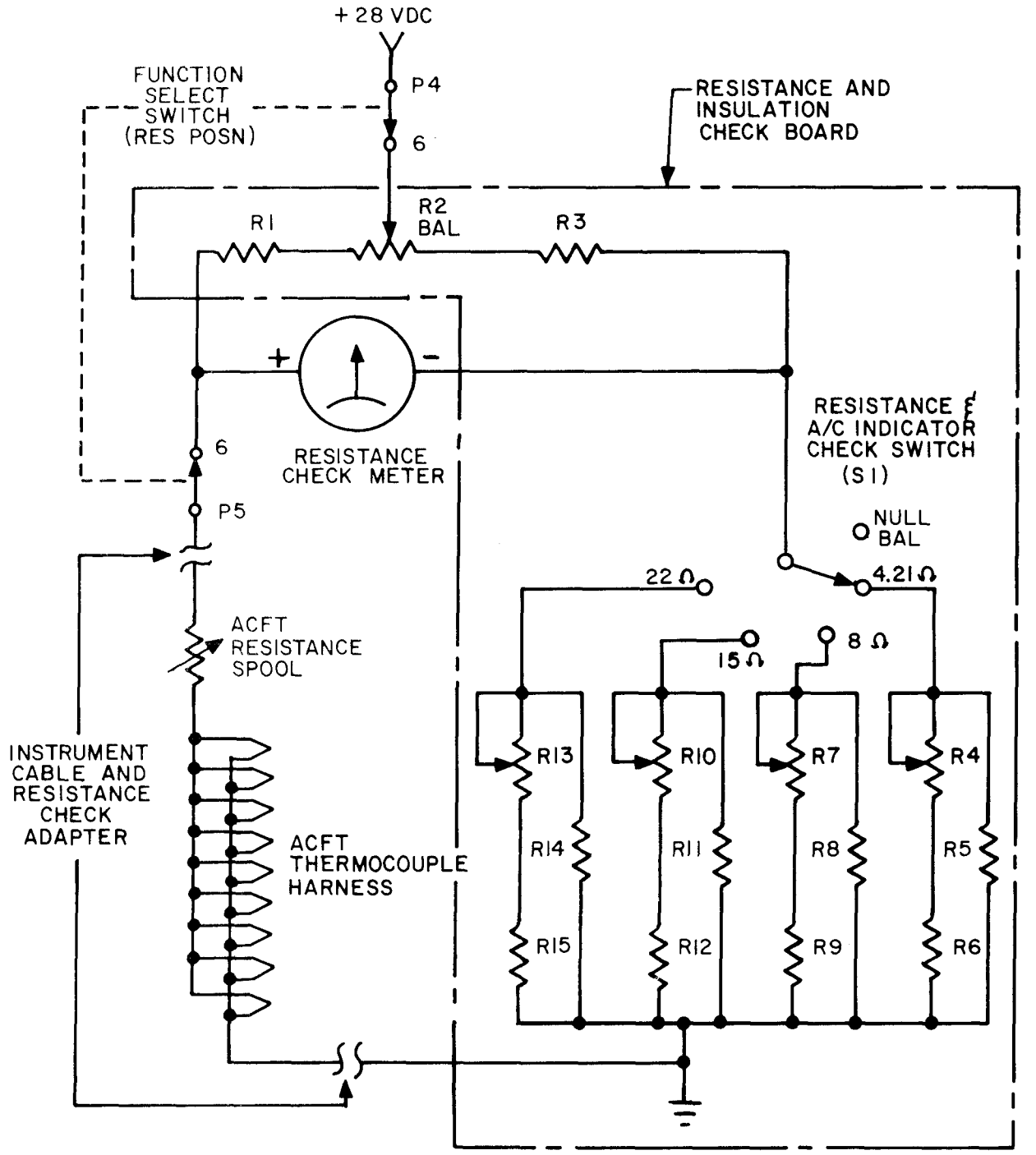


Figure 1-24. Resistance Check Circuit (Simplified Schematic).

resistance check circuit (fig. 1-24) and the heater probe power relay (fig. FO-1).

(b) Plus and Minus 15 VDC Supply. One of the 37 vac secondaries of T1 (fig. 1-25) is full-wave rectified by diodes CR5-CR8 on the switch-power board to forma positive and negative supply. The positive supply is regulated to +15 vdc by Q1, Q2, and A1 and filtered by C3. The + input of Al is referenced to 8.95 vdc generated by CR15. The negative supply is regulated to -15 vdc by Q3, Q4, and A2 and filtered by C4. The + input of A2 is referenced to ground.

(c) Display Lamp Supply. On the switch-power board diodes CR1 and CR2 full-wave rectify and C9 filters the 14 vac winding to provide a 5 vdc supply to excite the display diodes. The circuitry of A3 and the DISPLAY control convert the supply to an adjustable square wave by controlling the on-off time of series regulator Q15. At the 50% duty cycle, the square wave frequency is 800 Hz + 20%. When the DISPLAY control wiper is at the +15 vdc end the display is full on, and when the wiper is at the -15 vdc end the display is full off.

(d) Logic Voltage Supply. The 18.5 vac winding of T1 is full-wave rectified by CR3 and CR4 cm the switch-power board, filtered by C5, and regulated to +5 vdc by Q5. Q5 is controlled by a differential amplifier consisting of Q8 and Q9 and by transistors Q6 and Q7. The differential amplifier maintains its base voltages at ground potential. Assume an increase in the base voltage of Q9. Additional current from Q9 flows through R13, decreasing the bias on Q8. The bias on Q7 increases, causing the bias on Q6 to decrease. The base of Q5 becomes more positive, decreasing the current through Q5.

(e) Nine VDC Supply. This supply is located on the probe control and function switch board. It is powered by one-half of a 37 vac winding which is half-wave rectified by CR12 and filtered by C11. CR13 regulates the dc voltage to 18 vdc and CR14 regulates it to 9 vdc. The 9 vdc is switched by the FUNCTION SELECT switch to power the aircraft indicator check circuit (figs. 1-18 and 1-19), the PROBE CONTROL and probe control compensator (MOD-1, fig. FO-1), and the insulation check circuit (fig. 1-23).

(f) Plus and Minus 7 VDC Supply. This supply, on the calibrator board provides an isolated source of power to drive the % rpm calibrator circuit and the wave-shaping circuitry of A3 on the tachometer board.

(11) Logic Circuitry.

(a) Definition of Logic Levels. Standard positive logic is used. Logic 0 is a low voltage (= 0.4 vdc) and is said to be “false”. Logic 1 is a high voltage (= 2.4 vdc) and is said to be “true”. The logic circuitry excitation voltage is +5 vdc.

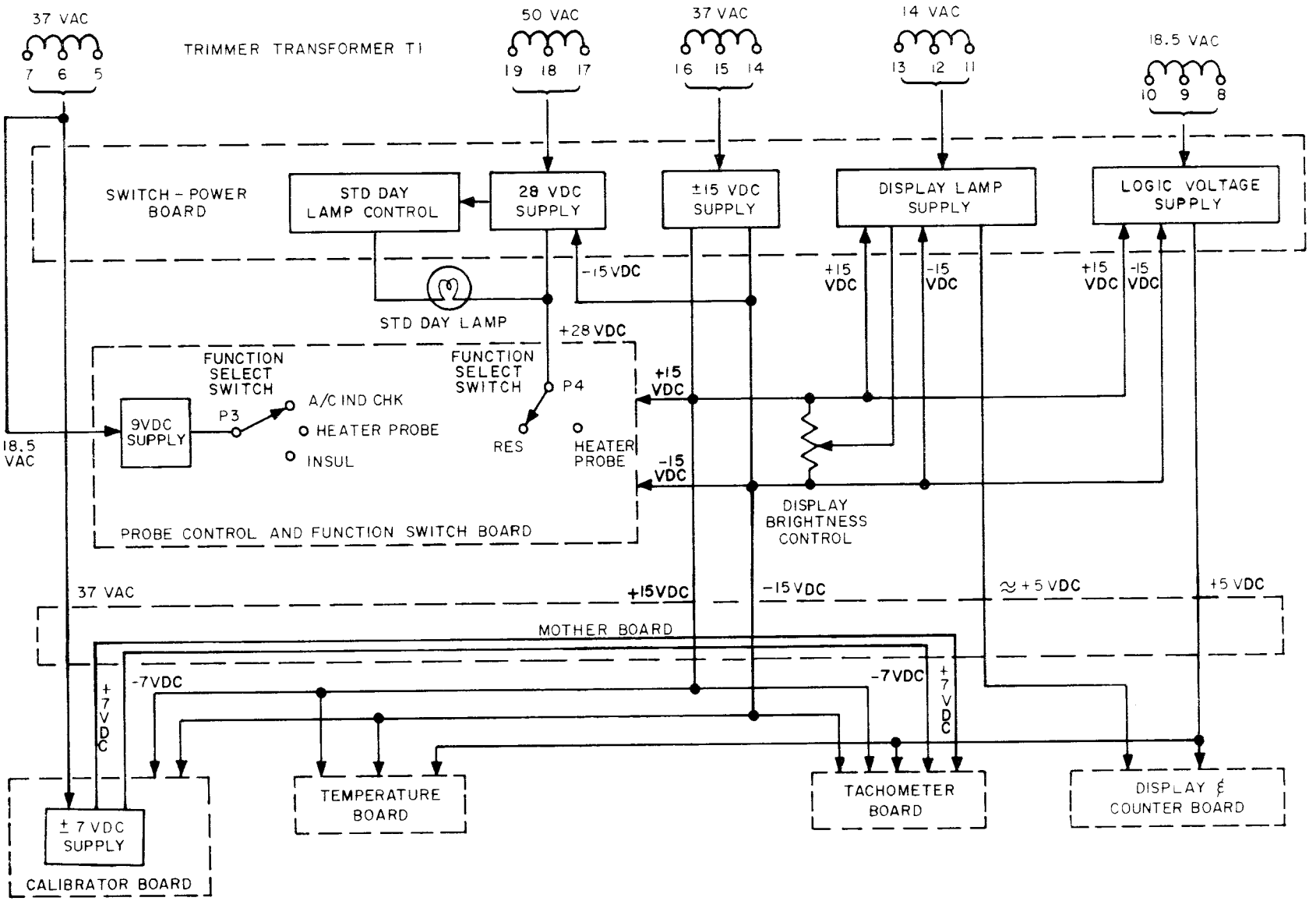


Figure 1-25. Power Flow Block Diagram.

(b) Integrated Circuit Pin Locations. Figure 1-26 shows top views and pin locations of integrated circuits.

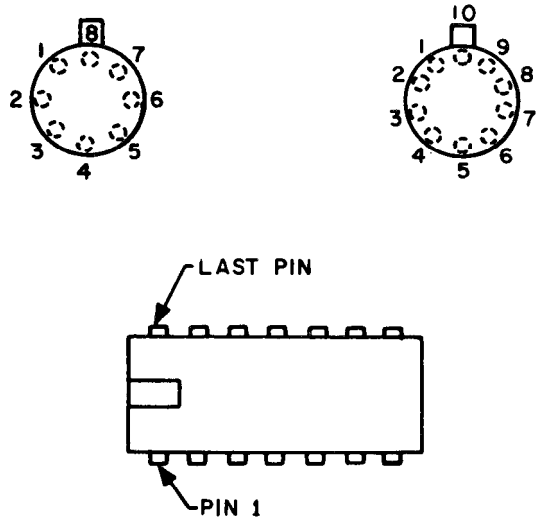


Figure 1-26. Integated Circuit Pin Locations.

(c) Definitions of Logic Circuits.

1. Quad 2- Input NOR Gate (CD4001A). If one or both inputs of a single gate (fig. 1-27) are at the 1 logic level, the output will be at the 0 logic level. If both inputs are at the 0 logic level, the output will beat the 1 level. The input and output relationships of a NOR gate are expressed in "truth" table 1-1.

2. Dual D-Type Flip-Flop (CD4013AE). Each flip-flop (fig. 1-28) has independent data, set reset, and clock inputs and Q and Q outputs. The logic level present at the D input is transferred to the Q output during the positive-going transition of the clock pulse (table 1-2). Setting or resetting is independent of the clock and is accomplished by a high level on the set or reset line, respectively.

3. Triple 3-Input NAND Gate (CD4023AE). If all inputs of a single gate (fig. 1-29) are at the 1 logic level, the output will be at the 0 level (table 1-3). If one or more inputs are at the 0 level, the output will be at the 1 level.

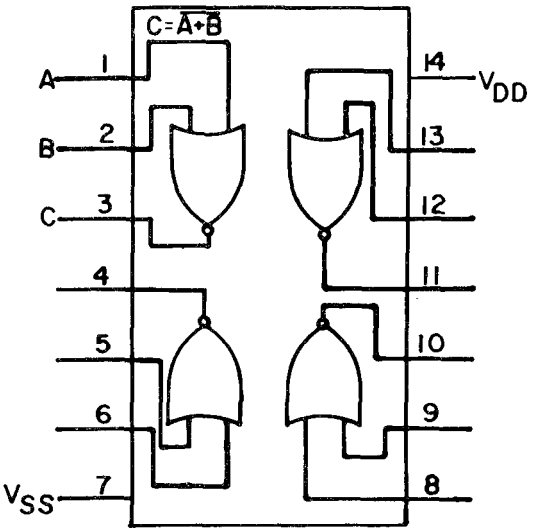


Figure 1-27. Quad 2 Input NOR Gate.

Table 1-1. NOR Gate Truth Table.

A	B	C
0	0	1
0	1	0
1	0	0
1	1	0

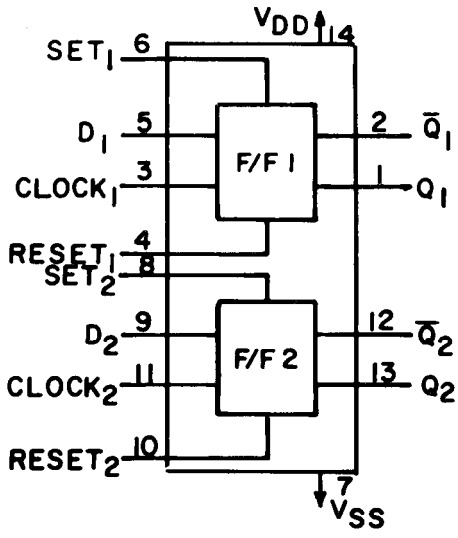


Figure 1-28. Dual D-Type Flip-Flop.

Table 1-2. Truth Table for D-Type Flip-Flop.

CL	D	R	S	Q	Q̄	
	0	0	0	0	1	
	1	0	0	1	0	
	X	0	0	Q	Q̄	- No Change
X	X	1	0	0	1	
X	X	0	1	1	0	
X	X	1	1	*	*	

X = don't care case

* = invalid condition

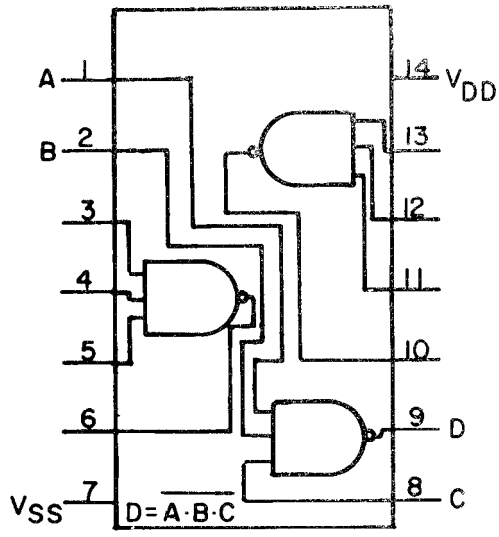


Figure 1-29. Triple 3-Input NAND Gate.

Table 1-3. Truth Table for 3-Input NAND Gate.

A	B	C	D
0	0	0	1
0	0	1	1
0	1	1	1
1	1	1	0

4. Seven-Stage Binary Counter (CD4024AE). This counter consists of an input pulse shaping circuit, reset line driver circuitry, and seven binary counter stages (fig. 1-30). The counter is reset to "zero" by a high level on the reset input. Each counter stage is a static master-slave flip-flop. The counter state is advanced one count on the negative-going transition of each input pulse.

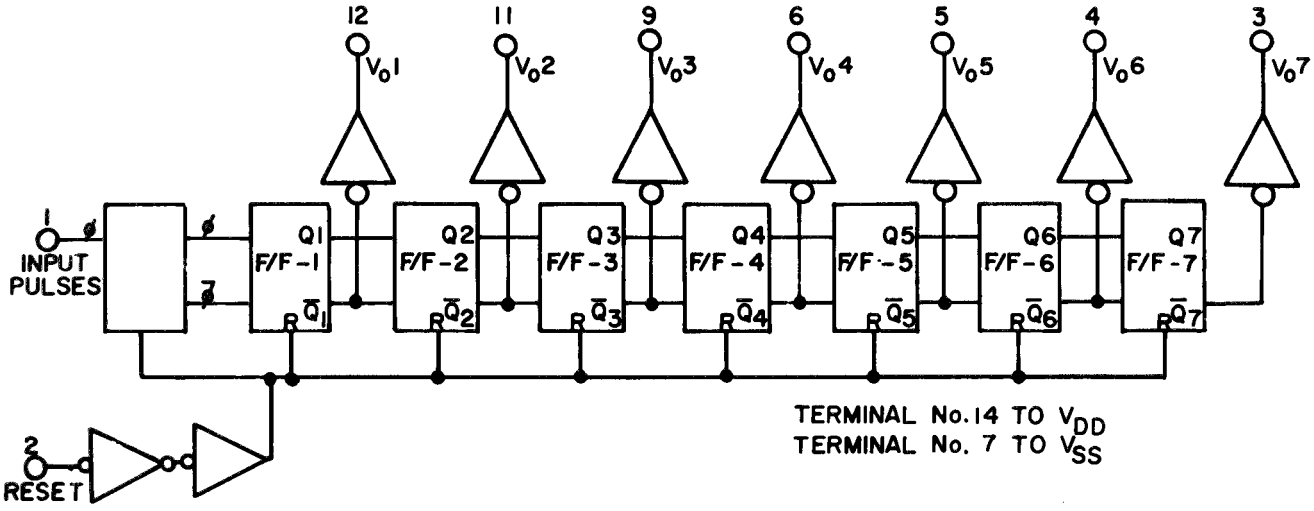


Figure 1-30. Functional Diagram of 7-Stage Binary Counter.

5. Seven-Segment LED Display (5082-7650). This is a large (0.43") red, common anode, seven-segment display with left-hand decimal point. Figure. 1-31 shows the schematic and the connection to drive circuitry. Table 1-4 lists pin functions.

6. Counter-Latch-Decoder (MC4350L). This device (fig. 1-32) combines the functions of an NBCD counter, four-bit latch, and a seven-segment decoder/driver. The counter advances on input. The serial output is high driving the ninth count, allowing synchronous or asynchronous counter operation when used in conjunction with the enable input and some external gating. The counter reset places the counter in a non-NBCD state, turning off the output driver transistors when transferred through the latch and decoded. This feature gives automatic suppression of leading zeros in the display. The latch section admits information while the strobe is high and latches the data on the negative edge of the strobe. A lamp blanking input is provided for intensity modulation, A lamp test feature is also available. Circuit operation is summarized in table 1-5.

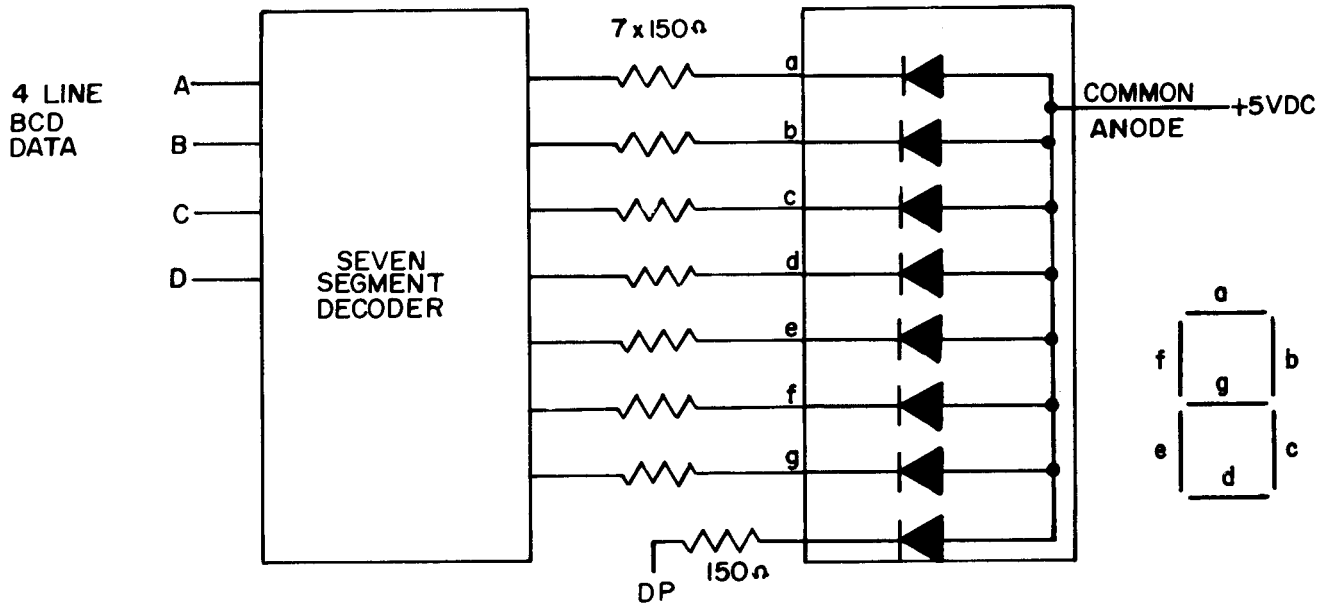


Figure 1-31. Seven-Segment LED Display.

Table 1-4. LED Display Pin Functions

PIN	FUNCTION
1	CATHODE - a
2	CATHODE - f
3	ANODE*
4	NO PIN
5	NO PIN
6	CATHODE - dp
7	CATHODE - e
8	CATHODE - d
9	NO CONN
10	CATHODE - c
11	CATHODE - g
12	NO PIN
13	CATHODE - b
14	ANODE*

* Redundant anodes.

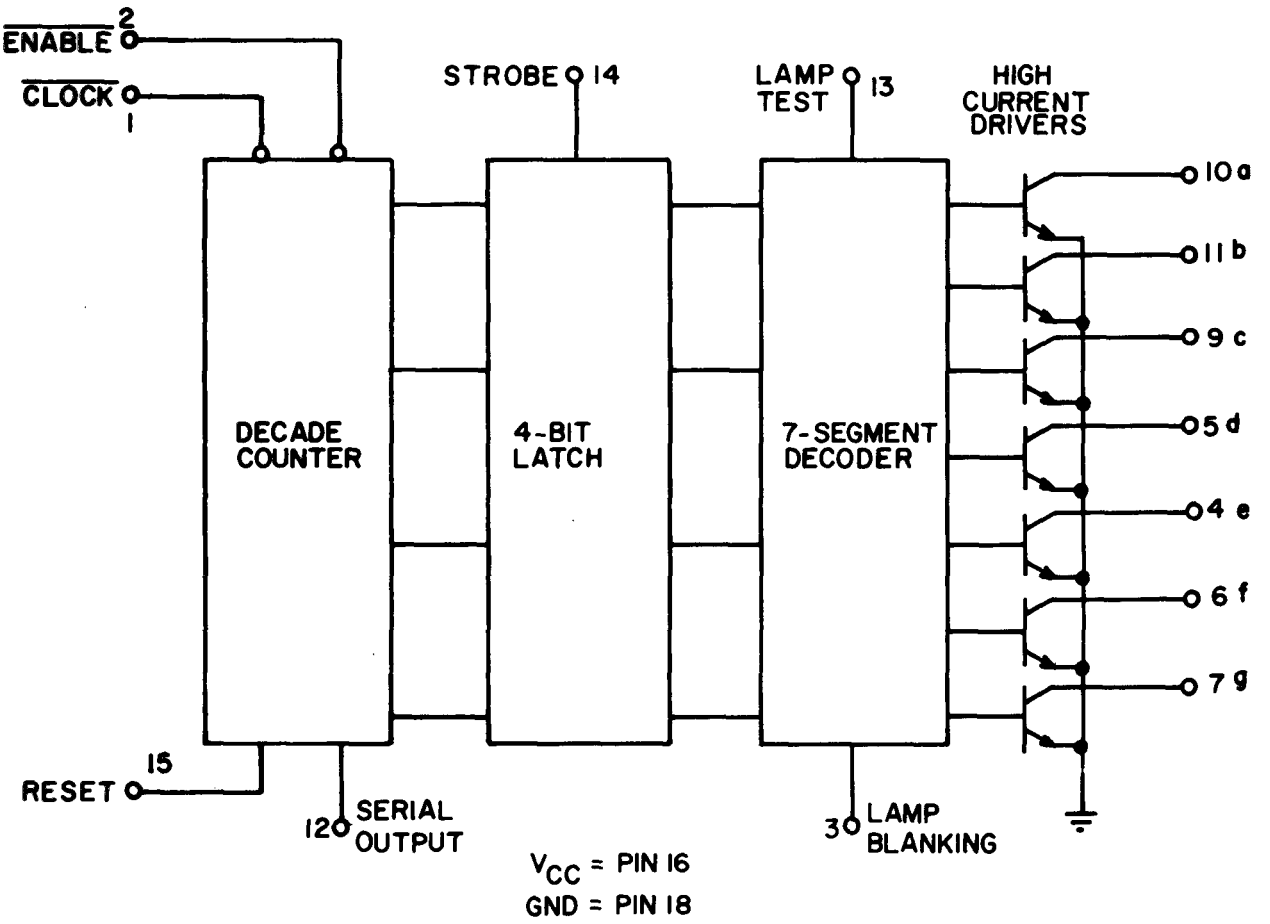


Figure 1-32. Counter-Latch-Decoder.

Table 1-5. Counter-Latch-Decoder Functional Truth Table

Function		Input						Output							
		$\overline{C}$	$\overline{E}$	R	S	LT	LB	S_{out}	a	b	c	d	e	f	g
Lamp Test		X	X	X	X	1	X	--	0	0	0	0	0	0	0
Lamp Blanking		X	X	X	X	0	1	--	1	1	1	1	1	1	1
Reset		X	X	1	1	0	0	0	1	1	1	1	1	1	1
Enable		P	1	0	1	0	0	0	1	1	1	1	1	1	1
State Sequence	1	P1	0	0	1	0	0	0	1	0	0	1	1	1	1
	2	P2	0	0	1	0	0	0	0	0	1	0	0	1	0
	3	P3	0	0	1	0	0	0	0	0	0	0	1	1	0
	4	P4	0	0	1	0	0	0	1	0	0	1	1	0	0
	5	P5	0	0	1	0	0	0	0	1	0	0	1	0	0
	6	P6	0	0	1	0	0	0	0	1	0	0	0	0	0
	7	P7	0	0	1	0	0	0	0	0	0	1	1	1	1
	8	P8	0	0	1	0	0	0	0	0	0	0	0	0	0
	9	P9	0	0	1	0	0	1	0	0	0	0	1	0	0
	0	P10	0	0	1	0	0	0	0	0	0	0	0	0	1
	1	P11	0	0	1	0	0	0	1	0	0	1	1	1	1
	Latch	P	0	0	0	0	0	0	1	0	0	1	1	1	1

P = any number of pulses may be applied.

P = n pulses on the clock input

X = don't care

7. Quadruple 2-Input NAND Gate (SN5400). Gate pins are identified in figure 1-33 and the operation of a single gate is summarized in Table 1-6.

Table 1-6. Truth Table of 2- Input NAND Gate

A	B	Y
1	1	0
0	1	1
1	0	1
0	0	1

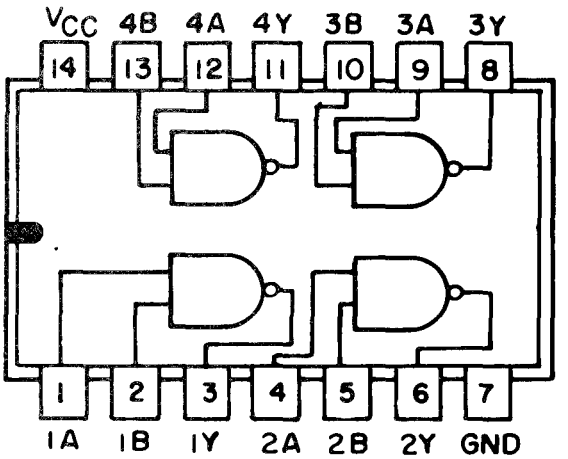


Figure 1-33. Quadruple 2-Input NAND Gate.

8. Quad 2-Input NOR Gate (SN5402). If one or both inputs of a single gate (fig. 1-34) are at the 1 level, the output is at the 0 level. If both inputs are at the 0 level, the output is at the 1 level. Input and output relationships are summarized in Table 1-7.

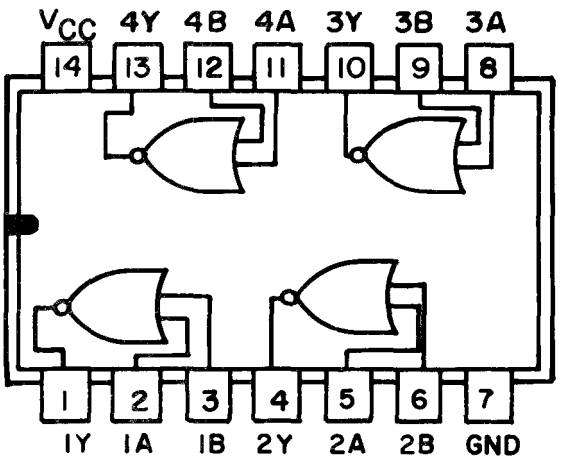


Figure 1-34. Quad 2-Input NOR Gate.

Table 1-7. NOR Gate Truth Table

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

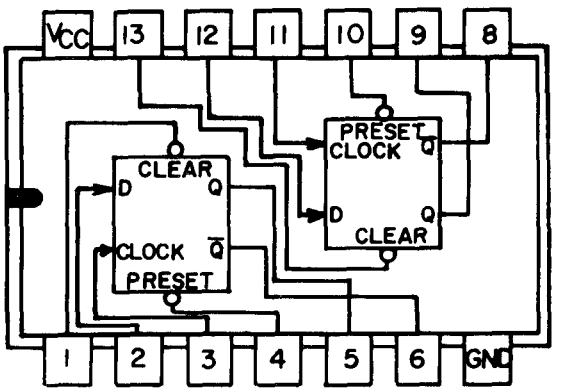


Figure 1-35. Dual D-Type Edge-Triggered Flip-Flop.

9. Dual D-Type Edge-Triggered Flip-Flop (SN5474). This flip-flop (fig. 1-35) has direct clear and preset inputs and complementary Q and Q outputs. Input information is transferred to the outputs on the positive edge of the clock pulse. Clock triggering occurs at a voltage level of the clock pulse and is not directly related to the transition time of the positive-going pulse. A low input to clear sets Q to logic 0. A low input to preset sets Q to logic 1. Clear and preset inputs dominate regardless of clock and D inputs. Table 1-8 summarizes the input-output relationships.

10. Dual J-K Master-Slave Flip-Flop with Preset and Clear (SN5476). The J-K flip-flop (fig. 1-36) is based on the master-slave principle. Inputs to the master section are controlled by the clock pulse (fig. 1-37). The clock pulse also regulates the state of the coupling transistors which connect the master and slave sections. The sequence of operation is as follows:

1. Isolate slave from master.

2. Enter information from J and K inputs to master.

3. Disable J and K inputs.

4. Transfer information from master to slave.

Clear and preset are independent of the clock. A low input to preset sets Q to logic 1. A low input to clear sets Q to-logic 0. Input-output relationships of each flip-flop are summarized in table 1-9.

Table 1-8. Truth Table for D-Type Flip-Flop.

Before Clock Pulse	After clock Pulse	
INPUT D	OUTPUT Q	OUTPUT Q
0	0	1
1	1	0

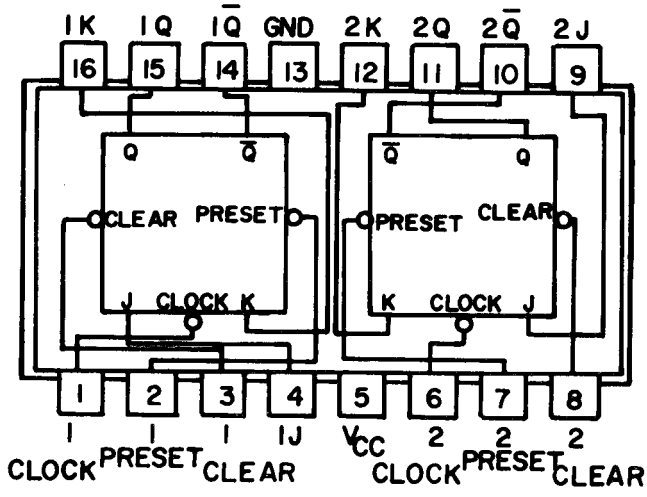


Figure 1-36. Dual J-K Master-Slave Flip-Flop.

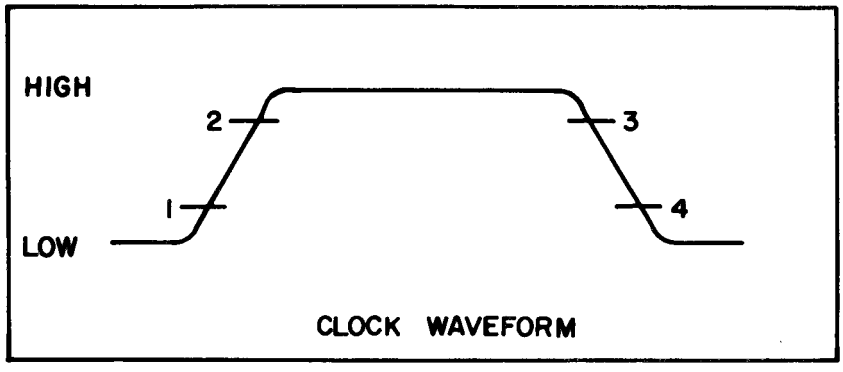


Figure 1-37. Clock Waveform to Master-Slave Flip-Flop.

Table 1-9. J-K Flip-Flop Truth Table.

Before Clock Pulse		After Clock Pulse
J	K	Q
0	0	Qn*
0	1	0
1	0	1
1	1	Qn*

* Qn means Q remains at the level it was before the clock pulse. Qn means Q changes to the level opposite the level before the clock pulse.

11. Decade Counter (SN5490). When output QA (fig. 1-38) is connected to input BD, the circuit provides a BCD output as shown in table 1-10. The counter is clocked by logic 0 pulses at terminal 14 and cleared to zero by logic 1 applied to terminals 2 and 3.

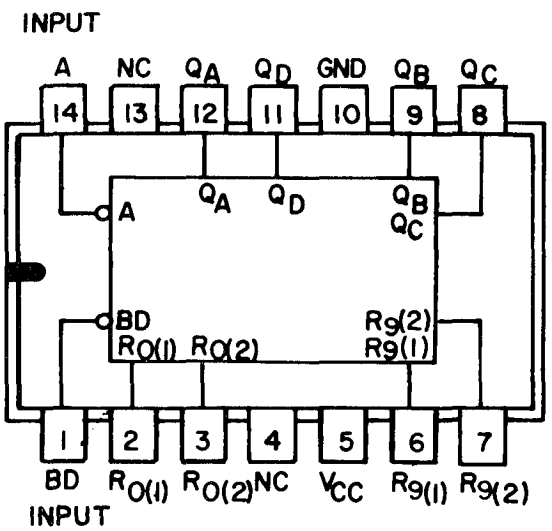


Figure 1-38. Decade Counter.

Table 1-10. Decade Counter Truth Table.

Count	Output			
	QD	QC	QB	QA
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1

12. Resistor Network (889-3-R150). This circuit (fig. 1-39) contains seven 150-ohm ± 2%, 0.25w resistors.

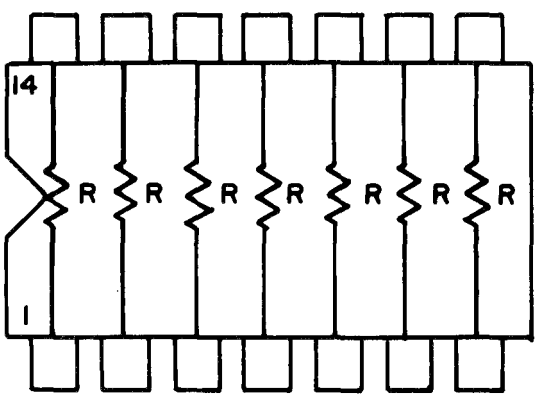


Figure 1-39. Resistor Network Schematic.

1-5. Leading Particulars. Leading particulars of the tester are listed in table 1-11. Indicators and controls are shown in figure 1-40 and their functions are described in table 1-12. Tester accessories, some or all of which may be used on a particular aircraft, are pictured in figure 1-41 and described in table 1-13. Basic accessories required for most aircraft are identified by manufacturer's part number and national stock number in table 1-14.

Table 1-11. Leading Particulars.

Temperature Measurements	
Signal Source:	Chromel-alumel (type K) thermocouple
Readout Range:	0 to 1399° C
Readout Increments:	1° C
Readout Accuracy:	± 2° C
% RPM Measurements	
Signal Source:	Standard two-pole tachometer generator
Readout Range:	0 to 119.9% rpm
Readout Increments:	0.1% rpm
Readout Accuracy:	± 0.1% rpm
Standard Day Measurements	
Ambient Temperature Range:	-41 to 139° F
Temperature Accuracy:	± 4°C
% RPM Accuracy:	± 0.5% rpm
Calibration Signal Range:	Ambient to 1399° C
Tests Temperature Indicator Types:	4.21, 8, 15, and 22 ohms and null balance
Resistance Check Circuit Ranges:	4.21, 8, 15, and 22 ohms (all have ± 0.05 ohm tolerance)
Ambient Operating Temperature Range:	-40 to 75° C
Power:	115 vat, 50-400 Hz, single phase, 3100 va maximum
Size (less handle):	22.5 in. long, 21 in. wide, 23.5 in. high
Weight:	96 lbs (less accessories)

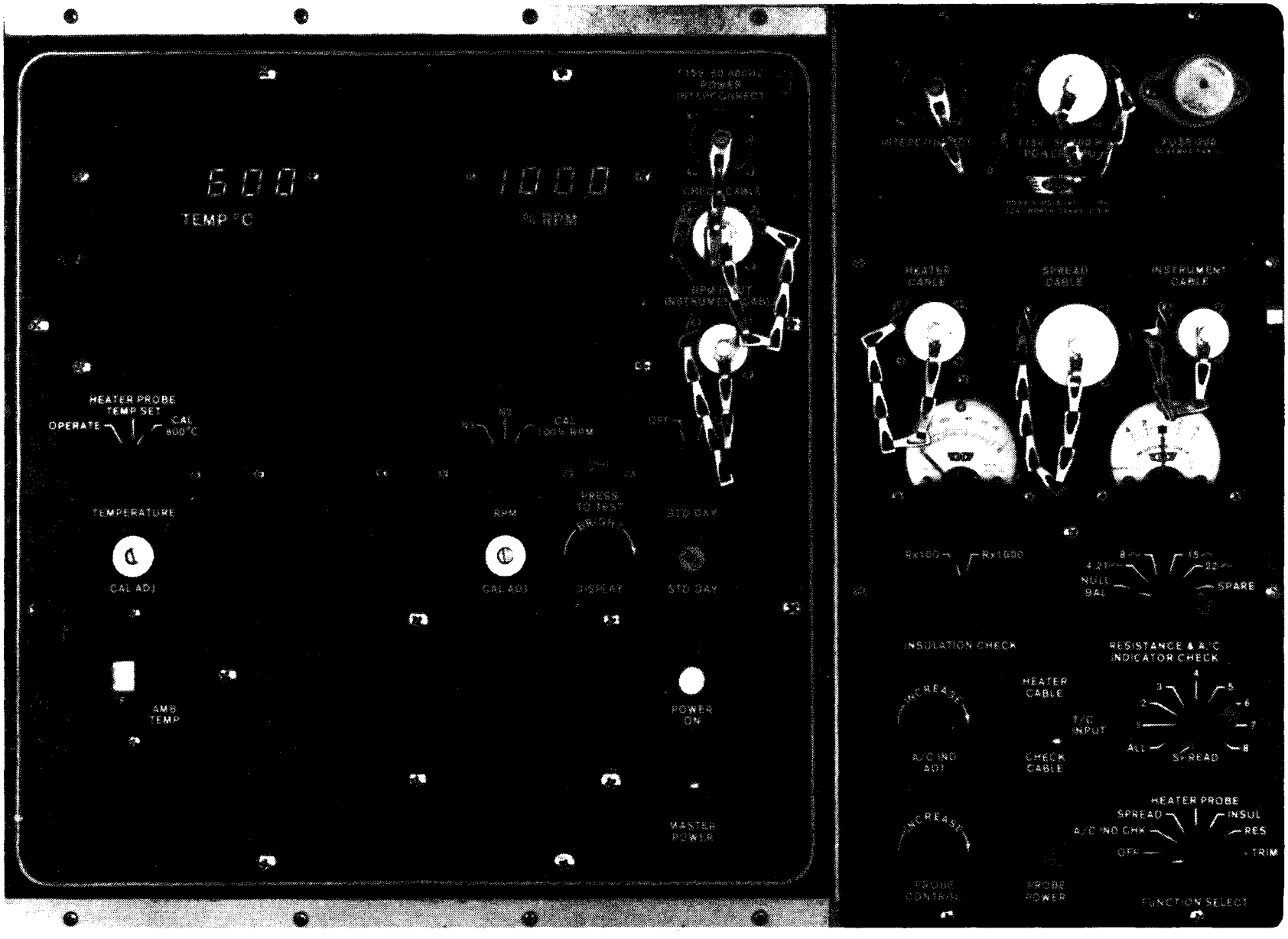


Figure 1-40. Tester Indicators and Controls.

Table 1-12. Indicator and Control Functions.

Indicator or Control	Function
A/C IND ADJ (INCREASE) potentiometer	Adjusts test signal for aircraft temperature indicator.
AMB TEMP potentiometer	Controls equivalent ambient temperature electrical signal for standard day correction circuit.
CAL ADJ potentiometer	Calibrates related indicator to internal calibration signal.
DISPLAY (BRIGHT)	Adjusts brightness of indicator displays.
FUNCTION SELECT switch	A seven-position switch that selects the circuit of the function being performed by the tester.
INSULATION CHECK meter	Indicates insulation resistance of engine temperature circuit during insulation resistance check.
INSULATION CHECK switch	Selects range of INSULATION CHECK meter.
MASTER POWER switch	Applies and removes power from tester,
POWER TO TEST switch	Tests all indicator displays.
PROBE CONTROL potentiometer	Adjusts the test temperature of the temperature probe.
PROBE POWER lamp	Glows while probes are heating, turns off during probe control overshoot, then blinks rapidly when test temperature is reached.
RESISTANCE & A/C INDICATOR CHECK switch	Places proper resistance in bridge circuit when checking resistance of engine thermocouple harness or checking aircraft indicator.
RESISTANCE CHECK meter	Indicates resistance error of aircraft temperature circuit.
% RPM indicator	Indicates N1 and N2 % rpm.
RPM switch	Selects N1 or N2 rpm. Calibration of % RPM indicator is displayed when switch is in CAL 100% RPM position.
SPREAD switch	With FUNCTION SELECT switch in SPREAD position, individual thermocouple signals applied to SPREAD CABLE receptacle can be read on TEMP° C indicator. In ALL position average of all thermocouple signals is displayed.

Table 1-12. Indicator and Control Functions (Continued).

Indicator or Control	Function
STD DAY lamp	Flashes when controls are not in correct position to make standard day corrections and glows steadily when positions are correct.
STD DAY switch	In ON position, rpm and temperature readings are automatically corrected to standard day conditions.
TEMP °C indicator	Indicates aircraft indicator test signal, spread thermocouple outputs, average output of egt thermocouples, heater probe temperature set signal, and heater probe temperature.
TEMPERATURE switch	The OPERATE position in conjunction with other controls selects the signal (heater probe output, aircraft thermocouple output, or aircraft indicator test) to be displayed by TEMP °C indicator. Heater probe set temperatures of internal calibration signal are displayed when this switch is in HEATER PROBE TEMP SET or CAL 600 °C position respectively.
T/C INPUT switch	Connects output of either heater probe thermocouples (in HEATER CABLE position) or engine thermocouples (CHECK CABLE position) to TEMP °C indicator.

Table 1-13. Accessory Functions.

Index Number (Figure 4-	Accessory	Function
1	Switch Box	During trim, permits thermocouple signal to be monitored on cockpit indicator or on tester. Used only with D'Arsonval indicators.
2	Junction Box	Connects to heater cable and probes. Power distribution box for probes. Also combines signals from probe thermocouples to obtain average thermocouple signal.
3	Heater Cable	Connects to junction box. Supplies power from tester to heat probes. Also carries probe thermocouple signal to tester.
4	Check Cable	Connects engine thermocouple signal to tester.
5	Instrument Cable	Connects tester to a variety of adapters including resistance check adapter, insulation check adapter, indicator check adapter, RPM adapter, and RPM indicator adapter.
6	Extension Handle	Where thermocouples are relatively inaccessible, extension handle holds probes and allows them to be properly positioned.
7	Power Cable	Supplies power to tester.
8	RPM Check Adapter	During trim, supplies tach generator output to tester through instrument cable and to cockpit RPM indicator, simultaneously. Connects at tach indicator.
9	Insulation Check Adapter	Connects through instrument cable to tester. Checks insulation resistance of complete aircraft thermocouple system.
10	EGT Indicator Check Adapter	Connects through instrument cable to tester. Provides calibrated signal to check cockpit indicator.
11	Resistance Check Adapter	Connects through instrument cable to tester. Checks resistance of complete aircraft thermocouple system.
12	Heater Probes	Heat aircraft thermocouples. Probes include their own thermocouples which permit their temperatures to be indicated on the tester. Probes must be matched to engine thermocouples. Connect to junction box.
13, 14	Check Cable Adapter	Adapts check cable to engine harness junction connector.

Table 1-14. *Basic Accessories Required for Most Aircraft.*

BASIC ACCESSORIES INCLUDED WITH BH112JB-53	BASIC ACCESSORIES INCLUDED WITH BH112JB-79	P/N	ITEM
QTY			
1		BH123-3	Switch Box 5930-00-338-2591
1		BH361-8	Junction Box 4920-00-329-8294
	1	BH361-12	Junction Box 4920-00-524-8644
1	1	BH405	Heater Cable 4920-00-503-1889
1	1	BH450	Check Cable 4920-00-503-1890
1	1	BH485	Instrument Cable 4920-00-548-7118
1		BH492B-3	Extension Handle 4920-00-612-9496
1	1	BH499A	Power Cable 4920-00-941-6503
1		BH820	RPM Indicator Adapter 4920-00-204-6457
1		BH821	Insulation Check Adapter 4920-00-549-6093
1		BH823	Resistance Check Adapter 4920-00-504-3192
3		BH996-40	Heater Probes 4920-00-670-9379
1		BH1504	Check Cable Adapter 4920-00-670-9410
1		BH4548	Check Cable Adapter 4920-00-953-2370
1	1	BH15184A	Interconnect Cable 4920-01-019-1628
1	1	BH15185A	Power Cable Adapter 4920-01-020-5328

Table 1-14. ***Basic Accessories Required for most Aircraft (cont)***

AH-1S WITH T53-L-703-ENGINE

ACCESSORIES REQUIRED WITH BH112JB-53

ACCESSORIES REQUIRED WITH BH112JB-79

QTY		P/N	ITEM
*1	1	BH361-12	Junction Box 4920-00-524-8644
1	1	BH405	Heater Cable 4920-00-503-1889
1	1	BH450	Check Cable 4920-00-503-1890
1	1	BH485	Instrument Cable 4920-00-548-7118
1	1	BH499A	Power Cable 4920-00-941-6503
1	*1	BH22279	Insulation Check Adapter 4920-00-549-6093
*1	*1	BH907	RPM Check Adapter (tach gen) 4920-00-715-4661
1	*1	BH14167	Check Cable Adapter 4920-00-670-9410
*1	*1	BH22196	RPM Check Adapter (tach ind) 4920-01-115-3654
*2	*2	BH7454AH-40	Heater Probes (bench check)
*2	*2	BH7454BH-40	Heater Probes (bench check)
*1	*1	BH16492	Temp Indicator Check Adapter
*1	*1	BH16491	Temp Adapter, Engine Run
1	1	BH15184A	Interconnect Cable 4920-01-019-1628
1	1	BH15185A	Power Cable Adapter 4920-01-020-5328

*These accessories are not included with basic tester.

Table 1-14. Basic Accessories Required for most Aircraft (cont)

OH-58A WITH T63A-700 ENGINE

ACCESSORIES REQUIRED WITH BH112JB-53

ACCESSORIES REQUIRED WITH BH112JB-79

QTY		P/N	ITEM
1	*1	BH123-3	Switch Box 5930-00-338-2591
1	*1	BH361-8	Junction Box 4920-00-329-8294
OR	OR	NOTE: Either Junction Box can be used	
*1	1	BH361-12	Junction Box 4920-00-524-8644
1	1	BH405	Heater Cable 4920-00-503-1889
1	1	BH450	Cheek Cable 4920-00-503-1890
1	1	BH485	Instrument Cable 4920-00-548-7118
1	1	BH499A	Power Cable 4920-00-941-6503
1	*1	BH820	RPM Check Adapter (tach ind) 4920-00-204-6457
1	*1	BH821	Insulation Check Adapter 4920-00-549-6093
1	*1	BH822	Temp Indicator Check Adapter 4920-00-539-9260
1	*1	BH823	Resistance Check Adapter 4920-00-504-3192
*1	*1	BH7424	Check Cable Adapter 4920-00-354-7956
*4	*4	BH7413-40	Heater Probes (bench check)
1	1	BH15184A	Interconnect Cable 4920-01-019-1628
1	1	BH15185A	Power Cable Adapter 4920-01-020-5328

*These accessories are not included with basic tester.

Table 1-14. *Basic Accessories Required for most Aircraft (cont)*

OH-58C WITH T63A-720 ENGINE

ACCESSORIES REQUIRED WITH BH112JB-53	ACCESSORIES REQUIRED WITH BH112JB-79	P/N	ITEM
QTY			
1	*1	BH361-8	Junction Box 4920-00-329-8294
OR	OR	NOTE: Either Junction Box can be used	
*1	1	BH361-12	Junction Box 4920-00-524-8644
1	1	BH405	Heater Cable 4920-00-503-1889
1	1	BH450	Check Cable 4920-00-503-1890
1	1	BH485	Instrument Cable 4920-00-548-7118
1	1	BH499A	Power Cable 4920-00-941-6503
1	*1	BH23318-19	RPM Check Adapter (tach ind)
1	*1	BH22278	Insulation Check Adapter
*1	*1	BH7424	Check Cable Adapter 4920-00-354-7956
*4	*4	BH7413-40	Heater Probes (bench check)
*1	*1	BH22167	Temp Indicator Check Adapter 5975-01-102-8759
*1	*1	BH22168	Temp Adapter, Engine Run 5975-01-102-8758
1	1	BH15184A	Interconnect Cable 4920-01-019-1628
1	1	BH15185A	Power Cable Adapter 4920-01-020-5328

*These accessories are not included with basic tester.

Table 1-14. *Basic Accessories Required for most Aircraft (cont)*

U-21 AND RU-21 WITH T74 OR PT6 ENGINES

ACCESSORIES REQUIRED WITH BH112JB-53 QTY	ACCESSORIES REQUIRED WITH BH112JB-79	P/N	ITEM
1	1	BH123-3	Switch Box 5930-00-338-2591
1	1	BH405	Heater Cable 4920-00-503-1889
1	1	BH450	Check Cable 4920-00-503-1890
1	1	BH485	Instrument Cable 4920-00-548-7118
1	1	BH499A	Power Cable 4920-00-941-6503
*2	*2	BH820A	RPM Check Adapters (tach ind)
1	*1	BH821	Insulation Check Adapter 4920-00-549-6093
1	*1	BH822	Temp Indicator Check Adapter 4920-00-539-9260
1	*1	BH823	Resistance Check Adapter 4920-00-504-3192
*2	*2	BH907	RPM Check Adapter (tach gen) 4920-00-715-4661
*1	*1	BH7424	Check Cable Adapter 4920-00-354-7956
*1	*1	BH14101-40	Heater Probe 6685-00-345-0508
*1	*1	BH14102-40	Continuity Heater Probe 6685-00-345-0507
*1	*1	BH15572	RPM “Y” Adapter
1	1	BH15184A	Interconnect Cable 4920-01-019-1628
1	1	BH15185A	Power Cable Adapter 4920-01-020-5328

*These accessories are not included with basic tester.

Table 1-14. Basic Accessories Required for most Aircraft (cont)

UH-1H WITH T53-L-13 ENGINE

QTY (ACCESSORIES REQUIRED WITH BH112JB-53)	QTY (ACCESSORIES REQUIRED WITH BH112JB-79)		
1	1	BH123-3	Switch Box 5930-00-338-2591
1	1	BH361-8	Junction Box 4920-00-329-8294
1	1	BH405	Heater Cable 4920-00-503-1889
1	1	BH450	Check Cable 4920-00-503-1890
1	1	BH485	Instrument Cable 4920-00-548-7118
1	1	BH499A	Power Cable 4920-00-941-6503
1	*1	BH820	RPM Check Adapter (tach ind) 4920-00-204-6457
1	*1	BH821	Insulation Check Adapter 4920-00-549-6093
1	*1	BH822	Temp Indicator Check Adapter 4920-00-539-9260
1	*1	BH823	Resistance Check Adapter 4920-00-504-3192
*1	*1	BH907	RPM Check Adapter (tach gen) 4920-00-715-4661
1	*1	BH1504	Check Cable Adapter 4920-00-670-9410
*1	*1	BH3810-40	Continuity Heater Probe 4920-00-861-0736
*1	*1	BH4352	Check Cable Adapter 4920-00-714-1317
*3	*3	BH7434L-40	Heater Probes 6685-00-235-4594
*3	*3	BH7434R-40	Heater Probes 6685-00-235-4593
1	1	BH15184A	Interconnect Cable 4920-01-019-1628
1	1	BH15185A	Power Cabel Adapter 4920-01-020-5328

*These accessories are not included with basic tester.

Section III. TEST EQUIPMENT, SPECIAL TOOLS AND MATERIALS

1-6 Special tools and Test Equipment List.

Table 1-15 lists special tools and test equipment and application figures when applicable.

Table 1-15. *Special tools and Test Equipment.*

Figure	Nomenclature	Part Number or Equivalent
1-42	probe controller support	
4-1	ice-bath cold junction	Howell Instruments BH14106
-	power interconnect cable	Howell Instruments BH15184A-1
-	extender board assembly	Howell Instruments BH15824-1
-	precision 4.21 resistor	Howell Instruments BH2434
-	precision 8 resistor	Howell Instruments BH2435
-	precision 22 resistor	Howell Instruments BH2436
-	precision 15 resistor	Howell Instruments H3492
	oscilloscope	Hewlett-Packard Co. 130C
4-2	low frequency function generator	Hewlett-Packard Co. 202A
	volt-ohm-microammeter	Simpson Electric Co. 269
	digital multimeter	Data Technology Corporation 370
4-2	frequency counter	Hewlett-Packard Company 522B
4-1,4-30	millivolt potentiometer	Leeds & Northrup Company 8686

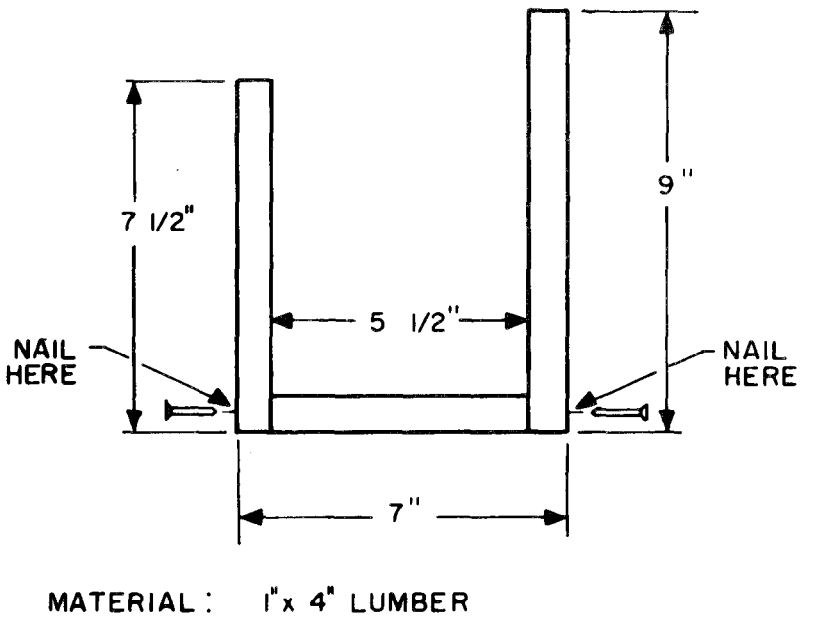


Figure 1-41. Probe Controller Support.

1-7. Consumable Materials List. Table 1-16 lists all consumable materials required to maintain the tester.

Table 1-16. Consumable Materials.

Item No.	Nomenclature	Military Specification	Item Part No. and FSCM
1	dessicant	MIL-D-3464	-
2	dry cleaning	P-D-680	-
3	grease	MIL-G-3027BA	Beacon 325 (29700)
4	alcohol, isopropyl	TT-I-735 (± 10% water)	-
5	adhesive	-	Pliobond 30 (86839)
6	RTV sealant	-	3140 (71984)
7	60/40 tin-lead solder	QQ-S-57 composition Sn 60)	-
8	flux	-	Eutector flux 157 (72271)
9	heat sink compound	-	DC340 (71984)

CHAPTER 2

OPERATING INSTRUCTIONS

2-1. Indicators, Controls, and Accessories. Tester indicators and controls are shown in figure 1-40 and listed with their functions in table 1-12. Tester accessories are shown in figure 4-30 and listed with their functions in table 1-13. Table 1-14 lists those accessories common to most aircraft.

2-2. Instruction Plate. The lid of the instrument case contains an operating instruction plate that covers all tests performed with the tester. The following paragraphs include all the tests as well as test setup diagrams.

WARNING

Ground the tester with the pigtail ground wire in the power inlet cable before using the tester.

NOTE

A flashing indicator indicated an out-of-range condition. Temperature indicator is designed to drift upscale to the out-of-range condition when input is open.

CAUTION

To prevent overheating of and possible damage to the heater probes, determine that all probes being used will heat per paragraph 3-4b.

2-3. **Aircraft Temperature System Check.** Paragraphs ***a*** and ***b*** give procedures necessary to check the aircraft temperature system. Perform the procedures in the order given.

a. Thermocouple System Continuity (Heat Rise) Check. The continuity test checks continuity of aircraft thermocouple system by heating each engine thermocouple independently and checking for a temperature increase on aircraft temperature indicator. Refer to figure 2-1 and proceed as follows:

(1) Turn FUNCTION SELECT, STD DAY, and MASTER POWER switches to OFF position.

NOTE

If continuity probe is not available perform continuity check with applicable heater probe. Junction box must be connected between BH405 heater cable and heater probe, refer to Fig. 2-2.

CAUTION

To prevent overheating of and possible damage to heater probe if used in place of applicable continuity probe, insure probe has cooled to ambient temperature before performing temperature system accuracy check, para 2-3 b.

(2) Connect BH405 heater cable between HEATER CABLE receptacle on tester and applicable continuity probe.

(3) Place T/C INPUT switch in HEATER CABLE position and turn PROBE CONTROL potentiometer full counterclockwise.

(4) Turn FUNCTION SELECT switch to HEATER PROBE, TEMPERATURE switch to HEATER PROBE TEMP SET, and MASTER POWER switch to ON position. Adjust PROBE CONTROL to test temperature (approximately 700° C). Place TEMPERATURE switch in OPERATE position.

NOTE

Lower test temperatures require a longer stabilization of time than higher test temperatures. When probe control overshoots the test temperature, the PROBE POWER lamp turns off to indicate that power has been removed from the continuity probe. Monitor the probe temperature by turning the TEMPERATURE switch to OPERATE.

(5) When temperature stabilizes at test temperature, PROBE POWER lamp flashes on and off rapidly. Apply continuity probe to each aircraft thermocouple junction. Aircraft indicator should indicate a temperature rise as each thermocouple is heated. A slight temperature rise on indicator is sufficient. The continuity check determines if all thermocouples are operating. All thermocouples must be operating before additional tests can be made.

(6) In some instances, the aircraft indicator may not be sensitive enough to detect temperature rise. If this occurs, connect BH450 check cable to CHECK CABLE receptacle and to engine thermocouple harness. Use check cable adapter if required. Apply applicable continuity probe or heater probe to each aircraft thermocouple junction. With T/C INPUT switch in CHECK

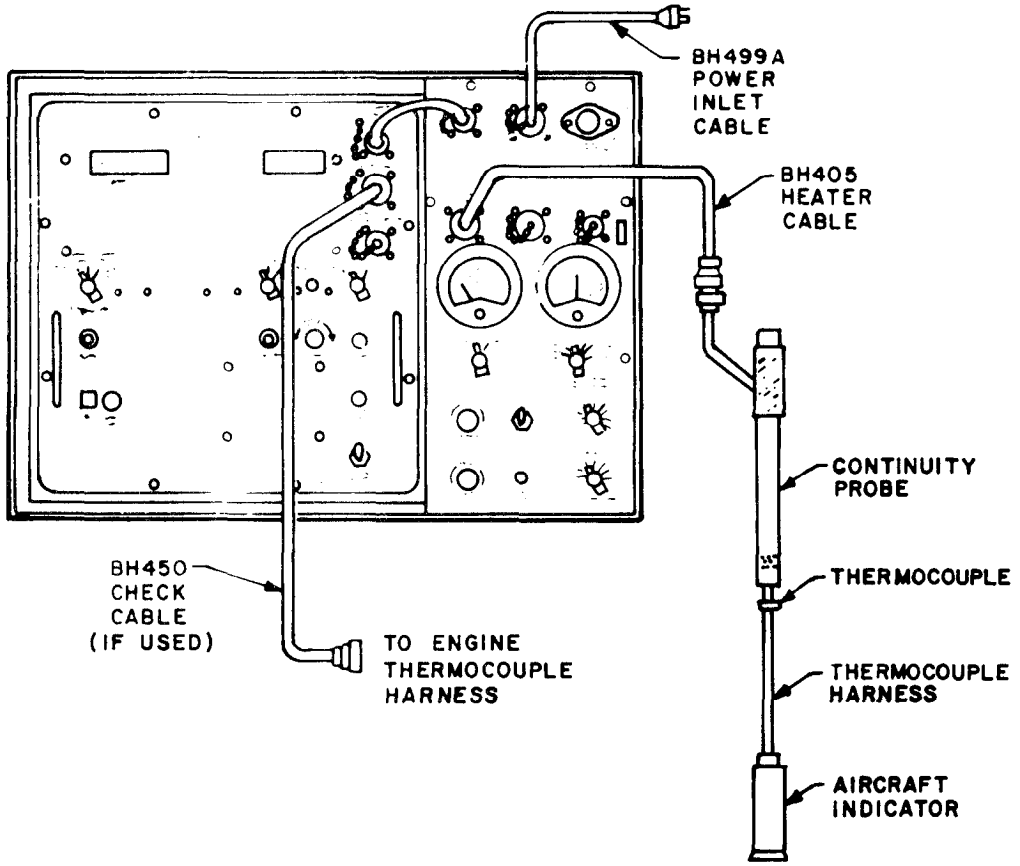


Figure 2-1. Thermocouple System Continuity Check Setup.

CABLE position, TEMP indicator should indicate temperature rise as each thermocouple junction is heated.

(7) Three continuity possibilities exist:

(a) Continuity O.K. Proceed to paragraph

(b) Continuity on some, but not all, thermocouples. Check thermocouples and harness wiring.

(c) No continuity. Make a rapid check of all connectors and associated wiring and if no malfunction is detected, make harness check (para ***a),*** indicator check (paras ***b*** or ***c)*** and insulation check (para ***e)*** until open circuit point is detected. After discontinuity is detected and repaired, perform accuracy test in paragraph ***b.***

b. Temperature System Accuracy Check. The accuracy check is used to test the entire aircraft temperature system by heating all engine thermocouples and comparing the temperature displayed on the aircraft temperature indicator with the heater probe temperature displayed on the tester TEMP indicator. Refer to figure 2-2 and proceed as follows:

NOTE

To check an engine not installed in an aircraft, follow the procedure listed below with the following exception. The check cable (and check cable adapter, if required) must be connected to the engine harness junction connector and to the CHECK CABLE receptacle. The temperature of the engine thermocouples is read on the tester TEMP indicator by switching the T/C INPUT switch to CHECK CABLE position.

(1) Turn FUNCTION SELECT, STD DAY, and MASTER POWER switches to OFF position and turn PROBE CONTROL fully counterclockwise.

(2) Connect BH405 heater cable to HEATER CABLE receptacle on tester and connect junction box to heater cable.

(3) Connect as many heater probes having the correct part number to the junction box as there are engine thermocouples.

CAUTION

Both the heater probe and heater probe cable length are extremely critical. Therefore, never check an aircraft engine without first determining that the probes and probe cable lengths are all identical and correct for the particular thermocouple. Combining heater probes of different part numbers and heater probes with

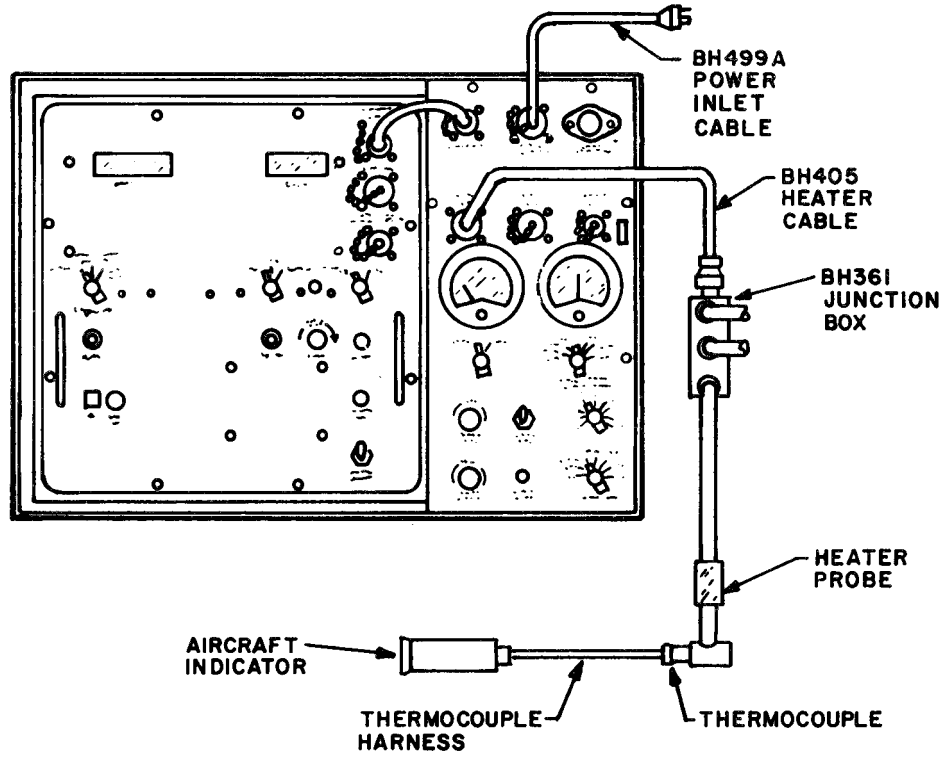


Figure 2-2. Temperature System Accuracy Check Setup.

cables of unequal length will produce erroneous readings. Never connect a cold heater probe to the tester when it is regulating other probes at an elevated temperature. To do so could cause overheating of the hot probes.

(4) Place a heater probe over each engine thermocouple. The heater probes must fit firmly and be positioned properly on the thermocouples.

(5) Turn FUNCTION SELECT switch to HEATER PROBE position, T/C INPUT switch to HEATER CABLE position, TEMPERATURE switch to HEATER PROBE TEMP SET position, and MASTER POWER switch to ON position.

(6) Adjust PROBE CONTROL until TEMP indicator reads approximately 600 ºC. Turn TEMPERATURE switch to OPERATE position to read probe temperature.

NOTE

Check applicable technical manual for exact test temperature and adjust PROBE CONTROL accordingly. While heater probes are heating, PROBE POWER lamp burns continuously. Probe control will overshoot test temperature and lamp will go out until probe temperature falls below set temperature. After test temperature has been reached (PROBE POWER lamp flashes), allow five minutes "soak" time. The time necessary to heat and stabilize probes depends upon line voltage, ambient temperature, and air currents. Some engines, after being idle for some time, collect moisture on the thermocouple terminals and extra time must be allowed for this moisture to evaporate. Normally a 10-minute "soak" time is sufficient. However, if after 10 minutes, the system is not within limits, an additional 20 minutes "soak" time should be allowed. If the system is still not within tolerance, out-of-tolerance difference is system error.

(7) If necessary, place cover over engine tail. cone to obtain stabilized test temperature.

(8) The difference between the heater probe temperature indicated on the tester and the aircraft indicator reading (or aircraft thermocouple temperature as read on the tester when engine is not installed in aircraft) is the error in the aircraft system and should not exceed allowable engine

tolerance. If system is not within tolerance, note the number of degrees out-of-tolerance and proceed to troubleshooting, paragraph 2-4.

NOTE

If an engine thermocouple is suspected of opening up at the test temperature, each thermocouple may be tested separately by momentarily removing the heater probe and observing the tester or aircraft indicator for a drop in average thermocouple temperature. If a Thermocouple is open, there will be no drop in temperature when its heater probe is removed.

(9) Turn FUNCTION SELECT and MASTER POWER switches to OFF position before removing heater probes from aircraft engine and tester.

2-4. Troubleshooting Temperature System. If the temperature system error exceeds applicable technical manual tolerance, one or more of the causes listed below will probably be the source of trouble. The complete temperature system and all of its components must be correct before the temperature system can be used for reliable temperature readings. The possible sources of trouble are:

1. Thermocouples and thermocouple harness (para ***a).***

2. Resistance of circuit out of tolerance (para ***d).***

3. Temperature indicator error (paras ***b*** and ***c).***

4. Shorts to ground (para ***e).***

When troubleshooting, keep in mind the system error detected in paragraph 2-3, subparagraph ***b.*** As each malfunction is corrected, the amount of error reduction can be compared to system error to determine if system has been returned within allowable limits.

a. Thermocouple and Harness Check. The thermocouple and harness check tests the aircraft thermocouple harness and the aircraft thermocouples by heating all the thermocouples and comparing the average output of the engine thermocouples with the average output of the heater probe thermocouples as read on the TEMP indicator. Refer to figure 2-3 and proceed as follows:

(1) Turn FUNCTION SELECT, STD DAY, and master power switches to OFF position and turn PROBE CONTROL fully counterclockwise.

(2) Connect BH405 heater cable to HEATER CABLE receptacle on tester and connect junction box to heater cable.

CAUTION

Never connect a cold heater probe to the tester when it is at an elevated temperature. To do so could cause overheating of the hot probes.

(3) Connect as many heater probes having the correct part number to the junction box as there are engine thermocouples.

(4) Place a heater probe over each engine thermocouple. The heater probes must fit firmly and be positioned properly on the thermocouples.

(5) Connect BH450 check cable to CHECK CABLE receptacle on tester and to aircraft thermocouple harness at engine disconnect. If required, use check cable adapter at engine disconnect.

(6) Turn FUNCTION SELECT switch to HEATER PROBE position, T/C INPUT switch to HEATER CABLE postion, TEMPERATURE switch to HEATER PROBE TEMP SET position, and MASTER POWER switch to ON position.

(7) Adjust PROBE CONTROL until TEMP indicator reads test temperature.

(8) Turn TEMPERATURE switch to OPERATE position to read probe temperature.

(9) Place T/C INPUT switch in CHECK CABLE position to read temperature of engine thermocouples and in HEATER CABLE position to read probe temperature on tester TEMP indicator.

(10) The difference in engine thermocouple temperature and probe temperature read in step 9 is the error of the engine thermocouples and should not exceed technical manual tolerance.

(11) If temperatures are within tolerance, perform temperature indicator check in paragraph ***b*** or ***c.*** If temperatures are not within limits, troubleshoot and repair harness and/or thermocouples.

(12) Turn PROBE CONTROL fully counterclockwise and turn FUNCTION SELECT and MASTER POWER switches to OFF position before removing heater probes and cables from aircraft and tester.

b. D'Arsonval Temperature Indicator Check. In the aircraft temperature indicator check, a simulated thermocouple signal from the tester is applied to both the aircraft indicator and the tester TEMP indicator and the two indicator readings are

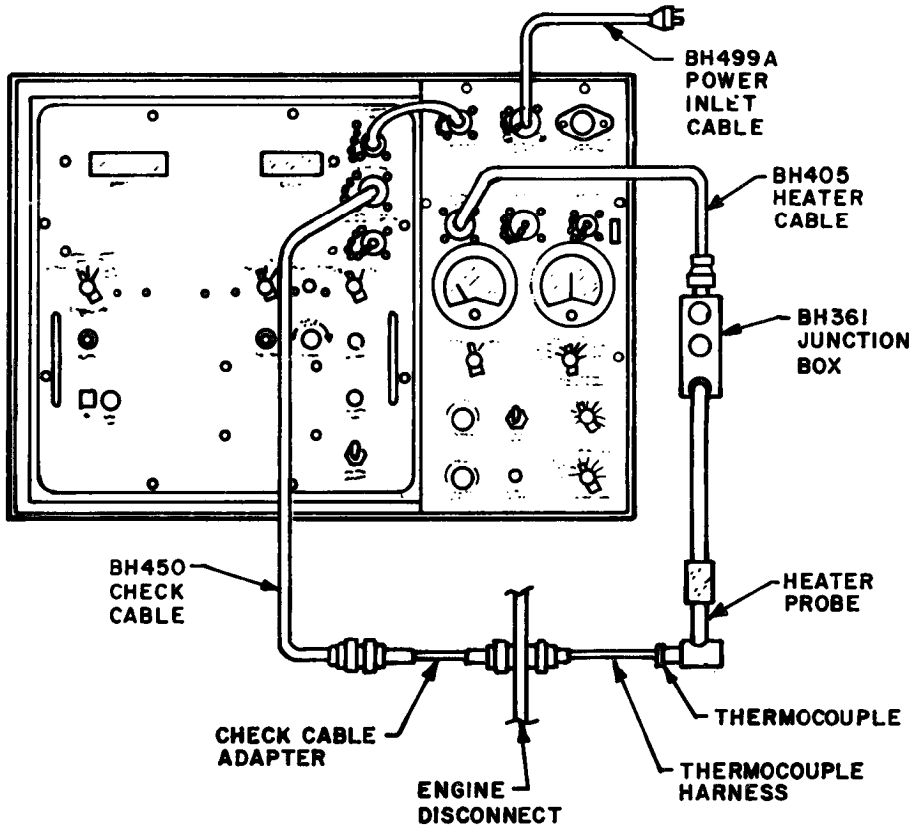


Figure 2-3. Thermocouple and Harness Check Setup.

compared. Refer to figure 2-4 and proceed as follows:

(1) Turn FUNCTION SELECT, STD DAY, and MASTER POWER switches to OFF position.

(2) Connect BH485 instrument cable to INSTRUMENT CABLE receptacle on tester and to egt indicator check adapter. Connect BH822 egt indicator check adapter to proper terminal posts on aircraft indicator. Place RESISTANCE & A/C INDICATOR CHECK switch in proper resistance position (see indicator for circuit resistance value).

NOTE

If indicator is left in instrument panel, one aircraft lead must be disconnected If indicator is removed from instrument panel, a more accurate check will be accomplished if indicator is kept in normal operating position.

(3) Turn FUNCTION SELECT switch to A/C IND CHECK position, TEMPERATURE switch to OPERATE position, and MASTER POWER switch to ON position.

(4) Observe reading on tester TEMP indicator and adjust A/C IND ADJ control to test temperature reading (usually 600 °C).

(5) The difference in the indication of the tester TEMP indicator and the aircraft indicator is the error of the aircraft indicator and should not exceed allowable technical manual tolerance.

(6) If aircraft indicator exceeds technical manual tolerance, repair or replace indicator.

(7) If indicator is within tolerance, proceed to check resistance in paragraph ***d.***

(8) Turn FUNCTION SELECT and MASTER POWER switches to OFF position before removing cables from tester and aircraft indicator.

c. Null-Balance Temperature Indicator Check. Connect the tester to the indicator at the engine disconnect or at the indicator using the appropriate adapter as shown in figure 2-5 and proceed as follows:

(1) Turn FUNCTION SELECT switch to A/C IND CHK position, RESISTANCE & A/C INDICATOR CHECK switch to NULL BAL position, TEMPERATURE switch to OPERATE

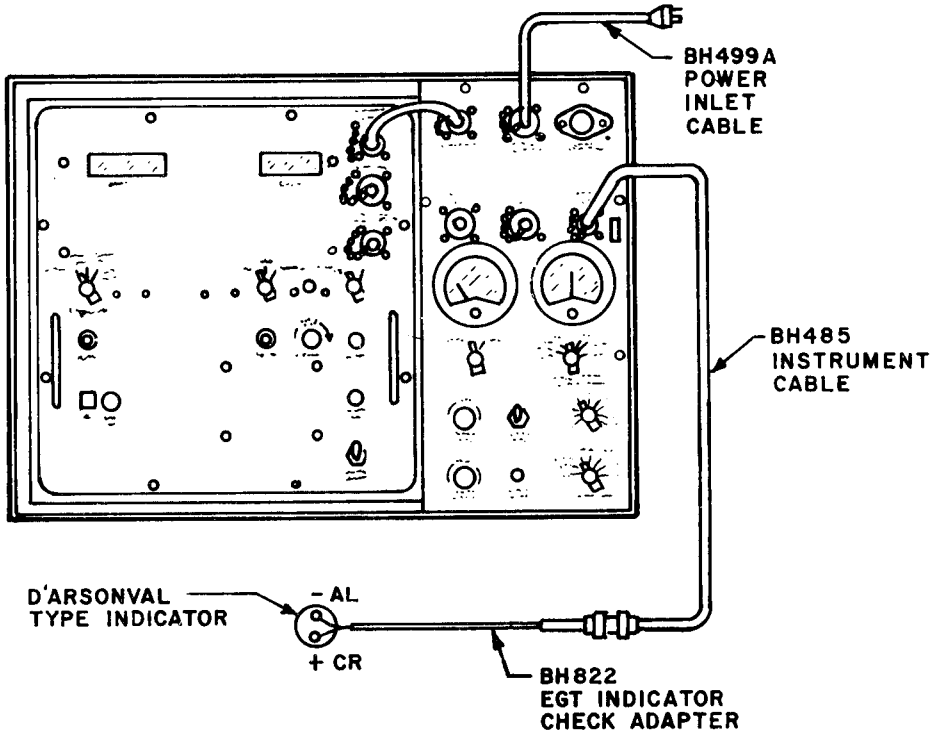


Figure 2-4. D'Arsonval Temperature Indicator Check Setup.

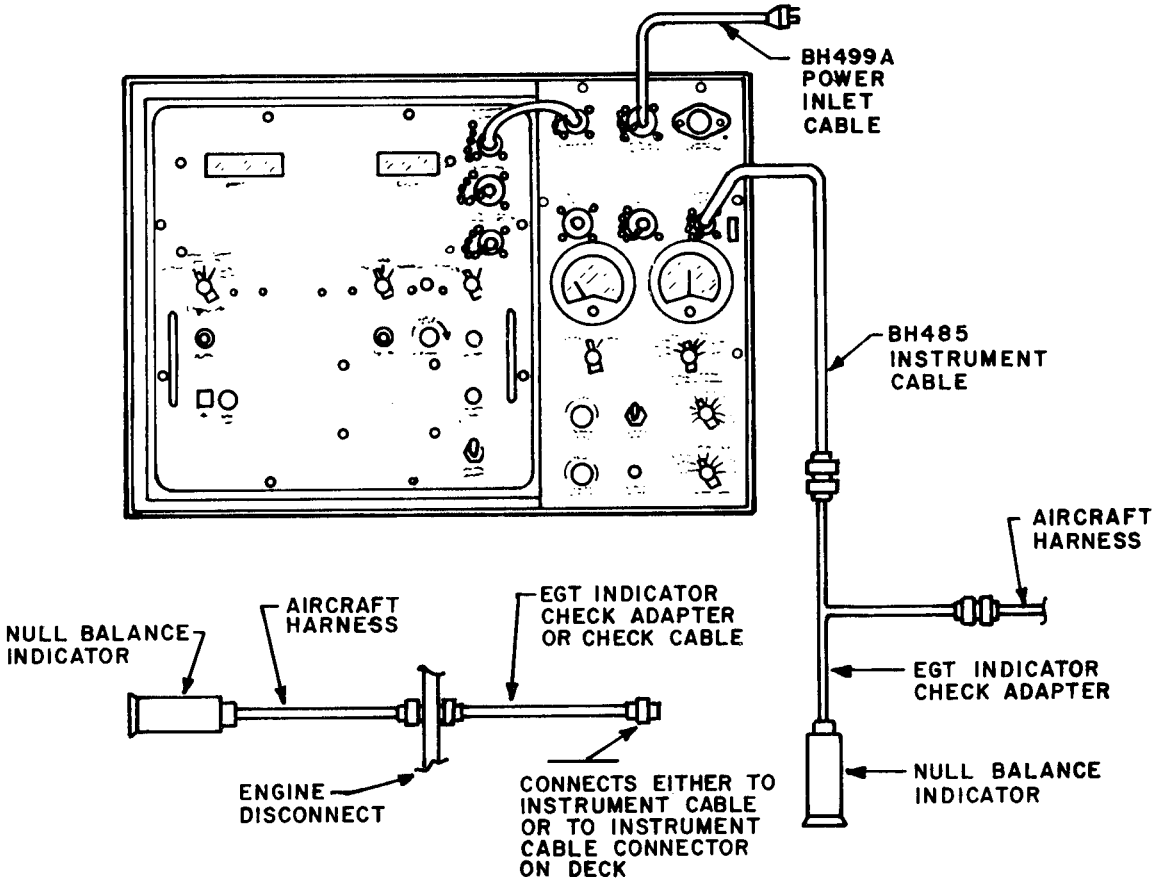


Figure 2-5. Null Balance Temperature Indicator Check Setup.

position, and MASTER POWER switch to ON position.

(2) observe reading on tester TEMP indicator and adjust A/C IND ADJ control to test temperature (usually 600 °C).

(3) The difference in the indication of the tester TEMP indicator and the aircraft indicator is the error of the aircraft indicator and should not exceed allowable technical manual tolerance.

(4) If aircraft indicator exceeds technical manual tolerance, repair or replace indicator.

(5) Turn FUNCTION SELECT and MASTER POWER switches to OFF position before removing cables from tester and aircraft.

d. Temperature Circuit Resistance Check (D'Arsonval Indicator(s)). In the resistance check, the resistance of the aircraft thermocouple wire, thermocouples, and resistance spool is measured on the tester RESISTANCE CHECK meter. Refer to figure 2-6 and proceed as follows:

CAUTION

A high resistance condition is dangerous because the aircraft temperature indicator will read low and the engine will be operating above indicated temperature.

(1) Turn FUNCTION SELECT, STD DAY, and MASTER POWER switches to OFF position.

(2) Connect BH485 instrument cable to INSTRUMENT CABLE receptacle on tester and to BH823 resistance check adapter.

(3) Disconnect aircraft thermocouple leads from indicator(s).

(4) Connect one set of aircraft thermocouple leads to resistance check adapter terminal block. Make sure polarity is correct. If there are two indicators, the other set of leads is left disconnected.

(5) Turn RESISTANCE & A/C INDICATOR CHECK switch to proper resistance position. (See proper aircraft maintenance manual for resistance value).

(6) Turn FUNCTION SELECT switch to RES position and MASTER POWER switch to ON position.

(7) RESISTANCE CHECK meter on tester should read within technical manual tolerance. If not, adjust resistance spool in aircraft for proper resistance. One increment on meter equals 0.05 ohm.

CAUTION

Check and clean all connections in the thermocouple system before adjusting aircraft resistance spool. Deflection of meter needle in clockwise direction indicates excessive resistance.

(8) If resistance is within tolerance, proceed to check insulation resistance as described in paragraph ***e.***

(9) Turn FUNCTION SELECT and MASTER POWER switches to OFF position before removing cables from tester and aircraft.

e. Insulation Resistance Check. In the insulation resistance check, the resistance between the thermocouple conductors and aircraft ground is measured first, followed by a check of the resistance between the conductors. Refer to figure 2-7 and proceed as follows:

(1) Turn FUNCTION SELECT, STD DAY, and MASTER POWER switches to OFF position.

(2) Connect BH485 instrument cable to INSTRUMENT CABLE receptacle on tester and to BH821 insulation check adapter, and disconnect both leads at aircraft indicator.

(3) Turn FUNCTION SELECT switch to INSUL position, INSULATION CHECK switch to RX1000 position, an MASTER POWER switch to ON position.

(4) Short alligator clips together. Meter should read 0 ohms.

(5) Connect one lead of insulation check adapter to a bare thermocouple lead in aircraft and connect other lead to aircraft ground.

(6) INSULATION RESISTANCE meter should indicate resistance specified for aircraft being checked.

(7) Disconnect engine thermocouple harness from airframe thermocouple harness.

(8) Disconnect insulation check adapter from aircraft ground and connect to other thermocouple lead.

(9) INSULATION RESISTANCE meter

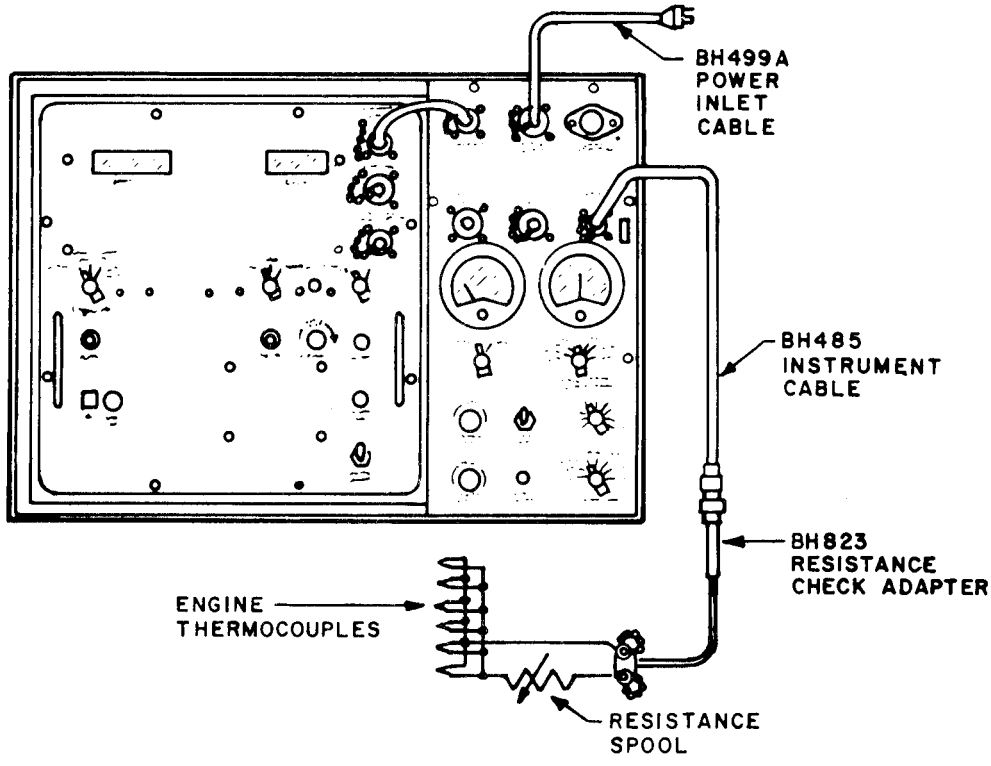


Figure 2-6. Temperature Circuit Resistance Check Setup.

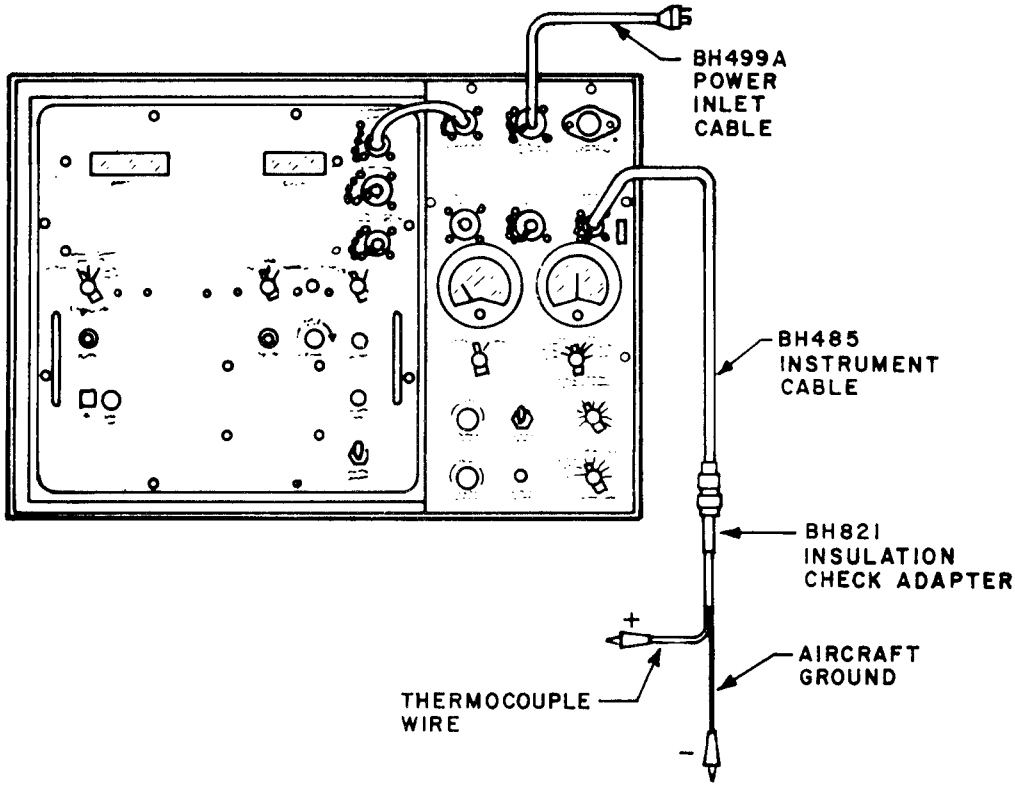


Figure 2-7. Insulation Resistance Check Setup.

should indicate resistance specified for aircraft being checked.

(10) If either insulation resistance reading is not within tolerance, locate source of leakage and repair.

NOTE

Healing of EGT harness of 200 degrees F for 1 hour, letting cool to ambient temperature, will increase insulation resistance.

(11) Turn FUNCTION SELECT and MASTER POWER switches to OFF position before removing cables from tester and aircraft.

2-6. Temperature Spread Test. The temperature spread test checks combustion chamber flame propagation during engine run. During this test, the temperature of each thermocouple in the engine can be read independently with the tester. The average temperature may also be read at any time during the test. Refer to figure 2-8 and proceed as follows:

a. Turn FUNCTION SELECT, STD DAY, and MASTER POWER switches to OFF position.

b. Connect spread cable to SPREAD CABLE receptacles on tester and to spread connector on engine (if required, use spread adapter).

c. Turn FUNCTION SELECT switch to SPREAD position.

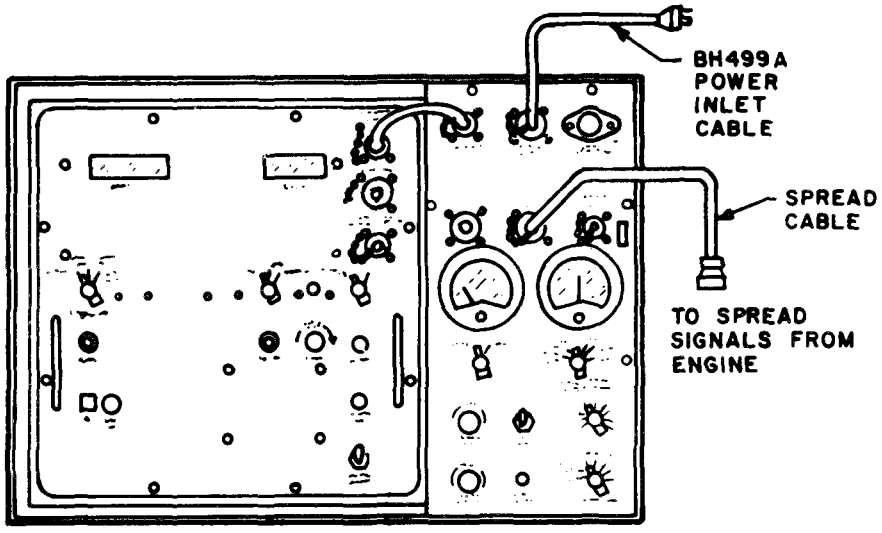


Figure 2-8. Temperature Spread Teat Setup.

d. Turn TEMPERATURE switch to OPERATE position and MASTER POWER switch to ON position.

e. Start engine and stablize rpm.

f. Turn SPREAD switch successively to each thermocouple position and note reading of each thermocouple on tester TEMP indicator. Temperature gradient (spread) between engine thermocouples should not exceed allowable technical manual limits.

g. Turn FUNCTION SELECT and MASTER POWER switches to OFF position before removing cables from tester and aircraft.

2-5 Engine Trim Check. During operation, the relationship between rpm, temperature, and fuel flow is critical. Therefore, the tester, which measures rpm to ± 0.1 percent and temperature to ± 2 degrees C, is used to measure these engine functions. The portable trimmer portion may be removed and placed in the cockpit during trimming. If aircraft has D'Arsonval type indicator(s) and it is desirable to check indicator accuracy during engine trim, a switch box (fig. 2-9), which is an accessory to the tester, must be used. Refer to figure 2-10 or 2-11 and proceed as follows:

a. Turn FUNCTION SELECT. STD DAY, and MASTER POWER switches to OFF position and T/C INPUT switch to CHECK CABLE position.

NOTE

If trimmer section is to be removed and placed in cockpit, remove power interconnect cable from tester. Connect power cable and power cable adapter to POWER INTERCONNECT connector and to power source identified at the POWER INTERCONNECT connector. Disregard reference to FUNCTION SELECT and T/C INPUT switch positions.

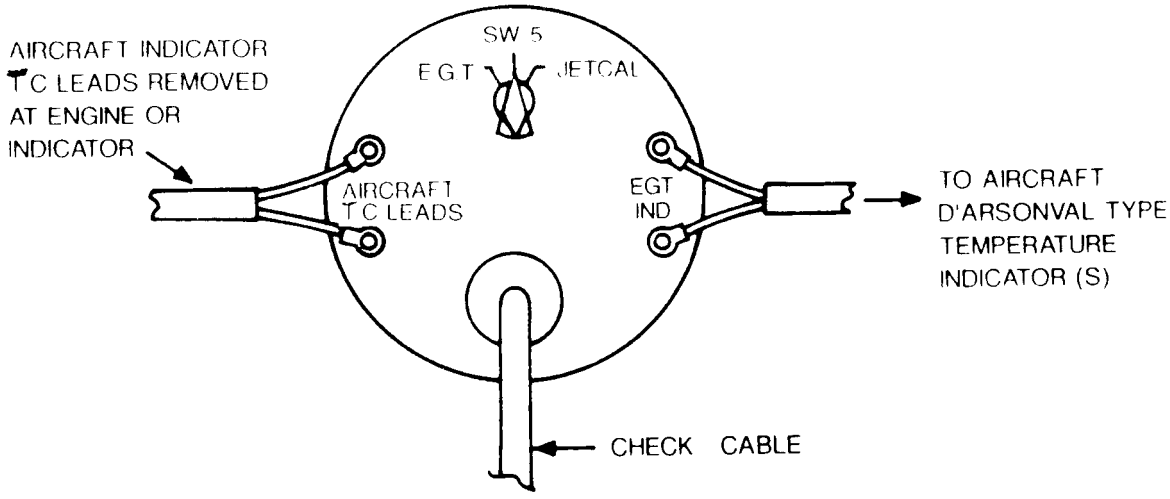


Figure 2-9. Switch Box

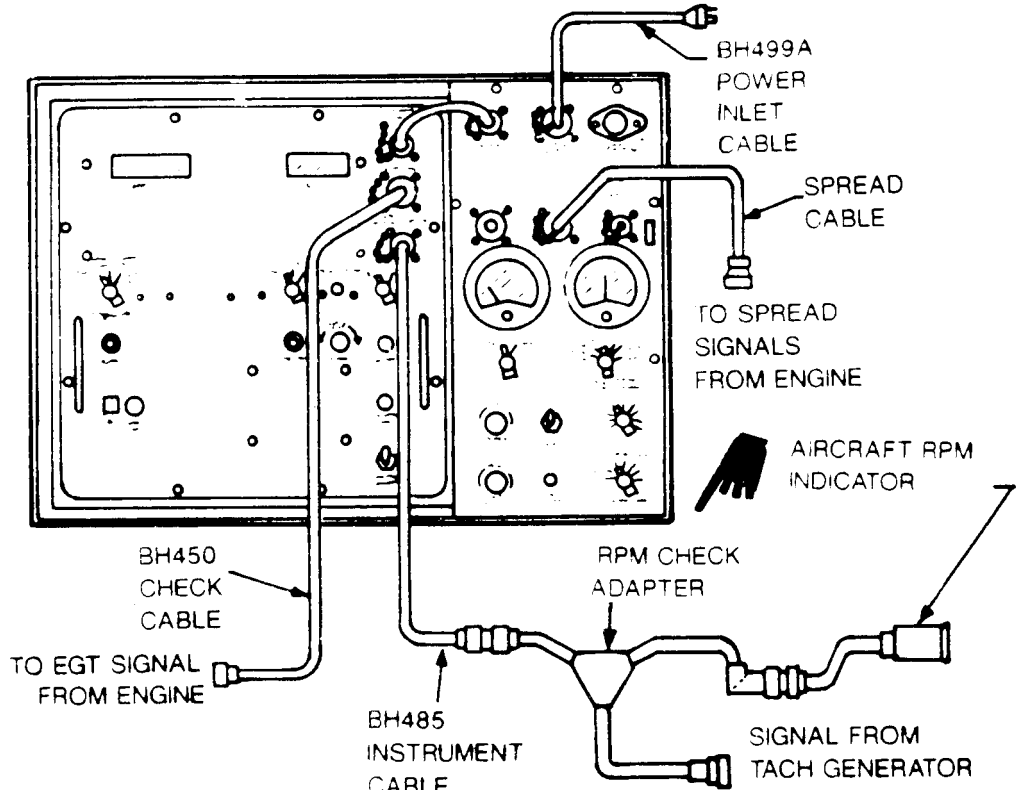


Figure 2-10. Engine Trim Check Setup Using Trimmer in Tester

b. Connect BH450 check cable to CHECK CABLE receptacle on tester and to aircraft thermocouple circuit using either (1) or (2) below.

(1) When switch box is not used: Break aircraft thermocouple circuit at engine temperature junction connector. Connect check cable to engine junction connector (if required, use check cable adapter to match engine temperature connector). Read out temperature on tester TEMP indicator.

(2) When switch box is used: Break aircraft thermocouple circuit at indicator if aircraft has a single D'Arsonval indicator or at engine if aircraft has dual D'Arsonval indicators. Connect aircraft thermocouple leads to AIRCRAFT T.C. LEADS terminals on BH123-3

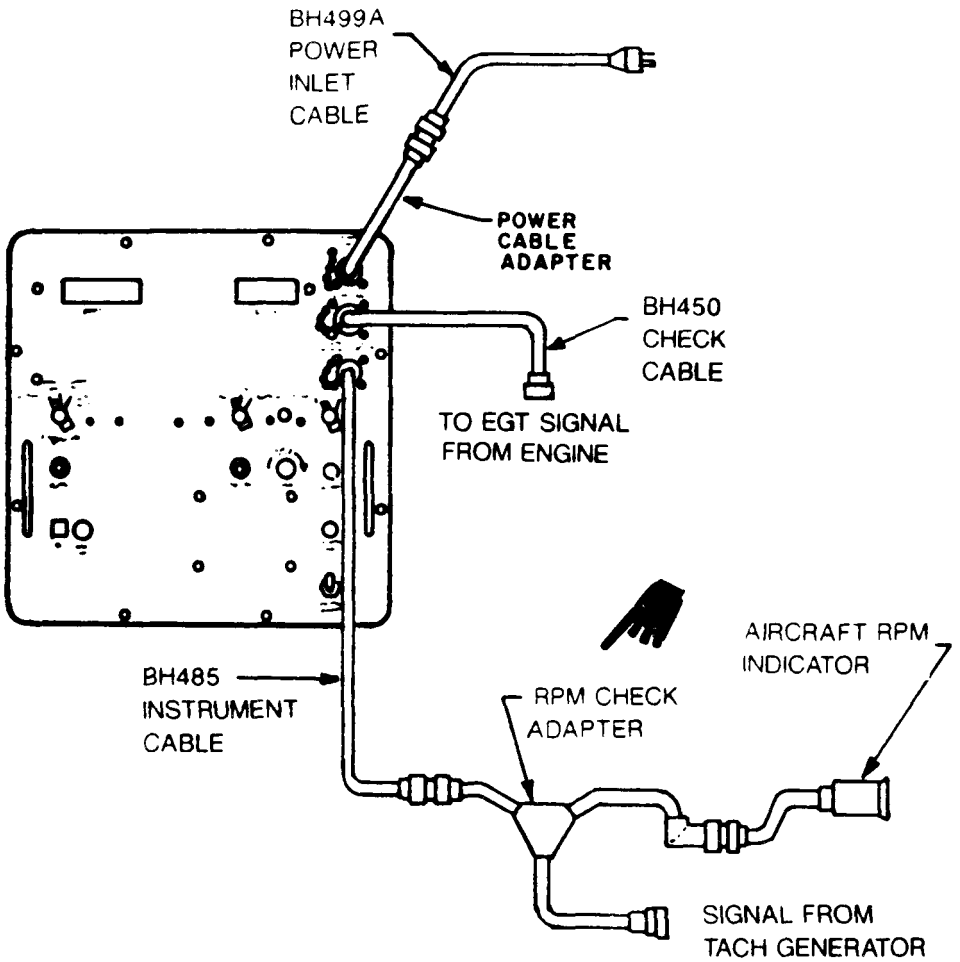


Figure 2-11. Engine Trim Check Setup Using Trimmer Removed from Tester

switch box. Connect check cable to JETCAL receptacle on switch box. When switch SW-5 on switch box is turned to JETCAL position, temperature of aircraft thermocouples is indicated by TEMP indicator on tester. When SW-5 is turned to EGT position, aircraft thermocouple temperature is read on aircraft indicator(s) for comparison with TEMP indicator.

c. Turn TEMPERATURE switch to OPERATE position.

NOTE

Refer to table 1-14 for appropriate RPM check adapter.

d. Connect BH485 instrument cable to RPM INPUT INSTRUMENT CABLE receptacle and through appropriate adapter to aircraft N1 or N2 tachometer generator.

e. Turn RPM switch to appropriate position (N1 or N2).

f. Turn FUNCTION SELECT switch ***to TRIM position*** and MASTER POWER switch to ON.

NOTE

If trimmer is used in cockpit, monitor engine temperature on tester TEMP indicator for hot start.

g. Start engine and trim to applicable engine specifications.

h. RPM and TEMPERATURE indications may be temperature corrected to standard day conditions as follows:

(1) Adjust AMB TEMP potentiometer until ambient temperature is displayed in adjacent window.

(2) Turn STD DAY switch to ON position. If STD DAY lamp flashes, indicative of a switch being in wrong position, that RPM switch is in N1 or N2 position, and that FUNCTION SELECT switch is in TRIM position. % RPM and TEMPERATURE readings will be automatically temperature corrected to standard day conditions.

i. Turn FUNCTION SELECT, STD DAY, and MASTER POWER switches to OFF position before removing cables from tester and aircraft.

2-7. RPM Indicator Check. In the rpm indicator check, engine rpm is read simultaneously on the tester and the cockpit indicators during engine run. The two readings arc compared to determine the rpm system error. Refer to figure 2-12 and proceed as follows:

a. Turn FUNCTION SELECT, STD DAY, and MASTER POWER switches to OFF position.

b. Connect BH485 instrument cable to RPM INPUT INSTRUMENT CABLE connector on tester and to proper rpm check adapter.

NOTE

Refer to table 1-14 for appropriate RPM check adapter.

c. Disconnect aircraft rpm circuit either at rpm indicator or tachometer generator (depending on type of rpm check adapter used) and insert rpm check adapter as shown in figure 2-12.

d. Turn FUNCTION SELECT switch to TRIM position and MASTER SWITCH to on.

e. Turn RPM SWITCH to either N1 or N2 position.

f. With aircraft engine running, monitor % rpm on rpm indicator of tester and compare with cockpit indicator.

NOTE

1% RPM difference is allowed. If a difference exists, refer to appropriate TM for testing of the indicator and tachometer generator.

g. Turn FUNCTION SELECT, STD DAY, and MASTER POWER switches to OFF position before removing cables from tester and aircraft.

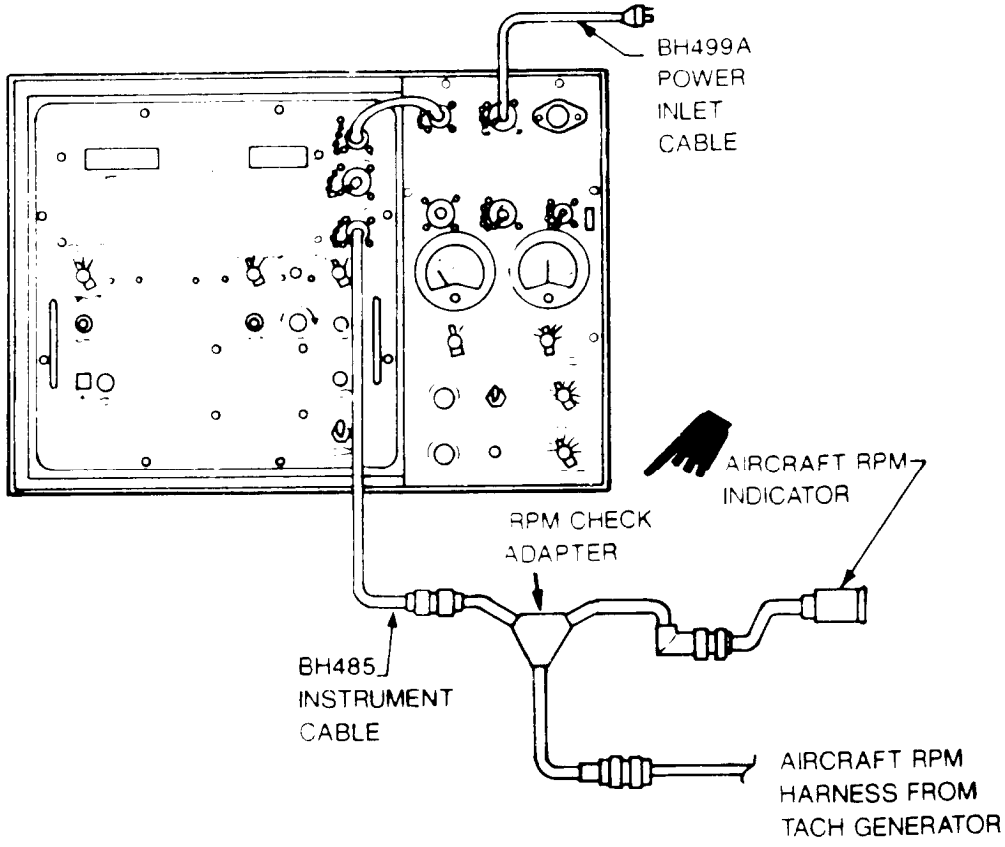


Figure 2-12. RPM Indicator Check Setup

2-8. Heat Detection Systems Check (Fire Warning). The tester can be used to check various types of heat detecting systems including thermal switches and continuous wire heat detection systems. The tester is used in conjunction with Tempcal probes to apply known heat to check the operating temperature of thermal detectors. Refer to figure 2-13 and proceed as follows:

a. Turn FUNCTION SELECT, STD DAY, and MASTER POWER switches to OFF position and PROBE CONTROL fully counterclockwise.

b. Connect BH405 heater cable to HEATER CABLE receptacle and to Tempcal probe.

c. Apply Tempcal probe to overheat detector.

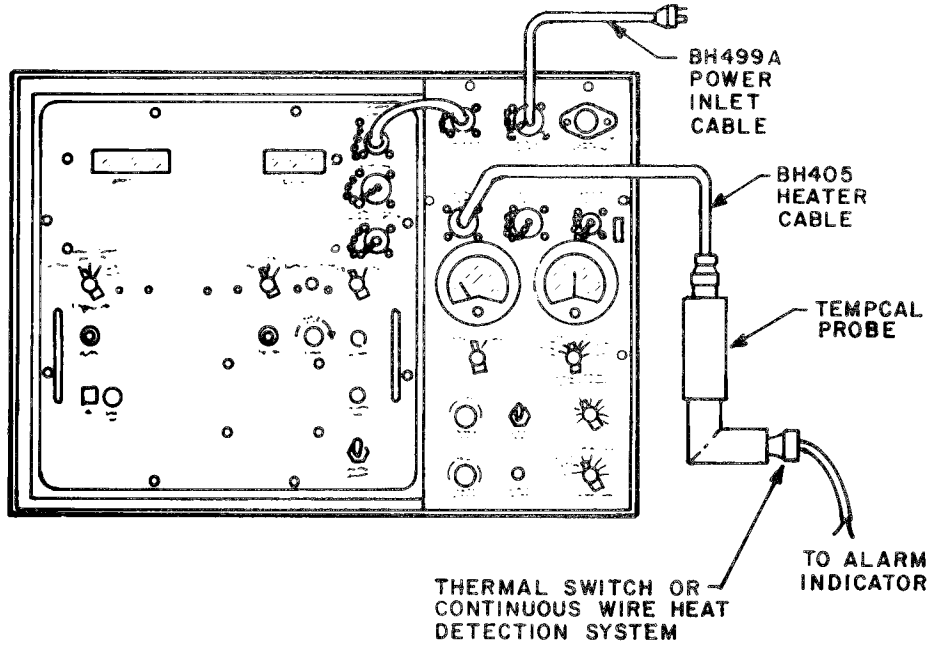


Figure 2-13. Heat Detection System Check Setup.

d. Turn FUNCTION SELECT switch to HEATER PROBE position, T/C INPUT switch to HEATER CABLE position, TEMPERATURE switch to HEATER PROBE TEMP SET position, and MASTER POWER switch to ON position.

e. Turn PROBE CONTROL until overheat detector test temperature is displayed by TEMP indicator.

f. Turn TEMPERATURE switch to OPERATE position and observe Tempcal probe temperature on tester TEMP indicator. Allow temperature to stabilize at over heat detection system operating point.

CAUTION

Do not apply temperatures beyond the tolerance of the overheat system. Excessive heat may damage overheat detector or Tempcal probe.

g. As overheat temperature is approached, observe heat detection system for proper operation.

h. With PROBE CONTROL, cycle temperature above and below actuating point of heat detector to determine true cm-off temperature of overheat detection system. Temperature should not exceed limits for system.

i. Turn PROBE CONTROL fully counterclockwise and turn FUNCTION SELECET and MASTER POWER switches to OFF position before removing cables from tester and aircraft.

CHAPTER 3

AVIATION UNIT MAINTENANCE INSTRUCTIONS

Section I. PREPARATION FOR INSTALLATION, STORAGE, AND SHIPMENT

3-1. UNPACKING. There are no special unpacking procedares. Unlatch and remove the instrument case from the accessory case. Open the accessory case, remove the dessicant, and check for the items in table 3-1.

Table 3-1. *Accessories List*

BH112JB-79 Quantity	BH112JB-53 Quantity	Part Number	Part Name
	1	BH123-3	switch box
	1	BH361-8	junction box
1	1	BH405	heater cable
1	1	BH450	check cable
1	1	BH485	instrument cable
	1	BH492B-3	extension handle
	1	BH499A	power cable
	1	BH820	rpm check adapter
	1	BH821	insulation check adapter
	1	BH822	egt indicator check adapter
	1	BH823	resistance check adapter
	3	BH996-40	heater probes
	1	BH1504	check cable adapter
	1	BH4548	check cable adapter
1		BH361-12	junction box
1	1	BH15184A	interconnect cable
1	1	BH15185A	power cable adapter

Loosen the wing nuts on the handle and place handle in a comfortable position for pushing. Retighten the wing nuts. The tester is ready for use after unpacking. Operation instructions are contained in the instrument case lid and detailed operation instructions accompanied by setup illustrations are contained in Chapter 2.

3-2. PREPARATION FOR STORAGE. Before storing the tester, place 5 eight-unit bags of dessicant (item 1, table 1-16) in the accessory case. Store the tester in a dry area where the temperature range does not exceed-65 to 160°F (-54 to 71 °C).

3-3 PREPARATION FOR SHIPMENT. Place 5 eight-unit bags of dessicant (item 1, table 1-16) in the accessory case. Surround the tester with 2 inches of rubberized hog hair when it is packed for shipment. Use the latest revision of specification MIL-P-1 16, method IIb, and JAN-P-100. A pallet (fig. 3-1) may be prepared to secure the tester in the shipping carton. Four holes in the pallet are for tie-down straps.

3-3.1. GENERAL INFORMATION FOR STORAGE AND SHIPMENT. For general technical information on preparation for storage and shipment, refer to TM 1-1500-204-23 (series). For regulatory requirement pertaining to equipment placed in administrative storage, refer to AR750-1.

Section II. INSTALLATION

Not applicable.

Section III. INSPECTIONS AND SERVICING

3-4. DAILY INSPECTION. Following the unpacking of the tester and prior to each day's operation, perform the following inspection procedures.

a. Visual Inspection.

(1) Inspect exterior of tester for evidence of damage and condition of paint.

(2) Lift instrument case lid and examine instrument case deck for broken knobs, broken meter glass, and damaged meter movements. INSULATION CHECK meter should be indicating in-

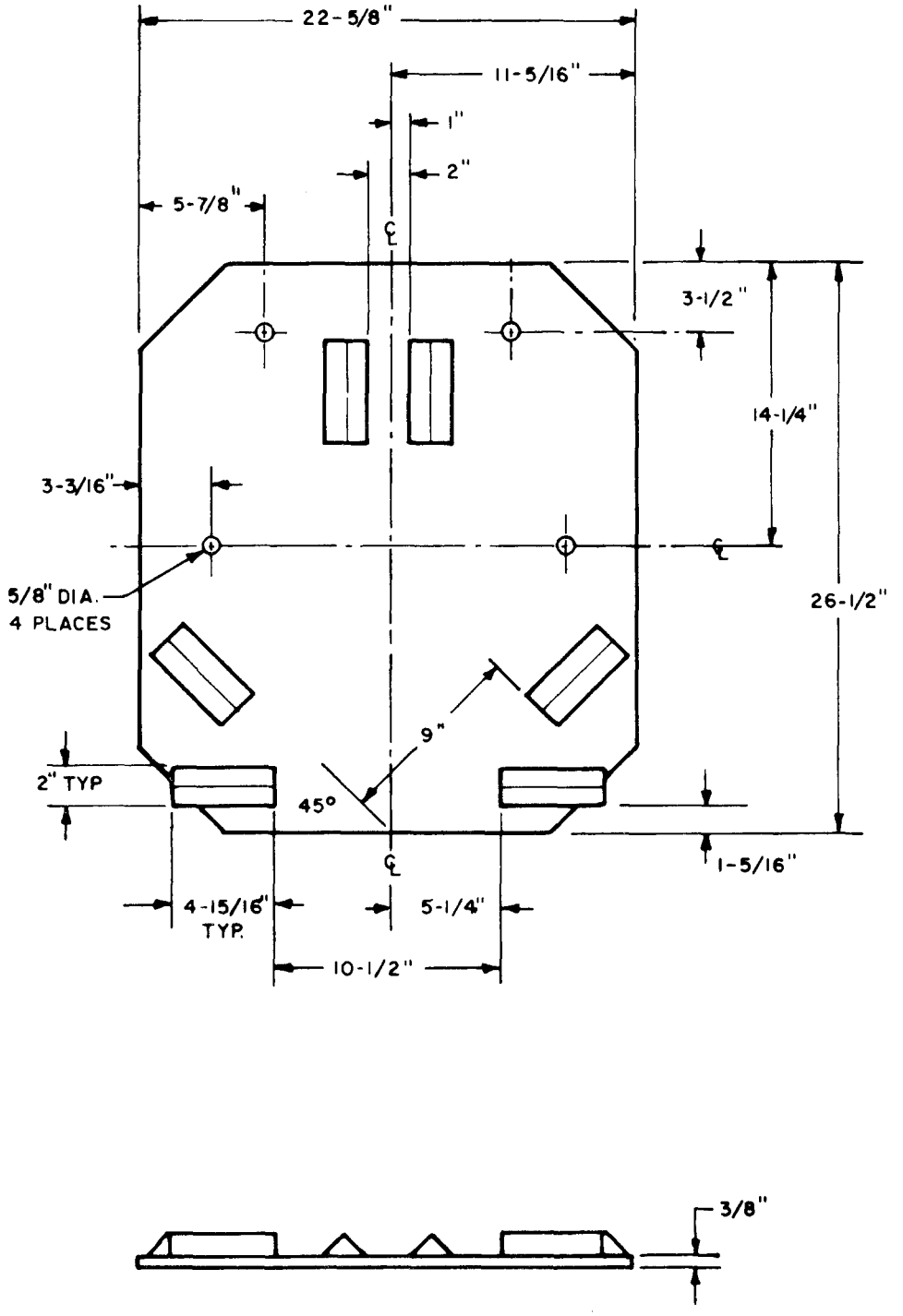


Figure 3-1. Shipping Pallet.

finite resistance and RESISTANCE CHECK meter should be indicating 0 ohms.

(3) Examine the instrument case lid for the condition of the instruction plate, the inclusion of spare heater probe controller fuses, and the inclusion and condition of the ambient temperature thermometer.

b. Functional Inspection. If a malfunction is detected during the functional inspection, refer to table 3-2 for the probable cause and corrective action.

NOTE

Lamp caps are interchangeable. PROBE POWER and POWER ON caps are red. STD DAY cap is yellow.

CAUTION

Do not interchange STD DAY lamp with POWER ON or PROBE POWER lamps. STD DAY lamp is 28V while the others are 115V.

(1) Turn FUNCTION SELECT, STD DAY, and MASTER POWER switches to OFF position.

(2) Connect BH499A power cable to POWER INPUT receptacle and to 115 vat, 50-400 Hz power source.

(3) Connect BH15184A power interconnect cable to two INTERCONNECT connectors on tester deck.

(4) Turn MASTER POWER switch to ON position and allow 15 minute warmup. POWER ON lamp shall light and displays shall light.

(5) Press PRESS TO TEST switch. All digits shall read "8".

(6) Turn TEMPERATURE switch to CAL 600° C position. Tester shall read 600 (± 2) ºC. See step 8.

(7) Turn RPM switch to CAL 100° RPM position. Tester shall read 100 (± 1) % RPM. See step 8.

(8) Adjust applicable CAP ADJ potentiometer to bring each indicator within tolerances listed in steps 6 and 7. If an indicator cannot be calibrated by adjusting applicable CAL ADJ potentiometer, indicator shall be calibrated.

(9) With TEMP and RPM switches in CAL positions, note readings of TEMP and % RPM indicators.

(10) Adjust AMB TEMP control for a 59° F reading in window.

NOTE

STD DAY lamp should flash in next step indicating switches are not in correct positions for making standard day measurements.

(11) Turn STD DAY switch to ON position. TEMP and % RPM indicator readings shall not change by more than ± 2°C and ± 0.1 % RPM respectively. If readings are not in tolerance, the standard day circuit shall be calibrated.

(12) Turn STD DAY switch to OFF position.

(13) Turn FUNCTION SELECT switch to A/C IND CHK position.

(14) Turn TEMPERATURE switch to OPERATE position.

(15) Observe that TEMP indicator reading is stable and that clockwise rotation of A/C IND ADJ causes reading to increase and that adjustment covers the range from ambient through 1399° C.

(16) Turn PROBE CONTROL fully counterclockwise.

(17) Turn T/C INPUT switch to HEATER CABLE position.

(18) Turn FUNCTION SELECT switch to HEATER PROBE position.

(19) Connect heater cable to HEATER CABLE receptacle.

(20) Connect junction box to heater cable.

(21) Connect one heaer probe to junction box.

(22) Turn TEMPERATURE switch to HEATER PROBE TEMP SET and adjust PROBE CONTROL until TEMP indicator displays 60° C (140° F).

(23) Turn TEMPERATURE switch to OPERATE position and monitor probe temperature as probe heats up.

(24) Observe PROBE POWER lamp for normal probe controller operation. Lamp burns steadily when probe is heating, extinguishes when probe is cooling, and flashes when probe is regulating at set temperature.

(25) Disconnect probe from junction box and connect another probe, using a different junction box connector.

(26) Determine that heater probe is heating by observing TEMP indicator.

(27) Repeat steps 25 and 26 until all probes and junction box connectors have been tested.

(28) Turn PROBE CONTROL fully counterclockwise, turn MASTER power switch off, and remove heater cable, junction box, and heater probes from HEATER CABLE receptacle and return to accessory case.

3-5. Periodic Inspection. Every 180 days, perform the checkout instructions of Chapter 4, Section II.

Section IV. PREVENTIVE MAINTENANCE

3-6. General. The preventive maintenance inspections will be recorded in accordance with procedures outlined in the inspection worksheets listed in paragraph 1-2. Each form covers a specific inspection period, providing a system of progressive preventive maintenance. These forms are available through normal supply channels.

3-7. Cleaning. Clean the tester and accessories with dry cleaning solvent (item 2, table 1-16).

3-8. Lubrication. As conditions warrant, remove the two wheels from the accessory case, wipe off old grease from wheel and axle bearing surfaces, and apply a fresh coat of grease (item 3, table 1-16).

3-9. Extreme Environmental Maintenance.

a. Cold. Provide best possible shelter to protect tester from freezing rain, sleet, or snow.

b. Heat. Provide best possible shelter to protect tester from direct rays of sun.

c. Dust and Sand. If possible, perform all maintenance in a sheltered, well protected area.

(1) Reduce inspection and servicing intervals and keep tester wiped clean.

(2) Keep tester under a protective cover.

d. Humidity. If possible, perform all maintenance in a well ventilated or dry area.

Section V. Operational Checkout

3-10. Performance Checks. The daily inspection procedures of paragraph ***3-4b*** are sufficient for checking the operation of the tester.

3-11. Troubleshooting Data. Table 3-2 provides information useful in diagnosing and correcting unsatisfactory operation of the tester. Each malfunction is followed by a list of probable causes. The possible corrective action recommended is described opposite the probable case. The use of conventional troubleshooting and corrective methods will enable aviation unit maintenance personnel to maintain the tester in operational readiness.

Section VI. REPAIR AND REPLACEMENT OF AUTHORIZED PARTS

3-12. Replacement of Lamps.

a. Unscrew and remove lamp cap.

b. Pull lamp out of lamp socket.

c. Align pins of new lamp with holes in lamp socket and insert lamp.

d. Reinstall lamp cap.

3-13. Replacement of Indicator Displays.

a. Use a phillips head screwdriver to remove four screws from display bezel and remove bezel.

b. Use a flat bladed screwdriver to pry defective display from display socket.

c. Insert new display in socket, orienting decimal point at bottom of socket. Be careful not to bend display pins when inserting display in socket.

d. Reinstall display bezel.

3-14. Replacement of Probe Controller Fuse (52, fig. FO-8).

a. Unscrew fuseholder cap and remove fuse.

b. Insert new fuse in cap.

c. Reinstall cap in fuseholder.

Table 3.2. Troubleshooting Table

Malfunction	Probable Cause	Corrective Action
1. INSULATION CHECK meter does not read infinite resistance when FUNCTION SELECT switch is off	a. Mechanical zero screw out of adjustment	a. Adjust screw.
2. RESISTANCE CHECK meter does not read 0 when FUNCTION SELECT switch is off	a. Mechanical zero screw out of adjustment	a. Adjust screw.
3. Entire tester inoperative with power source connected and MASTER POWER switch in ON position.	a. No input voltage b. Defective power cable c. Defective power interconnect cable	a. Check power source. b. Replace cable. c. Replace cable.
4. POWER ON lamp does not light when MASTER POWER switch is on.	a. Defective POWER ON lamp	a. Replace lamp (para. 3-12).
5. Power is applied to tester but displays do not light.	a. DISPLAY control in full counterclockwise position	a. Turn control clockwise.
6. All display digits do not read 8 when PRESS TO TEST button is pressed.	a. Defective display on display board	a. Replace display (para. 3-13).
7. STD DAY lamp does not light when STD DAY switch is on	a. Defective STD DAY lamp	a. Replace lamp (para. 3-12).
8. PROBE POWER lamp does not light when heater probes are connected, FUNCTION SELECT switch is in HEATER PROBE position, T/C INPUT switch is in HEATER CABLE position, and PROBE CONTROL is turned clockwise.	a. Defective PROBE POWER lamp b. FUSE 20A blown	a. Replace lamp (para. 3-12). b. Replace fuse (para. 3-14).
9. No heater probes heat.	a. Defective heater cable.	a. Replace cable.
10. One of several heater probes does not heat.	a. Defective heater probe b. Defective junction box	a. Replace probe. b. Replace box.
11. INSULATION CHECK meter reads infinity when insulation check adapter is jumpered.	a. Defective insulation check adapter b. Defective instrument cable	a. Replace adapter. b. Replace cable.

Table 3-2. Troubleshooting Table (Continued)

Malfunction	Probable Cause	Corrective Action
12. RESISTANCE CHECK meter deflects in full clockwise direction even with resistance check adapter jumpered.	a. Defective resistance check adapter b. Defective instrument cable	a. Replace adapter. b. Replace cable.
13. Aircraft indicator check circuit will not drive aircraft indicator	a. Defective egt indicator check adapter b. Defective instrument cable	a. Replace adapter b. Replace cable.

CHAPTER 4
AVIATION INTERMEDIATE MAINTENANCE INSTRUCTIONS

Section I. PREPARATION FOR MAINTENANCE, STORAGE, AND RESHIPMENT

4-1. Preparation for Maintenance. There are no special unpacking procedures. Unlatch and remove the instrument case from the accessory case. Open the accessory case, remove the dessicant, and check for the items in table 3-1. Loosen the wing nuts on the handle and rotate it to a comfortable position for pushing. Retighten the wing nuts. The testeris ready to be operated after unpacking.

4-2. Preparation for Storage. Place 5 eight-unit bags of dessicant (item 1, table 1-16) in the accessory case. Store the tester in a dry area where the temperature range does not exceed -65 to 160°F (-54 to 71ºC).

4-3. Preparation for Reshipment. Place 5 eight-unit bags of dessicant (item 1, table 1-16) in the accessory case. Surround the tester with 2 inches of rubberized hog hair when packing for reshipment. Use the latest revision of specification MIL-P-116, method IIb, and JAN-P-100. A pallet (fig. 3-1) may be prepared to secure the tester in the shipping carton. Four holes in the pallet are for tie-down straps.

4-3.1. General Information for Storage and Shipment. For general technical information on preparation for storage and shipment, refer to TM 55-1500-204-25/1. For regulatory requirement pertaining to equipment placed in administrative storage, refer to AR 750-1.

Section II. CHECKOUT AND ANALYSIS

4-4. General. This section contains information for testing the performance and accuracy of the tester. This information, together with troubleshooting information contained in tables 4-4 through 4-11 enable maintenance personnel to rapidly localize tester malfunctions.

4-5. Warmup Procedure.

a. Turn FUNCTION SELECT, STD DAY, and MASTER POWER switches to OFF position.

b. Connect BH499A power cable to POWER INPUT receptacle and to 115 vat, 50-400 Hz power source.

c. Connect BH15184A power interconnect cable to two INTERCONNECT connectors on testerdeck.

d. Place the MASTER POWER switch in ON position and allow 15 minute warmup. POWER ON lamp glows when power is applied to tester.

4-6. Checkout Instructions.

a. Temperature Indicator Accuracy Check.

(1) Make the test setup of figure 4-1.

(2) Place T/C INPUT switch in CHECK CABLE position.

(3) Turn FUNCTION SELECT switch to TRIM.

(4) Turn TEMPERATURE switch to CAL 600° C and adjust CAL ADJ pot until the temperature indicator reads 600° C.

(5) Turn TEMPERATURE switch to OPERATE.

(6) Using temperature vs emf values in table 4-1 or other values equivalent to those in NBS Circular 561 for a chromelalumel thermocouple, check the accuracy of the temperature indicator throughout its range (0° to 1399° C).

(7) The displayed temperatures shall agree with the test signals + 2° C.

b. % RPM Indicator Accuracy Check.

(1) Turn RPM switch to CAL 100% RPM and adjust rpm CAL ADJ potentiometer until display reads 100.0% rpm.

(2) Turn RPM switch to N1 and short pin A to pin B in RPM INPUT INSTRUMENT CABLE receptacle. Display shall read 000.0 + 0.1% rpm.

(3) Turn RPM switch to N2 anad short pin C to pin B in RPM INPUT INSTRUMENT CABLE receptacle. Display shall read 000.0 + 0.1% rpm.

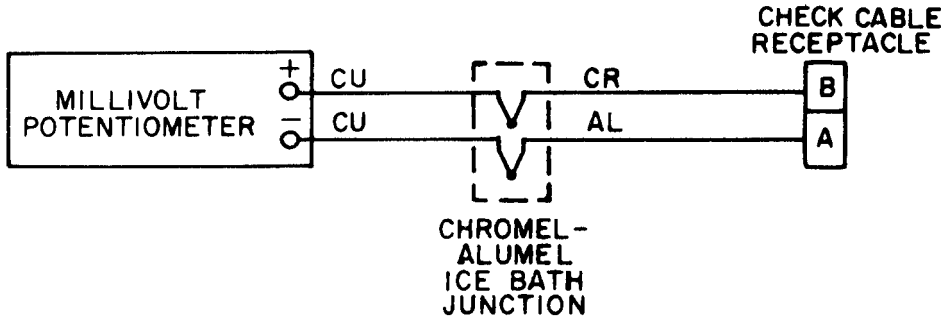


Figure 4-1. Temperature Indicator Test Setup.

Table 4-1. Temperature Indicator Accuracy Check Table.

Temperature °C	Millivolt Signal
0	0.00
200	8.13
400	16.40
600	24.91
800	33.30
1000	41.31
1200	48.89
1399	55.89

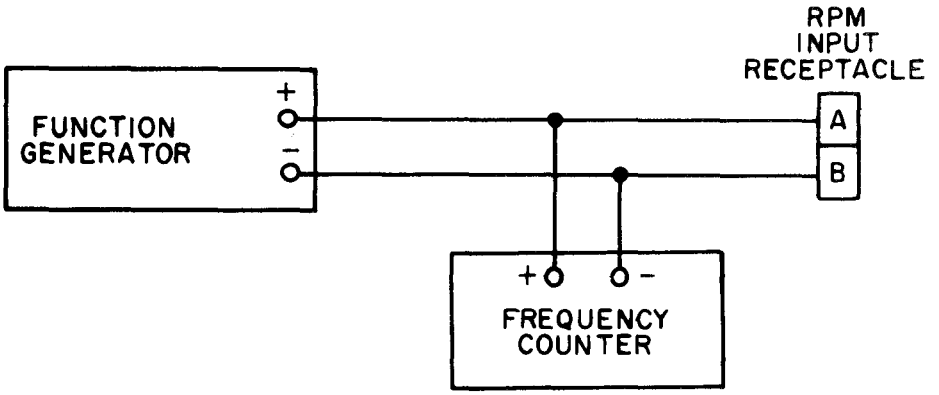


Figure 4-2. % RPM Indicator Test Setup.

c Standard Day Circuit Accuracy Check.

(1) Make testsetups of figures 4-1 and 4-2.

(2) Turn TEMPERATURE switch to OPERATE, RPM switch to N1, STD DAY switch to ON, FUNCTION SELECT switch to TRIM, and place T/C INPUT switch in CHECK CABLE position.

(3) Using 16.398 mvdc and 63 Hz as inputs (table 4-2), set AMB TEMP potentiometer to different settings in table 4-2 and check readings of temperature and % rpm displays against readings in table.

(4) Readings of the TEMP ºC display shall not differ more than + 3-1/2º and readings of the % RPM display shall not differ more than + 0.5% rpm from the corresponding values in the table.

d. Heater Probe Check and Heater Probe Control Circuit Accuracy Check.

CAUTION

Never add cold probes to a tester that is regulating other probes at elevated temperature. To do so could cause overheating of hot probes, since probe controller operates on average temperature.

NOTE

If less than 8 heater probes are used, the correlation between the PROBE CONTROL setting and the heater probe temperature may exceed +40 C.

(1) Make test setup of figure 4-3.

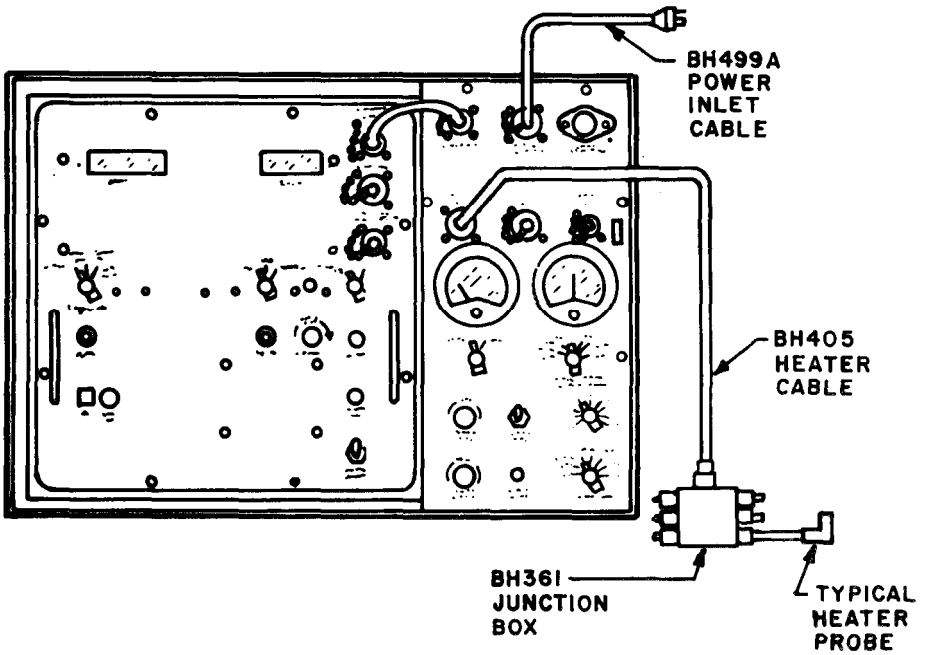


Figure 4-3. Test Setup of Heater Probe Control Circuit.

Table 4-2. Standard Day Circuit Test Table

Amp Temp Setting (°F)	Temperature Display			% RPM Display		
	16.398 (rev)	24.911 (rev)	33.299 (rev)	63 Hz (tpa = 15.893 ms)	70 Hz (tpa = 14.286 ms)	77 Hz (tpa = 12.987 ms)
-41	560	809	1055	100.1	111.2	flashes (out-of-range)
- 1	487	715	939	95.8	106.4	117.0
59	399	601	799	90.0	100.0	110.0
99	351	538	723	86.8	96.4	106.1
139	310	484	656	83.8	93.1	102.4

CAUTION

Suspend heater probes in air away from flammable material.

(2) Turn FUNCTION SELECT switch to HEATER PROBE, place T/C INPUT switch in HEATER CABLE position, turn PROBE CONTROL fully counterclockwise, turn TEMPERATURE switch to HEATER PROBE TEMP SET, and turn STD DAY switch to off.

(3) Adjust PROBE CONTROL until temperature indicator reads 600°C.

(4) Turn TEMPERATURE switch to OPERATE and observe probe temperature on indicator. While probes are heating up, PROBE POWER lamp glows continuously. As probe temperature approaches set temperature, PROBE POWER lamp begins to flash. If probe temperature exceeds set temperature, PROBE POWER lamp will go out until probe temeprature falls below set temperature. Wait until probe temperature begins to stabilize (lamp flashes on and off regularly) before taking a reading. Temperature indicator shall read 600 ± 4°C.

WARNING

Do not touch hot heater probes as severe burns could result.

(5) Place hand near each heater probe to determine if each probe is heating.

(6) Turn PROBE CONTROL fully counterclockwise and remove power from tester before disconnecting heater probes.

e. Spread Circuit Functional Check.

(1) Turn TEMPERATURE switch to OPERATE.

(2) Turn FUNCTION SELECT switch to SPREAD.

(3) Remove dust cap from SPREAD CABLE receptacle.

(4) Using a copper jumper wire with male contacts, jumper SPREAD CABLE receptacle contacts listed in table 4-3 when SPREAD switch is in corresponding positions and observe temperature indicator for an ambient temperature reading for each jumper position.

f. Insulation Resistance Accuracy Check.

(1) Connect BH485 instrument cable to INSTRUMENT CABLE receptacle and connect BH821 insulation adapter to instrument cable.

(2) Turn FUNCTION SELECT switch to INSUL.

(3) Adjust screw on INSULATION CHECK meter until meter reads infinity.

(4) Short alligator clips on insulation adapter.

(5) Turn INSULATION CHECK switch to RX100. Meter shall read zero.

(6) Connect a 10K (+ 5%) resistor between the alligator clips. Meter shall read 10K (+ 10%).

(7) Turn INSULATION CHECK switch to

Table 4-3. Spread Circuit Check Table.

Spread Switch Position	Jumper Position
All	A-B, A-C, A-D, A-E, A-F, A-G, A-I-I, A-I
1	A-B
2	A-C
3	A-D
4	A-E
5	A-F
6	A-G
7	A-H
8	A-I

RX1000. Remove resistor and short alligator clips. Meter shall read zero.

(8) Connect 1 100K (+ 5%) resistor between the alligator clips. Meter shall read 100K (+ 10%).

g. Resistance Check Circuit Accuracy Check.

(1) Connect BH485 instrument cable to INSTRUMENT CABLE receptacle and connect resistance check adapter to instrument cable.

(2) Turn RESISTANCE and A/C INDICATOR CHECK switch to NULL BAL position and turn FUNCTION SELECT switch to RES.

(3) Adjust screw on RESISTANCE & A/C INDICATOR CHECK meter until meter reads zero.

(4) Connect a precision 22-ohm resistor (table 1-15) to terminals of resistance check adapter.

(5) Turn RESISTANCE & A/C INDICATOR CHECK switch to 22 . RESISTANCE & A/C INDICATOR check meter shall read zero.

(6) Replace 22-ohm resistor of step (4) with a precision 15-ohrn resistor and turn RESISTANCE& A/C INDICATOR CHECK switch to 15 . Meter shall read zero.

(7) Replace 15-ohm resistor of step (6) with a precision 8-ohm resistor and turn RESISTANCE & A/C INDICATOR CHECK switch to 8 . Meter shall read zero.

(8) Replace 8-ohm resistor of step (7) with a precision 4.21 ohm resistor and turn RESISTANCE & A/C indicator check switch to 4.21 . Meter shall read zero.

h. Functional and Accuracy Check of Aircraft Indicator Check Circuit.

(1) Connect BH485 instrument cable to INSTRUMENT CABLE receptacle and connect BH822 egt indicator check adapter to instrument cable.

(2) Turn FUNCTION SELECT switch to A/C IND CHK position, RESISTANCE & A/C INDICATOR CHECK switch to NULL BAL position, and TEMPERATURE switch to OPERATE position.

(3) Connect a digital multimeter (table 1-15) with a 100 mdvc range between the + and - eyelet of the egt indicator check adapter if the adapter is for D'Arsonval type indicators or between terminal A (+) and terminal B (-) if the adapter is for null-balance type indicators.

(4) Turn A/C IND ADJ potentiometer from counterclockwise end to clockwise end while observing multimeter. Range of potentiometer shall be approximately 0-65 mvdc and there shall be no open spots throughout the range. During this check, TEMP °C indicator shall follow setting of potentiometer and display readings throughout the range of ambient temperature to 1399° C.

NOTE

4.21 position of RESISTANCE & A/C INDICATOR CHECK switch is for checking aircraft circuit resistance only.

(5) Turn RESISTANCE & A/C INDICATOR CHECK switch successively to 8 , 15 , and 22 positions. In each of the above positions, multimeter shall read higher than when switch is in NULL BAL position.

4-7. Trouble Analysis.

a. General Troubleshooting Information.

(1) Initial Check. Before troubleshooting a tester using tables 4-4 through 4-11 and paragraphs 4-7 *b* through 4-7 *e,* determine (1) that power of the proper voltage and frequency, as specified at the POWER INPUT receptacle, is applied to the tester, and (2) that the MASTER POWER switch is on.

(2) Gaining Access to Circuit Boards.

CAUTION

Always remove power from the tester when removing or installing a circuit board,

(a) Probe Controller Boards.

1. Disconnect BH15184A power interconnect cable from INTERCONNECT connectors.

2. Support tester lid and remove lid stop arm screw (12, fig. 4-29).

3. Remove screws (3) around edge of probe controller deck.

4. Lift controller asssembly high enough to slip support (fig. 1-43) under back edge of deck.

5. To operate tester after opening probe controller, connect BH15184A-1 power interconnect cable (table 1-15) to INTERCONNECT connectors.

(b) Trimmer Card Cage Boards

CAUTION

For proper terminal identification and to prevent damage to a circuit card in the card cage, install an extender board assembly (table 1-15) such that the lettered terminals are toward the deck and the circuit board such that its components are toward the deck.

1. Disconnect BH15184A power interconnect cable from INTERCONNECT connectors.

2. Remove screws (1, fig, FO-7) around edge of trimmer deck and lift deck assembly from case.

3. Remove circuit card retainers, (8) to gain access to circuit cards.

4. Place an extender board assembly (table 1-15) between the card cage receptacle and the circuit board being tested, observing the caution above.

5. To power the tester after removing the trimmer assembly, connect the BH15184A-1 power interconnect cable (table 1-15) between the INTERCONNECT connectors.

(3) Test Points. Test points, star-encircled Arabic numerals, e.g. , are identified on the schematic diagrams and board assembly drawings for the purpose of troubleshooting.

(4) Integrated Circuits. Note from the part lists in Section V of Chapter 4 that one board assembly may contain several integrated circuits having the same manufacturer's part number. Swapping locations of identical integrated circuits may provide a clue to a malfunction. Care should be exercised when swapping gates to note which circuits are affected by the gates.

CAUTION

Integrated circuit leads are fragile. Exercise care when removing or installing integrated circuits.

Always remove power from the tester when removing or installing a circuit component. The numbering of integrated circuit pins is explained in paragraph 1-4 *b (11) (b).*

b. Troubleshooting the DC Power Supplies. Table 4-12 lists voltages and voltage test points of the dc power supplies in the tester. Voltages shall be within voltage ranges when line voltage is 115 ± 15 percent. There are no adjustments to these voltages.

c. Troubleshooting the A/D **Converters.** Before troubleshooting an A/D converter, open the trimmer assembly per paragraph 4-7a. *(2) (b).* Make the testsetup of figure 4-1 when troubleshooting the TEMP °C indicator and of figure 4-2 when troubleshooting the % RPM indicator. When troubleshooting either indicator, apply a full-scale signal and use an oscilloscope to check the waveforms of figure 4-7. Indicator data is listed in table 4-13. Test points are identified in figures 4-8 and 4-9 and on the A/D converter schematics (figs. FO-4 and FO-5).

d. Troubleshooting the Temperature Compensator Circuits. There are three temperature compensators in the tester. One is on the calibrator board, one is on the temperature board, and one is on the probe control and function switch board. With power turned off, check the resistance of the precision 34K dropping resistor; R5 (19, fig. 4-36) on the calibrator board, R64 (28, fig. 4-34) on the temperature board, or R2 (43, fig. 4-37) on the probe control and function switch board. Do this by lifting one end of the resistor and measuring it with a digital multimeter. It shell measure 34K ± 34 ohms at 25° C (77°F). With the end of the resistor still up, measure the resistance of the compensator between terminals B and E. The compensator shall measure 33.2 ± 0.4 ohms at 20°C (68°F).

e. Troubleshooting Heater Probe Control Circuit. When troubleshooting the heater probe control circuit, open the probe controller assembly per paragraph ***4-7a (2) (a).*** Connect the BH405 heater cable to the tester and connect a known good heater probe to the heater cable receptacle.

WARNING

To prevent electrical shock or damage to test equipment, use an isolation transformer to power the oscilloscope or tester when troubleshooting the secondary winding of T1 on the probe control and function switch board or the SCR circuits.

CAUTION

Suspend the probe away from flammable material.

Turn the TEMPERATURE switch to HEATER PROBE TEMP SET, and adjust PROBE CONTROL to an elevated temperature (not to exceed 600º C). Use an oscilloscope to check the waveforms of table 4-14. Test points are identified in figure 4-5 and on the probe controller schematic (fig. FO-2).

Table 4-4. General Troubleshooting Table.

Malfunction	Probable Cause	Corrective Action
POWER ON lamp does not light when MASTER POWER switch is on.	a. Open circuit breaker, CB1, in probe controller b. Open circuit breaker, CB1, in trimmer. c. Defective MASTER POWER switch d. Defective power transformer	a. Replace circuit breaker (30, figure FO-8). b. Replace circuit breaker (25, figure FO-7). c. Replace switch (41). d. Replace transformer (39).
POWER ON lamp lights when MASTER POWER switch is on but displays do not light when DISPLAY control is turned clockwise.	a. Defective DISPLAY control b. Trimmer PCB retainer left off card cage and boards loose in connectors. c. Defective 15 vdc supply d. Defective lamp voltage voltage e. Defective logic voltage supply.	a. Replace control (63, figure FO-7). b. Install retainer (8). c. Repair 15 vdc supply. d. Repair lamp voltage supply. e. Repair logic voltage supply.
Display digit shows wrong numeral sequence or digit has missing segments but checks OK on press-to-test.	a. One of decade counters DC1-DC3, DC6, DC7 or one of counter-latch-decoders CLD1-CLD4, or CLD9-CLD12 defective	a. Replace defective circuit.

Table 4-5. TEMP °C Indicator Troubleshooting Table.

Malfunction	Probable Cause	Corrective Action
TEMP °C indicator drifts upscale to 1400°C then flashes on and off.	a. Open input circuit	a. Provide an input signal and check for open in appropriate temperature signal circuit. See figures 1-16 and 1-17.
TEMP °C indicator cannot be calibrated with CAL ADJ pot.	a. Temperature indicator out of calibration. b. Temperature signal generator out of calibration. c. Defective CAL ADJ pot or connecting wires d. Defective A/D converter	a. Calibrate. b. Calibrate. c. Replace pot (69, figure FO-7) or repair wire. d. Troubleshoot per para. 4-7c.

Table 4-6. % RPM Indicator Troubleshooting Table.

Malfunction	Probable Cause	Corrective Action
% RPM indicator cannot be calibrated with CAL ADJ pot.	a. %RPM indicator out of calibration	a. Calibrate.
	b. Defective + 7 vdc supply cm calibrator board	b. Repair + 7 vdc supply.
	c. Defective 70 Hz signal generator on calibrator board	c. Repair signal generator
	d. Defective CAL ADJ pot or connecting wires	d. Replace pot (65, figure FO-7)
	e. Defective A/D converter	e. Troubleshoot per para. 4-7C.

Table 4-7. Standard Day Circuit Troubleshooting Table.

Malfunction	Probable Cause	Corrective Action
Standard day circuit causes excessive shift in temperature and % rpm readings.	a. Standard day circuit out of calibration	a. Calibrate.
AMB TEMP potentiometer circuit cannot be calibrated.	a. Defective AMP TEMP	a. Replace potentiometer
	b. Defective amplifier A1 on calibrator board	b. Replace amplifier (4, figure 4-36)
	c. One of resistors R7-R11 on calibrator board defective	c. Replace defective resistor.
	d. Defective 9-volt zener diode, CR1, on calibrator board	d. Replace diode (13).

Table 4-8. Heater Probe Control Circuit Troubleshooting Table.

Malfunction	Probable Cause	Corrective Action
Heater probes will not heat.	a. Defective heater cable	a. Repair or replace cable.
	b. Probe controller circuit breaker CB1 open	b. Replace circuit breaker (30, figure FO-8)
	c. Relay K1 defective	c. Replace relay (28).
	d. Probe controller transformer T1 defective	d. Replace transformer (2).
	e. Defective amplifier (A 1 or A2) transformer (T1), or silicon controlled rectifier (SCR2) on probe control and function switch board.	e. Check waveforms per para. 4-7e and replace defective component.
	f. Voltage at test point 43 not in phase with line voltage	f. Check phasing and correct at transformer T1 on probe control and function switch board.
	g. SCR2 (rectifier furthest from transformer T1 inside probe control compartment defective.	g. Replace rectifier.
Heater probes heat too slowly.	a. SCR1 on probe control and function switch board defective	a. Replace rectifier (11, figure 4-37).
	b. SCR1 rectifier nearest transformer T1 inside probe control compartment) defective	b. Replace rectifier.
Heater probe temperature cannot be set with PROBE CONTROL.	a. PROBE CONTROL defective	a. Replace control (20, figure FO-8)
	b. TEMPERATURE switch defective	b. Replace switch (23, figure 4-31).
Heater probe temperature excessively overshoots or undershoots temperature setting.	a. Q3 on probe control and function switch board defective	a. Check waveform per para. 4-7e and replace Q3 (49, figure 4-37) if defective.
Heater probes heat continuously.	a. A1, A2, Q2, SCR1, or SCR2 on probe control and function switch board defective	a. Check waveforms per para. 4-7e and replace defective component.
	b. SCR1 or SCR2 (rectifiers inside probe control compartment defective	b. Replace detective rectifier.
Heater probe temperature and set temperature differ more than + 4ºC.	a. Fewer than 8 heater probes being used with tester.	a. Calibrate heater probe control circuit.
	b. Heater probe control circuit out of calibration.	b. Calibrate circuit.

Table 4-9. Insulation Check Circuit Troubleshooting Table.

Malfunction	Probable Cause	Corrective Action
INSULATION CHECK meter cannot be adjusted to read infinity when FUNCTION SELECT switch is not in INSUL position.	a. INSULATION CHECK meter	a. Replace meter (37, figure figure FO-8).
INSULATION CHECK meter reads infinity with insulation check adapter jumpered and INSULATION CHECK switch in either position.	a. Defective insulation check adapter. b. Defective instrument cable. c. Resistor R26 or R27 on resistance and insulation check board d. Defective FUNCTION SELECT switch e. Defective INSULATION CHECK switch	a. Repair or replace adapter. b. Repair or replace cable c. Replace defective resistor (3, 6, figure 4-38). d. Replace switch (32, figure 4-37). e. Replace switch (13, figure 4-38).
INSULATION CHECK meter drives to zero end with INSULATION CHECK switch in either position.	a. Resistor R30 or R32 on resistance and insulation check board b. Defective FUNCTION SELECT switch.	a. Replace defective resistor (5, 2, figure 4-38). b. Replace switch (32, figure 4-37).

Table 4-10. Resistance Check Circuit Troubleshooting Table.

Malfunction	Probable Cause	Corrective Action
RESISTANCE CHECK meter cannot be zeroed.	a. Defective RESISTANCE CHECK meter	a. Replace meter (34, figure FO-8).
RESISTANCE CHECK meter does not deflect when RESISTANCE & A/C INDICATOR CHECK switch is in any position.	a. Defective RESISTANCE CHECK meter b. Defective FUNCTION SELECT switch c. Defective BAL potentiometer (R2) on resistance and insulation check board	a. Replace meter (34, figure FO-8). b. Replace switch 32, figure (4-37). c. Replace potentiometer (7, figure 4-38).
RESISTANCE CHECK meter deflects in full clockwise direction in all resistance positions of RESISTANCE & A/C INDICATOR CHECK switch.	a. Defective resistance check adapter b. Defective instrument cable c. Resistor R3 open on resistance and insulation check board. d. Defective FUNCTION SELECT switch	a. Repair or replace adapter b. Repair or replace cable. c. Replace resistor (1, figure 4-38). d. Replace switch (32, figure 4-37).

Table 4-11. Aircraft Indicator Check Circuit Troubleshooting Table.

Malfunction	Probable Cause	Corrective Action
TEMP °C indication cannot be adjusted with A/C IND ADJ.	a. Defective A/C IND ADJ potentiometer	a. Replace potentiometer (25, figure FO-8).
	b. Defective 9 vdc power supply on probe control and function switch board.	b. Repair power supply.
	c. Defective RESISTANCE & A/C INDICATOR CHECK switch	c. Replace switch (18, figure 4-38).
	d. Defective FUNCTION SELECT switch	d. Replace switch (32, figure 4-37).
Range of A/C IND ADJ is too high when RESISTANCE & A/C INDICATOR CHECK switch is in NULL BAL position.	a. Resistor R19 open on resistance and insulation check board	a. Replace resistor (25, figure 4-38).
Aircraft indicator check circuit cable will not drive aircraft indicator.	a. Defective instrument cable	a. Repair or replace cable.
	b. Defective egt indicator check adapter	b. Repair or replace adapter.
	c. Defective FUNCTION SELECT switch	c. Replace switch (32, figure 4-37).
	d. Defective RESISTANCE & A/C INDICATOR CHECK switch	d. Replace switch (18, figure 4-38).
	e. One of resistors R22, R23, or R24 on resistance and insulation check board open (D'Arsonval indicator)	e. Replace defective resistor (21, 20, 19).

Table 4-12. DC Power Supply Voltages,

Power Supply	Board Location	Test Points			Voltage Range (vdc)
		+	–	Figure No.	
+28 vdc	BH15720-3	16	13	4-4	25 to 32
+15 vdc	BH15720-3	15	13	4-4	14.8 to 15.2
+9 vdc	BH15801-1	20	21	4-5, sht 1	8.78 to 9.23
+7 vdc	BH16365-1	46	23	4-6	5 to 9*
+5 vdc (logic voltage)	BH15720-3	1 9	1 3	4-4	4.7 to 5.2
+5 vdc (lamp voltage)	BH15720-3	17	18	4-4	4.5 to 5.2
-7 vdc	BH16465-1	23	22	4-6	-5 to -9*
15 vdc	BH15720-3	13	14	4-4	-14.8 to -15.2

* ± 7 vdc supply is non-regulated.

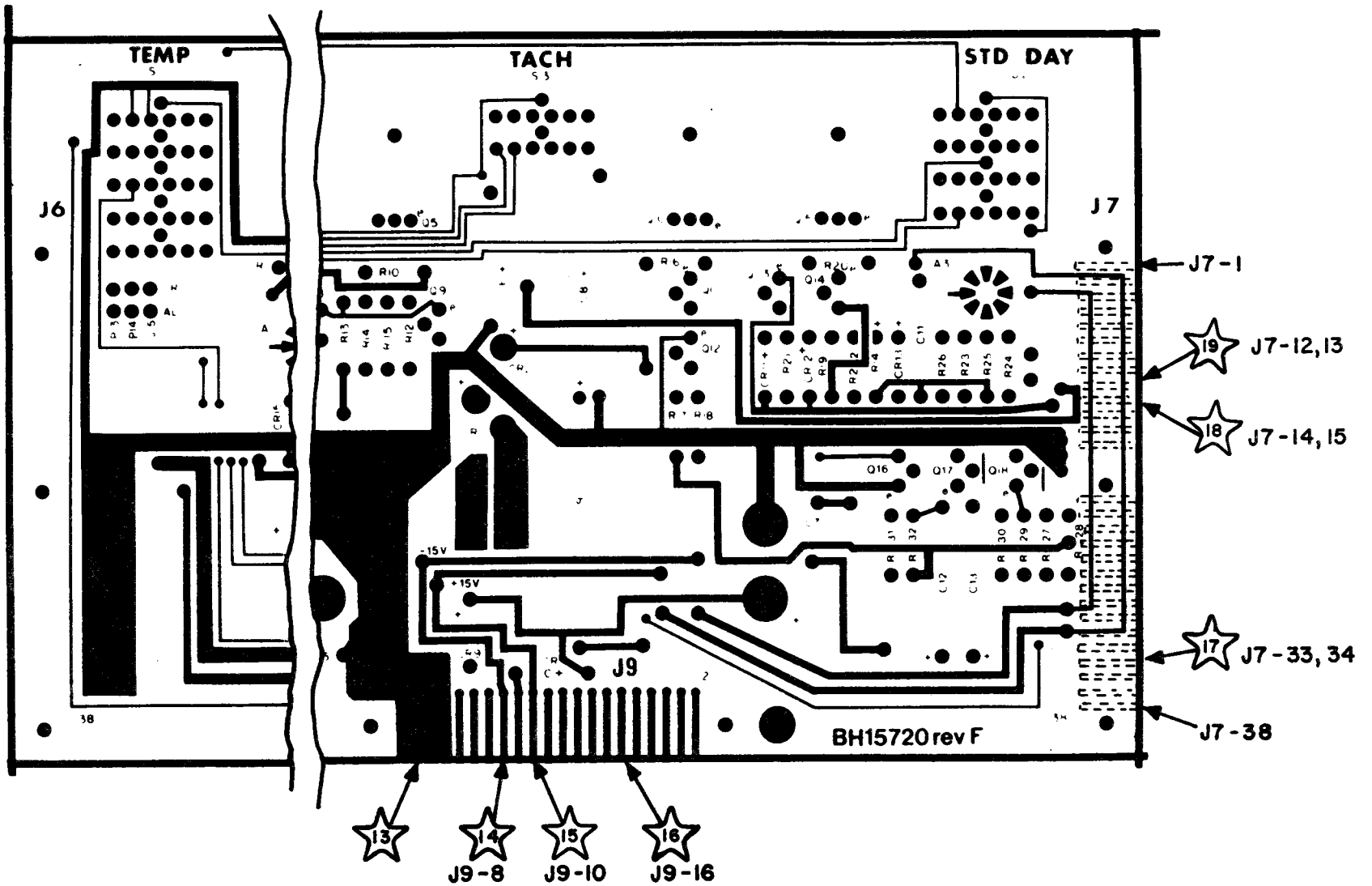


Figure 4-4. Switch-Power Board, BH15720-3, Test Points

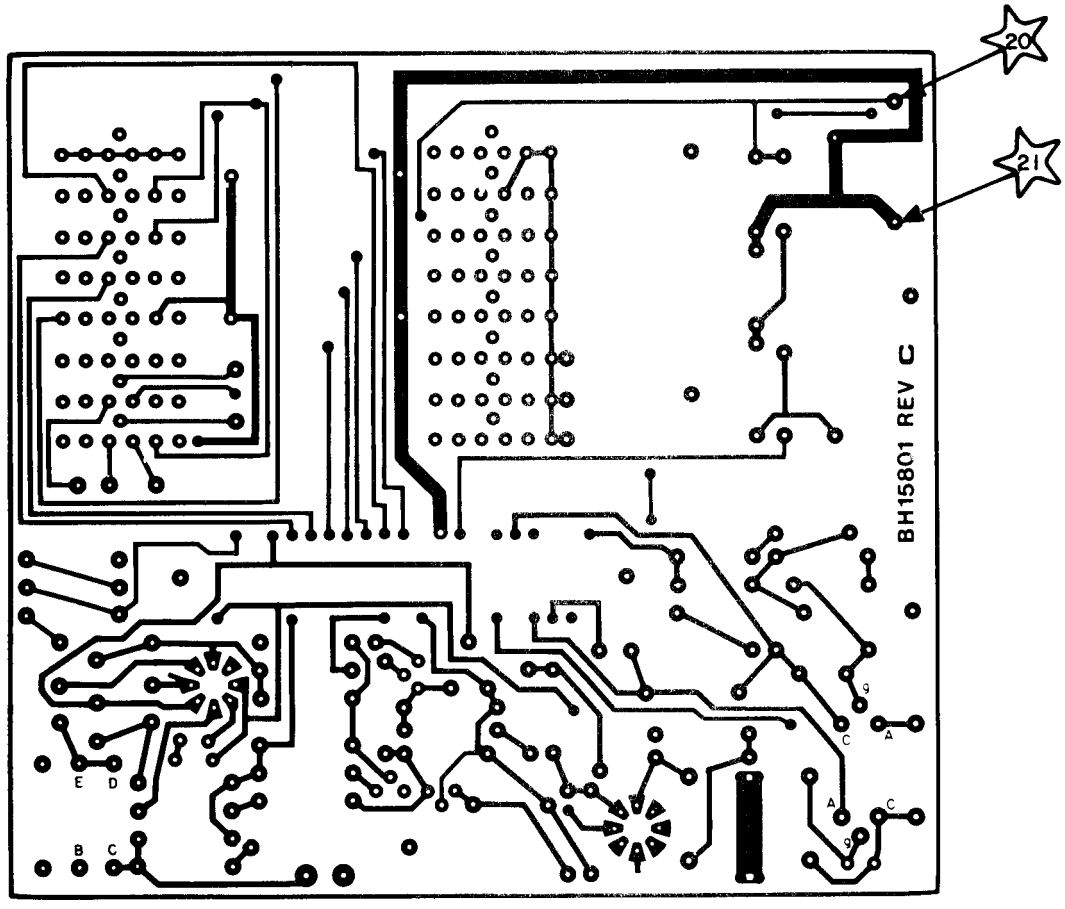


Figure 4-5. Probe Control and Function Switch Board, BH15801-1, Test Points (Sheet 1 of 2)

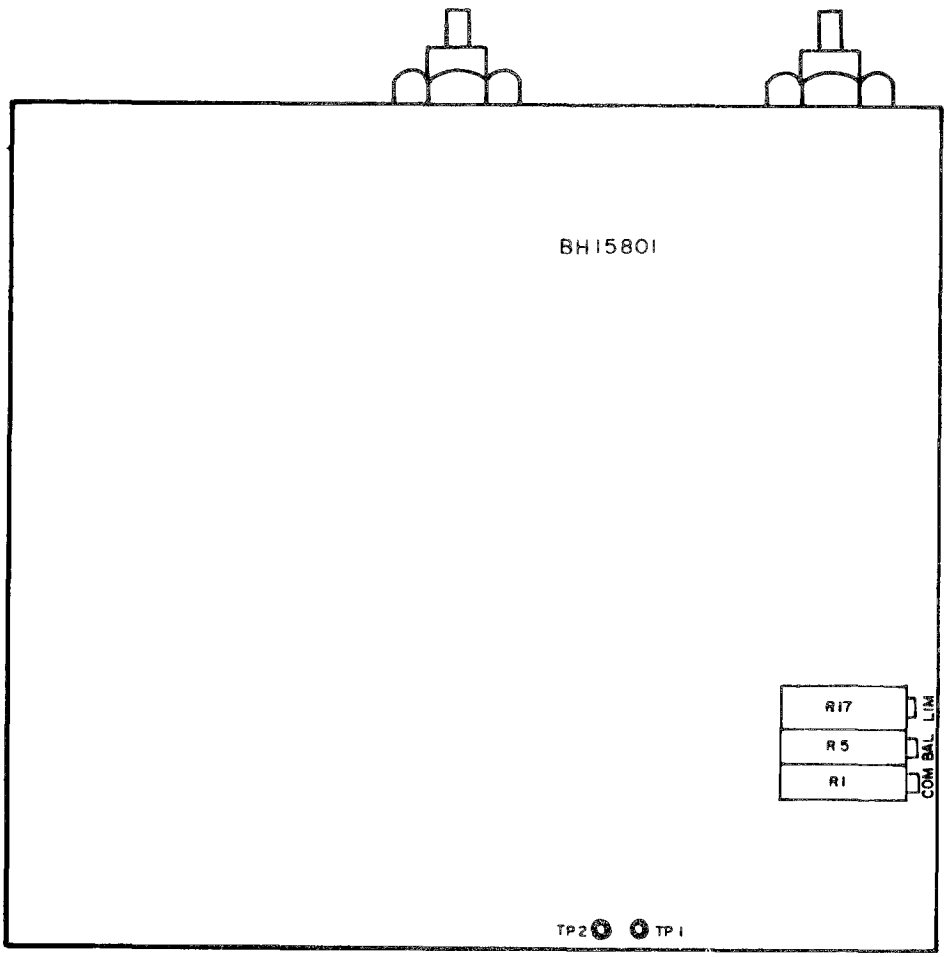


Figure 4-5. Probe Control and Function Switch Board, BH15801-1, Test Points (Sheet 2 of 2)

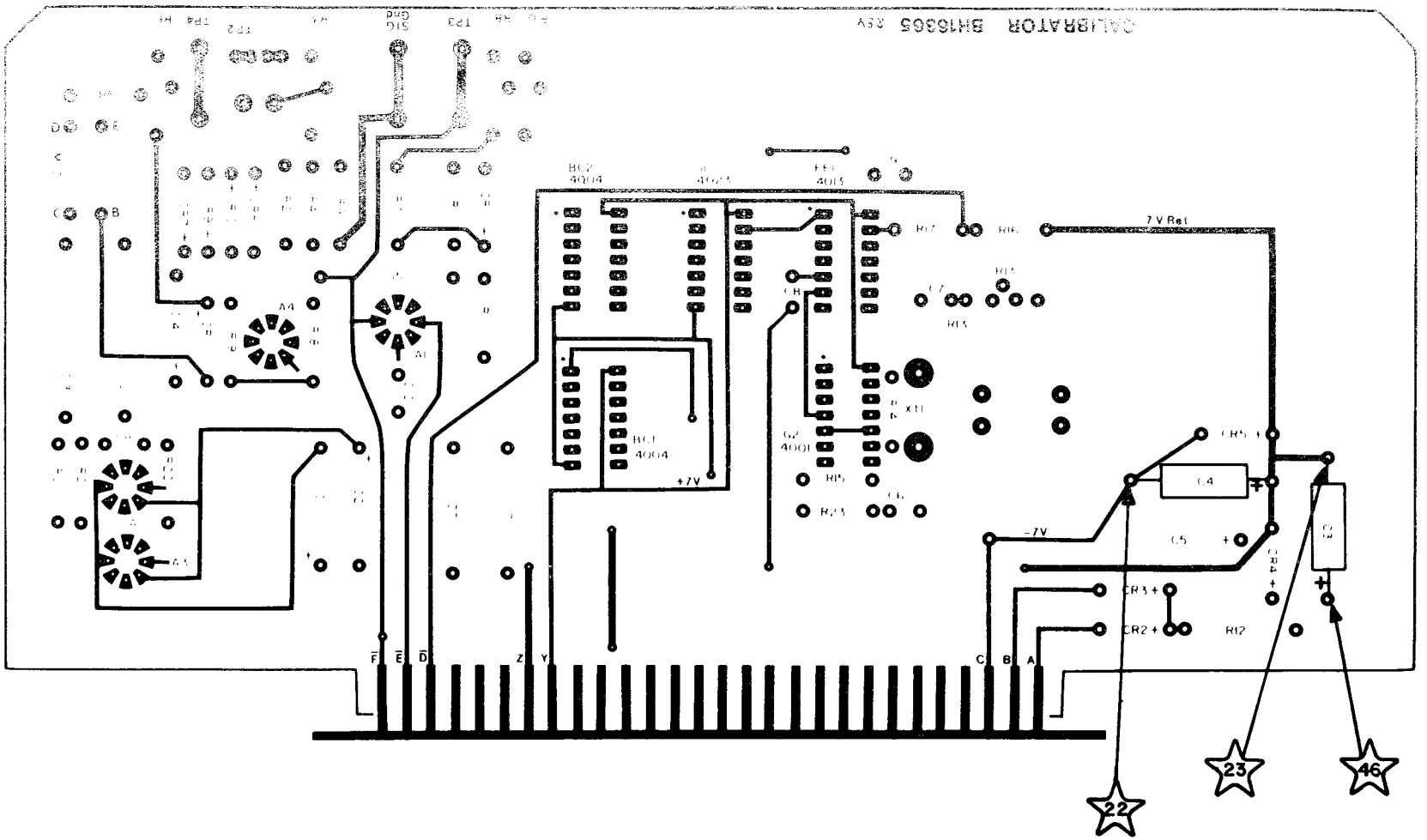
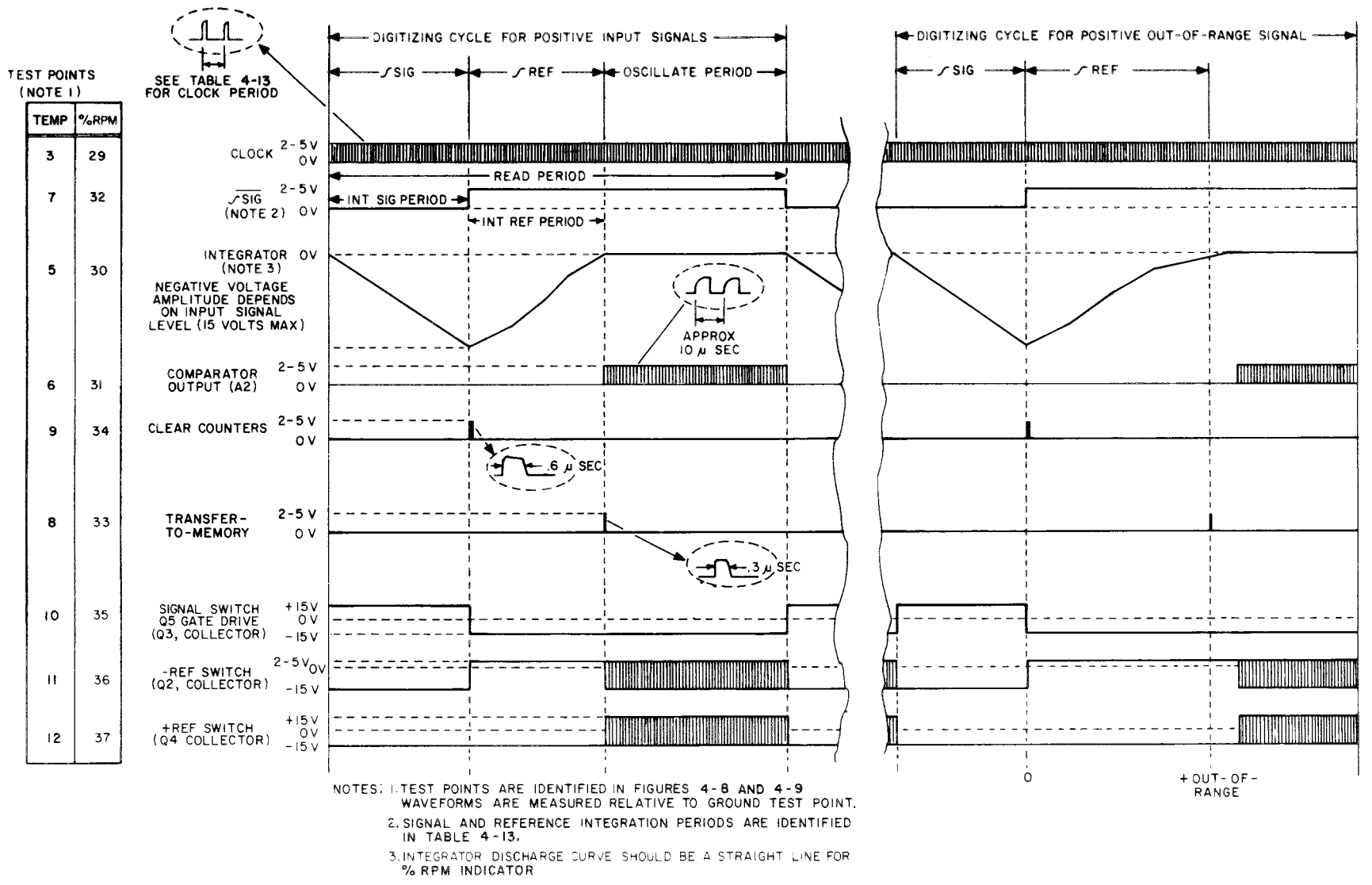


Figure 4-6. Calibrator Board, BH16365-1, Test Points



NOTES: 1. TEST POINTS ARE IDENTIFIED IN FIGURES 4-8 AND 4-9 WAVEFORMS ARE MEASURED RELATIVE TO GROUND TEST POINT.

2. SIGNAL AND REFERENCE INTEGRATION PERIODS ARE IDENTIFIED IN TABLE 4-13.

3. INTEGRATOR DISCHARGE CURVE SHOULD BE A STRAIGHT LINE FOR % RPM INDICATOR

Figure 4-7. Indicator Waveforms

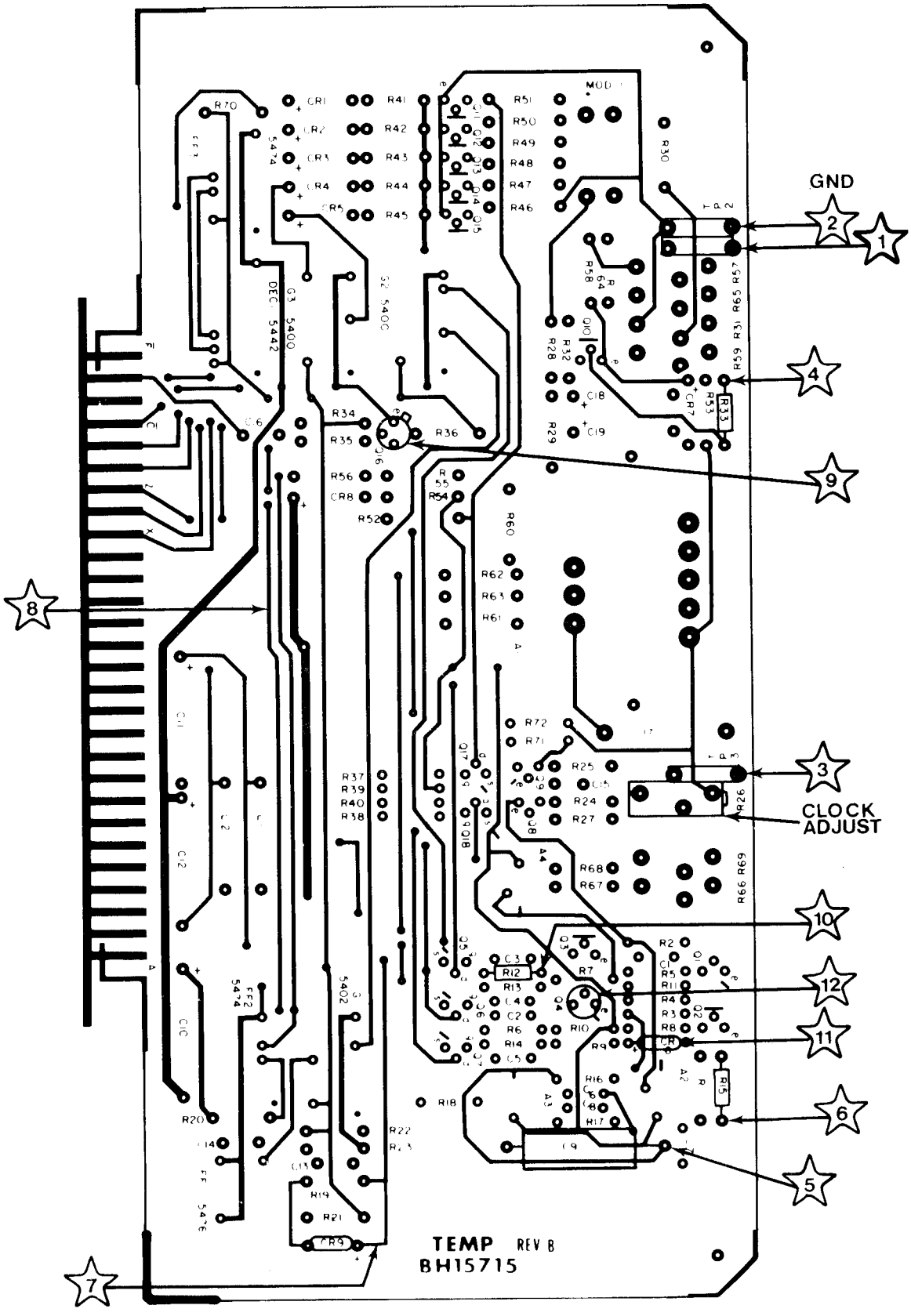


Figure 4-8. Temperature Board, BH 15715-1, Test Points

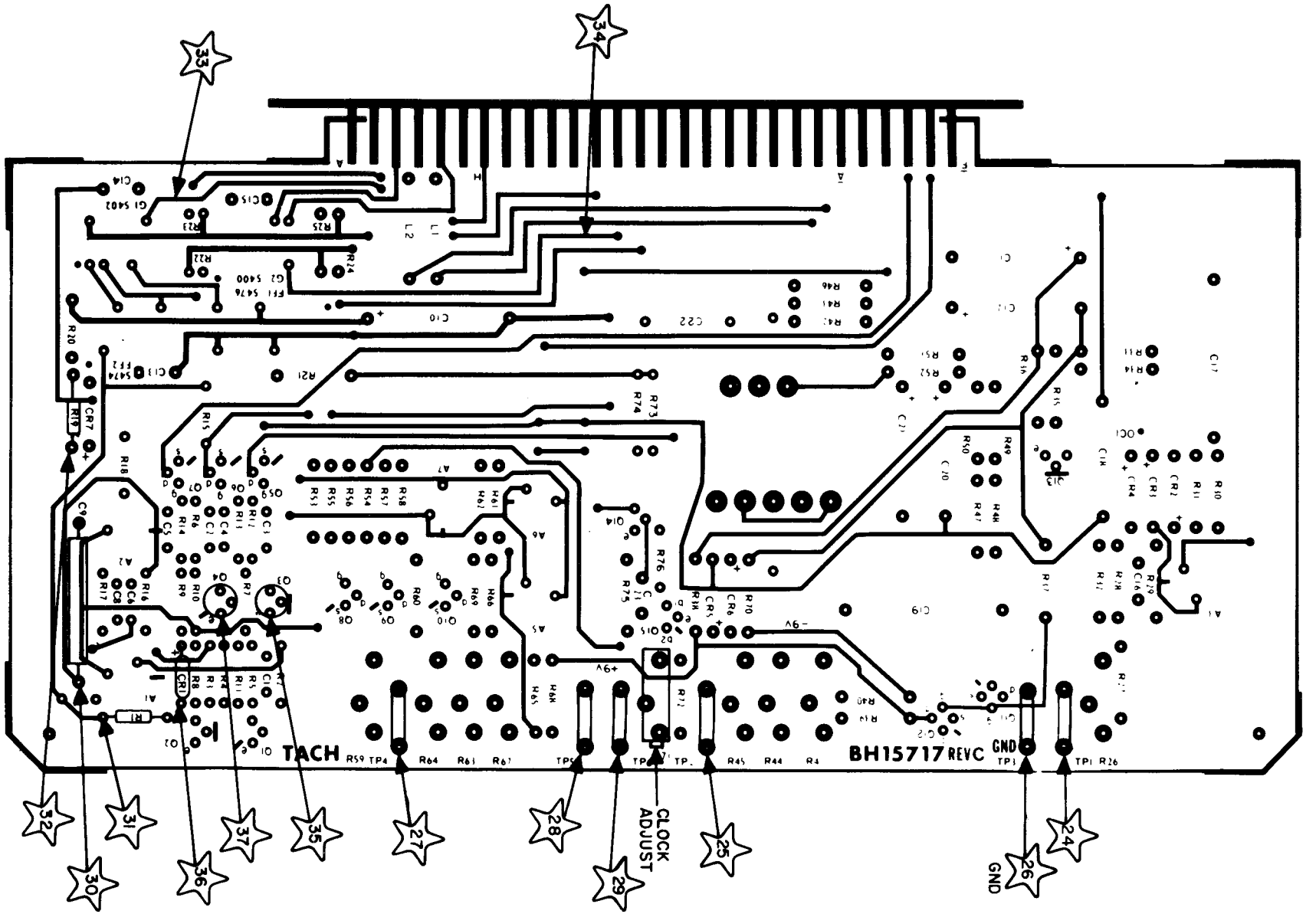
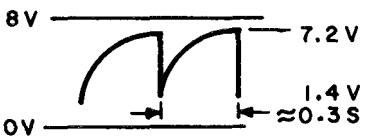
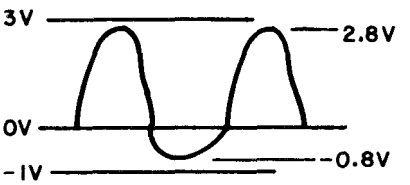
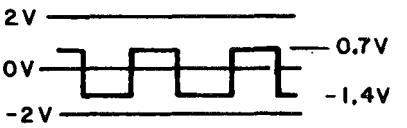
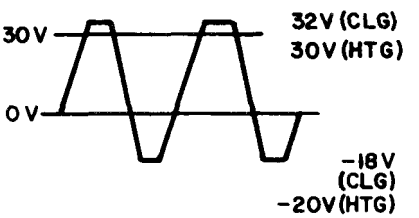


Figure 4-9. Tachometer Board, BH15717-1, Test Points

Table 4-13. Indicator Data Table.

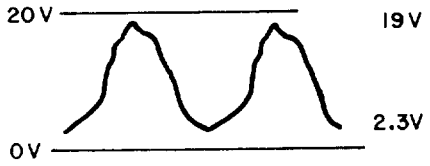
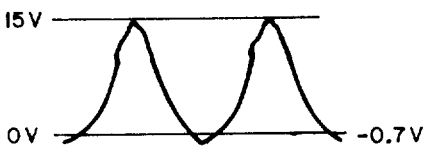
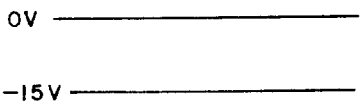
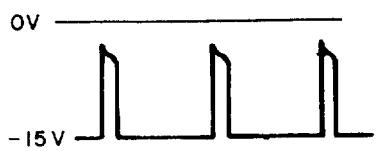
Indicator Parameter	Clock Period (usec)	Signal Counter Start	Period States Finish	Reference Period Counter State + Out-of-Range	Preamp Output for Full-Scale Inputs	Preamp Output for Zero Reading
Temperature	100	3000	4000	1400	8.44 vdc (+ 0.4 vdc) at 1399° C. Measure at test point 4 in figure 4-8.	0 + 0.04 vdc
% rpm	100	3000	4000	1200	7.16 vdc (+ 0.72 vdc) at 199.9% rpm. Measure at test point 25 in figure 4-9.	0 + 0.04 vdc

Table 4-14. Heater Probe Control Circuit Waveforms.

Test Point (figure 4-5, sht 2	Waveform*	Remarks
40		Use internal sync.
41		Heater probes cooling. Use line sync. Period determined by line frequency.
41		Heater probes heating. Use line sync. Period determined by line frequency.
42		Use line sync. Period determined by line frequency.
43		Use line sync. Period determined by line frequency.

* All waveforms are referenced to test point 38. Waveform amplitudes may vary± 10% due to component tolerances.

Table 4-14. Heater Probe Control Circuit Waveforms. (Continued)

Test Point (figure 4-5, sht 2)	Waveform*	Remarks
44		Heater probes cooling. Use line sync. Period determined by line frequency.
44		Heater probes heating. Use line sync. Period determined by line frequency.
45		Heater probes cooling. Use line sync.
45		Heater probes heating. Use line sync. Period determined by line frequency

* All waveforms are referenced to test point 38. Waveform amplitudes may vary ± 10% due to component tolerances.

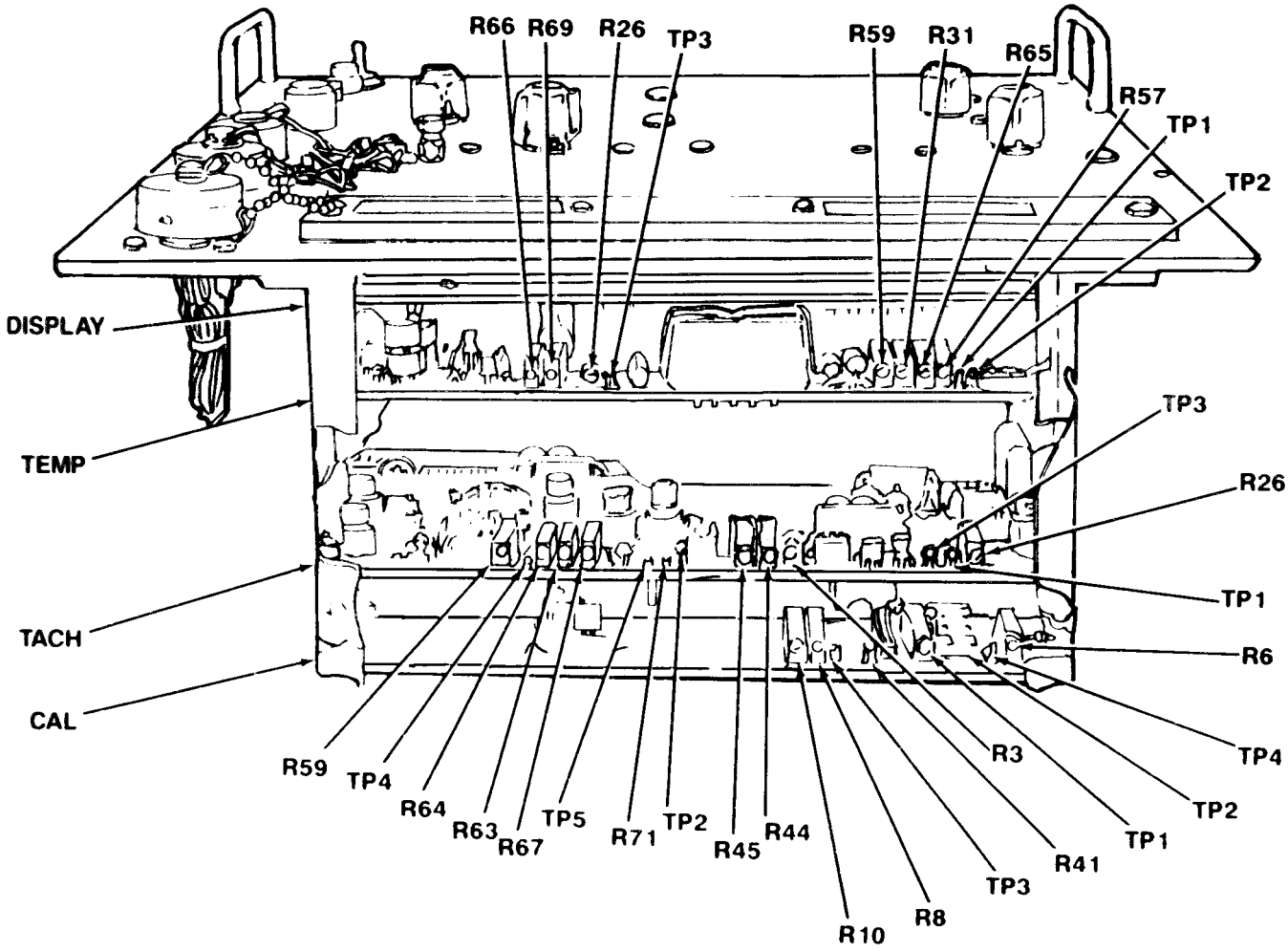


Figure 4-10. Trimmer Tester Points and Adjustments

4-8. SCHEMATIC DIAGRAMS. The following is a list of the schematic diagrams. Tester schematics appear first followed by accessory schematics.

Index of Schematic Diagrams

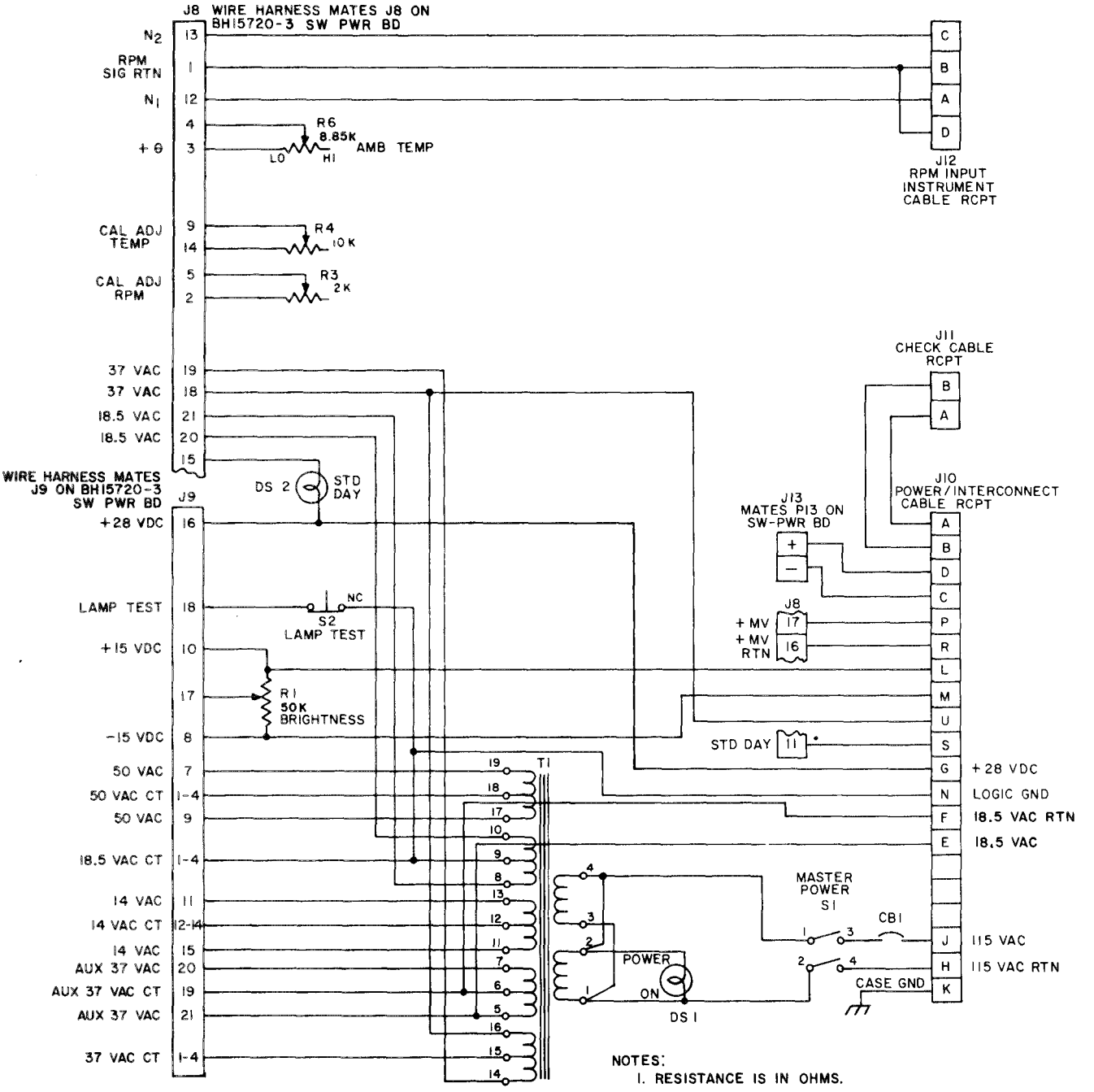


Figure 4-11. Trimmer Assembly, BH15195A-8, Schematic

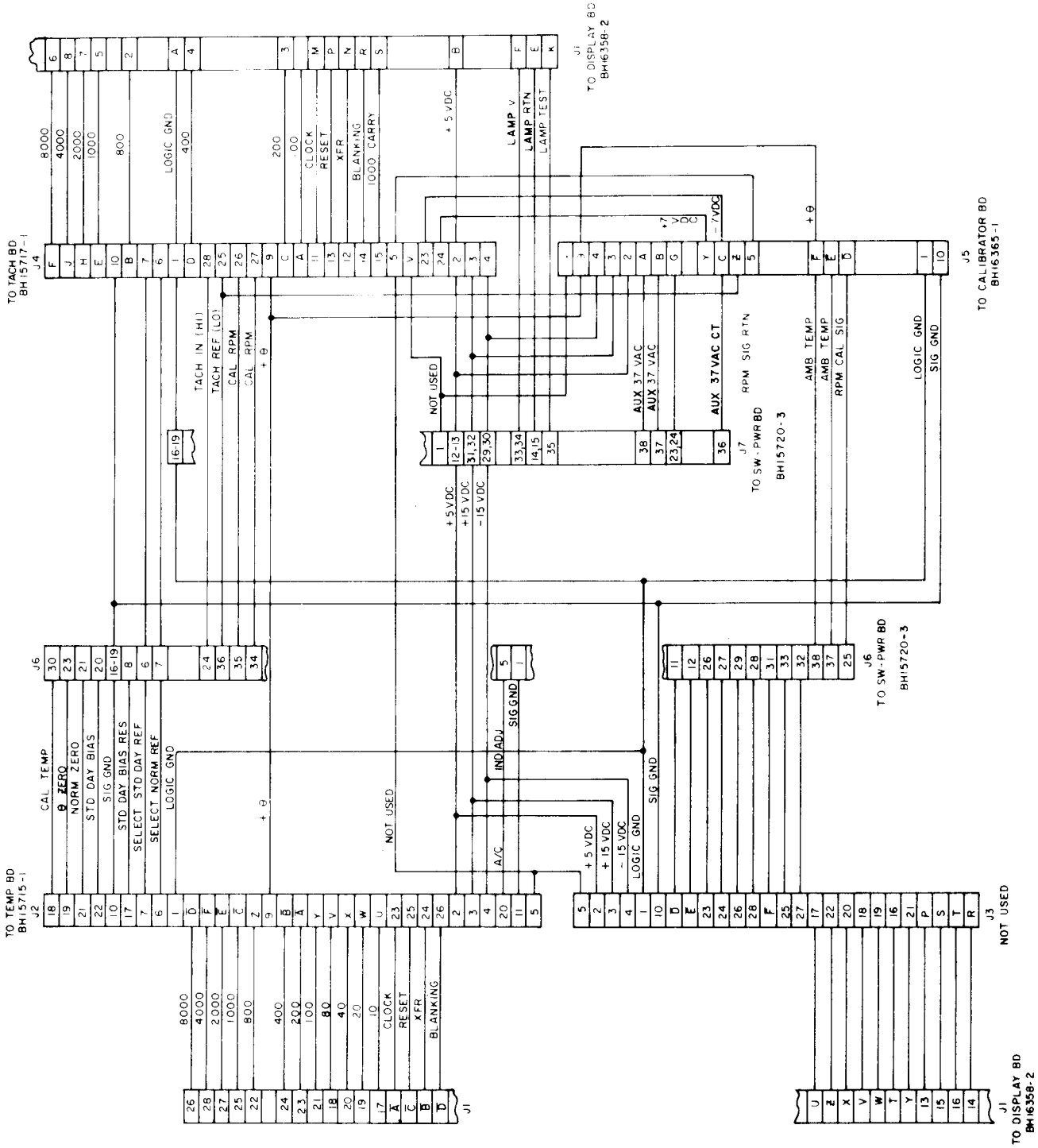
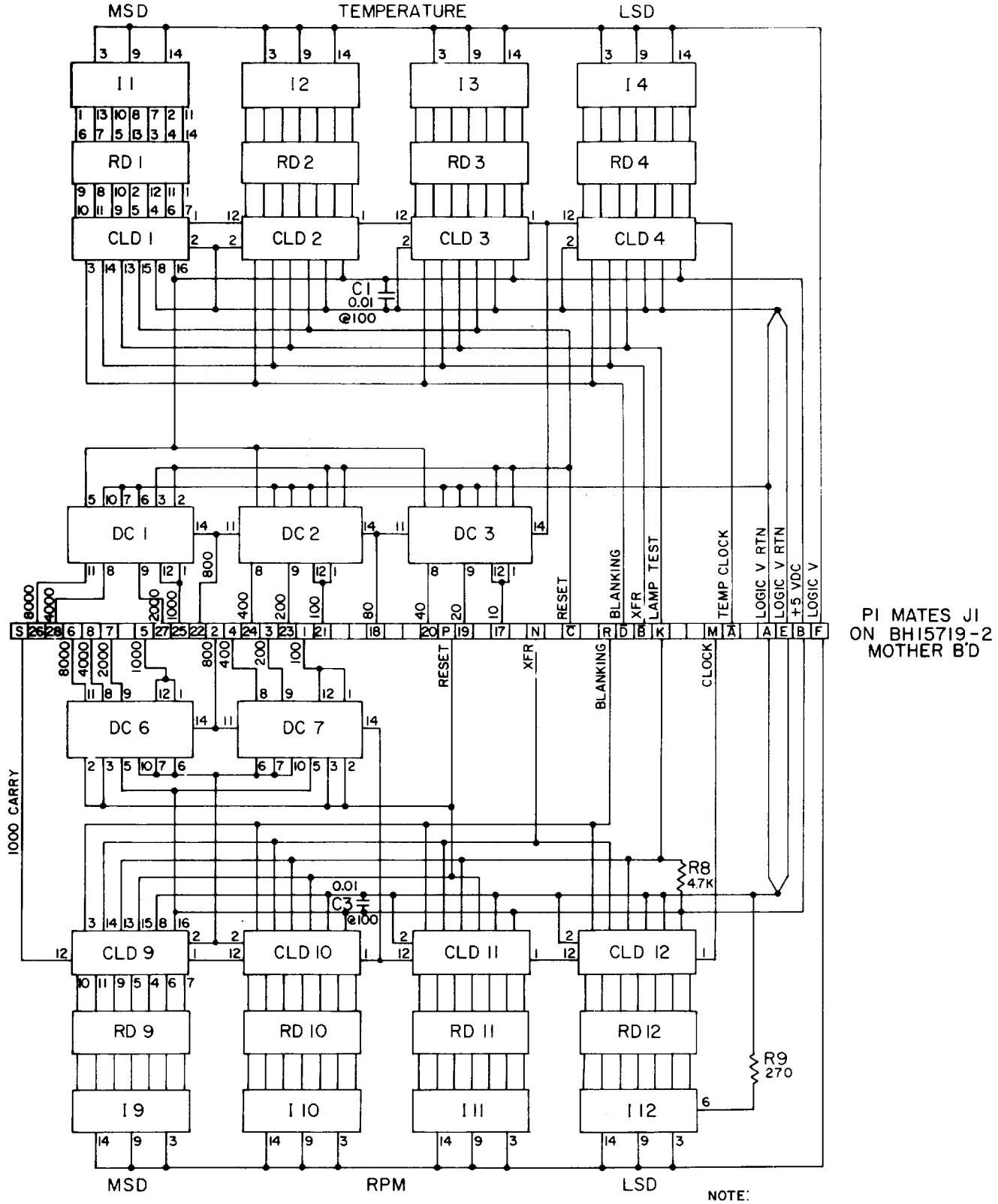


Figure 4-12. Mother Board, BH15719-2, Schematic



NOTE:
1. RESISTANCE IS IN OHMS AND CAPACITANCE IS IN MICROFARADS UNLESS OTHERWISE NOTED.

Figure 4-13. Display Board, BH16358-2, Schematic

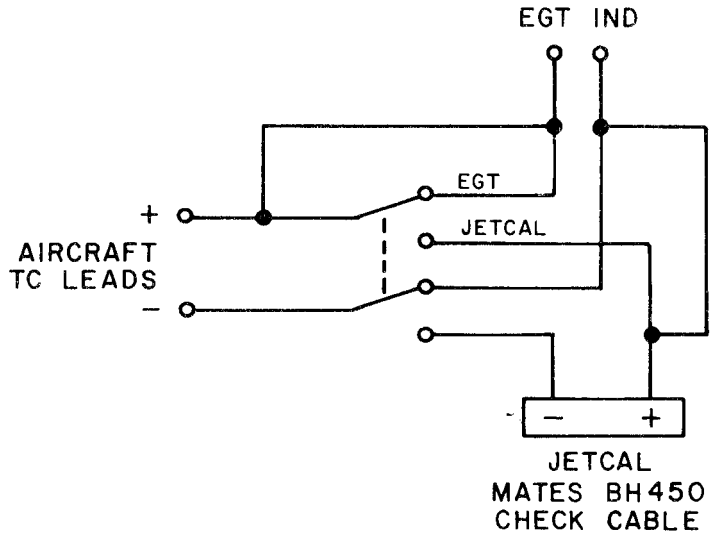
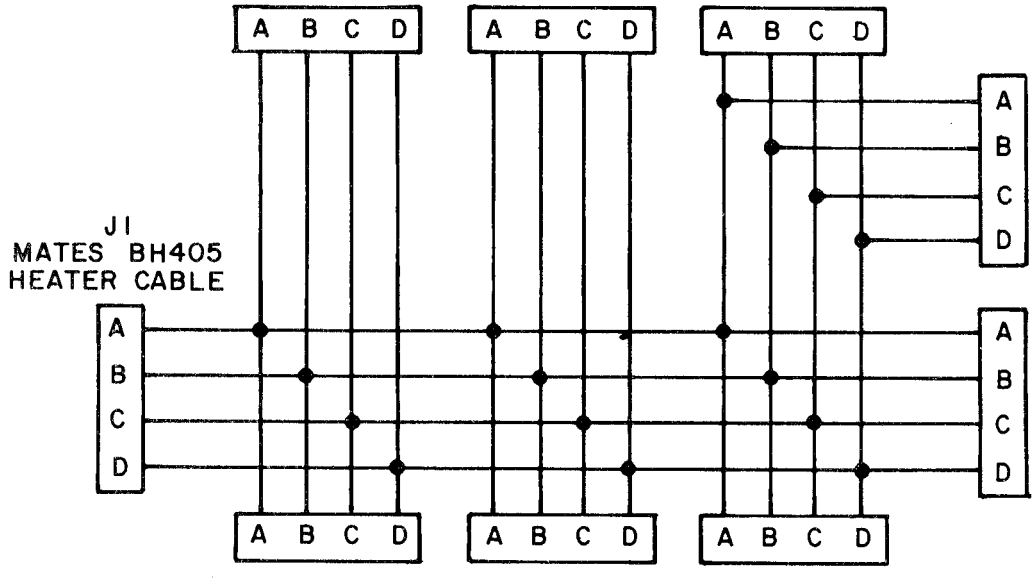


Figure 4-14. Switch Box, BH123-3, Schematic.



NOTES:

1. WIRES CONNECTED TO PINS A AND B ARE 16 GA COPPER
2. WIRES CONNECTED TO PINS C ARE 24 GA ALUMEL
3. WIRES CONNECTED TO PINS D ARE 24 GA CHROMEL
4. ALL CONNECTORS EXCEPT J1 MATE HEATER PROBES

Figure 4-15. Junction Box, BH361-8, Schematic

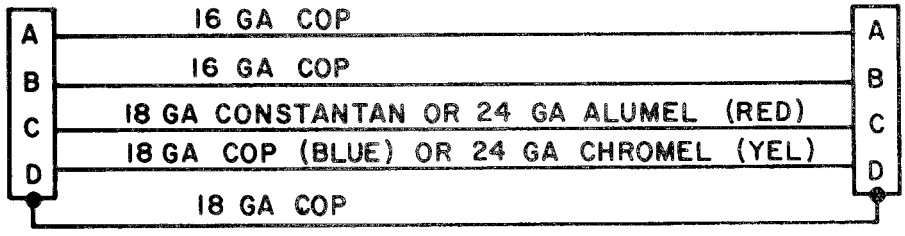


Figure 4-16. Heater Cable, BH405, Schematic.

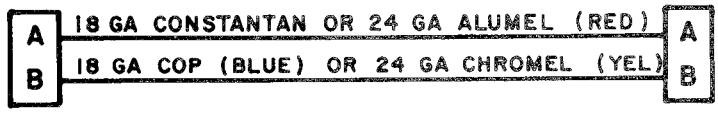


Figure 4-17. Check Cable, BH450, Schematic.

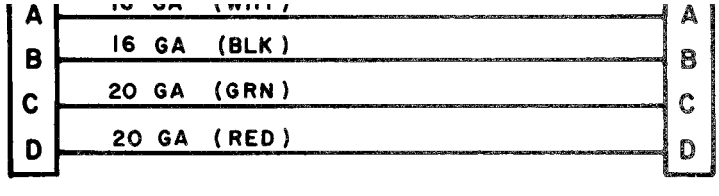


Figure 4-18. Instrument Cable, BH485, Schematic

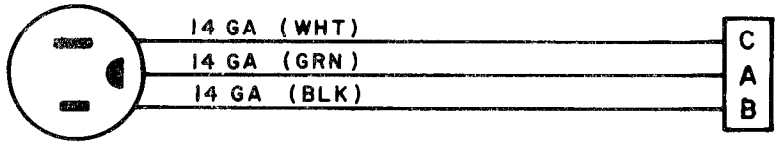


Figure 4-19. Power Cable, BH499A, Schematic.

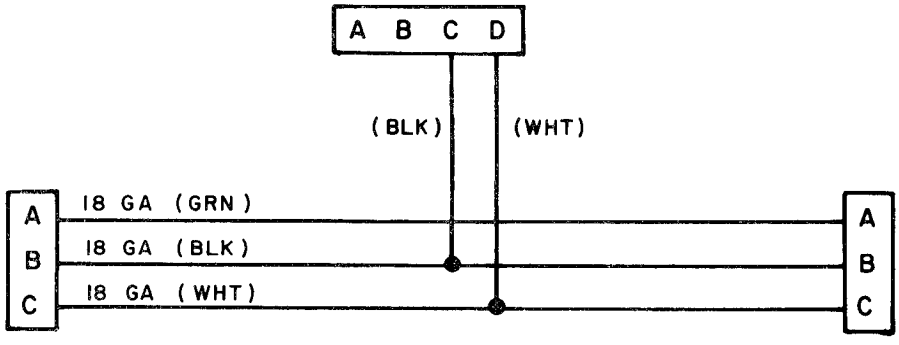


Figure 4-20. RPM Check Adapter, BH820, Schematic.

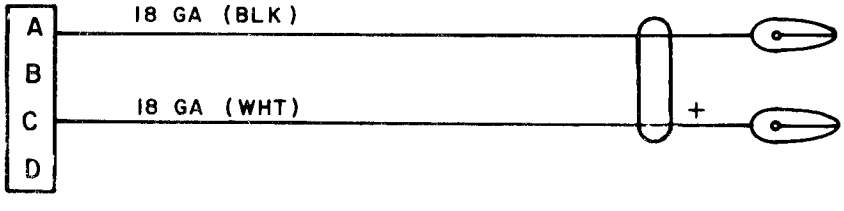


Figure 4-21. Insulation Check Adapter, BH821, Schematic

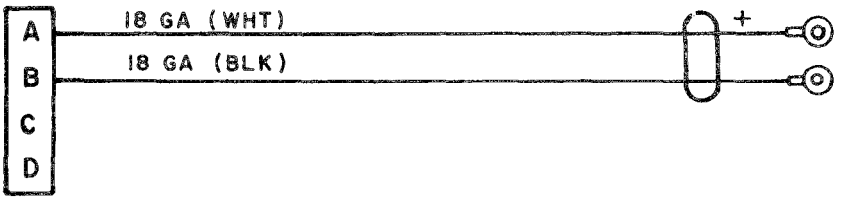


Figure 4-22. EGT Indicator Check Adapter, BH822, Schematic.

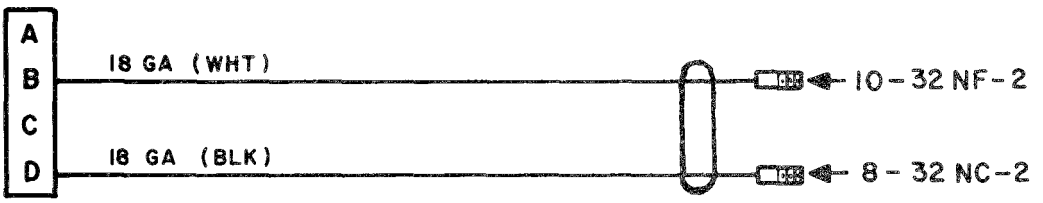


Figure 4-23. Resistance Check Adapter, BHH23, Schematic.

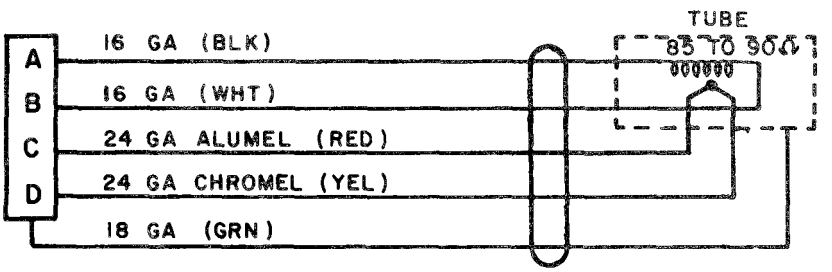


Figure 4-24. Heater Probe, BH996-40, Schematic

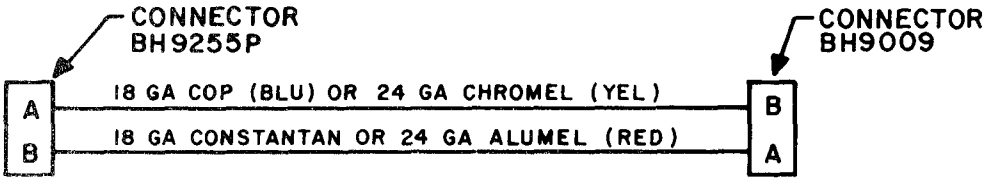


Figure 4-25. Check Cable Adapter, BH1504, Schematic.

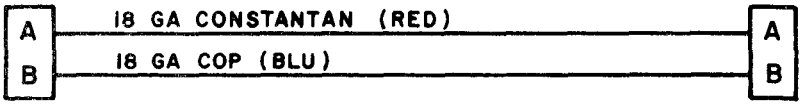


Figure 4-26. Check Cable Adapter, BH4548, Schematic.

Section III. REPAIR PROCEDURES

4-9. Soldering. Use a minimum amount of heat when unsoldering and resoldering components. Resolder components using 60/40 tin-lead rosin-core solder (item 2, table 1-16). Also use a flux (item 8) when soldering thermocouple wire. Isopropyl alcohol (item 4) may be used to remove excess flux.

4-10. Removal and Disassembly.

a. Removal of Trimmer Deck Assembly.

(1) Disconnect BH15184A power interconnect cable from INTERCONNECT connectors.

(2) Remove screws around edge of trimmer deck and lift trimmer deck assembly from case.

(3) See paragraph 4-11 for installation of trimmer deck assembly.

b. Removal of Probe Controller Assembly.

(1) Disconnect BH15184A power interconnect cable from INTERCONNECT connectors.

(2) Support tester lid and remove lid stop arm screw (12, fig. 4-29).

(3) Remove screws (3) around edge of probe controller deck.

(4) Lift controller assembly high enough to gain access to components in probe controller compartment.

(5) Mark wires to SCR's and remove screws holding terminal lugs to cathodes and unsolder wires to gates.

(6) Unscrew SCR's from heatsinks.

(7) Remove four screws holding transformer (2, fig. FO-8) to bottom of probe controller compartment and remove probe controller assmebly, wire harness, and transformer.

(8) See paragraph 4-12 for installation of probe controller assembly.

c. Removal of Switch-Power Board.

(1) Open trimmer assembly per paragraph **4-*10a***

(2) Disconnect thermocouple connectors P13 (20, fig. 4-31) and P14 (21) cm side of card cage.

(3) Remove four screws (4, fig. FO-7) attaching harness connectors J8 and J9 (5) to the board and remove the connectors.

(4) Remove three screws (18) at each end of the board that hold connectors P6 and P7 between this board and the mother board.

(5) Remove the TEMPERATURE, RPM, and STD DAY switch knobs and retaining nuts.

(6) Remove six screws (19) that are in line with the above switches and remove the board.

(7) See paragraph 4-13 for installation of board.

d. Removal of Probe Control and Function Switch Board.

(1) Open probe controller assembly per paragraph 4-10 ***b.***

(2) Remove two screws (11, fig. FO-8) holding connector J6 to the probe control and function switch board.

(3) Remove four screws (1) holding harness connectors P12 and P13 to board.

(4) Note location of and unsolder compensator chromel and alumel wires (white and green wires) from T/C INPUT switch (22).

(5) Mark and unsolder following wires from probe control and function switch board: (1) blue wire from eyelet POLE 7; (2) red wire from eyelet POLE 8; (3) blue wire from eyelet D7, P4; (4) red wire from eyelet P3; and (5) red wire from eyelet P8.

(6) Remove knobs (7) and seal nuts (9) from SPREAD and FUNCTION SELECT switches and remove board.

(7) See paragraph 4-14 for installation of board.

e. Removal of Resistance and Insulation Check Board.

(1) Open probe controller assembly per paragraph **4-10 *b.***

(2) Remove two screws (23, fig. 4-38) holding board to connector J6.

(3) Remove two screws (1, fig. FO-8) holding harness connector P7 to board.

(4) Remove knobs (12) and seal nuts (14) from INSULATION CHECK switch and RESISTANCE & A/C INDICATOR CHECK switch and remove board.

(5) Install board per paragraph **4-15.**

f. Removal of CAL ADJ Potentiometers.

(1) Open trimmer assembly per paragraph 4-***l0a.***

(2) Mark and unsolder wires from potentiometer.

(3) Relieve tension on pot hook clip (fig. 4-27) by turning nut on potentiometer shaft.

(4) Unscrew potentiometer shaft from panel bushing and remove potentiometer.

(5) Install CAL ADJ potentiometers per paragraph 4-16.

g. Removal of Heater Probe Power SCR.

(1) Open probe controller assembly per paragraph 4-10 ***b.***

(2) Mark and remove wires from SCR cathodes and gates.

(3) Unscrew SCR from heat sink.

(4) Install SCR per paragraph **4-17.**

Section IV. REASSEMBLY AND ALIGNMENT

4-11. Installation of Trimmer Deck Assembly.

CAUTION

Do not force circuit boards into card cage. Circuit boards are keyed to prevent insertion into incorrect connectors.

a. Inspect deck gasket (91, fig. FO-7) for breaks and deterioration and replace if necessary to ensure a watertight seal. When replacing deck gasket, apply adhesive (item 5, table 1-16), or an equivalent, to the underneath side of the gasket to hold it in place and assure a watertight seal.

b. Inspect the bead of sealant around the flange of the case for creaks or voids and replace as necessary with sealant (item 6, table 1-16), or an equivalent, for a watertight seal.

c. Ascertain that all circuit boards and card cage circuit card retainers are secured in place.

d. Set trimmer assembly in instrument case.

e. Use new seal screws (1, fig. FO-7) to secure trimmer assembly to instrument case.

f. Connect BH15184A power interconnect cable between INTERCONNECT connectors.

4-12. Installation of Probe Controller Assembly.

a. Inspect deck gasket (18, fig. FO-9) for breaks and deterioration and replace if necessary to ensure a watertight seal.

b. Inspect the bead of sealant at the ends and bottom of the case divider and around the flange for breaks or voids and repair as necessary with sealant (item 6, table 1-16).

c. Install deck gasket, applying adhesive (item 5, table 1-16) to the bottom side to ensure a watertight seal.

d. Install the transformer (2, fig. FO-8) in the bottom of the probe controller compartment using new seal screws (4, fig. 4-29) if required.

e. Reconnect wires to cathodes and gates of SCR's.

f. Install probe controller deck in instrument case, using new seal screws (3).

g. Attach lid stop arm to stop arm support with stop arm screw (12).

h. Connect BH15184A power interconnect cable between INTERCONNECT connectors.

4-13. Installation of Switch-Power Board.

NOTE

Perform the accuracy check of paragraph 4-6g after installing the switch-power board.

a. Attach heat sinks to trimmer deck with six seal screws (19, fig. FO-7).

b. Install seal nuts (17) on TEMPERATURE, RPM, and STD DAY switch shafts.

c. Install knobs (15) on TEMPERATURE, RPM, and STD DAY switches.

d. Install three screws (18) at each end of board that hold connectors P6 and P7 (2, fig. 4-32) between this board the mother board.

4-14. Installation of Probe Control and Function Switch Board.

NOTE

Perform the checks of paragraphs 4-6d, f, and h after installing the probe control and function switch board.

a. Place non-turn washers (19, fig. FO-8) over shafts of SPREAD and FUNCTION SELECT

switches and insert shafts through holes in probe controller deck.

b. Install seal nuts (9) and knobs (7) on switch shafts.

c. Resolder wires, removed in step (5) of paragraph 4-10d, to board.

d. Resolder chromel and alumel wires to T/C INPUT siwtch using solder (item 7, table 1-16) and flux (item 8).

e. Attach harness connector P12 (fig. FO-8) to board using two screws (1).

f. Attach harness connector P13 to board using two screws (l).

g. Install two screws (11) that attach connector P6 to board

4-15. Installation of Resistance and Insulation Check Ward.

NOTE

Perform the accuracy ckecks of paragraphs 4-6f, g, and h after replacing resistance and insulation check board.

a. Place non-turn washers (15, fig. FO-8) over shafts of INSULATION CHECK and RESISTANCE & A/C INDICATOR CHECK switches and insert shafts through holes in probe controller deck.

b. Install seal nuts (14) and knobs (12) on switch shafts.

c. Attach harness connector P7 to board with two screws (1).

d. Install two screws (23, fig. 4-38) that hold against connector J6.

4-16. Installation of CAL ADJ Potentiometers.

a. Inspect condition of pot hook gasket and o-ring (fig. 4-27). If worn or deteriorated, replace old pot hook with new pot hook.

b. Place gasket on bushing and insert bushing in trimmer deck.

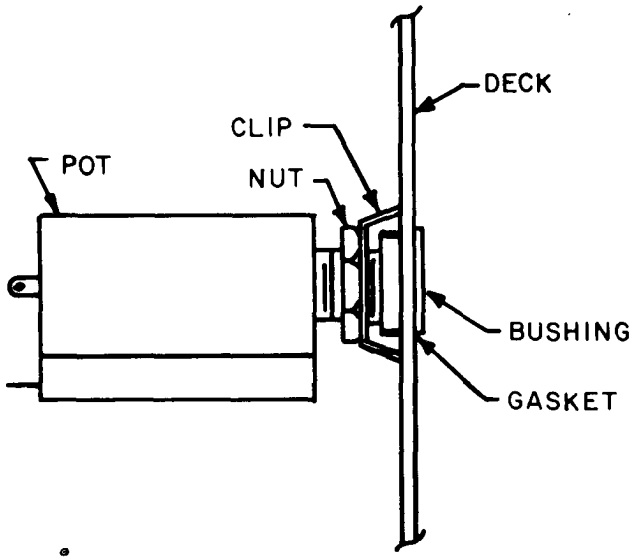


Figure 4-27. CAL ADJ Potentiometer Installation Detail

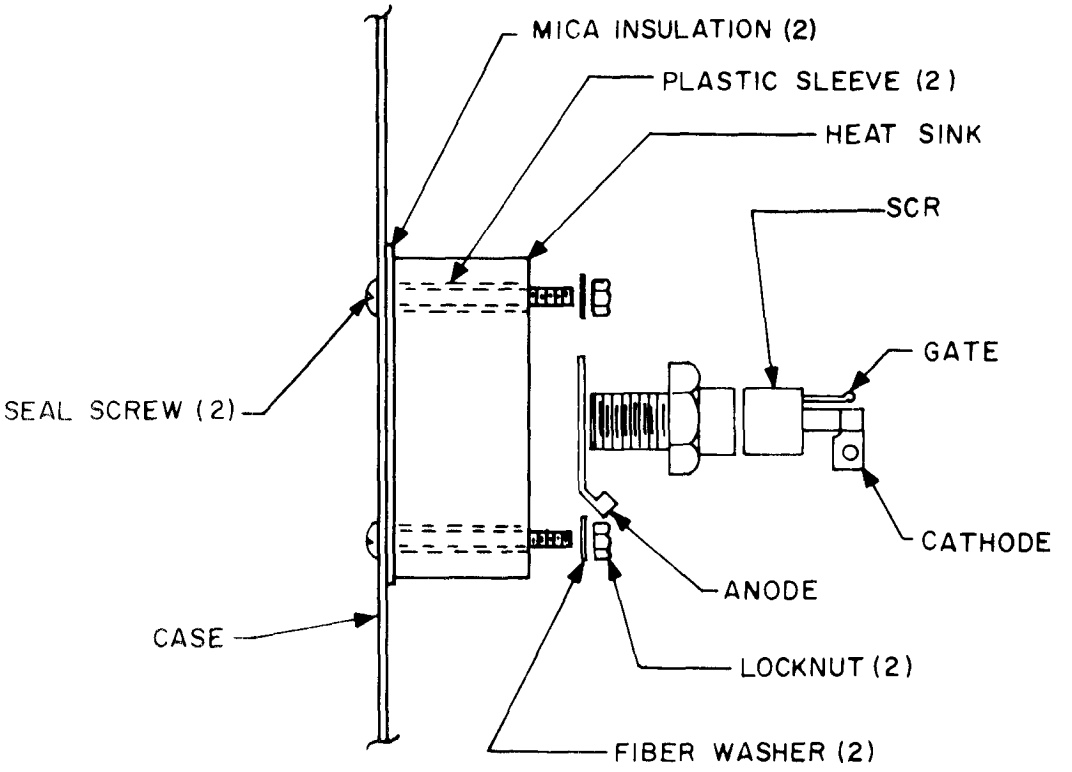


Figure 4-28. Power SCR Installation Detail.

c. Place clip over potentiometer shaft and screw shaft about two turns into bushing.

d. Apply tension to clip with nut.

e. Resolder wires removed from potentiometer.

4-17. Installation of Heater Probe Power SCR and Heat Sink.

a. Apply heat sink compound (item 9, table 1-16) to the area of the case where the mica insulation makes contact with the case and to the case side of the heat sink.

b. Insert two seal screws (fig. 4-28) through case and place two pieces of mica insulation over protruding ends of screws.

c. Place a plastic sleeve over each screw.

d. Place heat sink over screws and sleeves and fasten heat sink to case with two fiber washers and two locknuts.

e. Ascertain with an ohmmeter that there is no electrical contact between the heatsink and the case.

f. Place anode soldering lug on SCR and screw SCR into heat sink.

g. Reconnect cathode and gate wires to SCR.

Section V. PARTS LISTING

4-18. General. This section contains figures and parts lists of all tester assemblies. Included are exploded views of assemblies with parts numbered in disassembly order. Each index number in a parts list is followed by the part number, the part name, and the manufacturer's federal supply code (FSCM).

4-19. Federal Supply Code List of Manufacturers. The following is a list of the names and addresses of all manufacturers supplying items or articles together with their code symbols. Absence of a manufacturer's code in the description column indicates that the part is a Government standard part.

00779	Amp, Inc. Harrisburg, Pa 17105
01073	Acor, Inc. El Monte, Ca 91731
01295	Texas Instruments, Inc. Semiconductor-Components Div. Dallas, Tx 75222
02660	Bunker Ramo Corp. Amphenol Connector Div. Broadview, 1160153
02799	Arco Electronics Torrance, Ca 90501
03508	General Electric Co. Semiconductor Products Dept. Syracruse, NY 13201
04157	Omega Engineering, Inc. Canoga Park, Ca 91304
04274	Rosemont, Inc. Eden Prairie, Mn 55343
04618	American Pamcor, Inc. Paoli, Pa 19301
04713	Motorola, Inc. Semiconductor Products Div. Phoenix, AZ 85008
06928	Teledyne Kinetics Solana Beach, Ca 92075
07263	Fairchild Semiconductor Div. of Fairchild Camera and Instruments Corp. Mountain View, Ca 94042
12040	National Semiconductor Corp. Danbury, Ct 06810
12697	Clarostat Mfg. Co., Inc. Dover, NH 03820
13074	Multi-Flex Seals, Inc. Hackensack, NJ 07601
13861	National Precision Products Co. Dallas, Tx 75220
14752	Electro Cube, Inc. San Gabriel, Ca 91776
18677	Scanbe Mfg. Corp. El Monte, Ca 91731
21604	Buckeye Stamping Co., The Columbus, Oh 43207
31589	Apc Mfg. Co. Massapequa, NY 11758
37942	Mallory PR and Co., Inc. Indianapolis, In 46206
50436	Hewlett-Packard Co. Microwave Div. Palo Alto, Ca 94304
53507	Robleyco Richardson, Tx 75080
56289	Sprague Electric Co. North Adams, Ma 01247
63743	Ward Leonard Electric Co., Inc. Mount Vernon, NY 10550
64467	Weksler Instruments Corp. Long Island, NY 11520
70485	Atlantic India Rubber Works, Inc. Chicago, 1160607
7 279	Cambridge Thermionic Corp. Cambridge, Ma 02138
7 400	Bussman Mfg. Div. of McGraw-Edison Co. St. Louis, Mo 63017
71590	Globe-Union, Inc. Centralab Div. Milwaukee, Wi 53201
71785	TRW Electronics Components Cinch Div. Elk Grove Village, 1160007
72619	Dialight Corp. Sub. of Digitronics Corp. Brooklyn, NY 11237
72982	Erie Technological Products, Inc. Erie, Pa 16512

73138 Beckman Instruments, Inc.
Helipot Div.
Fullerton, Ca 92634

75915 Littelfuse, Inc.
DesPlaines,1160016

77342 AMF Inc.
Potter and Brumsfield Div.
Princeton, In 47570

77820 Bendix Corp.
Electrical Components Div.
Sidney, NY 13838

78046 Salisbury WH and Co., Inc.
Chicago, 1160622

79136 Waldes Kohinoor, Inc.
Long Island City, NY 11101

80031 Mepco/Electra Inc.
A North American Phillips Co.
Morristown, NJ 07960

80294 Bourns, Inc. Instrument Div.
Riverside, Ca 92506

81073 Greyhill, Inc.
La Grange, 1160525

81095 Triad-Utrad
Div. Litton Systems, Inc.
National City, Ca 92050

82647 Texas Instruments, Inc.
Control Products Div.
Attleboro, Ma 02703

83330 Smith, Herman H., Inc.
Brooklyn, NY 11207

86684 RCA Corp. Electronic Components
Harrison, NJ 07029

86928 Seastrom Manufacturing Co.
Glendale, Ca 91201

88245 Litton Systems, Inc.
USECO Div.
Van Nuys, Ca 91409

91506 Augat, Inc.
Attleboro, Ma 02703

91637 Dale Electronics, Inc.
Columbus, Nc 68601

94721 Weston Instruments, Inc.
Weston Components Div.
Archbald, Pa 18403

94603 Waters Mfg., Inc.
Wayland, Ma 01778

97539 Apm-Hexseal Corp.
Englewood, NJ 07631

98869 Howell Instruments, Inc.
3479 W. Vickery Blvd.
Ft. Worth, Tx 76107

Index of Parts List Figures

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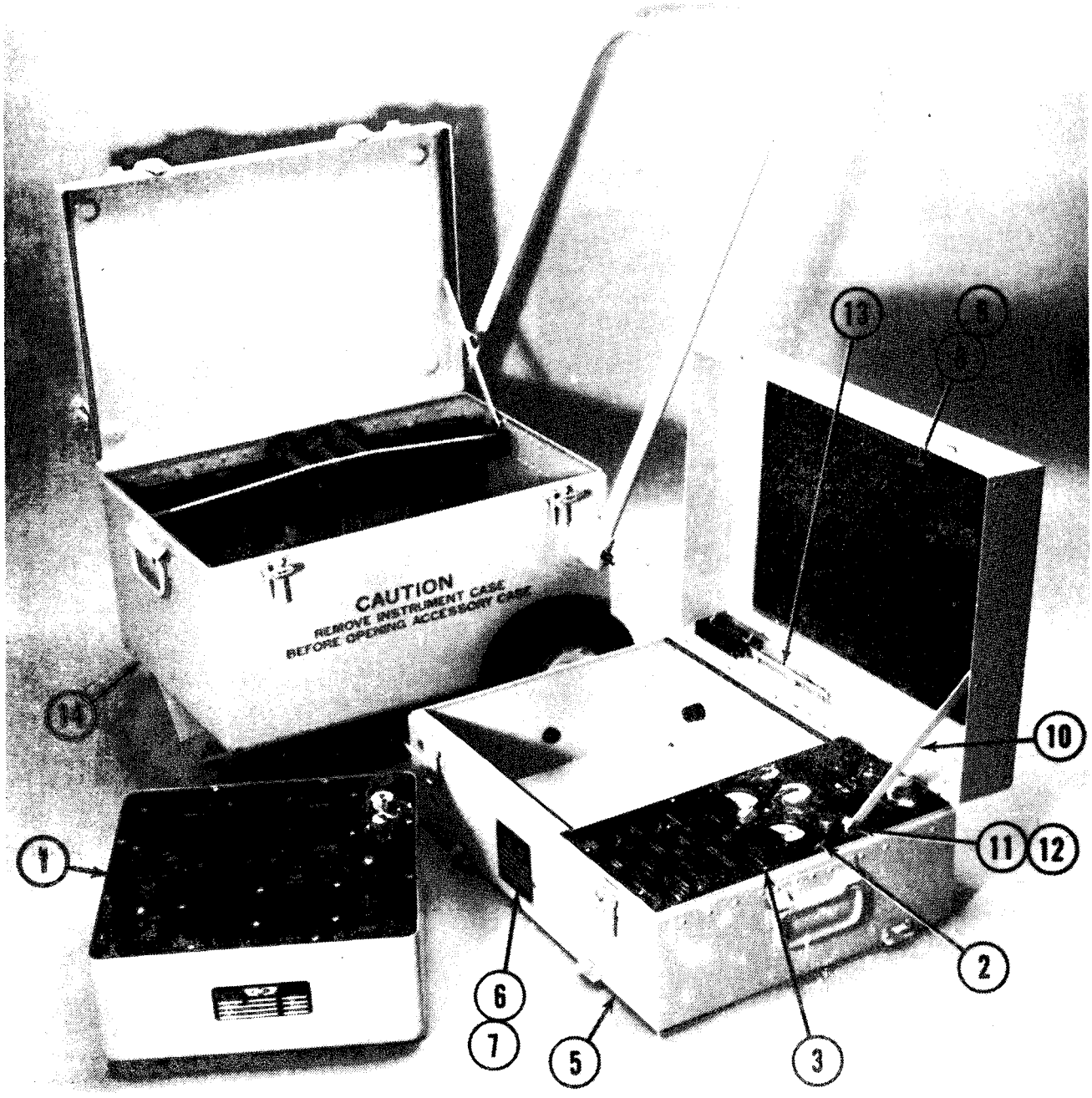

Figure 4-29. BH112JB-53 Jetcal Tester.

Figure & Index Number	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy
4-29	BH112JB-53	TESTER, Exhaust gas temperature (98869)	1
	BH16700-12	. ACCESSORY KIT (See figure 4-30 for breakdown.) (98869)	1
	BH112JB-916	. JETCAL ANALYZER (98869)	1
-1	BH15195A-8	. . TRIMMER ASSEMBLY (See figure FO-7 for breakdown.) (98869)	1
-2	BH15194A-4	. . PROBE CONTROLLER ASSEMBLY (See figure FO-8 for breakdown.) (98869)	1
-3	SEELSKREW/R/ 6-32x1/2”	. . SCREW, Seal (AP) (13074)	8
-4	SEELSKREW/R/ 10-32x1/2”	. . SCREW, Seal (AP) (13074)	4
	MS20365-1032A	. . NUT (not shown) (AP)	4
-5	BH15835-2	. . INSTRUMENT CASE ASSEMBLY (See figure FO-9 for breakdown.) (98869)	1
-6	BH760-1	. . NAMEPLATE (98869)	1
-7	MS21318-1	. . SCREW (AP)	4
-8	BH16805	. . INSTRUCTION PLATE (98869)	1
-9	MS21318-1	. . SCREW (AP)	12
-10	BH14978-2	. . STOP ARM (98869)	1
-11	BH437	. . STOP ARM SUPPORT (98869)	1
-12	MS51958-61	. . SCREW (AP)	1
-13	5151	. . THERMOMETER (64467)	1
-14	H122	. . ACCESSORY CASE (See figure 4-39 for breakdown.) (98869)	1
	BH15185A	. . POWER CABLE ADAPTER (Not shown) (98869)	1
	BH15184A	. . INTERCONNECT CABLE (Not shown) (98869)	1

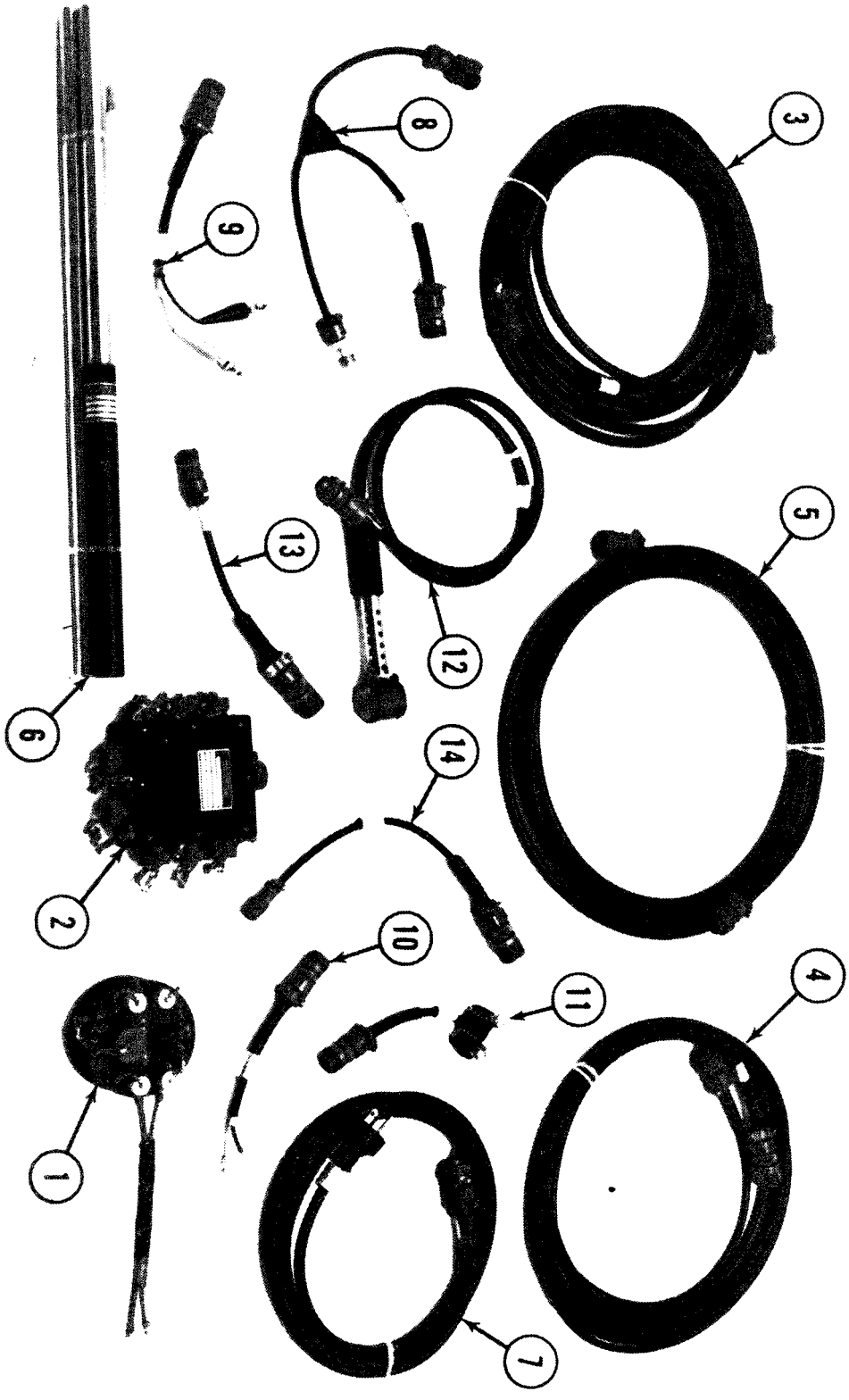

Figure 4-30. BH16700-12 Accessory Kit.

Figure & Index Numbet	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy
4-30	BH16700-12	ACCESSORY KIT (98869)	REF
-1	BH123-3	. SWITCH BOX (98869)	1
-2	BH361-8	. JUNCTION BOX (98869)	1
-3	BH405	. HEATER CABLE (98869)	1
-4	BH450	. CHECK CABLE (98869)	1
-5	BH485	. INSTRUMENT CABLE (98869)	1
-6	BH492B-3	. EXTENSION HANDLE (98869)	1
-7	BH499A	. POWER CABLE (98869)	1
-8	BH820	. RPM CHECK ADAPTER (98869)	1
-9	BH821	. INSULATION CHECK ADAPTER (98869)	1
-10	BH822	. EGT INDICATOR CHECK ADAPTER (98869)	1
-11	BH823	. RESISTANCE CHECK ADAPTER (988691	1
-12	BH996-40	. HEATER PROBE (98869)	1
-13	BH1504	. CHECK CABLE ADAPTER (98869)	1
-14	BH4548	. CHECK CABLE ADAPTER (98869)	1

Figure & Index Number	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy
FO-7	BH15195A-8	TRIMMER ASSEMBLY (See figure 4-29 for NHA.) (98869)	REF
- 1	SEELSKREW/R/10-32 x1/2”	. SCREW, Seal (AP) (13074)	8
- 2	BH15813-I	. TRIMMER HARNESS (98869)	1
- 3	MS35275-206	. SCREW (AP)	3
- 4	COML	. SCREW, Machine, flat hd, cross recess, 2-56x9/16 inch 1 (AP) (13861)	4
	34567	. . TERMINAL LUG (Not shown) (04618)	2
- 5	C406-021	. . CONNECTOR (06928)	2
- 6	NMP-COCO-F	. . CONNECTOR (04157)	1
- 7	Not Used		
- 8	BH16295	. RETAINER (98869)	2
- 9	MS51957-28	. SCREW (AP)	4
-10	BH16365-1	. CALIBRATOR CIRCUIT BOARD ASSEMBLY (See figure 4-36 for breakdown.) (98869)	1
-11	BH15717-1	. TACHOMETER CIRCUIT BOARD ASSEMBLY (See figure 4-35 for breakdown.) (98869)	1
-12	Not used		
-13	BH15715-I	. TEMPERATURE CIRCUIT BOARD ASSEMBLY (See figure 4-34 for breakdown.) (98869)	1
-14	BH16358-2	. DISPLAY CIRCUIT BOARD ASSEMBLY (See figure 4-33 for breakdown.) (98869)	1
-15	SS-70BL-2 BLK	. KNOB (21604)	3
-16	BH15720-3	. SWITCH-POWER CIRCUIT BOARD ASSEMBLY (See figure 4-31 for breakdown.) (98869)	1
-17	N-9030-l/4	. SEAL NUT (AP) (97539)	3
-18	MS51957-2	. SCREW (AP)	6
-19	SEELSKREW/R/ 4-40x3/8”	:. SCREW, Seal (AP) (13074)	6
-20	BH15719-2	. MOTHER CIRCUIT BOARD ASSEMBLY (See figure 4-32 for breakdown.) (98869)	1
-21	MS51957-28	. SCREW (AP)	4
-22	BH15814	. CARD CAGE (98869)	1
-23	SEELSKREW/R/ 8-32x5/8”	. SCREW, Seal (AP) (13074)	2
-24	SEELSKREW/R/ 8-32x1/2”	. SCREW, Seal (AP) (13074)	2
-25	6756-1-1/2	. CIRCUIT BREAKER (82647)	1
-26	1415-4	. TERMINAL LUG (AP) (83330)	1
-27	MS51957-14	. SCREW (AP)	2
-28	BH15559-I	. BEZEL (98869)	1
-29	BH15561	. WINDOW (98869)	1
-30	BH15560	. BEZEL GASKET (98869)	1
-30A	SEELSKREW/R/ 4-40x7/16”	. SCREW, Seal (AP) (13074)	2
-31	Not used		
-32	Not used		
-33	Not used		
-34	Not used		
-35	Not used		
-36	Not used		

Figure & Index Number	Part Number	1 2 3 4 5 6 7	Description	Units Per Assy
FO-7-37	Not used			
-38	Not used			
-39	BH15712	.	TRANSFORMER ()8869)	1
-40	MS20365-1032A	.	NUT (AP)	4
-40	SEELSKREW/R/ 1032x1/2”	.	SCREW, Seal (AP) (13074)	4
-41	MS35059-24	.	SWITCH	1
-42	N-9030-B	.	SEAL NUT (AP) (97539)	1
-43	250-1471-500	.	LAMP CAP (72619)	1
-44	507-5824-0747-600	.	LAMP (72619)	1
-45	250-8758-33-504	.	LAMP BASE (72619)	1
-46	250-1473-500	.	LAMP CAP (72619)	1
-47	507-5821-0747-600	.	LAMP (72619)	1
-48	250-8758-33-504	.	LAMP BASE (72619)	1
-49	Not used			
-50	BH17956-1	.	CLAMP (98869)	1
-51	MS51957-43	.	SCREW (AP)	1
	MS35333-72	.	WASHER (AP)	1
-52	BH17957	.	SPACER (AP) (98869)	1
-53	SEELSKREW/R/ 8-32 X 1/2”	.	SCREW, Seal (AP) (13074)	1
-54	Not used			
-55	Not used			
-56	Not used			
-57	Not used			
-58	H5600P-56	.	TA'POT POTENTIOMETER (98869)	1
-59	BH6522	.	GASKET (98869)	1
-60	Not used			
-61	SEELSKREW/R/ 4-40x5/16”	.	SCREW, Seal (AP) (13074)	2
-62	SSN-70-2 SHORT BLK	.	KNOB (21604)	1
-62A	SSN-70-2 BLK	.	KNOB (21604)	1
-63	53C3-50K	.	POTENTIOMETER (12697)	1
-64	N-9030-l/4	.	SEAL NUT (AP) (97539)	1
-65	BH18690-2	.	POTENTIOMETER (98869)	1
-66	CA10006	.	POTENTIOMETER HOOK (AP) (94693)	1
-67	Not used			
-68	Not used			
-69	BH18690-3	.	POTENTIOMETER (98869)	1
-70	CA10006	.	POTENTIOMETER HOOK (AP) (94603)	1
-71	30-252R	.	SWITCH (81073)	1
-72	MS25043-12C	.	DUST CAP	1
-73	BH9020P	.	CONNECTOR (98869)	1
-74	10-36675-12	.	GASKET (77829)	1
-75	SEELSKREW/R/ 4-40x1/2”	.	SCREW, Seal (AP) (13074)	4
	MS20365-440A	.	NUT (AP)	4
-76	MS25043-14C	.	DUST CAP	1
-77	BH9140S	.	CONNECTOR (98869)	1
-78	10-36675-14	.	GASKET (77829)	1

Figure &index Number	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy
FO-7-79	SEELSKREW/R/ 4-40x1/2"	. SCREW, Seal (AP) (13074)	4
	MS20365-440A	. NUT (AP)	4
-80	10-101960-143	. DUST CAP (77829)	1
-81	BH9385P	. CONNECTOR (98869)	1
-82	36675-14	. GASKET (77829)	1
-83	SEELSKREW/R/ 4-40x1/2"	. SCREW, Seal (AP) (13074)	4
	MS20365-440A	. NUT (AP)	4
-84	1291-1	. HANDLE (71279)	2
-85	MS51959-45	. SCREW (AP)	4
-86	BH6555	. WINDOW (98869)	1
-87	Not used		
-88	BH15807A	. DECK, Marked (98869)	1
-89	BH15179-2	. INSTRUMENT CASE (Partial breakdown follows.) (98869)	1
-80	BH4742-2	. NAMEPLATE (98869)	1
-91	BH16833	. . GASKET (98869)	1
-92	165A	. . RUBBER FOOT (70485)	4
-93	MS20365-832A	. . NUT (AP)	4

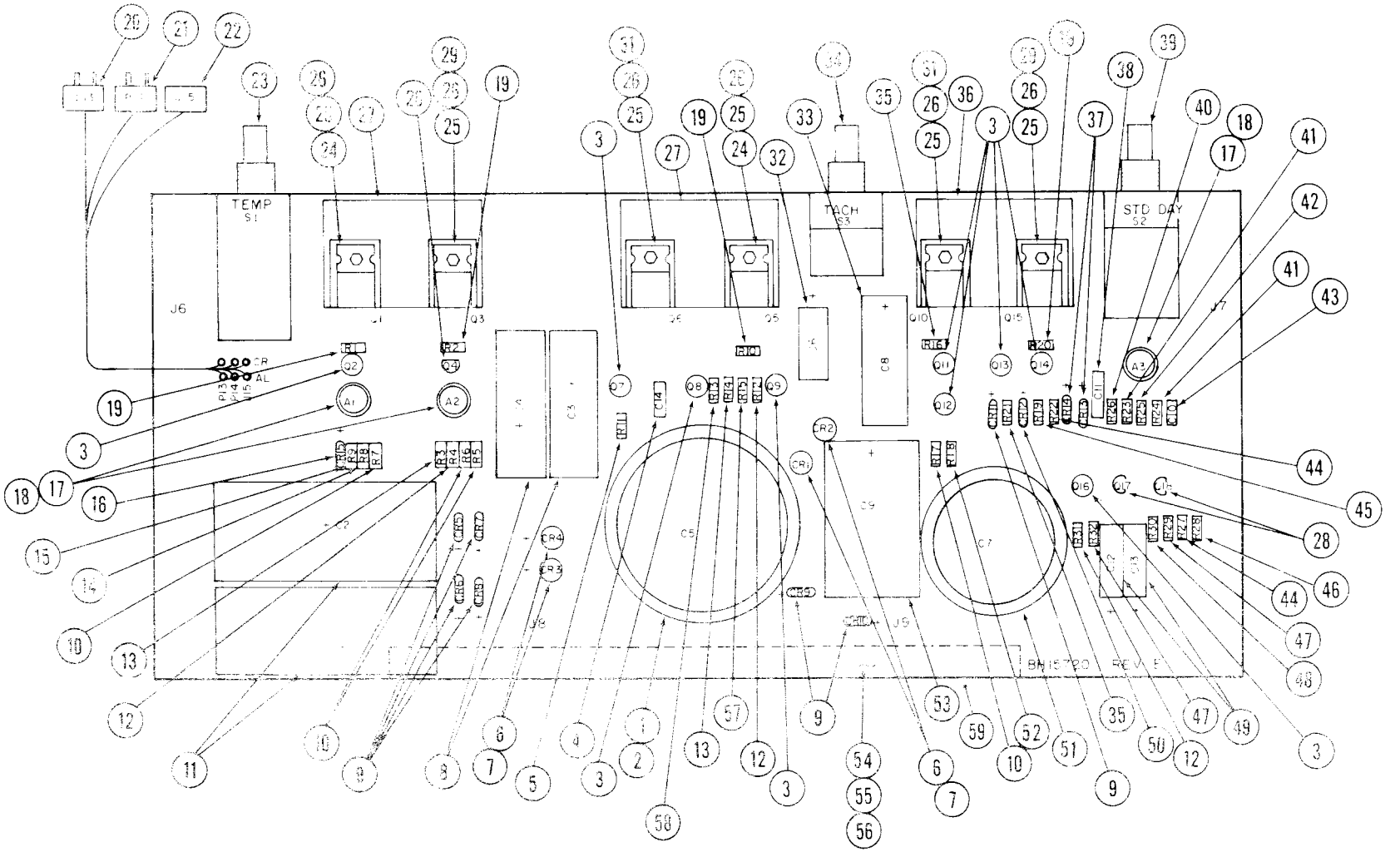

Figure 4-31. BH15720-3 Switch-Power Circuit Board Assembly.

Figure & Index Number	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy
4-31	BH15720-3	SWITCH-POWER CIRCUIT BOARD ASSEMBLY (See figure FO-7 for NHA.) (98869)	REF
-1	CG872U020V2C3PL	. CAPACITOR (37942)	1
-2	MS51960-62	. SCREW (AP)	2
-3	2N4945	. TRANSISTOR (07263)	9
-4	CK05BX222K	. CAPACITOR	1
-5	1-4-5P1K5	. RESISTOR (80031)	1
-6	1N5624	. DIODE (03508)	4
-7	131OD	. TERMINAL (88245)	8
-8	TTX200MFD35VDC	. CAPACITOR (37942)	2
-9	1N5059	. DIODE (03508)	7
-10	RN55D1002F	. RESISTOR	5
-11	TCG122U050N2C3P	. CAPACITOR (37942)	2
-12	1-4-5P4K7	. RESISTOR (80031)	3
-13	1-4-5P1K	. RESISTOR (80031)	1
-14	RN55D6981F	. RESISTOR	1
-15	RN55D8060F	. RESISTOR	1
-16	C933	. DIODE (98869)	1
-17	SN52741L	. INTEGRATED CIRCUIT (01295)	3
-18	8-ICS	. SOCKET (71785)	3
-19	1-4-5P470E	. RESISTOR (80031)	4
-20	NMP-COCO-M	. CONNECTOR (04157)	1
-21	NMP-CHAL-M	. CONNECTOR (04157)	1
-22	NMP-CHAL-F	. CONNECTOR (04157)	1
-23	71BY23198-1-3N	. SWITCH (81073)	1
-24	2N6109	. TRANSISTOR (86684)	2
-25	MS18212-5	. SCREW (AP)	6
-26	MS35649-224	. NUT (AP)	6
-27	BH15721	. HEAT SINK (98869)	2
-28	2N4402	. TRANSISTOR (04713)	3
-29	2N6290	. TRANSISTOR (86684)	2
-30	Not used		
-31	2N5296	. TRANSISTOR (86684)	2
-32	CS13BC396K	. CAPACITOR	1
-33	TT50X150	. CAPACITOR (37942)	1
-34	71BY23195-1-3N	. SWITCH (81073)	1
-35	1-4-5P2K2	. RESISTOR (80031)	2
-36	BH15721-1	. HEAT SINK (98869)	1
-37	1N702	. DIODE (01295)	2
-38	C389	. CAPACITOR (98869)	1
-39	71BY23197-1-2N	. SWITCH (81073)	1
-40	1-4-5P470K	. RESISTOR (80031)	1
-41	1-4-5P100K	. RESISTOR (80031)	2
-42	1-4-5P100E	. RESISTOR (80031)	1
-43	CK05BX103K	. CAPACITOR	1
-44	1-4-5P10K	. RESISTOR (80031)	2
-45	RC20GF271K	. RESISTOR	1
-46	1-4-5P5K6	. RESISTOR (80031)	1
-47	1-4-5P39K	. RESISTOR (80031)	2
-48	1-4-5P22K	. RESISTOR (80031)	1
-49	CS13BF226K	. CAPACITOR	2

Figure & Index Number	Part Number	2 3 4 5 6 7 Description	Units Per Assy
4-31-50	1N5232B	. DIODE (04713)	1
-51	36D132G050AA2A	. CAPACITOR (56289)	1
-52	RN55D5761F	. RESISTOR	1
-53	TCG412UO15N1L	. CAPACITOR (37942)	1
-54	BH15722	. NUT PLATE (98869)	1
-55	MS51957-3	. SCREW (AP)	2
-56	5610-9-10	. NYLON WASHER (AP) (86928)	2
-57	RN55D3321F	. RESISTOR	1
-58	1-4-5P6K8	. RESISTOR (80031)	1
-59	BH15720	. PRINTED CIRCUIT BOARD, Machined (98869)	1
4-32	BH15719-2	MOTHER CIRCUIT BOARD ASSEMBLY (See figure FO-7 for NHA.) (98869)	REF
-1	225-22821-110	. CONNECTOR (02660)	4
-2	B304-038	. CONNECTOR (06928)	2
-3	MS51957-2	. SCREW (AP)	6
-4	MS35333-69	. WASHER (AP)	6
-5	225-594	. POLARIZING KEY (02660)	4
-6	BH15719	. PRINTED CIRCUIT BOARD, Machined (98869)	1

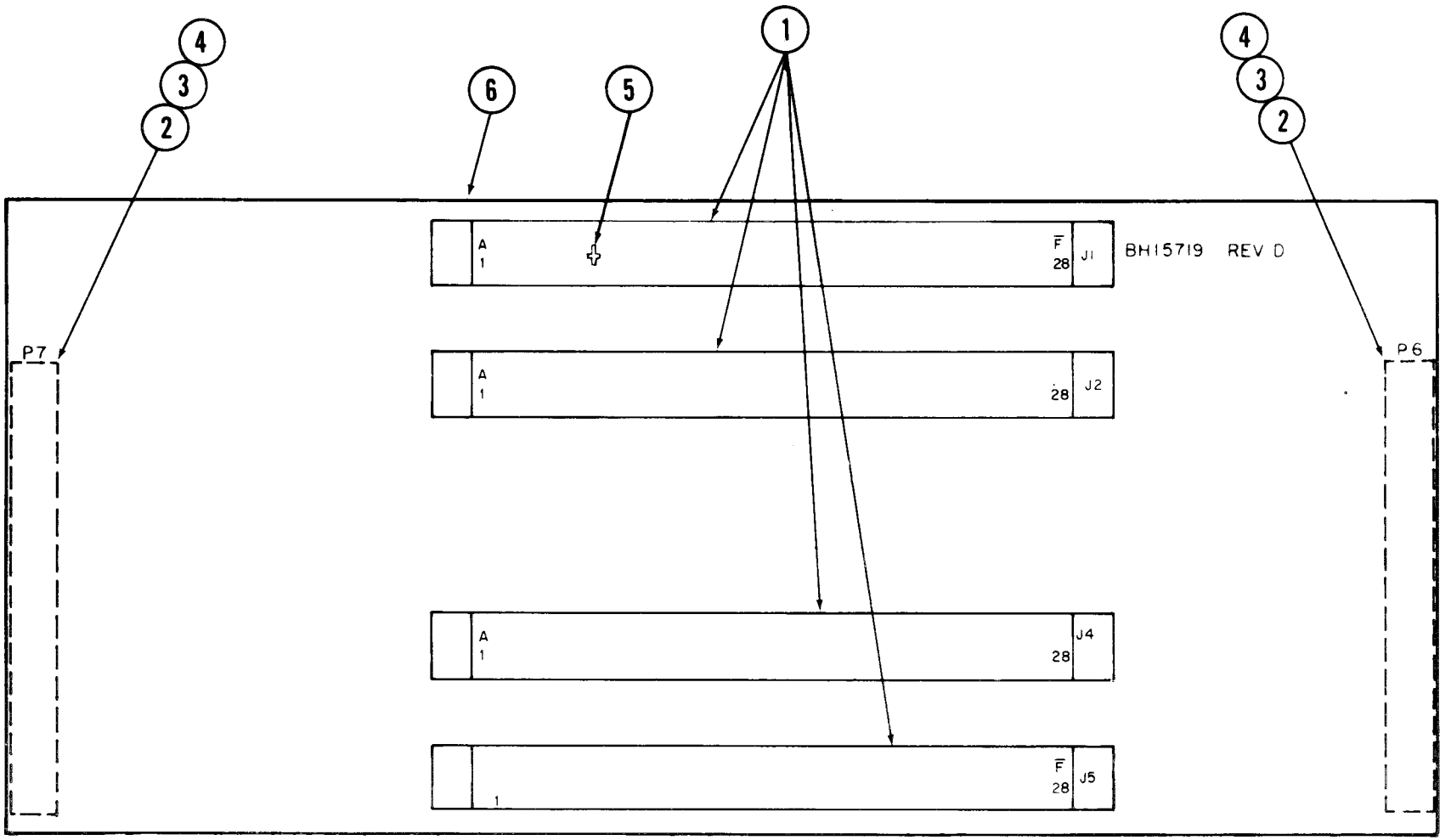

Figure 4-32. BH15719-2 Mother Circuit Board Assembly.

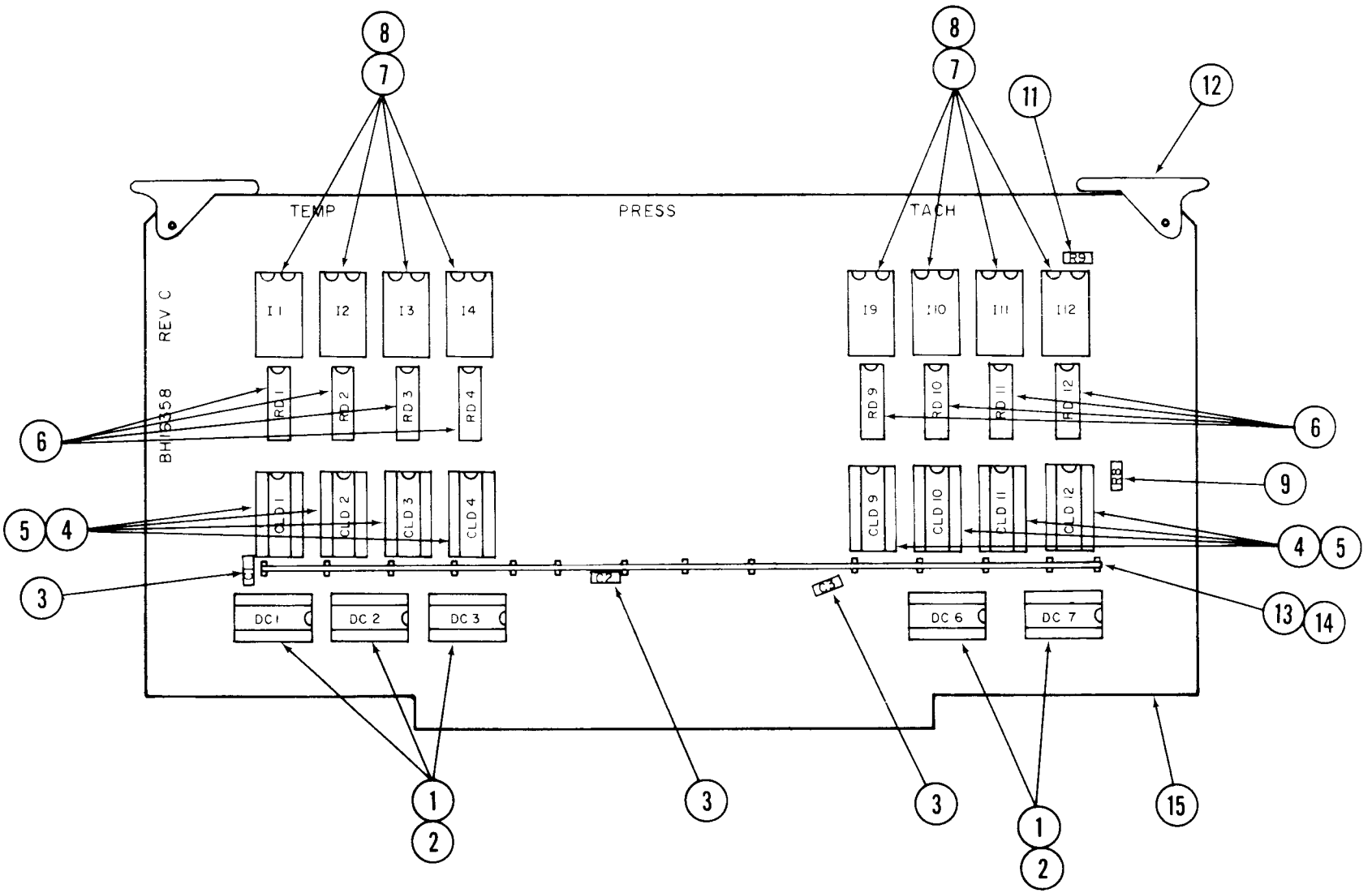

Figure 4-33. BH16358-2 Display Circuit Board Assembly.

Figure & Index Number	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy
4-33	BH16358-2	DISPLAY CIRCUIT BOARD ASSEMBLY (See figure FO-7 for NHA.) (98869)	REF
-1	SN5490N	. INTEGRATED CIRCUIT (01295)	5
-2	US-2-14-160-G-B	. SOCKET (18677)	5
-3	CK06BX103K	. CAPACITOR	3
-4	MC4350L	. INTEGRATED CIRCUIT (04713)	8
-5	US-2-16-160-G-B	. SOCKET (18677)	8
-6	899-3-R150	. RESISTOR NETWORK (73138)	8
-7	5082-7650	. DISPLAY (50436)	8
-8	US-2-14-160-G-B	. SOCKET (18677)	8
-9	1-4-5P4K7	. RESISTOR (80031)	1
-10	Not used		
-11	1-4-5P270E	. RESISTOR (80031)	2
-12	R-1003-A-2	. EJECTOR (53507)	2
-13	BH16357	. BUSS (98869)	1
-14	2024B	. TERMINAL (88245)	13
-15	BH16358	. PRINTED CIRCUIT BOARD, Machined (98869)	1

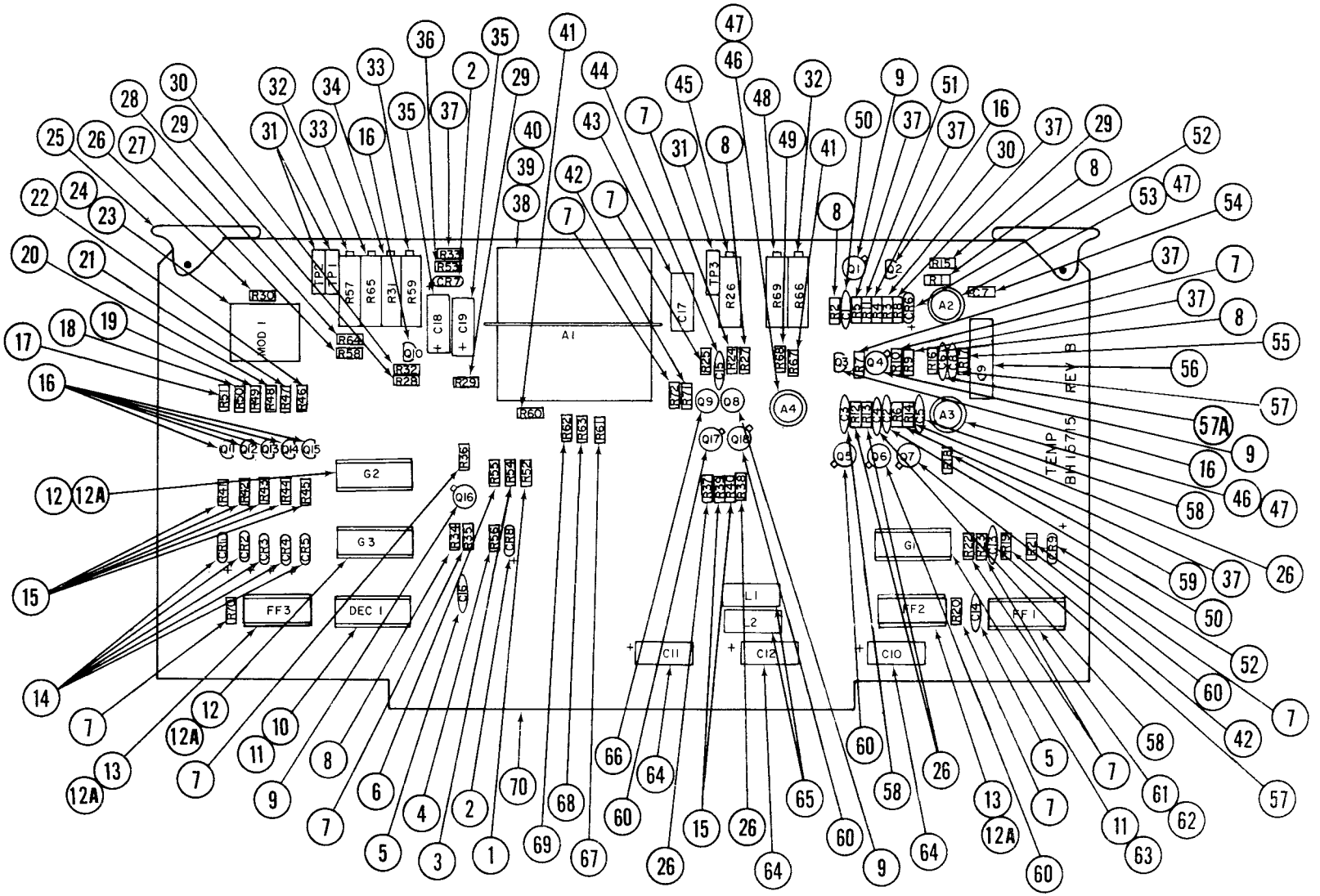

Figure 4-34. BH15715-1 Temperature Circuit Board Assembly.

Figure & Index Number	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy
4-34	BH15715-1	TEMPERATURE CIRCUIT BOARD ASSEMBLY (See figure FO-7 for NHA.) (98869)	REF
-1	H3536	RESISTOR (98869)	1
-2	C933	DIODE (98869)	2
-3	RN55D6980F	RESISTOR	1
-4	H3895	RESISTOR (98869)	1
-5	CK05CW102K	CAPACITOR	2
-6	H3905	RESISTOR (98869)	1
-7	1-4-5P2K2	RESISTOR (80031)	11
-8	1-4-5P4K7	RESISTOR (80031)	5
-9	C1904	TRANSISTOR (98869)	4
-10	SN5442N	INTEGRATED CIRCUIT (01295)	1
-11	US-2-16-160-G-B	SOCKET (18677)	1
-12	SN5400N	INTEGRATED CIRCUIT (01295)	2
-12A	US-2-14-160-6-B	SOCKET (18677)	5
-13	SN5474N	INTEGRATED CIRCUIT (01295)	2
-14	1N702	DIODE (01295)	5
-15	1-4-5P18K	REISTOR	7
-16	2N4402	TRANSISTOR (04713)	8
-17	H3783	RESISTOR (98869)	1
-18	H3784	RESISTOR (98869)	1
-19	H3785	RESISTOR (98869)	1
-20	H3736	RESISTOR (98869)	1
-21	H3786	RESISTOR (98869)	1
-22	BH4446	RESISTOR (88869)	1
-23	BH10666-8	COMPENSATOR (98869)	1
-24	NMP-CHAL-M	CONNECTOR (04157)	1
-25	R-1003-A-2	EJECTOR (53507)	2
-26	RC07GF226K	RESISTOR	6
-27	H3697	RESISTOR (98869)	1
-28	H3674	RESISTOR (98869)	1
-29	1-4-5P470E	RESISTOR (80031)	3
-30	1-4-5P47K	RESISTOR (80031)	2
-31	430	TEST POINT (83330)	3
-32	3800P-203	RESISTOR, Variable (02660)	2
-33	3800P-502	RESISTOR, Variable (02669)	2
-34	533-00HS50K	RESISTOR, Variable (94271)	1
-35	150D606X0006B2	CAPACITOR (56289)	2
-36	RN55D7870F	RESISTOR	1
-37	1-4-5P27K	RESISTOR (80031)	7
-38	C4600	AMPLIFIER (98869)	1
-39	BH12068-1	CLIP (98869)	1
-40	1-331892-0	SOCKET (00779)	8
-41	BH5007	RESISTOR (98869)	2
-42	1-4-5P47E	RESISTOR (80031)	2
-43	112A1C104	CAPACITOR (14752)	1
-44	CK05CW471K	CAPACITOR	1
-45	533-00HS250K	RESISTOR, Variable (94271)	1
-46	SN52741L	INTEGRATED CIRCUIT (01259)	2
-47	8-ICS	SOCKET (71785)	3

Figure & Index Number	Part Number	1 2 3 4 5 6 7	Description	Units Per Assy
4-34-48	3800P-202	.	RESISTOR, Variable (02669)	1
-49	H3828	.	RESISTOR (98869)	1
-50	DD-500	.	CAPACITOR (71590)	2
-51	1-4-5P10K	.	RESISTOR (80031)	1
-52	1N914	.	DIODE (04713)	2
-53	LM211H	.	INTEGRATED CIRCUIT (12040)	1
-54	DD-100	.	CAPACITOR (71590)	1
-55	RN55D1003F	.	RESISTOR	1
-56	625C1C105K	.	CAPACITOR (14752)	1
-57	5GAS-S10	.	CAPACITOR (56289)	2
-57A	CK05BX221K	.	CAPACITOR	1
-58	CK05BX220K	.	CAPACITOR	3
-59	H3524	.	RESISTOR (98869)	1
-60	2N4861	.	TRANSISTOR (01295)	5
-61	SN5476N	.	INTEGRATED CIRCUIT (01295)	1
-62	US-2-16-160-G-B	.	SOCKET (18677)	1
-63	SN5402N	.	INTEGRATED CIRCUIT (01295)	1
-64	CS13BF226K	.	CAPACITOR	3
-65	3711-2-2	.	CHOKE (71279)	2
-66	2N4852	.	TRANSISTOR (04713)	1
-67	H3378	.	RESISTOR (98869)	1
-68	H3627	.	RESISTOR (98869)	1
-69	H3690	.	RESISTOR (98869)	1
-70	BH15715	.	PRINTED CIRCUIT BOARD, Machined (98869)	1

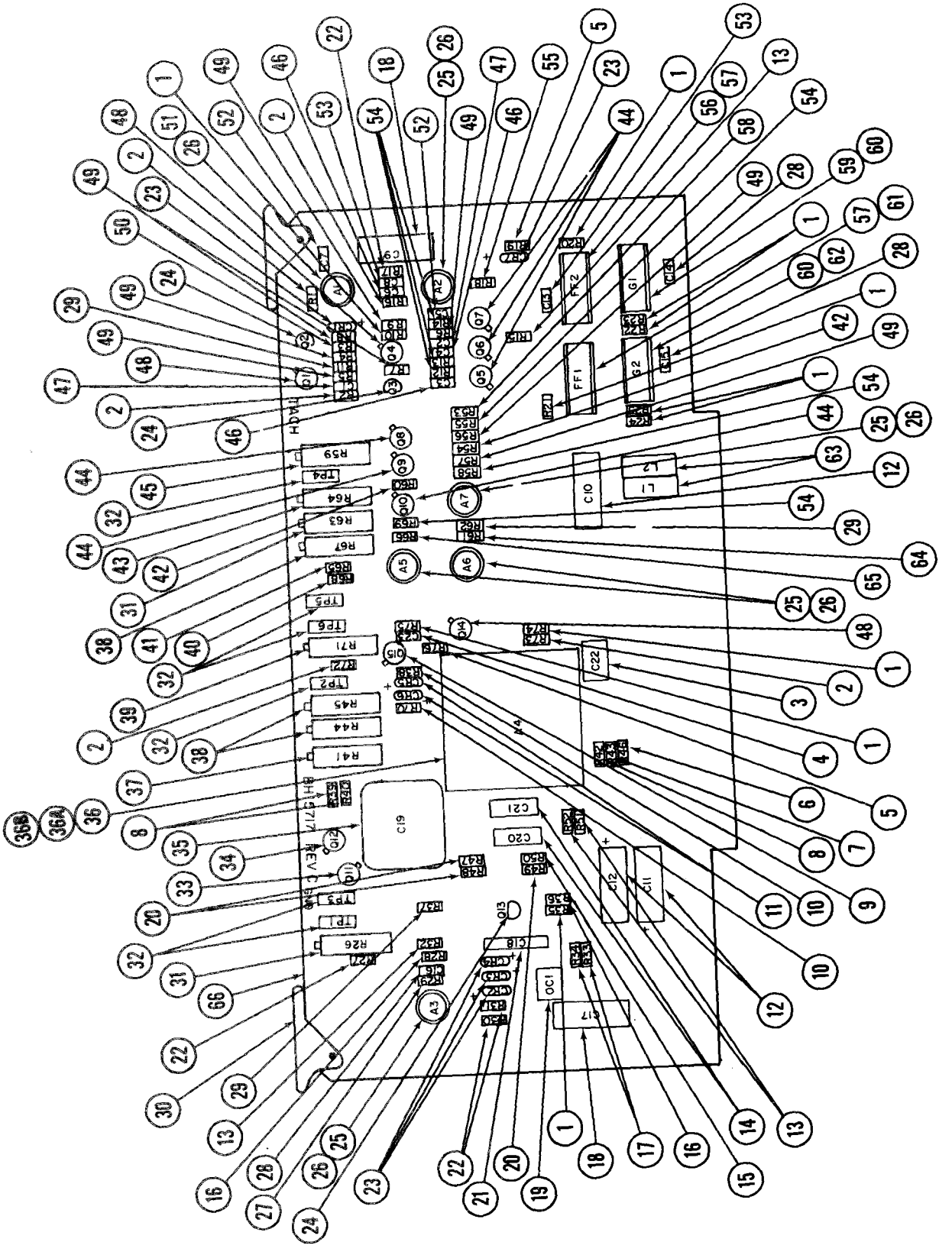

Figure 4-35. BH157117-1 Tachometer Circuit Board Assembly.

Figure & Index Number	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy
4-35	BH15717-1	TACHOMETER CIRCUIT BOARD ASSEMBLY (See figure FO-7 for NHA.) (98869)	REF
-1	1-4-5P2K2	. RESISTOR (80031)	10
-2	1-4-5P4K7	. RESISTOR (80031)	5
-3	ACF-50-.22-10	. CAPACITOR (31589)	1
-4	CK05CW102K	. CAPACITOR	1
-5	1-4-5P47E	. RESISTOR (80031)	2
-6	H3378	. RESISTOR (98869)	1
-7	H3447	. RESISTOR (98869)	1
-8	H3627	. RESISTOR (98869)	3
-9	2N4852	. TRANSISTOR (04713)	1
-10	RN55D7870F	. RESISTOR	2
-11	C933	. DIODE (98869)	2
-12	CS13BF226K	. CAPACITOR	3
-13	1-4-5P470E	. RESISTOR (80031)	4
-14	CS13BB187K	. CAPACITOR	2
-15	H3564	. RESISTOR (98869)	1
-16	1-4-5P100E	. RESISTOR (80031)	2
-17	RN60D4643F	. RESISTOR	2
-18	624C1C105K	. CAPACITOR (14752)	2
-19	TIL111	. OPTICAL COUPLER (01295)	1
-20	H3485	. RESISTOR (98869)	3
-21	112A1C104	. CAPACITOR (14752)	1
-22	RN55D1003F	. RESISTOR	4
-29	1N914	. DIODE (04713)	5
-24	2N4402	. TRANSISTOR (04713)	3
-25	SN52741L	. INTEGRATED CIRCUIT (01295)	5
-26	8-ICS	. SOCKET (71785)	6
-27	1-4-5P330K	. RESISTOR (80031)	1
-28	CK05CW102K	. CAPACITOR	3
-29	1-4-5P10K	. RESISTOR (80031)	3
-30	R-1003-A-2	. EJECTOR (53507)	2
-31	3800P-203	. RESISTOR, Variable (02669)	2
-32	430	. TEST POINT (83339)	6
-33	2N4352	. TRANSISTOR (04713)	1
-34	2N4351	. TRANSISTOR (04713)	1
-35	H-1022	. CAPACITOR (02799)	1
-36	C4600	. INTEGRATED CIRCUIT (98869)	1
-36A	BH12068-1	. RETAINER (98869)	1
-363	1-331892-0	. SOCKET (00779)	8
-37	533-00HS100K	. RESISTOR, Variable (94271)	1
-38	3800P-502	. RESISTOR, Variable (02669)	3
-39	533-00HS250K	. RESISTOR, Variable (94271)	1
-40	BH4446	. RESISTOR (98869)	1
-41	H3470	. RESISTOR (98869)	1
-42	BH3274	. RESISTOR (98869)	2
-43	3800P-103	. RESISTOR, Variable (02669)	1
-44	2N4861	. TRANSISTOR (01295)	6
-46	3800P-202	. RESISTOR, Variable (02669)	1
-46	CK05BX220K	. CAPACITOR	4
-47	DD-500	. CAPACITOR (71590)	2

Figure & Index Number	Part Number	1 2 3 4 5 6 7	Description	Units Per Assy
4-35-48	C1904	.	TRANSISTOR (98869)	3
-49	1-4-5P27K	.	RESISTOR (80031)	8
-50	1-4-5P47K	.	RESISTOR (80031)	1
-51	LM211H	.	INTEGRATED CIRCUIT (12040)	1
-52	DD-100	.	CAPACITOR (71590)	1
-53	5GAS-S10	.	CAPACITOR (56289)	2
-54	RC07GF226K	.	RESISTOR	6
-55	H3524	.	RESISTOR (98869)	1
-56	SN5474N	.	INTEGRATED CIRCUIT (01295)	1
-57	US-2-14-160-G-B	.	SOCKET (18677)	3
-58	H3515	.	RESISTOR (98869)	1
-59	SN5402N	.	INTEGRATED CIRCUIT (01295)	1
-60	SN5476N	.	INTEGRATED CIRCUIT (01295)	1
-61	US-2-16-160-G-B	.	SOCKET (18677)	1
-62	SN5400N	.	INTEGRATED CIRCUIT (01295)	1
-63	3711-2-2	.	CHOKE (71279)	2
-64	H3588	.	RESISTOR (98869)	1
-65	H3582	.	RESISTOR (98869)	1
-66	BH15717	.	PRINTED CIRCUIT BOARD, Machined (88869)	1

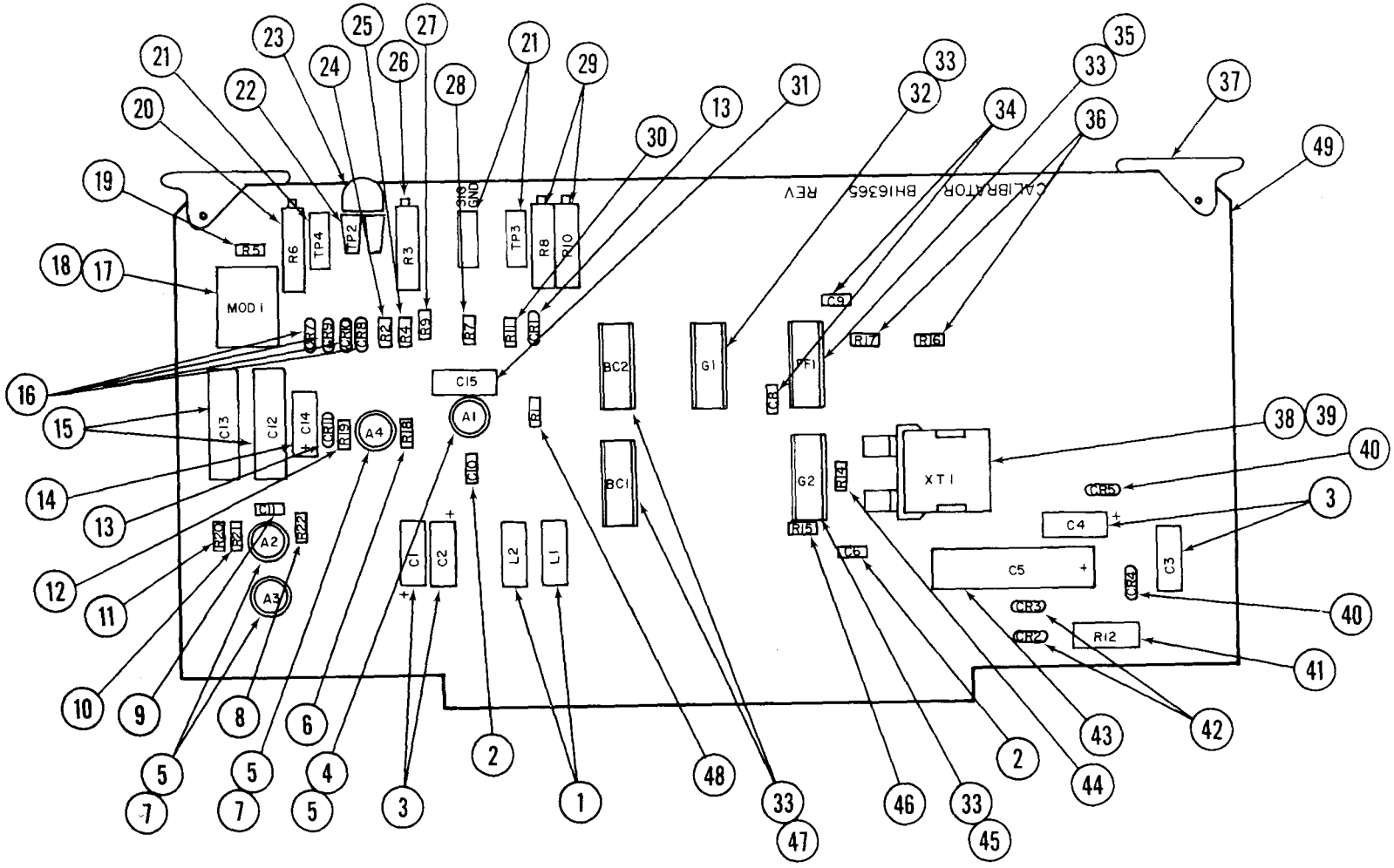

Figure 4-36. BH16365-1 Calibrator Circuit Board Assembly.

Figure & Index Number	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy
4-36	BH16365-1	CALIBRATOR CIRCUIT BOARD ASSEMBLY (See figure FO-7 for NHA.) (98869)	REF
-1	3711-2-2	. CHOKE (71279)	2
-2	CK05BX270K	. CAPACITOR	2
-3	CS13BF226K	. CAPACITOR	4
-4	LM101A	. INTEGRATED CIRCUIT (07263)	1
-5	8-ICS	. SOCKET (71785)	4
-6	RN55D2002F	. RESISTOR	1
-7	SN52741L	. INTEGRATED CIRCUIT (01295)	3
-8	1-4-5P1M	. RESISTOR (80031)	1
-9	CK05CW102K	. CAPACITOR	1
-10	1-4-5P150K	. RESISTOR (80031)	1
-11	1-4-5P10K	. RESISTOR (80031)	1
-12	RN55D7870F	. RESISTOR	1
-13	C933	. DIODE (98869)	2
-14	CS13BF685M	. CAPACITOR	1
-15	625C1C105K	. CAPACITOR (14752)	2
-16	1N914	. DIODE (04713)	4
-17	BH10666-8	. COMPENSATOR (98869)	1
-18	NMP-CHAL-F	. CONNECTOR (04157)	1
-19	H3674	. RESISTOR (98869)	1
-20	3800P-502	. RESISTOR (02669)	1
-21	430	. TEST POINT (83339)	3
-22	450-3422-01-03	. SOCKET (71279)	2
-23	461-2871-01-03-12	. PLUG (71279)	1
-24	BH5070	. RESISTOR (98869)	1
-25	BH5058	. RESISTOR (98869)	1
-26	3311P-100	. RESISTOR (02660)	1
-27	BH3274	. RESISTOR (98869)	1
-28	BH4098	. RESISTOR (98869)	1
-29	3800P-202	. RESISTOR (02669)	2
-30	H3512	. RESISTOR (98869)	1
-31	C389	. CAPACITOR (98869)	1
-32	CK4023AE	. INTEGRATED CIRCUIT (86684)	1
-33	US=2-14-160-G-B	. SOCKET (18677)	5
-34	CK06BX103K	. CAPACITOR	2
-35	CD4013AE	. INTEGRATED CIRCUIT (86684)	1
-36	1-4-5P15K	. RESISTOR (80031)	2
-37	R-1003-A-2	. EJECTOR (53507)	2
-38	CR-45/U	. CRYSTAL	1
-39	8000-AG9	. SOCKET (91506)	1
-40	1N4736A	. DIODE (04713)	2
-41	VC3D-350	. RESISTOR (12697)	1
-42	1N5059	. DIODE (03508)	2
-43	TTX200MFD35VDC	. CAPACITOR (37942)	1
-44	1-4-5P47K	. RESISTOR (80031)	1
-45	CD4001AE	. INTEGRATED CIRCUIT (86684)	1
-46	RC07GF106K	. RESISTOR	1
-47	CD4024AE	. INTEGRATED CIRCUIT (86684)	2
-48	RN55D6650F	. RESISTOR	1

Figure & Index Number	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy
4-36-49	BH16365	PRINTED CIRCUIT BOARD, Machined (98869)	1
FO-8	BH15194A-4	PROBE CONTROLLER ASSEMBLY (See figure 4-29 for NHA.) (98869)	
	BH15802	. PROBE CONTROLLER HARNESS (98869)	1
-1	MS51957-17	. SCREW (AP)	6
-2	BH15713	. . TRANSFORMER (See items 4 & 5, figure 4-29 for attaching parts) (98869)	1
-3	C406-021	. . CONNECTOR (06928)	2
-4	C404-010	. . CONNECTOR (06928)	1
-5	34567	. . TERMINAL LUG (04618)	4
-6	35316	. . TERMINAL LUG (Not shown) (04618)	2
-7	SS-70BL-2 BLK	. KNOB (21694)	2
-8	BH15801-1	. PROBE CONTROL-FUNCTION SWITCH BOARD ASSEMBLY (See figure 4-37 for breakdown.) (98869)	1
-9	N-9030-1/4	. SEAL NUT (AP) (97539)	2
-10	12C1087	. WASHER, Non-turn (AP) (01073)	2
-11	MS51957-5	. SCREW (AP)	2
-12	SS-7013L-2 BLK	. KNOB (21604)	2
-13	BH16367-3	. RESISTANCE-INSULATION BOARD ASSEMBLY (See figure 4-38 for breakdown.) (98869)	1
-14	N-9030-1/4	. SEAL NUT (AP) (97539)	2
-15	12C1087	. WASHER, Non-turn (AP) (01073)	2
-16	250-1471-500	. LAMP CAP (72619)	1
-17	507-5824-0747-600	. LAMP (72619)	1
-18	250-8758-33-504	. LAMPHOLDER (72619)	1
-19	SSN-70-2 BLK	. KNOB (26104)	1
-20	3540-S-1-203	. POTENTIOMETER (80294)	1
-21	N-9030-1/4	. SEAL NUT (AP) (97539)	1
-22	MS35059-23	. SWITCH	1
-23	N-9030-B	. SEAL NUT (AP) (97539)	1
-24	SSN-70-2 BLK	. KNOB (21694)	1
-25	3540-S-1-101	. POTENTIOMETER (80294)	1
-26	N-9030-1/4	. SEAL NUT (AP) (97539)	1
-27	1N5059	. DIODE (03508)	1
-28	KR7826	. RELAY (77342)	1
-29	MS20365-6342A	. NUT (AP)	3
	1415-6	. TERMINAL LUG (83339)	1
-30	PDA-20	. CIRCUIT BREAKER (01295)	1
-31	MS51957-47	. SCREW (AP)	2
-32	BH15180	. BRACKET (98869)	1
-33	SEELSKREW/R/ 6-32x112”	. SCREW, Seal (AP) (13074)	2
	MS20365-632A	. NUT (AP)	2
-34	BH2825	. METER (98869)	1

Figure Number	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy
FO-8-35	SEELSKREW/R/ 4-40x1/2"	. SCREW, Seal (AP) (13074)	3
-36	BH581-1	. GASKET (98869)	1
-37	BH6510	. METER (98869)	1
-38	SEELSKREW/R/ 4-40x1/2"	. SCREW, Seal (AP) (13074)	3
-39	BH581-1	. GASKET (98869)	1
-40	BH9020P	. CONNECTOR (98869)	1
-41	MS25043-12C	. DUST CAP	1
-42	SEELSKREW/R/ 4-40x1/2"	. SCREW, Seal (AP) (13074)	4
	MS20365-440A	. NUT (AP)	4
-43	10-36675-12	. GASKET (77829)	1
-44	BH9039S	. CONNECTOR (98869)	1
-45	MS25043-20C	. DUST CAP	1
-46	SEELSKREW/R/ 4-40x1/2"	. SCREW, Seal (AP) (13074)	4
	MS20365-440A	. NUT (AP)	4
-47	10-36675-20	. GASKET (78820)	1
-48	BH9030S	. CONNECTOR (98869)	1
-49	MS25043-14C 4-40x1/2"	. DUST CAP	1
	MS20365-440A	. NUT (AP)	4
-51	10-36675-14	. GASKET (77829)	1
-52	KAW-20	. FUSE (71400)	1
-53	FHN23W	. FUSE HOLDER (71400)	1
-54	SEELSKREW/R/ 6-32x1/2”	. SCREW, Seal (AP) (13074)	2
-55	BH9033P	. CONNECTOR (98869)	1
-56	MS25043-16C	. DUST CAP	1
-57	SEELSKREW/R/ 4-40x1/2"	. SCREW, Seal (AP) (13074)	4
	MS20365-440A	. NUT (AP)	4
-58	10-36675-16	. GASKET (77829)	1
-59	BH9385S	. CONNECTOR (98869)	1
-60	10-101960-143	. DUST CAP (77820)	1
-61	SEELSKREW/R/ 4-40X1/2"	. SCREW, Seal (AP) (13074)	4
	MS20365-440A	. NUT (AP)	4
-62	10-36675-14	. GASKET (78820)	1
-63	BH799	. STOP ARM SUPPORT (98869)	1
-64	MS51960-63	. SCREW (AP)	2
-65	C45H	. RECTIFIER (Not shown) (See figure FO-9 for physical location (03508)	2
-66	BH15189A-2	. DECK, Marked (98869)	1
4-37	BH15801-1	PROBE CONTROL-FUNCTION SWITCH CIRCUIT BOARD ASSEMBLY (See figure FO-8 for NHA.) (98869)	REF

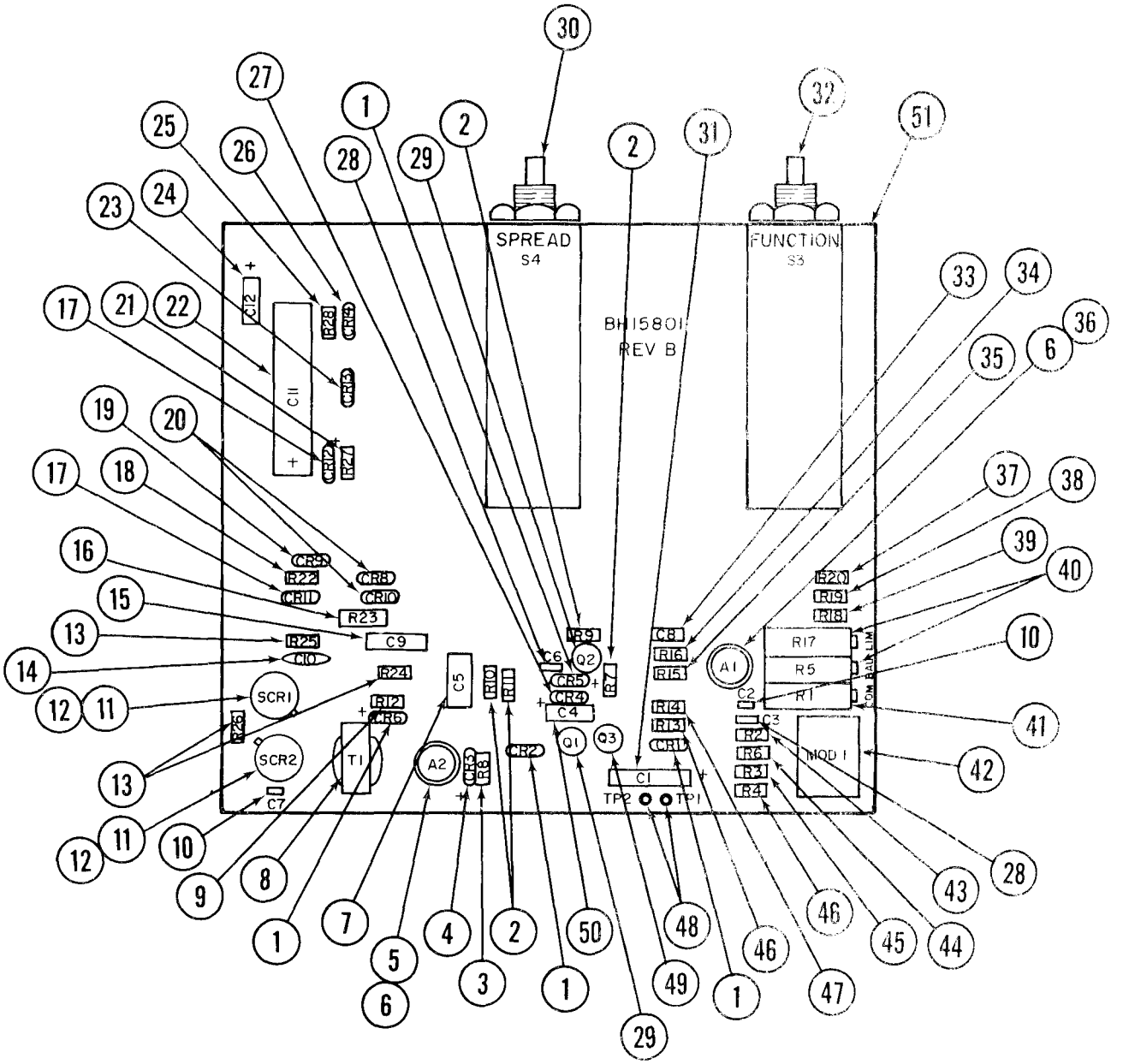

Figure 4-37. BH15801-1 Probe Control-Function Switch Circuit Board Assembly.

Figure & Index Number	Part Number	1 2 3 4 5 6 7	Description	Units Per Assy
4-37-1	1N914	.	DIODE (04713)	4
-2	1-4-5P39K	.	RESISTOR (80031)	4
-3	1-4-5P2K2	.	RESISTOR (80031)	1
-4	1N702	.	DIODE (01295)	1
-5	SN52741L	.	INTEGRATED CIRCUIT (01295)	1
-6	8-ICS	.	SOCKET (71785)	2
-7	ACF-50-2.0-10	.	CAPACITOR (31589)	1
-8	TZ-17XT	.	TRANSFORMER (81095)	1
-9	1-4-5P3K3	.	RESISTOR (80031)	1
-10	CK05BX103K	.	CAPACITOR	2
-11	2N6336	.	RECTIFIER (01295)	2
-12	5203-8	.	INSULATOR (86928)	2
-13	1-4-5P10K	.	RESISTOR (80031)	3
-14	DD-102	.	CAPACITOR (71590)	1
-15	637B1D563K	.	CAPACITOR (14752)	1
-16	VC3D-1K	.	RESISTOR (12697)	1
-17	1N5059	.	DIODE (03508)	2
-18	1-4-5P15K	.	RESISTOR (80031)	1
-19	1N4761A	.	DIODE (04713)	1
-20	1N4005	.	DIODE (04713)	2
-21	RC20GF331K	.	RESISTOR	1
-22	TTX200MFD35VDC	.	CAPACITOR (37942)	1
-23	IN4746A	.	DIODE (04713)	1
-24	CS13BD226K	.	CAPACITOR	1
-25	RN55D10C1F	.	RESISTOR	1
-26	C933	.	DIODE (98869)	1
-27	1N4736A	.	DIODE (04713)	1
-28	CK06BX223K	.	CAPACITOR	2
-29	2N3646	.	TRANSISTOR (07263)	2
-30	71BY23199-1-9N	.	SWITCH (81073)	1
-31	CS13BB187K	.	CAPACITOR	1
-32	71BY2300-1-7N	.	SWITCH (81073)	1
-33	CS13BF105M	.	CAPACITOR	1
-34	H3440	.	RESISTOR (98869)	1
-36	RC07GF106K	.	RESISTOR	1
-36	LM725H	.	INTEGRATED CIRCUIT (12040)	1
-37	H3378	.	RESISTOR (98869)	1
-38	BH4527	.	RESISTOR (98869)	1
-39	H3617	.	RESISTOR (98869)	1
-40	3800P-203	.	RESISTOR, Variable (02660)	2
-41	3800P-502	.	RESISTOR, Variable (02660)	1
-42	BH10666-8	.	COMPENSATOR (98869)	1
-43	H3674	.	RESISTOR (98869)	1
-44	1-4-5P4K7	.	RESISTOR (80(80031)	1
-47	1-4-5P220K	.	RESISTOR (80031)	2
-48	2754-2	.	RESISTOR (80031)	1
-49	2N4852	.	TEST POINT (71279)	2
-50	ACF-50-.22-10	.	CAPACITOR (31589)	1
-51	BH15801	.	PRINTED CIRCUIT BOARD, Machined (98869)	1

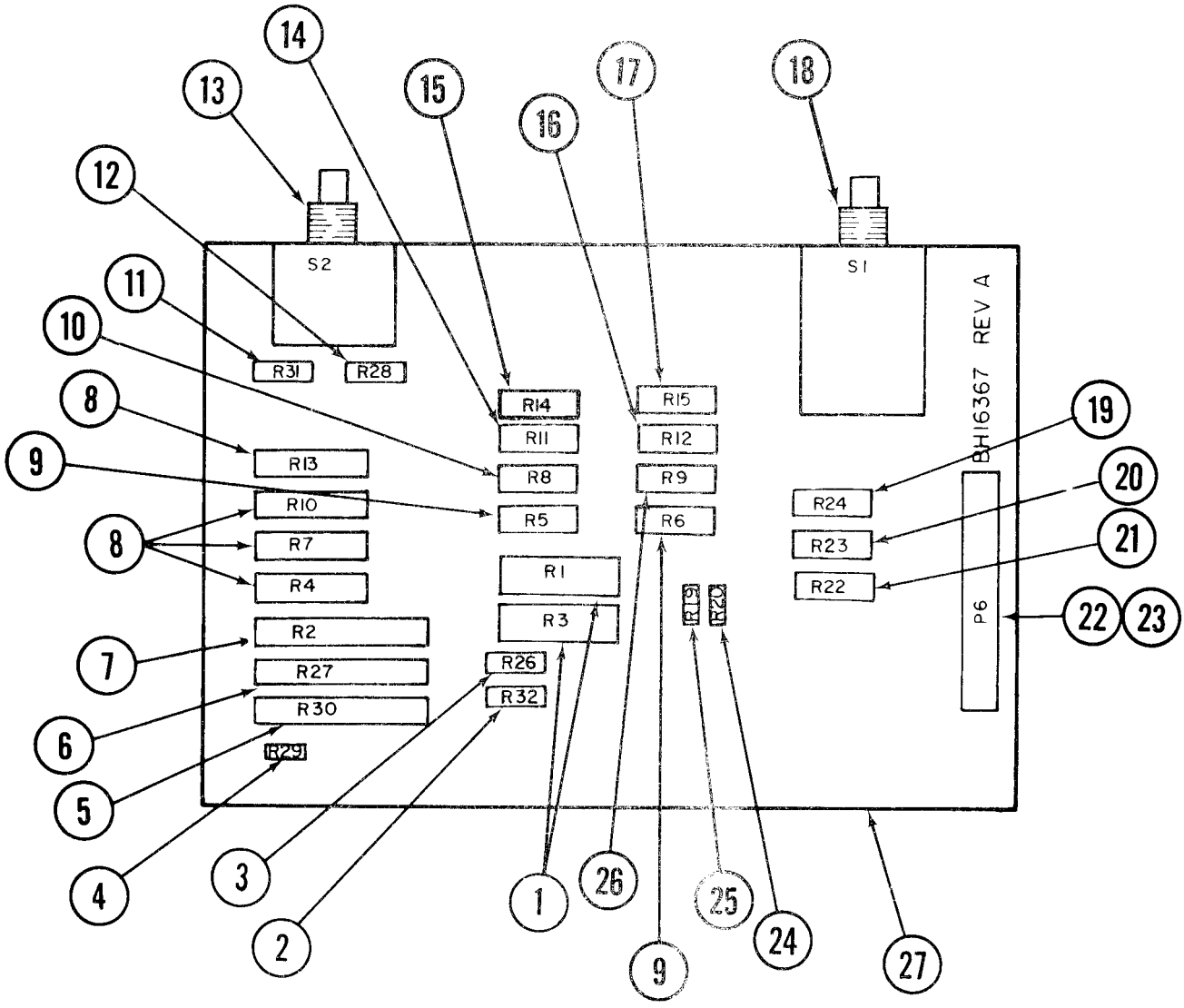

Figure 4-38. BH16367-3 Resistance-Insulation Circuit Board Assembly.

Figure & Index Number	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy
4-38	BH16367-3	RESISTANCE-INSULATION CIRCUIT BOARD ASSEMBLY (See figure FO-8 for NHA.) (98869)	REF
-1	5XM225	. RESISTOR (63743)	2
-2	H3395	. RESISTOR (98869)	1
-3	H3522	. RESISTOR (98869)	1
-4	H3394	. RESISTOR (98869)	1
-5	224P-1-101	. RESISTOR, Variable (80294)	1
-6	224P-1-501	. RESISTOR, Variable (80294)	1
-7	535-00HS10	. RESISTOR, Variable (94271)	1
-8	3811P-500	. RESISTOR, Variable (94271)	1
-9	RS-1A, 7.00, 1W	. RESISTOR (91637)	2
-10	RS-1A, 120, 1W	. RESISTOR (91637)	1
-11	BH1771	. RESISTOR (98869)	1
-12	BH1773	. RESISTOR (98869)	1
-13	71BY23196-1-2N	. SWITCH (81073)	1
-14	RS-1A, 220, 1W	. RESISTOR (91637)	1
-15	RS-1A, 350, 1W	. RESISTOR (91637)	1
-16	RS-1A, 300, 1W	. RESISTOR (91637)	1
-17	RS-1A, 450, 1W	. RESISTOR (91637)	1
-18	71BY23213-1-6N	. SWITCH (81073)	1
-19	BH275	. RESISTOR (98869)	1
-20	H3493	. RESISTOR (98869)	1
-21	BH274	. RESISTOR (98869)	1
-22	A402-010	. CONNECTOR (06928)	1
-23	MS51957-5	. SCREW (AP)	2
	MS35333-69	. SCREW (AP)	2
-24	RN55D6811F	. RESISTOR	1
-25	RN55C1000F	. RESISTOR	1
-26	RS-1A, 150, 1W	. RESISTOR (91637)	1
-27	BH16367	. PRINTED CIRCUIT BOARD, machined (98869)	1

Figure & Index Number	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy
FO-9	BH15835-2	INSTRUMENT CASE ASSEMBLY (See figure 4-29 for NHA.) (98869)	REF
-1	BH14548A-1	. LID (98869)	1
-2	MS20253-2-1812	. HINGE PIN (AP)	1
-3	123002	. CLIP (75915)	2
-4	COML	. SCREW, Seal, machine, cross recess, 4-40 x 5/16 inch 1 (AP) (13861)	2
	MS20365-440A	. NUT (AP)	2
-5	BH15827	. SPARE FUSEHOLDER (98869)	1
-6	KAW-20	. FUSE (71400)	2
-7	COML	. WING NUT, 4-40 (AP)	2
	MS51957-21	. SCREW (AP)	2
	MS20365-440A	. NUT (AP)	2
-8	BH15826	. HEAT SINK (98869)	2
-9	BH17427	. MICA SHEET (98869)	4
-10	COML	. SCREW, Seal, machine, cross recess, 8-32 x 1 inch 1 (AP) (13861)	4
	MS20365-832A	. NUT (AP)	4
	2163	. WASHER (AP) (83330)	4
-11	BH15524	. MOLD STRIP (98869)	2
-12	BH15525	. BUMPER STRIP (98869)	2
-13	COML	. SCREW, Machine, pan hd, cross recess, 4-40 x 9/16 inch 1 (AP) (13861)	8
	MS20365-440A	. NUT (AP)	8
-14	21	. BUMPER (70485)	4
-15	COML	. SCREW, Seal, machine, cross recess, 4-40 x 3/4 inch 1 (AP) (13861)	4
	MS20365-440A	. NUT (AP)	4
-16	R-116	. BUMPER (78046)	6
-17	COML	. SCREW, Seal, machine, cross recess, 4-40 x 3/8 inch 1 (AP) (13861)	6
	MS20365-440A	. NUT (AP)	6
	MS27183-4	. WASHER (AP)	6
-18	BH15197	. GASKET (98869)	1
-19	BH15834	. CASE (98869)	1

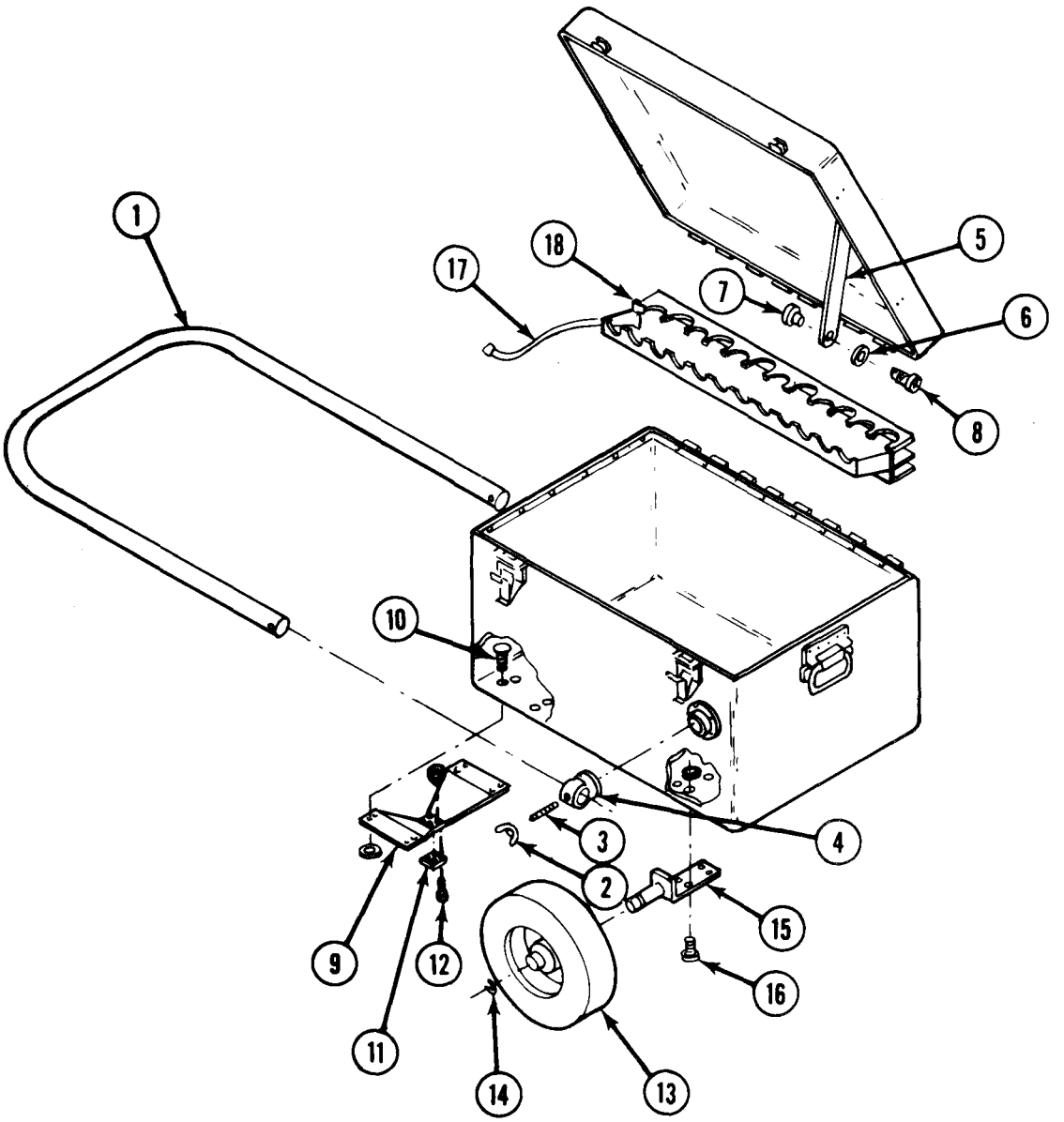

Figure 4-39. H122 Accessory Case.

Figure & Index Number	Part Number	1 2 3 4 5 6 7 Description	Units Per Assy
4-39	H122	ACCESSORY CASE (See figure 4-29 for NHA.) (98869)	REF
-1	BH585	. HANDLE (98869)	1
-2	MS35426-15	. WING NUT (AP)	2
-3	MS35308-341	. BOLT (AP)	2
-4	BH727	. PIVOT SOCKET (98869)	2
-5	BH796	. STOP ARM ASSEMBLY (98869)	1
-6	BH723	. SPACER (98869)	1
-7	BH437	. STOP ARM SUPPORT (98869)	1
-8	MS51958-61	. SCREW (AP)	1
	MS35333-73	. WASHER (AP)	1
-9	BH834-1	. POST (98869)	1
-10	MS51957-63	. SCREW (AP)	8
	MS20365D-1032A	. NUT (AP)	8
-11	BH834-2	. PAD (98869)	1
-12	MS51957-27	. SCREW (AP)	4
	MS35333-71	. WASHER (AP)	4
-13	BH3506	. WHEEL (98869)	2
-14	5100-62	. RETAINING RING (AP) (79136)	2
-15	BH835	. WHEEL MOUNT (98869)	2
-16	MS51957-65	. SCREW (AP)	8
	MS20365D-1032A	. NUT (AP)	8
-17	BH6554	. PROBE RETAINER (98869)	1
-18	BH6551	. PROBE RACK (98869)	1

APPENDIX A

REFERENCES

A-1. Dictionaries of Terms and Abbreviations.

H4-1 and H4-2	Federal Supply Code for Manufacturers
MIL-STD-12C	Abbreviations for Use on Drawings, Specifications, Standards and in Technical Documents

A-2. Publication Indexes.

AR 750-1	Army Material Maintenance Concepts and Policies
DA PAM 738-751	Functional Users Manual for the Army Maintenance Management System-Aviation (TAMMS-A)

A-3. Technical Manuals.

TM 9-213	Painting Instructions for Field Use
TM 55-744-1-4	Destruction of Aviation Equipment to Prevent Enemy Use
TM 55-1500-204-25/1	General Aircraft Maintenance Manual
TM 55-1500-323-25	Organizational, DS and GS and Depot Maintenance Manual Installation Practices for Aircraft Electric and Electronic Wiring

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APPENDIX B
MAINTENANCE ALLOCATION CHART
Section I. INTRODUCTION

B-1. Maintenance Allocation Chart.

a. This Maintenance Allocation Chart (MAC) assigns maintenance functions in accordance with the Three Levels of Maintenance concept for army aircraft. These maintenance levels: Aviation Unit Maintenance (AVUM), Aviation Intermediate Maintenance (AVIM) and Depot Maintenance are depicted on the MAC as:

AVUM which corresponds to the O code in the Repair Parts and Special Tools List (RPSTL).

AVIM which corresponds to the F code in the Repair Parts and Special Tools List (RPSTL).

DEPOT which corresponds to the D code in the Repair Parts and Special Tools List (RPSTL).

b. The maintenance to be performed below depot and in the field is described as follows:

(1) Aviation Unit Maintenance (AVUM). AVUM activities will be staffed and equipped to perform high frequency "On-Equipment" maintenance tasks required to retain or return equipment to a serviceable condition. The maintenance capability of the AVUM will be governed by the MAC and limited by the amount and complexity of support equipment, facilities required, and number of spaces and critical skills available. The range and quantity of authorized spare modules/components will be consistent with the mobility requirements dictated by the air mobility concept. (Assignment of maintenance tasks to divisional company size aviation units will consider the overall maintenance capability of the division, the requirement to conserve personnel and equipment resources and air mobility requirements).

(a) Company Size Aviation Units. Perform those tasks which consist primarily of preventive maintenance and maintenance repair and replacement functions associated with sustaining a high level of equipment operational readiness. Perform maintenance inspections and sevicing to inelude daily, intermediate, periodic and special inspections as authorized by the MAC or higher headquarters. Identify the cause of equipment/system malfunctions using applicable technical manual troubleshooting instructions, Built-In Test Equipment (BITE), installed instruments, or easy to use Test Measurement and Diagnostic Equipment (TMDE). Replace worn or damaged modules/components which do not require complex adjustments or system alignment and which can be removed/installed with available skills, tools and equipment. Perform operational and continuity checks and make minor repairs. Perform servicing, functional adjustments, and minor repair/replacement. Evacuate unserviceable modules/components and end items beyond the repair capability of AVUM to the supporting AVIM.

(b) Less than Company Size Aviation Units. Aviation elements organic to brigade, group, battalion headquarters and detachment size units are normally small and have less than ten aircraft assigned. Maintenance tasks performed by the aircraft crew chief or assigned aircraft repairman will normally be limited to preventive maintenance, inspections, servicing, spot painting, stop drilling, minor adjustments, module/component fault diagnosis and replacement of selected modules/components. Repair functions will normally be accomplished by the supporting AVIM unit.

(2) Aviation Intermediate Maintenance (AVIM). AVIM provides mobile, responsive "One Stop" maintenance support. (Maintenance functions which are not conducive to sustaining air mobility will be assigned to depot maintenance). Performs all maintenance functions authorized to be done at AVUM. Repair of equipment for return to user will emphasize support or operational readiness requirements. Authorized maintenance includes replacement and repair of modules/components and end items which can be accomplished efficiently with available skills, tools, and equipment. Establishes the Direct Exchange (DX) program for AVUM units by repairing selected items for return to stock when such repairs cannot be accomplished at the AVUM level. Inspects, troubleshoots, tests, diagnoses, repairs, adjusts, calibrates, and aligns system modules/components. Module/component disassembly and repair will support the DX progrmam and will normally be limited to tasks requiring cleaning and the replacement of seals, fittings and items of common hardware. Unserviceable reparable modules/components and end items which are beyond the capability of AVIM to

repair will be evacuated to Depot Maintenance This level will per-form special inspections which exceed AVUM capability. Provides quick response maintenance support, on-the-job-training, and technical assistance through the use of mobile maintenance contact teams. Maintains authorized operational readiness float. Provides collections and classification services for serviceable/unserviceable material. Operates a cannibalization activity in accordance with AR 750-50. (The aircraft maintenance company within the maintenance battalion of a division will perform AVUM functions consistent with air mobility requirements and conservation of personnel and equipment resources. Additional intermediate maintenance support will be provided by the supporting non-divisional AVIM unit).

B-2. Use of the Maintenance Allocation Chart.

a. The MAC assigns maintenance functions to the lowest level of maintenance based on past experience and the following consideration:

(1) Skills available.

(2) Time required

(3) Tools and lest equipment required and/or available.

b. Only the lowest level of maintenance authorized to perform a maintenance function is indicated. If the lowest level of maintenance cannot perform all tasks of any single maintenance function (e.g., test, repair), then the higher maintenance level(s) that can accomplish additional tasks will also be indicated.

c. A maintenance function assigned to a maintenance level will automatically be authorized to be performed at any higher maintenance level.

d. A maintenance function that cannot be performed at the assigned level of maintenance for any reason may be evacuated to the next higher maintenance organization. Higher maintenance levels will perform the maintenance functions of lower maintenance levels when required or directed by the appropriate commander.

e. The assignment of a maintenance function will not be construed as authorization to carry the associated repair parts in stock. Authority to requisition, stock, or otherwise secure necessary repair parts will be as specified in the repair parts and special tools list appendix.

f. Normally there will be no deviation from the assigned level of maintenance. In cases of operational necessity, maintenance functions assigned to a maintenance level may, on a one-time basis and at the request of the lower maintenance level, be specifically authorized by the maintenance officer of the level of maintenance to which the function is assigned. The special tools, equipment, etc. required by the lower level of maintenance to perform this function will be furnished by the maintenance level to which the function is assigned. This transfer of a maintenance function to a lower maintenance level does not relieve the higher maintenance level of the responsibility of the function. The higher level of maintenance has the authority to determine:

(1) If the lower level is capable of performing the work,

(2) If the lower level will require assistance or technical supervision and on-site inspection.

(3) If the authorization will be granted.

g. Organizational through depot maintenance of the US Army Electronics Command equipment will be performed by designated US Army Electronics Command personnel.

h. Changes to the MAC wll be based on continuing evaluation and analysis by responsible technical personnel and on reports received from field activities.

B-3. Definitions.

a. Inspect. To determine serviceability of an item by comparing its physical, mechanical and electrical characteristics with established standards.

b. Test. To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents and air.

d. Adjust. To rectify to the extent necessary to bring into proper operating range.

e. A line. To adjust specified variable elements of an item to bring to optimum performance.

f. Calibrate. TO determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument or test equipment being compared with the certified standard.

g. Install. To set up for use in an operational environment such as an emplacement, site or vehicle.

h. Replace. To replace unserviceable items with serviceable assemblies, subassemblies or parts.

i. Repair. To restore an item to serviceable condition through correction of a specific failure or unseviceable condition. This includes, but is not limited to, inspection, cleaning, preserving, adjusting, replacing, welding, riveting, and strengthening.

j. Overhaul. To restore an item to a completely serviceable condition as prescribed by maintenance serviceability standards prepared and published for the specific item to be overhauled.

k. Rebuild. To restore an item to a standard as nearly as possible to the original or new condition in appearance, performance, and life expectancy. This is accomplished through the maintenance technique of complete disassembly of the item, inspection of all parts or components, repair or replacement of worn or unserviceable elements (items) using original manufacturing tolerances and specifications, and subsequent reassembly of the item.

B-4. Functional Groups. Standard functional groupings are not considered feasible for aviation ground support equipment due to variation and complexity. Therefore, variations to functional groupings may occur.

B-5. Maintenance Categories and Work Times. The maintenance categories (levels) AVUM, AVIM, and DEPOT are listed on the Maintenance Allocation Chart with individual columns that indicate the work times for maintenance functions at each maintenance level. Work time presentations such as 0.1 indicate the average time it requires a maintenance level to perform a specified maintenance. function. If a work time has not been established, the columnar presentation shall indicate "_._". Maintenance levels higher than the level of maintenance indicated are authorized to perform the indicated function.

B-6. Tools and Test Equipment (Section III). Common tool sets (not individual tools), special tools, test and support equipment required to perform maintenance functions are listed alphabetically with a reference number to permit cross-referencing to column 5 in the MAC. In addition, the maintenance category authorized to use the device is listed along with the item National Stock Number (NSN) and, if applicable, the tool number to aid in identifying the tool/device.

Section II. MAINTENANCE ALLOCATION CHART

NOMENCLATURE OF END ITEMS

Tester, Exhaust Gas Temperature

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY			(5) TOOLS AND EQUIPMENT	(6) REMARKS
			AVUM	AVIM	DEPOT		
00	Exhaust Gas Temperature						
01	Case Accessory, Wheels, Wheel Mount, Probe Rack, Stops and Supports	Inspect	.3			106	
		Replace		1.5		115	A
		Repair		1.			
		Service	.3				
02	Deck Assembly						
0201	Power On and Galvo Lamps	Inspect	.2				
		Repair		.5		106	
		Replace	.2				
		Test	.1				C
		Adjust	.3				
03	Switches, Circuit Breakers and Relays	Inspect	.2				
		Replace		1.		106	
04	Cables, Connectors and Adapters	Inspect	.2				
		Repair		1.2		106	
		Replace		.5		109	B
05	Circuit Boards	Inspect		.3		106	
0501	Calibration	Replace		1.		109	B
0502	Tachometer	Repair			3.		C
0503	Temperature	Test		.3			
0504	Display	Calibrate			.2		
06	Trimmer Assembly	Inspect		.2		106	
		Service		.1			
		Test		.1		109	B
		Repair		.3			
		Replace		.5			
		Test		.2			C
		Calibrate		.3			
07	Insulation Check Meter	Replace		.5		106	C
		Test		.3			
08	Probe Assembly	Repair		.6		109	B
		Replace		.2		106	C
		Test		.3			

REMARKS

TESTER, EXHAUST GAS TEMPERATURE

Reference Code	Remarks
A	Use Available Motor Pool Tools
B	Use Available Equipment from Shop Set
C	Operational Test On Unit

Section III. TOOL AND TEST EQUIPMENT REQUIREMENT

REF. NO.	MAINT CAT.	NOMENCLATURE	NATIONAL STOCK NUMBER	TOOL NO.
100	0	Tool Set, AVUM, Set No. 1	4920-00-159-8727	SC492099CLA90
101	0	Tool Set, AVUM, Set No. 2	4920-00-567-0476	SC492099CLA92
102	0	Tool Kit, Acft Mech Gen	5180-00-323-4692	SC518099CLA01
103	0	Tool Kit, Arfrm Rpmn	5180-00-323-4876	SC518099CLA02
104	0	Tool Kit, Hyd Rpmn	5180-00-323-4891	SC518099CLA03
105	0	Tool Kit, Instr Rpmn	5180-00-323-4913	SC518099CLA05
106	0	Tool Kit, Elec Rpmn	5180-00-323-4915	SC518099CLA06
107	0	Tool Kit, Eng Rpmn	5180-00-323-4944	SC518099CAL07
108	0	Tool Kit, Pwr Trn	5180-00-003-5267	SC518099CLA13
109	F	Shop Set, AVIM, Elec-Instr	4920-00-165-1453	SC492099CLA91ELAM
110	F	Shop Set, AVIM, Hyd	4920-00-165-1454	SC492099CLA91HYAM
111	F	Shop Set, AVIM, Machine Shop	4920-00-405-9279	SC492099CLA91MAAM
112	F	Shop Set, AVIM, Pwr Trn	4920-00-001-4132	SC492099CLA91PTAM
113	AVIM	Shop Set, AVIM, Rtr Shop	4920-00-405-9270	SC492099CLA91ROAM
114	AVIM	Shop Set, AVIM, Sheet Metal	4920-00-166-5505	SC492099CLA91SMAM
115	AVIM	Shop Set, AVIM, Tool Crib	4920-00-472-4183	SC492099CLA91TCAM
116	AVIM	Shop Set, AVIM, Turbine Eng	4920-00-224-3684	492099CLA91ENTAM
117	AVIM	Shop Set, AVIM, Welding	4920-00-163-5093	492099CLA91WEAM

APPENDIX C

REPAIR PARTS AND SPECIAL TOOLS LIST

SECTION I. INTRODUCTION

C-1. Scope. This RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of Aviation Unit and Aviation Intermediate maintenance of the Tester, Exhaust Gas Temperature. It authorizes the requisitioning, issue, and disposition of spares, repair parts and special tools as indicated by the source, maintenance and recoverability (SMR) codes.

C-2. **General.** In addition to Section I. Introduction, this Repair Parts and Special Tools List is divided into the following sections:

a. Section II. Repair Parts List. A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence, Bulk materials are listed in item name sequence, Repair parts kits are listed separately in their own functional group within Section II. Repair parts for repairable special tools are also listed in this section. Items listed are shown on the associated illustration(s) figure(s).

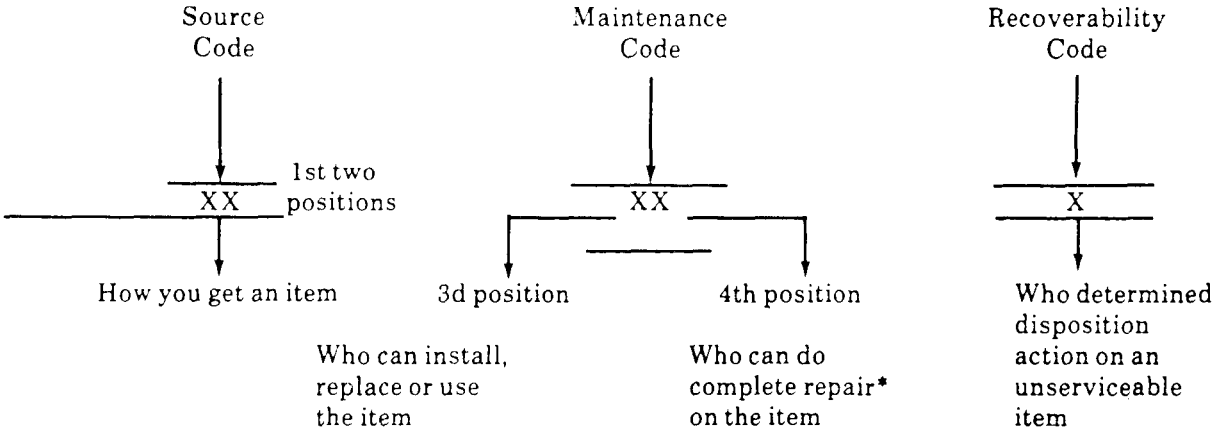
b. Section III. Special Tools List. A list of special tools, special TMDE, and other special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in DESCRIPTION AND USABLE ON CODE column) for the performance of maintenance. (Not applicable)

c. Section IV. National Stock Number and Part Number Index. A list, in National item identification number (NIIN) sequence, of all National stock numbered items appearing in the listing, followed by a list in alphanumeric sequence of all part numbers appearing in the listings. National stock numbers and part numbers are cross-referenced to each illustration figure and item number appearance.

C-3. **Explanation of Columns (Sections II and III).**

a. Item No. (Column (1)). Indicates the number used to identify items called out in the illustration.

b. SMR Code (Column (2)). The Source, Maintenance, and Recoverability (SMR) code is a 5-position code containing supply requisitioning information, maintenance category authorization criteria, and disposition instruction, as shown in the following breakout:



*Complete Repair: Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the "Repair" function in a use user environment in order to restore serviceability to a failed item.

(1) Source Code. The source code tells you how to get an item needed for maintenance, repair, or overhaul of an end item equipment. Explanations of source codes follows:

Code	Explanation
PA PB PC** PD PE PF PG	Stocked items; use the applicable NSN to request requisition items with these source codes. They are authorized to the category indicated by the code entered in the 3d position of the SMR code. **NOTE: Items coded PC are subject to deterioration.
KD KF KB	Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance category indicated in the 3d position of the SMR code. The complete kit must be requisitioned and applied.

Code	Explanation
MO- (Made at org AVUM Level) MF- (Made at DS AVUM Level) MH- (Made at GS Level) ML- (Made at Specialized Repair Act (SRA)) MD- (Made at Depot)	Items with these codes are not to be requested requisitioned individually. They must be made from bulk material which is identified by the part number in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the Bulk Material group of the repair parts list in this RPSTL. If the item is authorized to you by the 3d position code of the SMR code, but the source code indicates it is made at a higher level, order the item from the higher level of maintenance.

Code	Explanation
AO- (Assembled by org/AVUM Level) AF- (Assembled by DS/AVIM Level) AH- (Assembled by GS Category) AL- (Assembled by SRA) AD- (Assembled by Depot)	Items with these codes are not to be requested requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the 3d position code of the SMR code authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the higher level of maintenance.

XA - Do not requisition an "XA"-coded item. Order its next higher assembly. (Also, refer to the NOTE below.)
XB - If an "XB" item is not available from salvage, order it using the FSCM and part number given.
XC - Installation drawing, diagram, instruction sheet, field service drawing, that is identified by manufacturer's part number.
XD - Item is not stocked. Order an "XD"-coded item through normal supply channels using the FSCM and part number given, if no NSN is available.

NOTE: Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes, except for those source coded "XA" or those aircraft support items restricted by requirements of AR 700-42.

(2) Maintenance Code. Maintenance codes tells you the level(s) of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the SMR Code as follows:

(a) The maintenance code entered in the third position tells you the lowest maintenance level authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to one of the following levels of maintenance.

Code	Application/Explanation
C	-Crew or operator maintenance done within organizational or aviation unit maintenance.
O	-Organizational or aviation unit category can remove, replace, and use the item.
F	-Direct support or aviation intermediate level can remove, replace, and use the item.
H	-General support level can remove, replace, and use the item.
L	-Specialized repair activity can remove, replace, and use the item.
D	-Depot level can remove, replace, and use the item.

(b) The maintenance code entered in the fourth position tells whether or not the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (i.e., perform all authorized repair functions.) (NOTE: Some limited repair may be done on the item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.) This position will contain one of the following maintenance codes.

Code	Application/Explanation
O	-Organizational or (aviation unit) is the lowest level that can do complete repair of the item.
F	-Direct support or aviation intermediate is the lowest level that can do complete repair of the item.
H	-General support is the lowest level that can do complete repair of the item.
L	-Specialized repair activity (designate the specialized repair activity) is the lowest level that can do complete repair of the item,
D	-Depot is the lowest level that can do complete repair of the item.
Z	-Nonreparable. No repair is authorized.
B	-No repair is authorized. (No parts or special tools are authorized for the maintenance of a "B" coded item), However, the item may be reconditioned by adjusting, lubricating, etc., at the user level.

(3) Recoverability Code. Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the SMR Code as follows:

Recoverability Codes	Application/Explanation
Z	-Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in 3d position of SMR Code.
O	-Reparable item. When uneconomically reparable, condemn and dispose of the item at organizational or aviation unit level.
F	-Reparable item. When uneconomically reparable, condemn and dispose of the item at the direct support or aviation intermediate level
H	-Reparable item. When uneconomically reparable, condemn and dispose of the item at the general support level.
D	-Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item not authorized below depot level.
L	-Reparable item. Condemnation and disposal not authorized below specialized repair activity (SRA).
A	-Item requires special handling or condemnation procedures because of specific reasons (e.g., precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals directives for specific instructions.

c. FSCM (Column (3)). The Federal Supply Code for Manufacturer (FSCM) is a 5-digit numeric code which is used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

d. Part Number (Column (4)). Indicates the primary number used by the manufacturer (individual, company. firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings. specification standards. and inspection requirements to identify an item or range of items,

NOTE: When you use a NSN to requisition an item. the item you receive may have a different part number from the part ordered.

e. Description and Usable On Code (UOC) (Column (5)). This column includes the following information:

(1) The Federal item name and, when required, a minimum description to identify the item.

(2) The physical security classification of the item is indicated by the parenthetical entry (insert applicable physical security classification abbreviation, e.g., Phy Sec C1 (C) - Confidential, Phy Sec C1 (S) - Secret, Phy Sec C1 (T) - Top Secret).

(3) Items that are included in kits and sets are listed below the name of the kit or set.

(4) Spare repair parts that make up an assembled item are listed immediately following the assembled item line entry.

(5) Part numbers for bulk materials are referenced in this column in the line item entry for the item to be manufactured fabricated.

(6) When the item is not used with all serial numbers of the same model, the effective serial numbers are shown on the last line(s) of the description (before UOC).

(7) The usable on code, when applicable (see paragraph 5, Special information).

(8) In the Special Tools List section, the basis of issue (BOI) appears as the last line(s) in the entry for each special tool, special TM DE, and other special support equipment. When density of equipments supported exceeds density spread indicated in the basis of issue, the total authorization is increased proportionately.

(9) The statement "END OF FIGURE"' appears just below the last item description in Column 5 for a given figure in both Section 11 and Section 111.

f. QTY (Column (6)). The QTY (quantity per figure column) indicates the quantity of the item used in the breakout shown on the illustration figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column in lieu of a quantity indicates that the quantity is variable and the quantity may vary from application to application.

C-4. Explanation of Columns (Sect. IV).

a. National Stock Number (NSN) Index.

(1) Stock Number Column. This column lists the NSN by National item identification number (NIIN) sequence. The NIIN consists of the last nine digits of the NSN (i.e., 5305-01-674-1467). When using this column to locate an item, ignore the first 4 digits of the NSN. However, the complete NSN should be used when ordering items by stock number.

NSN
NIIN

(2) Fig. Column. This column lists the number of the figure where the item is identified located. The figures are-in numerical order in Section II and Section III.

(3) Item Column. The item number identifies the item associated with the figure listed in the adjacent FIG. column. This item is also identified by the NSN listed on the same line,

b. Part Number Index. Part numbers in this index are listed by part number in ascending alphanumeric sequence (i.e., vertical arrangement of letter and number combination which places the first letter or digit of each group in order A through Z, followed by the numbers 0 through 9 and each following letter or digit in like order).

(1) FSCM Column. The Federal Supply Code for Manufacturer (FSCM) is a 5-digit numeric code used to identify the manufacturer, distributor, or Government agency, etc., that supplies the item.

(2) Part Number Column. Indicates the primary number used by the manufacturer (individual, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items.

(3) Stock Number Column. This column lists the NSN for the associated part number and manufacturer identified in the Part Number and FSCM Columns to the left.

(4) FIG. Column. This column lists the number of the figure where the item is identified located in Section II and III.

(5) Item Column. The item number is that number assigned to the item as it appears in the figure referenced in the adjacent figure number column,

C-5. Special Information. Use the following subparagraphs as applicable:

a. Usable On Code. The usable on code appears in the lower left corner of the Description column heading, Usable on codes are shown as "UOC: . ." in the Description Column (justified left) on the first line applicable item description/nomenclature. Uncoded items are applicable to all models.

b. Index Numbers. Items which leave the word BULK in the figure column will have an index number shown in the item number column. This index number is a cross-reference between the National Stock Number/Part Number Index and the bulk material list in Section II.

c. Associated Publications. Not Applicable.

C-6. How to Locate Repair Parts.

a. When National Stock Number or Part Number is Not Known.

(1) First. Using the table of contents. determine the assembly group or subassembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and listings are divided into the same groups.

(2) Second. Find the figure covering the assembly group or subassembly group to which the item belongs.

(3) Third. Identify the item on the figure and note the item number.

(4) Fourth. Refer to the Repair Parts List for the figure to find the part number for the item number noted on the figure.

(5) ***Fifth.*** Refer to the Part Number Index to find the NSN, if assigned.

b. When National Stock Number or Part Number is Known:

(1) First. Using the Index of National Stock Numbers and Part Numbers, find the pertinent National Stock Number or Part Number. The NSN index is in National Item Identification Number (NIIN) sequence (see C-4a(l)). The part numbers in the Part Number index are listed in ascending alphanumeric sequence (see 4b). Both indexes cross-reference you to the illustration figure and item number of the item you are looking for.

(2) Second. After finding the figure and item number, verify that the item is the one you're looking for, then locate the item number in the repair parts list for the figure.

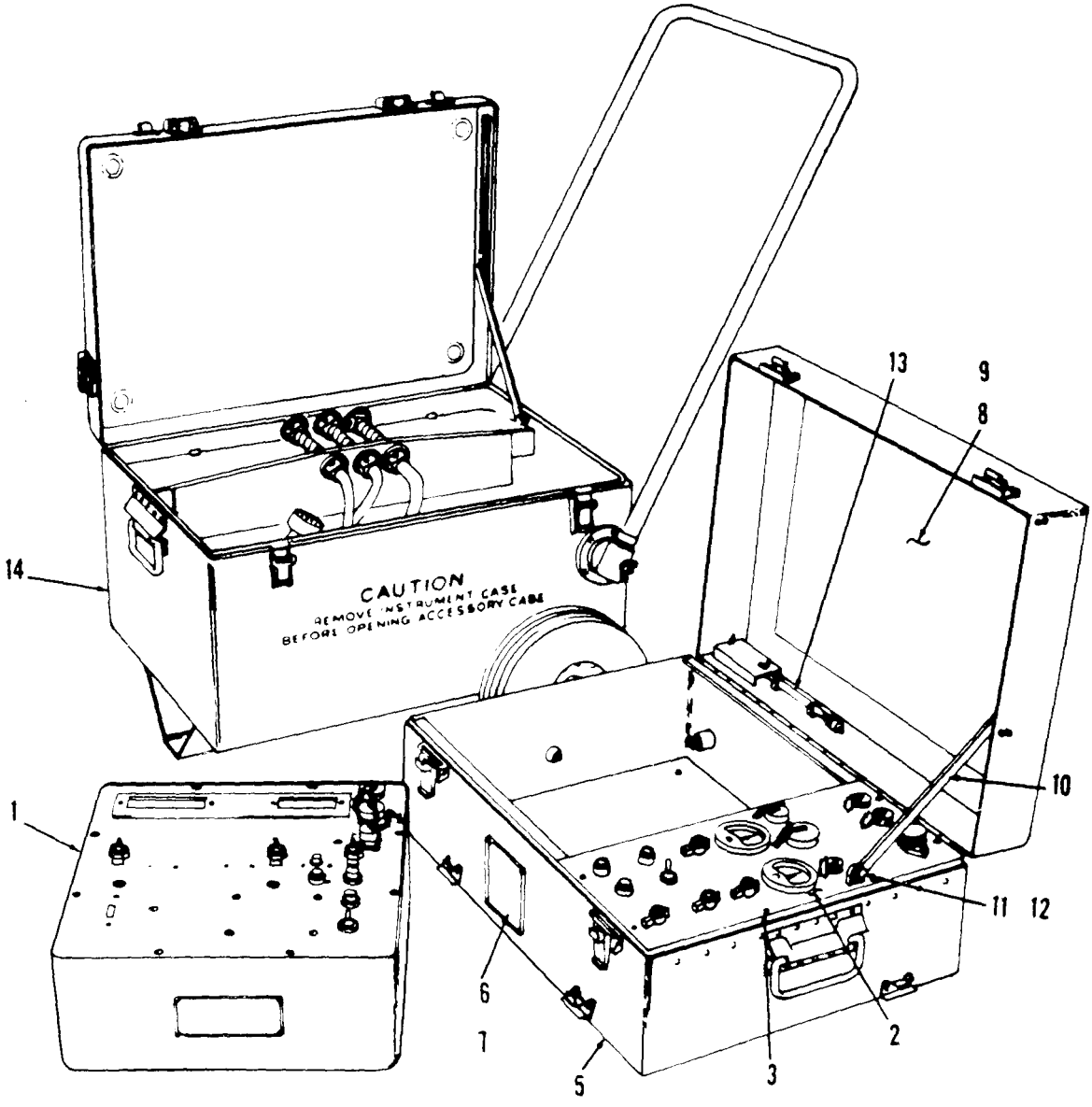


Figure 1. **BH112JB-53** *and BH112JB-79 Jetcal Tester*

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(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 01. EXHAUST GAS TESTER, ACCESSORY CASE-KIT AND COMPONENTS	
				FIGURE 1. BH112J8-53 JETCAL TESTER	
	XAFDD	98869	BH112JB916	ANALYZER,ENGINE	1
1	PBFFF	98869	BH15195A8	.TRIMMER ASSEMBLY SEE FIGURE 11 FORBREAKDOWN	1
2	PBFFD	98869	BH15194A-4	.PROBE CONTROLLER SEE FIGURE 12 FOR BREAKDOWN	1
3	PBFZZ	97539	SEELSKREWR6-32-1 -2	.SCREW,MACHINE	8
5	PBFFD	98869	BH15835-2	.CASE,CARRYING,INSTR	1
6	XDFZZ	98869	BH760-1	.NAMEPLATE	1
7	XDFZZ	96906	MS21318-1	.SCREW,DRIVE	4
8	XDFZZ	98869	BH16805	.PLATE INSTRUCTION	1
9	XDFZZ	96906	MS21318-1	.SCREW,DRIVE	12
10	PBDZZ	98869	BH14978-2	.STOP ARM ASSEMBLY	1
11	PBFZZ	98869	BH437	.STOP ARM SUPPORT	1
12	PBFZZ	96906	MS51958-61	.SCREW,MACHINE	1
13	PBOZZ	81348	GGT318TYPE2	.THERMOMETER,SELF-IN	1
14	XDFFF	98869	H122	.CASE ACCESSORY SEE FIGURE 10 FOR BREAKDOWN	1
				END OF FIGURE	

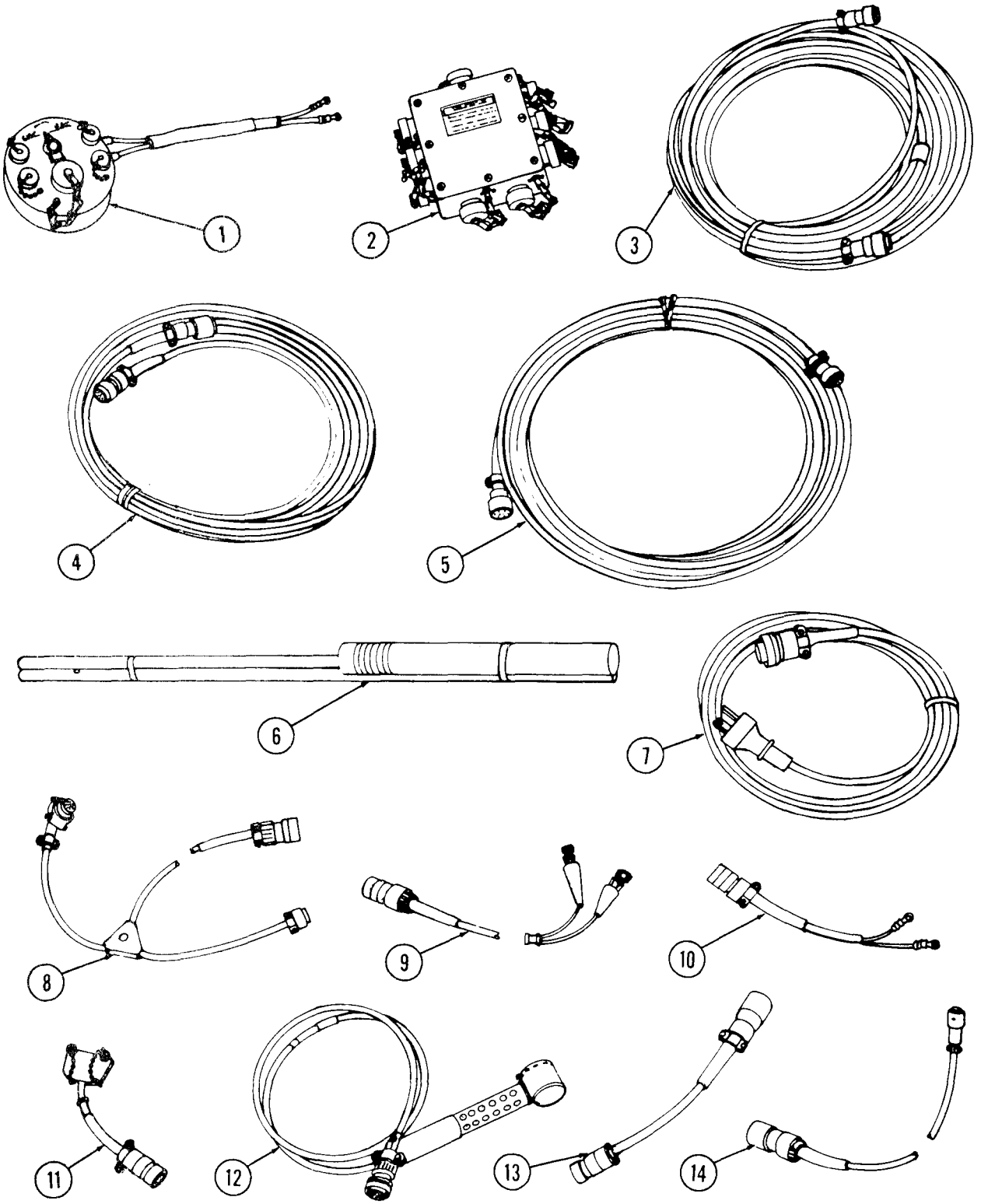

Figure 2. BH16700-12 Accessory Kit

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				FIGURE 2. BH16700-12 ACCESSORY KIT.	
	PBFFF	98869	BH16700-12	ACCESSORY KIT,ANALY.....	1
1	PBFZZ	98869	BH123-3	.SWITCH BOX.....	1
2	PBFLL	98869	BH361-8	.INTERCONNECTING BOX.....	1
3	PBFZZ	98869	BH405	.CABLE ASSEMBLY,SPEC --HEATER.....	1
4	PBFZZ	98869	BH450	.CABLE ASSEMBLY,SPEC --CHECK.....	1
5	PBFZZ	98869	BH485	.CABLE ASSEMBLY,SPEC --INSTRUMENT..	1
6	PBFZZ	98869	BH492B3	.HANDLE,EXTENSION.....	1
7	PBFZZ	98869	BH499A	.CABLE ASSEMBLY,POWE.....	1
8	PBFZZ	98869	BH820	.CABLE ASSEMBLY,POWE.....	1
9	PBFZZ	98869	BH821	.CABLE ASSEMBLY,POWE --INSULATION CHECK ADAPTER.....	1
10	PBFZZ	98869	BH822	.CABLE ASSEMBLY,SPEC --EGT INDICATOR CHECK ADAPTER.....	1
11	PBFZZ	98869	BH823	.CABLE ASSEMBLY,POWE --RESISTANCE CHECK ADAPTER.....	1
12	PBFZZ	98869	BH996-40	.PROBE ASSY,HEATER.....	3
13	PBFZZ	98869	BH1504	.CABLE ASSEMBLY,SPEC --CHECK CABLE ADAPTER.....	1
14	PBFZZ	98869	BH4548	.CABLE ASSEMBLY,SPEC --CHECK CABLE ADAPTER.....	1
				END OF FIGURE	

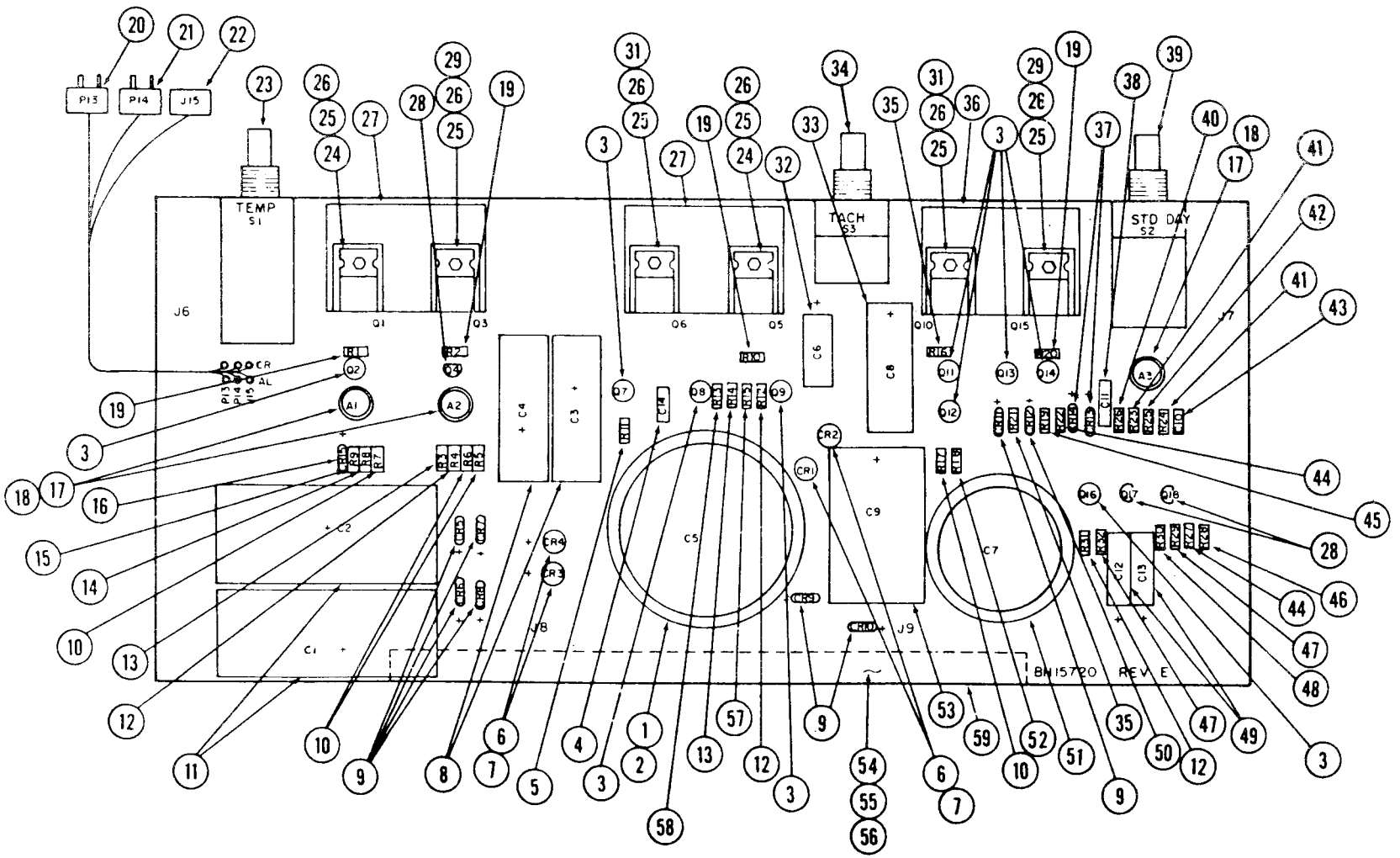

Figure 3. BH15720-3 Switch-Power Circuit Board Assembly

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 02. SWITCHES, CIRCUIT BREAKERS -BOARDS	
				FIGURE 3. BH15720-3 SWITCH-POWER CIRCUIT BOARD ASSEMBLY	
	PBFDD	98869	BH15720-1	CIRCUIT CARD ASSEMB --SWITCH-POWER.	1
1	PBDZZ	37942	CG872U020V2C3PL	.CAPACITOR,FIXED,ELE.....	1
2	PBDZZ	96906	MS51960-62	.SCREW,MACHINE.....	2
3	PBDZZ	07263	2N4945	.TRANSISTOR.....	9
4	XDDZZ	81349	CK05BX222K	.CAPACITOR,FIXED,CER.....	1
5	PBDZZ	81349	RLR07C1501GS	.RESISTOR,FIXED,FILM.....	1
6	PBDZZ	80131	1N5624	.SEMICONDUCTOR DEVIC.....	4
7	PBDZZ	81349	M55155/32-6	.TERMINAL,STUD.....	8
8	PBDZZ	56289	500D207G050FF7	.CAPACITOR,FIXED,ELE.....	2
9	PBDZZ	80131	1N5059	.SEMICONDUCTOR DEVIC.....	7
10	PBDZZ	81349	RNC55K1002FS	.RESISTOR,FIXED,FILM.....	5
11	PBDZZ	37942	TCG122U050N2C3P	.CAPACITOR,FIXED,ELE.....	2
12	XADZZ	81349	RLR07C4701GS	.RESISTOR,FIXED,FILM.....	3
13	PBDZZ	81349	RLR07C1001GS	.RESISTOR,FIXED,FILM.....	1
14	PBDZZ	81349	RNC55K6981FS	.RESISTOR,FIXED,FILM.....	1
15	PBDZZ	81349	RNC55K8060FS	.RESISTOR,FIXED,FILM.....	1
16	PBDZZ	98869	C933	.SEMICONDUCTOR DEVIC.....	1
17	PBDZZ	81349	M38510/10101BGC	.MICROCIRCUIT,LINEAR.....	3
18	XDDZZ	71785	8-ICS	.SOCKET,PLUG-IN,ELEC.....	3
19	PBDZZ	81349	RLR07C4700GS	.RESISTOR,FIXED,FILM.....	4
20	PBDZZ	04157	NMP-COCO-M	.CONNECTOR,PLUG,ELEC.....	1
21	PBDZZ	04157	NMP-CHAL-M	.CONNECTOR,PLUG,ELEC.....	1
22	PBDZZ	29907	NMP-CHAL-F	.CONNECTOR,PLUG,ELEC.....	1
23	PBDZZ	98869	C05229	.SWITCH,ROTARY.....	1
24	PBDZZ	80131	2N6109	.TRANSISTOR.....	2
25	PBDZZ	96906	MS18212-5	.SCREW,MACHINE.....	6
26	PBDZZ	96906	MS35649-224	.NUT,PLAIN,HEXAGON.....	6
27	PBDZZ	98869	BH15721	.HEATSINK,ELECTRICA.....	2
28	PBDZZ	80131	2N4402	.TRANSISTOR.....	3
29	PBDZZ	80131	2N6290	.TRANSISTOR.....	2
31	PBDZZ	80131	2N5294	.TRANSISTOR.....	2
32	PBDZZ	81349	M39003/01-2979	.CAPACITOR,FIXED,ELE.....	1
33	XDDZZ	37942	TT50X150B	.CAPACITOR.....	1
34	PBDZZ	98869	C05231	.SWITCH,ROTARY.....	1
35	PADZZ	81349	RLR07C2201GS	.RESISTOR,FIXED,FILM.....	2
36	PBDZZ	98869	BH15721-1	.HEATSINK,ELECTRICA.....	1
37	PBDZZ	80131	1N702A	.SEMICONDUCTOR DEVIC.....	2
38	PBDZZ	21207	MMF504K2	.CAPACITOR,FIXED,MET.....	1
39	PBDZZ	98869	C05230	.SWITCH,ROTARY.....	1
40	XDDZZ	80031	1-4-5P470K	.RESISTOR,FIXED.....	1
41	XDDZZ	80031	1-4-5P100K	.RESISTOR,FIXED,FILM.....	2
42	XDDZZ	81349	RLR07C1000GR	.RESISTOR,FIXED,FILM.....	1
43	PBDZZ	81349	M39014/01-1575	.CAPACITOR,FIXED,CER.....	1
44	XDDZZ	80031	1-4-5P10K	.RESISTOR,FIXED,FILM.....	2
45	PBDZZ	81349	RCR20G271JS	.RESISTOR,FIXED,COMP.....	1
46	XDDZZ	81349	RLR07C5601GR	.RESISTOR,FIXED,FILM.....	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
47	PBDZZ	81349	RLR07C3902GR	.RESISTOR,FIXED,FILM.....	2
48	XDDZZ	81349	RLR07C2202GR	.RESISTOR,FIXED,FILM.....	1
49	PBDZZ	81349	M39003/01-3026	.CAPACITOR,FIXED,ELE.....	2
50	PBDZZ	81349	JAN1N5524B	.SEMICONDUCTOR DEVIC.....	1
51	PBDZZ	56289	36D132G050AA2A	.CAPACITOR,FIXED,ELE.....	1
52	PBDZZ	81349	RNC55K5761FS	.RESISTOR,FIXED,FILM.....	1
53	PBDZZ	37942	TCG412U015N1L	.CAPACITOR,FIXED,ELE.....	1
54	PBDZZ	98869	BH15722	.SPACER,PLATE.....	1
55	PBDZZ	96906	MS51957-3	.SCREW,MACHINE.....	2
56	PBDZZ	86928	5610-9-10	.INSULATOR,WASHER.....	2
57	XDDZZ	81349	RN55D3321F	.RESISTOR,FIXED,FILM.....	1
58	XDDZZ	81349	RLR07C6801GR	.RESISTOR,FIXED,FILM.....	1
59	XADZZ	98869	BH15720	.PRINTED CIRCUIT BOA.....	1

END OF FIGURE

(1) ILLUSTRATION (a) FIG NO	(1) ILLUSTRATION (b) ITEM NO	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION / USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
5		PBFZD	4920-01-020-5563	88869	BH15715-1	CIRCUIT CARD ASSEMB --TEMPERATURE	EA	1
5	1	PBDZZ	5905-00-689-2927	88869	H3536	.RESISTOR,FIXED,WIRE	EA	1
5	2	PBDZZ	5961-00-405-8427	88869	C933	.SEMICONDUCTORDEVIC	EA	2
5	3	PBDZZ	5905-00-258-5413	81349	RNC55K6980FS	.RESISTOR,FIXED,FILM	EA	1
5	4	PBCZZ	5905-01-021-1398	88869	H3895	.RESISTOR,FIXED,WIRE	EA	1
5	5	PBCZZ	5910-00-010-8666	81349	M39014-01-1357	.CAPACITOR,FIXED,CER	EA	2
5	6	PBDZZ	5905-01-038-3034	88869	H3905	.RESISTOR,FIXED,WIRE	EA	1
5	7	XDDZZ	5905-00-184-7705	81349	RLR07C2201GR	.RESISTOR,FIXED,FILM	EA	11
5	8	PBDZZ	5905-00-438-0505	80131	1-4-5F4K7	.RESISTOR,FIXEDFILM	EA	5
5	9	PBDZZ	5961-00-905-8536	88869	C1904	.TRANSISTOR	EA	4
5	10	XCDZZ		01295	SN5442N	.INTEGRATEDCIRCUIT	EA	1
5	11	PBDZZ	5935-01-065-9763	18677	LS-2-16-160-G-B	.SOCKET	EA	1
5	12	PBDZZ	5962-00-318-2223	01295	SN54CCN	.MICROCIRCUIT,DIGITA	EA	2
5	12A	PBDZZ	5935-01-065-8350	18677	LS-2-14-160-G-B	.SOCKET,PLUG-INELEC	EA	5
5	13	PBDZZ	5962-00-348-2541	01295	SN5474N	.MICROCIRCUIT,DIGITA	EA	2
5	14	PBDZZ	5961-00-846-9125	80131	1N702A	.SEMICONDUCTORDEVIC	EA	5
5	15	PBCZZ	5905-00-240-2736	81349	RLR07C1R02GR	.RESISTOR,FIXED,FILM	EA	7
5	16	PBDZZ	5961-00-450-3048	04713	2N4402	.TRANSISTOR	EA	8
5	17	PBDZZ	5905-01-037-3380	88869	H3783	.RESISTOR,FIXED,WIRE	EA	1
5	18	PBCZZ	5905-01-038-0617	88869	H3784	.RESISTOR,FIXED,WIRE	EA	1
5	19	PBDZZ	5905-00-099-9690	88869	H3785	.RESISTOR,FIXED,WIRE	EA	1
5	20	PBDZZ		88869	H3736	.RESISTOR,FIXED,WIRE	EA	1
5	21	PBDZZ		88869	H3786	.RESISTOR,FIXED,WIRE	EA	1
5	22	PBDZZ	5905-00-412-1212	88869	BH4446	.RESISTOR,FIXED,WIRE	A	1
5	23	PBDZZ	5905-01-019-7689	88869	BH13666-9	.RESISTORASSEMBLY	A	1
5	24	PBDZZ	5935-01-021-5435	04151	AMP-CHAL-M	.CONNECTOR,PLUG,ELEC	A	1
5	25	PBCZZ	5999-01-022-2226	93907	R-1033-A-2	.RETAINER-EJECTOR,EL	EA	2
5	26	PBCZZ	5905-00-126-6703	81349	RCR07DF226JS	.RESISTOR,FIXED,COMP	A	6
5	27	PBDZZ	5905-01-037-8066	88869	H3697	.RESISTOR,FIXED,WIRE	EA	1
5	28	PBDZZ	5905-01-031-0432	88869	H3674	.RESISTOR,FIXED,WIRE	A	1
5	29	XDDZZ	5905-00-240-7579	81349	RLR07C470JGR	.RESISTOR	EA	3
5	30	PBDZZ	5905-00-563-1595	81349	RLR07C47G2GR	.RESISTOR,FIXED,FILM	EA	2
5	31	PBCZZ	5935-00-411-7929	83330	430	.JACK,TIP	A	3
5	32	PBCZZ	5905-00-189-2360	96791	38CCP2C3	.RESISTOR,VARIABLE,W	A	2
5	33	PBDZZ	5905-00-168-9287	02660	3800P-502	.RESISTOR,VARIABLE,W	EA	2
5	34	PBDZZ	5905-00-107-4672	94271	533-CCHS50K	.RESISTOR,VARIABLE,N	A	1
5	35	PBCZZ	5910-00-007-2001	81349	M39003-01-2966	.CAPACITOR,FIXED,ELE	A	2
5	36	PBCZZ	5905-00-273-5826	81349	RNC55K7870FS	.RESISTOR,FIXED,FILM	A	1
5	37	PBDZZ	5905-00-240-2745	81349	RLR07C2702GR	.RESISTOR,FIXED,FILM	A	7
5	38	PBDZZ	5962-00-107-4853	88869	C4660	.INTEGRATED CIRCUIT	EA	1

(1) ILLUSTRATION (a) FIG NO	(1) ILLUSTRATION (b) ITEM NO	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION / USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
5	39	PBDZZ	5340-01-023-5121	58869	BH12C68-1	.CLIP,RETAINING	EA	1
5	40	PBDZZ	5999-00-402-2485	CC779	1-331892-0	.CONTACT,ELECTRICAL	EA	8
5	41	PBDZZ	5905-00-312-3806	58869	BH50C7	.RESISTOR,FIXED,WIRE	EA	2
5	42	PBDZZ	5905-00-438-C447	8CC31	1-4-5F47E	.RESISTOR,FIXED,FILM	EA	2
5	43	PBDZZ	5910-00-409-3049	14752	112A1C104	.CAPACITOR,FIXED,PLA	EA	1
5	44	PBDZZ	5910-00-113-5276	81349	M39014-01-1351	.CAPACITOR,FIXED,CER	EA	1
5	45	PBDZZ	5905-01-021-6816	54271	533-CCHS250K	.RESISTOR,VARIABLE,N	EA	1
5	46	PBDZZ	5962-00-453-7715	C1295	SN52741L	.INTEGRATEDCIRCUIT	EA	2
5	47	XDDZZ		71785	133-58-92-061	.SOCKET,PLUG-IN,ELEC	EA	3
5	48	PBDZZ	5905-00-229-7391	C2660	38C0P2C2	.RESISTOR,VARIABLE,W	EA	1
5	49	PBDZZ	5905-01-030-9147	58869	H3828	.RESISTOR,FIXED,WIRE	EA	1
5	50	PBDZZ	5910-00-81C-4854	71590	DD500	.CAPACITOR,FIXED,CER	EA	2
5	51	XDDZZ	5905-00-240-2726	8CC31	1-4-5F10K	.RESISTOR,FIXED,FILM	EA	1
5	52	PBDZZ	5961-00-842-5864	C4713	1N914	.SEMICONDUCTORDEVIC	EA	2
5	53	PBDZZ	5962-00-157-3430	12C4C	LM211H	.MICROCIRCUIT,LINEAR	EA	1
5	54	PBDZZ	5910-00-983-5366	71590	CD100	.CAPACITOR,FIXED,CER	EA	1
5	55	PBDZZ	5905-00-208-4293	81349	RNC55K1003FS	.RESISTOR,FIXED,FILM	EA	1
5	56	PBDZZ	5910-00-211-1576	14752	625C1C105J	.CAPACITOR	EA	1
5	57	PBDZZ	5910-00-788-C32E	56289	5GAS-S10	.CAPACITOR,FIXED,CER	EA	2
5	57A	XDDZZ		81349	CK05BX221K	.CAPACITOR,FIXED	EX	1
5	58	PBDZZ	5910-00-988-6171	81349	CK05BX220K	.CAPACITOR,FIXED,CER	EA	3
5	59	PBDZZ	5905-01-C32-CC07	58869	H3524	.RESISTOR,FIXED,WIRE	EA	1
5	60	XDDZZ	5961-00-466-7C25	C1295	2N4861	.TRANSISTOR	EA	5
5	61	PBDZZ	5962-00-118-3871	C1295	SN5476N	.MICROCIRCUIT,DIGITA	EA	1
5	62	PBDZZ	5935-01-065-5763	1E677	LS-2-16-160-G-B	.SOCKET, ELEC	EA	1
5	63	PBDZZ	5962-00-118-3666	C1295	SN54C2N	.MICROCIRCUIT,DIGITA	EA	1
5	64	PBDZZ	5910-00-144-4362	81349	M39003-01-3026	.CAPACITOR,FIXED,ELE	EA	3
5	65	PBDZZ	5950-00-470-4200	81349	LT10K144	.COIL,RADIOFREQUENC	EA	2
5	66	PBDZZ	5961-00-118-4775	04713	2N4852	.TRANSISTOR	EA	1
5	67	PBDZZ	5905-00-415-6502	58869	H3378	.RESISTOR,FIXED,WIRE	EA	1
5	68	PBDZZ	5905-01-031-1401	58869	H3627	.RESISTOR,FIXED,WIRE	EA	1
5	69	PBDZZ		58869	H369C	.RESISTOR,FIXED,WIRE	EA	1
5	70	PBDZZ	4920-01-065-7936	58869	BH15715	.PRINTEDCIRCUITBOA	EA	1

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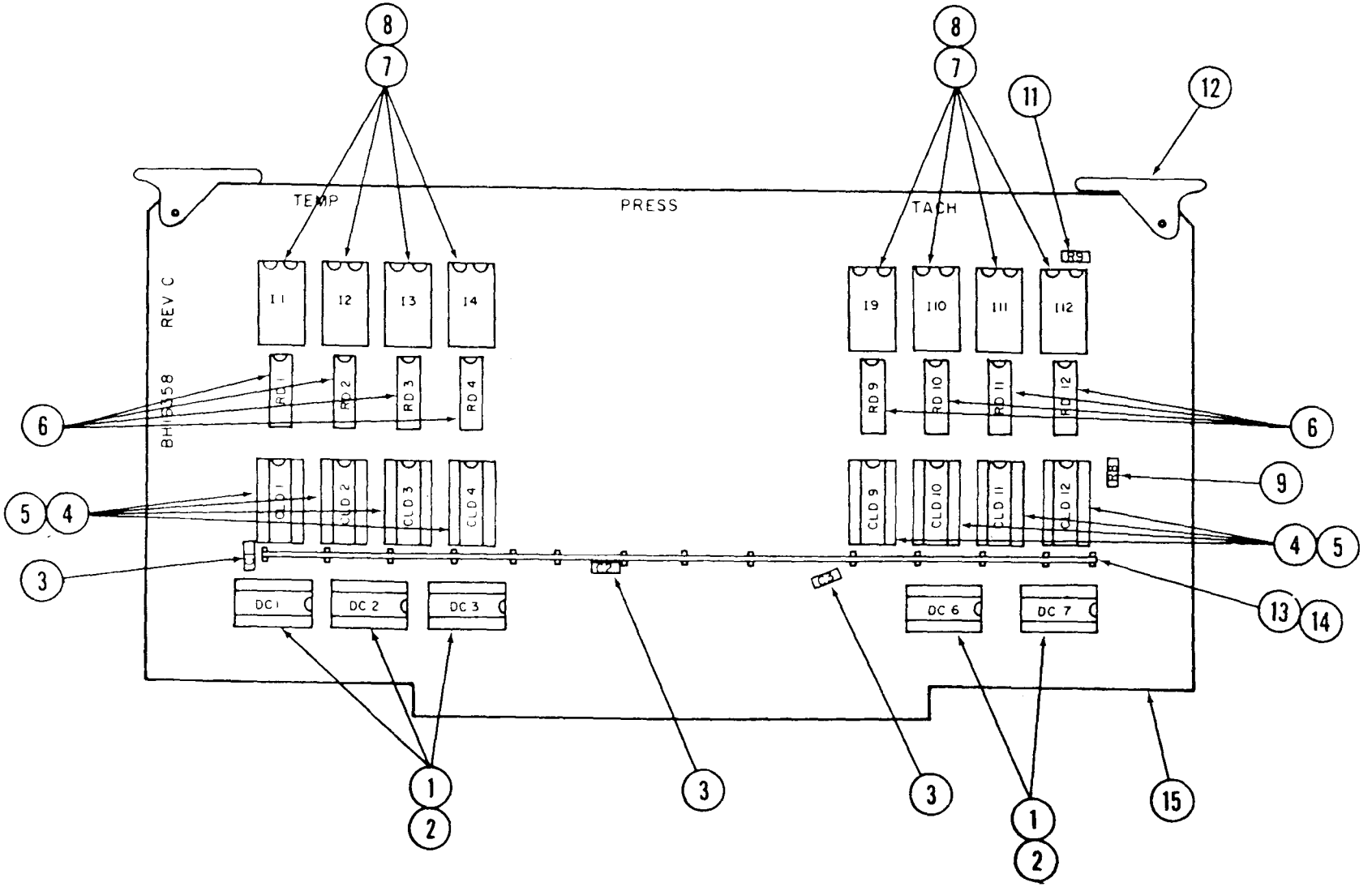

Figure 4. BH16358-2 Display Circuit Board Assembly

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				FIGURE 4. BH16358-2 DISPLAY CIRCUIT BOARD ASSEMBLY	
	PBFDD	98869	BH16358-2	PRINTED CIRCUIT BOA --DISPLAY	1
1	XDDZZ	01295	SNC5490AJ	.MICROCIRCUIT,DIGITA	5
2	XDDZZ	18677	US-2-14-160-G-B	.SOCKET,PLUG-IN ELEC	5
3	PBDZZ	81349	M39014/02-1338	.CAPACITOR,FIXED,CER	3
4	XDDZZ	04713	MC4350L	.MICROCIRCUIT,DIGITA	8
5	PBDZZ	18677	US-2-16-160-G-B	.SOCKET,PLUG-IN ELEC	8
6	PBDZZ	73138	899-3R150	.RESISTOR NETWORK,FI	8
7	XDDZZ	50436	5082-7650	.DISPLAY	8
8	XDDZZ	18677	US-2-14-160-G-B	.SOCKET,PLUG-IN ELEC	8
9	XADZZ	81349	RLR07C4701GS	.RESISTOR,FIXED,FILM	1
11	PBDZZ	81349	RLR07C2700GS	.RESISTOR,FIXED,FILM	2
12	PBDZZ	53507	R-1003-A-2	.RETAINER-EJECTOR,EL	1
13	PBDZZ	98869	BH16357	.BUS,CONDUCTOR	1
14	XDDZZ	88245	2024B	.TERMINAL,STUD	13
15	XADZZ	98869	BH16358	.PRINTED CIRCUIT BOA	1
				END OF FIGURE	

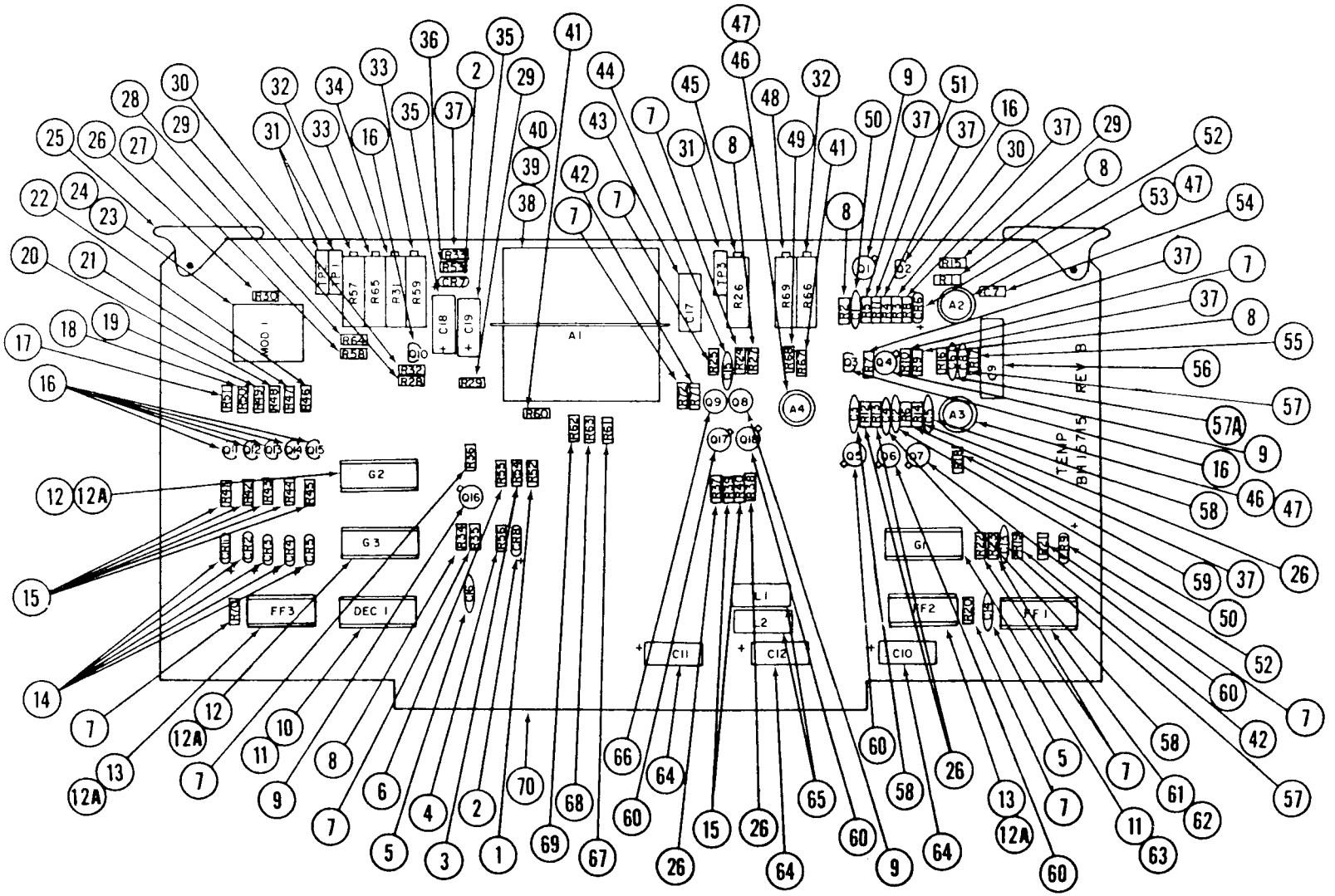

Figure 5. BH15715-1 Temperature Circuit Board Assembly

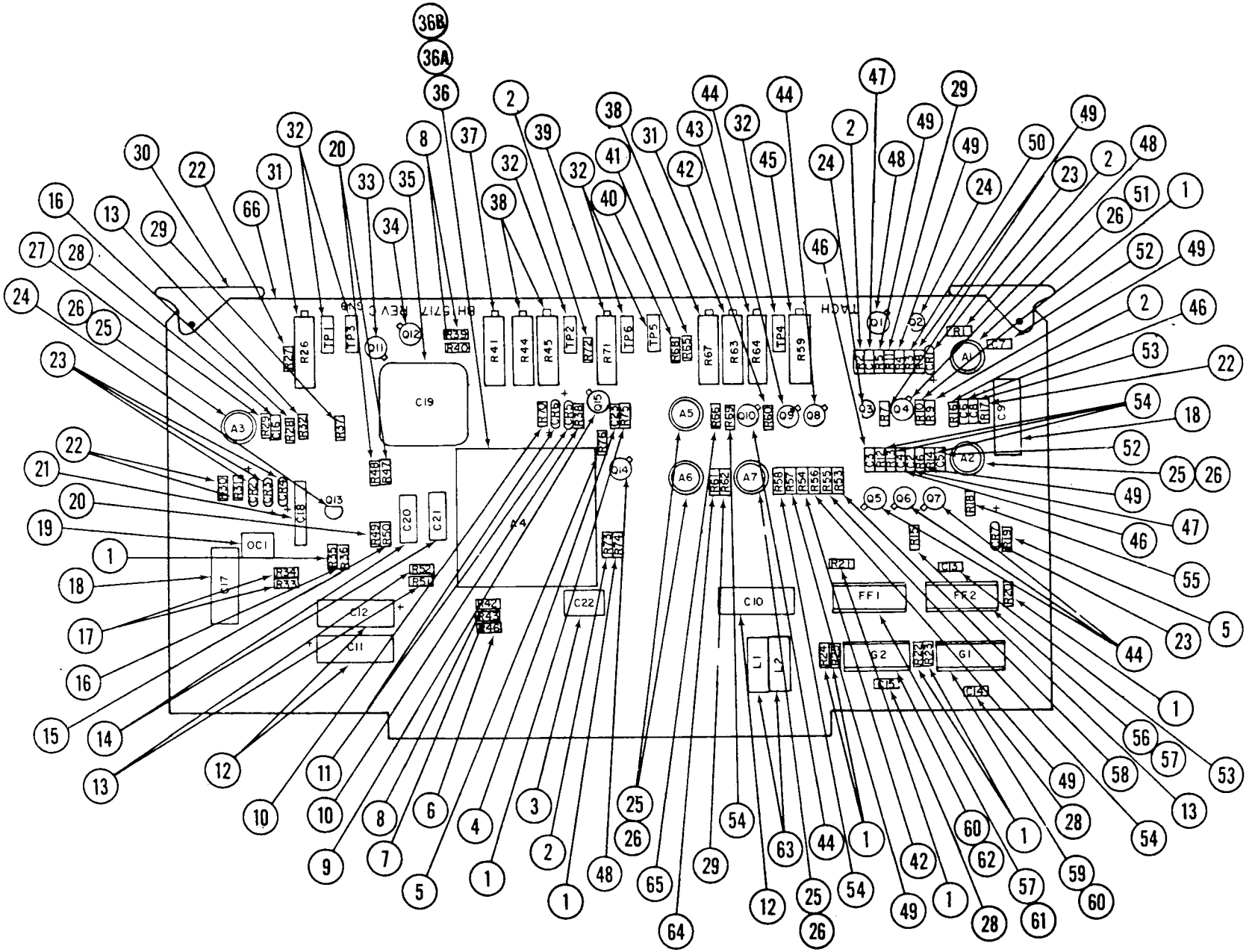

Figure 6. BH15717-1 Tachometer Circuit Board Assembly

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				FIGURE 5. BH15715-1 TEMPERATURE CIRCUIT BOARD ASSEMBLY	
	PBFDD	98869	BH15715-1	CIRCUIT CARD ASSEMB --TEMPERATURE..	1
1	XDDZZ	98869	H3536	.RESISTOR,FIXED,WIRE.....	1
2	PBDZZ	98869	C933	.SEMICONDUCTOR DEVIC.....	2
3	PBDZZ	81349	RNC55K6980FS	.RESISTOR,FIXED,FILM.....	1
4	PBDZZ	98869	H3895	.RESISTOR,FIXED,WIRE.....	1
5	PBDZZ	81349	M39014/01-1357	.CAPACITOR,FIXED,CER.....	2
6	XDDZZ	98869	H3905	.RESISTOR,FIXED,WIRE.....	1
7	PADZZ	81349	RLR07C2201GS	.RESISTOR,FIXED,FILM.....	11
8	XADZZ	81349	RLR07C4701GS	.RESISTOR,FIXED,FILM.....	5
9	PBDZZ	04713	SM5365	.TRANSISTOR.....	4
10	XDDZZ	01295	SN5442N	.INTEGRATED CIRCUIT.....	1
11	PBDZZ	18677	US-2-16-160-G-B	.SOCKET,PLUG-IN ELEC.....	1
12	PBDZZ	81349	M38510/00104BCB	.MICROCIRCUIT,DIGITA.....	2
12A	XDDZZ	18677	US-2-14-160-G-B	.SOCKET,PLUG-IN ELEC.....	5
13	PBDZZ	81349	M38510/00205BCB	.MICROCIRCUIT,DIGITA.....	2
14	PBDZZ	80131	1N702A	.SEMICONDUCTOR DEVIC.....	5
15	XDDZZ	81349	RLR07C1802GR	.RESISTOR,FIXED,FILM.....	7
16	PBDZZ	80131	2N4402	.TRANSISTOR.....	8
17	PBDZZ	98869	H3783	.RESISTOR,FIXED,WIRE.....	1
18	XDDZZ	98869	H3784	.RESISTOR,FIXED,WIRE.....	1
19	PBDZZ	05591	4H8A23180B	.RESISTOR,FIXED,WIRE.....	1
20	XDDZZ	05591	4H8A23790B	.RESISTOR,FIXED,WIRE.....	1
21	XDDZZ	05591	4H8A14630B	.RESISTOR,FIXED,WIRE.....	1
22	PBDZZ	05591	4H8A30000B	.RESISTOR,FIXED,WIRE.....	1
23	PBDZZ	98869	BH10666-8	.RESISTOR ASSEMBLY.....	1
24	PBDZZ	04157	NMP-CHAL-M	.CONNECTOR,PLUG,ELEC.....	1
25	PBDZZ	53507	R-1003-A-2	.RETAINER-EJECTOR,EL.....	2
26	PBDZZ	81349	RCR07G226JS	.RESISTOR,FIXED,COMP.....	6
27	XDDZZ	98869	H3697	.RESISTOR,FIXED,WIRE.....	1
28	PBDZZ	98869	H3674	.RESISTOR,FIXED,WIRE.....	1
29	PBDZZ	81349	RLR07C4700GS	.RESISTOR,FIXED,FILM.....	3
30	PBDZZ	81349	RLR07C4702GS	.RESISTOR,FIXED,FILM.....	2
31	PBDZZ	82389	430	.JACK,TELEPHONE.....	3
32	PBDZZ	04454	3800P203	.RESISTOR,VARIABLE,W.....	2
33	PBDZZ	02660	3800P502	.RESISTOR,VARIABLE,W.....	2
34	PBDZZ	94271	830P-50K	.RESISTOR,VARIABLE,N.....	1
35	PBDZZ	81349	M39003/01-2966	.CAPACITOR,FIXED,ELE.....	2
36	PBDZZ	81349	RNC55K7870FS	.RESISTOR,FIXED,FILM.....	1
37	XDDZZ	81349	RLR07C2702GS	.RESISTOR,FIXED,FILM.....	7
38	PBDZZ	98869	C4600	.MICROCIRCUIT,LINEAR.....	1
39	PBDZZ	98869	BH12068-1	.CLIP,RETAINING.....	1
40	PBDZZ	55974	1945708-2	.CLIP,ELECTRICAL.....	8
41	PBDZZ	98869	BH5007	.RESISTOR,FIXED,WIRE.....	2
42	PBDZZ	81349	RLR07C47R0GS	.RESISTOR,FIXED,FILM.....	2
43	PBDZZ	14752	112A1C104J	.CAPACITOR,FIXED,MET.....	1
44	PBDZZ	81349	M39014/01-1351	.CAPACITOR,FIXED,CER.....	1
45	PBDZZ	94271	533-00HS250K	.RESISTOR,VARIABLE,N.....	1
46	PBDZZ	81349	M38510/10101BGC	.MICROCIRCUIT,LINEAR.....	2
47	XDDZZ	71785	133-98-92-061	.SOCKET,PLUG-IN,ELEC.....	3

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
48	PBDZZ	04454	3800P202	.RESISTOR,VARIABLE,W.....	
49	PBDZZ	98869	H3828	.RESISTOR,FIXED,WIRE.....	1
50	PBDZZ	84171	CCD470	.CAPACITOR,FIXED,CER.....	2
51	XDDZZ	80031	1-4-5P10K	.RESISTOR,FIXED,FILM.....	1
52	PBDZZ	81349	JAN1N914	.SEMICONDUCTOR DEVIC.....	2
53	XDDZZ	88818	G193-064-001	.MICROCIRCUIT,LINEAR.....	1
54	PBDZZ	81349	CK60BX100K	.CAPACITOR,FIXED,CER.....	1
55	PBDZZ	81349	RNC55K1003FS	.RESISTOR,FIXED,FILM.....	1
56	PBDZZ	14752	625C1C105J	.CAPACITOR,FIXED,MET.....	1
57	XDDZZ	56289	C023B501G103M	.CAPACITOR,FIXED,CER.....	2
57A	XDDZZ	81349	CK05BX221K	.CAPACITOR,FIXED.....	1
58	XDDZZ	81349	CK05BX220K	.CAPACITOR,FIXED,CER.....	3
59	PBDZZ	98869	H3524	.RESISTOR,FIXED,WIRE.....	1
60	XDDZZ	01295	2N4861	.TRANSISTOR.....	5
61	PBDZZ	81349	M38510/00204BEB	.MICROCIRCUIT,DIGITA.....	1
62	PBDZZ	18677	US-2-16-160-G-B	.SOCKET,PLUG-IN ELEC.....	1
63	PBDZZ	81349	M38510/00401BCB	.MICROCIRCUIT,DIGITA.....	1
64	PBDZZ	81349	M39003/01-3026	.CAPACITOR,FIXED,ELE.....	3
65	PBDZZ	81349	LT10K144	.COIL,RADIO FREQUENC.....	2
66	PBDZZ	04713	2N4852	.TRANSISTOR.....	1
67	XDDZZ	05591	4H8A2300B	.RESISTOR,FIXED,WIRE.....	1
68	PBDZZ	98869	H3627	.RESISTOR,FIXED,WIRE.....	1
69	PBDZZ	05591	4H8A14402B	.RESISTOR,FIXED,WIRE.....	
70	XADZZ	98869	BH15715	.PRINTED CIRCUIT BOA.....	1

END OF FIGURE

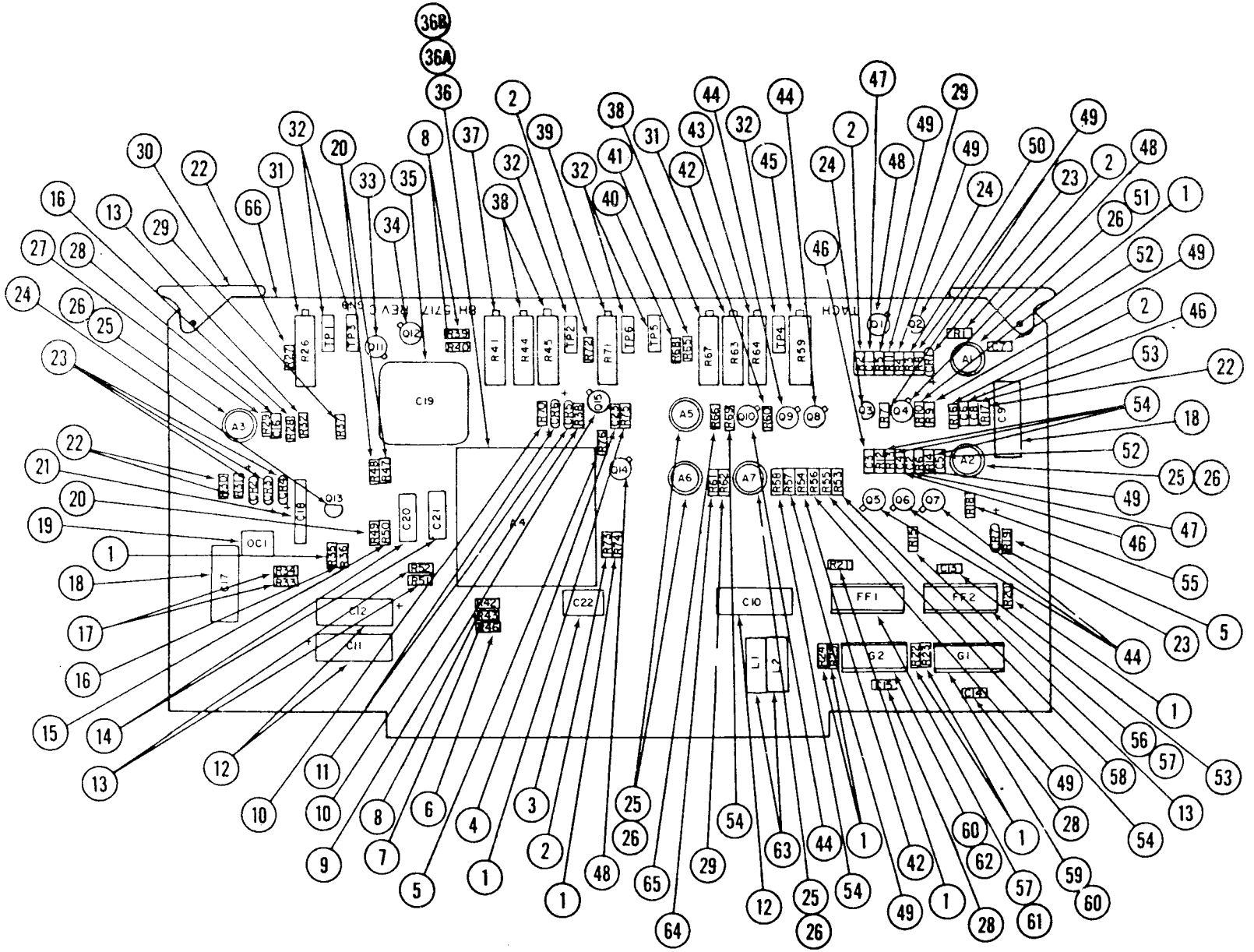

Figure 6. BH15717-1 Tachometer Circuit Board Assembly

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				FIGURE 6. BH15717-1 TACHOMETER CIRCUIT BOARD ASSEMBLY.	
	PBFDD	98869	BH15717-1	CIRCUIT CARD ASSEMB --TACHOMETER...	1
1	PADZZ	81349	RLR07C2201GS	.RESISTOR,FIXED,FILM.....	10
2	XADZZ	81349	RLR07C4701GS	.RESISTOR,FIXED,FILM.....	5
3	PBDZZ	50369	ACF50-0-22-5	.CAPACITOR,FIXED,MET.....	1
4	PBDZZ	81349	M39014/01-1357	.CAPACITOR,FIXED,CER.....	1
5	PBDZZ	81349	RLR07C47R0GS	.RESISTOR,FIXED,FILM.....	2
6	XDDZZ	05591	4H8A2300B	.RESISTOR,FIXED,WIRE.....	1
7	PBDZZ	98869	H3447	.RESISTOR,FIXED,WIRE.....	1
8	PBDZZ	98869	H3627	.RESISTOR,FIXED,WIRE.....	3
9	PBDZZ	04713	2N4852	.TRANSISTOR.....	1
10	PBDZZ	81349	RNC55K7870FS	.RESISTOR,FIXED,FILM.....	2
11	PBDZZ	98869	C933	.SEMICONDUCTOR DEVIC.....	2
12	PBDZZ	81349	M39003/01-3026	.CAPACITOR,FIXED,ELE.....	3
13	PBDZZ	81349	RLR07C4700GS	.RESISTOR,FIXED,FILM.....	4
14	PBDZZ	81349	M39003/01-2969	.CAPACITOR,FIXED,ELE.....	2
15	PBDZZ	98869	H3564	.RESISTOR,FIXED,WIRE.....	1
16	XDDZZ	80031	1-4-5P100E	.RESISTOR.....	2
17	PBDZZ	81349	RNC60K4643FS	.RESISTOR,FIXED,FILM.....	2
18	PBDZZ	14752	625C1C105J	.CAPACITOR,FIXED,MET.....	2
19	PBDZZ	01295	TIL111	.COUPLER,OPTOELECTRO.....	1
20	PBDZZ	98869	H3485	.RESISTOR,FIXED,WIRE.....	3
21	XDDZZ	14752	112A1C104J	.CAPACITOR,FIXED,MET.....	1
22	PBDZZ	81349	RNC55K1003FS	.RESISTOR,FIXED,FILM.....	4
23	PBDZZ	04713	1N914	.SEMICONDUCTOR DEVIC.....	5
24	PBDZZ	80131	2N4402	.TRANSISTOR.....	3
25	PBDZZ	81349	M38510/10101BGC	.MICROCIRCUIT,LINEAR.....	5
26	XDDZZ	71785	133-98-92-061	.SOCKET,PLUG-IN,ELEC.....	6
27	XDDZZ	81349	RLR07C3303GR	.RESISTOR,FIXED,FILM.....	1
28	PBDZZ	81349	M39014/01-1357	.CAPACITOR,FIXED,CER.....	3
29	XDDZZ	80031	1-4-5P10K	.RESISTOR,FIXED,FILM.....	3
30	PBDZZ	53507	R-1003-A-2	.RETAINER-EJECTOR,EL.....	2
31	PBDZZ	04454	3800P203	.RESISTOR,VARIABLE,W.....	2
32	PBDZZ	82389	430	.JACK,TELEPHONE.....	6
33	PBDZZ	80131	2N4352	.TRANSISTOR.....	1
34	PBDZZ	13499	352-0840-0[illegible]2	.TRANSISTOR.....	1
35	XDDZZ	02799	H-1022	.CAPACITOR,FIXED,PLA.....	1
36	PBDZZ	98869	C4600	.MICROCIRCUIT,LINEAR.....	1
36A	PBDZZ	98869	BH12068-1	.CLIP,RETAINING.....	1
36B	PBDZZ	19315	1945708-2	.CLIP,ELECTRICAL.....	8
37	PBDZZ	20747	101-127-104	.RESISTOR,VARIABLE,N.....	1
38	PBDZZ	02660	3800P502	.RESISTOR,VARIABLE,W.....	3
39	PBDZZ	94271	533-00HS250K	.RESISTOR,VARIABLE,N.....	1
40	PBDZZ	05591	4H8A30000B	.RESISTOR,FIXED,WIRE.....	1
41	PBDZZ	98869	H3470	.RESISTOR,FIXED,WIRE.....	1
42	PBDZZ	98869	BH3274	.RESISTOR,FIXED,WIRE.....	2
43	PBDZZ	13499	381-0003-100	.RESISTOR,VARIABLE,W.....	1
44	XDDZZ	01295	2N4861	.TRANSISTOR.....	6
45	PBDZZ	04454	3800P202	.RESISTOR,VARIABLE,W.....	1
46	XDDZZ	81349	CK05BX220K	.CAPACITOR,FIXED,CER.....	4

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
47	PBDZZ	84171	CCD470	.CAPACITOR,FIXED,CER.....	4
48	PBDZZ	04713	SM5365	.TRANSISTOR.....	3
49	XDDZZ	81349	RLR07C2702GS	.RESISTOR,FIXED,FILM.....	8
50	PBDZZ	81349	RLR07C4702GS	.RESISTOR,FIXED,FILM.....	1
51	XDDZZ	88818	G193-064-001	.MICROCIRCUIT,LINEAR.....	1
52	PBDZZ	81349	CK60BX100K	.CAPACITOR,FIXED,CER.....	1
53	XDDZZ	56289	C023B501G103M	.CAPACITOR,FIXED,CER.....	2
54	PBDZZ	81349	RCR07G226JS	.RESISTOR,FIXED,COMP.....	6
55	PBDZZ	98869	H3524	.RESISTOR,FIXED,WIRE.....	1
56	PBDZZ	81349	M38510/00205BCB	.MICROCIRCUIT,DIGITA.....	1
57	XDDZZ	18677	US-2-14-160-G-B	.SOCKET,PLUG-IN ELEC.....	3
58	PBDZZ	98869	H3515	.RESISTOR,FIXED,WIRE.....	1
59	PBDZZ	81349	M38510/00401BCB	.MICROCIRCUIT,DIGITA.....	1
60	PBDZZ	81349	M38510/00204BEB	.MICROCIRCUIT,DIGITA.....	1
61	PBDZZ	18677	US-2-16-160-G-B	.SOCKET,PLUG-IN ELEC.....	1
62	PBDZZ	81349	M38510/00104BCB	.MICROCIRCUIT,DIGITA.....	1
63	PBDZZ	81349	LT10K144	.COIL,RADIO FREQUENC.....	2
64	XDDZZ	05591	4H8A22001B	.RESISTOR,FIXED,WIRE.....	1
65	PBDZZ	05591	4H8A3802B	.RESISTOR,FIXED,WIRE.....	1
66	XADZZ	98869	BH15717	.PRINTED CIRCUIT BOA.....	1

END OF FIGURE

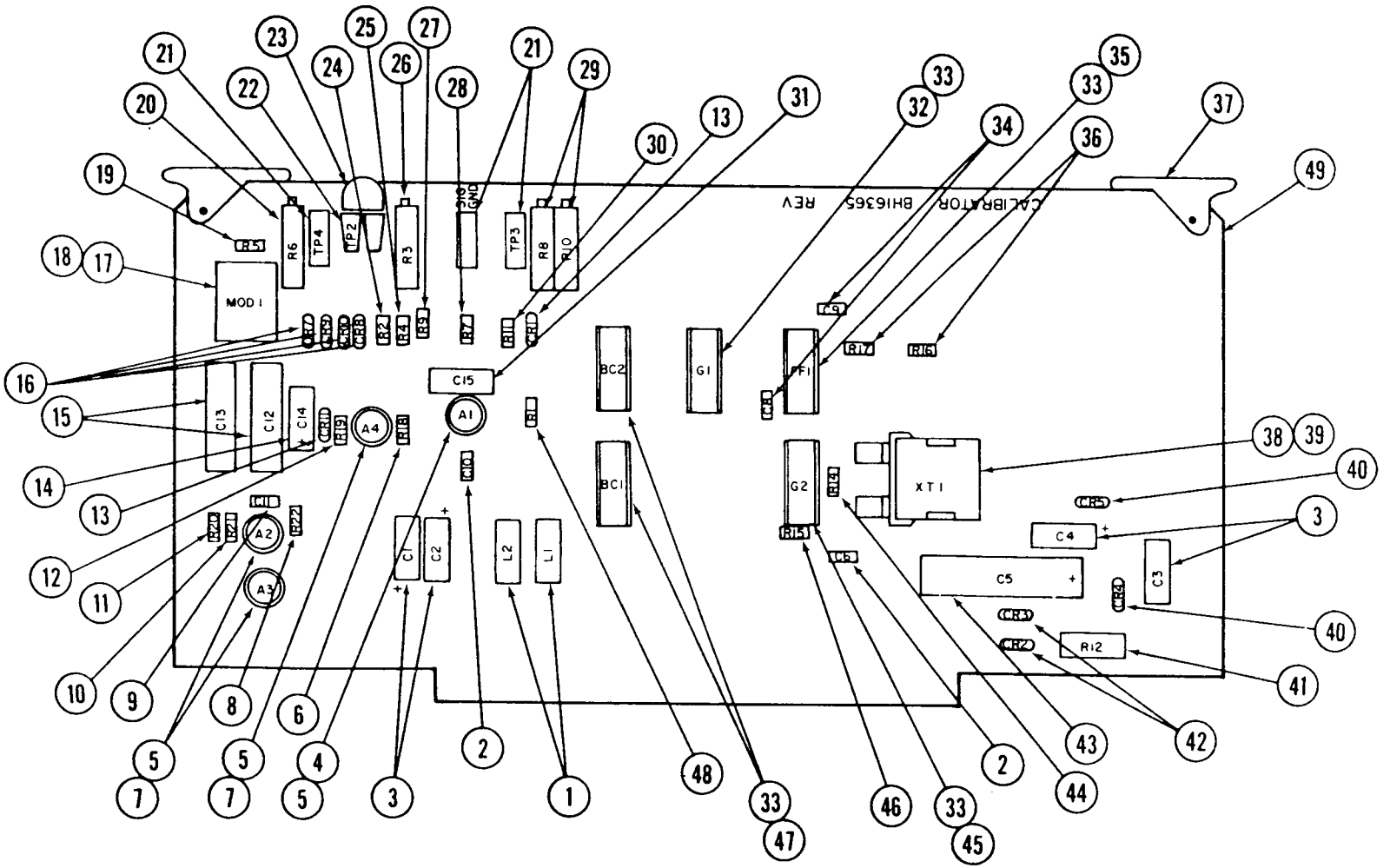

Figure 7. BH16365-1 Calibrator Circuit Board Assembly

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				FIGURE 7. BH16365-1 CALIBRATOR CIRCUIT BOARD ASSEMBLY	
	PBFDD	98869	BH16365-1	CIRCUIT CARD ASSEMB --CALIBRATOR...	1
1	PBDZZ	81349	LT10K144	.COIL,RADIO FREQUENC.....	2
2	XDDZZ	81349	M39014/01-1329	.CAPACITOR,FIXED,CER.....	2
3	PBDZZ	81349	M39003/01-3026	.CAPACITOR,FIXED,ELE.....	4
4	XDDZZ	81349	M38510/10103BGB	.MICROCIRCUIT,LINEAR.....	1
5	XDDZZ	71785	133-98-92-061	.SOCKET,PLUG-IN,ELEC.....	4
6	XDDZZ	81349	RNC55K2002FS	.RESISTOR,FIXED,FILM.....	1
7	PBDZZ	81349	M38510/10101BGC	.MICROCIRCUIT,LINEAR.....	3
8	PBDZZ	81349	RLR07C1004GS	.RESISTOR,FIXED,FILM.....	1
9	PBDZZ	81349	M39014/01-1357	.CAPACITOR,FIXED,CER.....	1
10	XDDZZ	81349	RLR07C1503GR	.RESISTOR,FIXED,FILM.....	1
11	XDDZZ	80031	1-4-5P10K	.RESISTOR,FIXED,FILM.....	1
12	PBDZZ	81349	RNC55K7870FS	.RESISTOR,FIXED,FILM.....	1
13	PBDZZ	98869	C933	.SEMICONDUCTOR DEVIC.....	2
14	PBDZZ	81349	M39003/01-3024	.CAPACITOR,FIXED,ELE.....	1
15	PBDZZ	14752	625C1C105J	.CAPACITOR,FIXED,MET.....	2
16	PBDZZ	81349	JAN1N914	.SEMICONDUCTOR DEVIC.....	4
17	PBDZZ	98869	BH10666-8	.RESISTOR ASSEMBLY.....	1
18	PBDZZ	29907	NMF-K-F	.CONNECTOR,PLUG,ELEC.....	1
19	PBDZZ	98869	H3674	.RESISTOR,FIXED,WIRE.....	1
20	PBDZZ	04454	3800P502	.RESISTOR,VARIABLE,W.....	1
21	PBDZZ	82389	430	.JACK,TELEPHONE.....	3
22	PBDZZ	71279	3422-1-03	.JACK,TIP.....	2
23	PBDZZ	71279	461-2871-01-03-12	.DUMMY CONNECTOR,PLU.....	1
24	PBDZZ	98869	BH5070	.RESISTOR,FIXED,WIRE.....	1
25	PBDZZ	98869	BH5058	.RESISTOR,FIXED,WIRE.....	1
26	PBDZZ	04454	3811P100	.RESISTOR,VARIABLE,N.....	1
27	PBDZZ	98869	BH3274	.RESISTOR,FIXED,WIRE.....	1
28	PBDZZ	98869	BH4098	.RESISTOR,FIXED,WIRE.....	1
29	PBDZZ	04454	3800P202	.RESISTOR,VARIABLE,W.....	2
30	XDDZZ	05591	4H8A193018	.RESISTOR,FIXED,WIRE.....	1
31	PBDZZ	21207	MMF504K2	.CAPACITOR,FIXED,MET.....	1
32	XDDZZ	81349	M38510/05003BCA	.MICROCIRCUIT,DIGITA.....	1
33	XDDZZ	18677	US-2-14-160-G-B	.SOCKET,PLUG-IN ELEC.....	5
34	PBDZZ	81349	M39014/02-1338	.CAPACITOR,FIXED,CER.....	2
35	XDDZZ	81349	M38510/05101BCA	.MICROCIRCUIT,DIGITA.....	1
36	XDDZZ	81349	RLR07C1502GR	.RESISTOR,FIXED,FILM.....	2
37	PBDZZ	53507	R-1003-A-2	.RETAINER-EJECTOR,EL.....	2
38	XDDZZ	81349	CR45U	.SEMICONDUCTOR DEVIC.....	1
39	XDDZZ	91506	8000-AG9	.SOCKET,PLUG-IN ELEC.....	1
40	PBDZZ	81349	JAN1N4461	.SEMICONDUCTOR DEVIC.....	2
41	PBFZZ	81349	RW69V360	.RESISTOR,FIXED,WIRE.....	1
42	PBDZZ	80131	1N5059	.SEMICONDUCTOR DEVIC.....	2
43	PBDZZ	56289	500D207G050FF7	.CAPACITOR,FIXED,ELE.....	1
44	PBDZZ	81349	RLR07C4702GS	.RESISTOR,FIXED,FILM.....	1
45	XDDZZ	02735	CD4001AE	.MICROCIRCUIT,DIGITA.....	1
46	PBDZZ	81349	RCR07G106JS	.RESISTOR,FIXED,COMP.....	1
47	PBDZZ	81349	M38510/05605BCB	.MICROCIRCUIT,DIGITA.....	2

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON COD ES(UOC)	(6) QTY
48	PBDZZ	81349	RNC55K6650FS	.RESISTOR,FIXED,FILM.....	1
49	XDDZZ	98869	BH16365	.PRINTED CIRCUIT BOA.....	1

END OF FIGURE

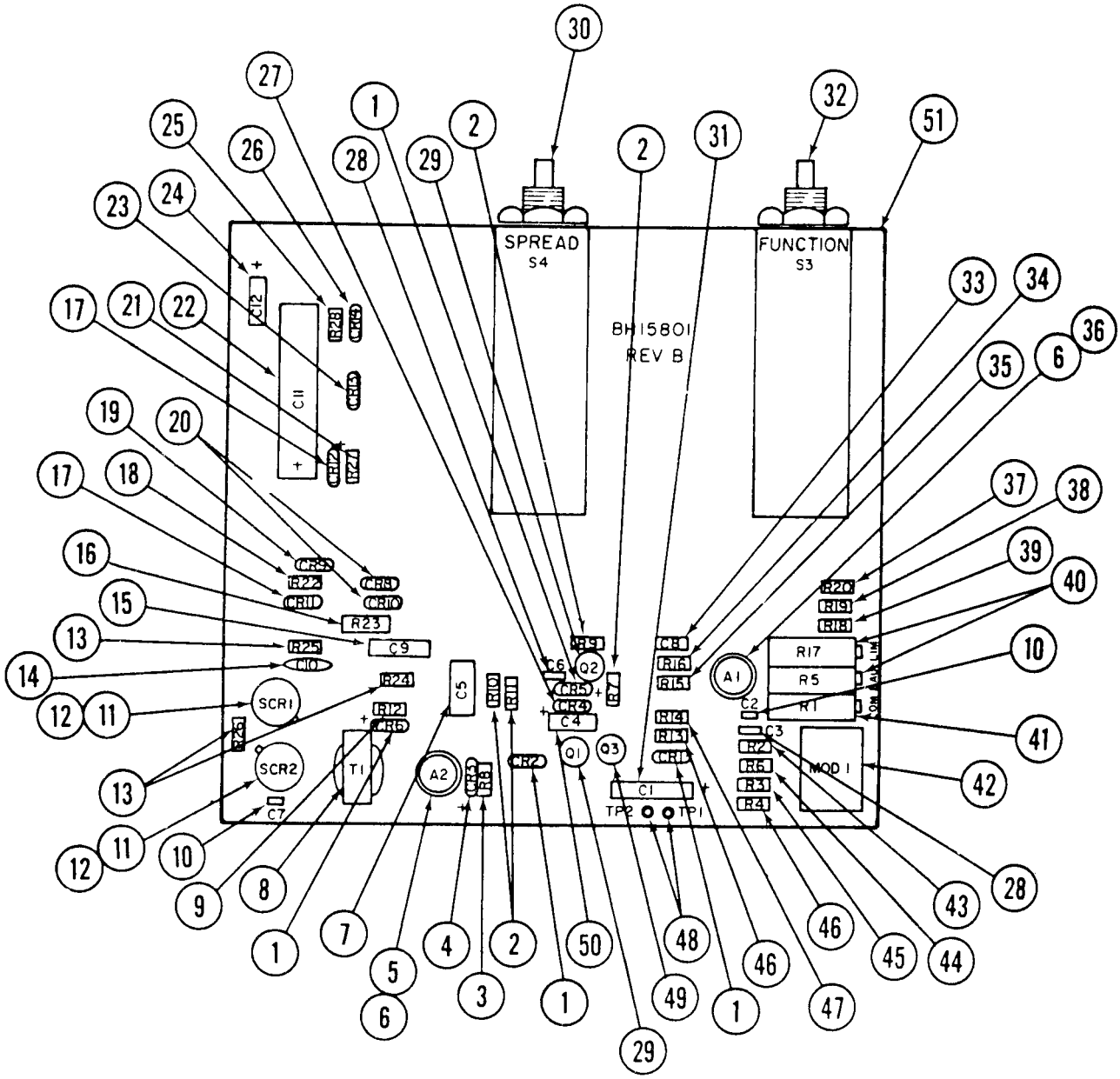

Figure **8. BH15801-1** Probe Control-Function Switch Circuit Board Assembly

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				FIGURE 8. BH15801-1 PROBE CONTROL-FUNCTION SWITCH CIRCUIT BOARD ASSEMBLY	
	PBFFF	98869	BH15801-1	CIRCUIT CARD ASSEMB --PROBE CONTROL-FUNCTION SWITCH.....	1
1	PBFZZ	81349	JAN 1N914	.SEMICONDUCTOR DEVIC.....	4
2	PBFZZ	81349	RLR07C3902GR	.RESISTOR,FIXED,FILM.....	4
3	PAFZZ	81349	RLR07C2201GS	.RESISTOR,FIXED,FILM.....	1
4	PBFZZ	80131	1N702A	.SEMICONDUCTOR DEVIC.....	1
5	PBFZZ	81349	M38510/10101BGC	.MICROCIRCUIT,LINEAR.....	1
6	XDFZZ	71785	8-ICS	.SOCKET,PLUG-IN,ELEC.....	2
7	XDDZZ	31589	ACF50-2-0-10	.CAPACITOR,FIXED,MET.....	1
8	PBFZZ	04386	TZ-17XT	.TRANSFORMER,AUDIO F.....	1
9	XDDZZ	80031	1-4-5P3K3	.RESISTOR,FIXED,FILM.....	1
10	PBFZZ	81349	M39014/01-1575	.CAPACITOR,FIXED,CER.....	2
11	PBFZZ	80131	2N6336	.SEMICONDUCTOR DEVIC.....	2
12	PBFZZ	86928	5203-8	.INSULATOR,DISK.....	2
13	XDFZZ	80031	1-4-5P10K	.RESISTOR,FIXED,FILM.....	3
14	PBFZZ	18876	10015417-054	.CAPACITOR,FIXED,CER.....	1
15	XDDZZ	14752	637B1D563K	.CAPACITOR.....	1
16	XDFZZ	12697	VC3D-1K	.RESISTOR,FIXED,WIRE.....	1
17	PBFZZ	80131	1N5059	.SEMICONDUCTOR DEVIC.....	2
18	XDFZZ	81349	RLR07C1502GR	.RESISTOR,FIXED,FILM.....	1
19	PBFZZ	81349	JAN1N4486	.SEMICONDUCTOR DEVIC.....	1
20	PBFZZ	81349	JAN1N3613	.SEMICONDUCTOR DEVIC.....	2
21	PBFZZ	81349	RCR20G331JS	.RESISTOR,FIXED,COMP.....	1
22	PBFZZ	56289	500D207G050FF7	.CAPACITOR,FIXED,ELE.....	1
23	PBFZZ	81349	JAN1N4471	.SEMICONDUCTOR DEVIC.....	1
24	PBFZZ	81349	M39003/01-2991	.CAPACITOR,FIXED,ELE.....	1
25	PBFZZ	81349	RNC55K1001FS	.RESISTOR,FIXED,FILM.....	1
26	PBFZZ	98869	C933	.SEMICONDUCTOR DEVIC.....	1
27	PBFZZ	81349	JAN1N4461	.SEMICONDUCTOR DEVIC.....	1
28	XDFZZ	81349	CK06BX223K	.CAPACITOR,FIXED,CER.....	2
29	PBFZZ	80131	2N3646	.TRANSISTOR.....	2
30	PBFZZ	98869	C05228	.SWITCH,ROTARY.....	1
31	PBFZZ	81349	M39003/01-2969	.CAPACITOR,FIXED,ELE.....	1
32	PBFZZ	98869	C05227	.SWITCH,ROTARY.....	1
33	PBFZZ	81349	M39003/01-3076	.CAPACITOR,FIXED,ELE.....	1
34	PBFZZ	98869	H3440	.RESISTOR,FIXED,WIRE.....	1
35	PBFZZ	81349	RCR07G106JS	.RESISTOR,FIXED,COMP.....	1
36	XDFZZ	27014	LM725AN/6838	.MICROCIRCUIT,LINEAR.....	1
37	XDFZZ	05591	4H8A2300B	.RESISTOR,FIXED,WIRE.....	1
38	PBFZZ	05591	4H8A40001B	.RESISTOR,FIXED,WIRE.....	1
39	PBFZZ	05591	4H8A16302B	.RESISTOR,FIXED,WIRE.....	1
40	PBFZZ	04454	3800P203	.RESISTOR,VARIABLE,W.....	2
41	PBFZZ	04454	3800P502	.RESISTOR,VARIABLE,W.....	1
42	PBFZZ	98869	BH10666-8	.RESISTOR ASSEMBLY.....	1
43	PBFZZ	98869	H3674	.RESISTOR,FIXED,WIRE.....	1
44	XAFZZ	81349	RLR07C4701GS	.RESISTOR,FIXED,FILM.....	1
45	PBFZZ	81349	RCR07G226JS	.RESISTOR,FIXED,COMP.....	1
46	PBFZZ	81349	RLR07C4700GS	.RESISTOR,FIXED,FILM.....	2

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
47	XDFZZ	81349	RLR07C2203GS	.RESISTOR,FIXED,FILM.....	1
48	PBFZZ	81349	SE23XC02	.TERMINAL,STUD.....	2
49	PBFZZ	04713	2N4852	.TRANSISTOR.....1	
50	XDDZZ	31589	ACF&504.22&10	.CAPACITOR,FIXED,MET.....1	
51	XADZZ	98869	BH15801	.PRINTED CIRCUIT BO A.....1	

END OF FIGURE

(1) ILLUSTRATION (a) FIG NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION / USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
						GROUP 03 TRIMMER ASSY, CASE AND COMPONENTS		
10		XDFFF		58869	H122	CASE ACCESSOR Y	EA	1
10		PBFZZ	4920-01-086-1464	58869	BH585	.HANDLE,CARRYING CAS	EA	1
10		PBFZZ	5310-00-063-6717	96906	*MS35426-15*	.NUT,PLAIN,WING	EA	2
10		PBFZZ	5306-00-080-0680	96906	MS35308-341	.BOLT,MACHICE	EA	2
10		PBFZZ	4920-00-565-3702	58869	BH727	.SOCKET,PIVOT	EA	2
10		PBFZZ	4920-00-565-3710	58869	BH796	.STOP,ARM ASSY	EA	1
10		PBFZZ	5365-01-032-7243	58869	BH723	.SPACER,SLEEVE	EA	1
10		PBFZZ	4920-00-734-8321	58869	BH437	.STOP ARM SUPPORT	EA	1
10		PBFZZ	5305-00-055-3657	96906	MS51956-61	.SCREW,MACHICE	EA	1
10		PBFZZ	4620-01-086-1488	58869	BH834-1	.MOUNT,SUPPORT	EA	1
10	1	PBFZZ	5305-00-050-9229	96906	MS51957-63	.SCREW,MACHINE	EA	8
10	1	PBFZZ		58869	BH834-2	.SPACER,PLATE	EA	1
10	I	PBFZZ	5305-00-054-6651	96906	MS51957-27	.SCREW,MACHINE	EA	4
10	1	PBFZZ	4920-00-589-8409	58869	BH3506	.WHEEL,SOLID RUBBER	EA	2
10	1	PBFZZ	5365-00-298-6563	79136	5100-62	.RING,RETAINING	EA	2
10	1	PBFZZ	4920-00-565-3714	58869	BH835	.MOUNT,WHEEL	EA	2
10	1	PBFZZ	5305-00-050-9231	96906	MS51957-65	.SCREW,MACHINE	EA	8
10	1	PBFZZ	4920-01-086-1470	58869	BH6554	.PROBE HOLDER	EA	1
10	1	PBFZZ	4920-01-086-1471	58869	BH6551	.RACK,TEST PROCEDURES	EA	1

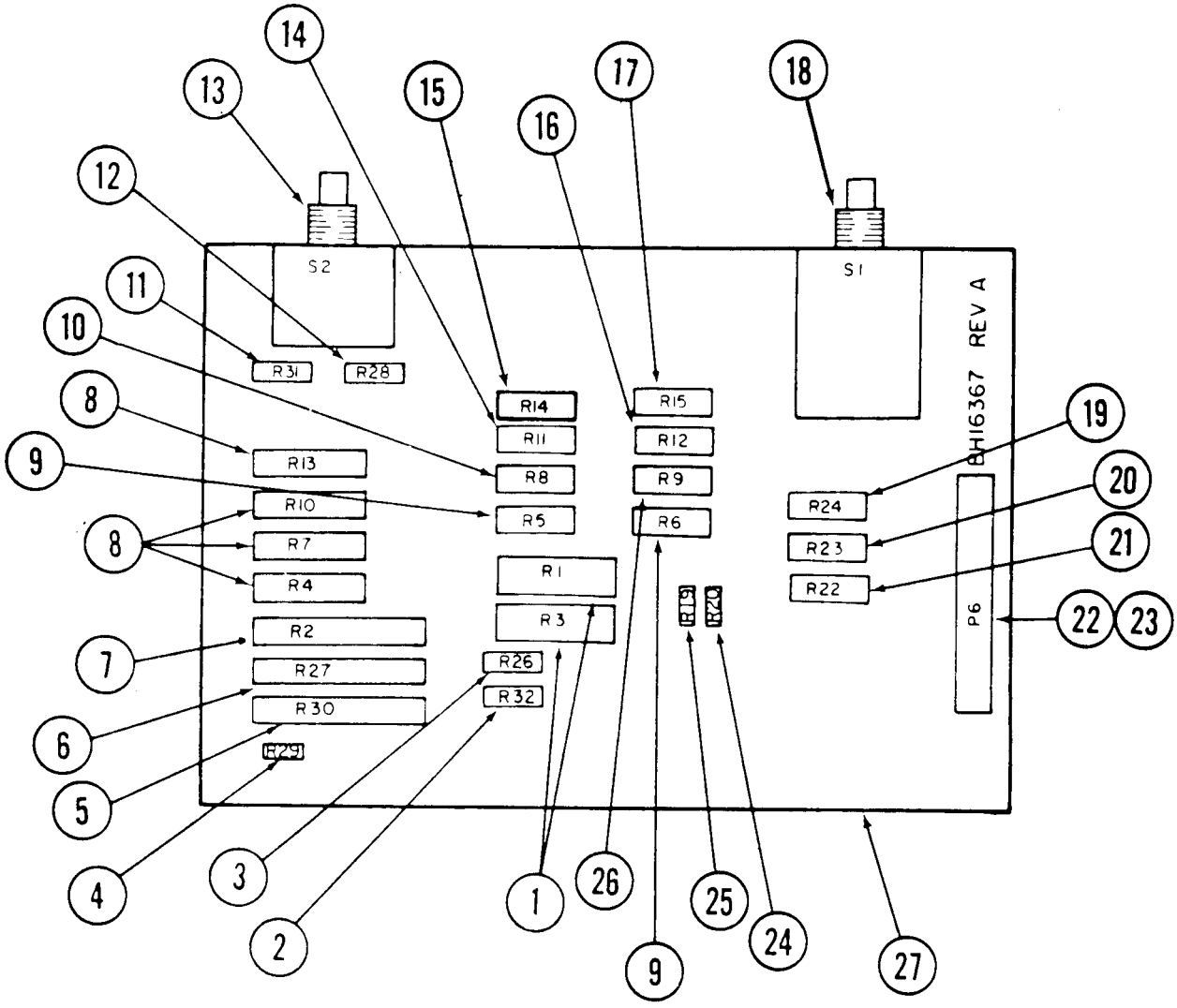

Figure 9. BH16367-3 Resistance-Insulation Circuit Board Assembly

SECTION II

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE(UOC)	(6) QTY
				FIGURE 9. BH16367-3 RESISTANCE-INSULATION CIRCUIT BOARD ASSEMBLY	
	XDFFF	98869	BH16367-3	CIRCUIT CARD ASSEMB --RESISTANCE-INSULATION	1
1	XDDZZ	63743	5XM225	.RESISTOR,FIXED,WIRE	2
2	PBFZZ	98869	H3395	.RESISTOR,FIXED,WIRE	1
3	PBFZZ	98869	H3522	.RESISTOR,FIXED,FILM	1
4	XDFZZ	98869	H3394	.RESISTOR,FIXED,WIRE.	1
5	PBFZZ	81349	RT12C2P101	.RESISTOR,VARIABLE,W.	1
6	PBFZZ	81349	M39015/1-003PP	.RESISTOR,VARIABLE,W	1
7	PBFZZ	81349	RT12C2P100	.RESISTOR,VARIABLE,W.	1
8	PBFZZ	52599	249E500M90	.RESISTOR,VARIABLE,W.	4
9	XDFZZ	91637	RS-1A7-1W	.RESISTOR,FIXED,FILM.	2
10	XDFZZ	91637	RS-1A12-1W	.RESISTOR,FIXED,FILM..	1
11	PBFZZ	98869	H3318	.RESISTOR,FIXED,WIRE RPLS--PN BH1771.	1
12	PBFZZ	98689	BH1773	.RESISTOR,FIXED,WIRE	1
13	PBFZZ	81073	71BY23196-1-2N	.SWITCH,ROTARY	1
14	XDFZZ	91637	RS-1A22-1W	.RESISTOR,FIXED,FILM.	1
15	XDFZZ	91637	RS-1A35-1W	.RESISTOR,FIXED,FILM	1
16	XDFZZ	91637	RS-1A30-1W	.RESISTOR,FIXED,FILM	1
17	XDFZZ	91637	RS-1A45-1W	.RESISTOR,FIXED,FILM.	1
18	PBFZZ	98869	C5225	.SWITCH,ROTARY	1
19	PBFZZ	98869	BH275	.RESISTOR,FIXED,WIRE.	1
20	PBFZZ	98869	H3493	.RESISTOR,FIXED,WIRE	1
21	PBFZZ	98869	BH274	.RESISTOR,FIXED,WIRE	1
22	PBFZZ	06928	A402-010	.CONNECTOR,RECEPTACL.	1
23	PBFZZ	96906	MS51957-5	.SCREW,MACHINE	2
24	PBFZZ	81349	RNC55K6811FS	.RESISTORS,FIXED,FILM.	1
25	PBFZZ	91349	RNC55H1000FS	.RESISTOR,FIXED,FILM.	1
26	XDFZZ	91637	RS-1A15-1W	.RESISTOR,FIXED,FILM.	1
27	XDFZZ	98869	BH16367	.PRINTED CIRCUIT BOA	1
				END OF FIGURE	

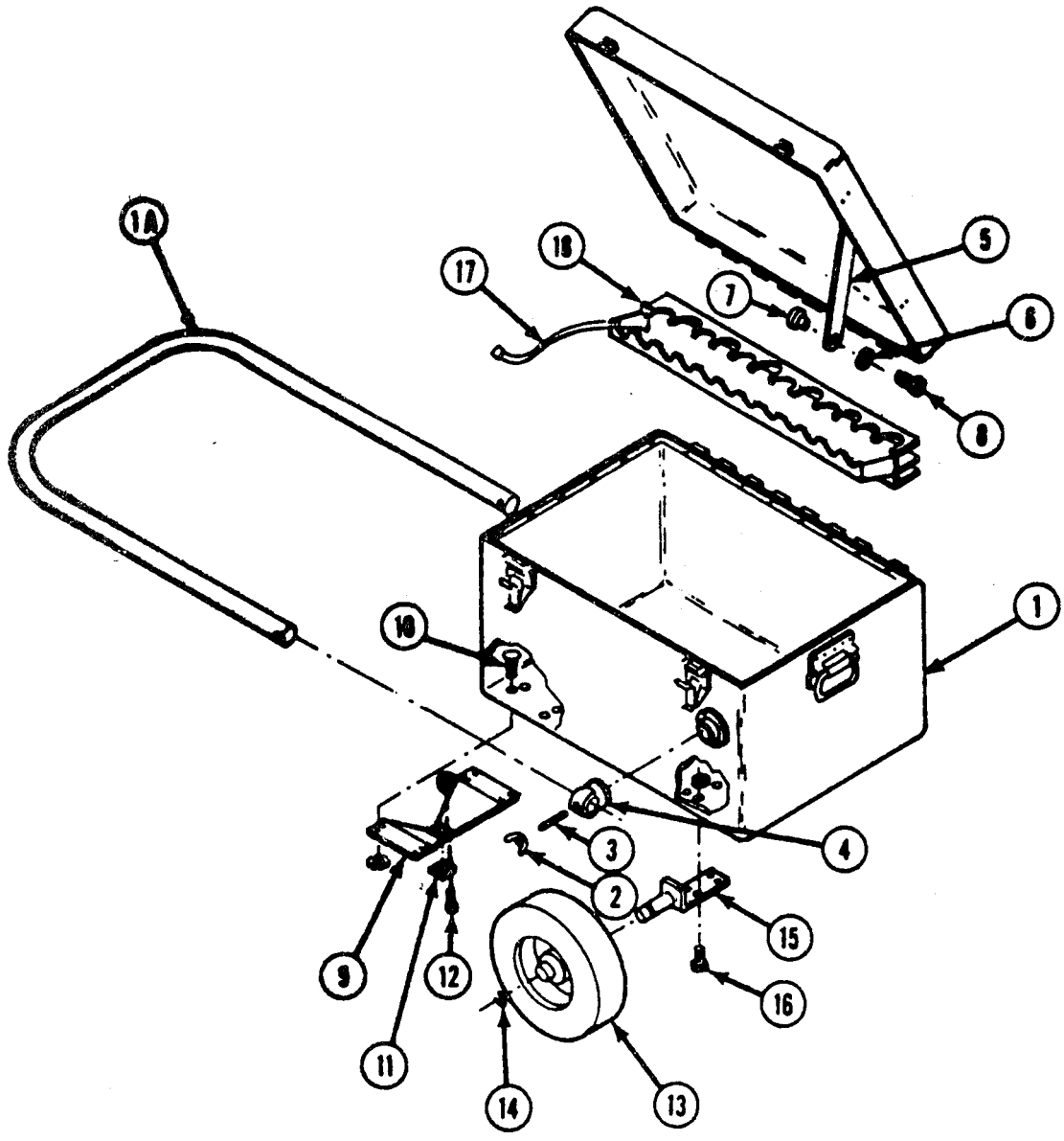

Figure 10. H122 Accessory Case

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE S(UOC)	(6) QTY
				GROUP 03. TRIMMER ASSY, CASE AND COMPONENTS.	
				FIGURE 10. H122 ACCESSORY CASE	
1	XDFFF	98869	H122	CASE ACCESSORY	1
1A	PBFZZ	98869	BH585	.HANDLE,CARRYING CAS	1
2	PBFZZ	96906	MS35426-15	.NUT,PLAIN,WING	2
3	PBFZZ	96906	MS35308-341	.BOLT,MACHINE	2
4	PBFZZ	98869	BH727	.SOCKET,PIVOT	2
5	PBFZZ	98869	BH796	.STOP,ARM,ASSEMBLY	1
6	PBFZZ	98869	BH723	.SPACER,SLEEVE	1
7	PBFZZ	98869	BH437	.STOP ARM SUPPORT	1
8	PBFZZ	96906	MS51958-61	.SCREW,MACHINE	1
9	PBFZZ	98869	BH834-1	.MOUNT,SUPPORT	1
10	PBFZZ	96906	MS51957-63	.SCREW,MACHINE	8
11	PBFZZ	09728	BH834-2	.PLATE,MENDING	1
12	PBFZZ	96906	MS51957-27	.SCREW,MACHINE	4
13	PBFZZ	98869	BH3506	.WHEEL,SOLID RUBBER	2
14	PBFZZ	79136	5100-62	.RING,RETAINING	2
15	PBFZZ	98869	BH835	.MOUNT,WHEEL	2
16	PBFZZ	96906	MS51957-65	.SCREW,MACHINE	8
17	PBFZZ	98869	BH6554	.PROBE HOLDER	1
18	PBFZZ	98869	BH6551	.RACK,TEST PROBES	1
				END OF FIGURE	

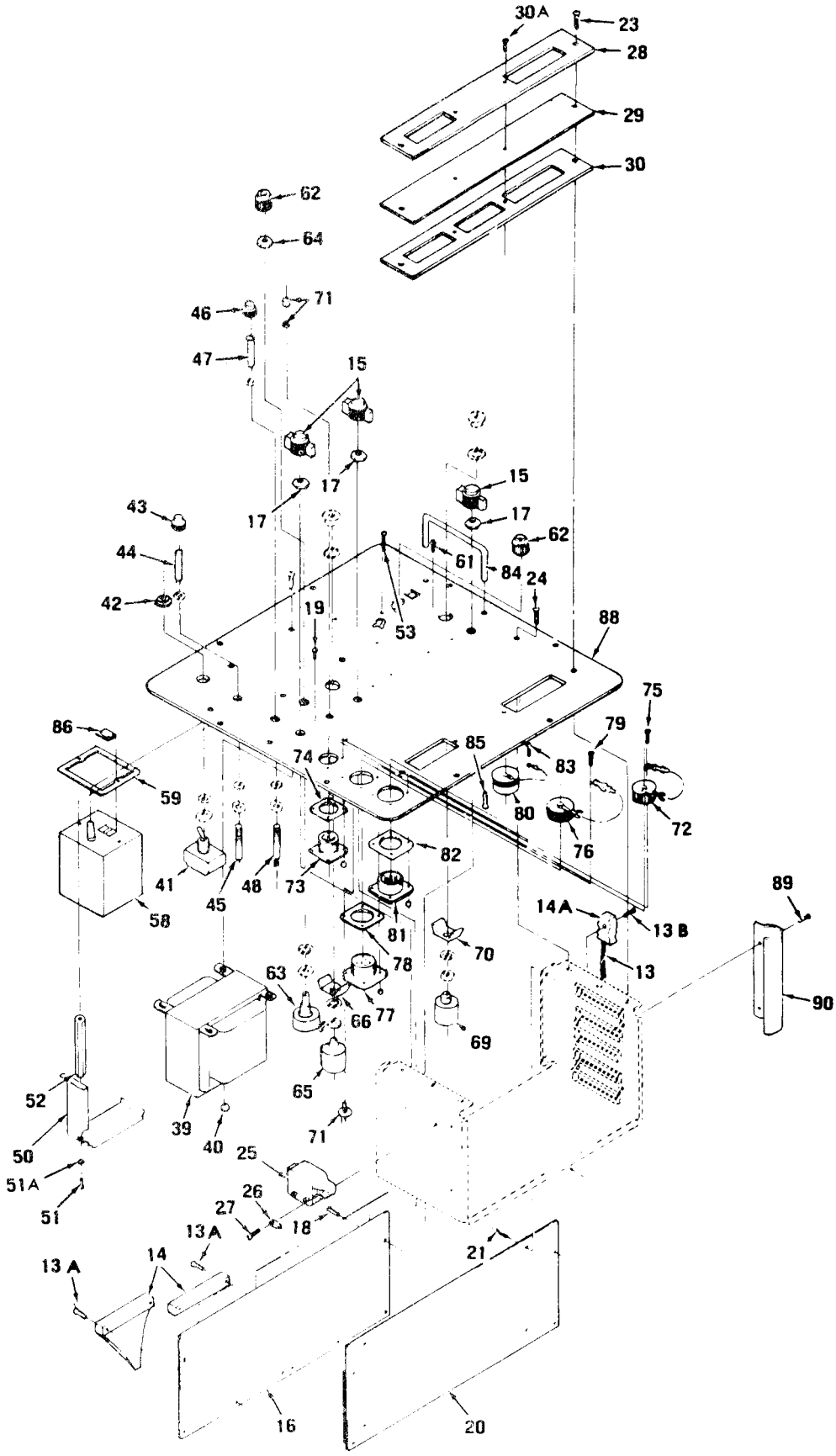

Figure 11. Trimmer Assembly (Sheet 2 of 2)

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				FIGURE 11. TRIMMER ASSEMBLY	
	PBFFF	98869	BH15195A8	TRIMMER ASSEMBLY	1
1	XDFZZ	97539	SEELSKREWR10-32X1-2	.SCREW,MACHINE	8
2	PBFDD	98869	BH16365-1	.CIRCUIT CARD ASSEMB --CALIBRATOR SEE FIGURE 7 FOR BREAKDOWN	1
3	PBFDD	98869	BH15717-1	.CIRCUIT CARD ASSEMB --TACHOMETER SEE FIGURE 6 FOR BREAKDOWN	1
4	PBFDD	98869	BH15715-1	.CIRCUIT CARD ASSEMB --TEMPERATURE SEE FIGURE 5 FOR BREAKDOWN	1
5	PBFDD	98869	BH16358-2	.PRINTED CIRCUIT BOA --DISPLAY SEE FIGURE 4 FOR BREAKDOWN	1
6	PBFZZ	98869	BH15814	.HOLDER,CIRCUIT CARD	1
8	XDFDD	98869	BH15179-2	.CASE,INSTRUMENT	1
9	PBFZZ	98869	BH16833	..GASKET	1
10	XDFZZ	98869	BH472-2	..NAMEPLATE	1
11	PBFZZ	96906	MS21044C08	..NUT,SELF-LOCKING,HE	4
12	PBFZZ	70485	165A	..BUMPER,RUBBER	4
13	PBFFF	98869	BH15813-1	.WIRING HARNESS	1
13A	XDFZZ	96906	MS35206-208	..SCREW,MACHINE	4
13B	PBFZZ	96906	MS35275-206	..SCREW,MACHINE	3
14	PBFZZ	06928	C406-021	..CONNECTOR,RECEPTACL	2
14A	PBFZZ	04157	NMP-COCO-F	..CONNECTOR,PLUG,ELEC	1
15	PBOZZ	21604	SS70BL2BLK	.KNOB	3
16	PBFDD	98869	BH15720-1	.CIRCUIT CARD ASSEMB SWITCH-POWER SEE FIG. 3 FOR BRKDWN	1
17	PBFZZ	81349	M5423-09-02	.BOOT,DUST AND MOIST	3
18	PBFZZ	96906	MS51957-2	.SCREW,MACHINE	6
19	PBFZZ	97539	SEELSKREWR4-40-3-8	.SCREW,MACHINE	6
20	PBFZZ	98869	BH15719-2	.PRINTED CIRCUIT BOA --MOTHER	1
21	PBFZZ	96906	MS51957-28	.SCREW,MACHINE	4
23	PBFZZ	97539	SEELSKREWR8-32X5-8	.SCREW,MACHINE	2
24	PBFZZ	97539	SEELSKREWR8-32X1-2	.SCREW,MACHINE	2
25	XDFZZ	82647	D6756-1-1-2	.CIRCUIT BREAKER	1
26	XDFZZ	83330	1415-4	.TERMINAL LUG	1
27	PBFZZ	96906	MS51957-14	.SCREW,MACHINE	2
28	PBFZZ	98869	BH15559-1	.BEZEL,INSTRUMENT MO	1
29	PBFZZ	98869	BH15561	.WINDOW,OBSERVATION	1
30	PBFZZ	98869	BH15560	.GASKET	1
30A	PBFZZ	97539	SEELSKREWR4-40X7-16	.SCREW,MACHINE	2
39	PBFZZ	98869	BH15712	.TRANSFORMER,POWER	1
40	PBFZZ	96906	MS21044N3	.NUT,SELF-LOCKING,HE	4
41	PBFZZ	96906	MS35059-24	.SWITCH,TOGGLE	1
42	PBFZZ	97539	N-9030-B-1/4	.BOOT,DUST AND MOIST	1
43	PBOZZ	72619	250-1471-500	.LENS,LIGHT	1
44	PBOZZ	72619	507-5824-0747-60	.LAMP,CARTRIDGE	1

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
45	PBFZZ	72619	250-8458-33-504	.LIGHT,INDICATOR	1
46	PBOZZ	72619	250-1473-500	.LENS,LIGHT	1
47	PBOZZ	72619	507-5821-0747-600	.LAMP,CARTRIDGE	1
48	PBFZZ	72619	250-8458-33-504	.LIGHT,INDICATOR	1
50	PBFZZ	98869	BH17956-1	.STRAP,RETAINING	1
51	PBFZZ	96906	MS51957-43	.SCREW,MACHINE	1
51A	PBFZZ	96906	MS35333-72	.WASHER,LOCK	1
52	PBFZZ	98869	BH17957	.POST,ELECTRICAL-MEC	1
53	PBFZZ	97539	SELLSKREWR8-32X1-2	.SCREW,MACHINE	1
58	PBFZZ	98869	H5600P-56	.RESISTOR, VARIABLE	1
59	PBFZZ	98869	BH6522	.GASKET	1
61	PBFZZ	97539	SEELSKREWR4-40-5-16	.SCREW,MACHINE	2
62	PBFZZ	21604	SSN-70-2 SHORT BLACK	.KNOB	1
62A	PBOZZ	21604	SSN70-2	.KNOB	1
63	PBFZZ	12697	53C3-50K	.RESISTOR,VARIABLE,N	1
64	PBFZZ	97539	N9030-1-4	.BOOT,DUST AND MOIST	1
65	PBFZZ	98869	BH18690-2	.RESISTOR,VARIABLE,W	1
66	PBFZZ	94603	CA10006	.HOOK,POTENTIOMETER	1
69	PBFZZ	98869	BH18690-3	.RESISTOR,VARIABLE,W	
70	PBFZZ	98869	RH24765-1	.HOOK,POTENTIOMETER	1
71	PBFZZ	81073	30-252 RED	.SWITCH,PUSH	1
72	PBFZZ	96906	MS25043-12DA	.COVER,ELECTRICAL CO	1
73	PBFZZ	98869	BH9020P	.CONNECTOR,RECEPTACL	1
74	PBFZZ	24454	B74143PS8	.GASKET	1
75	XDFZZ	97539	SEELSKREWS440X1-2	.SCREW,MACHINE	4
76	PBFZZ	96906	MS25043-14D	.COVER,ELECTRICAL CO	1
77	PBFZZ	98869	BH9140S	.CONNECTOR,RECEPTACL	1
78	PBFZZ	18876	8528783	.GASKET	1
79	XDFZZ	97539	SEELSKREWS440X1-2	.SCREW,MACHINE	4
80	PBFZZ	96906	MS3181-14C	.COVER,ELECTRICAL CO	1
81	PBFZZ	98869	BH9385P	.CONNECTOR,RECEPTACL	1
82	PBFZZ	18876	8528783	.GASKET	1
83	XDFZZ	97539	SEELSKREWS440X1-2	.SCREW,MACHINE	4
84	PBFZZ	71279	1291-1	.HANDLE,BOW	2
85	PBFZZ	96906	MS51959-45	.SCREW,MACHINE	4
86	XDFZZ	98869	BH6555	.WINDOW,OBSERVATION	1
88	XDFZZ	98869	BH15807A	.DECK	1
89	PBFZZ	96906	MS51957-28	.SCREW,MACHINE	4
90	PBFZZ	98869	BH16295	.RETAINER,PRINTED CI	2

END OF FIGURE

(1) ILLUSTRATION (a) FIG NO	(1) ILLUSTRATION (b) ITEM NO	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION / USABLE ON CODE	(7) U/I	(8) QTY INC IN UNIT
						GROUP 04 PROBE ASSY, CASE		
12		PBFFF	4920-01-088-1469	98869	BH151S4A-4	PROBE CONTROLLER ASSEMBLY	EA	1
12		PBOFF	4920-01-088-1469	98869	BH158C2	.CABLE ASSEMBLY, SPEC -- PROBE CONTROLLER	EA	1
12	1	PBFZZ	5305-00-054-5651	96906	MS51957-17	..SCREW, MACHINE	EA	6
12	2	PBFZZ	5950-01-047-1673	98869	BH15713	..TRANSFORMER, POWER, F	EA	1
12	3	XDDZZ	5935-01-022-5628	06928	C406-C21	..CONNECTOR	EA	2
12	4	XDDZZ		06928	C4C4-C10	..CONNECTOR	EA	1
12	5	PACZZ	5940-00-107-1481	04618	34567	..TERMINAL, LUG	EA	4
12	6	XDDZZ	5940-00-066-3633	04618	35316	..TERMINAL LUG	EA	2
12	7	PBOZZ	5355-00-403-1550	21604	SS70BL28LK	.KNOB	EA	2
12	8	PBFFF	4920-01-020-5561	98869	BH158C1-1	.CIRCUIT CARD AS SEMB -- PROBE CONTROL-FUNCTION SWITCH SEE FIGURE 8 FOR BREAKDOWN	EA	1
12	9	PBFZZ	5930-00-822-0482	97539	N9C30-1-4	.BOOT, DUST AND MOIST	EA	2
12	10	PBFZZ	5310-00-637-4885	81C73	12C1087	.WASHER, KEY	EA	2
12	11	PBFZZ	5305-00-054-5839	96906	MS51957-5	.SCREW, MACHINE	EA	2
12	12	PBOZZ	5355-00-403-1550	21604	SS70BL28LK	.KNOB	EA	2
12	13	PBFFF	4920-01-020-0539	98869	BH16367-3	.CIRCUIT CARD AS SEMB -- RESISTANCE- INSULATION SEE FIGURE 9 FOR BREAKDOWN	EA	1
12	14	PBFZZ	5930-00-822-0482	97539	N9030-1-4	.BOOT, DUST AND MOIST	EA	2
12	15	PBFZZ	5310-00-637-4885	81C73	12C1087	.WASHER, KEY	EA	2
12	16	PBOZZ	6210-00-470-7602	72619	25C-1471-500	.LENS, LIGHT	EA	1
12	17	PBOZZ	6240-00-924-6438	72619	507-5824-0747-60	.LAMP, CARTRIDGE	EA	1
12	18	PBFZZ	6210-00-244-1994	72619	25C-8758-33-504	.LIGHT, INDICATOR	EA	1
12	19	PBOZZ	5355-00-403-6496	21604	SSA70-28LK	.KNOB	EA	1
12	20	PBFZZ	5905-01-021-6816	80294	3540-S-1-203	.RESISTOR, VARIABLE, W	EA	1
12	21	PBFZZ	5930-00-823-0482	97539	N9030-1-4	.BOOT, DUST AND MOIST	EA	1
12	22	PBFZZ	5930-00-655-1582	96906	MS35059-23	.SWITCH, TOGGLE	EA	1
12	23	PBFZZ		97539	N-903C-8-1/4	.BOOT, DUST AND MOIST	EA	1
12	24	PBOZZ	5355-00-403-6496	21604	SSA70-28LK	.KNOB	EA	1
12	25	PBFZZ	5905-01-022-0134	80294	3540-S-1-101	.RESISTOR, VARIABLE, W	EA	1
12	26	PBFZZ	5930-00-822-0482	97539	N9030-1-4	.BOOT, DUST AND MOIST	EA	1
12	27	PBFZZ	5961-00-088-8792	03508	1N5059	.SEMICONDUCTOR DEVIC	EA	1
12	28	PBFZZ	5945-01-021-7183	77342	KR-7826	.RELAY, ARMATURE	EA	1
12	29	PBFZZ	5310-00-081-8087	96906	MS20365-632A	.NUT, SELF-LOCKING, HE	EA	3
12	29A	PBFZZ	5940-00-816-6103	96906	MS77066-2	.TERMINAL LUG	EA	1
12	30	PBFZZ	5925-00-283-6513	82647	PDA20	.CIRCUIT BREAKER	EA	1
12	31	PBFZZ	5305-00-054-6672	96906	MS51957-47	.SCREW, MACHINE	EA	2
12	32	PBFZZ	4920-01-067-9155	98869	BH15180	.BRACKET, MOUNTING	EA	1
12	33	PBFZZ	5305-00-758-0862	97539	SEE LSREWR6-32--2	.SCREW, MACHINE	EA	2
12	33A	PBFZZ	5310-00-081-8087	96906	MS20365-632A	.NUT, SELF-LOCKING, HE	EA	2

(1) ILLUSTRATION (A) FIG NO	(B) ITEM NO	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION	USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
12	36	PBFZZ	4920-00-877-3948	98869	BH2825	.METER,RESISTANCE		EA	1
12	35	PBFZZ	5305-00-964-6032	97539	SEELSKREWS440X1-2	.SCREW,MACHINE		EA	3
12	36	PBFZZ	5330-00-914-1916	98869	BH581-1	.GASKET		EA	1
12	37	PBFZZ	6625-00-948-1646	98869	BH6510	.METER,INSULATION		EA	1
12	38	PBFZZ	5305-00-964-6032	97539	SEELSKREWS440X1-2	.SCREW,MACHINE		EA	3
12	39	PBFZZ	5330-00-914-1916	98869	BH581-1	.GASKET		EA	1
12	40	PBFZZ	5935-00-228-4395	98869	BH9020P	.CONNECTOR,RECEPTACL		EA	1
12	41	PBFZZ	5935-00-238-6419	96906	MS25043-12C	.COVER,ELETRICAL		EA	1
12	42	PBFZZ	5305-00-964-6032	97539	SEELSKREWS440X1-2	.SCREW,MACHINE		EA	4
12	42A	PBFZZ	5310-00-088-0551	96906	MS20365-440A	.NUT,SELF-LOCKING,HE		EA	4
12	43	PBFZZ	5330-00-576-9890	77820	10-36675-12	.GASKET		EA	1
12	44	PBFZZ	5935-00-763-5629	98869	BH9039S	.CONNECTOR,PLUG,ELEC		EA	1
12	45	XDFZZ	5935-00-577-0091	96906	MS25043-20C	.COVER,ELECTRICAL CO		EA	1
12	46	PBFZZ	5305-00-964-6032	97539	SEELSKREWS440X1-2	.SCREW,MACHINE		EA	4
12	46A	PBFZZ	5310-00-088-0551	96906	MS20365-440A	.NUT,SELF-LOCKING,HE		EA	4
12	47	PBFZZ	5330-00-599-9126	77820	10-36675-20	.GASKET		EA	1
12	48	PBFZZ	5935-00-925-9061	98869	BH9030S	.CONNECTOR,ELECTRICA		EA	1
12	49	PBFZZ	5935-00-137-4669	96906	MS35043-14D	.COVER,ELECTRICAL CO		EA	1
12	50	PBFZZ	5305-00-964-6032	97539	SEELSKREWS440X1-2	.SCREW,MACHINE		EA	4
12	50A	PBFZZ	5310-00-088-0551	96906	MS20365-440A	.NUT,SELF-LOCKING,HE		EA	4
12	51	PBFZZ	5330-00-355-8976	06840	36675-14	.GASKET		EA	1
12	52	PBOZZ	5920-00-936-1649	71400	RAW20	.FUSE,CATRIDGE		EA	1
12	53	PBFZZ	5920-00-225-0420	71400	FHN23W	.FUSEHOLDER,EXTRACTO		EA	1
12	54	PBFZZ	5305-00-798-0862	97539	SEELSKREWR6-32-1-2	.SCREW,MACHINE		EA	2
12	55	PBFZZ	5935-00-763-5630	98869	BH9033F	.CONNECTOR,PLUG,ELEC		EA	1
12	56	PBFZZ	5935-00-137-4671	96906	MS25043-16D	.COVER,ELECTRICAL CO		EA	1
12	57	PBFZZ	5305-00-964-6032	97539	SEELSKREWS440X1-2	.SCREW,MACHINE		EA	4
12	57A	PBFZZ	5310-00-088-0551	96906	MS20365-440A	.NUT,SELF-LOCKING,HE		EA	4
12	58	PBFZZ	5330-00-292-3958	77820	10-36675-16	.GASKET		EA	1
12	59	PBFZZ	5935-01-021-5493	98869	BH9385S	.CONNECTOR,RECEPTACL		EA	1
12	60	PBFZZ	5935-00-899-9361	96906	MS3181-14C	.COVER,ELECTRICAL CO		EA	1
12	61	PBFZZ	5305-00-964-6032	97539	SEELSKREWS440X1-2	.SCREW,MACHINE		EA	4
12	61A	PBFZZ	5310-00-088-0551	96906	MS20365-440A	.NUT,SELF-LOCKING,HE		EA	4
12	62	PBFZZ	5330-00-355-8976	06840	36675-14	.GASKET		EA	1
12	63	PBFZZ	5340-01-032-8106	98869	BH799	.STOP ARM SUPPORT		EA	1
12	64	PBFZZ	5305-00-071-1320	96906	MS51960-63	.SCREW,MACHINE		EA	2

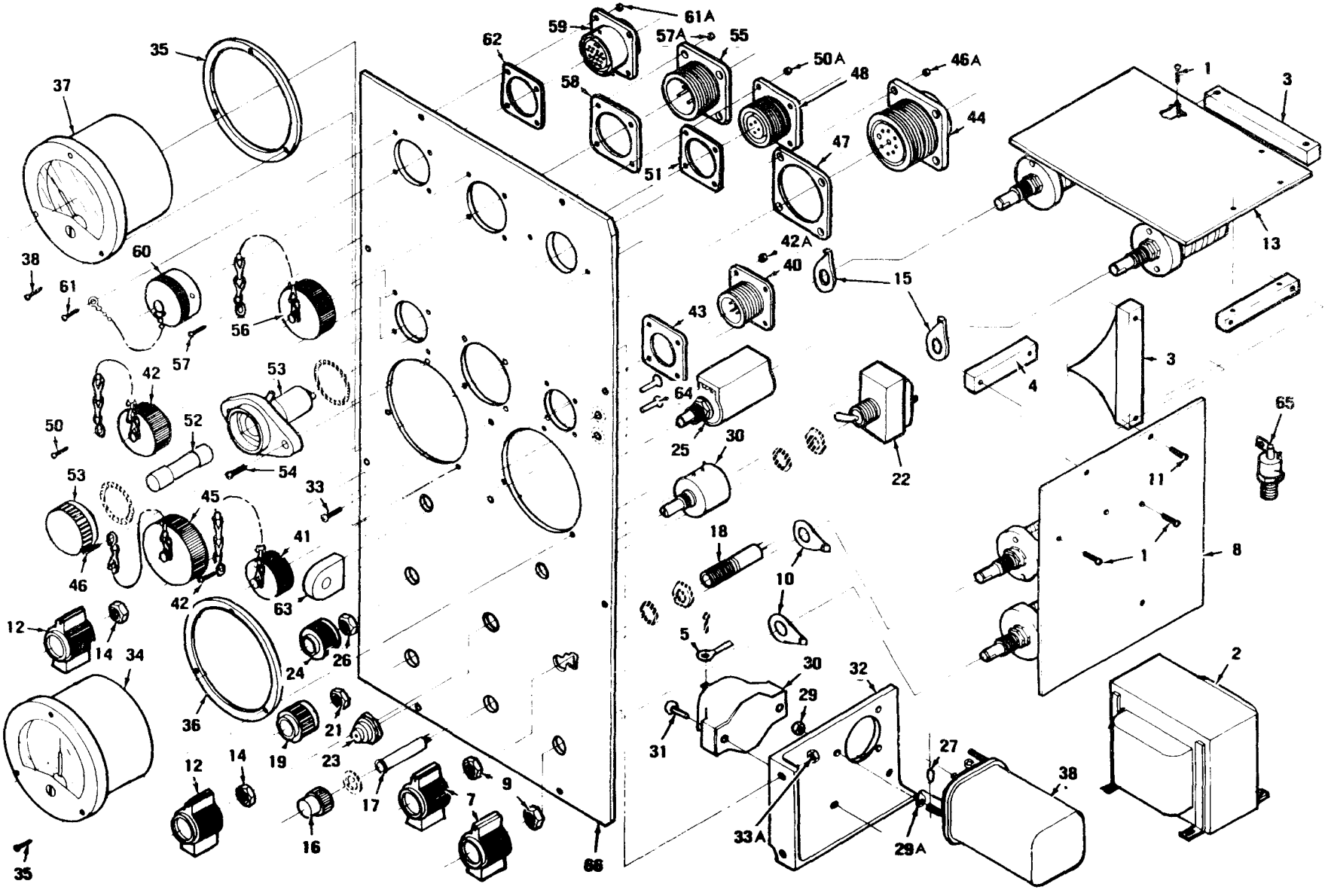

Figure 12. Probe Controller Assembly

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
				GROUP 04. PROBE ASSY, CASE	
				FIGURE 12. PROBE CONTROLLER ASSY	
	PBFFD	98869	BH15194A-4	PROBE CONTROLLER ASSEMBLY.....	1
	PBOFF	98869	BH15802	.CABLE,SPECIAL --PROBE CONTROLLER..	1
1	PBFZZ	96906	MS51957-17	..SCREW,MACHINE.....	6
2	XDFZZ	98869	BH15713	..TRANSFORMER,POWER,F.....	1
3	XDDZZ	06928	C406-021	..CONNECTOR,RECEPTACL.....	2
4	XDDZZ	06928	C404-010	..CONNECTOR.....	1
5	PADZZ	96906	MS20659-104	..TERMINAL,LUG.....	4
6	XDDZZ	04618	35316	..TERMINAL LUG.....	2
7	PBOZZ	21604	SS70BL2BLK	.KNOB.....	2
8	PBFFF	98869	BH15801-1	.CIRCUIT CARD ASSEMB --PROBE CONTROL-FUNCTION SWITCH SEE FIGURE 8 FOR BREAKDOWN N.....	1
9	PBFZZ	81349	M5423-09-02	.BOOT,DUST AND MOIST.....	2
10	PBFZZ	81073	12C1087	.WASHER,KEY.....	2
11	PBFZZ	96906	MS51957-5	.SCREW,MACHINE.....	2
12	PBOZZ	21604	SS70BL2BLK	.KNOB.....	2
13	PBFFF	98869	BH16367-3	.CIRCUIT CARD ASSEMB RESISTANCE-INSULATION SEE FIG. 9 FOR BRKDWN...	1
14	PBFZZ	81349	M5423-09-02	.BOOT,DUST AND MOIST.....	2
15	PBFZZ	81073	12C1087	.WASHER,KEY.....	2
16	PBDZZ	72619	250-1471-500	.LENS,LIGHT.....	1
17	PBOZZ	72619	507-5824-0747-600	.LAMP,CARTRIDGE.....	1
18	PBFZZ	72619	250-8758-33-504	.LIGHT,INDICATOR.....	1
19	PBOZZ	21604	SSN70-2	.KNOB.....	1
20	PBFZZ	80294	3540-S-1-203	.RESISTOR,VARIABLE,W.....	1
21	PBFZZ	97539	N9030-1-4	.BOOT,DUST AND MOIST.....	1
22	PBFZZ	96906	MS35059-23	.SWITCH,TOGGLE.....	1
23	PBFZZ	81349	M5423-09-02	.BOOT,DUST AND MOIST.....	1
24	PBOZZ	21604	SSN70-2	.KNOB.....	1
25	PBFZZ	80294	3540-S-1-101	.RESISTOR,VARIABLE,W.....	1
26	PBFZZ	81349	M5423-09-02	.BOOT,DUST AND MOIST.....	1
27	PBFZZ	80131	1N5059	.SEMICONDUCTOR DEVIC.....	1
28	PBFZZ	98869	C5218	.RELAY,ELECTROMAGNET.....	1
29	PBFZZ	96906	MS21044N06	.NUT,SELF-LOCKING,HE.....	3
29A	PBFZZ	96906	MS77066-2	.TERMINAL,LUG.....	1
30	PBFZZ	99832	101197	.CIRCUIT BREAKER.....	1
31	PBFZZ	96906	MS51957-47	.SCREW,MACHINE.....	2
32	PBFZZ	98869	BH15180	.BRACKET,MOUNTING.....	1
33	PBFZZ	97539	SEELSKREWR6-32-1-2	.SCREW,MACHINE.....	2
33A	PBFZZ	96906	MS21044N06	.NUT,SELF-LOCKING,HE.....	2
34	PBFZZ	98869	BH2825	.METER,RESISTANCE.....	1
35	XDFZZ	97539	SEELSKREWS440X1-2	.SCREW,MACHINE.....	3
36	PBFZZ	98869	BH581-1	.GASKET.....	1
37	PBFZZ	98869	BH6510	.METER,INSULATION.....	1
38	XDFZZ	97539	SEELSKREWS440X1-	.SCREW,MACHINE.....	3

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODES(UOC)	(6) QTY
			2		
39	PBFZZ	98869	BH581-1	.GASKET.....	1
40	PBFZZ	98869	BH9020P	.CONNECTOR,RECEPTACL.....	1
41	PBFZZ	96906	MS25043-12DA	.COVER,ELECTRICAL CO.....	1
42	XDFZZ	97539	SEELSKREWS440X1-2	.SCREW,MACHINE.....	4
42A	PBFZZ	96906	MS21044N04	.NUT,SELF-LOCKING,HE.....	4
43	PBFZZ	24454	B74143PS8	.GASKET.....	1
44	PBFZZ	98869	BH9039S	.CONNECTOR,PLUG,ELEC.....	1
45	XDFZZ	96906	MS25043-20C	.COVER,ELECTRICAL	1
46	XDFZZ	97539	SEELSKREWS440X1-2	.SCREW,MACHINE.....	4
46A	PBFZZ	96906	MS21044N04	.NUT,SELF-LOCKING,HE.....	4
47	PBFZZ	77820	10-36675-20	.GASKET.....	1
48	XDDZZ	98869	BH9030S	.CONNECTOR,ELECTRICA.....	1
49	PBFZZ	96906	MS25043-14D	.COVER,ELECTRICALCO.....	1
50	XDFZZ	97539	SEELSKREWS440X1-2	.SCREW,MACHINE.....	4
50A	PBFZZ	96906	MS21044N04	.NUT,SELF-LOCKING,HE.....	4
51	PBFZZ	18876	8528783	.GASKET.....	1
52	PBOZZ	71400	KAW20	.FUSE,CARTRIDGE.....	1
53	XDFZZ	71400	FHN23W	.FUSEHOLDER,EXTRACTO.....	1
54	PBFZZ	97539	SEELSKREWR6-32-1-2	.SCREW,MACHINE.....	2
55	PBFZZ	98869	BH9033P	.CONNECTOR,RECEPTACL.....	1
56	PBFZZ	96906	MS25043-16D	.COVER,ELECTRICALCO.....	1
57	XDFZZ	97539	SEELSKREWS440X1-2	.SCREW,MACHINE.....	4
57A	PBFZZ	96906	MS21044N04	.NUT,SELF-LOCKING,HE.....	4
58	PBFZZ	77820	10-36675-16	.GASKET.....	1
59	PBFZZ	98869	BH9385S	.CONNECTOR,RECEPTACL.....	1
60	PBFZZ	96906	MS3181-14C	.COVER,ELECTRICALCO.....	1
61	XDFZZ	97539	SEELSKREWS440X1-2	.SCREW,MACHINE.....	4
61A	PBFZZ	96906	MS21044N04	.NUT,SELF-LOCKING,HE.....	4
62	PBFZZ	18876	8528783	.GASKET.....	1
63	PBFZZ	98869	BH799	.STOP ARM SUPPORT.....	1
64	PBFZZ	96906	MS51960-63	.SCREW,MACHINE.....	2
65	PBFZZ	03508	C45H	.SEMICONDUCTOR DEVIC.....	2
66	XDFZZ	98869	BH15189A-2	.DECK.....	1

END OF FIGURE

(1) ILLUSTRATION (A) FIG NO	(B) ITEM NO	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) FSCM	(5) PART NUMBER	(6) DESCRIPTION	USABLE ON CODE	(7) U/M	(8) QTY INC IN UNIT
13		PBFFF	4920-01-086-1476	98869	BH15835-2	CASE,CARRYING INSTR		EA	1
13	1	XDFZZ		98869	BH14548A-1	.LID		EA	1
13	2	PBFZZ	5340-01-021-9621	96906	MS20253-2-1812	.ROD,STRAIGHT,HEADLE		EA	1
13	3	PBFZZ	5999-00-151-4035	75915	123002	.CLIP,ELECTRICAL		EA	2
13	4	PBFZZ	5305-00-051-6719	97539	SEELSKREWR4-40-5 -16	.SCREW,MACHINE		EA	2
13	14A	PBFZZ	5310-00-088-0551	96906	MS20365-440A	.NUT,SELF-LOCKING,HE		EA	2
13	5	PBFZZ	5920-01-016-7030	98869	BH15827	.FUSEHOLDER,BLOCK		EA	1
13	6	PAOZZ	5920-00-936-1649	71400	KAW20	.FUSE,CARTRIDGE		EA	2
13	7	PBFZZ	5305-00-054-5655	96906	MS51957-21	.SCREW,MACHINE		EA	2
13	7A	PBFZZ	5310-00-088-0551	96906	MS20365-440A	.NUT,SELF-LOCKING,HE		EA	2
13	8	PBFZZ	5999-01-016-2711	98869	BH15826	.HEAT SINK,ELECTRICA		EA	2
13	9	PBFZZ	5970-01-020-9631	98869	BH17427	.INSULATOR,PLATE		EA	4
13	10	PBFZZ	5905-00-563-1595	81349	RLR0704702GR	.NUT,SELF-LOCKING,HE		EA	4
13	10A	PBFZZ	5310-00-840-8342	83330	3052	.WASHER,FLAT		EA	4
13	11	PBFZZ	4920-01-086-1466	98869	BH15524	.MOLDING,METAL		EA	2
13	12	PBFZZ	5330-01-104-5959	98869	BH15525	.BUMBER,RUBBER		EA	2
13	13	PBFZZ	5305-00-054-5655	96906	MS51957-21	.SCREW,MACHINE		EA	8
13	13A	PBFZZ	5310-00-088-0551	96906	MS20365-440A	.NUT,SELF-LOCKING,HE		EA	8
13	14	PBFZZ	5340-01-021-4103	70485	21	.BUMPER,RUBBER		EA	4
13	15	PBFZZ	5305-00-993-9268	97539	SEELSKREWR4-40X3 -4	.SCREW,MACHINE		EA	4
13	15A	PBFZZ	5310-00-088-0551	96906	MS20365-440A	.NUT,SELF-LOCKING,HE		EA	4
13	16	PBFZZ	5340-00-956-5067	78046	R116	.BUMPER,SPECAIL		EA	6
13	17	PBFZZ	5305-00-855-2996	97539	SEELSKREWR4-40-3 -8	.SCREW,MACHINE		EA	6
13	17A	PBFZZ	5310-00-088-0551	96906	MS20365-440A	.NUT,SELF-LOCKING,HE		EA	6
13	17B	PBFZZ	5310-00-950-1310	96906	MS27183-4	.WASHER,FLAT		EA	6
13	18	PBFZZ	5330-01-021-6894	98869	BH15197	.GASKET		EA	1
13	19	XDFZZ		98869	BH15834	.CASE		EA	1

NATIONAL STOCK NUMBER AND PART NUMBER INDEX

STOCK NUMBER	FIGURE NO	ITEM NO	STOCK NUMBER	FIGURE NO	ITEM NO
5910-00-007-2001	5	35	5905-00-121-9919	8	35
5905-00-007-3808	8	47	5905-00-126-6703	5	26
5910-00-007-3974	8	24	5905-00-126-6703	6	54
5962-00-008-2701	7	47	5905-00-126-6703	8	45
5910-00-010-8240	6	14	5935-00-137-4669	11	76
5910-00-010-8240	8	31	5935-00-137-4669	12	49
5910-00-010-8666	5	5	5935-00-137-4671	12	56
5910-00-010-8666	6	4	5910-00-144-4381	7	14
5910-00-010-8666	6	28	5910-00-144-4383	3	49
5910-00-010-8666	7	9	5910-00-144-4383	5	64
5910-00-010-8718	4	3	5910-00-144-4383	6	12
5910-00-010-8718	7	34	5910-00-144-4383	7	3
5305-00-050-9229	10	10	5999-00-151-4035	13	3
5305-00-050-9231	10	16	5961-00-156-0570	3	6
5305-00-051-6719	11	61	5962-00-162-7505	4	1
5305-00-051-6719	13	4	5330-00-165-1905	11	59
5305-00-054-5636	11	18	5905-00-168-9287	5	33
5305-00-054-5637	3	55	5905-00-168-9287	6	38
5305-00-054-5639	9	23	5905-00-168-9287	7	20
5305-00-054-5639	12	11	5905-00-168-9287	8	41
5305-00-054-5648	11	27	5962-00-169-4728	7	35
5305-00-054-5651	12	1	5962-00-169-4730	7	45
5305-00-054-5655	13	7	5905-00-174-0346	6	37
5305-00-054-5655	13	13	5905-00-184-7705	3	35
5305-00-054-6651	10	12	5905-00-184-7705	4	4
5305-00-054-6652	11	21	5905-00-184-7705	5	7
5305-00-054-6668	11	51	5905-00-184-7705	6	1
5305-00-054-6672	12	31	5340-00-186-9481	11	84
5961-00-059-2904	8	20	5905-00-189-2380	5	32
5305-00-059-3657	1	12	5905-00-189-2380	6	31
5305-00-059-3657	10	8	5905-00-189-2380	8	40
5305-00-059-5433	3	2	5910-00-192-7180	3	32
5961-00-062-3133	8	29	5962-00-197-3430	5	53
5310-00-063-6717	10	2	5962-00-197-3430	6	51
5961-00-068-6441	8	19	4920-00-204-6457	2	8
5305-00-071-1320	12	64	5905-00-208-4293	5	55
5306-00-080-0680	10	3	5905-00-208-4293	6	22
5310-00-081-8087	12	29	5910-00-211-1976	5	56
5310-00-081-8087	12	33A	5910-00-211-1976	6	18
5905-00-087-0545	8	16	5910-00-211-1976	7	15
5310-00-088-0551	12	42A	5920-00-225-0420	12	53
5310-00-088-0551	12	46A	5935-00-228-4395	11	73
5310-00-088-0551	12	50A	5935-00-228-4395	12	40
5310-00-088-0551	12	57A	5905-00-229-7381	6	43
5310-00-088-0551	12	61A	5905-00-229-7391	5	48
5310-00-088-0551	13	4A	5905-00-229-7391	6	45
5310-00-088-0551	13	7A	5905-00-229-7391	7	29
5310-00-088-0551	13	13A	5905-00-236-6632	3	14
5310-00-088-0551	13	15A	5935-00-238-6419	11	72
5310-00-088-0551	13	17A	5935-00-238-6419	12	41
5961-00-088-8792	3	9	5905-00-240-2726	3	13
5961-00-088-8792	7	42	5905-00-240-2728	3	44
5961-00-088-8792	8	17	5905-00-240-2728	5	51
5961-00-088-8792	12	27	5905-00-240-2728	6	29
5910-00-098-8551	3	8	5905-00-240-2728	7	11
5910-00-098-8551	7	43	5905-00-240-2728	8	13
5910-00-098-8551	8	22	5905-00-240-2734	3	41
5905-00-099-9685	7	30	5905-00-240-2736	5	15
5905-00-099-9690	5	19	5905-00-240-2745	5	37
5905-00-101-1838	8	38	5905-00-240-2745	6	49
5905-00-104-8334	8	21	5905-00-240-2746	8	9
5910-00-105-1924	8	28	5905-00-240-2749	3	58
5961-00-106-5183	3	50	5905-00-240-7950	3	5
5940-00-107-1481	12	5	5905-00-240-7954	7	36
5905-00-107-4872	5	34	5905-00-240-7954	8	18
5962-00-107-4893	5	38	5905-00-240-7958	3	48
5962-00-107-4893	6	36	5905-00-240-7979	3	19
5910-00-111-4811	3	43	CHANGE 1	5	29
5910-00-111-4811	8	10	5905-00-240-7979	6	13
5910-00-113-5276	5	44	5905-00-240-7979	8	46
5910-00-114-5268	3	4	6210-00-244-1994	11	45
5905-00-114-5407	3	45	6210-00-244-1994	11	48
5962-00-118-3868	5	63	6210-00-244-1994	12	18
5962-00-118-3868	6	59	5305-00-253-5603	1	7
5962-00-118-3871	5	61	5305-00-253-5603	1	9
5962-00-118-3871	6	60	5905-00-258-5413	5	3
5961-00-118-4775	5	66	5905-00-264-4148	3	52
5961-00-118-4775	6	9	5340-00-266-0754	11	12
5961-00-118-4775	8	49	5905-00-273-9829	5	36
5905-00-121-9919	7	46	5905-00-273-9829	6	10

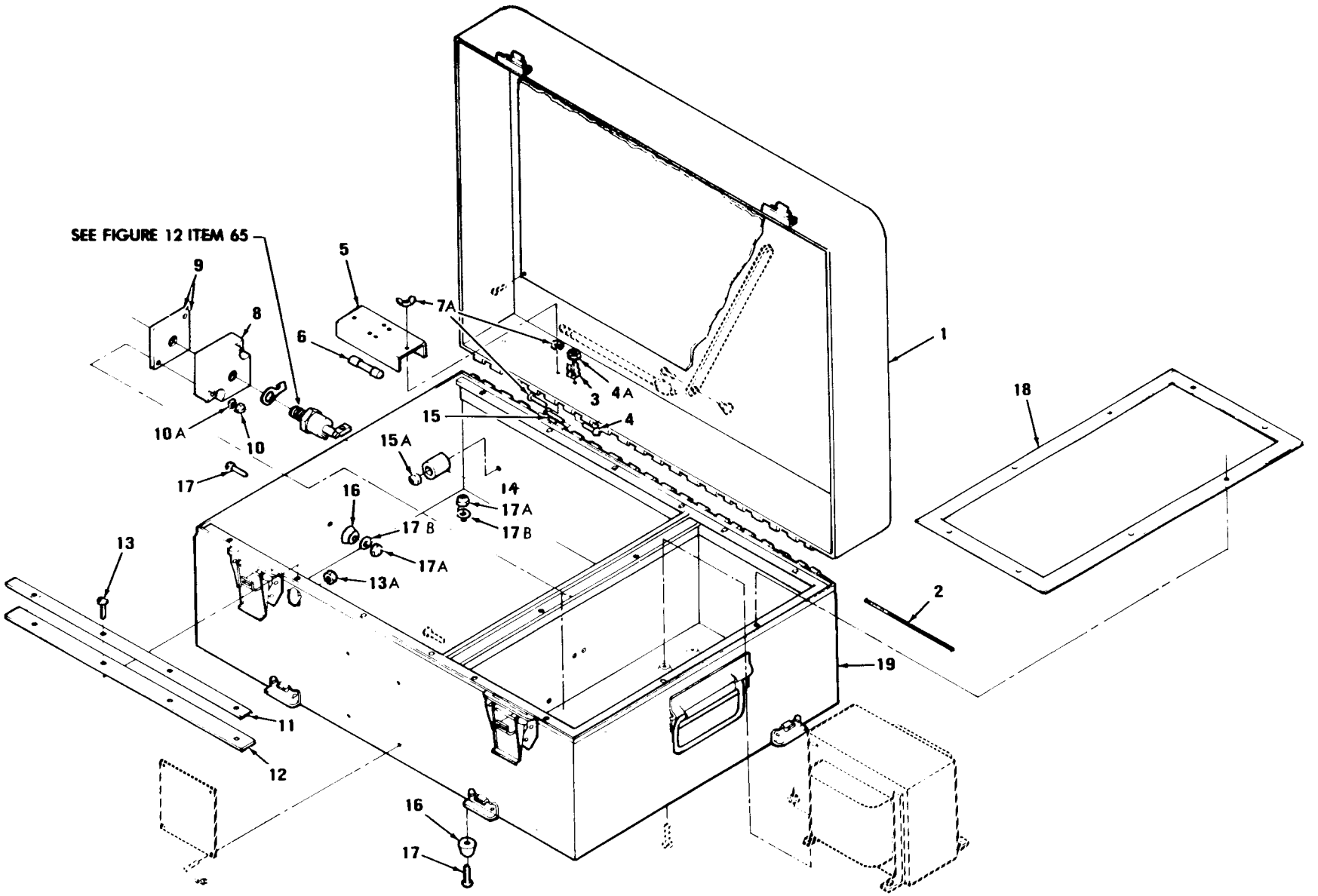

Figure 13. Instrument Case Assembly

(1) ITEM NO	(2) SMR CODE	(3) FSCM	(4) PART NUMBER	(5) DESCRIPTION AND USABLE ON CODE S(UOC)	(6) QTY
				FIGURE 13. INSTRUMENT CASE ASSEMBLY	
	PBFFD	98869	BH15835-2	CASE,CARRYING,INSTR.....	1
1	XDFZZ	98869	BH14548A-1	.LID.....	1
2	XDFZZ	96906	MS20253-2-2400	.ROD,STRAIGHT,HEADLE.....	1
3	PBFZA	75915	123002	.CLIP,ELECTRICAL.....	2
4	PBFZZ	97539	SEELSKREWR4-40-5-16	.SCREW,MACHINE.....	2
4A	PBFZZ	96906	MS21044N04	.NUT,SELF-LOCKING,HE.....	2
5	PBFZZ	98869	BH15827	.FUSEHOLDER,BLOCK.....	1
6	PAOZZ	71400	KAW20	.FUSE,CARTRIDGE.....	2
7	PBFZZ	96906	MS51957-21	.SCREW,MACHINE.....	2
7A	PBFZZ	96906	MS21044N04	.NUT,SELF-LOCKING,HE.....	2
8	PBFZZ	98869	BH15826	.HEATSINK,ELECTRICA.....	2
9	PBFZZ	98869	BH17427	.INSULATOR,PLATE.....	4
10	PBFZZ	96906	MS21044C08	.NUT,SELF-LOCKING,HE.....	4
10A	PBFZZ	56232	284202	.WASHER,FLAT.....	4
11	PBFZZ	98869	BH15524	.MOLDING,SPECIAL.....	2
12	PBFZZ	98869	BH15525	.SEAL,NONMETALLICST.....	2
13	PBFZZ	96906	MS51957-21	.SCREW,MACHINE.....	8
13A	PBFZZ	96906	MS21044N04	.NUT,SELF-LOCKING,HE.....	8
14	PBFZZ	70485	21	.BUMPER,RUBBER.....	4
15	PBFZZ	97539	SEELSKREWR4-40X3-4	.SCREW,MACHINE.....	4
15A	PBFZZ	96906	MS21044N04	.NUT,SELF-LOCKING,HE.....	4
16	PBFZZ	78046	R116	.BUMPER,RUBBER.....	6
17	PBFZZ	97539	SEELSKREWR4-40-3-8	.SCREW,MACHINE.....	6
17A	PBFZZ	96906	MS21044N04	.NUT,SELF-LOCKING,HE.....	6
17B	PBFZZ	96906	MS27183-4	.WASHER,FLAT.....	6
18	PBFZZ	98869	BH15197	.GASKET.....	1
19	XDFZZ	98869	BH15834	.CASE.....	1
				END OF FIGURE	

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STOCK NUMBER	FIG.	ITEM
4920-00-204-6457	2	8
5905-00-208-4293	5	55
	6	22
5910-00-211-1976	5	56
	6	18
	7	15
5935-00-228-4395	11	73
	12	40
5905-00-229-7391	5	48
	6	45
	7	29
5961-00-231-3169	8	23
5905-00-236-6632	3	14
5935-00-238-6419	11	72
	12	41
6685-00-243-9963	1	13
6210-00-244-1994	11	45
	11	48
	12	18
5905-00-258-5413	5	3
5905-00-264-4148	3	52
5340-00-266-0754	11	12
5905-00-273-9829	5	36
	6	10
	7	12
5910-00-280-8393	8	14
5925-00-283-6513	12	30
5330-00-292-3958	12	58
5365-00-298-6563	10	14
5905-00-305-6121	6	17
5905-00-312-3806	5	41
5962-00-318-2223	5	12
	6	62
4920-00-329-8294	2	2
5930-00-338-2591	2	1
5355-00-340-5152	11	62A
	12	19
	12	24
5962-00-348-2541	5	13
	6	56
5330-00-355-8976	11	78
	11	82
	12	51
	12	62
5961-00-365-6459	7	40
	8	27
5962-00-369-7607	5	63
	6	59
5962-00-369-7730	5	61
	6	60
5999-00-402-2485	5	40
	6	36B
5355-00-403-1590	11	15
	12	7
	12	12
5910-00-405-8395	3	38
	7	31
5961-00-405-8427	3	16
	5	2
	6	11
	7	13
	8	26
5910-00-409-3049	5	43
5910-00-410-4178	5	50
	6	47
5935-00-411-7929	5	31
	6	32
	7	21
5905-00-412-1212	5	22
	6	40
5905-00-415-6576	6	65
5905-00-422-5217	6	15
5905-00-432-0381	8	25
5905-00-432-0429	3	15
5961-00-450-3040	3	28
	5	16
	6	24
5905-00-451-7275	9	24
5305-00-455-2638	11	23
5935-00-456-4719	11	77
5961-00-459-2038	3	3
5950-00-470-4200	5	65
	6	63
	7	1
6210-00-470-7602	11	43
	12	16
5340-00-477-0807	10	11
5905-00-479-3990	3	10
5910-00-495-0042	8	33
5961-00-496-4643	6	34
5910-00-499-7435	3	8
	7	43
	8	22
4920-00-503-1889	2	3
4920-00-503-1890	2	4
4920-00-504-3192	2	11
5905-00-520-9440	4	6
4920-00-539-9260	2	10
5310-00-543-2739	11	51A
4920-00-548-7118	2	5

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STOCK NUMBER	FIG.	ITEM
4920-00-549-6093	2	9
4920-00-565-3702	10	4
4920-00-565-3710	10	5
4920-00-565-3714	10	15
5330-00-576-9890	11	74
	12	43
4920-00-589-8409	10	13
5330-00-599-9126	12	47
5930-00-636-2821	11	41
5310-00-637-4885	12	10
	12	15
5930-00-655-1582	12	22
5905-00-660-7834	9	12
4920-00-670-9379	2	12
4920-00-670-9410	2	13
5905-00-689-2926	6	41
5905-00-721-3732	7	48
4920-00-734-8321	1	11
	10	7
5935-00-763-5629	12	44
5935-00-763-5630	12	55
5305-00-764-0068	11	85
4920-00-767-2672	2	6
5305-00-798-0862	1	3
	12	33
	12	54
5940-00-816-6103	12	29A
5930-00-823-0482	11	17
	11	64
	12	9
	12	14
	12	21
	12	23
	12	26
5905-00-828-2416	9	25
5910-00-836-6258	3	51
5310-00-840-8342	13	10A
5961-00-842-9864	5	52
	6	23
	7	16
	8	1
5961-00-846-9125	3	37
	5	14
	8	4
5305-00-855-2996	11	19
	13	17
5905-00-865-7319	9	21
5905-00-865-7320	9	19
5905-00-865-7325	6	42
	7	27
5905-00-865-8932	9	2
4920-00-877-3948	12	34
5961-00-877-5692	12	65
5310-00-877-5797	11	40
5935-00-899-9361	11	80
	12	60
5961-00-905-8536	5	9
	6	48
5330-00-914-1916	12	36
	12	39
5905-00-921-4020	6	7
5905-00-921-4039	8	34
5305-00-922-3506	3	25
6240-00-924-6435	11	47
6240-00-924-6438	11	44
	12	17
5940-00-926-0015	8	48
5905-00-926-2826	9	7
5961-00-929-4951	6	33
5310-00-938-2013	3	26
5940-00-939-7842	3	7
5305-00-941-6402	11	138
6150-00-941-6503	2	7
6625-00-948-1646	12	37
5310-00-950-1310	13	17B
4920-00-953-2370	2	14
5305-00-956-4470	11	24
	11	53
5340-00-956-5067	13	16
5305-00-965-5944	11	30A
5905-00-974-6426	6	43
5905-00-978-4272	7	24
5310-00-982-6814	11	11
	13	10
5910-00-983-5388	5	54
	6	52
5935-00-988-6438	7	22
5305-00-993-9268	13	15
5905-00-994-7137	7	41
5961-01-012-9316	3	24
5961-01-013-0081	3	29
5910-01-014-1212	3	1
5905-01-015-5643	9	3
5910-01-016-0112	3	53
5999-01-016-2711	13	8
5961-01-016-2782	8	11
5920-01-016-7030	13	5
5905-01-017-4859	6	58
6210-01-018-7376	11	46
4920-01-019-1684	11	90

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STOCK NUMBER	FIG.	ITEM
5905-01-019-7294	11	65
5905-01-019-7295	11	69
5905-01-019-7689	5	23
	7	17
	8	42
4920-01-020-0538	7	
	11	2
4920-01-020-0539	12	13
5970-01-020-0877	3	56
4920-01-020-5360	11	29
4920-01-020-5560	3	
	11	16
4920-01-020-5561	8	
	12	8
4920-01-020-5563	5	
	11	4
4920-01-020-5565	6	
	11	3
5970-01-020-9631	13	9
5340-01-021-4103	13	14
5935-01-021-4605	3	20
5935-01-021-4609	11	81
5930-01-021-4623	3	34
5935-01-021-5433	3	22
	7	18
5935-01-021-5435	3	21
	5	24
5935-01-021-5437	11	14A
5935-01-021-5489	9	22
5935-01-021-5493	12	59
5930-01-021-5584	3	39
5930-01-021-5586	3	23
5930-01-021-5587	8	30
5930-01-021-5588	8	32
5930-01-021-5589	9	18
5930-01-021-5594	11	71
5905-01-021-6816	12	20
5905-01-021-6818	5	45
	6	39
5330-01-021-6894	13	18
5950-01-021-6985	11	39
5950-01-021-6987	8	8
5945-01-021-7183	12	28
5910-01-021-7661	3	11
5935-01-021-7728	7	23
5330-01-021-9220	11	9
5905-01-022-0134	12	25
5930-01-022-2061	9	13
5999-01-022-2226	4	12
	5	25
5999-01-022-2226	6	30
	7	37
5935-01-022-9628	11	14
5340-01-023-5121	5	39
	6	36A
5905-01-027-3536	7	26
5905-01-028-7911	11	58
5962-01-029-2899	7	47
5340-01-030-0892	1	10
5905-01-030-9139	6	20
5905-01-030-9147	5	49
5905-01-031-0430	7	25
5905-01-031-0432	5	28
	7	19
	8	43
5905-01-031-1398	5	4
5905-01-031-1399	7	28
5905-01-031-1401	5	68
	6	8
5365-01-032-7243	10	6
5340-01-032-8106	12	63
5905-01-033-0007	5	59
	6	55
5905-01-034-4262	9	11
5905-01-037-3380	5	17
5961-01-042-0416	3	50
5905-01-053-5788	5	42
	6	5
5935-01-065-9763	4	5
	5	11
	5	62
	6	61
5905-01-084-9946	11	63
5905-01-085-1164	3	13
4920-01-085-7942	11	20
5905-01-085-8973	9	5
4920-01-086-1464	10	1A
4920-01-086-1465	12	
4920-01-086-1466	13	11
4920-01-086-1467	11	66
4920-01-086-1468	10	9
4920-01-086-1469	1	2
	12	
4920-01-086-1470	10	17
4920-01-086-1471	10	18
4920-01-086-1472	11	6
4920-01-086-1473	1	1
	11	
4920-01-086-1474	2	
4920-01-086-1476	1	5

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STOCK NUMBER	FIG.	ITEM
4920-01-086-1476	13	
4920-01-086-1588	11	13
4920-01-087-9155	12	32
4920-01-089-4516	4	
	11	5
5970-01-095-6353	8	12
6150-01-095-8229	4	13
6695-01-096-0647	11	28
5355-01-096-2471	11	62
5905-01-097-4612	9	20
5365-01-097-6836	3	54
5340-01-097-8868	11	50
5330-01-097-9433	11	30
5330-01-104-5959	13	12
5999-01-111-1451	3	27
5905-01-112-0117	9	8
5340-01-114-0163	11	52
5999-01-114-5395	3	36
5905-01-137-0108	4	11
5905-01-137-0109	5	30
	6	50
	7	44
5905-01-148-6092	3	5
5905-01-151-1186	3	35
	5	7
	6	1
	8	3
5905-01-157-5608	3	19
	5	29
	6	13
	8	46
5905-01-157-5612	7	8
5961-01-197-5920	8	19
4920-01-223-3758	11	70

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
31589	ACF&504.22&10		8	50
50369	ACF50-0-22-5		6	3
31589	ACF50-2-0-10		8	7
06928	A402-010	5935-01-021-5489	9	22
98869	BH10666-8	5905-01-019-7689	5	23
			7	17
			8	42
98869	BH112JB916		1	
98869	BH12068-1	5340-01-023-5121	5	39
			6	36A
98869	BH123-3	5930-00-338-2591	2	1
98869	BH14548A-1		13	1
98869	BH14978-2	5340-01-030-0892	1	10
98869	BH1504	4920-00-670-9410	2	13
98869	BH15179-2		11	8
98869	BH15180	4920-01-087-9155	12	32
98869	BH15189A-2		12	66
98869	BH15194A-4	4920-01-086-1469	1	2
			12	
98869	BH15195A8	4920-01-086-1473	1	1
			11	
98869	BH15197	5330-01-021-6894	13	18
98869	BH15524	4920-01-086-1466	13	11
98869	BH15525	5330-01-104-5959	13	12
98869	BH15559-1	6695-01-096-0647	11	28
98869	BH15560	5330-01-097-9433	11	30
98869	BH15561	4920-01-020-5360	11	29
98869	BH15712	5950-01-021-6985	11	39
98869	BH15713		12	2
98869	BH15715		5	70
98869	BH15715-1	4920-01-020-5563	5	
			11	4
98869	BH15717		6	66
98869	BH15717-1	4920-01-020-5565	6	
			11	3
98869	BH15719-2	4920-01-085-7942	11	20
98869	BH15720		3	59
98869	BH15720-1	4920-01-020-5560	3	
			11	16
98869	BH15721	5999-01-111-1451	3	27
98869	BH15721-1	5999-01-114-5395	3	36
98869	BH15722	5365-01-097-6836	3	54
98869	BH15801		8	51
98869	BH15801-1	4920-01-020-5561	8	
			12	8
98869	BH15802	4920-01-086-1465	12	
98869	BH15807A		11	88
98869	BH15813-1	4920-01-086-1588	11	13
98869	BH15814	4920-01-086-1472	11	6
98869	BH15826	5999-01-016-2711	13	8
98869	BH15827	5920-01-016-7030	13	5

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
98869	BH15834		13	19
98869	BH15835-2	4920-01-086-1476	1	5
			13	
98869	BH16295	4920-01-019-1684	11	90
98869	BH16357	6150-01-095-8229	4	13
98869	BH16358		4	15
98869	BH16358-2	4920-01-089-4516	4	
			11	5
98869	BH16365		7	49
98869	BH16365-1	4920-01-020-0538	7	
			11	2
98869	BH16367		9	27
98869	BH16367-3		9	
		4920-01-020-0539	12	13
98869	BH16700-12	4920-01-086-1474	2	
98869	BH16805		1	8
98869	BH16833	5330-01-021-9220	11	9
98869	BH17427	5970-01-020-9631	13	9
98869	BH1773	5905-00-660-7834	9	12
98869	BH17956-1	5340-01-097-8868	11	50
98869	BH17957	5340-01-114-0163	11	52
98869	BH18690-2	5905-01-019-7294	11	65
98869	BH18690-3	5905-01-019-7295	11	69
98869	BH274	5905-00-865-7319	9	21
98869	BH275	5905-00-865-7320	9	19
98869	BH2825	4920-00-877-3948	12	34
98869	BH3274	5905-00-865-7325	6	42
			7	27
98869	BH3506	4920-00-589-8409	10	13
98869	BH361-8	4920-00-329-8294	2	2
98869	BH405	4920-00-503-1889	2	3
98869	BH4098	5905-01-031-1399	7	28
98869	BH437	4920-00-734-8321	1	11
			10	7
98869	BH450	4920-00-503-1890	2	4
98869	BH4548	4920-00-953-2370	2	14
98869	BH472-2		11	10
98869	BH485	4920-00-548-7118	2	5
98869	BH492B3	4920-00-767-2672	2	6
98869	BH499A	6150-00-941-6503	2	7
98869	BH5007	5905-00-312-3806	5	41
98869	BH5058	5905-01-031-0430	7	25
98869	BH5070	5905-00-978-4272	7	24
98869	BH581-1	5330-00-914-1916	12	36
			12	39
98869	BH585	4920-01-086-1464	10	1A
98869	BH6510	6625-00-948-1646	12	37
98869	BH6522	5330-00-165-1905	11	59
98869	BH6551	4920-01-086-1471	10	18
98869	BH6554	4920-01-086-1470	10	17
98869	BH6555		11	86

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FSCM	PART NUMBER	STOCK NUMBER	FIG.	ITEM
98869	BH723	5365-01-032-7243	10	6
98869	BH727	4920-00-565-3702	10	4
98869	BH760-1		1	6
98869	BH796	4920-00-565-3710	10	5
98869	BH799	5340-01-032-8106	12	63
98869	BH820	4920-00-204-6457	2	8
98869	BH821	4920-00-549-6093	2	9
98869	BH822	4920-00-539-9260	2	10
98869	BH823	4920-00-504-3192	2	11
98869	BH834-1	4920-01-086-1468	10	9
09728	BH834-2	5340-00-477-0807	10	11
98869	BH835	4920-00-565-3714	10	15
98869	BH9020P	5935-00-228-4395	11	73
			12	40
98869	BH9030S		12	48
98869	BH9033P	5935-00-763-5630	12	55
98869	BH9039S	5935-00-763-5629	12	44
98869	BH9140S	5935-00-456-4719	11	77
98869	BH9385P	5935-01-021-4609	11	81
98869	BH9385S	5935-01-021-5493	12	59
98869	BH996-40	4920-00-670-9379	2	12
24454	B74143PS8	5330-00-576-9890	11	74
			12	43
94603	CA10006	4920-01-086-1467	11	66
84171	CCD470	5910-00-410-4178	5	50
			6	47
02735	CD4001AE		7	45
37942	CG872U020V2C3PL	5910-01-014-1212	3	1
81349	CK05BX220K		5	58
			6	46
81349	CK05BX221K		5	57A
81349	CK05BX222K		3	4
81349	CK06BX223K		8	28
81349	CK60BX100K	5910-00-983-5388	5	54
			6	52
81349	CR45U		7	38
56289	C023B501G103M		5	57
			6	53
98869	C05227	5930-01-021-5588	8	32
98869	C05228	5930-01-021-5587	8	30
98869	C05229	5930-01-021-5586	3	23
98869	C05230	5930-01-021-5584	3	39
98869	C05231	5930-01-021-4623	3	34
06928	C404-010		12	4
06928	C406-021	5935-01-022-9628	11	14
			12	3
03508	C45H	5961-00-877-5692	12	65
98869	C4600	5962-00-107-4893	5	38
			6	36
98869	C5218	5945-01-021-7183	12	28
98869	C5225	5930-01-021-5589	9	18

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98869	C933	5961-00-405-8427	3	16
			5	2
			6	11
			7	13
			8	26
82647	D6756-1-1-2		11	25
71400	FHN23W		12	53
81348	GGT318TYPE2	6685-00-243-9963	1	13
88818	G193-064-001		5	53
			6	51
02799	H-1022		6	35
98869	H122		1	14
			10	1
98869	H3318	5905-01-034-4262	9	11
98869	H3394		9	4
98869	H3395	5905-00-865-8932	9	2
98869	H3440	5905-00-921-4039	8	34
98869	H3447	5905-00-921-4020	6	7
98869	H3470	5905-00-689-2926	6	41
98869	H3485	5905-01-030-9139	6	20
98869	H3493	5905-01-097-4612	9	20
98869	H3515	5905-01-017-4859	6	58
98869	H3522	5905-01-015-5643	9	3
98869	H3524	5905-01-033-0007	5	59
			6	55
98869	H3536		5	1
98869	H3564	5905-00-422-5217	6	15
98869	H3627	5905-01-031-1401	5	68
			6	8
98869	H3674	5905-01-031-0432	5	28
			7	19
			8	43
98869	H3697		5	27
98869	H3783	5905-01-037-3380	5	17
98869	H3784		5	18
98869	H3828	5905-01-030-9147	5	49
98869	H3895	5905-01-031-1398	5	4
98869	H3905		5	6
98869	H5600P- 56	5905-01-028-7911	11	58
81349	JAN1N3613	5961-00-059-2904	8	20
81349	JAN1N4461	5961-00-365-6459	7	40
			8	27
81349	JAN1N4471	5961-00-231-3169	8	23
81349	JAN1N4486	5961-01-197-5920	8	19
81349	JAN1N5524B	5961-01-042-0416	3	50
81349	JAN1N914	5961-00-842-9864	5	52
			7	16
			8	1
71400	KAW20		12	52
			13	6
27014	LM725AN/6838		8	36

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81349	LT10K144	5950-00-470-4200	5	65
			6	63
			7	1
04713	MC4350L		4	4
21207	MMF504K2	5910-00-405-8395	3	38
			7	31
96906	MS18212-5	5305-00-922-3506	3	25
96906	MS20253-2-2400		13	2
96906	MS20659-104	5940-00-107-1481	12	5
96906	MS21044C08	5310-00-982-6814	11	11
			13	10
96906	MS21044N04	5310-00-088-0551	12	42A
			12	46A
			12	50A
			12	57A
			12	61A
			13	4A
			13	7A
			13	13A
			13	15A
			13	17A
96906	MS21044N06	5310-00-081-8087	12	29
			12	33A
96906	MS21044N3	5310-00-877-5797	11	40
96906	MS21318-1		1	7
			1	9
96906	MS25043-12DA	5935-00-238-6419	11	72
			12	41
96906	MS25043-14D	5935-00-137-4669	11	76
			12	49
96906	MS25043-16D	5935-00-137-4671	12	56
96906	MS25043-20C		12	45
96906	MS27183-4	5310-00-950-1310	13	17B
96906	MS3181-14C	5935-00-899-9361	11	80
			12	60
96906	MS35059-23	5930-00-655-1582	12	22
96906	MS35059-24	5930-00-636-2821	11	41
96906	MS35206-208		11	13A
96906	MS35275-206	5305-00-941-6402	11	13B
96906	MS35308-341	5306-00-080-0680	10	3
96906	MS35333-72	5310-00-543-2739	11	51A
96906	MS35426-15	5310-00-063-6717	10	2
96906	MS35649-224	5310-00-938-2013	3	26
96906	MS51957-14	5305-00-054-5648	11	27
96906	MS51957-17	5305-00-054-5651	12	1
96906	MS51957-2	5305-00-054-5636	11	18
96906	MS51957-21	5305-00-054-5655	13	7
			13	13
96906	MS51957-27	5305-00-054-6651	10	12
96906	MS51957-28	5305-00-054-6652	11	21
			11	89

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96906	MS51957-3	5305-00-054-5637	3	55
96906	MS51957-43	5305-00-054-6668	11	51
96906	MS51957-47	5305-00-054-6672	12	31
96906	MS51957-5	5305-00-054-5639	9	23
			12	11
96906	MS51957-63	5305-00-050-9229	10	10
96906	MS51957-65	5305-00-050-9231	10	16
96906	MS51958-61	5305-00-059-3657	1	12
			10	8
96906	MS51959-45	5305-00-764-0068	11	85
96906	MS51960-62	5305-00-059-5433	3	2
96906	MS51960-63	5305-00-071-1320	12	64
96906	MS77066-2	5940-00-816-6103	12	29A
81349	M38510/00104BCB	5962-00-318-2223	5	12
			6	62
81349	M38510/00204BEB	5962-00-369-7730	5	61
			6	60
81349	M38510/00205BCB	5962-00-348-2541	5	13
			6	56
81349	M38510/00401BCB	5962-00-369- 7607	5	63
			6	59
81349	M38510/05003BCA		7	32
81349	M38510/05101BCA		7	35
81349	M38510/05605BCB	5962-01-029-2899	7	47
81349	M38510/10101BGC	5962-00-167-6330	3	17
			5	46
			6	25
			7	7
			8	5
81349	M38510/10103BGB		7	4
81349	M39003/01-2966	5910-00-007-2001	5	35
81349	M39003/01-2969	5910-00-010-8240	6	14
			8	31
81349	M39003/01-2979	5910-00-192-7180	3	32
81349	M39003/01-2991	5910-00-007-3974	8	24
81349	M39003/01-3024	5910-00-144-4381	7	14
81349	M39003/01-3026	5910-00-144-4383	3	49
			5	64
			6	12
			7	3
81349	M39003/01-3076	5910-00-495-0042	8	33
81349	M39014/01-1329		7	2
81349	M39014/01-1351	5910-00-113-5276	5	44
81349	M39014/01-1357	5910-00-010-8666	5	5
			6	4
			6	28
			7	9
81349	M39014/01-1575	5910-00-124-0659	3	43
			8	10
81349	M39014/02-1338	5910-00-010-8718	4	3
			7	34

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81349	M39015/1-C03PP	5905-00-101-1630	9	6
81349	M5423-09-02	5930-00-823-0482	11	17
			12	9
			12	14
			12	23
			12	26
81349	M55155/32-6	5940-00-939-7842	3	7
97539	N-9030-B-1/4		11	42
29907	NMF-K-F	5935-01-021-5433	7	18
29907	NMP-CHAL-F	5935-01-021-5433	3	22
04157	NMP-CHAL-M	5935-01-021-5435	3	21
			5	24
04157	NMP-COCO-F	5935-01-021-5437	11	14A
04157	NMP-COCO-M	5935-01-021-4605	3	20
97539	N9030-1-4	5930-00-823-0482	11	64
			12	21
53507	R-1003-A-2	5999-01-022-2226	4	12
			5	25
			6	30
			7	37
81349	RCR07G106JS	5905-00-121-9919	7	46
			8	35
81349	RCR07G226JS	5905-00-126-6703	5	26
			6	54
			8	45
81349	RCR20G271JS	5905-00-114-5407	3	45
81349	RCR20G331JS	5905-00-104-8334	8	21
98869	RH24765-1	4920-01-223-3758	11	70
81349	RLR07C1000GR		3	42
81349	RLR07C1001GS	5905-01-085-1164	3	13
81349	RLR07C1004GS	5905-01-157-5612	7	8
81349	RLR07C1501GS	5905-01-148-6092	3	5
81349	RLR07C1502GR		7	36
			8	18
81349	RLR07C1503GR		7	10
81349	RLR07C1802GR		5	15
81349	RLR07C2201GS	5905-01-151-1186	3	35
			5	7
			6	1
			8	3
81349	RLR07C2202GR		3	48
81349	RLR07C2203GS		8	47
81349	RLR07C2700GS	5905-01-137-0108	4	11
81349	RLR07C2702GS		5	37
			6	49
81349	RLR07C3303GR		6	27
81349	RLR07C3902GR	5905-00-150-5256	3	47
			8	2
81349	RLR07C47R0GS	5905-01-053-5788	5	42
			6	5
81349	RLR07C4700GS	5905-01-157-5608	3	19

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81349	RLR07C4700GS	5905-01-157-5608	5	29
			6	13
			8	46
81349	RLR07C4701GS		3	12
			4	9
			5	8
			6	2
			8	44
81349	RLR07C4702GS	5905-01-137-0109	5	30
			6	50
			7	44
81349	RLR07C5601GR		3	46
81349	RLR07C6801GR		3	58
81349	RNC55H1000FS	5905-00-828-2416	9	25
81349	RNC55K1001FS	5905-00-432-0381	8	25
81349	RNC55K1002FS	5905-00-479-3990	3	10
81349	RNC55K1003FS	5905-00-208-4293	5	55
			6	22
81349	RNC55K2002FS		7	6
81349	RNC55K5761FS	5905-00-264-4148	3	52
81349	RNC55K6650FS	5905-00-721-3732	7	48
81349	RNC55K6811FS	5905-00-451-7275	9	24
81349	RNC55K6980FS	5905-00-258-5413	5	3
81349	RNC55K6981FS	5905-00-236-6632	3	14
81349	RNC55K7870FS	5905-00-273-9829	5	36
			6	10
			7	12
81349	RNC55K8060FS	5905-00-432-0429	3	15
81349	RNC60K4643FS	5905-00-305-6121	6	17
81349	RN55D3321F		3	57
91637	RS-1A12-1W		9	10
91637	RS-1A15-1W		9	26
91637	RS-1A22-1W		9	14
91637	RS-1A30-1W		9	16
91637	RS-1A35-1W		9	15
91637	RS-1A45-1W		9	17
91637	RS-1A7-1W		9	9
81349	RT12C2P100	5905-00-926-2826	9	7
81349	RT12C2P101	5905-01-085-8973	9	5
81349	RW69V360	5905-00-994-7137	7	41
78046	R116	5340-00-956-5067	13	16
97539	SEELSKREWR10-32X 1-2		11	1
97539	SEELSKREWR4-40-3 -8	5305-00-855-2996	11	19
			13	17
97539	SEELSKREWR4-40-5 -16	5305-00-051-6719	11	61
			13	4
97539	SEELSKREWR4-40X3 -4	5305-00-993-9268	13	15

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97539	SEELSKREWR4-40X7-16	5305-00-965-5944	11	30A
97539	SEELSKREWR6-32-1-2	5305-00-798-0862	1	3
			12	33
			12	54
97539	SEELSKREWR8-32X1-2	5305-00-956-4470	11	24
			11	53
97539	SEELSKREWR8-32X5-8	5305-00-455-2638	11	23
97539	SEELSKREWS440X1-2		11	75
			11	79
			11	83
			12	35
			12	38
			12	42
			12	46
			12	50
			12	57
			12	61
81349	SE23XC02	5940-00-926-0015	8	48
04713	SM5365	5961-00-905-8536	5	9
			6	48
01295	SNC5490AJ		4	1
01295	SN5442N		5	10
21604	SSN-70-2 SHORT BLACK	5355-01-096-2471	11	62
21604	SSN70-2	5355-00-340-5152	11	62A
			12	19
			12	24
21604	SS70BL2BLK	5355-00-403-1590	11	15
			12	7
			12	12
37942	TCG122U050N2C3P	5910-01-021-7661	3	11
37942	TCG412U015N1L	5910-01-016-0112	3	53
01295	TIL111	5961-00-098-8032	6	19
37942	TT50X150B		3	33
04386	TZ-17XT	5950-01-021-6987	8	8
18677	US-2-14-160-G-B		4	2
			4	8
			5	12A
			6	57
			7	33
18677	US-2-16-160-G-B	5935-01-065-9763	4	5
			5	11
			5	62
			6	61
12697	VC3D-1K		8	16
80031	1-4-5P10K		3	44

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80031	1-4-5P10K		5	51
			6	29
			7	11
			8	13
80031	1-4-5P100E		6	16
80031	1-4-5P100K		3	41
80031	1-4-5P3K3		8	9
80031	1-4-5P470K		3	40
80131	1N5059	5961-00-088-8792	3	9
			7	42
			8	17
			12	27
80131	1N5624		3	6
80131	1N702A	5961-00-846-9125	3	37
			5	14
			8	4
04713	1N914	5961-00-842-9864	6	23
77820	10-36675-16	5330-00-292-3958	12	58
77820	10-36675-20	5330-00-599-9126	12	47
18876	10015417-054	5910-00-280-8393	8	14
20747	101-127-104	5905-00-174-0346	6	37
99832	101197	5925-00-283-6513	12	30
14752	112A1C104J	5910-00-409-3049	5	43
			6	21
81073	12C1087	5310-00-637-4885	12	10
			12	15
75915	123002	5999-00-151-4035	13	3
71279	1291-1	5340-00-186-9481	11	84
71785	133-98-92-061		5	47
			6	26
			7	5
83330	1415-4		11	26
70485	165A	5340-00-266-0754	11	12
55974	1945708-2	5999-00-402-2485	5	40
			6	36B
80131	2N3646	5961-00-062-3133	8	29
80131	2N4352	5961-00-929-4951	6	33
80131	2N4402	5961-00-450-3040	3	28
			5	16
			6	24
04713	2N4852	5961-00-118-4775	5	66
			6	9
			8	49
01295	2N4861		5	60
			6	44
07263	2N4945	5961-00-459-2038	3	3
80131	2N5294	5961-00-039-8814	3	31
80131	2N6109	5961-01-012-9316	3	24
80131	2N6290	5961-01-013-0081	3	29
80131	2N6336	5961-01-016-2782	8	11
88245	2024B		4	14

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70485	21	5340-01-021-4103	13	14
52599	249E500M90	5905-01-112-0117	9	8
72619	250-1471-500	6210-00-470-7602	11	43
			12	16
72619	250-1473-500	6210-01-018-7376	11	46
72619	250-8758-33-504	6210-00-244-1994	11	45
			11	48
			12	18
56232	284202	5310-00-840-8342	13	10A
81073	30-252 RED	5930-01-021-5594	11	71
71279	3422-1-03	5935-00-988-6438	7	22
13499	352-0840-012	5961-00-496-4643	6	34
04618	35316		12	6
80294	3540-S-1-101	5905-01-022-0134	12	25
80294	3540-S-1-203	5905-01-021-6816	12	20
56289	36D132G050AA2A	5910-00-836-6258	3	51
04454	3800P202	5905-00-229-7391	5	48
			6	45
			7	29
04454	3800P203	5905-00-189-2380	5	32
			6	31
			8	40
02660	3800P502		5	33
			6	38
		5905-00-168-9287	7	20
			8	41
13499	381-0003-100	5905-00-974-6426	6	43
04454	3811P100	5905-01-027-3536	7	26
05591	4H8A14402B	5905-00-099-9682	5	69
05591	4H8A14630B		5	21
05591	4H8A16302B	5905-00-099-9683	8	39
05591	4H8A19301B		7	30
05591	4H8A22001B		6	64
05591	4H8A2300B		5	67
			6	6
			8	37
05591	4H8A23180B	5905-00-099-9690	5	19
05591	4H8A23790B		5	20
05591	4H8A30000B	5905-00-412-1212	5	22
			6	40
05591	4H8A3802B	5905-00-415-6576	6	65
05591	4H8A40001B	5905-00-101-1838	8	38
82389	430	5935-00-411-7929	5	31
			6	32
			7	21
71279	461-2871-01-03-1 2	5935-01-021-7728	7	23
63743	5XM225		9	1
56289	500D207G050FF7	5910-00-499-7435	3	8
			7	43
			8	22

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72619	507-5821-0747-60 0	6240-00-924-6435	11	47
72619	507-5824-0747-60 0	6240-00-924-6438	11	44
			12	17
50436	5082-7650		4	7
79136	5100-62	5365-00-298-6563	10	14
86928	5203-8	5970-01-095-6353	8	12
12697	53C3-50K	5905-01-084-9946	11	63
94271	533-00HS250K	5905-01-021-6818	5	45
			6	39
86928	5610-9-10	5970-01-020-0877	3	56
14752	625C1C105J	5910-00-211-1976	5	56
			6	18
			7	15
14752	637B1D563K		8	15
81073	71BY23196-1-2N	5930-01-022-2061	9	13
71785	8-ICS		3	18
			8	6
91506	8000-AG9		7	39
94271	830P-50K	5905-00-107-4872	5	34
18876	8528783	5330-00-355-8976	11	78
			11	82
			12	51
			12	62
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☆ U.S.GOVERNMENT PRINTING OFFICE : 1988 O - 201-421 (80008)

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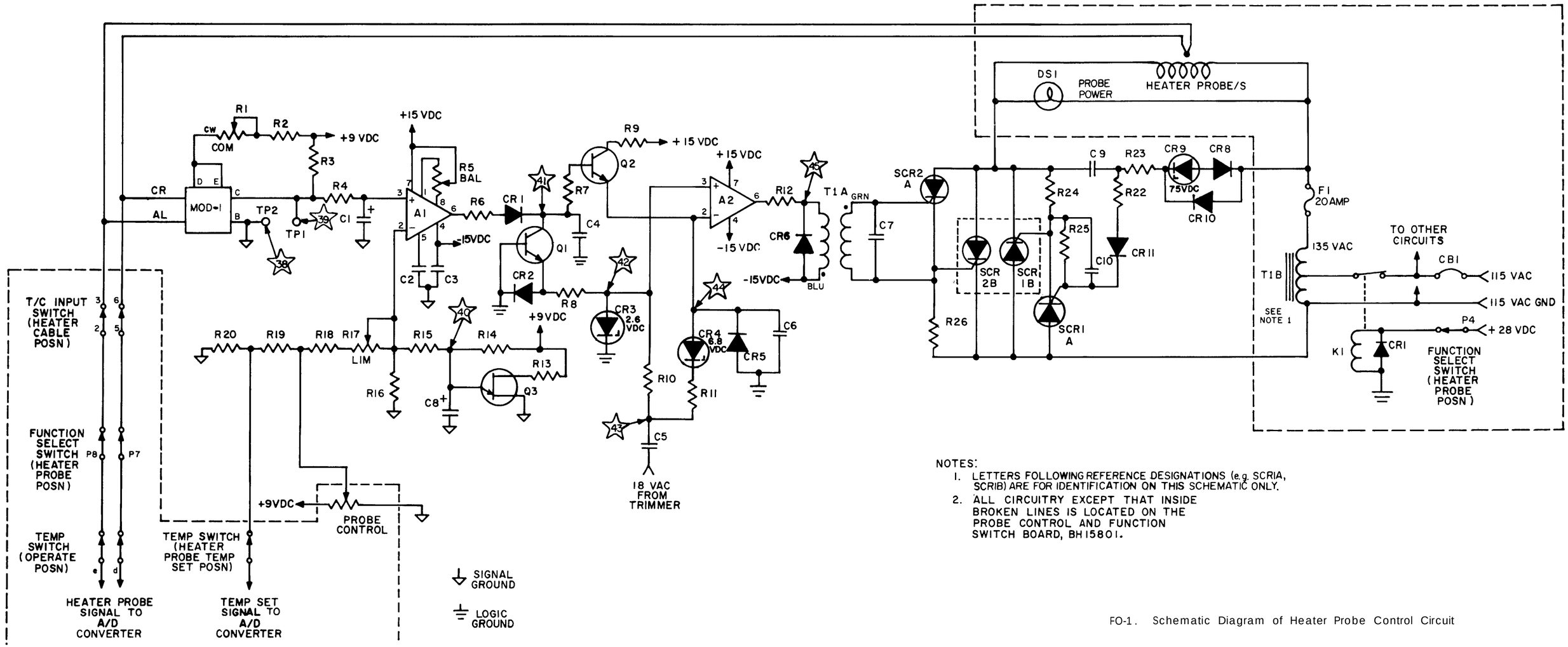
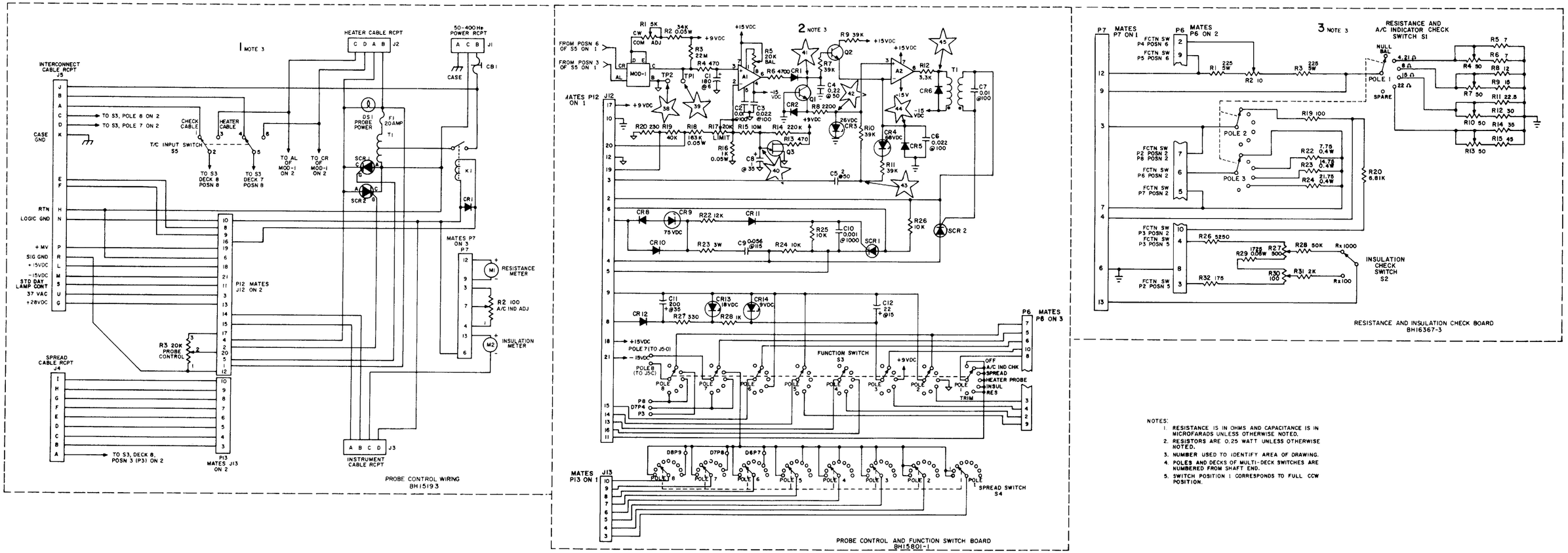


NOTES:

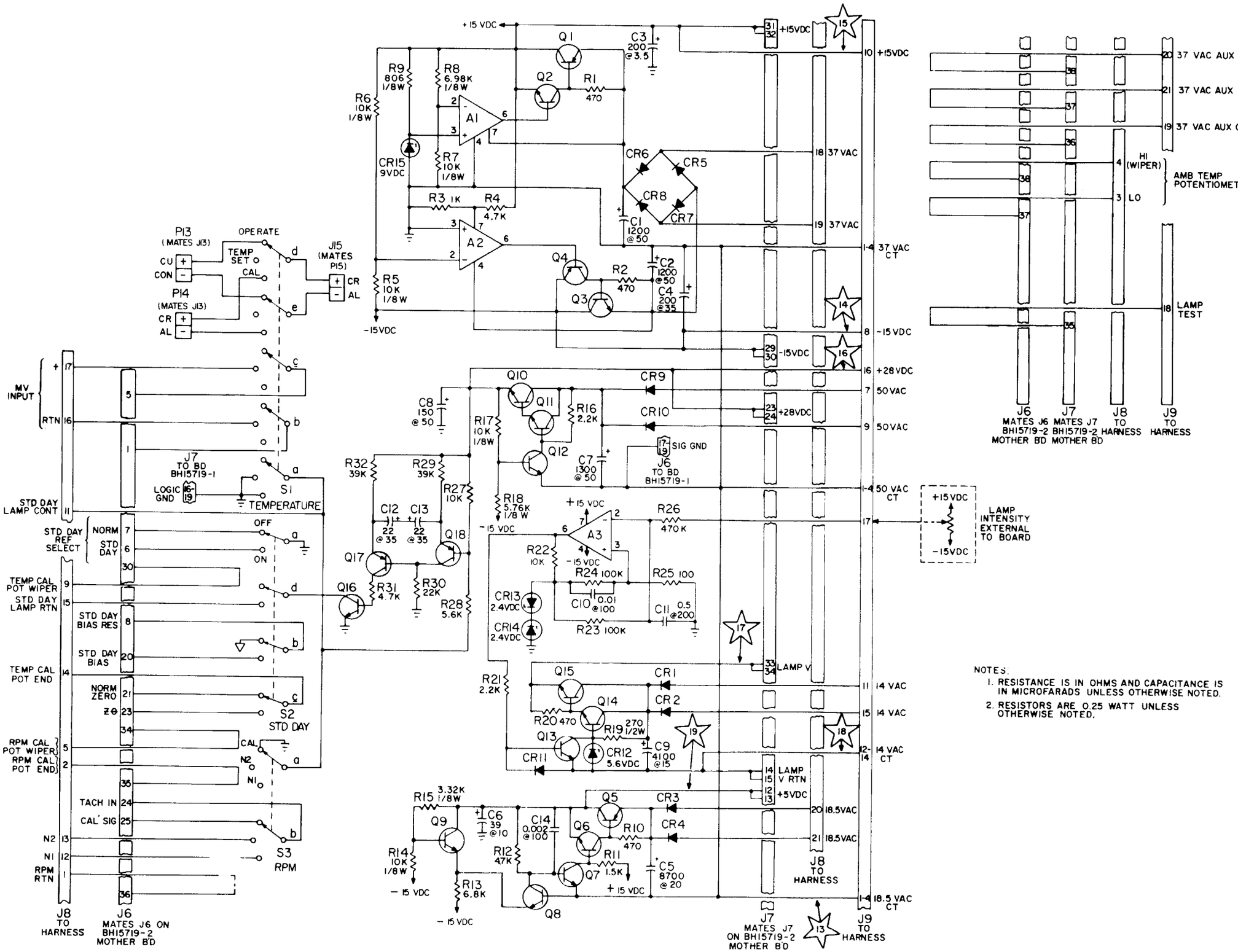
1. LETTERS FOLLOWING REFERENCE DESIGNATIONS (e.g. SCR1A, SCR1B) ARE FOR IDENTIFICATION ON THIS SCHEMATIC ONLY.
2. ALL CIRCUITRY EXCEPT THAT INSIDE BROKEN LINES IS LOCATED ON THE PROBE CONTROL AND FUNCTION SWITCH BOARD, BH15801.

FO-1. Schematic Diagram of Heater Probe Control Circuit



NOTES:
1. RESISTANCE IS IN OHMS AND CAPACITANCE IS IN MICROFARADS UNLESS OTHERWISE NOTED.
2. RESISTORS ARE 0.25 WATT UNLESS OTHERWISE NOTED.
3. NUMBER USED TO IDENTIFY AREA OF DRAWING.
4. POLES AND DECKS OF MULTI-DECK SWITCHES ARE NUMBERED FROM SHAFT END.
5. SWITCH POSITION 1 CORRESPONDS TO FULL CCW POSITION.

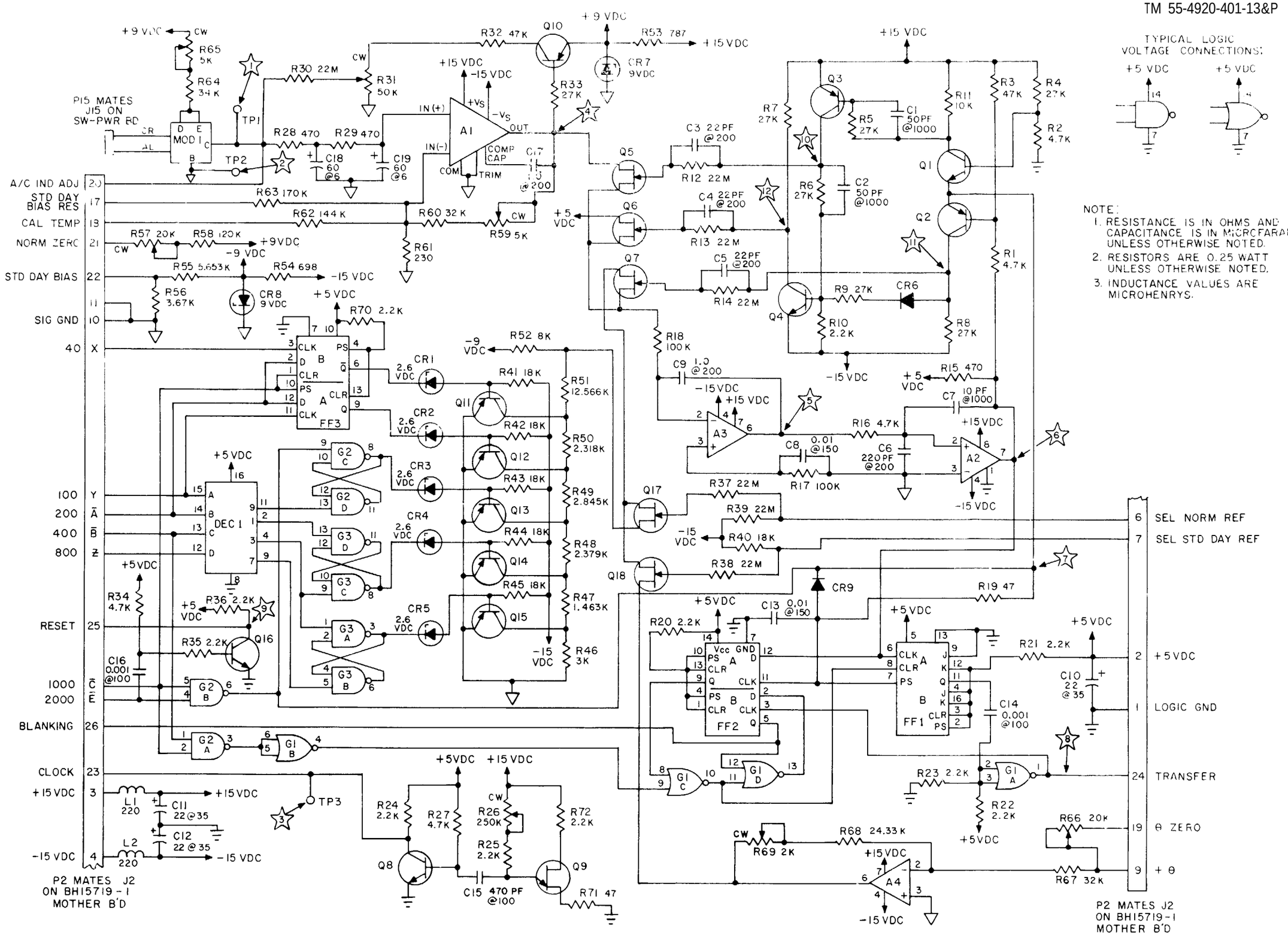
FO-2. Probe Controller Assembly, BH15194A-4, Schematic



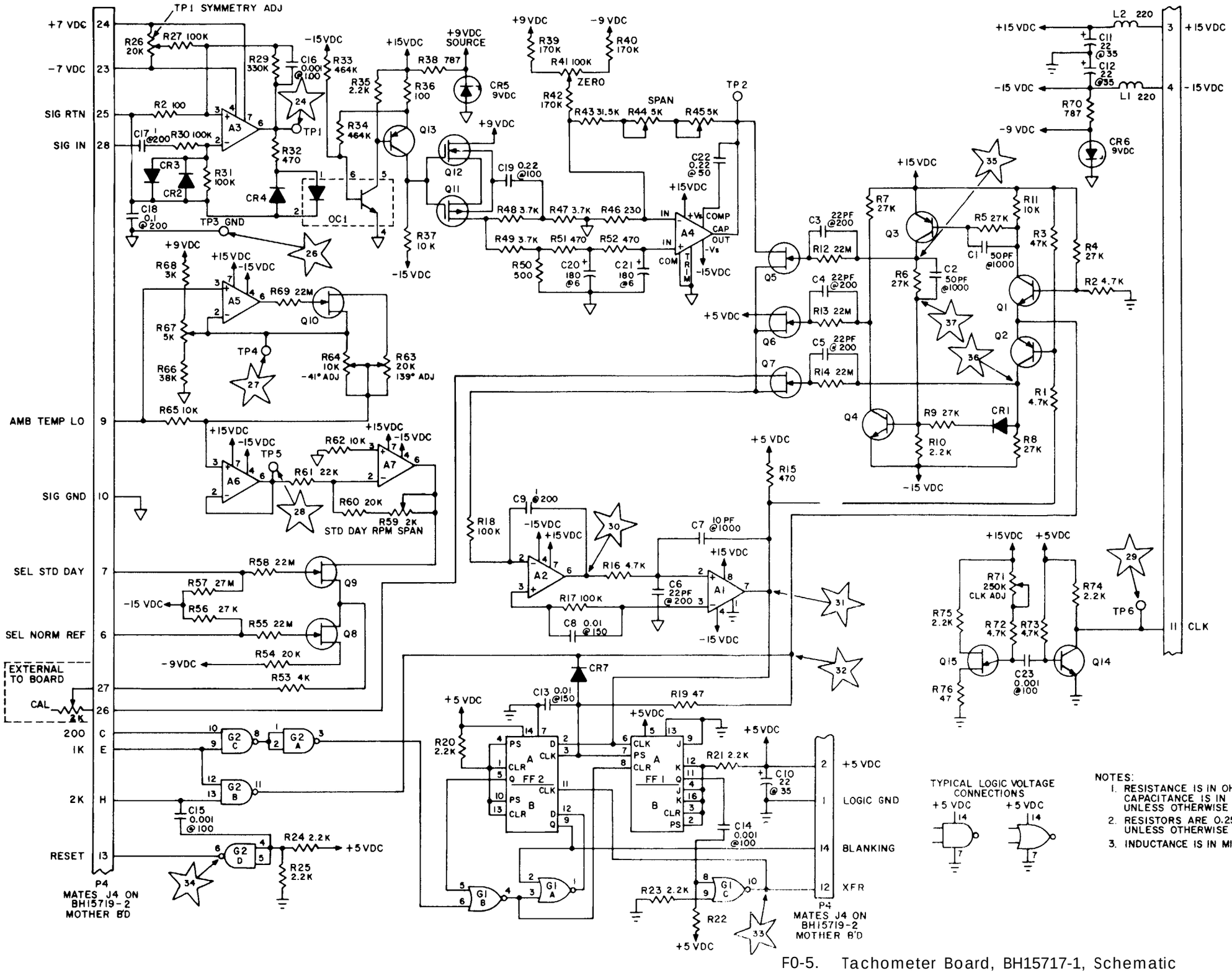
NOTES:

1. RESISTANCE IS IN OHMS AND CAPACITANCE IS IN MICROFARADS UNLESS OTHERWISE NOTED.
2. RESISTORS ARE 0.25 WATT UNLESS OTHERWISE NOTED.

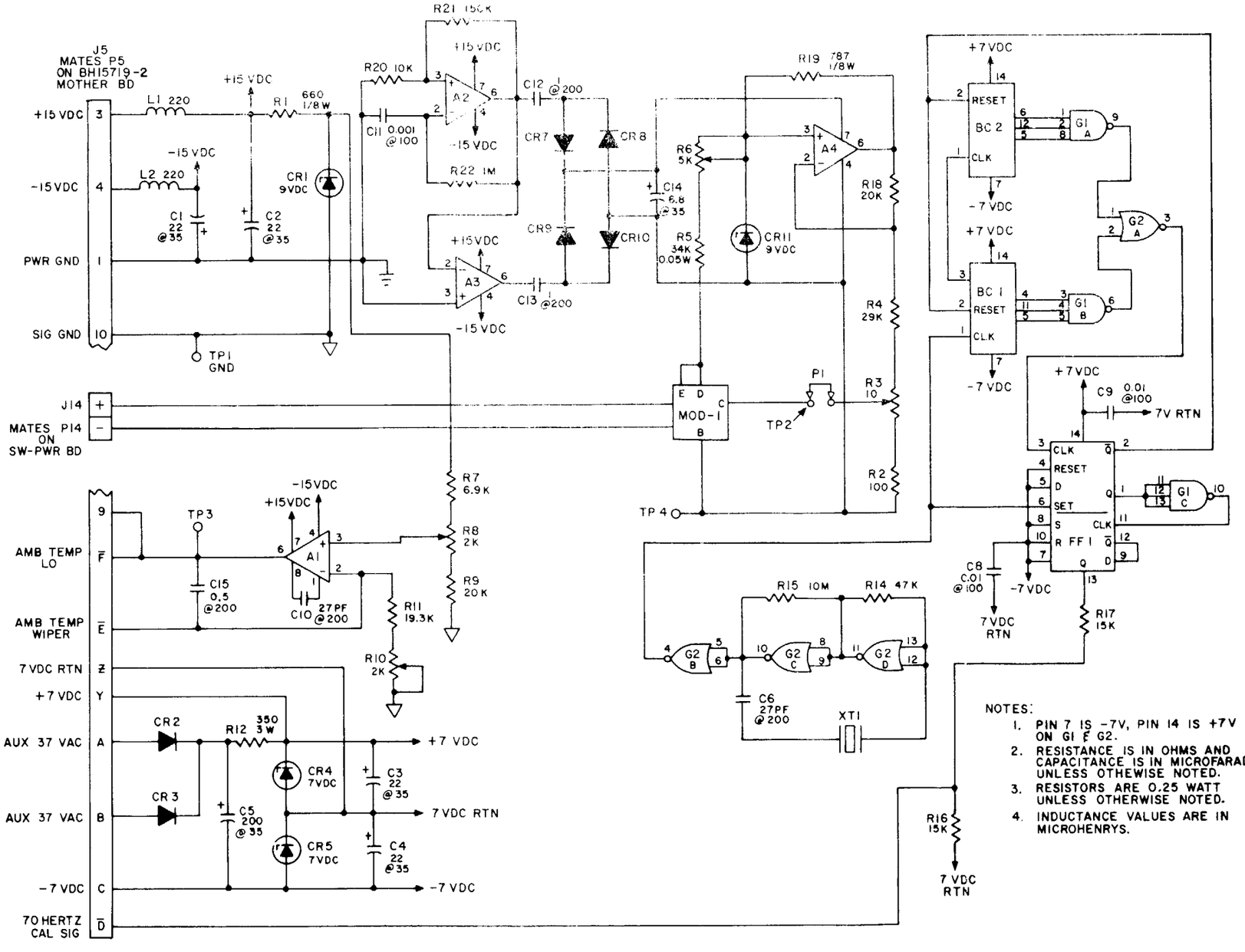
F0-3. Switch-Power Board, BH15720-3, Schematic



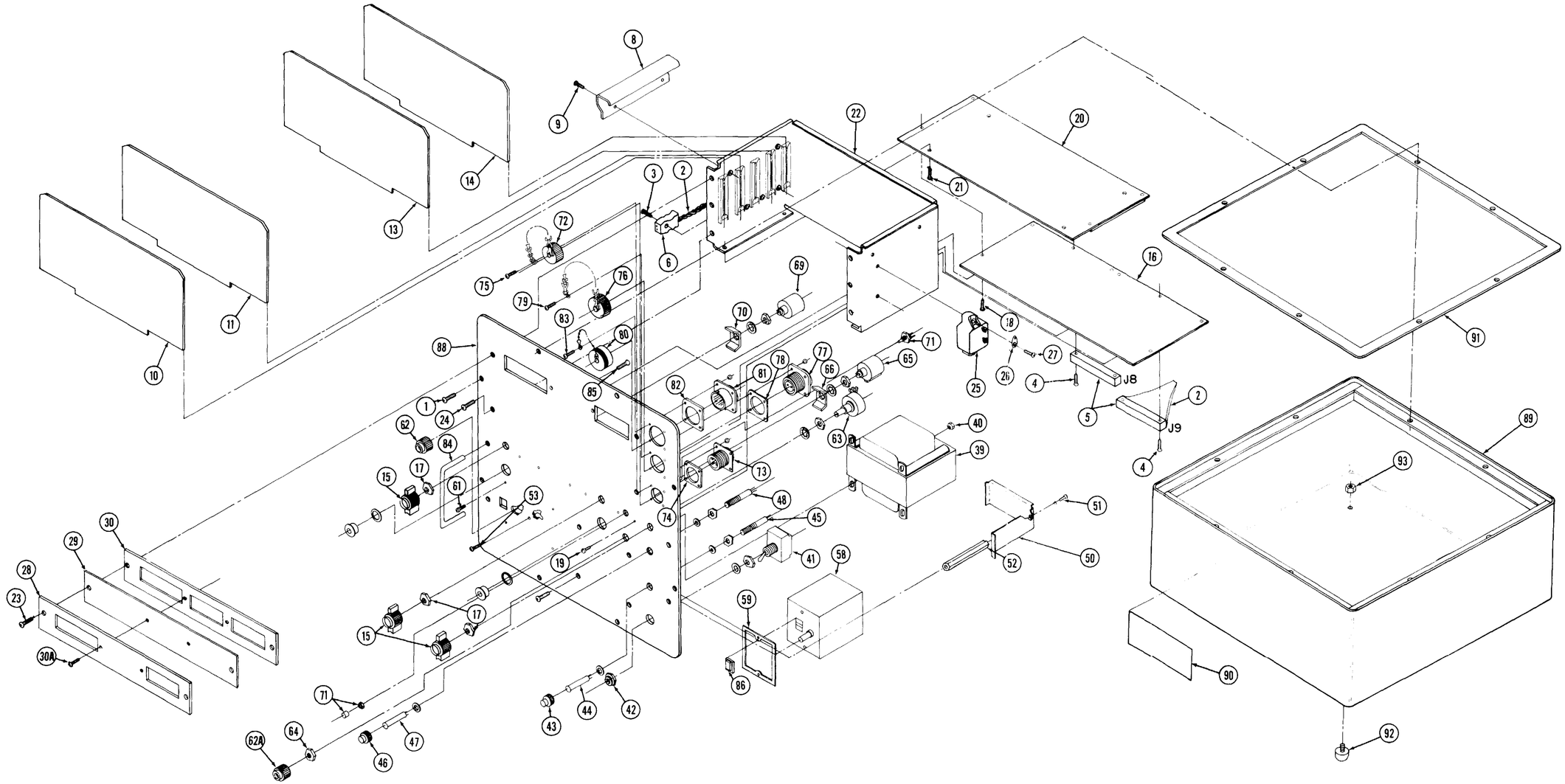
FO-4. Temperature Board, BH15715-1 , Schematic



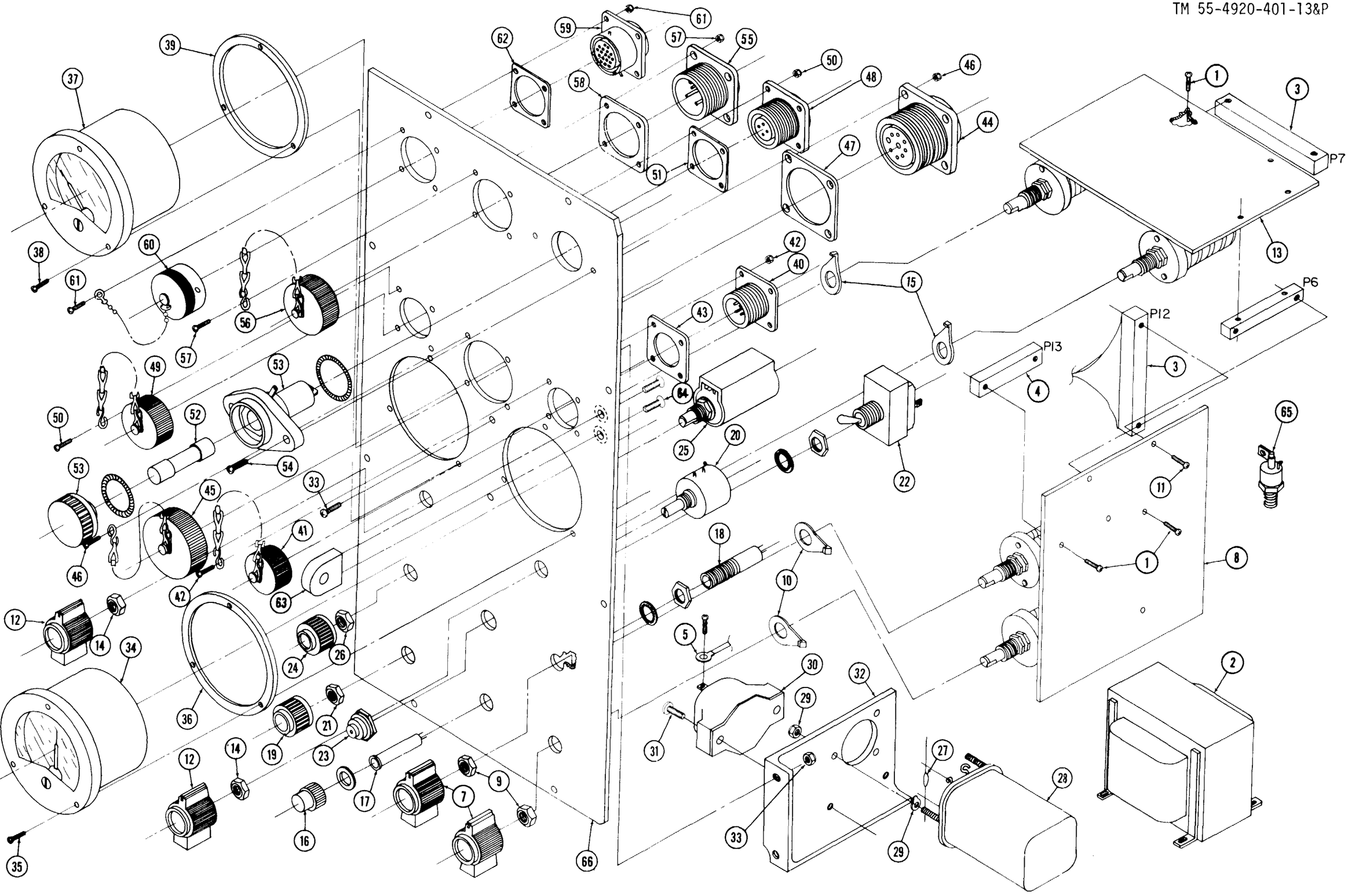
F0-5. Tachometer Board, BH15717-1, Schematic



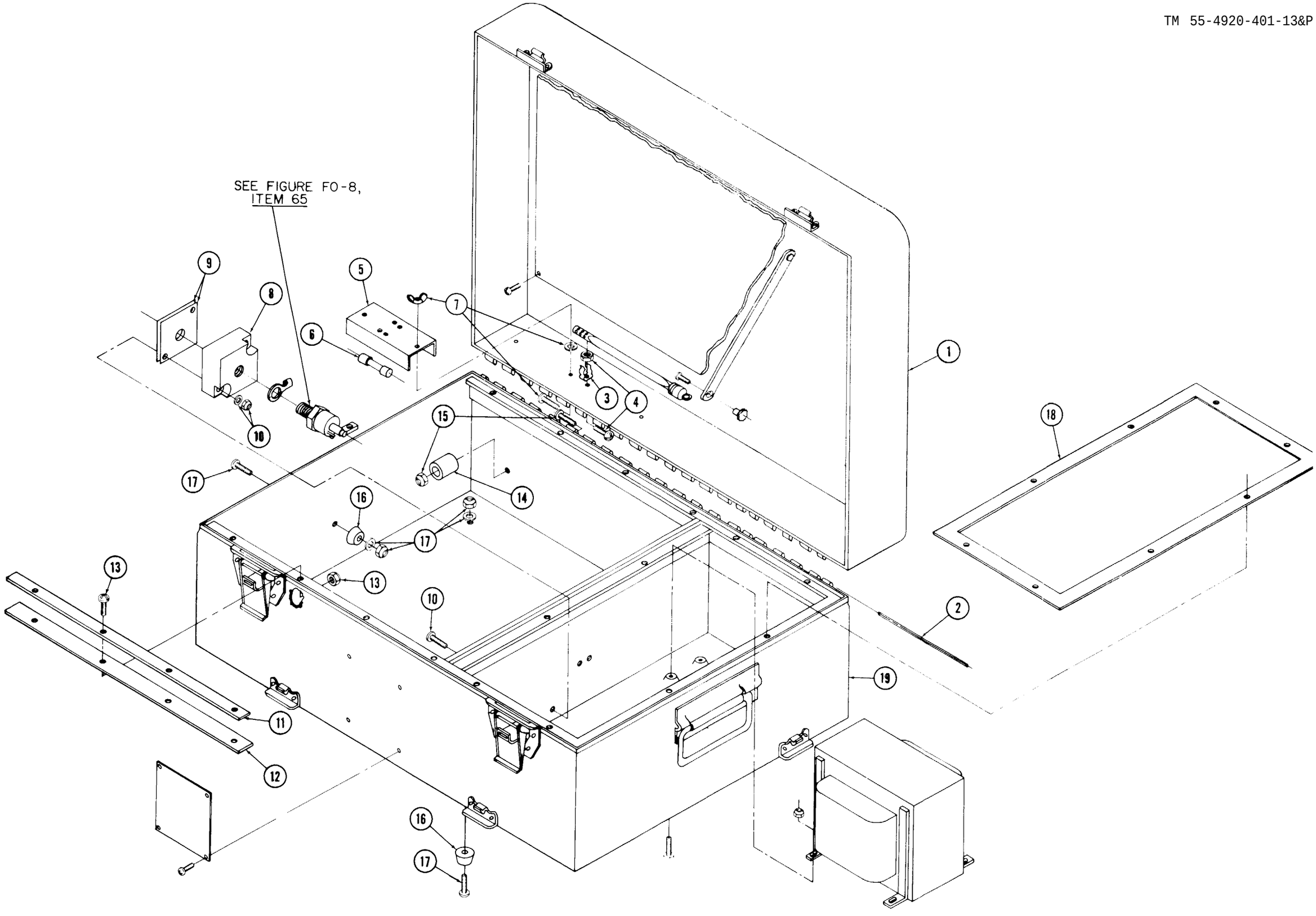
F0-6. Calibrator Board, BH16365-1, Schematic



FO-7. BH15195A-8 Trimmer Assembly



FO-8. BH15194A-4 Probe Controller Assembly



FO-9. BH15835-2 Instrument Case Assembly

By Order of the Secretary of the Army:

E. C. MEYER
General, United States Army
Chief of Staff

Official:

J. C. PENNINGTON
Major General, United States Army
The Adjutant General

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SOMETHING WRONG WITH THIS PUBLICATION?

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CDR, 1st Br, 65th ADA
ATTN: SP4 J. Brown
Key West, FL 33040

DATE SENT
10 Jun 79

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 9-1430-550-34-1	7 Sep 72 .	Unit of Radar Set AN/MPQ-50 Tested at the HFC

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
9-19		9-5	
21-2	step 1C	21-2	

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

"B" Ready Relay K11 is shown with two #9 contacts. That contact which is wired to pin 8 of relay K16 should be changed to contact #10.

Reads: Multimeter B indicates 600 K ohms to 9000 K ohms.

Change to read: Multimeter B indicates 600 K ohms minimum.

Reason. Circuit being checked could measure infinity. Multimeter can read above 9000 K ohms and still be correct.

SAMPLE

PRINTED NAME GRADE OR TITLE AND TELEPHONE NUMBER
SP4 J.T. Brown, Jr.

SIGN HERE
SP4 James Brown, Jr.

DA FORM 2 JUL 79 2028-2

REPLACES DA FORM 2028-2, 1 APR 78 WHICH WILL BE USED UNTIL EXHAUSTED
AMSAV M Overprint 3, 1 Mar 91

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS

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REVERSE OF DA FORM 2028-2 Reverse of DRSTS-M Overprint 2, 1 Nov 80

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U.S. ARMY AVIATION AND TROOP COMMAND
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4300 GOODFELLOW BOULEVARD
ST. LOUIS, MO 63120-1798

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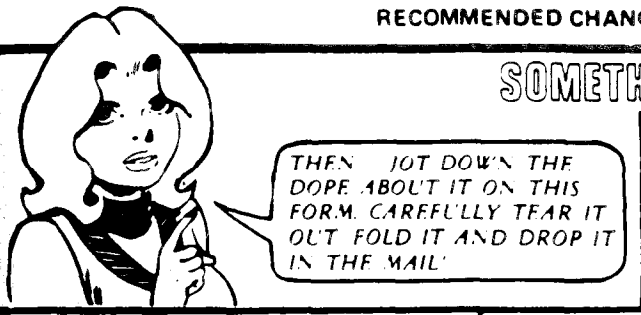

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PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 55-4920-401-13&P	17 NOV 79	OPERATOR'S, AVUM & AVIM MAINT MANUAL INCL RPSTL FOR TESTER, EXHAUST GAS TEMPERATURE

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PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO

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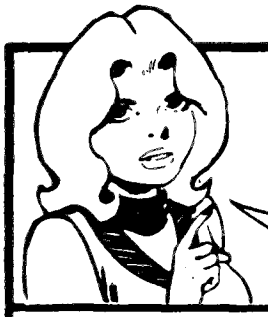

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The Metric System and Equivalents

Linear Measure

1 meter = 10 millimeters = . 39 inch
1 decimenter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = . 15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigrams = . 035 ounce
1 dekagram = 10 grams = . 35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = . 34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 38.82 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = . 155 sq. inch
1 sq. decimenter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = . 386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = . 06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
nches	centimeters	2.540	ounce-inches	newton-meters	.007062
eet	meters	.305	centimeters	inches	.394
ards	meters	.914	meters	feet	3.280
niles	kilometers	1.609	meters	yards	1.094
quare inches	square centimeters	6.451	kilometers	miles	.621
quare feet	square meters	.093	square centimeters	square inches	.155
quare yards	square meters	.836	square meters	square feet	10.764
quare miles	square kilometers	2.590	square meters	square yards	1.196
cres	square hectometers	.405	square kilometers	square miles	.386
ubic feet	cubic meters	.028	square hectometers	acres	2.471
ubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
luid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
ints	liters	.473	milliliters	fluid ounces	.034
uarts	liters	.946	liters	pints	2.113
allons	liters	3.785	liters	quarts	1.057
unces	grams	28.349	liters	gallons	.264
ounds	kilograms	.454	grams	ounces	.035
hort tons	metric tons	.907	kilograms	pounds	2.205
ound-feet	newton-meters	1.365	metric tons	short tons	1.102
ound-inches	newton-meters	.11375			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C