TO: ALL HOLDERS OF FUEL SYSTEM MODULE ASSEMBLY P5-2 OVERHAUL MANUAL, 28-23-02

REVISION NO. 3, DATED MAR 5/86

HIGHLIGHTS

DESCRIPTION OF CHANGE	TOPICS AFFECTED												
	D&O	D/Assy	Cleaning	Insp/Chk	Repair	Assy	F/C	Test	T/Shooting	S/Tools	Storage	IPL	L/Overhaul
Changed LEP-1 page to update page 703 date from Sep 10/79 to Sep 10/70													

FUEL SYSTEM MODULE ASSEMBLY P5-2

28-23-02

BOEING P/N 69-37312-21, -30

AIRLINE P/N

THE FOLLOWING DIRECTIVES APPLY TO THIS SUBJECT:

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVES	DATE DIRECTIVE INCORPORATED INTO TEXT
		PRR 31253	Sep 10/70
		PRR 31478	Sep 10/70
24-1014		PRR 31763	Sep 10/70

LIST OF EFFECTIVE PAGES

* Indicates pages revised, added or deleted in latest revision
F Indicates foldout pages - print one side only

	PAGE	DATE	PAGE	DATE	PAGE	DATE
	28-23-02					
	T-1	Sep 10/70	1101	Sep 10/70		
	T-2	BLANK	1102	Sep 10/70		
*	LEP-1	Mar 5/86	1103	Jul 5/83		
	LEP-2	BLANK	1104	Jul 5/79		
	T/C-1	Sep 10/70	1105	Jul 5/79		
	T/C-2	BLANK	1106	Jul 5/79		
	1	Jul 5/83				
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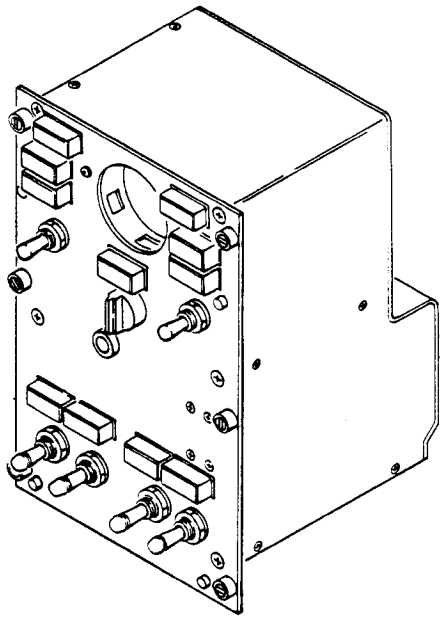
FUEL SYSTEM MODULE ASSEMBLY (P5-2)

Boeing Part Numbers: 69-37312-21 and -30



Fuel System Module Assembly (P5-2)
Figure 1

DESCRIPTION AND OPERATION

1. Description

CAUTION: THIS COMPONENT CONTAINS PARTS SUBJECT TO DAMAGE FROM ELECTROSTATIC DISCHARGE DURING HANDLING. HANDLE PER 20-12-02.

A. The fuel system module assembly consists of three printed circuit assemblies, a time delay switch, indicator lights, control switches, and a wire bundle assembly. The module assembly may be removed from the aircraft for inspection or repair by loosening the six quick-release fasteners on the baseplate and by disconnecting the primary power connectors.

2. Operation

A. The fuel system module assembly provides manual controls and monitoring devices for the fuel system. Visual indicators alert the crew of low fuel boost pump pressure. The module assembly contains manual switches controlling the fuel device system, and a position indicator for the fuel crossfeed and engine fuel shutoff valves.

3. Functional Description

A. General

(1) The indicator lamps receive power at pins 1 and require ground at pins 2, 3, or 4 to illuminate. Pins 4 are grounded such that the lamps will illuminate individually when pressed to test. Pins 3 are wired in common to P1-7 such that when P1-7 is grounded by master test actuation, all lamps illuminate. The master test input also actuates the master caution lamp through circuit card A3. The lamps perform their indicator function when pins 2 are grounded individually.

(2) Circuit card A4 contains two time delay units used to limit the relay hold-on time for the fuel heat valve switches. Circuit cards A1, A2, and A3 contain master caution circuitry, lamp dimming control, fuel boost pump logic to illuminate the master caution lamp when any two pumps in one tank indicate low pressure, and an 18-volt zener regulator to control card power supply transistor Q1.

(3) Refer to Subjects as follows for functional description of circuit cards:

(a) A1 and A2 - 31-36-60

(b) A3 - 31-56-59

(c) A4 - 28-09-60 or manufacturer's instructions if 2-462 card installed

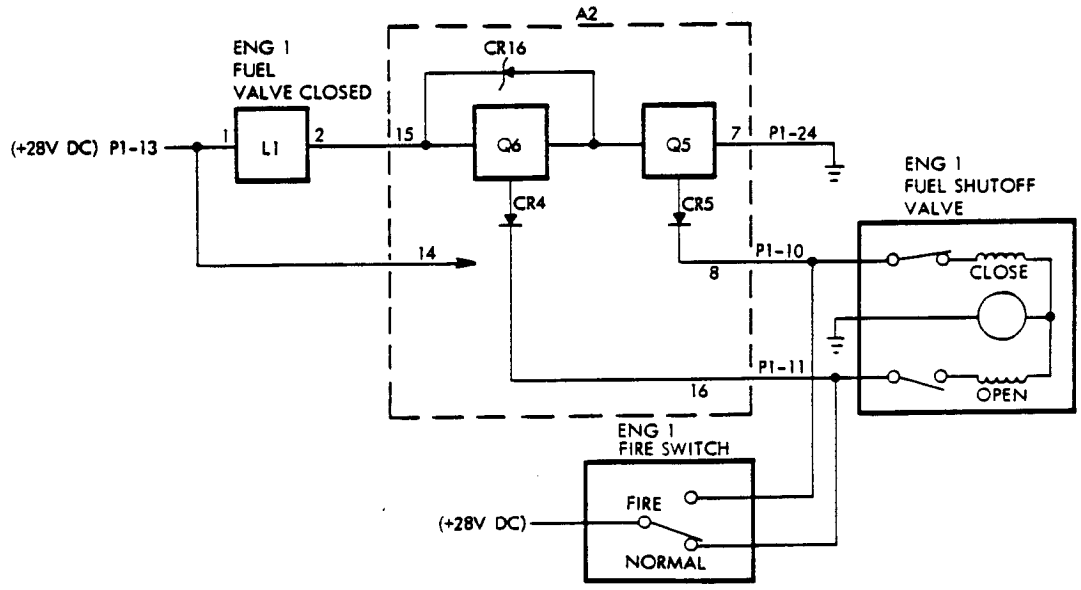
B. Indicator L1 (NO. 1 VALVE CLOSED) and indicator L2 (NO. 2 VALVE CLOSED) circuitry is similar and only the L1 circuit will be discussed. Indicator L1 indicates the position of the engine No. 1 fuel shutoff valve. When the valve is open L1 is extinguished and when the valve is closed L1 is dimly illuminated. When the valve is in travel between open and closed or vice versa L1 is brightly illuminated.

(1) With +28 volts dc supplied to pin P1-13, pin P1-24 grounded and neither of pins P1-10 or P1-11 grounded, Q5 and Q6 are turned on and L1 is illuminated bright. Grounding pin P1-11 turns off Q6, CR16 introduces a drop of approximately 9 volts in the L1 ground path, and L1 is illuminated dim. Grounding pin P1-10 turns off Q5 and L1 is extinguished.

(2) With the fire switch in "NORMAL" position and the fuel shutoff valve open, pin P1-10 is grounded through the valve close limit switch and winding, Q5 is off, and L1 is extinguished.

(3) When the fire switch is set to "FIRE" +28 volts dc is connected to the fuel shutoff valve close limit switch, the close winding and pin P1-10. Back emf voltage from the valve open winding is connected to pin P1-11 through the open limit switch. Q5 and Q6 are turned on and L1 is illuminated bright. When the fuel shutoff valve reaches the end of travel, the close limit switch opens. Pin P1-11 is grounded through the valve open limit switch and winding, Q6 is turned off, and L1 is illuminated dim.

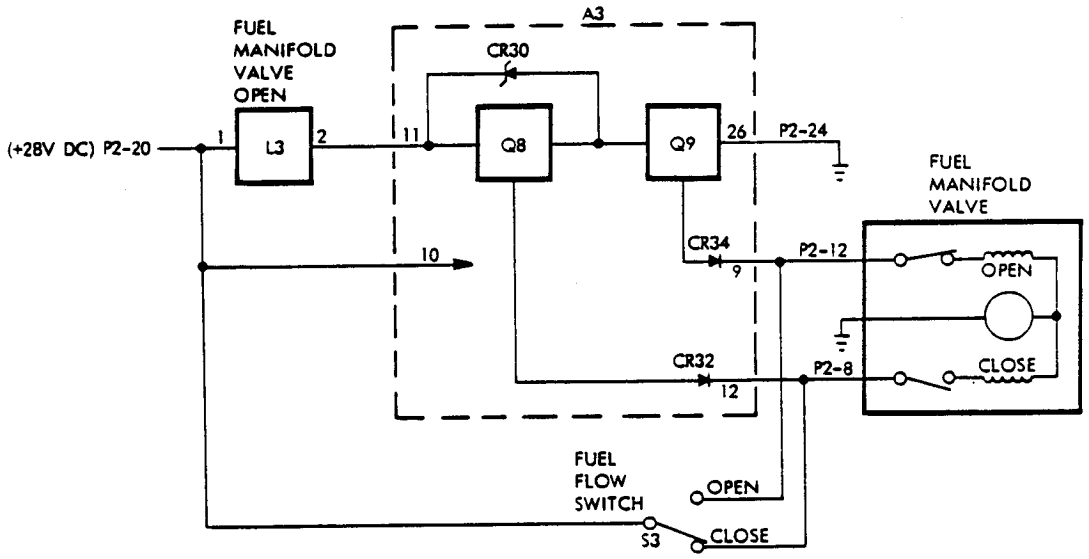
(4) When the fire switch is again set to "NORMAL" the lamp is illuminated bright until the valve reaches end of travel, the open limit switch opens, pin P1-10 is grounded through the valve close limit switch and winding, Q5 is turned off, and L1 is extinguished.



Engine 1 Fuel Shutoff Indicator Lamp Circuitry
Figure 2

C. Indicator L3 (FUEL MANIFOLD VALVE OPEN)

(1) Indicator L3 operates the same as indicators L1 and L2, paragraph 3.B., and in addition module switch S3 (FUEL FLOW) supplies power to open and close the external fuel crossfeed valve. (See figure 3.)



Fuel Manifold Valve Indicator Lamp Circuitry
Figure 3

D. Indicator L10 (NO. 1 VALVE OPEN) and L11 (NO. 2 VALVE OPEN) circuitry is similar and only the L10 circuit will be discussed. See figure 4. Indicator L10 indicates the position of the fuel heat valve which supplies hot air to the fuel heater. Indicator L10 is extinguished when the valve is closed and illuminated dimly when the valve is open. L10 is illuminated brightly when the valve is in travel or the valve is not in agreement with the switch S1 (ENG NO. 1 FUEL HEAT VALVE) setting.

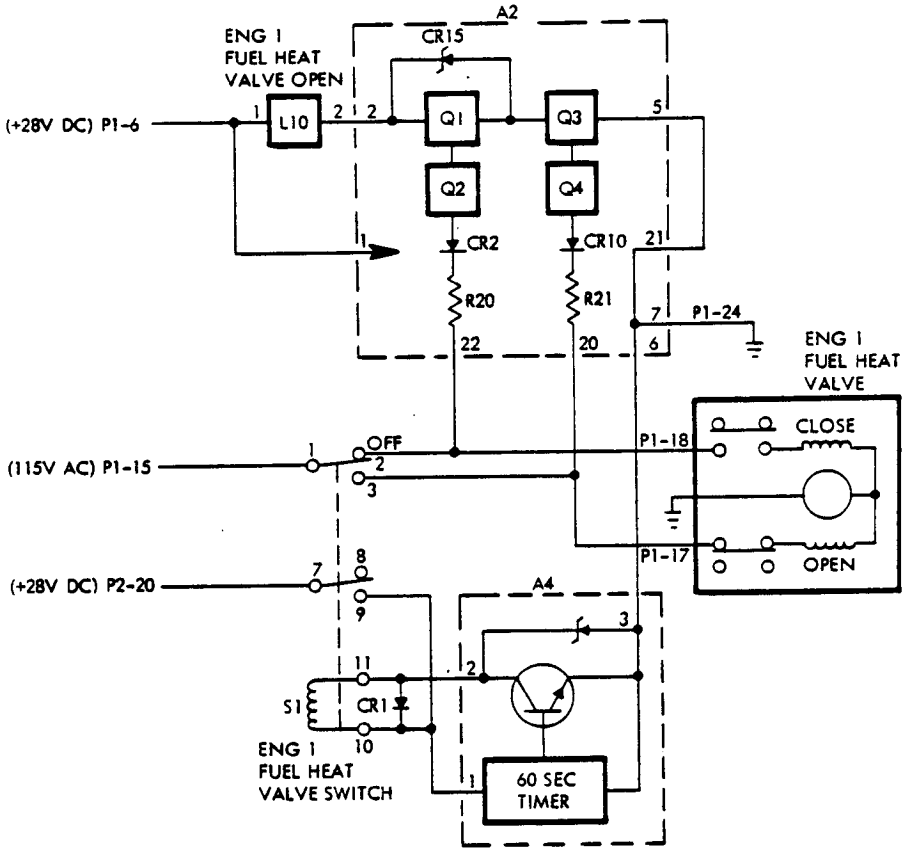
(1) The hot air supply to the engine fuel heater is controlled by an electrically operated valve. Fuel heat valve power is controlled through a pilot-operated, magnetically-held switch, S1. After manual actuation, S1 is held in the closed position for a period of 60 (± 5) seconds by the timer on circuit card A4. The indicator lamp, L10, will be off when the valve is closed, bright when the valve is in transit, and dim when the valve is open.

(2) With +28 volts dc supplied to pins P1-6 and P2-20, 115 volts ac supplied to pin P1-15, pin P1-24 grounded and neither of pins P1-17 or P1-18 grounded, Q1 through Q4 are turned on, and L10 is illuminated bright. Grounding pin P1-18 turns off Q2 and Q1, CR15 introduces a drop of approximately 9 volts in the L10 ground path, and L10 is illuminated dim. Grounding pin P1-17 turns off Q4 and Q3 and L10 is extinguished.

(3) With the fuel heat valve switch S1 in the "OFF" position and the fuel heat valve closed, pin P1-17 is grounded through the valve open limit switch and winding, Q4 and Q3 are turned off, and L10 is extinguished.

(4) When S1 is set to "ON" 115 volts ac is connected to pin P1-17, and the fuel heat valve open limit switch and open winding. Back emf voltage from the valve close winding is connected to pin P1-18 through the close limit switch. Q1 through Q4 are turned on and L10 is illuminated bright. Also when S1 is set to "ON" +28 volts dc from pin P2-20 is connected to the S1 holding coil. The coil has a ground path through the timer circuit on A4 and holds S1 in the "ON" position. When the fuel heat valve reaches its full open position, the open limit switch opens. Pin P1-18 is grounded through the valve close limit switch and winding, Q2 and Q1 are turned off, and L10 is illuminated dim.

(5) After 60 (± 5) seconds, the timer on A4 opens the ground path for the holding coil causing S1 to return to "OFF." AC voltages are present at pins 20 and 22 of A2, Q1 through Q4 are turned on, and L10 is illuminated bright. When the valve reaches end of travel, the close limit switch opens, pin P1-17 is grounded through the valve open limit switch and winding, Q4 and Q3 are turned off, and L10 is extinguished.



Fuel Heat Valve Indicator Lamp Circuitry
Figure 4

E. Master Caution Circuitry (See figures 5 and 6.)

(1) The fuel master caution lamp is connected externally between pin P2-19 and +28 volts dc, and requires a ground path for illumination. SCR A3Q3 and transistor A3Q5 are in series in the ground path. The master caution lamp is illuminated by the fuel system module under three conditions:

(a) When the pressure drop across the engine 1 or engine 2 fuel filter exceeds a preset limit due to filter icing or other obstruction. (See figure 5.)

(b) When two fuel boost pumps in any one tank simultaneously are registering low pressure. (See figure 6.)

(c) When the master test feature is used. (See figure 5.)

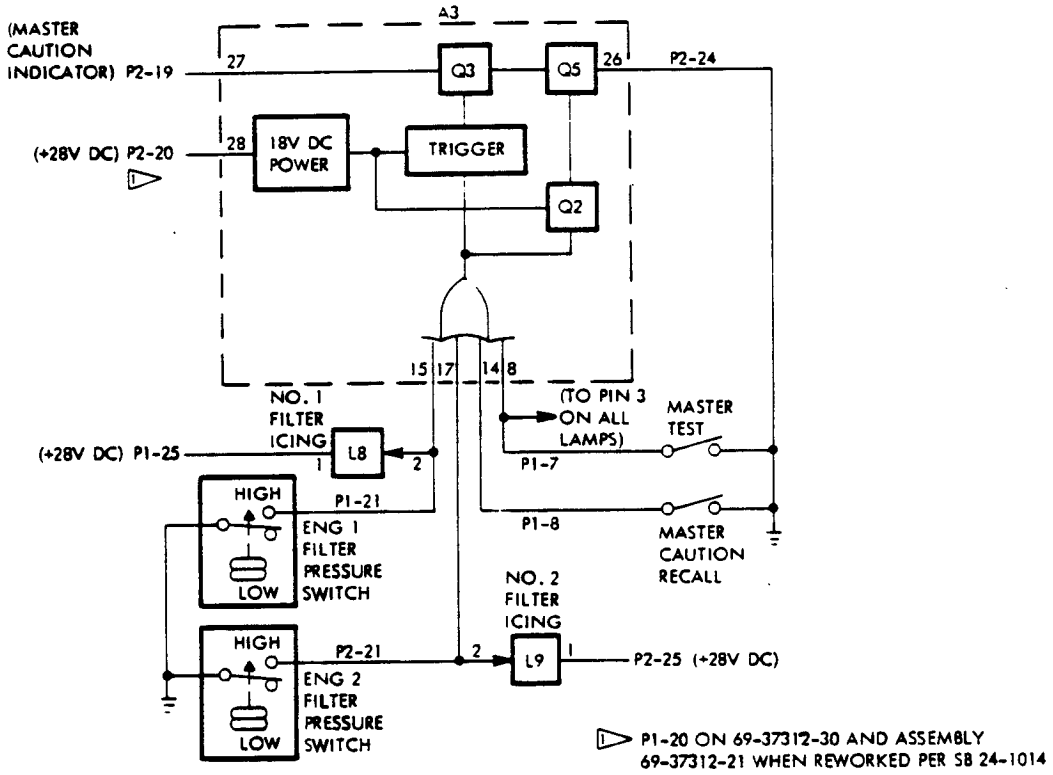
(2) The master caution circuitry operates from a regulated 18 volts dc derived from the +28 volts dc connected to P2-20. (P1-20 on 69-37312-30 and assembly 69-37312-21 when reworked per SB 24-1014.) When base drive is provided to A3Q2, A3Q2 will be turned on, turning on A3Q5. Completion of the master caution indicator lamp ground then requires triggering of A3Q3. A3Q3 is triggered through the A3 triggering circuit. Base drive for A3Q2 and the triggering input are provided by ground inputs to the A3 circuits. (Refer to Subject 31-36-59 for description of A3 operation.)

(3) The master test feature (figure 5) provides a ground input through pin P1-7 to A3 and pin 3 of all the module lamps. This ground input turns on A3Q5 and triggers SCR A3Q3 into conduction which completes the ground path for the master caution indicator. The master caution indicator and all the module lamps are illuminated.

(4) When illuminated, the circuit path through SCR A3Q3 may be interrupted to reset the circuit by momentarily depressing the master caution lamp. Activating master caution recall, which provides a ground input through pin P1-8 to A3, will illuminate the master caution indicator provided one or more of the activating ground inputs are still present.

F. Indicator L8 (NO. 1 FILTER ICING) and L9 (NO. 2 FILTER ICING) circuitry is similar and only the L8 circuit will be discussed. (See figure 5.) A differential pressure switch measures the pressure drop across the main fuel filter. If the filter becomes clogged the switch closes, illuminating indicator L8 on the module and the external master caution lamp.

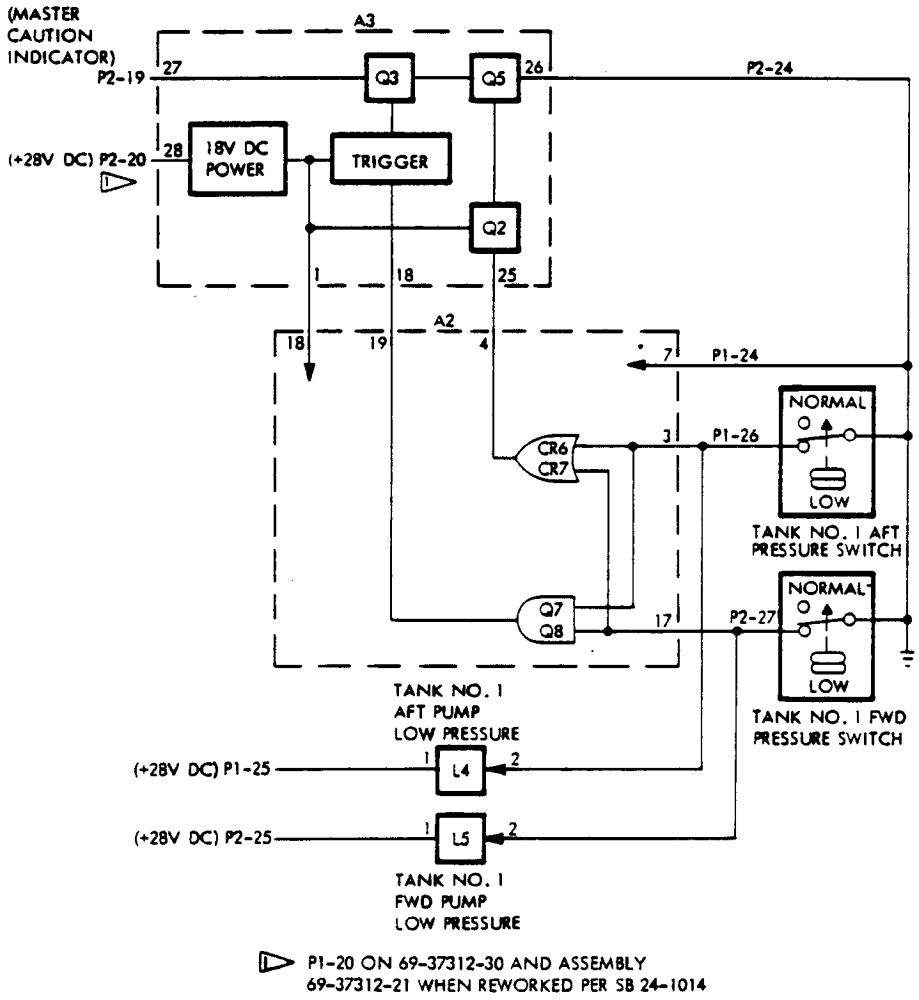
(1) When the pressure differential across the engine 1 fuel filter reaches a preset high limit due to filter icing or other obstruction, a pressure switch is actuated grounding pin P1-21. The ground input is supplied to L8 and A3. L8 and the master caution indicator are illuminated.



Filter Icing and Master Caution Indicator Lamp Circuitry
Figure 5

G. Indicators L4 (TANK NO. 1 AFT PUMP LOW PRESS) and L5 (TANK NO. 1 FWD PUMP LOW PRESS), and L6 (TANK NO. 2 FWD PUMP LOW PRESS) and L7 (TANK NO. 2 AFT PUMP LOW PRESS) operate in a similar manner and only the L4 and L5 circuitry will be discussed. (See figure 6.) The output pressure of the tank No. 1 forward and aft pumps is sensed by a pressure switch at each pump. If one pressure switch senses low pressure, an indicator on the module illuminates. If both pressure switches sense low pressure, both indicators on the module and the external master caution lamp illuminate and will remain illuminated until both pressure switches have returned to normal or the master caution lamp is pressed momentarily. If the master caution lamp is pressed, activating the external master caution recall switch at a later time will illuminate the master caution lamp if a low pressure condition still exists.

(1) With both pressure switches sensing normal pressure, pins P1-26 and P2-27 are open circuited and indicators L4 and L5 are extinguished. If one pressure switch is sensing low pressure, the aft switch, for example, pin P1-26 is grounded, illuminating indicator L4. Grounding pin P1-26 conditions printed circuit assembly A2 and A3 circuits to illuminate the master caution lamp should the forward pressure switch sense low pressure. The forward pressure switch, sensing low pressure, grounds pin P2-27, illuminating indicator L5. Grounding pin P2-27 causes printed circuit assemblies A2 and A3 to complete a ground path from pin P2-19 through printed circuit assembly A3 to pin P2-24, illuminating the master caution lamp connected at pin P2-19.



Fuel Pump Low Pressure Indicator Circuitry
Figure 6

4. Leading Particulars

Length -- 5.5 inches (approx)
Width -- 5.8 inches (approx)
Height -- 9.00 inches (approx)
Weight -- 3.0 pounds (approx)
Operating Voltage -- 28 volts dc and 115 volts ac, 400 Hz

DISASSEMBLY

1. General

   A. Disassemble only as necessary for cleaning, inspection, repair, and replacement of components.

   B. Unsolder wiring connections and remove connector pins only when replacement of wire or component is required. Tag disconnected wires to facilitate reassembly. Refer to "Repair of Electrical Connectors," Subject 20-11-02 and to "Soldering Electrical Connections," Subject 20-12-01.

2. Disassemble Unit (See figure 1101.)

   A. Remove screws (1) from cover (5) and cover assembly (2).

   B. Remove printed circuit assemblies (6 and 7), and time delay switch (8).

      NOTE: Refer to Subjects 31-36-59 and 31-36-60 for overhaul of printed circuit assemblies.

   C. Remove screws (9) from clip nuts (10) and connectors (11 and 12).

   D. Remove screws (13), washers (14), and backplate (15).

   E. Remove screws (23) and mounting plate (24) from standoffs (40 and 41).

      NOTE: Do not disconnect wires or remove connectors (19, 20 or 21) from mounting plate (24), unless repair or replacement is required.

   F. Disconnect terminals (59) from indicator light assemblies (25 through 29), switches (30, 33 and 35) and power connector (37).

   G. Remove indicator light assemblies (25 through 29), switches (30, 33 and 35), power connector (37), and terminal (60) from baseplate (52).

   H. Remove screws (39), standoffs (40 through 50) and baseplate assembly (51).

      NOTE: Screws (39) are installed with Loctite sealant and may be difficult to remove.

   I. Remove wire bundle assembly (54).

      NOTE: Clip ties holding wire bundle assembly only if replacement of wire is necessary.

CLEANING

CAUTION: USE ONLY CLEANING MATERIAL SPECIFIED HEREIN. USE OF UNAPPROVED MATERIALS MAY DAMAGE THE ASSEMBLY OR CAUSE CIRCUIT FAILURE.

1. Remove dust or foreign matter from assembly using low pressure air suction.

2. Clean with aliphatic naphtha or isopropyl alcohol. Dry thoroughly with low pressure air.

   WARNING: WHEN USING ISOPROPYL ALCOHOL OR ALIPHATIC NAPHTHA, AVOID PROLONGED OR REPEATED BREATHING OF VAPORS. USE ONLY WITH ADEQUATE VENTILATION. AVOID CONTACT WITH SKIN, EYES, AND CLOTHING. KEEP AWAY FROM HEAT, SPARKS OR OPEN FLAME.

3. For cleaning information related to soldering, refer to "Preparation for Soldering," in "Soldering Electrical Connections," Subject 20-12-01.

4. Clean terminal lugs and other bonding areas per "Repair of Electrical Terminations and Electrical Bonding Areas," Subject 20-11-03.

INSPECTION/CHECK

1. Check wiring, electrical components, and solder connections with a minimum of 5-power magnification.

   A. Check components for security of mounting.

   B. Check components and wire for damage.

   C. Check wire terminals and connections for proper installation.

   D. Check wire insulation for charring, cracking, and brittleness.

   E. Check connectors for bent, corroded, or cracked pins.

2. Check nameplates, metal labels, and Metal-Cals for proper installation and legibility.

3. Check components for legibility of reference designations and terminal identification.

4. Check finished surfaces for damage.

5. Check chassis assembly for damage.

6. Check insulating sleeving for proper installation and evidence of damage.

REPAIR

1. Repair

CAUTION: A4 IS SUBJECT TO DAMAGE FROM ELECTROSTATIC DISCHARGE WHILE HANDLING THE ASSEMBLY AND THE CARD. HANDLE PER 2-12-02.

A. Repair electrical connectors per "Repair of Electrical Connectors," Subject 20-11-02.

B. Repair soldered connections per "Soldering Electrical Connections," Subject 20-12-01.

C. Repair wire terminations at terminal lugs and bonding areas per "Repair of Electrical Terminations and Electrical Bonding Areas," Subject 20-11-03.

D. Where required, straighten box assembly components and connector pins and tighten component mounting hardware.

E. Restore reference designations, terminal numbers, or component identification markings to a legible condition. Refer to "Application of Stencils, Insignia, Silk Screen, Part Numbering and Identification Markings," Subject 20-50-10.

2. Refinish

NOTE: Refer to Subject 20-30-02 for stripping of protective finishes and Subject 20-41-01 for decoding of F and SRF finish symbols and their BAC equivalents.

A. If protective finishes are worn or damaged, refinish as indicated.

(1) All Structural Parts -- Apply F-2.21, F-2.30, or SRF-2.30 all over.

(2) Front Plate or Baseplate -- Apply F-12.75 or SRF-14.9031 to front surface and edges.

(3) Screws (with heads exposed on front of front plate or baseplate) -- Apply F-14.91 to heads.

3. Replacement

A. Replace damaged wire with wire type as noted on the schematic diagram.

B. Replace damaged Metal-Cals, per "Application of Metal-Cals," Subject 20-50-05.

C. Replace damaged heat shrinkable sleeving per "Repair of Electrical Terminations and Electrical Bonding Areas," Subject 20-11-03.

D. Replace damaged grommets per "Installation of Protective Grommets," Subject 20-50-09.

E. If rivets or nutplates require replacement, apply a coat of primer, Specification BMS 10-11, type 1, to faying surfaces and install while primer is wet.

F. Replace damaged pads with BAC5010, type 60 adhesive per "Application of Adhesives," Subject 20-50-12.

G. If keying plugs require replacement, bond into place per Subject 20-50-12, using type 60 adhesive, as follows:

(1) For connectors P3 and P4, install keying plug into contact position 10L.

(2) For connector P5, install keying plug into contact position 20X.

(3) For connector P6, install keying plug into contact position 11M.

H. If connectors (19, 20 or 21) require replacement, proceed as follows:

(1) Tag and disconnect wires from connectors.

(2) Remove nuts (18), spacers (17), screws (16) and connector from mounting plate (24).

(3) Position connector on mounting plate (24) with contact position number 1 toward bottom and front of module and install screws (16), spacers (17), and nuts (18).

(4) Connect wires to connector. See schematic diagram.

I. If stud assembly (53) requires replacement, proceed as follows:

(1) Insert punch in end of stud and drive stud assembly from baseplate.

(2) Clean faying surfaces.

(3) Insert new stud assembly in baseplate and flair small end of cup in baseplate.

J. If anchor nuts (38) require replacement, use punch press, or equivalent, utilizing a single impact stroke to install. Drive nut from back of baseplate until top of nut is flush with rear surface of baseplate. Appendage of nut shall protrude from front of baseplate.

ASSEMBLY

1. General

   A. Complete required REPAIR procedures.

   B. Connect electrical wires per schematic diagram.

2. Reassemble Unit (See figure 1101.)

   A. Attach standoffs (40 through 50) with screws (39) to baseplate assembly (51).

      NOTE: Apply Loctite primer, Grade T, and nut lock compound 74 (Loctite Corporation, 705 North Mountain Road, Newington, Connecticut) to threaded areas of screws (39) per manufacturer's instructions.

   B. Install indicator light assemblies (25 through 29), switches (30, 33 and 35), and power connector (37) to baseplate (52).

      (1) Install caps (32) on switches (30).

   C. Position wire bundle (54) and connect terminals (59 and 60) to indicator light assemblies (25 through 29), switches (30, 33 and 35), and power connector (37).

   D. Install mounting plate (24) with screws (23) to standoffs (40 and 41).

   E. Install backplate (15) with screws (13) and washers (14).

   F. Secure connectors (11 and 12) to backplate (15) with screws (9) and clip nuts (10).

   G. Insert printed circuit assemblies (6 and 7) and time delay switch (8) in connectors (19, 20 and 21).

   H. Install cover (5) and cover assembly (2) with screws (1).

TESTING

1. Test Equipment

   A. Power Supply: 28 volts dc, 2 amperes

   B. Multimeter: Triplett Model 625NA, or equivalent

   C. Stop watch or clock with second hand

   D. Test setup as follows:

Component	
Switches:	
SPST	23
Pushbutton, SPNO	1 (S21)
Pushbutton, SPNC	1 (S30)
Test Lamps:	
28 v dc, 0.1 amp (GE 1820)	4 (L14-L17)
28 v dc, 0.5 amp (three GE 1821 lamps in parallel)	1 (L13)
Connectors:	
BACC45FT18-31S	1 (P1)
BACC45FT18-31S6	1 (P2)

2. Functional Test

   A. Verify module assembly switch continuity per figure 701.

      NOTE: The following continuity checks shall be made prior to connecting the module assembly to the test setup.

Module Switch		Continuity		No Continuity	
Number	Position	From	To	From	To
S4	"ON"	P1-6	P1-28		
S4	"OFF"			P1-6	P1-28
S5	"ON"	P2-6	P2-28		
S5	"OFF"			P2-6	P2-28
S7	"ON"	P2-6	P2-29		
S7	"OFF"			P2-6	P2-29
S6	"ON"	P1-6	P1-29		
S6	"OFF"			P1-6	P1-29
S1	"OFF"	P1-15	P1-18		
*[1] S1	"ON"	P1-15	P1-17	P1-15	P1-18
S2	"OFF"	P2-15	P2-18		
*[2] S2	"ON"	P2-15	P2-17	P2-15	P2-18
S3	"OFF"	P2-8	P2-20		
S3	"ON"	P2-12	P2-20	P2-8	P2-20

*[1] Module switch S1 must be held in the "ON" position.

*[2] Module switch S2 must be held in the "ON" position.

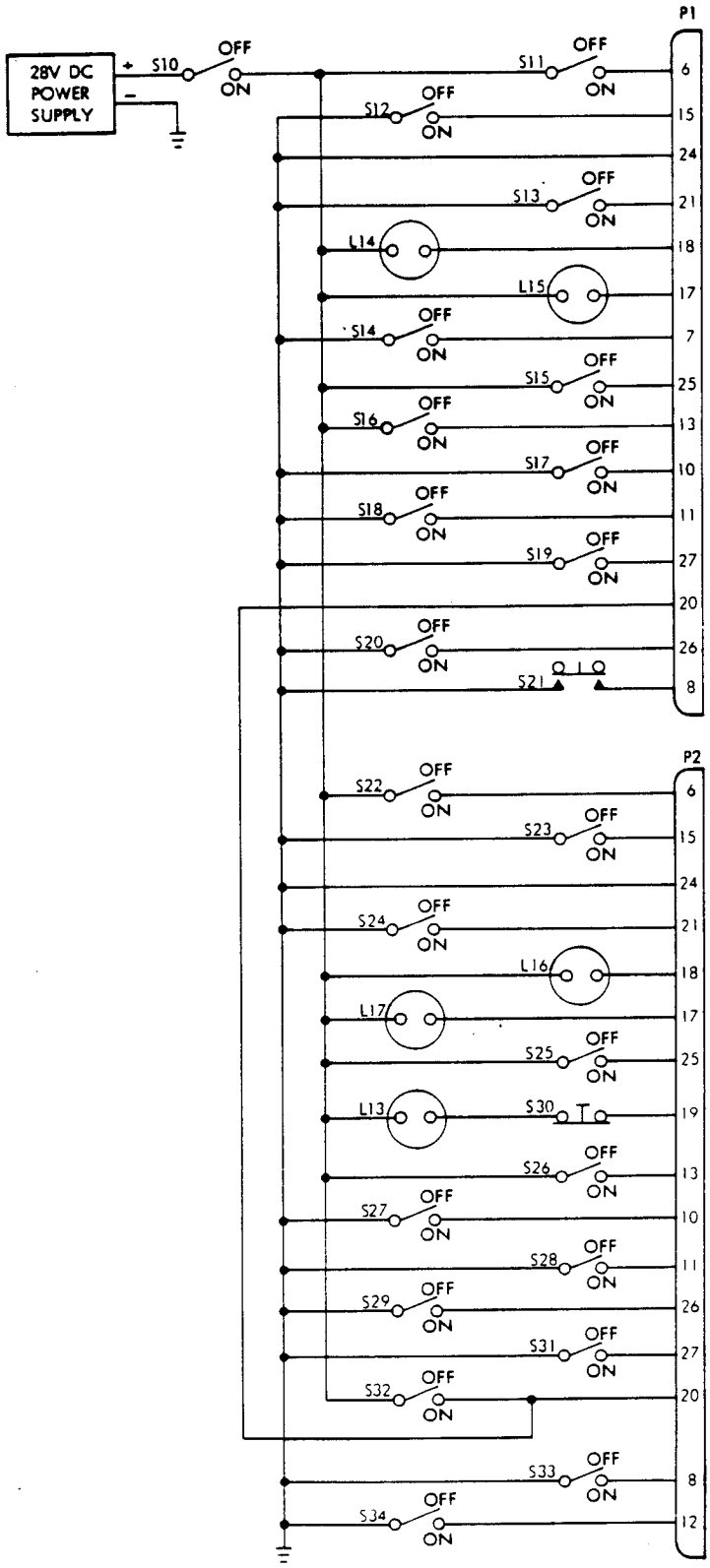
Module Assembly Switches Continuity Check
Figure 701

B. With all module assembly switches set to OFF, there shall be continuity between P1-2 and the center conductor of the power connector (L12), and P1-1 and case ground at the power connector.

C. Mate test setup P1 and P2 to module assembly P1 and P2. (See figure 702.) Set all test switches to OFF and all module switches to OFF or CLOSE. Turn on power supply.

D. Proceed to test in sequence listed in figure 703 and verify lamp conditions indicated. Begin each step with all switches in the last specified position.

E. Turn off power supply and disconnect test setup from module assembly.



Test Setup
Figure 702

	Switches or Lamps				Lamp Indication			
	Module		Test		Module		Test	
Step	Number	Position	Number	Position	Illum	Not Illum	Illum	Not Illum
1			S10	ON		All		All
2			S15	ON		All		All
3			S14	ON	L4,L6,L8	All others		All
4			S25	ON	L4-L9	All others		All
5			S14	OFF		All		All
6	L4-L9	Pressed			L4-L9	All others		All
7	L4-L9	Released				All		All
8			S32	ON	L3	All others		All
9			S34	ON		All		All
10	L3	Pressed			L3	All others		All
11	L3	Released				All		All
12			S20	ON	L4	All others		All
13			S29	ON	L4, L7	All others		All
14			S31	ON	L4,L5,L7	All others	L13	All others
15			S30	*[1] OFF	L4,L5,L7	All others		All
16			S19	ON	L4-L7	All others	L13	All others
17			S19,S20 S29,S31	OFF		All		All
18			S19	ON	L6	All others		All
19			S19	OFF		All		All
20			S16	ON	L1	All others		All
21			S17	ON		All		All
22			S26	ON	L2	All others		All
23			S27	ON		All		All
24	L1, L2	Pressed			L1, L2	All others		All
25	L1, L2	Released				All		All
26			S14	ON	L1-L9	All others	L13	All others
27			S14	OFF		All		All
28			S17,S27	OFF	L1, L2	All others		All
29			S18	ON	L1(DIM), L2	All others		All
30			S28	ON	L1(DIM), L2(DIM)	All others		All
31			S16,S26	OFF		All		All
32			S13	ON	L8	All others	L13	All others
33			S30	*[1] OFF	L8	All others		All
34			S24	ON	L8,L9	All others	L13	All others
35			S13,S24	OFF		All		All
36			S11	ON	L10	All others		All
37			S22	ON	L10,L11	All others		All
38			S12	ON	L10(DIM), L11	All others	L14	All others
39	1	*[2] "ON"				All	L15	All others

Module Assembly and Test Lamp Indications
Figure 703 (Sheet 1)

	Switches or Lamps				Lamp Indication			
	Module		Test		Module		Test	
Step	Number	Position	Number	Position	Illum	Not Illum	Illum	Not Illum
40	L10	Pressed			L10,L11	All others	L14	All others
41	L10	Released			L10(DIM), L11	All others	L14	All others
42			S14	ON	L3-L11	All others	L13, L14	All others
43			S14	OFF	L10(DIM), L11	All others	L14	All others
44			S12	OFF	L10,L11	All others		All
45			S11	OFF	L11	All others		All
46			S23	ON	L11(DIM)	All others	L16	All others
47	S2	*[2] "ON"				All	L17	All others
48			S14	ON	L3-L9,L11	All others	L13, L16	All others
49			S14	OFF	L11(DIM)	All others	L16	All others
50	L11	Pressed			L11	All others	L16	All others
51	L11	Released			L11(DIM)	All others	L16	All others
52			S22	OFF		All	L16	All others
53			S23	OFF		All		All
54	L3	Pressed			L3	All others		All
55	L3	Released				All		All
56			S34	OFF	L3	All others		All
57	S3	"OPEN"			L3	All others		All
58			S33	ON	L3(DIM)	All others		All
59			S33	OFF	L3	All others		All
60			S10	OFF		All		All

*[1] Momentarily
*[2] Module assembly switches S1 and S2 shall return to "OFF," 60 (± 5) seconds after setting to "ON"

Module Assembly and Test Lamp Indications
Figure 703 (Sheet 2)

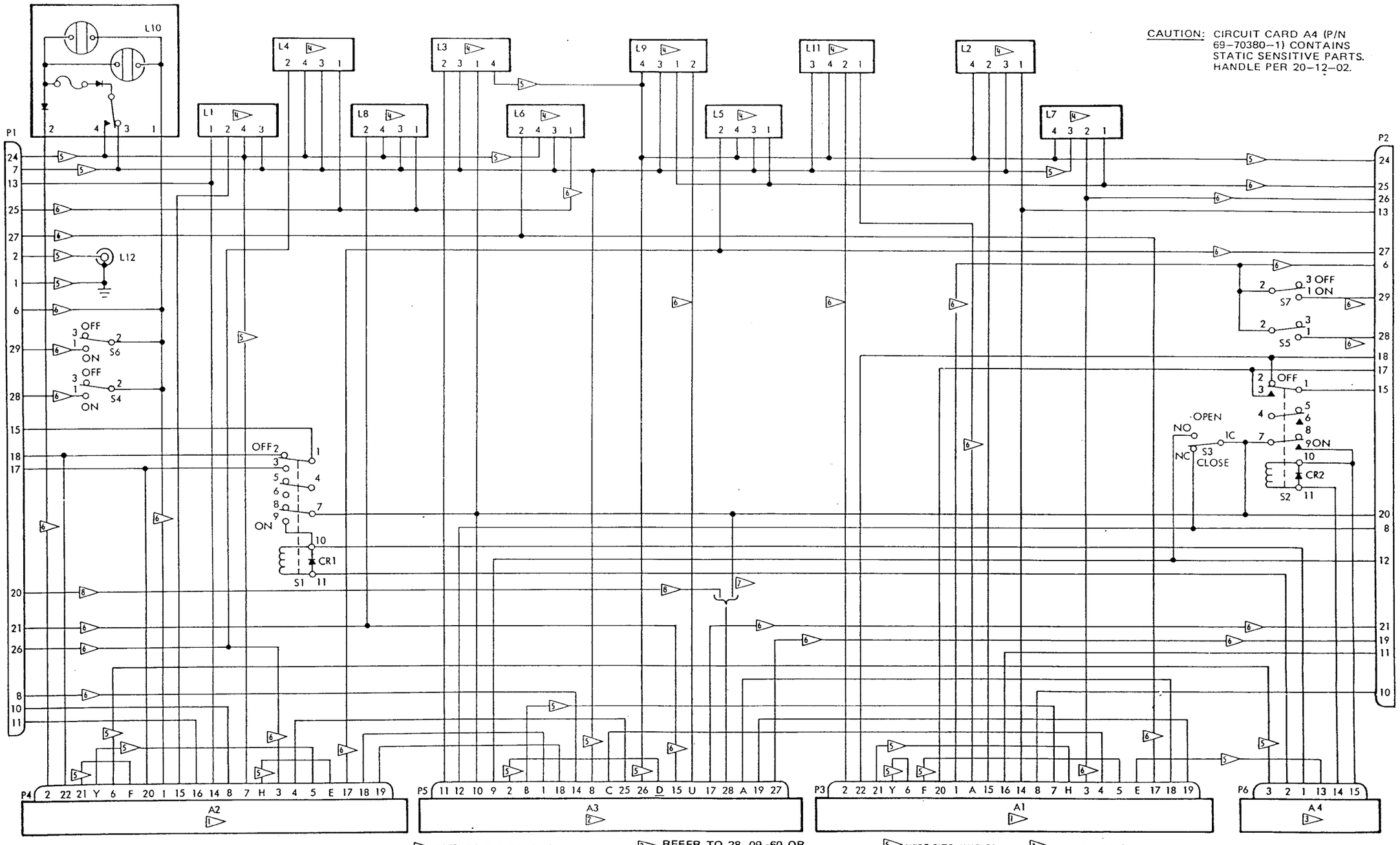
TROUBLE SHOOTING

1. Trouble shooting is keyed to steps of the test procedures. Paragraph and step references are to that portion of TESTING wherein the fault specified could occur. The presumption is made that when a fault indication is encountered, the results of all previous steps were normal.

Trouble	Possible Cause and Corrective Action
Paragraph A.	Switch as indicated in figure 701.
Paragraph B.	L12
Figure 703	
Step 3	L4, L6, L8
Step 4	L5, L7, L9
Step 6	L4 thru L9
Step 8	L3 or A3
Step 9	A3
Step 10	L3
Step 12	L4
Step 13	L7
Step 14:	
L5 fails to illuminate	L5
L13 fails to illuminate	A2 or A3
Step 15	A3
Step 16:	
L6 fails to illuminate	L6
L13 fails to illuminate	A1 or A3

Trouble	Possible Cause and Corrective Action
Step 20	L1 or A2
Step 21	A2
Step 22	L2 or A1
Step 23	A1
Step 24	L1 or L2
Step 26:	
L1 thru L9 fail to illuminate	L1 thru L9
L13 fails to illuminate	A3
Step 28	A1 or A2
Step 29	A2
Step 30	A1
Step 32:	
L8 fails to illuminate	L8
L13 fails to illuminate	A3
Step 33	A3
Step 34:	
L9 fails to illuminate	L9
L13 fails to illuminate	A3
Step 36	L10 or A2
Step 37	L11 or A1

Trouble	Possible Cause and Corrective Action
Step 38 or 39	A2 or S1
Step 40	L10
Step 42	L10 or L11
Step 44	A2
Step 46 or 47	A1 or S2
Step 50	L11
Step 54	L3
Step 56, 58 or 59	A3



Schematic Diagram
Figure 801

STORAGE INSTRUCTIONS

1. Protect assembly from dust, moisture, and rough handling. Place assembly in plastic bag and insert in protective carton, padded sufficiently to ensure against damage during storage and handling. Close, tape, and mark carton with assembly identity and date of overhaul.

2. For further information, refer to "Protection, Storage, and Handling of Airplane Components," Subject 20-70-01.

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT

1. Tools used for repair of electrical connectors are listed in "Repair of Electrical Connectors," Subject 20-11-02.

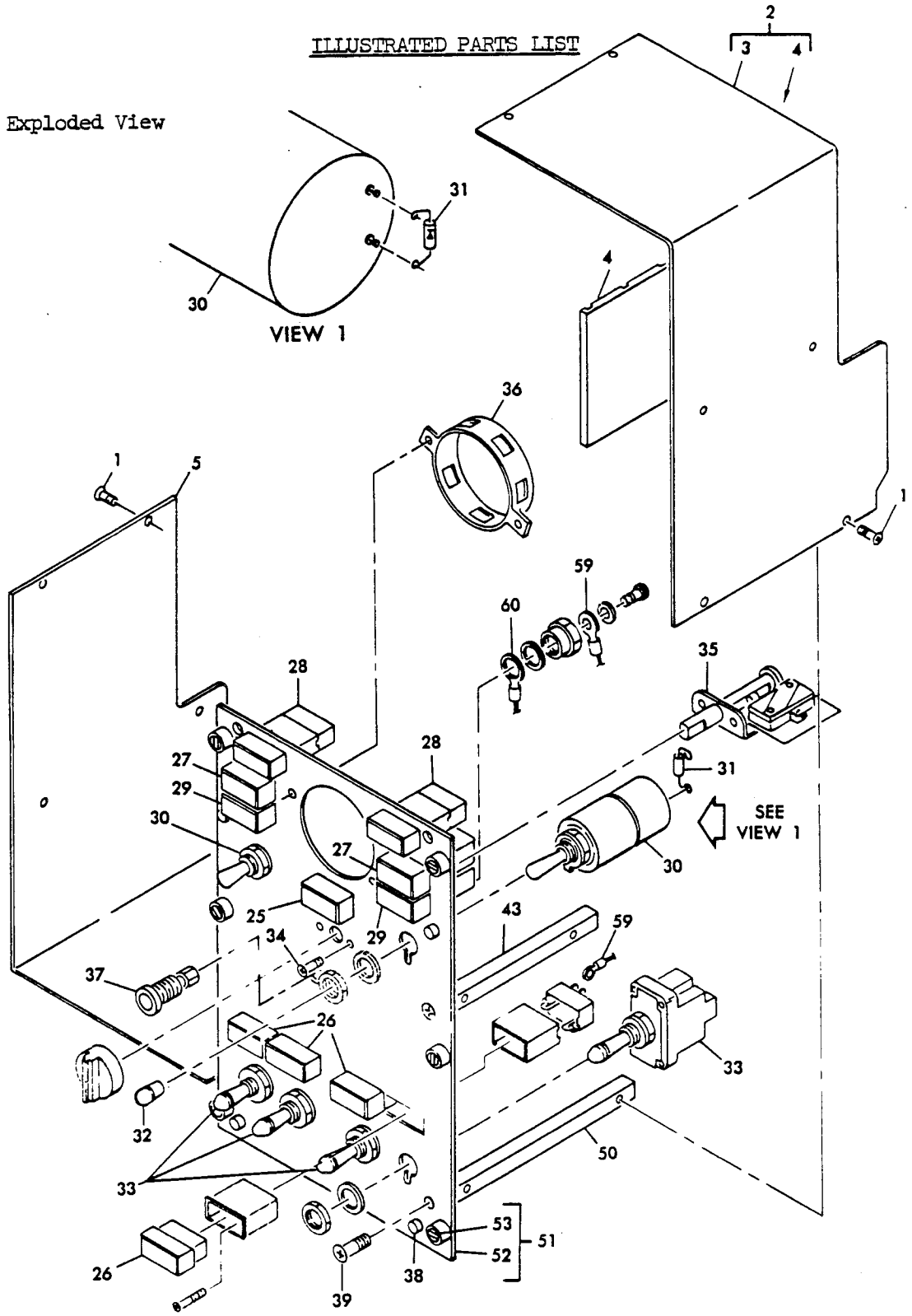
2. Tools used for repair of electrical terminations and for replacement of insulating sleeving are listed in "Repair of Electrical Terminations and Electrical Bonding Areas," Subject 20-11-03.

3. Tools used for soldering electrical connections are listed in "Soldering Electrical Connections," Subject 20-12-01.

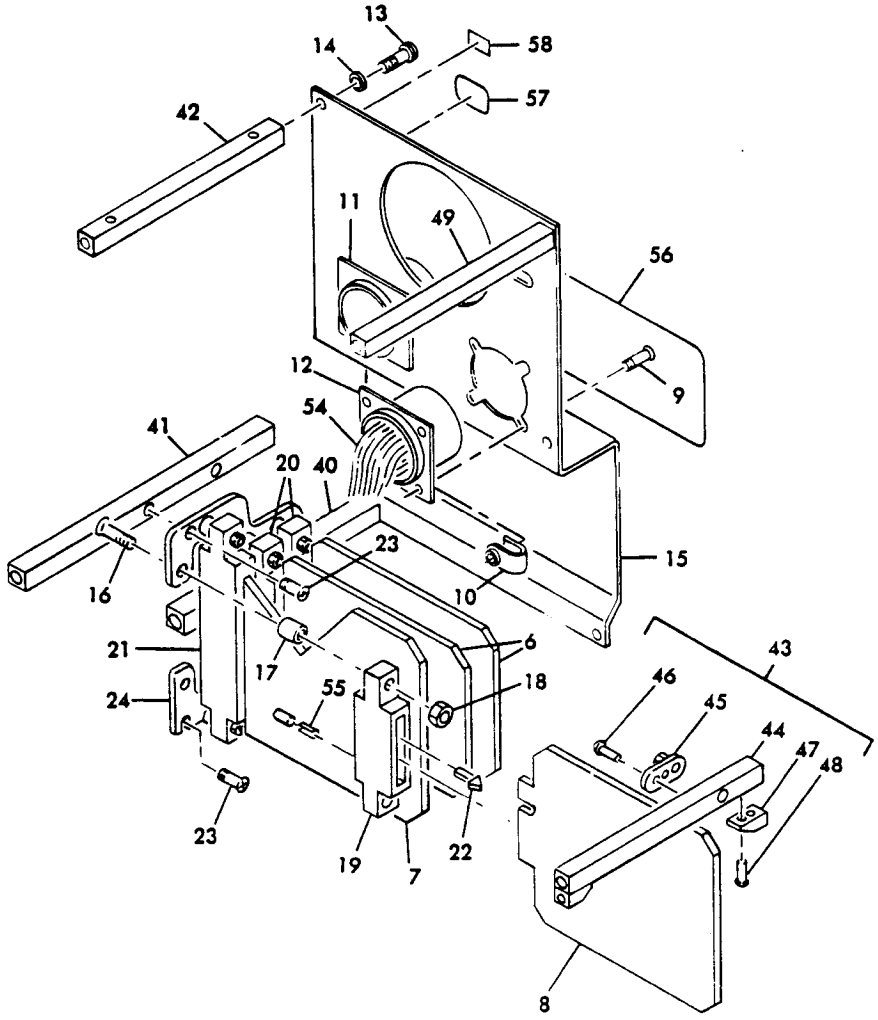
   NOTE: For additional equipment required for testing, refer to TESTING.

ILLUSTRATED PARTS LIST

1. Exploded View



Fuel System Module Assembly (P5-2)
Figure 1101 (Sheet 1)



Fuel System Module Assembly (P5-2)
Figure 1101 (Sheet 2)

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101					
	69-37312-21		FUEL SYSTEM MODULE ASSEMBLY (P5-2)	A	
	69-37312-30		FUEL SYSTEM MODULE ASSEMBLY (P5-2)	B	
	*[1]		FUEL SYSTEM MODULE ASSEMBLY (P5-2) (SB 24-1014)	C	
1	NAS514P440-4		. SCREW	12	
2	69-44456-9		. COVER ASSEMBLY	1	
3	69-44456-14		. . COVER (used on 69-44456-9)	1	
4	69-44457-15		. . FOAM (used on 69-44456-9)	1	
5	69-44456-10		. COVER	1	
6	69-60701-1		. PRINTED CIRCUIT ASSY (REF 31-36-60)	2	
7	69-60730-1		. PRINTED CIRCUIT ASSY (REF 31-36-59)	1	
8	69-70380-1		. 60-SEC TIME DELAY PRINTED CIRCUIT ASSY (REF 28-09-60) STATIC SENSITIVE PART	1	
8	2-462-02		. TIME DELAY SWITCH, V08748 (OPT)	1	
8	2-462		. TIME DELAY SWITCH, V08748 (OPT)	1	
9	BACS12CB04-5		. SCREW	8	
10	BACN10NW1		. NUT, Clip-on	8	
11	BACC45FN18-31P		. CONNECTOR	1	
12	BACC45FN18-31P6		. CONNECTOR	1	
13	BACS12CB06-5		. SCREW	6	
14	MS35338-4		. WASHER	6	
15	69-44456-11		. BACKPLATE	1	
16	NAS514P632-14		. SCREW	8	
17	NAS43DD1-17		. SPACER	8	
18	NAS679A06W		. NUT	8	
19	582553-1		. CONNECTOR, V00779	1	
20	582557-1		. CONNECTOR, V00779	2	
21	582559-1		. CONNECTOR, V00779	1	
22	582507-1		. KEYING PLUG, V00779	4	
23	BACS12CB04-4		. SCREW	3	
24	69-44456-12		. MOUNTING PLATE	1	
25	318-630-1001-051		. INDICATOR LIGHT ASSEMBLY, V81590 (BOEING 10-61803-71)	1	
26	318-630-1001-018		. INDICATOR LIGHT ASSEMBLY, V81590 (BOEING 10-61803-25)	4	
27	318-630-1001-019		. INDICATOR LIGHT ASSEMBLY, V81590 (BOEING 10-61803-26)	2	
28	318-630-1001-135		. INDICATOR LIGHT ASSEMBLY, V81590 (BOEING 10-61803-173)	2	
29	318-630-1001-051		. INDICATOR LIGHT ASSEMBLY, V81590 (BOEING 10-61803-71)	2	

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101					
30	8ET1T		. SWITCH, TOGGLE, V91929		2
31	1N4384		. DIODE, V14936		2
32	69-44578-2		. CAP, CUSHION		2
33	1TL150-3D		. SWITCH, TOGGLE, V91929		4
34	NAS514P632-6		. SCREW		2
35	7AS12		. SWITCH, ROTARY, V91929		1
36	BACC10EL3		. CLAMP, INSTRUMENT		1
37	SCN001		. POWER CONNECTOR, V95354		1
38	BACN10PA06-6		. NUT, ANCHOR		4
39	NAS514P632-5		. SCREW		6
40	69-44457-13		. STANDOFF		1
41	69-44457-12		. STANDOFF		1
42	69-37268-13		. STANDOFF		1
43	69-44456-13		. BRACKET ASSY		1
44	69-44456-15		. . STANDOFF		1
45	NAS696A04L		. . NUTPLATE		1
46	MS20426D3		. . RIVET		2
47	22ILHA27M-22-62		. . NUTPLATE, V72962		2
48	MS20470D2		. . RIVET		4
49	69-37268-14		. STANDOFF		1
50	69-37268-21		. STANDOFF		1
51	69-37312-25		. BASEPLATE ASSY		1
52	BACP10U0862G		. . GASEPLATE		1
53	BACS21DD1G		. . STUD ASSY		6
54	69-37312-26		. WIRE BUNDLE	A	1
54	69-37312-32		. WIRE BUNDLE	B	1
54	69-37312-26		. WIRE BUNDLE (MOD BY SB 24-1014)	C	1
55	66143-2		. TAB TERMINAL, V00779		53
56	BAC27DCC225		. METAL-CAL		1
57	BAC27DCC243		. METAL-CAL		1
58	BACM10L001CU		. METAL-CAL		1
59	BACT12AC		. TERMINAL		AR
60	BACT12S		. TERMINAL		1

*[1] NO BOEING ASSIGNED PART NUMBER

REFERENCE DESIGNATION INDEX (SEE SCHEMATIC DIAGRAM)		
REFERENCE DESIGNATION	PART NUMBER	ITEM NO.
A1, A2	69-60701-1	6
A3	69-60730-1	7
A4	69-70380-1	8
A4	2-462-02	8
A4	2-462	8
CR1, CR2	1N4384	31
L1, L2	318-630-1001-135	28
L3	318-630-1001-051	25
L4 thru L7	318-630-1001-018	26
L8, L9	318-630-1001-019	27
L10, L11	318-630-1001-051	29
L12	SCN001	37
P1	BACC45FN18-31P	11
P2	BACC45FN18-31P6	12
P3, P4	582557-1	20
P5	582559-1	21
P6	582553-1	19
S1, S2	8ET1T	30
S3	7AS12	35
S4 thru S7	1TL150-3D	33

VENDORS

V00779	AMP INCORPORATED, P.O. BOX 3608, HARRISBURG, PENNSYLVANIA 17105
V08748	ELECTRO DEVELOPMENT CORPORATION, 16700 13th WEST, LYNWOOD, WASHINGTON 98036
V14936	GENERAL INSTRUMENT CORP., SEMI-CONDUCTOR DIVISION, 600 WEST JOHN STREET, HICKSVILLE, L.I., NEW YORK 11802
V72962	ELASTIC STOP NUT CORPORATION OF AMERICA, 2330 VAUXHALL ROAD, UNION, NEW JERSEY 07083
V81590	KORRY MANUFACTURING CO., 233 - 8TH AVENUE NORTH, SEATTLE, WASHINGTON 98109
V91929	HONEYWELL INCORPORATED, MICRO SWITCH DIVISION, CHICAGO AND SPRING STREETS, FREEPORT, ILLINOIS 61032
V95354	METHODE MANUFACTURING CO., 1700 SOUTH HICKS ROAD, ROLLING MEADOWS, ILLINOIS 60008