TO: ALL HOLDERS OF FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODULE ASSEMBLY P5-19 OVERHAUL MANUAL, 31-36-01

REVISION NO. 8, DATED NOV 1/00

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 P/N for items 17, 18 and 38 of Fig. 1101												X	

FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODULE ASSEMBLY P5-19

31-36-01

BOEING P/N 69-37325-14, -14M, -17, -17M, -20, -20M, -24 thru -29, -33, -35 thru -38

AIRLINE P/N

THE FOLLOWING DIRECTIVES APPLY TO THIS SUBJECT:

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVES	DATE DIRECTIVE INCORPORATED INTO TEXT
		PRR 31030	Aug 15/68
78-1005, Rev 1		PRR 31030K	Aug 15/68
78-1005, Rev 1		PRR 31030-2	Aug 15/68
31-1009		PRR 31086	Aug 15/68
31-1009		PRR 31086-1	Aug 15/68
33-1013, Rev 1		PRR 31143	Aug 15/69
		PRR 31252	Aug 15/69
		PRR 31253	Aug 15/69

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
	31-36-01		*	1104	Nov 1/00			
	T-1	Jun 10/70		1105	Jul 1/98			
	T-2	BLANK	*	1106	Nov 1/00			
*	LEP-1	Nov 1/00		1107	Dec 5/90			
	LEP-2	BLANK		1108	Jul 1/99			
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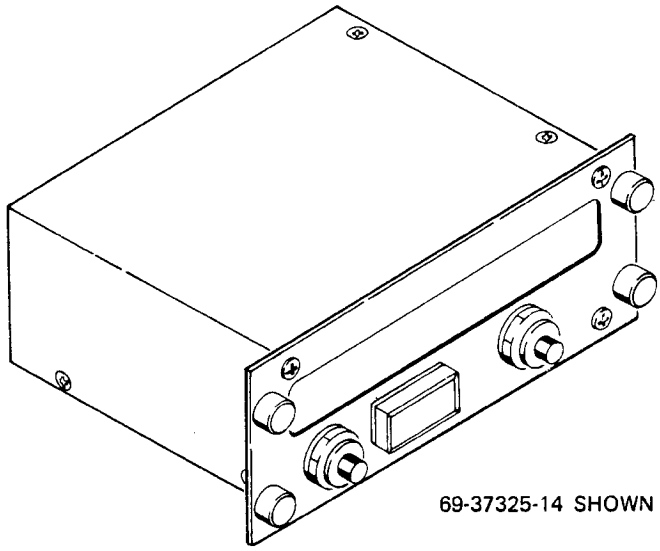
FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODULE ASSEMBLY (P5-19)

Boeing Part Numbers: 69-37325-14,-14M,-17,-17M,-20, -20M,-24,-25,-26,-27,-28,-29,-33,-35,-36,-37 and -38



Flight Recorder and Mach Airspeed Warning Module Assembly
Figure 1

DESCRIPTION AND OPERATION

1. Description

   A. The flight recorder and mach airspeed warning test module assembly is an electronic device located in the P5 captain's and first officer's overhead panel. The module may easily be removed for inspection or repair by loosening four quick-release screws on the baseplate and by disconnecting the primary power connector.

   B. The module consists of a wire bundle assembly, a relay (or two relays), switches, and a printed circuit assembly. The printed circuit assembly functions as a power and ground seeking master caution sensor.

2. Operation

A. Power, through relay K1 contacts, can be applied to the flight recorder for test purposes by actuating switch S2. The mach airspeed warning circuitry test switch is located in the P5-19 module. Ground, or power, inputs to the module trigger master caution circuitry contained in the printed circuit assembly. The crew is alerted to a flight recorder off condition by a lamp contained on the module. The input to this lamp also triggers the master caution circuitry.

3. Functional Description

A. Circuit power, +28 volts dc, is connected to pin 19 for the indicator lamp; to pin 7 for K1 relay coil and for base drive for A1Q8; and to pin 29 for A1Q3 (voltage regulator in the printed circuit assembly). Circuit ground is connected to pin 23. When connected as above, A1Q8 is turned on to provide a ground path for the relay coil. Relay K1 is energized. Actuating S2 to the ON position shunts A1Q8 base drive current to ground, turns A1Q8 off, and de-energizes K1.

B. The printed circuit assembly provides a ground path at pin 30 for the master caution lamp. The ground path is provided through a transistor and an SCR in series. (Refer to Subject 31-36-05 for theory of operation of printed circuit assembly A1.) Any input indicating malfunction will both turn on the transistor and trigger the SCR into conduction. As long as the input remains, the transistor remains on. The SCR may be reset by external interruption of the circuit to the master caution lamp. The indication may be recalled, if the malfunction input remains, by retriggering the SCR.

C. Malfunction inputs are as follows:

(1) Pin 27 - Ground input to indicate stall warning. (Pin 2 is used for second stall warning indicator.)

(2) Pin 20 - Ground input to indicate flight recorder off. This input also illuminates the indicator lamp. (Refer to paragraph E for flight recorder circuitry on assemblies 69-37325-33 and -38.)

(3) Pin 24 - Ground input to indicate passenger oxygen on.

(4) Pin 8 - Power input to indicate emergency exit not armed.

(5) Pin 28 - Power input to indicate equipment bay cooling forced air failure.

(6) Pins 21 and 1 - Ground inputs to indicate thrust reverser fault. (69-37325-14M, -17M, -20M, -27, -28, -29, -33, -35, -36, -37, and -38 only)

D. Pin 22 receives a ground input from master test. Pin 26 receives the recall input (ground) to retrigger the SCR.

E. (69-37325-33 and -38 only) - Power for relay K2, +28 volts dc, is connected to pin 13. Ground for the relay is connected to pin 31, and the relay is actuated as long as the flight recorder is on. The flight recorder off condition results in an absence of ground at pin 31 which releases relay K2. Relay K2 contacts then provides a ground from pin 23 to both the warning lamp and to the master caution trigger circuitry.

4. Leading Particulars

Length -- 4.75 inches (approx)
Width -- 5.75 inches (approx)
Height -- 2.25 inches (approx)
Weight -- 1.34 pounds (approx)
Operating Voltage -- 28 volts dc

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), cover assembly (2), and cover (5).

   B. Remove printed circuit assembly (6). Refer to Subject 31-36-05 for overhaul of printed circuit assembly.

   C. Remove screws (7, 10, 13, and 14), connector (9), relay (47) with screws (49) and nuts (48) (69-37325-33 and -38 assemblies only), washers (11), backplate (12), and standoffs (15 through 18).

      NOTE: Screws (13 and 14) are installed with Loctite sealant and may be difficult to remove.

   D. Remove items (19 through 21) to remove connector (22).

   E. Remove nuts (24), washers (25), relay (26), screws (27), and insulated terminals (28).

      NOTE: Screws (27) are installed with Loctite sealant and may be difficult to remove.

   F. Remove items (30 and 31) to remove resistor (32).

   G. Remove support plate (38).

   H. Tag and disconnect wires from switches (34 and 35) and indicator light assembly (37).

   I. Remove switches (34 and 35), switch guard (36), indicator light assembly (37), and baseplate assembly (39).

   J. Remove wire bundle assembly (40).

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

   K. Remove remaining items only if necessary for repair or replacement.

CLEANING

WARNING: MAKE CERTAIN THAT ALL SOURCES OF FLASH OR FIRE ARE ELIMINATED FROM AREA OF POSSIBLE CONTACT WITH COMBUSTIBLE MATERIALS AND VAPORS DURING THE FOLLOWING PROCEDURE.

CAUTION: DO NOT APPLY ABRASIVE CLEANING MATERIALS OR BRUSHES TO ANY PART OF ASSEMBLY UNLESS OTHERWISE SPECIFIED. USE ONLY CLEANING METHODS AS OUTLINED HEREIN. DO NOT ALLOW SOLVENTS OR CLEANING FLUIDS (EXCEPT NAPHTHA AND ALCOHOL) TO CONTACT ELECTRICAL SURFACES. DO NOT ALLOW SOLVENTS OR CLEANING FLUIDS TO CONTACT IMPREGNABLE MATERIALS.

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

2. Clean exterior surfaces per "Alkaline Cleaning" in Subject 20-30-03.

3. Clean interior surfaces and electrical contacts with aliphatic naphtha or isopropyl alcohol. Dry thoroughly with low pressure air.

4. For cleaning information related to soldering, see "Preparation for Soldering," in Subject 20-12-01.

5. Clean terminal lugs and other bonding areas per Subject 20-11-03.

INSPECTION/CHECK

1. Visual Checks

   NOTE: Visual inspection of wiring, electrical components, and solder connections shall be accomplished with a minimum of five-power magnification unless otherwise specified.

   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.

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

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

   H. Check finished surfaces for damage.

   I. Check assembly for warping, bending, or other damage.

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

2. Special Checks

   A. Check vendor components per manufacturer's instructions.

REPAIR

1. Repair

   A. Instructions for repair of electrical connectors (plugs, receptacles, sockets, and wire terminations) are contained in "Repair of Electrical Connectors," Subject 20-11-02.

   B. Instructions for repair of soldered connections at terminals or solder cups are contained in "Soldering Electrical Connections," Subject 20-12-01.

   C. Instructions for replacement of wire terminations at terminal lugs, replacement of heat-shrinkable insulating sleeving, and preparation of electrical bonding areas are contained in "Repair of Electrical Terminations," Subject 20-11-03.

   D. Straighten assembly components and connector pins if bent.

   E. Silk screen, rubber stamp, or steel stamp as applicable, all damaged reference designations, terminal numbers, or component identification markings. Refer to Subject 20-50-10.

2. Refinish

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

   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 (See figure 1101.)

   A. Replace parts worn or damaged beyond minor repair.

   B. Replace damaged wire with BMS 13-16, Type I, Class I, Size AWG 24, unless otherwise noted on schematic diagram.

C. If electronic components require replacement, refer to schematic diagram and connect per Subject 20-12-01.

D. If insulating sleeving requires replacement, install per Subject 20-11-03.

E. Apply new Metal-Cals per Subject 20-50-05.

NOTE: Prior to installation of Metal-Cal, steel stamp module assembly part number, serial number and date of manufacture in appropriate blank space.

F. Replace parts damaged by cleaning solvents.

G. If replacement of foam (4) is necessary, bond new foam to cover (3) per Subject 20-50-12.

H. Install new keying plug (23) into contact position number 9 of connector (22).

I. Solder new diodes (29 and 33) to insulated terminal (28) per Subject 20-12-01.

J. If stud assembly (41) requires replacement:

(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.

ASSEMBLY

1. General

   A. Complete required REPAIR procedures.

2. Reassembly (See figure 1101.)

   A. Install relay (26) to support plate (38) using nuts (24) and washers (25).

   B. Attach connector (22) to support plate (38) using items (19, 20, 21).

      NOTE: Contact position 1 of connector (22) shall be toward front of module assembly when installed.

   C. Attach resistor (32) to support plate (38) using screws (30) and nuts (31).

   D. Attach support plate (38) to standoffs (15 and 16) using screws (14).

      NOTE: Apply Loctite primer, grade T, and nut lock compound 74 (Loctite Corporation, 705 North Mountain Road, Newington, Connecticut), to threaded areas of screws (14) per manufacturer's instructions.

   E. Attach terminal lug (44) to switches (34 and 35) and indicator light assembly (37) and mount items (34 through 37) to baseplate assembly (39).

   F. Attach baseplate assembly (39) to standoffs (15 through 18) using screws (13).

      NOTE: Apply Loctite primer, grade T, and nut lock compound 74 (Loctite Corporation, 705 North Mountain Road, Newington, Connecticut), to threaded areas of screws (13) per manufacturer's instructions.

   G. Install connector (9) to backplate (12) using screws (7) and clip nuts (8).

   H. Install relay (47) on backplate (12) using screws (49) and nuts (48) (assemblies 69-37325-33 and -38 only).

   I. Insert printed circuit assembly (6) into connector (22).

   J. Install wire bundle assembly (42) with items (43 and 44).

   K. Attach backplate (12) to standoffs (15 through 18) using screws (10) and washers (11).

   L. Install cover assembly (2) and cover (5) using screws (1).

TESTING

1. The equipment required to test individual assemblies is tabulated in Fig. 701.

Test Equipment	Assembly 69-37325		
	-14, -17, -20, -24, -25, -26	-14M, -17M, -20M, -27, -28, -29, -35, -36, -37	-33, -38
Multimeter, Simpson 260P or equivalent (V)	1	1	1
Power Supply 28 ±2 v dc, 1 ampere	1	1	1
Test Setup: Connector BACC45FT18-31S (J1)	1	1	1
Switches: SPST	10	11	16
SPDT		1	
Capacitor, 1 UF, 35 volts (C1)		1	
Resistor, 330 ohms (± 5%), 0.5 w (R1)		1	
Diode, Part No. 1N4385 (CR1) *[1]		1	
Test Lamp, 28 v dc, 440 ma (L3)	1	1	1

*[1] General Instrument Corp., Semi-Conductor Division, 600 West John Street, Hicksville, New York 11802

2. Functional Test

A. Assemblies 69-37325-14, -14M, -17, -17M, -20, -20M, -24, -25, -26, -27, -28, -29, -35, -36, and -37

(1) Measure forward diode resistance between connector P1 pin 23(+) and pins 2, 20, 24, 26, and 27. Resistance shall be less than 12 ohms at each connection.

(2) Remove screws (1) and cover (5). Measure forward resistance of CR1 diode across terminals E2(+) and E1(-). Verify less than 15 ohms. Replace cover (5) and secure with screws (1).

(3) Verify continuity between pins 16 and 17 and no continuity between pins 15 and 16.

(4) Press NO. 1 MACH AIRSPEED WARNING TEST switch and verify continuity between pins 15 and 16 and no continuity between pins 16 and 17.

(5) Verify continuity between pins 3 and 6 and no continuity between pins 4 and 6 (69-37325-17, -17M, -25, -29, and -37 only).

(6) Press NO. 2 MACH AIRSPEED WARNING TEST switch and verify continuity between pins 4 and 6 and no continuity between pins 3 and 6 (69-37325-17, -17M, -25, -29, and -37 only).

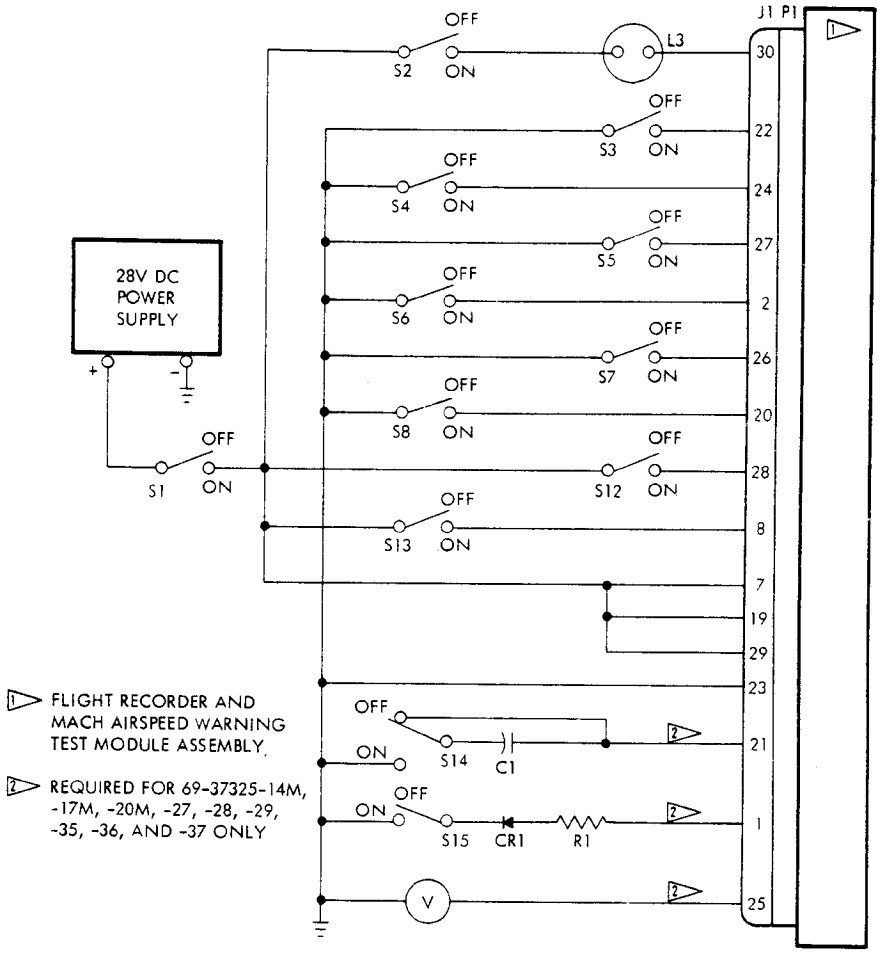
(7) Verify continuity between pin 10 and 11 and between 13 and 14. Verify no continuity between pins 9 and 10 and between 12 and 13.

(8) Measure diode resistance. If testing a 69-37325-14, -14M, -26, -27 or -35 assembly press FLIGHT RECORDER TEST switch, if testing a 69-37325-17, -17M, -20, -20M, -24, -25, -28, -29, -36 or -37 assembly, set FLIGHT RECORDER TEST switch to ON, and verify 15 ohms maximum between pin 23(+) and 18(-) and between 23(+) and 5(-). There shall be 15k minimum between pins 18(+) and 23(-) and between pins 5(+) and 23(-) (back diode test).

(9) Release FLIGHT RECORDER TEST switch or set it to OFF.

(10) Connect assembly to test setup as shown in figure 702. Set all switches to OFF. Turn on power supply.

(11) Set switch S1 and S2 to ON. Verify continuity between pins 9 and 10 and between 12 and 13. There shall be no continuity between pins 10 and 11 nor between 13 and 14.



Test Setup Assemblies 69-37325-14, -14M, -17, -17M, -20, -20M, -24, -25, -26, -27, -28, -29, -35, -36, and -37
Figure 702

(12) Test the following circuits:

(a) Assemblies 69-37325-14, -14M, -26, -27, and -35

1) Press "FLIGHT RECORDER TEST" switch. Verify continuity between pins 10 and 11 and between 13 and 14. There shall be no continuity between pins 9 and 10 nor between 12 and 13.

2) Release "FLIGHT RECORDER TEST" switch. Verify continuity between pins 9 and 10 and between 12 and 13. There shall be no continuity between pins 10 and 11 nor between 13 and 14.

(b) Assemblies 69-37325-17,-17M,-20,-20M,-24,-25,-28,-29,-36,and -37

1) Set "FLIGHT RECORDER TEST" switch to "ON." Verify continuity between pins 10 and 11 and between 13 and 14. There shall be no continuity between pins 9 and 10 nor between 12 and 13.

2) Set "FLIGHT RECORDER TEST" switch to "OFF." Verify continuity between pins 9 and 10 and between 12 and 13. There shall be no continuity between pins 10 and 11 nor between 13 and 14.

(13) Press and release "FLIGHT RECORDER OFF" indicator on assembly. Indicator shall illuminate when pressed and shall extinguish when released.

(14) Set S3 to ON. "FLIGHT RECORDER OFF" indicator on module assembly and lamp L3 shall illuminate.

(15) Set S3 to OFF. "FLIGHT RECORDER OFF" indicator and lamp L3 shall extinguish.

(16) Set switches as listed and verify indications as specified in figure 703. Any deviation constitutes a failure. Leave all switches in last specified position.

(17) Turn off power supply and disconnect assembly from test setup.

B. Assemblies 69-37325-33 and -38

(1) Verify less than 15 ohms resistance from pin 23(+) to following pins: 26, 24, 2, 20, and 27.

(2) Verify less than 15 ohms from pin 31(+) to 13.

(3) Measure less than 15 ohms resistance between diode terminal E2(+) and E1(-).

(4) Verify continuity between pins 16 and 17 and no continuity between 15 and 16.

(5) Press "MACH AIRSPEED WARNING TEST" switch and verify continuity between pins 15 and 16 and no continuity between 16 and 17.

(6) Verify continuity between pins 20(+) and 23.

Test Switch			Test Lamp Indications		
Step	Number	Position	Illuminated	Not Illuminated	V
A	1 and 2	ON			
B	4	ON	L3		
C	4	OFF		L3	
D	5	ON	L3		
E	5	OFF		L3	
F	6	ON	L3		
G	6	OFF		L3	
H	7	ON	L3		
I	7	OFF		L3	
J	8	ON	L3 *[1]		
K	8	OFF		L3 *[1]	
L	12	ON	L3		
M	12	OFF		L3	
N	13	ON	L3		
O	13	OFF		L3	
P	4 thru 7, 12, 13	ON	L3		
Q	2	OFF		L3	
R	2	ON		L3	
S	8	ON	L3 *[1]		
T	2	OFF	*[1]	L3	
U	2	ON	*[1]	L3	
V.(1)	4 thru 7, 12, 13	OFF	*[1]	L3	
V.(2)	8	OFF		L3 *[1]	
*[2] W	15	ON		L3	18 (± 3)V
X	14	ON	L3		18 (± 3)V
Y	15	OFF		L3	18 (± 3)V
Z	14	OFF		L3	18 (± 3)V

*[1] FLIGHT RECORDER OFF indicator on module
*[2] Complete steps W through Z only when testing 69-37325-14M, 17M, -20M, -27, -28, -29, -35, -36, and -37 assemblies

Test Procedures
Figure 703

(7) Verify continuity between pins 10 and 11 and between 13 and 14. There shall be no continuity between pins 9 and 10 nor between 12 and 13.

(8) Set "FLIGHT RECORDER TEST" switch to the left position. Verify 15 ohms maximum from pin 23(+) to pins 5 and 18. There shall be 15k minimum between pins 5(+) and 23(-) and between pins 18(+) and 23(-) (back diode test).

(9) Set "FLIGHT RECORDER TEST" switch to the right.

(10) Connect assembly to test setup shown in figure 704. Set all switches to OFF. Turn on power supply.

(11) Set S1 and S12 to ON.

(12) Set S11 to ON. Press cap of "FLIGHT RECORDER OFF" (L1). Light shall illuminate. Release cap. Light shall extinguish.

(13) Set S12 to OFF. L1 shall illuminate.

(14) Set S12 to ON. L1 shall extinguish.

(15) Set S13 to ON. L1 shall illuminate.

(16) Set S13 to OFF. L1 shall extinguish.

(17) Set S11 and S12 to OFF. Disregard L1 for remainder of the test.

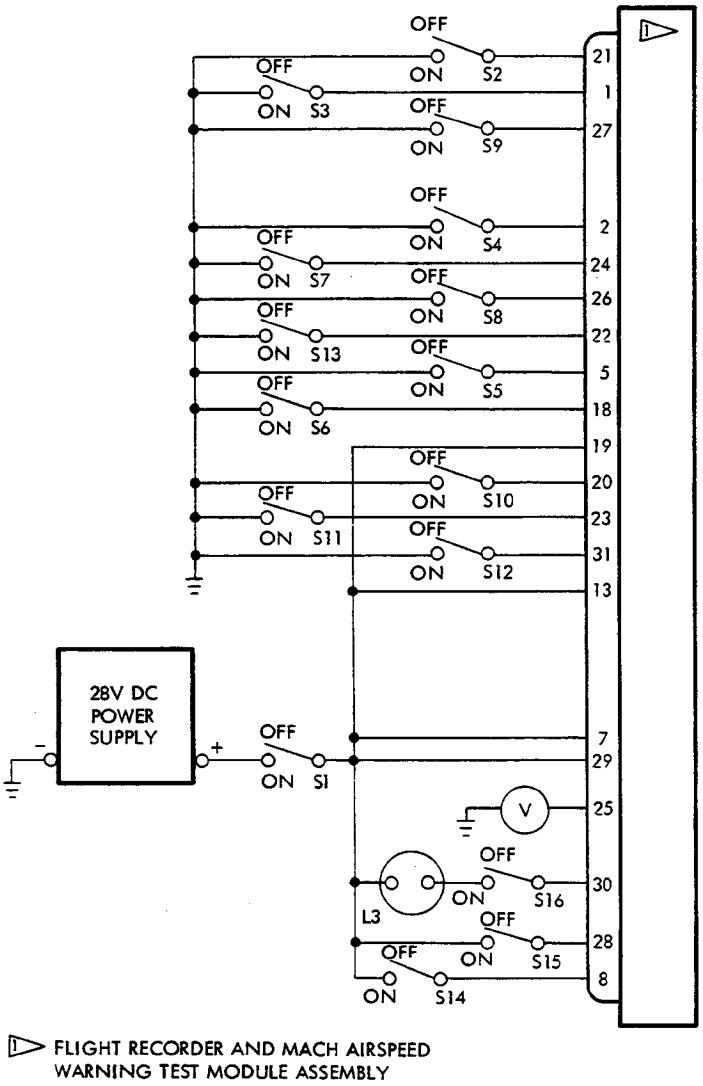
(18) Set S11 to ON. Verify continuity between pins 9 and 10 and between 12 and 13. There shall be no continuity between pins 10 and 11 nor between 13 and 14.

(19) Set S11 to OFF. Verify continuity between pins 10 and 11 and between 13 and 14. There shall be no continuity between pins 9 and 10 nor between 12 and 13.

(20) Set switches as listed and verify indications as specified in figure 705. Any deviation constitutes a failure. Leave all switches in last specified position.

NOTE: V shall indicate 18 volts dc from step B.(20) through remainder of test.

(21) Turn off power supply and disconnect assembly from test setup.



Test Setup, Assemblies 69-37325-33 and -38
Figure 704

Test Switch			Test Lamp Indications	
Step	Number	Position	Illuminated	Not Illuminated
1	S1, S12	ON		L3
2	S16, S11	ON		L3
3	S10	ON	L3	
4	S16	OFF		L3
5	S16	ON		L3
6	S9	ON	L3	
7	S16	OFF		L3
8	S16	ON		L3
9	S4	ON	L3	
10	S16	OFF		L3
11	S16	ON		L3
12	S7	ON	L3	
13	S16	OFF		L3
14	S16	ON		L3
15	S8	ON	L3	
16	S16	OFF		L3
17	S16	ON		L3
18	S8	OFF		L3
19	S13	ON	L3	
20	S16	OFF		L3
21	S16	ON		L3
22	S2	ON	L3	
23	S4, S7, S9 S10, S13, S16	OFF		L3
24	S16	ON		L3
25	S3	ON	L3	
26	S3, S2	OFF		L3
27	S14	ON	L3	
28	S14	OFF		L3
29	S15	ON	L3	
30	S1-S16	OFF		

Test Procedures
Figure 705

TROUBLE SHOOTING

1. If failure of a test occurs, check for defective connections and incorrect wiring connections, prior to replacement of components.

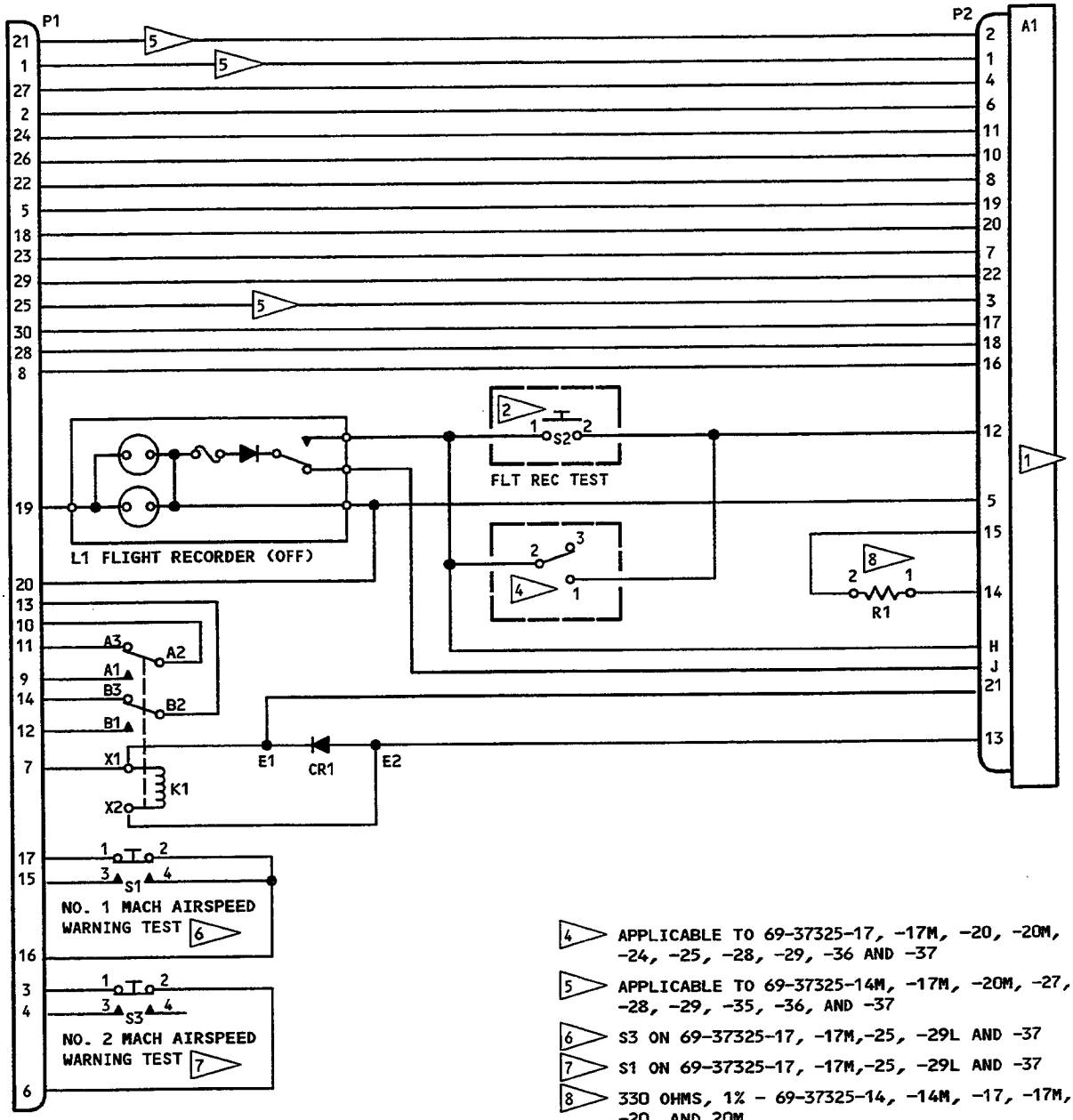
   NOTE: Trouble shooting is keyed to functional test procedures.

2. 69-37325-14, -14M, -17, -17M, -20, -20M, -24, -25, -26, -27, -28, -29, -35, -36 and -37 assemblies

	Trouble	Possible Cause	Correction
A.	Step (1)	A1 (diode open)	Replace A1
B.	Step (2)	CR1	Replace CR1
C.	Step (3) or (4)	Switch	Replace switch
D.	Step (5) or (6)	Switch	Replace switch
E.	Step (7)	K1	Replace K1
F.	Step (8)	A1 or S2	Replace A1 or S2
G.	Step (11)	K1 or A1	Replace defective component
H.	Step (12)	K1 or A1	Replace defective component
I.	Step (13)	L1	Replace L1
J.	Step (14)	A1, R1, or L1	Replace defective component
K.	Step (15)	A1	Replace A1
L.	Figure 703 steps B through H	A1	Replace A1
M.	Step J		
	L3 extinguished	A1	Replace A1
	Indicator L1 extinguished	L1	Replace L1
N.	Steps L through Z	A1	Replace A1

3. 69-37325-33 and -38 assemblies

	Trouble	Possible Cause	Correction
A.	Step (1)	A1	Replace A1
B.	Step (2)	CR2	Replace CR2
C.	Step (3)	CR1	Replace CR1
D.	Steps (4) or (5)	S1	Replace S1
E.	Step (6)	K2	Replace K2
F.	Step (7)	K1	Replace K1
G.	Step (8)	A1	Replace A1
H.	Step (12)		
	Light illuminates without pressing cap	K2	Replace K2
	Light does not illuminate when pressing cap	L1	Replace L1
I.	Step (13)	L1 or K2	Replace defective component
J.	Step (14)	K2	Replace K2
K.	Step (15) or (16)	L1	Replace L1
L.	Step (18)	K1 or A1	Replace defective component
M.	Step (19)	K1	Replace K1
N.	Figure 705, step C	A1 or R1	Replace defective component
O.	Figure 705, steps E to end	A1	Replace A1



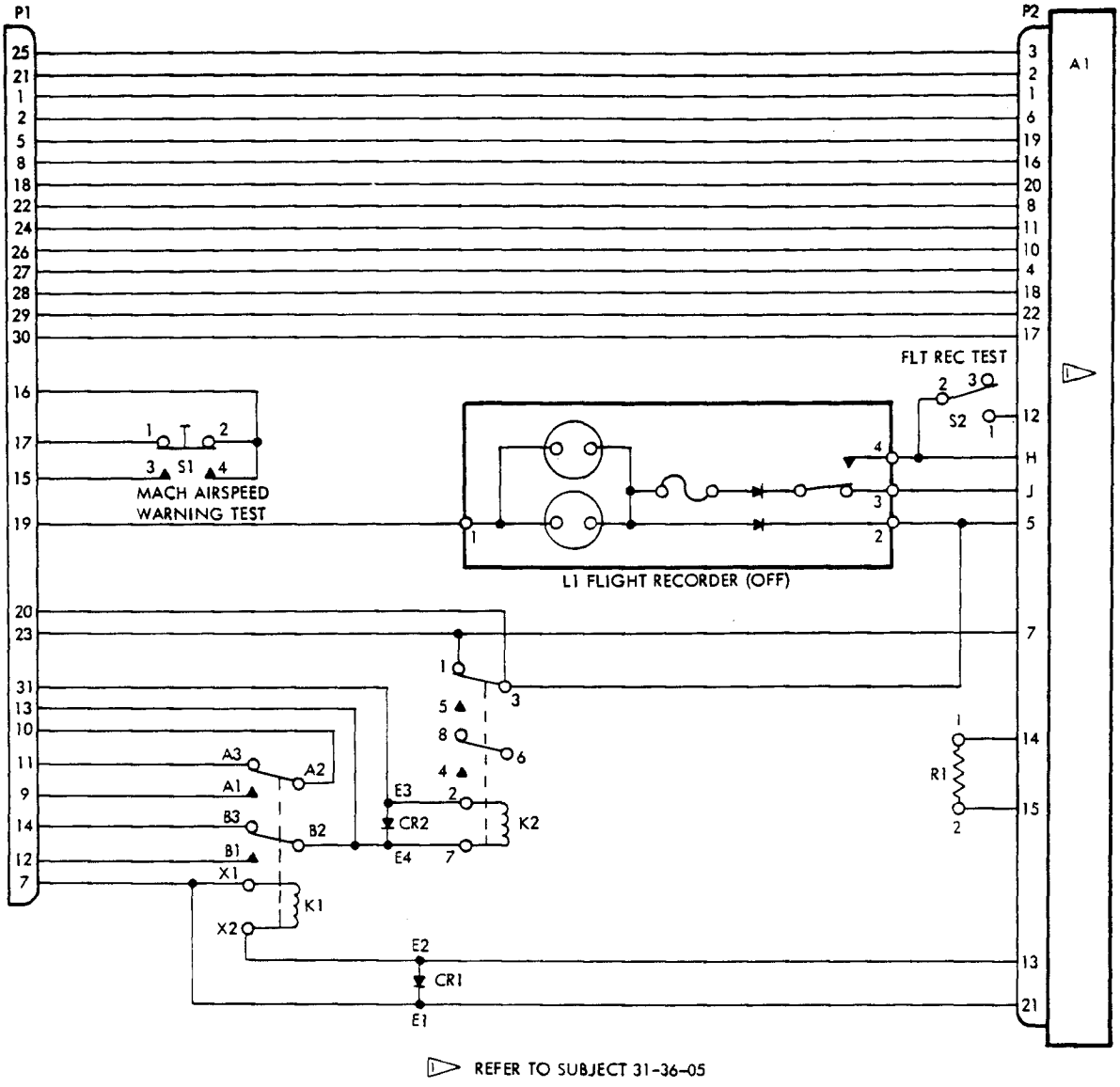
1. REFER TO SUBJECT 31-36-05
2. APPLICABLE TO 69-37325-14, -14M, -26, -27 AND -35
3. APPLICABLE TO 69-37325-17, -17M, -25, -29 AND -37
4. APPLICABLE TO 69-37325-17, -17M, -20, -20M, -24, -25, -28, -29, -36 AND -37
5. APPLICABLE TO 69-37325-14M, -17M, -20M, -27, -28, -29, -35, -36, AND -37
6. S3 ON 69-37325-17, -17M,-25, -29L AND -37
7. S1 ON 69-37325-17, -17M,-25, -29L AND -37
8. 330 OHMS, 1% - 69-37325-14, -14M, -17, -17M, -20, AND 20M
   510 OHMS, 3% - 69-37325-24 THRU -19, -35, -36, AND -37

NOTE: ALL WIRE BMS 13-16, TYPE I, CLASS I, SIZE AWG 20 UNLESS OTHERWISE NOTED.

69-37325-14, -14M, -17, -17M, -20, -20M, -24, -25, -26, -27, -28, -29, -35, -36, AND -37

Schematic Diagram
Figure 801

G14956



Schematic Diagram, Assemblies 69-37325-33 and -38
Figure 802

STORAGE INSTRUCTIONS

1. Protect assembly from dust, moisture, and atmospheric conditions. Slide unit into 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 Subject 20-11-02.

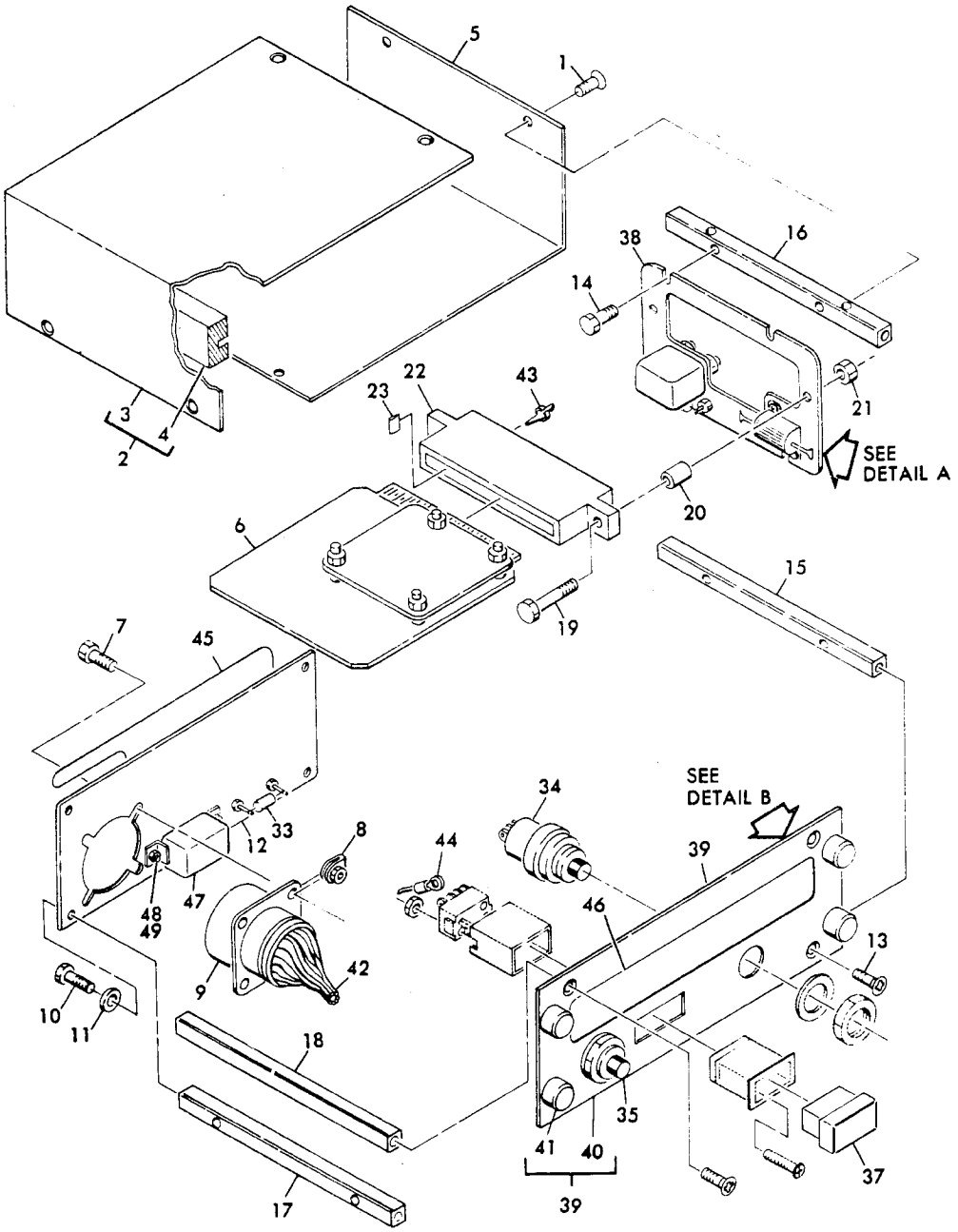
2. Tools used for repair of electrical terminations and for replacement of insulating sleeving are listed in Subject 20-11-03.

3. Tools used for soldering electrical connections are listed in Subject 20-12-01.

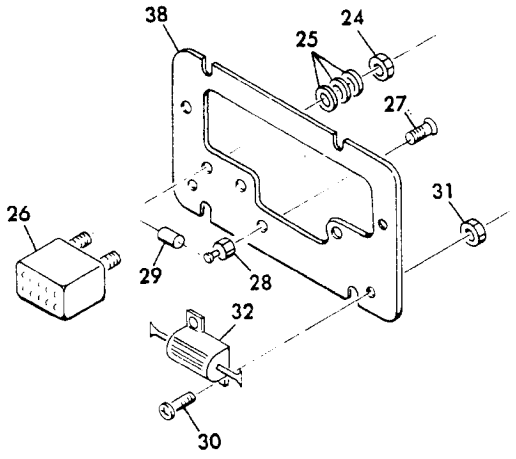
   NOTE: For additional equipment required for testing, refer to TESTING.

ILLUSTRATED PARTS LIST

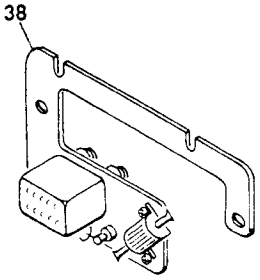
1. Exploded View



Flight Recorder and Mach Airspeed Warning
Test Module Assembly (P5-19)
Figure 1101 (Sheet 1)

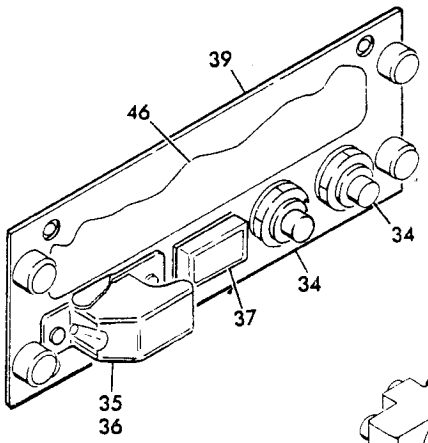


69-37325-14, -14M, -20, -20M, -24, -26, -27, -28, -33, -35, -36, AND -38 ASSEMBLIES

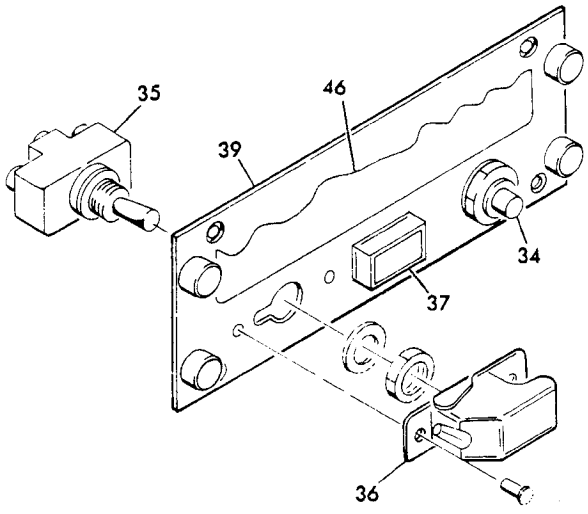


69-37325-17, -17M, -25, -29, AND -37 ASSEMBLIES

DETAIL A



69-37325-17, -17M, -25, -29, AND -37 ASSEMBLIES



69-37325-20, -20M, -24, -28, -33, -36, AND -38 ASSEMBLIES

DETAIL B

Flight Recorder and Mach Airspeed Warning
Test Module Assembly (P5-19)
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-					
	69-37325-14		FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODULE ASSY (P5-19)	A	
	69-37325-14M		FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODUEL ASSY (P5-19) (SB 78-1005 REV 1)	B	
	69-37325-17		FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODULE ASSY (P5-19)	C	
	69-37325-17M		FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODULE ASSY (P5-19) (SB78-1005 REV 1)	D	
	69-37325-20		FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODULE ASSY (P5-19) (SB 31-1009)	E	
	69-37325-20M		FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODULE ASSY (P5-19) (SB 78-1005 REV 1)	F	
	69-37325-24		FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODULE ASSY (P5-19) (SB 33-1013 REV 1)	G	
	69-37325-25		FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODULE ASSY (P5-19) (SB 33-1013 REV 1)	H	
	69-37325-26		FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODULE ASSY (P5-19)	I	
	69-37325-27		FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODULE ASSY (P5-19) (SB 78-1005 REV 1)	J	
	69-37325-28		FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODULE ASSY (P5-19) (SB 78-1005 REV 1)	K	
	69-37325-29		FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODULE ASSY (P5-19) (SB 78-1005 REV 1)	L	
	69-37325-33		FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODULE ASSY (P5-19)	M	
	69-37325-35		FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODULE ASSY (P5-19)	N	
	69-37325-36		FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODULE ASSY (P5-19)	O	

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
	69-37325-37		FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODULE ASSY (P5-19)	P	
	69-37325-38		FLIGHT RECORDER AND MACH AIRSPEED WARNING TEST MODULE ASSY (P5-19)	Q	
1	NAS514P440-4		. SCREW		8
2	69-43948-20		. COVER ASSY		1
2	69-43948-15		. COVER ASSY (OPT)	J-M	1
3	69-43948-19		. . COVER		1
3	69-43948-11		. . COVER (OPT)	J-M	1
4	69-43948-21		. . FOAM		1
4	69-43948-16		. . FOAM (OPT)	J-M	1
5	69-43948-19		. COVER		1
5	69-43948-11		. COVER (OPT)	J-M	1
6	69-51810-1		. PRINTED CIRCUIT ASSY (REF 31-36-05)	A-F	1
6	69-51810-8		. PRINTED CIRCUIT ASSY (REF 31-36-05)	H	1
6	69-51810-33		. PRINTED CIRCUIT ASSY (REF 31-36-05)	GI-Q	1
6	69-51810-22		. PRINTED CIRCUIT ASSY (REF 31-36-05) (OPT)	GI-Q	1
6	69-51810-8		. PRINTED CIRCUIT ASSY (REF 31-36-05) (OPT)	GI-Q	1
7	BACS12CB04-5		. SCREW		2
8	BACN10NW1		. CLIP NUT		2
9	BACC45FN18-31P		. CONNECTOR		1
10	BACS12CB06-5		. SCREW		4
11	MS35337-41		. WASHER	ABIJN	4
11	MS35338-41		. WASHER	C-HKLM POQ	4
12	69-43948-12		. BACKPLATE	A-LN-P	1
12	69-43948-18		. BACKPLATE	MQ	1
13	NAS514P632-5		. SCREW		4
14	BACS12CB04-4		. SCREW	ABEFGIJ KMNOQ	4
14	BACS12CB04-4		. SCREW	CDHLP	3
15	69-37325-5		. STANDOFF		1
16	69-37325-8		. STANDOFF		1
17	69-37268-13		. STANDOFF		1
18	69-37268-14		. STANDOFF		1
19	BACS12CB06-14		. SCREW		2
20	NAS43DD1-17		. SPACER		2

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
21	NAS679A06W		. NUT		2
22	582557-1		. CONNECTOR, V00779		1
23	582507-1		. KEYING PLUG, V00779		1
24	NAS679A06W		. NUT		2
25	AN960PD6		. WASHER		6
26	BACR13CF4		. RELAY (PREF)		1
26	JG2A		. RELAY (OPT), V35344		1
27	BACS12BE02-3		. SCREW	A-L NOP	2
27	BACS12BE02-3		. SCREW	MQ	4
28	1491A		. INSULATED TERMINAL, V88245 (OPTIONAL)	A-L NOP	2
28	1625-4-12		. INSULATED TERMINAL, V88245 (PREF)	A-L NOP	2
28	1491A		. INSULATED TERMINAL, V88245 (OPTIONAL)	MQ	4
28	1625-4-12		. INSULATED TERMINAL, V88245 (PREF)	MQ	4
29	1N4384		. DIODE, V14936		1
30	BACS12BE02-5		. SCREW		2
31	BACN10DN26		. NUT		2
32	RH5-330		. RESISTOR, 330 OHMS ± 1%, 5 W, V91637 (PREF)	A-F	1
32	3105M330-1		. RESISTOR, 330 OHMS ± 1%, 5 W, V00213 (OPT)	A-F	1
32	RH5-510		. RESISTOR, 510 OHMS ± 3%, 5 W, V91637 (PREF)	G-Q	1
32	3105M510-3		. RESISTOR, 510 OHMS ± 3%, 5 W, V00213 (OPT)	G-Q	1
33	1N4385		. DIODE, V14936	MQ	1
34	W20161-03		. SWITCH, V81640	ABEFG IJKMN OQ	1
34	W20161-03		. SWITCH, V81640	CDHLP	2
35	W20161-01		. SWITCH, V81640	ABIJN	1
35	MS24523-23		. SWITCH	C-HK LMOPQ	1
36	11170-1		. SWITCH GUARD, V72914	C-HK LMOPQ	1
37	319-619-1001-007		. INDICATOR LIGHT ASSY, V81590 (BOEING 10-61305-12)	A-M	1
37	318-630-1001-008		. INDICATOR LIGHT ASSY, V81590 (BOEING 10-61803-12)	N-Q	1

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	NOMENCLATURE 1 2 3 4 5 6 7	USE CODE	QTY PER ASSY
1101-					
38	69-43948-14		. SUPPORT PLATE	ABEFG IJKMN OQ	1
38	69-43948-17		. SUPPORT PLATE	CDHLP	1
39	69-37325-10		. BASEPLATE ASSY	ABIJN	1
39	69-37325-18		. BASEPLATE ASSY	CDHLP	1
39	69-37325-21		. BASEPLATE ASSY	EFGKM OQ	1
40	BACP10U0225G		. . BASEPLATE		1
41	BACS21DD1G		. . STUD ASSY		4
42	69-37325-13		. WIRE BUNDLE ASSY	ABI	1
42	69-37325-19		. WIRE BUNDLE ASSY	CDH	1
42	69-37325-22		. WIRE BUNDLE ASSY	EFG	1
42	69-37325-30		. WIRE BUNDLE ASSY	JN	1
42	69-37325-32		. WIRE BUNDLE ASSY	KO	1
42	69-37325-31		. WIRE BUNDLE ASSY	LP	1
42	69-37325-34		. WIRE BUNDLE ASSY	MQ	1
43	66143-2		. TAB TERMINAL, V00779		AR
44	BACT12S		. TERMINAL LUG		1
45	BAC27DCC239		. ALUMINUM FOIL MARKER		1
46	BAC27DCC98		. ALUMINUM FOIL MARKER	ABIJ	1
46	BAC27DCC459		. ALUMINUM FOIL MARKER	CDHL	1
46	BAC27DCC458		. ALUMINUM FOIL MARKER	EFGM	1
46	BAC27DCC571		. ALUMINUM FOIL MARKER (PREF)	K	1
46	BAC27DCC458		. ALUMINUM FOIL MARKER (OPT)	K	1
46	BAC27DCC570		. ALUMINUM FOIL MARKER	N	1
46	BAC27DCC571		. ALUMINUM FOIL MARKER	OQ	1
46	BAC27DCC572		. ALUMINUM FOIL MARKER	P	1
47	BR16-900B11-26V		. RELAY, V82050 (PREF)	MQ	1
47	BR16-900B11-26VR0		. RELAY, V82050 (OPT)	MQ	1
48	NAS679A04W		. NUT	MQ	2
49	BACS12CB04-5		. SCREW	MQ	2

FIG. 1101 REFERENCE DESIGNATION INDEX (SEE SCHEMATIC DIAGRAM)

REFERENCE DESIGNATION	PART NUMBER	ITEM NO.
A1	69-51810-1	6
A1	69-51810-8	6
A1	69-51810-22	6
A1	69-51810-33	6
CR1	1N4384	29
CR2	1N4385	33
E1 THRU E4	1491A	28
K1	*BACR13CF4	26
K1	JG2A	26
K2	BR16-900B11-26VRO	45
K2	*BR16-900B11-26V	45
L1	319-619-1001-007	37
L1	318-630-1001-008	37
P1	BACC45FN18-31P	9
P2	582557-1	22
R1	*RH5-330	32
R1	3105M-330-1	32
R1	*RH5-510	32
R1	3105M-510-3	32
S1, S3	W20161-03	34
S2	W20161-01	35
S2	MS24523-23	35

* PREFERRED PART

VENDORS

V00213	NYTRONICS COMPONENTS GRP., INC., SUBSIDIARY OF NYTRONICS INC., ORANGE ST., DARLINGTON, SOUTH CAROLINA 29532
V00779	AMP, INC., 2800 FULLING MILL, HARRISBURG, PA 17105-3608
V14936	GENERAL INSTRUMENTS CORP., SEMI-CONDUCTOR DIVISION, 600 W., JOHN STREET, HICKSVILLE, NEW YORK 11802
V35344	LEACH INTERNATIONAL OF NORTH AMERICA., 6900 ORANGETHROPE AVE., P.O. BOX 5032, BUENA PARK, CA. 90622-5032
V72914	MIDLAND-ROSS CORP., GRIMES DIV., 550 ROUTE 55, URBANA, OHIO 43078
V81590	KORRY ELECTRONIC INC., SUB OF CRITON CORP., 901 DEXTER AVE., NORTH, SEATTLE, WA 98109-3515
V81640	EATON CORP., AEROSPACE AND COMMERICIAL CONTROLS DIV., 2250 WHITFILED AVE., EAST, SARASOTA, FLORIDA 34243-9703
V82050	ESTERLINE ELECTONICS CORP., 3501 HARBOR BLVD., P.O. BOX 1499, COSTA MESA, CALIFORNIA 92626
V88245	LITTON SYSTEMS INC., USECO DIVISION, 13536 SATICOY ST., VAN NUYS, CALIFORNIA 91409
V91637	DALE ELECTRONICS, INC., 1122 23RD ST., P.O. BOX 609, COLUMBUS, NEBRASKA 68601-3632