

BOEING 
COMMERCIAL JET
OVERHAUL MANUAL

ANNUNCIATOR LIGHTS MODULE ASSEMBLY (M238)

31-36-48

BOEING P/N 65-55896

AIRLINE P/N

THIS SUBJECT APPLIES TO THE FOLLOWING BOEING AIRPLANE MODELS:

707 STRATOLINER	707 INTERCONTINENTAL	720	727	737
NONE	NONE	NONE	NONE	LIMITED

THE FOLLOWING DIRECTIVES APPLY TO THIS SUBJECT:

BOEING SERVICE BULLETIN	BOEING TEMPORARY REVISION	OTHER DIRECTIVES	DATE DIRECTIVE INCORPORATED INTO TEXT
		PRR 30689	May 15/69

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PAGE	DATE	PAGE	DATE	PAGE	DATE
31-36-48					
* T-1	May 15/69				
T-2	BLANK				
* LEP-1	May 15/69				
LEP-2	BLANK				
* T/C-1	May 15/69				
T/C-2	BLANK				
* 1	May 15/69				
* 2	May 15/69				
* 101	May 15/69				
102	BLANK				
* 201	May 15/69				
202	BLANK				
* 301	May 15/69				
302	BLANK				
* 401	May 15/69				
* 402	May 15/69				
* 501	May 15/69				
502	BLANK				
* 701	May 15/69				
* 702	May 15/69				
* 703	May 15/69				
* 704	May 15/69				
* 801	May 15/69				
802	BLANK				
*F 803	May 15/69				
804	BLANK				
* 901	May 15/69				
902	BLANK				
* 1001	May 15/69				
1002	BLANK				
* 1101	May 15/69				
* 1102	May 15/69				
* 1103	May 15/69				
* 1104	May 15/69				

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COMMERCIAL JET
OVERHAUL MANUAL

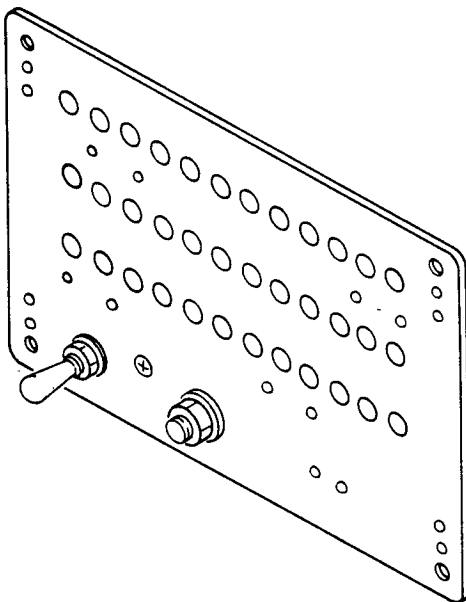
TABLE OF CONTENTS

<u>Paragraph Title</u>	<u>Page</u>
Description and Operation	1
Disassembly	101
Cleaning.	201
Inspection/Check.	301
Repair.	401
Assembly.	501
Fits and Clearances	None
Testing	701
Trouble Shooting.	801
Storage Instructions.	901
Special Tools, Fixtures, and Equipment.	1001
Illustrated Parts List.	1101
Numerical Parts List Index.	None

BOEING 
COMMERCIAL JET
OVERHAUL MANUAL

ANNUNCIATOR LIGHTS MODULE ASSEMBLY (M238)

Boeing Part Number: 65-55896-4



Annunciator Lights Module Assembly (M238)
Figure 1

DESCRIPTION AND OPERATION

1. Description

- A. The annunciator lights module assembly consists of a printed circuit assembly, switches, indicator lights and a wire bundle mounted on a panel.

2. Operation

- A. The annunciator lights module assembly contains the lights that indicate malfunction in various electrical systems.

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COMMERCIAL JET
OVERHAUL MANUAL

65-55896

3. Functional Description

- A. A1 is a blocking diode circuit.
- B. S1 is a two-pole pushbutton switch used to test A1 and lamps L1 through L12 by providing 28 volts dc from pin 46 and ground through pin 45.
- C. S2 is a 3-position single pole switch that will:
 - (1) Provide 28 volts dc to L1 through L12, bypassing S1, and in conjunction with pins 1 through 12 being individually grounded, allow L1 through L12 to be individually illuminated. (Pin and lamp numbers do not correlate.)
 - (2) Connect pin 46 to pins 42, 43, and 44.
- D. L13 through L18 are illuminated by applying 28 volts dc at pins 13 through 18 respectively, and grounding pin 41.
- E. L19 through L29 are illuminated by applying 115 volts, 400 Hz, at pins 19 through 29 respectively and grounding pin 47.

4. Leading Particulars

Height -- 8-3/4 inches (approx)
Length -- 8-1/2 inches (approx)
Width -- 2-1/2 inches (approx)
Weight -- 4-1/2 pounds (approx)
Operating voltage -- 28 volts dc; 115 volts ac, 400 Hz

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COMMERCIAL JET
OVERHAUL MANUAL

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 Subject 20-12-01 for unsoldering procedures.

CAUTION: USE CARE WHEN HANDLING WIRING CONNECTIONS. HOLD PRINTED CIRCUIT ASSEMBLIES BY EDGES ONLY.

2. Disassembly (See figure 1101.)

- A. Remove screws (1), receptacle (3), card assembly (6) and spacers (2) from panel assembly (31).
- B. Remove card assembly (6) from receptacle (3).

NOTE: Refer to Subject 31-36-49 for overhaul instructions on card assembly.

- C. Remove screws (7), clamps (10 and 11), receptacle (12), etched board (14) and spacers (8 and 9).
- D. Remove washers (18), clamp (15) and indicator lights (16 and 17). Clamp (15) is installed with indicator light L1 only.
- E. Disconnect terminal lugs (22) from switches (23 and 24) and remove switches.

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COMMERCIAL JET
OVERHAUL MANUAL

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 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, refer to "Preparation for Soldering," in Subject 20-12-01.
5. Clean terminal lugs and other bonding areas per Subject 20-11-03.

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COMMERCIAL JET
OVERHAUL MANUAL

INSPECTION/CHECK

1. Visual Checks

NOTE: Use five-power magnification for checking component, wiring, and soldering.

- 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 wire for proper routing.
- F. Check connectors for bent, corroded, or cracked pins.
- G. Check nameplates, metal labels, and Metal-Cals for proper installation and legibility.
- H. Check components for legibility of reference designations and terminal identification.
- I. Check finished surfaces for damage.
- J. Check assembly for warping, bending, or other damage.
- K. Check insulating sleeving for proper installation and evidence of damage.

2. Special Checks

- A. Check vendor components per manufacturer's instructions.

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COMMERCIAL JET
OVERHAUL MANUAL

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 repair of wire terminations at terminal lugs 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.

BOEING 
COMMERCIAL JET
OVERHAUL MANUAL

65-55896

3. Replacement

- A. If electrical wires require replacement, replace with same length as removed. Use electrical cable, Specification EMS 13-31, type 1 class 1, size 22, and connect per Subject 20-11-02. Refer to schematic diagram for wire routing.
- B. If electronic components require replacement, refer to schematic diagram for wire connections and connect per Subject 20-11-02.
- C. If Metal-Cals or nameplate require replacement, install per Subject 20-50-05.
- D. If keying plug (5, figure 1101) requires replacement, install adjacent to 43 on receptacle (3, figure 1101).
- E. Replace damaged terminals (22, figure 1101) per Subject 20-11-02.

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COMMERCIAL JET
OVERHAUL MANUAL

ASSEMBLY

1. General

- A. Complete required REPAIR procedures.
- B. Connect electrical wires per schematic diagram.

2. Reassembly (See figure 1101.)

- A. Install switches (23 and 24). Connect terminal lugs (22) to switches.
- B. Install indicator lights (16 and 17), washers (18) and clamp (15). Clamp (15) is installed with indicator light L1 only.
- C. Install spacers (8 and 9), etched board (14), receptacle (12), clamps (10 and 11) and screws (7).
- D. Install card assembly (6) in receptacle (3).
- E. Install card assembly (6), receptacle (3), spacer (2) and screw (1).
- F. Check to see that one end of tether thread (28) is attached to extraction tool (27) and the opposite end is attached to clamp (15).

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COMMERCIAL JET
OVERHAUL MANUAL

TESTING

1. Test Equipment

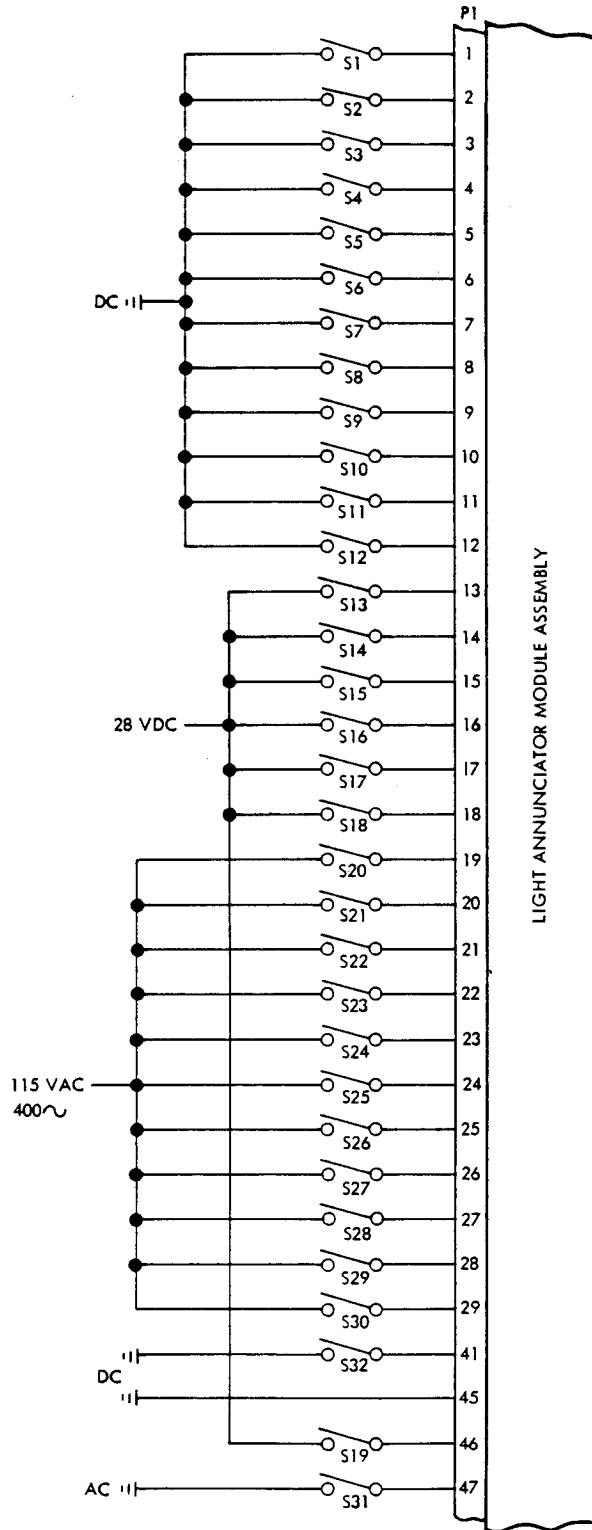
- A. Power Supply, 28 volts dc, 0.5 ampere
- B. Power Supply, 115 volts ac, 400 Hz
- C. Multimeter, 260 (Simpson) or equivalent
- D. Switches, SPST (32 required)

2. Functional Test

- A. Test electrical continuity between following pins:
 - (1) Pins 44 and 42
 - (2) Pins 44 and 43
 - (3) Pins 44 and 46 with switch S2 set to "ERASE"
- B. Connect 28 volts dc to pin 46 and ground pin 45.
- C. Push the press-to-test switch (S1). Verify following lamps are illuminated:

<u>APU Gen.</u>	<u>Gen No. 2</u>	<u>Gen No. 1</u>
MT (L12)	MT (L8)	MT (L4)
FF (L11)	FF (L7)	FF (L3)
LV (L10)	LV (L6)	LV (L2)
HV (L9)	HV (L5)	HV (L1)

- D. Release switch S1. The lamps will extinguish.
- E. Remove 28 volts dc from pins 45 and 46.
- F. Connect test setup as shown in figure 701.



Test Setup, Light Annunciator Module Assembly
 Figure 701

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OVERHAUL MANUAL

G. Perform tests indicated in figures 702 and 703. Tests will start with all switches in the "OFF" position and all lamps extinguished.

H. Remove assembly from test setup.

Test Switch			S2	Lamp Indications	
Step	Number	Position	▷	Illuminated	Not Illuminated
1	19	ON			
2	1	ON	IND	GEN 1, HV (L1)	
3	1	OFF	OFF		GEN 1, HV (L1)
4	2	ON	IND	GEN 1, LV (L2)	
5	2	OFF	OFF		GEN 1, LV (L2)
6	3	ON	IND	GEN 1, FF (L3)	
7	3	OFF	OFF		GEN 1, FF (L3)
8	4	ON	IND	GEN 1, MT (L4)	
9	4	OFF	OFF		GEN 1, MT (L4)
10	5	ON	IND	GEN 2, FF (L7)	
11	5	OFF	OFF		GEN 2, FF (L7)
12	6	ON	IND	GEN 2, MT (L8)	
13	6	OFF	OFF		GEN 2, MT (L8)
14	7	ON	IND	GEN 2, HV (L5)	
15	7	OFF	OFF		GEN 2, HV (L5)
16	8	ON	IND	GEN 2, LV (L6)	
17	8	OFF	OFF		GEN 2, LV (L6)
18	9	ON	IND	APU GEN, HV (L9)	
19	9	OFF	OFF		APU GEN, HV (L9)
20	10	ON	IND	APU GEN, LV (L10)	
21	10	OFF	OFF		APU GEN, LV (L10)
22	11	ON	IND	APU GEN, FF (L11)	
23	11	OFF	OFF		APU GEN, FF (L11)
24	12	ON	IND	APU GEN, MT (L12)	
25	12	OFF	OFF		APU GEN, MT (L12)
26	13,32	ON		DC BUS NO. 1 (L13)	
27	13	OFF			DC BUS NO. 1 (L13)
28	14	ON		DC BUS NO. 2 (L14)	
29	14	OFF			DC BUS NO. 2 (L14)
30	15	ON		DC BUS TR 3 (L15)	
31	15	OFF			DC BUS TR 3 (L15)
32	16	ON		DC BUS BAT (L16)	
33	16	OFF			DC BUS BAT (L16)
34	17	ON		DC BUS STBY (L17)	
35	17	OFF			DC BUS STBY (L17)
36	18	ON		DC BUS EXT PWR (L18)	
37	18,19,32	OFF			DC BUS EXT PWR (L18)

▷ S2 is in module being tested

BOEING 
COMMERCIAL JET
OVERHAUL MANUAL

65-55896

Test Switch			AC Bus Lamp Indications	
Step	Number	Position	Illuminated	Not Illuminated
1	All	OFF		
2	31	ON		
3	20	ON	No. 1, Phase A (L19)	
4	20	OFF		No. 1, Phase A (L19)
5	21	ON	No. 1, Phase C (L20)	
6	21	OFF		No. 1, Phase C (L20)
7	22	ON	No. 2, Phase A (L21)	
8	22	OFF		No. 2, Phase A (L21)
9	23	ON	No. 2, Phase C (L22)	
10	23	OFF		No. 2, Phase C (L22)
11	24	ON	Transfer No. 1, Phase A (L23)	
12	24	OFF		Transfer No. 1, Phase A (L23)
13	25	ON	Transfer No. 1, Phase C (L24)	
14	25	OFF		Transfer No. 1, Phase C (L24)
15	26	ON	Transfer No. 2, Phase A (L25)	
16	26	OFF		Transfer No. 2, Phase A (L25)
17	27	ON	Transfer No. 2, Phase C (L26)	
18	27	OFF		Transfer No. 2, Phase C (L26)
19	28	ON	STBY (L27)	
20	28	OFF		STBY (L27)
21	29	ON	Grd Service, Phase A (L28)	
22	29	OFF		Grd Service, Phase A (L28)
23	30	ON	Grd Service, Phase C (L29)	
24	30,31	OFF		Grd Service, Phase C (L29)

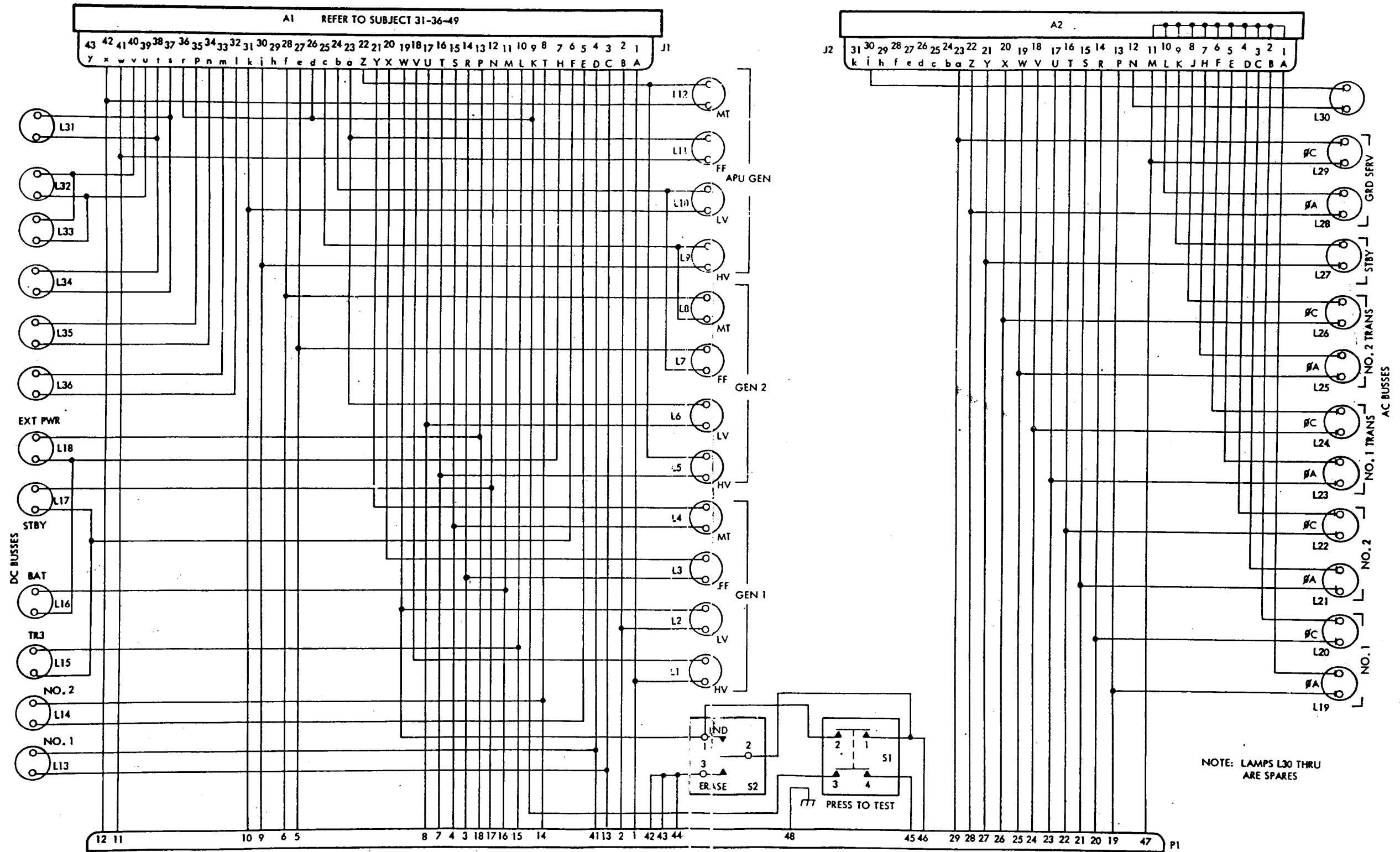
AC Power Test
Figure 703

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TROUBLE SHOOTING

1. If failure of a test occurs, check for defective connections, incorrect wiring connections, and defective components.
2. The trouble shooting table is keyed to the steps of the functional test procedures. Trouble shooting is written with the assumption that all previous steps of the functional test were satisfactorily completed.
3. When trouble has been isolated to a specific component, or associated circuitry, it will be necessary to replace components.
4. Trouble during test after overhaul.

<u>Trouble</u>	<u>Possible Cause</u>	<u>Correction</u>
A. Test step A		
Failure to obtain continuity	Defective S2	Replace S2
B. Test step C		
No lamp illuminates	Defective S1	Replace S1
One or more lamps do not illuminate	Defective lamp	Replace lamp
	Defective A1	Replace A1
C. Figure 702, steps 2 through 25		
Lamp does not illuminate	Defective S1 or wiring	Replace S1 or wiring
D. Figure 702, steps 26 and on		
Lamp does not illuminate	Defective lamp	Replace lamp
E. Figure 703		
Lamp does not illuminate	Defective A2	Replace A2
	Defective lamp	Replace lamp



NOTE: LAMPS L30 THRU
ARE SPARES

Schematic Diagram, Annunciator Lights Module Assembly
Figure 801

May 15/69

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STORAGE INSTRUCTIONS

1. Protect assembly from dust, moisture, and atmospheric conditions. 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.

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OVERHAUL MANUAL

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.

65-55896

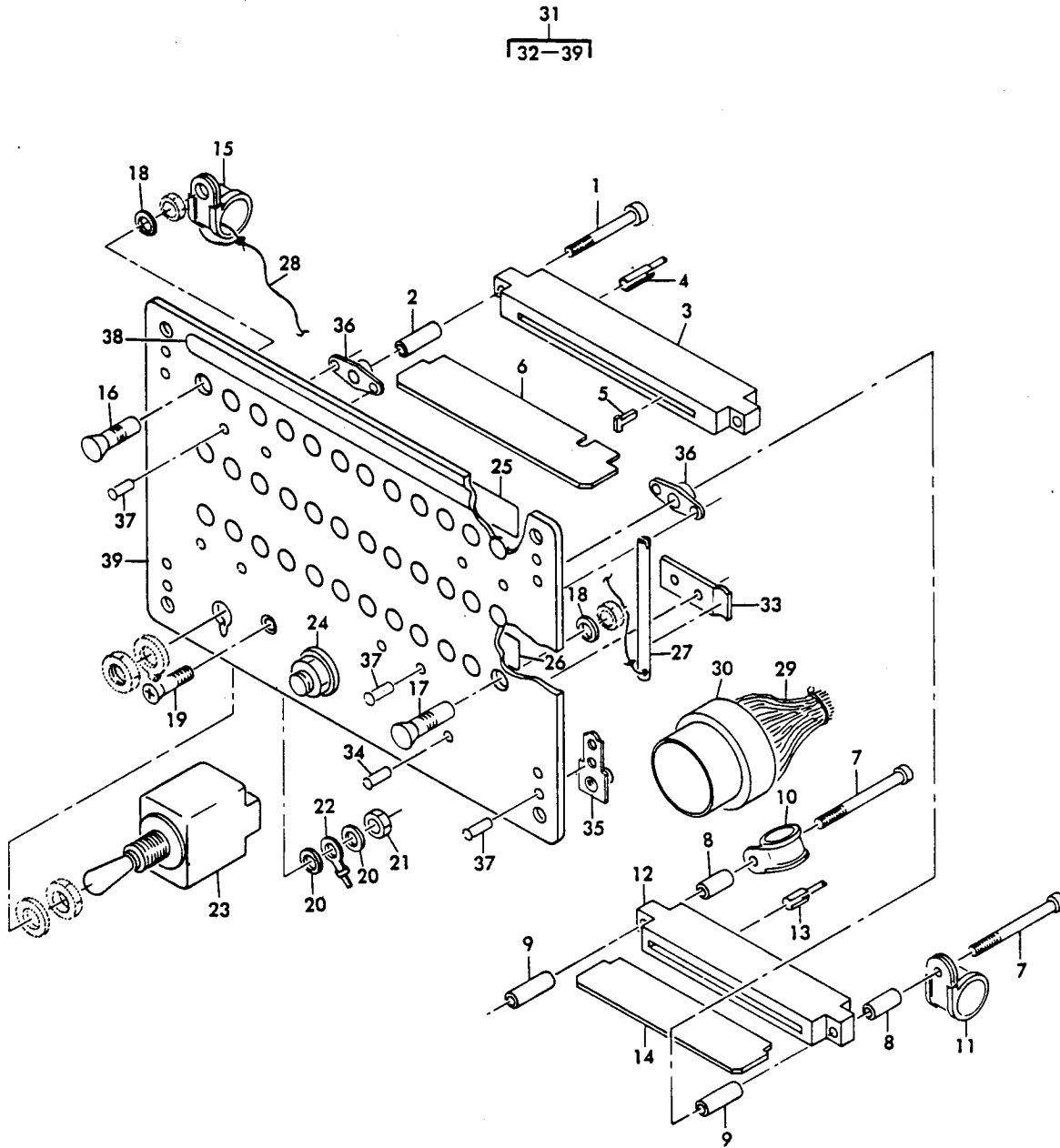
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OVERHAUL MANUAL

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May 15/69

31-36-48
Page 1101

1. Exploded View



Annunciator Light Module Assembly
Figure 1101

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OVERHAUL MANUAL

2. Group Assembly Parts List

FIG. & ITEM NO.	PART NO.	AIRLINE PART NUMBER	N O M E N C L A T U R E							USE CODE	QTY PER ASSY
			1	2	3	4	5	6	7		
1101	65-55896-4		ANNUNCIATOR LIGHT MODULE ASSEMBLY (M238)								
1	BACSL2CB3-20		. SCREW								2
2	NAS42DD6-6		. SPACER.								2
3	582561-1		. CONNECTOR, V00779								1
4	66144-2LP		. TERMINAL, Tab, V00779							AR	
5	582507-1		. PLUG, Keying, V00779.								1
6	69-42999-1		. DIODE CARD ASSEMBLY (See Subject 31-36-49 for details)								1
7	BACSL2CB3-30		. SCREW								2
8	NAS42DD6-36		. SPACER.								2
9	NAS42DD6-6		. SPACER.								2
10	BACCL0BH4RW		. CLAMP								1
11	BACCL0BH7RW		. CLAMP								1
12	582559-1		. CONNECTOR, V00779								1
13	66144-2LP		. TERMINAL, Tab, V00779							AR	
14	69-43200-1		. BOARD, AC etched.								1
15	BACCL0DK2		. CLAMP								1
16	L10600W		. LIGHT, Indicator, V81640.								24
17	L20204		. LIGHT, Indicator, V81640.								12
18	MS35338-43		. WASHER.								36
19	NAS514-632-8		. SCREW								1
20	AN960PD6		. WASHER.								2
21	NAS679A06W		. NUT								1
22	BACT12AC3		. LUGS, Terminal.							AR	
23	MS24658-27N		. SWITCH, Toggle.								1
24	A4-1089		. SWITCH, Pushbutton, V81640.								1
25	BAC27DEX49		. METAL-CAL								1
26	BAC27DEX50		. METAL-CAL								1
27	91011-1		. TOOL, Extraction, V00779.								1
28	65-55896-2		. TETHER THREAD								1
29	65-55896-3		. BUNDLE ASSEMBLY								1
30	BACC45FT22-55P		. . CONNECTOR PLUG.								1
31	69-43213-2		. PANEL ASSEMBLY.								1
32	BAC27DEX388		. . METAL-CAL								1
33	HL4		. . CLIP, V90434.								1
34	MS20426D4		. . RIVET								2
35	NAS687A3		. . NUT								4
36	BACN1OMS3-8		. . NUT, Spacer plate								4
37	MS20426D3		. . RIVET								16
38	BAC27DEX388		. . METAL-CAL								1
39	69-43213-3		. . PANEL								1

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COMMERCIAL JET
OVERHAUL MANUAL

65-55896

Reference Designation Index (See Schematic Diagram)		
Reference Designation	Part Number	Item No.
A1	69-42999-1	6
A2	69-43200-1	14
J1	582561-1	3
J2	582559-1	12
L1 thru L18	L10600W	16
L19 thru L30	L20204	17
L31 thru L36	L10600W	16
P1	BACC45FT22-55P	30
S1	A4-1089	20
S2	MS24658-27N	23

VENDOR CODE

<u>Code</u>	<u>Name and Address</u>
V00779	AMP, Incorporated P.O. Box 3608 Harrisburg, Pennsylvania 17105
V81640	Control Switch Division Controls Co. of America Folcroft, Pennsylvania
V90436	Laminated Plastic Service Co. 1220 Maple Los Angeles, California 90015