

CANADAIR CHALLENGER  
BREAKOUT TEST SET

Procedure No. CCSC3350E-01-09

Rev. NC

OPERATING GUIDE

For Emergency Lighting Test Set

P/N CCSC3350E-01

Mod Status NC

WARNING!

To prevent possible damage to equipment  
or injury to personnel,  
familiarize yourself with the maintenance manual  
and these procedures for the proper operation of the  
Emergency Lighting System.

\* \* \* \* \*

NOT AUTHORIZED  
FOR  
INFLIGHT USE

IN-HOUSE MANUFACTURE

PACKING SLIP

Ref. Service Order \_\_\_\_\_

Service Order \_\_\_\_\_ P.O. # \_\_\_\_\_

=====

<u>Qty</u>	<u>Part Number</u>	<u>Mod Status</u>	<u>Description</u>	<u>Ser Num</u>
1	CCSC3350E-01	___	Emergency LTG System Breakout Test Set	___
consisting of:				
1	CCSC3350E-01-00	___	Emer LTG System Test Set	___
1	CCSC3350E-01-50	___	Circuit Board (installed in unit)	___
1	CCSC3350E-01-09	___	Procedures	___
1	Accessory Kit, consisting of:			
1	CCSC0000-01-11		Alligator/banana test lead	
2	CCSC0000-01-12		Pin/banana test leads	
1	CCSC0000-01-15		Voltmeter test leads	
2	2 amp		Fuses, spare	
1	5 amp		Fuse, spare	

CHECK APPROPRIATE ITEM(S):

REPAIRED \_\_\_ UNREPAIRABLE (SCRAP) \_\_\_ RETURNED AS IS \_\_\_

MANUFACTURED \_\_\_ MODIFIED \_\_\_

CERTIFIED \_\_\_ RECERTIFIED \_\_\_

Date received \_\_\_\_\_

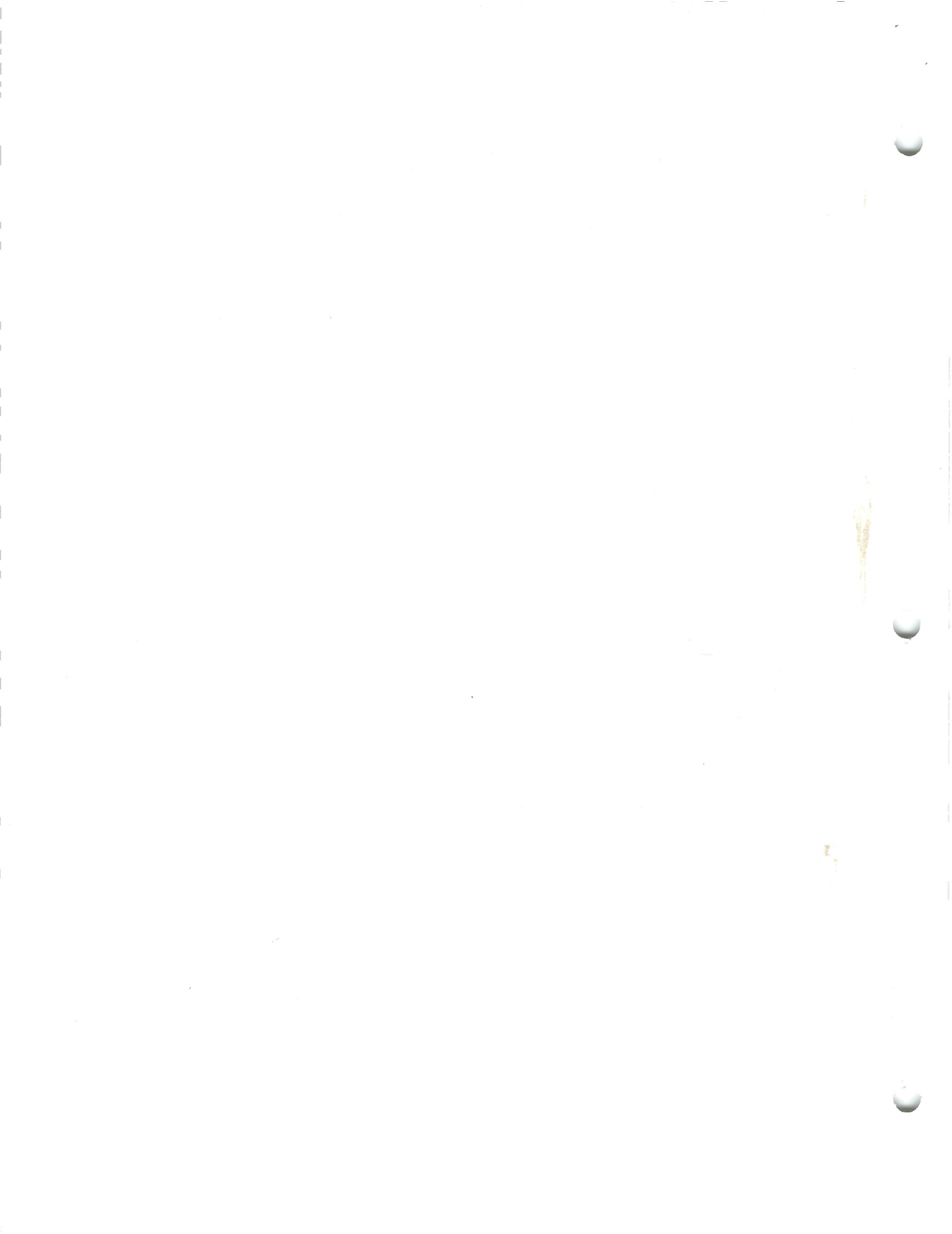
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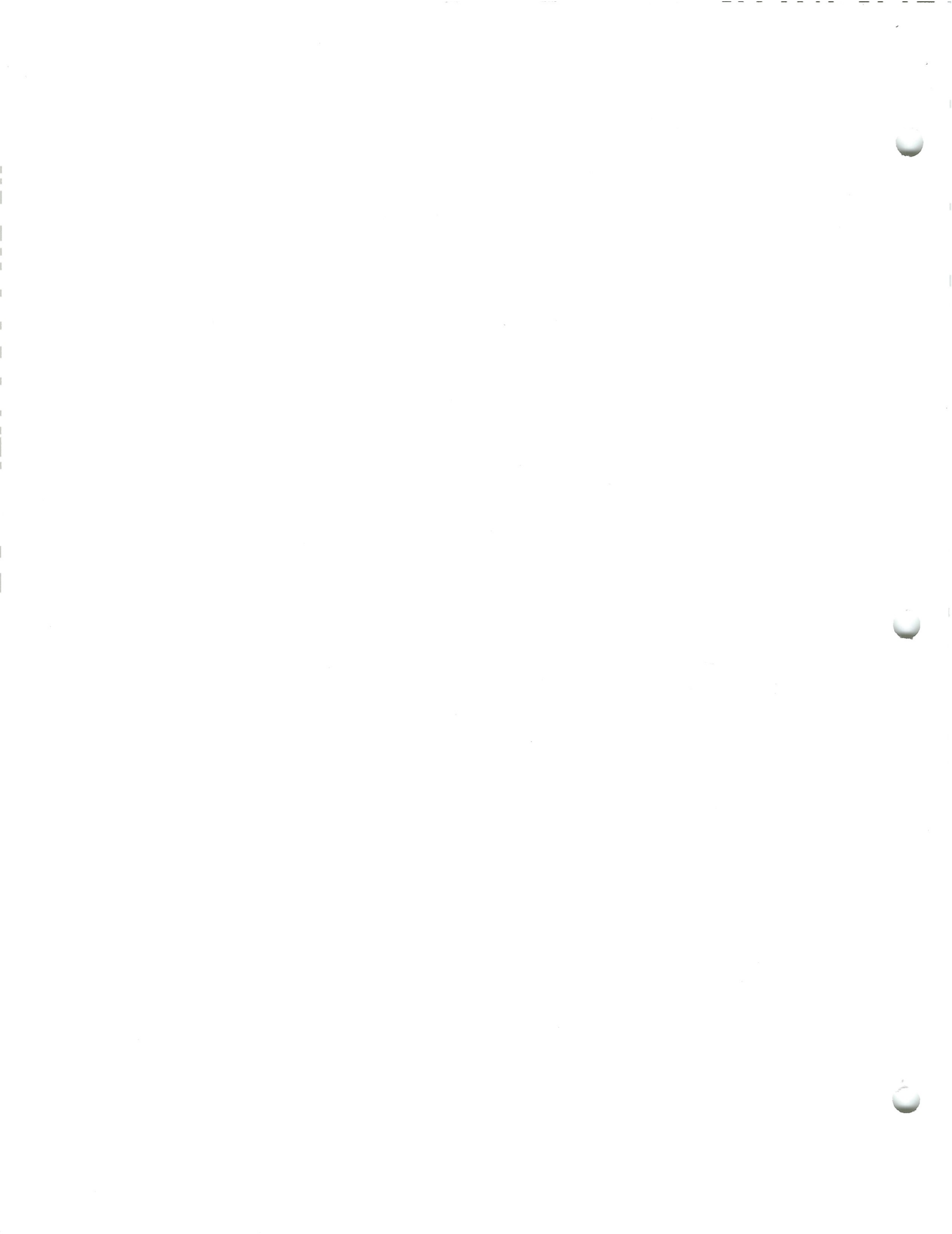
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The CANADAIR Emergency Lighting Breakout Test Set, p/n CCSC3350E-01, provides many features to assist in testing or troubleshooting the Challenger's Emergency Lighting System and Grimes Emergency Power Supplies.

The main features this unit includes are:

- Normal (Aircraft) and Bench Setup modes for both aircraft troubleshooting and for complete Bench Testing as called for in Grimes' Emergency Power Supply Maintenance Manual p/n 60-1321.
- Monitoring of each of the Emergency Power Supplies in the aircraft Emergency Lighting System while in operation to isolate malfunctioning components.
- Substitution of Cockpit Control Panel signals to confirm proper control input to each Emergency Power Supply.
- Substitution of Aircraft load Circuits to confirm outputs from each Emergency Power Supply, and to isolate which Emergency Power Supply is causing the "Emergency Lights On" indication in the cockpit.
- Bench Setup configuration to allow complete bench testing IN AIRCRAFT or on the bench.
- Provision for External Power input, to allow aircraft testing when aircraft power is not available.



I. Additional Support Tooling Required:

The following additional support tooling, or suitable substitutes, may be required, depending on the particular maintenance being performed. If in doubt, consult the Maintenance Manual.

- A. Digital Multimeter, 4 digit, +/- .005v accuracy .
- B. Power Supply; 28 VDC, 3 amps, outout.

II. P R E C A U T I O N S:

- A. DO NOT connect/disconnect BOB to/from system with aircraft power applied.
- B. Check aircraft/BOB connections for pushed/bent pins before connections are made.
- C. DO NOT use B.O.B while inflight.

III. References:

- Maint. Manual Chap. 6 for location of Access Panels
- Maint. Manual Chap. 7 for Jacking of A/C
- Maint. Manual Chap. 12 for application of aircraft power
- Maint. Manual Chap. 33 for Emergency Lighting System operation.
- Component Maint. Manual Chap 33-50-42 for Bench Testing

IV. BREAKOUT BOX TECHNICAL SUPPORT:

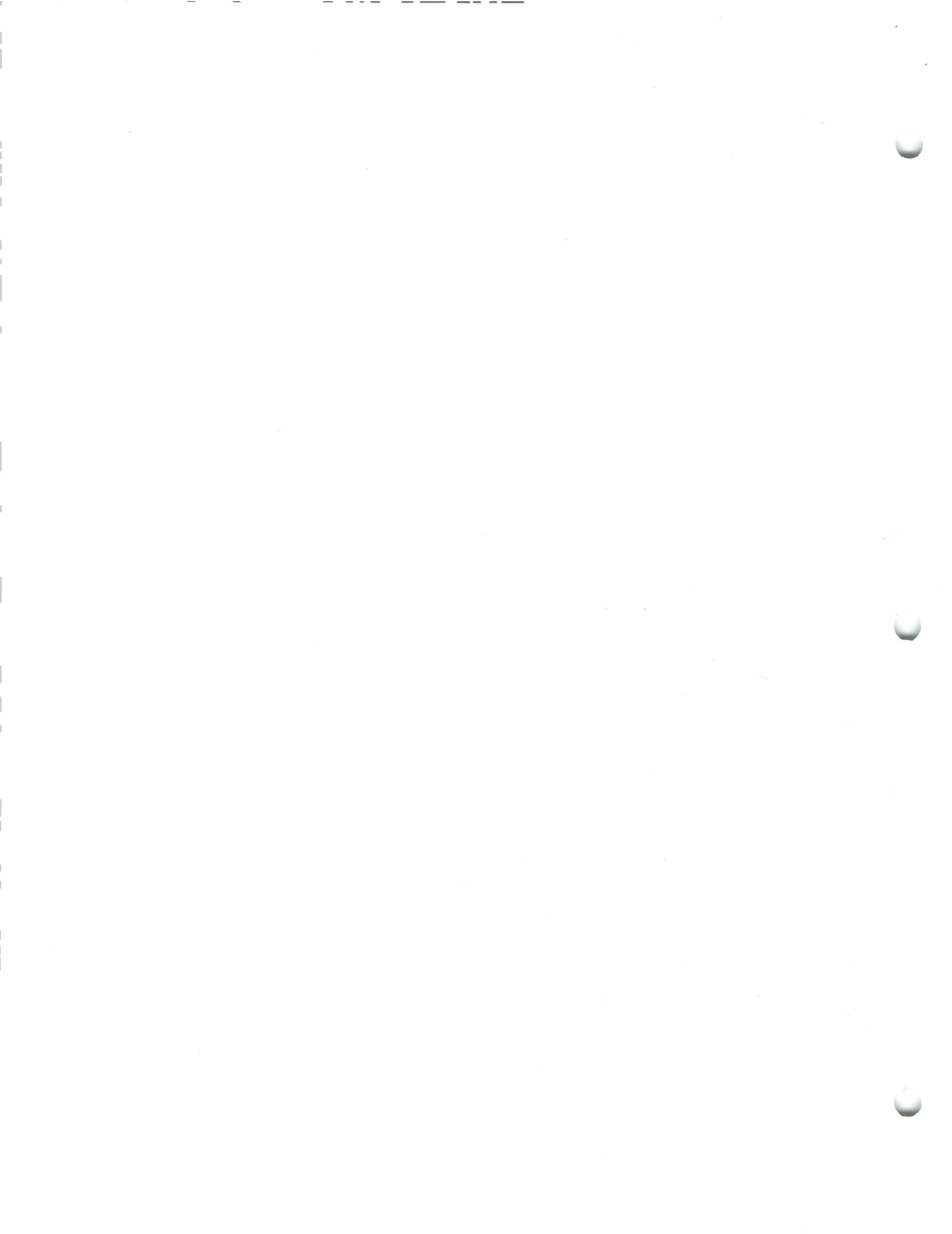
If you require assistance or experience difficulties while using the Emergency Lighting Test Set, contact:

Canadair Challenger Service Center  
Avionics Fabrication Department  
Bradley International Airport  
Windsor Locks, CT 06096

phone: (203)-627-9491 ext 236

or

your regional Field Service Representative





V. BREAKOUT BOX LEGEND:

A. Lamp, Red - Indicates 28 VDC power present, when illuminated.

B. Test Set Switch Functions:

1. "TEST SET CONFIG" switch:

"NORMAL (ACFT BREAKOUT)" position-

Configuration of aircraft's input circuitry is not changed.  
Monitoring of inputs at test points provided.

"BENCH SETUP (BENCH TEST)" position-

Aircraft system inputs to Power Supply are disconnected.  
Operation determined by Test Set's "POWER ON/OFF" and  
"OFF/ARMED/ON" switches.

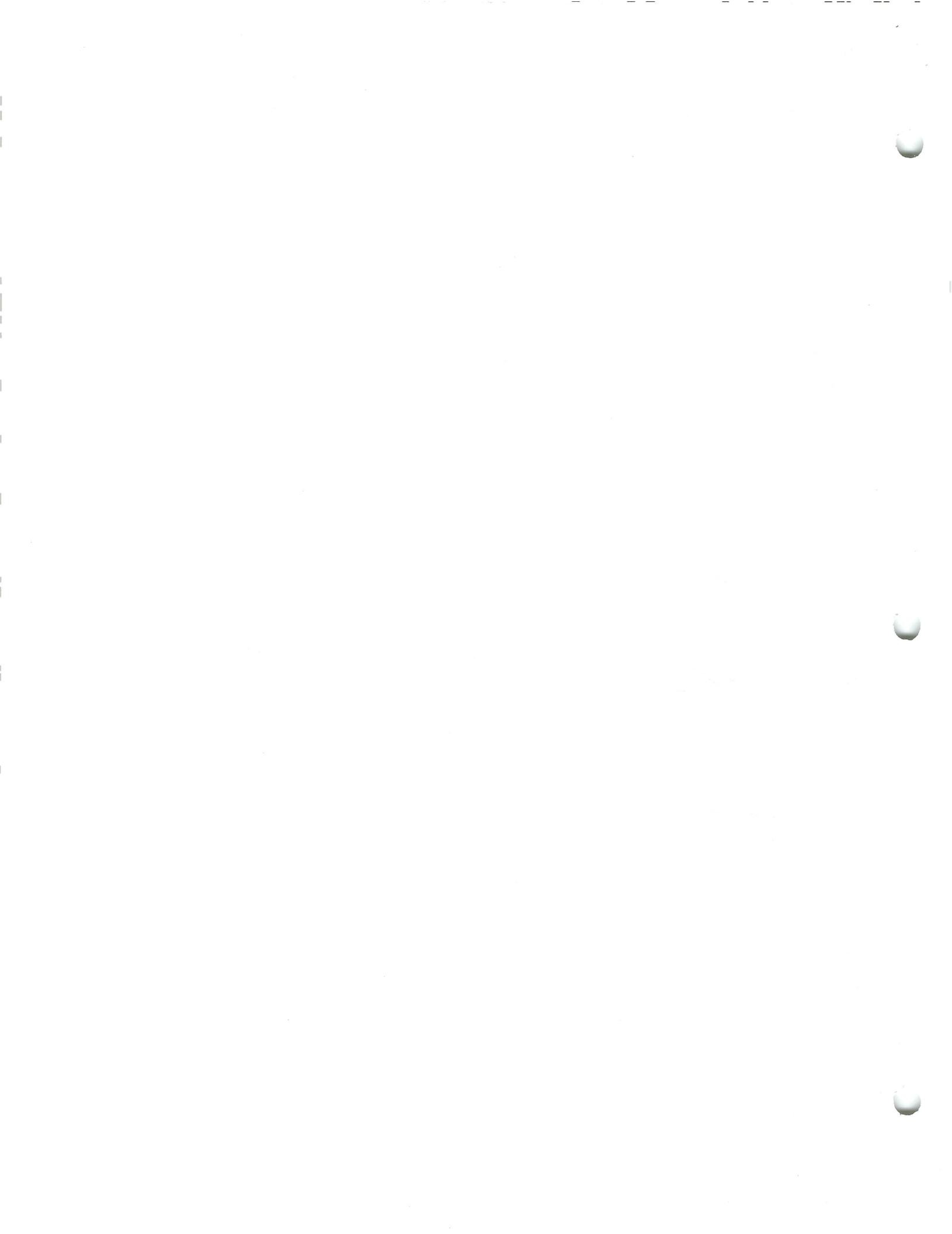
2. "LOAD SELECT" switch:

"NORMAL (ACFT BREAKOUT)" position-

Configuration of aircraft Emergency Lights circuitry is not  
changed. Monitoring at Test Set test points provided.

"BENCH SETUP (INTERNAL LAMPS)" position-

Aircraft system Emergency Lights circuits are disconnected.  
Test Set internal load lamps are substituted to establish  
exact loading per the Grimes recommended bench setup  
circuitry.



## VI. TEST SET / SYSTEM OPERATIONAL PROCEDURES:

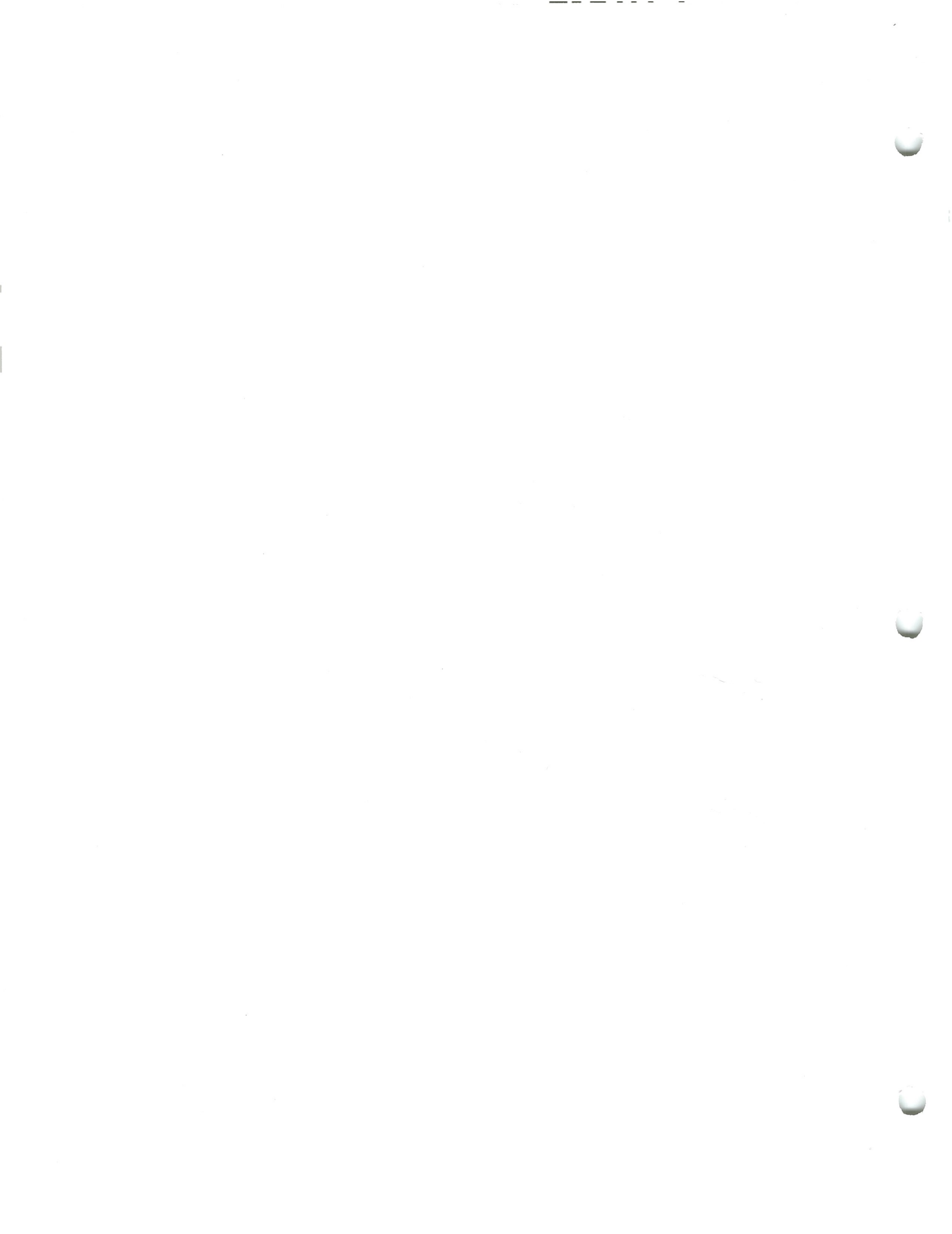
Except for INITIAL SETUP, the following numbered sections are designed as separate checkout modules which can be performed independently of each other.

### A. INITIAL SETUP

The following setup produces normal system operation. With the BOB installed in line, monitoring of all available test points is obtained, with no alteration or interruption of system operation.

1. Remove power from aircraft.
2. Connect BOB between Emergency Power Supply, Grimes p/n 60-1321, jack connector and aircraft wiring plug. The Challenger's normal system contains 2 power supplies, possible completion center additions may have been made.
3. Position Test Set "TEST SET CONFIG" and "LOAD SELECT" switches to "NORMAL".
4. Position Test Set "ON/OFF/LAMP TEST" switch to "OFF".
5. Position Test Set "OFF/ARMED/ON" switch to "OFF".
6. Position Test Set "NORMAL/DROPOUT CHECK" switch to "NORMAL".
7. Rotate Test Set "BATTERY DROPOUT VOLTAGE ADJUST" fully counterclockwise.
8. Turn on aircraft power.
9. Switch cockpit Master Caution BRT/DIM switch, on 10 channel annunciator, to BRT.
10. Perform cockpit Master Caution lamp test for "EMER LIGHTS OFF" and "EMER LIGHTS ON" annunciators, located on the Cockpit Emergency Lighting Control Panel. Both lamps should illuminate.
11. Position Test Set "ON/OFF/LAMP TEST" switch to "LAMP TEST". Test Set "POWER ON" lamp illuminates.
12. Release "LAMP TEST".

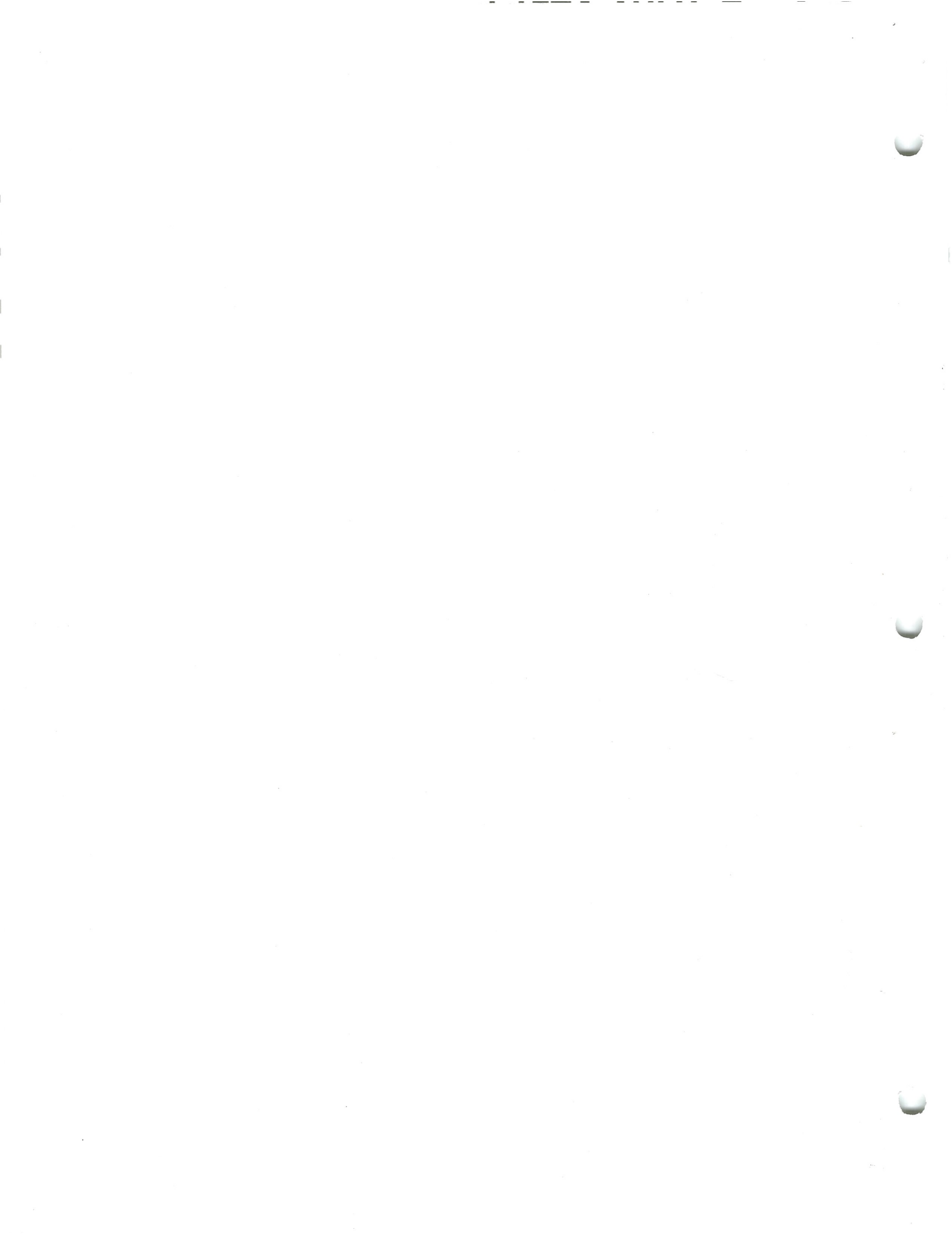
The system may now be operated from the cockpit normally, and monitored on the Test Set.



## B. OPERATIONAL TEST - ON AIRCRAFT

The following procedure may be used to perform operational testing of the Emergency Lighting Power Supplies.

1. Set Test Set and aircraft system configuration as in Initial System Setup, step VI.A.
2. If Test Set "LAMP TEST" fails, check Test Set "EXT 28 VDC POWER" fuses. If found good, perform System troubleshooting of the Cockpit Control Panel and associated wiring to the Emergency Power Supply under test.
3. Perform Operational Test as detailed in Canadair Maintenance Manual Chap 33-50-00 para. 2A.



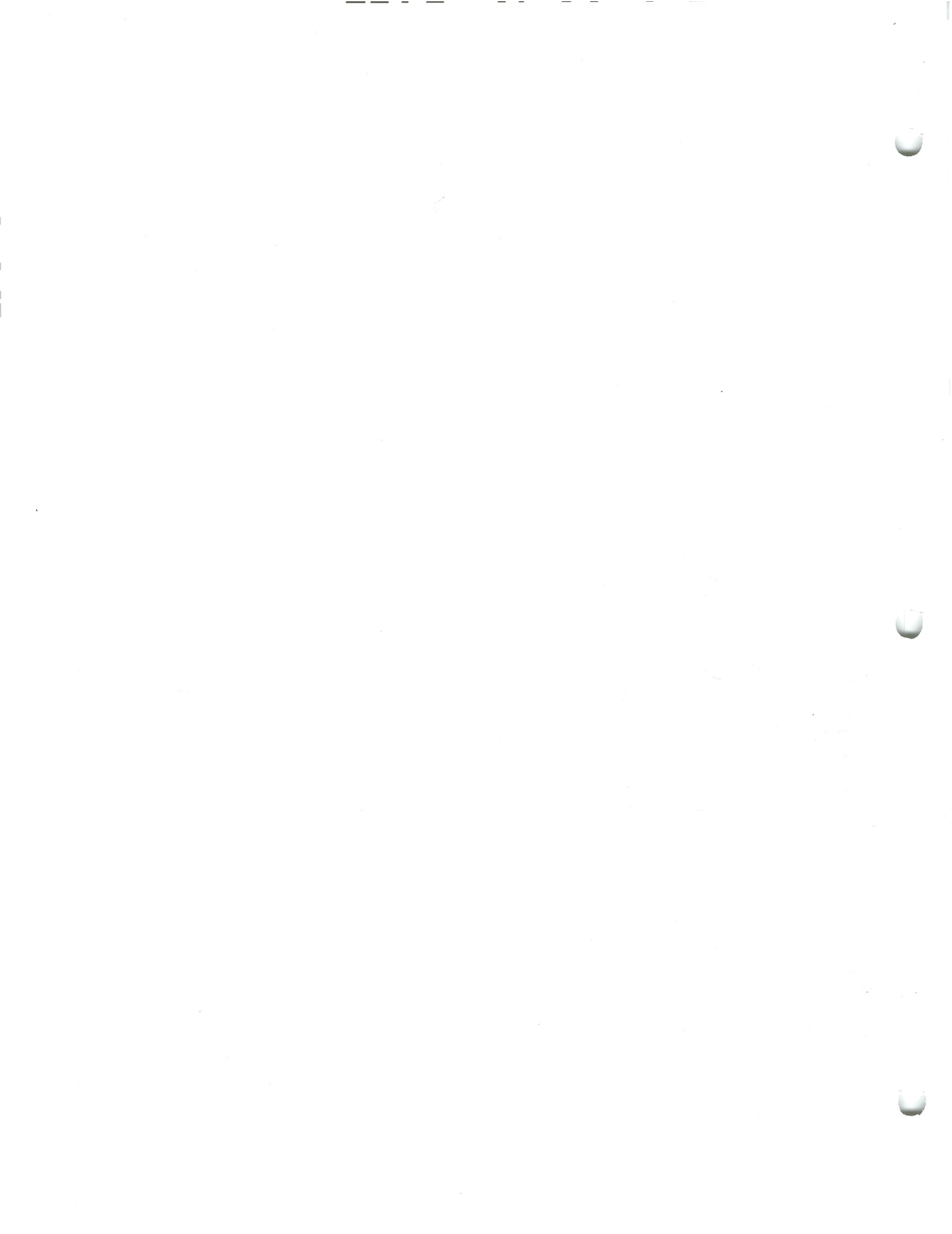
C. COMPONENT MAINT. MANUAL TEST - ON AIRCRAFT (AIRCRAFT POWER AVAIL)

1. Remove selected Power Supply from aircraft mounting.
2. Reposition Power Supply in a convenient location in the aircraft, allowing for access during testing, and for connection to Test Set.
3. Perform Test Set Initial System Setup, step VI.A..
4. If Test Set "LAMP TEST" fails, perform Aircraft System troubleshooting of the POWER SUPPLY INPUT LOGIC Fault Isolation (Cockpit Control Panel and its wiring to the Emergency Power Supply under test).

The following steps are provided per Grimes Overhaul Manual, 33-50-42 Rev. Apr 1/83:

a. Testing Setup

1. Remove cover and battery pack as a single unit. Remove plastic cover from battery pack for access to cells. Inspect cells for corrosion or loose/broken solder tabs.
2. Connect "HOUSING PINS" "+" and "-" jacks of Test Set to "+" and "-" connections on receptacle inside Power Supply circuitry case (not battery pack) using CCSC0000E-01-11 TEST LEADS.
3. Connect "BATTERY PACK RECEPTACLES" "+" AND "-" jacks on Test Set to "+" and "-" receptacles on battery pack using CCSC0000E-01-12 TEST LEADS. Test Set meter M2 shall read Battery Pack voltage.
4. Rotate Test Set "BATTERY DROPOUT VOLTAGE ADJUST" resistor fully counter-clockwise.
5. Position Test Set "ON/OFF/LAMP TEST" switch to "ON". The Test Set "POWER ON" lamp illuminates.





C. COMPONENT MAINT. MANUAL TEST - ON AIRCRAFT (A/C POWER AVAIL) cont.

b. Automatic Disable Circuit Test

1. Place Test Set "OFF/ARMED/ON" switch to "ON" position. Load Lamps on Test Set shall illuminate.
2. Place Test Set "NORMAL/DROPOUT CHECK" switch to "DROPOUT CHECK" position.
3. Rotate Test Set "BATTERY DROPOUT VOLTAGE ADJUST" resistor clockwise very slowly, while watching Test Set voltmeter M2, until load lamps extinguish.

NOTE: Potentiometer R15 in Power Supply (Ref. 80, IPL Fig. 3) is factory set and should only be readjusted if the cutoff voltage is not within tolerance. (This only occurs when Integrated Circuit U1 and Potentiometer R15 have been replaced).

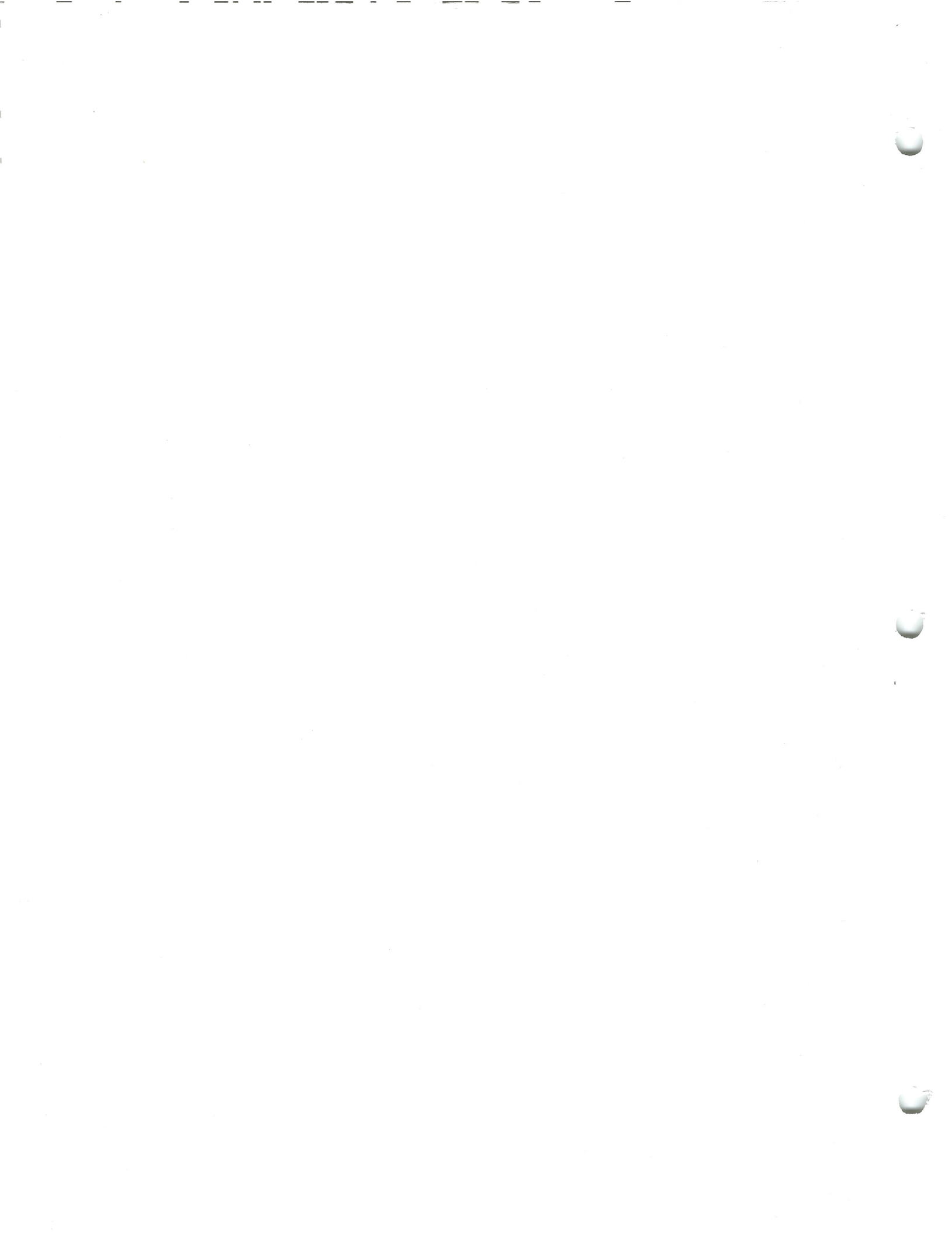
4. Load lamps must extinguish between 5.4 and 5.8 volts as read on meter M2. If they do not, adjust potentiometer R15 until load lamps do extinguish. Place "NORMAL/DROPOUT CHECK" switch to "NORMAL" position. Place "OFF/ARMED/ON" switch to "OFF" position, then repeat above steps 1 through 4.
5. Place Test Set "NORMAL/DROPOUT CHECK" switch to "NORMAL" position and rotate Test Set "BATTERY DROPOUT VOLTAGE ADJUST" resistor fully counterclockwise.
6. Return Test Set "OFF/ARMED/ON" switch to "OFF" position.

c. Load Circuit Test

1. Place Test Set "OFF/ARMED/ON" switch to "ON" position. Load Lamps on Test Set shall illuminate.
2. Check battery voltage on Test Set meter M2. Voltage must not be less than 7.2 volts.

NOTE: Check each individual cell voltage (with digital voltmeter) under loaded condition (while load lamps are illuminated). Voltage should nominally be 1.1 to 1.2 VDC each.

3. Return Test Set "OFF/ARMED/ON" switch to "OFF" position.



C. COMPONENT MAINT. MANUAL TEST- ON AIRCRAFT (A/C POWER AVAIL) cont.

d. Battery Charge Test

1. Place Test Set "OFF/ARMED/ON" switch to "OFF" position and depress Test Set "METER M1 BYPASS" switch.
2. Meter Test Set "M1" must read 265 +/- 10% milliamperes.
3. Release Test Set "METER M1 BYPASS" switch.

e. Armed Circuit Test

1. Place Test Set "OFF/ARMED/ON" switch in "ARMED" position and remove 28 VDC power input by depressing the Test Set "POWER FAIL" switch.
2. Test Set Load Lamps shall illuminate.
3. Release Test Set "POWER FAIL" switch.
4. Test Set Load Lamps shall extinguish.
5. Place Test Set "OFF/ARMED/ON" switch to "OFF" position.

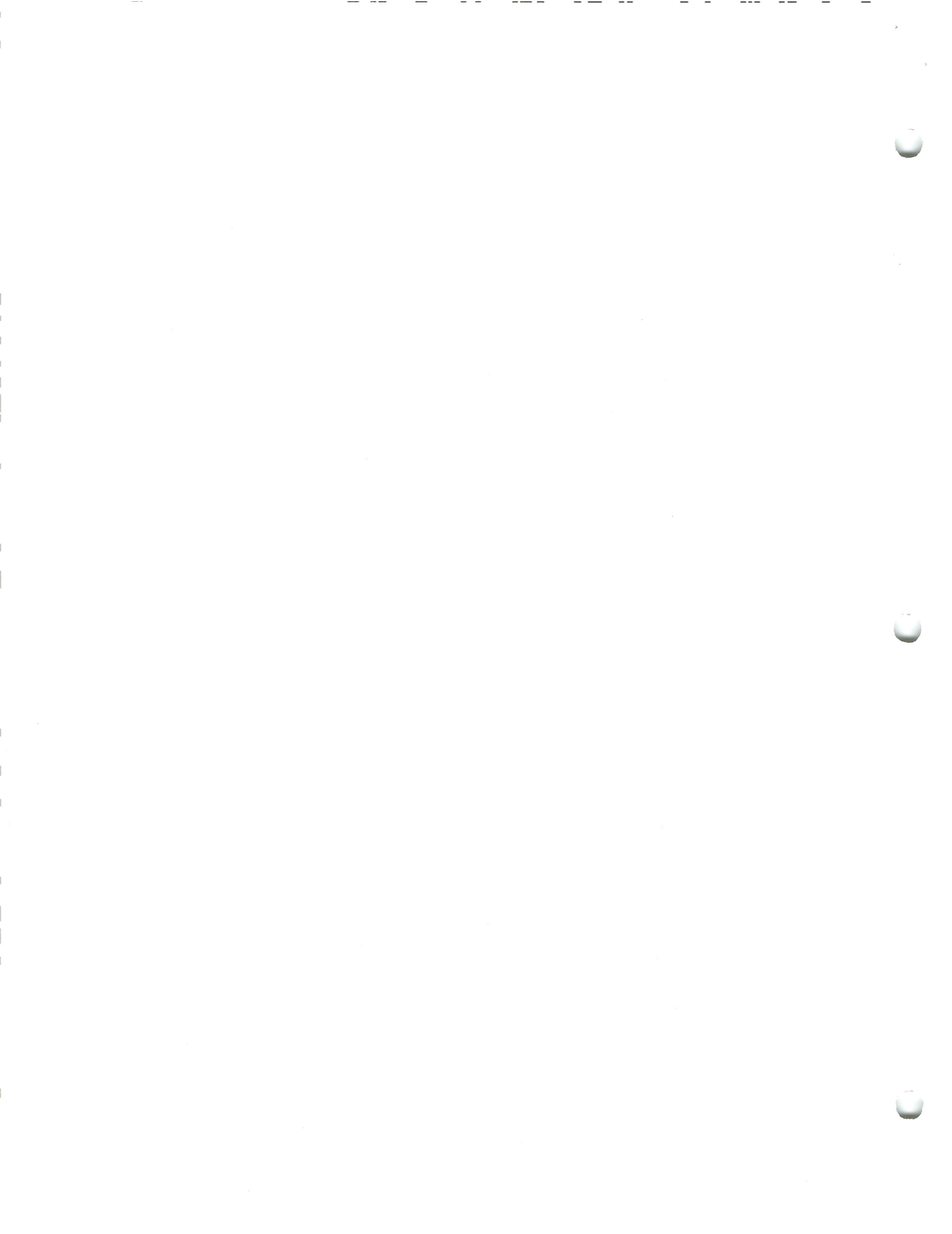
f. Disarm Circuit Test

1. Place Test Set "OFF/ARMED/ON" switch in "OFF" position.
2. Depress Test Set "POWER FAIL" switch.
3. Test Set Load Lamps shall remain extinguished.
4. Release Test Set "POWER FAIL" switch.

g. Disconnect and remove unit from test setup.

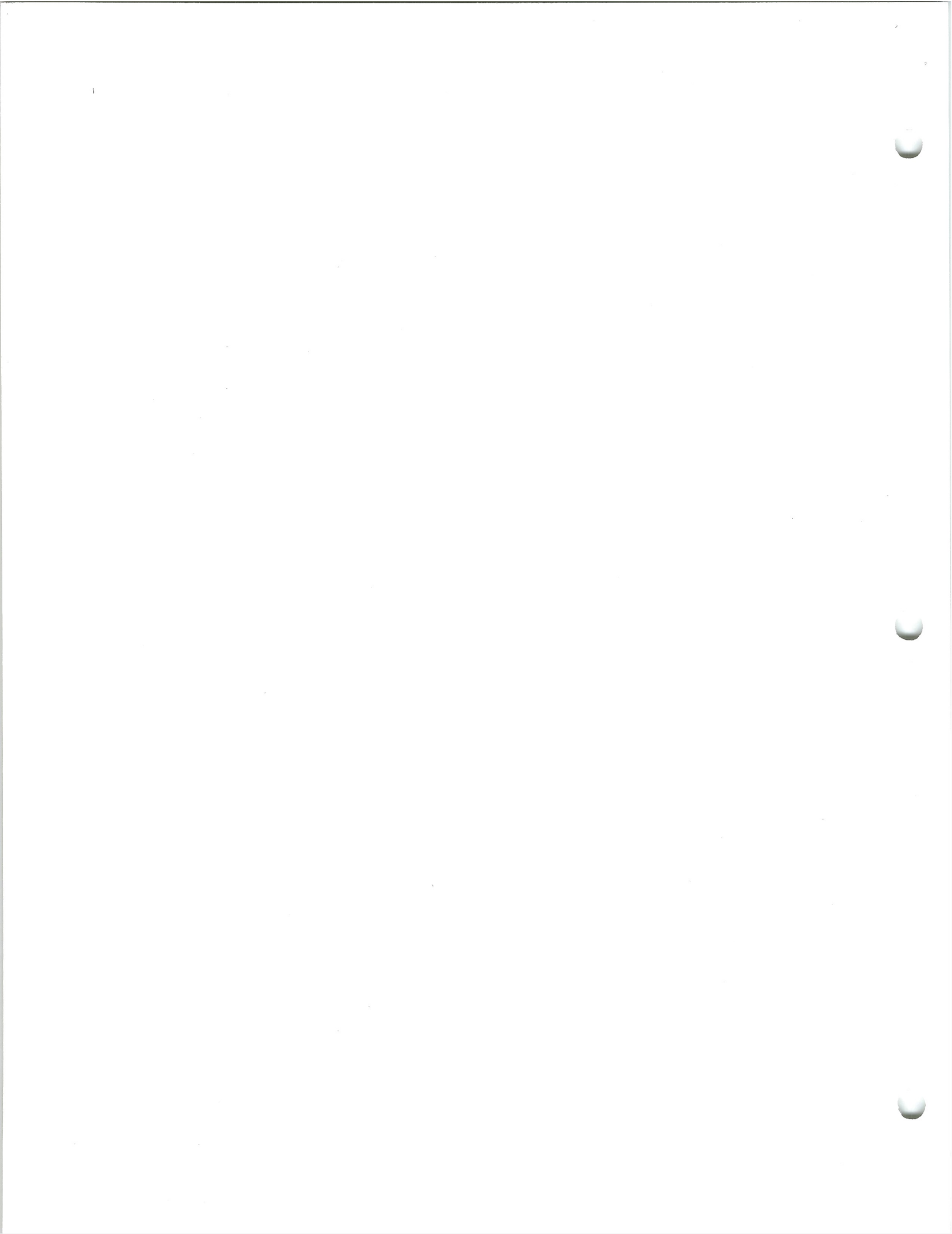
h. Reassemble unit.

i. Perform aircraft operation test per maintenance manual Chap 33-50-00, para 2A.



D. COMPONENT MAINTENANCE MANUAL TEST - OFF AIRCRAFT (ON BENCH)

1. Remove selected Power Supply from aircraft to bench.
2. Connect External 28 VDC power to Test Set "EXT 28 VDC POWER IN" "+" and "-" jacks using CCSC0000E-01-11 Power Jumper Leads supplied.
3. Connect Test Set to Power Supply connector.
4. Position Test Set "ON/OFF/LAMP TEST" switch to "OFF".
5. Position Test Set "OFF/ARMED/ON" switch to "OFF".
6. Position Test Set "NORMAL/DROPOUT CHECK" switch to "NORMAL".
7. Rotate Test Set "BATTERY DROPOUT VOLTAGE ADJUST" fully counterclockwise.
8. Place Test Set "TEST SET CONFIG" and "LOAD SELECT" switches to "BENCH SETUP" position.
9. Position Test Set "ON/OFF/LAMP TEST" switch to "LAMP TEST". Test Set "POWER ON" lamp illuminates.
10. Release "LAMP TEST".
11. If Test Set "LAMP TEST" step 1G., as stated in the Initial System Setup fails, then check External Power Supply, its settings, its connection, and the "EXT 28 VDC POWER IN" fuses.
12. Perform Test Set procedures COMPONENT MAINTENANCE MANUAL TEST - ON AIRCRAFT, starting with step VI.C.4.a.



VII. AIRCRAFT SYSTEM TROUBLESHOOTING procedures:

A. POWER SUPPLY INPUT LOGIC Fault Isolation -

1. Perform Test Set INITIAL SETUP, step VI.A..

Test Set "LAMP TEST" illuminates Test Set "POWER" lamp.

NOTE: This indicates at least one of the Power Supply's input logic lines contains 28 VDC. Verification can be made by reference to the Test Set "POWER SUPPLY INPUT LOGIC" chart, (located in the upper left corner of the Test Set faceplate). As long as the "TEST SET CONFIG" switch is in the "NORMAL" position, a failed "LAMP TEST" indicates NO INPUT POWER is available, and either; the Power Supply's Input Logic has a fault, or aircraft power is not available to the Emergency Lighting System.

2. Place cockpit "ON/OFF/ARM" switch in each of the three positions as shown on the Test Set's POWER SUPPLY INPUT LOGIC chart (located in the upper left corner of the Test Set's faceplate).
3. Measure the voltage at Test Set pins 4, 2, and 3 to pin 5 (ground). Compare your readings to the Test Set's POWER SUPPLY INPUT LOGIC CHART. Incorrect readings will indicate which logic line is faulty, and which aircraft components to further troubleshoot.

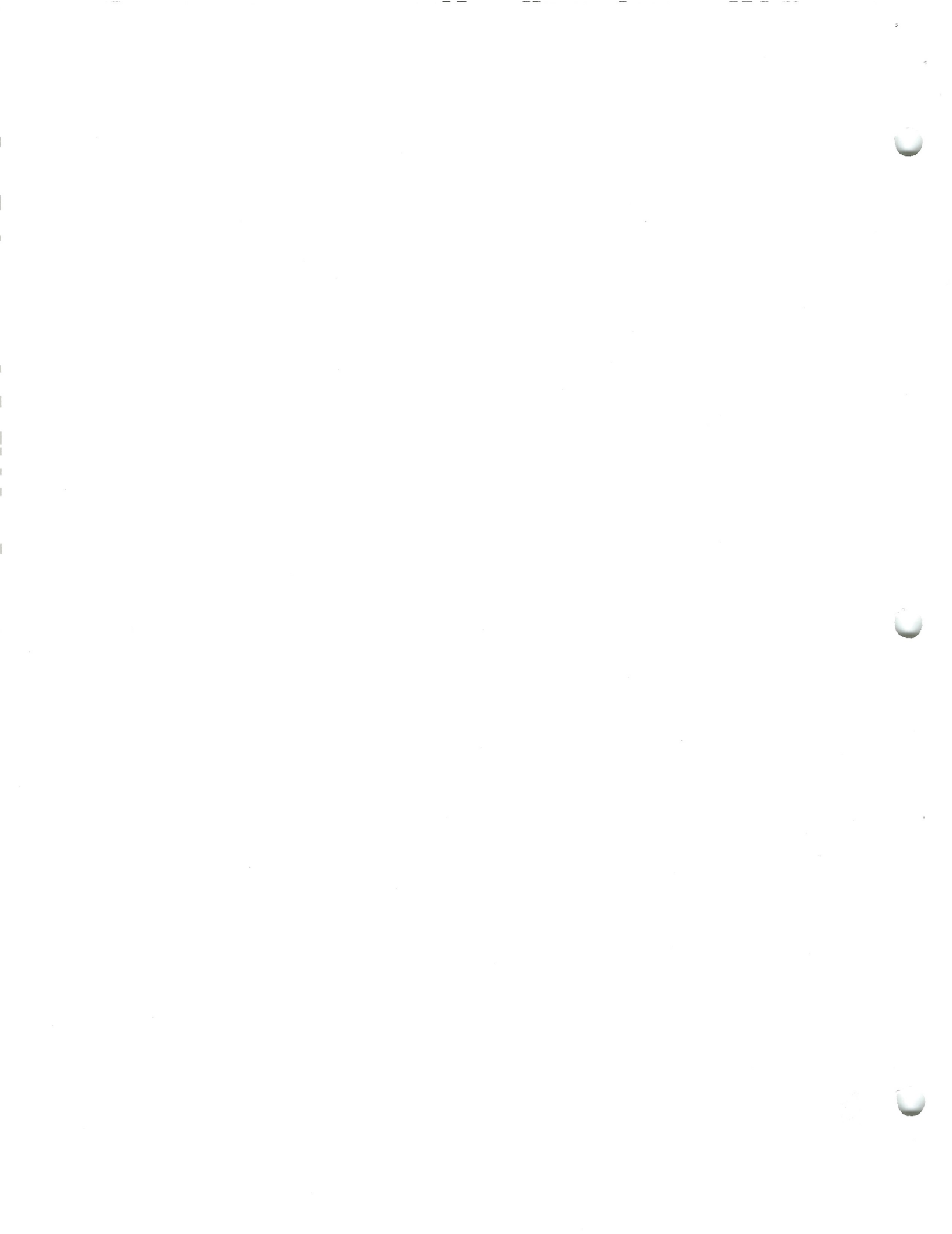
B. POWER SUPPLY OUTPUT ACFT EMER LTS Fault Isolation -

1. Perform Test Set INITIAL SETUP, step VI.A..
2. Position Test Set "TEST SET CONFIG" switch to "BENCH SETUP".
3. Position Test Set "ON/OFF/LAMP TEST" switch to "ON".

NOTE: Remember Power Supply's internal battery is ON, so checks should be made rapidly. Switch the Test Set "OFF/ARMED/ON" switch to "OFF" whenever possible to conserve power.

4. Position Test Set "OFF/ARMED/ON" switch to "ON".

NOTE: Only the Emergency Power Supply being troubleshot on the aircraft will turn ON. Positioning the Test Set "LOAD SELECT" switch to "BENCH SETUP" will indicate Power Supply Load Outputs are functioning. Repositioning the Test Set "LOAD SELECT SWITCH" to "NORMAL" allows troubleshooting of the individual lamp circuit failing to operate on the aircraft.





### VIII. BATTERY CHARGING procedures:

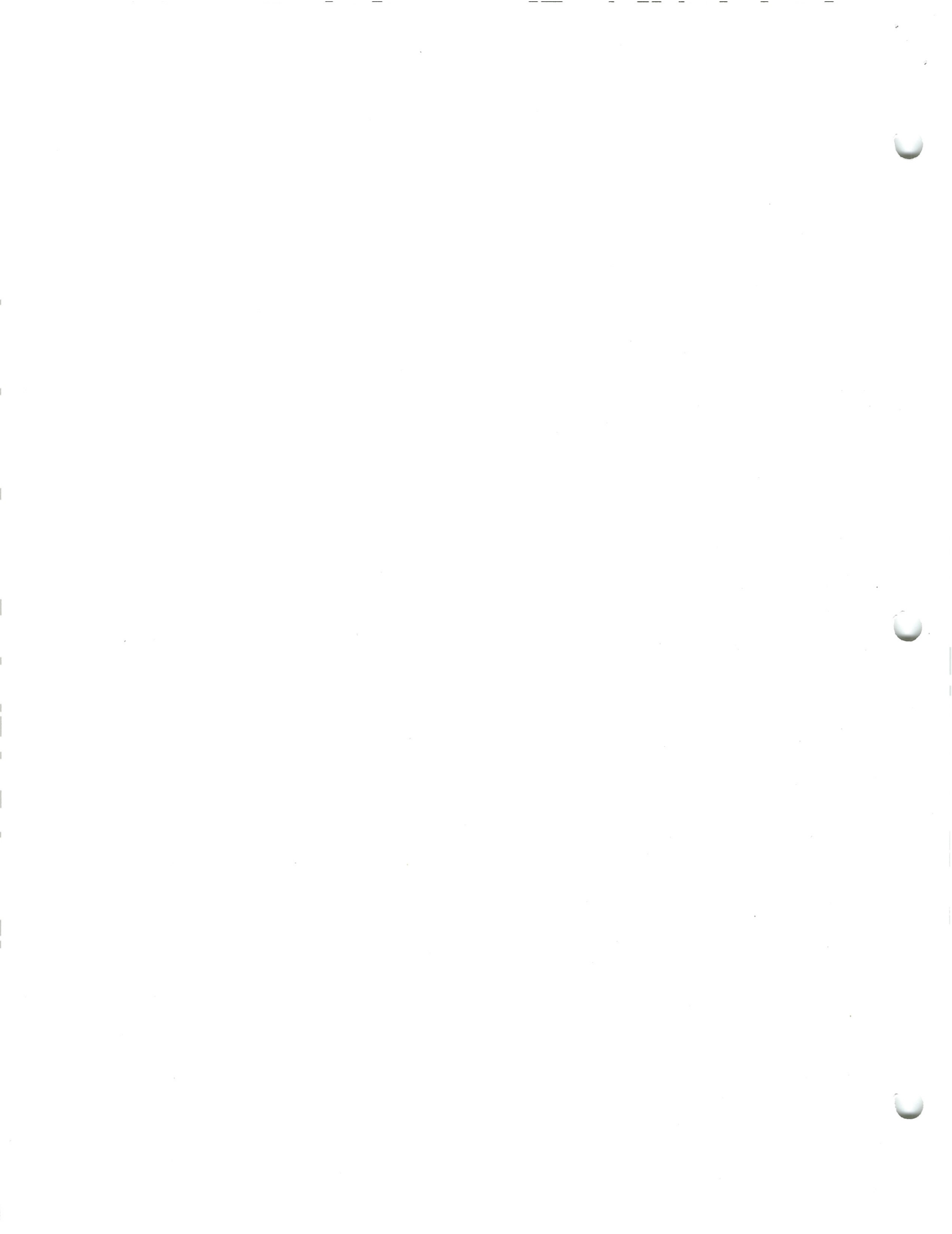
Power Supply internal Battery Pack Charging may be performed ON or OFF the aircraft.

#### A. ON AIRCRAFT:

The Challenger's system is designed to charge emergency lighting batteries whenever the cockpit control panel switch is selected to "OFF" or "ARM" mode, and the DC Essential Bus is operational.

#### B. OFF AIRCRAFT:

1. Remove selected Power Supply from aircraft to bench.
2. Remove cover and battery pack as a single unit. Remove plastic cover from battery pack for access to cells. Inspect cells for corrosion or loose/broken solder tabs.
3. Connect "HOUSING PINS" "+" and "-" jacks on Test Set to "+" and "-" connections on receptacle inside Power Supply case using CCSC0000E-01-11 TEST LEADS.
4. Connect "BATTERY PACK RECEPTACLES" "+" AND "-" jacks on Test Set to "+" and "-" receptacles on battery pack using CCSC0000E-01-12 TEST LEADS. Test Set meter M2 shall read Battery Pack voltage.
5. Connect External 28 VDC power to Test Set "EXT 28 VDC POWER IN" "+" and "-" jacks using CCSC0000E-01-11 Power Jumper Leads supplied.
6. Connect Test Set to Power Supply connector.
7. Position Test Set "ON/OFF/LAMP TEST" switch to "OFF".
8. Position Test Set "OFF/ARMED/ON" switch to "OFF".
9. Position Test Set "NORMAL/DROPOUT CHECK" switch to "NORMAL".
10. Rotate Test Set "BATTERY DROPOUT VOLTAGE ADJUST" fully counterclockwise.
11. Place Test Set "TEST SET CONFIG" and "LOAD SELECT" switches to "BENCH SETUP" position.
12. Turn on 28 vdc power supply.



VIII. BENCH BATTERY CHARGING procedure cont.

12. Position Test Set "ON/OFF/LAMP TEST" switch to "LAMP TEST". Test Set "POWER ON" lamp illuminates.

If Test Set "LAMP TEST" fails, check the external power Supply, its settings, its connection, and the Test Set "EXT 28 VDC POWER IN" fuses.

13. Release "LAMP TEST".
17. Position Test Set's "OFF/ARMED/ON" switch to "OFF".
18. Depress Test Set "METER M1 BYPASS" switch. Meter M1 shall indicate 265 +/- 10% milliamps.

The Power Supply battery will now charge for the desired time period.

end.

