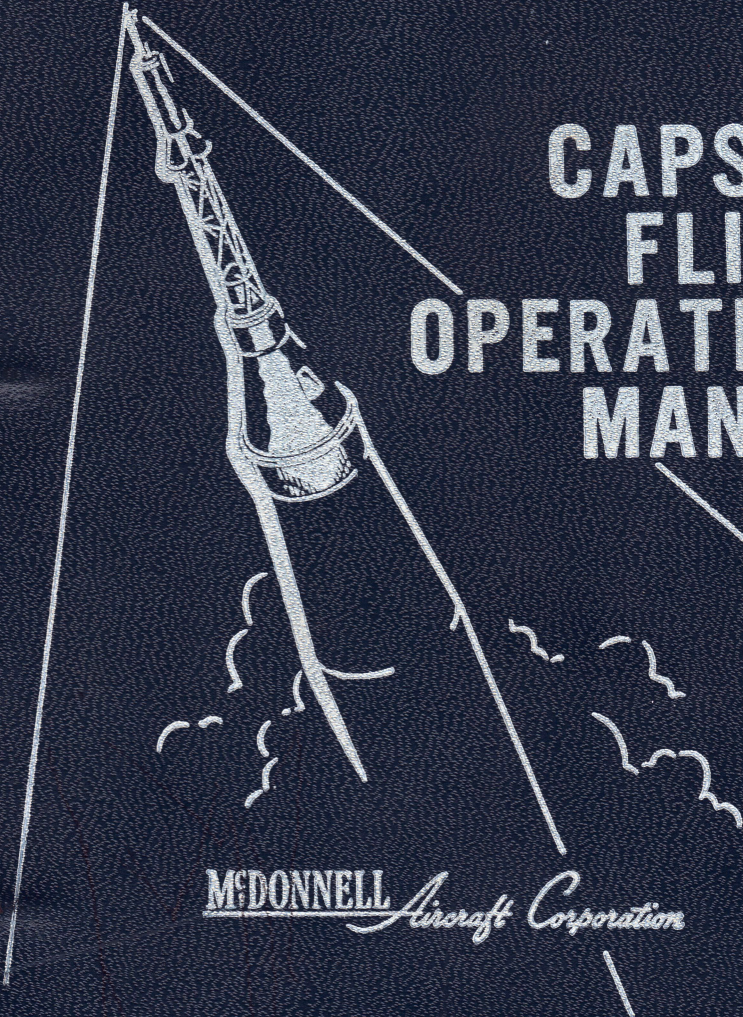


project mercury
NASA

**CAPSULE
FLIGHT
OPERATIONS
MANUAL**



MCDONNELL *Aircraft Corporation*

REVISION
NOTICE

LATEST REVISED PAGES SUPERSEDE
THE SAME PAGES OF PREVIOUS DATE

Insert revised pages into basic
publication. Destroy superseded pages.

SEDR 109-10

project mercury

NASA

**CAPSULE
FLIGHT
OPERATIONS
MANUAL**

**CAPSULES 11 AND 15
(REDSTONE)**

***MCDONNELL
AIRCRAFT***

30 January 1961

Revised 30 May 1961

INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED PAGES.

LIST OF EFFECTIVE PAGES

NOTE: The portion of the text affected by the changes is indicated by the vertical line in the outer margins of the page.

Total number of pages in this publication is 112,
consisting of the following:

Page No.	Issue	Page No.	Issue
*Title	30 May 1961	2-7 thru 2-13	Original
*A	30 May 1961	2-14	30 March 1961
i	Original	*2-15	30 May 1961
*ii	30 May 1961	2-16 thru 2-19	30 March 1961
iii thru iv	Original	*2-20 thru 2-20B	30 May 1961
1-1 thru 1-2	Original	2-21	Original
1-3	30 March 1961	*2-22	30 May 1961
1-4	Original	2-23 thru 2-25	Original
1-4A thru 1-4B	30 March 1961	*2-26	30 May 1961
*1-5	30 May 1961	2-27	Original
1-6	30 March 1961	*2-28 thru 2-29	30 May 1961
*1-7 thru 1-8B	30 May 1961	2-30 thru 2-31	30 March 1961
*1-9 thru 1-11	30 May 1961	2-32 thru 2-39	Original
1-12	Original	2-40 thru 2-42	30 March 1961
*1-13	30 May 1961	*3-1	30 May 1961
1-14 thru 1-15	30 March 1961	3-2	30 March 1961
1-16	Original	*3-3	30 May 1961
*1-17	30 May 1961	3-4 thru 3-4A	30 March 1961
1-18	Original	*3-4B	30 May 1961
*1-19	30 May 1961	3-5	30 March 1961
1-20	30 March 1961	3-6 thru 3-7	Original
*1-21	30 May 1961	3-8	30 March 1961
1-22 thru 1-24	Original	*3-9 thru 3-11	30 May 1961
1-25	30 March 1961	3-12 thru 3-13	Original
*1-26	30 May 1961	3-14	30 March 1961
1-27	Original	3-15	Original
1-28	30 March 1961	3-16	30 March 1961
1-29 thru 1-31	Original	*3-17	30 May 1961
1-32 thru 1-34	30 March 1961	3-18	30 March 1961
2-1 thru 2-2	30 March 1961	3-19	Original
2-3 thru 2-5	Original	3-20	30 March 1961
*2-6	30 May 1961	3-21 thru 3-22	Original

*The asterisk indicates pages changed, added,
or deleted by the current change.

Revised 30 May 1961

CONTENTS

SECTION I

NORMAL PROCEDURES 1-1

SECTION II

EMERGENCY PROCEDURES 2-1

SECTION III

TROUBLE SHOOTING 3-1

INTRODUCTION

The detailed preparation required in attempting a mission of the magnitude and scope of PROJECT MERCURY obviously cannot and need not be covered in a document of the manual type. Prior to any actual attempt to launch a manned capsule, many weeks will be spent in an extensive training and familiarization program. The information contained in this manual, therefore, will pre-suppose a detailed knowledge of the capsule systems and will be confined, for the most part, to procedural data. Detailed descriptions and operation of the various capsule systems are contained in Service Engineering Department Report (SEDR) 104 "PROJECT MERCURY FAMILIARIZATION MANUAL".

SCOPE

This manual covers operation of Project Mercury Redstone Manned Ballistic capsules 11 and 15. For manuals covering other capsules, refer to SEDR 109 (capsules 10, 13, 16, 17, 18, 19 and 20).

MANUAL DATE

All possible effort is made to insure that the material contained in this manual is factual and up-to-date. The date shown on the Title Page of the basic issue, or on revised pages, indicates that the material contained therein represents the latest engineering data available at the time.

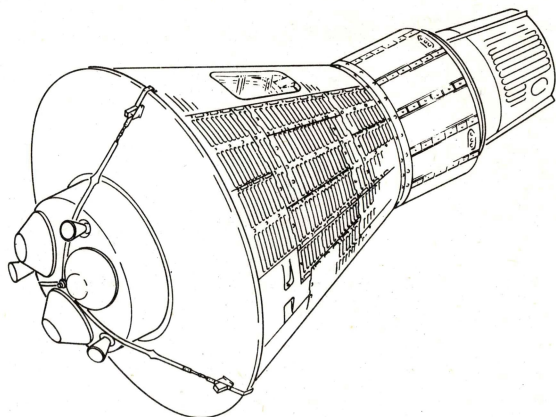
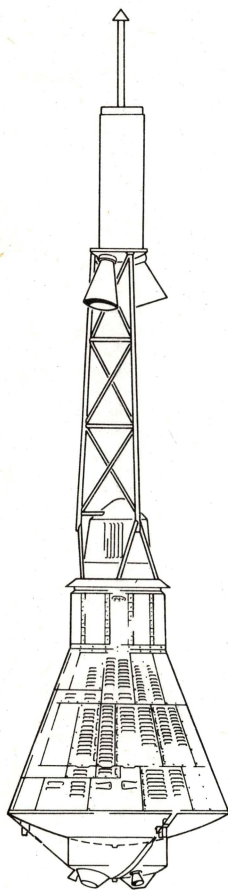
ARRANGEMENT

The material contained in this manual has been divided as follows:

NORMAL OPERATING PROCEDURES - This section will cover a complete normal mission, with expanded checklist type instructions.

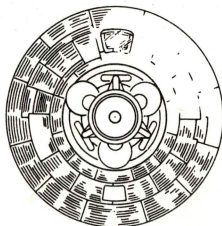
EMERGENCY OPERATING PROCEDURES - This section attempts to anticipate every emergency that might arise during the mission. Each emergency is discussed and instructions are provided in expanded checklist form.

TROUBLE SHOOTING - Simplified system schematics are contained in this section.



MERCURY

SPACE CAPSULE



CFM10-2



NORMAL PROCEDURES

Table of Contents

PRE-LAUNCH

Pre-Entrance Checks.	1-2
Entrance	1-2
Escape System Check.	1-6
Final Interior Inspection	1-6
Pre-Launch Check	1-20

LAUNCH-SEPARATION

Launch	1-20
Separation.	1-20

CAPSULE SYSTEMS

Capsule Stabilization	1-22
Environmental Control System	1-24
Electrical Power Supply System	1-26
Communications System	1-26

RETROGRADE

Retrograde	1-28
Re-Entry	1-30

LANDING

Landing	1-32
Recovery Aids	1-34
Egress	1-34



PRE-LAUNCH

PRE-ENTRANCE

The Pre-Entrance Checks are completed just prior to entering the capsule. The Jett Tower, Sep Capsule, Main, and Reserve sequence override rings actuate squibs when pulled, and have ground safety pins installed when the squibs are installed. The capsule also has safety pins installed in the Hand Controller and the Periscope Manual Engage Lever.

ENTRANCE

As soon as the intercomm is checked, confirm all Pre-Entrance checks. When all suit connections are completed, the ground crew performs a suit circuit leakage check, purges the suit system, and disconnects the external oxygen supply. Remove the ground safety pins and give them to the ground crew just prior to hatch installation.

ENTRANCE**PRE-ENTRANCE**

1. Knife - STOWED (on hatch)
2. Liquid waste container - SECURED (on hatch)
3. Six battery switches - ON
4. Transmit switch - OFF
5. Food and water containers - SECURED
6. Abort handle - LOCKED (normal)
7. Squib switch - OFF
8. Ground safety pins - INSTALLED
 Safety pins should be installed in the Hand Controller, Jett Tower, Sep Capsule, Main and Reserve Sequence Override rings, and Periscope Manual Engage Lever.
9. Flashlight - STOWED
10. Window pole - STOWED
11. Survival kit - SECURED
12. O₂ Bottle Shutoff Valves - OPEN
13. External Power - ON
14. Suit Fan fuse switch - OFF
15. Gyro switch - GYRO NORM (Gyros have been run up and torqued)
16. Portable ventilation unit - DISCONNECTED

ENTRANCE

1. Communications - CONNECTED
2. Intercomm - CHECK
3. Suit circuit inlet and outlet hose assemblies interconnector - REMOVED
4. Suit fan switch - NO. 1
5. Helmet visor seal hose - ATTACHED
6. Visor seal oxygen supply pressure - 1800 psi
7. Visor seal oxygen supply - ON

NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

ENTRANCE

8. Visor operation - CHECK
Manipulate visor to insure its proper operation.
9. Oxygen inlet hose - CONNECTED
External purge oxygen supply starts suit ventilation.
10. Oxygen outlet hose - CONNECTED
11. Visor seal system leakage - CHECK
12. Suit circuit oxygen purge - BEGIN
Close visor and commence oxygen purge.
13. Suit Fan fuse switch - NO. 1
14. Restraint harness - FASTENED
15. Beacon switch - GRND COMD
16. Mobility (unpressurized) - CHECK
17. Close suit circuit ground test shutoff valve and O₂ bottle shutoff valve.

NOTES

1-4B

Revised 30 March 1961

ENTRANCE**18. Suit circuit leakage - CHECK**

Check mobility while pressurized; depressurize suit after leakage check.

19. Suit circuit ground test shutoff valve and O₂ bottle shutoff valve - OPEN**20. Suit circuit purge oxygen - DISCONNECTED**

Disconnecting suit circuit purge oxygen starts suit circuit ventilation on capsule O₂ supply.

21. Ground safety pins - REMOVED

Account for and remove all equipment to be removed including the safety pins from Jett Tower, Sep Capsule, Main and Reserve Sequence Override rings, Hand Controller, and the Periscope Manual Engage Lever.

22. Isolated battery voltage - CHECK

Place voltmeter selector switch in ISOL and check voltage. The isolated battery should not read below mission rule.

23. Communications - CHECK

When cleared by ground command, check the following:

a. Transmit switch - UHF

b. UHF selector switch - HI PWR

c. Contact ground control over high power UHF set.

d. UHF selector switch - LO PWR

e. Contact ground control over the low power UHF set.

f. UHF selector switch - HI PWR

g. HF receiver - CHECK

h. Key button - CHECK

■ 24. TLM-LO FREQ switch - ON**25. Beacon switch - CONT**

ESCAPE SYSTEM CHECK

The Escape System Check is accomplished when cleared by the Test Director after the gantry is clear. The checklist is read by the Test Director and a response to each step is called out as it is accomplished.

Note

There will be some checks which require response to interrogation concerning various indicators or operation of controls and switches as directed to prove the integrity of capsule systems. The specific checks will be determined by the Test Director and are not listed here.

WARNING

- The Squib switch must be in the ARM position before the escape system can receive power.
- Placing the Squib switch to the ARM position arms all electrical squib operated systems, allowing them to operate **WHENEVER** their override control is actuated, **REGARDLESS** of the capsule condition or the phase of the mission. The escape rocket will also fire if the Sep capsule ring is pulled after capsule umbilical disconnect.

FINAL INTERIOR INSPECTION

The final interior inspection is accomplished during missile loxing.

WARNING

Do not operate hand controller to prevent possible injury to personnel or damage to equipment by the control jets.

ESCAPE SYSTEM**ESCAPE SYSTEM CHECK**

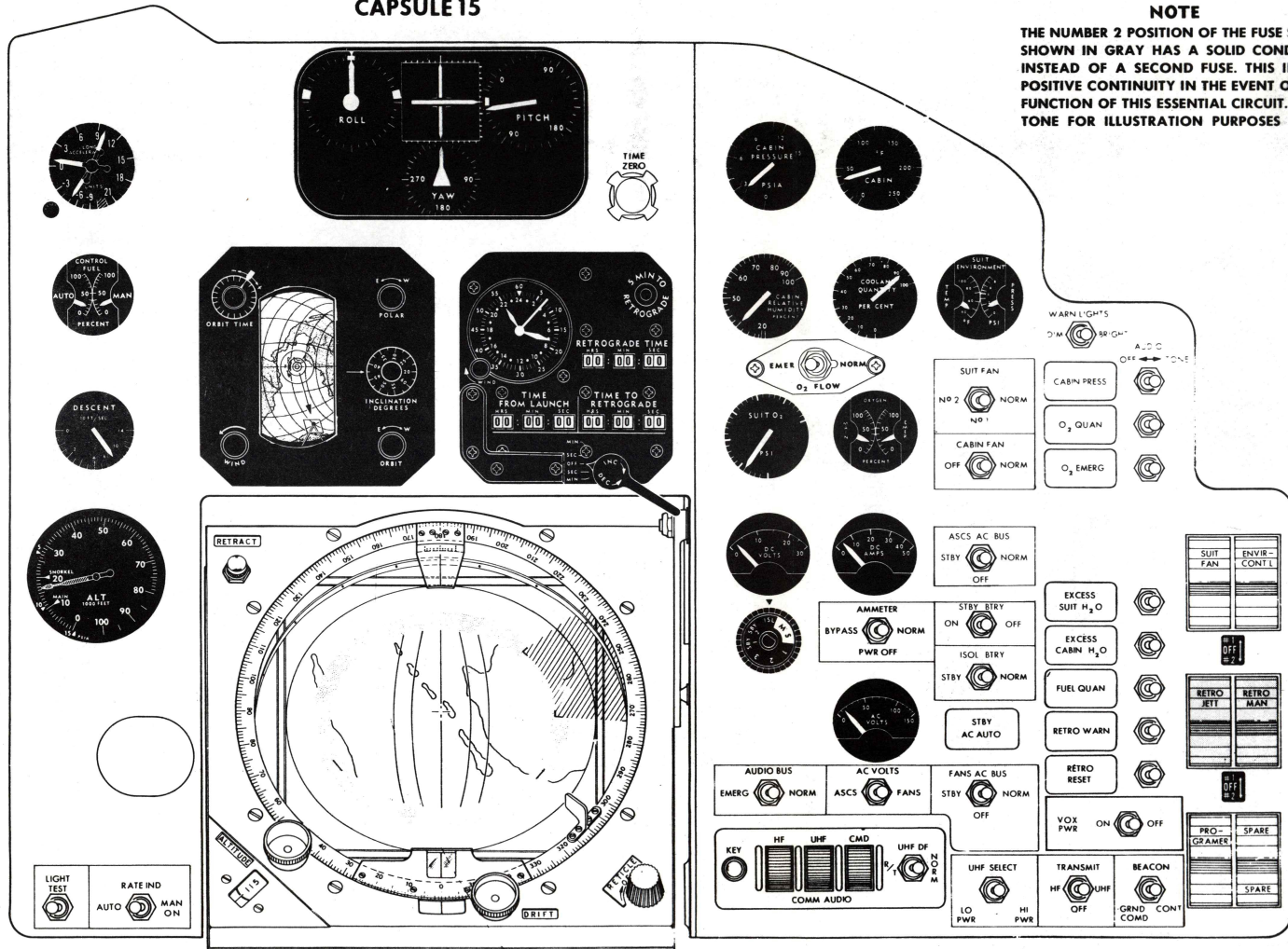
1. Squib switch - ARM
2. Auto Retro Jett switch - ARM
3. "Abort" light - MONITOR

FINAL INTERIOR INSPECTION

1. Abort handle - LOCKED (normal)
2. Survival kit - SECURED
3. Shoulder harness reel handle - UNLOCKED
4. Window shutter - AS DESIRED
5. Window pole - STOWED
6. Flashlight - STOWED
7. All fuse switches - NO. 1 POSITION
8. Squib switch - ARM
9. Auto Retro Jett switch - ARM
10. ASCS Mode Selector switches - SET
 - a. ASCS switch - NORM
 - b. RSCS switch - AUTO
 - c. Gyro switch - GYRO NORM
11. Pressurization "T" handles - CHECK
 - a. Decomp "T" handle - PUSH CLOSED, SAFETY CLIP INSTALLED
 - b. Repress "T" handle - PUSH TO RESET, SAFETY CLIP INSTALLED
12. Control fuel handles - IN
 - a. Manual fuel handle - PUSH RATE COMD
 - b. Roll fuel handle - PUSH ON
 - c. Yaw fuel handle - PUSH ON
 - d. Pitch fuel handle - PUSH ON
13. Retro delay switch - INST
14. Cabin lights switch - BOTH
15. TLM-LO FREQ switch - ON
16. Rescue switch - AUTO

MAIN INSTRUMENT PANEL

CAPSULE 15



NOTE

THE NUMBER 2 POSITION OF THE FUSE SWITCH SHOWN IN GRAY HAS A SOLID CONDUCTOR INSTEAD OF A SECOND FUSE. THIS INSURES POSITIVE CONTINUITY IN THE EVENT OF MALFUNCTION OF THIS ESSENTIAL CIRCUIT. (GRAY TONE FOR ILLUSTRATION PURPOSES ONLY).

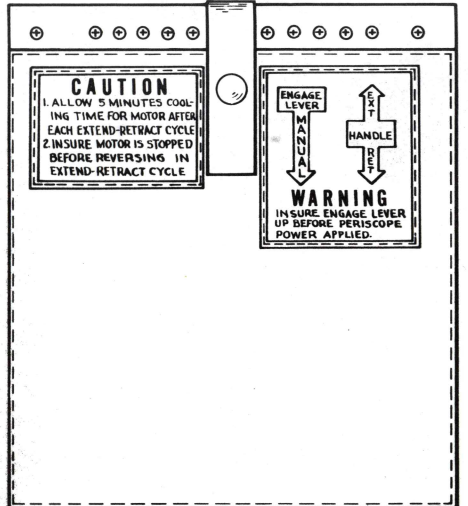
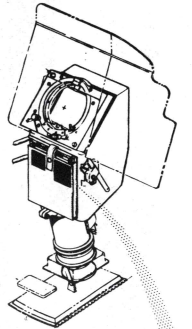


Figure 1-2

MAIN INSTRUMENT PANEL

CAPSULE 11

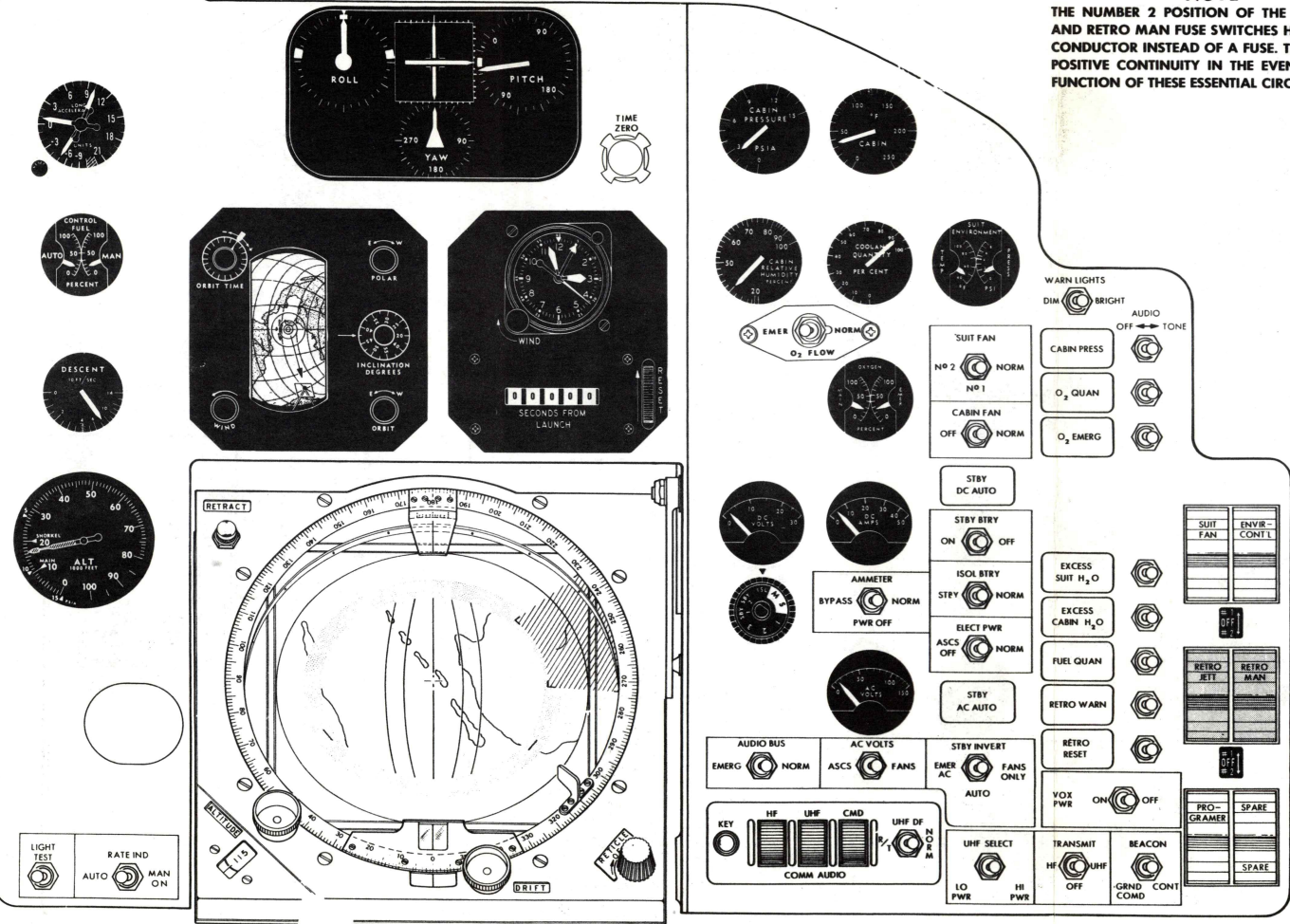
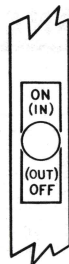


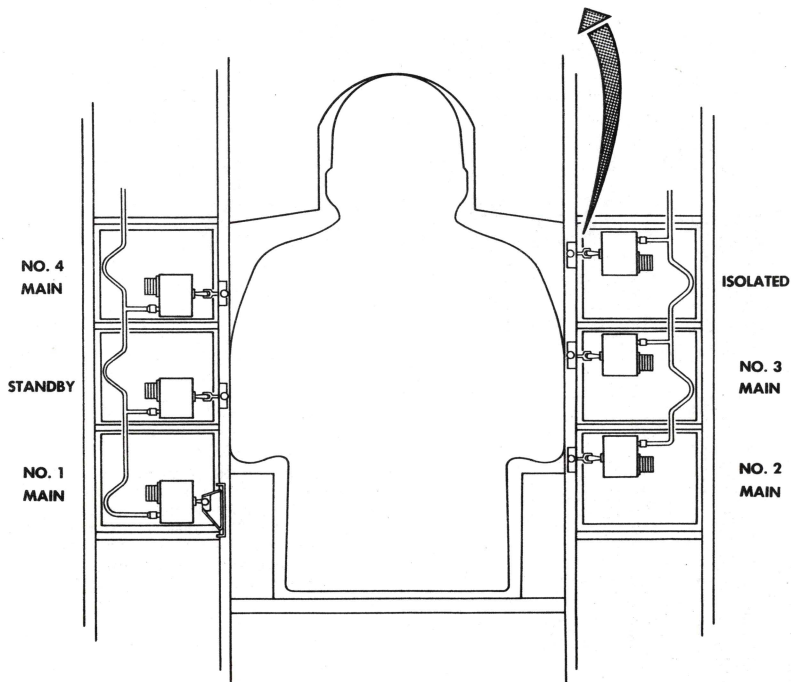
Figure 1-2A

CFM10-4A

NOTE
ALL BATTERIES ARE
1500 W.H. CAPACITY



PUSH-PULL SWITCH
TYPICAL ALL BATTERIES

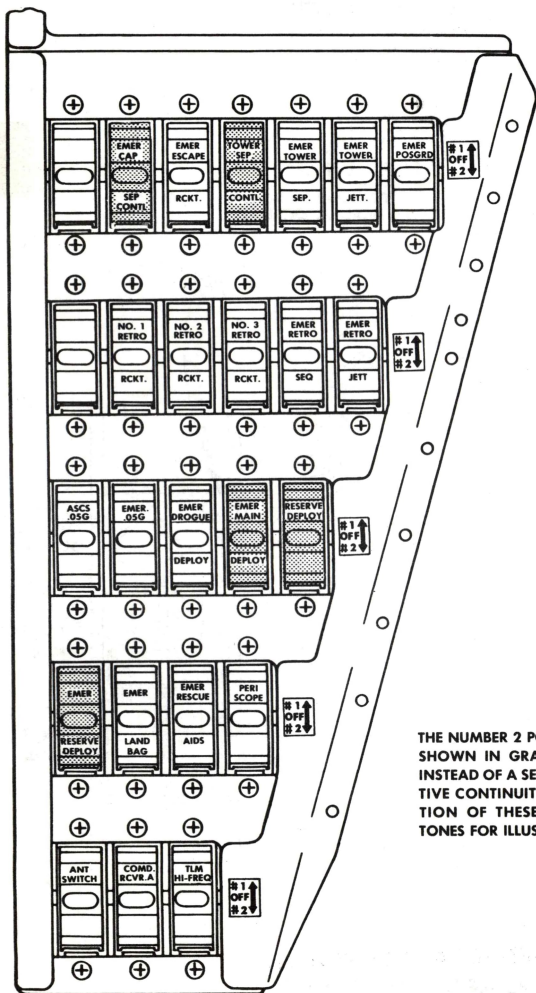


CAPSULE BATTERY SWITCHES

Figure 1-2B



FUSE PANEL



NOTE

THE NUMBER 2 POSITION OF ALL FUSE SWITCHES SHOWN IN GRAY HAS A SOLID CONDUCTOR INSTEAD OF A SECOND FUSE. THIS INSURES POSITIVE CONTINUITY IN THE EVENT OF MALFUNCTION OF THESE ESSENTIAL CIRCUITS (GRAY TONES FOR ILLUSTRATION PURPOSES ONLY)

CFM10-5A

Figure 1-3

FINAL INTERIOR INSPECTION

17. Landing bag switch - AUTO
18. All sequence override rings - IN
19. Retract Scope switch - AUTO
20. Retro Att switch - AUTO
21. PRESS REG handle - IN AND LOCKED
22. Launch Contl switch - OFF
23. Accelerometer - SET
24. Control fuel quantity gages - CHECK
 - a. Auto fuel - 100%
 - b. Manual fuel - 100%
25. Rate of descent indicator - 0 ft/sec.
26. Altimeter - CHECK

The altimeter should indicate pressure altitude at launch pad.
27. Light Test switch - ON/CHECK

Actuate the signal lights test switch and check that all warning lights, indicator lights and telelights except "Retract Scope" illuminate.
28. Rate Ind. switch - MAN ON
29. Map case - SECURED
30. Periscope - CHECK
 - a. Set anticipated retrograde altitude on altitude scale with altitude knob.
 - b. Rotate sun-moon index through 360° and check that index rotates smoothly.
 - c. Check that drift knob rotates drift grid smoothly throughout range.
 - d. Rotate filter selector knob through all four positions and return to CLEAR.
 - e. Check operation of magnification control and set to low magnification.
 - f. Manual extension-retraction handle - STOWED
 - g. Manual engage lever - DISENGAGED



FUSE SWITCH FUNCTIONS

FUSE SW.	LOC.	PWR'D BY	FUNCTIONS CONTROLLED
SUIT FAN	MAIN INSTRUMENT PANEL	A-C FANS BUS	SUPPLIES BOTH SUIT FANS WITH SUIT FAN SWITCH IN AUTO; SUPPLIES #1 FAN WITH SUIT FAN SWITCH IN NO. 1 POSITION. DOES NOT CONTROL POWER WITH SUIT FAN SWITCH IN NO. 2 POSITION.
ENVIR CONTRL		MAIN BUS	SUPPLIES RELATIVE HUMIDITY AND CABIN PRESSURE INDICATORS; EXCESS SUIT AND CABIN H ₂ O, O ₂ EMER AND O ₂ QUAN TELETES; SUIT SHUT-OFF VALVE, SUIT FAN CUTOFF ON EMER O ₂ , AND WATER SEPARATOR.
RETRO JETT		ISOL SQUIB BUS	ARMS JETT RETRO OVERRIDE
RETRO MAN		ISOL SQUIB BUS	ARMS FIRE RETRO OVERRIDE, ARMING RETRO ATTITUDE SWITCH.
PRO GRAMMER		MAIN BUS	SUPPLIES WINDING SOLENOID FOR ELECTRICALLY WOUND, SPRING DRIVEN INSTRUMENTATION PROGRAMMER.
EMER CAP SEP CONTRL	LEFT FUSE PANEL	ISOL SQUIB BUS	ARMS SEP. CAP. OVERRIDE BEFORE ORBIT; SUPPLIES FIRE COMMAND TO ESCAPE ROCKET AFTER CAP. ADAPTER RING RELEASE ON ABORT AFTER UMBILICAL SEPARATION; SUPPLIES FIRE COMMAND TO POSIGR'D ROCKETS AFTER CAP. ADAPTER RING RELEASE AND TOWER SEPARATION; SUPPLIES TELEM. COMMAND AFTER CAP. ADAPTER RING RELEASE AND CAP SEPARATION; ENERGIZES CAP. SEP. RELAY WHEN TLM. COMMAND GIVEN (CAP. SEP. RELAY FIRES TOWER SEP. BOLTS AT MAX. ALTITUDE ON ABORT.).
EMER ESCAPE RCKT		ISOL SQUIB BUS	FIRES ESCAPE ROCKETS ON COMMAND; NOT NEEDED IF MAIN SQUIB BUS IS GOOD.
TOWER SEP CONTRL		ISOL SQUIB BUS	ARMS JETT. TOWER OVERRIDE BEFORE ORBIT; SUPPLIES FIRE COMMAND TO ESCAPE ROCKET AFTER TOWER SEP ON NORMAL MISSION AFTER UMBILICAL RELEASE; SUPPLIES FIRE COMMAND TO JETT. ROCKET AFTER TOWER SEP. AND SUPPLIES TELEM. COMMAND (IF MAIN SQUIB BUS FAILS.)
EMER TOWER SEP		ISOL SQUIB BUS	FIRES TOWER SEP BOLTS ON COMMAND; NOT NEEDED IF MAIN SQUIB BUS IS GOOD.
EMER TOWER JETT		ISOL SQUIB BUS	FIRES JETTISON ROCKETS ON COMMAND; NOT NEEDED IF MAIN SQUIB BUS IS GOOD.
EMER POSGRD		ISOL SQUIB BUS	FIRES POSIGRADE ROCKETS; NOT NEEDED IF MAIN SQUIB BUS IS GOOD.
NO. 1 RETRO RCKT		ISOL SQUIB BUS	FIRES NO. 1 RETRO ROCKET; NOT NEEDED IF MAIN SQUIB BUS IS GOOD.

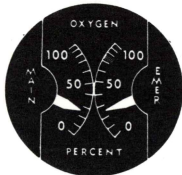
Figure 1-4

FUSE SW.	LOC.	PWR'D BY	FUNCTIONS CONTROLLED
NO. 2 RETRO RCKT	LEFT FUSE PANEL	ISOL SQUIB BUS	FIRES NO. 2 RETRO ROCKET; NOT NEEDED IF MAIN SQUIB BUS IS GOOD.
NO. 3 RETRO RCKT		ISOL SQUIB BUS	FIRES NO. 3 RETRO ROCKET; NOT NEEDED IF MAIN SQUIB BUS IS GOOD.
EMER RETRO SEQ		ISOL SQUIB BUS	ARMS GROUND COMMAND OR CAP. MANUAL OVERRIDE FOR RETRO SEQUENCE. FUSE SWITCH POWERS SEQUENCE OF EVENTS IN SAME MANNER AS MAIN SQUIB BUS DOES WHEN CLOCK COMMANDS RETRO SEQUENCE.
EMER RETRO JETT		ISOL SQUIB BUS	POWERS RETRO PACKAGE JETTISON BOLTS. NOT NEEDED IF MAIN SQUIB BUS IS GOOD.
ASCS .05g		MAIN BUS	ARMS .05g ACCELEROMETER 5 SEC. AFTER RETRO ROCKET ASSY. SEP.; ARMS ASCS .05g RELAY CONTACTS.
EMER .05g		MAIN BUS	ARMS .05g OVERRIDE.
EMER DROGUE DEPLOY		ISOL SQUIB BUS	ARMS DROGUE DEPLOY OVERRIDE.
EMER MAIN DEPLOY		MAIN SQUIB BUS	ARMS MAIN CHUTE OVERRIDE.
EMER RESERVE DEPLOY		MAIN SQUIB BUS	ARMS RESERVE CHUTE OVERRIDE.
PERISCOPE		MAIN BUS	SUPPLIES PERISCOPE MOTOR SWITCH AND AUTO EXTEND-RETRACT SEQUENTIAL CIRCUITS.
ANT SWITCH		AUDIO BUS	POWERS ANTENNA SWITCHOVER FROM BICONE TO UHF RESCUE ANTENNA 16 SECONDS AFTER ANTENNA SEPARATION.
COMD RCVR A		ISOL 18V BUS	SUPPLIES COMMAND RECEIVER "A" UNTIL IMPACT.
TLM HI-FREQ		PRE-IMPACT SECONDARY BUS	SUPPLIES HI-FREQ. TELEMETRY TRANSMITTER "A" POWER SUPPLY.
EMER LAND BAG		ISOL SQUIB BUS	SUPPLIES POWER TO ARM LANDING BAG OVERRIDE.
EMER RESCUE AIDS		ISOL SQUIB BUS	SUPPLIES POWER TO ARM RESCUE SWITCH AND 10 MIN. TIME DELAY FOR RESCUE SWITCH BY-PASS. NOT NEEDED IF MAIN SQUIB BUS RESCUE CIRCUITRY IS OPERATING.

CFM10-20



INSTRUMENT MARKINGS



OXYGEN QUANTITY INDICATOR

- 75%—BELOW THIS AMOUNT THERE WILL BE INSUFFICIENT OXYGEN FOR ONE ORBIT AND RE-ENTRY



COOLANT QUANTITY INDICATOR

- 15%—MINIMUM COOLANT FOR ONE SEPARATION AND ONE RE-ENTRY.



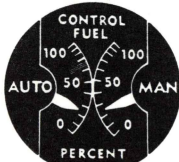
CABIN PRESSURE INDICATOR

- 5.6 PSI—MAXIMUM RELIEVING PRESSURE OF CABIN RELIEF VALVE. IF PRESSURE EXCEEDS 7.5 PSI, DEPRESSURIZE SLOWLY UNTIL PRESSURE IS NORMAL 5.1 PSI
- 4.1 PSI—CABIN REGULATOR FLOW IS CUT OFF BELOW THIS PRESSURE, CHECK THAT SUIT VISOR IS CLOSED BEFORE SUIT PRESSURE DROPS BELOW 4.8 PSI



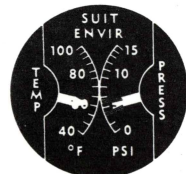
CABIN TEMPERATURE INDICATOR

- 120°F.—MAXIMUM ALLOWABLE OPERATING TEMPERATURE. IF EXCEEDED, TURN CABIN TEMP HANDLE TO COOLER, OR DEPRESSURIZE, THEN RE-PRESSURIZE CABIN.



CONTROL FUEL QUANTITY INDICATOR

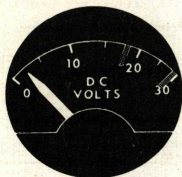
- 65%—MINIMUM AUTO CONTROL FUEL FOR RETROGRADE AND RE-ENTRY.



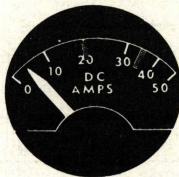
SUIT ENVIRONMENT INDICATOR

- 5.5 PSI—MAXIMUM SUIT PRESSURE MONITOR CABIN PRESSURE SITUATION CLOSELY.
- 4.0 PSI—MINIMUM SUIT PRESSURE

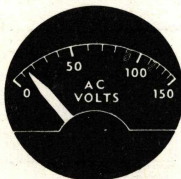
Figure 1-5

**D-C VOLTMETER**

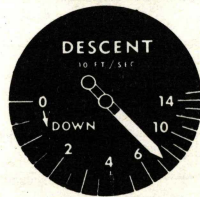
- 18 VOLTS—MINIMUM MAIN BUS VOLTAGE. IF BELOW, CAPSULE EQUIPMENT EFFICIENCY WILL BE LOST; SWITCH TO STDBY AND ELIMINATE ALL NON-ESSENTIAL LOADS.
- 29.5 VOLTS—BATTERIES FULLY CHARGED AT NO LOAD

**D-C AMMETER**

- 20 AMPERES—MINIMUM NORMAL LOAD. IF BELOW, SUSPECT EQUIPMENT FAILURE; CHECK ALL SYSTEMS.
- 35 AMPERES—MAXIMUM NORMAL LOAD. IF EXCEEDED, OVERLOAD CONDITION PROBABLY EXISTS; ATTEMPT TO ELIMINATE OVERLOADING EQUIPMENT. WATCH FOR SMOKE OR ELECTRICAL FIRE.

**A-C VOLTMETER**

- 90 VOLTS—MINIMUM VOLTAGE. IF BELOW AND DC VOLTAGE IS NORMAL, CHECK INVERTER SELECTION. IF DC VOLTAGE IS ALSO LOW (BELOW 18 VOLTS), SELECT STDBY (DC) AND/OR DROP ONE INVERTER. EQUIPMENT EFFICIENCY WILL DECREASE IF BELOW 90 VOLTS; CHECK ATTITUDE/RATE DISPLAY FREQUENTLY.
- 115 VOLTS—NORMAL A-C REGULATED VOLTAGE. VOLTAGE MAY VARY BETWEEN 109 AND 121 VOLTS.

**RATE OF DESCENT INDICATOR**

- 40 FT/SEC—MAXIMUM DESIRED RATE AFTER MAIN PARACHUTE DEPLOYMENT. IF EXCEEDED, MAIN CHUTE WILL PROBABLY BE DAMAGED. DEPLOY RESERVE CHUTE AFTER VERIFYING THAT MAIN CHUTE IS DAMAGED.

CFM10-18

NOTES

[illegible]

FINAL INTERIOR INSPECTION

31. Earth path indicator - SET
 - a. Wind knob - PULL
 - b. Wind knob - FULLY WOUND
 - c. Orbit time knob - SET
 - d. Inclination knob - SET
 - Set in computed orbit inclination.
 - e. Set earth path indicator over previously computed check point.
32. Satellite Clock - CHECK
 - a. CAPSULE 11 ONLY:
 1. Wind Knob - FULLY WOUND
 2. Check time of day with Ground Control
 3. Seconds from Launch - ZERO
 - b. CAPSULE 15 ONLY:
 1. Wind Knob - FULLY WOUND
 2. Check time of day with Ground Control
 3. Time From Launch - ZERO
 4. Time to Retrograde - SAME AS RETRO-GRADE TIME
 5. Check with Ground Control to be sure retrograde event time is correct.
33. Attitude rate indicators - CHECK
 - a. Rate indicators - $0^\circ/\text{sec}$.
 - b. Attitude indicators - To be specified for each flight.
34. Time Zero button cover - REMOVE
35. Cabin pressure indicator - CHECK
36. Cabin air temperature indicator - CHECK
37. Suit pressure indicator - CHECK
38. Suit temperature indicator - CHECK
39. Coolant quantity indicator - 100%
40. Cabin humidity indicator - CHECK
41. Oxygen quantity indicator - CHECK
 - a. Main - 100%
 - b. Reserve - 100%
42. Suit fan switch - NORM

NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

FINAL INTERIOR INSPECTION

43. Cabin fan switch - NORM
44. Stby Btry switch - OFF
45. Isol Btry switch - NORM
46. a. Elect Pwr switch (Capsule 11 only) - NORM
b. ASCS AC Bus switch (Capsule 15 only) - NORM
47. a. Stby Invert switch (Capsule 11 only) - AUTO
b. Fans AC Bus switch (Capsule 15 only) - NORM
48. Ammeter switch - NORM
49. D-C Voltmeter - MISSION RULE
D-C voltmeter should read in accordance with the mission rule for any voltmeter selector knob position.
50. D-C Voltmeter Selector knob - M
51. Audio Bus switch - NORM
52. A-C Voltmeter - 115 VOLTS (nominal)
A-C voltmeter should read between 109 and 121 volts with the a-c volts switch in FANS or ASCS.
53. A-C volts switch - FANS
54. Comm Audio volume wheels - MID-RANGE
55. UHF DF switch - NORM
56. UHF Select switch - HI PWR
57. Transmit switch - OFF
58. Beacon switch - GRND COMD
59. All audio tone switches except Excess Cabin H₂O - ON
60. Warning lights switch - BRIGHT
61. All fuse switches - NO. 1 POSITION
62. Emer O₂ lever - NORM (PULL INTO DETENT)
63. Suit Temperature selector - AS SET
64. Cabin Temperature selector - AS SET
65. Knife - STOWED
66. Food and water containers - SECURED
67. Waste containers - SECURED

PRE-LAUNCH CHECK

The Pre-Launch Check is accomplished after T-7 minutes.



LAUNCH

During launch, the operation of the capsule is completely automatic. Therefore, the only action required will be to monitor all instruments and warning lights to guard against a malfunction of some component. Closely monitor the "Abort" warning light and actuate the abort handle if it illuminates. If the elapsed time and the retrograde time to go clocks fail to start at launch, depress the Time Zero button. Replace the Time Zero button cap after launch. Check that the "Jett Tower" telelight illuminates green when the booster engines shut off and the "Sep Capsule" telelight illuminates green 10 seconds later.



SEPARATION

The separation check list should be completed as soon as possible after the capsule separates from the booster.

WARNING

Do not open the faceplate except in an emergency. If it becomes necessary to open the faceplate, the cabin pressure must be 5.0 ± 1.0 psi before opening the helmet faceplate.

The lap belt, chest strap, and leg straps may be loosened to provide greater comfort, but should not be unfastened.

LAUNCH & SEP

PRE-LAUNCH CHECK

1. Check time with blockhouse.
2. Earth path indicator Wind knob - DEPRESS
At previously computed time, depress the Wind knob to start the earth path indicator.
3. Transmit switch - UHF
4. Beacon Switch - CONT
5. Squib switch - ARM
6. Auto Retro Jett switch - ARM
7. Retro Delay switch - INST
8. Restraint harness - locked and secure
9. Periscope - retracted
10. "Retract" light - OFF
11. Launch Contl switch - READY
12. Arms and hands - POSITIONED

LAUNCH

1. Abort light - MONITOR
2. Satellite clock - CHECK
The elapsed time and time to go clocks should start at liftoff.
3. "Jett Tower" telelight - CHECK
The "Jett Tower" telelight should illuminate green at booster shutdown.
4. "Sep Capsule" telelight - CHECK
The "Sep Capsule" telelight should illuminate green 10 seconds after booster shutdown. The periscope should extend approximately 20 seconds after the escape tower separates.

SEPARATION

1. Retro Delay switch - NORM
2. All instruments - CHECK
3. Excess Cabin H₂O Tone switch - ON
4. Window shutter - OPEN
5. Time Zero button cap - REPLACE

CAPSULE STABILIZATION

Automatic Mode

During all phases of normal operation, proper capsule attitude is maintained by the automatic stabilization control system (ASCS).

Note

If ASCS a-c power has been interrupted, cage the gyros, level the capsule, blunt end forward, and then uncage the gyros before returning to the automatic mode.

WARNING

Be sure the AFCS switch is in the AUX DAMP or FLY-BY-WIRE position before caging the attitude gyros. If the attitude gyros are caged and the ASCS switch is in the NORM position, the capsule will tumble.

Note

If the normal control system fails, the attitude indicating system may be unreliable since it is slaved to the ASCS attitude gyros.

Fly-By-Wire Mode

The fly-by-wire mode generally would not be used unless manual control is required and the manual mode is inoperative or manual fuel is low. The fly-by-wire mode is used in conjunction with the rate command or manual modes if manual control is required during retrograde.

Manual Mode

The manual mode is used when manual control of the capsule is desired. It is also used during retrograde if the auto and

STABILIZATION

CAPSULE STABILIZATION

Fly-By-Wire Mode

To use the fly-by-wire control system, perform the following:

1. ASCS switch - FLY-BY-WIRE
2. RSCS switch - AUTO
3. Manual fuel handle - PUSH RATE COMD
4. Use hand controller to maintain desired attitude.

To return to the normal control system:

5. ASCS switch - NORM

Manual Mode

To use the manual control system, perform the following:

1. Manual fuel handle - PULL DIRECT
2. ASCS switch - AUX DAMP
3. If aux damping is desired, RSCS switch - AUTO
4. If aux damping is not desired, RSCS switch - RATE COMD
5. Use hand controller to maintain desired attitude.

To return to normal control system:

6. ASCS switch - NORM
7. RSCS switch - AUTO
8. Manual fuel handle - PUSH RATE COMD

rate command modes are inoperative. The manual mode can be used in conjunction with the fly-by-wire mode to provide additional control torque during retrograde.

Rate Command Mode

The rate command mode is used to recover if the capsule is tumbling or if the ASCS cannot maintain the proper attitude during retro fire. In controlling orbit attitude, the rate command mode consumes more fuel than the manual or fly-by-wire modes. Therefore, if it becomes necessary to use rate command, switch to fly-by-wire or manual as soon as the need for rate command is over.

ENVIRONMENTAL CONTROL SYSTEM

Separate control knobs for controlling suit and cabin temperatures are located on the right console and are adjusted to maintain maximum comfort. Cabin pressure is normally maintained at 5.1 psia.

WARNING

Do not open the faceplate except in an emergency.

Closely monitor the cabin pressure indicator and "Cabin Press" warning light whenever the faceplate is open and be prepared to close the faceplate immediately at any sign of dropping cabin pressure.

WARNING

In the event of sudden cabin depressurization, the faceplate must be closed and sealed immediately.

STABILIZATION

Rate Command Mode

To use the rate command mode:

1. Manual fuel handle - PUSH RATE COMD
2. RSCS switch - RATE COMD
3. Use hand controller to maintain desired rates and therefore attitude.

To return to normal control:

- #### 4. RS CS switch - AUTO

NOTES

[illegible]

ELECTRICAL POWER SUPPLY SYSTEM

AC and DC electrical power is automatically controlled and distributed to the capsule systems. Refer to Figures 3-1 and 3-2. Monitor the power supply system indicators and periodically check individual battery voltage in order to become immediately aware of any impending failure. Such failures will normally be indicated by a low reading on the AC or DC voltmeter, an abnormal reading on the DC ammeter, or illumination of the "Stby AC Auto" warning light.

COMMUNICATIONS SYSTEM

UHF voice communication is available throughout the mission with either the high power UHF or low power UHF communications set. To use the UHF transmitter, place the Transmit switch to UHF and select the high or low power transmitter with the UHF Select switch. The PTT button on the abort handle must be depressed to transmit any time the VOX PWR switch is in the OFF position. Either high or low power UHF receiver, depending upon the position of the UHF Select switch, is operative at all times. The HF transmitter may be used at any time from capsule separation to antenna fairing jettison by placing the Transmit switch to HF.

CAUTION

A 15 second warmup period is required before transmission on the HF or on either UHF transmitters. Damage to the equipment is probable if this is disregarded.

The HF receiver operates continuously until antenna fairing separation. The HF Rescue set may be used after impact if the HF Rescue whip antenna is deployed. The command receiver is operative throughout the mission and may be used for receiving voice communications in the event the UHF and HF receivers fail. The high-frequency (A) telemetry transmitter may be used for transmitting code with the Key button on the main console if all voice transmitters fail.

NOTES



RETROGRADE

The retrograde sequence is normally initiated by the retrograde clock, however, it can be initiated by depressing the Retro Seq button or by ground command. The "RetroWarn" warning light illuminates 30 seconds before retro event time, and the "Retro Seq" telelight illuminates green at event time. The "Retro Att" telelight should illuminate green within 10 seconds after the "Retro Seq" telelight illuminates green.

WARNING

If there has been a malfunction of the attitude reference system, the ASCS may energize the attitude permission relay and permit the retrograde rockets to fire even though the capsule is not in the retrograde attitude. Therefore, visually check the capsule attitude through the periscope as soon as the capsule is in retrograde attitude.

WARNING

If the Auto Retro Jett switch is in the ARM position, the retrograde package will jettison 60 seconds after the retrograde fire command even if no retrograde rockets have fired.

Be prepared to manually orientate capsule if the "Retro Att" telelight does not illuminate green or if the capsule is not in the retrograde attitude.

1. "Retro Warn" light - ILLUMINATED
2. Auto Retro Jett switch - OFF
3. "Retro Seq" telelight - GREEN
4. "Retro Att" telelight - GREEN
5. Crosscheck attitude indicator, periscope and window.
6. "Fire Retro" telelight - GREEN
7. After "Fire Retro" telelight illuminates green, Auto Retro Jett switch - ARM

NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper has a slightly textured appearance and some minor discoloration or foxing, particularly towards the edges. The lines are thin and dark, likely black or dark blue ink. The overall appearance is that of a standard piece of stationery or notebook paper.

RE-ENTRY

60 seconds after the retro fire signal, the retrograde package is jettisoned and the ASCS positions the capsule in the re-entry attitude. As soon as the capsule is in the re-entry attitude, cross check the periscope and attitude indicator to be sure that the capsule is in the correct attitude. The periscope is retracted 30 seconds after the retrograde package is jettisoned. The periscope "Retract" light will be illuminated while the periscope is retracting. The "Retract Scope" telelight will illuminate red 40 seconds after the retrograde package is jettisoned if the periscope does not retract.

WARNING

Be sure the periscope has fully retracted. If the periscope does not completely retract, the periscope door will not close, causing the cabin to overheat during re-entry.

When the capsule enters the atmosphere and deceleration reaches .05g, the .05g relay will shut off attitude hold, engage rate damping, and initiate a constant 10-12°/sec. slow roll to minimize touchdown dispersion. Pitch and yaw rates should not exceed 2°/sec.

Note

Prior to .05g, there will be no indication of roll rates in excess of 6°/sec. At .05g, the roll rate transducer range changes to 15°/sec., in order to allow higher rates to be indicated. The face of the roll rate indicator does not have a dual scale, therefore, the indications after .05g will be as follows:

RE-ENTRY**RE-ENTRY**

1. "Jett Retro" telelight illuminates green 60 seconds after retro fire signal.
2. ASCS positions the capsule in the re-entry attitude (40° heat shield down).
3. Check periscope and attitude indicator.
4. Check periscope fully retracted.
 - a. Periscope "Retract" light illuminates for 10-12 seconds.
 - b. "Retract Scope" telelight - NOT ILLUMINATED
5. Monitor attitude indicator until .05G.
6. ".05G" telelight illuminates green approximately 140 seconds after completion of retrograde firing.
7. ASCS initiates a 10°/sec roll rate.

NOTES

ACTUAL RATE °/sec

0

5

10

15

INDICATION °/sec

0

2.0

4.0

6.0



LANDING

When the capsule descends to 21,000 feet, the drogue chute is deployed. Drogue chute deployment can be checked by observing deployment through the window and by the opening shock. At 20,000 feet, the cabin fan goes off, the Emer O₂ handle moves to EMER and the "O₂ Emer" light illuminates, indicating that the cabin inlet valve has opened, thereby providing cooler suit ventilation. Pull the Snorkel ring at 20,000 feet to ensure that both the inlet and outlet valves open. At 10,000 feet, a set of dual barostats initiates the antenna fairing ejector to jettison the antenna fairing and extend the periscope. Separation of the antenna fairing will deploy the main chute, turn on UHF rescue beacon, switch communications to descent antenna, and fire cabin inlet and outlet valve squibs as a backup to ensure that they open. All remaining hydrogen-peroxide is also jettisoned at this time through the high thrust pitch and yaw reaction jets.

WARNING

Hydrogen-peroxide will jettison only if the Manual and Auto Fuel Handles are pushed in.

When the antenna fairing separates from the capsule, the "Main" telelight will illuminate green. Main chute deployment can be detected by the opening shock, rate of descent, and by observing the chute through the periscope and window. The reserve chute may be deployed in the event the main chute does not deploy properly or is damaged. 12 seconds after chute

LANDING**LANDING**

1. At 21,000 feet, check drogue chute deployment.
2. At 20,000 ft., Snorkel ring - PULL
3. "O₂ Emer" warning light - ILLUMINATED
4. "Main" telelight illuminates green at 10,000 ft.
5. Check main chute deployment.
 - a. Opening shock should be approximately 3 1/2g's.
 - b. Rate of descent indicator shows approximately 32 ft./sec.
 - c. Check chute for proper deployment or damage through window and periscope.
6. "Landing Bag" telelight - GREEN
7. Fuel handles - CHECK
8. "Fuel Quan" warning light - ILLUMINATED
9. After impact, Rescue switch - MAN.

NOTES

deployment, the heat shield is released to deploy the landing bag. The "Landing Bag" telelight will illuminate green as soon as the heat shield release is actuated. At impact, the inertia switch releases the main chute, illuminates the "Rescue" telelight red, and energizes the recovery light. Place the Rescue switch to MAN to disconnect the reserve chute, fire the reserve chute ejector, illuminate the "Rescue" telelight green, and deploy the HF rescue antenna. If the Rescue switch is not actuated within 10 minutes after impact, a time delay will bypass the Rescue switch and actuate the rescue aids automatically.

RECOVERY AIDS

Radar reflective chaff is ejected when the drogue chute is deployed to aid radar stations in tracking the capsule. A SOFAR bomb is also ejected when the main chute is deployed and a dye marker and shark repellent are ejected when the reserve chute is ejected. The UHF recovery beacon will operate during descent and after landing until capsule recovery. The UHF transmitter is switched to CW mode at antenna fairing separation, the HF transceiver becomes inoperative, and the Transmit switch is bypassed. In the CW mode, the UHF transmitter will transmit continuously for DF homing if the UHF DF switch is in the NORM position, however the UHF DF switch must be in the R/T position to receive and transmit on the UHF set. The impact switch actuates the recovery flashing light and the HF recovery beacon, and turns on the HF recovery transceiver. After impact, the HF recovery receiver operates continuously and both the HF and UHF transmitters operate simultaneously whenever the vox or mike button is actuated. A low-powered, hand-held UHF beacon is also available in the survival kit and may be used for DF transmission.

EGRESS

Except in an emergency, remain in the capsule in order to have the protection of the capsule and to have access to the recovery aids.



EMERGENCY PROCEDURES

Table of Contents

LAUNCH

Abort.	2-2
Tower Fails to Jettison	2-4
Capsule Fails to Separate	2-4
Failure of Two Posigrade Rockets	2-6

SYSTEMS

Stabilization System Emergency Operation	2-8
Environmental Control System Emergency Operation	2-12
Electrical System Emergency Operation	2-16
Communications System Failure	2-20B
Fire or Fumes	2-22
Periscope Emergency Operation	2-22

RETROGRADE

Failure to Start Retrograde Sequence	2-24
Failure to Attain Retrograde Attitude	2-26
Retrograde Rockets Fail to Fire	2-26
Failure to Maintain Retrograde Attitude	2-28
Retrograde Package Fails To Jettison	2-28
ASCS Cannot Maintain Re-Entry Attitude	2-30
.05G Switch Failure	2-30

LANDING

Drogue Chute Failure	2-32
Antenna Fairing Fails to Jettison	2-32
Main Chute Failure	2-32
Reserve Chute Fails to Deploy	2-32
Landing Bag Fails to Deploy	2-32
Post-Landing Emergencies	2-34

EGRESS

Egress	2-36
Emergency Egress	2-40
Post-Egress	2-42



LAUNCH

ABORT

Prior to capsule umbilical separation, the abort can be initiated from the blockhouse through the booster or capsule umbilical. After capsule umbilical separation and before liftoff, the abort can be initiated from the blockhouse through the booster umbilical or command receiver and by the abort handle. After liftoff, the abort can be initiated by ground command through the command receiver by the failure sensing system of the booster, and by the abort handle.

30 seconds after booster ignition, an abort signal from any source will shut down the booster engine, illuminate the "Abort" light, fire the capsule-adaptor ring bolts, fire the escape rocket and jettison the retrograde package. Near maximum altitude, the escape tower is jettisoned and the ASCS is energized to provide rate damping and re-entry roll rate ($10^\circ/\text{sec.}$). If the maximum altitude after abort does not exceed 10,000 feet, the drogue chute is deployed 2 seconds after tower jettison. Two seconds later, the antenna fairing is jettisoned, the periscope is extended, and the main chute is deployed. On aborts in which the maximum altitude is between 10,000 feet and 21,000 feet, the drogue chute is deployed 2 seconds after tower jettison and the main chute is deployed at 10,000 feet. If the maximum altitude after abort is above 21,000 feet, the normal recovery sequence is initiated. If the capsule does not rise above 20,000 feet, the inlet and outlet snorkel valves will be opened by the squibs upon antenna fairing separation. To ensure that these valves operate, pull the snorkel override ring after antenna fairing separation.

ABORT**ABORT**

1. Actuate the abort handle if the "Abort" light illuminates or upon command from the ground.
2. Check "Sep Capsule" telelight green.
3. Monitor "Jett Retro" telelight until it illuminates green.
4. Monitor "Jett Tower" telelight until it illuminates green.
5. Monitor "Main" telelight until it illuminates green.
If light is red, pull Main chute deploy ring.
6. If main chute fails to deploy properly, pull Reserve chute deploy ring.
7. Snorkel ring - PULL.
8. Complete normal recovery procedures.

NOTES

TOWER FAILS TO JETTISON

On a normal launch, the tower is jettisoned by firing the escape and tower jettison rockets at booster engine cutoff. On aborts, the tower is jettisoned by firing the tower jettison rocket near maximum altitude. If the tower fails to jettison at the proper time, the "Jett Tower" telelight will illuminate red. Pulling the Jet Tower ring will electrically fire the tower ring bolts through an alternate circuit and fire one of the bolts through a gas initiator. If the telelight remains red on a normal jettison, the tower jettison and escape rockets have not fired and the escape system fuse switches should be reset. If the telelight remains red on an abort, the tower jettison rocket has not fired and the tower separation fuses should be reset.

CAPSULE FAILS TO SEPARATE

If the capsule fails to separate from the adapter at the proper time, the "Sep Capsule" telelight will illuminate red. Pulling the Sep Capsule ring will electrically fire two capsule-adapter ring retaining bolts and fire the third bolt through a gas initiator. On aborts, the "Sep Capsule" telelight will remain red if the escape rocket fails to fire. In this event, place the Emer Escape Rckt fuse switch to the No. 2 position. After tower jettison the "Sep Capsule" telelight will remain red after the Sep Capsule ring is pulled if all posigrade rockets fail to fire. If this occurs, reset the Emerg Posigrade fuse switch to the No. 2 position to fire the posigrade rockets. Any two of the three posigrade rockets will provide sufficient capsule-booster separation. If all attempts to fire posigrades fail, a single retrograde rocket may be fired to effect separation. This must be considered the last method of separating, however, as there is a possibility of fire or explosion when firing a retrograde in close proximity of the booster. To be best prepared for the possibility of capsule

TOWER & CAPSULE SEP**TOWER FAILS TO JETTISON**

1. Jett Tower ring - PULL
2. If tower fails to jettison:
 - a. Twr Sep Contl fuse switch - NO. 2
 - b. Emer Twr Sep fuse switch - NO. 2
 - c. Emer Twr Jett fuse switch - NO. 2
 - d. For normal jettison, Emer Escape Rckt fuse switch - NO. 2

CAPSULE FAILS TO SEPARATE

1. Sep Capsule ring - PULL
2. If capsule fails to separate:
 - a. Emer Cap Sep Contl fuse switch - NO. 2
 - b. On aborts, Emer Escape Rckt fuse switch - NO. 2
 - c. For normal separation, Emer Posgrd fuse switch - NO. 2
3. If posigrade rockets still fail to fire, use single retrograde rocket to separate.
 - a. ASCS Mode Sel switch - FLY-BY-WIRE
 - b. RSCS switch - RATE COMD
 - c. Manual Fuel Handle - PUSH RATE COMD
 - d. Retro Att switch - BYPASS
 - e. Retro Fire button - DEPRESS
 - f. Within 5 seconds, Squib switch - OFF
 - g. Retro Man fuse switch - OFF
 - h. Squib switch - ARM
 - i. Retro Att switch - AUTO
 - j. When retrograde rocket ceases firing, ASCS Mode Sel switch - NORM
 - k. RSCS switch - AUTO

tumbling after separation of this means, RSCS and Fly-By-Wire control should be utilized. When the Retro Att switch is placed in the BY PASS position, the first retro rocket (left) will fire the instant the Fire Retro button is depressed. If no IMMEDIATE indication of retro firing is noted, place the Squib switch in the OFF position to interrupt the retro fire sequence before 5 seconds elapses, then place the Retro Man fuse switch in the No. 2 position, and re-arm the Squib switch. Re-arming the Squib switch at this time should result in the firing of the proper (left) retrograde rocket. As soon as the left retro rocket fires, and before 5 seconds elapses, the retro fire sequence must be interrupted by means of the squib switch as above. Placing the Retro Man fuse switch in the OFF position will allow re-arming of the squib switch. Normal sequential retrograde firing may be utilized when this is accomplished. In the event of failure of either remaining retrograde rocket in the normal sequence, it will be necessary to reposition the Retro Man fuse switch to the No. 1 (fused) position, or the No. 2 (solid conductor) position. The failed rocket will then fire as soon as its normal time interval elapses. (Bottom rocket fires at 5 seconds, and Right rocket at 10 seconds.)

FAILURE OF TWO POSIGRADE ROCKETS

Firing only one posigrade rocket will separate the capsule from the booster but may not give sufficient clearance to permit retro rocket firing. The number of posigrade rockets that have fired cannot be determined in the capsule. However, on capsule 15, the acceleration due to firing the posigrade rockets is displayed on the ground enabling ground control to determine how many posigrades have fired. There is no way to detect posigrade rocket failures on capsule 11. If ground control advises that two posigrade rockets have not fired and resetting the Emer Posgrd fuse switch fails, jettison the retrograde package before retrograde firing time.

CAPSULE FAIL SEP

4. If first retro rocket does not fire the instant the Fire Retro button is depressed:
 - a. Retro Man fuse switch - NO. 2
 - b. Squib switch - ARM
 - c. Within 5 seconds, Squib switch - OFF
5. Normal capsule operation may resume until retrograde. If one or both remaining retrograde rockets fail to fire at retrograde time:
 - a. Retro Man fuse switch - NO. 1 or NO. 2

FAILURE OF TWO POSIGRADE ROCKETS

If failure of two posigrades is detected:

1. Emer Posgrd fuse switch - NO. 2

If remaining posigrades do not fire:

2. Three Retro-Rocket fuse switches - OFF
3. Jett Retro button - DEPRESS
4. Retro Att switch - BYPASS
5. Fire Retro button - DEPRESS
6. Complete normal recovery procedures.

WARNING

If only one posigrade rocket fires, and emergency means prove unsuccessful, place the three retro-rocket fuse switches to the **OFF** position. This will prevent the retrograde rockets from firing before the retrograde package can be jettisoned and cause collision of capsule and booster.

Note

The ASCS must have a retrograde fire signal and a retrograde package jettisoned signal before the ASCS will position the capsule to re-entry attitude. Therefore, when the retrograde package is jettisoned before retrograde firing, the ASCS returns the capsule to orbit attitude. The retrograde firing signal can be supplied to the ASCS after the retrograde package has been jettisoned by placing the Retro Att switch to the **BYPASS** position and depressing the Fire Retro button.



STABILIZATION

STABILIZATION SYSTEM EMERGENCY OPERATION

Failure of Automatic Mode

If the automatic mode fails and the capsule is tumbling, switch to rate command to stop the tumbling and return the capsule to retrograde attitude. After the capsule is stabilized, switch to manual mode to conserve fuel. ASCS rate damping may be used with the manual mode to aid in maintaining smooth control, however, it may be turned off to conserve fuel if desired. Roll, pitch or

STABILIZATION**STABILIZATION SYSTEM EMERGENCY OPERATION****Failure of Automatic Mode**

1. Use rate command to stop any tumbling.
 - a. Manual fuel handle - PUSH RATE COMD
 - b. RSCS switch - RATE COMD
 - c. Stop tumbling.
 - d. Reposition capsule to orbit attitude.
2. Switch to manual mode.
 - a. Manual fuel handle - PULL DIRECT
 - b. ASCS switch - AUX DAMP
 - c. If ASCS damping is desired, RSCS switch - AUTO
3. Auto control fuel gage - CHECK
If ASCS failed in only one axis, the automatic mode may be used in the other axes.
4. Applicable ASCS fuel handle - PULL OFF
5. ASCS switch - NORM
6. RSCS switch - AUTO
7. Use hand controller in failed axis.

yaw axis controls can be shut off in the event the ASCS has failed in one axis only. If ASCS has failed or is too unreliable to use during retrograde, check that the rate command mode is operating properly and use rate command and fly-by-wire during retrograde.

Note

ASCS rate damping will not be available with the ASCS fuel handles pulled.

WARNING

If ASCS malfunction was caused by a malfunction of the attitude gyros or the horizon scanner, the attitude indicator will give incorrect indications.

Failure of Fly-By-Wire

Failure of fly-by-wire may occur in conjunction with failure of the automatic mode. If it occurs without failure of the automatic mode, there is probably an electrical malfunction in the control system fly-by-wire switches, ASCS switch, or associated circuits. Return to the automatic mode, unless it has also failed, or switch to the manual mode.

Failure of Rate Command

If rate command fails, switch to manual or fly-by-wire mode if manual control is desired, or to automatic mode. During retrograde, have manual control fuel handle pulled and be prepared to switch to manual AND fly-by-wire if the automatic mode also fails.

STABILIZATION**Failure of Fly-By-Wire**

1. Auto control fuel gage - CHECK
2. ASCS Switch - NORM
3. If the automatic mode has also failed, manual control fuel handle - PULL DIRECT
4. ASCS switch - AUX DAMP
5. Use hand controller as necessary to maintain proper attitude.

Failure of Rate Command

1. Manual control fuel handle - PULL DIRECT
2. RSCS switch - AUTO
3. ASCS switch - AS DESIRED
Switch to NORM, AUX-DAMP, or FLY-BY-WIRE mode as desired.

Attitude Gyro Slaving Failure

If the horizon scanner fails, the attitude indicating system will have no horizon reference for slaving and the vertical gyro will have to depend on automatic precession to maintain the gyro vertical to the earth's surface. The only indication that the horizon scanner has failed will be a difference in the indications of the attitude indicator and the periscope.

WARNING

Be sure the ASCS switch is in the AUX DAMP or FLY-BY-WIRE position before caging the attitude gyros. If the attitude gyros are caged, and the ASCS switch is in the NORM position, Reaction controls will cause the capsule to tumble about the pitch axis.

ENVIRONMENTAL CONTROL SYSTEM

EMERGENCY OPERATION

Cabin Pressurization

In the event the cabin becomes depressurized, it is only necessary to have the faceplate closed. The cabin may be depressurized to eliminate smoke, fumes, or fire. The cabin can be depressurized at any time as long as the faceplate is closed.

WARNING

If the faceplate is open and cabin pressure is suddenly lost, it must be closed and sealed immediately.

ENVIRONMENTAL**Attitude Gyro Slaving Failure**

1. Manual control fuel handle - PULL DIRECT
2. ASCS switch - AUX DAMPING
3. Gyro switch - GYRO CAGE
4. Use the hand controller to position the capsule in a horizontal position.
Align the earth image with the true horizontal pitch index and the roll indices on the periscope (i.e., so that pitch, roll, and yaw are all zero).
5. Gyro switch - GYRO NORM
6. ASCS switch - NORM
7. Check that ASCS returns capsule to orbit attitude.
8. Manual control fuel handle - PUSH RATE COMD

**ENVIRONMENTAL CONTROL SYSTEM
EMERGENCY OPERATION****Cabin Depressurization**

1. Faceplate - CLOSED
2. All suit connections - CHECK
3. Decomp "T" handle - PULL

Cabin Repressurization

1. Decomp "T" handle - PUSH
2. Repress "T" handle - PULL
3. At 5 psi cabin pressure, Repress "T" handle - PUSH

In the event of cabin depressurization, the cabin pressure regulator will automatically shut off oxygen flow when cabin pressure drops to 4.1 psia. The remaining oxygen is then reserved for the suit environmental circuit. If the cabin was depressurized by pulling the Decompress "T" handle, the cabin can be pressurized by pushing the handle IN and pulling Repress "T" handle. This will pressurize the cabin in approximately 7 1/2 minutes. When the cabin pressure reaches 5 psi, push Repress "T" handle IN.

Emergency Oxygen

In the event the suit pressure drops below $4 \pm .1$ psi, the emergency oxygen rate valve automatically opens and the suit circuit shutoff valve closes to prevent oxygen flow through the impurity removers, temperature control units, and the suit fans. The emergency oxygen rate valve may be opened at any time by actuating the Emer O₂ lever on the right console. This action supplies oxygen for cooling and pressurizing the suit as well as supplying oxygen for breathing. The "O₂ Emer Flow" light will illuminate whenever the emergency oxygen rate valve or suit circuit shutoff valve operates manually or automatically. During emergency rate operation, the oxygen supply duration is greatly reduced because oxygen is exhausted overboard.

Alternate Suit Fan

If the No. 1 suit fan fails with the Suit Fan switch in the Auto position, the No. 2 fan will automatically cut in to provide suit ventilation. Either fan may also be selected by placing the Suit Fan switch in the No. 1 or No. 2 position. If the No. 1 fan fails, and the No. 2 fan does not cut in automatically, place the Suit Fan switch in the No. 1 position and the Suit Fan fuse switch in the No. 2 position. If No. 1 fan operation is not regained, place the Suit Fan switch in the No. 2 position. The fuse will then be by-passed directly energizing the No. 2 fan. If it is impossible

ENVIRONMENTAL**Emergency Oxygen**

1. To transfer to emergency oxygen, Emer O₂ lever - EMER
 2. To return to normal operation; Capsule 11 only:
 - a. Emer O₂ lever - NORM
 - b. Suit Fan switch - NO. 1
 - c. After 30 seconds, Suit Fan switch - AUTO
- Capsules 15 only:
- a. Emer O₂ lever - NORM
 - b. Suit Fan switch - AUTO

Alternate Suit Fan

If the Auto suit fan fails and No. 2 does not switch in automatically:

1. Suit Fan switch - NO. 1
2. Suit Fan Fuse switch - NO. 2
3. If NO. 1 fan remains inoperative, Suit Fan Switch - NO. 2
4. If NO. 2 fan is inoperative, Emer O₂ lever - EMER

to regain suit fan operation, actuate the Emer O₂ lever on the right console to provide ventilation.

WARNING

Suit ventilation by fan or by emergency oxygen must not be lost for more than 30 seconds, or CO₂ build-up in the helmet will become dangerously high.

Excess Suit or Cabin Water

Indicator lights marked "Excess Suit H₂O" and "Excess Cabin H₂O" illuminate whenever excess water (not evaporated) reaches 42°F in the heat exchanger exhaust duct. Whenever either "Excess H₂O" light illuminates, position that temperature controller to a warmer setting.

Note

"Excess Cabin H₂O" warning light will illuminate when freon cooling is being supplied through the ground test umbilical before launch.

ELECTRICAL SYSTEM EMERGENCY OPERATION

Main Battery Failure

If main bus voltage drops below 18 volts, the standby battery switch should be switched to ON. If any battery is below 18 volts or more than 3 volts below bus voltage, turn that battery OFF.

ELECTRICAL**Excess Suit or Cabin Water**

1. Suit or cabin temperature cont. - WARMER

ELECTRICAL SYSTEM EMERGENCY OPERATION**Main Battery Failure**

1. If any battery is below 18 volts, turn that battery OFF.
2. If Main Bus voltage is below 18 volts:
 - a. Stby Btry switch - ON
 - b. Check all bus and battery voltages
 - c. Turn off all low priority equipment

NOTES

Standby Battery Failure

Standby battery failure can be detected by monitoring the voltmeter. If standby battery failure is detected, turn that battery off. If the main batteries also fail, place the Audio Bus switch to EMER to permit the isolated battery to maintain communications. The isolated battery also supplies the isolated squib bus to assure sufficient power to fire all squibs as well as the retrograde rockets. The isolated battery may also be connected to the main bus through the Stby Btry switch if the Isol Btry switch is placed in the STBY position.

WARNING

The isolated battery should not be used to supply other busses unless absolutely necessary and then only for essential equipment since it supplies the alternate power source for firing retrograde rockets and the recovery system pyrotechnics.

Isolated Battery Failure

If the isolated battery fails, the isolated squib bus can be powered from the standby battery by placing the Isol Btry switch to STDBY.

Complete Electrical Failure

Failure of the ammeter shunt or Ammeter switch can cause complete electrical failure by removing the ground for all capsule batteries. If all capsule power is suddenly lost, place the Ammeter switch to BYPASS to provide an alternate ground for the batteries.

ELECTRICAL**Standby Battery Failure**

If standby battery failure is detected:

1. Standby Battery - OFF
2. Check voltage of main and isolated batteries.
3. If main batteries are low, shut off all non-essential equipment.

If main batteries also fail:

4. If radios are needed, Audio Bus switch - EMER
5. If main bus power is needed, Isol Btry switch - STBY, Stby Btry switch ON

Isolated Battery Failure

If isolated battery failure is detected:

1. Isolated battery - OFF
2. Check all battery voltages.
3. Before retrograde, Isol Btry switch - STDBY

Complete Electrical Failure

1. If all electrical power is suddenly lost, Ammeter switch - BYPASS

Inverter Failure (Capsule 11 Only)

If either main inverter fails with the Stby Invert switch in the AUTO position, the standby inverter will automatically supply power to the failed AC bus and illuminate the "Standby AC Auto" light. Determine which inverter failed by placing Stby Invert switch to FANS ONLY and checking the ASCS bus with the AC voltmeter. If the ASCS bus voltage is zero, the ASCS bus inverter has failed. Then return the Stby Invert switch to AUTO. If both main inverters fail with the Stby Invert switch in the AUTO or EMER AC position, the standby inverter will automatically switch to the fan bus.

■ Single Inverter Failure (Capsule 15)

If either main inverter fails with both AC Bus switches in the NORM position, the Standby Inverter will automatically supply power to the failed AC bus and illuminate the "Standby AC Auto" light. Determine which inverter failed by placing ASCS AC Bus switch to STBY, and monitoring the "Standby AC Auto" telelight. If the light goes out, the ASCS Bus inverter has failed. Leave the ASCS AC Bus switch in STBY if ASCS inverter failed; if not, return the switch to NORM, and place the Fans AC Bus switch in the STBY position. This provides for illumination of the "Standby AC Auto" telelight if the remaining inverter should fail.

■ Double Inverter Failure (Capsule 15)

If both Main inverters fail with both AC bus switches in the NORM position, the standby inverter will automatically supply both AC buses. This may be detected by switching both AC Bus switches to STBY. If the "Standby AC Auto" telelight goes out with both switches in STBY, but remains illuminated when only one switch is in STBY, both inverters have failed. If both inverters have failed, turn off unnecessary AC bus to conserve power.

ELECTRICAL**Single Inverter Failure (Capsule 15)**

1. When "Standby AC Auto" light illuminates and it is desired to determine which inverter has failed, observe the following procedure:
 - a. ASCS AC Bus switch - STBY
 - b. If Stby AC Auto telelight goes out, ASCS inverter has failed. Leave ASCS Bus switch in STBY position so that failure of the Fans AC inverter may be detected by re-illumination of the Stby AC Auto light.
 - c. If Stby AC Auto light remains illuminated, Fans inverter has failed, place ASCS AC Bus switch in NORM, and Fans AC Bus switch in STBY. Stby AC Auto light should go out.

Double Inverter Failure (Capsule 15)

1. If both main inverters fail, the Stby AC Auto telelight will illuminate, and the Standby inverter will supply power to both the ASCS and Fans AC buses. To detect a double inverter failure:
 - a. ASCS AC Bus switch - STBY
Stby AC Auto light will remain illuminated.
 - b. Fans AC Bus switch - STBY
If both inverters are out, the Stby AC Auto telelight will go out.
2. If both inverters fail and both fans and ASCS power is needed:
 - a. ASCS AC Bus switch - STBY
 - b. Fans AC Bus switch - STBY
3. When either Fans or ASCS power is no longer required, switch the applicable AC Bus switch to OFF.
4. Initiate retrograde as soon as possible.

Fuses

All fuses accessible in flight are contained in fuse switches on two fuse panels. One is located just to the left of the left console and the other is on the right side of the main panel. Each fuse switch has four positions, NO. 1, NO. 2, OFF and REPLACE, and contains two fuses. If the NO. 1 fuse fails, the switch may be repositioned to NO. 2. The NO. 2 position of the Retro Jett, Retro Man, Emer Cap Sep Contl, Tower Sep Contl, Emer Main Deploy, Resrve Deploy, and the Emer Resrve Deploy fuse switches have the fuse in the No. 2 position replaced by a solid conductor to prevent loss of these important circuits because of fuse failure.

COMMUNICATIONS SYSTEM FAILURE

Since the basic capsule concept relies heavily on the communications system, three separate transmitters and receivers are provided for voice communications. Two additional command receivers are also provided and may be used for receiving ground commands if all other receivers fail. An emergency key for the high frequency telemetry transmitter

COMMUNICATIONS**COMMUNICATIONS SYSTEM FAILURE**

1. Check transmission using mike button.
If transmitter operates normally, only the voice controlled relay has failed.
2. Check operation of the two remaining communication sets.
3. Audio Bus switch - EMER
4. Attempt to contact ground using the emergency key button and command receiver.

NOTES

is also provided for use in the event all the voice transmitters become inoperative.

WARNING

Do not place Audio Bus switch to EMER unless it is absolutely necessary because of the excessive drain on the isolated battery.

FIRE OR FUMES

Any fire inside the capsule will probably be an electrical fire. Therefore, attempt to determine the cause of the fire and turn off the affected equipment. The cabin can be depressurized to extinguish any fire and eliminate fumes.

PERISCOPE EMERGENCY OPERATION

The periscope is electrically extended and retracted, with a manual lever for emergency extension and retraction if the normal (electrical) extension and retraction system should fail. The periscope is automatically extended 30 seconds after booster separation on capsule 11, and 20 seconds after tower separation on capsule 15. The periscope will retract 30 seconds after the retrograde package is jettisoned. The Retract Scope telelight will illuminate red if the periscope fails to retract by 40 seconds after retrograde package is jettisoned.

WARNING

The periscope must be manually retracted if the retrograde package fails to jettison.

FIRE OR FUMES**FIRE OR FUMES**

1. Faceplate - CLOSED
2. If fire or fumes are severe, Decomp "T" handle - PULL
3. Attempt to determine source of fire or fumes.
4. If source of fire or fumes can be determined, turn off affected equipment.
5. If affected equipment can be turned off, re-pressurize cabin.

PERISCOPE EMERGENCY OPERATION

1. Periscope fuse switch - NO. 2
If No. 1 fuse has failed, periscope should extend or retract automatically.
2. If periscope does not extend or retract, Retract Scope switch - MAN
3. Periscope fuse switch - OFF
4. Manual Engage lever - ENGAGED
5. Ratchet - AS REQUIRED
6. Manually extend or retract periscope.

WARNING

- Be sure the RetractScope switch is in the MAN position, and the Periscope Fuse switch is OFF, before the Manual Engage lever is engaged. The periscope extend-retract motor will burn out if automatic operation is attempted with the manual system engaged.
- The periscope must be retracted prior to re-entering the atmosphere. The periscope door forms a part of the capsule side insulation when it is closed. If the periscope is not retracted during re-entry, the door will be open causing the capsule to overheat.

The periscope is again extended at 10,000 feet during descent to allow the chute to be checked for proper deployment or damage.



RETROGRADE

FAILURE TO START RETROGRADE SEQUENCE

If the "Retro Seq" telelight fails to illuminate at retrograde time, the retrograde sequence can be started by depressing the Retro Seq button or the Fire Retro button. If the Retro Seq button fails, switch to Rate Command and Fly-By-Wire, position the capsule to retrograde attitude and fire the retrograde rockets by placing the Retro Att switch to BYPASS and depressing the Fire Retro button.

1. Retro Seq button - DEPRESS
2. If "Retro Seq" telelight is still out:
 - a. Emer Retro Seq fuse switch - NO. 2
 - b. Retro Seq button - DEPRESS
3. If capsule is not in retro attitude:
 - a. RSCS switch - RATE COMD
 - b. ASCS switch - FLY-BY-WIRE
 - c. Position capsule to retro attitude.
 - d. Retro Att Switch - BYPASS
 - e. Fire Retro button - DEPRESS

NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper appears slightly aged or off-white. There is no handwriting or other markings on the page.

FAILURE TO ATTAIN RETROGRADE ATTITUDE

The "Retro Att" telelight will illuminate red if the capsule is not in the retrograde attitude within 30 seconds after receiving a signal from the satellite clock or ground command, or when the Retro Seq button is depressed. It will also illuminate red if the attitude permission circuit fails even though the capsule is in the retrograde attitude. Therefore, if the "Retro Att" telelight fails to illuminate within 10 seconds, immediately check the attitude indicator and periscope to determine if the capsule is in the retrograde attitude. If the capsule is within approximately 12° of the retrograde attitude and the yaw angle appears to be near zero, place the Retro Att switch to BYPASS and depress the Fire Retro button to fire the retrograde rockets. If the capsule is not in the correct position, use rate command AND fly-by-wire to position the capsule in the retrograde position. If the attitude permission circuit of the ASCS has not failed, the retrograde rockets will fire automatically 30 seconds, after the retro sequence is initiated or, if over 30 seconds, as soon as the capsule is in the proper attitude. If the attitude permission circuit has failed, place the Retro Att. switch to BYPASS and push the Fire Retro button to fire the retrograde rockets.

RETROGRADE ROCKET FAILS TO FIRE

Normally the retrograde rockets are fired at 5 second intervals. In capsule 11, the "Fire Retro" telelight will illuminate red if the No. 3 retrograde rocket fails to fire within 15 seconds after receiving the fire signal while in capsule 15, the "Fire Retro" telelight will illuminate red if any two retrograde rockets fail to fire within 20 seconds. If the "Fire Retro" telelight illuminates red, recheck that the "Retro Att" telelight is green and depress the Retro Fire button to fire all retrograde rockets sequentially through another circuit. If the retrograde rockets still do not fire, place the No. 1 retro rocket,

RETROGRADE**FAILURE TO ATTAIN RETROGRADE ATTITUDE**

If the "Retro Att" telelight fails to illuminate within 10 seconds:

1. Check attitude indicator and periscope to determine if capsule is in retrograde attitude.
2. If the capsule is in the retrograde attitude:
 - a. Retro Att switch - BYPASS
 - b. Fire Retro button - DEPRESS
3. If the capsule is not in the retrograde attitude:
 - a. Manual fuel handle - PUSH RATE COMD
 - b. RSCS switch - RATE COMD
 - c. ASCS switch - FLY-BY-WIRE
 - d. Use hand controller to position capsule in the retrograde attitude.
 - e. If attitude permission circuit is operating, the retrograde rockets will fire 30 seconds after initiating retro sequence or as soon as the capsule is in the retrograde attitude, if over 30 seconds.
 - f. If attitude permission circuit is inoperative and retrograde rockets do not fire as soon as capsule is in retrograde attitude, place the Retro Att switch to BYPASS.
 - g. Fire Retro button - DEPRESS

RETROGRADE ROCKET FAILS TO FIRE

1. Recheck that "Retro Att" telelight is illuminated green.
2. Fire Retro button - DEPRESS
3. If "Fire Retro" telelight is still illuminated red:
 - a. No. 1, No. 2 and No. 3 Retro Rckt fuse switches - NO. 2

No. 2 retro rocket, No. 3 Retro Rocket and Retro Man fuse switches to the No. 2 position and depress the Fire Retro button again. The "Fire Retro" telelight remains red until No. 3 retrograde rocket fires (capsule 11) or until at least two rockets fire (capsule 15).

FAILURE TO MAINTAIN RETROGRADE ATTITUDE

If the capsule exceeds the retrograde firing limits during retrograde rocket firing, place the Squib switch to OFF to prevent remaining rockets from firing in an incorrect attitude. Reposition the capsule to the retrograde attitude employing the appropriate control mode, place the Retro Att switch to BYPASS, place the Squib switch to ARM, and depress the Fire Retro button. The No. 2 and No. 3 retrograde rockets will fire 5 seconds and 10 seconds after depressing the retro fire button.

Note

If No. 1 retrograde rocket was fired with the Retro Att switch in the BYPASS position, it is only necessary to return the Squib switch to the ARM position.

RETROGRADE PACKAGE FAILS TO JETTISON

The retrograde package is jettisoned 60 seconds after retro fire is initiated. If the retrograde package has not jettisoned 60 seconds after retro fire signal, the "Jett Retro" telelight will illuminate red 62 seconds after retro fire signal.

WARNING

If the retrograde package fails to jettison, the periscope must be manually retracted and capsule re-entry attitude must be manually positioned.

RETROGRADE

- b. Retro Man fuse switch - NO. 2
- c. Fire Retro button - DEPRESS
- 4. "Fire Retro" telelight will illuminate green when No. 3 retrograde rocket fires (capsule 11) or when two retrograde rockets have fired (capsule 15).

FAILURE TO MAINTAIN RETROGRADE ATTITUDE

If capsule exceeds retrograde firing limits:

- 1. Squib switch - OFF
- 2. Reposition capsule to retrograde attitude.
- 3. Retro Att switch - BYPASS
- 4. Squib switch - ARM
- 5. Fire Retro button - DEPRESS

RETROGRADE PACKAGE FAILS TO JETTISON

- 1. Jett Retro button - DEPRESS
- 2. If Retrograde package does not jettison:
 - a. Retro Jett fuse switch - NO. 2
 - b. Emer Retro Jett fuse switch - NO. 2
- 3. Jett Retro button - DEPRESS

Note

If the Squib switch is placed to the OFF position, the retrograde rocket assembly jettison 60 second time delay relay is re-cycled thus delaying normal retrograde package jettison.

ASCS CANNOT MAINTAIN RE-ENTRY ATTITUDE

After the retro package separates, the ASCS normally repositions the capsule to re-entry attitude (40° heat shield down). The periscope should be used to check the attitude as soon as the ASCS repositions the capsule to re-entry attitude since the periscope will automatically retract 30 seconds after the retrograde package is jettisoned. If the capsule is not in the correct re-entry attitude, use the rate command control system to manually position the capsule in the correct attitude. Place Retract Scope switch to MAN to prevent the periscope from retracting after the retrograde package is jettisoned. Leave periscope extended for approximately 60 seconds to check the attitude indicators and use RSCS to maintain re-entry attitude. Then immediately retract periscope and check that the RSCS automatically initiates a $7.7^\circ/\text{sec}$ slow roll when the ".05g" telelight illuminates.

.05G SWITCH FAILURE

If the .05g switch has not closed by 0.25g (approximately 100 seconds after retrograde package is jettisoned) the ".05g" telelight will illuminate red. If the .05g button does not override the failure, the Emer .05g fuse has probably failed.

Note

If after repositioning the ASCS and .05g Fuse switches, the .05g switch remains failed, the ASCS should be turned to RATE COMD.

RE-ENTRY**ASCS CANNOT MAINTAIN RE-ENTRY ATTITUDE**

If ASCS does not reposition capsule to correct re-entry attitude after retro package separates:

1. Manual fuel handle - PUSH RATE COMD
2. RSCS switch - RATE COMD
3. Retract Scope switch - MAN
4. Use hand controller to position the capsule in the re-entry attitude.
5. Check att. ind. & periscope.
6. Retract Scope switch - AUTO
7. Periscope - CHECK RETRACTED
8. RSCS initiates $7.7^{\circ}/\text{sec}$ roll.

.05G SWITCH FAILURE

If the ".05g" telelight illuminates red or fails to illuminate:

1. .05G button - DEPRESS
2. If .05G switch is still failed:
 - a. ASCS .05G fuse switch - NO. 2
 - b. Emer .05G fuse switch - NO. 2
3. .05G button - DEPRESS
4. If the .05g switch remains failed:
 - a. RSCS switch - RATE COMD
 - b. Manual fuel handle - PUSH RATE COMD
 - c. Use hand controller for position and control.



LANDING

DROGUE CHUTE FAILURE

Drogue chute failure can be detected by the lack of opening shock and by a visual check through the window. Failure of the Emer Drogue Deploy fuse will fail the Drogue Override button.

ANTENNA FAIRING FAILS TO JETTISON

If the "Main" telelight illuminates red at 10,000 feet, the antenna fairing has failed to jettison or the telelight relay has failed. If the telelight fails to illuminate, there has probably been a failure of the 10,000 ft. barostat, or of the telelight. If the telelight or the telelight relay has failed, the antenna fairing will still jettison normally and no corrective action is required.

MAIN CHUTE FAILURE

Main chute deployment failure can be detected by the lack of opening shock, a visual check through the periscope and window, and no decrease in the rate of descent. Chute damage can be detected by visual inspection and by a rate of descent above 32 feet per second.

LANDING BAG FAILS TO DEPLOY

If the heat shield release is not actuated 12 seconds after chute deployment, the "Landing Bag" telelight will illuminate red. If the heat shield fails to release when the Landing Bag switch is placed to MAN, the Emer Land Bag fuse has probably failed.

LANDING**DROGUE CHUTE FAILURE**

1. Drogue button - DEPRESS
2. If drogue chute does not deploy:
 - a. Emer Drogue Deploy fuse switch - NO. 2
 - b. Drogue button - DEPRESS

ANTENNA FAIRING FAILS TO JETTISON

If the "Main" telelight illuminates red or fails to illuminate at 10,000 feet:

1. Visually check for chute deployment.
2. Main deploy ring - PULL
3. Visually check for chute deployment.
4. If chute has not deployed, Emer Main Deploy fuse switch - NO. 2

MAIN CHUTE FAILURE

If the main chute does not deploy properly or is damaged:

1. Reserve deploy ring - PULL

RESERVE CHUTE FAILS TO DEPLOY

If the reserve chute does not deploy when the Reserve deploy ring is pulled:

1. Reserve Deploy fuse switch - NO. 2
2. Emer Reserve Deploy fuse switch - NO. 2

LANDING BAG FAILS TO DEPLOY

1. Landing Bag switch - MAN
2. Emer Land Bag fuse switch - NO. 2

POST-LANDING EMERGENCIES

Chute Fails to Release

If the main parachute fails to release upon impact, it may be released by pulling the Reserve ring. If the Reserve ring fails, the parachute may act as a sail and pull the capsule through the water. If this occurs, remain in the seat with the restraint system fastened to prevent injury from bouncing and tumbling. If the capsule is not bouncing or tumbling, release the escape hatch and cut shroud lines with a knife.

Reserve Chute Fails to Eject

In the event the reserve chute fails to eject or disconnect when the Rescue switch is actuated, the chute container can be pushed out of the capsule after removing the escape hatch.

Capsule Lands in Rough Seas

In the event the capsule lands in rough seas, remain in the seat with the restraint harness fastened except in emergencies such as: Fire, leaking capsule, etc. If an emergency prohibits remaining in the capsule, use extreme caution to prevent the raft from capsizing.

Cooling System Fails

In the event the cooling system fails after impact, adequate ventilation may be received by removing the escape hatch and opening the suit. If the capsule overheats, use normal egress procedures.

POST-LANDING**POST-LANDING EMERGENCIES****Chute Fails to Release**

1. Reserve deploy ring - PULL
2. If capsule is bouncing or tumbling, stay in seat.
3. If capsule is not bouncing or tumbling:
 - a. Remove right side of instrument panel and escape hatch.
 - b. Push out parachute container.
 - c. Cut shroud lines with knife.

Reserve Chute Fails to Eject

1. Reserve chute can be pushed out with parachute container.
2. If necessary, cut shroud lines with knife.

Capsule Lands in Rough Seas

1. Remain in seat with harness fastened.
2. If forced to leave capsule, use extreme caution.

Cooling System Fails

1. Remove escape hatch and open suit.
2. If capsule overheats, evacuate capsule.

Fire or Fumes

In the event of fire or fumes in the cabin, immediately evacuate the capsule using emergency egress procedures.

Capsule Leaks After Landing

If the leak is large, immediately leave capsule. If leak is small, check conditions outside before deciding whether or not to leave capsule immediately.

Capsule Strikes Land

In the event the capsule strikes land, use emergency egress procedures to leave capsule.

EGRESS

Except in an emergency, remain in the capsule in order to have the protection of the capsule and to have access to the recovery aids. If conditions prohibit remaining in the capsule, proceed as illustrated in Figure 2-1.

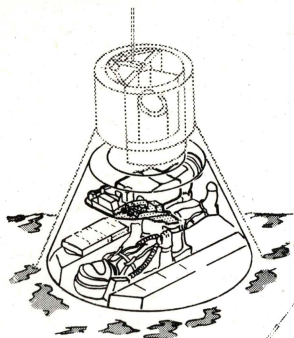
1. If leak is large, leave capsule immediately.
2. If leak is small, check conditions outside before deciding to leave capsule immediately.

NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.



EGRESS



1

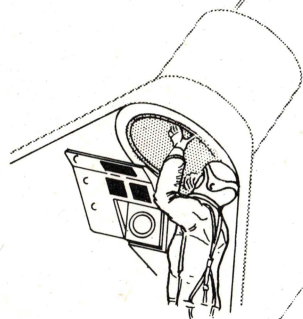
REMOVE HARNESS AND DISCONNECT PERSONAL LEADS. THE HELMET MAY BE REMOVED IF DESIRED.

2

REMOVE SURVIVAL KIT COVER AND INSERT KNIFE AND FLASHLIGHT IN SURVIVAL KIT.

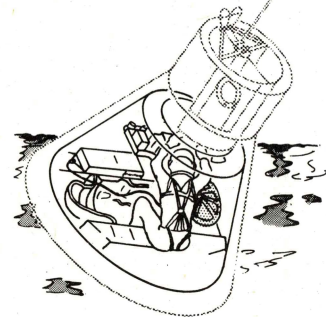
3

REMOVE RIGHT SIDE OF INSTRUMENT PANEL AND STOW BEHIND MAIN PANEL.



4

SIT ON RIGHT SIDE OF CAPSULE AND RELEASE ESCAPE HATCH. CAPSULE WILL START TIPPING WHEN WEIGHT SHIFTS.



5

STOW HATCH ON TOP OF LEG COUCH.

6

CHECK THAT SURVIVAL KIT LANYARD IS SECURED TO SUIT.

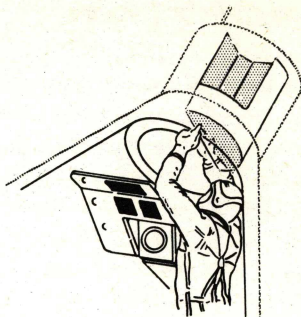
Figure 2-1

7

DISCONNECT TWO ELECTRICAL LEADS,
REMOVE THREE PIP PINS FROM THE PARA-
CHUTE CONTAINER.

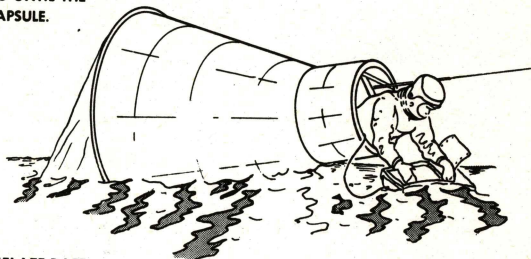
8

PUSH PARACHUTE CONTAINER AND SUR-
VIVAL KIT OUT OF CAPSULE.



9

MANEUVER THRU HOUSING UNTIL THE
SHOULDERS ARE OUT OF CAPSULE.



10

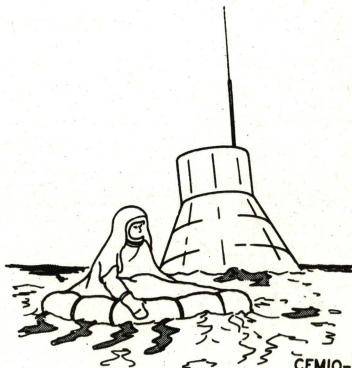
RETRIEVE SURVIVAL KIT, INFLATE RAFT
AND TIE RAFT TO CAPSULE.

11

GET INTO RAFT.

12

SECURE RAFT AND START RESCUE PRO-
CEDURES.



CFMIO-6A

EMERGENCY EGRESS

Explosive removal of the side entrance hatch provides an alternate egress route. The hatch is released by detonating a gasket type firing plate which severs the notched titanium hatch bolts. The side hatch can also be actuated from the outside by pulling the external release handle. The emergency escape hatch can be used for egress on the launch pad during countdown or for egress after land impact. The right main instrument panel may be removed for ease of egress. To actuate the emergency hatch, depress and rotate the cam-locked cap covering the initiator, and remove it. Withdraw the initiator safety pin, and strike the initiator with the heel of the clenched hand.

CAUTION

- Do not depress the initiator with one finger, or attempt to depress it with the window pole. The initiator is an explosive device, and actuating shock is very high.
- The helmet must be on, preferably with visor closed when the initiator is actuated. The noise level at detonation is severe enough to damage eardrums.

WARNING

- If the capsule is in the water, the emergency escape hatch should be used only in an emergency requiring immediate egress since the capsule can be swamped after the hatch is removed, especially in rough seas.
- When leaving capsule use the raft for support. If the hatch sill is used for support, it will sink below the waterline.

EGRESS**EMERGENCY EGRESS**

To use the emergency escape hatch, proceed as follows:

1. Remove harness and personal leads.
2. Detach survival kit from capsule.
3. Initiator cover and safety pin - REMOVE
4. Initiator button - DEPRESS
5. Push hatch out of capsule.

If the capsule is in the water:

6. Remain in the couch while pushing the survival kit out of the capsule and inflating the raft.
7. Use raft for support while leaving capsule.

NOTES

POST EGRESS

The water bottles are removable and may be retained by the astronaut upon egress. The survival kit, located to the astronaut's left is divided into two sections. Each section is contained in a support assembly and protected by a canvas, zipper opened cover. The upper section closest to the astronaut's head contains the life raft and a signal mirror. The lower part consists of the following equipment:

1. 10 ft. of nylon line
2. Tube of zinc oxide
3. Bar of soap
4. Pocket knife
5. RB-5 Battery (Ultra Sarah
6. RB-7 Radio Beacon (Rescue Beacon)
7. Signal light
8. Metal container of matches
9. Signal whistle
10. Desalting kit
11. Survival ration
12. First aid kit
13. Dye markers (3)
14. Shark repellent (2)
15. Morphine injectors

The suit assists flotation until it fills with water. After getting into the raft, it may be necessary to ventilate the suit by opening the zippers or by cutting open the suit with the knife.

WARNING

If the zippers have been opened or the suit cut for ventilation, the suit will not assist flotation in the event the raft capsizes.



SECTION III

TROUBLE SHOOTING

Table of Contents

Schematics

DC Electrical System	3-2
AC Electrical System (Capsule 11)	3-4
■ AC Electrical System (Capsule 15)	3-4B
Stabilization Control System.	3-6
Environmental Control System.	3-8
Communications System	3-10
Launch Separation Sequence.	3-12
Abort Sequence	3-14
Retrograde Sequence	3-16
Recovery Sequence (Pre-Impact).	3-18
Recovery Sequence (Post-Impact)	3-20

SECONDARY BUS RELAY IS ENERGIZED WHEN MAIN BUS VOLTAGE FALLS BELOW 18 VOLTS IF STANDBY BATTERY SWITCH IS IN THE AUTO POSITION. D-C

D-C AMMETER

D-C

D-C VOLTMETER



MAIN 24V D-C BUS

H₂O₂ JETTISON
AUTOMATIC SUIT FAN CONTROL
D-C VOLTS MONITOR
EMERGENCY HOLD CONTROL
* ENVIRONMENTAL CONTROL

INSTRUMENT DC NO. 6
MAIN INVERTER FANS
NO. 1 AUDIO
* PERISCOPE CONTROL
PERISCOPE RETICLE

* PROGRAMMER
SATELLITE CLOCK
WARNING LIGHTS TEST
● PRESSURE SWITCH

MAIN 24V D-C ASCS BUS

* ASCS .05G RATE GYRO CONTROL
* EMERGENCY .05G
FLY-BY-WIRE

SECONDARY 24V D-C ASCS BUS

ASCS LOGIC
ATTITUDE GYRO CONTROL
MAIN INVERTER ASCS

PRE-IMPACT MAIN 24V D-C BUS

C BAND BEACON
COMMAND RECEIVER AUDIO
HF COMMUNICATION

HIGH WATT TELEMETRY TRANSMITTER
INSTRUMENT DC NO.'s 2, 4 and 7
INSTRUMENT POWER SUPPLY

TAPE RECORDER
TELEMETRY COMMAND
● VELOCITY SENSOR

RSCS

PRE-IMPACT SECONDARY 24V D-C BUS

AUXILIARY COMMAND
INSTRUMENT DC NO.'S. 1, 3 AND 5

* LO WATT TELEMETRY TRANSMITTER
CAMERAS

S BAND BEACON

MAIN 24V D-C SQUIB BUS

CAPSULE ADAPTER UMBILICAL
CABIN VENT VALVE
CAPSULE SEPARATION BOLTS
CAPSULE SEPARATION CONTROL
MAIN AND RES. DISC.
RESERVE EJECT BAG
NOS. 1, 2, 3 RETRO-ROCKET FIRE
RETRO-ROCKET UMBILICAL
POSI GRADE ROCKETS
RESCUE AIDS

* RESERVE DEPLOY
RETRO GRADE SEQUENCE CONTROL
RETRO GRADE JETTISON
WHIP ANTENNA
TOWER ESCAPE ROCKET
TOWER JETTISON ROCKET
TOWER SEPARATION BOLTS
TWR. SEP. CONTROLS
DROGUE DEPLOY
ANTENNA FAIRING EJECT

MAIN DEPLOY
RESERVE DEPLOY
LANDING BAG
AUTO MAIN SYSTEM LOCKOUT
FORCE SENSOR DISCONNECT

INERTIA SWITCH
IMPACT SIGNAL
● INLET AIR DOOR
MAIN EJECT BAG

ISOLATED 24V D-C SQUIB BUS

ABORT CONTROL
EMER. CAP. ADAPTER UMBILICAL
CABIN VENT VALVE
EMERGENCY CAPSULE SEP BOLTS
EMER. MAIN AND RES. EJECT
* EMERGENCY CAPSULE SEP. CONTROLS
EMER. MAIN AND RES. DISC.
* EMERGENCY DROGUE DEPLOY
* EMERGENCY RETRO SEQUENCE
* EMERGENCY R. R. ASSEMBLY JETTISON
* EMERGENCY RETRO COMMAND

* EMERGENCY MAIN DEPLOY
* EMERGENCY RETRO JETTISON
* EMERGENCY RETRO-ROCKET FIRE
* EMERGENCY RETRO-ROCKET CONTROL
* EMERGENCY POSI GRADE ROCKET
* EMERGENCY ESCAPE ROCKET
* EMERGENCY TOWER JETTISON ROCKET
* EMERGENCY TOWER SEP BOLTS
* EMERGENCY TOWER SEP. CONTROL
* EMERGENCY RESCUE AIDS
* EMERGENCY RESERVE DEPLOY
DROGUE DEPLOY

MAIN DEPLOY
EMER. ANTENNA FAIRING EJECT
● INLET AIR DOOR * RETRO JETT
RESERVE DEPLOY
AUTO MAIN SYSTEM LOCKOUT
EMERGENCY INERTIA SWITCH
POST LANDING SYSTEM
EMER. DROGUE * RETRO MAN
* 1, 2, 3 RETRO RCKT.
EMERGENCY LANDING BAG
EMERGENCY FORCE SENSOR
EMER. RES. DEPLOY

24V D-C AUDIO BUS

* ANTENNA SWITCH
HF RECOVERY

NO. 2 AUDIO
UHF BACK-UP

● TONE GENERATOR
UHF COMMUNICATIONS

STANDBY 12V D-C BUS

HF BEACON RETRO HEATERS

STANDBY 18V D-C BUS

AUXILIARY COMMAND DECODER B

COMMAND RECEIVER DECODER B

ISOLATED 6V D-C BUS

UHF BEACON
TELEMETERED SEQUENCE

ISOLATED 18V D-C BUS

AUXILIARY COMMAND DECODER A
* COMMAND RECEIVER DECODER A



24/12V WARNING LIGHTS DC BUS

.05G TEELIGHTS
WARNING LIGHTS DIM
LAUNCH AND ESCAPE TEELIGHTS
RETRO ROCKETS TEELIGHTS
RECOVERY TEELIGHTS

● CAPSULE 15 ONLY

* FUSE SWITCH CFM10-7B



A-C ELECTRICAL SYSTEM

(CAPSULE 11)

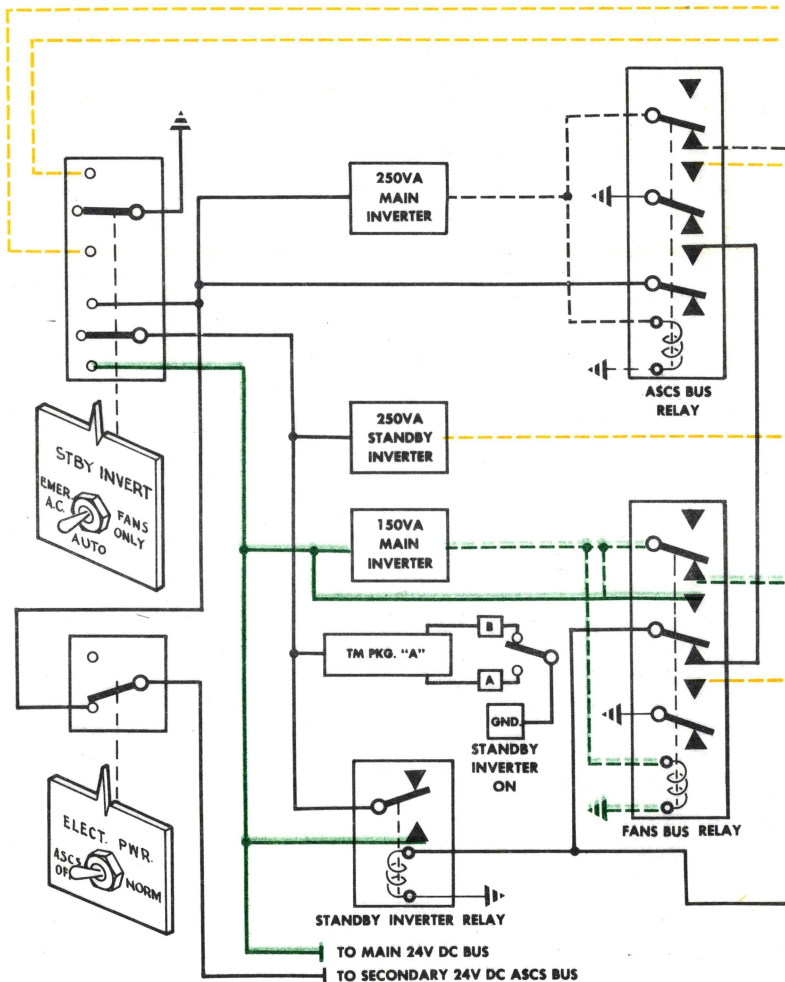
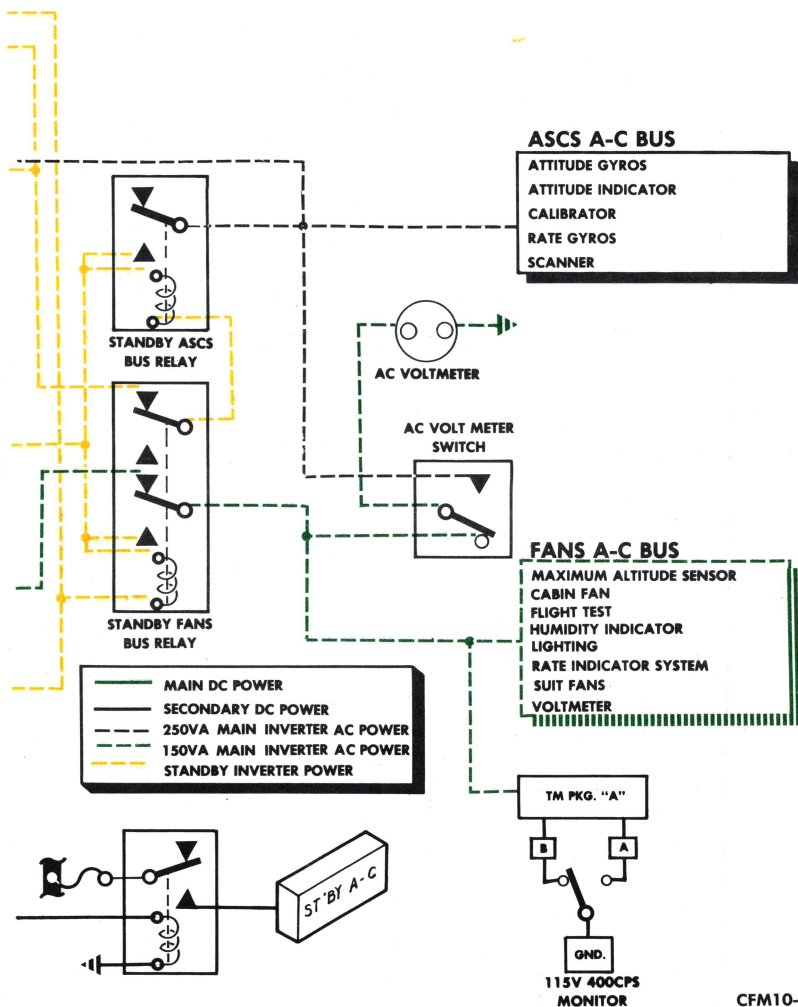


Figure 3-2



CFM10-8



A-C ELECTRICAL SYSTEM

(CAPSULE 15)

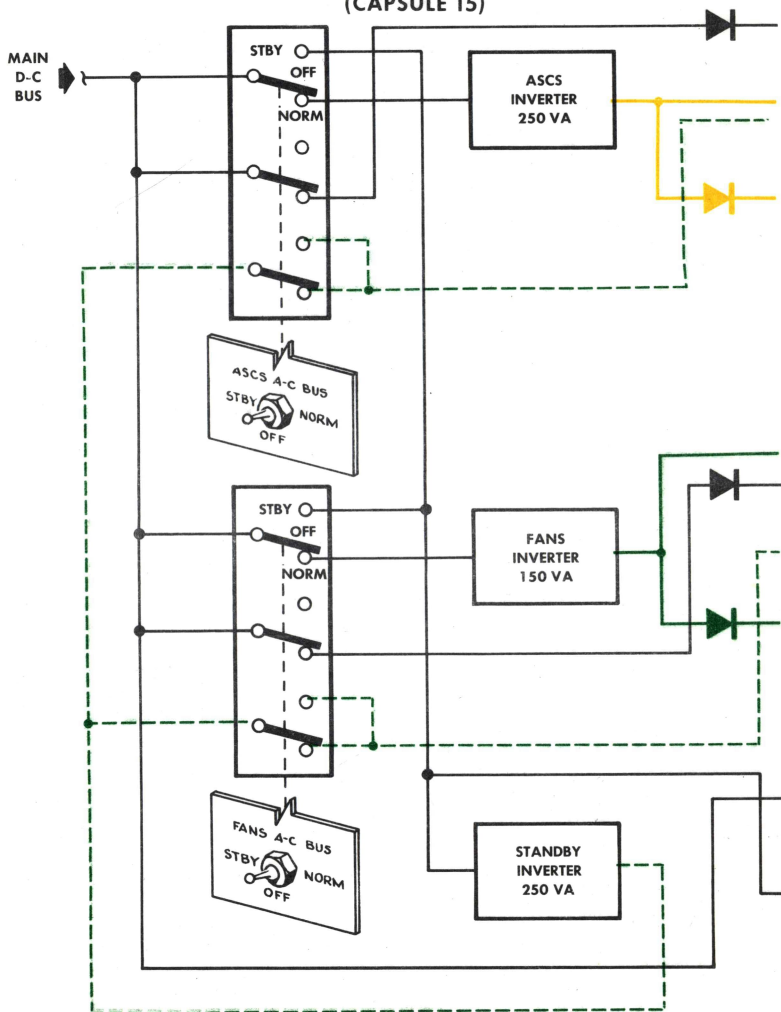


Figure 3-2A





STABILIZATION SYSTEM

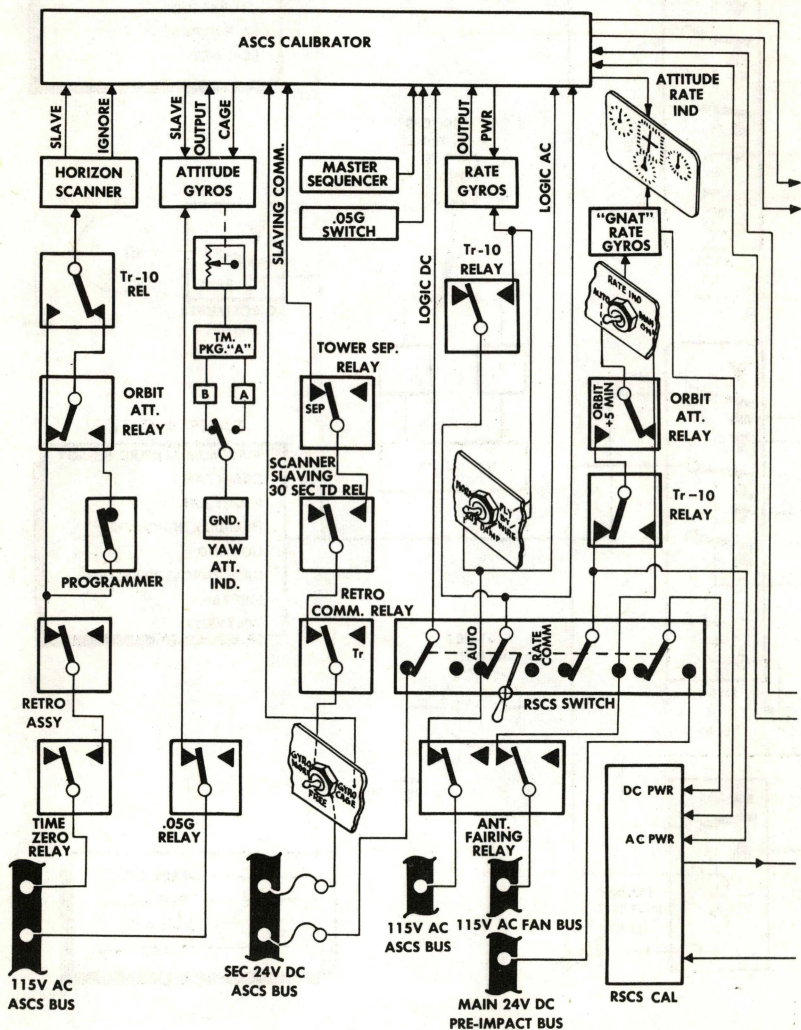
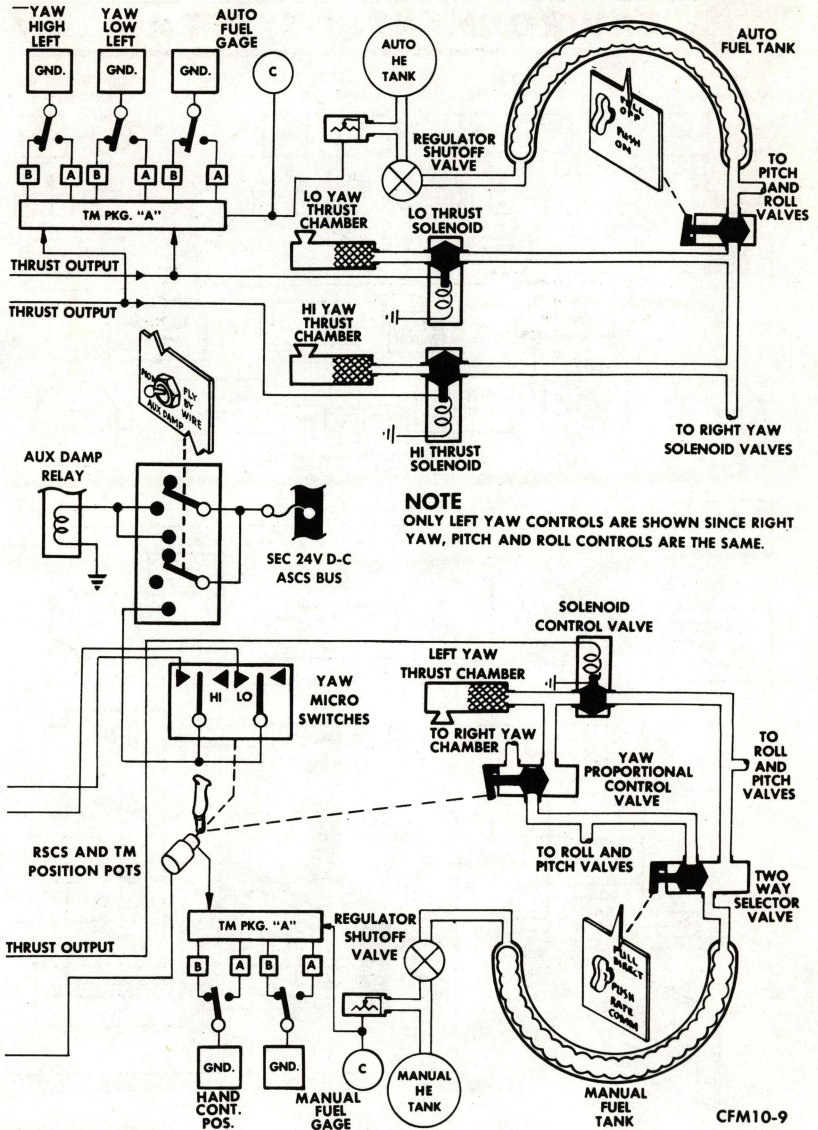


Figure 3-3





ENVIRONMENTAL SYSTEM

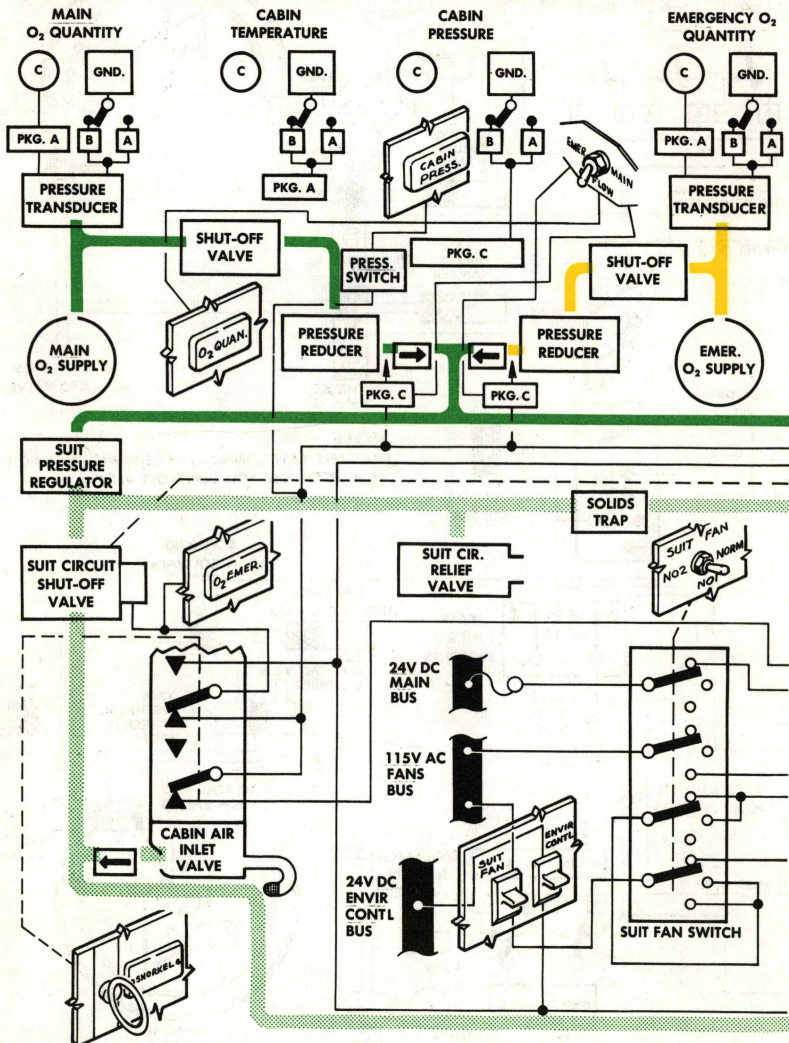
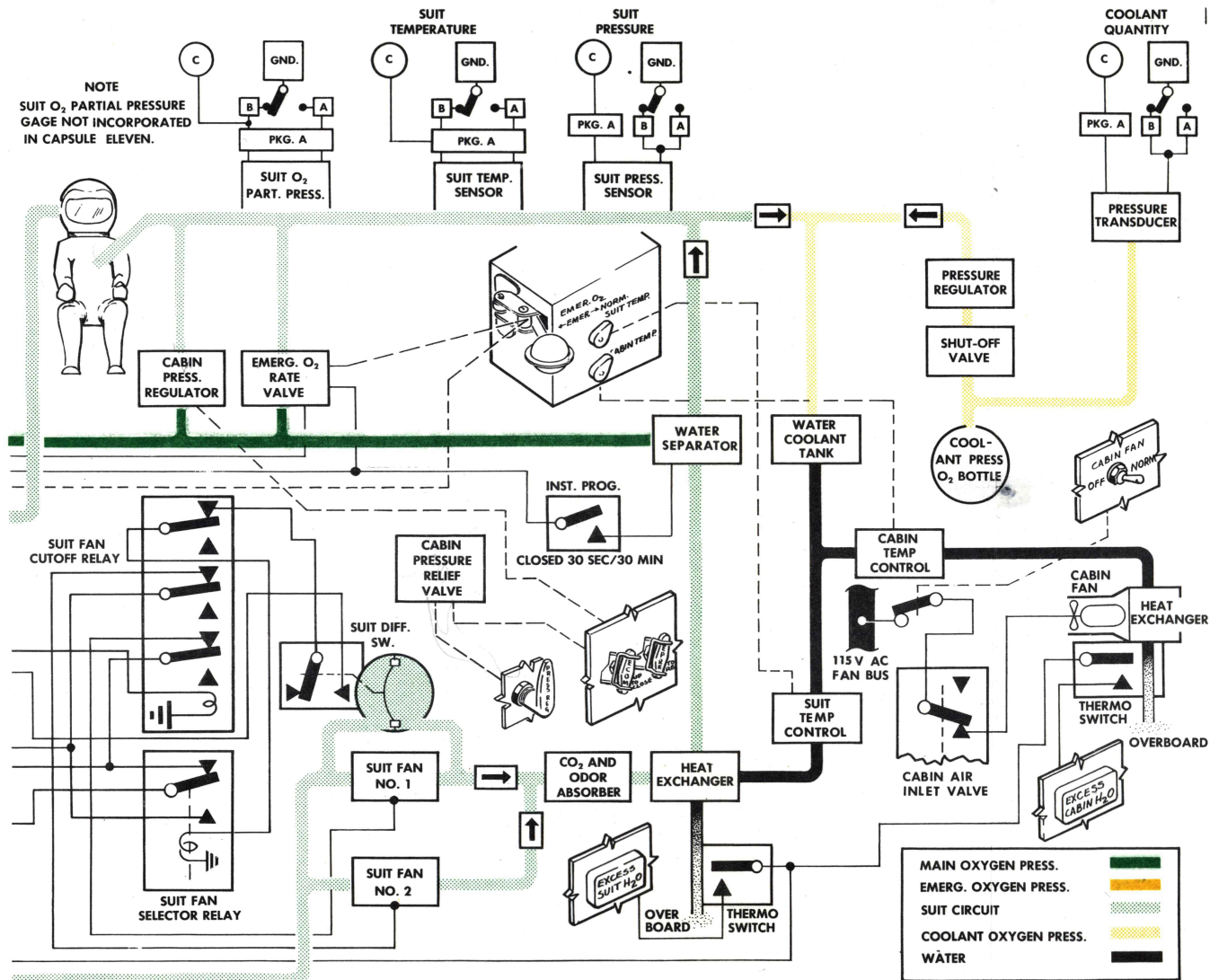


Figure 3-4



CFM10-17

Revised 30 May 1961



COMMUNICATIONS SYSTEM

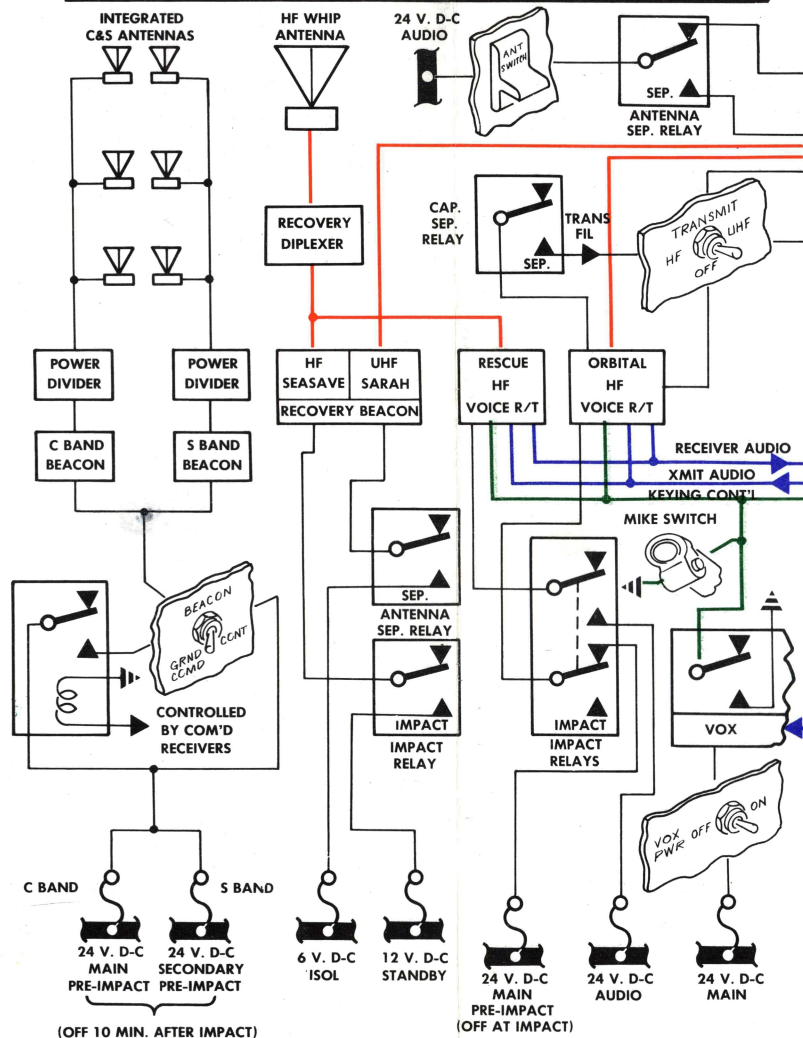
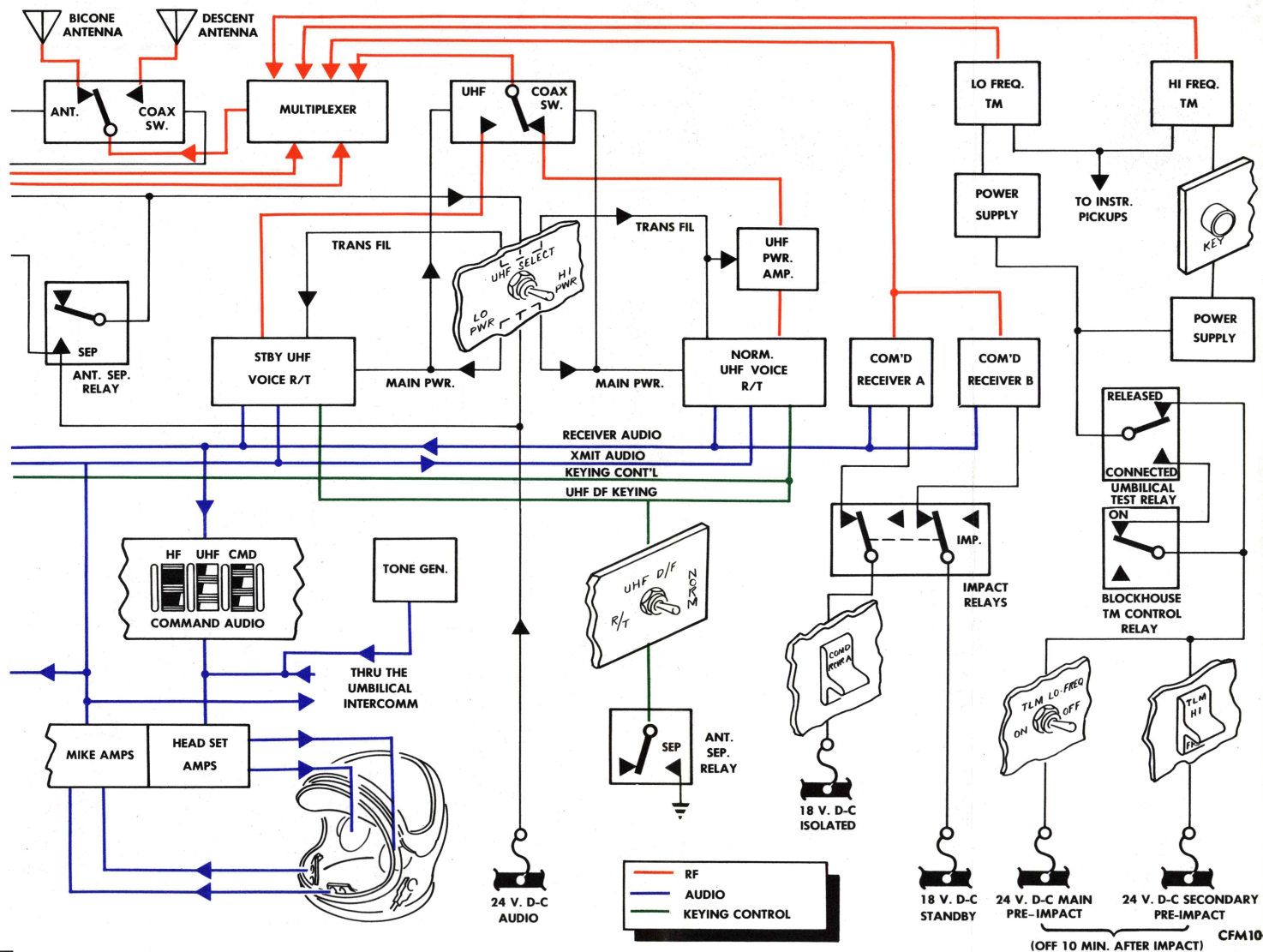


Figure 3-5

Revised 30 May 1961



LAUNCH SEPARATION SEQUENCE

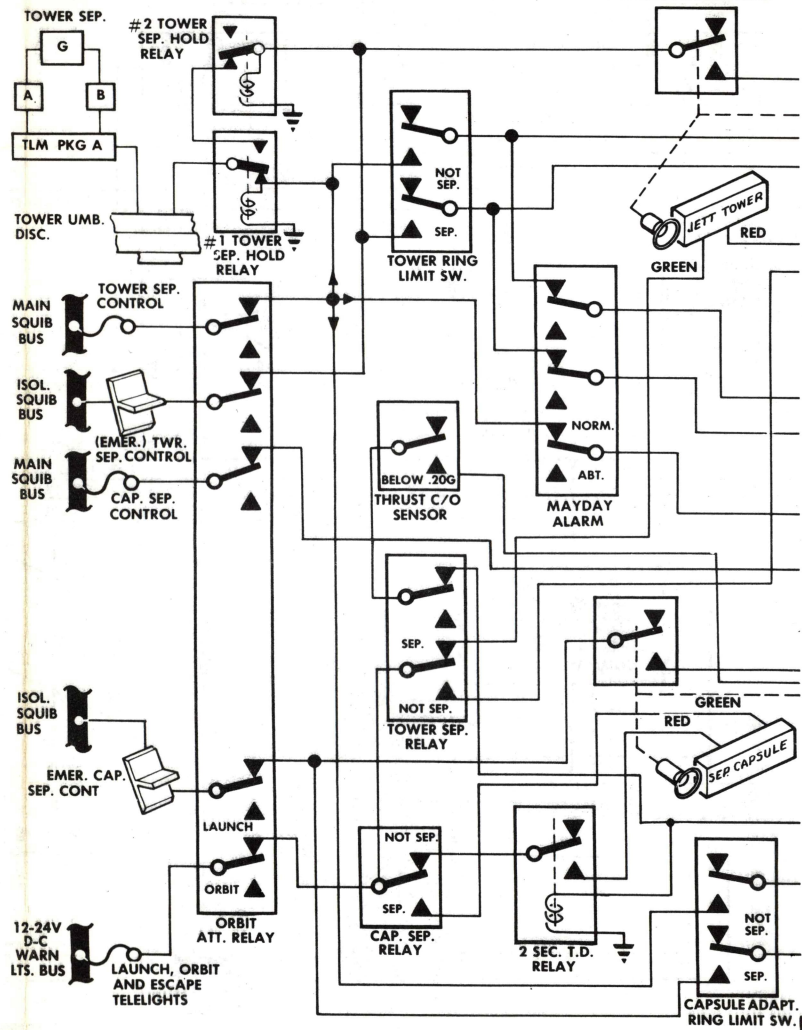
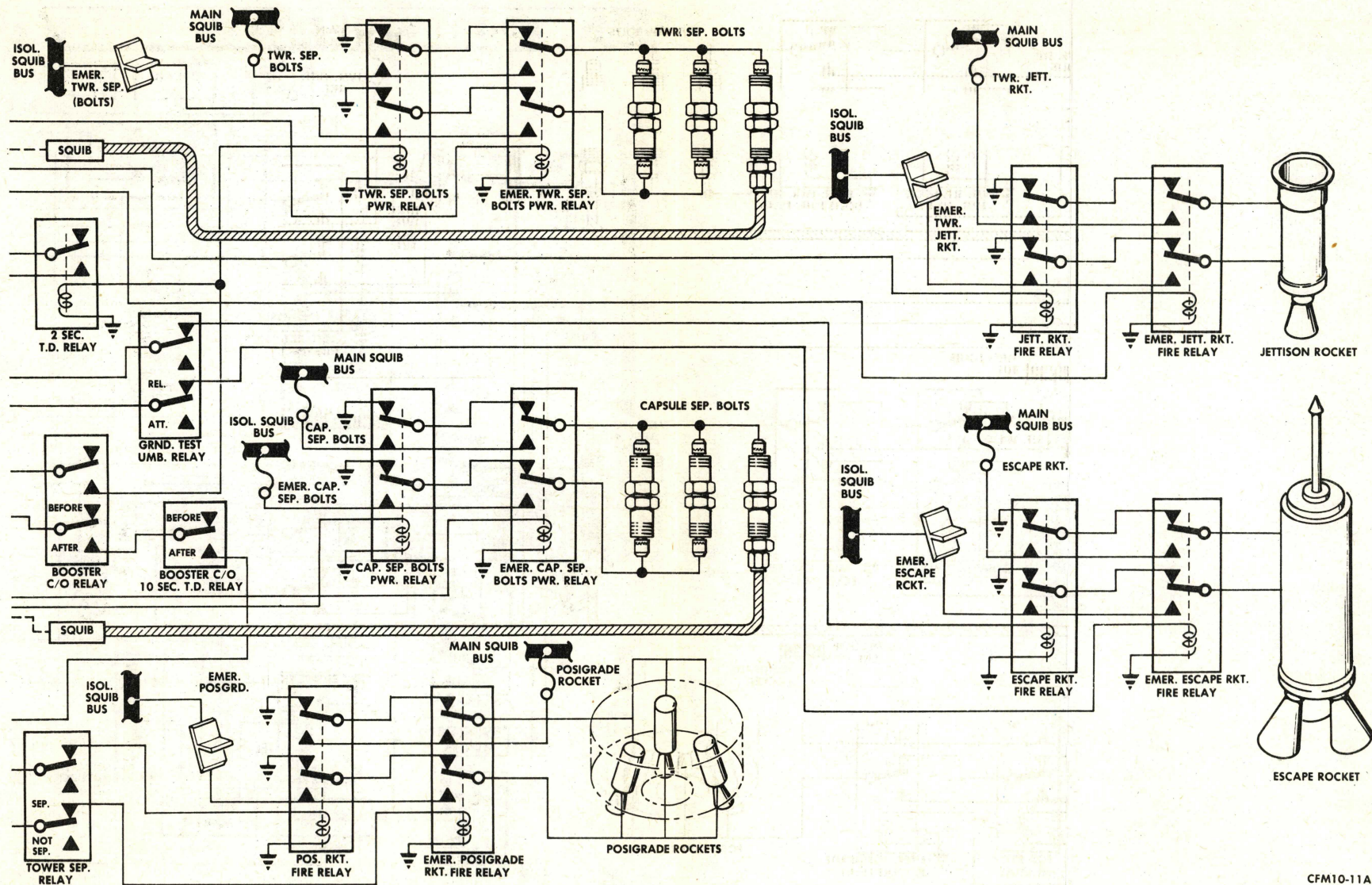


Figure 3-6



CFM10-11A



ABORT SEQUENCE

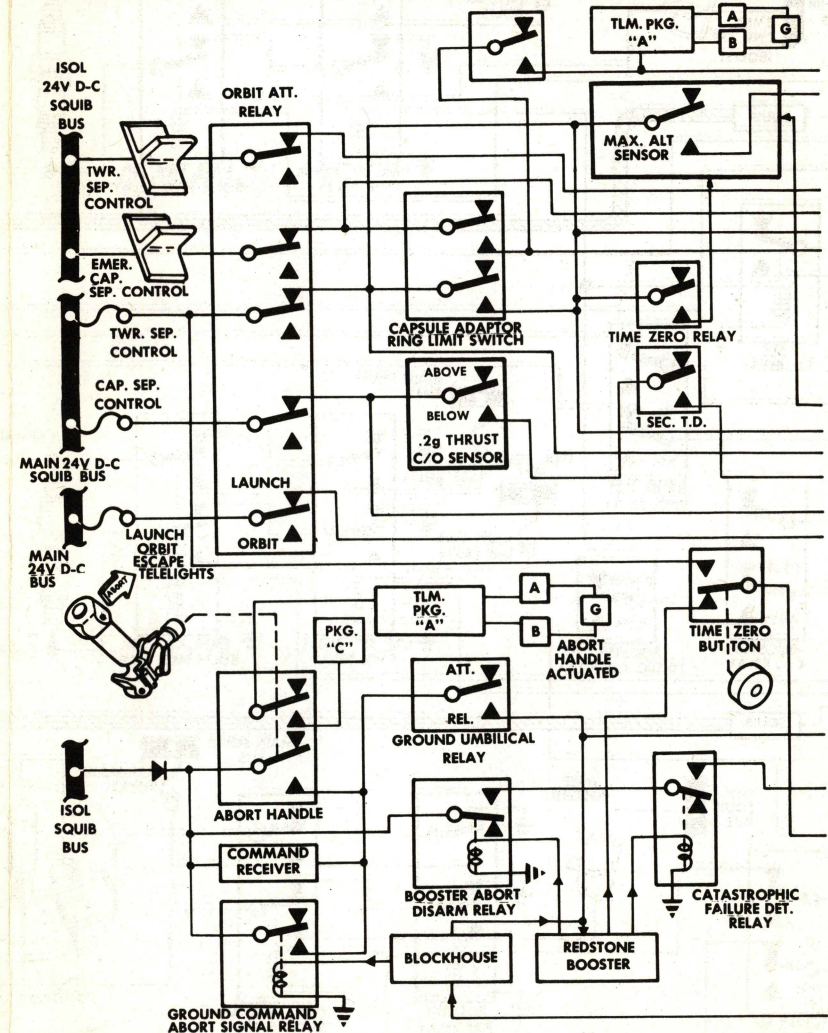
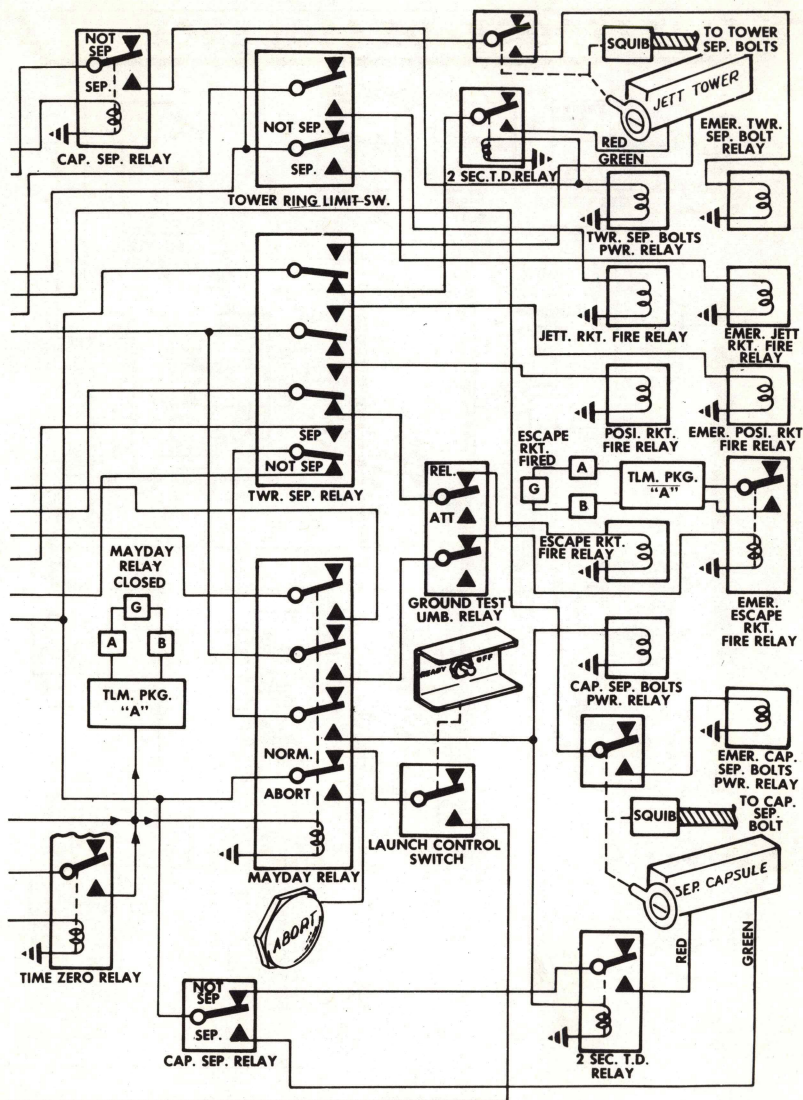
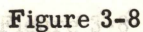


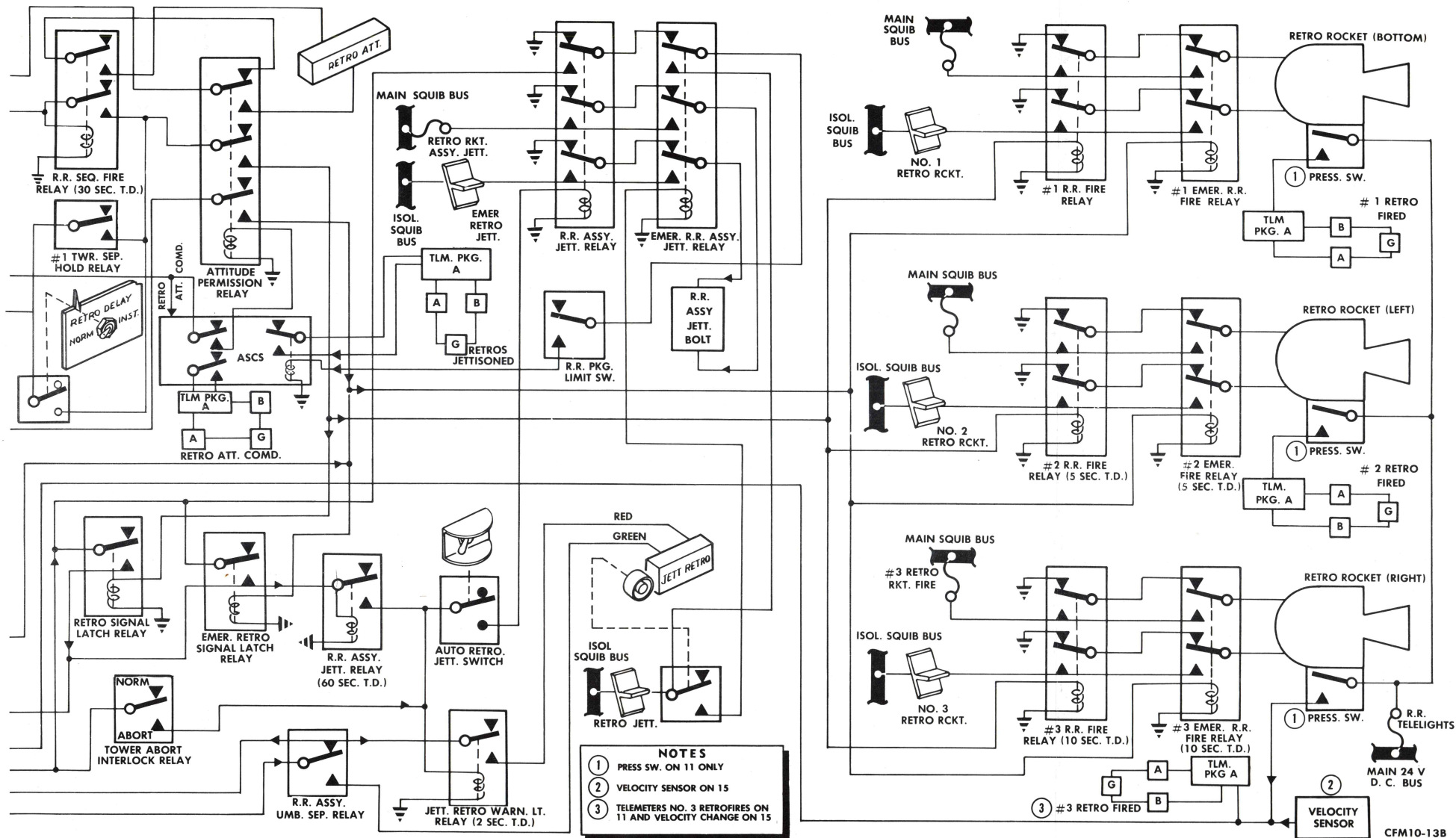
Figure 3-7



CFM10-12B

RETROGRADE SEQUENCE







RECOVERY SEQUENCE (PRE-IMPACT)

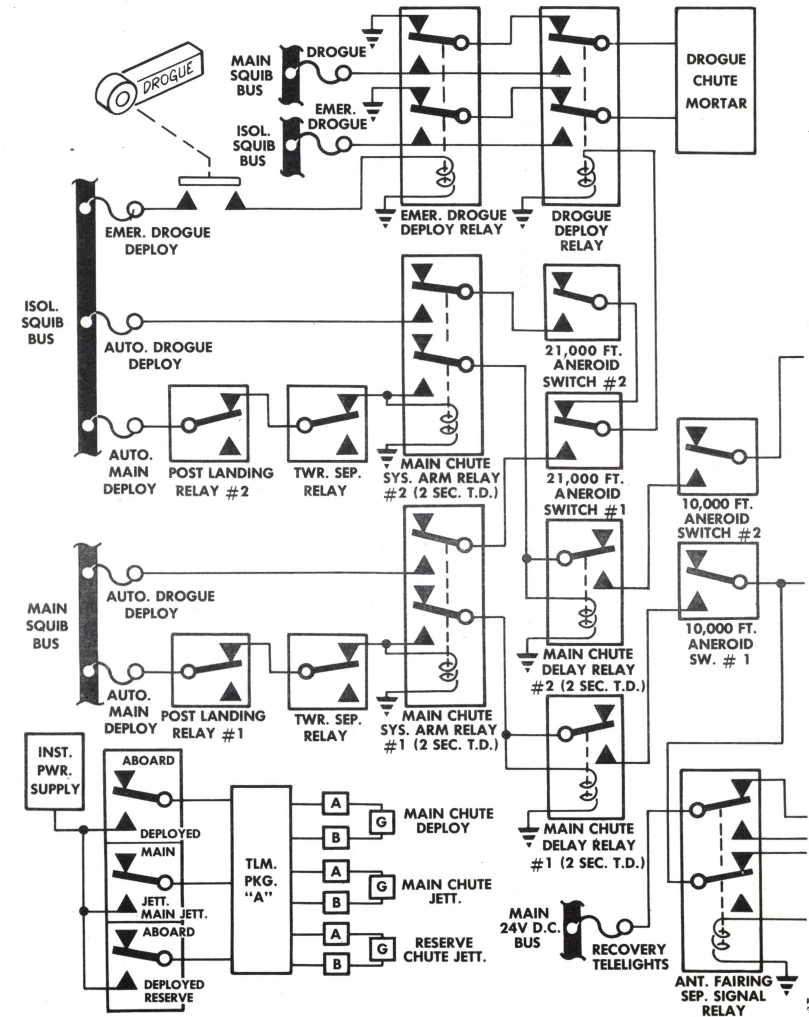
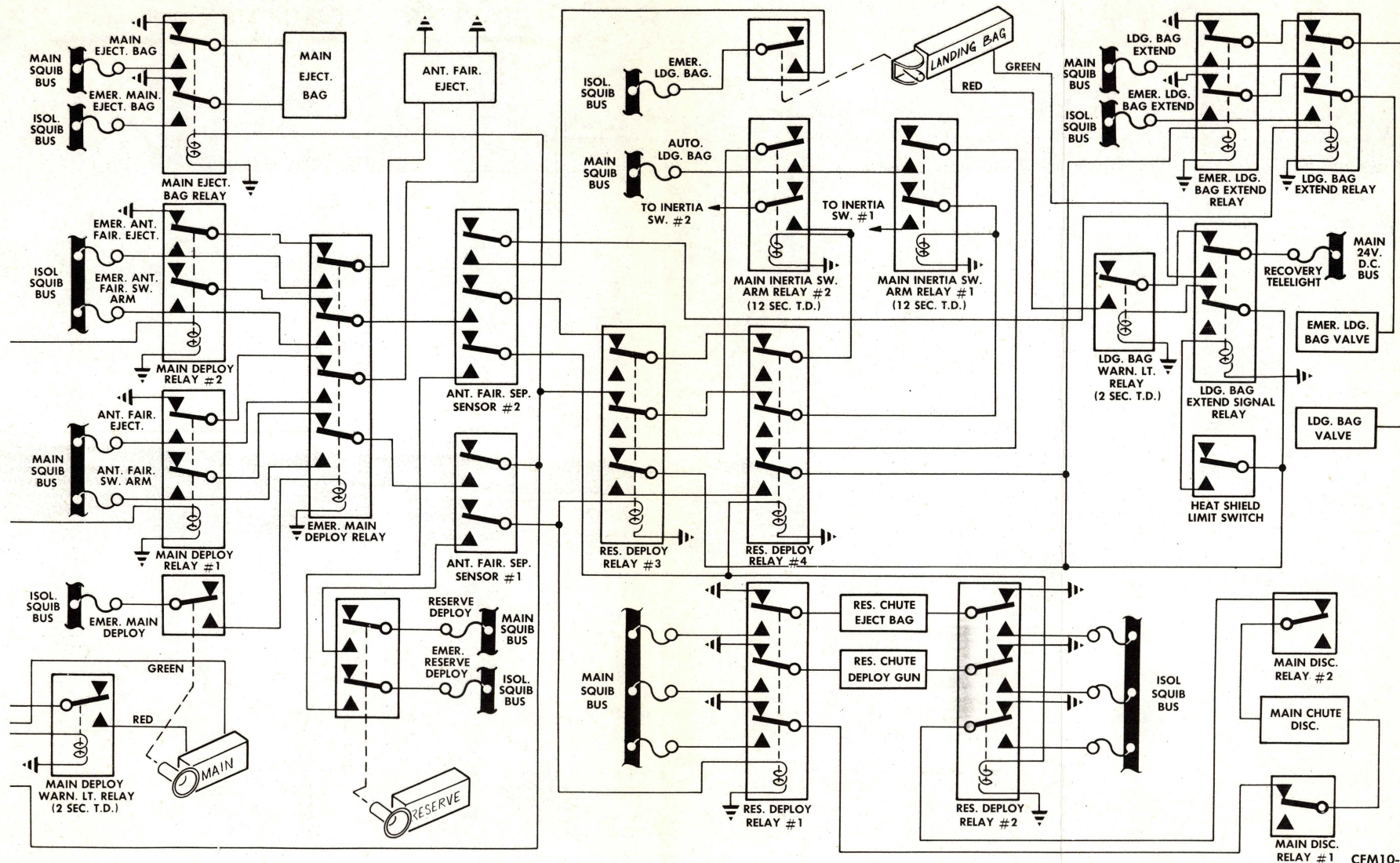


Figure 3-9



CFM10-14

RECOVERY SEQUENCE (POST IMPACT)

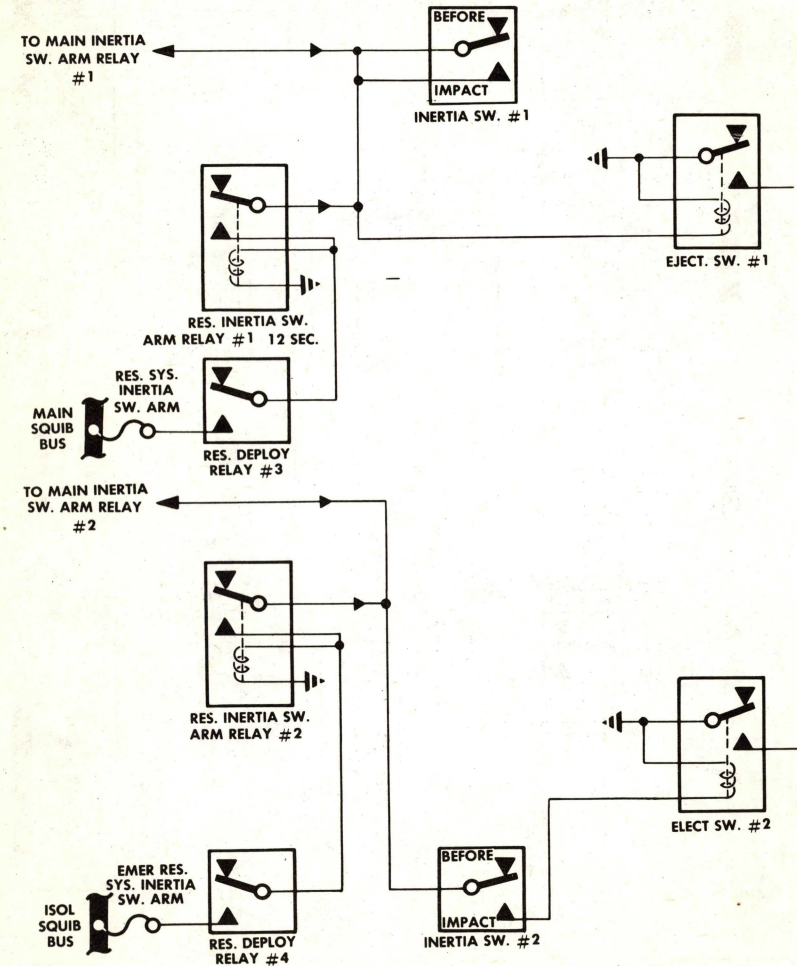
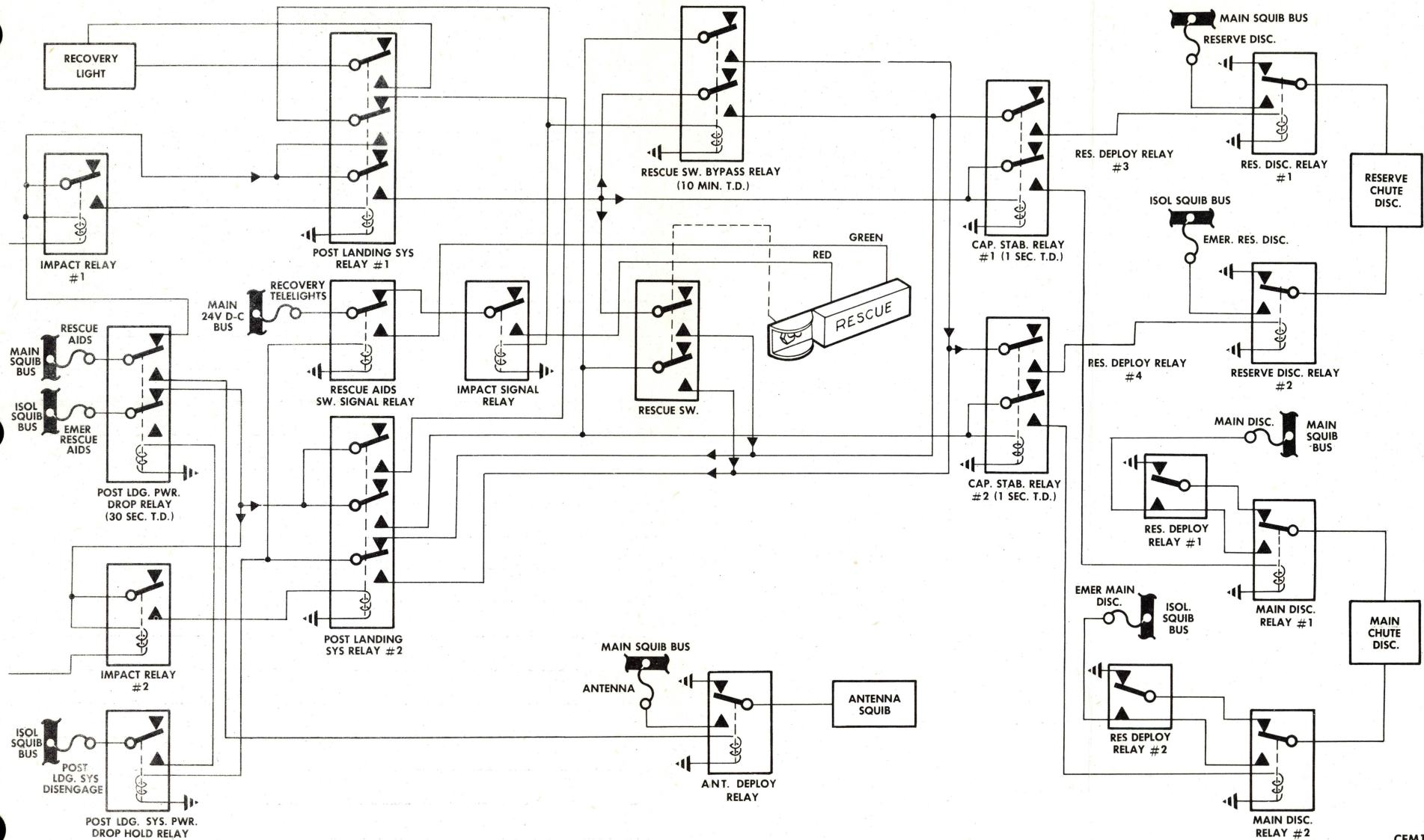


Figure 3-10

Revised 30 March 1961



NOTES

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are approximately 20 lines visible. The paper has a slightly textured appearance with some minor discoloration or foxing, particularly towards the edges. The lines are thin and black.

REVISION
NOTICE

LATEST REVISED PAGES SUPERSEDE
THE SAME PAGES OF PREVIOUS DATE

Insert revised pages into basic
publication. Destroy superseded pages.

SEDR 109-10 (CL)

ASTRONAUT'S CHECK LIST

MERCURY REDSTONE SPACE CAPSULES 11 AND 15

The procedures contained in
this check list are condensed
from SEDR 109-10, Capsule
Flight Operations Manual

30 MARCH 1961

Revised 30 May 1961

INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED PAGES.

LIST OF EFFECTIVE PAGES

NOTE: The portion of the text affected by the changes is indicated by the vertical line in the outer margins of the page.

Total number of pages in this publication is 24,
consisting of the following:

Page No.	Issue
*Title Page	30 May 1961
*A Page	30 May 1961
N-1	Original
*N-2 thru N-6	30 May 1961
N-7 thru N-8	Original
E-1 thru E-3	Original
*E-4	30 May 1961
E-5	Original
*E-6	30 May 1961
E-7 thru E-13	Original
E-14 Blank	Original

*The asterisk indicates pages changed, added,
or deleted by the current change.

This check list consists of two parts, normal procedures and emergency procedures. The numbered items (line items) correspond to identically numbered items in the amplified procedures in Sections I and II of the Capsule Flight Operations Manual. Emergency procedures are identified by a red and black diagonally striped border.

This check list does not replace the amplified version in the Capsule Flight Operations Manual. To operate the capsule safely and efficiently, you must thoroughly understand why each step is performed and why it occurs in a certain sequence.

Portions of the check list reproduced in this type style are exact duplicates of those presented in the Astronaut's check cards which will be carried in the capsule.

NORMAL PROCEDURES

PRE-ENTRANCE

1. Knife - STOWED
2. Liquid waste container - SECURED
3. Six battery switches - ON
4. Transmit switch - OFF
5. Food & water - SECURED
6. Abort handle - LOCKED (normal)
7. Squib switch - OFF
8. Ground safety pins - INSTALLED
9. Flashlight - STOWED
10. Window pole - STOWED
11. Survival kit - SECURED
12. O₂ Bottle Shutoff valves - OPEN
13. External Power - ON
14. Suit Fan fuse switch - OFF
15. Gyro switch - GYRO NORM
16. Portable ventilation unit - DIS-
CONNECTED

ENTRANCE

1. Communications - CONNECTED

2. Intercomm - CHECK
3. Suit circuit hose inter-
connector - REMOVED
4. Suit fan switch - NO. 1
5. Visor seal hose - ATTACHED
6. Visor seal O₂ press - 1800 psi
7. Visor seal O₂ supply - ON
8. Visor operation - CHECK
9. Oxygen inlet hose - CONNECTED
10. Oxygen outlet hose - CONNECTED
11. Visor seal leakage - CHECK
12. Suit circuit oxygen purge - BEGIN
13. Suit Fan fuse switch - NO. 1
14. Restraint harness - FASTENED
15. Beacon switch - GRND COMD
16. Mobility (unpressurized) - CHECK
17. Close suit circuit ground test shut-
off valve, and O₂ Bottle Shutoff
valve.
18. Suit circuit leakage - CHECK
19. Suit circuit ground test and O₂
Bottle Shutoff valves - OPEN
20. Purge oxygen - DISCONNECTED
21. Ground safety pins - REMOVED
22. Isolated battery voltage - CHECK
23. Communications - CHECK
24. TLM-LO FREQ switch - ON
25. Beacon switch - CONT

ESCAPE SYSTEM CHECK

1. Squib switch - ARM
2. Auto Retro Jett switch - ARM
3. "Abort" light - MONITOR

FINAL INTERIOR INSPECTION

1. Abort handle - LOCKED (normal)
2. Survival kit - SECURED
3. Shoulder harness - UNLOCKED
4. Window shutter - AS DESIRED
5. Window pole - STOWED
6. Flashlight - STOWED
7. All fuse switches - NO. 1
8. Squib switch - ARM
9. Auto Retro Jett switch - ARM
10. ASCS Mode Sel switches - CHECK
11. Press "T" handles - CHECK
12. Control fuel handles - IN
13. Retro delay switch - INST
14. Cabin lights switch - BOTH
15. TLM-LO FREQ switch - ON
16. Rescue switch - AUTO
17. Landing bas switch - AUTO
18. All sequence override rings - IN
19. Retract Scope switch - AUTO
20. Retro Att switch - AUTO
21. PRESS REG handle - IN and LOCKED

22. Launch Contl switch - OFF
23. Accelerometer - SET
24. Control fuel gages - CHECK
25. Rate of descent
indicator - 0 FT/SEC
26. Altimeter - CHECK
27. Light Test switch - ON/CHECK
28. Rate Ind. switch - MAN ON
29. Map case - SECURED
30. Periscope - CHECK
31. Earth path indicator - SET
32. Satellite clock - CHECK
33. Attitude rate indicators - CHECK
34. Time Zero Button cover - REMOVE
35. Cabin pressure indicator - CHECK
36. Cabin air temp indicator - CHECK
37. Suit pressure indicator - CHECK
38. Suit temp indicator - CHECK
39. Coolant quantity indicator - 100%
40. Cabin humidity indicator - CHECK
41. O₂ quantity indicator - CHECK
42. Suit fan switch - NORM
43. Cabin fan switch - NORM
44. Stby Btry switch - OFF
45. Isol Btry switch - NORM
46. a. Elect Pwr switch (Capsule 11
only) - NORM
- b. ASCS AC Bus switch (Capsule
15) - NORM

47. a. Stby Invert switch (Capsule 11 only) - AUTO
- b. Fans AC Bus switch (Capsule 15) - NORM
48. Ammeter switch - NORM
49. D-C Voltmeter - MISSION RULE
50. D-C Voltmeter Selector knob - M
51. Audio Bus switch - NORM
52. A-C voltmeter - 115
VOLTS (nominal)
53. A-C volts switch - FANS
54. Audio volume - MID-RANGE
55. UHF DF switch - NORM
56. UHF Select switch - HI PWR
57. Transmit switch - OFF
58. Beacon switch - GRND COMD
59. All audio tone switches except Ex-
cess Cabin H₂O - ON
60. Warning Lights switch - BRIGHT
61. All fuse switches - NO. 1
62. Emer O₂ lever - NORM (PULL INTO
DETENT)
63. Suit Temp selector - AS SET
64. Cabin Temp selector - AS SET
65. Knife - STOWED
66. Food and water - SECURED
67. Waste container - SECURED

PRE-LAUNCH CHECK

1. Check time with blockhouse.
2. Earth path indicator Wind knob—DEPRESS.
3. Transmit switch—UHF.
4. Beacon switch—CONT.
5. Squib switch—ARM.
6. Auto Retro Jett switch—ARM.
7. Retro Delay switch—INST.
8. Harness—Locked & secure.
9. Periscope—RETRACTED.
10. "Retract-scope" light—OFF.
11. Launch Contl switch—READY.
12. Arms and hands—POSITIONED.

LAUNCH

1. Abort light—MONITOR.
2. Satellite clock—CHECK.
3. "Jett Tower" telelight—CHECK.
4. "Sep Capsule" telelight—CHECK.

SEPARATION

1. Retro Delay switch—NORM.
2. All instruments—CHECK.
3. Excess Cabin H₂O Tone sw.—ON.
4. Window shutter—OPEN.
5. Time Zero button cover—REPLACE.

FLY-BY-WIRE MODE

1. ASCS switch—FLY-BY-WIRE.
2. RSCS switch—AUTO.
3. Man fuel handle—PUSH RATE COMD.
4. Use hand controller to maintain desired attitude.

To return to normal:

5. ASCS switch—NORM.

MANUAL MODE

1. Man fuel handle—PULL DIRECT.
2. ASCS switch—AUX DAMP.
3. For aux damp, RSCS switch—AUTO.
4. For no aux damp, RSCS switch—RATE COMD.
5. Use hand controller.

To return to normal control system:

6. ASCS switch—NORM.
7. RSCS switch—AUTO.
8. Man fuel handle—PUSH RATE COMD.

RATE COMMAND MODE

1. Man fuel handle—PUSH RATE COMD.
2. RSCS switch—RATE COMD.
3. Use hand controller.

To return to normal control:

4. RSCS switch—AUTO.

RETROGRADE

1. "Retro Warn" light—ILLUMINATED.
2. Auto Retro Jett switch—OFF.
3. "Retro Seq" telelight—GREEN.
4. "Retro Att" telelight—GREEN.
5. Crosscheck att ind. & periscope.
6. "Fire Retro" telelight—GREEN.
7. Auto Retro Jett switch—ARM.

RE-ENTRY

1. "Jett Retro" telelight—GREEN.
2. Check capsule in the re-entry att.
3. Check periscope and attitude ind.
4. Periscope—RETRACTED.
5. Monitor attitude ind. until .05G.
6. ".05G" telelight—GREEN.
7. ASCS initiates A—10°/sec. roll.

LANDING

1. At 21,000 ft., drogue deployed.
2. At 20,000 ft., Snorkel ring—PULL.
3. "O₂ Emer" warning light—ON.
4. "Main" telelight—GREEN.
5. Check main chute deployment.
6. "Landing Bag" telelight—GREEN.
7. Fuel handles—CHECK.
8. "Fuel Quan" warning lt.—ON.
9. After impact, Rescue sw.—MAN.

EMERGENCY PROCEDURES

ABORT

1. Actuate abort handle on signal.
2. "Sep Capsule" telelight—GREEN.
3. Monitor "Jett Retro" telelight until it illuminates green.
4. Monitor "Jett Tower" telelight.
5. Monitor "Main" telelight.
6. If main chute fails to deploy properly, Reserve ring—PULL.
7. Snorkel ring—PULL.
8. Complete normal recovery proc.

TOWER FAILS TO JETTISON

1. Jett Tower ring—PULL.
2. If tower fails to jettison:
 - a. Twr Sep Contl fuse—NO. 2.
 - b. Emer Twr Sep fuse—NO. 2.
 - c. Emer Trw Jett fuse—NO. 2.
 - d. For normal jett, Emer Escape Rckt fuse switch—NO. 2.

CAPSULE FAILS TO SEPARATE

1. Sep Capsule ring—PULL.

- 2. If capsule fails to separate:**
 - a. Emer Cap Sep Contl fuse—NO. 2.**
 - b. On aborts, Emer Escape Rckt fuse switch—NO. 2.**
 - c. For normal separation, Emer Posgrd fuse switch—NO. 2.**
- 3. If the Capsule still fails to separate:**
 - a. RSCS switch—RATE COMD.**
 - b. ASCS switch—FLY-BY-WIRE.**
 - c. Retro Att switch—BYPASS.**
 - d. Retro Fire button—DEPRESS.**

FAILURE OF TWO POSIGRADE ROCKETS

- 1. Emer Posgrd Fuse—NO. 2.**

If Posgrds do not fire:

- 2. Three Retro-Rocket fuse switches—OFF.**
- 3. Jett Retro button—DEPRESS.**
- 4. Retro Att switch—BYPASS.**
- 5. Fire Retro button—DEPRESS.**
- 6. Complete normal recovery.**

FAILURE OF AUTOMATIC MODE

- 1. Use rate command to stop tumbling.**
- 2. Switch to manual mode.**
- 3. Auto fuel gage—CHECK.**
- 4. Applicable ASCS fuel handle—PULL.**
- 5. ASCS switch—NORM.**

6. RSCS switch—AUTO.
7. Use hand controller in failed axis.

FAILURE OF FLY-BY-WIRE

1. Auto fuel gage—CHECK.
2. ASCS Switch—NORM.
3. If auto mode has also failed, manual fuel handle—PULL DIRECT.
4. ASCS switch—AUX DAMP.
5. Use hand controller.

FAILURE OF RATE COMMAND

1. Man fuel handle—PULL DIRECT.
2. RSCS switch—AUTO.
3. ASCS switch—AS DESIRED.

ATTITUDE GYRO SLAVING FAILURE

1. Man fuel handle—PULL DIRECT.
2. ASCS switch—AUX DAMPING.
3. Gyro switch—GYRO CAGE.
4. Position the capsule horizontal.
5. Gyro switch—GYRO NORM.
6. ASCS switch—NORM.
7. Check that ASCS returns capsule to orbit attitude.
8. Man fuel handle—PUSH RATE COMD.

CABIN DEPRESSURIZATION

1. Faceplate—CLOSED.
2. All suit connections—CHECK.
3. Decomp "T" handle—PULL.

CABIN REPRESSURIZATION

1. Decomp "T" handle—PUSH IN.
2. Repress "T" handle—PULL.
3. At 5 psi, Repress "T" handle—PUSH IN.

EMERGENCY OXYGEN

1. Emer O₂ lever—EMER.
2. To return to normal operation:
(CAPSULE 11)
 - a. Emer O₂ lever—NORM.
 - b. Suit Fan switch—AUTO.
 - c. Suit Fan switch—AUTO.

(CAPSULE 15)

- a. Emer O₂ lever—NORM.
- b. Suit Fan switch—AUTO.

ALTERNATE SUIT FAN

1. Suit Fan switch—NO. 1.
2. If Suit Fan fuse switch—NO. 2.
3. If NO. 1 fan is inop., Suit Fan Switch—NO. 2.
4. If NO. 2 fan is inop., Emer O₂ lever—EMER.

EXCESS SUIT OR CABIN WATER

1. Suit or cabin temp cont—WARMER.

MAIN BATTERY FAILURE

1. Turn off batt if below 18 volts.
2. If main batt is below 18 volts:
 - a. Stby btry switch—ON.
 - b. Check bus and batt voltages.
 - c. Turn off low priority equipment.

STANDBY BATTERY FAILURE

1. Standby Battery—OFF.
2. Check main & isol batteries.
3. If main batteries are low, shut off all non-essential equipment.

If main batteries also fail:

4. Audio Bus switch—EMER.
5. If main bus power is needed, Isol Btry switch—STBY, Stby Btry switch—ON.

ISOLATED BATTERY FAILURE

1. Isolated Battery—OFF.
2. Check all battery voltages.
3. Before retro, Isol Btry sw—STDBY.

COMPLETE ELECTRICAL FAILURE

1. Ammeter—BYPASS.

INVERTER FAILURE (CAPSULE 11)

To determine failed inverter:

- 1. Stby invert switch—FANS ONLY.**
- 2. Check ASCS Bus Voltage; if zero,
ASCS Bus Inverter is out.**
- 3. Stby invert switch—AUTO.**

SINGLE INVERTER FAILURE

■ (CAPSULE 15)

To determine failed inverter:

- 1. ASCS AC Bus switch—STBY.**
- 2. If Stby AC Auto light goes out, ASCS inverter
has failed. Leave switch in STBY so that Fans
inv. failure may be detected.**
- 3. If light stays on, Fans inv. has failed. Place
ASCS AC Bus switch in NORM, Fans AC Bus
switch in STBY.**

DOUBLE INVERTER FAILURE

■ (CAPSULE 15)

- 1. To detect a double inverter failure:**
 - a. ASCS AC Bus switch—STBY.
STBY AC Auto light stays on.**
 - b. Fans AC Bus switch—STBY.
If both inverters are out, light will go out.**
- 2. If both inverters fail,**
 - a. ASCS AC Bus switch—STBY.**
 - b. Fans AC Bus switch—STBY.**
- 3. When either Fans or ASCS power no longer
required, switch off applicable bus.**
- 4. Initiate retrograde as soon as possible.**

COMMUNICATIONS SYSTEM FAILURE

1. Check mike button.
2. Check remaining comm sets.
3. Audio Bus switch—EMERG.
4. Use key button & comm receiver.

FIRE OR FUMES

1. Faceplate—CLOSED.
2. If fire or fumes are severe, Decomp "T" handle—PULL.
3. Determine source of fire or fumes.
4. Turn off affected equipment.
5. If equipment turned off, repress.

PERISCOPE EMERGENCY OPERATION

1. Periscope fuse switch—NO. 2.
2. Retract Scope switch—MAN.
3. Periscope fuse switch—OFF.
4. Manual Engage lever—ENGAGED.
5. Ratchet—AS REQUIRED.
6. Manually extend or retract scope.

FAILURE TO START RETRO SEQUENCE

1. Retro Seq button—DEPRESS.
2. If "Retro Seq" telelight is still out:
 - a. Emer Retro Seq fuse sw—NO. 2.
 - b. Retro Seq button—DEPRESS.

- 3. If capsule is not in retro attitude:**
 - a. RSCS switch—RATE COMD.**
 - b. ASCS switch—FLY-BY-WIRE.**
 - c. Position capsule to retro att.**
 - d. Retro Att switch—BYPASS.**
 - e. Fire Retro button—DEPRESS.**

FAILURE TO ATTAIN RETRO ATTITUDE

- 1. Check att ind and periscope.**
- 2. If capsule is in retro att:**
 - a. Retro Att switch—BYPASS.**
 - b. Fire Retro button—DEPRESS.**
- 3. If capsule is not in retro att:**
 - a. Man fuel handle—PUSH RATE COMD.**
 - b. RSCS switch—RATE COMD.**
 - c. ASCS switch—FLY-BY-WIRE.**
 - d. Position capsule in retro att.**
 - e. If att perm circuit is operating, retro rockets fire.**
 - f. If retro rockets do not fire, Retro Att switch—BYPASS.**
 - g. Fire Retro button—DEPRESS.**

FAILURE TO MAINTAIN RETRO ATTITUDE

- 1. Squib switch—OFF.**
- 2. Reposition capsule to retro att.**

3. Retro Att switch—BYPASS.
4. Squib switch—ARM.
5. Fire Retro button—DEPRESS.

RETRO ROCKET FAILS TO FIRE

1. Check "Retro Att" telelight—GREEN.
2. Fire Retro button—DEPRESS.
3. If "Fire Retro" telelight is red:
 - a. NO. 1, NO. 2 and NO. 3 Retro Rckt fuse switches—NO. 2.
 - b. Retro Man fuse switch—NO. 2.
 - c. Fire Retro button—DEPRESS.
4. "Fire Retro" telelight green when NO. 3 Fires.

RETRO PACKAGE FAILS TO JETTISON

1. Jett Retro button—DEPRESS.
2. If Retro package does not jett:
 - a. Retro Jett fuse—NO. 2.
 - b. Emer Retro Jett fuse—NO. 2.
3. Jett Retro button—DEPRESS.

ASCS CANNOT MAINTAIN RE-ENTRY ATTITUDE

1. Man fuel handle—PULL DIRECT.
2. RSCS switch—RATE COMD.

- 3. Retract Scope switch—MAN.**
- 4. Position capsule in re-entry att.**
- 5. Check att. ind. & periscope.**
- 6. Retract Scope switch—AUTO.**
- 7. Periscope—CHECK RETRACTED.**
- 8. RSCS initiates 7.7°/sec. roll.**

.05G SWITCH FAILURE

- 1. .05G button—DEPRESS.**
- 2. If .05G switch is still failed:**
 - a. ASCS .05G fuse switch—NO. 2.**
 - b. Emer .05G fuse switch—NO. 2.**
- 3. .05G button—DEPRESS.**
- 4. If .05G switch remains failed, switch to RATE COMD.**

DROGUE CHUTE FAILURE

- 1. Drogue button—DEPRESS.**
- 2. If drogue chute does not deploy:**
 - a. Emer Drogue Deploy fuse—NO. 2.**
 - b. Drogue button—DEPRESS.**

ANTENNA FAIRING FAILS TO JETTISON

- 1. Visually check for chute deployment.**
- 2. Main deploy ring—PULL.**
- 3. Visually check for chute deployment.**
- 4. Emer Main Deploy fuse—NO. 2.**

MAIN CHUTE FAILURE

1. Reserve deploy ring—PULL.

RESERVE CHUTE FAILS TO DEPLOY

1. Reserve Deploy fuse—NO. 2.
2. Emer Reserve Deploy fuse—NO. 2.

LANDING BAG FAILS TO DEPLOY

1. Landing Bag switch—MAN.
2. Emer Land Bag fuse—NO. 2.

CHUTE FAILS TO RELEASE

1. Reserve deploy ring - PULL
2. If capsule is tumbling, stay in seat.
3. If capsule is not tumbling:
 - a. Remove right side of instrument panel and escape hatch.
 - b. Push out parachute container.
 - c. Cut shroud lines with knife.

RESERVE CHUTE FAILS TO EJECT

1. Reserve chute can be pushed out with parachute container.
2. If necessary, cut shroud lines.

CAPSULE LANDS IN ROUGH SEAS

1. Remain in seat; harness fastened.
2. If forced to leave capsule, use extreme caution.

COOLING SYSTEM FAILS

1. Remove escape hatch and open suit.
2. If capsule overheats, evacuate capsule.

CAPSULE LEAKS AFTER LANDING

1. If leak is large, leave capsule.
2. If leak is small, check conditions outside before deciding to leave capsule.

EGRESS

1. Remove harness and disconnect leads.
2. Remove survival kit cover, insert knife and flashlight in kit pockets.
3. Remove right side of instrument panel and stow behind main panel.
4. Sit on right side of capsule and release escape hatch.
5. Stow hatch on leg couch, step into seat, and climb into hatch opening.

6. Check survival kit secured to the suit.
7. Disconnect electrical leads, and remove pip pins from parachute container.
8. Push parachute container and survival kit out of capsule.
9. Maneuver through the housing until shoulders are out of capsule.
10. Retrieve survival kit, inflate raft, and tie raft to capsule.
11. Get into raft.
12. Secure raft & start rescue procedures.

EMERGENCY EGRESS

1. Remove harness and personal leads.
2. Detach survival kit.
3. Initiator cover and safety pin - REMOVE
4. Initiator button - DEPRESS
5. Push hatch out of capsule.

If the capsule is in the water:

6. Remain in the couch, push survival kit out of capsule, and inflate raft.
7. Use raft for support while leaving.