APOLLO 14

LM ACTIVATION CHECKLIST

PART NO.	S/N
SKB32100083-366	1003

APOLLO 14

LM
ACTIVATION CHECKLIST

DECEMBER 18, 1970

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It is requested that any organization having comments, questions, or suggestions concerning this document contact Gary Doerre, CF22, Building 4, room 255, telephone number 483-3048.

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Distribution of this document is controlled by J. W. O'Neill, Chief, Flight Planning Branch, Flight Crew Support Division.

CONTENTS

Changed Basic Date — 11/2/70 — 9/15/70

1. TLC DAY

2. PDI DAY

CONTENTS (CONTINUED)

Changed 11/2/70

Basic Date 9/15/70

Basic Date 9/15/70 Changed ~~12/18/70~~ 1/16/71

CSM TO LM TRANSFER LIST (TLC)

~~Tissue Dispenser -- RHSSC~~

Scissors (1) - Data File

70mm Magazines (5):

3 - RHSSC (JJ, LL, MM)

2 - ISA Bottom Pocket (II, KK)

16mm Magazines (8):

6 in Bag - RHSSC (CC - HH)

1 in Bag - ISA Top Pocket (BB)

1 - R.H. Window SEQ Camr (AA)

Flight Data In Bag:

LM ACTIVATION CHECKLISTS (2)

~~LM LUNAR SURFACE CHECKLIST~~
~~(Pages 1-19, 1-21) -- Data File~~

TOOL KIT

Basic Date 9/15/70 Changed _____

1-1

62:00

IVT TO LM

1 Activate CABIN DUMP VALVE & Open Hatch
Carry Comm Carrier, CWG Connector &
CSM O2 Hose

2 Record Docking Tunnel Index Angle

_____ Rc

3 FLOOD LIGHT - All
EXTERIOR LTG - OFF
Window Shades - Down

4 DES H2O - OPEN
DES O2 - OPEN
CABIN REPRESS - AUTO
CB(16) CABIN REPRESS - CLOSE

5 Check AOT Visibility

62:05

ENTRY STATUS CHECK

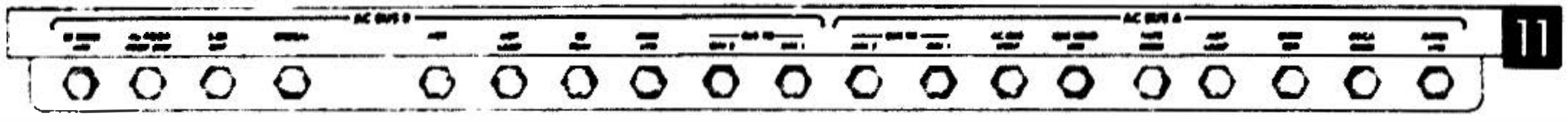
1 Mount Purse (ISA Bottom Pocket)
Unstow ISA And Install Over PLSS
Recharge Station

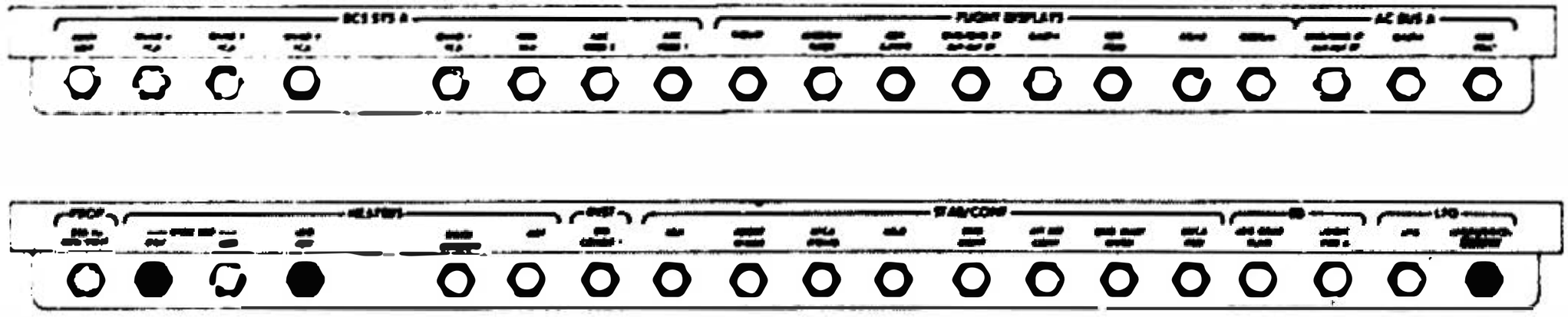
2 Verify CB Status Per INITIAL ACTIVATION
Status Chart

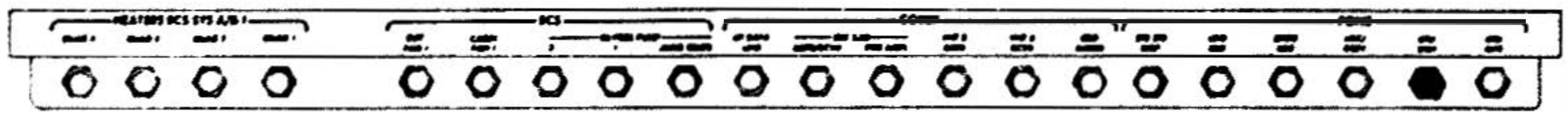
Basic Date 9/15/70

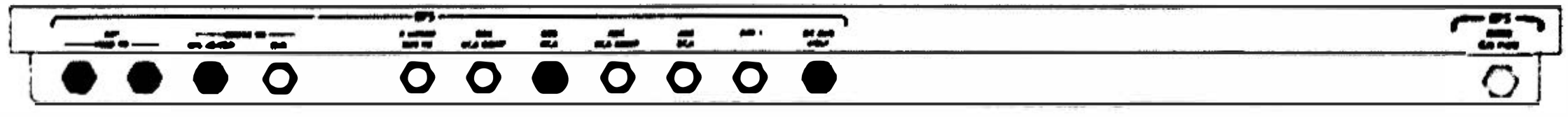
Changed 12/18/70

INITIAL ACTIVATION STATUS

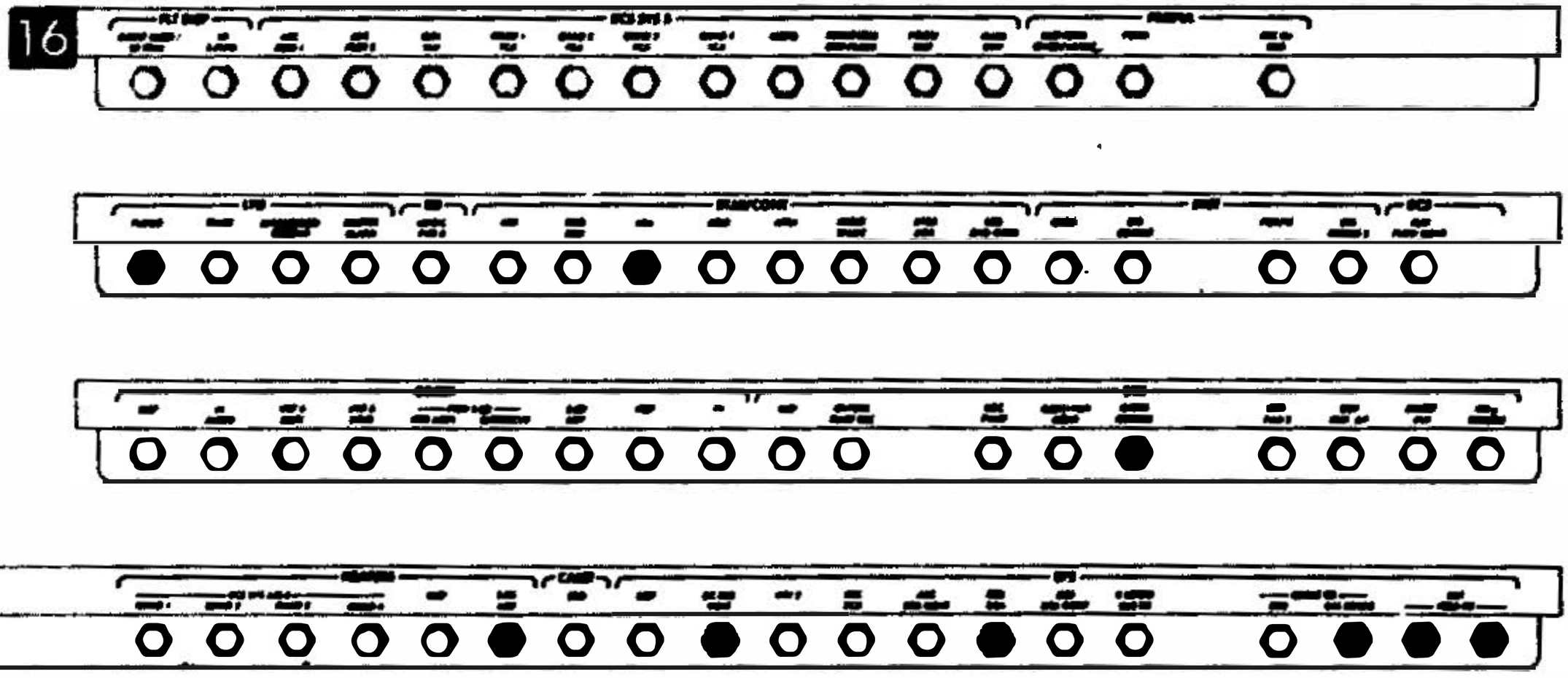








INITIAL ACTIVATION STATUS



Basic Date 9/15/70

Changed _____

3 RR GYRO SEL - PRIM

4 FDAI 1&2 - INRTL
EARTH/LUNAR - PWR OFF
LTG - OFF
MODE - HOLD/FAST
ALT SET - 60

5 MASTER ARM - OFF
ASC He SEL - BOTH
STAGE - SAFE (Guarded)

6 S-BAND T/R - OFF
ICS T/R - OFF
RELAY - OFF
MODE - ICS/PTT
AUDIO CONT - NORM
VHF A&B - OFF
VOX SENS - 9
COAS - OFF
THUMBWHEEL VOL (5)-6

7 TTCA (CDR) - JETS

8 TIMER CONT - STOP
LTG OVERRIDE (3) - OFF
SIDE PANELS - OFF
FLOOD OVHD/FWD - BRIGHT
ANUN/NUM - DIM
INTEGRAL - DIM

9 X-POINTER SCALE - HI MULT
RATE/ERR MON - LDG RDR/CMPTR
ATTITUDE MON - PGNS
GUID CONT - PGNS
MODE SEL - LOG RADAR
RNG/ALT MON - ALT/ALT RT
SHFT/TRUN - ±50°
RATE SCALE - ¯25°/SEC
ACA PROP - ENABLE
THR CONT - AUTO
MAN THROT - CDR
ENG ARM - OFF
ATT/TRANSL - 2 JETS
BAL CPL - ON
ASC He REG 1&2 - tb-gray (vlv Open)
DESCENT He REG 1-tb-gray (vlv Open)
DESCENT He REG 2-tb-bp (vlv Closed)
PRPLNT QTY MON - OFF
PRPLNT TEMP/PRESS MON - ASC
HELIUM MON - OFF
ABORT and ABORT STAGE - Flush/Guarded

Basic Date 9/15/70 Changed 11/2/70

10 SYS A&B ASC FUEL & ASC OXID (4) - tb-bp
(Feed 2-Close, Feed 1-Open)
SYS A&B QUADS (8)-tb-gray (vlv open)
CRSFD -tb-bp (vlv closed)
SYS A&B MAIN SOV - tb-gray (vlv open)
TEMP/PRESS MON - He
ACA PROP - ENABLE
RATE/ERR MON - LOG RDR/CMPTR
ATTITUDE MON - AGS
GLYCOL - PUMP 2
SUIT FAN - 1
O2/H2O QTY MON - ASC 2

11 ENG GMBL - ENABLE
DES ENG CMD OVRD - OFF
LOG ANT - AUTO
RADAR TEST - OFF
TEST MONITOR - ALT XMTR
SLEW RATE - HI
RNDZ RDR - SLEW
DEAD BAND - MIN
GYRO TEST - ROLL
ATTITUDE CONTROL (3) - MODE CONT
MODE CONT: (Both) - OFF
EVENT TIMER: TIMER CONT - STOP
TEMP MON - LOG

RCS SYS A/B-2 QUADS - OFF
LTG: SIDE PANELS - OFF
FLOOD-All
OVHD/FWD - BRIGHT
EXTERIOR LTG - OFF
LAMP/TONE TEST - OFF
X-POINTER SCALE - HI MULT

12 ACA/4 JET (2) - ENABLE

TTCA/TRANSL (2) - ENABLE

RNDZ RDR ANT - Stowed
AOT - CL, ANGLE - 0000 (Pushed In)
TTCA (LMP) - JETS
AGS STATUS - OFF

13 PWR TEMP MON-ED/OFF
INV-OFF
DES PWR (5)-tb-bp
ASC PWR (4)-tb-bp
UNLINK SQUELCH-ENABLE

14 AUDIO CONT - NORM
S-BAND T/R - OFF
ICS T/R - OFF
RELAY - OFF
MODE - ICS/PTT
UPDATA LINK - OFF
VHF A&B - OFF
VOX SENS - 9
THUMBWHEEL VOL (5)-6

15 S-BAND MODULATE - PM
XMTR/RCVR - OFF
PWR AMPL - OFF
VOICE - OFF
PCM - OFF
RANGE - OFF/RESET
VHF A - OFF (SQUELCH-3)
VHF B - OFF (SQUELCH-3)
TELEMETRY - OFF/HI
RECORDER - OFF
VHF - AFT
TRACK MODE - OFF
PITCH - -75°
YAW - -12°
S-BAND - AFT

16 SUIT GAS DIVERTER - PULL/EGRESS
CABIN REPRESS - AUTO
PLSS FILL - CLOSE
PRESS REG A&B - CLOSE
DES O2 - OPEN
ASC O2(2) - CLOSE
SUIT ISOL (2) - SUIT DISC
SUIT CIRCUIT RELIEF - AUTO
CABIN GAS RETURN - AUTO
CO2 CANISTER SEL - PRIM
PRIM & SEC CO2 CANISTER - CLOSE
WATER SEP SEL - PULL/SEP 2
ASC H2O - CLOSE
SEC EVAP FLOW - CLOSE
PRIM EVAP FLOW (2) - CLOSE
DES H2O - OPEN
WATER TANK SELECT - DES
SUIT TEMP - COLO
LIQUID COOLING GARMENT - COLD

17 Verify (192 PKG) Lanyard
Not Seated

18 FWD CABIN RELIEF AND DUMP - AUTO

Basic Date 9/15/70

Changed 11/2/70

62:19

HOUSEKEEPING

1 Install 16mm Camr Wedge - ISA Bottom Pocket

2 Remove Stowage Bags from Drink Bags - ISA Back Pocket

3 Position 2 Interim Stowage Straps (RHSSC) On Horizontal Handhold, O2 Module

4 Tape Broomclip On AOT

5 Tape Crash Bar

6 Position UTILITY LIGHTS On Back AOT Guard

7 Transfer EMU Maintenance Kit from CDR Helmet Bag to ISA Back Pocket

8 Configure 1-70mm Camr (Top RHSSC):

Stow Reseau Cover In Camr Compt
Install HCEX Mag (ISA) 11/250,∞
Stow Dark Slide In Camr Compt
Unstow RCU/Camr Brkt (ISA Top Pkt)
Unstow Trigger and Handle (RHSSC Camr Pkt)
Install Trigger, RCU/Camr Brkt, Then Handle
Stow Camr In RHSSC Camr Compt, 2 Snaps

Basic Date 9/15/70 Changed 1/15/71

1-13

63:17

COMM ACTIVATION

1 Transfer To LM POWER (FLOOD Lts. Blink,
C/W PWR Caution Lt - On)

GET _____:_____:_____ (Report To MCC)

CB(11) EPS: XLUNAR BUS TIE - Close
CB(16) EPS: XLUNAR BUS TIE - Close
CB(11) LTG: UTIL - Close
Activate Utility Lights

2 CB(11) COMM: VHF B XMTR - Close
: VHF A RCVR - Close
: CDR AUDIO - Close
INST: SIG CONDR 1- Close
ECS: GLYCOL PUMP 2- Close

3 CB(16) INST: SIG CONDR 2-Close
EPS: DISP - Close
: DES ECA CONT-Close
Verify DES BATS tb(4) - LO, DES BAT-tb-gray
PWR/TEMP MON - Check Voltages
READ & REPORT ED BAT VOLTAGE TO MSFN

When BUS VOLT < 27V, Select HI Voltage Taps
  CB(16)EPS: CROSS TIE BAL LOADS - Open
  BAT 1 HI VOLTAGE - OFF/RESET
  BAT 1 HI VOLTAGE - ON
  Repeat For BATS 2,3,4
CB(16) EPS: CROSS TIE BAL LOADS - Close

4 CB(16) COMM: DISP - Close
: VHF A XMTR - Close
: VHF B RCVR - Close
: PRIM S-BO (2) - Close
: PMP - Close
INST: SIG SENSOR - Close
: PCM/TE - Close
ECS: DISP - Close

5 Connect To LM COMM Umbilical Using CWG Connector

6 CB(16) SE AUDIO - Close

Basic Date 9/15/70

Changed

Basic Date 9/15/70 Changed

63:29

* S-BAND/VHF SIMPLEX VOICE TEST

1 AUDIO (LMP): S-BAND T/R - T/R
: VHF A - T/R
: VHF B - OFF
COMM: S-BAND-PM,PRIM,PRIM,DN VOICE BU,
PCM, OFF/RESET,OFF,LO
VHF A XMTR - VOICE
VHF A RCVR - ON
S-BAND ANT - AFT
Perform VHF A Voice Check With CSM

2 COMM: VHF A XMTR & RCVR - OFF
: VHF B XMTR - VOICE
: VHF B RCVR - ON
AUDIO (LMP): VHF A-OFF
: VHF B-T/R
Perform VHF B Voice Check With CSM

3 Perform S-BD Voice & LBR Check With MSFN
TLM-HI
Perform Voice & HBR Check With MSFN

4 BIOMED-RIGHT
Perform Voice & HBR Check With MSFN

5 TLM-LO
Perform Voice & LBR Check With MSFN

6 S-BAND: VOICE-VOICE
Perform Voice & LBR Check With MSFN

7 TLM-HI
Perform Voice & HBR Check With MSFN

8 TLM-LO
S-BAND: RANGE-RANGE
Perform Voice & Ranging Check With MSFN

9 CB(16) CAMR: SEQ - Close
Check SEQ Camera Operation

Basic Date 9/15/70 Changed _____

1-17

63:44

OPS CHECKOUT

1 Perform OPS Checkout
Read And Record Source Pressures
CDR OPS _____

LMP OPS _____

63:49

COMM DEACTIVATION

1 AUDIO (LMP): S-BAND T/R - OFF
: VHF B - OFF

2 COMM: S-BAND - PM,OFF,OFF,OFF,OFF,
OFF/RESET,OFF,LO
: VHF B XMTR - OFF
: VHF B RCVR - OFF

3 CB(16)EPS: CROSS TIE BAL LOADS-Open
Select LO TAPS
UTILITY LTS - OFF

4 Configure CB Panels Per INT ACT STATUS Chart (1-3, 1-4)
Disconnect From LM Comm Umbilical

5 Transfer To CSM Power, Observe C/W PWR Lt - Off
GET _____:_____:_____ (Report To MCC)

64:00

IVT TO CSM

1 DES O2 - CLOSE
DES H2O - CLOSE
CABIN REPRESS - CLOSE
CB(11) EPS:DC BUS VOLT - Open
CB(16) ECS:CABIN REPRESS - Open
Window Shades - Up

2 FLOOD LIGHT - OFF

3 CABIN RELIEF & DUMP (OVHD) - Open
IVT TO CSM, Close LM Hatch

Basic Date 9/15/70 Changed _____

Basic Date 9/15/70

Changed

PDI-DAY

PDI-DAY

Basic Date 9/15/70

Changed _____

Basic Date 9/15/70 Changed 12/18/70

CSM TO LM TRANSFER LIST(PDI)

Suits And Ancillary Eqpt:

IV Gloves (CDR Transfer)

Helmet (CDR Transfer)

UCTA

Bio Belt & Instrumentation

Comm Cap

Wristwatch (2)

Sunglasses in pouch

Pens & Pencils

Penlight

Pocket, Strap On

Gas Connector Plugs, LH Side PGA

Personal Radiation Dosimeter

Flight Data In Bag:

LM TIMELINE BOOK

LM DATA CARD BOOK

LM LUNAR SURFACE CHECKLIST

LM ORBIT MONITOR CHART

LUNAR PHOTO CHARTS

STAR CHARTS

Basic Date 9/15/70 Changed 12/18/70

TOT:50

LMP IVT TO LM

1 Activate CABIN DUMP VALVE & Open Hatch
Carry Comm Carrier & CSM O2 Hose

2 Verify Docking Tunnel Index
Angle (See 1-1)
Window Shades - Down
Deploy LMP Crash Bar

3 Transfer To LM PWR
GET _____:_____:_____
(FLOOD Lts. Blink, C/W PWR Caution Lt-On)
CB(11) EPS: XLUNAR BUS TIE - Close
CB(16) EPS: XLUNAR BUS TIE - Close

4 FLOOD LIGHT - All
CB(11) LTG: UTIL - Close
Activate Utility Lts

5 DES H2O - OPEN
DES O2 - OPEN
CABIN REPRESS - AUTO
CB(16) ECS: CABIN REPRESS - Close

UD - 2:30 (101:57)

SR 102:05

102:05

CDR IVT TO LM

CDR IVT To LM With CDR & LMP Helmet & Gloves

Connect To LM Comm Umbilical
CB(11) COMM: LOR AUDIO - Close
AUDIO (CDR): S-BAND-T/R
: ICS - T/R

102:05

EPS ACTIVATION

1 LTG: ANUN/NUM - BRIGHT (1 Caution, 9 Power Failure, 1 COMP Lt - On)

2 CB(11) INST: SIG CONDR 1 - Close
EPS: DES ECA CONT - Close
: DC BUS VOLT - Close

CB(16) INST: SIG SENSOR - Close
: PCM/TE - Close
: SIG CONDR 2 - Close
EPS: DISP - Close
: DES ECA CONT - Close

3 Connect To LM Comm Umbilical

Basic Date 9/15/70

Changed _____

Basic Date 9/15/70 Changed _____

2-3

AUDIO (LMP): S-BAND T/R - T/R
: ICS - T/R
CB(11) COMM: SEC S-BD(2) - Close
CB(16) COMM: DISP - Close
: S.E. AUDIO - Close
: S-BD ANT - Close
: PMP - Close
S-BAND - PM,SEC,SEC,VOICE,PCM,RANGE,
OFF,LO
S-BAND ANT - AFT

4 Verify BAT 1,2,3,4 - tb-LO
DES BATS tb-gray
BATS 5&6 NORMAL & BACKUP (4)-tb-bp
Check BAT and BUS Voltages

When BUS Volts ≤ 27V, Select High Voltage Taps
CB(16) EPS: CROSS TIE BAL LOADS - Open
BAT 1 HI VOLTAGE-OFF/RESET
BAT 1 HI VOLTAGE-ON
Repeat for BATS 2,3,4

5 CB(11) AC BUS B&A: BUS TIE INV 2&1(4)-Close
AC BUS A : AC BUS VOLT -Close
EPS: INV 1 - Close
CB(16) EPS: INV 2 - Close

	2-4	6	POWER/TEMP MON - AC BUS INV -1 Then 2 Verify Voltage in GREEN Band CB(11) EPS: INV 1 - Open

102:09

MISSION TIMER ACTIVATION

1 CB(11) AC BUS B: NUM LTG - Close
FLIGHT Displays: MISSION TIMER-Close
Set MSN TMR On CSM Mark

102:11

PRIMARY GLYCOL LOOP ACTIVATION

1 CB(16) ECS: DISP - Close
GLYCOL - PUMP 1 _____ psia
- INST(SEC) _____ psia
- PUMP 2
CB(11) ECS: GLYCOL PUMP AUTO TRNFR-Close
: GLYCOL PUMP 1 - Close
: GLYCOL PUMP AUTO TRNFR-Open
GLYCOL - PUMP 1
Verify Press _____ psia
CB(11) ECS: GLYCOL PUMP 2 - Close

Basic Date 9/15/70

Changed _____

Basic Date 9/15/70 Changed 11/2/70

2-5

T02:T3

CAUTION/WARNING CHECKOUT

1 CB(16) LTG: MASTER ALARM - Close
INST: CWEA - Close

WARN	CAUT PREAMP	COMP H2O SEP
CES AC		
CES DC	ECS	
LGC	GLYCOL(ON IF TEMP >50°)	
RCS A REG		
RCS B REG		

CB(16) LTG: ANUN/DOCK/COMPT - Close
STAB/CONT: ATCA - Close
HEATER: DISP - Close
CB(11) STAB/CONT: ENG CONT - Close

2 RCS SYS A/B-2: QUADS (4) - AUTO
LAMP/TONE TEST - Check All Positions

T02:15

ECS ACTIVATION & CHECKOUT

1 O2/H2O QTY MON - ASC 2, ASC 1, DES

2 SUIT ISOL (2) - SUIT FLOW
SUIT ISOL (2)-ACTUATE OVRD (Suit Disc)
SUIT GAS DIVERTER - PUSH/CABIN

3 CB(16) ECS: SUIT FAN 2 - Close
: DIVERT VLV - Close
SUIT FAN - 2 (ECS Caution, H2O
SEP Comp Lts - ON
Then OFF In 2 Min)

4 PRIM EVAP FLOW NO 1 - Open
GET ___:___:___

Basic Date 9/15/70 Changed 12/18/70

T02:17

COR CONNECT TO LM ECS

1 Connect To COR Hoses

SUIT ISOL - SUIT FLOW
Verify (192 PKG) Lanyard Stopper Not Seated
CB(16) ECS: LCG PUMP - Close
PRESS REG A - EGRESS (Suit Gas Diverter Automatically Extends)

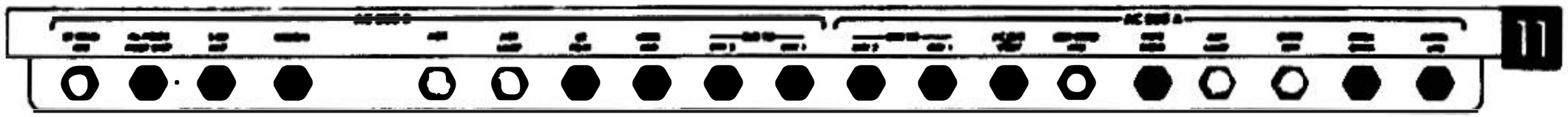
T02:17

LMP CONNECT TO LM ECS

Return CSM O2 Hose To CSM
Connect To LMP Hoses
SUIT ISOL - SUIT FLOW

Configure CB's Per ACTIVATION PWR UP Chart

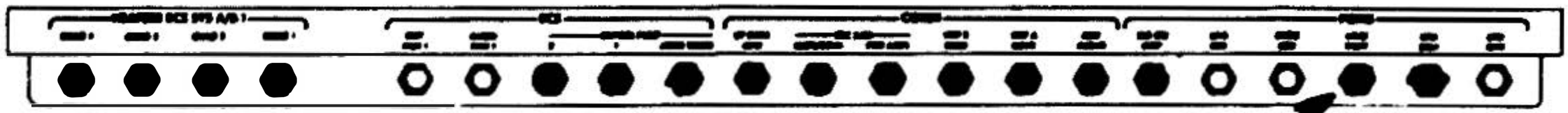
ACTIVATION PWR UP



6

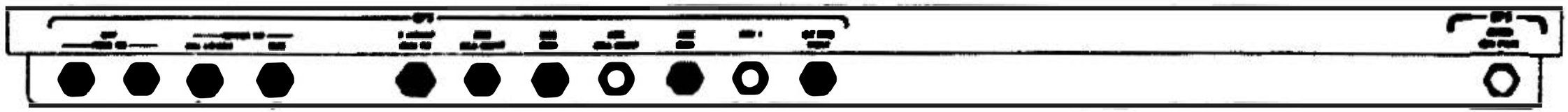
6

9



5

M.A. ,LGC ,RESTART

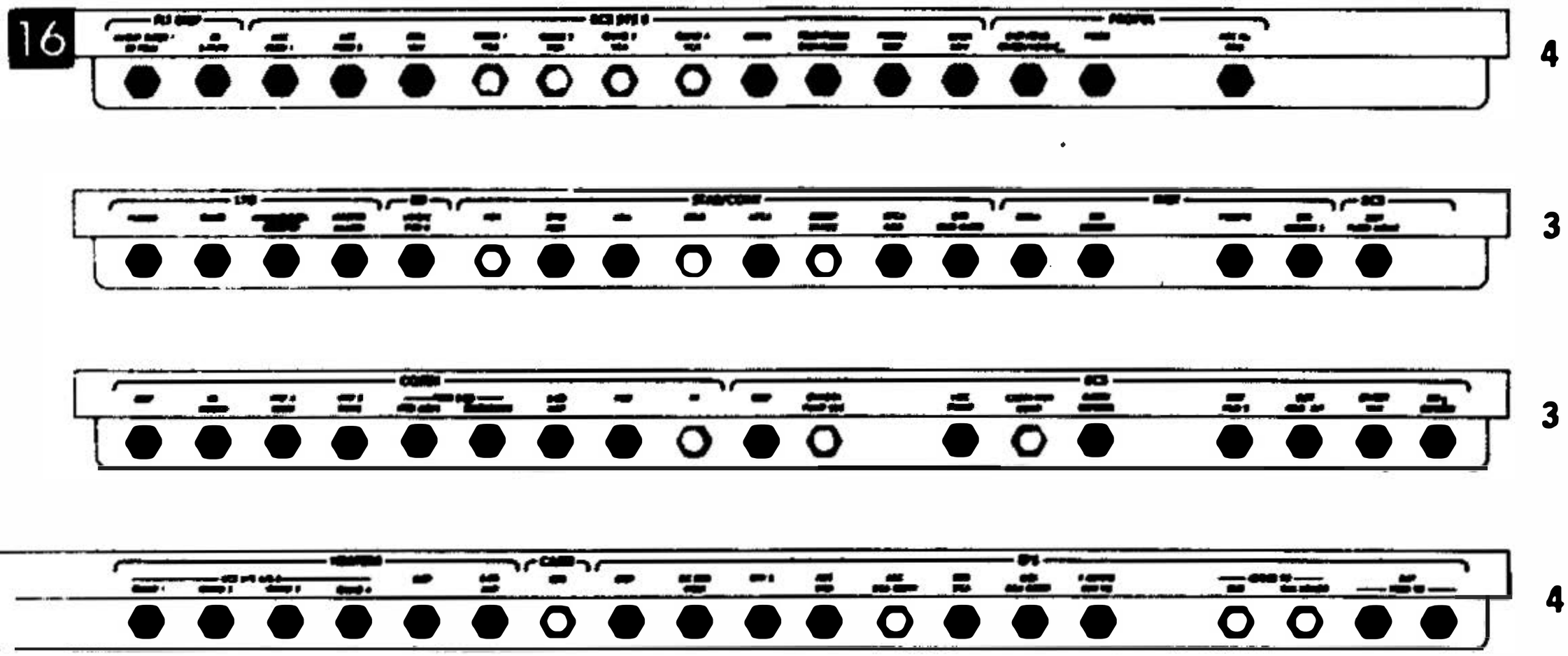


3

Basic Date 9/15/70

Changed 11/2/70

ACTIVATION PWR UP



T/B VERIFICATION

2-10

102:19

TB VERIFICATION

1 CB(16) INST: CWEA - Open Then Close

WARN	CAUT	COMP
RCS A REG		
RCS 8 REG		

2 FUEL & OXID VENT (2) -tb-gray
LDG GEAR DEPLOY - tb-bp

3 ASCENT He REG 1&2 -tb-gray
DESCENT He REG 1-tb-gray
DESCENT He REG 2 -tb-bp

4 SYS A&B ASC FUEL & OXID (4)-tb-bp
SYS A&B QUADS (B)-tb-gray
CRSFO tb-bp
SYS A&B MAIN SOV -tb-gray

5 RECORDER - OFF - tb-bp

Basic Date 9/15/70

Changed 11/2/70

Basic Date 9/15/70 Changed

T02:2T

PGNS TURN-ON & SELF TEST

1 Check Bus Voltages

2 V35E
F 88 88
(Master Alarm, LGC & ISS Warning, And All DSKY Lts - On, B's In All Registers; Lts Reset In 5 Sec ,LGC Warning Resets Within 20 Sec)

3 CB(11) PGNS: IMU OPR - Close
NO ATT Lt - On (Off In 90 sec)
Wait 20 sec After NO ATT Lt - Off, then
V37E00E

4 V25 N01E 1365E
E,E,E,

5 V15 N01E 1365E
R1,R2,R3 All Zero

T02:2T

VHF B CHECKOUT

1 CSM Configure for VHF Simplex B
VHF B XMTR - VOICE
VHF B RCVR - ON
VHF ANT - FWD
AUDIO (Both): VHF B - T/R

2 Both CDR & LMP Perform Voice Check On VHF Simplex B

PGNS T/O
VHF C/O

6 V21 N27E 10E (Test
Fixed And Erasable Memory)

R1 Number Of Errors
R2 Number Of Tests Started
R3 Number Of Erasable Tests Successful
Test Successful If R2 $\geq$ 3 (Minimum 78 sec)

```
*PROG Lt-On                    *
*        V05 N09E 01102 SELF-  *
*        TEST ERROR            *
* N08E   Record For MSFN       *
*                              *
*        R1 _____              *
*                              *
*        R2 _____              *
*                              *
*        R3 _____              *
```

7 V21 N27E 0E TERMINATE SELF TEST

T02:24

VHF A CHECKOUT

1 CSM Configure For VHF Simplex A
VHF A XMTR - VOICE
VHF A RCVR - ON
VHF B XMTR - OFF

AUDIO (Both): VHF B - RCV
: VHF A - T/R

2 Both CDR & LMP Perform Voice Check On
VHF Simplex A

Basic Date 9/15/70

Changed 11/2/70

Basic Date 9/15/70 Changed 12/18/70

2-13

AOS 102:25

UD - 2:00 (102:27)

Report LM Pwr Transfer Time (2-1)
Report PRIM EVAP FLOW TIME (2-6)

102:29

* SEC S-BAND VOICE CHECK

Notify MSFN of SEC S-BD CK
Perform SEC S-BD VOICE CK With MSFN
(Up To 60 sec To Lock)

102:31

* PRIM S-BAND T/R AND PWR AMPL CHECK

1 Notify MSFN of PRIM S-BD CK
S-BAND XMTR/RCVR - PRIM
S-BAND PWR AMPL - PRIM
(Up To 60 sec To Relock)

2 Perform Comm Check With MSFN

S-BD ANT ACT

102:33

* S-BAND STEERABLE ANTENNA ACTIVATION

1 HTR CONT TEMP MONITOR - S-BAND
(-52° to +135°)
S-BAND -PM,PRIM,PRIM,VOICE,PCM,
RANGE,OFF,HI
CSM Mnvr To Proper Attitude

2 HI GAIN: PITCH - -75°
YAW - -12°
TRACK MODE - SLEW (Wait 30 sec)
PITCH (From MSFN) _____(+116) CCW
YAW (From MSFN) _____(+ 41) CCW
ANTENNA S-BAND - SLEW

3 Verify Signal Strength > 3.0
TRACK MODE - AUTO (>4.0)

4 S-BAND CHECK WITH MSFN

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IMU C/A
SUIT FAN/H2O CK

102:39

DOCKED IMU COARSE ALIGN

1 Verify CSM In Min DEADBAND ATT HOLD

2 Calculate LM Gimbal Angles

OG	IG	MG
300.00	180.00	360.00
____.____ +Rc (See 1-1)		
____.____ -CM (7.5)	____.____ +CM (112.5)	____.____ -CM (22.5)
____.____ LM (292.5)	____.____ LM (292.5)	____.____ LM (337.5)

3 V41 N20E COARSE ALIGN IMU
F 21 22 LOAD ICDU ANGLE OG,IG,MG (.01°)
(NO ATT Lt - On, FDAI Torques) 1
*PROG Lt-On *
*V05 N09E 00211 COARSE *
* ALIGN ERROR,Go*
* To 3 *

102:39

SUIT FAN/H2O SEP CHECK

1 CB(16) ECS: SUIT FAN 2 - Open
(Master Alarm, SUIT/FAN Warning
SUIT FAN Comp Lts - On)

2 CB(11) ECS: SUIT FAN 1 - Close
H2O SEP SEL - PUSH SEP 1

3 SUIT FAN - 1 (SUIT/FAN Warning,
FAN Comp Lts-Off,ECS Caution,
H2O SEP Comp Lts -Off In 2 min)
CB(16) ECS: SUIT FAN 2 - Close

102:41

GLYCOL PUMP CHECK

CB(11) ECS: GLYCOL PUMP 1 - Open
(Master Alarm, ECS Caution
Lt - On Momentarily)
CB(11) ECS: GLYCOL PUMP 1 - Close
(GLYCOL Comp Lt-On)

Basic Date 9/15/70 Changed

4	V40 N20E ZERO CDU (NO ATT Lt-Off) Notify CSM ATT HOLD No Longer Required	2	GLYCOL - INST (SEC) (8 psia) CB(16) ECS: GLYCOL PUMP SEC - Close (10-20 psi Rise) : GLYCOL PUMP SEC - Open
5	V25 N07E F 21 07 SET REFSMFLG 77E,10000E,1E, V01 N01E,77E Confirm Bit 13 Is Set (Set If 1st Digit Is 1,3,5, or 7)	3	GLYCOL - PUMP 2 (21-37 psi) (GLYCOL Comp Lt - On Then Off) CB(11) ECS: GLYCOL PUMP AUTO TRNFR-Open GLYCOL - PUMP 1 (21-37 psi)
6	V37E 51E FR0 V37E 00E	4	Biomed Sw - Right
7	V06 N20 On LM MARK - ENTR Note Time: Copy CSM & LM OG, IG, MG GET _____:_____:_____ OG IG MG _____.___ CM _____.___ CM _____.___ CM _____.___ LM _____.___ LM _____.___ LM		
8	Voice Gimbal Angles And Time To MSFN		

LGC/CMC CLOCK SYNC

********** UD - 1:45 (102:42) **********

102:47

*LGC/CMC CLOCK SYNC/TEPHEM UPDATE

1 V25 N36E

2 Load CSM Time _____:_____:_____

3 On CSM Mark - ENTR

4 V06 N65, On Mark - ENTR
Compare With CSM N65

CSM Time _____:_____:_____

LM Time _____:_____:_____

V55E - Load ΔT
Check Mission Timer

Basic Date 9/15/70 Changed _____

Basic Date 9/15/70 Changed _____

2-19

102:49

5 Record CSM TEPHEM

R1 _____

R2 _____

R3 _____

6 V25 N01E, 1706E Load TEPHEM (Octal)

7 V05 N01E, 1706E Verify TEPHEM

8 Verify MSFN Contact
V74E (Erasable Dump) (42 Sec)

ASCENT BATTERY ACTIVATION & CHECKOUT

1 CB(16) EPS: ASC ECA CONT - Close

2 POWER/TEMP MON SEL - BAT 5
BAT 5 NORMAL FEED-ON (Verify BAT Current)

3 POWER/TEMP MON SEL - SE BUS Then BAT 6
BAT 6 NORMAL FEED-ON (Verify BAT Current)

4 BAT 1,2 HI-VOLT-OFF/RESET
BAT 3.4 HI-VOLT-OFF/RESET
Verify BAT Current = 0
POWER/TEMP MON SEL-CDR BUS Then SE BUS

5 BAT 5 BACKUP FEED-ON
BAT 6 BACKUP FEED-ON
BAT 5 NORMAL FEED-OFF/RESET
BAT 6 NORMAL FEED-OFF/RESET
POWER/TEMP MON SEL-CDR BUS, SE BUS, Then BAT Current

DAP SET
ASC BAT CK

102:52

SET OAP

1 V48E
R1 32022
PRO

2 F 06 47 LM, CSM Wt. (LBS)
R1 _____ (34150)
R2 _____ (36525)
PRO

3 F 06 48 GMBL TRIM, PITCH, ROLL (.01°)
R1 _____ (+00439)
R2 _____ (+00528)
(TERM) V34E

6 BAT 1&2 HI VOLT-ON
BAT 3&4 HI VOLT-ON
Verify BAT Current

7 BAT 5 BACKUP FEED-OFF/RESET
BAT 6 BACKUP FEED-OFF/RESET
Verify BAT Current = 0

8 CB(16) EPS: ASC ECA CONT - Open

9 Record & Report ED BAT Voltage to MSFN

BAT A _____

BAT B _____

Basic Date 9/15/70

Changed 12/18/70

T02:54

LANDING GEAR DEPLOY

1 CB(11) EO: LDG GEAR FLAG-Close
: LOGIC POWER A-Open
MASTER ARM-ON
LOG GEAR DEPLOY-FIRE, tb-gray
CB(11) EO: LOGIC POWER A-Close
LOG GEAR DEPLOY-FIRE
MASTER ARM-OFF
CB(11) ED: LOG GEAR FLAG-Open

T02:56

RCS PRESSURIZATION

1 RECYCLE: SYS A&B ASC FEED 2(2) - CLOSE
SYS A&B ASC FEED 1(2) - OPEN

2 RCS QUANTITY A&B - 100%
SYS A&B ASC FUEL & ASC OXID - tb(4) Remain-bp
SYS A&B THRUSTER PAIR QUADS - tb(8) gray
(Possible tb-Red, Cycle CWEA If Necessary)
RECYCLE: CRSFD-CLOSE
: MAIN SOV SYS A&B - OPEN
HTR CONT TEMP MON - Check RCS QUADS (≥120°)

LOG GEAR DEPLOY
RCS PRESS

3 TEMP/PRESS MON - He (2820-3280 psia)
PRPLNT (40°-100°/10-50 psi)
FUEL MANF (25-90 psi)
OXID MANF (25-90 psi)

4 CB(16) LOGIC PWR B - Open
MASTER ARM - ON
HE PRESS RCS - FIRE
(RCS A&B REG Warning Lts - Off)
RECYCLE: SYS A&B ASC FEED 2(2) - CLOSE
CB(16) LOGIC PWR B-Close
MASTER ARM-OFF

5 RECYCLE: SYS A&B ASC FEED 1(2) - OPEN
: SYS A&B THR PAIR QUADS (8) - OPEN
: CRSFD - CLOSE
: SYS A&B MAIN SOV-OPEN

6 TEMP/PRESS MON - OXID MANF (175-188 psi)
- FUEL MANF (175-188 psi)
- PRPLNT (40°-100°/178-188 psi)
- He (2750-3200 psi)
Read He Pressure To MSFN

********** UD - 1:30 (102:57) **********

Basic Date 9/15/70 Changed _____

Basic Date 9/15/70 Changed

2-23

103:00

*RCS CHECKOUT

1 GUID CONT - PGNS
ATT/TRANSL - 4 JET
ATT CONT (3) - PULSE
MODE CONT (Both) - ATT HOLD
ACA/4 JET (CDR) - DISABLE
TTCA (CDR) - JETS
Verify HBR With MSFN & CSM In
Wide Deadband & Attitude Hold
QUAD Flags - Red & RCS TCA Lt - on will
occur during cold fire checks

2 TTCA (Cold Fire) Check
V76E
V11N10E, 5E
CDR TTCA

UP	(+X)	- R1	00252
DN	(-X)	-	00125

E, 6E

RIGHT	(+Y)	- R1	00220
LEFT	(-Y)	-	00140
FWD	(+Z)	-	00011
AFT	(-Z)	-	00006

3 PGNS RATE CMD (Cold Fire), AGS PULSE (Cold Fire) Check

CB(T1) ATT OIR CONT - CLOSE
V77E
V15 NO1E, 42E

COR ACA (To Soft Stop, Pause 2 sec At Null)

ROLL RIGHT	R3	00045-00057
ROLL LEFT		77720-77732
PITCH UP	R1	00045-00057
PITCH DN		77720-77732
YAW RIGHT	R2	77720-77732
YAW LEFT		00045-00057

4 AGS RATE CMD (Cold Fire), 4 JET SEC COIL (Hot Fire) Check

Verify CMC MODE - FREE

GUID CONT - AGS
ATT CONT (3) - MODE CONT
ACA/4 JET (CDR) - ENABLE
CDR ACA (Deflect Slowly To Hardover, Pause 2 sec At Null)

ROLL	- RIGHT
ROLL	- LEFT
PITCH	- UP
PITCH	- DN
YAW	- RIGHT
YAW	- LEFT

5 PGNS MIN IMP (Hot Fire) Check
GUID CONT - PGNS
V76E

CB(11) RCS SYS A: QUAD TCA (4) - Close
CB(16) RCS SYS 8: QUAD TCA (4) - Close
CB(16) INST: CWEA - Open Then Close

V11N10E, 31E R1 67777
CDR ACA (Out Of Detent (2 1/2°), Pause 2 sec At Null)
ROLL RIGHT - R1 27757
ROLL LEFT - R1 27737
YAW RIGHT (Twice) - R1 27767
YAW LEFT (Twice) - R1 27773

V48E, V21E, 31022E, PRO, V34E
V11N10E, 31E
CDR ACA(Out of Detent (2 1/2°), Pause 2 sec At Null)
PITCH UP - R1 27776
PITCH DN - R1 27775
Notify CSM Hot Fire Checks Complete

6 ATT/TRANSL - 2 JET
V37E 00E

SS 103:10

103:10

*IMU FINE ALIGN

1 Copy Ground Calculated Gyro Torquing Angles

X_____, Y_____, Z_____

2 V76E (Verify)
V42E Fine Align IMU
F 21 93 Load Gyro Torquing Angles X,Y,Z (.001°)

3 V16 N93E Monitor Torquing (All Zero)

103:10

*MSFN UPLINK/UPDATE

1 UPDATA LINK - DATA
MSFN P-27 Updates LS REFSMMAT, LM STATE VECTOR AND V66, And LGC Abort Constants
UPDATA LINK - OFF

2 Copy Updates
Gyro Torquing Angles
AGS Abort Constants
DAP Data

UD - 1:15 (103:12)

Basic Date 9/15/70

Changed 11/2/70

Basic Date 9/15/70

Changed 12/18/70

2-27

103:12

AGS ACTIVATION AND SELF TEST

1 AGS STATUS - STBY (Master Alarm, AGS Warning Lt-On)
CB(16) STAB/CONT: AEA-Close (AGS Warning Lt-Off)
CB(11) AC BUS B: AGS - Close
AGS STATUS - OPERATE (Master Alarm & AGS Warning Lt-On)
O2/H2O QTY MON - C/W RESET

2 000+888888 (OPR ERR Lt-On)

3 123-45679

4 412+0 REINITIATE TEST
412R +1 SELF TEST SATISFACTORY
+3 LOGIC TEST FAILURE
+4 MEMORY TEST FAILURE
+7 LOGIC AND MEMORY TEST FAILURE

5 574R DESCENT STAGE FLAG (+ Not Staged)

6 604R LUNAR SURFACE FLAG (+ NOT On Lunar Surface)

7 612R STAGING SEQ COUNTER (+0 Nom)

103:15

DROGUE AND PROBE INSTALLATION

1 Verify:
Both Electrical Umbilicals Removed
Drogue Lock Lever Engaged & Flush
Three Capture Latches Engaged & Locked
LM Hatch Exterior Insulation O.K.
Flaps Secured Around Handles

2 Close & Secure Hatch
CABIN DUMP (OVHD) - AUTO
PRESS REG A&B - CABIN
SUIT GAS DIVERTER - PUSH/CABIN
Secure LEVA Bags On Engine Cover

DROGUE & PROBE
AGS T/O

103:18

AGS TIME INITIALIZATION

1 V16 N65E
Set AGS Time (377) 100 hr Bias

103:20

LOAD AGS PAD

1 224 _____ (+60470)

225 _____ (+29400)

226 _____ (+60486)

305 _____ (-01742)

662 _____ (-54613)

673 _____ (-31542)

2 232 +00600

233 +00250

464 +00500

Basic Date 9/15/70 Changed _____

2-29

465 +00195

616 +0

623 +0
514 R _____ (-60000)
515 R _____ (-44223)
516 R _____ (+00000)

3 Copy AGS K FACTOR Update

_____:_____:_____

V47E
N16 GET Of AGS CLOCK
V25E LOAD AGS K FACTOR UPDATE
V34E

********** UD - 1:00 (103:27) **********

103:28

1 Match Indicated Angles
TRACK MODE - SLEW,
S-BO ANT-AFT
Set P _____ (+132)
Y _____ (+ 48)

VHF 8 XMTR - DATA
BIOMED-OFF, PCM-LO
UPLINK SQUELCH - ENABLE

********** LOS 103:30 **********

103:30

Don Helmet & Gloves

103:30

Don Helmet & Gloves

Basic Date 9/15/70

Changed 11/2/70

103:39

PGA PRESSURE INTEGRITY CHECK

1 SUIT GAS DIVERTER - PULL/EGRESS
CABIN GAS RETURN - EGRESS
SUIT CIRCUIT RELIEF - CLOSE
PRESS REG A - EGRESS
PRESS REG B - DIRECT O2 (Monitor Cuff Gage To 3.7 - 4.0 psig)
PRESS REG B - EGRESS (Monitor Cuff Gage, Decay <.3 Psi in 1 min)

2 CO2 CANISTER SEL - SECONDARY (CO2 Comp Lt-On, Monitor Cuff Gage, <.3 psi In 1 min)
CO2 CANISTER SEL - PRIMARY (CO2 Comp Lt-Off)

3 SUIT CIRCUIT RELIEF - AUTO
PRESS REG A&B - CABIN
CABIN GAS RETURN - AUTO
SUIT GAS DIVERTER - PUSH/CABIN

********** UD - :45 (103:42) **********

103:44

REGULATOR CHECK

1 Verify CSM TUNNEL HATCH, PRESS EQUALIZATION, AND TUNNEL VENT VLVS CLOSED, AND TUNNEL VENTED

2 CABIN REPRESS VLV - MANUAL (VERIFY FLOW), then AUTO

3 VERIFY: OVHD CABIN DUMP VALVE - AUTO
CB(16) ECS: CABIN REPRESS - OPEN
PRESS REG A&B - EGRESS
(SUIT GAS DIVERTER - EGRESS)
CABIN GAS RETURN - EGRESS

4 FWD CABIN DUMP VALVE - OPEN then AUTO at 4.5 psia

5 SUIT CIRCUIT RELIEF - OPEN (VERIFY SUIT PRESS 4.5 psia), then CLOSE
PRESS REG A - CABIN
VERIFY SUIT PRESSURE Rises to 4.6-5.0 psia

6 PRESS REG A - EGRESS
SUIT CIRCUIT RELIEF - OPEN (SUIT PRESS 4.5 psia), then CLOSE
PRESS REG B - CABIN
VERIFY SUIT PRESSURE RISES TO 4.6-5.0 psia

7 SUIT CIRCUIT RELIEF - AUTO
CABIN GAS RETURN - AUTO
PRESS REG A - CABIN
SUIT GAS DIVERTER -PUSH/CABIN
(CABIN PRESS WILL RISE TO 4.6-5.0 psia IN APPROXIMATELY 5 MIN.)

8 CB(16) ECS: CABIN REPRESS - CLOSE
DOFF HELMETS & GLOVES (CREW OPT.)

DRIFT CK
RATE GYRO CK

DRIFT CK
RATE GYRO CK

103:54

DRIFT CHECK

V06N20 On LM MARK - ENTR

GET _____:_____:_____

OG	IG	MG
____.____ CM	____.____ CM	____.____ CM
____.____ LM	____.____ LM	____.____ LM

(Will Transmit Angles And Time To MSFN
At AOS)

********** UD - :30 (103:57) **********

********** SR 103:59 **********

103:54

RATE GYRO CHECK

1 Verify CSM Holding Attitude
GYRO TEST - POS RT (RPY RATE +5°/sec)
GYRO TEST - NEG RT (YPR RATE -5°/sec)

2 RATE SCALE-5°/SEC
REPEAT Tests

Basic Date 9/15/70 Changed _____

T04:00

RNDZ ROR SELF TEST

1 CB(11) RR(2) - Close (NO TRACK Lt-On)
Verify: CSM RCS Thruster B3 - Off
: Radar Xponder - Off
RNOZ RDR ANT - Released
X-POINTERS (Both) - HI MULT
RATE/ERR MON (Both) - RNDZ RADAR
ATTITUDE MON (Both) - PGNS
MODE SEL - LOG RDR

2 RNG/ALT MON - RNG/RNG RATE
SHFT/TRUN - ±50°
RR MODE - SLEW
TEMP MONITOR - RNDZ (+10° To +50°)
RR GYRO SEL-SEC
CB(11) AC BUS A: RNG/RNG RT/ALT/ALT
RT - Close

FLIGHT DISPLAYS: RNG/RNG RT/ALT/ALT
RT-Close

T04:00

AGS UPDATE & ALIGN

1 TLM-HI
V47E, 414+1

2 400 + 3 AGS/PGNS Align

3 V83E, 317R, 440R

4 TLM-LO

T04:05

AGS CALIBRATION

1 V16 N20E
16 20 ICDU Angles, O, I, M
CSM Mnvr Until LM ICDU'S:
292.5 (OG)
292.5 (IG)
337.5 (MG)
RATES <.075°/sec In All Axes

2 V40 N20E ICDU ZERO

RR SELF TEST
AGS CAL

3 SLEW RATE-HI
Slew Left To Mode I Region (18 sec)
Slew Right, Down, Left, Up
(FDAI Needles Right, Down, Left, Up)
SLEW RATE - LO
SHFT/TRUN - +5°
Slew Right, Down, Left, Up
(FOAI Needles Right, Down, Left, Up,
1°/sec: X-Pointer-3 mr/sec)

4 RR MODE - AUTO TRACK
RADAR TEST - RNDZ RDR (Rng Rt Tape Drives
To -478 to -518 fps, X-PNTR'S Oscillate
and FOAI Needles Vary Between ±5°.
After 12 sec Rng Tape Drives to
194 to 197 NM, NO TRACK Lt - OFF)

5 TEST MONITOR - AGC (1.5)
- XMTR 2.6)
- SHAFT ERR (2.2 to 2.6)
@1/2cps)
- TRUN ERR (2.2 to 2.5)
@1/2 cps)
- AGC

3 Read and record: ACCEL BIAS COEFF

540R X _____ (.001 ft/sec 2)
(-00013)

541R Y _____ (.001 ft/sec 2)
(-00001)

542R Z _____ (.001 ft/sec 2)
(+00002)

GYRO DRIFT COEFF

544R X _____ (.01°/hr)
(-00014)

545R Y _____ (.01°/hr)
(-00016)

546R Z _____ (.01°/hr)
(-00067)

4 Verify CSM Thrusters Disabled

Basic Date 9/15/70

Changed 12/18/70

Basic Date 9/15/70

Changed 11/2/70

6 Set NORM MON Flag
V25 N07E
101E, 10E, 1E
RR MODE - LGC (NO TRACK Lt - On)
Wait 10 sec)

7 V63E Start RR Self Test
F 04 12
R1 00004 Specify Radar
R2 00001 Rndz Radar
PRO
NO TRACK Lt-On (Off After 12 sec)

8 F 16 72 TRUN, SHAFT (.01°)
R1 Varying At 1/2 cps
R2 Varying At 1/2 cps
PRO

9 F 16 78 RANGE, RANGE RATE, TFI (.01nm, fps, min-sec)
R1 +195.40 to +195.80 (TM Within ±1.2 of R1)
R2 -00480 to -00520 (TM=R2-2)

10 V34E

11 RADAR TEST -OFF (NO TRACK Lt-On, X-Pntr-Center)

2-37

5 400+6 CALIBRATE GYRO & ACCEL
After 32 sec:
Read and Record

540R _____ (.001 ft/sec 2)
541R _____ (.001 ft/sec 2)
542R _____ (.001 ft/sec 2)
Values Should Not Change From Step 3 By More Than .039 ft/sec 2 (.008 nom)

6 400 R (+0 After 302 sec)
Notify CSM To Enable All Thrusters Except B3 (B3 Can Be Enabled If RR SELF TEST Complete)

Read and Record
544R _____ (.01°/hr)

545R _____ (.01°/hr)

546R _____ (.01°/hr)
Values Should Not Change From Step 3 By More Than 2.0°/hr (.9 Nominal)

12 V40 N72E RR CDU ZERO (10 sec)
SHFT/TRUN - ±50°

13 V41 N72E (+04000, +04000)
PRO
V16N72E

14 SHFT/TRUN - ±5°
RR GYRO SEL - PRIM
V41 N72E (+35600, +35600)
PRO
V16N72E

15 V41 N72E (+00000, +28300)
PRO
V16N72E
CB(11) RR(2) - Open
(NO TRACK Lt-Off)
V44E
Notify CSM That Thruster B3-Off, And
Radar Xponder-Off Are No Longer Required

16 RATE/ERR MON (LMP)-LDG RDR/CMPTR
ATT MON (LMP) - AGS

********** UD - :15 (104:12) **********

Basic Date 9/15/70 Changed _____

Basic Date 9/15/70 Changed 11/2/70

104:12

PREP FOR UNDOCKING

1 S-BD-PM, PRIM, PRIM, VOICE,
PCM, RANGE
VHF-VOICE, ON, DATA, ON, LEFT, LO
AUDIO (Both): VHF A-T/R
: VHF B-RCV

2 MISSION TIMER-SET
EVENT TIMER-SET, Count ON to 104:27:31 (Undocking)
OVHD HATCH-LOCKED
OVHD CABIN RELIEF & DUMP - AUTO
PRESS REG A&B - CABIN

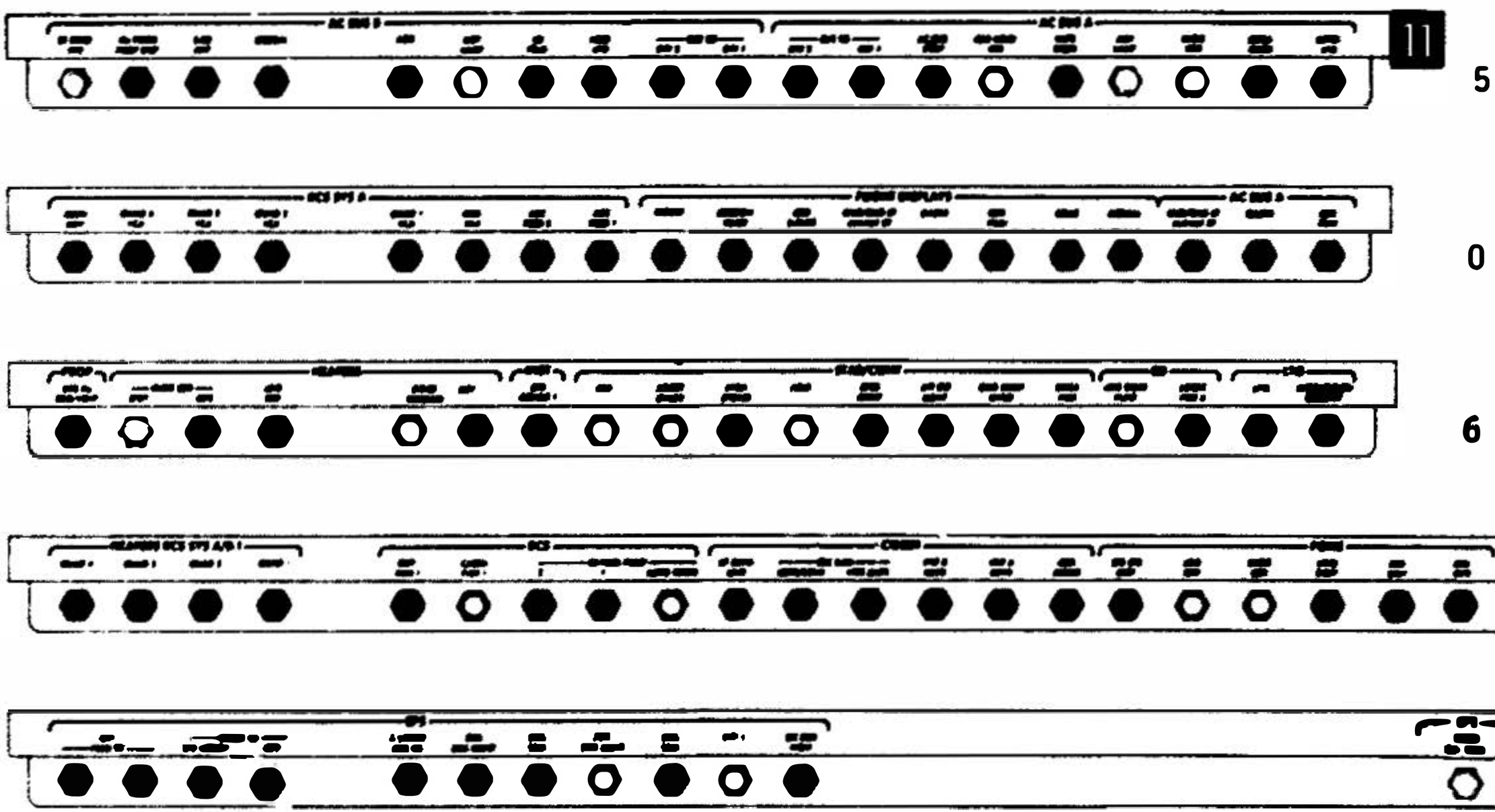
3 GUID CONT - PGNS
MODE SEL - LOG RADAR
RNG/ALT MON - RNG/RNG RT
RATE ERR MON (CDR) - LOG RDR/CMPTR
(LMP) - LOG RDR/CMPTR
ATTITUDE MON (CDR) - PGNS
(LMP) - AGS
RATE SCALE - 5°/SEC

4 ATT/TRANSL - 2 JET
BAL CPL - ON
DEADBAND - MAX
ATTITUDE CONTROL (3)-MODE CONT
MODE CONT (Both) - ATT HOLD
TTCA (Both) - JET
RR MODE - SLEW
CB(11) HTRS: AOT - Close
Mount Camera On Window Bar
LM 3 /DAC/10/CEX-ULC
(T8,250,∞) 6 fps, .06 Mag (1 min)
LM /DC/60/HCEX
(fT1,250,focus) 10 Pictures
Mount TIMELINE Book

5 Configure CB Panels Per UNDOCKING Chart

Basic Date 9/15/70 Changed 12/18/70

UNDOCKING



UNDOCKING

Basic Date 9/15/70 Changed _____

********** UD - :10 (104:17) **********

6 CHECK ATTITUDE (0,150/282,060)

7 V48E
R1 21002
PRO

F 06 47 LM,CSM Wt. (lbs)
R1 _____(34150)
R2 _____(36525)
PRO

F 06 48 GMBL TRIM,PITCH,ROLL (.01)
R1 _____ (+00439)
R2 _____ (+00528)
(TERM) V34E

HELMET AND GLOVES ON

********** AOS 104:19 **********

104:19

S-BD ANT-AFT, Verify Comm
CK S-BD P _____ (+132)
Y _____ (+ 48)
S-BD ANT - SLEW (>3.0)
TRACK MODE - AUTO (>4.0)
VHF B XMTR - OFF
BIOMED - LEFT, PCM-HI
UPLINK SQUELCH - OFF

********** GO/NO GO FOR UNDOCKING **********

Voice DRIFT CHECK Gimbal Angles
& Time To MSFN
(SEE 2-34)

8 TAPE RECORDER - ON

9 P47
404 + 0E
405 + 0E
406 + 0E
470R

Insert V77 (DO NOT ENTR)

T04:27:3T

********** UNDOCKING **********

Go To LM TIMELINE BOOK