National Space Transportation System

FLIGHT DATA FILE

JSC-17871

#091

Contingency Deorbit Prep

Mission Operations Directorate
Operations Division

Generic
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NASA

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LAUNCH DAY DEORBIT PREP (ORBIT 2)

Assumptions/Initial Conditions

- The Launch Day Deorbit Prep (Orbit 2) is a **STAND ALONE procedure**
- These procedures may be entered directly from the ASCENT C/L
- There is no requirement for completion of any of the Nominal Post Insert procedures
- MSs only will egress seats
- Procedures should be started at approximately MET 01:00

Problem Description/Rationale

- A failure in any system that requires a deorbit as soon as possible after the last AOA opportunity

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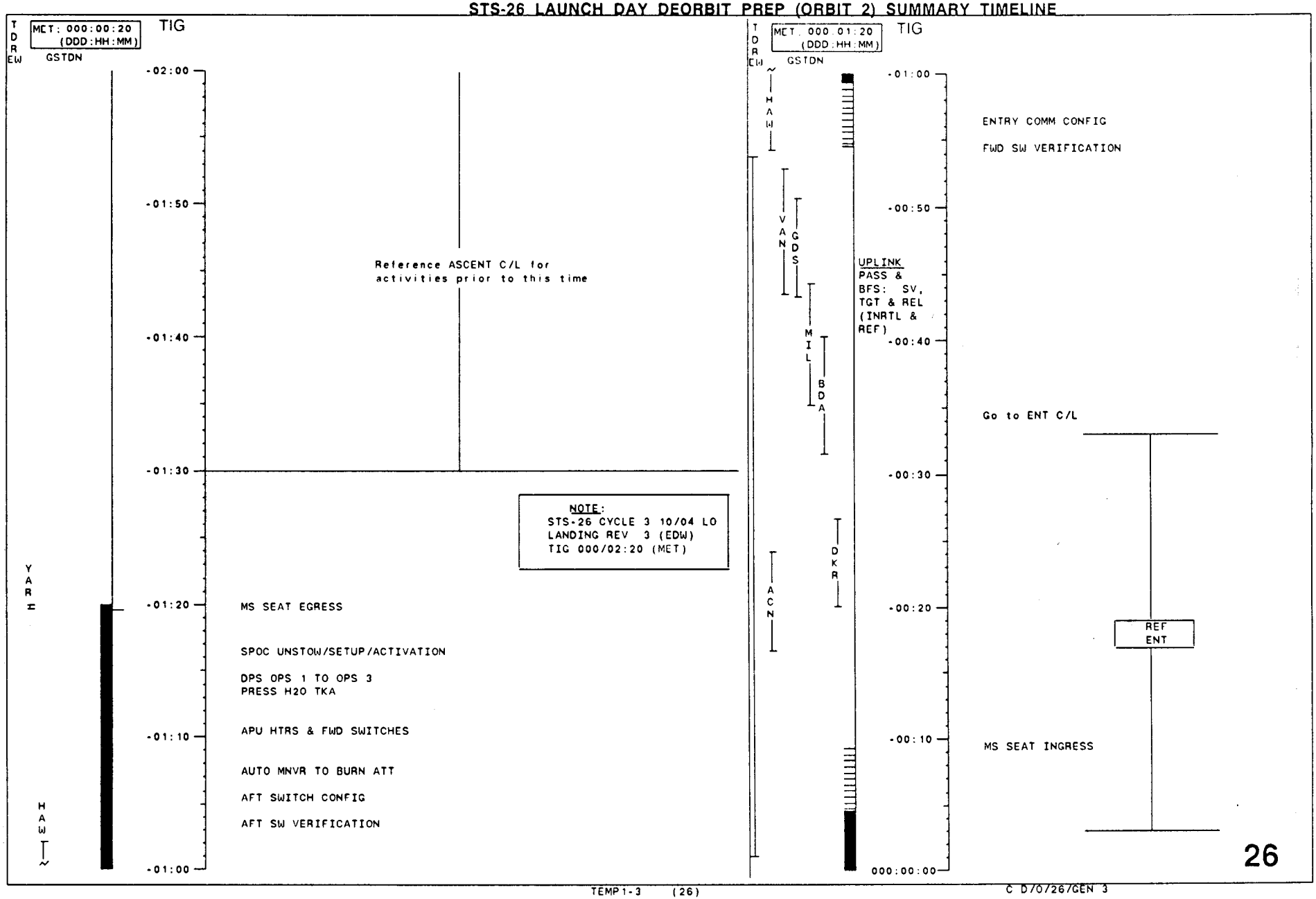
STS-26 LAUNCH DAY DEORBIT PREP (ORBIT 2) SUMMARY TIMELINE



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DPS ENTRY CONFIG [1]

C,P 1. REASSIGN G3FD GPC STRING TO ANOTHER GPC IN MC 1

[GNC 0 GPC MEMORY]
CONFIG - ITEM 1 + 1 EXEC
Modify MC 1 per Table →
C3 BFC CRT DISP - OFF
GNC, OPS 106 PRO
[GNC 0 GPC MEMORY]

CAUTION
If BFS is stand alone (BFC lt FLASH):
BFC CRT DISP - ON
BFS, GNC I/O RESET EXEC
BFC CRT DISP - OFF

NOMINAL

CONFIG GPC	1 12340
STR 1	1
2	2
3	2
4	4
PL 1/2	1
CRT 1	1
2	2
3	2
4	0
L 1	1
2	2
MM 1	1
2	2

2. REASSIGN ALL STRINGS TO G3FD GPC IN MC 3

CONFIG - ITEM 1 + 3 EXEC
Modify MC 3 per Table →

NOMINAL

CONFIG GPC	3 00300
STR 1	3
2	3
3	3
4	3
PL 1/2	0
CRT 1	3
2	3
3	3
4	0
L 1	0
2	0
MM 1	3
2	3

3 MODE G3FD GPC TO OPS 0

O6 GPC MODE G3FD - STBY (tb-bp), RUN (tb-RUN)

4 LOAD MC 3 INTO G3FD GPC

CRTX PL, GPC/CRT G3FD GPC/X EXEC
[X: PL GPC MEMORY]
CONFIG - ITEM 45 + 3 EXEC
GPC - ITEM 46 + (G3FD GPC) EXEC
STORE - ITEM 47 EXEC
Store complete when MC = 03 (~12 sec)

* If no MC = 03 after 2 min:
* a. Cycle pwr on MMU 1 & 2; wait 34 sec.
* b. Retry GPC FREEZE DRY (step 4)
* If FD successful, continue with step 5
* If not successful, and < 2 GPCs failed:
* c. If no GPCs failed, restring 1 & 4 to GPC 1 and 2 & 3 to GPC 4; then try to FD GPC 2
* d. If one GPC failed, restring all strings to lowest ID GPC; then try to FD other GPC
* If FD successful:
* or e. Consider first attempted FD GPC to be failed
* or and continue with step 5
* If not successful:
* f. Perform SELECT ALTERNATE PASS S/W COPY on MMU W/O IPL for G3 (MAL, DPS, SSR-10), retry GPC FREEZE DRY (step 4)
* If FD successful, continue with step 5
* If not successful:
* g. Both MMUs failed - consult MCC for possible BFS engage
* If not successful and 2 GPCs failed,
* Continue with step 5 attempting to transition remaining PASS GPC to G3

C2 Set event timer to countdown to TIG

✓RGA, AA, ASA, IMU (all) - ON

5. TRANSITION GPC 1, 2, 4 TO GNC OPS 3

[1: GNC 0 GPC MEMORY]
CONFIG - ITEM 1 + 3 EXEC
Modify MC 3 per Table →
GNC, OPS 301 PRO
[3: GNC DEORB MNVR COAST]

CONFIG GPC	3 12040
STR 1	1
2	2
3	2
4	4
PL 1/2	0
CRT 1	1
2	2
3	2
4	0
L 1	0
2	0
MM 1	1
2	2

6. TRANSITION BFS GPC TO GNC OPS 3

C3 BFC CRT DISP - ON
✓SEL - 3 + 1
[3: BFS, GNC BFS MEMORY]
O6 GPC OUTPUT 5 - B/U (tb-bp)
CRT3 ✓TFL ENA - ITEM 29 (*)
BFS, GNC OPS 301 PRO
[3: BFS, GNC DEORB MNVR COAST]

TIG

-01:30

TRANS DAP
AUTO
RT 0.5
DB 3.5

NOTE
These procedures do not require completion of any Nominal Post Insert procedures

-01:25

MS PAYLOAD DEACT TIG - _____ AFT [A], 1-11

-01:20

C L4:B,Q,R All cbs closed

UPLINK
PASS & BFS
TGT

MS SEAT EGRESS

MS SPOC UNSTOW/SETUP/ACTIVATION
(Flight deck SPOC) SPOC Cue Card

Transition to ENT PKT

C,P DPS ENTRY CONFIG (OPS 1 to OPS 3)
(BFS NOT ENGAGED) [1]

-01:15

MS PRESS H2O TK A MID [2], 1-13

-01:10

C,P APU HTRS & FWD SWITCH CONFIG [3], 1-8

P AUTO MNVR TO BURN ATT (MCC update ATT)
MNVR per DEORBIT MNVR PAD (ENT, MNVR PADS)

R ___ ___ ___
P ___ ___ ___
Y ___ ___ ___

MS SWITCH CONFIG AFT [4], 1-11

-01:05

MS AFT STATION SW VERIFICATION, 3-15 to 3-26

NOTE Deltas to SW LIST
Some HTRS may be in A vs B positions,
R12 SPLY H2O DUMP & GALLEY tbs will be bp due to MA73C cbs left op

-01:00

7. TRANSITION GPC 1, 2, 3, 4 TO GNC OPS 3
(Add G3FD GPC to GNC OPS 3)

✓CONFIG - ITEM 1 + 3 EXEC
Modify MC 3 per Table →
C3 BFC CRT DISP - OFF
GNC, OPS 301 PRO
[1: GNC DEORB MNVR COAST]
BFC CRT DISP - ON
CRT3 BFS, GNC OPS 000 PRO
BFS, GNC OPS 301 PRO

CONFIG GPC	3 12340
STR 1	1
2	2
3	3
4	4
PL 1/2	1
CRT 1	1
2	2
3	3
4	0
L 1	0
2	0
MM 1	1
2	2

8. LAND SITE UPDATE

[1: GNC 50 HORIZ SIT]

SEL SITE (See LAND SITE DATA)

9. LOAD IN TGTs

[1: GNC DEORB MNVR COAST]

* If MCC cannot provide DEORB TGT, use SPOC *
✓PASS and BFS TGT per DEORBIT MNVR PAD (ENT, MNVR PADS)
or SPOC
LOAD - ITEM 22 EXEC
TIMER - ITEM 23 EXEC
✓PASS and BFS solution per DEORBIT MNVR PAD
(ENT, MNVR PADS)
BURN ATT, HA, HP
ΔVTOT
TGO

10. VERIFY MC 9 TABLE (GNC 9) FOR POST LANDING

[2: GNC 0 GPC MEMORY]

✓CONFIG - ITEM 1 + 9 EXEC
Modify MC 9 per Table →
CONFIG - ITEM 1 + 3 EXEC

CONFIG GPC	9 12340
STR 1	1
2	2
3	3
4	4
PL 1/2	1
CRT 1	1
2	2
3	3
4	0
L 1	1
2	2
MM 1	1
2	2

APU HTRS & FWD SWITCH CONFIG 3

APU STEAM VENT HTR ACT

C,P R2 ✓BLR CNTLR/HTR (three) - A
PWR (three) - ON

NOTE
Htr reqd to be on 2 hrs prior to APU act

✓APU FUEL PUMP/VLV COOL A - AUTO
After all APUs started (ENT C/L):
APU FUEL PUMP/VLV COOL A - OFF

APU TK/FU LINE HTR ACT

A12 APU HTR TK/FU LINE/H2O SYS 1A, 2A, 3A - AUTO

FWD SWITCH CONFIG

F6/F8 INST PWR (two) - FLT,ON
O7 TACAN MODE (three) - GPC

O14:D cb MNA CAB VENT (two) - op
O17:B EIU (three) - OFF
O8 MLS (three) - ON

1: GNC DEORB MNVR COAST | 2: GNC 0 GPC MEMORY
3: BFS, GNC DEORB MNVR COAST

TIG

-01:00

TRANS DAP
AUTO
RT 0.5
DB 3.5

MS ENTRY COMM CONFIG MID [5], 1-13

-00:55

C,P FWD STATION SW VERIFICATION, 3-1 to 3-14

NOTE Deltas to SW LIST

APU FUEL PUMP/VLV COOL A
will be in AUTO

L1 NH3 CNTLR A(B) - PRI/GPC

-00:50

-00:45

UPLINK
PASS &
BFS:
SV & REL
(INRTL
& REF)

-00:40

C,P Stow ORBIT PKT C/L, ORBIT Cue Cards, &
DEORBIT PREP

Go to FINAL DEORB UPDATE/UPLINK
(ENT, DEORBIT BURN) with following pen and ink
to ENT MNVR Cue Card: V = 12K, delete:
RAD BYP VLV MODE (two) - AUTO
CNTLR LOOP (two) - AUTO B(A)

-00:35

-00:30

MS LAUNCH DAY DEORBIT PREP AFT DECK CONFIGURATION (ORBIT 2)

NOTE
Wait for GO from CDR or PLT before starting any activity on this page

TIME (TIG-)	MS AFT ACTIONS
01:19	SEAT EGRESS
01:18	SPOC UNSTOW/SETUP/ACTIVATION (Flight deck SPOC) SPOC Cue Card
01:13	PAYLOAD DEACT [A]
01:07	SWITCH CONFIG [4]
01:05	AFT STATION SW VERIFICATION

PAYLOAD DEACT [A]

RESTOW IUS (UMBILICAL ATTACHED) (CLOSEOUT - STEP 13)
(IUS DPY, CONTINGENCY OPS)

SWITCH CONFIG [4]

AFT SW CONFIG

R12U FC H2O LINE HTR - A AUTO
R12L SPLY H2O XOVR VLV - OP (tb-OP)
✓Aft deck lts as reqd

ENTRY COMM CONFIG (if reqd)

L9, R10 ✓MS, PS AUD PWR - AUD/TONE
A/G (two) - T/R
ICOM (two) - T/R
VOX SENS - R
VOL tw (five) - R
A1R S-BD FM DATA SOURCE - OPS RCDR (rotary)

RESET C/W

R13U		
PARAMETER NAME	C/W CH	UPPER LIMIT
FREON LOOP EVAP OUT T1	107	1.90V/64.8 deg
T2	117	1.90V/64.8 deg

HTR CONFIG

A12 HYD HTR (eight) - OFF

A14 RCS/OMS HTR FWD,AFT RCS JET 1,2,3,4 (eight) - AUTO
5 (two) - OFF

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MS LAUNCH DAY DEORBIT PREP MIDDECK CONFIGURATION (ORBIT 2)

NOTE
WAIT for GO from CDR or PLT before starting any activity on this page

TIME (TIG-)	MS MIDDECK ACTIONS
01:18	SEAT EGRESS
01:15	PRESS H2O TK A [2]
00:57	ENTRY COMM CONFIG [5] (if reqd)

PRESS H2O TK A [2]

ML26C SPLY H2O GN2 TK VENT vlv - PRESS
A SPLY vlv - OPEN

ENTRY COMM CONFIG [5] (if reqd)

MO42F MIDDECK SPKR AUD PWR - AUD/TONE

A/G (two)	- T/R
A/A	- T/R
ICOM (two)	- T/R
VOX SENS	- R
VOL tw (five)	- R
XMIT/ICOM MODE	- R

MO13Q ✓MIDDECK FLOODS as reqd

LAUNCH DAY DEORBIT PREP (ORBIT 3)

Assumptions/Initial Conditions

- The Launch Day Deorbit Prep (Orbit 3) is a **STAND ALONE procedure** that may be entered directly from an ascent configuration (Ascent C/L) or from an orbit configuration (Post Insertion)

- Appropriate PKT C/L or MAL should be accomplished prior to using these procedures

Problem Description/Rationale

- Any failure which results in a Fail Safe condition will be cause for Launch Day Deorbit. Examples include those listed in POST INSERTION, 1-9, plus PLBD problems

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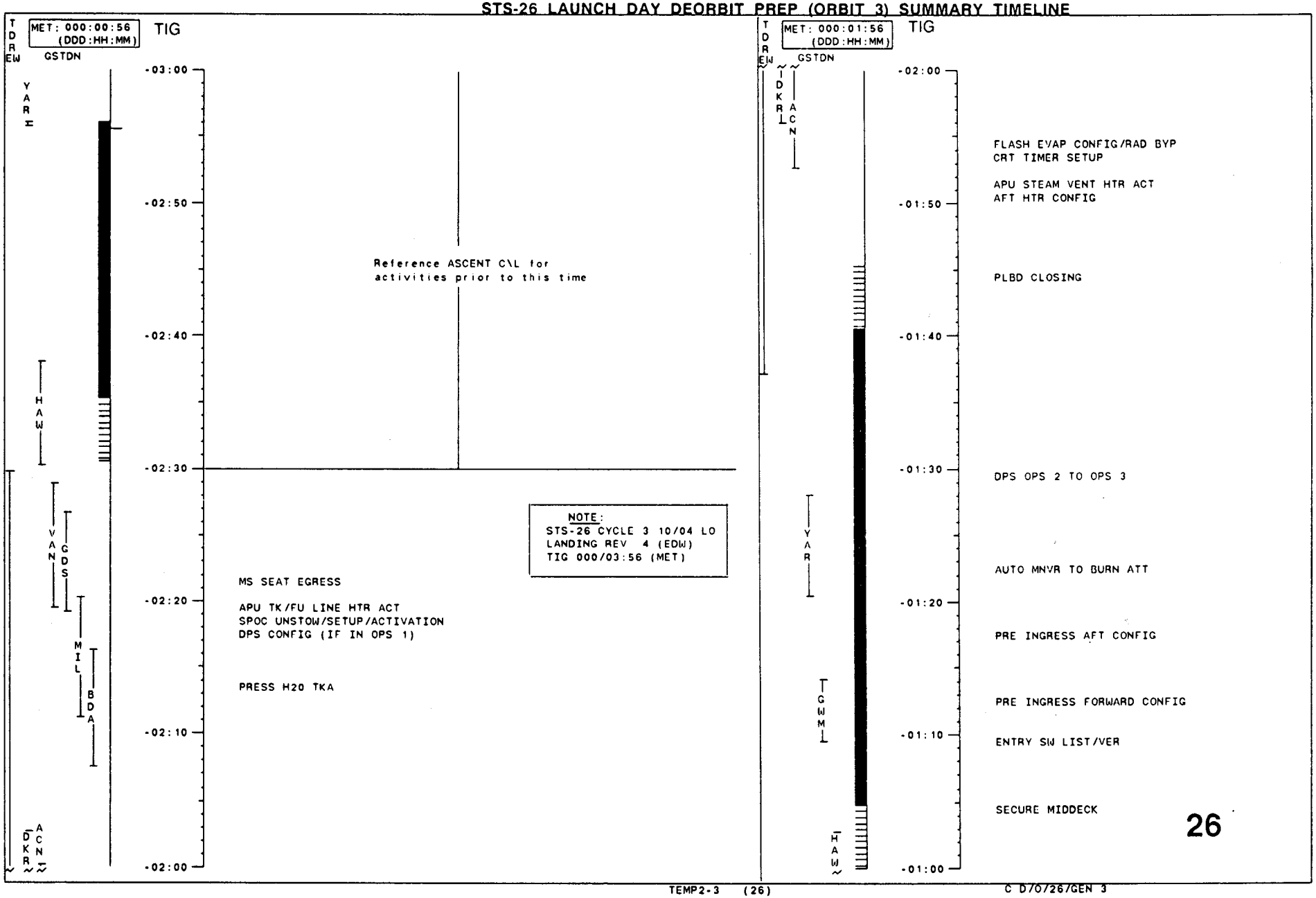
Notes

- This procedure can be used for an OPS 1 failure or an OPS 2 failure that has occurred prior to GO FOR ORBIT OPS at MET 01:45. After GO FOR ORBIT OPS these procedures no longer apply

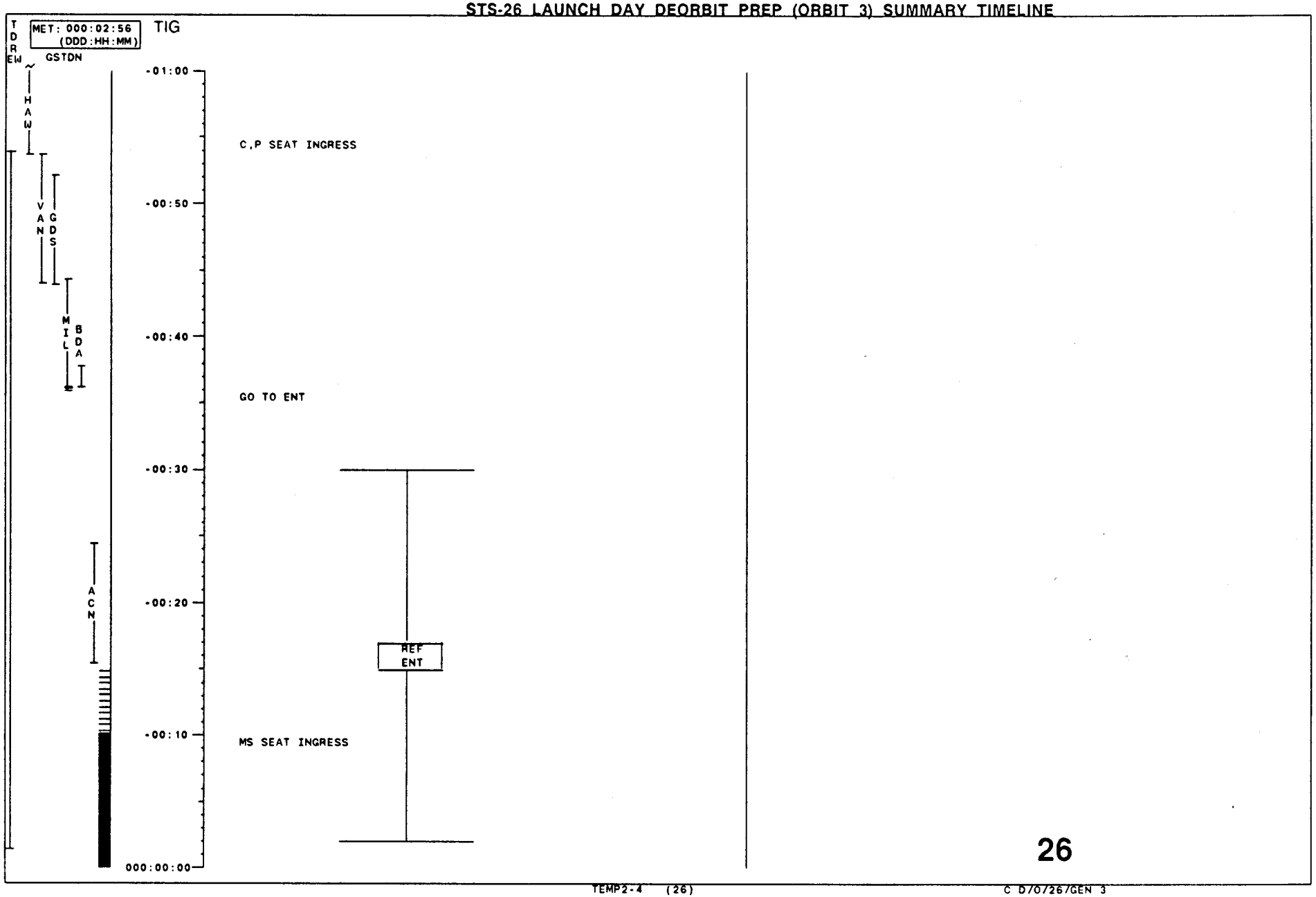
- If in OPS 1 or in OPS 2 prior to GO FOR RAD/PLBD OPS, begin procedure at TIG -2:30. This will cover necessary Post Insertion procedures that have not yet been accomplished

- If in OPS 2 after GO FOR RAD/PLBD OPS, begin procedure at TIG -2:00

STS-26 LAUNCH DAY DEORBIT PREP (ORBIT 3) SUMMARY TIMELINE



STS-26 LAUNCH DAY DEORBIT PREP (ORBIT 3) SUMMARY TIMELINE



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DPS CONFIG [2]

C,P 1. REASSIGN G3FD GPC STRING TO ANOTHER GPC IN MC 1

[GNC 0 GPC MEMORY]

CONFIG - ITEM 1 + 1 EXEC
Modify MC 1 per Table →
C3 BFC CRT DISP - OFF
GNC, OPS 106 PRO

[GNC 0 GPC MEMORY]

CAUTION
If BFS is stand alone (BFC lt FLASH):
BFC CRT DISP - ON
BFS, GNC I/O RESET EXEC
BFC CRT DISP - OFF

NOMINAL

CONFIG GPC	1 12340
STR 1	1
2	2
3	2
4	4
PL 1/2	1
CRT 1	1
2	2
3	2
4	0
L 1	1
2	2
MM 1	1
2	2

2 REASSIGN ALL STRINGS TO G3FD GPC IN MC 3

CONFIG - ITEM 1 + 3 EXEC
Modify MC 3 per Table →

NOMINAL

CONFIG GPC	3 00300
STR 1	3
2	3
3	3
4	3
PL 1/2	0
CRT 1	3
2	3
3	3
4	0
L 1	0
2	0
MM 1	3
2	3

3 MODE G3FD GPC TO OPS 0

O6 GPC MODE G3FD - STBY (tb-bp), RUN (tb-RUN)

4. LOAD MC 3 INTO G3FD GPC

CRTX PL, GPC/CRT G3FD GPC/X EXEC
[X: PL GPC MEMORY]
CONFIG - ITEM 45 + 3 EXEC
GPC - ITEM 46 + (G3FD GPC) EXEC
STORE - ITEM 47 EXEC
Store complete when MC = 03 (~12 sec)

* If no MC = 03 after 2 min:
* a. Cycle pwr on MMU 1 & 2; wait 34 sec
* b. Retry GPC FREEZE DRY (step 4)
* If FD successful, continue with step 5
* If not successful, and < 2 GPCs failed:
* c. If no GPCs failed, restring 1 & 4 to GPC 1 and 2 & 3 to GPC 4; then try to FD GPC 2
* d. If one GPC failed, restring all strings to lowest ID GPC; then try to FD other GPC
* If FD successful:
* e. Consider first attempted FD GPC to be failed and continue with step 5
* If not successful:
* f. Perform SELECT ALTERNATE PASS S/W COPY on MMU W/O IPL for G3 (MAL, DPS, SSR-10), retry GPC FREEZE DRY (step 4)
* If FD successful, continue with step 5
* If not successful:
* g Both MMUs failed - set up ASAP for OPS overlay (MAL, DPS, SSR-11)
* If not successful and 2 GPCs failed,
* Continue with step 5 attempting to transition remaining PASS GPC to G3

5. If no need for G2/SM config, go to step 6 on page 2-6 to establish G3 config

• If G2/SM config reqd:

SECURE BFS

C3 BFC CRT DISP - ON
CRT3 BFS, GNC, OPS 000 PRO
[3: BFS, BFS MEMORY]
C3 BFC CRT DISP - OFF

TRANSITION TO GNC OPS 2

[GNC 0 GPC MEMORY]

CONFIG - ITEM 1 + 2 EXEC
Modify MC 2 per Table →

GNC, OPS 201 PRO

[GNC UNIV PTG]

TURN OFF BFC LT

C3 BFC CRT DISP - ON
C2 BFS, MSG RESET (✓BFC LT - OFF)
C3 BFC CRT DISP - OFF

CONFIG GPC	DUAL G2 2 12000
STR 1	1
2	2
3	1
4	2
PL 1/2	0
CRT 1	1
2	2
3	0
4	2
L 1	0
2	0
MM 1	1
2	2

TRANSITION TO SM OPS 201(401)

CRTX SM, GPC/CRT SM GPC/X EXEC

X: SM 0 GPC MEMORY

CONFIG - ITEM 1 + 4(5) EXEC

Modify MC 4(5) per Table →

CONFIG GPC	4(5) 00040
STR 1	0
2	0
3	0
4	0
PL 1/2	4
CRT 1	4
2	4
3	0
4	4
L 1	4
2	0
MM 1	4
2	4

SM, OPS 201(401) PRO

SM ANTENNA

C3 UPLK - ENABLE

SM 1 DPS UTILITY

UL CNTL AUTO - ITEM 35 EXEC

SM ANTENNA

TDRS E - ITEM 14 EXEC

RECONFIG CRTs

GPC/CRT SM GPC/3 EXEC

LOAD ORBIT TFL

C3 ✓OI PCMMU FORMAT - GPC

SM 62 PCMMU/PL COMM

FORMAT:

CRT
- FXD - ITEM 1 EXEC (*)
- SEL ID - ITEM 3 + 183 EXEC
- LOAD - ITEM 4 EXEC
  - ✓RUN,CPLT
- SEL ID - ITEM 3 + 103 EXEC
- LOAD - ITEM 4 EXEC
  - ✓RUN,CPLT
- PGM - ITEM 2 EXEC

(FPM)
- SEL DECOM - ITEM 9 + 5 EXEC
- SEL FMT - ITEM 10 + 503 EXEC
- LOAD - ITEM 11 EXEC
  - ✓RUN,CPLT

SM ANTENNA

RECONFIG GPCs

O6 GPC MODE 5 - STBY (tb-RUN)
- HALT (tb-bp)

OUTPUT 5 - NORM (tb-bp)

OUTPUT (SM GPC) - TERM (tb-bp)

PWR 5 - OFF

GPC MODE (FD GPC) - STBY (tb-bp)
- HALT (tb-bp)

PWR (FD GPC) - OFF

Perform CRT TIMER SETUP [5], 2-8 >>

6. TRANSITION GPC 1,2,4 TO GNC OPS 3

✓RGA,AA,ASA,IMU (all) - ON

1: GNC GPC MEMORY

CONFIG - ITEM 1 + 3 EXEC

Modify MC 3 per Table →

GNC, OPS 301 PRO

3: GNC DEORB MNVR COAST

CONFIG GPC	3 12040
STR 1	1
2	2
3	2
4	4
PL 1/2	0
CRT 1	1
2	2
3	2
4	0
L 1	0
2	0
MM 1	1
2	2

7. TRANSITION BFS GPC TO GNC OPS 3

C3 BFC CRT DISP - ON

✓SEL - 3 + 1

3: BFS, GNC BFS MEMORY

O6 GPC OUTPUT 5 - B/U (tb-bp)

CRT3 ✓TFL ENA - ITEM 29(*)

BFS, GNC OPS 301 PRO

3: BFS, GNC DEORB MNVR COAST

8. TRANSITION GPC 1,2,3,4 TO GNC OPS 3
(Add G3FD GPC to GNC OPS 3)

✓CONFIG - ITEM 1 + 3 EXEC

Modify MC 3 per Table →

C3 BFC CRT DISP - OFF

GNC, OPS 301 PRO

1: GNC DEORB MNVR COAST

BFC CRT DISP - ON

CRT3 BFS, GNC OPS 000 PRO

BFS, GNC OPS 301 PRO

CONFIG GPC	3 12340
STR 1	1
2	2
3	3
4	4
PL 1/2	1
CRT 1	1
2	2
3	3
4	0
L 1	0
2	0
MM 1	1
2	2

9. LAND SITE UPDATE

1: GNC 50 HORIZ SIT

SEL SITE (See LAND SITE DATA)

TIG

-02:30

TRANS DAP
AUTO
RT 0.5
DB 3.5

-02:25

UPLINK
PASS & BFS
TGT

-02:20

-02:15

-02:10

-02:05

-02:00

NOTE
These procedures do not require completion of any Nominal Post Insertion procedures

C L4: B,Q,R All cbs closed

MS SEAT EGRESS

MS APU TK/FU LINE HTR ACT AFT [1], 2-15

MS SPOC UNSTOW/SETUP/ACTIVATION
(Flight deck SPOC) SPOC Cue Card

C,P DPS CONFIG (if in OPS 1) (BFS not engaged) [2], 2-5

MS PRESS H2O TKA MID [3], 2-17

MS UNSTOW/DON WIRELESS HEADSETS (if required)

18. LOAD IN TGTs

1: GNC DEORB MNVR COAST

* If MCC cannot provide DEORB TGT, use SPOC *

✓PASS and BFS TGT per DEORBIT MNVR PAD (ENT, MNVR PADS) or SPOC
LOAD - ITEM 22 EXEC
TIMER - ITEM 23 EXEC
✓PASS and BFS solution per DEORBIT MNVR PAD (ENT, MNVR PADS)
BURN ATT, HA, HP
ΔVTOT
TGO

19. VERIFY MC9 TABLE (GNC 9) FOR POST LANDING

2: GNC 0 GPC MEMORY

✓CONFIG - ITEM 1 + 9 EXEC
Modify MC9 per Table →
CONFIG - ITEM 1 + 3 EXEC

CONFIG GPC	9 12340
STR 1	1
2	2
3	3
4	4
PL 1/2	1
CRT 1	1
2	2
3	3
4	0
L 1	1
2	2
MM 1	1
2	2

FLASH EVAP CONFIG/RAD BYP [4]

C

FLASH EVAP CONFIG

L1 ✓FLASH EVAP CNTLR PRI A - ON
✓PRI B - OFF
✓SEC (two) - A SPLY, OFF
HI LOAD DUCT HTR - B
✓EVAP - ENA

RAD BYP (if rads not bypassed)

L1 RAD BYP VLV MODE (two) - MAN
MAN SEL (two) - BYP (after ~3 sec, tb-BYP)

RAD CNTLR LOOP (two) - OFF

O1 ✓FREON EVAP OUT TEMP ind ~39 ± 1 deg (after ~2.5 min)

CRT TIMER SETUP [5] (Omit if BFS or OPS 3)

[GNC 2 TIME]

CRT COUNT TO - ITEM 17 +__ +__ +__ EXEC

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APU STEAM VENT HTR ACT [6]

P R2 BLR CNTLR/HTR (three) - A
PWR (three) - ON

NOTE
Htr reqd to be on prior to APU act

APU FUEL PUMP/VLV COOL A - OFF
B - AUTO

After all APUs started:
APU FUEL PUMP/VLV COOL B - OFF

TIG

-02:00

If OPS 2:
A1(B1)
AUTO
NORM
RT 0.2
DB 5.0

MS Perform at TIG - _____ PAYLOAD DEACT
AFT Cue Card [A]

C FLASH EVAP CONFIG/RAD BYP [4]

-01:55

If OPS 3:
TRANS DAP
AUTO
RT 0.5
DB 3.5

P CRT TIMER SETUP (Omit if BFS or OPS 3) [5]

P APU STEAM VENT HTR ACT [6]

-01:50

MS AFT HTR CONFIG AFT [7], 2-15

-01:45

P PLBD CLOSING (AUTO SEQ) (if reqd) [8]

-01:40

-01:35

UPLINK
PASS & BFS
TGT

-01:30

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PLBD CLOSING (AUTO SEQ) (if reqd) [8]

CAUTION
If SM GPC fails during PLBD operations:
R13L PL BAY DR SYS 1,2 (two) - DISABLE

If SM GPC reqd, and time permits, perform PASS SM GPC FAIL (ORB PKT, DPS)

When closing any PLBD latch group:
- If no CL after 40 sec c/l (60 sec bhd):
  1. with at least one microswitch closed indication, continue PLBD operations (use manual procedure)
  2. otherwise perform MAL, MECH, 9.1i
- If latches close on single mtr (40 sec c/l, 60 sec bhd), continue PLBD operations
- Always note any single mtr latch operation
- If no latch or door motion within ~10 sec after cmd (no motion determined visually), PL BAY DR - STOP, perform MAL, MECH, 9.1a

When closing PLBD:
If door motion stops and no RDY status, PL BAY DR - STOP, perform MAL, MECH, 9.1k
If door closes on single motor (~120 sec), do not reopen PLBD, prepare to deorbit

NOTE
Ref DETAILED PLBD CLOSING PROCEDURES (DEORB PREP, NOMINAL DEORBIT PREP) if reqd

P
R12L ✓CRT4 PWR - ON
CRT4 SM, OPS X02 PRO
[4: SM PL BAY DOORS]
R13L ✓PL BAY DR - STOP
PL BAY DR SYS 1,2 (two) - ENA
CRT4 AC POWER ON - ITEM 1 EXEC (*)
AUTO MODE SEL - ITEM 3 EXEC (*)
R13L PL BAY DR - CL

When required to visually check door clearances:
Start & stop PLBD until nearly closed. Determine c/l latch that will make first contact. If time permits, record this latch & its expected contact point on NO GO DIAGRAM, POST INSERT, 1-16

* If PLB DOOR FDA AND PORT (STBD) AFT LATCH *
* CLOSE MICRO-sw STATS are '0', go to step 24. *
* (DEORB PREP, CONTINGENCY PLBD CLOSE) *

When closed:
R13L PL BAY DR - STOP
CRT4 AC POWER OFF - ITEM 2 EXEC (*)
R13L PL BAY DR SYS 1,2 (two) - DISABLE
R12L CRT 4 PWR - OFF

OPS 2 TO 3 TRANSITION [9]

(Omit if BFS engaged or if already configured with G3 set)

* If IMU or RHC dilemma, do not proceed with OPS 3 Transition *

✓Att mnvr complete
✓RGA,AA,ASA,IMU (all) - ON

VERIFY CRT CONFIG
C2 ✓CRT PWR (three) - ON
R12L ✓CRT 4 PWR - OFF

VERIFY CONFIG/PWR UP GPC 3 & 5
O6 ✓GPC MODE 3 - HALT (tb-bp)
O6 GPC PWR 3,5 - ON
✓OUTPUT 1,2 - NORM (tb-gray)
✓3,5 - NORM (tb-bp)
✓4 - TERM (tb-bp)
✓MODE 1,2,4 - RUN (tb-RUN)
3 - STBY (tb-RUN)
5 - STBY (tb-RUN)

LOAD ENTRY TFL/RECONFIG UPLK

[2: SM 62 PCMMU/PL COMM]

C3 ✓OI PCMMU FORMAT - GPC
CRTX ✓SM COM BUFF 'RDY'
FRMT:
FXD - ITEM 1 EXEC
SEL ID - ITEM 3 + 1 0 5 EXEC
LOAD - ITEM 4 EXEC
- ✓RUN, CPLT
SEL ID - ITEM 3 + 1 6 4 EXEC
LOAD - ITEM 4 EXEC
- ✓RUN, CPLT
PGM - ITEM 2 EXEC

TRANSITION GPC 1 & 2 TO GNC OPS 3

[1: GNC 0 GPC MEMORY]

CONFIG - ITEM 1 + 3 EXEC
Modify MC 3 per Table →
GNC, OPS 301 PRO

[3: GNC DEORB MNVR COAST]

CONFIG GPC	3 12000
STR 1	1
2	2
3	2
4	1
PL 1/2	0
CRT 1	1
2	2
3	2
4	0
L 1	0
2	0
MM 1	1
2	2

SM CHECKPOINT/UL CNTL ENA

[1: SM 60 SM TABLE MAINT]

[2: SM 1 DPS UTILITY]

CRT2 MMU ASSIGN 2 SM - ITEM 4 EXEC
CRT1 CKPT INITIATE - ITEM 18 EXEC
✓Update of CKPT TIME and STATUS GOOD indicated
CRT2 MMU ASSIGN 1 SM - ITEM 3 EXEC
CRT1 CKPT INITIATE - ITEM 18 EXEC
✓Update of CKPT TIME and STATUS GOOD indicated
CRT2 CKPT RETRV ENA - ITEM 12 EXEC (*)
UL CNTL ENA - ITEM 36 EXEC

TRANSITION BFS GPC TO GNC OPS 3

C3 BFC CRT DISP - ON
✓SEL - 3 + 1

[3: BFS, GNC BFS MEMORY]

O6 GPC OUTPUT 5 - B/U (tb-bp)
CRT3 ✓TFL ENA - ITEM 29 (*)
BFS, GNC OPS 301 PRO

[3: BFS, GNC DEORB MNVR COAST]

TRANSITION GPC 1,2,3,4 TO GNC OPS 3

SM, OPS 000 PRO (releases payload buses)

[SM GPC MEMORY]

O6 GPC OUTPUT 4 - NORM (tb-gray)
MODE 3,5 (two) - RUN (tb-RUN)

✓CONFIG - ITEM 1 + 3 EXEC
Modify MC 3 per Table →
C3 BFC CRT DISP - OFF
GNC, OPS 301 PRO

[1: GNC DEORB MNVR COAST]

BFC CRT DISP - ON
CRT3 BFS, GNC OPS 000 PRO
BFS, GNC OPS 301 PRO

CONFIG GPC	3 12340
STR 1	1
2	2
3	3
4	4
PL 1/2	1
CRT 1	1
2	2
3	3
4	0
L 1	0
2	0
MM 1	1
2	2

LAND SITE UPDATE

[1: GNC 50 HORIZ SIT]

SEL SITE (See LAND SITE DATA)

LOAD IN TGTs

[1: GNC DEORB MNVR COAST]

* If MCC cannot provide DEORB TGT, use SPOC *
✓PASS and BFS TGT per DEORBIT MNVR PAD (ENT, MNVR PADS) or SPOC
LOAD - ITEM 22 EXEC
TIMER - ITEM 23 EXEC
✓PASS and BFS solution per DEORBIT MNVR PAD (ENT, MNVR PADS)
BURN ATT, HA, HP
ΔVTOT
TGO

VERIFY MC 9 TABLE (GNC 9) FOR POST LANDING

[2: GNC 0 GPC MEMORY]

✓CONFIG - ITEM 1 + 9 EXEC
Modify MC 9 per Table →
CONFIG - ITEM 1 + 3 EXEC

CONFIG GPC	9 12340
STR 1	1
2	2
3	3
4	4
PL 1/2	1
CRT 1	1
2	2
3	3
4	0
L 1	1
2	2
MM 1	1
2	2

1: SM TABLE MAINT | 2: SM ANTENNA | 3: BFS, GNC DEORB MNVR COAST

TIG

-01:30

If OPS 2:
A1(B1)
AUTO
NORM
RT 0.2
DB 5.0

C,P OPS 2 TO 3 TRANSITION [9]
(Omit if BFS engaged or if already configured with G3 set)

-01:25

If OPS 3:
TRANS DAP
AUTO
RT 0.5
DB 3.5

C L1 ✓H2O PUMP LOOP 1 - OFF, B

P AUTO MNVR TO BURN ATT (MCC update ATT)
MNVR per DEORBIT MNVR PAD (ENT, MNVR PADS)

R — — —
P — — —
Y — — —

-01:20

MS PRE INGRESS AFT CONFIG AFT [10], 2-15

-01:15

C,P PRE INGRESS FORWARD CONFIG [11]

-01:10

ENTRY SWITCH LIST/VER, 3-1 to 3-32

NOTE Deltas to SW LIST

A12 APU TK/FU LINE/H2O SYS HTRS will be in A AUTO vs B AUTO position

R2 APU FUEL PUMP/VLV COOL A will be in AUTO position

L1 NH3 CNTLR A(B) - PRI/GPC

-01:05

MS SECURE MIDDECK MID [12], 2-17

-01:00

21

PRE INGRESS FORWARD CONFIG [11]

MLS CH/TACAN CH

O8 ✓MLS CH tw (three) - See LAND SITE DATA
MLS (three) - ON
O7 TACAN MODE (three) - GPC

SSME HYD REPRESS PREP

C3 ✓FCS CH (four) - AUTO
O17:A ATVC (four) - ON

CONTROL FOR ENTRY

F6/F8 ✓INST PWR (two) - FLT, ON
O14:E cb MNA DDU AFT - op
O16:E cb MNC DDU AFT - op

TIG

-01:00

TRANS DAP
AUTO
RT 0.5
DB 3.5

L5,R6 COMM PWR - OFF

C,P Disconnect, stow Wireless Headsets (if reqd)

C,P SEAT INGRESS

-00:55

-00:50

-00:45

-00:40

UPLINK
PASS & BFS
SV & REL
(INRTL
& REF)

P Stow ORBIT PKT, ORBIT Cue Cards,
& DEORBIT PREP

-00:35

Go to FINAL DEORB UPDATE/UPLINK
(ENT C/L, DEORBIT BURN) with following pen and ink
to ENT MNVR Cue Card: V = 12K, delete:
RAD BYP VLV MODE (two) - AUTO
CNTLR LOOP (two) - AUTO B(A)

-00:30

MS LAUNCH DAY DEORBIT PREP AFT DECK CONFIGURATION (ORBIT 3)

NOTE
Wait for GO from CDR or PLT before starting any activity on this page

TIME (TIG-)	MS AFT ACTIONS
02:22	SEAT EGRESS
02:21	APU TK/FU LINE HTR ACT [1]
02:20	SPOC UNSTOW/SETUP/ACTIVATION (Flight deck SPOC) SPOC Cue Card
02:11	UNSTOW/DON WIRELESS HEADSETS (if reqd)
01:50	AFT HTR CONFIG [7]
01:49	PAYLOAD DEACT [A]
01:19	PRE INGRESS AFT CONFIG [10]

APU TK/FU LINE HTR ACT [1]

A12 APU HTR TK/FU LINE/H2O SYS 1A,2A,3A - AUTO

AFT HTR CONFIG [7]

A12 HYD HTR (eight) - OFF
A14 RCS/OMS HTR FWD RCS - OFF
L POD (two) - A OFF, ✓B OFF
R POD (two) - A OFF, ✓B OFF
OMS CRSFD LINES (two) - B AUTO, ✓A AUTO
FWD, AFT RCS JET 1,2,3,4 (eight) - AUTO
5 (two) - OFF
R12U ✓FC PURGE VLVS (three) - GPC
✓HTR - GPC
✓H2O LINE HTR - A AUTO

NOTE
MCC command FC PURGE HTR off if reqd

PAYLOAD DEACT [A]

RESTOW IUS (UMBILICAL ATTACHED) (CLOSEOUT - STEP 13)
(IUS DPY, CONTINGENCY OPS)

PRE INGRESS AFT CONFIG [10]

ENTRY COMM CONFIG

A15 DC UTIL PWR MNC - OFF
PS COMM CCU PWR - R
L9, R10 ✓MS,PS AUD PWR - AUD/TONE
A/G (two) - T/R
A/A - T/R
ICOM (two) - T/R
VOX SENS - R
VOL tw (five) - R
XMIT/ICOM MODE - R(PTT/VOX recommended)

H2O STORAGE SYS CONFIG

R12L ✓SPLY H2O XOVR VLV - ctr (tb - OP)

RESET C/W

R13U		
PARAMETER NAME	C/W CH	UPPER LIMIT
FREON LOOP EVAP OUT T1	107	1.90V/64.8 deg
T2	117	1.90V/64.8 deg

A16 ✓Secure

R10 ✓MS LTG FLOOD as reqd

FOOT LOOP CONFIG

Tape foot loops in egress routes

23

MS LAUNCH DAY DEORBIT PREP MIDDECK CONFIGURATION (ORBIT 3)

NOTE
WAIT FOR GO FROM CDR OR PLT BEFORE STARTING ANY ACTIVITY ON THIS PAGE

TIME (TIG-)	MS MIDDECK ACTIONS
02:22	SEAT EGRESS
02:14	PRESS H2O TK A [3]
02:11	UNSTOW/DON WIRELESS HEADSETS (if reqd)
01:05	SECURE MIDDECK [12]

PRESS H2O TK A [3]

ML26C SPLY H2O GN2 TK VENT vlv - PRESS
TK A SPLY vlv - OPEN

SECURE MIDDECK [12]

ENTRY COMM CONFIG

MO39M	✓MIDDECK COMM CCU PWR	- ON
MO42F	MIDDECK SPKR AUD PWR	- AUD/TONE
	A/G (two)	- T/R
	A/A	- T/R
	ICOM (two)	- T/R
	VOX SENS	- R
	VOL tw (five)	- R
	XMIT/ICOM MODE	- R

Stow: Comm Equip
Wireless Headsets
✓LOCKERS secure
MO13Q ✓MIDDECK FLOODS as reqd

FOOT LOOP CONFIG

Tape foot loops in egress routes

MS LAUNCH DAY DEORBIT PREP MIDDECK CONFIGURATION (ORBIT 3)

NOTE
WAIT FOR GO FROM CDR OR PLT BEFORE STARTING ANY ACTIVITY ON THIS PAGE

TIME (TIG-)	MS MIDDECK ACTIONS
02:22	SEAT EGRESS
02:14	PRESS H2O TK A [3]
02:11	UNSTOW/DON WIRELESS HEADSETS (if reqd)
01:05	SECURE MIDDECK [13]

PRESS H2O TK A [3]

ML26C SPLY H2O GN2 TK VENT vlv - PRESS
TK A SPLY vlv - OPEN

SECURE MIDDECK [13]

ENTRY COMM CONFIG

MO39M ✓MIDDECK COMM CCU PWR - ON
MO42F MIDDECK SPKR AUD PWR - AUD/TONE
A/G (two) - T/R
A/A - T/R
ICOM (two) - T/R
VOX SENS - R
VOL tw (five) - R
XMIT/ICOM MODE - R

Stow: Comm Equip
Wireless Headsets
✓LOCKERS secure
MO13Q ✓MIDDECK FLOODS as reqd

FOOT LOOP CONFIG

Tape foot loops in egress routes

25

LEFT SEAT

L5..... 3-2
L4..... 3-2
L1..... 3-3
F3..... 3-3
L,R HUD..... 3-3
L2..... 3-4

F1..... 3-4
F2..... 3-5
F6..... 3-5
F7..... 3-5

C2..... 3-6
C3..... 3-6

O1..... 3-7
O2..... 3-7
L side OVHD flood..... 3-7
O5..... 3-7
O6..... 3-8
O7..... 3-8
O13..... 3-9
O14..... 3-9
O15..... 3-9

RIGHT SEAT

O16..... 3-10
O17..... 3-10
O8..... 3-11
O9..... 3-11
R side OVHD flood..... 3-11
O3..... 3-12

F4..... 3-12

RIGHT SEAT (Cont)

F8..... 3-12
F9..... 3-12
R1.....TEMP 3-13
R2.....TEMP 3-14
R4.....TEMP 3-14
R6.....TEMP 3-14

AFT

O19..... 3-15
C6..... 3-15
C5..... 3-15
C7..... 3-15

R10..... 3-16
R12U,L..... 3-16
R13U,L..... 3-17
R15..... 3-17

A1U,L,R..... 3-18
A4..... 3-19
A3..... 3-19
A6U..... 3-19
A7U,L..... 3-19
A8U,L..... 3-20
A2..... 3-21
A11..... 3-21
A12..... 3-21
A13..... 3-21
A14..... 3-22
A15..... 3-22

L9..... 3-22
L10/IUS..... 3-23
L11/IUS..... 3-24
L11.....TEMP 3-25
L12.....TEMP 3-25

MIDDECK-FWD

MO42F..... 3-27
MO58F..... 3-27
MO32M..... 3-27
MO39M..... 3-27
MO69M..... 3-27
MO29J..... 3-27
MO52J..... 3-27
MO30F..... 3-27
MO62M..... 3-27
ML86B..... 3-28
MD44F..... 3-29
MD24K..... 3-29

MIDDECK-AFT

MA73C..... 3-28
MA75H(TAGS)..... 3-28
MO13Q..... 3-29
ML18F..... 3-29
ML26C..... 3-29
ML31C..... 3-29
MO10W..... 3-30
WCS..... 3-30

AIRLOCK

AW18A..... 3-31
AW18D..... 3-31
AW18H..... 3-31
AW82A..... 3-31
AW82B..... 3-31
AW82D..... 3-31
AW82H..... 3-31
AIRLOCK HATCH..... 3-32

LEGEND

up — R - as reqd

center — ● - cb close

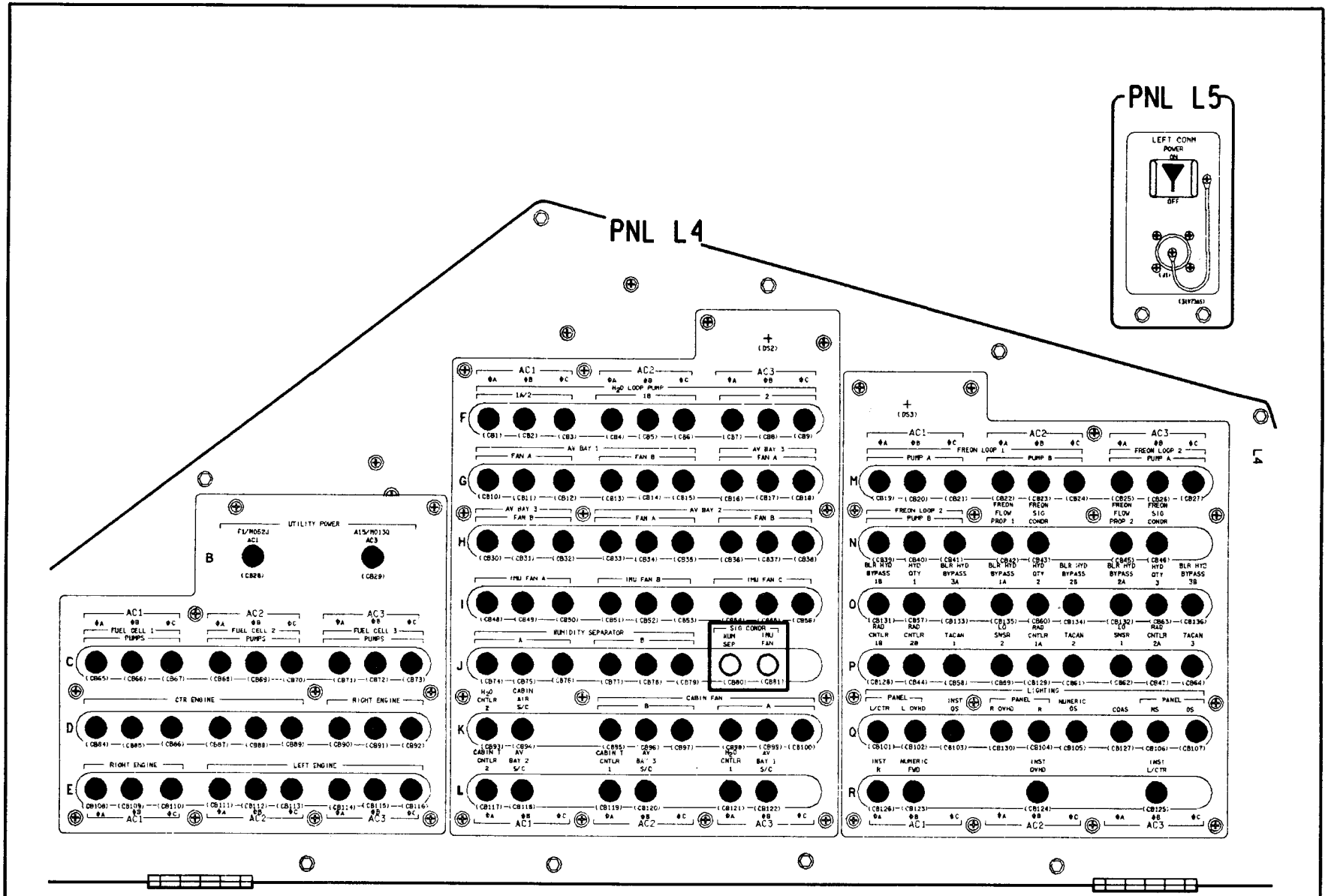
down — ○ - cb open

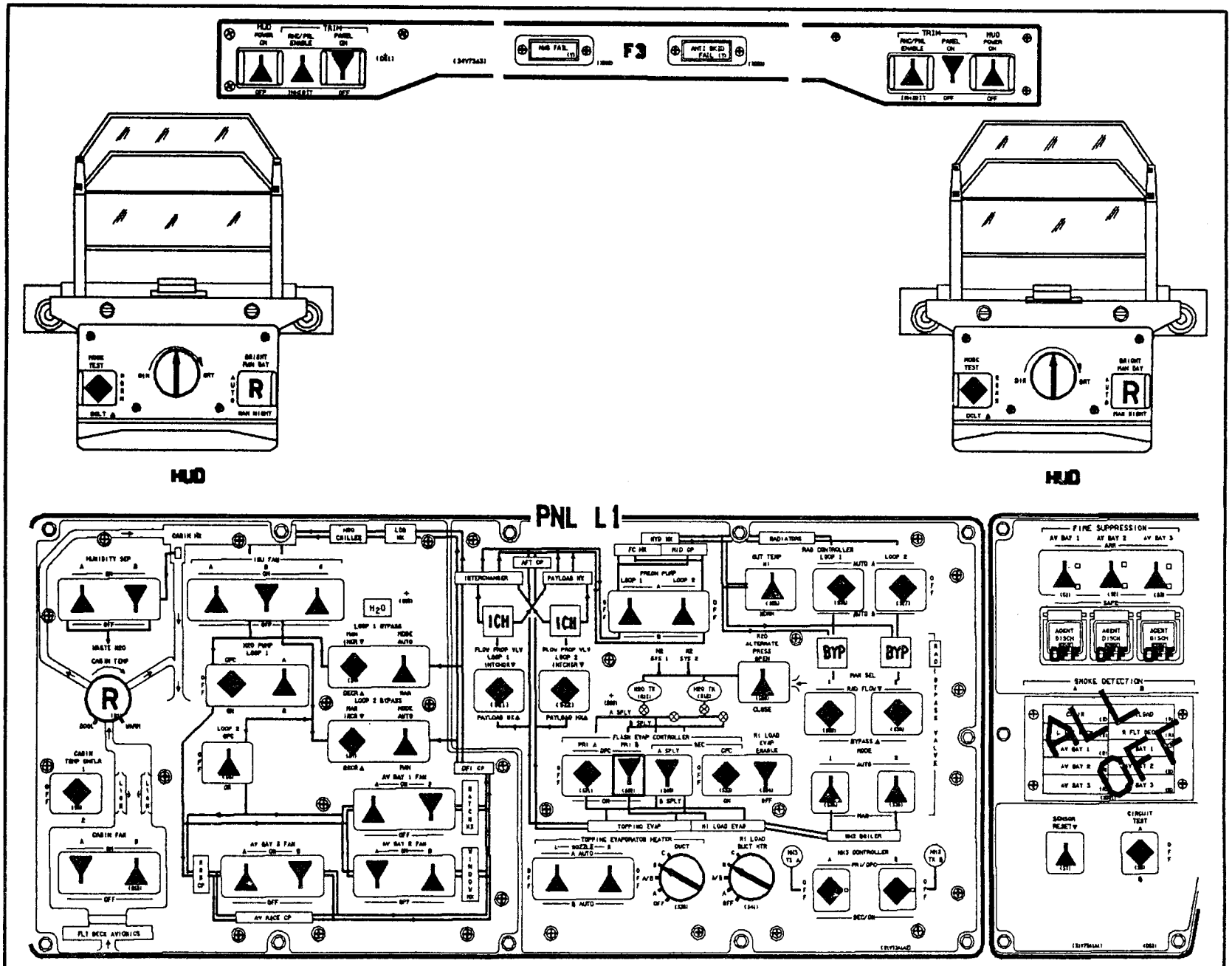
▒ - indicates switch/display not cked during ENTRY SWITCH LIST/VERIFICATION

▭ - indicates switch is CONFIGURED during ENTRY SWITCH LIST/VERIFICATION

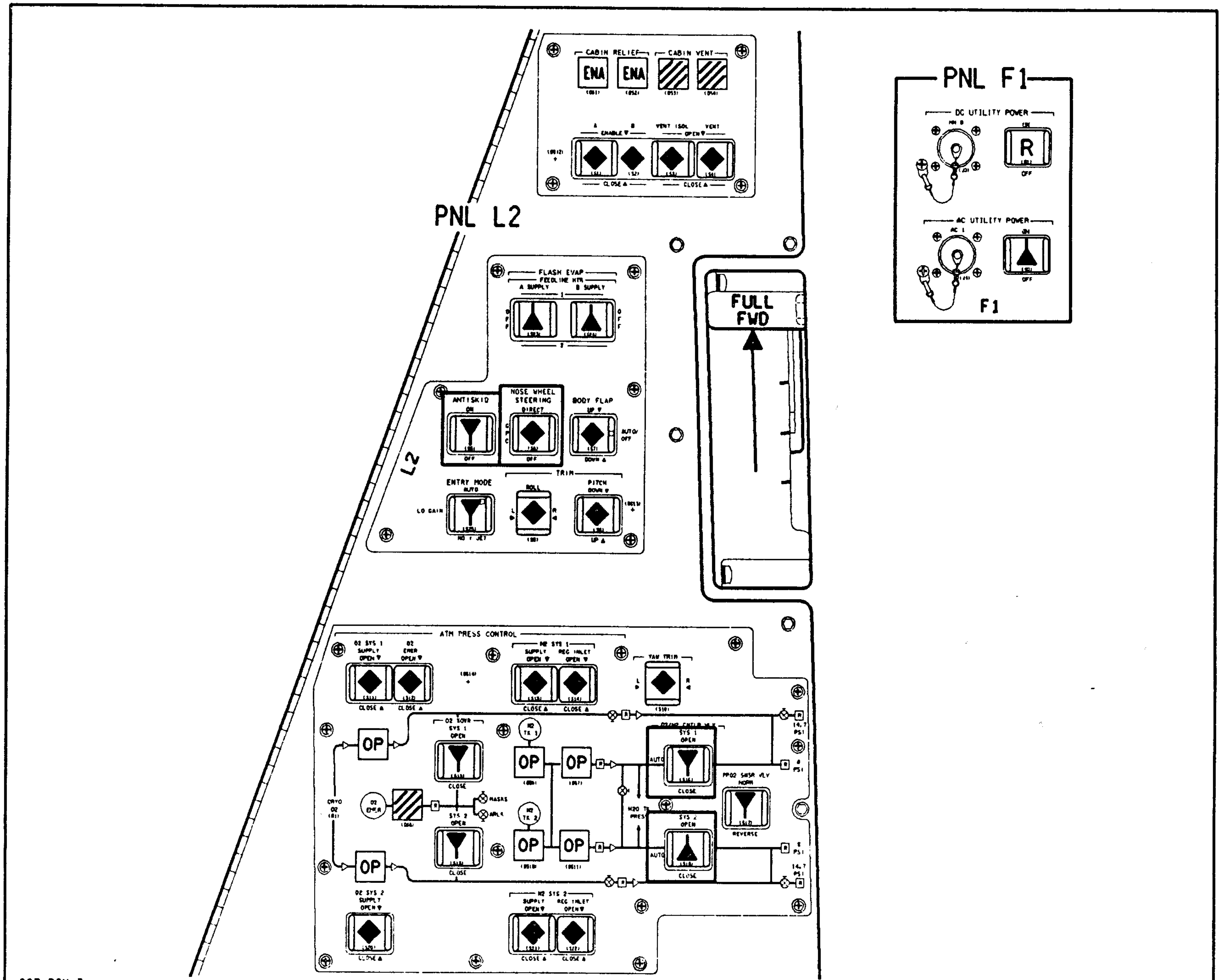
CIRCUIT BREAKER SNAPRING COLOR CODES

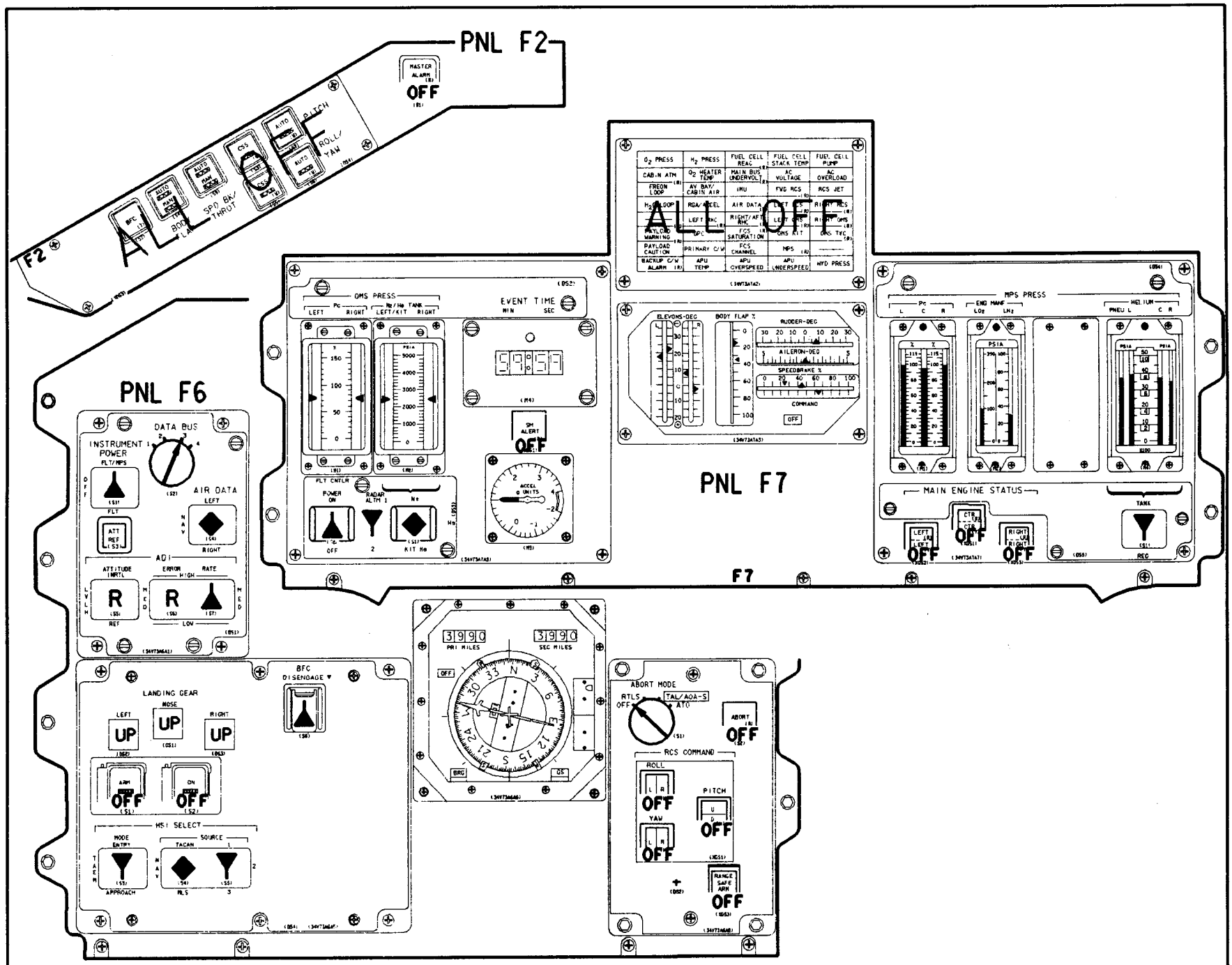
COLOR	CONFIGURATION
Red	Open at all times
Green	Open on orbit only
Yellow	Open ascent, close per procedure
Orange	Open orbit through entry
Blank (no ring)	Always closed or as required

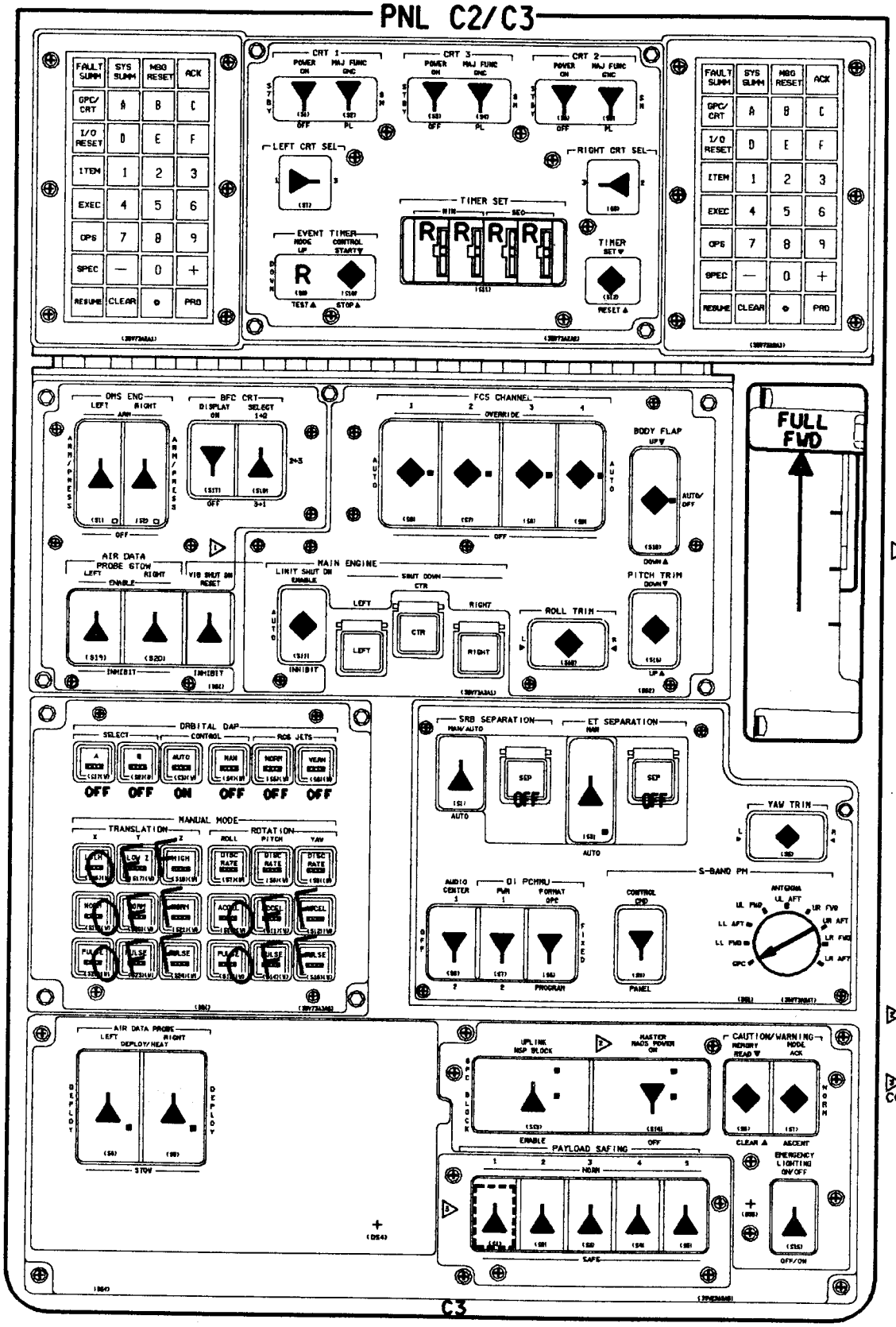

PNL L5
LEFT CONN
POWER
ON
OFF
PNL L4
L4
UTILITY POWER
AC1
AC2
AC3
FUEL CELL 1 PUMPS
FUEL CELL 2 PUMPS
FUEL CELL 3 PUMPS
CTR ENGINE
RIGHT ENGINE
LEFT ENGINE
H2O LOOP PUMP
AV BAY 1 FAN A
AV BAY 1 FAN B
AV BAY 2 FAN A
AV BAY 2 FAN B
AV BAY 3 FAN A
AV BAY 3 FAN B
IMU FAN A
IMU FAN B
IMU FAN C
HUMIDITY SEPARATOR
SIG CONDR
CABIN FAN
FREON LOOP 1 PUMP A
FREON LOOP 1 PUMP B
FREON LOOP 2 PUMP A
FREON LOOP 2 PUMP B
LIGHTING


F3
HUD
HUD
PNL L1
ALL OFF

29


PNL L2
CABIN RELIEF
CABIN VENT
ENA
ENA
PNL F1
DC UTILITY POWER
R
AC UTILITY POWER
F1
FLASH EVAP
FULL FWD
ANTISKID
NOSE WHEEL STEERING
BODY FLAP
L2
ENTRY MODE
TRIM
ROLL
PITCH
ATM PRESS CONTROL
OP
OP
OP
OP
OP
OP


PNL F2
MASTER ALARM
OFF
ALL OFF
PITCH
ROLL/YAW
SPD BK/THRUST
BODY FLAP
PNL F6
DATA BUS
INSTRUMENT POWER
AIR DATA
ATT REF
ADI
ATTITUDE
ERROR
RATE
HIGH
LOW
PNL F7
OMS PRESS
EVENT TIME
FLT CNTLR
POWER ON
RADAR ALTM
KIT
ELEVONS-DEG
BODY FLAP %
RUDDER-DEG
AILERON-DEG
SPEEDBRAKE %
COMMAND
MPS PRESS
MAIN ENGINE STATUS
TANK
F7
LANDING GEAR
NOSE
LEFT
RIGHT
UP
ARM
ON
BFC DISENGAGE
HSI SELECT
MODE ENTRY
SOURCE
TACAN
APPROACH
PRI MILES
SEC MILES
ABORT MODE
RTLS
TAL/AOA-S
ATO
ABORT
RCS COMMAND
ROLL
PITCH
YAW
RANGE SAFE ARM



△ ON OV102 ONLY

△ MASTER OEX POWER ON OV102 ONLY

△ POSSIBLE CONFIGURATION

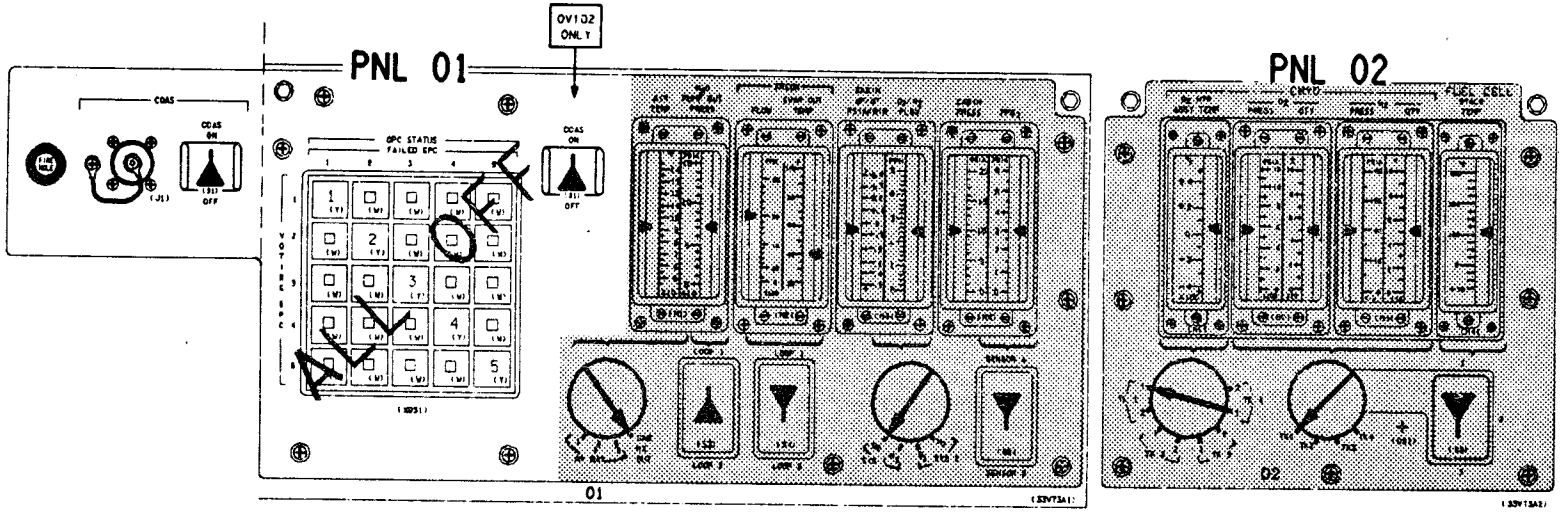
RTG PWR

ALT

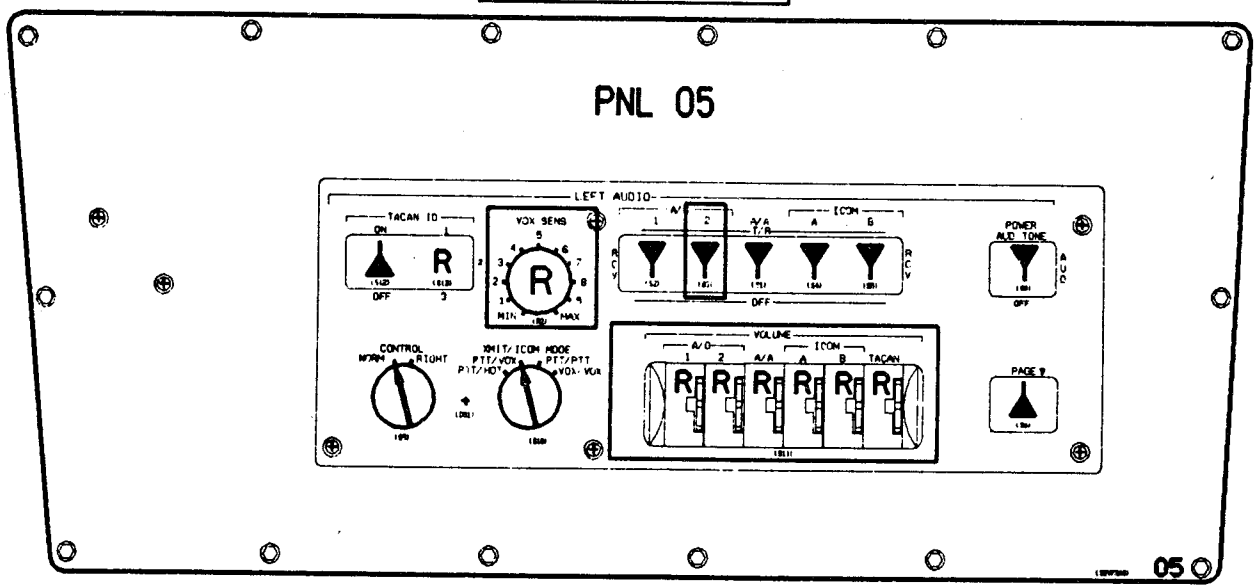
ALL VEH/DATE 01/12/88
C D/O/ALL/GEN

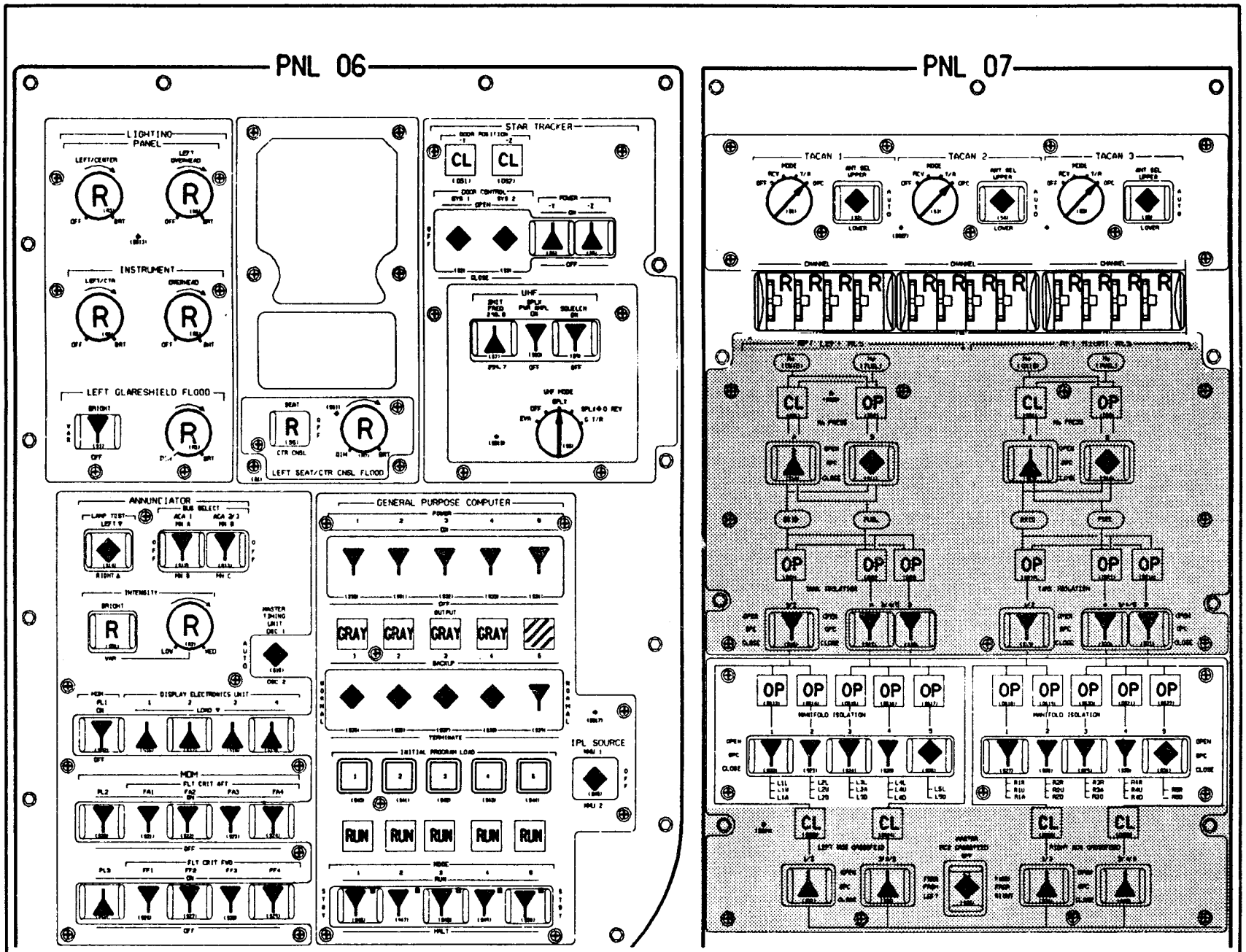
ENTRY 3-6

024.DGN, 10

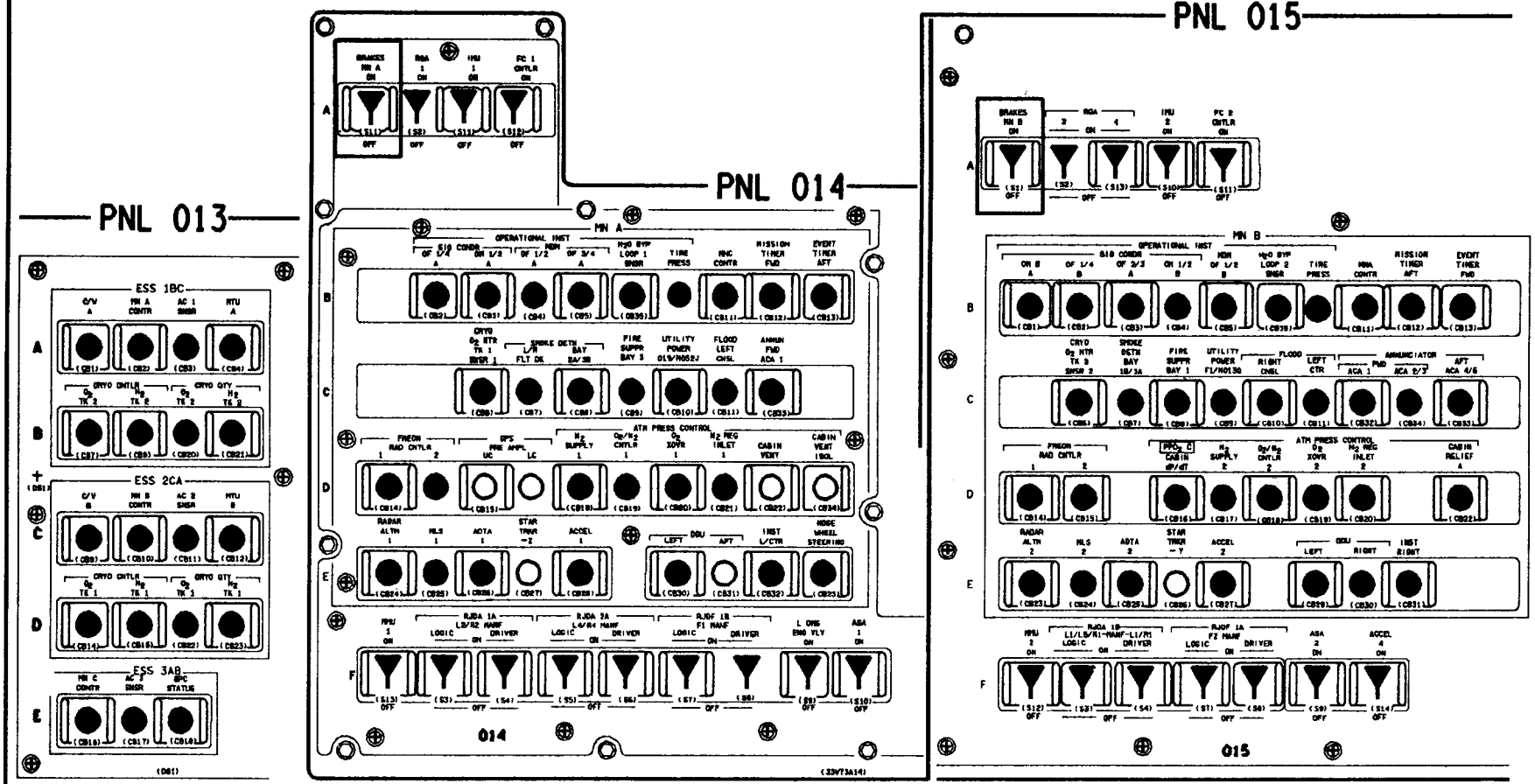


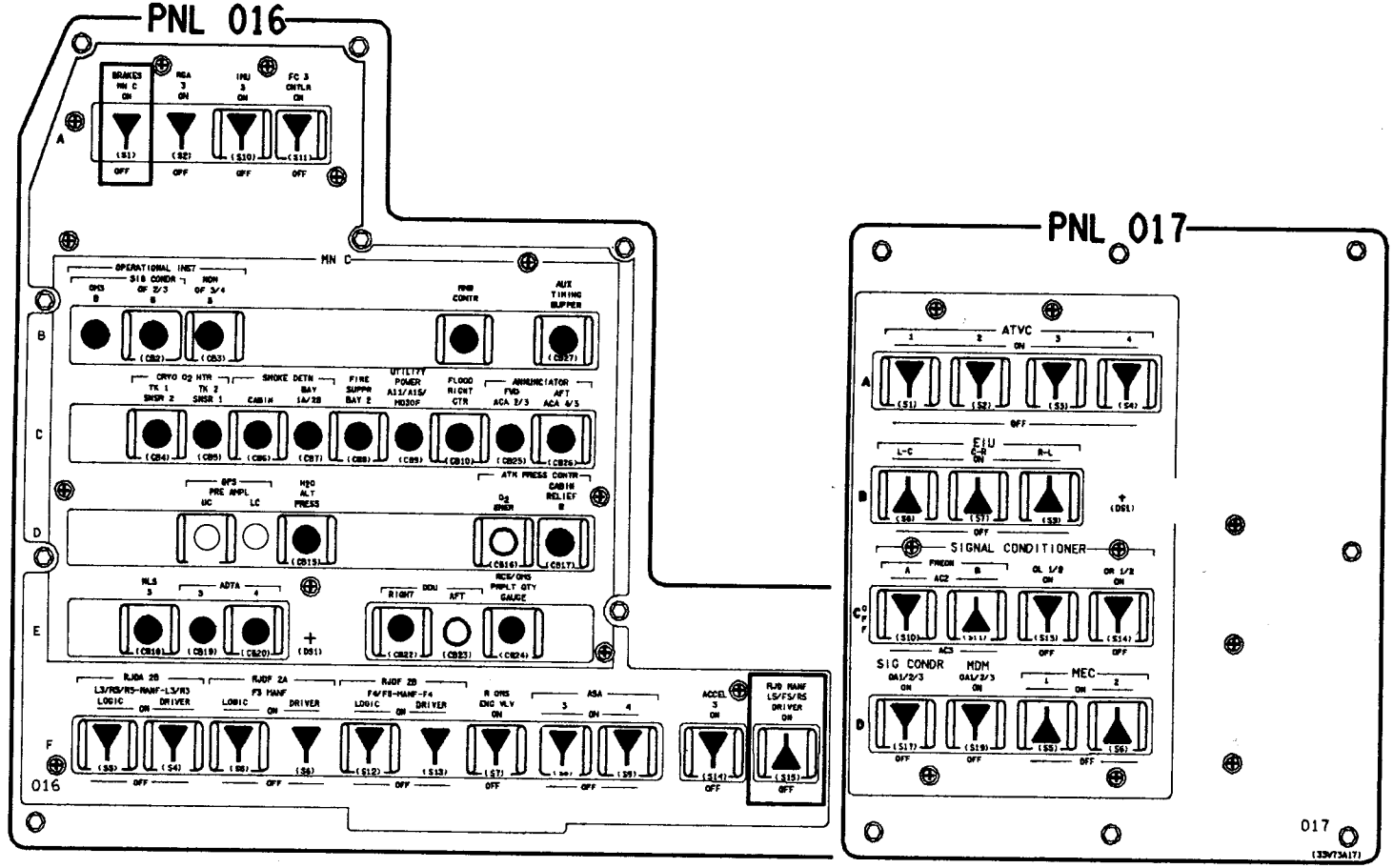
L side OVHD flood - R (MID)



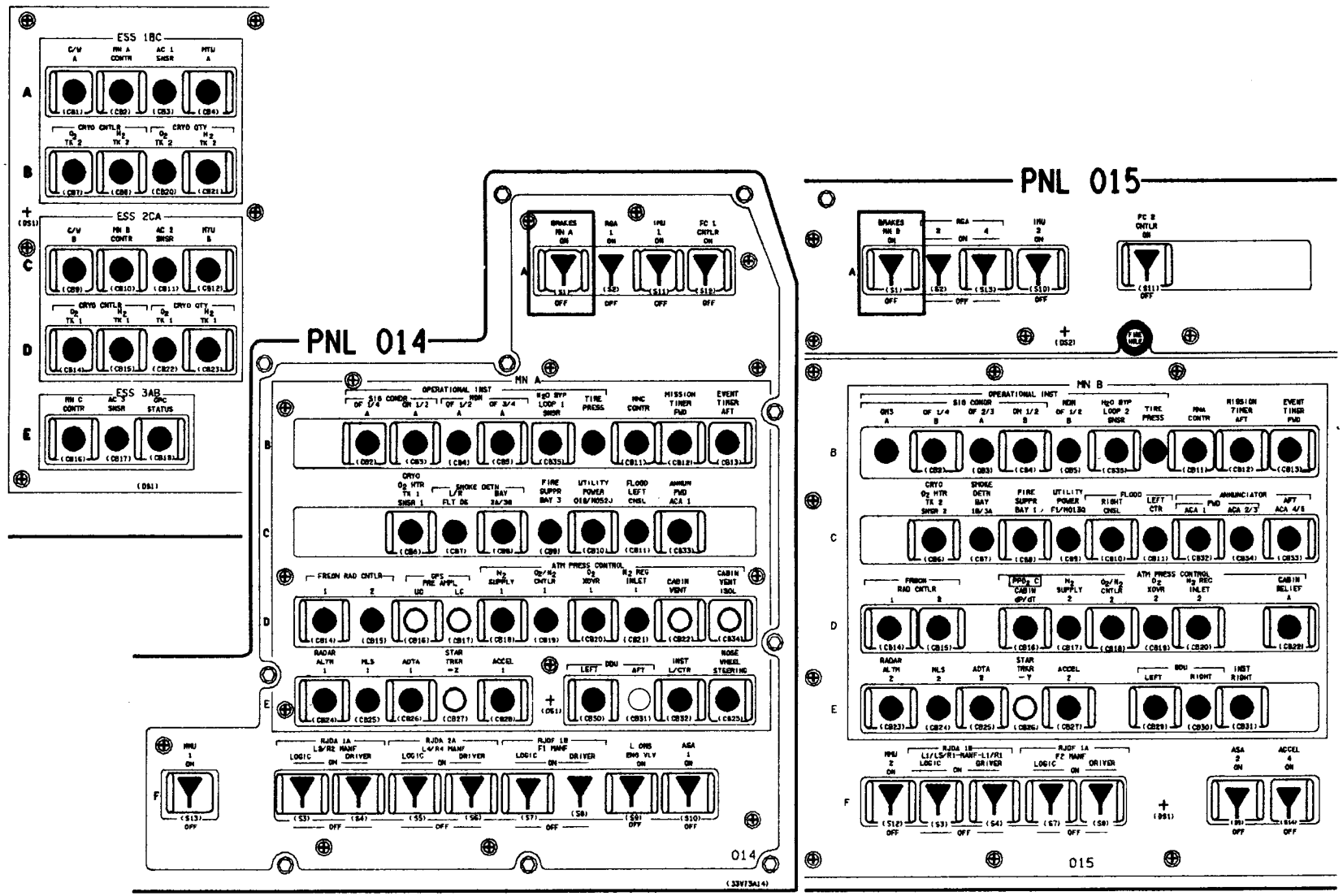

PNL 06
PNL 07
LIGHTING PANEL
INSTRUMENT
LEFT GLARESHIELD FLOOD
LEFT SEAT/CTR CNSL FLOOD
STAR TRACKER
UHF
ANNUNCIATOR
GENERAL PURPOSE COMPUTER
IPL SOURCE
TACAN 1
TACAN 2
TACAN 3
CHANNEL
MANIFOLD ISOLATION

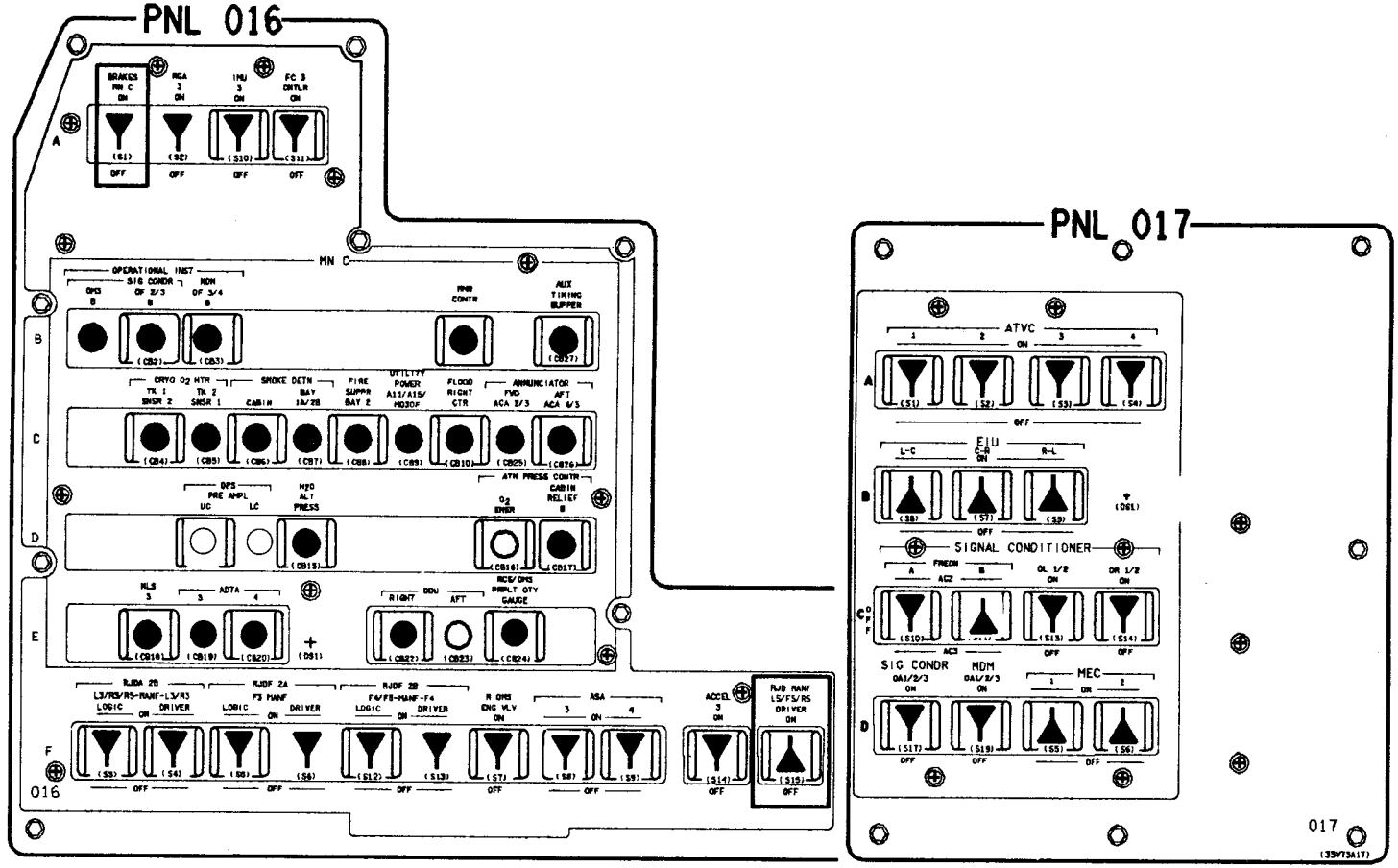
OV103/OV104

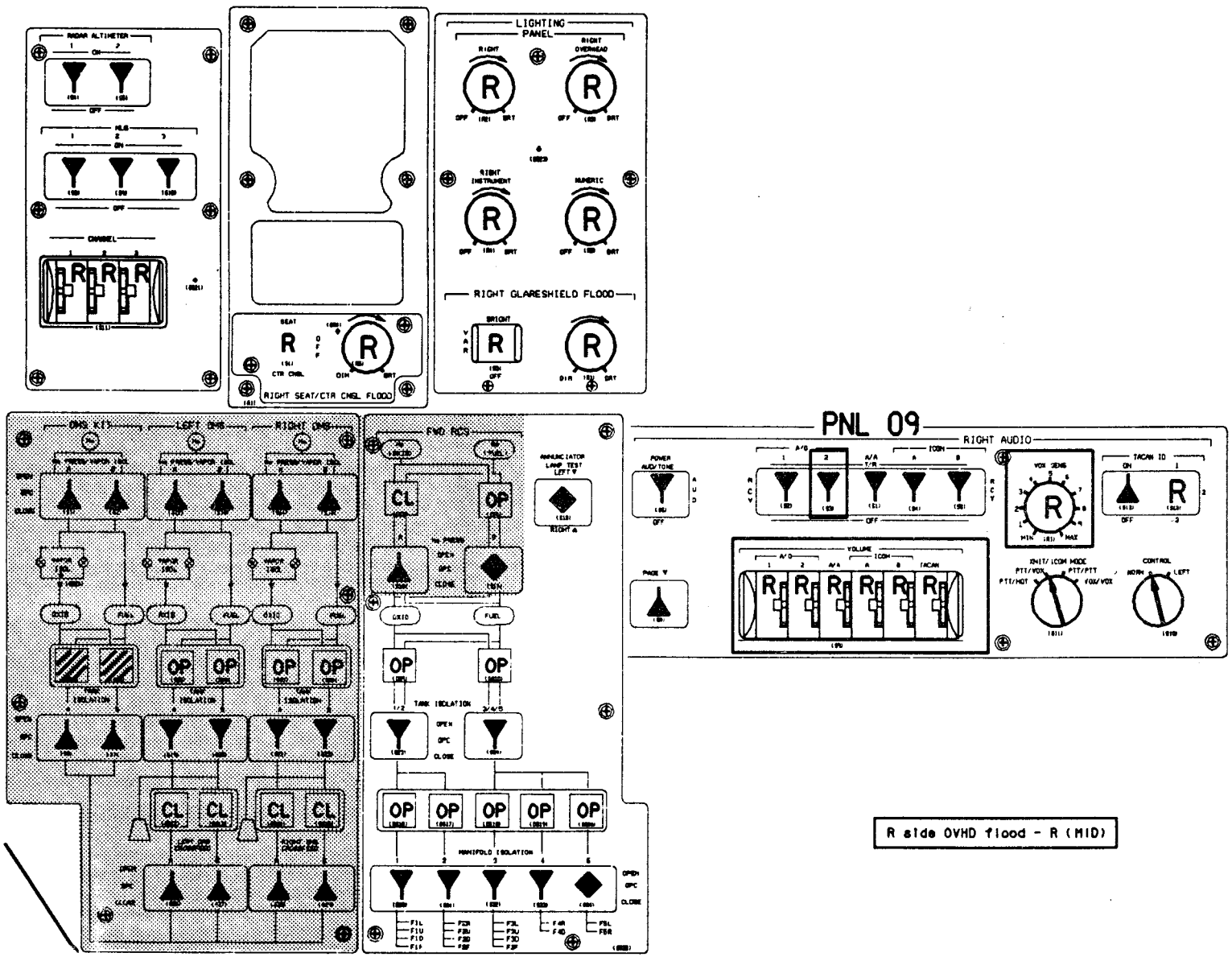


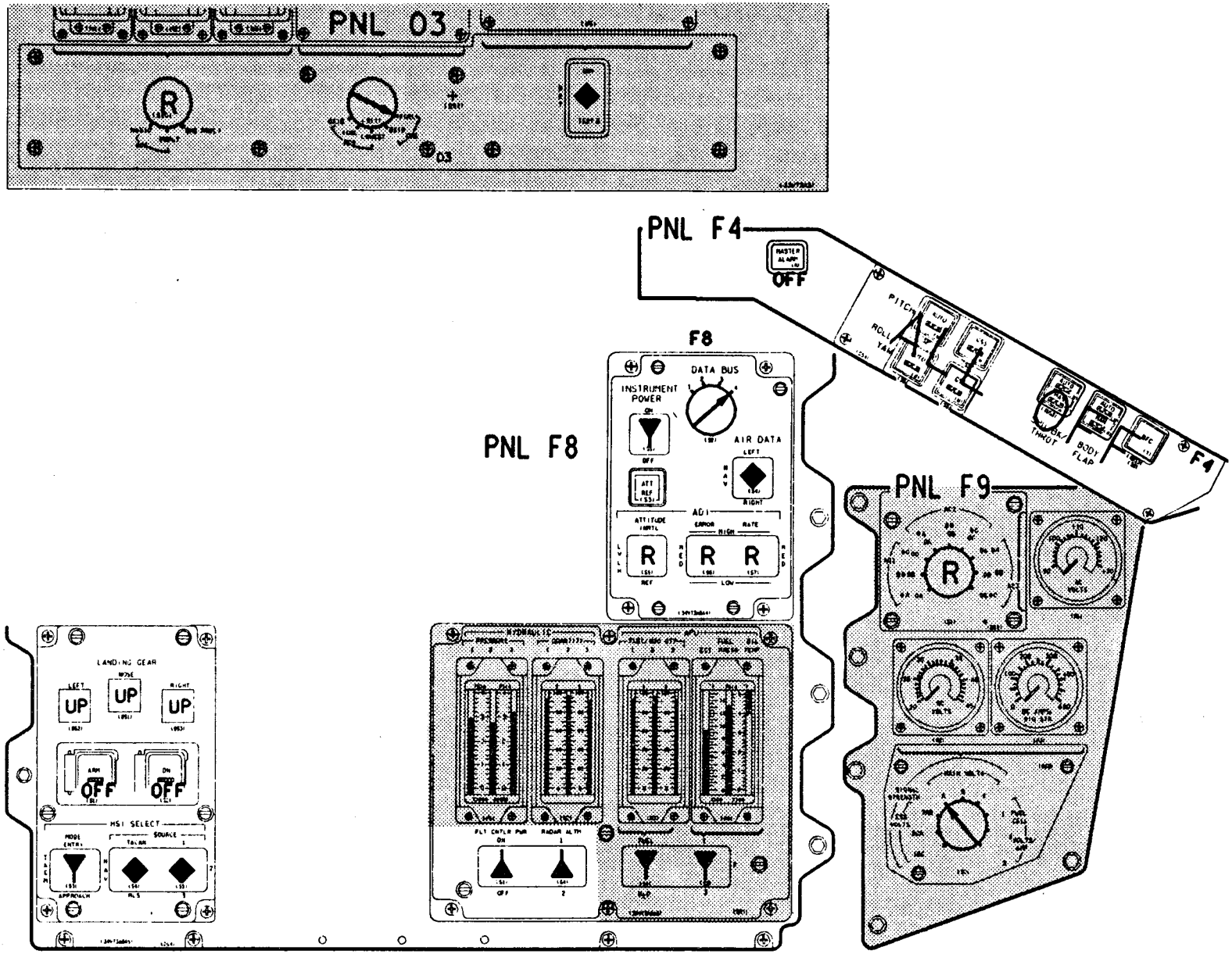

PNL 016
PNL 017
MN C
ATVC
SIGNAL CONDITIONER
SIG CONDR
MDM
MEC
016
017

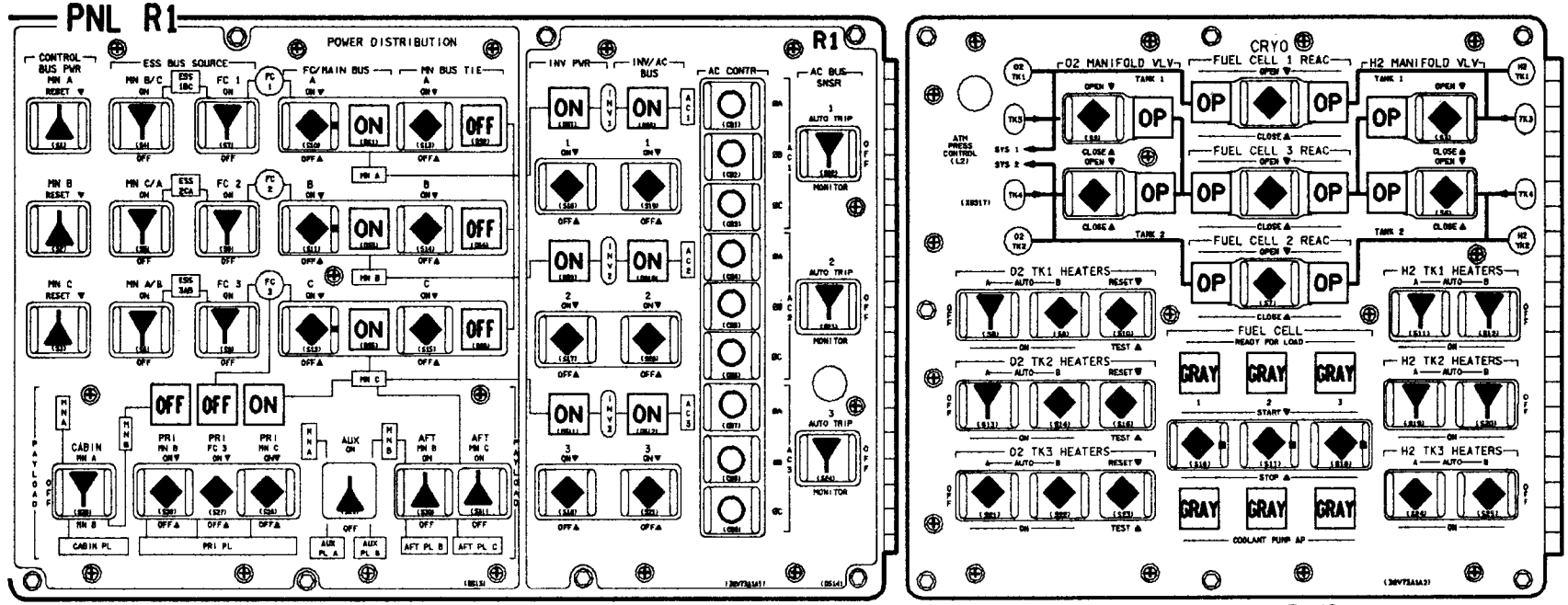
OV102

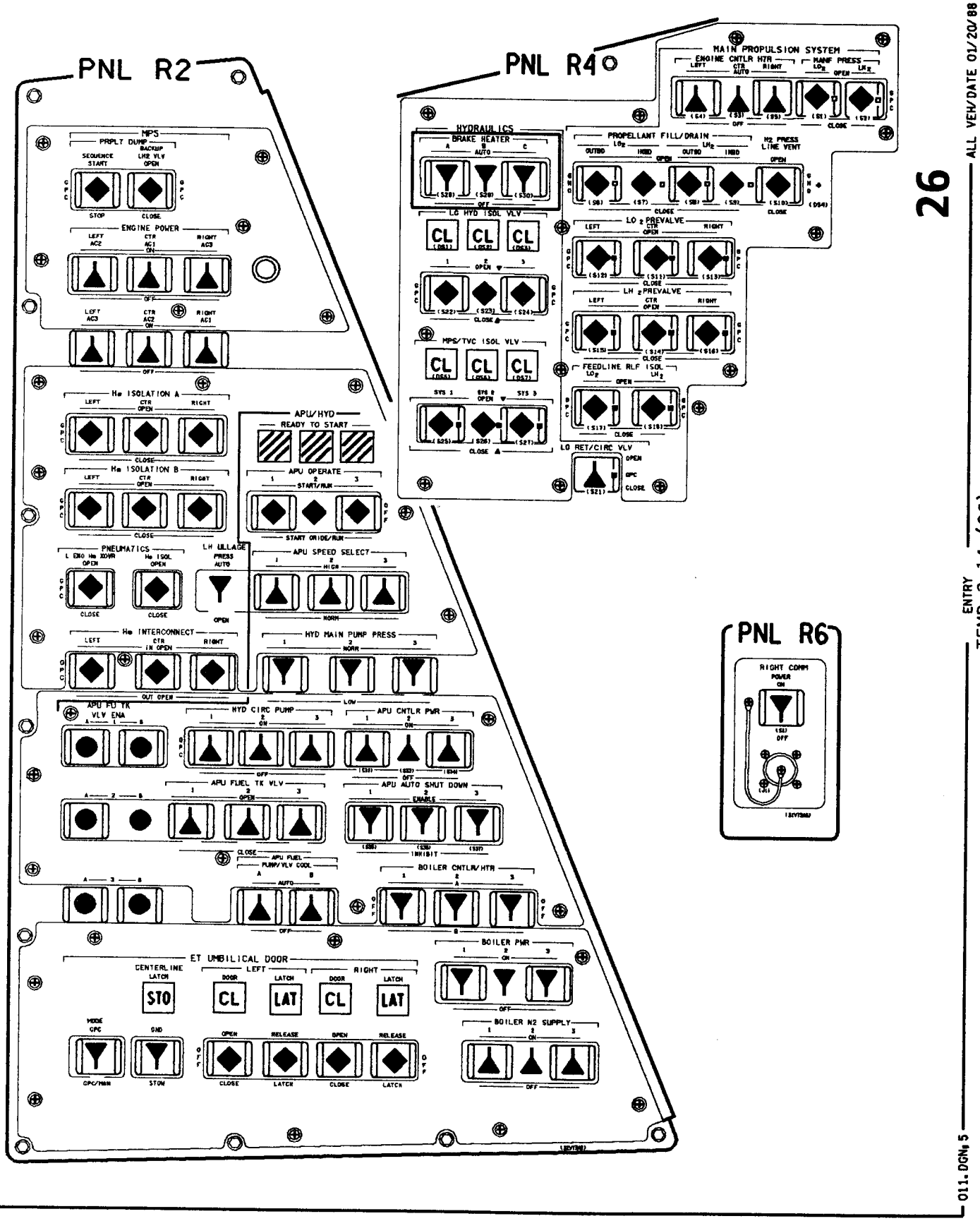



PNL 016
BRAKES MN C ON
RGA 3 ON
IMU 3 ON
FC 3 CNTLR ON
(S1)
(S2)
(S10)
(S11)
OFF
MN C
OPERATIONAL INST
SIG CONDR
MDM
AUX TIMING BUFFER
RNG CONTR
(CB2)
(CB3)
(CB27)
CRYO O2 HTR
SMOKE DETN
FIRE SUPPR
UTILITY POWER
FLOOD LIGHT CTR
ANNUNCIATOR
TK 1
TK 2
SNSR 2
SNSR 1
CABIN
BAY 1&2B
BAY 2
A13/A15/ MD30F
FWD
AFT
ACA 2/3
ACA 4/5
(CB4)
(CB5)
(CB6)
(CB7)
(CB8)
(CB9)
(CB10)
(CB25)
(CB26)
OPS
PRE AMPL
UC
LC
MPD ALT PRESS
ATM PRESS CONTR
O2 ENBR
CABIN RELIEF B
(CB13)
(CB16)
(CB17)
MLS
ADTA
RCS/OMS PRPLT QTY GAUGE
RIGHT
AFT
(CB18)
(CB19)
(CB20)
(CB22)
(CB23)
(CB24)
(D51)
RJDA 2B
RJDF 2A
RJDF 2B
L3/RS/RS-MANF-L3/R3
F3 MANF
F4/F8-MANF-F4
LOGIC
DRIVER
R OMS ENG VLV
ASA
ACCEL
RJD MANF L5/F5/R5 DRIVER
(S3)
(S4)
(S5)
(S6)
(S12)
(S13)
(S7)
(S8)
(S9)
(S14)
(S15)
016
PNL 017
ATVC
(S1)
(S2)
(S3)
(S4)
EIU
L-C
C-R
R-L
(S8)
(S7)
(S9)
(D51)
SIGNAL CONDITIONER
FREON
A
B
AC2
OL 1/2
OR 1/2
(S10)
(S13)
(S14)
SIG CONDR
MDM
MEC
(S17)
(S19)
(S5)
(S6)
017
(35V73A17)


PNL 08
RADAR ALTIMETER
LIGHTING PANEL
RIGHT
RIGHT OVERHEAD
RIGHT INSTRUMENT
NUMERIC
RIGHT GLARESHIELD FLOOD
BRIGHT
RIGHT SEAT/CTR CNSL FLOOD
PNL 09
RIGHT AUDIO
OMS KIT
LEFT OMS
RIGHT OMS
FWD RCS
TANK ISOLATION
MANIFOLD ISOLATION
R side OVHD flood - R (MID)


PNL 03
PNL F4
OFF
PITCH
ROLL
YAW
THROT
BODY FLAP
F4
F8
PNL F8
DATA BUS
INSTRUMENT POWER
AIR DATA
LEFT
RIGHT
ATT REF
ATTITUDE
ERROR
RATE
HIGH
LOW
R
PNL F9
LANDING GEAR
LEFT
NOSE
RIGHT
UP
ARM
OFF
HSI SELECT
MODE
SOURCE
APPROACH
HYDRAULIC
FLT CNTLR PWR
RADAR ALTM


PNL R1
POWER DISTRIBUTION
CONTROL BUS PWR
ESS BUS SOURCE
FC/MAIN BUS
MN BUS TIE
MN A
MN B
MN C
FC 1
FC 2
FC 3
ON
OFF
CABIN
PRI MN B
PRI FC 3
PRI MN C
AUX
AFT MN B
AFT MN C
CABIN PL
PRI PL
AUX PL A
AUX PL B
AFT PL B
AFT PL C
R1
INV PWR
INV/AC BUS
AC CONTR
AC BUS SNSR
AUTO TRIP
MONITOR
CRYO
O2 MANIFOLD VLV
FUEL CELL 1 REAC
FUEL CELL 3 REAC
FUEL CELL 2 REAC
H2 MANIFOLD VLV
O2 TK1 HEATERS
O2 TK2 HEATERS
O2 TK3 HEATERS
H2 TK1 HEATERS
H2 TK2 HEATERS
H2 TK3 HEATERS
FUEL CELL
READY FOR LOAD
GRAY
COOLANT PUMP AP
OP
TANK 1
TANK 2
OPEN
CLOSE
AUTO
RESET
TEST
START
STOP

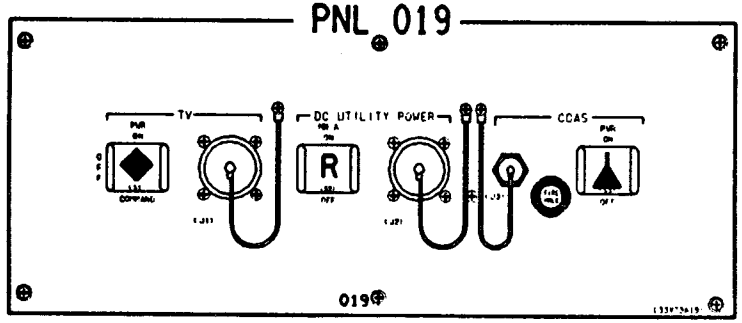


ALL VEH/DATE 01/20/88
C D/0/26/GEN

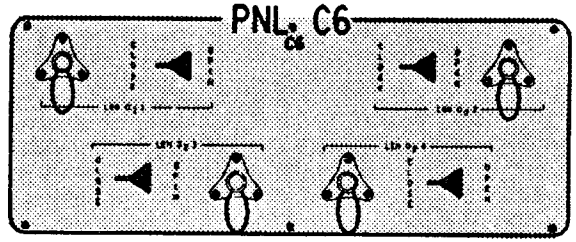
ENTRY
TEMP 3-14 (26)

011.DGN; 5

PNL 019

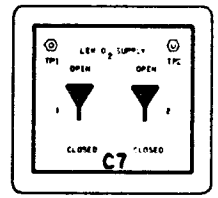


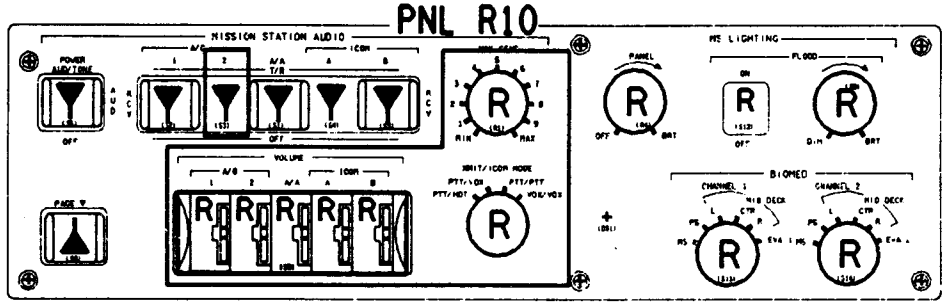
PNL C6

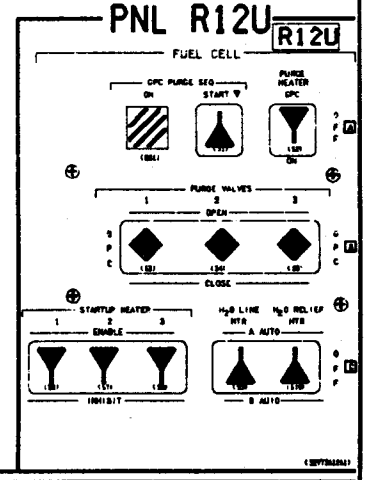


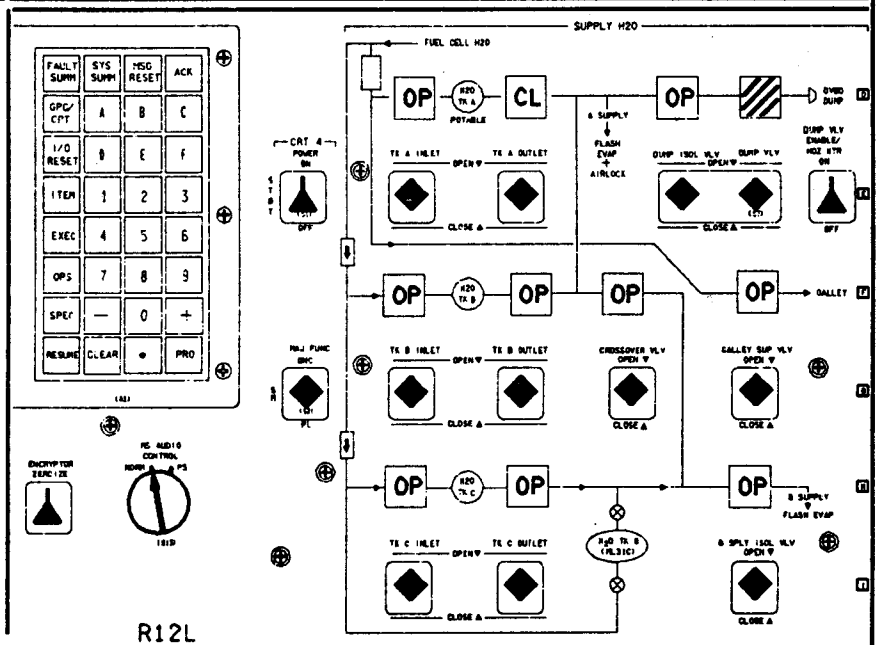
PNL C5

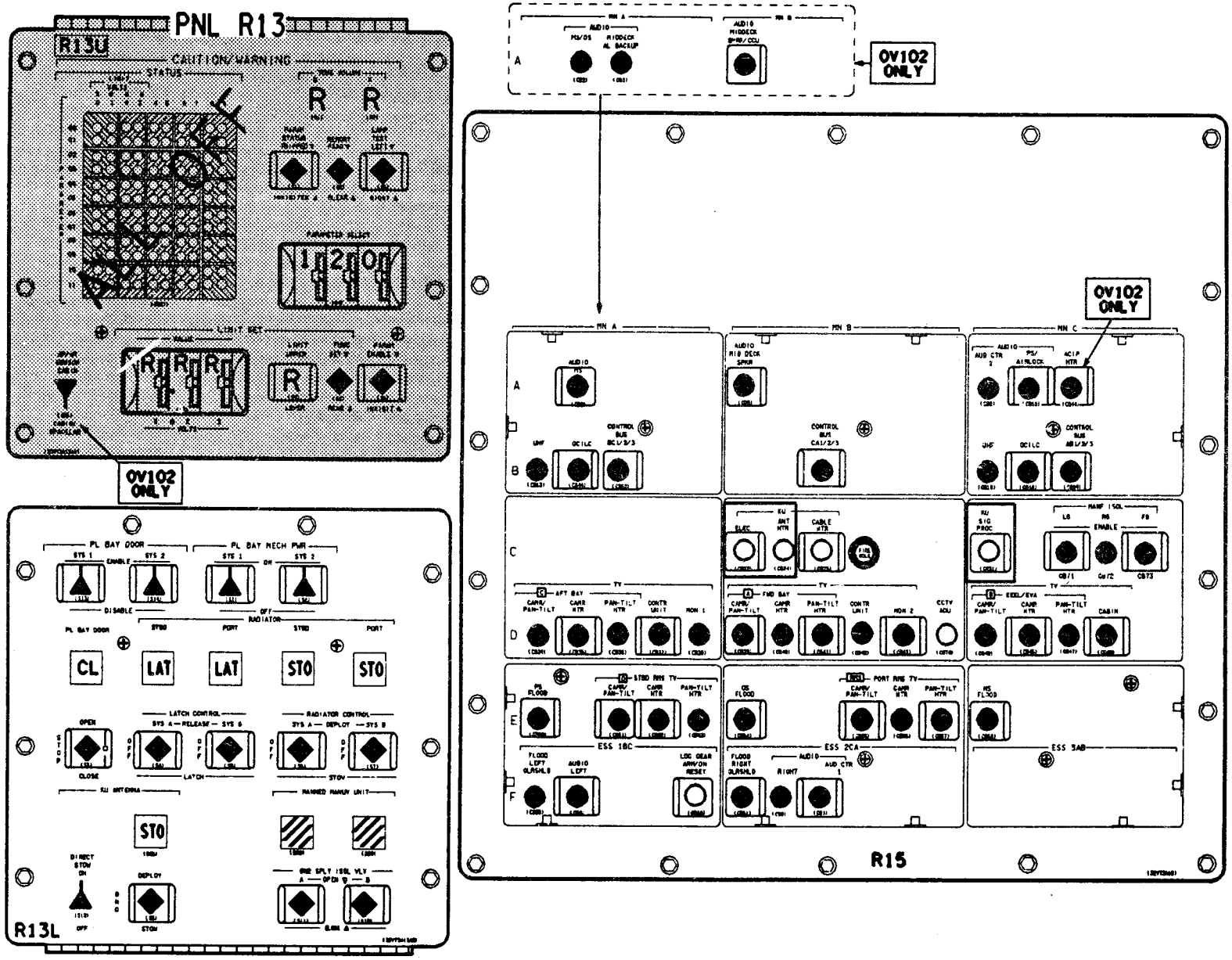
PNL C7

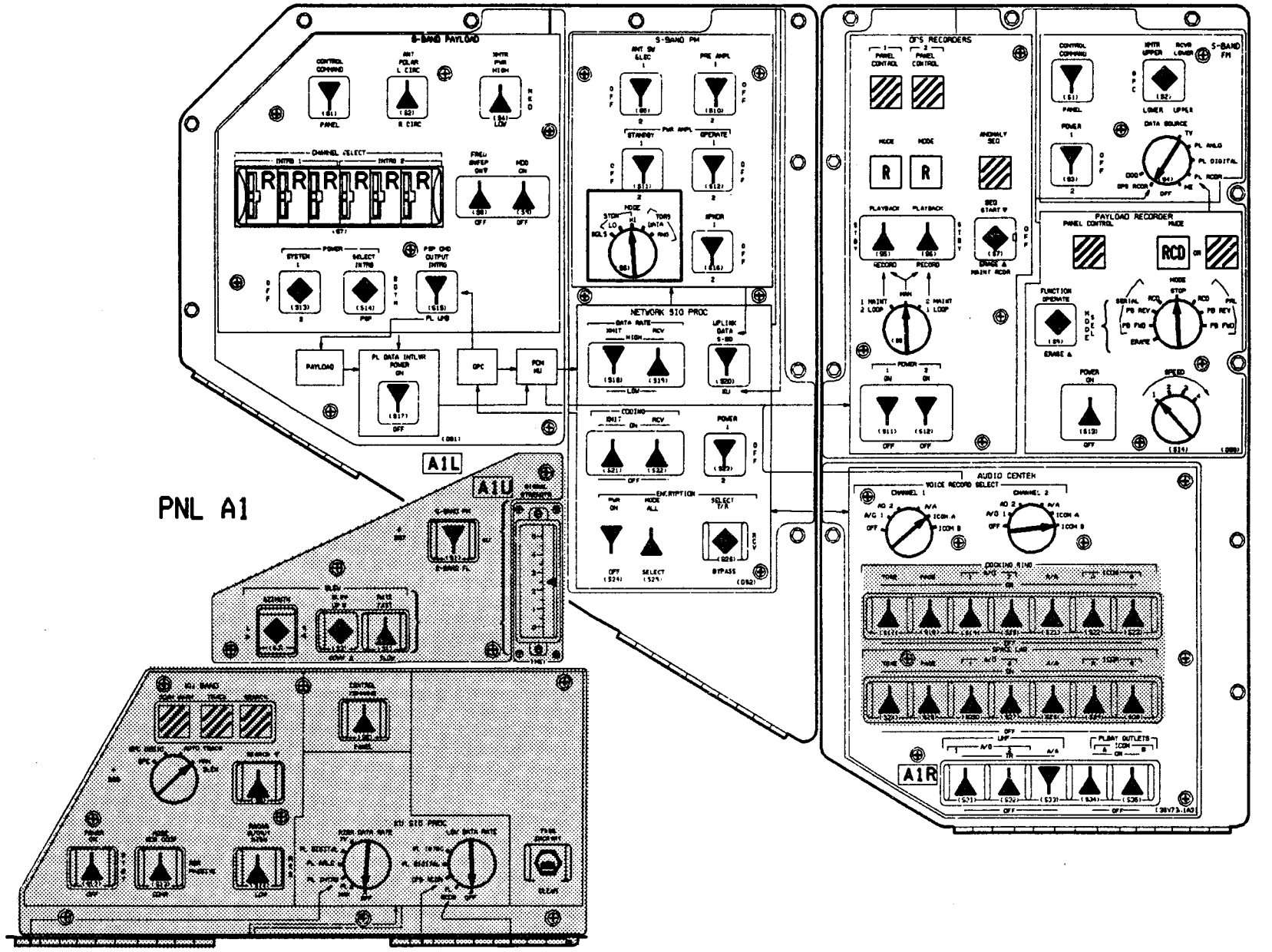


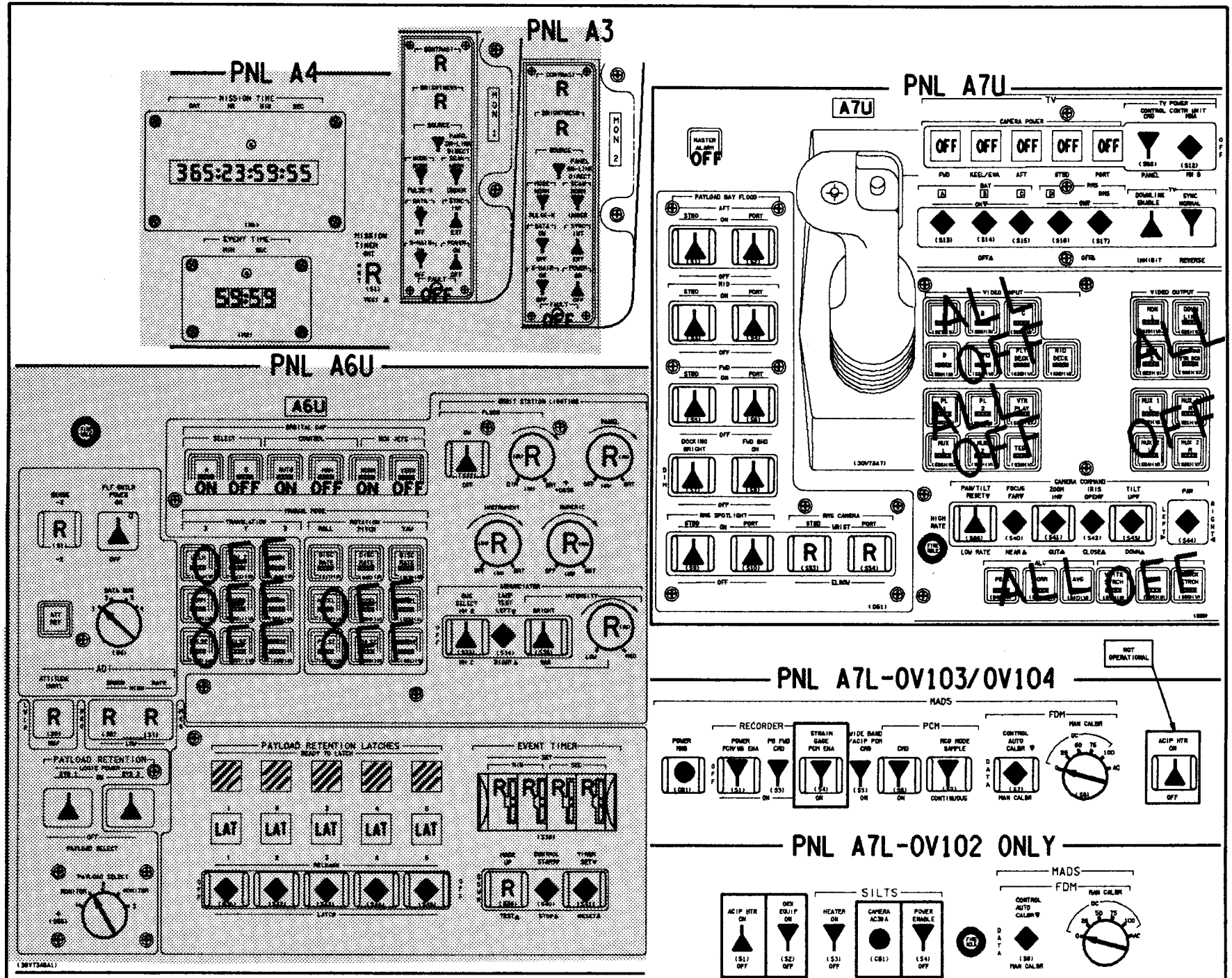

PNL R10
MISSION STATION AUDIO
MS LIGHTING
VOLUME
BIOMED

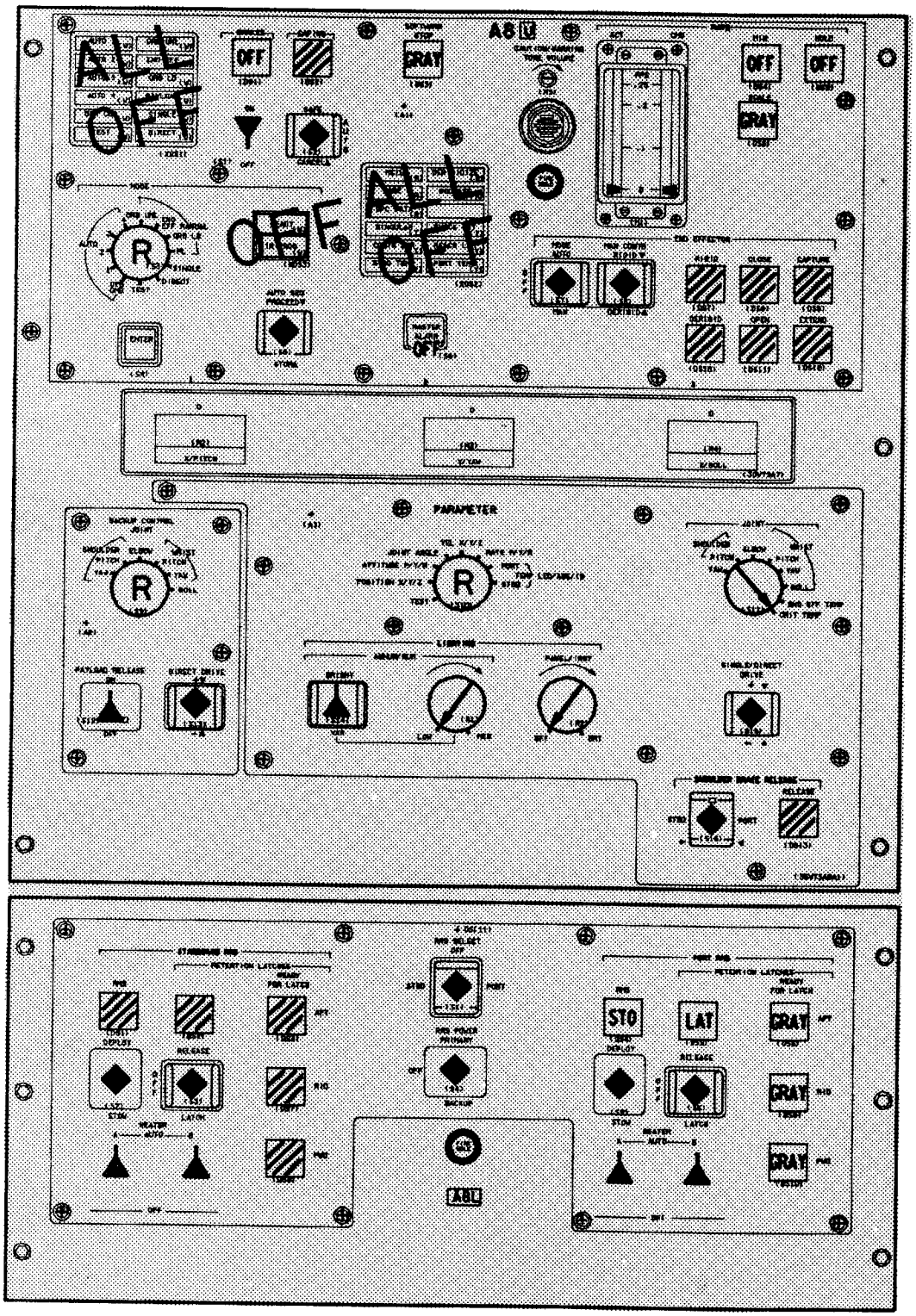

PNL R12U
R12U
FUEL CELL
PURGE VALVES
STARTUP HEATER
ENABLE
INHIBIT
A AUTO
B AUTO

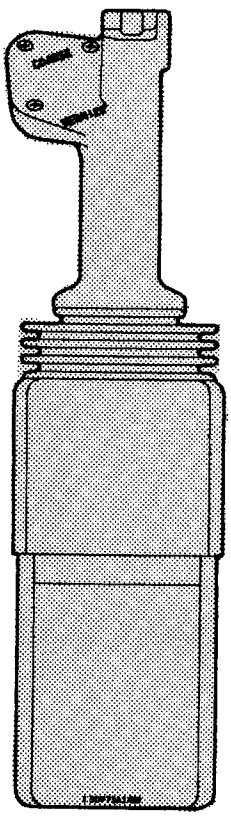

FAULT SUMM
SYS SUMM
MSG RESET
ACK
CLEAR
SUPPLY H2O
FUEL CELL H2O
OP
CL
CAT 4 POWER
R12L


PNL R13
R13U
CAUTION/WARNING
STATUS
0V102 ONLY
0V102 ONLY
R13L
R15
PL BAY DOOR
PL BAY MECH PWR
CL
LAT
LAT
STO
STO
STO
MN A
MN B
MN C
ESS 1BC
ESS 2CA
ESS 3AB


PNL A1
A1L
A1U
A1R
S-BAND PAYLOAD
S-BAND PM
NETWORK SIG PROC
OFS RECORDERS
PAYLOAD RECORDER
AUDIO CENTER
KU SIG PROC


PNL A3
PNL A4
365:23:59:55
55:59
PNL A7U
A7U
MASTER ALARM OFF
PAYLOAD BAY FLOOD
CAMERA POWER
OFF OFF OFF OFF OFF
FWD KEEL/EWA AFT STBD PORT
PANEL
VIDEO INPUT
VIDEO OUTPUT
CAMERA COMMAND
PAN/TILT RESET/F
FOCUS FAR/V
ZOOM HI/F
IRIS OPEN/F
TILT UP/V
PAN
HIGH RATE
LOW RATE
NEAR
OUT
CLOSE
DOWN
ALL OFF
PNL A6U
A6U
ON OFF ON OFF ON OFF
PAYLOAD RETENTION LATCHES
EVENT TIMER
LAT
PNL A7L-0V103/0V104
NOT OPERATIONAL
MADS
RECORDER
PCM
FDM
MAN CALIB
ACIP HTR ON
OFF
PNL A7L-0V102 ONLY
SILTS
ACIP HTR ON
OFF
HEATER ON
CAMERA AC39A
POWER ENABLE
CONTROL AUTO CALIB
MAN CALIB

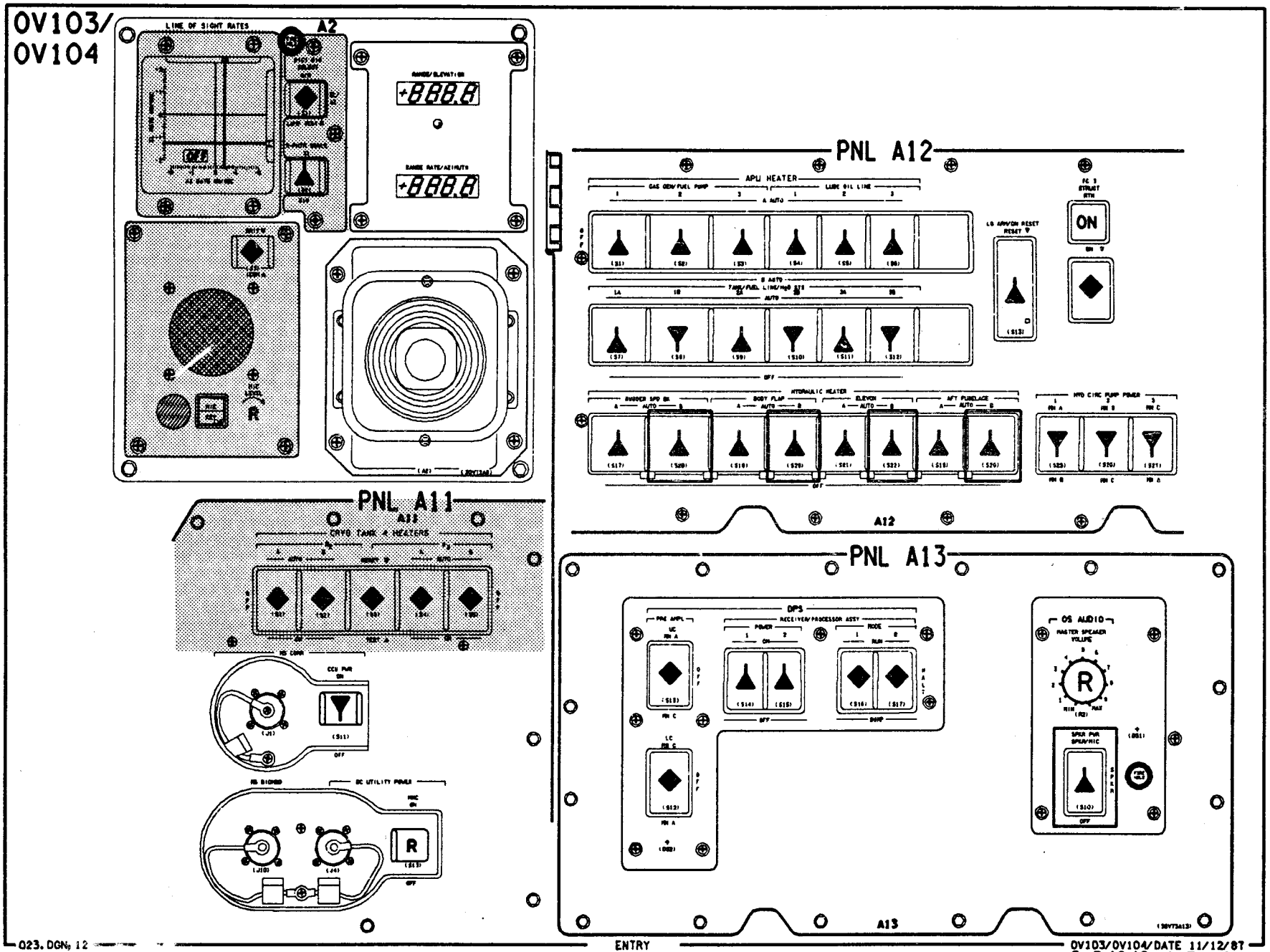


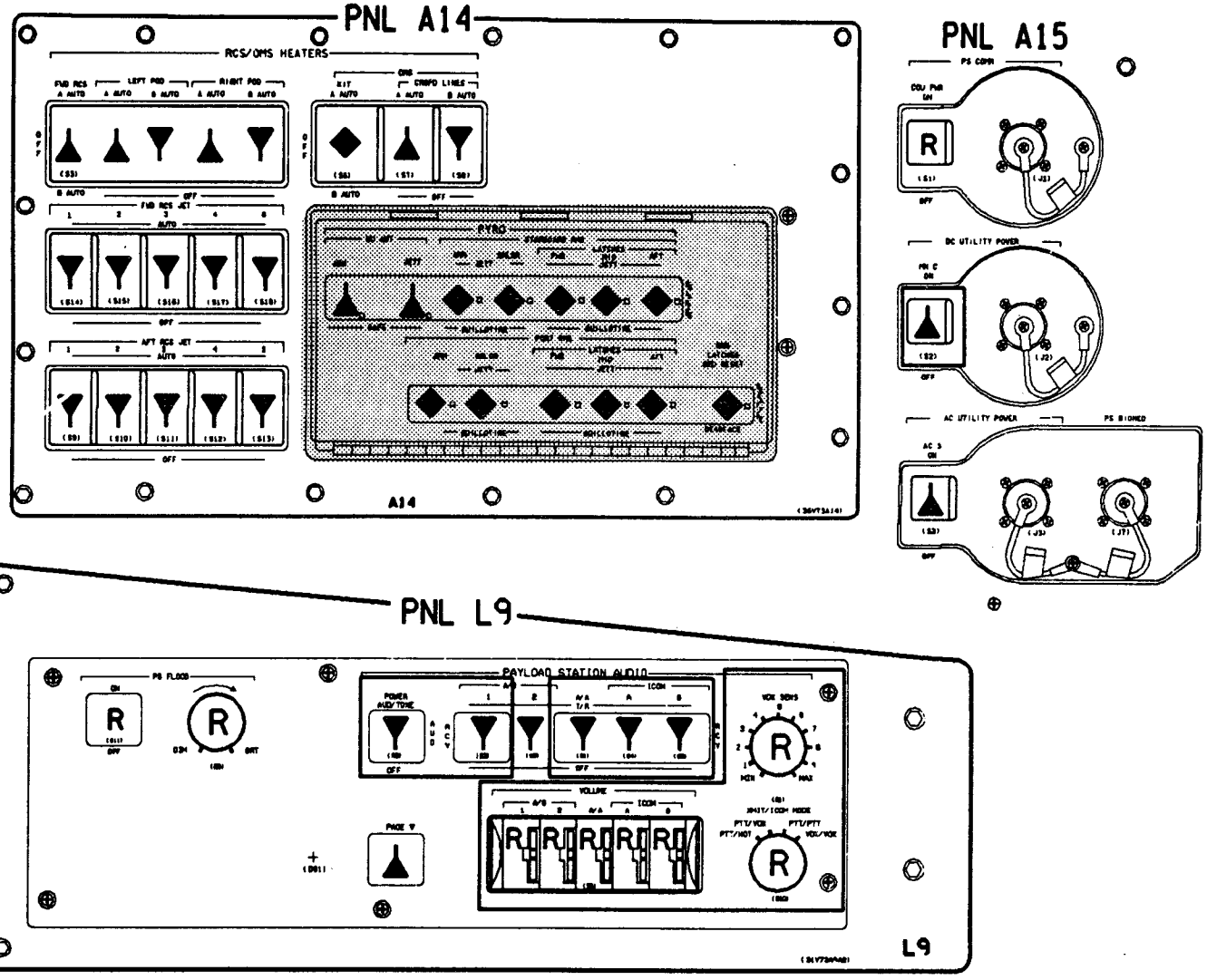


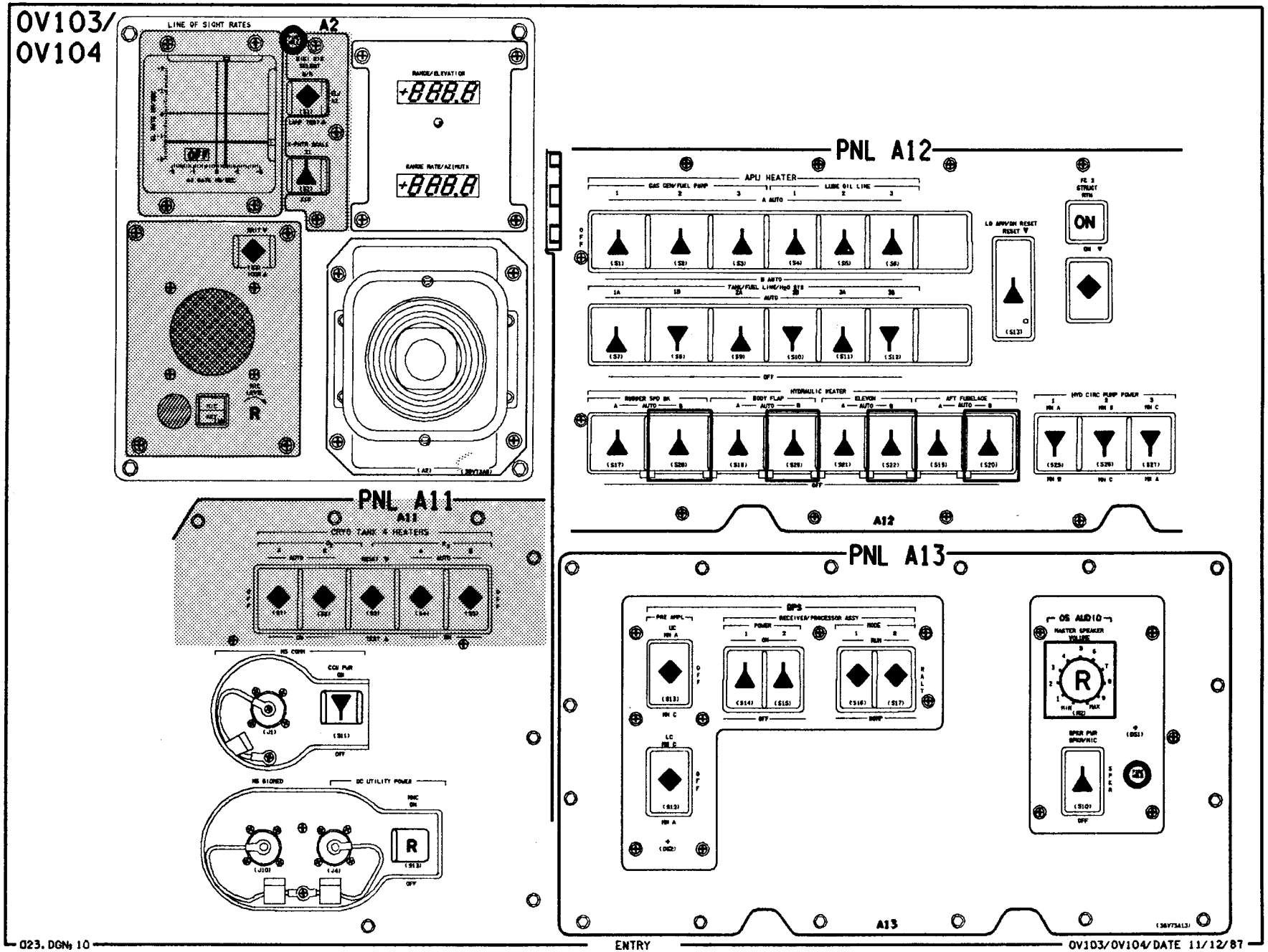
ALL VEH/DATE 01/15/97
C D/O/ALL/GEN

ENTRY
3-20

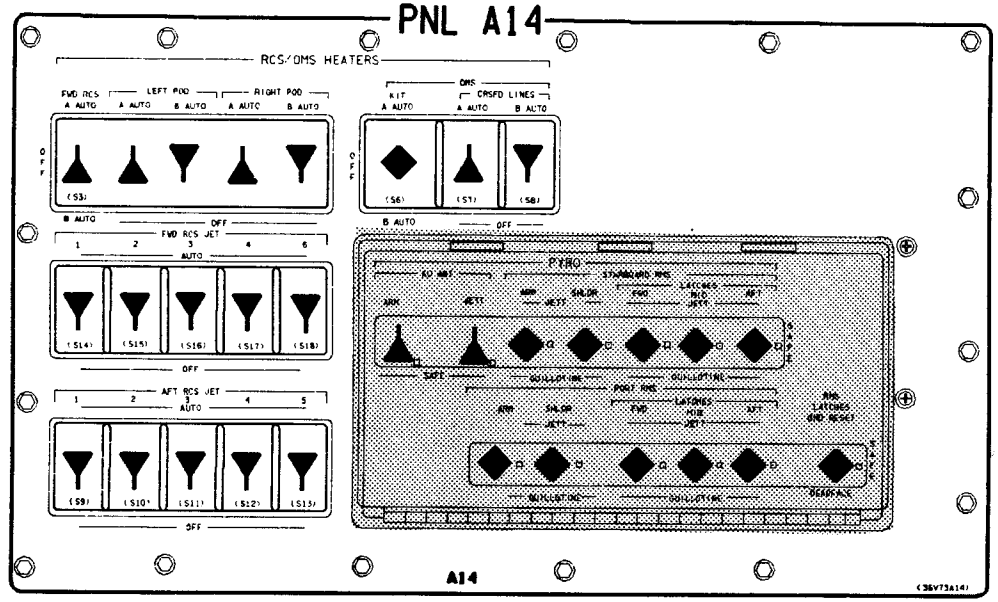
015. DGN 10


OV103/
OV104
A2
LINE OF SIGHT RATES
PNL A12
APU HEATER
PNL A11
CRYO TANK 4 HEATERS
PNL A13
DPS
OS AUDIO
A12
A13

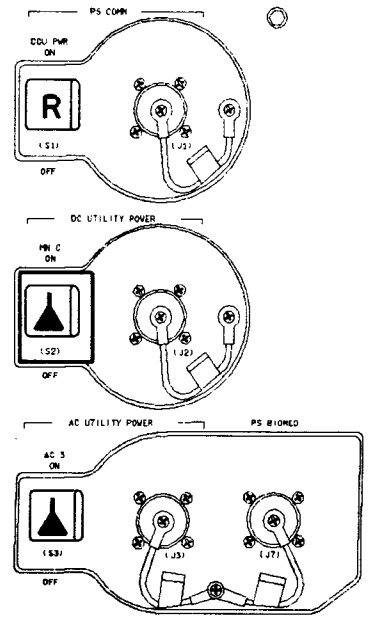

PNL A14
RCS/OMS HEATERS
A14
PNL A15
PS CONN
DC UTILITY POWER
AC UTILITY POWER
PS BIOMED
PNL L9
PAYLOAD STATION AUDIO
L9


OV103/
OV104
LINE OF SIGHT RATES
A2
PNL A12
PNL A11
A11
CRYO TANK A HEATERS
PNL A13
A12
A13

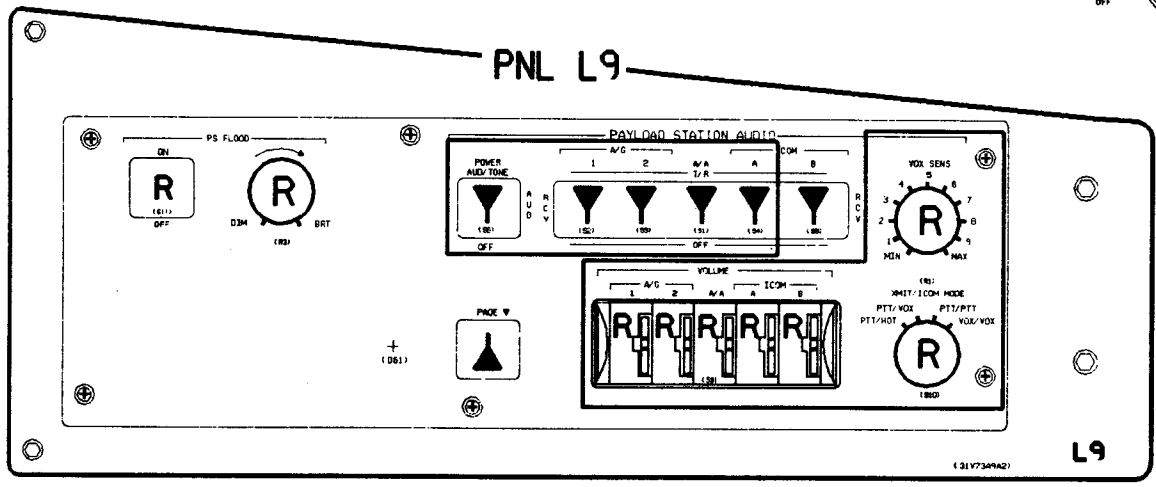
PNL A14

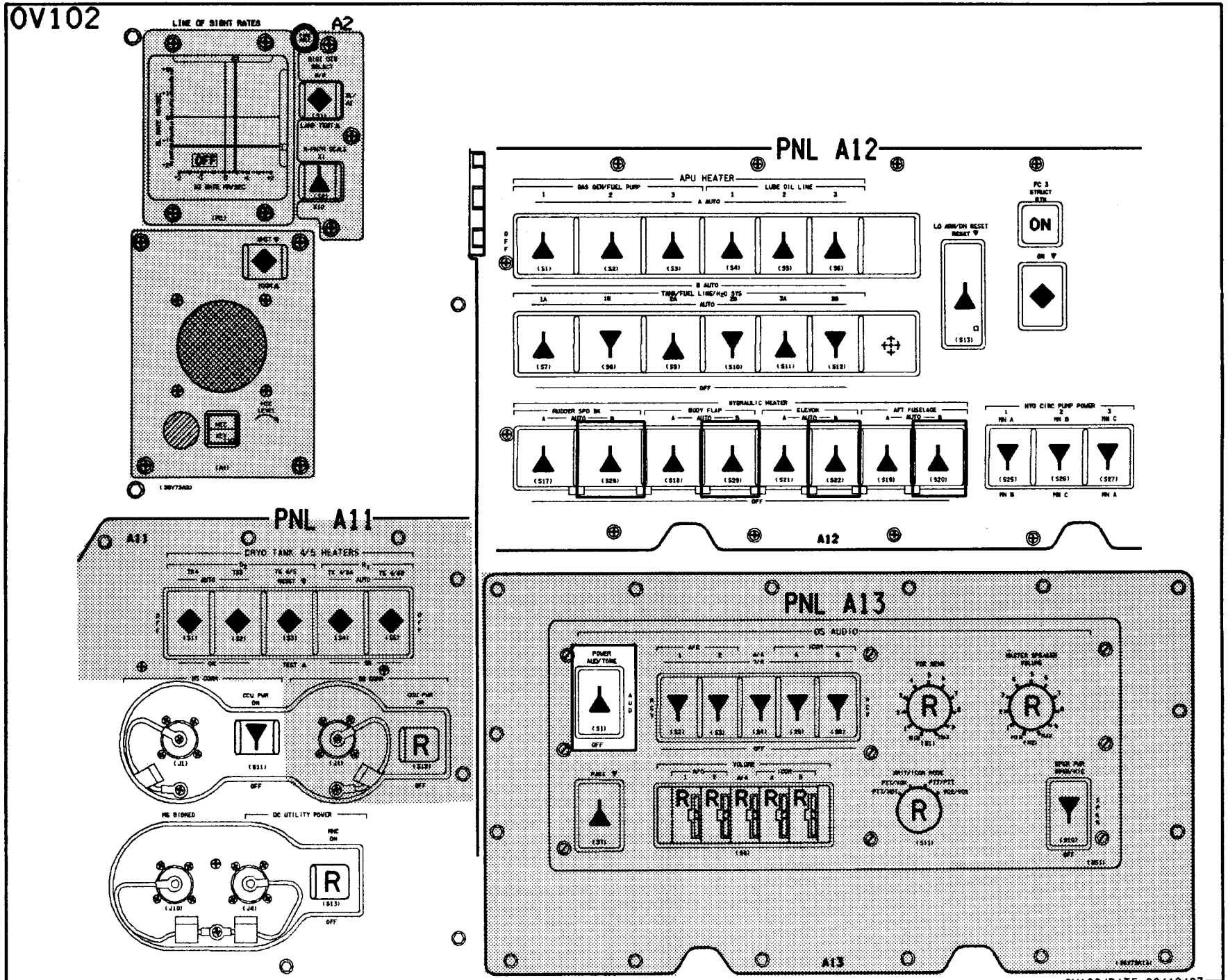


PNL A15

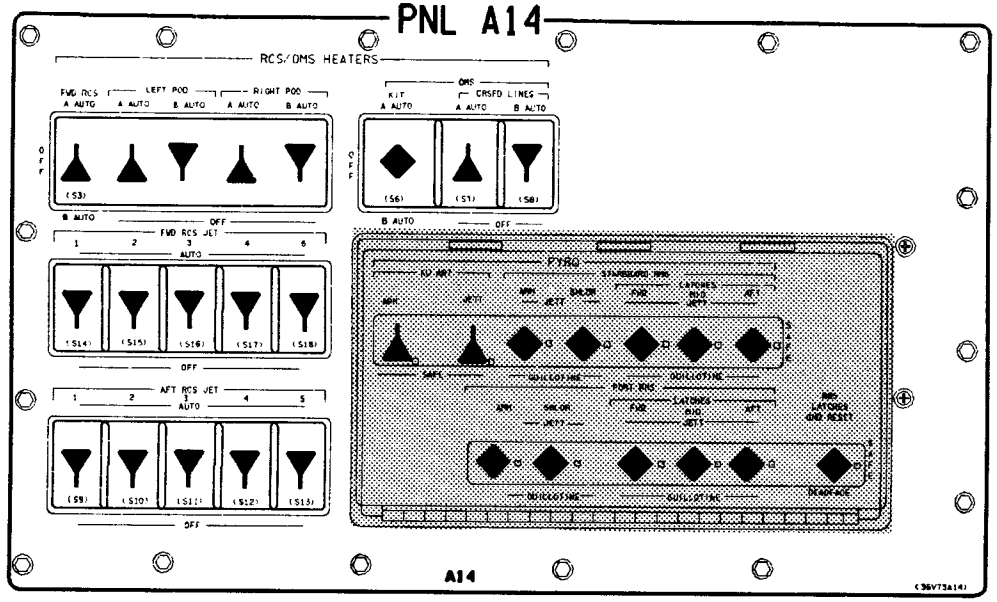


PNL L9

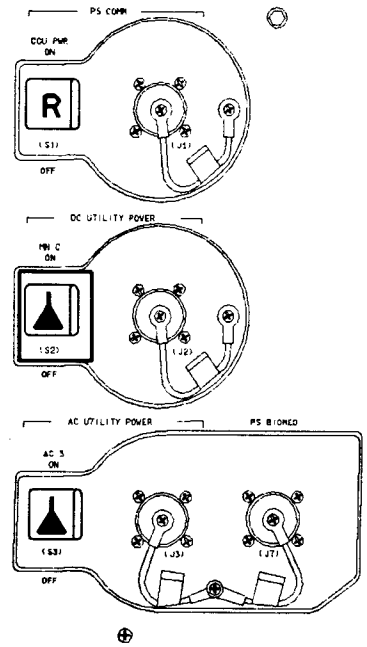



OV102
A2
LINE OF SIGHT RATES
PNL A12
APU HEATER
A12
PNL A11
A11
CRYO TANK 4/5 HEATERS
PNL A13
A13

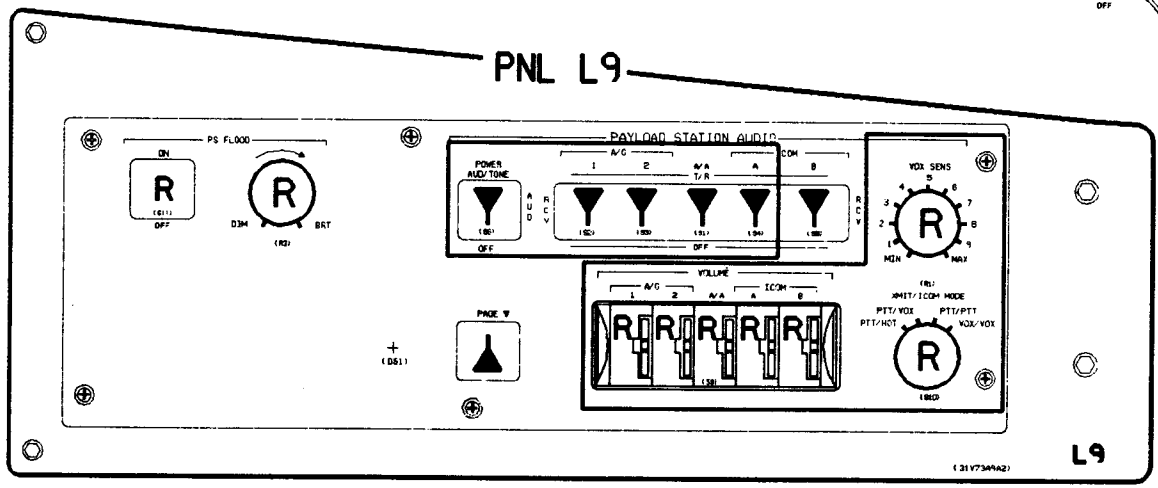
PNL A14



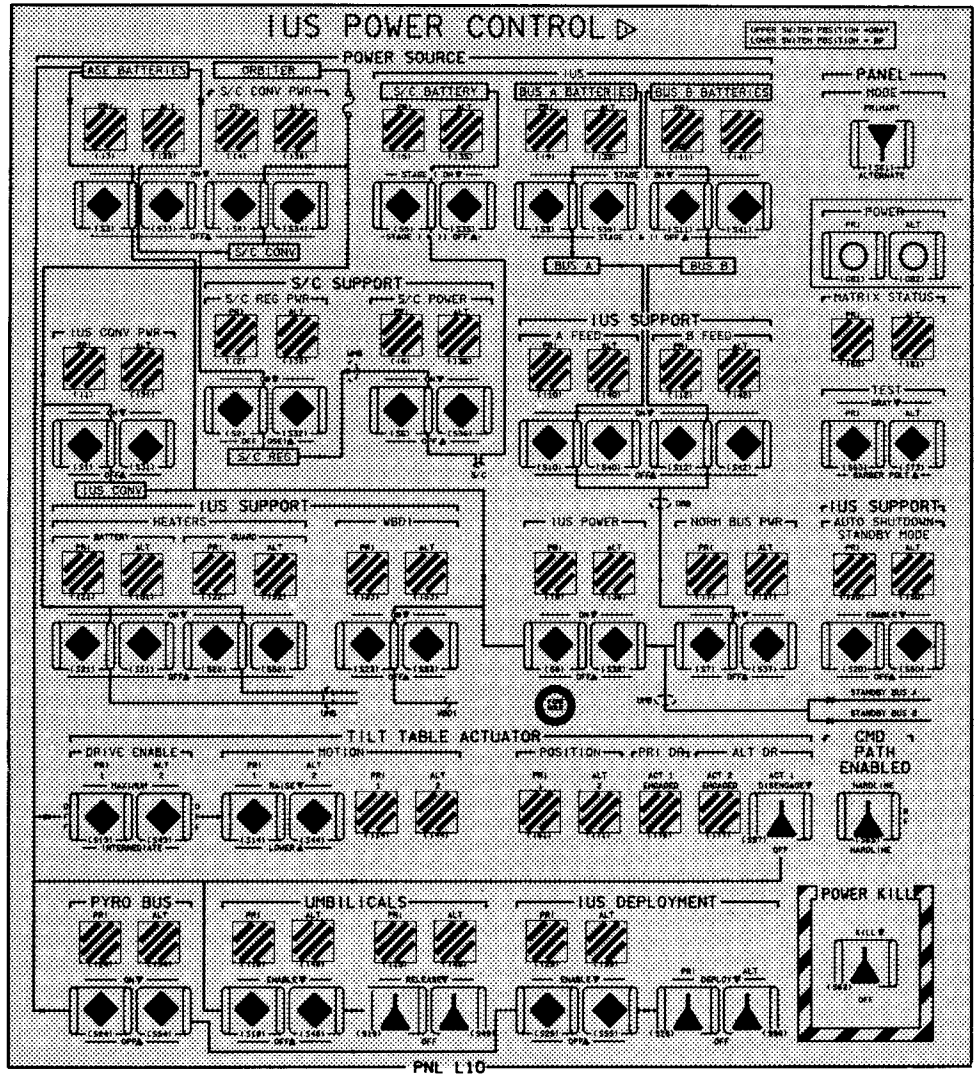
PNL A15

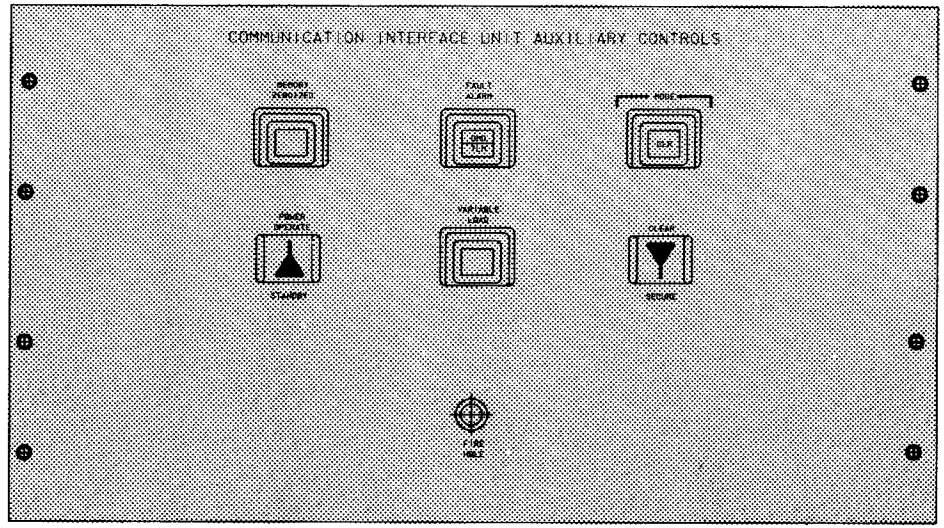


PNL L9

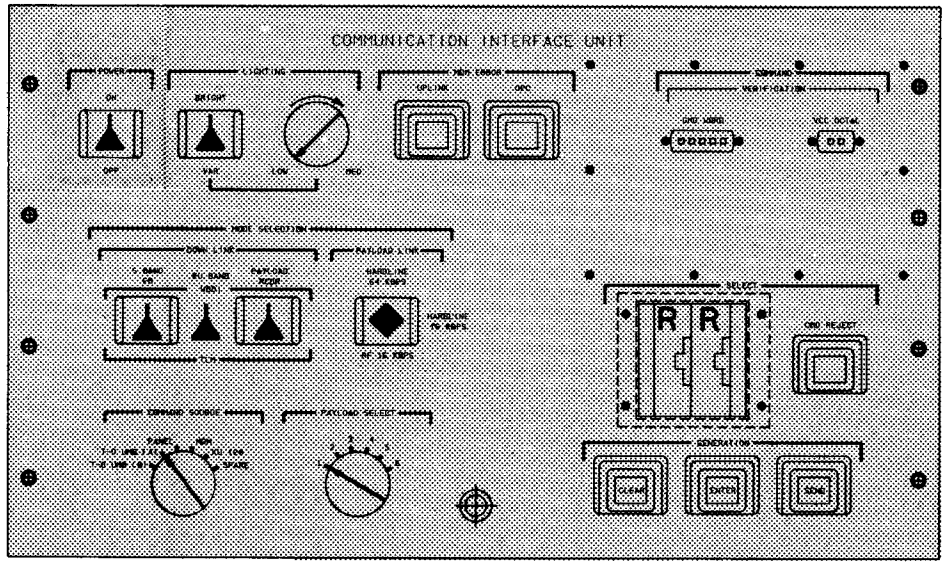


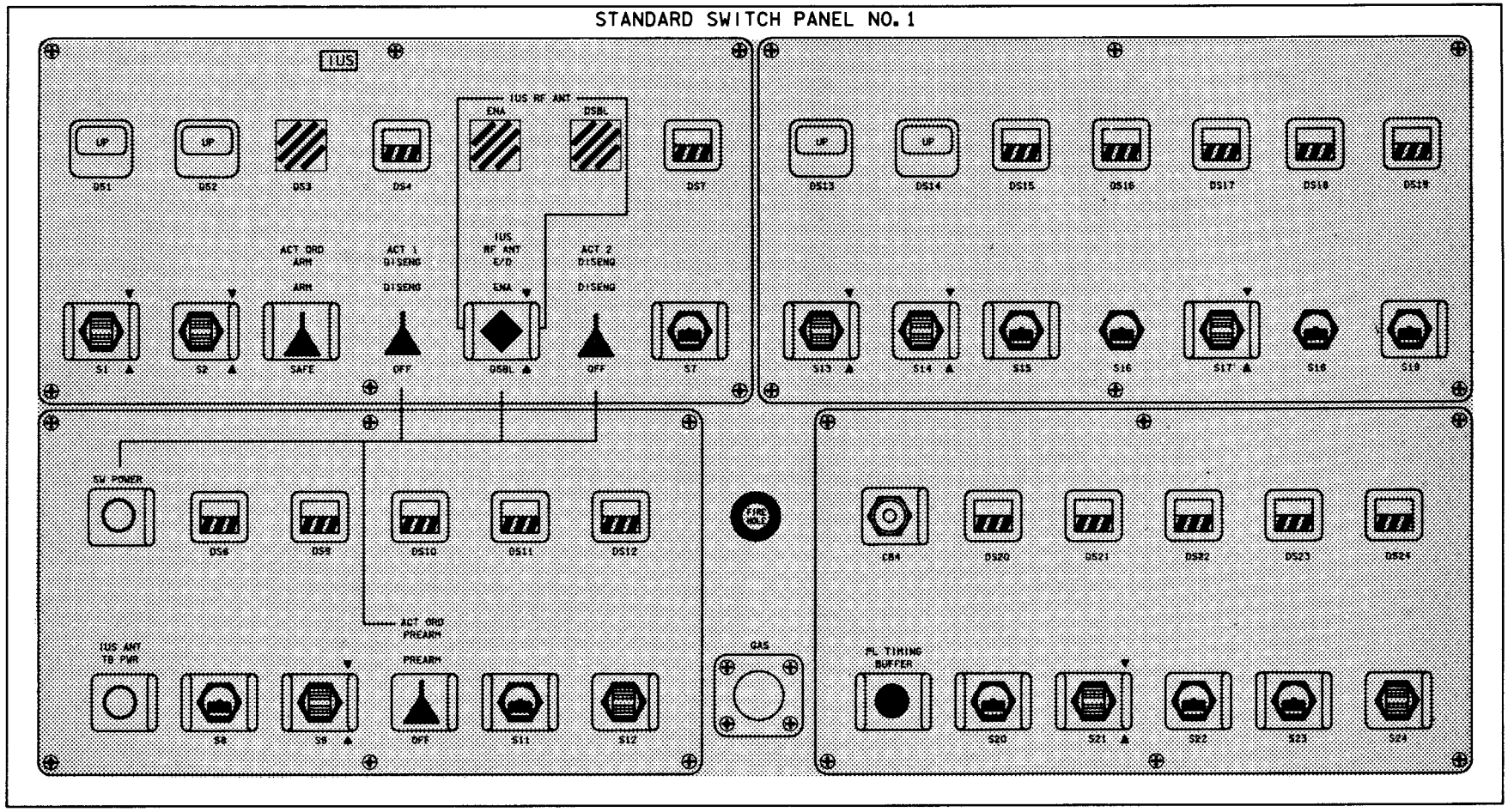
THIS PANEL ON IUS FLIGHTS ONLY

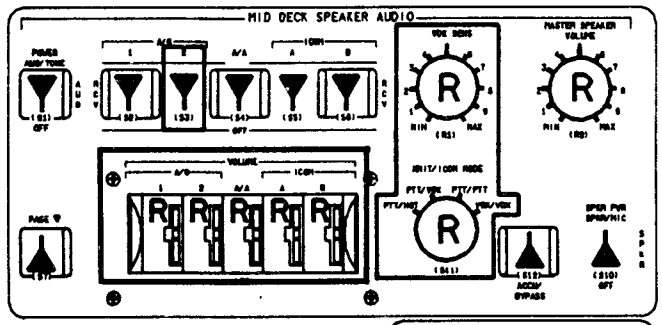



COMMUNICATION INTERFACE UNIT AUXILIARY CONTROLS

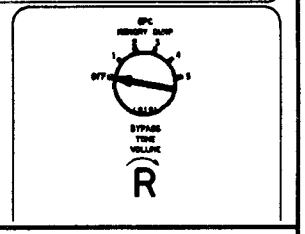
L11

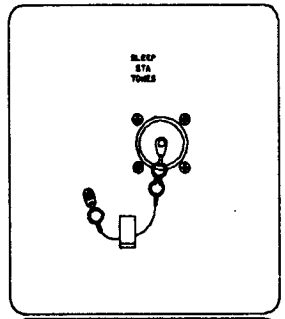

COMMUNICATION INTERFACE UNIT
R
R


STANDARD SWITCH PANEL NO. 1
IUS
IUS RF ANT
ENA
DSBL
UP
DS1
DS2
DS3
DS4
DS7
DS13
DS14
DS15
DS16
DS17
DS18
DS19
ACT ORD ARM
ACT 1 DISENG
ACT 2 DISENG
IUS RF ANT E/D
ARM
DISENG
ENA
DISENG
S1
S2
SAFE
OFF
DSBL
OFF
S7
S13
S14
S15
S16
S17
S18
S19
SW POWER
DS6
DS8
DS10
DS11
DS12
DS20
DS21
DS22
DS23
DS24
ACT ORD PREARM
IUS ANT TB PWR
PREARM
GAS
PL TIMING BUFFER
S6
S8
OFF
S11
S12
S20
S21
S22
S23
S24
4273.ART;4

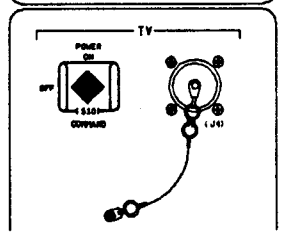


PNL M042F

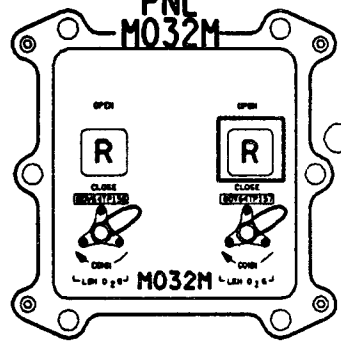




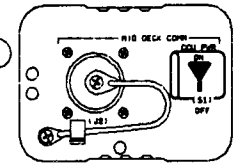
PNL M058F



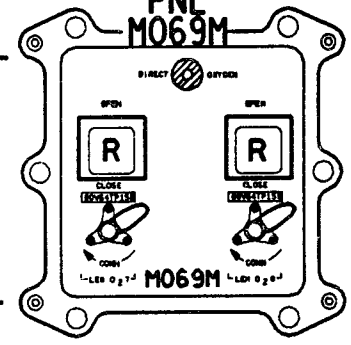
PNL M032M



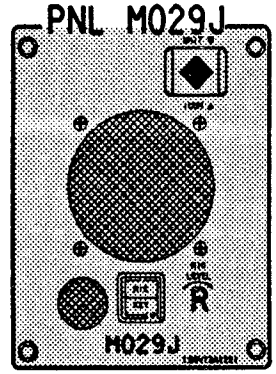
PNL M039M



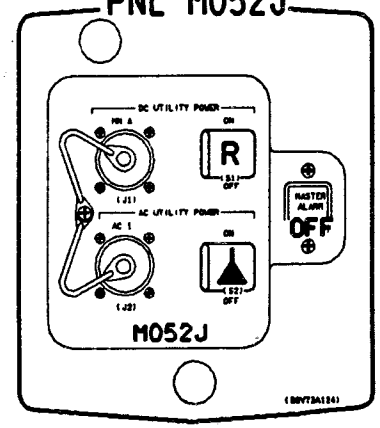
PNL M069M



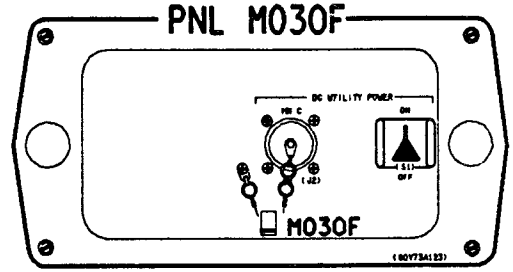
PNL M029J

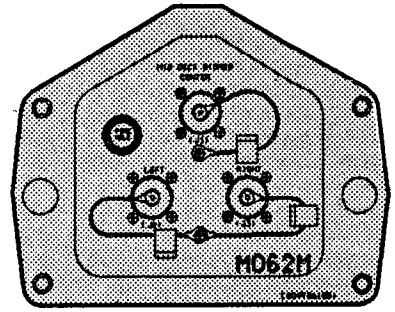


PNL M052J

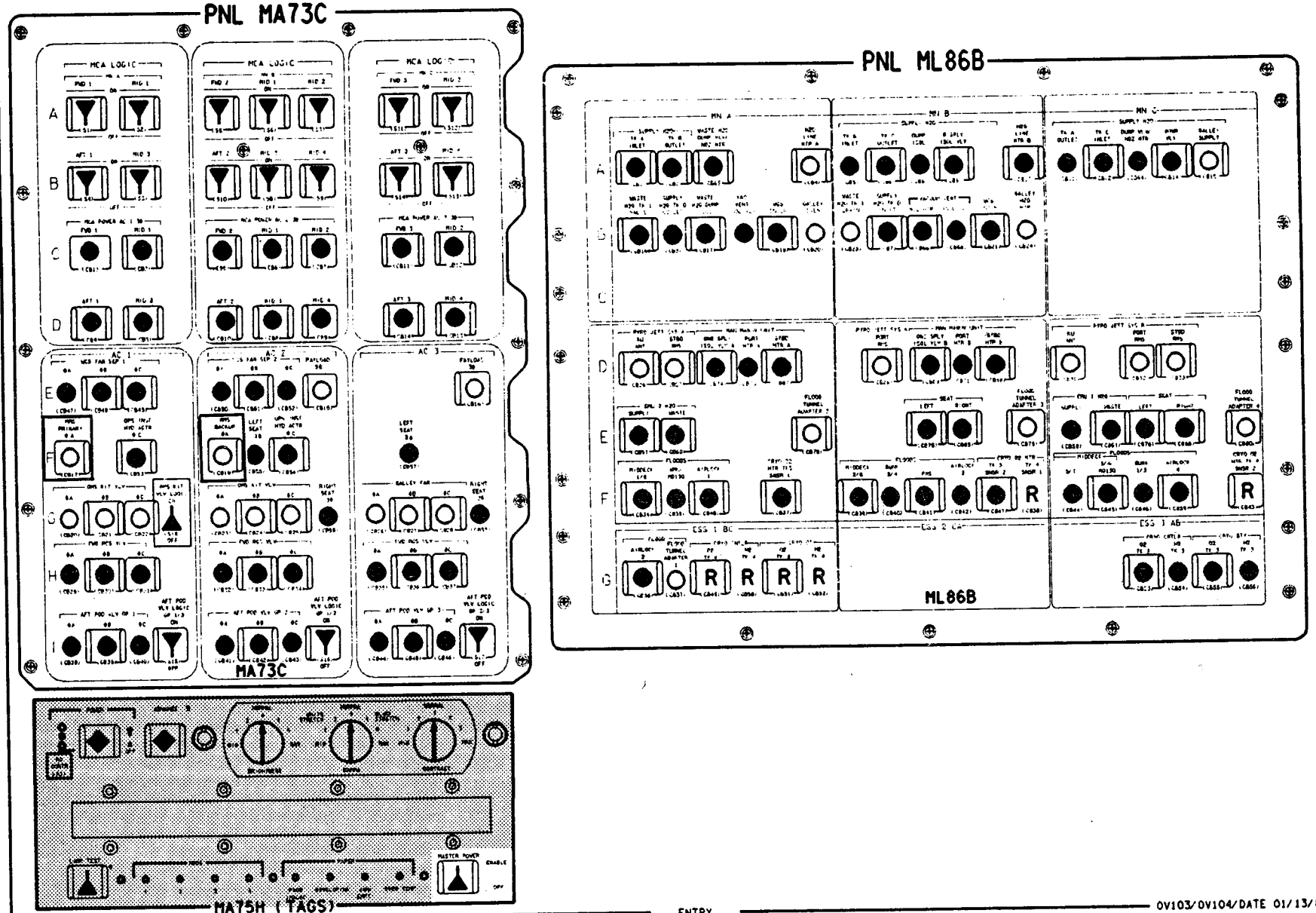


PNL M030F

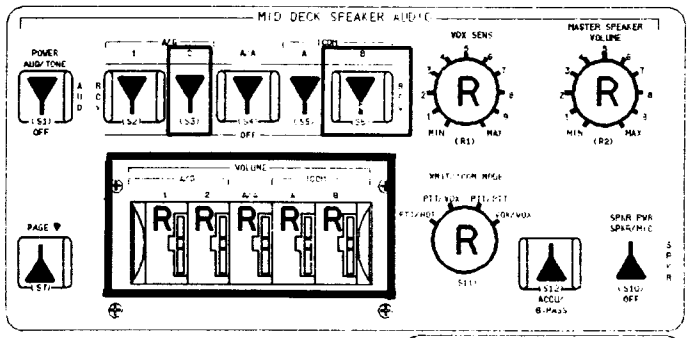




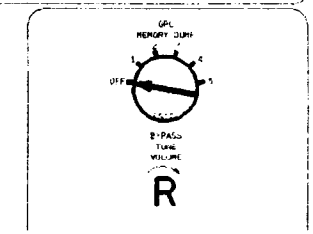
OV103/OV104

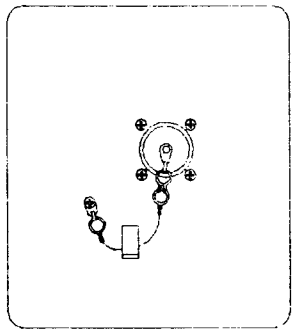


OV103/OV104

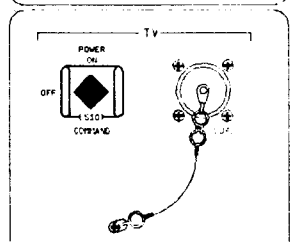


PNL M042F

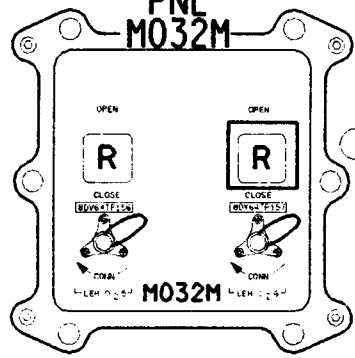




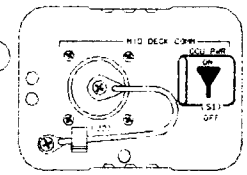
PNL M058F



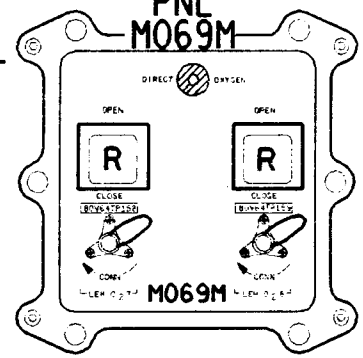
PNL M032M



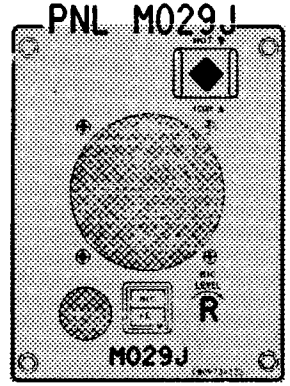
PNL M039M



PNL M069M



PNL M029J



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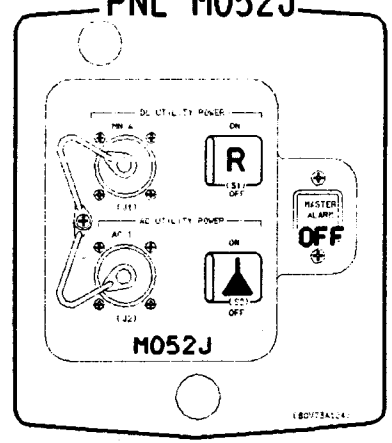
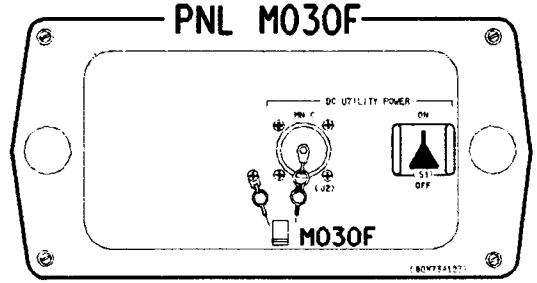
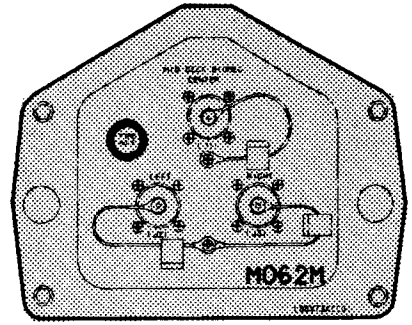
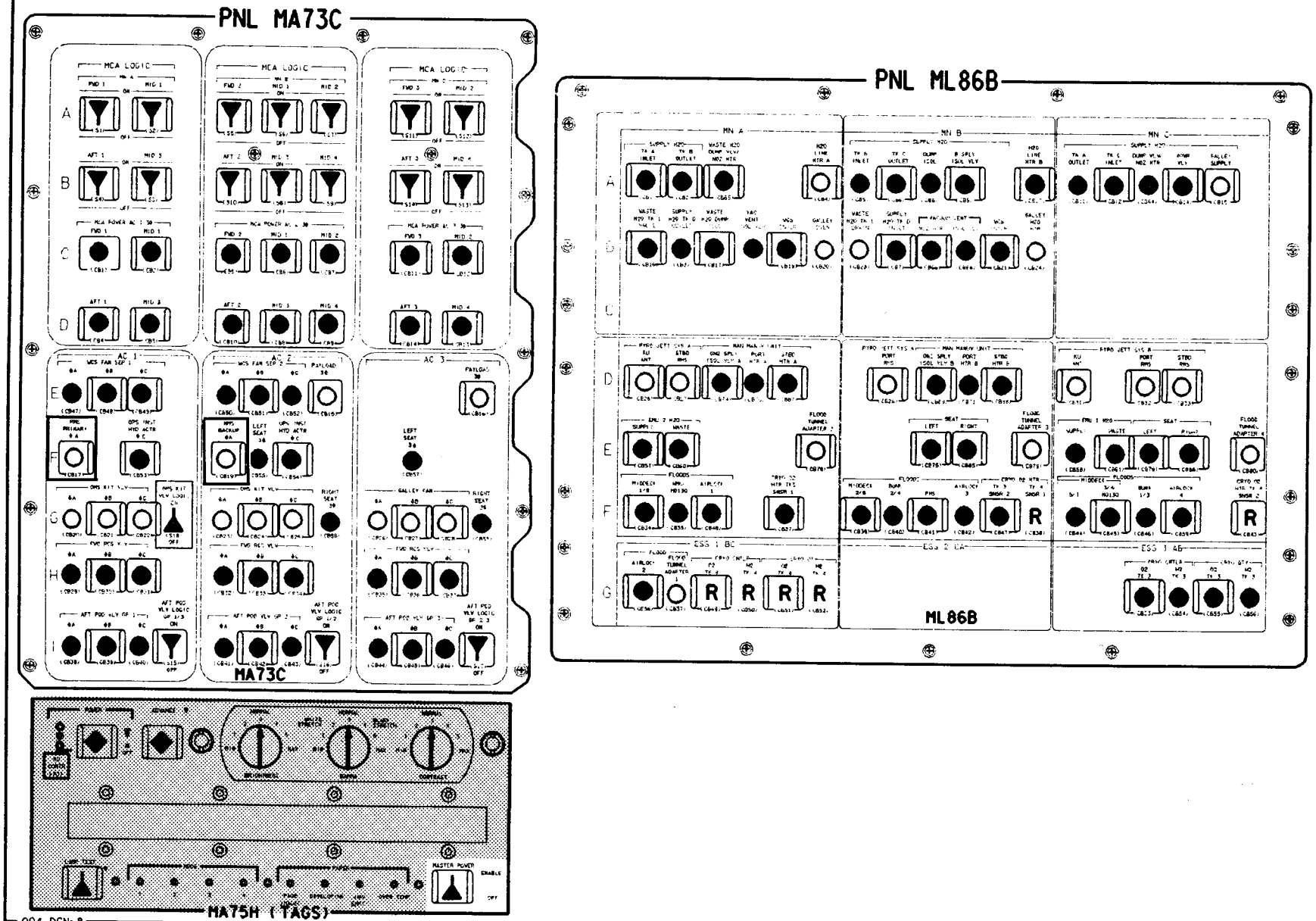


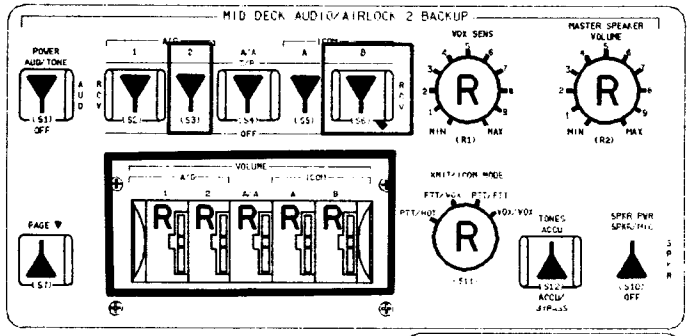
PNL M030F



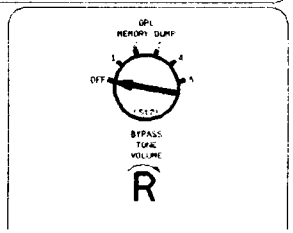


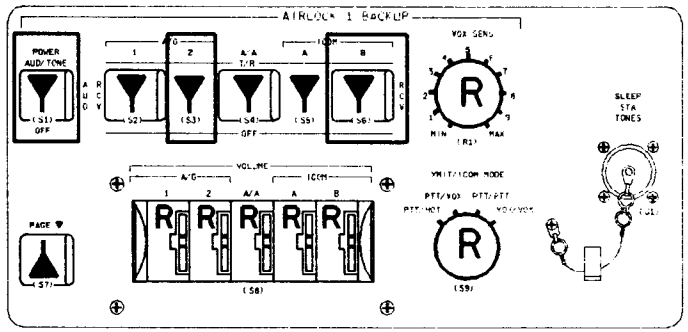
OV103/OV104


PNL MA73C
MCA LOGIC
AC 1
AC 2
AC 3
MA73C
PNL ML86B
MN A
MN B
MN C
ML86B
MA75H (TAGS)



PNL M042F





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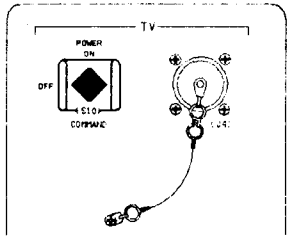
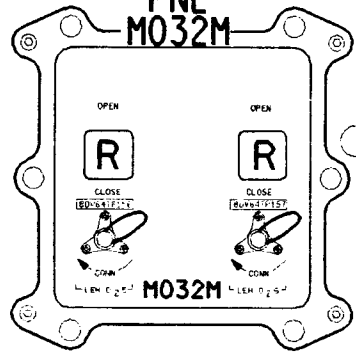
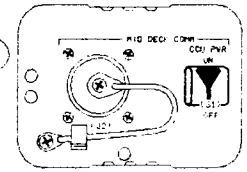


PNL M032M



PNL M039M



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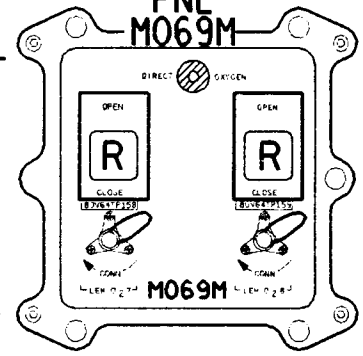
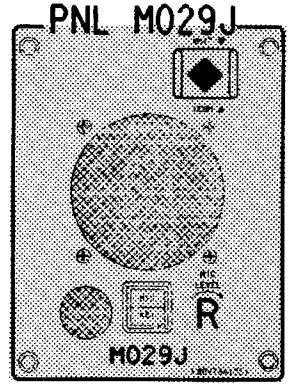
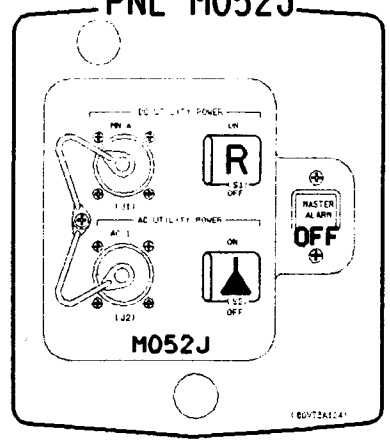


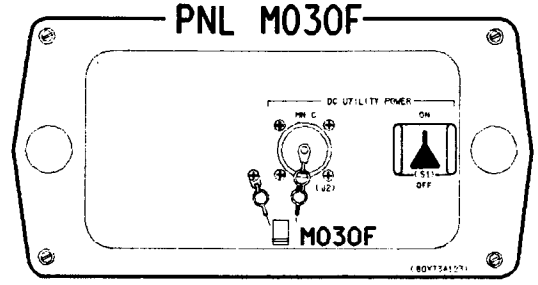
PNL M029J

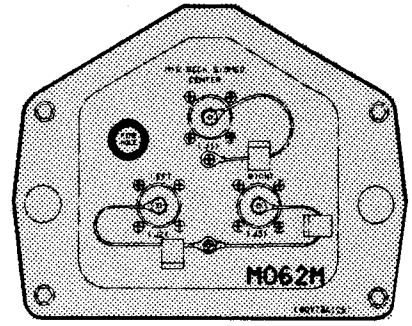


PNL M052J

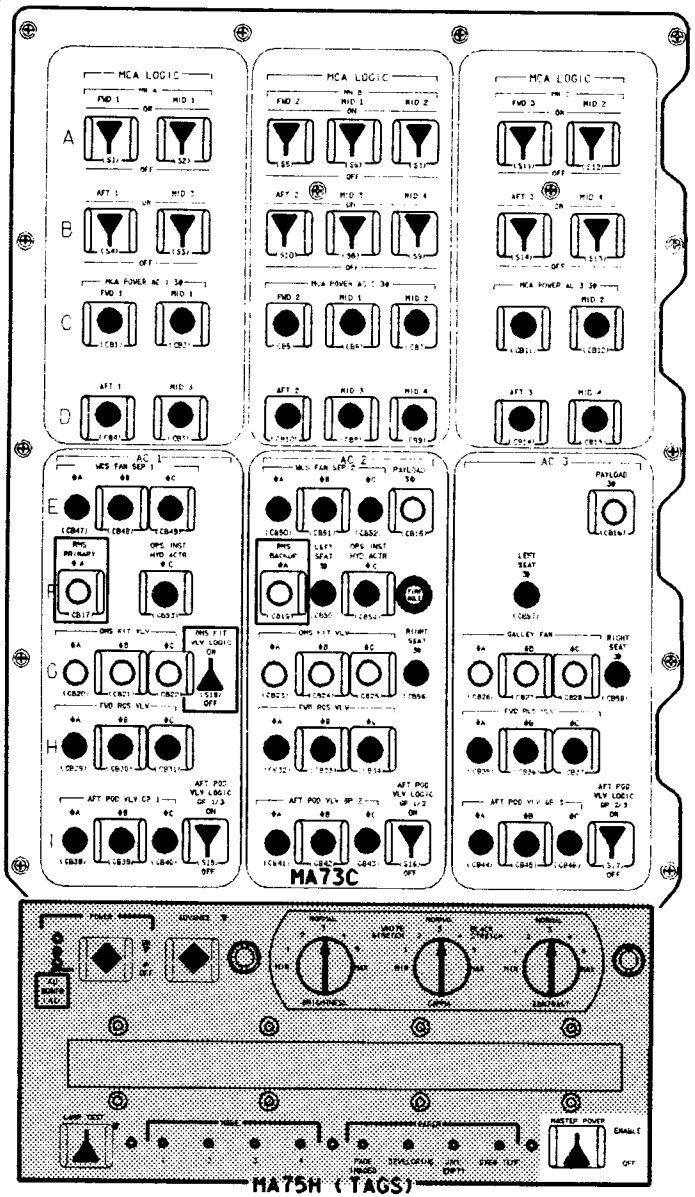


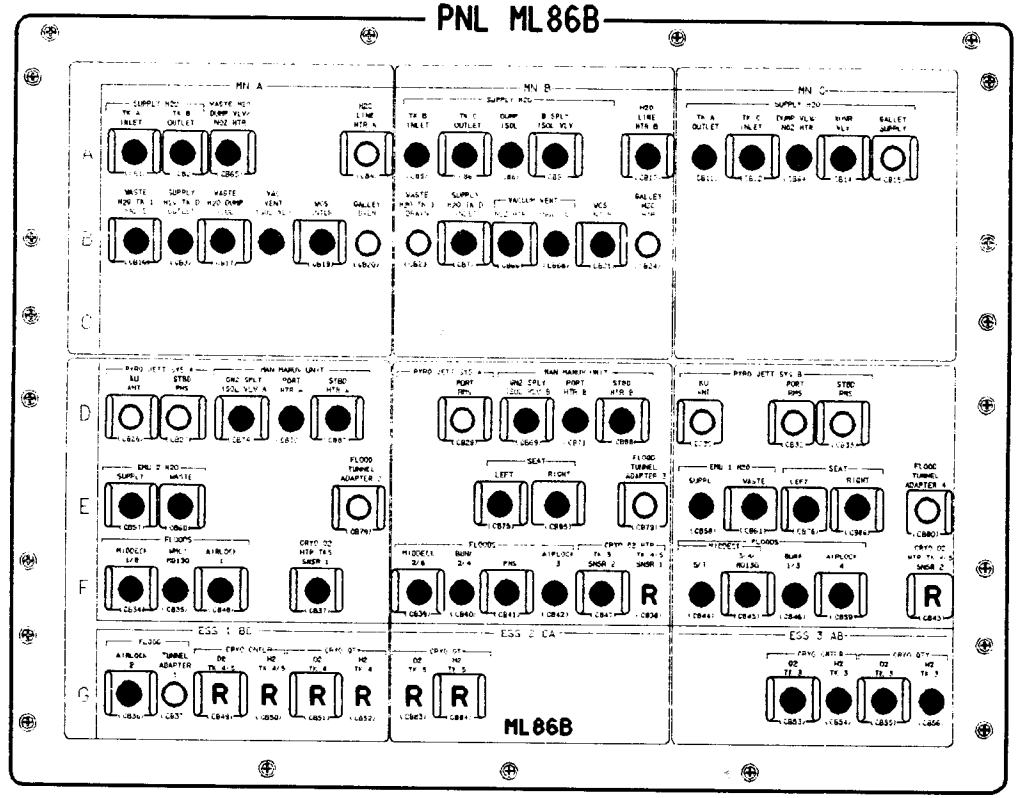
PNL M030F





OV102



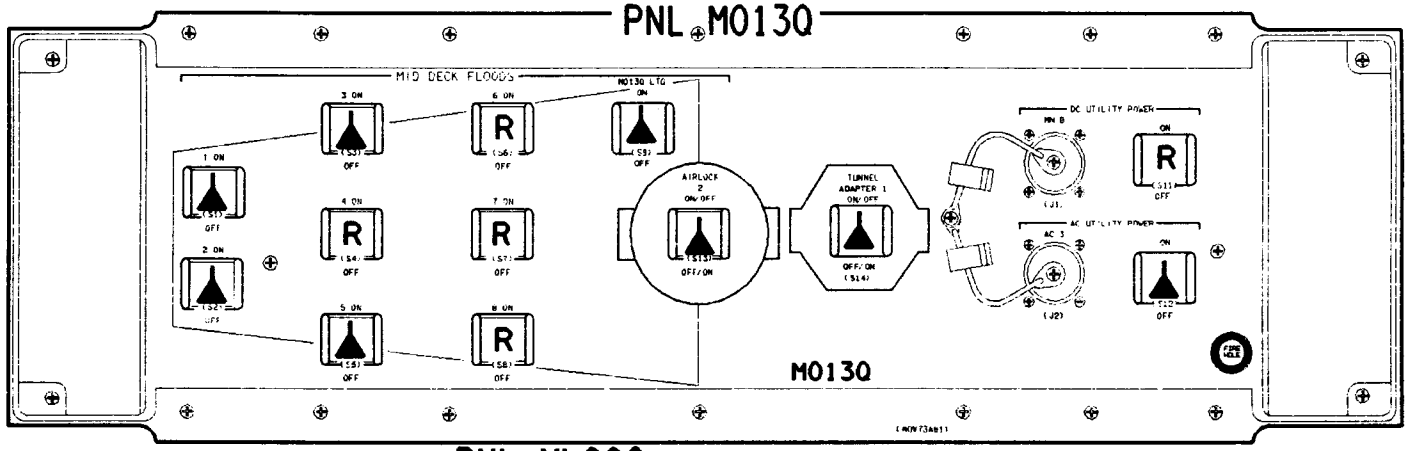


022.DGN; 11

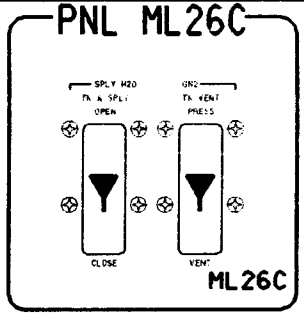
ENTRY
B3-28

OV102/DATE 01/20/88
C D/O/2/GEN

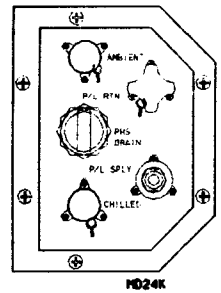
PNL M013Q



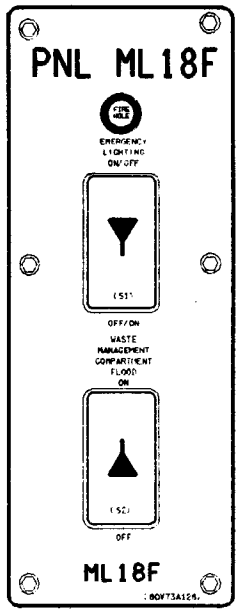
PNL ML26C



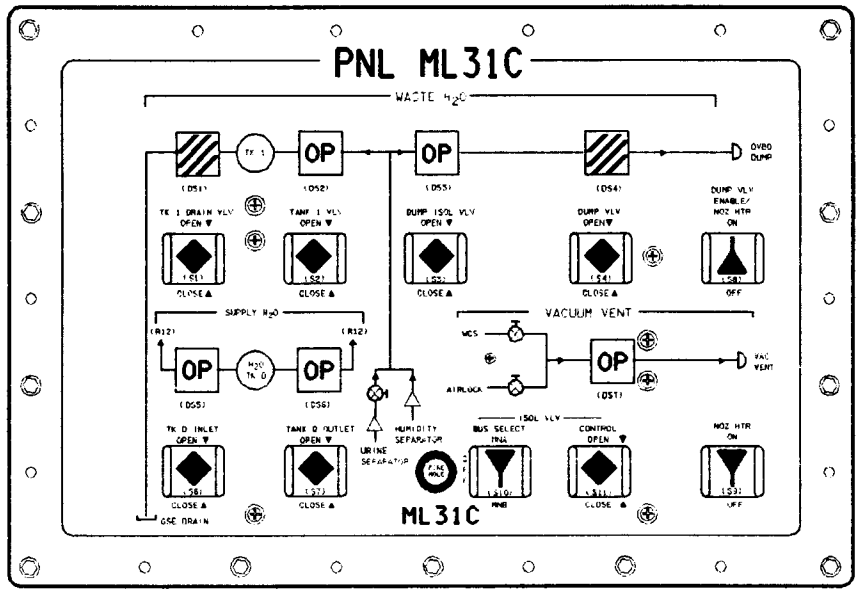
PNL MD24K



PNL ML18F

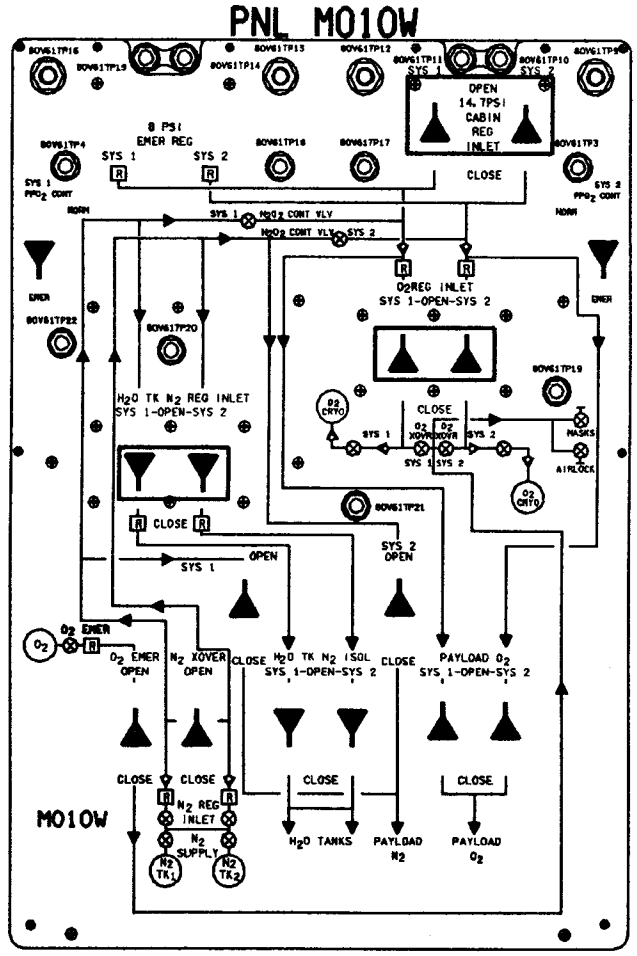


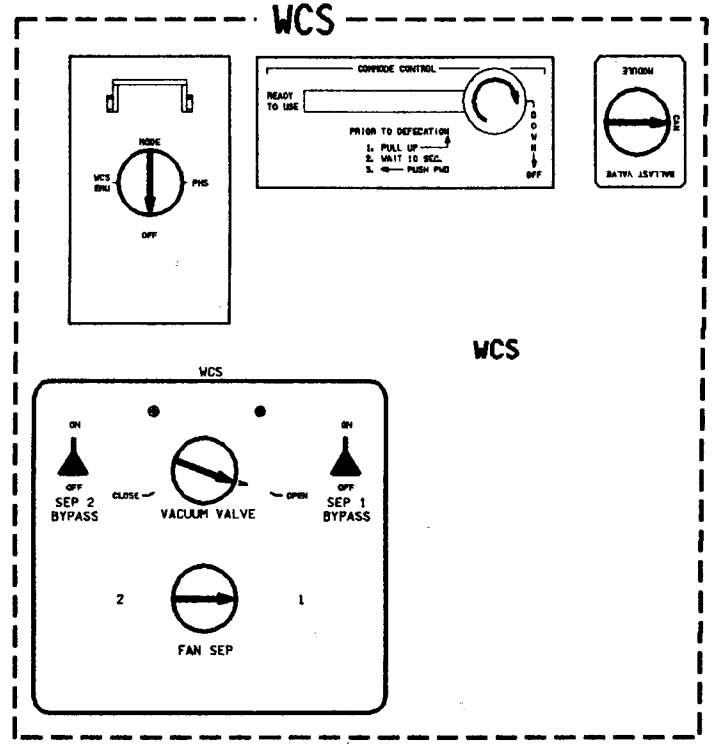
PNL ML31C

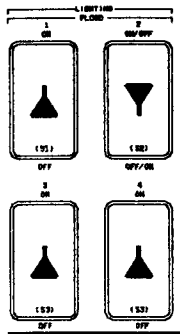


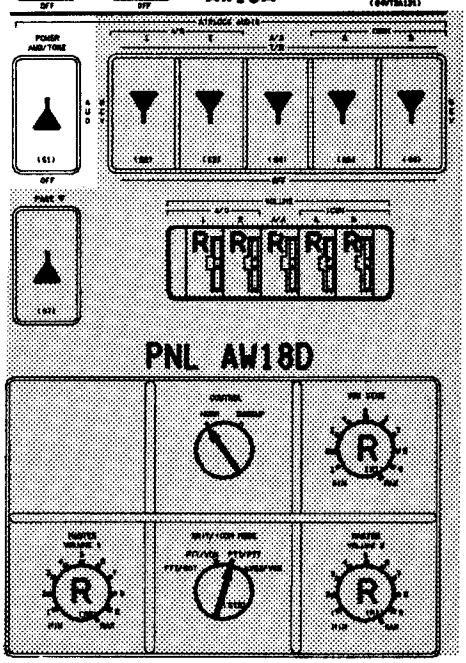
PNL MD44F

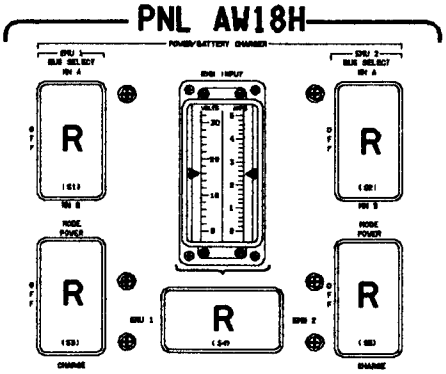
CAB TEMP CNTL v1v - FULL COOL

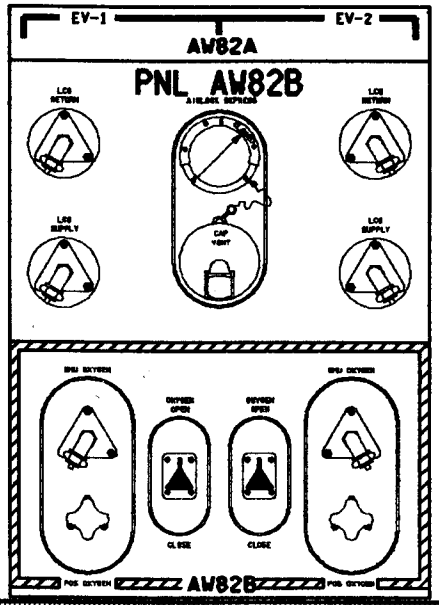

PNL M010W
OPEN
14.7PSI
CABIN
REG
INLET
SYS 1
SYS 2
8 PSI
EMER REG
CLOSE
O_2REG INLET
SYS 1-OPEN-SYS 2
H_2O TK N_2 REG INLET
SYS 1-OPEN-SYS 2
CLOSE
SYS 1
OPEN
SYS 2
OPEN
O_2 EMER
OPEN
N_2 XOVER
OPEN
CLOSE
H_2O TK N_2 ISOL
SYS 1-OPEN-SYS 2
CLOSE
PAYLOAD O_2
SYS 1-OPEN-SYS 2
CLOSE
CLOSE
CLOSE
CLOSE
N_2 REG
INLET
N_2
SUPPLY
H_2O TANKS
PAYLOAD
N_2
PAYLOAD
O_2
M010W

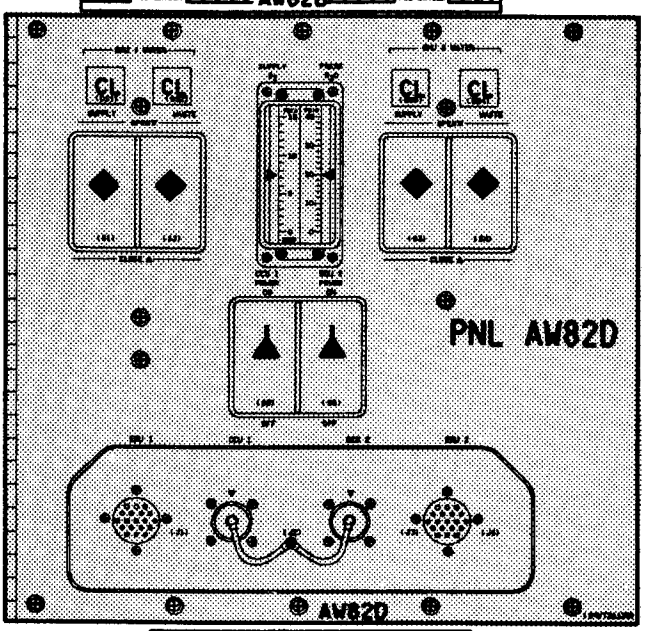

WCS
MODE
WCS
PHS
OFF
COMMODE CONTROL
READY
TO USE
PRIOR TO DEFECATION
1. PULL UP
2. WAIT 10 SEC.
3. PUSH PMD
DOWN
OFF
MODULE
WCS
WCS
ON
OFF
SEP 2
BYPASS
CLOSE
VACUUM VALVE
OPEN
ON
OFF
SEP 1
BYPASS
2
1
FAN SEP

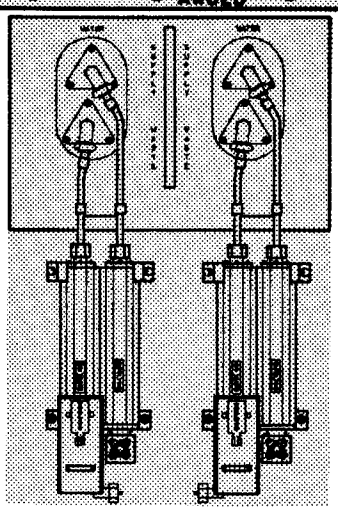

PNL AW18A


AW18A
PNL AW18D


PNL AW18H


EV-1
EV-2
AW82A
PNL AW82B
AW82B


PNL AW82D
AW82D


AW82H

Airlock Hatch

Actuator Handle	- LATCHED
Lock Lever	- LOCKED
Equalization vlv (two)	- NORM, capped

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LOSS OF 2 FC LAUNCH DAY DEORBIT PREP (ORBIT 2 or ORBIT 3)

Assumptions/Initial Conditions

- The LOSS OF 2 FC LAUNCH DAY DEORBIT assumes that LOSS OF 2 FC (ASC PKT, PWRDN) has been accomplished
- The electrical load will be 10-12 kW with transients to 14 kW during the D/O Prep and Entry
- This procedure assumes that RAD ACT, PLBD OPENING and subsequent Post Insertion activities have not been accomplished

Problem Description/Rationale

- The Orbiter electrical load is being carried by one fuel cell; therefore, it is a critical component. LRUs may experience undervoltage with accompanying alarms

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LOSS OF 2 FC LAUNCH DAY DEORBIT PREP
PROCEDURE NOTES

- USE ONE CRT, ONE INST PWR, & ONE DDU WHENEVER POSSIBLE
- MAINTAIN MINIMUM LIGHTING
- A SECOND PASS GPC (GPC 4) WILL BE POWERED-UP AT ~TIG-20
- VENT DOORS WILL BE OPEN THROUGHOUT ENTRY (EXCEPT L,R VENT DOORS 1&2)
- MS procedures are located on MS PULL-OUT pages 4-11 thru 4-13
  Extra copies are located in the back of the PLT's book

APU STEAM VENT HTR ACT [1]

P R2 ✓BLR CNTLR/HTR (three) - A
PWR (three) - ON

NOTE
Htr reqd to be on 2 hours prior to APU act

AC BUS CONFIG [3]

P,MS L4:D
:E
:Q

1. ✓All cbs (27) - op

2. If FC 1 OK, Perform AC3 3φ BUS LOSS ACTIONS, (ORB PKT, EPS),
Do only steps in ORB PKT, do not proceed to MAL,
or then go to steps 3 and 4 (AC3 is the Affected Bus)

If FC 2 or FC 3 OK, perform AC1 3φ BUS LOSS ACTIONS, (ORB PKT, EPS),
Do only steps in ORB PKT, do not proceed to MAL, then
go to steps 3 and 4 (AC1 is the Affected Bus)

R1 3. Affected BUS: cb AC CONTR (three) - cl
AC BUS SNSR - OFF
INV/AC BUS - OFF (tb-OFF)
INV PWR - OFF (tb-OFF)
cb AC CONTR (three) - op

4. Connect AC1 to AC3:
Perform AC POWER TRANSFER CABLE INSTALLATION
(IFM, PROCEDURES A THRU F)

PRE DPS TRANSITION SWITCH CONFIG [5]

C,P O14:A ✓RGA 1 - ON
:E ✓cb MNA ACCEL 1 - cl
:F ✓ASA 1 - ON
O15:A ✓RGA 2 - ON
:E ✓cb MNB ACCEL 2 - cl
:F ✓ASA 2 - ON
O16:A ✓RGA 3 - ON
✓ACCEL 3 - ON

DPS ENTRY CONFIG [6]

C,P L1 ✓AV BAY 2 FAN A - ON
O14:F ✓MMU 1 - ON
O15:F ✓MMU 2 - ON
C3 ✓FCS CH (four) - AUTO

LOAD ENTRY TFL

X: SM 62 PCMMU/PL COMM

C3 ✓OI PCMMU FORMAT - GPC
CRTX FMT:
FXD - ITEM 1 EXEC
SEL ID - ITEM 3 + 1 0 5 EXEC
LOAD - ITEM 4 EXEC
-✓RUN,CPLT
SEL ID - ITEM 3 + 1 6 4 EXEC
LOAD - ITEM 4 EXEC
-✓RUN,CPLT
PGM - ITEM 2 EXEC

SM CHECKPOINT/UL CNTL ENA

C2 X: SM 60 SM TABLE MAINT
Y: SM 1 DPS UTILITY

CRTY MMU ASSIGN 2 SM - ITEM 4 EXEC
CRTX CKPT INITIATE - ITEM 18 EXEC
✓Update of CKPT TIME and STATUS GOOD indicated

CRTY MMU ASSIGN 1 SM ITEM 3 EXEC
CRTX CKPT INITIATE - ITEM 18 EXEC
✓Update of CKPT TIME and STATUS GOOD indicated

CRTY CKPT RETRV ENA - ITEM 12 EXEC (*)
UL CNTL ENA - ITEM 36 EXEC

DEACT GPC 4

CRTX MAJ FUNC - GNC

NOTE
All MAJ FUNC should be GNC
prior to powering down SM GPC

O6 GPC 4 MODE - STBY,HALT
PWR - OFF
OUTPUT - NORM

CRT1 GPC/CRT 04 EXEC
GPC/CRT 13 EXEC

TIG

-01:30 P APU STEAM VENT HTR ACT [1]

MS FDF CONFIG/ENTRY STOW [2], 4-11

-01:25 P,MS AC BUS CONFIG [3], 4-13

MS HTR CONFIG [4], 4-11

C,P PRE DPS TRANSITION SWITCH CONFIG [5]

-01:20 C,P DPS ENTRY CONFIG [6]

-01:15 C IMU RECOVERY (if reqd)
Use MAL, GNC, FRP-3 to recover any IMUs lost due to bus failures or powerdown
BFS: GNC, OPS 000, 301 PRO
BFS, GNC 50 HORIZ SIT
✓BFS R/W sel

-01:10 C,P PREL DEORB UPDATE/UPLINK [7]

-01:05 MS FUEL CELL PURGE [8], 4-11

MS WCS DEACTIVATION [9], 4-13

-01:00

TRANSITION GPC 1 TO GNC OPS 3

[X: GNC GPC MEMORY]
CRTX CONFIG - ITEM 1 + 3 EXEC
Modify MC 3 per Table →

CRTX GNC, OPS 301 PRO
[DEORB MNVR COAST]

CONFIG GPC		3 10000
STR	1	1
	2	1
	3	1
	4	1
PL	1/2	1
CRT	1	1
	2	1
	3	1
	4	0
L	1	0
	2	0
MM	1	1
	2	1

TRANSITION BFS GPC TO GNC OPS 3

O6 GPC 5 PWR - ON
OUTPUT - B/U (tb-bp)
MODE - STBY (tb-RUN),RUN
C3 BFS CRT DISP - ON
SEL - 2 + 3

[2: BFS MEMORY]
CRT2 BFS, GNC OPS 301 PRO
[2: BFS, DEORB MNVR COAST]

LAND SITE UPDATE

[2: GNC 50 HORIZ SIT]
SEL SITE (See LAND SITE DATA)

O14:F MMU 1 - OFF
ASA 1 - OFF
O15:F MMU 2 - OFF
ASA 2 - OFF

PREL DEORB UPDATE/UPLINK [7]

C C3 ✓UPLK - ENA
✓[1: GNC ORBIT MNVR EXEC]
✓[3: BFS, GNC DEORB MNVR COAST]
MCC update:
OMS PRPLT PAD, DEL PAD (ENT, PRPLT/DEL), and DEORBIT MNVR PAD (ENT, MNVR PADS)
IMU ALIGN PAD, if reqd
MCC uplink:
PASS and BFS SV, TGT
✓PASS and BFS TGT per DEORBIT MNVR PAD (ENT, MNVR PADS

* If MCC cannot provide *
* DEORB TGT, use SPOC *

CRT1 LOAD - ITEM 22 EXEC
TIMER - ITEM 23 EXEC

CRT1 ✓PASS and BFS solution per DEORBIT MNVR PAD (ENT, MNVR PADS)
BURN ATT,
HA, HP,
ΔV TOT,
TGO
MNVR - ITEM 27 EXEC

PRE INGRESS CONFIG 12

MPS/H2 PURGE PREP

P	R2	MPS He ISOL B L - CL PNEU L ENG He XOVR - CL
	R4	MPS MANF PRESS (two) - CL

ENABLE QTY GAUGE

C,P	O16:E	cb MNC RCS/OMS PRPLT QTY GAUGE - cl

RA CONFIG

F8	RDR ALTM - 1

MLS CH/TACAN CH/DATA BUS

	O8	MLS CH (three) tw - See LAND SITE DATA
	O7	TACAN CH (three) tw - See LAND SITE DATA
	F6	✓DATA BUS - 3
	F8	✓DATA BUS - 4

ENABLE PROXIMITY PACKAGE

C	L4:P	✓cb AC2 ϕA LG SNSR 2 - cl ✓cb AC3 ϕA LG SNSR 1 - cl

cb CONFIG

C	L4:J	cb SIG CONDR HUM SEP - op IMU FAN - op

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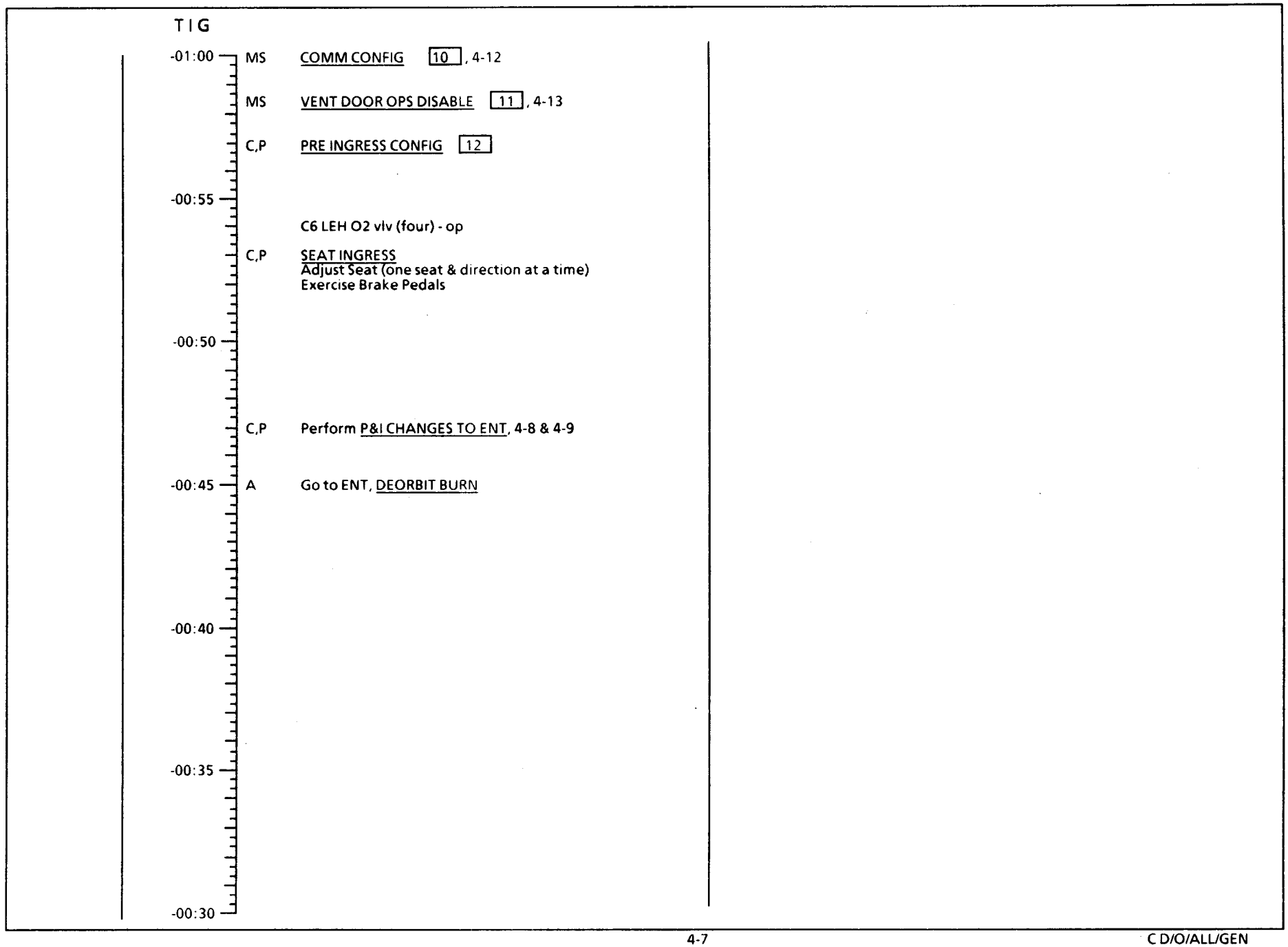
TIG
-01:00
MS
COMM CONFIG 10, 4-12
MS
VENT DOOR OPS DISABLE 11, 4-13
C,P
PRE INGRESS CONFIG 12
-00:55
C6 LEH O2 vlv (four) - op
C,P
SEAT INGRESS
Adjust Seat (one seat & direction at a time)
Exercise Brake Pedals
-00:50
C,P
Perform P&I CHANGES TO ENT, 4-8 & 4-9
-00:45
A
Go to ENT, DEORBIT BURN
-00:40
-00:35
-00:30

LOSS OF 2 FUEL CELLS

P&I Changes to ENTRY

GENERAL:

1. AV BAY FANS will be cycled as needed to keep power level low

2. GPCs 2,3 remain pwrd dn throughout ENTRY

SPECIFIC:

pg 3-4 Delete: OMS TVC GIMBAL CHECK

pg 3-7 Delete: VENT DOOR CLOSE
Insert: L1 HUMIDITY SEP (two) - OFF

TIG-20 FES HEATER DEACT
L1 TOP EVAP HTR NOZ/DUCT - OFF
HI LOAD DUCT HTR - OFF
L2 FLASH EVAP FDLN HTR B SPLY - OFF
ASA ACT
O14,O15,O16:F ASA (four) - ON

pg 3-8 Insert before OPS 302 PRO:
GPC 4 ACT
(1) GPC 4 PWR - ON/STBY/RUN
(2) BFC CRT DISP - OFF
(3) For OPS 3 TRANS use →
(4) GNC, OPS 301 PRO
(5) BFS CRT DISP - ON; BFS I/O RESET
(6) FCS CH (four) - ORIDE
(7) G50 ✓LAND SITE/RWY per DEL PAD

CONFIG GPC	3 10040
STR 1	1
2	4
3	4
4	1
PL 1/2	1
CRT 1	1
2	4
3	1
4	0
L 1	0
2	0
MM 1	1
2	4

pg 3-9 Delete: RCS/OMS HTR steps

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LOSS OF 2 FUEL CELLS

P&I Changes to ENTRY
(continued)

TIG-2

Use 2 DDU/FLT CNTLR PWR
Add: AV BAY FAN CYCLE
L1 AV BAY FAN (six) - OFF

pg 3-26

FLT CNTLR PWR (two) - OFF
Use 1 DDU
Insert after OMS/RCS POST BURN RECONFIGURATION:
L1 AV BAY FAN 1B,2A,3A [3B vice 3A if FC 1 OK] - ON (3 sec between each start)

pg 3-29

SECONDARY ACTUATOR CHECK
Add: C3 i. FCS CH (four) - ORIDE

pg 3-30

If FORWARD RCS DUMP reqd for off-nominal CG etc,
insert FORWARD RCS RECOVERY before the dump:
FORWARD RCS RECOVERY
O14,
O15,
O16:F RJDF LOGIC, DRIVER (eight) - ON
O8 FWD RCS MANF ISOL 1,2,3,4 - OP

pg 3-31

Insert after dump completion:
O14,O15,O16:F RJDF LOGIC, DRIVER (eight) - OFF

pg 3-32

Delete: ✓ANTISKID, NWS steps

pg 3-33

Delete: ✓RA, MLS, TACAN steps

pg 3-35

Delete: SSME HYD REPRESS

ENTRY MNVRS

Replace Nominal Entry Maneuvers Cue Card
with LOSS OF 2 FUEL CELLS ENTRY MANEUVERS, 4-10

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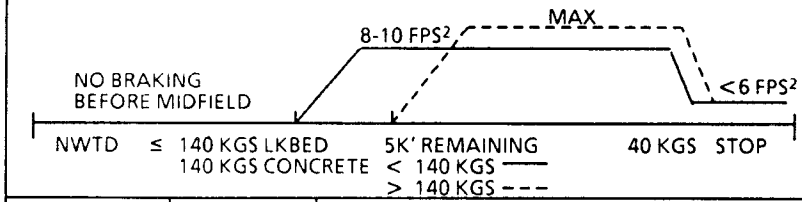
LOSS OF 2 FUEL CELLS ENTRY MANEUVERS

FLIGHT CONDITIONS	% RCS EACH SIDE	MANEUVER
EI-5		MDM FF4 - ON BRAKES (three) - ON cb ADTA 1,2,3 - cl GNC, I/O RESET - EXEC ✓cb DDU L,R (four) - cl L FLT CNTLR PWR - ON L INST PWR - FLT ✓LVLH ATT GNC, OPS 304 PRO ✓OPS 304, wait 1 min MDM FF4 - OFF * PREBANK [ ][ ][ ] (from DEL PAD) *
EI-3		✓FWD RCS MANF ISOL 1,2,3,4 - CLOSE
$\bar{q}$ = 8 or D = 3		CLOSED LOOP GUIDANCE _____:_____:_____ FIRST BANK CMD * If PREBANK, roll out PREBANK & FOLLOW * * ROLL CMD at 3°/sec (TIME CRITICAL) *
D = 11		✓DRAG H (FORCE if editing)
ΔAz = 10.5°		FIRST ROLL REVERSAL [ ][ ][ ][ ][ ] (from DEL PAD)
V = 15K		If FC 1 OK: TACAN 1,2 MODE - GPC If FC 2 or 3 OK: TACAN 2,3 MODE - GPC * If Inclination ≥ 50° * * DOUBLE TOGGLE (✓OVHD) * ✓TACAN ANT SEL (two) - AUTO * If ELS, UHF MODE - G T/R *
V = 12K		RAD BYP VLV MODE (two) - AUTO CNTLR LOOP (two) - AUTO B(A) * If no YAW JET, begin lateral trim * * monitoring *
V = 10K		✓SPD BRK to 81% * If three yaw jets failed on same side: * * Perform remaining roll reversals in * * R/Y - CSS *
V = 7K		✓TACAN status
V = 5K		L AIR DATA PROBE - DPY (wait 30 sec) R AIR DATA PROBE - DPY (Heat only 1 probe if reqd. If dilemma, deselect unheated ADTA) Begin AIL and RUD trim monitoring ✓MPS/TVC ISOL VLV - CL

FLIGHT CONDITIONS	% RCS EACH SIDE	MANEUVER
M = 4		MDM FF4 - ON GNC, I/O RESET - EXEC Begin $\dot{H}$ monitoring (✓ < 500 fps)
M = 2.9		CAB FAN (two) - OFF AV BAY FAN 2A - OFF 3A(3B) - OFF After ADTA incorporated, TACAN MODE (two) - OFF Use 1 HUD, 1 MLS, 1 RA GNC, I/O RESET - EXEC
M = 2.7		✓APUs
* If M < 2.5, P CSS for ADTA to G&C incorp *		
M = 2.0		Ensure ADTA to G&C else ✓Theta Limits
M = 0.95	* For bailout procedures, go to BAILOUT *	
M = 0.9		P,R/Y - CSS as reqd ✓SPDBK CMD vs POS ANTISKID - ON R FLT CNTLR PWR - ON R INST PWR - ON If NWS reqd: NWS - GPC
M = 0.7		✓HYD LG ISO 1,2 - OP
h = 15K		✓MLS
h = 10k		✓A/L
MAIN GEAR TD		SPD BRK - 100%
NOSE GEAR TD		SRB SEP - MAN/AUTO and depress pb ✓Auto Load Relief
		
STOP		✓All landing/navaids off CAB FAN B - ON (wait 3 sec, then continue) AV BAY FAN 2A,3A [3B vice 3A if FC1 OK] - ON (3 sec between each start) GO TO ENT C/L, POST LANDING PROCEDURES, 5-1

LOSS OF 2 FC LAUNCH DAY DEORBIT PREP
MS AFT FLIGHT DECK CONFIGURATION

NOTE
Wait for GO from CDR or PLT before starting any activity on this page

TIME	MS ACTIONS (AFT)
(TIG-)	
1:28	FDF CONFIG/ENTRY STOW [2]
1:23	HTR CONFIG [4]
1:05	FUEL CELL PURGE [8]
1:00	COMM CONFIG [10]

FDF CONFIG/ENTRY STOW [2]

FDF CONFIG

Unstow, install:
- Entry & Deorbit Burn Cue Cards
- ENT
- ENT PKT
- ✓AVAILABLE for ENTRY
- OMS/RCS Slide Rule Kit
- LDG SITE CHARTS
- Handheld Radio
- STAR CHART
- ORB OPS
- CONT DEORB
- ORB PKT
- REF DATA
- MAL
- Stow all other FDF articles

ENTRY STOW

Stow Flt Deck Camrs, Accessories
Stow VTR Cassettes (1 in VTR)

FOOT LOOP CONFIG

Tape Foot Loops in egress routes

HTR CONFIG [4]

R12U FC PURGE HTR - ON

NOTE
Htr must be on 15 min prior to purge

A12 ✓APU HTR TK/FU LINE/H20/SYS 1A,2A,3A - AUTO
✓1B,2B,3B - OFF
✓HYD HTR (eight) - OFF

A14 RCS/OMS HTR FWD RCS - OFF
L POD (two) - ✓A OFF, B OFF
R POD (two) - ✓A OFF, B OFF
OMS CRSFD LINES (two) - A OFF
- ✓B OFF
FWD, AFT RCS JET 5 (two) - OFF

FUEL CELL PURGE [8]

WARNING
Do not purge if FC AMPS > 430

✓FC PURGE HTR ON > 15 min

R12U FC PURGE VLV X - OP for 2 min, then - GPC
FC PURGE HTR - GPC
✓VLV - GPC

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COMM CONFIG	10		
A1L	S-BD	PM MODE	- STDN LO
	NSP	DATA RATE XMIT	- HI
		RCV	- LO
		CODING (two)	- OFF
A13	OS AUD SPKR		- OFF
A15	DC UTIL PWR MNC		- OFF
	PS COMM CCU PWR		- OFF
R15:C	✓cb KU ELEC		- OP
		✓ANT HTR	- OP
		✓CABLE HTR	- OP
		✓SIG PROC	- OP
O5,O9	L,R AUD A/G2		- T/R
	ICOM B		- T/R
	VOX SENS		- R
	VOL tw (six)		- R
	XMIT/ICOM MODE		- PTT/VOX
MO42F	MIDDECK SPKR AUD PWR		- AUD/TONE
R10, L9	MS, PS AUD PWR		- AUD/TONE
		A/G1	- T/R
		2	- T/R
		A/A	- T/R
		ICOM A,B	- T/R
		VOX SENS	- R
	VOL tw (six)		- R
	XMIT/ICOM MODE		- as reqd

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LOSS OF 2 FC LAUNCH DAY DEORBIT PREP
MS MIDDECK CONFIGURATION

NOTE
Wait for GO from CDR or PLT before starting any activity on this page

TIME	MS ACTIONS (MID)
(TIG-)	
1:25	AC BUS CONFIG [3]
1:03	WCS DEACTIVATION [9]
:59	VENT DOOR OPS DISABLE [11]

AC BUS CONFIG [3]

P,MS L4:D :E :Q

1 ✓All cbs (27) - op

2. If FC 1 OK, Perform AC3 3φ BUS LOSS ACTIONS, (ORB PKT, EPS),
   Do only steps in ORB PKT, do not proceed to MAL, then
   go to steps 3 and 4 (AC3 is the Affected Bus)

   If FC 2 or FC 3 OK, perform AC1 3φ BUS LOSS ACTIONS, (ORB PKT, EPS),
   Do only steps in ORB PKT, do not proceed to MAL, then
   go to steps 3 and 4 (AC1 is the Affected Bus)

R1 3. Affected BUS:
- cb AC CONTR (three) - cl
- AC BUS SNSR - OFF
- INV/AC BUS - OFF (tb-OFF)
- INV PWR - OFF (tb-OFF)
- cb AC CONTR (three) - op

4. Connect AC1 to AC3:
   Perform AC POWER TRANSFER CABLE INSTALLATION
   (IFM, PROCEDURES A THRU F)

WCS DEACTIVATION [9]

WCS
- VAC VLV - CL
- Remove, Stow - WCS Trash Can
- Mirror
- Close & latch door

ML31C VAC VENT ISOL VLV CNTL - CL (tb-CL)
NOZ HTR - OFF

VENT DOOR OPS DISABLE [11]

MA73C:A MCA LOGIC MID (four) - OFF
✓FWD (three) - ON
:B MCA LOGIC MID (four) - OFF
AFT (three) - OFF

If MNB and AC2 powered:
MA73C:C cb MCA PWR FWD 1 - op
FWD 3 - op

✓Minimum MIDDECK lighting

LOSS OF 2 FUEL CELLS DEORBIT PREP

Assumptions/Initial Conditions

- The LOSS OF 2 FUEL CELLS Deorbit Prep assumes one of the following powerdowns has been accomplished:
  - LOSS OF 2 FC (TIG < 4:00) (ORB PKT, PWRDN)
  - LOSS OF 2 FC (TIG > 4:00) (ORB PKT, PWRDN)
- The electrical load will be 10-12 kW with transients to 14 kW during the D/O Prep and ENT

IF TIME TO TIG < 4:00

- Refer to Activity Priority Table on 5-7
- Use the EXPEDITED D/O PREP column to determine LOSS OF 2 FC D/O PREP procedures that must be performed (MAND) and those which should be performed if time permits (OPT)
- If any portions of Nominal D/O Prep have been accomplished, reconfigure systems per the LOSS of 2 FC D/O Prep as reqd.

IF TIME TO TIG > 4:00

- Perform all LOSS OF 2 FC D/O Prep procedures

Problem Description/Rationale

- The Orbiter electrical load is being carried by one fuel cell; therefore, it is a critical component. LRUs may experience undervoltage with accompanying alarms

LOSS OF 2 FUEL CELLS DEORBIT PREP
PROCEDURE NOTES

- USE ONLY ONE CRT, ONE INST PWR, & ONE DDU WHENEVER POSSIBLE
- OMIT ALL MANEUVERS PRIOR TO TIG -03:36 IF GG FROM POWERDOWN
- MAINTAIN MINIMUM LIGHTING
- A SECOND PASS GPC (GPC 4) WILL BE POWERED-UP AT ~TIG -20
- VENT DOORS WILL BE OPEN THROUGHOUT ENTRY (EXCEPT L,R VENT DOORS 1&2)
- MS procedures are located on MS PULL-OUT PAGES 5-25 thru 5-30
  Extra copies are located in the back of the PLT's book

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		OPS 1 ASC PKT	OPS 2 ON-ORBIT WAIT	OPS 2 DEORBIT PREP	OPS 3 DEORBIT PREP
DPS					
GPC		1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
OPS		G1 - - - BFS	G2 -- -- SM --	G2 -- -- SM --	G3 -- -- -- BFS
POWER		ON OFF OFF OFF ON	ON OFF OFF ON OFF	ON OFF OFF ON OFF	ON OFF OFF OFF ON
OUTPUT		N N N N B	N N N T N	N N N T N	N N N N B
MODE		R H H H R	R H H R H	R H H R H	R H H H R
CONFIG		1	2 / 4	2 / 4 (5)	3
GPC		1 2 3 4 0	1 0 0 0 0 / 0 0 0 4 0	1 0 0 0 0 / 0 0 0 4 0	1 0 0 0 0
STR	1	1	1 / 0	1 / 0	1
	2	1	1 / 0	1 / 0	1
	3	1	1 / 0	1 / 0	1
	4	1	1 / 0	1 / 0	1
PL	1/2	1	0 / 4	0 / 4	1
CRT	1	1	1 / 4	1 / 4	1
	2	1	1 / 4	1 / 4	1
	3	1	0 / 0	0 / 0	1
	4	0	1 / 4	1 / 4	0
L	1	1	0 / 4	0 / 4	0
	2	2	0 / 0	0 / 0	0
MM	1	1	1(OFF) / 4	1(ON) / 4	1(OFF)
	2	1	1(OFF) / 4	1(OFF) / 4	1(OFF)
MDM			FF3; PL2 - ON*	All ON except FF4	All ON except FF4
D & C	ADI/DDU	L,R	AFT →	L →	→
	CRT/DEU	1	4 →	3 →	1,3 →
	INSTR	L,R	AFT →	L →	→
ECLS	AV BAY FAN	1,2,3	1,3 →	→	1,2,3 →
	CABIN FAN	A	B →	→	→
	IMU FAN	B	B →	→	→
	WATER LP	2	(A) →	→	1-OFF, 2-ON →
	FREON LP	1	1-A, 2-A →	→	→
	RADIATOR	Stow	Stow →	→	→
	FES	ON	OFF →	→	ON →
FCS/NAVS/AIDS	FCS CH	AUTO	AUTO →	→	→
	ASA	ON	OFF →	→	→
	AA	ON	OFF →	→	1,2,3 →
	RGA	ON	OFF →	→	1,2,3 →
	ADTA	ON	OFF →	→	→
	IMU	2,3	3 →	→	1,2,3 →
	MLS	OFF	OFF →	→	→
	RA	OFF	OFF →	→	→
	TACAN	OFF	OFF →	→	→
RJD	RJDA (B)	ALL ON	OFF →	1A,1B,2B →	→
	RJDF (B)	ALL ON	OFF →	→	All OFF →
	VERNIER	OFF	OFF →	→	All OFF →

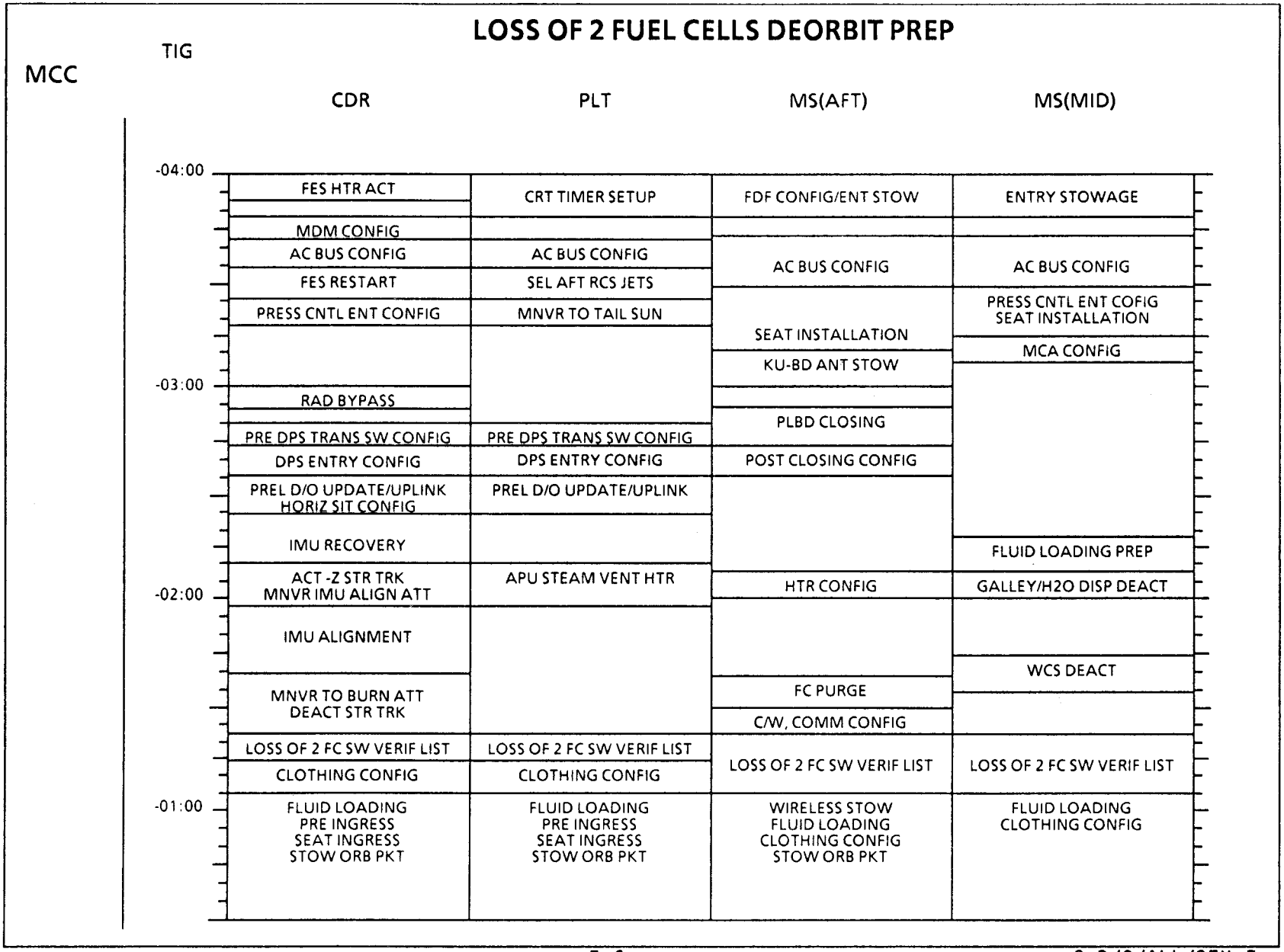
(A) Water loops cycled as reqd (950 lb/hr)

(B) Primary RJDs will be OFF during sleep periods

NOTE: Maintain minimum lighting

		SEAT INGRESS	TIG-20	EI-5	V = 15K
DPS					
GPC		1 2 3 4 5	1 2 3 4 5		
OPS		G3 - - -- BFS	G3 -- -- G3 BFS		
POWER		ON OFF OFF OFF ON	ON OFF OFF ON ON		
OUTPUT		N N N N B	N N N N B		
MODE		R H H H R	R H H R R		
CONFIG		3	3		
GPC		1 0 0 0 0	1 0 0 4 0		
STR	1	1	1		
	2	1	4		
	3	1	4		
	4	1	1		
PL	1/2	1	1		
CRT	1	1	1		
	2	1	1		
	3	1	4		
	4	0	0		
L	1	0	0		
	2	0	0		
MM	1	1(ON)	1(ON)		
	2	1(ON)	4(ON)		
MDM		All ON except FF4	All ON except FF4		
D & C	ADI/DDU	L,R	→	→	→
	CRT/DEU	1,3	→	→	→
	INSTR	L	→	L,R	→
E C L S	AV BAY FAN	1,2,3	→	1,2	→
	CABIN FAN	B	→	→	→
	IMU FAN	B	→	→	→
	WATER LP	1-OFF,2-ON	→	→	→
	FREON LP	1-A,2-A	→	→	→
	RADIATOR	Stow	→	→	→
	FES	ON	→	→	→
F C S / N A V A I D S S	FCS CH	AUTO →	ORIDE	→	→
	ASA	OFF →	ON	→	→
	AA	1,2,3	→	→	→
	RGA	1,2,3	→	→	→
	ADTA	OFF	→	ON	→
	IMU	1,2,3	→	→	→
	MLS	OFF	→	→	→
	RA	OFF	→	→	→
	TACAN	OFF	→	→	1, 2 or 2,3
R J D	RJDA	1A,1B,2B	→	→	→
	RJDF	ALL OFF	→	→	→
	VERNIER	All OFF	→	→	→

LOSS OF 2 FUEL CELLS DEORBIT PREP



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LOSS OF 2 FUEL CELLS DEORBIT PREP
ACTIVITY PRIORITY TABLE

TIG	ACTIVITY	PAGE	EXPEDITED D/O	
			MAND	OPT
4:00	CRT TIMER SETUP	5-8	1	--
3:59	ENTRY STOWAGE	5-29	--	2
3:58	FES HTR ACT	5-8	--	--
3:57	FDF CONFIG/ENT STOW	5-25	4	--
3:54	RCS/OMS HTR ACT	5-9	--	--
3:45	MDM CONFIG	5-9	--	--
3:42	AC BUS CONFIG	5-9	6	--
3:36	SELECT AFT RCS	5-9	--	--
3:32	AIRLOCK SW VERIF	5-9	--	T/L
3:30	FES RESTART	5-10	--	--
3:29	MNVR TO TAIL SUN	5-11	T/L	--
3:25	PCS ENT CONFIG	5-10	9	--
3:24	SEAT INSTALLATION	5-11	T/L	--
3:14	MCA CONFIG	5-30	10	--
3:10	KU-BD ANT STOW	5-11	T/L	--
3:00	RAD BYP	5-13	11	--
2:59	PLBD CLOSING	5-26	12	--
2:50	POST CLOSING CONFIG	5-26	13	--
2:49	CRYO QTY CONFIG	5-12	--	14
2:48	PRE DPS TRANS SW CONFIG	5-12	15	--
2:45	DPS ENTRY CONFIG	5-12	16	--
2:35	PREL D/O UPDT/UPLK	5-13	17	--
2:32	HORIZ SIT CONFIG	5-13	--	T/L
2:24	IMU RECOVERY	5-15	--	--
2:20	FLUID LOADING PREP	5-30	--	18
2:10	GALLEY or H2O DISP DEACT	5-30	--	19
2:09	HTR CONFIG	5-27	20	--
2:08	APU STEAM VENT HTR ACT	5-14	21	--
2:07	-Z S-TRKR ACT	5-15	T/L	--
2:04	MNVR TO IMU ATT	5-15	T/L	--
2:00	IMU ALIGNMENT	5-16	22	--
1:44	WCS DEACT	5-30	23	--
1:40	FUEL CELL PURGE	5-27	24	--
1:39	MNVR TO BURN ATT	5-17	T/L	--
1:34	S-TRKR DEACT	5-17	25	--
1:29	C/W, COMM CONFIG	5-27	26	--
1:27	VENT DOOR OPS DISABLE	5-30	27	--
1:25	SWITCH VERIF	5-19	--	T/L
1:15	CLOTHING CONFIG (C,P)	5-19	--	28
1:06	WIRELESS STOW	5-27	29	--
1:05	BEGIN FLUID LOADING	5-19	--	T/L
1:01	CLOTHING CONFIG (MS,PS)	5-28	--	30
1:00	PRE INGRESS CONFIG	5-20	31	--
:52	SEAT INGRESS	5-21	T/L	--
:45	GO TO ENT WITH P&I's	5-21	T/L	--

T/L - Procedure located in timeline vice procedure block

- This table assumes LOSS OF 2 FC (TIG < 4:00) (ORB PKT, PWRDN) has been performed
- Procedure blocks listed in the MAND column are the only ones that must be performed if failure occurs on-orbit with TIG < 4:00 away
- At least 1.5 hours is required to perform all MAND activities
- Those in the OPT column are optional and should be performed if time permits
- If a procedure has a dash in both the MAND and OPT columns, it is not required for the expedited case
- Some procedures may be deleted if any NOM D/O PREP actions have been accomplished

CRT TIMER SETUP [1]

P [1: GNC 2 TIME]

SET CRT TIMER TO COUNT DOWN TO TIG (perform for GNC & SM)

ENTRY DAY (HR:MIN:SEC - MET)

ITEM 17 + | | | + | | | + | | |

24 HOUR LATE DELAYED DEORBIT

ITEM 17 + | | | + | | | + | | |

[1: GNC UNIV PTG]

FES HTR ACTIVATION [3]

C	L1	TOP EVAP HTR NOZ (two) - B AUTO DUCT - B
	L2	FLASH EVAP FDLN HTR (two) - 2
	R12L	✓SPLY H2O TKA OUTLET - CL (tb-CL) ✓TKB OUTLET - OP (tb-OP) ✓B SPLY ISOL VLV - OP (tb-OP)

MDM CONFIG [5]

C	O6	✓MDM PL1,2 - ON ✓FF 1,2,3 - ON ✓FA (four) - ON
	CRT X	GNC, I/O RESET SM, I/O RESET

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TIG

-04:00 P CRT TIMER SETUP [1]

GRAVITY GRADIENT

MS ENTRY STOWAGE [2], 5-29

C FES HTR ACTIVATION [3]

MS FDF CONFIG/ENTRY STOW [4], 5-25

-03:55 P A14 ✓RCS/OMS HTR AFT RCS JET 1,2,3,4 - AUTO

-03:50

-03:45 C MDM CONFIG [5]

A AC BUS CONFIG [6], 5-25, 5-29

-03:40

P SELECT AFT RCS JETS [7] (if GG from pwrdn)

-03:35

MS LOSS OF 2 FC SW VERIF LIST, 6-28, 6-29
(Airlock & Airlock Hatch Only)

-03:30

AC BUS CONFIG [6]

A L4:D :E :Q

1. ✓All cbs (27) - op

2. If FC 1 OK, Perform AC3 3φ BUS LOSS ACTIONS (ORB PKT, EPS) Do only steps in ORB PKT, do not proceed to MAL,
or then mark-up pictorials in section 6 to match buss loss actions, then go to steps 3 and 4 (AC3 is the Affected Bus)

If FC 2 or FC 3 OK, perform AC1 3φ BUS LOSS ACTIONS (ORB PKT, EPS) Do only steps in ORB PKT, do not proceed to MAL, then mark-up pictorials in section 6 to match buss loss actions then go to steps 3 and 4 (AC1 is the Affected Bus)

R1 3. Affected BUS: cb AC CONTR (three) - cl
AC BUS SNSR - OFF
INV/AC BUS - OFF (tb-OFF)
INV PWR - OFF (tb-OFF)
cb AC CONTR (three) - op

4. Connect AC1 to AC3:
Perform AC POWER TRANSFER CABLE INSTALLATION (IFM, PROCEDURES A THRU F)

SELECT AFT RCS JETS [7] (if GG from pwrdn)

P O6 ✓MDM FA (four) - ON
[GNC 20 DAP CONFIG]
SELECT Jet OPT 3
O14:F ✓RJDA 1A L2/R2 LOGIC - ON
✓DRIVER - ON
O15:F ✓RJDA 1B L1/L5/R1 LOGIC - ON
✓L1/R1 DRIVER - ON
O16:F ✓RJDA 2B L3/R3/R5 LOGIC - ON
✓L3/R3 DRIVER - ON
[X:GNC 23 RCS]

NOTE
Monitor each manifold pressure before opening as follows:

If MANF PRESS > 130
O7 AFT L,R RCS He PRESS A (two) - OP (tb-OP)
TK ISOL (six) - OP (tb-OP)
MANF ISOL 1,2,3 - OP (tb-OP)

or

If MANF PRESS < 130, go to MAL, RCS, SSR-4, Staged Repress Procedure

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FES RESTART 8

C

L1 RAD CNTLR OUT TEMP - HI
When EVAP OUT T = 50 ± 2
FLASH EVAP CNTLR PRI B(A) - ON
HI LOAD DUCT HTR - B

R12L SPLY H2O XOVR VLV - OP (tb-OP)

PRESS CNTL SYS ENTRY CONFIG 9

MS MO10W 14.7 CAB REG INLET SYS 1,2 vlv (two) - CL
H2O TK N2 REG INLET SYS 1,2 vlv (two) - OP
O2 REG INLET SYS 1,2 vlv (two) - CL

MO32M LEH O2 5 vlv - CL
Remove and Stow O2 Bleed Orifice
LEH O2 5,6 vlv - OP (if reqd)

MO69M LEH O2 7,8 vlv - OP (if reqd)

C L2 ✓O2 SYS 1,2 SPLY (two) - OP (tb-OP)
✓XOVR SYS 1,2 (two) - OP
✓N2 SYS 1,2 SPLY (two) - OP (tb-OP)
✓REG INLET (two) - OP (tb-OP)
O2/N2 CNTLR VLV SYS 1 - OP
2 - CL

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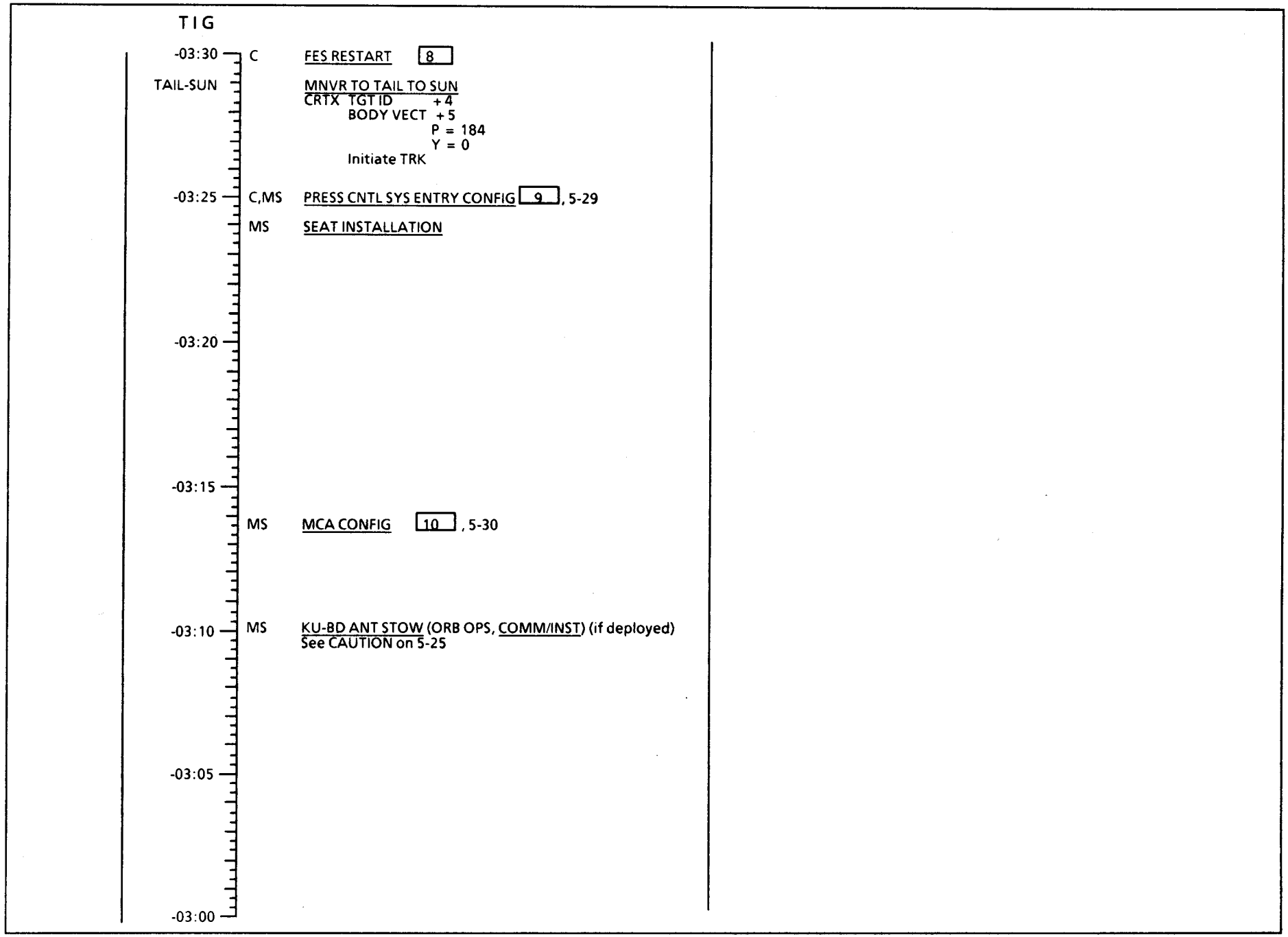
TIG
-03:30
C
FES RESTART 8
TAIL-SUN
MNVR TO TAIL TO SUN
CRTX TGT ID +4
BODY VECT +5
P = 184
Y = 0
Initiate TRK
-03:25
C,MS
PRESS CNTL SYS ENTRY CONFIG 9, 5-29
MS
SEAT INSTALLATION
-03:20
-03:15
MS
MCA CONFIG 10, 5-30
-03:10
MS
KU-BD ANT STOW (ORB OPS, COMM/INST) (if deployed)
See CAUTION on 5-25
-03:05
-03:00

RAD BYP [11]

FLASH EVAP CONFIG

C L1 ✓FLASH EVAP CNTLR PRI B(A) - ON
✓PRI A(B) - OFF
✓SEC - OFF
HI LOAD EVAP - ENA
✓DUCT HTR - B

RAD BYP

L1 RAD CNTLR OUT TEMP - NORM
RAD BYP VLV MODE (two) - MAN
MAN SEL (two) - BYP (after 3 sec, tb-BYP)
RAD CNTLR LOOP (two) - OFF
O1 ✓FREON EVAP OUT TEMP ind ~39 ± 1 (after 2.5 min)

FREON LOOP CONFIG

L1 FLOW PROP VLV LOOP (two) - ICH (hold 3 sec, tb-ICH)

CRYO QTY CONFIG [14]

C O13:B cb ESS 1BC CRYO QTY O2,H2 TK2 (two) - op
:D cb ESS 2CA CRYO QTY O2,H2 TK1 (two) - op

PRE DPS TRANS SWITCH CONFIG [15]

C,P O14:A RGA 1 - ON
:E cb MNA ACCEL 1 - cl
:F ASA 1 - ON
O15:A RGA 2 - ON
:E cb MNB ACCEL 2 - cl
:F ASA 2 - ON
O16:A RGA 3 - ON
ACCEL 3 - ON

DPS ENTRY CONFIG [16]

C,P L1 ✓AV BAY 2 FAN A - ON
O14:F ✓MMU 1 - ON
O15:F ✓MMU 2 - ON
C3 ✓FCS CH (four) - AUTO

LOAD ENTRY TFL

[X: SM 62 PCMMU/PL COMM]
C3 ✓OI PCMMU FORMAT - GPC
CRTX FMT:
FXD - ITEM 1 EXEC
SEL ID - ITEM 3 + 1 0 5 EXEC
LOAD - ITEM 4 EXEC
-✓RUN,CPLT
SEL ID - ITEM 3 + 1 6 4 EXEC
LOAD - ITEM 4 EXEC
-✓RUN,CPLT
PGM - ITEM 2 EXEC

SM CHECKPOINT/UL CNTL ENA

C2 [X: SM 60 SM TABLE MAINT]
[Y: SM 1 DPS UTILITY]

CRTY MMU ASSIGN 2 SM - ITEM 4 EXEC
CRTX CKPT INITIATE - ITEM 18 EXEC
✓Update of CKPT TIME and STATUS GOOD indicated

CRTY MMU ASSIGN 1 SM - ITEM 3 EXEC
CRTX CKPT INITIATE - ITEM 18 EXEC
✓Update of CKPT TIME and STATUS GOOD indicated

CRTY CKPT RETRV ENA - ITEM 12 EXEC (*)
UL CNTL ENA - ITEM 36 EXEC

DEACT GPC 4

CRTX MAJ FUNC - GNC

NOTE
All MAJ FUNC should be GNC
prior to powering down SM GPC

O6 GPC 4 MODE - STBY,HALT
PWR - OFF
OUTPUT - NORM

CRT1 GPC/CRT 04 EXEC
GPC/CRT 13 EXEC

TRANSITION GPC 1 TO GNC OPS 3

[X: GNC GPC MEMORY]
CRTX CONFIG - ITEM 1 + 3 EXEC
Modify MC 3 per Table →

CRTX GNC, OPS 301 PRO
[DEORB MNVR COAST]

CONFIG GPC		3 10000
STR	1	1
	2	1
	3	1
	4	1
PL	1/2	1
CRT	1	1
	2	1
	3	1
	4	0
L	1	0
	2	0
MM	1	1
	2	1

TRANSITION BFS GPC TO GNC OPS 3

O6 GPC 5 PWR - ON
OUTPUT - B/U (tb-bp)
MODE - STBY (tb-RUN),RUN
C3 BFS CRT DISP - ON
SEL - 2 + 3

[2: BFS MEMORY]
CRT2 BFS, GNC OPS 301 PRO
[2: BFS, DEORB MNVR COAST]

LAND SITE UPDATE

[2: GNC 50 HORIZ SIT]
SEL SITE (See LAND SITE DATA)

O14:F MMU 1 - OFF
ASA 1 - OFF
O15:F MMU 2 - OFF
ASA 2 - OFF

TIG

-03:00 C RAD BYP [11]

MS PLBD CLOSING [12], 5-26

-02:55

-02:50 MS POST CLOSING CONFIG [13], 5-26

C CRYO QTY CONFIG [14]

C,P PRE DPS TRANS SWITCH CONFIG [15]

-02:45 C,P DPS ENTRY CONFIG [16]

-02:40

-02:35 C,P PREL DEORB UPDATE/UPLINK [17]

C HORIZ SIT CONFIG (ENT, DEORBIT BURN)

-02:30

PREL DEORB UPDATE/UPLINK [17]

C C3 ✓UPLK - ENA
✓1: GNC ORBIT MNVR EXEC
✓3: BFS, GNC DEORB MNVR COAST
MCC update:
OMS PRPLT PAD, DEL PAD (ENT, PRPLT/DEL), and DEORBIT MNVR PAD (ENT, MNVR PADS)
IMU ALIGN PAD, if reqd
MCC uplink:
PASS and BFS SV, TGT
✓PASS and BFS TGT per DEORBIT MNVR PAD (ENT, MNVR PADS

* If MCC cannot provide *
* DEORB TGT; use SPOC *

CRT1 LOAD - ITEM 22 EXEC
TIMER- ITEM 23 EXEC

CRT1 ✓PASS and BFS solution per DEORBIT MNVR PAD (ENT, MNVR PADS)
BURN ATT,
HA, HP,
ΔV TOT,
TGO

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APU STEAM VENT HTR ACT [21]

P R2

If FC 1 OK:
BLR CNTLR/HTR 1 - A
✓2 - B
or ✓3 - A

If FC 2 or 3 OK:
✓BLR CNTLR/HTR 1 - A
2 - A
✓3 - B
BLR PWR (three) - ON

NOTE
Htr reqd to be on 2 hours prior to APU act

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TIG

-02:30

-02:25

C IMU RECOVERY (if reqd)
Use MAL, GNC, FRP-3 to recover
any IMUs lost due to bus failures or powerdown
BFS, GNC, OPS 000, 301 PRO
BFS, GNC 50 HORIZ SIT
✓BFS R/W sel

-02:20

MS FLUID LOADING PREP [18], 5-30

-02:15

-02:10

MS GALLEY or H2O DISPENSER DEACT [19], 5-30

MS HTR CONFIG [20], 5-27

P APU STEAM VENT HTR ACT [21]

C ACT -Z STAR TRKR (omit if BFS)
O6 ✓STAR TRKR -Z - ON
✓-Y - ON
CRT1 GNC, I/O RESET EXEC
✓STAR TRKR doors are open

-02:05

C MNVR TO IMU ATT (omit if BFS) use pad on this page
DAP: AUTO

-02:00

IMU STAR ALIGN PAD

NOTE
For pad data, ✓MCC or ref STAR PAIRS (ORB OPS, GNC)

STAR ID: -Y ___, _____ (TIG - ___ : ___ TO - ___ : ___)
-Z ___, _____ (TIG - ___ : ___ TO - ___ : ___)
ANG DIF: _____

ALIGNMENT ATTITUDE (Dual or Single S TRKR)	2nd ALIGNMENT ATTITUDE (Single S TRKR) -Z: _____	-Y: _____
R ___.__	R ___.__	R ___.__
P ___.__	P ___.__	P ___.__
Y ___.__	Y ___.__	Y ___.__

IMU STAR ALIGN LOG

REQD ID: -Y ___, -Z ___ ANG ERR __.___

ANG	1	2	3
ΔX	( ) ____.___	( ) ____.___	( ) ____.___
ΔY	( ) ____.___	( ) ____.___	( ) ____.___
ΔZ	( ) ____.___	( ) ____.___	( ) ____.___

EXECUTE TIME ___ : ___ : ___ (TIG MINUS)

IMU VERIFICATION PAD

NOTE
For pad data, ✓MCC or ref STAR PAIRS (ORB OPS, GNC)

STAR ID: -Y ___, _____ (TIG - ___ : ___ TO - ___ : ___)
-Z ___, _____ (TIG - ___ : ___ TO - ___ : ___)
ANG DIF: _____

ALIGNMENT ATTITUDE (Dual or Single S TRKR)	2nd ALIGNMENT ATTITUDE (Single S TRKR) -Z: _____	-Y: _____
R ___.__	R ___.__	R ___.__
P ___.__	P ___.__	P ___.__
Y ___.__	Y ___.__	Y ___.__

IMU VERIFICATION LOG

REQD ID: -Y ___, -Z ___ ANG ERR __.___

ANG	1	2	3
ΔX	( ) ____.___	( ) ____.___	( ) ____.___
ΔY	( ) ____.___	( ) ____.___	( ) ____.___
ΔZ	( ) ____.___	( ) ____.___	( ) ____.___

EXECUTE TIME ___ : ___ : ___ (TIG MINUS)

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IMU ALIGNMENT 22

NOTE

Procedure applies for 1 or 2 S TRKR aligns.
For 1 S TRKR, a 2nd ATT MNVR is reqd between data takes. See pad on 5-15 for ATT & stars

C 1. 1: GNC 22 S TRK/COAS CNTL

C3 BFC CRT DISP - OFF

3: GNC 21 IMU ALIGN

CRT1 2. ✓REQD ID - ITEM 11,12 - 0
✓STATUS (two) - NO BITE
✓SHUTTER (two) - OP

* If SHUTTER - CL: *
* ✓ATT, MET - correct *
* Visually verify no bright object *
* in FOV *
* After data collected and before changing *
* attitude return shutter to AUTO *
* To open shutter: *
* MAN OP - ITEM 15(16) EXEC (*) *
* To return shutter to AUTO: *
* MAN OP - ITEM 15(16) EXEC (no *) *

CRT3 IMU 1,2,3:
✓STAT - blank
✓OPER - ITEM 4,5,6 (*)

3. ✓IMU ALIGN ATT (pad)

CRT1 4. S TABLE CLR - ITEM 20 EXEC

CRT1 5. Enable Star Tracker:
✓STAR TRK - ITEM 3,4 EXEC (*)

6. Verify S TABLE:
TRK ID 1,2 = STAR ID (pad)
ANG ERR ≤ .08
Wait approx 1 minute for new IMU Δ ANGS

* If after 3 min no data (or bad data) in S TABLE: *
* ✓STAR TRK - ITEM 3,4 (*) *
* ✓ATT/STARS/TIME *
* ✓S TRK: TRK ID = STAR ID (pad) *
* Do S TRK Self Test *
* If neither tracker fails *
* MNVR to Verification ATT - repeat steps 3,4,5,6 *
* If one tracker fails *
* ✓TERM/IDLE for failed tracker - ITEM 9 (10) (*) *
* proceed with 1 S TRK ALIGN *
* If both trackers fail inform MCC *

For 1 S TRK ALIGN:
STAR TRK for good tracker - ITEM 3 (4) EXEC (*)
S TABLE CLR - ITEM 20 EXEC, reacquire star with good tracker
TERM/IDLE for good tracker during maneuvers - ITEM 9 (10) EXEC (*)
MNVR to 2nd ATT (Single S TRK): Do not clear S Table
Repeat steps 3,5,6 with 2nd Star ID

CRT1 7. ✓S TABLE SEL - ITEM 17,18 (*)
CRT3 ALIGN IMU 1,2,3 - ITEM 10,11,12,EXEC (*)
✓STAR ALIGN - ITEM 13 (*)
✓IMU 1,2,3 - ANG ΔX,ΔY,ΔZ < 0.80

* If ANG ΔX,ΔY,ΔZ > 0.80 for two IMUs, do not *
* torque: *
* MNVR to Verification ATT & repeat steps 3 thru *
* 7 once *
* If still > 0.80 report to MCC *

CRT3 8. Record ANG ΔX,ΔY,ΔZ,ANG ERR & execute time (use log on 5-15)

EXEC - ITEM 16 EXEC (*)

Alignment complete when:

EXEC - ITEM 16 (no *)

IMU ALIGN VERIFICATION

9. MNVR per IMU VERIFICATION PAD, 5-15
DAP: AUTO

10. Perform steps 3,4,5 & 6 using appropriate stars (pad)

11. ✓IMU 1,2,3 ANG ΔX,ΔY,ΔZ < 0.1

* If ANG ΔX,ΔY,ΔZ > 0.1, perform steps 8-11, *
* report to MCC *

NOTE

For alternate stars, ✓MCC or ref STAR PAIRS (ORB OPS, GNC)

12. Report IMU ALIGN results
C3 13. BFC CRT DISP - ON

8: BFS, GNC DEORB MNVR COAST

1: GNC DEORB MNVR COAST

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TIG

-02:00 — C — IMU ALIGNMENT [22] (omit if BFS)

-01:55

-01:50

-01:45 — MS — WCS DEACTIVATION [23], 5-30

-01:40 — MS — FUEL CELL PURGE [24], 5-27

C — MNVR TO BURN ATT
MNVR per DEORBIT MNVR PAD (ENT, MNVR PADS)
R ____ ____ ____
P ____ ____ ____
Y ____ ____ ____

-01:35 — DAP: AUTO

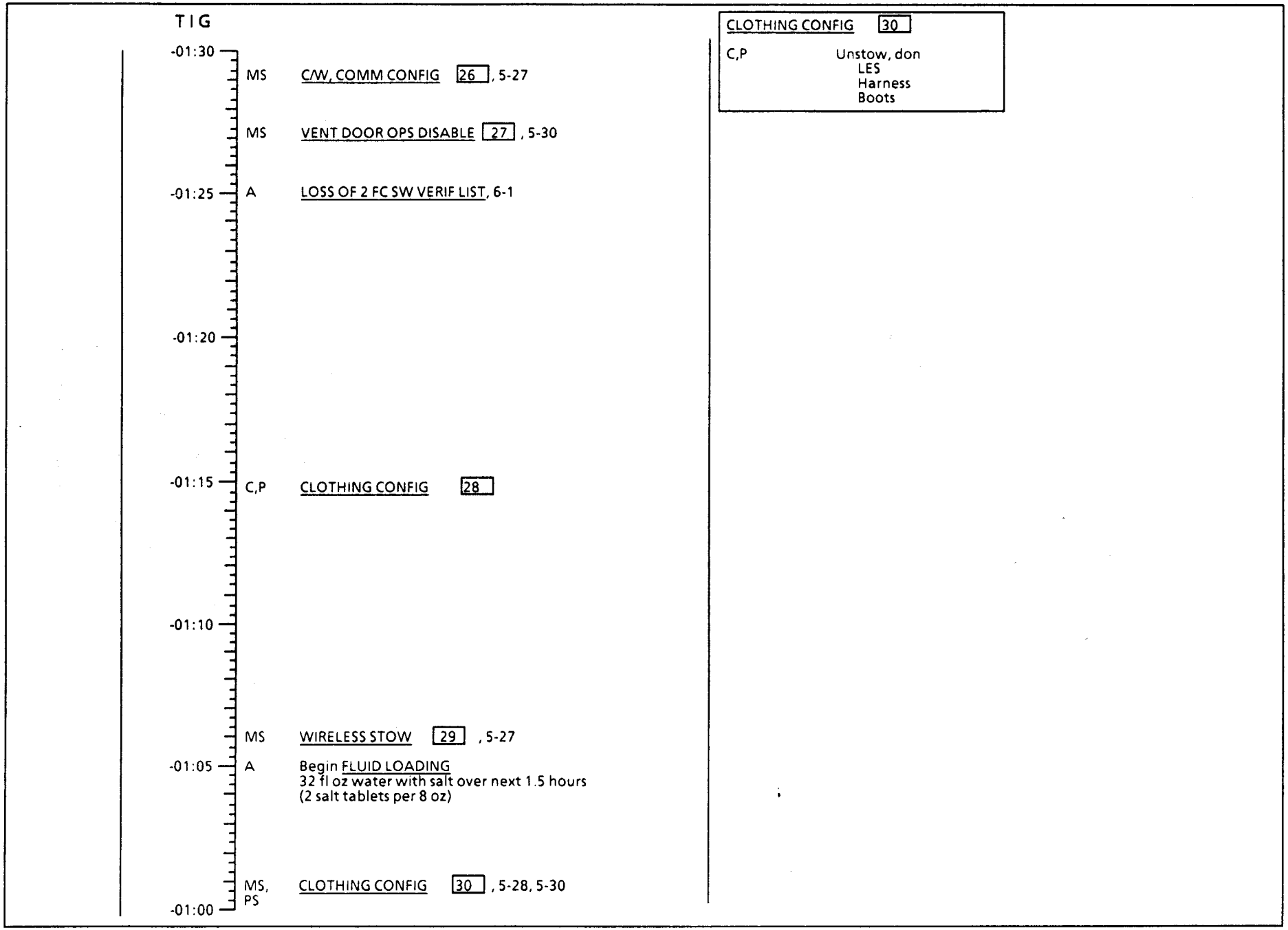
C — DEACT STAR TRACKERS & CLOSE DOORS [25]

-01:30

DEACT STAR TRACKERS & CLOSE DOORS [25]

C
O6 — STAR TRKR PWR (two) - OFF
O14:E — cb STAR TRKR - Z - op
O15:E — cb STAR TRKR - Y - op
O6 — STAR TRKR DR CNTL SYS (two) - CL
✓POS tb (two) - bp (start timer)
When both tb - CL (~8-24 sec)
or either tb -bp > 24 sec:
STAR TRKR DR CNTL SYS (two) - OFF

* If tb - bp > 8 sec, notify MCC *


TIG
-01:30
MS C/W, COMM CONFIG 26, 5-27
MS VENT DOOR OPS DISABLE 27, 5-30
-01:25
A LOSS OF 2 FC SW VERIF LIST, 6-1
-01:20
-01:15
C,P CLOTHING CONFIG 28
-01:10
MS WIRELESS STOW 29, 5-27
-01:05
A Begin FLUID LOADING
32 fl oz water with salt over next 1.5 hours
(2 salt tablets per 8 oz)
MS, PS CLOTHING CONFIG 30, 5-28, 5-30
-01:00
CLOTHING CONFIG 30
C,P Unstow, don
LES
Harness
Boots

PRE INGRESS CONFIG 31

MPS/H2 PURGE PREP

P R2 MPS He ISOL B L - CL
PNEU L ENG He XOVR - CL
R4 MPS MANF PRESS (two) - CL

ENABLE QTY GAUGE

C,P O16:E cb MNC RCS/OMS PRPLT QTY GAUGE - cl

RA CONFIG

F8 RDR ALTM - 1

MLS CH/TACAN CH/DATA BUS

O8 MLS CH (three) tw - See LAND SITE DATA
O7 TACAN CH (three) tw - See LAND SITE DATA

F6 ✓DATA BUS - 3
F8 ✓DATA BUS - 4

ENABLE PROXIMITY PACKAGE

C L4:P ✓cb AC2 ϕA LG SNSR 2 - cl
✓cb AC3 ϕA LG SNSR 1 - cl

cb CONFIG

C L4:J cb SIG CONDR HUM SEP - op
IMU FAN - op

HUD SETUP

Remove/stow HUD covers (2)
Ensure cloth cover does not obscure light sensor

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TIG

-01:00 C,P PRE INGRESS CONFIG [31]

-00:55 C6 LEH O2 vlv (four) - OP

C,P SEAT INGRESS
Adjust Seat (one seat & direction at a time)
Exercise Brake Pedals
LES PRESS INTEGRITY CHECK

-00:50 C,P Perform P&I CHANGES TO ENT, 5-22 & 5-23

-00:45 A Stow ORB PKT, Orbit Cue Cards
Go to ENT, DEORBIT BURN

-00:40

-00:35

-00:30

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LOSS OF 2 FUEL CELLS

P&I Changes to ENTRY

GENERAL:

1. AV BAY FANS will be cycled as needed to keep power level low
2. GPCs 2,3 remain pwrd dn throughout ENTRY

SPECIFIC:

pg 3-4 Delete: OMS TVC GIMBAL CHECK
Under APU PRESTART delete:
✓HYD LG HYD ISOL VLV (three) tb - CL
and associated starred procedures

pg 3-7 Delete: VENT DOOR CLOSE
Insert: L1 HUMIDITY SEP (two) - OFF

TIG-20 ADD:
FES HEATER DEACT
L1 TOP EVAP HTR NOZ/DUCT - OFF
HI LOAD DUCT HTR - OFF
L2 FLASH EVAP FDLN HTR B SPLY - OFF
ASA ACT
O14,O15,O16:F ASA (four) - ON

pg 3-8 Insert before OPS 302 PRO:
GPC 4 ACT
(1) GPC 4 PWR - ON/STBY/RUN
(2) BFC CRT DISP - OFF
(3) For OPS 3 TRANS use →
(4) GNC, OPS 301 PRO
(5) BFS CRT DISP - ON; BFS I/O RESET
(6) FCS CH (four) - ORIDE
(7) G50 ✓LAND SITE/RWY per DEL PAD

CONFIG GPC	3 10040
STR 1	1
2	4
3	4
4	1
PL 1/2	1
CRT 1	1
2	4
3	1
4	0
L 1	0
2	0
MM 1	1
2	4

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LOSS OF 2 FUEL CELLS

P&I Changes to ENTRY
(continued)

pg 3-9 Delete: RCS/OMS HTR steps

TIG-9 Insert after SINGLE APU START:
R4 ✓HYD LG HYD ISOL VLV (three) - GPC (tb-CL)

TIG-2 Use 2 DDU/FLT CNTLR PWR
Add: AV BAY FAN CYCLE
L1 AV BAY FAN (six) - OFF

pg 3-26 FLT CNTLR PWR (two) - OFF
Use 1 DDU
Insert after OMS/RCS POST BURN RECONFIGURATION:
L1 AV BAY FAN 1B,2A,3A [3B vice 3A if FC 1 OK] - ON (3 sec between each start)

pg 3-29 SECONDARY ACTUATOR CHECK
Add: C3 i. FCS CH (four) - ORIDE

pg 3-30 If FORWARD RCS DUMP reqd for off-nominal CG etc,
insert FORWARD RCS RECOVERY before the dump:
FORWARD RCS RECOVERY
O14,O15,O16:F RJDF LOGIC, DRIVER (eight) - ON
O8 FWD RCS MANF ISOL 1,2,3,4 - OP

pg 3-31 Insert after dump completion:
O14,O15,O16:F RJDF LOGIC, DRIVER (eight) - OFF

pg 3-32 Delete: ✓ANTISKID, NWS steps

pg 3-33 Delete: ✓RA, MLS, TACAN steps

pg 3-35 Delete: SSME HYD REPRESS

ENTRY MNVRS Replace Nominal Entry Maneuvers Cue Card
with LOSS OF 2 FUEL CELLS ENTRY MANEUVERS, 5-24

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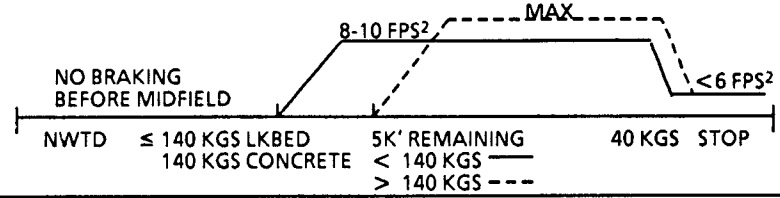
LOSS OF 2 FUEL CELLS ENTRY MANEUVERS

FLIGHT CONDITIONS	% RCS EACH SIDE	MANEUVER
EI-5		MDM FF4 - ON BRAKES (three) - ON cb ADTA 1,2,3 - cl GNC, I/O RESET - EXEC ✓cb DDU L,R (four) - cl L FLT CNTLR PWR - ON L INST PWR - FLT ✓LVLH ATT GNC, OPS 304 PRO ✓OPS 304, wait 1 min MDM FF4 - OFF * PREBANK ☐☐☐ (from DEL PAD) *
EI-3		✓FWD RCS MANF ISOL 1,2,3,4 - CLOSE
$\bar{q}$ = 8 or D = 3		CLOSED LOOP GUIDANCE ____:____:____ FIRST BANK CMD * If PREBANK, roll out PREBANK & FOLLOW * * ROLL CMD at 3°/sec (TIME CRITICAL) *
D = 11		✓DRAG H (FORCE if editing)
ΔAz = 10.5°		FIRST ROLL REVERSAL ☐☐☐☐☐ (from DEL PAD)
V = 15K		If FC 1 OK: TACAN 1,2 MODE - GPC | If FC 2 or 3 OK: TACAN 2,3 MODE - GPC * If inclination ≥ 50° * * DOUBLE TOGGLE (✓OVHD) * ✓TACAN ANT SEL (two) - AUTO * If ELS: UHF MODE - G T/R *
V = 12K		RAD BYP VLV MODE (two) - AUTO CNTLR LOOP (two) - AUTO B(A) * If no YAW JET, begin lateral trim * * monitoring *
V = 10K		✓SPD BRK to 81% * If three yaw jets failed on same side: * * Perform remaining roll reversals in * * R/Y - CSS *
V = 7K		✓TACAN status
V = 5K		L AIR DATA PROBE - DPY (wait 30 sec) R AIR DATA PROBE - DPY (Heat only 1 probe if reqd. If dilemma, deselect unheated ADTA) Begin AIL and RUD trim monitoring ✓MPS/TVC ISOL VLV - CL

FLIGHT CONDITIONS	% RCS EACH SIDE	MANEUVER
M = 4		MDM FF4 - ON GNC, I/O RESET - EXEC Begin $\dot{H}$ monitoring (✓ < 500 fps)
M = 2.9		CAB FAN (two) - OFF AV BAY FAN 2A - OFF 3A(3B) - OFF After ADTA incorporated: TACAN MODE (two) - OFF Use 1 HUD, 1 MLS, 1 RA GNC, I/O RESET - EXEC
M = 2.7		✓APUs
* If M < 2.5, P CSS for ADTA to G&C incorp *		
M = 2.0		Ensure ADTA to G&C else ✓Theta Limits
M = 0.95	* For bailout procedures, go to BAILOUT *	
M = 0.9		P,R/Y - CSS as reqd ✓SPDBK CMD vs POS ANTISKID - ON R FLT CNTLR PWR - ON R INST PWR - ON If NWS reqd: NWS - GPC
M = 0.7		✓HYD LG ISO 1,2 - OP
h = 15K		✓MLS
h = 10k		✓A/L
MAIN GEAR TD		SPD BRK - 100%
NOSE GEAR TD		SRB SEP - MAN/AUTO and depress pb ✓Auto Load Relief
		
STOP		✓All landing/navaids off CAB FAN B - ON (wait 3 sec, then continue) AV BAY FAN 2A,3A [3B vice 3A if FC1 OK] - ON (3 sec between each start) GO TO ENT C/L, POST LANDING PROCEDURES, 5-1

LOSS OF 2 FC
MS AFT FLIGHT DECK CONFIGURATION

NOTE
Wait for GO From CDR or PLT before starting any activity on this page

TIME	MS ACTIONS (AFT)
(TIG-)	
3:57	FDF CONFIG/ENTRY STOW [4]
3:42	AC BUS CONFIG [6]
3:24	SEAT INSTALLATION CAUTION Use only PL BAY MECH PWR SYS 2 during KU-BD STOW. This will reduce the voltage demands on the FC by using single-motor stowage.
3:10	KU-BD ANT STOW (ORB OPS, COMM/INST) (if deployed)
2:59	PLBD CLOSING [12], 5-26
2:50	POST CLOSING CONFIG [13], 5-26
2:09	HTR CONFIG [20], 5-27
1:40	FUEL CELL PURGE [24], 5-27
1:29	C/W, COMM CONFIG [26], 5-27
1:25	LOSS OF 2 FC SW VERIF LIST
1:06	WIRELESS STOW [29], 5-27
1:05	Begin FLUID LOADING - 32 fl oz water with salt over next 1.5 hours (2 salt tablets per 8 oz)
1:01	CLOTHING CONFIG [30], 5-28

FDF CONFIG/ENTRY STOW [4]

FDF CONFIG

Unstow, install:
- Entry & Deorbit Burn Cue Cards
- ENT
- ENT PKT
- ✓AVAILABLE for ENTRY
- OMS/RCS Slide Rule Kit
- LDG SITE CHARTS
- Handheld Radio
- STAR CHART
- ORB OPS
- CONT DEORB
- ORB PKT
- REF DATA
- MAL
- Stow all other FDF articles

ENTRY STOW

Stow Flt Deck Camrs, Accessories
Stow VTR Cassettes (1 in VTR)

FOOT LOOP CONFIG

Tape Foot Loops in egress routes

AC BUS CONFIG [6]

A L4: D :E :Q

1. ✓All cbs (27) - op
2. If FC 1 OK, Perform AC3 3φ BUS LOSS ACTIONS (ORB PKT, EPS) Do only steps in ORB PKT, do not proceed to MAL, then mark up pictorials in section 6 to match buss loss actions, then go to steps 3 and 4 (AC3 is the Affected Bus)

   If FC 2 or FC 3 OK, perform AC1 3φ BUS LOSS ACTIONS (ORB PKT, EPS) Do only steps in ORB PKT, do not proceed to MAL, then mark up pictorials in section 6 to match buss loss actions, then go to steps 3 and 4 (AC1 is the Affected Bus)

R1 3. Affected BUS:

cb AC CONTR (three)	- cl
AC BUS SNSR	- OFF
INV/AC BUS	- OFF (tb-OFF)
INV PWR	- OFF (tb-OFF)
cb AC CONTR (three)	- op

4. Connect AC1 to AC3:
   Perform AC POWER TRANSFER CABLE INSTALLATION (IFM, PROCEDURES A THRU F)

PLBD CLOSING [12]

GPC/CRT 44 EXEC
Use CRT 4

STOW RADIATORS (if reqd)

CAUTION

Use only PL BAY MECH PWR SYS 2 during RAD STOW. This will reduce the voltage demands on the FC by using single-motor stowage

Perform RAD STOW/DEPLOY, step 1 (ORB OPS, ECLS)

DEACTIVATE RMS HTR AND TEMP MON (if reqd)

A8L ✓PORT RMS HTR A,B (two) - OFF
✓RMS PWR - OFF

CLOSE PLBD

CAUTION

If SM GPC fails during this operation:
R13L PL BAY DR SYS (two) - DISABLE
Perform PASS SM GPC FAIL (ORB PKT, DPS)

When closing any PLBD latch set:
- If no CL after 40 sec c/l (60 sec bhd):
  1. with at least one microswitch closed indication, continue PLBD operations (use manual procedures)
  2. otherwise perform MAL, MECH, 9.1i
- If no latch or door motion within ~10 sec after cmd, (no motion determined visually)
  PL BAY DR - STOP, perform MAL, MECH, 9.1a

When closing PLBD:
- If door motion stops & no RDY status,
  PL BAY DR - STOP, perform MAL, MECH, 9.1k

Ref DETAILED PLBD CLOSING PROCEDURES (DEORB PREP, NOMINAL DEORBIT PREP) (if reqd)

CRT 4 SM OPS 202 PRO
4: SM PL BAY DOORS

R13L ✓PL BAY DR - STOP
PL BAY DR SYS 2 - ENA
✓PL BAY DR SYS 1 - DISABLE

CRT4 AC POWER ON - ITEM 1 EXEC (*)
CLOSE PLBD (MANUAL)

* If MAN MODE and during DOOR CLOSE 'CL' is not displayed prior to LATCH and the PORT(STBD) AFT DOOR CLOSE MICRO-sw STAT is a '0' or the PORT(STBD) DOOR SCALLOP is above the TARGET, go to CONTINGENCY PLBD CLOSURE (DEORB PREP) *

POST CLOSING CONFIG [13]

CRT4 AC POWER OFF - ITEM 2 EXEC
GPC/CRT 04 EXEC

R13L PL BAY DR SYS 2 - DISABLE

R12L CRT4 PWR - OFF
✓70mm Camr (2), Spotmeter stowed

A7U ✓PL BAY FLOOD (all) - OFF

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HTR CONFIG 20

R12U FC PURGE HTR - ON

NOTE
Htr must be on 15 min prior to purge

A12 ✓APU HTR TK/FU LINE/H2O/SYS 1B,2B,3B - AUTO
✓1A,2A,3A- OFF
✓HYD HTR (eight) - OFF

A14 RCS/OMS HTR FWD RCS - OFF
L POD (two) - ✓A OFF, B OFF
R POD (two) - ✓A OFF, B OFF
OMS CRSFD LINES (two) - ✓A OFF
- ✓B OFF
FWD, AFT RCS JET 5 (two) - OFF

FUEL CELL PURGE 24

WARNING
Do not purge if FC AMPS > 430

✓FC PURGE HTR ON > 15 min

R12U FC PURGE VLV X - OP for 2 min, then - GPC
FC PURGE HTR - GPC
✓VLV - GPC

C/W, COMM CONFIG 26

C/W RESET

R13U			
PARAMETER NAME		C/W CH	ENA/ INH
HYD P	1	99	ENA
	2	109	ENA
	3	119	ENA

COMM CONFIG

A1L	S-BD	PM MODE	- STDN LO
	NSP	DATA RATE XMIT	- HI
		RCV	- LO
		CODING (two)	- OFF
A13	OS AUD SPKR		- OFF
A15	DC UTIL PWR MNC		- OFF
	PS COMM CCU PWR		- OFF
R15:C	cb KU ELEC		- op
	ANT HTR		- op
	CABLE HTR		- op
	SIG PROC		- op
O5,O9	L,R AUD A/G2		- T/R
	ICOM B		- T/R
	VOX SENS		- R
	VOL tw (six)		- R
	XMIT/ICOM MODE		- PTT/VOX
MO42F	MIDDECK SPKR AUD PWR		- AUD/TONE
R10, L9	MS, PS AUD PWR		- AUD/TONE
	A/G1		- T/R
	2		- T/R
	A/A		- T/R
	ICOM A,B		- T/R
	VOX SENS		- R
	VOL tw (six)		- R
	XMIT/ICOM MODE		- R

WIRELESS STOW 29

Disconnect, stow wireless headsets (if reqd)

✓Minimum AFT DECK lighting

103

CLOTHING CONFIG 30

Unstow, don
LES
Harness
Boots

104

LOSS OF 2 FC
MS MIDDECK CONFIGURATION

NOTE
Wait for GO from CDR or PLT before starting any activity on this page

TIME	MS ACTIONS (MID)
(TIG-)	
3:59	ENTRY STOWAGE [2]
3:42	AC BUS CONFIG [6]
3:32	SW VERIF (Airlock & Airlock Hatch only)
3:25	PRESS CNTL SYS ENTRY CONFIG [9]
3:24	SEAT INSTALLATION
3:14	MCA CONFIG [10] , 5-30
2:20	FLUID LOADING PREP [18] , 5-30
2:10	GALLEY or H2O DISPENSER DEACT [19] , 5-30
1:44	WCS DEACTIVATION [23] , 5-30
1:27	VENT DOOR OPS DISABLE [27] , 5-30
1:25	LOSS OF 2 FC SW VERIF LIST
1:05	Begin FLUID LOADING - 32 fl oz water with salt over next 1.5 hours (2 salt tablets per 8 oz)
1:01	CLOTHING CONFIG [30] , 5-30

105

ENTRY STOWAGE [2]

PERSONAL HYGIENE SYS STOWAGE
Stow:
Personal Hygiene Kits
Hose

WCS CONFIG
Foot restraints - up, locked
Privacy Curtain - stow

POLE SETUP (Cue Card, ESCAPE POLE STOWAGE/SETUP)

FDF STOWAGE
Stow CAP

CABIN CONFIG
Stow backup SPOC
Stow Middeck Camrs, Accessories
Stow FWD/AFT Shades, Filters
W8 Install Debris Shield

MD44F Pin Cab Temp Cntl vlv in FULL COOL position
If OV104: Stow Cab Temp Cntl actuator linkage
Stow Treadmill

FOOT LOOP CONFIG
Tape Foot Loops in egress routes

AC BUS CONFIG [6]

A L4: D / E / Q

1. ✓All cbs (27) - op
2. If FC 1 OK, Perform AC3 3φ BUS LOSS ACTIONS (ORB PKT, EPS) Do only steps in ORB PKT, do not proceed to MAL, then mark up pictorials in section 6 to match bus loss actions, then go to steps 3 and 4 (AC3 is the Affected Bus)

   If FC 2 or FC 3 OK, perform AC1 3φ BUS LOSS ACTIONS (ORB PKT, EPS) Do only steps in ORB PKT, do not proceed to MAL, then mark up pictorials in section 6 to match bus loss actions, then go to steps 3 and 4 (AC1 is the Affected Bus)

R1 3. Affected BUS:
cb AC CONTR (three)	- cl
AC BUS SNSR	- OFF
INV/AC BUS	- OFF (tb-OFF)
INV PWR	- OFF (tb-OFF)
cb AC CONTR (three)	- op

4. Connect AC1 to AC3:
   Perform AC POWER TRANSFER CABLE INSTALLATION (IFM, PROCEDURES A THRU F)

PRESS CNTL SYS ENTRY CONFIG [9]

MS MO10W
14.7 CAB REG INLET SYS 1,2 vlv (two)	- CL
H2O TK N2 REG INLET SYS 1,2 vlv (two)	- OP
O2 REG INLET SYS 1,2 vlv (two)	- CL

MO32M LEH O2 5 vlv - CL
Remove and Stow O2 Bleed Orifice
LEH O2 5,6 vlv - OP (if reqd)
MO69M LEH O2 7,8 vlv - OP (if reqd)

C L2
✓O2 SYS 1,2 SPLY (two)	- OP (tb-OP)
✓XOVR SYS 1,2 (two)	- OP
✓N2 SYS 1,2 SPLY (two)	- OP (tb-OP)
✓REG INLET (two)	- OP (tb-OP)
O2/N2 CNTLR VLV SYS 1	- OP
2	- CL

MCA CONFIG [10]

MA73C MCA LOGIC FWD (three) - ON
MID (eight) - ON

FLUID LOADING PREP [18]

Unstow, fill 4 drink containers (per crewmember) with 8 oz of water each, temporarily stow near seat

Unstow 8 salt tablets (per crewmember), temporarily stow in Flight Suit pocket

GALLEY or H2O DISPENSER DEACT [19]

GALLEY

MA73C:G cb GALLEY FAN (three) - op
GALLEY ✓OVEN/RHS - OFF
✓H2O HTRS - OFF
ML86B: A cb GALLEY SPLY - op
: B cb GALLEY OVEN - op
H20 HTR - op
OVEN DOOR LAUNCH STRAP - snap clsd

H2O DISPENSER

✓PWR pb - OFF
MO30F ✓DC UTIL PWR MNC - OFF
ML86B:A cb GALLEY SPLY - op

WCS DEACTIVATION [23]

WCS VAC VLV - CL
Remove, Stow - WCS Trash Can
- Mirror
Close & latch door

ML31C VAC VENT ISOL VLV CNTL - CL (tb-CL)
NOZ HTR - OFF

VENT DOOR OPS DISABLE [27]

MA73C:A MCA LOGIC MID (four) - OFF
✓FWD (three) - ON
:B MCA LOGIC MID (four) - OFF
AFT (three) - OFF

If MNB and AC2 powered,
MA73C:C cb MCA PWR FWD 1 - op
FWD 3 - op

✓Minimum MIDDECK lighting

CLOTHING CONFIG [30]

Unstow, don
LES
Harness
Boots

106

LOSS OF TWO FUEL CELLS SWITCH VERIFICATION LIST

LEFT SEAT

L5..... 6-3
L4..... 6-3
L HUD..... 6-4
R HUD..... 6-4
L1..... 6-4
F3..... 6-4
L2..... 6-5

F1..... 6-5
F2..... 6-6
F6..... 6-6
F7..... 6-6

C2..... 6-7
C3..... 6-7

O1..... 6-8
O2..... 6-8
L side OVHD
flood..... 6-8
O5..... 6-8
O6..... 6-9
O7..... 6-9
O13..... 6-10
O14..... 6-10
O15..... 6-10

RIGHT SEAT

O16..... 6-11
O17..... 6-11
O8..... 6-12
O9..... 6-12
R side OVHD
flood..... 6-12
O3..... 6-13

F4..... 6-13
F8..... 6-13
F9..... 6-13

R1..... 6-14
R2..... 6-15
R4..... 6-15
R6..... 6-15

AFT

O19..... 6-16
C6..... 6-16
C5..... 6-16
C7..... 6-16

R10..... 6-17
R12U,L..... 6-17
R13U,L..... 6-18
R15..... 6-18

A1U,L,R..... 6-19
A4..... 6-20
A3..... 6-20
A6U..... 6-20
A7U,L..... 6-20
A8U,L..... 6-21
A2..... 6-22
A11..... 6-22
A12..... 6-22
A13..... 6-22
A14..... 6-23
A15..... 6-23
L9..... 6-23

MIDDECK-FWD

MO42F..... 6-24
MO58F..... 6-24
MO32M..... 6-24
MO39M..... 6-24
MO69M..... 6-24
MO29J..... 6-24
MO52J..... 6-24
MO30F..... 6-24
MO62M..... 6-24
ML86B..... 6-25
MD44F..... 6-26
MD24K..... 6-26

MIDDECK-AFT

MA73C..... 6-25
MO13Q..... 6-26
ML18F..... 6-26
ML26C..... 6-26
ML31C..... 6-26
MO10W..... 6-27
WCS..... 6-27

AIRLOCK

AW18A..... 6-28
AW18D..... 6-28
AW18H..... 6-28
AW82A..... 6-28
AW82B..... 6-28
AW82D..... 6-28
AW82H..... 6-28
AIRLOCK HATCH..... 6-29

LEGEND


up


center

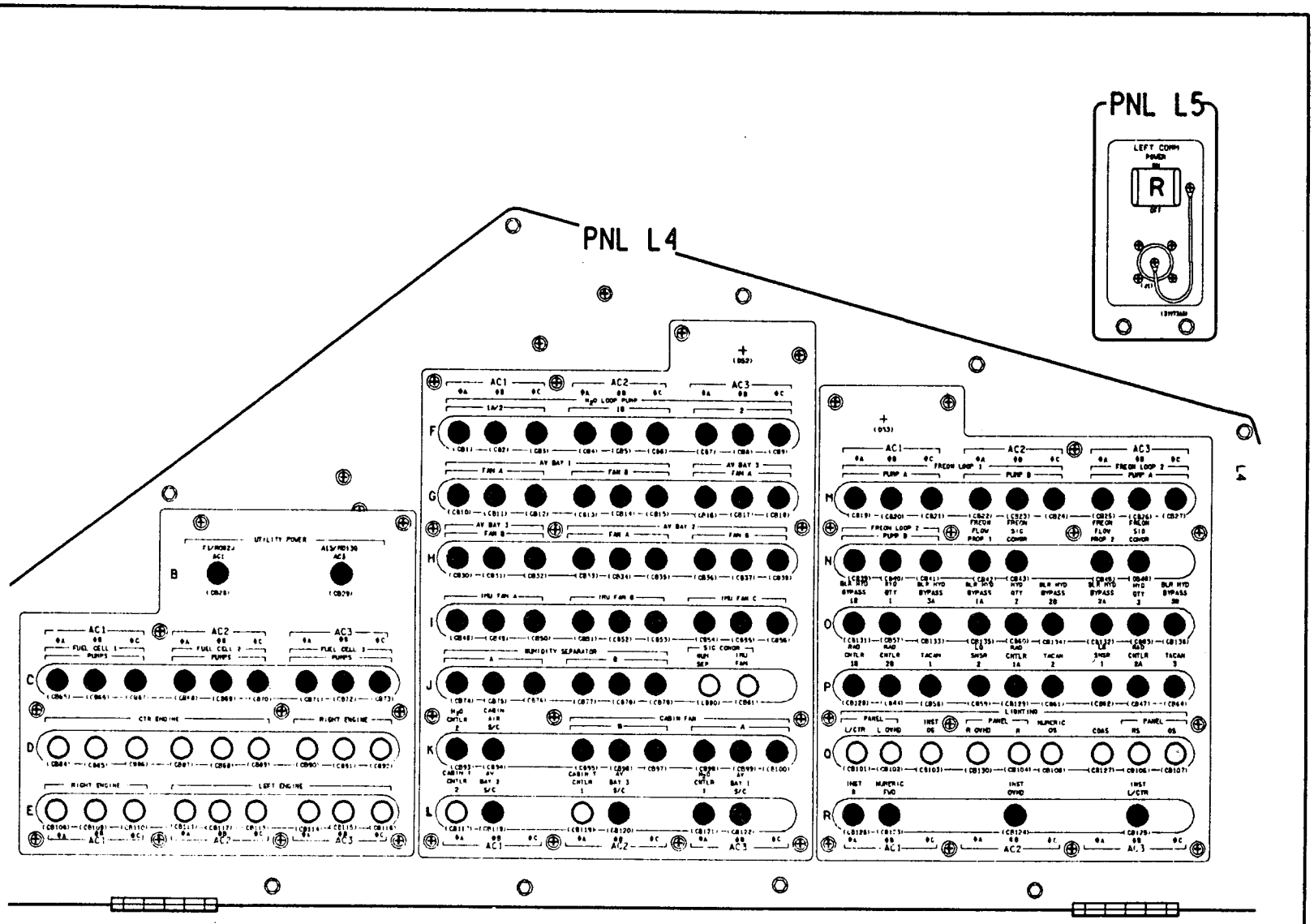

down

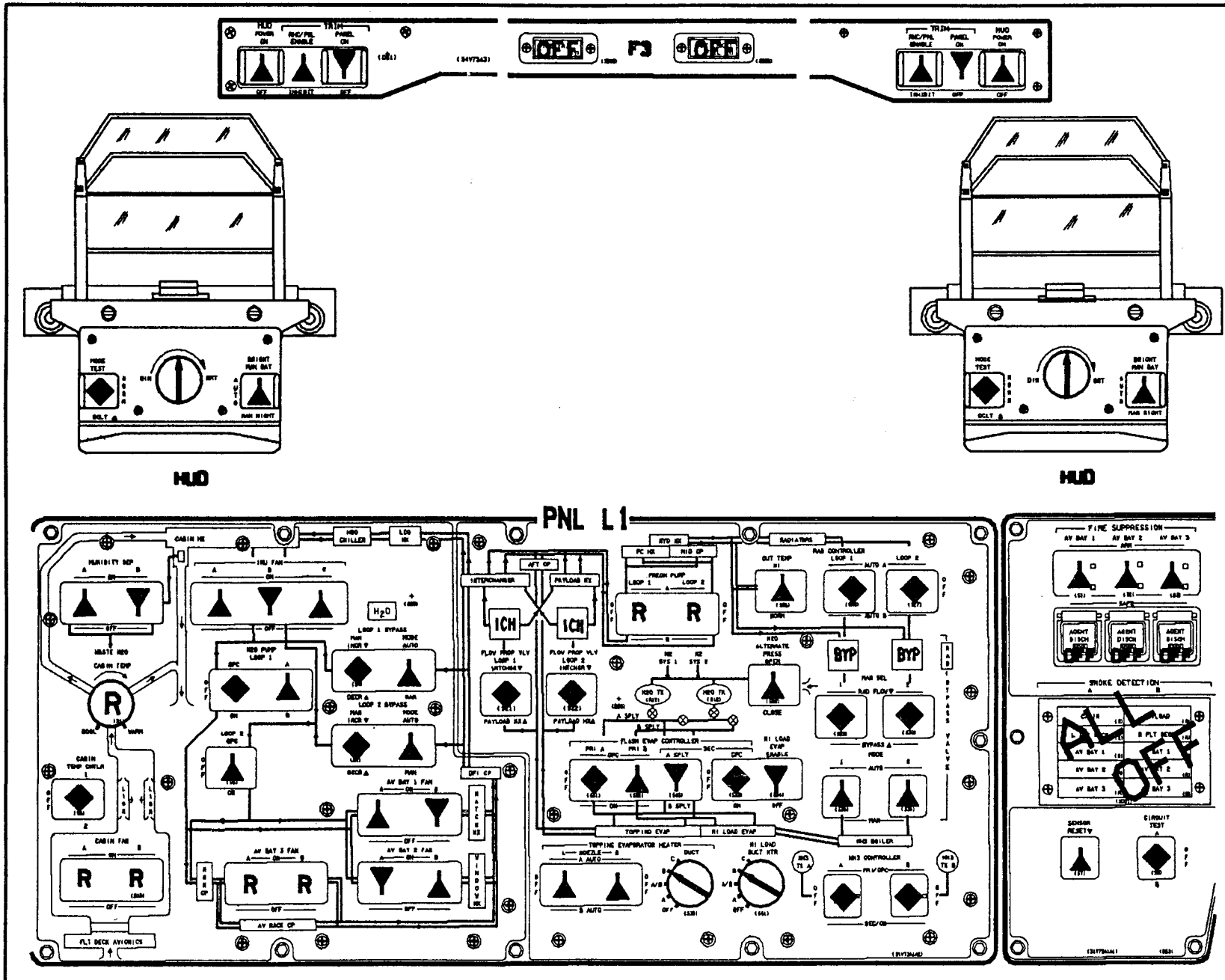
R - as reqd

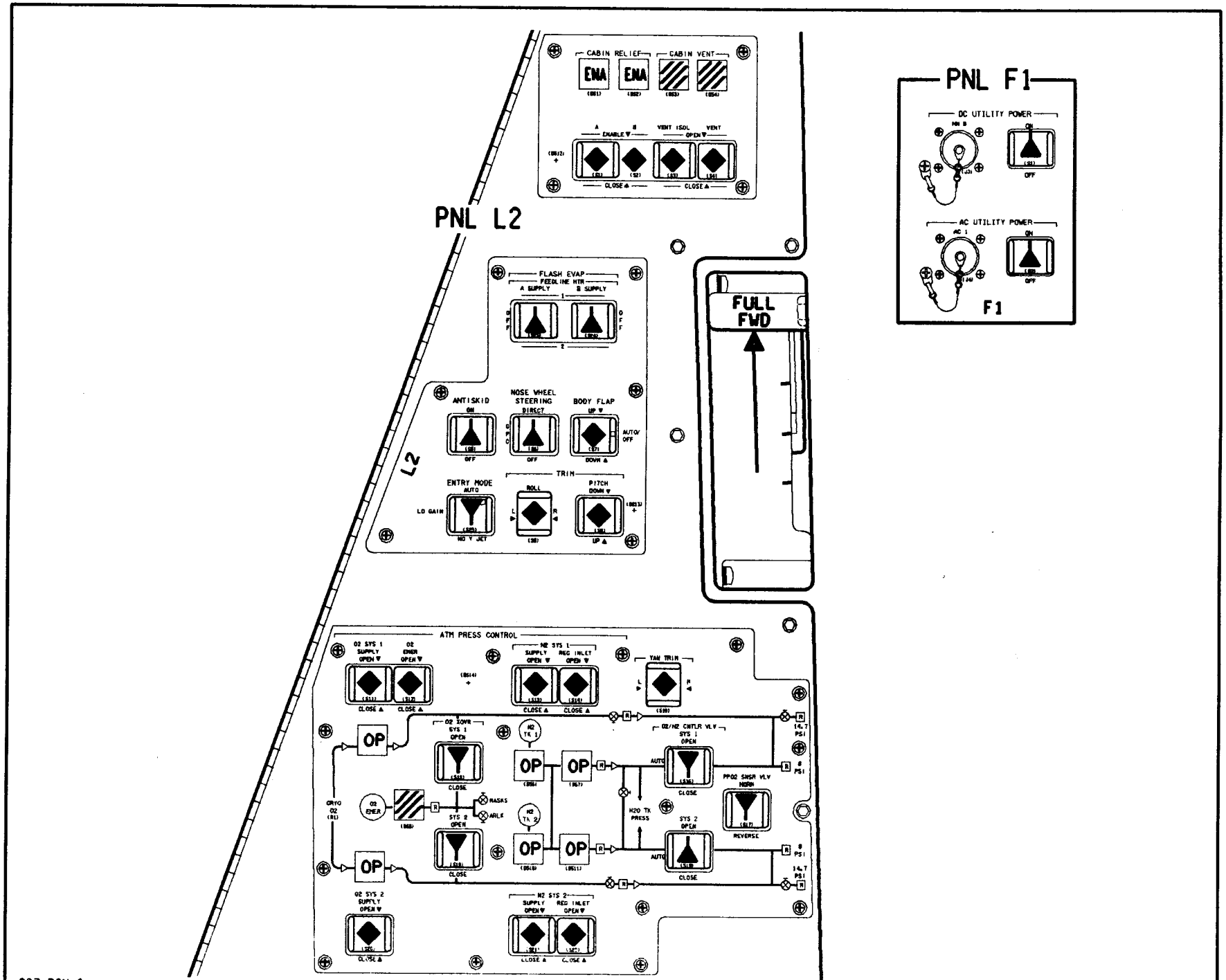

cb close

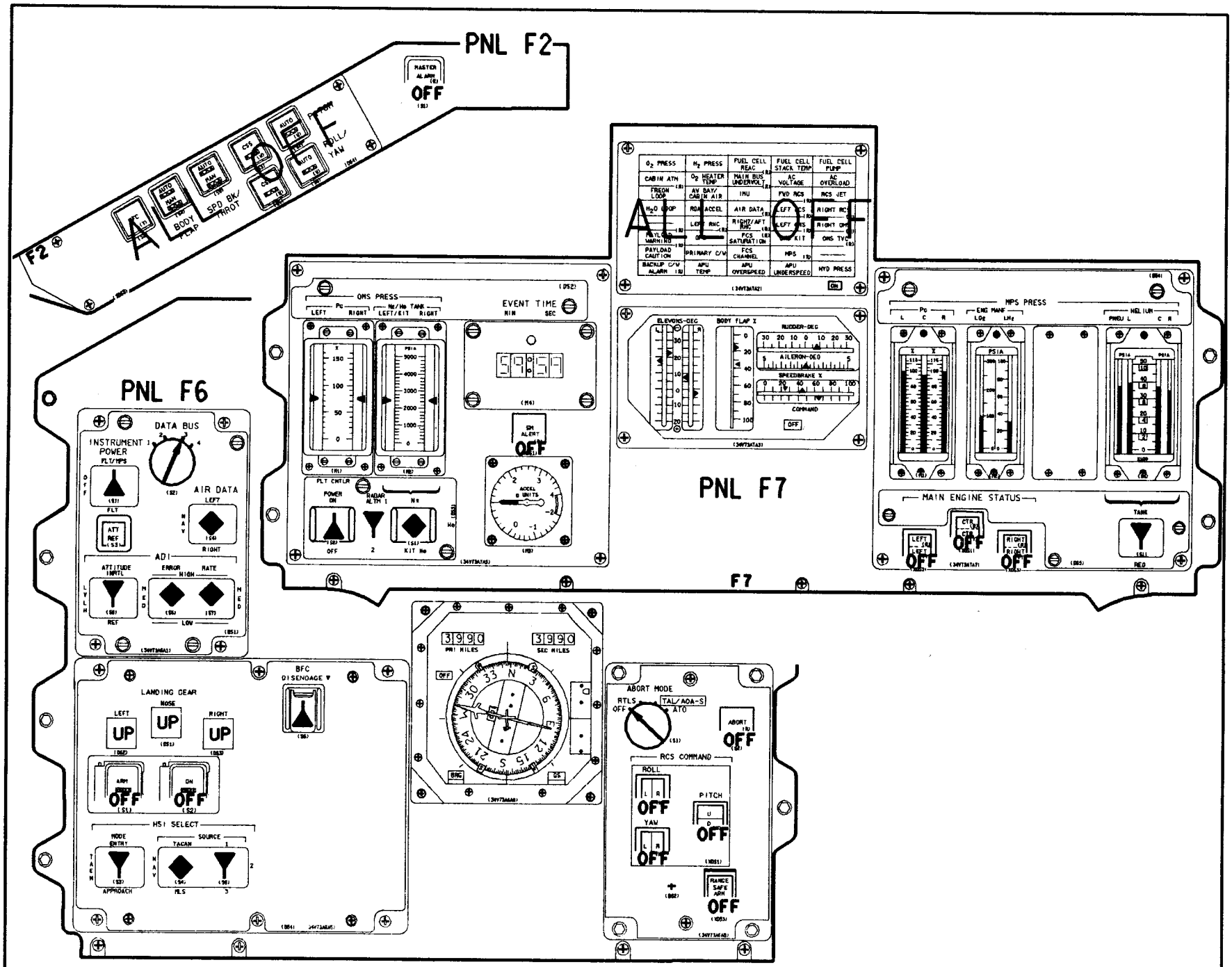

cb open

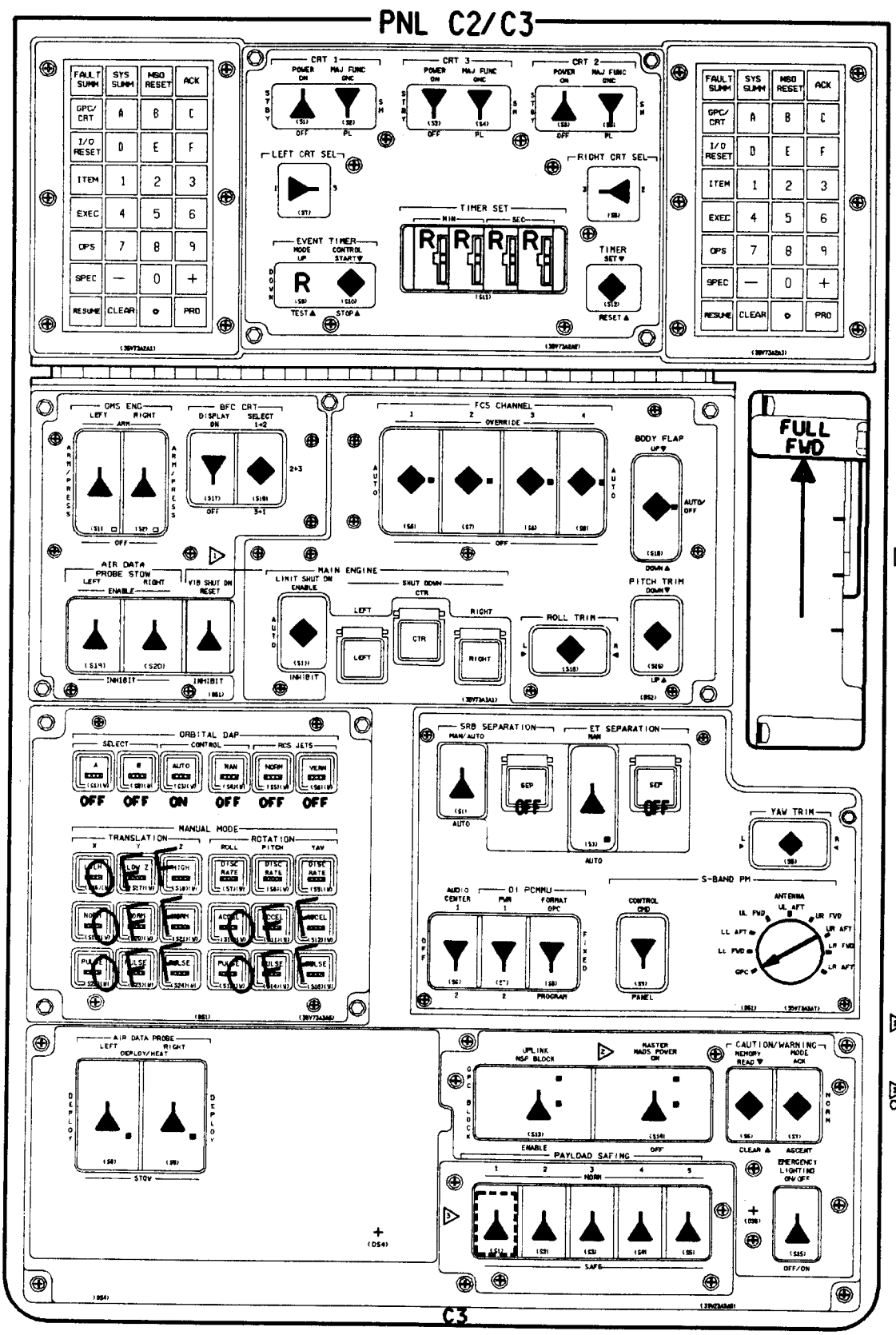

- indicates switches/display not cked during SWITCH VERIFICATION


PNL L5
PNL L4
L4


OFF
OFF
HUD
HUD
PNL L1
ALL OFF


PNL L2
CABIN RELIEF
CABIN VENT
ENA
ENA
VENT ISOL
VENT
ENABLE
OPEN
CLOSE
CLOSE
FLASH EVAP
FEEDLINE HTR
A SUPPLY
B SUPPLY
ANTISKID
ON
OFF
NOSE WHEEL STEERING
DIRECT
OFF
BODY FLAP
UP
DOWN
AUTO/ OFF
L2
TRIM
ENTRY MODE
AUTO
LO GAIN
NO Y JET
ROLL
PITCH
DOWN
UP
FULL FWD
PNL F1
DC UTILITY POWER
ON
OFF
AC UTILITY POWER
ON
OFF
F1
ATM PRESS CONTROL
O2 SYS 1 SUPPLY OPEN
O2 ENER OPEN
N2 SYS 1 SUPPLY OPEN
REG INLET OPEN
YAW TRIM
CLOSE
CLOSE
CLOSE
CLOSE
O2 XOVR SYS 1 OPEN
CLOSE
O2/N2 CNTLR VLV
SYS 1 OPEN
AUTO
CLOSE
14.7 PSI
0 PSI
PPO2 SNSR VLV NORM
REVERSE
OP
O2 ENER
MASKS
ABLE
SYS 2 OPEN
CLOSE
N2 TK 1
N2 TK 2
H2O TK PRESS
SYS 2 OPEN
AUTO
CLOSE
0 PSI
14.7 PSI
CRYO O2
O2 SYS 2 SUPPLY OPEN
N2 SYS 2 SUPPLY OPEN
REG INLET OPEN
CLOSE
CLOSE


PNL F2
F2
ALL OFF
PNL F6
PNL F7
F7
DATA BUS
INSTRUMENT POWER
AIR DATA
ADI
HSI SELECT
LANDING GEAR
ABORT MODE
RCS COMMAND
OMS PRESS
EVENT TIME
MPS PRESS
MAIN ENGINE STATUS
ELEVONS-DEG
BODY FLAP %
RUDDER-DEG
AILERON-DEG
SPEEDBRAKE %



ALL VEH/DATE 01/12/88

C D/O/ALL/GEN

▷ ON OV102 ONLY

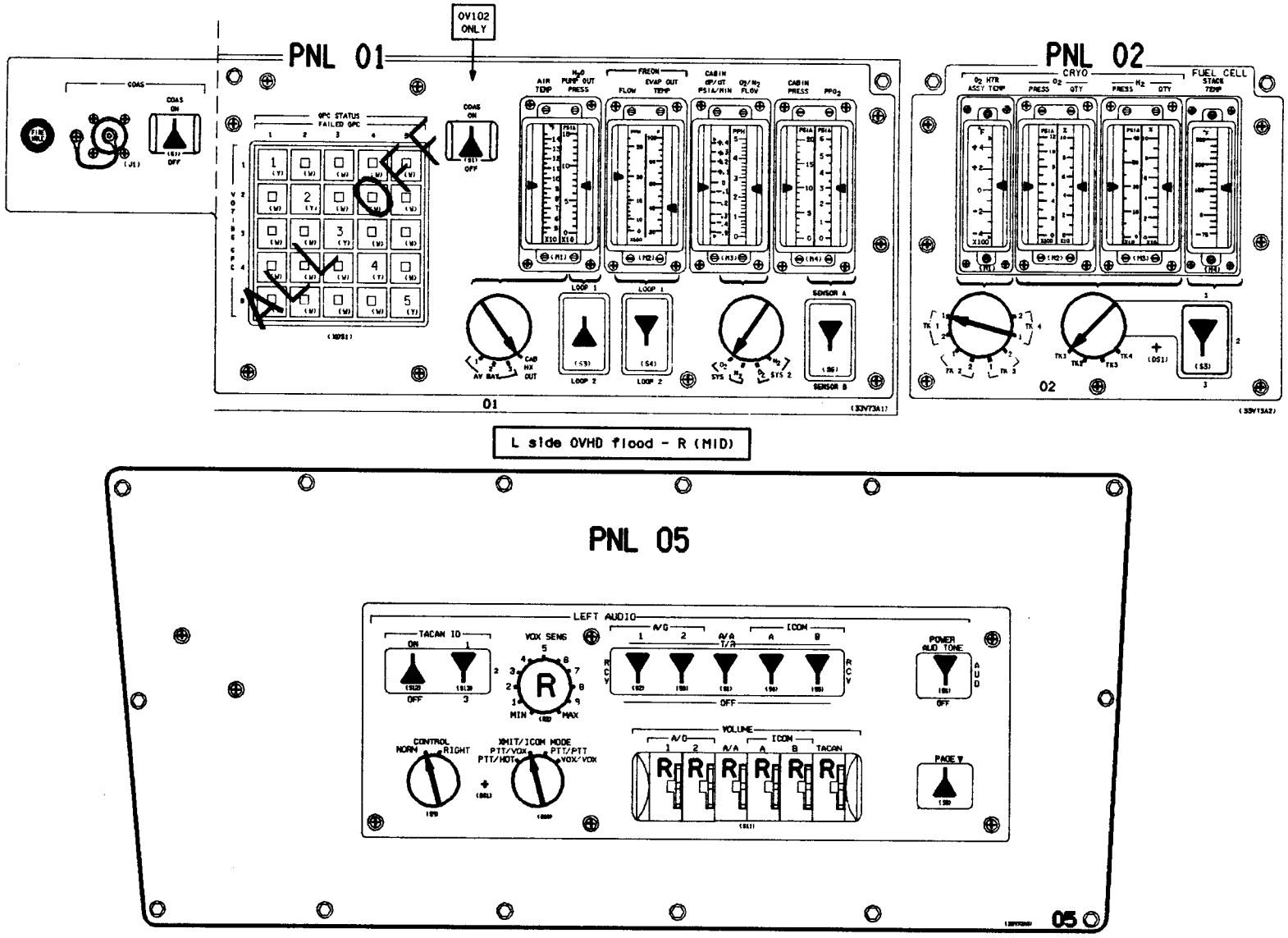
LOSS OF 2 FC

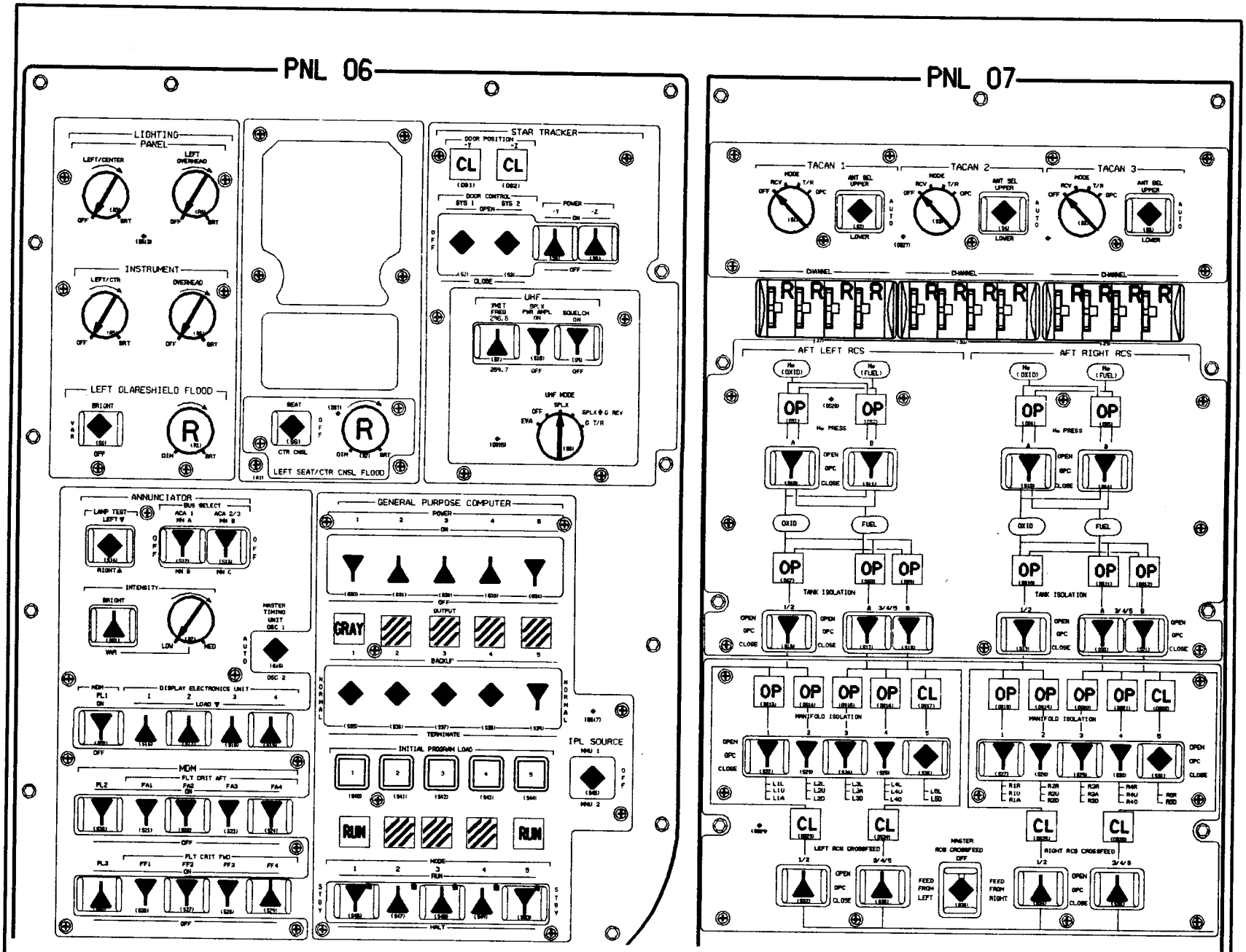
6-7

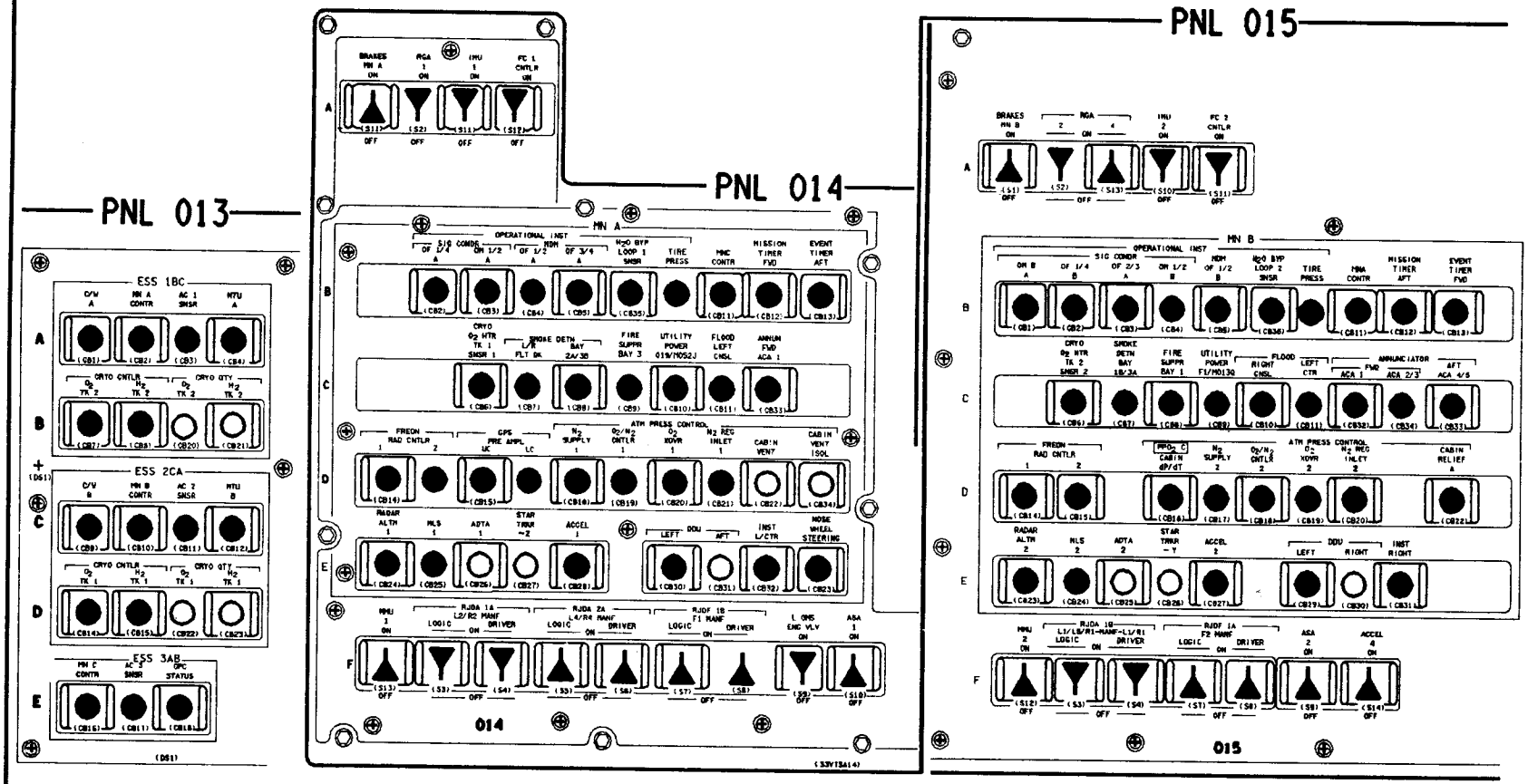
▷ MASTER OEX POWER ON OV102 ONLY

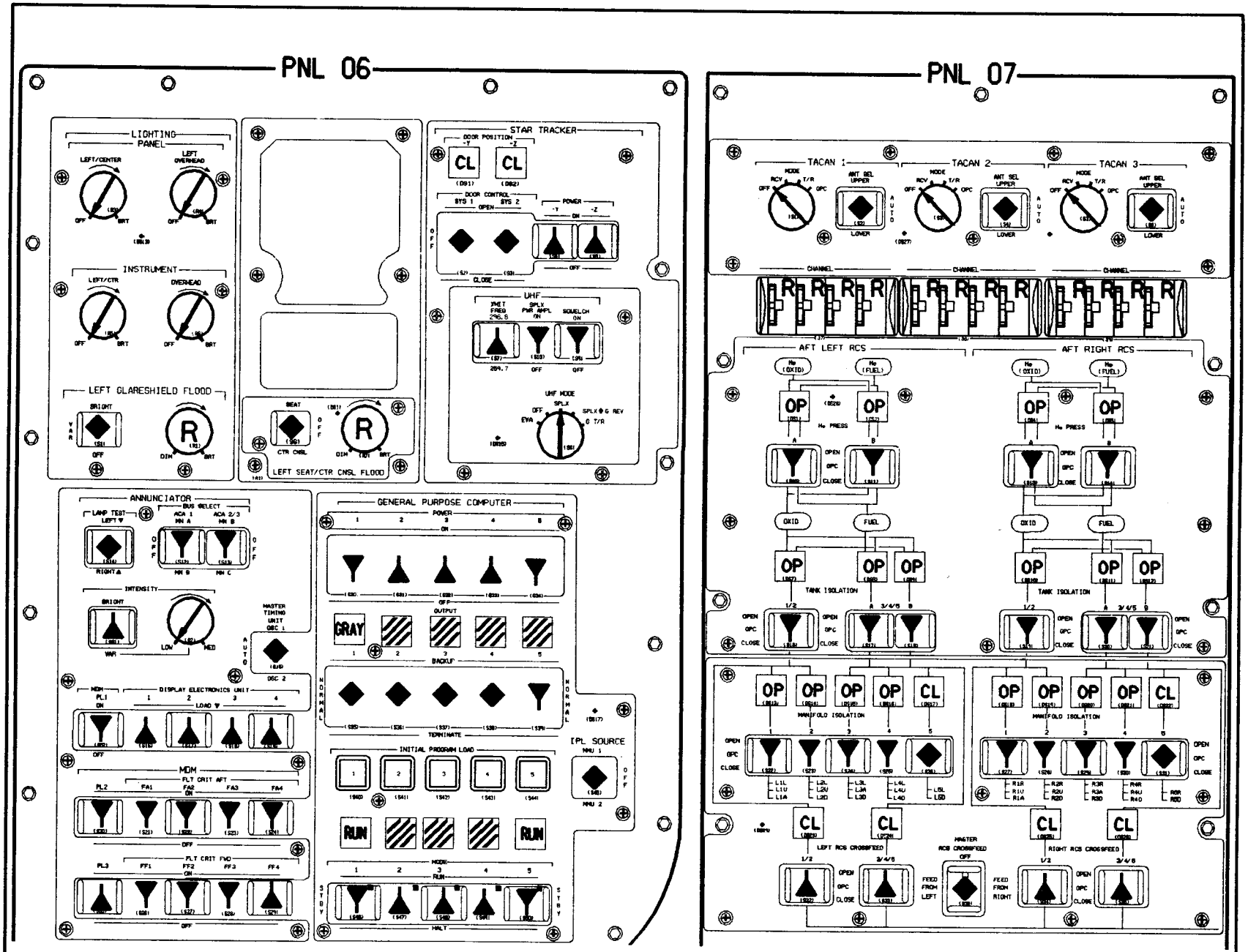
▷ POSSIBLE CONFIGURATION

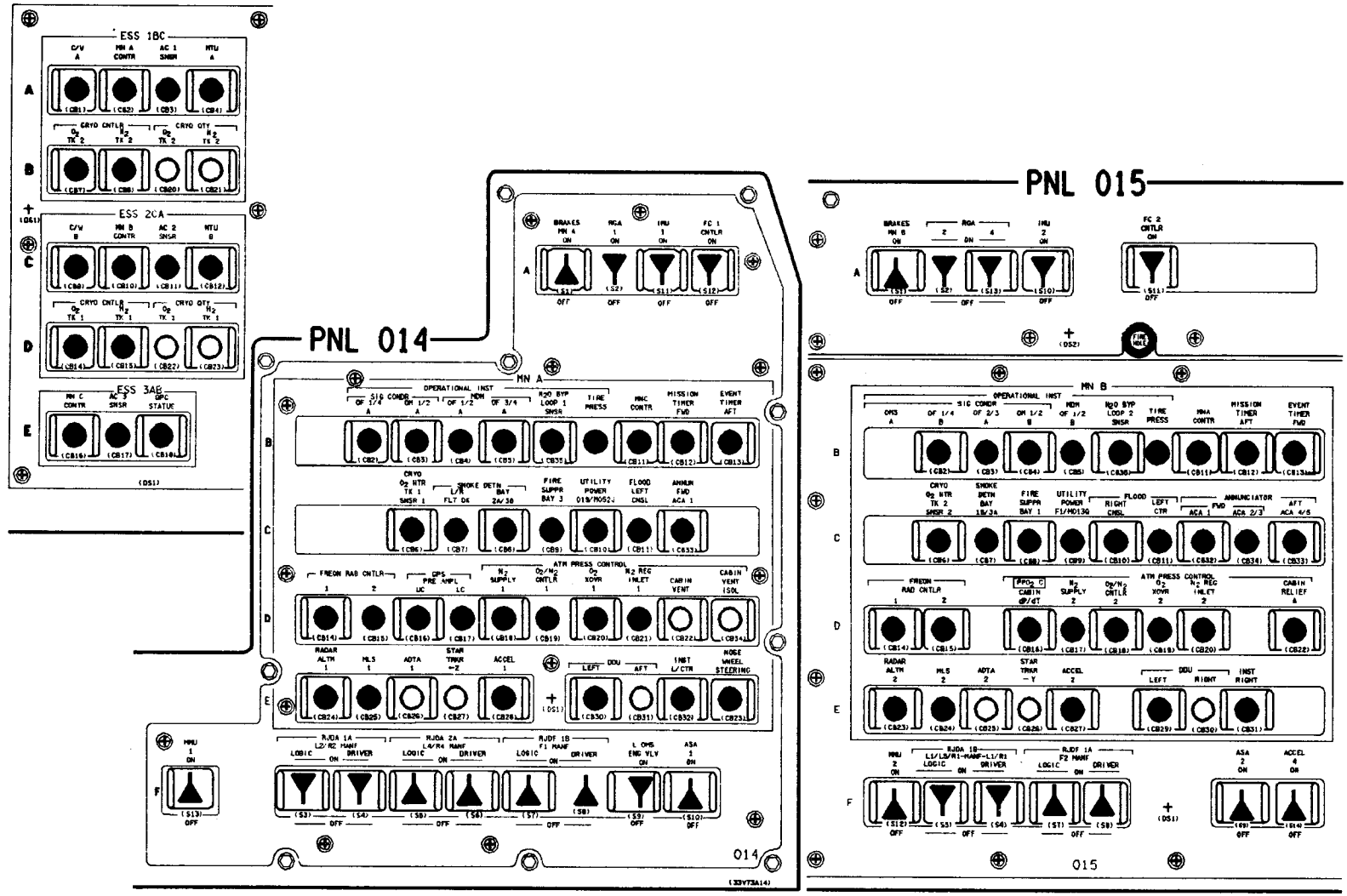
024.DGN 10

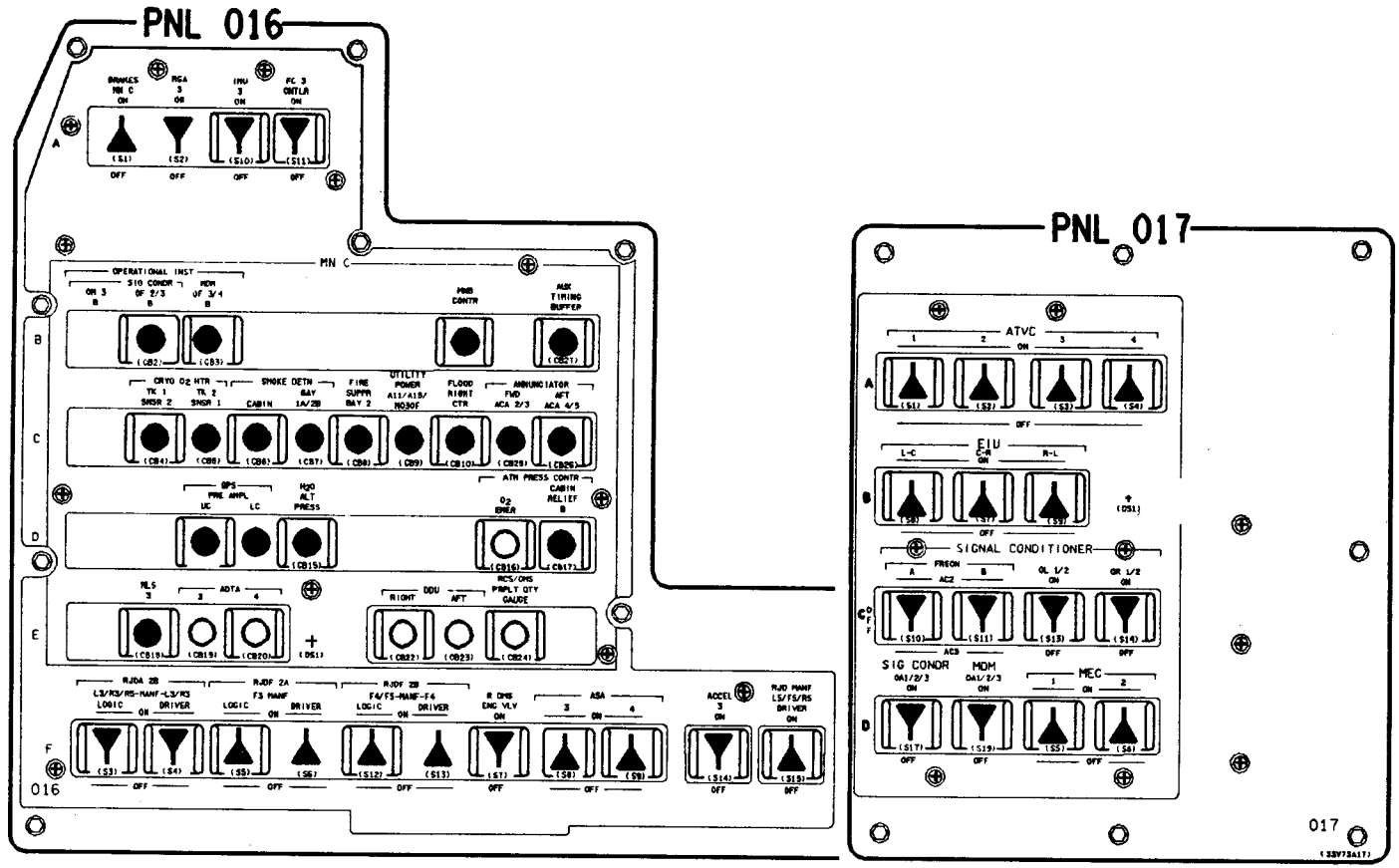

PNL 01
OV102 ONLY
ALL OFF
PNL 02
L side OVHD flood - R (MID)
PNL 05
LEFT AUDIO
01
02
05

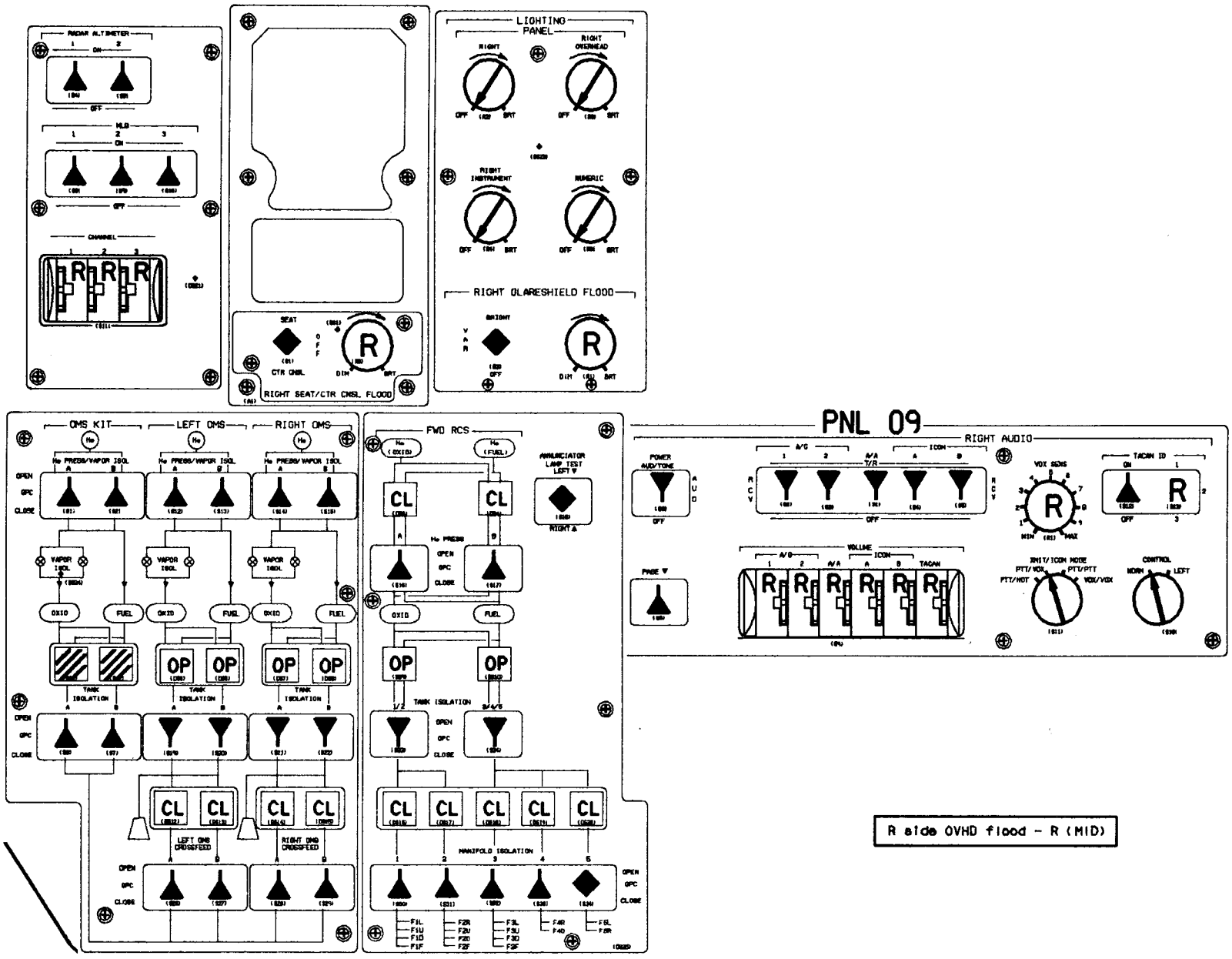

PNL 06
PNL 07
LIGHTING PANEL
LEFT/CENTER
LEFT OVERHEAD
INSTRUMENT
LEFT/CTR
OVERHEAD
LEFT GLARESHIELD FLOOD
BRIGHT
OFF
DIM
BRT
LEFT SEAT/CTR CNSL FLOOD
CTR CNSL
STAR TRACKER
DOOR POSITION
CL
DOOR CONTROL
STS 1
STS 2
OPEN
CLOSE
POWER
UHF
XMIT FREQ
SQUELCH
UHF MODE
SPLX
EVA
ANNUNCIATOR
LAMP TEST
BUS SELECT
INTENSITY
MASTER TIMING UNIT
DISPLAY ELECTRONICS UNIT
MDM
FLT CRIT AFT
FLT CRIT FWD
GENERAL PURPOSE COMPUTER
GRAY
BACKUP
TERMINATE
INITIAL PROGRAM LOAD
RUN
HALT
IPL SOURCE
TACAN 1
TACAN 2
TACAN 3
MODE
ANT SEL UPPER
LOWER
CHANNEL
AFT LEFT RCS
AFT RIGHT RCS
OP
TANK ISOLATION
MANIFOLD ISOLATION
LEFT RCS CROSSFEED
RIGHT RCS CROSSFEED
MASTER RCS CROSSFEED
FEED FROM LEFT
FEED FROM RIGHT

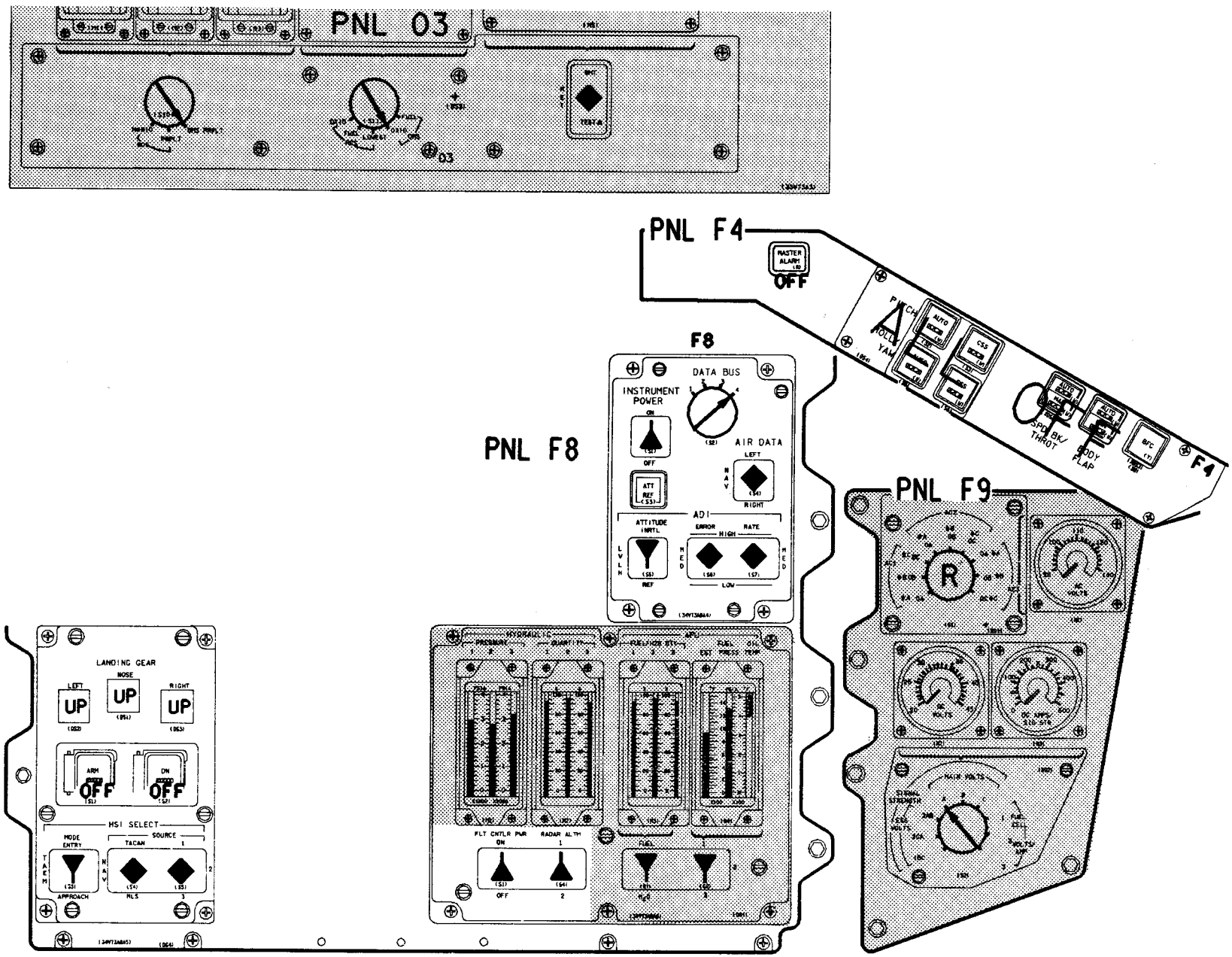

PNL 013
PNL 014
PNL 015
ESS 1BC
ESS 2CA
ESS 3AB
MN A
MN B
014
015

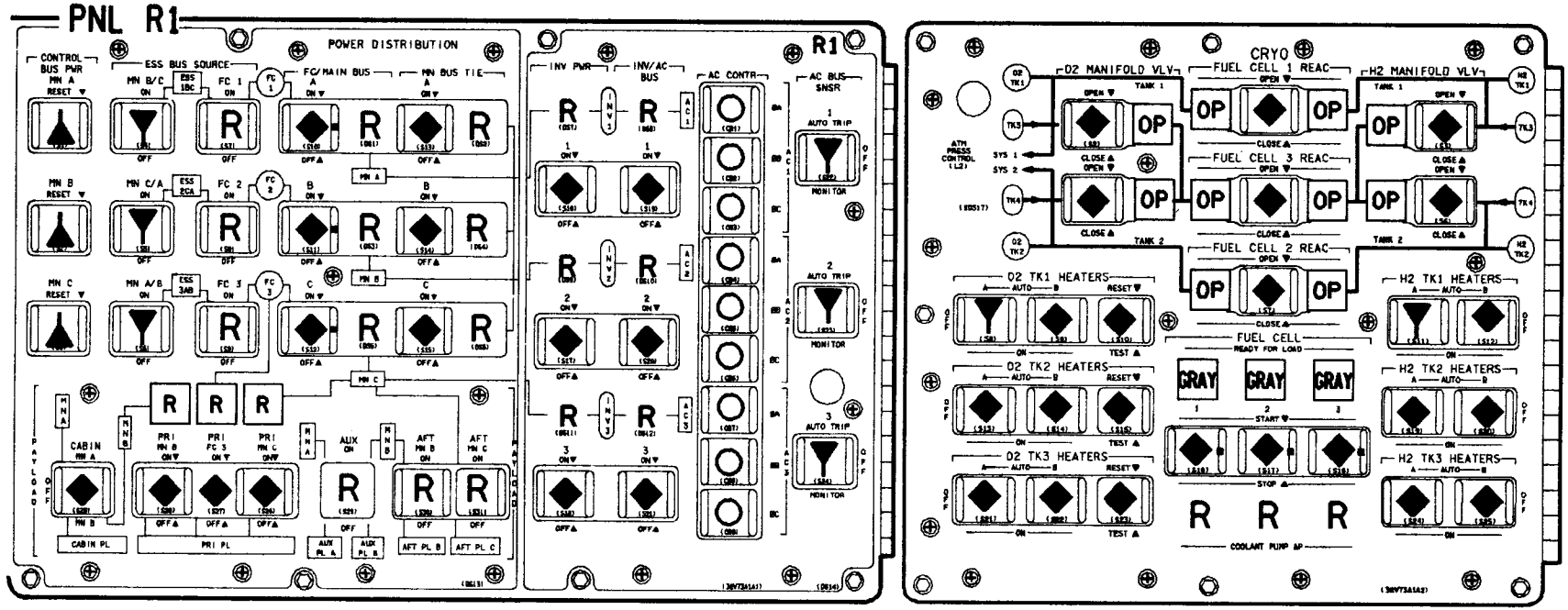

PNL 06
PNL 07
LIGHTING PANEL
INSTRUMENT
LEFT GLARESHIELD FLOOD
LEFT SEAT/CTR CNSL FLOOD
STAR TRACKER
DOOR POSITION
DOOR CONTROL
UHF
ANNUNCIATOR
GENERAL PURPOSE COMPUTER
DISPLAY ELECTRONICS UNIT
MDM
INITIAL PROGRAM LOAD
IPL SOURCE
TACAN 1
TACAN 2
TACAN 3
AFT LEFT RCS
AFT RIGHT RCS
TANK ISOLATION
MANIFOLD ISOLATION
LEFT RCS CROSSFEED
RIGHT RCS CROSSFEED
MASTER RCS CROSSFEED

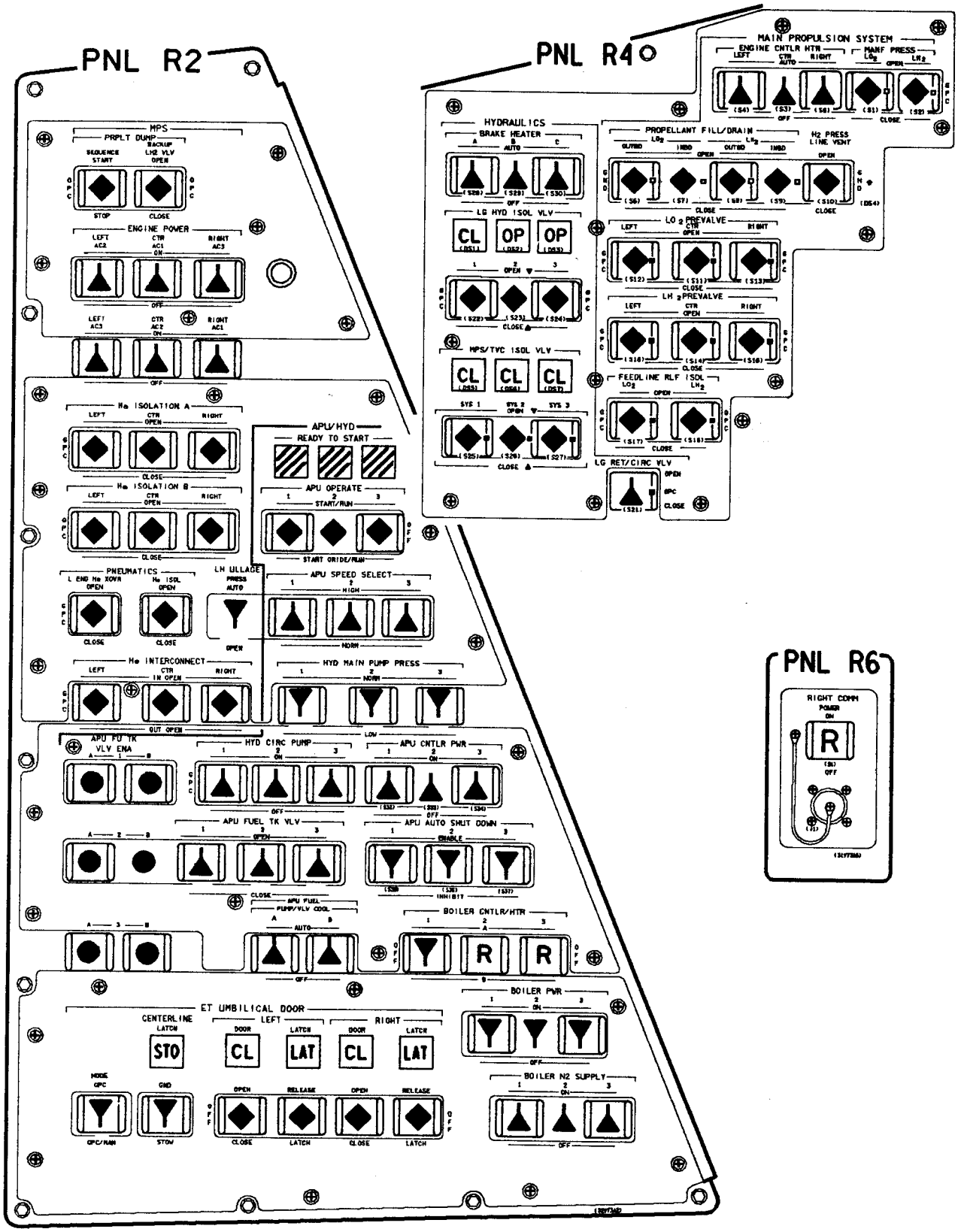

PNL 013
ESS 1BC
ESS 2CA
ESS 3AB
PNL 014
MN A
014
PNL 015
MN B
015


PNL 016
MN C
OPERATIONAL INST
016
PNL 017
ATVC
EIU
SIGNAL CONDITIONER
SIG CONDR
MDM
MEC
017

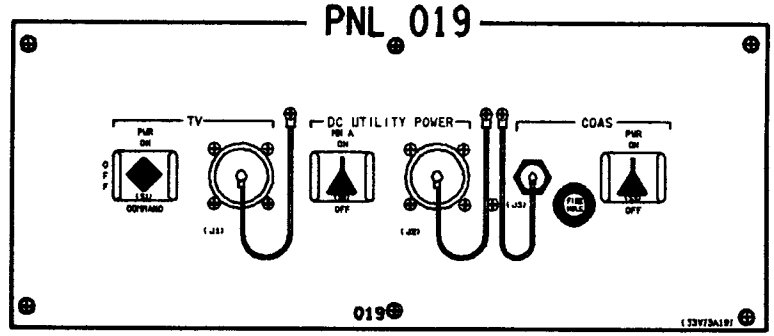

PNL 08
RADAR ALTIMETER
MLG
CHANNEL
SEAT
CTR CNSL
RIGHT SEAT/CTR CNSL FLOOD
LIGHTING PANEL
RIGHT
RIGHT OVERHEAD
RIGHT INSTRUMENT
NUMERIC
RIGHT GLARESHIELD FLOOD
BRIGHT
OMS KIT
LEFT OMS
RIGHT OMS
VAPOR ISOL
OXID
FUEL
OP
TANK ISOLATION
CL
LEFT OMS CROSSFEED
RIGHT OMS CROSSFEED
FWD RCS
ANNUNCIATOR LAMP TEST
MANIFOLD ISOLATION
PNL 09
RIGHT AUDIO
POWER AUD/TONE
PAGE
VOLUME
VOX SENS
TACAN ID
CONTROL
R side OVHD flood - R (MID)


PNL 03
PNL F4
MASTER ALARM
OFF
PITCH
ROLL
YAW
AUTO
CSS
SPD BK/ THROT
BODY FLAP
BFC
F4
F8
PNL F8
DATA BUS
INSTRUMENT POWER
ON
OFF
AIR DATA
LEFT
RIGHT
NAV
ATT REF
ADI
ATTITUDE
ERROR
RATE
HIGH
LOW
REF
PNL F9
LANDING GEAR
NOSE
LEFT
RIGHT
UP
ARM
DN
OFF
HSI SELECT
MODE ENTRY
SOURCE
TACAN
APPROACH
HYDRAULIC
PRESSURE
QUANTITY
APU
FUEL
OIL
EXT
FLT CNTLR PWR
RADAR ALTM
ON
OFF

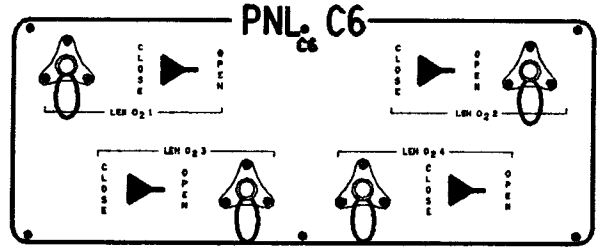

PNL R1
POWER DISTRIBUTION
CONTROL BUS PWR
MN A RESET
MN B RESET
MN C RESET
ESS BUS SOURCE
MN B/C
MN C/A
MN A/B
ESS 1BC
ESS 2CA
ESS 3AB
FC 1 ON
FC 2 ON
FC 3 ON
FC/MAIN BUS
MN BUS TIE
MN A
MN B
MN C
AUX ON
CABIN MN A
PRI MN B ON
PRI FC 2 ON
PRI MN C ON
AFT MN B ON
AFT MN C ON
PAYLOAD OFF
PAYLOAD ON
CABIN PL
PRI PL
AUX PL A
AUX PL B
AFT PL B
AFT PL C
R1
INV PWR
INV/AC BUS
AC CONTR
AC BUS SNSR
AUTO TRIP
MONITOR
CRYO
O2 MANIFOLD VLV
H2 MANIFOLD VLV
FUEL CELL 1 REAC
FUEL CELL 2 REAC
FUEL CELL 3 REAC
ATM PRESS CONTROL (L2)
SYS 1
SYS 2
TANK 1
TANK 2
O2 TK1 HEATERS
O2 TK2 HEATERS
O2 TK3 HEATERS
H2 TK1 HEATERS
H2 TK2 HEATERS
H2 TK3 HEATERS
FUEL CELL
READY FOR LOAD
GRAY
START
STOP
COOLANT PUMP AP
OP
CLOSE
OPEN
AUTO
RESET
ON
TEST


PNL R2
PNL R4
PNL R6
MPS
PRPLT DUMP
ENGINE POWER
He ISOLATION A
He ISOLATION B
PNEUMATICS
He INTERCONNECT
APU/HYD
READY TO START
APU OPERATE
APU SPEED SELECT
HYD MAIN PUMP PRESS
APU FU TK VLV ENA
HYD CIRC PUMP
APU CNTLR PWR
APU FUEL TK VLV
APU AUTO SHUT DOWN
BOILER CNTLR/HTR
ET UMBILICAL DOOR
BOILER PWR
BOILER N2 SUPPLY
HYDRAULICS
BRAKE HEATER
LG HYD ISOL VLV
MPS/TVC ISOL VLV
LG RET/CIRC VLV
MAIN PROPULSION SYSTEM
ENGINE CNTLR HTR
MANF PRESS
PROPELLANT FILL/DRAIN
LO2 PREVALVE
LH2 PREVALVE
FEEDLINE RLF ISOL
RIGHT COMM

PNL 019

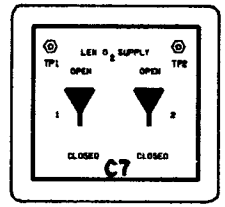


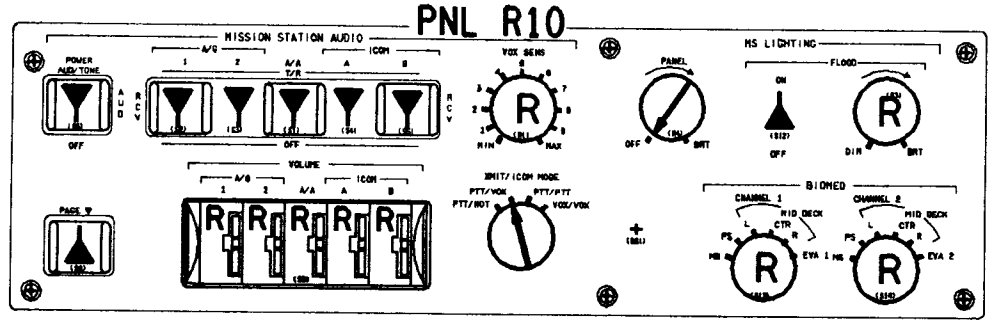
PNL C6

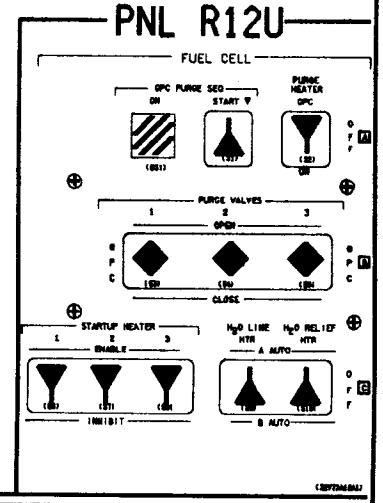


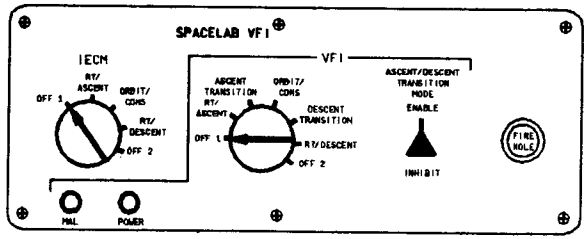
PNL C5

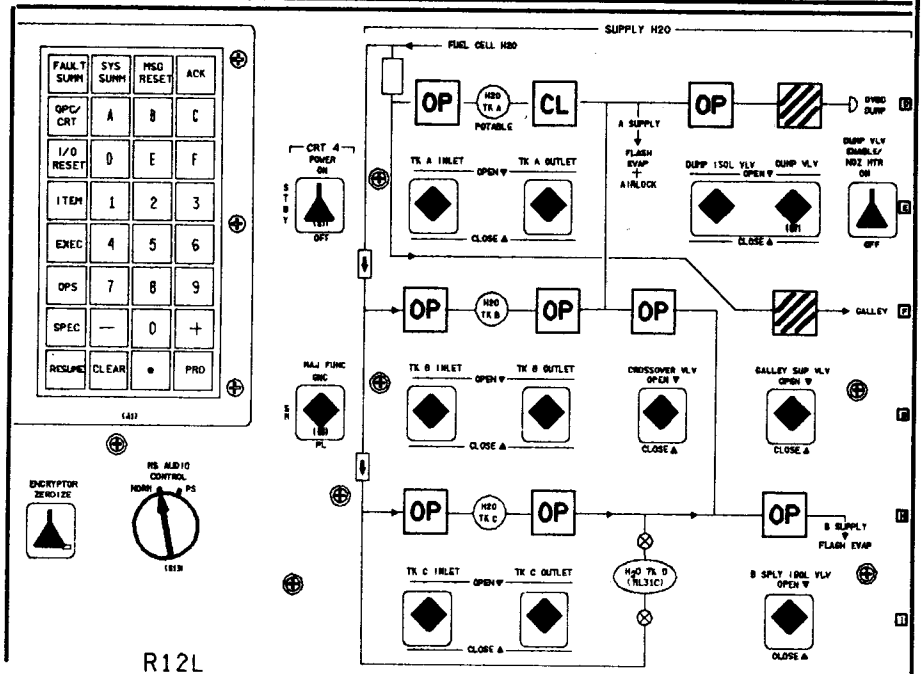
PNL C7

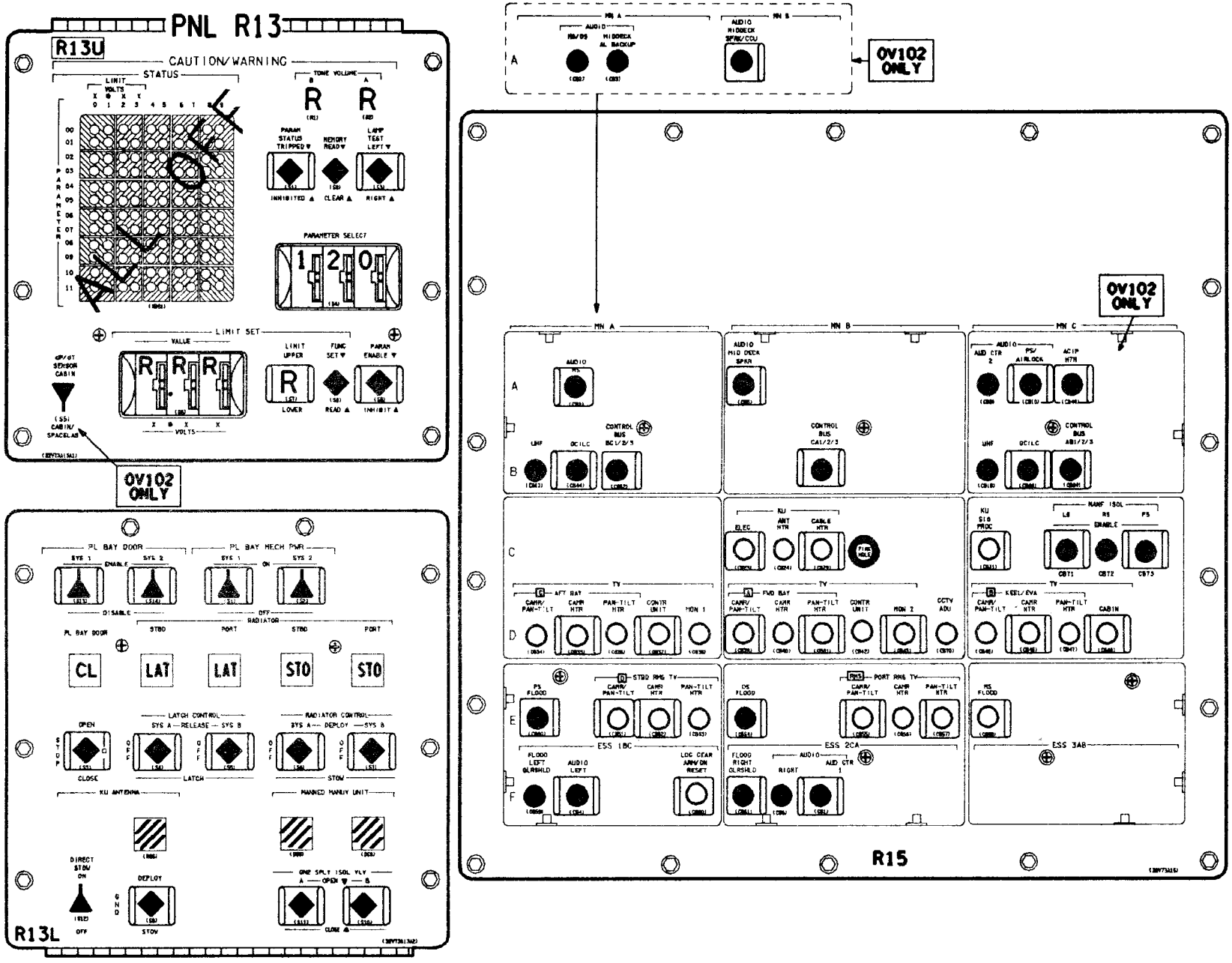


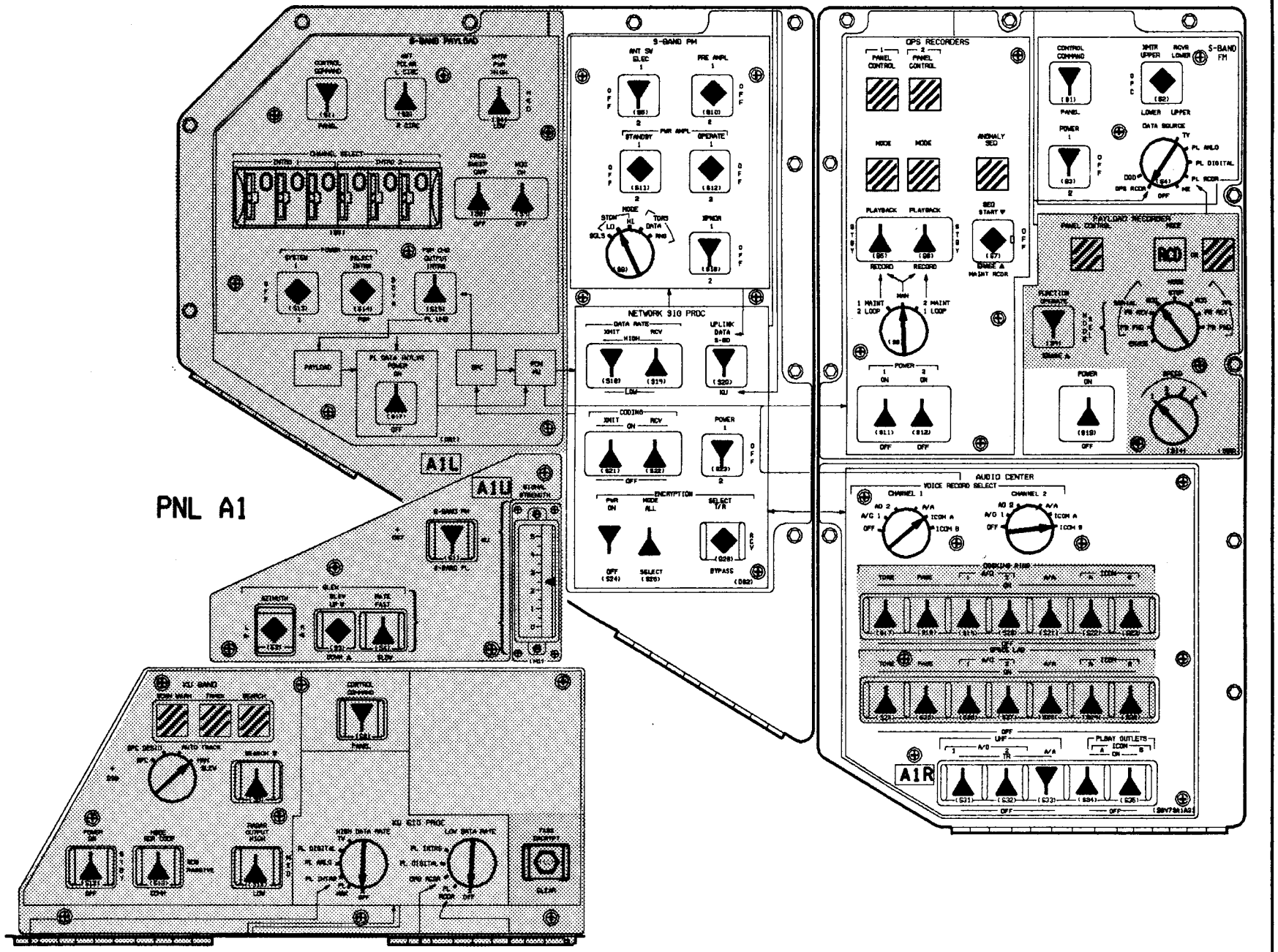

PNL R10
MISSION STATION AUDIO
POWER AUD/TONE
OFF
A/G
ICOM
A/A T/R
VOX SENS
PANEL
MS LIGHTING
FLOOD
ON
OFF
DIM
BRT
VOLUME
XMIT/ICOM MODE
PTT/VOX
PTT/PTT
PTT/HOT
VOX/VOX
PAGE
BIOMED
CHANNEL 1
CHANNEL 2
MID DECK
EVA 1
EVA 2

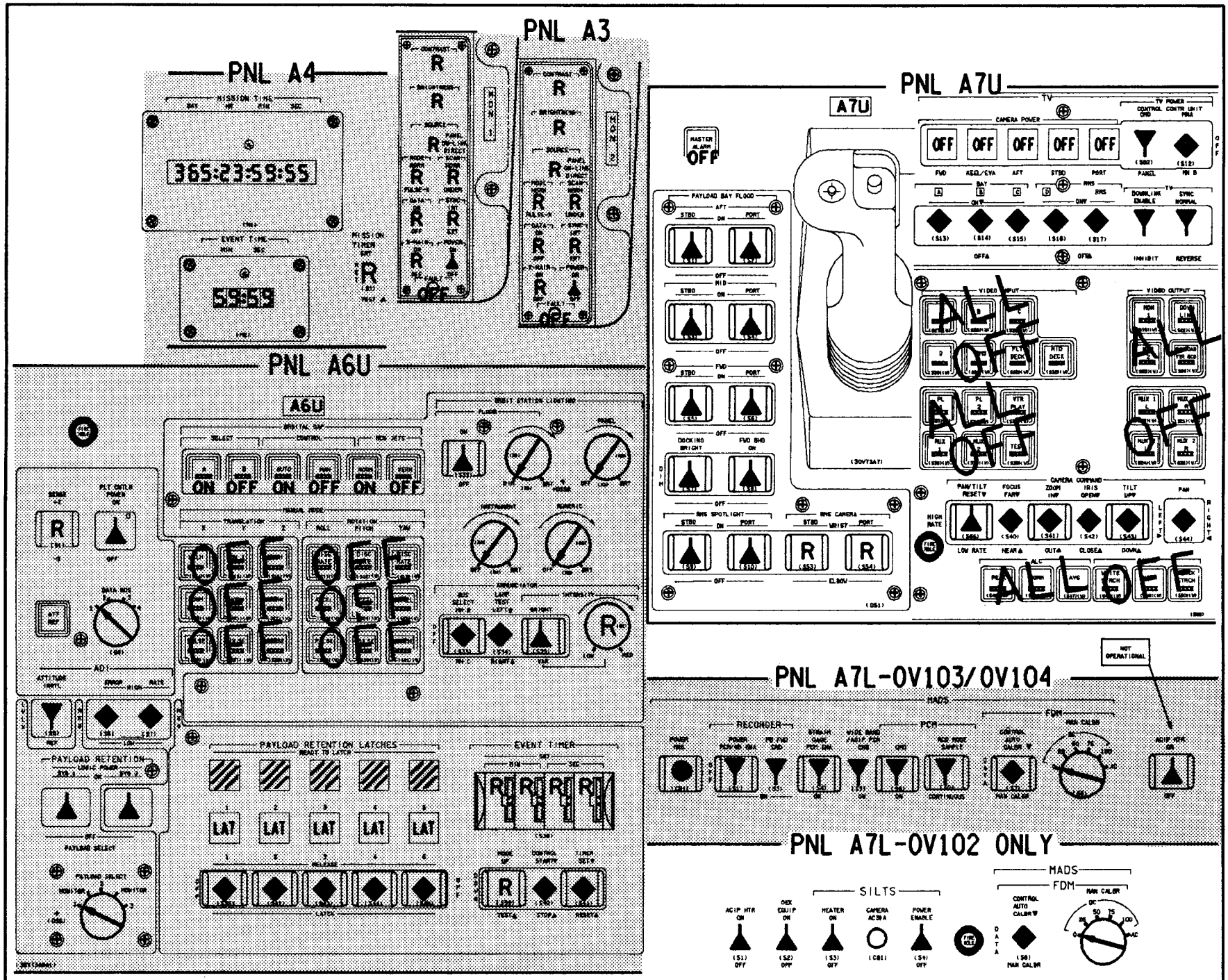

PNL R12U
FUEL CELL
OPC PURGE SEQ
START
PURGE HEATER
OPC
PURGE VALVES
OPEN
CLOSE
STARTUP HEATER
ENABLE
INHIBIT
H2O LINE HTR
H2O RELIEF HTR
A AUTO
B AUTO

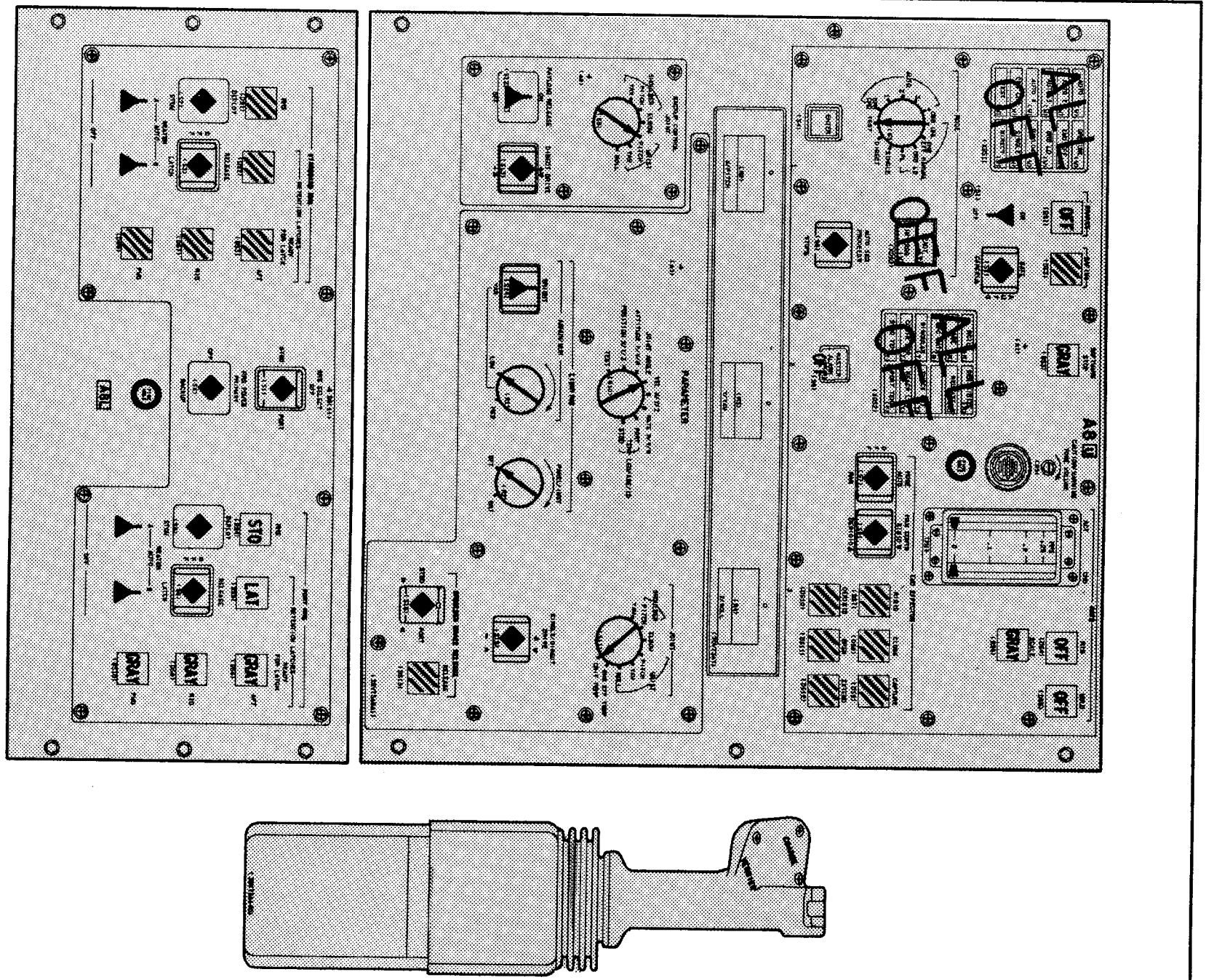

SPACELAB VFI
IECM
RT/ ASCENT
ORBIT/ COMS
RT/ DESCENT
OFF 1
OFF 2
VFI
ASCENT TRANSITION RT/ ASCENT
ORBIT/ COMS
DESCENT TRANSITION
RT/DESCENT
ASCENT/DESCENT TRANSITION MODE ENABLE
INHIBIT
FIRE HOLE
MAL
POWER


FAULT SUMM
SYS SUMM
MSG RESET
ACK
OPC/ CRT
I/O RESET
ITEM
EXEC
OPS
SPEC
RESUME
CLEAR
PRO
ENCRYPTOR ZEROIZE
MS AUDIO CONTROL
NORM
PS
SUPPLY H2O
FUEL CELL H2O
OP
CL
H2O TK A
POTABLE
A SUPPLY
FLASH EVAP + AIRLOCK
TK A INLET
TK A OUTLET
OPEN
CLOSE
DUMP ISOL VLV
DUMP VLV
DUMP VLV ENABLE/ NOZ HTR
H2O TK B
TK B INLET
TK B OUTLET
CROSSOVER VLV
GALLEY SUP VLV
GALLEY
H2O TK C
TK C INLET
TK C OUTLET
H2O TK D (NL31C)
B SUPPLY FLASH EVAP
B SPLY ISOL VLV
CRT 4 POWER ON
MAL FUNC
R12L


PNL R13
R13U
CAUTION/WARNING
STATUS
PARAMETER SELECT
LIMIT SET
VALUE
R13L
PL BAY DOOR
PL BAY MECH PWR
LATCH CONTROL
RADIATOR CONTROL
KU ANTENNA
MANNED MANUV UNIT
0V102 ONLY
MN A
MN B
MN C
R15
ESS 1BC
ESS 2CA
ESS 3AB


PNL A1
A1L
A1U
A1R
S-BAND PAYLOAD
S-BAND FM
NETWORK SIG PROC
OPS RECORDERS
PAYLOAD RECORDER
AUDIO CENTER
KU BAND
KU SIG PROC


PNL A4
PNL A3
PNL A7U
PNL A6U
PNL A7L-OV103/OV104
PNL A7L-OV102 ONLY
365:23:59:55
59:59
A7U
A6U
MASTER ALARM OFF
PAYLOAD BAY FLOOD
PAYLOAD RETENTION LATCHES
EVENT TIMER
CAMERA POWER
VIDEO OUTPUT
CAMERA COMMAND
RECORDER
PCM
FDM
MADS
SILTS
ALL OFF
HOT OPERATIONAL



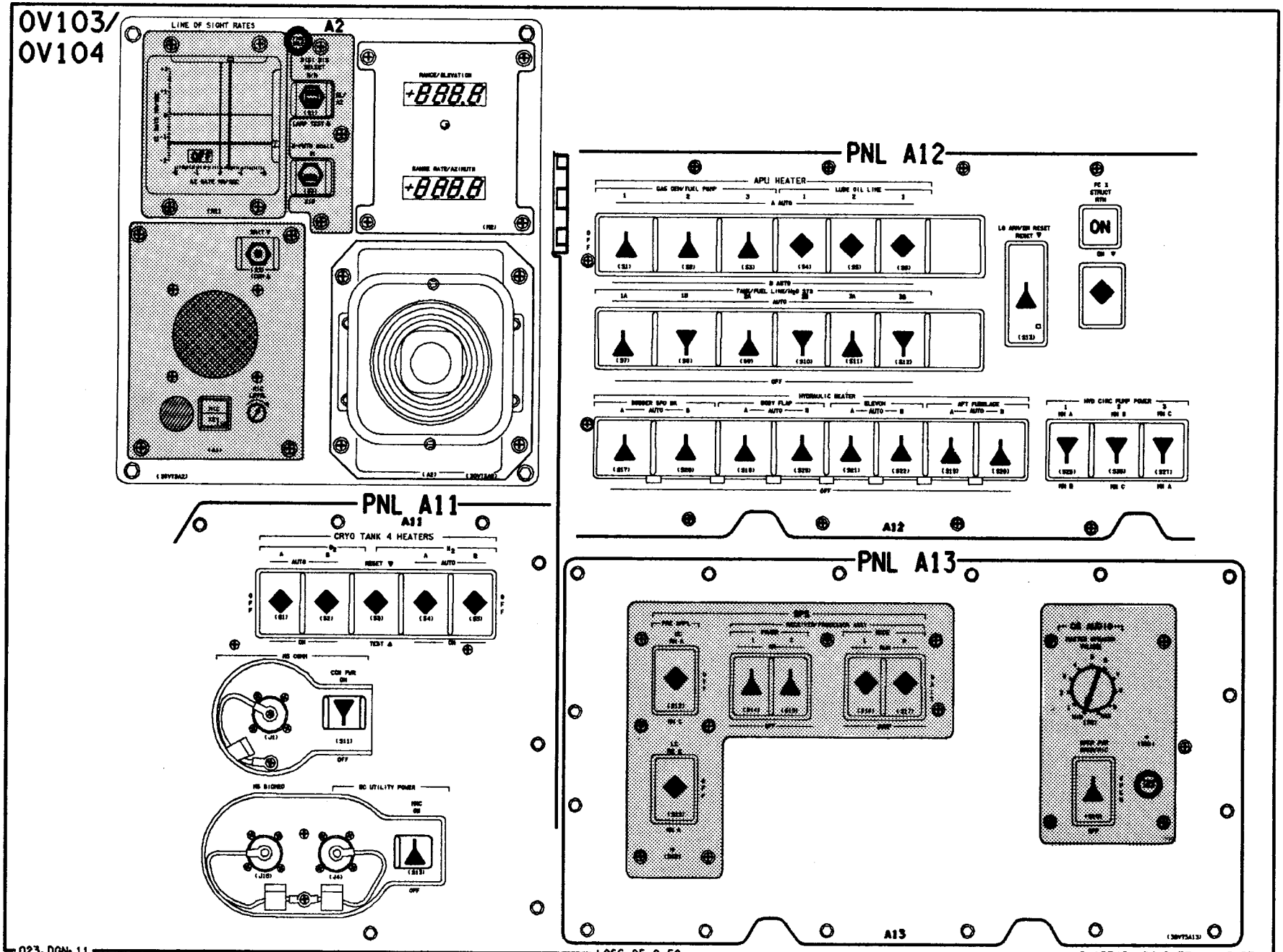
015.DGN; 10

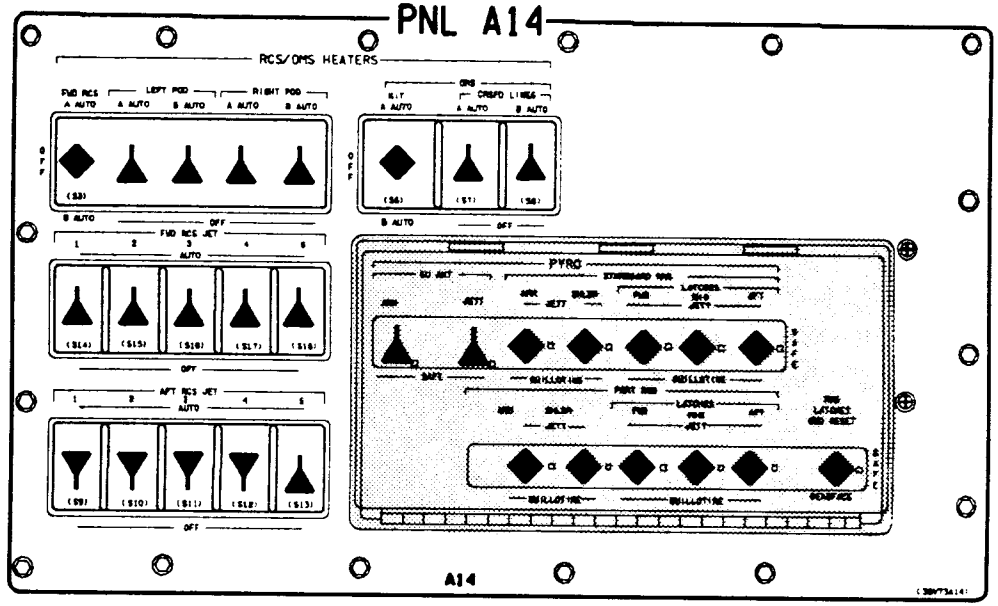
LOSS OF 2 FC

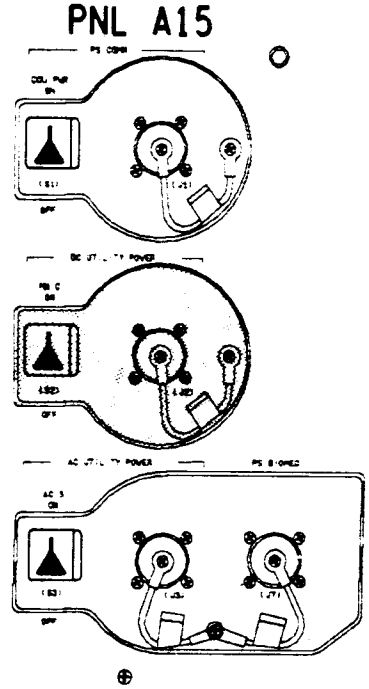
ALL VEH/DATE 01/15/87

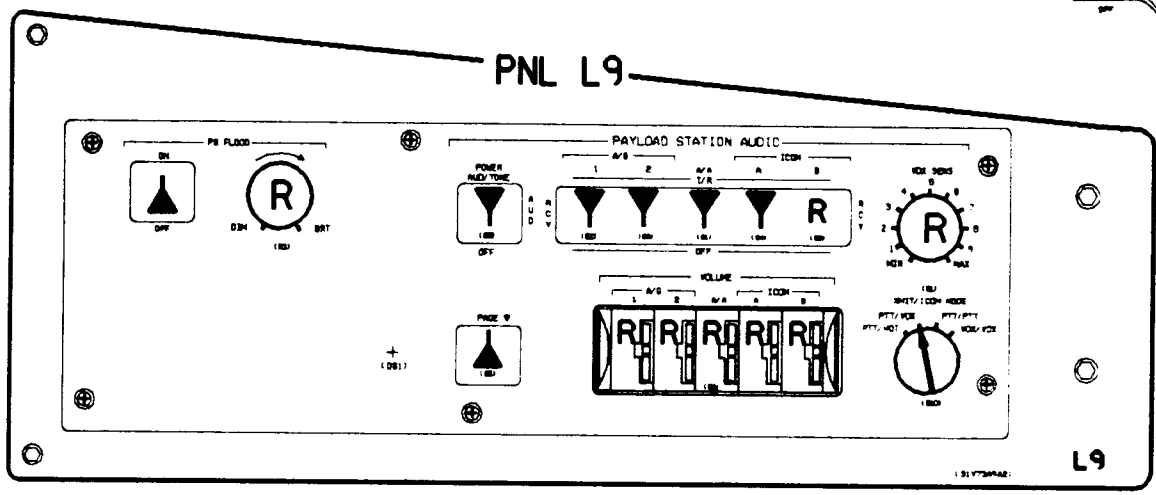
A6-21

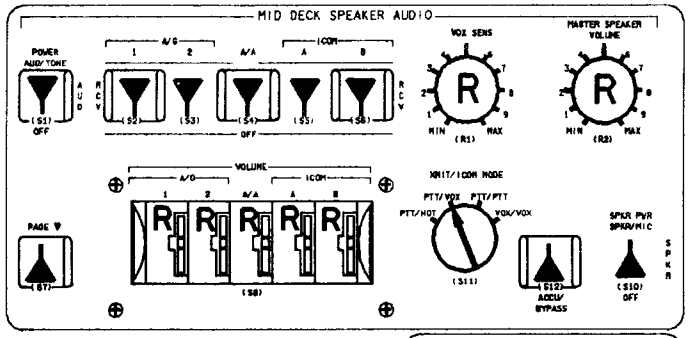
C D/O/3+/GEN


OV103/
OV104
LINE OF SIGHT RATES
A2
PNL A12
APU HEATER
A12
PNL A11
A11
CRYO TANK 4 HEATERS
PNL A13
A13
Q23.DGN; 11
LOSS OF 2 FC
OV103/OV104/DATE 11/12/87

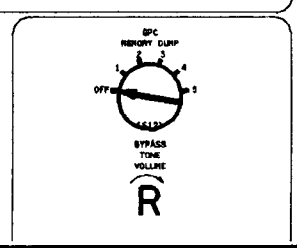

PNL A14
RCS/OMS HEATERS
PYRO
A14

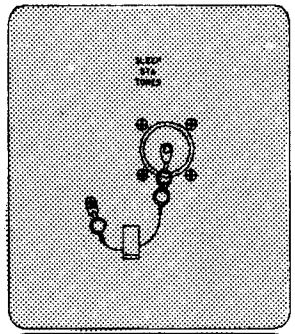

PNL A15


PNL L9
PAYLOAD STATION AUDIO
L9

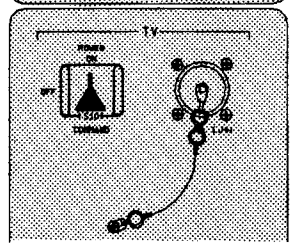


PNL M042F

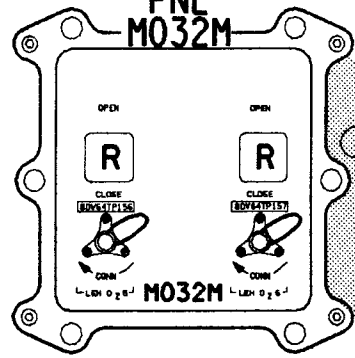




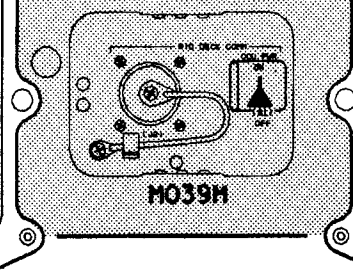
PNL M058F



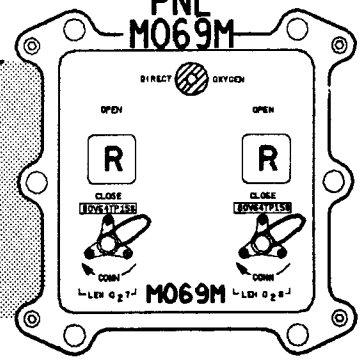
PNL M032M



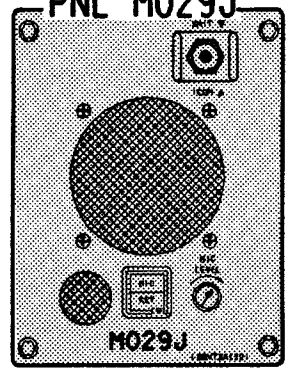
PNL M039M



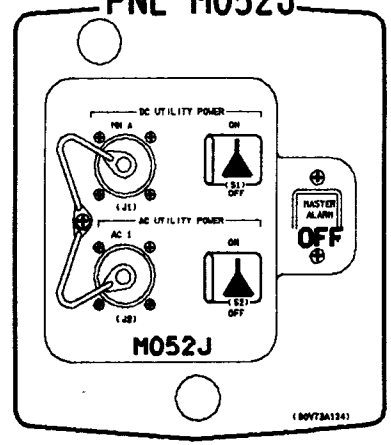
PNL M069M



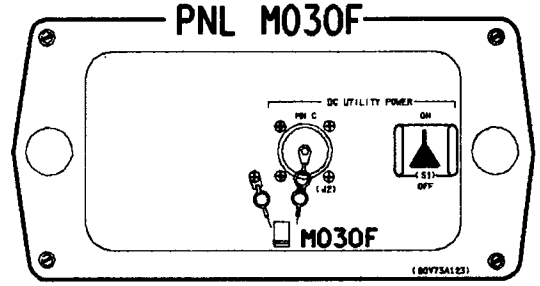
PNL M029J

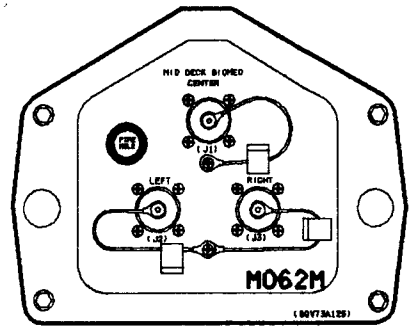


PNL M052J

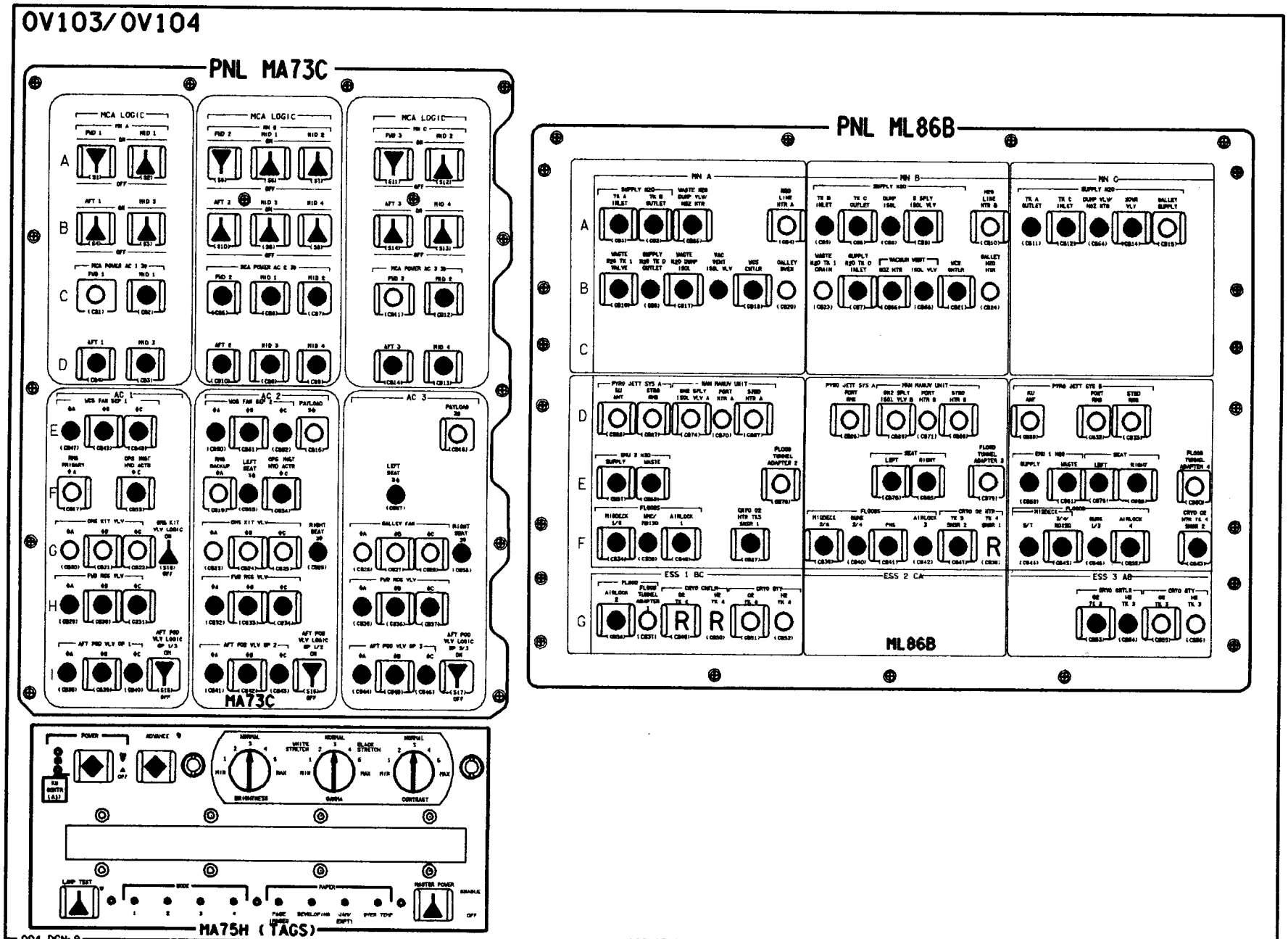


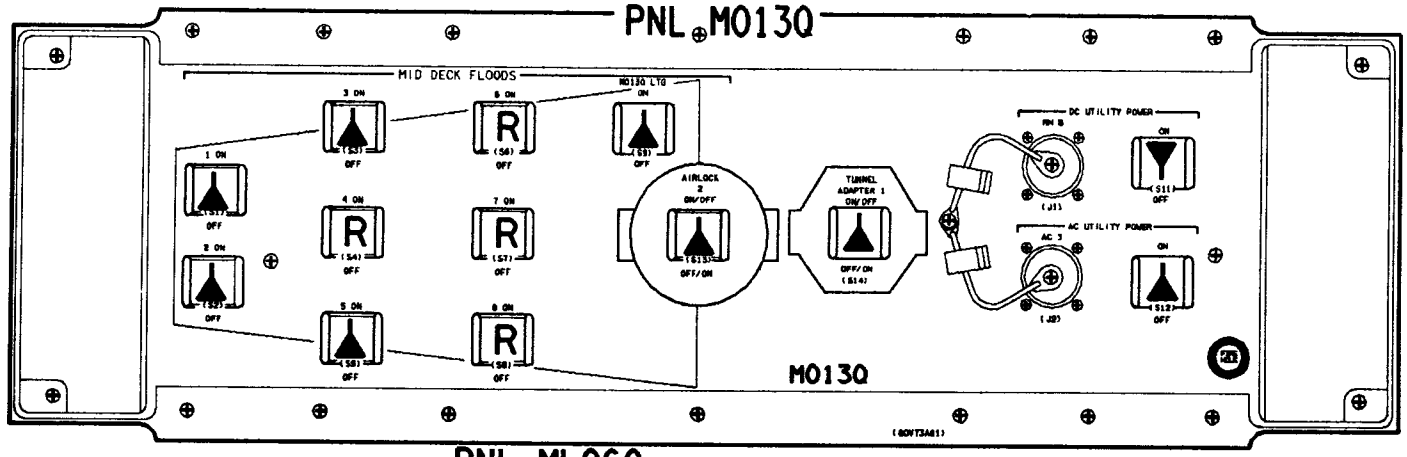
PNL M030F

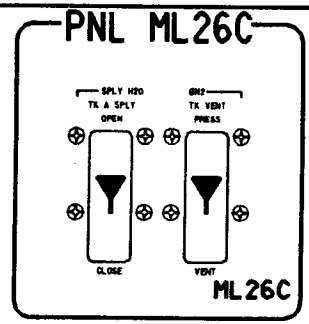


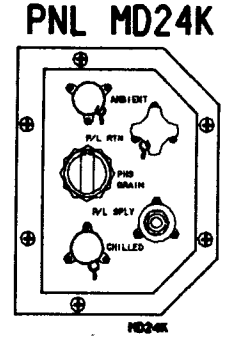


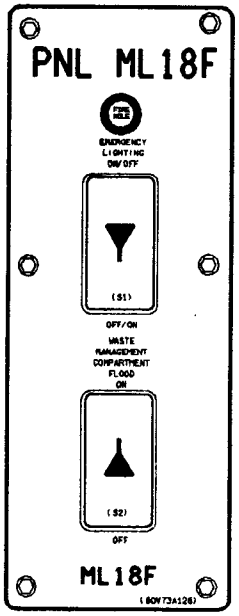
OV103/OV104

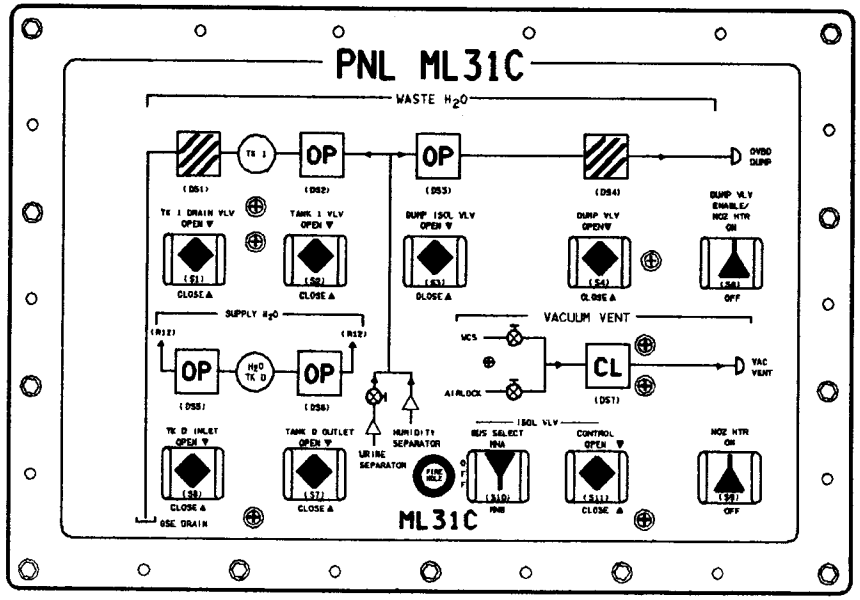

PNL MA73C
MCA LOGIC
MA73C
PNL ML86B
ML86B
ESS 1 BC
ESS 2 CA
ESS 3 AB
MA75H (TAGS)







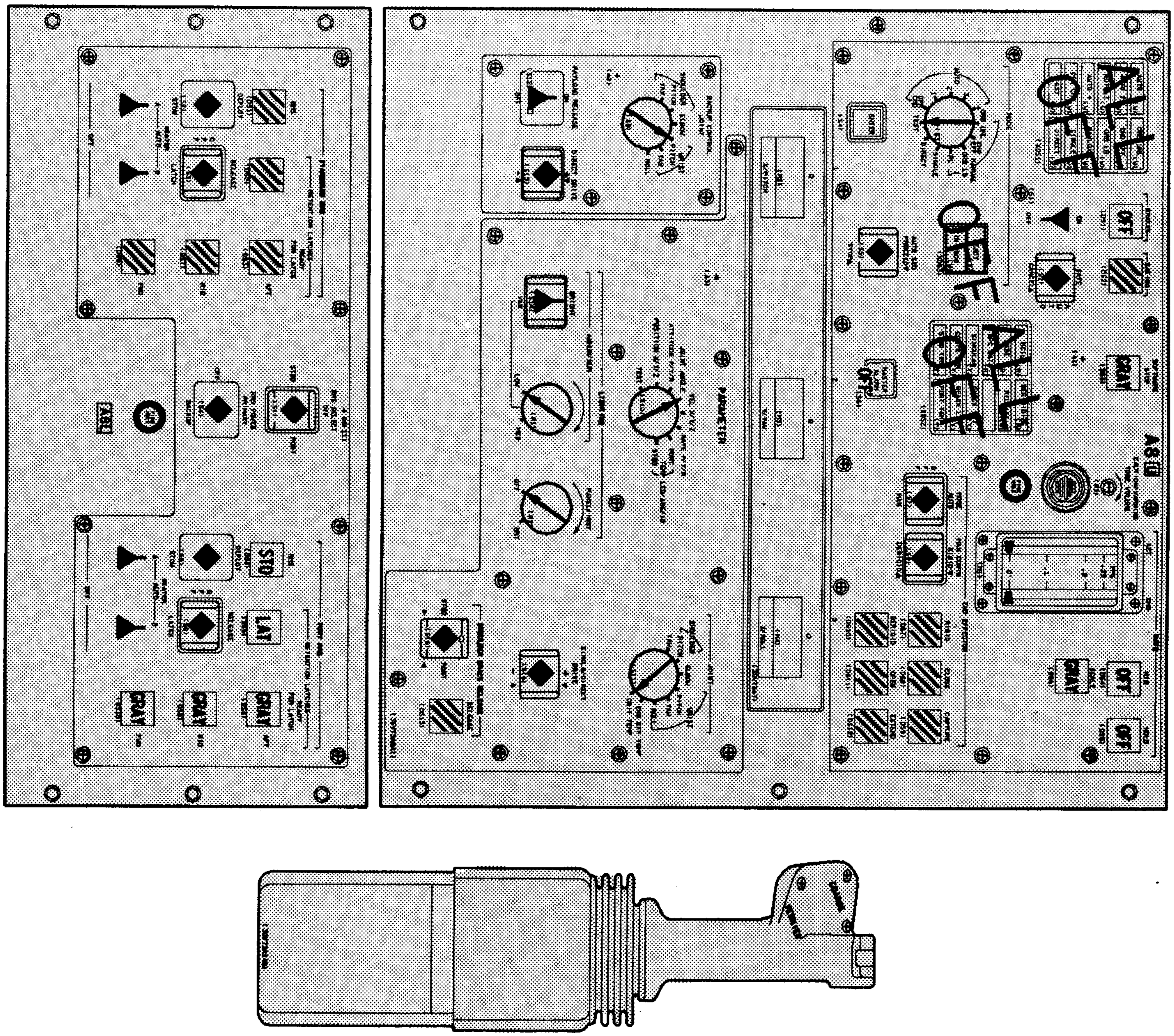


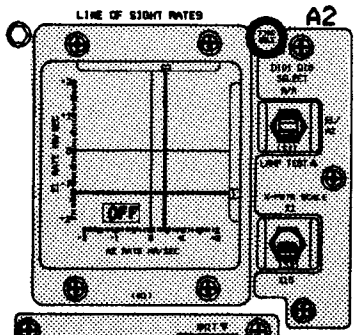


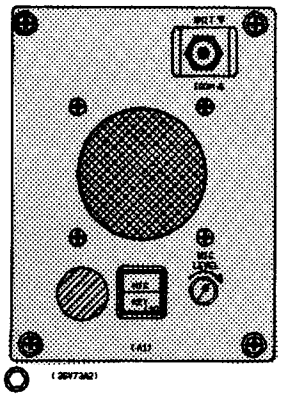
PNL MD44F

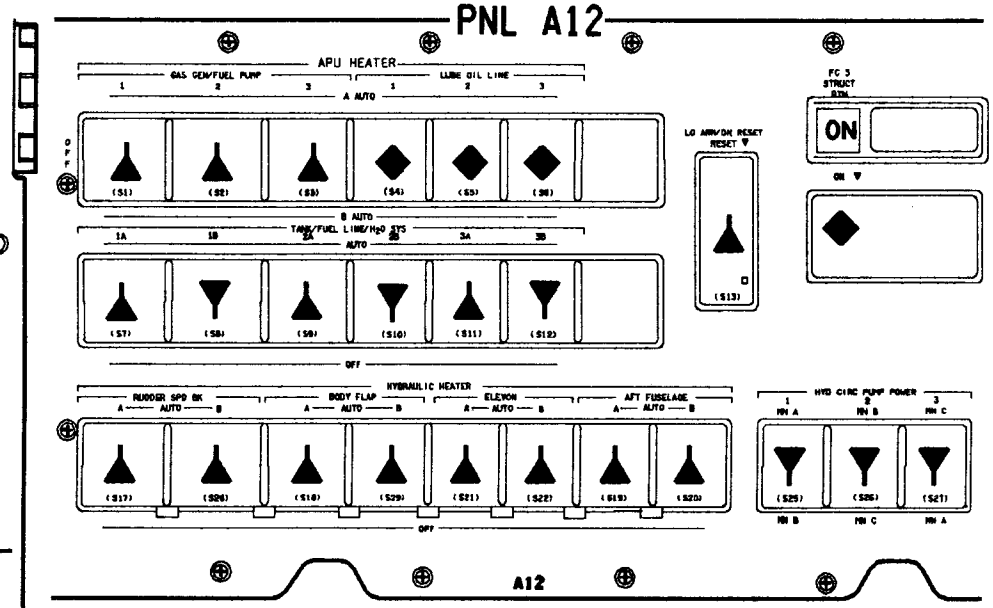
CAB TEMP CNTL vlv - FULL COOL

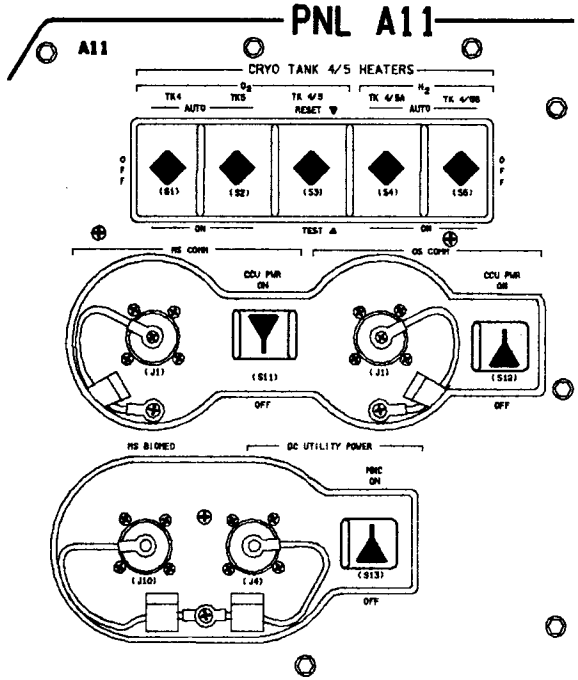
134

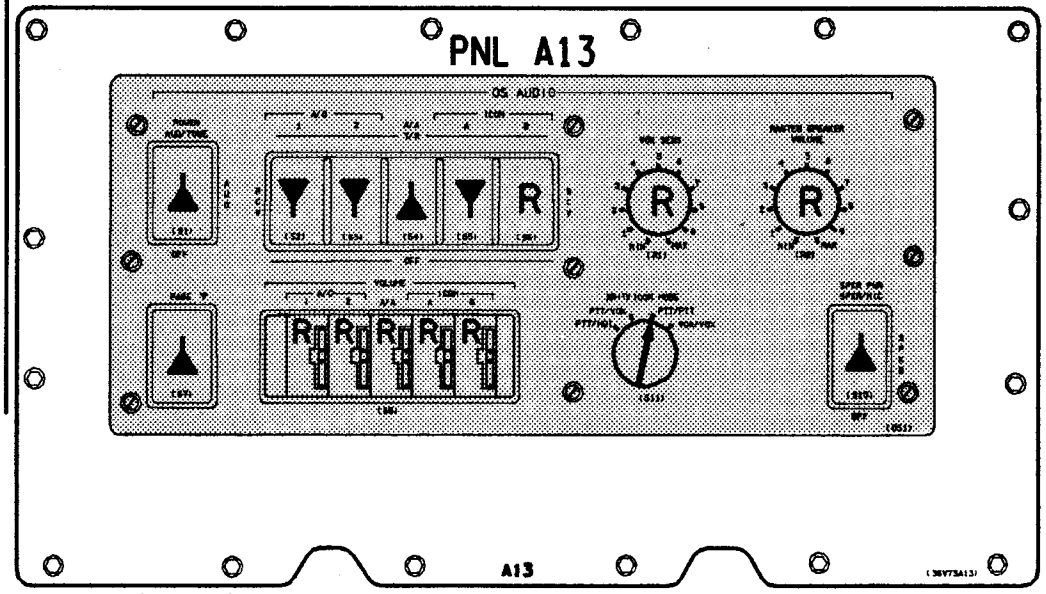


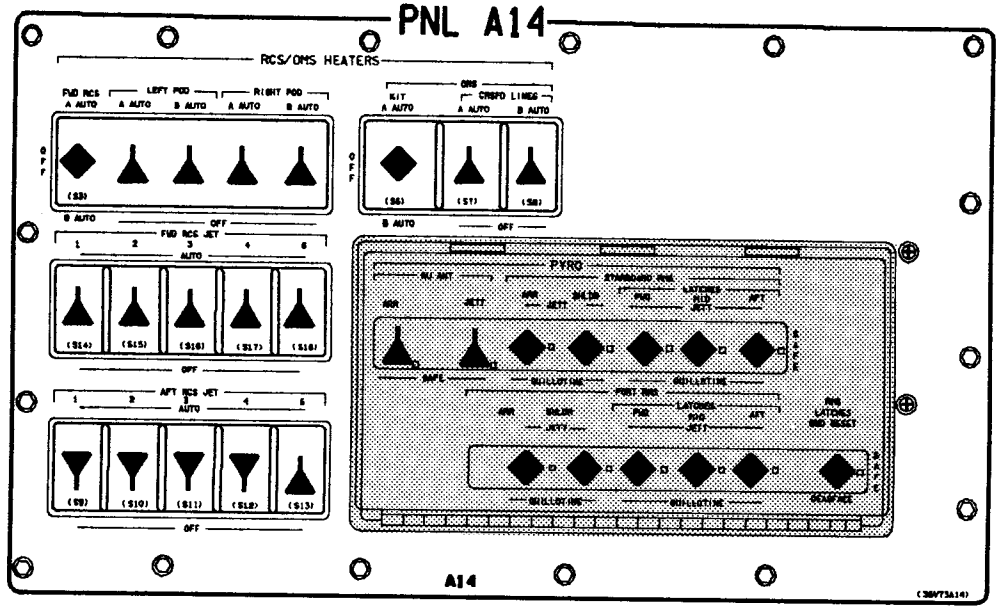

LINE OF SIGHT RATES
A2
OFF

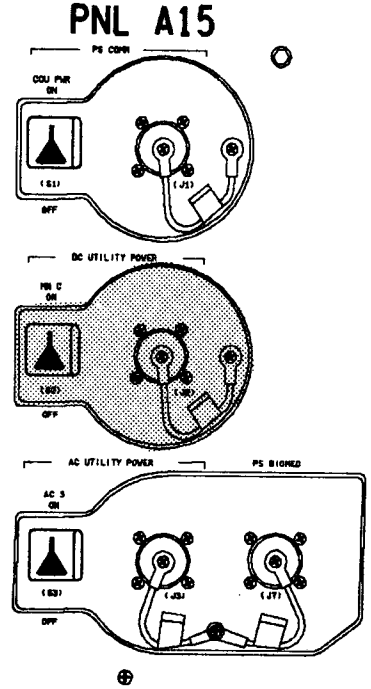


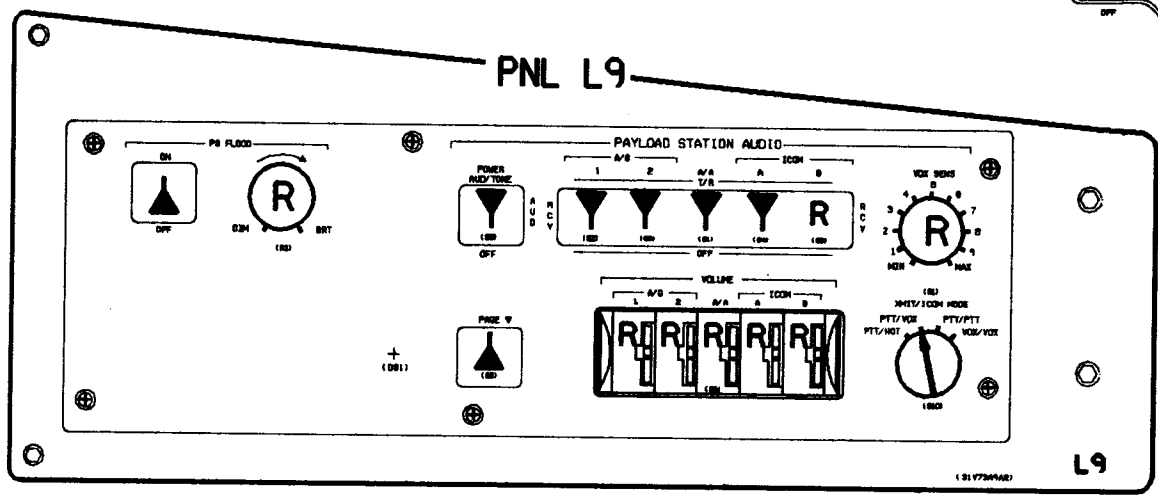

PNL A12
APU HEATER
GAS GEN/FUEL PUMP
LUBE OIL LINE
A AUTO
B AUTO
TANK/FUEL LINE/H2O SYS
AUTO
HYDRAULIC HEATER
RUDDER SPD BK
BODY FLAP
ELEVON
AFT FUSELAGE
HYD CIRC PUMP POWER
LG ARM/DN RESET
FC 3 STRUCT BIM
ON
OFF
A12

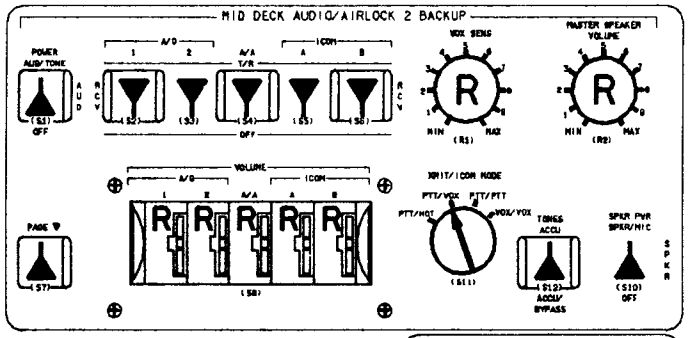

PNL A11
A11
CRYO TANK 4/5 HEATERS
TK4
TK5
TK 4/5
RESET
AUTO
ON
TEST
OFF
RS COMM
OS COMM
CCU PWR
RS BIOMED
DC UTILITY POWER
MNC


PNL A13
OS AUDIO
A13

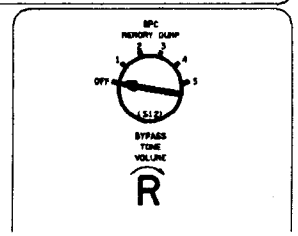

PNL A14
RCS/OMS HEATERS
PYRO
A14

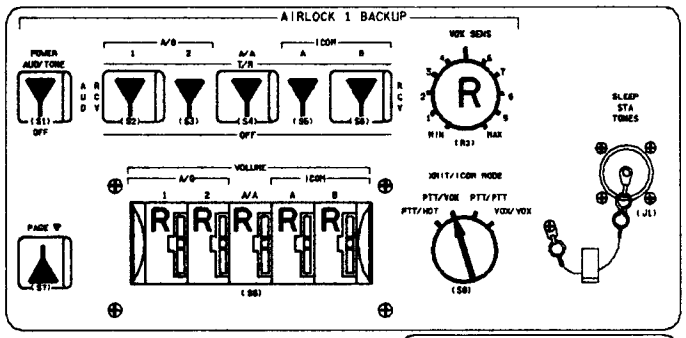

PNL A15
PS COMM
DC UTILITY POWER
AC UTILITY POWER
PS SIGNAL


PNL L9
PAYLOAD STATION AUDIO
L9

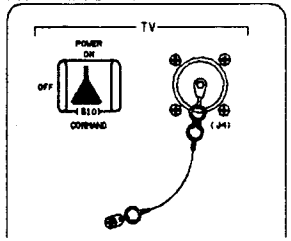


PNL M042F

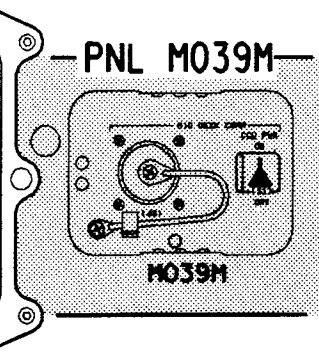




PNL M058F



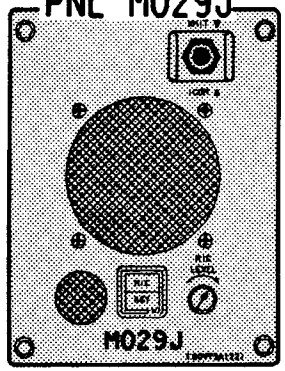
PNL M032M



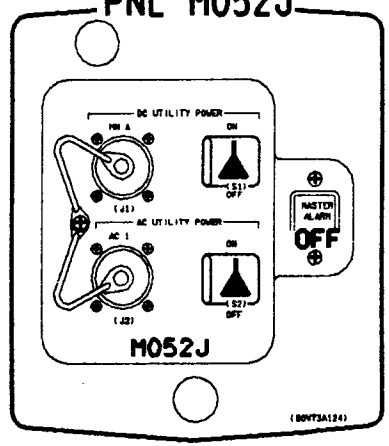
PNL M039M

PNL M069M

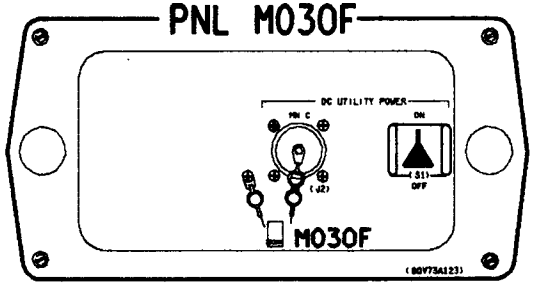
PNL M029J

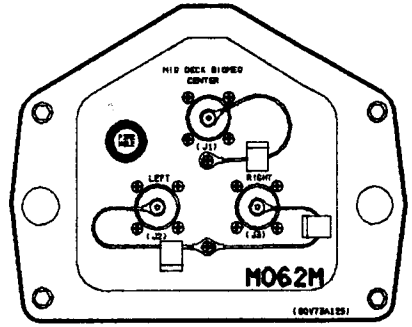


PNL M052J

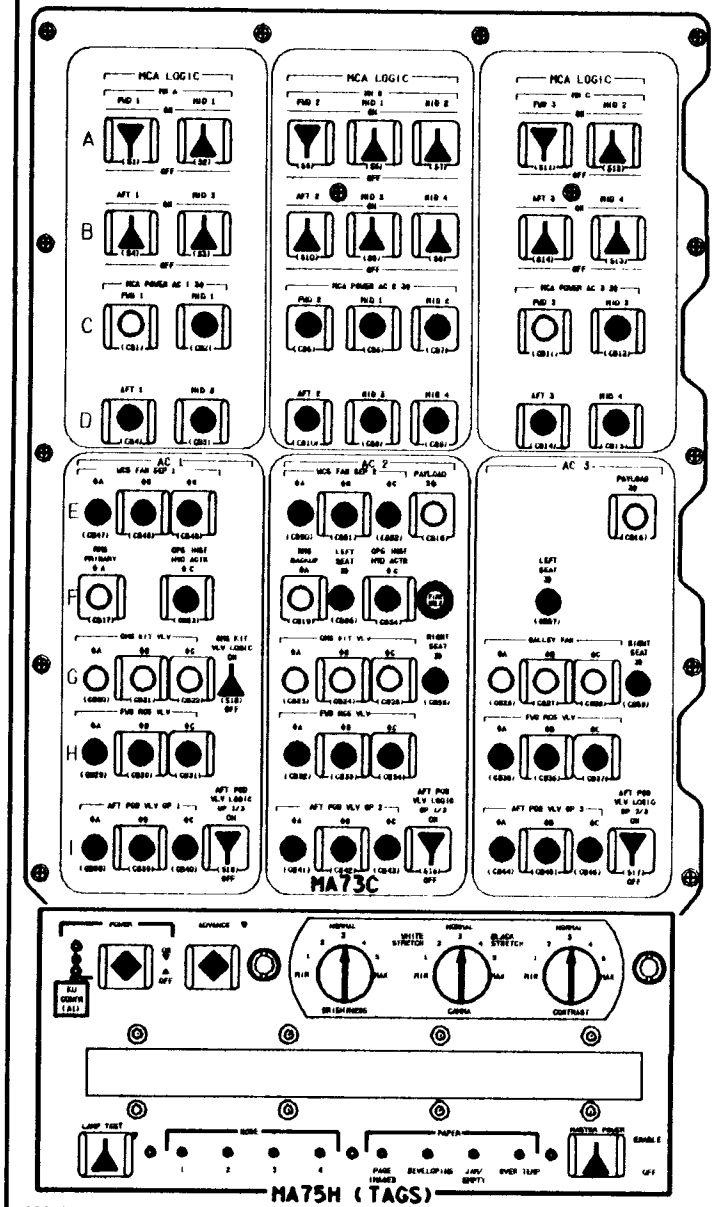


PNL M030F

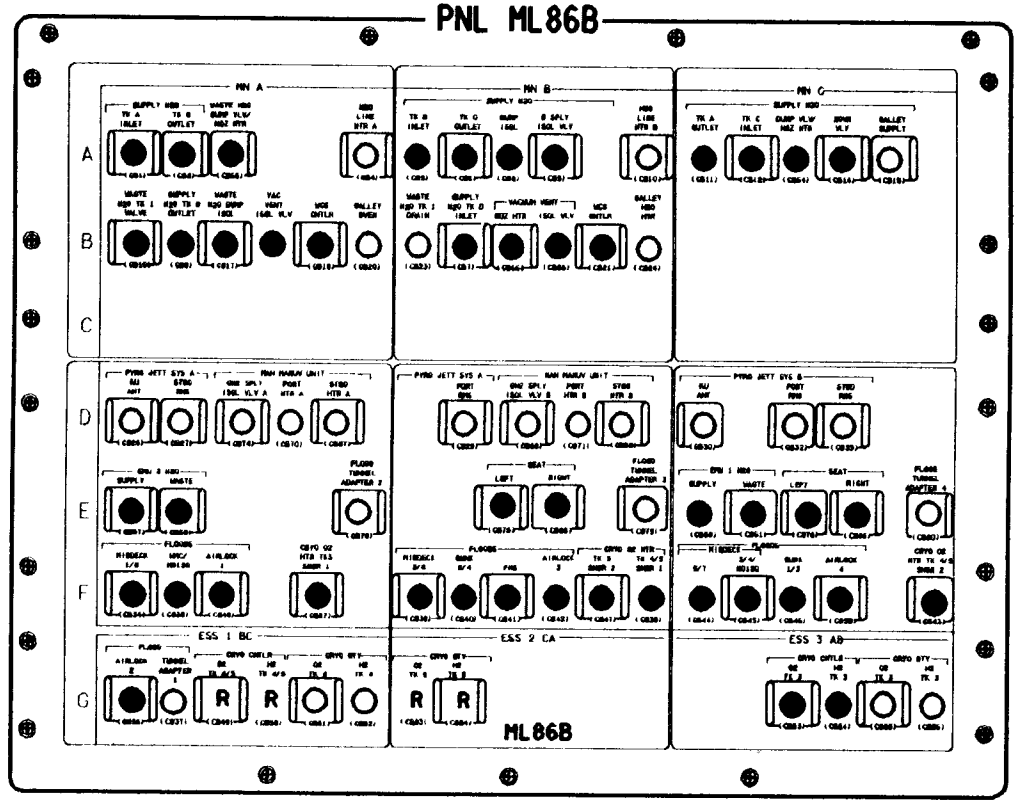


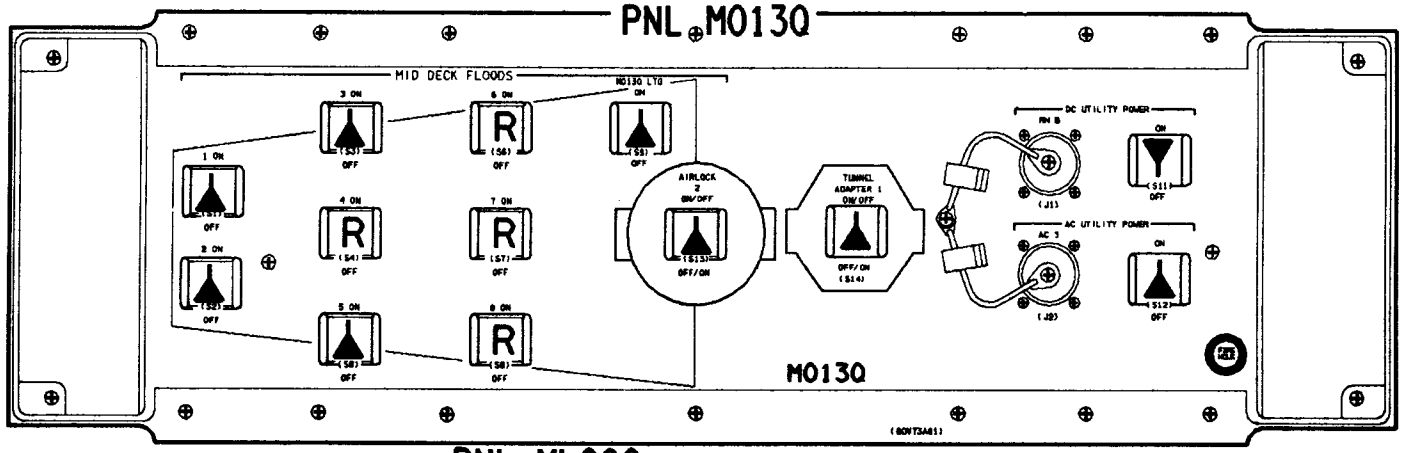


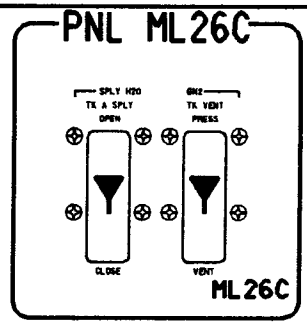
OV102

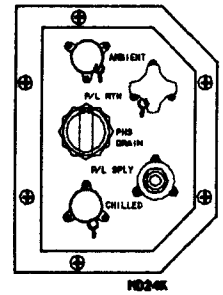

MCA LOGIC
MCA LOGIC
MCA LOGIC
AC 1
AC 2
AC 3
MA73C

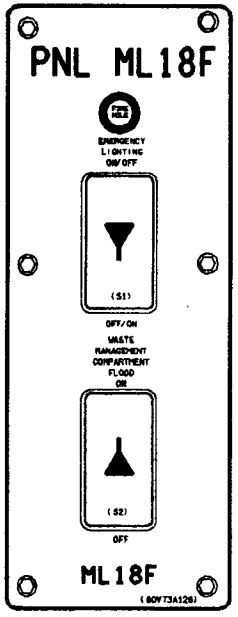
MA75H (TAGS)

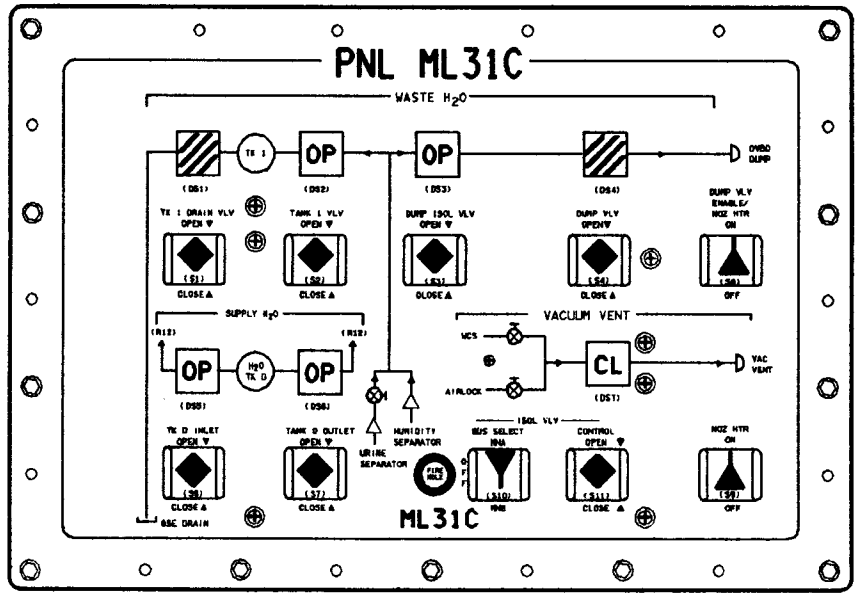

PNL ML86B
MAIN A
MAIN B
MAIN C
ESS 1 BC
ESS 2 CA
ESS 3 AB
ML86B





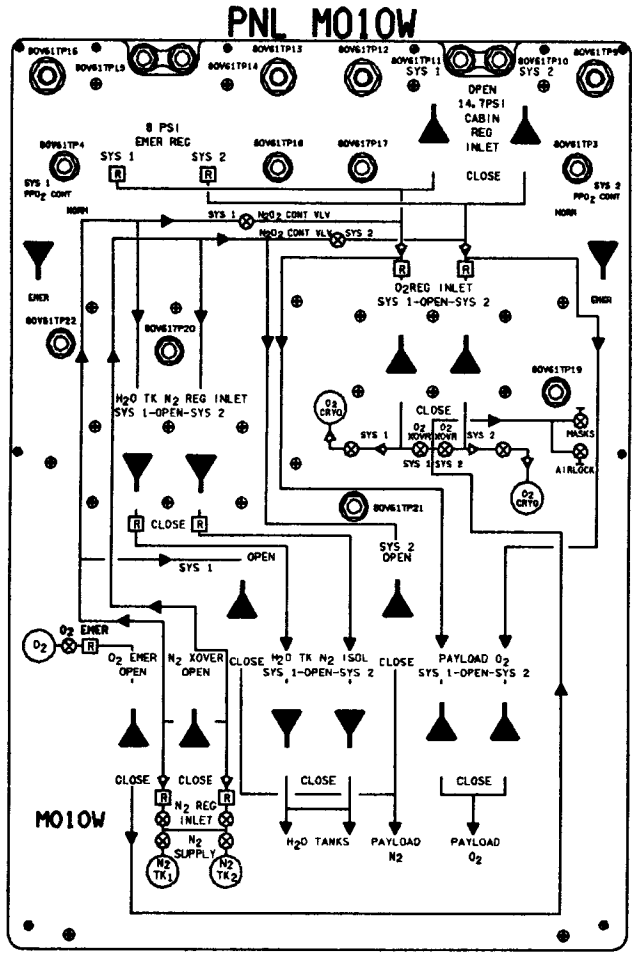


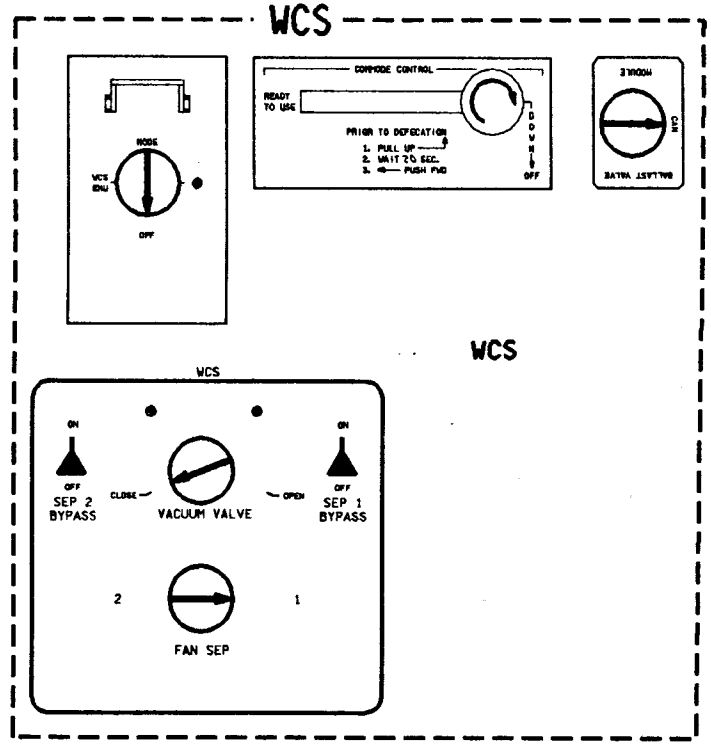


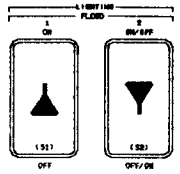


PNL MD44F

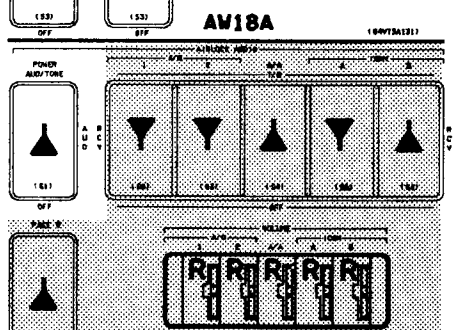
CAB TEMP CNTL vlv - FULL COOL


PNL M010W
8 PSI
EMER REG
SYS 1
SYS 2
OPEN
14.7PSI
CABIN
REG
INLET
CLOSE
SYS 1 MoO_2 CONT VLV
MoO_2 CONT VLV SYS 2
O_2REG INLET
SYS 1-OPEN-SYS 2
H_2O TK N_2 REG INLET
SYS 1-OPEN-SYS 2
CLOSE
MASKS
AIRLOCK
SYS 2
OPEN
SYS 1
OPEN
O_2 EMER
O_2 EMER
OPEN
N_2 XOVER
OPEN
CLOSE
H_2O TK N_2 ISOL
SYS 1-OPEN-SYS 2
CLOSE
PAYLOAD O_2
SYS 1-OPEN-SYS 2
CLOSE
CLOSE
CLOSE
CLOSE
N_2 REG
INLET
N_2
SUPPLY
H_2O TANKS
PAYLOAD
N_2
PAYLOAD
O_2
M010W

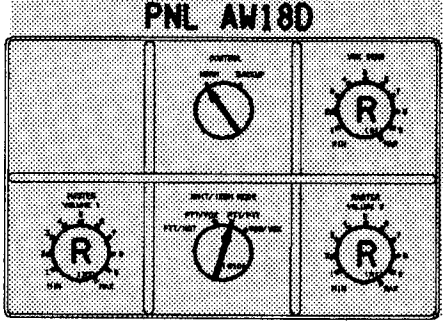

WCS
MODE
OFF
CORROSE CONTROL
READY
TO USE
PRIOR TO DEFECATION
1. PULL UP
2. WAIT 20 SEC.
3. PUSH FWD
DOWN
OFF
WCS
WCS
ON
OFF
SEP 2
BYPASS
CLOSE
VACUUM VALVE
OPEN
ON
OFF
SEP 1
BYPASS
2
1
FAN SEP



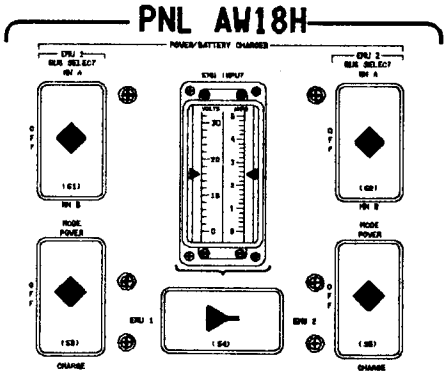
PNL AW18A



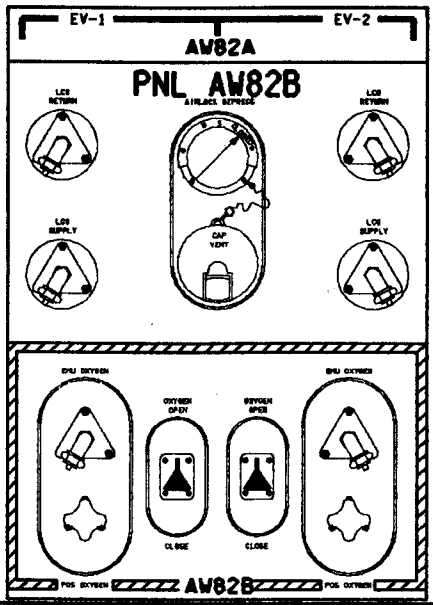
AW18A



PNL AW18D



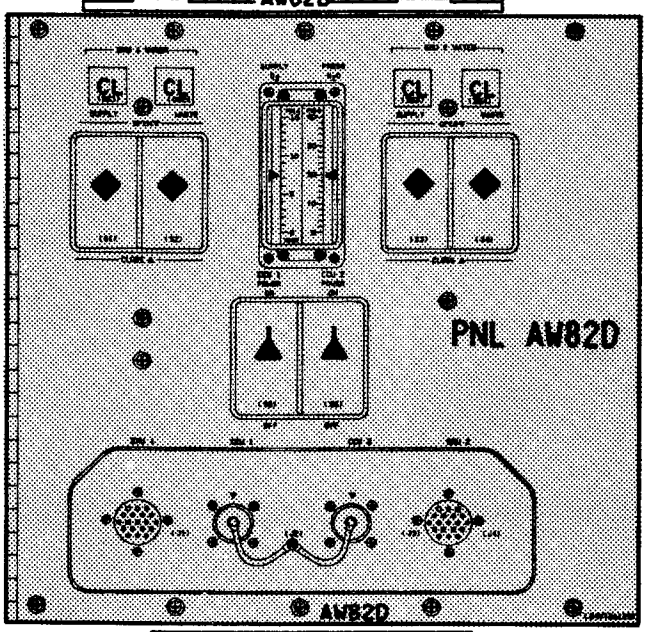
PNL AW18H



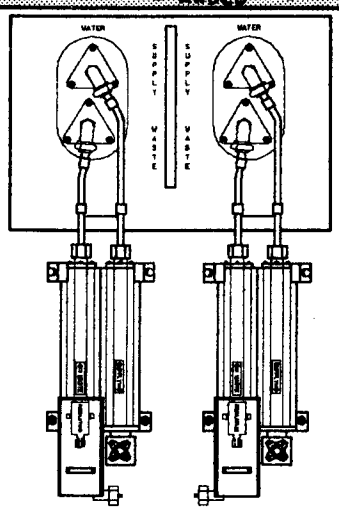
PNL AW82B

AW82A

AW82B



PNL AW82D



AW82H

Airlock Hatch

Actuator Handle	- LATCHED
Lock Lever	- LOCKED
Equalization vlv (two)	- NORM, capped

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LOSS OF FES DEORBIT PREP

Assumptions/Initial Conditions

- This procedure assumes that EVAP OUT T HIGH (ORB PKT, ECLS) and LOSS OF FES (DEORBIT PREP) (ORB PKT, PWRDN) have been performed
- If failure occurs after deorbit prep is entered, compare this timeline, beginning at TIG -4 hours, with activities previously accomplished for misconfigurations

Problem Description/Rationale

- Immediate deorbit is not mandatory if both freon loops are operating and radiator flow has been established
- The heat removal capability of the radiators allows for normal on-orbit power levels without thermal problems. However, for deorbit prep, to allow some coldsoak of the radiators and vehicle, power levels must be limited

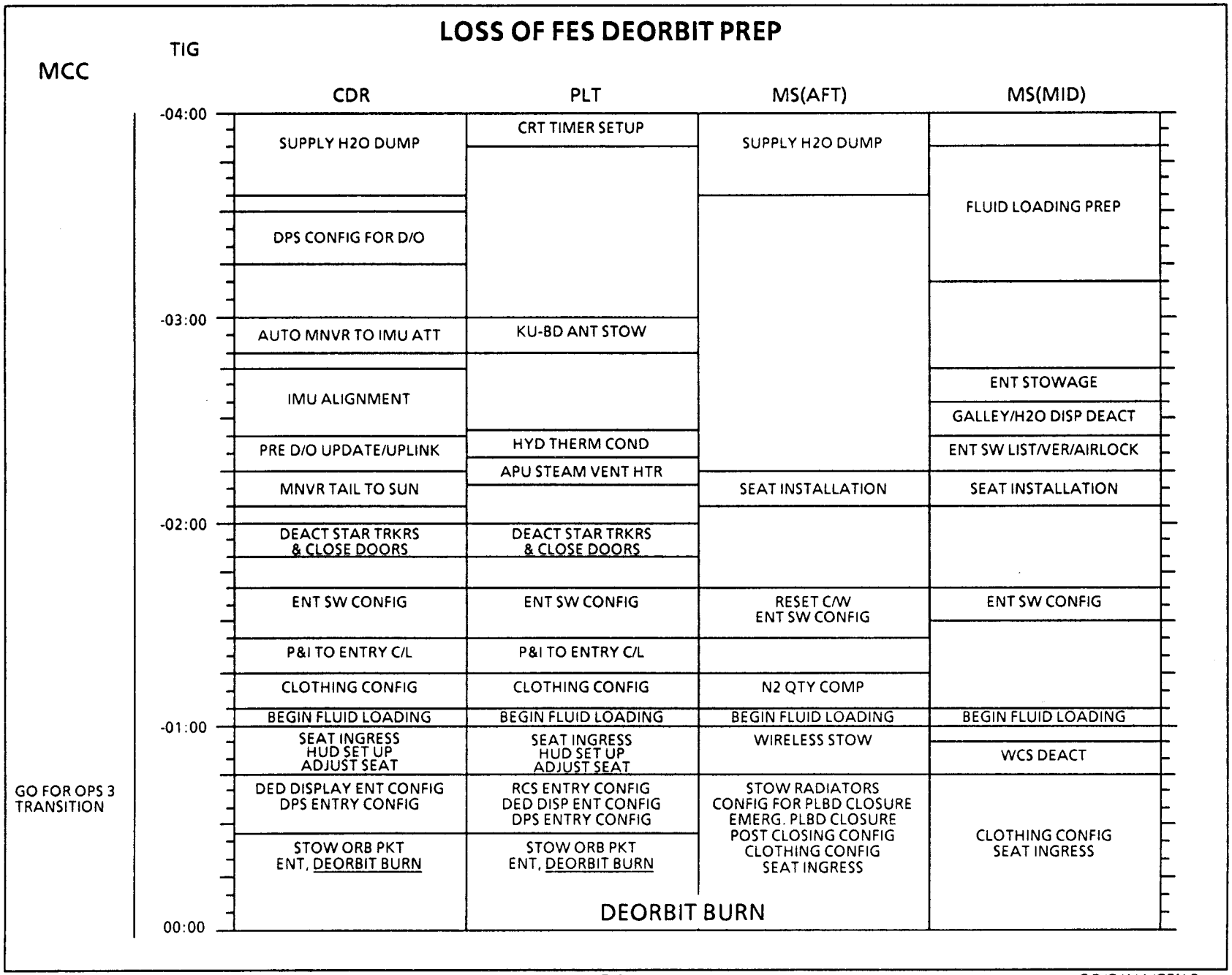
Procedure Notes

- A near normal deorbit prep and entry is performed except that:
  - Nav and landing aids are powered when needed during entry
  - Limited use of CRTs, Flt Cntlr Pwr, Inst Pwr, SPOC, and lighting
  - GPC entry configuration and OPS 3 transition are delayed to TIG -45 minutes to delay full GPC powerup
  - MS continues deorbit prep activities until TIG. CDR/PLT go to ENT C/L at TIG -30
  - Door closure delayed to TIG -10 minutes
  - Radiator coldsoak attitude (tail sun) maintained until TIG -15 minutes except for IMU align attitude
  - Ammonia boiler activated at entry interface (EI)
  - HYD circ pump operated for additional cooling

LOSS OF FES DEORBIT PREP OVERVIEW OF CONFIGURATION MANAGEMENT

			OPS 1 ASC C/L	OPS 2 ON-ORBIT	OPS 2 DEORBIT PREP TIG -03:28	OPS 3 DEORBIT PREP TIG -0:45	TIG	EI-5	V = 15K
DPS									
GPC			1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5		
OPS			G1 G1 G1 G1 BFS	G2 G2 G3F SM BFS	G2 G2 G3F SM BFS	G3 G3 G3 G3 BFS	G3 G3 G3 G3 BFS		
POWER			ON ON ON ON ON	ON ON OFF ON OFF	ON ON OFF ON ON	ON ON ON ON ON	ON ON ON ON ON		
OUTPUT			N N N N B	N N N T N	N N N T N	N N N N B	N N N N B		
MODE			R R R R R	R R H R H	R R H R S	R R R R R	R R R R R		
CONFIG			1	2 / 4 (5)	2 / 4 (5)	3	3		
GPC			1 2 3 4 0	1 2 0 0 0 / 0 0 0 4 0	1 2 0 0 0 / 0 0 0 4 0	1 2 3 4 0	1 2 3 4 0		
STR	1		1	1 / 0	1 / 0	1	1		
	2		2	2 / 0	2 / 0	2	2		
	3		3	1 / 0	1 / 0	3	3		
	4		4	2 / 0	2 / 0	4	4		
PL	1/2		1	0 / 4	0 / 4	1	1		
CRT	1		1	1 / 4	1 / 4	1	1		
	2		2	2 / 4	2 / 4	2	2		
	3		3	0 / 0	0 / 0	3	3		
	4		0	2 / 4	2 / 4	0	0		
L	1		1	0 / 4	0 / 4	0	0		
	2		2	0 / 0	0 / 0	0	0		
MM	1		1	1 / 4	1 / 4	1	1		
	2		2	2 / 4	2 / 4	2	2		
MDM			ALL ON	ALL ON	ALL ON	ALL ON	ALL ON		
D & C	ADI/DDU	L,R	L,A — MINIMIZE — USE						
	CRT/DEU	1,2,3	1,2,4-ON — MINIMIZE — USE						
	INSTR	L,R	NONE			MINIMIZE	USE		
ECLS	AV BAY FAN	1-B,2-A,3-B							
	CABIN FAN	A							
	IMU FAN	B							
	WATER LP	1-OFF, 2-ON	1-GPC,2-ON			1-OFF,2-ON			
	FREON LP	1-B,2-B							
	RADIATOR	STOWED →	DEPLOY			STOW			
FC/SS/EN/AV/IS	FCS	AUTO							
	ASA	ALL ON	OFF			ALL ON			
	AA	ALL ON	OFF			ALL ON			
	RGA	ALL ON	OFF			ALL ON			
	ADTA	ALL ON	OFF					ALL ON	
	IMU	ALL ON							
	RA	ALL ON	OFF						ON
	TACAN	ALL ON	OFF						ON
	UHF	ON							
	MLS	ALL OFF							ON
RJDC	RJDA	ALL ON							
	RJDF	ALL ON				OFF			
	VERNIER	OFF →	ON			OFF			

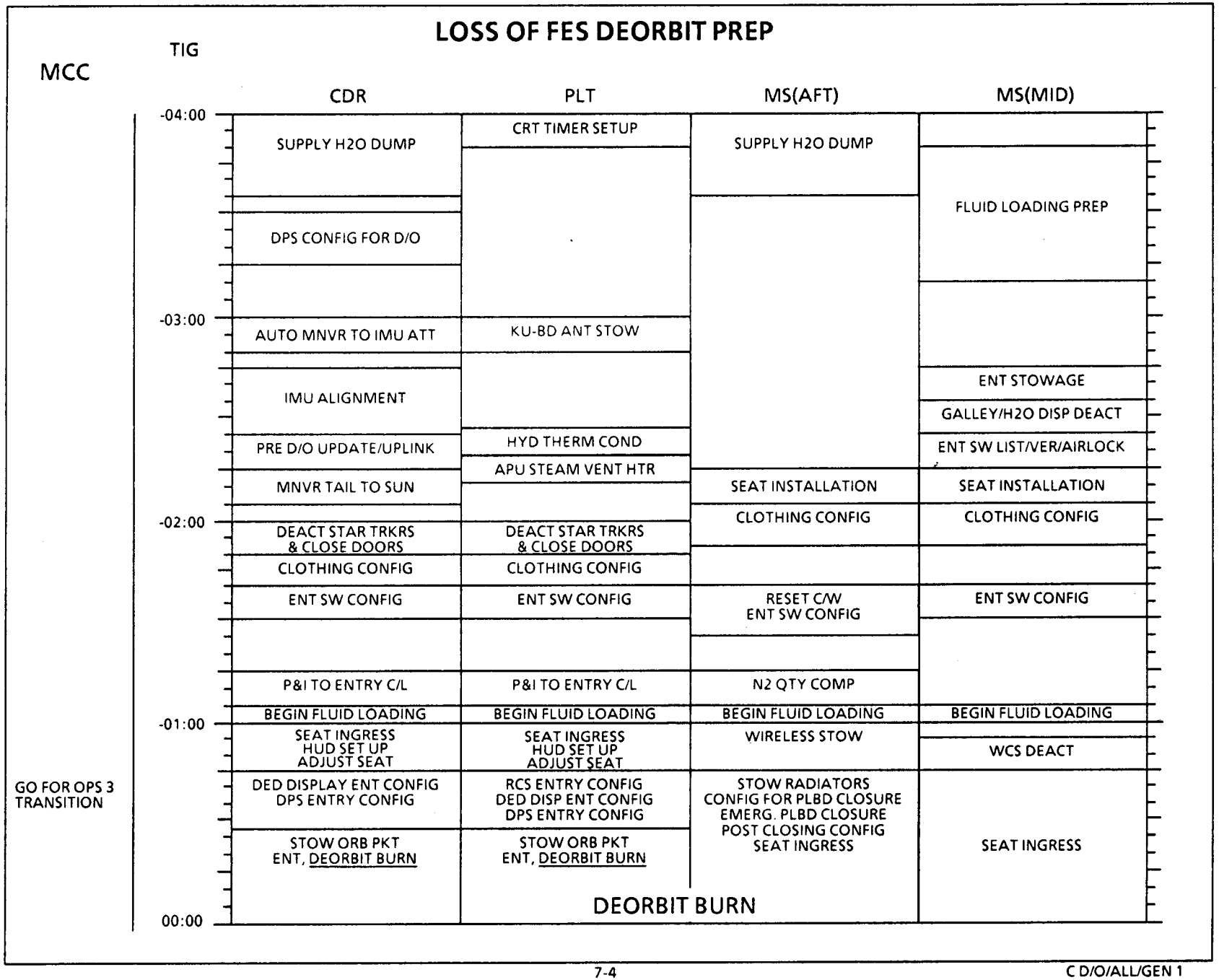
LOSS OF FES DEORBIT PREP



LOSS OF FES DEORBIT PREP OVERVIEW OF CONFIGURATION MANAGEMENT

			OPS 1 ASC C/L	OPS 2 ON-ORBIT	OPS 2 DEORBIT PREP TIG -03:28	OPS 3 DEORBIT PREP TIG -0:45	TIG	EI-5	V = 15K
DPS									
GPC			1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5		
OPS			G1 G1 G1 G1 BFS	G2 G2 G3F SM BFS	G2 G2 G3F SM BFS	G3 G3 G3 G3 BFS	G3 G3 G3 G3 BFS		
POWER			ON ON ON ON ON	ON ON OFF ON OFF	ON ON OFF ON ON	ON ON ON ON ON	ON ON ON ON ON		
OUTPUT			N N N N B	N N N T N	N N N T N	N N N N B	N N N N B		
MODE			R R R R R	R R H R H	R R H R S	R R R R R	R R R R R		
CONFIG			1	2 / 4(5)	2 / 4(5)	3	3		
GPC			1 2 3 4 0	1 2 0 0 0 / 0 0 0 4 0	1 2 0 0 0 / 0 0 0 4 0	1 2 3 4 0	1 2 3 4 0		
STR	1		1	1 / 0	1 / 0	1	1		
	2		2	2 / 0	2 / 0	2	2		
	3		3	1 / 0	1 / 0	3	3		
	4		4	2 / 0	2 / 0	4	4		
PL	1/2		1	0 / 4	0 / 4	1	1		
CRT	1		1	1 / 4	1 / 4	1	1		
	2		2	2 / 4	2 / 4	2	2		
	3		3	0 / 0	0 / 0	3	3		
	4		0	2 / 4	2 / 4	0	0		
L	1		1	0 / 4	0 / 4	0	0		
	2		2	0 / 0	0 / 0	0	0		
MM	1		1	1 / 4	1 / 4	1	1		
	2		2	2 / 4	2 / 4	2	2		
MDM			ALL ON	ALL ON	ALL ON	ALL ON	ALL ON		
D & C	ADI/DDU	L,R	L,A — MINIMIZE USE						
	CRT/DEU	1,2,3	1,2,4-ON — MINIMIZE USE						
	INSTR	L,R	NONE			MINIMIZE USE			
	AV BAY FAN	1-B,2-A,3-B							
E	CABIN FAN	B							
C	IMU FAN	B							
L	WATER LP	1-OFF, 2-ON	1-GPC,2-ON			1-OFF,2-ON			
S	FREON LP	1-A,2-A							
	RADIATOR	STOWED →	DEPLOY			STOW			
F C S	FCS	AUTO							
S / N	ASA	ALL ON	OFF			ALL ON			
S / A	AA	ALL ON	OFF			ALL ON			
N S	RGA	ALL ON	OFF			ALL ON			
A V	ADTA	ALL ON	OFF					ALL ON	
V A	IMU	ALL ON							
A I	RA	ALL ON	OFF					ON	
R S	TACAN	ALL ON	OFF					ON	
I D	UHF	ON							
S	MLS	ALL OFF						ON	
R	RJDA	ALL ON							
J	RJDF	ALL ON				OFF			
D	VERNIER	OFF →	ON			OFF			

LOSS OF FES DEORBIT PREP



TIG

-04:00

A1(B1)
AUTO
VERN
RT 0.2
DB 1.0

P CRT TIMER SETUP [1]

L1 ✓DAP: A1/AUTO/VERN
✓DAP: B set to B1

-03:55

C,MS SUPPLY WATER DUMP (ORB OPS, ECLS)
If no MCC, dump TK B to 50%

-03:50

MS FLUID LOADING PREP MID Cue Card [2], 7-23

-03:45

-03:40

-03:35

-03:30

CRT TIMER SETUP [1]

[1: GNC 2 TIME]

SET CRT TIMER TO COUNT DOWN TO TIG (perform for GNC & SM)

ENTRY DAY (HR:MIN:SEC - MET)

ITEM 17 + | | | + | | | + | | |

24 HOUR LATE DELAYED DEORBIT

ITEM 17 + | | | + | | | + | | |

[1: GNC UNIV PTG]

TIG

-03:30

A1(B1)
AUTO
VERN
RT 0.2
DB 1.0

C DPS CONFIG FOR D/O PREP [3]

-03:25

MCC: Update IMU ALIGN PAD, (if reqd, over STDN)

-03:20

UPLINK
(over STDN)
(if reqd)
PASS and BFS
SV

-03:15

-03:10

-03:05

P KU-BD ANT STOW, (if deployed) (ORB OPS, COMM/INST)

-03:00

DPS CONFIG FOR D/O PREP [3]

TURN ON GPC 2 (if off)

O6 ✓GPC MODE 2 - HALT (tb-bp)
✓OUTPUT 2 - NORM
PWR 2 - ON
MODE 2 - STBY (tb-RUN), RUN

TRANSITION GPCs 1&2 to OPS 2 (if GPC 2 was just activated)

[GNC 0 GPC MEMORY]

CONFIG - ITEM 1 + 2 EXEC
Modify MC 2 per Table →
GPC, OPS 201 PRO

DAP: A/AUTO/VERN

CONFIG GPC	2 12000
STR 1	1
2	2
3	1
4	2
PL 1/2	0
CRT 1	1
2	2
3	0
4	2
L 1	0
2	0
MM 1	1
2	2

ENSURE BFS GPC CAN DRIVE A CRT

O6 GPC PWR 5 - ON
MODE 5 - STBY (tb-RUN)

C3 BFC CRT DISP - ON
SEL - 2 + 3

[2: BFS, GNC BFS MEMORY or SM THERMAL]

C3 BFC CRT DISP - OFF
SEL - 3 + 1

IMU ALIGNMENT [5]

NOTE
Procedure applies for 1 or 2 S TRKR aligns.
For 1 S TRKR, a 2nd Att Mnvr is reqd between data takes. See STAR PAIRS (ORB OPS, GNC)

C 1. X: GNC 22 S TRK/COAS CNTL

Y: GNC 21 IMU ALIGN

CRTX 2. ✓REQD ID - ITEM 11,12 - 0
✓STATUS (two) - NO BITE
✓SHUTTER (two) - OP

* If SHUTTER - CL: *
* ✓Att, MET - correct *
* Visually verify no bright object in FOV *
* After data collected and before changing atti- *
* tude return shutter to AUTO *
* To open shutter: *
* MAN OP - ITEM 15(16) EXEC (*) *
* To return shutter to AUTO: *
* MAN OP - ITEM 15(16) EXEC (no *) *

CRTY ✓IMU 1,2,3:
✓STAT - blank
✓OPER - ITEM 4,5,6 (*)

3. ✓IMU ALIGN ATT (pad)

CRTX 4. S TABLE CLR - ITEM 20 EXEC

CRTX 5. Enable Star Tracker:
STAR TRK - ITEM 3,4 EXEC (*)

6. Verify S TABLE:
TRK ID 1,2 = STAR ID (pad)
ANG ERR ≤ .08
Wait approx 1 min for new IMU Δ ANGS

* If after 3 min no data (or bad data) in S TABLE: *
* ✓STAR TRK - ITEM 3,4 (*) *
* ✓ATT/STARS/TIME *
* ✓S TRK: TRK ID = STAR ID (pad) *
* Do S TRK Self Test *
* If neither tracker fails *
* Mnvr to Verification ATT - repeat steps 3,4,5,6 *
* If one tracker fails *
* ✓TERM/IDLE for failed tracker - ITEM 9 (10) - (*) *
* proceed with 1 S TRK ALIGN *
* If both trackers fail inform MCC *

For 1 S TRKR ALIGN:
STAR TRK for good tracker - ITEM 3 (4) EXEC (*)
S TABLE CLR - ITEM 20 EXEC, reacquire star with good tracker
TERM/IDLE for good tracker during maneuvers - ITEM 9(10) EXEC (*)
MNVR to 2nd ATT (Single S TRK): Do not clear S Table
Repeat steps 3,5,6, with 2nd Star ID

CRTX 7. ✓S TABLE SEL - ITEM 17,18 (*)
CRTY ALIGN IMU 1,2,3 - ITEM 10,11,12 EXEC (*)
✓STAR ALIGN - ITEM 13 (*)
✓IMU 1,2,3 - ANG ΔX,ΔY,ΔZ < 0.80

* If ANG ΔX,ΔY,ΔZ > 0.80 for two IMUs, do not torque: *
* Mnvr to Verification Att & repeat steps 3 thru 7 once *
* If still > 0.80, report to MCC *

CRTY 8. Record ANG ΔX,ΔY,ΔZ,ANG ERR & execute time (use log this page)
EXEC - ITEM 16 EXEC (*)
Alignment complete when:
EXEC - ITEM 16 (no *)

IMU ALIGN VERIFICATION

9. Mnvr to IMU VERIFICATION STAR ALIGN ATT: (pad)
✓DAP: B/AUTO/NORM

10. Perform steps 3,4,5,6 using appropriate stars (pad)

11. ✓IMU 1,2,3 ANG ΔX,ΔY,ΔZ < 0.1

* If ANG ΔX,ΔY,ΔZ ≥ , 0.1, perform steps 8-11 *
* report to MCC *

NOTE
For alternate stars ✓MCC or ref STAR PAIRS (ORB OPS, GNC)

12. Report IMU ALIGN results

IMU STAR ALIGN LOG

REQD ID: -Y ___, -Z ___ ANG ERR ___.___ ___

ANG	1	2	3
ΔX	( )___ ___ ___.___ ___	( )___ ___ ___.___ ___	( )___ ___ ___.___ ___
ΔY	( )___ ___ ___.___ ___	( )___ ___ ___.___ ___	( )___ ___ ___.___ ___
ΔZ	( )___ ___ ___.___ ___	( )___ ___ ___.___ ___	( )___ ___ ___.___ ___

EXECUTE TIME ___ ___ : ___ ___ : ___ ___ (TIG MINUS)

IMU STAR ALIGN LOG

REQD ID: -Y ___, -Z ___ ANG ERR ___.___ ___

ANG	1	2	3
ΔX	( )___ ___ ___.___ ___	( )___ ___ ___.___ ___	( )___ ___ ___.___ ___
ΔY	( )___ ___ ___.___ ___	( )___ ___ ___.___ ___	( )___ ___ ___.___ ___
ΔZ	( )___ ___ ___.___ ___	( )___ ___ ___.___ ___	( )___ ___ ___.___ ___

EXECUTE TIME ___ ___ : ___ ___ : ___ ___ (TIG MINUS)

TIG

-03:00

A1(B1)
AUTO
VERN
RT 0.2
DB 1.0

C AUTO MNVR TO IMU ATT

NOTE: See STAR PAIRS, (ORB OPS, GNC)

DAP: A/AUTO/VERN
Initiate MNVR

-02:55

-02:50

MS ENTRY STOWAGE MID Cue Card [4], 7-23

-02:45

C IMU ALIGNMENT [5]

-02:40

-02:35

MS GALLEY or WATER DISPENSER DEACTIVATION (if reqd)
MID Cue Card [6], 7-23

-02:30

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TIG

-02:30

C PREL DEORB UPDATE/UPLINK [7]

A1(B1)
AUTO
VERN
RT 0.2
DB 1.0

MS ENT SWITCH LIST/VER, 3-31 and 3-32
(Airlock and Airlock Hatch Only)

P HYD THERM COND-TERM (ORB OPS,APU/HYD)

-02:25

MS, PS SPECIALIST SEAT INSTALLATION

UPLINK
UPDATE
D/O FLT
RULES

P APU STEAM VENT HTR ACT

R2 BLR CNTLR/HTR (three) - A
PWR (three) - ON

NOTE
Htr reqd to be on 2 hrs prior to APU act

-02:20

-02:15

C When IMU verification complete, MNVR (TRK)
BIASED - XSI ATT

TG = 4 BV = 5
P = 184 Y = 0

A/AUTO/VERN Init TRK

-02:10

-02:05

-02:00

PREL DEORB UPDATE/UPLINK [7]

MCC Update:
OMS PRPLT PAD, DEL PAD (ENT,PRPLT/DEL)
& DEORBIT MNVR PAD (ENT,MNVR PADS)
MCC Uplink:
PASS and BFS SV, TGT

* If MCC cannot provide DEORB TGT, use SPOC *

ENTRY SWITCH CONFIG

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PRE INGRESS CONFIG

MLS CH/TACAN CH

O8	✓MLS CH tw (three)	- see LAND SITE DATA
O7	✓TACAN MODE (three)	- OFF
	✓ANT SEL (three)	- AUTO

HYD BRAKE HTR CONFIG

R4	HYD BRAKE HTR (three)	- AUTO

FLT DECK PCS CONFIG

L2	✓O2 SYS SPLY (two)	- OP (tb-OP)
	✓XOVR SYS (two)	- OP
	✓N2 SYS SPLY (two)	- OP (tb-OP)
	✓REG INLET (two)	- OP (tb-OP)
	O2/N2 CNTLR VLV SYS 1	- OP
	2	- CL
C7	✓LEH O2 SPLY vlv (two)	- OP

ENTRY COMM CONFIG (FLT DECK)/TELEPRINTER DEACT

A1L	S-BD PM MODE	- STDN HI
	NSP DATA RATE XMIT	- HI
	RCV	- LO
	CODING (two)	- OFF
A13	OS AUD MSTR SPKR VOL	- R
A15	DC UTIL PWR MNC	- OFF
	cb KU ELEC	- op
	ANT HTR	- op
	CABLE HTR	- op
	SIG PROC	- op
L4:J	cb SIG CONDR HUM SEP	- op
	IMU FAN	- op
O5,O9	L,R AUD A/G 2	- T/R
	ICOM B	- T/R
	VOX SENS	- R
	VOL tw (six)	- R
	XMIT/ICOM MODE	- PTT/VOX
MO42F,MIDDECK,MS,PS	AUD PWR	- AUD/TONE
R10,L9	A/G (two)	- T/R
	✓A/A	- T/R
	ICOM (two)	- T/R
	VOX SENS	- R
	VOL tw (five)	- R
	XMIT/ICOM MODE	- R

MIDDECK PCS/RMS PNL LTS CONFIG

MIDDECK PCS CONFIG

MO10W	14.7 CAB REG INLET vlv (two)	- CL
	H2O TK N2 REG INLET vlv (two)	- OP
	O2 REG INLET vlv (two)	- CL
MO69M	LEH O2 vlv (two)	- R
MO32M	LEH O2 6 vlv	- R

DEACT RMS PNL LTS (if RMS onboard)

MA73C:F	cb RMS PRI ϕA	- op
	RMS B/U ϕA	- op

TIG

-02:00 C,P DEACT STAR TRKRS & CLOSE DOORS [8]

A1(B1)
AUTO
VERN
RT 0.2
DB 1.0

-01:55

-01:50

UPLINK
TMBU

-01:45

-01:40

MS C/W RESET AFT Cue Card [9] 7-21

-01:35 A ENTRY SWITCH CONFIG, 7-12

-01:30

DEACT STAR TRKRS & CLOSE DOORS [8]

O6 STAR TRKR PWR (two) - OFF
O14:E, cb STAR TRKR -Z,-Y (two) - op
O15:E
O6 STAR TRKR DR CNTL SYS (two) - CL
✓POS tb (two) - bp (start timer)
When both tb - cl (~8 - 24 sec)
or either tb - bp > 24 sec:
STAR TRKR DR CNTL SYS (two) - OFF

* If tb - bp > 8 sec notify MCC *

TIG

-01:30

A1(B1)
AUTO
VERN
RT 0.2
DB 1.0

-01:25

C,P Make P&I changes to ENTRY C/L
using LOSS OF FES ENTRY DELTAS, 7-25

-01:20

-01:15

C,P CLOTHING CONFIG, [10]

-01:10

MS N2 QTY COMPUTATION

[SM 66 ENVIRONMENT]
Add N2 QTY 1 & 2, then annotate value
on PRESS LEAK NOMOGRAPH, (ENT PKT, ECLS)

-01:05

ALL Begin FLUID LOADING
32 fl oz water w/salt over next 1.5 hours
(2 salt tablets per 8 oz)

-01:00

CLOTHING CONFIG [10]
C,P Unstow/Don:
LES
Harness
Boots

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HUD SETUP [11]

Remove, stow HUD Covers (2)
Ensure Cloth Cover does not obscure light sensor

RCS ENTRY CONFIGURATION [14]

O14,15,16:F ✓RJDA DRIVER (four) - ON
✓ LOGIC (four) - ON
C3 DAP: A/AUTO/NORM
GNC 20 DAP CONFIG
Select JET OPTION 3
O14,15,16:F RJDF DRIVER (four) - OFF
LOGIC (four) - OFF
O8 FWD RCS MANF ISOL
1,2,3,4 - CL (tb - CL)
5 - CL (mom), (tb - CL)
O16:F RJD MANF L5/F5/R5 DRIVER - OFF
A14 RCS/OMS HTR FWD RCS JET (five) - OFF
AFT RCS JET 5 - OFF

DED DISP ENT CONFIG [15]

O14,O15,O16, RGA (four) - ON
cb MNA, B ACCEL 1, 2 (two) - cl
cb MNA, C DDU AFT (two) - op
ASA (four) - ON
ACCEL 4,3 (two) - ON

O7 TACAN ANT SEL (three) - AUTO
O8 MLS CH (three) tw- See LAND SITE DATA

F3 TRIM PNL (two) - ON
F6/F8 HSI: ✓off flag - not visible

ADI: ✓error needles & rate pointers - visible

DPS ENTRY CONFIG [16]

* If IMU or RHC dilemma, do not proceed with OPS 3 Transition *

✓RGA, AA, ASA, IMU (all) - ON

VERIFY CONFIG/PWR UP GPC 3
O6 ✓GPC MODE 3 - HALT (tb-bp)
GPC PWR 3 - ON
✓OUTPUT 1,2 - NORM (tb-gray)
✓3,5 - NORM (tb-bp)
✓4 - TERM (tb-bp)
✓MODE 1,2,4 - RUN (tb-RUN)
3 - STBY (tb-RUN)
✓5 - STBY (tb-RUN)

LOAD ENTRY TFL/RECONFIG UPLK

[X: SM 62 PCMMU/PL COMM]
C3 ✓OI PCMMU FORMAT - GPC
CRTX ✓SM COM BUFF 'RDY'
FMT:
FXD - ITEM 1 EXEC
SEL ID - ITEM 3 +1 0 5 EXEC
LOAD - ITEM 4 EXEC
-✓RUN, CPLT
SEL ID - ITEM 3 +1 6 4 EXEC
LOAD - ITEM 4 EXEC
-✓RUN, CPLT
PGM - ITEM 2 EXEC
O15:B cb EVENT TIMER FWD - cl

C2 Set event timer to countdown to TIG

TRANSITION GPC 1 & 2 to GNC OPS 3

[GNC 0 GPC MEMORY]
CONFIG - ITEM 1 +3 EXEC
Modify MC 3 per Table
GNC, OPS 301 PRO →
[3: GNC DEORB MNVR COAST]

CONFIG GPC	3 12000
STR 1	1
2	2
3	2
4	1
PL 1/2	0
CRT 1	1
2	2
3	2
4	0
L 1	0
2	0
MM 1	1
2	2

TIG

-01:00 C,P HUD SETUP [11]

A1(B1)
AUTO
RT 0.2
DB 1.0

C C6 LEH O2 vlv (four) - OP

C,P SEAT INGRESS
Adjust Seat
Exercise Brake Pedals
LES PRESS INTEGRITY CHECK

-00:55

MS WIRELESS STOW AFT Cue Card [12], 7-21

MS WCS DEACTIVATION MID Cue Card [13], 7-24

-00:50

P RCS ENTRY CONFIG, [14]

-00:45

C,P DED DISP ENT CONFIG, [15]

MCC: GO FOR OPS 3 TRANSITION

-00:40

C,P DPS ENTRY CONFIG, [16]

MS, PS CLOTHING CONFIG [17], 7-21, 7-24

-00:35

-00:30

C,P Stow ORB PKT, Orbit Cue Cards
Go to ENT, DEORBIT BURN

SM CHECKPOINT/UL CNTL ENA

[1: SM 60 SM TABLE MAINT]
[2: SM 1 DPS UTILITY]

CRT2 MMU ASSIGN 1 SM - ITEM 3 EXEC
CRT1 CKPT INITIATE - ITEM 18 EXEC
✓Update of CKPT TIME and STATUS GOOD indicated
CRT2 CKPT RETRV ENA - ITEM 12 EXEC (*)
UL CNTL ENA - ITEM 36 EXEC

TRANSITION BFS GPC TO GNC OPS 3
C3 BFC CRT DISP - ON
✓SEL - 3 + 1
[3: BFS, GNC BFS MEMORY]
O6 GPC OUTPUT 5 - B/U (tb-bp)
CRT3 ✓TFL ENA - ITEM 29 (*)
BFS, GNC OPS 301 PRO
[3: BFS, GNC DEORB MNVR COAST]

TRANSITION GPC 1,2,3,4 TO GNC OPS 3
SM, OPS 000 PRO
[SM GPC MEMORY]
O6 GPC OUTPUT 4 - NORM (tb-gray)
MODE 3,5 (two) - RUN (tb-RUN)
✓CONFIG - ITEM 1 + 3 EXEC
Modify MC 3 per Table →
GNC, OPS 301 PRO
[GNC DEORB MNVR COAST]
CRT3 BFS, GNC OPS 000 PRO
BFS, GNC OPS 301 PRO
C3 BFC CRT DISP - OFF (GPC 3 driving CRT 3)
BFC CRT DISP - ON

CONFIG GPC	3 12340
STR 1	1
2	2
3	3
4	4
PL 1/2	1
CRT 1	1
2	2
3	3
4	0
L 1	0
2	0
MM 1	1
2	2

LAND SITE UPDATE
[GNC 50 HORIZ SIT]
SEL SITE (See LAND SITE DATA)

LOAD IN TGTs
[GNC DEORB MNVR COAST]
✓PASS and BFS TGT per DEORBIT MNVR PAD
(ENT, MNVR PADS)
LOAD - ITEM 22 EXEC
TIMER - ITEM 23 EXEC
✓PASS and BFS solution per DEORBIT
MNVR PAD (ENT, MNVR PADS)
BURN ATT, HA HP
ΔVTOT
TGO
O14:F MMU 1 - OFF
O15:F ✓MMU 2 - OFF

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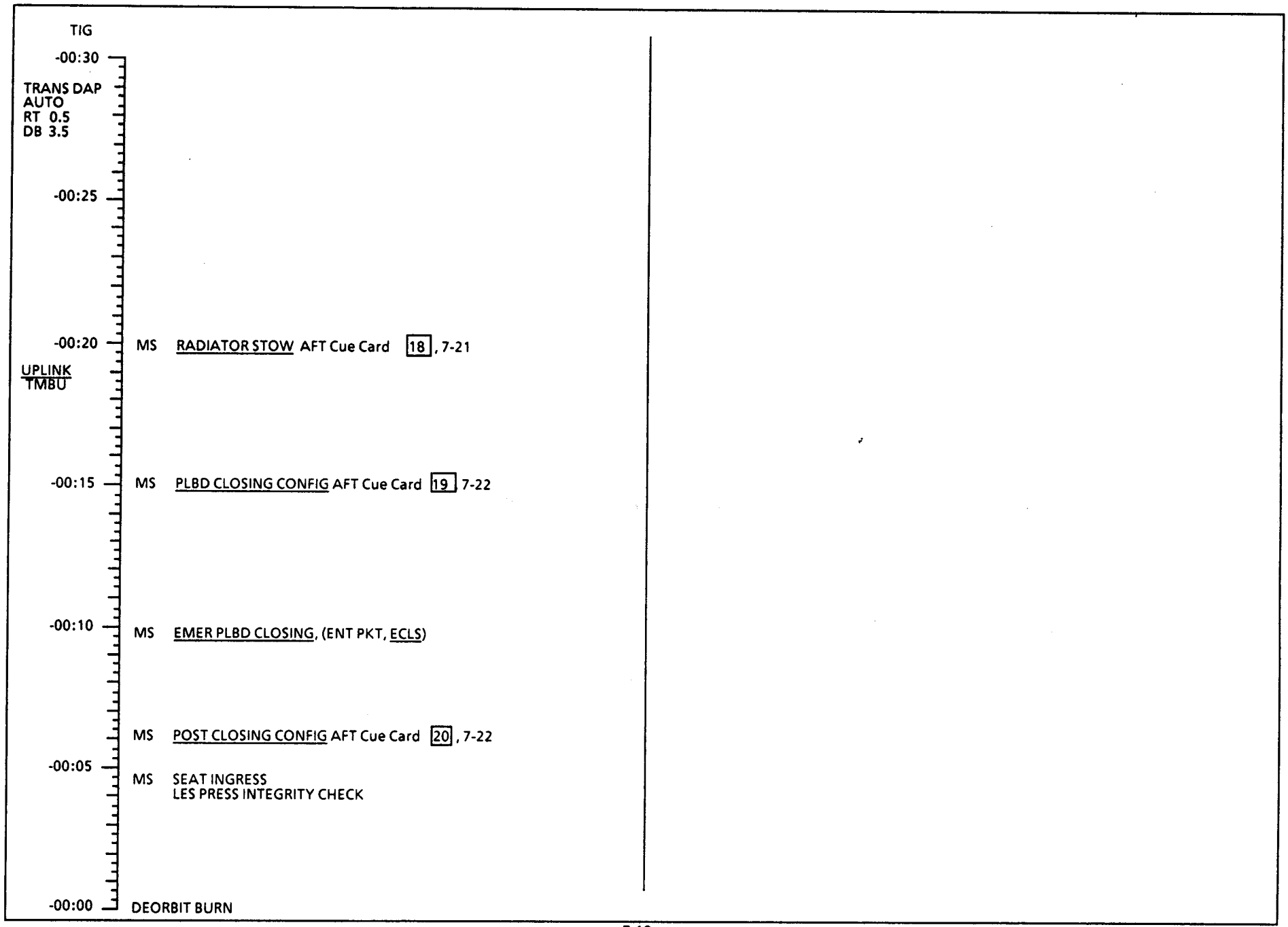
TIG
-00:30
TRANS DAP
AUTO
RT 0.5
DB 3.5
-00:25
-00:20
MS RADIATOR STOW AFT Cue Card 18, 7-21
UPLINK
TMBU
-00:15
MS PLBD CLOSING CONFIG AFT Cue Card 19 7-22
-00:10
MS EMER PLBD CLOSING, (ENT PKT, ECLS)
MS POST CLOSING CONFIG AFT Cue Card 20, 7-22
-00:05
MS SEAT INGRESS
LES PRESS INTEGRITY CHECK
-00:00
DEORBIT BURN

MS AFT FLIGHT DECK CONFIGURATION

NOTE

WAIT FOR GO FROM CDR OR PLT BEFORE STARTING ANY ACTIVITY ON THIS PAGE

TIME (TIG-)	MS AFT ACTIONS
2:25	SPECIALIST SEAT INSTALLATION
1:38	C/W RESET [9]
1:35	ENTRY SWITCH CONFIG, 7-12
1:10	N2 QTY COMPUTATION, 7-15
1:05	Begin FLUID LOADING 32 fl oz water w/salt over next 1.5 hours (2 salt tablets per 8 oz)
0:52	WIRELESS STOW [12]
0:39	CLOTHING CONFIG [17]
0:20	RADIATOR STOW [18]
0:15	PLBD CLOSING CONFIG [19], 7-22
0:10	EMER PLBD CLOSING, (ENT PKT, ECLS)
0:06	POST CLOSING CONFIG [20], 7-22
0:05	SEAT INGRESS

C/W RESET (Contact CDR for additional parameters) [9]

R13U			
PARAMETER NAME		C/W CH	ENA/INH
HYD	P 1	99	ENA
	2	109	ENA
	3	119	ENA

WIRELESS STOW [12]

Disconnect, stow Wireless Headsets (if reqd)
✓Aft deck lts as reqd (minimize use)

CLOTHING CONFIG [17]

Unstow, don:
LES
Harness
Boots

RADIATOR STOW [18]

R13L ✓RAD LAT CNTL SYS (two) - OFF (tb-REL)
✓CNTL SYS (two) - OFF (tb-DPY)

PL BAY MECH PWR SYS (two) - ON
RAD CNTL SYS (two) - STO (concurrently)
✓(tb-bp ~40 sec, STO)
- OFF

* If tb not bp after 10 sec or if tb not STO *
* in 40 sec & no motion determined visually: *
* R13L RAD CNTL SYS (two) - OFF *
* Go to MAL, MECH, 9.2b or 9.2d (Stbd) or *
* MECH, 9.2f or 9.2h (Port) *

RAD LAT CNTL SYS (two) - LAT (concurrently)
(tb-bp ~25 sec, LAT)
- OFF
PL BAY MECH PWR SYS (two) - OFF

(PROCEDURES CONTINUED ON BACK)

Back of MS AFT FLIGHT DECK CONFIGURATION

PLBD CLOSING CONFIG 19

DEACTIVATE RMS HTR AND TEMP MON (if RMS onboard)

A8L PORT RMS HTR (two) - OFF
RMS PWR - OFF

SET UP LIGHTS (minimize use)

R12L CRT4 PWR - ON
A6U ✓ANNUN BUS SEL - MNC
A7U PL BAY FLOOD FWD, MID, AFT (six) - ON (~3 min to full bright)
FWD BHD - ON (~3 min to full bright)

TV/VTR ACT

Activate TV/VTR per Cue Card (only if reqd)

POST CLOSING CONFIG 20

A7U PL BAY FLOOD (all) - OFF

Stow Flt Deck Camrs & Accessories

C2 CRT3 PWR - ON (only as reqd)
CRT2 GPC/CRT 2/3 EXEC(only as reqd)

DEACT TV/VTR per cue card if reqd

FOOT LOOP CONFIG

Tape foot loops in egress routes

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MS MIDDECK CONFIGURATION

NOTE

WAIT FOR GO FROM CDR OR PLT BEFORE STARTING ANY ACTIVITY ON THIS PAGE

TIME (TIG-)	MS MIDDECK ACTIONS
3:50	FLUID LOADING PREP [2]
2:46	ENTRY STOWAGE [4]
2:30	GALLEY OR WATER DISPENSER DEACTIVATION [6]
2:28	ENT SW LIST/VER, 3-31 and 3-32 (Airlock and Airlock Hatch Only)
2:25	SPECIALIST SEAT INSTALLATION
1:35	ENTRY SWITCH CONFIG, 7-12
1:05	Begin FLUID LOADING 32 fl oz water w/salt over next 1.5 hours (2 salt tablets per 8 oz)
0:51	WCS DEACTIVATION [13], 7-24
0:39	CLOTHING CONFIG [17], 7-24
0:05	SEAT INGRESS

FLUID LOADING PREP [2]

Unstow, fill 4 drink containers (per crewmember) with 8 oz of water each, temporarily stow near seat

Unstow 8 salt tablets (per crewmember), temporarily stow in Flight Suit pocket

ENTRY STOWAGE [4]

PERSONAL HYGIENE SYS STOWAGE

Stow:
Personal Hygiene Kits
Hose

WCS CONFIG

Foot restraints - up, latched
Privacy curtain - stow

POLE SETUP

(Cue Card, ESCAPE POLE STOWAGE/SETUP)

FDF STOWAGE

Stow CAP

CABIN CONFIG

Stow backup SPOC
Stow Middeck Camrs, Accessories
Stow FWD/AFT Shades, Filters
W8 Install Debris Shield

Stow Treadmill

FOOT LOOP CONFIG

Tape foot loops in egress routes

GALLEY OR WATER DISPENSER DEACTIVATION [6]

GALLEY

MA73C:G cb GALLEY FAN (three) - op
GALLEY ✓OVEN/RHS - OFF
H2O HTRS - OFF
Oven door launch strap - snap closed
ML86B:A cb GALLEY SUPPLY - op
:B cb GALLEY OVEN - op
H2O HTR - op

WATER DISPENSER

✓PWR pb - OFF
MO30F DC UTIL PWR MNC - OFF
ML86B:A cb GALLEY SUPPLY - op

(PROCEDURES CONTINUED ON BACK)

WCS DEACTIVATION [13]

WCS	VAC VLV - CL
	Remove, stow - WCS Trash Can
	Stow Mirror
	Close, latch door
ML31C	VAC VENT ISOL VLV CNTL - CL (tb-CL)
	NOZ HTR - OFF
	✓Middeck lts as reqd (minimize use)

CLOTHING CONFIG [17]

Unstow, don:
- LES
- Harness
- Boots

LOSS OF FES DEORBIT PREP
ENTRY DELTAS PULLOUT PAGE

DELTAS TO ENT, DEORBIT BURN

1. At TIG -30 min, enter ENT C/L DEORB BURN
   (do all)
2. At TIG -15 min, use two CRTs, two FLT
   CNTLR PWR/DDUs as reqd for burn
   Minimize use when possible
3. At TIG -15, Do not perform pnl
   A14 OMS/RCS heater configurations
4. At TIG -5, Use R INST PWR as reqd
   for APU start
   Minimize use

DELTAS TO ENT, POST BURN

1. Use one CRT, one FLT
   CNTLR PWR, ONE INST PWR only as reqd
2. Set EVENT TIMER counting to EI
3. At EI-21,
   R2 HYD CIRC PMP (one of two on
   non-operating hyd sys) - ON
4. At EI-18, If FRCS DUMP reqd,
   014,015,016:F
   RJDF LOGIC,DRIVER (eight) - ON
   O8 FWD RCS MANF ISOL 1,2,3,4 (four) - OP
   (tb-OP)
5. After dump completion:
   014, 015, 016:F
   RJDF LOGIC,DRIVER (eight) - OFF
6. In ENTRY SWITCH CHECK, do not activate
   ANTISKID, NWS, NAV AIDS
7. At EI-13,
   R2 Operating HYD CIRC PMP - OFF
   Start second APU (one only)
   R2 HYD CIRC PMP (remaining non-operating
   hyd sys) - ON
8. Prior to SSME HYD REPRESS
   C3 ✓FCS CH (four) - AUTO
   O17 ATVC (four) - ON

When SSME repositioning complete,
   O17 ATVC (four) - OFF
   ✓EIU (three) - OFF
   ✓MEC 1,2 (two) - OFF

DELTAS TO ENTRY MNVR CUE CARD

1. At EI-5,
   HYD CIRC PMP - OFF
   Start remaining APU
   BRAKES MNA,B,C (three) - ON
   cb ADTA 1,2,3,4 (four) - cl
   GNC, I/O RESET
2. At EI, H2O LOOP 1 PUMP - ON
   NH3 CNTLR A(B) - SEC/ON
   INST PWR (two) - FLT/ON
   FLT CNTLR PWR (two) - ON
3. At V=15K, TACAN MODE (three) - GPC
4. At V=12K, delete reference to radiator flow
5. At V=6K, NH3 CNTLR A(B) - OFF
   B(A) - SEC/ON
6. At M=2.9,
   MLS (three) - ON
   GNC, I/O RESET
   RADAR ALTM (two) - ON
   HUD PWR (two) - ON
   NWS - GPC
   ANTISKID - ON
7. Post wheel stop, perform EXPEDITED POWERDOWN

LOSS OF 2 H20 LOOPS (CONUS TIG > 2.5 Hours)

PART 1: ON-ORBIT WAIT

Assumptions/Initial Conditions

- Loss of 2 H2O Loops (CONUS TIG > 2.5 hr) (ORB PKT, PWRDN) has been accomplished
- IMU 2 and MDM FF2 have been activated
- With the GPCs off, the IMU is not expected to drift beyond the 1.4° STR TRKR align inhibit between alignments each rev. (MCC has backup method to recover the IMU using gyro drift compensation uplink, if reqd)
- Comm is being cycled per ORB PKT pwrdn comm pages

Problem Description/Rationale

- Use of H2O loop or air cooled equipment is minimized or delayed since heat transfer from the crew module is lost. The one activated IMU is run uncompensated and realigned each night pass until a CONUS site TIG is 1.5 hrs away. If the decision is made to deorbit prior to the CONUS opportunity (severe cabin environment, etc.), a site with TIG ≥ 1.5 hrs away should be used and Part 2: On-Orbit Wait Backout entered at TIG-1.5 hrs
- Cabin atmosphere purges are done coincident with the IMU aligns to aid in reducing cabin humidity and temp during the last revs before entering Part 2. Attitude control is reqd during purge because venting is propulsive
- Av bay 1 equipment is used as much as possible to keep av bays 2 and 3 cool for entry
- An accurate state vector is not required for the IMU aligns. The state vector will be uplinked in Part 2

LOSS OF 2 H20 LOOPS (CONUS TIG > 2.5 Hours)

PART 1: ON-ORBIT WAIT
PROCEDURE NOTES

- MS procedures for Part 1: On-Orbit Wait are located on MS pullout page 8-7. Extra copies are located in the back of the PLT's book
- Maintain minimum lighting
- Use wrist watches for time reference until GMT/MET UPDATE (COARSE) in Part 2: On-Orbit Wait Backout
- Alternate between GPC 1 and 4 for each IMU Align/Cabin De/Repress cycle. Minimize GPC on time. It is important that GPC on/off times are recorded accurately to support MCC uplink of IMU compensation in the event of STR TRKR align failure
- With MDM FF1/off, the panel C3 DAP controls are functional even though the lights are not on
- The IMU Align/Cabin De/Repress cycle is performed during the first night pass after the GPCs are powered down starting at Time to Sunrise (TSR) minus 20 min and during each subsequent night pass until TIG-1.5 hrs. (If no night passes, perform once per orbit starting one orbit after GPC powerdown)
- Determine IMU align star pairs prior to activating a GPC in order to minimize GPC on time. Preferred star pairs are available from approximately 20 min before sunrise until orbital daylight
- If good star data cannot be acquired during the IMU align, inform MCC and do not attempt subsequent IMU aligns. MCC will uplink IMU compensations to allow STR TRKR alignment prior to Part 2: On Orbit Wait Backout
- Use HRA and LES helmet as needed to provide relief during periods of high cabin temperature and humidity. Do not use the LES helmet during the cabin repress

IMU ALIGN & DE/REPRESS DETERMINATION [1]

1. Determine the number of IMU aligns required during Part 1:

   1.1 Write down the number of complete night passes (if none, the number of complete orbits) until the start of Part 2: On Orbit Wait Backout at TIG-1:30 _____

   1.2 If in darkness, add the current night pass if time to sunrise is greater than 20 minutes. _____

   1.3 If the time between the last IMU align in Part 1 and the align at TIG-0:47 in Part 2 is greater than 90 minutes, add one additional IMU align starting before TIG-1:50. If this additional align is required, use GPC 1 and note that the IMU align cycle will no longer be tied to sunrise and may be done during daylight. _____

   Total Part 1 IMU aligns: _____

2. Determine the number of cabin depress/repress cycles available based on total N2 quantity (recorded in the powerdown) using the table below.

TOTAL N2 QTY (LBS)	NUMBER OF DE/REPRESSES
>196	3
>150	2
>104	1

   If the number of IMU aligns (from step 1) exceeds the number of de/represses available, then perform only the IMU align blocks (skip blocks [3], [4], [8], and [11]) until the number of IMU aligns remaining before the start of Part 2 equals the number of de/represses available

3. Determine the BITE mask memory address for IMU 2 (REF DATA, MAL ADD). Record in IMU ALIGN ATT MNVR [7]

4. Determine star pairs for IMU aligns from STAR PAIRS Cue Card (ORB OPS, GNC) or MCC prior to powering up a GPC. Record in IMU ALIGN ATT MNVR [7]

STR TRK CONFIG CHECK [2]

O6 ✓STAR TRKR PWR (two) - ON
✓MDM FA1,2,3,4 (four) - ON
O14:F, ✓RJDA LOGIC, DRIVERS (eight) - ON
O15:F, ✓RJDF LOGIC, DRIVERS (eight) - OFF
O16:F ✓RJD L5/F5/R5 DRIVER - OFF

PCS SETUP [3]

L2 ✓O2 SYS 1 SPLY - CL (tb-CL)
✓2 SPLY - OP (tb-OP)
✓XOVR SYS 1 - CL
2 - OP
✓N2 SYS 1,2 REG INLET (two) - OP (tb-OP)
O2/N2 CNTLR VLV SYS 1 - OP (N2)
2 - CL (O2)

CABIN DEPRESS SETUP [4]

MS ML31C ✓VAC VENT ISOL VLV BUS SEL - MNA
✓CNTL - OP (tb-OP)
✓NOZ HTR - ON
MO10W 14.7 CAB REG INLET SYS 1 - CL
2 - OP
✓O2 REG INLET SYS 1 - CL
✓O2 REG INLET SYS 2 - OP
INNER HATCH OPEN and STOW HATCH
Unstow flashlight
AW82B AIRLK DEPRESS vlv cap - vent, remove
C O15:B cb MNB OI SIG CONDR OF 2/3 A - cl
O1 PPO2 sel - SNSR B

GNC GPC ACTIVATION [5]

Alternate between GPC's 1 and 4
Record MET 1) _____/_____:_____:_____ 2) _____/_____:_____:_____
3) _____/_____:_____:_____ 4) _____/_____:_____:_____

C2 CRT 2 PWR - ON
MAJ FUNC - GNC
L1 AV BAY 1 FAN A - ON
O6 ✓GPC MODE 1(4) - HALT (tb-bp)
✓OUTPUT 1(4) - NORM (tb-bp)
PWR 1(4) - ON
MODE 1(4) - STBY (tb - RUN), RUN

RESTRING TO GNC GPC [6]

GNC 0 GPC MEMORY
CONFIG - ITEM 1 + 2 EXEC
Assign all strings to GPC 1(4)
GNC, OPS 201 PRO

ALL Begin fluid loading (one 8 oz container every 15 min, with a salt tablet every other container) and continue through entry

C,P Perform IMU ALIGN & DE/REPRESS DETERMINATION [1]
Start all IMU ALIGN/CABIN DE/REPRESS cycles at TSR - 0:20

IMU ALIGN/CABIN DE/REPRESS

T SR

-0:20
- C,P STR TRK CONFIG CHECK [2]
- C PCS SETUP [3]
  L1 CAB FAN B - ON
- C, MS CABIN DEPRESS SETUP [4], 8-4, 8-7
- C,P GNC GPC ACTIVATION [5]
  Accurately record GPC ON time

-0:15
- C,P RESTRING TO GNC GPC [6]
- C,P IMU ALIGN ATT MNVR [7]
- MS CAB DEPRESS [8], 8-7
- C,P IMU ALIGN [9]

-0:10

- C,P TAIL SUN ATT MNVR [10], 8-6

-00:05
- C, MS CAB REPRESS [11], 8-6, 8-8
- C,P ESTABLISH FREE DRIFT [12], 8-6
- C,P GNC GPC POWERDOWN [13], 8-6
  Accurately record GPC OFF time
- C ✓L1 CAB FAN B - OFF

-00:00

MS If MCC requests data on Cab temp and humidity, or AV Bay temp, perform CABIN ENVIRONMENT MONITOR [15], 8-8

MS After final IMU ALIGN/CABIN DE/REPRESS cycle and prior to entering Part 2, perform CABIN PREP [16], 8-8

ALL At TIG-1:30 go to Part 2: On-Orbit Wait Backout, 8-11

IMU ALIGN ATT MNVR [7]

GNC UNIV PTG
Load ALIGN ATT provided by MCC if available or use ORB OPS, GNC, Star Pairs Cue Card ___, ___

R ___ P ___ ___ ___ Y ___ ___ ___

O15:E cb MNB DDU R - cl
ITEM 18 EXEC
C3 DAP: A/AUTO/NORM
O6 MDM FF 1,3 (two) - ON
GNC, I/O RESET
Give MS GO to start CAB DEPRESS [8], 8-7

GNC IMU ALIGN
* If IMU 2 has a BITE, mask all BITEs: *
* GPC MEMORY *
* ✓HEX - ITEM 27 (*) *
* BIT RESET - ITEM 23 EXEC (*) *
* ADD ID: ITEM 28 + ___ EXEC *
* ✓ACTUAL = FFFC *
* DESIRED: ITEM 29 + FFFC EXEC *
* WRITE: ITEM 25 EXEC *
x ✓ACTUAL = 0000 *

IMU ALIGN [9]

F8 ✓Att mnvr complete
C3 DAP: B/AUTO/NORM

CRT GNC 22 $ TRK/COAS CNTL
$ TABLE CLR - ITEM 20 EXEC
STAR TRK - ITEM 3,4 EXEC (*)
✓$ TABLE: TRK ID 1,2
✓ANG ERR 1 - ≤ 0.08 DEG
✓SEL ITEM 17,18 - (*)

* If no data or bad data after 3 min: *
* go to TAIL SUN ATT MNVR [10], 8-6 *
* inform MCC, and do not perform *
* subsequent IMU aligns *

GNC 21 IMU ALIGN
✓STAR ALIGN - ITEM 13 EXEC (*)
✓ANG 1(2,3) ΔX, ΔY, ΔZ, - ≤ 2°
ALIGN IMU 2 - ITEM 11 EXEC (*)
EXEC - ITEM 16 EXEC (*)
✓EXEC, ITEM 16 - (NO *)

TAIL SUN ATT MNVR [10]

WARNING
Do not turn off FF MDM that is on for the IMU

O6 MDM FF 1,3 (two) - OFF
CRT GNC UNIV PTG
✓TGT ID, ITEM 8 + 4
BODY VECT - ITEM 14 + 5 EXEC
Load Tail Sun Att P = 225, Y = 0, OM = (blank)
C3 DAP: A/AUTO/NORM
TRK - ITEM 19 EXEC (CUR - *)
✓ERR TOT - ITEM 23 (*)
F8 ✓Att mnvr complete
Have MS stop CAB DEPRESS [8] and start CAB REPRESS [11];
Continue with ESTABLISH FREE DRIFT [12] when venting terminated

CAB REPRESS [11]

NOTE
This procedure takes up to 15 min to perform

WARNING
Terminate ALL WCS activity and LES helmet usage during cabin repress to 14.7 psia

MS MO10W 14.7 CAB REG INLET SYS 1,2 (two) - OP
C L2 ✓O2/N2 CNTLR VLV SYS 1 - OP (N2)
SYS 2 - AUTO (O2/N2)
O1 When cabin in NORMAL CAB P, PPO2 operating limits, then:
O15:B cb MNB OI SIG CONDR OF 2/3 A - op
L1 CAB FAN B - OFF

ESTABLISH FREE DRIFT [12]

C3 DAP: B/AUTO/NORM
DAP ROT: PULSE/PULSE/PULSE
Wait 30 sec
DAP: B/MAN/NORM
O15:E cb MNB DDU R - op

NOTE
Deviations from TAIL/SUN att are expected during free drift period. No action reqd

GNC GPC POWERDOWN [13]

CRT GNC, OPS 000 PRO
O6 GPC MODE 1(4) - STBY (tb-bp)
- HALT (tb-bp)
PWR 1(4) - OFF
C2 CRT 2 PWR - OFF
L1 AV BAY 1 FAN A - OFF

Record MET 1) ___/___:___:___ 2) ___/___:___:___
3) ___/___:___:___ 4) ___/___:___:___

LOSS OF 2 H2O LOOPS (CONUS TIG > 2.5 HOURS)
PART 1: ON-ORBIT WAIT
MS CONFIGURATION

NOTE
Wait for GO from CDR or PLT before starting any activity on this page

TIME	MS ACTIONS
(TSR-)	
0:18	CABIN DEPRESS SETUP [4]
0:13	CAB DEPRESS [8]
0:04	CAB REPRESS [11], 8-8
as reqd	CABIN ENVIRONMENT MONITOR [15], 8-8
Before Part 2	CABIN PREP [15], 8-8

CABIN DEPRESS SETUP [4]

MS	ML31C	✓VAC VENT ISOL VLV BUS SEL - MNA
		✓CNTL - OP (tb-OP)
		✓NOZ HTR - ON
	MO10W	14.7 CAB REG INLET SYS 1 - CL
		2 - OP
		✓O2 REG INLET SYS 1 - CL
		✓O2 REG INLET SYS 2 - OP
	INNER HATCH	OPEN and STOW HATCH
		Unstow flashlight
	AW82B	AIRLK DEPRESS vlv cap - vent, remove
C	O15:B	cb MNB OI SIG CONDR OF 2/3 A - cl
	O1	PPO2 sel - SNSR B

CABIN DEPRESS [8]

When attitude control is established,
During depress, use panel O1 gauges to monitor
CABIN PRESS and PPO2 instead of CRT
To start the depress, config the following valves
per Figure CABIN DEPRESS TO 10.2 PSIA, 8-9
AW82B AIRLK DEPRESS vlv
MO10W 14.7 CAB REG INLET SYS 1,2 (two)

> WARNING
> Cabin O2 concentration must be maintained below 28.5% to protect against increased flamability

Plot CABIN PRESS VS PPO2 every 60 sec. The trend of the plot should closely parallel the slope of the shading lines in each of the respective zones. If it does not, immediately verify correct valve config. If the plot transitions to another zone during the depress, reconfig the three valves as shown on the chart

On call from CDR or if CONTROL ZONE is reached,
AW82B AIRLK DEPRESS vlv - CL
GO TO CAB REPRESS [11], 8-8

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LOSS OF 2 H2O LOOPS (CONUS TIG > 2.5 HRS)
PART 1: ON-ORBIT WAIT
BACK OF MS CONFIGURATION

CABIN REPRESS [11]

NOTE
This procedure takes up to 15 min to perform

WARNING
Terminate ALL WCS activity and LES helmet usage during cabin repress to 14.7 psia

MS	MO10W	14.7 CAB REG INLET SYS 1,2 (two) - OP
C	L2	✓O2/N2 CNTLR VLV SYS 1 - OP (N2) 2 - AUTO (O2/N2)
	O1	When cabin in NORMAL CAB P, PPO2 operating limits, then:
	O15:B	cb MNB OI SIG CONDR OF 2/3 A - op
	L1	CAB FAN B - OFF

CABIN ENVIRONMENT MONITOR [15]

Perform at GSTDN (SGLS) on MCC call

NOTE
Cab or Av Bay fan must be on for good Cab air temp and humidity, or Av Bay temp readings as reqd

If MCC requests data on Cab Environ,

L1	✓CAB FAN B - ON
O15:B	cb MNB OI MDM OF 1/2 B - cl
L4:K	CABIN AIR S/C - cl
L4:L	T CNTLR 1 - cl

If MCC requests data on Av Bay 1,

L1	✓AV BAY 1 FAN B - ON
O15:B	cb MNB OI MDM OF 1/2 B - cl
	SIG CONDR OF 2/3 A - cl
L4:L	AV BAY 1 S/C - cl

If MCC requests data on Av Bay 2,

L1	✓AV BAY 2 FAN A - ON
O14:B	cb MNA OI MDM OF 3/4 A - cl
O15:B	MNB OI SIG CONDR OF 2/3 A - cl
L4:L	AV BAY 2 S/C - cl

If MCC requests data on Av Bay 3,

L1	✓AV BAY 3 FAN B - ON
O15:B	cb MNB OI MDM OF 1/2 B - cl
	SIG CONDR OF 1/4 B - cl
L4:L	AV BAY 3 S/C - cl

Perform LOSS OF 2 H2O LOOPS (CONUS TIG > 2.5 HR) COMM POWERUP steps 1 and 4 (ORB PKT, PWRDN)

C3 OI PCMMU PWR - 1

After Comm/Data complete perform LOSS OF 2 H2O LOOPS (CONUS TIG > 2.5 HR) COMM PWRDN (ORB PKT, PWRDN) and powerdown equipment used in the above steps

CABIN PREP [16]

Stow personal hygiene hose
Stow loose equipment
Remove and stow side hatch UV filter (except OV 102), locking device,
and pyro box safing pin
Remove and stow window shades if not needed for cabin temp control
Unstow ENT, ENT PKT, Deorbit Burn Cue Cards, Entry Cue Cards
Stow backup SPOC
Tape foot loops in egress routes
Perform Pole Setup ESCAPE POLE STOWAGE/SETUP (Cue Card)
Install seats

When WCS no longer needed,

WCS	Foot Restraints - up, locked
ML31C	VAC VENT ISOL VLV CNTL - CL (tb-CL)

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LOSS OF 2 H2O LOOPS (CONUS TIG > 2.5 Hours)

PART 2: ON ORBIT WAIT BACKOUT

Assumptions/Initial Conditions

- LOSS OF 2 H2O LOOPS (CONUS TIG > 2.5 HR) (ORB PKT, PWRDN) has been accomplished
- Orbiter is in an On-Orbit Wait config - IMU 2 and MDM FF2 are activated and the IMU has been aligned each rev in Part 1: On-Orbit Wait
- IMU aligns and cabin depress/repress cycles have been performed during Part 1
- Comm is being cycled per ORB PKT pwrdn comm pages
- A CONUS TIG is available in ≥ 1.5 hours

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Problem Description/Rationale

- IMU reference was maintained and heat load minimized during Part 1 by allowing the IMU to run uncompensated (GPC off) and aligned each rev
- During Part 2: On-Orbit Wait Backout, minimum equipment will be configured to accomplish PLBD closing, IMU alignment, and GMT/MET update. Final powerup to a single fault tolerant entry config is initiated at TIG-0:30 min in the LOSS OF 2 H2O LOOPS DEORBIT PREP/ENTRY (Sec 9)

Notes

- MS procedures are located on MS pullout page 8-17. Extra copies are located in the back of the PLT's book
- No cabin de/repress cycles will be performed after starting this section (Part 2)
- Continue fluid loading (8 oz water every 15 min with a salt tablet every other container)

FES HTR ACTIVATION [1]

C L1 ✓TOP EVAP HTR NOZ (two) - B AUTO
✓DUCT - B
HI LOAD DUCT HTR - B
L2 ✓FLASH EVAP FDLN HTR SPLY (two) - 2
R12L ✓SPLY H2O B SPLY ISOL VLV - OP (tb-OP)

FES CHECKOUT [2]

C L1 ✓FLASH EVAP CNTLR PRI A,B (two) - OFF
✓SEC - OFF
RAD CNTLR OUT TEMP - HI
When EVAP OUT T = 50 ± 2
RAD CNTLR OUT TEMP - NORM (then immediately)
FLASH EVAP CNTLR PRI B(A) - ON
After 50 sec
✓EVAP OUT T ~39°F

ACTIVATE GPC 4 [3]

O14:F MMU 1 - ON (wait 34 sec)

C,P GPC 4 ACT
L1 AV BAY 1 FAN A - ON
O6 ✓GPC 4 MODE - HALT (tb-bp)
✓OUTPUT - NORM (tb-bp)
PWR - ON
MODE - STBY (tb-RUN),RUN

CONFIG CRTs
C2 CRT2 PWR - ON
GPC/CRT 03 EXEC
GPC/CRT 44 EXEC
R12L CRT4 PWR - ON
MAJ FUNC - SM
C2 CRT2 PWR - OFF
CRT4 SM, OPS 201(401) PRO
ENABLE UPLINK CONTROL
4: SM 1 DPS UTILITY
ITEM 36 EXEC (*)
C3 UPLK - ENA (during AOS)
- GPC BLK (during LOS)
O14:F MMU 1 - OFF

MODE GPC 4 TO SM OPS 202(402)
CRT4 SM, OPS 202(402) PRO
4: SM PL BAY DOORS

RAD BYP CONFIG [4]

FLASH EVAP CONFIG
C L1 FLASH EVAP CNTLR SEC - ON
PRI B(A) - OFF

RAD BYP
L1 RAD BYP VLV MODE (two) - MAN
MAN SEL (two) - BYP
(after ~3 sec, tb-BYP)
RAD CNTLR LOOP (two) - OFF
O1 ✓FREON EVAP OUT TEMP ind ~39 ± 1°
(after ~2.5 min)

GMT AND MET UPDATE (COARSE) [7]

NOTE
This procedure provides for a crew autonomous update of the onboard GMT and MET. OPS 0 is reqd for a GMT UPDATE > 15 msec

✓PLBDs - closed
P C2 CRT 2 PWR - ON
CRT 2 MAJ FUNC - SM
CRT GPC/CRT 42 EXEC
O6 ✓GPC 4 OUTPUT - NORM
MODE - STBY (tb-bp), RUN

2: SM GPC MEMORY

NOTE
Make no kybd entries during TIME SYNC and UPDATE actions. UPDATE causes reinitialization and TIME SPEC will have to be recalled

1. 2: SM 2 TIME
TIME SYNC - ITEM 38 EXEC (takes up to 2 min)

2. GMT UPDATE

Calculate GMT Δ for ITEM 24 as follows:
GMT Δ = wristwatch GMT - Orbiter GMT (DAY/HR:MIN:SEC)

ITEM 24 [±] | | | | / | | | : | | | : | | | . | | | |

UPDATE - ITEM 32 EXEC (takes up to 2 min)

3. NOTE: Record GMT when MET RESET occurs _____/_____:_____:_____ Reset MET to 0 on an even GMT minute.

MET RESET - ITEM 33 EXEC

4. MET UPDATE:

GMT at liftoff = | | | | / | | | : | | | : | | | . | | | |

Calculate MET Δ for ITEM 28 as follows:
MET Δ = GMT recorded in step 3 - GMT at liftoff
✓ITEM 2(*)

ITEM 28 [±] | | | | / | | | : | | | : | | | . | | | |

UPDATE - ITEM 32 EXEC (takes up to 2 min)

NOTE
Stay in OPS 0 until OPS 201 PRO in block 8

TIG

-01:30 P MTU ACTIVATION
013:A cb ESS 1 BC MTU A - cl
:C cb ESS 2 CA MTU B - cl
(Record MET of cb closure _____/_____:_____)

C,P FES HTR ACTIVATION [1]

-01:25 C,P FES CHECKOUT [2]

C,P ACTIVATE GPC 4 [3]

-01:20 C RAD BYPASS [4]

-01:15 MS PLBD CLOSING [5], 8-17

-01:10 MS POST CLOSING CONFIG [6], 8-17

P GMT AND MET UPDATE (COARSE) [7]

-01:05

-01:00

ACTIVATE GPC 1/DEACT GPC 4 [8]

C,P **GPC 1 ACT**

O6 ✓GPC 1 MODE - HALT (tb-bp)
✓OUTPUT - NORM (tb-bp)
PWR - ON
MODE - STBY (tb-RUN), RUN

REASSIGN ALL STRINGS TO GPC 1 IN MC 2

C2 CRT2 MAJ FUNC - GNC
GPC/CRT 12 EXEC
2: GNC GPC MEMORY
CONFIG - ITEM 1 + 2 EXEC
Modify MC 2 per Table →

GNC, OPS 201 PRO
2: GNC UNIV PTG

CONFIG GPC	2 10000
STR 1	1
2	1
3	1
4	1
PL 1/2	0
CRT 1	1
2	1
3	0
4	1
L 1	0
2	0
MM 1	1
2	1

GPC 4 DEACT

O6 GPC 4 MODE - STBY (tb-bp),HALT
PWR - OFF

R12L CRT 4 PWR - ON
MAJ FUNC - GNC
CRT GPC/CRT 14 EXEC
C2 CRT 2 PWR - OFF

IMU STAR ALIGN PAD

NOTE
For pad data, ref STAR PAIRS (ORB OPS, GNC)

STAR ID: -Y __, _____ (TIG- ___ : ___ TO- ___ : ___)

-Z __, _____ (TIG- ___ : ___ TO- ___ : ___)

ANG DIF: _____

ALIGNMENT ATTITUDE (Dual or Single S TRKR)	2nd ALIGNMENT ATTITUDE (Single S TRKR) -Z: _____	-Y: _____
R ___ ___ ___	R ___ ___ ___	R ___ ___ ___
P ___ ___ ___	P ___ ___ ___	P ___ ___ ___
Y ___ ___ ___	Y ___ ___ ___	Y ___ ___ ___

MNVR TO IMU ALIGN ATT [9]

C 4: GNC UNIV PTG

Load ALIGN ATT from MCC
or STAR PAIRS cue card
CRT ITEM 18 EXEC
C3(A6) DAP: A/AUTO/NORM
L1 HI LOAD EVAP - ENA
FLASH EVAP CNTLR PRI B(A) - ON
SEC - OFF
✓Att mnvr complete
DAP: B/AUTO/NORM

IMU ALIGN [10]

C O6 MDM FF 1 - ON
✓MDM FF3 - ON

4: GNC 22 S TRK/COAS CNTL

GNC, I/O RESET - EXEC
1. S TABLE CLR - ITEM 20 EXEC
STAR TRK - ITEM 3,4 EXEC (*)
2. ✓S TABLE: TRK ID 1,2 - STAR ID (PAD)
✓ANG ERR 1 - ≤ 0.08
✓SEL ITEM 17,18 (*)

4: GNC 21 IMU ALIGN
✓STAR ALIGN - ITEM 13 EXEC (*)
✓ANG 2 ΔX, ΔY, ΔZ, ≤ 2°
3. ALIGN IMU 2 - ITEM 11 EXEC (*)
EXEC - ITEM 16 EXEC (*)
✓EXEC, ITEM 16 - (NO*)

WARNING
Do not turn off MDM FF2

O6 MDM FF1,3 - OFF

TIG

-01:00

C,P ACTIVATE GPC 1/DEACT GPC 4 [8]

P STATE VECTOR/TIME UPLINK
(If not previously accomplished)
MDM FF3 - ON
GNC, I/O RESET
Perform COMM POWERUP on MS Comm Pages (OPCL) to allow state vector uplink and update of GMT/MET UPDATE delta. Use GSTDN with data if available or TDRS with data if GSTDN coverage not available

-00:55

C MNVR TO IMU ALIGN ATT [9]

-00:50

C IMU ALIGN [10]

-00:45

P GMT AND MET UPDATE (FINE) [11], 8-16

-00:40

C TRANSITION CONFIG [12], 8-16

-00:35

MS GALLEY/H2O DISPENSER DEACT [13], 8-17

A Go to LOSS OF 2 H2O LOOPS D/O PREP/ENTRY

-00:30

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GMT AND MET UPDATE (FINE) [11]

NOTE
This procedure is for updating the onboard GMT and MET to the degree of accuracy reqd for ENTRY Use deltas provided by MCC. OPS 0 reqd for GMT UPDATE > 15 msec

P 1. GNC, OPS 000 PRO

NOTE
Make no kybd entries during TIME SYNC and UPDATE actions. UPDATE causes reinitialization and TIME SPEC will have to be recalled

2. [2: GNC 2 TIME]
TIME SYNC - ITEM 38 EXEC (takes up to 2 min)

3. GMT UPDATE

Use GMT Δ provided by MCC for ITEM 24 (DAY/HR:MIN:SEC)

ITEM 24 [±] | | | | / | | | : | | | : | | | . | | | |

UPDATE - ITEM 32 EXEC (takes up to 2 min)

If LOS:

4. NOTE: Record GMT when RESET occurs _____/_____:_____:_____
MET RESET - ITEM 33 EXEC

5. Calculate MET Δ for ITEM 28 as follows:
MET Δ = GMT recorded in step 4 - GMT at liftoff

6. Go to step 7

If AOS:
MCC will provide MET Δ for ITEM 28 after GMT UPDATE complete

7. MET UPDATE:

✓ITEM 2(*)

ITEM 28 [±] | | | | / | | | : | | | : | | | . | | | |

UPDATE - ITEM 32 EXEC (takes up to 2 min)
When UPDATE complete,
GNC, OPS 201 PRO

[2: GNC 2 TIME]

SET CRT TIMER TO COUNT DOWN TO TIG

(HR:MIN:SEC - MET)

COUNT TO - ITEM 17 + | | + | | | + | | |

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TRANSITION CONFIG [12]

C O13:E cb ESS 3AB GPC STAT - cl
O14:C cb MNA SMOKE DETN L/R FLT DK - cl

LOSS OF 2 H2O LOOPS MS CONFIGURATION

Part 2: On-Orbit Wait Backout
MS CONFIGURATION

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NOTE
Wait for Go from CDR or PLT before starting any activity on this page

TIME	MS ACTIONS
(TIG)	
1:13	PLBD CLOSING [5]
1:08	POST CLOSING CONFIG [6]
0:42	STOW COAS
0:35	GALLEY/H2O DISPENSER DEACT [13]

NOTE
Prepare LES's for donning. Delay donning as late as possible but prior to EI (CDR last)

PLBD CLOSING [5]

MA73C:A MCA LOGIC MID (four) - ON
:B MCA LOGIC MID (four) - ON

CLOSE PLBD

O6 MDM PL 1,2 (two) - ON
CRT SM I/O RESET
R13L PL BAY DR SYS 1,2 (two) - ENA
CRT AC PWR ON - ITEM 1 EXEC
AUTO MODE SEL - ITEM 3 EXEC
PBD SW BYP - ITEM 14 EXEC
CLOSE - ITEM 17 EXEC
If 'S63 PLB DOOR' MSG and PORT (STBD) AFT LATCH CLOSE MICRO sw STAT are zero, perform DEORBIT PREP, CONTINGENCY PLBD CLOSURE, beginning at step 24
After PLBD CLOSED:
CRT PBD STOP - ITEM 16 EXEC

POST CLOSING CONFIG [6]

CRT4 AC POWER OFF - ITEM 2 EXEC
R13L PL BAY DR SYS (two) - DISABLE

R12L CRT4 PWR - OFF
✓70mm Camr (2), Spotmeter stowed

A7U ✓PL BAY FLOOD (all) - OFF

MA73C:A MCA LOGIC MID (four) - OFF
:B MCA LOGIC MID (four) - OFF
O6 MDM PL1 - OFF
If no data transmission in progress:
O6 MDM PL2 - OFF

GALLEY/H2O DISPENSER DEACT [13]

NOTE
Ensure sufficient containers and salt tablets are prepared to continue fluid loading through entry

If Galley:
MA73C:G cb AC3 GALLEY FAN (three) - op
ML86B:B cb MNA GALLEY OVEN - op
MNB GALLEY H2O HTR - op
Oven door launch strap - snap closed
If H2O DISP:
H2O DISPENSER PWR pb - OFF
✓FOOD WARMER - OFF
C 016:C cb UTIL POWER A11/A15/MO30F - op

LOSS OF 2 H2O LOOPS DEORBIT PREP/ENTRY

Assumptions/Initial Conditions

- The LOSS OF 2 H2O LOOPS DEORBIT PREP/ENTRY is a **STAND ALONE procedure** that assumes one of the following has been accomplished:
  - LOSS OF 2 H2O LOOPS (CONUS TIG < 2.5 hr) (ORB PKT, PWRDN)
  - LOSS OF 2 H2O LOOPS (CONUS TIG > 2.5 hr) (ORB PKT, PWRDN) and LOSS OF 2 H2O LOOPS (CONUS TIG > 2.5 hr) Parts 1 and 2 (Section 8)
- This procedure assumes that 30 minutes remain until the deorbit burn.

Problem Description Rationale

- With no H2O loop flow, heat is not removed from water and air-cooled equipment. The ORB PKT powerdown is maintained until TIG-30 min to minimize the thermal load as long as possible.

Procedure Notes

- The LOSS OF 2 H2O LOOPS DEORBIT PREP/ENTRY configures the vehicle for entry as quickly as possible and repowers critical equipment as late as possible to a single fault tolerant level.
- MS procedures are located on MS PULL-OUT page 9-3. Extra copies are located in the back of the PLT's book.
- CDR and PLT procedures begin on page 9-5.
- Use COMM pages from ORB PKT powerdown to cycle COMM if necessary.
- The nominal DEORBIT BURN and MONITOR cue cards will be used.
- This procedure utilizes a modified version of the ENTRY MANEVUERS cue card which is located at the end of this section.

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NOTE: Wait for "GO" from CDR before accomplishing any action on this page

TIG-20 **MCA CONFIG**

MA73C MCA LOGIC (fourteen) - ON

TIG-15 **CONSTANT CABIN PURGE**

> WARNING
> Do not use WCS once Constant Cabin Purge has started because of high N2 concentration

MO10W 14.7 CAB REG INLET SYS 1,2 vlv (two) - OP
O2 REG INLET SYS 1,2 vlv (two) - CL
L2 O2/N2 CNTLR VLV SYS 1,2 (two) - OP (N2)
C5 DIRECT O2 vlv - OP
L2 ✓O2 XOVR SYS 1 - CL
✓2 - OP
INNER Equalization vlv caps (two) - remove, stow
HATCH ✓Equalization vlv (two) - NORM
Install Equalization vlv caps (two)
Open INNER HATCH wide
ML86B:B ✓cb MNA VAC VENT ISOL vlv - cl
ML31C ✓VAC VENT ISOL VLV BUS SEL - MNA
✓CNTL - OP (tb-OP)
✓NOZ HTR - ON
AW82B ✓AIRLK DEPRESS vlv cap - vent, remove
AIRLK DEPRESS vlv - 5
Egress airlock
Close INNER HATCH

(Cont in right column)

TIG-10 **AFT PANEL CONFIG FOR ENTRY COMM**

NOTE
This procedure configures the aft panel for landing site comm coverage at V=12K. If comm cycled post-TIG-10 (using ORB PKT powerdown comm pages), this AFT PANEL CONFIG FOR ENTRY COMM must be reestablished

L9,R10 PS,MS AUD PWR - AUD
R15:B cb GCIL (two) - cl
C3 S-BD PM CNTL - CMD
A1L S-BD PM ANT SW ELEC - 2
MODE - STDN LO
XPNDR - 2

A1L NSP PWR - 2
DATA RATE XMIT - HI
RCV - LO
✓UPLK DATA - S-BD
✓CODING XMIT - OFF
✓RCV - OFF

TIG-5 **LEH VLV CONFIG**

MO32M LEH O2 5 vlv - CL
Remove and stow O2 Bleed Orifice
LEH O2 5,6 vlv - OP (if reqd)
MO69M LEH O2 7,8 vlv - OP (if reqd)

(Cont next page)

NOTE: Wait for "GO" from CDR before accomplishing any action on this page

CLOTHING CONFIG

NOTE
Delay donning LES's as late as possible but prior to EI (CDR last)

Don: LES, HARNESS, BOOTS
C6 LEH O2 vlv (two) - OP

EI-10 Stow flight deck SPOC

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CDR

06 MDM FF1,3 (two) - ON
✓FF2 - ON
I/O RESET EXEC
F6 DATA BUS - 1

VERIFY DAP/SELECT NORMS

✓DAP: A1/AUTO/NORM
✓DAP: B set to B1

IMU ACTIVATION (If IMUs 1, 3 are off):

ACTIVATE IMU 1,3

014:A IMU 1 - ON
016:A IMU 3 - ON
GNC 21 IMU ALIGN
CRT IMU 1,3: OPER, ITEM 4,6 EXEC (*)
(wait ~1 min for *)
I/O RESET EXEC

IMU to IMU ALIGNMENT

CRT ✓IMU 1,3: STAT - blank
IMU/IMU - ITEM 14 +2 (ref IMU) EXEC
ALIGN IMU 1,3 - ITEM 10,12 EXEC (*)
EXEC - ITEM 16 EXEC (*)

RESELECT IMU 1,3

✓ALIGNMENT COMPLETE - ITEM 16 (no *)
IMU 1,3: DES - ITEM 7,9 EXEC (no *)

PLT

DEORBIT TARGET

Use SPOC to compute targets
(Record on 9-8)

APU STEAM VENT HTR ACT

R2 BLR PWR (three) - ON

SWITCH CONFIG FOR OPS 3

014,015,
016:A RGA 1,2,3 (three) - ON
:E cb ACCEL 1,2 (two) - cl
:F ASA (four) - ON
ACCEL 3 - ON

MCA CONFIG (no earlier than TIG-20)

Give MS "GO" for MCA LOGIC config

STAR TRKR DEACT

STAR TRKR PWR (two) - OFF

014,
015:E cb STAR TRKR -Z, -Y (two) - op
06 STAR TRKR DR CNTL SYS (two) - CL
✓POS tb (two) - bp (start timer)
When both tb - CL (~8-24 sec)
or either tb - bp > 24 sec,
STAR TRKR DR CNTL SYS (two) - OFF

DPS ENTRY CONFIG (assumes GPC 1 active)

015:F MMU 2-ON, wait 34 sec
06 ✓GPC MODE 2,3,4,5 (four) - HALT (tb-bp)
✓OUTPUT 2,3,4 (three) - NORM (tb-bp)
5 - B/U (tb-bp)
PWR 3,5 (two) - ON
MODE 3,5 (two) - STBY (tb-RUN)
- RUN

GNC O GPC MEMORY
CRT CONFIG - ITEM 1 +3 EXEC
Modify MC3 per Table →
GNC OPS 301 PRO
DEORB MNVR COAST

CONFIG GPC	3 10000
STR 1	1
2	1
3	1
4	1
PL 1/2	1
CRT 1	1
2	1
3	1
4	0
L 1	0
2	0
MM 1	1
2	1

(Cont next page)

Do not proceed until all DPS ENTRY CONFIG steps are complete

CLOSE VENT DOORS

06 MDM FF4 - ON
GNC I/O RESET
GNC 51 OVERRIDE
CRT VENT DOORS CNTL CLOSE - ITEM 44 EXEC (*),
wait one minute, then
06 MDM FF4 - OFF

LANDING SITE UPDATE

1: GNC 50 HORIZ SIT

SEL SITE, RWY (PASS/BFS)

DRAG ALT ATM SELECTION

SELECT ATM: incl ≤ 50 deg ✓ ITEM 22 (*)
incl > 50 deg SEL ITEM NO.
(table)

Hemi	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
N Desc	23	23	23	23	22	24	24	24	22	23	23	23
S Asc	24	24	22	23	23	23	23	23	23	23	22	24
N Asc	22											
S Desc												

CHECK CG

UPDATE PRPLT ITEM 18 as reqd

CDR

GNC 0 GPC MEMORY
CONFIG - ITEM 1 +3 EXEC
Modify MC 3 per Table →
GNC, OPS 301 PRO (✓DAP)
BFS: GNC, OPS 301 PRO
GNC, OPS 302 PRO
GNC 0 GPC MEMORY
DOWNLIST GPC - ITEM 44 +3 EXEC

GPC MODE 1 - STBY (tb-bp)
- HALT
PWR 1 - OFF

For any fwd CRT pwrd off:
GPC/CRT 3X EXEC

015:F MMU 2 - OFF
L1 AV BAY 1 FAN A - OFF
2 FAN A - ON, wait 3 sec,
3 FAN B - ON

CAB FAN B - ON (no earlier than TIG-15), then give MS "GO" for CONSTANT CABIN PURGE

CONFIG GPC	3 10300
STR 1	3
2	3
3	3
4	3
PL 1/2	3
CRT 1	3
2	3
3	3
4	0
L 1	0
2	0
MM 1	3
2	3

AFT PANEL CONFIG FOR ENTRY COMM (no earlier than TIG-10 min)

Give MS "GO" to config AFT panel

PLT

OMS BURN PREP

07 ✓AFT L,R RCS He PRESS (four) - OP (tb-OP)
✓TK ISOL (six) - GPC (tb-OP)
✓XFEED (four) - GPC (tb-CL)

08 ✓L,R OMS He PRESS/VAP ISOL (four) - CL
✓TK ISOL (four) - OP (tb-OP)
✓XFEED (four) - CL (tb-CL)

LOAD TGTs AND MNVR

CRT ENTER TGT DATA from MCC or SPOC → DEORBIT PAD

LOAD - ITEM 22 EXEC
TIMER - ITEM 23 EXEC

014,015,016:E cb DDU L,R (four) - cl
F7,F8 FLT CNTLR PWR (two) - ON

MNVR TO BURN ATT

CLOTHING CONFIG

NOTE

Delay donning LES's as late as possible but prior to EI (CDR last)

Don: LES, HARNESS, BOOTS

C6 LEH O2 vlv (two) - OP

TIG-2 Go to DEORBIT BURN CUE CARDS

RECORD DEORBIT OPPORTUNITIES

SITE	APPROX TIG	XRNG
___	___/___ ___:___ ___:___ ___	____
___	___/___ ___:___ ___:___ ___	____
___	___/___ ___:___ ___:___ ___	____
___	___/___ ___:___ ___:___ ___	____

COMPUTE WEIGHT
Use SPOC CG MANAGER program (record below)
COMPUTE TARGET

WT	___ ___ ___ ___ ___ ___
TIG	___ /___ ___:___ ___:___ ___
C1	___ ___ ___ ___ ___
C2	(-).6000
HT	65.832
ΦT	___ ___ ___.___ ___ ___
ΔVTOT	___ ___ ___.___
REI	___ ___ ___ ___

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CDR — POST BURN ACTIVITIES — PLT

014, 015:E cb DDU L (two) - op,cl as reqd to achieve/maintain EI-5 attitude

F7 FLT CNTLR PWR - OFF

MNVR TO EI-5 ATT

CRT1 GNC, OPS 303 PRO

TIME TO EI (MIN)	LVLH PITCH (DEG)
26	315
25	319
24	323
	327
	331
	335
20	339
	343
	347
	351
	355
15	359
	3
	7
	11
	15
10	19
	23
	27
	31
	35
5	39

NOTE

Use LVLH table unless INRTL EI-5 attitude supplied by MCC.

NOTE

EI attitude may be loaded in ITEM 24,25, and 26 if desired

When mnvr complete:

L4:P cb LG SNSR (two) - cl

014:A BRAKES MNA - ON

015:A BRAKES MNB - ON

016:A BRAKES MNC - ON

015, 016:E cb DDU R (two) - op

F8 FLT CNTLR PWR - OFF

OMS/RCS POST BURN RECONFIG

O7 AFT L,R RCS
- ✓He PRESS (four) - OP (tb-OP)
- ✓TK ISOL (six) - GPC (tb-OP)
- ✓XFEED (four) - GPC (tb-CL)

O8 L,R OMS
- ✓He PRESS/VAP ISOL (four) - CL
- ✓TK ISOL (four) - OP (tb-OP)
- ✓XFEED (four) - CL (tb-CL)

APU PRESTART

R4 ✓HYD LG RET/CIRC VLV - CL

R2
- BLR N2 SPLY (three) - ON
- ✓PWR (three) - ON
- ✓CNTLR/HTR (three) - A
- ✓APU AUTO SHUTDN (three) - ENA
- CNTLR PWR (three) - ON
- HYD MAIN PUMP PRESS (three) - LO
- ✓APU SPEED SELECT (three) - NORM
- ✓OPERATE (three) - OFF
- ✓FUEL TK VLV (three) - CL
- ✓HYD CIRC PUMP (three) - OFF
- ✓cb APU FUEL TANK VALVE ENABLE (six) - cl

CDR — POST BURN ACTIVITIES — PLT

FORWARD RCS DUMP (if reqd)

(Use for off-nominal Xcg entry using lowest of OX or FU qty)

Perform FRCS dump if reqd to maintain Xcg in the box
If FRCS dump not reqd, go to page 9-12

IF FORWARD RCS DUMP REQD -- FOUR JET DUMP

FRCS REACTIVATION

MA73C:A ✓MCA LOGIC FWD (three) - ON
014:B cb OI SIG CONDR OF 1/4A - cl
:F RJDF 1B F1 DRIVER - ON
LOGIC - ON
015:B cb OI SIG CONDR OF 2/3A - cl
:F RJDF 1A F2 DRIVER - ON
LOGIC - ON
016:F RJDF-2A F3, 2B F4 DRIVER (two) - ON
F4/F5 LOGIC (two) - ON
06 ✓MDM FF1,2,3 (three) - ON
FF4 - ON
GNC I/O RESET
08 FRCS MANF ISOL 1,2,3,4 (four) - OP (tb-OP)

GNC 23 RCS

CRT JET RESET - ITEM 45 EXEC
Reselect deselected FRCS jets
JET RESET - ITEM 45 EXEC

APU START

C3 OI PCMMU PWR - 1
BFS I/O RESET

R2 APU FUEL TK VLV (three) - OP
✓APU/HYD RDY tb (three) - gray

* If tb - bp, attempt normal start *

APU OPERATE (three) - START/RUN

F8 ✓HYD PRESS ind (three) - LO green

R2 APU/HYD RDY tb (three) - bp
HYD MN PUMP PRESS (three) - NORM

F8 ✓HYD PRESS ind (three) - HI green

* If any APU did not start normally, *
* APU OPERATE - START ORIDE/RUN *
* (Wait 3.5 min for APU start) *
* If no APU start, *
* APU AUTO SHUTDN - INH *
* If OIL OUT P < 25 and OIL OUT *
* TEMP not increasing after APU *
* start or no start, perform *
* APU SHUTDN (Cue Card) *

R4 ✓HYD LG HYD ISOL VLV (three) - GPC (tb-CL)

C3 OI PCMMU PWR - OFF

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FORWARD RCS DUMP (continued)

Determine FWD RCS 'DUMP TO %' (calculator, cg wheel, or DEL PAD)

NOTE
During dump disregard F RCS qty

GNC DEORB MNVR EXEC

188 CRT FWD RCS ARM - ITEM 36 EXEC
DUMP - ITEM 37 EXEC
(Start watch)

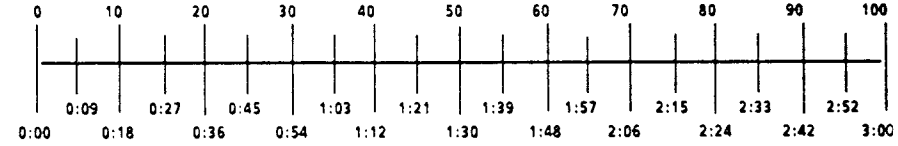
When dump time achieved,
OFF - ITEM 38 EXEC

When dump complete,
08 FWD RCS MANF ISOL 1,2,3,4 (four) - CL (tb-CL)

06 MDM FF4 - OFF
014:B cb OI SIG CONDR OF 1/4A - op
014:F RJDF - 1B F1 DRIVER - OFF
LOGIC - OFF
015:B cb OI SIG CONDR OF 2/3A - op
015:F RJDF - 1A F2 DRIVER - OFF
LOGIC - OFF
016:F RJDF - 2A F3, 2B F4 DRIVER (two) - OFF
F4/F5 LOGIC (two) - OFF

FOUR JET DUMP:

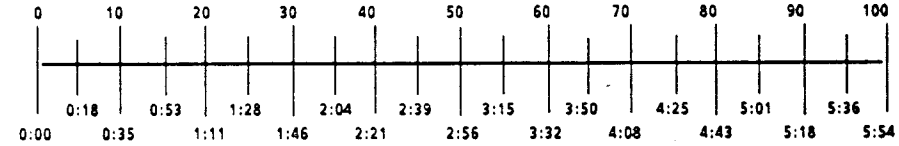
F RCS PRPLT TO BE DUMPED (%)



TIME FROM DUMP INITIATION (M:S)

TWO JET DUMP:

F RCS PRPLT TO BE DUMPED (%)



TIME FROM DUMP INITIATION (M:S)

1: GNC 53 ENTRY CONTROLS	2: BFS, GNC SYS SUMM 2
3: GNC DEORB MNVR COAST	

SECONDARY ACTUATOR CHECK (if not previously performed and time permits)

NOTE
If a port does not bypass during the check, bypass the affected port after the check
SEC ACT BYPASS - ITEM 8 +XX EXEC
If the affected port still does not bypass:
SEC ACT RESET - ITEM 9 +XX EXEC

R2 a. ✓HYD MN PUMP PRESS (three) - NORM

F7 b. ✓SPI: If all elevon posns not within +12° to -27°, then:
CRT3 SURF DRIVE ON, ITEM 39 EXEC (*)
Stop drive test when all posns within limits:
SURF DRIVE OFF, ITEM 40 EXEC (*)

CRT1 c. ✓POST STIM ENA, ITEM 7 - (no *)

C3 d. ✓FCS CH 1,2,3,4 - AUTO

CRT1 e. SEC ACT CK, CH 1 - ITEM 1 EXEC (*)
SEC ACT CK START - ITEM 5 EXEC

f. ✓all CH 1 ports bypass (↓)
STOP - ITEM 6 EXEC (*)

C3 g. FCS CH1 - ORIDE
CRT1 ✓all CH 1 ports reset (no ↓)
C3 FCS CH 1 - AUTO

h. Repeat steps e thru g for CH 2,3,&4

EQUIPMENT STOWAGE AND SEAT INGRESS

If not already accomplished:
Stow equip
Seat ingress
Adjust seat, exercise brake pedals

ENTRY SWITCH CHECK

C	L1	NH3 CNTLR B	- PRI/GPC
	L2	✓CAB RELIEF (two)	- ENA (tb-ENA)
		✓ENTRY MODE	- AUTO
C,P	C2/C3	✓SBTC	- full fwd
		✓SRB SEP	- AUTO
		✓ET SEP	- AUTO
	F6/F8	✓AIR DATA	- NAV
		✓ADI ERR	- MED
		RATE	- MED
		✓HSI SEL MODE	- ENTRY
		✓SOURCE (two)	- NAV,1
		✓SOURCE (two)	- NAV,2
C,P	F3	✓TRIM RHC/PNL (two)	- INH
		✓PNL (two)	- ON

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CDR

HORIZ SIT CONFIG

ALTM - ITEM 9 + [ ][ ][.][ ][ ]

	PASS ITEM		BFS ITEM	
PTI	INH 1	✓		
INDEX	1	✓	=	
LAND SITE (DEL PAD)	41	✓	41	✓
RWY (DEL PAD)	3	✓	3	✓
	4	✓	4	✓
TACAN (DEL PAD)	5	✓	5	✓
SPD BK	NOM 39	✓		
TAEM TGT				
G&N	OVHD 6	✓	BLANK	✓
HSI	BLANK	✓	BLANK	
XEP	NEP 7	✓	NEP 7	✓
AIM	NOM 8	✓	NOM 8	✓
TAC	INH 20	✓	INH 20	✓
DRAG H	AUT 22	✓	AUT 22	✓
ADTA H	INH 26	✓	INH 26	✓
ADTA TO G&C	INH 29	✓	AUT 28	✓
DES any failed TACANs		✓		✓
TAC	DELTA 35	✓	-	
HUD	37 L 0	✓	-	
	38 R 0	✓	-	

Stow:
Deorbit Burn Cue Cards (C6)
DEORBIT BURN MONITOR Cue Card (C6)

Go to Loss of 2 H2O LOOPS ENT MNVR Cue Card-EI-5, 9-14

PLT

If Xcg ≥ 1098 at EI:
3: GNC 51 OVERRIDE
ALT ELEVON - ITEM 18 EXEC
3: BFS, GNC 51 OVERRIDE
ALT ELEVON - ITEM 18 EXEC

If Xcg < 1098 at EI:
3: GNC 51 OVERRIDE
NOM ELEVON - ✓ITEM 17 (*)
3: BFS, GNC 51 OVERRIDE
NOM ELEVON - ✓ITEM 17 (*)

* If returning payloads > 10K lb: *
* 3: GNC 51 OVERRIDE *
* ALT FILTER - ITEM 21 EXEC *
* 3: BFS, GNC 51 OVERRIDE *
* ALT FILTER - ITEM 21 EXEC *

R1 AC BUS SNSR (three) - OFF (1 sec), then MON

G SUIT INFLATION

All Load - 1.5

Go to Loss of 2 H2O LOOPS ENT MNVR Cue Card-EI-5, 9-14

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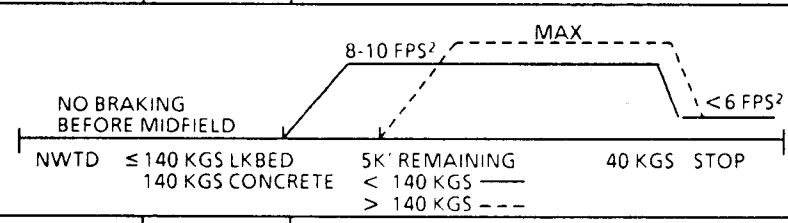
LOSS OF 2 H2O LOOPS ENTRY MANEUVERS

FLIGHT CONDITIONS	% RCS EACH SIDE	MANEUVER
EI-5		cb ADTA 1,2,3 (three) - cl cb DDU L (two) - cl L FLT CNTLR PWR - ON L INST PWR - FLT MDM FF4 - ON GNC I/O RESET ✓LVLH ATT GNC, OPS 304 PRO * PREBANK [ ][ ][ ] (from DEL pad) *
$\overline{q}$ = 8 or D = 3		CLOSED LOOP GUIDANCE _____:_____:_____ FIRST BANK CMD * If PREBANK, roll out PREBANK & FOLLOW * * ROLL CMD at 3°/sec (TIME CRITICAL) *
D = 11		✓DRAG H (FORCE if editing)
ΔAZ = 10.5°		FIRST ROLL REVERSAL [ ][ ][ ][ ][ ] (DEL pad)
V = 15K		TACAN 2,3 (two) - GPC
V = 12K		* If no YAW JET, begin lateral trim monitoring * ACTIVATE ENTRY COMM ✓L, R AUD PWR - AUD AUD CTR - 1 UHF MODE - SPLX S-BD PM CNTL-PNL,CMD OI PCMMU PWR - 1 ✓FORMAT - FXD MDM PL2 - ON GNC, BFS, I/O RESET
V = 10K		✓SPD BRK to 81% * If three yaw jets failed on same side: * * Perform remaining roll reversals in * * R/Y - CSS *
V = 7K		✓TACAN status
V = 5K		ADTA PROBES - DEPLOY (✓HEAT) Begin AIL and RUD trim monitoring ✓MPS/TVC ISOL VLV - CL

FLIGHT CONDITIONS	% RCS EACH SIDE	MANEUVER
M = 4		Begin $\dot{H}$ monitoring (✓ < 500 fps)
M = 2.9		CAB FAN B - OFF Power 1 HUD, 1 MLS, 1 RA for landing GNC I/O RESET
M = 2.7		✓APUs
* If M < 2.5; P CSS FOR ADTA TO G&C incorp *		
M = 2.0		Ensure ADTA to G&C else ✓Θ Limits
M = 0.95	* For bailout procedures, go to BAILOUT *	
M = 0.9		P,R/Y - CSS as reqd ✓SPDBK CMD vs POS R INST PWR - ON cb R DDU (two) - cl R FLT CNTLR - ON NWS - GPC ANTISKID - ON
M = 0.7		✓HYD LG ISO 1,2 - OP
h = 15K		✓MLS (If activated)
h = 10k		✓A/L
MAIN GEAR TD		SPD BRK - 100%
NOSE GEAR TD		SRB SEP - MAN/AUTO and depress pb ✓AUTO LOAD RELIEF
		
STOP		DIRECT O2 vlv - CL GO TO EXPEDITED PWRDN (ENT, POST LDG)

EMERGENCY DEORBIT PREP/ENTRY
(20 min < Time to TIG < 2 hrs 40 min)

Assumptions/Initial Conditions

- The Emergency Deorbit Prep/Entry procedure is compatible with, but does not require, the LOSS OF CABIN PRESSURE POWERDOWN (ORB PKT). This procedure may also be used for other failure cases requiring a deorbit in less than 2 hrs 40 min.
- This procedure assumes at least 20 min and at most 2 hrs 40 min remain until the deorbit burn.

Problem Description/Rationale

- The maximum time to TIG (Tmax) is based on cabin pressure, leak rate and total N2 quantity, and is determined from the CAB PRESS LEAK NOMOGRAPH (ORB PKT). Tmax can be exceeded, but cabin pressure will drop below 8 psi.
- The actual time to TIG is based on landing site availability.

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Procedure Notes

- The procedure is designed for a worst-case scenario, 20 min until TIG. Any activity that is not absolutely necessary is omitted, and any activity that is not required prior to the burn is delayed until after the burn.
- AFT DECK and MIDDECK MS procedures are located on MS PULLOUT pages 10-5 and 10-7, respectively. Extra copies are located in the back of the PLT's book.
- CDR and PLT procedures begin on page 10-9.
- The nominal DEORBIT BURN and MONITOR cue cards will be used.
- If a landing site is available, this procedure is exited on page 10-18 and the nominal ENTRY MANEUVERS cue card with pen and inks are used.
- If a landing site is not available, the bailout procedures beginning on page 10-19 are used.
- This procedure baselines a single fault tolerant configuration on most air-cooled equipment. If cabin pressure stabilizes at 8 psi or greater, additional equipment may be activated as desired.
- If time available, review NOMINAL DEORBIT PREP (DEORBIT PREP) for any additional activities that may be desired.

EMERGENCY DEORBIT PREP/ENTRY MATRIX

The following Matrix is for general information purposes only. The first and second columns list all Nominal Deorbit Prep activities and the times when they are performed, respectively. The third column indicates whether or not these activities are performed in the Emergency Deorbit Prep and, if so, when they are performed relative to the deorbit burn.

ACTIVITY	NOM 4.0 HR D/O PREP	EMERGENCY D/O PREP
FLUID LOADING PREP	CAP	-✓
CRT TIMER SETUP	-04:00	-----
CONFIGURE DAP	-03:59	-✓
COLDSOAK INITIATE	-03:57	-----
RAD STOW	-03:45	-✓
DPS CONFIG FOR D/O PREP	-03:27	-----
CONFIG FOR PLBD CLOSING	-03:15	-✓
KU-BD ANTENNA STOW	-03:05	-✓
SUNSHIELD OPENING (if PAM flight)	-03:02	-----
AUTO MNVR TO IMU ATT	-03:00	-----
SELECT NORM JETS	-02:50	-✓
RAD BYPASS	-02:49	-✓
PLBD CLOSING	-02:45	-✓
IMU ALIGNMENT	-02:45	-----
ENT STOWAGE	-02:37	-----
POST CLOSING CONFIG	-02:35	-----
GALLEY OR WATER DISPENSER DEACT	-02:31	-----
PREL DEORB UPDATE/UPLINK	-02:30	-----

ACTIVITY	NOM 4.0 HR D/O PREP	EMERGENCY D/O PREP
SPECIALIST SEAT SETUP/INSTALLATION	-02:25	+✓
APU STEAM VENT HTR ACT	-02:24	-✓
DED DISP ENT CONFIG	-02:20	+✓
AUTO MNVR TO D/O BURN ATT	-02:15	-✓
(MS) CLOTHING CONFIG	-02:10	+✓
SSME HYD REPRESS Prep	-02:08	-----
DPS ENTRY CONFIG	-02:05	-✓
DEACT STAR TRKRS & CLOSE DOORS	-01:51	-✓
(C,P) CLOTHING CONFIG	-01:50	+✓
RESET C/W	-01:38	-----
ENT SWITCH LIST/VER	-01:35	-✓
ENTRY REVIEW	-01:20	-----
FLUID LOADING	01:05	-✓
SEAT INGRESS	-01:00	+✓
HUD SETUP/WIRELESS STOW (if reqd)	-00:59	-----
WCS DEACTIVATION	-00:58	-----
REMOVE SIDE HATCH UV FILTER (not OV102) and LOCKING DEVICE	-00:15	+✓

-✓ Indicates accomplished some time before TIG
+✓ Indicates accomplished some time between TIG and EI

PL SAFING (if reqd)
Perform PL SAFING (ORB PKT)

RMS POWERDOWN (if reqd)

If unable to cradle RMS, perform QUICK RESPONSE JETTISON after KU-BD Antenna is stowed
If RMS is powered, perform RMS PWRDN (PDRS OPS)

STOW KU-BD ANTENNA (if deployed)

A1U ✓KU PWR - ON
- MAN SLEW
MODE - RDR PASSIVE
CNTL - PNL

A2 DIGI-DIS SEL - EL/AZ
A1U SLEW RATE - as reqd
ELEV - as reqd:
A2 RANGE/ELEVATION - -29.0 (±2.5)
A1U SLEW AZM - as reqd
A2 RANGE RATE/AZM - -125.0 (±2.5)
R13L KU ANT - STO
A2 ✓RANGE/ELEVATION - -29.0 (±1°)
✓RANGE RATE/AZIMUTH - -125.0 (±1°)
✓NO ANTENNA DISH MOVEMENT FOR 35 SEC
IF DISH MOVEMENT OCCURS WITHIN 35 SEC
A1U | KU PWR - OFF
| KU ANT - GND, go to QUICK RESPONSE JETTISON >>
IF NO DISH MOVEMENT OCCURS WITHIN 35 SEC, continue

R13L PL BAY MECH PWR SYS (two) - ON
✓KU ANT tb - bp
IF KU ANT tb - STO (23-46 sec)
A1U | KU PWR - OFF
R15:C | cb KU ELEC - op
R13L | KU ANT - GND
| PL BAY MECH PWR SYS (two) - OFF >>
R13L If KU ANT tb NOT STO, and KU BD not within STO Envelope after 46 sec, continue

NOTE
KU ANT CCTV OVERLAY is located in commander's CAP

A1U KU PWR - OFF
R15:C cb KU ELEC - op

CAUTION
1. KU ANT switch must be in GND position prior to use of Direct Sto switch to prevent phase to phase short of STO/DPY motors
2. Antenna Gimbals must be locked prior to this Direct Sto procedure

R13L KU ANT - GND
DIRECT STOW - ON
✓KU ANT tb - bp
If KU ANT tb - STO or antenna within STO ENVELOPE after 46 sec
| DIRECT STOW - OFF
| PL BAY MECH PWR SYS (two) - OFF >>
If NO STO indication and KU-BD not within STO Envelope
DIRECT STOW - OFF
PL BAY MECH PWR SYS (two) - OFF, go to QUICK RESPONSE JETTISON >>

STOW RADIATORS (if deployed)

R13L	✓RAD LAT CNTL SYS (two)	- OFF (tb-REL)
	✓CNTL SYS (two)	- OFF (tb-DPY)
	PL BAY MECH PWR SYS (two)	- ON
	RAD CNTL SYS (two)	- STO (concurrently)
		(tb-bp ~40 sec, STO)
		- OFF
	RAD LAT CNTL SYS (two)	- LAT (concurrently)
		(tb-bp ~25 sec, LAT)
		- OFF
	PL BAY MECH PWR SYS (two)	- OFF

CLOSE PLBD (with BFS)

If BFS not already in OPS 301:

C3	S-BD PM ANT - as reqd
O6	GPC PWR 5 - ON
	MODE 5 - STBY (tb-RUN), RUN

CRT	GPC/CRT O/4 EXEC
	GPC/CRT 4/3 EXEC
	GPC/CRT 5/4 EXEC

4: BFS, SM 63 PL BAY DOORS

R13L	PL BAY DR SYS (two)	- ENA
CRT	AC POWER ON	- ITEM 1 EXEC (*)
	AUTO MODE SEL	- ITEM 3 EXEC (*)
R13L	PL BAY DR	- CL

* If PLBD FDA and PORT(STBD) AFT BHD LATCH *
* CLOSE MICRO-sw STATs are 'O', go to *
* step 24, CONTINGENCY PLBD CLOSE (DEORB PREP) *

After PLBD closed:

R13L	PL BAY DR	- STOP
CRT	AC POWER OFF	- ITEM 2 EXEC (*)
R13L	PL BAY DR SYS (two)	- DISABLE

RECONFIG FDF

Unstow: ENT PKT
DEORBIT BURN and MONITOR Cue Cards
Entry Cue Cards

ENTRY SWITCH LIST/VERIFICATION (AFT) (if time available) 3-15 to 3-25

If not already accomplished:
Tape Foot Loops in egress routes
Stow loose FLT DECK equipment
Unstow/install MS SEATs
Don LES
HARNESS
BOOTS
Begin FLUID LOADING (if time available)
Ingress SEAT
LES PRESS INTEGRITY CHECK

EI-10 Stow Flight deck SPOC

TAGS DEACTIVATION
Deactivate TAGS per Cue Card

Fluid Loading Prep (if time available)

ENTRY SWITCH LIST/VERIFICATION (MIDDECK) (if time available)
3-27 to 3-32

DELTAS TO ENTRY SWITCH LIST

196 ML31C ✓VAC VENT ISOL VLV CNTL - CL (tb-CL)

If not already accomplished:

Tape Foot Loops in egress routes

WCS Foot restraints - up, locked
POLE SETUP (Cue Card, ESCAPE POLE STOWAGE/SETUP)
L1 ✓CAB TEMP CNTLR - OFF

MD44F Pin CAB TEMP CNTLR in FULL cool position
If OV104: Stow CAB TEMP CNTL actuator linkage
MO32M LEH O2 5 vlv - CL
Remove and stow O2 Bleed Orifice
LEH O2 5 vlv - OP (if reqd)
LES PRESS INTEGRITY CHECK
Stow Treadmill
Stow loose MIDDECK equipment
After deorbit targeting complete: Stow backup SPOC
Remove and stow side hatch UV Filter (not OV102), Locking Device, and Pyro Box Safing Pin
Unstow, install MS Seats
Don LES, HARNESS, BOOTS
Begin FLUID LOADING (if time available)
Ingress SEAT

CDR

VERIFY DAP/SELECT NORMS

✓DAP: A1/AUTO/NORM
✓DAP: B set to B1

FES HTR ACTIVATION

HI LOAD DUCT HTR - A/B
✓TOPPING EVAP HTR NOZ (two) - B AUTO
✓DUCT - B

STAR TRKR DEACT

06 STAR TRKR PWR (two) - OFF
014:E, cb STAR TRKR -Z, -Y (two) - op
015:E
06 STAR TRKR DR CNTL SYS (two) - CL
✓POS tb (two) - bp (start timer)
When both tb - CL (~8-24 sec)
or either tb - bp > 24 sec:
STAR TRKR DR CNTL SYS (two) - OFF

DPS ENTRY CONFIG

✓RGA,AA,ASA,IMU (all) - ON

UPLINK ENA, GPC DNLIST

X: SM 1 DPS UTLITY

CRTX UL CNTL ENA - ITEM 36 EXEC
C3 OI PCMMU FORMAT - FXD

PLT

DEORBIT TARGET

Use SPOC to compute targets
(Record on 10-11)

APU STEAM VENT HTR ACT

R2 BLR PWR (three) - ON

SWITCH CONFIG

06 ✓UHF MODE - SPLX
013,014,015,016 All switches ON and all cbs closed except the following:
All orange dot - op
014:E ADTA 1 - op
DDU L,AFT (two) - op
015:E ADTA 2 - op
DDU L,R (two) - op
016:E ADTA 3,4 (two) - op
DDU R,AFT (two) - op
RCS/OMS PRPLT QTY GAUGE - op
:F RJD MANF L5/F5/R5 DRIVER - OFF

FLT CNTLR ACTIVATION (no earlier than TIG-15)

014,015,016:E cb DDU L,R (four) - cl
F7,F8 FLT CNTLR PWR (two) - ON

CDR

CONFIG GPCs

	1	2	3	4	5
PWR	ON	ON	ON	ON	ON
OUTPUT	NORM	NORM	NORM	NORM	B/U
MODE	RUN	RUN	RUN	RUN	RUN

SM, OPS 000 PRO

SM 0 GPC MEMORY

VERIFY MC 3 PER TABLE

CONFIG GPC	3 12340
STR 1	1
2	2
3	3
4	4
PL 1/2	1
CRT 1	1
2	2
3	3
4	0
L 1	0
2	0
MM 1	1
2	2

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TRANSITION TO OPS 3

CRT3 GNC, OPS 301 PRO
BFS, GNC OPS 301 PRO
GNC, OPS 302 PRO

PLT

Do not proceed until all DPS ENTRY CONFIG steps are complete

CLOSE VENT DOORS

GNC 51 OVERRIDE

CRT VENT DOORS CNTL CLOSE - ITEM 44 EXEC (*)

LANDING SITE UPDATE

1: GNC 50 HORIZ SIT

SEL SITE, RWY (PASS/BFS)

DRAG ALT ATM SELECTION

GNC 51 OVERRIDE

SELECT ATM: incl ≤ 50 deg ✓ ITEM 22 (*)
incl > 50 SEL ITEM NO.
(table)

Hemi	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
N Desc	23	23	23	23	22	24	24	24	22	23	23	23
S Asc	24	24	22	23	23	23	23	23	23	23	22	24
N Asc	22											
S Desc												

CHECK CG

GNC DEORB MNVR EXEC

UPDATE PRPLT ITEM 18 as reqd

RAD BYPASS/FES ACTIVATION

L1	✓FLOW PROP VLV LOOP (two)	- INTCHGR (tb-ICH)
R12L	SPLY H2O XOVR VLV	- OP (tb-OP)
L1	RAD BYP VLV MODE (two)	- MAN
	MAN SEL (two)	- BYP (after ~3 sec, tb-BYP)
	✓FLASH EVAP CNTLR PRI B(A)	- ON
	HI LOAD EVAP	- ENA
	RAD CNTLR LOOP (two)	- OFF

LOAD TGTs AND MNVR

CRT ENTER TGT DATA from MCC or SPOC →

* For Bailout: *
* Enter TIG for desired deorbit time *
* *

LOAD TARGET IN OPS 3

LOAD - ITEM 22 EXEC
TIMER - ITEM 23 EXEC

MNVR TO BURN ATT

DEORBIT PAD

RECORD DEORBIT OPPORTUNITIES

SITE	APPROX TIG	XRNG
___ ___ ___	___/___ ___:___ ___:___ ___	___ ___ ___ ___
___ ___ ___	___/___ ___:___ ___:___ ___	___ ___ ___ ___
___ ___ ___	___/___ ___:___ ___:___ ___	___ ___ ___ ___
___ ___ ___	___/___ ___:___ ___:___ ___	___ ___ ___ ___

COMPUTE WEIGHT

Use SPOC CG MANAGER program (record below)

COMPUTE TARGET

WT	___ ___ ___ ___ ___ ___
TIG	___ /___ ___:___ ___:___ ___
C1	___ ___ ___ ___ ___
C2	(-).6000
HT	65.832
ΦT	___ ___ ___.___ ___ ___
ΔVTOT	___ ___ ___.___
REI	___ ___ ___ ___

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CDR

CLOTHING CONFIG (if time permits)

Don LES
HARNESS
BOOTS

C6 LEH O2 vlv (four) - op

LES PRESS INTEGRITY CHECK

TIG-2 Go to DEORBIT BURN CUE CARDS

200

PLT

OMS BURN PREP

O7 ✓AFT L,R RCS He PRESS (four) - OP (tb-OP)
✓TK ISOL (six) - GPC (tb-OP)
✓XFEED (four) - GPC (tb-CL)

O8 ✓L,R OMS He PRESS/VAP ISOL (four) - CL
✓TK ISOL (four) - OP (tb-OP)
✓XFEED (four) - CL (tb-CL)

CLOTHING CONFIG (if time permits)

Don LES
HARNESS
BOOTS

C6 LEH O2 vlv (four) - op

LES PRESS INTEGRITY CHECK

TIG-2 Go to DEORBIT BURN CUE CARDS

CDR — POST BURN ACTIVITIES — PLT

014, 015:E cb DDU L (two) - op, cl as reqd to achieve/ maintain EI-5 attitude

F7 FLT CNTLR PWR - OFF

MNVR TO EI-5 ATT

CRT1 GNC, OPS 303 PRO

TIME TO EI (MIN)	LVLH PITCH (DEG)
26	315
25	319
24	323
	327
	331
	335
20	339
	343
	347
	351
	355
15	359
	3
	7
	11
	15
10	19
	23
	27
	31
	35
5	39

NOTE

Use LVLH table unless INRTL EI-5 attitude supplied by MCC

NOTE

EI attitude may be loaded in ITEM 24,25, and 26 if desired

015, 016:E cb DDU R (two) - op

F8 FLT CNTLR PWR - OFF

OMS/RCS POST BURN RECONFIG

07 AFT L,R RCS
- ✓He PRESS (four) - OP (tb-OP)
- ✓TK ISOL (six) - GPC (tb-OP)
- ✓XFEED (four) - GPC (tb-CL)

08 L,R OMS
- ✓He PRESS/VAP ISOL (four) - CL
- ✓TK ISOL (four) - OP (tb-OP)
- ✓XFEED (four) - CL (tb-CL)

APU PRESTART

R4 ✓HYD LG RET/CIRC VLV - CL

R2
- BLR N2 SPLY (three) - ON
- ✓PWR (three) - ON
- ✓CNTLR/HTR (three) - A
- ✓APU AUTO SHUTDN (three) - ENA
- ✓CNTLR PWR (three) - ON
- HYD MAIN PUMP PRESS (three) - LO
- ✓APU SPEED SELECT (three) - NORM
- ✓OPERATE (three) - OFF
- ✓FUEL TK VLV (three) - CL
- ✓HYD CIRC PUMP (three) - OFF
- ✓cb APU FUEL TANK VALVE ENABLE (six) - cl

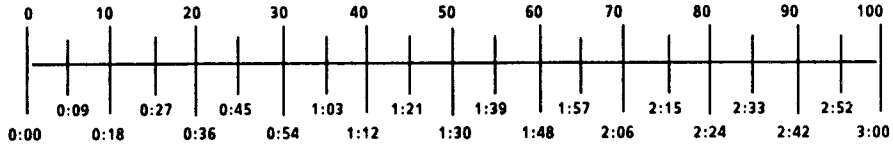
CDR

FORWARD RCS DUMP (use for off-nominal X cg entry using lowest of OX or FU qty)

Determine FWD RCS 'DUMP TO %' (calculator, cg wheel, or DEL PAD)

FOUR JET DUMP:

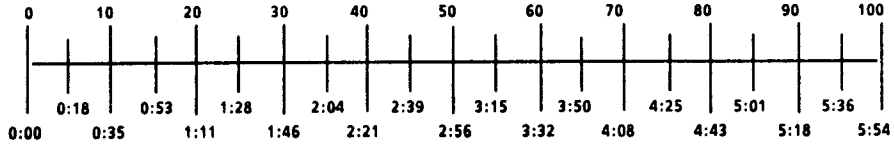
F RCS PRPLT TO BE DUMPED (%)



TIME FROM DUMP INITIATION (M:S)

TWO JET DUMP:

F RCS PRPLT TO BE DUMPED (%)



TIME FROM DUMP INITIATION (M:S)

PLT

APU START

R2 APU FUEL TK VLV (three) - OP
✓APU/HYD RDY tb (three) - gray

* If tb - bp, attempt normal start *

APU OPERATE (three) - START/RUN

F8 ✓HYD PRESS ind (three) - LO green

R2 APU/HYD RDY tb (three) - bp
HYD MN PUMP PRESS (three) - NORM

F8 ✓HYD PRESS ind (three) - HI green

* If any APU did not start: *
* APU OPERATE - START ORIDE/RUN *
* (Wait 3.5 min for APU start) *
* If no APU start, *
* APU OPERATE - OFF *
* APU AUTO SHUTDN - INH *
* OPERATE - START ORIDE/RUN *
* (start in 3.5 min) *
* If OIL OUT P < 25 and OIL OUT *
* TEMP not increasing after APU *
* start or no start perform *
* APU SHUTDN (Cue Card) *

R4 ✓HYD LG HYD ISOL VLV (three) - GPC (tb-CL)

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CDR

FORWARD RCS DUMP (continued)

NOTE
During dump disregard F RCS qty

GNC DEORB MNVR EXEC

CRT FWD RCS ARM - ITEM 36 EXEC
DUMP - ITEM 37 EXEC (Start watch)

When dump time achieved:
OFF - ITEM 38 EXEC

When dump complete:
08 FWD RCS MANF ISOL 1,2,3,4 - CL (tb-CL)

PLT

1: GNC 53 ENTRY CONTROLS | 2: BFS, GNC SYS SUMM 2
3: GNC DEORB MNVR COAST

SECONDARY ACTUATOR CHECK (if not previously performed and time permits)

NOTE
If a port does not bypass during the check, bypass the affected port after the check.
SEC ACT BYPASS - ITEM 8 +XX EXEC
If the affected port still does not bypass:
SEC ACT RESET ITEM 9 +XX EXEC

R2 a. HYD MN PUMP PRESS (one) - NORM

F7 b. ✓SPI: If all elevon posns not within +12° to -27°, then:
CRT3 SURF DRIVE ON, ITEM 39 EXEC - (*)
Stop drive test when all posns within limits:
SURF DRIVE OFF, ITEM 40 EXEC (*)

CRT1 c. ✓POS STIM ENA, ITEM 7 - (no *)

C3 d. ✓FCS CH 1,2,3,4 - AUTO

CRT1 e. SEC ACT CK, CH 1 - ITEM 1 EXEC (*)
SEC ACT CK START - ITEM 5 EXEC (*)

f. ✓all CH 1 ports bypass (↓)
STOP - ITEM 6 EXEC (*)

C3 g. FCS CH 1 - ORIDE
CRT1 ✓all CH 1 ports reset (no ↓)
C3 FCS CH 1 - AUTO

h. Repeat steps e thru g for CH 2,3,&4

EQUIPMENT DONNING AND SEAT INGRESS

If not already accomplished:
Stow equip
Don LES
HARNESS
BOOTS

C6 LEH O2 vlv (four) - OP
Begin Fluid Loading (if time available)
Seat ingress
Install Entry Cue Cards
Adjust seat, exercise brake pedals

ENTRY SWITCH CHECK

C	L1	NH3 CNTLR A (B)	- PRI/GPC
	L2	✓CAB RELIEF (two)	- ENA (tb-ENA)
		ANTISKID	- ON
		NWS	- GPC
		✓ENTRY MODE	- AUTO
C,P	C2/C3	✓SBTC - full fwd	
		✓SRB SEP - AUTO	
		✓ET SEP - AUTO	
	F6/F8	✓AIR DATA	- NAV
		✓ADI ERR	- MED
		RATE	- MED
		✓HSI SEL MODE	- ENTRY
		✓SOURCE (two)	- NAV,1
		✓SOURCE (two)	- NAV,2
C,P	F3	✓TRIM RHC/PNL (two)	- INH
		✓PNL (two)	- ON
C	F7	✓RDR ALTM-1	
P	F8	✓RDR ALTM-2	

CDR

HORIZ SIT CONFIG

ALTM - ITEM 9 + [ ][ ][.][ ][ ]

	PASS ITEM	BFS ITEM
PTI	INH 1 ✓	=
INDEX	1 ✓	
LAND SITE (DEL PAD)	41 ✓	41 ✓
RWY (DEL PAD)	3 ✓	3 ✓
	4 ✓	4 ✓
TACAN (DEL PAD)	5 ✓	5 ✓
SPD BK	NOM 39 ✓	
TAEM TGT		
G&N	OVHD 6 ✓	BLANK ✓
HSI	BLANK ✓	BLANK
XEP	NEP 7 ✓	NEP 7 ✓
AIM	NOM 8 ✓	NOM 8 ✓
TAC	INH 20 ✓	INH 20 ✓
DRAG H	AUT 22 ✓	AUT 22 ✓
ADTA H	INH 26 ✓	INH 26 ✓
ADTA TO G&C	INH 29 ✓	AUT 28 ✓
DES any failed TACANs	✓	✓
TAC	DELTA 35 ✓	-
HUD	37 L 0 ✓	-
	38 R 0 ✓	-

PLT

If Xcg≥1098 at EI

3: GNC 51 OVERRIDE

ALT ELEVON - ITEM 18 EXEC

3: BFS, GNC 51 OVERRIDE

ALT ELEVON - ITEM 18 EXEC

If Xcg < 1098 at EI:

3: GNC 51 OVERRIDE

NOM ELEVON - ✓ITEM 17 (*)

3: BFS, GNC 51 OVERRIDE

NOM ELEVON - ✓ITEM 17 (*)

* If returning payloads > 10K lb: *

* 3: GNC 51 OVERRIDE *

* ALT FILTER - ITEM 21 EXEC *

* 3: BFS, GNC 51 OVERRIDE *

* ALT FILTER - ITEM 21 EXEC *

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Stow:
Deorbit Burn Cue Cards (C6)
DEORBIT BURN MONITOR Cue Card (C6)
✓Entry Cue Cards installed

R1 AC BUS SNSR (three) - OFF (1 sec), then MON

If Landing Site available:
Go to ENT MNVR Cue Card at EI-5 with following pen and inks:

NOTE

If cabin pressure stabilizes at 8 psi or greater, activate additional air-cooled equipment as desired

EI-5 cb ADTA 1,2,3 (three) - cl
GNC, I/O RESET
cb DDU L (two) - cl
L FLT CNTLR PWR - ON
L INST PWR - FLT

V=15K TACAN MODE 1,2 (two) - GPC

M=2.9 Use 1 HUD, 1 MLS, 1 RA

M=0.9 cb R DDU (two) - cl
R FLT CNTLR - ON
R INST PWR - ON

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CDR

HORIZ SIT CONFIG

ALTM - ITEM 9 + [ ][ ].[ ][ ]

	PASS ITEM	BFS ITEM
PTI	INH 1 ✓	=
INDEX	1 ✓	
LAND SITE (DEL PAD)	41 ✓	41 ✓
RWY (DEL PAD)	3 ✓	3 ✓
	4 ✓	4 ✓
TACAN (DEL PAD)	5 ✓	5 ✓
SPD BK	NOM 39 ✓	
TAEM TGT		
G&N	OVHD 6 ✓	BLANK ✓
HSI	BLANK ✓	BLANK
XEP	NEP 7 ✓	NEP 7 ✓
AIM	NOM 8 ✓	NOM 8 ✓
TAC	INH 20 ✓	INH 20 ✓
DRAG H	AUT 22 ✓	AUT 22 ✓
ADTA H	INH 26 ✓	INH 26 ✓
ADTA TO G&C	INH 29 ✓	AUT 28 ✓
DES any failed TACANs	✓	✓
TAC	DELTA 35 ✓	-
HUD	37 L 0 ✓	-
	38 R 0 ✓	-

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PLT

If Xcg≥1098 at EI

3: GNC 51 OVERRIDE

ALT ELEVON - ITEM 18 EXEC

3: BFS, GNC 51 OVERRIDE

ALT ELEVON - ITEM 18 EXEC

If Xcg < 1098 at EI:

3: GNC 51 OVERRIDE

NOM ELEVON - ✓ITEM 17 (*)

3: BFS, GNC 51 OVERRIDE

NOM ELEVON - ✓ITEM 17 (*)

* If returning payloads > 10K lb: *

* 3: GNC 51 OVERRIDE *

* ALT FILTER - ITEM 21 EXEC *

* 3: BFS, GNC 51 OVERRIDE *

* ALT FILTER - ITEM 21 EXEC *

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Stow:
Deorbit Burn Cue Cards (C6)
DEORBIT BURN MONITOR Cue Card (C6)
✓Entry Cue Cards installed

R1 AC BUS SNSR (three) - OFF (1 sec), then MON

If Landing Site available:
Go to ENT MNVR Cue Card at EI-5 with following pen and inks:

NOTE

If cabin pressure stabilizes at 8 psi or greater, activate additional air-cooled equipment as desired

EI-5 cb ADTA 1,2,3 (three) - cl
GNC, I/O RESET
cb DDU L (two) - cl
L FLT CNTLR PWR - ON
L INST PWR - ON

V=15K TACAN MODE 1,2 (two) - GPC

M=2.9 If TLM/MCC support available: Use 1 HUD, 1 MLS, 1 RA
If no TLM/MCC support or non-CONUS site: Use 2 HUD, 2 MLS, 2 RA

M=0.9 cb R DDU (two) - cl
R FLT CNTLR - ON
R INST PWR - ON

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If Landing Site not available, perform following bailout procedures

EI-5

cb ADTA (four) - cl
cb DDU L (two) - cl
L FLT CNTLR PWR - ON
L INST PWR - ON
✓ADI ATT - LVLH
MNVR to R 001, P 039, Y 358
C CRT1 GNC, OPS 304 PRO
C ADI ✓ENTRY ATT (R 000, P 040, Y 000)
F2 SPDBK/THROT pb - AUTO
✓PITCH pb - AUTO (PASS)
✓ROLL/YAW pb - AUTO (PASS)
(CSS if PREBANK)

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EI

h=400K
(00:00)

q=.5 PITCH pb - CSS
ROLL/YAW pb - CSS

$\dot{H}$=-200 and INCREASING (D=5-6)

Start 3 deg/sec roll to ENTRY ALPHA cue card ref bank angle while maintaining alpha = 40 deg

Approaching the ref bank angle, bank as necessary to center the phugoid damper with BIAS = 0

```
* Always null alpha errors from ENTRY TRAJ     *
* display or ENTRY ALPHA cue card before       *
* nulling bank errors                          *
*                                              *
* When a roll reversal is required or if the   *
* phugoid damper becomes overly sensitive, use *
* alpha and Ḣ from cue card as primary fly-to  *
* indications                                  *
*                                              *
* During a roll reversal, if the phugoid       *
* damper commands an Ḣ significantly different *
* than the cue card, establish the approximate *
* cue card Ḣ with an Ḧ of ± 3-5 ft/sec² and    *
* wait for the phugoid damper to stablize      *
* before following it                          *
```

D=11 ✓DRAG H UPDATE ACTIVE

```
* If editing occurs:        *
*   [2: GNC 50 HORIZ SIT]   *
* DRAG H FOR - ITEM 24 EXEC *
```

V=15K TACAN MODE 1,2 (two) - GPC
M=6.0 Wings level, follow α sched

M=4.0 [2: GNC 51 OVERRIDE]
M=3.4 AIR DATA PROBES (two) - DEPLOY(✓HEAT)

P ✓AIR DATA R,L then NAV

3: GNC 50 HORIZ SIT

RATIO < 1	RATIO > 1	
	ADTA ERRATIC	ADTA STEADY
AUTO	AUTO	FORCE

When ADTA-H AUTO/FORCE:
ADTA to G&C - AUTO

```
* If no Air Data and M < 1.5:                *
*   Fly θ limits                            *
*   If PRI DME > 80nm, θ limits unavailable: *
*     Maintain θ below limits as determined  *
*       by SB posn and roll angle            *
*       Supersonic,                          *
*         θ < -7° for SB = 65% & Φ = 0°      *
*       Subsonic,                            *
*         θ < -1° for SB = 0% & Φ = 0°       *
*         θ < -12° for SB = 100% & Φ = 0°    *
```

M=2.5 FLY α = 12°
M=0.95 Go To BAILOUT

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LOSS OF TWO FREON LOOPS DEORBIT PREP/ENTRY

Assumptions/Initial Conditions

- The Loss of Two Freon Loops Deorbit Prep/Entry is a STAND ALONE procedure that assumes the FREON FLOW LOW Procedure and the LOSS OF 2 FREON LOOPS POWERDOWN (ORBIT or ENT PKT) have been accomplished
- This failure requires an immediate deorbit to the first available landing site while powered down to a very low level
- If Deorbit TIG to an ELS is within 40 min, all FCs will be on with a continuous purge; otherwise 2 FCs will be shut down and additional equipment will be powered off for the wait period

Problem Description/Rationale

- The source of Orbiter cooling is the freon coolant loops. With no freon flow, heat is not removed from the freon and hence from the water and air-cooled equipment as well
- The Orbiter freon loops are designed to remove heat from the fuel cell coolant (FC-40), maintaining the FCs at ~200°F. When the freon no longer cools the FC-40, the fuel cell Stack Temperature rises and the electrolyte concentration drops. By-product H2O is not condensed/removed and accumulates in the cells, causing the fuel cells to flood. Flooding is predicted to occur when electrolyte concentration drops below 25% and will result in loss of power to the Orbiter. Additionally, the fuel cell stack can fail allowing mixing and/or escape of reactants if the stack temperature becomes excessively high (~250°)
- SODB data indicates that fuel cell life without H2O removal is expected to be 110 amp-hours (on-orbit average is ~160 amps/FC, ascent ~260 amps/FC). Rockwell analysis indicates that with a continuous purge, flooding is postponed to ~100 min if a pwrdn is accomplished to an 8kW total load within 15 min of freon loop failure

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LOSS OF 2 FREON LOOPS DEORBIT PREP/ENTRY PROCEDURE NOTES

- MS procedures are located on MS PULL-OUT PAGE 11-4. Extra copies are located in the back of the PLT's book
- Use COMM pages from ORB PKT powerdown to cycle COMM if necessary
- Maintain minimum lighting
- Only 2 APUs will be used for entry and will be started at EI-5
- Vent Doors will be open throughout Entry (Except L,R VENT DOORS 1 & 2)
- This procedure utilizes modified DEORBIT BURN MONITOR and ENTRY MANEUVERS cue cards located in this section
- If 2 FCs stopped (ON-ORBIT WAIT), perform ON-ORBIT WAIT BACKOUT on 11-5 and 11-6; otherwise, go directly to ENTRY CONFIG on 11-7

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LOSS OF 2 FREON LOOPS DEORBIT PREP

MS PULL-OUT PAGE

NOTE: Wait for "GO" from CDR before accomplishing any action on this page

Prepare LES's for donning

NOTE

Delay donning as late as possible but prior to EI (CDR last)

~TIG-15 **MCA CONFIG**

MA73C:A MCA LOGIC FWD (three) - ON
:C cb MCA PWR FWD 1 - op
FWD 3 - op

~TIG-10 **AFT PANEL CONFIG FOR ENTRY COMM**

NOTE

This procedure configures the aft panel for landing site comm coverage @ V=12K. If comm cycled post TIG-10 (using ORB PKT powerdown comm pages), this AFT PANEL CONFIG FOR ENTRY COMM must be reestablished.

R15:B cb GCIL (two) - cl
C3 S-BD PM CNTL - CMD
A1L S-BD PM ANT SW ELEC - 2
MODE - STDN LO
XPNDR - 2
NSP PWR - 2
DATA RATE XMIT - HI
RCV - LO
✓UPLK DATA - S-BD
✓CODING XMIT - OFF
✓RCV - OFF

214

~TIG-5 **LEH VLV CONFIG**

M032M LEH O2 5 vlv - CL
Remove and stow O2 Bleed Orifice
LEH O2 5,6 vlv - OP (if reqd)
M069M LEH O2 7,8 vlv - OP (if reqd)

~EI-10 Stow Flight Deck SPOC

CLOTHING CONFIG

Don: LES, HARNESS, BOOTS
C6 LEH O2 vlv (two) - OP

LOSS OF 2 FREON LOOPS DEORBIT PREP
ON-ORBIT WAIT BACKOUT

NOTE: If 2 FCs stopped (ON-ORBIT WAIT), execute ON-ORBIT WAIT BACKOUT, 11-5 and 11-6; otherwise go to ENTRY CONFIG, 11-7

CDR

~TIG-25 SWITCH TO COOL IMU

1. Activate IMU 2

   C2 CRTX PWR - ON

   X: GNC 21 IMU ALIGN

   CRTX ✓IMU 2 - deselected (ITEM 8)
   O15:A IMU 2 - ON

2. Activate MDM FF2 (✓MNB-ON)

   O6 MDM FF2 - ON
   CRTX GNC, I/O RESET EXEC
   IMU 2 OPER - ITEM 5 EXEC (*)
   (wait for * (≤1 min))
   CRTX GNC, I/O RESET EXEC

3. Align IMU 2 to IMU 3

   CRTX IMU/IMU - ITEM 14 + 3 EXEC
   ALIGN IMU 2 - ITEM 11 EXEC (*)
   EXEC - ITEM 16 EXEC (*)

4. Reselect IMU 2, Deselect IMU 3

   X: GNC 21 IMU ALIGN

   CRTX DES - ITEM 8 EXEC (no *)
   DES - ITEM 9 EXEC (*)
   O16:A IMU 3 - OFF

   NOTE
   Leave MDM FF2 and FF3 on

PLT

~TIG-30 ACTIVATE FUEL CELL 2 THEN 3

R12 FC STARTUP HTR (three) - INH
R1 MN BUS TIE A - ON (tb-ON)
MN BUS TIE B - ON (tb-ON)

1. cb AC CONTR AC 2(3) (three) - cl
   INV PWR 2(3) - ON (tb-ON)
   INV/AC PWR BUS - ON (tb-ON)
   AC SENSOR 2(3) - AUTO
   cb AC CONTR AC 2(3) (three) - op
   FC2(3) - START
   FC2(3) COOL PUMP ΔP tb - gray (~4 sec)
   FC MN BUS B(C) - ON (tb-ON)
   ESS BUS SOURCE FC2(3) - ON
2. ASAP AFTER FC START, BEGIN CONTINUOUS PURGE

R12U ✓FC PURGE HTR - ON
FC2(3) PURGE VLV - OP

3. MN BUS TIE C - ON (tb-ON)
   Repeat step 1 & 2 for FC 3 then go to step 4
4. ✓O14:B cb OI SIG CONDR OF 1/4A - cl
   ✓O15:B cb OI SIG CONDR OF 2/3A - cl

CAUTION
Two FC's required for Entry/Landing.
Monitor FC performance through landing:
If any single FC STACK TEMP ≥ 250:
- Affected ESS BUS SOURCE FC1(2,3) - OFF
- Affected FC MAIN BUS A (B,C) - OFF
- When FC STACK T within 5° of either remaining FC, reconnect FC to buses (MN first, then ESS)

If all 3 FC STACK TEMPs ≥ 250 - no action

LOSS OF 2 FREON LOOPS DEORBIT PREP

ON-ORBIT WAIT BACKOUT

CDR	PLT
~TIG-20 POWERUP	
06 ✓MDM FF2,3 (two) - ON ✓FF1,4 (two) - OFF (CDR GREEN DOT) FA2,3 (two) - ON ✓FA1,4 (two) - OFF CRTX GNC, I/O RESET EXEC L4:P cb AC2 ϕA LG SNSR 2 - cl AC3 ϕA LG SNSR 1 - cl	
By ~TIG-15, go to 11-7	By ~TIG-15, go to 11-7

LOSS OF 2 FREON LOOPS DEORBIT PREP

ENTRY CONFIG

CDR

~TIG-15 **MCA CONFIG**
Give MS "GO" to config MCAs

SW CONFIG FOR OPS 3
(assumes MNA and MNB on)

06 ✓MDM FF 2,3 - ON
✓FF 1,4 - OFF (CDR GREEN DOT)
✓FA 2,3 - ON
✓FA 1,4 - OFF

F6 ✓RDR ALTM - 2

O14:B ✓cb MNA OI SIG CONDR OF 1/4 A - cl
OM 1/2 A - cl
✓MDM OF 1/2 A - op
✓3/4 A - op
O15:A RGA 2 - ON
:B ✓cb MNB OI SIG CONDR OF 2/3 A - cl
O16:A RGA 3 - ON
O17:D SIG CONDR OA 1/2/3 - ON
✓MDM OA 1/2/3 - OFF

PLT

~TIG-15 **DEORBIT TARGET**
Use SPOC to compute targets (Record in Pad on 11-10)

APU STEAM VENT HTR ACTIVATION

R2 ✓BLR CNTLR/HTR 1,3 - A
PWR 1,3 - ON

MPS H2 PURGE PREP

R2 MPS He ISOL B L - CL
PNEU L ENG He XOVR - CL
R4 MPS MANF PRESS (two) - CL

SW CONFIG FOR OPS 3

F8 ✓RDR ALTM - 2

O14:F RJDA 1A L2/R2 LOGIC - ON
DRIVER - ON
O15:F ASA 2 - ON
O16:F RJDA 2B L3/R3/R5 LOGIC - ON
L3/R3 DRIVER - ON
✓RJD MANF L5/F5/R5 DRIVER - OFF
ASA 3 - ON

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ENTRY CONFIG

CDR

STAR TRKR DOOR CLOSURE

06 ✓STAR TRKR PWR (two) - OFF
DR CNTL SYS (two) - CL
✓POS tb (two) - bp (start timer)
When both tb - CL (~8-24 sec)
or either tb - bp > 24 sec:
STAR TRKR DR CNTL SYS (two) - OFF

AFT PANEL CONFIG FOR ENTRY COMM (no earlier than ~TIG-10)

Give MS "GO" to config AFT panel

DPS ENTRY CONFIG (Assumes GPC 1 Active)

C3 ✓FCS CH 2,3 (two) - AUTO
✓RGA 2,3 - ON
✓ASA 2,3 - ON
014:F MMU 1 - ON, wait 34 sec

1. TRANSITION GPC 1 TO GNC OPS 3

[GNC 0 GPC MEMORY]

CRT CONFIG - ITEM 1 +3 EXEC
Modify MC3 per Table →
GNC OPS 301 PRO

[DEORB MNVR COAST]

2. ACTIVATE GPC 3

06 ✓GPC 3 MODE - HALT (tb-bp)
✓OUTPUT - NORM (tb-bp)
PWR - ON
MODE - STBY,RUN (tb-RUN)

CONFIG GPC	3 10000
STR 1	1
2	1
3	1
4	1
PL 1/2	1
CRT 1	1
2	1
3	1
4	0
L 1	0
2	0
MM 1	1
2	1

PLT

If OMS/RCS interconnected,
A6U ✓DAP: Free Drift

OMS BURN PREP

08 L,R OMS
✓He PRESS/VAP ISOL (four) - CL
✓TK ISOL (four) - OP (tb-OP)
✓XFEED (four) - CL (tb-CL)
07 AFT L,R RCS
He PRESS (four) - OP (tb-OP)
TK ISOL (six) - GPC (tb-OP)
XFEED (four) - GPC (tb-CL)

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LOSS OF 2 FREON LOOPS DEORBIT PREP

ENTRY CONFIG

CDR

3. ASSIGN GPC 3 TO MC3 REDUNDANT SET

GNC 0 GPC MEMORY

CRT CONFIG - ITEM 1 +3 EXEC

Modify MC3 per Table → GNC, OPS 301 PRO

GNC 0 GPC MEMORY

DOWNLIST GPC - ITEM 44 +3 EXEC

CONFIG GPC	3 10300
STR 1	3
2	3
3	3
4	3
PL 1/2	3
CRT 1	3
2	3
3	3
4	0
L 1	0
2	0
MM 1	3
2	3

4. DEACT GPC 1, MMU 1, ASAs

06 GPC 1 MODE - STBY,HALT
PWR - OFF

014:F MMU 1 - OFF
015:F ASA 2 - OFF
016:F ASA 3 - OFF

5. SWITCH AV BAY FANS

L1 AV BAY 1 FAN A - OFF
3 FAN B - ON

6. ACTIVATE FA4 FOR BURN

06 MDM FA4 - ON
GNC, I/O RESET - EXEC

PLT

Do not proceed until all DPS ENTRY CONFIG steps are complete

ATMOSPHERE SELECT

GNC 51 OVERRIDE

CRT SELECT ATM: incl ≤ 50 deg ✓ITEM 22 (*)
incl > 50 deg SEL ITEM NO.

HEMI	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEP	OCT	NOV	DEC
N DESC	23	23	23	23	22	24	24	24	22	23	23	23
S ASC	24	24	22	23	23	23	23	23	23	23	22	24
N ASC S DESC	22											

LAND SITE UPDATE

✓LAND SITE UPDATE

GNC 50 HORIZ SIT

CRT SEL SITE (See LAND SITE DATA)
07 ✓TACAN 3 CH - as reqd (See LAND SITE DATA)

CG CHECK

DEORB MNVR COAST

CRT UPDATE PRPLT, ITEM 18, AS REQD

LOSS OF 2 FREON LOOPS DEORBIT PREP

ENTRY CONFIG

LOAD TGTs AND MNVR

CRT ENTER TGT DATA from MCC or SPOC

LOAD - ITEM 22 EXEC
TIMER - ITEM 23 EXEC
DAP - AUTO
MNVR TO BURN ATT

SELECT SEC GIMBALS (because FF1, FF4 - OFF)
LEFT - ITEM 30 EXEC
RIGHT - ITEM 31 EXEC
GNC, OPS 302 PRO

220

CRT CONFIG FOR ENTRY

C2 CRT 3 PWR - ON
✓All other CRTs - OFF

013:A cb MTU A - op
015:E cb DDU R - cl
016:E cb DDU R - cl
F8 FLT CNTLR PWR - ON

CLOTHING CONFIG

NOTE

Delay donning LES's as late as possible but prior to EI (CDR last)

Don: LES, HARNESS, BOOTS
C6 LEH O2 vlv (two) - OP

~TIG-3 Go to DEORBIT BURN CUE CARDS

* Use LOSS OF 2 FREON LOOPS *
* D/O BURN MONITOR CARD *

SPOC DEORBIT PAD

RECORD DEORBIT OPPORTUNITIES

SITE	APPROX TIG	XRNG
___ ___ ___	___ / ___ ___:___ ___	___ ___ ___ ___
___ ___ ___	___ / ___ ___:___ ___	___ ___ ___ ___
___ ___ ___	___ / ___ ___:___ ___	___ ___ ___ ___
___ ___ ___	___ / ___ ___:___ ___	___ ___ ___ ___

COMPUTE WEIGHT

Use SPOC CG MANAGER program (record below)

COMPUTE TARGET

WT	___ ___ ___ ___ ___ ___
TIG	___ / ___ ___:___ ___:___ ___
C1	___ ___ ___ ___ ___
C2	(-).6000
HT	65.832
ΘT	___ ___ ___.___ ___ ___
ΔVTOT	___ ___ ___.___
REI	___ ___ ___ ___

LOAD TARGET IN OPS 3

LOSS OF 2 FREON LOOPS
DEORBIT BURN MONITOR

OMS Pc LOW	
OMS +	OMS PRPLT FAIL
NO OMS +	SENSOR FAIL
OMS OX/FU TK P	
OX & FU LOW	He PRESS/VAP ISOL (two) - OP
OX LOW	Burn to OMS +, then OMS PRPLT FAIL
FU LOW	He PRESS/VAP ISOL (two) - CL BURN to OMS +, then OMS PRPLT FAIL
OX & FU HIGH	Cycle He to maint OMS TK P 234-284
OMS GMBL FAIL	If control problems or high RCS fuel usage: Affected OMS ENG - OFF OMS ENG FAIL

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ENTRY

CDR

MNVR TO EI-5 ATT

06 MDM FA4 - OFF
CRT GNC, OPS 303 PRO
014, cb DDU L (two) - cl, as reqd to achieve/
015:E maintain EI-5 attitude

TIME TO EI (MIN)	LVLH PITCH (DEG)
26	315
25	319
24	323
	327
	331
	335
20	339
	343
	347
	351
	355
15	359
	3
	7
	11
	15
10	19
	23
	27
	31
	35
5	39

NOTE
Use LVLH table unless INRTL EI-5 attitude supplied by MCC.

NOTE
EI attitude may be loaded in ITEM 24,25, and 26 if desired

PLT

F8 FLT CNTLR PWR - OFF
015:E cb DDU R - op
016:E cb DDU R - op

OMS/RCS POST BURN RECONFIG

07 AFT L,R RCS
✓He PRESS (four) - OP (tb-OP)
✓TK ISOL (six) - GPC (tb-OP)
✓XFEED (four) - GPC (tb-CL)

08 L,R OMS
✓He PRESS/VAP ISOL (four) - CL
✓TK ISOL (four) - OP (tb-OP)
✓XFEED (four) - CL (tb-CL)

OMS GIMBAL PWRDN

CRT Verify gimbal positions:

	L	R
P	+5.9	+5.9
Y	+6.4	-6.4

GMBL OFF - ITEM 32 EXEC
- ITEM 33 EXEC

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LOSS OF 2 FREON LOOPS

ENTRY

CDR

Perform FRCS dump if reqd to maintain Xcg in the box

HORIZ SIT CONFIG

ALTM - ITEM 9 +

		.		

	PASS ITEM	
PTI	INH 1	✓
INDEX	1	✓
LAND SITE (DEL PAD)	41	✓
RWY (DEL PAD)	3	✓
	4	✓
TACAN (DEL PAD)	5	✓
SPD BK	NOM 39	✓
TAEM TGT		
G&N	OVHD 6	✓
HSI	BLANK	✓
XEP	NEP 7	✓
AIM	NOM 8	✓
TAC	INH 20	✓
DRAG H	AUT 22	✓
ADTA H	INH 26	✓
ADTA TO G&C	INH 29	✓
DES any failed TACANs		
TAC	DELTA 35	✓
HUD	37 L 0	✓
	38 R 0	✓

PLT

If no FRCS dump reqd, go to page 11-15

FWD RCS RECOVERY

O14:B ✓cb OI SIG CONDR OF 1/4A - cl
:F RJDF-1B F1 DRIVER - ON
LOGIC - ON
O15:B ✓cb OI SIG CONDR OF 2/3A - cl
:F RJDF-1A F2 DRIVER - ON
LOGIC - ON
O16:F RJDF-2A F3, 2B F4 DRIVER (two) - ON
2A F3, 2B F4/F5 LOGIC (two) - ON
O6 MDM FF1,4 - ON
GNC, I/O RESET - EXEC
O8 Reopen FRCS

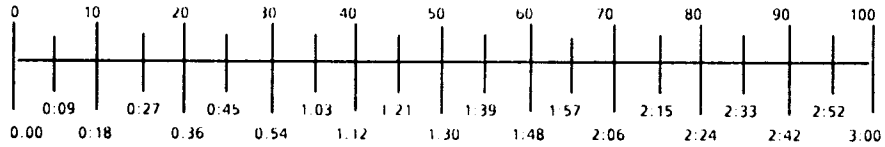
GNC 23 RCS

CRT X JET RESET - ITEM 45 - EXEC
Reselect deselected FRCS jets
JET RESET - ITEM 45 - EXEC

FORWARD RCS DUMP (use for off-nominal X cg entry using lowest of OX or FU qty)
Determine FWD RCS 'DUMP TO %' (calculator, cg wheel, or DEL PAD)

FOUR JET DUMP:

FRCS PRPLT TO BE DUMPED (%)



TIME FROM DUMP INITIATION (M:S)

26

LOSS OF 2 FREON LOOPS

ENTRY

CDR

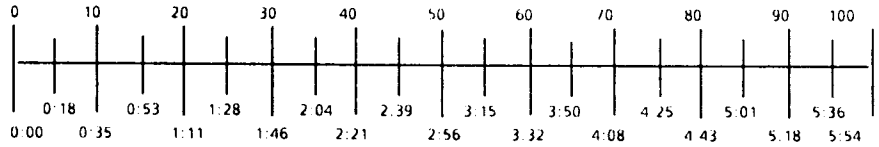
If Xcg ≥ 1098 at EI:
| X: GNC 51 OVERRIDE
or
| ALT ELEVON - ITEM 18 EXEC
If Xcg < 1098 at EI:
X: GNC 51 OVERRIDE
✓NOM ELEVON - ITEM 17 (*)

* If returning payloads > 10K lb: *
* X: GNC 51 OVERRIDE *
* ALT FILTER - ITEM 21 EXEC *

PLT

TWO JET DUMP:

FRCS PRPLT TO BE DUMPED (%)



TIME FROM DUMP INITIATION (M:S)

NOTE
During dump disregard FRCS qty

GNC DEORB MNVR EXEC

CRT FWD RCS ARM - ITEM 36 EXEC
DUMP - ITEM 37 EXEC (Start watch)

When dump time achieved:
OFF - ITEM 38 EXEC

When dump complete:
08 FWD RCS MANF ISOL 1,2,3,4 - CL (tb-CL)
06 MDM FF1,4 (two) - OFF
014, RJDF LOGIC & DRIVER (eight) - OFF
015,
016

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LOSS OF 2 FREON LOOPS

ENTRY

CDR

Stow: DEORBIT BURN and DEORBIT BURN MONITOR Cue Cards

~EI-10 Give MS "GO" to stow Flight Deck SPOC

✓ENTRY Cue Cards are installed

SEAT INGRESS

Adjust Seat (one seat and direction at a time)

Exercise brake pedals

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G-SUIT INFLATION

All Load - 1.5

EI-5 Go to <u>LOSS OF 2 FREON LOOPS ENTRY MANEUVERS</u> (page 11-17)

PLT

FC PERFORMANCE CHECK

Two FC's required for ENTRY/LANDING
Monitor FC performance through landing:
If any single FC STACK T ≥ 250:
Affected ESS BUS SOURCE FC1(2,3) - OFF
Affected FC MAIN BUS A(B,C) - OFF
When FC STACK T within 5° of either remaining FC, reconnect FC to buses (MN first, then ESS)
If all 3 FC STACK T's ≥ 250 - no action

EI-5 **APU PRESTART**

R4 ✓HYD LG RET/CIRC VLV - CL

R2 BLR N2 SPLY 1,3 - ON
✓PWR 1,3 - ON
✓CNTLR/HTR 1,3 - A
APU AUTO SHTDN 1,3 - ENA
CNTLR PWR 1,3 - ON
HYD MN PUMP PRESS 1,3 - LO
✓APU SPEED SEL 1,3 - NORM
✓OPERATE 1,3 - OFF
✓FUEL TK VLV 1,3 - CL
✓HYD CIRC PUMP 1,3 - OFF
✓cb APU FUEL TK VLV ENA 1A,1B - cl
3A,3B - cl

C3 FCS CH 1,4 - OFF
2,3 - OVRD

O14,O15,
O16:F ASA (four) - ON

CDR

PLT

APU START

R2 APU FUEL TK VLV 1,3 - OP
✓APU HYD RDY tb 1,3 - gray
APU OPERATE 1,3 - START/RUN

F8 INST PWR - ON
✓HYD PRESS ind 1,3 - LO green

R2 APU/HYD RDY tb 1,3 - bp

```
* If APU 1(3) does not start:          *
*  BLR CNTLR/HTR 2 - A                 *
*      N2 SPLY 2 - ON                  *
*      PWR 2 - ON                      *
*  APU AUTO SHUTDN 2 - ENA             *
*  APU CNTLR PWR 2 - ON                *
*  HYD MN PUMP PRESS 2 - LO            *
* ✓APU SPEED SEL 2 - NORM              *
*     ✓OPERATE 2 - OFF                 *
*     ✓FUEL TK VLV 2 - CL              *
* ✓HYD CIRC PUMP 2 - OFF               *
* ✓cb APU FUEL TK VLV ENA 2A,2B - CL   *
*  APU FUEL TK VLV 2 - OP              *
*      OPERATE 2 - START/RUN           *
* ✓HYD PRESS ind 2 - LO green          *
*  APU AUTO SHUTDN (two) - INH         *
* If any APU does not start:           *
*  Affected APU:                       *
* If APU underspeed on previous        *
*   attempt:                           *
*   APU OPERATE      - OFF             *
*       AUTO SHUTDN - INHIBIT          *
*       OPERATE      - START ORIDE/RUN *
*                    (start in 3.5 min) *
```

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LOSS OF 2 FREON LOOPS
ENTRY

CDR	PLT
	APU START
	* If APU does not start: *
	* BLR CNTLR/HTR - OFF *
	* APU OPERATE - OFF *
	* FUEL TK VLV - CL *
	* CNTLR PWR - OFF *
	* HYD MN PUMP PRESS - NORM *
	HYD MN PUMP PRESS 1,3 - NORM
	F8 ✓HYD PRESS ind 1,3 - HI green INST PWR - OFF
	R4 ✓HYD LG HYD ISOL VLV - 1,3 - GPC (tb-CL)
	R1 AC BUS SNSR (three) - OFF (1 sec) then MON

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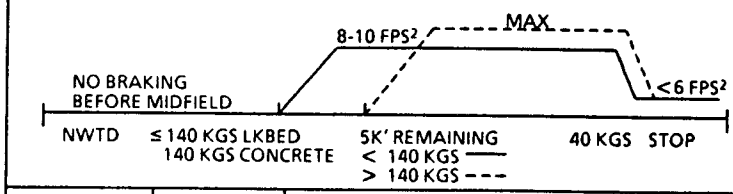
LOSS OF 2 FREON LOOP ENTRY MANEUVERS

FLIGHT CONDITIONS	% RCS EACH SIDE	MANEUVER
EI-5		MDM FF 1,4 - ON CAB FAN B - ON L INST PWR - FLT cb DDU L (two) - cl cb ADTA 2,3 - cl ACCEL 2 - CL ACCEL 3 - ON GNC, I/O RESET - EXEC ✓LVLH ATT GNC, OPS 304 PRO ✓OPS 304, wait 1 min MDM FF 1,4 - OFF * PREBANK ☐☐☐ (DEL PAD) *
$\bar{q}$ = 8 or D = 3		CLOSED LOOP GUIDANCE ____:____:____ FIRST BANK CMD * If PREBANK, roll out PREBANK & FOLLOW *
D = 11		✓DRAG H (FORCE if editing)
ΔAZ = 10.5°		1st ROLL REVERSAL ☐☐☐☐☐ (DEL PAD)
V = 15K		* If inclination ≥ 50° * * DOUBLE TOGGLE (✓OVHD) *
V = 12K		BRAKES MNB,MNC - ON UHF MODE - SPLX (G T/R if ELS) AUD CTR - 1 ✓OI PCMMU FORMAT - FXD L AUD PWR - AUD R AUD PWR - AUD PS,MS AUD PWR - AUD (if reqd) If command or data reqd, OI PCMMU PWR - 2 MDM PL2 - ON S-BD PM CNTL - PNL, then CMD GNC, I/O RESET EXEC ANT SW - Select best ANT On MCC call: MDM PL2 - OFF OI PCMMU PWR - OFF
V = 10K		✓SPD BRK to 81% * If three yaw jets failed on same side: * * Perform remaining roll reversals in R/Y - CSS * TACAN 3 - GPC
V = 7K		✓TACAN status
V = 6K		Begin lateral trim monitoring
V = 5K		ADTA PROBES - DEPLOY (✓HEAT, only 1 side if reqd. If dilemma, deselect unheated ADTA) Begin AIL and RUD trim monitoring ✓MPS/TVC ISOL VLV - CL

FLIGHT CONDITIONS	% RCS EACH SIDE	MANEUVER
M = 4		MDM FF4 - ON MDM FF1 - ON (if NWS reqd) GNC, I/O RESET - EXEC Begin H monitoring (✓ < 500 fps)
M = 2.9		RADAR ALTM 2 - ON CAB FAN (two) - OFF Use no landing aids (HUD, MLS) unless reqd to safely land the vehicle
M = 2.7		R INST PWR - ON ✓APUs APU SPEED SEL (two) - HI R INST PWR - OFF
* If M < 2.5, P CSS for ADTA to G&C incorp *		
M = 2.0		Ensure ADTA to G&C else ✓⊖ Limits
M = 0.95		* For bailout procedures, go to BAILOUT *
M = 0.9		L FLT CNTLR PWR - ON P,R/Y - CSS as reqd ✓SPDBK CMD vs POS ANTISKID - ON If NWS reqd, cb DDU R (two) - cl R FLT CNTLR PWR - ON NWS - GPC
M = 0.7		HYD LG ISO 1,3 - OPEN
h = 15K		✓MLS (If on)
h = 10k		✓A/L
MAIN GEAR TD		SPD BRK - 100%
NOSE GEAR TD		SRB SEP - MAN/AUTO and depress pb ✓AUTO LOAD RELIEF
		
STOP		GO TO EMER PWRDN, cue card

QUICK RESPONSE JETTISON

Assumptions/Initial Conditions

- QUICK RESPONSE JETTISON assumes:
  - Failed KU-BD and/or RMS (with P/L possibly attached) must be jettisoned ASAP
  - At least one G2 GPC is up and running
  - Full RCS and AFT DDU/FLT CNTLR PWR are available for use
  - Hardware jettison and initial separation mnvr may be done in any attitude

Problem Description/Rationale

- QUICK RESPONSE JETTISON is an integrated, rapidly executable procedure to accomplish a time constrained jettison and separation from a failed KU-BD and/or RMS. It was designed to be used as required during a time critical powerdown and/or deorbit scenario.

Notes

- The deorbit burn is done in place of a 3rd separation mnvr if 1) deorbit TIG < 28 min from an initial separation mnvr done in an arbitrary attitude, or if 2) deorbit TIG < 45 min from an initial separation mnvr done in -ZLV ± 10 deg
- If the initial separation mnvr is done in a -ZLV ± 10 deg attidude, the out-of-plane separation mnvr is not required
- The initial separation mnvr rate must be between 0.7 and 0.9 fps
- This procedure is divided into CDR actions in the left column and MS actions in the right column

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CDR

1 SETUP FOR JETTISON

014:F ✓Primary RJDs DRIVER & LOGIC (sixteen) - ON
015:F
016:F

06 ✓MDM FF,FA (eight) - ON
MA73C:A ✓MCA LOGIC FWD (three) - ON
07 Reopen FWD and AFT RCS if reqd
08

014:E ✓cb DDU AFT (two) - cl
016:E

A6U SENSE - as reqd

DAP: A/LVLH/VERN
DAP TRANS: PULSE/PULSE/PULSE, NO LOW Z
DAP ROT: DISC/DISC/DISC

CRT GNC 20 DAP CONFIG
✓Dap A Trans Pulse ITEM 1 + 0.10 EXEC

MS

1 PREP FOR JETTISON

If only RMS/payload jettison reqd

A8U MODE - best available

Mnvr RMS/payload clear of up-firing jets and Orbiter structure

BRAKES - ON (tb-ON)

A8L PORT RMS HTR A,B (two) - OFF
RMS SEL - OFF
PWR - OFF
A7 TV CAMR PWR RMS PORT - OFF (tb-OFF)
✓RMS SPOTLIGHT PORT - OFF
R15:E cb MNB PORT RMS TV (three) - op

✓PL power thru SPEE connector is off (PAYLOAD POWERDOWN)

A14 ✓PYRO PORT RMS (five) - SAFE
✓RMS LAT - SAFE
ML86B:D cb MNB PYRO JETT SYS A PORT RMS - cl
cb MNC PYRO JETT SYS B PORT RMS - cl

A14 PYRO PORT RMS ARM - GUILLOTINE••
Wait 1 sec, then••
PYRO PORT RMS SHLDR - GUILLOTINE
- SAFE
ARM - SAFE

Go to Step 2, 12-6

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CDR

MS

If only KU ANT jettison reqd

R15:C cb MNB KU ELEC - op
ANT HTR - op
✓CABLE HTR - op
MNC KU SIG PROC - op

A1U ✓KU PWR - OFF
CNTL - PNL

A14 ✓KU ANT ARM - SAFE
✓JETT - SAFE

MA73C:A MCA LOGIC MNC MID 2 - OFF
:B MNB MID 4 - OFF

ML86B:D cb MNA PYRO JETT SYS A KU ANT - cl
cb MNC PYRO JETT SYS B KU ANT - cl

Go to Step 2, 12-6

If KU ANT and RMS/payload jettison reqd

R15:C cb MNB KU ELEC - op
ANT HTR - op
✓CABLE HTR - op
MNC KU SIG PROC - op

:E cb MNB PORT RMS TV (three) - op

A1U ✓KU PWR - OFF
CNTL - PNL

A14 ✓KU ANT ARM - SAFE
✓JETT - SAFE
✓PYRO PORT RMS (five) - SAFE
✓RMS LAT - SAFE

MA73C:A MCA LOGIC MNC MID 2 - OFF
:B MNB MID 4 - OFF

CDR	MS
	ML86B:D cb MNA PYRO JETT SYS A KU ANT - cl cb MNC PYRO JETT SYS B KU ANT - cl cb MNB PYRO JETT SYS A PORT RMS - cl cb MNC PYRO JETT SYS B PORT RMS - cl
	A7 TV CAMR PWR RMS PORT - OFF (tb-OFF) ✓RMS SPOTLIGHT PORT - OFF
	A8U RMS MODE - best available Mnvr RMS/payload clear of up-firing jets and orbiter structure BRAKES - ON (tb-ON)
	A8L PORT RMS HTR A,B (two) - OFF RMS SEL - OFF PWR - OFF ✓PL power thru SPEE connector is off (PAYLOAD POWERDOWN)
	A14 PRYO PORT RMS ARM - GUILLOTINE•• Wait 1 sec, then•• PYRO PORT RMS SHLDR - GUILLOTINE - SAFE ARM - SAFE

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CDR	MS
2 INITIAL SEP MNVR	**2 KU/RMS/PAYLOAD JETTISON**
WARNING Initial Sep mnvr must be 0.8 ± 0.1 fps	
A6U FLT CNTLR PWR - ON ✓DAP TRANS: PULSE/PULSE/PULSE, No LOW Z DAP ROT: PULSE/PULSE/PULSE DAP: A/LVLH/NORM	
	If payload jettison/deploy Complete jettison/deploy procedure (ORB PKT, PL SAFING)
	If KU ANT jettison A14 PYRO KU ANT ARM - ARM Wait 1 sec, then•• PRYO KU ANT JETT - JETT
	If RMS/payload jettison A14 PYRO PORT RMS ARM - JETT Wait 1 sec, then•• PYRO PORT RMS SHLDR - JETT
DAP ROT: DISC/DISC/DISC NOTE MET ___/___:___:___ THC - +Z 8 PULSES (-X sense - dn) (-Z sense - out) DAP: A/MAN/NORM	

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CDR

3 OUT-OF-PLANE SEP MNVR

If Initial Sep (Step 2) was done in -ZLV
± 10 deg, Go to Step 4, 12-8

CRT GNC, OPS 202 PRO

GNC ORB MNVR EXEC

RCS SEL - ITEM 4 EXEC (*)

Set TIG to initial sep mnvr from
step 2 + 4:00 min
TGT PEG 7 ΔVx - ITEM 19 + 0 EXEC
ΔVy - ITEM 20 + 4 EXEC
ΔVz - ITEM 21 + 0 EXEC
LOAD - ITEM 22 EXEC
TIMER - ITEM 23 EXEC

If VGO Z < 0
TGT PEG 7 ΔVy - ITEM 20 -4 EXEC
LOAD - ITEM 22 EXEC
TIMER - ITEM 23 EXEC
✓VGO Z > 0

DO NOT MNVR TO BURN ATT

A6U ✓DAP: A/MAN/NORM
DAP TRANS: as reqd
✓DAP ROT: DISC/DISC/DISC

At TIG, THC - Trim VGO's < .2 fps

MS

3 POST-JETTISON CLEANUP

A14 PYRO KU ANT JETT - SAFE
ARM - SAFE
PYRO PORT RMS SHLDR - SAFE
ARM - SAFE

MA73C:A ✓MCA LOGIC MNA MID 1 - ON
✓MNB MID 2 - ON
✓MNC MID 2 - ON
:B ✓MCA LOGIC MNB MID 4 - ON
✓MNC MID 4 - ON

.....If RMS jettisoned, stow MPM.....

WARNING

The payload bay doors
cannot be closed until
the MPMs are stowed

.R13L PL BAY MECH PWR SYS (two) - ON
.A8 PORT RMS - STO (tb-STO) (68 SEC MAX)
- OFF
.R13L PL BAY MECH PWR SYS (two) - OFF

ML86B:D cb MNA PYRO JETT SYS A KU ANT - op
cb MNC PYRO JETT SYS B KU ANT - op
cb MNB PYRO JETT SYS A PORT RMS - op
cb MNC PYRO JETT SYS B PORT RMS - op

Perform post jettison/deploy cleanup steps
if reqd (ORB PKT, PL SAFING)

CDR

MS

4 FINAL (POSIGRADE) SEP MNVR

If Deorbit TIG < 28 min from Initial Sep done
in an arbitrary attitude, Go to Step 5

If Deorbit TIG < 45 min from Initial Sep done
in -ZLV ± 10 deg, Go to Step 5

CRT

GNC ORB MNVR EXEC
RCS SEL - ITEM 4 (*)
Set TIG to TIG from previous
Sep Mnvr + 4:00 min
TGT PEG 7 ΔVx - ITEM 19 + 3 EXEC
ΔVy - ITEM 20 + 0 EXEC
ΔVz - ITEM 21 - 2 EXEC
LOAD - ITEM 22 EXEC
TIMER - ITEM 23 EXEC

DO NOT MNVR TO BURN ATT

A6U

✓DAP: A/MAN/NORM
✓DAP TRANS: as reqd
✓DAP ROT: DISC/DISC/DISC

At TIG, THC - Trim VGOs < .2 fps
If VGO Z is neg, Z,X,Y seq,
otherwise, X,Y,Z

235

CDR

MS

5 POST-SEP CLEANUP

> CAUTION
>
> If Deorbit TIG < 9 min after Initial Sep, > 500 ft clearance not guaranteed

A6U FLT CNTLR PWR - OFF
CRT GNC OPS 201 PRO

07,08 Secure FWD and AFT RCS if reqd (ORB PKT, RCS)
MA73C:A MCA LOGIC FWD (three) - as reqd
06 MDM FF,FA (eight) - as reqd
014:F ✓Primary RJDs DRIVER & LOGIC (sixteen) - as reqd
015:F
016:F

014:E ✓cb DDU AFT (two) - op
016:E

236

BAILOUT

- MACH < .95, OPS 305

  SB - AUTO BF - AUTO

  FLY 185 - 195 KEAS, Φ = 0°

  ABORT MODE - ATO

  ABORT PBI - push

  P,R/Y - AUTO

  FLT CNTLR PWR (two) - OFF

- 40K ft
  LES O2 - ON/VISOR
  VENT T HANDLE - pull

- 30 - 20K ft

  HATCH JETT T HANDLE - pull

  COMMENCE BAILOUT

237

JSC-17871-30

National Space Transportation System

FLIGHT DATA FILE

Contingency Deorbit Prep

STS-30 Flight Supplement

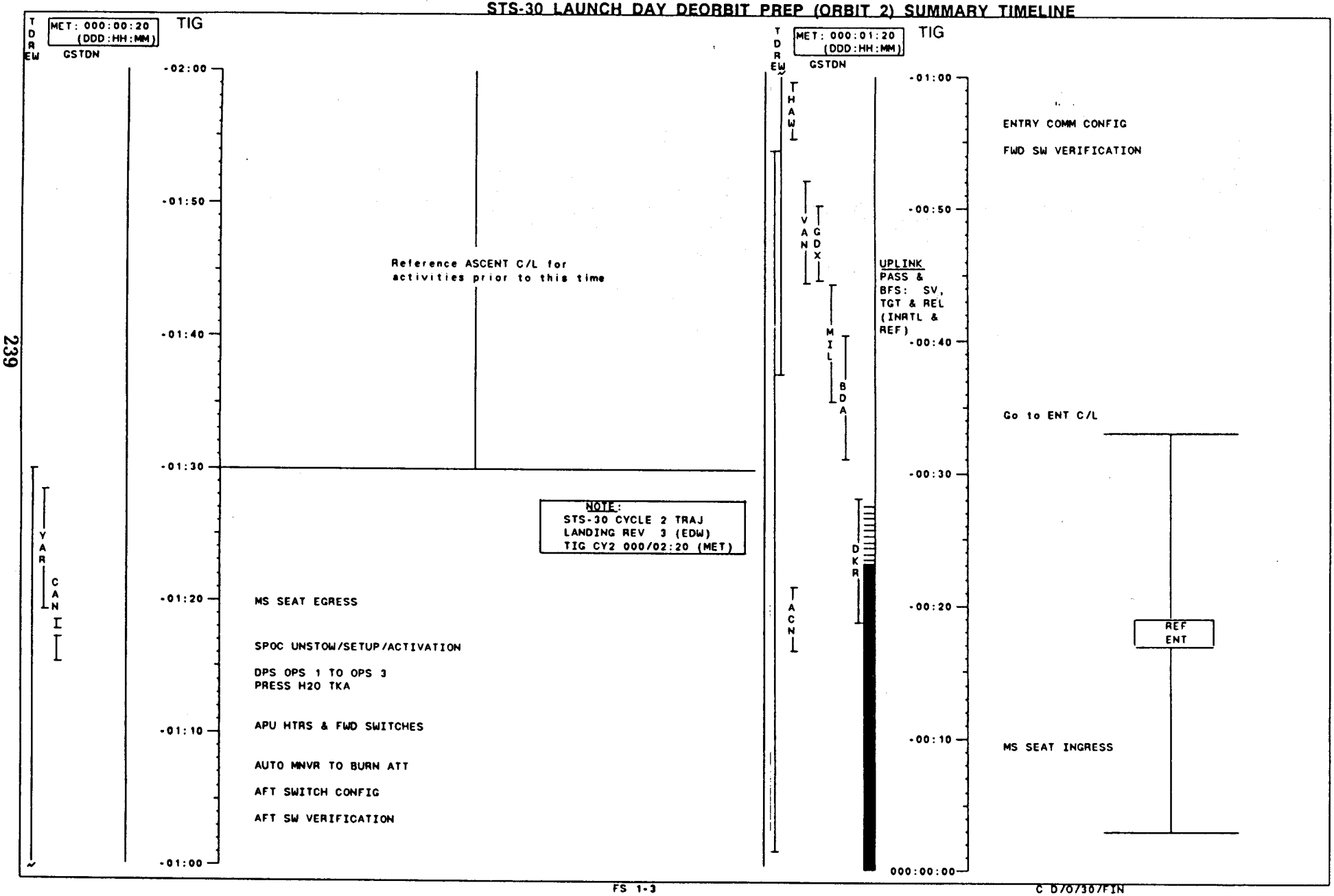
Mission Operations Directorate
Operations Division

Final
March 10, 1989

NASA
National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas

STS-30 LAUNCH DAY DEORBIT PREP (ORBIT 2) SUMMARY TIMELINE



C D70730/FIN

MS LAUNCH DAY DEORBIT PREP AFT DECK CONFIGURATION (ORBIT 2)

NOTE
Wait for GO from CDR or PLT before starting any activity on this page

TIME (TIG-)	MS AFT ACTIONS
01:19	SEAT EGRESS
01:18	SPOC UNSTOW/SETUP/ACTIVATION (Flight deck SPOC) SPOC Cue Card
01:13	PAYLOAD DEACT [A]
01:07	SWITCH CONFIG [4]
01:05	AFT STATION SW VERIFICATION

PAYLOAD DEACT [A]

RESTOW IUS (UMBILICAL ATTACHED)
(CLOSEOUT - STEP 12)(IUS DPY, CONTINGENCY OPS)

SWITCH CONFIG [4]

AFT SW CONFIG

R12U FC H2O LINE HTR - A AUTO
R12L SPLY H2O XOVR VLV - OP (tb-OP)
✓Aft deck lts as reqd

ENTRY COMM CONFIG (if reqd)

L9, R10 ✓MS, PS AUD PWR - AUD/TONE
A/G (two) - T/R
ICOM (two) - T/R
VOX SENS - R
VOL tw (five) - R
A1R S-BD FM DATA SOURCE - OPS RCDR (rotary)

RESET C/W

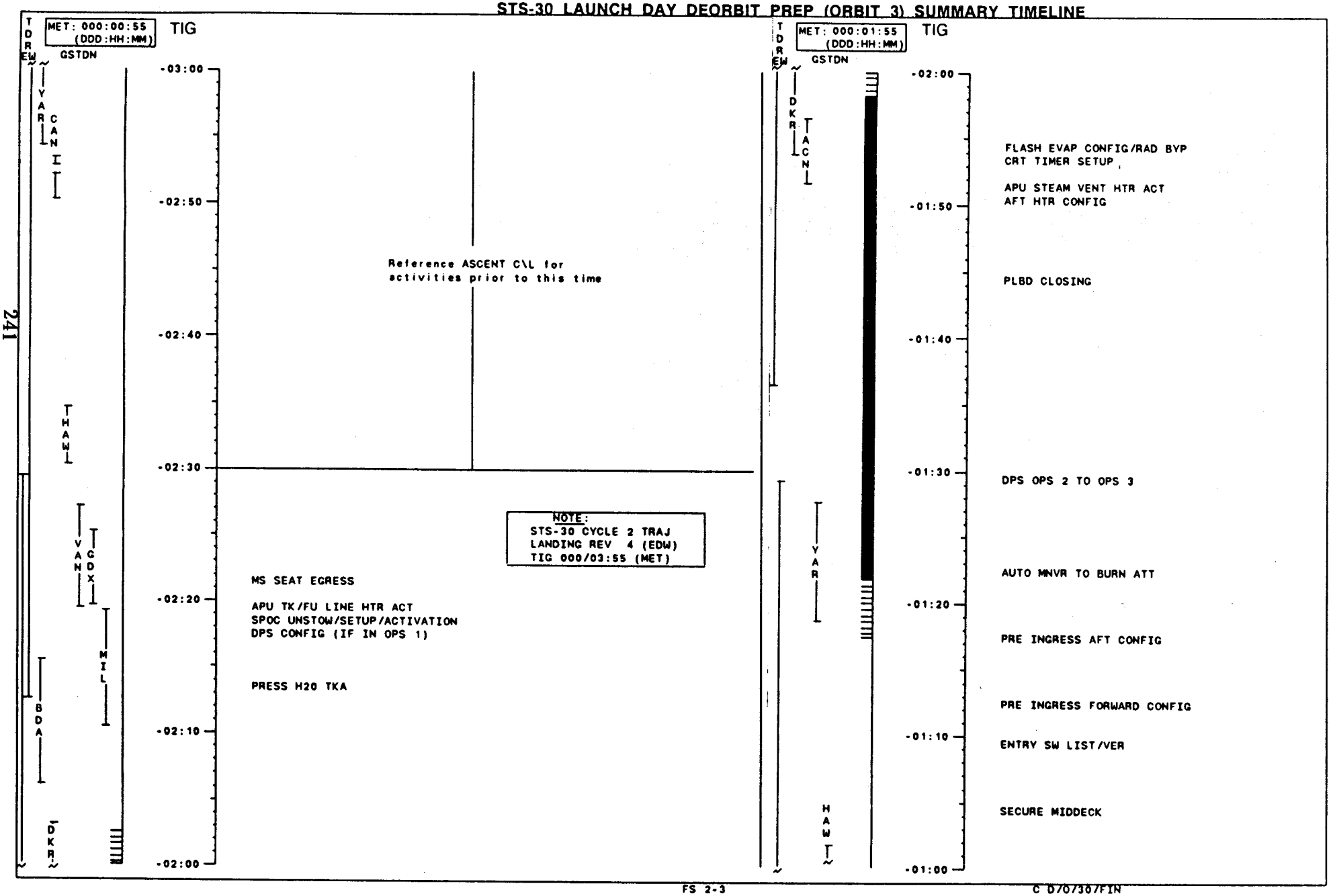
R13U		
PARAMETER NAME	C/W CH	UPPER LIMIT
FREON LOOP EVAP OUT T1	107	1.90V/64.8 deg
T2	117	1.90V/64.8 deg

HTR CONFIG

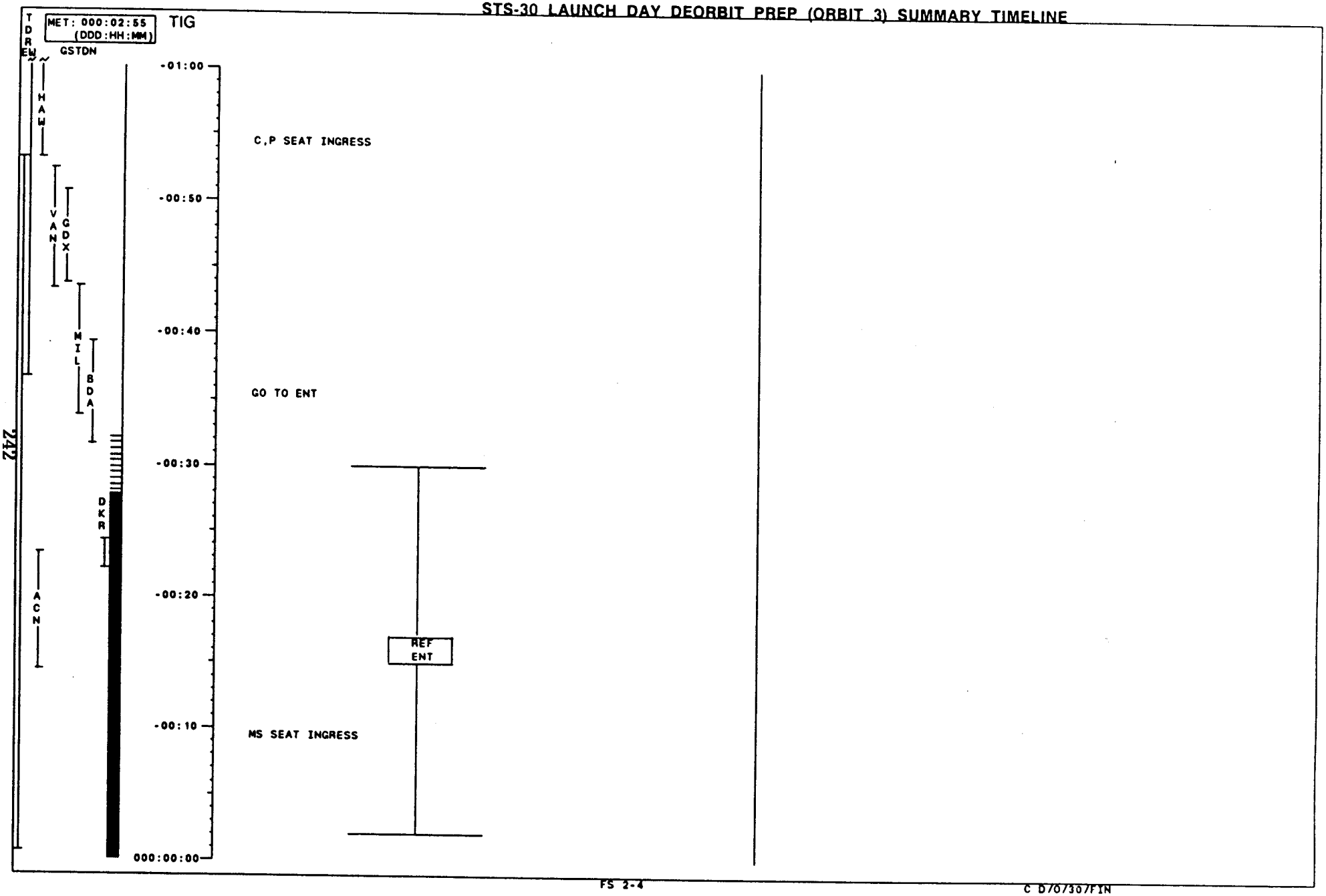
A12 HYD HTR (eight) - OFF

A14 RCS/OMS HTR FWD,AFT RCS JET 1,2,3,4 (eight) - AUTO
5 (two) - OFF

STS-30 LAUNCH DAY DEORBIT PREP (ORBIT 3) SUMMARY TIMELINE



STS-30 LAUNCH DAY DEORBIT PREP (ORBIT 3) SUMMARY TIMELINE



FS 2-4

C D70730/FIN

MS LAUNCH DAY DEORBIT PREP AFT DECK CONFIGURATION (ORBIT 3)

NOTE
Wait for GO from CDR or PLT before starting any activity on this page

TIME (TIG-)	MS AFT ACTIONS
02:22	SEAT EGRESS
02:21	APU TK/FU LINE HTR ACT [1]
02:20	SPOC UNSTOW/SETUP/ACTIVATION (Flight deck SPOC) SPOC Cue Card
02:11	UNSTOW/DON WIRELESS HEADSETS (if reqd)
01:50	AFT HTR CONFIG [7]
01:49	PAYLOAD DEACT [A]
01:19	PRE INGRESS AFT CONFIG [10]

APU TK/FU LINE HTR ACT [1]

A12 APU HTR TK/FU LINE/H2O SYS 1A,2A,3A - AUTO

AFT HTR CONFIG [7]

A12 HYD HTR (eight) - OFF
A14 RCS/OMS HTR FWD RCS - OFF
L POD (two) - A OFF, ✓B OFF
R POD (two) - A OFF, ✓B OFF
OMS CRSFD LINES (two) - B AUTO, ✓A AUTO
FWD, AFT RCS JET 1,2,3,4 (eight) - AUTO
5 (two) - OFF
R12U ✓FC PURGE VLVS (three) - GPC
✓HTR - GPC
✓H2O LINE HTR - A AUTO

NOTE
MCC command FC PURGE HTR off if reqd

PAYLOAD DEACT [A]

RESTOW IUS (UMBILICAL ATTACHED)
(CLOSEOUT - STEP 12) (IUS DPY, CONTINGENCY OPS)

PRE INGRESS AFT CONFIG [10]

ENTRY COMM CONFIG

A15 DC UTIL PWR MNC - OFF
PS COMM CCU PWR - R
L9, R10 ✓MS,PS AUD PWR - AUD/TONE
A/G (two) - T/R
A/A - T/R
ICOM (two) - T/R
VOX SENS - R
VOL tw (five) - R
XMIT/ICOM MODE - R(PTT/VOX recommended)

H2O STORAGE SYS CONFIG

R12L ✓SPLY H2O XOVR VLV - ctr (tb - OP)

RESET C/W

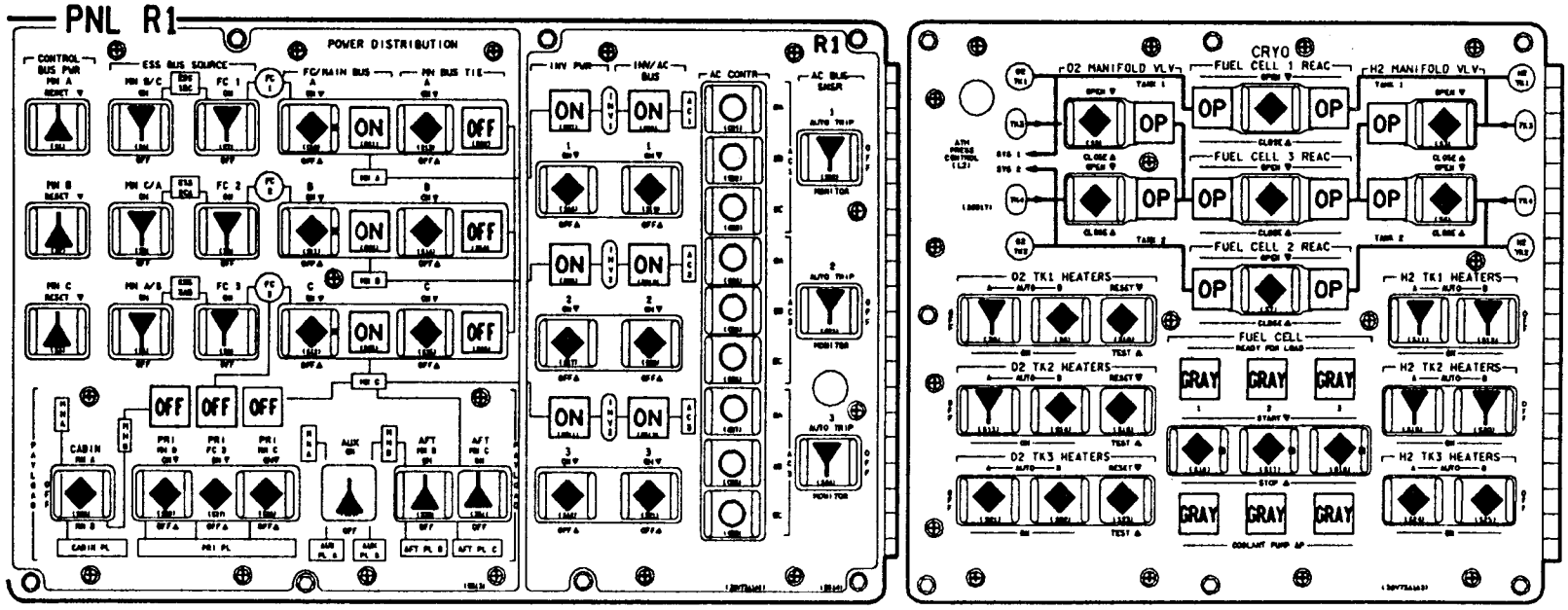
R13U		
PARAMETER NAME	C/W CH	UPPER LIMIT
FREON LOOP EVAP OUT T1	107	1.90V/64.8 deg
T2	117	1.90V/64.8 deg

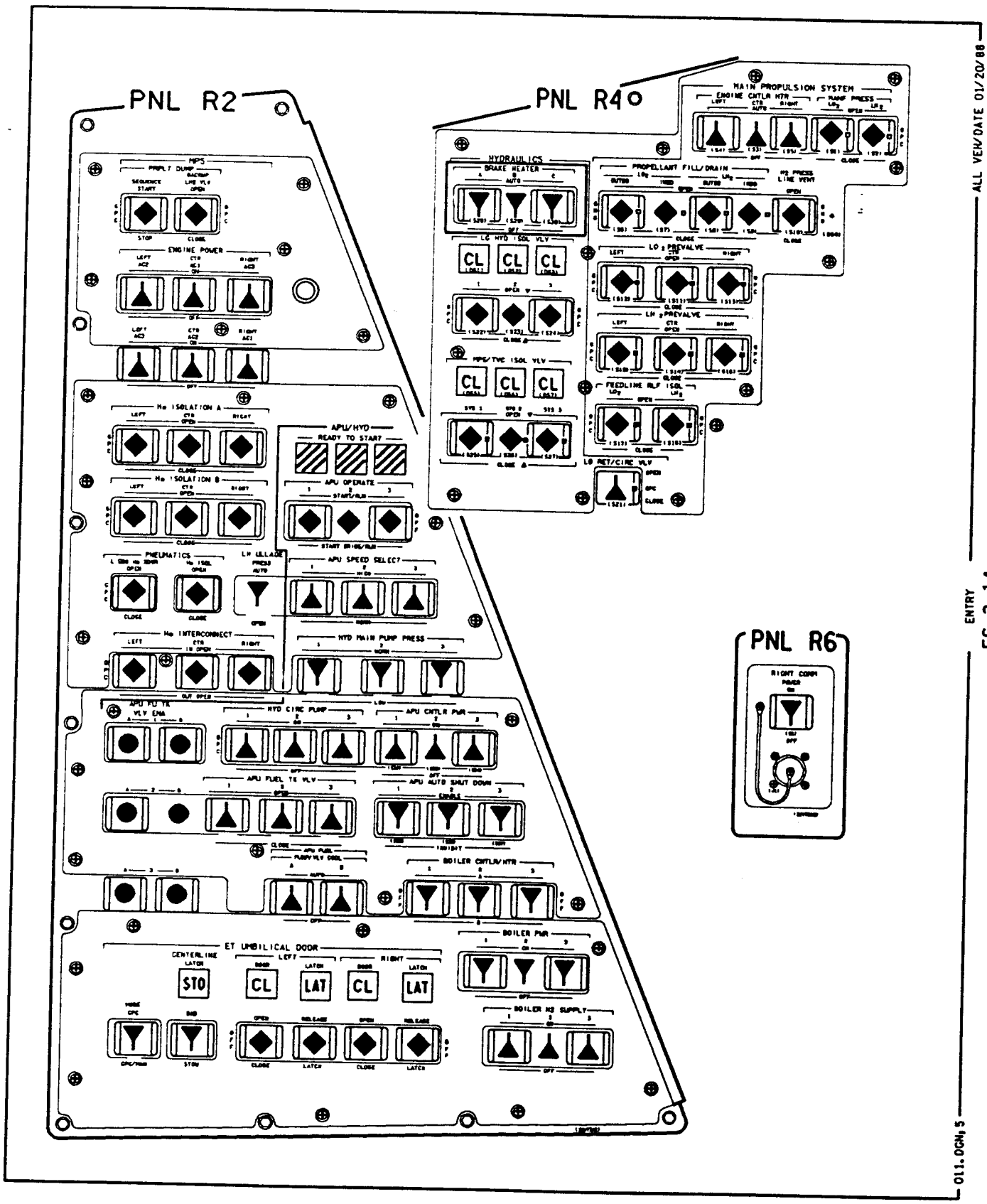
A16 ✓Secure

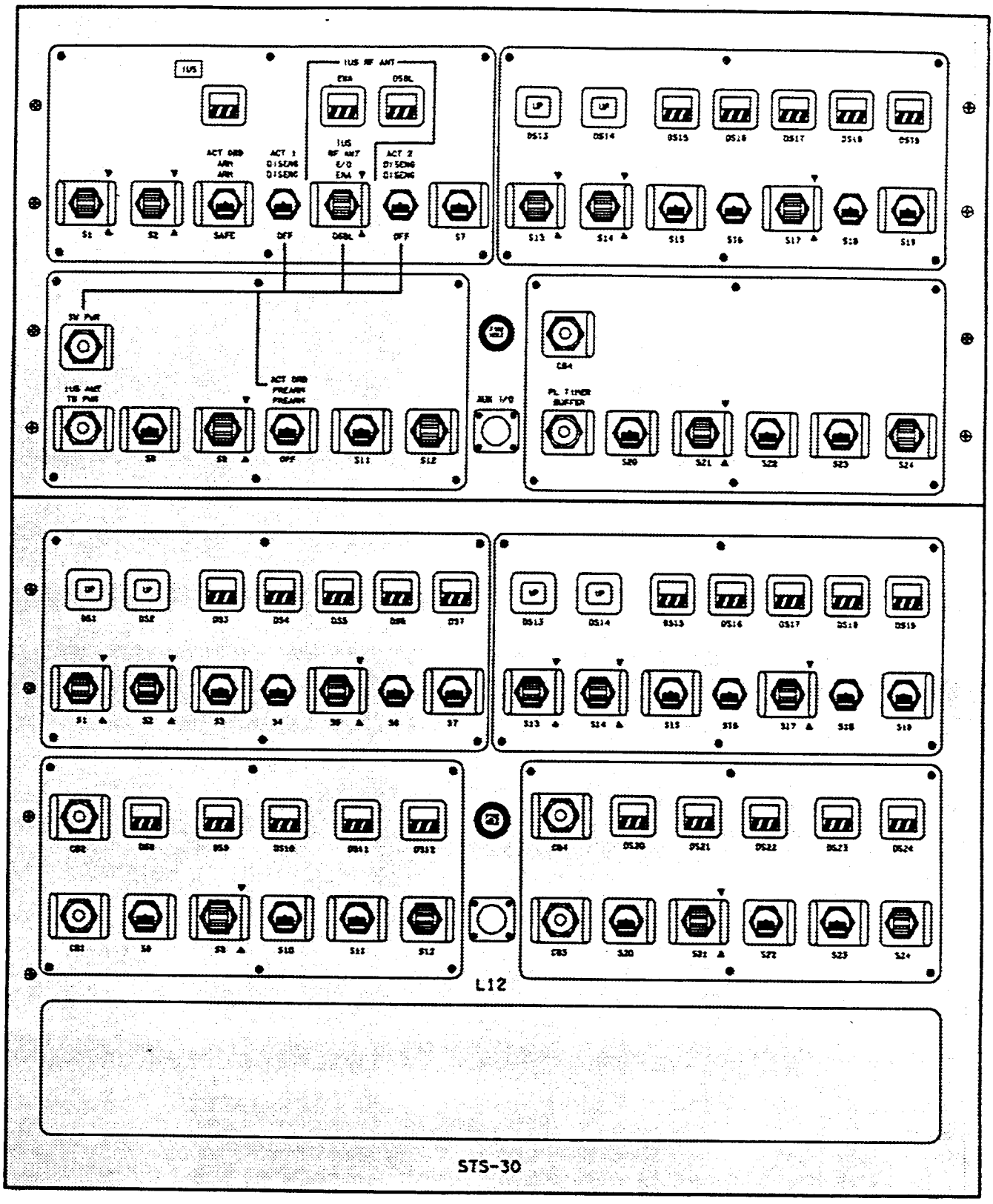
R10 ✓MS LTG FLOOD as reqd

FOOT LOOP CONFIG

Tape foot loops in egress routes


PNL R1
POWER DISTRIBUTION
CONTROL BUS PWR
ESS BUS SOURCE
FC/MAIN BUS
MN BUS TIE
INV PWR
INV/AC BUS
AC CONTR
AC BUS SENSR
R1
ON
OFF
CRYO
O2 MANIFOLD VLV
FUEL CELL 1 REAC
H2 MANIFOLD VLV
FUEL CELL 3 REAC
FUEL CELL 2 REAC
OP
O2 TK1 HEATERS
O2 TK2 HEATERS
O2 TK3 HEATERS
H2 TK1 HEATERS
H2 TK2 HEATERS
H2 TK3 HEATERS
FUEL CELL
GRAY
CABIN
PRI
AFT
AUX
CABIN PL
PRI PL
AFT PL C


PNL R2
PNL R40
PNL R6
MAIN PROPULSION SYSTEM
HYDRAULICS
ENGINE POWER
APU/HYD
READY TO START
APU OPERATE
PNEUMATICS
ET UMBILICAL DOOR
CENTERLINE
LEFT
RIGHT
STO
CL
LAT
ALL VEH/DATE 01/20/88
C D/0/30/FIN
FS 3-14
ENTRY
011.OGN;5


C D/O/30/FIN
FS 3-25
L12
STS-30

CDR

HORIZ SIT CONFIG

ALTM - ITEM 9 + [| | . | |]

	PASS ITEM		BFS ITEM	
PTI	INH 1	✓		
INDEX	1	✓	=	
LAND SITE (DEL PAD)	41	✓	41	✓
RWY (DEL PAD)	3	✓	3	✓
	4	✓	4	✓
TACAN (DEL PAD)	5	✓	5	✓
SPD BK	NOM 39	✓		
TAEM TGT				
G&N	OVHD 6	✓	BLANK	✓
HSI	BLANK	✓	BLANK	
XEP	NEP 7	✓	NEP 7	✓
AIM	NOM 8	✓	NOM 8	✓
TAC	INH 20	✓	INH 20	✓
DRAG H	AUT 22	✓	AUT 22	✓
ADTA H	INH 26	✓	INH 26	✓
ADTA TO G&C	INH 29	✓	AUT 28	✓
DES any failed TACANs		✓		✓
TAC	DELTA 35	✓	-	
HUD	37 L 0	✓	-	
	38 R 0	✓	-	

Stow:
Deorbit Burn Cue Cards (C6)
DEORBIT BURN MONITOR Cue Card (C6)

Go to LOSS OF 2 H2O LOOPS ENT MNVR Cue Card-EI-5, 9-14

PLT

If Xcg ≤ 1100 at EI:
3: GNC 51 OVERRIDE
ALT ELEVON - ITEM 18 EXEC
3: BFS, GNC 51 OVERRIDE
ALT ELEVON - ITEM 18 EXEC

If Xcg > 1100 at EI:
3: GNC 51 OVERRIDE
NOM ELEVON - ✓ITEM 17 (*)
3: BFS, GNC 51 OVERRIDE
NOM ELEVON - ✓ITEM 17 (*)

* If returning payloads > 10K lb: *
* 3: GNC 51 OVERRIDE *
* ALT FILTER - ITEM 21 EXEC *
* 3: BFS, GNC 51 OVERRIDE *
* ALT FILTER - ITEM 21 EXEC *

R1 AC BUS SNSR (three) - OFF (1 sec), then MON

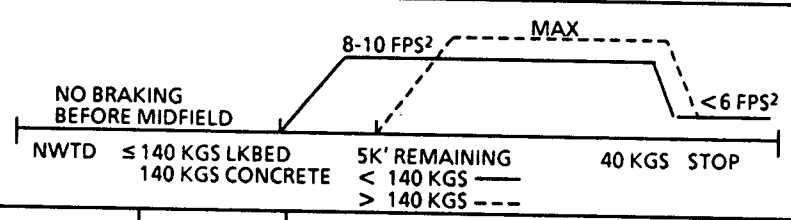
G SUIT INFLATION

All Load - 1.5

Go to LOSS OF 2 H2O LOOPS ENT MNVR Cue Card-EI-5, 9-14

LOSS OF 2 H2O LOOPS ENTRY MANEUVERS

FLIGHT CONDITIONS	% RCS EACH SIDE	MANEUVER
EI-5		cb ADTA 1,2,3 (three) - cl cb DDU L (two) - cl L FLT CNTLR PWR - ON L INST PWR - FLT MDM FF4 - ON GNC I/O RESET ✓LVLH ATT GNC, OPS 304 PRO * PREBANK ☐☐☐ (from DEL pad) *
$\overline{q}$ = 8 or D = 3		CLOSED LOOP GUIDANCE ____:____:____ FIRST BANK CMD * If PREBANK, roll out PREBANK & FOLLOW * * ROLL CMD at 3°/sec (TIME CRITICAL) *
D = 11		✓DRAG H (FORCE if editing)
ΔAZ = 10.5°		FIRST ROLL REVERSAL ☐☐☐☐☐ (DEL pad)
V = 15K		TACAN 2,3 (two) - GPC * If inclination ≥ 50°, * * DOUBLE TOGGLE (✓OVHD) *
V = 12K		* If no YAW JET, begin lateral trim monitoring * ACTIVATE ENTRY COMM ✓L, R AUD PWR - AUD AUD CTR - 1 UHF MODE - SPLX S-BD PM CNTL-PNL,CMD OI PCMMU PWR - 1 ✓FORMAT - FXD MDM PL2 - ON GNC, BFS, I/O RESET
V = 10K		✓SPD BRK to 81% * If three yaw jets failed on same side: * * Perform remaining roll reversals in * * R/Y - CSS *
V = 7K		✓TACAN status
V = 5K		ADTA PROBES - DEPLOY (✓HEAT) Begin AIL and RUD trim monitoring ✓MPS/TVC ISOL VLV - CL

FLIGHT CONDITIONS	% RCS EACH SIDE	MANEUVER
M = 4		Begin $\dot{H}$ monitoring (✓ < 500 fps)
M = 2.9		CAB FAN B - OFF Power 1 HUD, 1 MLS, 1 RA for landing GNC I/O RESET
M = 2.7		✓APUs
* If M < 2.5; P CSS FOR ADTA TO G&C incorp *		
M = 2.0		Ensure ADTA to G&C else ✓⊖ Limits
M = 0.95	* For bailout procedures, go to BAILOUT *	
M = 0.9		P,R/Y - CSS as reqd ✓SPDBK CMD vs POS R INST PWR - ON cb R DDU (two) - cl R FLT CNTLR - ON NWS - GPC ANTISKID - ON
M = 0.7		✓HYD LG ISO 1,2 - OP
h = 15K		✓MLS (If activated)
h = 10k		✓A/L
MAIN GEAR TD		SPD BRK - 100%
NOSE GEAR TD		SRB SEP - MAN/AUTO and depress pb ✓AUTO LOAD RELIEF
		
STOP		DIRECT O2 vlv - CL GO TO EXPEDITED PWRDN (ENT, POST LDG)

CDR

HORIZ SIT CONFIG

ALTM - ITEM 9 + [| | . | |]

	PASS ITEM	BFS ITEM
PTI	INH 1 ✓	=
INDEX	1 ✓	
LAND SITE (DEL PAD)	41 ✓	41 ✓
RWY (DEL PAD)	3 ✓	3 ✓
	4 ✓	4 ✓
TACAN (DEL PAD)	5 ✓	5 ✓
SPD BK	NOM 39 ✓	
TAEM TGT		
G&N	OVHD 6 ✓	BLANK ✓
HSI	BLANK ✓	BLANK
XEP	NEP 7 ✓	NEP 7 ✓
AIM	NOM 8 ✓	NOM 8 ✓
TAC	INH 20 ✓	INH 20 ✓
DRAG H	AUT 22 ✓	AUT 22 ✓
ADTA H	INH 26 ✓	INH 26 ✓
ADTA TO G&C	INH 29 ✓	AUT 28 ✓
DES any failed TACANs	✓	✓
TAC	DELTA 35 ✓	-
HUD	37 L 0 ✓	-
	38 R 0 ✓	-

PLT

If Xcg ≤ 1100 at EI

3: GNC 51 OVERRIDE

ALT ELEVON - ITEM 18 EXEC

3: BFS, GNC 51 OVERRIDE

ALT ELEVON - ITEM 18 EXEC

If Xcg > 1100 at EI:

3: GNC 51 OVERRIDE

NOM ELEVON - ✓ITEM 17 (*)

3: BFS, GNC 51 OVERRIDE

NOM ELEVON - ✓ITEM 17 (*)

* If returning payloads > 10K lb: *

* 3: GNC 51 OVERRIDE *

* ALT FILTER - ITEM 21 EXEC *

* 3: BFS, GNC 51 OVERRIDE *

* ALT FILTER - ITEM 21 EXEC *

Stow:
Deorbit Burn Cue Cards (C6)
DEORBIT BURN MONITOR Cue Card (C6)
✓Entry Cue Cards installed

R1 AC BUS SNSR (three) - OFF (1 sec), then MON

If Landing Site available:
Go to ENT MNVR Cue Card at EI-5 with following pen and inks:

NOTE

If cabin pressure stabilizes at 8 psi or greater, activate additional air-cooled equipment as desired

EI-5 cb ADTA 1,2,3 (three) - cl
GNC, I/O RESET
cb DDU L (two) - cl
L FLT CNTLR PWR - ON
L INST PWR - FLT

V=15K TACAN MODE 1,2 (two) - GPC

M=2.9 Use 1 HUD, 1 MLS, 1 RA

M=0.9 cb R DDU (two) - cl
R FLT CNTLR - ON
R INST PWR - ON

LOSS OF 2 FREON LOOPS

ENTRY

CDR

Perform FRCS dump if reqd to maintain Xcg in the box

HORIZ SIT CONFIG

ALTM - ITEM 9 +

		.		

	PASS ITEM	
PTI	INH 1	✓
INDEX	1	✓
LAND SITE (DEL PAD)	41	✓
RWY (DEL PAD)	3	✓
	4	✓
TACAN (DEL PAD)	5	✓
SPD BK	NOM 39	✓
TAEM TGT		
G&N	OVHD 6	✓
HSI	BLANK	✓
XEP	NEP 7	✓
AIM	NOM 8	✓
TAC	INH 20	✓
DRAG H	AUT 22	✓
ADTA H	INH 26	✓
ADTA TO G&C	INH 29	✓
DES any failed TACANs		
TAC	DELTA 35	✓
HUD	37 L 0	✓
	38 R 0	✓

PLT

If no FRCS dump reqd, go to page 11-15

FWD RCS RECOVERY

014:B ✓cb OI SIG CONDR OF 1/4A - cl
:F RJDF-1B F1 DRIVER - ON
LOGIC - ON
015:B ✓cb OI SIG CONDR OF 2/3A - cl
:F RJDF-1A F2 DRIVER - ON
LOGIC - ON
016:F RJDF-2A F3, 2B F4 DRIVER (two) - ON
2A F3, 2B F4/F5 LOGIC (two) - ON
06 MDM FF1,4 - ON
GNC, I/O RESET - EXEC
08 Reopen FRCS

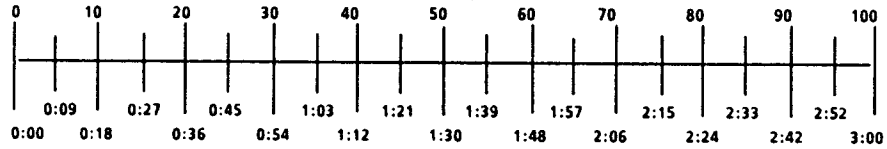
GNC 23 RCS

CRT X JET RESET - ITEM 45 - EXEC
Reselect deselected FRCS jets
JET RESET - ITEM 45 - EXEC

FORWARD RCS DUMP (use for off-nominal X cg entry using lowest of OX or FU qty)
Determine FWD RCS 'DUMP TO %' (calculator, cg wheel, or DEL PAD)

FOUR JET DUMP:

FRCS PRPLT TO BE DUMPED (%)



TIME FROM DUMP INITIATION (M:S)

LOSS OF 2 FREON LOOPS

ENTRY

CDR

If Xcg ≤ 1100 at EI:
| X: GNC 51 OVERRIDE
or
| ALT ELEVON - ITEM 18 EXEC
If Xcg > 1100 at EI:
X: GNC 51 OVERRIDE
✓NOM ELEVON - ITEM 17 (*)

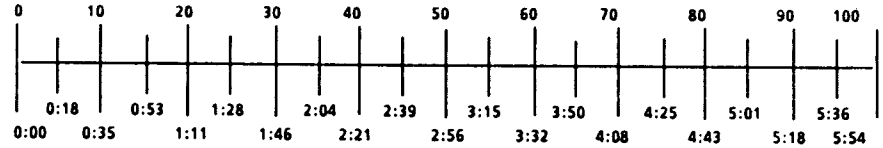
* If returning payloads > 10K lb: *
* *
* X: GNC 51 OVERRIDE *
* *
* ALT FILTER - ITEM 21 EXEC *

252 END

PLT

TWO JET DUMP:

FRCS PRPLT TO BE DUMPED (%)



TIME FROM DUMP INITIATION (M:S)

NOTE
During dump disregard FRCS qty

GNC DEORB MNVR EXEC

CRT FWD RCS ARM - ITEM 36 EXEC
DUMP - ITEM 37 EXEC (Start watch)

When dump time achieved:
OFF - ITEM 38 EXEC

When dump complete:
08 FWD RCS MANF ISOL 1,2,3,4 - CL (tb-CL)
06 MDM FF1,4 (two) - OFF
014, RJDF LOGIC & DRIVER (eight) - OFF
015,
016