

Orbit Operations Checklist

STS-114 Flight Supplement

**Mission Operations Directorate
Operations Division**

**Final, Rev A
April 14, 2005**

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas



United Space Alliance

ORBIT OPERATIONS, STS-114 Flt Suppl

FINAL, REV A (Apr 14, 2005)

PCN-3 (June 24, 2005) Sheet 1 of 1

List of Implemented Change Requests (482s):

ORB OPS-2147

Incorporate the following:

1. Replace FS iii and FS iv
2. Replace section 2

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Encl: 6 pages

File this PCN immediately behind the front cover as a permanent record

JSC-48036-114

MISSION OPERATIONS DIRECTORATE

**ORBIT OPERATIONS CHECKLIST
STS-114 FLIGHT SUPPLEMENT**

FINAL, REV A
April 14, 2005

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ORB OPS/114/FIN A

Incorporates the following:			
482#:	ORB OPS-2097	ORB OPS-2114	ORB OPS-2128
	ORB OPS-2100	ORB OPS-2116	ORB OPS-2129
	ORB OPS-2101B	ORB OPS-2119	ORB OPS-2131
	ORB OPS-2105	ORB OPS-2125	
	ORB OPS-2106	ORB OPS-2127	

AREAS OF TECHNICAL RESPONSIBILITY

Book Manager	DO3/T. Zulauf	281-244-0922
Alt Book Manager	DO3/CJ Gilson	281-483-2345

ORBIT OPERATIONS CHECKLIST
 STS-114 FLIGHT SUPPLEMENT

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* – Omit from flight book

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* – Omit from flight book

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COMM/INST

LOAD PCMMU FORMAT	FS 1-2
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**COMM/
INST**

COMM/
INST

LOAD PCMMU FORMAT

- C3 1. √OI PCMMU FORMAT – GPC
SM 62 PCMMU/PL COMM
- CRT 2. FORMAT:
SEL FXD – ITEM 1 EXEC (*)
SEL ID – ITEM 3 +X X X EXEC
3. √SM COMM BUF – RDY
LOAD – ITEM 4 EXEC
√LOAD, ITEM 4 – RUN,CPLT
- If LOAD – CPLT:
Repeat steps 2 and 3 for second ID
- * If LOAD – FAIL and ERR MSG – 'I/O *
* ERR MMU 1(2)': *
* Go to 5.2a, 'I/O ERR MMU 1(2)' (MAL, *
* DPS) >> *
* *
* If LOAD – FAIL and a first load attempt: *
* Repeat steps 1 and 2 for failed ID *
* *
* If LOAD – FAIL and a subsequent load *
* attempt: *
* √MCC *
C3 * OI PCMMU PWR – 2(1) *
* √ERR MSG – 'I/O ERR PCM' *
CRT * I/O RESET PCM – ITEM 5 EXEC (*) *
* Repeat steps 2 and 3 *
4. When final LOAD – CPLT:
SEL PGM – ITEM 2 EXEC (*)

DNLIST COMPATIBILITY	PHASE	FORMAT ID 64/128	CONFIG NO.
G1,G3,BFS	(ASCENT)	102/FXD	-
G3,BFS	(ENTRY)	102/164	-
G2,G8,S2	ORBIT/ORBIT BURN/FCS C/O	103/161	-
G2,S2,OPS 0	OPS 0	- /163	-
G2,S2,P9	MMU C/O	- /163	-
G2,G8,S2	MPLM/SSV (PRIME)	103/184	760
G2,G8,S2	MPLM/SSV (B/U)	103/205	767
G2,G8,S2	RNDZ/UNDOCK (OIU/TCS/SSV) (PRIME)	103/192	763
G2,G8,S2	RNDZ/UNDOCK (OIU/TCS/SSV) (B/U)	103/211	770
G2,G8,S2	DOCKED OIU/SSV (PRIME)	103/199	780
G2,G8,S2	DOCKED OIU/SSV (B/U)	103/212	781
G2,G8,S2	OIU H&S/SSV (PRIME)	103/179	757
G2,G8,S2	OIU H&S/SSV (B/U)	103/203	765

NOTE

LDR TFL may affect PCMMU BITE. If PCMMU or SM 2 GPC switched since last TFL, ID 64 and 128 will not reflect current state

LOAD PDI DECOM FORMAT

SM 62 PCMMU/PL COMM

```
1. PDI:
CRT  √I/O RESET – ITEM 8 (*)
      SEL DECOM – ITEM 9 +X EXEC
      SEL FMT – ITEM 10 +X X X EXEC
      LOAD – ITEM 11 EXEC

If LOAD – CPLT:
      SEL INPUT – ITEM 12 +X EXEC
      LOAD – ITEM 13 EXEC
      Repeat step 1 for additional DECOMs/FPM

* If LOAD – FAIL and ERR MSG – 'I/O ERR *
* MMU 1(2)': *
* Go to 5.2a, 'I/O ERR MMU 1(2)' (MAL, *
* DPS) >> *
* *
* If LOAD – FAIL and a first load attempt: *
* Repeat step 1 *
* *
* If LOAD – FAIL and a subsequent load *
* attempt: *
* *
* NOTE *
* Power cycling PDI will cause PDI *
* to lose DFLs previously loaded *
* *
* √MCC *
A1L * S-BD PL CNTL – PNL *
* PL DATA INTLVR PWR – OFF,ON *
* √ERR MSG – 'S62 BCE BYP PL' *
* √'S62 BCE BYP PDI' *
* S-BD PL CNTL – CMD *
* *
* PCM: *
CRT * I/O RESET PCM – ITEM 5 EXEC (*) *
* PDI: *
* I/O RESET – ITEM 8 EXEC (*) *
* Repeat step 1 for all of config (XXX) *
```

CONFIG	DECOM	FMT	INPUT	USE
760 MPLM/SSV (PRIME) TFL 184	1	2	1,2	OIU5 (MPLM) **
	2	-	-	-
	3	-	-	-
	4	4	4	SSV (3) ***
	5-FPM	502		H-H-H *
767 MPLM/SSV (BACKUP) TFL 205	1	-	-	-
	2	3	1,2	OIU5 (MPLM) **
	3	14	4	SSV (3) ***
	4	-	-	-
	5-FPM	507		H-H-H *
763 RNDZ/UNDOCK (PRIME) TFL 192	1	30	1,2	OIU7 (6UH) **
	2	-	-	-
	3	9	5	TCS
	4	4	4	SSV (3) ***
	5-FPM	503		H-H-H *
770 RNDZ/UNDOCK (BACKUP) TFL 211	1	-	-	-
	2	31	1,2	OIU7 (6UH) **
	3	14	4	SSV (3) ***
	4	19	5	TCS
	5-FPM	508		H-H-H *
780 DOCKED OPS/SSV (PRIME) TFL 199	1	6	1,2	OIU9 (9C) **
	2	-	-	-
	3	-	-	-
	4	27	4	SSV (2) ***
	5-FPM	501		H-H-H *
781 DOCKED OPS/SSV (BACKUP) TFL 212	1	-	-	-
	2	16	1,2	OIU9 (9C) **
	3	29	4	SSV (2) ***
	4	-	-	-
	5-FPM	506		H-H-H *

* OI-GNC-SM, Orbiter Downlist Data Rates (High or Low)
** # in OIU# represents the OIU format;
(XXX) represents data type
*** # in SSV (#) represents the SSV Out Rate sw selection

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FS 1-5

ORB OPS/114/FIN A

CONFIG	DECOM	FMT	INPUT	USE
757 OIU H&S/SSV (PRIME) TFL 179	1	5	1,2	OIU255 (H&S) **
	2	-	-	-
	3	-	-	-
	4	4	4	SSV (3) ***
5-FPM	505			L-H-H *
765 OIU H&S/SSV (BACKUP) TFL 203	1	-	-	-
	2	15	1,2	OIU255 (H&S) **
	3	14	4	SSV (3) ***
	4	-	-	-
5-FPM	509			L-H-H *

* OI-GNC-SM, Orbiter Downlist Data Rates (High or Low)

** # in OIU# represents the OIU format;
(XXX) represents data type

*** # in SSV (#) represents the SSV Out Rate sw selection

LOAD OIU FORMAT/CONFIG

Determine which step is needed and complete all actions to obtain desired OIU configuration

NOTE

A corresponding TFL/DFL CONFIG is reqd for MCC to receive telemetry. Reference S62 PCMMU/PL COMM for the last loaded HDR TFL and perform LOAD PCMMU FORMAT/LOAD PDI DECOM FORMAT for the associated CONFIG

S212 OIU

1. GNC-1 PRIMARY ON LB-ORB N2-1 (OIU BUS 3)

LOAD FORMAT	ITEM 1 + <u>9</u> EXEC
GNC TO GNC 1	ITEM 18 + <u>1</u> <u>4</u> EXEC
GNC 1 TO BUS 3	ITEM 18 + <u>1</u> <u>6</u> EXEC
BUS 4 BC	ITEM 15 EXEC (*)
BUS 3 RT	ITEM 10 EXEC (*)
LOAD FORMAT	ITEM 1 + <u>9</u> EXEC >>

2. GNC-1 PRIMARY ON LB-ORB N2-2 (OIU BUS 4)

LOAD FORMAT	ITEM 1 + <u>9</u> EXEC
GNC TO GNC 1	ITEM 18 + <u>1</u> <u>4</u> EXEC
GNC 1 TO BUS 4	ITEM 18 + <u>1</u> <u>5</u> EXEC
BUS 3 BC	ITEM 11 EXEC (*)
BUS 4 RT	ITEM 14 EXEC (*)
LOAD FORMAT	ITEM 1 + <u>9</u> EXEC >>

3. GNC-2 PRIMARY ON LB-ORB N2-1 (OIU BUS 3)

LOAD FORMAT	ITEM 1 + <u>9</u> EXEC
GNC TO GNC 2	ITEM 18 + <u>1</u> <u>3</u> EXEC
GNC 2 TO BUS 3	ITEM 18 + <u>1</u> <u>8</u> EXEC
BUS 4 BC	ITEM 15 EXEC (*)
BUS 3 RT	ITEM 10 EXEC (*)
LOAD FORMAT	ITEM 1 + <u>9</u> EXEC >>

4. GNC-2 PRIMARY ON LB-ORB N2-2 (OIU BUS 4)

LOAD FORMAT	ITEM 1 + <u>9</u> EXEC
GNC TO GNC 2	ITEM 18 + <u>1</u> <u>3</u> EXEC
GNC 2 TO BUS 4	ITEM 18 + <u>1</u> <u>7</u> EXEC
BUS 3 BC	ITEM 11 EXEC (*)
BUS 4 RT	ITEM 14 EXEC (*)
LOAD FORMAT	ITEM 1 + <u>9</u> EXEC >>

Cont next page

5. MPLM
LOAD FORMAT ITEM 1 +5 EXEC |
BUS 2 BC ITEM 7 EXEC (*)
LOAD FORMAT ITEM 1 +5 EXEC >>
6. SSOR
LOAD FORMAT ITEM 1 +7 EXEC |
BUS 1 BC ITEM 3 EXEC (*)
LOAD FORMAT ITEM 1 +7 EXEC >>

PTG

STAR PAIRS PAD FS 2-2
PAIRS..... FS 2-3

PTG

FS 2-1

ORB OPS/114/FIN A

PTG

FS 2-2

ORB OPS/114/FIN A,3

STAR PAIRS PAD									
		ATT SET 1				ATT SET 2			
PAIR	ANG SEP	DUAL S TRK		SINGLE S TRK		DUAL S TRK		SINGLE S TRK	
				-Z	-Y			-Z	-Y
A	92.1	-Y:53 R+ 295 -Z:22 P+ 225 Y+ 344	R+ 206 P+ 227 Y+ 359	-Y:22 R+ 28 -Y:22 P+ 241 Y+ 342	-Y:22 R+ 335 -Z:53 P+ 51 Y+ 359	R+ 247 P+ 43 Y+ 12	-Y:53 P+ 64 Y+ 6		
B	84.9	-Y:34 R+ 155 -Z:54 P+ 82 Y+ 296	R+ 98 P+ 112 Y+ 286	-Y:54 R+ 209 -Y:54 P+ 47 Y+ 293	-Y:54 R+ 85 -Z:34 P+ 294 Y+ 79	R+ 21 P+ 272 Y+ 66	-Y:34 P+ 210 Y+ 79		
C	84.2	-Y:72 R+ 143 -Z:80 P+ 37 Y+ 10	R+ 57 P+ 42 Y+ 356	-Y:80 R+ 229 -Y:80 P+ 23 Y+ 6	-Y:80 R+ 129 -Z:72 P+ 219 Y+ 8	R+ 44 P+ 221 Y+ 354	-Y:72 P+ 204 Y+ 7		
D	87.1	-Y:87 R+ 265 -Z:91 P+ 293 Y+ 76	R+ 106 P+ 7 Y+ 81	-Y:91 R+ 328 -Y:91 P+ 318 Y+ 63	-Y:91 R+ 83 -Z:87 P+ 191 Y+ 284	R+ 282 P+ 116 Y+ 280	-Y:87 P+ 167 Y+ 296		

STAR PAIRS PAD

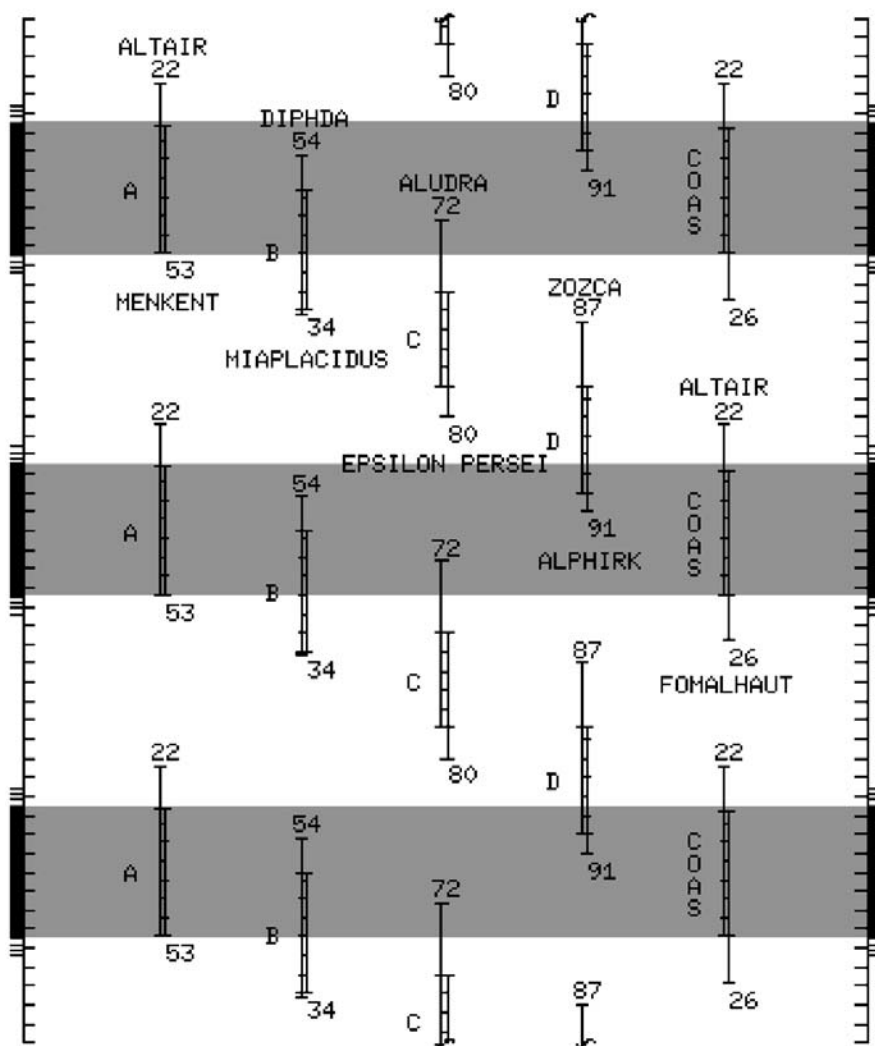
PAIR		COAS ALIGN ATTITUDE 1	ANG SEP	COAS ALIGN ATTITUDE 2
C	+X COAS	26 R+ 245 P+ 31 Y+ 346	NOSE UP 59	22 R+ 211 P+ 341 Y+ 298
O				
A	-Z COAS	26 R+ 329 P+ 273 Y+ 298	TAIL UP	22 R+ 295 P+ 224 Y+ 346
S				

SINGLE S TRK MIN MNVR OPT
TGT ID = 11-110 NAV STAR #
BODY VECTOR = 5

	-Z S TRK	-Y S TRK
P	87.7	0
Y	358	280.6

MET Applicable: 00/01:00:0 - 11/12:00:0
Date L/O: 07/13/05
GMT L/O: 194/19:50:47

STAR PAIRS



MET Applicable: 00/01:00:0 - 11/12:00:0
 Date L/O: 07/13/05
 GMT L/O: 194/19:50:47



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**DAP
TABLES**

DAP TABLES

DAP Overview

DAP – Purpose	DAP – Purpose
A1 – Nominal	B1 – OMS & RCS Burns (ORB OPS)
A2 – PTC	B2 – Loss of VERN (Tail Only)
A3 – GG	B3 – Loss of VERN (All)
A4 – Pre/Post Deploy	B4 –
A5 – Loss of VERN (All)	B5 – COAS/HUD CAL
A6 – Loss of VERN (Tail Only)	B6 –
A7 – Rendezvous	B7 – Rendezvous
A8 – Terminal Phase	B8 – Terminal Phase
A9 – PROX OPS/Flyaround	B9 – PROX OPS/Flyaround
A10 – Docking	B10 – Docking
A11 – Auto Reboost	B11 –
A12 – Mated MNVRS & Att Hold (VRCS)	B12 – Mated MNVRS & Att Hold (PRCS)
A13 – Shuttle A/L Depress Att Cntrl (VRCS)	B13 – Shuttle A/L Depress Att Cntrl (PRCS)
A14 – Orbiter alone SRMS/OBSS Ops	B14 –
A15 –	B15 –

- CNTL ACC = 0 Orbiter alone with unloaded RMS
 = 1 Mated Control - VRCS & Shuttle A/L Pressurized
 = 2 Mated Control - ALT & Shuttle A/L Pressurized
 = 3 Mated Control - VRCS & Shuttle A/L Depressurized
 = 4 Mated Control - ALT & Shuttle A/L Depressurized
 = 5 ORM Position 1 (GMEM required)
 = 6 ORM Position 2 (GMEM required)
 = 7 ORM Position 8 (GMEM required)
 = 8 ORM Position 13 (GMEM required)
 = 9 Orbiter alone SRMS/OBSS Ops

DAPs for mated operations are based on analysis from GNC, PDRS, and C. S. Draper Labs

FS-3-2

ORB OPS/14/FINA

UNIV PTG

TGT ID	= 1	Orbiting Vehicle
	= 2	Earth Center
	= 3	Earth Target
	Input	LAT (± 90)
		LON (± 180 , + = East)
		ALT (-3444.0 to 20000.0 nm)
	= 4	Sun Center
	= 5	Celestial Target
	Input	RA (0-359.99)
		DEC (± 90)
	= 11-110	Nav Stars
BODY VECTOR	= 1	+X*
	= 2	-X*
	= 3	-Z*
	= 4	-Y Star Tracker*
	= 5	Selectable
	Input	P (0-359.99)
		Y (270-359.99, 0-90)
	*Input OM \rightarrow	OM (0-359.99)
MON AXIS	= 1	+X
	= 2	-X

STS-114 DAP A1 -- A8 CONFIGURATIONS

	ITEM #	A1	A2	A3	A4	A5	A6	A7	A8
PRI									
ROT RATE	10 (50)	0.2000	0.4000	0.2000	0.5000	0.2000	0.2000	0.2000	0.0500
ATT DB	11 (51)	5.00	1.00	0.30	3.00	5.00	5.00	2.00	2.00
RATE DB	12 (52)	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
ROT PLS	13 (53)	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
COMP	14 (54)	.000	.000	.000	.000	.000	.000	.000	.000
P OPTION	15 (55)	ALL	ALL	ALL	ALL	ALL	TAIL	ALL	ALL
Y OPTION	16 (56)	ALL	ALL	TAIL	ALL	ALL	TAIL	ALL	ALL
TRAN PLS	17 (57)	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
ALT									
RATE DB	18 (58)	0.200	0.200	0.070	0.200	0.070	0.070	0.100	0.100
JET OPT	19 (59)	ALL	ALL	ALL	ALL	ALL	TAIL	ALL	ALL
# JETS	20 (60)	2	2	1	2	1	1	2	2
ON TIME	21 (61)	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
DELAY	22 (62)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VERN									
ROT RATE	23 (63)	0.2000	0.4000	0.0080	0.2000	0.0500	0.0500	0.0160	0.0500
ATT DB	24 (64)	1.000	1.000	0.070	1.000	1.000	1.000	1.000	1.000
RATE DB	25 (65)	.020	.020	.010	.020	.020	.020	.020	.020
ROT PLS	26 (66)	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.050
COMP	27 (67)	.000	.000	.000	.000	.000	.000	.000	.000
CNTL ACC	28 (68)	0	0	0	0	0	0	0	0
PURPOSE		NOMINAL	PTC	GG	PRE/POST DEPLOY	LOSS OF VERN (ALL)	LOSS OF VERN (TAIL ONLY)	RNDZ	TERMINAL PHASE
BOLD/ITALIC indicates change from I-Load.									

FS 3-4

ORB OPS/14/FIN A

STS-114 DAP A9 -- A14 CONFIGURATIONS

	ITEM #	A9	A10	A11	A12	A13	A14
PRI							
ROT RATE	10 (50)	0.1300	0.0500	0.1000	0.1000	0.1000	0.2000
ATT DB	11 (51)	2.00	0.60	15.00	5.00	5.00	5.00
RATE DB	12 (52)	0.10	0.10	0.20	0.20	0.20	0.20
ROT PLS	13 (53)	0.100	0.100	0.100	0.040	0.040	0.100
COMP	14 (54)	.000	.000	.000	.000	.000	.000
P OPTION	15 (55)	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL
Y OPTION	16 (56)	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL
TRAN PLS	17 (57)	0.050	0.050	0.100	0.010	0.010	0.100
ALT							
RATE DB	18 (58)	0.100	0.100	0.070	0.070	0.070	0.200
JET OPT	19 (59)	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL
# JETS	20 (60)	2	2	3	3	3	1
ON TIME	21 (61)	0.08	0.08	0.08	0.08	0.08	0.08
DELAY	22 (62)	0.00	0.00	12.00	11.04	11.04	6.00
VERN							
ROT RATE	23 (63)	0.1300	0.0500	0.1000	0.1000	0.1000	0.2000
ATT DB	24 (64)	1.000	0.500	5.000	3.000	3.000	3.000
RATE DB	25 (65)	.020	.020	.050	.050	.080	.200
ROT PLS	26 (66)	0.050	0.050	0.010	0.002	0.002	0.010
COMP	27 (67)	.000	.000	.000	.000	.000	.000
CNTL ACC	28 (68)	0	0	1,2*	1	3	9
PURPOSE		PROX OPS/ FLYAROUND	DOCKING	AUTO REBOOST	MATED STACK & RMS OPS (VRCS)	A/L DEPRESS ATTITUDE CONTROL (VRCS)	ORBITER ALONE SRMS/ OBSS
BOLD/ITALIC indicates change from I-Load. * 1 for Config 3&4, 2 for Config 1&2							

FS-3-5

ORB OPS/14/FINA

STS-114 DAP B1 -- B8 CONFIGURATIONS

	ITEM #	B1	B2	B3	B4	B5	B6	B7	B8
PRI									
ROT RATE	30 (50)	0.5000	0.2000	0.2000	0.2000	0.2000	0.5000	0.5000	0.0500
ATT DB	31 (51)	3.00	3.00	3.00	0.30	3.00	3.00	2.00	2.00
RATE DB	32 (52)	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
ROT PLS	33 (53)	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040
COMP	34 (54)	.000	.000	.000	.000	.000	.000	.000	.000
P OPTION	35 (55)	ALL	TAIL	ALL	TAIL	TAIL	ALL	ALL	ALL
Y OPTION	36 (56)	ALL	TAIL	ALL	TAIL	TAIL	ALL	ALL	ALL
TRAN PLS	37 (57)	0.100	0.020	0.020	0.020	0.020	0.020	0.050	0.050
ALT									
RATE DB	38 (58)	0.200	0.070	0.070	0.100	0.200	0.200	0.100	0.100
JET OPT	39 (59)	ALL	TAIL	ALL	ALL	ALL	ALL	ALL	ALL
# JETS	40 (60)	2	1	1	2	2	2	2	2
ON TIME	41 (61)	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
DELAY	42 (62)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VERN									
ROT RATE	43 (63)	0.2000	0.2000	0.2000	0.0080	0.0160	0.2000	0.2000	0.0500
ATT DB	44 (64)	1.000	1.000	1.000	0.100	0.033	1.000	1.000	1.000
RATE DB	45 (65)	.020	.020	.020	.010	.020	.020	.020	.020
ROT PLS	46 (66)	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.020
COMP	47 (67)	.000	.000	.000	.000	.000	.000	.000	.000
CNTL ACC	48 (68)	0	0	0	0	0	0	0	0
PURPOSE		OMS & RCS Burns (ORB OPS)	Loss of VERN (Tail Only)	Loss of VERN (All)		COAS/HUD CAL		RNDZ	TERMINAL PHASE
<i>BOLD/ITALIC</i> indicates change from I-Load.									

FS 3-6

ORB OPS/14/FIN A,1

STS-114 DAP B9 -- B13 CONFIGURATIONS

	ITEM #	B9	B10	B12	B13
PRI					
ROT RATE	30 (50)	0.1300	0.0500	0.1000	0.1000
ATT DB	31 (51)	2.00	0.60	5.00	5.00
RATE DB	32 (52)	0.10	0.10	0.20	0.20
ROT PLS	33 (53)	0.040	0.040	0.040	0.040
COMP	34 (54)	.000	.000	.000	.000
P OPTION	35 (55)	TAIL	TAIL	TAIL	TAIL
Y OPTION	36 (56)	TAIL	TAIL	TAIL	TAIL
TRAN PLS	37 (57)	0.010	0.010	0.010	0.010
ALT					
RATE DB	38 (58)	0.100	0.100	0.070	0.070
JET OPT	39 (59)	TAIL	TAIL	TAIL	TAIL
# JETS	40 (60)	2	2	3	3
ON TIME	41 (61)	0.08	0.08	0.08	0.08
DELAY	42 (62)	10.00	0.00	11.04	11.04
VERN					
ROT RATE	43 (63)	0.1300	0.0500	0.1000	0.1000
ATT DB	44 (64)	1.000	0.500	3.000	3.000
RATE DB	45 (65)	.020	.020	.050	.080
ROT PLS	46 (66)	0.020	0.020	0.002	0.002
COMP	47 (67)	.000	.000	.000	.000
CNTL ACC	48 (68)	0	0	2	4
PURPOSE		PROX OPS/ FLYAROUND	DOCKING	MATED STACK & RMS OPS (ALT)	A/L DEPRESS ATTITUDE CONTROL (ALT)
BOLD/ITALIC indicates change from I-Load.					

FS 3-7

ORB OPS/114/FIN A,1



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REBOOST/DAP

AUTO REBOOST	FS 4-2
AUTO REBOOST ATTITUDE REFERENCE.....	FS 4-4
DOCKED CONFIGURATION DAP REFERENCE	FS 4-5

**REBOOST/
DAP**

AUTO REBOOST

NOTE

Allow 5 min between establishing reboost attitude and reboost start time for DAP accelerations to converge

REBOOST/
DAP

- O14:F,
O15:F,
O16:F
1. If PRCS required:
RJDA 1A L2/R2 DRIVER – OFF
RJD MANF L5/F5/R5 DRIVER – OFF
Pri RJD LOGIC (eight) – ON

√MCC for GO to power up Pri Drivers
RJD MANF L5/F5/R5 DRIVER – ON
Pri RJD DRIVER (eight) – ON

2. Select Reboost Configuration

GNC 20 DAP CONFIG
REBOOST CFG – ITEM 8 +_ EXEC
INTVL – ITEM 9 +_ EXEC

3. Set up Future Reboost

GNC UNIV PTG
DURATION – ITEM 27 +_ +_ +_ EXEC
START TIME – ITEM 1 +_ . . . +_ . . . +_ . . . EXEC
RBST – ITEM 25 EXEC (FUT-*)

- C3
4. Select appropriate Reboost Rotation DAP
When in attitude and prior to START TIME,
DAP: A11/AUTO/VERN(ALT)

If using Config 1(2):

GNC 20 DAP CONFIG
Disable X JETS ROT – ITEM 7 EXEC (no *)

Cont next page

FS 4-2

ORB OPS/114/FIN A

NOTE

Reboost can be aborted with an item 26 on UNIV PTG or by selecting FREE on the DAP

5. Post Reboost Configuration

If using Config 1(2):

GNC 20 DAP CONFIG

Enable X JETS ROT – ITEM 7 EXEC (*)

Return to FLIGHT PLAN Attitude

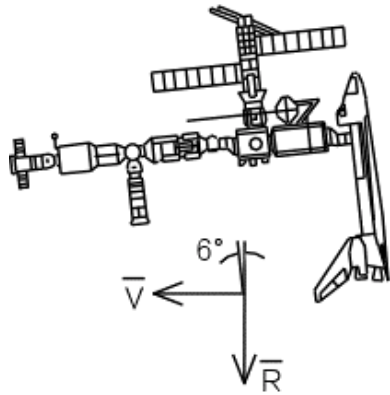
DAP: as reqd

Pri RJD LOGIC,DRIVER (sixteen) – as reqd

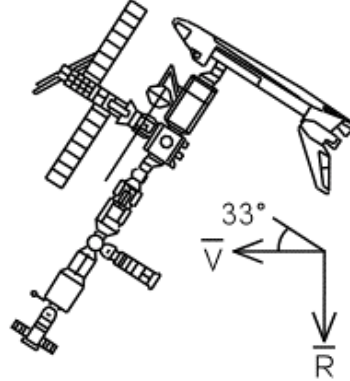
C3
O14,
O15,
O16

AUTO REBOOST ATTITUDE REFERENCE

VRCS ATTITUDE HOLD CONFIGURATIONS:

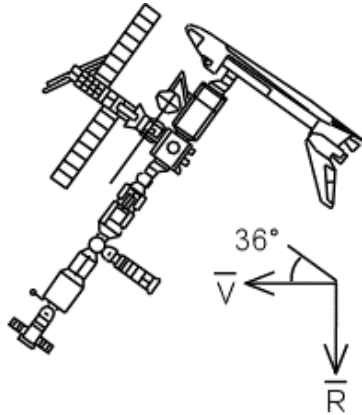


Earth
Nose up, Config 3 (VRCS)

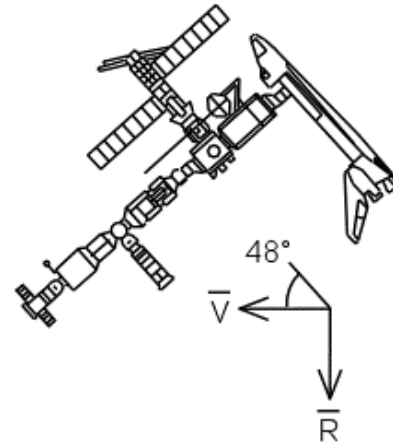


Earth
Nose up, Config 4 (+X, VRCS)

ALT ATTITUDE HOLD CONFIGURATIONS:



Earth
Nose up, Config 1 (+X, -pitch)



Earth
Nose up, Config 2 (+X)

DOCKED CONFIGURATION DAP REFERENCE

SHUTTLE AIRLOCK		
	PRESS (≥ 2.44 psia)	DEPRESS (< 2.44 psia)
VERN	A12 (CA: 1)	A13 (CA: 3)
ALT, LO Z	B12 (CA: 2)	B13 (CA: 4)
RATE DAMPING	LVLH(INRTL), then AUTO	
RATE > 0.20	LVLH(INRTL) 6 min max FREE, LVLH(INRTL)	

NOTE

DAP A12(B12) cannot be used when shuttle airlock pressure < 2.44 psia

1. When shuttle airlock pressurized, select DAP:
A12/VERN(B12/ALT, LO Z)

NOTE

Use of DAP A13(B13) when shuttle airlock pressure ≥ 2.44 psia results in degraded DAP performance and increased propellant consumption

2. Before shuttle airlock depressurized, select DAP:
A13/VERN(B13/ALT, LO Z)

All DAPs can be used for attitude maintenance or maneuvering



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OIU PROCEDURES

OIU ACTIVATION	FS 5-2
DEACTIVATION	FS 5-2

OIU

OIU ACTIVATION

NOTE

√MCC that steps 1 and 2
may not be reqd

1. Load PCMMU/PDI (config 760) for OIU
2. Power on PSP 1(2)

A1L √S-BD PL CNTL – CMD
 PWR SYS – 1(2)
 √SEL – PSP
 √PSP CMD OUTPUT – PL UMB
 CNTL – PNL,CMD

SM 62 PCMMU/PL COMM

I/O RESET PSP 1(2) – ITEM 6(7) EXEC (*)

3. Power on OIU 1(2)

SSP1 OIU PWR – OIU 1(2) ON
 √tb – UP(DN)

OIU

OIU DEACTIVATION

NOTE

√MCC for OIU ops complete

1. Possible 'S62 PDI DECOM FAIL' msg

SSP1 OIU PWR – OFF
 √tb – bp

2. MCC will config PCMMU and PDI as reqd

PRLA

PRLA CLOSE FS 6-2

PRLA

FS 6-1

ORB OPS/114/FIN A

PRLA CLOSE

A6U 1. √PL RETEN PL SEL – 3
√LAT 1,2,3,4 (four) – OFF (tb-REL)

SM 97 PL RETENTION

√LAT 1,2,3,4 (eight) – '0'

- * If any LAT msw shows '1', drive *
- * for single motor time (60 sec) *

R13L 2. PL RETEN LOGIC PWR SYS 1,SYS 2 (two) – ON
BAY MECH PWR SYS 1,SYS 2 (two) – ON

NOTE

Any single motor times (>30 sec)

A6U 3. PL RETEN LAT 1,2 (two) – LAT
(tb-LAT, 60 sec max)
– OFF
4. 3,4 (two) – LAT
(tb-LAT, 60 sec max)
– OFF

R13L 5. PL RETEN LOGIC PWR SYS 1,SYS 2 (two) – OFF
BAY MECH PWR SYS 1,SYS 2 (two) – OFF

A6U 6. PL RETEN PL SEL – MON

PRLA

DETAILED SUPPLEMENTARY OBJECTIVES (DSOs)

DSO 490 (PROTOCOL B), BIOAVAILABILITY & PERFORMANCE EFFECTS OF PROMETHAZINE (PMZ) DURING SPACE FLIGHT ...		FS 7-3
DSO 634, SLEEP-WAKE ACTIGRAPHY.....		FS 7-3
FLIGHT SLEEP LOG		FS 7-5
SALIVA/KSS LOG		FS 7-6
MONITORING LATENT VIRUS REACTIVATION AND SHEDDING (DSO 493)		FS 7-7
SALIVA COLLECTION (ALL FLIGHT DAYS)		FS 7-7
VIRAL CULTURE COLLECTION (CONTINGENCY ONLY).....		FS 7-8

DSOs



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DSOs



FS 7-2

ORB OPS/114/FIN A

3. Collect Baseline saliva sample:
 - a. Unstow appropriate saliva tube

NOTE

Do not touch cotton w/fingers.
Do not bite/chew cotton

- b. Place small cotton roll in mouth and lightly roll w/tongue ~2 min
 - c. Replace saturated cotton roll into tube
 - d. Tighten cap
 - e. Record MET on tube and on SALIVA/KSS LOG
 - f. Record additional information required on SALIVA/KSS LOG
 - g. Stow tube in Saliva Sample Kit
 - h. Temp stow Saliva Sample Kit
4. Take PMZ

If PMZ dose taken less than 8 hrs prior to sleep but before pre-sleep:

5. Collect saliva samples per SALIVA/KSS LOG until sleep time, then pick up with next sample (24 hrs) following wakeup
6. Collect remaining saliva samples per SALIVA/KSS LOG following steps 3a-h

If PMZ dose is taken during pre-sleep:

7. Collect saliva samples pre-dose (Baseline sample) just before sleep, immediately upon wakeup, 1 hr after wakeup, and at 24,36, and 48 hrs post-dose

If second PMZ dose is taken within 48 hrs:

8. Begin PMZ protocol again; record MET in second column of SALIVA/KSS LOG

MF43C

9. If last saliva sample, stow Saliva Sample Kit |

Cont next page

FS 7-4

ORB OPS/114/FIN A

C. DOFFING ACTILIGHT WATCH

On final day of orbit:

MF43C

1. Remove Actilight Watch, stow

NOTE

If mission length extended, continue to wear Actilight Watch and complete FLIGHT SLEEP LOG as timeline permits

FLIGHT SLEEP LOG

Crew ID: _____ Actilight Watch Dot Color: _____

Current Time: _____ [ddd:hh:mm (MET)]

Lights Out: _____ [ddd:hh:mm (MET)]

Lights On: _____ [ddd:hh:mm (MET)]

1. How long did you take to fall asleep last night? _____ (hrs) _____ (mins)
2. How long did you sleep last night? _____ (hrs) _____ (mins)
3. How many times did you awaken during the night? _____
4. After the end of your sleep period, how long did you remain in bed before getting up?
_____ (hrs) _____ (mins)
5. Where did you sleep last night? [Flight deck / Middeck / Spacehab / Sleepstation]
6. Was your sleep disturbed: [Yes / No] (If Yes, check all that apply)
 shuttle noise mission duties voids, # of voids: _____ other crew
 physical discomfort too hot too cold other _____
7. How did you sleep last night?
poorly | _____ | great
8. How do you feel right now?
sleepy | _____ | alert
9. Did you have any caffeine yesterday? [Yes / No] (If Yes, indicate how much)
coffee _____ (cups) caffeine pills _____ (100mg) _____ (200mg)
tea _____ (cups) caffeinated soft drinks _____ (glasses)
Indicate how long before bed your last caffeine intake was: _____ (hrs) _____ (mins)
10. Did you take any medications yesterday? [Yes / No / Decline] (If Yes, list all)

Comments:

Crew Member _____	Circle dosage form: 25mg Tablet 50mg Injectable 25mg Suppository		SALIVA / KSS LOG																												
	Note: To be used only if PMZ is taken.																														
	PMZ Dose One		PMZ Dose Two																												
Activity Time (hr) Post-PMZ Dose	KSS	Saliva Sample MET	KSS	Saliva Sample MET																											
Baseline																															
1																															
2																															
4																															
8																															
24																															
36																															
48																															
<p>(1) Rate sleepiness during last 5 mins using key (2) Record saliva collection MET KSS Key</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td> </tr> <tr> <td>very alert</td><td></td><td>alert</td><td></td><td>neutral</td><td></td><td>sleepy, no</td><td></td><td>very sleepy, great</td> </tr> <tr> <td></td><td></td><td>normal level</td><td></td><td>neither alert/sleepy</td><td></td><td>effort to stay awake</td><td></td><td>effort to stay awake</td> </tr> </table>					1	2	3	4	5	6	7	8	9	very alert		alert		neutral		sleepy, no		very sleepy, great			normal level		neither alert/sleepy		effort to stay awake		effort to stay awake
1	2	3	4	5	6	7	8	9																							
very alert		alert		neutral		sleepy, no		very sleepy, great																							
		normal level		neither alert/sleepy		effort to stay awake		effort to stay awake																							
SDD46108178-601																															

**MONITORING LATENT VIRUS REACTIVATION AND
SHEDDING (DSO 493)**

SALIVA COLLECTION (ALL FLIGHT DAYS)

MF43C Immediately post-sleep (before brushing teeth):
1. Unstow: Saliva Kit Assy

NOTE

DO NOT touch cotton w/fingers.

DO NOT bite down or chew cotton

2. Remove Salivette Bag Assy w/cotton rolls from 'UNUSED' pocket
 3. Open Salivette Bag Assy w/cotton roll, remove cotton roll using Forceps
 4. Lightly roll cotton in mouth w/tongue until saturated (2 min max)
 5. Replace Salivette Bag Assy w/cotton rolls in 'UNUSED' pocket
 6. Place cotton roll in Collection Bag Assy by guiding w/tongue
 7. Close seal on Collection Bag Assy, remove clamp, mix preservative w/cotton roll
 8. Reclamp across top of Collection Bag Assy
 9. Stow Collection Bag Assy in 'USED' pocket
 10. Temp stow Saliva Kit
- MF43C 11. If last FD, stow Saliva Kit

NOTE

If mission length extended, as timeline permits, continue collecting saliva samples to end of mission or until sample Collection Bags are depleted

┌ | | | ┌

VIRAL CULTURE COLLECTION (CONTINGENCY ONLY)

If lesion appears:

- Saliva Kit
1. Unstow: Viral Culturette (1)
 2. Uncap culturette, remove swab, swab lesion once
 3. Reinsert swab, recap culturette
Squeeze bottom of culturette to break Ampule
 4. Record MET, ID on Viral Culturette, stow
- |

WLE SENSORS PROCEDURES

ACTIVATION AND CHECKOUT	FS 8-2
DEACTIVATION AND TEARDOWN	FS 8-7
WLE LAPTOP RECEIVER UNIT (LRU) R&R	FS 8-9

WLE
SENSORS

**WLE
SENSORS**

ACTIVATION AND CHECKOUT

1. UNSTOW EQUIPMENT
MA16G Unstow:
Laptop Receiver Unit
Cabin Relay Units (2)

2. SETUP WLE RELAY UNITS
A13 Retrieve WLE SYSTEM CABLE coiled on panel A6
Connect to MICRO WIS SYSTEM A – J7 (see
Figure 8-1)
W7 Connect to J1 on Cabin Relay Unit S/N 1664 and
secure to STBD side of aft cabin with Velcro (see
Figure 8-2)
A13 Retrieve WLE SYSTEM CABLE coiled on panel A9
Connect to MICRO WIS SYSTEM B – J8 (see
Figure 8-1)
A4 Connect to J1 on Cabin Relay Unit S/N 1728 and
secure to PORT side of aft cabin with Velcro (see
Figure 8-3)

NOTE

Green patch on Cabin Relay Unit is antenna and must face into cabin.
Software is configured to communicate with specific Relay Units on specific buses

Cont next page

FS 8-2

ORB OPS/114/FIN A

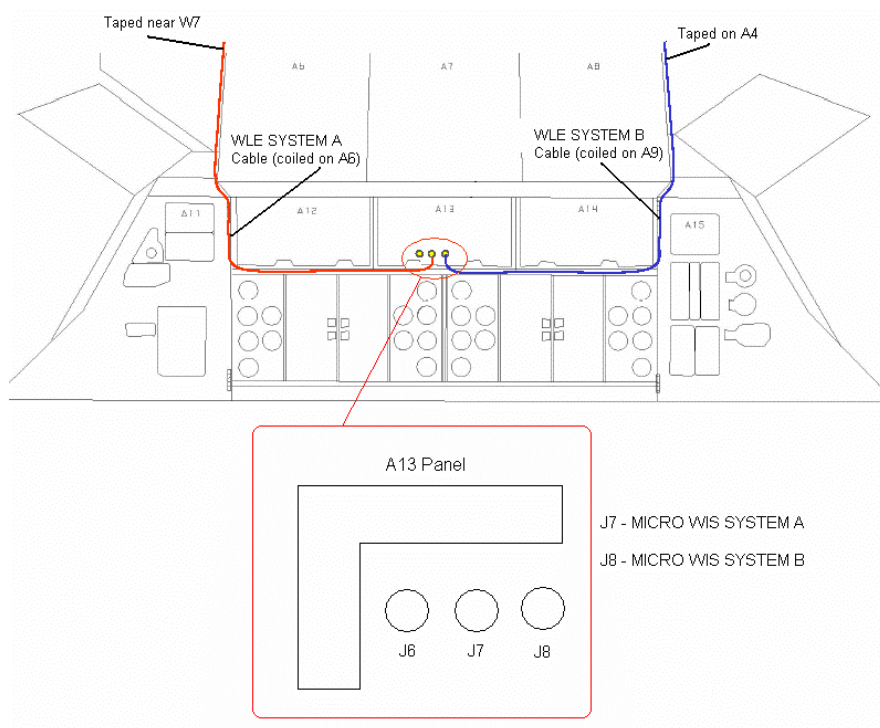


Figure 8-1.- A13 panel.

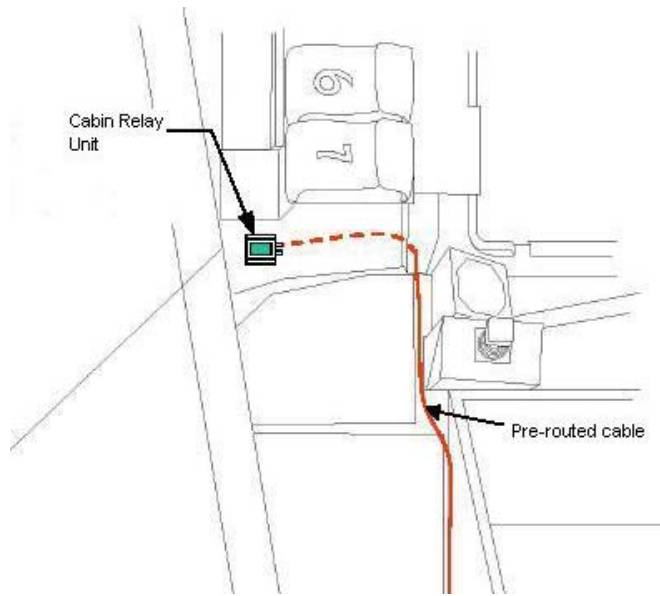


Figure 8-2.- Aft STBD location.

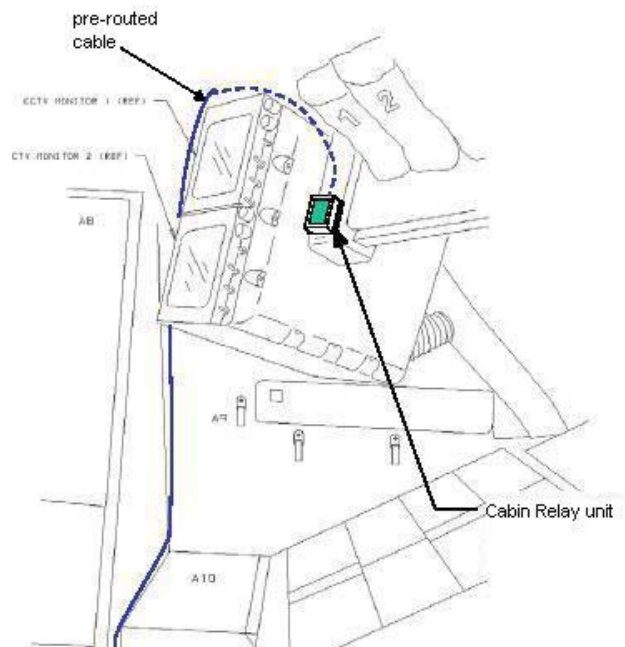


Figure 8-3.- Aft PORT location.

Cont next page

A31p

3. SET UP WLE LAPTOP

If necessary, close all applications, exit Windows
'Start'>'Shutdown'
Secure Laptop Receiver Unit to A31p with Velcro
Connect Laptop Receiver Unit to A31p Serial port

4. LAUNCH WLE SOFTWARE

Verify A31p connected to network before powering
on
A31p pwr – On
Select clock from system tray
Adjust time to match orbiter GMT
Sel OK
Double click 'Shuttle Apps'>'EWBMTAU-WLE'
Verify 'Mode: Processing Remote Commands'
(shows locked icon at top of display)

5. VERIFY COMM WITH RELAY UNITS

'Main'

NOTE

Each Cabin Relay Unit is identified with a
unique serial number; this number appears
as 'Unit ID' in the software

√Relay Units Unit ID 1664 and 1728 (2) present on
display in first column; scroll down as necessary

For each Cabin Relay Unit:

- √Unit ID present
- √Type: 'Relay-GL'
- √Last Update: time is updating
- √Via: 'RF'
- √Mode: 'Idle'
- √NETWORK Card Acquisition: 'Inactive'

NOTE

'Last Update' times nominally
update every 5 to 15 sec

If no time updates after 2 min, contact MCC-H

Cont next page

FS 8-5

ORB OPS/114/FIN A

Using Windows Explorer, navigate to 'My Computer'
>'C:'>'Program Files'>'Invocon'>'EWBMTAU- WLE'
>'Command'

NOTE

Deleting 'BLOCK' file initiates command execution. Command files disappear from this folder as they are executed

Delete file labeled 'BLOCK'

Notify MCC-H: "WLES setup complete"

NOTE

Files appearing in the 'Data' folder verifies two-way communication with the Sensor Units in the orbiter wing

DEACTIVATION AND TEARDOWN

- A31p 1. DEACTIVATE WLE SENSORS LAPTOP
'Enhanced Wideband MicroTAU – WLE v1.0'

Click 'Exit'

At prompt 'Are you sure you want to exit?' click 'Yes'
'Start'>'Shutdown'

Disconnect Laptop Receiver Unit from A31p Serial
port

Remove Laptop Receiver Unit from Velcro on A31p

2. REMOVE WLE SENSOR RELAY UNITS

Remove Cabin Relay Units (2) from aft cabin (see
Figure 8-4 and Figure 8-5)

Disconnect Cabin Relay Units from pre-routed
cables

Coil cables, stow in launch location

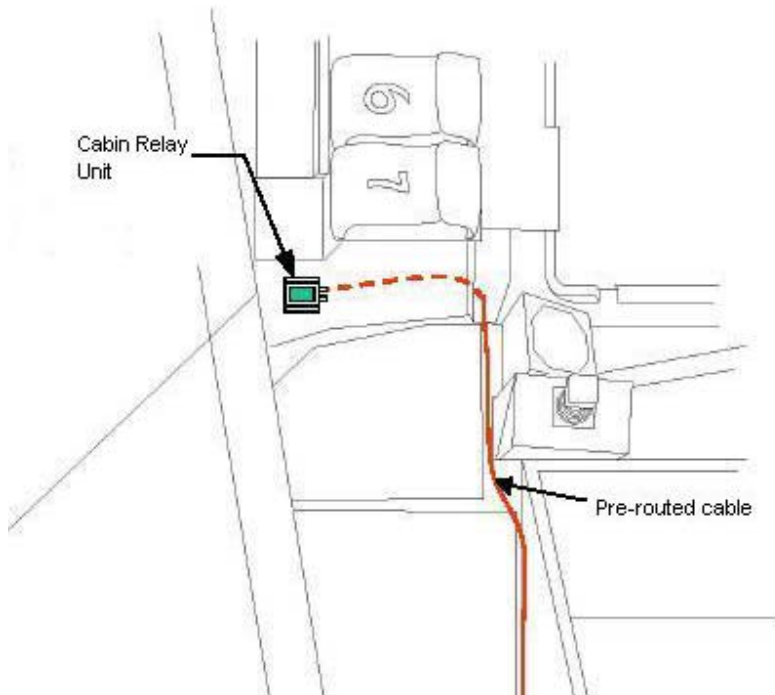


Figure 8-4.- Aft STBD location.

Cont next page

FS 8-7

ORB OPS/114/FIN A

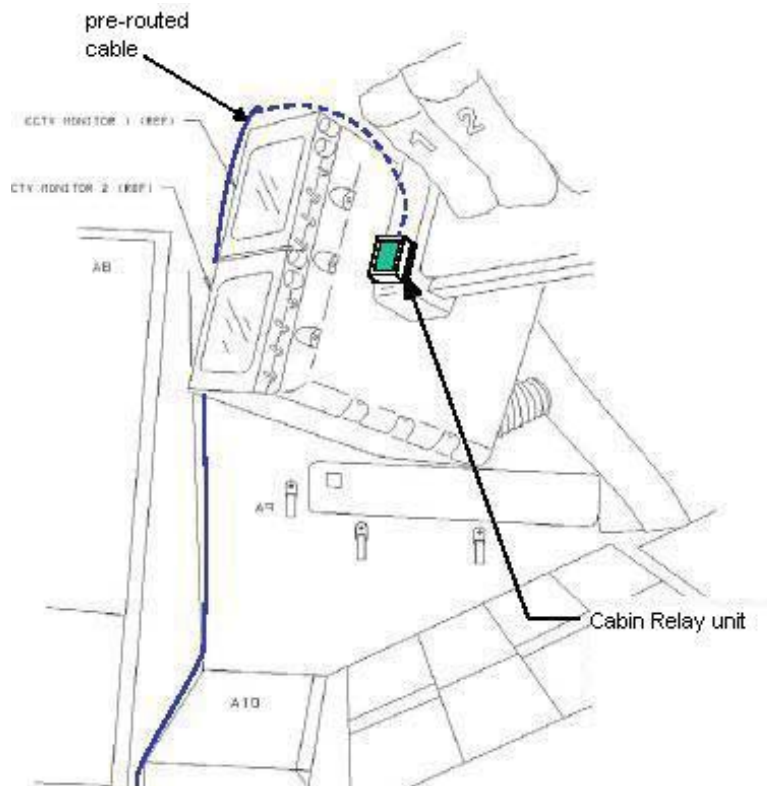


Figure 8-5.- Aft PORT location.

3. STOW EQUIPMENT

MA16G

Stow:

Laptop Receiver Unit

Cabin Relay Units (2)

A31p Laptop

Notify MCC-H: "WLES Teardown Complete"

WLE LAPTOP RECEIVER UNIT (LRU) R&R

- MA16G
1. UNSTOW EQUIPMENT
Unstow:
Spare LRU (see Figure 8-6)

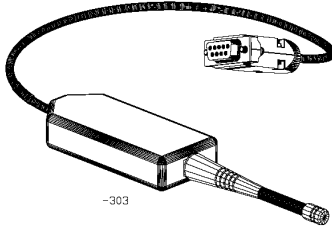


Figure 8-6.- Laptop Receiver Unit.

- A31p
2. DISCONNECT PRIME LRU FROM LAPTOP
'Enhanced Wideband MicroTAU – WLE v1.0'

Click 'Exit'
At prompt 'Are you sure you want to exit?',
click 'Yes'
Close other software applications

'Start'>'Shutdown'

Disconnect LRU from A31p Serial port (see Figure
8-7)
Remove LRU from Velcro on A31p



Figure 8-7.- A31p ports.

Cont next page

- A31p
3. CONNECT SPARE LRU
Connect Spare LRU to A31p Serial port
Secure LRU to A31p with Velcro
 4. LAUNCH WLE SOFTWARE
Pwr – On
Double click ‘Shuttle Apps’>‘EWBMTAU-WLE’
 5. VERIFY COMM WITH RELAY UNITS
‘Main’
 - √Relay Units Unit ID 1664 and 1728 (2) present on display in first column; scroll down as necessary
 - For each Cabin Relay Unit:
 - √Unit ID present
 - √Type: ‘Relay-GL’
 - √Last Update: time is updating
 - √Via: ‘RF’
 - √Mode: ‘Idle’
 - √NETWORK Card Acquisition: ‘Inactive’

NOTE
‘Last Update’ times nominally
update every 5 to 15 sec

If no time updates after 2 min, contact MCC-H

Notify MCC-H: “WLES LRU R&R complete”, report
S/N of failed LRU
 6. STOW EQUIPMENT
Stow:
Prime LRU
- MA16G

DETAILED TEST OBJECTIVES (DTO)

W/B COOLING VERIFICATION (DTO-850) (CIL) FS 9-3

DTO

DTO

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W/B COOLING VERIFICATION (DTO-850)

CAUTION

Visually verify the absence of ice accumulation on W/B 3 steam vent prior to performing this procedure

1. GNC CONFIG
O14, ASA (four) – ON
O15,
O16:F

O17:A ATVC (four) – ON
C3 √FCS CH (four) – AUTO
2. DPS CONFIG
Perform G2 TO G8 TRANSITION, steps 2-4 only,
(ORB OPS, DPS); in step 2 use “If FCS Checkout:”
steps (TFL 161)
3. APU 3 PRESTART

2: SM 86 APU/HYD

CRT2 √APU, HYD, W/B status no ‘↑’ or ‘↓’ (except HYD B/U P)
R4 √HYD BK ISOL VLV 3 tb – CL
R2 BLR N2 SPLY 3 – ON
√PWR 3 – ON
√CNTLR/HTR 3 – A(B)
HYD CIRC PUMP 3 – OFF
√cb APU FU TK VLV ENA 3 (two) – cl
√APU FU TK VLV 3 – CL
√AUTO SHTDN 3 – ENA
√SPEED SEL 3 – NORM
√OPER 3 – OFF

HYD MN PUMP PRESS 3 – LO
APU CNTLR PWR 3 – ON
FU TK VLV 3 – OP
√APU/HYD RDY 3 tb – gray

* If tb – bp, √MCC *

Cont next page

CRT2 Verify APU 3 GG BED T < 401 degF
Notify MCC: READY FOR APU 3 START

4. APU 3 START

NOTE

Any previously failed actuator channel should be bypassed via ITEM 21 on FCS/DED DIS C/O display prior to APU 3 start

HYD/APU
R2

APU OPER 3 – START/RUN
√HYD PRESS ind 3 – LOW green
√APU/HYD RDY 3 tb – bp

- * If APU 3 did not start or shuts down, *
- * 'S86 APU GBX T', 'S86 APU TEMP', *
- * 'S86 APU GBX P' msgs, then go to *
- * step 5, APU 3 SHUTDOWN *

HYD/APU

HYD MN PUMP PRESS 3 – NORM
√PRESS ind 3 – HI green

- * If APU 3 OIL IN TEMP > 290 and incr: *
- * BLR CNTLR/HTR 3 – B(A) *
- * If APU 3 OIL IN TEMP > 305 and incr: *
- * Go to step 5, APU 3 SHUTDOWN *

Cont next page

5. APU 3 SHUTDOWN

On MCC GO or APU 3 OIL IN TEMP steady for
3 minutes:

R2 BLR N2 SPLY 3 – OFF
PWR 3 – OFF
APU OPER 3 – OFF
FU TK VLV 3 – CL
HYD/APU √Shutdn (HYD PRESS < 200)
R2 CNTLR PWR 3 – OFF
HYD CIRC PUMP 3 – GPC

If ELEVON PARK not reqd, go to step 7

6. ELEVON PARK

GNC 0 GPC MEMORY

CONFIG – ITEM 1 +2 EXEC

√NBAT

C3(A6U) DAP: FREE
CRT GNC, OPS 201 PRO

O14, ASA (four) – OFF

O15,
O16:F
CRT

GNC 0 GPC MEMORY

CONFIG – ITEM 1 +8 EXEC

√NBAT

GNC, OPS 801 PRO

Pause ~30 sec (DAP settling), then:

C3(A6U) DAP: A/AUTO/VERN

O16:F ASA 4 – ON

R2 HYD CIRC PUMP 1 – ON

NOTE

Elevons will be positioned within 3 min

On MCC GO:

HYD CIRC PUMP 1 – GPC

Cont next page

7. DPS RECONFIG

Perform G8 TO G2 TRANSITION, steps 1-4 only
(ORB OPS, DPS)

O17:A

8. GNC RECONFIG

ATVC (four) – OFF

If ELEVON PARK not performed:

O14,
O15,
O16:F

ASA (four) – OFF



CUE
CARDS

CUE CARD CONFIGURATION

NOT FLOWN

FS 10-1

ORB OPS/114/FIN A



CUE
CARDS

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NOT FLOWN

FS 10-2

ORB OPS/114/FIN A

TOP

HOOK
VELCRO

**FLIGHT DAY 3 DOCKING
ORBITER with ISS
CO2 ABSORBER REPLACEMENT**

HOOK
VELCRO

FLIGHT DAY	POS A	POS B	STOWAGE	LOCATION	CK CMLPT
			PRE DOCK	POST DOCK	
LAUNCH	STS-114 1	STS-114 2	Installed	MPLM	
PRE FD1	"	"			
POST FD2	STS-114 3	STS-114 4	LiOH Box	MPLM	
PRE FD2	STS-114 5	"	LiOH Box	MPLM	
POST FD3 (Docking)	STS-114 6	STS-114 7	LiOH Box	MPLM	
PRE FD3	"	STS-111 ___	NOD1D4_D2	MPLM	
POST FD4 (MPLM)	STS-111 ___	STS-111 ___	NOD1D4_D2	MPLM	
PRE FD4	STS-113 ___	STS-113 ___	NOD1D4_D2	MPLM	
POST FD5 (EVA 1)	STS-113 ___	STS-113 ___	NOD1D4_D2	MPLM	
PRE FD5	STS-111 ___	STS-111 ___	NOD1D4_D2	MPLM	
POST FD6	STS-111 ___	"	NOD1D4_D2	MPLM	
PRE FD6	STS-113 ___	STS-113 ___	NOD1S4_F2	MPLM	
POST FD7 (EVA 2)	STS-113 ___	STS-113 ___	NOD1S4_F2	MPLM	
PRE FD7	STS-113 ___	STS-113 ___	NOD1S4_F2	LiOH Box	
POST FD8	"	STS-113 ___	NOD1P4	LiOH Box	
PRE FD8	STS-113 ___	STS-113 ___	NOD1P4	LiOH Box	
POST FD9 (EVA 3)	STS-113 ___	STS-113 ___	LAB1P4_F1	LiOH Box	
PRE FD9	STS-112 ___	STS-112 ___	NOD1P4_B1	LiOH Box	
POST FD10 (MPLM)	STS-112 ___	"	NOD1P4_B1	LiOH Box	
PRE FD10	STS-112 ___	STS-112 ___	NOD1P4_B1	LiOH Box	
POST FD11 (Undock)	"	STS-112 ___	NOD1P4_B1	LiOH Box	
MID FD11	STS-112 ___	"	NOD1P4_B1	LiOH Box	
PRE FD11	"	STS-114 15	LiOH Box	LiOH Box	
POST FD12	STS-114 16	STS-114 17	LiOH Box	LiOH Box	
PRE FD12	STS-114 18	STS-114 19	LiOH Box	LiOH Box	
POST FD13 (EOM)	STS-114 20	STS-114 21	LiOH Box	LiOH Box	
PRE FD13	STS-114 22	"	LiOH Box	LiOH Box	
POST FD14 (EOM+1)	STS-114 23	STS-114 24	LiOH Box	LiOH Box	
PRE FD14	STS-114 25	STS-114 26	LiOH Box	LiOH Box	
POST FD15 (EOM+2)	STS-114 27	STS-114 28	LiOH Box	LiOH Box	
PRE FD15	"	STS-114 29	LiOH Box	LiOH Box	
POST FD16 (EOM+3)	STS-114 30	STS-114 31	LiOH Box	Installed	

NOTES

1. STS-111 __, 112 __, and 113 __ denotes any LiOH can from those flights
2. STS-111, 112, and 113 LiOH cans will have black decals with white text with no "Used" checkbox
3. Record LiOH can decal numbers in space provided for STS-111 __, 112 __, and 113 __ LiOH cans
4. Place Kapton tape on STS-111, STS-112, and STS-113 LiOH cans and mark "USED"
5. STS-114 LiOH cans will have white decals with black text
6. For STS-114 LiOH cans, place ✓ in box next to word "Used" to indicate LiOH can has been used
7. Report LiOH can decal number for LiOH cans used at each LiOH changout to MCC-H
8. See Transfer List for MPLM LiOH can final stowage locations
9. Reseal all LiOH cans w/Gray Tape and stow

ORB OPS-29a/nonRCRS/114/O/D

(reduced copy)

FAB USE ONLY

FS CC 10-3

ORB OPS/114/FIN A,2

TOP
 BACK OF 'FLIGHT DAY 3 DOCKING ORBITER with ISS
 CO2 ABSORBER REPLACEMENT'

HOOK
VELCRO

**LiOH CANISTER STOWAGE LOCATIONS
 (Predocking and Post Undocking)**

HOOK
VELCRO

ORB + MPLM LiOH STOWAGE LOCATIONS

	PRE DOCK	POST UNDOCK	NOTES
STS-114 1 thru 7	LiOH Box	MPLM	Transfer on FD5
STS-114 8 thru 14	LiOH Box	NOD1S4_D/E/F2	Transfer on FD3
STS-114 15 thru 31	LiOH Box	LiOH Box	No transfer
STS-114 32 thru 47	MPLM	FGB Floor	Transfer on FD5/FD6
STS-114 48	MPLM	NOD1P4_B2	Transfer on FD6
STS-114 49	MPLM	CM1PO_4_417_1	Transfer on FD6

ISS LiOH STOWAGE LOCATIONS

	PRE DOCK	POST UNDOCK	NOTES
S/N 334	CM1PO_4_417_1	MPLM	No Flight # on decal, Transfer on FD6
S/N 336	NOD1P4_B2	MPLM	No Flight # on decal, Transfer on FD6
STS-111 65	NOD1D4_D2	MPLM	LiOH can used on ISS, Transfer on FD5
STS-111 59	NOD1D4_D2	MPLM	LiOH can used on ISS, Transfer on FD5
STS-111 60 thru 64, 66	NOD1D4_D2	MPLM	
STS-112 25 thru 31	NOD1P4_B1	LiOH Box	
STS-113 23 thru 28	NOD1S4_F2	MPLM, LiOH Box	4 return in MPLM, 2 in LiOH Box
STS-113 29	NOD1D4_D2	MPLM	
STS-113 30, 31	LAB1P4_F1	LiOH Box	
STS-113 32 thru 34	NOD1P4	LiOH Box	
STS-113 35 thru 37	NOD1D4_D2	MPLM	

LiOH EXCHANGE PLAN

- | | |
|---------------|--|
| FD3: A | 1. LiOH Box: STS-114 cans 8 thru 14 to NOD1S4_D/E/F2
2. NOD1D4_D2: 3 STS-111 cans plus 4 STS-113 cans to the LiOH Box |
| FD5: B | 1. LiOH Box: STS-114 cans 1 thru 7 (used) to MPLM
2. NOD1D4_D2: 2 ISS used STS-111 cans to MPLM
3. NOD1D4_D2: 3 STS-111 cans to LiOH Box
4. NOD1S4_F2: 4 STS-113 cans to LiOH Box
5. MPLM: 16 STS-114 cans to FGB Floor between FD5 and FD6 |
| FD6: C | 1. LiOH Box: 4 used STS-111 and 4 used STS-113 cans from LiOH Box to MPLM
2. NOD1S4_F2: 2 STS-113 cans to LiOH Box
3. NOD1P4: 3 STS-113 cans to LiOH Box
4. LAB1P4_F1: 2 STS-113 cans to LiOH Box
5. NOD1P4_B1: 1 STS-112 can to LiOH Box
6. MPLM: 16 STS-114 cans to FGB Floor (if not complete on FD5)
7. NOD1P4_B2 (Post Fire Cleanup Kit): 1 can (no flight decal) to MPLM
8. CM1PO_4_417_1 (Post Fire Cleanup Kit): 1 can (no flight decal) to MPLM
9. MPLM: 1 STS-114 can to NOD1P4_B2 (Post-Fire Cleanup Kit),
report decal and S/N to MCC-H
10. MPLM: 1 STS-114 can to CM1PO_4_417_1 (Post Fire Cleanup Kit),
report decal and S/N to MCC-H |
| FD8: D | 1. LiOH Box: 2 used STS-111 and 4 STS-113 cans to MPLM
2. NOD1P4_B1: 6 STS-112 cans to the LiOH Box |

ORB OPS-29b/nonRCRS/114/O/C

(reduced copy)

FAB USE ONLY

FS CC 10-4

ORB OPS/114/FIN A

TOP

HOOK
VELCRO

HOOK
VELCRO

ORBIT BURN MONITOR

OMS TEMP*		
FU IN P ≥	L 225	R 220
≤	205	204
or No FU IN P		
		OMS ENG FAIL
		OMS PRPLT FAIL
OMS PC* & OMS ↓		
ENG VLV 1 or 2 < 70		OMS ENG FAIL
or OX IN P > 227		
OX IN P ≤ 227		OMS PRPLT FAIL
or No OX IN P		
OMS OX/FU TK P (√ENG IN P)		
OX/FU LOW		He PRESS/VAP ISOL (two) – OP If aff TK P not incr: OMS PRPLT FAIL
OX & FU HIGH		He PRESS/VAP ISOL (two) – CL Cycle He A(B) to maintain TK P 234-284
OMS N2 REG P HIGH or LOW		
		OMS ENG – ARM
OMS N2 TK P LOW		
(√ OMS/MPS)		At N2 TK P < 470: OMS ENG – ARM
OMS GMBL		
PRI fail		L(R) OMS GMBL – SEC (twice)
SEC fail		If high RCS usage: OMS ENG FAIL
GPC		
<input type="checkbox"/> () & Burning OMS aff		aff GPC PWR – OFF If SEC GMBL avail: aff MDM FF 1(4) – OFF,ON L(R) OMS GMBL – SEC (twice)
SEC GMBL lost		If high RCS usage: OMS ENG FAIL
2 FAs lost		√MAN SHUTDN
I/O ERROR FA 1(4)		
		L(R) OMS GMBL – SEC I/O RESET If high RCS usage: OMS ENG FAIL
2 FAs lost		√MAN SHUTDN
BCE STRG D 1(4)		
		I/O RESET (if recov: >>) If high RCS usage: L(R) OMS GMBL – SEC (twice)
GPC SET SPLIT		
Non-crit burn		STOP BURN: OMS ENG(s) – OFF
Crit burn		Go to "GPC" above
I/O ERROR PCM		
BCE BYP OA		OI PCMMU PWR – 2(1) SM I/O RESET

*If XFD, BLDN, or sensor fail, monitor ENG IN P for off-nominal performance

ORB OPS-31a/114/O/C

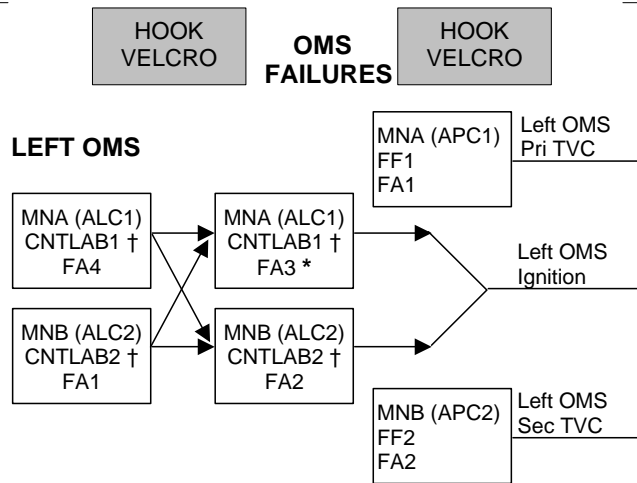
(reduced copy)

FAB USE ONLY

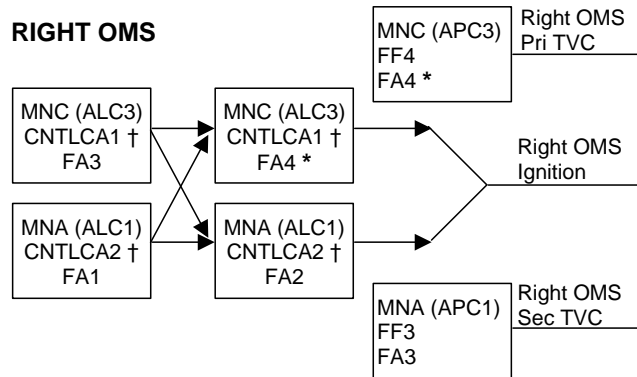
FS CC 10-5

ORB OPS/114/FIN A

TOP
BACK OF 'ORBIT BURN MONITOR'



- † If CNTL AB1 or AB2 (CA1 or CA2) failed and ign path still exists at OMS fail, assume L(R) OMS ↓ is PRPLT FAIL
- * If L(R) Pc failed high during burn or FA3(4) failed, at L(R) OMS fail, no guidance downmode after L(R) OMS ENG switch OFF (TGO slow, ADI needles in error, 6 ft/s underburn)



If two FA MDMs lost		
MDMs	Preburn: ENG – OFF	During burn: MAN SHUTDN
1,2	LEFT (TVC)	BOTH
1,3	RIGHT (IGN)	LEFT
1,4	LEFT (IGN)	RIGHT
2,3	LEFT (IGN)	RIGHT
2,4	RIGHT (IGN)	LEFT
3,4	RIGHT (TVC)	BOTH

ORB OPS-31b/114/O/A

Cont next page

FAB USE ONLY

FS CC 10-6

ORB OPS/114/FIN A

TOP

PILE
VELCRO

ORB OPS-41a/114/O/A

PILE
VELCRO

STS-114 DAP A1 -- A8 CONFIGURATIONS

	ITEM #	A1	A2	A3	A4	A5	A6	A7	A8
PRI									
ROT RATE	10 (50)	0.2000	0.4000	0.2000	0.5000	0.2000	0.2000	0.2000	0.0500
ATT DB	11 (51)	5.00	1.00	0.30	3.00	5.00	5.00	2.00	2.00
RATE DB	12 (52)	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
ROT PLS	13 (53)	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
COMP	14 (54)	.000	.000	.000	.000	.000	.000	.000	.000
P OPTION	15 (55)	ALL	ALL	ALL	ALL	ALL	TAIL	ALL	ALL
Y OPTION	16 (56)	ALL	ALL	TAIL	ALL	ALL	TAIL	ALL	ALL
TRAN PLS	17 (57)	0.100	0.100	0.100	0.100	0.100	0.100	0.100	0.100
ALT									
RATE DB	18 (58)	0.200	0.200	0.070	0.200	0.070	0.070	0.100	0.100
JET OPT	19 (59)	ALL	ALL	ALL	ALL	ALL	TAIL	ALL	ALL
# JETS	20 (60)	2	2	1	2	1	1	2	2
ON TIME	21 (61)	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
DELAY	22 (62)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VERN									
ROT RATE	23 (63)	0.2000	0.4000	0.0080	0.2000	0.0500	0.0500	0.0160	0.0500
ATT DB	24 (64)	1.000	1.000	0.070	1.000	1.000	1.000	1.000	1.000
RATE DB	25 (65)	.020	.020	.010	.020	.020	.020	.020	.020
ROT PLS	26 (66)	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.050
COMP	27 (67)	.000	.000	.000	.000	.000	.000	.000	.000
CNTL ACC	28 (68)	0	0	0	0	0	0	0	0
PURPOSE		NOMINAL	PTC	GG	PRE/POST DEPLOY	LOSS OF VERN (ALL)	LOSS OF VERN (TAIL ONLY)	RNDZ	TERMINAL PHASE

BOLD/ITALIC indicates change from I-Load.

HINGE

(reduced copy)
FS CC 10-7

ORB OPS/114/FIN A

TOP
HINGED AT BOTTOM OF
'STS-114 DAP A1 -- A8 CONFIGURATIONS'
HINGE

STS-114 DAP B1 -- B8 CONFIGURATIONS

	ITEM #	B1	B2	B3	B4	B5	B6	B7	B8
PRI									
ROT RATE	30 (50)	0.5000	0.2000	0.2000	0.2000	0.2000	0.5000	0.5000	0.0500
ATT DB	31 (51)	3.00	3.00	3.00	0.30	3.00	3.00	2.00	2.00
RATE DB	32 (52)	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
ROT PLS	33 (53)	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040
COMP	34 (54)	.000	.000	.000	.000	.000	.000	.000	.000
P OPTION	35 (55)	ALL	TAIL	ALL	TAIL	TAIL	ALL	ALL	ALL
Y OPTION	36 (56)	ALL	TAIL	ALL	TAIL	TAIL	ALL	ALL	ALL
TRAN PLS	37 (57)	0.100	0.020	0.020	0.020	0.020	0.020	0.050	0.050
ALT									
RATE DB	38 (58)	0.200	0.070	0.070	0.100	0.200	0.200	0.100	0.100
JET OPT	39 (59)	ALL	TAIL	ALL	ALL	ALL	ALL	ALL	ALL
# JETS	40 (60)	2	1	1	2	2	2	2	2
ON TIME	41 (61)	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
DELAY	42 (62)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VERN									
ROT RATE	43 (63)	0.2000	0.2000	0.2000	0.0080	0.0160	0.2000	0.2000	0.0500
ATT DB	44 (64)	1.000	1.000	1.000	0.100	0.033	1.000	1.000	1.000
RATE DB	45 (65)	.020	.020	.020	.010	.020	.020	.020	.020
ROT PLS	46 (66)	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.020
COMP	47 (67)	.000	.000	.000	.000	.000	.000	.000	.000
CNTL ACC	48 (68)	0	0	0	0	0	0	0	0
PURPOSE		OMS & RCS Burns (ORB OPS)	Loss of VERN (Tail Only)	Loss of VERN (All)		COAS/HUD CAL		RNDZ	TERMINAL PHASE
BOLD/ITALIC indicates change from I-Load.									

HOOK
VELCRO

ORB OPS-41aa/114/O/B

HOOK
VELCRO

(reduced copy)
 FS CC 10-8 ORB OPS/114/FIN A,1

TOP
BACK OF 'STS-114 DAP A1 -- A8 CONFIGURATIONS'

PILE
VELCRO

ORB OPS-41b/114/O/B

PILE
VELCRO

STS-114 DAP A9 -- A14 CONFIGURATIONS

	ITEM #	A9	A10	A11	A12	A13	A14
PRI							
ROT RATE	10 (50)	0.1300	0.0500	0.1000	0.1000	0.1000	0.2000
ATT DB	11 (51)	2.00	0.60	15.00	5.00	5.00	5.00
RATE DB	12 (52)	0.10	0.10	0.20	0.20	0.20	0.20
ROT PLS	13 (53)	0.100	0.100	0.100	0.040	0.040	0.100
COMP	14 (54)	.000	.000	.000	.000	.000	.000
P OPTION	15 (55)	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL
Y OPTION	16 (56)	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL
TRAN PLS	17 (57)	0.050	0.050	0.100	0.010	0.010	0.100
ALT							
RATE DB	18 (58)	0.100	0.100	0.070	0.070	0.070	0.200
JET OPT	19 (59)	TAIL	TAIL	TAIL	TAIL	TAIL	TAIL
# JETS	20 (60)	2	2	3	3	3	1
ON TIME	21 (61)	0.08	0.08	0.08	0.08	0.08	0.08
DELAY	22 (62)	0.00	0.00	12.00	11.04	11.04	6.00
VERN							
ROT RATE	23 (63)	0.1300	0.0500	0.1000	0.1000	0.1000	0.2000
ATT DB	24 (64)	1.000	0.500	5.000	3.000	3.000	3.000
RATE DB	25 (65)	.020	.020	.050	.050	.080	.200
ROT PLS	26 (66)	0.050	0.050	0.010	0.002	0.002	0.010
COMP	27 (67)	.000	.000	.000	.000	.000	.000
CNTL ACC	28 (68)	0	0	1,2*	1	3	9
PURPOSE		PROX OPS/ FLYAROUND	DOCKING	AUTO REBOOST	MATED STACK & RMS OPS (VRCS)	A/L DEPRESS ATTITUDE CONTROL (VRCS)	ORBITER ALONE SRMS/ OBSS
BOLD/ITALIC indicates change from I-Load. * 1 for Config 3&4, 2 for Config 1&2							

HINGE

FS CC 10-9
(reduced copy)

ORB OPS/114/FINA

TOP
 BACK OF 'STS-114 DAP B1 -- B8 CONFIGURATIONS'
 HINGED AT BOTTOM OF 'STS-114 DAP A9 -- A14 CONFIGURATIONS'
 HINGE

STS-114 DAP B9 -- B13 CONFIGURATIONS

	ITEM #	B9	B10	B12	B13
PRI					
ROT RATE	30 (50)	0.1300	0.0500	0.1000	0.1000
ATT DB	31 (51)	2.00	0.60	5.00	5.00
RATE DB	32 (52)	0.10	0.10	0.20	0.20
ROT PLS	33 (53)	0.040	0.040	0.040	0.040
COMP	34 (54)	.000	.000	.000	.000
P OPTION	35 (55)	TAIL	TAIL	TAIL	TAIL
Y OPTION	36 (56)	TAIL	TAIL	TAIL	TAIL
TRAN PLS	37 (57)	0.010	0.010	0.010	0.010
ALT					
RATE DB	38 (58)	0.100	0.100	0.070	0.070
JET OPT	39 (59)	TAIL	TAIL	TAIL	TAIL
# JETS	40 (60)	2	2	3	3
ON TIME	41 (61)	0.08	0.08	0.08	0.08
DELAY	42 (62)	10.00	0.00	11.04	11.04
VERN					
ROT RATE	43 (63)	0.1300	0.0500	0.1000	0.1000
ATT DB	44 (64)	1.000	0.500	3.000	3.000
RATE DB	45 (65)	.020	.020	.050	.080
ROT PLS	46 (66)	0.020	0.020	0.002	0.002
COMP	47 (67)	.000	.000	.000	.000
CNTL ACC	48 (68)	0	0	2	4
PURPOSE		PROX OPS/ FLYAROUND	DOCKING	MATED STACK & RMS OPS (ALT)	A/L DEPRESS ATTITUDE CONTROL (ALT)
BOLD/ITALIC indicates change from I-Load.					

HOOK
VELCRO

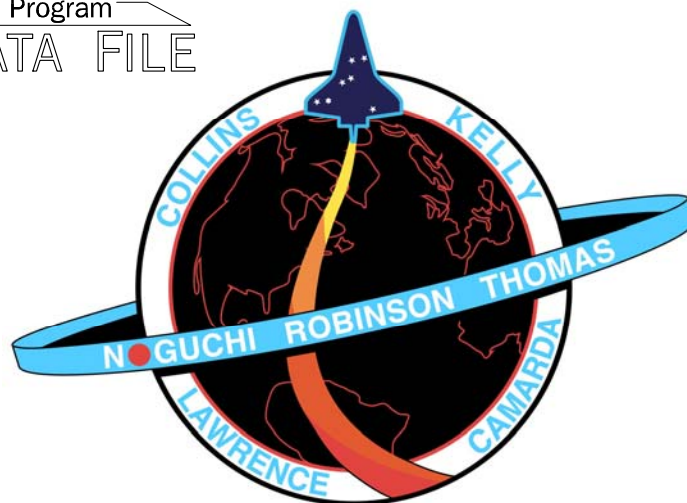
ORB OPS-41bb/114/O/C

HOOK
VELCRO

(reduced copy)
 FS CC 10-10 ORB OPS/114/FIN A,1

Space Shuttle Program
FLIGHT DATA FILE

JSC-48036-114
FINAL, REV A



ORBIT OPS CHECKLIST

STS
114

Flight Cover (trim bottom to expose tabs)