

# Orbit Operations Checklist

## STS-115 Flight Supplement

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**Mission Operations Directorate  
Operations Division**

**Final  
August 8, 2006**

National Aeronautics and  
Space Administration

**Lyndon B. Johnson Space Center**  
Houston, Texas



***United Space Alliance***



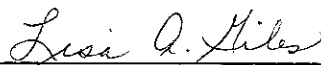
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MISSION OPERATIONS DIRECTORATE

**ORBIT OPERATIONS CHECKLIST  
STS-115 FLIGHT SUPPLEMENT**

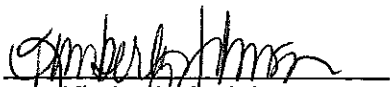
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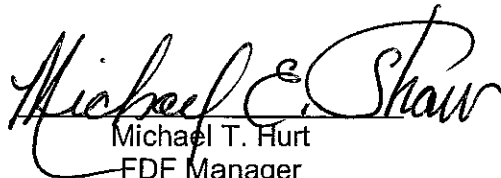
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	ORB OPS-2195	ORB OPS-2201
	ORB OPS-2197	ORB OPS-2205
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REBOOST/DAP	DF6/C. Alford	281-483-0703
OIU	DF2/D. Branham	281-483-1187
PRLA	DF5/J. Kling	281-483-0677
DSOs	SK/S. Irwin	281-483-5089
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CUE CARDS:

FLIGHT DAY 3 DOCKING ORBITER WITH ISS CO2 ABSORBER REPLACEMENT	DF8/S. Tripodi	281-483-3521
ORBIT BURN MONITOR	DF6/D. Lenort	281-483-2644
DAP TABLES	DF6/C. Alford	281-483-0703

ORBIT OPERATIONS CHECKLIST  
 STS-115 FLIGHT SUPPLEMENT

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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 \*
  - \* OI PCMMU PWR – 2(1) \*
  - \* √ERR MSG – 'I/O ERR PCM' \*
  - C3 \* I/O RESET PCM – ITEM 5 EXEC (\*) \*
  - CRT \* 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	-
G9	Prelaunch PL C/O	103/180	758
G2,G8,S2	RNDZ w/UHF FMT CCSU (SSOR/SSV/TCS) (PRIME)	103/192	763
G2,G8,S2	RNDZ w/UHF FMT CCSU (SSOR/SSV/TCS) (B/U)	103/211	770
G2,G8,S2	DOCKED ISS FMT CCSH (OIU/SSV) (PRIME)	103/184	760
G2,G8,S2	DOCKED ISS FMT CCSH (OIU/SSV) (B/U)	103/205	767
G2,G8,S2	DOCKED ISS FMT CCSH-A (OIU/SSV) (PRIME)	103/199	780
G2,G8,S2	DOCKED ISS FMT CCSH-A (OIU/SSV) (B/U)	103/212	781
G2,G8,S2	OIU C/O AND SSV RATE 4 (PRIME)	103/188	762
G2,G8,S2	OIU C/O AND SSV RATE 5 (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
763 RNDZ w/UHF FMT CCSU  (PRIME) TFL 192	1 2 3 4 5-FPM	30 - 9 4 503	1,2 - 5 4	OIU7 (CCSU) ** - TCS SSV (3) *** H-H-H *
770 RNDZ w/UHF FMT CCSU  (BACKUP) TFL 211	1 2 3 4 5-FPM	14 31 - 19 502	4 1,2 - 5	SSV (3) *** OIU7 (CCSU) ** - TCS H-H-H *
760 DOCKED FMT CCSH  (PRIME) TFL 184	1 2 3 4 5-FPM	7 - - 27 501	1,2 - - 4	OIU9 (CCSH) ** - - SSV (2) *** H-H-H *
767 DOCKED FMT CCSH  (BACKUP) TFL 205	1 2 3 4 5-FPM	- 17 29 - 506	- 1,2 4 -	- OIU9 (CCSH) ** SSV (2) *** - H-H-H *
780 DOCKED FMT CCSH-A  (PRIME) TFL 199	1 2 3 4 5-FPM	6 - - 27 501	1,2 - - 4	OIU9 (CCSH-A) ** - - SSV (2) *** H-H-H *
781 DOCKED FMT CCSH-A  (BACKUP) TFL 212	1 2 3 4 5-FPM	- 16 29 - 506	- 1,2 4 -	- OIU9 (CCSH-A) ** SSV (2) *** - H-H-H *

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

Cont next page

FS 1-5

ORB OPS/115/FIN

CONFIG	DECOM	FMT	INPUT	USE
762 SSV RATE 4	1 2 3 4	5 - - 1	1,2 - - 4	OIU255 ** - - SSV (4) ***
(PRIME) TFL 188	5-FPM	505		H-H-H *
765 SSV RATE 5	1 2 3 4	- 15 11 -	- 1,2 4 -	- OIU255 ** SSV (5) *** -
(BACKUP) TFL 203	5-FPM	507		L-H-H *
758 Pre-Launch PL C/O	1 2 3 4	28 15 9 -	1,2 1,2 5 -	OIU253 ** OIU255 ** TCS -
(PRIME) TFL 180	5-FPM	504		H-H-H *

\* OI-GNC-SM, Orbiter Downlist Data Rates (High or Low)  
 \*\* # in OIU (#) represents the OIU format and 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 +9 EXEC  
GNC TO GNC 1      ITEM 18 +1 4 EXEC  
GNC 1 TO BUS 3    ITEM 18 +1 6 EXEC  
BUS 4 BC            ITEM 15 EXEC (\*)  
BUS 3 RT            ITEM 10 EXEC (\*)  
LOAD FORMAT      ITEM 1 +9 EXEC >>
2. GNC-1 PRIMARY ON LB-ORB N2-2 (OIU BUS 4)  
LOAD FORMAT      ITEM 1 +9 EXEC  
GNC TO GNC 1      ITEM 18 +1 4 EXEC  
GNC 1 TO BUS 4    ITEM 18 +1 5 EXEC  
BUS 3 BC            ITEM 11 EXEC (\*)  
BUS 4 RT            ITEM 14 EXEC (\*)  
LOAD FORMAT      ITEM 1 +9 EXEC >>
3. GNC-2 PRIMARY ON LB-ORB N2-1 (OIU BUS 3)  
LOAD FORMAT      ITEM 1 +9 EXEC  
GNC TO GNC 2      ITEM 18 +1 3 EXEC  
GNC 2 TO BUS 3    ITEM 18 +1 8 EXEC  
BUS 4 BC            ITEM 15 EXEC (\*)  
BUS 3 RT            ITEM 10 EXEC (\*)  
LOAD FORMAT      ITEM 1 +9 EXEC >>
4. GNC-2 PRIMARY ON LB-ORB N2-2 (OIU BUS 4)  
LOAD FORMAT      ITEM 1 +9 EXEC  
GNC TO GNC 2      ITEM 18 +1 3 EXEC  
GNC 2 TO BUS 4    ITEM 18 +1 7 EXEC  
BUS 3 BC            ITEM 11 EXEC (\*)  
BUS 4 RT            ITEM 14 EXEC (\*)  
LOAD FORMAT      ITEM 1 +9 EXEC >>

Cont next page

5. MPLM (if flown)  
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/115/FIN

PTG

FS 2-2

ORB OPS/15/FIN

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	86.0	-Y:33 R+ 20 -Z:77 P+ 272 Y+ 287	R+ 260 P+ 236 Y+ 295	R+ 113 P+ 280 Y+ 301	-Y:77 R+ 283 -Z:33 P+ 58 Y+ 61	R+ 181 P+ 76 Y+ 74	R+ 350 P+ 80 Y+ 52		
B	89.8	-Y:85 R+ 112 -Z:73 P+ 36 Y+ 10	R+ 24 P+ 33 Y+ 355	R+ 202 P+ 21 Y+ 13	-Y:73 R+ 159 -Z:85 P+ 209 Y+ 6	R+ 72 P+ 217 Y+ 354	R+ 247 P+ 196 Y+ 358		
C	83.4	-Y:39 R+ 195 -Z:94 P+ 306 Y+ 3	R+ 110 P+ 320 Y+ 358	R+ 279 P+ 300 Y+ 349	-Y:94 R+ 76 -Z:39 P+ 141 Y+ 7	R+ 352 P+ 131 Y+ 356	R+ 162 P+ 132 Y+ 18		
D	83.6	-Y:48 R+ 350 -Z:49 P+ 178 Y+ 31	R+ 274 P+ 164 Y+ 40	R+ 66 P+ 192 Y+ 40	-Y:49 R+ 272 -Z:48 P+ 344 Y+ 315	R+ 193 P+ 352 Y+ 328	R+ 11 P+ 3 Y+ 308		

STAR PAIRS PAD

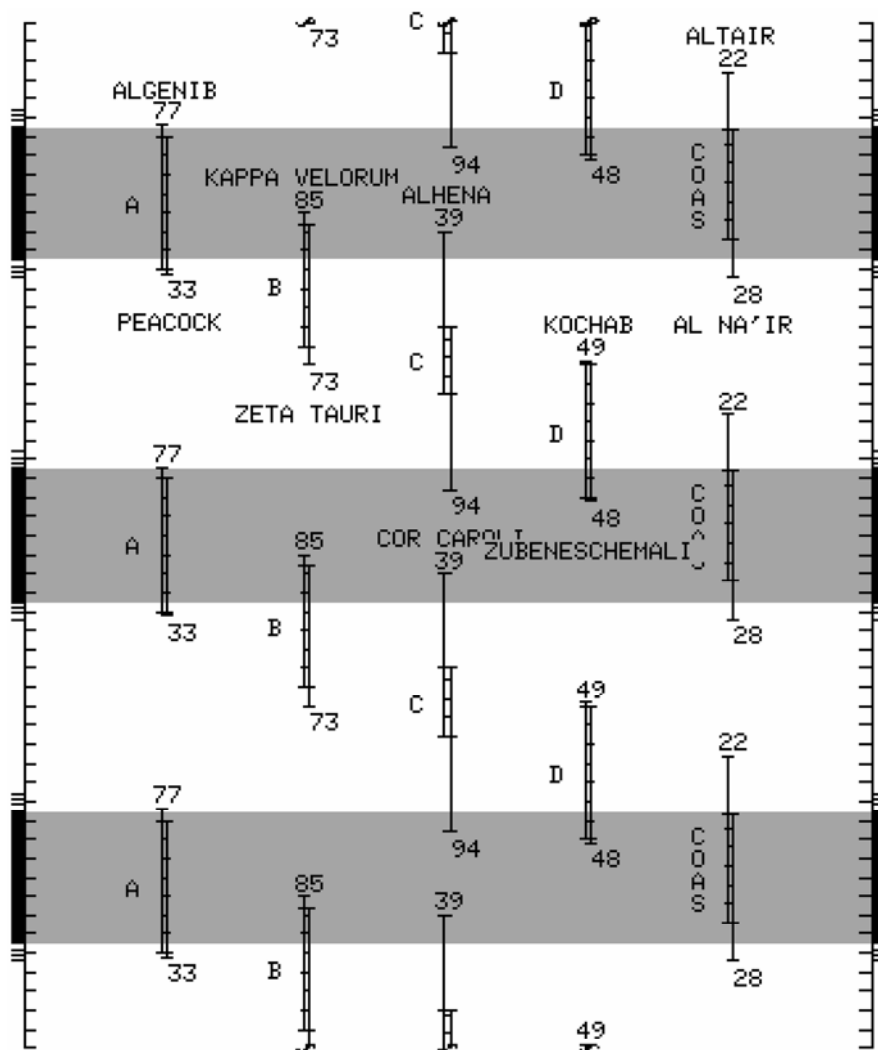
PAIR	COAS ALIGN	ANG SEP	COAS ALIGN
	ATTITUDE 1		ATTITUDE 2
C	+X COAS	22 R+ 9 P+ 341 Y+ 298	28 R+ 60 P+ 51 Y+ 341
D			
A			
S	-Z COAS	22 R+ 242 P+ 64 Y+ 4	28 R+ 215 P+ 111 Y+ 55

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

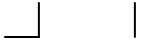
	-Z S TRK	-Y S TRK
P	87.7	0
Y	358	280.6

MET Applicable: 000/01:00 - 011/00:00  
Date L/O: 08/28/06  
GMT L/O: 240/19:59:04

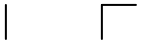
# STAR PAIRS



MET Applicable: 000/01:00 - 011/00:00  
 Date L/O: 08/28/06  
 GMT L/O: 240/19:59:04



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DAP TABLES

DAP OVERVIEW ..... FS 3-2  
UNIV PTG ..... FS 3-3  
STS-115 DAP A CONFIGURATIONS..... FS 3-4  
          B CONFIGURATIONS..... FS 3-6

**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 Stack & SRMS Ops (VRCS)	B12 – Mated Stack (ALT)
A13 – Shuttle Airlock Depress Att Cntrl (VRCS)	B13 –
A14 – Orbiter alone SRMS/OBSS Ops	B14 –
A15 – Mated Stack RMS Ops (VRCS)	B15 –

- CNTL ACC = 0 Orbiter alone with unloaded RMS
- = 1 Mated - VRCS and Shuttle Airlock Pressurized with P3/P4 Berthed, at Low Hover, and at Auto Seq Start
  - = 2 Mated - ALT and Shuttle Airlock Pressurized with P3/P4 Berthed
  - = 3 Mated - VRCS and Shuttle Airlock Pressurized with P3/P4 at Capture Complete to Installed
  - = 4 Mated - ALT and Shuttle Airlock Pressurized with P3/P4 Installed
  - = 5 Mated - VRCS and Shuttle Airlock Pressurized with P3/P4 at Handoff
  - = 6 Mated - VRCS and Shuttle Airlock Pressurized with P3/P4 at Intermediate and Preinstall
  - = 7 Mated - VRCS and Shuttle Airlock Depressurized with P3/P4 Berthed
  - = 8 Mated - VRCS and Shuttle Airlock Depressurized with P3/P4 Installed
  - = 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/115/FIN

UNIV PTG

TGT ID = 1 Orbiting Vehicle = 2 Earth Center = 3 Earth Target Input LAT ( $\pm 90$ ) LON ( $\pm 180$ , + = East) ALT (-3444.0 to 20000.0 nm) = 4 Sun Center = 5 Celestial Target Input RA (0-359.99) DEC ( $\pm 90$ ) = 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-115 DAP A1 -- A8 CONFIGURATIONS**

	ITEM #	A1	A2	A3	A4	A5	A6	A7	A8
<b>PRI</b>									
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
<b>ALT</b>									
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
<b>VERN</b>									
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/15/FIN



**STS-115 DAP A9 -- A15 CONFIGURATIONS**

	ITEM #	A9	A10	A11	A12	A13	A14	A15
<b>PRI</b>								
ROT RATE	10 (50)	0.1300	0.0500	<b>0.1000</b>	<b>0.1000</b>	<b>0.1000</b>	0.2000	0.1000
ATT DB	11 (51)	2.00	0.60	<b>15.00</b>	5.00	5.00	5.00	<b>5.00</b>
RATE DB	12 (52)	0.10	0.10	0.20	0.20	0.20	0.20	0.20
ROT PLS	13 (53)	0.100	0.100	0.100	<b>0.040</b>	<b>0.040</b>	0.100	<b>0.040</b>
COMP	14 (54)	.000	.000	.000	.000	.000	.000	.000
P OPTION	15 (55)	TAIL	TAIL	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	TAIL
Y OPTION	16 (56)	TAIL	TAIL	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	TAIL
TRAN PLS	17 (57)	0.050	0.050	0.100	<b>0.010</b>	<b>0.010</b>	0.100	0.010
<b>ALT</b>								
RATE DB	18 (58)	0.100	0.100	<b>0.070</b>	<b>0.070</b>	<b>0.070</b>	0.200	<b>0.070</b>
JET OPT	19 (59)	TAIL	TAIL	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	TAIL
# JETS	20 (60)	2	2	<b>3</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>3</b>
ON TIME	21 (61)	0.08	0.08	0.08	0.08	0.08	0.08	0.08
DELAY	22 (62)	0.00	0.00	<b>12.00</b>	<b>11.04</b>	<b>11.04</b>	<b>6.00</b>	<b>11.04</b>
<b>VERN</b>								
ROT RATE	23 (63)	0.1300	0.0500	<b>0.1000</b>	<b>0.1000</b>	<b>0.1000</b>	0.2000	<b>0.1000</b>
ATT DB	24 (64)	1.000	0.500	<b>5.000</b>	<b>3.000</b>	<b>3.000</b>	<b>3.000</b>	<b>3.000</b>
RATE DB	25 (65)	.020	.020	<b>.050</b>	<b>.050</b>	<b>.080</b>	<b>.200</b>	<b>.100</b>
ROT PLS	26 (66)	0.050	0.050	0.010	<b>0.002</b>	<b>0.002</b>	0.010	<b>0.002</b>
COMP	27 (67)	.000	.000	.000	.000	.000	.000	.000
CNTL ACC	28 (68)	0	0	<b>1(3)(2)(4)<sup>1</sup></b>	<b>1(3)<sup>2</sup></b>	<b>7(8)<sup>3</sup></b>	<b>9</b>	<b>5(6)<sup>4</sup></b>
PURPOSE		PROX/OPS FLYAROUND	DOCKING	AUTO REBOOST	MATED STACK & SRMS OPS (VRCS)	A/L DEPRESS ATTITUDE CONTROL (VRCS)	ORBITER ALONE SRMS/OBSS	MATED STACK RMS OPS (VRCS)

**BOLD/ITALIC** indicates change from I-Load.

<sup>1</sup> For Reboost Config 3 & 4: 1 for P3/P4 Berthed, 3 for P3/P4 Installed;

For Reboost Config 1 & 2: 2 for P3/P4 Berthed, 4 for P3/P4 Installed

<sup>2</sup> 1 for P3/P4 Berthed, Low Hover, and Auto Seq Start, 3 for P3/P4 after Capture Complete

<sup>3</sup> 7 for P3/P4 Berthed, 8 for P3/P4 Installed

<sup>4</sup> 5 for P3/P4 at Handoff, 6 for P3/P4 at Intermediate and Preinstall

FS-3-5

ORB OPS/15/FIN

**STS-115 DAP B1 -- B8 CONFIGURATIONS**

	ITEM #	B1	B2	B3	B4	B5	B6	B7	B8
<b>PRI</b>									
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
<b>ALT</b>									
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
<b>VERN</b>									
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.

FS 3-6

ORB OPS/15/FIN

**STS-115 DAP B9 -- B12 CONFIGURATIONS**

	ITEM #	B9	B10	B12
<b>PRI</b>				
ROT RATE	30 (50)	0.1300	0.0500	<b><i>0.1000</i></b>
ATT DB	31 (51)	2.00	0.60	<b><i>5.00</i></b>
RATE DB	32 (52)	0.10	0.10	0.20
ROT PLS	33 (53)	0.040	0.040	0.040
COMP	34 (54)	.000	.000	.000
P OPTION	35 (55)	TAIL	TAIL	<b><i>TAIL</i></b>
Y OPTION	36 (56)	TAIL	TAIL	<b><i>TAIL</i></b>
TRAN PLS	37 (57)	0.010	0.010	<b><i>0.010</i></b>
<b>ALT</b>				
RATE DB	38 (58)	0.100	0.100	<b><i>0.070</i></b>
JET OPT	39 (59)	TAIL	TAIL	<b><i>TAIL</i></b>
# JETS	40 (60)	2	2	<b><i>3</i></b>
ON TIME	41 (61)	0.08	0.08	0.08
DELAY	42 (62)	10.00	0.00	<b><i>11.04</i></b>
<b>VERN</b>				
ROT RATE	43 (63)	0.1300	0.0500	<b><i>0.1000</i></b>
ATT DB	44 (64)	1.000	0.500	<b><i>3.000</i></b>
RATE DB	45 (65)	.020	.020	<b><i>.050</i></b>
ROT PLS	46 (66)	0.020	0.020	0.002
COMP	47 (67)	.000	.000	.000
CNTL ACC	48 (68)	0	0	<b><i>2(4)<sup>5</sup></i></b>
PURPOSE		PROX OPS/ FLYAROUND	DOCKING	MATED STACK (ALT)

***BOLD/ITALIC*** indicates change from I-Load.

<sup>5</sup> 2 for P3/P4 Berthed, 4 for P3/P4 Installed

FS 3-7

ORB OPS/115/

FIN



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REBOOST/DAP

AUTO REBOOST.....	FS 4-2
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/115/FIN

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

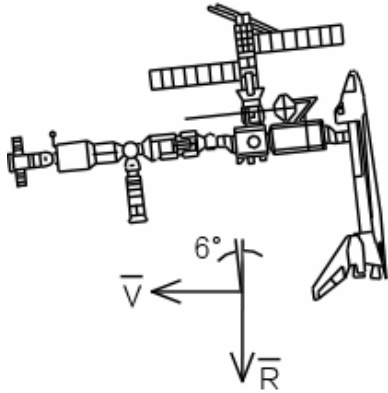
DAP: as reqd

Pri RJD LOGIC,DRIVER (sixteen) – as reqd

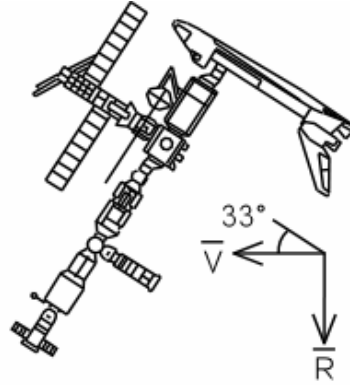
C3  
O14,  
O15,  
O16

## AUTO REBOOST ATTITUDE REFERENCE

### VRCS ATTITUDE HOLD CONFIGURATIONS:

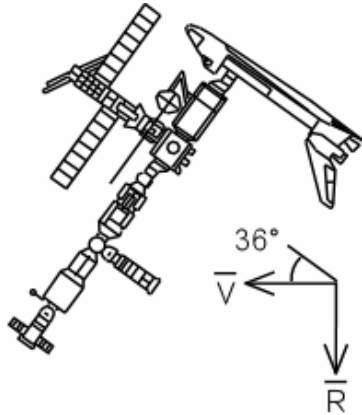


Earth  
Nose up, Config 3 (VRCS)

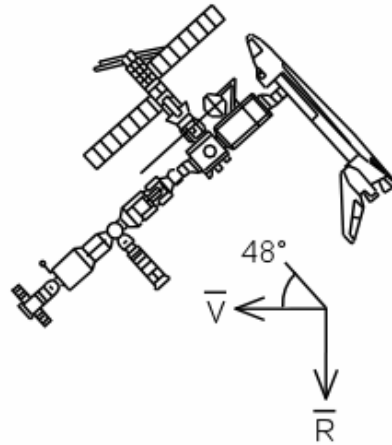


Earth  
Nose up, Config 4 (+X, VRCS)

### ALT ATTITUDE HOLD CONFIGURATIONS:



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



Earth  
Nose up, Config 2 (+X)



## DOCKED CONFIGURATION DAP REFERENCE

SHUTTLE AIRLOCK			
		PRESS ( $\geq 3.45$ psia)	DEPRESS ( $< 3.45$ psia)
	non-RMS	RMS	non-RMS only
VERN	A12 (CA: 1,3)	A12/A15 (CA: 1,5,6)	A13 (CA: 7,8)
ALT	B12 (CA: 2,4)	Not Certified	Not Certified
RATE DAMPING	LVLH(INRTL), then AUTO		
RATE > 0.20	LVLH(INRTL) 6 min max FREE,LVLH(INRTL)		

1. When shuttle airlock pressurized (NON-RMS OPS),  
select DAP: A12/VERN or B12/ALT  
Pre-P3/P4 INSTALL: CA1 for VERN  
CA2 for ALT  
Post-P3/P4 INSTALL: CA3 for VERN  
CA4 for ALT  
All can be used for attitude maintenance or maneuvering
2. When shuttle airlock pressurized and loaded RMS,  
with P3/P4 at Low Hover and Auto Seq Start,  
select DAP: A12/VERN CA1  
with P3/P4 at Handoff and SSRMS ungrappled,  
select DAP: A15/VERN CA5  
with P3/P4 at Intermediate and Preinstall,  
select DAP: A15/VERN CA6  
All can be used for attitude maintenance or maneuvering on VERN only
3. When shuttle airlock depressurized,  
select DAP: A13/VERN  
CA7 with P3/P4 Berthed  
CA8 with P3/P4 Installed  
Can be used for attitude maintenance or maneuvering on VERN only
4. When rate damping, select DAP: AUTO when rates are below rate deadband and jet activity stopped



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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 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

OIU

PRLA

PRLA CLOSE..... FS 6-2

**PRLA**

FS 6-1

ORB OPS/115/FIN

**PRLA CLOSE**

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

**SM 97 PL RETENTION**

√PL SEL 1 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 1,2 (two) – ON  
BAY MECH PWR SYS 1,2 (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 1,2 (two) – OFF  
BAY MECH PWR SYS 1,2 (two) – OFF

A6U 6. PL RETEN PL SEL – MON

**PRLA**

SHORT DURATION BIOASTRONAUTICS  
INVESTIGATION (SDBI)

SDBI 1490 (PROTOCOL B), BIOAVAILABILITY & PERFORMANCE EFFECTS OF PROMETHAZINE (PMZ) DURING SPACE FLIGHT;	
SDBI 1634, SLEEP-WAKE ACTIGRAPHY .....	FS 7-3
A. DON ACTIWATCH.....	FS 7-3
B. PMZ PROTOCOL .....	FS 7-3
C. DOFFING ACTIWATCH .....	FS 7-5
FLIGHT SLEEP LOG .....	FS 7-5
SALIVA/KSS LOG .....	FS 7-6
SDBI 1493, MONITORING LATENT VIRUS	
REACTIVATION AND SHEDDING .....	FS 7-7
SALIVA COLLECTION (ALL FLIGHT DAYS) .....	FS 7-7

SDBI



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**SDBI**



FS 7-2

ORB OPS/115/FIN



**SDBI 1490 (PROTOCOL B), BIOAVAILABILITY & PERFORMANCE EFFECTS OF PROMETHAZINE (PMZ) DURING SPACE FLIGHT; SDBI 1634, SLEEP-WAKE ACTIGRAPHY**

**ASAP** after entry into orbit:

A. DON ACTIWATCH

MF71M

1. Unstow: Actiwatch  
FLIGHT SLEEP LOG

NOTE

If necessary to remove Actiwatch, record doff/don time on FLIGHT SLEEP LOG

2. Don Actiwatch on non-dominant arm and wear continuously throughout mission
3. Deploy FLIGHT SLEEP LOG and record required information daily (within 15 min after waking)

NOTE

Perform B. PMZ PROTOCOL if SMS is experienced. If unable to collect saliva sample before taking PMZ dose, collect saliva sample at some other drug-free time during mission

B. PMZ PROTOCOL

MF71M

1. Unstow: Saliva Sample Kit  
SALIVA/KSS LOG
2. Temp stow SALIVA/KSS LOG w/Saliva Sample Kit

Cont next page

FS 7-3

ORB OPS/115/FIN

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

MF71M

9. If last saliva sample, stow Saliva Sample Kit

Cont next page

FS 7-4

ORB OPS/115/FIN

C. DOFFING ACTIWATCH

On final day of orbit:

MF71M

- 1. Remove Actiwatch, stow

NOTE

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

FLIGHT SLEEP LOG (example below) is used with both SDBI 1490B and SDBI 1634:

**FLIGHT SLEEP LOG**

Crew ID: \_\_\_\_\_ Actiwatch Dot Color: \_\_\_\_\_

Current Time: \_\_\_\_\_ [ddd:hh:mm (MET)]

Lights Out: \_\_\_\_\_ [ddd:hh:mm (MET)]

Lights On: \_\_\_\_\_ [ddd:hh:mm (MET)]

- How long did you take to fall asleep last night? \_\_\_\_ (hrs) \_\_\_\_ (mins)
- How long did you sleep last night? \_\_\_\_ (hrs) \_\_\_\_ (mins)
- How many times did you awaken during the night? \_\_\_\_
- After the end of your sleep period, how long did you remain in bed before getting up? \_\_\_\_ (hrs) \_\_\_\_ (mins)
- Where did you sleep last night? [Flight deck / Middeck / Spacehab / Sleepstation]
- 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 \_\_\_\_\_
- How did you sleep last night?
 

poorly |-----| great
- How do you feel right now?
 

sleepy |-----| alert
- 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)
- Did you take any medications yesterday? [Yes / No / Decline] (If Yes, list all)

Comments:

SALIVA/KSS LOG (example below) is used with SDBI 1490B:

Crew Member _____	Circle dosage form: 25mg Tablet 50mg Injectable 25mg Suppository		<b>SALIVA / KSS LOG</b> Note: To be used only if PMZ is taken.	
	<b>PMZ Dose One</b>		<b>PMZ Dose Two</b>	
<b>Activity Time (hr) Post-PMZ Dose</b>	<b>KSS</b>	<b>Saliva Sample MET</b>	<b>KSS</b>	<b>Saliva Sample MET</b>
<b>Baseline</b>				
<b>1</b>				
<b>2</b>				
<b>4</b>				
<b>8</b>				
<b>24</b>				
<b>36</b>				
<b>48</b>				
(1) Rate sleepiness during last 5 mins using key (2) Record saliva collection MET				
<b>KSS KEY</b>				
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
very alert	alert	neutral	sleepy, no	very sleepy, great
SDD46108178-601	normal level	neither alert/sleepy	effort to stay awake	effort to stay awake

**SDBI 1493, MONITORING LATENT VIRUS REACTIVATION  
AND SHEDDING**

**SALIVA COLLECTION (ALL FLIGHT DAYS)**

Immediately post-sleep (before brushing teeth):

MF71M 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 rolls and remove a cotton roll using fingers on the outside of the bag
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. Write the FD or MET on Collection Bag Assy using a Sharpie
10. Stow Collection Bag Assy in 'USED' pocket
11. Temp stow Saliva Kit

MF71M 12. 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



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WLE SENSORS PROCEDURES

ACTIVATION AND CHECKOUT .....	FS 8-2
DEACTIVATION AND TEARDOWN .....	FS 8-9
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CONFIGURE DATA FILE BACKUP PATH .....	FS 8-14
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DISABLE WLES FILE BACKUP .....	FS 8-18
ENABLE WLES FILE BACKUP .....	FS 8-18

WLE  
SENSORS

## ACTIVATION AND CHECKOUT

### 1. UNSTOW EQUIPMENT

#### NOTE

A31p laptops may already be unstowed as part of orbiter laptop network setup

MA9D

Unstow:

Laptop Receiver Units (2)  
Cabin Relay Units (2) (S/N 2432, 2496)  
A31p laptops (2)

### 2. SETUP WLE RELAY UNITS

A13

Retrieve WLE SYSTEM CABLE coiled on panel A6  
Connect to MICRO WIS SYSTEM A – J7 (see fig 8-1)

W7

Connect to J1 on Cabin Relay Unit S/N 2432 and secure to STBD side of aft cabin with Velcro (see fig 8-2)

Verify terminator connected to J2

A13

Retrieve WLE SYSTEM CABLE coiled on panel A9  
Connect to MICRO WIS SYSTEM B – J8 (see fig 8-1)

A4

Connect to J1 on Cabin Relay Unit S/N 2496 and secure to PORT side of aft cabin with Velcro (see fig 8-3)

Verify terminator connected to J2

#### 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/115/FIN



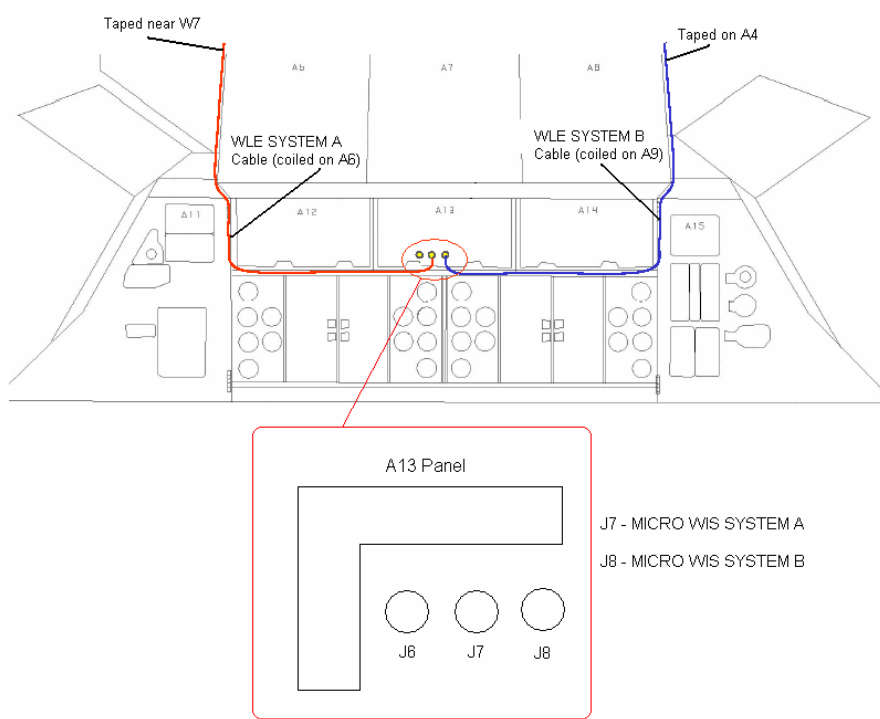


Figure 8-1.- A13 panel.

Cont next page

FS 8-3

ORB OPS/115/FIN

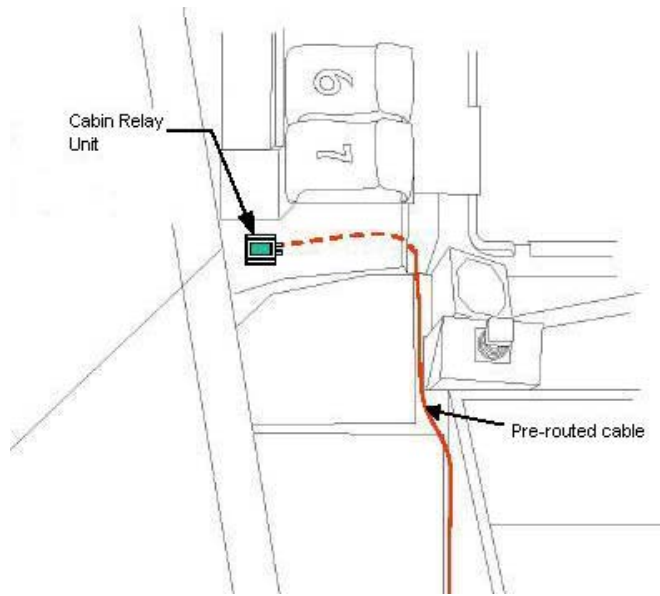


Figure 8-2.- Aft STBD location.

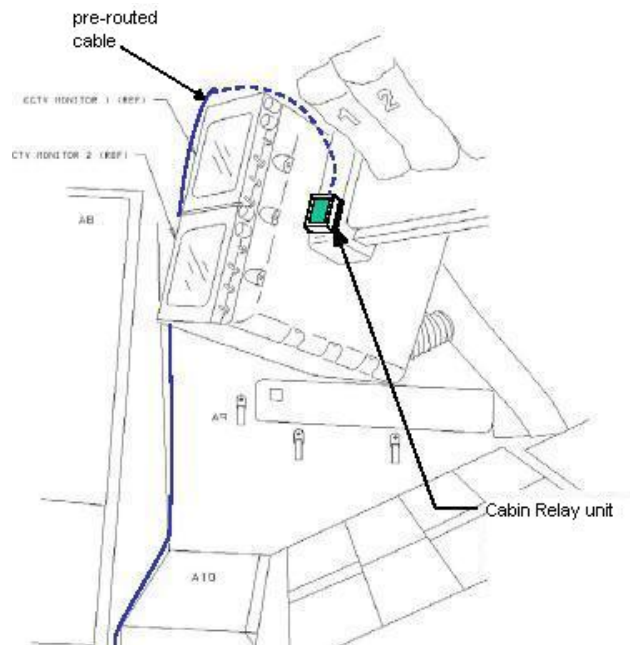


Figure 8-3.- Aft PORT location.

Cont next page

3. SETUP PRIME WLE LAPTOP

A31p

Verify laptop physically connected to network before proceeding with setup

If necessary, close all applications, exit Windows

Click 'Start'>'Shutdown'

Secure Laptop Receiver Unit to A31p with Velcro (see fig 8-4)

Connect Laptop Receiver Unit to A31p Serial port using thumbscrews (see fig 8-5)

4. SETUP BACKUP WLE LAPTOP

A31p

Verify laptop physically connected to network before proceeding with setup

If necessary, close all applications, exit Windows

Click 'Start'>'Shutdown'

Secure Laptop Receiver Unit to A31p with Velcro (see fig 8-4)

Connect Laptop Receiver Unit to A31p Serial port (see fig 8-5)

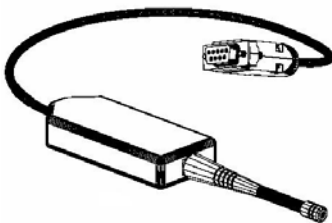


Figure 8-4.- Laptop Receiver Unit.



Figure 8-5.- A31p ports.

Cont next page

5. LAUNCH WLE SOFTWARE

Perform for both laptops:

A31p pwr – On

Select clock from system tray

Verify time is set to GMT (Casablanca,  
Monrovia), adjust if necessary

Click 'OK'

Double click 'Shuttle Apps'>'EWBMTAU-  
WLEFlight'

'Backup Mode Selection'

If setting up one A31p, select 'Standard'

If setting up two A31p laptops:

For prime laptop, select 'Primary'

For backup laptop, select 'Secondary'

NOTE

The secondary laptop lid may be closed at this time, if no longer needed for other applications. The laptops are configured so that they do not enter 'standby' or 'hibernate' mode when the lids are closed. However, due to cooling concerns, fully closing the lid is not recommended

Cont next page

FS 8-6

ORB OPS/115/FIN

6. VERIFY COMM WITH RELAY UNITS

Use prime WLES laptop

'Main'

Click 'Unit List' (left side of display)

NOTE

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

√Cabin Relay Units Unit ID 2432 and 2496 (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'

NOTE

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

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

7. ENABLE DATA FILE BACKUP

Use prime WLES laptop

'Main'

Click 'System Settings' (left side of display)

'Directories'

At the line 'Backup Directory' click 'Browse...'

Navigate to the mapped drive for the backup WLES laptop (expected to be the "U" drive)

Navigate to 'Program Files'>'Invocon'>'EWBMTAU-WLEFlight'

Click 'OK'

Cont next page

FS 8-7

ORB OPS/115/FIN

‘Backup Interval’

Using drop-down list, select 30 minutes

Click ‘Status’ (left side of display)

## 8. INITIATE COMMANDING

### NOTE

The first time a user navigates to ‘Program Files’ folder, display may show information saying the program files are hidden. To view the contents of the folder, select ‘display files’ in the left-hand portion of the Windows Explorer window

Using Windows Explorer, navigate to

‘My Computer’>‘C:’>‘Program Files’>

‘Invocon’>‘EWBMTAU-WLEFlight’>‘Command’

### NOTE

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

Delete file labeled ‘BLOCK.xml’

### NOTE

Files appearing in the ‘Data’ folder verifies two-way communication with the Sensor Units in the orbiter wing. You may view this by using Windows Explorer to navigate to: ‘My Computer’>‘C:’>‘Program Files’>‘Invocon’>‘EWBMTAU-WLEFlight’>‘Data’

Notify MCC-H: “WLES setup complete”

### NOTE

The laptop lid may be closed at this time, if no longer needed for other applications. The laptops are configured so that they do not enter ‘standby’ or ‘hibernate’ mode when the lids are closed. However, due to cooling concerns, fully closing the lid is not recommended

## DEACTIVATION AND TEARDOWN

### A31p 1. DEACTIVATE WLE SENSORS LAPTOP 'Enhanced Wideband MicroTAU – WLEFlight 2.2'

For each WLES A31p:

Click 'Exit'

At prompt 'Are you sure you want to exit?'

click 'Yes'

Click '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  
fig 8-6 and fig 8-7)

Disconnect Cabin Relay Units from pre-routed  
cables

Coil cables, stow in launch location

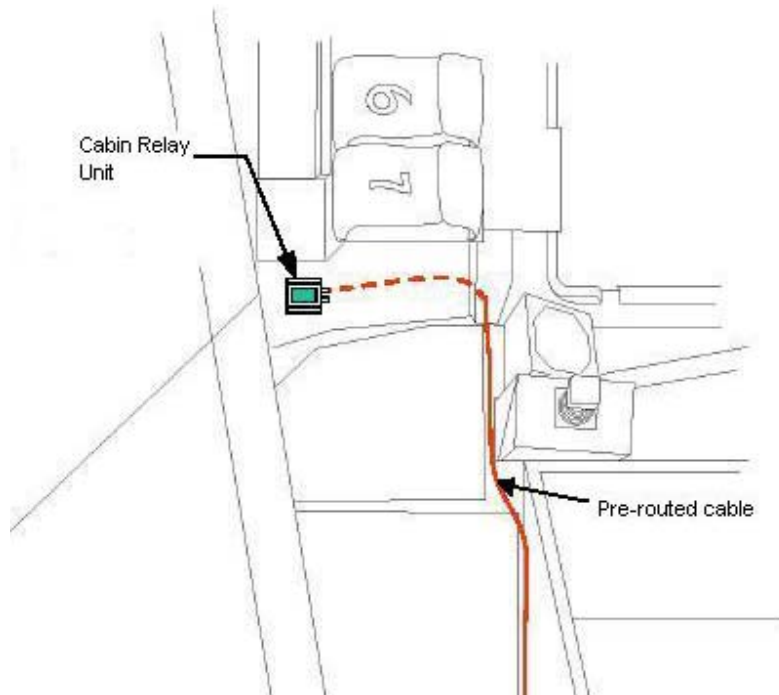


Figure 8-6.- Aft STBD location.

Cont next page

FS 8-9

ORB OPS/115/FIN

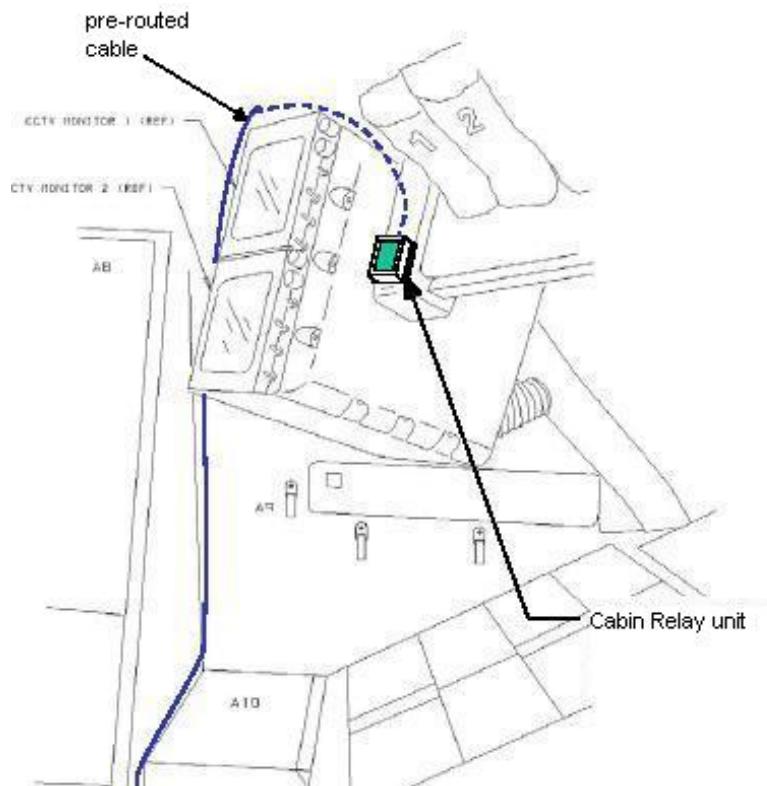


Figure 8-7.- Aft PORT location.

- MA9D
3. STOW EQUIPMENT  
 Stow:  
     Laptop Receiver Units (2)  
     Cabin Relay Units (2)  
 Notify MCC-H: "WLES Teardown Complete"



## WLE LAPTOP RECEIVER UNIT (LRU) R&R

- A31p
1. DISCONNECT BACKUP LRU FROM LAPTOP  
'Enhanced Wideband MicroTAU – WLEFlight 2.2'  
Click 'Exit'  
At prompt 'Are you sure you want to exit?'  
click 'Yes'  
Close other software applications  
Click 'Start'>'Shutdown'  
Disconnect Backup LRU from Backup A31p Serial  
port (see fig 8-8)  
Remove Backup LRU from Velcro on Backup A31p  
(see fig 8-9)

### NOTE

Laptop can now be restarted for use



Figure 8-8.- A31p ports.

- A31p
2. DISCONNECT PRIME LRU FROM LAPTOP  
'Enhanced Wideband MicroTAU – WLEFlight 2.2'  
Click 'Exit'  
At prompt 'Are you sure you want to exit?',  
click 'Yes'  
Close other software applications  
Click 'Start'>'Shutdown'

Cont next page

FS 8-11

ORB OPS/115/FIN

Disconnect Prime LRU from Prime A31p Serial port  
(see fig 8-8)  
Remove LRU from Velcro on A31p

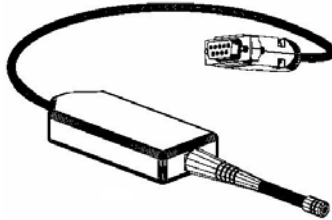


Figure 8-9.- Laptop Receiver Unit.

A31p

3. CONNECT BACKUP LRU  
Connect Backup LRU to Prime WLES A31p Serial port  
Secure LRU to A31p with Velcro
4. LAUNCH WLE SOFTWARE  
Pwr – On  
Double click ‘Shuttle Apps’>‘EWBMTAU-WLEFlight’  
  
‘Backup Mode Selection’  
Select ‘Standard’
5. VERIFY COMM WITH RELAY UNITS  
‘Main’  
  
Click ‘Unit List’ (left side of display)  
√Cabin Relay Units Unit ID 2432 and 2496 (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’

Cont next page

FS 8-12

ORB OPS/115/FIN

NOTE

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

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

Click 'Status' (left side of display)

Notify MCC-H: "WLES LRU R&R complete", mark  
failed LRU as 'failed'

- MA9D
6. STOW EQUIPMENT  
Stow:  
Prime (failed) LRU

## CONFIGURE DATA FILE BACKUP PATH

A31p            Use prime WLES laptop

                 'Main'  
                 Click 'System Settings' (left side of display)

                 'Directories'  
                 At the line 'Backup Directory' click 'Browse...'

                 Navigate to the mapped drive for the backup WLES  
                 laptop (expected to be the "U" drive)

                 Navigate to 'Program Files'>'Invocon'>'EWBMTAU-  
                 WLEFlight'

                 Click 'OK'

                 'Backup Interval'  
                 Verify interval is set for 30 minutes

                 Click 'Status' (left side of display)

## DECONFIGURE DATA FILE BACKUP PATH

A31p            Use prime WLES laptop

                 'Main'  
                 Click 'System Settings' (left side of display)

                 'Directories'  
                 At the line 'Backup Directory' click 'Browse...'

                 Navigate to the 'C' drive of the Prime WLES laptop

                 Navigate to 'Program Files'>'Invocon'

                 Click 'OK'

                 'Backup Interval'  
                 Verify interval is set for 30 minutes

                 Click 'Status' (left side of display)

## PREP WLES LAPTOPS FOR TRANSFER

- A31p 1. DEACTIVATE WLE SENSORS LAPTOP(S)  
'Enhanced Wideband MicroTAU – WLEFlight 2.2'

For each WLES A31p in use:

Click 'Exit'

At prompt 'Are you sure you want to exit?'

click 'Yes'

Click 'Start'>'Shutdown'

Disconnect Laptop Receiver Unit from A31p

Serial port

Remove Laptop Receiver Unit from Velcro on  
A31p

2. CONNECT LRU TO 'NEW' PRIME WLES LAPTOP

√MCC-H for which laptop to use

Click 'Start'>'Shutdown'

Connect LRU to A31p Serial port

Secure LRU to A31p with Velcro

3. CONNECT LRU TO 'NEW' BACKUP WLES LAPTOP

√MCC-H for which laptop to use

Click 'Start'>'Shutdown'

Connect LRU to A31p Serial port

Secure LRU to A31p with Velcro

4. LAUNCH WLE SOFTWARE

Perform for both laptops:

A31p pwr – On

Select clock from system tray

Verify time is set to GMT (Casablanca,  
Monrovia), adjust if necessary

Click 'OK'

Double click 'Shuttle Apps'>'EWBMTAU-  
WLEFlight'

'Backup Mode Selection'

For prime laptop, select 'Primary'

For backup laptop, select 'Secondary'

Cont next page

5. VERIFY COMM WITH RELAY UNITS

'Main'

Click 'Unit List' (left side of display)

√Cabin Relay Units Unit ID 2432 and 2496 (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'

NOTE

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

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

Click 'Status' (left side of display)

6. ENABLE DATA FILE BACKUP

Use prime WLES laptop

'Main'

Click 'System Settings' (left side of display)

'Directories'

At the line 'Backup Directory' click 'Browse...'

Navigate to the mapped drive for the backup WLES laptop (recorded in step 3 above)

Navigate to 'Program Files'>'Invocon'>'EWBMTAU-WLEFlight'

Click 'OK'

Notify MCC-H: "WLES laptop prep for transfer complete"

## PREP WLES FOR RNDZ TOOLS CHECKOUT

- A31p
1. DEACTIVATE BACKUP WLES LAPTOP  
On backup WLES laptop:  
    'Enhanced Wideband MicroTAU – WLEFlight 2.2'  
    Click 'Exit'  
    At prompt 'Are you sure you want to exit?'  
    click 'Yes'  
    Disconnect Laptop Receiver Unit from A31p  
    Serial port  
    Leave attached to laptop with Velcro on A31p
  2. DEACTIVATE WLES FILE BACKUP  
On prime WLES laptop:  
    'Main'  
    Click 'System Settings' (left side of display)  
    'Backup Mode'  
    Click 'Standard'  
    Click 'Status' (left side of display)

## WLES RECONFIG POST DOCK/UNDOCK

- A31p
1. RECOVER BACKUP WLES LAPTOP  
On backup WLES laptop:  
    If necessary, close all applications, exit Windows  
    Click 'Start'>'Shutdown'  
    Connect Laptop Receiver Unit to A31p Serial port  
    A31p pwr – On  
    Double click 'Shuttle Apps'>'EWBMTAU-  
    WLEFlight'  
    'Backup Mode Selection'  
    Click 'Secondary'
  2. REACTIVATE WLES FILE BACKUP  
On prime WLES laptop:  
    'Main'  
    Click 'System Settings' (left side of display)  
    'Backup Mode'  
    Click 'Primary'  
    Click 'Status' (left side of display)

┌ | | | ┐

## **DISABLE WLES FILE BACKUP**

- A31p 1. DISABLE WLES FILE BACKUP  
On prime WLES laptop:

'Main'  
Click 'System Settings' (left side of display)

'Backup Mode'  
Click 'Standard'  
Click 'Status' (left side of display)

## **ENABLE WLES FILE BACKUP**

- A31p 1. ENABLE WLES FILE BACKUP  
On prime WLES laptop:

'Main'  
Click 'System Settings' (left side of display)

'Backup Mode'  
Click 'Primary'  
Click 'Status' (left side of display)



CUE  
CARDS

CUE CARD CONFIGURATION

NOT FLOWN

FS 9-1

ORB OPS/115/FIN

CUE  
CARDS

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NOT FLOWN

FS 9-2

ORB OPS/115/FIN

TOP

HOOK  
VELCRO

HOOK  
VELCRO

**FLIGHT DAY 3 DOCKING  
ORBITER WITH ISS  
CO2 ABSORBER REPLACEMENT**  
(6 crewmembers/Single Shift/FD 1-17)

FLIGHT DAY	POS A	POS B	CK CMPLT
LAUNCH	STS-115 1	STS-115 2	
PRE FD1	"	"	
POST FD2	STS-115 3	STS-115 4*	
PRE FD2	"	STS-115 5*	
POST FD3	STS-115 6	STS-115 7	Docking
PRE FD3	STS-115 8	"	
POST FD4	"	"	
PRE FD4	"	STS-115 9	
POST FD5	"	"	
PRE FD5	STS-115 10	"	
POST FD6	"	"	
PRE FD6	"	STS-115 11	
POST FD7	"	"	
PRE FD7	STS-115 12	"	
POST FD8	"	"	
PRE FD8	"	STS-114 47	
POST FD9	"	"	
PRE FD9	STS-114 TBD	"	1st extra day
POST FD10	"	"	
PRE FD10	"	STS-114 TBD	2nd extra day
POST FD11	"	"	
MID FD11	STS-115 13	STS-115 14	ODS Hatch Close
PRE FD11	"	"	
POST FD12	STS-115 15	STS-115 16	
PRE FD12	STS-115 17*	"	
POST FD13	STS-115 18	STS-115 19	
PRE FD13	"	STS-115 20*	
POST FD14	STS-115 21	STS-115 22	EOM
PRE FD14	STS-115 23*	"	
POST FD15	STS-115 24	STS-115 25	EOM+1
PRE FD15	"	STS-115 26*	
POST FD16	STS-115 27	STS-115 28	EOM+2
PRE FD16	STS-115 29*	"	
POST FD17	STS-115 30	STS-115 31	EOM+3

\*Re-bag and seal LiOH cans w/Gray Tape and stow

ORB OPS-29a/nonRCRS/115/O/B

NOTE

This card is specifically used for the STS-115 mission with orbiter conducting single shift ops with crew size of 6. This change out scheme reflects FD3 docking with ISS; Vozdukh and CDRA on during docked ops and undocking on FD11 (assumes 2 extra docked days). CDRA deactivated the morning of undocking  
(reduced copy)

FAB USE ONLY

FS CC 9-3

ORB OPS/115/FIN

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

HOOK  
VELCRO

HOOK  
VELCRO

**LiOH CANISTER STOWAGE LOCATIONS**

Orbiter:

MD52M (LiOH Box): Cans 1-31\*

\* 2 LiOH cans installed in LiOH slots A and B

ISS:

NOD1S4\_D2: STS-114 can 47 and two STS-114  
cans TBD

(Take any two STS-114 cans and report decal  
numbers to MCC)

FAB USE ONLY

ORB OPS-29b/nonRCRS/115/O/B

(reduced copy)

FS CC 9-4

ORB OPS/115/FIN

TOP

HOOK  
VELCRO

HOOK  
VELCRO

**ORBIT BURN MONITOR**

<b>OMS TEMP*</b>		
FU IN P $\geq$	L	R
	230	230
FU IN P $\leq$	214	212
or No FU IN P		OMS ENG FAIL ----- OMS PRPLT FAIL
<b>OMS PC* &amp; OMS ↓</b>		
ENG VLV 1 or 2 < 70		OMS ENG FAIL
or OX IN P > 227		----- OMS PRPLT FAIL
OX IN P $\leq$ 227		
or No OX IN P		
<b>OMS OX/FU TK P</b> ( $\sqrt$ 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
<b>OMS N2 REG P HIGH or LOW</b>		OMS ENG – ARM
<b>OMS N2 TK P LOW</b>		At N2 TK P < 470:
( $\sqrt$ OMS/MPS)		OMS ENG – ARM
<b>OMS GMBL</b>		L(R) OMS GMBL – SEC (twice)
PRI fail		----- If high RCS usage: OMS ENG FAIL
SEC fail		
<b>GPC</b>		aff GPC PWR – OFF
<input type="checkbox"/> ( <input type="checkbox"/> ) &		If SEC GMBL avail:
Burning OMS aff		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		$\sqrt$ MAN SHUTDN
<b>I/O ERROR FA</b>		L(R) OMS GMBL – SEC
1(4)		----- I/O RESET
		If high RCS usage: OMS ENG FAIL
2 FAs lost		$\sqrt$ MAN SHUTDN
<b>BCE STRG D</b>		I/O RESET (if recov: >>)
1(4)		----- If high RCS usage: L(R) OMS GMBL – SEC (twice)
<b>GPC SET SPLIT</b>		STOP BURN: OMS ENG(s) – OFF
Non-crit burn		----- Go to "GPC" above
Crit burn		
<b>I/O ERROR PCM</b>		OI PCMMU PWR – 2(1)
<b>BCE BYP OA</b>		SM I/O RESET

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

ORB OPS-31a/115/O/C

(reduced copy)

FAB USE ONLY

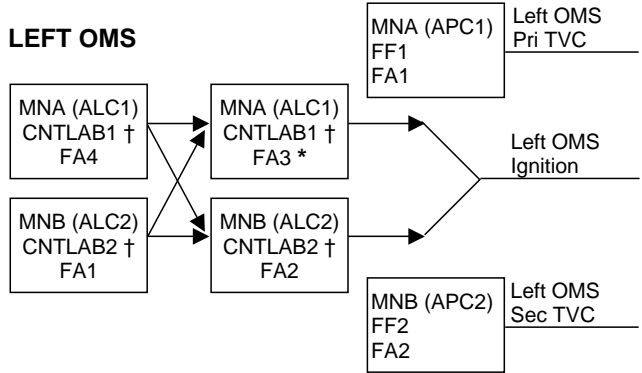
FS CC 9-5

ORB OPS/115/FIN

TOP  
BACK OF 'ORBIT BURN MONITOR'

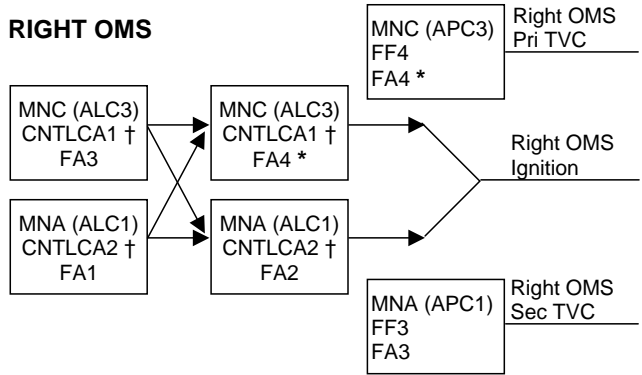


**LEFT OMS**



- † 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)

**RIGHT OMS**



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/115/O/A

(reduced copy)

FAB USE ONLY

FS CC 9-6

ORB OPS/115/FIN

TOP

PILE  
VELCRO

ORB OPS-41a/115/O/B

PILE  
VELCRO

**STS-115 DAP A1 – DAP A8 CONFIGURATIONS**

	ITEM #	A1	A2	A3	A4	A5	A6	A7	A8
<b>PRI</b>									
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
<b>ALT</b>									
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
<b>VERN</b>									
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)  
FSCC 9-7

ORB OPS/115/FIN

TOP  
HINGED AT BOTTOM OF  
'STS-115 DAP A1 – A8 CONFIGURATIONS'  
HINGE

---

**STS-115 DAP B1 – DAP B8 CONFIGURATIONS**

PRI	ITEM #	B1	B2	B3	B4	B5	B6	B7	B8
<b>PRI</b>									
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
<b>ALT</b>									
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
<b>VERN</b>									
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/115/O/B

HOOK  
VELCRO

FS CC 9-8 (reduced copy)

ORB OPS/115/FIN



TOP  
BACK OF 'STS-115 DAP A1 – A8 CONFIGURATIONS'

PILE  
VELCRO

ORB OPS-41b/115/O/B

PILE  
VELCRO

**STS-115 DAP A9 – DAP A15 CONFIGURATIONS**

	ITEM #	A9	A10	A11	A12	A13	A14	A15
<b>PRI</b>								
ROT RATE	10 (50)	0.1300	0.0500	<b>0.1000</b>	<b>0.1000</b>	<b>0.1000</b>	0.2000	0.1000
ATT DB	11 (51)	2.00	0.60	<b>15.00</b>	5.00	5.00	5.00	<b>5.00</b>
RATE DB	12 (52)	0.10	0.10	0.20	0.20	0.20	0.20	0.20
ROT PLS	13 (53)	0.100	0.100	0.100	<b>0.040</b>	<b>0.040</b>	0.100	<b>0.040</b>
COMP	14 (54)	.000	.000	.000	.000	.000	.000	.000
P OPTION	15 (55)	TAIL	TAIL	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	TAIL
Y OPTION	16 (56)	TAIL	TAIL	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	TAIL
TRAN PLS	17 (57)	0.050	0.050	0.100	<b>0.010</b>	<b>0.010</b>	0.100	0.010
<b>ALT</b>								
RATE DB	18 (58)	0.100	0.100	<b>0.070</b>	<b>0.070</b>	<b>0.070</b>	0.200	<b>0.070</b>
JET OPT	19 (59)	TAIL	TAIL	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	TAIL
# JETS	20 (60)	2	2	<b>3</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>3</b>
ON TIME	21 (61)	0.08	0.08	0.08	0.08	0.08	0.08	0.08
DELAY	22 (62)	0.00	0.00	<b>12.00</b>	<b>11.04</b>	<b>11.04</b>	<b>6.00</b>	<b>11.04</b>
<b>VERN</b>								
ROT RATE	23 (63)	0.1300	0.0500	<b>0.1000</b>	<b>0.1000</b>	<b>0.1000</b>	0.2000	<b>0.1000</b>
ATT DB	24 (64)	1.000	0.500	<b>5.000</b>	<b>3.000</b>	<b>3.000</b>	<b>3.000</b>	<b>3.000</b>
RATE DB	25 (65)	.020	.020	<b>.050</b>	<b>.050</b>	<b>.080</b>	<b>.200</b>	<b>.100</b>
ROT PLS	26 (66)	0.050	0.050	0.010	<b>0.002</b>	<b>0.002</b>	0.010	<b>0.002</b>
COMP	27 (67)	.000	.000	.000	.000	.000	.000	.000
CNTL ACC	28 (68)	0	0	<b>1(3)(2)(4)</b> <sup>1</sup>	<b>1(3)</b> <sup>2</sup>	<b>7(8)</b> <sup>3</sup>	<b>9</b>	<b>5(6)</b> <sup>4</sup>
PURPOSE		PROX OPS FLYAROUND	DOCKING	AUTO REBOOST	MATED STACK & SRMS OPS (VRCS)	AIL DEPRESS ATTITUDE CONTROL (VRCS)	ORBITER ALONE SRMS/OBSS	MATED STACK RMS OPS (VRCS)

**BOLD/ITALIC** indicates change from I-Load.

<sup>1</sup> For Reboost Config 3 & 4: 1 for P3/P4 Berthed, 3 for P3/P4 Installed;

For Reboost Config 1 & 2: 2 for P3/P4 Berthed, 4 for P3/P4 Installed

<sup>2</sup> 1 for P3/P4 Berthed, Low Hover, and Auto Seq Start, 3 for P3/P4 after Capture Complete

<sup>3</sup> 7 for P3/P4 Berthed, 8 for P3/P4 Installed

<sup>4</sup> 5 for P3/P4 at Handoff, 6 for P3/P4 at Intermediate and Preinstall

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HINGE

FS CC 9-9 (reduced copy)

ORB OPS/115/FIN

TOP  
 BACK OF 'STS-115 DAP B1 – B8 CONFIGURATIONS'  
 HINGED AT BOTTOM OF 'STS-115 DAP A9 – A15 CONFIGURATIONS'  
 HINGE

**STS-115 DAP B9 – DAP B12 CONFIGURATIONS**

	ITEM #	B9	B10	B12
<b>PRI</b>				
ROT RATE	30 (50)	0.1300	0.0500	<b>0.1000</b>
ATT DB	31 (51)	2.00	0.60	<b>5.00</b>
RATE DB	32 (52)	0.10	0.10	0.20
ROT PLS	33 (53)	0.040	0.040	0.040
COMP	34 (54)	.000	.000	.000
P OPTION	35 (55)	TAIL	TAIL	<b>TAIL</b>
Y OPTION	36 (56)	TAIL	TAIL	<b>TAIL</b>
TRAN PLS	37 (57)	0.010	0.010	<b>0.010</b>
<b>ALT</b>				
RATE DB	38 (58)	0.100	0.100	<b>0.070</b>
JET OPT	39 (59)	TAIL	TAIL	<b>TAIL</b>
# JETS	40 (60)	2	2	<b>3</b>
ON TIME	41 (61)	0.08	0.08	0.08
DELAY	42 (62)	10.00	0.00	<b>11.04</b>
<b>VERN</b>				
ROT RATE	43 (63)	0.1300	0.0500	<b>0.1000</b>
ATT DB	44 (64)	1.000	0.500	<b>3.000</b>
RATE DB	45 (65)	.020	.020	<b>.050</b>
ROT PLS	46 (66)	0.020	0.020	0.002
COMP	47 (67)	.000	.000	.000
CNTL ACC	48 (68)	0	0	<b>2(4)<sup>5</sup></b>
PURPOSE		PROX OPS/ FLYAROUND	DOCKING	MATED STACK (ALT)

**BOLD/TALIC** indicates change from I-Load.

<sup>5</sup> 2 for P3/P4 Berthed, 4 for P3/P4 Installed

HOOK  
VELCRO

ORB OPS-41bb/115/O/B

HOOK  
VELCRO

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 FS CC 9-10

ORB OPS/115/FIN

Space Shuttle Program  
FLIGHT DATA FILE

JSC-48036-115  
FINAL



# ORBIT OPS CHECKLIST

STS  
**115**

Flight Cover (trim bottom to expose tabs)