

# Orbit Operations Checklist

## STS-116 Flight Supplement

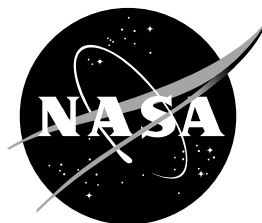
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**Mission Operations Directorate  
Operations Division**

**Final, Rev A  
November 10, 2006**

National Aeronautics and  
Space Administration

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



***United Space Alliance***

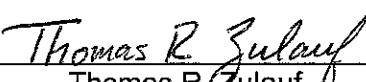


MISSION OPERATIONS DIRECTORATE

**ORBIT OPERATIONS CHECKLIST  
STS-116 FLIGHT SUPPLEMENT**

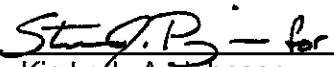
FINAL, REV A  
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PREPARED BY:

  
\_\_\_\_\_  
Thomas R. Zulauf  
Publication Manager

APPROVED BY:

ACCEPTED BY:

  
\_\_\_\_\_  
Kimberly A. Johnson  
Manager, Shuttle  
Procedures Management

  
\_\_\_\_\_  
Michael T. Hurt  
FDF Manager

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ORB OPS/116/FIN A

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MAUI – RCS FIRING SEQUENCE	DF6/W. Helms	281-244-6504
RSK INSTALLATION	DX3/A. Flagan	281-483-0651

ORBIT OPERATIONS CHECKLIST  
STS-116 FLIGHT SUPPLEMENT

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REV A 11/10/06

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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)	102/129	–
G3,BFS	(ENTRY)	102/166	756
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	ORBIT (SHAB/OIU/TCS/SSV) (PRIME)	103/184	760
G2,G8,S2	ORBIT (SHAB/OIU/TCS/SSV) (B/U)	103/205	767
G2,G8,S2	ISS INT CBM (LAB FWD) (SHAB/OIU) (PRIME)	103/199	780
G2,G8,S2	ISS INT CBM (LAB FWD) (SHAB/OIU) (B/U)	103/212	781
G2,G8,S2	RNDZ/UNDOCK (SHAB/OIU/TCS/SSV) (PRIME)	103/192	763
G2,G8,S2	RNDZ/UNDOCK (SHAB/OIU/TCS/SSV) (B/U)	103/211	770
G2,G8,S2	ISS NCS CBM (NODE 1) (SHAB/OIU) (B/U)	103/208	769
G2,G8,S2	ISS NCS CBM (NODE 1) (SHAB/OIU) (PRIME)	103/188	762

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
756 ENTRY  TFL 166	1	2	3	SHAB (2K)
	2	3	3	SHAB (2K)
	3	-	-	-
	4	-	-	-
	5-FPM	505		H-H-N/A *
760 ORBIT  (PRIME) TFL 184	1	27	3	SHAB (8K)
	2	5	1(2)	OIU255 (ONLY) **
	3	9	5	TCS
	4	4	4	SSV (3) ***
	5-FPM	502		H-H-H *
767 ORBIT  (BACKUP) TFL 205	1	19	5	TCS
	2	29	3	SHAB (8K)
	3	14	4	SSV (3) ***
	4	15	1(2)	OIU255 (ONLY) **
	5-FPM	506		H-H-H *
780 ISS INT CBM (LAB FWD) (4BC) (PRIME) TFL 199	1	27	3	SHAB (8K)
	2	-	-	-
	3	7	1(2)	OIU9 (CCSH) **
	4	-	-	-
	5-FPM	503		H-H-H *
781 ISS INT CBM (LAB FWD) (4BC) (BACKUP) TFL 212	1	-	-	-
	2	29	3	SHAB (8K)
	3	-	-	-
	4	17	1(2)	OIU9 (CCSH) **
	5-FPM	508		H-H-H *
763 RNDZ/UNDOCK  (PRIME) TFL 192	1	27	3	SHAB (8K)
	2	30	1(2)	OIU7 (CCSU) **
	3	9	5	TCS
	4	8	4	SSV (2) ***
	5-FPM	501		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

Cont next page

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ORB OPS/116/FIN A

CONFIG	DECOM	FMT	INPUT	USE
770 RNDZ/UNDOCK	1	19	5	TCS
	2	29	3	SHAB (8K)
	3	18	4	SSV (2) ***
(BACKUP)	4	31	1(2)	OIU7 (CCSU) **
TFL 211	5-FPM	507		H-H-H *
762 ISS NCS CBM	1	27	3	SHAB (8K)
(NODE 1)	2	-	-	-
(4AC)	3	6	1(2)	OIU9 (CCSH-A) **
(PRIME)	4	-	-	-
TFL 188	5-FPM	503		H-H-H *
769 ISS NCS CBM	1	-	-	-
(NODE 1)	2	29	3	SHAB (8K)
(4AC)	3	-	-	-
(BACKUP)	4	16	1(2)	OIU9 (CCSH-A) **
TFL 208	5-FPM	508		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



## 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/116/FIN A

PTG

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	84.6	-Y:45 R+ 93 -Z:21 P+ 193 Y+ 338	R+ 4 -Z:45 P+ 184 Y+ 325	R+ 175 -Y:21 P+ 180 Y+ 346	-Y:21 R+ 185 -Z:45 P+ 358 Y+ 35	R+ 92 -Z:21 P+ 13 Y+ 27	R+ 274 -Y:45 P+ 350 Y+ 22		
B	88.5	-Y:98 R+ 51 -Z:63 P+ 61 Y+ 334	R+ 316 -Z:98 P+ 44 Y+ 330	R+ 137 -Y:63 P+ 57 Y+ 348	-Y:63 R+ 229 -Z:98 P+ 221 Y+ 26	R+ 134 -Z:63 P+ 237 Y+ 29	R+ 315 -Y:98 P+ 224 Y+ 12		
C	85.0	-Y:43 R+ 344 -Z:28 P+ 321 Y+ 352	R+ 259 -Z:43 P+ 311 Y+ 3	R+ 70 -Y:28 P+ 332 Y+ 1	-Y:28 R+ 287 -Z:43 P+ 132 Y+ 353	R+ 201 -Z:28 P+ 136 Y+ 7	R+ 14 -Y:43 P+ 146 Y+ 348		
D	89.2	-Y:104 R+ 11 -Z:54 P+ 289 Y+ 8	R+ 286 -Z:104 P+ 275 Y+ 13	R+ 96 -Y:54 P+ 296 Y+ 21	-Y:54 R+ 257 -Z:104 P+ 94 Y+ 342	R+ 172 -Z:54 P+ 105 Y+ 353	R+ 349 -Y:104P+ 105 Y+ 331		

STAR PAIRS PAD

FS 2-2

ORB OPS/116/FIN A

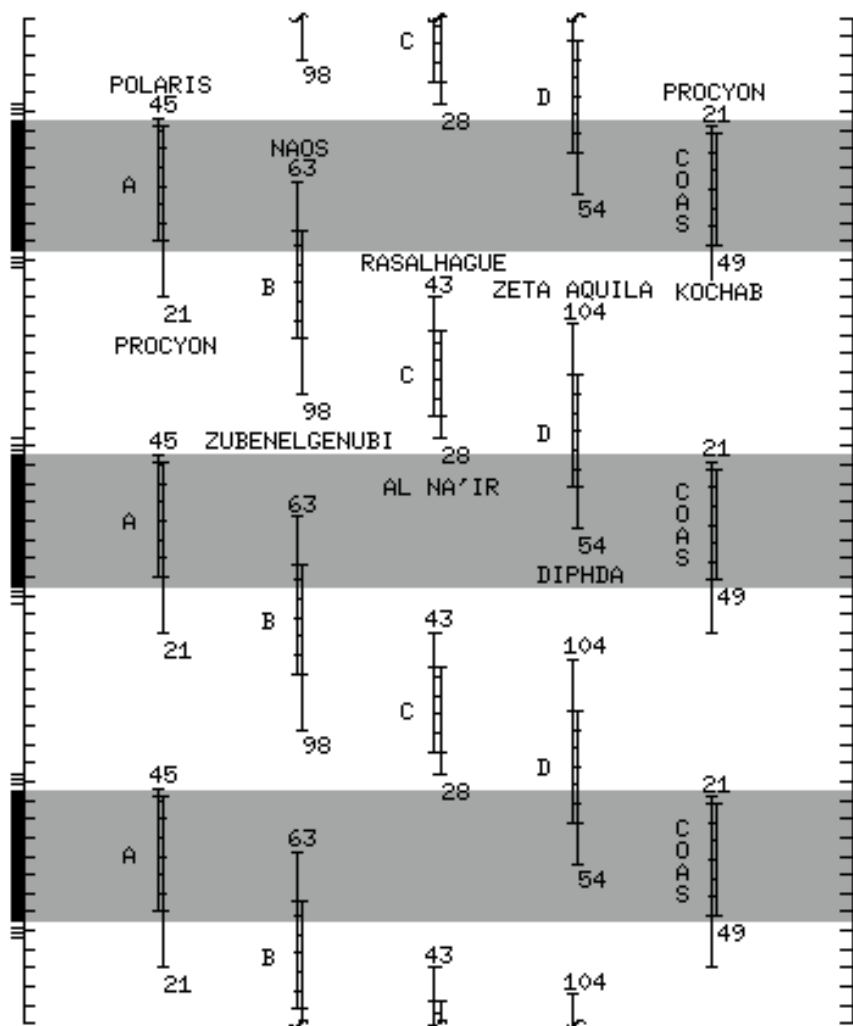
PAIR	COAS ALIGN ATTITUDE 1	ANG SEP	COAS ALIGN ATTITUDE 2
C	+X COAS	21 R+ 333 P+ 193 Y+ 65	NOSE UP 90
D			
A	-Z COAS	21 R+ 112 P+ 258 Y+ 349	TRAIL UP 90
S			

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: 0:0:0:0 - 011:0:0:0  
Date L/O: 12/08/06  
GMT L/O: 342/02:38:46

# STAR PAIRS



MET Applicable: 0:0:0:0 - 011:0:0:0  
 Date L/O: 12/08/06  
 GMT L/O: 342/02:38:46



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DAP TABLES

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UNIV PTG .....	FS 3-3
STS-116 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 MNVRS (VRCS)	B12 – Mated MNVRS & Att Hold (ALT)
A13 –	B13 –
A14 – Orbiter Alone SRMS/OBSS	B14 –
A15 – Mated Att Hold (VRCS)	B15 –

- CNTL ACC = 0 Orbiter alone with unloaded RMS  
 = 1 Mated Control - VRCS - Maneuvers  
 = 2 Mated Control - ALT - Maneuvers and Attitude Hold  
 = 3 Mated Control - VRCS - Attitude Hold  
 = 4 not used  
 = 5 not used  
 = 6 not used  
 = 7 not used  
 = 8 not used  
 = 9 Orbiter Alone SRMS/OBSS

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

FS-3-2

ORB OPS/116/FIN A



### 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

FS 3-3

ORB OPS/116/FIN A

**STS-116 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

FS 3-4

ORB OPS/16/FIN A

**STS-116 DAP A9 -- A15 CONFIGURATIONS**

	ITEM #	A9	A10	A11	A12	A14	A15
<b>PRI</b>							
ROT RATE	10 (50)	0.1300	0.0500	<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	<b>5.00</b>
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	<b>0.040</b>	0.100	<b>0.040</b>
COMP	14 (54)	.000	.000	.000	.000	.000	.000
P OPTION	15 (55)	TAIL	TAIL	<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>	TAIL
TRAN PLS	17 (57)	0.050	0.050	0.100	<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>	0.200	<b>0.070</b>
JET OPT	19 (59)	TAIL	TAIL	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	TAIL
# JETS	20 (60)	2	2	<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
DELAY	22 (62)	0.00	0.00	<b>12.00</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>	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>
RATE DB	25 (65)	.020	.020	<b>.050</b>	<b>.050</b>	<b>.200</b>	<b>.080</b>
ROT PLS	26 (66)	0.050	0.050	0.010	<b>0.002</b>	0.010	<b>0.002</b>
COMP	27 (67)	.000	.000	.000	.000	.000	.000
CNTL ACC	28 (68)	0	0	<b>1(2)*</b>	<b>1</b>	<b>9</b>	<b>3</b>
PURPOSE		PROX/OPS FLYAROUND	DOCKING	AUTO REBOOST	MATED MNVRS (VRCS)	ORBITER ALONE SRMS/OBSS	MATED ATTITUDE HOLD (VRCS)

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

\* 1 for Config 3&4, 2 for Config 1&2

FS 3-5

ORB OPS/116/FIN A

**STS-116 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		NOMINAL OMS & RCS BURNS	LOSS OF VERN (TAIL ONLY)	LOSS OF VERN (NOSE/TAIL)		COAS/HUD CAL		RNDZ	TERMINAL PHASE

FS 3-6

ORB OPS/116/FIN A

**STS-116 DAP B9 -- B12 CONFIGURATIONS**

	ITEM #	B9	B10	B11	B12
<b>PRI</b>					
ROT RATE	30 (50)	0.1300	0.0500	0.5000	<b><i>0.1000</i></b>
ATT DB	31 (51)	2.00	0.60	3.00	<b><i>5.00</i></b>
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	ALL	<b><i>TAIL</i></b>
Y OPTION	36 (56)	TAIL	TAIL	ALL	<b><i>TAIL</i></b>
TRAN PLS	37 (57)	0.010	0.010	0.020	<b><i>0.010</i></b>
<b>ALT</b>					
RATE DB	38 (58)	0.100	0.100	0.200	<b><i>0.070</i></b>
JET OPT	39 (59)	TAIL	TAIL	ALL	<b><i>TAIL</i></b>
# JETS	40 (60)	2	2	2	<b><i>3</i></b>
ON TIME	41 (61)	0.08	0.08	0.08	0.08
DELAY	42 (62)	10.00	0.00	0.00	<b><i>11.04</i></b>
<b>VERN</b>					
ROT RATE	43 (63)	0.1300	0.0500	0.2000	<b><i>0.1000</i></b>
ATT DB	44 (64)	1.000	0.500	1.000	<b><i>3.000</i></b>
RATE DB	45 (65)	.020	.020	.020	<b><i>.050</i></b>
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	0	<b><i>2</i></b>
PURPOSE		PROX OPS/ FLYAROUND	DOCKING		MATED MNVRS & HOLD(P RCS)

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

FS 3-7

ORB OPS/16/FINA



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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/116/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

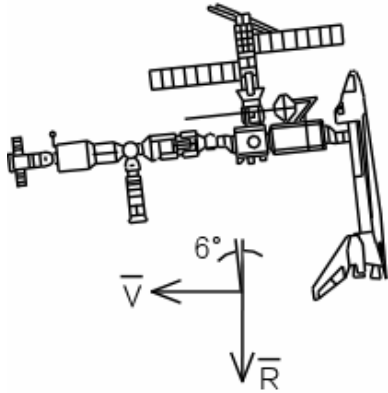
DAP: as reqd

Pri RJD LOGIC,DRIVER (sixteen) – as reqd

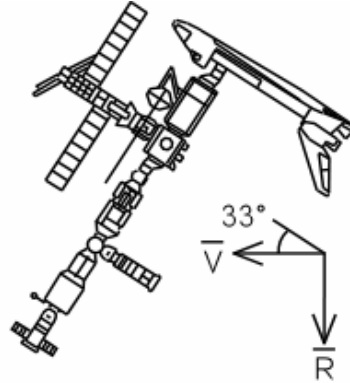
C3  
O14,  
O15,  
O16

## AUTO REBOOST ATTITUDE REFERENCE

### VRCS ATTITUDE HOLD CONFIGURATIONS:

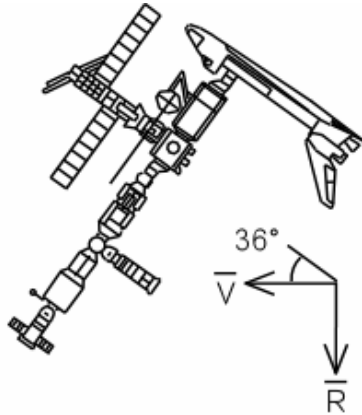


Earth  
Nose up, Config 3 (VRCS)

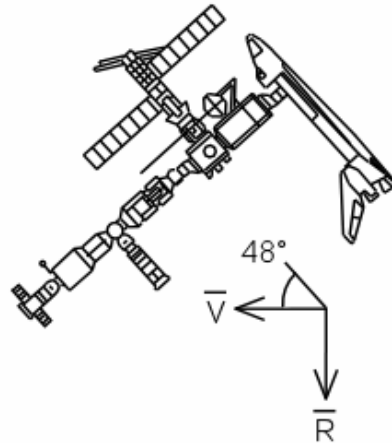


Earth  
Nose up, Config 4 (+X, VRCS)

### ALT ATTITUDE HOLD CONFIGURATIONS:



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



Earth  
Nose up, Config 2 (+X)

## DOCKED CONFIGURATION DAP REFERENCE

### SHUTTLE AIRLOCK

PRESS ( $\geq 3.45$  psia)      DEPRESS ( $< 3.45$  psia)

VERN	MNVR – A12 (CA: 1) ATT HOLD – A15 (CA: 3)	Not Certified
ALT	B12 (CA: 2)	Not Certified
RATE DAMPING	LVLH(INRTL), then AUTO	
RATE > 0.20	LVLH(INRTL) 6 min max FREE,LVLH(INRTL)	

1. When shuttle airlock pressurized, select DAP:  
     A12/VERN for attitude maneuvering  
     A15/VERN for attitude maintenance  
     (B12/ALT) attitude maintenance or maneuvering
2. 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



PRLA

PRLA CLOSE..... FS 6-2

**PRLA**

FS 6-1

ORB OPS/116/FIN A

## PRLA CLOSE

A6U 1. √PL RETEN PL SEL – 1  
√LAT 1,2,3,4,5 (five) – OFF (tb-REL)

### SM 97 PL RETENTION

CRT √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 BAY MECH PWR SYS 1,2 (two) – ON  
A6U RETEN LOGIC PWR SYS 1,2 (two) – ON

### NOTE

Any single motor times (>30 sec)

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 1634, SLEEP-WAKE ACTIGRAPHY .....	FS 7-2
SDBI 1493, MONITORING LATENT VIRUS REACTIVATION AND SHEDDING .....	FS 7-4
SALIVA COLLECTION (ALL FLIGHT DAYS) .....	FS 7-4

SDBI

FS 7-1

ORB OPS/116/FIN A

**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)

B. 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

SDBI

Cont next page

FS 7-2

ORB OPS/116/FIN A

FLIGHT SLEEP LOG (example below) is used with 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)]

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:

**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

WING LEADING EDGE SENSORS (WLES) PROCEDURES

ACTIVATION AND CHECKOUT .....	FS 8-2
DEACTIVATION AND TEARDOWN .....	FS 8-9
WLE LAPTOP RECEIVER UNIT (LRU) R&R .....	FS 8-11
CONFIGURE DATA FILE BACKUP PATH .....	FS 8-14
DECONFIGURE DATA FILE BACKUP PATH .....	FS 8-14
PREP WLES LAPTOPS FOR TRANSFER.....	FS 8-15
FOR RNDZ TOOLS CHECKOUT .....	FS 8-17
WLES RECONFIG POST DOCK/UNDOCK .....	FS 8-17
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

MA16G

Unstow:

Laptop Receiver Units (2)  
Cabin Relay Units (2) (S/N 1664, 1728)  
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 1664 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 1728 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/116/FIN A

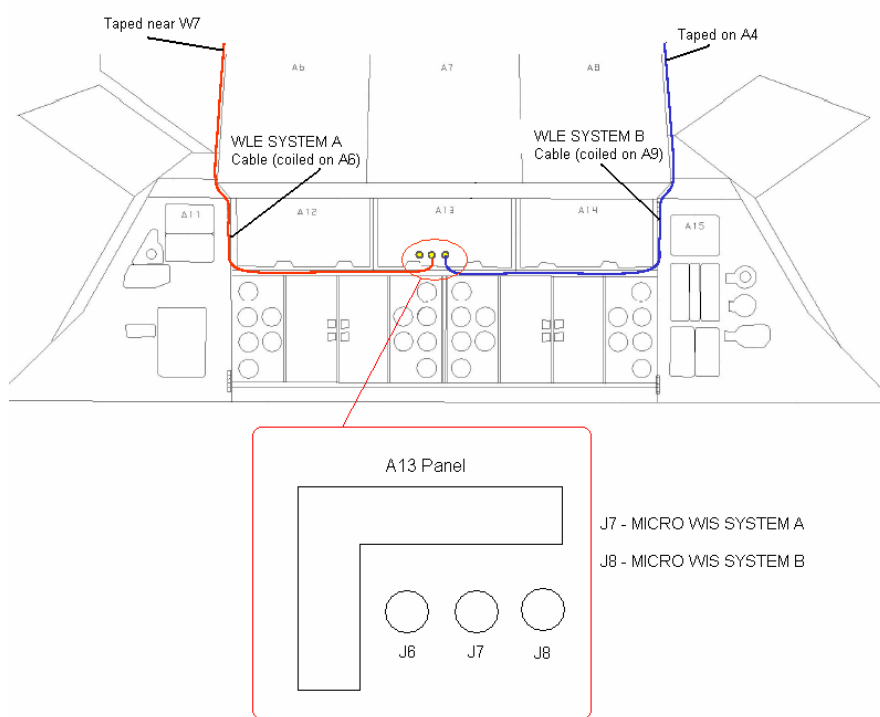


Figure 8-1.- A13 panel.

Cont next page

FS 8-3

ORB OPS/116/FIN A

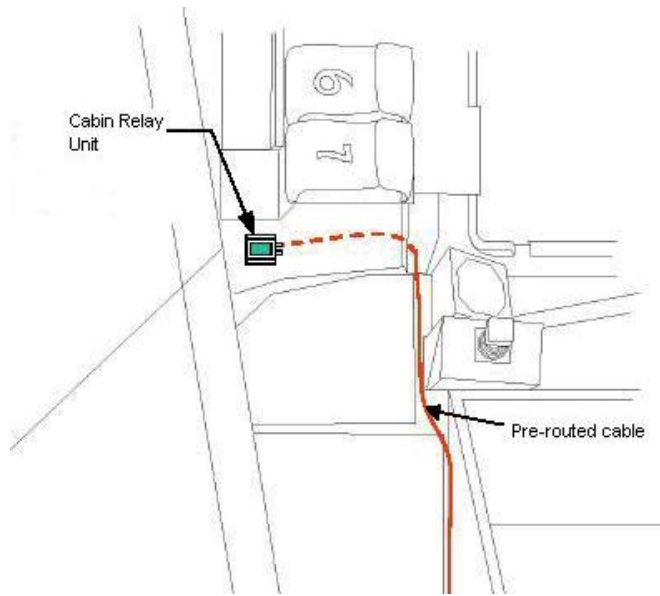


Figure 8-2.- Aft STBD location.

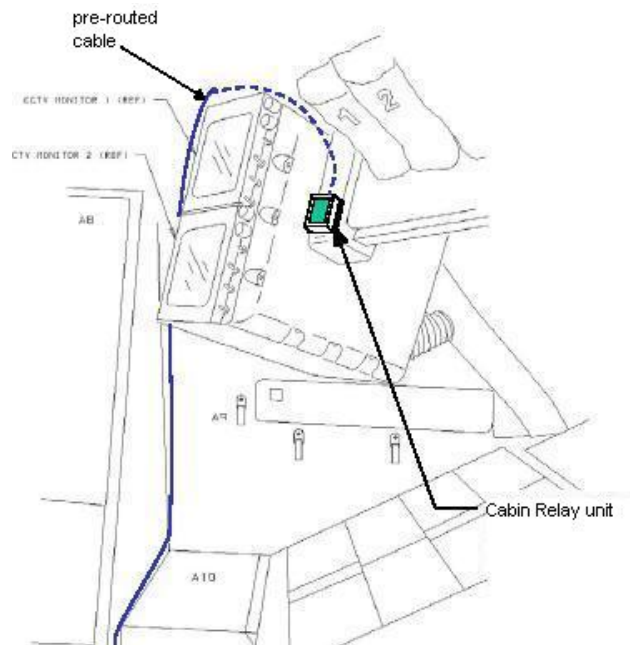


Figure 8-3.- Aft PORT location.

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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)

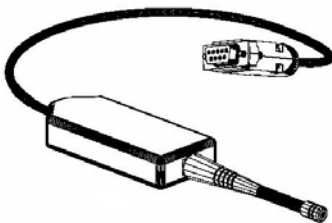


Figure 8-4.- Laptop Receiver Unit.



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/116/FIN A

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 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'

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/116/FIN A

‘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

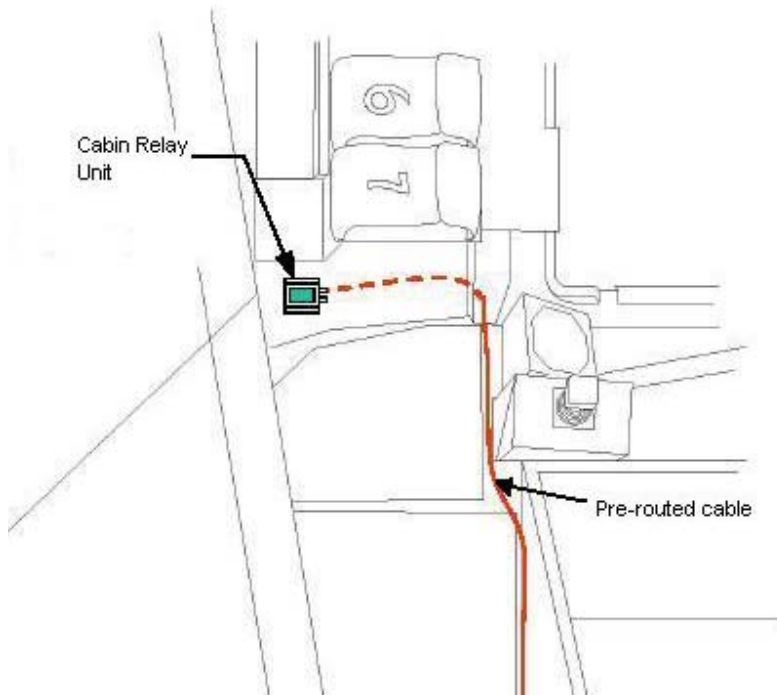


Figure 8-6.- Aft STBD location.

Cont next page

FS 8-9

ORB OPS/116/FIN A

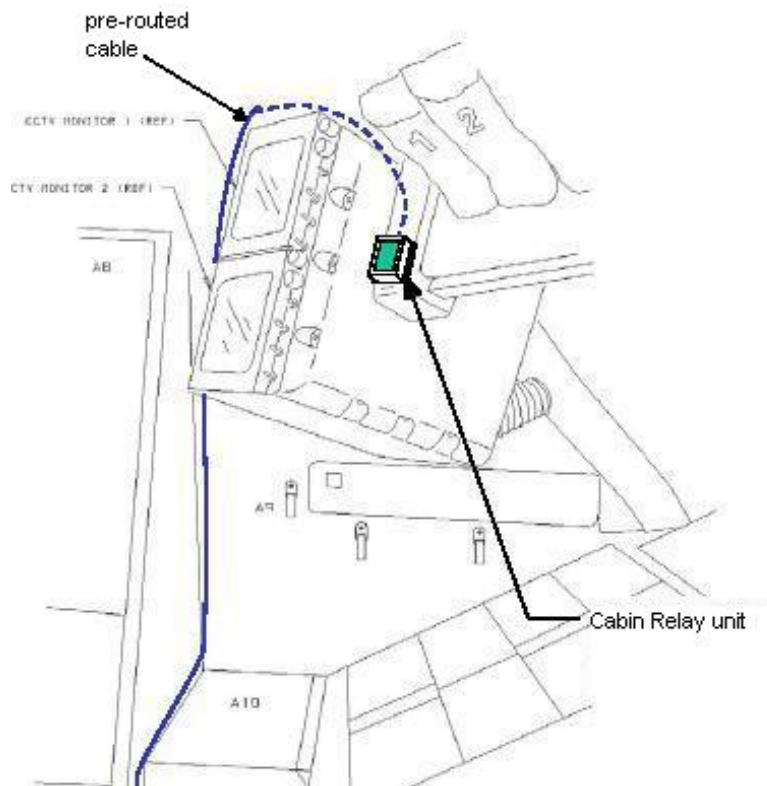


Figure 8-7.- Aft PORT location.

3. STOW EQUIPMENT

MA16G

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

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ORB OPS/116/FIN A

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

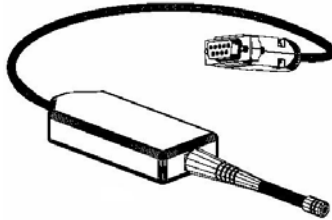


Figure 8-9.- Laptop Receiver Unit.

3. CONNECT BACKUP LRU

Connect Backup LRU to Prime WLES A31p Serial port  
Secure LRU to A31p with Velcro

A31p

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 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’

Cont next page

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ORB OPS/116/FIN A



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'

- MA16G 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 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'

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

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)

FRED

FRED SETUP .....	FS 9-2
STOWAGE .....	FS 9-2

**FRED**

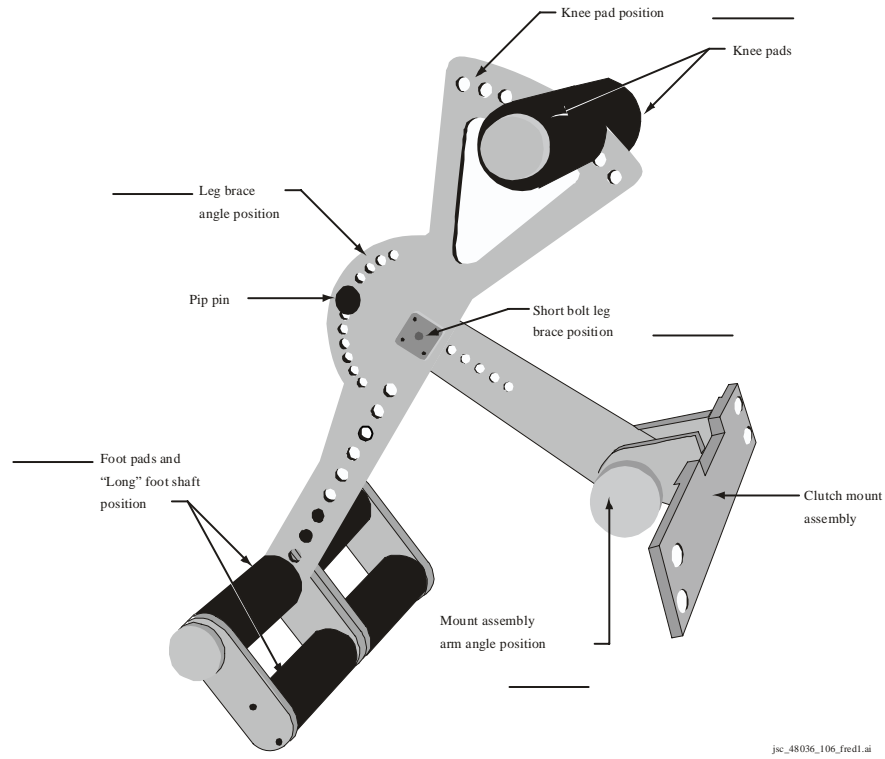
FS 9-1

ORB OPS/116/FIN A

FRED

## FRED SETUP

1. Unstow FRED tray and FRED leg brace
- A8L 2. Attach clutch bracket mount assy below aft panel A8 with captive fasteners (four)
3. Assemble FRED as shown and adjust to desired position. Note positions



## FRED STOWAGE

1. Disassemble FRED and set clutch bracket mount assy to #8 angle position
2. Stow FRED in locker tray cushion. Re-adjust clutch bracket mount assy as required
3. Stow leg brace



MAUI ANALYSIS OF UPPER-ATMOSPHERIC  
INJECTIONS (MAUI)

MAUI PROCEDURE ..... FS 10-2

**MAUI**

FS 10-1

ORB OPS/116/FIN A

## MAUI PROCEDURE

- 15:00 or earlier 1. MANEUVER TO START ATTITUDE  
(BIASED +ZLV +YVV)

Deploy MAUI – RCS FIRING SEQUENCE  
(Cue Card)

GNC 20 DAP CONFIG

√DAP A1, B1 loaded

UNIV PTG

TGT ID – ITEM 8 +2 EXEC  
BODY VECT – ITEM 14 +5 EXEC  
P – ITEM 15 +2 7 0 EXEC  
Y – ITEM 16 +3 5 0 EXEC  
OM – ITEM 17 +2 7 0 EXEC

TRK – ITEM 19 EXEC (CUR - \*)

2. INITIATE TIMER

√MCC for start time

GNC 2 TIME

Set count down/count up timer per MCC

√MET – ITEM 2 EXEC (\*)

CRT TIMER COUNT TO – ITEM 17 +   +   +    
EXEC

3. SETUP

O14:E, cb DDU L (two) – cl  
O15:E

O14:F, Pri RJD LOGIC, DRIVER (sixteen) – ON  
O15:F,  
O16:F

GNC 20 DAP CONFIG

DAP A PRI P OPTION – ITEM 15 EXEC (NOSE)

TRAN PLS – ITEM 17 +0.7 3 EXEC

VERN ROT PLS – ITEM 26 +0.1 5 3 EXEC

Cont next page

FS 10-2

ORB OPS/116/FIN A

MAUI

**GNC 23 RCS**

Deselect Jets:

Forward RCS page – ITEM 1 EXEC

JET DES F1D – ITEM 23 EXEC (\*)

F2D – ITEM 27 EXEC (\*)

C3     √DAP: A/AUTO/VERN  
          √DAP TRANS: PULSE/PULSE/PULSE  
          DAP ROT: PULSE/PULSE/PULSE

-05:00   4. VERIFY ATTITUDE  
          Verify in attitude

NOTE

For the following RCS firing sequence  
(step 5):

- A. Expect total orbiter body rates  
(RSS) to exceed 1 deg/sec
- B. Possible loss of comm due to orbiter  
body rates and attitude excursions
- C. For any jet fail OFF, continue with  
firing sequence
- D. Requirement is for a particular jet  
group, not a specific jet
- E. The table in step 5 is also provided  
as a cue card

Cont next page

FS 10-3

ORB OPS/116/FIN A

## 5. RCS FIRING SEQUENCE

### NOTE

Use the table below or the cue card

#### MAUI – RCS FIRING SEQUENCE

Timer	Jets Fired	CDR	PLT
-03:00		Body rates: $+0.047 \leq \text{roll} \leq +0.087$ $-0.020 \leq \text{pitch} \leq +0.020$ $-0.020 \leq \text{yaw} \leq +0.020$ DAP: FREE DAP: A/PRI  Inform PLT "GO" for jet deselection	Configure initial setup GNC 23 RCS Left RCS page – ITEM 2 EXEC  On CDR "GO", proceed  <u>NOTE</u> Expect DAP RECONF msgs in following actions  Deselect jets: JET DES L5L – ITEM 37 EXEC (*) Right RCS page – ITEM 3 EXEC JET DES R5D – ITEM 39 EXEC (*) Forward RCS page – ITEM 1 EXEC JET DES F5L – ITEM 37 EXEC (*)  <u>NOTE</u> Queue the following ITEM entry on the scratch pad. Do not perform the EXEC until specified at 35 sec  JET DES F3D – ITEM 25
-00:30		FLT CNTRL PWR – ON	
00:00	RXA, LXA	THC +X (in) (3 sec firing)	
00:15	FXL, LXL	THC +Y (right) (3 sec firing)	
00:30	FXR, RXR	THC -Y (left) (3 sec firing)	
00:35			When jets stop firing: GNC 23 RCS EXEC [JET DES F3D – ITEM 25 (*)]
00:45	F4D	RHC +pitch (hard stop, hold 3 sec)	
00:48		RHC release	
00:50			DAP: VERN
01:00	R5R	RHC +yaw (10 sec firing)	
01:20	L5D	RHC -pitch (12 sec firing)	
01:40	F5R	RHC +pitch (12 sec firing)	
		FLT CNTRL PWR – OFF	Return to MAUI PROCEDURE, step 6, (ORB OPS FS, MAUI)

Cont next page

FS 10-4

ORB OPS/116/FIN A

6. CLEANUP  
F6 √FLT CNTRL PWR – OFF

GNC 23 RCS

√Forward RCS page – ITEM 1 EXEC

Reselect Jets:

JET DES F1D – ITEM 23 EXEC (no \*)  
F3D – ITEM 25 EXEC (no \*)  
F2D – ITEM 27 EXEC (no \*)  
F5L – ITEM 37 EXEC (no \*)

Left RCS page – ITEM 2 EXEC  
JET DES L5L – ITEM 37 EXEC (no \*)

Right RCS page – ITEM 3 EXEC  
JET DES R5D – ITEM 39 EXEC (no \*)

GNC 20 DAP CONFIG

DAP A1 – ITEM 1 + 1 EXEC

7. SNAP LVLH ATTITUDE AND NULL RATES

When time  $\geq$  +03:30:

DAP: A/PRI  
DAP: LVLH

When rates stable:

DAP: VERN

Return to FLT PLN attitude

8. RECONFIGURE TO GROUP B POWERDOWN

√MCC

O14:E,   cb DDU L (two) – op  
O15:E

O14:F,   Pri RJD LOGIC,DRIVER (sixteen) – OFF  
O15:F,   RJDA 1A L2/R2 MANF DRIVER – ON  
O16:F



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YERO PROCEDURES

YERO PROCEDURE (Part 1).....	FS 11-2
(Part 2).....	FS 11-4
(Part 3).....	FS 11-15

YERO

**YERO PROCEDURE (Part 1)**

YERO

NOTE

- (a) Part 1 actions are performed prior to occurrence of the actual year-end rollover event
- (b) The MTU time adjustment will cause the MTU GMT and MET accumulators to roll-over to 001/00:00:00 GMT and 000/00:00:00 MET at the YERO event. With  $GMT \geq MET$ , PASS flight software computational issues with 'negative time' values are avoided
- (c) Aligning IMUs to an 'Identity Matrix' REFSMMAT prior to the YERO event maintains a valid inertial attitude reference during the GPC re-IPL process
- (d) Forcing the GPCs to internal time avoids a nuisance alarm during crew sleep at the moment of YERO

1. ADJUST MTU MET TO RESET AT YERO

NOTE

- (a) Required 'MET  $\Delta$ ' update value equals launch GMT minus 1 day
- (b) MCC will voice up desired 'MET  $\Delta$ ' update values; MCC will confirm results following MTU update

MET  $\Delta$ : days ('ddd') \_\_\_\_\_  
hours ('hh') \_\_\_\_\_  
minutes ('mm') \_\_\_\_\_  
sec ('ss.sss') \_\_\_\_\_

Cont next page



CRT

GNC 2 TIME

MET Δ – ITEM 28 +d d d +h h +m m EXEC  
MET Δ – ITEM 31 +s s s s EXEC  
UPDATE – ITEM 32 EXEC

NOTE

Following the MTU 'MET update' any new PASS fault message will reflect new MET time-tag

2. CONFIGURE TO REALIGN IMUs

Verify IMUs in operate and selected:

CRT

GNC 21 IMU ALIGN

√IMU OPER 1,2,3 – ITEM 4,5,6 (\*)  
√DES 1,2,3 – ITEM 7,8,9 (no \*)

NOTE

MCC must uplink 'Identity Matrix' REFSMMATs before crew can initiate IMU alignment actions

Wait for MCC 'GO', then continue

3. REALIGN IMUs TO NEW REFSMMATs

NOTE

IMU aligns may take up to 12 min. MCC will verify successful IMU realignments

GNC 21 IMU ALIGN

ALIGN IMU 1,2,3 – ITEM 10,11,12 EXEC (\*)  
IMU/IMU 1 – ITEM 14 +1 EXEC  
EXEC – ITEM 16 EXEC

4. FORCE GPCs TO INTERNAL TIME

NOTE

After YERO, onboard CRT clocks continue to count up to day 366 GMT (day 365 MET)

CRT

GNC 2 TIME

TRY – ITEM 37 EXEC

## YERO PROCEDURE (Part 2)

### NOTE

- (a) Part 2 actions are not to be performed until after occurrence of the actual year-end rollover event
- (b) Before proceeding, MCC should capture any flight-specific data reqd to build uplink loads to restore post-IPL GPC flight software

C3 1. CONFIGURE ORBITER FOR YERO  
DAP: FREE  
VERN

O14:F, √Pri RJD LOGIC, DRIVER (sixteen) – OFF  
O15:F √RJD MANF L5/F5/R5 DRIVER – ON  
O16:F  
C2 IDP/CRT3 PWR – ON  
√1 PWR – ON  
√2 PWR – ON  
R11L √4 PWR – ON

2. COMM RECONFIGURATION  
Check MCC for KU-BD configuration  
C3 √OI PCMMU FORMAT – GPC

Maintain manual S-BD antenna during DPS recovery:  
Select best antenna, F9 meter > 300

3. CONFIGURE FOR GPC IPLs  
O14,O15:F MMU (two) – ON  
C3 √BFC CRT DISP – OFF  
O6 IPL SOURCE – MMU 1(2)  
GPC OUTPUT 4 – NORM (tb-gray)  
MODE 4 – STBY (tb-bp), HALT (tb-bp)  
1 – STBY (tb-bp), HALT (tb-bp)

Cont next page

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ORB OPS/116/FIN A

- O6 4. IPL GPC 1  
 GPC IPL 1 pb – push (tb-IPL, then bp within 2 min)  
 When tb-bp (or after 2 min):  
     GPC MODE 1 – STBY (tb-RUN within 2 min)  
 When tb-RUN (or after 2 min):  
     GPC MODE 1 – RUN (tb remains RUN)  
 √GPC OUTPUT 1 – NORM (tb-gray)  
 CRT √GPC MEMORY driven on all three FWD IDP/CRTs

5. CONFIGURE FOR GNC OPS TRANSITION

NOTE

Masking the IPL SOURCE switch configures flight software for normal OPS, plus it eliminates need to take IPL SOURCE sw to OFF during the GNC OPS transition and IMU preflight cal MM read

- C2 Desired IDP/CRT1(2,3) MAJ FUNC – GNC  
 CRT GNC 1 DPS UTILITY  
 IPL SOURCE SW MASK – ITEM 38 EXEC (\*)  
 GNC 0 GPC MEMORY  
 CONFIG – ITEM 1 +2 EXEC  
 Assign MC 2 →

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

6. G2 OPS TRANSITION

NOTE

DAP will initialize to “A1/AUTO/PRI”. Pushing DAP ‘FREE’ pb during OPS transition avoids false jet fail-off msgs

- C3 DAP: FREE pb – push and hold during OPS transition
- CRT GNC, OPS 201 PRO
- C3 √DAP: FREE  
 VERN

Cont next page

7. RESTORE IMU PREFLIGHT CALIBRATION DATA

NOTE

'IMU/BITE T' msgs may be annunciated until MM READ restores IMU gyro delta bias terms

CRT

GNC 21 IMU ALIGN

Update all IMUs:

IMU 1,2,3 – ITEM 10,11,12 EXEC (\*)

MM READ – ITEM 19 EXEC (\*)

√MM READ – ITEM 19 (no \*)

8. ORBITER UPLINKS

NOTE

A series of PASS uplink command loads are reqd to establish the new year ephemeris, update onboard SV, GPS time ref, and to restore sensor bias terms

UPLINK PRIORITY	MCC	UPLINK COMMAND LOAD DESCRIPTION
1	GPO	RNP MATRIX TIME PARAMETERS
2	FDO	ORBITER STATE VECTOR
3	GPO	GPS SOP TIME ADJUSTMENT
4	GNC	IMU DESIRED REFSMMAT
5	PROP	RCS QUANTITY MONITORING
6 (if reqd)	FDO	DRAG MODEL PARAMETER
7 (if reqd)	GNC	IMU GYRO BIAS
8 (if reqd)	GNC	IMU ACCEL BIAS
9 (if reqd)	GNC	STAR CATALOG UPDATE
10 (if reqd)	GNC	IMU ACCEL SCALE FACTOR
11 (if reqd)	GNC	NOTCH FILTER/MASS PROPERTIES UPDATE

Wait for MCC 'GO', then continue

Cont next page

9. RELOAD CURRENT ORBITER MASS

GNC, OPS 202 PRO

ORBIT MNVR EXEC

NOTE

MCC will uplink a dummy burn target to  
update MMU prelaunch Orbiter weight  
I-Load value

Wait for MCC 'GO', then continue:

LOAD – ITEM 22 EXEC

√WT updates (Item 9), then:

GNC, OPS 201 PRO

10. RE-ESTABLISH GNC OPERATIONAL  
CONFIGURATION

NOTE

Flight-specific DAP loads, if reqd, are  
delayed until following DPS reconfiguration.  
Do not sel DAP 'AUTO' until completion of  
DAP reloads

CRT

GNC 23 RCS

If in L(R) OMS/RCS I'CNCT:

L(R) OMS TO AFT – ITEM 5(6) EXEC

C3

11. **If undocked:**

DAP: INRTL

O6

12. Power Off Target GPCs:

GPC PWR 2,3,4 (three) – OFF

Cont next page

FS 11-7

ORB OPS/116/FIN A

13. IPL GPC 2

NOTE

From this point on within the YERO procedure:  
No keyboard entries or sw throws 10 sec:  
Before and after moding PASS GPCs to RUN  
Before OPS transition or set expansion/contraction  
requests until new OPS base page is displayed

O6 GPC PWR 2 – ON  
IPL 2 pb – push (tb-IPL, then bp within 2 min)  
When tb-bp (or after 2 min):  
GPC MODE 2 – STBY (tb-RUN within 2 min)  
When tb-RUN (or after 2 min):  
GPC MODE 2 – RUN (tb remains RUN)  
√GPC OUTPUT 2 – NORM (tb-gray)

CRT X 14. CHECK GPC 2 DRIVES A CRT  
On desired IDP/CRT:  
MAJ FUNC – PL  
GPC/CRT – 2/X EXEC  
√X: PL GPC MEMORY display driven by GPC 2

O6 15. IPL GPC 3  
GPC PWR 3 – ON  
IPL 3 pb – push (tb-IPL, then bp)  
When tb-bp (or after 2 min):  
GPC MODE 3 – STBY (tb-RUN)  
When tb-RUN (or after 2 min):  
GPC 3 MODE – RUN (tb remains RUN)  
√GPC OUTPUT 3 – NORM (tb-gray)

CRT X 16. CHECK GPC 3 DRIVES A CRT  
On desired IDP/CRT:  
MAJ FUNC – PL  
GPC/CRT – 3/X EXEC  
√X: PL GPC MEMORY display driven by GPC 3

Cont next page

17. IPL GPC 4  
 O6 GPC PWR 4 – ON  
 IPL 4 pb – push (tb-IPL, then bp)  
 When tb-bp (or after 2 min):  
 GPC MODE 4 – STBY (tb-RUN)  
 When tb-RUN (or after 2 min):  
 GPC MODE 4 – RUN (tb remains RUN)  
 √GPC OUTPUT 4 – NORM (tb-gray)
18. CHECK GPC 4 DRIVES CRT 3  
 C2 IDP/CRT3 MAJ FUNC – SM  
 GPC/CRT – 43 EXEC  
 O6 √3: SM GPC MEMORY display driven by GPC 4  
 IPL SOURCE – OFF
19. CONFIGURE GPC 4 AS SM GPC

NOTE

OPS transitions neither add nor remove IDP/CRTs from PASS set based upon CRT NBAT. However, PASS will redistribute active CRTs based on new NBAT provided IDPs are powered on

CRT 3

SM 1 DPS UTILITY

Disable checkpoint retrieve:

√CKPT RETRV ENA – ITEM 12 (no \*)

SM 0 GPC MEMORY

CONFIG – ITEM 1 +4 EXEC

Assign MC 4 →

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

CRT 3

SM, OPS 201 PRO

√SM ANTENNA display driven by GPC 4

Cont next page

CRT 3 20. LOAD PCMMU FORMAT  
SM 62 PCMMU/PL COMM  
FORMAT:  
SEL FXD – ITEM 1 EXEC (\*)  
SEL ID – ITEM 3 +1 6 1 EXEC  
√SM COM BUF – RDY  
LOAD – ITEM 4 EXEC  
√LOAD, ITEM 4 – RUN,CPLT, then:  
SEL PGM – ITEM 2 EXEC (\*)  
RESUME

O6  
CRT 3 21. RE-ESTABLISH SM OPERATIONAL  
CONFIGURATION  
GPC OUTPUT 4 – TERM (tb-bp)  
SM 1 DPS UTILITY  
CKPT RETRV ENA – ITEM 12 EXEC (\*)  
√UL CNTL ENA, ITEM 36 – (\*)

NOTE

MCC will complete comm reconfig,  
including loading low-rate TFL, TDRS  
vectors, and any reqd site reconfigurations

C3 Wait for MCC 'GO' to reselect auto antenna control:  
S-BD PM ANT sel – GPC

A1U  
CRT 3 KU BD PWR – ON (if reqd)  
SM 1 DPS UTILITY  
UL CNTL AUTO – ITEM 35 EXEC (\*)  
RESUME

22. RMS CLEANUP (if reqd)  
SM 94 PDRS CONTROL (MA, C/W GPC DATA It on)  
I/O ON – ITEM 5 EXEC (\*) (C/W GPC DATA It off)  
Update as needed:  
WR range, PL ID, PL INIT ID, EE ID, SPEC 95  
Overrides  
SAFING – CANCEL (tb-bp if arm deselected)

Cont next page

FS 11-10

ORB OPS/116/FIN A



23. CONFIGURE FOR GNC SET EXPANSION TO TRIPLE G2
- CRT 3 GNC 0 GPC MEMORY  
 CONFIG – ITEM 1 +2 EXEC  
 Assign MC 2 →
- |            |     |   |       |
|------------|-----|---|-------|
| CONFIG GPC |     | 2 | 12300 |
| STR        | 1   | 1 |       |
|            | 2   | 2 |       |
|            | 3   | 3 |       |
|            | 4   | 3 |       |
| PL         | 1/2 | 0 |       |
| CRT        | 1   | 1 |       |
|            | 2   | 2 |       |
|            | 3   | 0 |       |
|            | 4   | 3 |       |
| L          | 1   | 0 |       |
|            | 2   | 0 |       |
| MM         | 1   | 1 |       |
|            | 2   | 2 |       |
24. OPS MODE RECALL  
 C3 DAP: FREE  
 CRT GNC, OPS 201 PRO,  
 Pause ~30 sec (DAP settling)  
 C3 DAP: FREE (or INRTL) as reqd
25. ORBITER UPLINKS

NOTE

MCC will uplink GNC and SM Variable Parameters, plus SM TMBU command loads as required. Crew is not required to wait for uplinks

26. REALIGN IMUS TO LAUNCH REFSMMATS

NOTE

IMU aligns may take up to 12 min. MCC will verify successful IMU realignments

- CRT GNC 21 IMU ALIGN  
 ALIGN IMU 1,2,3 – ITEM 10,11,12 EXEC (\*)  
 IMU/IMU 1 – ITEM 14 +1 EXEC  
 EXEC – ITEM 16 EXEC  
 IMU 1,2,3 – ITEM 10,11,12 EXEC (no \*)

Wait for MCC 'GO', then continue

Cont next page

27. CONFIGURE FOR GNC SET CONTRACTION

CRT

GPC 0 GPC MEMORY

CONFIG – ITEM 1 +2 EXEC

Assign MC 2 →

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

C3  
CRT

28. OPS MODE RECALL

DAP: FREE

GNC, OPS 201 PRO

Pause ~30 sec (DAP settling)

C3

DAP: FREE (or INRTL) as reqd

CRT X

29. FREEZE DRY GPC 3 (G3FD)

On desired IDP/CRT:

MAJ FUNC – PL

GPC/CRT 3/X EXEC

PL GPC MEMORY

CONFIG – ITEM 45 +3 EXEC

GPC – ITEM 46 +3 EXEC

STORE – ITEM 47 EXEC

Store complete when MC = 03 (~15 sec)

√All IDPs deassigned from GPC 3

O6

GPC MODE 3 – STBY (tb-bp)

– HALT (tb-bp)

– STBY (tb-RUN)

– HALT (tb-bp)

CRT X

30. FREEZE DRY GPC 2 (G2FD)

On desired IDP/CRT:

MAJ FUNC – PL

GPC/CRT 2/X EXEC

PL GPC MEMORY

CONFIG – ITEM 45 +2 EXEC

GPC – ITEM 46 +2 EXEC

STORE – ITEM 47 EXEC

Store complete when MC = 02 (~15 sec)

√All IDPs deassigned from GPC 2

Cont next page

FS 11-12

ORB OPS/116/FIN A

O6 GPC MODE 2 – STBY (tb-bp)  
– HALT (tb-bp)  
– STBY (tb-RUN)  
– HALT (tb-bp)

CRT 31. CONFIGURATION CLEANUP  
GNC 22 S TRK/COAS CNTL  
S TRK -Y,-Z: STAR TRK – ITEM 3,4 EXEC (\*)  
GNC 21 IMU ALIGN  
RESUME  
Clear software fail votes:  
GNC 0 GPC MEMORY  
ITEM 48 EXEC  
SM 0 GPC MEMORY  
ITEM 48 EXEC

32. LOAD FLIGHT-SPECIFIC DAPs

NOTE

At this point, flight-specific DAP loads may or may not be reqd to support the remainder of the mission. Check with MCC for any reqd DAP changes

CRT If reqd:  
GNC 20 DAP CONFIG  
Load desired DAP A,B (see FLIGHT PLAN)

33. RE-ESTABLISH DESIRED DAP CONFIGURATION

NOTE

Check with MCC for desired DAP config

CRT GNC 20 DAP CONFIG  
DAP A – ITEM 1 +X X EXEC  
B – ITEM 2 +X X EXEC

Cont next page

FS 11-13

ORB OPS/116/FIN A

34. MANEUVER TO DESIRED ATTITUDE/ESTABLISH TRACK ATTITUDE  
 If reqd:  
 CRT UNIV PTG  
 Load desired attitude (see FLIGHT PLAN)  
 Init MNVR(TRK) – ITEM 18(19)  
 DAP: as reqd
35. REASSIGN IDPs  
 CRT GPC/CRT – 03 EXEC  
 – 44 EXEC
36. VERIFY FINAL DPS CONFIGURATION FOLLOWING YERO PROCEDURE

		Dual G2	Single G2				
O6	GPC OPS	1 G2	2 G2	2 G2FD	3 G3FD	4 SM	5 BFS
	POWER OUTPUT MODE	ON NORM RUN	ON NORM RUN	ON NORM HALT	ON NORM HALT	ON TERM RUN	ON NORM HALT
	IDP/CRT	1	2	3	4		
C2,R11L	POWER	ON	ON	OFF	ON		
	MAJ FUNC	as reqd	as reqd	---	as reqd		

NOTE

This completes all PASS GPC reconfiguration steps associated with Part 2 of the YERO Procedure. BFS reconfiguration actions are defined in Part 3 of YERO Procedure

## YERO PROCEDURE (Part 3)

### NOTE

This procedure is not to be performed until after occurrence of the actual year-end rollover event

#### 1. TRANSITION PASS TO OPS 3

O14, RGA (four) – ON  
O15, cb ADTA (four) – cl  
O16, ASA (four) – ON

O8 MLS (three) – ON

C3 √FCS CH (four) – AUTO

If docked:  
| √Pri RJD LOGIG, DRIVER (sixteen) – OFF  
If undocked:  
Pri RJD LOGIC, DRIVER (sixteen) – ON

CRT SM 62 PCMMU/PL COMM  
SEL FXD – ITEM 1 EXEC

GNC 0 GPC MEMORY  
CONFIG – ITEM 1 +3 EXEC  
Assign MC 3

GNC, OPS 301 PRO

If docked:  
DAP: INRTL/PULSE/PULSE/PULSE

#### 2. ACTIVATE BFS

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

C2 BFS CRT DISP – ON  
SEL – 3+1

BFS, GNC OPS 301 PRO

Cont next page

FS 11-15

ORB OPS/116/FIN A

### 3. BFS YERO UPLINKS

#### NOTE

Some loads must be uplinked while the BFS is in OPS 000, others while BFS is in OPS 3

CRT 3 BFS, GNC OPS 000 PRO

#### NOTE

The 'RNP Matrix Time' load must be uplinked to the BFS while it is in pre-deorbit OPS 000 and tracking the PASS. However, the uplinked data will not be incorporated by the BFS until it is PRO'd to OPS 3

UPLINK PRIORITY	MCC	UPLINK COMMAND LOAD DESCRIPTION
1	GPO	RNP MATRIX TIME

Wait for MCC 'GO', then continue

BFS, GNC OPS 301 PRO

UPLINK PRIORITY	MCC	UPLINK COMMAND LOAD DESCRIPTION
1	GPO	GPS SOP TIME ADJUSTMENT
2	FDO	DUMMY PEG TARGETS
3	INCO	TDRS STATE VECTORS
4 (if reqd)	GPO	ORBITER STATE VECTOR
5 (if reqd)	GNC	IMU GYRO BIAS
6 (if reqd)	GNC	IMU ACCEL BIAS
7 (if reqd)	GNC	IMU ACCEL SCALE FACTOR

Wait for MCC 'GO', then continue

CRT BFS, DEORB MNVR COAST

LOAD – ITEM 22 EXEC

√WT updates (Item 9)

Cont next page

FS 11-16

ORB OPS/116/FIN A

4. SECURE BFS  
 BFS, GNC OPS 000 PRO  
 O6 GPC MODE 5 – HALT  
 C2 BFS CRT DISP – OFF  
 IDP/CRT3 PWR – OFF
5. G2 TRANSITION  
 CRT SM 62 PCMMU/PL COMM  
 SEL PGM – ITEM 2 EXEC
- C3 DAP: FREE pb – push and hold  
 during OPS transition
- CRT GNC, OPS 201 PRO  
 Pause ~30 sec (DAP settling)  
 C3 DAP: as reqd
6. CLEAN UP JET CONFIG (if reqd)  
 CRT GNC 23 RCS  
 JET RESET – ITEM 45 EXEC  
 Reset all FAIL OFF jets  
 JET RESET – ITEM 45 EXEC
7. CONFIG CLEANUP  
 CRT GNC 22 S TRK/COAS CNTL  
 S TRK -Y,-Z: STAR TRK – ITEM 3,4 EXEC (\*)  
GNC 21 IMU ALIGN  
 RESUME
- O14, RGA (four) – OFF  
 O15, cb ADTA (four) – op  
 O16 ASA (four) – OFF
- O8 MLS (three) – OFF



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CUE CARD CONFIGURATION

FLIGHT DAY 3 DOCKING ORBITER WITH ISS  
CO2 ABSORBER REPLACEMENT (Front) ..... FS CC 12-3  
LiOH CANISTER STOWAGE LOCATIONS  
(Back)..... FS CC 12-4  
ORBIT BURN MONITOR (Front) ..... FS CC 12-5  
OMS FAILURES (Back)..... FS CC 12-6  
STS-116 DAP CONFIGURATIONS  
(Front/Top) ..... FS CC 12-7  
(Front/Bottom) ..... FS CC 12-8  
(Back/Top)..... FS CC 12-9  
(Back/Bottom) ..... FS CC 12-10  
MAUI – RCS FIRING SEQUENCE (Front) ..... FS CC 12-11  
(Back)..... FS CC 12-12  
RECUMBENT SEAT KIT (RSK)  
INSTALLATION (HC)(CIL)(Front) ..... FS CC 12-13  
(Back)..... FS CC 12-14  
MIDODRINE PILL INGESTION (Front)..... FS CC 12-15

CUE  
CARDS

NOT FLOWN

FS 12-1

ORB OPS/116/FIN A



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**CUE  
CARDS**



NOT FLOWN

FS 12-2

ORB OPS/116/FIN A



TOP

HOOK  
VELCRO

**FLIGHT DAY 3 DOCKING**  
**ORBITER with ISS**  
**CO2 ABSORBER REPLACEMENT**  
(7 Crewmembers/Single Shift/FD 1-15)

FLIGHT DAY	POS A	POS B	CK CMPLT
LAUNCH	1	2	
PRE FD1	"	"	
POST FD2	3	4	
PRE FD2	5*	6*	
POST FD3	7	8	DOCKING
PRE FD3	"	9	
POST FD4	10	11	EVA 1
PRE FD4	12	"	
POST FD5	13	14	
PRE FD5	"	15	
POST FD6	16	17	EVA 2
PRE FD6	"	18	
POST FD7	19	20	
PRE FD7	"	21	
POST FD8	22	23*	EVA 3
PRE FD8	"	24	
POST FD9	25*	26	
PRE FD9	27	"	
POST FD10	28*	29*	
MID FD10	"	30	UNDOCK
PRE FD10	31	"	
POST FD11	32	33	
PRE FD11	34*	35*	
POST FD12	36	37	EOM
PRE FD12	38*	39*	
POST FD13	40	41	EOM+1
PRE FD13	42*	43*	
POST FD14	44	45	EOM+2
PRE FD14	46*	47*	
POST FD15	48	49	EOM+3

\*Reseal LiOH cans w/Gray Tape and stow  
(Location of canisters on back)

ORB OPS-29a/nonRCRS/116/O/B

NOTE

This card is specifically used for STS-116 mission with orbiter conducting single shift ops with crew size of 7. Changeout scheme reflects FD3 docking with ISS; Vozdukh on during docked ops, CDRA activated in single-bed mode post EVA 2, and undocking on FD10. CDRA will be deactivated the morning of undocking

(reduced copy)

FAB USE ONLY

FS CC 12-3

ORB OPS/116/FIN A

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

HOOK  
VELCRO

**LiOH CANISTER STORAGE  
LOCATIONS**

ASCENT STOWAGE LOCATIONS

Orbiter:

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

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

NOTE

LiOH cans stored in Spacehab will be transferred to orbiter LiOH box per Flight Plan. When needed for changeouts, cans 32-49 will be found in orbiter LiOH box

Spacehab:

FS03: Cans 47-49

FS08: 44-46

FS09: 35-37

SF01: 32-34

SF07: 41-43

SF11: 38-40

ENTRY (EOM) STOWAGE LOCATIONS

Orbiter:

MD52M (LiOH Box): Cans 5, 6, 21-49

Spacehab:

SF01: Any three cans 1-4 or 7-20

SF07: Any three cans 1-4 or 7-20

SF11: Any three cans 1-4 or 7-20

FS03: Any three cans 1-4 or 7-20

FS07: Any three cans 1-4 or 7-20

FS08: Any three cans 1-4 or 7-20

ORB OPS-29b/nonRCRS/116/O/B

(reduced copy)

FAB USE ONLY

FS CC 12-4

ORB OPS/116/FIN A

HOOK  
VELCRO

HOOK  
VELCRO

**ORBIT BURN MONITOR**

<b>OMS TEMP*</b>		
FU IN P ≥	L 225 R 220	OMS ENG FAIL
≤	L 205 R 204	OMS PRPLT FAIL
or No FU IN P		
<b>OMS PC* &amp; OMS ↓</b>		
ENG VLV 1 or 2 < 70		OMS ENG FAIL
or OX IN P > 227		OMS PRPLT FAIL
or OX IN P ≤ 227		OMS PRPLT FAIL
or No OX IN P		
<b>OMS OX/FU TK P (√ENG IN P)</b>		
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> (√ OMS/MPS)		At N2 TK P < 470: OMS ENG – ARM
<b>OMS GMBL</b>	PRI fail SEC fail	L(R) OMS GMBL – SEC (twice) If high RCS usage: OMS ENG FAIL
<b>GPC</b>	<input type="checkbox"/> ( <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 2 FAs lost	If high RCS usage: OMS ENG FAIL √MAN SHUTDN
<b>I/O ERROR FA</b>	1(4)	L(R) OMS GMBL – SEC I/O RESET
	2 FAs lost	If high RCS usage: OMS ENG FAIL √MAN SHUTDN
<b>BCE STRG D</b>	1(4)	I/O RESET (if recov: >>) If high RCS usage: L(R) OMS GMBL – SEC (twice)
<b>GPC SET SPLIT</b>	Non-crit burn Crit burn	STOP BURN: OMS ENG(s) – OFF Go to "GPC" above
<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/116/O/C

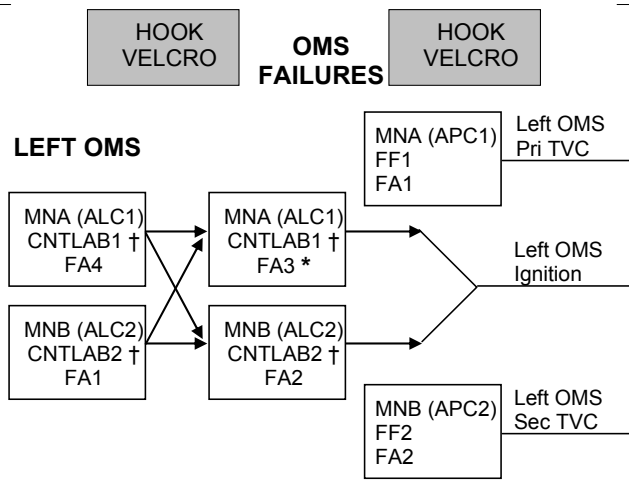
(reduced copy)

FAB USE ONLY

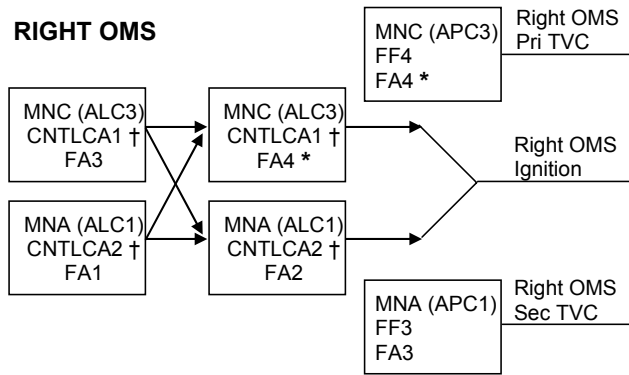
FS CC 12-5

ORB OPS/116/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/116/O/A

(reduced copy)

FAB USE ONLY

FS CC 12-6

ORB OPS/116/FIN A

FAB USE ONLY

FS CC 12-7

ORB OPS/116/FINA

(reduced copy)

TOP

PILE  
VELCRO

PILE  
VELCRO

STS-116 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	PREPOST DEPLOY	LOSS OF VERN (ALL)	LOSS OF VERN (TAIL ONLY)	RNDZ	TERMINAL PHASE

ORB OPS-41a/116/O/A

HINGE

FAB USE ONLY

FS CC 12-8

ORB OPS/116/FIN A

(reduced copy)

TOP  
HINGED AT BOTTOM OF  
'STS-116 DAP A1 – A8 CONFIGURATIONS'  
HINGE

STS-116 DAP B1 – DAP 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		NOMINAL OMS & RCS BURNS	LOSS OF VERN (TAIL ONLY)	LOSS OF VERN (NOSE/TAIL)		COASHUD CAL		RNDZ	TERMINAL PHASE

HOOK  
VELCRO

ORB OPS-41aa/116/O/A

HOOK  
VELCRO



TOP  
BACK OF 'STS-116 DAP A1 – A8 CONFIGURATIONS'

PILE  
VELCRO

PILE  
VELCRO

**STS-116 DAP A9 – DAP A15 CONFIGURATIONS**

	ITEM #	A9	A10	A11	A12	A14	A15
<b>PRI</b>							
ROT RATE	10 (50)	0.1300	0.0500	<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	<b>5.00</b>
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	<b>0.040</b>	0.100	<b>0.040</b>
COMP	14 (54)	.000	.000	.000	.000	.000	.000
P OPTION	15 (55)	TAIL	TAIL	<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>	TAIL
TRAN PLS	17 (57)	0.050	0.050	0.100	<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>	0.200	<b>0.070</b>
JET OPT	19 (59)	TAIL	TAIL	<b>TAIL</b>	<b>TAIL</b>	<b>TAIL</b>	TAIL
# JETS	20 (60)	2	2	<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
DELAY	22 (62)	0.00	0.00	<b>12.00</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>	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>
RATE DB	25 (65)	.020	.020	<b>.050</b>	<b>.050</b>	<b>.200</b>	<b>.080</b>
ROT PLS	26 (66)	0.050	0.050	0.010	<b>0.002</b>	0.010	<b>0.002</b>
COMP	27 (67)	.000	.000	.000	.000	.000	.000
CNTL ACC	28 (68)	0	0	<b>1(2)*</b>	<b>1</b>	<b>9</b>	<b>3</b>
PURPOSE		PROX/OPS FLYAROUND	DOCKING	AUTO REBOOST	MATED MNVRS (VRCS)	ORBITER ALONE SRMS/OBSS	MATED ATTITUDE HOLD (VRCS)

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

\* 1 for Config 3&4, 2 for Config 1&2

ORB OPS-41b/116/O/C

-----  
HINGE

FAB USE ONLY

FS CC 12-9

ORB OPS/116/FIN A

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FAB USE ONLY

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ORB OPS/116/FINA

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TOP  
 BACK OF 'STS-116 DAP B1 – B8 CONFIGURATIONS'  
 HINGED AT BOTTOM OF 'STS-116 DAP A9 – A15 CONFIGURATIONS'  
 HINGE

**STS-116 DAP B9 – DAP B12 CONFIGURATIONS**

	ITEM #	B9	B10	B11	B12
<b>PRI</b>					
ROT RATE	30 (50)	0.1300	0.0500	0.5000	<b>0.1000</b>
ATT DB	31 (51)	2.00	0.60	3.00	<b>5.00</b>
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	ALL	<b>TAIL</b>
Y OPTION	36 (56)	TAIL	TAIL	ALL	<b>TAIL</b>
TRAN PLS	37 (57)	0.010	0.010	0.020	<b>0.010</b>
<b>ALT</b>					
RATE DB	38 (58)	0.100	0.100	0.200	<b>0.070</b>
JET OPT	39 (59)	TAIL	TAIL	ALL	<b>TAIL</b>
# JETS	40 (60)	2	2	2	<b>3</b>
ON TIME	41 (61)	0.08	0.08	0.08	0.08
DELAY	42 (62)	10.00	0.00	0.00	<b>11.04</b>
<b>VERN</b>					
ROT RATE	43 (63)	0.1300	0.0500	0.2000	<b>0.1000</b>
ATT DB	44 (64)	1.000	0.500	1.000	<b>3.000</b>
RATE DB	45 (65)	.020	.020	.020	<b>.050</b>
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	0	<b>2</b>
PURPOSE		PROX OPS/ FLYAROUND	DOCKING		MATED MNVRS & HOLD(PRCs)

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

HOOK  
VELCRO

ORB OPS-41bb/116/O/C

HOOK  
VELCRO

TOP

MAUI – RCS FIRING SEQUENCE

Timer	Jets Fired	CDR	PLT
-03:00		√Body rates: $+0.047 \leq \text{roll} \leq +0.087$ $-0.020 \leq \text{pitch} \leq +0.020$ $-0.020 \leq \text{yaw} \leq +0.020$ DAP: FREE DAP: A/PRI  Inform PLT "GO" for jet deselects	Configure initial setup GNC 23 RCS Left RCS page – ITEM 2 EXEC  On CDR "GO", proceed  <u>NOTE</u> Expect DAP RECONF msgs in following actions  Deselect jets: JET DES L5L – ITEM 37 EXEC (*) Right RCS page – ITEM 3 EXEC JET DES R5D – ITEM 39 EXEC (*) Forward RCS page – ITEM 1 EXEC JET DES F5L – ITEM 37 EXEC (*)  <u>NOTE</u> Queue the following ITEM entry on the scratch pad. Do not perform the EXEC until specified at 35 sec  JET DES F3D – ITEM 25
-00:30		FLT CNTRL PWR – ON	
00:00	RXA, LXA	THC +X (in) (3 sec firing)	
00:15	FXL, LXL	THC +Y (right) (3 sec firing)	
00:30	FXR, RXR	THC -Y (left) (3 sec firing)	
00:35			When jets stop firing: GNC 23 RCS EXEC [JET DES F3D – ITEM 25 (*)]
00:45	F4D	RHC +pitch (hard stop, hold 3 sec)	
00:48		RHC release	
00:50			DAP: VERN
01:00	R5R	RHC +yaw (10 sec firing)	
01:20	L5D	RHC -pitch (12 sec firing)	
01:40	F5R	RHC +pitch (12 sec firing)	
		FLT CNTRL PWR – OFF	Return to MAUI PROCEDURE, step 6, (ORB OPS FS, MAUI)

ORB OPS-42a/116/O/B

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ORB OPS/116/FIN A

TOP  
BACK OF 'MAUI - RCS FIRING SEQUENCE'

HOOK  
VELCRO

HOOK  
VELCRO

HOOK  
VELCRO

ORB OPS-42b/116/O/A

(reduced copy)

FAB USE ONLY

FS CC 12-12

ORB OPS/116/FIN A

TOP

HOOK  
VELCRO

### RECUMBENT SEAT KIT (RSK) INSTALLATION

**NOTE**

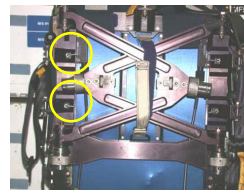
This procedure may be used to install RSK(s) 6, 7, and 8. Refer to figures as reqd for assembly steps (Time: 1 hr)



1 Unstow Headrest(s), bushing(s), RSK (blue) ICU brackets and extension strap(s)



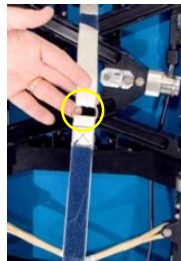
2 Install bushing into port side of seat back. Secure with spring pin



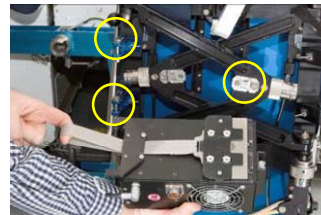
3 Remove ICU brackets on stbd seat pan (pull spring pin, slide out bracket)



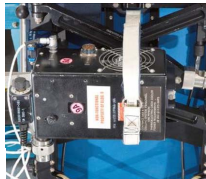
4 Install RSK (blue) ICU brackets (pull spring pin, slide in brackets)



5 Install extension strap(s) (loop strap through D-ring)



6 Install ICU(s) onto blue ICU brackets. Pull strap and install bottom of ICU onto bracket on top of seat leg (note: see photo 7 for config with ICU installed onto seat. Seat legs will still be folded)



7 Restrain ICU and seat legs using extension strap



8 Install RSK headrest(s)



9 Open seat pan(s) into entry config (pull gold T-handles on port & stbd seat back to release seat pan(s))

HOOK  
VELCRO

ORB OPS-43a/116/O/B

(reduced copy)

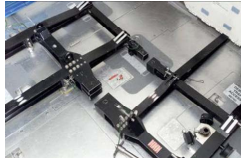
FAB USE ONLY

FS CC 12-13

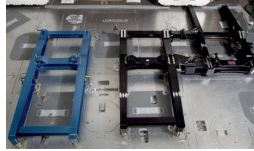
ORB OPS/116/FIN A

TOP, BACK OF 'RECLINABLE SEAT KIT (RSK) INSTALLATION'

HOOK  
VELCRO



10 If RSK 8 reqd:  
Attach rail 7 to rail 8 and secure  
using pip pins (two)



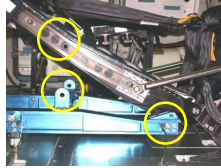
11 As reqd:  
Open deck stud collars (push button,  
lift collars/four per rail 6 and rail 7).  
Align collars aft of deck studs and  
slide rail(s) fwd onto deck studs and  
close collars



12 If RSK 8 reqd:  
Backout knobs on rail 8, place QD  
into park per decal. Open brownline  
QD (push button, lift collar) and align/  
secure QD onto brownline deck stud.  
Tighten knobs



13 As reqd:  
Open MF43K, MF57K, MF71K remove  
tray(s). Verify foot box is attached to  
MF71K



14 As reqd:  
Attach seat(s) to rail(s).  
Align slots, install pip pins (4)



15 As reqd:  
Route O2/COMM/ICU lines

**CAUTION**  
Verify ICU pwr OFF before  
making connections

Connect ICU pwr (per plug in plan).  
Install parachute(s), install lumbar  
cushion(s).

HOOK  
VELCRO

ORB OPS-43b/116/O/A

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FAB USE ONLY

FS CC 12-14

ORB OPS/116/FIN A

TOP

## MIDODRINE PILL INGESTION

### NO GO

If ANY of the conditions below are true, then you are NO GO for pill ingestion:

1. Midodrine PI/Crew Surgeon has given a "NO GO"
2. Taken Promethazine/Phenergan or PhenDex in the last 70 hrs.
3. Taken any medication in the last 24 hrs.
4. Performed maximum exercise in the last 24 hrs.
5. **Taken** nicotine, caffeine, or alcohol in the last 12 hrs.

### GO

LOCATION	STEP
Midodrine Pill Kit	Ingest 10 mg dose (1 tablet) of midodrine with liquid. <b>NOTE:</b> In the event the midodrine pill is lost, a backup dose is located beneath the first pill.
	Record time of ingestion. GMT Time:
ACES right leg pocket	Stow kit.

ORB OPS-45a/116/O,E/A

### FABRICATION NOTES

1) Fabricate as a kneeboard card

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FS CC 12-16

ORB OPS/116/FIN A





Space Shuttle Program  
FLIGHT DATA FILE

JSC-48036-116  
FINAL, REV A



# ORBIT OPS CHECKLIST

STS  
**116**

Flight Cover (trim bottom to expose tabs)