

Payload Operations Checklist

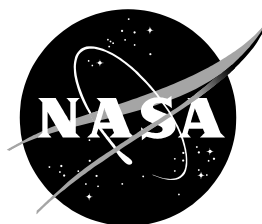
STS-118

**Mission Operations Directorate
Operations Division**

**Final
April 13, 2007**

National Aeronautics and
Space Administration

Lyndon B. Johnson Space Center
Houston, Texas




SMS FDF CHANGE NOTIFICATION		SIM PACK		DATE INITIATED 6/21/07	DATE RECEIVED (PMO) 06/21/07
BOOK TITLE		BK ISSUE (Ed, Rev, PCN) FIN		SIM PACK NUMBER SIM-153	
PAYLOAD OPERATIONS Change is for flights (Also give SMS load if load dependent): STS-118		SMS UNIQUE? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		DEVELOPMENTAL? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
FABRICATED ITEM CHANGE? <input checked="" type="checkbox"/> NONE <input type="checkbox"/> CUE CARDS <input type="checkbox"/> TRANSPARENCIES <input type="checkbox"/> Other _____					
INSTRUCTIONS TO USER: Replace pages 5-5 through 5-8 Replace pages 5-45 and 5-46					
AUTHORITY FOR CHANGE* (Approved 482 numbers, approved issue at print shop, supervisors deem mandatory, etc.): Supervisor Deem Mandatory					
*Refer to Crew Procedures Management Plan					
OTHER AFFECTED FDF BOOKS None		Are all SIM PACKS submitted? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO			
IMPLEMENTATION REQUIREMENTS		<input type="checkbox"/> Limited Distribution (List in comments)		<input type="checkbox"/> NO EARLIER THAN _____ (Date and/or Sim ID)	
				<input checked="" type="checkbox"/> NO LATER THAN <u>FD3 Sim on 6/27/2007</u> (Date and/or Sim ID)	
BOOK MGR (Signature/Date) <i>[Signature]</i> 6/21/07		SUPERVISOR (If required, Signature/Date) <i>[Signature]</i> 6/21/07		FDF COORD or FDF MGR (Signature/Date) <i>[Signature]</i> 06/21/07	
COMMENTS:					

MISSION OPERATIONS DIRECTORATE

**PAYLOAD OPERATIONS CHECKLIST
STS-118**

FINAL
April 13, 2007

PREPARED BY:



Cindy A. Simon
Publication Manager

ACCEPTED BY:



Kirsten G. Thompson
Technical Lead, Cargo Support Integration Group

APPROVED BY:



Joseph H. Cavallaro
Lead, Cargo Support Operations Group



Robert H. Nute
Chief, Cargo Integration and
Operations Branch

This document is under the configuration control of the Crew Procedures Control Board (CPCB). All proposed changes must be submitted via FDF Workflow Crew Procedure Change Request (CR) to DO3/FDF Manager.

Additional distribution of this book, for official use only, may be requested in writing to DO3/PMO Administrator. The request must include justification and requester's name, organization, position, and phone number. Contractor requests are made through the NASA or DOD organization supported. Deletions, reduction in quantity, or change of address may be submitted to DO3/FDF Management Office, 281-244-1184.

Incorporates the following:		
482#:	PL OPS-1738	PL OPS-1742
	PL OPS-1739	PL OPS-1743
	PL OPS-1740	PL OPS-1744
	PL OPS-1741	

AREAS OF TECHNICAL RESPONSIBILITY

Publication Manager	DO35/C. Simon	281-483-0656
Alternate Publication Manager	DO35/T.Vaughan	281-483-4180
Middeck Payloads	DO5/K. Thompson	281-483-9176

PAYLOAD OPERATIONS CHECKLIST
 STS-118

LIST OF EFFECTIVE PAGES

	FINAL	04/13/07	
Sign Off	* 118/FIN	CC 5-3	118/FIN
ii	* 118/FIN	CC 5-4	118/FIN
iii	* 118/FIN	5-5	118/FIN
iv	* 118/FIN	5-6	118/FIN
v	* 118/FIN	5-7	118/FIN
vi	* 118/FIN	5-8	118/FIN
vii	118/FIN	5-9	118/FIN
viii	118/FIN	5-10	118/FIN
1-1	118/FIN	5-11	118/FIN
1-2	118/FIN	5-12	118/FIN
CC 1-3	118/FIN	5-13	118/FIN
CC 1-4	118/FIN	5-14	118/FIN
CC 1-5	118/FIN	5-15	118/FIN
CC 1-6	118/FIN	5-16	118/FIN
CC 1-7	118/FIN	5-17	118/FIN
CC 1-8	118/FIN	5-18	118/FIN
1-9	118/FIN	5-19	118/FIN
1-10	118/FIN	5-20	118/FIN
1-11	118/FIN	5-21	118/FIN
1-12	118/FIN	5-22	118/FIN
1-13	118/FIN	5-23	118/FIN
1-14	118/FIN	5-24	118/FIN
2-1	118/FIN	5-25	118/FIN
CC 2-2	118/FIN	5-26	118/FIN
CC 2-3	118/FIN	5-27	118/FIN
CC 2-4	118/FIN	5-28	118/FIN
CC 2-5	118/FIN	5-29	118/FIN
2-6	118/FIN	5-30	118/FIN
2-7	118/FIN	5-31	118/FIN
2-8	118/FIN	5-32	118/FIN
3-1	118/FIN	5-33	118/FIN
3-2	118/FIN	5-34	118/FIN
3-3	118/FIN	5-35	118/FIN
3-4	118/FIN	5-36	118/FIN
3-5	118/FIN	5-37	118/FIN
3-6	118/FIN	5-38	118/FIN
4-1	118/FIN	5-39	118/FIN
4-2	118/FIN	5-40	118/FIN
4-3	118/FIN	5-41	118/FIN
4-4	118/FIN	5-42	118/FIN
4-5	118/FIN	5-43	118/FIN
4-6	118/FIN	5-44	118/FIN
4-7	118/FIN	5-45	118/FIN
4-8	118/FIN	5-46	118/FIN
4-9	118/FIN	5-47	118/FIN
4-10	118/FIN	5-48	118/FIN
5-1	118/FIN	5-49	118/FIN
5-2	118/FIN	5-50	118/FIN

* – Omit from flight book

5-51	118/FIN	8-12	118/FIN
5-52	118/FIN	9-1	118/FIN
5-53	118/FIN	9-2	118/FIN
5-54	118/FIN	9-3	118/FIN
5-55	118/FIN	9-4	118/FIN
5-56	118/FIN	10-1	118/FIN
5-57	118/FIN	10-2	118/FIN
5-58	118/FIN	10-3	118/FIN
5-59	118/FIN	10-4	118/FIN
5-60	118/FIN	10-5	118/FIN
5-61	118/FIN	10-6	118/FIN
5-62	118/FIN	10-7	118/FIN
5-63	118/FIN	10-8	118/FIN
5-64	118/FIN	11-1	118/FIN
5-65	118/FIN	11-2	118/FIN
5-66	118/FIN	11-3	118/FIN
5-67	118/FIN	11-4	118/FIN
5-68	118/FIN	11-5	118/FIN
5-69	118/FIN	11-6	118/FIN
5-70	118/FIN	11-7	118/FIN
5-71	118/FIN	11-8	118/FIN
5-72	118/FIN		
5-73	118/FIN		
5-74	118/FIN		
5-75	118/FIN		
5-76	118/FIN		
5-77	118/FIN		
5-78	118/FIN		
5-79	118/FIN		
5-80	118/FIN		
5-81	118/FIN		
5-82	118/FIN		
5-83	118/FIN		
5-84	118/FIN		
5-85	118/FIN		
5-86	118/FIN		
6-1	118/FIN		
6-2	118/FIN		
6-3	118/FIN		
6-4	118/FIN		
6-5	118/FIN		
6-6	118/FIN		
7-1	118/FIN		
7-2	118/FIN		
8-1	118/FIN		
8-2	118/FIN		
8-3	118/FIN		
8-4	118/FIN		
8-5	118/FIN		
8-6	118/FIN		
8-7	118/FIN		
8-8	118/FIN		
8-9	118/FIN		
8-10	118/FIN		
8-11	118/FIN		

PAYLOAD OPS CUE CARDS

<u>Title</u>	<u>Ref. Page</u>	<u>Card No.</u>
CBTM UNIT #1 (MF43E) STATUS CHECK (Front)....	CC 1-3	PL OPS-1a/118/O/B
DAILY LOG (Back)	CC 1-4	PL OPS-1b/118/O/B
#2 (MF57E) STATUS CHECK (Front)....	CC 1-5	PL OPS-5a/118/O/A
DAILY LOG (Back)	CC 1-6	PL OPS-5b/118/O/A
#3 (MF43K) STATUS CHECK (Front)....	CC 1-7	PL OPS-6a/118/O/A
DAILY LOG (Back)	CC 1-8	PL OPS-6b/118/O/A
CCM-A INITIALIZATION (Front)	CC 2-2	PL OPS-4a/118/O/A
ENTRY PREP (Back)	CC 2-3	PL OPS-4b/118/O/A
CCM-A STATUS CHECK		
(Front)	CC 2-4	PL OPS-3a/118/O/A
(Back)	CC 2-5	PL OPS-3b/118/O/A
MERLIN STATUS CHECK (Front)	CC 5-3	PL OPS-2a/118/O/B
LOG (Back).....	CC 5-4	PL OPS-2b/118/O/A

This Page Intentionally Blank

<u>CONTENTS</u>	<u>PAGE</u>
<u>COMMERCIAL BIOMEDICAL TESTING MODULE (CBTM)</u>	1-1
NOMINAL	
CBTM UNIT #1 (MF43E) STATUS CHECK	CC 1-3
DAILY LOG	CC 1-4
#2 (MF57E) STATUS CHECK	CC 1-5
DAILY LOG	CC 1-6
#3 (MF43K) STATUS CHECK	CC 1-7
DAILY LOG	CC 1-8
CONTINGENCY	
CBTM LIGHT TIMER CYCLE RESET	1-9
VIDEO PREPARATION	1-10
MALS	
1.1a CBTM ANY PWR INDICATOR OFF	1-11
1.1b CBTM FAN(S) FAILURE	1-12
1.1c CBTM LIGHT CYCLE INCORRECT (OFF) DURING OPERATIONS	1-13
1.1d CBTM WATER LEAKING	1-14
<u>CELL CULTURE MODULE-A (CCM-A)</u>	2-1
CCM-A INITIALIZATION	CC 2-2
ENTRY PREP	CC 2-3
STATUS CHECK.....	CC 2-4
MALS	
2.1a CCM-A FAILURE	2-6
2.1b LCD FROZEN, BLANK, OR SCRAMBLED	2-7
2.1c TEMP OUT OF RANGE ON LCD	2-8
<u>COMMERCIAL GENERIC BIOPROCESSING APPARTATUS/CGBA SCIENCE</u>	
<u>INSERT (CGBA CSI) TRANSFER</u>	3-1
CGBA SCIENCE INSERT SWAP	3-2
<u>EDUCATION PAYLOAD OPERATIONS (EPO)</u>	4-1
EPO KIT C DRINK BAG PREPARATION	4-2
EDUCATOR SEED PHOTOS	4-3
KIT C TRANSFER VIDEO	4-5
EDUCATOR VIDEO ACTIVITIES.....	4-8
<u>MICROGRAVITY EXPERIMENT RESEARCH LOCKER INCUBATOR (MERLIN)/</u>	
<u>STREPTOCOCCUS PNEUMONIAE EXPRESSION OF GENES IN SPACE</u>	
<u>(SPEGIS)</u>	5-1
NOMINAL	
MERLIN STATUS CHECK	CC 5-3
LOG	CC 5-4
SPEGIS SETUP.....	5-5
SPEGIS CANISTER ACTIVATION	5-9
TERMINATION	5-11
MERLIN WARM SHUTDOWN	5-13
CONFIGURE FOR DESCENT.....	5-14
REFERENCE 1: MERLIN ASCENT-DESCENT ON-ORBIT CONFIGURATION ...	5-15
2: MERLIN INSTALLATION TO MOUNTING PANEL	5-16
3: MERLIN OUTER STRUCTURE	5-17
4: MERLIN ELECTRICAL SCHEMATIC	5-21
5: MERLIN SETUP.....	5-23

CONTINGENCY	
MERLIN FAIL TO HOLD SET POINT	5-29
FILE CLEANUP	5-34
POWER CYCLE	5-36
REBOOT	5-37
RECONFIGURE	5-38
POWER UP	5-46
RECORD DIAGNOSTIC DATA	5-47
UPDATE PROFILE PARAMETERS	5-50
MALS	
5.1a MERLIN ERROR MESSAGE	5-69
5.1b MERLIN FAIL TO REPOWER.....	5-78
5.1c MERLIN LCD BLANK	5-80
DEORBIT PREP	
PAYLOAD DEACT	6-1
REACT	6-2
ENTRY SWITCH LIST/VERIFICATION	6-3
	6-4
PAYLOAD EVA CONFIG	
POST EVA PL CONFIG	7-1
PRE EVA PL CONFIG	7-2
	7-2
PL COMM MALS	
8.1a S62 PDI DECOM FAIL	8-1
8.1b S212 OIU AD 1 NOLK/LOSS OF ISS OR SSOR TELEMETRY	8-2
	8-9
PAYLOAD/DPS RECONFIGURATION	
PL/DPS RECONFIGURATION	9-1
	9-2
CRITICAL EQUIPMENT LOSS	
ORBITER ELECTRICAL BUS LOSS MATRIX	10-1
PRLA	10-3
	10-5
PAYLOAD RETENTION USAGE	10-5
ORBITER MDM LOSS IMPACTS	10-7
REFERENCE DATA	
C3 PAYLOAD SAFING	11-1
SSP 1	11-2
1 FUNCTIONS	11-3
	11-4
SSP 2	11-5
2 FUNCTIONS	11-6
TABLES	
TABLE 5-I.- MERLIN RESET LOG FILE	5-60
5-II.- MERLIN DIAGNOSTIC LOG FILE	5-65
5-III.- MERLIN PROFILE DATA LOG FILE	5-67
5-IV.- MERLIN ERROR MESSAGE LOG FILE.....	5-84
11-I.- SPACEHAB FIRE SUPPRESSOR AND H2O LINE HEATERS PANEL ...	11-2

COMMERCIAL BIOMEDICAL TESTING MODULE (CBTM)

NOMINAL

CBTM UNIT #1 (MF43E) STATUS CHECK.....	CC 1-3
DAILY LOG.....	CC 1-4
#2 (MF57E) STATUS CHECK.....	CC 1-5
DAILY LOG.....	CC 1-6
#3 (MF43K) STATUS CHECK.....	CC 1-7
DAILY LOG.....	CC 1-8

CONTINGENCY

CBTM LIGHT TIMER CYCLE RESET	1-9
VIDEO PREPARATION	1-10

MALS

1.1a CBTM ANY PWR INDICATOR OFF	1-11
1.1b CBTM FAN(S) FAILURE	1-12
1.1c CBTM LIGHT CYCLE INCORRECT (OFF) DURING OPERATIONS	1-13
1.1d CBTM WATER LEAKING	1-14

CBTM



This Page Intentionally Blank


 HOOK
VELCRO
 

 HOOK
VELCRO
 
CBTM UNIT #1 (MF43E) STATUS CHECK

- MF43E
1. Log begin MET and Observer for appropriate Flight Day in
CBTM DAILY LOG
 2. Remove Muffler from locker door, temp stow
Unlatch, open locker door
 3. √FANS A&D, FANS B&C lts (two) – on (green)
√FANS fans operating (audible)
 - * If fan indicator lts off or fans not operating: *
 - * Perform 1.1b CBTM FANS(S) FAILURE *
 4. √CBTM air inlet screens free of debris, clean if reqd
 5. √cb LIGHTS B&C – cl (lt on)
 - * If lts off, perform 1.1c CBTM LIGHT CYCLE INCORRECT *
 - * (OFF) DURING OPERATIONS *
 6. Using straps, pull CBTM ~3/4 out of locker
 7. √CBTM interior lts (two) – illuminated
 - * If lts off, perform 1.1c CBTM LIGHT CYCLE INCORRECT *
 - * (OFF) DURING OPERATIONS *
 8. √Water Level
 - * If bladders inside water box are low (spring plates between 3,4), *
 - * notify MCC *
 - * If noticeable water leak: *
 - * Perform 1.1d CBTM WATER LEAKING *
 9. Log Rodent Observation for appropriate Flight Day in CBTM DAILY LOG
 - * If rodents appear distressed, *
 - * notify MCC *
 10. Push CBTM into locker
√LIGHTS sw – AUTO
√cb LIGHTS A&D – op (lt off)
√FANS sw – ON
Close, latch locker door
Reattach Muffler to locker door
 11. When all three CBTM status checks complete, notify MCC, CBTM
STATUS CHECK complete and any off-nominal rodent conditions

NOMINAL


 PL OPS/1a/118/O/B
 

(reduced copy)

TOP
Back of 'CBTM STATUS CHECK'

HOOK
VELCRO

HOOK
VELCRO

CBTM UNIT #1 (MF43E) DAILY LOG

NOMINAL

OBSERVE	CONDITION OBSERVED (Check Box)					
Respiration:	(N)ormal (3/sec)	(R)apid	(S)hallow	(L)abored		(U)nable to Determine
Skin: (ears, toes, tail)	(N)ormal: Dark	(D)ry/Scaly	(S)crapes/ Cuts	(Sw)ollen/ Red		(U)nable to Determine
Coat/Fur:	(N)ormal: Smooth/shiny	(R)ough spiky, clump	(D)iscolored	(Du)ll	(W)et	(H)air Loss
Nose:	(N)ormal: Clear	(D)ischarge: Red/Brown	(B)leeding	(O)ther		(U)nable to Determine
Eyes:	(N)ormal: Shiny/clear	(D)ischarge Red/Brown	(S)wollen	(O)ther		(U)nable to Determine
Appetite:	(N)ormal Intake Food/water	(A)bnormal Intake				(U)nable to Determine
Activity:	(N)ormal: Bright/Alert	(L)istless (decreased)	Un(R)espon- sive	(D)ead		(U)nable to Determine
Extremities:	(N)ormal	(D)eformity or fracture	(A)mputated limb or digits	(B)leeding		(U)nable to Determine
Water Lft (1-4)		Water Rt (1-4)				
Comments:						

Observe	FD1	FD2	FD3	FD4	FD5	FD6	FD7	FD8
MET								
Observer								
Respiration								
Skin								
Coat/Fur								
Nose								
Eyes								
Appetite								
Activity								
Extremities								
Water Lft/Rt								
Comments								

Observe	FD9	FD10	FD11	FD12	FD13	FD14	FD15	FD16
MET								
Observer								
Respiration								
Skin								
Coat/Fur								
Nose								
Eyes								
Appetite								
Activity								
Extremities								
Water Lft/Rt								
Comments								

PL OPS/1b/118/O/B

(reduced copy)

HOOK
VELCRO

HOOK
VELCRO

CBTM UNIT #2 (MF57E) STATUS CHECK

- MF57E
1. Log begin MET and Observer for appropriate Flight Day in
CBTM DAILY LOG
 2. Remove Muffler from locker door, temp stow
Unlatch, open locker door
 3. √FANS A&D, FANS B&C lts (two) – on (green)
√FANS fans operating (audible)
 - * If fan indicator lts off or fans not operating: *
 - * Perform 1.1b CBTM FANS(S) FAILURE *
 4. √CBTM air inlet screens free of debris, clean if reqd
 5. √cb LIGHTS B&C – cl (lt on)
 - * If lts off, perform 1.1c CBTM LIGHT CYCLE INCORRECT *
 - * (OFF) DURING OPERATIONS *
 6. Using straps, pull CBTM ~3/4 out of locker
 7. √CBTM interior lts (two) – illuminated
 - * If lts off, perform 1.1c CBTM LIGHT CYCLE INCORRECT *
 - * (OFF) DURING OPERATIONS *
 8. √Water Level
 - * If bladders inside water box are low (spring plates between 3,4), *
 - * notify MCC *
 - * If noticable water leak: *
 - * Perform 1.1d CBTM WATER LEAKING *
 9. Log Rodent Observation for appropriate Flight Day in CBTM DAILY LOG
 - * If rodents appear distressed, *
 - * notify MCC *
 10. Push CBTM into locker
√LIGHTS sw – AUTO
√cb LIGHTS A&D – op (lt off)
√FANS sw – ON
Close, latch locker door
Reattach Muffler to locker door
 11. When all three CBTM status checks complete, notify MCC, CBTM
STATUS CHECK complete and any off-nominal rodent conditions

PL OPS/5a/118/O/A

(reduced copy)

TOP
Back of 'CBTM STATUS CHECK'

HOOK
VELCRO

HOOK
VELCRO

CBTM UNIT #2 (MF57E) DAILY LOG

OBSERVE	CONDITION OBSERVED (Check Box)					
Respiration:	(N)ormal (3/sec)	(R)apid	(S)hallow	(L)abored		(U)nable to Determine
Skin: (ears, toes, tail)	(N)ormal: Dark	(D)ry/Scaly	(S)crapes/ Cuts	(S)wollen/ Red		(U)nable to Determine
Coat/Fur:	(N)ormal: Smooth/shiny	(R)ough spiky, clump	(D)iscolored	(D)ull	(W)et	(H)air Loss
Nose:	(N)ormal: Clear	(D)ischarge: Red/Brown	(B)leeding	(O)ther		(U)nable to Determine
Eyes:	(N)ormal: Shiny/clear	(D)ischarge Red/Brown	(S)wollen	(O)ther		(U)nable to Determine
Appetite:	(N)ormal Intake Food/water	(A)bnormal Intake				(U)nable to Determine
Activity:	(N)ormal: Bright/Alert	(L)istless (decreased)	Un(R)espon- sive	(D)ead		(U)nable to Determine
Extremities:	(N)ormal	(D)eformity or fracture	(A)mputated limb or digits	(B)leeding		(U)nable to Determine
Water Lft (1-4)	Water Rt (1-4)					
Comments:						

Observe	FD1	FD2	FD3	FD4	FD5	FD6	FD7	FD8
MET								
Observer								
Respiration								
Skin								
Coat/Fur								
Nose								
Eyes								
Appetite								
Activity								
Extremities								
Water Lft/Rt								
Comments								

Observe	FD9	FD10	FD11	FD12	FD13	FD14	FD15	FD16
MET								
Observer								
Respiration								
Skin								
Coat/Fur								
Nose								
Eyes								
Appetite								
Activity								
Extremities								
Water Lft/Rt								
Comments								

PL OPS/5b/118/O/A

(reduced copy)


 HOOK
VELCRO
 

 HOOK
VELCRO
 
CBTM UNIT #3 (MF43K) STATUS CHECK

- MF43E
1. Log begin MET and Observer for appropriate Flight Day in
CBTM DAILY LOG
 2. Remove Muffler from locker door, temp stow
Unlatch, open locker door
 3. √FANS A&D, FANS B&C lts (two) – on (green)
√FANS fans operating (audible)
 - * If fan indicator lts off or fans not operating: *
 - * Perform 1.1b CBTM FANS(S) FAILURE *
 4. √CBTM air inlet screens free of debris, clean if reqd
 5. √cb LIGHTS B&C – cl (lt on)
 - * If lts off, perform 1.1c CBTM LIGHT CYCLE INCORRECT *
 - * (OFF) DURING OPERATIONS *
 6. Using straps, pull CBTM ~3/4 out of locker
 7. √CBTM interior lts (two) – illuminated
 - * If lts off, perform 1.1c CBTM LIGHT CYCLE INCORRECT *
 - * (OFF) DURING OPERATIONS *
 8. √Water Level
 - * If bladders inside water box are low (spring plates between 3,4), *
 - * notify MCC *
 - * If noticeable water leak: *
 - * Perform 1.1d CBTM WATER LEAKING *
 9. Log Rodent Observation for appropriate Flight Day in CBTM DAILY LOG
 - * If rodents appear distressed, *
 - * notify MCC *
 10. Push CBTM into locker
√LIGHTS sw – AUTO
√cb LIGHTS A&D – op (lt off)
√FANS sw – ON
Close, latch locker door
Reattach Muffler to locker door
 11. When all three CBTM status checks complete, notify MCC, CBTM
STATUS CHECK complete and any off-nominal rodent conditions

PL OPS/6a/118/O/A

(reduced copy)

TOP
Back of 'CBTM STATUS CHECK'

HOOK
VELCRO

HOOK
VELCRO

CBTM UNIT #3 (MF43K) DAILY LOG

OBSERVE	CONDITION OBSERVED (Check Box)					
Respiration:	(N)ormal (3/sec)	(R)apid	(S)hallow	(L)abored		(U)nable to Determine
Skin: (ears, toes, tail)	(N)ormal: Dark	(D)ry/Scaly	(S)crapes/ Cuts	(S)wollen/ Red		(U)nable to Determine
Coat/Fur:	(N)ormal: Smooth/shiny	(R)ough spiky, clump	(D)iscolored	(D)ull	(W)et	(H)air Loss
Nose:	(N)ormal: Clear	(D)ischarge: Red/Brown	(B)leeding	(O)ther		(U)nable to Determine
Eyes:	(N)ormal: Shiny/clear	(D)ischarge Red/Brown	(S)wollen	(O)ther		(U)nable to Determine
Appetite:	(N)ormal Intake Food/water	(A)bnormal Intake				(U)nable to Determine
Activity:	(N)ormal: Bright/Alert	(L)istless (decreased)	Un(R)espon- sive	(D)ead		(U)nable to Determine
Extremities:	(N)ormal	(D)eformity or fracture	(A)mputated limb or digits	(B)leeding		(U)nable to Determine
Water Lft (1-4)		Water Rt (1-4)				
Comments:						

Observe	FD1	FD2	FD3	FD4	FD5	FD6	FD7	FD8
MET								
Observer								
Respiration								
Skin								
Coat/Fur								
Nose								
Eyes								
Appetite								
Activity								
Extremities								
Water Lft/Rt								
Comments								

Observe	FD9	FD10	FD11	FD12	FD13	FD14	FD15	FD16
MET								
Observer								
Respiration								
Skin								
Coat/Fur								
Nose								
Eyes								
Appetite								
Activity								
Extremities								
Water Lft/Rt								
Comments								

PL OPS/6b/118/O/A

(reduced copy)

CBTM LIGHT TIMER CYCLE RESET

1. √MCC for correct Day/Night It cycle

	HH	:	MM
ON/D			
OF/N			

NOTE

Pen can be used for Timer pushbuttons. If more than 2 min pass after the most recent pb press, display reverts to current settings without saving changes.

On GMT display, first two characters reflect current timer It status and do not change when MENU pb pressed.

New SP Temp Range (-20.0 to +48.5 degC)

- MF43E
2. pb MENU – push until correct Day/Night indicator ('D' or 'N') appears on GMT display
 3. pb HOURS – push to set correct hours

NOTE

Minutes can only be set in 15 min increments

4. pb MIN – push to set correct minutes
5. pb MENU – push
6. Repeat steps 3-5 to reset other It cycle
7. If reqd, repeat steps 2-6 for CBMT #2 (MF57E) and CBTM #3 (MF43K) units

CBTM VIDEO PREPARATION

- MF43E, MF57E, MF43K
1. Remove Muffler from locker door, temp stow
Unlatch, open locker door
 2. ✓cb LIGHTS B&C – cl (lt on)
 - * If lt off, perform CBTM LIGHT CYCLE *
 - * INCORRECT (OFF) DURING OPERATIONS *
 - * (PAYLOAD MALS) *
 3. Using straps, pull CBTM ~3/4 out of locker
 4. ✓CBTM interior lts (two) – lts on
 - * If lts off, perform LIGHT CYCLE INCORRECT *
 - * (OFF) DURING OPERATIONS (PAYLOAD *
 - * MALS) *
 5. PD100 Setup
 - Attach Multiuse Arm to Base Plate above CBTM lockers
 - Attach PD100 to Multiuse Arm
 - ✓PD100 powered by Middeck TV power port
 - Config PD100
 - ✓Wide Conversion Lens installed
 - PWR – Camera
 - Tape – Install
 - ✓Viewfinder (DCS) displays STBY
 - Camr Settings
 - ✓AUTO LOCK – AUTO LOCK
 - ✓Focus – AUTO
 - ✓FOV includes entire animal compartment

Turn off lights causing reflection in FOV
 6. PD100 Operations
 - Document each animal enclosure for 40min
 - Label tapes CBTM when finished
 7. Push CBTM back into locker
 - ✓LIGHTS sw – AUTO
 - ✓cb LIGHTS A&D – op (lt off)
 - ✓FANS sw – ON
 - Close, latch locker door
 - Reattach Muffler to locker door

CONTINGENCY

CBTM

1.1a CBTM ANY PWR INDICATOR OFF

①
Any pwr indicator – off

Nominal Config:
(MF43E (MF57E, MF43K))
cb MAIN BREAKER – cl
cb PUMP BKR – op
cb FANS A&D – cl (lt on)
cb FANS B&C – cl (lt on)
FANS sw – ON
cb LIGHTS A&D – op (lt off)
cb LIGHTS B&C – cl (lt on)
LIGHTS sw – AUTO (ML86B:E)
cb MNB – cl (ML85E)
cb DC 10AMP MNB CB2 – cl
DC 10 AMP MNB S2 – ON

1 | ✓CBTM pwr
Any lt on, G.M.T. display on, or Fans running (audible)?

2 | Check cable connections
(MF43E (MF57E, MF43K))
• A/E PAYLOAD DC W (24') →|← J1
(ML85E)
• A/E PAYLOAD DC W (24') →|← J12
Cables connected?

4 |
•√MCC

3 | Cycle CBTM cb
On MCC GO:
(MF43E (MF57E, MF43K))
• cb MAIN BREAKER – op
(MF43E (MF57E, MF43K))
• cb MAIN BREAKER – cl
Power to CBTM?

5 | EXPERIMENT FAILURE

6 | TRANSIENT FAILURE

7 |
•√MCC

8 |
•√MCC

9 | Determine:
LIGHTS B&C light off while other pwr indicators on → 1.1c 1
FANS A&D (FANS B&C) light off while other pwr indicators on → 1.1b 1
G.M.T. display blank

10 | G.M.T. DISPLAY FAILURE

11 |
•√MCC

①
This malfunction procedure only supports troubleshooting one Animal Enclosure

②
All three CBTM's are powered off the same MUP power port (J12) via the W-cable. In order to reconfigure the W-cable, power will need to be removed from all three CBTM's. MCC will direct crew if further action is required

③
MCC may direct crew to perform CBTM CHECKLIST AFTER PWR RECOVERY

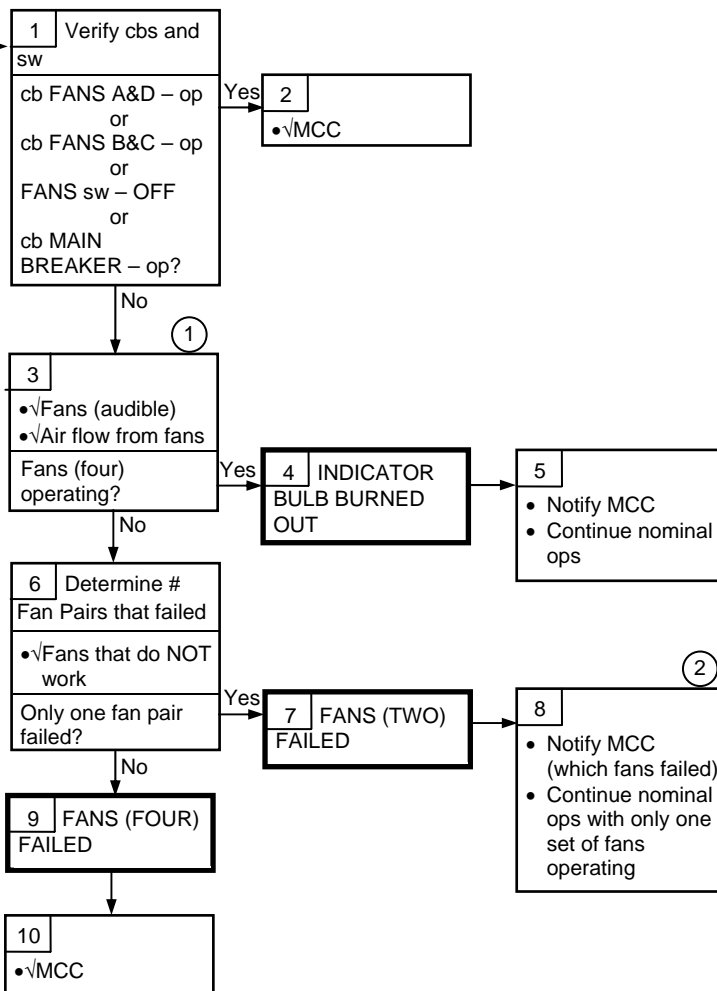
MALS

CBTM

1.1b CBTM FAN(S) FAILURE

Inaudible Fan(s)/
Indicator Bulb(s)
Off

Nominal Config:
(MF43E (MF57E,
MF43K))
cb PUMP BKR – op
cb MAIN
BREAKER – cl
cb FANS A&D – cl
(It on)
cb FANS B&C – cl
(It on)
FANS sw – ON
cb LIGHTS A&D –
op (It off)
cb LIGHTS B&C – cl
(It on)
LIGHTS sw – AUTO
(ML86B:E)
cb MNB MAR 1 – cl
(ML85E)
cb DC 10 AMP MNB
CB2 – cl
DC 10 AMP MNB
S2 – ON



①
Hold Tissue in front of fan outlet to determine existence of air flow

②
CBTM can function with one set of fans operating

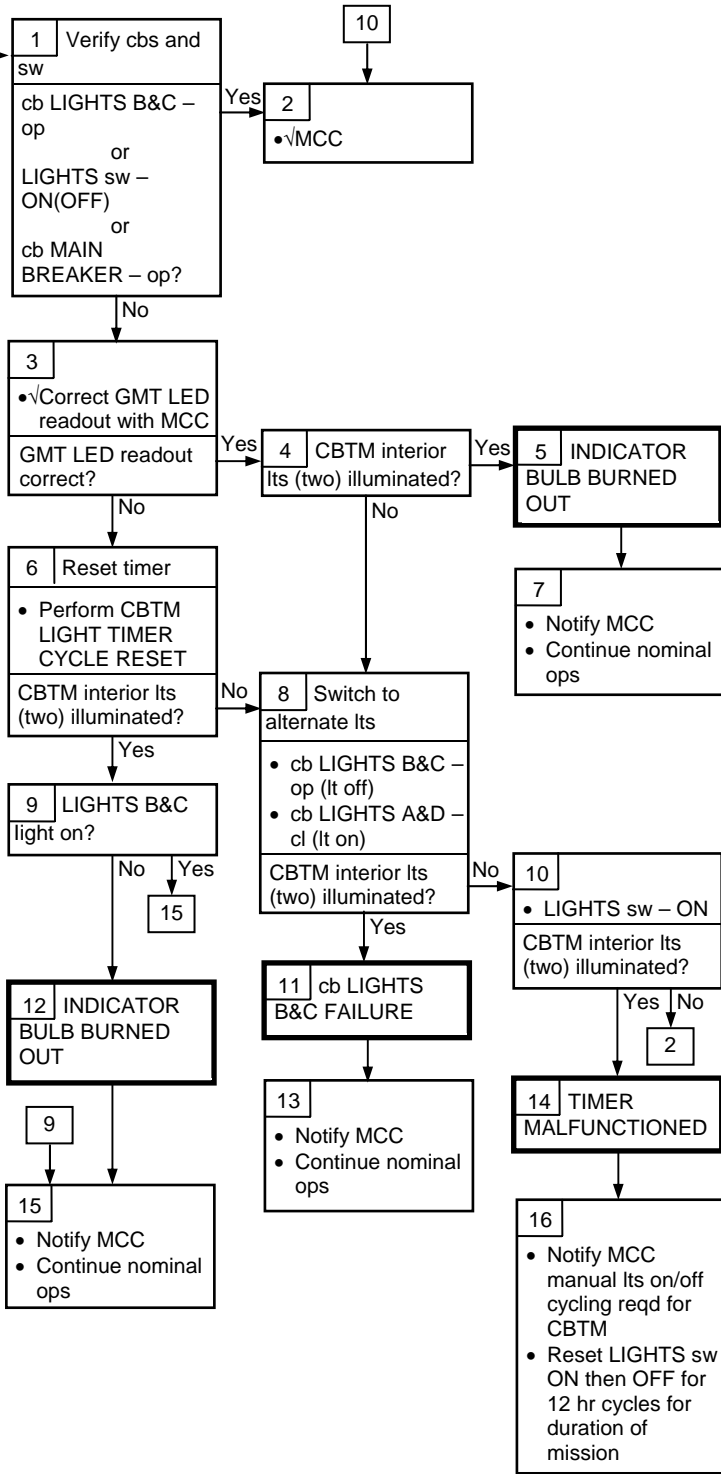
MALS

CBTM

1.1c CBTM LIGHT CYCLE INCORRECT (OFF) DURING OPERATIONS

CBTM Light Cycle Incorrect (off) during Operations

Nominal Config:
 (MF43E (MF57E, MF43K))
 cb PUMP BKR – cl
 cb MAIN BREAKER – cl
 cb FANS A&D – cl (lt on)
 cb FANS B&C – cl (lt on)
 FANS sw – ON
 cb LIGHTS A&D – op (lt off)
 cb LIGHTS B&C – cl (lt on)
 LIGHTS sw – AUTO (ML86B:E)
 cb MNB MAR 1 – cl (ML85E)
 cb DC 10 AMP MNB CB2 – cl
 DC 10 AMP MNB S2 – ON

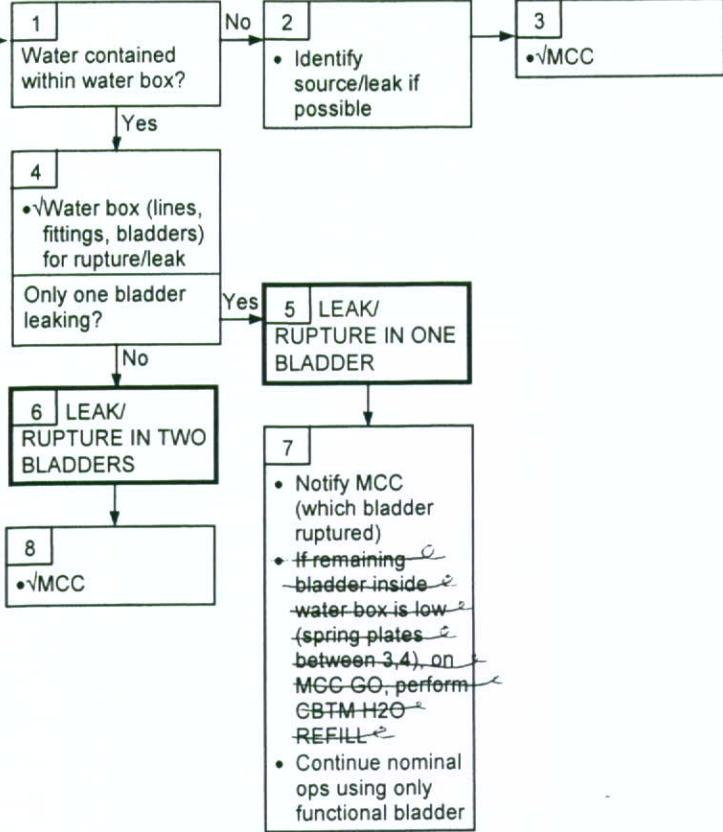


CBTM

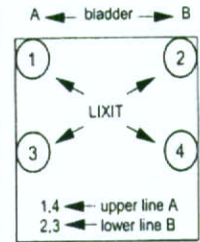
1.1d CBTM WATER LEAKING

Water Leaking in CBTM

Nominal Config:
 (MF43E (MF57E, MF43K))
 Bladder A,B – spring plates 1-4
 B/OFF/A vlv – OFF
 cb PUMP BKR – op
 cb MAIN BREAKER – cl
 cb FANS A&D – cl (It on)
 cb FANS B&C – cl (It on)
 FANS sw – ON
 cb LIGHTS A&D – op (It off)
 cb LIGHTS B&C – cl (It on)
 LIGHTS sw – AUTO (ML86B:E)
 cb MNB MAR 1 – cl (ML85E)
 cb DC 10 AMP MNB CB2 – cl
 DC 10 AMP MNB S2 – ON



①
 Water box is crossed plumbed
 Lixits 1, 4 are fed from bladder A
 Lixits 2, 3 are fed from bladder B
 Both sides of cage have water as long as one bladder



remains

CELL CULTURE MODULE-A (CCM-A)

CCM-A INITIALIZATION.....	CC 2-2
ENTRY PREP	CC 2-3
STATUS CHECK	CC 2-4
MALS	
2.1a CCM-A FAILURE	2-6
2.1b LCD FROZEN, BLANK, OR SCRAMBLED.....	2-7
2.1c TEMP OUT OF RANGE ON LCD.....	2-8

CCM-A

HOOK
VELCRO

CCM-A INITIALIZATION

MF71H 1. ✓POWER It – on
(CCM-A) ✓F1 It – off

- * If POWER It off or F1 It on, *
- * perform 2.1a CCM-A FAILURE, all *

2. ✓Display shows cycling status information including 'PRESS BUTTON FOR ORBIT TIME REF'

NOTE

Complete step 4 within 5 sec of step 3

3. PULSE pb – push, hold until display reads 'PRESS BUTTON TO CONFIRM SIGNAL'

- * If Display – 'THE ACTION HAS BEEN CANCELED', *
- * wait at least 2 sec; then return to step 2 *

4. PULSE pb – push, hold until display reads 'THE ACTION HAS BEEN CONFIRMED' (2 sec)

✓Display shows cycling status information including 'PRESS BUTTON FOR LANDING PREP'

5. Record MET and Rail temps, CCM-A STATUS CHECK

✓Rail temps (four) within nominal range 36-39 degC

- * If temps out of range, *
- * ✓MCC *

6. Notify MCC activity complete; report values for step 5

PL OPS-4a/118/O/A

HOOK
VELCRO

CCM-A ENTRY PREP

MF71H 1. √POWER lt – on
(CCM-A) √F1 lt – off

- * If POWER lt off or F1 lt on, *
- * perform 2.1a CCM-A FAILURE, all *

2. √Display shows cycling status information including 'PRESS BUTTON FOR LANDING PREP'

NOTE

Complete step 4 within 5 sec of step 3

3. PULSE pb – push, hold until display reads 'PRESS BUTTON TO CONFIRM SIGNAL'

- * If Display – 'THE ACTION HAS BEEN CANCELED', *
- * wait at least 2 sec; then return to step 2 *

4. PULSE pb – push, hold until display reads 'THE ACTION HAS BEEN CONFIRMED' (2 sec)

5. Record MET and Rail temps, CCM-A STATUS CHECK

√Rail temps (four) within nominal range 36-39 degC

- * If temps out of range, *
- * √MCC *

6. Notify MCC activity complete; report values for step 5

7. Photograph CCM-A, including LCD display, Ops Item 2 (P/TV, SCENES, P/TV12 MD PAYLOADS)

PL OPS-4b/118/O/A

HOOK
VELCRO

CCM-A STATUS CHECK

MF71H 1. √POWER It – on
(CCM-A) √F1 It – off

- * If POWER It off or F1 It on, *
- * perform 2.1a CCM-A FAILURE, all *

2. Record MET and Rail temps
√Rail temps (four) within nominal range 36-39 degC

- * If temps out of range, *
- * √MCC *

3. Notify MCC of Rail temps

4. √Fan filter and clean if reqd

MET	TEMP (degC)			
	RAIL 1	RAIL 2	RAIL 3	RAIL 4
___/___:___				
___/___:___				
___/___:___				
___/___:___				
___/___:___				
___/___:___				
___/___:___				
___/___:___				
___/___:___				
___/___:___				
___/___:___				
___/___:___				
___/___:___				
___/___:___				
___/___:___				

PL OPS-3a/118/O/A

TOP
Back of 'CCM-A STATUS CHECK'

HOOK
VELCRO

MET	TEMP (degC)			
	RAIL 1	RAIL 2	RAIL 3	RAIL 4
—/—:—:—				
—/—:—:—				
—/—:—:—				
—/—:—:—				
—/—:—:—				
—/—:—:—				
—/—:—:—				
—/—:—:—				
—/—:—:—				
—/—:—:—				
—/—:—:—				
—/—:—:—				
—/—:—:—				
—/—:—:—				
—/—:—:—				
—/—:—:—				
—/—:—:—				
—/—:—:—				
—/—:—:—				

MALS

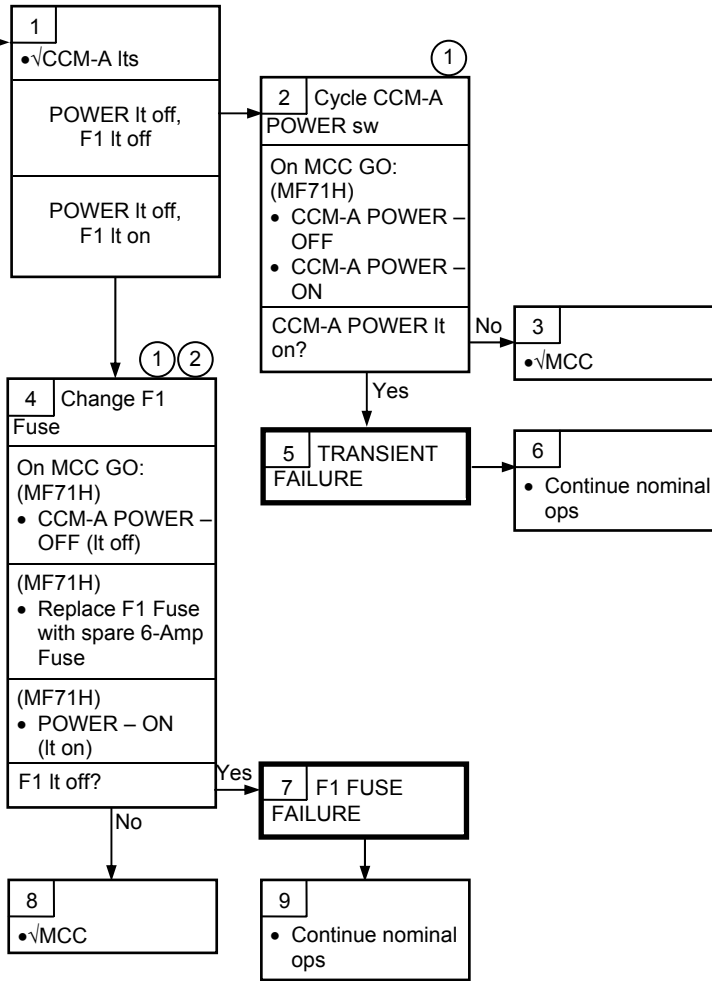
PL OPS-3b/118/O/A

CCM-A

2.1a CCM-A FAILURE

CCM-A POWER It or F1 It Off-nominal

Nominal Config:
 (MF71H)
 POWER It – on
 F1 It – off
 (ML86B:E)
 cb MNB MAR 2 – cl
 (ML85E)
 cb DC 10 AMP MNB
 CB4 – cl
 DC 10 AMP MNB
 S4 – ON



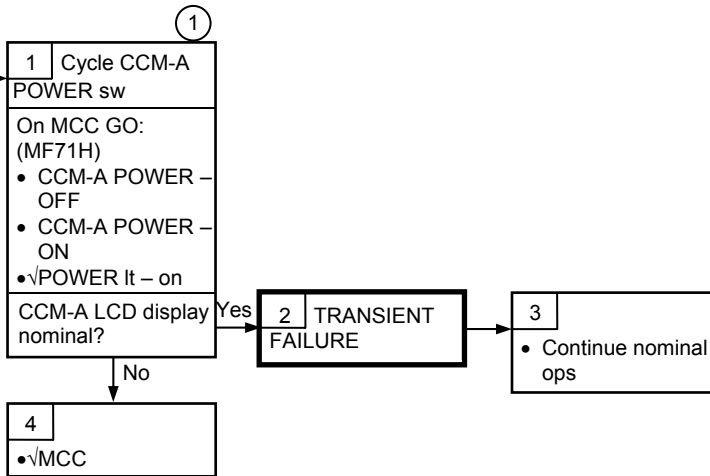
- ① Do not leave CCM-A pwr off for > 15 min
- ② Spare fuses located inside foam on back of locker door

CCM-A

2.1b LCD FROZEN, BLANK, OR SCRAMBLED

LCD Display Frozen, Blank, or Scrambled

Nominal Config:
(MF71H)
POWER It – on
F1 It – off
LCD display – scrolling thru rail status 1-4 and system status msgs (ML86B:E)
cb MNB MAR 2 – cl (ML85E)
cb DC 10 AMP MNB CB4 – cl
DC 10 AMP MNB S4 – ON



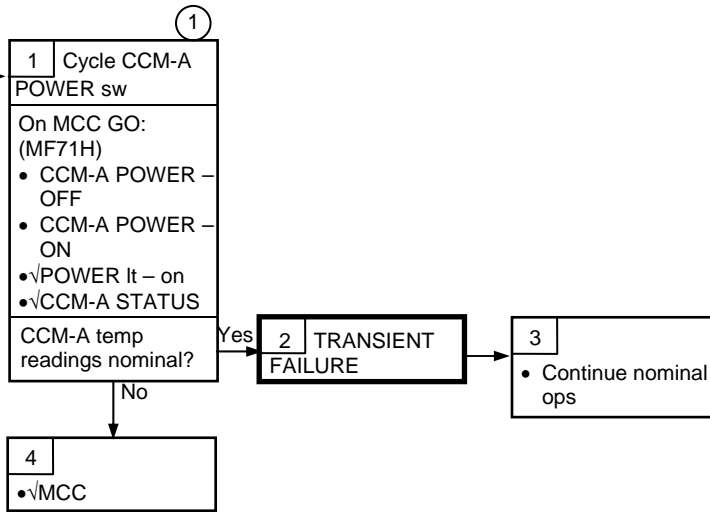
① Do not leave CCM-A pwr off for > 15 min

CCM-A

2.1c TEMP OUT OF RANGE ON LCD

CCM-A Temp Readings Off-Nominal

Nominal Config:
(MF71H)
POWER It – on
F1 It – off
(ML86B:E)
cb MNB MAR 2 – cl
(ML85E)
cb DC 10 AMP MNB
CB4 – cl
DC 10 AMP MNB
S4 – ON



①
Do not leave CCM-A pwr off for > 15 min

COMMERCIAL GENERIC BIOPROCESSING APPARATUS/CGBA SCIENCE INSERT |
(CGBA-CSI) TRANSFER

CGBA SCIENCE INSERT SWAP 3-2

CGBA-CSI

CGBA SCIENCE INSERT SWAP

OBJECTIVE:

To exchange the Commercial Generic Bioprocessing Apparatus (CGBA-4) Science Insert 1 (CSI-1) with the new CSI-2. Crew will transfer CSI-2 from Shuttle, power off CGBA, open CGBA, remove CSI-1 and install CSI-2, close CGBA and repower. CSI-1 will be packed for return.

LOCATION:

Stowed: CSI-2 (ref Transfer List)

Installed: CSI-1 (EXPRESS-4 RACK - LAB1P2_G1)

DURATION:

30 minutes

PARTS:

Resupply: CSI-2

Return: CSI-1

LAB1P2_ 1. POWER DOWN CGBA

G1

NOTE

If CGBA Computer Display blank, press [ENTER] to disable screen saver.

- CGBA-CSI
- 1.1 On keypad,
 - pb MENU → Press
 - pb 7 Shutdown → Press
 - pb ENTER → Press
 - 1.2 Verify Shutdown CGBA screen,
 - On keypad,
 - pb 1 Shutdown system → Press
 - pb ENTER → Press
 - 1.3 ✓CGBA Computer Display indicates
 - CGBA system shutdown
is in progress!
Please wait 2 minute
For OK to POWERDOWN'**
 - 1.4 While waiting for CGBA to shut down (approximately 2 minutes), remove mufflers (2) and temporarily stow.
 - ✓CGBA Computer Display indicates:
 - 'OK TO POWERDOWN
It is now safe to turn off
power to CGBA!'**
 - 1.5 cb MAIN POWER → Open
 - ✓LED-MAIN POWER – Off

LAB1P2_F1 1.6 sw LOCKER-3 POWER → OFF
√LOCKER-3 POWER Lt – Off

LAB1P2_G1 1.7 Disconnect EXPRESS Rack cables from CGBA:
EXPRESS Rack Power Cable (24") ← | → POWER-IN 28 VDC J1
EXPRESS Rack Data Cable (38") ← | → EXPRESS DATA J4

2. SWAP CSI-01 AND CSI-02

2.1 Unlatch, open CGBA locker door.



Figure 1: CGBA 4 Locker Insert

2.2 Grasp CGBA, pull unit out of locker using side handles. If needed, pull Velcro tabs (ref Figure 1) to deploy CGBA recessed handles (push recessed handles back into place when done).



Figure 2: CGBA 4 Locker Insert Nomex Cover (rear view)

2.3 Open CGBA lid by lifting Velcro tabs on each side of Nomex cover (ref Figure 2).



Figure 3: CGBA 4 Locker Insert with Lid Open

2.4 Remove CSI-01 Stow Bag from inside CGBA lid (ref Figure 3). Open CSI-01 Stow Bag by removing tape and unfolding bag. Temporarily stow.

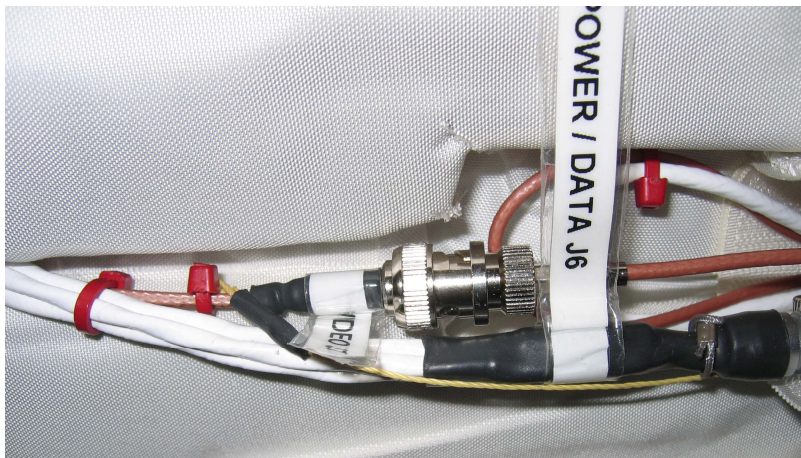


Figure 4: CSI Cables

2.5 Photograph CSI-01 before removing from CGBA (PHOTO/TV MDDK, P/TV12 MIDDECK PAYLOADS, Ops Item 3)

- 2.6 Disconnect CSI-01 cables from CGBA along right side panel of CGBA (ref Figure 4)
 - ← | → POWER / DATA J6
 - ← | → VIDEO J7



Figure 5: CSI Thumbscrew Locations

- 2.7 Reach inside CGBA and turn thumbscrews B1, B2, and B3 (ccw) to release CSI-01 from CGBA (ref Figure 5). Place CSI-01 inside CSI-01 Stow Bag. Close CSI-01 Stow Bag and stow for return home.
- 2.8 Place CSI-02 inside CGBA attaching with thumbscrews B1, B2, and B3 (cw).
- 2.9 Connect CSI-02 cables to CGBA along right side panel of CGBA
 - | ← POWER / DATA J6
 - | ← VIDEO J7
- 2.10 Photograph CSI-02 after installation in CGBA (PHOTO/TV MDDK, P/TV12 MIDDECK PAYLOADS, Ops Item 3)

3. CLOSE AND CONNECT CGBA

- | | |
|-----------|---|
| CGBA | 3.1 Close CGBA lid, and attach Velcro tabs. |
| LAB1P2_G1 | 3.2 Slide CGBA into locker, close locker door, and latch. |

3.3 √cb MAIN POWER – Open
√LED-MAIN POWER – Off

LAB1P2_F1 3.4 √sw LOCKER-3 POWER – OFF
√LOCKER-3 POWER Lt – Off

CGBA 3.5 Connect EXPRESS Rack cables:
EXPRESS Rack Power Cable (24") →|← POWER-IN 28 VDC J1
EXPRESS Rack Data Cable (38") →|← EXPRESS DATA J4

4. CGBA POWER ON

LAB1P2_F1_ 4.1 sw LOCKER-3 POWER – ON
√LOCKER-3 POWER Lt – On

LAB1P2_G1 4.2 cb MAIN POWER – Closed
√LED-MAIN POWER – On

5. CGBA CHECK OUT

LAB1P2_G1 5.1 √CGBA fan running (check airflow at EXHAUST)

5.2 Replace CGBA mufflers (2).

5.3 √CGBA Computer Display indicates:
EET ddd / hh:mm
Temp nn.n deg C
Set Temp nn.n deg C
ddmmmyy hh:mm:ss

5.4 Return CSI-1 to orbiter for return (ref Transfer List).

EDUCATION PAYLOAD OPERATIONS (EPO)

EPO KIT C DRINK BAG PREPARATION..... 4-2
EDUCATOR SEED PHOTOS 4-3
KIT C TRANSFER VIDEO..... 4-5
EDUCATOR VIDEO ACTIVITIES 4-8

EPO KIT C DRINK BAG PREPARATION

SCENE SYNOPSIS

Fill Drinking Water Containers from the Shuttle water supply to be used as plant growth water supply during stage operations of EPO Kit C. These bags will also be used during the video transfer of Kit C from SPACEHAB to ISS during 13A.1 docked ops

PARTS

Drinking Water Containers P/N SED48101685-622

FILL DRINKING WATER CONTAINERS

- XXXXX
1. Unstow CTB containing EPO Kit C and temp stow in SPACEHAB
 2. Unstow Drinking Water Containers (4) from CTB
 3. Fill Drinking Water Containers (4) (approx 8 oz ea) from Shuttle Water Supply
 4. Restow Drinking Water Containers inside CTB containing EPO Kit C. Restow CTB

EPO EDUCATOR SEED PHOTOS

SCENE SYNOPSIS

Capture still imagery of crewmembers holding mass quantity of seeds. Upon return, these seeds will be distributed to schools across the country as part of a national engineering design challenge. Through this challenge, students will be asked to plan, design, build, and validate the performance of their design for a plant growth chamber and use the flown seeds to conduct science experiments

TOOLS

DCS760 Camera P/N SEZ33113001-302

28mm Lens P/N SED33110609-301

SETUP

1. Camera Setup: 760 Program w/Flash

Install 28mm lens

Pwr – ON

√Disk installed

Rear LCD

√Batt

√Frames remaining sufficient

√White Balance – Auto

ISO – 100

√BKT disabled

√Focus Area – Center, LOCK displayed

Exp Comp – 0.0

Exp Mode – P

AF Area Mode – [] (no “+”)

Meter – Matrix

Diopter – Adjust

Film Adv – S

Body Focus Mode – S

Lens Focus Mode – A (M/A)

Aperture – Min, locked

Flash Settings

ON/OFF – ON

√TTL, Matrix

√Zoom – Auto (no M)

Tilt – Direct

Use exposure match technique for photos of subjects with seeds if taken in front of the flight deck windows

TBD 2. Unstow EPO Basil Seeds

PHOTOGRAPH SEEDS

3. Photograph crewmembers holding EPO Basil Seeds

4. Photograph EPO Basil Seeds floating inside shuttle

5. Photograph crewmembers and EPO Basil Seeds floating

STOW AND DCS760 DEACTIVATION

6. DCS760
Pwr – OFF
Remove disk and download images to OCA-Down/EPO folder
Start batt recharge as reqd

TBD 7. Restow EPO Basil Seeds

|

EPO KIT C TRANSFER VIDEO

SCENE SYNOPSIS

Capture video of transfer of EPO Kit C plant growth chambers. Video will be edited and distributed to education organizations to be incorporated into education products for students in grades K-12

PARTS

EPO Growth Chambers P/N 245107
EPO Watering Syringe P/N 245020
EPO Seed Kit P/N 245104
Drinking Water Containers P/N SED48101685-622

TOOLS

PD100 Camcorder P/N SEZ16103293-301
Mini DVCAM Tape P/N SED33111489-305
Fine Point Sharpie P/N 528-40674-18-
PD100 Wide Conversion Lens P/N SEZ16103293-303
Camcorder Lavalier Microphone P/N SED33104330-303
Sony Headphone P/N MDR-14
LI-ION Battery Pack (2) P/N SED33111486-303
Multiuse Bracket Assy P/N SED33104076-302
Multiuse Bracket Clamp Assy (2) P/N SED33104844-303
Portable Fluorescent Light P/N SED33103311-301
Loc-line Flex Bracket P/N SED33104480-302

VIDEO SETUP

1. Unstow blank Mini DVCAM tape
2. Set up PD100
 - Install Wide Conversion Lens
 - Connect headphones
 - Connect Multiuse Bracket and Multiuse Clamp to Bracket
 - Install LI-ION Battery
 - Configure PD100:
 - PWR – CAMERA
 - Install Tape
 - √Viewfinder (LCD) displays STBY
 - Camr Settings:
 - √AUTO LOCK – AUTO LOCK
 - √FOCUS – AUTO

If single subject/speaker:
Install Camcorder Lavalier Microphone
Mic ON/OFF – ON

If multiple subjects/speakers:
√Audio Muting Plug removed

Mount PD100 with multiuse bracket/clamp

Perform PORTABLE LIGHT SETUP (SH OPS, ON-ORBIT)

Mount Portable Fluorescent Light with locline bracket/clamp

sw HI/LO – HI

Turn on all SPACEHAB lights

Check scene composition and audio, adjust accordingly

OPERATIONS

NOTE

The following steps should be reviewed prior to video taping and then executed during taping of the actual transfer of EPO Kit C from SPACEHAB to ISS

3. Unstow CTB containing EPO Kit C
Describe the launch configuration of the hardware and how it was packed
4. Unpack from CTB:
 - EPO Growth Chambers
 - EPO Watering Syringe
 - EPO Seed Kit
 - Drinking Water Containers (4 for resupply of water, 1 for waste water)

Describe the physical characteristics of each piece of hardware, the connection with ground-based education activities and the duration of the on-orbit investigation. Share information on the importance of the engineering process when designing plant or human habitats for future missions to the Moon and Mars. Feel free to adapt this activity to reflect personal interests

Talking points may include:

Engineering design of the plant growth chamber

Each growth chamber is approximately 18 cm long, 10.5 cm wide and 5.5 cm high (when packed for ascent)

The bellows assembly (clear plastic collapsible component) can be extended to approximately 21.5 cm high to allow for plant growth

Water for the plants is injected using a watering syringe

The seeds are embedded in a crushed clay-like growth medium which contains fertilizer pellets

The plants that will be grown are basil

Description of experiment set up/operations

Growth chambers will be attached to ISS lockers with Velcro

Growth chambers need to be located near General Luminaire Assemblies (GLA) to receive sufficient light for plant growth

Plants/seeds will be watered on a regular basis

Still imagery of plants will be taken with a camera and downlinked every other day

Connection with ground-based activities

National engineering design challenge students will be asked to plan, design, build, and validate the performance of their design for a plant growth chamber (habitat)

Students in grades K-12 can participate

The importance of engineering design for plant and/or human habitat for future missions to the Moon and Mars

Identify a need for the hardware

Determine usability and desirability of the hardware

Identify criteria and constraints

Criteria – sets the design parameters (identify key elements and features)

Constraints – the limits on the design (funding, space, materials, human capabilities, time or the environment)

There is no perfect design and many possible solutions to a design problem exist

5. Repack EPO Kit C hardware in CTB
6. Unclamp PD100 keeping bracket and clamp installed to aid camera stability
7. Record transfer with camcorder with the ambient microphone (nothing plugged into the MIC port)
8. Record Transfer of CTB to ISS (per Transfer List)

STOW

9. Remove tape from PD100 and label with Sharpie, “EPO KIT C Transfer”; stow tape
10. PD100 PWR – OFF
11. Perform PORTABLE LIGHT STOW (SH OPS, ON-ORBIT)
12. Stow PD100, brackets

EPO EDUCATOR VIDEO ACTIVITIES

I

SCENE SYNOPSIS

Capture video of transfer of EPO Kit C plant growth chambers. The video will be edited and distributed to education organizations to be incorporated into education products for students in grades K-12

PARTS

EPO Growth Chambers P/N 245107
EPO Watering Syringe P/N 245020
EPO Seed Kit P/N 245104
Drinking Water Containers P/N SED48101685-622

TOOLS

PD100 Camcorder P/N SEZ16103293-301
Mini DVCAM Tape P/N SED33111489-305
Fine Point Sharpie P/N 528-40674-18
PD100 Wide Conversion Lens P/N SEZ16103293-303
Camcorder Lavalier Microphone P/N SED33104330-303
Sony Headphone P/N MDR-14
LI-ION Battery Pack (2) P/N SED33111486-303
Multiuse Bracket Assy P/N SED33104076-302
Multiuse Bracket Clamp Assy (2) P/N SED33104844-303
Portable Fluorescent Light P/N SED33103311-301
Loc-line Flex Bracket P/N SED33104480-302

VIDEO SETUP

1. Retrieve blank Mini DVCAM tape
2. Set up PD100 to obtain video of OPERATIONS:
 - Install Wide Conversion Lens
 - Connect headphones
 - Connect Multiuse Bracket for stability while hand-held
 - Install LI-ION Battery
 - Configure PD100:
 - PWR – CAMERA
 - Install Tape
 - √Viewfinder (LCD) displays STBY
 - Camr Settings:
 - √AUTO LOCK – AUTO LOCK
 - √FOCUS – AUTO
 - √Audio Muting Plug removed
 - Hand-hold PD100 with bracket
 - Turn on all cabin lights
 - Check scene composition and audio, adjust accordingly, minimize zooming and panning

OPERATIONS

Show various locations on space shuttle and provide descriptions of crewmember duty during ascent, on-orbit, and descent. Share information on various responsibilities of space shuttle crewmembers and coordination (between crewmembers and ground personnel) for a successful shuttle mission. Feel free to adapt this activity to reflect personal interests. Demonstrations or talking points may include:

Flight Deck

- Commander/Pilot/Mission Specialist positions during ascent and descent
- Commander/Pilot/Mission Specialist responsibilities during ascent, on-orbit (pre-dock, docked and post-dock), and descent
- Robotic Workstation
- View from windows

Middeck

- Mission Specialist positions during ascent and descent
- Mission Specialist responsibilities during ascent, on-orbit (pre-dock, docked, and post-dock), and descent
- Sleeping area
- Eating Area
- Galley
- Toilet
- Lockers

Airlock

SPACEHAB

Additional activities per crew discretion

STOW

3. Remove tape from PD100 and label with Sharpie, "EPO Video Activities"; stow tape
4. PD100 PWR – OFF
5. Stow PD100, bracket

This Page Intentionally Blank

MICROGRAVITY EXPERIMENT RESEARCH LOCKER INCUBATOR (MERLIN)/
STREPTOCOCCUS PNEUMONIAE EXPRESSION OF GENES IN SPACE (SPEGIS)

NOMINAL	
MERLIN STATUS CHECK	CC 5-3
LOG	CC 5-4
SPEGIS SETUP	5-5
SPEGIS CANISTER ACTIVATION	5-9
TERMINATION	5-11
MERLIN WARM SHUTDOWN	5-13
CONFIGURE FOR DESCENT	5-14
REFERENCE 1: MERLIN ASCENT-DESCENT ON-ORBIT CONFIGURATION	5-15
2: MERLIN INSTALLATION TO MOUNTING PANEL	5-16
3: MERLIN OUTER STRUCTURE	5-17
4: MERLIN ELECTRICAL SCHEMATIC	5-21
5: MERLIN SETUP	5-23
CONTINGENCY	
MERLIN FAIL TO HOLD SET POINT	5-29
FILE CLEANUP	5-34
POWER CYCLE	5-36
REBOOT	5-37
RECONFIGURE	5-38
POWER UP	5-46
RECORD DIAGNOSTIC DATA	5-47
UPDATE PROFILE PARAMETERS	5-50
MALS	
5.1a MERLIN ERROR MESSAGE	5-69
5.1b MERLIN FAIL TO REPOWER	5-78
5.1c MERLIN LCD BLANK	5-80
<u>TABLES</u>	
TABLE 5-I.- MERLIN RESET LOG FILE	5-60
5-II.- MERLIN DIAGNOSTIC LOG FILE	5-65
5-III.- MERLIN PROFILE DATA LOG FILE	5-67
5-IV.- MERLIN ERROR MESSAGE LOG FILE	5-84

This Page Intentionally Blank

TOP

HOOK
VELCRO

NOMINAL

MERLIN STATUS CHECK

MERLIN STATUS CHECK (TWICE DAILY)

MF71E 1. √cb PAYLOAD – op (lt off)
(MERLIN)

2. √cb MAIN – cl (lt on)

- * If MAIN power LED – lt off and cb closed: *
- * √Display – active *
- * If Display not active: *
- * Perform 5.1c MERLIN LCD BLANK, then: *

- * If Display – ‘**ERROR PENDING**’: *
- * Perform 5.1a MERLIN ERROR MESSAGE, then: *

3. √Display – ‘HOME DISPLAY’

- * If HOME DISPLAY not shown: *
- * Right (EXIT) pb – push until appears *

NOTE

During SPEGIS Preservation prior to ramp, CURR TEMP expected to be +04.0°C.

During ramp activity, CURR TEMP may be out of range, approaching +37.5°C.

During SPEGIS incubation after ramp, CURR TEMP = +37.5°C

4. √Display – ‘CURR TEMP: XX.XC’ ± 2.0 °C of expected temperature
Log CURR TEMP and GPS data in MERLIN Log

5. Notify MCC of logged data and any off-nominal conditions

PL OPS-2a/118/O/C

(reduced copy)

NOMINAL

TOP
Back of 'MERLIN STATUS CHECK'

HOOK
VELCRO

MERLIN LOG

CURR TEMP	GPS	CURR TEMP	GPS
	/ : :		/ : :
	/ : :		/ : :
	/ : :		/ : :
	/ : :		/ : :
	/ : :		/ : :
	/ : :		/ : :
	/ : :		/ : :
	/ : :		/ : :
	/ : :		/ : :
	/ : :		/ : :
	/ : :		/ : :
	/ : :		/ : :
	/ : :		/ : :
	/ : :		/ : :
	/ : :		/ : :
	/ : :		/ : :
	/ : :		/ : :

PL OPS-2b/118/O/A

MERLIN SPEGIS SETUP

OBJECTIVE

The following steps will set up MERLIN for SPEGIS incubation activities. Using the MERLIN Pouch Assembly as the transfer mechanism, the three SPEGIS Canisters will go from MERLIN +4 °C to MELFI +2 °C Dewar and the three MELFI Bottle Holders will go from MERLIN +4 °C to MELFI -95 °C Dewar. The MERLIN Pouch Assembly will be returned to MERLIN and the MERLIN ramp to 37.5 °C will be initiated

- * If Display – ****ERROR PENDING****: *
- * Perform 5.1a MERLIN ERROR MESSAGE, then: *

CAUTION
The time MERLIN door is open and SPEGIS Canisters are exposed should be kept to a minimum
The transfer of SPEGIS Canisters is a time-critical activity. The canisters cannot stay at room temperature for more than 10 min

SPEGIS CANISTER REMOVAL

MF71E
(MERLIN)

1. Record MET for SPEGIS removal from MERLIN:
_____ / _____ : _____
2. Open MERLIN locker door
3. Unlock payload retainers on each side. (See Figures 5-1 and 5-2
REFERENCE 5: MERLIN SETUP)
4. Remove the MERLIN Pouch Assembly (with Tray Assembly attached)
from internal volume
5. Close MERLIN locker door
6. Remove Tray Assembly from bottom of MERLIN Pouch Assembly by
removing straps secured to D-Ring Pallet. (See Figure 5-4
REFERENCE 5: MERLIN SETUP)
7. Temp stow D-Ring Pallet on front of MERLIN door
8. Open MERLIN locker door
9. Slide Tray Assembly into MERLIN using bottom slide rails of internal
volume. (See Figure 5-3 REFERENCE 5: MERLIN SETUP)
10. Close and lock MERLIN locker door

SPEGIS TRANSFER AND INSTALLATION TO MELFI

- 11. Transfer the MERLIN Pouch Assembly containing the three SPEGIS Canisters and the three MELFI Bottle Holders to MELFI and temp stow

MELFI
LAB104

- 12. Move Acoustic Pad to access Stowage Compartment
- 13. Unstow and don White Gloves

CAUTION
Tray must not be opened and exposed more than 60 sec for any active Dewar

NOTE

If accessing the last box module in tray it will be necessary to pull tray entirely out of Dewar.

If accessing Tray C or D, it will be necessary to pull tray completely out of Dewar to open box modules

MELFI

- 14. Unlock, open Dewar 4
Pull Tray C to reveal the Tray Sections 2,3 box module
Open box module lid
- 15. Open MERLIN Pouch Assembly by separating Velcro tabs
Retrieve from MERLIN Pouch Assembly the three SPEGIS Canisters in foam holder blocks and insert into Tray Sections 2,3
Close and latch box module lid
- 16. Push Tray into Dewar
Close, lock Dewar door
- 17. Record MET for SPEGIS insertion into MELFI:

_____ / _____ : _____

Electronic Unit

- 18. Check Dewar 4 Open Door LED – It off

- * If Dewar Open Door LED – It on: *
- * Unlock Dewar door handle *
- * Open Dewar door handle *
- * Close, lock Dewar door handle *
- * Verify Dewar Open Door LED – It off *
- * Notify POIC of results of malfunction *

CAUTION
Dewar door must not be re-opened before contacting POIC to ensure temperature has reached stable value

WARNING
 White Gloves must be worn when manipulating cold trays or samples in -95 °C Dewar

MELFI
 LAB104

19. Unlock, open Dewar 3
 Pull Tray B to reveal Tray Section 3 box module
 Open box module lid
 * If elastic too stiff (frozen) to insert sample, *
 * manipulate by pulling lightly to warm elastic*
20. Retrieve from MERLIN Pouch Assembly three MELFI Bottle Holders and insert into Tray Section 3
 Close and latch box module lid
 Close MERLIN Pouch Assembly flaps while placing straps inside and temp stow
21. Push Tray into Dewar
 Close, lock Dewar Door
22. Record MET of MELFI Bottle Holders insertion into MELFI:
 _____/_____:_____

Electronic Unit

23. Check Dewar 3 Open Door LED – It off
 * If Dewar Open Door LED – It on: *
 * Unlock Dewar door handle *
 * Open Dewar door handle *
 * Close, lock Dewar door handle *
 * Verify Dewar Open Door LED – It off *
 * Notify POIC of results of malfunction *

CAUTION
 Dewar door must not be re-opened before contacting POIC to ensure temperature has reached stable value

MELFI
 Stowage
 Compartment

24. Doff and stow White Gloves
25. Replace Acoustic Pad over MELFI Stowage Compartment
 Check Electronic Unit still visible
 Check Fire hole accessible
 Check Dewar 1,2 doors are unobstructed
26. Transfer empty MERLIN Pouch Assembly back to MERLIN

MF71E
 (MERLIN)

27. Open MERLIN Pouch Assembly by separating Velcro tabs
28. Retrieve temp stowed D-Ring Pallet on front of MERLIN door and place inside MERLIN Pouch Assembly

29. Close MERLIN Pouch Assembly flaps while placing straps inside and temp stow to front of MERLIN (See Figure 5-9 REFERENCE 5: MERLIN SETUP)

SET MERLIN TEMPERATURE CONTROL

MF71E
(MERLIN)

30. Left (MENU) pb – push, expect 'Quick Status 1/8' to appear
31. Left (NEXT) pb – push (3 times) until 'Temp Control 4/8' appears
32. Center (SELECT) pb – push 'Mode 1/3'
33. Left (NEXT) pb – push 'SP Mode Options 2/3'
34. Center (SELECT) pb – push (2 times) until
'Old SP Temp: ±xx.xC'
'New SP Temp: ±xx.xC'

NOTE

The left pushbutton (CURSOR) moves cursor between NEW SP TEMP fields. The default cursor position will be blinking.

The center pushbutton (PLUS) increases NEW SP TEMP selected digit field value by 1.

NEW SP TEMP Range (-20.0 to +48.5 °C)

35. Enter '+37.5C' |
36. Right (DONE) pb – push
If Display – 'ARE YOU SURE?', then: |
Left (APPLY) pb – push |
37. √Display – '+37.5C' |
Right (EXIT) pb – push until 'HOME DISPLAY' appears |
38. Notify MCC of recorded MET times in steps 1, 17, and 22

SPEGIS CANISTER ACTIVATION

OBJECTIVE

Retrieve all three SPEGIS Canisters and associated foam blocks from MELFI +2 degC Dewar.
Transfer and install the Canisters into MERLIN, where they will be allowed to incubate for approximately 15 (\pm 2) hr at a temperature of +37.5 degC

DURATION

15 min

Galley or
TBD was

1. Unstow and temp stow near MF71E (MERLIN)!
Dry Wipes (for wiping condensation in step 15)

MF71E
(MERLIN)

2. \sqrt Display 'CURR TEMP' = '+37.5C' \pm 0.5 degC
 - * If CURR TEMP not between 37.0 and 38.0 degC: *
 - * \sqrt MCC *

MELFI
LAB104

3. Move Acoustic Pad to access Stowage Compartment
4. Unstow and don White Gloves

CAUTION

Tray must not be opened and exposed for more than 60 sec for any active Dewar

The transfer of the SPEGIS Canisters is a time-critical activity. The Canisters cannot stay at room temperature for more than 10 min

NOTE

If accessing the last box module in the Tray it will be necessary to pull Tray entirely out of Dewar.

If accessing Tray C or D, it will be necessary to pull Tray completely out of Dewar to open box modules

MELFI

5. Unlock, open Dewar 4
Pull Tray C to reveal the Tray Sections 2,3 box module
6. Open box module lid
Remove SPEGIS Canisters 1, 2, and 3 with foam blocks from box module
Close and latch the box module lid
7. Push Tray into Dewar
Close, lock Dewar Door
8. Record MET of SPEGIS Canister removal from MELFI:
_____/_____:_____
9. ~~Using Dry Wipes, wipe visible condensation from SPEGIS Canisters~~

Electronic Unit 910. Check Dewar 4 Open Door LED – It off

- * If Dewar Open Door LED – It on: *
- * Unlock Dewar door handle *
- * Dewar door handle – OPEN *
- * Close, lock Dewar door handle *
- * Verify Dewar Open Door LED – It off *
- * Notify POIC of results of malfunction *

CAUTION

Dewar door must not be re-opened before contacting POIC to ensure temperature has reached stable value

MELFI 1011. Doff and stow White Gloves
Stowage
Compartment

MELFI 1112. Replace Acoustic Pad over MELFI Stowage Compartment
Check Electronic Unit still visible
Check Fire hole accessible
Check Dewar 1,2 doors unobstructed

- MELFI (MERLIN) 12
13. Transfer SPEGIS Canisters to MERLIN
 - 13
14. Remove MERLIN Pouch Assembly and temp stow
Open MERLIN locker door
 - 14
 15. Pull tray partially out
 15. Using Dry Wipes, wipe visible condensation from SPEGIS canisters
 16. Secure Canisters to Velcro strip on right side of tray. (See Figure 5-16 REFERENCE 5: MERLIN SETUP)
 17. Slide Tray Assembly into MERLIN
 18. Lock tray in place by using MERLIN restraint mechanisms on both sides of internal volume. (See Figures 5-9 and 5-10 REFERENCE 5: MERLIN SETUP)
 19. Verify base of all three SPEGIS Canisters has good contact with MERLIN internal right wall
 20. Close MERLIN locker door
Retrieve MERLIN Pouch Assembly and temp stow to front of MERLIN
 21. Record MET of SPEGIS Canister insertion into MERLIN:
_____ / _____ : _____
 22. Dispose of used wipes in trash
 23. Stow:
Dry Wipes
 24. Notify MCC of recorded MET in steps 8 and 21

SPEGIS CANISTER TERMINATION

OBJECTIVE

Retrieve all three SPEGIS Canisters from incubation in MERLIN. Transfer and install Canisters into MELFI -95 degC Dewar to terminate experiment

DURATION

20 min

CAUTION

Transfer of SPEGIS Canisters is a time-critical activity. Canisters cannot stay at room temperature for more than 10 min

MF71E
(MERLIN)

1. Remove MERLIN Pouch Assembly and temp stow
Open MERLIN locker door
2. Remove SPEGIS Canisters 1, 2, and 3 from MERLIN tray *with foam blocks*
3. Close MERLIN locker door
Retrieve MERLIN Pouch Assembly and temp stow to front of MERLIN
4. Record MET of SPEGIS Canister removal from MERLIN:
_____ / _____ : _____
5. Transfer SPEGIS Canisters to MELFI and temp stow

WARNING

White Gloves must be worn when manipulating cold trays or samples in -95 degC Dewar

MELFI
LAB104

6. Move Acoustic Pad to access Stowage Compartment
7. Unstow and don White Gloves

CAUTION

Tray must not be opened and exposed more than 60 sec for any active Dewar

NOTE

If accessing last box module in Tray it will be necessary to pull Tray entirely out of Dewar.

If accessing Tray C or D, it will be necessary to pull Tray completely out of Dewar to open box modules

MELFI

8. Unlock, open Dewar 3
Pull Tray B to reveal the Tray Section 3 box module
Open the box module lid

- * If elastic too stiff (frozen) to insert sample *
- * Manipulate by pulling lightly to warm elastic *

9. Retrieve and remove SPEGIS Canisters from foam blocks
10. Insert SPEGIS Canisters into MELFI Bottle Holders and install into box
module Tray Section 3
11. Draw elastic over Canisters and secure
Close and latch box module lid
12. Push Tray into Dewar
Close, lock Dewar Door
13. Record MET of SPEGIS Canister insertion into MELFI:
_____ / _____ : _____

Electronic Unit

14. Check Dewar 3 Open Door LED – It off
 - * If Dewar Open Door LED – It on: *
 - * Unlock Dewar door handle *
 - * Dewar door handle – OPEN *
 - * Close, lock Dewar door handle *
 - * Verify Dewar Open Door LED – It off *
 - * Notify POIC of results of malfunction *

CAUTION
Dewar door must not be re-opened before contacting POIC to ensure temperature has reached stable value

MELFI
Stowage
Compartment

15. Doff and stow White Gloves
16. Replace Acoustic Pad over MELFI Stowage Compartment
Check Electronic Unit still visible
Check Fire hole accessible
Check Dewar 1,2 doors are unobstructed

MIFMIE
(MERLIN)
MF71E

17. Transfer foam blocks back to MERLIN
18. *Retrieve MERLIN Pouch Assembly from front of MERLIN*
~~Open MERLIN locker door and place foam blocks inside~~
19. *Open Pouch Assembly*
~~Close MERLIN locker door~~ *by separating Velcro tabs*
20. Notify MCC of recorded MET in steps 4 and 13
21. *Place foam holder blocks inside MERLIN Pouch Assembly, close flaps and temp stow on front of MERLIN*

MERLIN WARM SHUTDOWN

OBJECTIVE

The following steps will perform a warm shutdown of MERLIN Systems.

Warm shutdowns prevent loss of data and system errors and are the desired nominal method of shutdown

- * If Display – ‘**ERROR PENDING**’: *
- * Perform 5.1a MERLIN ERROR MESSAGE, then: *

1. √Display – ‘HOME DISPLAY’

- * If HOME DISPLAY not shown: *
- * Right (EXIT) pb – push until *
- appears

2. Log MERLIN GPS:

GPS _____:_____:

3. Left (MENU) pb – push until ‘Quick Status 1/8’

4. Left (NEXT) pb – push (7 times) until ‘Shutdown 8/8’

5. Center (SELECT) pb – push until ‘Shutdown 1/2’

6. Center (SELECT) pb – push until ‘WARM SHUTDOWN’

7. Center (APPLY) pb – push until ‘ARE YOU SURE’

8. Left (APPLY) pb – push until ‘Shutdown Done’

9. cb MAIN – op (It off)

10. √cb PAYLOAD – op (It off)

11. Notify MCC of recorded GPS time in step 2

MERLIN CONFIGURE FOR DESCENT

I

OBJECTIVE

The following steps will set up MERLIN for descent activities

- MERLIN, MF71E
1. Retrieve MERLIN Pouch Assembly from front of MERLIN door
 2. Open MERLIN locker door

CONFIGURE POUCH FOR DESCENT

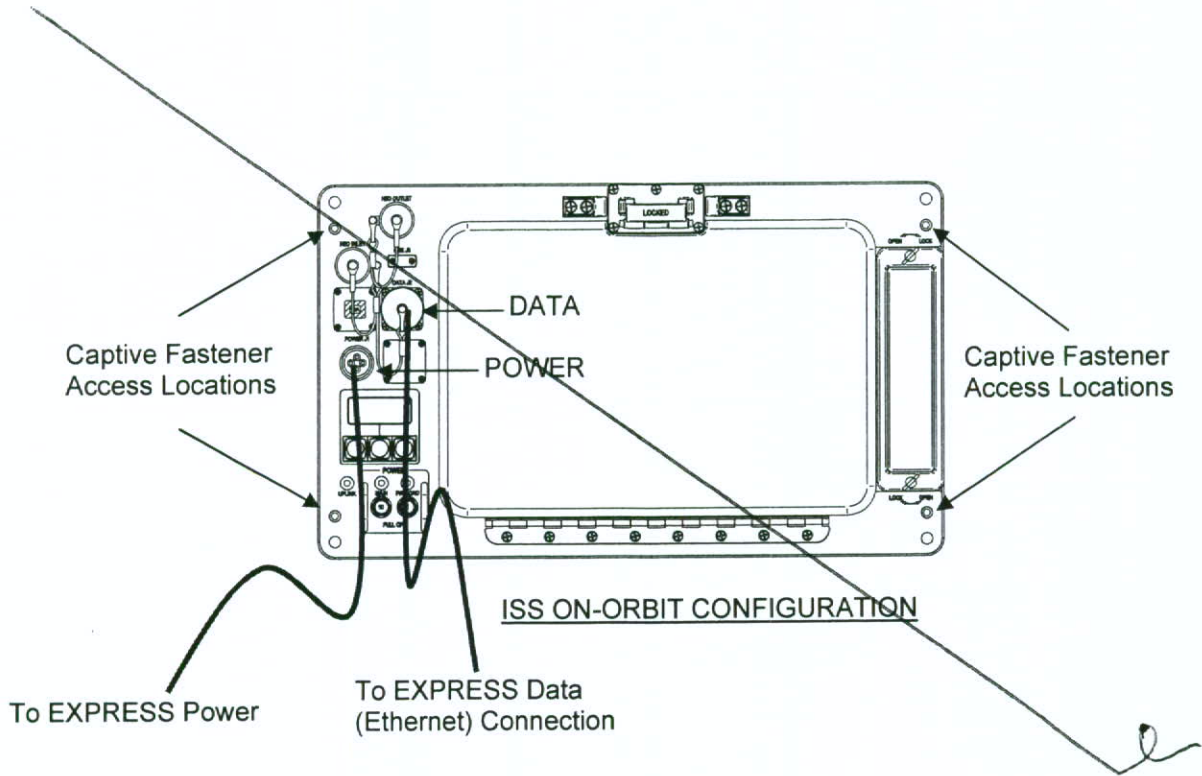
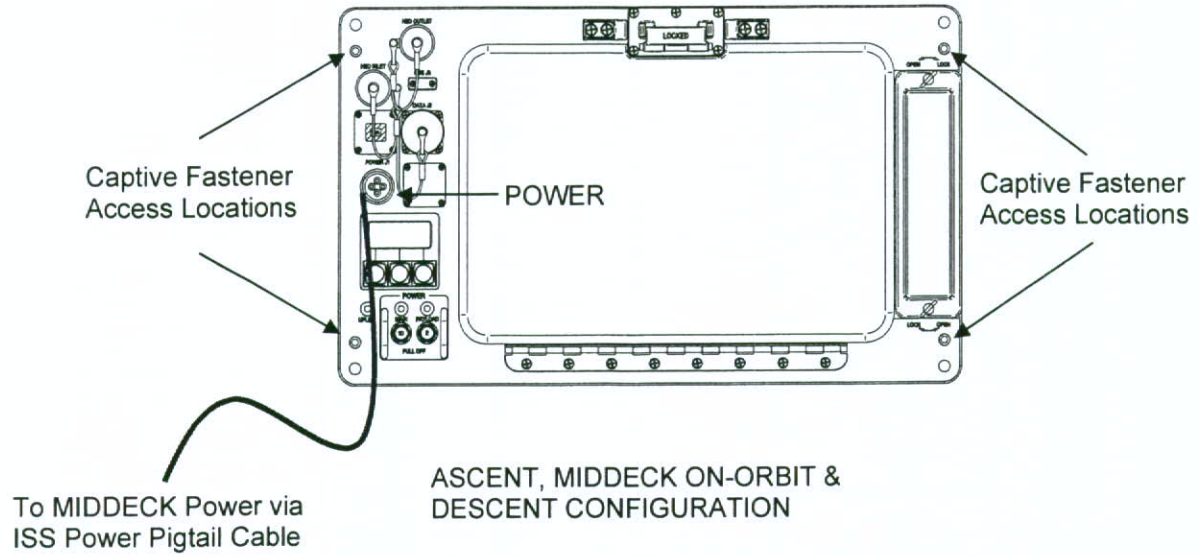
- * If attachment configuration of Pouch to Tray required: *
- * Unlock payload retainers on each side (See Figures 5-1 and *
- * 5-2 of REFERENCE 5: MERLIN SETUP) *
- * Remove Tray Assembly from internal volume *
- * Close MERLIN locker door *
- * Retrieve D-Ring Pallet from MERLIN Pouch Assembly and *
- * close pouch *
- * Mount Tray Assembly to bottom of closed MERLIN Pouch *
- * Assembly by feeding Velcro straps through corresponding *
- * slots on Tray Assembly. (See Figure 5-4 REFERENCE 5: *
- * MERLIN SETUP) *
- * Secure MERLIN Pouch Assembly to Tray Assembly using *
- * D-Ring Pallet. (See Figure 5-5 REFERENCE 5: MERLIN *
- * SETUP) *
- * Open MERLIN locker door *
- * Slide Pouch/Tray Assembly into MERLIN using bottom slide *
- * rails of internal volume. (See Figure 5-3 REFERENCE 5: *
- * MERLIN SETUP) *
- * Continue at step 6 *

3. Place straps neatly inside MERLIN Pouch Assembly then close all flaps
4. Slide MERLIN Pouch Assembly into MERLIN internal volume with tray already installed (anticipate Velcro resistance)
5. Verify Pouch installed to rear of internal volume

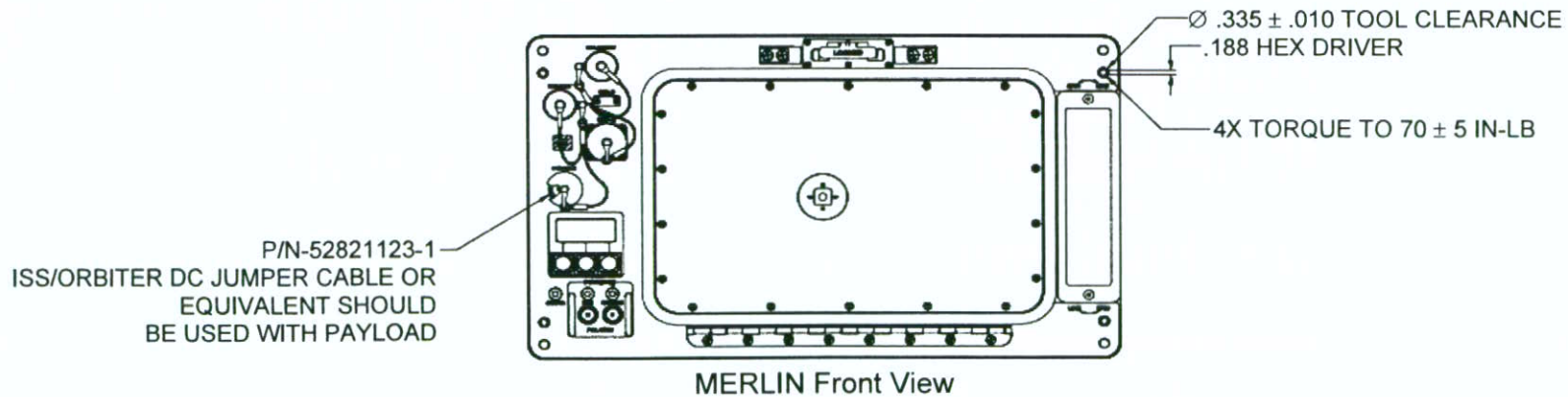
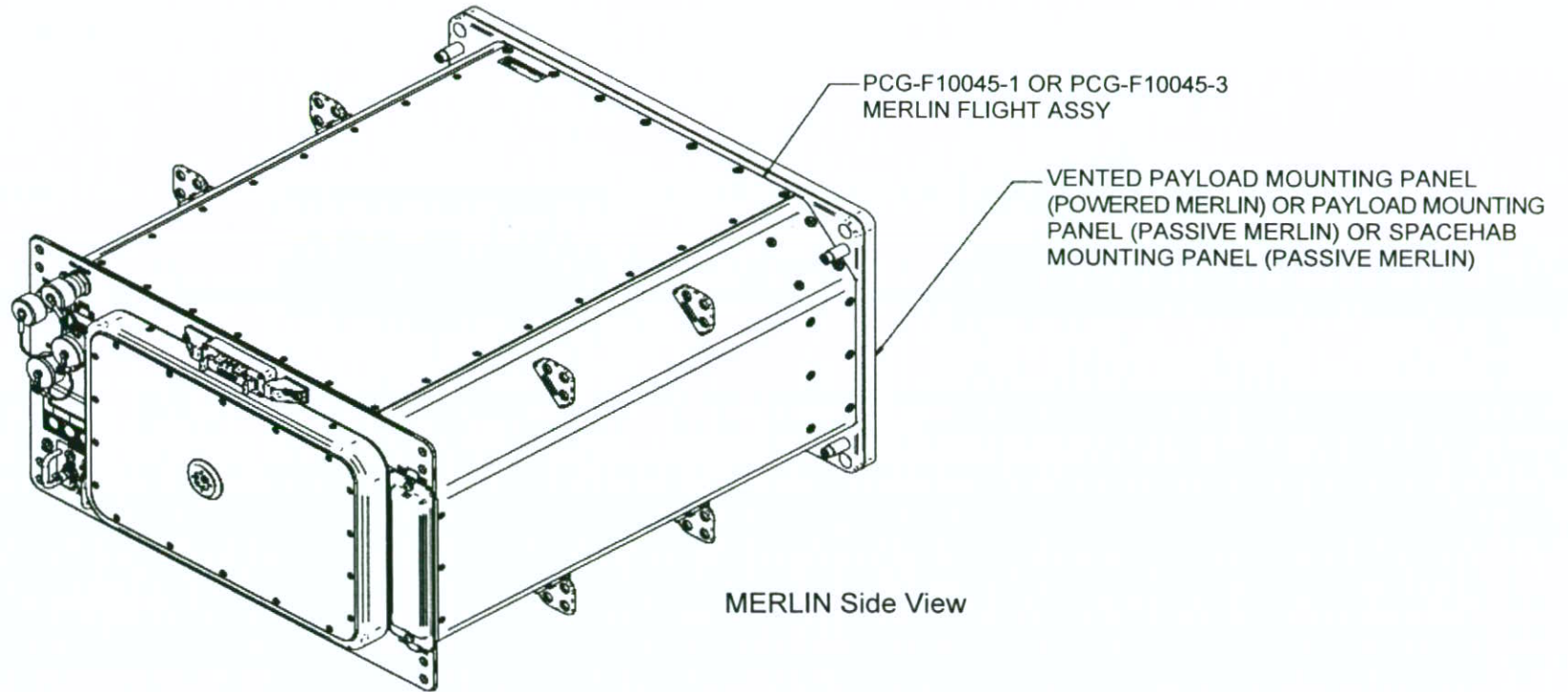
LOCK RESTRAINTS AND DOOR

6. Lock tray in place by using MERLIN restraint mechanisms on both sides of internal volume. (See Figures 5-1 and 5-2 REFERENCE 5: MERLIN SETUP)
 - a. Press restraint button flush on each side of internal volume and verify each slide lever went to up locked position
 - b. Press down on each slide lever and verify restraint button out position
7. Close MERLIN locker door
8. Verify locker door finger latches are fully spread apart and locking flap is positioned between finger latches (See Figure 5-10 REFERENCE 5: MERLIN SETUP)

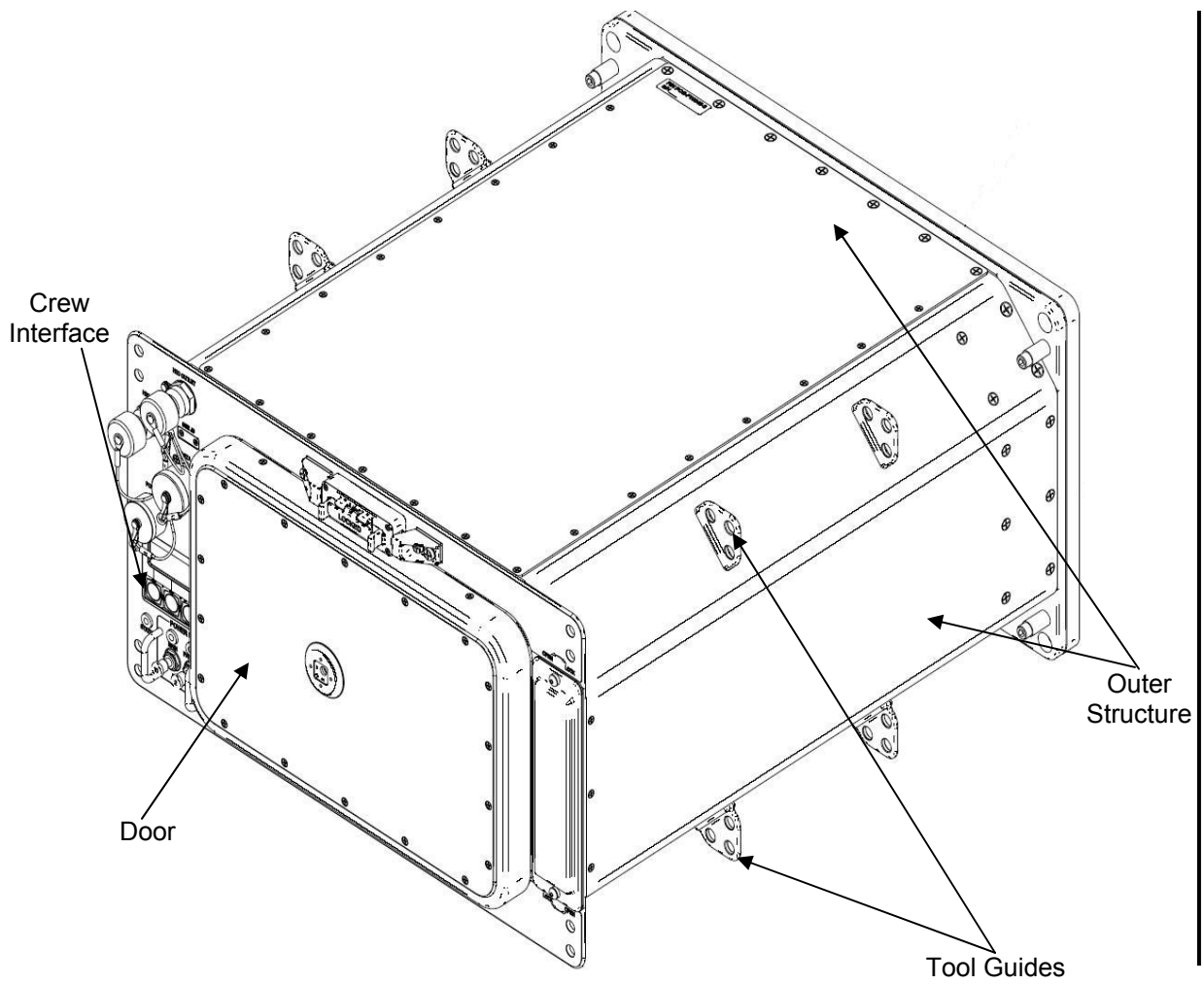
REFERENCE 1: MERLIN ASCENT-DESCENT ON-ORBIT CONFIGURATION



REFERENCE 2: MERLIN INSTALLATION TO MOUNTING PANEL

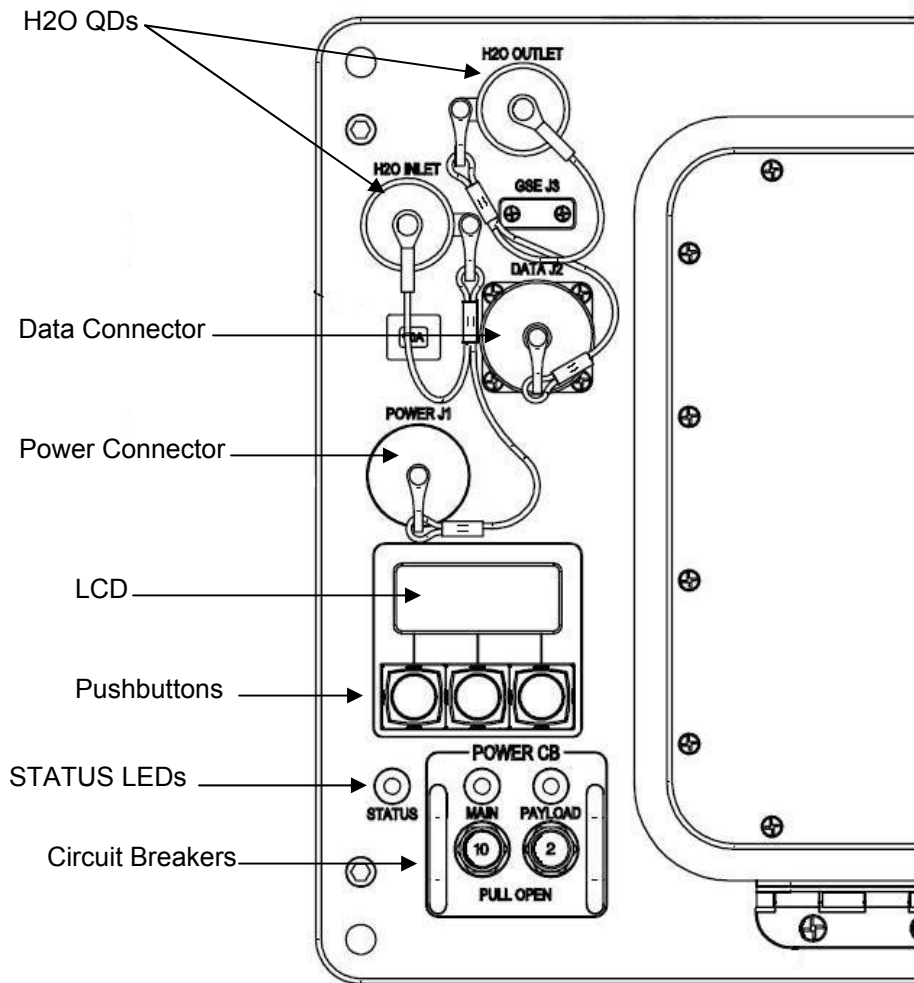


REFERENCE 3: MERLIN OUTER STRUCTURE



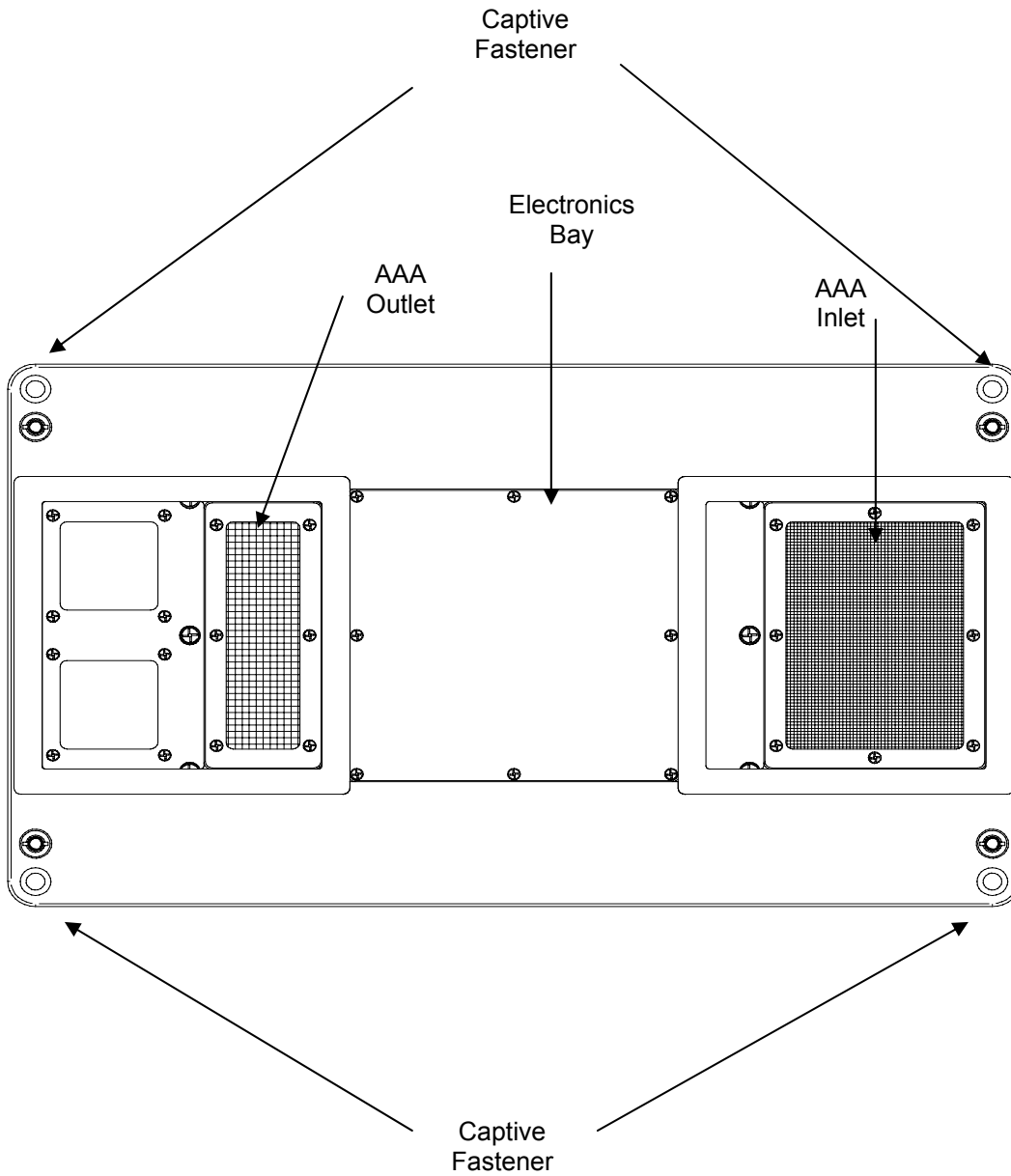
MERLIN Isometric View

REFERENCE 3: MERLIN OUTER STRUCTURE (Cont)



MERLIN Front Panel

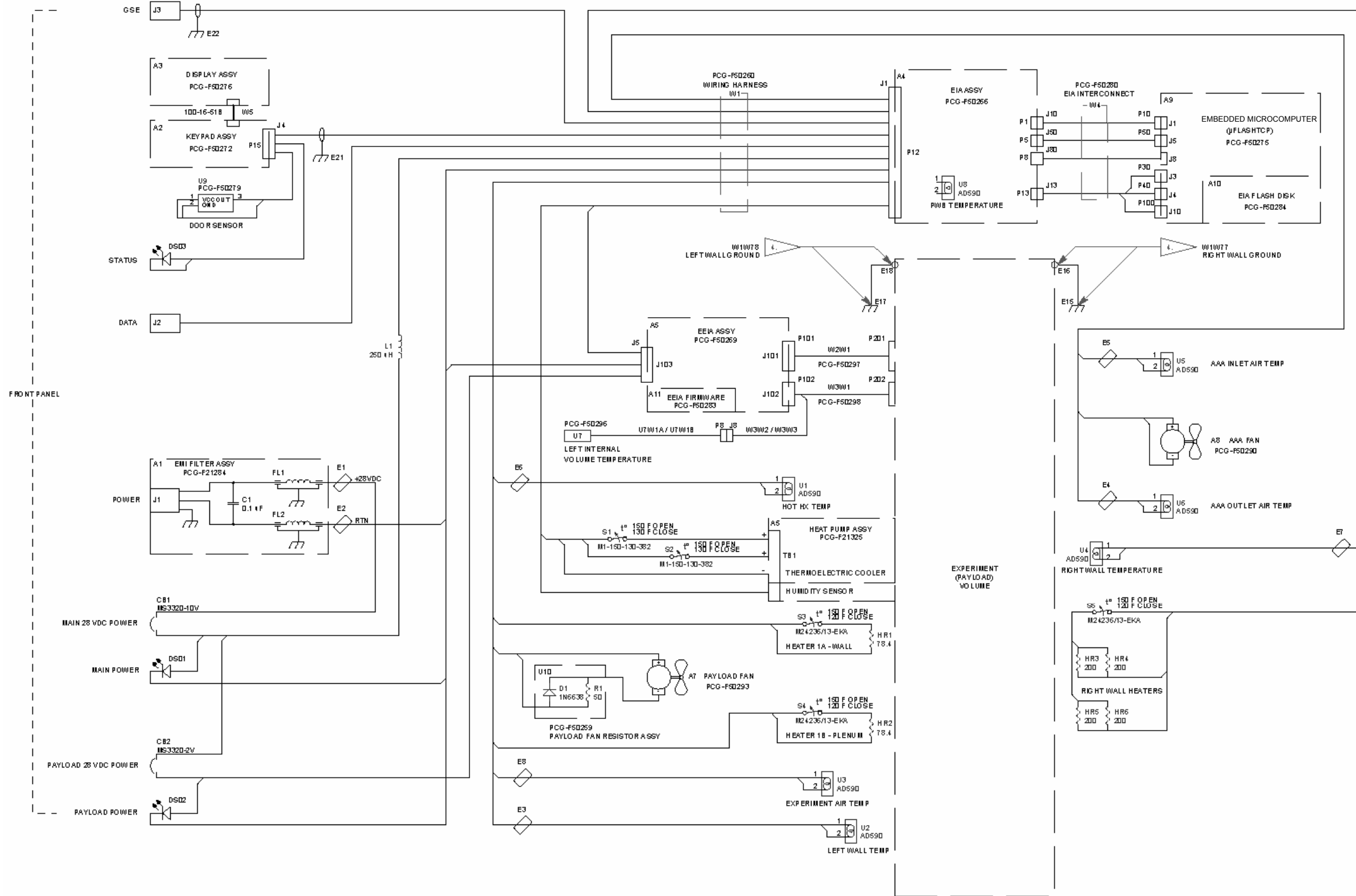
REFERENCE 3: MERLIN OUTER STRUCTURE (Cont)



MERLIN Back Mounting Panel View

This Page Intentionally Blank

REFERENCE 4: MERLIN ELECTRICAL SCHEMATIC



- NOTES:**
- ASSEMBLY IS ELECTROSTATIC SENSITIVE WHEN CONNECTOR CONTACTS ARE EXPOSED OR PANELS REMOVED. FOLLOW ESD CONTROLS AND OPERATING REQUIREMENTS PER NASA-STD-8739.7.
 - REFERENCE DOCUMENTS:
 PCG-F21400 MERLIN ASSY
 PCG-F50260 MERLIN WIRING HARNESS
 PCG-F50280 EIA INTERCONNECT (W4)
 PCG-F50282 MERLIN POWER DISTRIBUTION
 PCG-F50297 EEIA TO L WALL CABLE ASSY (W2)
 PCG-F50298 EEIA TO L WALL CABLE ASSY (W3)
 - COMPLETE REFERENCE DESIGNATOR OBTAINED BY PREFIXING INDICATED REFERENCE DESIGNATOR WITH MERLIN UNIT DESIGNATOR "A1".

 EXAMPLE: A1A1J1 = FRONT PANEL POWER CONNECTOR
 - CLASS R BOND [2.5 MILLI OHMS]; OTHER BONDING INFORMATION, CIRCUIT PROTECTION, & WIRE SIZING SHOWN ON PCG-F50282, MERLIN POWER DISTRIBUTION.
 - W1 HARNESS ASSEMBLED IN PLACE PER PCG-F50260.

This Page Intentionally Blank

REFERENCE 5: MERLIN SETUP

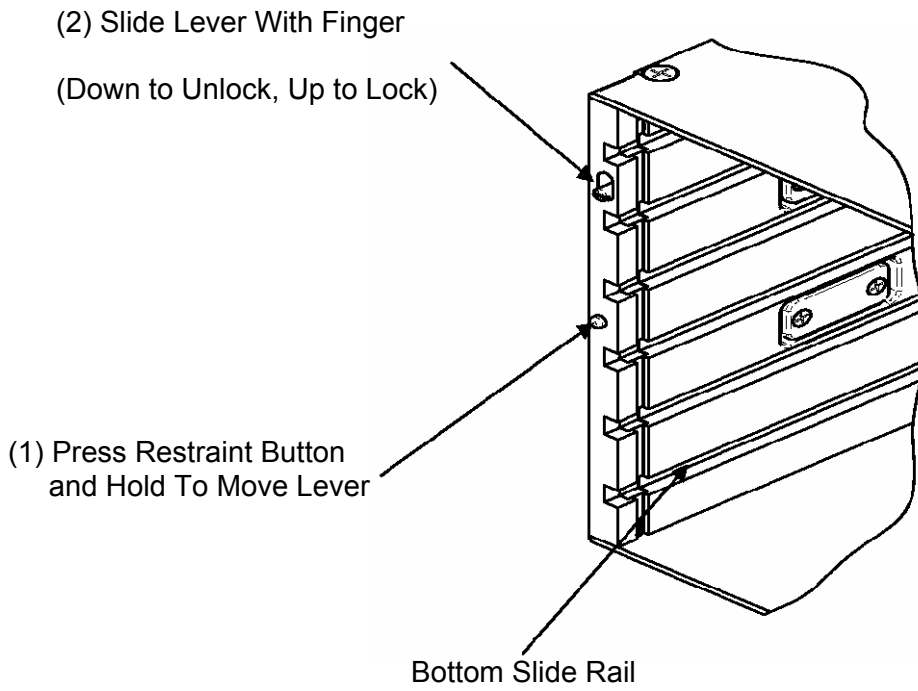
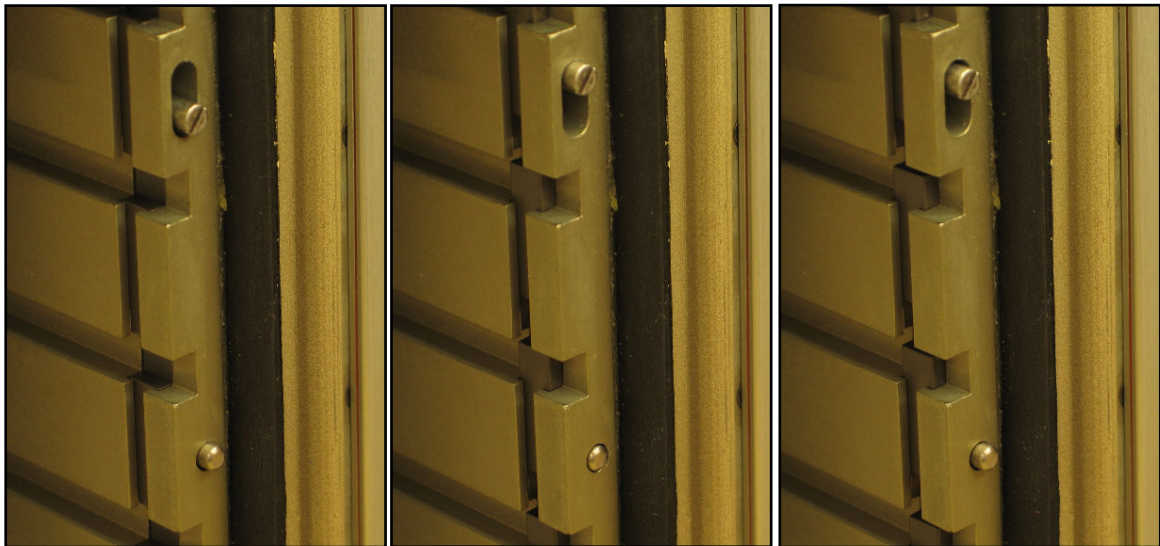


Figure 5-1. - Payload Retainer



Unlocked

Interim Locked
Restraint Button Flush

Locked
Restraint Button Out

Figure 5-2. - MERLIN Payload Retainer Latch

REFERENCE 5: MERLIN SETUP (Cont)

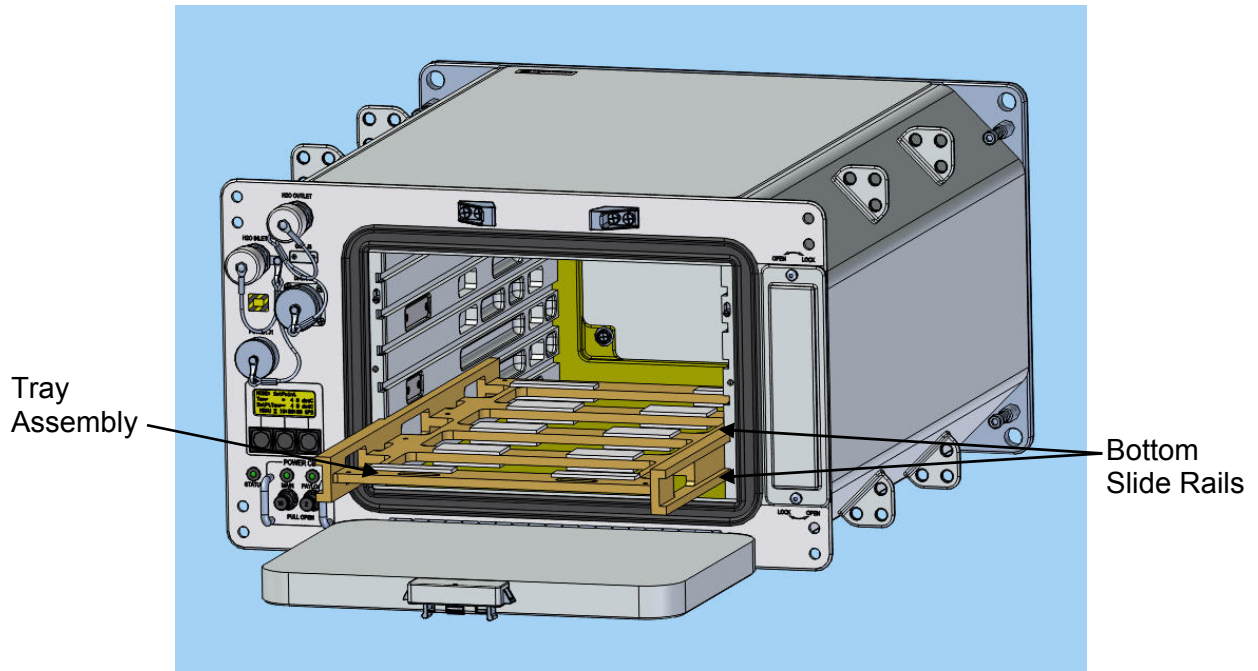


Figure 5-3. - MERLIN with Tray Assembly

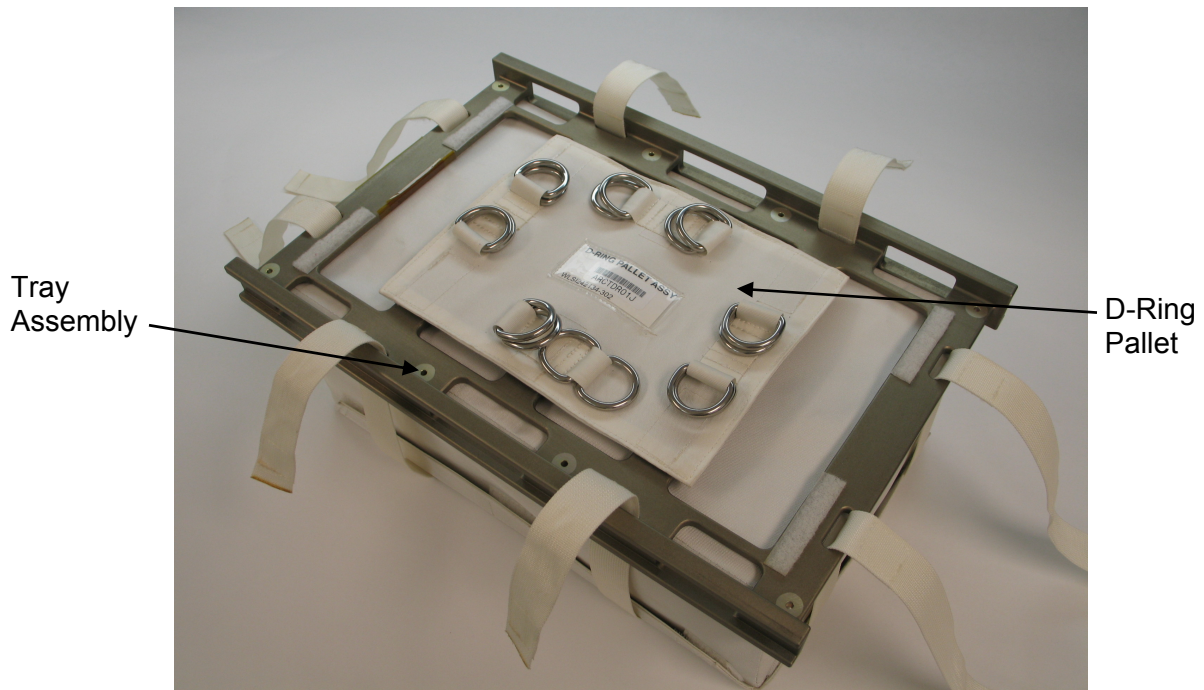


Figure 5-4. - MERLIN Pouch Assembly Unstrapped

REFERENCE 5: MERLIN SETUP (Cont)

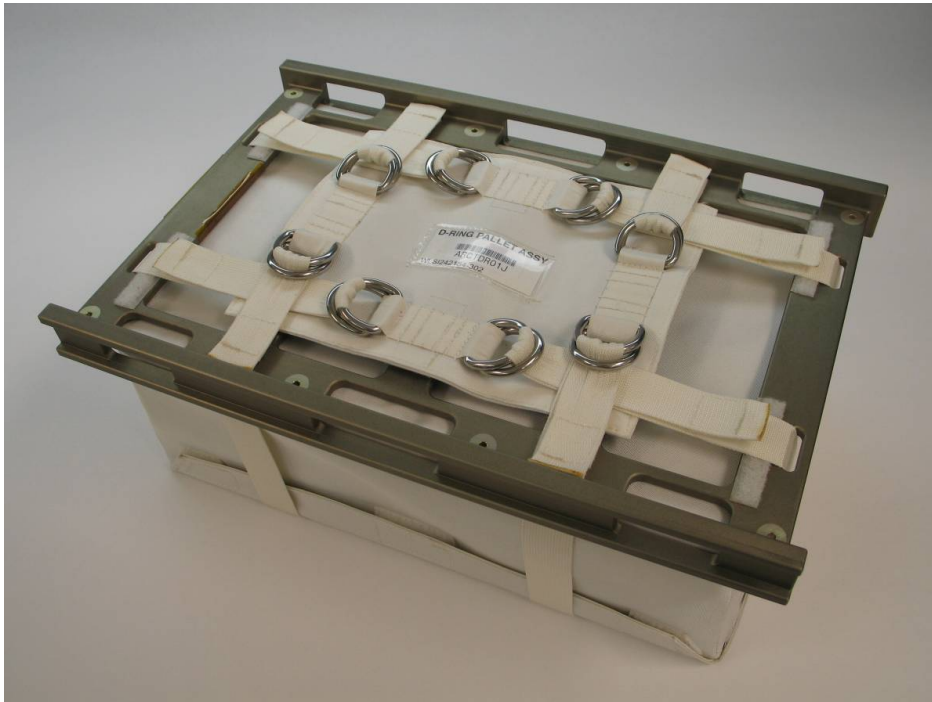


Figure 5-5. - MERLIN Pouch Assembly Strapped

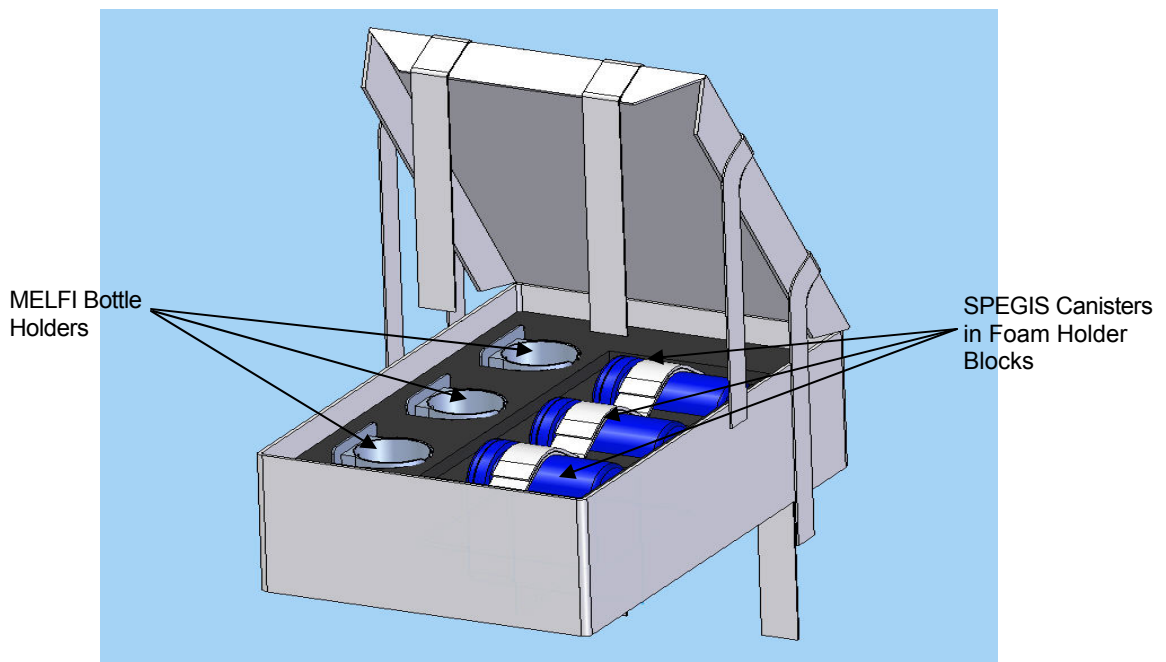


Figure 5-6. - MERLIN Pouch Assembly Opened

REFERENCE 5: MERLIN SETUP (Cont)

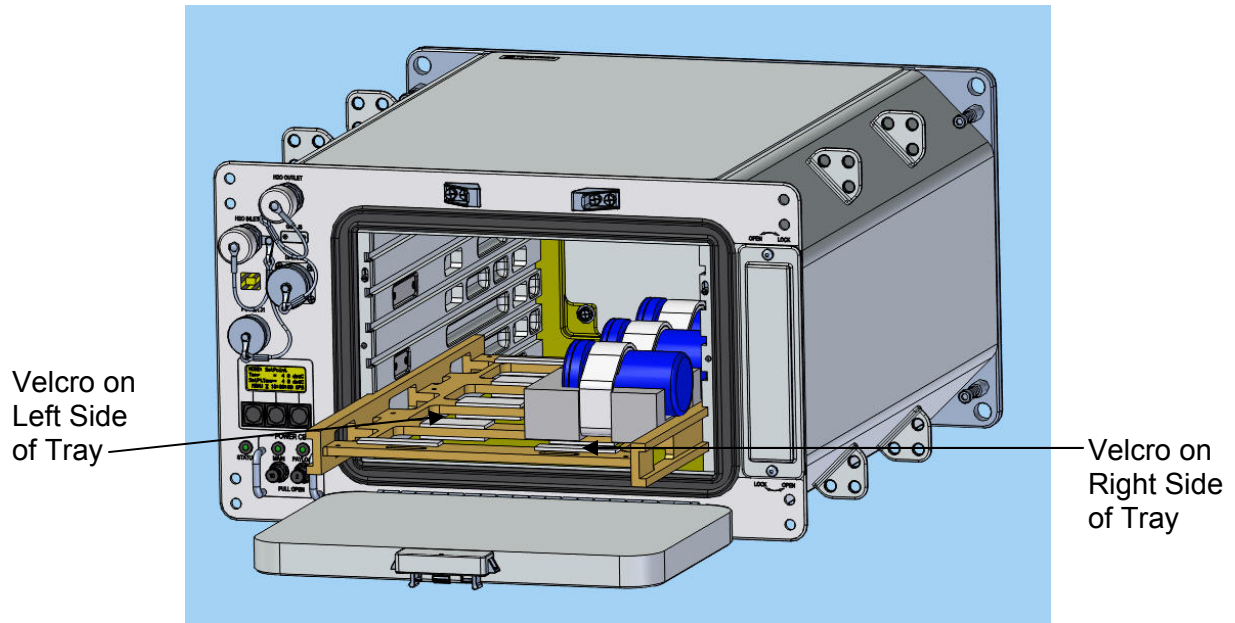


Figure 5-7. - MERLIN with Canisters on Tray Right Side

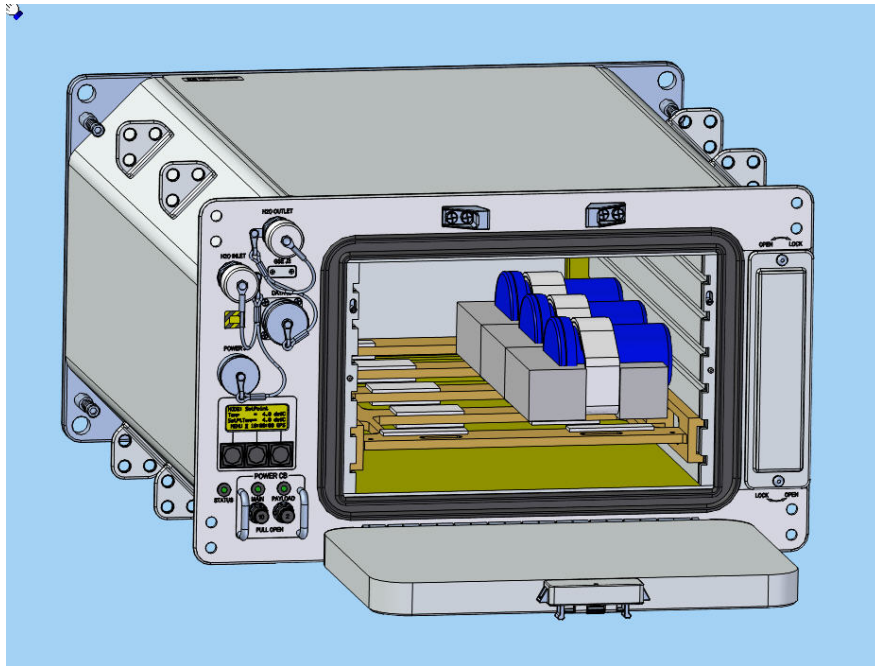


Figure 5-8. - MERLIN with Canisters on Tray Right Side

REFERENCE 5: MERLIN SETUP (Cont)

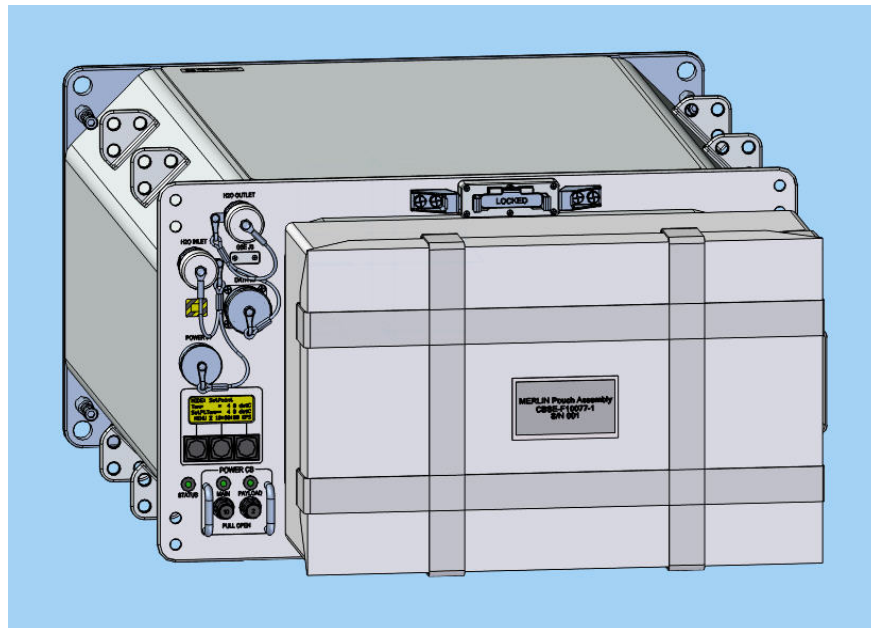


Figure 5-9. - MERLIN with Pouch Assembly Temp Stowed on Front

REFERENCE 5: MERLIN SETUP (Cont)

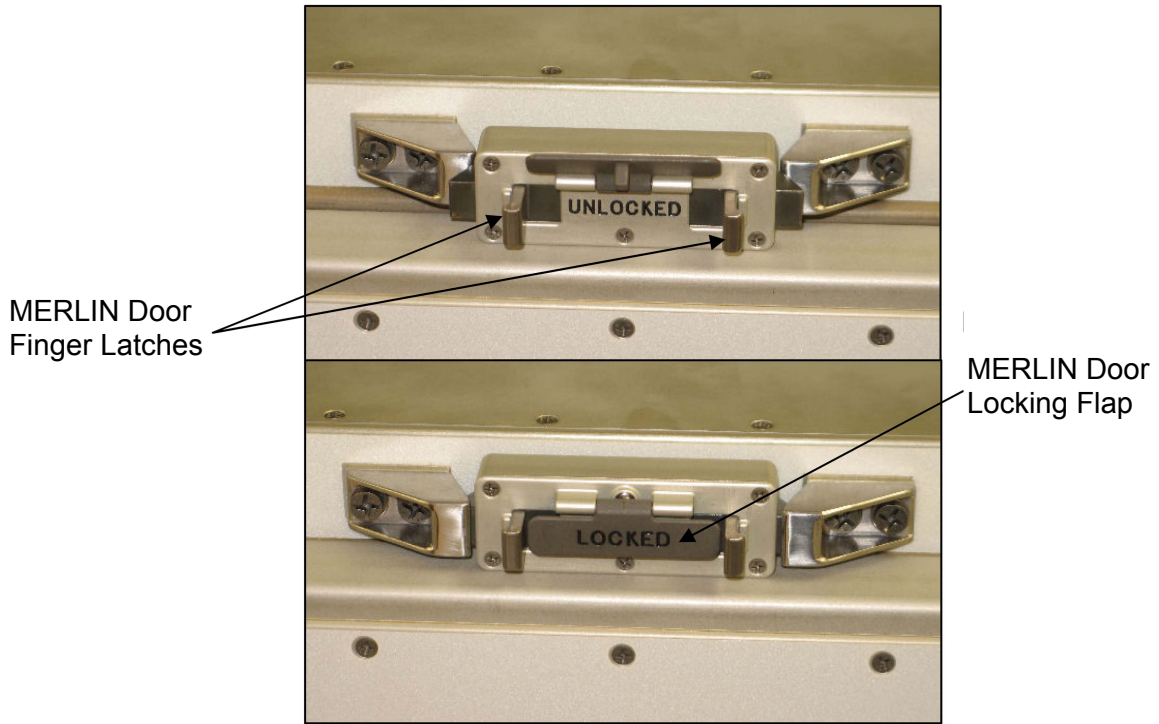


Figure 5-10. - MERLIN Door Lock Mechanism



Figure 5-11. - Desiccant Pack Attachment Locations

MERLIN FAIL TO HOLD SET POINT

OBJECTIVE

The following steps allow reconfiguration of Temperature Control Mode, Ramp Rate, Heat Removal Mode and Fan Modes

- * If Display – ‘**ERROR PENDING**’:
- * Perform 5.1a MERLIN ERROR MESSAGE, then:

RECORD DATA

1. √Display – ‘HOME DISPLAY’
 - * If HOME DISPLAY not shown:
 - * Right (EXIT) pb – push until appears *
2. Record Start ‘CURR TEMP’, start ‘GPS’, and any callup data in Table 5-I. MERLIN RESET LOG FILE

SET TEMPERATURE CONTROL MODE

3. Left (MENU) pb – push until ‘Quick Status 1/8’
4. Left (NEXT) pb – push (3 times) until ‘Temp Control 4/8’
5. Center (SELECT) pb – push until ‘Mode 1/3’
6. Left (NEXT) pb – push until ‘SP Mode Options 2/3’
7. Center (SELECT) pb – push (2 times)
‘SET PT TEMPERATURE’
‘Old SP Temp: ±xx.xC’
‘New SP Temp: ±xx.xC’ appears

NOTE

The left pushbutton (CURSOR) moves the cursor between NEW SP Temp fields (default cursor position will be blinking).

The center pushbutton (PLUS) increases New SP Temp selected digit field value by 1.

New SP Temp Range (-20.0 to +48.5 °C)

8. Enter desired Set Point temperature per MCC
9. Right (DONE) pb – push
 - If Display – ‘ARE YOU SURE?’, then:
 - Left (APPLY) pb – push
10. √Display – desired Set Point temperature per MCC

SET RAMP RATE

11. Left (+PARAM) pb – push ‘Ramp Rate 2/4’
12. Center (SELECT) pb – push
‘SET PT RAMP RATE’
‘Old Ramp: xx.xC/hr’
‘New Ramp: xx.xC/hr’

NOTE

The left pushbutton (CURSOR) moves the cursor between New Ramp fields (default cursor position will be blinking).

The center pushbutton (PLUS) increases New Ramp selected digit field value by 1.

Nominal New Ramp Range (+3.0 to +20.0 °C/hr)
New value must be greater than zero

13. Enter desired Set Point Ramp Rate per MCC |
14. Right (DONE) pb – push |
- If Display – ‘ARE YOU SURE?’, then: |
- Left (APPLY) pb – push |
15. √Display – desired Ramp Rate per MCC |
16. Right (EXIT) pb – push until ‘Temp Control 4/8’

SELECT HEAT REMOVAL MODE

17. Left (NEXT) pb – push (3 times) until ‘Setup 7/8’
18. Center (SELECT) pb – push (3 times)
‘HEAT REMOVAL MODE’
‘Select Mode x of 2:’

NOTE

The left pushbutton (NEXT) toggles between AIR and WATER

19. Left (NEXT) pb – push until desired Heat Removal Mode per MCC |
20. Center (APPLY) pb – push

SELECT EXTERNAL FAN MODE

21. Left (NEXT) pb – push (2 times)
‘SETUP: GENERAL’
‘External Fan Mode 3/8’
22. Center (SELECT) pb – push
‘EXTERNAL FAN MODE’
‘Select Mode x of 3:’

NOTE

The left pushbutton (NEXT) toggles between OFF, ON and AUTOMATIC

- 23. Left (NEXT) pb – push until desired External Fan Mode per MCC
- 24. Center (APPLY) pb – push

SELECT EXPERIMENT VOLUME FAN MODE

- 25. Left (NEXT) pb – push (3 times)
‘SETUP: GENERAL’
‘Exp Vol Fan Mode 6/8’
- 26. Center (SELECT) pb – push
‘EXP VOLUME FAN MODE’
‘Select Mode x of 2:’

NOTE

The left pushbutton (NEXT) toggles between DISABLE and ENABLE

- 27. Left (NEXT) pb – push until desired Exp Vol Fan Mode per MCC
- 28. Center (APPLY) pb – push

SET TEMPERATURE BANDWIDTH

- 29. Left (NEXT) pb – push
‘SETUP: GENERAL’
‘Temp Bandwidth 7/8’
- 30. Center (SELECT) pb – push
‘TEMP BANDWIDTH’
‘Bandwidth: xx.xC’

NOTE

The left pushbutton (CURSOR) moves cursor between Bandwidth digit fields.

The center pushbutton (PLUS) increases Bandwidth selected digit field value by 1

- 31. Enter desired Temp Bandwidth per MCC
- 32. Right (DONE) pb – push

If Display – ‘ARE YOU SURE?’, then:
Left (APPLY) pb – push

- 33. √Display – desired Temp Bandwidth per MCC
- 34. Right (EXIT) pb – push until ‘HOME DISPLAY’

SELECT PID SENSORS FOR THERMAL CARRIER CONTROL

35. Left (MENU) pb – push until ‘Quick Status 1/8’
36. Left (NEXT) pb – push (6 times) until ‘Setup 7/8’
37. Center (SELECT) pb – push
‘MAIN: SETUP’
‘General 1/4’
38. Left (NEXT) pb – push until ‘PID 2/4’
39. Center (SELECT) pb – push (2 times)
‘PID SENSORS’
‘S:LRE E:123456789AB’

NOTE

The left pushbutton (CURSOR) moves the cursor between PID SENSORS fields.

The center pushbutton (TOGGLE) toggles the ‘*’ on/off indicator on row 3.

If a ‘*’ character is under any of the PID SENSORS fields then this sensor is selected for use in the control of the thermal carrier

40. Select desired active PID Sensors per MCC |
41. Right (DONE) pb – push

If Display – ‘ARE YOU SURE?’, then:
Left (APPLY) pb – push |
42. Right (EXIT) pb – push (2 times) until
‘MAIN MENU’
‘Setup 7/8’

SELECT TEMPERATURE CONTROL MODE FOR THERMAL CARRIER

43. Left (NEXT) pb – push (5 times) until ‘Temp Control 4/8’
44. Center (SELECT) pb – push (2 times)
‘Temp Control: MODE’
‘Select Mode x of 5:’

NOTE

The left pushbutton (NEXT) toggles between SET POINT, PROG TEMP PROFILE, SET POINT TO PROFILE, OFF, and OVERRIDE

45. Left (NEXT) pb – push until desired TEMP CONTROL:MODE per MCC |
46. Center (APPLY) pb – push
47. Right (EXIT) pb – push until ‘HOME DISPLAY’

CHECK STATUS OF THERMAL CARRIER

- 48. Left (MENU) pb – push until ‘Quick Status 1/8’
- 49. Center (SELECT) pb – push
‘MAIN: QUICK STATUS’
‘ECW 01/19’
‘NOMINAL’
- 50. Right (EXIT) pb – push until ‘HOME DISPLAY’

CHECK CONTROL TEMPERATURE

- 51. √Display – ‘CURR TEMP:’ expected Set Point temperature ± bandwidth in °C per MCC |
- 52. √Display – ‘SP TEMP:’ expected Set Point temperature in °C per MCC |
- 53. √Display – ‘GPS’ Incrementing
- 54. √STATUS LED – Nominal (It off)

NOTE

The STATUS LED is on for approximately 2/3 of a sec then is turned off for approximately 1/3 of a sec when an off-nominal situation is present, and will toggle until off-nominal situation is acknowledged

- 55. √Display – continuously reads ‘HOME DISPLAY’

- * If Display, STATUS LED, ECW, CURR TEMP*
- * or SP TEMP are not in the nominal then: *
- * √MCC *

RECORD END DATA

- 56. Record End ‘CURR TEMP’ and End ‘GPS’ in Table 5-I, MERLIN RESET LOG FILE |
- 57. Notify MCC log values for log file Table 5-I, MERLIN RESET LOG FILE |

MERLIN FILE CLEANUP

OBJECTIVE

The following steps allow removal of files from MERLIN directories

- * If Display – ‘**ERROR PENDING**’:
- * Perform 5.1a MERLIN ERROR MESSAGE, then: *

On MCC GO:

PERFORM FILE CLEANUP

1. Record active directories to delete, expected CURR TEMP, and expected SP TEMP per MCC in Table 5-I, MERLIN RESET LOG FILE
2. √Display – ‘HOME DISPLAY’
 - * If HOME DISPLAY not shown: *
 - * Right (EXIT) pb – push until appears *
3. Left (MENU) pb – push until ‘Quick Status 1/8’
4. Left (NEXT) pb – push (6 times) until ‘Setup 7/8’
5. Center (SELECT) pb – push
‘MAIN: SETUP’
‘General 1/4’
6. Left (NEXT) pb – push (3 times) until ‘Alternate 4/4’
7. Center (SELECT) pb – push until ‘TE Power 1/8’
8. Left (NEXT) pb – push (7 times) until ‘File Cleanup 8/8’
9. Center (SELECT) pb – push
10. √Display – ‘LMEU’

NOTE

The left pushbutton (CURSOR) moves the cursor between Directory fields. The default cursor position will be blinking.

The center pushbutton (TOGGLE) toggles the ‘*’ on/off indicator.

If a ‘*’ character is under any of the ‘LMEU’ directory fields, then this directory is selected for deletion of files

11. Select active directories for deletion as recorded in step 1
12. Right (DONE) pb – push

NOTE

MERLIN may take several minutes (up to 15 min depending on number of directories deleted) to delete files, scan disk and re-initialize system

If Display:

'ARE YOU SURE?'
'SYSTEM will reboot'
'Directory: XXX'

Then:

Left (APPLY) pb – push
'File Cleanup'
'Command Received'
'System Rebooting'

CHECK THERMAL CARRIER TEMPERATURE

13. √Display – 'HOME DISPLAY'
14. √Display – 'CURR TEMP:' expected current temperature ± bandwidth in °C per MCC
15. √Display – 'SP TEMP:' expected Set Point temperature in °C per MCC
16. √Display – 'GPS' incrementing
 - * If Display, CURR TEMP or SP TEMP *
 - * not in nominal state then: *
 - * √MCC *

RECORD END DATA

17. Record End CURR TEMP and End GPS in Table 5-I, MERLIN RESET LOG FILE
18. Notify MCC log values for log file Table 5-I, MERLIN RESET LOG FILE

MERLIN POWER CYCLE

OBJECTIVE

The following steps will perform a power cycle to the MERLIN System.
Warm shutdowns prevent loss of data and system errors

- * If Display – ‘**ERROR PENDING**’:
- * Perform 5.1a MERLIN ERROR MESSAGE, then:

On MCC GO:

1. √Display – ‘HOME DISPLAY’
 - * If HOME DISPLAY not shown:
 - * Right (EXIT) pb – push until appears *
2. Left (MENU) pb – push until ‘Quick Status 1/8’
3. Left (NEXT) pb – push (7 times) until ‘Shutdown 8/8’
4. Center (SELECT) pb – push until ‘Shutdown 1/2’
5. Center (SELECT) pb – push until ‘WARM SHUTDOWN’
6. Center (APPLY) pb – push until ‘ARE YOU SURE?’
7. Left (APPLY) pb – push until ‘Shutdown Done’
8. cb MAIN – op (It off)
9. √cb PAYLOAD – op (It off)

NOTE

System Initialization may take up to 2 min

10. cb MAIN – cl (It on)
11. √Display – ‘HOME DISPLAY’
12. Log and report to MCC:

CURR TEMP _____.

GPS _____ / _____ ; _____

MERLIN REBOOT

OBJECTIVE

The following steps will perform a reboot of MERLIN Systems

- * If Display – ‘**ERROR PENDING**’:
- * Perform 5.1a MERLIN ERROR MESSAGE, then:

On MCC GO:

1. √Display – ‘HOME DISPLAY’
 - * If ‘HOME DISPLAY’ not shown:
 - * Right (EXIT) – PUSH until appears *
2. Left (MENU) pb – push until ‘Quick Status 1/8’
3. Left (NEXT) pb – push (7 times) until ‘Shutdown 8/8’
4. Center (SELECT) pb – push until ‘Shutdown 1/2’
5. Left (NEXT) pb – push until ‘Reboot 2/2’
6. Center (SELECT) pb – push
‘ARE YOU SURE?’
‘Reboot System’

NOTE

After Reboot begins, Display will read ‘SYSTEM REBOOTING...’ for approximately 10 sec and then screens will scroll through initialization screens before getting to ‘HOME DISPLAY’. Initialization may take up to 2 min

7. Left (APPLY) pb – push until ‘System Rebooting...’
8. √Display – ‘HOME DISPLAY’
9. Log and report to MCC

CURR TEMP _____.

GPS _____/_____:_____

MERLIN RECONFIGURE

OBJECTIVE

The following steps will reconfigure various control modes within MERLIN System

- * If Display – ‘**ERROR PENDING**’:
- * Perform 5.1a MERLIN ERROR MESSAGE, then: *

RECORD DATA

1. √Display – ‘HOME DISPLAY’
 - * If HOME DISPLAY not shown: *
 - * Right (EXIT) pb – push until appears *
2. Record Start ‘CURR TEMP’, Start ‘GPS’, and any callup data in Table 5-1, MERLIN RESET LOG FILE

SET TEMPERATURE CONTROL MODE

3. Left (MENU) pb – push until ‘Quick Status 1/8’
4. Left (NEXT) pb – push (3 times) until ‘Temp Control 4/8’
5. Center (SELECT) pb – push until ‘Mode 1/3’
6. Left (NEXT) pb – push until ‘SP Mode Options 2/3’
7. Center (SELECT) pb – push (2 times)
 - ‘Old SP Temp: ±xx.xC’
 - ‘New SP Temp: ±xx.xC’

NOTE

The left pushbutton (CURSOR) moves cursor between NEW SP TEMP fields. The default cursor position will be blinking.

The center pushbutton (PLUS) increases NEW SP TEMP selected digit field value by 1.

NEW SP TEMP Range (-20.0 to +48.5 °C)

8. Enter desired Set Point temperature per MCC
9. Right (DONE) pb – push
 - If Display – ‘ARE YOU SURE?’, then:
 - Left (APPLY) pb – push
10. √Display – desired Set Point temperature per MCC

CHANGE RAMP RATE

11. Left (+PARAM) pb – push until ‘Ramp Rate 2/4’
12. Center (SELECT) pb – push
‘Old Ramp: xx.xC/hr’
‘New Ramp: xx.xC/hr’

NOTE

The left pushbutton (CURSOR) moves cursor between New digit fields. The default cursor position will be blinking.

The center pushbutton (PLUS) increases New selected digit field value by 1.

New must be greater than zero

13. Enter desired Ramp Rate per MCC |
14. Right (DONE) pb – push

If Display – ‘ARE YOU SURE?’, then: |
Left (APPLY) pb – push |
15. √Display – desired Ramp Rate per MCC |

CHANGE SYSTEM STORAGE INTERVAL

16. Left (+PARAM) pb – push until ‘Sys Sto Interval 3/4’
17. Center (SELECT) pb – push
‘Old: xx:xx:xx’
‘New: xx:xx:xx’

NOTE

The left pushbutton (CURSOR) moves the cursor between New digit fields. The default cursor position will be blinking.

The center pushbutton (PLUS) increases New selected digit field value by 1.

New must be greater than zero

18. Enter desired System Storage Interval per MCC |
19. Right (DONE) pb – push

If Display – ‘ARE YOU SURE?’, then: |
Left (APPLY) pb – push |
20. √Display – desired System Storage Interval per MCC |

CHANGE EXPERIMENT STORAGE INTERVAL

21. Left (+PARAM) pb – push until ‘Exp Sto Interval 4/4’
22. Center (SELECT) pb – push
‘Old: xx:xx:xx’
‘New: xx:xx:xx’

NOTE

The left pushbutton (CURSOR) moves the cursor between New digit fields. The default cursor position will be blinking.

The center pushbutton (PLUS) increases New selected digit field value by 1.

New must be greater than zero

23. Enter desired Experiment Storage Interval per MCC |
24. Right (DONE) pb – push

If Display – ‘ARE YOU SURE?’, then: |
Left (APPLY) pb – push |
25. √Display – desired Experiment Storage Interval per MCC |
26. Right (EXIT) pb – push (2 times)
‘MAIN MENU’
‘Temp Control 4/8’

SELECT HEAT REMOVAL MODE

27. Left (NEXT) pb – push (3 times) until ‘Setup 7/8’
28. Center (SELECT) pb – push (2 times) until ‘HeatRemoval Mode 1/8’
29. Center (SELECT) pb – push until ‘Select Mode x of 2’

NOTE

The left pushbutton (NEXT) toggles between AIR and WATER

30. Select desired Heat Removal Mode per MCC |
31. Center (APPLY) pb – push

SELECT MEMORY FULL MODE

32. Left (NEXT) pb – push
‘SETUP: GENERAL’
‘Memory Full Mode 2/8’
33. Center (SELECT) pb – push
‘MEMORY FULL MODE’
‘Select Mode x of 2’

NOTE

The left pushbutton (NEXT) toggles between OVERWRITE OLD DATA and STOP DATA RECORDING

34. Select desired Memory Full Mode per MCC |

35. Center (APPLY) pb – push

SELECT EXTERNAL FAN MODE

36. Left (NEXT) pb – push
‘SETUP: GENERAL’
‘ExternalFan Mode 3/8’

37. Center (SELECT) pb – push
‘EXTERNAL FAN MODE’
‘Select Mode x of 3’

NOTE

The left pushbutton (NEXT) toggles between OFF, ON, and AUTOMATIC

38. Select desired External Fan Mode per MCC |

39. Center (APPLY) pb – push

SELECT POWER RECOVERY MODE

40. Left (NEXT) pb – push
‘SETUP: GENERAL’
‘PwrRecovery Mode 4/8’

41. Center (SELECT) pb – push
‘POWER RECOVERY MODE’
‘Select Mode x of 4’

NOTE

The left pushbutton (NEXT) toggles between RETURN TO SP TEMP, HOLD PRESENT TEMP, CONT RAMP LAST SP, or CONT RAMP PRES TEMP

42. Select desired Power Recovery Mode per MCC |

43. Center (APPLY) pb – push

SELECT DOOR DETECTION MODE

44. Left (NEXT) pb – push
‘SETUP: GENERAL’
‘Door Detection 5/8’

45. Center (SELECT) pb – push
‘DOOR DETECTION MODE’
‘Select Mode x of 2’

NOTE

The left pushbutton (NEXT) toggles between
DISABLE and ENABLE

46. Select desired Door Detection Mode per MCC |

47. Center (APPLY) pb – push

SELECT EXPERIMENT VOLUME FAN MODE

48. Left (NEXT) pb – push
‘SETUP: GENERAL’
‘ExptVol Fan Mode 6/8’

49. Center (SELECT) pb – push
‘EXPT VOL FAN MODE’
‘Select Mode x of 2:’

NOTE

The left pushbutton (NEXT) toggles between
DISABLE and ENABLE

50. Select desired Experiment Volume Fan Mode per MCC |

51. Center (APPLY) pb – push

CHANGE TEMPERATURE BANDWIDTH

52. Left (NEXT) pb – push
‘SETUP: GENERAL’
‘Temp Bandwidth 7/8’

53. Center (SELECT) pb – push
‘TEMP BANDWIDTH’
‘Bandwidth: xx.xC’

NOTE

The left pushbutton (CURSOR) moves the cursor between
Bandwidth digit fields. The default cursor position will be
blinking.

The center pushbutton (PLUS) increases Bandwidth selected
digit field value by 1

54. Enter desired Temp Bandwidth per MCC |

55. Right (DONE) pb – push

If Display – ‘ARE YOU SURE?’, then:
pb Left (APPLY) pb – push |

56. √Display – desired Temperature Bandwidth per MCC |

57. Right (EXIT) pb – push (3 times) until Display – ‘HOME DISPLAY’

SELECT PID SENSORS FOR THERMAL CARRIER CONTROL

58. Left (MENU) pb – push until
‘Quick Status 1/8’
59. Left (NEXT) pb – push (6 times) until ‘Setup 7/8’
60. Center (SELECT) pb – push
‘MAIN: SETUP’
‘General 1/4’
61. Left (NEXT) pb – push until ‘PID 2/4’
62. Center (SELECT) pb – push until ‘PID Sensors 1/2’
63. Center (SELECT) pb – push until ‘S: LRE E:123456789AB’

NOTE

The left pushbutton (CURSOR) moves the cursor between PID SENSORS fields.

The center pushbutton (TOGGLE) toggles the ‘*’ on/off indicator on row 3.

If a ‘*’ character is under any of the PID SENSORS field then this sensor is selected for use in the control of the thermal carrier

64. Select desired active PID Sensors per MCC
65. Right (DONE) pb – push

If Display:
‘SET LRE123456789AB’
‘Old:’
‘New:’
Then:
Left (APPLY) pb – push
66. Right (EXIT) pb – push
‘MAIN:SETUP’
‘PID 2/4’

RESET POWER LOSS FLAG

67. Left (NEXT) pb – push (2 times) until
‘MAIN: SETUP’
‘Alternate 4/4’
68. Center (SELECT) pb – push
‘SETUP: ALTERNATE’
‘TE Power 1/8’
69. Left (NEXT) pb – push (4 times) until ‘Power Loss Reset 5/8’
70. Center (SELECT) pb – push until ‘RESET PWR LOSS FLAG’
71. Left (RESET) pb – push

CHANGE PAYLOAD FUNCTION CODE

72. Left (NEXT) pb – push (2 times) until
'SETUP: ALTERNATE'
'Function Code 7/8'

73. Center (SELECT) pb – push until
'Old : XxXXXX'
'New: XxXXXX'

NOTE

The left pushbutton (CURSOR) moves cursor between
FUNCTION CODE digits.

The center pushbutton (PLUS) increases FUNCTION
CODE selected digit field value by 1.

The values are in hexadecimal

74. Enter desired Function Code per MCC

75. Right (DONE) pb – push

If Display – 'ARE YOU SURE?', then:
Left (APPLY) pb – push

76. √Display – has desired Function Code per MCC

77. Right (EXIT) pb – push (2 times) until
'MAIN MENU'
'Setup 7/8'

SELECT TEMPERATURE CONTROL MODE FOR THERMAL CARRIER

78. Right (EXIT) pb – push until 'HOME DISPLAY'

79. Left (MENU) pb – push until 'Quick Status 1/8'

80. Left (NEXT) pb – push (3 times)
'MAIN MENU'
'Temp Control 4/8'

81. Center (SELECT) pb – push (2 times)
'TEMP CONTROL: MODE'
'Select Mode x of 5:'

NOTE

The left pushbutton (NEXT) toggles between SET POINT,
PROG TEMP PROFILE, SET POINT TO PROFILE, OFF,
and OVERRIDE

82. Left (NEXT) pb – push until desired TEMP CONTROL: MODE per MCC

83. Center (APPLY) pb – push

84. Right (EXIT) pb – push until 'MAIN MENU'

CHECK STATUS OF THERMAL CARRIER FROM HOME DISPLAY

- 85. Left (NEXT) pb – push (5 times) until
 'MAIN MENU'
 'Quick Status 1/8'
- 86. Center (SELECT) pb – push
- 87. √Display –
 'MAIN: QUICK STATUS'
 'ECW 01/19'
 'NOMINAL'
- 88. Right (EXIT) pb – push until 'HOME DISPLAY'

NOTE

The MERLIN may take several minutes to achieve its command temperature once parameters have been reconfigured

CHECK CONTROL TEMPERATURE AT HOME DISPLAY

- 89. √Display – 'CURR TEMP:' expected current temperature ± bandwidth in °C per MCC
- 90. √Display – 'SP TEMP:' expected Set Point temperature in °C per MCC
- 91. √Display – 'GPS' incrementing

NOTE

The STATUS LED is on for approximately 2/3 of a sec and then is turned off for approximately 1/3 of a sec when an off-nominal situation is present, and continues until off-nominal situation is acknowledged

- 92. √STATUS LED – Nominal (It off)
- 93. √Display – continuously reads 'HOME DISPLAY'

- * If Display or STATUS LED or ECW or CURR TEMP *
- * or SP TEMP are not in nominal state then: *
- * √MCC *

RECORD END DATA

- 94. Record End 'CURR TEMP' and End 'GPS' in Table 5-I, MERLIN RESET LOG FILE
- 95. Notify MCC log values for log file in Table 5-I, MERLIN RESET LOG FILE

MERLIN POWER UP

OBJECTIVE

The following steps will activate MERLIN Systems

On MCC GO:

- ML85E (MUP) 1. DC 10 AMP MNB S3 – OFF
cb DC 10 AMP MNB CB3 – op
- MF71E (MERLIN) 2. √cb MAIN – op (It off)
3. √cb PAYLOAD – op (It off)
4. √ISS DC Jumper →|← POWER (J1)
5. √ISS DC Jumper →|← SHUTTLE PAYLOAD DC PWR CABLE
- ML85E (MUP) 6. √SHUTTLE PAYLOAD DC PWR CABLE →|← J13
7. cb DC 10 AMP MNB CB3 – cl
DC 10 AMP MNB S3 – ON

NOTE

System initialization may take up to 2 min

- MF71E (MERLIN) 8. cb MAIN – cl (It on)
- * If MERLIN does not successfully complete initialization: *
 - * Perform 5.1b MERLIN FAIL TO REPOWER, then: *
9. √Display – 'HOME DISPLAY'
10. Log and report to MCC
Power-on time (GPS) _____ / _____ : _____
CURR TEMP _____.

MERLIN RECORD DIAGNOSTIC DATA

OBJECTIVE

The following steps allow the recording of some MERLIN data for diagnostic purposes

- * If Display – ‘**ERROR PENDING**’: *
- * Perform 5.1a MERLIN ERROR MESSAGE, then: *

RECORD HOME DISPLAY DATA

1. √MCC for parameters to record in Table 5-II, MERLIN DIAGNOSTIC LOG FILE
2. √Display – ‘HOME DISPLAY’
 - * If HOME DISPLAY not shown: *
 - * Right (EXIT) pb – push until appears *
3. Record ‘CURR TEMP’, ‘GPS’ in Table 5-II, MERLIN DIAGNOSTIC LOG FILE

RECORD QUICK STATUS

4. Left (MENU) pb – push
‘MAIN MENU’
‘Quick Status’
5. Center (SELECT) pb – push
‘MAIN: QUICK STATUS’
‘ECW 01/19’

NOTE

The left pushbutton (-PARAM) moves to previous parameter display.

The center pushbutton (+PARAM) moves to next parameter display

6. Record Quick Status data per MCC in Table 5-II, MERLIN DIAGNOSTIC LOG FILE
7. Center (+PARAM) pb – push until all Quick Status data has been recorded per MCC
8. Right (EXIT) pb – push until ‘HOME DISPLAY’
9. √MCC to report log values from log file

RECORD THERMAL GENERAL

10. Left (MENU) pb – push until
‘MAIN MENU’
‘Quick Status 1/8’
11. Left (NEXT) pb – push until
‘MAIN MENU’
‘Status 2/8’
12. Center (SELECT) pb – push
‘MAIN: STATUS’
‘Thermal 1/6’

13. Center (SELECT) pb – push
 'STATUS:THERMAL'
 'General 1/4'
14. Center (SELECT) pb – push
 'THERMAL: GENERAL'
 'Temp Control 01/12'

NOTE

The left pushbutton (-PARAM) moves to previous parameter display.

The center pushbutton (+PARAM) moves to the next parameter display

15. Record Thermal General data per MCC in Table 5-II, MERLIN DIAGNOSTIC LOG FILE
16. Center (+PARAM) pb – push until all Thermal General data has been recorded per MCC
17. Right (EXIT) pb – push until 'HOME DISPLAY'
18. √MCC to report log values from log file

RECORD ANCILLARY GENERAL

19. Left (MENU) pb – push
 'MAIN MENU'
 'Quick Status 1/8'
20. Left (NEXT) pb – push
 'MAIN MENU'
 'Status 2/8'
21. Center (SELECT) pb – push
 'MAIN: STATUS'
 'Thermal 1/6'
22. Left (NEXT) pb – push (2 times)
 'MAIN: STATUS'
 'Ancillary 3/6'
23. Center (SELECT) pb – push
 'STATUS: ANCILLARY'
 'General 1/4'
24. Center (SELECT) pb – push
 'ANCILLARY: GENERAL'
 'Boot Count 01/06'

NOTE

The left pushbutton (-PARAM) moves to previous parameter display.

The center pushbutton (+PARAM) moves to next parameter display

25. Record Ancillary General data per MCC in Table 5-II, MERLIN DIAGNOSTIC DATA LOG FILE
26. Center (+PARAM) pb – push until all Ancillary General data has been recorded per MCC
27. Right (EXIT) pb – push until 'HOME DISPLAY'
28. √MCC to report log values from log file

MERLIN UPDATE PROFILE PARAMETERS

OBJECTIVE

The following steps allow editing of the Programmed Temperature Profile (PTP) and associated parameters

- * If Display – ‘**ERROR PENDING**’:
- * Perform 5.1a MERLIN ERROR MESSAGE, then: *

RECORD DATA

1. Record profile data per MCC in Table 5-III, MERLIN PROFILE DATA LOG FILE
2. √Display – ‘HOME DISPLAY’
 - * If HOME DISPLAY not shown:
 - * Right (EXIT) pb – push until appears *
3. Record Start ‘CURR TEMP’, Start ‘GPS’ in Table 5-III, MERLIN PROFILE DATA LOG FILE

SET DURATION FOR PROFILE LINE

4. Left (MENU) pb – push until ‘Quick Status 1/8’
5. Left (NEXT) pb – push (3 times) until ‘Temp Control 4/8’
6. Center (SELECT) pb – push until ‘Mode 1/3’
7. Left (NEXT) pb – push (2 times) until ‘Prof Mode Options 3/3’
8. Center (SELECT) pb – push (3 times)
 - ‘PROFILE LN 01 OF XX’
 - ‘xxxx:xx:xx ±xx.xC’
 - ‘Mxx:xx:xx Exx:xx:xx’
9. Left (NEXTLN) pb – push until desired Profile Line Number per MCC
10. Center (EDITLN/SELECT) pb – push (2 times)
 - ‘XX: DURATION’
 - ‘Old Dur: xxxx:xx:xx’
 - ‘New Dur: xxxx:xx:xx’

NOTE

The left pushbutton (CURSOR) moves cursor between New Dur: hhhh:mm:ss fields (default cursor position will be blinking).

The center pushbutton (PLUS) increases New Dur: selected digit field value by 1

11. Enter desired Duration for this profile line per MCC |

12. Right (DONE) pb – push

If Display – ‘ARE YOU SURE?’, then: |
Left (APPLY) pb – push

13. √Display – desired Duration per MCC |

SET END POINT TEMP FOR PROFILE LINE

14. Left (+PARAM) pb – push until ‘End Point Temp 2/4’

15. Center (SELECT) pb – push until
‘XX: END POINT TEMP’
‘Old EPT: ±xx.xC’
‘New EPT: ±xx.xC’

NOTE

The left pushbutton (CURSOR) moves cursor between New EPT fields (default cursor position will be blinking).

The center pushbutton (PLUS) increases New EPT selected digit field value by 1.

Nominal EPT Range (-20.0 to +48.5 °C) |

16. Enter desired End Point Temperature per MCC |

17. Right (DONE) pb – push

If Display – ‘ARE YOU SURE?’, then: |
Left (APPLY) pb – push

18. √Display – desired End Point Temp per MCC |

SET SYSTEM STORAGE INTERVAL FOR PROFILE LINE

19. Left (+PARAM) pb – push until ‘Sys Sto Interval 3/4’

20. Center (SELECT) pb – push
‘XX: SYS STO INTERVAL’
‘Old: xx:xx:xx’
‘New: xx:xx:xx’

NOTE

The Left pushbutton (CURSOR) moves the cursor between New fields (default cursor position will be blinking).

The Center pushbutton (PLUS) increases New selected digit field value by 1.

New value must be greater than zero

21. Enter desired System Storage Interval per MCC |

22. Right (DONE) pb – push

If Display – ‘ARE YOU SURE?’, then: |

Left (APPLY) pb – push |

23. √Display – desired System Storage Interval per MCC |

SET EXPERIMENT STORAGE INTERVAL FOR PROFILE LINE

24. Left (+PARAM) pb – push until ‘Exp Sto Interval 4/4’

25. Center (SELECT) pb – push
‘XX: EXP STO INTERVAL’
‘Old: xx:xx:xx’
‘New: xx:xx:xx’

NOTE

The left pushbutton (CURSOR) moves cursor between New fields (default cursor position will be blinking).

The center pushbutton (PLUS) increases New selected digit field value by 1.

New value must be greater than zero

26. Enter desired Experiment Storage Interval per MCC |

27. Right (DONE) pb – push

If Display – ‘ARE YOU SURE?’, then: |

Left (APPLY) pb – push |

28. √Display – desired Experiment Storage Interval per MCC

SET START TIME FOR PROFILE

29. Right (EXIT) pb – push until ‘HOME DISPLAY’

30. Left (MENU) pb – push until ‘Quick Status 1/8’

31. Left (NEXT) pb – push (3 times) until ‘Temp Control 4/8’

32. Center (SELECT) pb – push until ‘Mode 1/3’

33. Left (NEXT) pb – push (2 times) until ‘Prof Mode Options 3/3’
34. Center (SELECT) pb – push
‘TEMP CONTROL : PROFILE’
‘Profile View/Edit X/X’
35. Left (NEXT) pb – push until ‘Start Date/Time 2/4’
36. Center (SELECT) pb – push
‘START DATE/TIME’
‘Date: DD MMM YYYY’
‘Time: xx:xx:xx GPS’

NOTE

The left pushbutton (CURSOR) moves the cursor between Start Date/Time fields (default cursor position will be blinking).

The center pushbutton (PLUS) increases Start Date/Time selected digit field value by 1.

Start Day value must be ≤ 31 and Hour value must be ≤ 23

37. Enter desired Profile Start Date/Time per MCC
38. Right (DONE) pb – push

If Display – ‘ARE YOU SURE?’, then:
Left (APPLY) pb – push
39. √Display – is desired Profile Start Date/Time per MCC

SET CURRENT LINE FOR PROFILE

40. Right (EXIT) pb – push until ‘HOME DISPLAY’
41. Left (MENU) pb – push until ‘Quick Status 1/8’
42. Left (NEXT) pb – push (3 times) until ‘Temp Control 4/8’
43. Center (SELECT) pb – push until ‘Mode 1/3’
44. Left (NEXT) pb – push (2 times) until ‘Prof Mode Options 3/3’
45. Center (SELECT) pb – push
‘TEMP CONTROL : PROFILE’
‘Profile View/Edit X/X’
46. Left (NEXT) pb – push (2 times) until ‘Current Line 3/4’
47. Center (SELECT) pb – push
‘CURRENT LINE NUMBER’
‘Current LN: XX’
‘New LN : XX’

NOTE

The left pushbutton (CURSOR) moves cursor between New LN fields (default cursor position will be blinking).

The center pushbutton (PLUS) increases New LN selected digit field value by 1.

New LN value must be a valid line number and greater than zero

48. Enter desired New Current Line Number per MCC

49. Right (DONE) pb – push

If Display – ‘ARE YOU SURE?’, then:

Left (APPLY) pb – push

50. √Display – is desired New Current Line Number per MCC

MANUAL START PROFILE AT PARTICULAR LINE NUMBER

51. Right (EXIT) pb – push until ‘HOME DISPLAY’

52. Left (MENU) pb – push until ‘Quick Status 1/8’

53. Left (NEXT) pb – push (3 times) until ‘Temp Control 4/8’

54. Center (SELECT) pb – push until ‘Mode 1/3’

55. Left (NEXT) pb – push (2 times) until ‘Prof Mode Options 3/3’

56. Center (SELECT) pb – push
‘TEMP CONTROL : PROFILE’
‘Profile View/Edit X/X’

57. Left (NEXT) pb – push (3 times) until ‘Manual Start 4/4’

58. Center (SELECT) pb – push
‘MANUAL START PROFILE’
‘Profile Line Number:’
‘XX’

NOTE

The left pushbutton (CURSOR) moves cursor between Line Number fields (default cursor position will be blinking).

The center pushbutton (PLUS) increases Line Number selected digit field value by 1.

The Line Number value must be a valid line number and greater than zero

59. Enter desired Manual Start Profile Line Number per MCC

60. Right (DONE) pb – push

If Display – ‘ARE YOU SURE?’, then:

Left (APPLY) pb – push

ADD LINE TO PROFILE STARTING WITH DURATION

61. Right (EXIT) pb – push until ‘HOME DISPLAY’
62. Left (MENU) pb – push until ‘Quick Status 1/8’
63. Left (NEXT) pb – push (3 times) until ‘Temp Control 4/8’
64. Center (SELECT) pb – push until ‘Mode 1/3’
65. Left (NEXT) pb – push (2 times) until ‘Prof Mode Options 3/3’
66. Center (SELECT) pb – push (2 times) |
 ‘PROFILE VIEW/EDIT’
 ‘View Line 1/5’
67. Left (NEXT) pb – push until ‘Add Line 2/5’
68. Center (SELECT) pb – push until ‘PROF EDIT: ADD LINE’
69. Left (ADD LN) pb – push
 ‘Profile: Add In xx’
 ‘Duration 1/4’
 ‘XXXX:XX:XX’
70. Center (SELECT) pb – push
 ‘XX: DURATION’
 ‘Old Dur: xxxx:xx:xx’
 ‘New Dur: xxxx:xx:xx’

NOTE

The left pushbutton (CURSOR) moves cursor between New Dur: hhhh:mm:ss fields (default cursor position will be blinking).

The center pushbutton (PLUS) increases New Dur: selected digit field value by 1

71. Perform steps 11-28 to set Duration, End Set Point Temp, System Storage Interval and Experiment Storage Interval for added profile line

INSERT LINE TO PROFILE STARTING WITH DURATION

72. Right (EXIT) pb – push until ‘HOME DISPLAY’
73. Left (MENU) pb – push until ‘Quick Status 1/8’
74. Left (NEXT) pb – push (3 times) until ‘Temp Control 4/8’
75. Center (SELECT) pb – push until ‘Mode 1/3’
76. Left (NEXT) pb – push (2 times) until ‘Prof Mode Options 3/3’
77. Center (SELECT) pb – push (2 times) |
 ‘PROFILE VIEW/EDIT’
 ‘View Line 1/5’

78. Left (NEXT) pb – push (2 times) until ‘Insert Line 3/5’

79. Center (SELECT) pb – push
‘PROF EDIT: INS LINE’
‘Insert new line’
‘before: LN XX’

NOTE

The left pushbutton (CURSOR) moves cursor between LN fields (default cursor position will be blinking).

The center pushbutton (PLUS) increases LN selected digit field value by 1.

Nominal LN Range (1 to 99)
New value must be greater than zero.

If profile is full a line must be deleted prior to inserting a line

80. Enter desired profile Line Number (LN) per MCC

81. Right (DONE) pb – push

If Display – ‘ARE YOU SURE?’, then:
Left (APPLY) pb – push

82. √Display – ‘PROFILE: INS LN XX’
‘Duration 1/4’
‘XXXX:XX:XX’

83. Center (SELECT) pb – push
‘XX: DURATION’
‘Old Dur: xxxx:xx:xx’
‘New Dur: xxxx:xx:xx’

NOTE

The left pushbutton (CURSOR) moves cursor between New Dur: hhh:mm:ss fields (default cursor position will be blinking).

The center pushbutton (PLUS) increases New Dur: selected digit field value by 1

84. Perform steps 11-28 to set Duration, End Set Point Temp, System Storage Interval and Experiment Storage Interval for inserted profile line

DELETE LINE TO PROFILE

85. Right (EXIT) pb – push until ‘HOME DISPLAY’

86. Left (MENU) pb – push until ‘Quick Status 1/8’

87. Left (NEXT) pb – push (3 times) until ‘Temp Control 4/8’

88. Center (SELECT) pb – push until ‘Mode 1/3’

89. Left (NEXT) pb – push (2 times) until ‘Prof Mode Options 3/3’

90. Center (SELECT) pb – push (2 times) |
 ‘PROFILE VIEW/EDIT’
 ‘View Line 1/5’

91. Left (NEXT) pb – push until ‘Delete Line 4/5’

92. Center (SELECT) pb – push |
 ‘PROF EDIT: DEL LINE’
 ‘Delete line: LN XX’

NOTE

The left pushbutton (CURSOR) moves cursor between LN fields (default cursor position will be blinking).

The center pushbutton (PLUS) increases LN selected digit field value by 1.

Nominal LN Range (1 to 99). New value must be greater than zero

93. Enter desired profile Line Number (LN) to delete per MCC

94. Right (DONE) pb – push

If Display – ‘ARE YOU SURE?’, then: |
 Left (APPLY) pb – push

CLEAR ALL PROFILE LINES

95. Right (EXIT) pb – push until ‘HOME DISPLAY’

96. Left (MENU) pb – push until ‘Quick Status 1/8’

97. Left (NEXT) pb – push (3 times) until ‘Temp Control 4/8’

98. Center (SELECT) pb – push until ‘Mode 1/3’

99. Left (NEXT) pb – push (2 times) until ‘Prof Mode Options 3/3’

100. Center (SELECT) pb – push (2 times) |
 ‘PROFILE VIEW/EDIT’
 ‘View Line 1/5’

101. Left (NEXT) pb – push (4 times) until ‘Clear All 5/5’

102. Center (SELECT) pb – push

103. If Display – ‘ARE YOU SURE?’, then: |
 Left (APPLY) pb – push

COPY PROFILE FILE

104. Right (EXIT) pb – push until 'HOME DISPLAY'
105. Left (MENU) pb – push until 'Quick Status 1/8'
106. Left (NEXT) pb – push (5 times) until 'File Management 6/8'
107. Center (SELECT) pb – push
'MAIN: FILE MGMT'
'Downlink 1/8'
108. Left (NEXT) pb – push (2 times)
'MAIN: FILE MGMT'
'C: 3/8'
109. Center (SELECT) pb – push
<DIRECTORY>
<FILENAME> XX/YY
110. Left (NEXT) pb – push until
<DIRECTORY>
<FROM FILENAME>
111. Center (SELECT) pb – push
<FROM FILENAME>
'File Info 1/5'
112. Left (NEXT) pb – push (3 times) until
<FROM FILENAME>
'File Copy 4/5'
113. Center (SELECT) pb – push
'From:' <FROM FILENAME>
'To:' <TO FILENAME>

NOTE

The left pushbutton (CURSOR) moves cursor between To: fields (default cursor position will be blinking).

The center pushbutton (PLUS) increases To: selected character field value by 1 character.

Nominal To: PTP File name is MERLIN.PTP

114. Enter desired To Filename per MCC
115. Right (DONE) pb – push

If Display – 'ARE YOU SURE?', then:
Left (APPLY) pb – push

CHECK STATUS OF THERMAL CARRIER

116. Right (EXIT) pb – push until 'HOME DISPLAY'
117. √Display – 'GPS' Incrementing

118. ✓STATUS LED – Nominal (It off) |

NOTE

The STATUS LED is on for approximately 2/3 of a sec then is turned off for approximately 1/3 of a sec when and off-nominal situation is present, and will toggle until off-nominal situation is acknowledged |

119. ✓Display – continuously reads ‘HOME DISPLAY’ |

- * If Display, GPS or STATUS LED are not in *
- * nominal (listed state) then: *
- * ✓MCC *

RECORD END DATA

120. Record End ‘CURR TEMP’ and End ‘GPS’ in Table 5-III, MERLIN PROFILE DATA LOG FILE |

121. Notify MCC log values for log file in Table 5-III, MERLIN PROFILE DATA LOG FILE |

TABLE 5-I.- MERLIN RESET LOG FILE

I

PARAMETER	EVENT 1	EVENT 2	DEFINITION / OPTIONS
CURR TEMP	Start ____ . ____ °C End ____ . ____ °C	Start ____ . ____ °C End ____ . ____ °C	MERLIN Current Temperature XX.XX °C
GPS	Start ____ : ____ : ____ (Day) ____ : ____ : ____ GPS End ____ : ____ : ____ (Day) ____ : ____ : ____ GPS	Start ____ : ____ : ____ (Day) ____ : ____ : ____ GPS End ____ : ____ : ____ (Day) ____ : ____ : ____ GPS	Day Month-Abbreviation Year Hours : Min : Sec
Expected CURR TEMP	____ . ____ °C	____ . ____ °C	Expected MERLIN Current Temperature per MCC (-20.0 to +48.5 °C)
Expected SP TEMP	____ . ____ °C	____ . ____ °C	Expected Set Point Temperature per MCC (-20.0 to +48.5 °C)
Set Point Temperature	____ . ____ °C	____ . ____ °C	-20.0 to +48.5 °C
Ramp Rate	____ . ____ °C / Hour	____ . ____ °C / Hour	0.1 to 99.0 °C / Hour

TABEL 5-I.- MERLIN RESET LOG FILE (Cont)

PARAMETER	EVENT 1	EVENT 2	DEFINITION / OPTIONS
System Data Storage Interval	____:____:____	____:____:____	Hours : Min : Sec (Interval must be greater than 0)
Experiment Data Storage Interval	____:____:____	____:____:____	Hours : Min : Sec (Interval must be greater than 0)
Heat Removal Mode	Air <input type="checkbox"/> Water <input type="checkbox"/>	Air <input type="checkbox"/> Water <input type="checkbox"/>	Air or Water
Memory Full Mode	Overwrite Oldest Data <input type="checkbox"/> Terminate Data Recording <input type="checkbox"/>	Overwrite Oldest Data <input type="checkbox"/> Terminate Data Recording <input type="checkbox"/>	Overwrite Oldest Data or Terminate Data Recording
External Fan Mode	Off <input type="checkbox"/> On <input type="checkbox"/> Automatic <input type="checkbox"/>	Off <input type="checkbox"/> On <input type="checkbox"/> Automatic <input type="checkbox"/>	Off or On or Automatic

TABLE 5-I.- MERLIN RESET LOG FILE (Cont)

PARAMETER	EVENT 1	EVENT 2	DEFINITION / OPTIONS
Power Recovery Mode	Return to Set Point Temperature <input type="checkbox"/>	Return to Set Point Temperature <input type="checkbox"/>	Return to Set Point Temperature
	Hold Present Temperature <input type="checkbox"/>	Hold Present Temperature <input type="checkbox"/>	Hold Present Temperature
	Continue Ramp from Last Set Point <input type="checkbox"/>	Continue Ramp from Last Set Point <input type="checkbox"/>	Continue Ramp from Last Set Point
	Continue Ramp from Present Set Point <input type="checkbox"/>	Continue Ramp from Present Set Point <input type="checkbox"/>	Continue Ramp from Present Set Point
Door Detection Mode	Enabled <input type="checkbox"/>	Enabled <input type="checkbox"/>	Enabled or Disabled
	Disabled <input type="checkbox"/>	Disabled <input type="checkbox"/>	
Experiment Volume Fan Mode	Enabled <input type="checkbox"/>	Enabled <input type="checkbox"/>	Enabled or Disabled
	Disabled <input type="checkbox"/>	Disabled <input type="checkbox"/>	
Temperature Bandwidth	____. ____ °C	____. ____ °C	00.1 to 25.0 °C
Downlink Mode	Enabled <input type="checkbox"/>	Enabled <input type="checkbox"/>	Enabled or Disabled
	Disabled <input type="checkbox"/>	Disabled <input type="checkbox"/>	

TABLE 5-I.- MERLIN RESET LOG FILE (Cont)

PARAMETER	EVENT 1	EVENT 2	DEFINITION / OPTIONS
PID Temperature Sensors	Left Wall <input type="checkbox"/> Right Wall <input type="checkbox"/> Experiment volume air <input type="checkbox"/> Experiment 1-11 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input type="checkbox"/> 10 <input type="checkbox"/> 11 <input type="checkbox"/>	Left Wall <input type="checkbox"/> Right Wall <input type="checkbox"/> Experiment volume air <input type="checkbox"/> Experiment 1-11 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input type="checkbox"/> 10 <input type="checkbox"/> 11 <input type="checkbox"/>	System Left Wall Right Wall Experiment volume air Experiment 1-11
Temperature Control Mode	Set Point <input type="checkbox"/> Programmable Temperature Profile (PTP) <input type="checkbox"/> Set Point to PTP <input type="checkbox"/> Override <input type="checkbox"/> Off <input type="checkbox"/>	Set Point <input type="checkbox"/> Programmable Temperature Profile (PTP) <input type="checkbox"/> Set Point to PTP <input type="checkbox"/> Override <input type="checkbox"/> Off <input type="checkbox"/>	Set Point Programmable Temperature Profile (PTP) Set Point to PTP Override Off

TABLE 5-I.- MERLIN RESET LOG FILE (Cont)

PARAMETER	EVENT 1	EVENT 2	DEFINITION / OPTIONS
FILE Cleanup Directories	DIRECTORIES	DIRECTORIES	DIRECTORIES
	L (Log Directory) <input type="checkbox"/>	L (Log Directory) <input type="checkbox"/>	L (Log Directory)
	M (System Data Directory) <input type="checkbox"/>	M (System Data Directory) <input type="checkbox"/>	M (MERLIN System Data Directory)
	E (Experiment Data Directory) <input type="checkbox"/>	E (Experiment Data Directory) <input type="checkbox"/>	E (Experiment Data Directory)
	U (Uplink Directory) <input type="checkbox"/>	U (Uplink Directory) <input type="checkbox"/>	U (Uplink Directory)

NOTE: These items may need to be entered for multiple events

TABLE 5-II.- MERLIN DIAGNOSTIC LOG FILE

PARAMETER		DEFINITION	1	2	3	4
MAIN MENU						
1	CURR TEMP	Current Temperature °C				
2	GPS	Day Month-Abbreviation Year Hours : Min : Sec (>0) (12Apr06 20:24:34)	_____ ____ : ____ : ____	_____ ____ : ____ : ____	_____ ____ : ____ : ____	_____ ____ : ____ : ____
QUICK STATUS						
1	ECW	Nominal Status Indicator				
2	Left Wall	Sensor Temperature °C				
3	Exp Volume Air	Sensor Temperature °C				
4	Right Wall	Sensor Temperature °C				
5	Duct Inlet	Sensor Temperature °C				
6	Hot HX Surface	Sensor Temperature °C				
7	Duct Outlet	Sensor Temperature °C				
8	Electronics Bay	Sensor Temperature °C				
9	Ambient	Sensor Temperature °C				
10	HX Humidity	% Humidity				
11	Temp Bandwidth	Bandwidth °C				
12	Exp Volume Fan	Enabled/Disabled				
13	External Fan	On/Off				
14	Memory Used	% Memory				
15	TE Power	0 – 127				
16	Heater Power	0 – 100				
17	Function Code	Hex Value				
18	IP Address	Ethernet Address				
19	Usage Meter	Days:Hours:Minutes				

TABLE 5-II.- MERLIN DIAGNOSTIC LOG FILE (Cont)

THERMAL : GENERAL						
1	Temp Control	SET POINT OFF OVERRIDE PROG TEMP PROFILE SET POINT TO PROFILE				
2	Current Temp	Sensor Temperature °C				
3	Interim Set Pt	Sensor Temperature °C				
4	End Set Point	Sensor Temperature °C				
5	Ramp Rate	Rate °C/Hour				
6	Heater Power	0 – 127				
7	TE Power	0 – 100				
8	Temp Bandwidth	Bandwidth °C				
9	B/W Status	Inside / Outside				
10	Curr Prof Line	Current profile line				
11	Prof Start GPS	Profile start time				
12	Line Time Left	Profile time left				
ANCILLARY : GENERAL						
1	Boot Count	Number of times the system had rebooted				

TABLE 5-III.- MERLIN PROFILE DATA LOG FILE

I

CURR TEMP and GPS				
Event 1	Event 2	Event 3	Event 4	Event 5
Start ____ . ____ °C ____ : ____ : ____ GPS	Start ____ . ____ °C ____ : ____ : ____ GPS	Start ____ . ____ °C ____ : ____ : ____ GPS	Start ____ . ____ °C ____ : ____ : ____ GPS	Start ____ . ____ °C ____ : ____ : ____ GPS
End ____ . ____ °C ____ : ____ : ____ GPS	End ____ . ____ °C ____ : ____ : ____ GPS	End ____ . ____ °C ____ : ____ : ____ GPS	End ____ . ____ °C ____ : ____ : ____ GPS	End ____ . ____ °C ____ : ____ : ____ GPS

Action to a Profile Line	Profile Line #	Duration	End Set Point Temp	System Storage Interval	Experiment Storage Interval
(M)odify / (A)dd / (D)elete / (I)nsert /	1-99	Hours : Min : Sec (12:00:00)	-20 to 48.5 °C	Hours : Min : Sec (00:15:00)	Hours : Min : Sec (00:15:00)
___	___	____ : ____ : ____	____ . ____ °C	____ : ____ : ____	____ : ____ : ____
___	___	____ : ____ : ____	____ . ____ °C	____ : ____ : ____	____ : ____ : ____
___	___	____ : ____ : ____	____ . ____ °C	____ : ____ : ____	____ : ____ : ____
___	___	____ : ____ : ____	____ . ____ °C	____ : ____ : ____	____ : ____ : ____
___	___	____ : ____ : ____	____ . ____ °C	____ : ____ : ____	____ : ____ : ____
___	___	____ : ____ : ____	____ . ____ °C	____ : ____ : ____	____ : ____ : ____
___	___	____ : ____ : ____	____ . ____ °C	____ : ____ : ____	____ : ____ : ____
___	___	____ : ____ : ____	____ . ____ °C	____ : ____ : ____	____ : ____ : ____
___	___	____ : ____ : ____	____ . ____ °C	____ : ____ : ____	____ : ____ : ____

TABLE 5-III.- MERLIN PROFILE DATA LOG FILE (Cont)

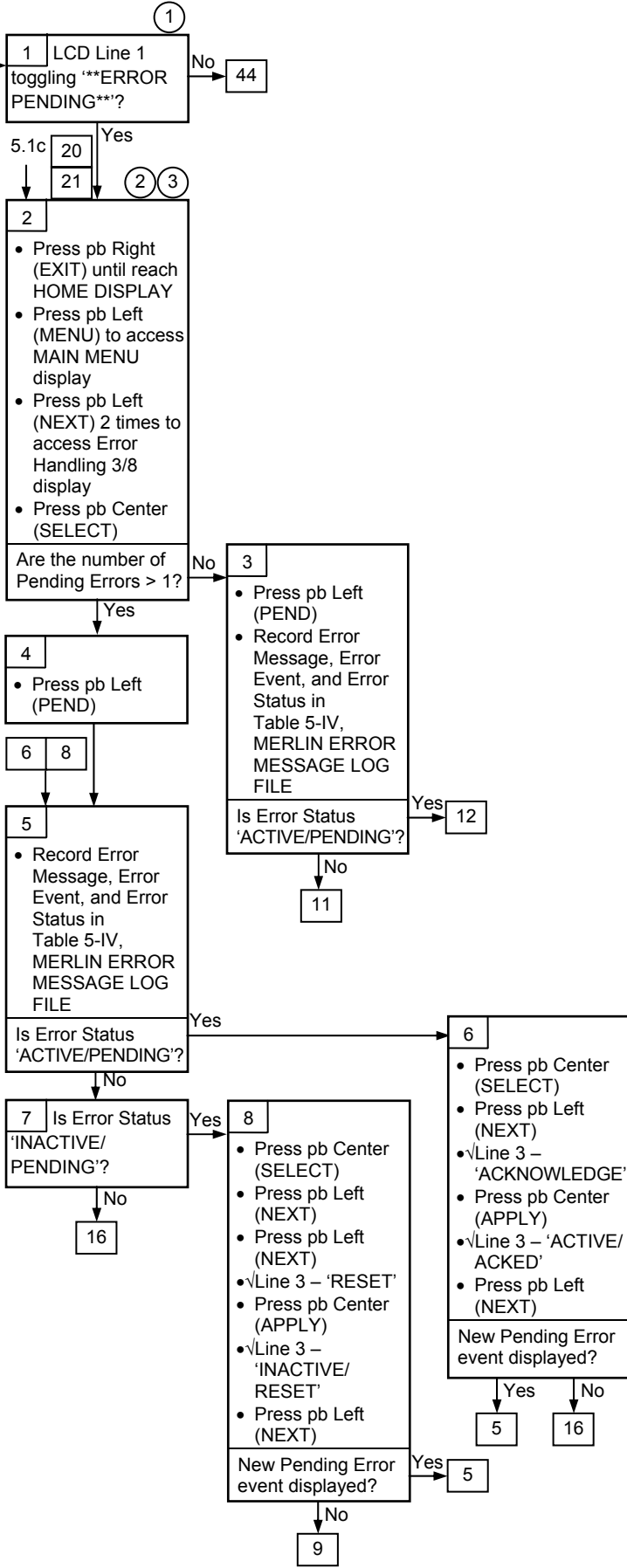
Start Date/Time for a Profile	Current Line Number for a Profile	Manual Start Profile Line Number	Copy Profile Filenames	
Day Month- Abbreviation Year Hours : Min : Sec (12Jun07 20:03:15)	1-99	1-99	FROM: Filename 8 Characters, a period, 3 extension characters (Filename.ext)	TO: Filename 8 Characters, a period, 3 extension characters (Filename.ext)
____-____-____ __:__:__	____	____	____.____	____.____
____-____-____ __:__:__	____	____	____.____	____.____
____-____-____ __:__:__	____	____	____.____	____.____
____-____-____ __:__:__	____	____	____.____	____.____

MERLIN

5.1a MERLIN ERROR MESSAGE

MERLIN System Error

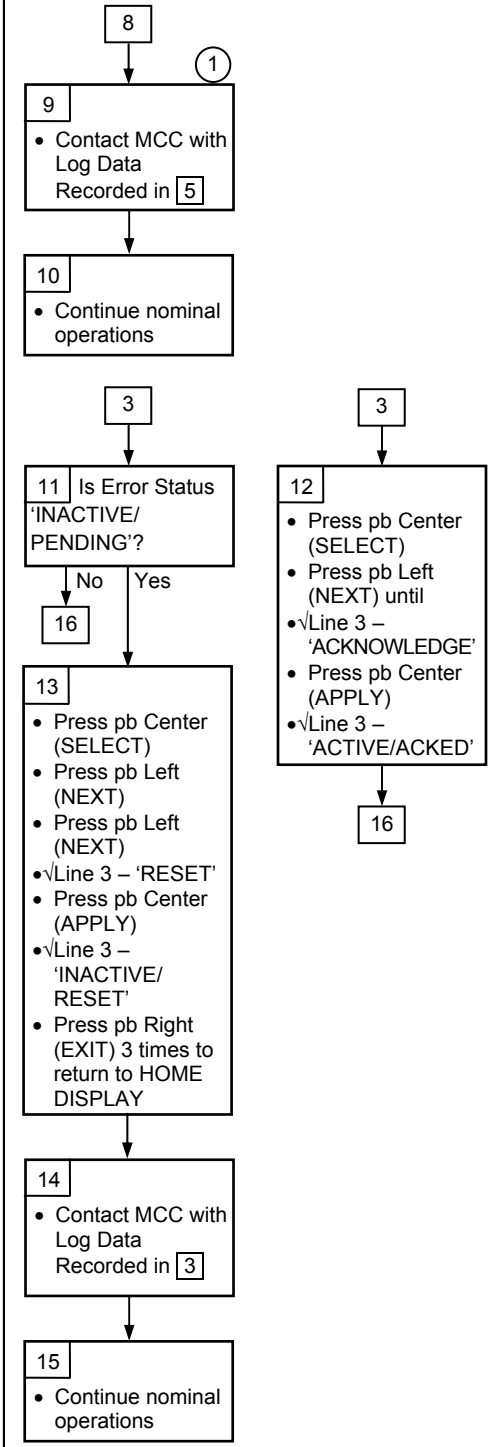
Nominal Config:
 (MF71E)
 cb POWER CB MAIN – cl (It on)
 cb POWER CB PAYLOAD – op (It off)
 (ML86B:E)
 cb MNB MAR 1 – cl (ML85E)
 cb DC 10 AMP MNB CB3 – cl
 DC 10 AMP MNB S3 – ON



- ① Contact MCC before proceeding
- ② Operator can always exit sub menus by pressing pb Right until HOME DISPLAY is reached
- ③ ERR HANDLING: PEND display will identify the Event on Line 2 and the Status on Line 3. 'ACTIVE/PENDING' indicates that error is still occurring and should be acknowledged. 'INACTIVE/PENDING' indicates the Error is no longer occurring and can be Reset

MALS

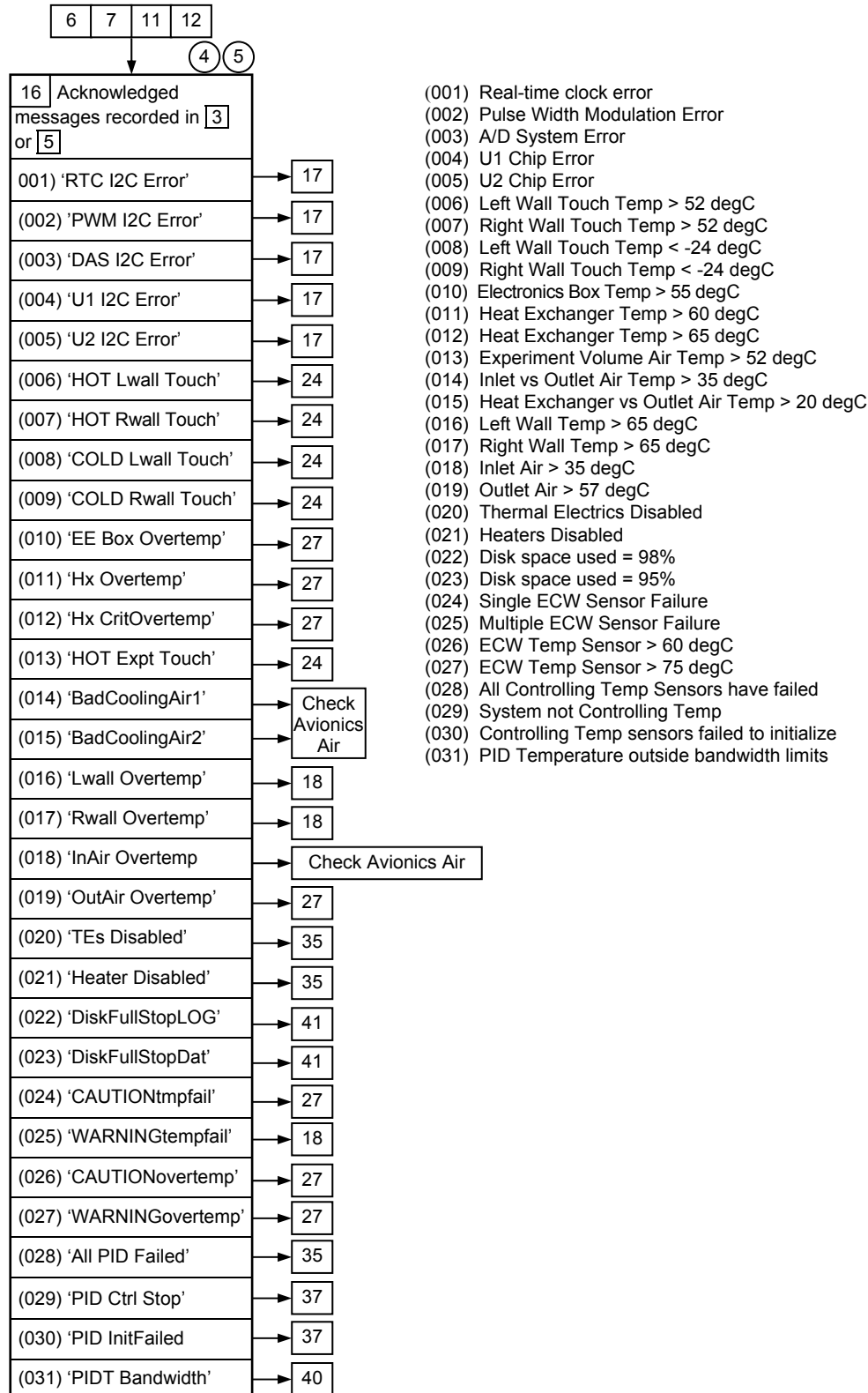
MERLIN 5.1a (Cont)



①
Contact MCC before proceeding

MALS

MERLIN 5.1a (Cont)

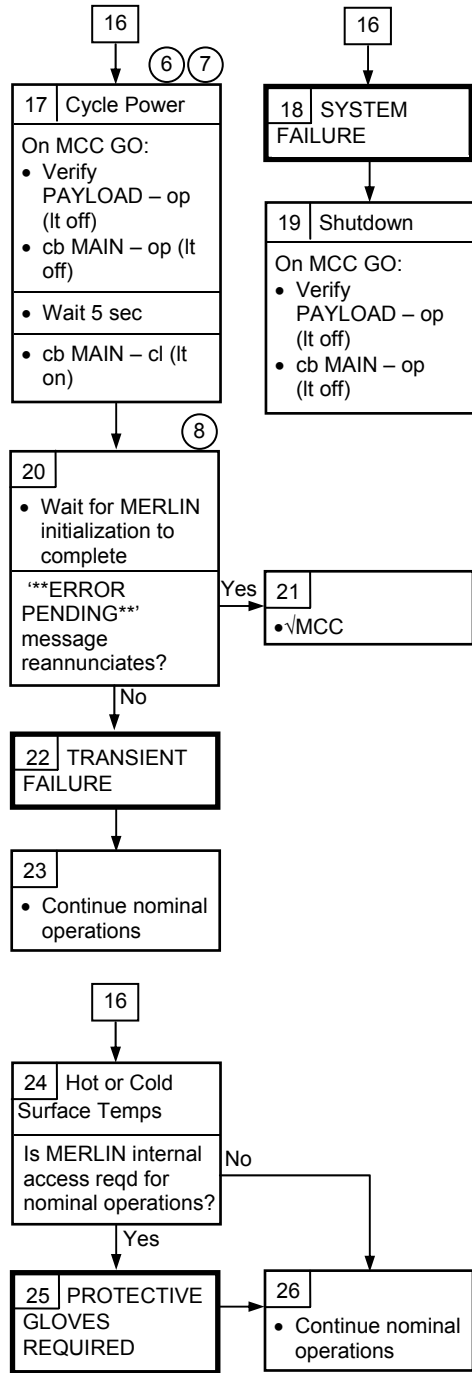


④
16 lists all possible error messages

⑤
The MERLIN RECORD DIAGNOSTIC DATA procedure may be performed to capture the state of key data elements per MCC direction

- (001) Real-time clock error
- (002) Pulse Width Modulation Error
- (003) A/D System Error
- (004) U1 Chip Error
- (005) U2 Chip Error
- (006) Left Wall Touch Temp > 52 degC
- (007) Right Wall Touch Temp > 52 degC
- (008) Left Wall Touch Temp < -24 degC
- (009) Right Wall Touch Temp < -24 degC
- (010) Electronics Box Temp > 55 degC
- (011) Heat Exchanger Temp > 60 degC
- (012) Heat Exchanger Temp > 65 degC
- (013) Experiment Volume Air Temp > 52 degC
- (014) Inlet vs Outlet Air Temp > 35 degC
- (015) Heat Exchanger vs Outlet Air Temp > 20 degC
- (016) Left Wall Temp > 65 degC
- (017) Right Wall Temp > 65 degC
- (018) Inlet Air > 35 degC
- (019) Outlet Air > 57 degC
- (020) Thermal Electrics Disabled
- (021) Heaters Disabled
- (022) Disk space used = 98%
- (023) Disk space used = 95%
- (024) Single ECW Sensor Failure
- (025) Multiple ECW Sensor Failure
- (026) ECW Temp Sensor > 60 degC
- (027) ECW Temp Sensor > 75 degC
- (028) All Controlling Temp Sensors have failed
- (029) System not Controlling Temp
- (030) Controlling Temp sensors failed to initialize
- (031) PID Temperature outside bandwidth limits

MERLIN 5.1a (Cont)

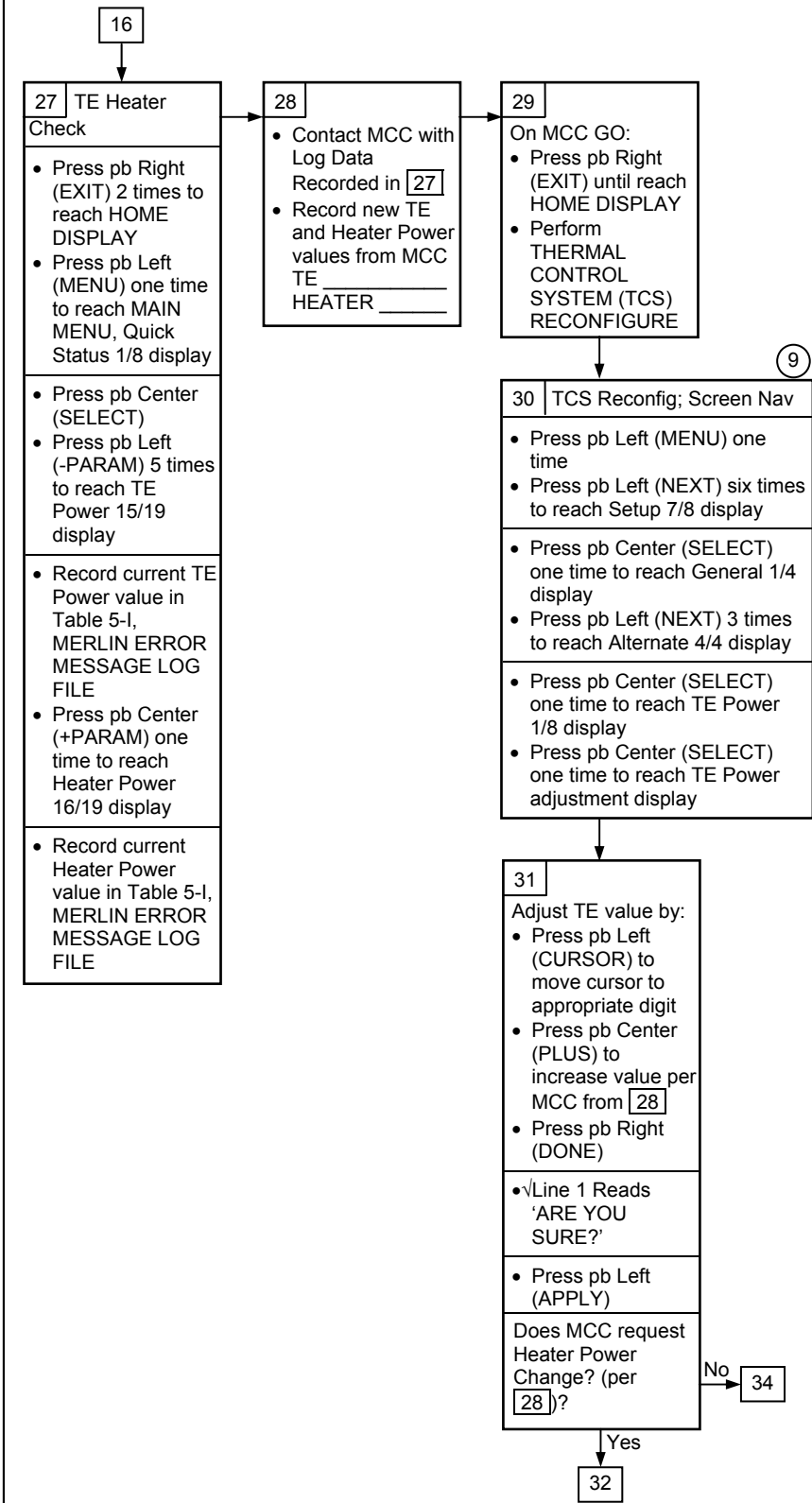


⑥ Power cycle requires MCC approval

⑦ Some Possible causes of Software Errors not resetting:
 • Frequent intermittent power failure
 • Single Event Upset
 • Watchdog Timer failure

⑧ Initialization takes approximately 1 min. Initialization is complete when LCD Line 1 reads 'HOME DISPLAY'

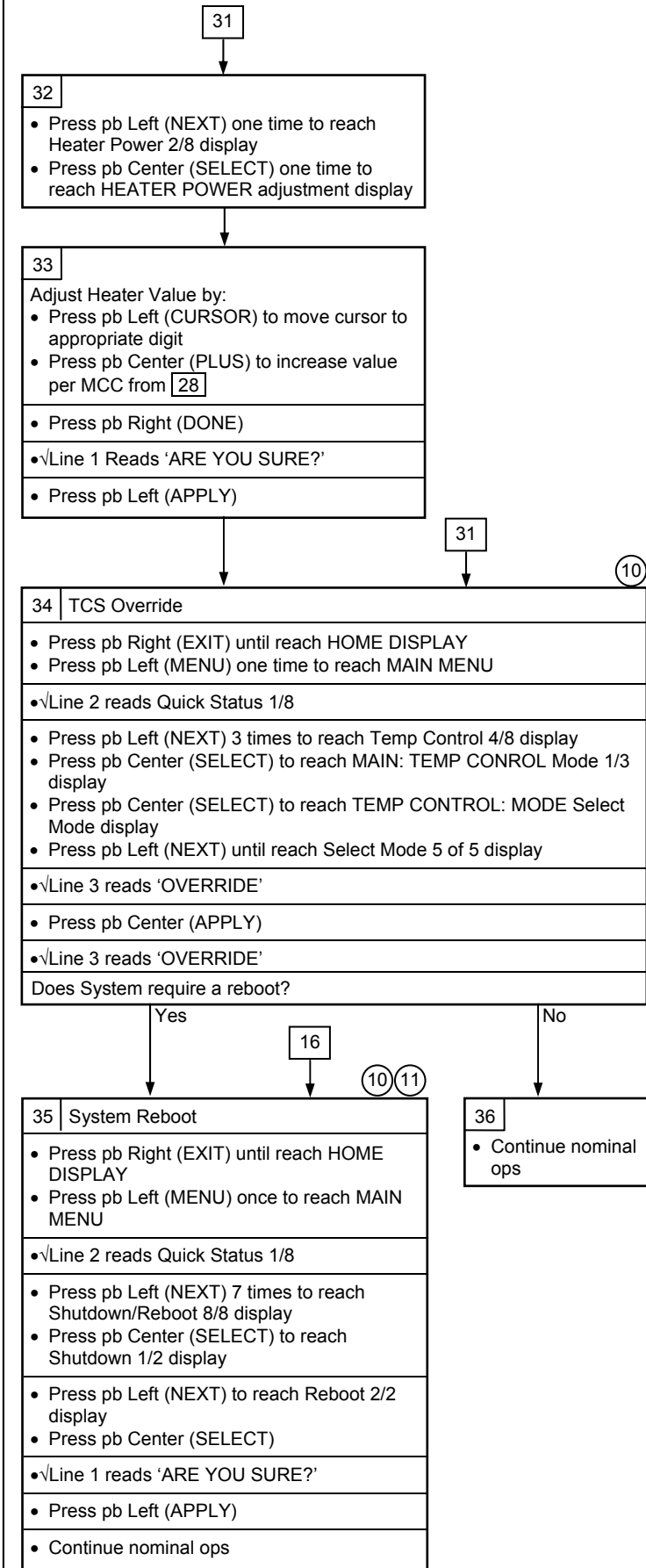
MERLIN 5.1a (Cont)



9

TCS and Heater Reconfigurations will set fixed power values to these devices. Setting system to Override will inhibit responsive thermal control

MERLIN 5.1a (Cont)



10
Errors 12,16, 17, 19, 20, 21 and 28 will automatically disable the TED devices; the system must be rebooted in order to re-enable them

11
System reboot takes approximately 1 min. System will initiate to HOME DISPLAY

MERLIN 5.1a (Cont)

16

37 PID Sensor Reconfiguration

- Contact MCC for new sensor selections
- Record new sensor selections

MERLIN System Sensors

L = Left Wall
R = Right Wall
E = Experiment Volume Air

Experiment Sensors

1 = ExpT1
2 = ExpT2
3 = ExpT3
4 = ExpT4
5 = ExpT5
6 = ExpT6
7 = ExpT7
8 = ExpT8
9 = ExpT9
A = ExpT10
B = ExpT11

38

- Press pb Right (EXIT) until reach HOME DISPLAY
- Press pb Left (MENU) one time
- Press pb Left (NEXT) 6 times to reach Setup 7/8 display

- Press pb Center (Select) once
- Press pb Left (NEXT) one time to reach PID 2/4 display

- Press pb Center (SELECT) one time to reach PID Sensors 1/2 display
- Press pb Center (SELECT) one time to reach PID SENSORS selection display

Adjust Sensor selection value by:

- Press pb Left (CURSOR) to move cursor to appropriate digit or letter
- Press pb Center (TOGGLE) to turn on or off designated sensor

- √Display shows selections from 37

- Press pb Right (DONE) when complete

- √Display for Old and New Settings

- Press pb Left (APPLY)
- Press pb Right (EXIT) until reach the HOME DISPLAY

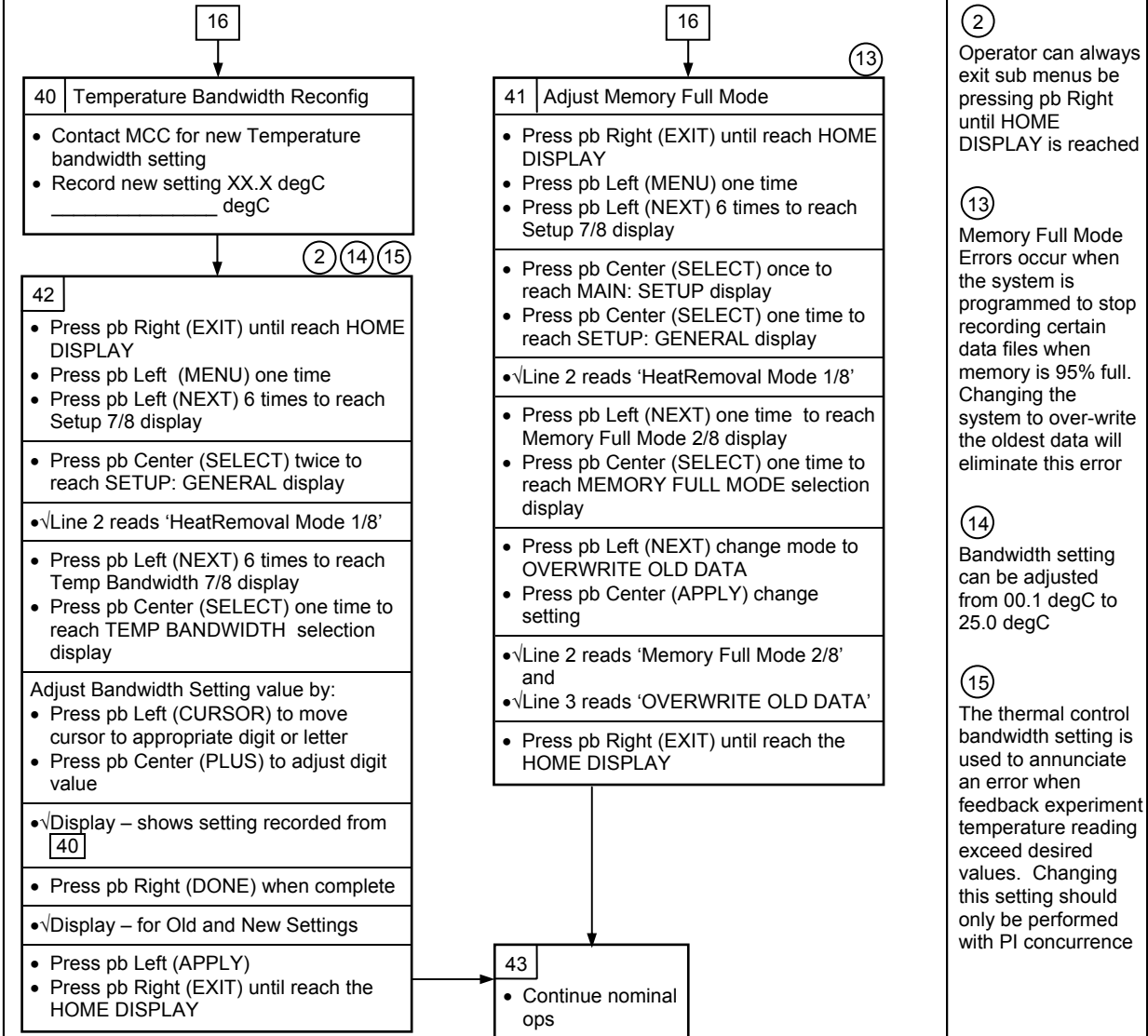
39

- Continue nominal ops

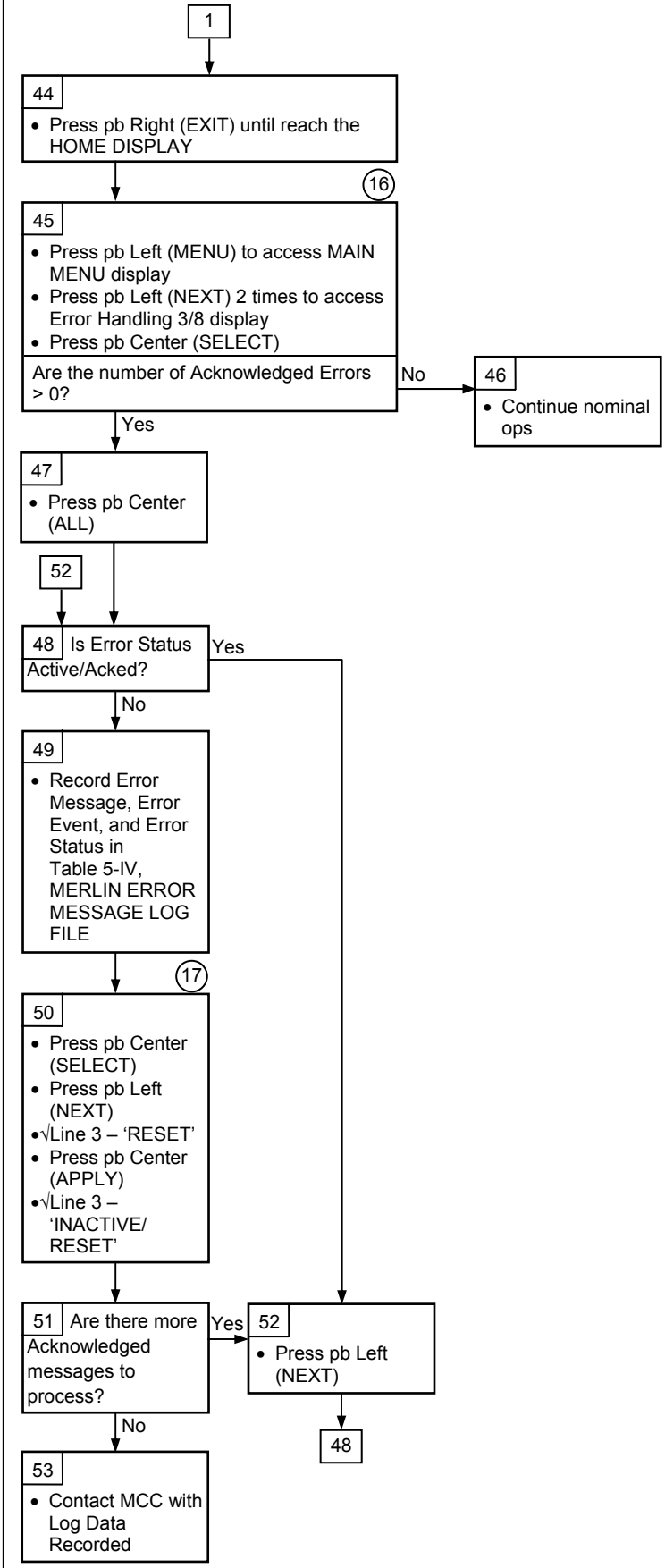
12

Sensor selection is displayed in the following order. An * symbol under the designed letter or numeral indicates selected sensor (Example)
M:LRE E:123456789AB
* * * * *

MERLIN 5.1a (Cont)



MERLIN 5.1a (Cont)



16

ERR HANDLING:
 ALL display will identify the Event on Line 2 and the Status on Line 3. 'ACTIVE/ACKED' indicates that error is still occurring and has been acknowledged. 'INACTIVE/ACKED' indicates the Error is no longer occurring and can be Reset

17

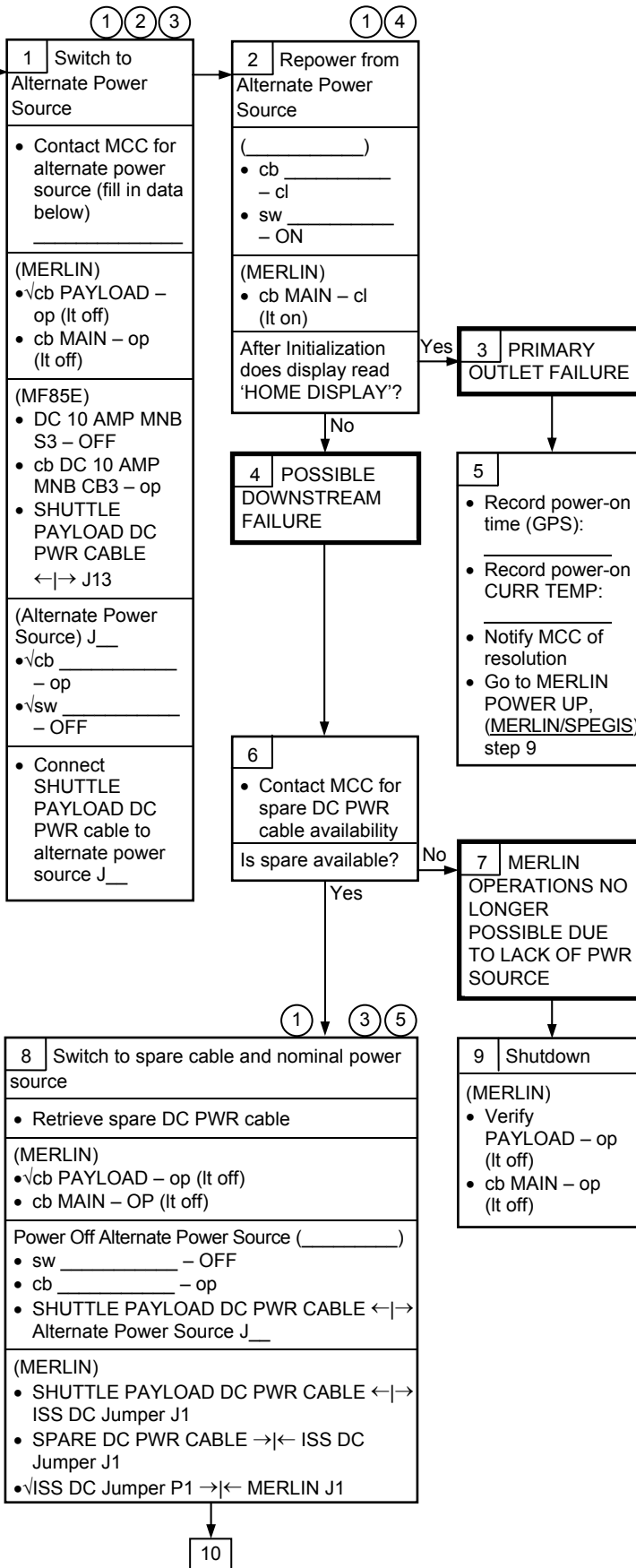
Note Errors:
 12, 16, 17, 19, 20, 21 and 28 cannot be reset. The system must be rebooted to clear error

MERLIN

5.1b MERLIN FAIL TO REPOWER

MERLIN Initialization Not Successfully Completed When Power Applied During MERLIN Power Up Procedure

Nominal Config:
 (MF71E)
 cb POWER CB MAIN – cl (It on)
 cb POWER CB PAYLOAD – op (It off)
 (ML86B:E)
 cb MNB MAR 1 – cl
 (ML85E)
 cb DC 10 AMP MNB CB3 – cl
 DC 10 AMP MNB S3 – ON



① MCC may instruct crew to an alternate power source that is not 10 AMP service. The ISS DC JUMPER cable is only reqd if the Orbiter power source is 10 amps. ML85E is 10 amp service

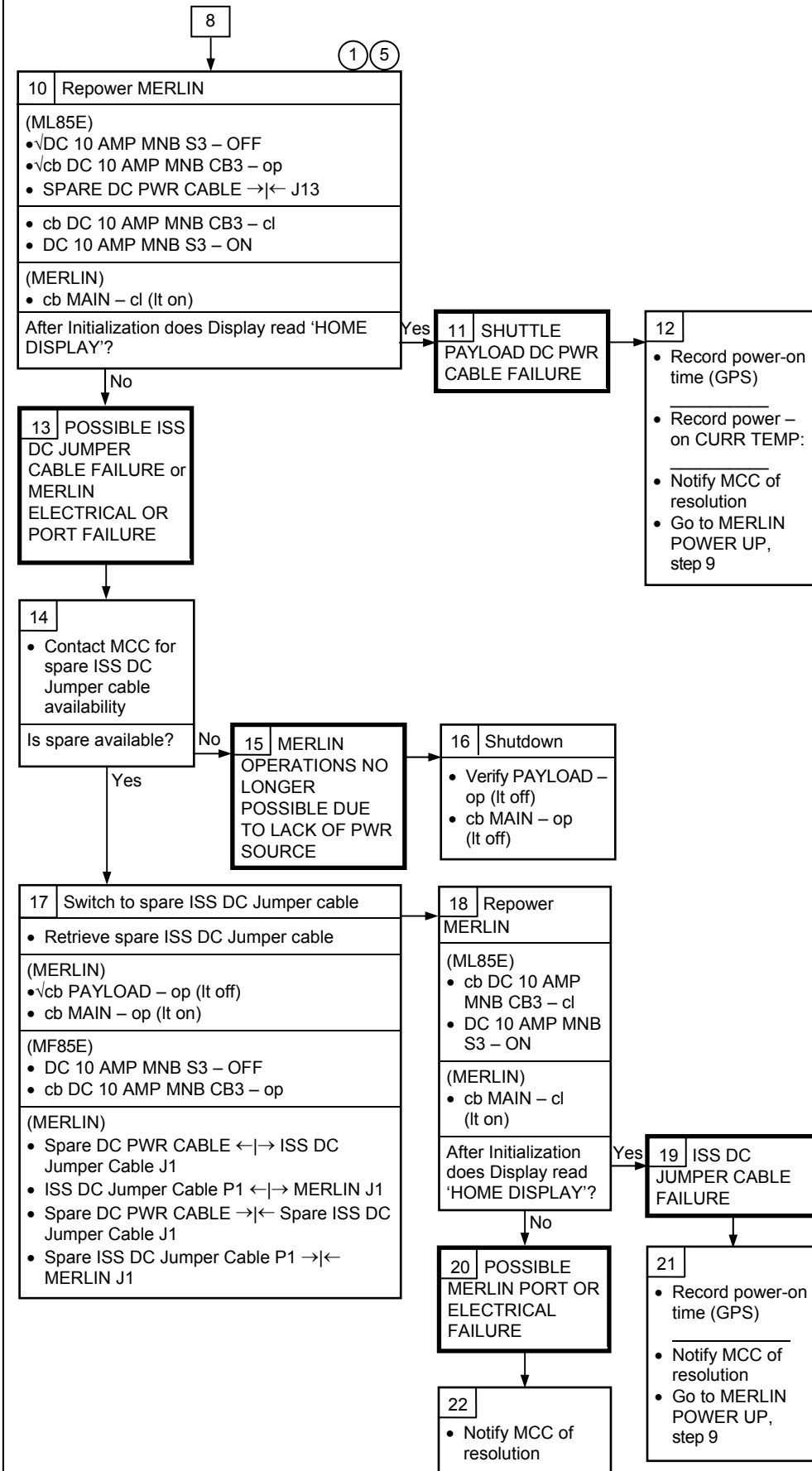
② Always deadface DC power source when disconnecting/ connecting power cable

③ Verify connectors are properly mated and seated securely when switching to alternate power source

④ MERLIN will take approximately 2 min to initialize after power on; after initialization is successfully completed, LCD Line 1 will read 'HOME DISPLAY'

⑤ Alternate power source is detailed in 1

MERLIN 5.1b (Cont)



①
MCC may instruct crew to an alternate power source that is not 10 AMP service. The ISS DC JUMPER cable is only reqd if the Orbiter power source is 10 amps. ML85E is 10 amp service

③
Verify connectors are properly mated and seated securely when switching to alternate power source

⑤
Alternate power source is detailed in ①

MERLIN

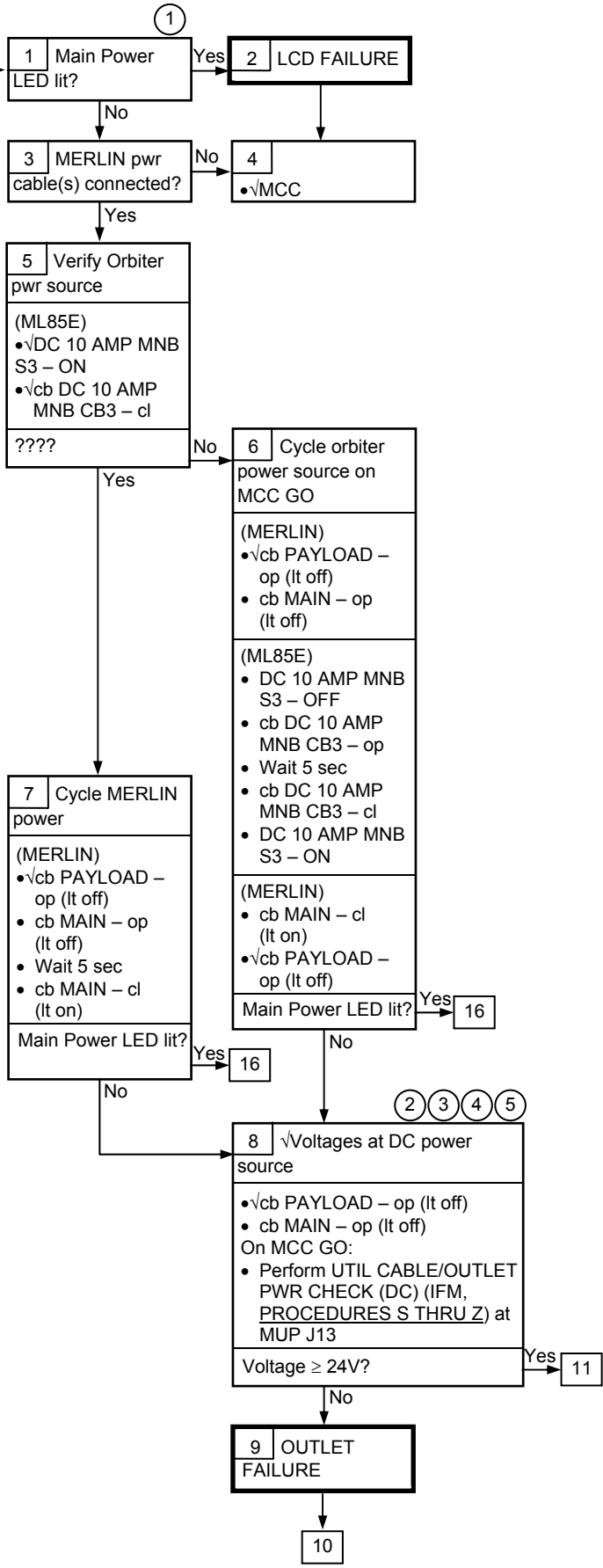
5.1c MERLIN LCD BLANK

LCD Blank

Nominal Config:
 (MF71E)
 cb POWER CB
 MAIN – cl (It on)
 cb POWER CB
 PAYLOAD – op
 (It off)

 (ML86B:E)
 cb MNB MAR 1 – cl

 (ML85E)
 cb DC 10 AMP MNB
 CB3 – cl
 DC 10 AMP MNB
 S3 – ON



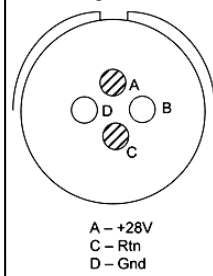
① Fan running indicates MERLIN on STS or EXPRESS power

② Always deadface DC Power source when disconnecting/connecting power cable

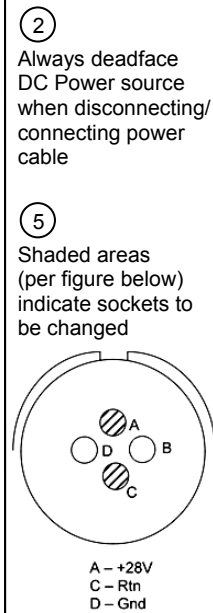
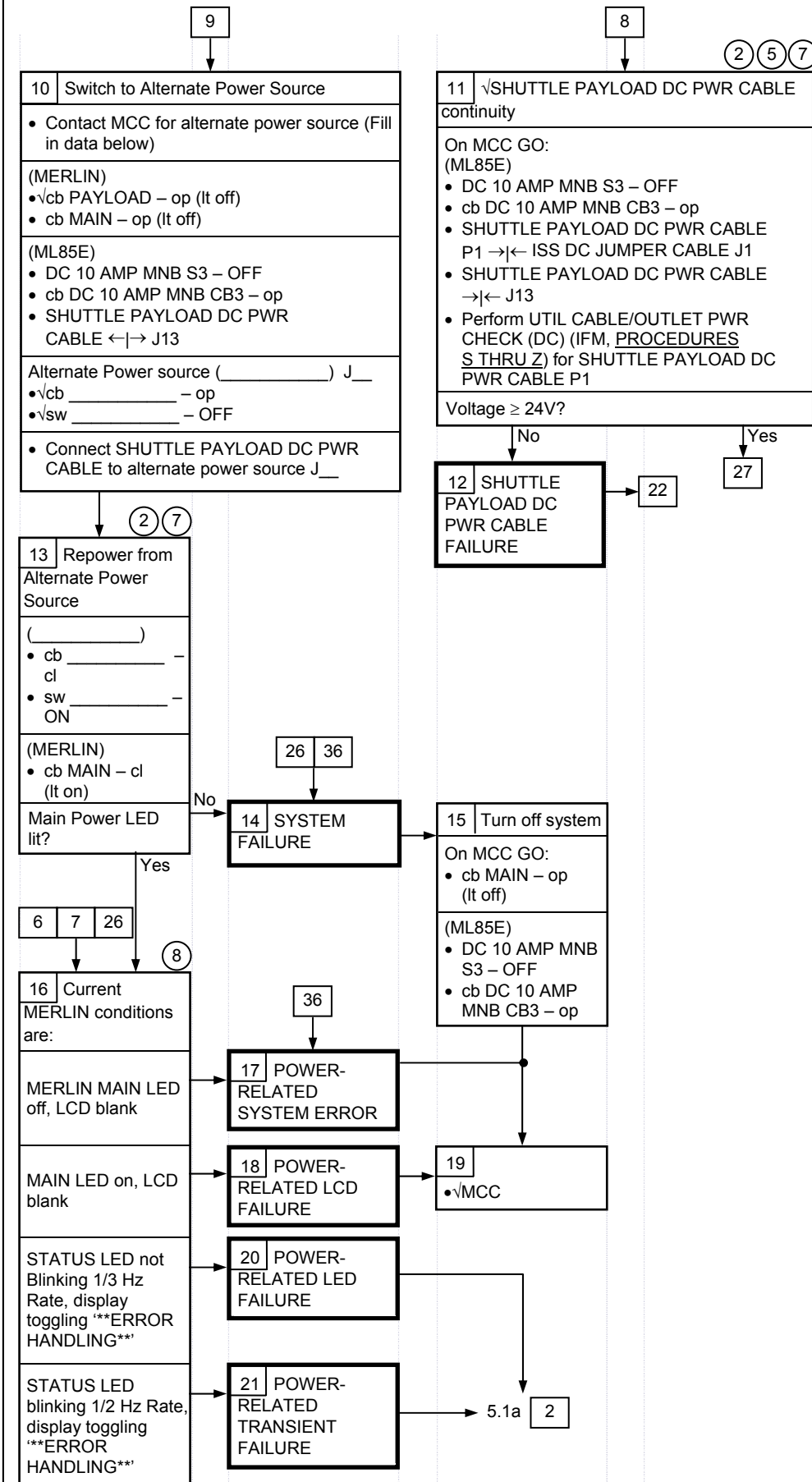
③ Verify connectors are properly mated and seated securely

④ Path from ④ checks outlet, from ⑦ checks cb

⑤ Shaded areas (per figure below) indicate sockets to be changed

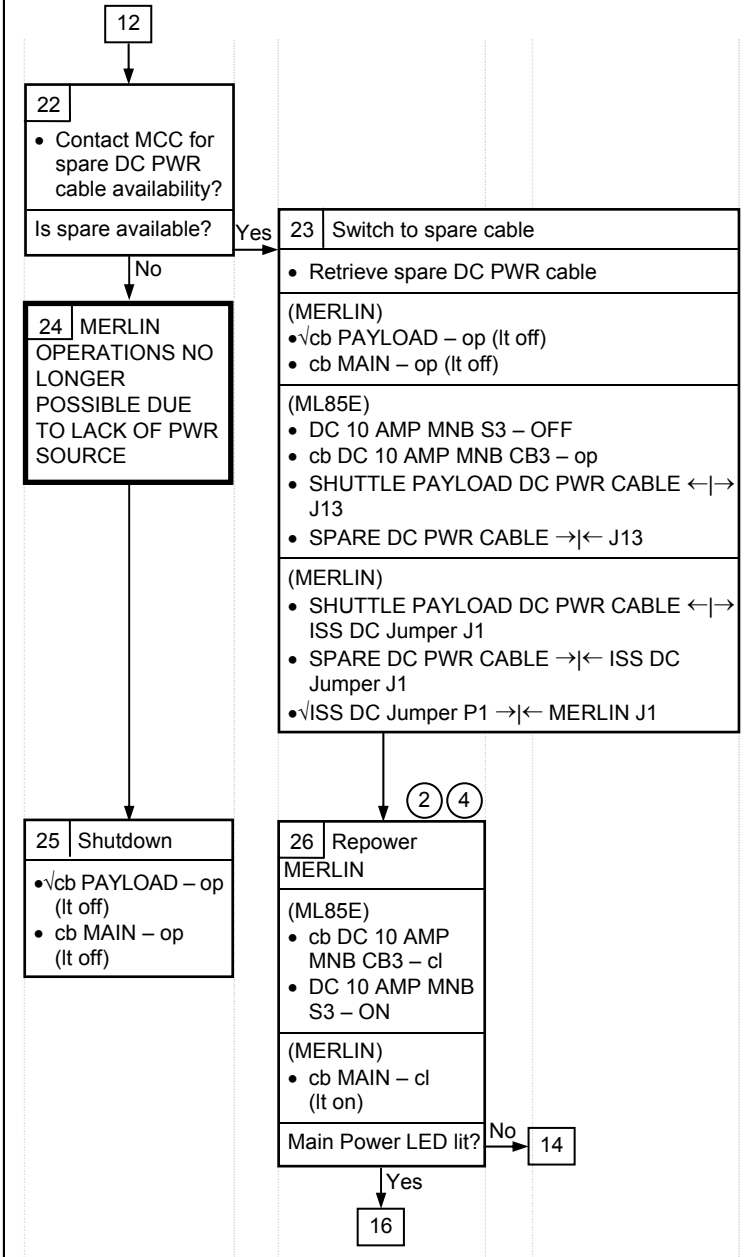


MERLIN 5.1c (Cont)



- 6 Requires a real time TBD Corrective Proc and EGIL call
- 7 Verify connectors are properly mated and seated securely when reconnecting
- 8 Initialization takes approximately 2 min. Initialization is complete when LCD Line 1 reads 'HOME DISPLAY'

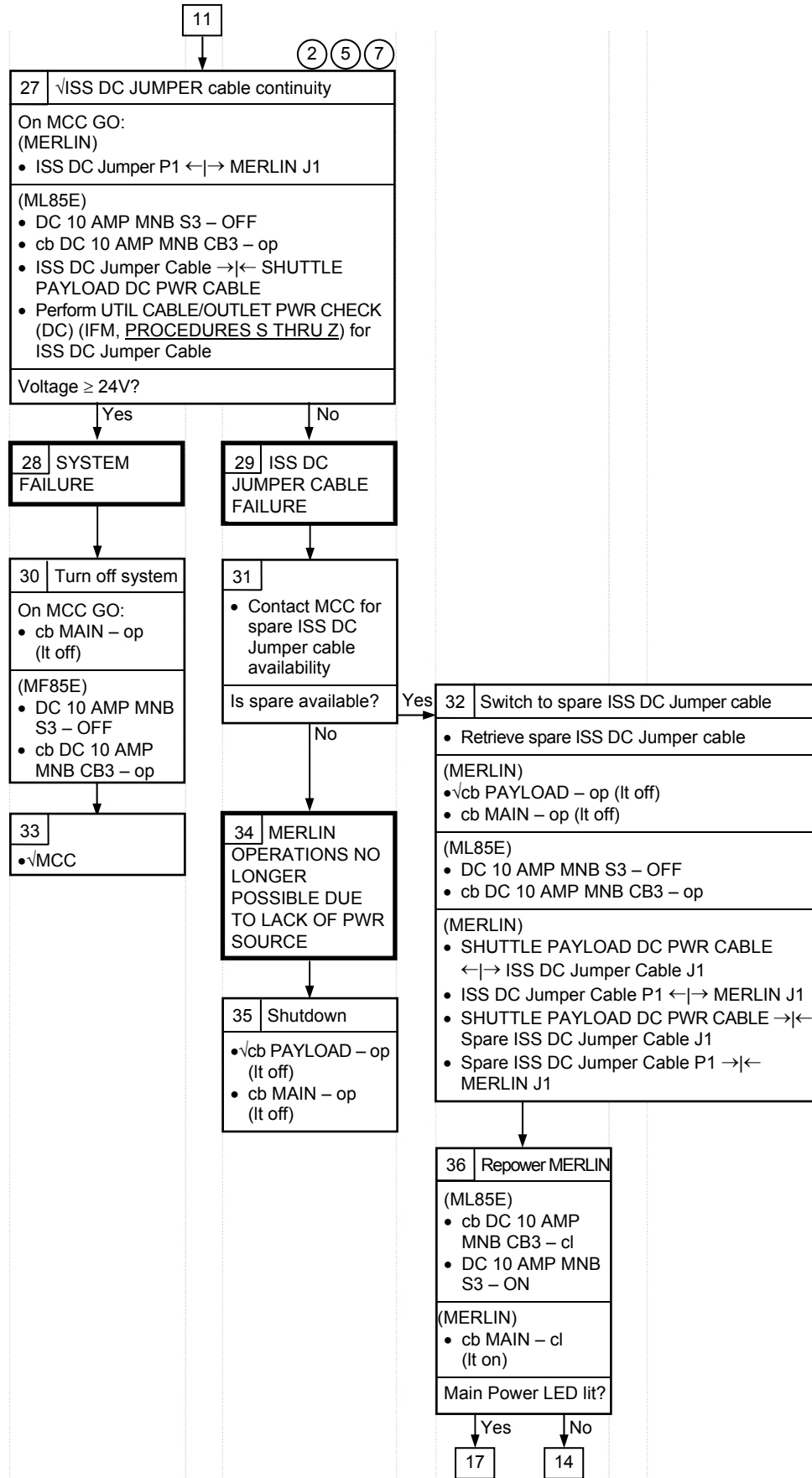
MERLIN 5.1c (Cont)



2
Always deadface DC Power source when disconnecting/connecting power cable

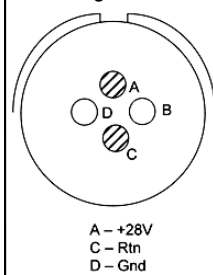
4
Path from **4** checks outlet, from **7** checks cb

MERLIN 5.1c (Cont)



2 Always deadface DC Power source when disconnecting/connecting power cable

5 Shaded areas (per figure below) indicate sockets to be changed



7 Verify connectors are properly mated and seated securely when reconnecting

TABLE 5-IV.- MERLIN ERROR MESSAGE LOG FILE (Cont)

POSSIBLE MERLIN ERROR MESSAGES:

- | | |
|-----------------------|-------------------------|
| (1) RTC I2 ERROR | (17) RWALL OVERTEMP |
| (2) PWM I2 ERROR | (18) IN AIR OVERTEMP |
| (3) DAS I2C ERROR | (19) OUT AIR OVERTEMP |
| (4) U1 I2C ERROR | (20) TEs DISABLED |
| (5) U2 IC2 ERROR | (21) HEATER DISABLED |
| (6) HOT LWALL TOUCH | (22) DISK FULL STOP LOG |
| (7) HOT RWALL TOUCH | (23) DISK FULL STOP DAT |
| (8) COLD LWALL TOUCH | (24) CAUTION TMPFAIL |
| (9) COLD RWALL TOUCH | (25) WARNING TMPFAIL |
| (10) EE BOX OVERTEMP | (26) CAUTION OVERTEMP |
| (11) HX OVERTEMP | (27) WARNING OVERTEMP |
| (12) HX CRIT OVERTEM | (28) ALL PID FAILD |
| (13) HOT EXPT TOUCH | (29) PID CTRL STOP |
| (14) BAD COOLING AIR1 | (30) PID INIT FAILED |
| (15) BAD COOLING AIR2 | (31) PIDT BANDWIDTH |
| (16) LWALL OVERTEMP | |

NOTE: Errors 12, 16, 17, 19, 20, 21 and 28 can not be reset from front panel.
The system must be rebooted to clear error

TABLE 5-IV.- MERLIN ERROR MESSAGE LOG FILE (Cont)

CURRENT TE POWER (0 to 127)	NEW TE POWER (0 to 127)	CURRENT HEATER POWER (0 to 100)	NEW HEATER POWER (0 to 100)

PID Temperature Control Sensors	Left Wall	<input type="checkbox"/>	System Left Wall
	Right Wall	<input type="checkbox"/>	
	Experiment volume air	<input type="checkbox"/>	Experiment Volume Air
	Experiment 1-11		Experiment 1-11
	1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/>		
	7 <input type="checkbox"/> 8 <input type="checkbox"/> 9 <input type="checkbox"/> 10 <input type="checkbox"/> 11 <input type="checkbox"/>		

Temperature Bandwidth	____. ____ °C	00.1 to 25.0 °C
--------------------------	---------------	-----------------

DEORBIT PREP

PAYLOAD DEACT 6-2
REACT 6-3
ENTRY SWITCH LIST/VERIFICATION 6-4

DEORBIT
PREP

PAYLOAD DEACT

I

(SSP1) 1. cb SW PWR 1 – op
L12U PDIP 1 PWR 2 KuBAND RLY – op
PWR 1 – op

(SSP2) 2. cb PDIP 2 PWR 2 – op
L12L PWR 1 – op

(PDIP1) 3. Ku BAND RATE – OFF
L12L DC PWR 1 – OFF
2 – OFF

(PDIP2) 4. DC PWR 1 – OFF
L12L 2 – OFF

DEORBIT
PREP

PAYLOAD REACT

N/A

PAYLOAD ENTRY SWITCH LIST/VERIFICATION

TIG-1:55	PAYLOAD POWER CONFIG
R1	<ul style="list-style-type: none"> √PL CAB – MNA √PRI MNC – ctr (tb-ON) √MNB – ctr (tb-OFF) √FC3 – ctr (tb-OFF) √AUX – ON √AFT MNB – ON √MNC – OFF
MA73C:E	√cb AC3 PL 3φ – op
L1	<ul style="list-style-type: none"> √FLOW PROP VLV LOOP 1,2 (two) – ctr (tb-ICH) √SMOKE DETN B PL It – off
C3	<ul style="list-style-type: none"> √SH FIRE SUPPR MCP – SAFE √MCP – NO-OP √FSCU – SAFE √FSCU – NO-OP √H2O LN HTRS – OFF
(SSP1)	√cb PDIP1 PWR2 KuBAND RLY – op
L12U	<ul style="list-style-type: none"> √TCS PWR – OFF (tb-bp) √cb SW PWR 1 – op √ORB H2O LINE HTR PWR A – OFF (B ENA) √B – OFF (A ENA) √cb SW PWR 2 – op √cb PDIP1 PWR1 – op √OIU PWR – OFF (tb-bp)
(SSP2)	√cb PDIP2 PWR2 – op
L12L	<ul style="list-style-type: none"> √C/L CAM PWR – OFF √FIRE SUPPR FSCU ARM/SAFE – ctr (tb-DN) √DISCH – ctr (tb-DN) √CAB DEPRESS VLV ARM/SAFE – SAFE (tb-bp) √OPEN/CLOSE – CL (tb-bp) √NOT CLOSED (tb-bp) √SMOKE SENSOR RESET/TEST – ctr √A – ENA (tb-gray) √B – ENA (tb-gray) √cb SW PWR 4 – cl √cb PDIP2 PWR1 – op √MN PWR – NO-OP √SS DC BUS – ctr (tb-gray) √ORB SEC DC BUS – ON (tb-gray) √INVERTER – NO-OP (tb-gray) √EXP DC BUS – ctr (tb-gray)

(PDIP1) L12L	<ul style="list-style-type: none"> √KuBAND RATE – OFF √DC PWR 1 – OFF <li style="padding-left: 2em;">√2 – OFF 	
(PDIP2) L12L	<ul style="list-style-type: none"> √DC PWR 1 – OFF <li style="padding-left: 2em;">√2 – OFF 	
(CBTM-1) MF43E	<ul style="list-style-type: none"> √cb PUMP BKR – op <li style="padding-left: 2em;">√MAIN BREAKER – cl <li style="padding-left: 2em;">√FANS A&D, B&C (two) – cl <li style="padding-left: 2em;">√FANS A&D, B&C Its (two) – on √FANS sw – ON (audible fan operation) √WATER REFILL SEL VLV – OFF √LIGHTS sw – AUTO √cb LIGHTS B&C – cl <li style="padding-left: 2em;">√A&D – op √LIGHTS B&C It – on (off during CBTM night cycle) <li style="padding-left: 2em;">√A&D It – off √LED Display – showing elapsed time 	
(CBTM-2) MF57E	<ul style="list-style-type: none"> √cb PUMP BKR – op <li style="padding-left: 2em;">√MAIN BREAKER – cl <li style="padding-left: 2em;">√FANS A&D, B&C (two) – cl <li style="padding-left: 2em;">√FANS A&D, B&C Its (two) – on √FANS sw – ON (audible fan operation) √WATER REFILL SEL VLV – OFF √LIGHTS sw – AUTO √cb LIGHTS B&C – cl <li style="padding-left: 2em;">√A&D – op √LIGHTS B&C It – on (off during CBTM night cycle) <li style="padding-left: 2em;">√A&D It – off √LED Display – showing elapsed time 	
(CBTM-3) MF43K	<ul style="list-style-type: none"> √cb PUMP BKR – op <li style="padding-left: 2em;">√MAIN BREAKER – cl <li style="padding-left: 2em;">√FANS A&D, B&C (two) – cl <li style="padding-left: 2em;">√FANS A&D, B&C Its (two) – on √FANS sw – ON (audible fan operation) √WATER REFILL SEL VLV – OFF √LIGHTS sw – AUTO √cb LIGHTS B&C – cl <li style="padding-left: 2em;">√A&D – op √LIGHTS B&C It – on (off during CBTM night cycle) <li style="padding-left: 2em;">√A&D It – off √LED Display – showing elapsed time 	
(CCM-A) MF71H	<ul style="list-style-type: none"> √Switch – ON √POW It – ON √Fuse It – OFF 	
(MERLIN) MF71E	<ul style="list-style-type: none"> √STATUS It – OFF √POWER CB MAIN cb – op (It OFF) √POWER CB PAYLOAD cb – op (It OFF) 	

This Page Intentionally Blank

PAYLOAD EVA CONFIG

POST EVA PL CONFIG..... 7-2
PRE EVA PL CONFIG 7-2

PL EVA
CONFIG

POST EVA PL CONFIG

SPACEHAB RECONFIG

If SPACEHAB will be reentered:

Go to SPACEHAB RECONFIG POST DOCKING (SH OPS, DOCKING) >>

If otherwise, no actions are reqd

SPACEHAB configured for entry

PRE EVA PL CONFIG

SPACEHAB PREP

If SPACEHAB to remain isolated for remainder of mission:

Go to ENTRY PREP (SH OPS) >>

If SPACEHAB will be reentered:

Go to SPACEHAB PREP FOR DOCKING (SH OPS, DOCKING)

PL EVA
CONFIG

PL COMM MALS

MALS

8.1a S62 PDI DECOM FAIL.....	8-2
8.1b S212 OIU AD 1 NOLK/LOSS OF ISS OR SSOR TELEMETRY	8-9

PL COMM MALS

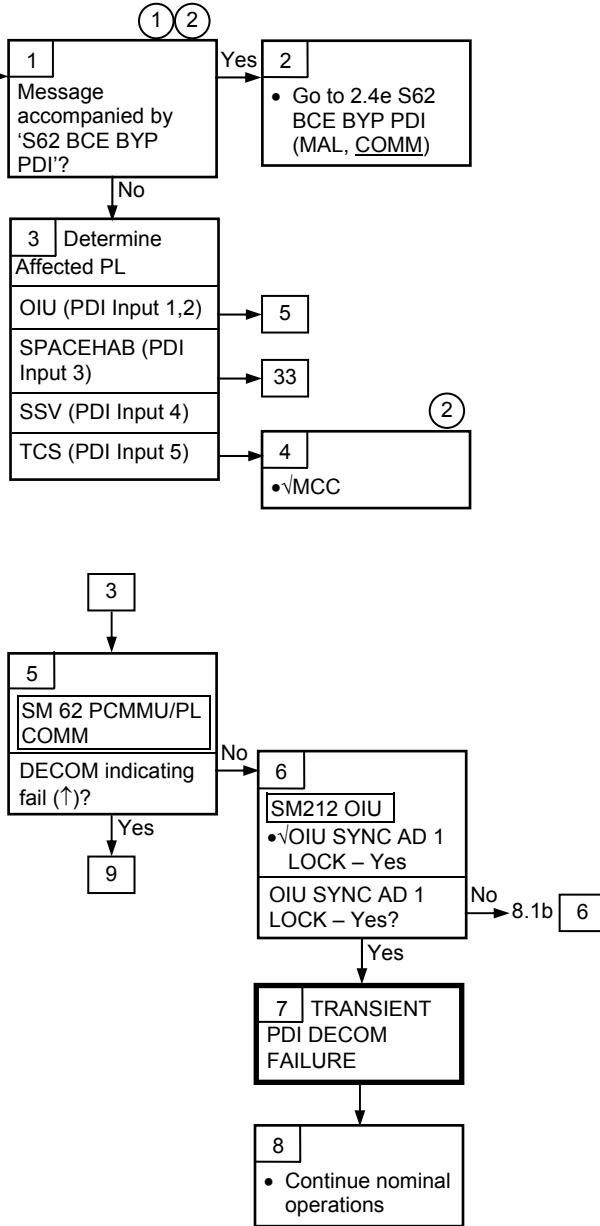
PL COMM

8.1a S62 PDI DECOM FAIL

SM ALERT

'S62 PDI DECOM FAIL'

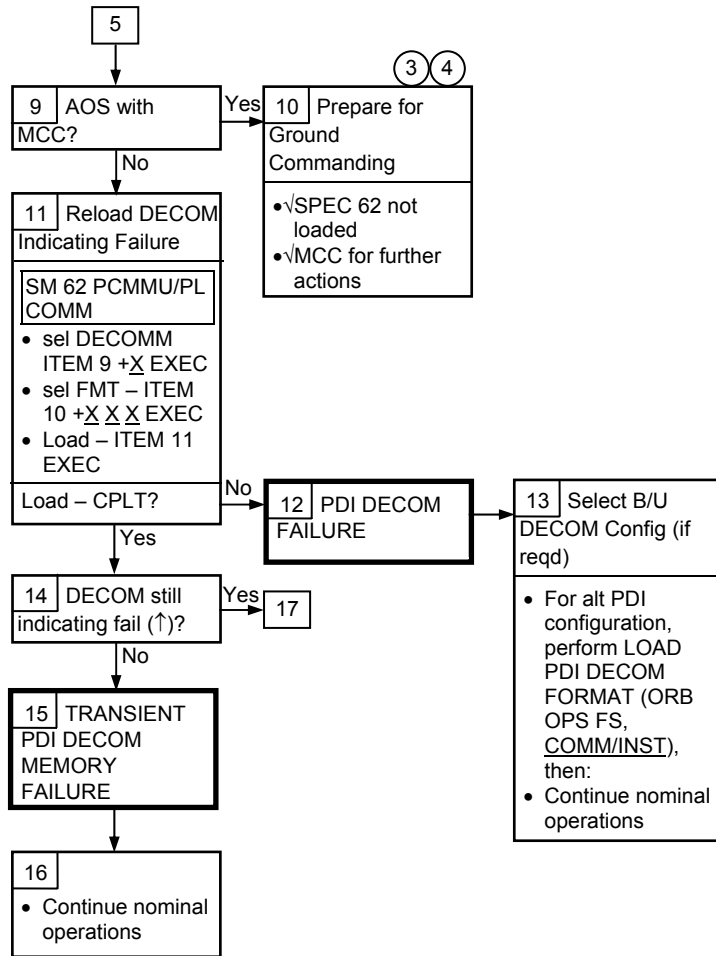
Nominal Config:
 (A1L)
 PL DATA INTLVR
 PWR – ON
 (R1)
 PL PRI MNC – ON
 PL AUX – ON
 PL AFT MNB – ON
 PL CAB –
 MNB(MNA)
 (SSP1)
 OIU PWR – OIU 1(2)



① All displays in this procedure are on the PCS

② TCS and SSV not addressed in MAL; FDA not nominally enabled

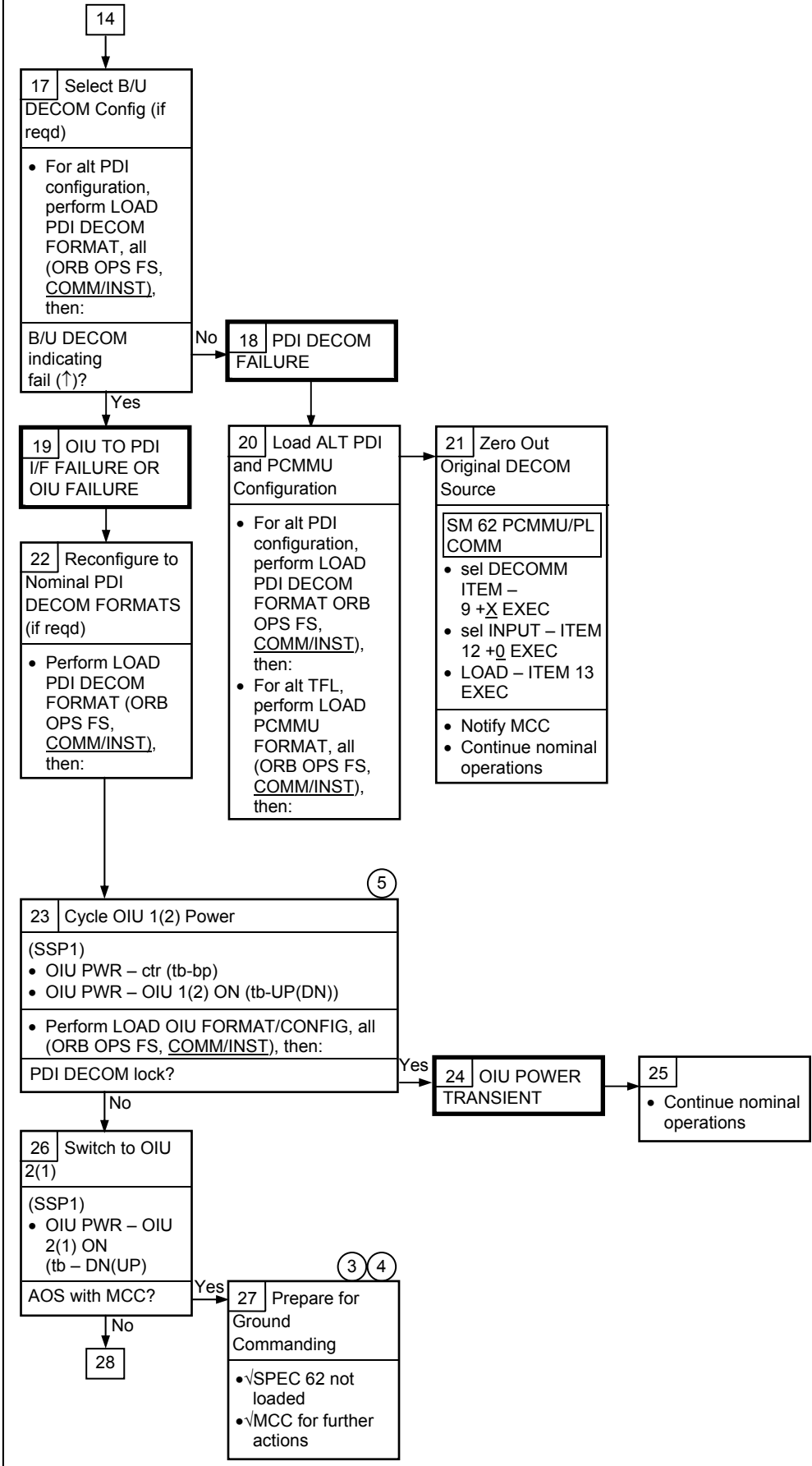
PL COMM 8.1a (Cont)



③
For ground commanding of PL COMM system, SPEC 62 must not be loaded

④
MCC can perform all PL COMM reconfig except OIU PWR cycle and swap steps

PL COMM 8.1a (Cont)

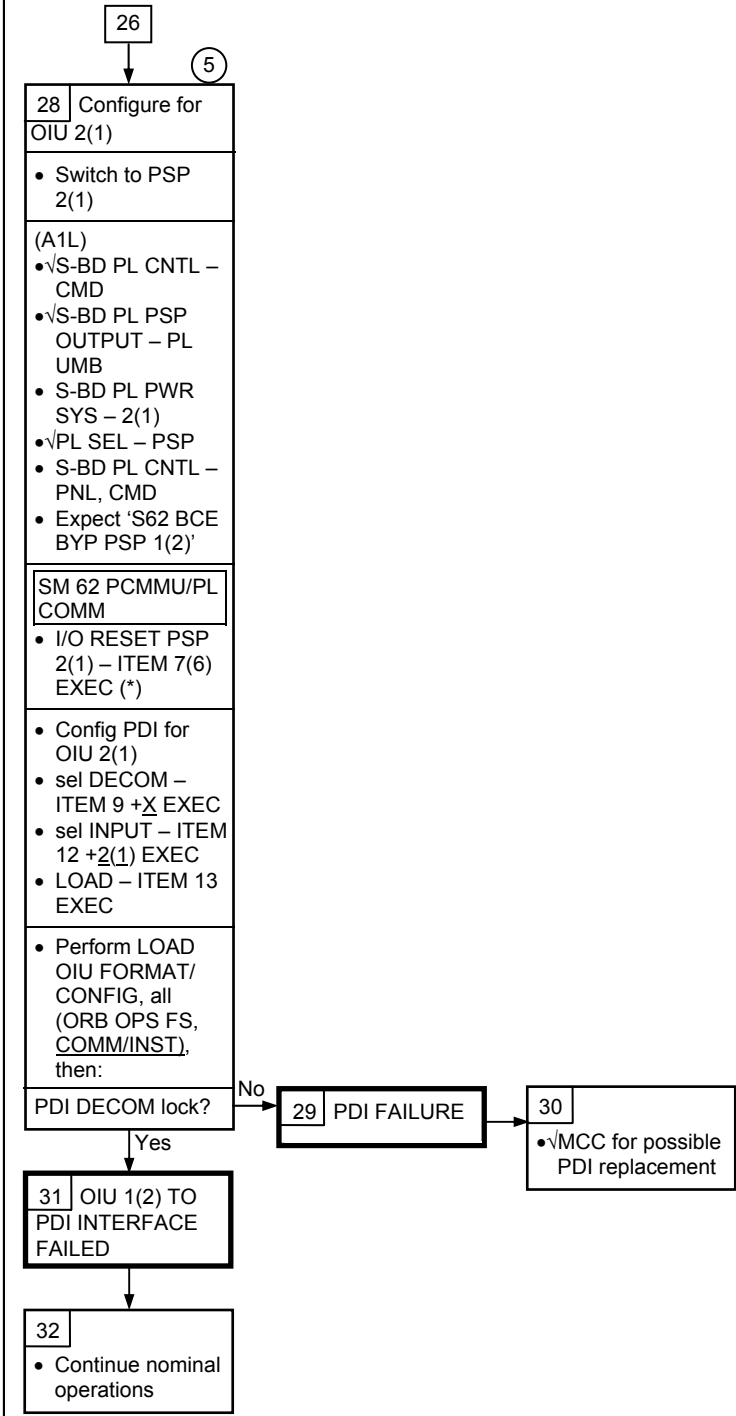


③ For ground commanding of PL COMM system, SPEC 62 must not be loaded

④ MCC can perform all PL COMM reconfig except OIU PWR cycle and swap steps

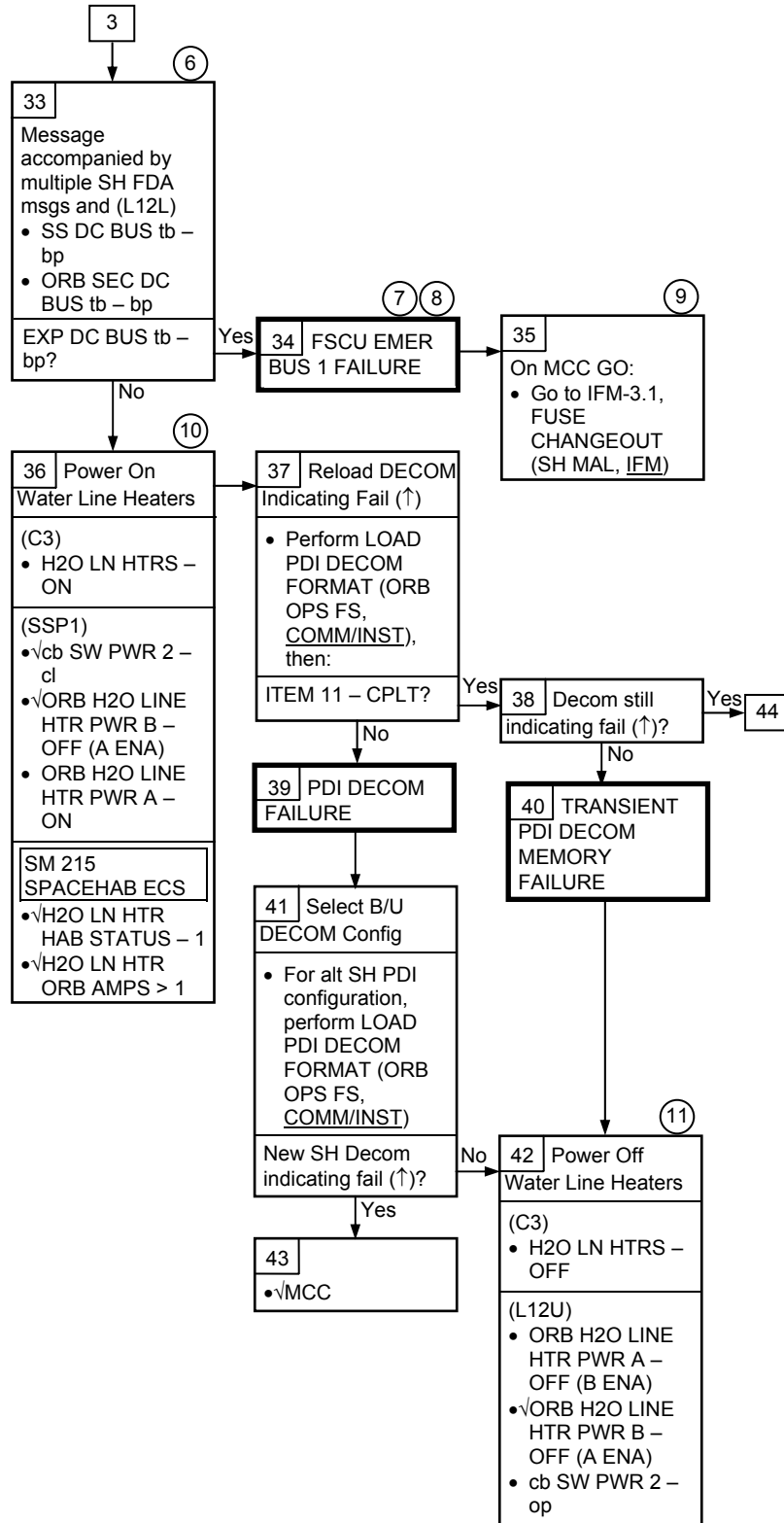
⑤ Default condition on powerup is GNC 1 Bus 3 RT

PL COMM 8.1a (Cont)



⑤
Default condition on powerup is GNC 1 Bus 3 RT

PL COMM 8.1a (Cont)



⑥
If listed tbs are bp, then an emergency bus problem has affected the DMU. Possible FDA messages include '214 SH EXP BUS V' '214 SH WFCEU V' '214 SH EMG BUS V'

⑦
H2O LN HTR cmd from C3 lost due to this failure. H2O Pump 2 remains operational. Monitor ORB AC Bus currents for pump health status

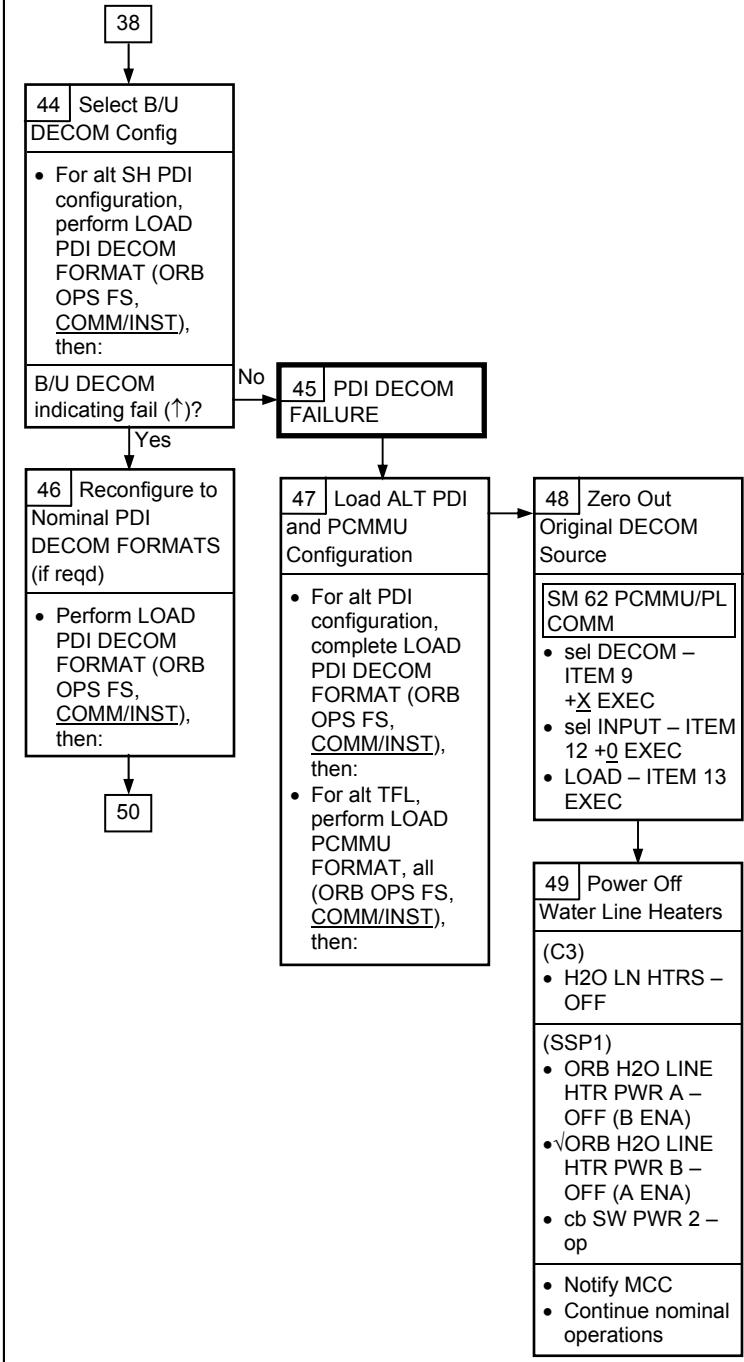
⑧
Refer to BUS/CRITICAL EQUIPMENT LOSS (SH MAL, CRITICAL EQUIPMENT LOSS) for system impacts

⑨
FDF SH MAL IFM-3.1 can be performed to check for fuse continuity

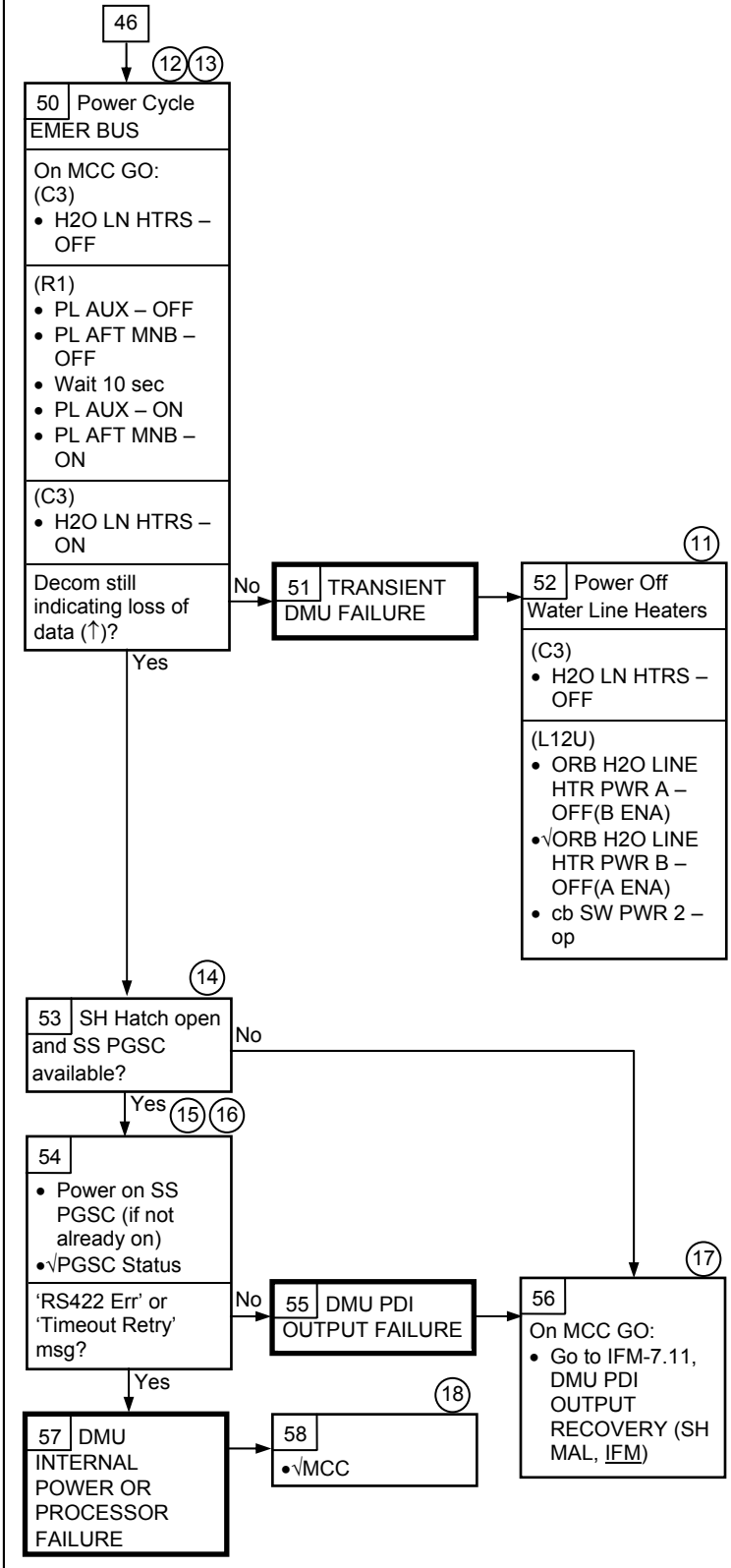
⑩
Water line heaters on as precaution since loop status not directly available with loss of PDI data. H2O Pump 2 remains operational

⑪
Expect FDA messages '215 SH H2O HTR HAB' and '215 SH H2O HTR ORB'

PL COMM 8.1a (Cont)



PL COMM 8.1a (Cont)



- (11) Expect FDA messages '215 SH H2O HTR HAB' and '215 SH H2O HTR ORB'
- (12) Stop DTV VTR recording before power cycle. SH H2O Ln Htrs powered off while cycling Aft MNB. Expect '215 SH H2O HTR HAB' message
- (13) The following occur during emergency bus power cycle Master Alarm from CWEA ch 55, 65, 85, 95, FDA message '214 SH PPO2 2', loss of emergency It
- (14) If SH hatch open, subsys PGSC can provide additional insight into DMU health
- (15) Subsys PGSC not reqd to be powered on at all times. For power on steps, refer to SUBSYSTEM PGSC ACTIVATION (SH OPS, ON-ORBIT)
- (16) If PGSC has indicated msgs, then the problem is in the DMU. If PGSC shows no msgs, SH data is being received from the DMU and problem lies in DMU to PDI interface
- (17) IFM-7.11 can be performed to recover PDI output by using the PLR (SSR) DMU output feed
- (18) MCC will investigate further troubleshooting options. If PGSC was not verified as having good DMU data earlier in the mission, then the DMU to PGSC cables could be suspect and IFM 7-11 might be an option

PL COMM

SM ALERT

S212 OIU AD1 NOLK

Loss of Data On SPEC 205 During Undocking

MCC Reports Loss of ISS Data To Ground Via OIU

Nominal Config:

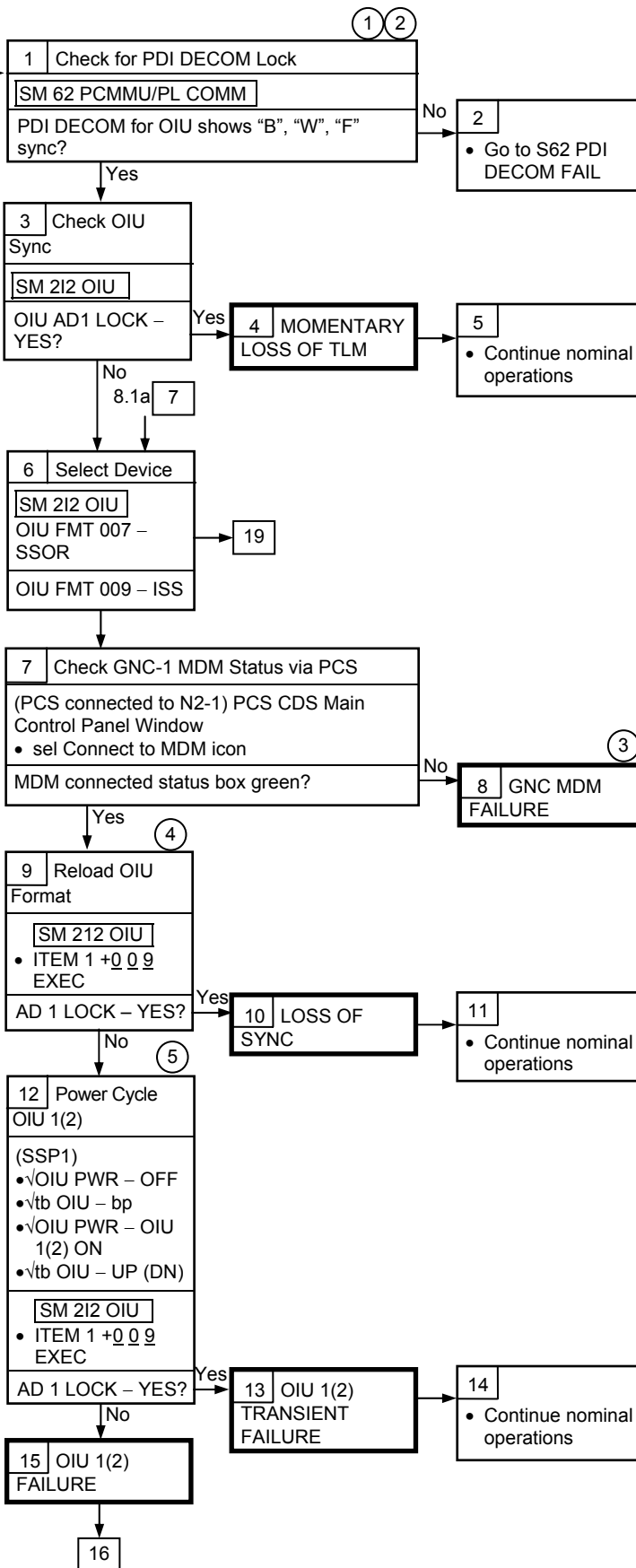
(R1)
 PL CAB – MNB(MNA)
 PL AUX – ON (SSP1)
 OIU PWR – OIU 1(2) ON
 tb OIU – UP(DN)

For ISS
 One PCS connected to GNC-1 MDM

SM 212 OIU
 OIU FMT: 009

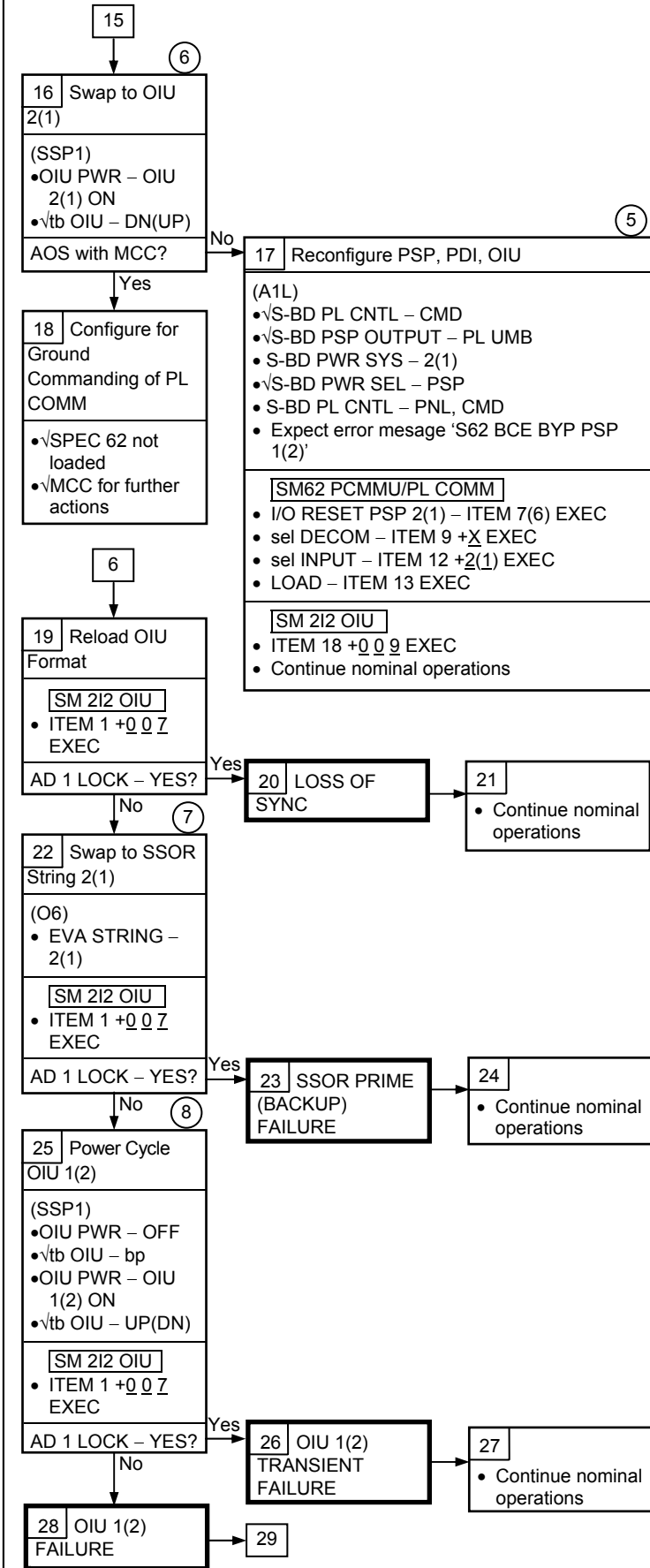
For SSOR (R14)
 cb MNA UHF EVA – cl
 cb MNC UHF EVA – cl (O6)
 EVA STRING: 1(2) UHF MODE – EVA
 SM 212 OIU
 OIU FMT – 007

8.1b S212 OIU AD 1 NOLK/LOSS OF ISS OR SSOR TELEMETRY



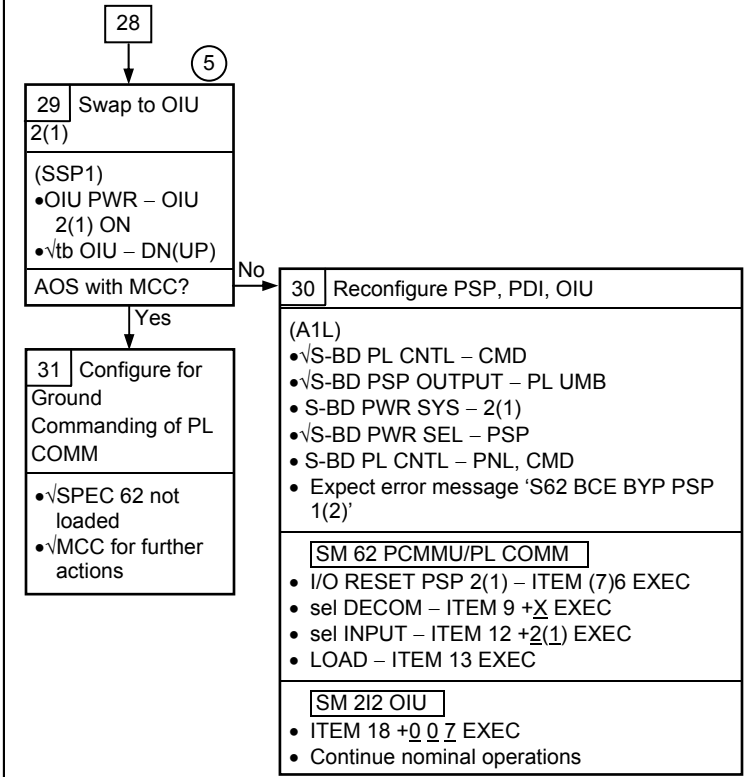
- ① All displays in this procedure are on the PCS
- ② OIU to PDI problems would annunciate a 'S62 PDI DECOM FAIL' message if FDA enabled
- ③ MCC will likely direct STS or ISS crew to perform 3.602 LOSS OF PCS TELEMETRY (POST CCS) (SODF: JNT OPS: MALFUNCTION)
- ④ Reloading the OIU format forces a resync with the GNC MDM or SSOR
- ⑤ Default condition on powerup is GNC 1 on Bus 3 RT

PL COMM 8.1b (Cont)



- ⑤ Default condition on power up is GNC 1 on Bus 3 RT
- ⑥ Malfunction restores operational capability; additional troubleshooting to determine BIA failure may be performed later
- ⑦ Reloading the OIU format forces a resync with the SSOR
- ⑧ OIU active device mapping occurs with format load

PL COMM 8.1b (Cont)



⑤
Default condition on power up is GNC 1 on Bus 3 RT

This Page Intentionally Blank

PL/DPS RECONFIGURATION

PL/DPS RECONFIGURATION 9-2

PL/DPS
RECONFIG

PL/DPS RECONFIGURATION

Procedure	Secure Action	Recovery Action	Information Only
PL 1(2) MDM I/O ERROR; PL 1(2) MDM OUTPUT (ORB PKT, <u>DPS</u>)	N/A	N/A	D
5.3c I/O ERROR PL 1(2); MDM OUTPUT PL 1(2) (MAL, <u>DPS</u>)	N/A*	N/A	D
PASS SM GPC FAIL (ORB PKT, <u>DPS</u>)	N/A	B	E
GNC RECOVERY VIA G2FD (ORB PKT, <u>DPS</u>)	N/A	A,B	E
5.1a CS SPLIT (MAL, <u>DPS</u>)	N/A	A,B,C**	E
5.3e I/O ERROR FLEX (MAL, <u>DPS</u>)	N/A	N/A	N/A
5.3f BCE BYP FLEX (MAL, <u>DPS</u>)	N/A	N/A	N/A
5.3g BCE BYP PL 1(2) (MAL, <u>DPS</u>)	N/A*	N/A**	D
GPC FRP-4 PASS RECOVERY AFTER BFS ENGAGE (ASCENT/ORBIT/ENTRY) (MAL, <u>DPS</u>)	N/A*	A,B**	E
GPC FRP-7 DPS RECONFIG FOR LOSS OF AV BAY COOLING (ASCENT/ORBIT) (MAL, <u>DPS</u>)	N/A	A,B,C**	E
DPS SSR-3 GNC REASSIGNMENT (MAL, <u>DPS</u>)	N/A*	N/A	E
DPS SSR-4 SM REASSIGNMENT (MAL, <u>DPS</u>)	N/A	A,B	E
ECLS SSR-10 H2O PUMP OPS VIA GPC (MAL, <u>ECLS</u>)	N/A	A,B,C**	E

*Procedure does not call out PL/DPS RECONFIG, Secure

**Procedure does not call out PL/DPS RECONFIG, Recovery

ACTION A

If PSP I/O reset not previously performed:

SM 62 PCMMU/PL COMM

I/O RESET PSP 1(2) – ITEM 6(7) EXEC

Notify MCC when complete

ACTION B

Reload LOAD PDI DECOM FORMAT (ORB OPS FS, COMM/INST)

Reenable PDI DECOM FDA as reqd

SM 62 PCMMU/PL COMM

ACTION C

Reload PCMMU TFLs, LOAD PCMMU FORMAT (ORB OPS FS, COMM/INST)

PL/DPS
RECONFIG

INFO D

If 'I/O ERROR PL1' message:

Loss of ground and orbiter MCDS command interface to ISS via PSP 1/OIU 1

Loss of command capability (onboard and ground) and telemetry via PL comm string 1 for SPACEHAB

Loss of command capability and telemetry via PL1 for STP-H2

Loss of PL1 telemetry on SPECS 201, 206, 214, 215 denoted by 'M'

Failed IOM can be determined using chart from PF MDM CHANNELIZATION (SH MAL, CRITICAL EQUIP LOSS)

For additional impacts, refer to ORBITER MDM LOSS IMPACTS, all (SODF: ASSY OPS: MALFUNCTION: CRITICAL EQUIPMENT LOST)

If failure at IOP XMTR/RCVR at SM GPC:

Port mode to select PF2 (this will cause loss of PF2/SM GPC interface)

If 'I/O ERROR PL2' message:

Loss of ground and orbiter MCDS command interface to ISS via PSP 2/OIU 2

Loss of command capability (onboard and ground) and telemetry via PL comm string 2 for SPACEHAB

Note associated loss of H2O LN HTR HAB STATUS and ORB AMPS on SPEC 215 denoted by 'M'

Loss of SPACEHAB FSS DISCHARGE (FSCU) onboard and ground discrete command via PL2

If failure at IOP XMTR/RCVR at SM GPC:

If PL1 interface with SM GPC failed:

Notify MCC for SM GPC reassignment

If PL1 interface with SM GPC is okay:

ORT mode to select PF1 (this will cause loss of PF1/SM GPC interface)

For additional impacts, refer to ORBITER MDM LOSS IMPACTS (SODF: ASSY OPS: MALFUNCTION: CRITICAL EQUIPMENT LOSS)

INFO E

If affected GPC is SM

Loss of command capability (onboard and ground) via SM GPC until SM GPC restored and/or PL 1(2) I/F restored

If affected GPC is GNC

Loss of ground command capability until GNC GPC restored

This Page Intentionally Blank

CRITICAL EQUIPMENT LOSS

ORBITER ELECTRICAL BUS LOSS MATRIX 10-3
PRLA 10-5
PAYLOAD RETENTION USAGE 10-5
ORBITER MDM LOSS IMPACTS 10-7

This Page Intentionally Blank

ORBITER ELECTRICAL BUS LOSS MATRIX

ORBITER ELECTRICAL BUSES →					MNA DA1							MNB DA2							FC 3	MNC DA3				CNTL CA1			
	ESS 1BC	ESS 2CA	ESS 3AB	CNTL AB2	R15	O14	A6&A14	MPC1	P	(R)	MPC2	A6&A14	APC5	FPC2	O15	R15	MAR1*	MAR2*	(R)	(R)	P	O16	R15		APC6	FPC3	
	O13&R14	O13&R14						AUX PLA			AUX PLB		APC2	AC2					PRI PL						APC3	AC3	
													AFT PLB	φA											AFT PLC	φA, φB φC (MA73C)	
ORBITER EQUIPMENT AND CARGO																											
PTU 1	XRC														XRC												
APCU (ESP3)				XC			P																				
PTU 2		XRC																				XRC					
APCU (LCS)											P															XC	
OIU 1										X, XC																	
OIU 2											X, XC																
TCS			XC																								
Pri C/L Camera										X																	
Sec C/L Camera									X																		
PDIP #1										X																	
PDIP #2										X																	
Video Processing Unit															X												
Payload Timing Buffer											X																
OPP											X																
SSOR					R																	R					
DTV														X													
DTV MUX & VTR								X																			
RSC											X																
RSC ILLUMINATOR						XC		X																			
ISS EQUIPMENT																											
PMA 2/3 Hooks – SYS A																											
PMA 2/3 Hooks – SYS B							X							X													
PAYLOAD BUS CNTL PWR																											
CABIN PL MNA	XC																										
CABIN PL MNB		XC																									
AUX PLA	XC																										
AUX PLB		XC																									
PL PRI MNB		XRC																				XRC					
PL PRI MNC			XRC			XRC																					
PL PRI FC3			XRC			XRC																					
AFT PLB		XRC																					XRC				
AFT PLC			XRC			XRC																					
SPACEHAB SUBSYSTEMS																											
MAIN BUS																											

X = Total loss of operational power
P = Loss of primary power source
R = Loss of redundant power source
(R) = Requires action to use redundant source
XC = Total loss of CNTL power
XRC = Loss of redundant CNTL power

* – CNTL bus name identifies power source (ex: CNTL BC1 is powered by MNB & MNC through RPCs and by MNA through cb and fuse)

ORBITER ELECTRICAL BUS LOSS MATRIX

ORBITER ELECTRICAL BUSES →					MNA DA1					MNB DA2									FC 3	MNC DA3				CNTL CA1														
	ESS 1BC		ESS 2CA		ESS 3AB	CNTL AB2	R15	O14	A6&A14	MPC1		P	(R)	MPC2		A6&A14	APC5	FPC2	O15	R15	MAR1*	MAR2*	(R)		(R)	P	O16	R15	APC6	FPC3								
	O13&R14		O13&R14							AUX PLA	CABIN PL			AUX PLB	APC2		AC2	AFT PLB											φA	APC3	AC3							
								PL1 PL2 PL3							PRI PL		AFT PLC φA,φB φC (MA73C)																					
SEC FEED TO MAIN BUS												XC																		X								
FSCU EMER 1 BUS										R							R																					
MCP EMER 2 BUS										R							R																					
SS DC BUS																																			X			
EXP DC BUS										XRC							XRC																		X			
INVERTER AC										XRC							XRC																		X			
ARS FAN																																		(R)			P	
CABIN FAN																																		(R)			P	
WATER PUMP 1																																			X			
WATER PUMP 2																																			(R)			P
DMU										R							R																					
BPSMU (SH audio via PLT ATU)											X																											
WFCEU										XRC							XRC																				X	
MCP (LIGHTS ONLY)										XRC							XRC																				X	
CABIN DEPRESS VALVE										R		XC					R																					
CABIN DEPRESS VALVE ARM/SAFE										R							R																					
PPRV OPEN/CLOSE										R							R																					
SMOKE SENSOR A ENABLE										R		XC					R																					
SMOKE SENSOR B ENABLE										XRC,R							XRC, R																					
SMOKE SENSOR TEST/RESET (SSP)													X																									
SMOKE SENSOR TEST/RESET (MCP)										R							R																					
MAIN POWER KILL CIRCUITRY										XRC,R							XRC, R																					
FSS DISCHARGE (FSCU & MCP)										XRC,R							XRC, R																					
FSS ARM/SAFE (FSCU & MCP)										XRC,R							XRC, R																					
SH H2O LN HTRS										XRC							XRC, X																					
ORBITER H2O LN HTRS													X, XC																									
ORBITER H2O LN HTRS CURRENT SENSOR													X																									
MERLIN																																						X
CBTM																																					X	
CCM-A																																					X	

X = Total loss of operational power
P = Loss of primary power source
R = Loss of redundant power source
(R) = Requires action to use redundant source
XC = Total loss of CNTL power
XRC = Loss of redundant CNTL power

* – CNTL bus name identifies power source (ex: CNTL BC1 is powered by MNB & MNC through RPCs and by MNA through cb and fuse)

ORBITER ELECTRICAL BUS LOSS MATRIX PRLA

ORBITER ELECTRICAL BUSES →	MNA DA1		CNTL BUS*					MNB DA2		
	FPC1	PNL A6&A14	AB1	AB2	BC1	BC2	CA1	CA2	FPC2	PNL A6&A14
	AC1								AC2	
PRLA-PAYLOAD RETENTION LATCHES										
PRLA PL 1, 2, & 3 – Latch 1/Sys A, 2/A, 3/A, 4/A, 5/A DC Logic Pwr		X								
PRLA PL 1, 2, & 3 – Latch 1/Sys A, 2/A, 3/A, 4/A, 5/A Cntl Bus			XC							
PRLA PL 1, 2, & 3 – Latch 1/Sys A, 2/A, 3/A, 4/A, 5/A AC Mech Pwr	X									
PRLA PL 1, 2, & 3 – Latch 1/Sys B, 2/B, 3/B, 4/B, 5/B DC Logic Pwr										X
PRLA PL 1, 2, & 3 – Latch 1/Sys B, 2/B, 3/B, 4/B, 5/B Cntl Bus					XC					
PRLA PL 1, 2, & 3 – Latch 1/Sys B, 2/B, 3/B, 4/B, 5/B AC Mech Pwr								X		
Logic Pwr Sys 1		X								
Logic Pwr Sys 2										X
PL Bay Mech Pwr Sys 1	X		XRC	XRC			XRC	XRC		
PL Bay Mech Pwr Sys 2					XC	XC			X	

X = Total loss of operational power

P = Loss of primary power source

R = Loss of redundant power source

(R) = Requires action to use redundant source

XC = Total loss of CNTL power

XRC = Loss of redundant CNTL power

* – CNTL bus name identifies power source (ex: CNTL BC1 is powered by MNB & MNC through RPCs and by MNA through cb and fuse)

PAYLOAD RETENTION USAGE

Payload	Latch	PL SEL	Latch Use	Latch Location
S5 Truss	1	1	Latch/Release	Fwd, Port
	2	1	Latch/Release	Fwd, Stbd
	3	1	Latch/Release	Aft, Port
	4	1	Latch/Release	Aft, Stbd
	5	1	Latch/Release	Keel
ESP3	1	3	Latch/Release	Fwd, Port
	2	3	Latch/Release	Fwd, Stbd
	3	3	Latch/Release	Aft, Port
	4	3	Latch/Release	Aft, Stbd

ORBITER MDM LOSS IMPACTS

FF1	Uplink through NSP 1 (secondary)
FF3	Uplink through NSP 2 (primary)
PF1	ISS Primary command path (via PSP 1 - UMB 1/OIU 1) OIU 1 telemetry (PDI Telemetry 1) Ku-Band command and telemetry SPACEHAB command path via PSP 1 SPACEHAB C/W Annunciation (B/U C/W Alarm) SPACEHAB Discrete Commands ARS Fan On ARS Fan Off Cabin Fan On Cabin Fan Off FSS Arm (FCSU) FSS Safe (FSCU) Water Pump 2 On/Water Pump 1 Off Water Pump 1 On/Water Pump 2 Off Water Pump 2 to Inverter Water Pump 2 to Orbiter SPACEHAB Discrete Monitors Water Pump 1 Off/On Water Pump 2 Off/On FSS Discharged Multibottle Halon Discharge Smoke Sensor A Alarm Smoke Sensor B Alarm FSS Arm/Safe (MCP) FSS Arm/Safe (FSCU) SPACEHAB Analog Monitors PPCO2 #2 PPO2 #2 Orbiter Waterline Heater Current

ORBITER MDM LOSS IMPACTS (Cont)

PF2	ISS Redundant command path (via PSP 2 - UMB 1/OIU 2) OIU 2 telemetry (PDI Telemetry 2) CCTV command path from MCC (crew still has control from PNL A7) SPACEHAB redundant command path via PSP 2 SPACEHAB Discrete Command FSS Discharge (FSCU) SPACEHAB Analog Monitor Waterline Heater Status C/W Annunciation (PL Caution, B/U C/W Alarm)
OF1	PCMMU 1 – mode select telemetry PCMMU 1,2 – ON/OFF power telemetry PCMMU 1,2 – RPC A telemetry PL AUX A – RPC ON/OFF telemetry MID MCA 1 OP STATUS 1, 2, 3, 4 telemetry MID MCA 3 OP STATUS 1, 2, 3, 4 telemetry PL BAY MECH PWR SYS 1, 2 telemetry PL RETEN LOGIC PWR SYS 1, 2 telemetry PRLA PL SEL 3 Latch/System 1B, 2B, 3B, 4B R-F-L, LAT, REL telemetry
OF2	PSP 1,2 – bit and frame sync PCMMU 2 – mode select telemetry PCMMU 2 RPC B telemetry PL AUX B – RPC ON/OFF telemetry MID MCA 1 OP STATUS 5, 6 telemetry MID MCA 3 OP STATUS 5, 6, 7, 8 telemetry PRLA PL SEL 1 Latch/System 1B, 2B, 3B, 4B, 5B R-F-L, LAT, REL telemetry PRLA PL SEL 3 Latch/System 1A, 2A, 3A, 4A R-F-L, LAT, REL telemetry PRLA PL SEL 1,3 System A, REL and LAT command state telemetry
OF3	Orbiter comm system telemetry (refer to OI MDM/DSC Failure Impacts) PL PRI MNC, MNB, FC3 – ON/OFF telemetry PCMMU 1 RPC B telemetry
OF4	Ku-Band – RADAR mode and output power S-Band, Ku-Band – PNL/CMD switch position PSP, GCIL – ON/OFF telemetry Orbiter comm system telemetry (refer to OI MDM/DSC Failure Impacts) CAB PL (MNA, MNB), PL AUX – ON/OFF telemetry
OA1	ODS X4/PMA X3 connector mate telemetry PMA 2/3 GRP 1 passive hooks (1,3,5,7,9,11) Close telemetry
DSC OA1	ODS X4/PMA X3 connector mate telemetry PMA 2/3 GRP 1 passive hooks (1,3,5,7,9,11) Close telemetry

ORBITER MDM LOSS IMPACTS (Cont)

OA2 AFT PL MNB PWR ON telemetry
 AFT PL MNB amps
 ODS X3/PMA X4 connector mate telemetry
 PMA 2/3 GRP 2 passive hooks (2,4,6,8,10,12) Close telemetry

DSC OA2 ODS X3/PMA X4 connector mate telemetry
 PMA 2/3 GRP 2 passive hooks (2,4,6,8,10,12) Close telemetry

OA3 AFT PL MNC PWR ON telemetry
 AFT PL MNC amps
 PRLA PL SEL 1
 Latch/System 1A, 2A, 3A, 4A, 5A
 R-F-L, LAT, REL telemetry

REFERENCE DATA

C3 PAYLOAD SAFING	11-2
SSP 1	11-3
1 FUNCTIONS	11-4
SSP 2	11-5
2 FUNCTIONS	11-6

TABLES

TABLE 11-I.- SPACEHAB FIRE SUPPRESSOR AND H2O LINE HEATERS PANEL ...	11-2
--	------

REFERENCE

C3 PAYLOAD SAFING

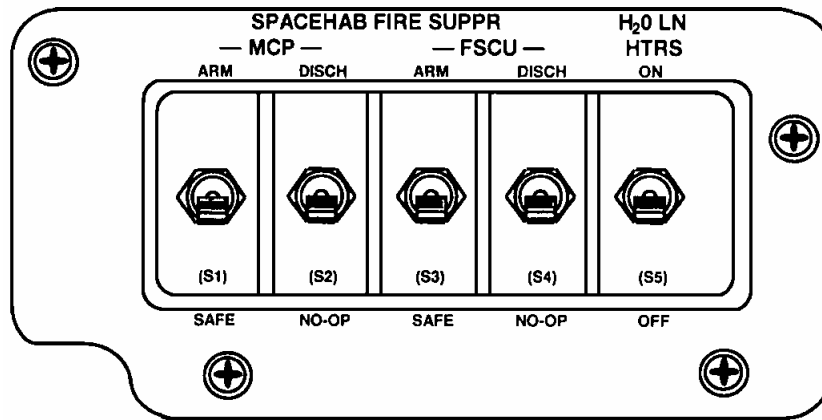
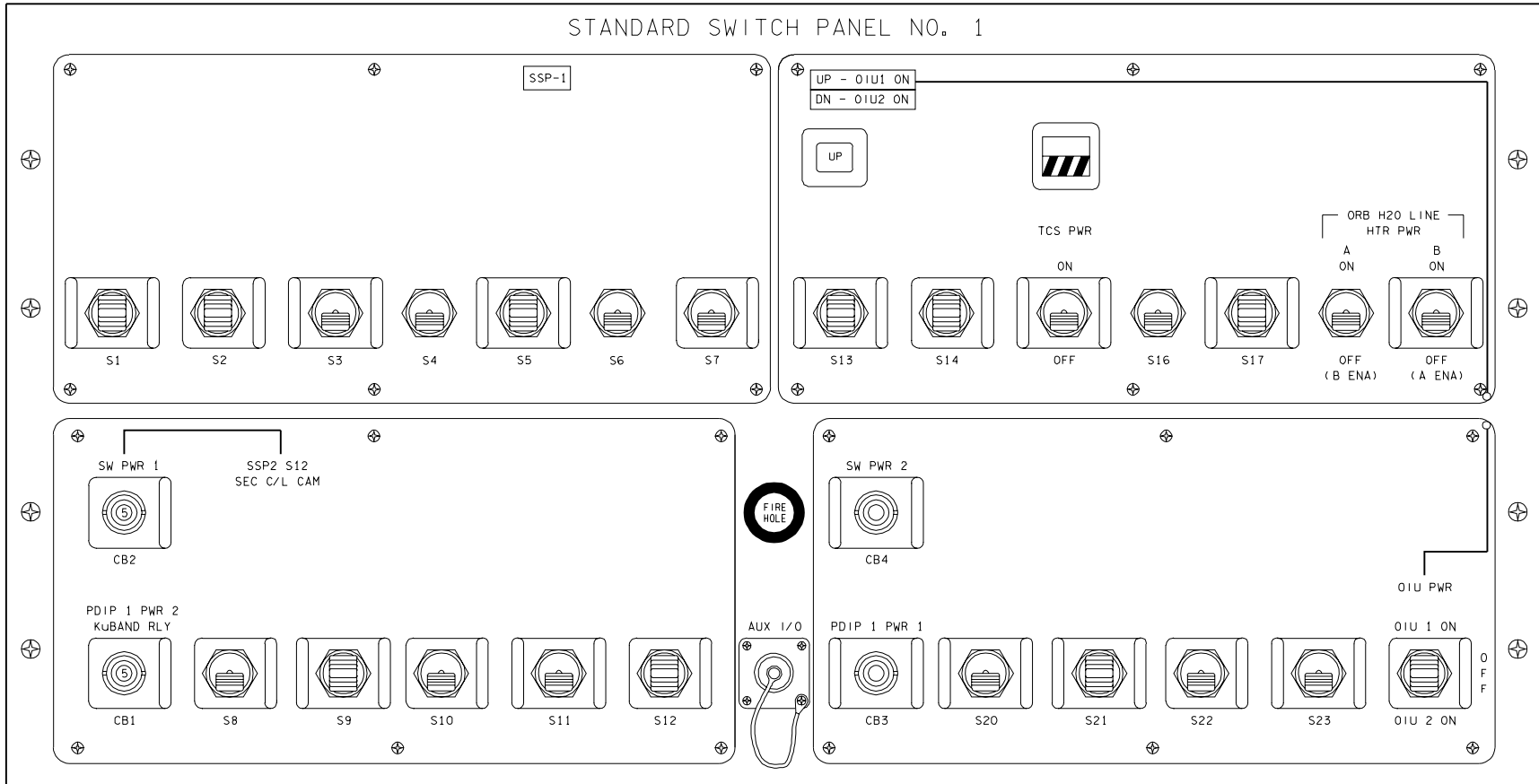


Figure 11-1.- SPACEHAB Fire Suppressor and H2O Line Heaters Panel.

TABLE 11-I.- SPACEHAB FIRE SUPPRESSOR AND H2O LINE HEATERS PANEL

ITEM	TYPE DEVICE	FUNCTION
S1 SPACEHAB FIRE SUPPR MCP ARM/SAFE	Two-position toggle switch: (up, down – maintained)	ARM (up) – Sends Arming signal to MCP FSS Discharge circuitry, which closes ground path for pyro circuit SAFE (down) – Sends Safing signal to MCP FSS Discharge circuitry
S2 SPACEHAB FIRE SUPPR MCP DISCH/NO-OP	Two-position toggle switch: (up, down – maintained)	DISCH (up) – Sends Fire signal to MCP FSS Discharge circuitry. If circuit is armed, firing pulses will be sent to pyro circuits NO-OP (down) – not wired
S3 SPACEHAB FIRE SUPPR FSCU ARM/SAFE	Two-position toggle switch: (up, down – maintained)	ARM (up) – Sends arm signal to FSCU FSS Discharge circuitry, and closing ground path for pyro circuit SAFE (down) – Removes arm signal from FSCU FSS Discharge circuitry
S4 SPACEHAB FIRE SUPPR FSCU DISCH/NO-OP	Two-position toggle switch: (up, down – maintained)	DISCH (up) – Sends Fire signal to FSCU FSS Discharge circuitry. If circuit is armed, firing pulses will be sent to pyro circuits NO-OP (down) – not wired
S5 H2O LN HTRS	Two-position toggle switch: (up, down – maintained)	ON (up) – Closes relays, allowing PL AFT B to power SH Water Line heaters OFF (down) – not wired

SSP 1

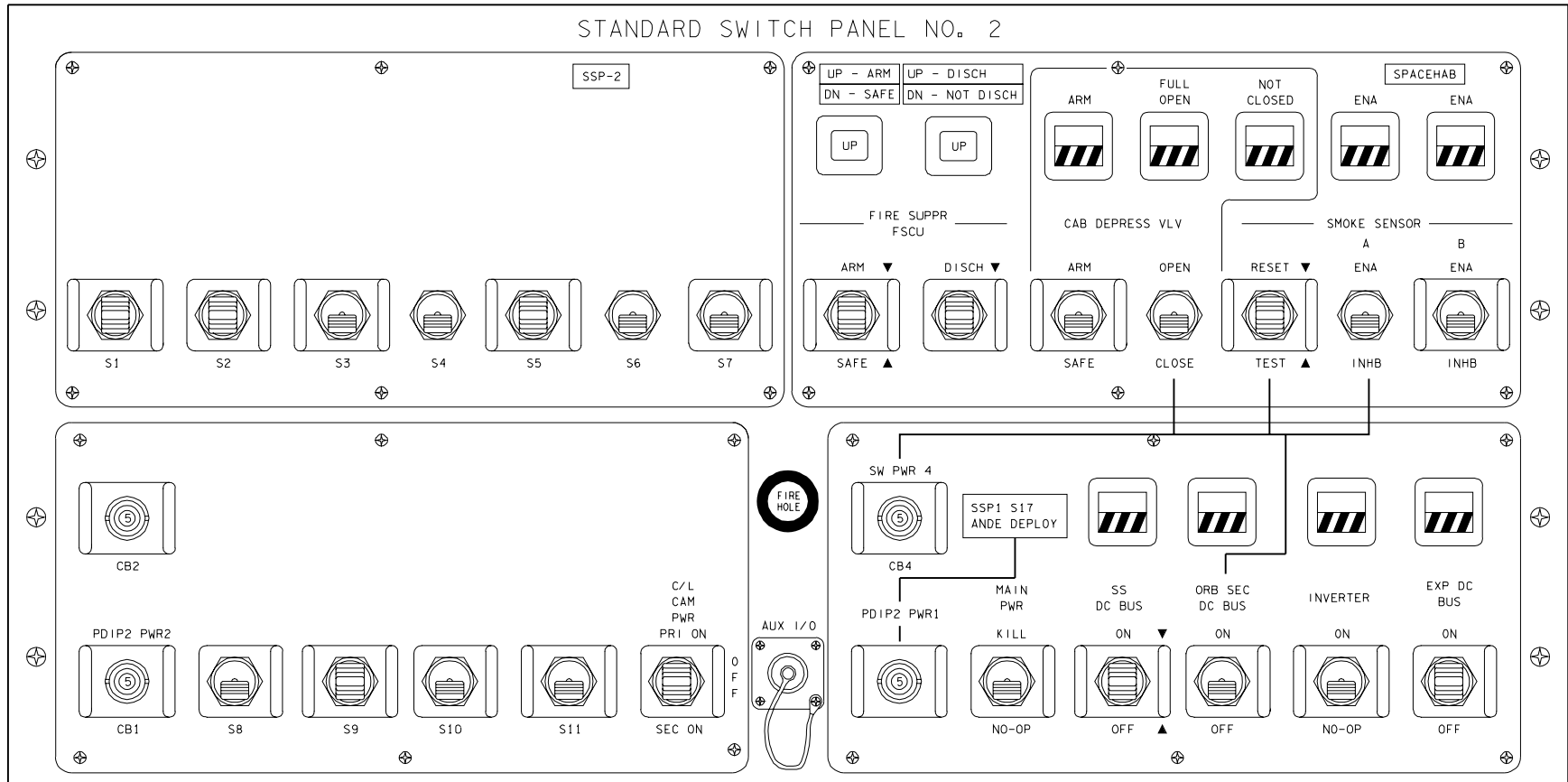


19409002_118. PNL; 1

SSP 1 FUNCTIONS

ITEM	DEVICE TYPE	FUNCTION
DS13 [OIU PWR]	Event indicator, three-position	UP – Indicates that CAB PL3 power is being supplied to OIU 1 bp – Indicates power is removed from OIU 1 and OIU 2 DN – Indicates that AUX PLB power is being supplied to OIU 2
S15 TCS PWR	Toggle switch, two-position (Maintained – Maintained)	ON (up) – Applies power to TCS OFF (dn) – Removes power from TCS
DS15 TCS PWR	Event indicator, two-position	gray – Indicates TCS is powered bp – Indicates TCS is not powered
S18 ORB H2O LINE HTR PWR A	Toggle switch, two-position (Maintained – Maintained)	ON (up) – Applies A heater power to the orbiter portion of the SH water line heaters OFF (dn) – Disables A heater power, enables B heater power
S19 ORB H2O LINE HTR PWR B	Toggle switch, two-position (Maintained – Maintained)	On (up) – Applies B heater power to the orbiter portion of the SH water line heaters OFF (dn) – Disables B heater power, enables A heater power
CB2 SWITCH PWR 1	Circuit breaker, 5 amp	closed (in) – Applies orbiter CAB PL1 power to C/L CAM PWR (SSP2, S12) open (out) – Removes power from C/L CAM PWR (SSP2, S12)
CB1 PDIP 1 PWR 2/ KuBAND RLY	Circuit breaker, 5 amp	closed (in) – Applies orbiter CAB PL2 power to PDIP DC PWR 2 switch outlet and KuBAND RATE switch open (out) – Removes power from PDIP DC PWR 2 outlet and KuBAND RATE switch
CB4 SW PWR 2	Circuit breaker, 5 amp	closed (in) – Applies orbiter CAB PL3 power to ORB H2O LN HTR A (S18), ORB H2O LN HTR B (S19) open (out) – Removes power from ORB H2O LN HTR A (S18), ORB H2O LN HTR B (S19)
CB3 PDIP1 PWR 1	Circuit breaker, 5 amp	closed (in) – Applies orbiter CAB PL2 to PDIP DC PWR 1 outlet open (out) – Removes power from PDIP DC PWR 1 outlet
S24 OIU PWR	Toggle switch, three-position (Maintained – Maintained – Maintained)	OIU 1 ON (up) – Provides CAB PL3 power to OIU 1 OFF (ctr) – Removes power from OIU 1 and OIU 2 OIU 2 ON (dn) – Provides AUX PLB power to OIU 2

SSP 2



19409003_118. PNL: 1

SSP 2 FUNCTIONS

ITEM	DEVICE TYPE	FUNCTION
S13 FIRE SUPPR FSCU ARM	Momentary sw, two-position	ARM (up) – Applies 28 VDC command to FSS discharge logic within FSCU. This command combined with DISCHARGE command, detonates Halon Bottles SAFE (dn) – Removes 28 VDC command above, which interrupts ARM command or DISCHARGE command
DS13 FIRE SUPPR FSCU ARM	Event indicator, three-position	Provides status of FSS firing circuitry in FSCU Down – SAFE Up – ARM bp – unpowered
S14 FIRE SUPPR FSCU DISCH	Momentary sw, two-position	DISCHARGE – Applies 28 VDC command to FSS discharge logic within FSCU. This command detonates Halon Bottles once ARM command is present Other switch position not used
DS14 FIRE SUPPR FSCU DISCH	Event indicator, three-position	Provides status of Halon Bottles Up – Nine Bottles have discharged Down – Less than nine Bottles have discharged bp – unpowered
S15 CAB DEPRESS VLV ARM/SAFE	Toggle switch, two-position (Maintained – Maintained)	ARM (up) – Applies 28 VDC command to CDV control logic within MCP. This command combined with OPEN command from S16 opens CDV SAFE (dn) – Removes 28 VDC pwr from CDV control logic. This position not electrically wired
DS15 CAB DEPRESS VLV ARM	Event indicator, two-position	gray – Indicates CDV control logic has been armed bp – Indicates CDV control logic has not received power and valve is safed
S16 CAB DEPRESS VLV OPEN/CLOSE	Toggle switch, two-position (Maintained – Maintained)	OPEN (up) – Applies 28 VDC command to CDV control logic in MCP, which opens CDV if ARM command from S15 present CLOSED (dn) – Applies 28 VDC command to CDV control logic in MCP, which closes CDV if ARM command present
DS16 CAB DEPRESS VLV FULL OPEN	Event indicator, two-position	gray – (full open) Indicates CDV has reached full open position bp – (not full open) indicates CDV has not reached full open position
DS17 CAB DEPRESS VLV NOT CLOSED	Event indicator, two-position	gray – (not closed) Indicates CDV is not closed (partially open) bp – (closed) Indicates CDV is closed

SSP 2 FUNCTIONS (Cont)

ITEM	DEVICE TYPE	FUNCTION
S17 SMOKE SENSOR TEST/RESET	Momentary sw, two-position	TEST (up) – Applies 28 VDC test input to both smoke sensors causing them to produce an alarm signal if sensors enabled RESET (dn) – Applies to 28 VDC signal to reset input of both smoke sensors returning them to normal operational mode
S18 SMOKE SENSOR A	Toggle switch, two-position (Maintained – Maintained)	ENA (up) – Applies 28 VDC to relay inside FSCU, which allows Smoke Sensor A alarm signal to travel to the CWEA and the MDM INHIB (dn) – Other switch position not wired to SH. However, inhibit signal occurs by removing 28 VDC from above relay at this switch position
DS18 SMOKE SENSOR A ENA	Event indicator, two-position	Provides status of Smoke Sensor A: gray – Smoke Sensor A ENABLED bp – Smoke Sensor A is INHIBITED
S19 SMOKE SENSOR B	Toggle switch, two-position (Maintained – Maintained)	ENA (up) – Applies 28 VDC to relay inside the MCP, which allows Smoke Sensor B alarm signal to travel to the CWEA and the MDM INHIB (dn) – Other switch position not wired to SH. However, inhibit signal occurs by removing 28 VDC from the above relay at this switch position
DS19 SMOKE SENSOR B ENA	Event indicator, two-position	Provides status of Smoke Sensor B: gray – Smoke Sensor B ENABLED bp – Smoke Sensor B INHIBITED
CB1 PDIP 2 PWR 2	Circuit breaker, 5 amp	closed (in) – Applies orbiter pwr to PDIP DC pwr 2 open (out) – Removes orbiter pwr from PDIP DC pwr 2
S12 C/L CAM PWR PRI ON/SEC ON	Toggle switch, three-position (Maintained – Maintained – Maintained)	PRI ON (up) – Provides primary power to centerline camera OFF (ctr) – Removes power from centerline camera SEC ON (dn) – Provides secondary power to centerline camera
CB4 SW PWR 4	Circuit Breaker, 5 amp	closed (in) – Applies orbiter power to CAB DEPRESS VLV (S16), SMOKE SENSOR TEST/RETEST (S17), SMOKE SENSOR A (S18), and ORB SEC DC BUS (S22) open (out) – Removes power from CAB DEPRESS VLV (S16), SMOKE SENSOR TEST/RETEST (S17), SMOKE SENSOR A (S18), and ORB SEC DC BUS (S22)

SSP 2 FUNCTIONS (Cont)

ITEM	DEVICE TYPE	FUNCTION
CB3 PDIP2 PWR1	Circuit breaker, 5 amp	closed (in) – Applies 28 VDC pwr to PDIP2 open (out) – Removes 28 VDC pwr from PDIP2
S20 MAIN PWR	Toggle switch, two-position (Maintained – Maintained)	KILL (up) – Applies 28 VDC command to open PDU relays K1, K13, K14, K15, K16, K18, K21, and pwr contactors 1 and 2. This effectively removes AC and DC pwr from all SH subsystem and experiment equipment, except ARS Fan, Water Pump 2, and emergency bus powered equipment NO-OP (dn) – Not wired to SH
S21 SS DC BUS	Momentary sw, two-position	ON (up) – Applies 28 VDC command to close PDU relays K13 and K14 which enables distribution of DC pwr to SH subsystem bus OFF (dn) – Applies 28 VDC command to open above relays removing pwr from SH subsystem equipment bus
DS21 SS DC BUS	Event indicator, two-position	gray – Indicates both PDU relays K13 and K14 closed bp – Indicates both PDU relay K13 and K14 open
S22 ORB SEC DC BUS	Toggle switch, two-position (Maintained – Maintained)	ON (up) – Used to activate PDU pwr contactor 1 and relay K15 which allows distribution of secondary feed OFF (dn) – Applies 28 VDC command to open above relays removing secondary DC power from subsystems and experiments
DS22 ORB SEC DC BUS	Event indicator, two-position	gray – Indicates PDU pwr contactor 1 is closed bp – Indicates PDU pwr contactor 1 is open
S23 INVERTER	Toggle switch, two-position (Maintained – Maintained)	ON (up) – Applies 28 VDC command to close PDU relay K1 which sends DC pwr to inverter for AC conversion NO-OP (dn) – Switch position not wired to SH
DS23 INVERTER	Event indicator, two-position	gray – Indicates PDU relay K1 closed bp – Indicates PDU relay K1 open
S24 EXP DC BUS	Toggle switch, three-position (Maintained – Maintained)	ON (up) – Applies 28 VDC command to close PDU pwr contactor 2 and relay K16 which allows distribution of DC pwr to locker and rack experiments ctr – Not wired OFF (dn) – Applies 28 VDC command to above relays removing DC pwr from all experiments
DS24 EXP DC BUS	Event indicator, two-position	gray – Indicates PDU pwr contactor 2 closed bp – Indicates PDU pwr contactor 2 open



PAYLOAD OPS
C/L

STS
118