



# International Space Station Assembly Operations Book

## ISS-12A

Mission Operations Directorate  
Operations Division

16 AUG 06

**This publication replaces  
all previous publications.**  
These procedures are available  
electronically on the SODF Homepage  
at <http://mod.jsc.nasa.gov/do3>

National Aeronautics and  
Space Administration

Lyndon B. Johnson Space Center  
Houston, Texas



**United Space Alliance**



**INTERNATIONAL SPACE STATION  
ASSEMBLY OPERATIONS BOOK  
ISS-12A**

16 AUG 06

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Assy_OpsU760	Assy_OpsU788	Assy_OpsU829	Assy_OpsU851
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Uplinked Messages (or Approved Flight Notes) replaced by this revision,  
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None

**INTERNATIONAL SPACE STATION  
ASSEMBLY OPERATIONS BOOK  
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485.....	09 AUG 06	535.....	09 MAY 06
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498.....	16 AUG 06	548.....	16 AUG 06
499.....	15 AUG 06	549.....	10 MAY 06
500.....	16 AUG 06	550.....	10 MAY 06
501.....	15 AUG 06	551.....	21 JUN 06
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504.....	16 AUG 06	554.....	20 JUL 06
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509.....	25 JUL 06	559.....	08 MAY 06
510.....	25 JUL 06	560.....	08 MAY 06
511.....	10 AUG 06	561.....	08 MAY 06
512.....	10 AUG 06	562.....	08 MAY 06
513.....	10 AUG 06	563.....	08 MAY 06
514.....	10 AUG 06	564.....	08 MAY 06
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516.....	16 AUG 06	566.....	01 MAY 06
517.....	28 APR 06	567.....	03 MAY 06
518.....	16 AUG 06	568.....	03 MAY 06
519.....	16 AUG 06	569.....	03 MAY 06
520.....	16 AUG 06	570.....	03 MAY 06
521.....	03 MAY 06	571.....	03 MAY 06
522.....	16 AUG 06	572.....	03 MAY 06
523.....	28 APR 06	573.....	03 MAY 06
524.....	16 AUG 06	574.....	03 MAY 06

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576 .....	16 AUG 06
577 .....	21 JUN 06
578 .....	21 JUN 06
579 .....	21 JUN 06
580 .....	16 AUG 06
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ASSY OPS

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### C3 PAYLOAD SAFING

(ASSY OPS/12A.1/FIN)

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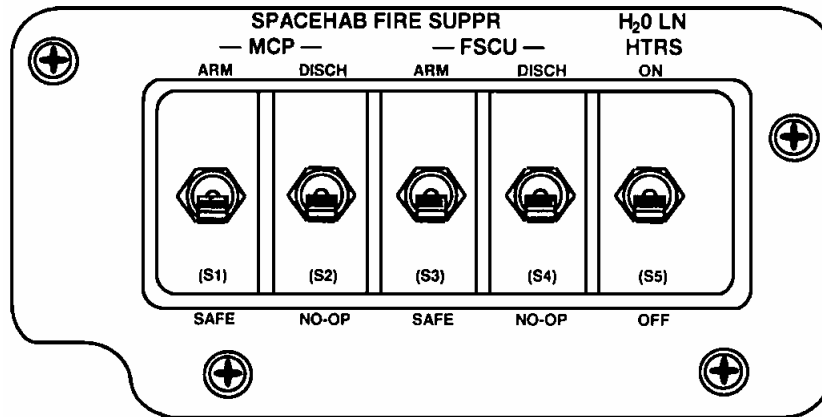


Figure 1.- Spacehab Fire Suppressor and H2O Line Heaters Panel.

Table 1. 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

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OBJECTIVE:

The purpose of this display is to allow the orbiter crew to command the ANDE and RAFT payloads and monitor the relay status. Figure 1 shows the display.

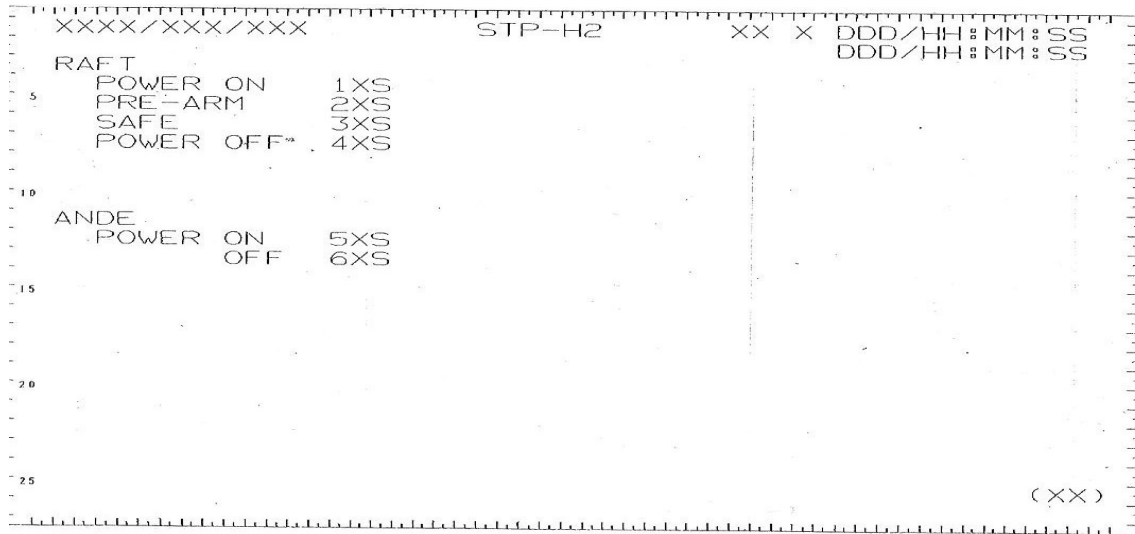


Figure 1.- SPEC 201: STP-H2.

TITLE: STP-H2

TYPE: SPEC 201

PURPOSE, OPERATION, AND ORGANIZATION

This display is used to close and open the ANDE and RAFT relays and monitor relay status. The function of the display is described below.

1. RAFT POWER ON shows when the RAFT POWER relay is Closed. It is denoted by the asterisk. To close, the relay crew executes Item 1.
2. RAFT PRE-ARM shows when the RAFT PRE-ARM relay is Closed. It is denoted by the asterisk. To close, the relay crew executes Item 2.
3. RAFT SAFE shows when the RAFT PRE-ARM relay is Open. It is denoted by the asterisk. To open, the relay crew executes Item 3.
4. RAFT POWER OFF shows when the RAFT POWER relay is Open. It is denoted by the asterisk. To open, the relay crew executes Item 4.
5. ANDE POWER ON shows when the ANDE POWER relay is Closed. It is denoted by the asterisk. To close, the relay crew executes Item 5.
6. ANDE POWER OFF shows when the ANDE POWER relay is Open. It is denoted by the asterisk. To open, the relay crew executes Item 6.

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**CHANNEL 2/3 POWERDOWN SUMMARY - (EVA 2)**

(ASSY OPS/12A.1/FIN)

Page 1 of 11 pages

	2/3 Power Reconfiguration		Z1 SPDA Power Reconfiguration
	Powered	Unpowered	Unpowered <sup>(1)</sup>
<b>C&amp;DH</b>			
<b>MDMs</b>	<u>INTERNAL:</u> C&C-1, C&C-2 <sup>(2)</sup> , C&C-3 INT-1 PMCU-1 GNC-1 LA-1 PL-1 A/L <sup>(4)</sup>  <u>EXTERNAL:</u> EXT-1 N1-1 P1-1, P3-1 S0-1 STR, S1-1 PVCU-2B, PVCU-4B, PVCU-2A, PVCU-4A	<u>INTERNAL:</u> INT-2 <sup>(3)</sup> PMCU-2 <sup>(3)</sup> GNC-2 LA-2, LA-3 PL-2  <u>EXTERNAL:</u> EXT-2 N1-2 PTR, P1-2, P3-2 S0-2 S1-2	
<b>Heaters</b>	EXT-2, N1-2, P3-2, P1-2, PTR, S1-2	EXT-1, N1-1, P3-1, P1-1, S0-1, S1-1, STR	
<b>C&amp;W</b>		LAB Panel	
<b>PCS</b>	PCS-2 (LAB RWS)	PCS-1 (Cupola RWS)	
<b>Misc</b>	SDMS Signal Conditioner-1 SDMS Signal Conditioner-1 Heater  APS-1 PEHG-1	SDMS Signal Conditioner-2 SDMS Signal Conditioner-2 Heater  APS-2 PEHG-2	

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Notes

- <sup>(1)</sup> Equipment powered off for the Z1 SPDA Patch Panel Reconfiguration.
- <sup>(2)</sup> Assumes Av Rack Power Jumper installed to power Av Rack 1 from Channel 1/4.
- <sup>(3)</sup> Could be powered, if needed, while the Av Rack Power Jumper is connected to power Av Rack 1 from Channel 1/4.
- <sup>(4)</sup> Assumes Airlock Avionics Power Reconfiguration is complete.

# CHANNEL 2/3 POWERDOWN SUMMARY - (EVA 2)

(ASSY OPS/12A.1/FIN)

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	2/3 Power Reconfiguration		Z1 SPDA Power Reconfiguration
	Powered	Unpowered	Unpowered <sup>(1)</sup>
<b>CHeCS</b>	EV-CPDS IV-CPDS  MEC TEPC	CHeCS Rack (LAB1D4) AAA VOA Defibrillator  EV-CPDS Heater  CEVIS	
<b>C&amp;T</b>			
<b>General</b>	S-Band String 1 (S1) S-Band String 1 (S1) Heaters S-Band String 2 (P6) <sup>(1)</sup> S-Band String 2 (P6) Heaters  Ku-Band External ORUs <sup>(1)</sup> Ku-Band Heaters	*Ku-Band Internal ORUs (see Data section)  *Ku-Band system is down for the main powerdown due to Internal ORUs being down. The External ORUs will not be powered down until the Z1 Patch Panel Reconfiguration.	S-Band String 2 (P6) Ku-Band External ORUs
<b>Audio</b>	IAC-1 ATUs: LAB Fwd (ATU-2), A/L1 <sup>(4)</sup> , EMU1 <sup>(4)</sup> , EMU2 <sup>(4)</sup> AUAI-2S ABC-1 DAIU SSSR-2 (UHF-2) EMU Audio Control Panel <sup>(4)</sup>	IAC-2 <sup>(3)</sup> ATU-1 (LAB Aft) AUAI-1P ABC-2 <sup>(3)</sup> RAIU-1 - No intermodule voice with RS; C&W still avail in RS SSSR-1 (UHF-1) <sup>(3)</sup>	

## Notes

<sup>(1)</sup> Equipment powered off for the Z1 SPDA Patch Panel Reconfiguration.

<sup>(2)</sup> Assumes Av Rack Power Jumper installed to power AV Rack 1 from Channel 1/4.

<sup>(3)</sup> Could be powered, if needed, while the Av Rack Power Jumper is connected to power Av Rack 1 from Channel 1/4.

<sup>(4)</sup> Assumes Airlock Avionics Power Reconfiguration is complete.

**CHANNEL 2/3 POWERDOWN SUMMARY - (EVA 2)**

(ASSY OPS/12A.1/FIN)

Page 3 of 11 pages

	<b>2/3 Power Reconfiguration</b>		<b>Z1 SPDA Power Reconfiguration</b>
	<b>Powered</b>	<b>Unpowered</b>	<b>Unpowered<sup>(1)</sup></b>
<b>Video</b>	VTR-1 VSU-1 CVIU-1, 2, 3, 7 <sup>(4)</sup> , 12 SCU-1 EVSU-1, -3 EVSU-2 Heaters MSS Trunklines 4, 5, 8, 9 USOS Trunklines 1, 2, 5 to 7, 10, 14 to 22 Orbiter Video Channel 2	VTR-2 VSU-2 <sup>(3)</sup> , 3 CVIU-4, 5, 6, 8 SCU-2 <sup>(3)</sup> EVSU-2 EVSU-1, -3 Heaters MSS Trunklines 1, 2, 3, 6, 7 USOS Trunklines 3, 4, 8, 9, 11, 12, 13, 23 to 26 Orbiter Video Channel 1  Summary: No downlink Video; limited internal Video Routing capability; limited external/SSRMS video routing capability; no video from Cup RWS or Node ports. Only one view to or from orbiter.	
<b>Data</b>	Ku-Band Fwd Receiver (powered from EXPRESS Rack 4)	HCOR High Rate Frame Mux (HRFM) High Rate Modem (HRM) VBSP (no downlink video)  Summary: No payload telemetry, no OCA.	

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Notes

- <sup>(1)</sup> Equipment powered off for the Z1 SPDA Patch Panel Reconfiguration.
- <sup>(2)</sup> Assumes Av Rack Power Jumper installed to power AV Rack 1 from Channel 1/4.
- <sup>(3)</sup> Could be powered, if needed, while the Av Rack Power Jumper is connected to power Av Rack 1 from Channel 1/4.
- <sup>(4)</sup> Assumes Airlock Avionics Power Reconfiguration is complete.

**CHANNEL 2/3 POWERDOWN SUMMARY - (EVA 2)**

(ASSY OPS/12A.1/FIN)

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	<b>2/3 Power Reconfiguration</b>		<b>Z1 SPDA Power Reconfiguration</b>
	<b>Powered</b>	<b>Unpowered</b>	<b>Unpowered<sup>(1)</sup></b>
<b>VCSA Ports</b>	<u>WETAs:</u> Port 8 (P1UPOB) Heaters Port 12 (NOD1UP) Heaters  <u>ETVCGs:</u> Port 3 (S1 LOOB) Port 9 (P1 LOOB) Port 13 (LAB_S)  FPMU - Port 2 (S1 UPOB) Heaters	<u>WETAs:</u> Port 8 (P1UPOB) Port 12 (NOD1UP)  <u>ETVCGs:</u> Port 3 (S1 LOOB) Heaters Port 9 (P1 LOOB) Heaters Port 13 (LAB_S) Heaters  FPMU - Port 2 (S1 UPOB)  Summary: Helmet-cam not available via station assets.	

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Notes

- <sup>(1)</sup> Equipment powered off for the Z1 SPDA Patch Panel Reconfiguration.
- <sup>(2)</sup> Assumes Av Rack Power Jumper installed to power AV Rack 1 from Channel 1/4.
- <sup>(3)</sup> Could be powered, if needed, while the Av Rack Power Jumper is connected to power Av Rack 1 from Channel 1/4.
- <sup>(4)</sup> Assumes Airlock Avionics Power Reconfiguration is complete.

**CHANNEL 2/3 POWERDOWN SUMMARY - (EVA 2)**

(ASSY OPS/12A.1/FIN)

Page 5 of 11 pages

	<b>2/3 Power Reconfiguration</b>		<b>Z1 SPDA Power Reconfiguration</b>
	<b>Powered</b>	<b>Unpowered</b>	<b>Unpowered<sup>(1)</sup></b>
<b>ECLSS</b>			
<b>Node</b>	N1 Stbd Fwd IMV Valve N1 Stbd Aft IMV Valve N1 Aft Stbd IMV Valve N1 Aft Port IMV Valve N1 Aft Port IMV Fan N1 RAMV N1 Cabin Fan N1 Smoke Detector 1	N1 Fwd Port IMV Valve N1 Fwd Stbd IMV Valve N1 Stbd Aft IMV Fan Node 1 Smoke Detector 2	
<b>LAB</b>	LAB Aft Port IMV Fan LAB Fwd Port IMV Fan LAB Fwd Stbd IMV Valve Pressure Control Assembly LAB1P6 CCAA Port Waste Water Vent Valve LAB Smoke Detector PD1	LAB Aft Port IMV Valve LAB Aft Stbd IMV Valve LAB Fwd Stbd IMV Fan LAB Smoke Detector SD5 LAB1S6 CCAA Stbd Waste Water Vent Valve ARS Rack (AAA, MCA, CDRA, TCCS, Rack Smoke Detector)	
<b>A/L</b>	Pressure Control Assembly <sup>(4)</sup> Smoke Detectors <sup>(4)</sup> A/L CCAA <sup>(4)</sup>	Depress Pump <sup>(4)</sup> ORCA <sup>(4)</sup> Metox Recharger <sup>(4)</sup>	

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Notes

- <sup>(1)</sup> Equipment powered off for the Z1 SPDA Patch Panel Reconfiguration.
- <sup>(2)</sup> Assumes Av Rack Power Jumper installed to power AV Rack 1 from Channel 1/4.
- <sup>(3)</sup> Could be powered, if needed, while the Av Rack Power Jumper is connected to power Av Rack 1 from Channel 1/4.
- <sup>(4)</sup> Assumes Airlock Avionics Power Reconfiguration is complete.

**CHANNEL 2/3 POWERDOWN SUMMARY - (EVA 2)**

(ASSY OPS/12A.1/FIN)

	2/3 Power Reconfiguration		Z1 SPDA Power Reconfiguration
	Powered	Unpowered	Unpowered <sup>(1)</sup>
<b>EPS</b>			
<b>Lights</b>	<u>Node:</u> NOD1OP4 NOD1SD2 NOD1OP2-1 (Fwd) NOD1OP2-2 (Aft)  <u>LAB:</u> LAB1OS1 LAB1OS3 LAB1OS5 LAB1OP2 LAB1OP4 LAB1OP6  <u>CETA:</u> S1-1 N1-1 LAB Luminaire Heater S1-2 Luminaire Heater N1-2 Luminaire Heater	<u>Node:</u> NOD1OS4 NOD1PD2 NOD1OS2-1 (Fwd) NOD1OS2-2 (Aft)  <u>LAB:</u> LAB1OS2 LAB1OS4 LAB1OS6 LAB1OP1 LAB1OP3 LAB1OP5  <u>CETA:</u> LAB S1-2 N1-2 S1-1 Luminaire Heater N1-1 Luminaire Heater	
<b>SARJ</b>	SARJ RJMC P3-1 SARJ RJMC P3-2 Heaters	SARJ RJMC P3-2 SARJ RJMC P3-1 Heaters	
<b>Russian Power</b>	FGB ARCUs 51 and 52 <sup>(1)</sup> FGB ARCUs 53 and 54 SM CHTs 23 and 24 <sup>(1)</sup>	SM CHTs 21 and 22	FGB ARCUs 51 and 52 SM CHTs 23 and 24

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Notes

- <sup>(1)</sup> Equipment powered off for the Z1 SPDA Patch Panel Reconfiguration.
- <sup>(2)</sup> Assumes Av Rack Power Jumper installed to power AV Rack 1 from Channel 1/4.
- <sup>(3)</sup> Could be powered, if needed, while the Av Rack Power Jumper is connected to power Av Rack 1 from Channel 1/4.
- <sup>(4)</sup> Assumes Airlock Avionics Power Reconfiguration is complete.



**CHANNEL 2/3 POWERDOWN SUMMARY - (EVA 2)**

(ASSY OPS/12A.1/FIN)

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	<b>2/3 Power Reconfiguration</b>		<b>Z1 SPDA Power Reconfiguration</b>
	<b>Powered</b>	<b>Unpowered</b>	<b>Unpowered<sup>(1)</sup></b>
<b>Misc</b>	MBSU 2, 3 Coldplate Heaters DDCU S0-2B, S0-3B P1-3A Coldplate Heaters  A/L Power Supply Assembly (PSA) <sup>(4)</sup>  PCU Z1-3B <sup>(1)</sup> PCU Z1-3B Heater PCU Z1-4B PCU Z1-4B Heater <sup>(1)</sup>	MBSU 1, 4 Coldplate Heaters DDCU S0-4B, S0-1A, S1-4B Coldplate Heaters  A/L Battery Charger <sup>(4)</sup>	PCU Z1-3B PCU Z1-4B Heater

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Notes

- <sup>(1)</sup> Equipment powered off for the Z1 SPDA Patch Panel Reconfiguration.
- <sup>(2)</sup> Assumes Av Rack Power Jumper installed to power AV Rack 1 from Channel 1/4.
- <sup>(3)</sup> Could be powered, if needed, while the Av Rack Power Jumper is connected to power Av Rack 1 from Channel 1/4.
- <sup>(4)</sup> Assumes Airlock Avionics Power Reconfiguration is complete.

**CHANNEL 2/3 POWERDOWN SUMMARY - (EVA 2)**

(ASSY OPS/12A.1/FIN)

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	2/3 Power Reconfiguration		Z1 SPDA Power Reconfiguration
	Powered	Unpowered	Unpowered <sup>(1)</sup>
<b>MCS</b>	CMG-1 CMG-2 <sup>(1)</sup> CMG-3 <sup>(1)</sup> CMG-4  CMG 1 Heater <sup>(1)</sup> CMG 2 Heater CMG 3 Heater CMG 4 Heater <sup>(1)</sup>  RGA-1 SIGI-1	RGA-2 SIGI-2	CMG-2 CMG-3 CMG-1 Heater CMG-4 Heater
<b>Payloads</b>	<u>Racks:</u> LAB1P2 (EXPRESS-4)	<u>Racks:</u> LAB1O1 (EXPRESS-2) LAB1O2 (EXPRESS-1) **LAB1O3 (EXPRESS-3) LAB1O4 (MELFI) LAB1P4 (HRF-2) *LAB1S2 (HRF-1) **LAB1S3 (MSG) LAB1S4 (EXPRESS-5)  *These racks are powered by Channel 1/4 but planned to be powered off for power savings.  **These racks could be powered from Channel 1/4 but are nominally planned to be off.	

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Notes

- <sup>(1)</sup> Equipment powered off for the Z1 SPDA Patch Panel Reconfiguration.
- <sup>(2)</sup> Assumes Av Rack Power Jumper installed to power AV Rack 1 from Channel 1/4.
- <sup>(3)</sup> Could be powered, if needed, while the Av Rack Power Jumper is connected to power Av Rack 1 from Channel 1/4.
- <sup>(4)</sup> Assumes Airlock Avionics Power Reconfiguration is complete.

**CHANNEL 2/3 POWERDOWN SUMMARY - (EVA 2)**

(ASSY OPS/12A.1/FIN)

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	<b>2/3 Power Reconfiguration</b>		<b>Z1 SPDA Power Reconfiguration</b>
	<b>Powered</b>	<b>Unpowered</b>	<b>Unpowered<sup>(1)</sup></b>
<b>Robotics</b>	AVU-1 LAB RWS (LAB1P5)  MBS/SSRMS Prime String MT 4B Power Channel	AVU-2 Cupola RWS (LAB1S5)  MBS/SSRMS Redundant String MT 3A Power Channel 1 SSRMS Camera or the Mast Camera	
<b>S&amp;M</b>			

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Notes

- <sup>(1)</sup> Equipment powered off for the Z1 SPDA Patch Panel Reconfiguration.
- <sup>(2)</sup> Assumes Av Rack Power Jumper installed to power AV Rack 1 from Channel 1/4.
- <sup>(3)</sup> Could be powered, if needed, while the Av Rack Power Jumper is connected to power Av Rack 1 from Channel 1/4.
- <sup>(4)</sup> Assumes Airlock Avionics Power Reconfiguration is complete.

**CHANNEL 2/3 POWERDOWN SUMMARY - (EVA 2)**

(ASSY OPS/12A.1/FIN)

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	<b>2/3 Power Reconfiguration</b>		<b>Z1 SPDA Power Reconfiguration</b>
	<b>Powered</b>	<b>Unpowered</b>	<b>Unpowered<sup>(1)</sup></b>
<b>TCS</b>			
<b>ITCS</b>	LAB LTL System LAB MTL IFHX Heaters Loop Crossover Assembly Valve 1	LAB MTL System LAB LTL IFHX Heaters Loop Crossover Assembly Valve 2	
<b>ETCS</b>	Loop A PM PCVP Loop A PM Htr 2 Loop A PM Line Heaters Loop A PM Bypass Return Flowmeter Loop A PM Outlet Flowmeter Loop A NTA Tank and GPRV Heater 2 Loop A ATA Tanks - Heater 2  Loop B PM Heater 1 Loop B NTA Tank and GPRV Heater 1 Loop B ATA Tanks - Heater 1	Loop B PM PCVP Loop B PM Htr 2 Loop B PM Line Heaters Loop B PM Bypass Return Flowmeter Loop B PM Outlet Flowmeter Loop B NTA Tank and GPRV Heater 2 Loop B ATA Tanks - Heater 2  Loop A PM Heater 1 Loop A NTA Tank and GPRV Heater 1 Loop A ATA Tanks - Heater 1	
<b>EETCS</b>	All Loop A equipment All Loop B equipment		

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Notes

- <sup>(1)</sup> Equipment powered off for the Z1 SPDA Patch Panel Reconfiguration.
- <sup>(2)</sup> Assumes Av Rack Power Jumper installed to power AV Rack 1 from Channel 1/4.
- <sup>(3)</sup> Could be powered, if needed, while the Av Rack Power Jumper is connected to power Av Rack 1 from Channel 1/4.
- <sup>(4)</sup> Assumes Airlock Avionics Power Reconfiguration is complete.

**CHANNEL 2/3 POWERDOWN SUMMARY - (EVA 2)**

(ASSY OPS/12A.1/FIN)

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	<b>2/3 Power Reconfiguration</b>		<b>Z1 SPDA Power Reconfiguration</b>
	<b>Powered</b>	<b>Unpowered</b>	<b>Unpowered<sup>(1)</sup></b>
<b>Radiators</b>	TRRJ RJMC S1-1 TRRJ RJMC P1-1  <u>Heaters:</u> RJMC S1-1 Htr 1 and Htr 4 RJMC S1-2 Htr 2 and Htr 3 RJMC P1-2 Gp-1 Htr-1 and Gp-2 Htr-2 RJMC P1-2 Gp-1 Htr-2 and Gp-2 Htr-1 DLA S1-1 Htr DLA P1-1 Htr TRRJ S1 Cradle Htr Radiator Beam S1 Misc Groups 1 to 4 Power Buses Radiator Beam P1 Thermo Groups 1 to 3 Power Buses	TRRJ RJMC P1-2 TRRJ RJMC S1-2  <u>Heaters:</u> RJMC S1-1 Htrs 2 and 3 RJMC S1-2 Htrs 1 and 4 RJMC P1-1 Htr Gp-1 Htr-2 and GP-2 Htr-3 RJMC P1-2 Gp-1 Htr-1 and Gp-2 Htr-4 DLA S1-2 Htr DLA P1-2 Htr TRRJ P1 Cradle Htr Radiator Beam P1 Misc Groups 1 to 4 Power Buses Radiator Beam S1 Thermo Groups 1 to 3 Power Buses	
<b>CIO</b>	Ops LAN Equipment Channel 1/4 SSCs (crew can access procedures from ODF CDs)	Ops LAN Equipment Channel 2/3 SSCs Channel 2/3 Printers SSC Fileserver OCA Router (OCA not available due to Ku-Band system being down)	
<b>UOPs</b>	NODE UOP 1 (NOD1SD4) LAB UOP 1 (LAB1OS2) LAB UOP 2 (LAB1OS4) LAB UOP 6 (LAB1SD4) LAB RWS (LAB UOP 7 bypass) A/L UOP <sup>(4)</sup>	NODE UOP 2 (NOD1PD4) LAB UOP 3 (LAB1OP2) LAB UOP 4 (LAB1OP4) LAB UOP 5 (LAB1PD2) CUPOLA RWS (LAB UOP 8 bypass)	

Notes

- <sup>(1)</sup> Equipment powered off for the Z1 SPDA Patch Panel Reconfiguration.
- <sup>(2)</sup> Assumes Av Rack Power Jumper installed to power AV Rack 1 from Channel 1/4.
- <sup>(3)</sup> Could be powered, if needed, while the Av Rack Power Jumper is connected to power Av Rack 1 from Channel 1/4.
- <sup>(4)</sup> Assumes Airlock Avionics Power Reconfiguration is complete.

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# CHANNEL 1/4 POWERDOWN SUMMARY - (EVA 3)

(ASSY OPS/12A.1/FIN)

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	1/4 Power Reconfiguration		Z1 SPDA Power Reconfig
	Powered	Unpowered	Unpowered <sup>(1)</sup>
<b>C&amp;DH</b>			
<b>MDMs</b>	<u>INTERNAL:</u> C&C-1 <sup>(2)</sup> , C&C-2 INT-2 PMCU-2 GNC-2 LA-2, LA-3 PL-2 A/L  <u>EXTERNAL:</u> EXT-2 N1-1 <sup>(4)</sup> , N1-2 PTR, P1-2, P3-2 S0-2 S1-2 PVCU-2B, PVCU-4B, PVCU-2A, PVCU-4A	<u>INTERNAL:</u> C&C-3 INT-1 <sup>(3)</sup> PMCU-1 <sup>(3)</sup> GNC-1 LA-1 PL-1 <sup>(3)</sup>  <u>EXTERNAL:</u> EXT-1 P1-1, P3-1 S0-1 STR, S1-1	
<b>Heaters</b>	EXT-1, N1-1, P3-1, P1-1, S0-1, S1-1, STR	EXT-2, N1-2, P3-2, P1-2, PTR, S1-2	
<b>C&amp;W</b>	LAB Panel		
<b>PCS</b>	PCS-1 (Cupola RWS)	PCS-2 (LAB RWS)	
<b>Data</b>	SDMS Signal Conditioner-2 SDMS Signal Conditioner-2 Heater  APS-2 PEHG-2	SDMS Signal Conditioner-1 SDMS Signal Conditioner-1 Heater  APS-1 PEHG-1	

## Notes

- (1) Equipment powered off for the Z1 SPDA Patch Panel Reconfiguration.
- (2) Assumes Av Rack Power Jumper installed to power AV Rack 2 from Channel 2/3.
- (3) Could be powered, if needed, while the Av Rack Power Jumper is connected to power Av Rack 2 from Channel 2/3.
- (4) Assumes Node 1 Y-Jumper installed to power Node loads from RACU 6.
- (5) Assumes S0/N1 Primary Power Jumper installed but not connected.

**CHANNEL 1/4 POWERDOWN SUMMARY - (EVA 3)**

(ASSY OPS/12A.1/FIN)

Page 2 of 10 pages

	1/4 Power Reconfiguration		Z1 SPDA Power Reconfig
	Powered	Unpowered	Unpowered <sup>(1)</sup>
<b>CHeCS</b>	CHeCS Rack AAA VOA Defibrillator  EV-CPDS Heater  CEVIS	EV-CPDS IV-CPDS  MEC TEPC	

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Notes

- <sup>(1)</sup> Equipment powered off for the Z1 SPDA Patch Panel Reconfiguration.
- <sup>(2)</sup> Assumes Av Rack Power Jumper installed to power AV Rack 2 from Channel 2/3.
- <sup>(3)</sup> Could be powered, if needed, while the Av Rack Power Jumper is connected to power Av Rack 2 from Channel 2/3.
- <sup>(4)</sup> Assumes Node 1 Y-Jumper installed to power Node loads from RACU 6.
- <sup>(5)</sup> Assumes S0/N1 Primary Power Jumper installed but not connected.

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# CHANNEL 1/4 POWERDOWN SUMMARY - (EVA 3)

(ASSY OPS/12A.1/FIN)

Page 3 of 10 pages

C&T	1/4 Power Reconfiguration		Z1 SPDA Power Reconfig
	Powered	Unpowered	Unpowered <sup>(1)</sup>
<b>General</b>	S-Band String 2 (P6) S-Band String 2 (P6) Heaters <sup>(1)</sup> Ku-Band Ku-Band Heaters <sup>(1)</sup>	S-Band String 1 (S1) S-Band String 1 (S1) Heaters	Ku-Band Heaters String 2 S-Band (P6) Heaters
<b>Audio</b>	IAC-2 ATUs: LAB Aft (ATU-1), A/L1, EMU1, EMU2 AUAI-1P ABC-2 RAIU-1 SSSR-1(UHF-1) EMU Audio Control Panel	IAC-1 ATU-2 (LAB Fwd) AUAI-2S <sup>(3)</sup> ABC-1 <sup>(3)</sup> DAIU (No hardline voice with orbiter) SSSR-2 (UHF-2)	
<b>Video</b>	AVU-2 VTR-2 VSU-2, 3 CVIU-4, 5, 6, 7, 8 SCU-2 EVSU-2 EVSU-1, -3 Heaters MSS Trunklines 1, 2, 3, 6, 7 USOS Trunklines 3, 4, 8, 9, 11, 12, 13, 23 to 26 VBSP Orbiter Video Channel 1	AVU-1 VTR-1 VSU-1 <sup>(3)</sup> CVIU-1 <sup>(3)</sup> , 2, 3, 12 SCU-1 <sup>(3)</sup> EVSU-1, -3 EVSU-2 Heaters MSS Trunklines 4, 5, 8, 9 USOS Trunklines 1, 2, 5-7, 10, 14-22 Orbiter Video Channel 2	
<b>Data</b>	HCOR High Rate Frame Mux (HRFM) High Rate Modem (HRM) Ku-Band Fwd Receiver (powered from EXPRESS Rack 4)		

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## Notes

- <sup>(1)</sup> Equipment powered off for the Z1 SPDA Patch Panel Reconfiguration.
- <sup>(2)</sup> Assumes Av Rack Power Jumper installed to power AV Rack 2 from Channel 2/3.
- <sup>(3)</sup> Could be powered, if needed, while the Av Rack Power Jumper is connected to power Av Rack 2 from Channel 2/3.
- <sup>(4)</sup> Assumes Node 1 Y-Jumper installed to power Node loads from RACU 6.
- <sup>(5)</sup> Assumes S0/N1 Primary Power Jumper installed but not connected.

**CHANNEL 1/4 POWERDOWN SUMMARY - (EVA 3)**

(ASSY OPS/12A.1/FIN)

Page 4 of 10 pages

	1/4 Power Reconfiguration		Z1 SPDA Power Reconfig
	Powered	Unpowered	Unpowered <sup>(1)</sup>
<b>VCSA Ports</b>	<u>WETAs:</u> Port 8 (P1UPOB) Port 12 (NOD1UP)  <u>ETVCGs:</u> Port 3 (S1 LOOB) Heaters Port 9 (P1 LOOB) Heaters Port 13 (LAB_S) Heaters  FPMU - Port 2 (S1 UPOB)	<u>WETAs:</u> Port 8 (P1UPOB) Heaters Port 12 (NOD1UP) Heaters  <u>ETVCGs:</u> Port 3 (S1 LOOB) Port 9 (P1 LOOB) Port 13 (LAB_S)  FPMU - Port 2 (S1 UPOB) Heaters	

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Notes

- <sup>(1)</sup> Equipment powered off for the Z1 SPDA Patch Panel Reconfiguration.
- <sup>(2)</sup> Assumes Av Rack Power Jumper installed to power AV Rack 2 from Channel 2/3.
- <sup>(3)</sup> Could be powered, if needed, while the Av Rack Power Jumper is connected to power Av Rack 2 from Channel 2/3.
- <sup>(4)</sup> Assumes Node 1 Y-Jumper installed to power Node loads from RACU 6.
- <sup>(5)</sup> Assumes S0/N1 Primary Power Jumper installed but not connected.

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**CHANNEL 1/4 POWERDOWN SUMMARY - (EVA 3)**

(ASSY OPS/12A.1/FIN)

Page 5 of 10 pages

	1/4 Power Reconfiguration		Z1 SPDA Power Reconfig
	Powered	Unpowered	Unpowered <sup>(1)</sup>
<b>ECLSS</b>			
<b>Node</b>	N1 Fwd Port IMV Valve N1 Fwd Stbd IMV Valve N1 Stbd Aft IMV Fan Node 1 Smoke Detector 2 N1 Stbd Fwd IMV Valve <sup>(4)</sup> N1 Stbd Aft IMV Valve <sup>(4)</sup> N1 Aft Stbd IMV Valve <sup>(4)</sup> N1 Aft Port IMV Valve <sup>(4)</sup> N1 Aft Port IMV Fan <sup>(4)</sup> N1 RAMV <sup>(4)</sup> N1 Cabin Fan <sup>(4)</sup> N1 Smoke Detector 1 <sup>(4)</sup>		
<b>LAB</b>	LAB Aft Port IMV Valve LAB Aft Stbd IMV Valve LAB Fwd Stbd IMV Fan LAB Smoke Detector SD5 LAB1S6 CCAA Stbd Waste Water Vent Valve ARS Rack (AAA, MCA, CDRA, TCCS, Rack Smoke Detector)	LAB Aft Port IMV Fan LAB Fwd Port IMV Fan LAB Fwd Stbd IMV Valve Pressure Control Assembly LAB1P6 CCAA Port Waste Water Vent Valve LAB Smoke Detector PD1	
<b>A/L</b>	Pressure Control Assembly Smoke Detectors A/L CCAA	Depress Pump ORCA Metox	

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Notes

- (1) Equipment powered off for the Z1 SPDA Patch Panel Reconfiguration.
- (2) Assumes Av Rack Power Jumper installed to power AV Rack 2 from Channel 2/3.
- (3) Could be powered, if needed, while the Av Rack Power Jumper is connected to power Av Rack 2 from Channel 2/3.
- (4) Assumes Node 1 Y-Jumper installed to power Node loads from RACU 6.
- (5) Assumes S0/N1 Primary Power Jumper installed but not connected.

**CHANNEL 1/4 POWERDOWN SUMMARY - (EVA 3)**

(ASSY OPS/12A.1/FIN)

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	1/4 Power Reconfiguration		Z1 SPDA Power Reconfig
	Powered	Unpowered	Unpowered <sup>(1)</sup>
<b>EPS</b>			
<b>Lights</b>	Node: NOD1OS4 NOD1PD2 NOD1OS2-1 (Fwd) NOD1OS2-2 (Aft) LAB: LAB1OS2            A/L: LAB1OS4            A/L1OF1 LAB1OS6            A/L1OA1 LAB1OP1            A/L1F3 LAB1OP3            A/L1A3 LAB1OP5 CETA: LAB S1-2 N1-2 S1-1 Luminaire Heater N1-1 Luminaire Heater	Node: NOD1OP4 NOD1SD2 NOD1OP2-1 (Fwd) NOD1OP2-2 (Aft) LAB: LAB1OS1 LAB1OS3 LAB1OS5 LAB1OP2 LAB1OP4 LAB1OP6 CETA: S1-1 N1-1 LAB Luminaire Heater S1-2 Luminaire Heater N1-2 Luminaire Heater	
<b>SARJ</b>	SARJ RJMC P3-2 SARJ RJMC P3-1 Heaters	SARJ RJMC P3-1 SARJ RJMC P3-2 heaters	
<b>Russian Power</b>	FGB ARCUs 51 and 52 (1 & 2) <sup>(1)</sup> FGB ARCUs 53 and 54 (3 & 4) <sup>(1)</sup> SM SNTs 1 and 2 <sup>(1)</sup> SM SNTs 3 and 4 <sup>(1)</sup>		FGB ARCUs 51 and 52 <sup>(5)</sup> FGB ARCUs 53 and 54 <sup>(5)</sup> SM SNTs 21 and 22 <sup>(5)</sup> SM SNTs 23 and 24 <sup>(5)</sup>

Notes

- <sup>(1)</sup> Equipment powered off for the Z1 SPDA Patch Panel Reconfiguration.
- <sup>(2)</sup> Assumes Av Rack Power Jumper installed to power AV Rack 2 from Channel 2/3.
- <sup>(3)</sup> Could be powered, if needed, while the Av Rack Power Jumper is connected to power Av Rack 2 from Channel 2/3.
- <sup>(4)</sup> Assumes Node 1 Y-Jumper installed to power Node loads from RACU 6.
- <sup>(5)</sup> Assumes S0/N1 Primary Power Jumper installed but not connected.

**CHANNEL 1/4 POWERDOWN SUMMARY - (EVA 3)**

(ASSY OPS/12A.1/FIN)

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	1/4 Power Reconfiguration		Z1 SPDA Power Reconfig
	Powered	Unpowered	Unpowered <sup>(1)</sup>
<b>Misc</b>	MBSU 1, 4 Coldplate Heaters DDCU S0-4B, S0-1A, S1-4B Coldplate Heaters  A/L Power Supply Assembly (PSA)  PCU Z1-3B PCU Z1-3B Heater <sup>(1)</sup> PCU Z1-4B <sup>(1)</sup> PCU Z1-4B Heater	MBSU 2, 3 Coldplate Heaters DDCU S0-2B, S0-3B P1-3A Coldplate Heaters  A/L Battery Charger	PCU Z1-3B Heater PCU Z1-4B RPCM Z14B-A RPCM Z14B-B

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Notes

- <sup>(1)</sup> Equipment powered off for the Z1 SPDA Patch Panel Reconfiguration.
- <sup>(2)</sup> Assumes Av Rack Power Jumper installed to power AV Rack 2 from Channel 2/3.
- <sup>(3)</sup> Could be powered, if needed, while the Av Rack Power Jumper is connected to power Av Rack 2 from Channel 2/3.
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**CHANNEL 1/4 POWERDOWN SUMMARY - (EVA 3)**

(ASSY OPS/12A.1/FIN)

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	1/4 Power Reconfiguration		Z1 SPDA Power Reconfig
	Powered	Unpowered	Unpowered <sup>(1)</sup>
<b>MCS</b>	CMG-2 CMG-3 CMG-4 <sup>(1)</sup> CMG 1 Heater CMG 2 Heater <sup>(1)</sup> CMG 3 Heater <sup>(1)</sup> CMG 4 Heater RGA-2 SIGI-2	CMG-1 RGA-1 SIGI-1	CMG-4 CMG-2 Heater CMG-3 Heater
<b>Payloads</b>	Racks: *LAB1O1 (EXPRESS-2) *LAB1O2 (EXPRESS-1) *LAB1O3 (EXPRESS-3) *LAB1O4 (MELFI) LAB1P2 (EXPRESS-4) *LAB1P4 (HRF-2) *LAB1S3 (MSG) *LAB1S4 (EXPRESS-5) *These racks may be powered off for power savings.	Racks: LAB1S2 (HRF-1)	
<b>Robotics</b>	Cupola RWS (LAB1S5) MBS/SSRMS Redundant String MT 3A Power Channel 1 SSRMS Camera or the Mast Camera	LAB RWS (LAB1P5) MBS/SSRMS Prime String MT 4B Power Channel	
<b>S&amp;M</b>			

Notes

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**CHANNEL 1/4 POWERDOWN SUMMARY - (EVA 3)**

(ASSY OPS/12A.1/FIN)

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	1/4 Power Reconfiguration		Z1 SPDA Power Reconfig
	Powered	Unpowered	Unpowered <sup>(1)</sup>
<b>TCS</b>			
<b>ITCS</b>	LAB MTL System LAB LTL IFHX Heaters Loop Crossover Assembly Valve 2	LAB LTL System LAB MTL IFHX Heaters Loop Crossover Assembly Valve 1	
<b>ETCS</b>	Loop B PM PCVP Loop B PM Htr 2 Loop B PM Line Heaters Loop B PM Bypass Return Flowmeter Loop B PM Outlet Flowmeter Loop B NTA Tank and GPRV Heater 2 Loop B ATA Tanks - Heater 2  Loop A PM Heater 1 Loop A NTA Tank and GPRV Heater 1 Loop A ATA Tanks - Heater 1	Loop A PM PCVP Loop A PM Htr 2 Loop A PM Line Heaters Loop A PM Bypass Return Flowmeter Loop A PM Outlet Flowmeter Loop A NTA Tank and GPRV Heater 2 Loop A ATA Tanks - Heater 2  Loop B PM Heater 1 Loop B NTA Tank and GPRV Heater 1 Loop B ATA Tanks - Heater 1	
<b>EETCS</b>	All Loop A equipment All Loop B equipment		

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**CHANNEL 1/4 POWERDOWN SUMMARY - (EVA 3)**

(ASSY OPS/12A.1/FIN)

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	1/4 Power Reconfiguration		Z1 SPDA Power Reconfig
	Powered	Unpowered	Unpowered <sup>(1)</sup>
<b>Radiators</b>	TRRJ RJMC P1-2 TRRJ RJMC S1-2  <u>Heaters:</u> RJMC S1-1 Htrs 2 and 3 RJMC S1-2 Htrs 1 and 4 RJMC P1-1 Htr Gp-1 Htr-2 and GP-2 Htr-3 RJMC P1-2 Gp-1 Htr-1 and Gp-2 Htr-4 DLA S1-2 Htr DLA P1-2 Htr TRRJ P1 Cradle Htr Radiator Beam P1 Misc Groups 1 to 4 Power Buses Radiator Beam S1 Thermo Groups 1 to 3 Power Buses	TRRJ RJMC S1-1 TRRJ RJMC P1-1  <u>Heaters:</u> RJMC S1-1 Htr 1 and Htr 4 RJMC S1-2 Htr 2 and Htr 3 RJMC P1-2 Gp-1 Htr-1 and Gp-2 Htr-2 RJMC P1-2 Gp-1 Htr-2 and Gp-2 Htr-1 DLA S1-1 Htr DLA P1-1 Htr TRRJ S1 Cradle Htr Radiator Beam S1 Misc Groups 1 to 4 Power Buses Radiator Beam P1 Thermo Groups 1 to 3 Power Buses	
<b>CIO</b>	Ops LAN Equipment Channel 2/3 SSCs Channel 2/3 Printers SSC Fileserver OCA Router	Ops LAN Equipment Channel 1/4 SSCs	
<b>UOPs</b>	NODE UOP 2 (NOD1PD4) LAB UOP 3 (LAB1OP2) LAB UOP 4 (LAB1OP4) LAB UOP 5 (LAB1PD2) CUPOLA RWS (LAB UOP 8 bypass) A/L UOP	NODE UOP 1 (NOD1SD4) LAB UOP 1 (LAB1OS2) LAB UOP 2 (LAB1OS4) LAB UOP 6 (LAB1SD4) LAB RWS (LAB UOP 7 bypass)	

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# INTERNATIONAL SPACE STATION

# ASSEMBLY OPERATIONS BOOK

