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<u>Page</u>	<u>Paragraph(s)</u>	<u>Figure(s)</u>	<u>Table(s)</u>	*R	*A	*D
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Table of Contents				X		
2-2	2.1			X		
2-4	2.1			X		
3-1	3.1.1.1.C			X		
3-23	3.1.2.4, 3.1.3			X		
3-38	3.2.2.9					X
3-40a	3.2.2.12				X	
3-57	3.3.5.1.9			X		
3-66	3.3.8.1.E			X		
3-67		3.3.8.1-1		X		
3-68	3.3.8.2.2.A			X		
3-80	3.4.1.4.B, 3.4.1.4.C			X		
3-96			3.9.4-1	X		
3-97			3.9.4-2			X
3-99		3.9.4-2, 3.9.4-3				X
3-100		3.9.4-4				X
3-119			3.12.3.4-1, 3.12.3.4-2	X		
4-7	4.3.1.1.7.B			X		
4-21	4.3.2.2.9					X
4-21	4.3.2.2.12				X	

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THE INFORMATION CONTAINED IN THE "PRESSURIZED PAYLOAD INTERFACE REQUIREMENTS DOCUMENT IS "INTERFACE REQUIREMENT" DATA, WHICH IS CONTROLLED BY THE EXPORT ADMINISTRATION REGULATIONS (EAR) (15 CFR PARAT 730 et.seq.) AND CLASSIFIED AS EAR99 UNDER THE EAR. RE-EXPORT OR RE-TRANSMISSION OF SUCH DATA IN VIOLATION OF THE EAR OR OTHER EXPORT CONTROL LAWS AND REGULATIONS IS PROHIBITED.



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004176	24-APR-01	57000-NA-0198A 57000-NA-0203 57000-NA-0208 57000-NA-0222 57000-NA-0235A	3.2.2.3 1.1, 2.1, 3.3.1, 3.3.4.1.1.1, 3.3.4.1.1.2, 3.3.4.1.2, 3.3.4.1.3, 3.3.4.1.4, 3.3.4.2, 3.3.4.2.1, 3.3.4.2.2, 3.3.6.1.1, Appendix A TABLE(S) 3.12.3.3.2-1 PARAGRAPH(S) 3.2.5.1.1 3.2.5.2, 3.3.10.1, 4.3.2.5.2, 4.3.3.10.1, TABLE(S) 3.2.5.2-1
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IRN 0001

IRN 0004

TABLE OF CONTENTS

PARAGRAPH		PAGE
1.0	INTRODUCTION	1 – 1
1.1	PURPOSE	1 – 1
1.2	SCOPE	1 – 1
1.3	USE	1 – 1
1.4	EXCEPTIONS	1 – 1
1.5	CONTROL AND MAINTENANCE	1 – 3
2.0	DOCUMENTATION	2 – 1
2.1	APPLICABLE DOCUMENTS	2 – 1
2.2	REFERENCE DOCUMENTS	2 – 5
3.0	PAYLOAD INTERFACE REQUIREMENTS AND GUIDANCE	3 – 1
3.1	STRUCTURAL/MECHANICAL, AND MICROGRAVITY AND STOWAGE INTERFACE REQUIREMENTS	3 – 1
3.1.1	STRUCTURAL/MECHANICAL	3 – 1
3.1.1.1	GSE INTERFACES	3 – 1
3.1.1.2	MPLM INTERFACES	3 – 1
3.1.1.2.1	MPLM LATE/EARLY ACCESS REQUIREMENTS	3 – 2
3.1.1.2.1.1	MPLM LATE ACCESS ENVELOPE (KSC)	3 – 2
3.1.1.2.1.2	MPLM EARLY ACCESS ENVELOPES (KSC AND DFRC)	3 – 6
3.1.1.3	LOADS REQUIREMENTS	3 – 7
3.1.1.4	RACK REQUIREMENTS	3 – 9
3.1.1.4.1	LAB WINDOW RACK LOCATION REQUIREMENTS	3 – 10
3.1.1.5	SAFETY CRITICAL STRUCTURES REQUIREMENTS	3 – 12
3.1.1.6	CONNECTOR AND UMBILICAL PHYSICAL MATE	3 – 12
3.1.1.6.1	CONNECTOR PHYSICAL MATE	3 – 12
3.1.1.6.2	UMBILICAL PHYSICAL MATE	3 – 14
3.1.1.7	ON-ORBIT PAYLOAD PROTRUSIONS	3 – 14
3.1.1.7.1	ON-ORBIT PERMANENT PROTRUSIONS	3 – 15
3.1.1.7.2	ON-ORBIT SEMI-PERMANENT PROTRUSIONS	3 – 15
3.1.1.7.3	ON-ORBIT TEMPORARY PROTRUSIONS	3 – 17
3.1.1.7.4	ON-ORBIT MOMENTARY PROTRUSIONS	3 – 18
3.1.1.7.5	ON-ORBIT PROTRUSIONS FOR KEEP ALIVE PAYLOADS	3 – 19
3.1.2	MICROGRAVITY	3 – 22
3.1.2.1	QUASI-STEADY REQUIREMENTS	3 – 22
3.1.2.2	VIBRATORY REQUIREMENTS	3 – 23
3.1.2.3	TRANSIENT REQUIREMENTS	3 – 23
3.1.2.4	MICROGRAVITY ENVIRONMENT	3 – 23
3.1.2.5	ARIS INTERFACES	3 – 23
3.1.3	STOWAGE	3 – 23
3.2	ELECTRICAL INTERFACE REQUIREMENTS	3 – 23

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
3.2.1	ELECTRICAL POWER CHARACTERISTICS	3 – 23
3.2.1.1	STEADY-STATE VOLTAGE CHARACTERISTICS	3 – 24
3.2.1.1.1	INTERFACE B	3 – 24
3.2.1.1.2	INTERFACE C	3 – 24
3.2.1.2	RIPPLE VOLTAGE CHARACTERISTICS	3 – 25
3.2.1.2.1	RIPPLE VOLTAGE AND NOISE	3 – 25
3.2.1.2.2	RIPPLE VOLTAGE SPECTRUM	3 – 25
3.2.1.3	TRANSIENT VOLTAGES	3 – 26
3.2.1.3.1	INTERFACE B	3 – 26
3.2.1.3.2	INTERFACE C	3 – 26
3.2.1.3.3	FAULT CLEARING AND PROTECTION	3 – 26
3.2.1.3.4	NON-NORMAL VOLTAGE RANGE	3 – 29
3.2.1.4	DELETE	3 – 29
3.2.2	ELECTRICAL POWER INTERFACE	3 – 29
3.2.2.1	UIP AND UOP CONNECTORS AND PIN ASSIGNMENTS	3 – 29
3.2.2.2	POWER BUS ISOLATION	3 – 29
3.2.2.3	COMPATIBILITY WITH SOFT START/STOP RPC	3 – 30
3.2.2.4	SURGE CURRENT	3 – 31
3.2.2.5	REVERSE ENERGY/CURRENT	3 – 33
3.2.2.6	CIRCUIT PROTECTION DEVICES	3 – 33
3.2.2.6.1	ISS EPS CIRCUIT PROTECTION CHARACTERISTICS	3 – 33
3.2.2.6.1.1	REMOTE POWER CONTROLLERS (RPCS)	3 – 33
3.2.2.6.2	EPCE RPC INTERFACE REQUIREMENTS	3 – 34
3.2.2.6.2.1	RPC TRIP COORDINATION	3 – 34
3.2.2.6.2.1.1	PAYLOAD TRIP RATINGS	3 – 34
3.2.2.6.2.1.2	DELETED	3 – 34
3.2.2.7	EPCE COMPLEX LOAD IMPEDANCES	3 – 34
3.2.2.7.1	INTERFACE B	3 – 34
3.2.2.7.2	INTERFACE C	3 – 38
3.2.2.8	LARGE SIGNAL STABILITY	3 – 38
3.2.2.9	DELETED	3 – 38
3.2.2.10	ELECTRICAL LOAD-STAND ALONE STABILITY	3 – 38
3.2.2.11	ELECTRICAL LOAD INDUCTANCE	3 – 38
3.2.2.12	MAXIMUM LOAD STEP SIZE	3 – 40a
3.2.3	ELECTRICAL POWER CONSUMER CONSTRAINTS	3 – 41
3.2.3.1	WIRE DERATING	3 – 41
3.2.3.2	EXCLUSIVE POWER FEEDS	3 – 41
3.2.3.3	LOSS OF POWER	3 – 42
3.2.4	ELECTROMAGNETIC COMPATIBILITY	3 – 42

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
3.2.4.1	ELECTRICAL GROUNDING	3 – 42
3.2.4.2	ELECTRICAL BONDING	3 – 42
3.2.4.3	CABLE/WIRE DESIGN AND CONTROL REQUIREMENTS	3 – 42
3.2.4.4	ELECTROMAGNETIC INTERFERENCE	3 – 42
3.2.4.5	ELECTROSTATIC DISCHARGE	3 – 43
3.2.4.6	ALTERNATING CURRENT (AC) MAGNETIC FIELDS	3 – 43
3.2.4.7	DIRECT CURRENT (DC) MAGNETIC FIELDS	3 – 43
3.2.4.8	CORONA	3 – 44
3.2.4.9	LIGHTNING	3 – 44
3.2.4.10	EMI SUSCEPTIBILITY FOR SAFETY-CRITICAL CIRCUITS	3 – 44
3.2.5	SAFETY REQUIREMENTS	3 – 44
3.2.5.1	PAYLOAD ELECTRICAL SAFETY	3 – 44
3.2.5.1.1	MATING/DEMATING OF POWERED CONNECTORS	3 – 44
3.2.5.1.2	SAFETY-CRITICAL CIRCUITS REDUNDANCY	3 – 44
3.2.5.2	RACK MAINTENANCE SWITCH (RACK POWER SWITCH)	3 – 44
3.2.5.3	POWER SWITCHES/CONTROLS	3 – 45
3.2.5.4	GROUND FAULT CIRCUIT INTERRUPTERS (GFCI)/ PORTABLE EQUIPMENT DC SOURCING VOLTAGE	3 – 45
3.2.5.5	PORTABLE EQUIPMENT/POWER CORDS	3 – 46
3.2.5.6	DELETED	3 – 47
3.2.6	MPLM	3 – 47
3.2.6.1	MPLM ELECTRICAL POWER CHARACTERISTICS	3 – 47
3.2.6.2	MPLM ELECTRICAL POWER INTERFACE	3 – 48
3.2.6.2.1	MPLM UIP CONNECTORS AND PIN ASSIGNMENTS	3 – 48
3.2.6.2.2	COMPATIBILITY WITH RPC SOFT START/STOP IN MPLM	3 – 48
3.2.6.2.3	MPLM SURGE CURRENT	3 – 49
3.2.6.2.4	MPLM REVERSE ENERGY/CURRENT	3 – 49
3.2.6.2.5	MPLM PAYLOAD TRIP RATINGS	3 – 50
3.2.6.3	MPLM ELECTRICAL POWER CONSUMER CONSTRAINTS	3 – 50
3.2.6.4	MPLM ELECTROMAGNETIC COMPATIBILITY	3 – 50
3.2.6.4.1	MPLM BONDING	3 – 51
3.2.6.5	MPLM SAFETY REQUIREMENTS	3 – 51
3.3	COMMAND AND DATA HANDLING INTERFACE REQUIREMENTS	3 – 51
3.3.1	DELETED	3 – 51
3.3.2	WORD/BYTE NOTATIONS, TYPES AND DATA TRANSMISSIONS	3 – 51
3.3.2.1	WORD/BYTE NOTATIONS	3 – 51
3.3.2.2	DATA TYPES	3 – 51
3.3.2.3	DATA TRANSMISSIONS	3 – 52

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
3.3.3	DELETED	3 – 52
3.3.4	CONSULTATIVE COMMITTEE FOR SPACE DATA SYSTEMS	3 – 52
3.3.4.1	CCSDS DATA	3 – 52
3.3.4.1.1	CCSDS DATA PACKETS	3 – 52
3.3.4.1.1.1	CCSDS PRIMARY HEADER	3 – 52
3.3.4.1.1.2	CCSDS SECONDARY HEADER	3 – 53
3.3.4.1.2	CCSDS DATA FIELD	3 – 53
3.3.4.1.3	CCSDS DATA BITSTREAM	3 – 53
3.3.4.1.4	CCSDS APPLICATION PROCESS IDENTIFICATION FIELD	3 – 53
3.3.4.2	CCSDS TIME CODES	3 – 53
3.3.4.2.1	CCSDS UNSEGMENTED TIME	3 – 53
3.3.4.2.1.1	CCSDS PRIMARY HEADER	3 – 53
3.3.4.2.1.2	CCSDS SECONDARY HEADER	3 – 53
3.3.4.2.2	CCSDS DATA FIELD	3 – 54
3.3.5	MIL-STD-1553B LOW RATE DATA LINK (LRDL)	3 – 54
3.3.5.1	MIL-STD-1553B PROTOCOL	3 – 54
3.3.5.1.1	STANDARD MESSAGES	3 – 54
3.3.5.1.2	COMMANDING	3 – 54
3.3.5.1.3	HEALTH AND STATUS DATA	3 – 54
3.3.5.1.4	SAFETY DATA	3 – 55
3.3.5.1.4.1	CAUTION AND WARNING	3 – 55
3.3.5.1.4.1.1	CLASS 1 – EMERGENCY	3 – 55
3.3.5.1.4.1.2	CLASS 2 – WARNING	3 – 56
3.3.5.1.4.1.3	CLASS 3 – CAUTION	3 – 56
3.3.5.1.4.1.4	CLASS 4 – ADVISORY	3 – 56
3.3.5.1.5	SERVICE REQUESTS	3 – 57
3.3.5.1.6	ANCILLARY DATA	3 – 57
3.3.5.1.7	FILE TRANSFER	3 – 57
3.3.5.1.8	LOW RATE TELEMETRY	3 – 57
3.3.5.1.9	DEFINED MODE CODES	3 – 57
3.3.5.1.10	IMPLEMENTED MODE CODES	3 – 57
3.3.5.1.11	UNIMPLEMENTED/UNDEFINED MODE CODES	3 – 58
3.3.5.1.12	ILLEGAL COMMANDS	3 – 58
3.3.5.2	MIL-STD-1553B LOW RATE DATA LINK (LRDL) INTERFACE CHARACTERISTICS	3 – 58
3.3.5.2.1	LRDL REMOTE TERMINAL ASSIGNMENT	3 – 58
3.3.5.2.1.1	LRDL CONNECTOR/PIN ASSIGNMENTS	3 – 58
3.3.5.2.1.2	MIL-STD-1553B BUS A AND B CONNECTOR/PIN ASSIGNMENT	3 – 58
3.3.5.2.1.3	DELETED	3 – 58

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
3.3.5.2.1.4	REMOTE TERMINAL HARDWIRED ADDRESS CODING	3 – 58
3.3.5.2.2	LRDL SIGNAL CHARACTERISTICS	3 – 60
3.3.5.2.3	LRDL CABLING	3 – 60
3.3.5.2.4	MULTI-BUS ISOLATION	3 – 61
3.3.6	MEDIUM RATE DATA LINK (MRDL)	3 – 61
3.3.6.1	MRDL PROTOCOL	3 – 61
3.3.6.1.1	INTEGRATED RACK PROTOCOLS ON THE MRDL	3 – 61
3.3.6.1.2	MRDL ADDRESS	3 – 61
3.3.6.1.3	ISPR MRDL CONNECTIVITY	3 – 62
3.3.6.1.4	MRDL CONNECTOR/PIN ASSIGNMENTS AND WIRE REQUIREMENTS	3 – 62
3.3.6.1.4.1	DELETED	3 – 63
3.3.6.1.4.2	DELETED	3 – 63
3.3.6.1.5	MRDL SIGNAL CHARACTERISTICS	3 – 63
3.3.6.1.6	MRDL CABLE CHARACTERISTICS	3 – 63
3.3.6.1.6.1	INSERTION LOSS	3 – 63
3.3.6.1.6.2	DIFFERENTIAL CHARACTERISTIC IMPEDANCE	3 – 63
3.3.6.1.6.3	MEDIUM TIMING JITTER	3 – 63
3.3.7	HIGH RATE DATA LINK (HRDL)	3 – 64
3.3.7.1	PAYLOAD TO HIGH RATE FRAME MULTIPLEXER (HRFM) PROTOCOLS	3 – 64
3.3.7.2	HRDL INTERFACE CHARACTERISTICS	3 – 64
3.3.7.2.1	PHYSICAL SIGNALING	3 – 64
3.3.7.2.1.1	PHYSICAL SIGNALING DATE RATES	3 – 64
3.3.7.2.2	ENCODING	3 – 65
3.3.7.2.3	DELETED	3 – 65
3.3.7.3	INTEGRATED RACK HRDL OPTICAL POWER	3 – 65
3.3.7.3.1	INTEGRATED RACK HRDL TRANSMITTED OPTICAL POWER	3 – 65
3.3.7.3.2	INTEGRATED RACK HRDL RECEIVED OPTICAL POWER	3 – 65
3.3.7.4	HRDL FIBER OPTIC CABLE	3 – 65
3.3.7.5	HRDL FIBER OPTIC CABLE BEND RADIUS	3 – 65
3.3.7.6	HRDL CONNECTORS AND FIBER	3 – 66
3.3.7.7	DELETED	3 – 66
3.3.8	PERSONAL COMPUTERS	3 – 66
3.3.8.1	PAYLOAD LAPTOP	3 – 66
3.3.8.2	PCS	3 – 68
3.3.8.2.1	PCS TO UOP INTERFACE	3 – 68
3.3.8.2.2	760XD LAPTOP TO RACK INTERFACE	3 – 68
3.3.8.3	SSC	3 – 69

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
3.3.9	UOP	3 – 69
3.3.10	MAINTENANCE SWITCH, SMOKE DETECTOR, SMOKE INDICATOR, AND INTEGRATED RACK FAN INTERFACES	3 – 69
3.3.10.1	RACK MAINTENANCE SWITCH (RACK POWER SWITCH) INTERFACES	3 – 69
3.3.10.2	SMOKE DETECTOR INTERFACES	3 – 70
3.3.10.2.1	ANALOG INTERFACE CHARACTERISTICS	3 – 70
3.3.10.2.2	DISCRETE COMMAND BUILT-IN-TEST INTERFACE CHARACTERISTICS	3 – 71
3.3.10.2.3	SMOKE INDICATOR ELECTRICAL INTERFACES	3 – 71
3.3.10.2.4	FAN VENTILATION STATUS ELECTRICAL INTERFACES	3 – 72
3.3.10.3	RACK MAINTENANCE SWITCH (RACK POWER SWITCH)/FIRE DETECTION SUPPORT INTERFACE CONNECTOR	3 – 72
3.4	PAYLOAD NTSC VIDEO AND AUDIO INTERFACE REQUIREMENTS	3 – 72
3.4.1	PAYLOAD NTSC VIDEO INTERFACE REQUIREMENTS	3 – 73
3.4.1.1	PAYLOAD NTSC OPTICAL VIDEO CHARACTERISTICS	3 – 73
3.4.1.2	NTSC FIBER OPTIC VIDEO	3 – 74
3.4.1.2.1	PULSE FREQUENCY MODULATION NTSC FIBER OPTIC VIDEO CHARACTERISTICS	3 – 74
3.4.1.2.2	INTEGRATED RACK NTSC PFM VIDEO TRANSMITTED OPTICAL POWER	3 – 74
3.4.1.2.3	INTEGRATED RACK NTSC PFM VIDEO AND SYNC SIGNAL RECEIVED OPTICAL POWER	3 – 75
3.4.1.2.4	FIBER OPTIC CABLE CHARACTERISTICS	3 – 75
3.4.1.2.5	PFM NTSC VIDEO FIBER OPTIC CABLE BEND RADIUS	3 – 75
3.4.1.2.6	DELETED	3 – 76
3.4.1.2.7	PFM NTSC OPTICAL CONNECTOR/PIN ASSIGNMENTS	3 – 76
3.4.1.3	NTSC ELECTRICAL VIDEO INTERFACES	3 – 76
3.4.1.3.1	CABLES	3 – 76
3.4.1.3.2	SIGNAL STANDARD	3 – 76
3.4.1.3.3	INTERFACE CIRCUIT	3 – 78
3.4.1.3.4	CROSS TALK	3 – 78
3.4.1.4	NTSC ELECTRICAL CONNECTOR/PIN ASSIGNMENTS	3 – 80
3.4.2	U.S. ELEMENT AUDIO INTERFACE REQUIREMENTS	3 – 80
3.5	THERMAL CONTROL INTERFACE REQUIREMENTS	3 – 80
3.5.1	INTERNAL THERMAL CONTROL SYSTEM (ITCS) INTERFACE REQUIREMENTS	3 – 80
3.5.1.1	PHYSICAL INTERFACE	3 – 80
3.5.1.2	ITCS FLUID USE AND CHARGING	3 – 80
3.5.1.3	ITCS PRESSURE DROP	3 – 81

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
3.5.1.3.1	ON-ORBIT INTERFACES	3 – 81
3.5.1.3.2	MPLM INTERFACES	3 – 81
3.5.1.4	COOLANT FLOW RATE	3 – 81
3.5.1.5	COOLANT SUPPLY TEMPERATURE	3 – 82
3.5.1.6	COOLANT RETURN TEMPERATURE	3 – 82
3.5.1.7	COOLANT MAXIMUM DESIGN PRESSURE	3 – 82
3.5.1.8	FAIL SAFE DESIGN	3 – 83
3.5.1.9	LEAKAGE	3 – 83
3.5.1.10	QUICK-DISCONNECT AIR INCLUSION	3 – 83
3.5.1.11	RACK FRONT SURFACE TEMPERATURE	3 – 83
3.5.1.12	CABIN AIR HEAT LEAK	3 – 83
3.5.1.13	MPLM CABIN AIR COOLING	3 – 84
3.5.1.14	SIMULTANEOUS COOLING	3 – 84
3.5.1.15	CONTROL SYSTEM TIME CONSTANT	3 – 84
3.5.1.16	PAYLOAD COOLANT QUANTITY	3 – 85
3.5.1.17	PAYLOAD GAS INCLUSION (TBR #6)	3 – 85
3.6	VACUUM SYSTEM REQUIREMENTS	3 – 85
3.6.1	VACUUM EXHAUST SYSTEM (VES)/WASTE GAS SYSTEM (WGS) REQUIREMENTS	3 – 85
3.6.1.1	VES/WGS PHYSICAL INTERFACE	3 – 85
3.6.1.2	INPUT PRESSURE LIMIT	3 – 85
3.6.1.3	INPUT TEMPERATURE LIMIT	3 – 85
3.6.1.4	INPUT DEWPOINT LIMIT	3 – 85
3.6.1.5	ACCEPTABLE EXHAUST GASES	3 – 86
3.6.1.5.1	ACCEPTABLE GASES – LIST	3 – 86
3.6.1.5.2	EXTERNAL CONTAMINATION CONTROL	3 – 86
3.6.1.5.3	INCOMPATIBLE GASES	3 – 86
3.6.1.6	PAYLOAD VACUUM SYSTEM ACCESS VALVE	3 – 87
3.6.2	VACUUM RESOURCE SYSTEM (VRS)/VACUUM VENT SYSTEM (VVS) REQUIREMENTS	3 – 87
3.6.2.1	VRS/VVS PHYSICAL INTERFACE	3 – 87
3.6.2.2	INPUT PRESSURE LIMIT	3 – 87
3.6.2.3	VRS/VVS THROUGH-PUT LIMIT	3 – 87
3.6.2.4	ACCEPTABLE GASES	3 – 87
3.7	PRESSURIZED GASES INTERFACE REQUIREMENTS	3 – 88
3.7.1	NITROGEN INTERFACE REQUIREMENTS	3 – 88
3.7.1.1	NITROGEN INTERFACE CONTROL	3 – 88
3.7.1.2	NITROGEN INTERFACE MDP	3 – 88
3.7.1.3	NITROGEN INTERFACE TEMPERATURE	3 – 88

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
3.7.1.4	NITROGEN LEAKAGE	3 – 88
3.7.1.5	NITROGEN PHYSICAL INTERFACE	3 – 88
3.7.2	ARGON INTERFACE REQUIREMENTS	3 – 88
3.7.2.1	ARGON INTERFACE CONTROL	3 – 88
3.7.2.2	ARGON INTERFACE MDP	3 – 89
3.7.2.3	ARGON INTERFACE TEMPERATURE	3 – 89
3.7.2.4	ARGON LEAKAGE	3 – 89
3.7.2.5	ARGON PHYSICAL INTERFACE	3 – 89
3.7.3	CARBON DIOXIDE INTERFACE REQUIREMENTS	3 – 89
3.7.3.1	CARBON DIOXIDE INTERFACE CONTROL	3 – 89
3.7.3.2	CARBON DIOXIDE INTERFACE MDP	3 – 89
3.7.3.3	CARBON DIOXIDE INTERFACE TEMPERATURE	3 – 90
3.7.3.4	CARBON DIOXIDE LEAKAGE	3 – 90
3.7.3.5	CARBON DIOXIDE PHYSICAL INTERFACE	3 – 90
3.7.4	HELIUM INTERFACE REQUIREMENTS	3 – 90
3.7.4.1	HELIUM INTERFACE CONTROL	3 – 90
3.7.4.2	HELIUM INTERFACE MDP	3 – 90
3.7.4.3	HELIUM INTERFACE TEMPERATURE	3 – 90
3.7.4.4	HELIUM LEAKAGE	3 – 90
3.7.4.5	HELIUM PHYSICAL INTERFACE	3 – 91
3.7.5	PRESSURIZED GAS SYSTEMS	3 – 91
3.7.6	MANUAL VALVES	3 – 91
3.8	PAYLOAD SUPPORT SERVICES INTERFACES REQUIREMENTS	3 – 91
3.8.1	POTABLE WATER	3 – 91
3.8.1.1	POTABLE WATER INTERFACE CONNECTION	3 – 91
3.8.1.2	POTABLE WATER INTERFACE PRESSURE	3 – 91
3.8.1.3	POTABLE WATER USE	3 – 92
3.8.2	FLUID SYSTEM SERVICER	3 – 92
3.9	ENVIRONMENT INTERFACE REQUIREMENTS	3 – 92
3.9.1	ATMOSPHERE REQUIREMENTS	3 – 92
3.9.1.1	PRESSURE	3 – 92
3.9.1.2	TEMPERATURE	3 – 92
3.9.1.3	HUMIDITY	3 – 92
3.9.2	INTEGRATED RACK USE OF CABIN ATMOSPHERE	3 – 93
3.9.2.1	ACTIVE AIR EXCHANGE	3 – 93
3.9.2.2	OXYGEN CONSUMPTION	3 – 93
3.9.2.3	CHEMICAL RELEASES	3 – 93
3.9.3	RADIATION REQUIREMENTS	3 – 94

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
3.9.3.1	INTEGRATED RACK CONTAINED OR GENERATED IONIZING RADIATION	3 – 94
3.9.3.2	IONIZING RADIATION DOSE	3 – 94
3.9.3.3	SINGLE EVENT EFFECT (SEE) IONIZING RADIATION	3 – 94
3.9.3.4	LAB WINDOW RACK LOCATION RADIATION REQUIREMENTS	3 – 94
3.9.3.4.1	WINDOW RACK INFRARED RADIATION REQUIREMENTS	3 – 94
3.9.3.4.2	WINDOW RACK ULTRAVIOLET RADIATION REQUIREMENTS	3 – 95
3.9.4	ADDITIONAL ENVIRONMENTAL CONDITIONS	3 – 95
3.10	FIRE PROTECTION INTERFACE REQUIREMENTS	3 – 101
3.10.1	FIRE PREVENTION	3 – 101
3.10.2	PAYLOAD MONITORING AND DETECTION REQUIREMENTS	3 – 101
3.10.2.1	SMOKE DETECTION	3 – 101
3.10.2.1.1	SMOKE DETECTOR	3 – 101
3.10.2.1.2	FORCED AIR CIRCULATION INDICATION	3 – 101
3.10.2.1.3	FIRE DETECTION INDICATOR	3 – 101
3.10.2.2	PARAMETER MONITORING (TBR #11)	3 – 102
3.10.2.2.1	PARAMETER MONITORING USE	3 – 102
3.10.2.2.2	PARAMETER MONITORING RESPONSE	3 – 102
3.10.2.2.2.1	PARAMETER MONITORING IN SUBRACK	3 – 102
3.10.2.2.2.2	PARAMETER MONITORING IN INTEGRATED RACK	3 – 102
3.10.3	FIRE SUPPRESSION	3 – 103
3.10.3.1	PORTABLE FIRE EXTINGUISHER	3 – 103
3.10.3.2	FIRE SUPPRESSION ACCESS PORT ACCESSIBILITY	3 – 103
3.10.3.3	FIRE SUPPRESSANT DISTRIBUTION	3 – 105
3.10.3.4	DELETED	3 – 106
3.10.3.4.1	DELETED	3 – 106
3.10.3.4.2	DELETED	3 – 106
3.10.4	LABELING	3 – 106
3.11	MATERIALS AND PARTS INTERFACE REQUIREMENTS	3 – 106
3.11.1	MATERIALS AND PARTS USE AND SELECTION	3 – 106
3.11.1.1	COMMERCIAL PARTS	3 – 106
3.11.2	FLUIDS	3 – 106
3.11.3	CLEANLINESS	3 – 107
3.11.4	FUNGUS RESISTANT MATERIAL	3 – 107
3.12	HUMAN FACTORS INTERFACE REQUIREMENTS	3 – 107
3.12.1	STRENGTH REQUIREMENTS	3 – 107
3.12.2	BODY ENVELOPE AND REACH ACCESSIBILITY	3 – 111
3.12.2.1	ADEQUATE CLEARANCE	3 – 111
3.12.2.2	ACCESSIBILITY	3 – 111

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
3.12.2.3	FULL SIZE RANGE ACCOMMODATION	3 – 112
3.12.3	HABITABILITY	3 – 112
3.12.3.1	HOUSEKEEPING	3 – 112
3.12.3.1.1	CLOSURES OR COVERS	3 – 112
3.12.3.1.2	BUILT-IN CONTROL	3 – 112
3.12.3.1.3	DELETED	3 – 112
3.12.3.1.4	DELETED	3 – 112
3.12.3.1.5	ONE-HANDED OPERATION	3 – 112
3.12.3.1.6	DELETED	3 – 112
3.12.3.2	TOUCH TEMPERATURE	3 – 113
3.12.3.2.1	CONTINUOUS/INCIDENTAL CONTACT - HIGH TEMPERATURE	3 – 113
3.12.3.2.2	CONTINUOUS/INCIDENTAL CONTACT – LOW TEMPERATURE	3 – 113
3.12.3.3	ACOUSTIC REQUIREMENTS	3 – 113
3.12.3.3.1	CONTINUOUS NOISE LIMITS	3 – 115
3.12.3.3.2	IINTERMITTENT NOISE LIMITS	3 – 116a
3.12.3.4	LIGHTING DESIGN	3 – 118
3.12.4	STRUCTURAL/MECHANICAL INTERFACES	3 – 120
3.12.4.1	DELETED	3 – 120
3.12.4.1.1	DELETED	3 – 120
3.12.4.2	PAYLOAD HARDWARE MOUNTING	3 – 120
3.12.4.2.1	EQUIPMENT MOUNTING	3 – 120
3.12.4.2.2	DRAWERS AND HINGED PANELS	3 – 120
3.12.4.2.3	DELETED	3 – 120
3.12.4.2.4	DELETED	3 – 120
3.12.4.2.5	ALIGNMENT	3 – 120
3.12.4.2.5.1	DELETED	3 – 120
3.12.4.2.6	SLIDE-OUT STOPS	3 – 120
3.12.4.2.7	PUSH-PULL FORCE	3 – 120
3.12.4.2.8	ACCESS	3 – 121
3.12.4.2.8.1	COVERS	3 – 121
3.12.4.2.8.2	SELF-SUPPORTING COVERS	3 – 121
3.12.4.2.8.3	DELETED	3 – 121
3.12.4.2.8.4	UNIQUE TOOLS	3 – 121
3.12.4.3	CONNECTORS	3 – 121
3.12.4.3.1	ONE-HANDED OPERATION	3 – 121
3.12.4.3.2	ACCESSIBILITY	3 – 122
3.12.4.3.3	EASE OF DISCONNECT	3 – 122
3.12.4.3.4	INDICATION OF PRESSURE/FLOW	3 – 122
3.12.4.3.5	SELF LOCKING	3 – 122

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
3.12.4.3.6	CONNECTOR ARRANGEMENT	3 – 122
3.12.4.3.7	ARC CONTAINMENT	3 – 123
3.12.4.3.8	CONNECTOR PROTECTION	3 – 123
3.12.4.3.9	CONNECTOR SHAPE	3 – 123
3.12.4.3.10	FLUID AND GAS LINE CONNECTORS	3 – 123
3.12.4.3.11	ALIGNMENT MARKS OR GUIDE PINS	3 – 123
3.12.4.3.12	CODING	3 – 123
3.12.4.3.13	PIN IDENTIFICATION	3 – 123
3.12.4.3.14	ORIENTATION	3 – 124
3.12.4.3.15	HOSE/CABLE RESTRAINTS	3 – 124
3.12.4.4	FASTENERS	3 – 124
3.12.4.4.1	NON-THREADED FASTENERS STATUS INDICATION	3 – 124
3.12.4.4.2	MOUNTING BOLT/FASTENER SPACING	3 – 124
3.12.4.4.3	DELETED	3 – 125
3.12.4.4.4	MULTIPLE FASTENERS	3 – 125
3.12.4.4.5	CAPTIVE FASTENERS	3 – 126
3.12.4.4.6	QUICK RELEASE FASTENERS	3 – 126
3.12.4.4.7	THREADED FASTENERS	3 – 126
3.12.4.4.8	OVER CENTER LATCHES	3 – 126
3.12.4.4.9	WINGHEAD FASTENERS	3 – 126
3.12.4.4.10	DELETED	3 – 126
3.12.4.4.11	FASTENER HEAD TYPE	3 – 126
3.12.4.4.12	ONE-HANDED ACTUATION	3 – 127
3.12.4.4.13	DELETED	3 – 127
3.12.4.4.14	ACCESS HOLES	3 – 127
3.12.5	CONTROLS AND DISPLAYS	3 – 127
3.12.5.1	CONTROLS SPACING DESIGN REQUIREMENTS	3 – 127
3.12.5.2	ACCIDENTAL ACTUATION	3 – 127
3.12.5.2.1	PROTECTIVE METHODS	3 – 129
3.12.5.2.2	NONINTERFERENCE	3 – 129
3.12.5.2.3	DEAD-MAN CONTROLS	3 – 129
3.12.5.2.4	BARRIER GUARDS	3 – 130
3.12.5.2.5	RECESSED SWITCH PROTECTION	3 – 130
3.12.5.2.6	DELETED	3 – 130
3.12.5.2.7	POSITION INDICATION	3 – 130
3.12.5.2.8	HIDDEN CONTROLS	3 – 130
3.12.5.2.9	HAND CONTROLLERS	3 – 130
3.12.5.3	VALVE CONTROLS	3 – 131
3.12.5.4	TOGGLE SWITCHES	3 – 132

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
3.12.6	RESTRAINTS AND MOBILITY AIDS	3 – 132
3.12.6.1	STOWAGE DRAWER CONTENTS RESTRAINTS	3 – 132
3.12.6.2	STOWAGE AND EQUIPMENT DRAWERS/TRAYS	3 – 134
3.12.6.3	CAPTIVE PARTS	3 – 134
3.12.6.4	HANDLE AND GRASP AREA DESIGN REQUIREMENTS	3 – 134
3.12.6.4.1	HANDLES AND RESTRAINTS	3 – 134
3.12.6.4.2	DELETED	3 – 134
3.12.6.4.3	HANDLE LOCATION/FRONT ACCESS	3 – 134
3.12.6.4.4	HANDLE DIMENSIONS	3 – 134
3.12.6.4.5	NON-FIXED HANDLES DESIGN REQUIREMENTS	3 – 136
3.12.7	IDENTIFICATION LABELING	3 – 136
3.12.7.1	DELETED	3 – 136
3.12.7.2	DELETED	3 – 136
3.12.7.3	DELETED	3 – 136
3.12.7.4	DELETED	3 – 136
3.12.7.5	DELETED	3 – 136
3.12.7.6	DELETED	3 – 136
3.12.8	COLOR	3 – 136
3.12.9	CREW SAFETY	3 – 137
3.12.9.1	ELECTRICAL HAZARDS	3 – 137
3.12.9.1.1	MISMATCHED	3 – 137
3.12.9.1.2	DELETED	3 – 138
3.12.9.1.3	DELETED	3 – 138
3.12.9.1.4	OVERLOAD PROTECTION	3 – 138
3.12.9.1.4.1	DEVICE ACCESSIBILITY	3 – 138
3.12.9.1.4.2	EXTRACTOR –TYPE FUSE HOLDER	3 – 138
3.12.9.1.4.3	OVERLOAD PROTECTION LOCATION	3 – 138
3.12.9.1.4.4	OVERLOAD PROTECTION IDENTIFICATION	3 – 138
3.12.9.1.4.5	AUTOMATIC RESTART PROTECTION	3 – 138
3.12.9.1.5	DELETED	3 – 139
3.12.9.1.5.1	DELETED	3 – 139
3.12.9.2	SHARP EDGES AND CORNERS PROTECTION	3 – 139
3.12.9.3	HOLES	3 – 139
3.12.9.4	LATCHES	3 – 139
3.12.9.5	SCREWS AND BOLTS	3 – 139
3.12.9.6	SECURING PINS	3 – 139
3.12.9.7	LEVERS, CRANKS, HOOKS, AND CONTROLS	3 – 139
3.12.9.8	BURRS	3 – 139
3.12.9.9	LOCKING WIRES	3 – 140

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
3.12.9.10	AUDIO DEVICES (DISPLAYS)	3 – 140
3.12.9.11	DELETED	3 – 140
3.12.9.12	EGRESS	3 – 140
3.12.10	PAYLOAD IN-FLIGHT MAINTENANCE	3 – 140
3.12.11	DELETED	3 – 140
4.0	VERIFICATION	4 – 1
4.1	RESPONSIBILITIES	4 – 1
4.2	VERIFICATION METHODS	4 – 1
4.3	INTERFACE VERIFICATION METHODS	4 – 2
4.3.1	STRUCTURAL/MECHANICAL AND MICROGRAVITY AND STOWAGE INTERFACE REQUIREMENTS	4 – 2
4.3.1.1	STRUCTURAL/MECHANICAL	4 – 2
4.3.1.1.1	GSE INTERFACES	4 – 2
4.3.1.1.2	MPLM INTERFACES	4 – 2
4.3.1.1.2.1	MPLM LATE / EARLY ACCESS REQUIREMENTS	4 – 3
4.3.1.1.2.1.1	MPLM LATE ACCESS ENVELOPE (KSC)	4 – 3
4.3.1.1.2.1.2	MPLM EARLY ACCESS ENVELOPES (KSC AND DFRC)	4 – 3
4.3.1.1.3	LOADS REQUIREMENTS	4 – 4
4.3.1.1.4	RACK REQUIREMENTS	4 – 4
4.3.1.1.4.1	LAB WINDOW RACK LOCATION REQUIREMENTS	4 – 5
4.3.1.1.5	SAFETY CRITICAL STRUCTURES REQUIREMENTS	4 – 6
4.3.1.1.6	CONNECTOR AND UMBILICAL PHYSICAL MATE	4 – 6
4.3.1.1.6.1	CONNECTOR PHYSICAL MATE	4 – 6
4.3.1.1.6.2	UMBILICAL PHYSICAL MATE	4 – 6
4.3.1.1.7	ON ORBIT PAYLOAD PROTRUSIONS	4 – 7
4.3.1.1.7.1	ON-ORBIT PERMANENT PROTRUSIONS	4 – 7
4.3.1.1.7.2	ON-ORBIT SEMI-PERMANENT PROTRUSIONS	4 – 7
4.3.1.1.7.3	ON-ORBIT TEMPORARY PROTRUSIONS	4 – 8
4.3.1.1.7.4	ON-ORBIT MOMENTARY PROTRUSIONS	4 – 8
4.3.1.1.7.5	ON-ORBIT PROTRUSIONS FOR KEEP ALIVE PAYLOADS	4 – 8
4.3.1.2	MICROGRAVITY	4 – 9
4.3.1.2.1	QUASI-STEADY REQUIREMENTS	4 – 9
4.3.1.2.2	VIBRATORY REQUIREMENTS	4 – 9
4.3.1.2.3	TRANSIENT REQUIREMENTS	4 – 9
4.3.1.2.4	MICROGRAVITY ENVIRONMENT REQUIREMENTS	4 – 9
4.3.1.2.5	ARIS REQUIREMENTS	4 – 9
4.3.1.3	STOWAGE	4 – 9
4.3.2	ELECTRICAL INTERFACE REQUIREMENTS	4 – 9
4.3.2.1	ELECTRICAL POWER CHARACTERISTICS	4 – 10

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
4.3.2.1.1	STEADY-STATE VOLTAGE CHARACTERISTICS	4 – 10
4.3.2.1.1.1	INTERFACE B	4 – 10
4.3.2.1.1.2	INTERFACE C	4 – 10
4.3.2.1.2	RIPPLE VOLTAGE CHARACTERISTICS	4 – 10
4.3.2.1.2.1	RIPPLE VOLTAGE AND NOISE	4 – 11
4.3.2.1.2.2	RIPPLE VOLTAGE SPECTRUM	4 – 11
4.3.2.1.3	TRANSIENT VOLTAGES	4 – 11
4.3.2.1.3.1	INTERFACE B	4 – 11
4.3.2.1.3.2	INTERFACE C	4 – 11
4.3.2.1.3.3	FAULT CLEARING AND PROTECTION	4 – 12
4.3.2.1.3.4	NON-NORMAL VOLTAGE RANGE	4 – 12
4.3.2.1.4	DELETE	4 – 12
4.3.2.2	ELECTRICAL POWER INTERFACE	4 – 12
4.3.2.2.1	UIP AND UOP CONNECTORS AND PIN ASSIGNMENTS	4 – 12
4.3.2.2.2	POWER BUS ISOLATION	4 – 13
4.3.2.2.3	COMPATIBILITY WITH SOFT START/STOP RPC	4 – 13
4.3.2.2.4	SURGE CURRENT	4 – 14
4.3.2.2.5	REVERSE CURRENT	4 – 14
4.3.2.2.6	CIRCUIT PROTECTION DEVICES	4 – 15
4.3.2.2.6.1	ISS EPS CIRCUIT PROTECTION CHARACTERISTICS	4 – 15
4.3.2.2.6.1.1	REMOTE POWER CONTROLLERS (RPCS)	4 – 15
4.3.2.2.6.2	EPCE RPC INTERFACE REQUIREMENTS	4 – 16
4.3.2.2.6.2.1	RPC TRIP COORDINATION	4 – 16
4.3.2.2.6.2.1.1	PAYLOAD TRIP RATINGS	4 – 16
4.3.2.2.6.2.1.2	DELETED	4 – 16
4.3.2.2.7	EPCE COMPLEX LOAD IMPEDANCES	4 – 16
4.3.2.2.7.1	INTERFACE B	4 – 17
4.3.2.2.7.2	INTERFACE C	4 – 17
4.3.2.2.8	LARGE SIGNAL STABILITY	4 – 18
4.3.2.2.9	MAXIMUM RIPPLE VOLTAGE EMISSIONS	4 – 21
4.3.2.2.10	ELECTRICAL LOAD-STAND ALONE STABILITY	4 – 21
4.3.2.2.11	ELECTRICAL LOAD INDUCTANCE	4 – 21
4.3.2.2.12	MAXIMUM LOAD STEP SIZE	4 – 21
4.3.2.3	ELECTRICAL POWER CONSUMER CONSTRAINTS	4 – 21
4.3.2.3.1	WIRE DERATING	4 – 22
4.3.2.3.2	EXCLUSIVE POWER FEEDS	4 – 22
4.3.2.3.3	LOSS OF POWER	4 – 22
4.3.2.4	ELECTROMAGNETIC COMPATIBILITY	4 – 23
4.3.2.4.1	ELECTRICAL GROUNDING	4 – 24

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
4.3.2.4.2	ELECTRICAL BONDING	4 – 24
4.3.2.4.3	CABLE/WIRE DESIGN AND CONTROL REQUIREMENTS	4 – 24
4.3.2.4.4	ELECTROMAGNETIC INTERFERENCE	4 – 24
4.3.2.4.5	ELECTROSTATIC DISCHARGE	4 – 25
4.3.2.4.6	ALTERNATING CURRENT (AC) MAGNETIC FIELDS	4 – 25
4.3.2.4.7	DIRECT CURRENT (DC) MAGNETIC FIELDS	4 – 26
4.3.2.4.8	CORONA	4 – 26
4.3.2.4.9	LIGHTNING	4 – 27
4.3.2.4.10	EMI SUSCEPTIBILITY FOR SAFETY-CRITICAL CIRCUITS	4 – 27
4.3.2.5	SAFETY REQUIREMENTS	4 – 27
4.3.2.5.1	PAYLOAD ELECTRICAL SAFETY	4 – 27
4.3.2.5.1.1	MATING/DEMATING OF POWERED CONNECTORS	4 – 27
4.3.2.5.1.2	SAFETY-CRITICAL CIRCUITS REDUNDANCY	4 – 28
4.3.2.5.2	RACK MAINTENANCE SWITCH (RACK POWER SWITCH)	4 – 28
4.3.2.5.3	POWER SWITCHES/CONTROLS	4 – 28
4.3.2.5.4	GROUND FAULT CIRCUIT INTERRUPTERS/PORTABLE EQUIPMENT DC SOURCING VOLTAGE	4 – 29
4.3.2.5.5	PORTABLE EQUIPMENT/POWER CORDS	4 – 30
4.3.2.5.6	DELETED	4 – 31
4.3.2.6	MPLM	4 – 31
4.3.2.6.1	MPLM ELECTRICAL POWER CHARACTERISTICS	4 – 31
4.3.2.6.2	MPLM ELECTRICAL POWER INTERFACE	4 – 31
4.3.2.6.2.1	MPLM UIP CONNECTORS AND PIN ASSIGNMENTS	4 – 32
4.3.2.6.2.1.1	PAYLOAD TRIP RATINGS	4 – 32
4.3.2.6.2.2	COMPATIBILITY WITH RPC SOFT START/STOP IN MPLM	4 – 32
4.3.2.6.2.3	MPLM SURGE CURRENT	4 – 32
4.3.2.6.2.4	MPLM REVERSE ENERGY/CURRENT	4 – 33
4.3.2.6.2.5	MPLM PAYLOAD TRIP RATINGS	4 – 33
4.3.2.6.3	MPLM ELECTRICAL POWER CONSUMER CONSTRAINTS	4 – 34
4.3.2.6.4	MPLM ELECTROMAGNETIC COMPATIBILITY	4 – 34
4.3.2.6.4.1	MPLM BONDING	4 – 34
4.3.2.6.5	MPLM SAFETY REQUIREMENTS	4 – 35
4.3.3	COMMAND AND DATA HANDLING INTERFACE VERIFICATION REQUIREMENTS	4 – 35
4.3.3.1	GENERAL REQUIREMENTS	4 – 35
4.3.3.2	WORD/BYTE NOTATIONS, TYPES AND DATA TRANSMISSIONS	4 – 35
4.3.3.2.1	WORD/BYTE NOTATIONS	4 – 35
4.3.3.2.2	DATA TYPES	4 – 36
4.3.3.2.3	DATA TRANSMISSIONS	4 – 36

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
4.3.3.3	DELETED	4 – 36
4.3.3.4	CONSULTATIVE COMMITTEE FOR SPACE DATA SYSTEMS	4 – 36
4.3.3.4.1	CCSDS DATA	4 – 37
4.3.3.4.1.1	CCSDS DATA PACKETS	4 – 37
4.3.3.4.1.1.1	CCSDS PRIMARY HEADER	4 – 37
4.3.3.4.1.1.2	CCSDS SECONDARY HEADER	4 – 37
4.3.3.4.1.2	CCSDS DATA FIELD	4 – 38
4.3.3.4.1.3	CCSDS DATA BITSTREAM	4 – 38
4.3.3.4.1.4	CCSDS APID FIELD	4 – 38
4.3.3.4.2	CCSDS TIME CODES	4 – 38
4.3.3.4.2.1	CCSDS UNSEGMENTED TIME	4 – 38
4.3.3.4.2.2	CCSDS SEGMENTED TIME	4 – 39
4.3.3.5	MIL-STD-1553B LRDL	4 – 39
4.3.3.5.1	MIL-STD-1553B PROTOCOL	4 – 39
4.3.3.5.1.1	STANDARD MESSAGES	4 – 39
4.3.3.5.1.2	COMMANDING	4 – 39
4.3.3.5.1.3	HEALTH AND STATUS DATA	4 – 39
4.3.3.5.1.4	SAFETY DATA	4 – 40
4.3.3.5.1.4.1	CAUTION AND WARNING	4 – 40
4.3.3.5.1.4.1.1	CLASS 1 – EMERGENCY	4 – 40
4.3.3.5.1.4.1.2	CLASS 2 – WARNING	4 – 40
4.3.3.5.1.4.1.3	CLASS 3 – CAUTION	4 – 41
4.3.3.5.1.4.1.4	CLASS 4 – ADVISORY	4 – 41
4.3.3.5.1.5	SERVICE REQUESTS	4 – 42
4.3.3.5.1.6	ANCILLARY DATA	4 – 42
4.3.3.5.1.7	FILE TRANSFER	4 – 42
4.3.3.5.1.8	LOW RATE TELEMETRY	4 – 42
4.3.3.5.1.9	DEFINED MODE CODES	4 – 42
4.3.3.5.1.10	IMPLEMENTED MODE CODES	4 – 43
4.3.3.5.1.11	UNIMPLEMENTED/UNDEFINED MODE CODES	4 – 43
4.3.3.5.1.12	ILLEGAL COMMANDS	4 – 43
4.3.3.5.2	MIL-STD-1553B LRDL INTERFACE CHARACTERISTICS	4 – 44
4.3.3.5.2.1	LRDL REMOTE TERMINAL ASSIGNMENT	4 – 44
4.3.3.5.2.1.1	LRDL CONNECTOR/PIN ASSIGNMENTS	4 – 44
4.3.3.5.2.1.2	MIL-STD-1553B BUS A AND B CONNECTOR/PIN ASSIGNMENT	4 – 44
4.3.3.5.2.1.3	DELETED	4 – 44
4.3.3.5.2.1.4	REMOTE TERMINAL HARDWIRED ADDRESS CODING	4 – 44
4.3.3.5.2.2	LRDL SIGNAL CHARACTERISTICS	4 – 45
4.3.3.5.2.3	LRDL CABLING	4 – 45

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
4.3.3.5.2.4	MULTI-BUS ISOLATION	4 – 45
4.3.3.6	MEDIUM RATE DATA LINK (MRDL)	4 – 45
4.3.3.6.1	MRDL PROTOCOL	4 – 46
4.3.3.6.1.1	INTEGRATED RACK PROTOCOLS ON THE MRDL	4 – 46
4.3.3.6.1.2	MRDL ADDRESS	4 – 46
4.3.3.6.1.3	ISPR MRDL CONNECTIVITY	4 – 47
4.3.3.6.1.4	MRDL CONNECTOR/PIN ASSIGNMENTS	4 – 47
4.3.3.6.1.4.1	DELETED	4 – 48
4.3.3.6.1.4.2	DELETED	4 – 48
4.3.3.6.1.5	MRDL SIGNAL CHARACTERISTICS	4 – 48
4.3.3.6.1.6	MRDL CABLE CHARACTERISTICS	4 – 48
4.3.3.6.1.6.1	INSERTION LOSS	4 – 48
4.3.3.6.1.6.2	DIFFERENTIAL CHARACTERISTIC IMPEDANCE	4 – 49
4.3.3.6.1.6.3	MEDIUM TIMING JITTER	4 – 49
4.3.3.7	HIGH RATE DATA LINK (HRDL)	4 – 49
4.3.3.7.1	PAYLOAD HRFM PROTOCOLS	4 – 49
4.3.3.7.2	HRDL INTERFACE CHARACTERISTICS	4 – 49
4.3.3.7.2.1	PHYSICAL SIGNALING	4 – 49
4.3.3.7.2.1.1	PHYSICAL SIGNALING DATE RATES	4 – 50
4.3.3.7.2.2	ENCODING	4 – 50
4.3.3.7.2.3	DELETED	4 – 50
4.3.3.7.3	INTEGRATED RACK HRDL OPTICAL POWER	4 – 50
4.3.3.7.3.1	INTEGRATED RACK HRDL TRANSMITTED OPTICAL POWER	4 – 50
4.3.3.7.3.2	INTEGRATED RACK HRDL RECEIVED OPTICAL POWER	4 – 51
4.3.3.7.4	HRDL FIBER OPTIC CABLE	4 – 51
4.3.3.7.5	HRDL FIBER OPTIC CABLE BEND RADIUS	4 – 51
4.3.3.7.6	HRDL CONNECTORS AND FIBER	4 – 51
4.3.3.7.7	DELETED	4 – 52
4.3.3.8	PERSONAL COMPUTERS	4 – 52
4.3.3.8.1	PAYLOAD LAPTOP	4 – 52
4.3.3.8.2	PCS	4 – 53
4.3.3.8.2.1	PCS TO UOP INTERFACE	4 – 53
4.3.3.8.2.2	760XD LAPTOP TO RACK INTERFACE	4 – 53
4.3.3.8.3	SSC	4 – 53
4.3.3.9	UOP	4 – 54
4.3.3.10	MAINTENANCE SWITCH, SMOKE DETECTOR, SMOKE INDICATOR, AND INTEGRATED RACK FAN INTERFACES	4 – 54
4.3.3.10.1	RACK MAINTENANCE SWITCH (RACK POWER SWITCH) INTERFACES	4 – 54

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
4.3.3.10.2	SMOKE DETECTOR INTERFACES	4 – 54
4.3.3.10.2.1	ANALOG INTERFACE CHARACTERISTICS	4 – 54
4.3.3.10.2.2	DISCRETE COMMAND BUILT-IN-TEST INTERFACE CHARACTERISTICS	4 – 55
4.3.3.10.2.3	SMOKE INDICATOR ELECTRICAL INTERFACES	4 – 55
4.3.3.10.2.4	FAN VENTILATION STATUS ELECTRICAL INTERFACES	4 – 55
4.3.3.10.3	RACK MAINTENANCE SWITCH (RACK POWER SWITCH)/FIRE DETECTION SUPPORT INTERFACE CONNECTOR	4 – 55
4.3.4	PAYLOAD NTSC VIDEO AND AUDIO INTERFACE REQUIREMENTS	4 – 56
4.3.4.1	PAYLOAD NTSC VIDEO INTERFACE REQUIREMENTS	4 – 56
4.3.4.1.1	PAYLOAD NTSC OPTICAL VIDEO SIGNAL CHARACTERISTICS	4 – 56
4.3.4.1.2	NTSC FIBER OPTIC VIDEO	4 – 56
4.3.4.1.2.1	PAYLOAD NTSC VIDEO CHARACTERISTICS	4 – 56
4.3.4.1.2.2	INTEGRATED RACK NTSC PFM VIDEO TRANSMITTED OPTICAL POWER	4 – 56
4.3.4.1.2.3	INTEGRATED RACK NTSC PFM VIDEO AND SYNC SIGNAL RECEIVED OPTICAL POWER	4 – 56
4.3.4.1.2.4	NTSC ELECTRICAL VIDEO CHARACTERISTICS	4 – 57
4.3.4.1.2.5	PFM NTSC VIDEO FIBER OPTIC CABLE BEND RADIUS	4 – 57
4.3.4.1.2.6	DELETED	4 – 57
4.3.4.1.2.7	PFM NTSC OPTICAL CONNECTOR/PIN ASSIGNMENTS	4 – 57
4.3.4.1.3	NTSC ELECTRICAL VIDEO INTERFACES	4 – 57
4.3.4.1.3.1	CABLES	4 – 57
4.3.4.1.3.2	SIGNAL STANDARD	4 – 58
4.3.4.1.3.3	INTERFACE CIRCUIT	4 – 58
4.3.4.1.3.4	CROSS TALK	4 – 58
4.3.4.1.4	NTSC ELECTRICAL CONNECTOR/PIN ASSIGNMENTS	4 – 58
4.3.4.2	U.S. ELEMENT AUDIO INTERFACE REQUIREMENTS	4 – 58
4.3.5	THERMAL CONTROL INTERFACE REQUIREMENTS	4 – 59
4.3.5.1	INTERNAL THERMAL CONTROL SYSTEM (ITCS) INTERFACE REQUIREMENTS	4 – 59
4.3.5.1.1	PHYSICAL INTERFACE	4 – 59
4.3.5.1.2	ITCS FLUID USE AND CHARGING	4 – 59
4.3.5.1.3	ITCS PRESSURE DROP	4 – 59
4.3.5.1.3.1	ON ORBIT INTERFACES	4 – 59
4.3.5.1.3.2	MPLM INTERFACES	4 – 60
4.3.5.1.4	COOLANT FLOW RATE	4 – 60
4.3.5.1.5	COOLANT SUPPLY TEMPERATURE	4 – 60
4.3.5.1.6	COOLANT RETURN TEMPERATURE	4 – 60

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
4.3.5.1.7	COOLANT MAXIMUM DESIGN PRESSURE	4 – 61
4.3.5.1.8	FAIL SAFE DESIGN	4 – 61
4.3.5.1.9	LEAKAGE	4 – 62
4.3.5.1.10	QUICK-DISCONNECT AIR INCLUSION	4 – 62
4.3.5.1.11	RACK FRONT SURFACE TEMPERATURE	4 – 62
4.3.5.1.12	CABIN AIR HEAT LEAK	4 – 63
4.3.5.1.13	MPLM CABIN AIR COOLING	4 – 63
4.3.5.1.14	SIMULTANEOUS COOLING	4 – 63
4.3.5.1.15	CONTROL SYSTEM TIME CONSTANT	4 – 63
4.3.5.1.16	PAYLOAD COOLANT QUANTITY	4 – 63
4.3.5.1.17	PAYLOAD GAS INCLUSION	4 – 64
4.3.6	VACUUM SYSTEM REQUIREMENTS	4 – 64
4.3.6.1	VACUUM EXHAUST SYSTEM REQUIREMENTS	4 – 64
4.3.6.1.1	VES PHYSICAL INTERFACE	4 – 64
4.3.6.1.2	INPUT PRESSURE LIMIT	4 – 64
4.3.6.1.3	INPUT TEMPERATURE LIMIT	4 – 64
4.3.6.1.4	INPUT DEWPOINT LIMIT	4 – 65
4.3.6.1.5	ACCEPTABLE EXHAUST GASES	4 – 65
4.3.6.1.5.1	ACCEPTABLE GASES – INITIAL LIST	4 – 68
4.3.6.1.5.2	EXTERNAL CONTAMINATION CONTROL	4 – 68
4.3.6.1.5.3	INCOMPATIBLE GASES	4 – 68
4.3.6.1.6	PAYLOAD VACUUM SYSTEM ACCESS VALVE	4 – 69
4.3.6.2	VACUUM RESOURCE SYSTEM REQUIREMENTS	4 – 69
4.3.6.2.1	VRS PHYSICAL INTERFACE	4 – 69
4.3.6.2.2	INPUT PRESSURE LIMIT	4 – 69
4.3.6.2.3	VRS THROUGH-PUT LIMIT	4 – 70
4.3.6.2.4	ACCEPTABLE EXHAUST GASES	4 – 70
4.3.7	PRESSURIZED GASES INTERFACE VERIFICATION REQUIREMENTS	4 – 70
4.3.7.1	NITROGEN INTERFACE VERIFICATION REQUIREMENTS	4 – 70
4.3.7.1.1	NITROGEN INTERFACE CONTROL	4 – 70
4.3.7.1.2	NITROGEN INTERFACE PRESSURE	4 – 70
4.3.7.1.3	NITROGEN INTERFACE TEMPERATURE	4 – 70
4.3.7.1.4	NITROGEN LEAKAGE	4 – 71
4.3.7.1.5	NITROGEN INTERFACE CONNECTION	4 – 71
4.3.7.2	ARGON INTERFACE VERIFICATION REQUIREMENTS	4 – 71
4.3.7.2.1	ARGON INTERFACE CONTROL	4 – 71
4.3.7.2.2	ARGON INTERFACE MDP	4 – 71
4.3.7.2.3	ARGON INTERFACE TEMPERATURE	4 – 71

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
4.3.7.2.4	ARGON LEAKAGE	4 – 71
4.3.7.2.5	ARGON INTERFACE CONNECTION	4 – 72
4.3.7.3	CARBON DIOXIDE INTERFACE VERIFICATION REQUIREMENTS	4 – 72
4.3.7.3.1	CARBON DIOXIDE INTERFACE CONTROL	4 – 72
4.3.7.3.2	CARBON DIOXIDE INTERFACE PRESSURE	4 – 72
4.3.7.3.3	CARBON DIOXIDE INTERFACE TEMPERATURE	4 – 72
4.3.7.3.4	CARBON DIOXIDE LEAKAGE	4 – 72
4.3.7.3.5	CARBON DIOXIDE INTERFACE CONNECTION	4 – 72
4.3.7.4	HELIUM INTERFACE VERIFICATION REQUIREMENTS	4 – 73
4.3.7.4.1	HELIUM INTERFACE CONTROL	4 – 73
4.3.7.4.2	HELIUM INTERFACE MDP	4 – 73
4.3.7.4.3	HELIUM INTERFACE TEMPERATURE	4 – 73
4.3.7.4.4	HELIUM LEAKAGE	4 – 73
4.3.7.4.5	HELIUM INTERFACE CONNECTION	4 – 73
4.3.7.5	PRESSURIZED GAS SYSTEMS	4 – 74
4.3.7.6	MANUAL VALVES	4 – 74
4.3.8	PAYLOAD SUPPORT SERVICES INTERFACES VERIFICATION REQUIREMENTS	4 – 74
4.3.8.1	POTABLE WATER	4 – 74
4.3.8.1.1	POTABLE WATER INTERFACE CONNECTION	4 – 74
4.3.8.1.2	POTABLE WATER INTERFACE PRESSURE	4 – 74
4.3.8.1.3	POTABLE WATER USE	4 – 74
4.3.8.2	FLUID SYSTEM SERVICER	4 – 75
4.3.9	ENVIRONMENT INTERFACE VERIFICATION REQUIREMENTS	4 – 75
4.3.9.1	ATMOSPHERE REQUIREMENTS	4 – 75
4.3.9.1.1	PRESSURE	4 – 75
4.3.9.1.2	TEMPERATURE	4 – 75
4.3.9.1.3	HUMIDITY	4 – 75
4.3.9.2	INTEGRATED RACK USE OF CABIN ATMOSPHERE	4 – 76
4.3.9.2.1	ACTIVE AIR EXCHANGE	4 – 76
4.3.9.2.2	OXYGEN CONSUMPTION	4 – 76
4.3.9.2.3	CHEMICAL RELEASES	4 – 76
4.3.9.3	IONIZING RADIATION REQUIREMENTS	4 – 76
4.3.9.3.1	INTEGRATED RACK CONTAINED OR GENERATED IONIZING RADIATION	4 – 76
4.3.9.3.2	IONIZING RADIATION DOSE	4 – 76
4.3.9.3.3	SINGLE EVENT EFFECT (SEE) IONIZING RADIATION DOSE	4 – 77
4.3.9.3.4	LAB WINDOW RACK LOCATION RADIATION REQUIREMENTS	4 – 77
4.3.9.3.4.1	WINDOW RACK INFRARED RADIATION REQUIREMENTS	4 – 77

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
4.3.9.3.4.2	WINDOW RACK ULTRAVIOLET RADIATION REQUIREMENTS	4 – 77
4.3.9.4	ADDITIONAL ENVIRONMENTAL CONDITIONS	4 – 77
4.3.10	FIRE PROTECTION INTERFACE VERIFICATION REQUIREMENTS	4 – 78
4.3.10.1	FIRE PREVENTION	4 – 78
4.3.10.2	PAYLOAD MONITORING AND DETECTION REQUIREMENTS	4 – 78
4.3.10.2.1	SMOKE DETECTION	4 – 78
4.3.10.2.1.1	SMOKE DETECTOR	4 – 78
4.3.10.2.1.2	FORCED AIR CIRCULATION INDICATION	4 – 78
4.3.10.2.1.3	FIRE DETECTION INDICATOR	4 – 79
4.3.10.2.2	PARAMETER MONITORING	4 – 79
4.3.10.2.2.1	PARAMETER MONITORING USE	4 – 79
4.3.10.2.2.2	PARAMETER MONITORING RESPONSE	4 – 79
4.3.10.2.2.2.2	PARAMETER MONITORING IN INTEGRATED RACK	4 – 80
4.3.10.3	FIRE SUPPRESSION	4 – 80
4.3.10.3.1	PORTABLE FIRE EXTINGUISHER	4 – 81
4.3.10.3.2	FIRE SUPPRESSION ACCESS PORT ACCESSIBILITY	4 – 81
4.3.10.3.3	FIRE SUPPRESSANT DISTRIBUTION	4 – 81
4.3.10.3.4	DELETED	4 – 82
4.3.10.3.4.1	DELETED	4 – 82
4.3.10.3.4.2	DELETED	4 – 82
4.3.10.4	LABELING	4 – 82
4.3.11	MATERIALS AND PARTS INTERFACE VERIFICATION REQUIREMENTS	4 – 82
4.3.11.1	MATERIALS AND PARTS USE AND SELECTION	4 – 82
4.3.11.1.1	COMMERCIAL PARTS	4 – 82
4.3.11.2	FLUIDS	4 – 83
4.3.11.3	CLEANLINESS	4 – 83
4.3.11.4	FUNGUS RESISTANT MATERIAL	4 – 83
4.3.12	HUMAN FACTORS INTERFACE REQUIREMENTS	4 – 84
4.3.12.1	STRENGTH REQUIREMENTS	4 – 84
4.3.12.2	BODY ENVELOPE AND REACH ACCESSIBILITY	4 – 84
4.3.12.2.1	ADEQUATE CLEARANCE	4 – 84
4.3.12.2.2	ACCESSIBILITY	4 – 85
4.3.12.2.3	FULL SIZE RANGE ACCOMMODATION	4 – 85
4.3.12.3	HABITABILITY	4 – 85
4.3.12.3.1	HOUSEKEEPING	4 – 85
4.3.12.3.1.1	CLOSURES OR COVERS	4 – 85
4.3.12.3.1.2	BUILT-IN CONTROL	4 – 85

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
4.3.12.3.1.3	DELETED	4 – 86
4.3.12.3.1.4	DELETED	4 – 86
4.3.12.3.1.5	ONE-HANDED OPERATION	4 – 86
4.3.12.3.1.6	DELETED	4 – 86
4.3.12.3.2	TOUCH TEMPERATURE	4 – 86
4.3.12.3.2.1	CONTINUOUS/INCIDENTAL CONTACT – HIGH TEMPERATURE	4 – 86
4.3.12.3.2.2	CONTINUOUS/INCIDENTAL CONTACT – LOW TEMPERATURE	4 – 86
4.3.12.3.3	ACOUSTIC REQUIREMENTS	4 – 86
4.3.12.3.3.1	CONTINUOUS NOISE LIMITS	4 – 86
4.3.12.3.3.2	INTERMITTENT NOISE LIMITS	4 – 87
4.3.12.3.4	LIGHTING DESIGN	4 – 89
4.3.12.4	STRUCTURAL/MECHANICAL INTERFACES	4 – 90
4.3.12.4.1	DELETED	4 – 90
4.3.12.4.1.1	DELETED	4 – 90
4.3.12.4.2	PAYLOAD HARDWARE MOUNTING	4 – 90
4.3.12.4.2.1	EQUIPMENT MOUNTING	4 – 90
4.3.12.4.2.2	DRAWERS AND HINGED PANELS	4 – 90
4.3.12.4.2.3	DELETED	4 – 90
4.3.12.4.2.4	DELETED	4 – 90
4.3.12.4.2.5	ALIGNMENT	4 – 90
4.3.12.4.2.6	SLIDE-OUT STOPS	4 – 90
4.3.12.4.2.7	PUSH-PULL FORCES	4 – 91
4.3.12.4.2.8	ACCESS	4 – 91
4.3.12.4.2.8.1	COVERS	4 – 91
4.3.12.4.2.8.2	SELF-SUPPORTING COVERS	4 – 91
4.3.12.4.2.8.3	DELETED	4 – 91
4.3.12.4.2.8.4	UNIQUE TOOLS	4 – 91
4.3.12.4.3	CONNECTORS	4 – 92
4.3.12.4.3.1	ONE-HANDED OPERATION	4 – 92
4.3.12.4.3.2	ACCESSIBILITY	4 – 92
4.3.12.4.3.3	EASE OF DISCONNECT	4 – 92
4.3.12.4.3.4	INDICATION OF PRESSURE/FLOW	4 – 93
4.3.12.4.3.5	SELF LOCKING	4 – 93
4.3.12.4.3.6	CONNECTOR ARRANGEMENT	4 – 93
4.3.12.4.3.7	ARC CONTAINMENT	4 – 93
4.3.12.4.3.8	CONNECTOR PROTECTION	4 – 93
4.3.12.4.3.9	CONNECTOR SHAPE	4 – 93
4.3.12.4.3.10	FLUID AND GAS LINE CONNECTORS	4 – 94
4.3.12.4.3.11	ALIGNMENT MARKS OR GUIDE PINS	4 – 94

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
4.3.12.4.3.12	CODING	4 – 94
4.3.12.4.3.13	PIN IDENTIFICATION	4 – 94
4.3.12.4.3.14	ORIENTATION	4 – 94
4.3.12.4.3.15	HOSE/CABLE RESTRAINTS	4 – 94
4.3.12.4.4	FASTENERS	4 – 95
4.3.12.4.4.1	NON-THREADED FASTENERS STATUS INDICATION	4 – 95
4.3.12.4.4.2	MOUNTING BOLT/FASTENER SPACING	4 – 95
4.3.12.4.4.3	DELETED	4 – 95
4.3.12.4.4.4	MULTIPLE FASTENERS	4 – 95
4.3.12.4.4.5	CAPTIVE FASTENERS	4 – 95
4.3.12.4.4.6	QUICK RELEASE FASTENERS	4 – 96
4.3.12.4.4.7	THREADED FASTENERS	4 – 96
4.3.12.4.4.8	OVER CENTER LATCHES	4 – 96
4.3.12.4.4.9	WINGHEAD FASTENERS	4 – 96
4.3.12.4.4.10	DELETED	4 – 96
4.3.12.4.4.11	FASTENER HEAD TYPE	4 – 96
4.3.12.4.4.12	ONE-HANDED ACTUATION	4 – 97
4.3.12.4.4.13	DELETED	4 – 97
4.3.12.4.4.14	ACCESS HOLES	4 – 97
4.3.12.5	CONTROLS AND DISPLAYS	4 – 97
4.3.12.5.1	CONTROLS SPACING DESIGN REQUIREMENTS	4 – 97
4.3.12.5.2	ACCIDENTAL ACTUATION	4 – 97
4.3.12.5.2.1	PROTECTIVE METHODS	4 – 97
4.3.12.5.2.2	NONINTERFERENCE	4 – 98
4.3.12.5.2.3	DEAD-MAN CONTROLS	4 – 98
4.3.12.5.2.4	BARRIER GUARDS	4 – 98
4.3.12.5.2.5	RECESSED SWITCH PROTECTION	4 – 98
4.3.12.5.2.6	DELETED	4 – 98
4.3.12.5.2.7	POSITION INDICATION	4 – 98
4.3.12.5.2.8	HIDDEN CONTROLS	4 – 98
4.3.12.5.2.9	HAND CONTROLLERS	4 – 98
4.3.12.5.3	VALVE CONTROLS	4 – 99
4.3.12.5.4	TOGGLE SWITCHES	4 – 99
4.3.12.6	RESTRAINTS AND MOBILITY AIDS	4 – 99
4.3.12.6.1	STOWAGE DRAWER CONTENTS RESTRAINTS	4 – 99
4.3.12.6.2	STOWAGE AND EQUIPMENT DRAWERS/TRAYS	4 – 100
4.3.12.6.3	CAPTIVE PARTS	4 – 100
4.3.12.6.4	HANDLE AND GRASP AREA DESIGN REQUIREMENTS	4 – 100
4.3.12.6.4.1	HANDLES AND RESTRAINTS	4 – 100

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
4.3.12.6.4.2	DELETED	4 – 101
4.3.12.6.4.3	HANDLE LOCATION/FRONT ACCESS	4 – 101
4.3.12.6.4.4	HANDLE DIMENSIONS	4 – 101
4.3.12.6.4.5	NON-FIXED HANDLES DESIGN REQUIREMENTS	4 – 101
4.3.12.7	IDENTIFICATION LABELING	4 – 101
4.3.12.7.1	DELETED	4 – 102
4.3.12.7.2	DELETED	4 – 102
4.3.12.7.3	DELETED	4 – 102
4.3.12.7.4	DELETED	4 – 102
4.3.12.7.5	DELETED	4 – 102
4.3.12.7.6	DELETED	4 – 102
4.3.12.8	COLOR	4 – 102
4.3.12.9	CREW SAFETY	4 – 102
4.3.12.9.1	ELECTRICAL HAZARDS	4 – 102
4.3.12.9.1.1	MISMATCHED	4 – 103
4.3.12.9.1.2	DELETED	4 – 103
4.3.12.9.1.3	OVERLOAD PROTECTION	4 – 103
4.3.12.9.1.3.1	DEVICE ACCESSIBILITY	4 – 103
4.3.12.9.1.3.2	EXTRACTOR –TYPE FUSE HOLDER	4 – 103
4.3.12.9.1.3.3	OVERLOAD PROTECTION LOCATION	4 – 104
4.3.12.9.1.3.4	OVERLOAD PROTECTION IDENTIFICATION	4 – 104
4.3.12.9.1.3.5	AUTOMATIC RESTART PROTECTION	4 – 104
4.3.12.9.1.4	DELETED	4 – 104
4.3.12.9.1.4.1	DELETED	4 – 104
4.3.12.9.2	SHARP EDGES AND CORNERS PROTECTION	4 – 104
4.3.12.9.3	HOLES	4 – 105
4.3.12.9.4	LATCHES	4 – 105
4.3.12.9.5	SCREWS AND BOLTS	4 – 105
4.3.12.9.6	SECURING PINS	4 – 105
4.3.12.9.7	LEVERS, CRANKS, HOOKS, AND CONTROLS	4 – 105
4.3.12.9.8	BURRS	4 – 105
4.3.12.9.9	LOCKING WIRES	4 – 106
4.3.12.9.10	AUDIO DEVICES (DISPLAYS)	4 – 106
4.3.12.9.11	DELETED	4 – 106
4.3.12.9.12	EGRESS	4 – 106
4.3.12.10	PAYLOAD IN-FLIGHT MAINTENANCE	4 – 106
4.3.12.11	DELETED	4 – 107

TABLE OF CONTENTS (Continued)

PARAGRAPH		PAGE
APPENDIX		
A	ABBREVIATIONS AND ACRONYMS	A – 1
B	GLOSSARY OF TERMS	B – 1
C	INSTRUCTIONS FOR LABELS AND DECALS	C – 1
D	EXHAUST GASES COMPATIBLE WITH THE ISS VES/WGS WETTED MATERIALS	D – 1
E	OPEN ITEMS	E – 1

TABLES

TABLE		PAGE
3.1.1.3-1	CREW-INDUCED LOADS	3 - 8
3.1.1.3-2	RANDOM VIBRATION CRITERIA FOR ISPR POST-MOUNTED EQUIPMENT WEIGHING 100 POUNDS OR LESS IN THE MPLM	3 - 8
3.1.1.3-3	RANDOM VIBRATION CRITERIA FOR ISPR POST-MOUNTED EQUIPMENT WEIGHING MORE THAN 100 POUNDS IN THE MPLM	3 - 9
3.1.1.3-4	PAYLOAD ISPR MOUNTED EQUIPMENT LOAD FACTORS (EQUIPMENT FREQUENCY 35 HZ)	3 - 9
3.1.1.6.1-1	MODULE CONNECTORS	3 - 13
3.2.2.5-1	MAXIMUM REVERSE ENERGY/CURRENT FROM DOWNSTREAM LOADS	3 - 33
3.2.5.2-1	RACK MAINTENANCE SWITCH (RACK POWER SWITCH) LABEL	3 - 45
3.2.5.4-1	LET-GO CURRENT PROFILE THRESHOLD VERSUS FREQUENCY	3 - 46
3.3.5.2.1.4-1	REMOTE TERMINAL HARDWIRED ADDRESS CODING FOR STANDARD PAYLOAD BUS	3 - 59
3.3.5.2.3-1	MIL-STD-1553B NETWORK CHARACTERISTICS	3 - 61
3.3.6.1.6-1	LINK SEGMENT CABLE CHARACTERISTICS	3 - 63
3.3.8.1-1	RACK CONNECTOR PART NUMBERS	3 - 67
3.3.10.1-1	BI-LEVEL DATA CHARACTERISTICS (SWITCH CONTACT)	3 - 70
3.3.10.2.1-1	ELECTRICAL CHARACTERISTICS ENVELOPE OF ANALOG SIGNALS	3 - 71
3.3.10.2.2-1	ELECTRICAL CHARACTERISTICS OF THE BIT INTERFACE	3 - 71
3.3.10.2.3-1	SMOKE INDICATOR INTERFACE CHARACTERISTICS	3 - 72
3.4.1.1-1	NTSC VIDEO PERFORMANCE CHARACTERISTICS (OPTICAL VIDEO ONLY) (TBR #3)	3 - 73
3.4.1.2-1	NTSC FIBER OPTIC VIDEO SIGNAL CHARACTERISTICS	3 - 74
3.4.1.2.4-1	PFM NTSC VIDEO OPTICAL FIBER CHARACTERISTICS	3 - 75
3.4.1.3.2-1	JEM VIDEO AND SYNC SIGNAL STANDARD	3 - 78
3.5.1.13-1	MPLM CABIN AIR HEAT ABSORPTION	3 - 84
3.9.3.4-1	SOLAR RADIATION	3 - 94
3.9.4-1	ENVIRONMENTAL CONDITIONS	3 - 96
3.9.4-2	ASSEMBLY COMPLETE QUASI-STEADY STATE MICROGRAVITY ENVIRONMENT	3 - 97
3.12.3.3.1-1	CONTINUOUS NOISE LIMITS	3 - 116
3.12.3.3.2-1	INTERMITTENT NOISE LIMITS	3 - 117
3.12.3.4-1	SURFACE INTERIOR COLORS AND PAINTS	3 - 119
3.12.3.4-2	PAYLOAD REQUIRED ILLUMINATION LEVELS	3 - 119

FIGURES

FIGURE		PAGE
3.1.1.2.1.1-1	LATE ACCESS PAYLOAD ENVELOPE	3-3
3.1.1.2.1.1-2	LATE ACCESS HOIST HOOK	3-4
3.1.1.2.1.1-3	LATE ACCESS MONORAIL HOIST HOOK	3-5
3.1.1.2.1.2-1	EARLY ACCESS PAYLOAD ENVELOPE	3-6
3.1.1.2.1.2-2	EARLY ACCESS DEAP MONORAIL INTERFACE	3-7
3.1.1.4-1	MANUAL FIRE SUPPRESSION SYSTEM PERFORMANCE CHARACTERISTICS AT THE RACK I/F	3-11
3.1.1.7.2-1	SIR AND ISIS DRAWER HANDLES PROTRUSION ENVELOPE	3-16
3.1.1.7.2-2	ON-ORBIT SEMI-PERMANENT PROTRUSIONS ENVELOPE	3-17
3.1.1.7.3-1	ON-ORBIT TEMPORARY PROTRUSIONS ENVELOPE	3-18
3.1.1.7.5-1	ON-ORBIT PROTRUSIONS FOR KEEP ALIVE PAYLOADS ENVELOPE	3-20
3.1.1.7.5-2	ISIS FLUID LINE ENVELOPE FOR 3-INCH PROTRUSIONS	3-21
3.1.1.7.5-3	ISIS FLUID LINE ENVELOPE FOR 2-INCH PROTRUSIONS	3-22
3.2.1-1	ELECTRICAL POWER INTERFACE LOCATIONS	3-24
3.2.1.2.2-1	MAXIMUM INTERFACES B AND C RIPPLE VOLTAGE SPECTRUM	3-25
3.2.1.3.1-1	INTERFACE B VOLTAGE TRANSIENTS	3-26
3.2.1.3.2-1	INTERFACE C VOLTAGE TRANSIENTS	3-27
3.2.1.3.3-1	FAULT CLEARING AND PROTECTION TRANSIENT LIMITS	3-28
3.2.2.3-1	U.S. RPCM SOFT START/STOP CHARACTERISTICS	3-30
3.2.2.4-1	PEAK SURGE CURRENT AMPLITUDE VERSUS STEADY-STATE INPUT CURRENT	3-31
3.2.2.4-2	MAXIMUM CURRENT RATE OF CHANGE VERSUS PEAK SURGE CURRENT AMPLITUDE	3-32
3.2.2.7.1-1	3KW INTERFACE B LOAD IMPEDANCE LIMITS	3-35
3.2.2.7.1-2	6 KW INTERFACE B LOAD IMPEDANCE LIMITS	3-36
3.2.2.7.1-3	1.2 TO 1.44 KW AUXILIARY INTERFACE B LOAD IMPEDANCE LIMITS	3-37
3.2.2.7.2-1	INTERFACE C LOAD IMPEDANCE LIMITS FOR 10 - 12 AMPERE CIRCUIT RATING	3-39
3.2.2.8-1	PULSE APPLIED TO THE POWER INPUT OF THE INTEGRATED RACK OR EPCE	3-40
3.2.3.1-1	WIRE DERATING REQUIREMENTS FOR ISPR AND EPCE	3-41
3.2.6.2.2-1	MPLM RPC SOFT START/STOP CHARACTERISTICS	3-49
3.3.5.2.1.4-1	REMOTE TERMINAL HARDWIRED ADDRESS CODING (EXAMPLE)	3-60
3.3.8.1-1	DATA/POWER CABLE DESIGN	3-67
3.4.1.3.2-1	INTERFACE POINT FOR JEM ELECTRICAL VIDEO	3-77
3.4.1.3.3-1	VIDEO/SYNC SIGNAL INTERFACE CIRCUIT	3-79
3.9.1.3-1	ISS TEMPERATURE/HUMIDITY ENVELOPE	3-93

FIGURES (Continued)

FIGURE		PAGE
3.9.4-1	OPERATING LIMITS OF THE ISS ATMOSPHERIC TOTAL PRESSURE, AND NITROGEN AND OXYGEN PARTIAL PRESSURES	3 - 98
3.9.4-2	DELETED	3 - 99
3.9.4-3	DELETED	3 - 99
3.9.4-4	DELETED	3 - 100
3.10.3.2-1	MANUAL FIRE SUPPRESSION HARDWARE ENVELOPE	3 - 104
3.10.3.2-2	CLOSED VOLUME PFE NOZZLE	3 - 105
3.12.1-1	ARM, HAND, AND THUMB/FINGER STRENGTH (5TH PERCENTILE MALE DATA)	3 - 108
3.12.1-2	LEG STRENGTH AT VARIOUS KNEE AND THIGH ANGLES (5TH PERCENTILE MALE DATA)	3 - 109
3.12.1-3	TORQUE STRENGTH	3 - 109
3.12.1-4	MAXIMAL STATIC PUSH FORCES	3 - 110
3.12.1-5	MALE GRIP STRENGTH AS A FUNCTION OF THE SEPARATION BETWEEN GRIP ELEMENTS	3 - 111
3.12.2.2-1	MINIMUM SIZES FOR ACCESS OPENINGS FOR FINGERS	3 - 111
3.12.3.3-1	INTERMITTENT NOISE LIMIT REQUIREMENTS	3 - 114
3.12.3.3.2-1	INTERMITTENT NOISE LIMITS	3 - 118
3.12.4.4.2-1	DELETED	3 - 124
3.12.4.4.2-2	MINIMAL CLEARANCE FOR TOOL-OPERATED FASTENERS	3 - 125
3.12.5.1-1	CONTROL SPACING REQUIREMENTS FOR UNGLOVED OPERATION	3 - 128
3.12.5.2.3-1	ROTARY SWITCH GUARD	3 - 130
3.12.5.3-1	VALVE HANDLE - CENTRAL PIVOT TYPE	3 - 131
3.12.5.3-2	VALVE HANDLE - LEVER TYPE	3 - 132
3.12.5.4-1	TOGGLE SWITCHES	3 - 133
3.12.6.4.4-1	MINIMUM IVA HANDLE DIMENSIONS FOR IVA APPLICATIONS	3 - 135
4.3.2.2.8-1	STABILITY TEST SETUP, TRANSIENT RESPONSES	4 - 19
4.3.2.2.8-2	ISS LINE IMPEDANCE SIMULATION NETWORK (LISN)	4 - 20
4.3.12.3.3.1-1	TEST-CORRELATED MODEL PROCESS	4 - 88

DOCUMENT NO.	TITLE
220G07455	Upper Structure Assembly
220G07470	MSFC Base Assembly
220G07475	SSPF Base Assembly
220G07500	Rack Shipping Containers
683-50243-4	ED for Refrigerator/Freezer Rack Structure
683-10007	Fire Detection Assembly
683-17103	Fluid System Servicer (FSS) Interface Definition Drawings
D684-10056-01	International Space Station Program, Prime Contractor Software Standards and Procedures Specification
EIA-RS-170	Electrical Performance Standards for Television Studio Facilities
EIA/TIA 250	Electrical Performance for Television Relay Facility
FED-STD-595	Federal Standard Colors Used in Government Procurement
ISO/IEC 8802-3	Carrier Sense Multiple Access With Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications
JSC 27199	End Item Specification for the International Space Station Portable Utility Light
JSC 27260	Decal Process Document and Catalog
MIL-HDBK-1553	Digital Time Division Command/Response Multiplex Data Bus Handbook
MIL-STD-1189	Standard Department of Defense Bar Code Symbology
MIL-STD-1522	Standard General Requirements for Safe Design and Operation of Pressurized Missile and Space Systems
MIL-STD-1553	Digital Time Division Command/Response Multiplex Data Bus
MIL-STD-1686	Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices) Document
MIL-STD-1777	Internet Protocol
MSFC-SPEC-250	Protective Finishes for Space Vehicle Structures and Associated Flight Equipment, General Specification for Document
MSFC-STD-275	Marking of Electrical Ground Support Equipment, Front Panels, and Rack Title Plates
MSFC-STD-531	High Voltage Design Criteria

DOCUMENT NO.	TITLE
SSP 30575	Interior and Exterior Operational Location Coding System
SSP 41000	System Specification for the International Space Station
SSP 41002	International Standard Payload Rack to NASA/NASDA Modules Interface Control Document
SSP 41017	Rack to Multi-Purpose Logistics Module Interface Control Document (ICD) Part 1 and Part 2
SSP 41155	Refrigerator/Freezer Rack to MPLM ICD
SSP 41172	Qualification and Acceptance Environmental Test Requirements
SSP 41175-02	Software ICD Part 1 Station Management and Control to ISS Book 2 General Interface Software Interfaces Requirement
SSP 41175-08	Software ICD Part 1 SMC to ISS Book 8 Payload Multiplexer/Demultiplexer Interface
SSP 50005	International Space Station Flight Crew Integration Standard (NASA-STD-3000/T) Document
SSP 50007	Space Station Inventory Management System Label Specification
SSP 50008	International Space Station Interior Color Scheme
SSP 50014	International Space Station Utility Coding Specification
SSP 50184	High Rate Data Link Physical Media, Physical Signaling & Protocol Specifications
SSP 50200-8	Station Program Implementation Plan Vol. VIII, Increment Execution Preparation
SSP 50313	Display and Graphical Commonality Standard
SSP 50467	ISS Cargo Stowage Technical Manual: Pressurized Volume
SSP 52005	ISS Payload Flight Equipment and Guidelines For Safety Critical Structures
SSP 52050	Software Interface Control Document Part 1, International Standard Payload Rack to International Space Station.
SSP 52051	Payload Interface Definition Document (IDD) Baseline – SSP 52051 – User Electric Power Specifications and Standards.
SSP 57001	Pressurized Payload Hardware ICD
SSP 57002	Pressurized Payload Software ICD
SSP 57005	Active Rack Isolation System to Payload ICD
SSQ 21635	Connectors and Accessories, Electrical, Rectangular, Rack and Panel

IRN 0001

IRN 0004

3.0 PAYLOAD INTERFACE REQUIREMENTS AND GUIDANCE

The requirements contained in this section will be complied with in order to certify a payload for integration into the applicable ISS modules. This section is divided by the following disciplines: Structural and Mechanical, Electrical, Command and Data Handling, Audio/Video, Thermal Control, Vacuum Exhaust and Vacuum Resource, Gases, Payload Support Services, Environment, Fire Protection, Material and Parts, Human Factors. Unless otherwise specified as USL, JEM, APM, MPLM, or CAM, a requirement applies to all modules.

3.1 STRUCTURAL/MECHANICAL, AND MICROGRAVITY AND STOWAGE INTERFACE REQUIREMENTS

3.1.1 STRUCTURAL/MECHANICAL

3.1.1.1 GSE INTERFACES

- A. Integrated racks shall interface to the KSC GSE Rack Insertion Device in accordance with SSP 41017 Part 1, paragraph 3.2.1.1.2 Static Envelope, 3.2.1.4.3 Interface Loads, and SSP 41017 Part 2, paragraph 3.3.2 Upper Attachment Interfaces and 3.3.3 Ground Handling Attachment Interfaces.
- B. Integrated racks shall interface to Rack Shipping Containers in accordance with the Teledyne Brown Engineering (TBE) as-built drawing 220G07500.
- C. Integrated racks shall interface to Rack Handling Adapters (RHA) in accordance with the following TBE as-built drawings: 220G07455 Upper Structure Assembly, 220G07470 MSFC Base Assembly, and 220G07475 SSPF Base Assembly.
- D. Integrated racks shall be limited to ground transportation accelerations of 80% of flight accelerations defined by SSP 41017 Part 1, paragraph 3.2.1.4.2.

3.1.1.2 MPLM INTERFACES

- A. Integrated racks shall interface to the MPLM structural attach points in accordance with SSP 41017 Part 2, paragraph 3.1.1.
- B. Integrated racks shall maintain positive margins of safety for MPLM depress rates of 890 Pa/second (7.75 psi/minute) and repress rates of 800 Pa/second (6.96 psi/minute).
- C. Deleted.
- D. Deleted.

3.1.2.2 VIBRATORY REQUIREMENTS

- A. Integrated racks shall limit vibroacoustic disturbances to Table **(TBD #3)**.
- B. During microgravity isolation, integrated ARIS racks shall meet the vibroacoustic disturbance requirements in accordance with the SSP **(TBD #4)** ARIS IDD, to avoid bumping.

3.1.2.3 TRANSIENT REQUIREMENTS

- A. Integrated racks shall meet the **(TBD #5)** transient disturbance requirement.
- B. During microgravity isolation, integrated ARIS racks shall meet the transient disturbance requirements in accordance with the SSP **(TBD #6)** ARIS IDD.

3.1.2.4 MICROGRAVITY ENVIRONMENT

Refer to the Pressurized Payload Accommodation Handbook (PAH), SSP 57020 for microgravity environment data.

IRN 0004

3.1.2.5 ARIS INTERFACES

3.1.3 STOWAGE

Stowage interface information is provided in SSP 50467, Cargo Stowage Technical Manual: Pressurized Volume.

IRN 0004

3.2 ELECTRICAL INTERFACE REQUIREMENTS

3.2.1 ELECTRICAL POWER CHARACTERISTICS

Electrical power characteristics are specified in this section for two interfaces, Interfaces B and C, as depicted in Figure 3.2.1–1, Electrical Power System Interface Locations. Integrated racks, payload associated hardware and payload hardware connected to Utility Outlet Panels (UOPs) in the USL, JEM, and CAM or the Standard Utility Panels (SUP) in the APM are required to be compatible with the prescribed characteristics of the Electrical Power System (EPS). For purposes of this specification, compatibility is defined as operating without producing an unsafe condition or one that could result in damage to ISS equipment or payload hardware.

3.2.2.7.2 INTERFACE C

The load impedance presented by the EPCE to Interface C shall not exceed the bounds defined by Figure 3.2.2.7.2–1 for input over the frequency range of 50 Hz to 100kHz. The magnitude component of the EPCE input impedance should not be less than the minimum defined in Figure 3.2.2.7.2–1. At frequencies where the magnitude component of the EPCE input impedance is less than the defined minimum, the phase component of the input impedance shall not exceed the bounds defined in this Figure.

3.2.2.8 LARGE SIGNAL STABILITY

The integrated rack connected to Interface B and the EPCE connected to Interface C shall maintain stability with the ISS EPS interface by damping a transient response to 10 percent of the maximum response amplitude within 1.0 millisecond (ms), and remaining below 10 percent thereafter under the following conditions:

1. The rise time/fall time (between 10 and 90 percent of the amplitude) of the input voltage pulse is less than 10 microseconds (s).
2. The voltage pulse is to be varied from 100 to 150 μ s in duration.

Note: Figure 3.2.2.8–1 is used to clarify the above requirement.

3.2.2.9 DELETED

■ IRN 0004

3.2.2.10 ELECTRICAL LOAD-STAND ALONE STABILITY

The Integrated Rack connected to Interface B and EPCE (or Integrated rack in MPLM) connected to Interface C shall provide local stability by meeting the following conducted susceptibility requirements defined in Paragraph 3.2.4.4:

- A. Paragraph 3.2.2.1 of SSP 30237 (CS01)
- B. Paragraph 3.2.2.2 of SSP 30237 (CS02)
- C. Paragraph 3.2.2.3 of SSP 30237 (CS06)

3.2.2.11 ELECTRICAL LOAD INDUCTANCE

(TBD #3)

3.2.2.12 MAXIMUM LOAD STEP SIZE

IRN 0004

For 6 kW and 12 kW racks, step changes in power demand by the integrated rack connected to Interface B shall not exceed 3 kilowatts on a single power feed.

- (1) Advisories are set primarily for ground monitoring purposes (advantageous due to limited comm. coverage and data recording).
- (2) Data item that most likely will not exist permanently in Telemetry List but should be time tagged and logged for failure isolation, trending, sustaining engineering, etc.

3.3.5.1.5 SERVICE REQUESTS

Integrated racks shall develop service requests shall be in accordance with paragraph 3.2.3.7, Service Requests of SSP 52050. The service requests data format, shall be developed in accordance with Table 3.2.3.7-1, Service Requests, of SSP 52050.

3.3.5.1.6 ANCILLARY DATA

Information regarding ancillary data that can be made available to payloads is contained in paragraph 3.2.3.8, Ancillary Data, of SSP 52050.

3.3.5.1.7 FILE TRANSFER

Integrated racks requiring file transfer shall develop its file transfer in accordance with paragraph 3.2.3.9, File Transfer, of SSP 52050.

3.3.5.1.8 LOW RATE TELEMETRY

Integrated racks requiring low rate telemetry shall develop low rate telemetry (i.e. science data) in accordance with paragraph 3.2.3.10, Low Rate Telemetry of SSP 52050.

3.3.5.1.9 DEFINED MODE CODES

Integrated racks MIL-STD-1553B mode codes are defined in paragraph 3.2.3.2.1.5, Data Word Count/Mode Code in SSP 52050. The MPLM does not support the Initiate Self-Test or Transmit BIT Word mode codes referenced in that paragraph and listed in Table 3.2.3.2.1.5-1 of SSP 52050.

IRN 0004

3.3.5.1.10 IMPLEMENTED MODE CODES

Integrated racks shall implement MIL-STD-1553B mode codes in accordance with paragraph 3.2.3.2.1.5, Data Word Count/Mode Code, and Table 3.2.3.2.1.5-1, Mode Codes of SSP 52050.

3.3.7.6 HRDL CONNECTORS AND FIBER

- A. Integrated rack connector P7 mating requirement to the UIP connector J7 is specified in paragraph 3.1.1.6.1, E.
- B. Integrated rack connector P7 shall meet the pin out interfaces of the UIP J7 connector as specified in SSP 57001, paragraph 3.3.4.1.
- C. Integrated rack HRDL connector P7 shall meet the requirements of SSQ 21635 or equivalent.
- D. Integrated rack HRDL fiber shall meet the requirements of SSQ 21654 or equivalent.

3.3.7.7 DELETED

3.3.8 PERSONAL COMPUTERS

There are three types of personal computers available for payload operations: the Payload Laptop, Portable Computer System (PCS), and the Station Support Computer (SSC).

3.3.8.1 PAYLOAD LAPTOP

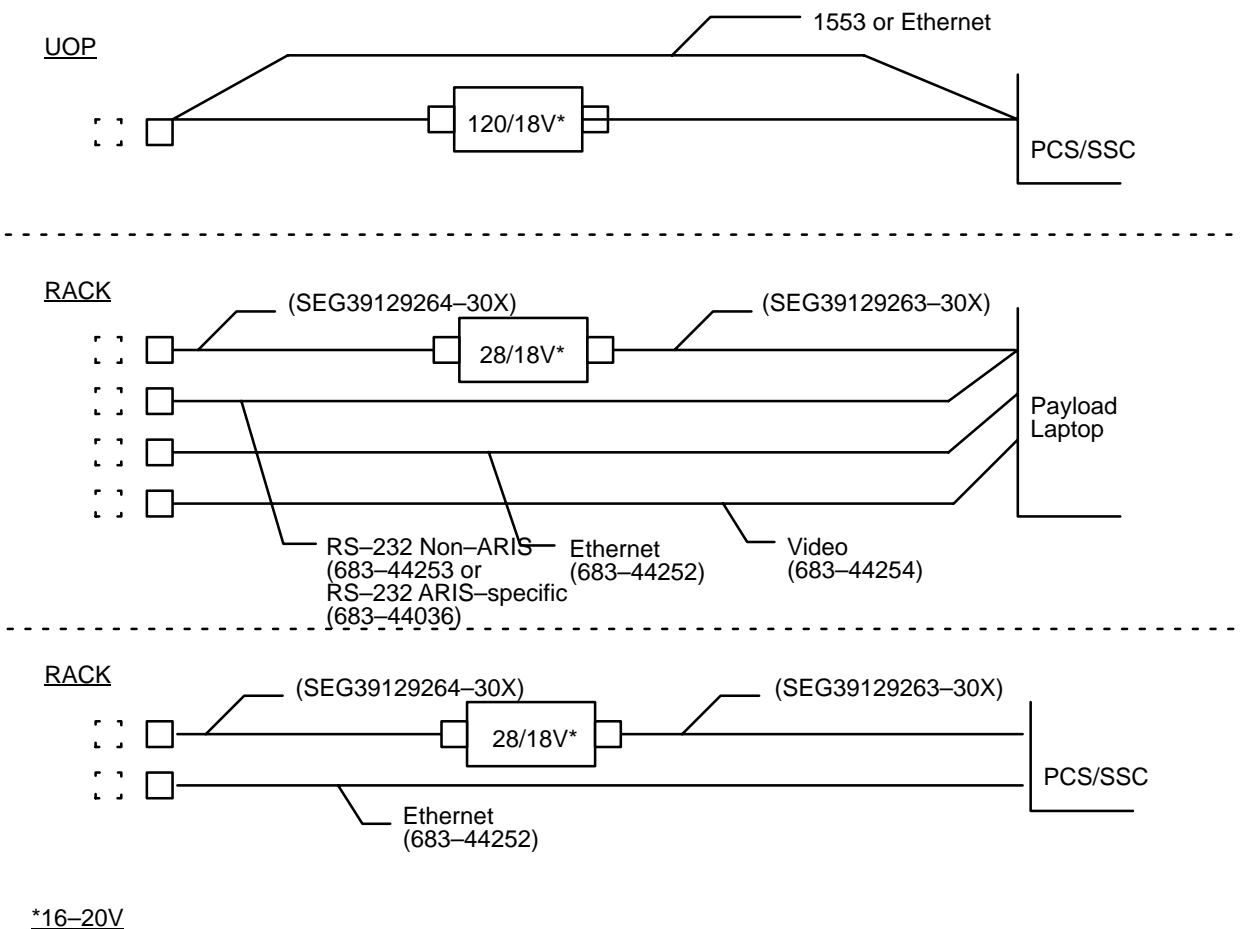
The Payload Laptop is a rack unique laptop which is provided by the Payload Developer (PD). The primary purpose of the Payload Laptop is to provide rack and experiment control and display. Requirements for the Payload Laptop are detailed below.

- A. Payload racks which require a laptop shall utilize an IBM 760XD (model 9546U9E) laptop per JSC 27337, Project Technical Requirements Specification for the PCS.
- B. Payload Laptops shall utilize a Windows NT 4.0 software load supporting the following standard services (Computer Browser, Internet Info Server 4.0, TCP/IP Printing, NetBIOS Interface, Network Monitor & Tools, RPC Config, Server, Transaction Server, Workstation) with TCP/IP Protocol suite.
- C. Payload Laptop displays shall be in accordance with SSP 50313, Display and Graphical Commonality Standard.
- D. Each rack shall be limited to one Payload Laptop computer.
- E. The Payload Laptop shall interface to the rack via a front panel connection utilizing the connectors as specified in Table 3.3.8.1-1 and pin outs per SSP 57001, Figures 3.3.6-1 through 3.3.6-5.

- F. Data / power cables shall be per design specified in drawings shown in Figure 3.3.8.1-1.
- G. A 28V power converter, shown in Figure 3.3.8.1-1, shall be per design specified in drawing SED39126010-305.
- H. The Payload Laptop shall be attached to the rack seat track via the multi-use bracket, SEG33107631-301 and PGSC desk, Shuttle P/N SED33108703-302 or equivalent.

TABLE 3.3.8.1-1 RACK CONNECTOR PART NUMBERS

Power	MS3474L14-12S
RS-232	MS27468T15F35SA
Ethernet	MS27468T11F35S
Video	BJ76



*16-20V

FIGURE 3.3.8.1-1 DATA/POWER CABLE DESIGN

3.3.8.2 PCS

The PCS is a complement level laptop which is a shared ISS resource. The purpose of the PCS is to provide 1553 connectivity to the C&C and Payload MDMs. PCS has the following displays available for use by the crew: vehicle displays, complement level payload displays, and if requested, payload unique displays. All of these run under the Solaris operating system. The IBM 760XD laptop hardware also provides Ethernet, RS-232 and RS-422 interfaces. The PCS is only connected to the payload 1553 bus for payload command and control. However, the PCS hardware and Solaris OS is available as a shared resource for direct connection to a payload rack. Ethernet, RS-422/232 user display and interface control software must be provided by the payload developers. All payload developed software for use on PCS must be delivered to the PSIV for integration into a payload complement load.

- A. All payload software to be used on PCS shall adhere to the PCS Interface Definition Document (IDD), SSP 52052.
- B. PCS displays shall be in accordance with SSP 50313, Display and Graphical Commonality Standard. (not unique to PCS)
- C. Each integrated rack shall be limited to one shared PCS. The PCS is not dedicated to a rack; memory and hard drive availability for payload displays and software must be negotiated with the Payload Software Control Panel.

3.3.8.2.1 PCS TO UOP INTERFACE

- A. The PCS interface to payloads is through the MIL-STD-1553B (PLMDM) port or SSMB (Ethernet) port of a UOP in accordance with paragraph 3.2.1.2 of SSP 57001.
- B. A 120V power converter and data / power cables are utilized as shown in Figure 3.3.8.1-1.

3.3.8.2.2 760XD LAPTOP TO RACK INTERFACE

- A. The integrated rack shall interface with the 760XD via a front panel connection utilizing the connectors as specified in Table 3.3.8.1-1 and pin outs per SSP 57001, Figures 3.3.6-1 through 3.3.6-5.
- B. Data / power cables shall be per design specified in drawings shown in Figure 3.3.8.1-1.
- C. A 28V power converter, shown in Figure 3.3.8.1-1, shall be per design specified in drawing SED39126010-305.
- D. The 760XD shall be attached to the rack seat track via the multi-use bracket, SEG33107631-301 and PGSC desk, Shuttle P/N SED33108703-302.

3.4.1.4 NTSC ELECTRICAL CONNECTOR/PIN ASSIGNMENTS

- A. Integrated rack connector P77 mating requirements to the ISPR UIP connector J77 are specified in paragraph 3.1.1.6.1, K.
- B. The integrated rack electrical video system P77 connector shall meet the pin out interfaces of the UIP J77 connector as specified in SSP 57001, paragraph 3.4.2.1. ■ IRN 0004
- C. The integrated rack electrical video system P77 connector shall meet the requirements of SSQ 21635 or equivalent. ■ IRN 0004

3.4.2 U.S. ELEMENT AUDIO INTERFACE REQUIREMENTS

There are no direct audio interfaces from a payload to any ISS equipment. Audible Caution and Warning enunciation is through the Standard safety caution and warning status words.

3.5 THERMAL CONTROL INTERFACE REQUIREMENTS

3.5.1 INTERNAL THERMAL CONTROL SYSTEM (ITCS) INTERFACE REQUIREMENTS

3.5.1.1 PHYSICAL INTERFACE

- A. Integrated rack connectors for moderate temperature water cooling supply and return mating requirements to the utility interface panel connectors are specified in paragraph 3.1.1.6.1, items L and M.
- B. Integrated rack connectors for low temperature water cooling supply and return mating requirements to the utility interface panel connectors are specified in paragraph 3.1.1.6.1, items N and O.

3.5.1.2 ITCS FLUID USE AND CHARGING

A. ITCS Fluid Use

Coolant contained in the integrated rack that interfaces with ITCS coolant shall satisfy the cleanliness and materials requirements specified in paragraph 3.11.2.

B. Integrated Rack Charging

Payloads shall be delivered on-orbit charged with coolant as specified in paragraph 3.11.2 and during transport, integrated racks that are not actively serviced by the MPLM Thermal Control

TABLE 3.9.4–1 ENVIRONMENTAL CONDITIONS

Environmental Condition	Value	
Atmospheric Conditions on ISS		
Pressure Extremes	0 to 104.8 kPa (0 to 15.2 psia)	
Normal operating pressure	See Figure 3.9.4–1	
Oxygen partial pressure	See Figure 3.9.4–1	
Nitrogen partial pressure	See Figure 3.9.4–1	
Dewpoint	4.4 to 15.6 °C (40 to 60 °F) ref. figure 3.9.1.3–1	
Percent relative humidity	25 to 75% ref. figure 3.9.1.3–1	
Carbon dioxide partial pressure during normal operations with 6 crewmembers plus animals	24-hr average exposure 5.3 mm Hg Peak exposure 7.6 mm Hg	
Carbon dioxide partial pressure during crew changeout with 11 crewmembers plus animals	24-hr average exposure 7.6 mm Hg Peak exposure 10 mm Hg	
Cabin air temperature in USL, JEM, APM, and CAM	17 to 28 °C (63 to 82 °F)	
Cabin air temperature in Node 1	17 to 31 °C (63 to 87 °F)	
Air velocity (Nominal)	0.051 to 0.203 m/s (10 to 40 ft/min)	
Airborne microbes	Less than 1000 CFU/m3	
Atmosphere particulate level	Average less than 100,000 particles/ft3 for particles less than 0.5 microns in size	
MPLM Air Temperatures	Passive Flights	Active Flights
Pre-Launch	15 to 24°C (59 to 75.2°F)	14 to 30 °C (57.2 to 86 °F)
Launch/Ascent	14 to 24°C (57.2 to 75.2°F)	20 to 30 °C (68 to 86 °F)
On-orbit (Cargo Bay + Deployment)	24 to 44°C (75.2 to 111.2°F)	16 to 46 °C (60.8 to 114.8 °F)
On-orbit (On-Station)	23 to 45°C (73.4 to 113°F)	16 to 43 °C (60.8 to 109.4 °F)
On-orbit (Retrieval + Cargo Bay)	17 to 44°C (62.6 to 111.2°F)	11 to 45 °C (51.8 to 113 °F)
Descent/Landing	13 to 43°C (55.4 to 109.4 °F)	10 to 42 °C (50 to 107.6 °F)
Post-Landing	13 to 43°C (55.4 to 109.4 °F)	10 to 42 °C (50 to 107.6 °F)
Ferry Flight	15.5 to 30°C (59.9 to 86 °F)	15.5 to 30 °C (59.9 to 86 °F)
MPLM Maximum Dewpoint Temperatures		
Pre-Launch	13.8°C (56.8°F)	12.5°C (54.5°F)
Launch/Ascent	13.8°C (56.8°F)	12.5°C (54.5°F)
On-orbit (Cargo Bay + Deployment)	13.8°C (56.8°F)	12.5°C (54.5°F)
On-orbit (On-Station)	15.5°C (60°F)	15.5°C (60°F)
On-orbit (Retrieval + Cargo Bay)	10°C (50°F)	10°C (50°F)
Descent/Landing	10°C (50°F)	10°C (50°F)
Post-Landing	10°C (50°F)	10°C (50°F)
Ferry Flight	15.5°C (60°F)	15.5°C (60°F)
Thermal Conditions		
USL module wall temperature	13 °C to 43 °C (55 °F to 109 °F)	
JEM module wall temperature	13 °C to 45 °C (55 °F to 113 °F) (TBR #7)	
APM module wall temperature	13 °C to 43 °C (55 °F to 109 °F) (TBR #8)	
CAM module wall temperature	13 °C to 43 °C (55 °F to 109 °F) (TBR #9)	
Other integrated payload racks	Front surface less than 37 °C (98.6 °F)	
General Illumination	108 Lux (10 fc) measured 30 inches from the floor in the center of the aisle	

IRN 0004

TABLE 3.9.4-2 DELETED


 IRN 0004

FIGURE 3.9.4-2 DELETED

FIGURE 3.9.4-3 DELETED

FIGURE 3.9.4-4 DELETED

TABLE 3.12.3.4-1 SURFACE INTERIOR COLORS AND PAINTS

HARDWARE DESCRIPTION	COLOR	FINISH	PAINT SPECIFICATION PER FED-STD-595
Equipment Rack Utility Panel Recess	White	Semigloss	27925
Equipment Rack Utility Panel Text Characters	Black	Lusterless	37038
ISPR Utility Panel Recess	White	Semigloss	27925
ISPR Utility Panel Recess Text Characters	Black	Lusterless	37038
Functional Unit Utility Panel Recess (as applicable)	White	Semigloss	27925
Functional Unit Utility Panel Recess Text Characters	Black	Lusterless	37038
Rack Front Aisle Extensions	Off-White	Semigloss	27722
Overhead Rack Face Plates	Off-White	Semigloss	27722
Port Rack Face Plates	Off-White	Semigloss	27722
Starboard Rack Face Plates	Off-White	Semigloss	27722
Deck Rack Face Plates	Off-White	Semigloss	27722
Overhead Rack Utility Panel Closeouts	Off-White	Semigloss	27722
Port Rack Utility Panel Closeouts	Off-White	Semigloss	27722
Starboard Rack Utility Panel Closeouts	Off-White	Semigloss	27722
Deck Rack Utility Panel Closeouts	Off-White	Semigloss	27722
Stowage Trays	Off-White	Semigloss	27722
Stowage Tray Handle Straps (any location)	Natural/Off White Material	Semigloss	none
Common Seat Track	Nickel Plate	Semigloss	none
Glovebox (Aluminum or Plastic)	Medium Gray	Gloss	16329 or 16373
Glovebox (Aluminum)	White	Gloss	17925
Glovebox (Aluminum or Plastic)	Off-White	Gloss	17722
Glovebox (Aluminum)	Tan	Gloss	10475
EXPRESS Program Rack Utility Panels	Off-White	Gloss	17875

IRN 0004

TABLE 3.12.3.4-2 PAYLOAD REQUIRED ILLUMINATION LEVELS

Type of Task	Required Lux (Foot-Candles)*
Medium payload operations (not performed in the aisle) (e.g., payload change-out and maintenance)	325 (30)
Fine payload operations (e.g., instrument repair)	1075 (100)
Medium glovebox operations (e.g., general operations, experiment set-up)	975 (90)
Fine glovebox operations (e.g., detailed operations, protein crystal growth, surgery/dissection, spot illumination)	1450 (135)

* As measured at the task site

4.3.1.1.7 ON ORBIT PAYLOAD PROTRUSIONS

- A. An inspection shall be performed to determine that on-orbit protrusions do not extend laterally across the edges of the rack or pass between racks. The inspection shall be of the hardware or the as built drawings. The verification shall be considered successful when the inspection shows that no on-orbit protrusions extends extend laterally across the edges of the rack or pass between racks.
- B. Verification that the integrated rack hardware does not preclude the attachment of RMA to the seat track shall be by demonstration or analysis. The demonstration shall be on the flight hardware or a flight like equivalent. The verification shall be considered successful when the demonstration shows that integrated rack hardware does not prevent attachment of RMA on the seat track for each discrete operational configuration of the rack.

IRN 0004

IRN 0004

The analysis will consist of an assessment of each discrete operational configuration of the integrated rack based upon the as-built hardware drawings. The verification shall be considered successful when the analysis shows that the integrated rack hardware does not prevent attachment of RMA on the seat track for each discrete operational configuration.

4.3.1.1.7.1 ON-ORBIT PERMANENT PROTRUSIONS

An inspection of the integrated rack shall be conducted to determine that there are no permanent protrusions. The inspection shall be of the hardware or the as built drawings. The verification shall be considered successful when the inspection shows that there are no permanent protrusions.

4.3.1.1.7.2 ON-ORBIT SEMI-PERMANENT PROTRUSIONS

- A. An inspection of the integrated rack shall be conducted to determine SIR and ISIS drawer handles remain within the envelope shown in Figure 3.1.1.7.2-1. The inspection shall be of the hardware or the as built drawings. The verification shall be considered successful when the inspection shows that all SIR and ISIS drawer handles remain within the envelope shown in Figure 3.1.1.7.2-1.
- B. Verification of the other on-orbit semi-permanent protrusions, including knobs, switches, guards, quick-disconnect fittings, etc., of the integrated rack shall be performed by inspection. The inspection shall be of the as built drawings or hardware. Verification shall be considered successful when the inspection shows that all on-orbit semi-permanent protrusions including knobs, switches, guards, quick-disconnect fittings, etc., are limited to a total of 500 square inches within the envelope shown in Figure 3.1.1.7.2.2
- C. Verification that the on-orbit semi-permanent protrusions are removable with hand operations and/or standard IVA tools shall be performed by demonstration. The demonstration shall be performed on the hardware. The verification shall be considered successful when the on-orbit semi-permanent protrusion can be removed with hand operations and/or standard IVA tools.

4.3.2.2.9 DELETED

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4.3.2.2.10 ELECTRICAL LOAD-STAND ALONE STABILITY

Verification of local stability requirements is defined in paragraph 4.3.2.4.4.

The verification shall be considered successful when analysis of test data for the requirements identified in the following paragraphs are met:

- A. Paragraph 3.2.2.1 of SSP 30237 (CS01)
- B. Paragraph 3.2.2.2 of SSP 30237 (CS02)
- C. Paragraph 3.2.2.3 of SSP 30237 (CS06)

4.3.2.2.11 ELECTRICAL LOAD INDUCTANCE

(TBD #9)

4.3.2.2.12 MAXIMUM LOAD STEP SIZE

IRN 0004

Maximum load step size shall be verified by test.

Verification shall be by test for loads will operate from feeds rated for more than 25 amperes or 3 kilowatts. The test shall simulate all operational modes and related transitions for each power feed. The maximum change in power demand must be determined for each transition that is possible under normal operating conditions, and that can occur in less than 1 millisecond (measured between the 10 and 90 percent of transition points). In all cases, the power levels measured will be the average over any 10 millisecond, or greater, time interval. The test shall be considered successful if the test results show that a change in power does not exceed 3 kilowatts.

4.3.2.3 ELECTRICAL POWER CONSUMER CONSTRAINTS

NVR