Space Station Approved Electrical, Electronic, and Electromechanical Parts List

International Space Station

Revision H
January 15, 2000

NASDA
National Space Development Agency of Japan

esa
european space agency

agenzia spaziale italiana
(Italian Space Agency)

Canadian Space Agency
Agence spatiale canadienne

National Aeronautics and Space Administration
Space Station Program Office
Johnson Space Center
Houston, Texas

NASA

REVISIONS

REV.	DESCRIPTION	PUB. DATE
A	BASELINE ISSUE (REFERENCE SSCBD BB000226, EFF. 01-15-87) REVISION A (REFERENCE SSCBD BB000444 EFF. 09-12-88 AND THE ELECTRONIC BASELINE REFORMATTED VERSION	01-15-87 11-15-88
B	REVISION B (REFERENCE SSCBD BB000809, EFF. 4-11-91)	04-91
C	REVISION C (REFERENCE SSCBD BB000809A EFF. 07-30-91)	06-91
D	REVISION D (REFERENCE SSCBDs BB003116 EFF. 03031-92 AND BB003148 EFF. 05-04-92)	06-92
E	REVISION E (REFERENCE SSCBD 00002, Dated 2-1-94	5-13-94
F	REVISION F INCORPORATES ECP 145 (REFERENCE SSCBD 000145 EFF. 10-31-95)	11-27-95
G	REVISION G AUTHORIZED BY SSCN 002439	11-22-99
H	REVISION H AUTHORIZED BY SSCN 002588	01-15-00

SPACE STATION PROGRAM OFFICE

SPACE STATION APPROVED ELECTRICAL, ELECTRONIC, AND ELECTROMECHANICAL PARTS LIST

LIST OF CHANGES

November 22, 1999January 15, 2000

All changes to paragraphs, tables, and figures in this document are shown below:

SSCBD	ENTRY DATE	CHANGE	PARAGRAPH
TBD	3-31-95	REVISION F	TOTAL REVISION
SSCN 002439	11-22-99	REVISION G	FIGURE 4.1-5
SSCN 002588	01-15-00	REVISION H	TOTAL REVISION

PREFACE

The Space Station Approved Electrical, Electronic, and Electromechanical Parts List, SSP 30423, establishes a list of Electrical, Electronic, and Electromechanical (EEE) parts approved for use in Space Station hardware.The Space Station Approved Electrical, Electronic, and Electromechanical Parts List contains an introduction and paragraphs that define approved standard and approved nonstandard parts for Space Station Program Grade 1 applications and Space Station Program Grade 2 applications.The contents of this document are intended to be consistent with the tasks and products of the Prime Contractor and Space Station Program participants as dictated by the requirements in SSP 41000, System Specification for the Space Station. The Space Station Approved Electrical, Electronic, and Electromechanical Parts List shall be implemented on all new Space Station Program contractual and internal activities and shall be included in any existing contracts through contract changes. This document is under the control of the Space Station Control Board, and any changes or revisions shall be approved by the Program Manager.

Signature	ORG	Date
Prepared by: _____	_____	_____
Checked by: _____	_____	_____
Supervised by (Boeing): _____	_____	_____
Supervised by (NASA): _____	_____	_____
Approved by (Boeing): _____	_____	_____
Approved by (NASA): _____	_____	_____
DQA: _____	_____	_____

INTERNATIONAL **SPACE STATION PROGRAM PARTS CONTROL BOARD**

SPACE STATION APPROVED ELECTRICAL, ELECTRONIC, AND ELECTROMECHANICAL PARTS LIST

~~November 22, 1999~~January 15, 2000

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NASA/ASI

INTERNATIONAL SPACE STATION PROGRAM

SPACE STATION APPROVED ELECTRICAL, ELECTRONIC, AND ELECTROMECHANICAL PARTS LIST

NOVEMBER 22, 1999 January 15, 2000

_____ _____

For NASA **DATE**

_____ _____

For ASI Concurrence **DATE**

Changes from SSP 30423, Revision D and/or Revision E requirements do not impact previous NASA and ASI "Meet or exceed EEE parts requirements" agreements.

NASA/CSA

INTERNATIONAL SPACE STATION PROGRAM

SPACE STATION APPROVED ELECTRICAL, ELECTRONIC, AND ELECTROMECHANICAL PARTS LIST

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For NASA DATE

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For CSA Concurrence DATE

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NASA/ESA

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Changes from SSP 30423, Revision D and/or Revision E requirements do not impact previous NASA and ESA "Meet or exceed EEE parts requirements" agreements.

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SPACE STATION APPROVED ELECTRICAL, ELECTRONIC, AND ELECTROMECHANICAL PARTS LIST

January 15, 2000~~NOVEMBER 22, 1999~~

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For NASA **DATE**

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For NASDA Concurrence **DATE**

Changes from SSP 30423, Revision D and/or Revision E requirements do not impact previous NASA and NASDA "Meet or exceed EEE parts requirements" agreements.

NASA/RSA

INTERNATIONAL SPACE STATION PROGRAM

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January 15, 2000~~NOVEMBER 22, 1999~~

_____ _____

For NASA DATE

_____ _____

For RSA Concurrence DATE

Changes from SSP 30423, Revision D and/or Revision E requirements do not impact previous NASA and RSA "Meet or exceed EEE parts requirements" agreements.

1.0 INTRODUCTION

1.1 Scope

This document establishes a list of Electrical, Electronic, and Electromechanical (EEE) parts, manufacturers and laboratories that meet the requirements of and are approved for use by International Space Station Program flight hardware. EEE parts for all items shall be selected from those listed herein. Approved standard parts are preferred, but approved nonstandard are included to limit the proliferation of device types not available as standard parts.

1.2 Purpose

The purpose of this document is as follows:

1.2.1 To provide design engineers with a selection of approved parts which have been selected on the basis of their technology, specification controls, manufacturing processes and controls, supplier performance, testing, screening and qualification methods, and general suitability for long-term space applications.

1.2.2 To maximize EEE parts quality and reliability, enhance parts standardization, and minimize International Space Station (ISS) costs by reducing: nonstandard parts usage; duplication of specification preparation and coordination; duplication of parts qualifications, Destructive Physical Analyses, and lot purchases; multiple preaward surveys; and the proliferation of part types.

1.3 Responsibility

The International Space Station Parts Control Board (PCB) Analysis and Integration Team (AIT) is responsible for revising and maintaining SSP 30423.

1.4 Listing of EEE parts

EEE parts are limited to the following Federal Stock Classes (FSC):

Part Types	FSC
Capacitors	5910
Circuit Breakers	5925
Connectors	5935

Part Types		FSC
Crystals and Crystal Oscillators		5955
Diodes		5961
Fiber Optic Accessories	6070	
Fiber Optic Cables		6015
Fiber Optic Conductors	6010	
Fiber Optic Devices		6030
Fiber Optic Interconnects	6060	
Filters		5915
Fuses		5920
Inductors		5950
Hybrids/Multi-Chip Modules (MCMs)	5999 (misc.)	
Microcircuits	5962	
Relays		5945
Resistors		5905
Switches		5930
Thermistors	5905	
Transformers	5950	
Transistors		5961
Wire and Cable		6145

2.0 APPLICABLE DOCUMENTS

The following documents are applicable to the extent specified herein. The applicable issue for all documents shall be that identified herein, or if not specified that identified in the issue of Department of Defense Index of Specifications and Standards (DoDISS) applicable at EEE part procurement contract award.

2.1 Government specifications

Note that only standard part specifications are listed in this section; nonstandard part specifications are not. All FSC numbers identified in paragraph 1.4 herein are listed in this section, but may not have any standard part specifications; those paragraph numbers are reserved for future use.

2.1.1 FSC 5905 – Resistors and thermistors

DOCUMENT NO.	TITLE
GSFC S-311-P-18	Thermistor (Thermally Sensitive Resistor), Insulated, Negative Temperature Coefficient, Style 311P18, Specification for
Reference paragraphs:	Figure 4.1-2
MIL-T-23648	Thermistor (Thermally Sensitive Resistor), Insulated, General Specification for
Reference paragraphs:	Figure 4.1-2
MIL-R-39005	Resistors, Fixed, Wire-Wound (Accurate), Established Reliability, General Specification for
Reference paragraphs:	Figure 4.1-1
MIL-R-39007	Resistors, Fixed, Wire-Wound (Power Type), Established Reliability, General Specification for
Reference paragraphs:	Figure 4.1-1
MIL-R-39009	Resistors, Fixed, Wire-Wound (Power Type, Chassis Mounted), Established Reliability, General Specification for
Reference paragraphs:	Figure 4.1-1
MIL-R-39015	Resistors, Variable, Wire-Wound (Lead Screw Actuated), Established Reliability, General Specification for
Reference paragraphs:	Figure 4.1-1

MIL-R-39017	Resistors, Fixed, Film (Insulated), Established Reliability, General Specification for
Reference paragraphs:	Figure 4.1-1
MIL-R-39032	Resistors, Packaging of
Reference paragraphs:	Figure 4.1-1
MIL-R-55182	Resistors, Fixed, Film, Established Reliability, General Specification for
Reference paragraphs:	Figure 4.1-1
MIL-R-55342	Resistors, Fixed, Film, Chip, Established Reliability, General Specification for
Reference paragraphs:	Figure 4.1-1
SSQ 21005	Resistor, Fixed, Film, Chip, Space Quality
Issue:	As Specified in ~~SSQ 25002~~SSP 50257
Reference paragraphs:	Figure 4.1-1
SSQ 21006	Resistor, Network, Fixed, Film 10 PIN SIP, Space Quality
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-1
SSQ 21007	Resistor, Network, Fixed, Film 16 PIN SIP, Space Quality
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-1
SSQ 21008	Resistor, Network, Fixed, Film 4 PIN SIP, Space Quality
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-1
SSQ 21009	Resistor, Network, Fixed, Film 6 PIN SIP, Space Quality
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-1
SSQ 21010	Resistor, Network, Fixed, Film 8 PIN SIP, Space Quality
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-1

SSQ 21676	Coupler, Data Bus, MIL-STD-1553, Space Quality, General Specification for
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-1 (and Figure 4.1-10 for paragraph 2.1.9)

2.1.2 FSC 5910 - Capacitors

DOCUMENT NO.	TITLE
MIL-C-20	Capacitors, Fixed, Ceramic Dielectric (Temperature Compensating), Established and Non-established Reliability, General Specification for
Reference paragraphs:	Figure 4.1-3
MIL-C-123	Capacitors, Fixed, Ceramic Dielectric (Temperature Stable and General Purpose), High Reliability, General Specification for
Reference paragraphs:	Figure 4.1-3; B.3.1, B.3.2
MIL-C-23269	Capacitors, Fixed, Glass Dielectric, Established Reliability, General Specification for
Reference paragraphs:	Figure 4.1-3
MIL-C-39003	Capacitors, Fixed, Electrolytic (Solid Electrolyte), Tantalum, Established Reliability, General Specification for
Reference paragraphs:	Figure 4.1-3
MIL-C-39006	Capacitors, Fixed, Electrolytic (Nonsolid Electrolyte), Tantalum, Established Reliability, General Specification for
Reference paragraphs:	Figure 4.1-3
MIL-C-39014	Capacitors, Fixed, Ceramic Dielectric (General Purpose), Established Reliability, General Specification for
Reference paragraphs:	Figure 4.1-3
MIL-C-55365	Capacitors, Chip, Fixed, Tantalum, Established Reliability, General Specification for
Reference paragraphs:	Figure 4.1-3
MIL-C-55681	Capacitors, Chip, Multiple Layer, Fixed, Unencapsulated, Ceramic Dielectric, Established Reliability, General Specification for
Reference paragraphs:	Figure 4.1-3
MIL-C-83421	Capacitors, Fixed, Supermetallized Plastic Film Dielectric (dc, ac, or dc and ac), Hermetically Sealed in Metal Cases, Established Reliability, General Specification for
Reference paragraphs:	Figure 4.1-3
MIL-C-87217	Capacitors, Fixed, Supermetallized Plastic Film Dielectric, Direct Current for Low Energy, High Impedance Applications, Hermetically Sealed in Metal Cases, High Reliability, General Specification for
Reference paragraphs:	Figure 4.1-3

SSQ 21111	Capacitors, Fixed Supermetallized, Plastic Film Dielectric (DC, AC or DC&AC), Hermetically Sealed, Space Quality
Issue:	As Specified in SSP 50257 SSQ 25002
Reference paragraphs:	Figure 4.1-3
SSQ 21112	Capacitors, Chip, Fixed, Tantalum High Reliability
Issue:	As Specified in SSP 50257 SSQ 25002
Reference paragraphs:	Figure 4.1-3
SSQ 21113	Capacitors, Ceramic, High Voltage, Radial-Leaded, High Reliability
Issue:	As Specified in SSP 50257 SSQ 25002
Reference paragraphs:	Figure 4.1-3

2.1.3 FSC 5915 - Filters

DOCUMENT NO.	TITLE
MIL-F-28861	Filters and Capacitors, Radio Frequency/Electromagnetic Interference Suppression, Specification for
Reference paragraphs:	Figure 4.1-4
SSQ 21215	Filters, Radio Frequency/Electromagnetic Interference Suppression, Hermetically Sealed, Space Quality
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-4
SSQ 21216	Filters, Radio Frequency/Electromagnetic Interference Suppression, Resin Sealed, Space Quality
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-4
SSQ 21217	Filters, Radio Frequency/Electromagnetic Interference Suppression, Hermetically Sealed on One End, Space Quality
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-4
SSQ 21218	Filters, Radio Frequency/Electromagnetic Interference Suppression, Hermetically Sealed, Space Quality
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-4

2.1.4 FSC 5920 - Fuses

DOCUMENT NO.	TITLE
MIL-F-23419	Fuses, Instrument Type, General Specification for
Reference paragraphs:	Figure 4.1-5

2.1.5 FSC 5925 - Circuit breakers

DOCUMENT NO.	TITLE
MIL-C-39019	Circuit Breakers, Magnetic, Low-Power, Sealed, Trip-Free, General Specification for
Reference paragraphs:	Figure 4.1-6

2.1.6 FSC 5930 Switches

DOCUMENT NO.	TITLE
SSQ 21678	Switch, MIL-STD-1553, Data Bus, Space Quality, General Specification for
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-7

2.1.7 FSC 5935 - Connectors

DOCUMENT NO.	TITLE
40M38277	Connector, Electrical, Circular, Miniature, High Density, Environment Resisting, Specification for
Reference paragraphs:	Figure 4.1-8
40M38298	Connector, Electrical, Special, Miniature Circular, Environment Resisting, Specification for
Reference paragraphs:	Figure 4.1-8
40M39569	Connector, Electrical, Miniature Circular, Environment Resisting, 200^{O}C Specification for
Reference paragraphs:	Figure 4.1-8
GSFC S-311-P-4	Connectors (and Contacts), Electrical, Rectangular, for Space Flight Use, General Specification for
Reference paragraphs:	Figure 4.1-8
GSFC S-311-P-10	Connectors, Subminiature, Electrical and Coaxial Contact, for Space Flight Use
Reference paragraphs:	Figure 4.1-8
MIL-C-5015	Connector, Electrical Circular Threaded, AN Type, General Specification for
Reference paragraphs:	Figure 4.1-8
MIL-C-24308	Connector, Electric, Rectangular, Miniature Polarized Shell, Rack and Panel, General Specification for
Reference paragraphs:	Figure 4.1-8
MIL-C-26482	Connector, Electrical, (Circular, Miniature, Quick Disconnect, Environment Resisting) Receptacles and Plugs, General Specification for
Reference paragraphs:	Figure 4.1-8
MIL-C-38999	Connector, Electrical, Circular, Miniature, High Density, Quick Disconnect, (Bayonet, Threaded and Breech Coupling), Environment Resistant, Removable Crimp and Hermetic Solder Contacts, General Specification for
Reference paragraphs:	Figure 4.1-8
MIL-C-39012	Connector, Coaxial, Radio Frequency, General Specification for
Reference paragraphs:	Figure 4.1-8

MIL-C-39029	Contacts, Electrical Connector, General Specification for
Reference paragraphs:	Figure 4.1-8
MIL-C-55302	Connectors, Printed Circuit Subassembly and Accessories, General Specification for
Reference paragraphs:	Figure 4.1-8
MIL-C-83513	Connector, Electrical, Rectangular Microminiature, Polarized Shell, Crimp and Solder Contacts, General Specification for
Reference paragraphs:	Figure 4.1-8
SSQ 21635	Connectors and Accessories, Electrical, Circular, Miniature, IVA/EVA Compatible, Space Quality, General Specification for
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-8
SSQ 21636	Connectors and Accessories, Electrical, Rectangular, Rack and Panel, Space Quality, General Specification
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-8
SSQ 21637	Connectors and Accessories, Electrical, Umbilical Interface, Environmental, Space Quality, General Specification for
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-8
SSQ 22680	Connector, Rectangular (ORU) Space Quality
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-8
SSQ 22681	Connector, Modular Rectangular, Space Quality
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-8
SSQ 22698	Connector, EVA
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-8

2.1.8 FSC 5945 - Relays

DOCUMENT NO.	TITLE
MIL-R-39016	Relays, Electromagnetic, Established Reliability, General Specification for
Reference paragraphs:	Figure 4.1-9

2.1.9 FSC 5950 - Inductors and transformers

DOCUMENT NO.	TITLE
MIL-STD-981	Design Manufacturing and Quality Standards for Custom Electromagnetic Devices for Space Applications
Reference paragraphs:	Figure 4.1-10
MIL-R-39010	Coils, Fixed, Radio Frequency, Molded, Established Reliability, General Specification for
Reference paragraphs:	Figure 4.1-10
MIL-C-83446	Coils, Chip, Fixed or Variable, General Specification for
Reference paragraphs:	Figure 4.1-10
SSQ 21676	Coupler, Data Bus, MIL-STD-1553B, Space Quality, General Specification for
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-10 (and Figure 4.1-1 for paragraph 2.1.1)
SSQ 22676	Transformer, MIL-STD-1553, Terminal Interface, Space Quality
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-10

2.1.10 FSC 5955 - Crystals and crystal oscillators

DOCUMENT NO.	TITLE
MIL-O-55310	Oscillators, Crystal, General Specification for
Reference paragraphs:	Figure 4.1-11

2.1.11 FSC 5961 - Diodes and transistors

DOCUMENT NO.	TITLE
MIL-S-19500	Semiconductor Devices, General Specification for
Reference paragraphs:	Figures 4.1-12 and 4.1-13
SSQ 21936	Semiconductor Device, Diode, Silicon, Fast Recovery, Power Rectifier (similar to 1N5816 type)
Issue:	As Specified in SSP 50257 ~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-12
SSQ 21937	Semiconductor Device, Diode, Silicon, Schottky Barrier Fast Recovery (similar to 1N6391 type)
Issue:	As Specified in SSP 50257 ~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-12
SSQ 22039	Semiconductor Device, Transistor, Silicon, PNP Power (similar to 2N5153)
Issue:	As Specified in SSP 50257 ~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-13
SSQ 22684	Opto Coupler, Type 4N47, 4N48, 4N49
Issue:	As Specified in SSP 50257 ~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-13
SSQ 22688	MOS Field Effect Transistor, Semiconductor Device, N-Channel Silicon, IRHF 7230
Issue:	As Specified in SSP 50257 ~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-13
SSQ 22689	MOS Field Effect Transistor, Semiconductor Device, N-Channel Silicon, IRHM 7450SE
Issue:	As Specified in SSP 50257 ~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-13
SSQ 22690	MOS Field Effect Transistor, Semiconductor Device, N-Channel Silicon, IRHF 7130
Issue:	As Specified in SSP 50257 ~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-13

2.1.12 FSC 5962 - Monolithic microcircuits

DOCUMENT NO.	TITLE
MIL-M-38510	Microcircuits, General Specification for
Reference paragraphs:	Figure 4.1-14
MIL-I-38535	Integrated Circuits (Microcircuits) Manufacturing, General Specification for
Reference paragraphs:	Figure 4.1-14
SSQ 22263	Microcircuit, Digital, Advanced Schottky TTL, Monolithic Silicon (selected 54F Device Types)
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-14SSQ 22264Microcircuit, Digital, High Speed, CMOS, Monolithic Silicon (selected 54HC/HCT Device Types)
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-14
SSQ 22563	Microcircuit, Linear, CMOS, Analog Switch, Monolithic Silicon (HS-390RH)
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-14
SSQ 22569	Microcircuit, Linear, CMOS/Analog Single 8 Channel Multiplexer/Demultiplexer with Overvoltage Protection, Monolithic Silicon, Positive Logic (508A)
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-14
SSQ 22580	Microcircuit, Linear, Quad High Speed Differential Line Driver, Monolithic Silicon (26LS31)
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-14
SSQ 22581	Microcircuit, Linear, Quad Differential Line Receiver, Monolithic Silicon 26LS32
Issue:	As Specified in SSP 50257SSQ 25002

Reference paragraphs:	Figure 4.1-14
SSQ 22582	Microcircuit, Linear, Regulator Pulse-Width Modulator Monolithic Silicon (1526 & 1527A)
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-14
SSQ 22662	Microcircuit, Digital, CMOS, Microprocessor, Monolithic Silicon (80C86)
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-14
SSQ 22663	Microcircuit, Digital CMOS, Programmable Interval Timer, Monolithic Silicon (82C54)
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-14
SSQ 22665	Microcircuit, Digital CMOS, Programmable Interrupt Controller, Monolithic Silicon 82C59A-5
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-14
SSQ 22667	Microcircuit, Digital, 16 Bit Microprocessor, CHMOS Monolithic Silicon
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-14
SSQ 22668	Microcircuit, Digital, 32 Bit Microprocessor, CHMOS Monolithic Silicon
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-14

SSQ 22669	Microcircuit, Digital, 80 Bit Numeric Processor, CHMOS Monolithic Silicon
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-14
SSQ 22670	Microcircuit, Digital, Multi-Bus II Interface Controller CHMOS, Monolithic Silicon
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-14
SSQ 22673	Microcircuit, Digital, CMOS, MIL-STD-1553, Bus Controller, Monolithic Silicon
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-14
SSQ 22677	Microcircuit, Digital, 8 Bit Microcontroller with EPROM, CHMOS, Monolithic, Silicon
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-14
SSQ 22679	Microcircuit, Interface, Bipolar, MIL-STD-1553, Dual Bus Transceiver
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-14
SSQ 22685	Microcircuit, Linear High Speed Pulse Width Modulator Controller, 1825
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-14
SSQ 22686	Microcircuit, Linear Low Noise Precision Instrumentation Amplifier AMP-01A
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-14
SSQ 22687	Microcircuit, Bipolar, Hall Effect Digital Latch, OMH-3075
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-14
SSQ 22692	Microcircuit, Digital, 32 Bit DMA Controller, CHMOS Monolithic Silicon
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figure 4.1-14

FSC 5999 - Hybrids microcircuits and MCMS

DOCUMENT NO.	TITLE
MIL-H-38534	Hybrid Microcircuits, General Specification for

Reference paragraphs:	Figure 4.1-15
SSQ 22678	Microcircuit, Hybrid, MIL-STD-1553 Terminal Interface and Transceiver, Space Quality
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-15
SSQ 22691	Microcircuit, Hybrid, Smart Power, 3-Phase Motor Drivers
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-15
SSQ 22705	Microcircuit, Hybrid, PFM Modulator, Video
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-15
SSQ 22706	Microcircuit, Hybrid, PFM Demodulator Video
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-15
SSQ 22707	Microcircuit, Hybrid, Fiber Optic Transmitter, Video
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-15
SSQ 22708	Microcircuit, Hybrid, Fiber Optic Receiver, Video
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-15
SSQ 22709	Microcircuit, Hybrid, Fiber Optic Transmitter, Data Link
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-15
SSQ 22710	Microcircuit, Hybrid, Fiber Optic Receiver, Data Link
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-15

2.1.13 FSC 6010 - Fiber optic conductors

DOCUMENT NO.	TITLE

2.1.14 FSC 6015 - Fiber optic cables

DOCUMENT NO.	TITLE
SSQ 21654	Cable, Single Fiber, Multimode, Space Quality, General Specification for
Issue:	As Specified in SSP 50257 SSQ 25002
Reference paragraphs:	Figure 4.1-16

2.1.15 FSC 6030 - Fiber optic devices

DOCUMENT NO.	TITLE

2.1.16 FSC 6060 - Fiber optic interconnects

DOCUMENT NO.	TITLE
SSQ 21640	Connector, IVA, Fiber Optic, Single Channel, Space Quality, General Specification for
Issue:	As Specified in SSP 50257 SSQ 25002
Reference paragraphs:	Figure 4.1-16

2.1.17 FSC 6070 - Fiber optic accessories

DOCUMENT NO.	TITLE

2.1.19 FSC 6145 - Wire and cable

DOCUMENT NO.	TITLE
MIL-C-17	Cable, Radio Frequency, Flexible and Semirigid, General Specification for
Reference paragraphs:	Figure 4.1-17
MIL-W-22759	Wire, Electric, Fluorocarbon Insulated, Copper or Copper Alloy
Reference paragraphs:	Figure 4.1-17
MIL-C-27500	Cable, Electrical, Shielded and Unshielded, Aerospace
Reference paragraphs:	Figure 4.1-17
SSQ 21644	Clamp, Electrical Cable Harness, Space Quality, General Specification for
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-17
SSQ 21652	Wire, Electric, Silicone Insulated, Nickel Coated Copper, Space Quality, General Specification for
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-17
SSQ 21653	Cable, Coaxial, Twinaxial, and Triaxial, Flexible and Semirigid, General Specification for
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-17
SSQ 21655	Cable, Electrical, MIL-STD-1553 Data Bus, Space Quality, General Specification for
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-17
SSQ 21656	Wire and Cable, Fluoropolymer-Insulated, Nickel Coated Copper or Copper Alloy, General Specification for
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-17
SSQ 22720	Wire, Crosslinked Ethylene Tetrafluoroethylene
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	Figure 4.1-17

2.2 NASA Documents

DOCUMENT NO.	TITLE
SSQ 25000	Destructive Physical Analysis Testing Specification for the Space Station Program
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	3.6.1
SSQ 25001	Upgrade Screening, Space Station Program, Electrical, Electronic, and Electromechanical (EEE) Parts Requirements
Issue:	As Specified in SSP 50257SSQ 25002
Reference paragraphs:	3.6.1
SSQ 25002	Supplemental List of Qualified EEE Parts, Manufacturers, and Laboratories (QEPM&L)
Issue:	Current Issue
Reference paragraphs:	2.1.1, 2.1.2, 2.1.3, 2.1.6, 2.1.7, 2.1.9, 2.1.11, 2.1.12, 2.1.13, 2.1.15, 2.1.17, 2.1.19, 2.2, 2.6, 3.5, 3.6, 4.2, 4.3, 4.4

2.3 Military standards

DOCUMENT NO.	TITLE
MIL-STD-883	Test Methods and Procedures for Microelectronics
Issue:	D Chg Notice 1
(June 1, 1993)	
Reference paragraphs:	B.2.1
Military handbooks	
MIL-HDBK-978	NASA Parts Application Handbook
Issue:	B Volume 1 (March 1, 1988) Volume 2 Chg Notice 1 (September 1, 1989) Volume 3 Chg Notice 3 (March 25, 1991) Volume 4 (March 1, 1988) Volume 5 Chg Notice 3 (March 25, 1991)
Reference paragraphs:	Figures 4.1-3 and 4.1-9; A.3.1, A.3.2

2.5 Lockheed Missiles and Space Company documents

D573815, Appendix A	Monitored Line Program Part Number Index
Issue:	As Specified in SSP 50257~~SSQ 25002~~
Reference paragraphs:	Figures 4.1-13, 4.1-14 and 4.1-15

3.0 GENERAL

ISSA Grade 1 and Grade 2 Approved Standard Parts are the first order of precedence, and ISSA Grade 1 and Grade 2 Approved Nonstandard Parts are the second order of precedence. Approved Grade 1 and Grade 2 Standard and Approved Nonstandard Parts are as defined and listed in Section 4 herein.

3.1 Addition of approved standard EEE parts

When a contractor identifies a part to be considered as a candidate to become an approved standard part, a recommendation shall be provided to the International Space Station Parts Control Board (PCB) and shall include the following:

a. Rationale for incorporating the candidate part.

b. Test data and space-flight data, when available.

c. Identification of manufacturers qualified or capable of producing the device.

d. Other appropriate data including usage and need date.

e. A copy of the acceptable space-quality specification.

The request and supplementing data shall be submitted to the PCB Chairman who will coordinate review of the package. The signature of the PCB Chairman shall signify approval of the part type for ISSA.

3.2 Addition of approved nonstandard EEE parts

The PCB will add approved nonstandard EEE parts on a regular basis. Tier 1 contractors shall provide a request to the PCB to add nonstandard EEE parts that have been approved at the Tier 1 level.

3.3 Restrictions on use of approved EEE parts

Parts listed in SSP 30423 may subsequently become unsuitable for use in new-design hardware or difficult-to-procure for spares for any of the following reasons:

a. No longer suitable for ISSA usage.

b. Part becomes obsolete or there are no longer any qualified sources for the part. (Reference: Government-Industry Data Exchange Program Diminishing Sources Alerts).

c. No longer available to space-quality standards.

d. An uncorrectable reliability problem.

e. Part replaced with a functionally similar device having improved characteristics or reliability.

The parts will be designated as restricted and will not be approved for new design hardware from the date the part is labeled as restricted.

The column heading and contents are defined as follows:

a. FSC is the Federal Supply Class number for the general type of part (see paragraph 1.4 herein).

b. Grade 1 is Space Station Program Grade 1.

c. Grade 2 is Space Station Program Grade 2.

d. Generic Part is the common number that describes the basic part, typically dissociated from any product assurance requirements.

e. Specification Number is the procurement drawing to which the part is purchased (e.g., contractor source control drawing, military specification, or SSQ drawing).

f. Part Description is a general description of the generic part or general part type.

3.4 List of qualified EEE parts

The detailed qualification status for parts specified on SSQ drawings and for nonstandard EEE parts shall be asare documented in SSQ 25002, Supplemental List of Qualified EEE Parts, Manufacturers, and Laboratories (QEPM&L),at http://iss-www.jsc.nasa.gov/ss/issapt/veh/veh-home.html#seo

3.5 List of qualified manufacturers and laboratories

Approval status of EEE part supplier and manufacturer pre–award surveys, including PCB AIT approval of screening/test facilities, DPA, failure analysis and radiation laboratories, and value–added services shall be asare listed in SSQ 25002at http://iss-www.jsc.nasa.gov/ss/issapt/veh/veh-home.html#seo

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3.5.1 The PCB AIT DPA specification is SSQ 25000, Destructive Physical Analysis Testing Specification for the Space Station Program. The PCB AIT Upgrade Screening specification is SSQ 25001, Upgrade Screening, Space Station Program, Electrical, Electronic and Electromechanical (EEE) Parts Requirements.

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4.0 INTERNATIONAL SPACE STATION PROGRAM APPROVED EEE PARTS

ISSA approved EEE parts are those defined in the following paragraphs.

4.1 Space Station Program Grade 1 and Grade 2 approved standard EEE parts

ISSA Grade 1 and Grade 2 approved standard parts are those identified in Figures 4.1-1 through 4.1–17. They are in sequence according to the FSC numbers. See paragraph 1.4 for correlation between part type and FSC numbers.

4.2 Space Station Program approved nonstandard EEE parts

International Space Station approved nonstandard EEE parts are those identified in SSQ 25002listed at http://iss-www.jsc.nasa.gov/ss/issapt/veh/veh-home.html#seo

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4.3 ISS Program approved nonstandard EEE parts for selected Grade 1 applications

Nonstandard EEE parts approved for use in selected grade 1 applications are identified in SSQ 25002.listed at http://iss-www.jsc.nasa.gov/ss/issapt/veh/veh-home.html#seo

4.4 ISSA Program approved Grade 2 applications

ISSA Program approved Grade 2 applications are those identified in SSQ 25002listed at http://iss-www.jsc.nasa.gov/ss/issapt/veh/veh-home.html#seo.

FSC	GRADE 1	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
5905	FAILURE RATE LEVEL (1)				RESISTORS
	R	P	RBR	MIL-R-39005	Fixed, Wirewound (accurate), ER
	S, R	P	RWR	MIL-R-39007	Fixed, Wirewound (power type), ER
	R	P	RER	MIL-R-39009 (4)	Fixed, Wirewound, Power, Chassis mounted, ER
	(2)	P	RTR	MIL-R-39015 (5)	Variable, Wirewound (lead screw actuated), ER
	S, R	P	RLR	MIL-R-39017	Fixed, Film (insulated), ER
	S, R	P	RNR	MIL-R-55182 (6), (7)	Fixed, Film (hermetic), ER
	S, R	P	RNC	MIL-R-55182 (6), (7)	Fixed, Film, ER
	S, R	P	RM	MIL-R-55342	Fixed, Film, Chip, ER
	(3)	(3)		SSQ21005	Resistor, Fixed, Film, Chip, MIL-R-55342/1-7
	(3)	(3)		SSQ21006	Resistor, Network, Fixed, Film, 10 Pin SIP, MIL-R-83401/6
	(3)	(3)		SSQ21007	Resistor, Network, Fixed, Film, 16 Pin SIP, MIL-R-83401/2
	(3)	(3)		SSQ21008	Resistor, Network, Fixed, Film, 4 Pin SIP, MIL-R-83401/3
	(3)	(3)		SSQ21009	Resistor, Network, Fixed, Film, 6 Pin SIP, MIL-R-83401/4
	(3)	(3)		SSQ21010	Resistor, Network, Fixed, Film, 6 Pin SIP, MIL-R-83401/5
	(3)	(3)		SSQ21676	Terminator, Data Bus, MIL-STD-1553

FIGURE 4.1-1 ISS~~A~~ GRADE 1 AND GRADE 2 APPROVED STANDARD RESISTORS (FSC 5905)

(1) Failure Rate Level (FRL). Reference the Applicable Detail Specification.

(2) Parts are for use in Grade 2 applications only.

(3) Parts may be used in Grade 1 or 2 applications.

(4) Resistance values shall be limited to those using 0.001-inch nominal diameter wire.

(5) Parts covered by this specification may contain internal soldered connections that may reflow during installation. Special care must be exercised when soldering to prevent internal solder reflow. Welded connections are preferred. Consult with the manufacturer.

(6) To prevent corona effects, hollow core resistors are restricted to applied voltages below 100 Vdc. Samples of lots of resistors with unknown internal structure shall be subjected to destructive physical analysis to determine application restrictions.

(7) All styles except RNC90 are electrostatic discharge senstive. For tolerance B (+/- 0.1%), package in accordance with MIL-R-39032 as specified for field force protection.

FIGURE 4.1-1 ISSA GRADE 1 AND GRADE 2 APPROVED STANDARD RESISTORS (FSC 5905)

(Continued from previous page)

FSC	GRADE 1	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
5905	PART QUALITY LEVEL				THERMISTORS
	(2)	(2)		MIL-T-23648/19	Positive Temperature Coefficient
	(1)	(1)		GSFC S-311-P-18	Negative Temperature Coefficient

(1) Parts may be used in Grade 1 or 2 applications.

(2) Parts are for use in Grade 2 applications only. There are no standard Grade 1 part types. For Grade 1 applications, an NSPAR is required. Consult the acquisition activity for design and product assurance requirements.

FIGURE 4.1-2 ISS~~A~~ GRADE 1 AND GRADE 2 APPROVED STANDARD THERMISTORS (FSC 5905)

FSC	GRADE 1	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
5910	FAILURE RATE LEVEL				CAPACITORS
	S, R (1)	P	CCR	MIL-C-20 (4), (7)	Fixed, Ceramic, Temperature Compensating
	(2)	(2)	CKS	MIL-C-123	Fixed, Ceramic
	S	S	CYR	MIL-C-23269	Fixed, Glass
	C, B	B	CSR, CSS (1)	MIL-C-39003 (6), (7)	Fixed, Tantalum (solid) Electrolytic
	R	P	CLR	MIL-C-39006 (8)	Fixed, Tantalum (non-solid) Electrolytic
	(3)	S	CKR	MIL-C-39014 (5)	Fixed, Ceramic
	C, B	B	CWR	MIL-C-55365	Chip, Fixed, Tantalum
	S, R (1)	P	CDR	MIL-C-55681 (4), (5)	Chip, Fixed, Ceramic
	S, R	R	CRH	MIL-C-83421 (7), (9)	Fixed, Supermetallized, Plastic Film, DC, AC
	(2)	(2)	CHS	MIL-C-87217 (7), (10)	Fixed, Supermetallized, Plastic Film, DC, Low Energy, High Impedance
	(2)	(2)	CRH	SSQ21111 (7), (9)	Fixed, Supermetallized, Plastic Film Dielectric, MIL-C-83421/2
	(2)	(2)	CWR	SSQ21112	Chip, Fixed, Tantalum, High Reliability, MIL-C-55365/8
	(2)	(2)		SSQ21113	Fixed, Ceramic, High Voltage, Radial-Leaded, MIL-C-49467

FIGURE 4.1-3 ISSA GRADE 1 AND GRADE 2 APPROVED STANDARD CAPACITORS (FSC 5910)

(1) Parts shall be tested in accordance with Appendix B.

(2) FRL not applicable. These parts may be used in Grade 1 or Grade 2 applications.

(3) There are no MIL-C-39014 Grade 1 parts available. Use MIL-C-123 for Grade 1 applications.

(4) MIL-C-123 is the preferred specification.

(5) For low voltage applications (< 10Vdc), capacitor rated voltge shall be at least 100 volts dc. Reference MIL-HDBK-978, Vol. 1, 2.6.7.2.

(6) MIL-C-39003/9 capacitors shall not be used in circuits where the series impedance is less than 1.5Ω/~~□~~V. Reference MIL-HDBK-978, Vol. 1, 2.6.7.2.

(7) Parts covered by these specifications contain internal soldered connections which may reflow during installation. Special precautions such as heat sinking are recommended when soldering onto boards. For CSR and CSS part types, A, A1, B, and B1 case sizes are particularly susceptible. For CHS and CRH part types, the plastic dielectric is also temperature sensitive

(8) CLR parts are susceptible to vibration failures. Consult the project parts engineer for recommendations.

(9) This capacitor is not approved for use in circuits where the energy is less than 250 microjoules. Reference MIL-HDBK-978, Vol. 1, 2.4.2.

(10) To ensure clearing of breakdown, the circuit in which capacitors of 0.1µF and greater are intended for use, shall be capable of providing at least 100 microjoules of energy.

FIGURE 4.1-3 ISS~~A~~ GRADE 1 AND GRADE 2 APPROVED STANDARD CAPACITORS (FSC 5910)
(Continued from previous page)

FSC	GRADE 1	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
5915	PART QUALITY LEVEL				FILTERS (3), (4)
	(1)	QPL "B"		MIL-F-28861	RF and EMI Suppression
	(2)	(2)		SSQ21215	Radio Frequency, MIL-F-28861/5
	(2)	(2)		SSQ21216	Radio Frequency, MIL-F-28861/7
	(2)	(2)		SSQ21217	Radio Frequency, MIL-F-28861/12
	(2)	(2)		SSQ21218	Radio Frequency, MIL-F-28861/16

(1) Parts are for use in Grade 2 applications only. For Grade 1 applications, use SSQ drawing filters.

(2) These parts may be used in Grade 1 or Grade 2 applications.

(3) For stud-mounted filters, do not exceed the rated torque specification on the stud nut.

(4) Parts covered by these specifications contain internal soldered connections that may reflow during installation. Special care must be exercised when soldering to prevent internal solder reflow.

FIGURE 4.1-4 ISSA GRADE 1 AND GRADE 2 APPROVED STANDARD FILTERS (FSC 5915)

FSC	GRADE 1	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
5920	PART QUALITY LEVEL				FUSES
	(1) (2) (3)	(1) (2) (3)	FM-08	MIL-F-23419/8	Instrument Type, Subminiature

(1) Parts are for use in Grade 2 applications only. There are no standard Grade 1 part types. For Grade 1 applications, an NSPAR is required. Consult the acquisition activity parts engineering for design and product assurance requirements.

(2) FM-08 fuses shall not be used in Space Station applications where the applied voltage is greater than 28 volts DC in vacuum.

(3) Destructive physical analysis shall not be required for FM-08 fuses. However, FM-08 fuses shall be screened 100% in accordance with Table I herein

FIGURE 4.1-5 ISSA GRADE 1 AND GRADE 2 APPROVED STANDARD FUSES (FSC 5920)

Table I. FM-08 Fuse Screening Requirements

			PART TYPE/GRADE LEVEL			
INSPECTION/TEST	TEST METHODS, CONDITIONS AND REQUIREMENTS 1/	NOTES	1	2	3	4
Serialize			X	X		
Visual Inspection	Materials, design, construction, marking and workmanship		X	X	X	X
Cold Resistance Measurements	MIL-STD-202, Method 203 Resistance To Specification	2/	X	X	X	
Voltage Drop At Rated Current	100% rated current for 5 minutes, in accordance with MIL-PRF-23419	3/	X	X	X	X
Thermal Shock	MIL-STD-202, Method 107 Condition B	4/, 5/	X	X	X	X
Pull Test	MIL-STD-202, Method 211A, Test Condition A		X	X		
Visual Inspection	Materials, design, construction, marking and workmanship		X	X		
Cold Resistance Measurements	MIL-STD-202, Method 203 Resistance To Specification	2/	X	X		
Voltage Drop At Rated Current	100% rated current for 5 minutes, in accordance with MIL-PRF-23419 Ratio voltage drop: (Hot-1/Hot-2) = 0.97 to 1.03	3/	X	X		
Percent Defective Allowed (PDA)	Grade 1: 5% Grade 2: 10% Grade 3: 15%	6/	X	X 	X	

NOTES:

1/ Fuses shall meet the test criteria specified in the SCD or by the manufacturer.

2/ The source current for the resistance measurement shall not exceed 10% of the nominal current rating at room temperature.

3/ The voltage drop (hot) measurement must be recorded to calculate the voltage drop ratio regardless of whether on not it is a specification requirement.

4/ External visual examination required after testing to verify no evidence of mechanical damage.

5/ Fuse rated < +125^{0}C shall be tested to Condition A.

6/ Marking and voltage ratio rejects shall not be counted for purposes of establishing the failure rate.

FSC	GRADE 1	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
5925	PART QUALITY LEVEL				CIRCUIT BREAKERS
	(1)	(1)		MIL-C-39019	Magnetic, Low-Power

(1) Parts are for use in Grade 2 applications only. There are no standard Grade 1 part types. For Grade 1 applications, an NSPAR is required. Consult the acquisition activity parts engineering for design and product assurance requirements.

FIGURE 4.1-6 ISSA GRADE 1 AND GRADE 2 APPROVED STANDARD CIRCUIT BREAKERS (FSC 5925)

FSC	GRADE 1	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
5930					SWITCHES
	(1)	(1)		SSQ21678	Switch, MIL-STD-1553 Data Bus

(1) These parts may be used in Grade 1 or Grade 2 applications.

FIGURE 4.1-7 ISSA GRADE 1 AND GRADE 2 APPROVED STANDARD SWITCHES (FSC 5930)

FSC	CAGE	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
5935					CONNECTORS (4)
	(1)	(1)		40M38277	High-Density, Miniature, Environment Resistant, Circular (contact, backshells, etc., available with connector)
	(1)	(1)		40M38298	Special, Miniature Circular, Environment Resisting, +200^{O}C (contacts, backshells available with connector)
	(1)	(1)		40M39569	Miniature, +200^{O}C, Environment Resistant, Circular (contacts, backshells, etc., available with connector)
	(1)	(1)		GSFC S-311-P-4	Rack and Panel, Miniature, Polarized Shell, Removable Crimp Contacts, Rectangular
	(1)	(1)		GSFC S-311-P-10	Rack and Panel, Miniature, Polarized Shell, Soldered Contacts, Electrical and Coaxial Contacts, Rectangular
	(2)	(2)		MIL-C-5015	Threaded Coupling, AN type, Circular Rear Release Crimp Contacts, Hermetic Solder Contacts, Contact Sizes 8 and Larger Only
	(2)	(2)		MIL-C-24308	Rack and Panel, Polarized Shell, Miniature Rectangular
	(2)	(2)		MIL-C-26482	Quick Disconnect, Environment Resistant, Miniature, Circular (rear release crimp and solder contacts)

	(2)	(2)		MIL-C-38999 (3)	Scoop Proof, Miniature, Circular
	(2)	(2)		MIL-C-39012	Coaxial, Radio Frequency (N, TNC, SC, SMA)
	(1)	(1)		MIL-C-39029	Contacts, Electrical Connector
	(2)	(2)		MIL-C-55302	Printed Circuit Subassembly and Accessories, Non-Environment Resisting
	(2)	(2)		MIL-C-83513	Rack and Panel, Polarized Shell, Microminiature, Rectangular

FIGURE 4.1-8 ISSA GRADE 1 AND GRADE 2 APPROVED STANDARD CONNECTORS (FSC 5935)
(Continued on next page)

FSC	GRADE 1	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
5935					CONNECTORS (4)
	(1)	(1)		SSQ21635	Circular, Miniature, MIL-C-38999 Series III and Series IV Type
	(1)	(1)		SSQ21636	Rack and Panel, Rectangular
	(1)	(1)		SSQ21637	Umbilical Interface
	(1)	(1)		SSQ22680	Rectangular, ORU
	(1)	(1)		SSQ22681	Modular Rectangular, RPCM
	(1)	(1)		SSQ22698	EVA Connector

(1) These parts may be used in Grade 1 or Grade 2 applications.

(2) These parts need an additional control drawing to add: ISSA materials requirements for outgassing, offgassing, thermal vacuum stability, flammability, and stress corrosion cracking criteria; and 100% testing of contact cavities for insertion/removal force, DWV, and IR (not applicable to MIL-C-39012). Parts so specified and approved on an NSPAR may be used in Grade 1 or Grade 2 applications.

(3) SSQ21635 is the preferred specification for Grade 1 and 2 applications.

(4) It may be necessary to order accessories such as backshells, contacts, protective caps, and sealing plugs, etc., separately. Precautions must be taken to select accessories from military specifications/standards listed or referenced in the associated connector specification, and to verify those accessories meet ISSA materials requirements. Contacts, if ordered separately, shall be procured to MIL-C-39029 or an SSQ drawing.

FIGURE 4.1-8 ISSA GRADE 1 AND GRADE 2 APPROVED STANDARD CONNECTORS (FSC 5935)
(Continued from previous page)

FSC	GRADE 1	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
5945	FAILURE RATE LEVEL				RELAYS (3)
	(1)	P		MIL-R-39016 (2)	Latching and Nonlatching

(1) Parts are for use in Grade 2 applications only. There are no standard Grade 1 part types. For Grade 1 applications, an NSPAR is required. Consult the acquisition activity for design and product assurance requirements.

(2) Refer to MIL-HDBK-978, Vol. 5, for construction and application information.

(3) Molybdenum contact material shall not be used. Tin plating of any type, used internally or externally, is associated with tin whisker growth and shall be approved by the acquisition activity parts engineer.

FIGURE 4.1-9 ISSA GRADE 1 AND GRADE 2 APPROVED STANDARD RELAYS (FSC 5945)

FSC	GRADE 1	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
5950	FAILURE RATE LEVEL				INDUCTORS (6)
	(1)	P (4)		MIL-C-39010 (5)	Fixed, Molded, Radio Frequency Coil
	(2)	(4)		MIL-C-83446	Chip, Radio Frequency, Fixed or Variable
	PART QUALITY LEVEL				TRANSFPRMERS (6)
	(3)	(3)	BUS25679	SSQ 22676	MIL-STD-1553 Interface
	(1)	(1)		SSQ 22676	Coupler, Data Bus, MIL-STD-1553

(1) Parts are for use in Grade 2 applications only. There are no standard Grade 1 part types. For Grade 1 applications, an NSPAR is required. Consult the acquisition activity for design and product assurance requirements.

(2) Parts may be used in Grade 1 applications if they meet the Product Assurance Class S requirements of MIL-STD-981.

(3) These parts may be used in Grade 1 or Grade 2 applications.

(4) Parts used in Grade 2 applications shall meet the Product Assurance Class B requirements of MIL-STD-981.

(2) Parts covered by this specification contain internal soldered connections that may reflow during installation. Special care must be exercised when soldering to prevent internal solder reflow.

(6) All magnetics parts shall meet the requirements of MIL-STD-981, Product Assurance Class S for Grade 1 applications and Class B for Grade 2 applications.

FIGURE 4.1-10 ISS~~A~~ GRADE 1 AND GRADE 2 APPROVED STANDARD INDUCTORS, TRANSFORMERS (FSC 5950)

FSC	GRADE 1	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
5955	PART QUALITY LEVEL				CRYSTAL OSCILLATORS
	QPL "S"	QPL "B"		MIL-O-55310	Crystal Oscillator, Type 1
	CRYSTALS: THERE ARE PRESENTLY NO STANDARD CRYSTALS				

FIGURE 4.1-11 ISSA GRADE 1 AND GRADE 2 APPROVED STANDARD CRYSTALS AND CRYSTAL OSCILLATORS (FSC 5955)

FSC	GRADE 1	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
5961	PART QUALITY LEVEL				DIODES (2)
	JANS	JANTXV		MIL-S-19500	Small Signal
	JANS	JANTXV			Power
	JANS	JANTXV			Multiple Array
	JANS	JANTXV			Monolithic Array
	JANS	JANTXV			Zener – Voltage Regulator
	JANS	JANTXV			Zener – Voltage Suppressor
	JANS	JANTXV			Bidirectional Voltage Suppresor
	JANS	JANTXV			FET – Current Regulator
	JANS	JANTXV			Schottky Barrier
	JANS	JANTXV			Thyristor
	(1)	(1)	1N5816	SSQ 21936	Fast Recovery, Power Rectifier, 1N5816
	(1)	(1)	1N6391	SSQ 21937	Schottky Barrier Fast Recovery, 1N6391

(1) Parts may be used in Grade 1 or 2 applications.
(2) All diodes shall be Category I, Category II (brazing alloys only) or Category III metallurgically bonded except where prohibited by design.

FIGURE 4.1-12 ISS~~A~~ GRADE 1 AND GRADE 2 APPROVED STANDARD DIODES (FSC 5961)

FSC	GRADE 1	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
5961	PART QUALITY LEVEL				TRANSISTORS (2)
	JANS	JANTXV		MIL-S-19500	Low-Power, NPN
	JANS	JANTXV			Low-Power, PNP
	JANS	JANTXV			Matched Pair, NPN, PNP
	JANS	JANTXV			High Power, NPN, PNP
	JANS	JANTXV			Silicon RF, NPN, PNP
	JANS	JANTXV			FETs, N-channel, P-channel
	JANS	JANTXV			Choppers
	JANS	JANTXV			Optocouplers
	(1)	(1)		Lockheed MLP (3)	Bipolar
	(1)	(1)	2N5153	SSQ22039	PNP, Power, 2N5153
	(1)	(1)		Lockheed MLP (3)	Power
	(1)	(1)	4N47 to 4N49	SSQ22684	Optocoupler, 4N47, 4N48, 4N49
	(1)	(1)	IRHF7230	SSQ22688	MOSFET, Power
	(1)	(1)	IRHM7450SE	SSQ22689	MOSFET, Power
	(1)	(1)	IRHF7130	SSQ22690	MOSFET, Power
	(1)	(1)		Lockheed MLP (3)	FET

(1) Parts may be used in Grade 1 or 2 applications.
(2) All MOSFET selections should consider radiation tolerance.
(3) Lockheed Monitored Line Program (MLP) parts are listed in Lockheed Missiles and Space Company (LMSC) document D573815, Appendix A.

FIGURE 4.1-13 ISSA GRADE 1 AND GRADE 2 APPROVED STANDARD TRANSISTORS (FSC 5961)

FSC	GRADE 1	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
5962					MONOLITHIC MICROCIRCUITS (2)
	QML "V"	QML "Q"		MIL-I-38535	
	JANS	JANB		MIL-M-38510	
	(1)	(1)	OMH-3075	SSQ22687	Bipolar, Hall-Effect Digital Latch
	(1)	(1)	HS-390RH	SSQ22563	Linear, CMOS, Analog Switch
	(1)	(1)	508A	SSQ22569	Linear, CMOS, Mux
	(1)	(1)	26LS31	SSQ22580	Linear, Quad Differential Line Driver
	(1)	(1)	26LS32	SSQ22581	Linear, Quad Differential Line Receiver
	(1)	(1)	1526, 1527A	SSQ22582	Linear, Regulator
	(1)	(1)	UT63M125	SSQ22679	Linear, 1553 Dual Bus Transceiver
	(1)	(1)	1825	SSQ22685	Linear, Pulse-Width Modulator
	(1)	(1)	AMP-01A	SSQ22686	Linear, Precision Inst. Amp, Low Noise
	(1)	(1)	54F	SSQ22263	Digital, AS TTL, Selected Types
	(1)	(1)	54HC/HCT	SSQ22264	Digital, HCMOS, Selected Types
	(1)	(1)	80C86	SSQ22662	Digital, CMOS, Microprocessor, 8-bit
	(1)	(1)	82C54	SSQ22663	Digital, CMOS, Programmable Interval Timer
	(1)	(1)	82C59A-5	SSQ22665	Digital, Programmable Interrupt Controller
	(1)	(1)	80C186	SSQ22667	Digital, CHMOS, Microprocessor, 16-bit
	(1)	(1)	80386	SSQ22668	Digital, CHMOS, Microprocessor, 32-bit
	(1)	(1)	80387	SSQ22669	Digital, CHMOS, Numeric Processor, 80-bit
	(1)	(1)	80389	SSQ22670	Digital, CHMOS, Multi-Bus II I/F Controller
	(1)	(1)	UT1553B	SSQ22673	Digital, MIL-STD-1553 Terminal Interface
	(1)	(1)	87C51FC	SSQ22677	Digital, CHMOS, Microcontroller, 8-bit
	(1)	(1)	82380	SSQ22692	Digital, CHMOS, DMA Controller
	(1)	(1)		Lockheed MLP (3)	Linear

FIGURE 4.1-14 ISS~~A~~ GRADE 1 AND GRADE 2 APPROVED STANDARD MONOLITHIC MICROCIRCUITS (FSC 5962)
(Continued on next page)

FSC	GRADE 1	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
5962					MONOLITHIC MICROCIRCUITS (2)
	(1)	(1)		Lockheed MLP (3)	Digital
	(1)	(1)		Lockheed MLP (3)	Digital CMOS
	(1)	(1)		Lockheed MLP (3)	Large Scale Integration

(1) Parts may be used in Grade 1 or 2 applications.

(2) All microcircuits (hybrid, MCM, and monolithic) selections should consider radiation tolerance.

(3) Lockheed Monitored Line Program (MLP) parts are listed in Lockheed Missiles and Space Company (LMSC) document D573815, Appendix A.

FIGURE 4.1-14 ISS~~A~~ GRADE 1 AND GRADE 2 APPROVED STANDARD MONOLITHIC MICROCIRCUITS (FSC 5962)

(Continued from previous page)

FSC	GRADE 1	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
5999	PART QUALITY LEVEL				HYBRID MICROCIRCUITS (2)
	QML "K"	QML "H"		MIL-H-38534	
	(1)	(1)	BUS61553	SSQ22678	MIL-STD-1553 Terminal Interface, with Internal Transceivers and 8k x 16 SRAM
	(1)	(1)	PWR82332	SSQ22691	Smart Power, 3-Phase Motor Drive
	(1)	(1)		Lockheed MLP (3)	Hybrids
	(1)	(1)		SSQ22705	Video, PFM Modulator
	(1)	(1)		SSQ22706	Video, PFM Demodulator
	(1)	(1)		SSQ22707	Video, Fiber Optic, Transmitter
	(1)	(1)		SSQ22708	Video, Fiber Optic, Receiver
	(1)	(1)		SSQ22709	Fiber Optic Transmitter, Data Link
	(1)	(1)		SSQ22710	Fiber Optic Receiver, Data Link
	MCMs: THERE ARE PRESENTLY NO STANDARD MCMs				

(1) Parts may be used in Grade 1 or 2 applications.
(2) All microcircuits (hybrid, MCM, and monolithic) selections should consider radiation tolerance.
(3) Lockheed Monitored Line Program (MLP) parts are listed in Lockheed Missiles and Space Company (LMSC) document D573815, Appendix A.

FIGURE 4.1-15 ISSA GRADE 1 AND GRADE 2 APPROVED STANDARD HYBRID MICORCIRCUITS AND MCMs
(FSC 5999)

FSC	GRADE 1	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
6010	FIBER OPTIC CONDUCTORS: THERE ARE PRESENTLY NO STANDARD FIBER OPTIC CONDUCTORS				
6015					FIBER OPTIC CABLES
	(1)	(1)		SSQ21654	Single Fiber, Multimode
6030	FIBER OPTIC DEVICES: THERE ARE PRESENTLY NO STANDARD FIBER OPTIC DEVICES				
6060					FIBER OPTIC INTERCONNECTS
	(1)	(1)		SSQ21640	Fiber Optic, Single Channel
6070	FIBER OPTIC ACCESSORIES: THERE ARE PRESENTLY NO STANDARD FIBER OPTIC ACCESSORIES				

(1) These parts may be used in Grade 1 or Grade 2 applications.

FIGURE 4.1-16 SPACE STATION PROGRAM GRADE 1 AND GRADE 2 APPROVED STANDARD FIBER OPTIC PARTS (CONDUCTORS, CABLES, DEVICES, INTERCONNECTS, ACCESSORIES) (FSC 6010, 6015, 6030, 6060, 6070)

FSC	GRADE 1	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
6145					WIRE AND CABLE
	(1)	(1)		MIL-W-22759/11 (Limited Use, Note (3))	Wire, Fluoropolymer-Insulated, Copper or Copper Alloy, Extruded TFE, Silver Coated
	(1)	(1)		MIL-W-22759/12	Wire, Fluoropoolymer-Insulated, Copper or Copper Alloy, Extruded TFE, Nickel Coated
				MIL-W-22759/22 (Limited Use, Note (3))	Wire, Fluoropolymer-Insulated, Copper or Copper Alloy, Extruded TFE, Silver Coated
	(1)	(1)		MIL-W-22759/23	Wire, Fluoropoolymer-Insulated, Copper or Copper Alloy, Extruded TFE, Nickel Coated
				MIL-C-17	Cable, Radio Frequency, Flexible, Coaxial (50, 75, and 93 ohms)
	(1)	(1)		MIL-C-17/60-RG142	50□, 12.4GHz, 1400Vrms, Double Braid
	(1)	(1)		MIL-C-17/93-RG178	50□, 3GHz, 750Vrms, Single Braid
	(1)	(1)		MIL-C-17/94-RG179	□□□, 3GHz, 900Vrms, Single Braid
	(1)	(1)		MIL-C-17/95-RG180	□□□, 3GHz, 1100Vrms, Single Braid
	(1)	(1)		MIL-C-17/110-RG302	□□□, 3GHz, 1700Vrms, Single Braid
	(1)	(1)		MIL-C-17/111-RG303	50□, 3GHz, 1400Vrms, Single Braid
	(1)	(1)		MIL-C-17/113-RG316	50□, 3GHz, 900Vrms, Single Braid
	(1)	(1)		MIL-C-17/127-RG393	50□, 11GHz, 1875Vrms, Double Braid
	(1)	(1)		MIL-C-17/128-RG400	50□, 12.4GHz, 1400Vrms, Double Braid
	(1)	(1)		MIL-C-17/152-00001	50□, 12.4GHz, 900Vrms, Double Braid
				MIL-C-27500 (2)	Cable, Shielded and Unshielded
	(1)	(1)			Cable, using MIL-W-22759/11 wire (Limited use, Note (3))
	(1)	(1)			Cable, using MIL-W-22759/22 wire (Limited use, Note (3))
	(1)	(1)			Cable, using MIL-W-22759/12 wire
	(1)	(1)			Cable, using MIL-W-22759/23 wire
	(1)	(1)		SSQ21652	Wire, Silicone Insulated, Nickel Coated Copper
	(1)	(1)		SSQ21653	Cable, Coaxial, Twinaxial, Triaxial, Flexible and Semirigid

FIGURE 4.1-17 ISSA GRADE 1 AND GRADE 2 APPROVED STANDARD WIRE AND CABLE (FSC 6145)

(Continued on next page)

FSC	GRADE 1	GRADE 2	GENERIC PART	SPECIFICATION NUMBER	PART DESCRIPTION
6145					WIRE AND CABLE (3)
	(1)	(1)		SSQ21655	Cable, MIL-STD-1553 Data Bus
	(1)	(1)		SSQ21656	Wire and Cable, Fluoropolymer-Insulated, Nickel Coated Copper or Copper Alloy
	(1)	(1)		SSQ21655	Cable, MIL-STD-1553 Data Bus
	(1)	(1)		SSQ21644	Clamp, Cable Harness
	(1)	(1)		SSQ22720	Wire, Crosslinked Ethylene Tetrafluoroethylene

(1) Parts may be used in Grade 1 or 2 applications.

(2) All wire used in the cable shall be of the same size. For shielded or shielded and jacketed cables, the number of wires shall be from 1 to 10. For unshielded and unjacketed or unshielded and jacketed cables, the number of wires shall be from 2 to 10. The single jacket style shall consist of an outer jacket only. The double jacket style shall be used in conjunction with a double shield jacket only and shall consist of a jacket between the two shields and an outer jacket. The inner and outer jackets shall be of the same material. The jacket style and material shall be designated by two digits in accordance with the applicable paragraph of MIL-C-27500.

(3) Silver coated wire shall only be used where a solder process is required on installation or assembly. Silver coated wire shall be procured using a cuprous oxide corrosion control plan approved by Boeing Prime Materials and Processes AIT.

FIGURE 4.1-17 ISSA GRADE 1 AND GRADE 2 APPROVED STANDARD WIRE AND CABLE (FSC 6145)
(Continued from previous page)

APPENDIX A ABBREVIATIONS AND ACRONYMS

AC	Advanced CMOS
ac, AC	Alternating Current
AIR	Allied-Signal Aerospace Systems and Equipment
AIT	Analysis and Integration Team
ALE	Alenia Spazio
ARD	Arde
ASIC	Application Specific Integrated Circuit
AST	Astro
BAL	Ball
BOE	Boeing
BVEBO	Emitter-Base reverse voltage, Collector open
C	Celsius
CAGE	Commercial And Government Entity
CMOS	Complementary MOS
Co-60	Cobalt-60
dc, DC	Direct Current
DESC	Defense Electronics Supply Center
DoDISS	Department of Defense Index of Specifications and Standards
DPA	Destructive Physical Analysis
DR	Data Requirement
DRD	Data Requirement Description
EEE	Electrical, Electronic, and Electromechanical
EMI	Electromagnetic Interference
EPID	EEE Parts Information Database
ER	Established Reliability
ESD	Electrostatic Discharge
ESDS	Electrostatic Discharge Sensitive
FET	Field Effect Transistor
FSC	Federal Stock Class
GDS	Gulton Data Systems
GIDEP	Government-Industry Data Exchange Program
GRM	Grumman
GSE	Ground Support Equipment
GSFC	Goddard Space Flight Center
HAM	Hamilton Standard
HAR	Harris

APPENDIX A ABBREVIATIONS AND ACRONYMS (continued)

HC	High Speed CMOS
HCT	High Speed CMOS TTL Compatible
HDBK	Handbook
I_{BW}	Current, Bundled Wire
I_D	Drain Current
ILS	ILC Space
ILT	ILC Technology
IMO	IMO Industries/CEC Instruments Division
IR	Ionizing Radiation
IREC	Ionizing Radiation Environment Compatibility
ISS~~A~~	International Space Station ~~Alpha~~
I_{SW}	Current, Single Wire
JFET	Junction FET
JSC	Johnson Space Center
LCH	Lockheed
LED	Light-Emitting Diode
LFS	Loral Fairchild
LMSC	Lockheed Missiles and Space Company
LSY	Life Systems
M&P	Materials and Processes
Mac	MacIntosh
MCM	Multi-Chip Module
MDSSC	McDonnell Douglas Space Systems Company
MIL	Military
ML	Mission Launch
MLP	Monitored Line Program
MOS	Metal Oxide Semiconductor
MRB	Material Review Board
MSFC	Marshall Space Flight Center
MUA	Material Usage Agreement
µF	Microfarad
N	Number of wires
N/A	Not Applicable
NASA	National Aeronautics and Space Administration
NASA HQ	NASA Headquarters

APPENDIX A ABBREVIATIONS AND ACRONYMS (continued)

NSPAR	Nonstandard Part Approval Request
NTC	Negative Temperature Coefficient
OPR	Office of Prime Responsibility
OTS	Off-The-Shelf
PC	Personal Computer
PCB	Parts Control Board
PG	Product Group
PIN	P-Intrinsic-N
PIND	Particle Impact Noise Detection
PIV	Peak Inverse Voltage
PKE	Perkin Elmer/Orbital Sciences Corporation
PM&P	Parts, Materials and Processes
PRACA	Problem Reporting and Corrective Action
PRACAS	Problem Reporting and Corrective Action System
PTC	Positive Temperature Coefficient
QEPM&L	Qualified EEE Parts, Manufacturers & Laboratories
QML	Qualified Manufacturers List
QPL	Qualified Products List
rms	Root Mean Square
SCD	Source/Specification Control Drawing
SEE	Single Event Effects
SF	Space Flight
SPEC	Specification
SRR	System Requirements Review
SSAEPL	Space Station Approved EEE Parts List
SSPO	Space Station Program Office
SSQ	Space Station Quality
TBD	To Be Determined
TBE	Teledyne Brown Engineering
TFE	Tetrafluoroethylene
TID	Total Ionizing Dose
TSE	Test Support Equipment
TTL	Transistor-Transistor Logic
UL	Underwriters Laboratory
Vcc	Voltage, power supply
Vdc	Volts dc

APPENDIX A ABBREVIATIONS AND ACRONYMS (continued)

VGS	Gate-to-Source Voltage
VLSI	Very Large Scale Integration

APPENDIX B. ADDITIONAL TESTING REQUIREMENTS

B.1 SCOPE

This appendix contains the additional testing requirements for parts used in the design and construction of ISSA hardware.

B.2 Introduction

To support the designs required by ISSA, SSP 30423 includes parts that require additional testing prior to use. Therefore, the specified additional tests must be fully complied with in order to use a part for the applicable grade level, and part documentation shall reflect the successful completion of additional testing requirements.

B.2.1 Marking

Upon successful completion of additional testing, each part shall be permanently and legibly marked with a NU, except when the contractor uses a Part Control Procedure to implement these requirements and specifies a unique marking, so that the part may be identified and controlled. The marking shall be legible (with a contrasting color), nontoxic, and permanent such that it meets the resistance to solvent requirements of MIL-STD-883, Method 2015. In addition, the marking shall meet the contractual requirements for outgassing. Alternate methods of part marking shall be approved by the Tier 1 contractor.

B.3 Additional Testing Requirements

The following additional testing shall be performed on the parts indicated, as required by Section 4 of SSP 30423. All parts shall be marked in accordance with paragraph B.2.1 herein.

B.3.1 Capacitors, Fixed, Ceramic, Temperature Compensating (CCR)

CCR capacitors rated <100Vdc for Grade 1 low voltage (<10Vdc) applications shall be lot tested in accordance with MIL-C-123 group B, subgroup 2. Sample parts subjected to this testing shall not be used. Reference MIL-HDBK-978, Vol.1, 2.2.7.2. c and d.

B.3.2 Capacitors, Fixed, Ceramic (CDR)

CDR capacitors rated <100 Vdc for Grade 1 low voltage (<10Vdc) applications shall be lot tested in accordance with MIL-C-123, Table X, group A destructive physical analysis criteria and Table XI, group B humidity, steady state, low voltage criteria. Sample parts subjected to this testing shall not be used. Reference MIL-HDBK-978, Vol. 1, 2.2.7.2 and 2.2.7.3.

B.3.3 Capacitors, Fixed, Tantalum (Solid) Electrolytic (CSR09 and CSR13)

Each CSR09 and CSR13 part for Grade 1 low impedance (<1.5 Ω/V) applications shall be subjected to a surge current test of five charge/discharge surge current cycles of at least 1 second each per cycle at +25°C, -55°C, and +85°C and maximum rated voltage. Definition of surge current (inrush current) is the peak current, for a given duration, that the capacitor will receive through a maximum series resistance of less than or equal to 0.3 ohm including the mercury relay, fuse, and wire, from the turn-on of a bank of 100,000µF aluminum electrolytic capacitors charged to the rated voltage of a given capacitor under test. The surge current test circuit shall comply with the following conditions.

a. The power supply used for charging the capacitors shall be capable of supplying a regulated direct voltage variable from 0 to 150 volts at a minimum of 15 amps.

b. The energy storage bank shall be placed across the power supply, and shall consist of parallel aluminum electrolytic capacitors having an aggregate capacitance of 100,000µF, -0/+30% rated at 150 volts dc working or higher.

c. A 30-ampere mercury relay shall be used to switch the capacitor under test to the energy bank for charge and into a short circuit for discharge.

d. The total resistance of all wiring between the energy source and the capacitors under test, including mercury relays but excluding fuses, shall not exceed 0.1 ohm.

e. The fuses in the test circuit shall have a rating of not less than 1 amp nor more than 5 amps, shall be placed in series with each capacitor undergoing the surge current test, and shall have a maximum resistance of not more than 0.2 ohm.

f. The capacitor under test shall be considered a failure either when a fuse blows, the dc leakage current is exceeded, or both.