ITEM 1 - TYPE MS CONNECTOR, CIRCULAR, MINIATURE . . . MS3106X-XXXXX
ITEM 2 - TYPE MS3 CONNECTOR, CIRCULAR, MINIATURE . . . MS3106X-XXX
ITEM 3 - TYPE MLS CONNECTOR, CIRCULAR, MINIATURE . . . MLS6GTXX-XXXX

THE FOLLOWING TABLE LISTS FAILURE MODES AND CAUSES WHICH WERE CONSIDERED IN DERIVING THE FAILURE RATES AND DEVICES REQUIRED (PARA'S) FOR THE ITEMS LISTED ABOVE:

FAILURE MODE / FAILURE CAUSE	ITEM 1 TYPE MS CONNECTOR	ITEM 2 TYPE MS3 CONNECTOR	ITEM 3 TYPE MLS CONNECTOR
PIN-TO-PIN SHORT (BOTH)			
(a) Place Part Structural Failure	X	X	X
(b) Contamination	X	X	X
(c) Vibration	X	X	X
(d) Mechanical Shock	X	X	X
(e) Processing Anomaly	X	X	X
(f) Thermal Stress	X	X	X
PIN-TO-PIN SHORT (GROUND)			
(a) Place Part Structural Failure	X	X	X
(b) Contamination	X	X	X
(c) Vibration	X	X	X
(d) Mechanical Shock	X	X	X
(e) Processing Anomaly	X	X	X
(f) Thermal Stress	X	X	X
INADVERTENT OPENING			
(a) Place Part Structural Failure	X	X	X
(b) Contamination	X	X	X
(c) Vibration	X	X	X
(d) Mechanical Shock	X	X	X
(e) Processing Anomaly	X	X	X

APP-K-1

SHUTTLE CRITICAL ITEMS LIST - 05A1 CKT 1/1 WIRING CONNECTORS

NO.	PMEA NO.	SUBSYSTEM	CIRCUIT DESCRIPTION	FAILURE MODE
1.	05-7 -2000-1	RPD6C (BASIC)	RT TUMBLE VALVE	PIN-TO-PIN SHT (GND)
2.	05-7 -2001-1	RPD6C (BASIC)	RT TUMBLE VALVE	INADVERTENT DEWATING
3.	05-7BA-2000-1	LAND GEAR & CNTRL	NLG RETENSION PYRO POWERED ASSIST	INADVERTENT DEWATING
4.	05-7BA-2001-1	LAND GEAR & CNTRL	LANDING GEAR DOWN COMMAND	PIN-TO-PIN SHT (HOT)
5.	05-7BA-2002-1	LAND GEAR & CNTRL	LANDING GEAR DOWN CONTROL	PIN-TO-PIN SHT (GND)
6.	05-7BB-2000-1	LAND GEAR & CNTRL	BRAKE COMMAND	PIN-TO-PIN SHT (HOT)
7.	05-7DA-2000-1	REMOTE MANIP ARM	REMOTE MANIPULATOR ARM CONTROL	PIN-TO-PIN SHT (HOT)
8.	05-7DA-2001-1	REMOTE MANIP ARM	REMOTE MANIPULATOR ARM CONTROL	PIN-TO-PIN SHT (GND)
9.	05-7J -2000-1	MPS	LO2 RELIEF SHUTOFF VALVE	PIN-TO-PIN SHT (HOT)
10.	05-7J -2001-1	MPS	LH2 RELIEF SHUTOFF VALVE	PIN-TO-PIN SHT (HOT)
11.	05-7J -2002-1	MPS	LO2 OVERBOARD BLEED VALVE	PIN-TO-PIN SHT (GND)
12.	05-7J -2003-1	MPS	LO2 OVERBOARD BLEED VALVE	INADVERTENT DEWATING
13.	05-7J -2004-1	MPS	LH2 AND LO2 ULLAGE PRESSURE TRANSDUCER	INADVERTENT DEWATING
14.	05-7J -2005-1	MPS	LH2 HELIUM MANIFOLD REPRESS VALVE	INADVERTENT DEWATING
15.	05-7J -2006-1	MPS	HELIUM SUPPLY BLOWDOWN VALVE	INADVERTENT DEWATING
16.	05-7EA-2000-1	AFT-RCS	LEFT & RIGHT AFT RCS FUEL & OXID VALVE	PIN-TO-PIN SHT (HOT)
17.	05-7EF-2000-1	FWD-RCS	FORWARD RCS FUEL & OXID VALVE	PIN-TO-PIN SHT (HOT)
18.	05-7M -2000-1	APU	APU START/RUN CONTROL	PIN-TO-PIN SHT (HOT)
19.	05-7S -2000-1	DPS	RIU NO. 1 COMMAND PATH	INADVERTENT DEWATING
20.	05-7S -2000-2	DPS	RIU NO. 1 COMMAND PATH	PIN-TO-PIN SHT (HOT)

APP-K-2

APPENDIX K, ITEM 3 - TYPE NLS CONNECTOR
NLS6GTXX-XXXX

DISPOSITION & RATIONALE
(A) DESIGN, (B)TEST, (C) INSPECTION, (D) FAILURE HISTORY:

(A) DESIGN

LOW SILHOUETTE, HIGH DENSITY, MINIATURE, CIRCULAR, ELECTRICAL CONNECTORS DESIGNED TO BE ENVIRONMENTALLY SEALED WITH EACH CONTACT INDIVIDUALLY SEALED TO PREVENT MOISTURE ENTRY AND EXCLUSION AFTER MATING. CONTACTS ARE INDIVIDUALLY REMOVABLE TO FACILITATE REPAIR AND REWORK. SOCKET CONTACTS ARE SHROUDED TO PREVENT DAMAGE DUE TO ELECTRICAL PROBING AND SELF ALIGN WITH PIN CONTACT TO ASSIST MATING AND PREVENT BENT PIN CONTACTS. CONNECTOR COUPLING IS ACHIEVED BY A 1/3 TURN BAYONET COUPLING MECHANISM WITH A TACTILE DETENT WHEN FULLY MATED AND CAN BE INSPECTED THRU THREE INSPECTION HOLES.

DESIGNED, TESTED AND INSPECTED TO MEET THE REQUIREMENTS OF THE SPACE SHUTTLE PROGRAM BY GEORGE C. MARSHALL SPACE FLIGHT CENTER SPECIFICATION 40M38277.

(B) TEST

QUALIFICATION/CERTIFICATION

CERTIFICATION TESTING AND ANALYSIS ARE COMPLETED AND APPROVED. TESTS INCLUDED THE FOLLOWING:

TEST	CAUSE CONTROL					
	a	b	c	d	e	f
PERFORMANCE	X	X			X	
THERMAL CYCLING (-250°F TO 392°F)						X
DURABILITY (250 CYCLES MATE/DEMATE)	X					
VIBRATION (1.0 G^2/HZ)	X		X			
PHYSICAL SHOCK (75 G)	X		X			
TEMPERATURE LIFE (392°F FOR 1000 HRS)	X					X
INSERT RETENTION (75 PSI)	X				X	
MOISTURE RESISTANCE (100% HUMIDITY)		X				
VACUUM ($1x10^{-8}$ MM OF MERCURY)	X					
CORROSION (5% SALT FOG, 48 HOURS)		X				
OZONE (0.01% FOR 2 HOURS)	X	X				
CONNECTOR MATING AND UNMATING FORCES	X				X	
CONTACT RETENTION	X				X	

QUALIFICATION/CERTIFICATION, CONT'D

TEST	CAUSE CONTROL					
	a	b	c	d	e	f
DIELECTRIC WITHSTANDING VOLTAGE (1500 VAC AT 2 MILLIAMPERES)	X	X	X	X	X	
INSULATION RESISTANCE (5000 MEGOHMS)	X	X	X	X	X	
CONTACT RESISTANCE (LESS THAN 65 MILLIOHMS)	X	X	X		X	
EXPLOSIVE ATMOSPHERE (2 GAS MIXTURES WILL NOT INITIATE EXPLOSION)	X	X			X	
SHELL CONDUCTIVITY (LESS THAN 50 MILLIOHMS)	X	X	X		X	

ACCEPTANCE AND SCREENING

ALL CONNECTORS ARE SUBJECTED TO A 100% ACCEPTANCE PRIOR TO DELIVERY AND INCLUDE THE FOLLOWING:

TEST	CAUSE CONTROL				
	a	b	c	d	e
DIELECTRIC WITHSTANDING VOLTAGE (1500 VAC)	X	X	X	X	X
INSULATION RESISTANCE (5000 MEGOHMS AT 500 VDC)	X	X	X	X	X
CONTACT ENGAGING AND SEPARATING FORCES (VARIES BY SIZE)	X	X			X
EXAMINATION OF PRODUCT (DIMENSIONAL/VISUAL)	X	X			X
INSERT BOND INTEGRITY (VERIFIES ADHESIVES)	X	X			X
SHELL CONDUCTIVITY (LESS THAN 50 MILLIOHMS)	X	X			X

ACCEPTANCE TEST AT NEXT ASSEMBLY:

TEST	CAUSE CONTROL				
	a	b	c	d	e
EXAMINATION (VISUAL)	X	X			X
DIELECTRIC WITHSTANDING VOLTAGE (1500 VAC)*	X	X			X
CONTINUITY (VERIFIES CIRCUIT PATH)	X	X			X

* NOTE: PIGTAILED COMPONENTS AND MINOR HARNESS REWORK MAY NOT BE SUBJECT TO THIS TEST.

(C) INSPECTION

SUPPLIER INSPECTION (FAILURE CAUSE a,b,e)

ALL RAW MATERIALS INSPECTED AND RECORDED UPON RECEIPT. CRITICAL PROCESSES (MOLDING, BONDING, PLATING) WITNESSED AND TESTED BY INSPECTION PERSONNEL.

CONTAMINATION CONTROL (FAILURE CAUSE b)

CONTAMINATION CONTROL PROCESSES AND CORROSION PROTECTION PROVISIONS ARE VERIFIED BY INSPECTION. CONNECTOR IS CLEANED AS REQUIRED DURING AND AFTER ASSEMBLY.

ASSEMBLY/INSTALLATION (FAILURE CAUSE a,b,e)

ALL RAW MATERIALS ARE INSPECTED UPON RECEIPT. ALL MOLDING, MACHINING, AND ASSEMBLY PROCESSES ARE INSPECTED DURING AND AFTER COMPLETION OF THE ASSEMBLY CYCLE WHICH INCLUDES SHOP TRAVELERS AND MANDATORY INSPECTION POINTS (MIP'S).

CRITICAL PROCESSES (FAILURE CAUSE a,e)

ALL BONDING, PLATING AND MOLDING OPERATIONS ARE VERIFIED BY DETAILED INSPECTION INSTRUCTIONS.

TESTING (FAILURE CAUSE a,b,e)

100% OF ALL PARTS DELIVERED ARE TESTED AND WITNESSED BY INSPECTION PERSONNEL.

HANDLING/PACKAGING (FAILURE CAUSE a,b)

PARTS ARE PACKAGED AND PROTECTED TO MILITARY LEVELS AND ARE VERIFIED BY QC TO APPLICABLE LEVELS.

(D) FAILURE HISTORY

FAILURE HISTORY INDICATES NO GENERIC FAILURE MODES EXIST (APOLLO, MILITARY, COMMERCIAL).

NUMEROUS PROBLEMS HAVE BEEN REPORTED RELATED TO MISHANDLING AND ABUSE (WORKMANSHIP) BUT NOT RELATED TO DESIGN.

IN-FLIGHT FAILURE HISTORY:

INADVERTENT DEMATE:	0
PIN-TO-PIN SHORT (HOT):	0
PIN-TO-PIN SHORT (GND):	0

VEHICLE GROUND PROCESSING FAILURE HISTORY:

INADVERTENT DEMATE:	0
PIN-TO-PIN SHORT (HOT):	0
PIN-TO-PIN SHORT (GND):	0

PREPARED BY:		APPROVED BY:	APPROVED BY (NASA):
DESIGN	B. WADDELL	DES	SSM
RELIABILITY	T. KIMURA	REL	REL 6/4/89
QUALITY	J. COURSEN	QE	QE