INTRODUCTION TO APPENDIX E

ITEM 1 - RESISTOR - FILM - RLR42
ITEM 2 - RESISTOR - FILMED FILM - RLR07
ITEM 3 - RESISTOR - WIRE WOUND - RWR80
ITEM 4 - RESISTOR - FIXED, POWER WIRE WOUND - RE77
ITEM 5 - RESISTOR - FIXED, POWER WIRE WOUND - RER65
ITEM 6 - RESISTOR - FIXED FILM - RLR20

THE FOLLOWING TABLE LISTS FAILURE MODES AND CAUSES WHICH WERE CONSIDERED IN DERIVING THE FAILURE MODES AND EFFECTS ANALYSIS (FMEA'S).

FAILURE MODE / Failure Cause	RLR42	RLR07	RWR80	RE77	RER65	RLR20
OPEN (a) Structural Failure Mechanical Stress Vibration (c) Electrical Stress (d) Thermal Stress (e) Processing Anomaly	X	X	X	X	X	X
SHORT (END TO END) (a) Structural Failure Mechanical Stress Vibration (b) Contamination (c) Electrical Stress (d) Thermal Stress (e) Processing Anomaly			X	X	X	
SHORT TO STRUCTURE (GROUND) (a) Structural Failure Mechanical Stress Vibration (b) Contamination (c) Electrical Stress (d) Thermal Stress (e) Processing Anomaly				X	X	

APPENDIX E ITEM 4 - RESISTOR - FIXED WIRE WOUND - CHASSIS MOUNTIN
RE77G20RO

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

(A) DESIGN

THE DEVICE IS A 75 WATT FIXED RESISTOR WITH A WIRE WOUND ELEMENT. THE RESISTOR IS PACKAGED IN A CHASSIS MOUNTED, POWER TYPE CASE. THE PART DISSIPATES HEAT THROUGH A METAL MOUNTING SURFACE. THE INITIAL TOLERANCE IS ±1% AND A RESISTANCE - TEMPERATURE CHARACTERISTIC OF ±.0050% PER °C. THE PART IS NOT SUITABLE FOR APPLICATIONS WHERE THE ALTERNATING CURRENT CHARACTERISTICS ARE OF IMPORTANCE; HOWEVER, INDUCTANCE EFFECTS HAVE BEEN MINIMIZED WHERE FEASIBLE. THE PART IS DESIGNED TO MEET THE REQUIREMENTS OF MIL-R-18546/2. THE APPLICATION IS ALSO ANALYZED TO ASSURE COMPLIANCE WITH THE 25% DERATING CRITERIA OF THE ORBITER PROJECT PARTS LIST.

(B) TEST

THE PART IS SCREENED AND QUALIFIED TO THE REQUIREMENTS OF MIL-R-18546/2. THE DESIGN HAS BEEN QUALIFIED TO THE SPECIFICATION BY HAVING THE FOLLOWING TESTS AND INSPECTIONS PERFORMED:

TEST / INSPECTION	CAUSE CONTROL				
	a	b	c	d	e
DC RESISTANCE		X			X
VISUAL AND MECHANICAL EXAMINATION	X				X
SOLDERABILITY		X			X
TERMINAL STRENGTH	X				X
RESISTANCE-TEMPERATURE CHARACTERISTIC		X			X
TEMPERATURE (275 °C, 2 HRS)				X	X
DIELECTRIC WITHSTANDING VOLTAGE (4.5k V)		X	X		X
INSULATION RESISTANCE		X	X		X
THERMAL SHOCK (25 TO -55 °C)				X	X
MOMENTARY OVERLOAD (5X RATED WATTAGE)			X		X
MOISTURE RESISTANCE	X				X
LIFE (RATED POWER, 25 °C, 1000 HRS)		X	X	X	X
SHOCK (50G)	X				X
VIBRATION	X				X
FINAL VISUAL AND MECHANICAL	X				X

QUALIFICATION TESTS

APPENDIX E ITEM 4 CONT'D

TESTS AND INSPECTIONS PERFORMED ON A SAMPLE OF PARTS FROM EACH LOT AS A PART OF QUALIFICATION ARE:

TEST / INSPECTION	CAUSE CONTROL				
	a	b	c	d	e
DC RESISTANCE		X			X
VISUAL AND MECHANICAL INSPECTION	X				X
DIMENSIONS					X
CONSTRUCTION	X				X
MARKING					X
WORKMANSHIP	X	X			X
SOLDERING		X			X

QUALIFICATION TESTS (LOT SAMPLE)

TESTS AND INSPECTIONS PERFORMED ON A PERIODIC BASIS AS A PART OF QUALIFICATION ARE:

TEST / INSPECTION	CAUSE CONTROL				
	a	b	c	d	e
RESISTANCE-TEMPERATURE CHARACTERISTIC		X			X
TEMPERATURE				X	X
DIELECTRIC WITHSTANDING VOLTAGE		X	X		X
INSULATION RESISTANCE		X	X		X
THERMAL SHOCK				X	X
MOMENTARY OVERLOAD			X		X

QUALIFICATION TESTS (PERIODIC)

NO TESTS OR INSPECTIONS ARE PERFORMED ON ALL DEVICES.

(C) INSPECTION

THE PART HAS REQUIRED INSPECTION DURING MANUFACTURING PROCESS IN ACCORDANCE WITH THE REQUIREMENTS OF MIL-R-18546/2. THIS INCLUDES VISUAL INSPECTIONS, BURN-IN AND SCREENING TESTS AS DESCRIBED IN PARAGRAPH B. THE SPECIFICATION HAS NO SPECIFIC PROCESS OR CONTROLS LISTED REQUIRING QUALIFYING AGENCY APPROVAL. THE CONTROLS OF MIL-STD-790 ARE NOT SPECIFICALLY IMPOSED.

APPENDIX E ITEM 4 CONT'D

(D) FAILURE HISTORY

SHUTTLE PROGRAM PART FAILURE HISTORY INDICATES NO REPORTED FAILURES FOR THIS DEVICE TYPE. A REVIEW OF GIDEP PRIOR MILITARY PART FAILURE HISTORY REVEALS NO UNCORRECTED GENERIC ISSUES EXIST.

PREPARED BY:		APPROVED BY:	APPROVED BY (NASA):
DESIGN		DES A. K. Chase	SSM W. C. Stamp 11/3/87
RELIABILITY	M. HOVE	REL M. Hove 11-3-87	REL
QUALITY	J. COURSEN	QE Stamp for K. Spurlock	QE 11/3/