



**Aerospace
Systems Division**

Failure Mode, Effects and Criticality
Analysis - Array D
Redundant Command Receiver

ATM 984

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DATE 26 Feb. 1971

This Failure Mode, Effects, and Criticality Analysis was prepared by Motorola's Government Electronics Division as required under the Bendix/Motorola subcontract SC-0721 for the ALSEP program.

The ALSEP Redundant Command Receiver is a solid state receiver with active redundancy that may be used to receive either PM or PM-FM type signals. This receiver includes two identical electrically separate receivers, consisting of an rf converter, and IF and Audio Amp, and a power isolator. In addition, the redundant receiver has an rf power divider referred to as an rf coupler, and a selection circuit referred to as an audio combiner.

The failure mode, effects, and criticality analysis shows, in a systematic way, the effect of part, pin, and receiver redundancy on system performance. Specifically these analyses have identified the only single point failure mechanism, have showed which piece part failure modes result in minor degradation at most and may be eliminated from the reliability calculation, and have verified that Receivers A and B are failure isolated.

This FMECA reflects the FACI configuration of the ALSEP Redundant Command Receiver. Based on this FMECA the reliability prediction is .99795 in format 1 and .99786 in format 2.

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Failure Mode, Effects, And
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ALSEP Redundant Command Receiver
BxA Part Number 2345147

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1.0 INTRODUCTION

The failure mode, effects, and criticality analysis was performed on the ALSEP Redundant Command Receiver for Bendix Aerospace Systems. The method of analysis generally complied with the technique requirements as outlined in the Reliability Program Plan for the ALSEP Redundant Command Receiver (Motorola Document Number 3875/001, Rev. A, dated 30 April 1970).

This report is considered a final FMECA analysis, submitted to fulfill the requirements of the CDR. A revision of this report, if necessary, will be submitted 10 days prior to FACI.

2.0 REQUIREMENTS

The failure mode, effects, and criticality analysis is required to show, in a systematic way, the effect of part, pin, and receiver redundancy on system performance. The procedures used and the results and conclusions are detailed within this report.

The FMECA accomplishes the following:

1. Identifies any single point failures.
2. Shows which piece part failure modes result in minor degradation at most and may be eliminated from the reliability calculation.

3. Verifies that Receivers A and B are failure isolated.

The following ground rules were used in the performance of the FMECA:

1. Telemetry is considered non-mission essential, and failures resulting only in the loss of telemetry functions were not included in the reliability estimate.
2. For failure modes resulting in a low impedance path to ground from the +12 V supply, the following statements were assumed:
 - a. No receiver fusing is in the present configuration.
 - b. No secondary series regulator failures were postulated.
 - c. The +12 V supply can supply receiver B, as well as the failed receiver A, without mission degradation.
3. CSP A and B and Audio A and Audio B were not considered mission essential, except as used within the Redundant Command Receiver to provide a selected audio output.

3.0 FUNCTIONAL DESCRIPTION

The ALSEP Redundant Command Receiver is a solid state receiver with active redundancy that may be used to receive either PM (Format 1) or PM-FM (Format 2) type signals.

The Redundant Command Receiver includes two identical electrically separate receivers, consisting of an RF converter, an IF and Audio Amp, and a power isolator. Each receiver (A and B) is a dual conversion superheterodyne receiver with a center frequency of 2119 MHz. In addition, the Redundant Command Receiver has an RF power divider referred to as an RF coupler and a selection circuit referred to as an audio combiner. The overall block diagram is shown in Figure 1.

The RF input power is provided to the receiver through a single RF connector interface and is divided by a power divider and applied to receivers A and B. The local oscillator injection for each converter is provided from a crystal oscillator at 110.9631 MHz. Selectivity is provided by a 3-pole preselector preceeding the mixer, a 3-pole filter in the first IF, and a 5-pole filter following the second mixer. Integrated circuits are used in the receiver for most of the IF gain and the subcarrier and audio circuitry. After amplification and gain leveling, a limiter and a Travis discriminator circuit are used to demodulate the receiver signal. After the first discriminator, the signal is processed in accordance with

the format selected and then proceeds to the active filter output amplifier, which provides a narrow post detector bandwidth to reduce output audio noise.

A narrow band detector is used to recognize and indicate the presence of a 1 KHz synchronizing tone. The filter has a noise bandwidth of approximately 100 Hz. The output of the detection circuit is a bi-level signal, identified as a Command Signal Presence Indicator (CSP). The CSP is used within the audio combiner circuitry to implement the redundancy switch for switching from receiver A to receiver B.

The Redundant Command Receiver is designed to receive modulated signals in either of two types of modulation designated as Format 1 or Format 2. The format is selected by means of appropriate connections in the wiring harness external to the receiver.

The modulating signals are constructed as follows:
Digital data is bi-phase modulated onto a 2 KHz subcarrier and a 1 KHz synchronizing tone is added. This combination then constitutes the composite audio signal and is used in either format. In Format 1, the composite audio signal is phase modulated directly onto the S-band carrier at 3 radians peak. In Format 2, the composite audio signal is frequency modulated onto a 70 KHz subcarrier at 5 KHz peak deviation.

After the first discriminator in the IF and Audio Module of the receiver, the signal processing is dependent upon the format. In Format 1 operation, an integrator having a corner frequency of approximately 80 Hz is used to restore the original composite audio form. This is necessary because the received PM signal is demodulated by a FM discriminator. The output amplifier is combined with an active filter to provide a narrow post-detection bandwidth to reduce the output audio noise.

In Format 2 operation, the first discriminator output is the 70 KHz subcarrier with its frequency modulation. This signal is further processed through an Integrator (corner frequency of 30 KHz), a limiter, and a pulse counting discriminator. The composite audio signal from the discriminator goes to the active filter output amplifier.

The implementation of redundancy in this receiver is a major design characteristic. Figure 2 shows the reliability model for the Redundant Command Receiver. Both receivers A and B are operating during the mission. When the CSP from receiver A indicates the presence of a command signal from the output of receiver A, receiver A is selected by the audio combiner. When CSP does not appear, either due to failure of A or due to no command signal, then receiver B will be selected.

All single point failure modes have been eliminated through the use of part redundancy, except the RF input receptacle which is a contractually specified interface. All functions, except telemetry, have redundant pin connections within the multipin connector.

4.0 ANALYSIS DETAILS

An FMECA was performed on a subassembly and a system level. The worksheets are contained in Appendix B.

4.1 SUBASSEMBLY LEVEL: On each subassembly, all piecepart components were itemized in accordance with the following schematic numbers and revisions, and the assembly parts list dated 20 Nov. 1970. Schematics are not included in the report and are assumed submitted as project documentation under separate cover.

<u>Schematic Name</u>	<u>Schematic No.</u>	<u>Revision</u>
IF and Audio	63-P11349B	D
RF Converter	63-P11377B	B
Audio Combiner & Power Isolator	63-P11380B	B
Overall Schematic	63-P11356B	C

The major failure modes for each component piecepart were listed along with the probability of that piece part failing in each mode (designated as α). The values of α were

obtained from Table VI of Motorola's R&C Special Memorandum Number 265, included as Appendix A.

The effect of each piecepart failure mode on the subassembly was determined and itemized. An effect number (E) was assigned from 0 to 1.0, with 0 representing the smallest (least critical) effect, and 1.0 representing the largest (most critical) effects.

The failure probability (Q) is the failure rate of each piecepart at 45°C and at the stresses tabulated on the Part Application Analysis.

The criticality product was then derived as the product of $\alpha \times E \times Q$. The criticality products were then ranked, starting with 1 assigned to the largest product. Criticality products of less than 10.0 were not ranked.

Table 1 lists the five most critical failure modes for each subassembly and the respective criticality products.

4.2 SYSTEM LEVEL: At the system level, the subassembly failure modes were grouped according to the criticality of those failure modes.

The α for a system failure mode was obtained by dividing by the sum of the module α 's by the total subassembly α sum.

The effect on the Command Receiver System was considered by listing conditions where switch-over to receiver B was accomplished and where redundancy was lost.

The following general assumptions were used in assigning system effect numbers (E).

1. Telemetry - not considered mission essential and assigned a .2.
2. Loss of RFI filtering between modules was assigned a .5.
3. Loss of case ground in the multipin connector was assigned a .2.
4. The pins are redundant in the multipin connector. In addition, further redundancy is possible due to redundant receivers. If both redundant pins fail and the command receiver still operates, a system effect number of .3 is assigned to each pin failure. If both redundant pins fail and the command receiver fails, a system effect number of .5 is assigned to each pin failure.

The ten most critical failure modes for the command receiver are ranked in Table 2, from the subassembly criticality products shown in Table 1.

4.3 RELIABILITY: The failure rates (%/1000 hours) are itemized in the Reliability Model Code column of the system FMECA sheets for those failure modes considered mission essential. These failure rates also comprise the reliability model in Figure 2.

5.0 CONCLUSIONS

In the system critical ranking, there are three part types that appear in the first ten:

1. Sensistors (06-P14404A)
2. Toroidal inductors (24-P11420B)
3. Toroidal inductors (24-P11417B)

The sensistors were assigned a failure rate of .015 %/1000 hours, in accordance with SM-188. In addition, since a catastrophic failure is critical to the Command Receiver, the criticality is high. However, the use of sensistors is imperative in the design and no feasible design alternative exists. The toroidal inductors (both 24-P11420B and 24-P11417B) are not actually component pieceparts until after potting of the Command Receiver. These toroidal inductors are manufactured as assemblies and, therefore, cannot be screened as pieceparts. However, these toroidal inductors were assigned a failure rate from SM-188 as unscreened coils. Since they are single layer windings, relatively few turns, visually examined, and are

screened by virtue of module tests, the assigned failure rate is considerably pessimistic. No feasible design alternative seems acceptable.

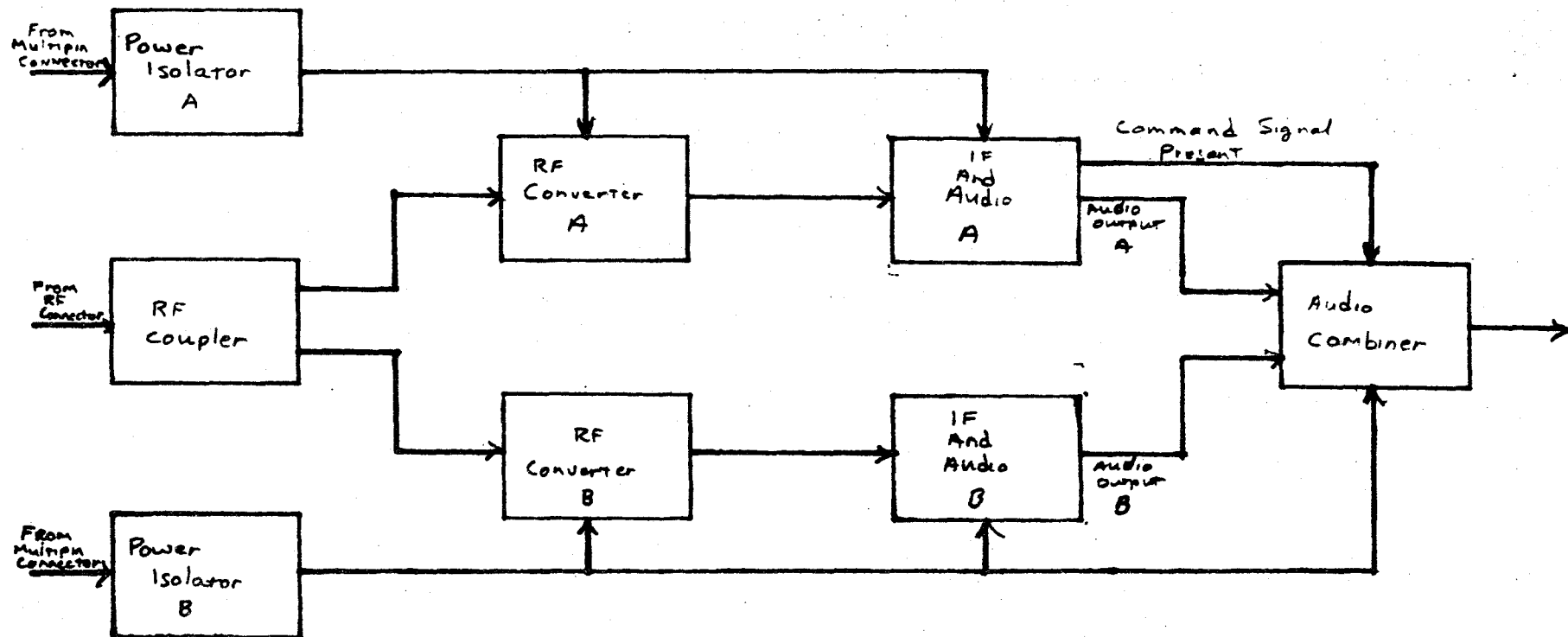


Figure 1

ALSEP Redundant Command Receiver

Functional Block Diagram

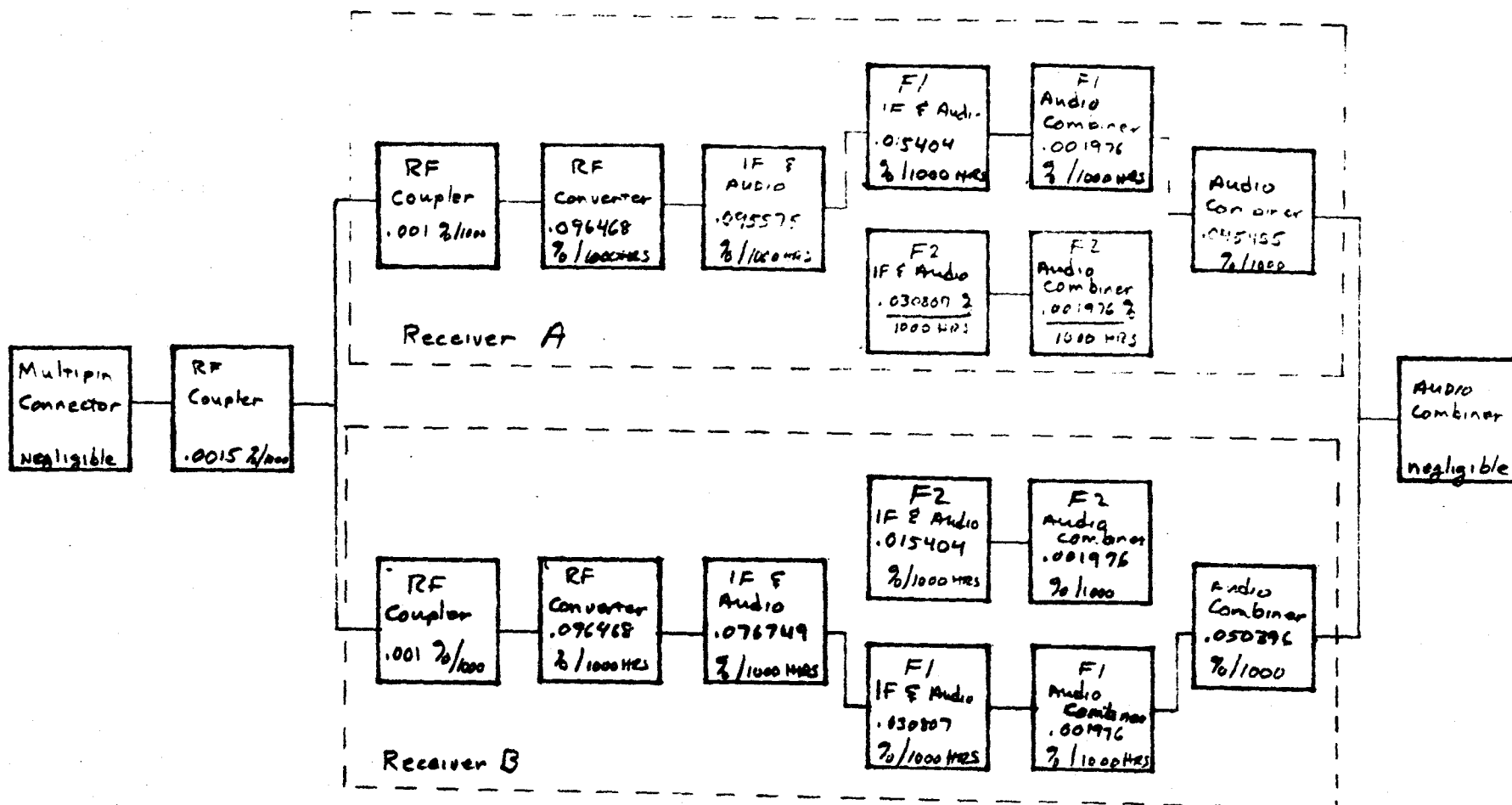


Figure 2

ALSEP Redundant Command Receiver

Reliability Block Diagram

Table 1

Subassembly FMECA Ranking

<u>Subassembly Name</u>	<u>Part</u>	<u>Failure Mode</u>	<u>F.R. (%/1000)</u>	<u>System Effect Number</u>	<u>Criticality Ranking</u>	<u>Criticality Product</u>
IF & Audio	T1	Open	.005	1.0	1	452
	T2	Open	.005	1.0	2	452
	T5	Open	.005	1.0	3	452
	T6	Open	.005	1.0	4	452
	FL1	Short	.0036	1.0	5	255.5
RF Converter	R30	Open	.015	1.0	1	750
	T2	Open	.0056	1.0	2	452
	T3	Open	.0056	1.0	3	452
	T4	Open	.0056	1.0	4	452
	R30	Drift	.015	.5	5	325
Power Iso. Audio Comb	FL8	Short	.0036	1.0	1	255.5
	FL9	Short	.0036	1.0	2	255.5
	FL10	Short	.0036	1.0 (F1)	3	255.5
	FL11	Short	.0036	1.0 (F1)	4	255.5
	FL1	Short	.0036	1.0	5	252

Table 2

n <u>System Level FMECA Ranking</u>					
Subassembly	Part	Failure Mode	F.R. (%/1000)	System Effect Number	Criticality Ranking
RF Converter	R30	Open	.015	1.0	1
IF & Audio	T1	Open	.00565	1.0	2
	T2	Open	.00565	1.0	3
	T5	Open	.00565	1.0	4
	T6	Open	.00565	1.0	5
RF Converter	T2	Open	.00565	1.0	6
	T3	Open	.00565	1.0	7
	T4	Open	.00565	1.0	8
IF & Audio	T3	Open	.00565	.8	9
Power Isolator Audio Combiner	FL8	Short	.0036	1.0	10

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APPENDIX A
SM-265

**APPENDIX A IS ON FILE WITH ORIGINAL
MOTOROLA DOCUMENT 3875/035**

APPENDIX B
FMECA Data Sheets

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME	NO.	REV. NO
					63-P11349B				IF & Audio	PAGE 1	OF 51 PAGES
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(\alpha) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION		
C1 (Solid Tant)		Open .15 .05	Possible ripple	.9			4.4100				
		Short .85 .10	No effect	.0	.00098						
			No signal	1.0			83.3	37			
C4 (Ceramic)		Open .25 .05	F1* Degraded perf	.5	.001095		2.7375				
		Open .20 .01	F1 No effect	.0			0.00				
		.25 .01	F2** Degraded perf	.5			2.7375				
			F2 No effect	.0			0.00				
		Short .75 .75	F1 No effect	.0			0.00				
			F2 No signal	1.0			82.125	38			
C5 (Ceramic)		Open .23 .23	F1 No effect	.0	.001050		0.00				
			F2 No signal	1.0			26.25	113			
		Short .75 .75	F1 No effect	.0			0.00				
			F2 No signal	1.0			78.75	42			
C6 (Ceramic)		Open .25 .25	F1 No effect	.0	.001050		0.00				
			F2 Degraded sig	.3			7.875				
		Short .75 .75	F1 No effect	.0			0.00				
			F2 No signal	1.0			78.75	43			
C7 (Ceramic)		Open .25 .25	F1 No effect	.0	.001050		0.00				
			F2 Degraded perf	.7			18.375	135			
		Short .75 .75	F1 No effect	.0			0.00				
			F2 No signal	1.0			78.75	44			

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*F1 = Format 1

**F2 = Format 2

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME IF & Audio		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^{-5}$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^{-5}$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
C8 (Ceramic)		Open	.25	F1 No effect	.0	.001365		0.00	16		
				F2 Possible oscillation	.8			5.46			
				F2 No effect	.0			0.00			
				F1 No effect	.0			0.00			
				F2 No signal	1.0			102.375			
C9 (Ceramic)		Open	.25	F1 No effect	.0	.001050		0.00	175		
				F2 Wrong passband	.4			10.5			
				F1 No effect	.0			0.00			
				F2 No signal	1.0			78.75			
C10 (Ceramic)		Open	.25	F1 No effect	.0	.001050		0.00	160		
				F2 Degraded output	.5			13.125			
				F1 No effect	.0			0.00			
				F2 No output	1.0			78.75			
C11 (Ceramic)		Open	.25	F1 No effect	.0	.0010505		0.00	47		
				F2 Degraded output	.3			7.875			
				F1 No effect	.0			0.00			
				F2 No signal	1.0			78.75			
C12 (Ceramic)		Open	.25	F1 No effect	.0	.001050		0.00	48		
				F2 Degraded output	.3			7.875			
				F1 No effect	.0			0.00			
				F2 No signal	1.0			78.75			
C13 (Mica)		Open	.80	Possible osc	.8	.000080		0.64			
				Increased band width-mope noise	.9			5.64			
				No signal	1.0			1.20			
				No effect	.0			0.00			

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION	RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME		
				63-P11349B				IF & Audio		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE		EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY x 10 ⁵ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (α) x (E) x (Q) x 10 ⁵	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
C14 (Ceramic)		Open	.25	F1 No effect	.0	.001050		0.00	114	
			.25	F2 No signal	1.0			26.25		
		Short	.75	F1 No effect	.0			0.00		
			.75	F2 No signal	1.0			78.75		
C15 (Ceramic)		Open	.25	F1 Distorted output	.6	.001110		16.65	138	
			.25	F2 No effect	.0			0.00		
		Short	.75	F1 No signal	1.0			83.25		
			.75	F2 No effect	.0			0.00		
C16 (Ceramic)		Open	.25	F1 No effect	.0	.001050		0.00	161	
			.25	F2 Distorted output	.5			13.125		
		Short	.75	F1 No effect	.0			0.00		
			.75	F2 No signal	1.0			78.75		
C17 (Ceramic)		Open	.25	F1 No effect	.0	.001050		0.00	162	
			.25	F2 Distorted output	.5			13.125		
		Short	.75	F1 No effect	.0			0.00		
			.75	F2 No signal	1.0			78.75		
C18 (Ceramic)		Open	.25	F1 No effect	.0	.001185		0.00	29	
			.05	F2 Poss oscillation	1.0			5.925		
			.20	F2 No effect	.0			0.00		
		Short	.75	F1 No effect	.0			0.00		
C19 (Ceramic)			.75	F2 No signal	1.0	.001335		88.875	99	
		Open	.25	F1 No effect	.0			0.00		
			.25	F2 No signal	1.0			33.375		
		Short	.75	F1 No effect	.0			0.00		
C200 (Mica)			.75	F2 No signal	1.0	.000080		100.125	21	
		Open	.80	Increased noise	.7			4.48		
		Short	.15	Degraded signal	1.0			1.20		
		Drift	.05	No effect	.0			0.00		

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME	
					63-P11349B				IF & Audio	
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE	(α)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (α) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
C201 (Mica)		Open	.80	No signal	1.0	.000080		6.40		
		Short	.15	Widen bandwidth increase noise	.5			0.60		
		Drift	.05	No effect	.0			0.00		
C22 (Ceramic)		Open	.25	F1 No effect	.0	.001095		0.00	39	
			.25	F2 Little effect	.1			2.7375		
		Short	.75	F1 No effect	.0			0.00		
			.75	F2 No signal	1.0			82.125		
C23 (Ceramic)		Open	.25	F1 No effect	.0	.001050		0.00	163	
			.25	F2 Poorer inte- gration i.e. distor- tion	.5			13.125		
		Short	.75	F1 No effect	.0			0.00		
			.50	F2 No output	1.0			52.50		
			.25	F2 Distorted output	.5			13.125		
			.75							
C24 (Ceramic)		Open	.25	F1 No effect	.0	.001050		0.00	165	
			.25	F2 Poor Inte- gration i.e. distortion	.5			13.125		
		Short	.75	F1 No effect	.0			0.00		
			.50	F2 No output	1.0			52.50		
			.25	F2 Distorted	.5			13.125		
			.75							
C25 (Ceramic)		Open	.25	F1 Distorted sig	.5	.001125		14.0625	155	
			.25	F2 No effect	.0			0.00		
		Short	.75	F1 No signal	1.0			84.375		
			.75	F2 No effect	.0			0.00		
C26 (Ceramic)		Open	.25	F1 Oscillation	.7	.001365		4.7775	18	
			.20	F1 No effect	.0			0.00		
			.25	F2 No effect	.0			0.00		
		Short	.75	F1 No signal	1.0			102.375		
			.75	F2 No effect	.0			0.00		
			.75							

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME	NO.	REV. NO
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PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(\alpha) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION		
C27 (Ceramic)		Open	.25 F1 No signal	1.0	.001185		29.625	106			
			.25 F2 No effect	.0			0.00	70			
		Short	.75 F1 Distorted output	.8			71.10				
			.75 F2 Distorted output	.6			53.325			82	
C28 (Ceramic)		Open	.25 F1 No effect	.0	.001095		0.00	111			
			.25 F2 No signal	.0			27.375	87			
		Short	.75 F1 Distorted output	.6			49.275				
			.75 F2 Distorted output	.8			65.700			76	
C202 (Mica)		Open	.80 Increased noise, decreased part	.5	.000080		3.20				
		Short	.15 No signal	1.0			1.20				
		Drift	.05 No effect	.0			0.00				
C203 (Mica)		Open	.80 No signal	1.0	.000080		6.40				
		Short	.15 Decreased parts	.5			0.60				
		Drift	.05 No effect	.0			0.00				
C31 (Ceramic)		Open	.25 Decreased perf	.6	.001050		15.75	141			
		Short	.75 No signal	1.0			78.75	52			
C32 (Ceramic)		Open	.25 Decreased perf	0.5	.001050		13.125	167			
		Short	.75 No signal	1.0			78.75	53			
C204 (Mica)		Open	.80 Increased noise decreased perf	.5	.000080		3.20				
		Short	.15 No signal	1.0			1.20				
		Drift	.05 No effect	.0			0.00				
C205 (Mica)		Open	.80 No signal	1.0	.000080		6.40				
		Short	.15 Decreased perf	.5			0.60				
		Drift	.05 No effect	.0			0.00				

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME	PAGE 6 OF 51 PAGES		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION	
C206 (Mica)				Open	.80	Decreased perf	.5		3.20			
				Short	.15	No signal	1.0		.000080			1.20
				Drift	.05	No effect	.0		0.00			
C36 (Mica)				Open	.80	Decreased perf	.5		3.20			
				Short	.15	No signal	1.0		.000080			1.20
				Drift	.05	No effect	.0		0.00			
C37 (Ceramic)				Open	.20	No effect	.0		0.00			
					.03	Possible oscillation	0.8		.001365			5.46
				Short	.75	No signal	1.0		102.375			18
C207 (Mica)				Open	.80	No signal	1.0		6.40			
				Short	.15	Decreased perf	0.5		.000080			0.60
				Drift	.05	No effect	.0		0.00			
C208 (Mica)				Open	.80	Decreased perf	0.5		3.20			
				Short	.15	No signal	1.0		.000080			1.20
				Drift	.05	No effect	.0		0.00			
C209 (Mica)				Open	.80	No signal	1.0		6.40			
				Short	.15	Decreased perf	.5		.000080			0.60
				Drift	.05	No effect	0.0		0.00			
C41 (Ceramic)				Open	.20	No effect	.0		0.00			
					.05	Poss oscillation	.7		.001050			3.675
				Short	.75	No signal	1.0		78.75			54
C42 (Ceramic)				Open	.25	No signal	1.0		26.25			
				Short	.75	No signal	1.0		.001050			78.75
C43 (Ceramic)				Open	.25	Probable oscillation	.90		23.625			
				Short	.75	Degraded perf (AGC disabled)	.95		.001050			74.8125

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE 63-P11349B	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME IF & Audio		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
C44 (Ceramic)			Open	.25	Probable oscill	.90	.001050		23.625 74.8125	127 68	
			Short	.75	Degraded perf (AGC disabled)	.95					
C45 (Ceramic)			Open	.25	No signal	1.0	.001050		26.25 78.75	116 56	
			Short	.75	No signal	1.0					
C46 (Ceramic)			Open	.01	Possible osc	.8	.001065		0.852 0.00 79.875	40	
				.24	No effect	.0					
			Short	.75	No signal	1.0					
C47 (Ceramic)			Open	.25	Possible osc or deg perf	0.8	.001050		21.00 78.75	129 57	
			Short	.75	No signal	1.0					
C48 (Ceramic)			Open	.25	Probable osc or deg perf	.3	.001050		23.625 74.8125	128 69	
			Short	.75	Degraded perf (AGC disabled)	.95					
C49 (Ceramic)			Open	.25	Degraded perf	0.6	.001275		19.125 95.625	133 22	
			Short	.75	No signal	1.0					
C50 (Ceramic)			Open	.25	No effect	.0	.001365		0.00 6.825 102.375	19	
				.05	Possible osc	1.0					
			Short	.75	No signal	1.0					
C51 (Ceramic)			Open	.25	Deg perf	.2	.001050		5.25 15.75	142	
			Short	.75	Deg perf	.2					
C52 (Ceramic)			Open	.25	Deg perf responds to noise	1.0	.001905		47.625 28.575	89 108	
			Short	.75	Deg perf	.2					

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME IF & Audio	
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE (a)		EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(a) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
C53 (Ceramic)		Open	.25 .05	Oscillate	1.0			9.525		
		Short	.20 .75	Deg perf	.5	.001905		19.05	134	
				Deg perf	.5			90.4375	73	
C54 (Ceramic)		Open	.25	Decrease band- width	.3	.001125		8.4375		
		Short	.75	No signal	1.0			84.375	30	
C55 (Not used)										
C56 (Ceramic)		Open	.25 .05	Possible oscil- lation	1.0	.001050		5.25		
			.20	No effect	.0			0.00		
		Short	.75	No signal	1.0			78.75	58	
C57 (Ceramic)		Open	.25 .05	Possible oscil- lation	1.0	.001050		5.25		
			.20	No effect	1.0			78.75	59	
C58 (Ceramic)		Open	.25	No signal	1.0	.001050		26.25	117	
		Short	.75	No signal	1.0			78.75	60	
C53 (Ceramic)		Open	.25	AC on DC signal line	1.0	.001365		34.125	98	
		Short	.75	No signal	1.0			102.375	21	
C60 (Ceramic)		Open	.25 .05	Possible oscilla	.8	.001050		4.20		
			.20	No effect	.0			0.00		
		Short	.75	No signal	1.0			78.75	61	
C61 (Ceramic)		Open	.25	Degraded gain	.7	.001050		18.375	136	
		Short	.75	No signal	1.0			78.75	62	
C62 (Ceramic)		Open	.25 .05	Possible oscillation	1.0	.001050		5.25		
			.20	No effect	.0			0.00		
		Short	.75	No signal	1.0			78.75	63	

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION	RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME	
				63-P11349B				IF & Audio	
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(\alpha) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
C63 (Mica)		Open	.80 Less gain distorted output	.8	.000080		5.13		
		Short	.15 Less gain distorted output	.8	0.96				
		Drift	.05 No effect	.0	0.00				
C64 (Mica)		Open	.80 Less gain distorted output	.8	.000080		5.12		
		Short	.15 Less gain distorted output	.8	0.96				
		Drift	.05 No effect	.0	0.00				
C65 (Ceramic)		Open	.25 No signal	1.0	.001065		26.625	112	
		Short	.75 No signal	1.0	79.875		41		
C66 (Air variable)		Short	.87 Less gain distorted output	.8	.000600		41.76	91	
		Open	.13 Mildly distorted output	.3	2.34				
C67 (Ceramic)		Open	.25 Less gain distorted output	.8	.001050		21.00	130	
		Short	.75 Less gain distorted output	.8	63.00		77		
C68 (Ceramic)		Open	.25 Less gain distorted output	.8	.001050		21.00	131	
		Short	.75 Less gain distorted output	.8	63.00		78		
C69 (Glass)		Open	.80 Less gain distorted output	.8	.000060		3.84		
		Short	.05 Less gain distorted output	.8	0.24				
		Drift	.15 No effect	.0	0.00				

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE 63-P11349B	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME IF & Audio		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
C70 (Air variable) C71 (Glass)			Short	.87	Less gain distorted output	.8	.000600		41.76	91	
			Open	.13	Mildly distorted output	.3			2.34		
			Open	.80	Less gain distorted output	.8	.000060		3.84		
			Short	.05	Less gain distorted output	.8			0.24		
			Drift	.15	No effect	.0			0.00		

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME	PAGE 10 OF 51 PAGES	
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^{-5}$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^{-5}$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
C72 (Ceramic)				Open	.25	Extreme noise	1.0	.001050		26.25	118
				Short	.75	No signal	1.0			78.75	64
C73 (Ceramic)				Open	.25	Detuned discriminator	1.0	.001050		26.25	119
				Short	.75	No output	1.0			78.75	65
C74 (Not used)											
C75 (Ceramic)				Open	.25	F1 No effect	.0	.001050		0.00	120
					.25	F2 No signal	1.0			26.25	
				Short	.75	F1 No effect	.0			0.00	
					.75	F2 Widen bandwidth	.4			31.50	
C77 (Ceramic)				Open	.25	F1 Narrow bwdth decrease gain	.5	.001050		13.125	168
					.25	F2 No effect	.0			0.00	
				Short	.75	F1 Distort sig badly	.9			70.875	
					.75	F2 No effect	.0			0.00	
C78 (Ceramic)				Open	.25	F1 Narrow bwdth decrease gain	.5	.001050		13.125	169
				Short	.75	F2 No effect	.0			0.00	

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE 63-P11349B	ORIGINATOR	DATE 1/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME IF & Audio		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
C79 (Ceramic)		Open	.25	Noisy signal	1.0	.001125			28.25	109	
		Short	.75	No signal	1.0				84.375	31	
C80 (Ceramic)		Open	.25	Noisy signal	.6	.001050			15.75	143	
		Short	.75	No signal	1.0				78.75	66	
C81 (Ceramic)		Open	.25	Low gain, low signal	1.0	.001215			30.375	105	
		Short	.75	No signal	1.0				91.125	23	
C82 (Ceramic)		Open	.25	Decreased bdwth	.3	.001125			8.4375	32	
		Short	.75	No signal	1.0				84.375		
C83 (Ceramic)		Open	.25	F1 Decreased bdwth	.3	.001125			8.4375	33	
		Short	.25	F2 No effect	.0				0.00		
			.75	F1 No signal	1.0				84.375		
			.75	F2 No effect	.0				0.00		
C84 (Ceramic)		Open	.25	F1 No effect	.0	.001125			0.00	34	
		Short	.25	F2 Decreased bandwidth	.3				8.4375		
			.75	F1 No effect	.0				0.00		
			.75	F2 No signal	1.0				84.375		

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME	PAGE 12 OF 51 PAGES	NO.	REV. NO A
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION	
CR1				Open	.42 F1 No signal	1.0	.000320		13.44	158		
					.42 F2 No effect	.0			0.00			
				Short	.39 F1 No effect	.0			0.00			
					.39 F2 Fickts on	1.0			12.48			
				Drift	.19 F1 No effect	.0			0.00			
					.19 F2 No effect	.0			0.00			
CR2				Open	.42 F1 No effect	.0	.000336		0.00	154		
					.42 F2 Fickts on	1.0			14.112			
				Short	.39 F1 No effect	.0			0.00			
					.39 F2 No effect	.0			0.00			
				Drift	.19 F1 No effect	.0			0.00			
					.19 F2 No effect	.0			0.00			
CR3				Open	.42 No signal	1.0	.000320		13.44	159		
				Short	.39 Noisy signal	1.0			12.48			
				Drift	.19 No effect	.0			0.00			
CR4				Open	.42 Dist signal	.4	.000129		2.1672			
				Short	.39 Dist signal	.5			2.5155			
				Drift	.19 No effect	.0			0.00			
CR5				Open	.42 Dist signal	.5	.000129		2.7090			
				Short	.39 Dist signal	.4			2.0124			
				Drift	.19 No effect	.0			0.00			
CR6				Open	.42 Dist signal	.4	.000129		2.1672			
				Short	.39 Dist signal	.5			2.5155			
				Drift	.19 No effect	.0			0.00			
CR7				Open	.42 Dist signal	.5	.000129		2.7090			
				Short	.39 Dist signal	.4			2.0124			
				Drift	.19 No effect	.0			0.00			

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET										NO.		REV. NO	
ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME	PAGE	OF	PAGES	
					63-P11349B				IF & Audio				
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE	(α)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (α) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION			
FL1		Short (to gnd)	.7	No Signal	.0			255.50	7				
		Open (to cap)	.3	No Filtering	.5	.003650		54.75	79				
FL2		Short (to gnd)	.7	F1 No Signal	1.0	.003650		255.50	8				
			.7	F2 No Effect	.0			0.00					
		Open (to cap)	.3	F1 No Effect	.0			0.00					
			.3	F2 No Filtering	.5			54.75	80				
FL3		Short (to gnd)	.7	No Telemetry	.2	.003500		49.00	89				
		Open (to cap)	.3	No Filtering	.5			52.50	85				
FL4		Short (to gnd)	.7	No Signal	1.0	.003600		252.00	9				
		Open (to cap)	.3	No Filtering	.5			54.00	81				
FL5		Short (to gnd)	.7	No Signal	1.0	.003500		245.00	10				
		Open (to cap)	.3	No Filtering	.5			52.50	86				
J1		Short (to gnd)	.1	No Signal	1.0	.001000		10.00	176				
		Open (to sig)	.9	No Signal	1.0			90.00	24				

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET										NO.		REV. NO	
ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME	PAGE	OF	PAGES	
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(\alpha) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION		
L1 (Not Used)													
L20 (Toroid)				Short	No Signal	1.0	.002060		19.420	149			
				Open	Deg Perf	.7			124.012	11			
				Drift	No Effect	.0			0.00				
L21 (Toroid)				Short	No Signal	1.0	.002060		14.420	150			
				Open	Deg Perf	.7			124.012	12			
				Drift	No Effect	.0			0.000				
L22 (Toroid)				Short	No Signal	1.0	.002060		14.420	151			
				Open	Deg Perf	.7			124.012	13			
				Drift	No Effect	.0			0.00				
L23 (Toroid)				Short	No Signal	1.0	.002060		14.420	152			
				Open	Deg Perf	.7			124.012	14			
				Drift	No Effect	.0			0.00				
L6 (Toroid)				Short	F1 No Effect	.0	.004120		0.00				
					F2 No Signal	1.0			14.420	153			
				Open	F1 No Effect	.0			0.00				
					F2 Deg Perf	.7			124.012	15			
				Drift	F1 No Effect	.0			0.00				
					F2 No Effect	.0			0.00				

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET										NO.		REV. NO.	
ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME	PAGE	OF	PAGES	
					63-P11349B				IF & Audio				
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE	(a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(a) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION			
Q1, 2N3044		Short	.45	F1&F2 Ckts Both On	1.0	.000840		37.80	95				
		Open	.33	No Signal	1.0			27.74	110				
		Drift	.22	No Effect	0.0			0.00					
Q2, 2N2712A		Short	.45	No Signal	1.0	.000780		35.10	96				
		Open	.33	No Signal	1.0			27.74	125				
		Drift	.22	No Effect	0.0			0.00					
Q3, 2N3044		Short	.45	No Signal	1.0	.000460		20.70	132				
		Open	.33	No Signal	1.0			15.18	146				
		Drift	.22	No Effect	0.0			0.00					
Q4, 2N3044		Short	.45	No Signal	1.0	.000880		39.60	93				
		Open	.33	No Signal	1.0			29.04	107				
		Drift	.22	No Effect	0.0			0.00					
R1, Comp.		Open	.65	F1, No Effect	0.0	.000010		0.00					
			.65	F2, No Signal	1.0			0.65					
		Drift	.35	F1, No Effect	0.0			0.0					
			.35	F2, No Effect	0.0			0.0					
R2, Comp		Open	.30	F1, No Effect	0.0	.000010		0.0					
			.35	F1, No Signal	1.0			.35					
			.65	F2, No Effect	0.0			0.00					
		Drift	.35	F1, No Effect	0.0			0.00					
			.35	F2, No Effect	0.0			0.00					
R3, Comp		Open	.65	F1, No Effect	0.0	.000010		0.00					
			.65	F2, No Signal	1.0			0.65					
		Drift	.35	F1, No Effect	0.0			0.00					
			.35	F2, No Effect	0.0			0.00					

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME	NO.	REV. NO	
					63-P11349B-X3 APL-7/13/70				IF and Audio	PAGE 16	OF 51	PAGES
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(\alpha) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION			
R4, Comp.		Open .65	Wrong Band-width	0.5	.000010		0.375					
		Drift .35	Distorted Signal	0.0			0.00					
R5, Comp.		Open .65	F1, No Effect	0.0	.000010		0.00					
		.65	F2, Osc/No Sig	1.0			0.65					
		Drift .35	F1, No Effect	0.0			0.00					
		.35	F2, No Effect	0.0			0.00					
R6, Comp.		Open .65	F1, No Effect		.000010		0.00					
		.65	F2, No Signal	1.0			0.65					
		Drift .35	F1, No Effect	0.0			0.00					
		.35	F2, No Effect	0.0			0.00					
R7, Comp.		Open .65	F1, No Effect	0.0	.000010		0.00					
		.65	F2, No Signal	1.0			0.65					
		Drift .35	F1, No Effect	0.0			0.00					
		.35	F2, No Effect	0.0			0.00					
R8, Comp.		Open .65	F1, No Signal	1.0	.000010		0.00					
		.65	F2, No Effect	0.0			0.00					
		Drift .35	F1, No Effect	0.0			0.00					
		.35	F2, No Effect	0.0			0.00					
R9, Comp.		Open .65	Dist. Output	0.5	.000010		0.60					
		.65	No Output	1.0			0.00					
		Drift .35	No Effect	0.0								
R10, Comp.		Open .65	No Signal	1.0	.000010		0.65					
		Drift .35	No Effect	0.0			0.00					
R11, Comp.		Open .65	No Effect	0.0	.000010		0.00					
		Drift .35	No Effect	0.0			0.00					

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME		
					63-P11349B-X3 APL-7/13/70				IF and Audio		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(\alpha) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
R12, Comp.				Open	.65	F1, No Effect	0.0	.000010	0.00		
					.65	F2, No Signal	1.0		0.65		
				Drift	.35	F1, No Effect	0.0		0.00		
					.35	F2, No Effect	0.0		0.00		
R13, Comp.				Open	.65	F1, No Effect	0.0	.000010	0.00		
					.65	F2, No Signal	1.0		0.65		
				Drift	.35	F1, No Effect	0.0		0.00		
					.35	F2, No Effect	0.0		0.00		
R14, Not Used R15, Comp.				Open	.65	F1, No Effect	0.0	.000010	0.00		
					.65	F2, No Signal	1.0		0.65		
				Drift	.35	F1, No Effect	0.0		0.00		
					.35	F2, No Effect	0.0		0.00		
R16, Comp.				Open	.65	F1, No Effect	0.0	.000010	0.00		
					.65	F2, No Signal	1.0		0.65		
				Drift	.35	F1, No Effect	0.0		0.00		
					.35	F2, No Effect	0.0		0.00		
R17, Comp.				Open	.65	F1, No Signal	1.0	.000010	0.65		
					.65	F2, No Effect	0.0		0.00		
				Drift	.35	F1, No Effect	0.0		0.00		
					.35	F2, No Effect	0.0		0.00		
R18, Film				Short	.11	F1, Clipping	0.6	.000083	0.55		
					.11	F2, No Effect	0.0		0.00		
				Open	.78	F1, No Signal	1.0		6.48		
					.78	F2, No Effect	0.0		0.00		
				Drift	.11	F1, No Effect	0.0		0.00		
					.11	F2, No Effect	0.0		0.00		

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE 63-P11349B-X3 APL-7/13/70	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME IF and Audio	
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE	(a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(a) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
R19, Comp.		Open	.65	F1, No Signal	1.0	.000010		0.65		
			.65	F2, No Effect	0.0	0.00				
		Drift	.35	F1, No Effect	0.0	0.00				
			.35	F2, No Effect	0.0	0.00				
R20, Comp.		Open	.65	F1, No Signal	1.0	.000010		0.65		
			.65	F2, No Effect	0.0	0.00				
		Drift	.35	F1, No Effect	0.0	0.00				
			.35	F2, No Effect	0.0	0.00				
R21, Comp.		Open	.65	F1, No Signal	1.0	.000010		0.65		
			.65	F2, No Effect	0.0	0.00				
		Drift	.35	F1, No Effect	0.0	0.00				
			.35	F2, No Effect	0.0	0.00				
R22, Comp.		Open	.65	F1, Dist. Signal	0.7	.000010		0.455		
			.65	F2, No Effect	0.0	0.00				
		Drift	.35	F1, No Effect	0.0	0.00				
			.35	F2, No Effect	0.0	0.00				
R23, Comp.		Open	.65	F1, Dist. Signal	0.7	.000010		0.455		
			.65	F2, No Effect	0.0	0.00				
		Drift	.35	F1, No Effect	0.0	0.00				
			.35	F2, No Effect	0.0	0.00				
R24, Not Used										
R25, Film		Short	.11	F1, Wrong Gain	0.5	.000083		0.4565		
			.11	F2, Wrong BW						
			.11	F2, Low Signal	0.9	0.8217				
		Open	.78	F1, No Signal	1.0	6.474				
			.78	F2, No Effect	0.0	0.00				
		Drift	.11	F1, No Effect	0.0	0.00				
			.11	F2, No Effect	0.0	0.00				
			.11							

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME			
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE			FAILURE MODE	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(\alpha) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
R26, Film					Short .11 Open .78 Drift .11	Clipped Signal No Signal No Effect	1.0 1.0 0.0	.000083		0.913 6.474 0.00		
R27, Comp.					Open .65 Drift .35	No Signal No Effect	1.0 0.0	.000010		0.65 0.00		
R28, Film					Short .11 Open .78 Drift .11	Dist. Signal No Signal No Effect	0.5 1.0 0.0	.000083		0.4565 6.474 0.00		
R29, Comp.					Open .65 Drift .35	No Signal No Effect	1.0 0.0	.000010		0.65 0.00		
R30, Film					Short .11 Open .78 Drift .11	Low Signal Clipped Signal No Effect	1.0 0.6 0.0	.000083		0.913 3.8844 0.00		
R31, Comp.					Open .65 .65 Drift .35 .35	F1, No Signal F2, No Effect F1, No Effect F2, No Effect	1.0 0.0 0.0 0.0	.000010		0.65 0.00 0.00 0.00		
R32, Comp.					Open .65 Drift .35	No Signal No Effect	1.0 0.0	.000010		0.65 0.00		
R33, Comp.					Open .65 Drift .35	No Signal No Effect	1.0 0.0	.000010		0.65 0.00		

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME	NO.	REV. NO
					63-P11349B-X3 APL-7/13/70				IF and Audio	PAGE 20	OF 51 PAGES
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE (α)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY × 10 ⁻⁵ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (α) × (E) × (Q) × 10 ⁵	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION		
R34, Comp.		Open .65 Drift .35	No Signal No Effect	1.0 0.0	.000010		0.65 0.00				
R35, Comp.		Open .65 Drift .35	Dist. Signal No Effect	1.0 0.0	.000010		0.65 0.00				
R36, Comp.		Open .65 Drift .35	No Signal No Effect	1.0 0.0	.000010		0.65 0.00				
R37, Comp.		Open .65 Drift .35	No Signal No Effect	1.0 0.0	.000010		0.65 0.00				
R38, Comp.		Open .65 Drift .35	Dist. Signal No Effect	0.8 0.0	.000010		0.52 0.00				
R39, Comp.		Open .65 Drift .35	No Signal No Effect	1.0 0.0	.000010		0.65 0.00				
R40, Film		Short .11 Open .78 Drift .11	No Signal No Signal No Effect	1.0 1.0 0.0	.000083		0.913 6.474 0.00				
R41, Film		Short .11 Open .78 Drift .11 { .10 .01	No Signal No Signal No Effect Wrong Gain	1.0 1.0 0.0 0.5	.000083		0.913 6.474 0.00 0.0415				
R42, Comp.		Open .65 { .30 .35 Drift .35	No Effect Wrong Signal Respond to Noise Small Effect	0.0 1.0 0.1	.000010		0.00 0.35 0.035				

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME	NO.	REV. NO.
					63-P11349B-X3 APL-7/13/70				IF and Audio	PAGE 21 OF 51	PAGES
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION		
R43, Not Used											
R44, Film		Short .11 Open .78 { .40 .38	Low Signal No Effect Incr LF Gain/ may resp to noise	1.0 0.0 1.0	.000083		0.913 0.00 3.154				
R45, Film		Drift .11	No Effect	0.0			0.00				
		Short .11 Open .78 { .18 .60	Low Signal No Effect Incr Gain/Osc/ may resp to noise	1.0 0.0 1.0	.000083		0.913 0.00 4.98				
		Drift .11	No Effect	0.0			0.00				
R46, Comp.		Open .65 Drift .35	No Signal No Effect	1.0 0.0	.000010		0.65 0.00				
R47, Film		Short .11 Open .78 Drift .11	No Signal No Signal No Effect	1.0 1.0 0.0	.000083		0.913 6.474 0.00				
R48, Film		Short .11 Open .78 Drift .11	No Signal No Signal No Effect	1.0 1.0 0.0	.000083		0.913 6.474 0.00				
R49, Film		Short .11 Open .78 Drift .11	No Signal No Signal No Effect	1.0 1.0 0.0	.000083		0.913 6.474 0.00				

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME	PAGE 22 OF 51 PAGES	
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
R50, Film				Short	.11	No Signal	1.0	.000083	0.913		
				Open	.78	No Signal	1.0		6.474		
				Drift	.11	No Effect	0.0		0.00		
R51, Film				Short	.11	Noisy Output Probable	1.0	.000083	0.913		
				Open	.78	No Signal	1.0		6.474		
				Drift	.11	No Effect	0.0		0.00		
R52, Film				Short	.11	No Signal	1.0	.000083	0.913		
				Open	.78	Noisy Signal	1.0		6.474		
				Drift	.11	No Effect	0.0		0.00		
R53, Comp.				Open	.65	No Sig to TLM	0.2	.000010	0.13		
				Drift	.35	No Effect	0.0		0.00		
R54, Comp.				Open	.65	No Signal	1.0	.000010	0.65		
				Drift	.35	No Effect	0.0		0.00		
R55, Film				Short	.11	F1, No Effect	0.0	.000083	0.00		
					.11	F2, Noisy Sig.	0.5		.4565		
					.78	F1, No Effect	0.0		0.00		
				Open	.78	F2, No Signal	1.0		6.474		
					.11	F1, No Effect	0.0		0.00		
				Drift	.11	F2, No Effect	0.0				
R56, Film				Short	.11	F1, No Effect	0.0	.000083	0.00		
					.11	F2, Noisy Sig.	0.5		.4565		
				Open	.78	F1, No Effect	0.0		0.00		
					.78	F2, No Signal	1.0		6.474		
				Drift	.11	F1, No Effect	0.0		0.00		
					.11	F2, No Effect	0.0				

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME IF and Audio			
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE			FAILURE MODE (α)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (α) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
R57, Comp.					Open .65 Drift .35	No Signal No Effect	1.0 0.0	.000010		0.65 0.00		
R58, Film					Open .78 Drift .11 Drift .11 Short .11	Low Signal/ Distortion No Effect Low Signal/ Distortion	0.5 0.0 0.0 .5	.000083		3.237 0.00 0.00 .4565		
R59, Film					Open .78 Drift .11 Short .11	Low Signal/ Distortion No Effect Low Signal/ Distortion	0.5 0.0 .5	.000083		3.237 0.00 .4565		
R60, Film					Short .11 Open .78 { .18 .60	Low Signal No Effect Incr Gain/Osc/ may resp to noise	0.5 0.0 1.0	.000083		0.4565 0.00 4.98		
					Drift .11	No Effect	0.0			0.00		
R61, Comp.					Open .65 Drift .35	No Effect No Effect	0.0 0.0	.000010		0.00 0.00		
R62, Comp.					Open .65 .65 Drift .35 .35	F1, No Effect F2, No Signal F1, No Effect F2, No Effect	0.0 1.0 0.0	.000010		0.00 0.65 0.00 0.00		
R63, Film					Short .11 .11 Open .78 .78 Drift .11 .11	F1, No Effect F2, Wrong BW F1, No Effect F2, No Signal F1, No Effect F2, No Effect	0.0 0.5 0.0 1.0 0.0 0.0	.000083		0.00 0.4565 0.00 6.474 0.00 0.00		

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/3/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME	PAGE	OF	PAGES
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION	
R65, Comp				Open	.65	No Effect	1.0		0.65			
				Drift	.35		0.0		0.00			
R66, Comp				Open	.65		1.0		0.65			
				Drift	.35		0.0		0.00			
R67, Comp				Open	.65	No Signal	1.0		0.65			
				Drift	.35		0.0		0.00			
R68, Comp				Open	.65	Low Signal	0.9		0.585			
				Drift	.35		0.0		0.00			
R69, Comp				Open	.65		0.7		0.455			
					.65		0.0		0.00			
				Drift	.35		0.0		0.00			
					.35		0.0		0.00			

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME	NO.	REV. NO	
										PAGE	OF	PAGES
										IF and Audio		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE	(a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^{-5}$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^{-5}$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION		
U1, MC159		Short	.25	No Signal	1.0	.000507		12.567	170			
		Open	.30	No Signal	1.0			15.21	144			
		Drift	.45	No Effect	0.0			0.00				
U2, MC159		Short	.25	No Signal	1.0	.000507		12.675	171			
		Open	.30	No Signal	1.0			15.21	145			
		Drift	.45	No Effect	0.0			0.00				
U3, MC159		Short	.25	No Signal	1.0	.000578		14.45	149			
		Open	.30	No Signal	1.0			17.34	137			
		Drift	.45	No Effect	0.0			0.00				
U4, MC236		Short	.25	No Signal	1.0	.000546		13.65	156			
		Open	.30	No Signal	1.0			16.38	139			
		Drift	.45	No Effect	0.0			0.00				
U5, MC159		Short	.25	No Signal	1.0	.000546		13.65	157			
		Open	.30	No Signal	1.0			16.38	140			
		Drift	.45	No Effect	0.0			0.00				

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET										NO. _____ REV. NO. _____	
ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	PAGE _____ OF _____ PAGES		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (α)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^{-5}$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (α) \times (E) \times (Q) $\times 10^{-5}$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
T1, Toroid				Short	.15	No Signal	1.0	.003650	84.75	25	
				Open	.80	No Signal	1.0		452.00	1	
				Drift	.05	No Effect	0.0		0.00		
T2, Toroid				Short	.15	No Signal	1.0	.005650	84.75	26	
				Open	.80	No Signal	1.0		452.00	2	
				Drift	.05	No Effect	0.0		0.00	2	
T3, Toroid				Short	.15	Degraded Sig.	0.8	.005650	67.80	74	
				Open	.80	Degraded Sig.	0.8		361.60	5	
				Drift	.05	No Effect	0.0		0.00		
T4, Toroid				Short	.15	Degraded Sig.	0.8	.005650	67.80	75	
				Open	.80	Degraded Sig.	0.8		361.60	6	
				Drift	.05	No Effect	0.0		0.00		
T20, Toroid				Short	.15	No Signal	1.0	.005650	84.75	27	
				Open	.80	No Signal	1.0		452.00	3	
				Drift	.05	No Effect	0.0		0.00		
T6, Toroid				Short	.15	No Signal	1.0	.005650	84.75	28	
				Open	.80	No Signal	1.0		452.00	4	
				Drift	.05	Degraded Sig.	0.1		2.825		
VR1, IN755A				Short	.39	No Signal	1.0	.000415	16.185		
				Open	.21	No Effect	0.0		0.00		
					.21	No Signal	1.0		8.715		
				Drift	.19	No Effect	0.0		0.00		

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME	NO.	REV. NO	
										PAGE	OF	PAGES
					63-P11349B				IF and Audio			
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE	(α)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (α) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION		
AR1, μ A715		Open	.30	F1 No Effect	0.0	.001536		0.00	90			
			.30	F2 No Signal	1.0			46.08				
		Short	.25	F1 No Effect	0.0			0.00				
			.25	F2 No Signal	1.0			38.40	94			
		Drift	.45	F1 No Effect	0.0			0.00				
			.45	F2 No Effect	0.0			0.00				
AR2, SC4057		Open	.30	F1 No Effect	0.0	.000486		0.00				
			.30	F2 No Signal	1.0			14.58	147			
		Short	.25	F1 No Effect	0.0			0.00				
			.25	F2 No Signal	1.0			12.15	174			
		Drift	.45	F1 No Effect	0.0			0.00				
			.45	F2 No Effect	0.0			0.00				
AR3, μ A741		Open	.30	F1 No Signal	1.0	.001040		31.20				
			.30	F2 No Effect	0.0			0.00	101			
		Short	.25	F1 No Signal	1.0			26.00	121			
			.25	F2 No Effect	0.0			0.00				
		Drift	.45	F1 No Effect	0.0			0.00				
			.45	F2 No Effect	0.0			0.00				
AR4, μ A741		Open	.30	No Signal	1.0	.001040		31.20	102			
		Short	.25	No Signal	1.0			26.00	122			
		Drift	.45	No Effect	0.0			0.00				

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET										NO.	REV. NO
											A
ASSY FAILURE DESCRIPTION	RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME	PAGE	OF	PAGES
											IF & Audio
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION	
AR5 (μ A741)			Open .30 Short .25 Drift .45	No Signal No Signal No Effect	1.0 1.0 0.0	.001040		01.28 26.00 0.00	103 123		
AR6 (μ A741)			Open .30 Short .25 Drift .45	No Signal No Signal No Effect	1.0 1.0 0.0	.001040		31.20 26.00 0.00	104 124		

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME	PAGE	OF	PAGES
					63-P11349B		20 Nov 70		IF & Audio			
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^{-5}$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^{-5}$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION			
CR9, IN3064		Open .42	Loss of Sig. Level TLM	.2	.000320		2.688					
		Short .39	Change in Sig. Level of TLM	.5			6.240					
		Drift .19	No Effect	0.0			0.000					
Q5, 2N2222A		Open .45	No Signal	.0	.000780		35.100	97				
		Short .33	Increased Ripple	.4			10.296					
		Drift .22	No Effect	0.0			0.00					
R14, Comp		Open .65	No Signal	1.0	.00001		.65					
		Drift .35	No Effect	0.0			0.0					
R24, Comp		Open .65	No Signal	1.0	.00001		.65					
		Drift .35	No Effect	0.0			0.0					
R64, Comp		Open .65	Change in Sig. Level of TLM	.2	.00001		0.0					
		Drift .35	No Effect	0.0			0.0					
R70, Comp		Open .65	Low Signal	.5	.00001		.325					
		Drift .35	No Effect	0.0			0.000					
R71, Comp		Open .65	F1 No Effect	.0	.00001		0.0					
			F2 No Signal	1.0			.65					
		Drift .35	F1 No Effect	0.0	.00001		0.0					
			F2 No Effect	0.0								

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME		
					63-P11349B		20 Nov 70		IF & Audio		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (α)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (α) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
R72, Comp				Open	Reduced Sensitivity	.2	.00001		0.013		
				Drift	No Effect	.0	0.0				
				Open	Reduced Sensitivity	.2	.00001		0.013		
				Drift	No Effect	.0	0.0				
R73, Comp											

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME	NO.	REV. NO A	PAGE	OF	PAGES
					63-P11377B				RF Converter					
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE (α)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (α) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION					
C1, Cap, End		Short Open Drift	Low Signal No Signal No Effect	0.5 1.0 0.0	.000080		0.60 6.40 0.00							
C2, Fxd. Mica		Short Open Drift	No Signal No Signal No Effect	1.0 1.0 0.0	.000080		1.20 6.40 0.00							
C3, Var. Air		Short Open	No Signal No Signal	1.0 1.0	.000600		52.20 7.80	53						
Cr, Fxd Mica		Short Open Drift	No Signal No Signal No Effect	1.0 1.0 0.0	.000080		1.20 6.40 0.00							
C5, Fxd. Cer.		Short Open	No Signal Low Signal	1.0 0.5	.001050		78.75 13.125	29 83						
C6, Fxd. Cer.		Short Open	No Signal No Signal	1.0 1.0	.001050		78.75 6.25	30 61						
C7, Fxd. Cer.		Short Open	No Signal Low Signal	1.0 0.5	.001050		78.75 13.125	31 84						
C8, Fxd. Mica		Short Open Drift	No Signal No Signal No Signal	1.0 1.0 0.0	.000080		1.20 6.40 0.00							

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME	PAGE	OF	PAGES
					63-P11317B				RF Converter			
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE	(a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION		
C9, Cap, Fxd. Cer.		Short	.75	No Signal	1.0	.001050		78.75	32			
		Open	.25	Low Signal	0.5			13.125	84			
C10, Fxd. Cer.		Short	.70	No Signal	1.0	.001050		78.75	33			
		Open	.25	No Signal	1.0			26.25	62			
C11, Fxd. Cer.		Short	.75	No Signal	1.0	.001000		78.75	34			
		Open	.25	Low Signal	0.5			13.125	86			
C12, Fxd. Mica		Short		No Signal	1.0	.000080		1.20				
		Open	.80	No Signal	1.0			6.40				
		Drift	.05	No Effect	0.0			0.00				
C13, Fxd. Cer.		Short	.75	No Signal	1.0	.001050		78.75	34			
		Open		Low Signal	0.5			13.125	87			
C14, Fxd. Cer.		Short		No Signal	1.0	.001050		78.75	36			
		Open	.03	No Signal	1.0			3.15				
			.22	No Effect	0.0			0.00				
C15, Fxd. Cer.		Short	.75	No Signal	1.0	.001050		78.75	37			
		Open	.25	No Signal	1.0			26.25	63			
C16, Fxd. Cer			.72	No Signal	1.0	.001050		78.75	68			
		Open		Low Signal	0.5			26.25	64			
C17, Fxd. Cer.		Short	.75	No Signal	1.0	.001050		78.75	39			
		Open	.25		1.0			26.25	65			
C18, Var. Air		Short		No Signal	1.0	.000600		52.20	54			
		Open		No Signal	1.0			0.00				
C19, Fx. Glass		Short	.05	Low Signal	0.5	.000060		0.15				
		Open		No Signal	1.0			4.80				
		Drift	.15	No Effect	0.0			0.00				

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME	PAGE	OF	PAGES
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION	
C20, Cap, Var. Air		Short	.87	No Signal	1.0	.000600		52.20	55			
		Open	.13	No Signal	1.0			7.80				
C21, Fxd. Mica		Short			1.0	.000080		1.20				
		Open			0.5			3.20				
		Drift		No Effect	0.0			0.00				
C22, Fxd. Cer.		Short			1.0			78.75	40			
		Open	.25		2.5			13.125	88			
C23, Fxd. Glass		Short	.05	No Signal	0.5	.000060		0.15				
		Open			1.0			4.80				
		Drift	.15		0.0			0.00				
C24, Var. Air		Short			1.0	.000600		52.20	56			
		Open			1.0			7.80				
C23, Fxd. Cer.		Short			1.0	.001050		78.75	41			
		Open			1.0			26.25	66			
C26, Fxd. Cer.					1.0	.001050		78.75	42			
					0.5			13.125	89			
C28, Fxd. Glass					1.0	.000060		0.30				
					1.0			4.80				
					0.0			0.00				
C30, Fxd. Cer.		Short	.70		1.0	.001050		78.75	43			
		Open	.08		1.0			3.15				
			.22	No Effect	0.0			0.00				
C31, Fxd. Cer.		Short		No Signal	1.0	.001050		78.75	44			
		Open		Low Signal	0.5			13.125	90			

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET										NO. _____ REV. NO. A	
ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME	PAGE _____ OF _____ PAGES	
					-P11377B				RF Converter		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(a) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION		
C32, Cap, Fxd. Cer.		Short .75 Open .25	No Signal No Signal	1.0 1.0	.001050		78.75 26.25	45 67			
C33, Fxd. Cer.		Short Open		1.0 0.5	.001050		78.75 13.125	46 91			
C34, Fxd. Cer		Short .75 Open .25		1.0 0.5	.001050		78.75 13.125	47 92			
C35, Fxd. Mica		Short .15 Open .00 Drift .05		1. 0. 0.0	.000080		1.20 3.20 0.00				
C36, Fxd. Cer.		Short .25	No Signal No Signal	1. 1.5	.001050		78.75 13.125	48 93			
C37, Fxd. Glass			No Signal No Signal No Effect	1.0 1.0 0.0	.000060		0.30 4.80 0.00				
C38, Fxd. Cer.		Short .75	No Signal No Signal	1.0 1.0	.001050		78.75 26.25	49 68			
C39, Fxd. Mica		Short .15 Open .80 Drift .05	No Signal No Signal No Effect	1.0 1.0 0.0	.000080		1.20 6.40 0.00				
C40, Fxd. Mica		Short .13 .86	No Signal No Signal No Effect	1.0 1.0 0.0	.000080		1.20 6.40 0.00				
C41, Fxd. Mica		Short Open Drift	No Signal No Signal No Effect	1.0 1.0 0.0	.000080		1.20 6.40 0.00				

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME	NO.	REV. NO.
					63-P11377B		11-20-70		RF Converter	PAGE	OF PAGES
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE (α)		EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (α) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION	
C42, Ceramic		Short .75 Open .25		No Signal Low Signal	1.0 .5	.00105		75.75 13.125			

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ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME	PAGE	OF	PAGES
					63-P11377B-X3 APL-13 July 1970				RF Converter			
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE (α)		EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (α) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION		
R1, Res, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65				
		Drift	.35	No Effect	0.0			0.00				
R2, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65				
		Drift	.35	No Effect	0.0			0.00				
R3, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65				
		Drift	.35	No Effect	0.0			0.00				
R4, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65				
		Drift	.35	No Effect	0.0			0.00				
R5, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65				
		Drift	.35	No Effect	0.0			0.00				
R6, Fxd Comp		Open	.65	Low Signal	0.5	.000010		0.325				
		Drift	.35	No Effect	0.0			0.00				
R7, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65				
		Drift	.35	No Effect	0.0			0.00				
R8, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65				
		Drift	.35	No Effect	0.0			0.00				
R9, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65				
		Drift	.35	No Effect	0.0			0.00				
R10, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65				
		Drift	.35	No Effect	0.0			0.00				
R11, Fxd Comp		Open	.65	Low Signal	0.5	.000010		0.325				
		Drift	.35	No Effect	0.0			0.00				
R12, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65				
		Drift	.35	No Effect	0.0			0.00				
R13, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65				
		Drift	.35	No Effect	0.0			0.00				

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE 63-P11377B-X3 APL-13 July 1970	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME	
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE	(a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^{-5}$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(a) \times (E) \times (Q) \times 10^{-5}$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
R14, Res, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65		
		Drift	.35	No Effect	0.0			0.00		
R15, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65		
		Drift	.35	No Effect	0.0			0.00		
R16, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65		
		Drift	.35	No Effect	0.0			0.00		
R17, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65		
		Drift	.35	No Effect	0.0			0.00		
R18, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65		
		Drift	.35	No Effect	0.0			0.00		
R19, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65		
		Drift	.35	No Effect	0.0			0.00		
R20, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65		
		Drift	.35	No Effect	0.0			0.00		
R21, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65		
		Drift	.35	No Effect	0.0			0.00		
R22, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65		
		Drift	.35	No Effect	0.0			0.00		
R23, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65		
		Drift	.35	No Effect	0.0			0.00		
R24, Fxd Comp		Open	.65	Low Signal	0.5	.000010		0.325		
		Drift	.35	No Effect	0.0			0.00		
R25, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65		
		Drift	.35	No Effect	0.0			0.00		

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME	PAGE	OF	PAGES
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(a) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION	
R26, Res, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65				
		Drift	.35	No Effect	0.0			0.00				
R27, Not Used												
R28, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65				
		Drift	.35	No Signal	0.0			0.00				
R29, Fxd Comp		Open	.05	No Signal	1.0	.000010		0.65				
		Drift	.35	No Effect	0.0			0.00				
R30, Thermistor		Open	.50	No Signal	1.0	.015000		750.00	1			
		Drift	.50	Low Signal	0.5			325.00	5			
R31, Res, Fxd Comp		Open	.65		0.5	.000010		0.325				
		Drift	.35		0.0			0.00				
R32, Fxd Comp		Open	.65	No Signal	1.0	.000010		0.65				
		Drift	.35	No Effect	0.0			0.00				
R33, Fxd, Comp		Open	.65	Low Signal	.5	.00001		3.25				
		Drift	.35	No Effect	0.0			0.0				
R40, Fxd, Comp		Open	.65	No Signal	1.0	.000010		0.65				
		Drift	.35	No Effect	0.0			0.00				

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET										NO. _____		REV. NO. _____ A	
ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME	PAGE	OF	PAGES	
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION		
L1, Coil, RF, Phenolic		Open	1.0	No Signal	1.0	.002060		206.00	15				
L2, RF, Iron		Short	.07	No Signal	1.0	.002825		19.775	71				
		Open	.86	No Signal	1.0			242.94	8				
		Drift	.07	No Effect	0.0			0.00					
L3, RF, Phen.		Open	1.0	No Signal	1.0	.002060		206.00	16				
L4, RF, Phen.		Open	1.0	No Signal	1.0	.002060		206.00	17				
L5, RF, Iron		Short	.07	No Signal	1.0	.002825		19.775	72				
		Open	.86	No Signal	1.0			242.95	9				
		Drift	.07	No Effect	0.0			0.00					
L6, RF, Phen.		Open	1.0	No Signal	1.0	.002060		206.00	18				
L7, RF, Iron		Short	.07	No Signal	1.0	.002825		19.775	73				
		Open	.86	No Signal	1.0			242.95	10				
		Drift	.07	No Effect	0.0			0.00					
L8, Not Used													
L9, Coil, RF, Iron		Short	.07	No Signal	1.0	.002825		19.775	74				
		Open	.86	No Signal	1.0			242.95	11				
		Drift	.07	No Effect	0.0			0.00					
L10, RF, Iron		Short	.07	No Signal	1.0	.002825		19.775	75				
		Open	.86	No Signal	1.0			242.95	12				
		Drift	.07	No Effect	0.0			0.00					
L11, RF, Phen.		Open	1.0	No Signal	1.0	.002060		206.00	19				
L12, RF, Iron		Short	.07	No Signal	1.0	.002825		19.775	76				
		Open	.86	No Signal	1.0			242.95	13				
		Drift	.07	No Effect	0.0			0.00					
L13, RF, Phen.		Open	1.0	No Signal	1.0	.002060		206.00	20				
L14, RF, Phen.		Open	1.0	No Signal	1.0	.002060		206.00	21				

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE	INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME	
					63-F11377B		7/31/70	20 Nov 70		RF Converter	
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (α)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (α) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
L15, Coil, RF, Iron				Short .07	Low Signal	0.3	.002060		4.326	50	
				Open .86	Low Signal	0.3			59.74		
				Drift .07	No Effect	0.0			0.00		
L16, RF, Phen.				Open 1.0	No Signal	1.0	.002060		206.00	22	
L17, RF, Phen.				Open 1.0	No Signal	1.0	.002060		206.00	23	
L18, RF, Iron				Short .07	No Signal	1.0	.002825		19.775	77	
				Open .86	No Signal	1.0			242.95	14	
				Drift .07	No Effect	0.0			0.00		
L19, RF, Air				Open 1.0	No Signal	1.0	.002825		282.50	6	
L20, Not Used											

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE 63-P11377B-X3 APL-13 July 1970	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME RF Converter	NO.	REV. NO
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
T1, Not Used											
T2, Transformer, RF, Fxd				Short	.15	No Signal	1.0	.005650	84.75	26	
				Open	.80	No Signal	1.0		452.00	2	
				Drift	.05	No Effect	0.0		0.00		
T3, RF, Fxd				Short	.15	No Signal	1.0	.005650	84.75	26	
				Open	.80	No Signal	1.0		452.00	3	
				Drift	.05	No Effect	0.0		0.00		
T4, RF, Fxd				Short	.15	No Signal	1.0	.005650	84.75	26	
				Open	.80	No Signal	1.0		452.00	4	
				Drift	.05	No Effect	0.0		0.00		

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

NO.		REV. NO							
		A							
PAGE		OF		PAGES					
ASSY FAILURE DESCRIPTION	RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov 70	SUBSYSTEM NAME	ASSEMBLY NAME	
				63-P11377B				Converter, RF	
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(\alpha) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
CR1, Diode, Step, Rec		Short .11 Open .15 Drift .74	No Signal No Signal No Effect	1.0 1.0 0.0	.000052		0.572 0.78 0.00		
CR2, Diode, Mixer		Short .11 Open .15 Drift .74	No Signal No Signal No Effect	1.0 1.0 0.0	.000044		2.684 3.660 0.00		
CR3, Diode, Mixer		Short .11 Open .15 Drift .74	No Signal No Signal No Effect	1.0 1.0 0.0	.000244		2.684 3.660 0.00		
CR4, Diode,		Short .09 Open Drift		0.5 1.0 0.0	.000320		6.24 13.44 0.00	82	
Q1, Transistor		Short Open Drift	No Signal No Signal No Effect	1.0 1.0 0.0	.000994		44.73 32.802 0.00	57 60	
Q2, Transistor		Short Open Drift	No Signal No Signal No Effect	1.0 1.0 0.0	.000522		23.49 17.226 0.00	69 78	
Q3, Transistor		Short Open Drift	No Signal No Signal No Effect	1.0 1.0 0.0	.000507		22.815 16.731 0.00	70 79	
Q4, Transistor		Short Open Drift	No Signal No Signal No Effect	1.0 1.0 0.0	.001210		54.45 39.93 0.00	52 58	

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME	PAGE	REV. NO	PAGES
					63-P11377B-X3 APL-13 July 1970				RF Converter			
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(\alpha) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION			
Q5, Transistor		Short	No Signal	1.0	.000368		16.56	82				
		Open	No Signal	1.0	12.144		98					
		Drift	No Effect	0.0	0.00							
Q6, Transistor		Short	No Signal	1.0	.000368		16.56	83				
		Open	No Signal	1.0	12.144		99					
		Drift	No Effect	0.0	0.00							
U1, Not Used												
U2, Integrated Circuit		Short	No Signal	1.0	.000387		9.675	100				
		Open	No Signal	1.0	11.61							
		Drift	No Effect	0.0	0.00							
U3, Integrated Circuit		Short	No Signal	1.0	.000387		9.675	101				
		Open	No Signal	1.0	11.61							
		Drift	No Effect	0.0	0.00							
Y1, Crystal, Quartz		Short	No Signal	1.0	.000500		5.50	61				
		Open	No Signal	1.0	33.50							
		Drift	No Effect	0.0	0.00							
FL1, Filter, RFI		Short	No Signal	1.0	.003700		259.00	7				
		Open	Low S/N	0.5	55.00		53					
J1, Conn., RF		Open	No Signal	1.0	.001000		100.00	24				
J2, Conn., RF		Open	No Signal	1.0	.001000		100.00	25				

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME	PAGE	OF	PAGES
					63-P11356B-X3 APL-13 July 1970				Audio Combiner Power Isolator			
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE	(a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(a) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION		
C1, Cap, Fxd, Solid Tant.		Short	.85	No A Supply Volt.	1.0	.000980		83.30 1.47	16			
		Open	.15	A Rcvr. Ripple	0.1							
C2, Cap, Fxd, Solid Tant		Short	.85	No B Supply Volt.	1.0	.000980		83.30 1.47	17			
		Open	.15	B Rcvr. Ripple	0.1							
C3, Cap, Fxd, Ceramic		Short	.75	Loss of DC Isol. at Aud. A Output	0.1	.001050		7.875 13.125	39			
		Open	.25	No Audio A	0.5							
C4, Cap, Fxd, Ceramic		Short	.75	Loss of DC Isol. at selected Output	0.1	.001050		7.875 13.125	40			
		Open	.25	No Part Redund	0.5							
C5, Cap, Fxd, Ceramic		Short	.75	Loss of DC Isol.	0.1	.001050		7.875 13.125	41			
		Open	.25	No Part Redund	0.5							
C6, Cap, Fxd, Ceramic		Short	.75	Loss of DC Isol.	0.1	.001050		7.875 13.125	42			
		Open	.25	No Audio B	0.5							
C7, Cap, Fxd, Wet Slug		Short	.10	No A Supply Volt.	1.0	.010500		10.50 9.45	49			
		Open	.90	A Revr. Ripple	0.1							
C8, Cap, Fxd, Wet Slug		Short	.10	No B Supply Volt.	1.0	.010500		10.50 9.45	50			
		Open	.90	B Revr. Ripple	0.1							

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME	PAGES
					63-P11356B-X3 APL - 13 July 1970				Audio Combiner Power Isolator	42 OF 51
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(\alpha) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION	
R1, Res, FxD, Comp.		Open .65 Drift .35	No A Supply Volt No Effect	1.0 0.0	.000010		0.65 0.00			
R2, Res, FxD, Comp.		Open .65 Drift .35	A Revr. Ripple No Effect	0.1 0.0	.000010		0.65 0.00			
R3, Res, FxD, Comp.		Open .65 Drift .35	B Revr. Ripple No Effect	0.1 0.0	.000010		0.65 0.00			
R4, Res, FxD, Comp.		Open .65 Drift .35	No B Supply Volt No Effect	1.0 0.0	.000010		0.65 0.00			
R5, Res, FxD, Comp.		Open .65 Drift .35	A Revr. Only At Selected Out- put No Effect	0.5 0.0	.000010		0.325 0.00			
R6, Res, FxD, Comp.		Open .65 Drift .35	Simult. Aud. Output No Effect	0.2 0.0	.000010		0.13 0.00			
R7, Res, FxD, Comp.		Open .65 Drift .35	No B Supply Reg. No Effect	0.2 0.0	.000010		0.13 0.00			
R8, Res, FxD, Comp.		Open .65 Drift .35	No A Supply Reg. No Effects	0.2 0.0	.000010		0.13 0.00			
R9, Res, FxD, Comp.		Open .65 Drift .35	No 1 KHZ BTLM No Effect	0.2 0.0	.000010		0.13 0.00			
R10, Res, FxD, Comp.		Open .65 Drift .35	No 11 Volt BTLM No Effect	0.2 0.0	.000010		0.13 0.00			
R11, Res, FxD, Comp.		Open .65 Drift .35	No N Volt B TLM No Effect	0.2 0.0	.000010		0.13 0.00			
R12, Res, FxD, Comp.		Open .65 Drift .35	No Temp TLM No Effect	0.2 0.0	.000010		0.13 0.00			

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE 63-P11356B-X3 APL - 13 July 1970	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME Audio Combiner Power Isolator		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(a) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
R13, Thermistor				Open .50 Drift .50	No Temp TLM No Effect	0.2 0.0	.015000		150.00 0.00	10	

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME	PAGES	
					63-P11356 B-X3 APL-13 July 1970				Audio Combiner Power Isolator	43	51
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(\alpha) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION		
R14, Res, FxD, Comp		Open .65	No Part Redundancy	0.5			0.325				
		Drift .35	No Effects	0.0	.000010	R15, Q6	0.00				
R15, Res, FxD, Comp		Open .65	No Part Redundancy	0.5	.000010	R14, Q8	0.325				
		Drift .35	No Effect	0.0			0.00				
R16, Res, FxD, Comp		Open .65	A Revr. At Selected Output	0.5			0.325				
		Drift .35	No Effect	0.0	.000010		0.00				
R17, Res, FxD, Comp		Open .65	No 1 KHz A TLM	0.2			0.13				
		Drift .35	No Effect	0.0	.000010		0.00				
R18, Res, FxD, Comp		Open .65	No 1 KHz A TLM	0.2			0.13				
		Drift .35	No Effect	0.0	.000010		0.00				
R19, Res, FxD, Comp		Open .65	No 1 KHz B TLM	0.2			0.13				
		Drift .35	No Effect	0.0	.000010		0.00				
R20, Res, FxD, Comp		SEE RF COUPLER									
R21, Res, FxD, Comp		Open .65	No Part Redndcy	0.5			0.325				
		Drift .35	No Effect	0.0	.000010	R24	0.00				
R22, Res, FxD, Comp		Open .65	No 11volt A TLM	0.2			0.13				
		Drift .35	No Effect	0.0	.000010		0.00				
R23, Res, FxD, Comp		Open .65	No 11volt A TLM	0.2			0.13				
		Drift .35	No Effect	0.0	.000010		0.00				
R24, Res, FxD, Comp		Open .65	No Part Redndcy	0.5			0.325				
		Drift .35	No Effect	0.0	.000010	R21	0.00				
R25, Res, FxD, Comp		Open .65	No A Supply Volt.	1.0			0.65				
		Drift .35	No Effect	0.0	.000010		0.00				
R26, Res, FxD, Comp		Open .65	No A Supply Volt.	1.0			0.65				
		Drift .35	No Effect	0.0	.000010		0.00				

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE 63-P11356 B-X3 APL-13 July 1970	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME Audio Combiner Power Isolator		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
R27, Res, FxD, Comp				Open	.65 No B Supply Volt	1.0			0.65		
				Drift	.35 No Effect	0.0	.000010		0.00		
R28, Res, FxD, Comp				Open	.65 No B Supply Volt	1.0			0.65		
				Drift	.35 No Effect	0.0	.000010		0.00		

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE 63-P11356B-X3 APL-13 July 1970	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME Audio Combiner Power Isolator
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
L1, Coil, RF, Phenolic		Open	1.0 No A Supply Volt	1.0	.002060		206.00	8	
L2, Coil, RF, Phenolic		Open	1.0 No B Supply Volt	1.0	.002060		206.00	9	

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME	PAGE 46 OF 51 PAGES	
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(\alpha) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
Q1, Transistor	Short	.45	No A Supply Reg	0.3	.000890		12.015	43			
	Open	.33	No A Supply Volt	1.0							
	Drift	.22	No Effect	0.0							
Q2, Transistor	Short	.45	No B Supply Reg	0.3	.000890		12.015	44			
	Open	.33	No B Supply Volt	1.0							
	Drift	.22	No Effect	0.0							
Q3, Transistor	Short	.45	Simult. Avd. Output	0.2	.000950		8.55	38			
	Open	.33	A Revr. only	0.5							
	Drift	.22	No Effect	0.0							
Q4, Transistor	Short	.45	No B Supply Volt	1.0	.001140		51.30	26			
	Open	.33	No B Supply Reg.	0.3							
	Drift	.22	No Effect	0.0							
Q5, Transistor	Short	.45	No A Supply Volt	1.0	.001140		51.30	27			
	Open	.33	No A Supply Reg.	0.3							
	Drift	.22	No Effect	0.0							
Q6, Transistor	Short	.45	No Effect	0.0	.000566	Q8	0.00				
	Open	.33	No Part Redndcy	0.0							
	Drift	.22	No Effect	0.0							
Q7, Transistor	Short	.45	Simult. Avd. Output	0.2	.000566		5.094	46			
	Open	.33	A Revr. Only	0.5							
	Drift	.22	No Effect	0.0							

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME	NO.	REV. NO
					63-P11356B-X3 APL-13 July 1970				Audio Combiner Power Isolator	PAGE 47	OF 51 PAGES
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE	(a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(a) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION	
Q8, Transistor		Short	.45	No Effect	0.0						
		Open	.33	No Part Redundancy	0.5	.000566	Q6	0.00 9.339			
		Drift	.22	No Effect	0.0			0.00			
Q9, Transistor		Short	.45	No A Supply	1.0	.000597		26.865	33		
		Open	.33	No A Supply	0.3			5.9103			
		Drift	.22	No Effect	0.0			0.00			
Q10, Transistor		Short	.45	No B Supply	1.0	.000597		26.865	34		
		Open	.33	No B Supply	0.0			0.00			
CR1, Diode, Gen. Purp.		Short	.39	No Protection	0.1			1.2246			
		Open	.42	F1 Only	0.5	.000314		6.594			
		Drift	.19	No Effect	0.0			0.00			
CR2, Diode, Gen. Purp.		Short	.39	No Protection	0.1			1.2246			
		Open	.42	F1 Only	0.5	.000314		6.594			
		Drift	.19	No Effect	0.0			0.00			
VR1, Diode, Zener		Short	.39	Simult. Aut. Output	0.2			3.4788			
		Open	.42	A Rcvr. Only	0.5	.000446		9.366			
		Drift	.19	No Effect	0.0			0.00			

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE 63-PI1356B-X3 APL-13 July 1970		ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME Audio Combiner Power Isolator	
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(\alpha) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
FL1, Filter, RF	Short	.70	No A Rcvr.	1.0	.003600		252.00	5			
	Open	.30	No Filtering	0.5							
FL2, Filter, RF	Short	.70	No A Rcvr.	1.0	.003500		245.00	7			
	Open	.30	No Filtering	0.5							
FL3, Filter, RF	Short	.70	No B Rcvr.	1.0	.003600		252.00	6			
	Open	.30	No Filtering	0.5							
FL4, Filter, RF	Short	.70	No Filtering	0.5	.003500		122.50	11			
	Open	.30	No Filtering	0.5							
FL5, Filter, RF	Short	.70	No 1 KHz B TLM	0.2	.003500		49.00	28			
	Open	.30	No 1 KHz B TLM	0.2							
FL6, Filter, RF	Short	.70	No Sig. A TLM	0.2	.003500		49.00	29			
	Open	.30	No Sig. A TLM	0.2							
FL7, Filter, RF	Short	.70	No Sig. B TLM	0.2	.003500		49.00	30			
	Open	.30	No Sig. B TLM	0.2							
FL8, Filter, RF	Short	.70	No A Supply Volt	1.0	.003650		255.50	1			
	Open	.30	A Rcvr. Ripple	0.1							
FL9, Filter, RF	Short	.70	No B Supply Volt	1.0	.003650		255.50	2			
	Open	.30	B Rcvr. Ripple	0.1							
FL10, Filter, RF	Short	.70	A F2 No Effect	0.0	.003650		0.00	3			
		.70	A F1 No Signal	1.0							
	Open	.30	A F2 No Filter- ing	0.5							
		.30	A F1 No Filter- ing	0.5							

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION	RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE 63-PI1356B-X3 APL -13 July 1970	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME Audio Combiner Power Isolator		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
FL11, Filter, RF			Short	B F2 No Effect	0.0	.003650		0.00	4	
			.70	B F1 No Signal	1.0			255.50		
			Open	B F2 No Filter-	0.5			54.75		
			ing							
			.30	B F1 No Filter-	0.5			54.75	21	
				ing						

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME	
					63-PI1356B-X3 APL-13 July 1970				Audio Combiner Power Isolator	
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(a) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION	
W ₁ - P ₁ , Plug, RF		Open	1.0 No Output, Receiver "A"	1.0	.00100		100.00	12		
W ₁ - P ₂ , Plug, RF		Open	1.0 No Output, Receiver, "A"	1.0	.00100		100.00	13		
W ₂ - P ₁ , Plug, RF		Open	1.0 No Output, Receiver "B"	1.0	.00100		100.00	14		
W ₂ - P ₂ , Plug, RF		Open	1.0 No Output, Receiver "B"	1.0	.00100		100.00	15		

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE 63-P11356B	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov. 70	SUBSYSTEM NAME	ASSEMBLY NAME RF Coupler		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (α)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (α) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
J102, Conn., RF		Open	(1.0)	No Signal A, B	1.0	.001500		150.00			
P1, "A", Conn., RF		Open	(1.0)	No Signal A	1.0	.001000		100.00			
P1, "B", Conn., RF		Open	(1.0)	No Signal B	1.0	.001000		100.00			
R1, Res., Fixed Comp.		Open		Low Signal A, B	0.5	.000010		0.325			
		Drift		Low Signal A, B	0.5			0.175			

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE 7/31/70 INITIAL REVISION 20 Nov. 70	SUBSYSTEM NAME	ASSEMBLY NAME	NO.	REV. NO A
					63-P11377B					PAGE 40	OF 51 PAGES
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(\alpha) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION		
Q5, Transistor		Short	No Signal	1.0	.000368		16.56	80			
		Open	No Signal	1.0			12.144	94			
		Drift	No Effect	0.0			0.00				
Q6, Transistor		Short	No Signal	1.0	.000368		16.56	81			
		Open	No Signal	1.0			12.144	95			
		Drift	No Effect	0.0			0.00				
U1, Not Used											
U2, Not Used											
U3, Integrated Circuit		Short	No Signal	1.0	.000387		9.675				
		Open	No Signal	1.0			11.61	96			
		Drift	No Effect	0.0			0.00				
Y1, Crystal, Auqrtz		Short	No Signal	1.0	.000500		5.50				
		Open	No Signal	1.0			33.50	59			
		Drift	No Effect	0.0			0.00				
FL1, Filter, RFI		Short	No Signal	1.0	.003700		259.00	7			
		Open	Low S/N	0.5			55.00	51			
J1, Conn., RF		Open	No Signal	1.0	.001000		100.00	24			
J2, Conn., RF		Open	No Signal	1.0	.001000		100.00	25			

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME		
									ALSEP Redundant Command Receiver		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
IF & Audio (Receiver "A") Common Parts				DEGRADATION A (.30) (Oscillation, No signal, increased Bandwidth degraded performance Distorted Signal, Distorted Output, Extreme noise, detuned discriminator, noisy signal, bad signal, F1 & F2 modes clipped signal)	No Receiver "A" Output	1.0	.154011	Switch to Receiver "B".	4620.00	2	0.046203
				DEGRADATION B (.09) (Degraded performance Receiver F1 & F2 modes, wrong Pass band, degraded output, increased noise, oscillation, degraded gain, noisy signal, no filtering, clipping, wrong gain, low signal)	Degraded Receiver "A" Output	0.6	.154011		831.66	8	0.0.3861
				DEGRADATION C (.01) (Degraded signal, wrong bandwidth, mildly distorted signal)	Slightly degraded Receiver "A" Output No Effect on Reliability	0.2	.154011		30.80	23	
				No Telemetry (0.1) (No signal level Telem)	Slightly degraded Receiver "A" out. No effect on Reliability	0.2	.154011		30.80	24	
				No Effect (.10)							

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME ALSEP Redundant Command Receiver		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (α)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY × 10 ⁵ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (α) × (E) × (Q) × 10 ⁵	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
IF & Audio (Receiver "A") F1				DEGRADATION A (. 07) (No signal, distorted output, noisy signal)	No Receiver "A" Output	1. 0	. 154011	Switch to Receiver "C".	1078. 08	6	0. 010781
				DEGRADATION B (. 02) (Degraded performance, distorted output, oscillation, wrong sandwidth, clipping, wrong gain)	Degraded Receiver "A" Output	0. 6	. 154011		184. 81	15	0. 003080
				No Effect (. 03)							
IF & Audio (Receiver "A") F2				DEGRADATION A (. 15) (No signal, oscillation)	No Receiver "A" Output	1. 0	. 154011	Switch to Receiver "B".	2310. 17	3	0. 023102
				DEGRADATION B (. 03) (Degraded performance, wrong pass-band, degraded output, distortion, wrong bandwidth, no filtering, noisy signal)	Degraded Receiver "A" Output	0. 6	. 154011		277. 22	12	0. 004620
				No Effect (. 04)							
IF & Audio (Receiver "B")	The failure mode, effects, and criticality analysis for the IF & Audio Receiver "B" is identical to the IF & Audio Receiver "B" except (1) a further effect on the assembly is a loss of redundancy and (2) there is no design compensation for no Receiver "B" output.										

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME ALSEP Redundant Command Receiver		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT $(a) \times (E) \times (Q) \times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
IF & Audio (Receiver "A" only)				DEGRADATION A (. 11) (No signal, oscillation, degraded performance, AC on DC line, noisy signal, low signal, wrong signal, increased gain)	Loss of Receiver "A" and Audio "A" Telemetry.	1. 0	. 154011	Switch to Receiver "B".	1694. 12	5	0. 016941
				DEGRADATION B (. 01) (Degraded performance, noisy signal, no filtering, wrong gain, low signal)	Decreased Audio "A" Telemetry no effect on reliability	0. 1	. 154011		15. 401	26	
				DEGRADATION C (. 01) (Decreased performance, small effect)	Slightly degraded Audio "A" Telemetry no effect on reliability	0. 0	. 154011		0. 00	30	
				No Effect (. 02)							
IF & Audio (Receiver "B" only)				DEGRADATION A (. 11) (No signal, oscillation, degraded performance, AC on DC line, noisy signal, low signal, wrong signal, increased gain)	Loss of Audio "B" Telemetry No effect on reliability	0. 2	. 154011		338. 82	11	
				DEGRADATION B (. 01) (Degraded performance, noisy signal, no filtering wrong, gain, low signal)	Degraded Audio "B" Telemetry No effect on reliability	0. 1	. 154011		15. 401	27	

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME ALSEF Redundant Command Receiver		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (α)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (α) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
				DEGRADATION C (.01) (Degraded performance, small effect) No Effect (.02)	Slightly degraded Audio "B" Telemetry No effect on reliability	0.0 e	.154011		0.00	31	

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME		
									ALSEP Redundant Command Receiver		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
RF Converter (Receiver) "A"	This Failure Mode, Effects, and Criticality Analysis for the RF Converter Receiver "B" is identical to the RF Converter Receiver "A" except (1) a further effect on the Assembly is a loss of redundancy and (2) there is no design compensation for No Receiver Output.	Degradation A (.75) (No Signal)	No Receiver "A" Output	1.0	.112445	Switch to Receiver "B"	8433.375	1	0.084333		
		Degradation B (.09) (Low Signal, Low S/N) Ratio, Distorted Signal)	Degraded Receiver "A" Output	0.5	.112445		506.003	10	0.010120		
RF Converter (Receiver) "B"		No Effect (.16)									

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME ALSEP Redundant Command Receiver	
									PAGE 5 OF 7 PAGES	
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION	STATEMENT OF THE ASSUMED FAILURE	FAILURE MODE (a)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (a) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION	
Audio Combiner & Power Isolator (Receiver "A")		Degradation A (.25) (No "A" Supply Voltage, No Output)	No Receiver "A" Output	1.0	.098816	Switch to Receiver "B"	2470.40	4	0.024704	
		Degradation B (.21) (No Audio "A", "A" Receiver Ripple, Loss of DC Isolation at Audio "A" Output, No "A" Supply Regulation, No Filtering, No Format Protection)	Degraded Receiver "A" Output	0.5	.098816		1037.57	7	0.020751	
		No Telemetry (.14) (No 1 kHz "A" TLM, No "A" Supply TLM, No Signal "A" TLM)	Slightly Degraded Receiver "A" Output	0.2	.098816		276.69	13		
		No F2 (.02)	No Receiver "A" Output	1.0	.098816	Switch to Receiver "B"	197.63	16	0.001976	
		No F1 (.02)	No Receiver "A" Output	1.0	.098816	Switch to Receiver "B"	197.63	17	0.001976	
		No Effect (.16)								
Audio Combiner & Power Isolator (Receiver "B")	The Failure Mode, Effects, and Criticality Analysis for the Audio Combiner/PWR Isol. Receiver "B" is Identical to the Audio Combiner/Pwr Isol. Receiver "A" except (1) a further effect on the Assembly is a loss of redundancy and (2) there is no design compensation for no Receiver "B" output.									

FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME ALSEP Redundant Command Receiver		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (α)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (α) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
Audio Combiner & Power Isolator (Receiver "A" & Receiver "B")		Degradation C (.09) (No Part Redundancy, Loss of DC Isolation at Selected Output, Loss of Filtering)	Slight Degradation Receiver "A" & "B" Output No Effect on Reliability	0.1	.098816		88.9344	20			
Audio Combiner & Power Isolator (Receiver "A" Only)		No Effect (.04) No Telemetry (.01) (No Temperature TLM) No Effect (.005)	Slightly Degraded Receiver "A" Output No Effect on Reliability	0.2	.098816		19.77				
Audio Combiner & Power Isolator (Receiver "B" Only)		Degradation A (.05) (Loss of Receiver "B" Select Audio Output, Simultaneous Select Audio Output) No Effect (.005)	Degraded Receiver "B" Output	0.5	.098816		247.04	14	0.004941		

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FAILURE MODE, EFFECTS, AND CRITICALITY ANALYSIS WORKSHEET

ASSY FAILURE DESCRIPTION		RELIABILITY GOAL	SUPPLIER NAME	MISSION PHASE(S)	ASSY DWG OR SK REFERENCE	ORIGINATOR	DATE INITIAL REVISION	SUBSYSTEM NAME	ASSEMBLY NAME ALSEP Redundant Command Receiver		
PART, COMPONENT, UNIT, CIRCUIT ITEM, SET OR BOX DESCRIPTION		STATEMENT OF THE ASSUMED FAILURE		FAILURE MODE (α)	EFFECT ON ASSEMBLY	SYSTEM EFFECT NUMBER (E)	FAILURE PROBABILITY $\times 10^5$ (Q)	DESIGN COMPENSATION TO ELIMINATE THE FAILURE MODE	PROBABILITY CRITICALITY PRODUCT (α) \times (E) \times (Q) $\times 10^5$	RANK FOR ASSY	RELIABILITY MODEL CODE IDENTIFICATION
RF Coupler				No Signal A, B (.430)	No Output RCVR A and B	1.0	.00351	None	150.00	19	.0015
				No Signal A (.284)	No Output RCVR A	0.5		Switch to Receiver B	50.00	21	.0010
				No Signal B (.284)	No Output RCVR B	0.5			50.00	22	.0010
				Low Signal (.002) A and B	Slight Degradation no Effect on Reliability	0.1			.07	29	
Multi-Pin Connector				Loss of Pin (.63) Redundancy	Loss of Protection Negligible Effect on Reliability	0.3	.0408		771.120	9	
				Loss of Case (.02) Ground	Slight Degradation no Effect on Reliability	0.1			8.200	28	
				Loss of TLM (.24) and Test Point	Loss of a Specification no Effect on Reliability	0.2			95.840	18	
				Unused Pins (.11)	No Effect	0.0					