

Apollo Lunar Surface Experiments Package

ALSEP Qualification Status List (QSL Package) Flight 3 Configuration

Prepared for NASA/Manned Spacecraft Center

by

Bendix Aer Sys

Aerospace Systems Division ALSEP Qualification Status List (QSL Package) Flight 3 Configuration

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Aerospace Systems Division

ALSEP Array B QSL Data Sheets Appendix B

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** Reference only, see text of ATM, Section 4.0.



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1.0 INTRODUCTION

In compliance with NASA Contract NASA 9-5829 requirements, this document provides a Qualification Status List (QSL) for use as part of the ALSEP Flight 3 Acceptance Data Package (ADP).

As of the date of publication, the information herein reflects the status of qualification following the system level tests which are completed on the ALSEP Qual SB system model.

Minutes 974-1264, of the 1/29/69 "QAR Board Meeting on Qual SB" have established that ALSEP B Array qualification will be considered successfully completed with the closeout of Category II Open Items, i.e., open items which constrain qualification of Array B. These open items are summarized on page 2 and the equipment subsections which follow.

Minutes dated 1/28/69 on the "QAR, Qual SB General Meeting" defined the ALSEP hardware being qualified as:

Subpackage #1

Data Processor - Patch plane board only Central Station Wire Harness Sunshield Antenna Gimbal Box PSE Sensor/Shroud - Gnomon only Heat Flow Experiment Charged Particle Lunar Environment Experiment Cold Cathode Gage Experiment

Subpackage #2

Drill Carrier Subpackage Interface of Drill Carrier with Subpackage #2

General

Weight and C.G.

Reviewed by:

R. C. Roukas Group Engineer ALSEP Reliability

Approved by: Ellison S. J.

S. J. Ellison, Manager ALSEP Reliability

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The qualification data herein, however, covers all major assemblies and subassemblies which were qualified under either the Qual SA or the Qual SB test programs. The discussion data in the following subsections and the QSL Summary Sheets of the Appendix reflect the appropriate qual history comments and outstanding open items. The organization of these data is as follows:

Section	Subtitle
2.0	SUBPACKAGE #1
2.1	Antenna Assembly
2.2	Central Station Electronics
	Diplexer Filter & Diplexer Switch
	Command Receiver
	Command Decoder
	Transmitters
	Data Processor & Multiplexer
	Power Distribution Unit
	Power Conditioning Unit
2.3	Passive Seismic Experiment
2.4	Heat Flow Experiment
2.5	Cold Cathode Gage Experiment
2.6	Charged Particle Lunar Environment Experiment
3.0	SUBPACKAGE #2
3.1	RTG Assembly
3.2	RTG Shorting Plug Assembly
3.3	APOLLO Lunar Handling Tool (ALHT)
3.4	APOLLO Lunar Scientific Drill (ALSD)
4.0	FUEL CASK ASSEMBLY

Appendix

A-Figures 1-5 Vibration Specification; B-QSL Data Sheets

For convenience, a brief summary of outstanding Category II Open Items which were defined by the 1/29/69 QAR Board Meeting is as follows:

Subpackage #1: Center of Gravity out of tolerance. A Bendix defined specification change has been submitted by MSC to Grumman. GAEC action scheduled for 2/7/69.

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Subpackage #1 & #2: Combined overweight condition to be defined by Bendix on 2/5/69 for MSC consideration of a specification change. Also, by 2/5/69, BxA to report technical feasibility of off-loading any experiment or subsystem on Flight 3 to achieve a combined weight of 215 pounds.

<u>CPLEE</u>: The following items are Category II and to be dispositioned as provided for in the Qual Verification Plan 9713-11-565, namely:

- Intermittent Amplifier Operation; FR 200/DR's 2499, 2488, 2489 and 2709.
- High Science Counts in Detectors A-1 and B-1; FR 199/DR 2468.
- CPLEE Sync Loss at Lunar Noon; FR 211/DR 2502 (19 bit problem).

PSE: Opem items which remain are residual from the Qual SA program per "PSE Qual SB QAR Minutes" 9713-10-3021 and BxA Memo 9713-10-3007, "PSE Qual SA Plan to Close", namely:

- 1) Post qualification functional testing of PSE. To be closed by test of Sensor, SN/06 to be completed in March 69 and reported by 1 April 1969.
- Caging Leak Test. To be completed on Sensor SN/02 and reported by 15 February 1969. Includes the completion of FAR #206/DR AB2869.

HFE: Qualified except for MSC approval of a specification change which will allow HFE to operate down to 0° F vs. plus 10° F (RFC H-1);

<u>CCGE</u>: The closeout of FR 204 on cracked case damage to CCGE SN/02 was defined as a constraint on qualification by the "Minutes of the ALSEP Qual SB ADP Review", dated 1/28/69. A CRD for weight specification change was identified in Minutes 9713-09-537.

<u>Central Station</u>: The completion of C/S Timer reliability evaluation tests (March 1969) is an outstanding open item against Array A qualification.

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2.0 SUBPACKAGE #1 (SP #1)

The qualification of Subpackage #1 was initially accomplished as a result of Qual SA model system level tests which are itemized in the Appendix QSL Sheet B-1. This QSL sheet is the top assembly record which is mechanically and environmentally applicable to all SP #1 equipment used in both the ALSEP Array A & B Configurations.

The basic structure thermal differences between the A & B Array are the Sunshield Assembly, Antenna Gimbal Container and Array B experiment interfaces were reviewed in the "QAR-Qual SB Structure Thermal Minutes dated 1/28/68" for Qual B test results and discrepancies. As a result of this review and the "QAR Board Meeting, Qual SB Minutes 974-1264," the Array B Subpackage #1 Structure/Thermal Configuration is considered to be fully qualified pending MSC approval specification changes on (1) SP #1 C.G. location tolerance, and (2) on SP #1/SP #2 total weight allowance.

Other Category II Open Items on Subpackage #1 installed equipment are against CPLEE, PSE, HFE and the CCGE as noted in the following subsections, as applicable.

The assemblies and components listed in the following subsections are the ArrayB/Flight 3 assemblies and experiments. The differences which exist are noted and justified on the basis of similarity, as applicable.

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2.1 Antenna Assembly

The qualification status of the antenna assembly has been established by system qualification testing, and the details are itemized in the Appendix QSL Sheet B-2. The subassemblies, i.e., helical antenna, antenna cable and aiming mechanism, were qualified by virtue of successful completion of the Qual SA system tests and subsequent (9/12/68) functional testing of the antenna subsystem per the as-run test procedure, BxA TP #2338629. The successful test results were documented in the test report BRL #4620 to close out the Qual SA open item qualification status.

The antenna gimbal package for stowing the aiming mechanism on the Configuration B Subpackage 1 is qualified by virtue of successful Qual SB testing with no open items as recorded by the "Minutes of the QAR Board Meeting, Qual SB 974-1264".

2.2 Central Station Electronics

The Central Station components are comprised of the following:

Diplexer Filter Diplexer Switch Command Receiver Command Decoder Data Processor 90 Channel Multiplexer/Converter Transmitters Power Distribution Unit Power Conditioning Unit Central Station Harness Central Station Timer PSE Central Electronics (See Section 2.3)

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With exception to those areas discussed below, the Central Station was successfully qualified under the Qual SA program. The QSL sheets provided in Appendix B for the Central Station Electronic Assemblies reflect the Qual SA test results except where noted on the applicable sheets or discussed herein.

Qualification Accomplished During Qual SB Testing

Data Processor - Except for the patch plane board, the Data Processor was fully qualified during the Qual SA program. The function of the patch plane board is to provide the telemetry format for the Flight 3 experiment array. The functional and environmental capability was fully demonstrated and thus no constraints on qualification are outstanding.

Command Decoder - The uplink command address format for Flight 3 was qualified as part of the Qual SB program. Hardware differences between the Qual SA and Qual SB command decoder consist of a patch plane similar to the one employed by in the Data Processor. The Command Decoder is considered qualified.

Central Station Harness - The Flight 3 configuration of the Central Station harness was successfully qualified during Qual SB testing.

Flight 3 Vs. Qual SB Hardware Differences

Differences between Qual SB and Flight 3 hardware were reviewed and documented in the FTRR Flight 3 minutes 9712-1075, dated 11/21/68. In comparing Flight 3 hardware and previously qualified hardware it was agreed by BxA and NASA that "there are certain known differences such as (1) new transmitter frequency, (2) command address, (3) Data Processor S/N identification, and (4) thermal plate has two (2) new holes, however, these known differences will not constrain Flight 3 Acceptance Test and are considered qualified by similarity." Based on the QTRR memo 971-476, there are no known differences between the Central Station Electronics Qual SB and Flight 3 items.

Constrains on C/S Electronics Qualification

Central Station Timer - Parametric qualification of the C/S Timer is contingent on the completion of a separate 36 cycle thermal/vacuum reliability evaluation test. BxA Memo 9721-1288, 1/27/69, summarizes the C/S Timer test history and status. The reliability evaluation test is scheduled for completion in February 1969.

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2.3 Passive Seismic Experiment

The qualification status of the PSE was initially established by Qual SA model system level tests and reports data which are itemized in the Appendix B-QSL Sheets B18 through B-20 on the Sensor, Electronics and Thermal Control Shroud.

The only Qual SA Category II open items which were outstanding after the Qual SB QAR on the PSE (per Minutes 9713-10-3021 dated 1/28/69) were:

- (a) Post qualification functional testing of the PSE which is scheduled to be closed on 4/1/69.
- (b) Caging leak modification vibration and thermal vacuum verification which is scheduled for close out by 2/15/69. FAR 206/DR AB2869 is outstanding on this test.

An additional open item for qualification is the SPZ bolt, 233161, which has been changed to 2338790. The material has been changed to Titanium 6AL-4V from commercial titanium. This item will remain open until the rationale for qualification has been provided.

The Gnomon was the only PSE article tested for qualification on the Qual SB model, with no open items as reflected by QSL Sheet B-21.

One difference between the Qual SB and Flight Gnomons is a teflon washer added to the flight models to ensure erection. This difference does not affect qual status, and the PSE Gnomon is considered fully qualified.

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2.4 Heat Flow Experiment (HFE)

The HFE has been functionally and environmentally qualified as a result of system level testing on the Qual SB Subpackage #1 configuration. The applicable tests, test levels and report references are itemized in Appendix B, QSL Sheet B-22.

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Status of HFE qualification was reviewed on 1/28/69 as documented in Minutes 9713-13-345 and on 1/29/69 in Minutes 974-1264, the Qual SB QAR Board Meeting. One outstanding Category II open item is based on the HFE electronics temperature which went to 3° C at lunar night which is below the spec level of plus 10°C. Since the data indicates accuracy can be maintained to 0°C, BxA is submitting a request for specification change to 1C 314109, i.e., CRD #56290.

DR AB 2705 on the HFE Release Pin resulted in FAR #209 which was issued to complete this open item.

The HFE Qual SB vs. flight model differences were reviewed during the 1/28/69 QAR meeting and by the QTRR based on BxA Minutes 9713-13-422. PC Board hard wiring, RCR vs. ultronic resistors, and heater circuit resistance value differences were considered to be qualified by similarity.

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2.5 Cold Cathode Gage Experiment (CCGE)

The CCGE has been functionally and environmentally qualified as a result of system level testing on the Qual SB Subpackage #1 configuration. The applicable tests, test levels and report references are itemized in Appendix B, QSL Sheet B-23.

Status of the CCGE qualification was reviewed during the 1/28/69 QAR, Qual SB, Minutes 9713-09-537. The FR #204 on the cracked case, and a CRD to change the weight specification were the only open items identified as required for closeout. MSC Letter TF 4/M18-69 which discusses the cracked fiberglass housing was cited in Minutes 9713-09-537 as the basis for considering qual test results to be acceptable.

Qual vs. flight model differences for the CCGE were reviewed in the QAR Qual SB Minutes 9713-09-537; CCGE reel stowage and minor wiring differences previously reviewed at QTRR and Flight 3 FTRR were resolved as having no affect on qualification (BxA Memo 971-476).

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2.6 Charged Particle Lunar Environment Experiment (CPLEE)

The CPLEE has been functionally and environmentally qualified during Qual SB system level tests as reflected by the test and report data itemized in Appendix B, QSL Sheet B-24, except for outstanding problems in thermal vacuum environment.

Status of the CPLEE qualification was reviewed in the QAR Board Minutes 974-1264. This meeting on 1/29/69 established that the following items are Category II constraints to closeout of qualification in accordance with the CPLEE Qual Verification Plan outlined in Memo 9713-11-56:

- Resolution of Intermittent Amplifier Operation -FR 200; DR's 2499, 2488, 2489 and 2709.
- High Science Data Counts in Detectors A-1 and B-1 -FR 199; DR 2468
- CPLEE Sync Loss at Lunar Noon-FR 211; DR 2502, 19 bit problem

Design differences between the SN/2 qual and flight models were reviewed in the 9713-11-565 Qual SB QAR Minutes. Signal ground changes resulting from FR #197, changes in grounding connections, and high voltage enable plug modifications reviewed were judged to have no affect on the validity of qual test results.

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3.0 SUBPACKAGE #2 (SP #2)

The qualification of Subpackage #2 was initially accomplished as a result of Qual SA system level tests which are itemized in Appendix B, QSL Sheet B-25. This QSL sheet is mechanically environmentally applicable to all SP #2 equipment used in both the ALSEP Array A and B Configurations.

The basic structure differences to be qualifed in the Qual SB Configuration were identified in the QAR Qual SB General Meeting Minutes of 1/28/69 as:

- a) Drill Carrier Subpackage, and
- b) Interface of Drill Carrier with Subpackage #2

The only Category II open item which constrains the closeout of qual status was identified in the 1/29/69 QAR Board Meeting Minutes 974-1264 as a combined overweight condition for Subpackages #1 and 2. This condition is to be defined for MSC consideration of a specification change, and/or the consideration of off-loading any experiment as subsystem to achieve a combined weight of 115 pounds.

The assemblies and components listed in the following subsections are SP #2 installed equipment items reviewed for qualification and qual/flight difference considerations, as applicable.

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3.1 RTG Assembly

The qualification of the RTG was initially accomplished by the subcontractor test and report documents cited in the Appendix B QSL Sheet B-26, and subsequently by BxA system level tests on Qual SA as recorded on QSL Sheet B-26.

No qual vs. flight model differences or outstanding qual test open items exist on this hardware.

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3.2 RTG Shorting Plug Assembly

The qualification of the RTG Shorting Plug Assembly was qualified during Qual SA model system tests to configuration drawing BxA 2335520, and in accordance the test and report documentation "itemized" in Appendix B, QSL Sheet B-27.

The B Configuration Shorting Plug Assembly which is identified by a BxA 2338017 drawing is identical to the Revision C BxA 2335520 part number qualified in the Array A configuration.

No outstanding open items constraining qualification exist on this hardware.

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3.3 ALSEP Lunar Handling Tool (ALHT)

The ALHT mass simulator rather than Flight Hardware was used in the Qual SB system level dynamic tests. The test conditions and reports data identified for SP #2 is applicable from a dynamic environment interface standpoint (QSL Sheet B-25).

The QAR-Qual SB Structural/Thermal Minutes of Meeting dated 1/28/69 reviewed the qual status of the ALHT, however, no Category II open items to constrain qualification were identified.

The ALHT has been previously qualified by MSC.

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3.4 ALSEP Lunar Surface Drill (ALSD)

The ALSD (SCALADE 165) is GFE and was previously qualified at a subsystem level by Martin prior to Drill/ALSEP-Interface qualification on BxA Qual SB system level tests. The test conditions and report documents itemized for SP #2 dynamic environment testing recorded on QSL Sheet B-25 is applicable.

The QAR-Qual SB Minutes of Meeting 9713-13-345 reviewed the qualification status of the ALSD interface and established that no Category II open items exist to constrain qualification.

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3.5 Passive Seismic Experiment Leveling Stool

The PSE Leveling Stool was qualified as a result of the Qual SA Test Program as reflected by the QSL Sheet B-30 in Appendix B.

No outstanding open items constraining qualification exist on this hardware.

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4.0 Fuel Cask Assembly

The ALSEP Fuel Cask Assembly Qualification Test Program (CCP #89) was defined separate from the BxA Qual model tests on ALSEP for conduct at GE facilities (BxA Letter 68-500-507).

A separate document, BxA ATM 780, has been established as the means by which QSL data will be documented for the subject hardware.

The ATM 780 QSL will be submitted for MSC review with flight model Fuel Cask ADP documentation at the Flight 1 CAR on Fuel Cask Assembly equipment.

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APPENDIX A

QSL SHEET COMPARISON CRITERIA

The qualification status defined in the Appendix B QSL Sheets (BxA format 970-12) is presented in a manner to compare ALSEP equipment specified environment or parametric requirements to the stress levels achieved during ALSEP system level or previous equipment level testing.

The qualification status has been established by the qualification testing accomplished at BxA and is reflected on the applicable QSL sheets by the listing of the appropriate test procedure, test reports and remarks relative to each test.

Qualification testing of ALSEP for vibration shock, and acceleration was required at the system level only. That is, all equipments that comprise ALSEP were subjected to design limit levels for a stowed configuration, simulating the mounting of ALSEP into the LM compartment. The qualification vibration levels are depicted in Figures 1 through 5. These levels are in accordance with those specified by NASA Letter TD3/LO23/68/B-26(JAC).

With exception to the pressure, the intention is to demonstrate each environmental and/or parametric capability to equal to exceed the specified requirement under test. In the instance of pressure, the low level is limited by the capability of the test equipment.



Subpackage 1 & 2 Launch Boost & Lunar Descant, Sine Vibration Design Limit. All-Axes

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Test duration 2.5 minutes power spectral density tolerance 3 db



Subpackage 1

Subpackage 1 Earth Launch Boost Phase Random Vibration Spectrum Design Limit. X-Axis only





+3 db

Frequency -Hz





Subpackage 1 & 2 Earth Launch Boost Phast Random Vibration Spectrum Level. Z-Axis only

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Test Duration 12: 5 minutes Power Spectral Density +3 db



Frequency -Hz

Subpackage & & 2 Lunar Descent Randon Vibration Spectrum Design Limit. All Axes





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	Command Deceder	Be
	Data Processor	B8
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	PSE Gnomon Assembly	B21
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Item Nomenclature Subpackage #1 BxA 2334843 S/N-6 S/N-6 Ex M Pres Ope Nor Hum: Ope Nor L L Acce Ope Nor Shoc Shoc Shoc Shoc Shoc Shoc Shoc Shoc	Environment and/or Parameter IRONMENTAL mperature: perating on-Operating Earth Moon essure perating on-Operating on-Operating on-Operating on-Operating on-Operating on-Operating Departing on-Operating on-Operating on-Operating on-Operating on-Operating on-Operating on-Operating on-Operating on-Operating on-Operating on-Operating on-Operating on-Operating	Stress Requirement -300 °F to +250 °F -65 °F to +160 °F -300 °F to +250 °F 10 ⁻¹² Torr SL to 10 ⁻¹² Torr N/A 15 - 100% N/A Refer to CEL	Level Capability $-300 \degree F to +250 \degree F$ (See Note 1) $-300 \degree F to +250 \degree F$ Tested to 5×10^{-6} Torr Design to meet Requirements	Agent BxA BxA BxA	Ann Arbor, Michigan Michigan	Level Capability Document Reference TP2334335 TP2333032 ATR-60, 70 BSR-2367, 2376 Same as above	Analyst Date 6/10/68 6/10/68	Page <u>Bl</u> of <u>3</u> Pages Remarks Successfully Qualified on Qual SA, See Note 1 Test level limited by test
Item Nomenclature Subpackage #1 BxA 2334843 S/N-6 Pres Ope Nor Hum Ope Nor Vibr: Ope Nor Li Li Acce Ope Nor Shoc Ope Nor Shoc Shoc Shoc Shoc Shoc Shoc Shoc Shoc	Environment and/or Parameter <u>IRONMENTAL</u> mperature: perating on-Operating Earth <u>Moon</u> essure perating on-Operating on-Operating on-Operating on-Operating on-Operating on-Operating Launch & Flight	Stress Requirement -300 °F to +250 °F -65 °F to +160 °F -300 °F to +250 °F 10 ⁻¹² Torr SL to 10 ⁻¹² Torr N/A 15 - 100% N/A Refer to CEL	Level Capability -300 °F to +250 °F (See Note 1) -300 °F to +250 °F Tested to 5×10^{-6} Torr Design to meet Requirements	Agent BxA BxA BxA	Ann Arbor, Michigan Ann Arbor, Michigan	Level Capability Document Reference TP2334335 TP2333032 ATR-60, 70 BSR-2367, 2376 Same as above	Date 6/10/68 6/10/68	Remarks Successfully Qualified on Qual SA, See Note 1 Test level limited by test
Item P Nomenclature P Subpackage #1 Tem BxA 2334843 Ope S/N-6 Nor Ea Ope Nor Hum Ope Nor Li Li Accee Ope Nor Shoc Shoc Ope Nor Shoc Shoc Ope Nor Li Li Accee Ope Nor Shoc Shoc Shoc Shoc Shoc Shoc Shoc Shoc	and/or Parameter IRONMENTAL mperature: perating on-Operating Earth Moon perating on-Operating on-Operating on-Operating on-Operating on-Operating on-Operating Launch & Flight Lunar Landing	Requirement -300 °F to +250 °F -65 °F to +160 °F -300 °F to +250 °F 10 ⁻¹² Torr SL to 10 ⁻¹² Torr N/A 15 - 100% N/A Refer to CEL	Capability - $300 \degree F$ to $+250 \degree F$ (See Note 1) - $300 \degree F$ to $+250 \degree F$ Tested to 5 x 10^{-6} Torr Design to meet Requirements	Agent BxA BxA BxA	Location Ann Arbor, Michigan Ann Arbor, Michigan	Document Reference TP2334335 TP2333032 ATR-60, 70 BSR-2367, 2376 Same as above	Date 6/10/68 6/10/68	Remarks Successfully Qualified on Qual SA, See Note 1 Test level limited by test
Subpackage #1 BxA 2334843 S/N-6 Nor Pres Ope Nor Hum: Ope Nor L Acce Ope Nor Shoc Shoc Shoc Shoc Shoc Shoc Shoc Shoc	IRONMENTAL mperature: perating on-Operating Earth Moon essure perating on-Operating on-Operating on-Operating on-Operating on-Operating on-Operating Launch & Flight Launch & Flight	-300 °F to +250 °F -65 °F to +160 °F -300 °F to +250 °F 10 ⁻¹² Torr SL to 10 ⁻¹² Torr N/A 15 - 100% N/A Refer to CEL	-300 °F to +250 °F (See Note 1) -300 °F to +250 °F Tested to $5 \times 10^{-6} \text{ Torr}$ Design to meet Requirements	BxA BxA BxA	Ann Arbor, Michigan Ann Arbor, Michigan	TP2334335 TP2333032 ATR-60,70 BSR-2367,2376 Same as above	6/10/68 6/10/68	Successfully Qualified on Qual SA, See Note 1 Test level limited by test
Pres Ope Nor Hum: Ope Nor Vibr: Ope Nor L L Acce Ope Nor Shoc Ope Nor Shoc Ope Nor Shoc Ope Nor Shoc Ope Nor Shoc Ope Nor Shoc Shoc Ope Nor Shoc Shoc Shoc Shoc Shoc Shoc Shoc Shoc	essure perating on-Operating midity perating on-Operating on-Operating on-Operating Launch & Flight Launch & Flight	10 ⁻¹² Torr SL to 10 ⁻¹² Torr N/A 15 - 100% N/A Refer to CFL	Tested to 5 x 10 ⁻⁶ Torr Design to meet Requirements	BxA	Ann Arbor, Michigan	Same as above	6/10/68	Test level limited by test
Humi Ope Nor Vibri Ope Nor L. Acce Ope Nor Shoc Ope Nor Salt Sand Fung Acou Rain Radi Expl	midity perating on-Operating pration perating on-Operating Launch & Flight Lunar Landing	N/A 15 - 100% N/A Refer to CEI	Design to meet Requirements	BxA				equipment capabilities
Vibr Ope Nor L Acce Ope Nor Shoc Ope Nor Salt Sand Fung Acou Rain Rain Rain	pration perating on-Operating Launch & Flight Lunar Landing	N/A Refer to CEU			Ann Arbor, Michigan	N/A	N/A	No testing planned to the 100% humidity level: ALSEP OTRR. Board decision
Acce Ope Nor Shoc Ope Nor Salt Sand Fung Acou Rain Radi Expl		Specification CP100001	Tested to Design Limit Vib. Levels indicated in Figures 1-5	BxA	Ann Arbor, Michigan	TP2334343 ATR-82, 83 BSR-2402, 2403	6/28/68	Successfully qualified on QSA See Note 1 and 2
Shoc Ope Nor Salt Sand Fung Acou Rain Radi Expl	celeration perating on-Operating	N/A CP100001	Tested to 14 ± lg 1 min du- ration each axis	BxA	Ann Arbor, Michigan	TP 2334343 ATR-90,91 - BSR-2412.2413	7/4/68	
Salt Sand Fung Acou Rain Radi Expl	ock perating fon-Operating	N/A CP100001	Tested to 15 ± 2g 11 ms saw- tooth ea_axis	ВжА	Ann Arbor, Michigan	TP2334328 ATR-86, 87 BSR-2406, 2407	6/29/68	
Fung Acou Rain Radi Expl	t Spray	N/A					·	No test required
Acou Rain Radi Expl		Not Defined						No test required
Rain Radi Expl	oustical Noise	Not Defined				· · · · · · · · · · · · · · · · · · ·	<u> </u>	No test required
Radi Expl	in	Not Defined						No test required
Expl	diation	1N/A LED-520	$130W/FT^2$ IR	BxA	Ann Arbor, Mich	TP 2334335	6/10/68	See operating temperature
	plosion Proof	N/A	100 11/1 1 / 110		,,			No test required
<u>PARA</u> Missi Simul	AMETRIC sion ulation	ATM-785 Section 5.3	Capable of startup and operation lunar surface	BxA	Ann Arbor, Michigan	TP 2334345 TP 2338610 ATR, 101-102	8/7/68	Qualified on Qual SA
Note Note Note	 1: Temperature 2: Differences f as run test pr 3: See Section 2 	storage tests may or Array B config ocedures and rep 0 discussion	be replaced by a iration defined in orts referenced in	n added hot deploymd 2.0 were qualified to Addendum I dated 1	ent test per MSC Lett o comparable environ /27/69 of ALSEP TM	er BG931/L226/ mental levels in -321.	197 (CCP-122) accordance with	
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OHALIFICATION STA	TUS LIST-ALSEP PR	OGRAM SUBPAC	CKAGE I, ANTEN	NA ASSEMBLY			Date 9/20/68	No. ATM-825 Rev. No.
WAUPILIAUSIAN ALV	TAA FIALVER LU		•		Revised 1/	Analyst R. O. J.	Page of Pages	
	Environment	Stress	Level	Verif	fication of Stress			
Item Nomenclature	and/or Parameter	Requirement	Capability	Agent	Location	Document Reference	Date	Remarks
Antenna Assembly Helical Antenna BxA 2330307 Filt #3	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	-250°F to+300°F -65°F to +160°F N/A	Tested in Space Simulation Chamber for temp excursions of -300°F to +250°F	Bendix Aerospace Systems	Ann Arbor, Mich	TP 2334335 ATR-60,70 BSR-2367,2376	May-June 1968	Qualification of the Antenna Assy has been accomplished at the system level.
SN-10	Pressure Operating Non-Operating	1x10 ⁻¹² mmHg Sea L to 10 ⁻⁸ mmHg	Verified to 5x10 ⁻⁶ Torrs in Space Sim Cham	Bendix Aerospace Systems	Ann Arbor, Mich	TP2334335 ATR-60, 70 BSR-2367, 2376		
Antenna Cable BxA 2330309 Fit #3 SN-9	Humidity Operating Non-Operating	N/A 15% to 100% RH	Designed to meet Humidity Req'mt	Bendix Aerospace Systems	Ann Arbor, Mich	N/A	N/A	
F11. #3 514-0	Vibration Operating Non-Operating Launch & Flight Lunar Landing	N/A Refer to ATR-16 Addendum 1	Tested in stowed configuration to vibration design limits indicated in Figs 1 thru 5	Bendix Aerospace Systems	Ann Arbor, Mich	T. P. 2334346 ATR -82, 83 BSR -2402, 2403	June -July 1968	In stowed configuration, the aiming mechanism is mounted on S/P#2. Refer to ATM-776 for x-Axis Random Vibration Qual level for Earth Launch
	Acceleration Operating Non-Operating	N/A ATR-16, Add. 1	Tested in stowed configuration 14 ± lg, 1 min 5 tests ea axis	Bendix Aerospace Systems	Ann Arbor, Mich	TP 2334343 ATR-90, 91 BSR-2412, 2413	July 1968	Boost Phase
Antenna Gimbal Package BxA 2335765	Shock Operating Non-Operating	N/A ATR-16, Add. 1	Tested in stowed configuration 15g±2, 11 ms 3 times ea axis	Bendix Aerospace Systems	Ann Arbor, Mich	TP 2334328 ATR-86, 87 2406, 2407	July 1968	V
Fit. #5 5N-5	Sand & Dust Fungus Acoustical Noise	N/A LED-520 N/A	Exceeds Req	Bendix Research Labs	Southfield, Mich	Design Verif.	June 1967	Verified by Analysis
	Rain Radiation Explosion Proof	N/A LED-520 N/A	Exceeds Req	Bendix Research Labs	Southfield, Mich	Design Verif.	June 1967	Verified by Analysis
	PARAMETRIC Radiated Power (Eff. Beamwidth Transmit/Receive)	42.5 dbm 27°@ 11.7 db 27°@11.0 db	42.5 dbm 29°@ 11.7 db 31°@11.0 db	Bendix Research Labs	Southfield, Mich	Design Verif. Report #4028	June 1967	Past environmental functional tests sucessfully performed on the antenna assembly at Bx Research
	Input VSWR @Transmitter f _o @Receiver f _o	1.25:1 1.5:1	1.25:1 1.50:1	Bendix Research Labs	Southfield, Mich.	Design Verif. Report #4028		on 9/12/68 per TP2338629 and documented by Report BRL #4620
	Minimum Power Handling Capability	1.5w CW @Transmitter f	1.5w CW @Transmitter f	Bendix Research Labs	Southfield, Mich	Design Verif.		
070.12	Error	1. 10 AMS	0.13 KMB			Report #4037	<u> </u>	

Note: See Section 2.1 discussion

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UALIFICATION STA	TUS LIST-ALSEP PR	CENI	RAL STATION ELECTRONICS Revised 1-31-69					Date	^{No.} ATM	825 Re	v. No.		
				COMPONENTS						Analyst Rantec	Page	of	Pages
	Environment	Stress	Level	Verification of Stress Level Capability									
Item Nomenclature	and/or Parameter	Requirement	Capability	Ag	ent	Location		Document Reference		Date	Remarks		s
Filter, Diplexer BxA #2330525 Flt #3	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	$-25^{\circ}F$ to $+160^{\circ}F$ $-65^{\circ}F$ to $+160^{\circ}F$	OK per reqm OK per reqm	Rantec Wyle Labs		Calabasas, Calif El Segundo, Calif		Rantec #66279-QTP		2/19/67 2/6/67	<u>An 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 19</u>		
S /N 10	Pressure Operating Non-Operating	∠10-12 Torr 30 to 1.3 Torr	1 x 10 ⁻⁵ Torr OK	Wyle	Labs	El Segund	lo, Calif			2/20/67	Quali 5 x 10	fied in sy)-6 Torrs	stem to
	Humidity Operating Non-Operating	NYD 15 to 100% R. H.	100% RH at 160° 100% RH at 120° F	7						2/8/67			
	Vibration - Operating Non-Operating	N/A Random: 15 to 150 cps, 0.2g ² /c Sine:5 to 20 cps 0.4 in. D.A. 20	P⁵OK per reqm.							2/13/67) Interio		
	Acceleration	to 100 cps 8g's N/A 25 g's ea avis	OK per reqm							2/10/67	R		
	Shock Operating Non-Operating	N/A	OK per reqm.	•	/	\downarrow		↓		2/9/67		<u> </u>	
	Salt Spray	N/A	N/A										
	Sand & Dust	N/A	N/A										
	Fungus	N/A	N/A										
	Acoustical Noise	N/A	N/A										
	Rain	N/A	N/A										
	Radiation EMI	Radiated at fo=**	52db	Bunke	r Ramo	Canoga P	ark Calif	66279-0	TP	: 2/22/67			
	Explosion Proof	N/A	N/A										
	PARAMETRIC VSWR	l.36:1 Max all ports	1.22:1 max 33 Mc Min	Rantec		Calabasas, Calif.		66279-PTP-D		Before and after each environmenta test	Qual integ space	ified as p rated sys simulat	art of an tem in the ion chambe
	Insertion Loss	0.8 db Max	0. 73 db max	Rante	ec	Calabas Calif.	as,	66279-P	rp-D	1/16/67 to 2/23/67	TP 2 ATR June	2333032 -60, 70 1968	
	Isolation between Channels	50 db f_r to f_{LO} 80 db f_t to f_r	90 db min 7100 db min	Rante	ec	Calabasas, 66 Calif.		66279-PTP-D		1/16/67 to 2/23/67			
0-12	4.4.0.1.0		1	L		-L		L		<u> </u>	i		. 31

**2119 mc and 2277 mc

See Section 2.2 discussion

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MALIFICATION CT	FICATION STATUS LIST-ALSEP PROGRAM			STATION ELECTR	ONICS	Revised	Date	No. ATM-825 Rev. No.	
UALIFICATION ST.	AIUS LISI-ALSEF FR	UGRAM	C	OMPONENTS		1-31-69	Analyst Rantec	Page of Pages	
	Environment	Stress	Level	Ve	erification of Stress				
Item Nomenclature	and/or Parameter	Requirement	Capability	Agent	Location	Document Reference	Date	Remarks	
Diplexer Switch BxA #2330526 Flt #2 S/N 10	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	-25°F to -160°F -65°F to -160°F 	OK per reqm. OK per reqm.	Rantec Wyle Labs	Calabasas, Calif El Segundo Calif	66279-QTP	2/19/67 2/6/67		
_, _, _	Pressure Operating Non-Operating	10-12 Torr 30 to 1.3 Torr	1 x 10 ⁻⁵ Torr OK	Wyle Labs	El Segundo Calif	66279-QTP	2/20/67	Qualified in system to 5 x 10 ⁻⁶ Torrs	
	Humidity Operating Non-Operating	NYD 15 to 100% R.H.	100% RH at 160 [°] F 100% RH at 120 [°] F				2/8/67		
	Vibration -Operatin Non-Operating	g N/A Random: 15 to 150 cps, 0.2g ² /c Sine: 5 to 20 cps 0.4 in. D.A. 20 to 100 cps, 8'gs	ps OK per reqm				2/13/67		
	Acceleration Operating Non-Operating	N/A 25g's ea axis	OK per reqm.				2/10/67		
	Shock Operating Non-Operating	N/A 20 g's ea axis	OK per reqm			\downarrow	2/9/67		
	Salt Spray	N/A	N/A						
	Sand & Dust	N/A	N/A						
	Fungus	N/A	N/A	······					
	Acoustical Noise	N/A	N/A						
	Rain	N/A	N/A						
	Radiation	Radiated at fo=**	50 db	Bunker Ramo	Canoga Park Cal	if 66279-QTP	2/22/67		
	Explosion Proof	N/A	N/A	· · · · · · · · · · · · · · · · · · ·					
	PARAMETRIC VSWR	1.36:1 Max	1, 21:1 max (130 Mc min)	R antec	Calabasas, Calif	66279-PTP-S	Before and after each environmental test		
	Insertion Loss	0.7 db Max	0. 63 db max	Rantec	Calabasas, Calif	66279-PTP-S	1/16/67 to 2/23/67	Qualified as part of an integrated system in the space simulation chamber	
	Isolation between Channels	20 db Min Port A to Port B or vice versa	22 db min	Rantec	Calabasas, Calif	66279-PTP-S	1/16/67 to 2/23/67		
70-12		L	I			_L		I Sheet B4 of 3	

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Note: See Section 2.2 discussion • • Sheet_B4 of 31

QUALIFICATION ST	ATUS LIST-ALSEP PR	OGRAM	CE	NTRAL STA	TION EL	ECTRONIC	cs	Revis	ed	Date 1/30/68	No. ATM-82	Rev.	No.
	T	I	COMP	UNENIS	ification -	f Strong	1:4	R°O Jones	Page	10	Fages		
	Environment	Stress	Level		ver	Theation of	I Stress		lity				
Item Nomenclature	and/or Parameter	Requirement	Capability	Agent		Location		Document Reference		Date	R	emarks	
Command Receiver BxA # 23305 23 Flt #3	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	-10°F to +140°F -65°F to +160°F N/A	-10°F to +140°F -65°F to +160°F	Philco-	Ford	Palo Alto, California		Qualification Test Report RN-DA1664		March 1968		7 8.	
S/N 10	Pressure Operating Non-Operating	1 x 10 ⁻¹² mm Sea Level-10 ⁻⁸ n	lx10 ⁻⁵ mmHg nm lx10 ⁻⁵ mmHg								Qualified in 5 x 10 ⁻⁶ To	n System i orrs	to
	Humidity Operating Non-Operating	50% 15% - 100%	15% - 100%										
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	N/A Refer to ATR-16 Addendum #1	N/A 9.0G - peak 20 - 100 cps	-							Qualified a for S/P #1 Test in the Configurati	s part of Design L Stowed on	system imit
	Acceleration Operating Non-Operating	N/A ATR-16, Add. #	N/A 14G - 1 min. 1 each of 3 axes								11		
	Shock Operating Non-Operating	N/A ATR-16, Add. #1	N/A 20G - 10ms rise each of 3 axes					V			I		
	Salt Spray	N/A	N/A	······									
	Sand & Dust	Not Defined	N/A								No testing	required	·
	Fungus	N/A	N/A										
	Acoustical Noise	Not Defined	N/A			_							
	Rain	N/A	N/A								No testing	required	
	Radiation	N/A	N/A										
1	Explosion Proof	N/A	N/A			_							
	PARAMETRIC Performance Specification	Per AL310700		Philco	o-Ford	Palo Alto, California		Qualification Test Report RN-DA 1664		March 1968			
	Functional Performance	Tested aspe System in S Chamber.	ect of Integrated pace Simulation	В	хA	Ann Mich	Arbor, igan	TP 233303 ATR-60, 7 BSR-2367,	2 '0 2376	May-June 1968			
	EMI Performance	Tested As p System	art of Integrated	I	BxA		1	TP 233308 ATR-27, 3 BSR-2300,	7 33 2320		1 		
970-12			L			1		1		_L		. B5	<u> </u>

Note: See Section 2.2 discussion

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NUALIFICATION STA	THS LIST-ALSEP PR	OGRAM CENT	RAL STATION EI	ECTRONICS COMPON	ENTS		Date 9/20/68	No.ATM-825 Rev. No.
CALIFICATION STA	TO LIGI ALOLI IN				Revised 1	/31/69	Analyst J.M.	Page of Pages
		Strace Level Verification of Stress Level (Level Capability		
Item Nomenclature	Environment and/or Parameter	Requirement	Capability	Agent	Location	Document Reference	Date	Remarks
Command Decoder BxA #2330509 Flt #3 S/N 6	ENVIRONMENTAL Temperature: Operating Non-Operating Earth More	$-22^{\circ}F$ to $+158^{\circ}F$ $-65^{\circ}F$ to $+160^{\circ}F$	$-22^{\circ}F$ to $+158^{\circ}F$ $-65^{\circ}F$ to $+160^{\circ}F$	Bendix Aerospace	Ann Arbor, Mich.	TP 2334335 ATR-60,70 BSR-2363,2376	May-June 1968	
	Pressure Operating Non-Operating	1×10^{-12} mmHg S/L to 1 x 10mmHg	Tested in Spare Sim. Chamber to 5x10 ⁻⁶ Torr	Bendix Aerospace	Ann Arbor, Mich	BSR-2363, 2376	May-June 1968	Test Level Limited by Equipment Capability
	Humidity Operating Non-Operating	N/A 15% to 100%	Designed to meet Humidity Re- guirements	Bendix Aerospace	Ann Arbor, Mich.	N/A	N/A	
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	N/A Refer to ATR-16 Addendum 1	Tested to S/P#1 Design Limit Test Levels Refer to figures 1 through 5	Bendix Aerospace	Ann Arbor, Mich.	TP2334346 ATR-82, 83 BSR-2402, 2403	June 1968	Qualified to Design Limit Test Levels for Subpackage # (in the stowed configuration)
	Acceleration Operating Non-Operating	N/A ATR-16, Add. 1	Tested to 14 ± 1 g 1 Min Dur ation 5 times in Ax	. Bendix Aerospace is	Ann Arbor, Mich	TP 2334343 ATR-90, 91 BSR-2414, 2413	July 1968	Qualified to Design Limit Test Levels for Subpackage # (in the stowed configuration)
	Shock Operating Non-Operating	N/A ATR-16, Add. 1	Tested to 15 ± 2 g 11 ms Saw- tooth 3 times in Ax	Bendix Aerospace	Ann Arbor, Mich.	TP 2334328 ATR-86, 87 BSR-2406, 2407	July 1968	Qualified to Design Limit Test Levels for Subpackage # (in the stowed configuration)
	Salt Spray	N/A	N/A	Bendix Aerospace	Ann Arbor, Mich.			(1.1. 0.10 0.00 0.00 0.00 gg
	Sand & Dust	Not Defined	Designed to Meet	Bendix Aerospace	Ann Arbor, Mich			
	Fungus	N/A	N/A	Bendix Aerospace	Ann Arbor, Mich.			
	Acoustical Noise	Not Defined		Bendix Aerospace	Ann Arbor, Mich.			
	Rain	N/A	N/A	Bendix Aerospace	Ann Arbor, Mich.			
	Radiation	Not Defined	I.R.130 w/ft ²	Bendix Aerospace	Ann Arbor, Mich	TP 2334335	May-June 1968	
	Explosion Proof	N/A	N/A	Bendix Aerospace	Ann Arbor, Mich			
	PARAMETRIC See Table 1 Sheet B-7	Tested as part of System in space Chamber	f Integrated Simulation	Bendix Aerospace	Ann Arbor, Mich	TP 2333032 ATR-60,70 BSR-2367,2376	May-June 1968	Qualified via Integrated Syste Thermal Vacuum Test for a Simulated Lunar Mission
	EMI Performance	Tested as part o System	f Integrated	Bendix Aerospace	Ann Arbor, Mich	TP2333087 ATR-27, 33 BSR-2300, 2320	May-June 1968	

Note: See Section 2.2 discussion

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Aerospace Systems Division

Qualification Status List Command Decoder Assembly

NO.	REV. NO.
ATM-825	
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TABLE I

COMMAND DECODER PARAMETRIC REQUIREMENTS

PARAMETER

Demodulator Input NRZ Bi-Phase Mod.

Command Format
Preamble
Decoder Address
Cmd Complement
Command
Cmd Execution Timing

Command Verification

Normal Cmd Rate

Slow Cmd Rate

Command Capability

Commands Used

REQUIREMENT

2kc Subcarrier 1kc sync. 5vpp +10% 29.4 db SNR

61 Bits
20 Bits (zeros)
7 Bits
7 Bits
7 Bits
20 Bits (ones)
7 Bits + parity
1 message/second

-

1 message/2 sec.

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		CENT.	KAL STATION L	LECTRONICS COMPO	ONEN 1S	1/31/69	Analyst _{J.} M.	Page of Pages	
		Stress Level		Ve	erification of Stress	Level Capability			
Item Nomenclature	and/or Parameter	Requirement AL 310900	Capability	Agent	Location	Document Reference	Date	Remarks	
Data Processor (DA06) BxA #2330521 S/N 8 Flight #3	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	$-\frac{12^{\circ}F \text{ to } +158^{\circ}F}{-65^{\circ}F \text{ to } +185^{\circ}F}$ N/A	-22 [°] F to +158 [°] F ≁65 [°] F to +185 [°] F	Bendix Aerospace Systems Division	Ann Arbor, Mich	T.P. 2334335 ATR-60,70 BSR-2367,2376	May-June 1968	Successfully tested (on Qual SA model	
light #3	Pressure Operating Non-Operating	lx10 ⁻¹² mmHg AMB to lx10 ⁻¹² mmHg	Tested is spare chamber to 5 x 10-6 Torr				l v	Test level limited by Equip-	
	Humidity Operating Non-Operating	N/A 15% to 100%	Designed to meet humidity requirements			N:/ A	N/A	2 	
	Operating Non-Operating Launch & Flight	NA Refer to ATR-16 Addendum 1	Design Limit Test Levels. Re fer to figures 1 thru 5.	-		T.P. 2334346 ATR-82,83 BSR-2402,2403	June-July 1968	Qualified at Subpackage #1 Design Limit Test Levels for a stowed configuration.	
	Acceleration Operating Non-Operating	N/A ATR-16,Add. 1	Tested to $14 \pm 1g$ 1 Min Duration 5 times ea. Axis.			T.P. 2334343 ATR-90,91 BSR-2412,2413			
	Operating Non-Operating Salt Spray	N/A ATR-16, Add. 1 N/A	11 ms sawtooth 3 times ea. Axis N/A			ATR-86, 87 BSR-2406, 2407		•	
	Sand & Dust Fungus Acoustical Noise	Not Defined N/A Not Defined	N/A						
	Rain Radiation Explosion Proof	N/A Not Defined N/A	N/A 130 w/ft ² IR Lam N/A	P		T.P. 2334335	May-June''68		
	See Table 1 Sheet B-9	Tested as part System in Space Chamber	of Integrated Simulation			T. P. 2333032 ATR-60,70 BSR-2367,2376	May-June 1968	Qualified via Integrated System Thermal Vacuum Test for a simulated lunar mission;	
	EMI Performance	Tested as part Integrated Syste	of m			TP2333087 ATR-27,33 BSR-2300,2320	May-June 1968		

Note: See Section 2.2 Discussion

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Aerospace Systems Division

Qualification Status List Data Processor & 90 Channel Multiplexer/Converter Assemblies

REV. NO.

ATM-825

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DATE 1/29/69

Table I

Environment and/or Parameter	Stress Requirement AL 310900	s Level Capability		
TELEMETRY FORMAT				
Frame Format Word Length	64 Words 10 Bits	64 Words 10 Bits		
FRAME FORMAT				
Control Words Passive Seismic Exp. Magnetometer Exp. Solar Wind Exp. SIDE/CCG Exp. Command Verification Word Housekeeping Word Total	$ \begin{array}{c} 3 \\ 43 \\ 7 \\ 4 \\ 5 \\ 1 \\ \underline{1} \\ 64 \end{array} $	$ \begin{array}{c} 3 \\ 43 \\ 7 \\ 4 \\ 5 \\ 1 \\ \underline{1} \\ 64 \end{array} $		
OPERATIONAL MODES				
Normal Bit Rage Slow Bit Rate Active Seismic Bit Rate OUTPUT DATA TO XMTR	1060 bps 530 bps N/A	1060 bps 530 bps N/A		
Split-Phase-Modulated (Square Wave Data) TIMING & CONTROL SIGNALS	5. 0v + 0. 5v, -2. 5v 0. 0v, + 0. 4v	5.0v, +0.5, -2.5v 0.0v, + 0.4v		
Frame Mark Even Frame Mark Shift Pulse Data Demand Pulse Data Gate Pulse 90th Frame Pulse Analog Multiplexer Advance A/D Start Pulse	118 μs 118 μs 472 μs 9.4 ms/18.8 ms 118 μs > 1μs > 1μs No less than 118 μs apart	118 μs 118 μs 472 μs 9.4 ms/18.8 ms 118 μs > 1μs > 1μs, No less than 118 μs apart		

ONALIFICATION STA	TUS LIST-ALSEP PR	OGRAM CENT	RAL STATION EL	ECTRONI	CS COMPON	ENTS		Revised		Date 1/	9/67	NO. ATM-825 Rev. No.
QUALITICATION OTA		01111		lonon		5117.0		1/28/69		Analyst R. I	billard	Page of Pages
······································		Stress	Level		Verification of Stress Level Capability							
Item	Environment	5(1035	Level					1				
Nomenclature	and/or Parameter	Requirement	Capability	А	gent	1	ocation	Docur Refer	nent ence	Da	ate	Remarks
Data Processor, 90 Channel Analog Multiplexer/Con- verter BxA 2330524	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	-22 [°] F to +158 [°] F -65 [°] F to +185 [°] F	Tested to Same	Dynatı	ronics	Orla Flo	ando, rida	Qualific Test Re 90 Chan log Mul	ation port nel Ana t/Conv.	7 Ma 1967	rch	
S/N 11	Pressure Operating Non-Operating	Sea Level to 10- ¹² mm Hg	Tested to 10 ⁻⁵ mm Hg @ +158 ^o F									
	Humidity Operating Non-Operating	50% R.H. Max 15% - 100% R.H.	Tested to 72 Hr @ 95% RH During Temp. Cycle +25°C to +70°C									
	Vibration Operating N/A Non-Operating Launch & Flight Lunar Landing	Random 7g RMS 20 min Sinusoidal 0.4 ir DA 5-20cps, 8g 20-100cps 2cy at 1 oct/min	Random - Same Sinusoidal - sam plus 9g 50-100 cps for 2 min	;	V						,	
	Acceleration Operating Non-Operating	ATR-16 Adden 1	Tested to 14 ± 1g 1 Min Duration 5 times ea. Axis.	Bendix Aerospace		Ann Mic	Arbor, higan	TP23343 ATR-90, BSR-241	43 91 2. 2413	July 1968	3	Verified at S/P #1 Level Qualification, Qual SA
	Shock Operating Non-Operating	N/A 20g for 11 ms	N/A Same	Dynatro Inc.	onics,	Orla Flor	ando, rida	Qualifica Test Rep 90 ch. Mu	ation port 11t/Conv.	7 M 1967	arch 7	
	Salt Spray	<u>N/A</u>	N/A									
	Sand & Dust	N/A	N/A			_		-				
	Fungus	N/A	N/A									
	Acoustical Noise	N/A	N/A									
	Rain	N/A	N/A									
	Radiation	N/A	N/A									
	Explosion Proof	N/A	N/A									
	PARAMETRIC Multiplexer Analog Input Volt. Analog Accuracy Crosstalk (F. Scale)	0 - 5.0 v 0.33% ±0.1% (max)	-0.0196 to 5.019 0.33% ±0.1%	Dynatr v	onics, Inc.	Orla Flor	undo, rida	Qualifica Test Rep 90 Ch. Ar Mult/Con	tion ort nalog nverter	7 Ma 1967	arch	
	Leakage Current: ON OFF Input Impedance :	<0.5 µa <0.2 µa >50 Merohms	<20 nano amp < 2.3 nano amp >100 Megohms									· · · ·
	OFF Analog Overvoltage: Operating Non Operating Power Consumption	>1 Megohms See Remarks ± 12 v (max) 738 mw	>1 Megohms Same ± 12 Same		V	1						Ch. 6, 7, 26, 52, 67, 70:+8v, -9v Ch. 21, 36, 45, 80:+8v, -6. 5v All remaining Chs:+8v, *5 v
970-12			· · · · · · · · · · · · · · · · · · ·							-		P10 : 21

Note: Parametric continued on sheet 11

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QUALIFICATION ST	ATUS LIST-ALSEP PR	OGRAM CEN'	TRAL STATION E	LECTRONICS COMPONENTS Revised			Date	No. _{ATM-825} Rev. No.	
						9/20/68	Analyst	Page of Pages	
	Environment	Stress Level		vv	erification of Stress	Level Capability			
Item Nomenclature	and/or Parameter	Requirement	Capability	Agent	Location	Document Reference	Date	Remarks	
90 Channel Multiplexer/ Converter (cont.)	PARAMETRIC A/D Converter Resolution Quantizing Error	8 bits ± 1/2 bit	8 bits ± 1/2 bit	Dynatronics Orlando, Florida		Qualification Test Report 90 Channel Analog Multi- plexer/Conver- ter	7 March 1967		
	Output Signal Level Logical "1" Logical "0"	0 to +0.4 v +2.5 to 5.5v	Same						
	Data Availability (After Encode Pulse)	165 µ sec	118 µ. sec						
	Power Consumption	593.3 mw	Same			v			
	Multiplexer/Conv. Operating Life	l Year	l Year with Probability of 0,953			Reliability Analysis Re- port for 90	1 March 1967		
	Storage Life	2 Years	tain parts or mat erial with known age limitations	ΥΥ	V	11	31		
							· · · · · · · · · · · · · · · · · · ·		
970.12	Functional Performance	Tested as part o System in space Chamb e r	f Integrated Simulation	BxA	Ann Arbor, Michigan	TP2333032 ATR-60, 70 BSR, 2367, 2376	May, -June 1968	Qualified as part of an integrated system, Qual SA	
	EMI Performance	Tested as part o System	f Integrated	BxA	Ann Arbor, Michigan	TP2333087 ATR-27, 33 BSR-2300, 2320	May 1968		

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Note: See Section 2.2 Discussion

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NUALIFICATION STA	THS LIST ALSEP PR	OGRAM CENT	RAL STATION EL	ECTRONICS COMP	ONENTS Revi	sed	Date1/30/68	No. ATM-825 Rev. No.	
UNCHIONING JIK	TOO LIGT ALOLI IN	vennin obriti			1/31	/69	Analgso Jones	Page of Pages	
		St	T. une of	V	erification of Stress	Level Capability			
Itam	Environment	Stress	Tevel						
Nomenclature	and/or			Agent	Location	Document	Data	Remarks	
,,omenciature	Parameter	Requirement	Capability	**5 ****	Location	Reference	Date		
	ENVIRONMENTAL								
Transmitter	Temperature:		1000 11000	Philco-Ford	Palo Alto	Qualification			
BxA #2330527	Operating	-10° F to $+140^{\circ}$ F	-10°F to +140°F		California	Test Report			
S/N 17 FI+#3	Non-Operating	$-65^{\circ}F$ to +160°F	-65°E to +160°E	-		RN-DA-1795			
S/N 18)	Larth	N/A	-05 1 10 1100 1	4	f				
	Pressure		_ 5						
	Operating	1 x 10 ⁻¹² mm	lx10 mmHg						
	Non-Operating	Sea Level-10 ⁻⁸ n	im lx10 mmHg						
	Humidity								
	Operating	50%	150 1000			а. 19			
	Non-Operating	15% - 100%	15% - 100%						
	Vibration							Qualified at S/P #1	
	Operating	N/A	N/A					Design Limit Test Level	
	Non-Operating	Refer to ATR-16	9.0G - peak					for a Stowed Configuration.	
	Launch & Flight	Addendum #1	20 - 100 cps			- -		Test Levels per figures 1-5	
	Lunar Landing								
	Acceleration	NI/A	N/A						
	Operating Non-Operating	ATR-16 Add #	14G - 1 min.			l l			
	Non-Operating	231R-10, 11uu. #	each of 3 axes						
	Operating	N/A	N/A	ς,					
	Non-Operating	ATR-16, Add. #1	20G - 10 ms rise	V	, V	v			
	Salt Spray	N/A	N/A						
	Sand & Dust	N/A	N/A						
	Fungus	N/A	N/A						
	Acoustical Noise	N/A	N/A						
	Rain	N/A	N/A						
	Radiation	N/A	N/A				/		
	Explosion Proof	N/A	N/A			· · · · · · · · · · · · · · · · · · ·	+		
	PARAMETRIC	:				TP 2333032			
	Functional	Tested as part of	t Integrated	BxA	Ann Arbor,	ATR-60, 70	May-June	Successful	
	Performance	System in Space	Simulation		Michigan	BSR-2367, 2376	1968		
1	1	Ghamber'							
1								· · · · · · · · · · · · · · · · · · ·	
	EMI Performance	Tested as part	of Integrated		Ann Arbor.	TP 2333087		EAR 120 analyzed as not	
	Linit I offormanoe	System		BxA	Michigan	ATR-27, 33	May-June	FAR-139 analyzed as not	
						BSR - 2300, 2320	1968	significant on 205 KHZ EMI	
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				Sec. Sec.					
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				· ·					
970-12	1	<u></u>	L	L		1	_ _	1 (B12 (2)	

Note: See Section 2.2 Discussion

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QUA

QUALIFICATION STA	ALIFICATION STATUS LIST-ALSEP PROGRAM				STATION ELECTRONICS			Revised	Date 12/29/66	No. ATM-825	Rev. No.
			CO	MPONENTS				1-31-09	Analyst J.M.	Page	of Pages
	P	Stress Level			Verif	ication (of Stress	Level Capability			
Item Nomenclature	and/or Parameter	Requirement	Capability	Age	nt	Location		Document Reference	Date	Re	marks
Power Distribution Unit BxA 2330450-2 S/N 8	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	-22 [°] F to +158 [°] F -65 [°] F to +160 [°] F N/A	-22° F to $+158^{\circ}$ F -65° F to $+160^{\circ}$ F	Bendix A Systems	Bendix Aerospace Systems Division		Arbor, nigan	TP 2334335 ATR-60,70 BSR-2367,2376	May-June 1968		
	Pressure Operating Non-Operating	1×10^{-12} mmHg S/L to 1×10^{-12} mm	Tested in Space Simul. Chamber to 5x10 ⁻⁶ Torrs	Bendix Aerospace Systems Division		Ann Arbor, Michigan		TP 2334335 ATR-60,70 BSR-2367,2376	May-June 1968	Test Level Limited by Equipment Capability	
	Humidity Operating Non-Operating	Hg N/A 15% to 100%	Designed to meet Humidity Re- quirements					N/A	N/A		
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	N/A Refer to ATR-16 Addendum 1	Tested to S/P#1 Design Limit Test Levels Refer to fig 1 thru 5					TP 2334346 ATR-82, 83 BSR-2402, 2403	July 1968	Qualified at Design Limi a Stowed Cor	Subpackage(S/P)# t Test Levels for nfiguration
	Acceleration Operating Non-Operating	N/A ATR-16, Add. 1	Tested to 14 ± lg l Min. Dur~ ation, 5 times ea					TP 2334343 ATR-90, 91 BSR-2412, 2413	July 1968		
	Shock Operating Non-Operating	N/A ATR-16, Add. 1	Tested to 15 ±2g, 11 mo Saw- tooth 3 times ea Axis		/			TP 2334328 ATR-86,87 BSR-2406,2407	July-Aug 1068		↓
	Salt Spray Sand & Dust Fungus	N/A Not Defined N/A	N/A Designed to Meet N/A							No testing r	equired
	Acoustical Noise Rain Radiation	Not Defined N/A Not Defined	N/A tested to 130w/ft ²	IR						No testing r	equired
	Explosion Proof PARAMETRIC	N/A See Table I	N/A See Table I Shoot B 14	BxA	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Ann	Arbor,				
	Performance Specifications	Sheet D-14	20661 1-14			WIIC.	liigan				
	Functional Performance	Tested as part System in Space Chamber	of Integrated Simulation	BxA		Ann Mic	Arbor, higan	TP 2333032 ATR-60,70 BSR-2367,2376	May-June 1968		
	EMI Performance	Tested as part System	of Integrated	BxA		Ann Mic	h Arbor, chigan	TP 2333087 ATR-27, 33 BSR-2300, 2320			

Note: See Section 2.2 discussion

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TABLE I

QUALIFICATION STATUS LIST PDU

Parametric Reqm'ts	Requirements	Capability
Exp. Pwr Control:		
Operational Modes	ON/OFF/STDBY	ON/OFF/STDBY
Overload Circuit Protection:		
Experiments (+29v)	$500 \text{ ma} \pm 10\%$	$500 \text{ ma} \pm 10\%$
Transmitter (+29v)	$600 \text{ ma} \pm 100 \text{ ma}$	600 ma ± 100 ma
Transmitter (+12v)	150 ma + 75, - 40 ma	150 ma + 75, - 40 ma
Cmd Receiver (+12v)	150 ma, + 75,-40 ma	150 ma, + 75, - 40 ma
PDU Pwr Rqmt:		
Quiescent State	3.0 W (Max)	3.0 W (Max)
Cmd Execution	4.4 W Peak	4.4 W Peak
Signal Conditioning:		
Housekeeping Data	0-5 v	0 - 5 v
PCU Loading:		
Reserve Pwr. Dump		
Capability	0 - 10 w	0 - 10 w
Experiment Ripple-off:		
Response Time (1st Exp)	$135 \text{ ms} \pm 15 \text{ ms}$	$135 \text{ ms} \pm 15 \text{ ms}$
Sequential Switching (3 Experiments)	8 ± 1 ms ea Exp.	8 ± 1 ms ea Exp.
Redundant Pwr. Control		
Transmitter	Selects A or B	Selects A or B
Data Processor	Selects X or Y	Selects X or Y
Power Switching Control:		
Switching Relays		
Coil Voltage	26.5 v (Nominal)	26.5 v (Nominal)
Coil Current	22.5 ma (Max)	22.5 ma (Max)
Response Time	8 ms (Max)	8 ms (Max)
Relay Drivers		
Active State (+29.0v)	36 ma (min.)	36 ma (min.)
Inactive State	2 mw (max)	2 mw (max)

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ANALIFICATION STA	AN ASSIATOR SHT	OGRAM	CENTRALSTA	TION ELECTRONICS			Date 20 June 68	No. ATM-825 Rev. No.
QUALIFICATION STA	IUS LISI ALSLI IN	o u i k i iii	COM	IPONENTS	Revised	1-31-68	Analyst J.T.	Page of Pages
	E-1	Stress	Level	Veri	fication of Stress	Level Capability		
Item Nomenclature	and/or Parameter	Requirement	Capability	Agent	Location	Document Reference	Date	Remarks
Power Condition- ing Unit (P. C. U.) S/N 6	ENVIRONMENTAL Temperature: Operating Non-Operating Earth	-22 [°] F to +158 [°] F -65 [°] F to +160 [°] F	-22° F to $+158^{\circ}$ F -65° F to $+160^{\circ}$ F	Bendix Aerospace Systems Division	Ann Arbor, Mich.	T. P. 2334335 ATR-60, 70 BSR-2367, 2376	May-June 1968	Qualified in Subpackage #1 system level tests
	Moon Pressure Operating Non-Operating	Sea Level to 1x10 ⁻¹² Torr	Tested to 5x10 ⁻⁶ Torr			T.P. 2334335 ATR-60, 70 BSR-2367,2376		Test level limited by Test Equipment Capability
	Humidity Operating Non-Operating	50% relative max	Designed to meet humidity requirements			N/A	N/A	Testing Not Required
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	ATR-16 Adden. #1	Tested to S/P#1 Design Limits Test Levels(Refer to Fig 1 thru 5)			T. P. 2334346 ATR-82, 83 BSR-2402, 2403	July 1968	Qualified at Subpackage #1 Design Limit Test Levels for a stowed configuration
	Acceleration Operating Non-Operating	ATR-16 Adden.#1	Tested to 14± 1g, 1 min duration, 5 times per axis			T. P. 2334343 ATR-90, 91 BSR-2412, 2413	July 1968	Verified at Subpackage #1 Design Limit Test and for a stowed configuration
	Shock Operating Non-Operating	ATR-16 Adden. #1	Tested to 15±2g, 11 ms 3 times each axis			T.P.2334328 ATR-86, 87 BSR-2406.2407	July 1968	Verified at Subpackage #1 Design Limit Test and for a stowed configuration
	Salt Spray Sand & Dust	N/A Not Defined	N/A					No Test Required
	Acoustical Noise Rain	N/A Not Defined	N/A NYD					No Test Required
	Radiation Explosion Proof	Not Defined Not Defined	NYD N/A					
	PARAMETRIC Regulation Ripple	Refer to Table I Refer to Table II	Refer to Table I Refer to Table II	Sheet B-16				Waiver or change to Speci- fication pending on ripple and voltage regulation limits.
	Functional Performance	Tested as part of tem in Space Sin	Integrated Sys- ulation Chamber	BxA	Ann Arbor, Mich.	T.P. 2333032 ATR-60, 70 BSR-2367, 2376	May-June 1968	
	EMI Performance	Tested as part of System	Integrated	BxA	Ann Arbor, Mich.	T.P. 2333087 ATR-27, 33 BSR-2300, 2320	May-June 1968	

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TABLE I

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QUALIFICATION STATUS LIST PCU

• •	Voltage Range (AVG)	Ran	nge (of Loads	Nominal	Loads
Output #1	28.59 to 29.40 VDC	18.0	to	45 watts	34.5	watts
Output #2	14.80 to 15.30 VDC	0.12	to	1.2 watts	1.2	watts
Output #3	11.85 to 12.10 VDC	2.4	to	3.6 watts	3.6	watts
Output #4	4.85 to 5.25 VDC	2.25	to	4.5 watts	4.5	watts
Output #5	-5.86 to -6.10 VDC	0.21	to	0.27 watts	0.27	watts
Output #6	-11.80 to -12.40 VDC	0.48	to	1.8 watts	1.8	watts

TABLE II

PCU PEAK-TO-PEAK RIPPLE VOLTAGE LIMITS

	Volts	Frequency	Resistive		
	Peak-to-Peak	Band	Loading (watts)		
Output #1 (+ 29 VDC Nom)	0.20	< 100 KHz	45	Maximum	
Output #2	0.20	< 100 KHz	1.2	Maximum	
(+15 VDC Nom.)	0.50	> 100 KHz	0.12	Minimum	
Output #3	0.20	$\leq 100 \text{ KHz}$	3.6	Maximum	
(+12 VDC Nom.)	0.50	> 100 KHz	2.4	Minimum	
Output #4	0.20	<pre>< 100 KHz > 100 KHz</pre>	4.5	Maximum	
(+5 VDC Nom.)	0.50		2.25	Minimum	
Output #5	0.20	<pre>< 100 KHz > 100 KHz</pre>	0.27	Maximum	
(-6 VDC Nom.)	0.50		0.21	Minimum	
Output #6	0.20	< 100 KHz > 100 KHz	1.8	Maximum	
(-12 VDC Nom.)	0.50		0.48	Minimum	

QUALIFICATION STA	TUS LIST-ALSEP PR	OGRAM	CENTRAL ST	ATION ELECTRONICS	5		Date 1-31-69	No.ATM-825 Rev. No.
QUALITICATION OF		•••••	CON	PONENTS			Analyst	Page of Pages
		Strass Level		Verif	fication of Stress 1			
Item Nomenclature	Environment and/or Parameter	Requirement	Capability	Agent	Location	Document Reference	Date	Remarks
Timer, Central Station P/N 2330626	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	-30° C to $+80^{\circ}$ C -55° C to $+100^{\circ}$ C -30° C to $+80^{\circ}$ C	-30° C to $+80^{\circ}$ C -55° C to $+100^{\circ}$ C -30° C to $+80^{\circ}$ C	Bendix Aerospace Systems Division (BxA)	Ann Arbor, Michigan	TP 2334335 ATR-60,70 BSR-2367,2376	May-June 1968	Qualification of the Timer has been accomplished at the System Level.
	Pressure Operating Non-Operating	1×10^{-12} Torrs 1×10^{-8} Torrs	Verified to 5x10 ⁻⁶ Torrs in space Simulation Chamb	BxA	Same	Same	Same	Pressure limited by test chamber capability
	Humidity Operating Non-Operating	N/A 50% to 1 <u>00% RH</u>	Designed to meet Humidity Requirements	N/A	N/A	N/A	N/A	No Testing Planned to the 100% Humidity Level.
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	N/A Refer to ATR-16 Addendum 1	See Fig 1 thru 5	BxA	Ann Arbor, Michigan	TP 2334346 ATR-82, 83 BSR-2402, 2403	July-Aug. 1968	Qualification of the Timer was accomplished at the System Level.
	Acceleration Operating Non-Operating	N/A ATR-16, Add. 1	Tested at 14 <u>+</u> 1g 1 Min Duration ea Axis	BxA	Same	TP 2334343 ATR- 90, 91 BSR-2412, 2413	July 1968	Qualified to S/P#1 Design Limit Test for a Stowed Configuration
	Shock Operating Non-Operating	N/A ATR-16, Add. 1	Tested to 15+2g 11 ms Sawtooth ea Axis	BxA	Same	TP 2334328 ATR-86,87 BSR-2406,2407	July 1968	Same'as above
	Salt Spray	N/A	N/A					
	Sand & Dust					· · · · · · · · · · · · · · · · · · ·		
	Fungus							
	Acoustical Noise			······	<u> </u>		<u> </u>	
	Rain De die tien		 		<u> </u>		<u>+</u>	
	Furnhagion Drost		h				†	
	DAPAMETRIC	<u>N/A</u>	IN/A		f	· · · · · · · · · · · · · · · · · · ·	t	<u> </u>
	Power Requirements Volts Current Start Mode	1.2 to 1.5 VDC	1.2 to 1.5 VDC	BxA	Same	TP2334345 ATR-101,102	August 1968	Qualified contingent on completion of separate 36- cycle reliability evaluation tests, February 1969
	Stop Mode	- Zu amp max	7μ'amp'max		<u> </u>	<u> </u>	t	
	Switch Closures: Repetitive Non-Repetitive	l minute 12 Hr 720 Day	l Minute 12 Hr 720 Day	ВхА	Same	Same	Same	Same as above

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ATZ MOLTANIALIE	RE STATES AND A SHE	OGRAM PASSIVE	SEISMIC EXPER	MENT			Dale 1/31/69	NO.ATM -825 Rev. No.
UNCHIONING SIN	IUS LISI'ALSLI IN	IVENUM LYDOLAE	S DEIDIVITO EAFER.	TTATTATA T			Analyst	Page of Pages
		Streep	Level	Verif	ication of Stress I	Level Capability		
Item Nomenclature	Environment and/or Parameter	Requirement	Capability	Agent	Location	Document Reference	Date	Remarks
PSE Sensor Assembly P/N 233425 BxA #2338460-2 Flt #3, S/N 6	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	107 ⁰ to 125 ⁰ F -65 ⁰ F to 160 ⁰ F Same as Operating	Tested is Space Simulation Chamber for Temperature	Bendix Aerospace Systems Division	Ann Arbor, Michigan	T13022 TP2334335 ATR-60,70 BSR-2367,2376	11 Jan 69 June 10, 1968	See Note 4 Qualified contingent on resolution of major items listed in Note 1 below at the System Level.
	Pressure Operating Non-Operating	1×10^{-12} mm Hg 1×10^{-8} mm Hg	Verified to 5x10 ⁻⁵ Torrs in Space Sim. Cham.					Test level limited by test equipment capability
	Humidity Operating Non-Operating	Not applicable 50-100% R.H.	Designed to Meet Humidity Requirement			N/A	N/ A	N/A
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	Not Applicable Refer to ATR-16 Addendum 1	Tested in Stowed Configuration to Vibration Design Limits Indicated in Fig. 1 Thru 5.			TP2334346 ATR-82,83 BSR-2402,2403	6/28/68	
	Acceleration Operating Non-Operating	Not Applicable ATR-16, Add.1	Tested in Stowed Configuration to $14 \pm 1g$, 1 Min,			TP2334343 ATR-90,91 BSR-2412,2413	7/4/68	
	Shock Operating Non-Operating	Not Applicable ATR-16, Add 1	Tested in Stowed Configuration to 15 ± 2g 11ms 3 Times Ea. Axis	Y	Y	TP2334328 ATR-86,87 BSR-2406,2407	6/24/68	
	Salt Spray	Not Applicable	Not Applicable				·,	
	Sand & Dust	LED-520	Designed to Meet					
	Fungus	Not Applicable	Not Applicable					
	Redustical Noise	Not Applicable	Not Applicable					
	Radiation	Not Applicable	Not Applicable					
	Explosion Proof	N 6 6 11 11	Designed to Meet				t	
	PARAMETRIC Functional Performance	Not Applicable Tested as part of System in Space Chamber	Not Applicable If Integrated Simulation	BxA		TP 2333032 ATR-60,70 BSR-2367,2376	June 10 1968	Qualification contingent on resolution of major open items listed in Notes 2 & 3
	EMI Performance	Tested as part of system	f integrated	BxA		TP 2333087 ATR-27,33 BSR-2300,2320	April 1968	
	Note 1: FR-192 PS Note 2: FR 125 PS Note 3: Retest of 1 Note 4: Thermal C	E S/N 3 uncage; 1 E Uncage Final F. FSE S/N 2 require Control Qualified p	final FAR-132A is AR-125A issued a after QSA system Fr as run T/P T1:	sued n level testing 1022 & accepted by MSC	per Qual SB QAF	Meeting Minutes	9713-10-3021	1/27/69

Note: See Section 2.3 discussion

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QUALIFICATION STATUS LIST-ALSEP PROGRAM

ATTENDATION CTA	DD DDIA.TOIL DIIT	OGPAM	DASSIVE S	FISMIC EXPERIM	(ENT			1	Date 1/31/69	^{No.} ATM-825	Rev. No.
JALITICATION STA	IUJ LIJI-ALJET FN		F 4 2 2 1 4 2 3						Analyst	Page	of Pages
	Environment.	Stress	Level		Verif	ication o	f Stress I	Level Capability			
Item Nomenclature	and/or Parameter	Requirement	Capability	Agent		Loc	ation	Document Reference	Date	Re	marks
PSE Central Station Electronics	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	107 ⁰ F to 125 ⁰ F -65 ⁰ F to 160 ⁰ F Same as Operating	Tested is Space Simulation Chamber for Temperature	Bendix Aerospa Systems Divisio	ice on	Ann A1 Michig	rbor, an	TP2334335 ATR-60,70 BSR-2367,2376	June 10 1968	Successfully on BxA Qual	tested SA model
BxA #2334670 Flt #3 S/N 5	Pressure Operating Non-Operating	1 x 10 ⁻¹² mm Hg 1 x 10 ⁻⁸ mm Hg	Verified to 5 x 10 ⁻⁵ Torrs in Space Sim. Cham								
	Humidity Operating Non-Operating	Not Applicable	Designed to Meet Humidity Requirements					N/A	N/A	N/A	
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	Not Applicable Refer to ATR-16 Addendum 1	Tested in Stowed Configuration to Vibration Design Limits Indicated in Figs. 1 Thru 5.					TP2334346 ATR-82,83 BSR-2402,2403	6/28/68	Successfully	Tested
	Acceleration Operating Non-Operating	Not Applicable ATR-16, Add. 1	Tested in Stowed Configuration to 14 ± 1g. 1 Min.					TP2334343 ATR-90,91 BSR-2412,2413	7/4/68	Successfully	Tested
	Shock Operating Non-Operating	Not Applicable ATR-16, Add. 1	Tested in Stowed Configuration to 15 ± 2g 11ms 3 Times Ea. Axis	V			1	TP2334328 ATR-86,87 BSR-2406,2407	6/24/68	Successfully	Tested
	Salt Spray	Not Applicable	Not Applicable								
	Fungus	Not Applicable	Designed To Meet						[
	Acoustical Noise	Not Applicable	Not Applicable	······································		1				1	
	Rain	Not Applicable	Not Applicable								
	Radiation	LED-520	Designed to Meet			<u> </u>					
	PARAMETRIC Functional Performance	Not Applicable Tested as part system in the s chamber	Not Applicable of the integrated pace simulation	BxA		Ann A Michi	rbor, gan	TP 2333032 ATR-60-70 BSR-2367,2376	June 10, 1968		
	EMI Performance	Tested as part system	of the integrated	BxA		Ann A Michi	.rbor, gan	TP 2333087 ATR-27,33 BSR-2300,2320	April 1968		

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NALIFICATION STA	RG GAZIA-TZII ZHT	INGRAM	_				Date 1/31/69	No. ATM-825 Rev. No.
UNEITIVATION JIA				PASSIVE SEISMIC EXPI	CRIMENT		Analyst	Page of Pages
	Environment	Stress	Level	Veri	fication of Stress :	Level Capability	1	
Item Nomenclature PSE	and/or Parameter	Requirement	Capability	Agent	Location	Document Reference	Date	Remarks
Shroud, Thermal Control P/N 233415	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	-300 - +250°F	-300 - +250°F	Earth Sciences Division-Teledyne during DVT thermal vacuum tests	Hughes Air- craft Space Simulation Laboratory El Segundo, Cal.	Engineering Report No. 640-0268-0053	8 Feb. 1968	See Note Below
	Pressure Operating Non-Operating	1 x 10 ⁻¹² mm Hg Same as oper.	1 x 10 ⁻⁷ mm Hg	11	IT	n	11	
	Humidity Operating Non-Operating	Notapplicable 50%-100% R. H.	Designed to Meet Humidity Requirements					
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	See Remarks	Hz g ³ /Hz 23-58 0.304 58-100.12db/oct 100-200 0.039 200-430.12db/oct 430-1000 0.99	Earth Sciences Division - Teledyne	Bunker Ramo Corporation Testing Lab Canoga Park, Calif.	DVT Report ENV-R-2363	Nov. 1967	
	Acceleration Operating Non-Operating	Not applicable 14^{+1}_{-0}	14 g's	11	18	11	ţI	
	Shock Operating Non-Operating	Not applicable 20 ±1 g	20 g ±10% saw tooth 10 msec rise 1 msec decay	11	11	11	11	
	Salt Spray	Not applicable	Not applicable					
	Fungus	LED-520	Designed to Meet				t	
	Acoustical Noise	Not applicable	Not applicable					
	Rain	Not applicable	Not applicable				1	T. T
	Radiation	LED-520	Designed to Meet					İ
	Explosion Proof	Not applicable	Not applicable	·····			1	
	PARAMETRIC							
		NOTE: PSE Shr test and	oud qualified on S report reference	nbpackage #1 installati shown on SP#1 Sheet 1	on per -1.			

Sheet <u>\$20</u> of <u>31</u>

ONALIFICATION STA	ATTAL TRAILER PR	OGRAM			NOME EVD		n		Date 1/31/69	No. ATM -825	Rev. No.
QUALITURITUR SIA	100 2101 42027 11	U u i r i ii		PASSIVE SE	LISMIC LAP	ERIVIEN	L		Analyst	Page	of Pages
		Stress	Level		Veri	fication o	f Stress	Level Capability			
Item	Environment					Demonst		1 _	,		
Nomenclature	Parameter	Requirement	Capability	Ag	ent	Loc	ation	Reference	Date	R	emarks
	ENVIRONMENTAL		Tested is Space						12/22/12		~ · ·
PSE	Temperature:	107°F to 125°F	Simulation	Bendix Ae	rospace	Ann Art	oor,	1 P2334378	12/30/68	Successfully	lested
Gnomon Assembly	Operating	-65°F to 160°F	Chamber for	Systems D	1V1510n	Michiga	n	AIR-100		at System Le	everasa
D- A #2220016	Non-Operating	Same as	1 emperature					DSR-2570	1	Result of Qu	al ob lest
DXA #2550010	Maarth	Operating								Frogram	
	Pressure	1 x 10-12mmHg	Varified to		<u> </u>	1	<u> </u>		1-1	1	
	Operating	I X IO IIIIIIIg	5 x 10-5Torrs in			1	1				
	Non-Operating	Lx 10 ⁻⁸ mmHg	Space Sim. Cham					₩		1 1	
	Humidity	The to mining	Designed to					†		·	
	Operating	Not Applicable	Meet Humidity								
	Non-Operating		Requirements					N/A	N/A	N/A	
	Vibration		Tested in Stowed		·····			mp32270.05		, , , , , ,	m
	Operating	Not Applicable	Configuration to					1 P2337905	12/10/60	Successfully	Tested at
	Non-Operating	Reter to ATR-16	Vibration Design					A1R-149	12/19/08	System Leve	as a Result
	Launch & Flight	Addendum I	Limits Indicated					DSR-2540		OI QUAL SE I	est Program
	Lunar Landing		in Figs. 1 Thru 5.		(I V	V				1
	Acceleration		Tested in Stowed			Mishaw	auka	TP2337915			1
	Operating	Not Applicable	Configuration to	BMSD		Indiana		ATR-164	1/15/69		
	Non-Operating	ATR-16, Add. 1	14 ± 1g. 1Min.					BSR-2574			
	Shock	Not	Tested in Stowed	Bendix Ae	rospace	Ann Ar	bor	TP2337917			
	Operating	Applicable	Configuration to	Systems I	Division	Michiga	an	ATR-161	1/7/69		
	Non-Operating	ATR-16, Add. 1	3 Times Ea. Axi			_		BSR-2571			[
	Salt Spray	Not Applicable	Not Applicable			1		<u> </u>			
	Sand & Dust	LED-520	Designedto Meet	 		<u> </u>					
	Fungus	Not Applicable	Not Applicable	ļ						<u> </u>	
	Acoustical Noise	Not Applicable	Not Applicable				<u> </u>			+	
	Rain Dediction	Not Applicable	Not Applicable	<u> </u>		+			+		
	Explosion Proof	LED-520	Designed to Meet	 		+		+	+	<u>+</u>	
	PARAMETRIC	Not Applicable	Not Applicable	 		+			· · · · · · · · · · · · · · · · · · ·		
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Note: See Section 2.3 Discussion

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1.6.4

NHALIFICATION STA	RE TIST.ALSEP PR	OGRAM					Date 1-31-69	No. ATM 825 Rev. No.
UNLIFICATION STA	TUS EIST-RESET TH						Analyst JTS	Page of Pages
	Environment	Stress	Level	Vei	ification of Stress	Level Capability		
Item Nomenclature	and/or Parameter	Requirement	Capability	Agent	Location	Document Reference	Date	Remarks
Heat Flow Experi- ment 2330661 S/N 05	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	-300°F to +250°I -65°F to +160°F -300°F to +250°F	F-300°F to +250°F Not Tested	BxA	Ann Arbor, Michigan	TP 2334387 ATR-160 BSR-2570	Dec 1968	Qual SB Test
	Pressure Operating Non-Operating	Sea Level to 10 ⁻¹² TORR	5 x 10 ⁻⁷ TORR	BxA	Ann Arbor, Michigan	TP 2334387 ATR-160 BSR-2570	Dec 1968	BxA facilities will not allo testing to below 5 x 10 TO
	Humidity Operating Non-Operating	15 to 100%	Designed to Meet Humidity Requirement	ВхА	Ann Arbor, Michigan	N/A	N/A	No testing planned to 100% level.
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	N/A LTA-3D/R LTA-3D/R	Tested without failure to levels shown in figures l-5	BxA	Ann Arbor, Michigan	TP 2337905 ATR-149 BSR-2546	Dec 1968	Qual SB Design Limit Test
	Acceleration Operating Non-Operating	N/A ATR-16 ADD. 1	$14g \pm 1g/1$ min.	BxA/BMSD	Mishawauka Indiana	TP 2337915 ATR-164 BSR-2574	Dec 1968	Qual SB Design Limit Test
	Shock Operating Non-Operating	N/A 15g±2g Sawtooth	15g±2g Sawtooth	BxA	Ann Arbor, Michigan	TP 2337917 ATR-161 BSR-2571	Jan 1969	Qual SB Design
	Salt Spray	N/A N/A				<u> </u>		
	Fungus							
	Acoustical Noise	N/A						······································
	Rain	N/A						
	Radiation	N/A				T	1	
	Explosion Proof	N/A						·····
	PARAMETRIC functional performance	Tested as a part system in the Sp chamber	of integrated ace Simulation	BxA	Ann Arbor, Michigan	TP 2338640 (Mod. IST) ATR-163 BSR-2573	Jan 1969	Qual SB Test
	Note: See Se	ction 2.4 discussi	on					
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QUALIFICATION STATUS LIST-ALSEP PROGRAM

COLD CATHODE GAUGE EXPERIMENT

THODE GAUGE EXPERIMENT

 Date
 No.
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 Rev. No.

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		Stress Level		Veri	fication of Stress	Level Capability		
Item Nomenclature	Environment and/or Parameter	Requirement	Capability	Agent	Location	Document Reference	Date	Remarks
Cold Cathode Gauge Experiment BxA 2338549 S/N 1003	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	-300°F to +250°F -65°F to +160°F -300°F to +250°F	-300°F to +250°F	BxA	Ann Arbor, Michigan	TP2334387 ATR 60 BSR-2570	Dec. 1968	Qual SB Test
	Pressure Operating Non-Operating	10 ⁻¹² Torr SL-10 ⁻¹² Torr	Tested to 5×10^{-6} Torr	BxA	Ann Arbor, Michigan	TP2334387 ATR 60 BSR-2570	Dec. 1968	Test level limited by test equipment capability
	Humidity Operating Non-Operating	N/A 15-100%	Designed to meet Humidity Re- guirements	BxA	Ann Arbor, Michigan	N/A	N/A	No testing planned to 100% level
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	N/A IC 314105	Tested in stowed conf. to design limit levels in- dicated in fig- ures 1-5	BxA	Ann Arbor, Michigan	TP2337905 ATR 149 BSR-2546	Dec. 1968	
	Acceleration Operating Non-Operating	N/A IC 314105	Tested to 14 ±1 g 1 Min Duration	BxA	Ann Arbor, Michigan	TP2337915 ATR 164	Jan. 1969	Tested in stowed configura- tion during design limit test
	Shock Operating Non-Operating	N/A IC 314105	Tested to 15g±2g lms sawtooth ea Axis	BxA	Ann Arbor, Michigan	TP2337917 ATR 161 BSR-2571	Jan. 1969	Tested in stowed configuration during design limit test
1	Salt Spray	N/A						
	Sand & Dust	N/A Not defined						No testing planned
	Fungus	N/A						
	Acoustical Noise	Not Defined						No testing planned
	Rain	N/A		· · · · · · · · · · · · · · · · · · ·				
	Radiation	N/A		-				
	Explosion Proof	N/A						
	PARAMETRIC Functional Per- formance		Tested as part of Integrated System	BxA	Ann Arbor, Michigan	TP2338640 ATR-163 BSR-2573	Jan. 1969	Modified IST (Post Shock)

Note: See Section 2.5 discussion.

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QUALIFICATION STATUS LIST-ALSEP PROGRAM CHARGED PARTICLE LUNAR ENVIRONMENT EXPERIMENT

UNCLISENTION STR	(105 LIST RESET TR	Vullium					Analyst J.T.	Page of Pages
		Stress	Level	Veri	fication of Stress	Level Capability		
Item Nomenclature	Environment and/or Parameter	Requirement	Capability	Agent	Location	Document Reference	Date	Remarks
CPLEE BRL#2165701	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	-300°Fto+250°F -65°Fto+160°F -300°Fto+250°F	-300°F to +250°F -300°F to +250°F	Bendix Aerospace Systems Division	Ann Arbor, Michigan	TP2334387 TP2337912 ATR160/BSR2570	12/30/68	Qualification contingent on resolution of FR 199, FR 200 and FR 211.
	Pressure Operating Non-Operating	10^{-12} torr 10^{-12} torr	Tested to 10 ⁻⁶ torr 10 ⁻⁶ torr	11	11	TP2334387 and TP2337912 ATR160/BSR2570	12/30/68	
	Humidity Operating Non-Operating	NA 15% to 100% Relative	Designed to meet Humidity Reguirements	11	11	NA	NA	No Testing Planned
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	NA Design Limit vib. Defined in figures 1-5	Tested to Design Limit vib. Levels indicated in figures 1-5	п		TP2337905C ATR149/BSR254 TP2338640 ATR163/BSR2573	12/19/68 6 1/13/69	Capability to meet require- ment verified by system level qualification testing.
	Acceleration Operating Non-Operating	NA 14g±lg min in the +X Direction	Tested to 14±1g 1 min in the +X Direction	BMSD	Mishawauka, Indiana	TP2337915A ATR149/BSR2546 TP2338640 ATR163/BSR2573	12/19/68 1/13/69	
	Shock Operating Non-Operating	NA 15g±2g, 11ms Sawtooth ea axis	Tested to 15g±2g 11ms Sawtooth ea axis	Bendix Aerospace Systems Division	Ann Arbor, Michigan	TP2337917A ATR161/BSR2571 TP2338640 ATR163/BSR2573	1/7/69 1/13/69	
	Salt Spray	NA			\		-	
	Fungus	NA			†			
	Acoustical Noise	NA						
	Rain	NA						
	Radiation	NA						
	Explosion Proof	NA						
	PARAMETRIC Functional Performance	Tested as part or system in Space Chamber.	integrated Simulation	11	u	TP2334375 ATR167/BSR2577	1/15/69	See First Remark.
	Note: See Sec	tion 2.6 discussio	m.					

Date 1-31-69 No. ATM-825 Rev. No.

							Date 1-31-69	NoATM-825 Rev. No.
UALIFICATION ST	ATUS LIST-ALSEP PR	UGRAM - ASSEMI	BLY, SUBPACKAC	<u>E #2</u>			Analyst	Page of Pages
	T			Verif	ication of Stress]	Level Capability		
Item Nomenclature	Environment and/or Parameter	Stress	Level Capability	Agent	Location	Document Reference	Date	Remarks
Subpackage #2 BxA 2334844 Flt. #3 S/N 8	ENVIRONMENTAL Temperature: Operating Non-Operating Earth	-300°F to +250°E -65°F to +160°F	-300°F to +270°F (See note 1)	BxA	Ann Arbor, Michigan	TP2334335(ENV TP2333032(IST) ATR-60,70	6/10/68	Completed testing with no open items
	Moon	-300°F to +250°F	-300 °F to +250 °F			BSR-2367, 2376	L	
	Pressure Operating Non-Operating	10 ⁻¹² Torr SL to 10 ⁻¹² Torr	Tested to 5×10^{-6} Torr	BxA	Ann Arbor, Michigan	Same as above	6/10/68	Test level limited by test equipment capabilities.
1	Humidity Operating Non-Operating	N/A 15-100%	Designed to Meet Humidity Requirement	BxA	Ann Arbor, Michigan	N/A	N/A	No Testing planned to the 100% humidity level: ALSEP QTRR Board decision
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	N/A Refer to CP 100001	Tested in Stowed Configuration to Desing Limit Levels Indicated in Figures 1-5.	BxA	Ann Arbor, Michigan	TP 2334348 ATR-84, 85 BSR 2404, 2405	6/28/68	Qualified
	Acceleration Operating Non-Operating	N/A CP100001	Tested to 14± 1g each axis	BxA	Ann Arbor, Michigan	TP 2334330 ATR-92, 93	7/6/68	Successful test
	Shock Operating Non-Operating	N/A CP100001	Test to $15 \pm 2g$ each axis	BxA	Ann Arbor, Michigan	TP2334331 ATR - 88, 89 BSR - 2408, 2409	6/30/68	Successful test
	Salt Spray	N/A						h
	Sand & Dust	Not Defined						
	Fungus	N/A						No test required
	Acoustical Noise	Not Defined						
	Rain	N/A					_	P
	Radiation	LED-520	130 w/ft ⁻ I.R.	BxA	Ann Arbor,	TP2334335	6/10/68	See operating temperature
	Explosion Proof	N/A			Michigan			No test required
	<u>PARAMETRIC</u> Mission Simulation	ATM-785 Section 5.3	Capable of startup and operation on lunar surface	BxA	Ann Arbor, Michigan	TP 2334345 TP 2338610 ATR-101, 102	8/7/68	Qualified contingent on completion of open items in note 3
	Note 1: Temper Note 2: Differer with tes Note 3: See Sec	ture storage tes ces for Array B of procedures and ion 3.0 discussion	s may be replaced onfiguration is de reports referenced n.	by an added deploymer ined in Section 3.0 wer in addendum #1 dated	t test per MSC L e qualified to com 1/27/69 of ALSEP	etter BG 931/L22 parable environn TM-321.	6/T97(CCP-12 nent levels in a	2), ccordance
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QUALIFICATION STATUS LIST-ALSEP PROGRAM

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Date

No. ATM-825

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QUALIFICATION STA	TUS LIST-ALSEP PR	OGRAM	SUBPACKA	GE II, RTG ASSEMBLY Revised 1/31/69			Date 20 June	No. ATM-825 Rev. No.
					fination of Street	Level Couchilit	F.W	Page of Pages
	Environment	Stress	Level	veri	Incation of Stress	Level Capability		
Item Nomenclature	and/or Parameter	Requirement	Capability	Agent	Location	Document Reference	Date	Remarks
Radioisotope Thermoelectric Generator (R. T. G)	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	1000 ⁰ F to 1140 ⁰ F - 380 ⁰ F to 440 ⁰ F	1170° F 500°F	ВхА	Ann Arbor, Michigan	TP 2334335 ATR-60 BSR-2387	May-June 1968	Qualification at assembly level was performed by G. E. Refer to test reports ANSQ Doc. No. 6300-281, ANSQ Doc. No. 6300-288
G.E.#47E300779 Mod. 21 632011	Pressure Operating Non-Operating	Sea Level to 1x10 ⁻¹² torr	5x10 ⁻⁵ torr 16x10-8 toor	BxA	Ann Arbor, Michigan		+	Test level limited by test equipment capability
	Humidity Operating Non-Operating	15 to 100%	Designed to meet humidity require- ments	N/A	N/A	N/A	N/A	
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	ATR-16 Addendum l	Refer to Table l	General Electric Valley Forge Technology Center Philadelphia, Pa.	General Electric	GE Doc. #6300 Doc. #6300-288	Jan 1968	Qualified at Subpackage #2 Design limit level in the stowed configuration. Refer to ATR-84, 85
	Acceleration Operating Non-Operating	ATR-16 Addendum 1	7.SG 3 to 4 min each axis	BxA	Ann Arbor, Michigan	TP 2334330 ATR-92,93	June 1968	Successfully Tested, Qual SA
	Shock Operating Non-Operating	ATR-16 Addendum 1	l5 G each axis ll msec±l0%	BxA		TP 2334331 ATR-88, 89 BSR-2408, 2409	June 1968	п п
	Salt Spray	N/A	N/A	N/A	N/A	N/A		
	Sand & Dust	NYD	G. E	Phil. Penn	NYD	NYD		
	Fungus	N/A	N/A	N/A	N/A	<u>N/A</u>		
	Acoustical Noise	NYD	NYD	G.E.	Phil. Penn.	NYD		
	Rain	N/A	N/A	N/A	N/A			
	Explosion Proof	NYD	NYD	<u>G. E</u>	Phil. Penn.	I NYD		
	PARAMETRIC				Phil, Penil.			

Note: See Section 3.1 discussion

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ALIFICATION CT	ATHE LICT ALCED DD	00011	SUBPACKAGE	II, RTG SHORTING	PLUG	Revised	Date	NoATM-825 Rev. No.	
ALIFICATION ST	AIUS LISI-ALSEF FR	UUNAM				1/31/69	Analyst	Page of Pages	
		Stress	Level	v	erification of Stress	s Level Capability			
Item	and/or					Document		Pemarka	
Nomenclature	Parameter	Requirement	Capability	Agent	Location	Reference	Date		
RTG Shorting Plug 3xA 2338017 Flt. #3 S/N-5	ENVIRONMENTAL Temperature: Operating Non-Operating Earth	-300°F to +50°F -60°F to +160°F	-300°F to +250°I -60°F to +160°F	Bendix Aerospace System	Ann Arbor Michigan	TP2334335 TP2333032 ATR-60,70 BSR-2367,2376	June 1968	Successfully tested on Qual SA model.	
See Note 1.	Pressure Operating Non-Operating	1×10^{-12} Toors SL to 1×10^{-12}	Tested to 5x10 ⁻⁶ Torrs			¥		Capability limited by test Equipment Capability	
	Humidity Operating Non-Operating	N/A	Designed to meet Humidity Requirements		N/A	N/A	N/A		
Ni Vib Oj N	Vibration Operating Non-Operating Launch & Flight	N/A Refer to Fig.	Tested in stowed configuration to Design Limit levels indicated by Fig. 1-5		Ann Arbor Michigan	TP2334348 ATR-84,85 BSR-2404,2405	July 1968	Successfully Tested, Qual S	
	Acceleration Operating Non-Operating	N/A LTA-3D/R	Tested to 14 ± 1g 1 min duration 5 times @ axis			TP2334330 ATR-92,93	June 1968	н н	
	Shock Operating Non-Operating	N/A LTA-3D/R	Tested to $15 \pm 2g$ 11 ms sawtooth 5 times @ axis.		•	TP2334331 ATR-88, 89 BSR-2408, 2409	June 1968	н н	
	Salt Spray	N/A	ļ	L					
	Fungus	Not Defined	{	<u> </u>		- <u> </u>	+		
	Acoustical Noise	Not Defined							
	Rain	N/A							
	Radiation	Not Defined	IR 130W/ft ⁴						
	Explosion Proof	N/A							

Note 1: Qualified on Qual SA configuration as B&A 2335520 Assembly Revision C which is identical to B&A 2338017 Assembly used on Array B.

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Note: See Section 3.2 discussion

UNVELLIPHING 21	WIND FIDI-WEDEL LU	lunAm	DUDIAC	12102 #0, 111 0000 D0			Analyst JTS	Page of Pages
Item Nomenclature ALHT SEB39101165 SN/102		Stress	Level	Veri	fication of Stress I			
	Environment and/or Parameter	Requirement	Capability	Agent	Location Document Reference		Date	Remarks
	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	<u>{ONMENTAL</u> perature: erating n-Operating arth foon						See Notes Below
	Pressure Operating Non-Operating							
	Humidity Operating Non-Operating							
	Vibration Operating Non-Operating Launch & Flight Lunar Landing							
	Acceleration Operating Non-Operating							
	Shock Operating Non-Operating							
	Salt Spray							
	Sand & Dust							
	Fungus							l
l	Acoustical Noise	<u> </u>			L			
	Rain	<u> </u>						
	Radiation	<u> </u>						<u> </u>
	Explosion Proof	4			+			
	Note 1: The A BxA (LHT mass simula Jual SB system lev	or rather than a el dynamic tests.	flight configuration mod	el was used for th	e		
	Note 2: Refer	to SP#2 QSL Shee	B-25 for shock,	vibration and accelerat	on environment			
	levels	which apply to the	interface qualifi	cation.	1	<u> </u>		
	Note 3: Minut catego	es 974-1264 on the ory II open items e	QAR Board Meet wist to conțăin qu	ng for Qual SB reflect alification.	that no			
970-12		1 025 etter 2 2	for such status of	L	1	L	_ <u></u>	Short B-28 of 31

Note: See ATM-825 section 3.3 for qual status comment.

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IALIFICATION ST	FICATION STATUS LIST-ALSEP PROGRAM SUBPACKAGE #2, APOLLO LUNAR SCIENTIFIC DRILL (ALSD)							Analyst JTS	Page of Pages
Item Nomenclature	1	Strang Lough		Veri	fication of Stress I				
	Environment and/or Parameter	Requirement Capability		Agent	Location Document Reference		Date	Remarks	
Nomenclature ALSD 467A805000 -029 Serial Number 0000003	Parameter ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon Pressure Operating Non-Operating Non-Operating Non-Operating Non-Operating Non-Operating Launch & Flight Lunar Landing Acceleration Operating Non-Operating Non-Operating Shock Operating Non-Operating Shock Operating Non-Operating Shock Operating Non-Operating Shock Operating Non-Operating Shock Operating Non-Operating Shock Operating Non-Operating Salt Spray Sand & Dust Fungus Acoustical Noise Rain Radiation Explosion Proof PARAMETRIC	Requirem	The AI prior to	Capability Capability	Agent Agent s previously qualified a nterface testing on the	Location	Reference Reference	Date	See Notes Below
		Note 3:	Minute open it	face qualification 9713-13-345 of t ms exist to const	he QAR Qual SB meetir rain qual status.	g established that	no category II		
			-						

970-12

Note: See ATM 825, Section 3.4 for qual status comment.

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LATONITON ST	AIUS LIST-ALSEF FR	UUNAM SUBI	PACKAGE #2, PSI	E LEVELING	STOOL			i	Analyst		Page -	f Dow
			Wentflood for a figure to a figure					PM7_ J	[.Bren	t Page o	I Pages	
	Environment	Stress	Level		Veri		Stress .	Lever Capability	r			
Item Nomenclature	and/or Parameter	Requirement	Capability	Agent		Location		Document Reference	Date		Remarks	
PSE Leveling Stool Assembly P/N 233400 BxA #2333795	ENVIRONMENTAL Temperature: Operating Non-Operating Earth Moon	107 ⁰ F to 125 ⁰ F -65 ⁰ F to 160 ⁰ F Same as Operating	Tested in Space Simulation Chamber for Temperature	Bendix Aerospace Systems Division		Ann Arbor, Michigan		TP2334335 ATR-60, 70 BSR-2367 2376	May-June 1968		Qualification Accomplished at the System Level, QSA	
	Pressure Operating Non-Operating	1 x 10 ⁻¹² mm Hg 1 x 10 ⁻⁸ mm Hg	Verified to 5 x 10 ⁻⁵ Torrs in SpaceSim.Cham						V			
	Humidity Operating Non-Operating	Not Applicable	Designed to Meet Humidity Requirements					N/A	N/A			
	Vibration Operating Non-Operating Launch & Flight Lunar Landing	Not Applicable Refer to ATR-16 Addendum 1	Tested in Stowed Configuration to Vibration Design Limits Indicated in Figs. 1 Thru5					TP 2334348 ATR-84, 85 BSR-2404, 2405	July-A 1968	lug		
	Acceleration Operating Non-Operating	Not Applicable	Tested in Stowed Configuration to 14 ± 1g 1 Min.					TP 2334330 ATR-92, 93	7/4/6	8	-	
	Shock Operating Non-Operating	Not Applicable ATR-16- Add. 1	Tested in Stowed Configuration to 15 ± 2g 11ms 3 Times Ea Axis				V	TP 2334331 ATR-88, 89 BSR-2408, 2409	6/24/	68	1	
	Salt Spray Sand & Dust Fungus	Not Applicable LED-520 Not Applicable	Not Applicable Designed to Meet Not Applicable								·	·
	Acoustical Noise Rain	Not Applicable Not Applicable	Not Applicable Not Applicable									
	Radiation Explosion Proof	LED-520 Not Applicable	Designed to Meet Not Applicable						· · · · · · · · · · · · · · · · · · ·			
	<u>PARAMETRIC</u>											
												<u> </u>

Note: See Section 3.5 discussion

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