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TEST REPORT
ELECTRON-PROTON SPECTROMETER
QUALIFICATION TEST UNIT
QUALIFICATION TEST

LEC Document Number EPS-695

Prepared by

Lockheed Electronics Company, Inc.
Houston Aerospace Systems Division
Houston, Texas

Under Contract NAS 9-11373

For

National Aeronautics and Space Administration
Manned Spacecraft Center
Houston, Texas
March 1972

EPS-695

TEST REPORT
ELECTRON-PROTON SPECTROMETER QUALIFICATION TEST UNIT, QUALIFICATION TEST

Prepared by: D. L. Vincent.
D. L. Vincent
Mech. Engineer

Approved by: Bruce E Curtsinger
B. E. Curtsinger
Engineering Supervisor

B C Hall
B. C. Hall
Program Manager

Lockheed Electronics Company, Inc.
Houston Aerospace Systems Division
Houston, Texas

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PURPOSE

The purpose of the EPS Qualification Test Unit testing was to qualify the EPS for use in the 'Skylab' program and to demonstrate that the instrument would operate satisfactorily during, and subsequent to, exposure to the environmental requirements of the end item specification.

PROCEDURE

The tests described in this report were conducted in accordance with LEC document EPS-503, Qualification Test for Electron-Proton Spectrometer, P/N SEC39106425-301, S/N 1001. All testing was conducted with NASA QA and an LEC engineering representative as witnesses.

To maintain the test schedule and utilize available test facilities, the tests did not follow the sequence called for in EPS-530. The tests are reported in the sequence in which they were run, which is also shown in the test summary sheets, pages 30 and 31 of this report.

ACCEPTANCE TEST

Prior to the start of the qualification testing, the EPS Qualification Test Unit was subjected to acceptance testing in accordance with LEC document EPS-489. Data from this testing is shown in the data sheets that form Appendix A of this report.

QUALIFICATION TEST

Functional Test

As the final functional test of the acceptance testing was completed less than one week prior to the start of the qualification testing, the functional test of EPS-530, para. 2.1 did not need to be performed.

Thermal/Vacuum Test

On the 21st January 1972, the EPS Qualification Test Unit and its associated Bench Test Equipment (BTE) were taken to Building 33, NASA/MSC. The test article was installed in the test fixture in chamber 'N' and the BTE connected as required by para. 2.2 of EPS-503. A functional test was performed and the chamber door closed and sealed.

At 1:58 a.m. on 24 January, pump down of chamber 'N' was started. At 3:18 a.m. the BTE was activated, and the EPS electronics package and detector temperatures were monitored every 30 minutes, as called for in the test procedures, using the instruments built-in sensors for temperature measurement. Test mode 1 - cold, operating - and its accompanying functional test was completed by 5:50 p.m. on 24 January, and the test article was switched into test mode 2 - cold, standby. Test mode 2 was completed at 7:45 a.m. on 25 January and functional test data was then taken. A loss of electrical power in Building 33 between 7:56 a.m. and 8:25 a.m. delayed the taking of the functional test data, but did not continue long enough to cause drastic change in the test items internal temperature, and the functional test data taken is considered valid.

At 9:15 a.m. on 25 January the chamber and test article were placed into test mode 3 - hot, operating. At 6:00 p.m. on 25 January, this test case and its accompanying functional test were completed.

The chamber conditions were then changed to test mode 4 - hot, survival - and the 'electronics' power and detector bias supply to the test article were turned off at the BTE. At 7:45 a.m. on 26 January this final test mode was completed and the return of the test chamber to ambient conditions was started, and by 9:30 a.m. the post thermal/vacuum functional test data had been taken.

The test article was then returned to LEC's Radiation Instrumentation Department. Visual examination of the EPS revealed no damage that would prevent the instrument from meeting the operational requirements. No discrepancy reports were generated during the period of the Thermal/Vacuum test. Data from this test is included in the data sheets forming Appendix B of this report. Temperature and power profiles for each test mode are given on pages 33 through 36.

EMI Test

On 28 January 1972, the EPS Qualification Test Unit was taken to Building 14, NASA/MSC and accepted for electromagnetic compatibility testing to EPS-503, para. 2.8. Storage in Building 14 over the weekend permitted immediate commencement of testing on 31 January.

Radiated interference from the test instrument was evaluated on 31 January, and all levels of irradience were shown to be within specification.

The instrument's electromagnetic susceptibility was evaluated on the 1st and 2nd of February. Although susceptibility was noted between 200 - 450 MHz, the levels were 6 to 10 dB above the specification levels, hence the instrument's performance was considered to be within specification.

The test unit was then returned to LEC's Radiation Instrumentation Department for functional test to EPS-503, para. 2.9.

Acoustic Test

On 8 February 1972, the EPS Qualification Test Unit was taken to Building 49, NASA/MSC and accepted for acoustic qualification testing to EPS-503, para. 2.10. The test article was then taken to Building 262, NASA/MSC and installed on the test fixture. The test article and fixture was then suspended inside the reverberant chamber and the door closed.

The test article was then exposed to 80 seconds of acoustic noise to the spectrum given in EPS-503, figure 6, followed immediately by 10 seconds at an overall level 4 dB higher to simulate transonic buffetting. It was then removed from the test chamber.

Visual examination of the unit showed no visible evidence of damage or failure caused by this test, and the test unit was then returned to Building 49. On the morning of 9 February the test article was returned to LEC's Radiation Instrumentation Department, where it was subjected to a functional test as per EPS-503, para. 2.11.

No discrepancy reports were generated during the period of the acoustic test or the subsequent functional test. Acoustic test data is shown on pages 37 through 40 of this report, and data from the functional test is included in Appendix B.

Shock Test

On 9 February 1972, the test article was transported to Building 49, NASA/MSC and accepted for shock testing to EPS-503, para. 2.6. The unit was instrumented with accelerometers in accordance with TPS EPS-1204.

The test article was then mounted to the test fixture V6-1-116 attached to the 310 slideplate. This shaker system had been set up to produce the shock response spectrum of EPS-503, figure 4. After subjecting the test article to shock pulses in the +X and -X direction, it was removed from the test fixture and the fixture rotated 90° to orient it for the 'T' axis. The test article was then reinstalled on the fixture and subjected to the same shock pulse in the +T and -T directions.

The unit was again removed from the test fixture and the fixture was removed from the slideplate and mounted on the 249 shaker. The test item was reinstalled on the fixture and subjected to shock excitation in the +R and -R directions. It was then removed from the fixture and replaced on its servicing stand and returned to LEC's Radiation Instrumentation Department.

Upon receipt of the test article at LEC, it was subjected to the bench shock test called for in EPS-503, 2.6.19 through 2.6.21. Upon completion of this portion of the shock testing, the unit received a functional check-out as per EPS-503, para. 2.7.

No discrepancy reports were generated during the period of the shock test or the subsequent functional check. Shock test data is shown on pages 41 through 70, and data from the functional test is included in Appendix B.

Vibration Test

On 10 February 1972, the Qualification Test Unit was taken to Building 49, NASA/MSC and accepted for vibration testing.

The test article was exposed to the 'X' and 'T' axis random and sinusoidal vibration of EPS-503, para. 2.4. At the end of this time it was returned to LEC's Radiation Instrumentation Department for functional testing to EPS-503, para. 2.5. The test article completed this functional test satisfactorily.

A discrepancy report (DR EPS-0087) was generated regarding the 'O-ring' seal on the underside of the mounting flange of the EPS. Sections of this had become unbonded during the constant removal from servicing stand to test fixture and back. It was determined that this discrepancy was due to handling damage, caused primarily by the large amount of handling required to do the testing and attempts to align the hold-down holes with those on the fixture with the full weight of the package bearing down on the 'O-ring' seal. The seal was rebonded to the flange.

On 15 February, the test article was returned to Building 49 to be subjected to 'R' axis vibration. Due to the inability of the 249 shaker system to attain the levels required when the spectrum was run as a single segment, the test spectrum was broken down into 6 segments as shown in Figure 54, page 71.

Each segment was run for 80 seconds at the nominal level plus 10 seconds at the high energy level. Each segment of the spectrum is shown in Figures 75 through 154.

Upon completion of the 'R' axis vibration testing (random and sinusoidal), the test article was returned to LEC's Radiation Instrumentation Department for functional testing. The unit satisfactorily completed the functional test with no discrepancies in the data, and visual inspection of the unit revealed no damage that would prevent it from meeting the operational requirements.

Data from the functional tests associated with the vibration testing is included in Appendix B.

Humidity Test

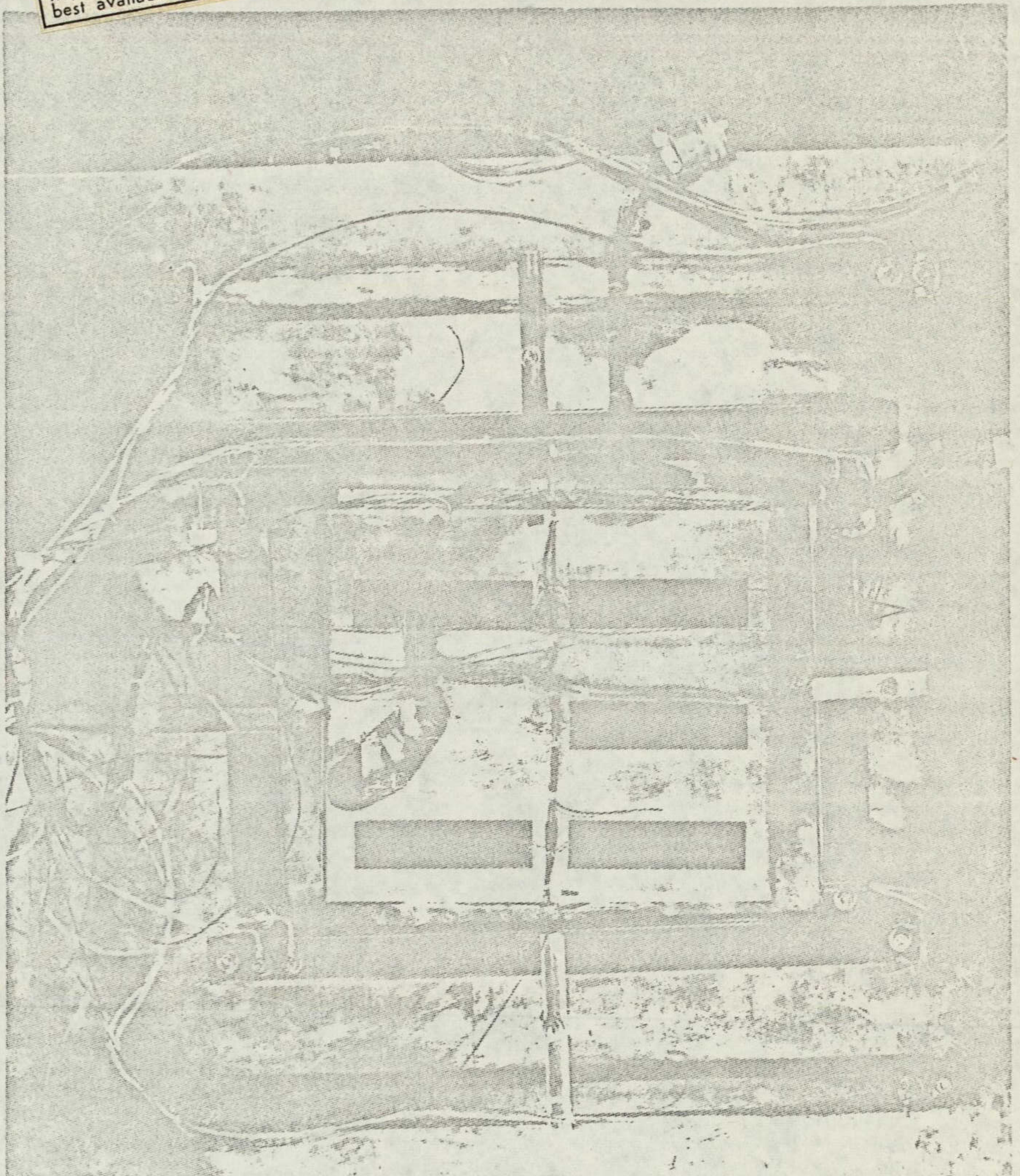
On 18 February 1972 the Qualification Test Unit was transported to Building 15, NASA/MSC and accepted for humidity testing.

The test article was placed in the humidity chamber and the door closed and sealed. It was then exposed to the humidity cycling described in EPS-503, para. 7.0. On 23 February the unit was removed from the humidity chamber.

Visual inspection disclosed some staining of a screw and washer, also of the test stand, and some 'bubbling' of paint where moisture had penetrated under the paint surface. DR EPS-0089 was generated at this time.

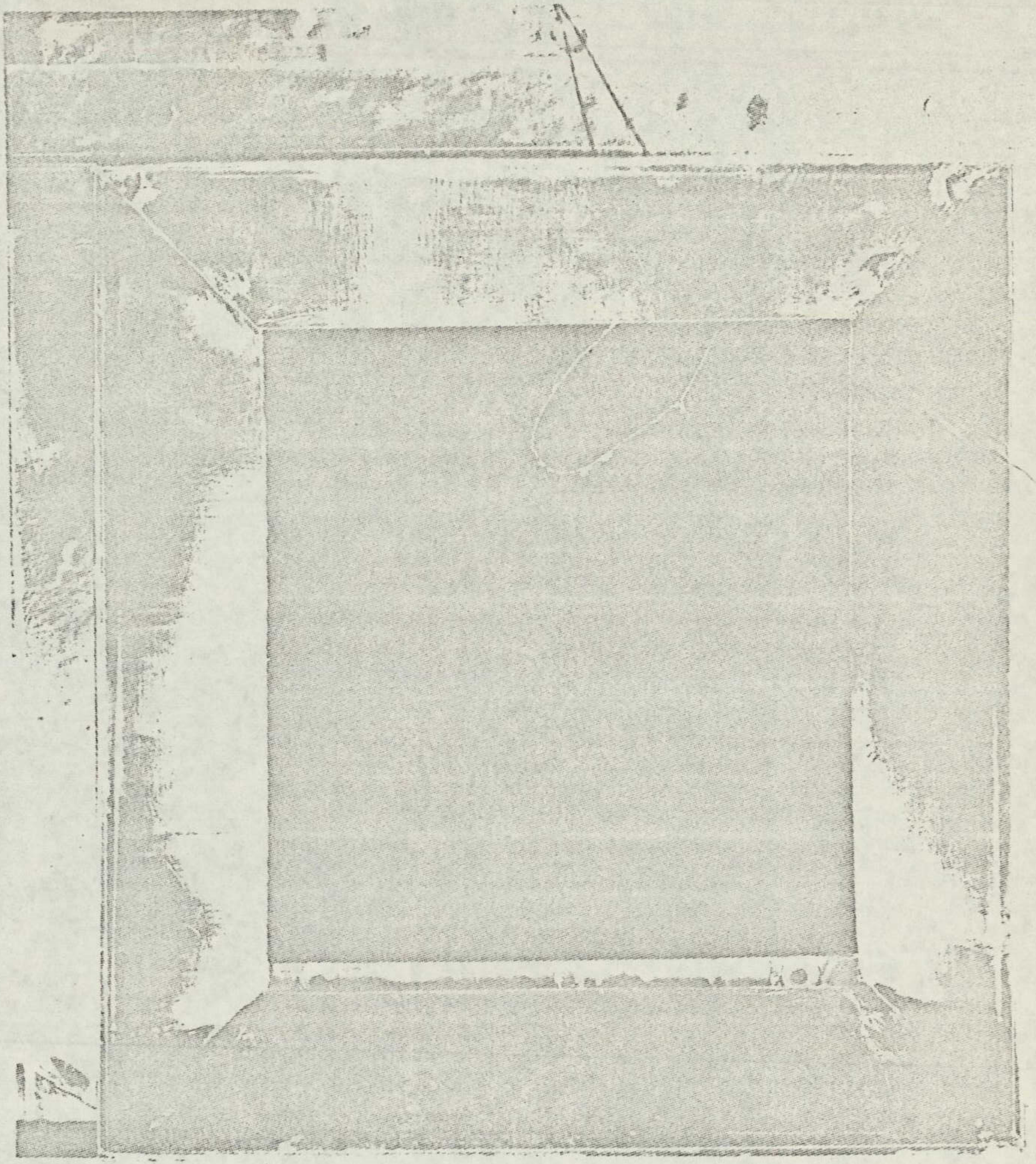
The unit was then returned to LEC's Radiation Instrumentation Department. The outside surfaces of the instrument were wiped dry and it was allowed to dry out at room ambient conditions for 8 hours. It was then subjected to the functional check called for in EPS-503, para. 2.13. During this functional test, some data was not within the specified limits and DR EPS-0090 was generated.

The test article was then placed in a vacuum chamber overnight, and the functional check repeated. The instrument satisfactorily completed this functional check. Data from the two functional checks is included in Appendix B.



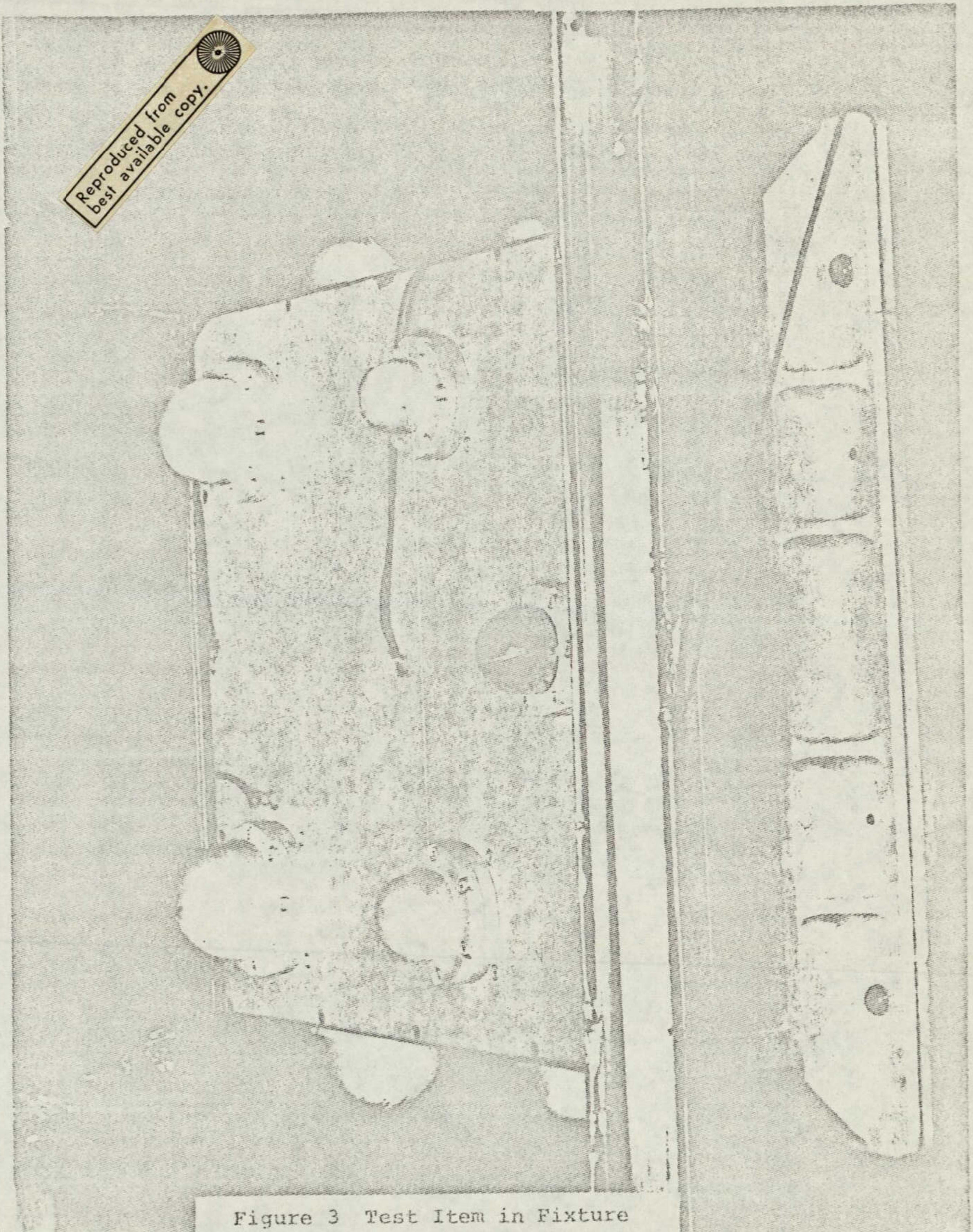
NASA
S-71-41256

Figure 1 Underside of Test Fixture



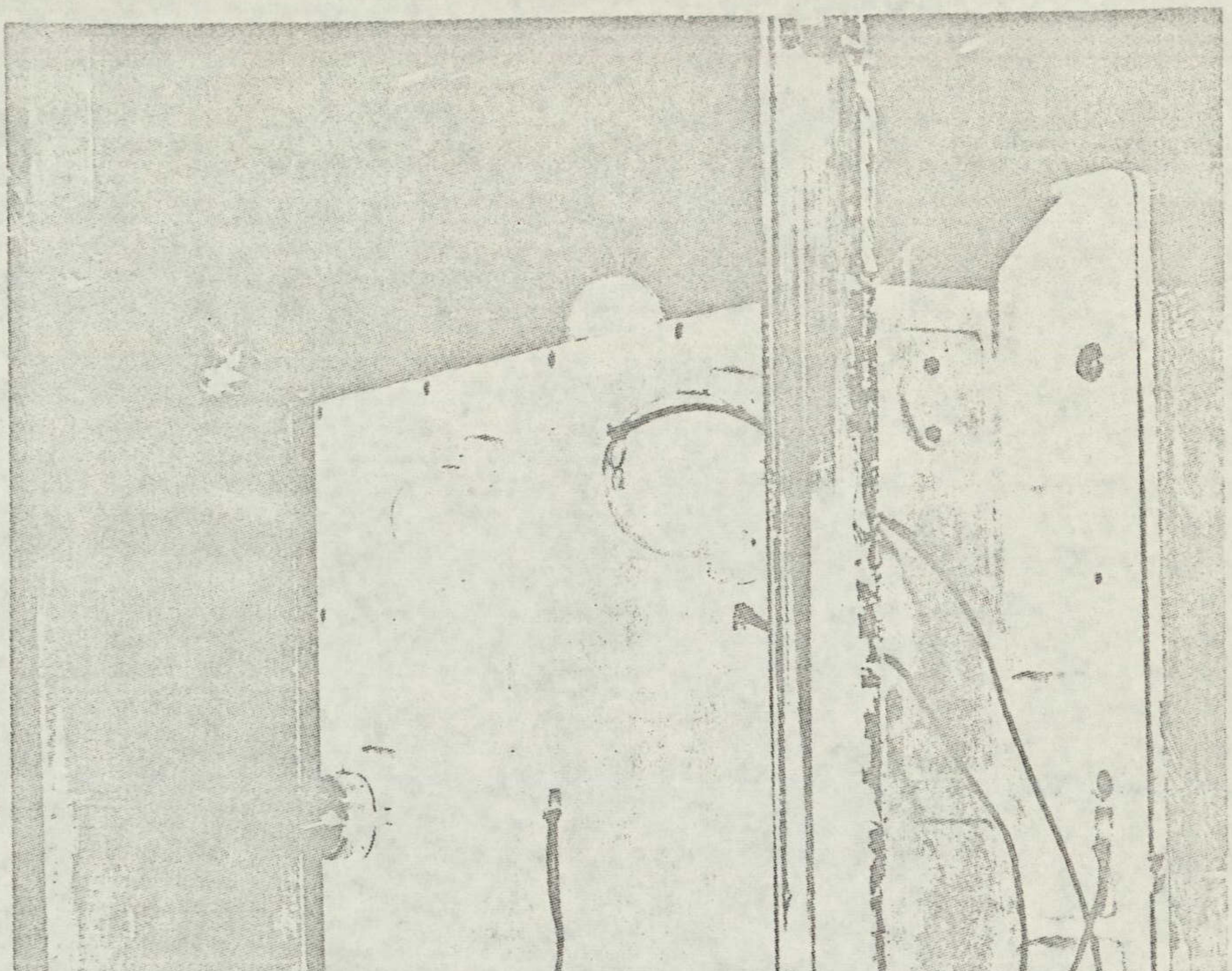
NASA
S-71-41265

Figure 2 Top of Test Fixture



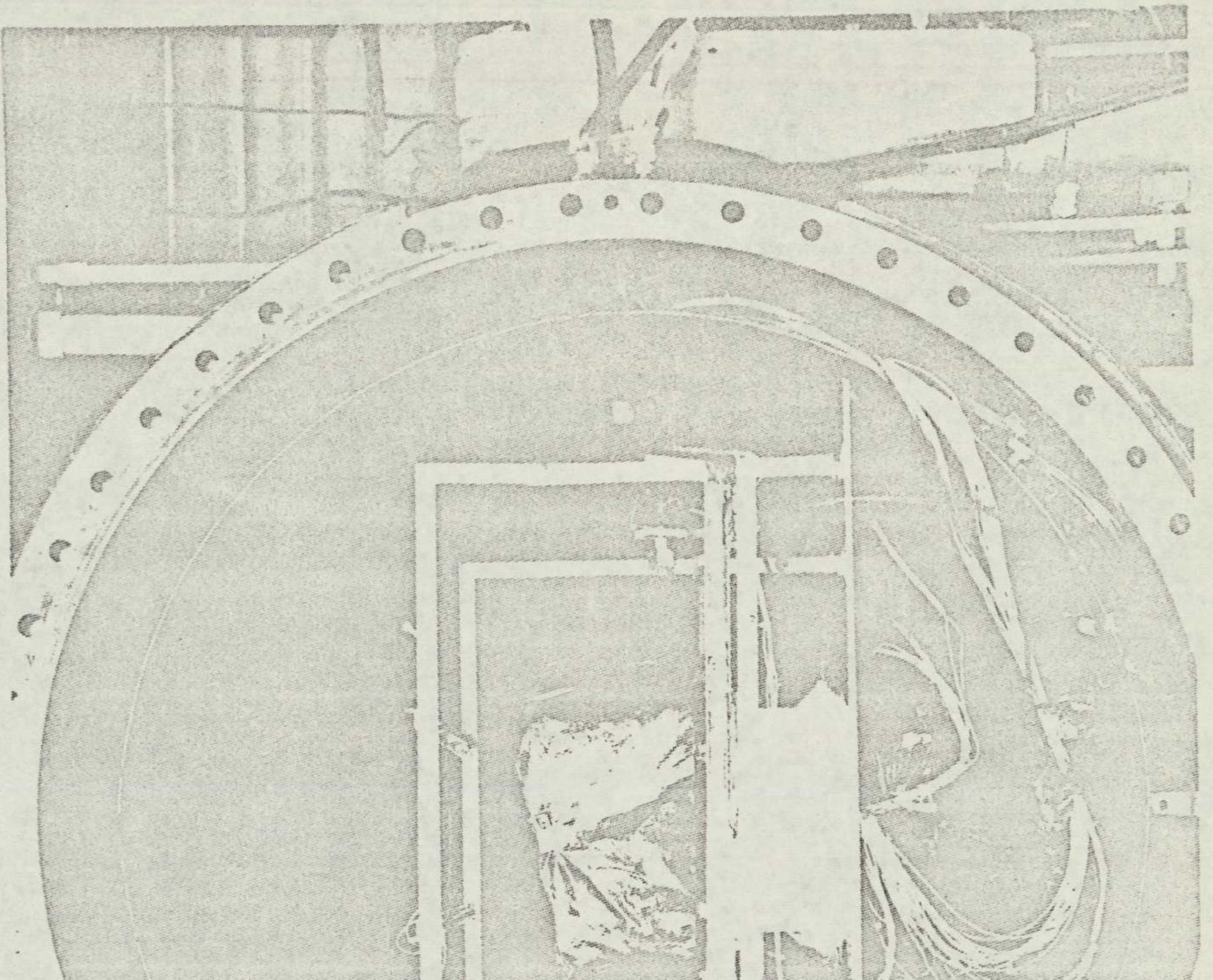
NASA
S-71-41258

Figure 3 Test Item in Fixture
(Thermal Test Unit)



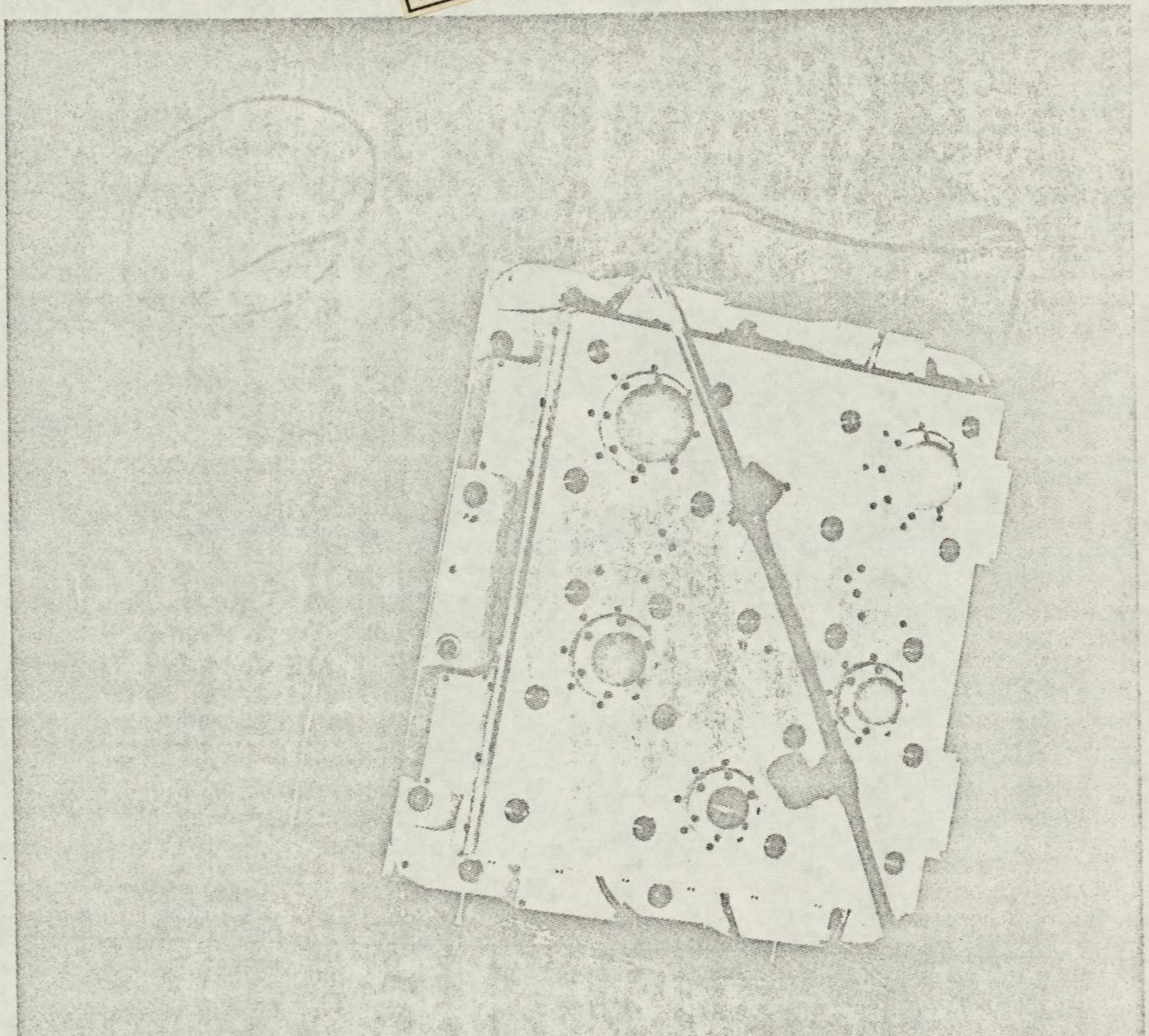
NASA
S-71-41257

Figure 4 Test Item in Fixture
(Thermal Test Unit



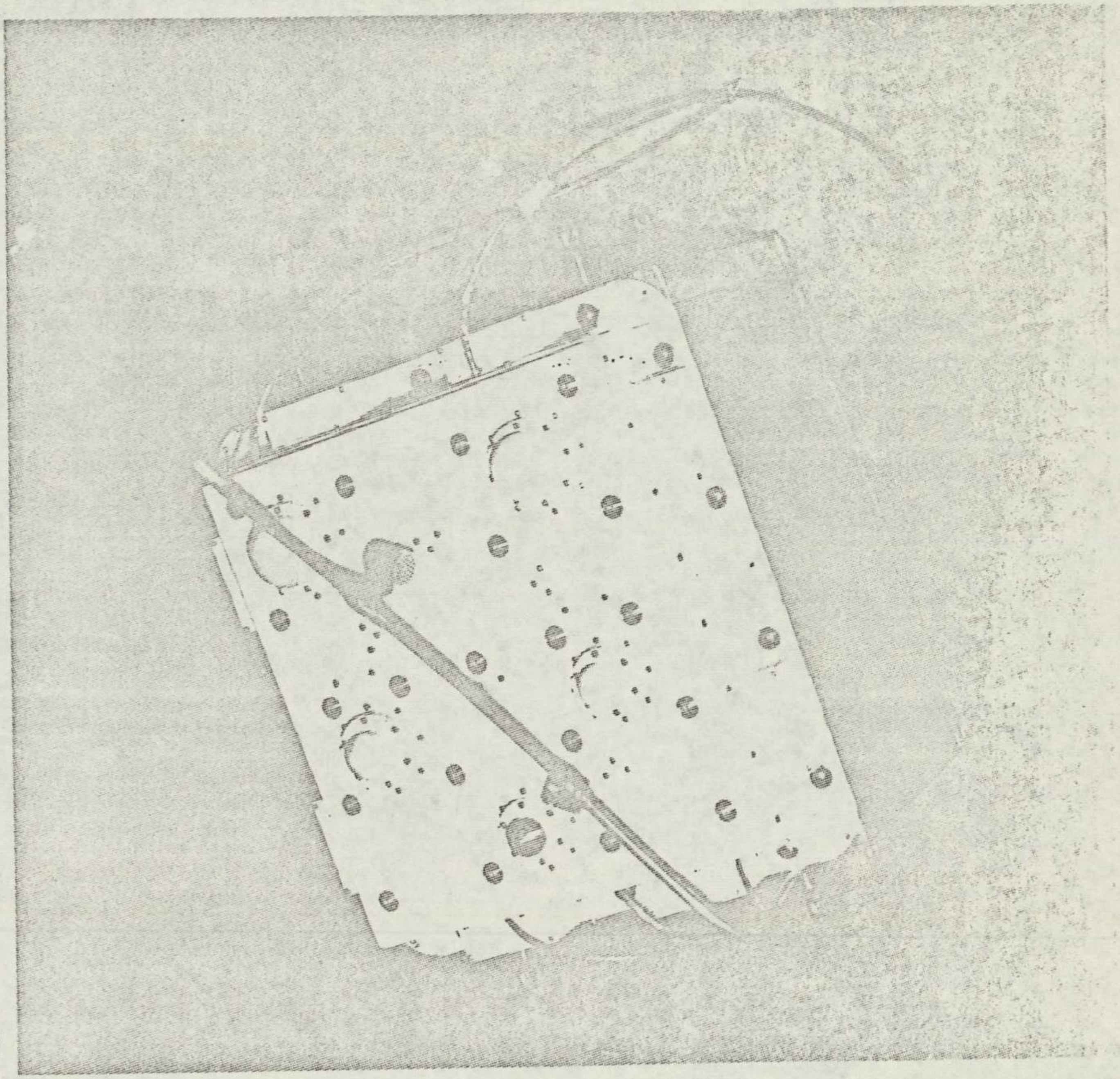
NASA
S-71-41259

Figure 5 View of Test Article and Fixture in Chamber 'N' (Thermal Test Unit)



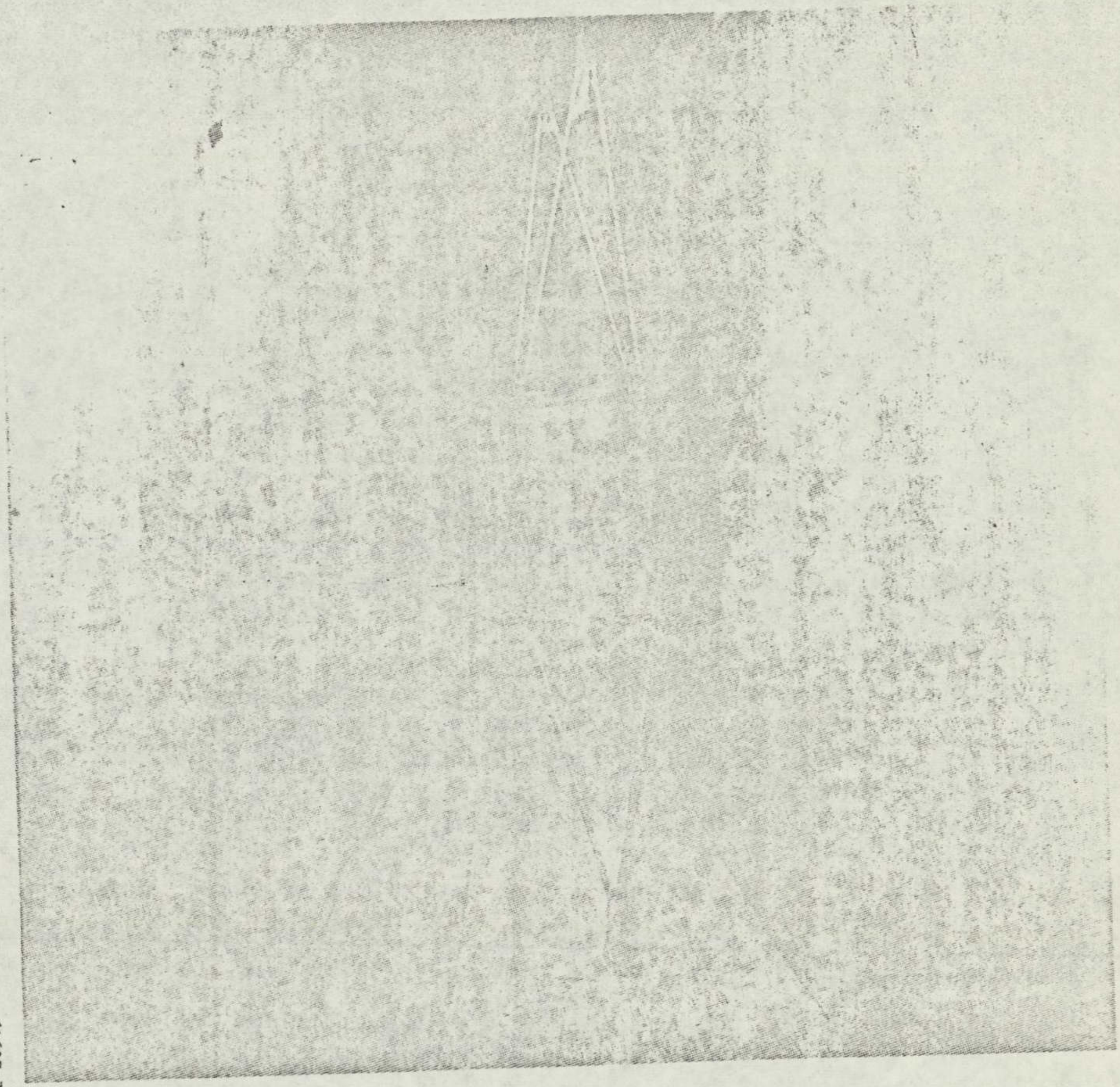
NASA
S-72-20360

Figure 6 Test Item Prepared for Acoustic Testing



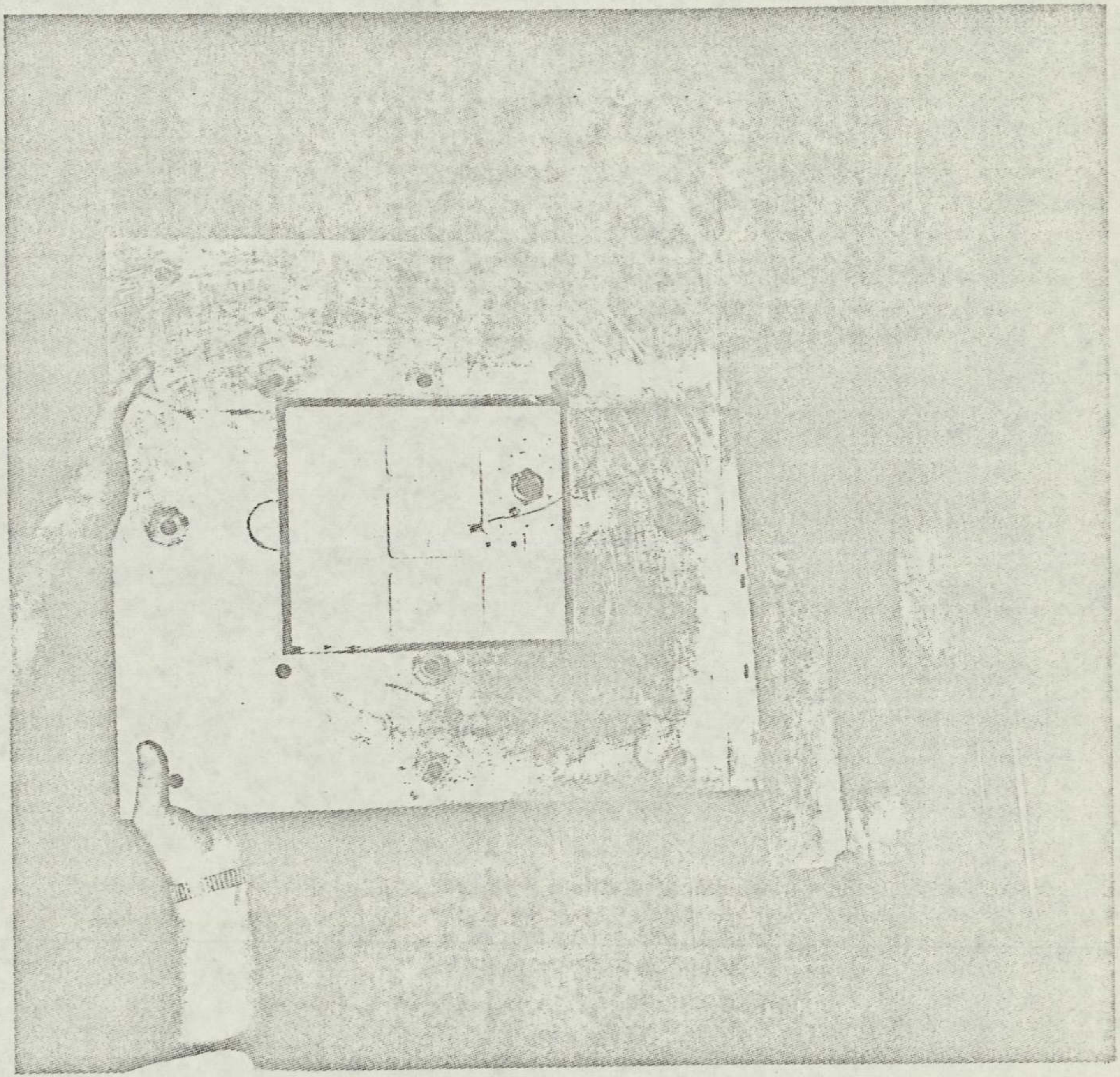
NASA
-72-20364

Figure 7 Test Item Prepared for Acoustic Testing



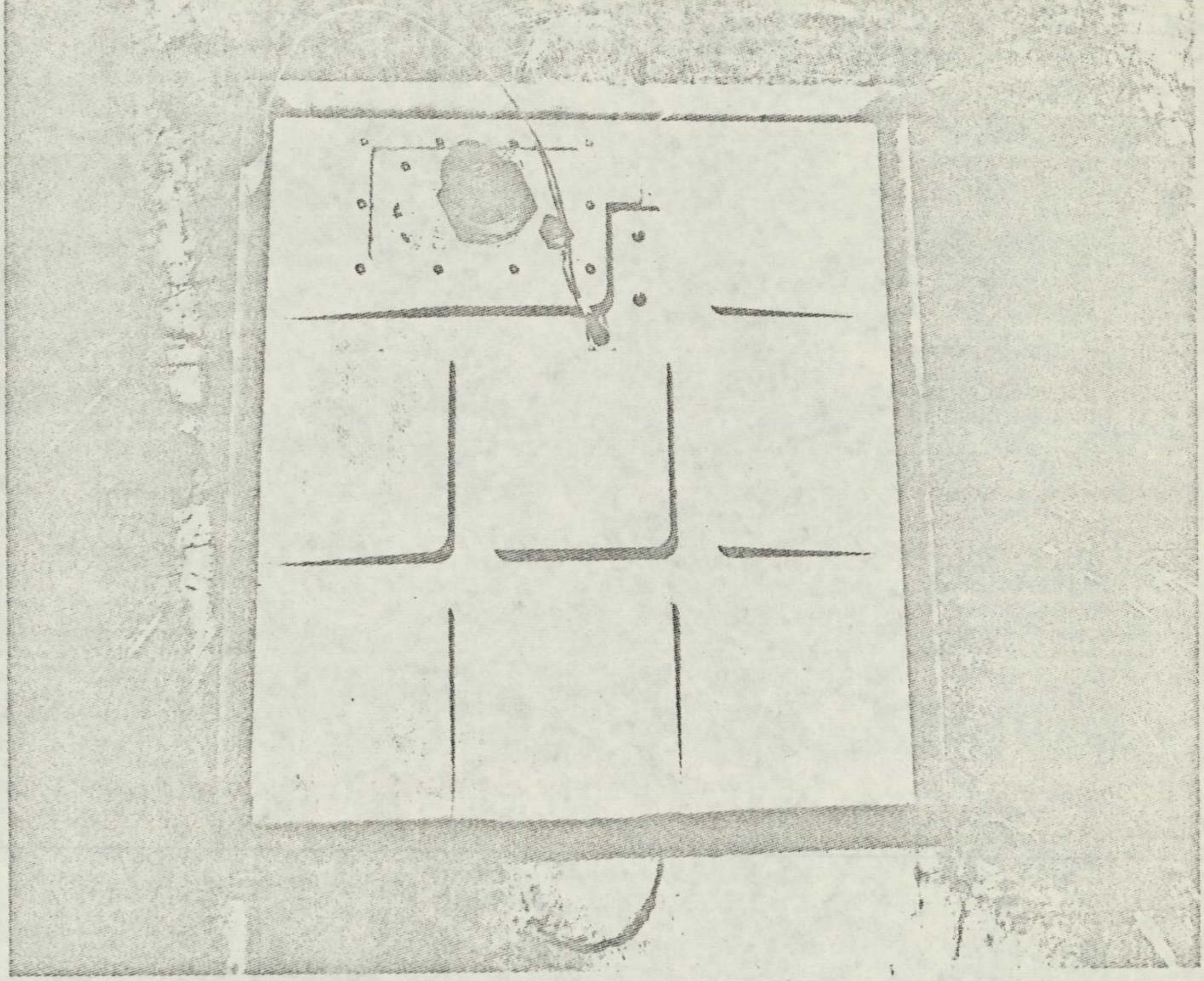
NASA
S-72-20363

Figure 8 Test Article Suspended in Acoustic Test Chamber Horn



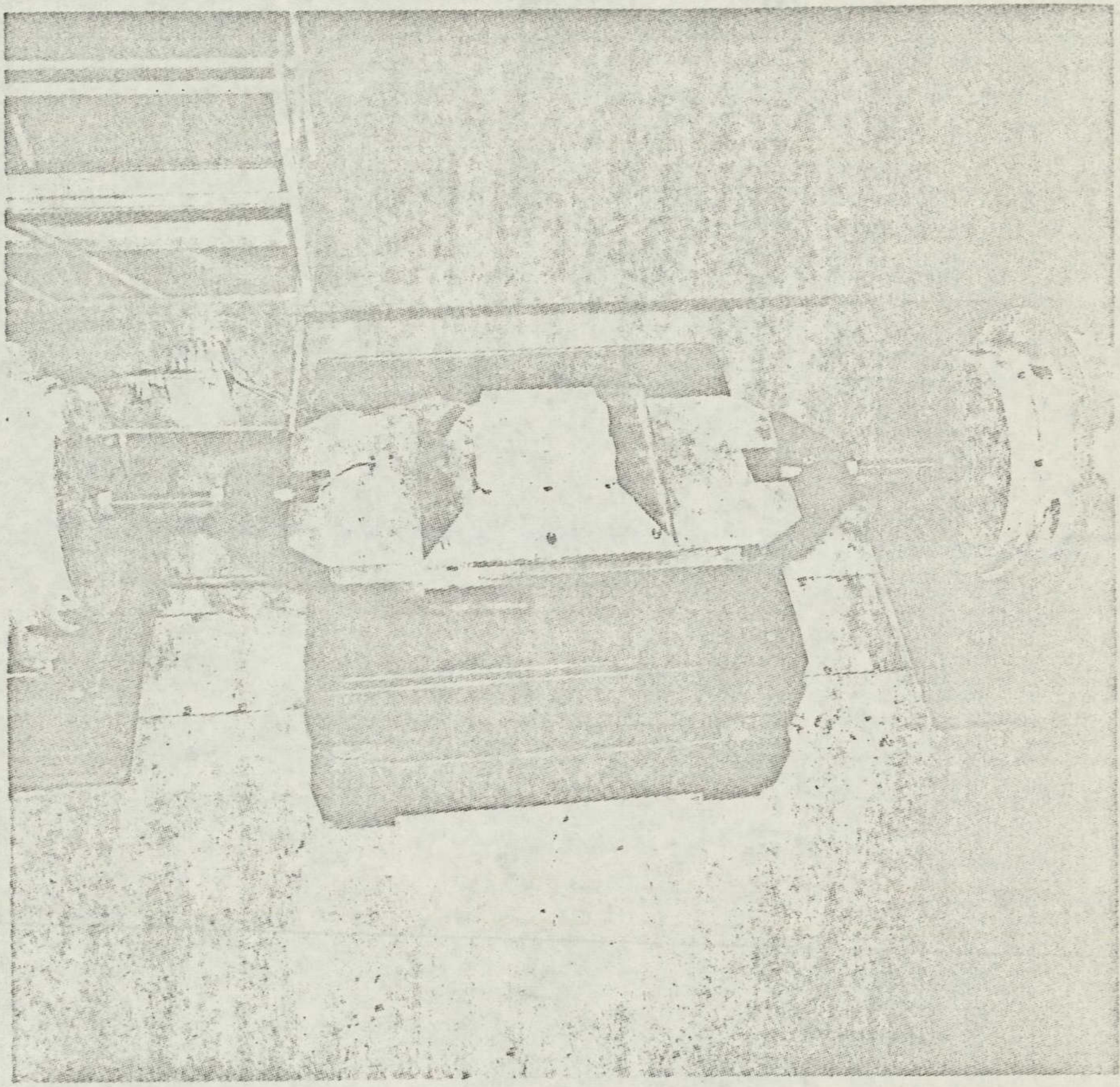
NASA
S-72-20358

Figure 9 Underside of EPS in Vibration Test Fixture



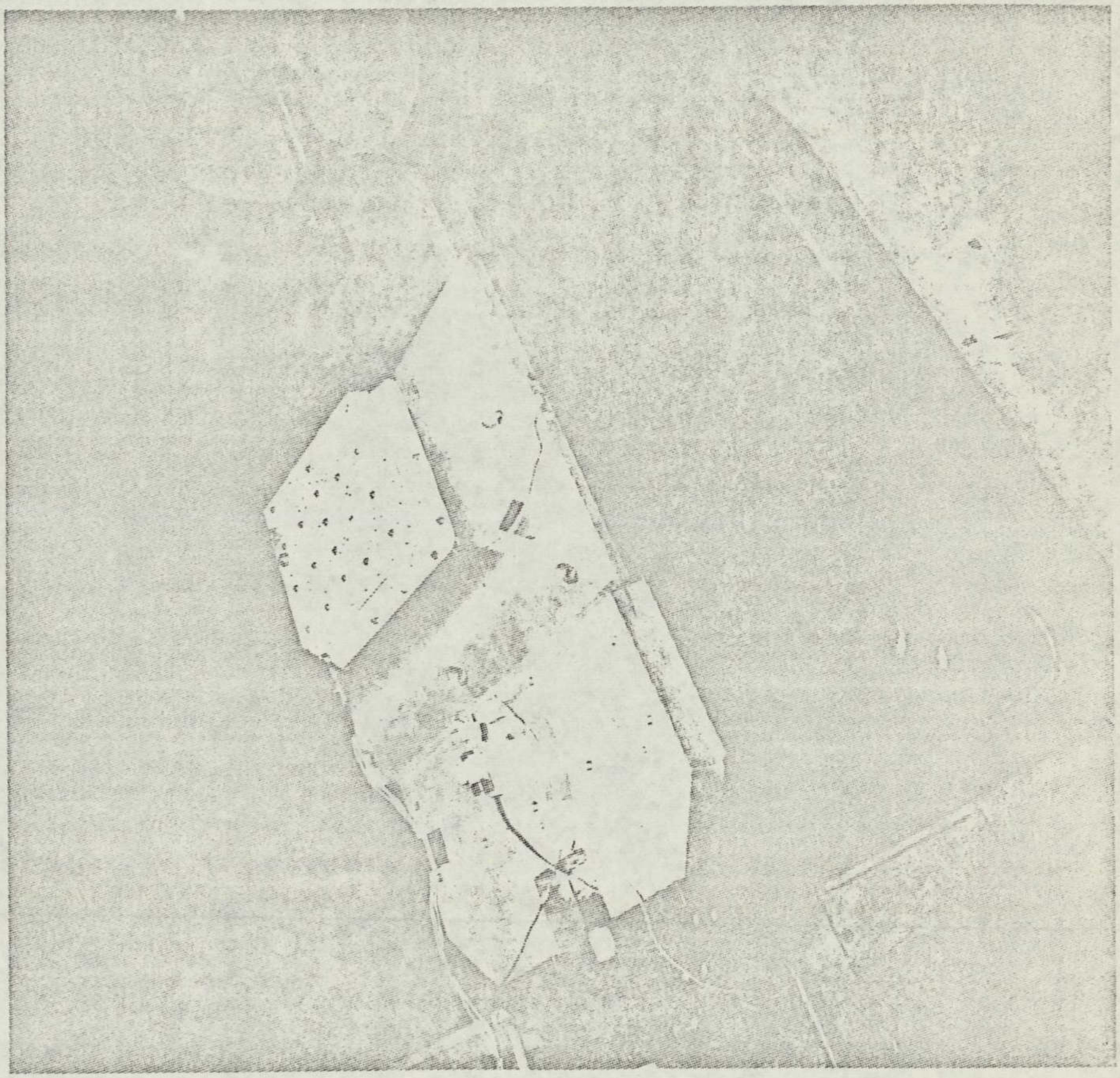
NASA S-72-20357

Figure 10 Closeup of Underside of EPS in Vibration Test Fixture



NASA
S-72-20361

Figure 11 Vibration and Shock Setup
'X' Axis



NASA
S-72-20362

Figure 12 Vibration and Shock Setup
'T' Axis

NASA S-72-20359

Figure 13 Closeup of EPS on Vibration Test Fixture, 'X' Axis

NASA
S-72-20365

Figure 14 EPS Mounted for 'R' Axis Vibration and Shock

The temperature results from the qualification test agree closely with those from the Engineering Test Unit test, and show that the operating temperatures for hot or cold orbits are satisfactory and do not exceed the predicted values. For test case 4, survival in 'hot' orbit, which is not considered an operational requirement, the test results are acceptably below the survival limits placed on the instrument.

The results of the functional tests (Appendix B) show no change in the test unit's operating characteristics either during or after thermal/vacuum testing, and the test is considered to verify the ability of the EPS to satisfactorily meet its performance requirements in the thermal/vacuum environment.

EMI Test

The test article was tested to NASA EMC-P-EB8-003. A report on this testing was generated (EMC-R-EB8-003) and is included as Appendix D of this report. The instrument is considered to have satisfactorily demonstrated its ability to meet the specification requirements placed upon it.

Acoustic Test

Photographs of the test setup are shown in Figures 6 to 8. Figures 20 and 21 show the spectrum shaped for the 'maximum aerodynamic pressure' run. Figure 22 shows the spectrum shaped for the transonic buffetting. Figure 23 shows the data taken during the actual ' maximum aerodynamic pressure' test run.

Subsequent to the acoustic exposure, visual examination of the instrument revealed no surface or structural damage of any kind attributable to the test environment. The post acoustic functional test results show no change in the instrument's operating characteristics, and the test verifies the ability of the EPS to satisfactorily meet its operational and performance requirements after exposure to the acoustic environment.

Shock Test

Accelerometers were mounted to the test article prior to the commencement of the shock testing, and Figure 13 shows the location of these accelerometers. Their purpose was primarily to monitor the response of the instrument to the increased 'R' axis random vibration levels, however, by placing them on the instrument at this point in time allowed the monitoring of the shock responses of the unit also.

These responses were recorded and included in this report as follows:

Figure	Direction
24 to 28	+X Axis
29 to 33	-X Axis
34 to 38	-T Axis
39 to 43	+T Axis
44 to 48	+R Axis
49 to 53	-R Axis

Examination of the input shock response spectra shows that they are all outside of the test specification in a number of areas. All of the input spectra are above the test specification up to 100 - 120 Hz frequency, with the +R axis being also over in the ranges of 1500 - 2000 Hz and 3000 - 3700 Hz. The -R axis is above the test criteria in the range 3100 - 3700 Hz.

The test inputs are below the test criteria in the following areas:

+X axis	430 - 750 Hz,	850 - 1900 Hz,	4000 - 6000 Hz
-X axis	430 - 2100 Hz,	4000 - 5500 Hz	
-T axis	850 - 2700 Hz,	3400 - 6200 Hz	
+T axis	430 - 750 Hz,	900 - 2700 Hz,	3300 - 6800 Hz
+R axis	400 - 1200 Hz		
-R axis	450 - 1400 Hz		

However, it is felt that these input response spectra represent as good a test input as could be achieved with the equipment available to perform this test in Building 49.

Studying the responses of the vibration isolated electronics package to the input shocks shows a considerable amount of isolation of the input, particularly when compared with the response measured on the baseplate accelerometer, which is not isolated from the input.

Visual examination of the test article indicated no damage or failure that would prevent the unit from meeting its performance or operational requirements. The unit was again visually examined after the bench drop test, with the same result.

The post shock functional check disclosed no changes in the instrument's operating characteristics, and the test is considered to verify the ability of the EPS to satisfactorily meet its operational and performance requirements after exposure to the shock environment.

Vibration Test

The accelerometers attached to the instrument prior to the shock test were used to monitor the responses of the instrument to random vibration inputs. Responses to sinusoidal vibration input were not recorded. Though required primarily to monitor responses to increased 'R' axis vibration levels, the accelerometers were also used to record the 'X' and 'T' axis responses.

As noted under QUALIFICATION TEST, Vibration Test, the 'X' and 'T' axes were run first, followed by a functional check. The input and response data for the 'X' axis is given in Figures 55 to 64, and for the 'T' axis in Figures 65 to 74. Data from the functional test is included in Appendix B.

Visual inspection of the test article after the vibration led to the generation of DR EPS-0087 regarding the 'O-ring' seal. It was considered that the cause of the seal coming loose was due to heavy handling rather than the testing, and the seal was rebonded to the mounting flange of the instrument. No other evidence of damage that would affect performance or operation was found. The functional check showed no change in the data or the instrument's operating characteristics.

As mentioned earlier, the 'R' axis random vibration was run in 6 segments (Figure 54). The input spectra and response data from the instrument are shown in Figures 75 through 134.

Visual examination of the instrument after the 'R' axis vibration revealed no evidence of damage that would affect performance or operation of the instrument. The functional test disclosed no change in data or operating characteristics of the EPS. Data from this functional test appears in Appendix B.

<u>Humidity Test</u>

Visual examination of the test article after completion of the humidity cycling disclosed some 'staining' of a screw and washer used to mount the top plate of the instrument to the top slice of the electronics package, and some small areas of thermal control paint were 'bubbled' where moisture had penetrated under the paint skin. These flaws are mentioned in DR EPS-0089 which was generated at this time.

During the functional test, certain data was out of specification.

- Medium voltage ADC, 1.0, 2.0, 3.0, 4.0 and 4.9 Vdc input voltage: output voltage checked low.
- Discriminator reference monitor checked 2.965 Vdc should be 3.0 ± .02 Vdc.

DR EPS-0090 was generated to cover these discrepancies. The test unit was placed in a vacuum of 70 microns or lower and allowed to remain overnight. The functional check was then repeated and all data was found to be within specification. Data from the initial functional check is included in Appendix B, and from the final checkout is included on the DR (see Appendix E of this report).

The 'staining' of the screw and washer and the bubbling of the paint were not considered to be problems that would affect the operational or performance characteristics of the instrument. The out of tolerance condition noted during the functional test was demonstrated to return to an in-tolerance condition as the instrument dried out. It is therefore considered that the test verified the ability of the EPS to satisfactorily operate in a space environment after being subjected to humidity.

TEST SUMMARY SHEET

ITEM: EPS QUALIFICATION TEST UNIT SHEET 2 OF 2
PART NO.: SEC39106425-301 SER. NO. 1001

QUAL TEST PROCEDURE LEC DOCUMENT EPS-503		REF. PAGES IN THIS REPORT		TEST RESULTS	PASS	FAIL	DATE	REMARKS
TEST	PARA.	DATA	SETUP				1972	
Functional Test	2.9			See Data Sheets	X		2-2	Data recorded on Data Sht 6 by error
Acoustic Test	2.10			See Test Data	X		2-7 to 2-8	
Functional Test	2.11			See Data Sheets	X		2-9	Recorded on Data Sht 10
Shock Test	2.6			See Test Data	X		2-9	
Functional Test	2.7			See Data Sheets	X		2-10	
Vibration Test:	2.4							
'X' & 'T' Axis Vibration	2.4.11 to 2.4.23			See Test Data	X		2-10	
Functional Test	2.5			See Data Sheets	X		2-11	Recorded on Data Sht. 8
'R' Axis Vibration	2.4.1 to 2.4.9			See Test Data	X		2-14	
Functional Test	2.4.10			See Data Sheets	X		2-15	Recorded on Data Sht. 4
Humidity Test	2.12				X		2-18 to 2-23	
Functional Test	2.13			See Data Sheets & DR EPS-0090	X		2-23 to 2-24	Recorded on Data Sht. 13 & DR EPS-0090

TEST SUMMARY SHEET

ITEM: EPS QUALIFICATION TEST UNIT SHEET 1 of 2
PT. NO.: SEC39106425 SER. NO.: 1001

QUAL TEST PROCEDURE LEC DOCUMENT EPS-503		REF. PAGES IN THIS REPORT		TEST RESULTS	PASS	FAIL	DATE	REMARKS
TEST	PARA.	DATA	SETUP				1972	
Acceptance Test (LEC Document EPS-489	1.1				X		1-19 to 1-21	Completed prior to Qual. Testing
Functional Test	2.1							Not run-Accept Test less than 1 week previous.
Thermal/Vacuum Test:	2.2							
Functional Test	2.2.5			See Data Sheets	X		1-21	
Test Case 1	2.2.7			See Temp Curve	X		1-24	
Functional Test	2.2.15			See Data Sheets	X		1-24	
Test Case 2	2.2.18			See Temp Curve	X		1-25	
Functional Test	2.2.21			See Data Sheet	X		1-25	Power loss 0756 to 0825 in Bldg 33-Did not affect test or data
Test Case 3	2.2.23			See Temp Curve	X		1-25	
Functional Test	2.2.27			See Data Sheets	X		1-25	
Test Case 4	2 2 28			See Temp Curves	X		1-26	
Functional Test	2.3			See Data Sheets	X		1-26	
EMC Test (Per NASA Doc. EMC-P-EB8-003	2.8							
Functional Test	2.8.1			See Data Sheets	X		1-28	Data recorded on Data Sht 5 by error
EMC Test	2.8.2				X		2-1	

Test Case	Predicted Temperature		Measured Temperature	
	Electronics	Detectors	Electronics	Detectors
1. Cold Orbit-Operating	+2.2°C (+36°F)	-17.8°C (0°F)	+5.57°C	-16.5°c
2. Cold Orbit-Standby (Heater Power Only)	-41.1°C (-42°F)	-50°C (-58°F)	-27.08°C	-38.32°C
3. Hot Orbit-Operating	+22.2°C (+72°F)	+7.8 to -7.8°C (+46 to +18°F) 0°C (32°F) Mean	+11.92°C	-6.48°C
4. Hot Orbit-Survival	+40.6°C (+105°F)	+35.6°C (+96°F)	+46.52°C	+40.27°C

Figure 15 - Predicted and Measured Temperatures - Thermal/Vac. Test.

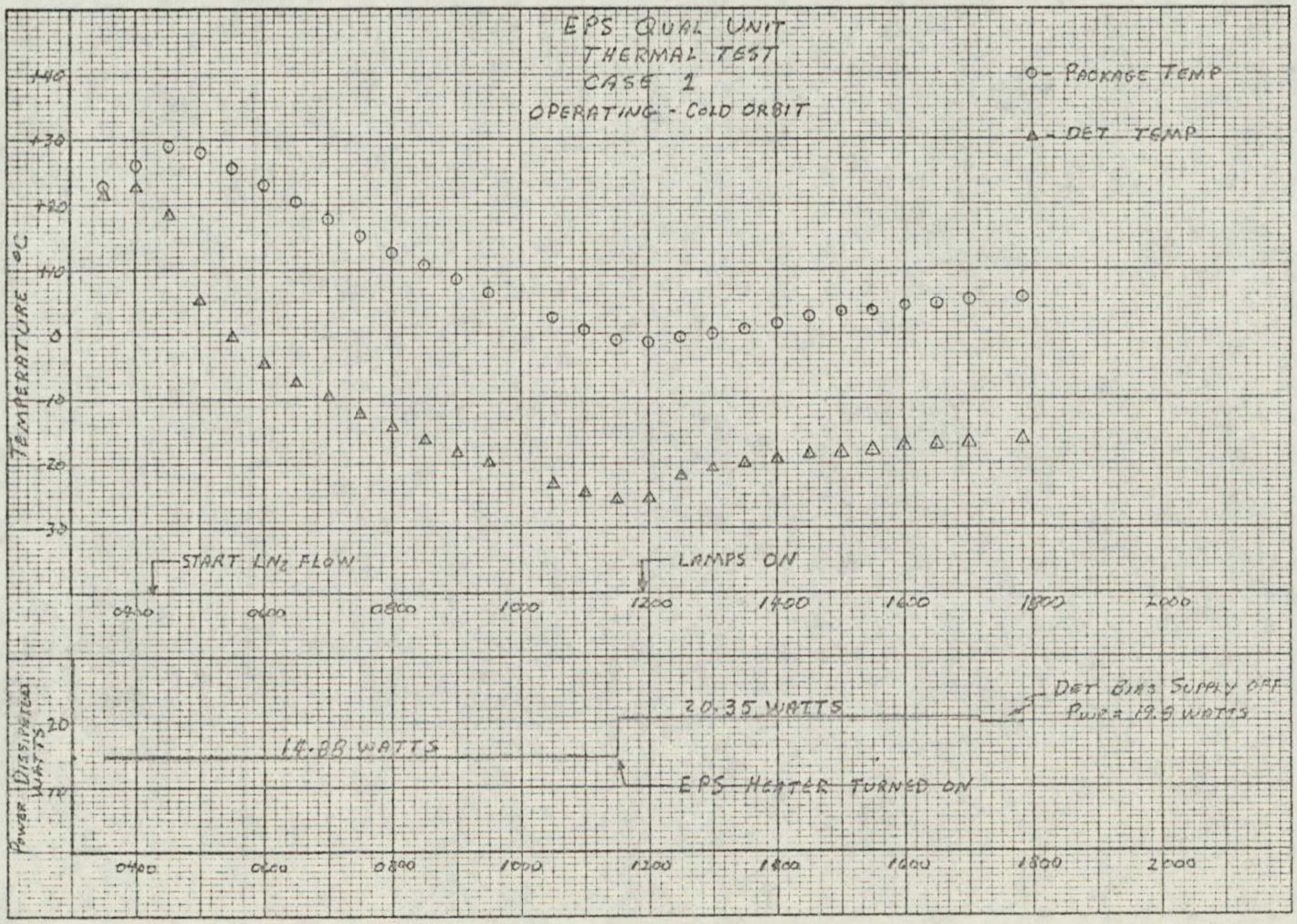


Figure 16 EPS Qual Unit, Thermal Test
Case 1 - Operating, Cold Orbit

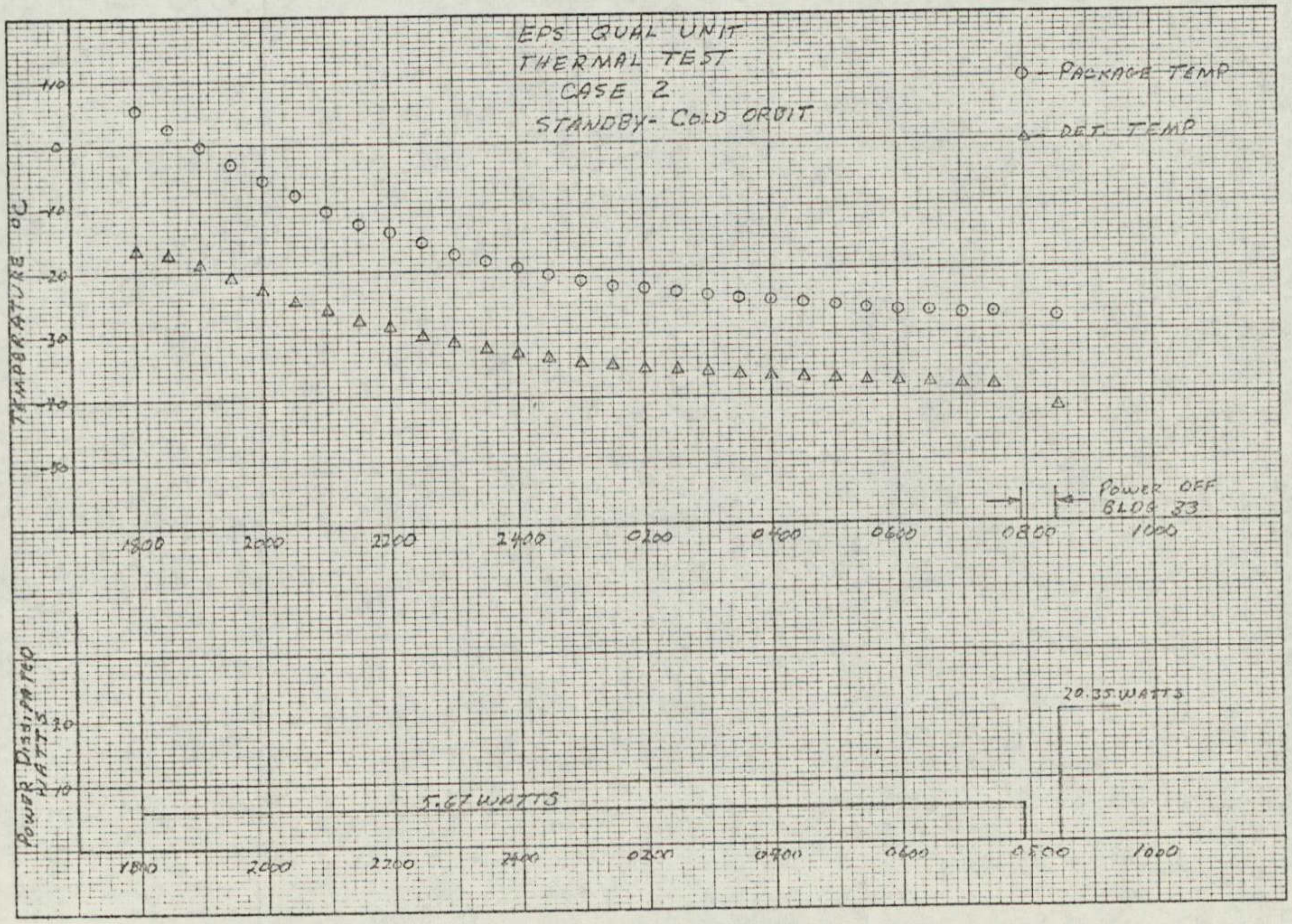


Figure 17 EPS Qual Unit, Thermal Test
Case 2 - Standby, Cold Orbit

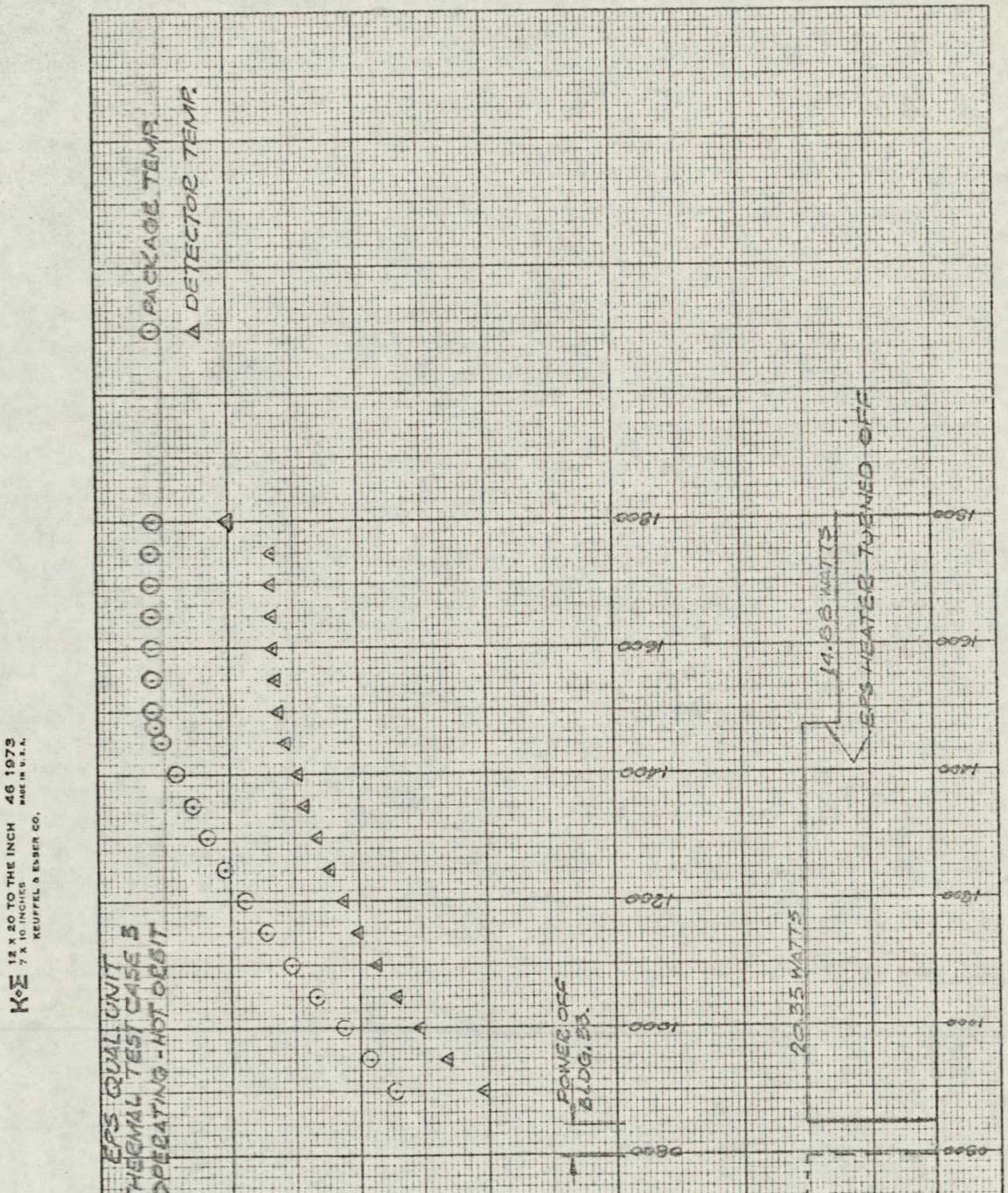


Figure 18 EPS Qual Unit, Thermal Test
Case 3 - Operating, Hot Orbit

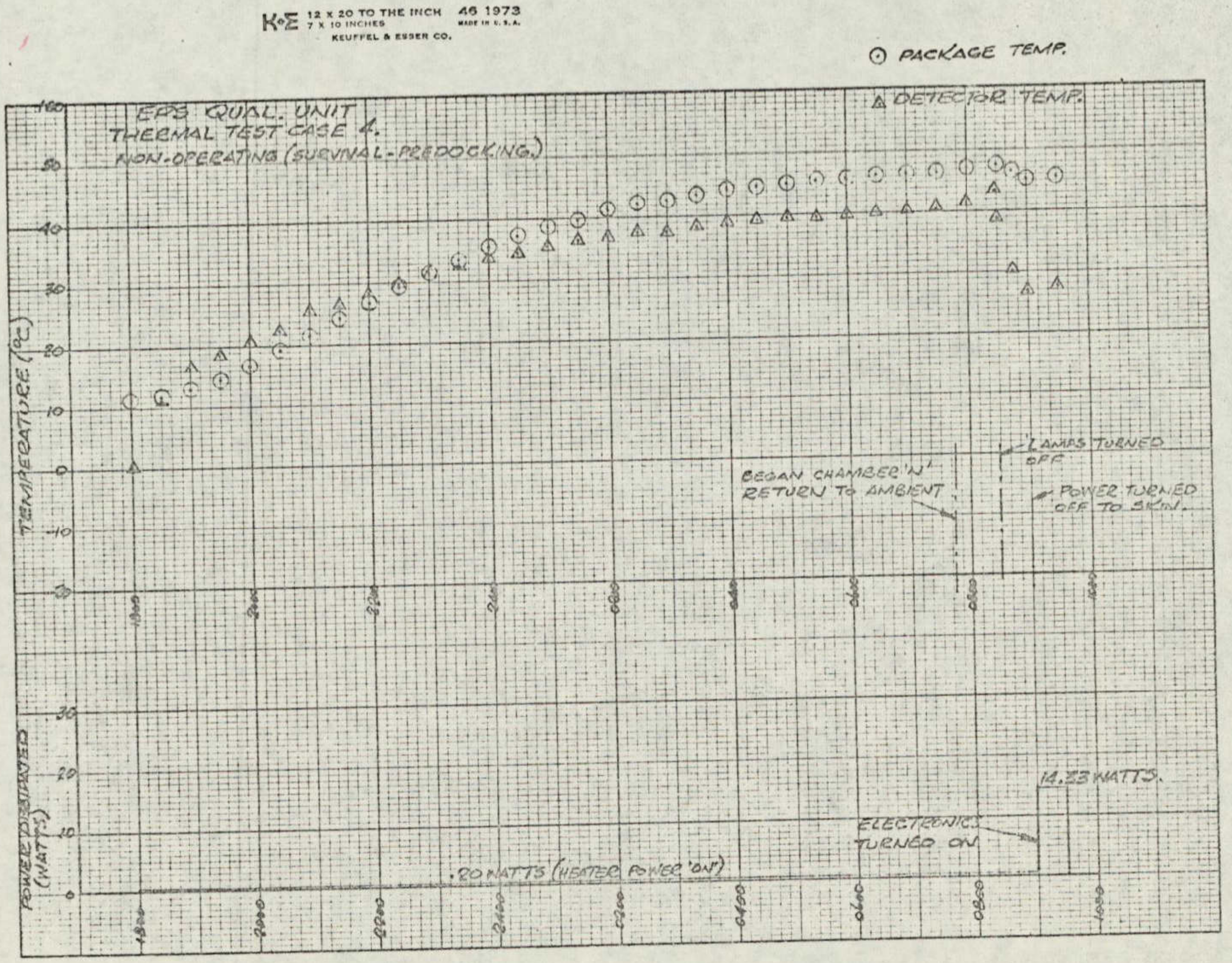
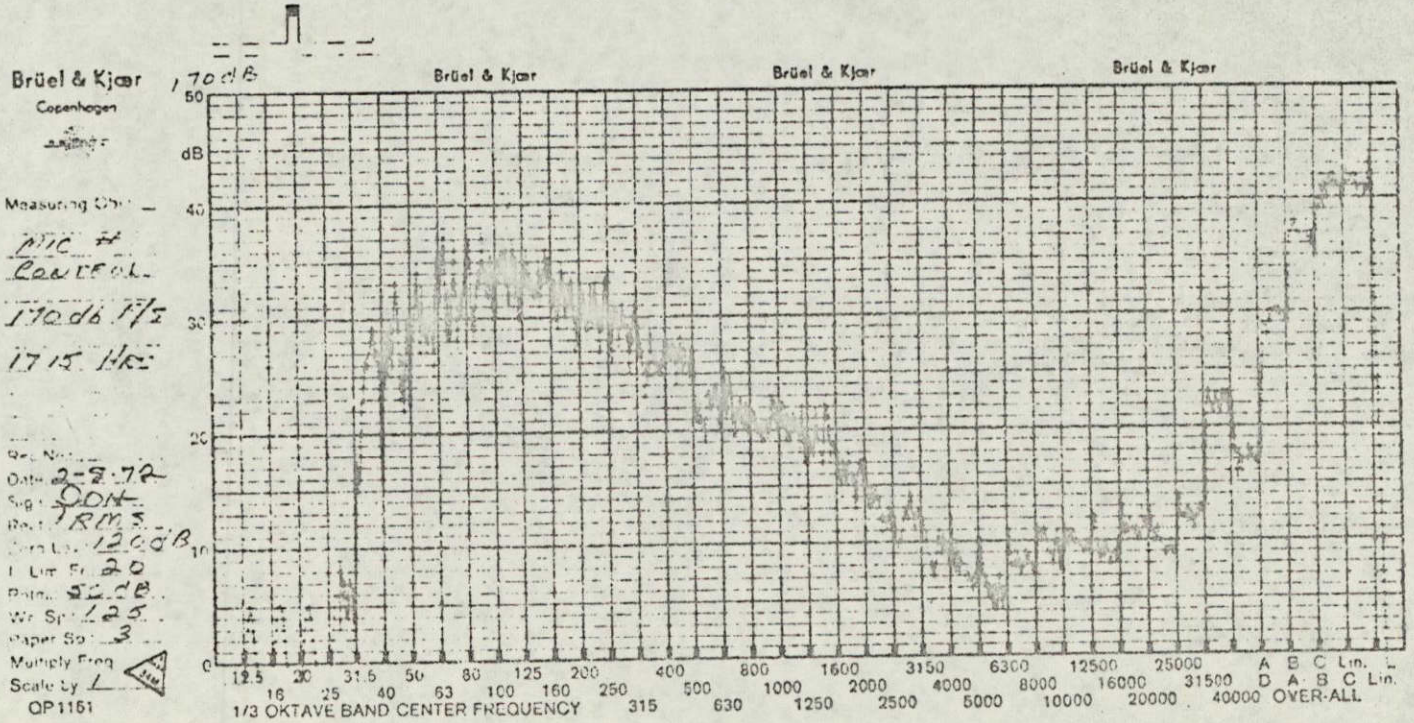


Figure 19 EPS Qual Unit, Thermal Test Case 4 -
Nonoperating, Survival Predocking

SPECTRUM SHAPED FOR
AERODYNAMIC RUN



Measuring Obj.: MIC # CONTROL
170 db F/S
1715 Hrs
Rec. No.:
Date 2-8-72
Sign. DDH
Rect. RMS
Zero Lev. 120 dB
L. Lim. Fr. 20
Potm. 50 dB
Wr. Sp. 125
Paper Sp. 3
Multiply Freq Scale by 1
QP 1151

Figure 20 Spectrum Shaped for Aerodynamic Run Mike 1

SPECTRUM SHAPED FOR
AERODYNAMIC RUN

Brüel & Kjær
Copenhagen

Measuring Obj.:
MIC #2
CENTREL
170 dB 1/3
1715 HRS.

Rec.No.
Date: 2-8-72
Sign: DH
Rect.: RMS
Zero Lev.: 120
L. Lim. Fr.: 20
Potm.: 50 dB
Wr. Sp.: 125
Paper Sp.: 3
Multiply Freq. Scale by: 1
QP 1151

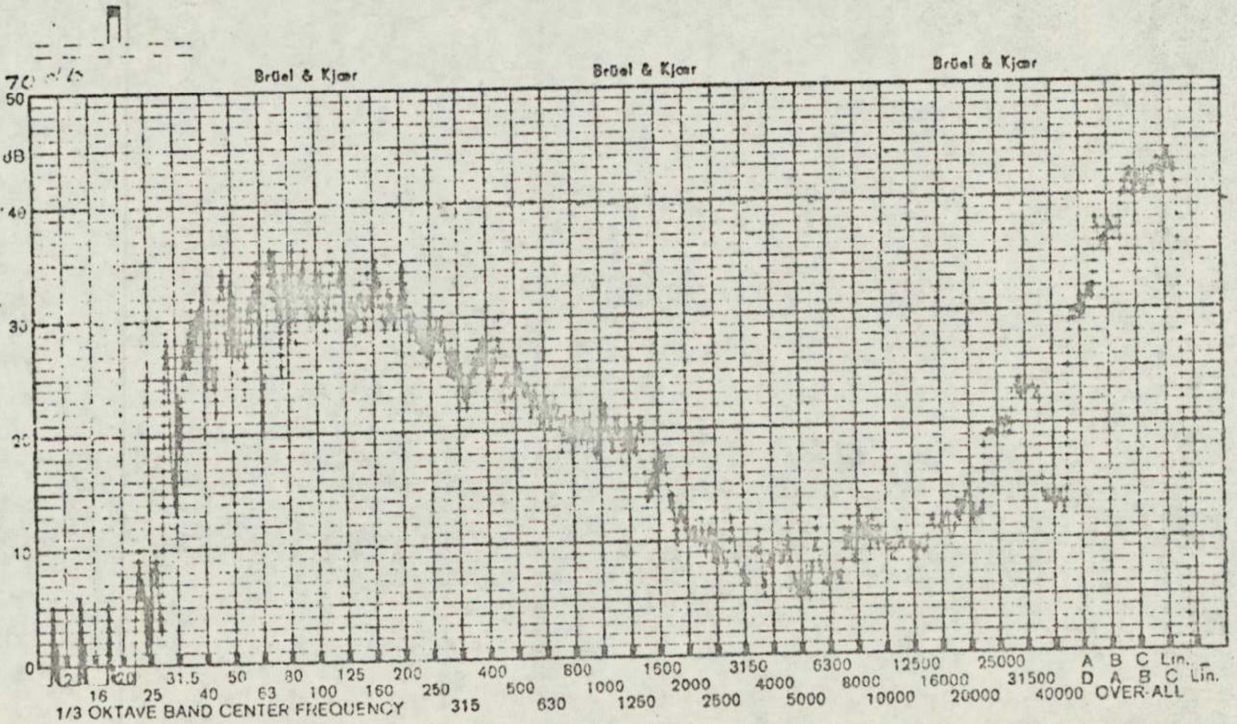
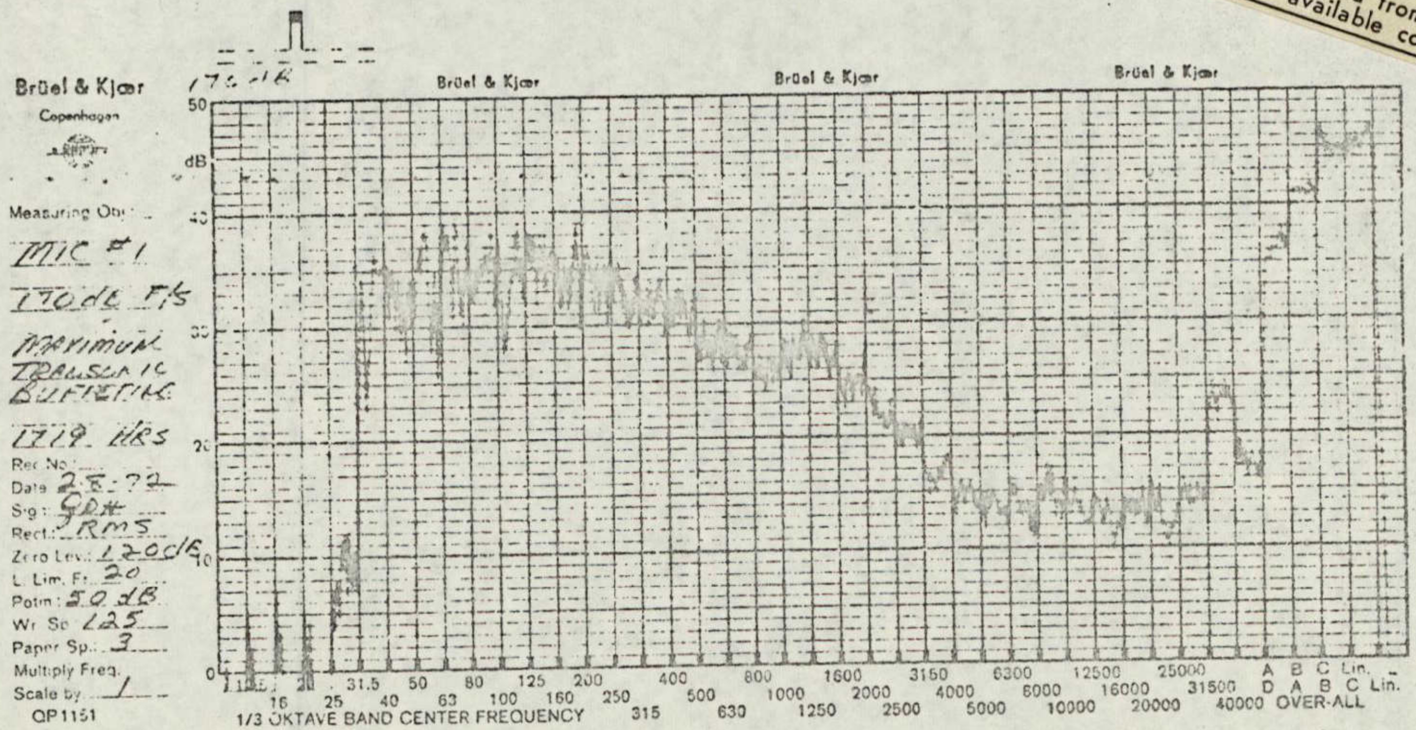


Figure 21 Spectrum Shaped for
Aerodynamic Run Mike 2

SPECTRUM SHAPED FOR 165 dB
TRANSONIC BUFFETING SPECTRUM

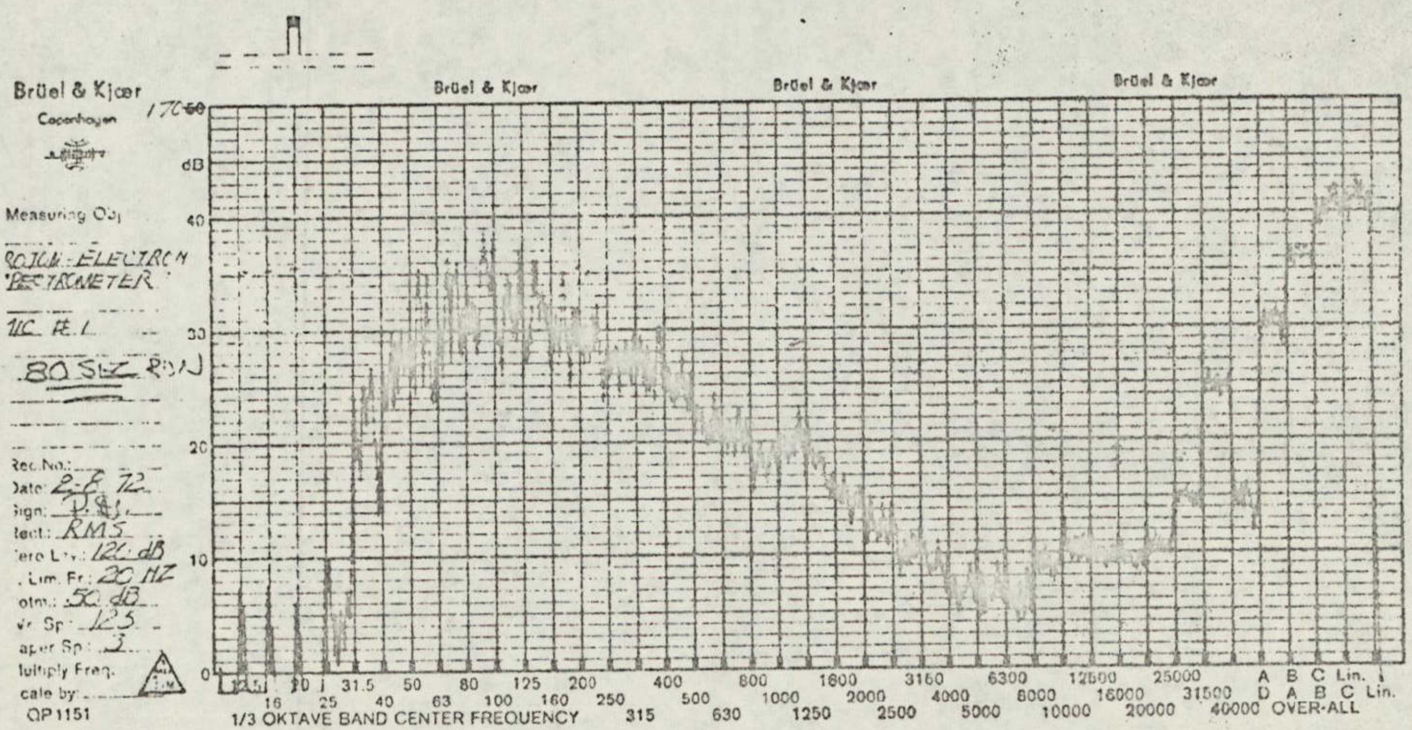


Brüel & Kjær
Copenhagen

Measuring Obj.:
MIC #1
170 dB F/S
MAXIMUM
TRANSONIC
BUFFETING
1719 HRS
Rec. No.:
Date 2-8-72
Sig.: GDH
Rect.: RMS
Zero Lev.: 120 dB
L. Lim. F.: 20
Potm.: 50 dB
Wr. Sp. 125
Paper Sp.: 3
Multiply Freq.
Scale by 1
QP 1151

Figure 22 Spectrum Shaped for 165 db
Transonic Buffeting

DATA TAKEN DURING MAXIMUM AERODYNAMIC RUN



Measuring Obj.

ROTOR-ELECTRON SPECTROMETER

UC R.L

.80 SEC RUN

Rec.No.:
Date: 2-8-72
Sign: D.S.
Rect.: RMS
Zero Lev.: 120 dB
L. Lim. Fr.: 20 HZ
Potm.: 50 dB
Wr. Sp: 125
Paper Sp: 3
Multiply Freq. Scale by:

Figure 23 Data Taken During Maximum Aerodynamic Run.

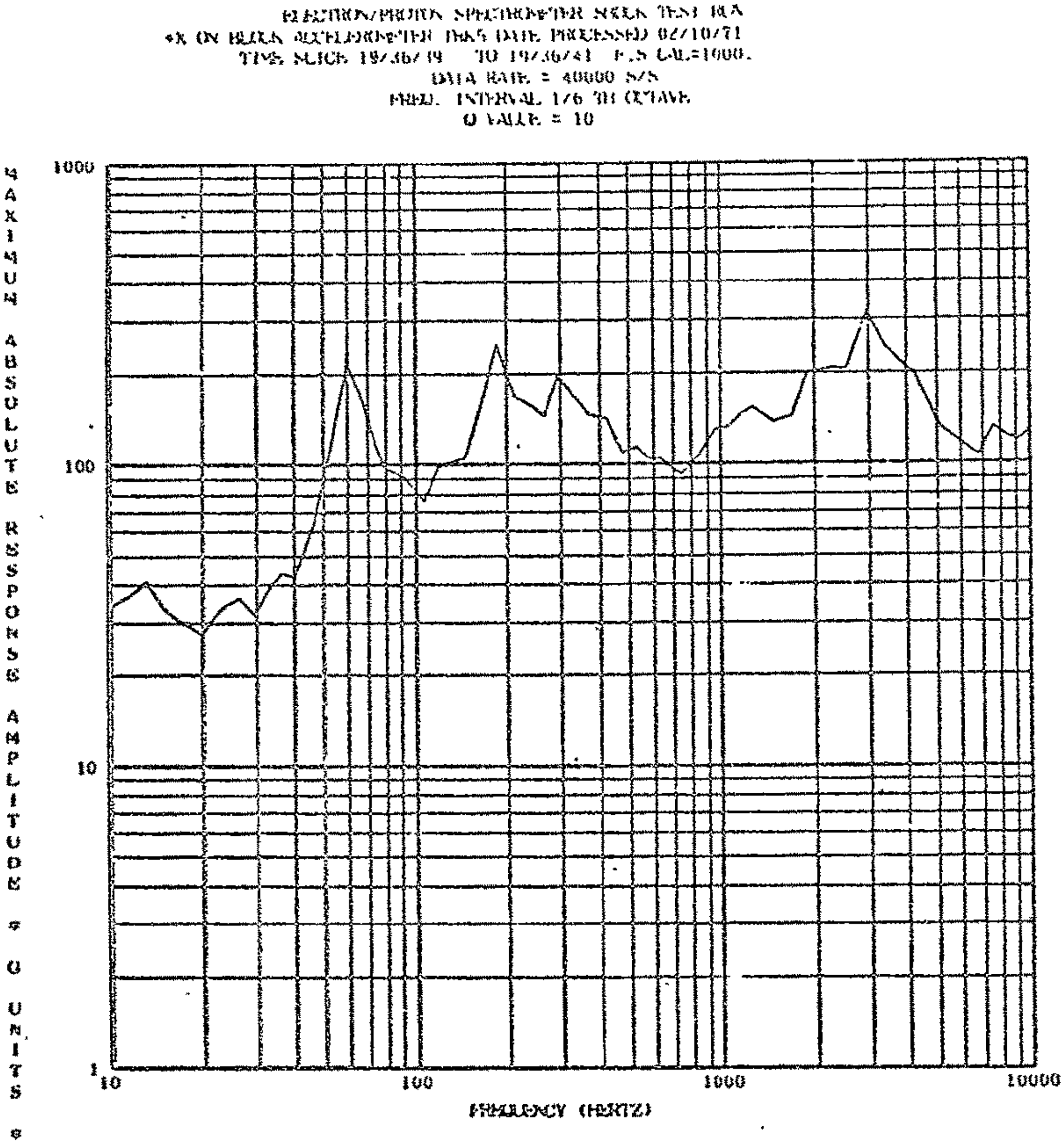


Figure 25 Shock Response Spectrum
+'X' Direction, 'X' Axis,
Electronics Package

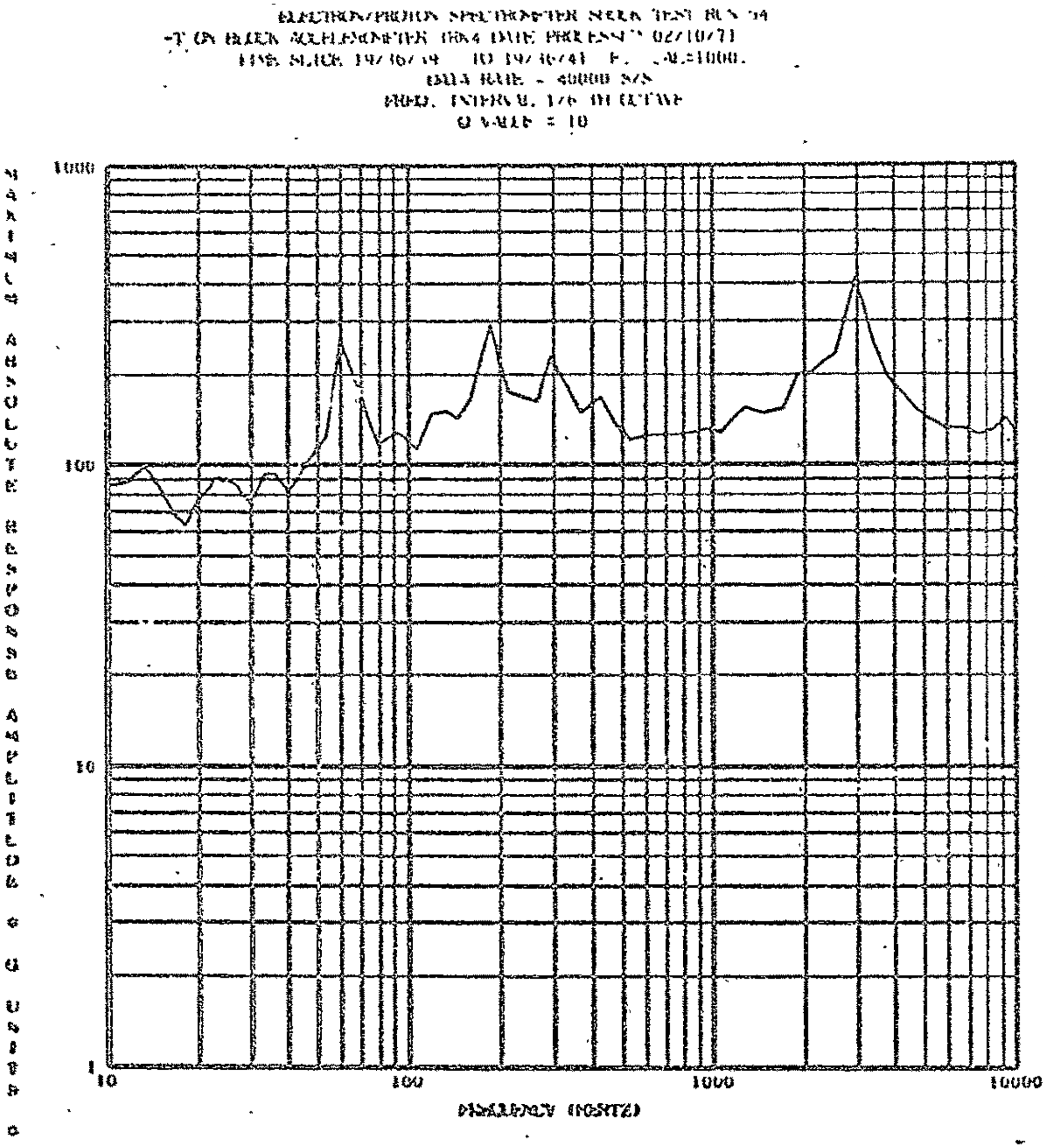


Figure 26 Shock Response Spectrum
+'X' Direction, 'T' Axis,
Electronics Package

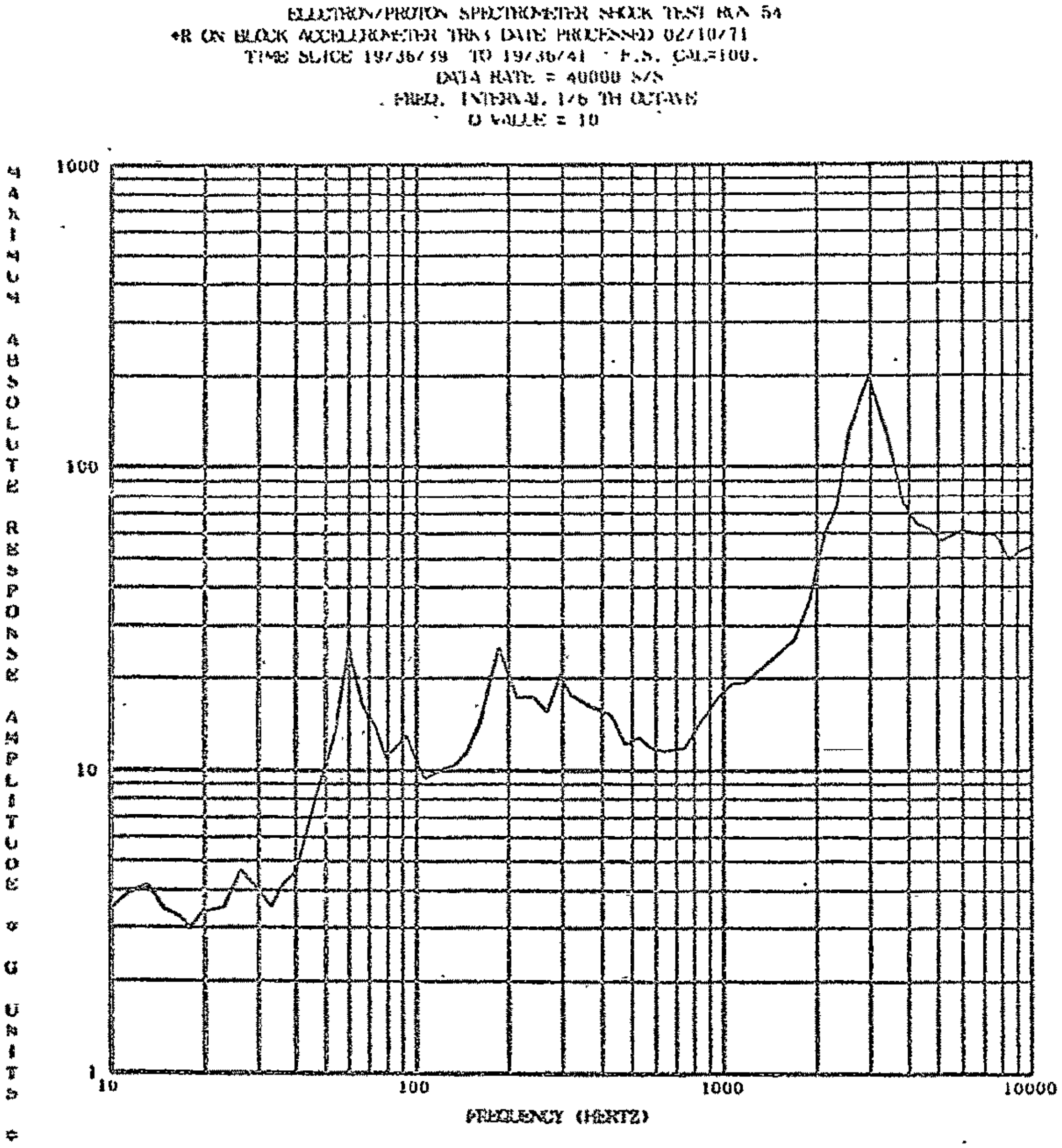


Figure 27 Shock Response Spectrum
+'X' Direction, 'R' Axis,
Electronics Package

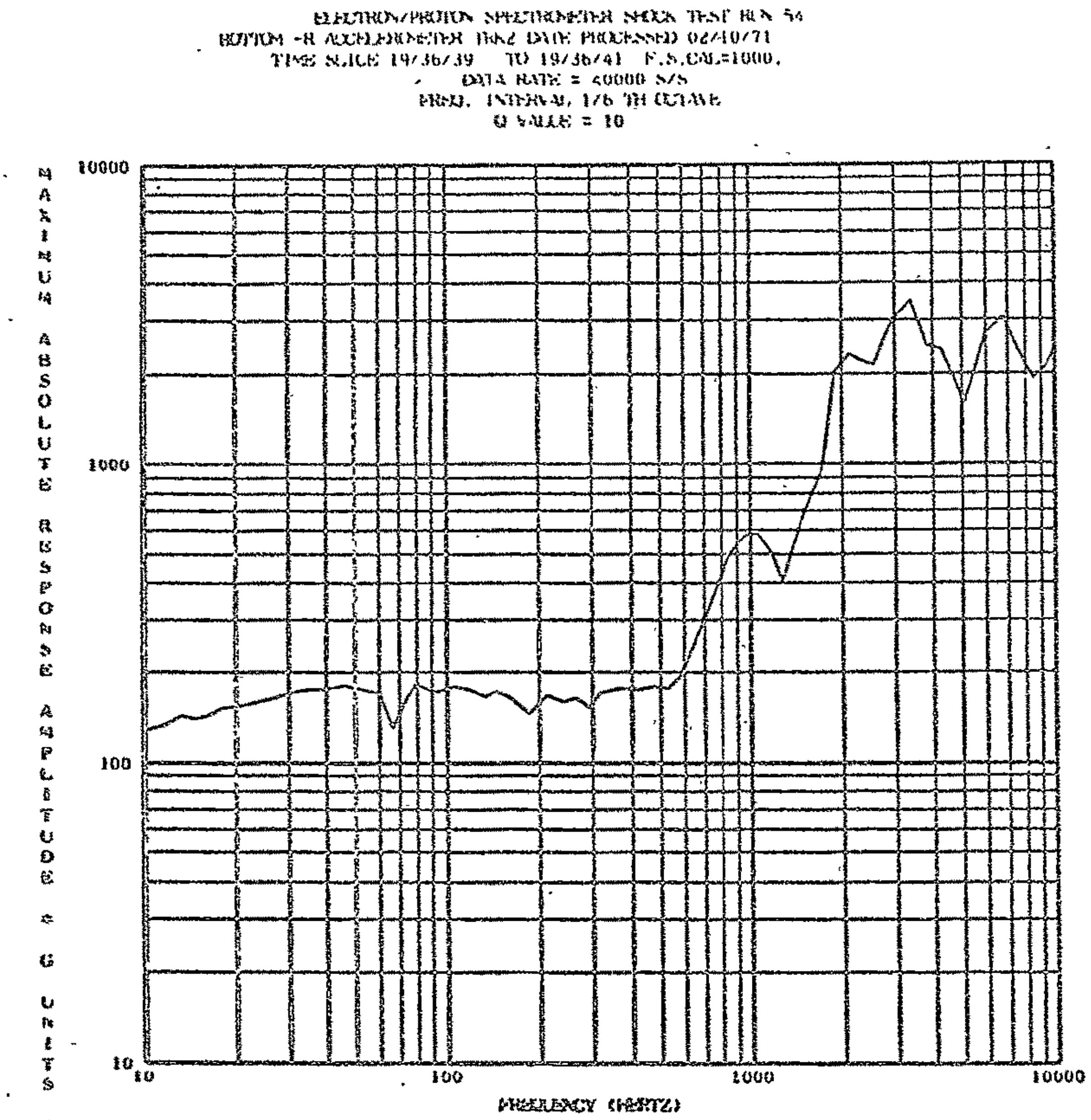


Figure 28 Shock Response Spectrum
+'X' Direction, 'R' Axis,
Baseplate

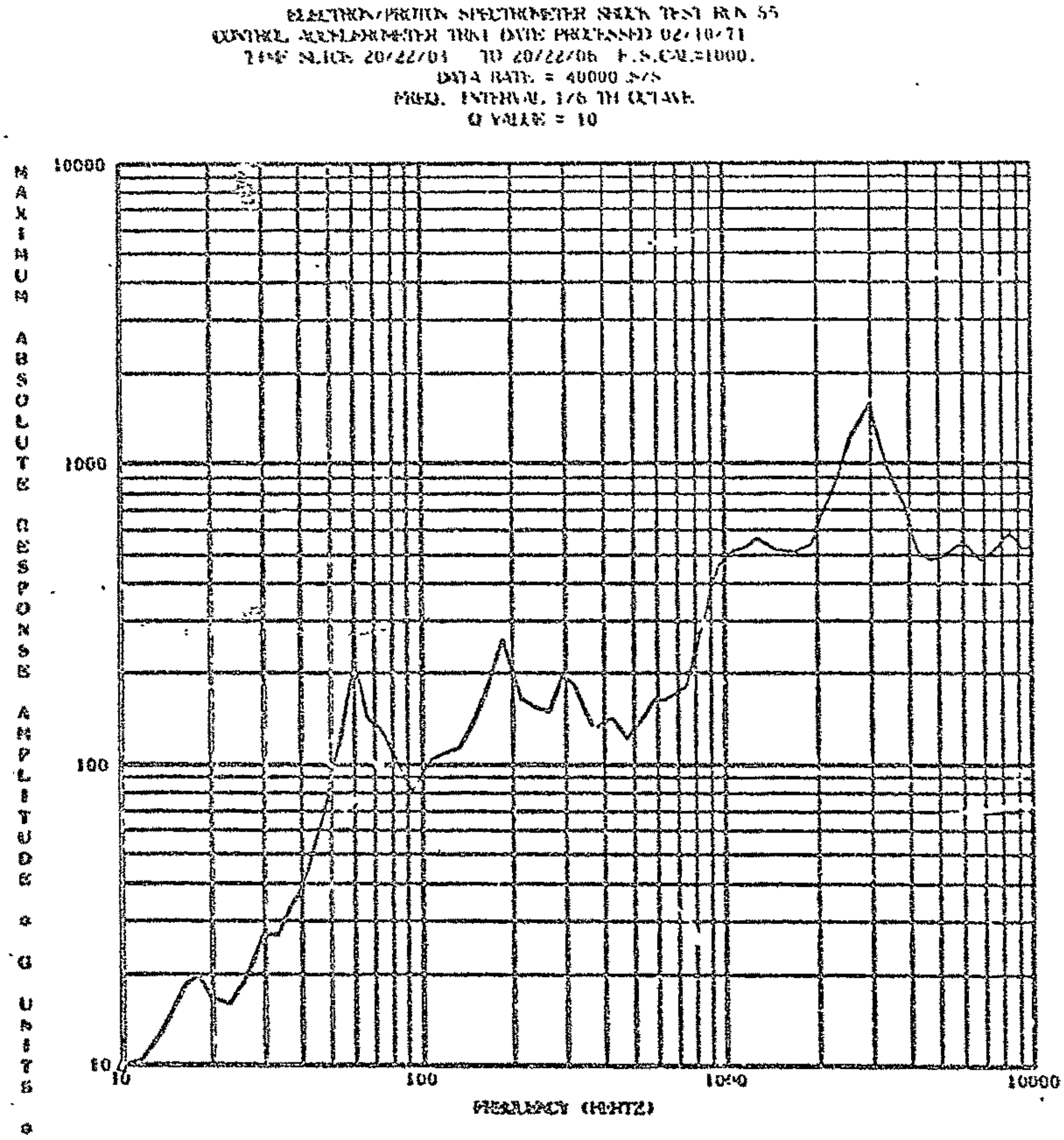


Figure 29 Shock Response Spectrum,
Input, -X Direction

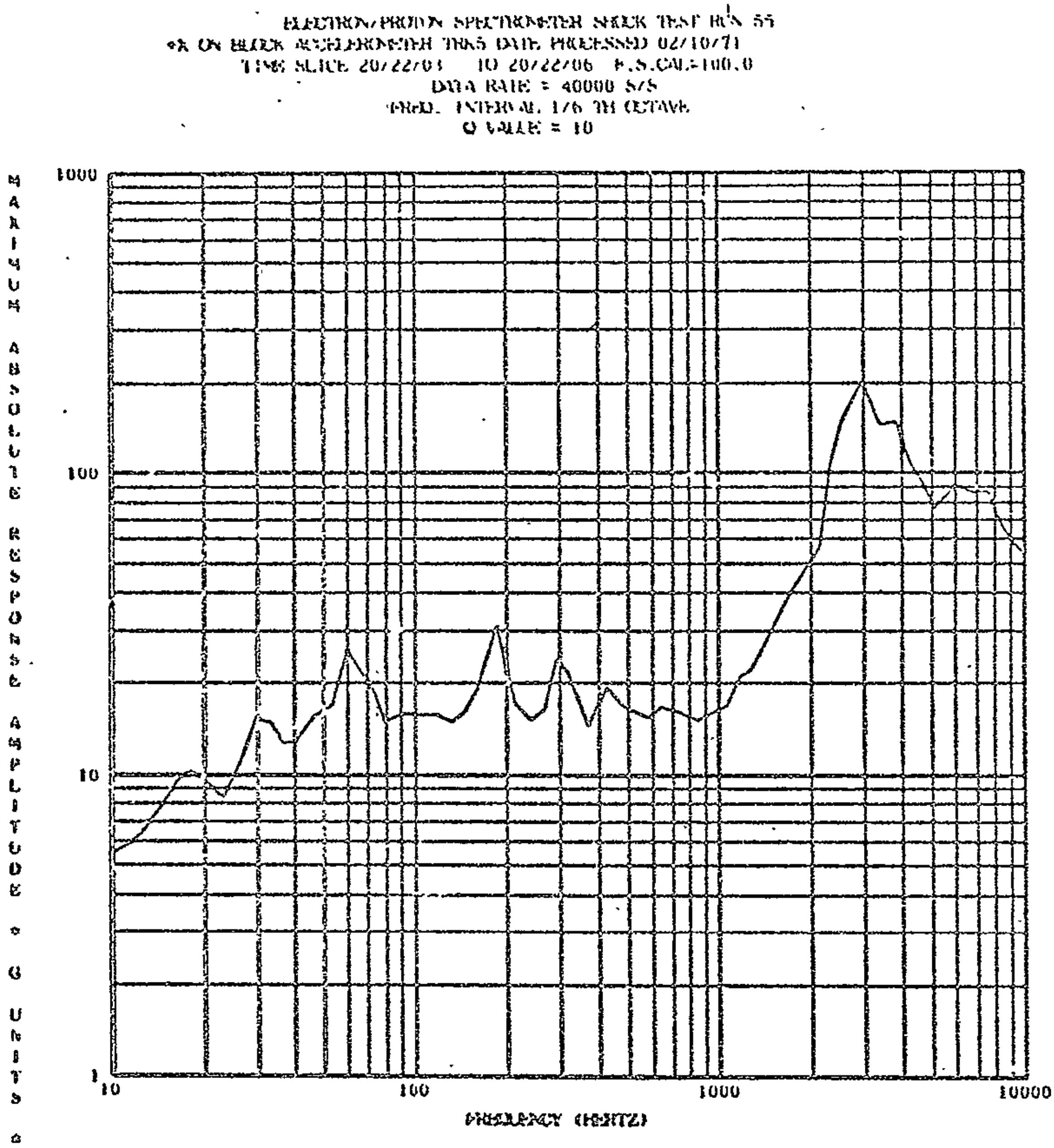


Figure 30 Shock Response Spectrum
-'X' Direction, 'X' Axis,
Electronics Package

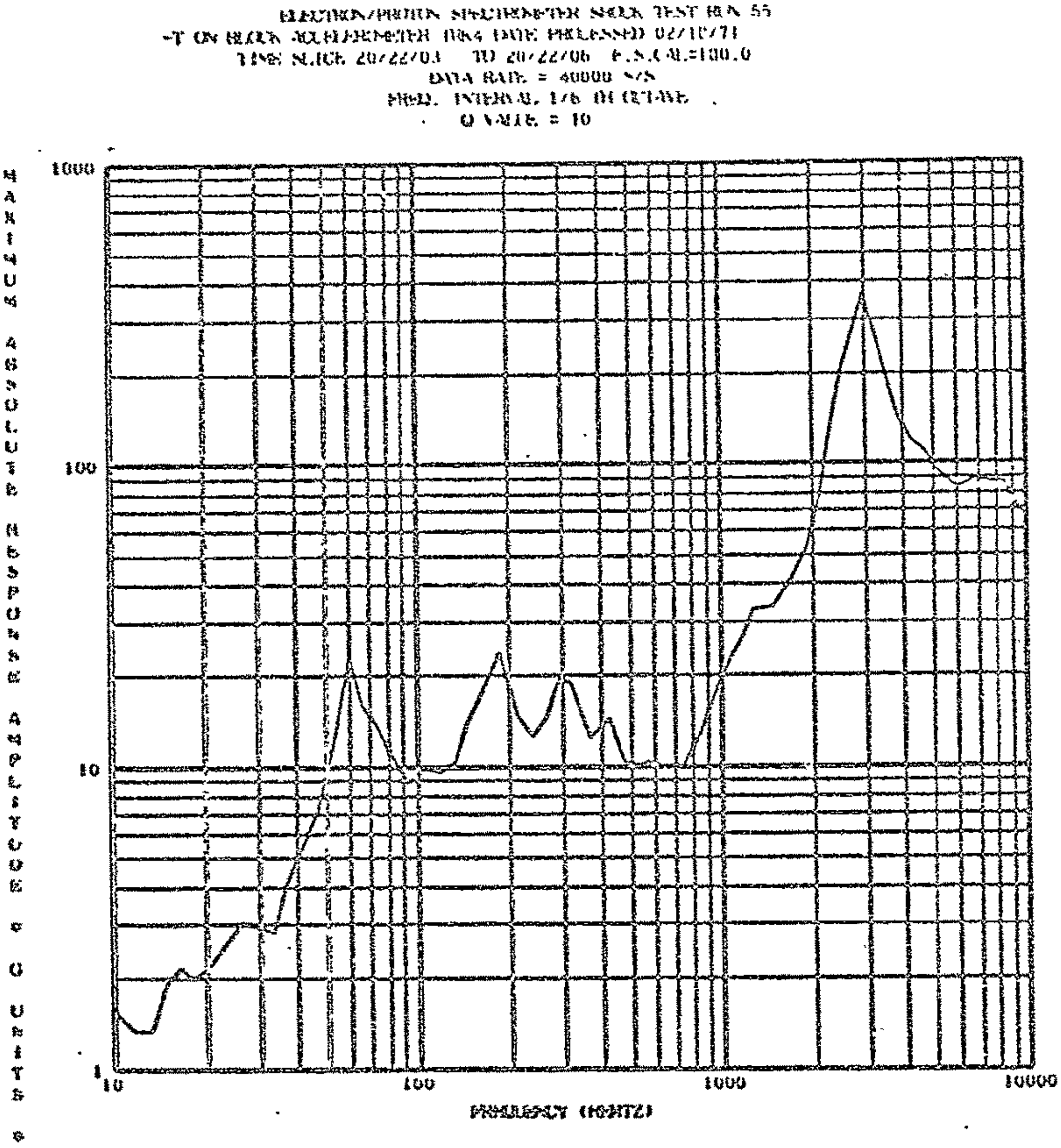


Figure 31 Shock Response Spectrum -'X' Direction, 'T' Axis, Electronics Package

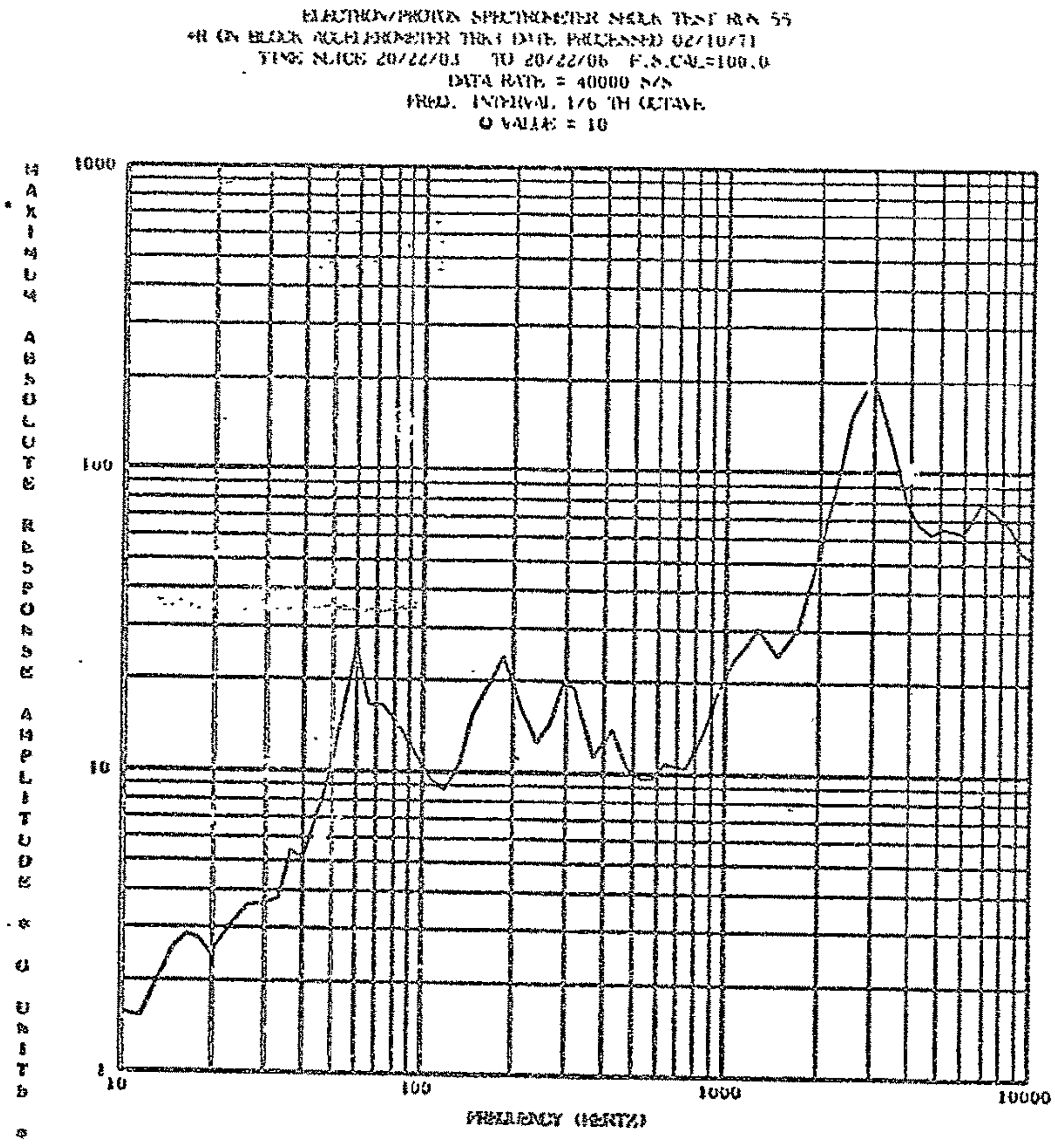


Figure 32 Shock Response Spectrum
-'X' Direction, 'R' Axis,
Electronics Package

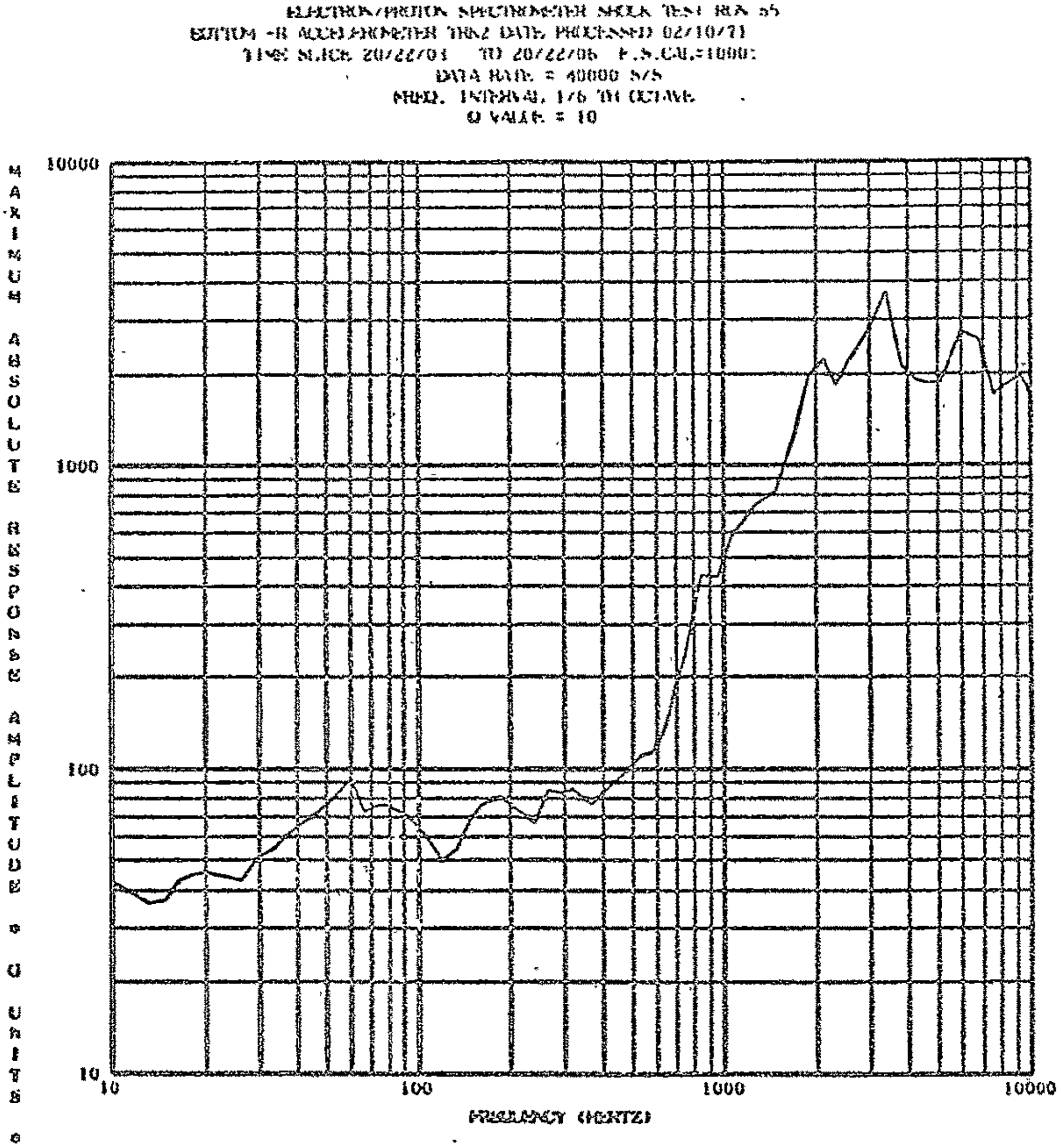


Figure 33 Shock Response Spectrum -'X' Direction, 'R' Axis, Baseplate

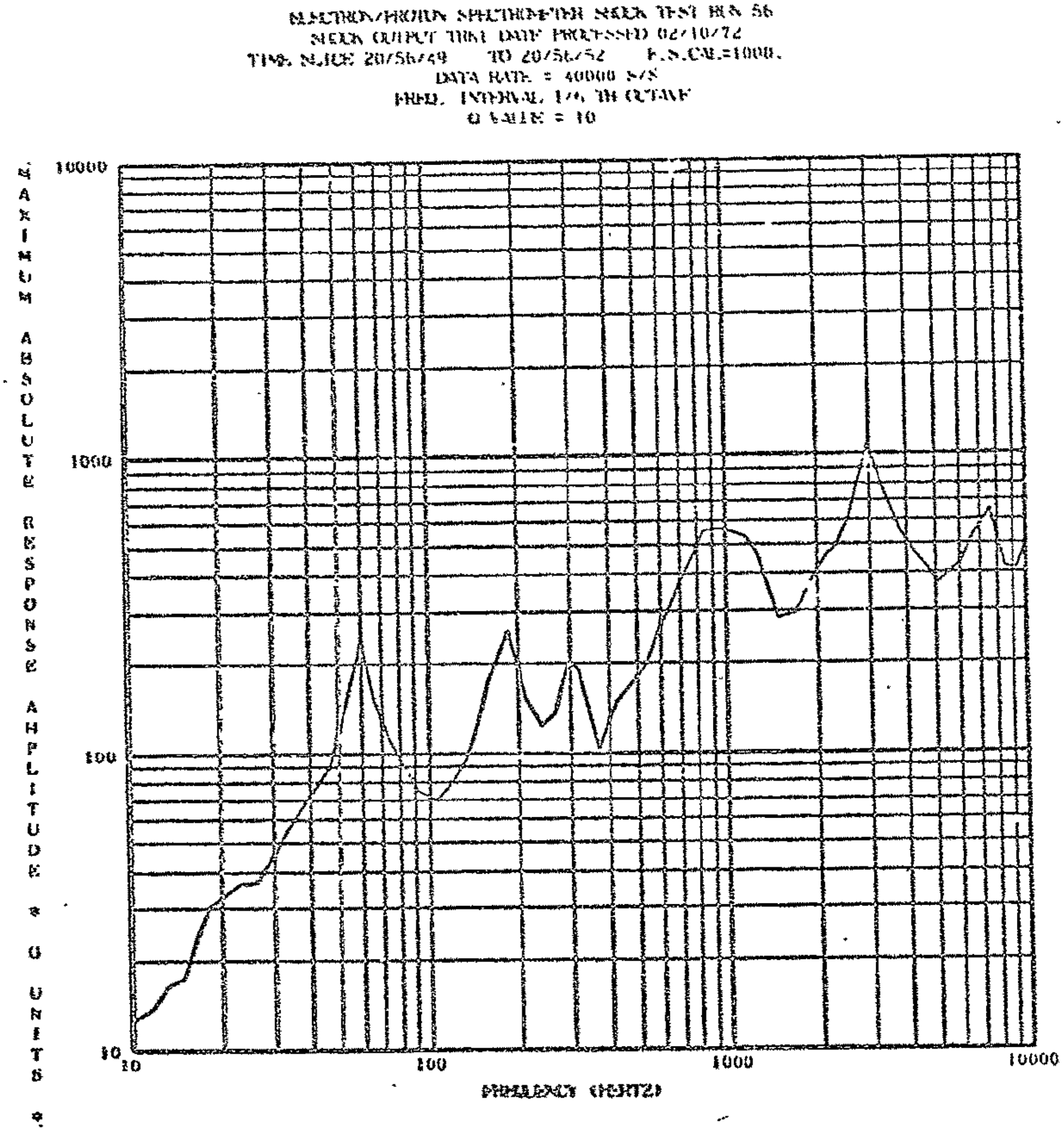


Figure 34 Shock Response Spectrum, Input, -T Direction

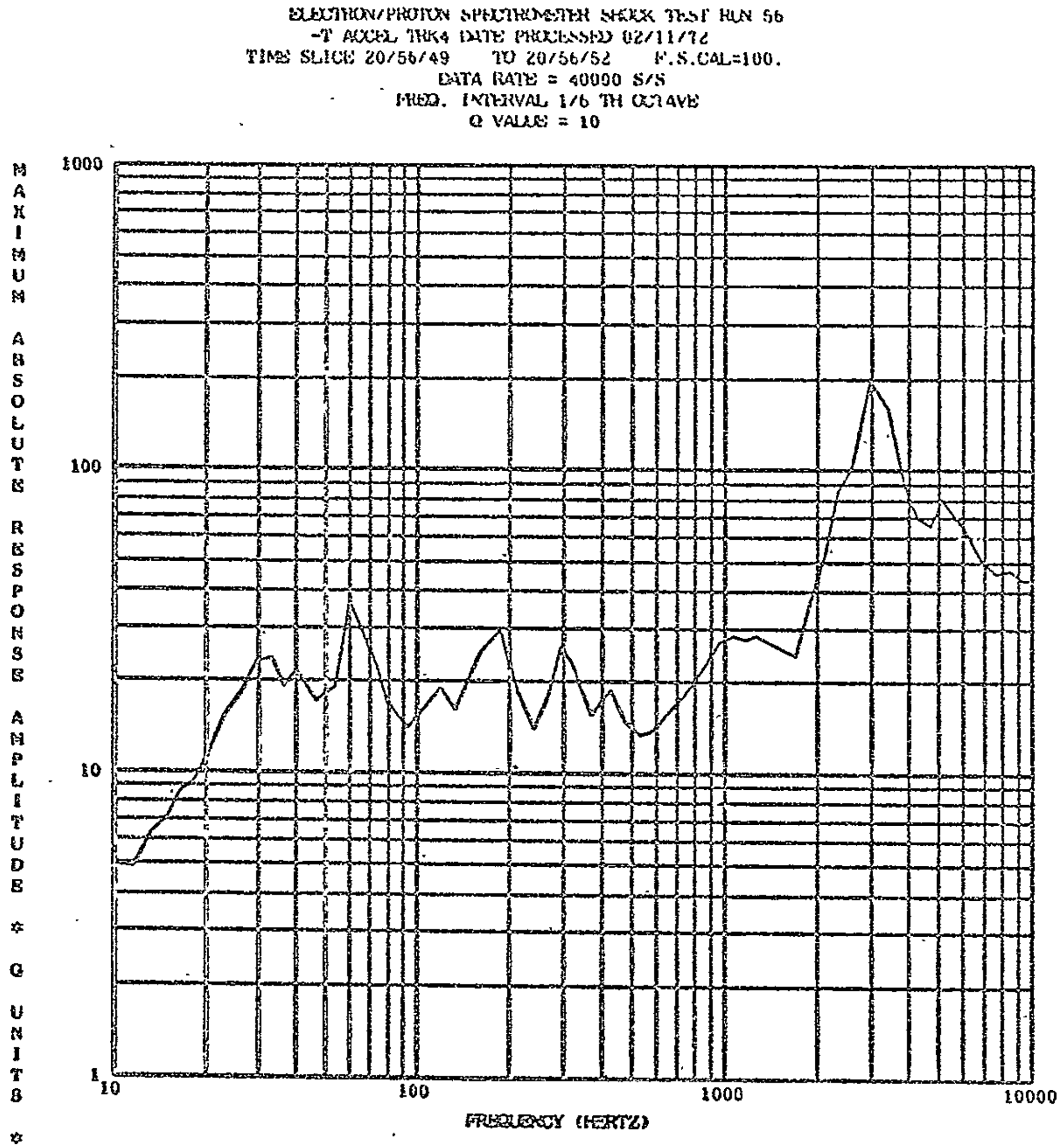


Figure 35 Shock Response Spectrum
-'T' Direction, 'T' Axis,
Electronics Package

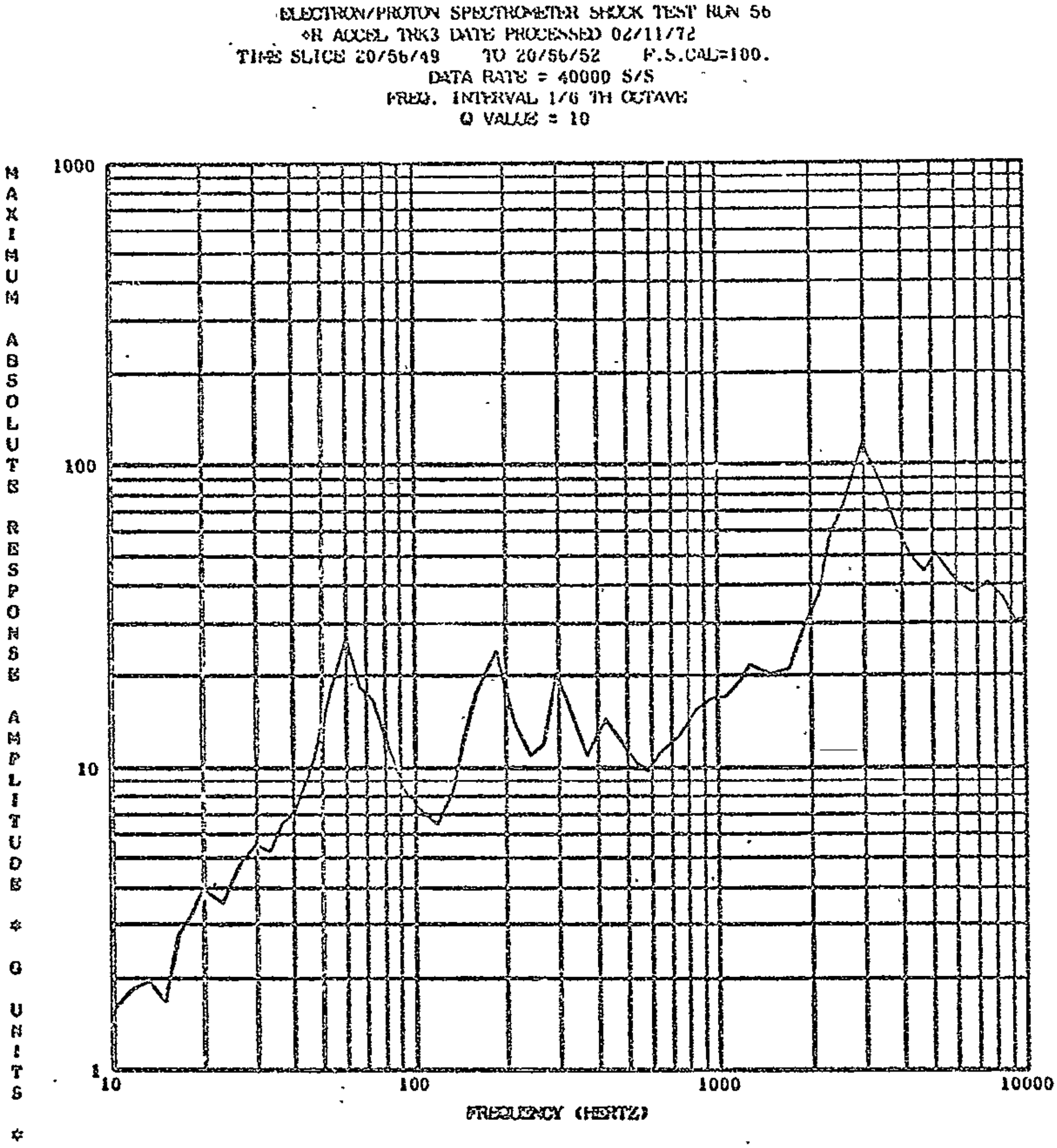


Figure 36 Shock Response Spectrum
-'T' Direction, 'R' Axis,
Electronics Package

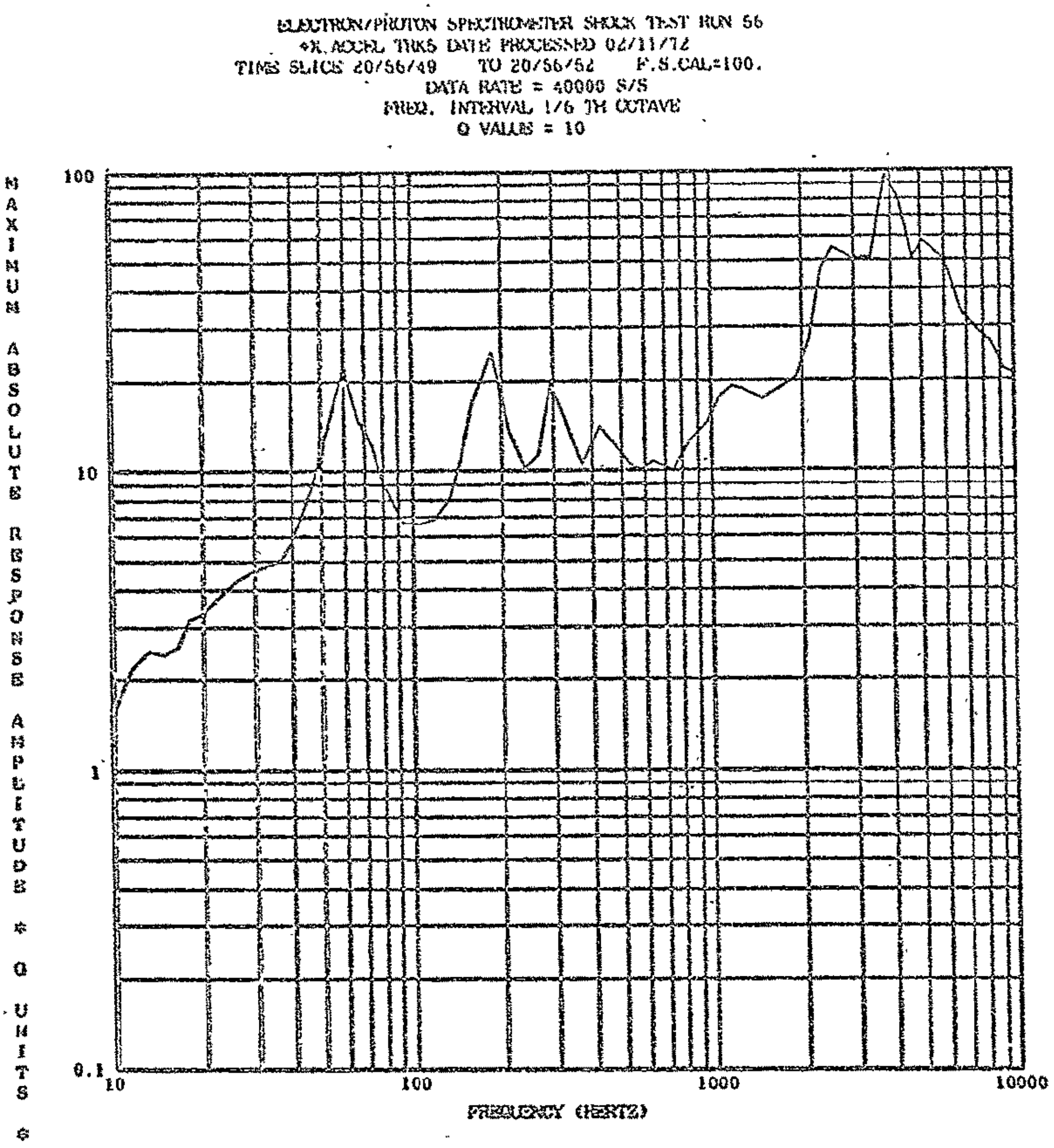


Figure 37 Shock Response Spectrum
-T Direction, 'X' Axis,
Electronics Package

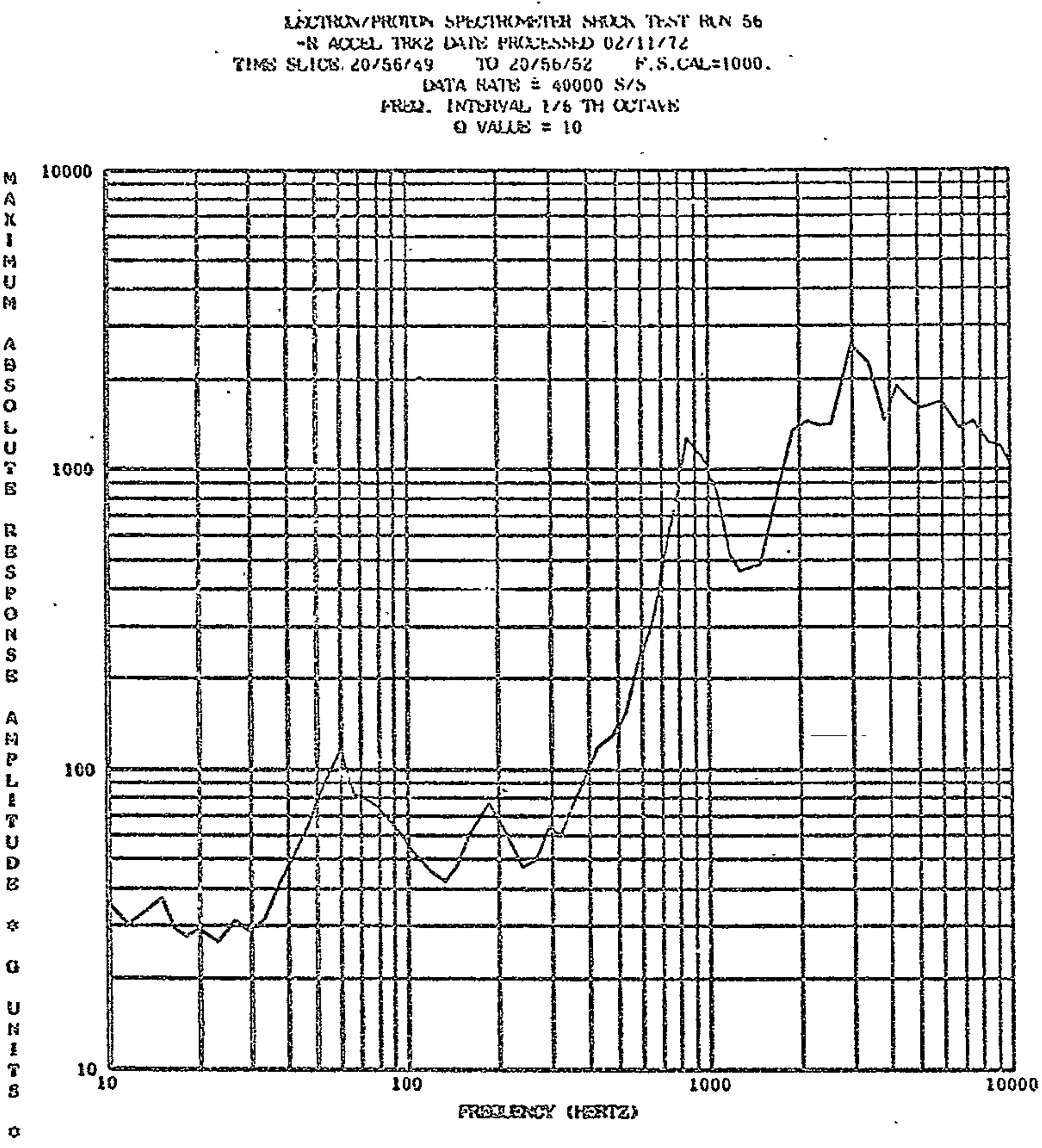


Figure 38 Shock Response Spectrum
-T Direction, 'R' Axis,
Baseplate

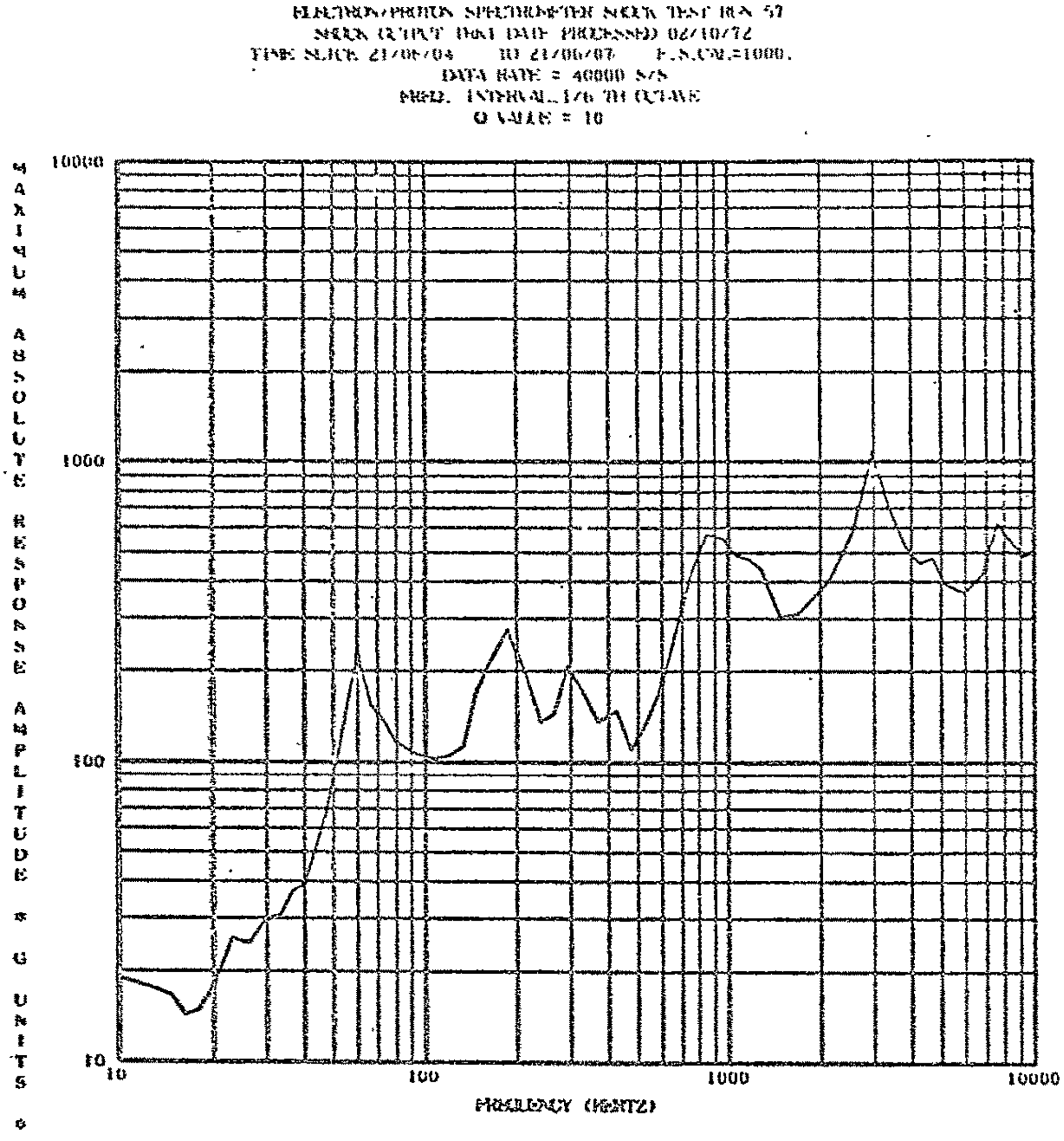


Figure 39 Shock Response Spectrum
Input, +T Direction

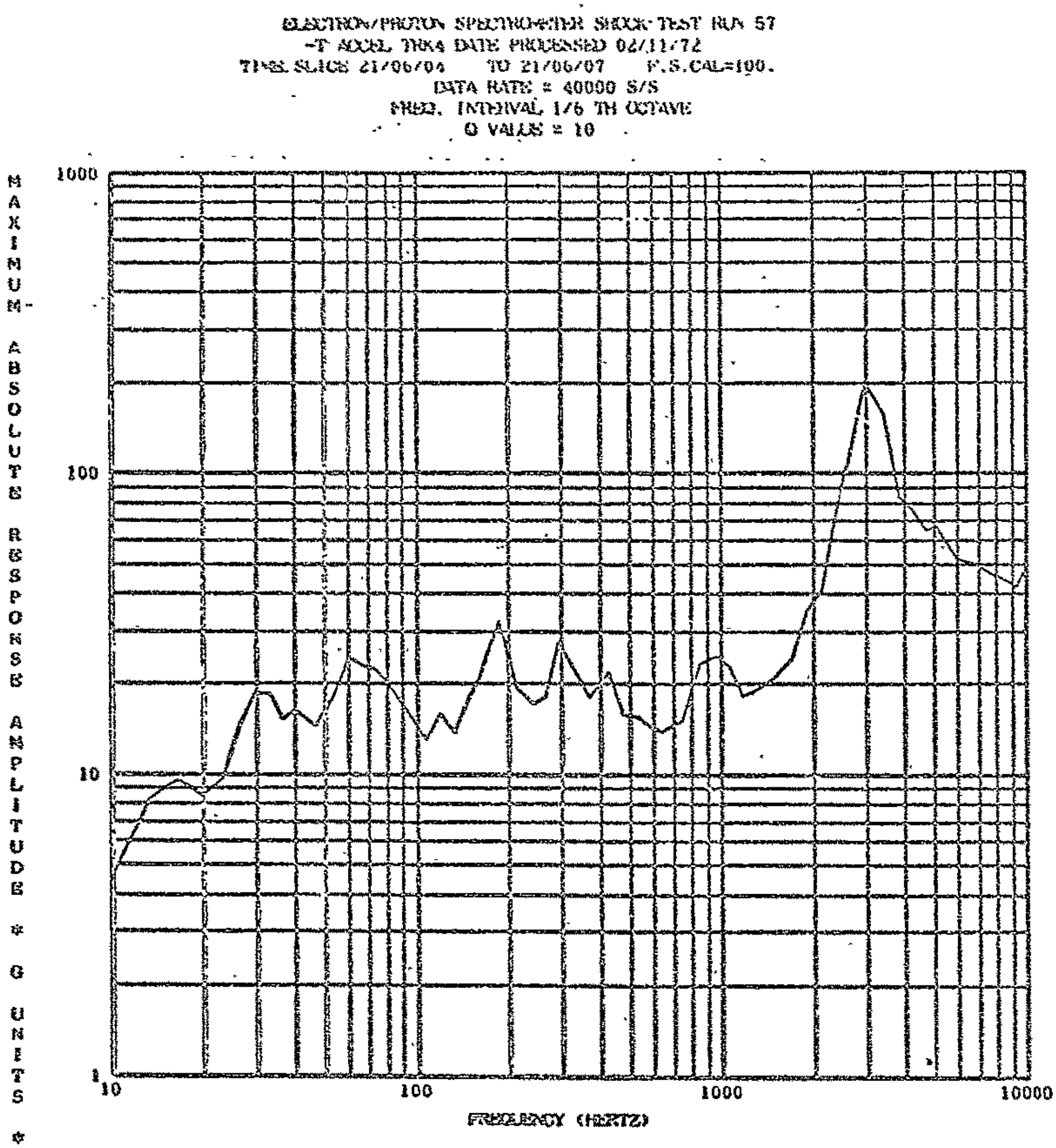


Figure 40 Shock Response Spectrum
+'T' Direction, 'T' Axis,
Electronics Package

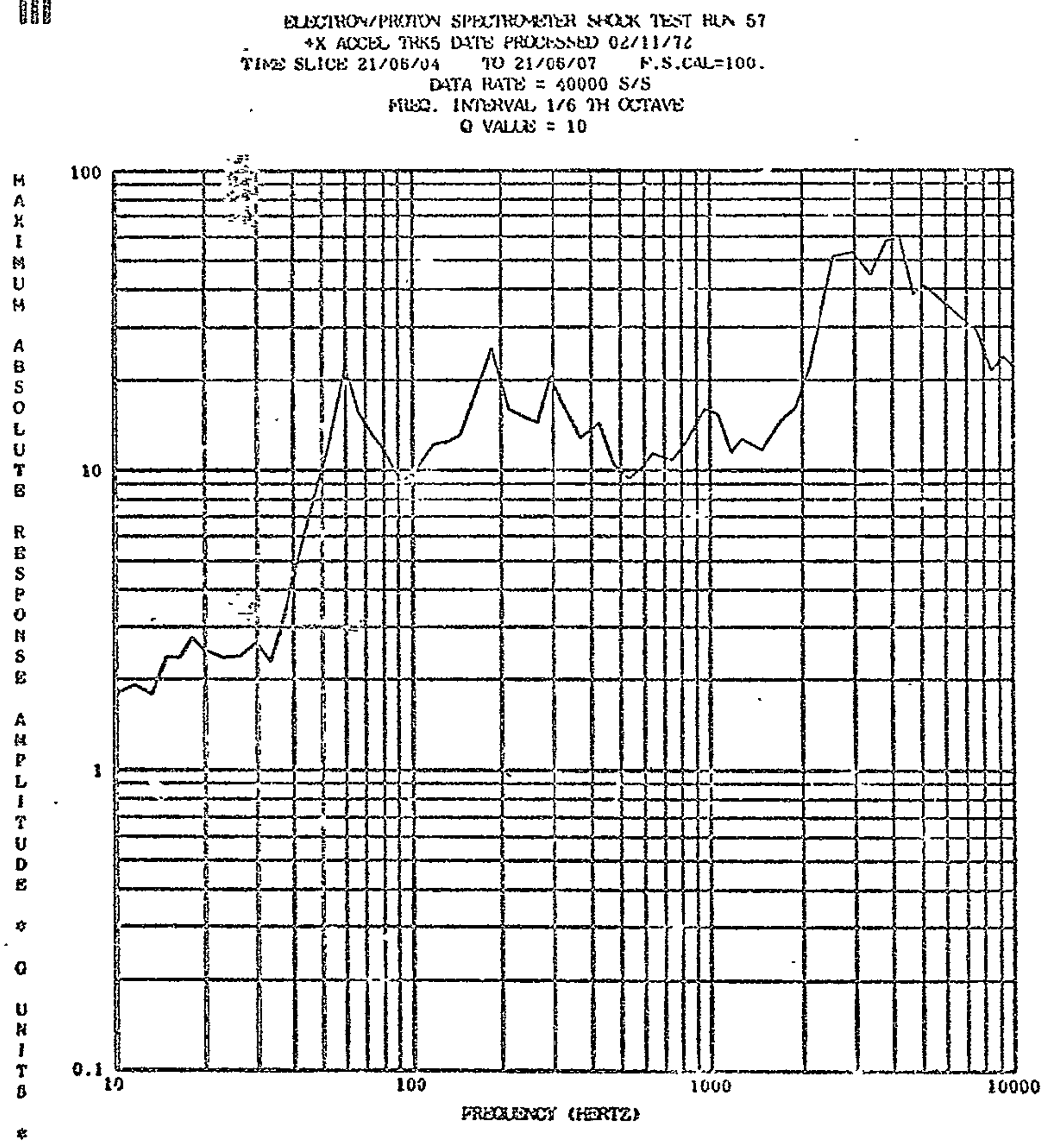


Figure 41 Shock Response Spectrum
+T Direction, X Axis,
Electronics Package

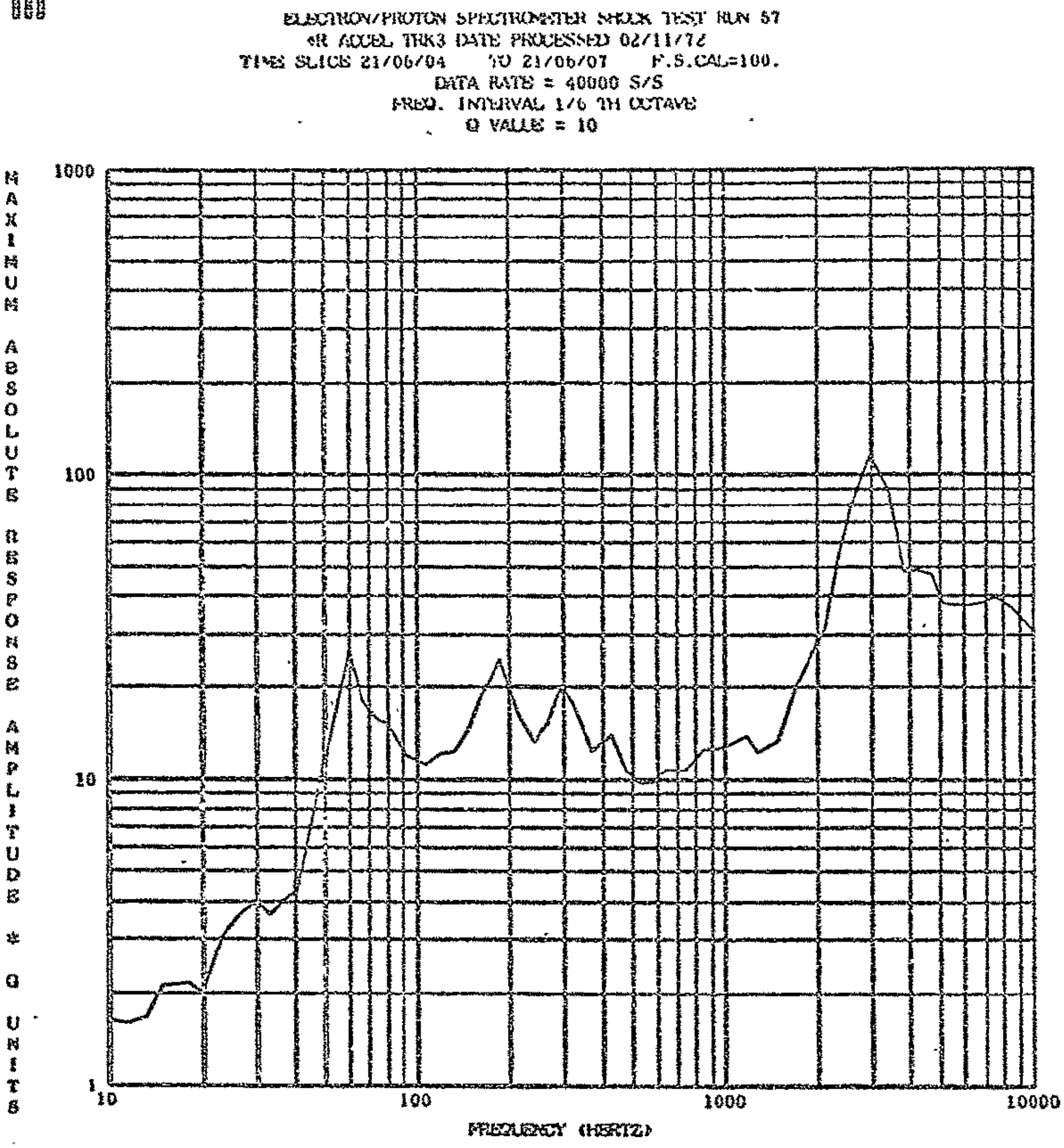


Figure 42 Shock Response Spectrum
+T Direction, 'R' Axis,
Electronics Package

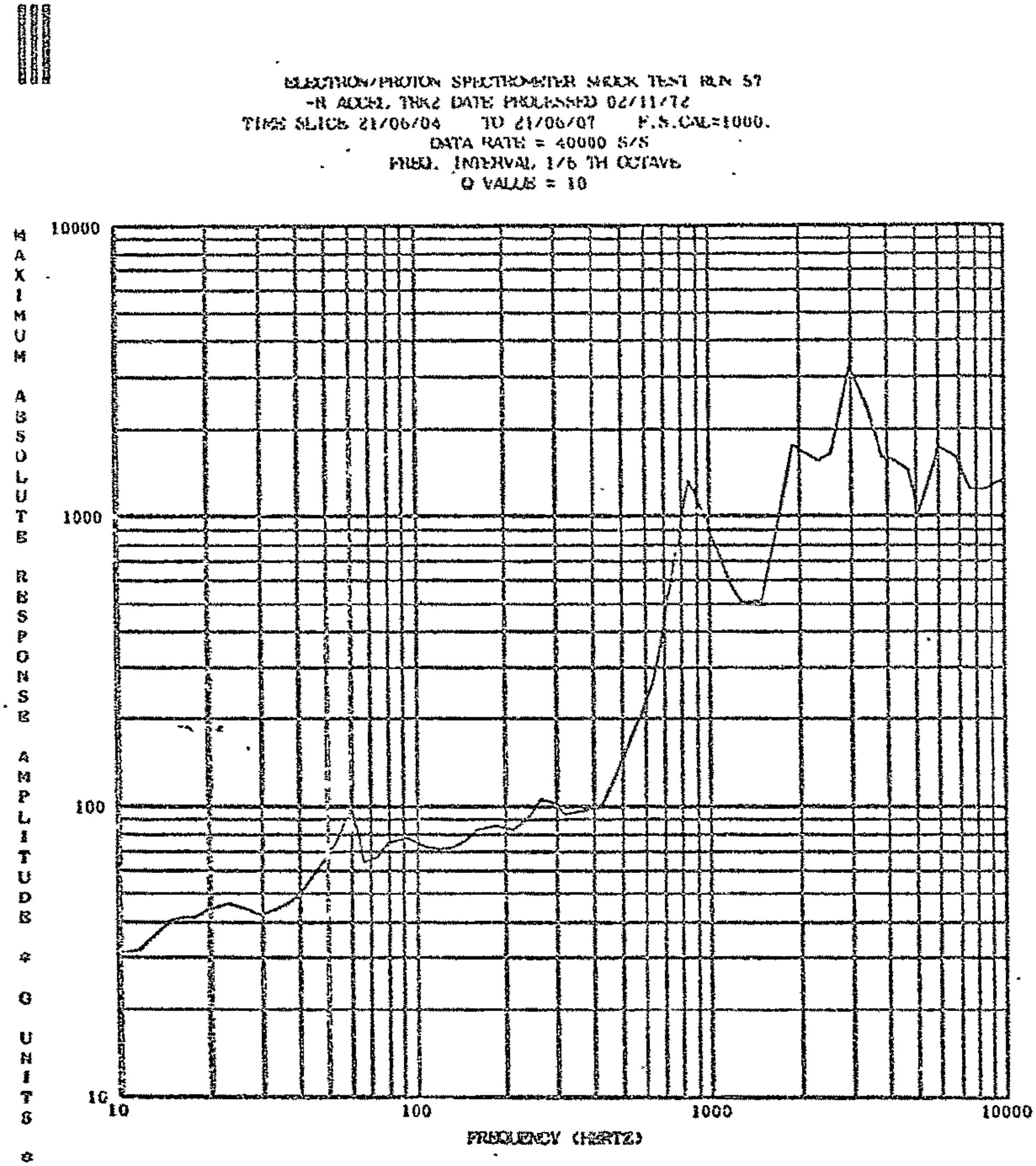


Figure 43 Shock Response Spectrum
+T Direction, 'R' Axis,
Baseplate

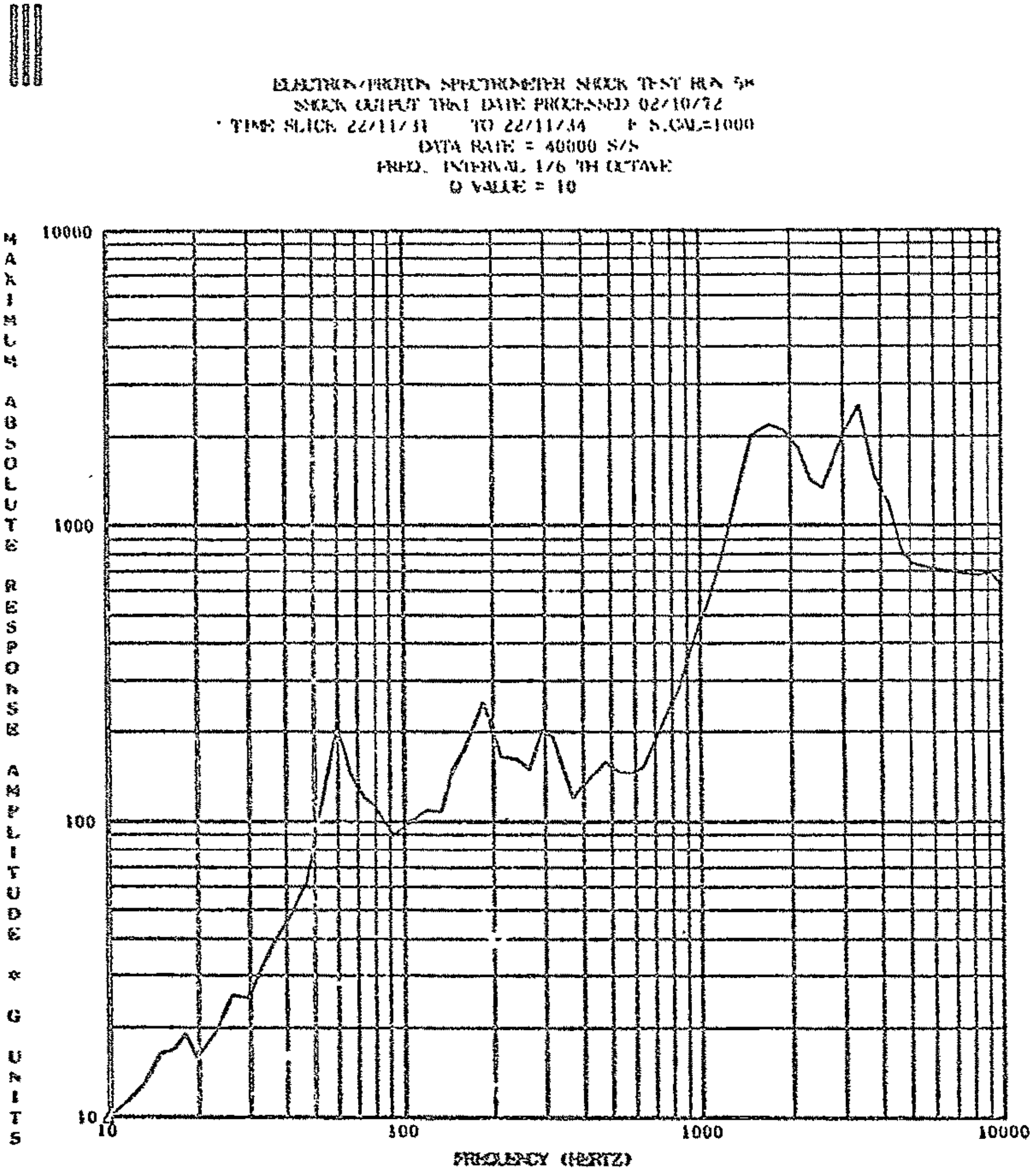


Figure 44 Shock Response Spectrum
Input, +R Direction

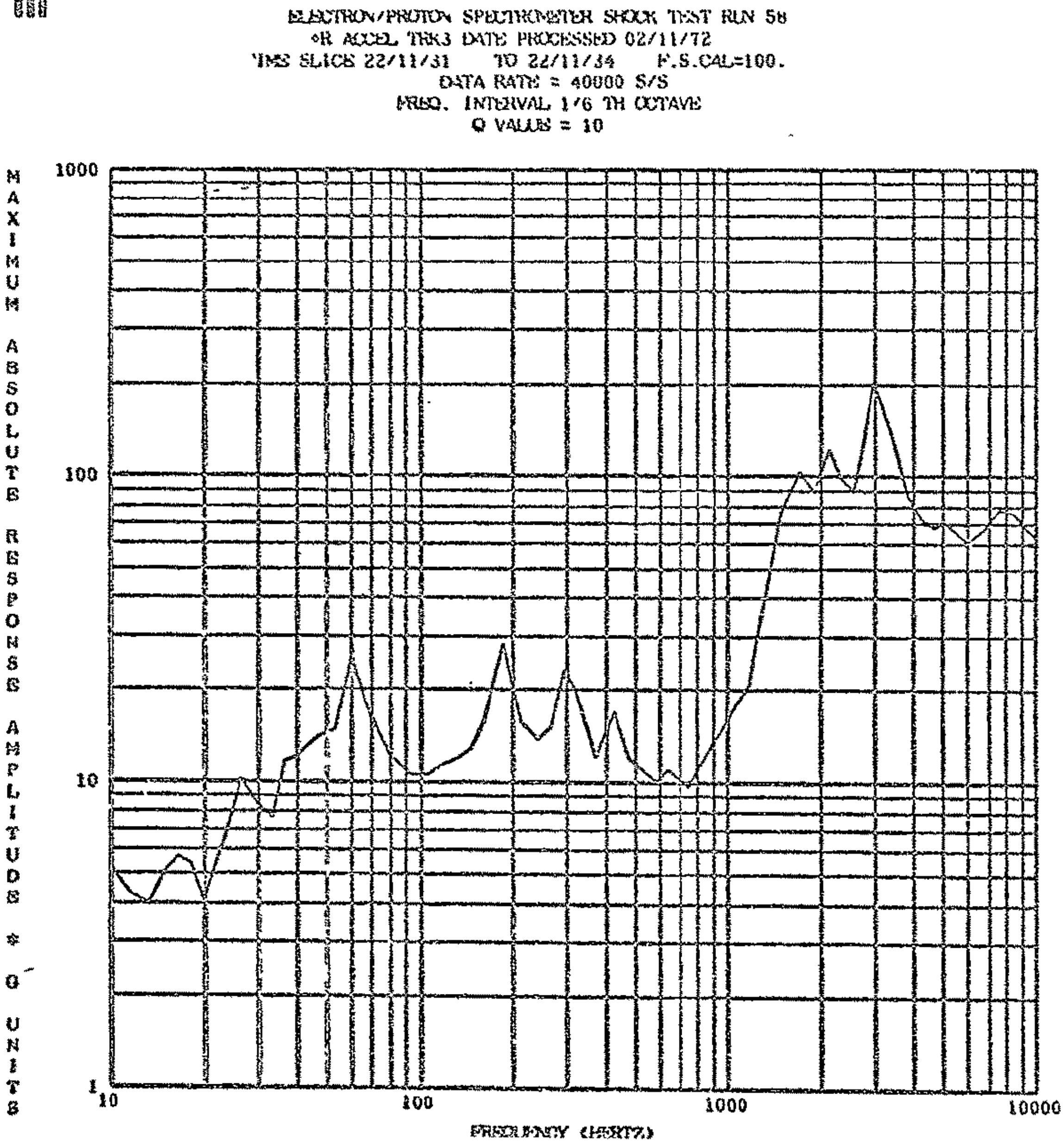


Figure 45 Shock Response Spectrum
+R Direction, 'R' Axis,
Electronics Package

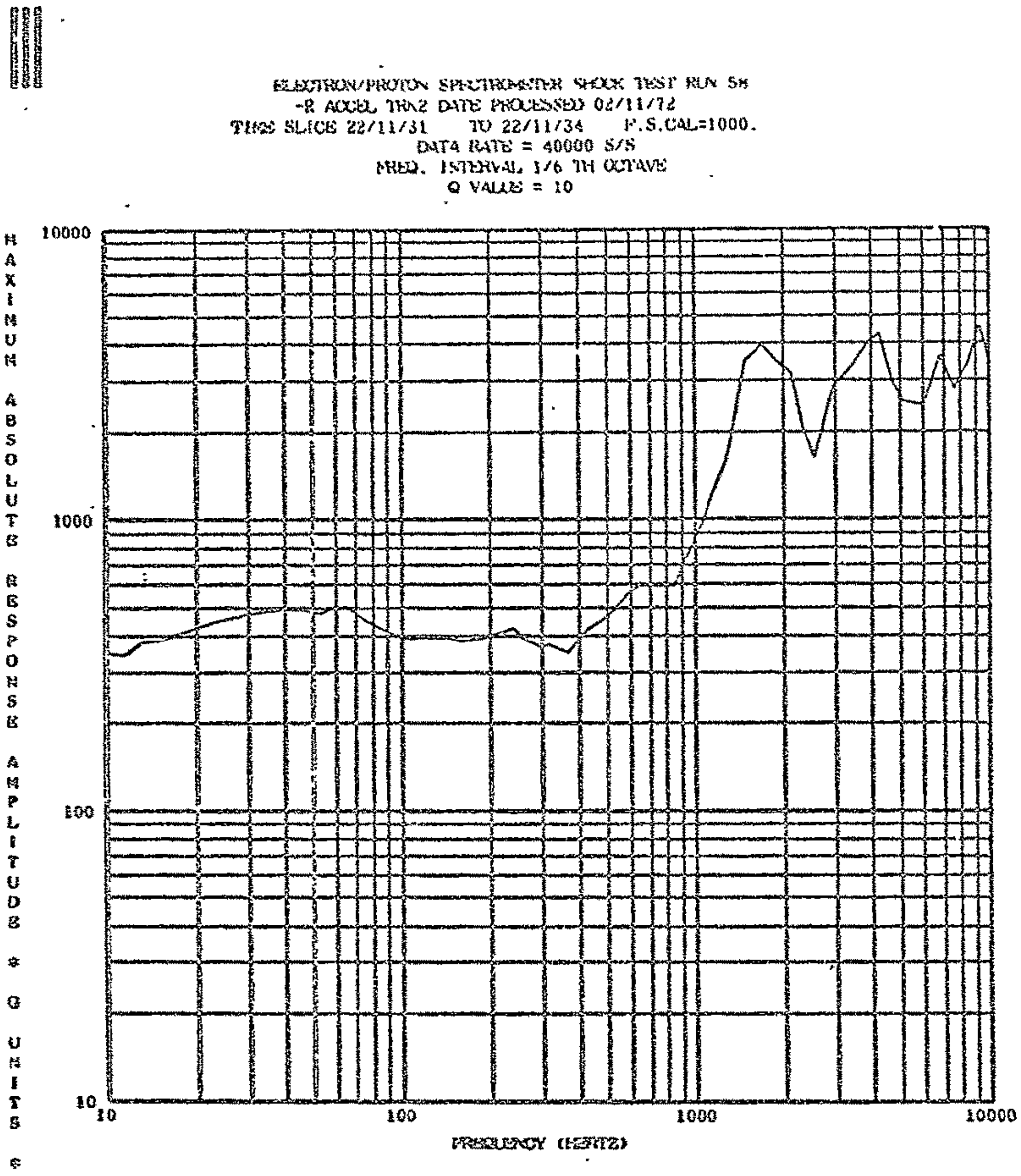


Figure 46 Shock Response Spectrum
+R Direction, 'R' Axis,
Baseplate

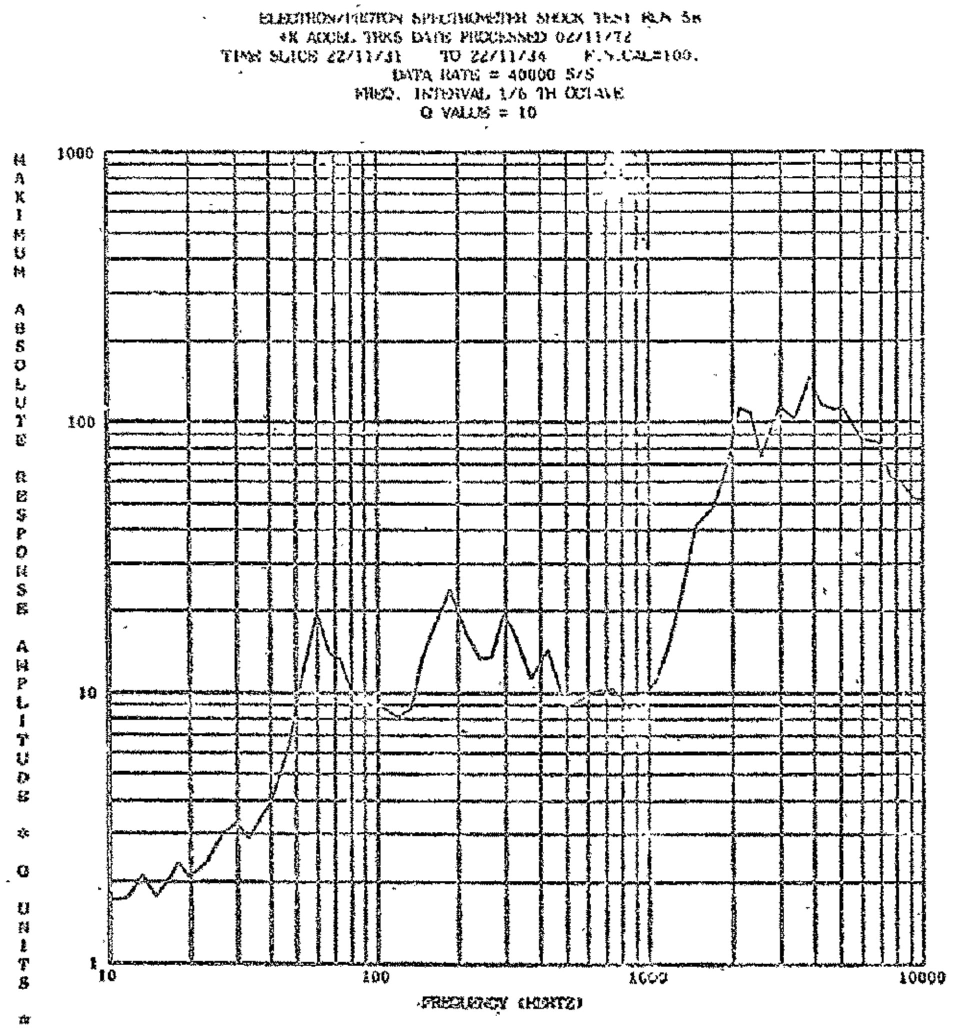


Figure 47 Shock Response Spectrum +'R' Direction, 'X' Axis, Electronics Package

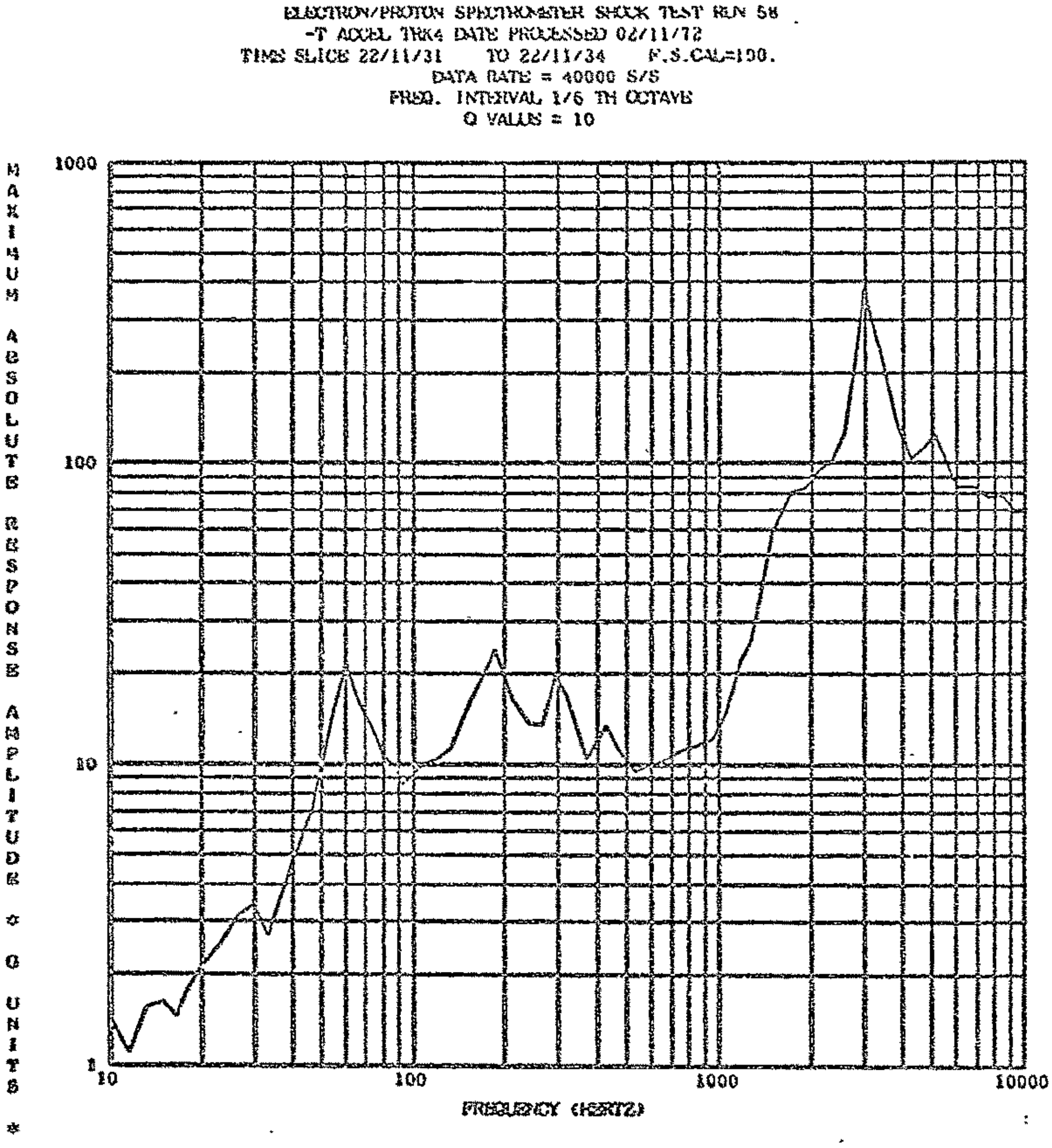


Figure 48 Shock Response Spectrum
+'R' Direction, 'T' Axis,
Electronics Package

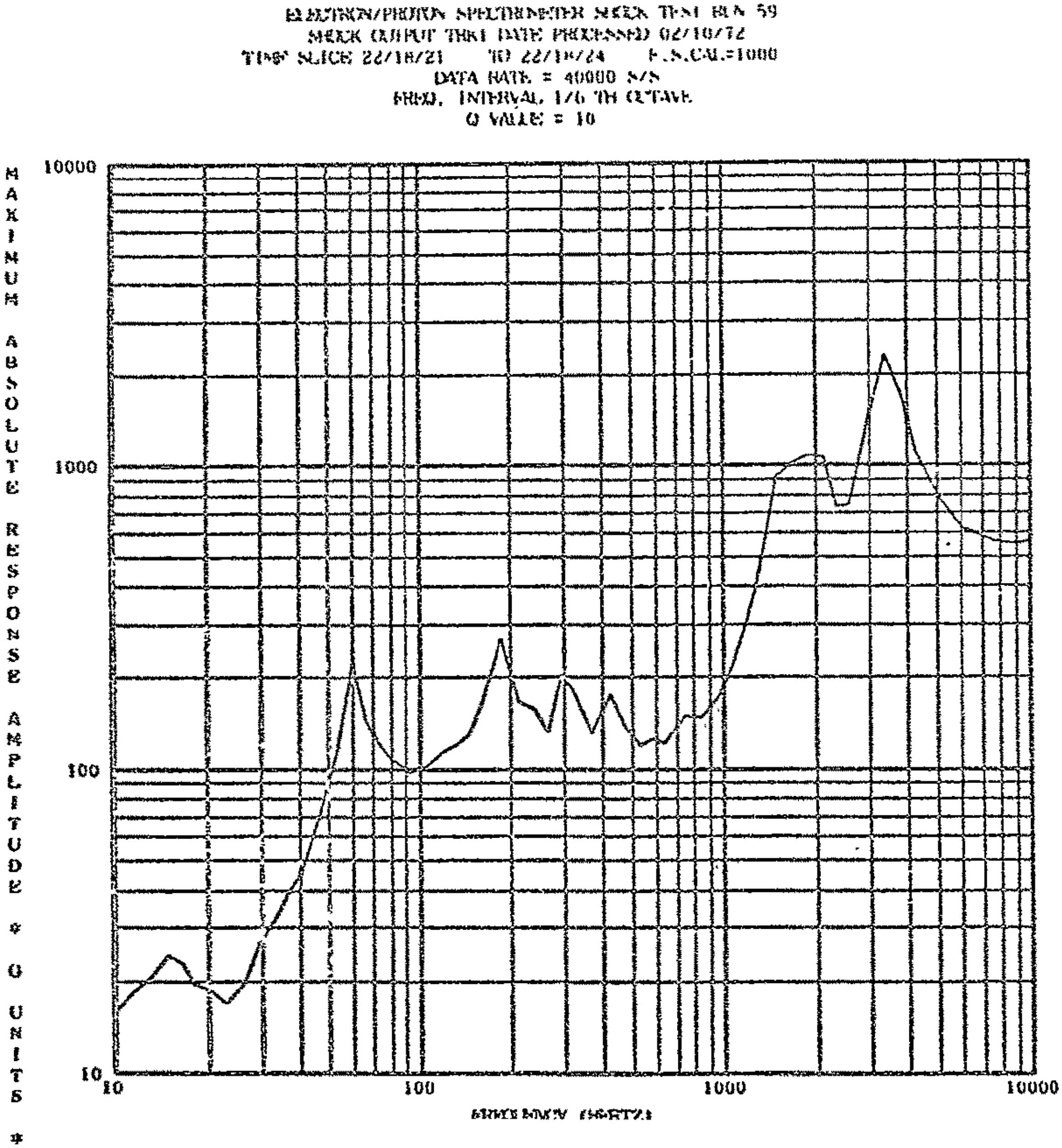


Figure 49 Shock Response Spectrum
Input, -R Direction

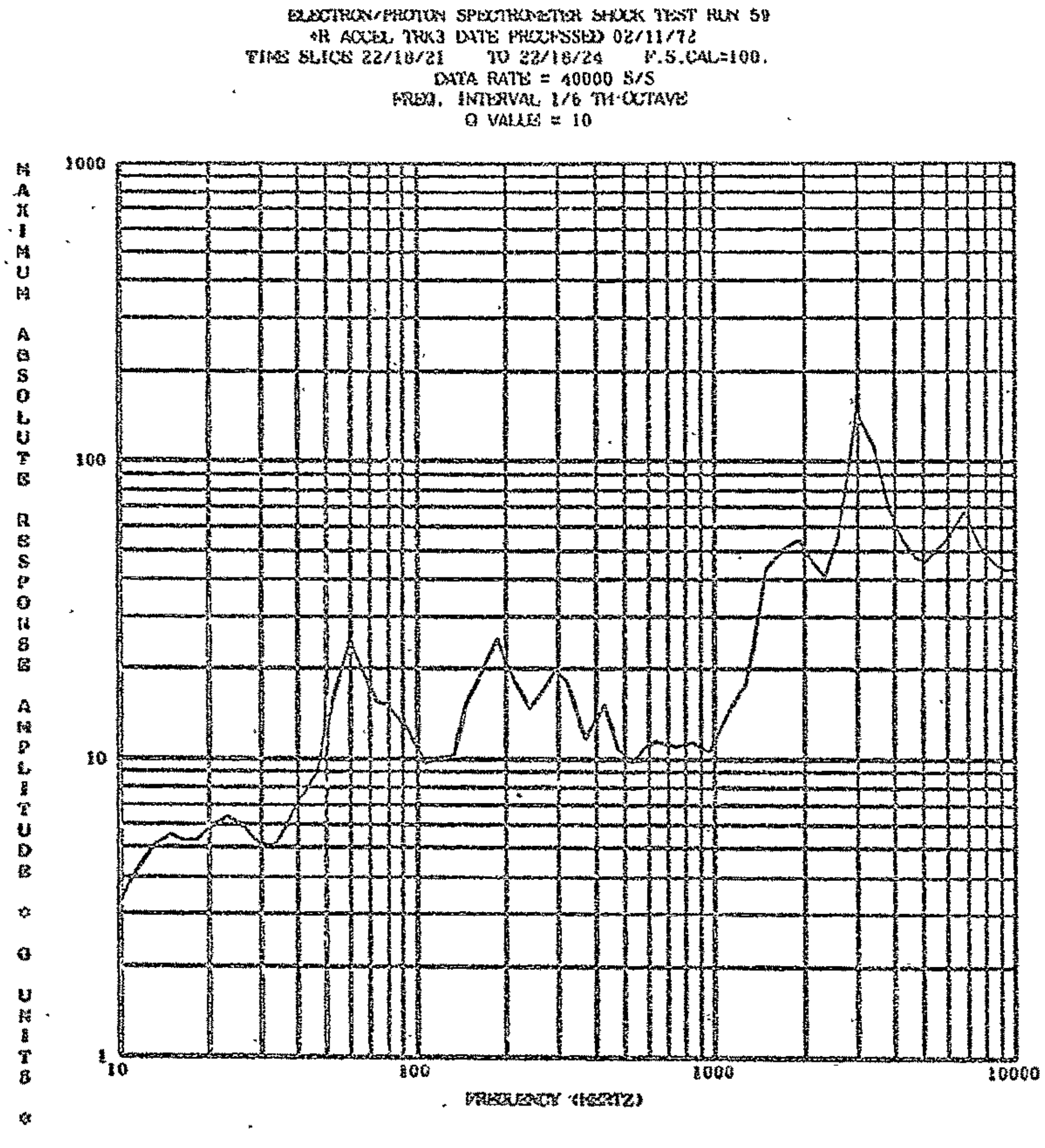


Figure 50 Shock Response Spectrum
-R Direction, 'R' Axis,
Electronics Package

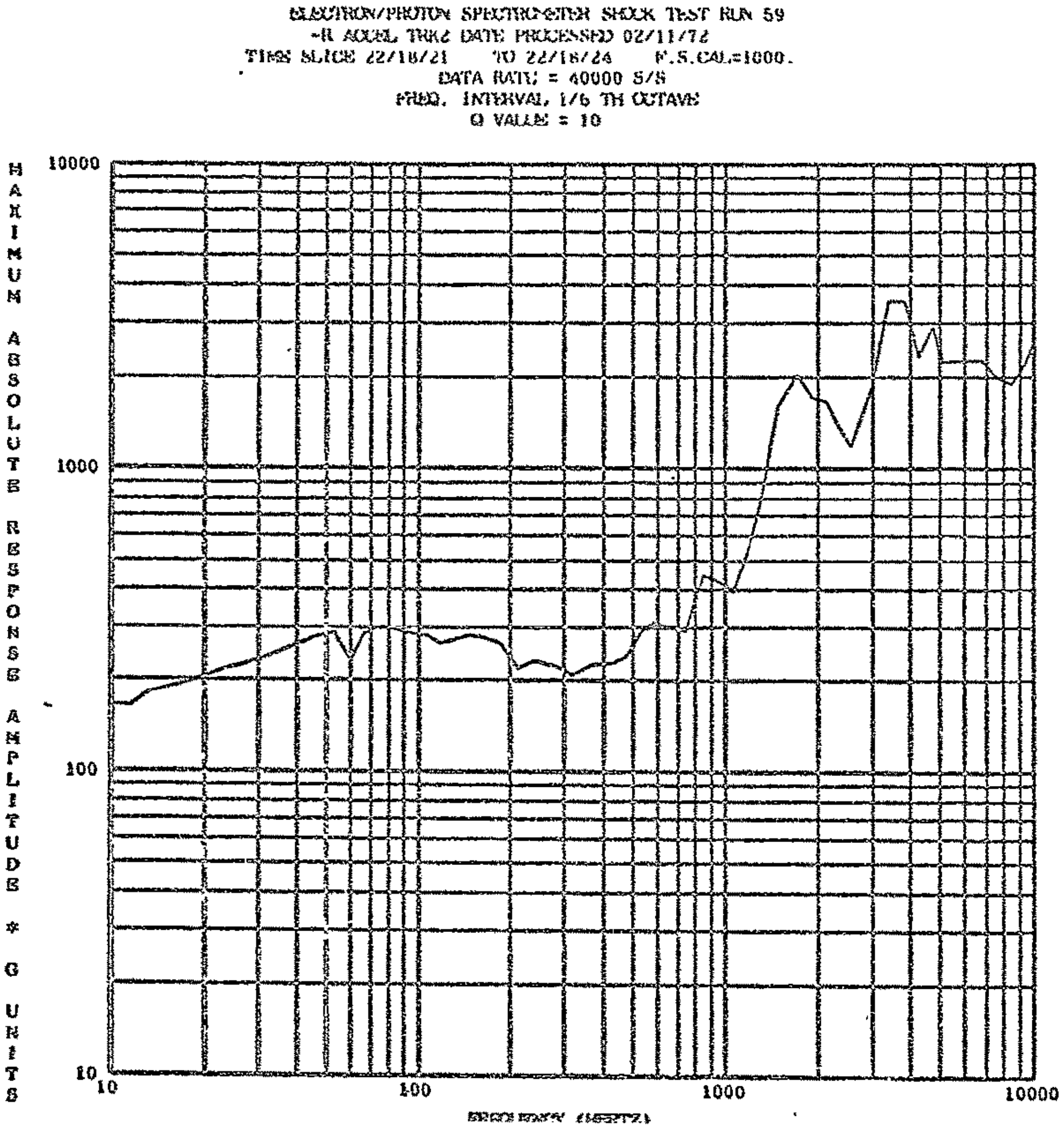


Figure 51 Shock Response Spectrum
-R Direction, 'R' Axis,
Baseplate

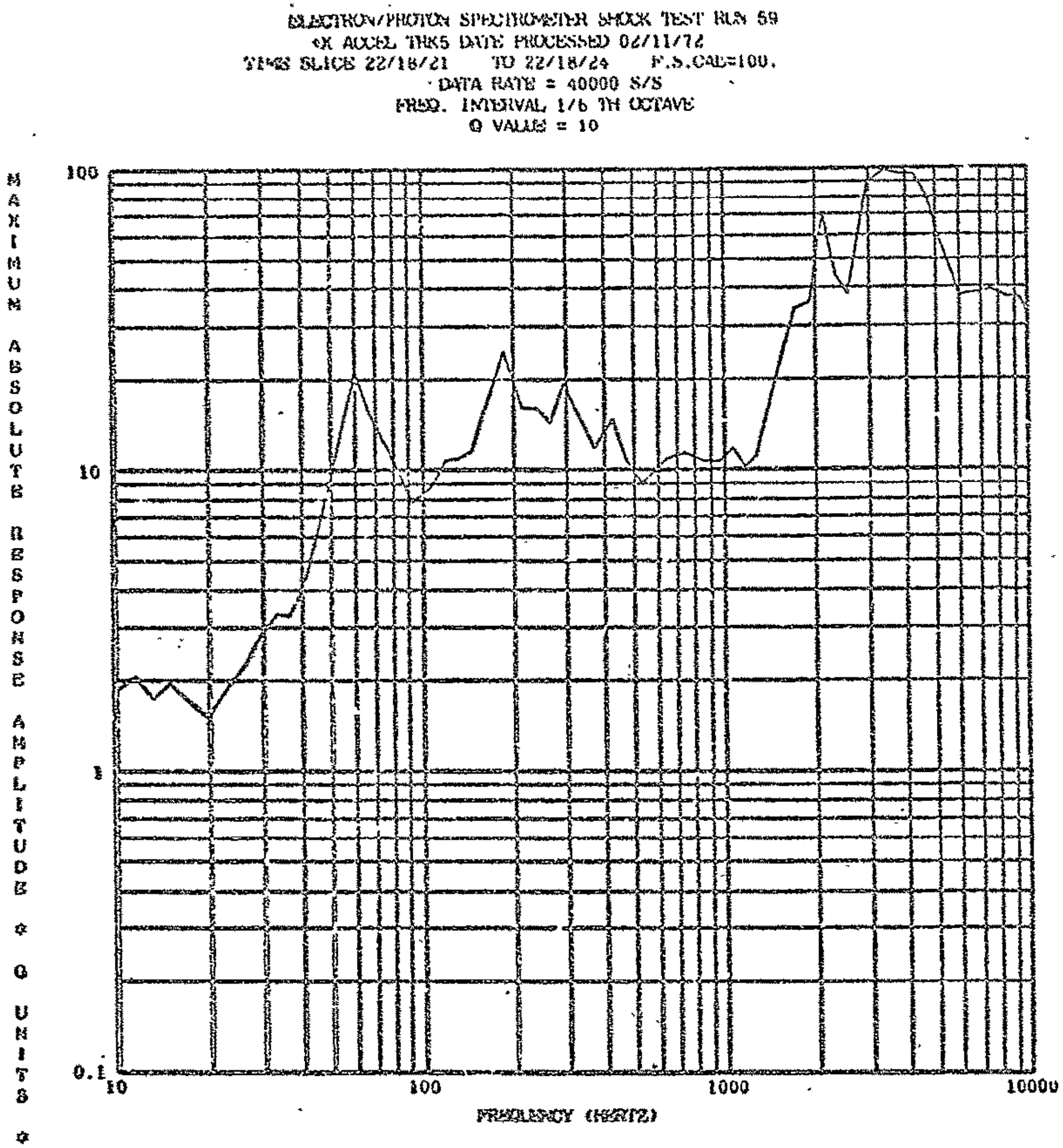


Figure 52 Shock Response Spectrum
-R Direction, 'X' Axis,
Electronics Package

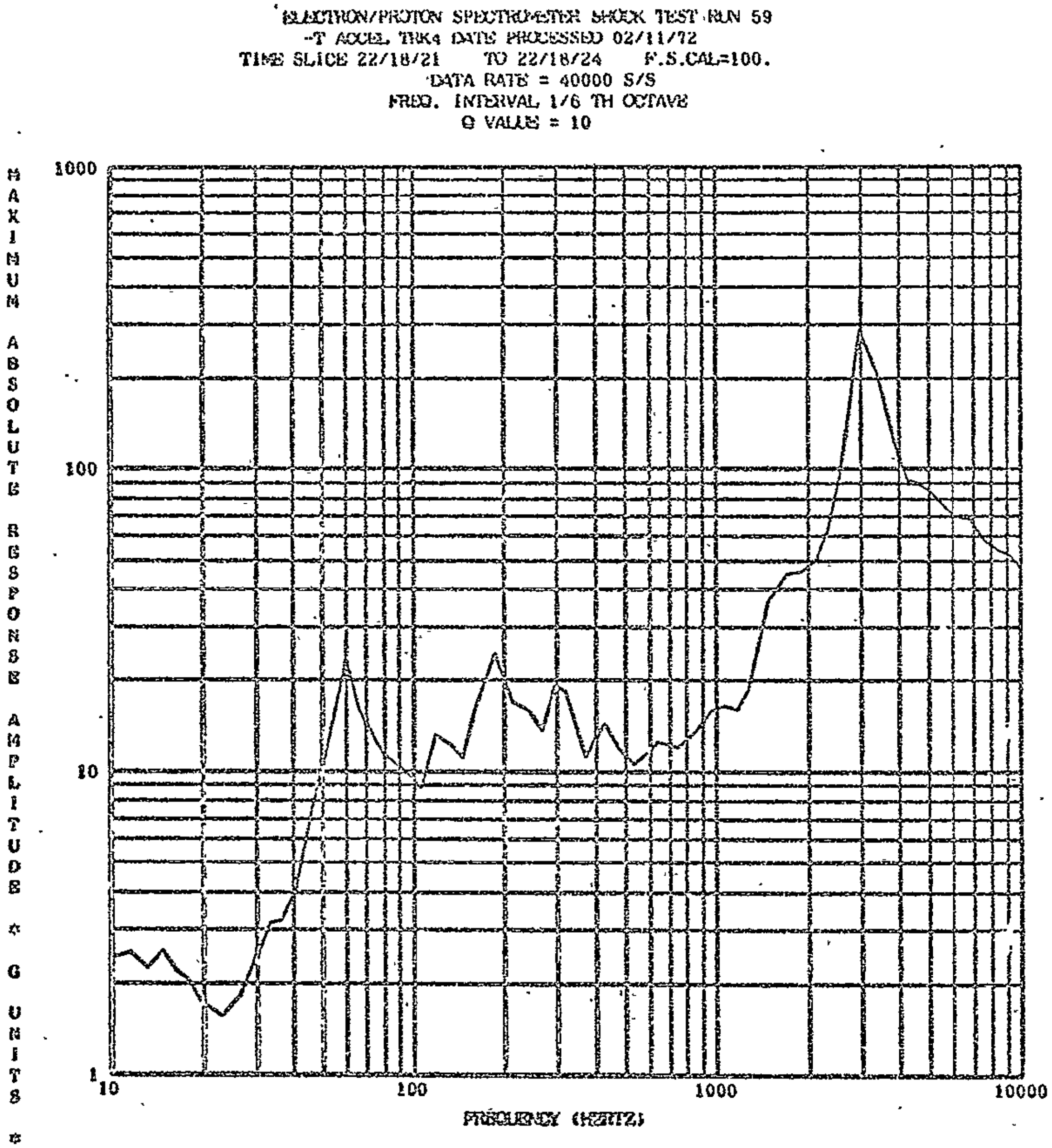


Figure 53 Shock Response Spectrum
-R Direction, 'T' Axis,
Electronics Package

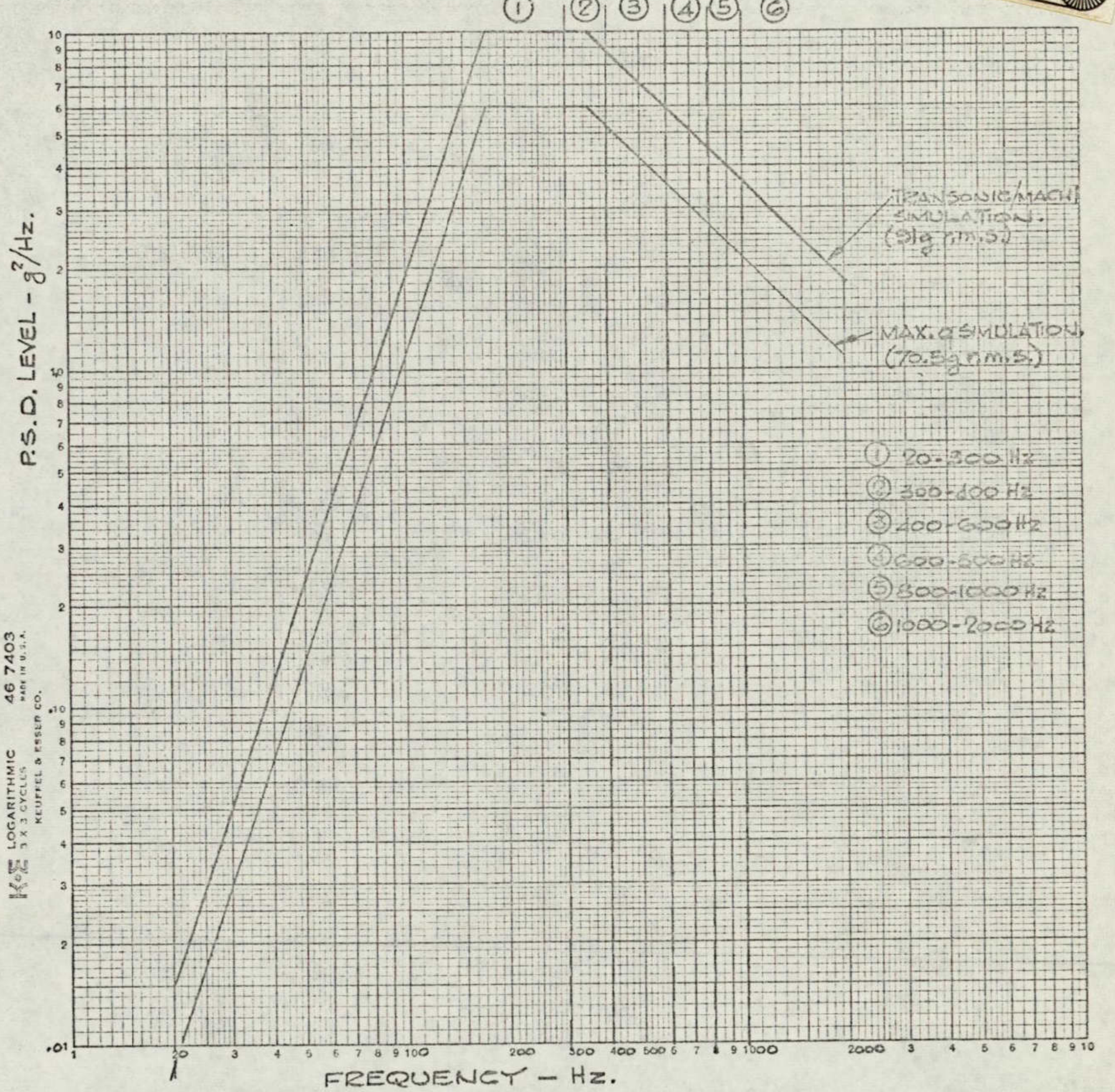
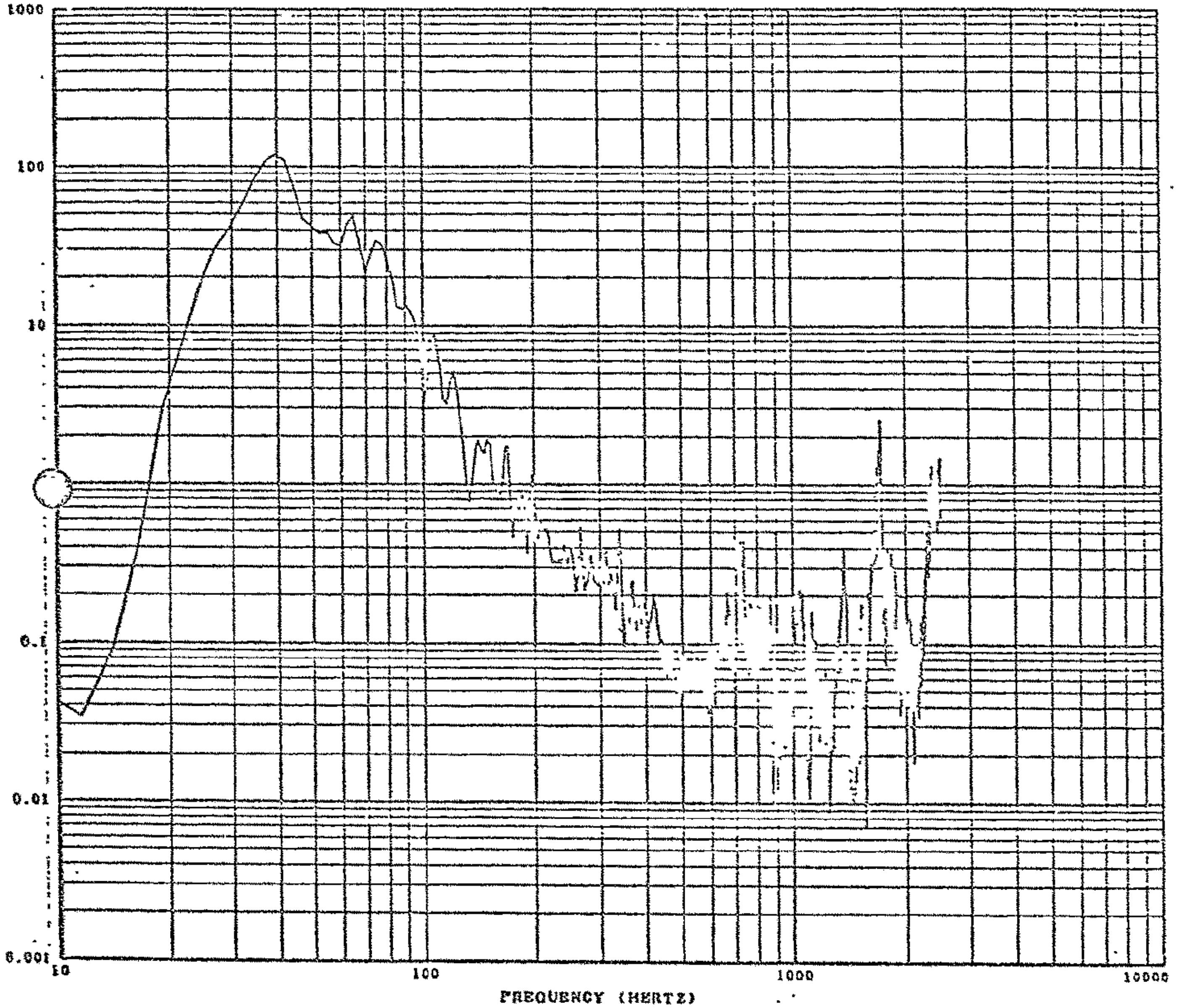


Figure 54 'R' Axis Vibration Spectrum Showing Segments

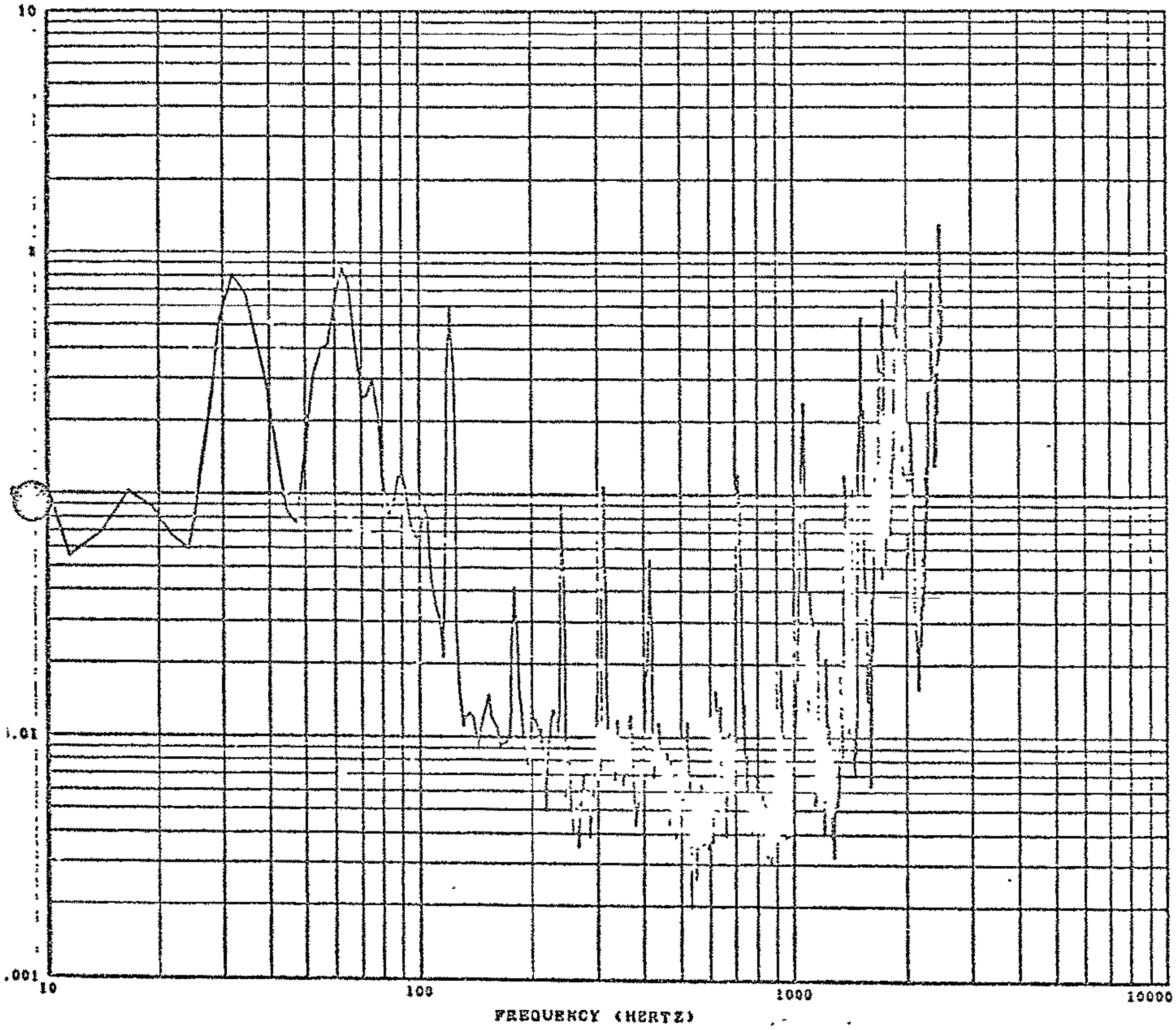
```
SENSOR -  EPS-2R ELECTRON/PHOTON SPECT  TEST CAL=31 6        TIME SLICE (HR-MIN-SEC)  15 [illegible]
LOW-PASS FILTER USED        3000.0         STANDARD DEVIATION.        2.1275         DATE PROCESSED......    23FEB77
NORM. STD. ERROR ...        .22124         VIBRATION TEST RUN.60X                    INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1077
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X       .001000
```



g rms = 2.13 PAGE 2.

Figure 56 Electronic Package -
'X' Axis Response to Input
of Figure 55

```
SENSOR =  EPS-3T ELECTRON/PROTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  15  3 38 0000 TO  15  3 42.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION .        .9984           DATE PROCESSED  . ..    23FEB77
NORM. STD. ERROR....       .22124          VIBRATION TEST RUN 60X                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1077
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X      .001000
```

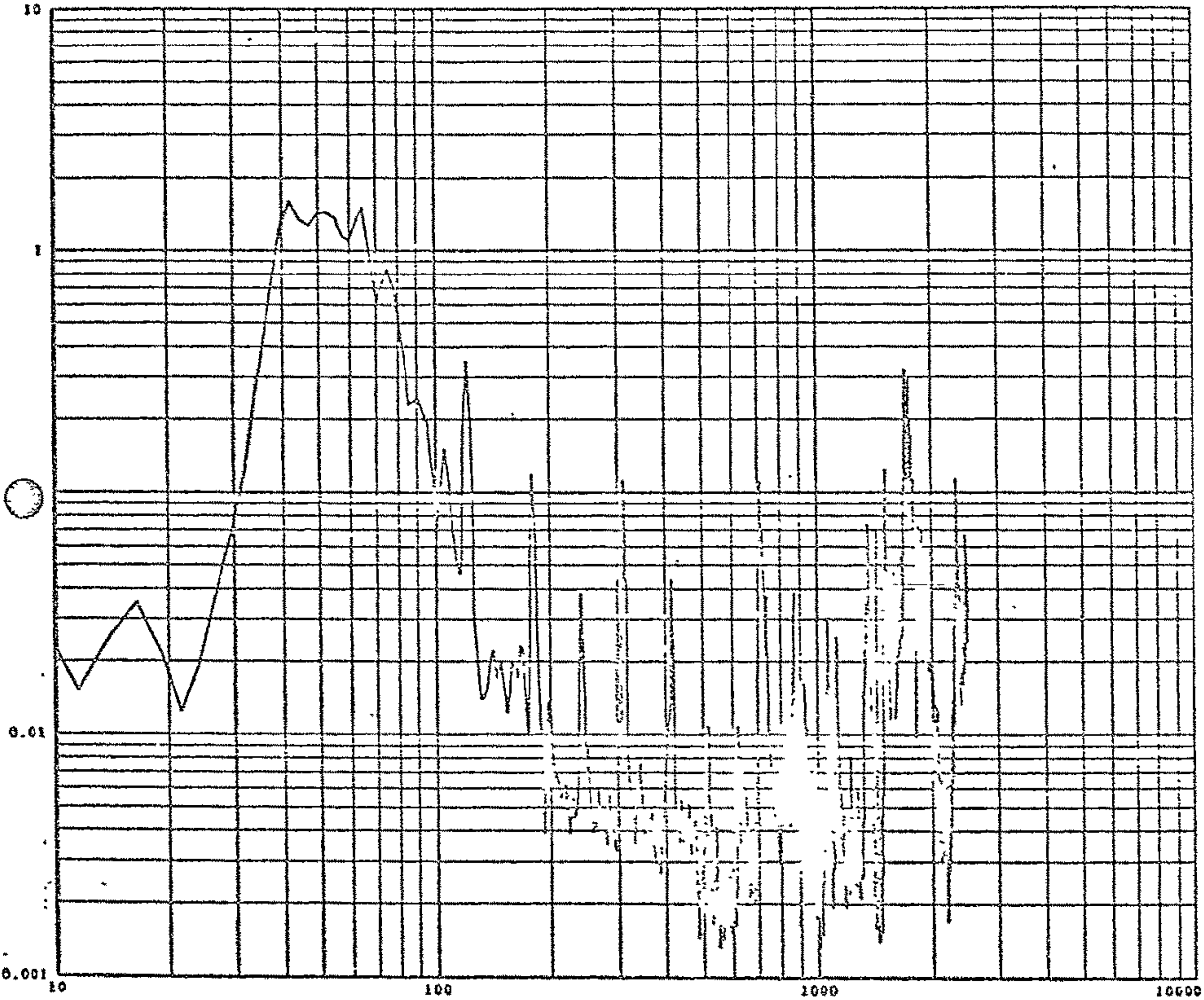


g rms = 1.00

PAGE 4.

Figure 57 Electronics Package
'T' Axis Response to
Input of Figure 55

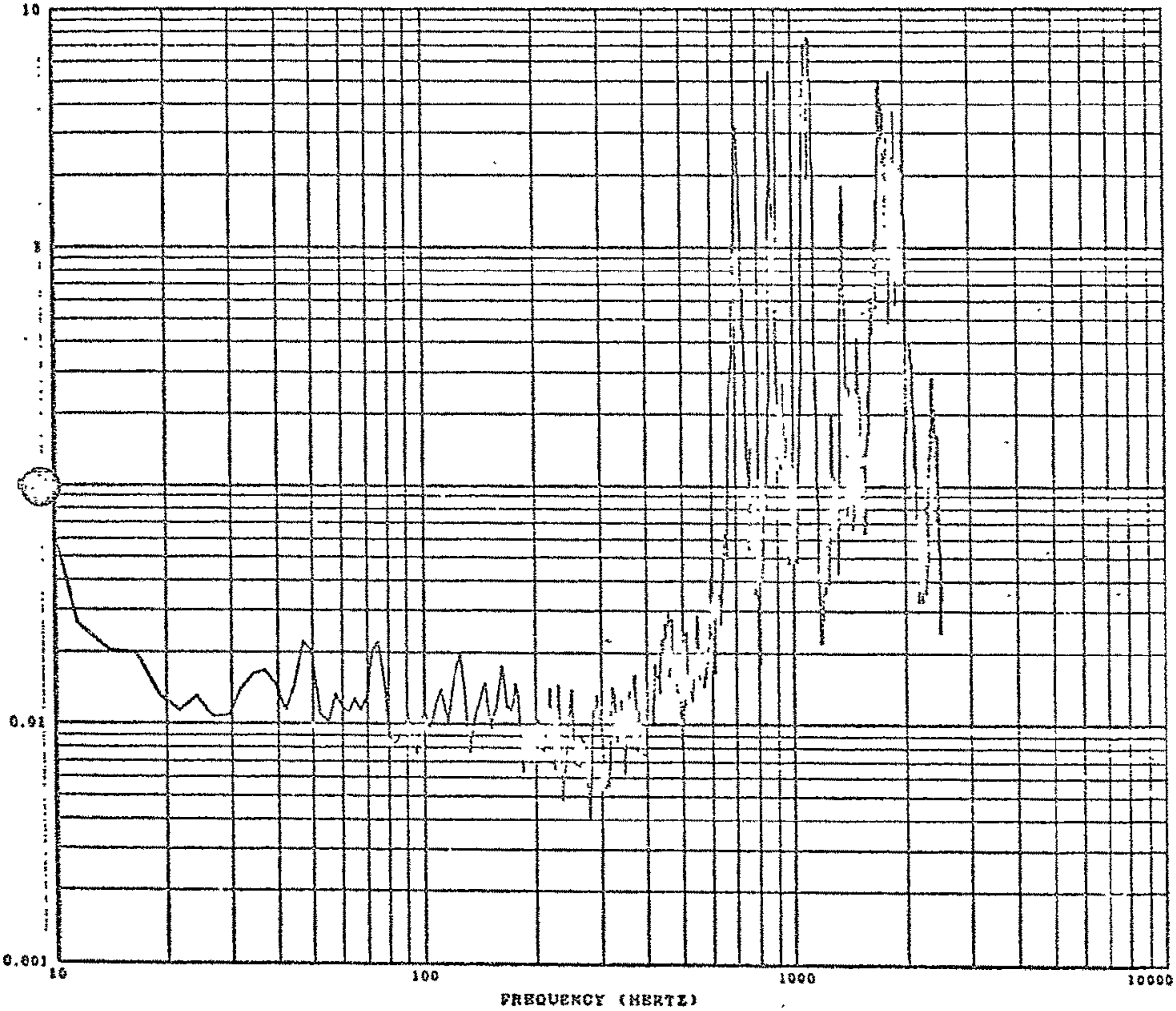
```
SENSOR -  EPS-IR ELECTRON/PROTON SPECT. TEST CAL=100        TIME SLICE (HR-MIN-SEC)  15  3 38 0000 TO  15  3 42 0000
LOW-PASS FILTER USED        3000.0          STANDARD DEVIATION..      1.2290          DATE PROCESSED.. ...     23FEB77
NORM. STD. ERROR....        .22124          VIBRATION TEST RUN 60X                    INPUT TAPE NUMBER..
FILTER BANDWIDTHS...      5.1077
FILTER START POINTS.       .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN* X       .010000
```



g rms = 1.23 PAGE 0.

Figure 58 Electronics Package, 'R' Axis
Response to Input of Figure 55

```
SENSOR -  EPS-4R ELECTRON/PHOTON SPECT. TEST CAL=100        TIME SLICE (HR-MIN-SEC)  15  3 38.0000 TO  15  3 42.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION..    39.9486             DATE PROCESSED. ....    23FEB77
NORM  STD. ERROR....       .22124          VIBRATION TEST RUN 60X                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS...      5.1077
FILTER START POINTS.       .0000
```



g rms = 39.95

PAGE 6.

Figure 59 Baseplate Response, 'R' Axis, to Input of Figure 55

```
SENSOR -  CONTRL ELECTRON/PROTON SPECT. TEST CAL=100        TIME SLICE (HR-MIN-SEC)  15  4 27.0000 TO  15  4 31.0000
LOW-PASS FILTER USED        3000.0          STANDARD DEVIATION.       31.3871           DATE PROCESSED .....     23FEB77
NORM. STD. ERROR....        .22121          VIBRATION TEST RUN 60X                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS...       5.1090
FILTER START POINTS.        .0000
```

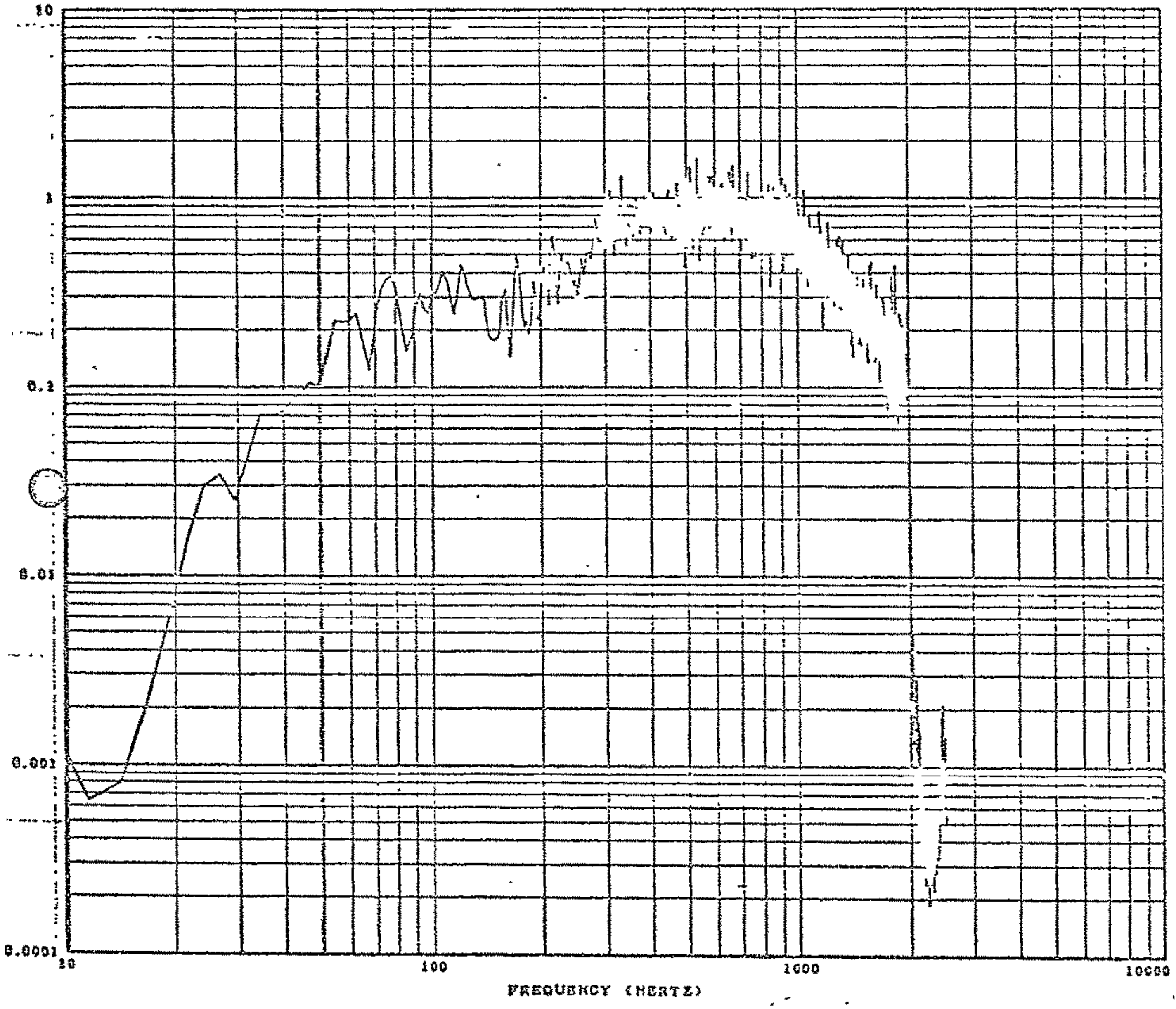
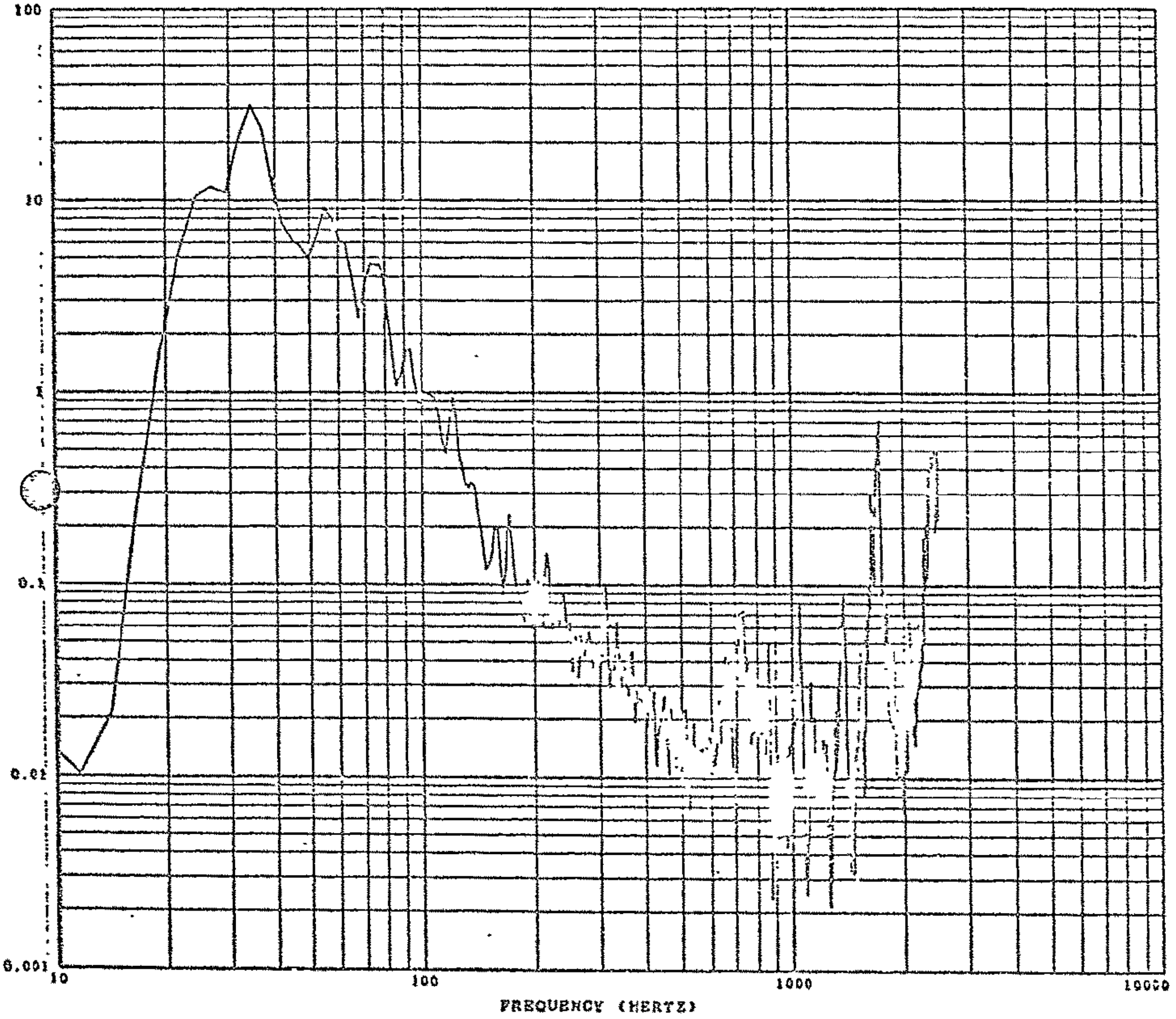


Figure 60 'X' Axis Input, Transonic/MACH 1 Simulation

```
SENSOR =  EPS-2R ELECTRON/PROTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  15  4 27.0000 TO  15  4 31 0000
LOW-PASS FILTER USED       3000.0           STANDARD DEVIATION..      3.1060           DATE PROCESSED ....     23FEB77
NORM. STD. ERROR....       .22121           VIBRATION TEST RUN 60X                     INPUT TAPE NUMBER...
FILTER BANDWIDTHS..      5.1090
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X       .010000
```



g rms = 3.11

Figure 61 Electronics Package, 'X' Axis
Response to Input of Figure 60

```
SENSOR =  EPS-3T ELECTRON/PROTON SPECT. TEST CAL=31.6        TIME SLICE (HR-MIN-SEC)  15  4 27.0000 TO  15  4 31.0000
LOW-PASS FILTER USED        3000.0          STANDARD DEVIATION..      1.6688            DATE PROCESSED......     23FEB77
NORM. STD. ERROR....        .22121          VIBRATION TEST RUN 60X                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS ..      5.1090
FILTER START POINTS.       .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X       .001000
```

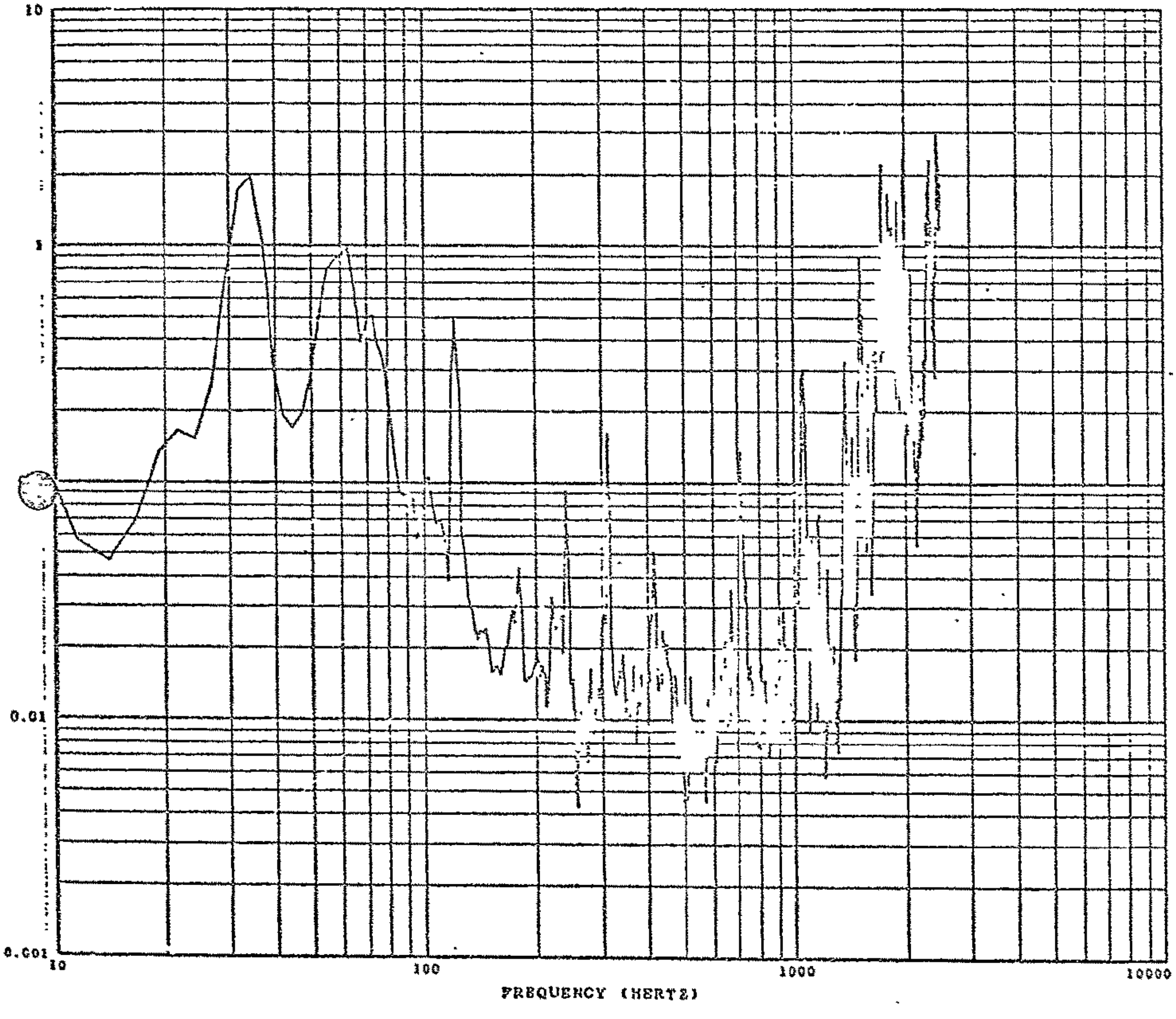
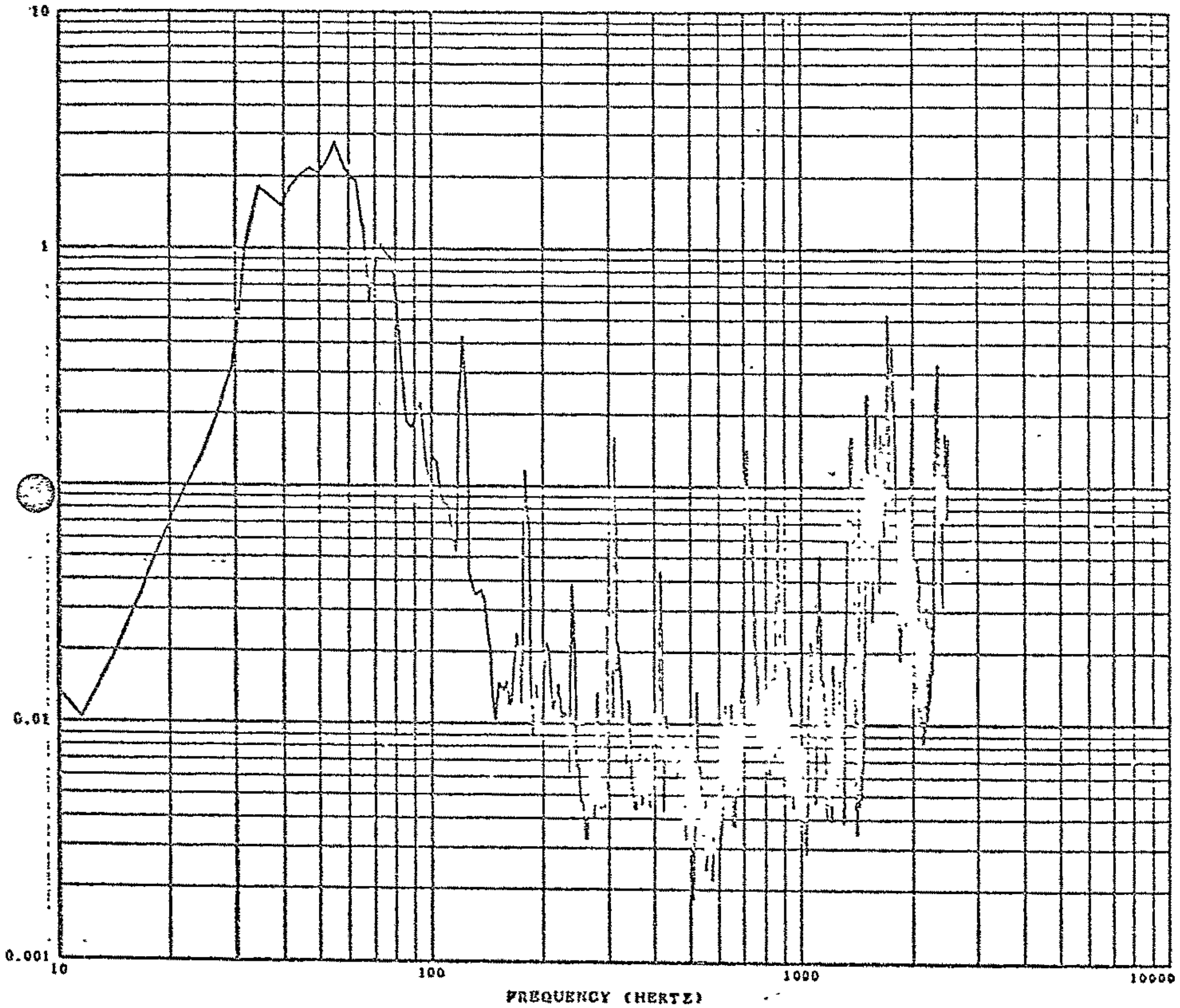


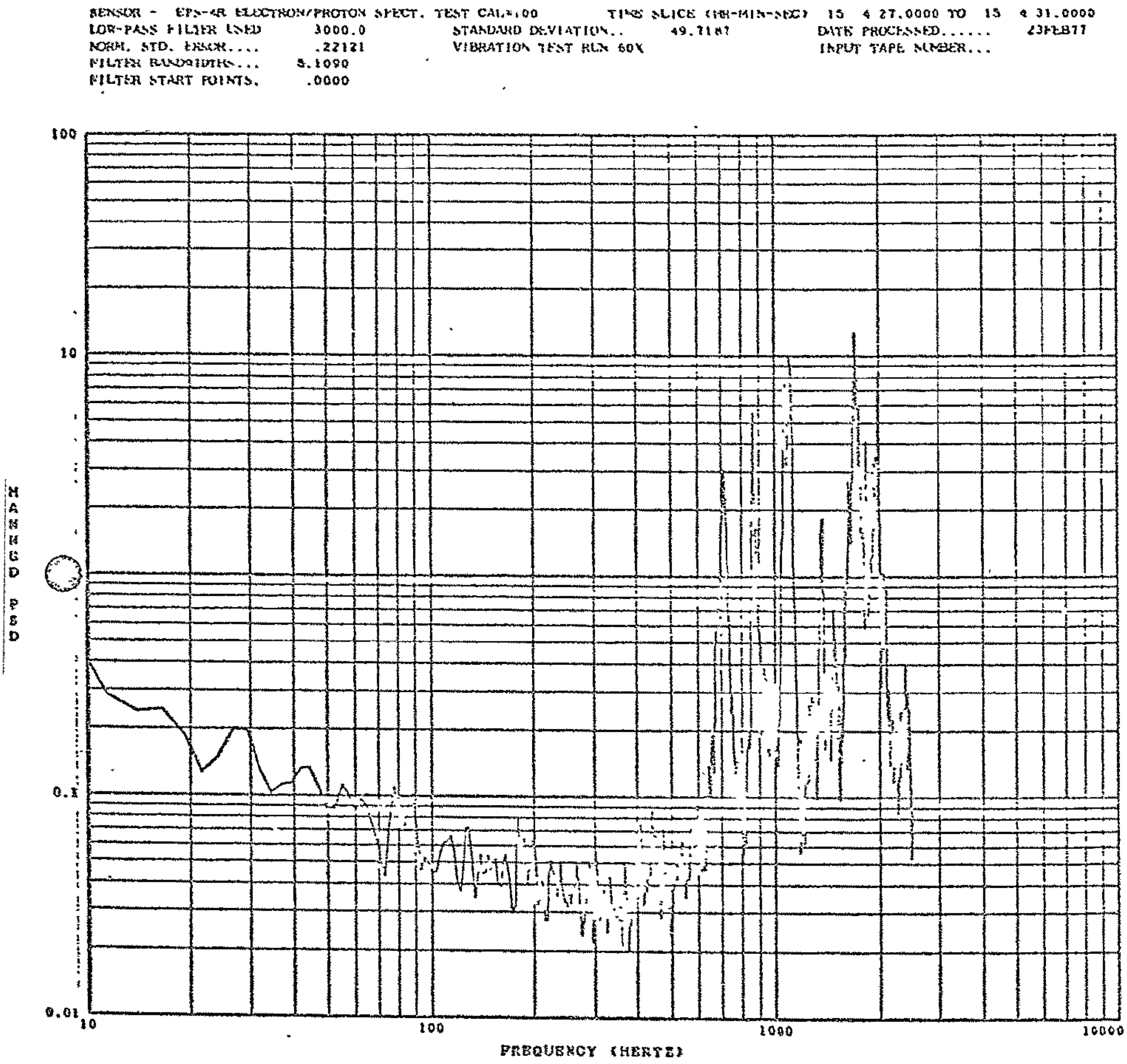
Figure 62 Electronics Package, 'T' Axis
Response to Input of Figure 60

```
SENSOR =  EPS-IR ELECTRON/PROTON SPECT. TEST CAL=100        TIME SLICE (HR-MIN-SEC)  15  4 27 0000 TO  15  4 31 0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION..      1.7992            DATE PROCESSED......    23FEB77
NORM. STD. ERROR....       .22121          VIBRATION TEST RUN 60X                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1090
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN' X       .010000
```



g rms = 1.80   PAGE 1.

Figure 63 Electronics Package, 'R' Axis
Response to Input of Figure 60



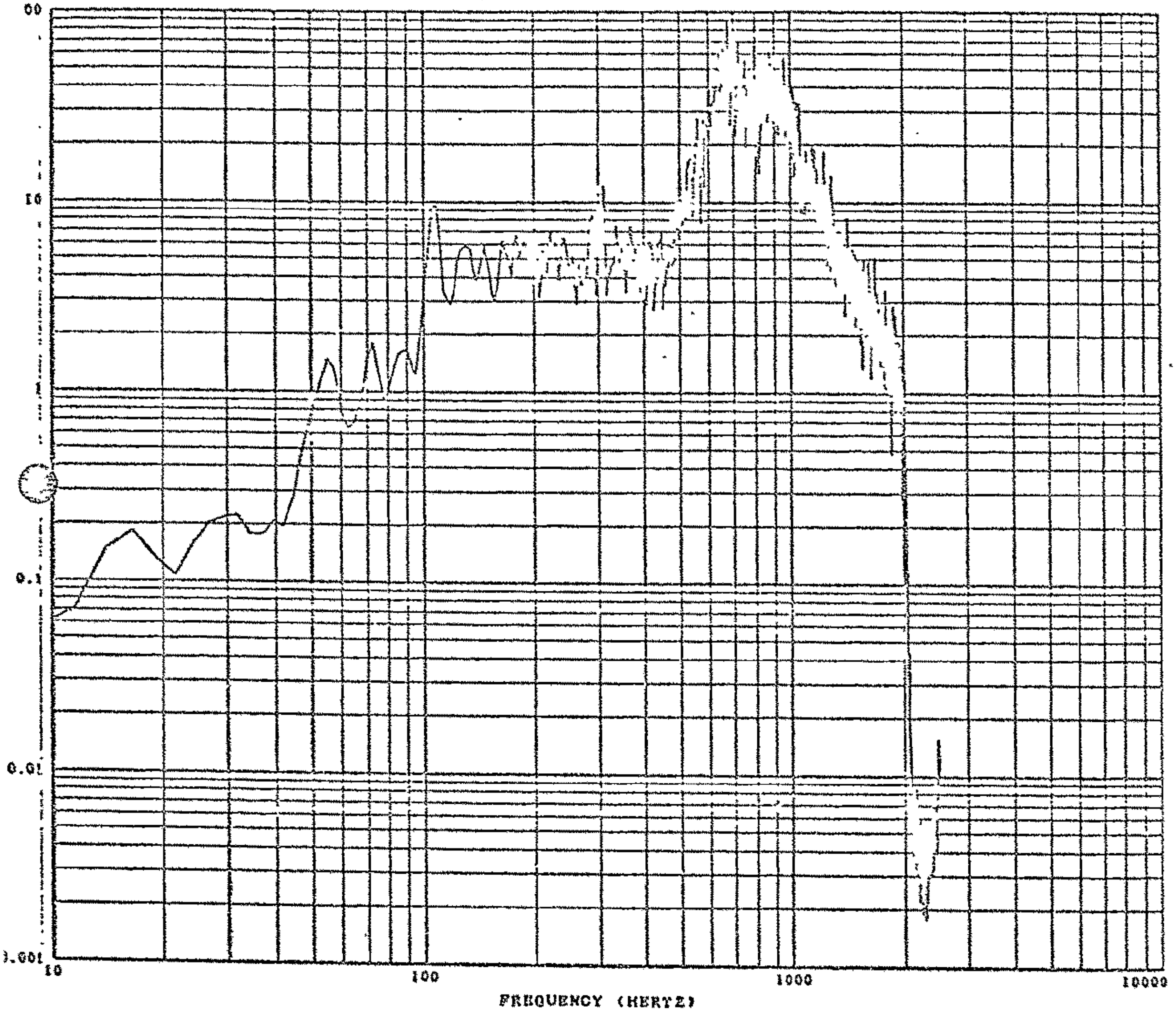
```
SENSOR -  EPS-4R ELECTRON/PROTON SPECT. TEST CAL=1.00      TIME SLICE (HR-MIN-SEC)  15  4 27.0000 TO  15  4 31.0000
LOW-PASS FILTER USED       3000.0        STANDARD DEVIATION..    49.7187          DATE PROCESSED......    23FEB77
NORM. STD. ERROR....        .22121       VIBRATION TEST RUN 60X                   INPUT TAPE NUMBER...
FILTER BANDWIDTHS...      5.1090
FILTER START POINTS.       .0000
```

g rms = 49.72

PAGE 1.

Figure 64 Baseplate, 'R' Axis Response to Input of Figure 60

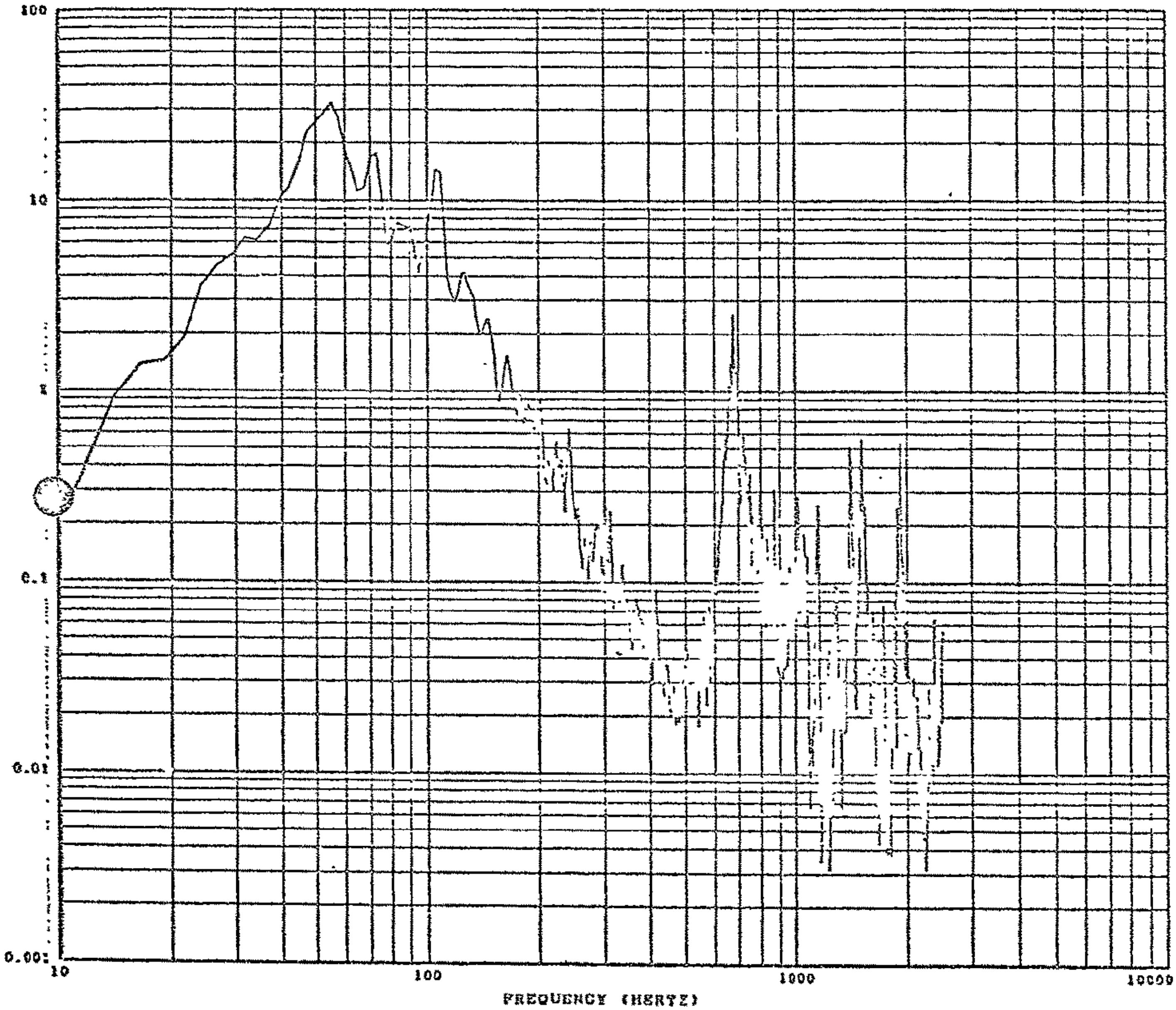
```
SENSOR =  CONTRL ELECTRON/PROTON SPECT. TEST CAL=100.       TIME SLICE (HR-MIN-SEC)  18 35 15.0000 TO  18 35 19.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION..     15.9526            DATE PROCESSED......    2JUN877
NORM. STD. ERROR....       .22115          VIBRATION TEST RUN BOX                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1116
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN' X       .010000
```



g rms = 15.95

PAGE 6.

Figure 65 'T' Axis Input, Max. q Simulation



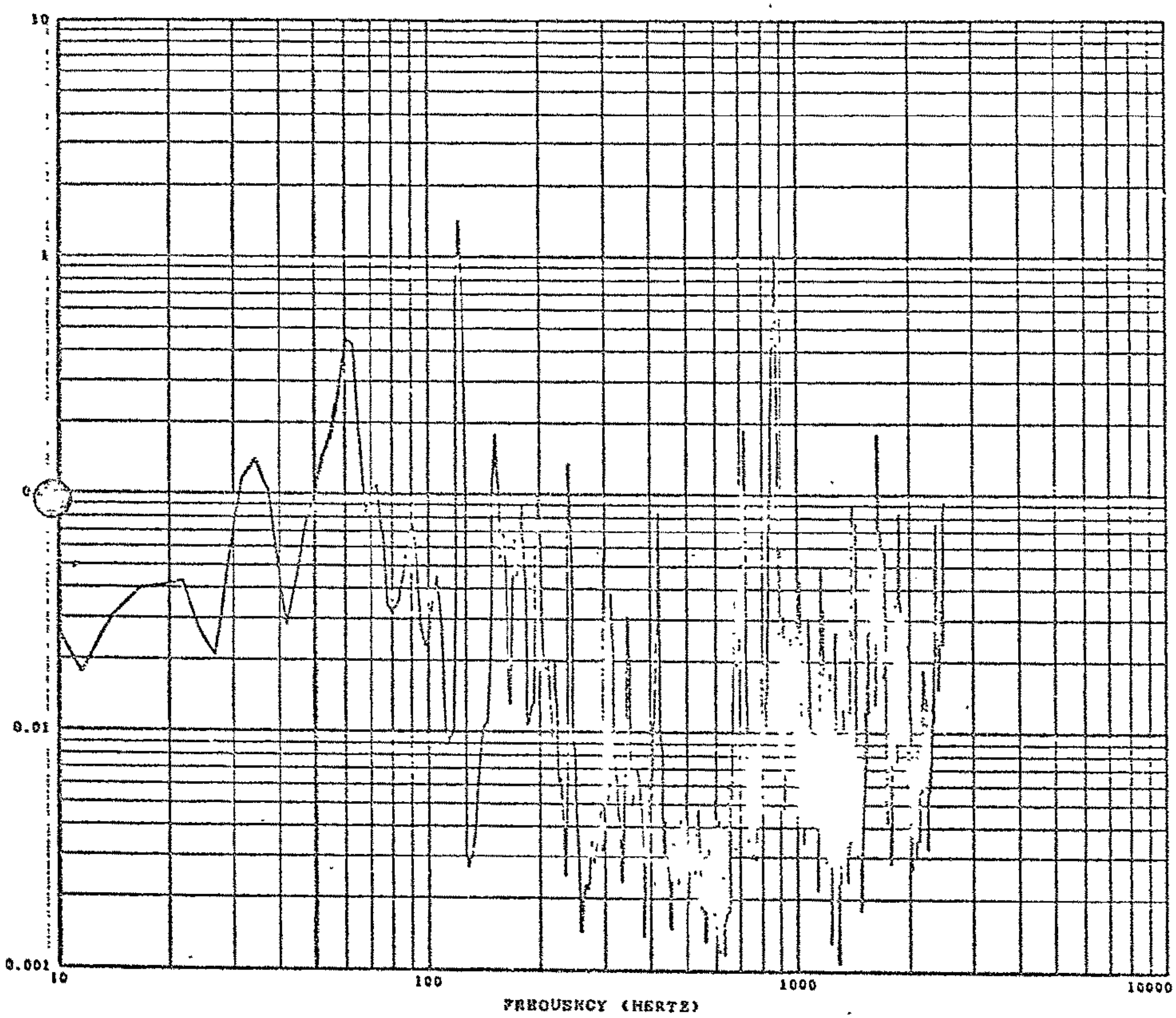
```
SENSOR -  EPS-31 ELECTRON/PROTON SPECT. TEST CAL=31.6        TIME SLICE (HR-MIN-SEC)  16 35 15.0000 TO  16 35 19 0000
LOW-PASS FILTER USED       3000.0           STANDARD DEVIATION..       1.2513            DATE PROCESSED......     23FEB77
NORM. STD. ERROR....       .22115           VIBRATION TEST RUN 60X                       INPUT TAPE NUMBER...
FILTER BANDWIDTHS...    5.1116
FILTER START POINTS.     .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN' X       .001000
```

g rms = 1.25

PAGE 4.

Figure 66 Electronics Package, 'T' Axis
Response to Input of Figure 65

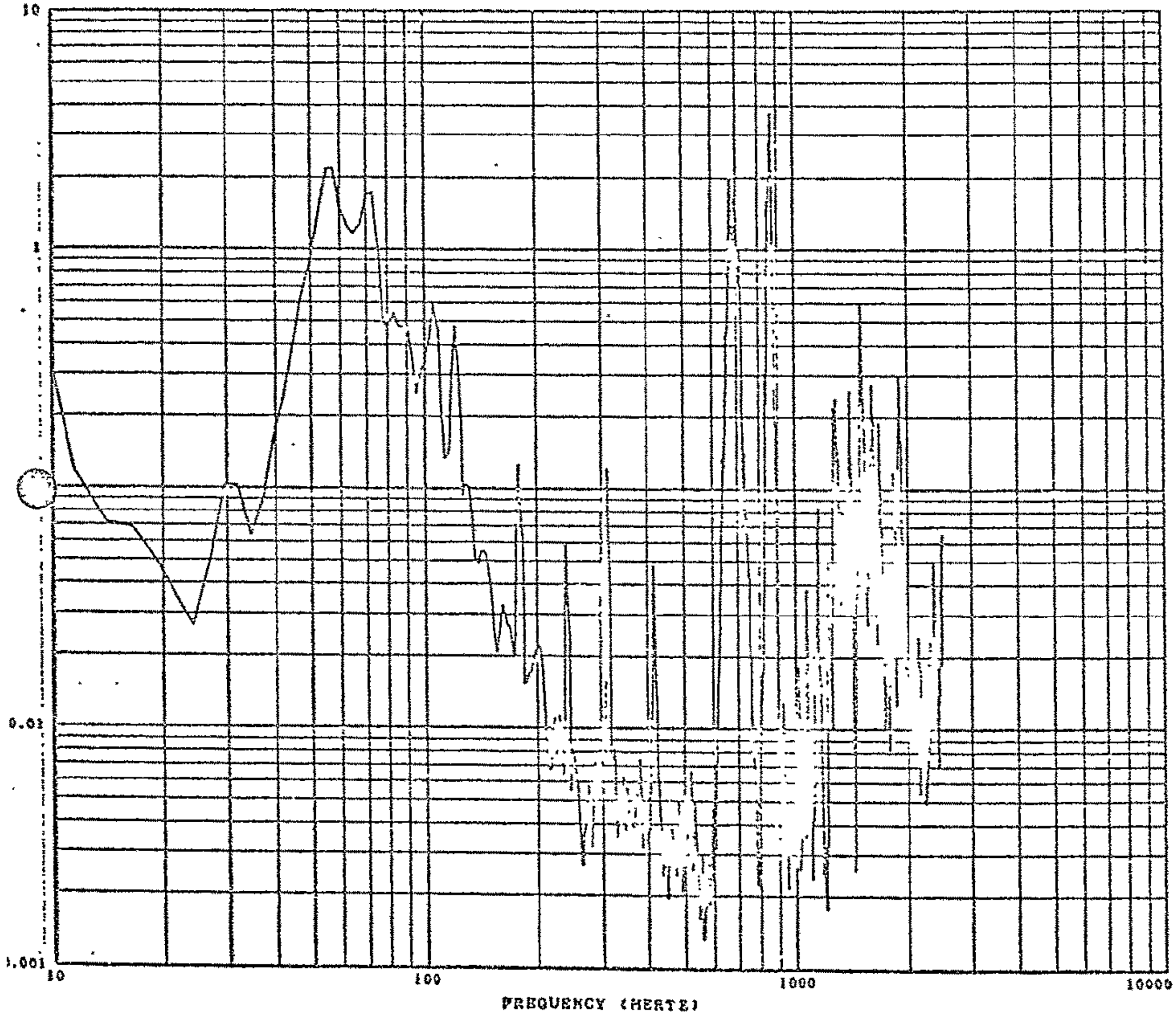
```
SENSOR -  EPS-2R ELECTRON/PROTON SPECT. TEST CAL=31 6       TIME SLICE (HR-MIN-SEC)  16 35 15.0000 TO  16 35 19.0000
LOW-PASS FILTER USED       3000.0           STANDARD DEVIATION..        .3440            DATE PROCESSED......     23FEB77
NORM. STD. ERROR....       .22115           VIBRATION TEST RUN 60X                       INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1116
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X       .001000
```



g rms = .34 PAGE 2.

Figure 67 Electronics Package, 'X' Axis Response to Input of Figure 65

```
SENSOR -  EPS-IR ELECTRON/PROTON SPECT. TEST CAL=11.6       TIME SLICE (HR-MIN-SEC)  16 35 15 0000 TO  16 35 19.0000
LOW-PASS FILTER USED        3000.0          STANDARD DEVIATION..        .5899          DATE PROCESSED......    23FEB77
NORM. STD. ERROR....        .22115          VIBRATION TEST RUN 60X                     INPUT TAPE NUMBER...
FILTER BANDWIDTHS ..      5.1116
FILTER START POINTS.       .0000.
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN' X       .001000
```

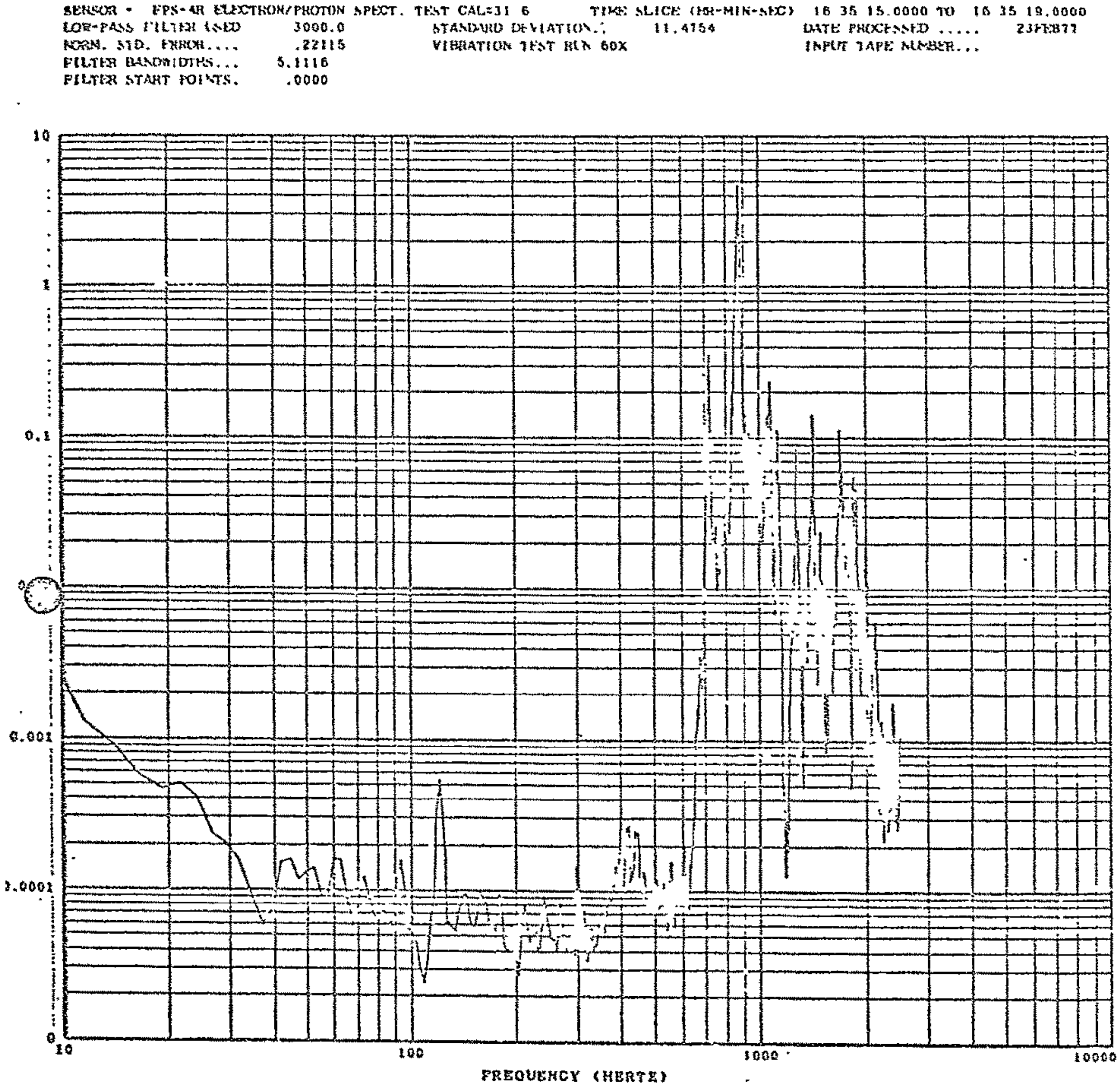


g rms = .59

PAGE 0.

Figure 68 Electronics Package, 'R' Axis
Response to Input of Figure 65

C-2

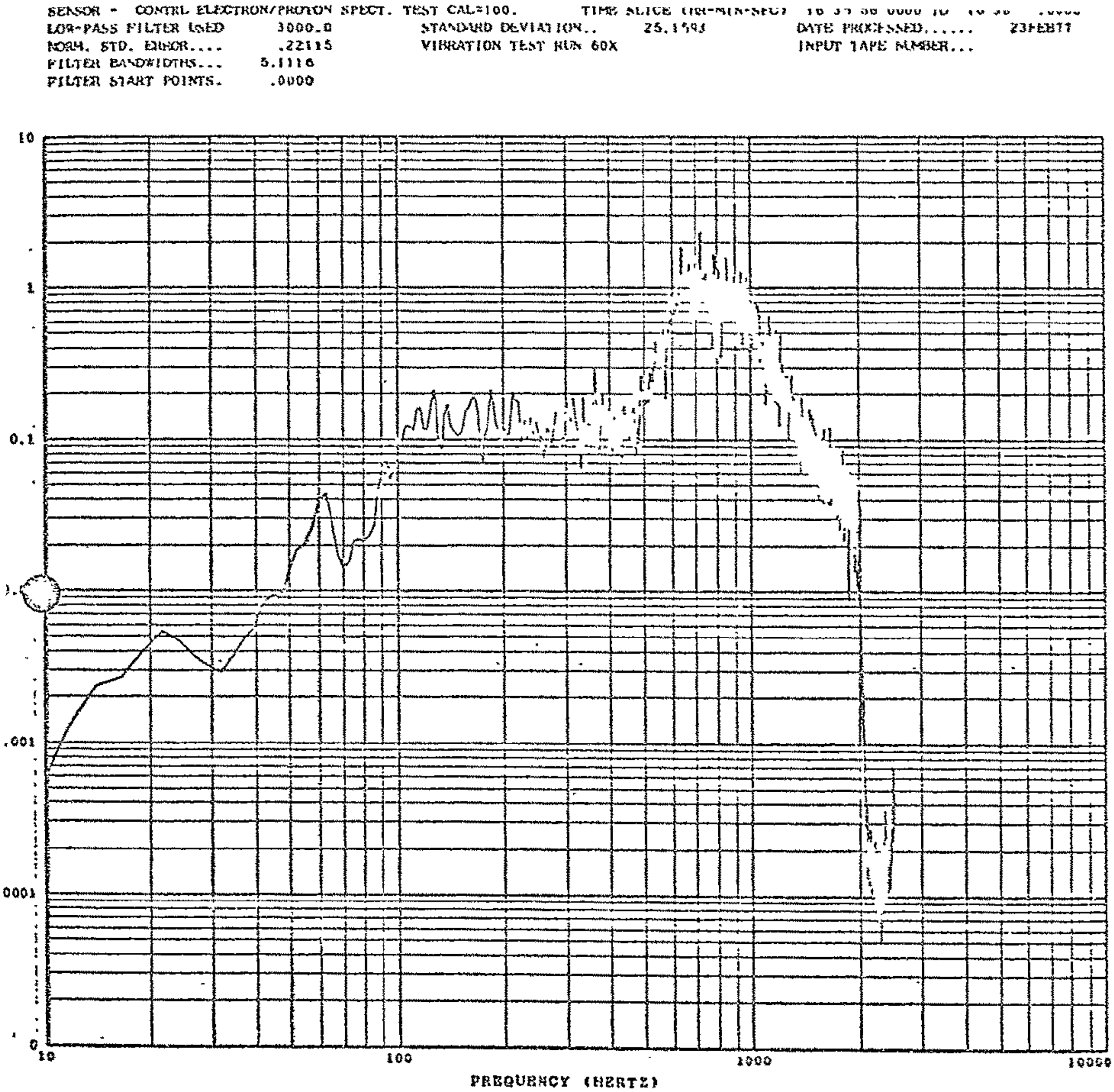


```
SENSOR -  EPS-4R ELECTRON/PHOTON SPECT. TEST CAL=31 6       TIME SLICE (HR-MIN-SEC)  16 35 15.0000 TO  16 35 19.0000
LOW-PASS FILTER USED       3000.0         STANDARD DEVIATION..      11.4754           DATE PROCESSED .....    23FEB77
NORM. STD. ERROR....       .22115         VIBRATION TEST RUN 60X                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS...      5.1116
FILTER START POINTS.       .0000
```

g rms = 11.48

PAGE 6.

Figure 69 Baseplate, 'R' Axis Response to Input of Figure 65

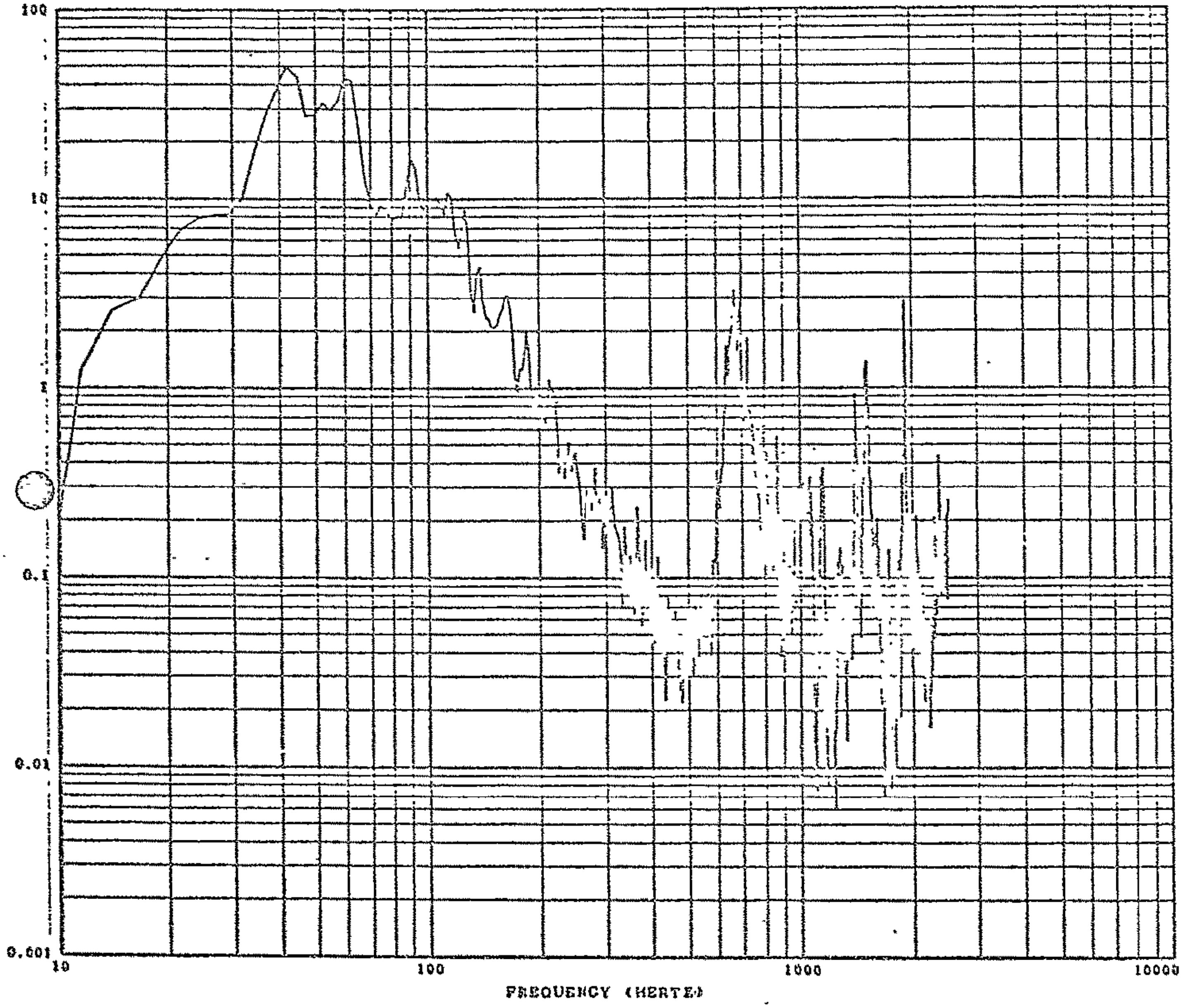


```
SENSOR -  CONTRL ELECTRON/PROTON SPECT. TEST CAL=100.       TIME SLICE (HR-MIN-SEC)  16 35 56 0000 TO  16 36   .0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION..     25.1593          DATE PROCESSED......     23FEB77
NORM. STD. ERROR....       .22115          VIBRATION TEST RUN 60X                    INPUT TAPE NUMBER...
FILTER BANDWIDTHS...      5.1116
FILTER START POINTS.       .0000
```

g rms = 25.16

Figure 70 'T' Axis Input, Transonic/MACH 1 Simulation

```
SENSOR -  EPS-3T ELECTRON/PHOTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  16 35 56.0000 TO  16 36   .0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION .       1.6722             DATE PROCESSED......    23FEB77
NORM. STD. ERROR....       .22115          VIBRATION TEST RUN 60X                        INPUT TAPE NUMBER....
FILTER BANDWIDTHS...     5.1116
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X       .001000
```



g rms = 1.67

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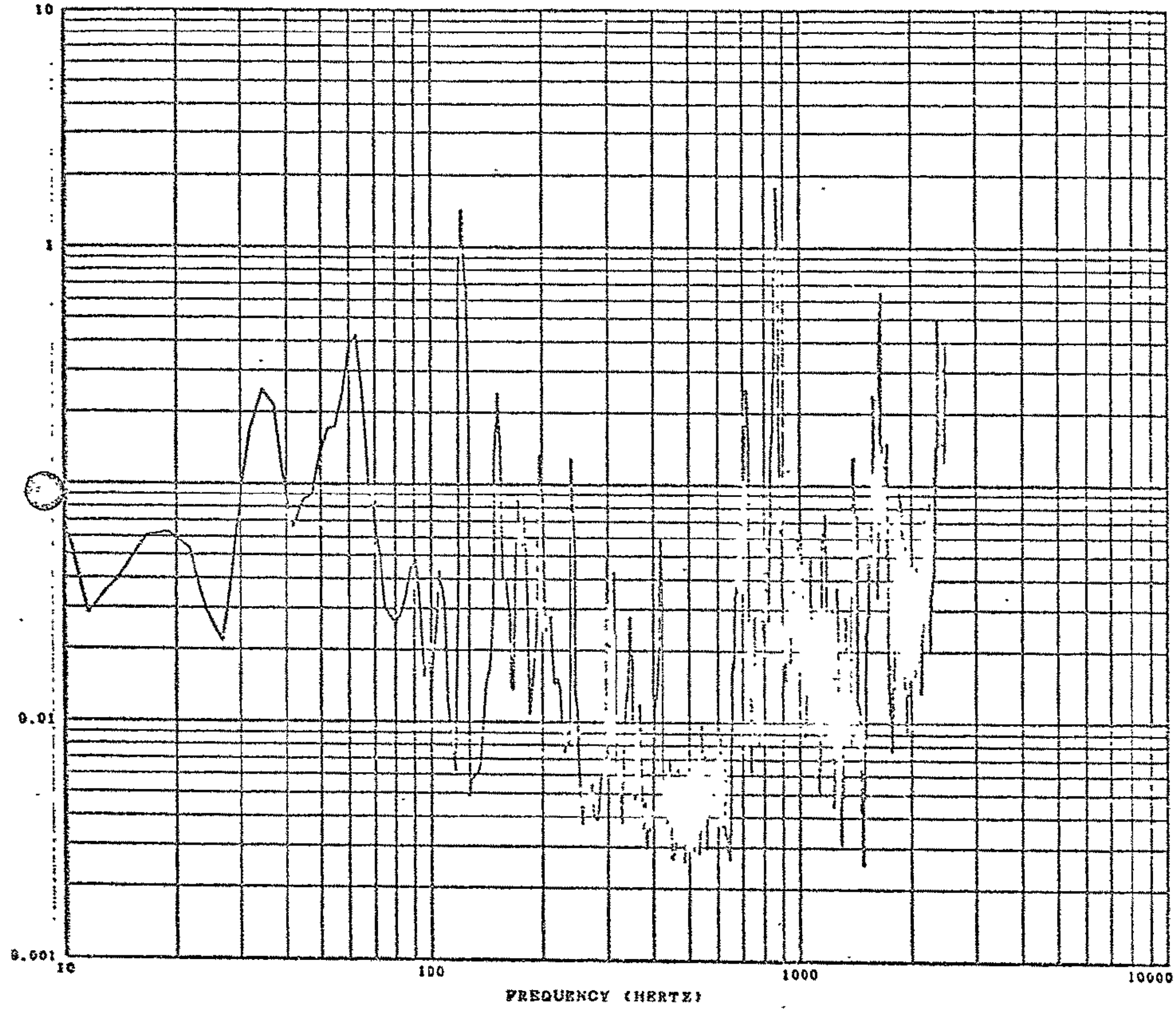
Figure 71 Electronics Package, 'T' Axis Response to Input of Figure 70

```
SENSOR -  EPS-2R ELECTRON/PROTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  16 35 56.0000 TO  16 36   .0000
LOW-PASS FILTER USED        3000.0          STANDARD DEVIATION..        .5986           DATE PROCESSED......    23FEB77
NORM. STD. ERROR....        .22115          VIBRATION TEST RUN 60X                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS...      5.1116
FILTER START POINTS.       .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN* X       .001000
```

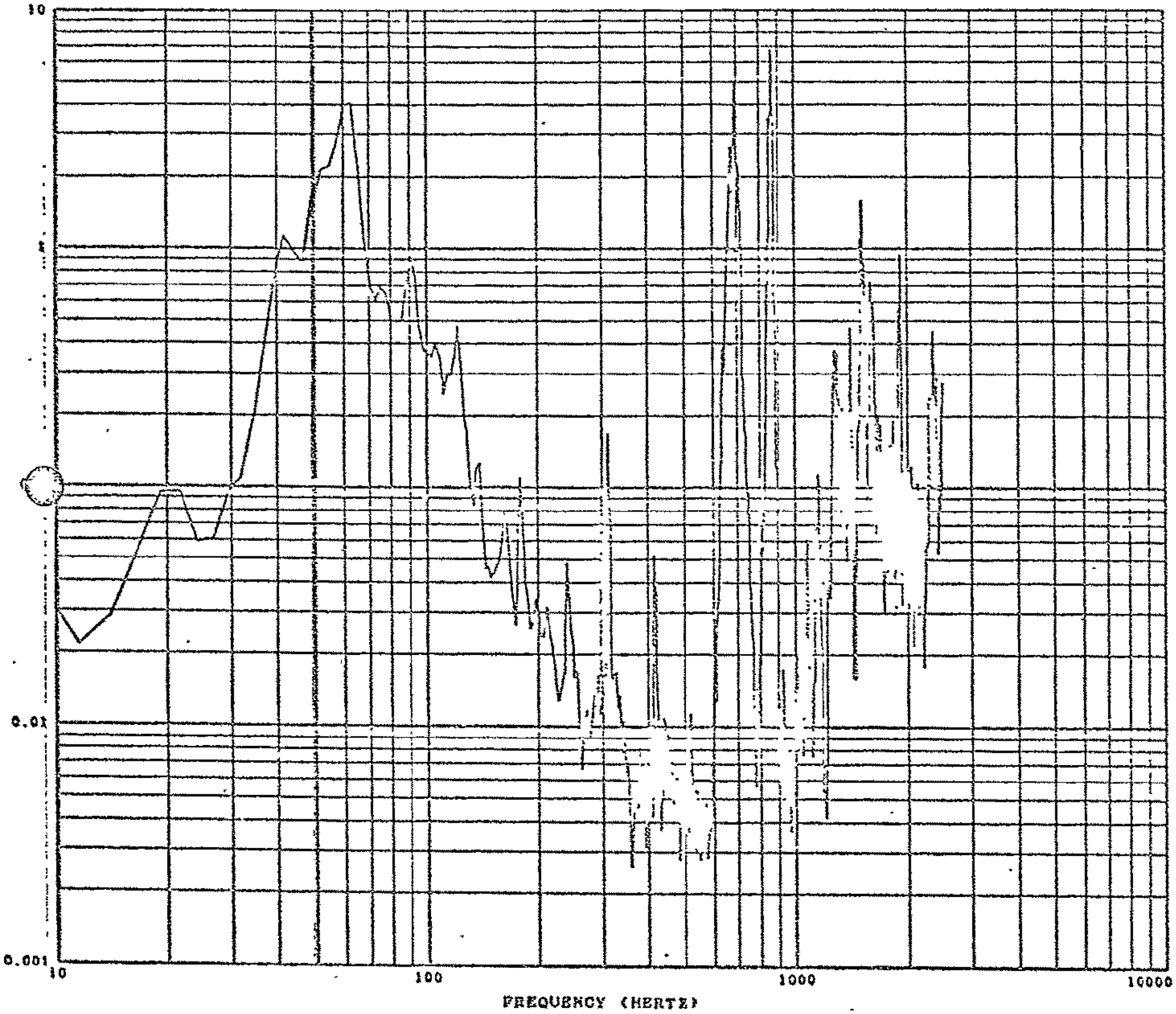


g rms = .60

PAGE 3.

Figure 72 Electronics Package, 'X' Axis Response to Input of Figure 70

```
SENSOR =  EPS-1R ELECTRON/PROTON SPECT. TEST CAL=31 6       TIME SLICE (HR-MIN-SEC)  16 35 56 0000 TO  16 36   .0000
LOW-PASS FILTER USED        3000.0          STANDARD DEVIATION..         .8702           DATE PROCESSED......    23FEB77
NORM  STD. ERROR....        .22115          VIBRATION TEST RUN 60X                       INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1116
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN* X       .001000
```

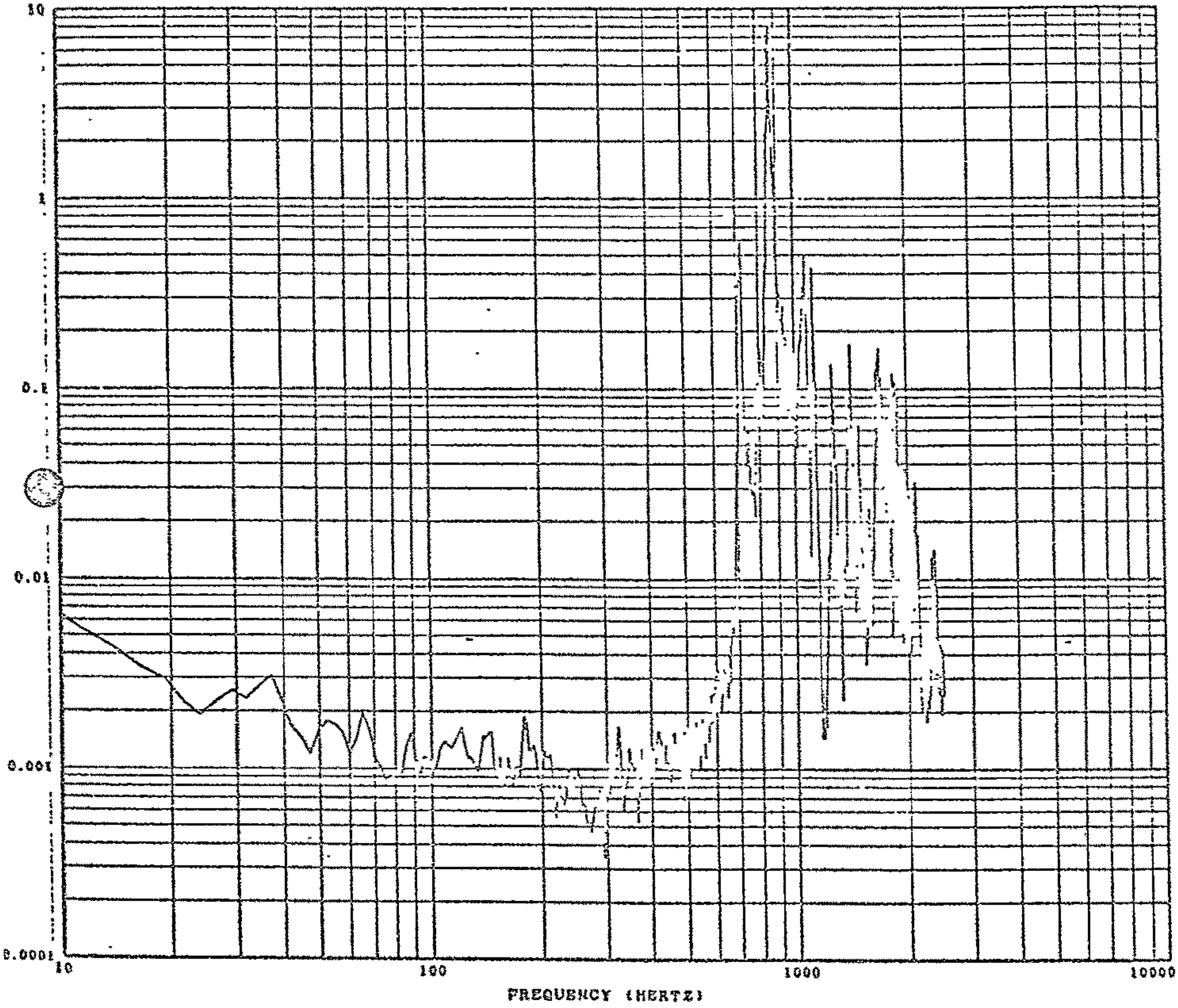


g rms = .87

PAGE 1.

Figure 73 Electronics Package, 'R' Axis
Response to Input of Figure 70

```
SENSOR -  EPS-4R ELECTRON/PROTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  16 35 56.0000 TO  16 36   .0000
LOW-PASS FILTER USED        3000.0           STANDARD DEVIATION .      16.4033            DATE PROCESSED......     23FEB77  .
NORM. STD. ERROR....        .22115           VIBRATION TEST RUN 60X                       INPUT TAPE NUMBER...
FILTER BANDWIDTHS...       5.1118
FILTER START POINTS.        .0000
```

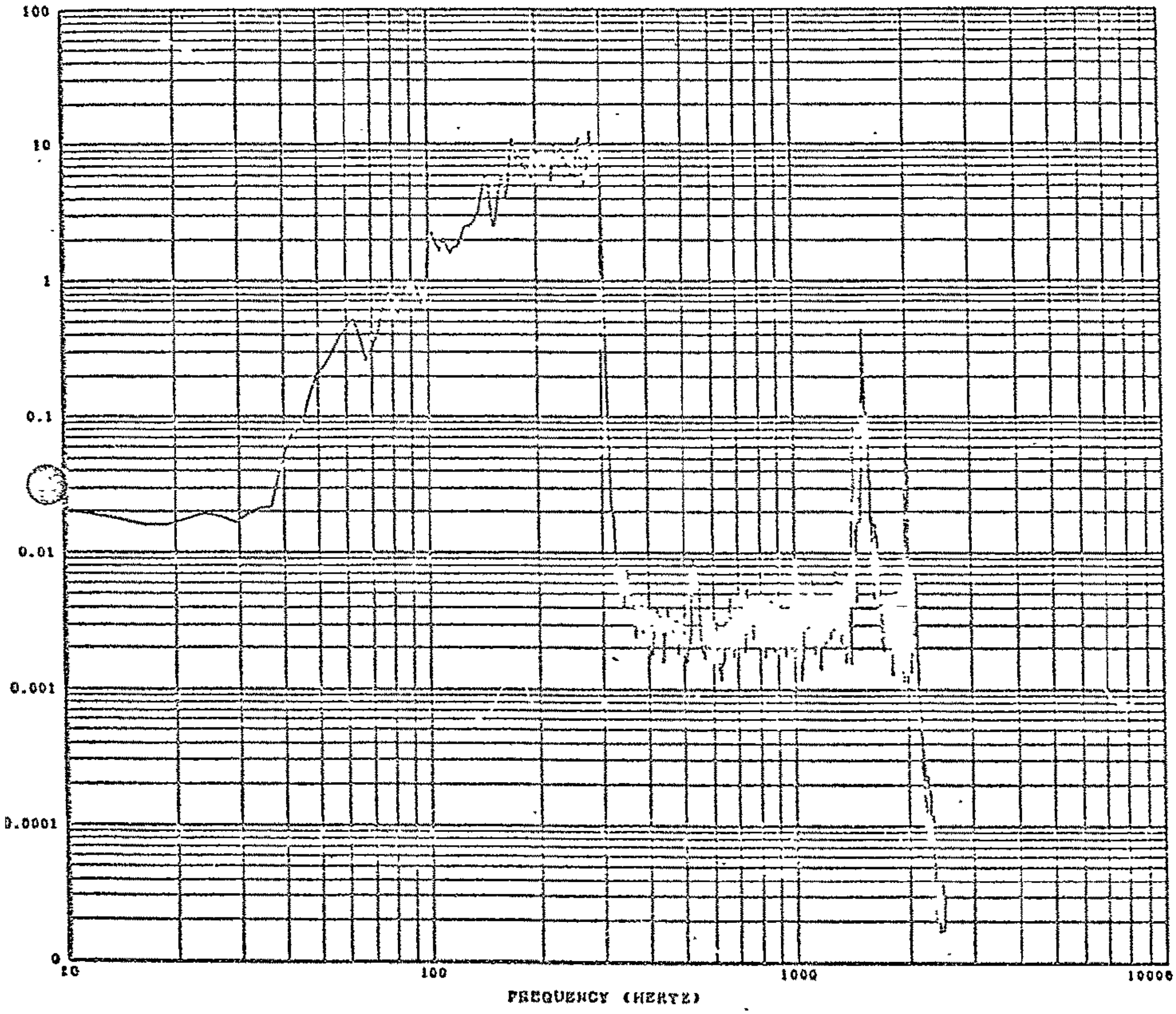


g rms = 16.40

PAGE 7.

Figure 74 Baseplate, 'R' Axis Response
to Input of Figure 70

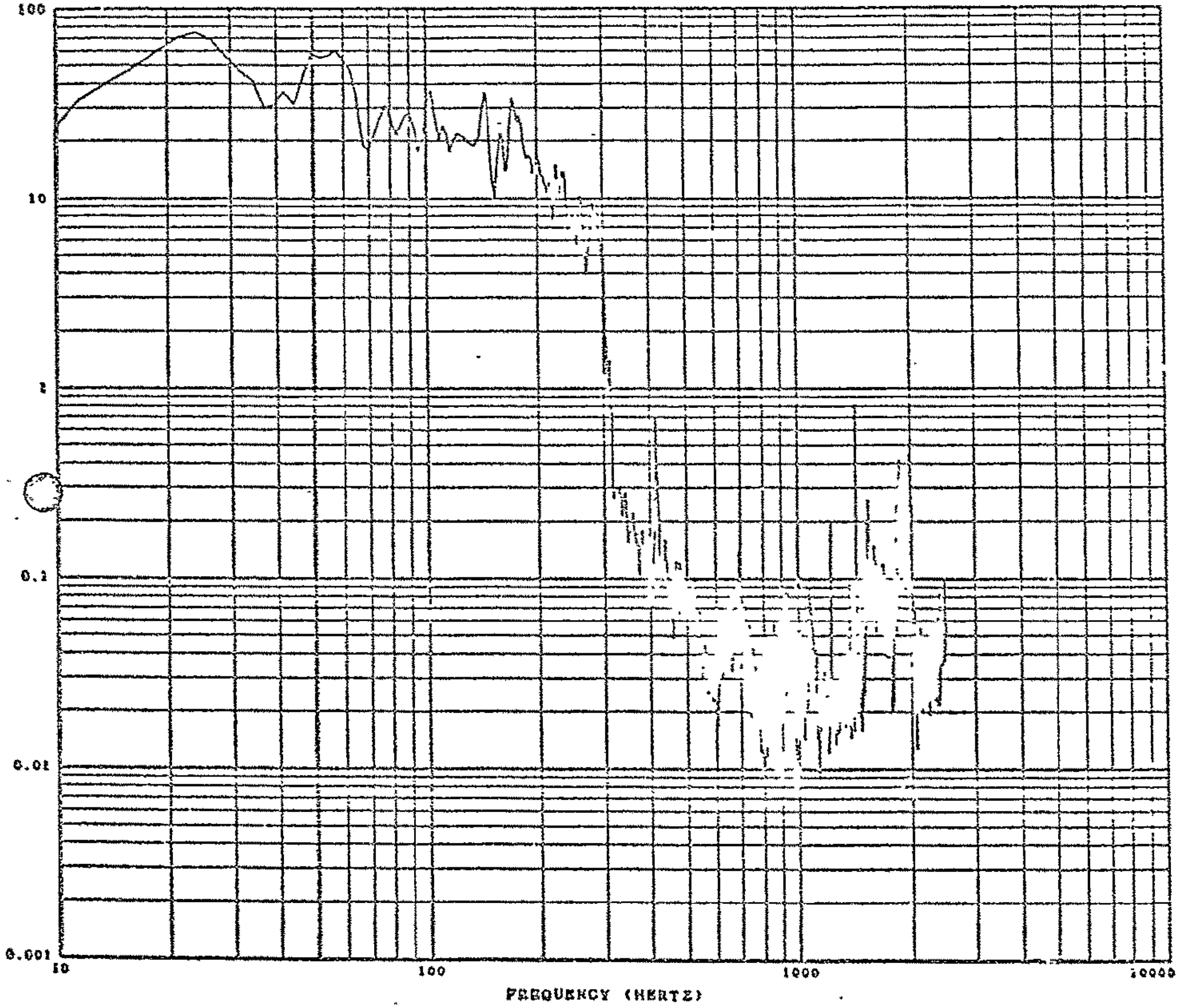
```
SENSOR -  CONTRL ELECTRON/PROTON SPECT. TEST CAL=100.       TIME SLICE (HR-MIN-SEC)  15 20 29.0000 TO  15 20 33.0000
LOW-PASS FILTER USED      3000.0         STANDARD DEVIATION..     36.5886           DATE PROCESSED... ..    25FEB77
NORM. STD. ERROR....      .22115         VIBRATION TEST RUN 60X                     INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1116
FILTER START POINTS.      .0000
```



g rms = 36.58   PAGE 0.

Figure 75 'R' Axis Input, Max. q Simulation (20 - 300 Hz)

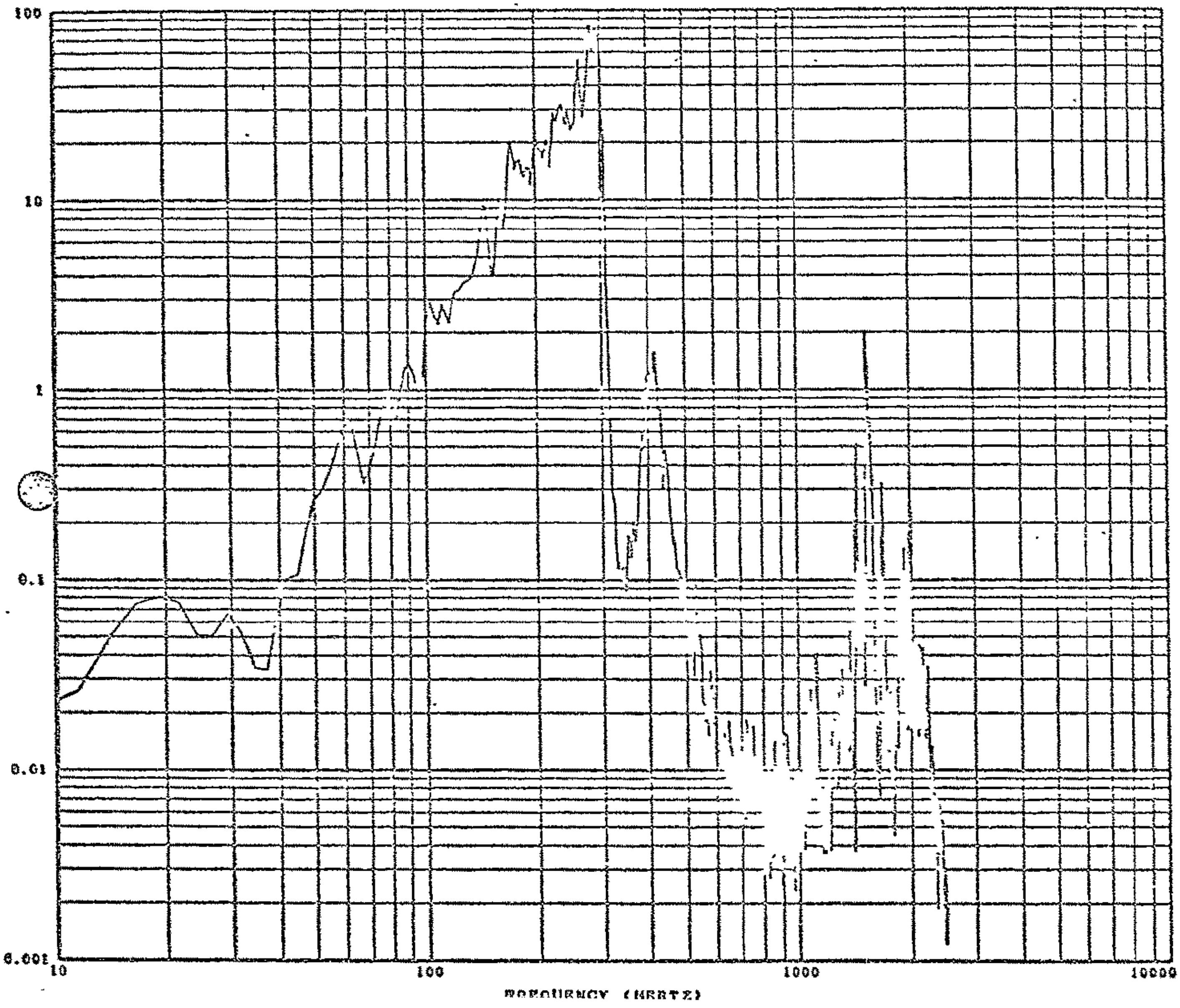
```
SENSOR -  EPS-IR ELECTRON/PROTON SPECT. TEST CAL=100        TIME SLICE (HR-MIN-SEC)  15 29 29.0000 TO  15 29 33.0000
LOW-PASS FILTER USED       3000.0           STANDARD DEVIATION .       2.6475           DATE PROCESSED......     25FEB77
NORM. STD. ERROR....       .22115           VIBRATION TEST RUN 60X                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1116
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN' X       .001000
```



g rms = 2.65

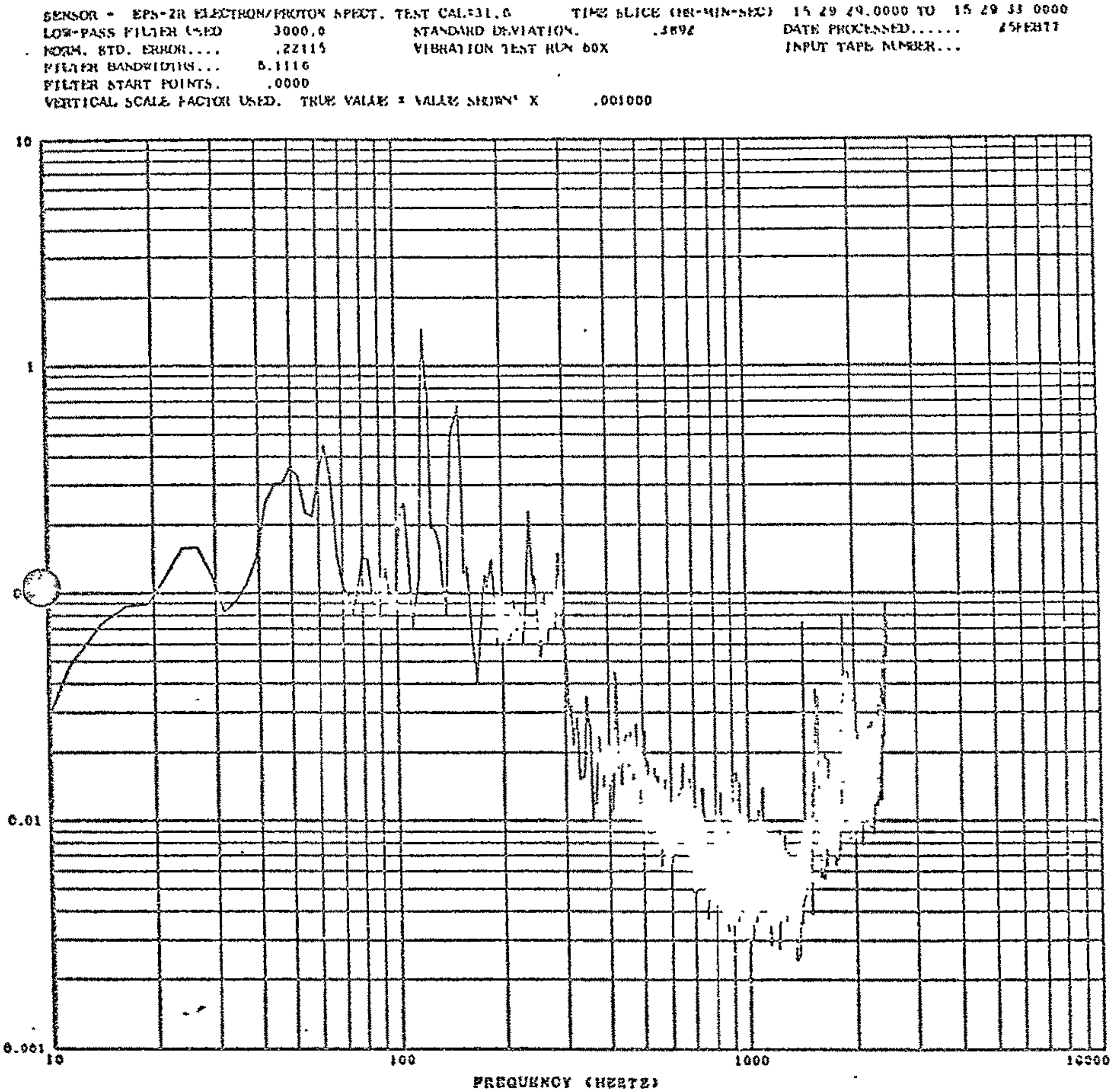
Figure 76 Electronics Package, 'R' Axis
Response to Input of Figure 75

```
SENSOR -  EPS-4R ELECTRON/PROTON SPECT. TEST CAL=1000.      TIME SLICE (HR-MIN-SEC)  15 29 29.0000 TO  15 29 31.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION.     71.5610          DATE PROCESSED .....     25FEB77
NORM. STD. ERROR....       .22115          VIBRATION TEST RUN 60X                 . INPUT TAPE NUMBER...
FILTER BANDWIDTHS...      5.1116
FILTER START POINTS.       0000
```



g rms = 71.56 PAGE 6.

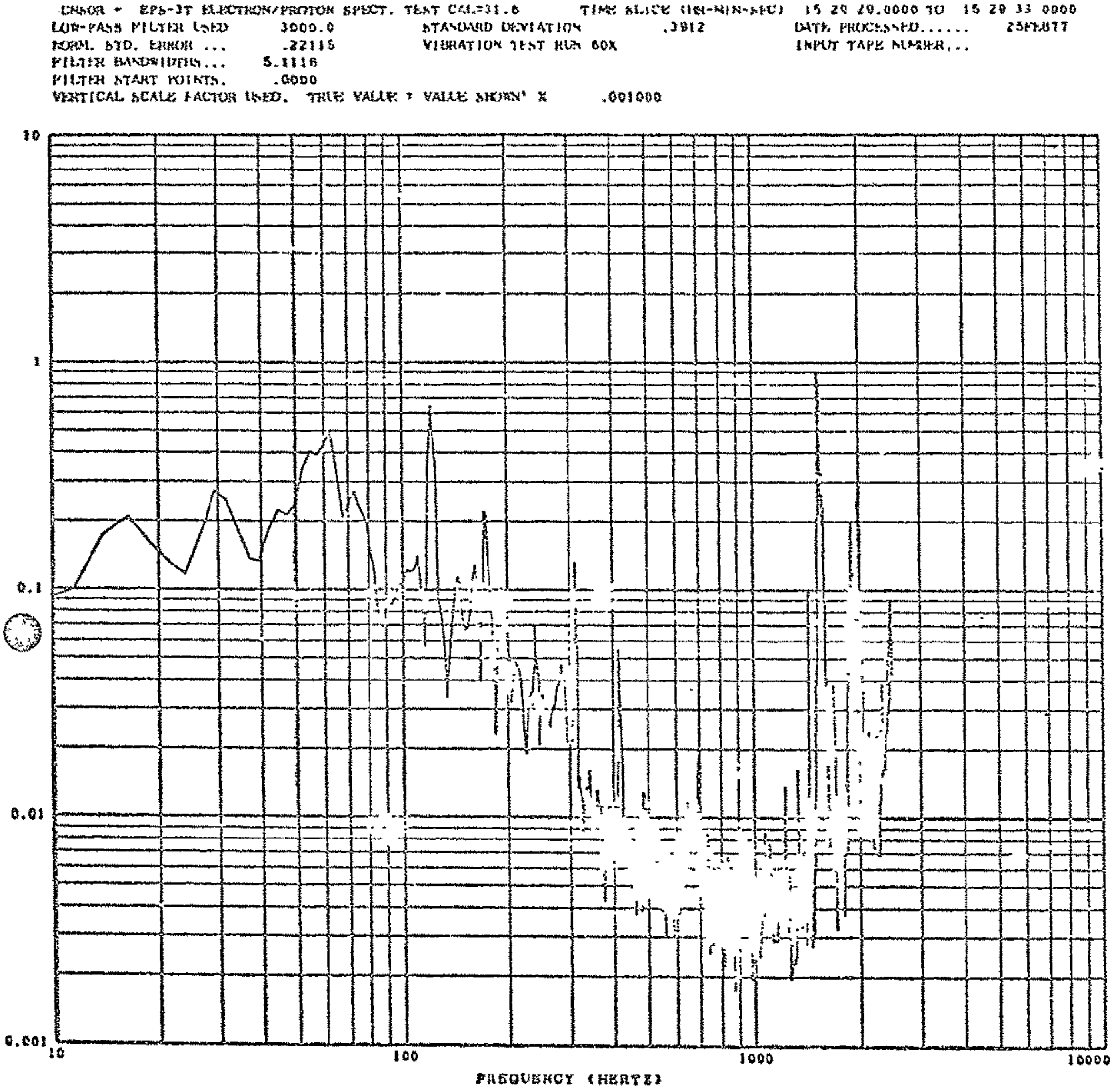
Figure 77 Baseplate, 'R' Axis Response to Input of Figure 75



```
SENSOR -  EPS-2R ELECTRON/PROTON SPECT. TEST CAL=31.6      TIME SLICE (HR-MIN-SEC)  15 29 29.0000 TO  15 29 33 0000
LOW-PASS FILTER USED      3000.0          STANDARD DEVIATION.        .3892           DATE PROCESSED......     25FEB77
NORM. STD. ERROR....      .22115          VIBRATION TEST RUN 60X                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1116
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X       .001000
```

g rms = .39

Figure 78 Electronics Package, 'X' Axis Response to Input of Figure 75

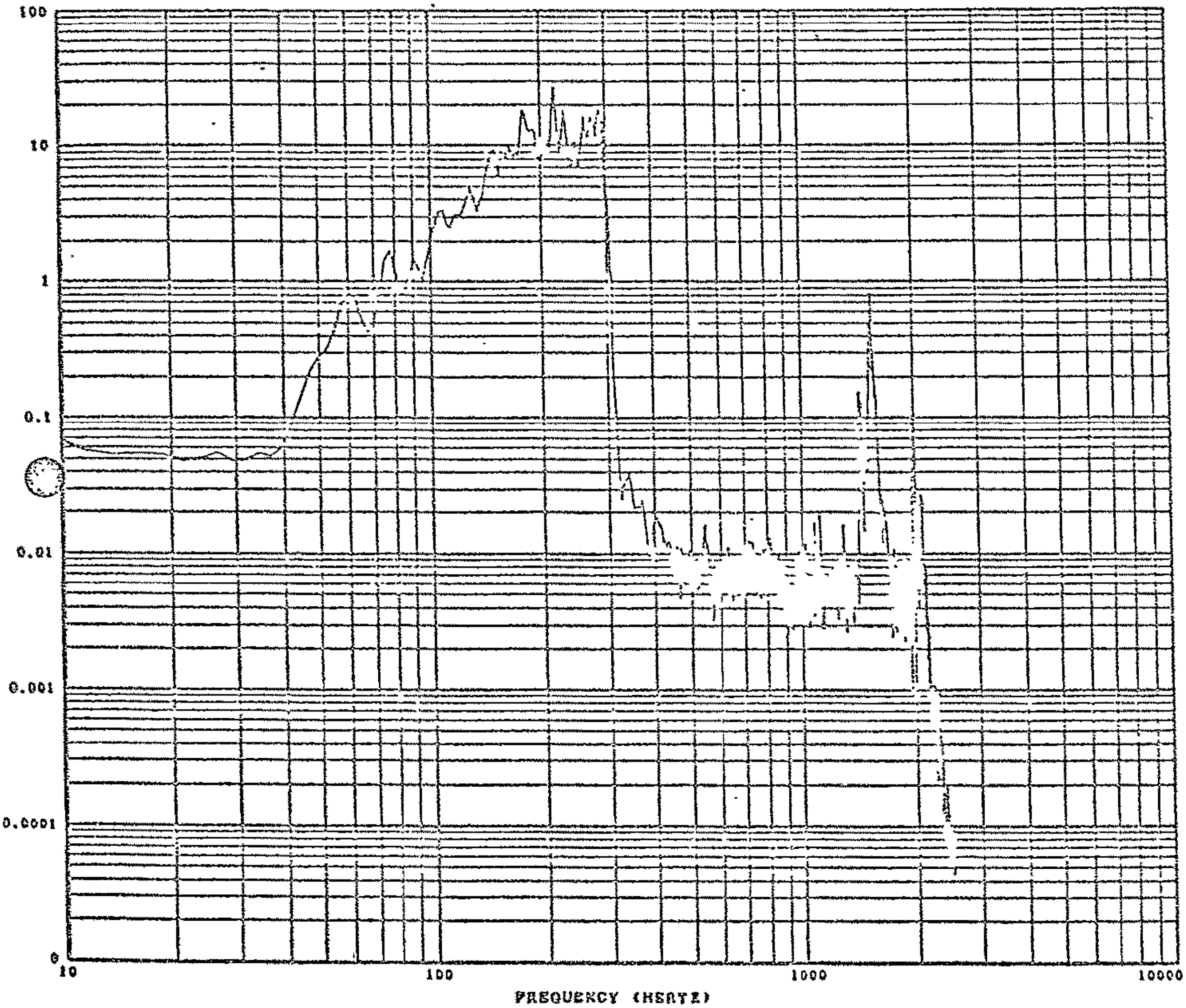


```
SENSOR -  EPS-3T ELECTRON/PROTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  15 29 20.0000 TO  15 29 33 0000
LOW-PASS FILTER USED        3000.0          STANDARD DEVIATION           .3912               DATE PROCESSED......     25FEB77
NORM. STD. ERROR ...         .22115         VIBRATION TEST RUN 60X                           INPUT TAPE NUMBER...
FILTER BANDWIDTHS...      5.1116
FILTER START POINTS.       .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X        .001000
```

g rms = .39

Figure 79 Electronics Package, 'T' Axis Response to Input of Figure 75

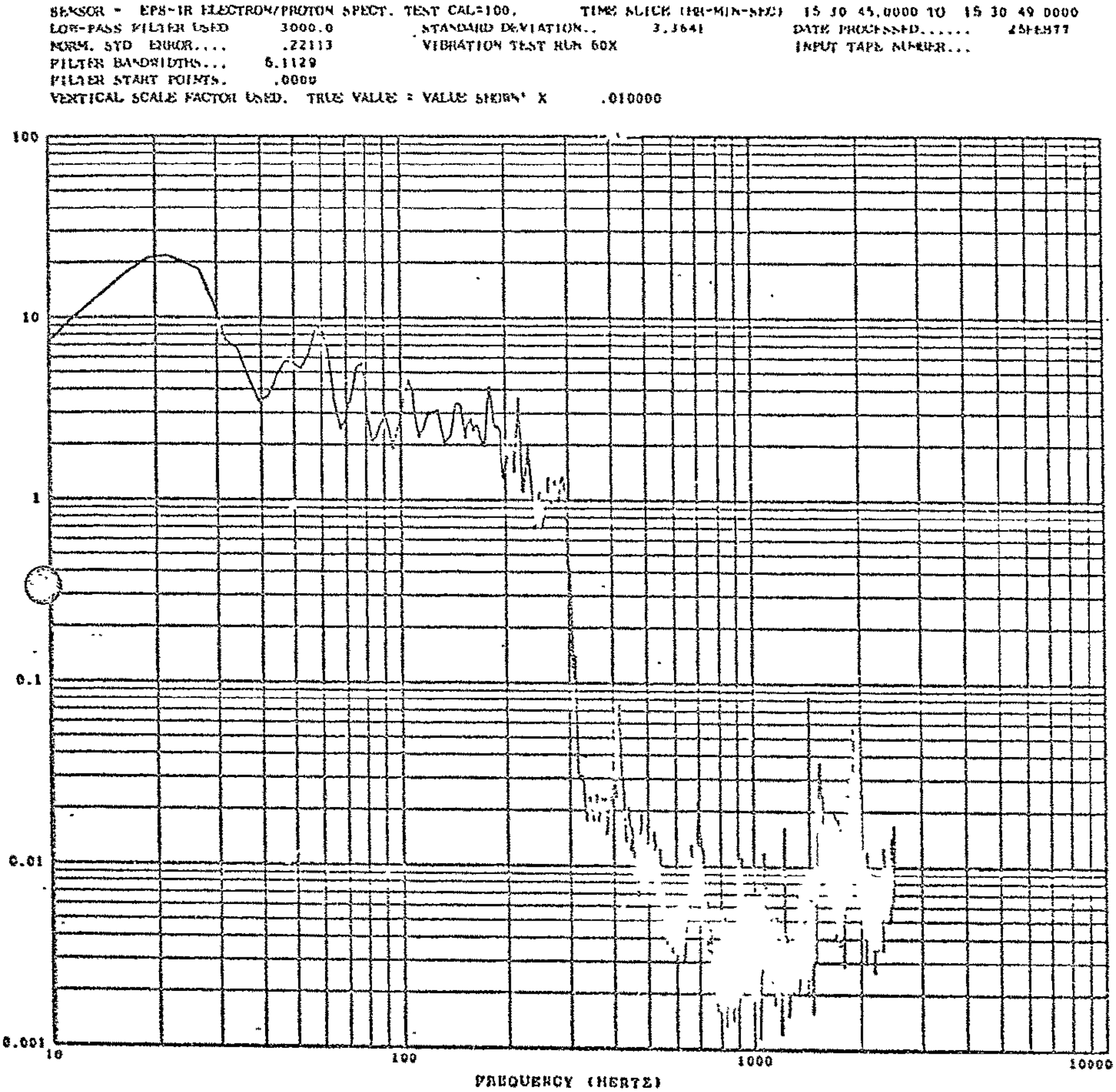
```
SENSOR -  CONTRL ELECTRON/PHOTON SPECT. TEST CAL=100.       TIME SLICE (HR-MIN-SEC)  15 30 45.0000 TO  15 30 49.0000
LOW-PASS FILTER USED        3000.0          STANDARD DEVIATION..     46.0644           DATE PROCESSED......     25FEB77
NORM. STD. ERROR....         .22113         VIBRATION TEST RUN 60X                     INPUT TAPE NUMBER...
FILTER BANDWIDTHS...       5.1129
FILTER START POINTS.        .0000
```



g rms = 46.06

PAGE 0.

Figure 80 'R' Axis Input, Transonic/MAC" ' Simulation, (20 - 300 Hz)

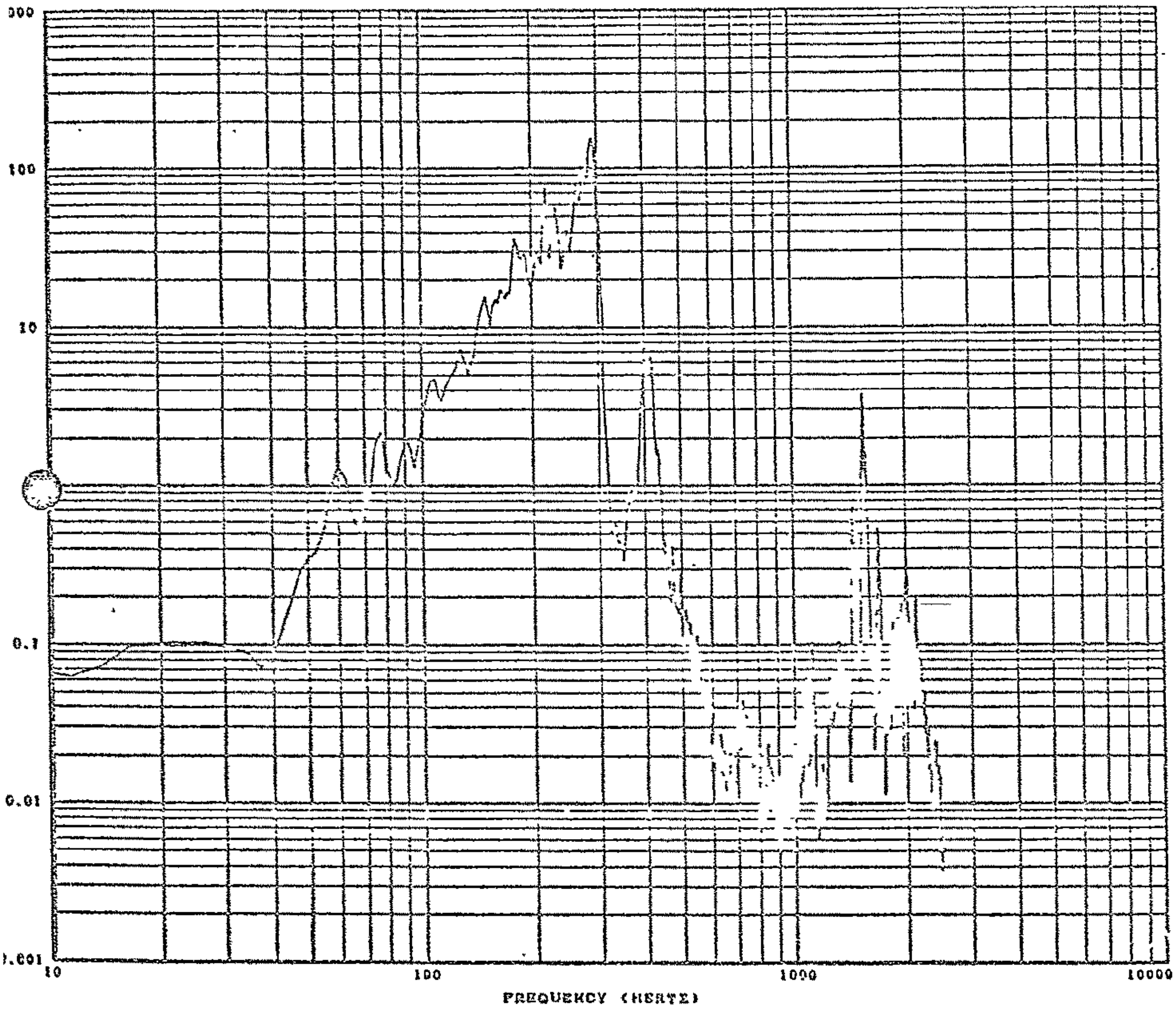


g rms = 3.36

PAGE 1.

Figure 81 Electronics Package, 'R' Axis
Response to Input of Figure 80

```
SENSOR -  EPS-4R ELECTRON/PROTON SPECT. TEST CAL=1000.      TIME SLICE (HR-MIN-SEC)  15 30 45.0000 TO  15 30 49.0000 .
LOW-PASS FILTER USED        3000.0          STANDARD DEVIATION..    91.5681          DATE PROCESSED......    25FEB77
NORM. STD. ERROR....        .22113          VIBRATION TEST RUN 60X                   INPUT TAPE NUMBER...
FILTER BANDWIDTHS...      5.1129
FILTER START POINTS.       .0000
```

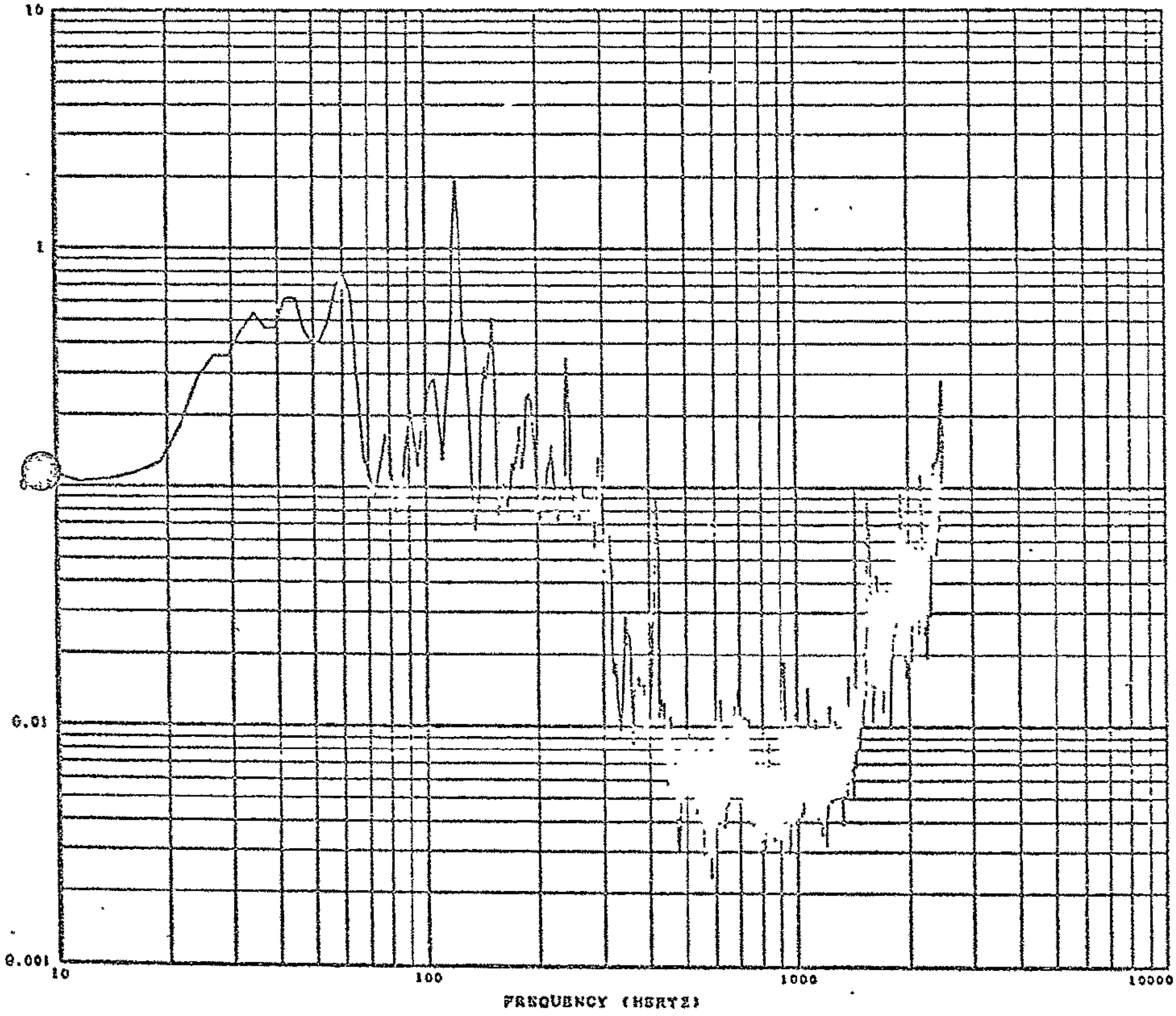


g rms = 91.57

PAGE ?.

Figure 82 Baseplate, 'R' Axis Response to Input of Figure 80

```
SENSOR =  EIS-2R ELECTRON/PROTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  15 30 45.0000 TO  15 30 49 0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION..        .5253           DATE PROCESSED......    25FEB77
NORM. STD. ERROR..          .22113         VIBRATION TEST RUN 60X                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1120
FILTER START POINTS       .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X       001000
```

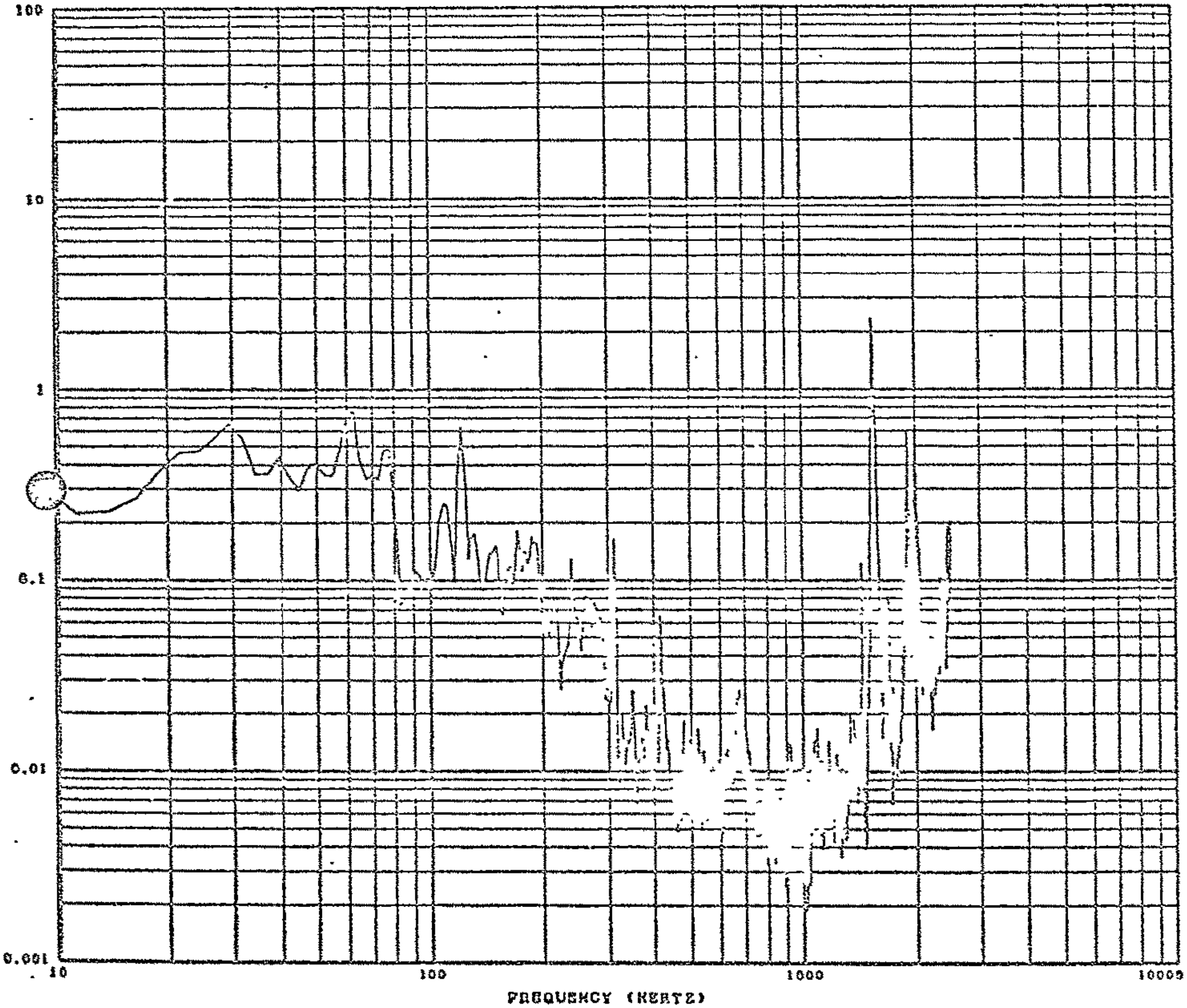


g rms = .53

PAGE 3.

Figure 83 Electronics Package, 'X' Axis Response to Input of Figure 80

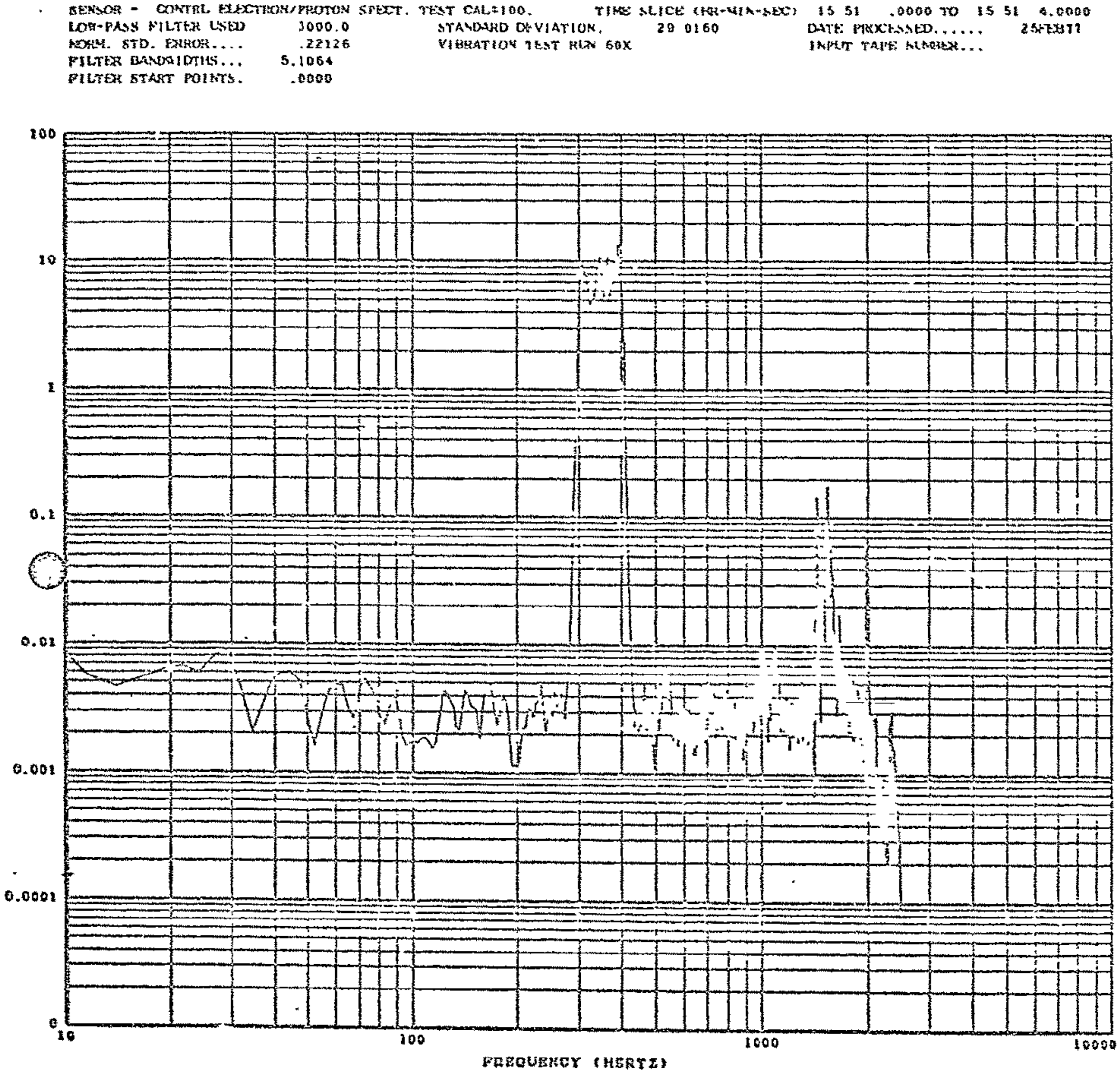
```
SENSOR =  EPS-3T ELECTRON/PHOTON SPECT. TEST CAL=31.8       TIME SLICE (HR-MIN-SEC)  15 30 45.0000 TO  15 30 49.0000 .
LOW-PASS FILTER USED        3000.0          STANDARD DEVIATION..        .6264          DATE PROCESSED......    25FEB71
NORM. STD. ERROR....        .22113          VIBRATION TEST RUN 60X                     INPUT TAPE NUMBER...
FILTER BANDWIDTHS...      5.1129
FILTER START POINTS.       .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X        .001000
```



g rms = .63

PAGE 8.

Figure 84 Electronics Package, 'T' Axis
Response to Input of Figure 80



g rms = 29.02

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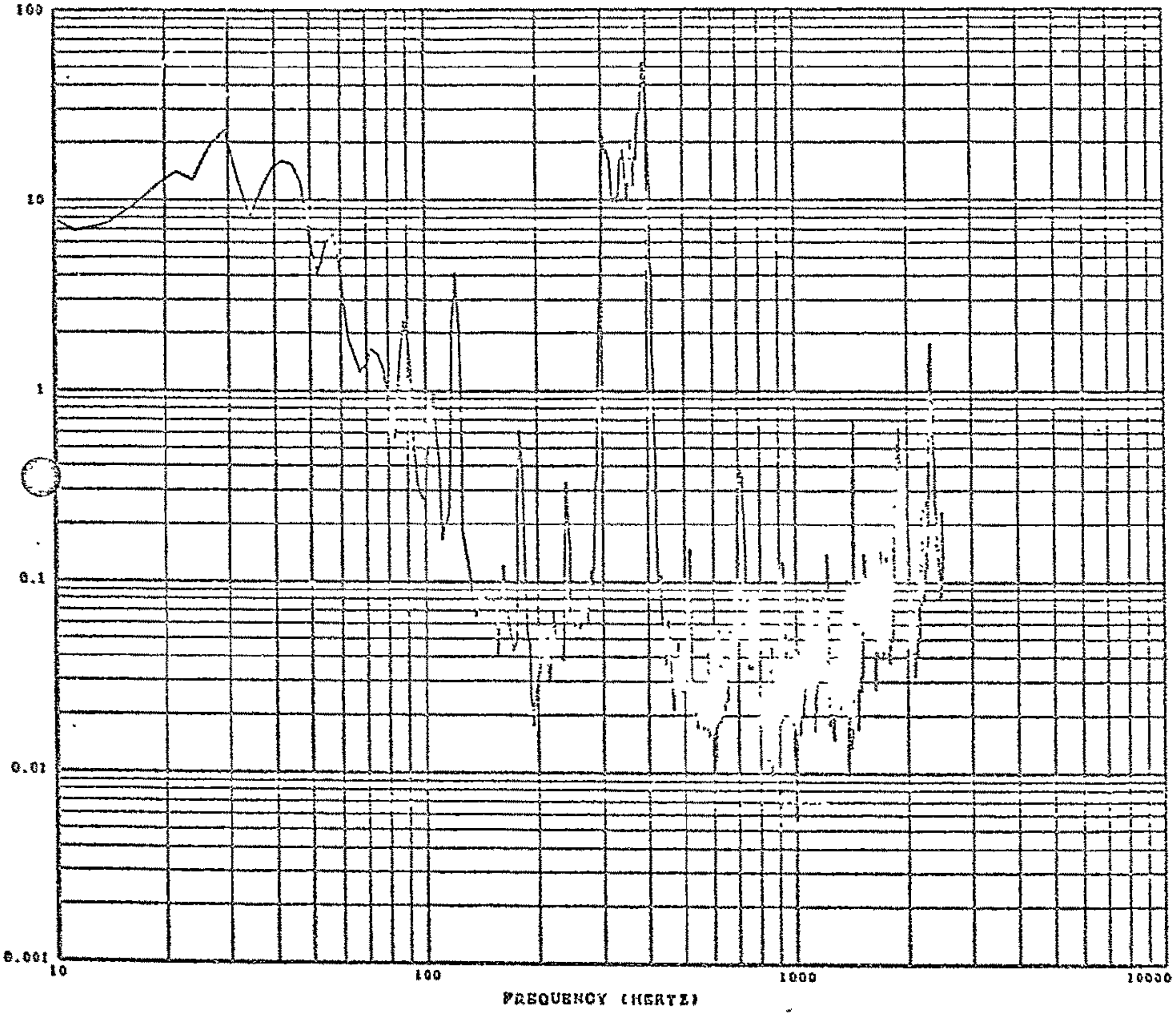
Figure 85 'R' Axis Input, Max. q Simulation (300 - 400 Hz)

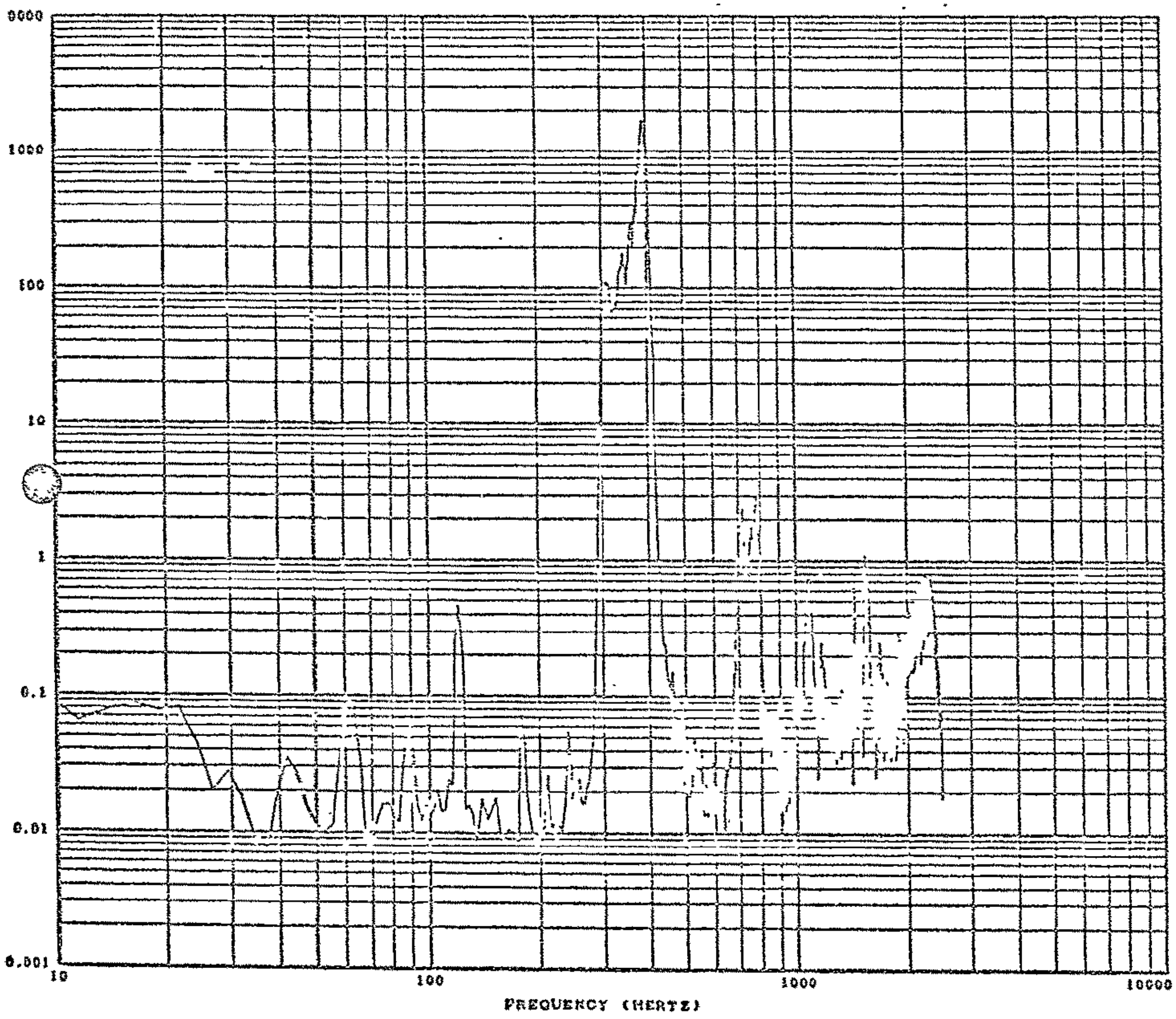
```
SENSOR =  EPS-1R ELECTRON/PROTON SPECT.TEST CAL=100.        TIME SLICE (HR-MIN-SEC)  15 51   .0000 TO  15 51  4 0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION..       1 8281          DATE PROCESSED......    25FEB77
NORM. STD. ERROR....       .22126          VIBRATION TEST RUN 60X  -                  INPUT TAPE NUMBER...
FILTER BANDWIDTHS ..     5.1064
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X      .001000
```



g rms = 1.83   PAGE 0.

Figure 86 Electronics Package, 'R' Axis
Response to Input of Figure 85

```
SENSOR -  EPS-4R ELECTRON/PROTON SPECT. TEST CAL=1000      TIME SLICE (HR-MIN-SEC)  15 51   .0000 TO  15 51  4.0000
LOW-PASS FILTER USED        3000.0          STANDARD DEVIATION..   213.1949          DATE PROCESSED......    25FEB77
NORM. STD. ERROR....        .22126          VIBRATION TEST RUN 60X                   INPUT TAPE NUMBER...
FILTER BANDWIDTHS...       5.1064
FILTER START POINTS.        .0000
```



g rms = 213.19

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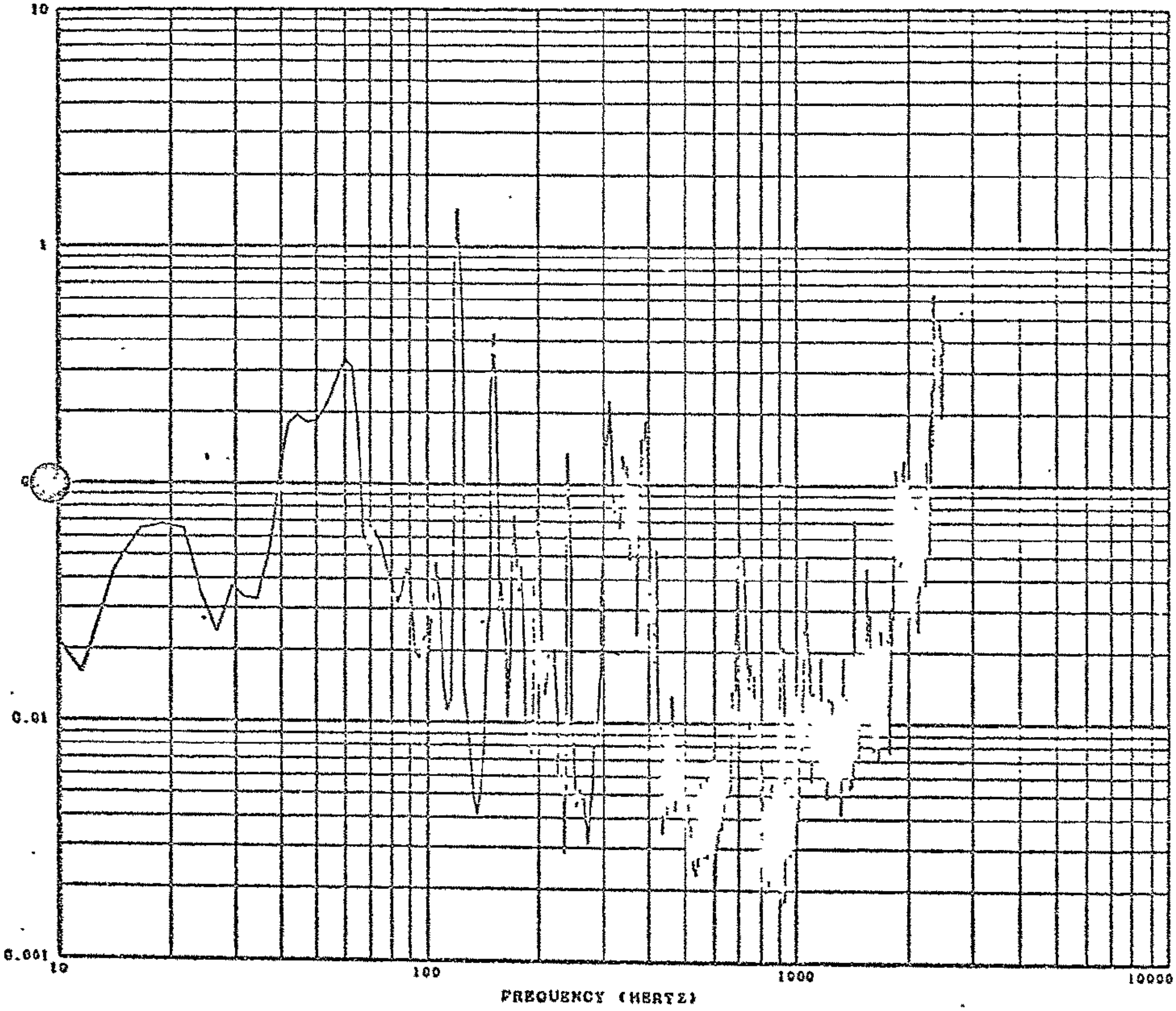
Figure 87 Baseplate, 'R' Axis Response to Input of Figure 85

```
SENSOR -  EPS-2R ELECTRON/PROTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  15 51   .0000 TO  15 51  4.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION..        .7543          DATE PROCESSED. ....    25FEB77
NORM. STD. ERROR....       .22126          VIBRATION TEST RUN 60X                     INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1064
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X     .001000
```

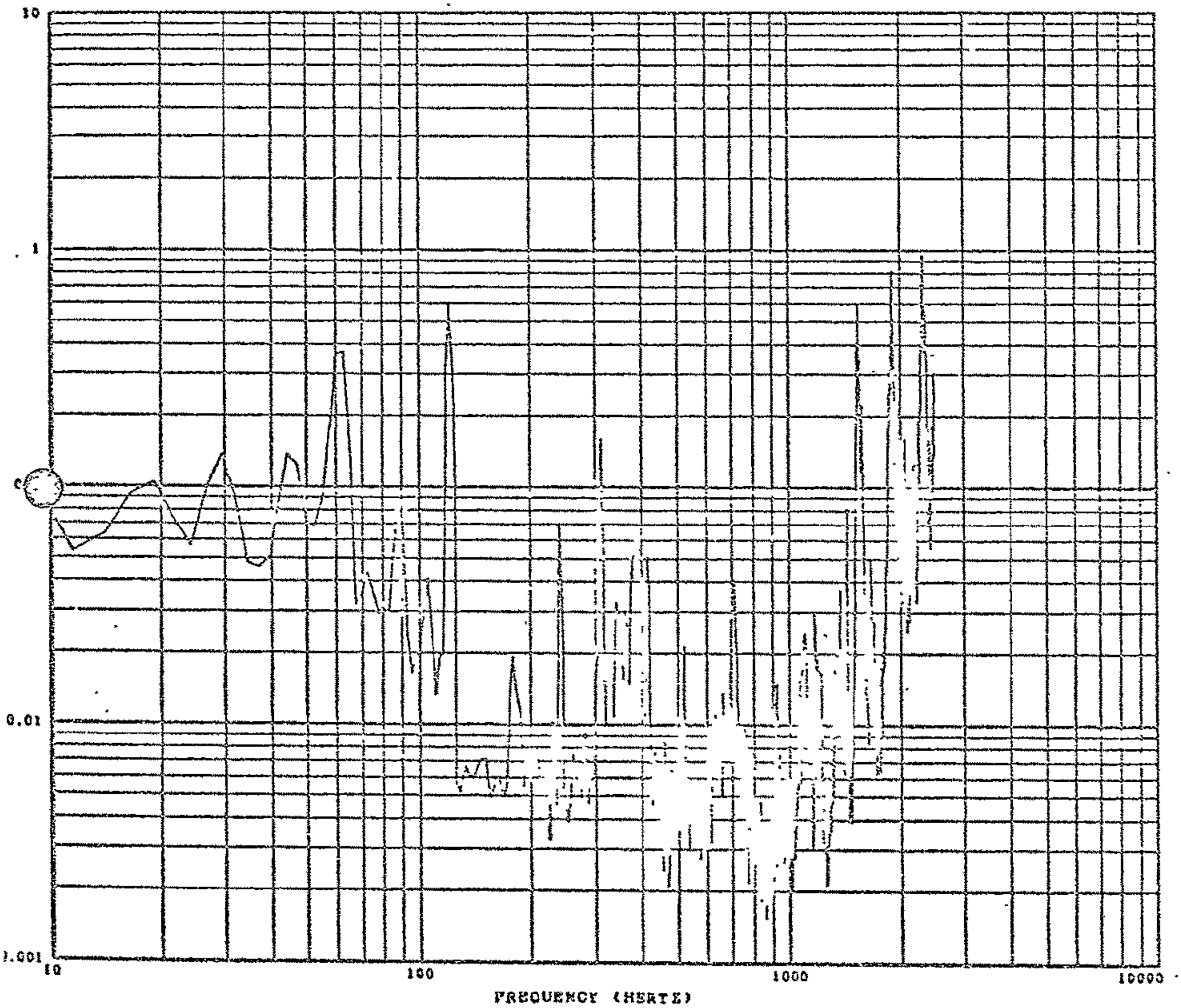


g rms = .75

PAGE 2.

Figure 88 Electronics Package, 'X' Axis Response to Input of Figure 85

```
SENSOR =  EPS-3T ELECTRON/PROTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  15 51   .0000 TO  15 51  4.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION..          .6831            DATE PROCESSED......      25FEB77
NORM. STD. ERROR....       .22126          VIBRATION TEST RUN 60X                         INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1064
FILTER START POINTS.       .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X       .001000
```

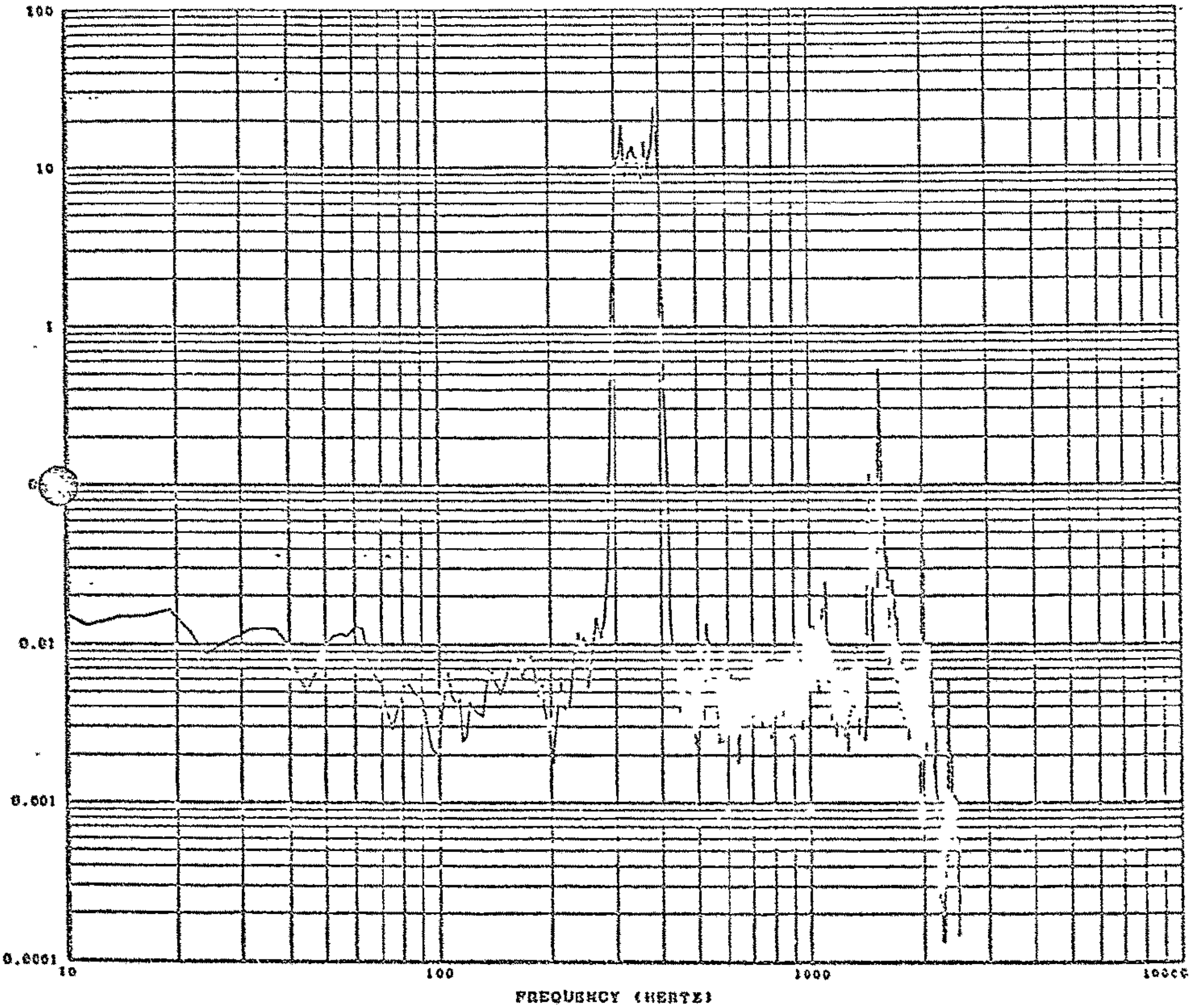


g rms = .68

PAGE 4.

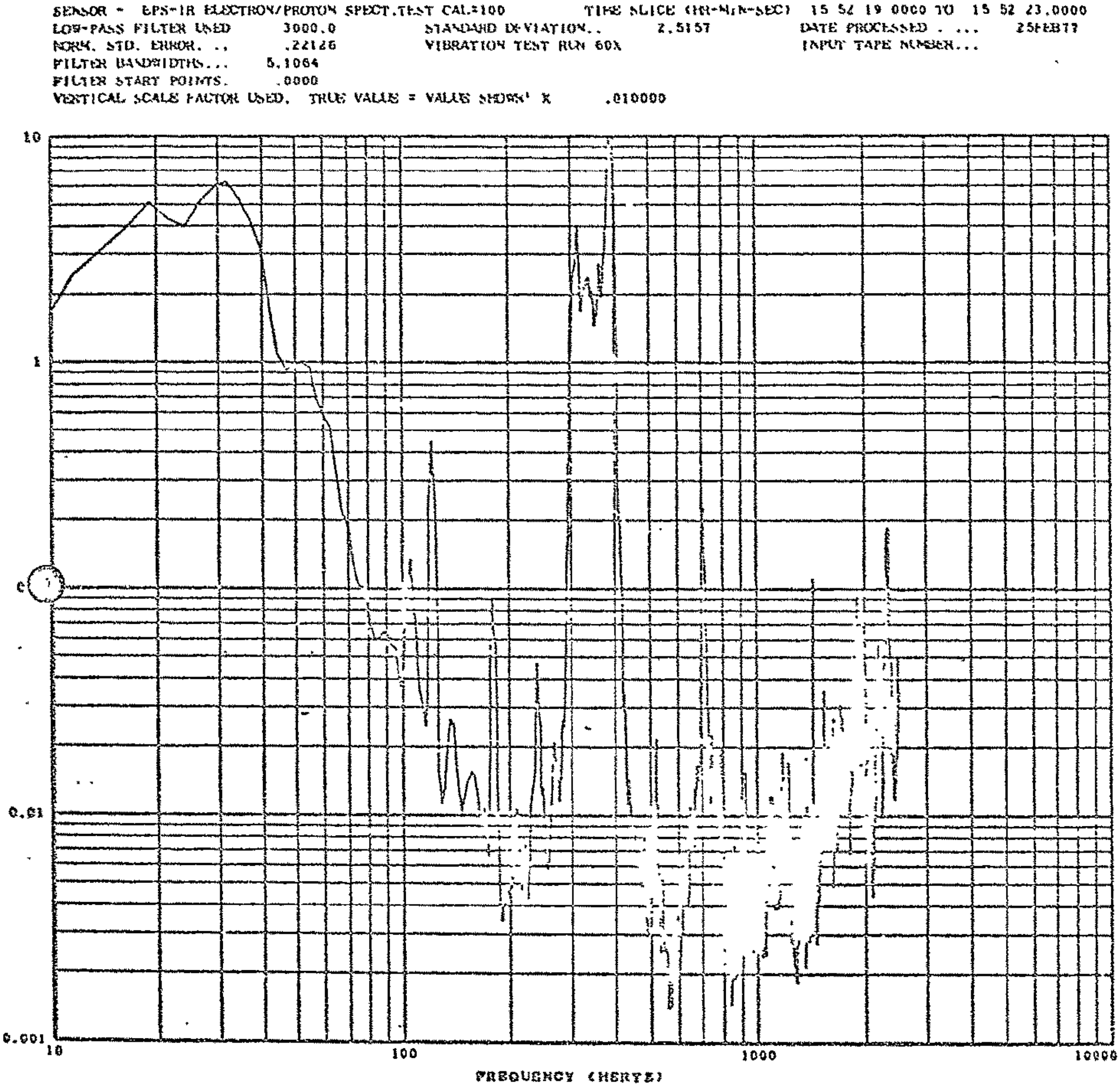
Figure 89 Electronics Package, 'T' Axis Response to Input of Figure 85

```
SENSOR -  CONTRL ELECTRON/PROTON SPECT. TEST CAL=100.        TIME SLICE (HR-MIN-SEC)  15 52 19 0000 TO  15 52 23 0000
LOW-PASS FILTER USED         3000.0         STANDARD DEVIATION..     36.5010            DATE PROCESSED......     25FEB77
NORM. STD. ERROR....          .22126        VIBRATION TEST RUN 60X                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS...         5.1064
FILTER START POINTS.          .0000
```



g rms = 36.50   PAGE 9.

Figure 90 'R' Axis Input, Transonic/MACH 1 Simulation (300 - 400 Hz)



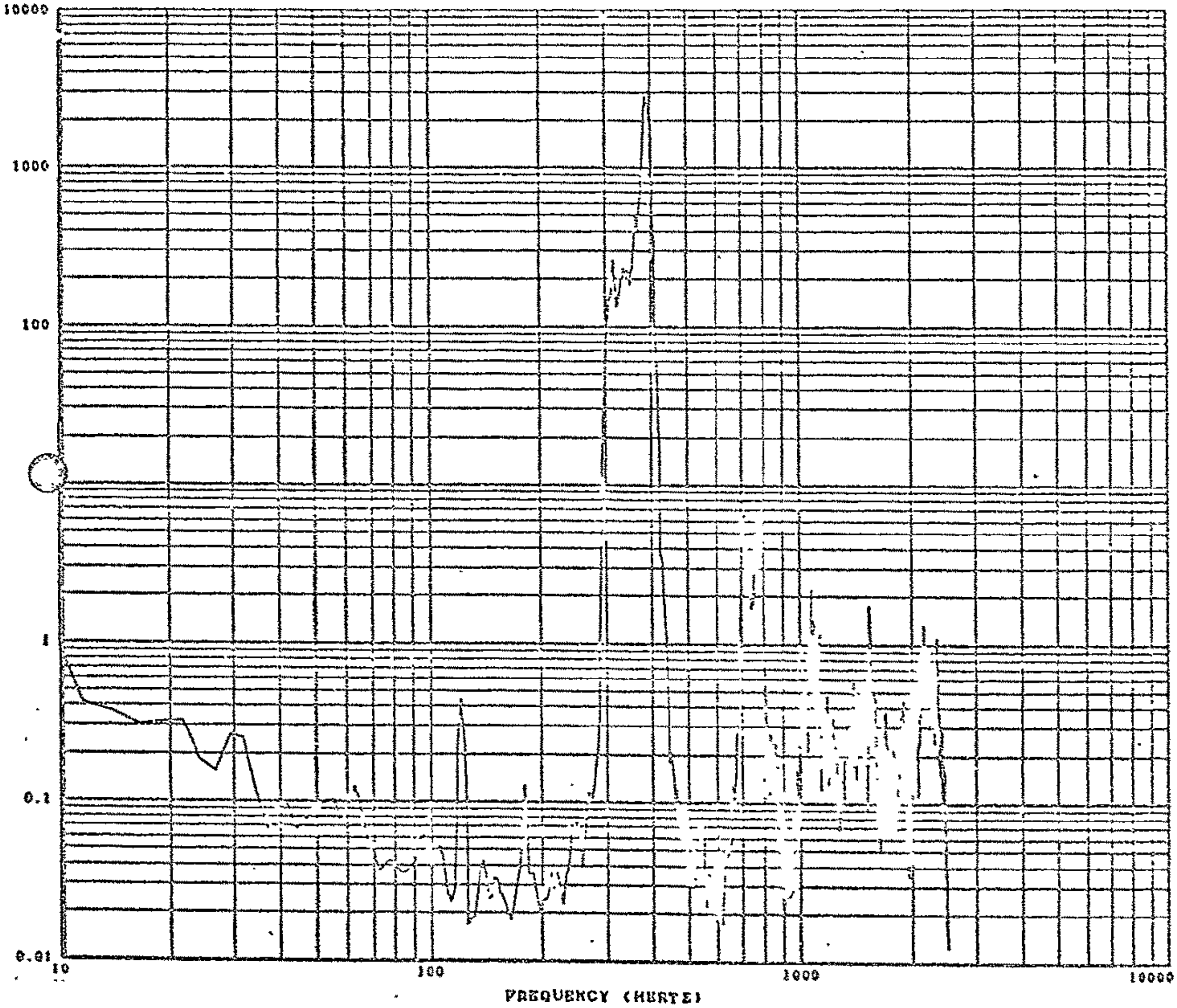
```
SENSOR =  EPS-IR ELECTRON/PROTON SPECT.TEST CAL=100         TIME SLICE (HR-MIN-SEC)  15 52 19 0000 TO  15 52 23.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION..      2.5157           DATE PROCESSED . ...     25FEB77
NORM. STD. ERROR. ..       .22126          VIBRATION TEST RUN 60X                     INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1064
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN' X       .010000
```

g rms = 2.52

PAGE 1.

Figure 91 Electronics Package, 'R' Axis
Response to Input of Figure 90

```
SENSOR =  EPS-4R ELECTRON/PROTON SPECT. TEST CAL=1000       TIME SLICE (HR-MIN-SEC)  15 52 19.0000 TO  15 52 23.0000
LOW-PASS FILTER USED      3000.0          STANDARD DEVIATION..    272.7499          DATE PROCESSED......    25FEB77
NORM. STD. ERROR....       .22126          VIBRATION TEST RUN 60X                    INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1064
FILTER START POINTS.      .0000
```

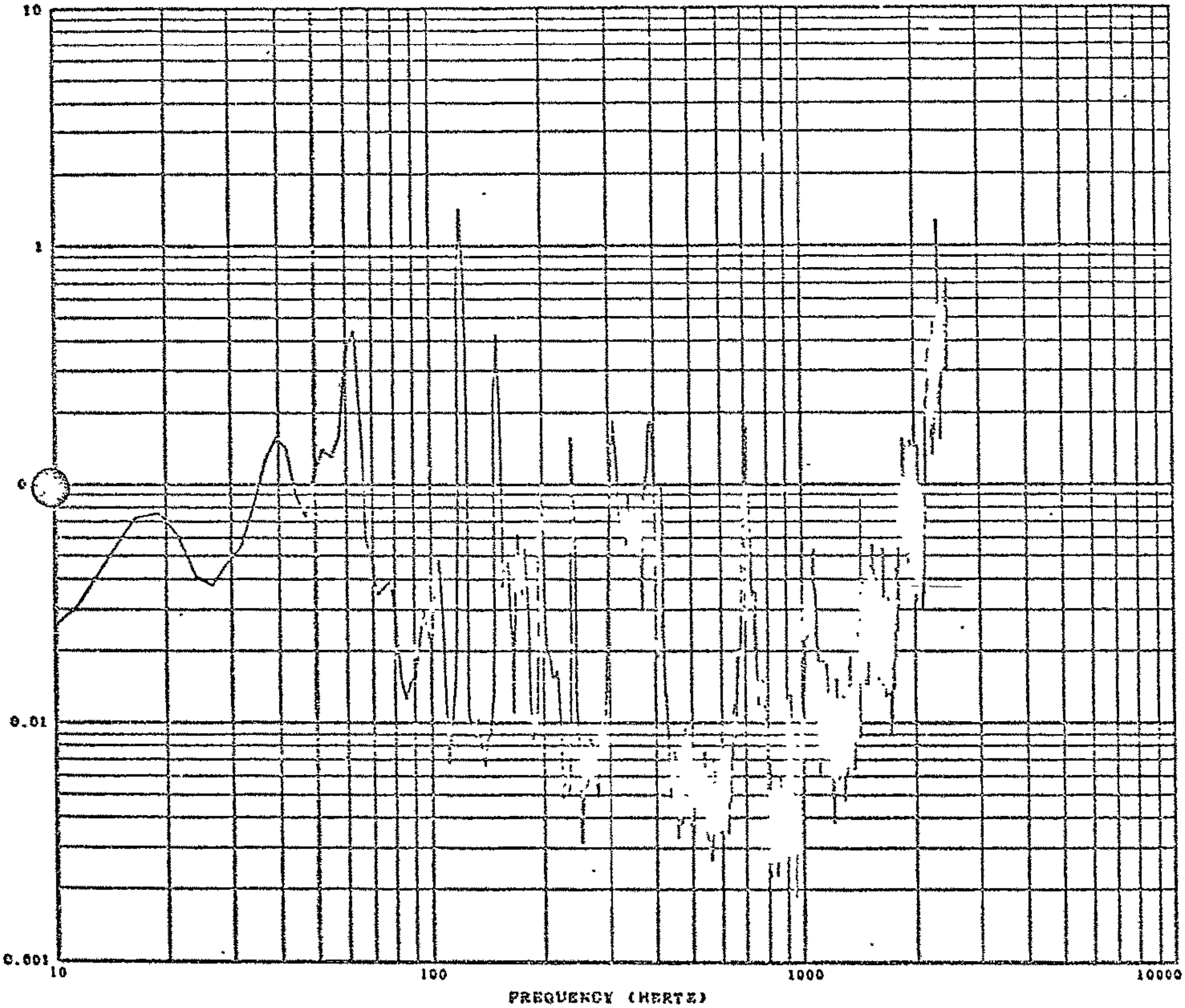


g rms = 272.75

PAGE 7.

Figure 92 Baseplate, 'R' Axis Response to Input of Figure 90

```
SENSOR -  EPS-2R ELECTRON/PHOTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  15 52 19.0000 TO  15 52 23.0000
LOW-PASS FILTER USED        3000.0          STANDARD DEVIATION..        .9069         DATE PROCESSED......    25FEB77
NORM. STD. ERROR....        .22126          VIBRATION TEST RUN 60X                    INPUT TAPE NUMBER...
FILTER BANDWIDTHS...      5.1064
FILTER START POINTS.       .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X       .001000
```

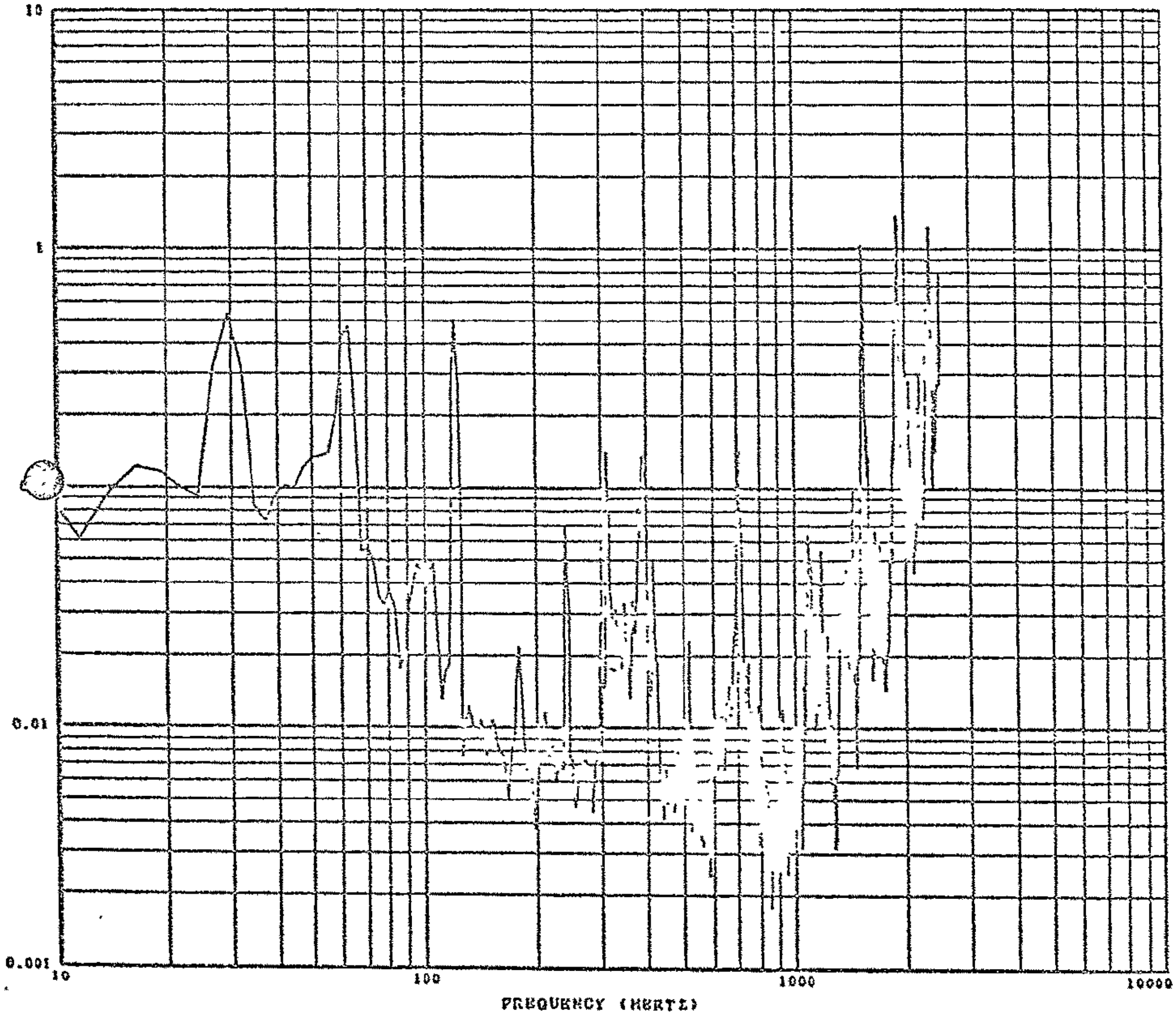


g rms = .91

PAGE 2.

Figure 93 Electronics Package, 'X' Axis Response to Input of Figure 90

```
SENSOR =  EPS-3T ELECTRON/PROTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  15 52 19.0000 TO  15 52 23.0000
LOW-PASS FILTER USED      3000.0          STANDARD DEVIATION..        .9042             DATE PROCESSED......    25FEB77
NORM. STD. ERROR....       .22128         VIBRATION TEST RUN 60X                        INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1064
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X      .001000
```

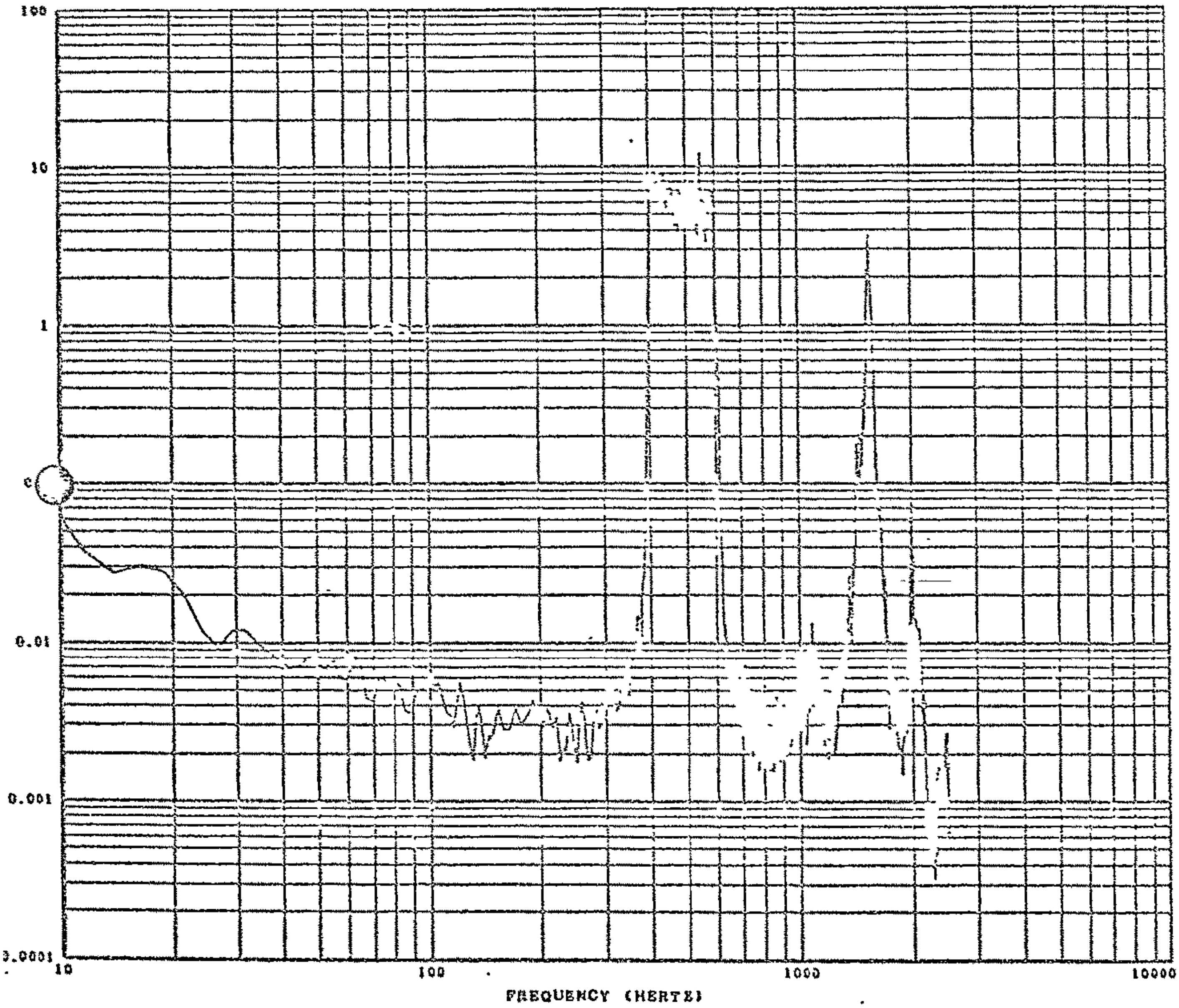


g rms = .90

PAGE 8.

Figure 94 Electronics Package, 'T' Axis Response to Input of Figure 90

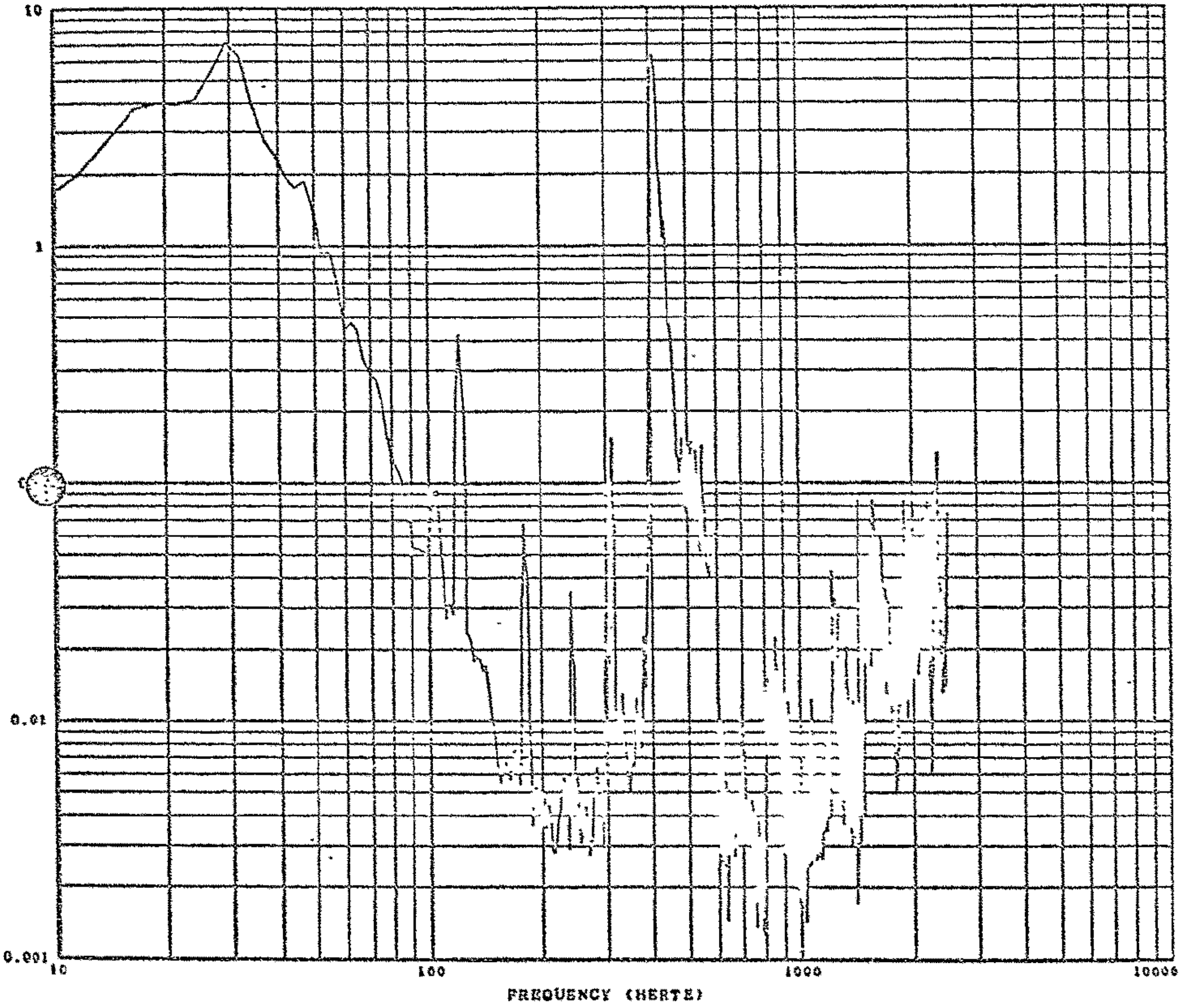
```
SENSOR -  CONTRL ELECTRON/PROTON SPECT. TEST CAL=100.       TIME SLICE (HR-MIN-SEC)  16  6 50.0000 TO  16  6 54.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION.       37.7699          DATE PROCESSED......     25FEB77
NORM. STD. ERROR....        .22124         VIBRATION TEST RUN 60X                     INPUT TAPE NUMBER...
FILTER BANDWIDTHS...      5.1077
FILTER START POINTS.       .0000
```



g rms = 37.77   PAGE 6.

Figure 95 'R' Axis Input, Max. q Simulation (400 - 600 Hz)

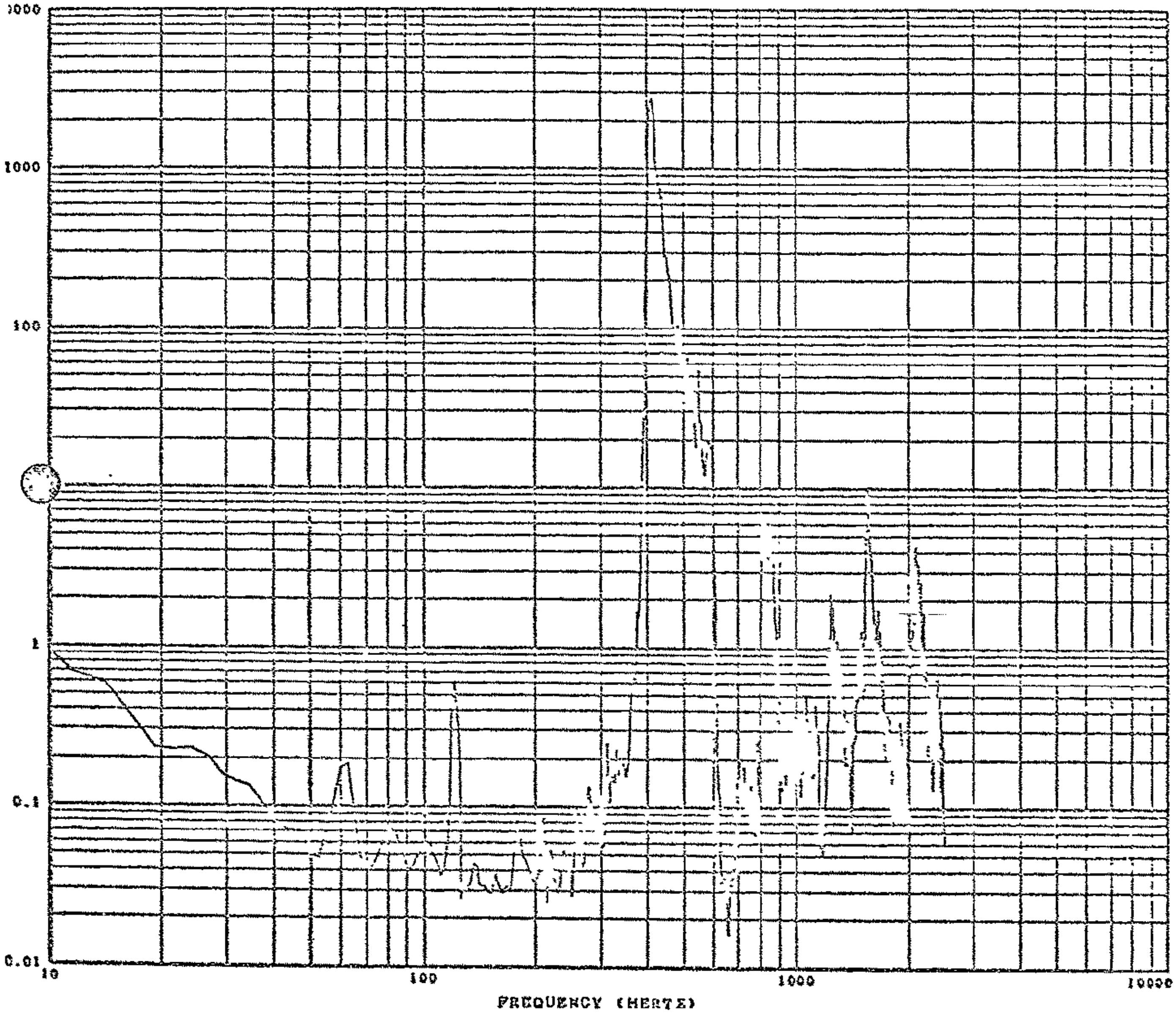
```
SENSOR -  EPS-IR ELECTRON/PROTON SPECT. TEST CAL=100.      TIME SLICE (HR-MIN-SEC)  16  8 50.0000 TO  16  8 54.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION.      2.0286          DATE PROCESSED......    25FEB77
NORM. STD. ERROR....       .22134          VIBRATION TEST RUN 60X                   INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1077
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN* X      .010000
```



g rms = 2.03

Figure 96 Electronics Package, 'R' Axis Response to Input of Figure 95

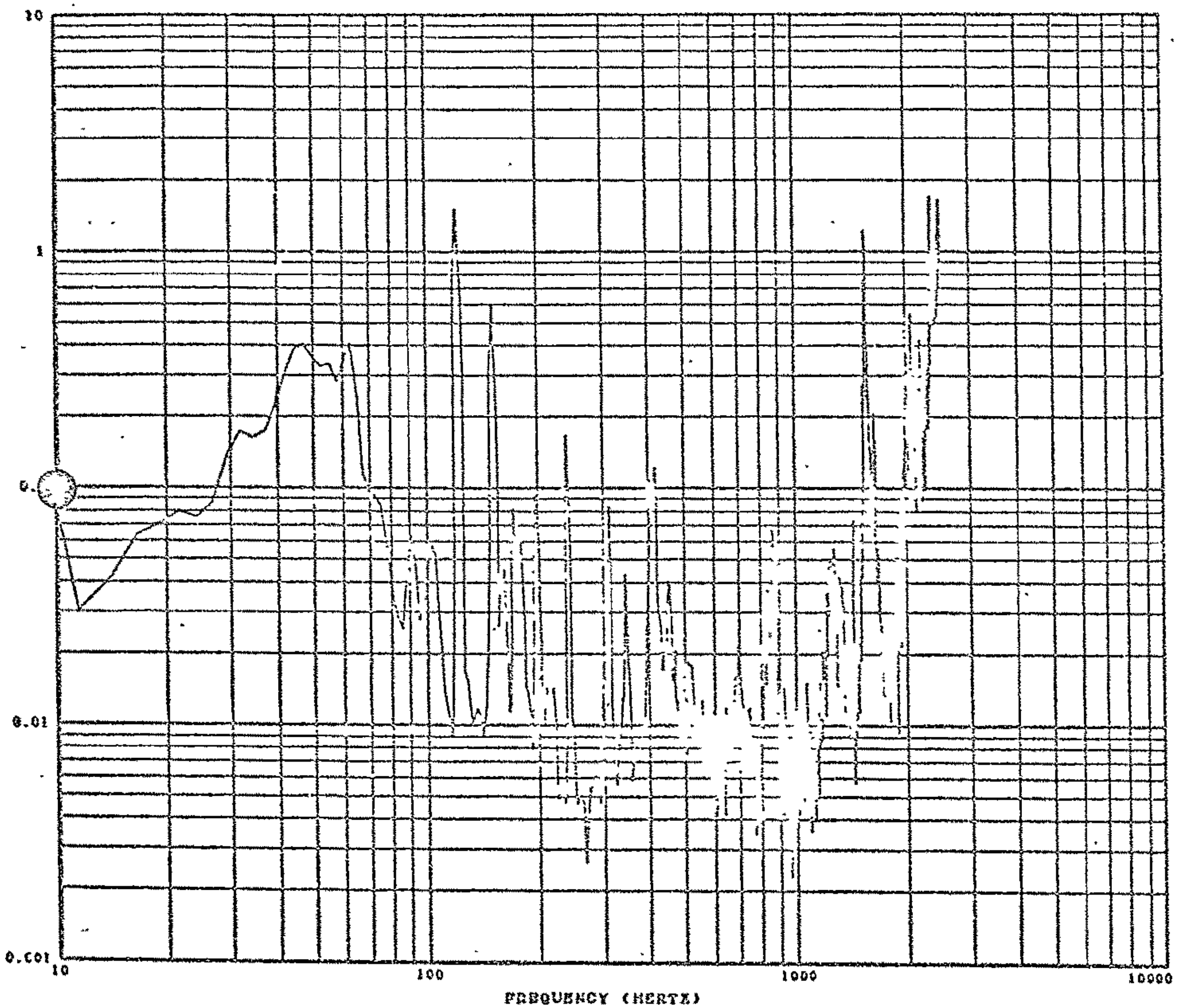
```
SENSOR =  EPS-4R ELECTRON/PROTON SPECT. TEST CAL=1000.      TIME SLICE (HR-MIN-SEC)  16  0 50.0000.TO  16  0 54.0000
LOW-PASS FILTER USED        3000.0          STANDARD DEVIATION..    273.5802            DATE PROCESSED......     25FEB77
NORM. STD. ERROR....        .22124          VIBRATION TEST RUN 60X                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS...       5.1077
FILTER START POINTS.        .0000
```



g rms = 273.58 PROB G.

Figure 97 Baseplate, 'R' Axis Response
to Input of Figure 95

```
SENSOR -  EPS-2R ELECTRON/PROTON SPECT. TEST CAL#31 6       TIME SLICE (HR-MIN-SEC)  16  6 50.0000 TO  16  6 54 0000
LOW-PASS FILTER USED       3000.0           STANDARD DEVIATION..       1.0637           DATE PROCESSED.. ...    25FEB71
NORM. STD. ERROR....        .22124          VIBRATION TEST RUN 60X                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1077
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X       .001000
```



g rms = 1.08

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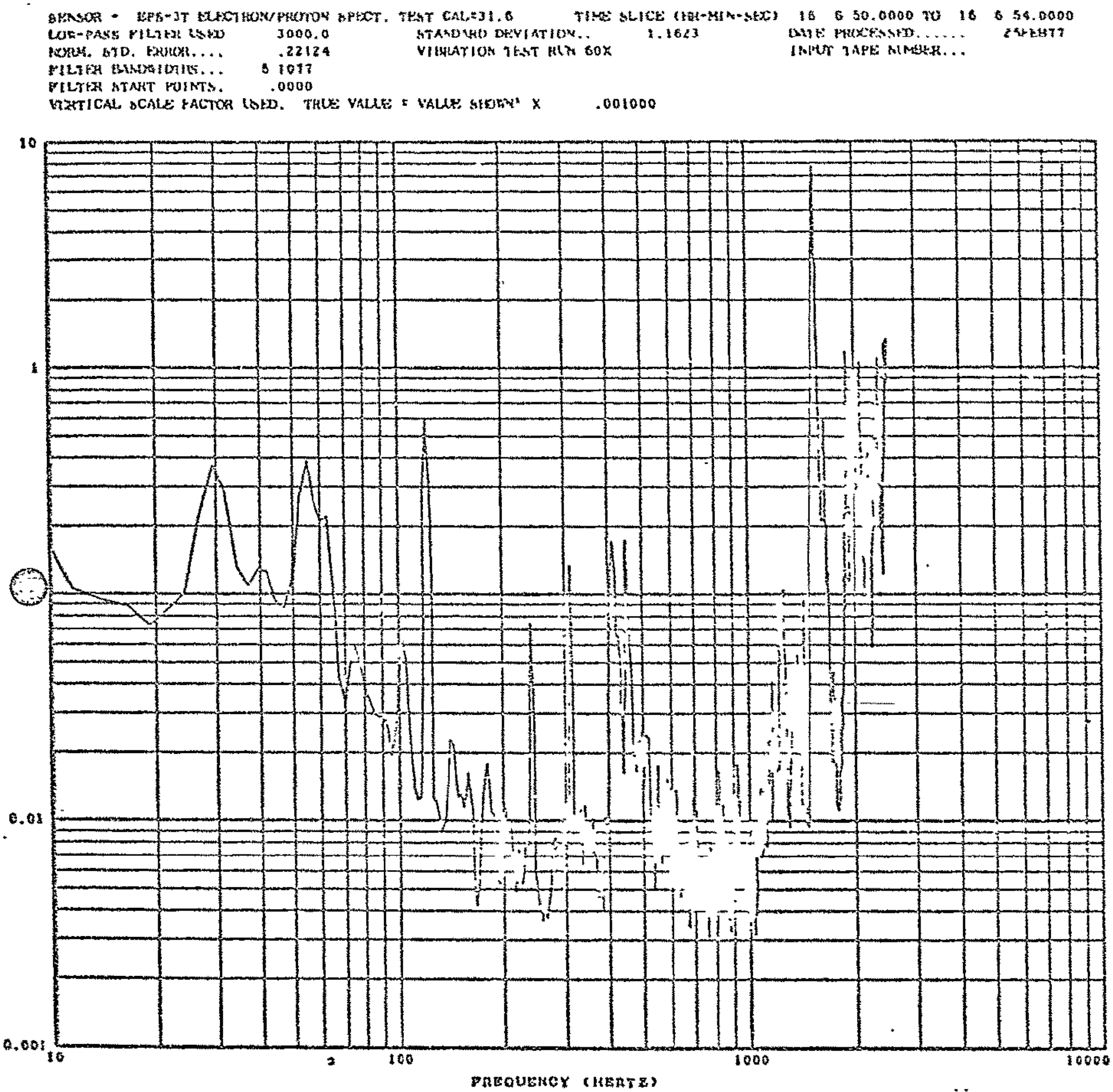
Figure 98 Electronics Package, 'X' Axis Response to Input of Figure 95



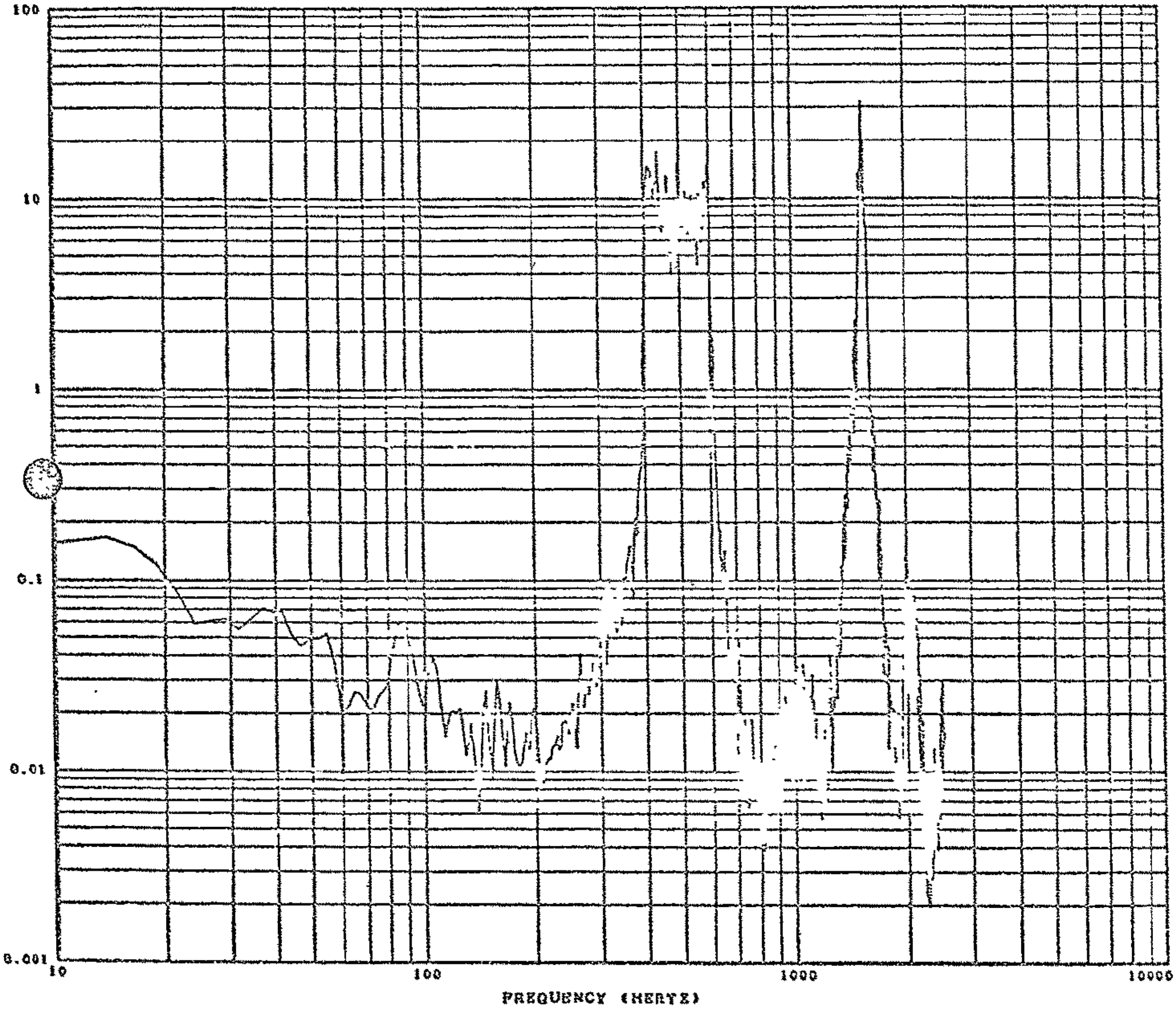
```
SENSOR =  EPS-3T ELECTRON/PROTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  16  6 50.0000 TO  16  6 54.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION..       1.1623           DATE PROCESSED......    25FEB77
NORM. STD. ERROR....       .22124          VIBRATION TEST RUN 60X                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5 1077
FILTER START POINTS.     .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN* X       .001000
```

g rms = 1.16

PAGE 6.

Figure 99 Electronics Package, 'T' Axis
Response to Input of Figure 95

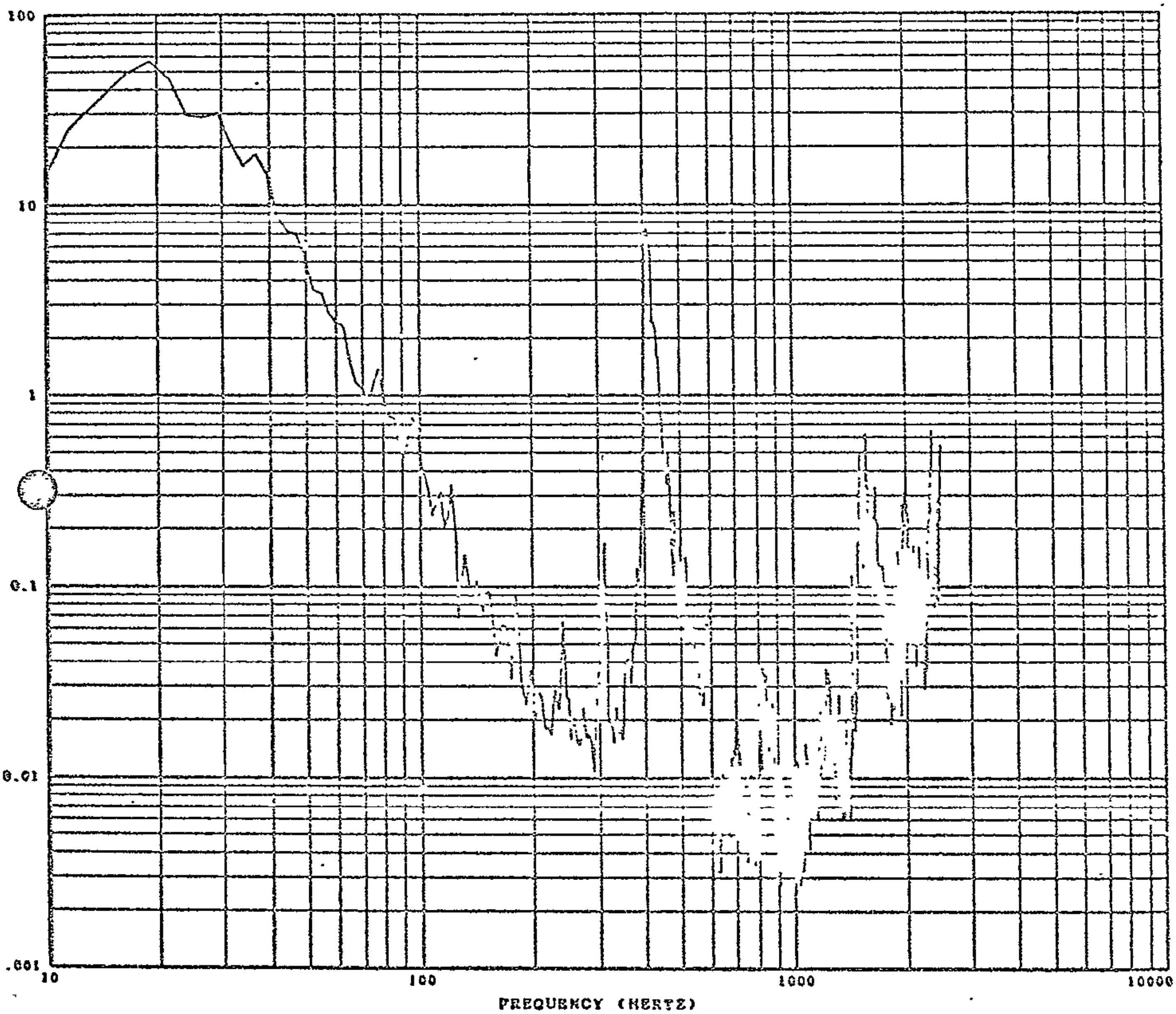
```
SENSOR =  CONTRL ELECTRON/PROTON SPECT. TEST CAL=100.       TIME SLICE (HR-MIN-SEC)  16 13 41.0000 TO  16 13 45.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION..     57.4523           DATE PROCESSED......     25FEB77
NORM. STD. ERROR ...       .22124          VIBRATION TEST RUN 60X                     INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1077
FILTER START POINTS.      .0000
```



g rms = 57.45　　PAGE 6.

Figure 100 'R' Axis Input, Transonic/MACH 1 Simulation (400 - 600 Hz)

```
SENSOR -  EPS-IR ELECTRON/PROTON SPECT. TEST CAL=100.        TIME SLICE (HR-MIN-SEC)  16 13 41 0000 TO  16 13 45.0000
LOW-PASS FILTER USED        3000.0            STANDARD DEVIATION..       4.1273          DATE PROCESSED. ....     25FEB77
NORM. STD. ERROR....        .22124            VIBRATION TEST RUN 60X                     INPUT TAPE NUMBER...
FILTER BANDWIDTHS...      5.1077
FILTER START POINTS.       .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X       .010000
```

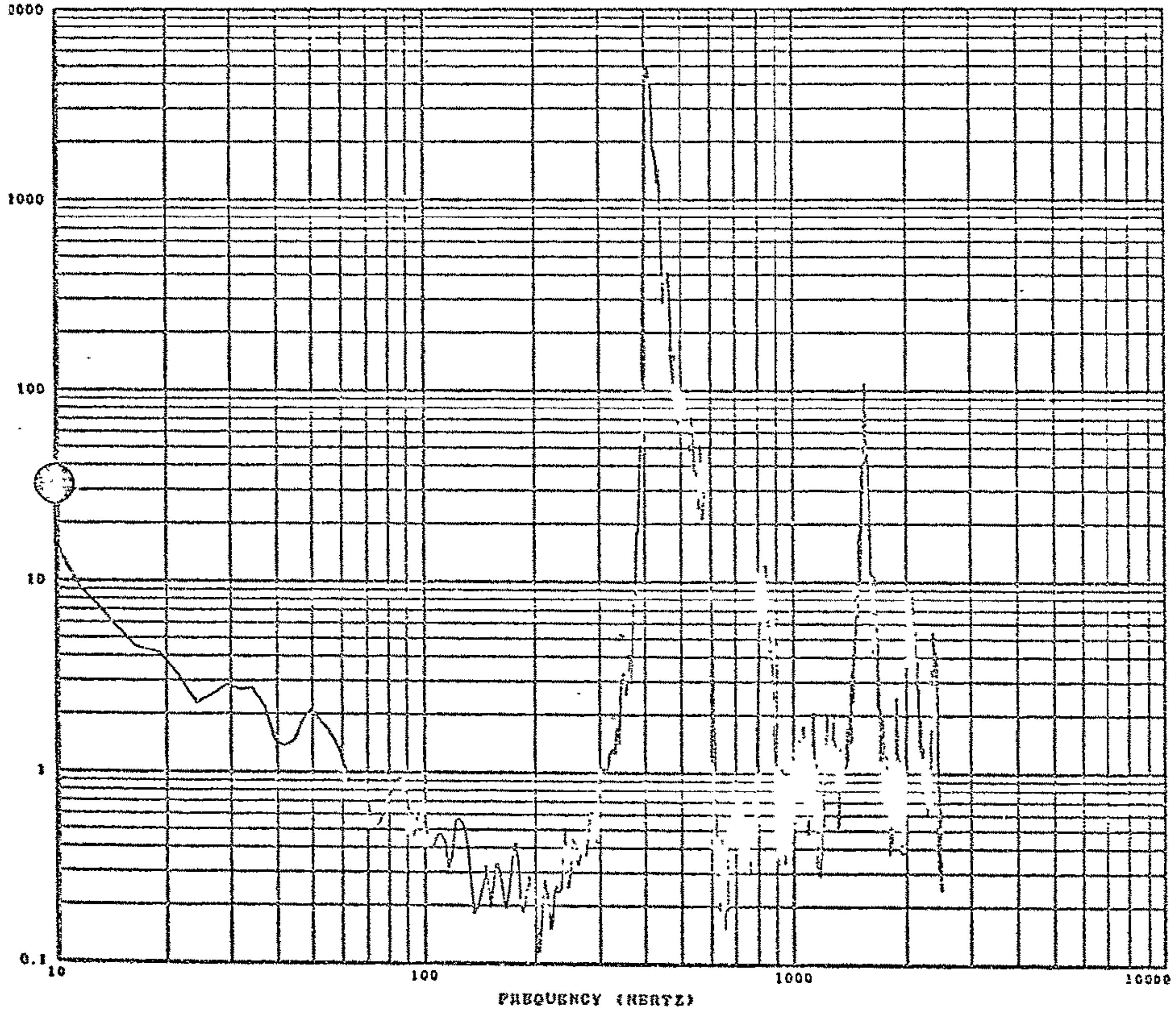


g rms = 4.13

PAGE 1.

Figure 101 Electronics Package, 'R' Axis Response to Input of Figure 100

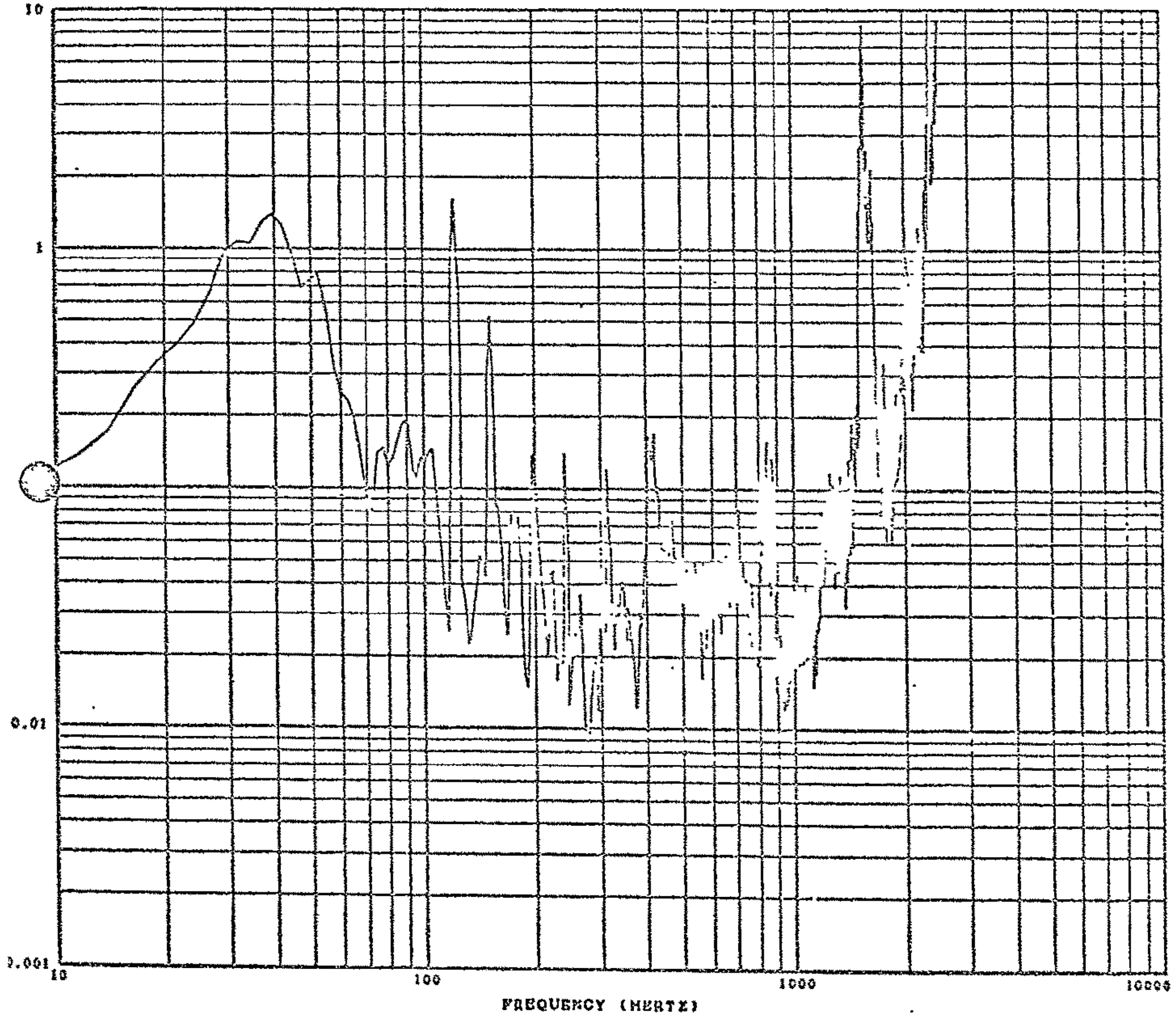
```
SENSOR -  EPS-4R ELECTRON/PROTON SPECT. TEST CAL=1000.      TIME SLICE (HR-MIN-SEC)  16 13 41.0000 TO  16 13 45.0000
LOW-PASS FILTER USED      3000.0          STANDARD DEVIATION..    377.5562          .DATE PROCESSED......    25FEB77
NORM. STD. ERROR....       .22124         VIBRATION TEST RUN 60X                     INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1077
FILTER START POINTS.      .0000
```



g rms = 377.56   PAGE 1.

Figure 102 Baseplate, 'R' Axis Response to Input of Figure 100

```
SENSOR =  EPS-2R ELECTRON/PROTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  16 13 41.0000 TO  16 13 45 0000
LOW-PASS FILTER USED       3000.0         STANDARD DEVIATION..       2.4224        DATE PROCESSED......     25FEB77
NORM. STD. ERROR....       .22124        VIBRATION TEST RUN 60X                    INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1077
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X       .001000
```

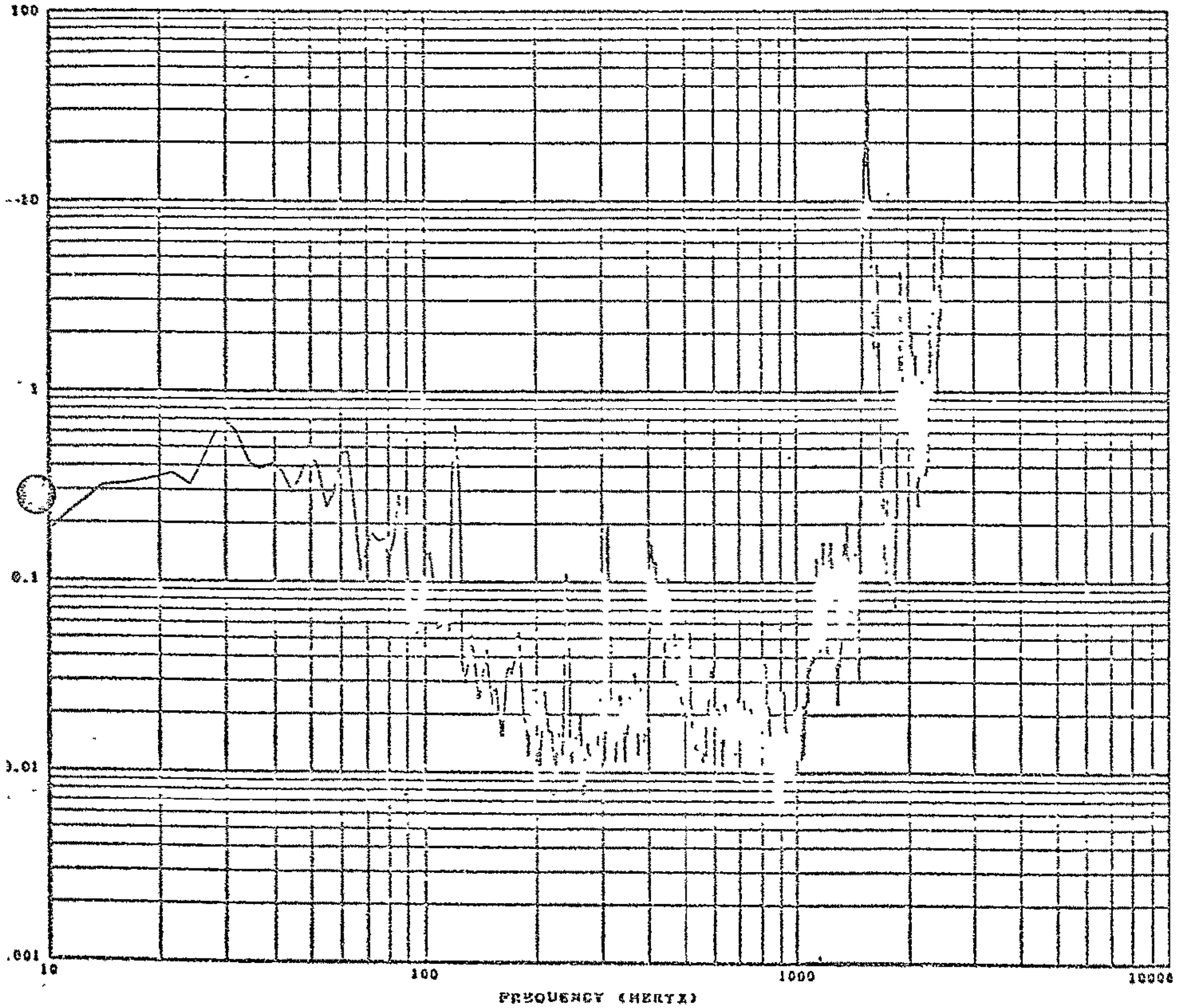


g rms = 2.42

PAGE 3.

Figure 103 Electronics Package, 'X' Axis Response to Input of Figure 100

```
SENSOR -  EPS-3T ELECTRON/PROTON SPECT. TEST CAL=31.5        TIME SLICE (HR-MIN-SEC)  16 13 41.0000 TO  16 13 45.0000
LOW-PASS FILTER USED        3000.0          STANDARD DEVIATION..      2.7646            DATE PROCESSED......     25FEB77
NORM. STD. ERROR....        .22124          VIBRATION TEST RUN 60X                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1077
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X      .001000
```

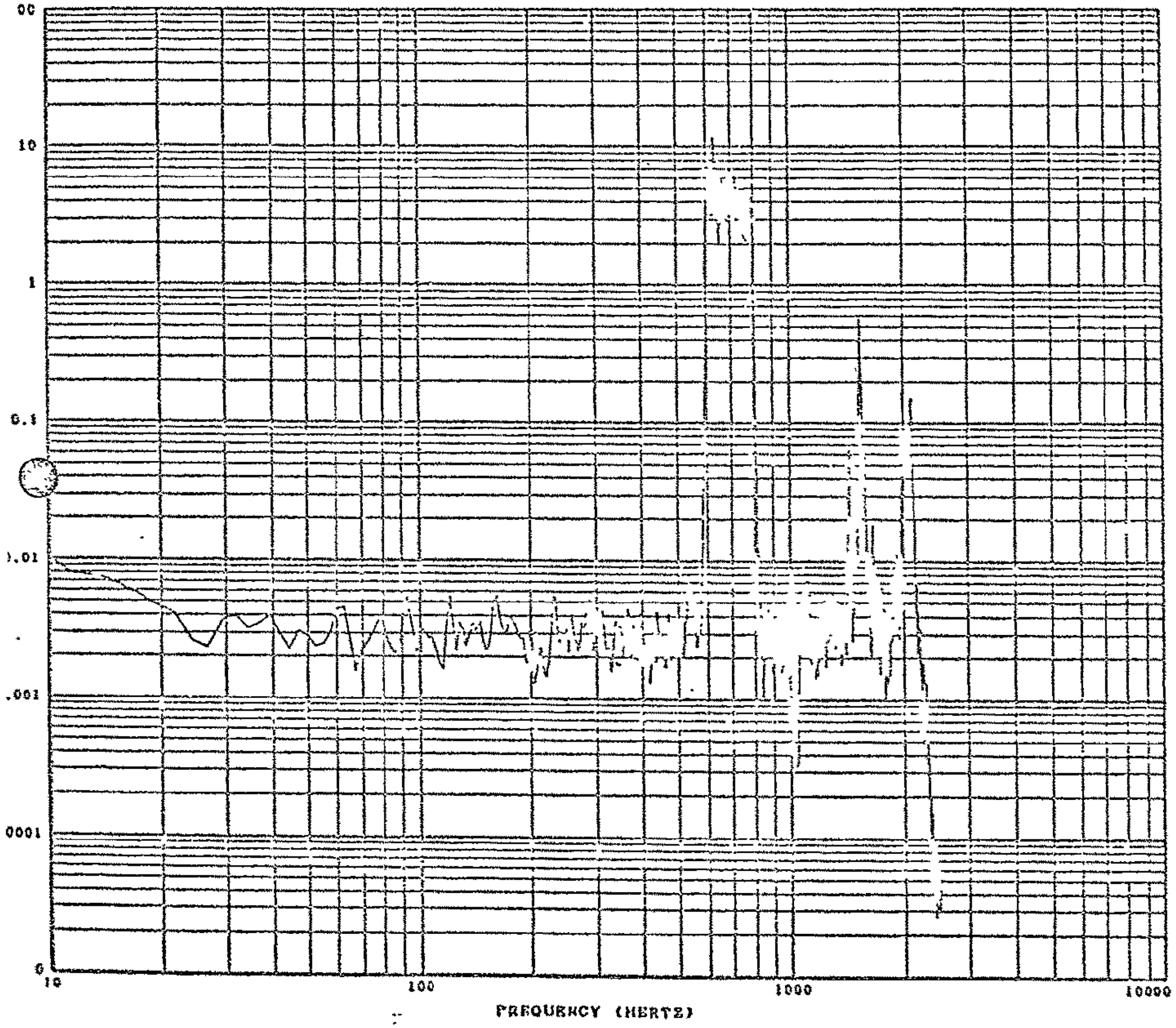


g rms = 2.76

PAGE 5.

Figure 104 Electronics Package, 'T' Axis Response to Input of Figure 100

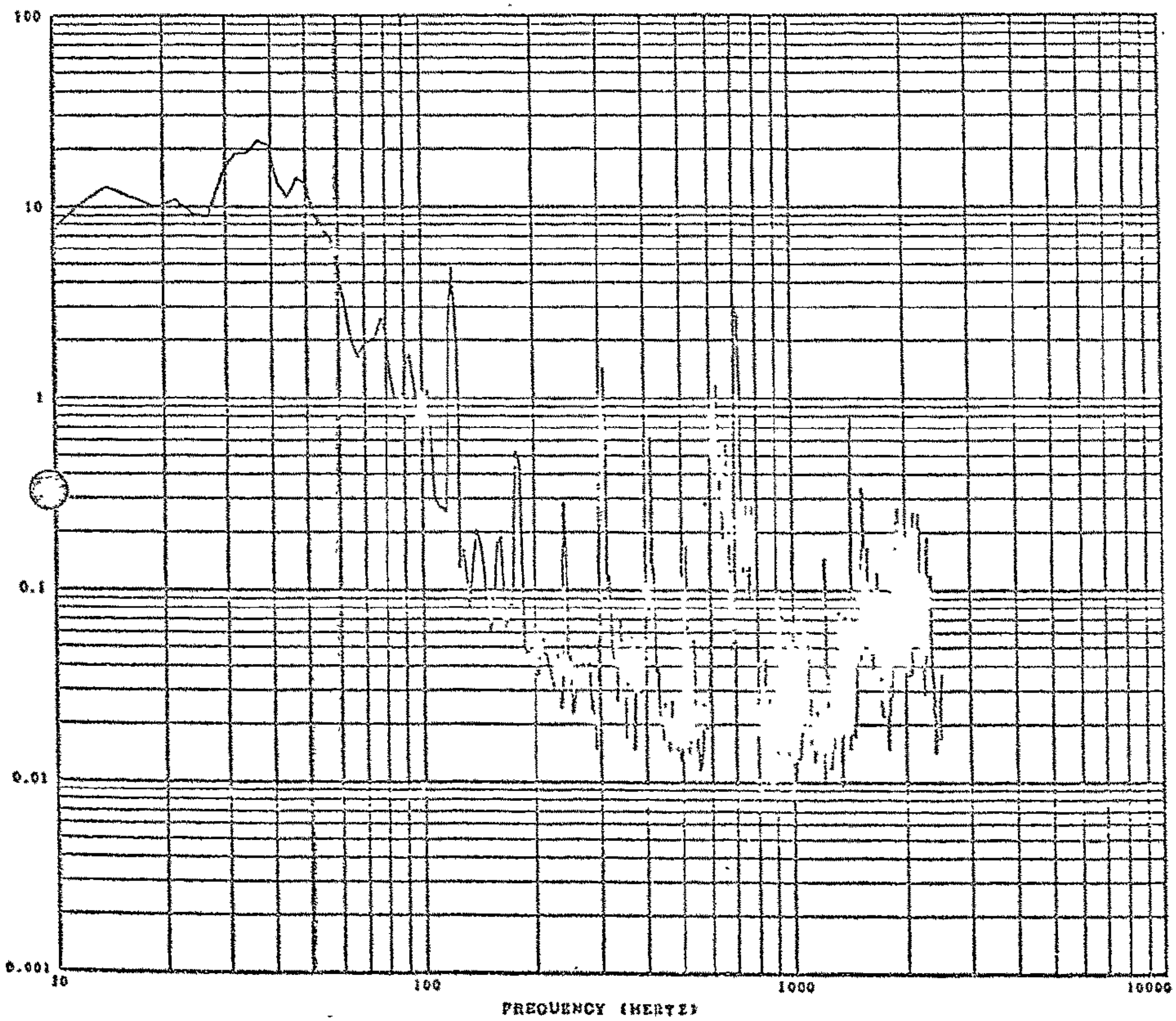
```
SENSOR -  CONTRL ELECTRON/PROTON SPECT. TEST CAL=100.       TIME SLICE (HR-MIN-SEC)  16 32 10 0000 TO  16 32 14.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION..    30.0951          DATE PROCESSED......    25FEB77
NORM. STD. ERROR....       .22120          VIBRATION TEST RUN 60X                   INPUT TAPE NUMBER...
FILTER BANDWIDTHS...      5.1052
FILTER START POINTS.       .0000
```



g rms = 30.

Figure 105 'R' Axis Input, Max. q simulation (600 - 800 Hz)

```
SENSOR -  EPS-IR ELECTRON/PROTON SPECT. TEST CAL=100        TIME SLICE (HR-MIN-SEC)  16 32 10.0000 TO  16 32 14.0000
LOW-PASS FILTER USED      3000.0          STANDARD DEVIATION..      1.0408          DATE PROCESSED .....    25FEB77
NORM. STD. ERROR....       .22129         VIBRATION TEST RUN 60X                    INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1052
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN* X      .001000
```

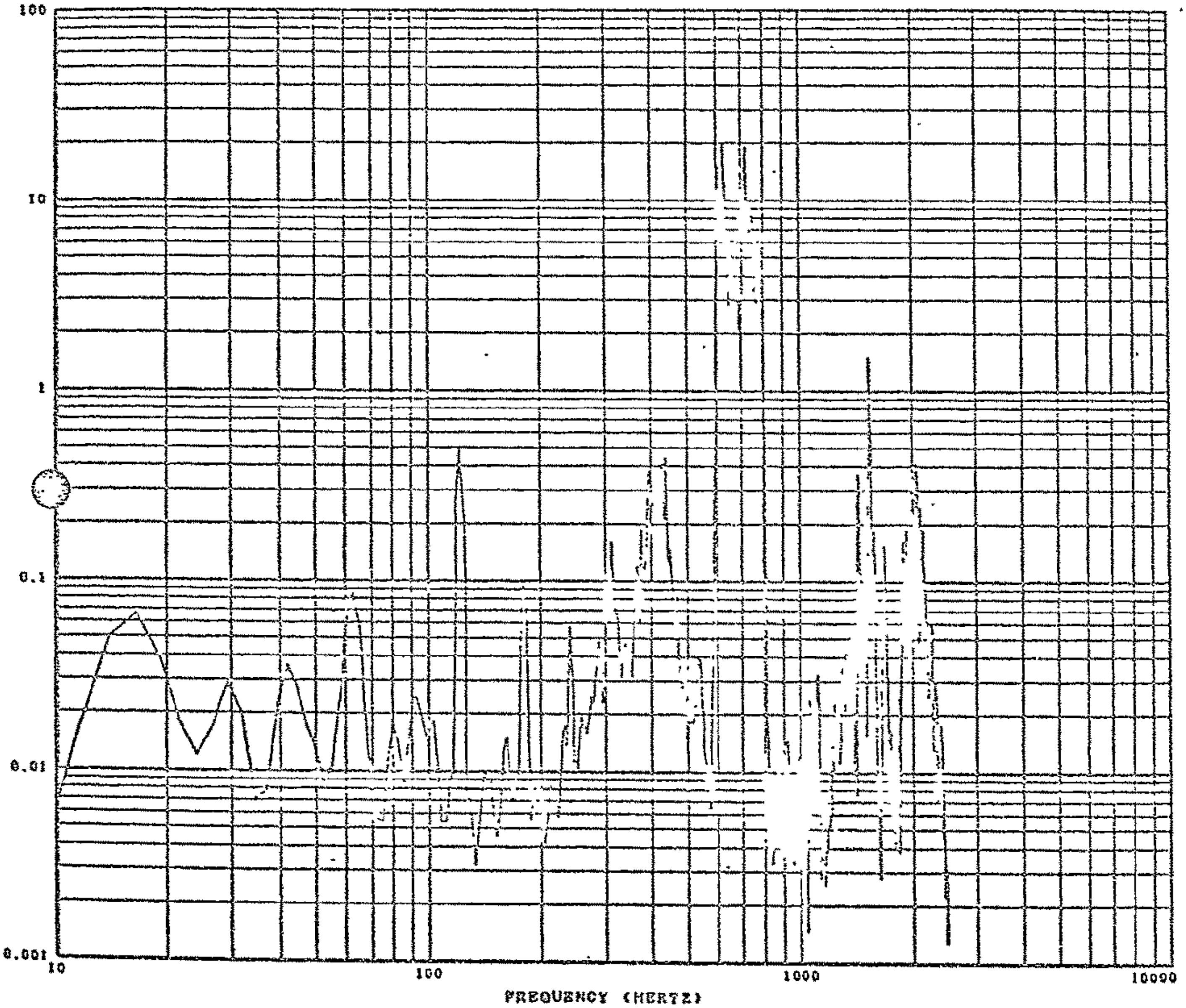


g rms = 1.04

PAGE 0.

Figure 106 Electronics Package, 'R' Axis Response to Input of Figure 105

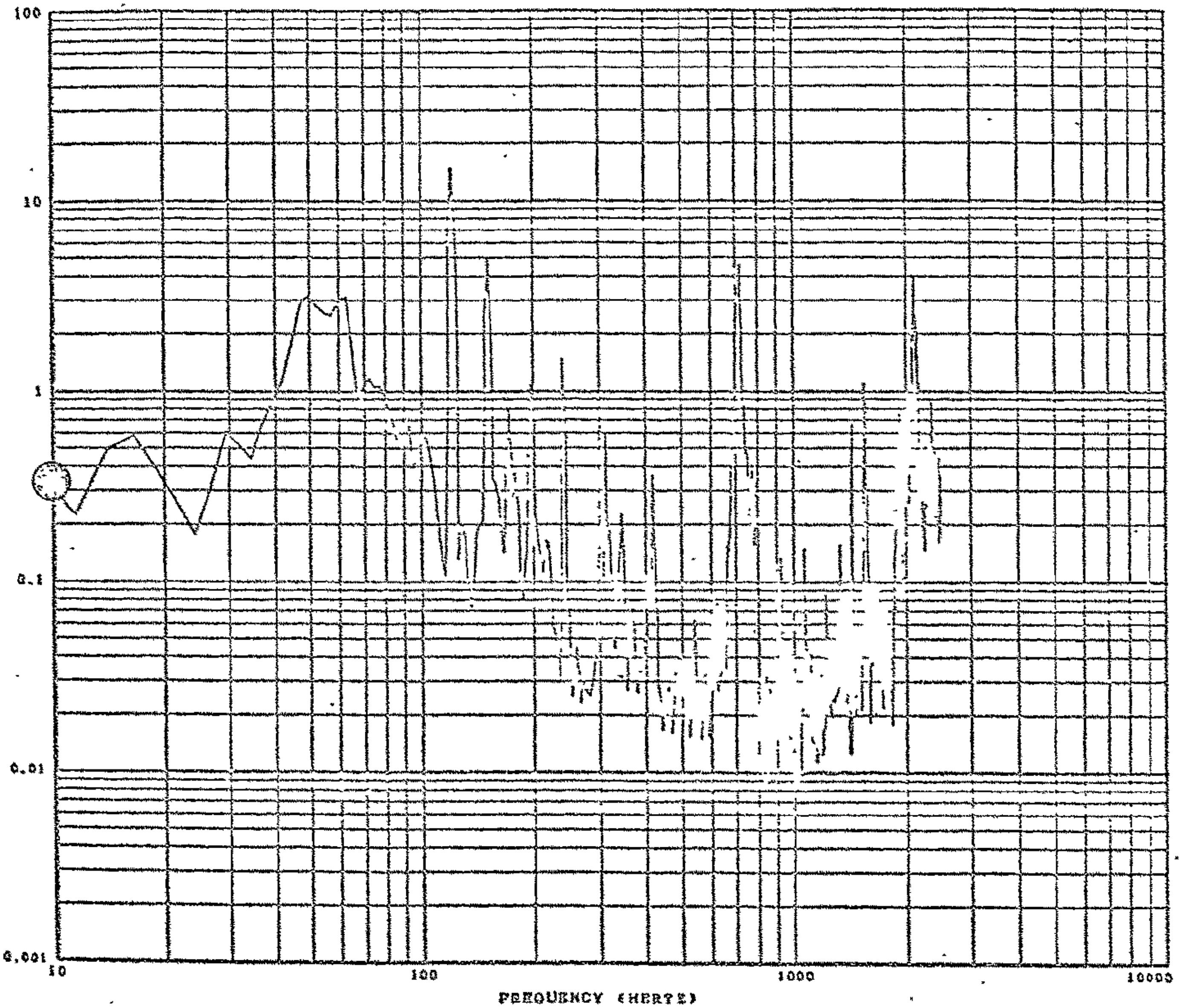
```
SENSOR -  EPS-4R ELECTRON/PROTON SPECT. TEST CAL=1000.      TIME SLICE (HR-MIN-SEC)  16 32 10.0000 TO  16 32 14.0000
LOW-PASS FILTER USED       3000.0        STANDARD DEVIATION..     39.4558         .DATE PROCESSED......    25FEB77
NORM. STD. ERROR....        .22129       VIBRATION TEST RUN 60X                    INPUT TAPE NUMBER...
FILTER BANDWIDTHS...       5.1052
FILTER START POINTS.        .0000
```



g rms = 39.46 PAGE 6.

Figure 107 Baseplate, 'R' Axis Response to Input of Figure 105

```
SENSOR -  EPS-2R ELECTRON/PROTON SPECT, TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  16 32 10.0000 TO  16 32 14 0000
LOW-PASS FILTER USED      3000.0          STANDARD DEVIATION..        .3787       .. DATE PROCESSED......     25FEB77
NORM. STD. ERROR ...       .22129         VIBRATION TEST RUN 60X                     INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     6.1052
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN' X       .000100
```

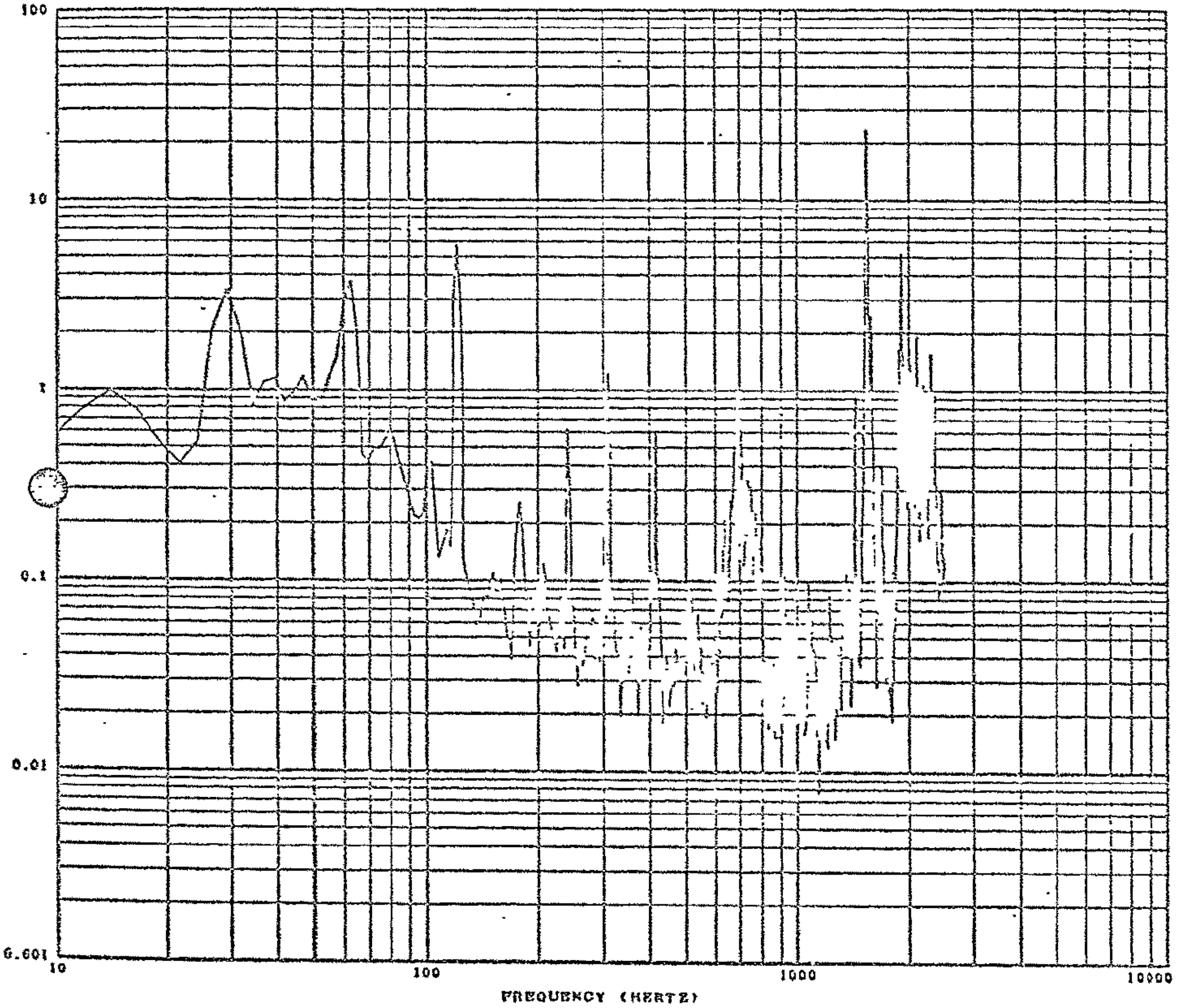


g rms = .38

PAGE 2.

Figure 108 Electronics Package, 'X' Axis Response to Input of Figure 105

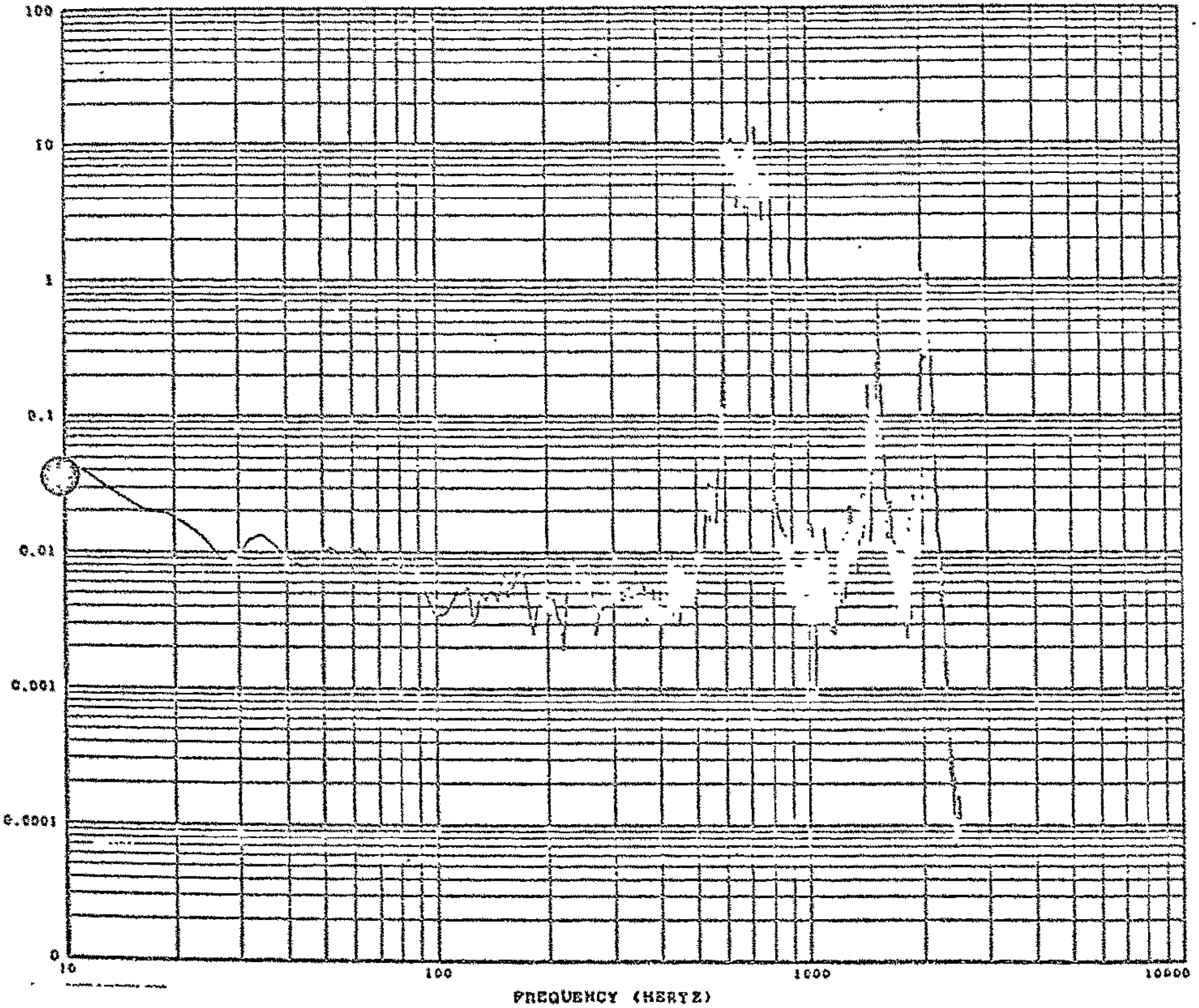
```
SENSOR -  EPS-3T ELECTRON/PROTON SPECT. TEST CAL=31.0        TIME SLICE (HR-MIN-SEC)  18 32 10.0000 TO  18 32 14.0000
LOW-PASS FILTER USED       3000.0           STANDARD DEVIATION..        .4228          DATE PROCESSED......     25FEB77
NORM. STD. ERROR....        .22129          VIBRATION TEST RUN 60X                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS...      5.1052
FILTER START POINTS.       .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN' X       .000100
```



g rms = .42   PAGE 6.

Figure 109 Electronics Package, 'T' Axis Response to Input of Figure 105

```
SENSOR =  CONTRL ELECTRON/PROTON SPECT. TEST CAL=100.       TIME SLICE (HR-MIN-SEC)  16 32 52.0000 TO  16 32 56.0000
LOW-PASS FILTER USED       3000.0           STANDARD DEVIATION..      38 3723          DATE PROCESSED......     25FEB77
NORM. STD  ERROR....       .22124           VIBRATION TEST RUN 60X                     INPUT TAPE NUMBER...
FILTER BANDWIDTHS...      5.1077
FILTER START POINTS.       .0000
```



g rms = 38.37

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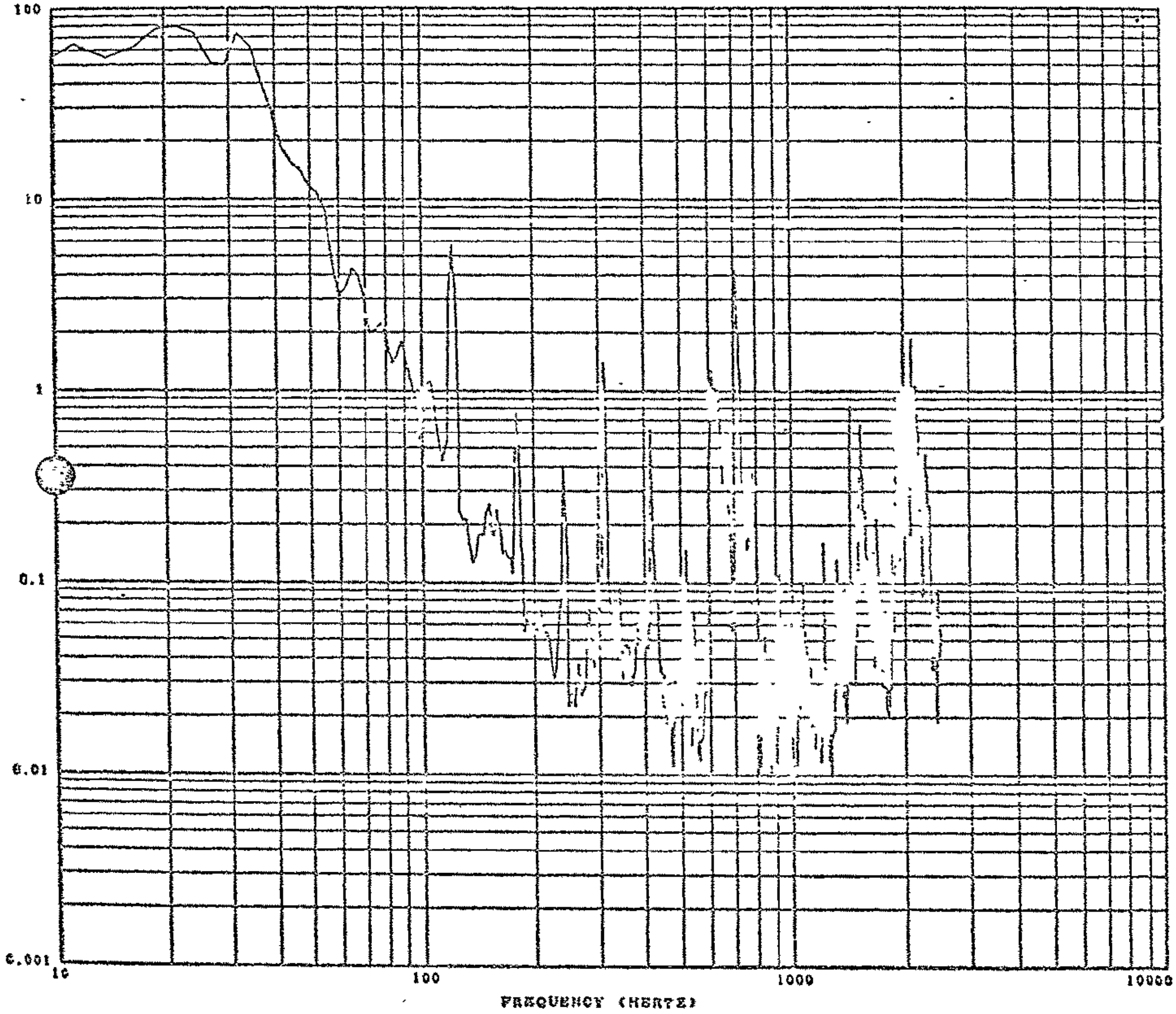
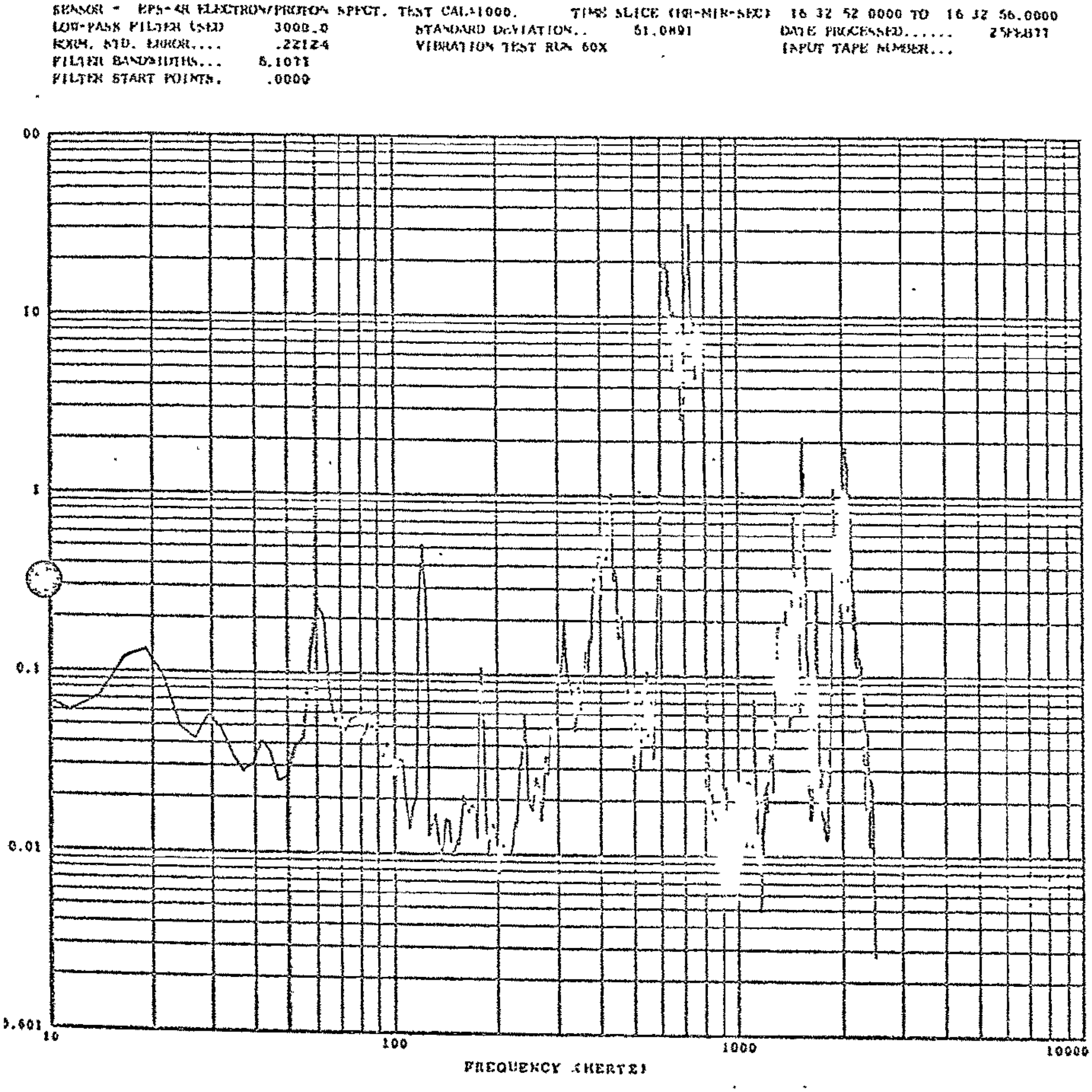
Figure 110 'F' Axis Input, Transonic/MACH 1 Simulation (600 - 800 Hz)

```
SENSOR -  EPS-IR ELECTRON/PROTON SPECT. TEST CAL=100.       TIME SLICE (HR-MIN-SEC)  16 32 52 0000 TO  16 32 56.0000
LOW-PASS FILTER USED      3000.0          STANDARD DEVIATION..      1.7750          DATE PROCESSED .....    25FEB77
NORM. STD. ERROR....      .22124          VIBRATION TEST RUN 60X                    INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1077
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X      .001000
```



g rms = 1.78

Figure 111 Electronics Package, 'R' Axis Response to Input of Figure 110

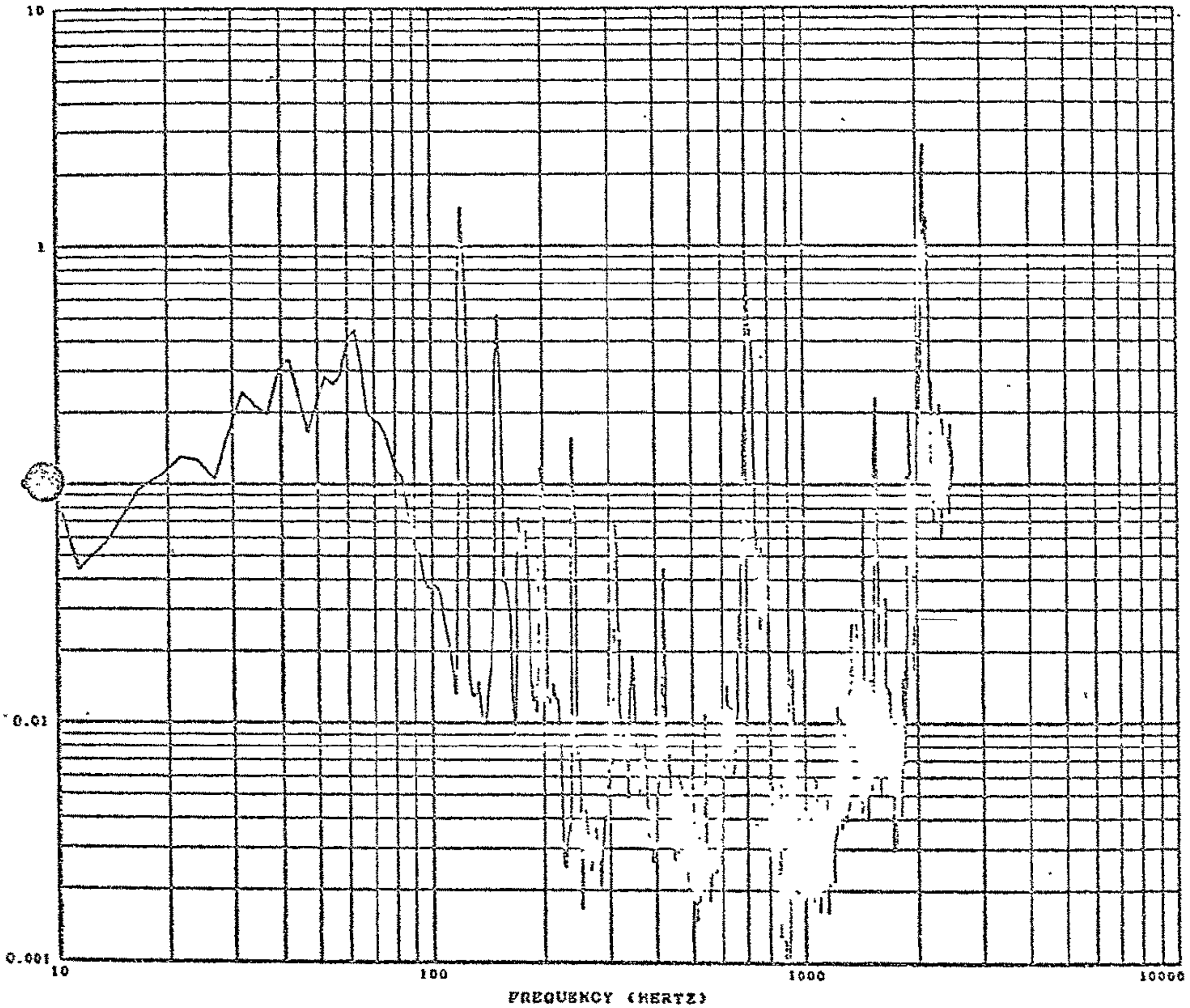


SENSOR = EPS-4R ELECTRON/PROTON SPECT. TEST CAL=1000.
TIME SLICE (HR-MIN-SEC) 16 32 52 0000 TO 16 32 56.0000
LOW-PASS FILTER (SEC) 3000.0
STANDARD DEVIATION.. 51.0891
DATE PROCESSED...... 25FEB77
NORM. STD. ERROR.... .22124
VIBRATION TEST RUN 60X
INPUT TAPE NUMBER...
FILTER BANDWIDTHS... 8.1011
FILTER START POINTS. .0000

g rms = 51.09

Figure 112 Baseplate, 'R' Axis Response to Input of Figure 110

```
SENSOR -  EPS-2R ELECTRON/PHOTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  16 32 52.0000 TO  16 32 56.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION..        .7001          DATE PROCESSED......     25FEB77
NORM. STD. ERROR....       .22124          VIBRATION TEST RUN 60X                     INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1071
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN' X      .001000
```



g rms = .70

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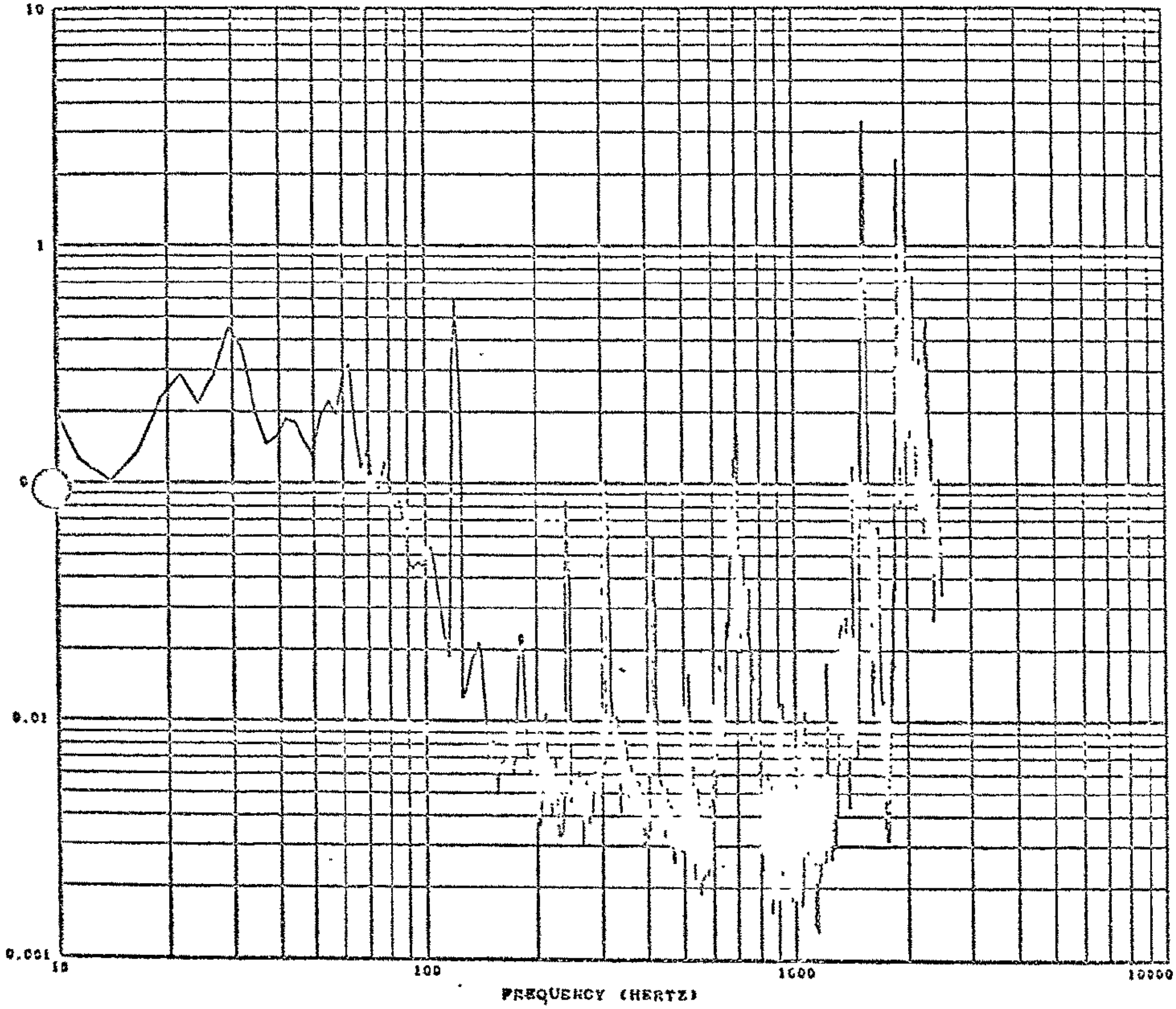
Figure 113 Electronics Package, 'X' Axis Response to Input of Figure 110

```
SENSOR =  EPS-3T ELECTRON/PROTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  16 32 52.0000 TO  16 32 56.0000
LOW-PASS FILTER USED       3000 0          STANDARD DEVIATION..        .7378          DATE PROCESSED......    25FEB77
NORM. STD. ERROR....       22124           VIBRATION TEST RUN 60X                     INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1077
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X       .001000
```



g rms = .74

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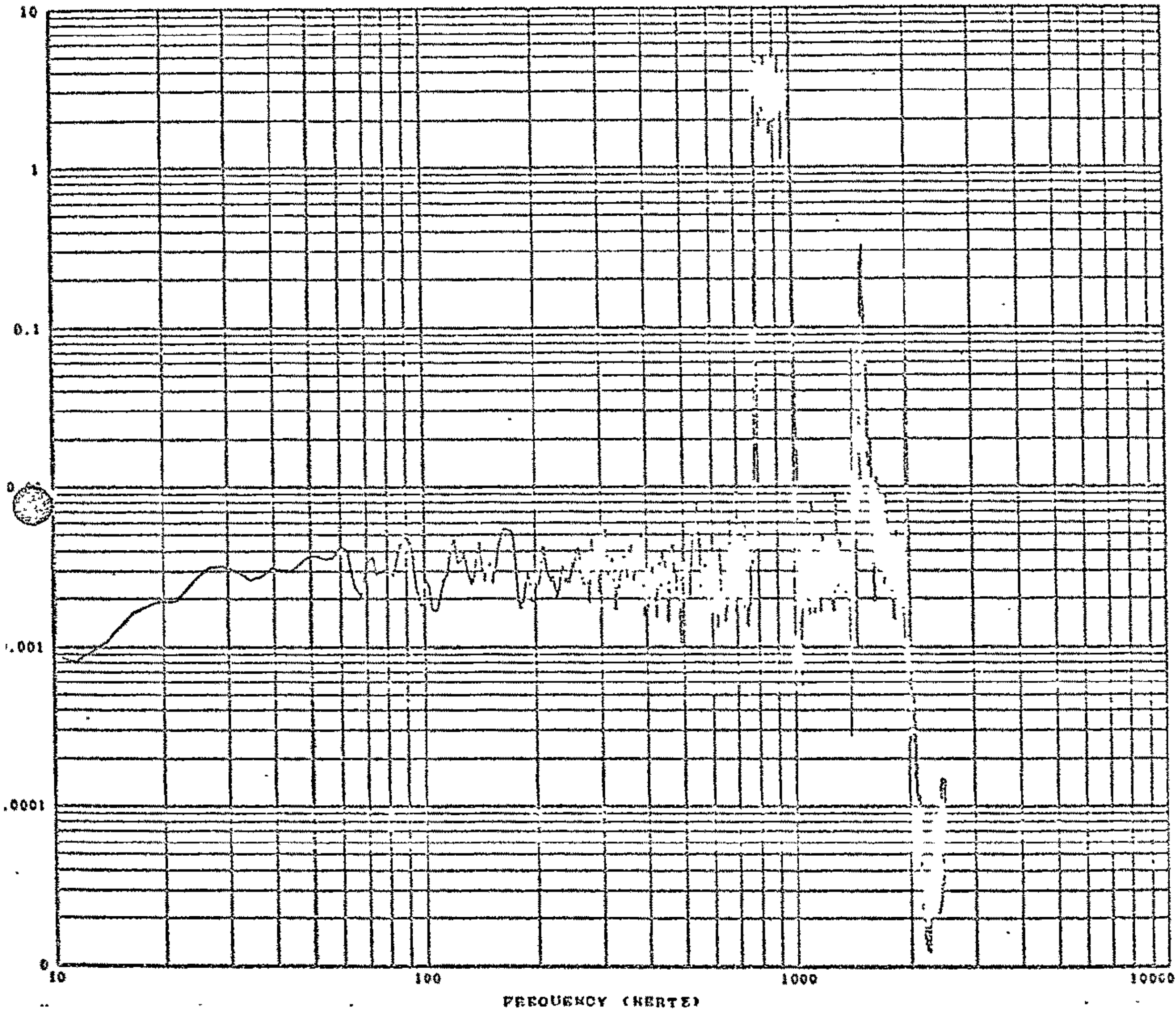
Figure 114 Electronics Package, 'T' Axis Response to Input of Figure 110

```
SENSOR -  CONTRL ELECTRON/PROTON SPECT. TEST CAL=100.        TIME SLICE [illegible]
LOW-PASS FILTER USED       3000.0        STANDARD DEVIATION       25.1061          DATE PROCESSED. ....    25FEB77
NORM. STD. ERROR....        .22113       VIBRATION TEST RUN 60X                     INPUT TAPE NUMBER...
FILTER BANDWIDTHS...       5.1129
FILTER START POINTS.        .0000
```



g rms = 25.11

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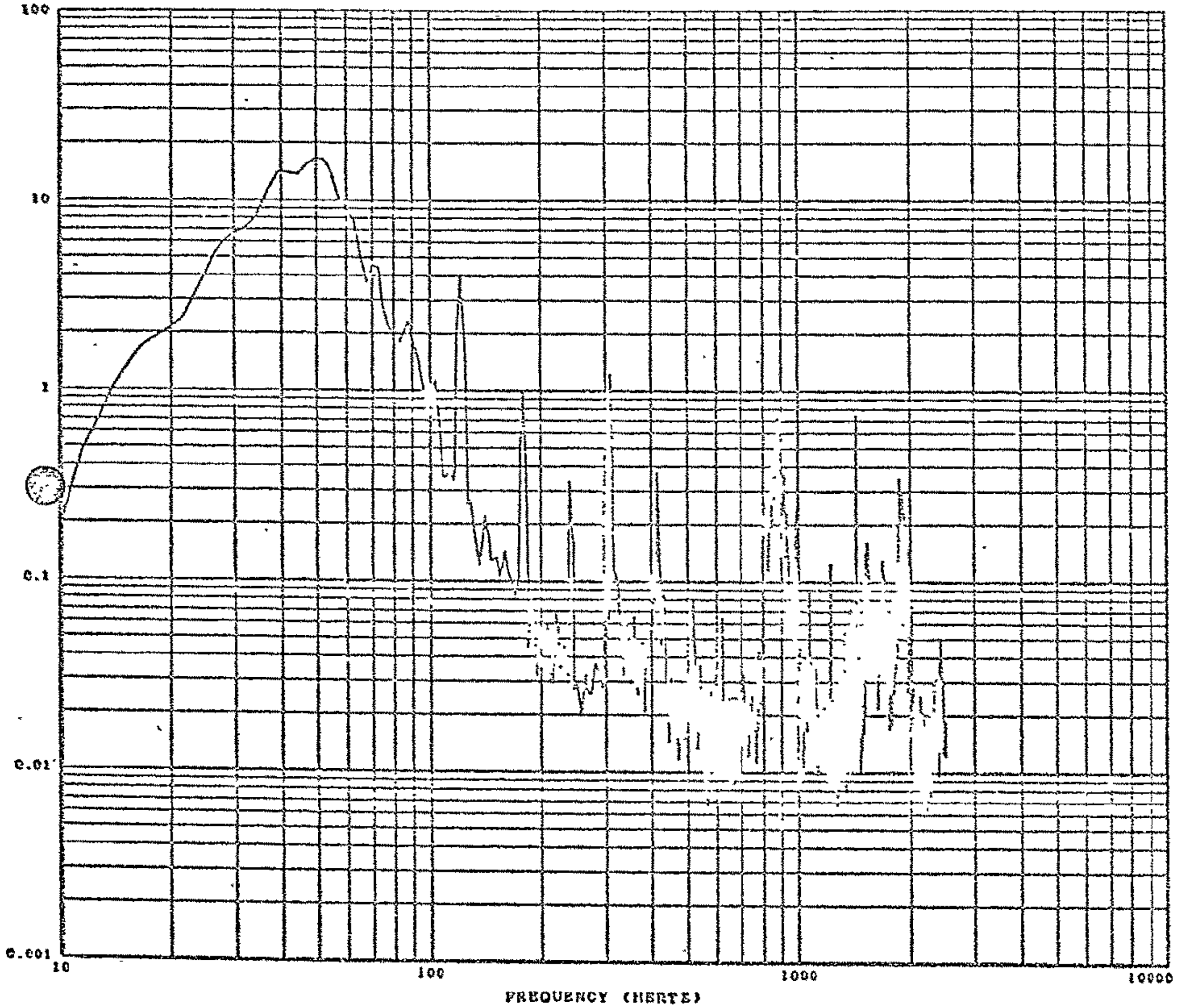
Figure 115 'R' Axis Input, Max. q Simulation (800 - 1000 Hz)

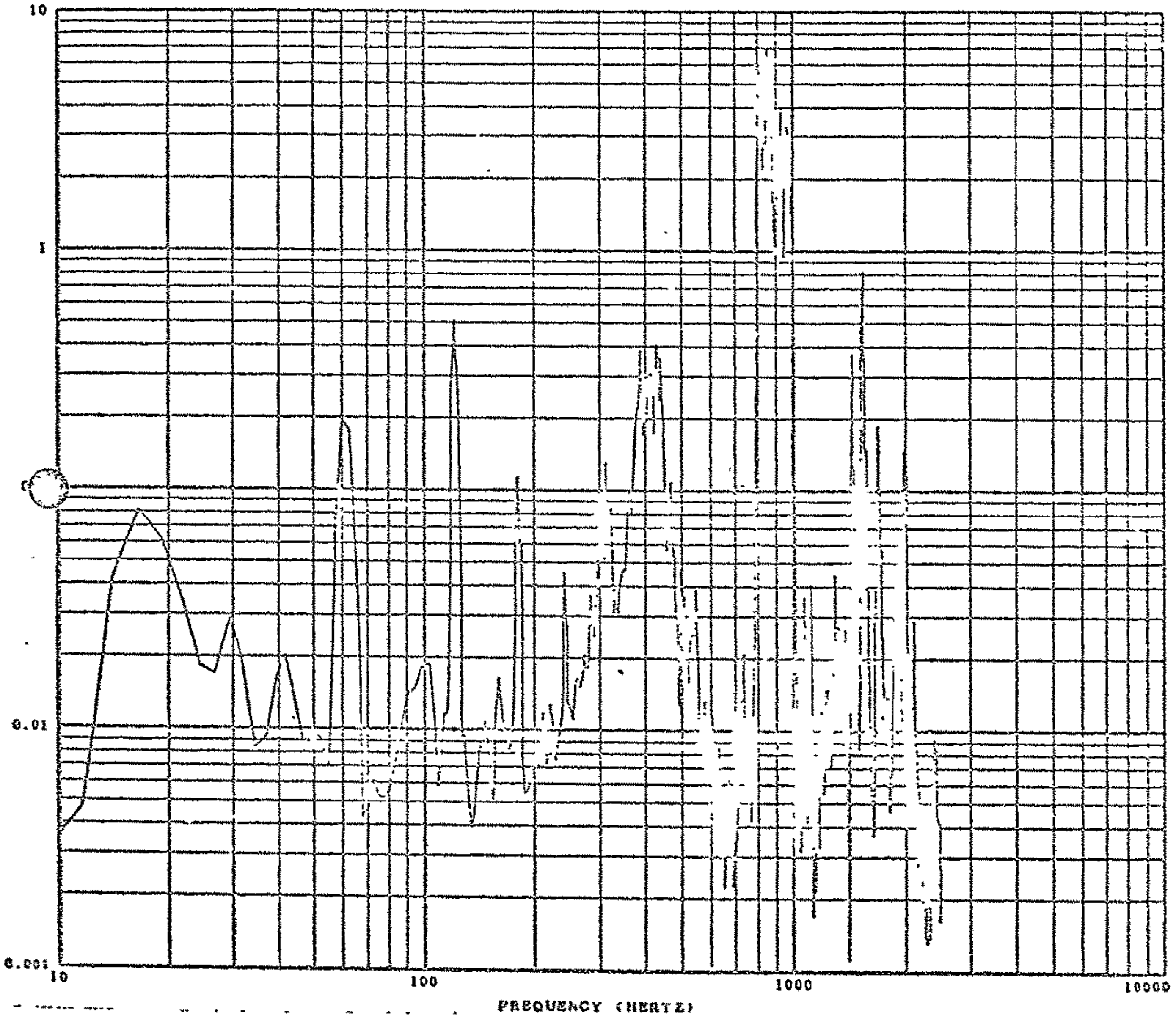
```
SENSOR =  EPS-IR ELECTRON/PROTON SPECT. TEST CAL=100        TIME SLICE (HR-MIN-SEC)  16 54 19.0000 TO  16 54 23.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION..        .8874            DATE PROCESSED .. ..    25FEB77
NORM. STD. ERROR....       .22113          VIBRATION TEST RUN 60X                       INPUT TAPE NUMBER ..
FILTER BANDWIDTHS. .      5.1120
FILTER START POINTS.       .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN' X      .001000
```



g rms = .89

Figure 116 Electronics Package, 'R' Axis
Response to Input of Figure 115

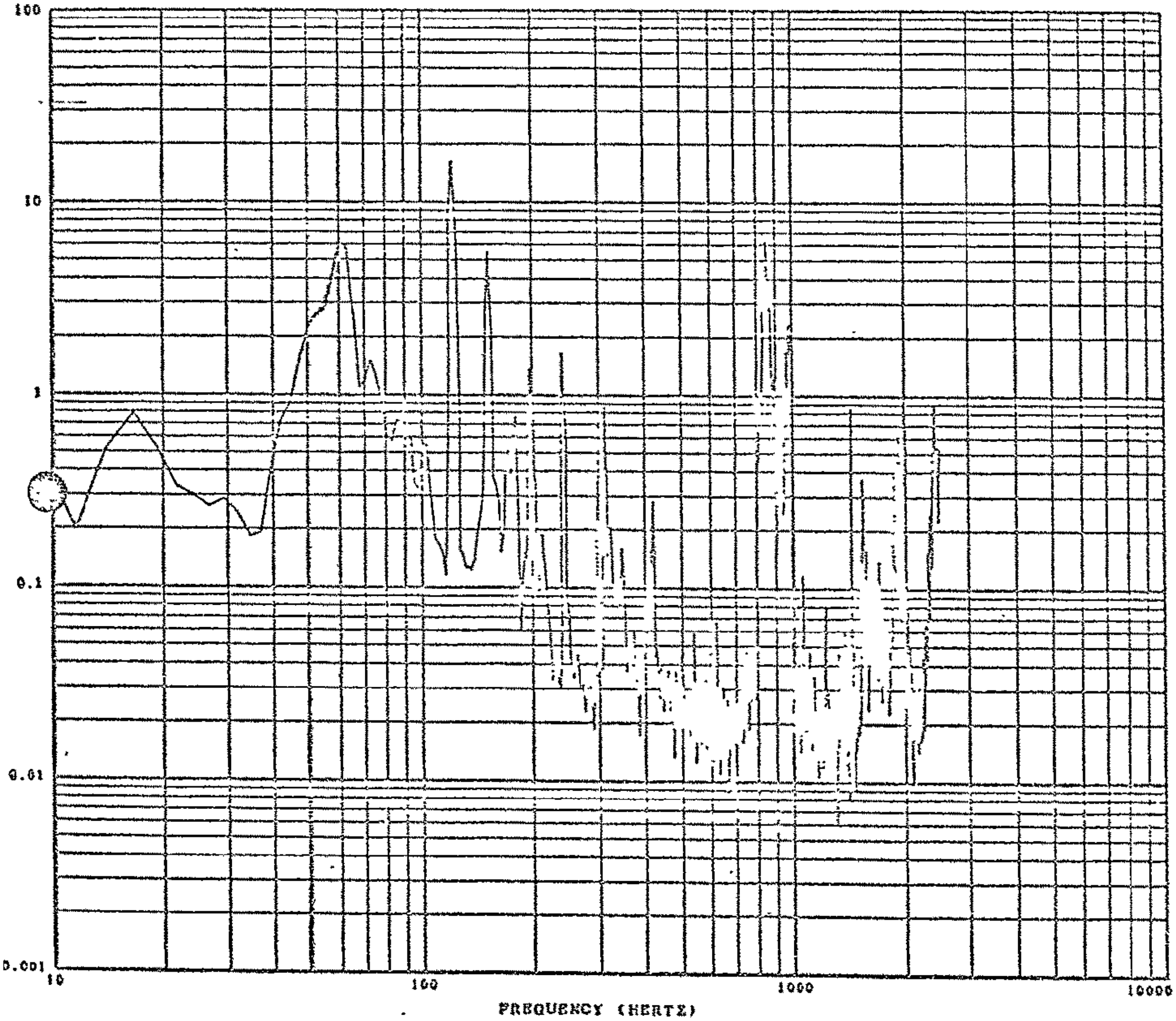
```
SENSOR =  EPS-4R ELECTRON/PROTON SPECT. TEST CAL=1000.      TIME SLICE (HR-MIN-SEC)  16 54 19.0000 TO  16 54 23.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION..      26.5542           DATE PROCESSED......    25FEB77
NORM. STD. ERROR....       .22113          VIBRATION TEST RUN BOX                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1129
FILTER START POINTS.       .0000
```



g rms = 26.55

Figure 117 Baseplate, 'R' Axis Response to Input of Figure 115

```
SENSOR -  EPS-2R ELECTRON/PROTON SPECT. TEST CAL#31 6       TIME SLICE (HR-MIN-SEC)  16 54 19.0000 TO  16 54 23.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION..        .3470          DATE PROCESSED......    25FEB77
NORM. STD. ERROR....       .22113          VIBRATION TEST RUN 60X                     INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1129
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X       .000100
```



g rms = .35

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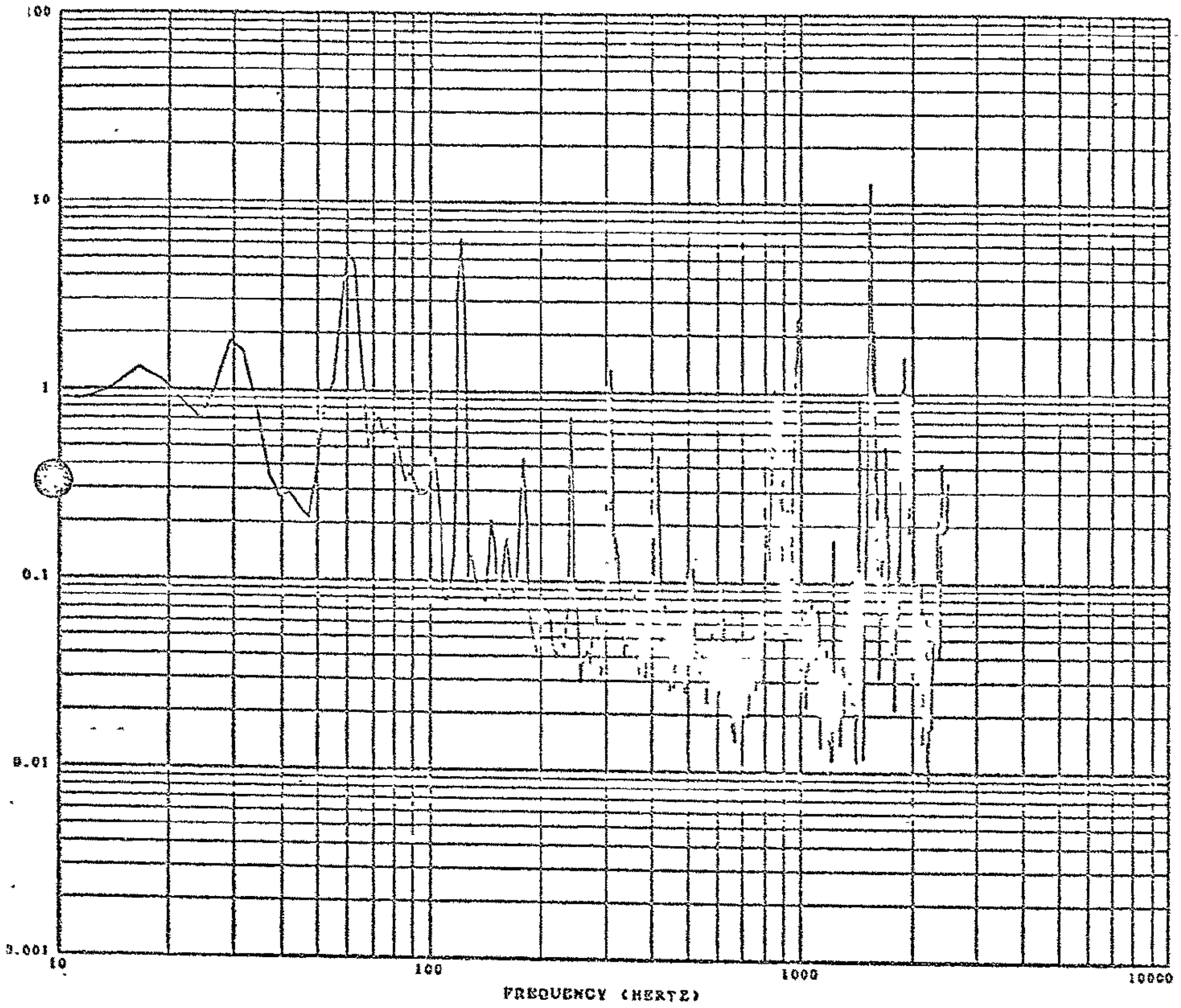
Figure 118 Electronics Package, 'X' Axis
Response to Input of Figure 115

```
SENSOR =  EPS-3T ELECTRON/PROTON SPECT. TEST CAL=31.6        TIME SLICE (HR-MIN-SEC)  16 54 19.0000 TO  16 54 23.0000
LOW-PASS FILTER USED        3000.0          STANDARD DEVIATION..         .3702    .     DATE PROCESSED......     25FEB77
NORM. STD. ERROR....        .22113          VIBRATION TEST RUN 60X                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS...      5.1120
FILTER START POINTS.        .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN* X        .000100
```



g rms = .37

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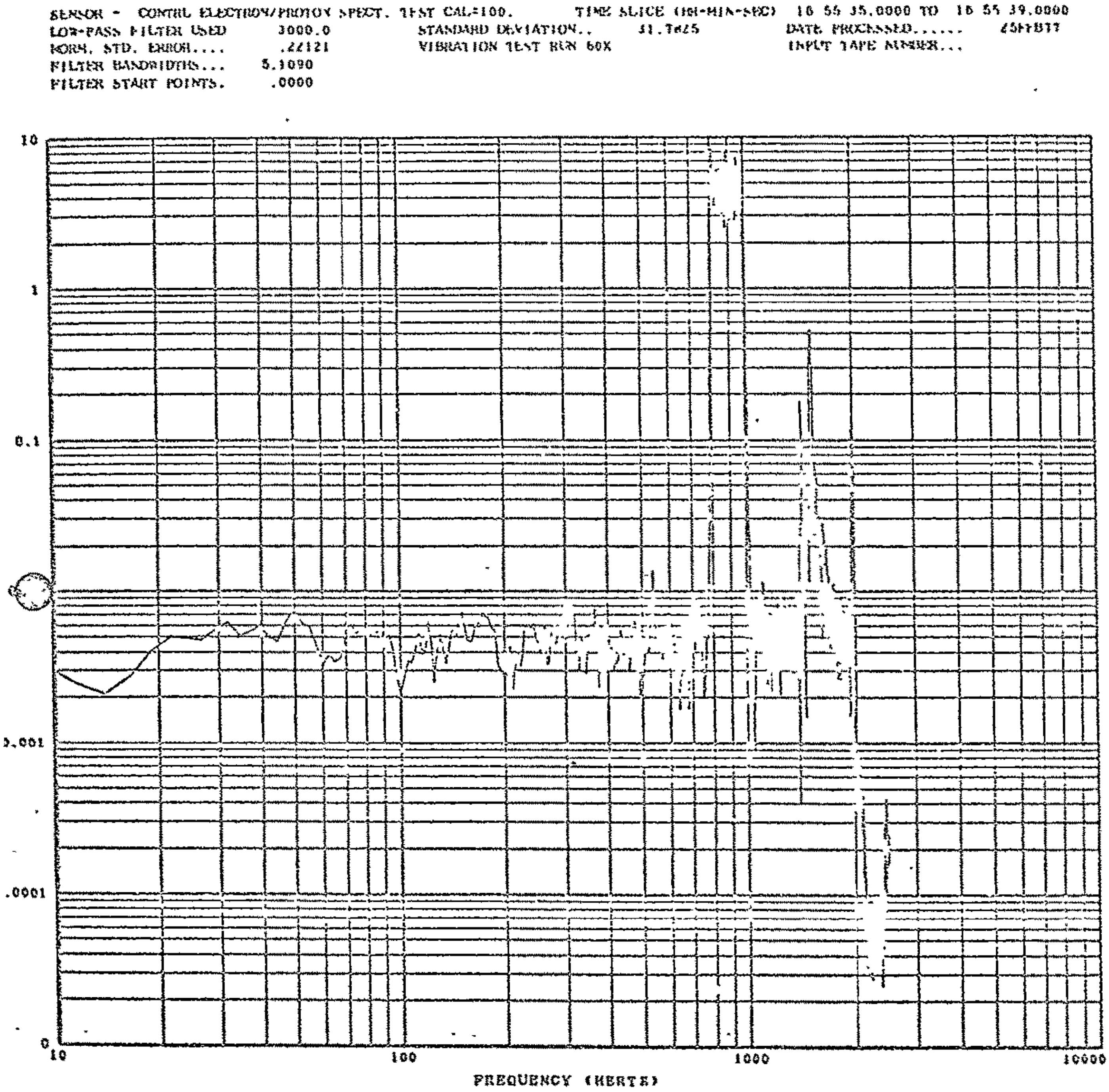
Figure 119 Electronics Package, 'T' Axis Response to Input of Figure 115



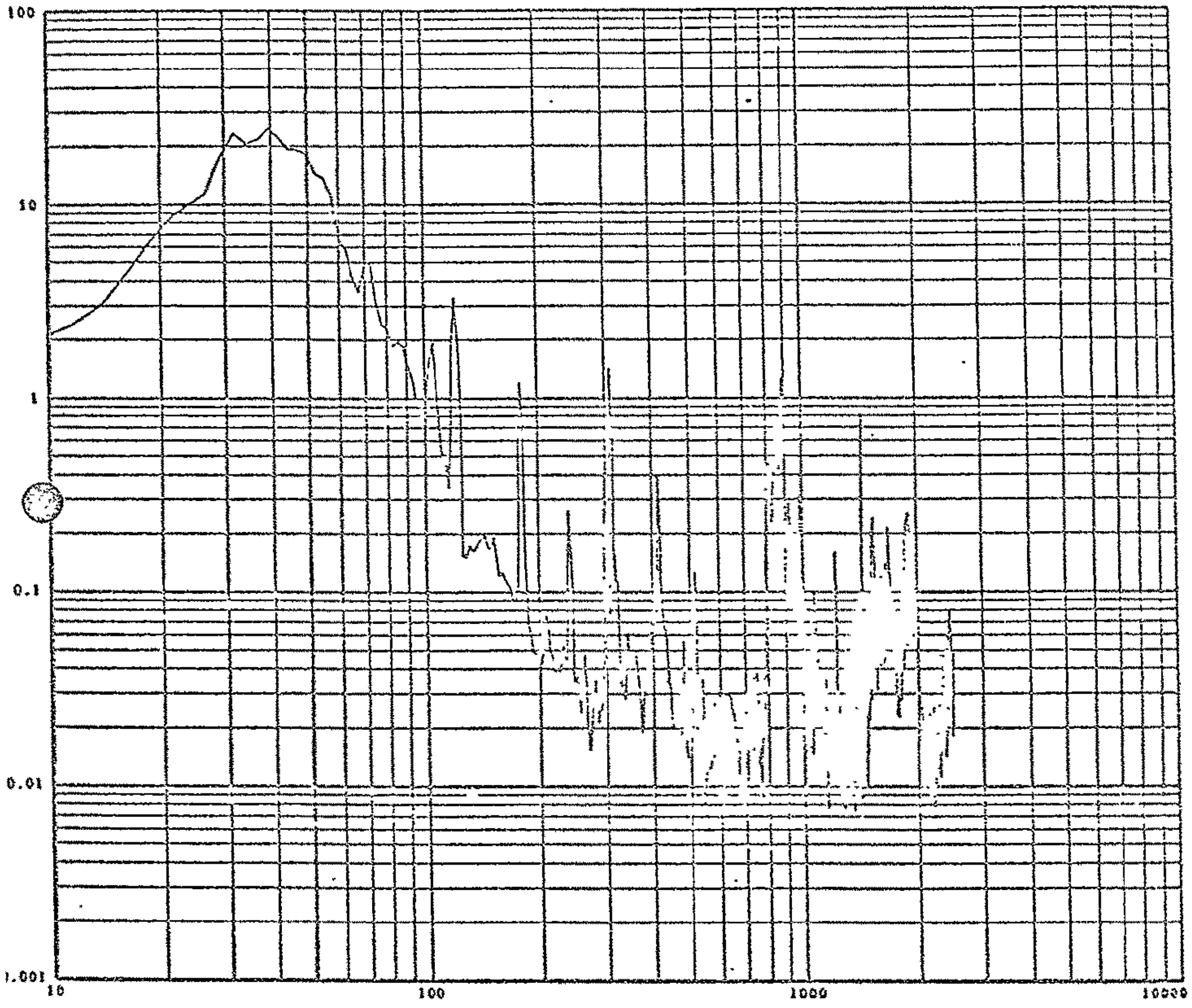
SENSOR - CONTRL ELECTRON/PROTON SPECT. TEST CAL=100. TIME SLICE (HH-MIN-SEC) 16 55 35.0000 TO 16 55 39.0000
LOW-PASS FILTER USED 3000.0 STANDARD DEVIATION.. 31.7825 DATE PROCESSED...... 25FEB77
NORM. STD. ERROR.... .22121 VIBRATION TEST RUN 60X INPUT TAPE NUMBER...
FILTER BANDWIDTHS... 5.1090
FILTER START POINTS. .0000

g rms = 31.78

PADS 0.

Figure 120 'R' Axis Input, Transonic/MACH 1 Simulation (800 - 1000 Hz)

```
SENSOR =  EPS-IR ELECTRON/PROTON SPECT. TEST CAL=100.       TIME SLICE (HR-MIN-SEC)  16 55 35.0000 TO  16 55 39.0000
LOW-PASS FILTER USED      3000 0         STANDARD DEVIATION .      1.0664   . ...  DATE PROCESSED......    25FEB77
NORM. STD. ERROR....      .22121        . VIBRATION TEST RUN 60X                  INPUT TAPE NUMBER...
FILTER BANDWIDTHS...    5.1000
FILTER START POINTS.     .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X      .001000
```



g rms = 1.07

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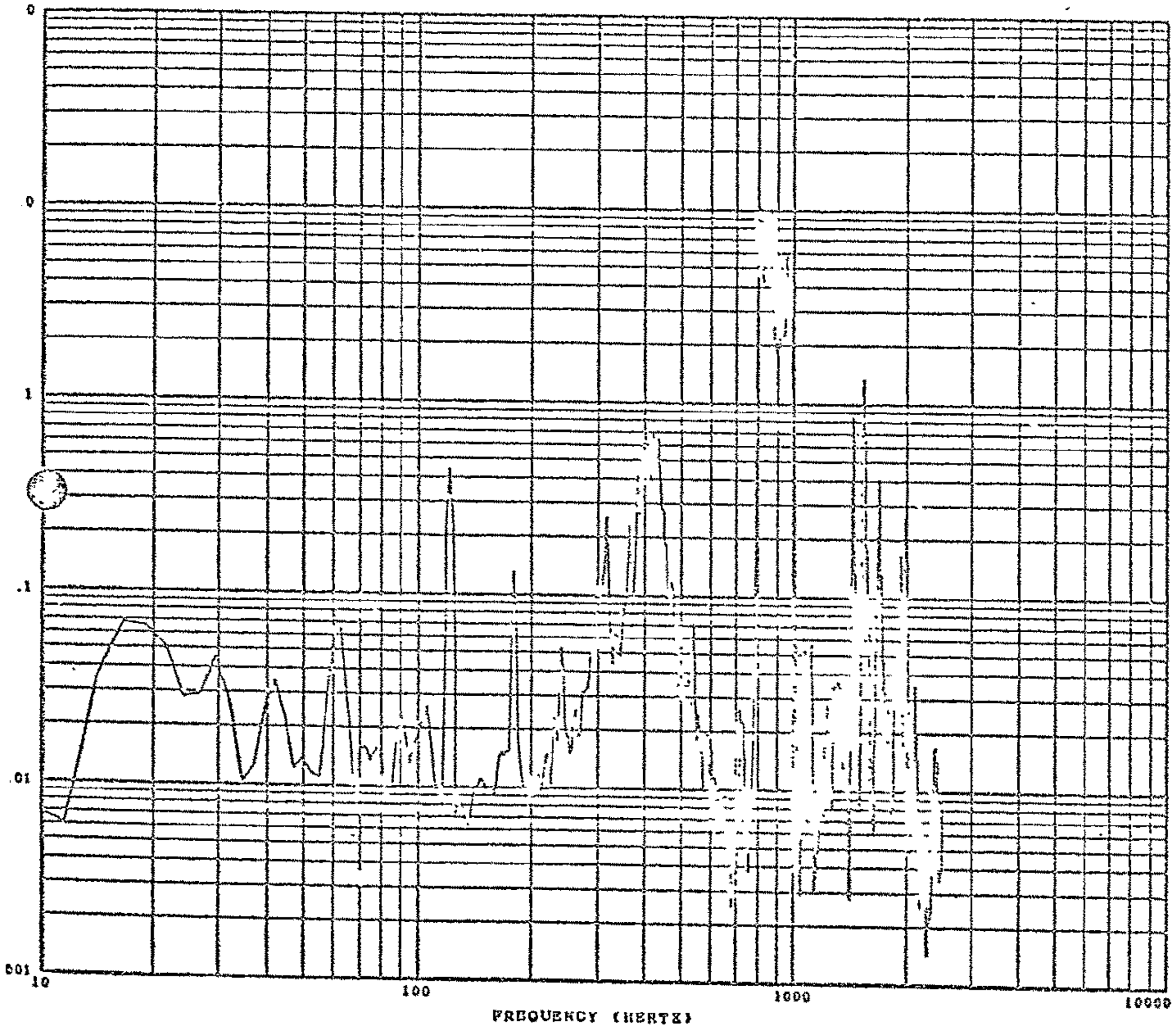
Figure 121 Electronics Package, 'R' Axis Response to Input of Figure 120

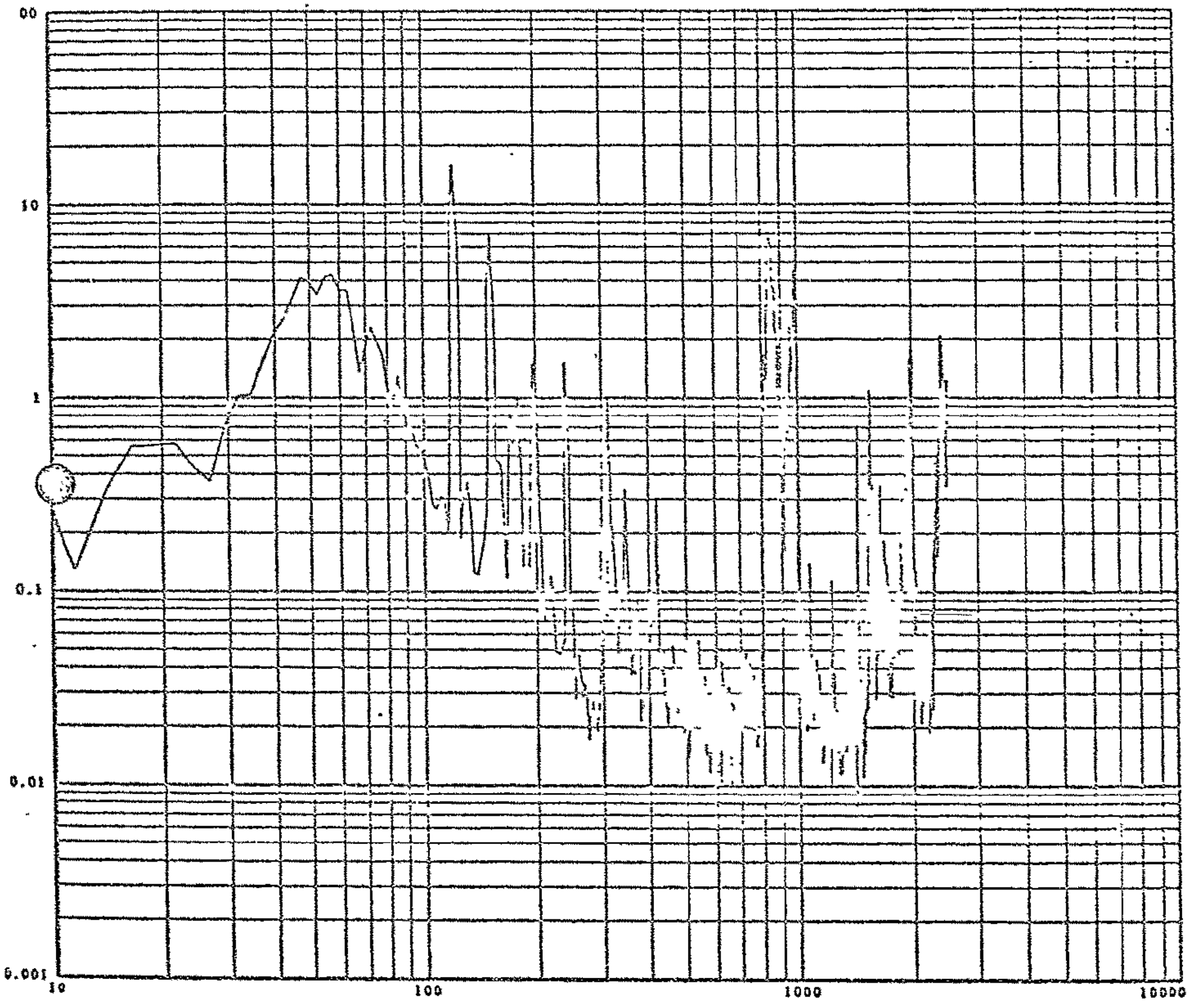
```
SENSOR -  EPS-4B ELECTRON/PROTON SPECT. TEST CAL=1000.      TIME SLICE (HR-MIN-SEC)  16 55 35.0000 TO  16 55 39 0000
LOW-PASS FILTER USED        3000.0        STANDARD DEVIATION..      33.4494             DATE PROCESSED...... .   25FEB77
NORM. STD  ERROR....        .22121        VIBRATION TEST RUN 60X                        INPUT TAPE NUMBER...
FILTER BANDWIDTHS...      5.1090
FILTER START POINTS.       .0000
```



g rms = 33.45   PAGE 9.

Figure 122 Baseplate, 'R' Axis Response
to Input of Figure 120

```
SENSOR -  EPS-2R ELECTRON/PROTON SPECT. TEST CAL=31 6       TIME SLICE (HR-MIN-SEC)  16 55 35 0000 TO  16 55 39.0000
LOW-PASS FILTER USED        3000 0           STANDARD DEVIATION .          .4324          DATE PROCESSED......     25FEB77
NORM. STD. ERROR....        .22121           VIBRATION TEST RUN 60X                       INPUT TAPE NUMBER ..
FILTER BANDWIDTHS...     5.1000
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X       .000100
```



g rms = .43

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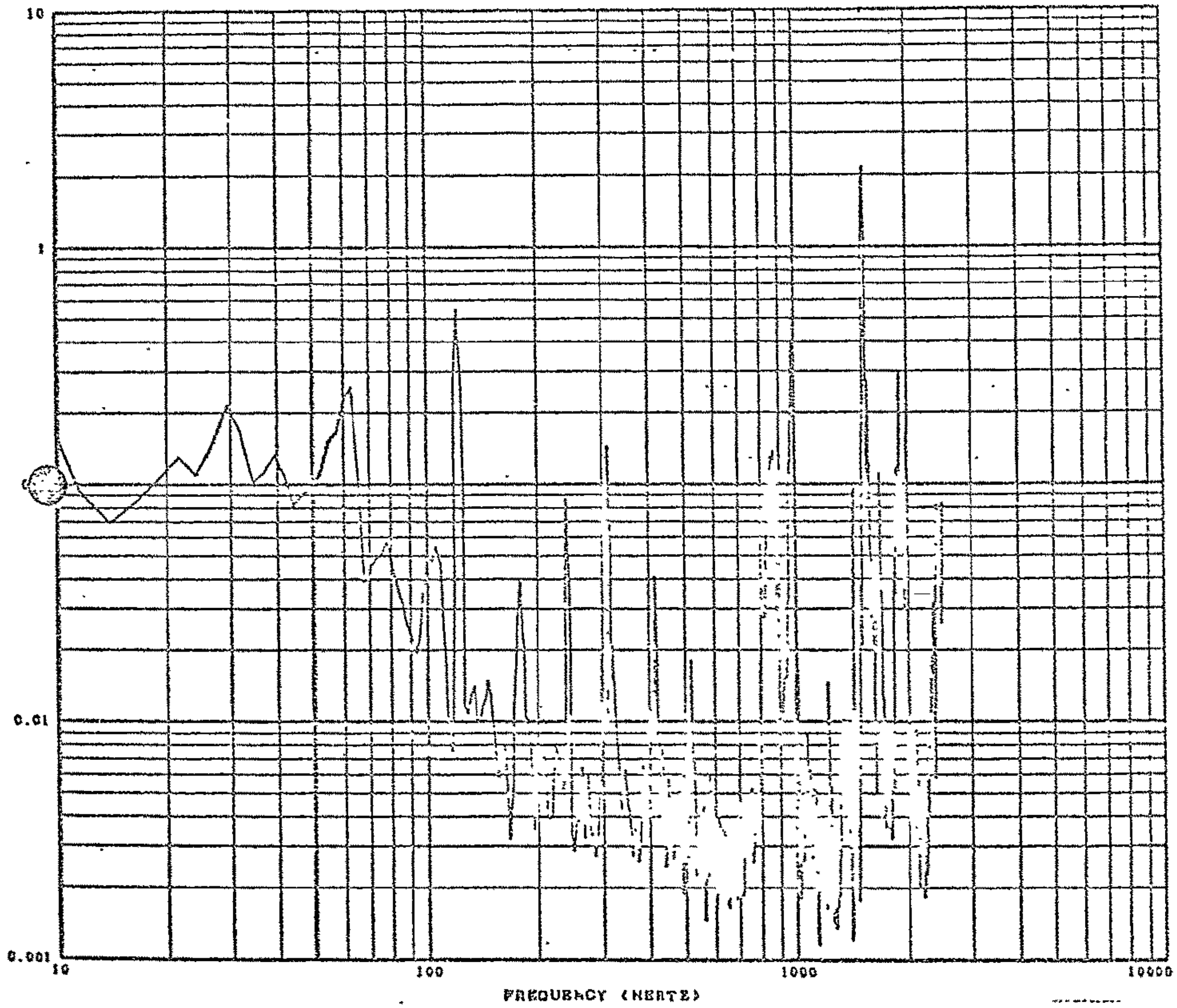
Figure 123 Electronics Package, 'X' Axis
Response to Input of Figure 120

```
SENSOR -  EPS-3T ELECTRON/PROTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  16 55 35.0000 TO  16 55 39.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION..         .4637                DATE PROCESSED ...       25FEB77
NORM. STD. ERROR....        .22121         VIBRATION TEST RUN 60X                            INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1090
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X       .001000
```

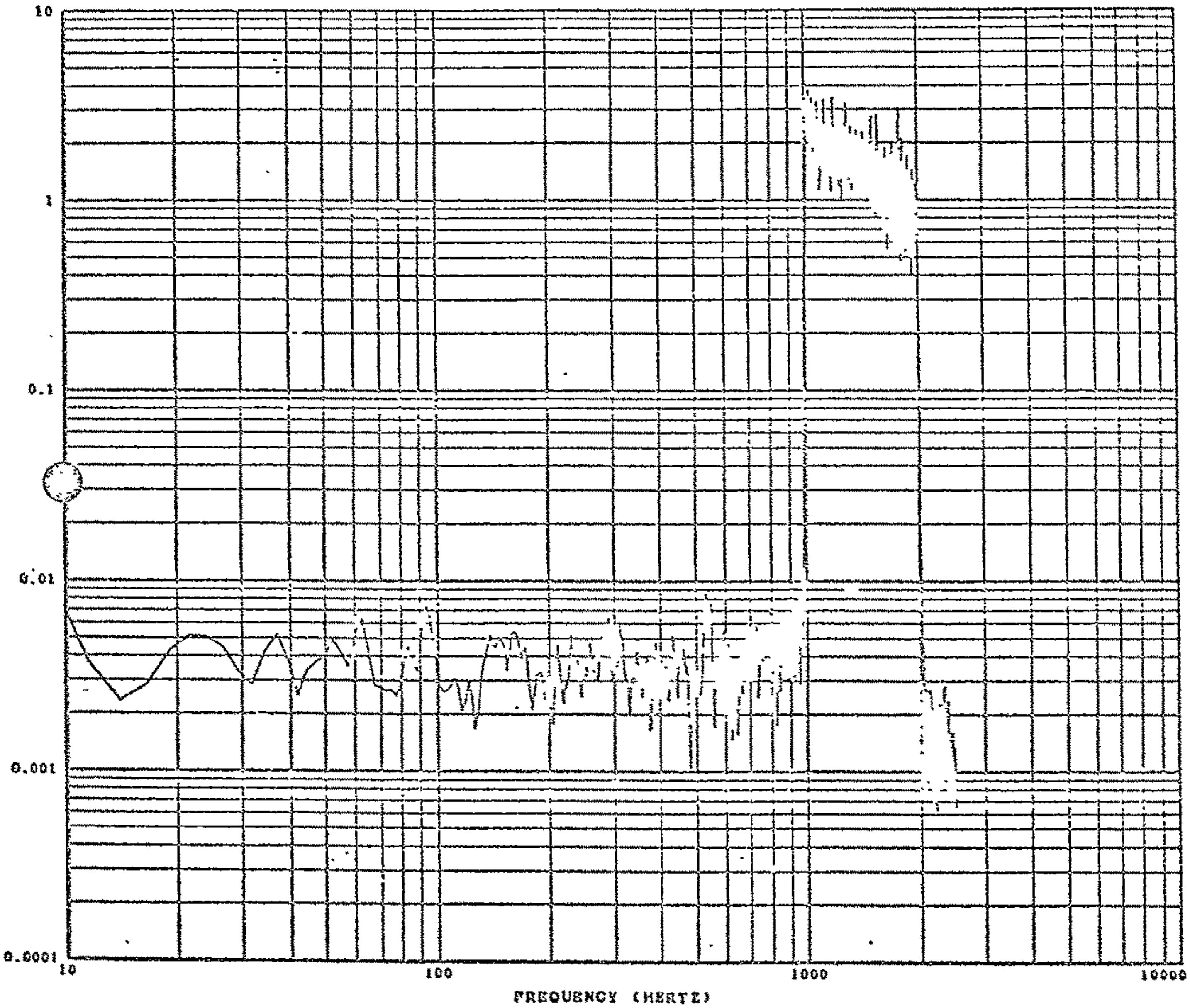


g rms = .46

PAGE 6.

Figure 124 Electronics Package, 'T' Axis Response to Input of Figure 120

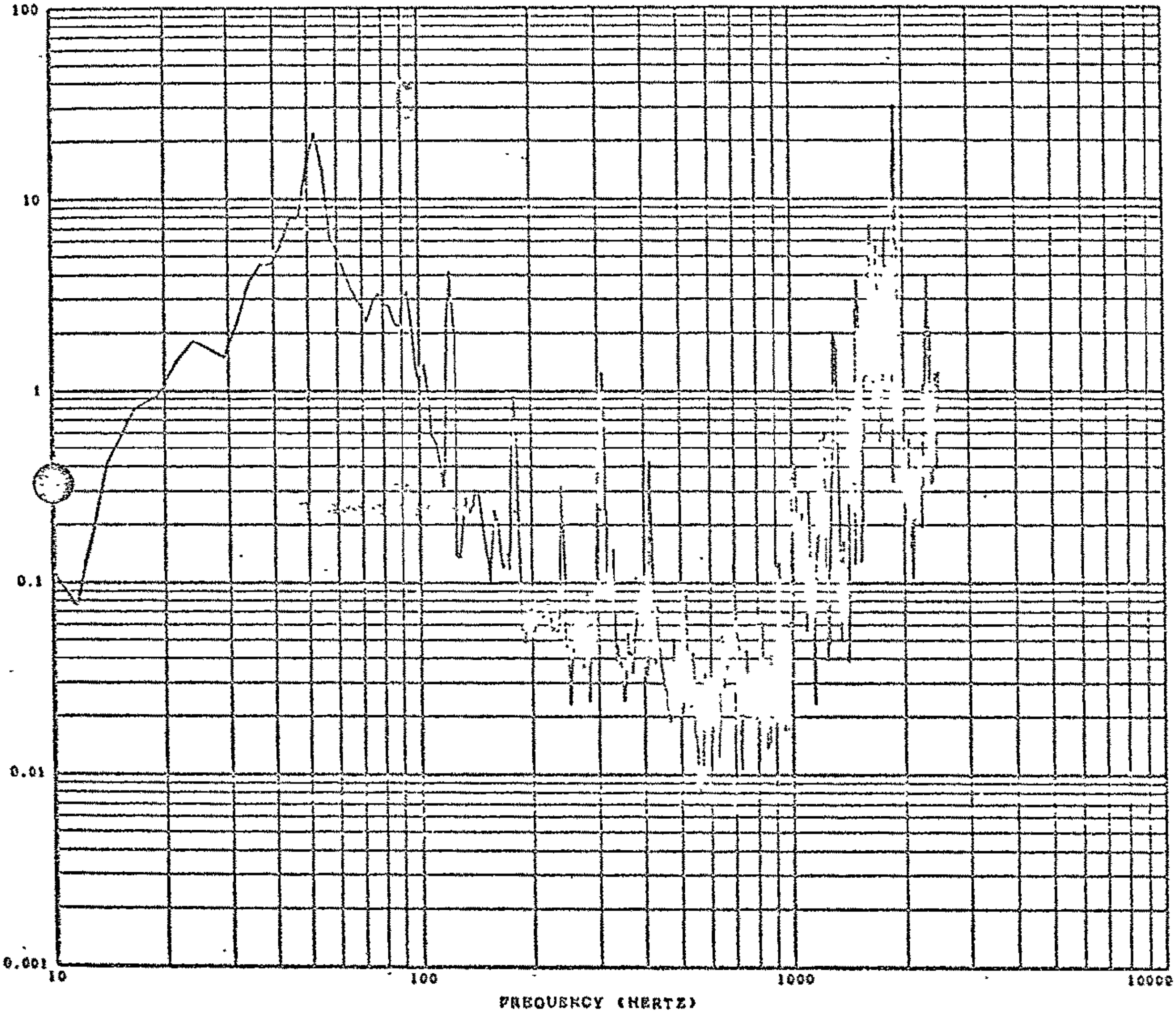
```
SENSOR -  CONTR. ELECTRON/PROTON SPECT. TEST CAL=100        TIME SLICE (HR-MIN-SEC)  17 21 10.0000 TO  17 21 14.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION .      39 9349     -    DATE PROCESSED ....      25FEB77
NORM. STD. ERROR....        .22124         VIBRATION TEST RUN 60X                     INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1077
FILTER START POINTS.      .0000
```



g rms = 39.93   PAGE 0.

Figure 125 'R' Axis Input, Max. q Simulation (1000 - 2000 Hz)

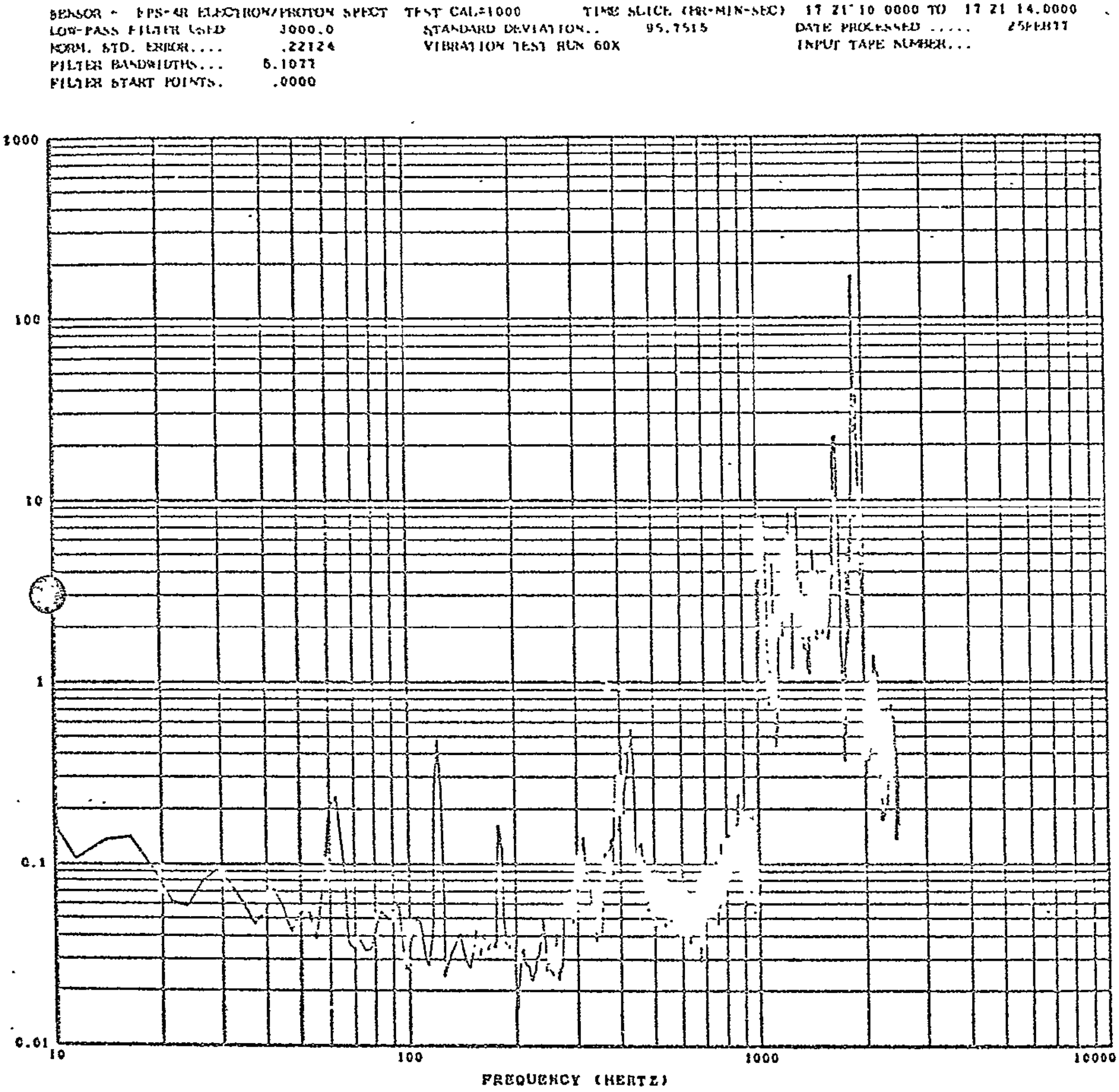
```
SENSOR -  EPS-1R ELECTRON/PROTON SPECT. TEST CAL=100.        TIME SLICE (HR-MIN-SEC)  17 21 10.0000 TO  17 21 14.0000
LOW-PASS FILTER USED        3000.0          STANDARD DEVIATION..       2.1210   - --     DATE PROCESSED......      25FEB77
NORM. STD. ERROR....        .22124          VIBRATION TEST RUN 60X                       INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1077
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN' X       .001000
```



g rms = 2.12

PAGE 0.

Figure 126 Electronics Package, 'R' Axis
Response to Input of Figure 125

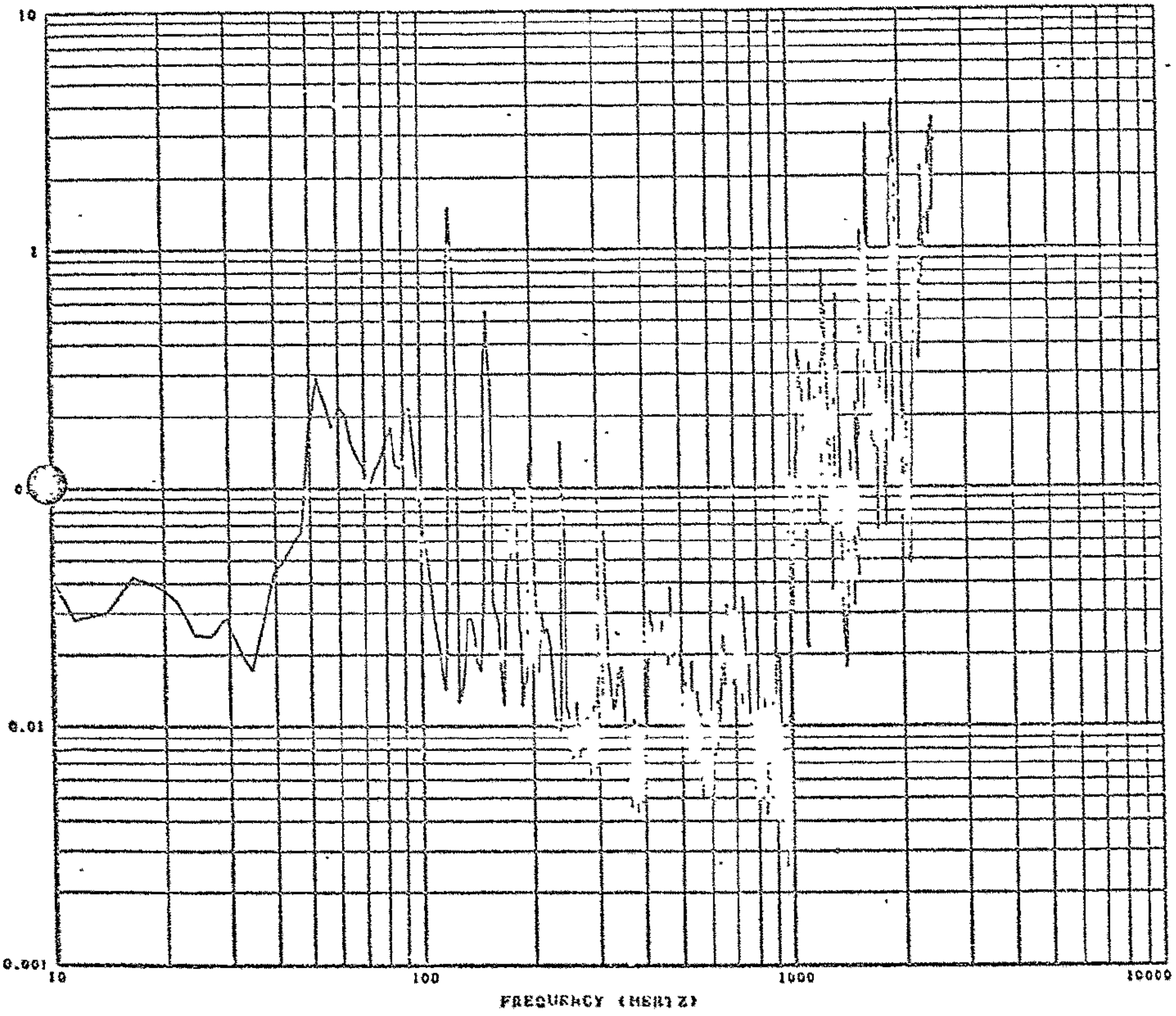


```
SENSOR - EPS-4R ELECTRON/PROTON SPECT  TEST CAL=1000       TIME SLICE (HR-MIN-SEC)  17 21 10 0000 TO  17 21 14.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION..     95.7515          DATE PROCESSED .....     25FEB77
NORM. STD. ERROR....        .22124         VIBRATION TEST RUN 60X                    INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     6.1077
FILTER START POINTS.      .0000
```

g rms = 95.75   PAGE 6.

Figure 127 Baseplate, 'R' Axis Response to Input of Figure 125

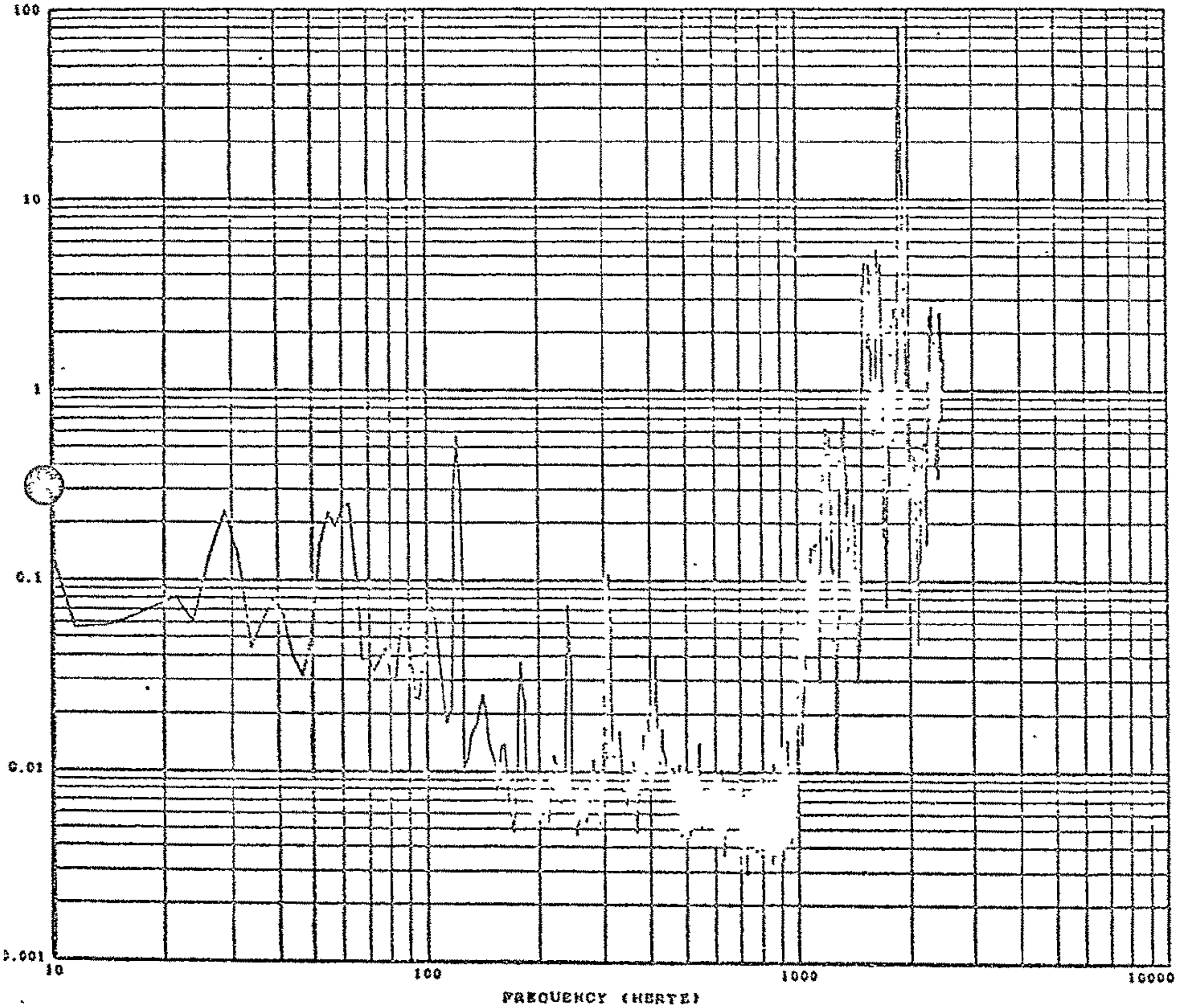
```
SENSOR =  EPS-2R ELECTRON/PROTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  17 21 10 0000 TO  17 21 14 0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION        2 1203        . DATE PROCESSED......    25FEB77
NORM. STD  ERROR....       .22124          VIBRATION TEST RUN 60X                    INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1077
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN* X       .001000
```



g rms = 2.12   PAGE 2.

Figure 128 Electronics Package, 'X' Axis Response to Input of Figure 125

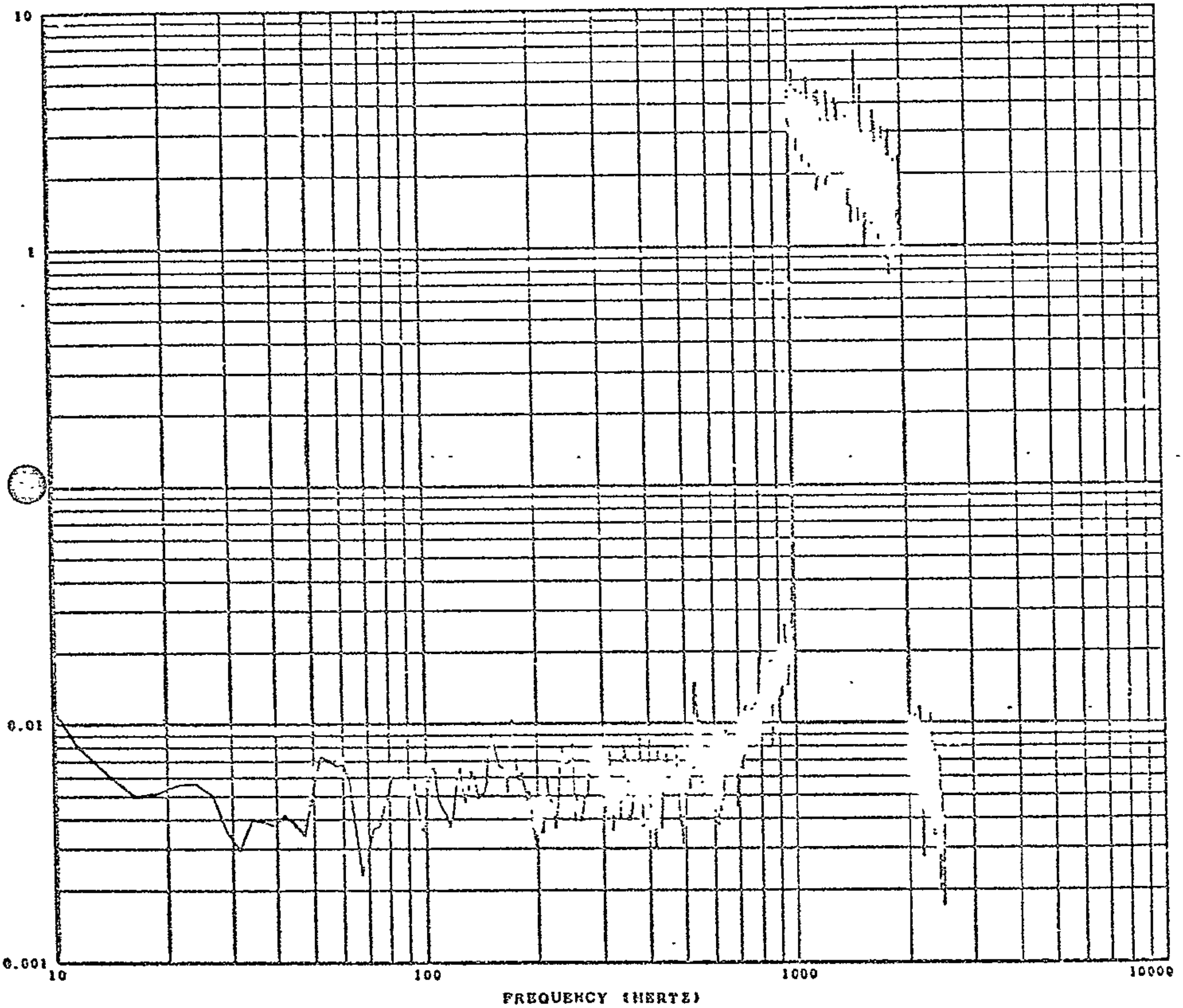
```
SENSOR -  EPS-3T ELECTRON/PROTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  17 21 10.0000 TO  17 21 14.0000
LOW-PASS FILTER USED        3000.0          STANDARD DEVIATION          2.5409          DATE PROCESSED. ....    25FEB77
NORM. STD. ERROR....        .22124          VIBRATION TEST RUN 60X                      INPUT TAPE NUMBER...
FILTER BANDWIDTHS...      5.1077
FILTER START POINTS.       .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN' X      -.001000
```



g rms = 2.54   PAGE 4.

Figure 129 Electronics Package, 'T' Axis
Response to Input of Figure 125

```
SENSOR -  CONTRL ELECTRON/PROTON SPECT  TEST CAL=100.      TIME SLICE (HR-MIN-SEC)  17 22 28.0000 TO  17 22 32.0000
LOW-PASS FILTER USED      3000.0         STANDARD DEVIATION..     50.2095      :  DATE PROCESSED......     25FEB77
NORM. STD. ERROR....       .27124        VIBRATION TEST RUN 60X                   INPUT TAPE NUMBER...
FILTER BANDWIDTHS...      5.1077
FILTER START POINTS.       .0000
```

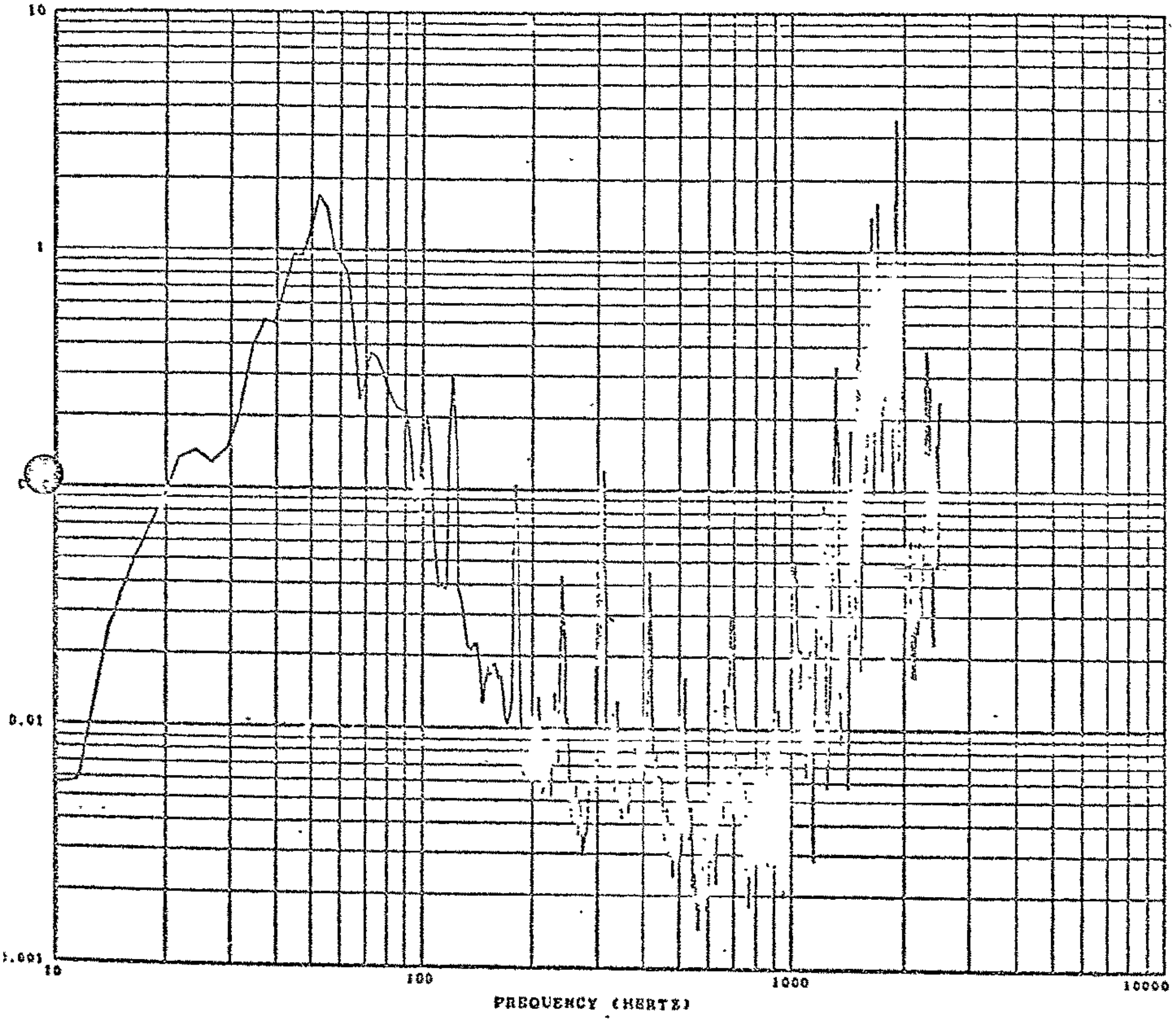


g rms = 50.21

PAGE 9.

Figure 130 'R' Axis Input, Transonic/MACH 1 Simulation (1000 - 2000 Hz)

```
SENSOR =  EPS-1R ELECTRON/PROTON SPECT. TEST CAL=100.        TIME SLICE (HR-MIN-SEC)  17 22 28.0000 TO  17 22 32.0000
LOW-PASS FILTER USED        3000 0            STANDARD DEVIATION.          2.5687             DATE PROCESSED .....     25FEB77
NORM. STD. ERROR....        .22124            VIBRATION TEST RUN 60X                          INPUT TAPE NUMBER...
FILTER BANDWIDTH...      5.1077
FILTER START POINTS.        0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X        .010000
```

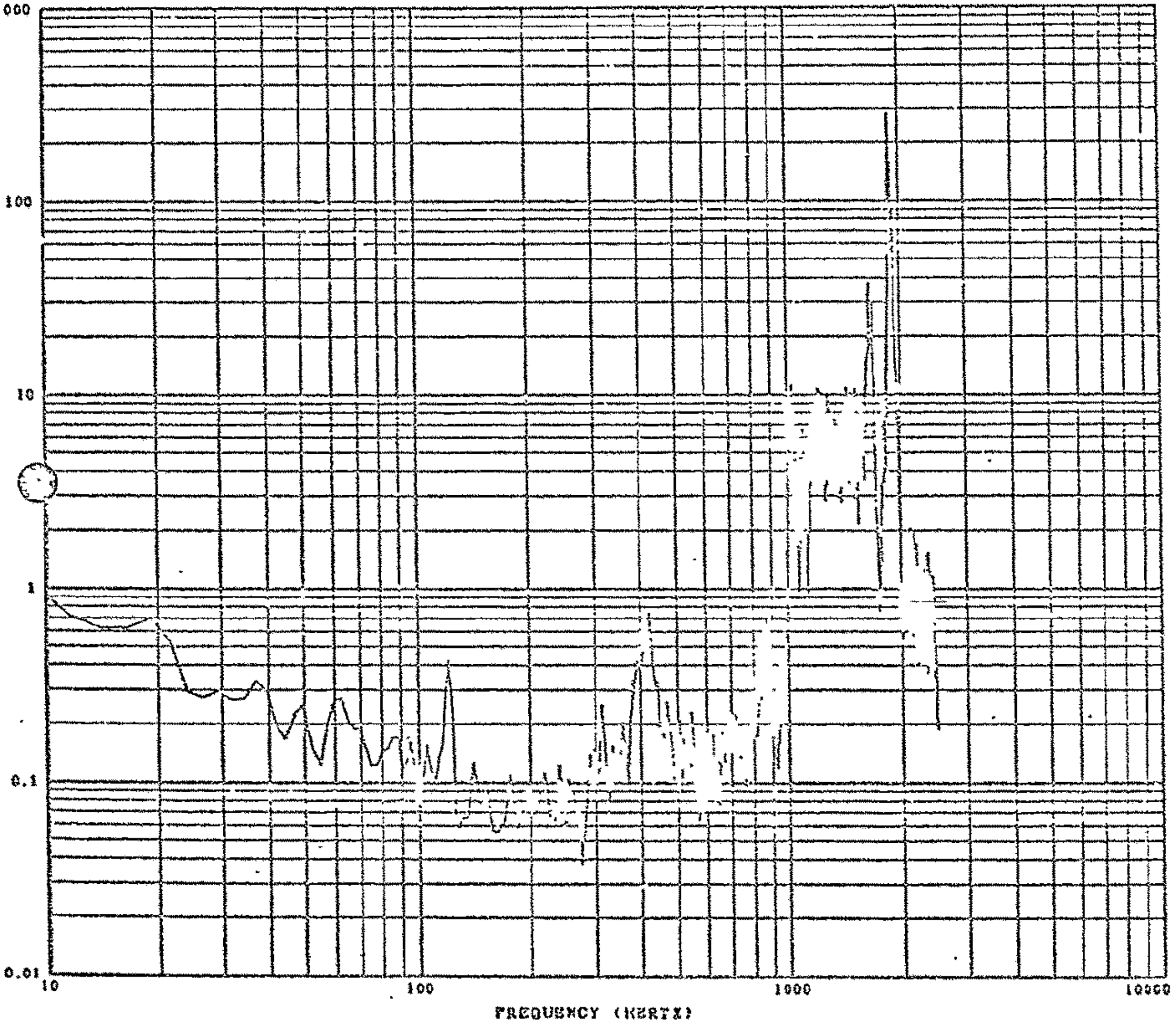


g rms = 2.57

PAGE 1.

Figure 131 Electronics Package, 'R' Axis
Response to Input of Figure 130

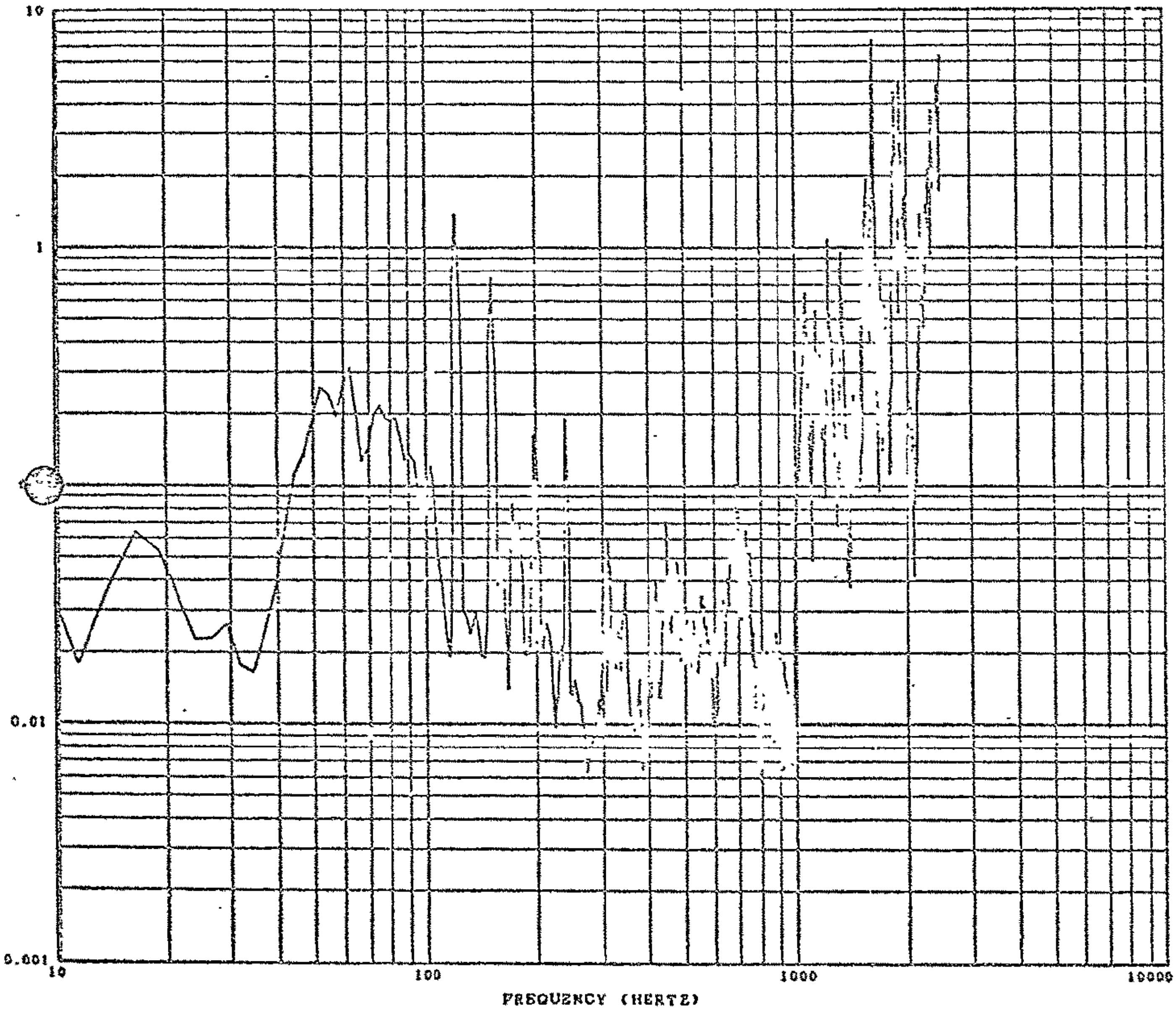
```
SENSOR =  EPS-4R ELECTRON/PROTON SPECT. TEST CAL=1000.      TIME SLICE (HR-MIN-SEC) 17 22 28 0000 TO  17 22 32.0000
LOW-PASS FILTER USED        3000.0        STANDARD DEVIATION..    130.3424          DATE PROCESSED ....    25FEB77 .
NORM. STD. ERROR....         .22124        VIBRATION TEST RUN 60X                    INPUT TAPE NUMBER...
FILTER BANDWIDTHS...        5.1077
FILTER START POINTS.         .0000
```



g rms = 130.34   PAGE 1.

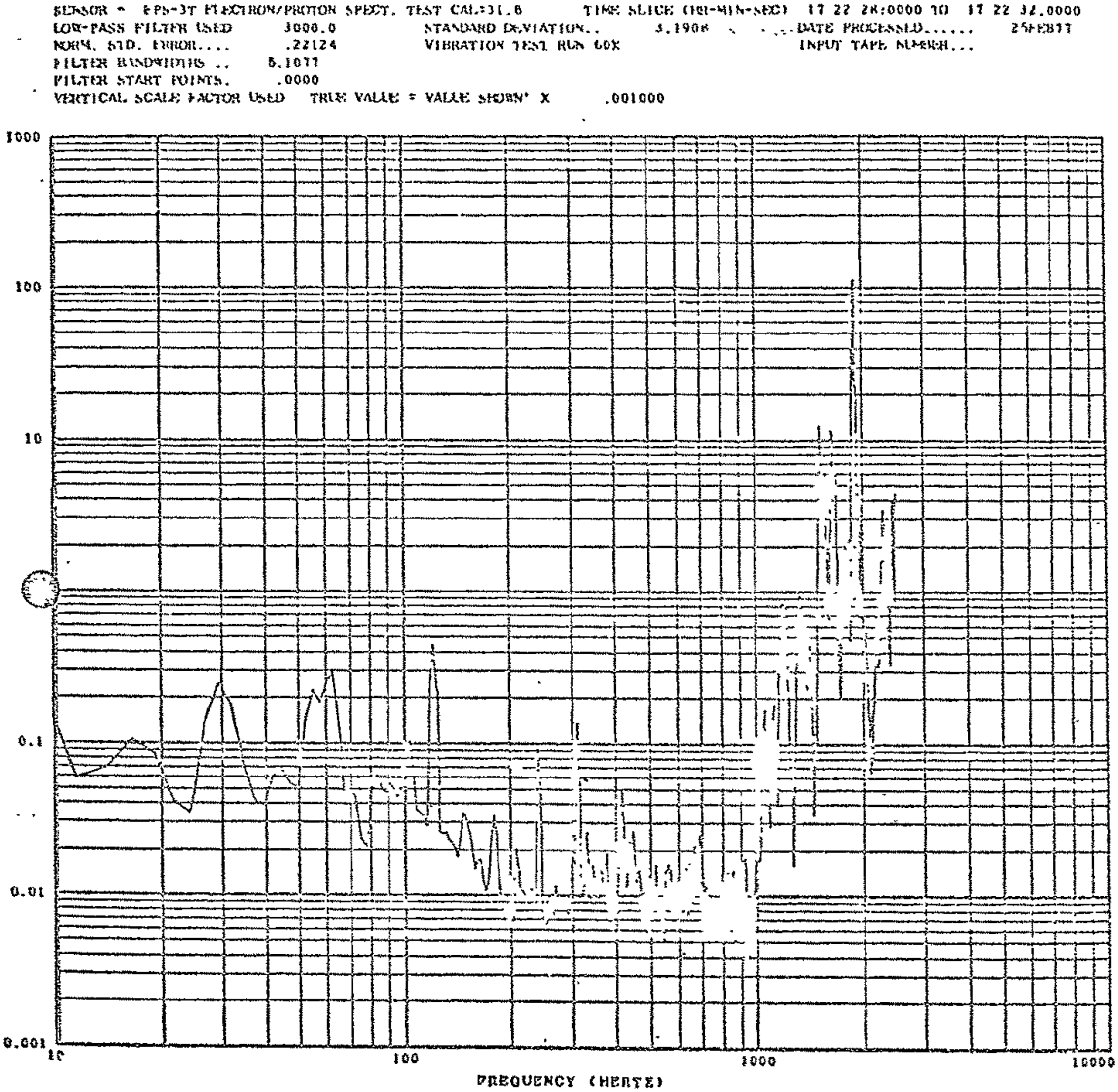
Figure 132 Baseplate, 'R' Axis Response to Input of Figure 130

```
SENSOR =  EPS-2R ELECTRON/PROTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  17 22 28.0000 TO  17 22 32.0000
LOW-PASS FILTER USED       3000.0          STANDARD DEVIATION..      2.5632        ...DATE PROCESSED......    25FEB77
NORM. STD. ERROR....       .22124          VIBRATION TEST RUN 60X                     INPUT TAPE NUMBER...
FILTER BANDWIDTHS...     5.1077
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED.  TRUE VALUE = VALUE SHOWN X       .001000
```



g rms = 2.56 PAGE 3.

Figure 133 Electronics Package, 'X' Axis Response to Input of Figure 130



```
SENSOR =  EPS-3T ELECTRON/PROTON SPECT. TEST CAL=31.6       TIME SLICE (HR-MIN-SEC)  17 22 28:0000 TO  17 22 32.0000
LOW-PASS FILTER USED        3000.0          STANDARD DEVIATION..      3.1906         DATE PROCESSED......     25FEB77
NORM. STD. ERROR....        .22124          VIBRATION TEST RUN 60X                   INPUT TAPE NUMBER...
FILTER BANDWIDTHS ..     5.1077
FILTER START POINTS.      .0000
VERTICAL SCALE FACTOR USED   TRUE VALUE = VALUE SHOWN* X       .001000
```

g rms = 3.19

PAGE 5.

Figure 134 Electronics Package, 'T' Axis Response to Input of Figure 130

Appendix A

Acceptance Test Data Sheets

DATA SHEET 1

FUNCTIONAL TEST

(1) Visual inspection

Insp. ______ Date 1/19/71

(5) Detector Plate Temperature

Rosemount Temperature Value	Package Temperature Monitor Value	Detector Plate Temperature Monitor Value	Elapsed Time	
22.95°C	25.3 °C	23.8 °C	0 Min.	1715
19.5 °C	22.9	20.5	1:55	19:10
16.6 °C	23.6	20.8	:36	19:46
19.6	23.7	20.8	:34	20:20

Insp. ______ Date 1/19/72

(6) Heater Power

Measured Value	Acceptable Value
27.54 VDC	+27.5 ± 0.5 Vdc

Insp. ______ Date 1-19-72

(7) Medium Voltage Heater Current

Measured Value	Acceptable Value
7 ma	10 ± 5 mA

1-19-72

DATA SHEET 1 (Cont.)

(8) Electronic Power

Measured Value	Acceptable Value
27.45VDC	+27.5 ± 0.5 Vdc
	Insp.
	1-19-72 Date

(9) Medium Voltage Electronics Current

Measured Value	Maximum Value
514 ma	560 mA
	Insp.
	1-19-72 Date

(10) Detector Bias

Measured Value	Acceptable Value
27.58VDC	+27.5 ± 0.5 Vdc
	Insp.
	1-19-72 Date

(11) Medium Voltage Detector Bias Current

Measured Value	Maximum Value
21 ma	30 mA
	Insp.
	1-19-72 Date

DATA SHEET 1 (Cont.)

(13) Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	0.019 Vdc	+0.025±0.010 Vdc
+0.050±0.001	.044	0.050±0.010
+0.100±0.001	.093	0.100±0.010
+1.000±0.001	.992	1.000±0.010
+2.000±0.001	1.994	2.000±0.010
+3.000±0.001	2.996	+3.000±0.010
+4.000±0.001	3.993	+4.000±0.015
+4.900±0.001	4.897	+4.900±0.020

12
Insp.

1/19/72
Date

DATA SHEET 1 (Cont.)

(15) Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit.Value
+5V Monitor	A	5.111 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.135	+8.10±0.15
-8V Monitor	A	-8.181	-8.15±0.15
+25V Monitor	A	25.688	+25.50±0.75
+350V Monitor	A	346.33	+350.±15.
-15V Monitor	A	-16.016	-15.0±1.0
-5V Monitor	A	-5.401	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.111	+5.00±0.25
+8V Monitor	B	8.135	+8.10±0.15
-8V Monitor	B	-8.166	-8.15±0.15
+25V Monitor	B	25.642	+25.50±0.75
+350V Monitor	B	346.33	+350.±15.
-15V Monitor	B	-15.993	-15.0±1.0
-5V Monitor	B	-5.401	-5.25±0.25
Disc Ref Mon.	B	3.000	+3.000±0.02

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Insp. ________ Date 1/19/72

(16)

	Actual Value	Acceptable Value
Heater	25.37	+25.0 ± 0.5 Vdc
Electronics	25.00	+25.0 ± 0.5 Vdc
Detector Bias	25.02	+25.0 ± 0.5 Vdc

Insp. ________ Date 1/19/72

DATA SHEET 1 (Cont.)

(17) Low Voltage Current Consumption

Current Sink	Measured Current		Acceptable Value
Heater	7 mA	ma	10 ± 5 mA
Electronics	543 mA	ma	≤ 560
Detector Bias	21 mA	ma	≤ 50

Insp. Date 1/19/72

(18) Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output		Acceptable Value
+5V Monitor	A	5.111	Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.126		+8.10±0.15
-8V Monitor	A	-8.160		-8.15±0.15
+25V Monitor	A	25.588		+25.50±0.75
+350 V Monitor	A	346.33		+350.±15.
-15V Monitor	A	-15.980		-15.0±1.0
-5V Monitor	A	-5.398		-5.25±0.25
Disc Ref Mon.	A	2.995		+3.00±0.02
+5V Monitor	B	5.111		+5.00±0.25
+8V Monitor	B	8.126		+8.10±0.15
-8V Monitor	B	-8.160		-8.15±0.15
+25V Monitor	B	25.588		+25.50±0.75
+350V Monitor	B	346.33		+350.±15.
-15V Monitor	B	-15.957		-15.0±1.0
-5V Monitor	B	-5.398		-5.25±0.25
Disc Ref Mon.	B	3.000		+3.00±0.02

Insp. Date 1/19/72

DATA SHEET 1 (Cont.)

(19)

	Actual Value	Acceptable Value
Heater	29.98	+30.0 ± 0.5 Vdc
Electronics	29.97	+30.0 ± 0.5 Vdc
Detector Bias	30.11	+30.0 ± 0.5 Vdc

Insp. ____________ Date 1/19/72

(20) High Voltage Current Consumption

Current Sink	Measured Current	Acceptable Current
Heater	7 ma	10 ± 5 mA
Electronics	495 mA	≤ 560
Detector Bias	21 mA	≤ 30

Insp. ____________ Date 1/19/72

DATA SHEET 1 (Cont.)

(21) High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output		Acceptable Value
+5V Monitor	A	5.111	Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.135		+8.10±0.15
-8V Monitor	A	-8.182		-8.15±0.15
+25V Monitor	A	25.588		+25.50±0.75
+350V Monitor	A	346.33		+350.±15.
-15V Monitor	A	-16.029		-15.0±1.0
-5V Monitor	A	-5.417		-5.25±0.25
Disc Ref Mon.	A	2.995		+3.00±0.02
+5V Monitor	B	5.121		+5.00±0.25
+8V Monitor	B	8.145		+8.10±0.15
-8V Monitor	B	-8.187		-8.15±0.15
+25V Monitor	B	25.642		+25.50±0.75
+350V Monitor	B	346.33		+350.±15.
-15V Monitor	B	-16.029		-15.0±1.0
-5V Monitor	B	-5.417		-5.25±0.25
Disc Ref Mon.	B	2.995		+3.00±0.02

Insp. ______ Date 1/19/72

DR# EPS-0071

DATA SHEET 1 (Cont.)

(22) Temperature Measurement

Parameter	Prime Frame	Measured Value	Acceptable Limits
Package Temperature Monitor	A	23.36 °C	
Package Temperature Monitor	B	23.45	
Detector Plate Temperature Monitor	A	20.72	61°F to 75°F = 16°C to 24°C
Detector Plate Temperature Monitor	B	20.72	

12

Insp.

Date 1/19/72

(23) Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	.184 μA	1.0 μA
B	.397	2.0 μA
C	1.968	2.0 μA
D	.545	2.0 μA
E	.516	2.0 μA

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Insp.

Date 1/19/72

DATA SHEET 1 (Cont.)

(24) Detector Resolution Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	7 keV	50. keV
B	6	50. keV
C	7.5	50. keV
D	12.5	50. keV
E	6.5	50. keV

Insp. Date 1/19/72

(27) Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	14	14 or 16
B	E2	16	14 or 16
C	E3	14	14 or 16
D	E4	14	14 or 16
E	P6	14	14 or 16

Insp. Date 1/19/72

DATA SHEET 1 (Cont.)

(28) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	14	14 or 16
B	P2	14	14 or 16
C	P3	14	14 or 16
D	P4	14	14 or 16
E	P5	14	14 or 16

Insp.

Date 1/19/72

(30) Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	2032	2032 or 2048
A	E2	2048	2032 or 2048
C	E3	2032	2032 or 2048
D	E4	2032	2032 or 2048
E	P6	2032	2032 or 2048

Insp.

Date 1/19/72

DATA SHEET 1 (Cont.)

(31) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	2032	2032 or 2048
B	P2	2032	2032 or 2048
C	P3	2032	2032 or 2048
D	P4	2032	2032 or 2048
E	P5	2032	2032 or 2048

Insp. ________ Date 1/19/72

(33) Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	260,096	260,096 or 262,144
B	E2	262,144	260,096 or 262,144
C	E3	260,096	260,096 or 262,144
D	E4	260,096	260,096 or 262,144
E	P6	260,096	260,096 or 262,144

Insp. ________ Date 1/19/72

DATA SHEET 1 (Cont.)

(34) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	260,096	260,096 or 262,144
B	P2	260,096	260,096 or 262,144
C	P3	260,096	260,096 or 262,144
D	P4	260,096	260,096 or 262,144
E	P6	260,096	260,096 or 262,144

Insp. Date 1/19/72

(36) Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	33,292,288	33,292,288 or 0
B	E2	0	33,292,288 or 0
C	E3	33,292,288	33,292,288 or 0
D	E4	38 –	33,292,288 or 0
E	P6	33,292,288	33,292,288 or 0

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Insp. Date 1/19/72

DATA SHEET 1 (Cont.)

(37) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test .

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	33,292,288	33,292,288 or 0
B	P2	33,292,288	33,292,288 or 0
C	P3	33,292,288	33,292,288 or 0
D	P4	0	33,292,288 or 0
E	P5	33,292,288	33,292,288 or 0

Insp.

Date 1/19/72

DATA SHEET 2
THERMAL CYCLE TEST

33.3
44.5

(40) Temperature Transition to +102°F = +38.9°C

Rosemount Temperature Value	Package Temperature Monitor Value	Detector Plate Temperature Monitor Value	Elapsed Time	
19.9°C °C	23.5°C °C	20.7 °C	0 Min.	2200
37	~~[illegible]~~ 33.2	35.7	30	2230
35	37.7	35.6	60	2309
32.7	42.4 ~~[illegible]~~	38.0		09;2

Insp. Date 1-19-72

(42) Repeat steps 6 through 37 at +102 ± 10°F.

(6) Heater Power

Measured Value 27.54

Acceptable Value +27.5 ± 0.5 Vdc

Insp. Date 1-20-72

(7) Medium Voltage Heater Current

Measured Value 7 ma ma

Acceptable Value 10 ± 5 mA

Insp. Date 1-20-71

DATA SHEET 2 (Cont.)

(8) Electronic Power

Measured Value: 27.44

Acceptable Value: +27.5 ± 0.5 Vdc

Insp. ______ Date 1/20/72

(9) Medium Voltage Electronics Current

Measured Value: 514 ma

Maximum Value: 560 mA

Insp. ______ Date 1/20/72

(10) Detector Bias

Measured Value: ______

Acceptable Value: +27.5 ± 0.5 Vdc

Det Plate Temp > 25°C

Insp. ______ Date ______

(11) Medium Voltage Detector Bias Current

Measured Value: ______ ma

Maximum Value: 30 mA

Insp. ______ Date ______

Bias Supply off.
Ref Page 5 Caution

DATA SHEET 2 (Cont.)

(13) Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	.019 Vdc	+0.025±0.010 Vdc
+0.050±0.001	.044	0.050±0.010
+0.100±0.001	.093	0.100±0.010
+1.000±0.001	.997	1.000±0.010
+2.000±0.001	1.999	2.000±0.010
+3.000±0.001	2.996	+3.000±0.010
+4.000±0.001	3.998	+4.000±0.015
+4.900±0.001	4.897	+4.900±0.020

Insp.

1-20-72
Date

DATA SHEET 2 (Cont.)

(15) Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	5.151 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.165	+8.10±0.15
-8V Monitor	A	8.215	-8.15±0.15
+25V Monitor	A	25.696	+25.50±0.75
+350V Monitor	A	24.243	+350.±15. ✓ BIAS OFF PLATE TEMP > 25°C
-15V Monitor	A	-15.964	-15.0±1.0 —
-5V Monitor	A	-5.449	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.151	+5.00±0.25
+8V Monitor	B	8.165	+8.10±0.15
-8V Monitor	B	8.199	-8.15±0.15
+25V Monitor	B	25.750	+25.50±0.75
+350V Monitor	B	24.243	+350.±15. ✓
-15V Monitor	B	-15.964	-15.0±1.0 —
-5V Monitor	B	5.436	-5.25±0.25
Disc Ref Mon.	B	3.000	+3.000±0.02

Insp. ______ Date 1/20/72

(16)

	Actual Value	Acceptable Value
Heater	25.37	+25.0 ± 0.5 Vdc
Electronics	25.01	+25.0 ± 0.5 Vdc
Detector Bias	OFF	+25.0 ± 0.5 Vdc

Ref: Page 5 Caution

Insp. ______ Date 1/20/72

DATA SHEET 2 (Cont.)

(17) Low Voltage Current Consumption

Current Sink	Measured Current		Acceptable Value
Heater	7 ma	ma	10 ± 5 mA
Electronics	547	ma	≤ 560
Detector Bias	OFF	ma	≤ 50

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(18) Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output		Acceptable Value
+5V Monitor	A	5.141	Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.155		+8.10±0.15
-8V Monitor	A	-8.209		-8.15±0.15 Ref Page 5 Caution
+25V Monitor	A	25.696		+25.50±0.75
+350 V Monitor	A	24.243		+350.±15. OFF - DET. NOT T° > 25°C
-15V Monitor	A	-15.951		-15.0±1.0 —
-5V Monitor	A	-5.433		-5.25±0.25
Disc Ref Mon.	A	2.995		+3.00±0.02
+5V Monitor	B	5.141		+5.00±0.25
+8V Monitor	B	8.155		+8.10±0.15
-8V Monitor	B	-8.193		-8.15±0.15
+25V Monitor	B	25.696		+25.50±0.75
+350V Monitor	B	24.243		+350.±15.
-15V Monitor	B	-15.951		-15.0±1.0 —
-5V Monitor	B	-5.433		-5.25±0.25
Disc Ref Mon.	B	3.000		+3.00±0.02

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DATA SHEET 2 (Cont.)

(19)

	Actual Value	Acceptable Value
Heater	29.98	+30.0 ± 0.5 Vdc
Electronics	29.97	+30.0 ± 0.5 Vdc
Detector Bias	OFF	+30.0 ± 0.5 Vdc

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(20) High Voltage Current Consumption

Current Sink	Measured Current	Acceptable Current
Heater	7 ma	10 ± 5 mA
Electronics	490 ma	≤ 560
Detector Bias	OFF	≤ 30

Ref Page 5 Caution

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DATA SHEET 2 (Cont.)

(21) High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output		Acceptable Value
+5V Monitor	A	5.151	Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.165		+8.10±0.15
-8V Monitor	A	-8.221		-8.15±0.15
+25V Monitor	A	25.750		+25.50±0.75
+350V Monitor	A	24.243 OF		+350.±15.
-15V Monitor	A	-16.023		-15.0±1.0 —
-5V Monitor	A	-5.452		-5.25±0.25
Disc Ref Mon.	A	2.995		+3.00±0.02
+5V Monitor	B	5.151		+5.00±0.25
+8V Monitor	B	8.174		+8.10±0.15
-8V Monitor	B	-8.221		-8.15±0.15
+25V Monitor	B	25.750		+25.50±0.75
+350V Monitor	B	24.243		+350.±15.
-15V Monitor	B	-16.000		-15.0±1.0 —
-5V Monitor	B	-5.452		-5.25±0.25
Disc Ref Mon.	B	3.000		+3.00±0.02

Ref Page: Caution

DET PLAT TEMP 725°C

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DR# EPS-0071

DATA SHEET 2 (Cont.)

(22) Temperature Measurement

Parameter	Prime Frame	Measured Value	Acceptable Limits
Package Temperature Monitor	A	41.7 °C	92°F to 112°F = 33.3°C to 44.4°C
Package Temperature Monitor	B	41.7	↓
Detector Plate Temperature Monitor	A	35.6	
Detector Plate Temperature Monitor	B	35.6	

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NOTE: DET BIAS OFF ∴ READINGS ARE FOR 25 VOLTS APPLIED TO DETECTOR

(23) Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	.194 μA	1.0 μA
B	.433	2.0 μA
C	.985	2.0 μA
D	.138	2.0 μA
E	.432	2.0 μA

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DATA SHEET 2 (Cont.)

(24) Detector Resolution Test

DET PLATE TEMP > 25°C DET BIAS OFF
25 VOLTS APPLIED TO DET.

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	10 keV	50. keV
B	10.	50. keV
C	7.5	50. keV
D	9	50. keV
E	8	50. keV

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(27) Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	14	14 or 16
B	E2	16	14 or 16
C	E3	14	14 or 16
D	E4	14	14 or 16
E	P6	14	14 or 16

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DATA SHEET 2 (Cont.)

(28) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	14	14 or 16
B	P2	14	14 or 16
C	P3	14	14 or 16
D	P4	14	14 or 16
E	P5	14	14 or 16

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(30) Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	2032	2032 or 2048
A	E2	2048	2032 or 2048
C	E3	2032	2032 or 2048
D	E4	2032	2032 or 2048
E	P6	2032	2032 or 2048

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DATA SHEET 2 (Cont.)

(31) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	2032	2032 or 2048
B	P2	2032	2032 or 2048
C	P3	2032	2032 or 2048
D	P4	2032	2032 or 2048
E	P5	2032	2032 or 2048

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(33) Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	260 096	260,096 or 262,144
B	E2	260 096	260,096 or 262,144
C	E3	260 096	260,096 or 262,144
D	E4	260 096	260,096 or 262,144
E	P6	260 096	260,096 or 262,144

124 Insp.

1/20/72 Date

DATA SHEET 2 (Cont.)

(34) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	260 096	260,096 or 262,144
B	P2	260 096	260,096 or 262,144
C	P3	260 096	260,096 or 262,144
D	P4	260 096	260,096 or 262,144
E	P6	260 096	260,096 or 262,144

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(36) Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	0	33,292,288 or 0
B	E2	118	33,292,288 or 0
C	E3	0	33,292,288 or 0
D	E4	33,292,288	33,292,288 or 0
E	P6	33,292,288	33,292,288 or 0

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DATA SHEET 2 (Cont.)

(37) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	33,292,288	33,292,288 or 0
B	P2	33,292,288	33,292,288 or 0
C	P3	33,292,288	33,292,288 or 0
D	P4	0	33,292,288 or 0
E	P5	33,292,288	33,292,288 or 0

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DATA SHEET 2 (Cont.)

-11.1
-22.3

(43) Temperature Transition to +2°F = -16.7°C

Rosemount Temperature Value	Package Temperature Monitor Value	Detector Plate Temperature Monitor Value	Elapsed Time	
32	34.4 °C	22 °C	0 Min.	0930
-22.3	-11.2	-19.4	90 min	11:00
-20.7	-15.8	-19.6	150 min	12:00
-20.6	-15.7	-19.6	180 min	12:30
-20.6	-15.7	-19.6	210 min	1300
-20.6	-15.6	-19.7	240 min	13:30

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(45) Repeat of steps 6 through 37 at +2 ± 10°F.

(6) Heater Power

Measured Value	Acceptable Value
27.52	+27.5 ± 0.5 Vdc

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(7) Medium Voltage Heater Current

Measured Value	Acceptable Value
206 ma ma	200 ± 25 mA

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DATA SHEET 2 (Cont.)

(8) Electronic Power

Measured Value
27.44

Acceptable Value
+27.5 ± 0.5 Vdc

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(9) Medium Voltage Electronics Current

Measured Value
509 ma

Maximum Value
560 mA

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(10) Detector Bias

Measured Value
27.55

Acceptable Value
+27.5 ± 0.5 Vdc

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(11) Medium Voltage Detector Bias Current

Measured Value
20 ma

Maximum Value
30 mA

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DATA SHEET 2 (Cont.)

(13) Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	.024 Vdc	+0.025±0.010 Vdc
+0.050±0.001	,048	0.050±0.010
+0.100±0.001	.097	0.100±0.010
+1.000±0.001	.992	1.000±0.010
+2.000±0.001	1,994	2.000±0.010
+3.000±0.001	2,991	+3.000±0.010
+4.000±0.001	3,988	+4.000±0.015
+4.900±0.001	4.887	+4.900±0.020

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DATA SHEET 2 (Cont.)

(15) Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	5.063 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.077	+8.10±0.15
-8V Monitor	A	-8.099	-8.15±0.15
+25V Monitor	A	25.427	+25.50±0.75
+350V Monitor	A	345.84	+350.±15.
-15V Monitor	A	-16.029	-15.0±1.0
-5V Monitor	A	-5.332	-5.25±0.25
Disc Ref Mon.	A	2.989	+3.00±0.02
+5V Monitor	B	5.072	+5.00±0.25
+8V Monitor	B	8.077	+8.10±0.15
-8V Monitor	B	-8.083	-8.15±0.15
+25V Monitor	B	25.427	+25.50±0.75
+350V Monitor	B	345.84	+350.±15.
-15V Monitor	B	-16.029	-15.0±1.0
-5V Monitor	B	-5.319	-5.25±0.25
Disc Ref Mon.	B	2.989	+3.000±0.02

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(16)

	Actual Value	Acceptable Value
Heater	25.36	+25.0 ± 0.5 Vdc
Electronics	25.01	+25.0 ± 0.5 Vdc
Detector Bias	25.02	+25.0 ± 0.5 Vdc

Insp. ______ Date 1-20-72

DATA SHEET 2 (Cont.)

(17) Low Voltage Current Consumption

Current Sink	Measured Current	Acceptable Value
Heater	190 ma	180 ± 25 mA
Electronics	549 ma	≤ 560
Detector Bias	20 ma	≤ 50

Insp.
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(18) Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.053 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.067	+8.10±0.15
-8V Monitor	A	-8.093	-8.15±0.15
+25V Monitor	A	25.373	+25.50±0.75
+350 V Monitor	A	345.84	+350.±15.
-15V Monitor	A	-16.016	-15.0±1.0
-5V Monitor	A	-5.329	-5.25±0.25
Disc Ref Mon.	A	2.989	+3.00±0.02
+5V Monitor	B	5.063	+5.00±0.25
+8V Monitor	B	8.067	+8.10±0.15
-8V Monitor	B	-8.093	-8.15±0.15
+25V Monitor	B	25.373	+25.50±0.75
+350V Monitor	B	345.84	+350.±15.
-15V Monitor	B	-15.993	-15.0±1.0
-5V Monitor	B	-5.316	-5.25±0.25
Disc Ref Mon.	B	2.989	+3.00±0.02

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DATA SHEET 2 (Cont.)

(19)

	Actual Value	Acceptable Value
Heater	29.96	+30.0 ± 0.5 Vdc
Electronics	29.97	+30.0 ± 0.5 Vdc
Detector Bias	30.11	+30.0 ± 0.5 Vdc

Insp. Date 1-20-72

(20) High Voltage Current Consumption

Current Sink	Measured Current	Acceptable Current
Heater	225 ma	225 ± 25 mA.
Electronics	490	≤ 560
Detector Bias	20	≤ 30

Insp. Date 1-20-72

DATA SHEET 2 (Cont.)

(21) High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output		Acceptable Value
+5V Monitor	A	5.053	Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.077		+8.10±0.15
-8V Monitor	A	-8.120		-8.15±0.15
+25V Monitor	A	25.427		+25.50±0.75
+350V Monitor	A	345.84		+350.±15.
-15V Monitor	A	-16.065		-15.0±1.0
-5V Monitor	A	-5.348		-5.25±0.25
Disc Ref Mon.	A	2.983		+3.00±0.02
+5V Monitor	B	5.063		+5.00±0.25
+8V Monitor	B	8.086		+8.10±0.15
-8V Monitor	B	-8.105		-8.15±0.15
+25V Monitor	B	25.427		+25.50±0.75
+350V Monitor	B	345.84		+350.±15.
-15V Monitor	B	-16.042		-15.0±1.0
-5V Monitor	B	-5.335		-5.25±0.25
Disc Ref Mon.	B	2.989		+3.00±0.02

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DATA SHEET 2 (Cont.)

(22) Temperature Measurement

Parameter	Prime Frame	Measured Value	Acceptable Limits
Package Temperature Monitor	A	-15.642 °C	-8°F to +12°F = -22.2°C to -11.1°C
Package Temperature Monitor	B	-15.642	↓
Detector Plate Temperature Monitor	A	-19.649	✕
Detector Plate Temperature Monitor	B	-19.552	✕

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(23) Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output		Maximum Acceptable Value
A	.006	μA	1.0 μA
B	.011		2.0 μA
C	.092		2.0 μA
D	.025		2.0 μA
E	.013		2.0 μA

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DATA SHEET 2 (Cont.)

(24) Detector Resolution Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	6 keV	50. keV
B	4	50. keV
C	5	50. keV
D	7	50. keV
E	6.5	50. keV

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(27) Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	14	14 or 16
B	E2	16	14 or 16
C	E3	14	14 or 16
D	E4	16	14 or 16
E	P6	14	14 or 16

Insp. ______ Date 1/20/72

DATA SHEET 2 (Cont.)

(28) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	14	14 or 16
B	P2	14	14 or 16
C	P3	14	14 or 16
D	P4	14	14 or 16
E	P5	14	14 or 16

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(30) Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	2032	2032 or 2048
A	E2	2048	2032 or 2048
C	E3	2032	2032 or 2048
D	E4	2032	2032 or 2048
E	P6	2032	2032 or 2048

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DATA SHEET 2 (Cont.)

(31) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	2032	2032 or 2048
B	P2	2032	2032 or 2048
C	P3	2032	2032 or 2048
D	P4	2032	2032 or 2048
E	P5	2032	2032 or 2048

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(33) Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	260 096	260,096 or 262,144
B	E2	262 144	260,096 or 262,144
C	E3	260 096	260,096 or 262,144
D	E4	262 144	260,096 or 262,144
E	P6	260 096	260,096 or 262,144

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DATA SHEET 2 (Cont.)

(34) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	260 096	260,096 or 262,144
B	P2	260 096	260,096 or 262,144
C	P3	260 096	260,096 or 262,144
D	P4	260 096	260,096 or 262,144
E	P6	262 144	260,096 or 262,144

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(36) Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

START 2:08

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	33,292,288	33,292,288 or 0
B	E2	0	33,292,288 or 0
C	E3	0	33,292,288 or 0
D	E4	33,292,288	33,292,288 or 0
E	P6	33,292,288	33,292,288 or 0

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DATA SHEET 2 (Cont.)

(37) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	33,292,288	33,292,288 or 0
B	P2	33,292,288	33,292,288 or 0
C	P3	33,292,288	33,292,288 or 0
D	P4	33,292,288	33,292,288 or 0
E	P5	33,292,288	33,292,288 or 0

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DATA SHEET 2 (Cont.)

(46) Temperature Transition to +102°F = +38.9°C 33.3 44.5

Rosemount Temperature Value	Package Temperature Monitor Value	Detector Plate Temperature Monitor Value	Elapsed Time	START 15:00
39.8	33.5 °C	37.8 °C	0 Min.	1620
40.7	42.3	41.7	45	1705
35.7	37.6	40.9	108	1808

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(48) Repeat of steps 6 through 37 at +102 ± 10°F.

(6) Heater Power

Measured Value	Acceptable Value
27.54	+27.5 ± 0.5 Vdc

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(7) Medium Voltage Heater Current

Measured Value	Acceptable Value
7 ma	10 ± 5 mA

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DATA SHEET 2 (Cont.)

(8) Electronic Power

Measured Value 27.44

Acceptable Value +27.5 ± 0.5 Vdc

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(9) Medium Voltage Electronics Current

Measured Value 515 ma

Maximum Value 560 mA

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~~(10) Detector Bias~~

~~Measured Value ______~~

~~Acceptable Value +27.5 ± 0.5 Vdc~~

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~~(11) Medium Voltage Detector Bias Current~~

~~Measured Value ______ ma~~

~~Maximum Value 30 mA~~

~~Insp. ______ Date ______~~

Det Bias OFF
Ref Page 5 Caution

DATA SHEET 2 (Cont.)

(13) Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage		Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	.019	Vdc	+0.025±0.010 Vdc
+0.050±0.001	.044		0.050±0.010
+0.100±0.001	.097		0.100±0.010
+1.000±0.001	.997		1.000±0.010
+2.000±0.001	1.999		2.000±0.010
+3.000±0.001	3.000		+3.000±0.010
+4.000±0.001	3.998		+4.000±0.015
+4.900±0.001	4.897		+4.900±0.020

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DATA SHEET 2 (Cont.)

(15) Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	5.141 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.165	+8.10±0.15
-8V Monitor	A	-8.215	-8.15±0.15
+25V Monitor	A	25.696	+25.50±0.75
+350V Monitor	A	24.24	+350.±15.
-15V Monitor	A	-15.989	-15.0±1.0
-5V Monitor	A	-5.449	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.141	+5.00±0.25
+8V Monitor	B	8.165	+8.10±0.15
-8V Monitor	B	-8.215	-8.15±0.15
+25V Monitor	B	25.696	+25.50±0.75
+350V Monitor	B	24.24	+350.±15.
-15V Monitor	B	-15.987	-15.0±1.0
-5V Monitor	B	-5.436	-5.25±0.25
Disc Ref Mon.	B	3.000	+3.000±0.02

Det Bias off
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Caution

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(16)

	Actual Value	Acceptable Value
Heater	25.37	+25.0 ± 0.5 Vdc
Electronics	25.00	+25.0 ± 0.5 Vdc
Detector Bias	OFF	+25.0 ± 0.5 Vdc

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Caution

Insp. ______ Date 1-20-72

DATA SHEET 2 (Cont.)

(17) Low Voltage Current Consumption

Current Sink	Measured Current		Acceptable Value
Heater	7	ma	10 ± 5 mA
Electronics	544	ma	≤ 560
Detector Bias	OFF	ma	≤ 50

Ref Page 5 Caution

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(18) Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.131 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.155	+8.10±0.15
-8V Monitor	A	-8.209	-8.15±0.15
+25V Monitor	A	25.696	+25.50±0.75
+350 V Monitor	A	24.24	+350.±15.
-15V Monitor	A	-15.974	-15.0±1.0
-5V Monitor	A	-5.433	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.141	+5.00±0.25
+8V Monitor	B	8.155	+8.10±0.15
-8V Monitor	B	-8.193	-8.15±0.15
+25V Monitor	B	25.696	+25.50±0.75
+350V Monitor	B	24.24	+350.±15.
-15V Monitor	B	-15.951	-15.0±1.0
-5V Monitor	B	-5.433	-5.25±0.25
Disc Ref Mon.	B	3.000	+3.00±0.02

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DATA SHEET 2 (Cont.)

(19)

	Actual Value	Acceptable Value
Heater	29.98	+30.0 ± 0.5 Vdc
Electronics	29.97	+30.0 ± 0.5 Vdc
Detector Bias	OFF	+30.0 ± 0.5 Vdc

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(20) High Voltage Current Consumption

Current Sink	Measured Current	Acceptable Current
Heater	7 ma	10 ± 5 mA
Electronics	490	≤ 560
Detector Bias	OFF	≤ 30

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DATA SHEET 2 (Cont.)

(21) High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.141 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.165	+8.10±0.15
-8V Monitor	A	-8.236	-8.15±0.15
+25V Monitor	A	25.696	+25.50±0.75
+350V Monitor	A	24.24	+350.±15.
-15V Monitor	A	-16.023	-15.0±1.0
-5V Monitor	A	-5.452	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.151	+5.00±0.25
+8V Monitor	B	8.174	+8.10±0.15
-8V Monitor	B	-8.221	-8.15±0.15
+25V Monitor	B	25.750	+25.50±0.75
+350V Monitor	B	24.29	+350.±15.
-15V Monitor	B	-16.023	-15.0±1.0
-5V Monitor	B	-5.452	-5.25±0.25
Disc Ref Mon.	B	3.000	+3.00±0.02

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DATA SHEET 2 (Cont.)

(22) Temperature Measurement

Parameter	Prime Frame	Measured Value	Acceptable Limits
Package Temperature Monitor	A	40.66 °C	92°F to 112°F = 33.3°C to 44.4°C
Package Temperature Monitor	B	40.66	
Detector Plate Temperature Monitor	A	37.53	
Detector Plate Temperature Monitor	B	37.53	

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Det Bias OFF – Bias Applied ≃ 25V

(23) Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	.216 μA	1.0 μA
B	.459	2.0 μA
C	1.100	2.0 μA
D	.738	2.0 μA
E	.504	2.0 μA

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DATA SHEET 2 (Cont.)

Det Bias off
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Caution

(24) Detector Resolution Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	7 keV	50. keV
B	5	50. keV
C	5	50. keV
D	9	50. keV
E	7	50. keV

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(27) Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	14	14 or 16
B	E2	16	14 or 16
C	E3	14	14 or 16
D	E4	22,784	14 or 16
E	P6	14	14 or 16

Insp. ______ Date 1-20-72

DATA SHEET 2 (Cont.)

(28) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	14	14 or 16
B	P2	14	14 or 16
C	P3	14	14 or 16
D	P4	172	14 or 16
E	P5	14	14 or 16

Insp. ______ Date 1-20-72

(30) Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	2032	2032 or 2048
A	E2	2032	2032 or 2048
C	E3	2032	2032 or 2048
D	E4	18688	2032 or 2048
E	P6	2032	2032 or 2048

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DATA SHEET 2 (Cont.)

(31) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	2032	2032 or 2048
B	P2	2032	2032 or 2048
C	P3	2032	2032 or 2048
D	P4	2048	2032 or 2048
E	P5	2032	2032 or 2048

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(33) Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	260 096	260,096 or 262,144
B	E2	262 144	260,096 or 262,144
C	E3	260 096	260,096 or 262,144
D	E4	260096	260,096 or 262,144
E	P6	260096	260,096 or 262,144

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DATA SHEET 2 (Cont.)

(34) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	260 096	260,096 or 262,144
B	P2	260 096	260,096 or 262,144
C	P3	260 096	260,096 or 262,144
D	P4	260 096	260,096 or 262,144
E	P6	260 096	260,096 or 262,144

Insp. Date 1-20-72

(36) Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	33,292,288	33,292,288 or 0
B	E2	0	33,292,288 or 0
C	E3	33,292,288	33,292,288 or 0
D	E4	880	33,292,288 or 0
E	P6	0	33,292,288 or 0

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DATA SHEET 2 (Cont.)

(37) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	33,292,288	33,292,288 or 0
B	P2	33,292,288	33,292,288 or 0
C	P3	33,292,288	33,292,288 or 0
D	P4	0	33,292,288 or 0
E	P5	33,292,288	33,292,288 or 0

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DATA SHEET 2 (Cont.)

(49) Temperature Transition to +70°F = +21.1°C 11.5 26.7

Rosemount Temperature Value	Package Temperature Monitor Value	Detector Plate Temperature Monitor Value	Elapsed Time	
30.6 °C	40.4 °C	35.4 °C	5 Min.	20:05
16.8	30.1	21.0	30	20:50
16.5	26.5	19.5	45	20:45
16.9	21.3	18.2		07:45

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(51) Repeat of steps 6 through 37 at +70 ± 10°F

(6) Heater Power

Measured Value	Acceptable Value
27.53	+27.5 ± 0.5 Vdc

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(7) Medium Voltage Heater Current

Measured Value	Acceptable Value
7 ma	10 ± 5 mA

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DATA SHEET 2 (Cont.)

(8) Electronic Power

Measured Value 27.44

Acceptable Value +27.5 ± 0.5 Vdc

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(9) Medium Voltage Electronics Current

Measured Value 510 ma

Maximum Value 560 mA

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(10) Detector Bias

Measured Value 27.55

Acceptable Value +27.5 ± 0.5 Vdc

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(11) Medium Voltage Detector Bias Current

Measured Value 20 ma

Maximum Value 30 mA

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DATA SHEET 2 (Cont.)

(13) Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	.024 Vdc	+0.025±0.010 Vdc
+0.050±0.001	.048	0.050±0.010
+0.100±0.001	.097	0.100±0.010
+1.000±0.001	.997	1.000±0.010
+2.000±0.001	1.994	2.000±0.010
+3.000±0.001	2.996	+3.000±0.010
+4.000±0.001	3.998	+4.000±0.015
+4.900±0.001	4.897	+4.900±0.020

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DATA SHEET 2 (Cont.)

(15) Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	5.111 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.135	+8.10±0.15
-8V Monitor	A	-8.181	-8.15±0.15
+25V Monitor	A	25.588	+25.50±0.75
+350V Monitor	A	346.33	+350.±15.
-15V Monitor	A	-16.039	-15.0±1.0
-5V Monitor	A	-5.401	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.111	+5.00±0.25
+8V Monitor	B	8.135	+8.10±0.15
-8V Monitor	B	-8.166	-8.15±0.15
+25V Monitor	B	25.642	+25.50±0.75
+350V Monitor	B	346.33	+350.±15.
-15V Monitor	B	-16.016	-15.0±1.0
-5V Monitor	B	-5.401	-5.25±0.25
Disc Ref Mon.	B	2.995	+3.000±0.02

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(16)

	Actual Value	Acceptable Value
Heater	25.36	+25.0 ± 0.5 Vdc
Electronics	25.60	+25.0 ± 0.5 Vdc
Detector Bias	25.02	+25.0 ± 0.5 Vdc

Insp. ______ Date 1-21-72

DATA SHEET 2 (Cont.)

(17) Low Voltage Current Consumption

Current Sink	Measured Current	Acceptable Value
Heater	7 ma	10 ± 5 mA
Electronics	540 ma	≤ 560
Detector Bias	20 ma	≤ 50

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(18) Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.102 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.126	+8.10±0.15
-8V Monitor	A	-8.160	-8.15±0.15
+25V Monitor	A	25.588	+25.50±0.75
+350 V Monitor	A	346.33	+350.±15.
-15V Monitor	A	-15.98	-15.0±1.0
-5V Monitor	A	-5.398	-5.25±0.25
Disc Ref Mon.	A	+2.995	+3.00±0.02
+5V Monitor	B	5.111	+5.00±0.25
+8V Monitor	B	8.126	+8.10±0.15
-8V Monitor	B	-8.160	-8.15±0.15
+25V Monitor	B	25.588	+25.50±0.75
+350V Monitor	B	346.33	+350.±15.
-15V Monitor	B	-15.98	-15.0±1.0
-5V Monitor	B	-5.398	-5.25±0.25
Disc Ref Mon.	B	+2.995	+3.00±0.02

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DATA SHEET 2 (Cont.)

(19)

	Actual Value	Acceptable Value
Heater	29.98	+30.0 ± 0.5 Vdc
Electronics	29.97	+30.0 ± 0.5 Vdc
Detector Bias	30.11	+30.0 ± 0.5 Vdc

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(20) High Voltage Current Consumption

Current Sink	Measured Current	Acceptable Current
Heater	7 ma	10 ± 5 mA
Electronics	490	≤ 560
Detector Bias	20	≤ 30

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DATA SHEET 2 (Cont.)

(21) High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.111 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.135	+8.10±0.15
-8V Monitor	A	-8.166	-8.15±0.15
+25V Monitor	A	25.588	+25.50±0.75
+350V Monitor	A	346.33	+350.±15.
-15V Monitor	A	-16.016	-15.0±1.0
-5V Monitor	A	-5.400	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.111	+5.00±0.25
+8V Monitor	B	8.135	+8.10±0.15
-8V Monitor	B	-8.166	-8.15±0.15
+25V Monitor	B	25.642	+25.50±0.75
+350V Monitor	B	346.33	+350.±15.
-15V Monitor	B	-15.993	-15.0±1.0
-5V Monitor	B	-5.401	-5.25±0.25
Disc Ref Mon.	B	2.995	+3.00±0.02

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DATA SHEET 2 (Cont.)

(22) Temperature Measurement

Parameter	Prime Frame	Measured Value	Acceptable Limits
Package Temperature Monitor	A	21.3 °C	60°F-80°F = 15.5°C-26.7°C
Package Temperature Monitor	B	21.3	↓
Detector Plate Temperature Monitor	A	18.2	
Detector Plate Temperature Monitor	B	18.2	

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(23) Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	.201 μA	1.0 μA
B	.328	2.0 μA
C	1.871	2.0 μA
D	.476	2.0 μA
E	.467	2.0 μA

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DATA SHEET 2 (Cont.)

(24) Detector Resolution Test

EPS Channel	Measured Engineering Unit Output		Maximum Acceptable Value
A	6.5	keV	50. keV
B	6		50. keV
C	5.5		50. keV
D	10.5		50. keV
E	7		50. keV

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(27) Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	14	14 or 16
B	E2	14	14 or 16
C	E3	14	14 or 16
D	E4	14	14 or 16
E	P6	14	14 or 16

Insp. ____ Date 1-21-72

DATA SHEET 2 (Cont.)

(28) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	14	14 or 16
B	P2	14	14 or 16
C	P3	14	14 or 16
D	P4	14	14 or 16
E	P5	14	14 or 16

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(30) Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	2032	2032 or 2048
A	E2	2048	2032 or 2048
C	E3	2032	2032 or 2048
D	E4	2048	2032 or 2048
E	P6	2032	2032 or 2048

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DATA SHEET 2 (Cont.)

(31) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	2032	2032 or 2048
B	P2	2032	2032 or 2048
C	P3	2032	2032 or 2048
D	P4	2032	2032 or 2048
E	P5	2032	2032 or 2048

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(33) Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	260 096	260,096 or 262,144
B	E2	260 096	260,096 or 262,144
C	E3	260 096	260,096 or 262,144
D	E4	260 096	260,096 or 262,144
E	P6	260 096	260,096 or 262,144

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DATA SHEET 2 (Cont.)

(34) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	260 096	260,096 or 262,144
B	P2	260 096	260,096 or 262,144
C	P3	260 096	260,096 or 262,144
D	P4	260 096	260,096 or 262,144
E	P6	260 096	260,096 or 262,144

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(36) Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	33,292,288	33,292,288 or 0
B	E2	33,292,288	33,292,288 or 0
C	E3	33,292,288	33,292,288 or 0
D	E4	344	33,292,288 or 0
E	P6	33,292,288	33,292,288 or 0

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DATA SHEET 2 (Cont.)

(37) Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	33 292 288	33,292,288 or 0
B	P2	0	33,292,288 or 0
C	P3	0	33,292,288 or 0
D	P4	33 292,288	33,292,288 or 0
E	P5	0	33,292,288 or 0

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(54) Visual Inspection.

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Date

Appendix B

Qualification Test Procedure with Data Sheets EPS-530

QUALIFICATION TEST
FOR
ELECTRON-PROTON SPECTROMETER

P/N 39106425-_____

S/N ________

LEC Document EPS-503

Prepared by

Lockheed Electronics Company, Inc.
Houston Aerospace Systems Division
Houston, Texas

Under Contract NAS 9-11373

For

National Aeronautics and Space Administration
Manned Spacecraft Center
Houston, Texas

November 1971

QUALIFICATION TEST
FOR
ELECTRON-PROTON SPECTROMETER

P/N 39106425-301

S/N 1001

LEC Document EPS-503

Revised 2-8-72

Prepared by

Lockheed Electronics Company, Inc.
Houston Aerospace Systems Division
Houston, Texas

Under Contract NAS 9-11373

For

National Aeronautics and Space Administration
Manned Spacecraft Center
Houston, Texas
November 1971

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QUALIFICATION TEST
FOR
ELECTRON-PROTON SPECTROMETER

Prepared by: D. L. Vincent
D. L. Vincent
Mechanical Engineer

Approved by: Bruno E. Curtsinger
B. E. Curtsinger
Engineering Supervisor

B C Hall
B. C. Hall
Program Manager

Electron-Proton Spectrometer Program
Radiation Instrumentation Department

Lockheed Electronics Company, Inc.
Houston Aerospace Systems Division
Houston, Texas

EPS-503

QUALIFICATION TEST
FOR
ELECTRON-PROTON SPECTROMETER

P/N 39106425-301
S/N 1001

Approved by: 1/11/72

Approved by: 1-17-72

Approved by: 1/17/72

National Aeronautics and Space Administration
Manned Spacecraft Center
Houston, Texas

REVISION RECORD

Revision of

2-8-72 Page 4 - Rearranged
Page 5 - Changed R Axis levels
Page 6 - Changed R Axis duration
Page 21 - Changed step 2.4.8
Page 36 - New illustration

Approved 2/14/72
2/14/72

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QUALIFICATION TEST PROCEDURE

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QUALIFICATION TEST PROCEDURE
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QUALIFICATION TEST PROCEDURE

1. OBJECTIVES AND REQUIREMENTS

1.1 OBJECTIVE

The objective of this test is to verify the operational integrity of the Electron-Proton Spectrom~~eter~~(EPS). The test will be conducted on the completed EPS, therefore, the acceptance tests, (EPS Acceptance Test Procedure, LEC Document # EPS-489) will be conducted on the EPS prior to the start of this test.

1.2 ENVIRONMENTAL TEST REQUIREMENTS

The following environmental tests required by the End Item Specification and the Interface Control Documents will be conducted at the various NASA/MSC test facilities in accordance with the EPS Contract NAS 9-11373. The tests will be conducted in the sequence below, however, this is subject to change should scheduling problems be encountered at MSC test facilities. When specified, visual inspection will be performed between the following tests.

Test Sequence	Test Type
1	Functional
2	Thermal Vacuum
3	Vibration
4	Shock
5	EMC
6	Acoustic
7	Humidity

Tests to determine that the EPS is operating within specification tolerances will be conducted during the Thermal Vacuum and EMC tests and before and after for all other tests.

The EPS electronics will be calibrated prior to conducting this test and no adjustments or tuning of the EPS will be permitted during the testing.

Each of the EPS systems including the scientific analog system, power system, temperature control system, housekeeping system, and the data processor system will be thoroughly exercised during the test.

The Bench Test Equipment (BTE) will be utilized during the test to provide power, timing signals, and test input signals, and to process data from the EPS by providing data storage, data decompression, engineering unit conversion visual display, and hard copy print out of all data. The BTE provides an interface to the EPS equivalent to that provided by the spacecraft/telemetry system in that it provides the same timing, voltage and impedance levels, signal rise times and power as does the spacecraft interface/telemetry system.

1.3 EQUIPMENT REQUIRED

1. Functional:

BTE (including test cables) (39106424)
Power Design 2005 Power Supply S/N 703138

2. Thermal Vacuum

Thermal/Vacuum Chamber (Chamber 'N') Test Fixture.	T/V Facility Bldg. 33, NASA/MSC

3. Vibration

GVL Control System 249 Shaker Dual 310 Slideplate Fixture V6-1-116	Vibration Facility Bldg. 49, NASA/MSC

4. Shock

GVL Control System Fixture V6-1-116 Stand SEC39107541	Vibration Facility Bldg. 49, NASA/MSC

5. EMC

Stand SEC39107541	Test Facility Bldg. 14, NASA/MSC

6. Acoustic

Reverberent Chambers	Test Facility Bldg. 262, NASA/MSC

7. Humidity

Humidity-Temperature Chamber and associated equipment	Test Facility Bldg. 15, NASA/MSC

Humidity Test Connector
SEC39107561-301
Stand SEC39107541.

1.4 TEST ENVIRONMENT AND SPECIFICATION

1. Functional

Prior to any environmental test, and subsequent to the test articles exposure to that environment, a functional test shall be run to ascertain that the test article is operational.

If less than one week has elapsed since the last functional test was conducted after an environmental exposure, that test may serve as verification of proper performance before succeeding environmental exposure.

2. Thermal Vacuum

The following test cases will be conducted: *

(a)	Operating - Cold	B angle = ±73 1/2°
(b)	Standby - Cold (heater power only)	B angle = ±73 1/2°
(c)	Operating - Hot	B angle = 0°
(d)	Predocking, power off	Direct sun exposure

*Sequence is not mandatory, but is most efficient for test facility use.

Boundary conditions for the above test cases are shown in Figure 1. Temperature and limits of the detectors and electronics package for test case are given in Figure 3.

The test shall be conducted in a vacuum chamber, with the EPS mounted to the test fixture (provided by NASA). The lamp banks (Figure 2) shall have been calibrated to provide the heat flux requirements called for in Figure 1.

3. Vibration

Sinusoidal: Sweep from 5 to 35 to 5 Hz at .25 g peak.
Sweep rate: 3 octaves/min.
(Applicable to all 3 axes of the instrument.)

Random:

R Axis

Max g and liftoff simulation

20 to 175 Hz + 9 dB/octave increase
175 to 350 Hz 6.0 g^2/Hz
350 to 2000 Hz - 3 dB/octave decrease

Transonic/Mach 1 simulation

20 to 175 Hz + 9 dB/octave increase
175 to 350 Hz 10.0 g^2/Hz
350 to 2000 Hz - 3 dB/octave decrease

X Axis

20 - 75 Hz @ 6 dB/oct increasing
75 - 175 Hz - .085 g^2/Hz
175 - 300 Hz - 6 dB/oct increasing
300 - 1000 Hz - .25 g^2/Hz
1000 - 2000 Hz - 6 dB/oct

T Axis

20 - 100 Hz @ 6 dB/oct increasing
100 - 440 Hz - .04 g^2/Hz
440 - 600 Hz - 19 dB/oct increasing
600 - 900 Hz - .30 g^2/Hz
900 - 2000 Hz - -12 dB/oct

Duration:
For R axis; 80 seconds at liftoff simulation plus 10 seconds at Mach 1 simulation. For X and T axes; 80 seconds at nominal level plus 10 seconds at 4 dB above nominal.

All tests shall be performed under the prevailing laboratory conditions.

The tolerances on the test conditions shall be:

(a) The test tolerances for equalization bursts at any level are 2 dB above full levels from 20 to 1000 Hz and 4 dB above full levels from 1000 to 2000 Hz. There are no minimum tolerance requirements.

(b) The test tolerances for full level test runs are ±2 dB from 20 to 1000 Hz and ±4 dB from 1000 to 2000 Hz.

(c) The overall g rms tolerance is +15% and -10%, applicable both to bursts and test runs. (Note: g rms values are to be read out of the control console meter).

(d) Compliance with the tolerance shall be verified by analysis of the input spectrum.

(e) Three separate exceedances whose bandwidth is less than that of the shaping filter (up to 25 Hz) or less than 5% of the center frequency, whichever is larger, are acceptable.

(f) Reductions below tolerance, whose bandwidth is less than that of the shaping filter (up to 25 Hz are acceptable, provided the maximum capability of the shaker system has been used.

4. Shock

The shock test consists of two parts:

(a) Verifying the integrity of the EPS to the pyrotechnic shock given in the I.C.D. (NR Document MH04-02120-434).

(b) MIL-STD-810B, Method 516.1, Procedure V.

Test (a) consists of subjecting the test article to a pulse that produces the shock spectrum shown in Figure 4. The test article shall be subjected to this pulse once in each direction for the three mutually perpendicular axes (total of 6 shocks).

Test (b) consists of placing the test article, in its assembly and servicing stand, on a wooden bench top at least 1 5/8" thick and performing the following:

With the stand resting on its base lift one edge of the base four inches and allow the unit to drop back freely to the horizontal bench top. Repeat using the other three edges as pivot points for a total of four drops. Functionally test unit and compare with previous test results. Figure 5 shows test arrangement for Procedure V.

5. EMC

The EMC test will be conducted in accordance with Qualification Procedure for Electromagnetic Interference and Susceptibility Tests, Skylab Electron-Proton Spectrometer, EMC-P-EB8-003, and North American Rockwell ICD MH04-02057-234.

6. Acoustic

The acoustic test shall be run in accordance with MIL-STD-810B, Method 515, Procedure I with the following exceptions:

(a) The sound pressure levels shall be as shown in Figure 6

(b) The test time shall be 80 seconds of nominal exposure + 10 seconds of exposure to the transonic buffeting levels.

These test levels shall apply to the top (detector) face of the instrument. The sides of the instrument will be exposed to a level approximately 6 dB lower, when mounted on the test fixture. At the conclusion the unit shall be functionall tested and the results compared with previous functional test results.

7. Humidity

The humidity test will be run to MIL-STD-810B. Method 507, Procedure I, except that the minimum temperature shall be 68°F and the maximum temperature shall be 120°F. This test shall be repeated for five cycles only.

In general Procedure I consists of exposing the unit under test to the following conditions.

(a) Raise temperature from ambient to 120°F and humidity to 95% over a two hour period. Maintain this condition for six hours.

(b) Over a period of 16 hours reduce temperature to 68°F and 85° or greater relative humidity.

(c) Repeat steps (a) and (b) for 5 cycles (120 hours).

(d) Allow the EPS to remain at room ambient conditions with no power applied for 8 hours.

(e) Functionally operate test unit at ambient conditions and compare with previous results.

1.5 FAILURE REPORTS

All failures will be reported in compliance with paragraph 4.4.4.1 of MSC-KA-D-69-44.

2. TEST PROCEDURE

2.1 FUNCTIONAL TEST

2.1.1 Turn OFF all EPS power at the BTE.

2.1.2 Connect the EPS to BTE as shown in Figure 7.

2.1.3 Place the BTE output power voltage level selection switch in the medium position.

2.1.4 Turn the Heater Power Switch to ON and verify that the output voltage is +27.5 ± 0.5 Vdc. Record actual voltage.

2.1.5 Record the EPS Heater input current on the data sheet. Verify that this current is within the acceptance limits given on the data sheet.

2.1.6 Turn the Electronics Power Switch to ON and verify that the output voltage is 27.5 ± 0.5 Vdc. Record actual voltage.

2.1.7 Record the EPS Electronics input current on the data sheet. Verify that this current is within the acceptance limits given on the data sheet.

CAUTION

Do not apply Detector Bias when Detector Plate Temperature Monitor indicates 25°C or higher. If Detector Plate Temperature reaches 25°C, remove Detector Bias if applied. Detector Bias applied above 25°C may damage detectors. CAUTION does not apply when diodes are installed in place of detectors.

2.1.8 Turn the Detector Bias Switch to ON and verify that the input voltage is +27.5 ± 0.5 Vdc. Record actual voltage.

2.1.9 Record the EPS Detector Bias Current on the data sheet. Verify that this current is within the acceptance limits given on the data sheet.

2.1.10 Activate the BTE controller and display. Select the Housekeeping Format.

2.1.11 Sequentially apply external reference voltage values given in the data sheet using the ADC External Reference Supply. Record on the data sheet the electrical unit value of the +350 V monitor as displayed by the BTE for each reference voltage. Verify that all EPS output values are within acceptance limits given in the data sheet.

2.1.12 Disconnect the External ADC Reference Supply from the BTE.

2.1.13 Record the values of those housekeeping parameters listed in the data sheet displayed on the BTE in engineering units. Verify that these EPS output values are within the acceptance limits given in the data sheet.

2.1.14 Place the BTE output power voltage level selection switch in the low position. Verify the Heater, Electronics and Detector Bias output voltages are +25.0 ± 0.5 Vdc. Record actual values.

2.1.15 Record the values of the EPS input currents and verify that these values are within the acceptance limits given in the data sheet.

2.1.16 Record the values of those housekeeping parameters listed in the data sheet displayed on the BTE in engineering units. Verify that these EPS output values are within the acceptance limits given in the data sheet.

2.1.17 Place the BTE output voltage switch in the high position. Verify that the Heater, Electronics, and the Detector Bias output voltages are +30.0 ± 0.5 Vdc.

2.1.18 Record the values of the EPS input currents and verify that these values are within the acceptance limits given in the data sheet.

2.1.19 Record the values of those housekeeping parameters listed in the data sheet displayed on the BTE in engineering units. Verify that these EPS output values are within the acceptance limits given in the data sheet.

2.1.20 Place the BTE output voltage switch in the Medium position. Record the values of the Package Temperature Monitor and the Detector Plate Temperature Monitor as displayed on the BTE in engineering units. Verify that the recorded values are within the acceptance limits given in the data sheet. During Thermal Vacuum Tests, this step for information only.

2.1.21 If the engineering unit value of the Detector Plate Temperature Monitor measured in step 2.1.20 is within the limits -50°C to +25°C record the values of each of the Detector Leakage Current Monitors as displayed on the BTE in engineering units. Verify that the recorded values are within the acceptance limits given in the data sheet.

2.1.22 If the engineering unit value of the Detector Plate Temperature Monitor measured in step 2.1.20 is within the limits -50°C to +25°C record the values of each of the Detector Resolution Monitors as displayed on the BTE in engineering units. Verify that the recorded values are within the acceptance limits given in the data sheet.

2.1.23 Place the Detector Bias Voltage switch of the BTE to OFF.

2.1.24 Place the BTE in the Data Format with a Burst Generator burst length of 14 pulses and a Sync Pulse Rate of 1 pulse/second.

2.1.25 Place the Burst Generator amplitude selection switch in the E1, E2, E3, E4, P6 position. For a complete burst cycle record the value of the information accumulated by the EPS Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 channels on the data sheet. Verify that these values are within acceptance limits given on the data sheet.

2.1.26 Place the Burst Generator amplitude selection switch in the P1, P2, P3, P4, P5 position. For a complete burst cycle record the value of the information accumulated by the EPS Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 channels on the data sheet. Verify that these values are within acceptance limits given on the data sheet.

2.1.27 Change the BTE Burst Length to 2046 pulses.

2.1.28 Place the Burst Generator amplitude selection switch in the E1, E2, E3, E4, P6 position. For a complete burst cycle record the value of the information accumulated by the EPS Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 channels on the data sheet. Verify that these values are within acceptance limits given on the data sheet.

2.1.29 Place the Burst Generator amplitude selection switch in the P1, P2, P3, P4, P5 position. For a complete burst cycle record the value of the information accumulated by the EPS Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 channels on the data sheet. Verify that these values are within acceptance limits given on the data sheet.

2.1.30 Change the BTE Burst Length to 262,142 pulses and the Sync Pulse Rate to 1 pulse/4 seconds.

2.1.31 Place the Burst Generator amplitude selection switch in the E1, E2, E3, E4, P6 position. For a complete burst cycle record the value of the information accumulated by the EPS Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 channels on the data sheet. Verify that these values are within acceptance limits given on the data sheet.

2.1.32 Place the Burst Generator amplitude selection switch in the P1, P2, P3, P4, P5 position. For a complete burst cycle record the value of the information accumulated by the EPS Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 channels on the data sheet. Verify that these values are within acceptance limits given on the data sheet.

2.1.33 Change the BTE Burst Length to 33,554,430 pulses and the Sync Pulse Rate to 1 pulse/16 seconds.

2.1.34 Place the Burst Generator amplitude selection switch in the E1, E2, E3, E4, P6 position. For a complete burst cycle record the value of the information accumulated by the EPS Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 channels on the data sheet. Verify that these values are within acceptance limits given on the data sheet.

2.1.35 Place the Burst Generator amplitude selection switch in the P1, P2, P3, P4, P5 position. For a complete burst cycle record the value of the information accumulated by the EPS Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 channels on the data sheet. Verify that these values are within acceptance limits given on the data sheet.

2.1.36 Perform a visual inspection for obvious damage such as dents, cracks, scratches, chipped paint, and loose screws.

2.2 THERMAL/VACUUM TEST

✓ 2.2.1 Upon completion of steps 2.1.1 through 2.1.36, move the the test article and BTE to vacuum chamber facility of Building 33, NASA/MSC.

✓ 2.2.2 Prepare vacuum chamber and test fixture for thermal/vacuum testing of the EPS.

✓ 2.2.3 Verify that all environmental chamber power is off and install test article on test fixture and connect to feed-through connector.

✓ 2.2.4 Turn off all power to test fixture (environmental simulation power) by unplugging at wall socket. Connect BTE to feed-through connector.

✓ 2.2.5 Perform a functional test steps 2.1.3 thru 2.1.35.

✓ 2.2.6 Close chamber door and pump down. (Vacuum to be better than 1 x 10^{-6} Torr).

✓ 2.2.7 Provide suitable power to the test fixture lamps, skin and cavity to give boundary conditions for test case 1 (operating - cold orbit. See Figure 1).

✓ 2.2.8 Place the BTE output power voltage level selection switch in the 'Medium' position.

✓ 2.2.9 Turn the Electronics Power Switch of the BTE to 'ON'.

✓ 2.2.10 Turn the Heater Power Switch of the BTE to 'ON'.

✓ 2.2.11 Turn the Detector Bias Switch of the BTE to 'ON'.

✓ 2.2.12 Activate the BTE controller and display. Select the housekeeping format.

✓ 2.2.13 Record the values of the Package Temperature Monitor and the Detector Plate Temperature Monitor, as displayed on the BTE Prime Frame A in engineering units, every 1/2 hour until the package temperature stabilizes. (Stabilization is reached when this temperature does not change more than 1.5°C (3°F) per hour.)

✓ 2.2.14 When stabilization is reached, allow the test article to 'soak' at this condition for 2 hours. (Package and detector temperatures will still be changing slowly; continue to record these temperatures every 1/2 hour.)

✓ 2.2.15 Repeat steps 2.1.4 through 2.1.35.

✓ 2.2.16 Return BTE to housekeeping mode.

✓ 2.2.17 Turn the Electronics Power Switch of BTE to 'OFF'.

✓ 2.2.18 Turn the Detector Bias Switch of the BTE to 'OFF'.

Test article is now in test case 2 (Heater power only - cold orbit, see Figure 1). Monitoring of Package Temperature and Detector Plate Temperature is achieved by turning Electronics Power Switch of the BTE to 'ON', allowing housekeeping data to stabilize (2 cycles is sufficient) and then returning the Electronics Power Switch to the 'OFF' position. BTE console will continue to display housekeeping data from the period of operation.

✓ 2.2.19 Repeat step 2.2.13.

✓ 2.2.20 Repeat step 2.2.14.

✓ 2.2.21 Repeat steps 2.1.4 through 2.1.35.

✓ 2.2.22 Return BTE to housekeeping mode.

✓ 2.2.23 Set fixture lamps, skin and cavity to give boundary conditions for test case 3 (operating - hot orbit, See Figure 1).

✓ 2.2.24 Place BTE:
- (a) Electronics Power Switch - 'ON'
- (b) Detector Bias Switch - 'ON'
- (c) Heater Power Switch - 'ON'

✓2.2.25 Repeat step 2.2.13.

✓2.2.26 Repeat step 2.2.14.

✓2.2.27 Repeat steps 2.1.4 through 2.1.35.

✓2.2.28 Set fixture lamps, skin and cavity to give boundary conditions for test case 4. (See Figure 1.)

✓2.2.29 Turn BTE:

(a) Electronics Power Switch to 'OFF'
(b) Heater Power Switch ot 'ON'
(c) Detector Bias Switch to 'OFF'

Test article is now in test case 4 (No power - pre-docking see Figure 1). Monitoring of Package Temperature and Detector Plate Temperature is achieved by turning Electronics Power Switch of the BTE to 'ON', allowing housekeeping data to stabilize (2 cycles is sufficient) and then returning the Electronics Power Switch to the 'OFF' position. BTE console will continue to display housekeeping data from the period of operation.

✓2.2.30 Repeat step 2.2.13.

✓2.2.31 Repeat step 2.2.14.

2.2.32 Return vacuum chamber to ambient temperature and pressure.

2.3 FUNCTIONAL TEST

Repeat steps 2.1.1 through 2.1.36.

2.4 VIBRATION

2.4.1 Repeat steps 2.1.1 through 2.1.36. (Note: If less than one week has passed since Functional Test 2.3, this test may be omitted.)

2.4.2 Take test article to vibration facility, Building 49, NASA/MSC.

2.4.3 Prepare the GVL control system for sinusoidal and random excitation, utilizing the 249 shaker and dual 310 slideplate.

2.4.4 Mount the vibration fixture V6-1-116 on the 249 shaker.

2.4.5 Shape 'R' axis random vibration spectrum (see Figure 8 for spectrum).

2.4.6 Install test article on vibration fixture, using P/N SDC39107458-001, SDC39107458-002, and 10-32UNF x 3/4 long skt. hd. cap screw (as shown in Figure 9). Screws to be installed to a torque of 56 ± 1 lbs-ins.

2.4.7 Expose the test article to the sinusoidal sweep (5-35-5 Hz at .25g peak, sweep at 3 octave/min.).

2.4.8 Expose the test article to the max q and liftoff random vibration spectrum for 80 seconds plus 10 seconds of Mach 1 random vibration spectrum (total exposure = 90 seconds

2.4.9 Remove test article from fixture.

2.4.10 Repeat steps 2.1.1 through 2.1.35.

2.4.11 Remove fixture from 249 shaker, move to dual 310 slideplate, mount and orient for 'X' axis excitation (see Figure 10).

2.4.12 Shape the 'X' axis spectrum (see Figure 11 for spectrum).

2.4.13 Repeat step 2.4.6.

2.4.14 Repeat step 2.4.7.

2.4.15 Repeat step 2.4.8 for 'X' axis excitation.

2.4.16 Repeat step 2.4.9.

2.4.17 Re-orient test fixture for 'T' Axis excitation. (See Figure 10)

2.4.18 Shape the 'T' Axis spectrum (see Figure 12 for spectrum).

2.4.19 Repeat step 2.4.6.

2.4.20 Repeat step 2.4.7.

2.4.21 Repeat step 2.4.8 for 'T' Axis excitation.

2.4.22 Repeat step 2.4.9.

2.4.23 Return test article to Beta Building.

2.5 FUNCTIONAL TEST

Repeat steps 2.1.1 through 2.1.36.

2.6 SHOCK

2.6.1 Repeat steps 2.1.1 through 2.1.36. (Note: If less than one week has passed since Functional Test 2.5, this test may be omitted.)

2.6.2 Take test article to vibration facility, Building 49, NASA/MSC.

2.6.3 Prepare shaker system, utilizing 249 shaker and dual 310 slide plate, for shock exictation.

2.6.4 Mount the vibration fixture V6-1-116 on the 249 shaker.

2.6.5 Shape shock pulse to produce the response spectrum of Figure 4.

2.6.6 Repeat step 2.4.6.

2.6.7 Expose the test article to the shock pulse in the +R and -R axis.

2.6.8 Repeat step 2.4.9.

2.6.9 Orient fixture and test item for 'X' Axis excitation, on 310 slideplate.

2.6.10 Repeat step 2.6.5.

2.6.11 Repeat step 2.4.6.

2.6.12 Repeat step 2.6.7 for +X and -X axis.

2.6.13 Repeat step 2.4.9.

2.6.14 Repeat step 2.4.17.

2.6.15 Repeat step 2.4.6.

2.6.16 Repeat step 2.6.7 for +T and -T axis.

2.6.17 Remove test article from test fixture.

2.6.18 Perform visual inspection of the end item for obvious damage such as dents, cracks, scratches, chipped paint, and loose screws.

2.6.19 Place EPS in servicing stand as shown in Figure 5. Secure to the stand in eight places with hardware shown in Figure 9.

2.6.20 Place EPS on wooden bench top at least 1 5/8" thick.

2.6.21 With stand resting on its base, lift one edge of the base 4 inches and allow the unit to drop freely to the bench top. Repeat using the other three edges as pivot points for a total of four drops.

2.7 FUNCTIONAL TEST

Repeat 2.1.1 to 2.1.36

2.8 EMC

2.8.1 After the EPS has been transferred to MSC Building 14, EMC Test Area, a demonstration of proper instrument operation is required prior to EMC Testing. Repeat steps 2.1.1 through 2.1.36.

2.8.2 Perform EMC testing as per NASA Document EMC-P-EB8-003, Qualification Procedure for Electromagnetic Interference and Susceptibility Tests, Skylab Electron/Proton Spectrometer.

Note: Since the Operating Temperature requirements for the EPS cannot be met during EMC testing (i.e., when the Detector Plate Temperature is greater than 25°C, all detector power is removed from the EPS), then the definition of susceptibility as given in Paragraph 5.0 of EMC-P-EB8-003 may not be valid. During EMC testing, if greater than 10 counts is obtained in any electron or proton channel, the RF stimulus shall be removed and another reading taken. If the counts are still present the EPS is not susceptible to the RF stimulus.

2.9 FUNCTIONAL TEST

After completion of all EMI testing, a demonstration of proper instrument operation is required.

Repeat steps 2.1.1 through 2.1.36.

2.10 ACOUSTIC

2.10.1 Repeat steps 2.1.1 through 2.1.36. (If less than one week has passed since Functional Test 2.9, this test may be omitted.)

2.10.2 Take test article to Acoustic Test Facility.

2.10.3 Prepare anechoic chamber to provide sound pressure levels of Figure 6.

2.10.4 Install test article in test chamber.

2.10.5 Subject the EPS to a sweep of from 25 to 8000 cps at the sound pressure levels specified in Figure 6. Subject the instrument to the specified sweep for a period of 80 + 10 seconds for each of the orthogonal axes of the instrument. If the test facility permits exposure of all sides simultaneously, the total test time may be limited to 80 seconds plus 10 seconds of transonic buffeting.

2.10.6 Remove test article from chamber.

2.10.7 Return to Beta Building

2.11 FUNCTIONAL TEST

Repeat steps 2.1.1 through 2.1.36.

2.12 HUMIDITY

2.12.1 Repeat steps 2.1.1 through 2.1.36. (If less than one week has passed since Functional Test 2.11, this test may be omitted.)

2.12.2 Install potted dummy plug (SEC39107561-301) in connector. Mount EPS in stand SEC39107~~5~~941.

2.12.3 Take test article to Test Facility.

2.12.4 Place test article in test chamber. Prior to starting cycling, the internal chamber temperature shall be at standard ambient with uncontrolled humidity.

2.12.5 Gradually raise internal chamber temperature to 48.9°C (120°F) and the relative humidity to 95% over a period of 2 hours.

2.12.6 Maintain conditions of step 2.12.5 for not less than 6 hours.

2.12.7 Maintain 85%, or greater, relative humidity and reduce internal chamber temperature in 16 hours to 20°C ± 10°C (68°F).

2.12.8 Repeat steps 2.12.5 thru 2.12.7 for 5 cycles (not less than 120 hours). Figure 13 is an outline of the humidity cycle for this procedure.

2.12.9 Remove the test article from the chamber and allow the test article to return to 20°C ± 10°C.

2.12.10 Within one hour of test completion, perform a visual inspection for obvious damage such as dents, cracks, scratches, chipped paint, and loose screws.

2.12.11 Return test article to Beta Building.

2.13 FUNCTIONAL TEST

Repeat steps 2.1.1 to 2.1.35 eight hours after completion of the humidity test.

Test Case	Instrument Mode	Power	Simulated β Angle	Hot or Cold	Absorbed Heat Flux(BTU/Hr-Ft^2)		Boundary Temp. (°F)	
					Top	Sides	Skin	Cavity
1	Operating	Electronics and Heaters	±73 1/2°	Cold	18.2	13.9	-75	0
2	Standby	Heater Only	±73 1/2°	Cold	18.2	13.9	-75	0
3	Operating	Electronics Only	0	Hot	33.8	16.0	-23	75
4	Pre-Docking	None	±73 1/2°	Hot	128	13.9	250	75

Figure 1 Thermal/Vac. Test Parameters

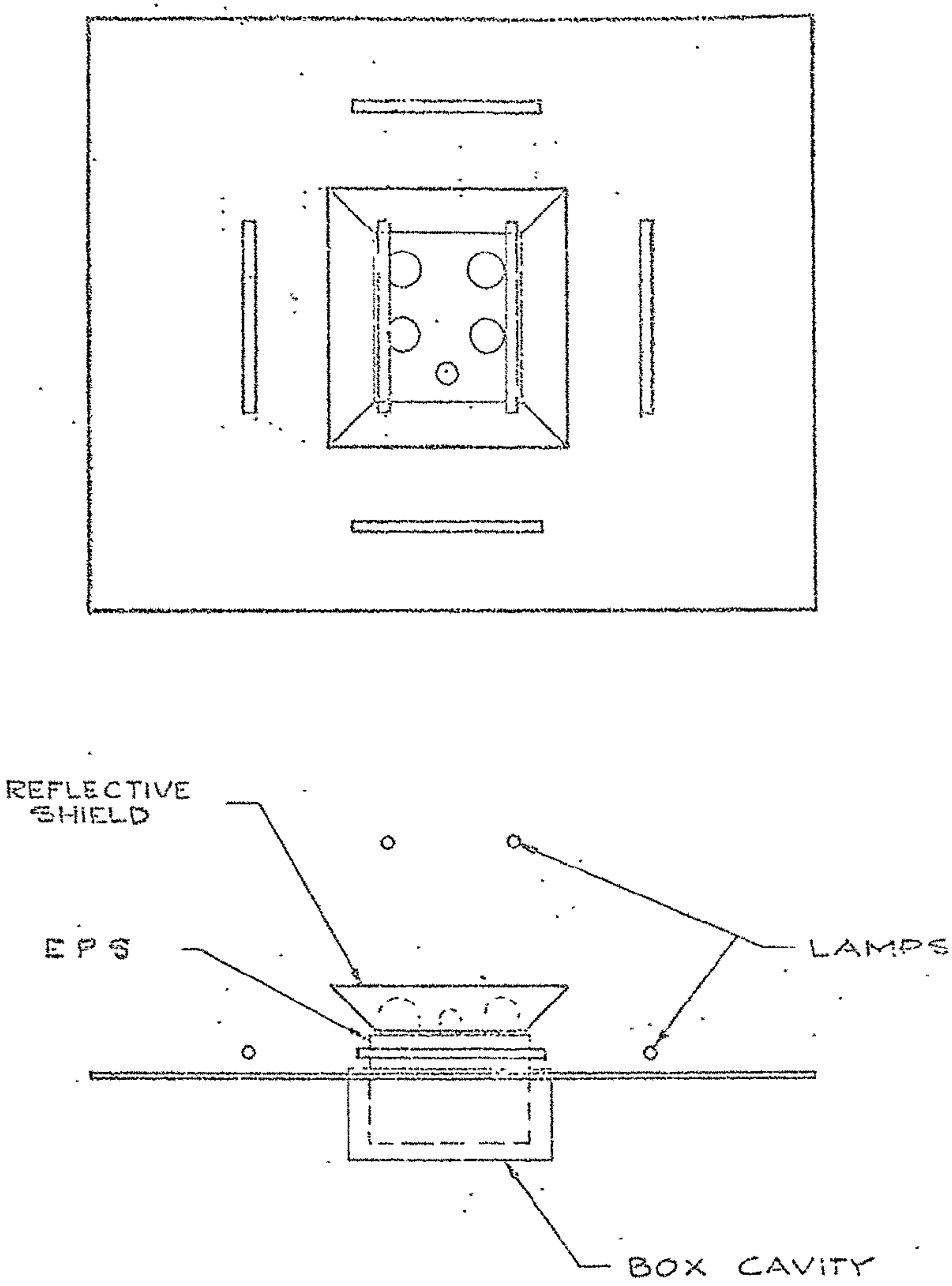


Figure 2 EPS Thermal Test Unit
Diagram of Test Fixture

EPS THERMAL VACUUM TEST LIMITS AND ANALYTICAL PREDICTIONS

Case		Electronics Temp. (°F)		Detector Temp. (°F)	
No.		Limit	Predicted	Limit	Predicted
1	Operating Mode 15 Watts, $\beta = \pm 73^\circ$	-13 Lower	20	-58 Lower	-12
2	Heater Only 6 Watts, $\beta = \pm 73^\circ$	-58 Lower	-34	-58 Lower	-52
3	Operating Mode 15 Watts, $\beta = 0^\circ$	122 Upper	79	50 Upper	28
4	Survival - Predock No Power, Sun on EPS Cavity at 117°F	150 Upper	75	122 Upper	75

Figure 3

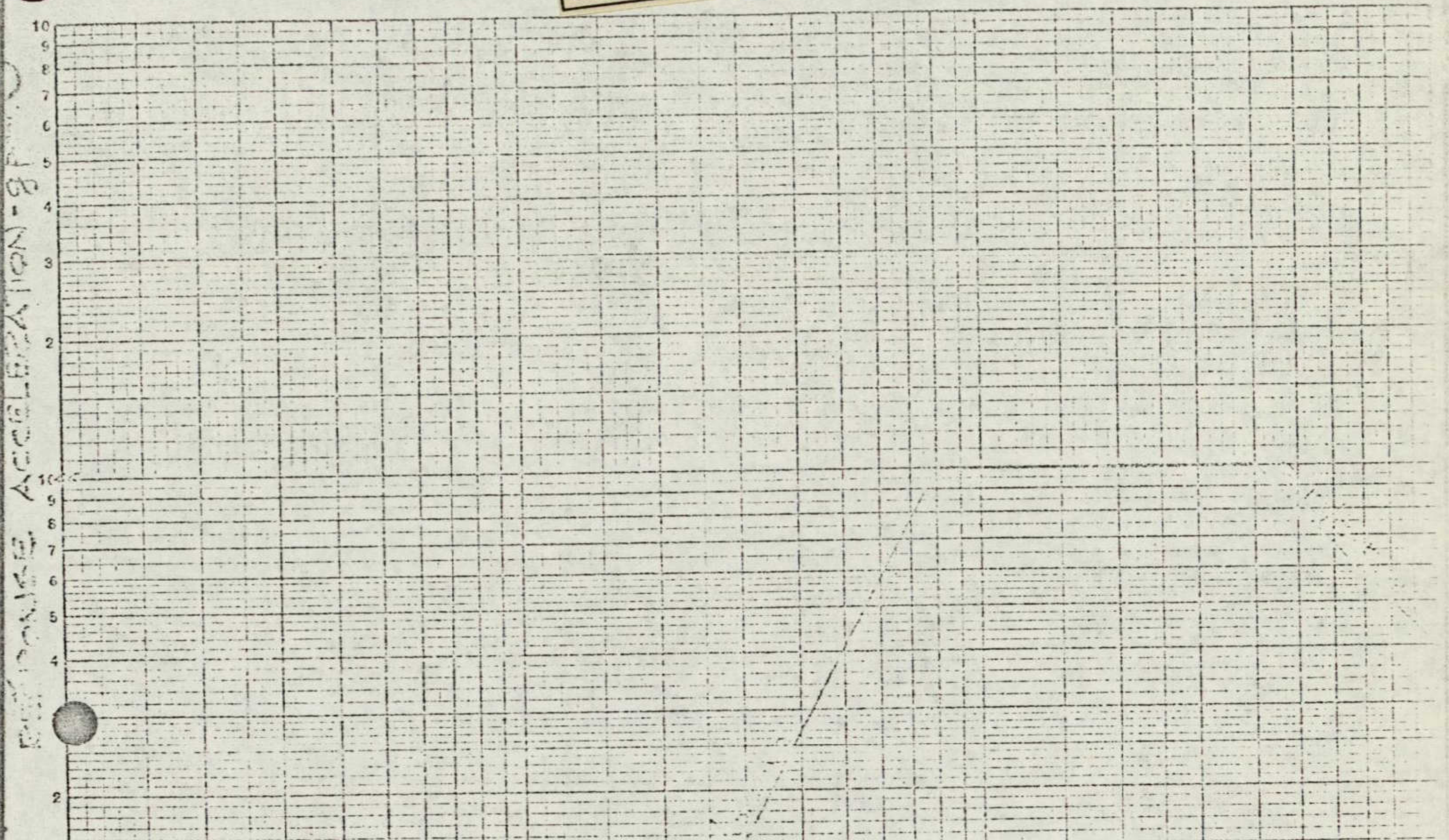
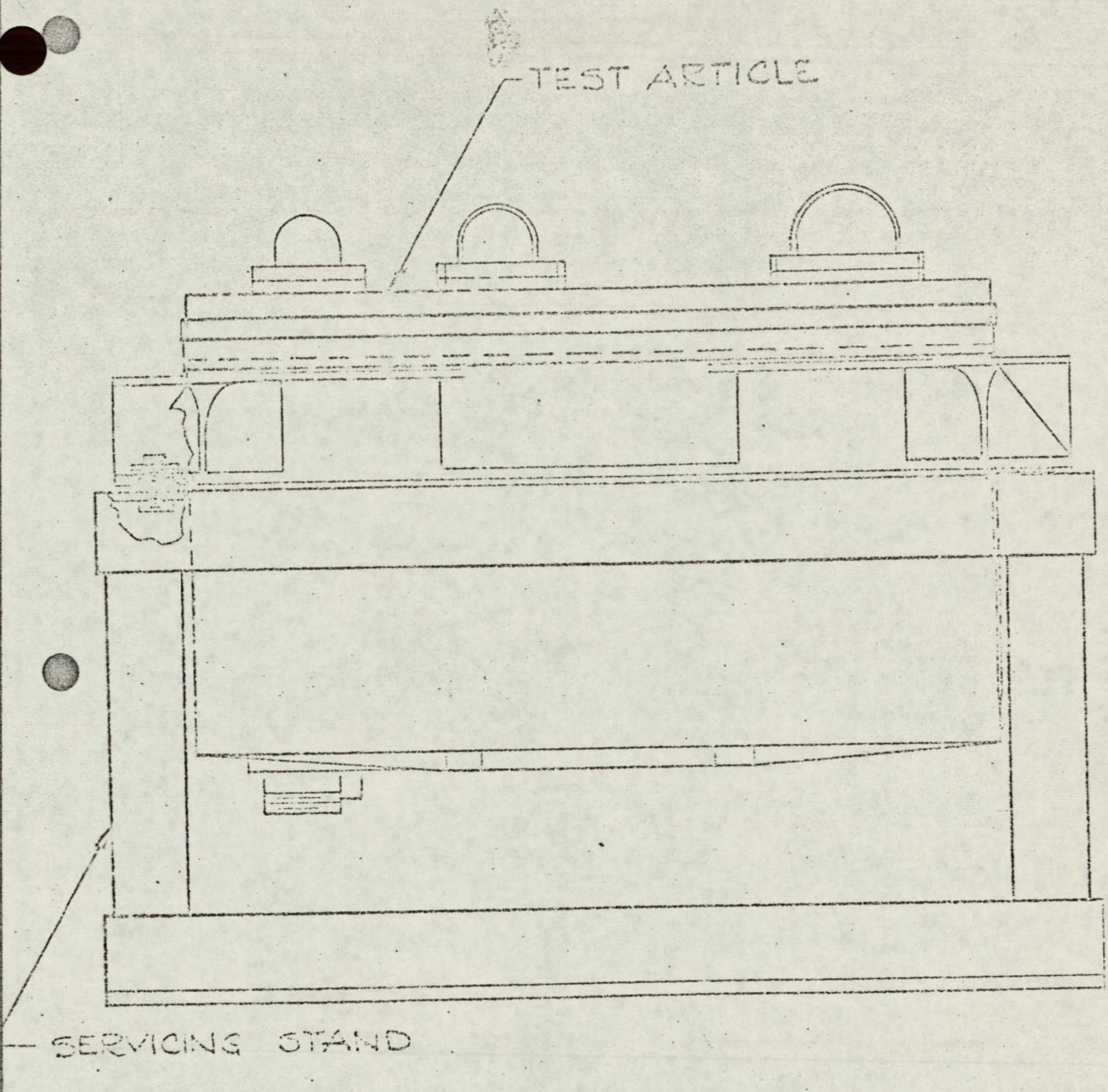


FIG. 4 - SHOCK RESPONSE SPECTRUM.

(TAKEN FROM ICD, NAS
[illegible]



1.5 EPS BENCH DROP TEST ARRANGEMENT

ACOUSTIC ENVIRONMENT

1/3 Octave Band Center Frequency (CPS)	1/3 Octave Band Sound Pressure Level - dBre 0.0002 uBar	
	Maximum Aerodynamic Pressure	Transonic Buffeting
25	143	
31.5	145	
40	147	
50	148	
63	149	
80	150	Run to same spectrum, but overall level 4 dB higher.
100	151	
125	150	
160	149	
200	148	
250	147	
315	146	
400	145	Test tolerances: overall level, ±1 dB. below 40 cps ±6 dB 40 - 1000 cps ±1 dB above 1000 cps ±20 dB.
500	143	
630	141	
800	139	
1000	137	
1250	135	
1600	133	
2000	131	
2500	129	
3150	127	
4000	125	
5000	123	
6300	121	
8000	118	
OVERALL	161	

Duration: 80 seconds of Max. Aerodynamic Pressure +10 seconds of Transonic Buffeting.

Figure 6 - Acoustic Noise

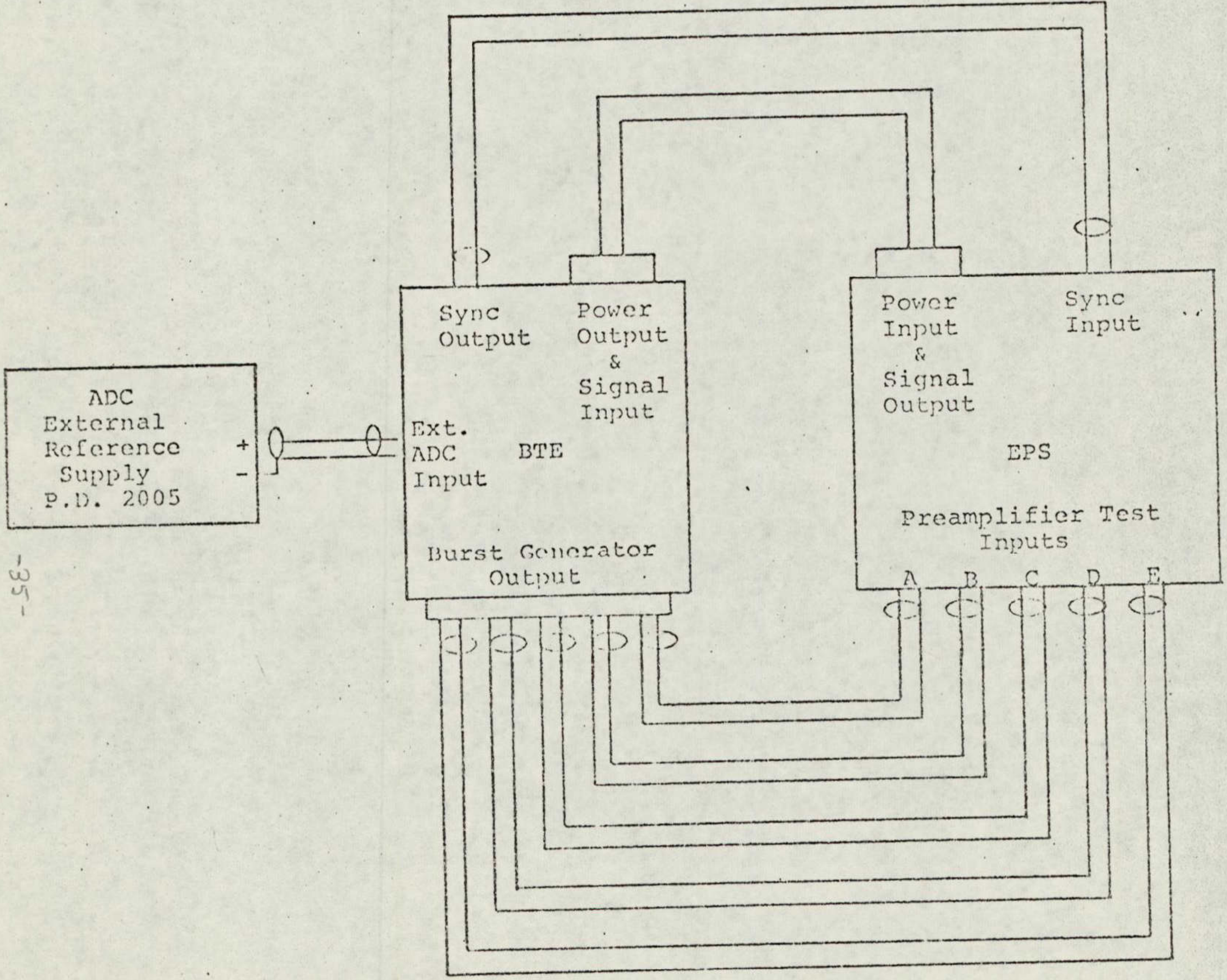


Figure 7 Test Setup

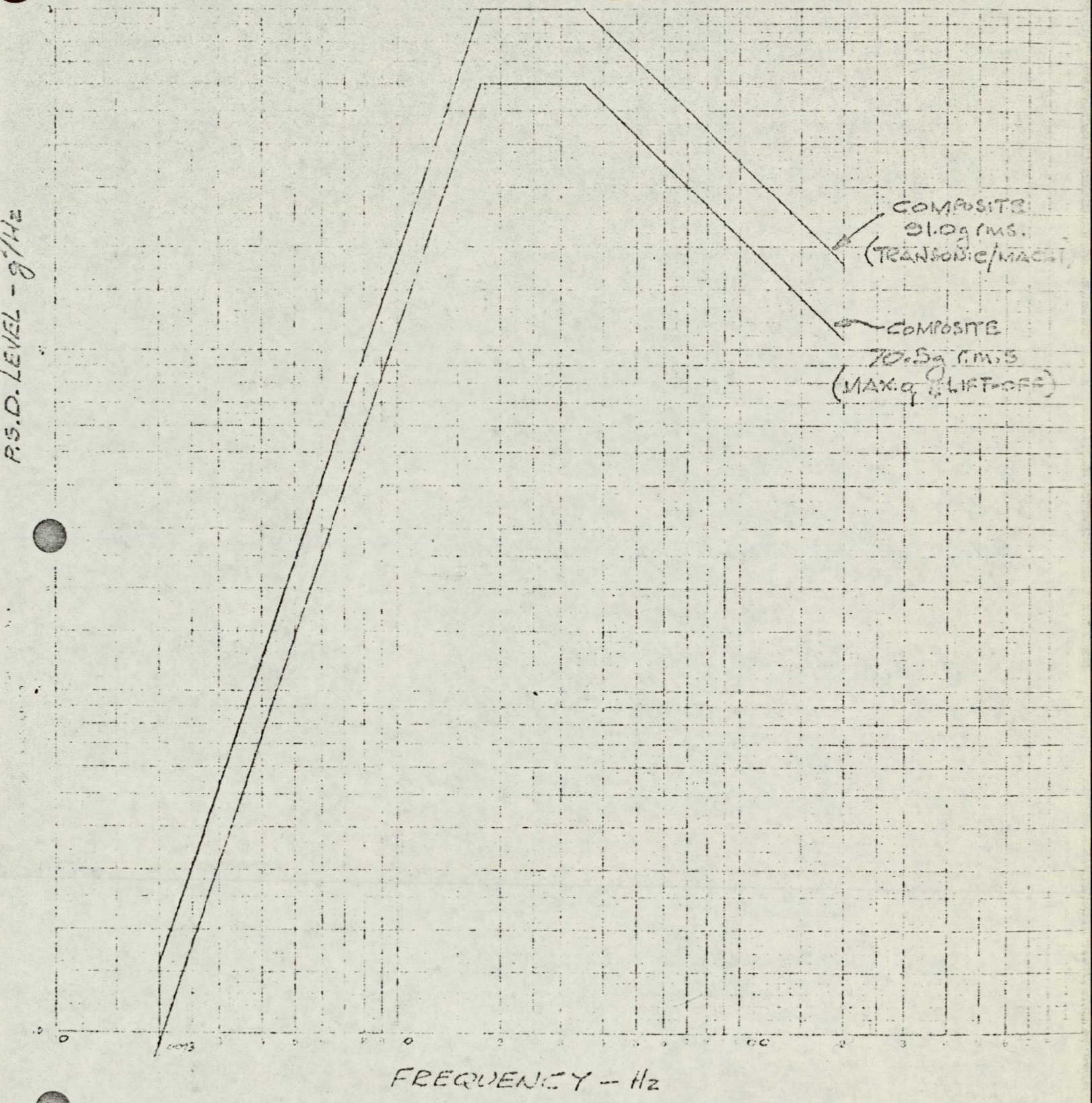

P.S.D. LEVEL - g^2/Hz
COMPOSITE 91.0g rms. (TRANSONIC/MACH)
COMPOSITE 70.5g r.m.s (MAX.q & LIFT-OFF)
FREQUENCY -- Hz

FIG. 8 'Z' AXIS

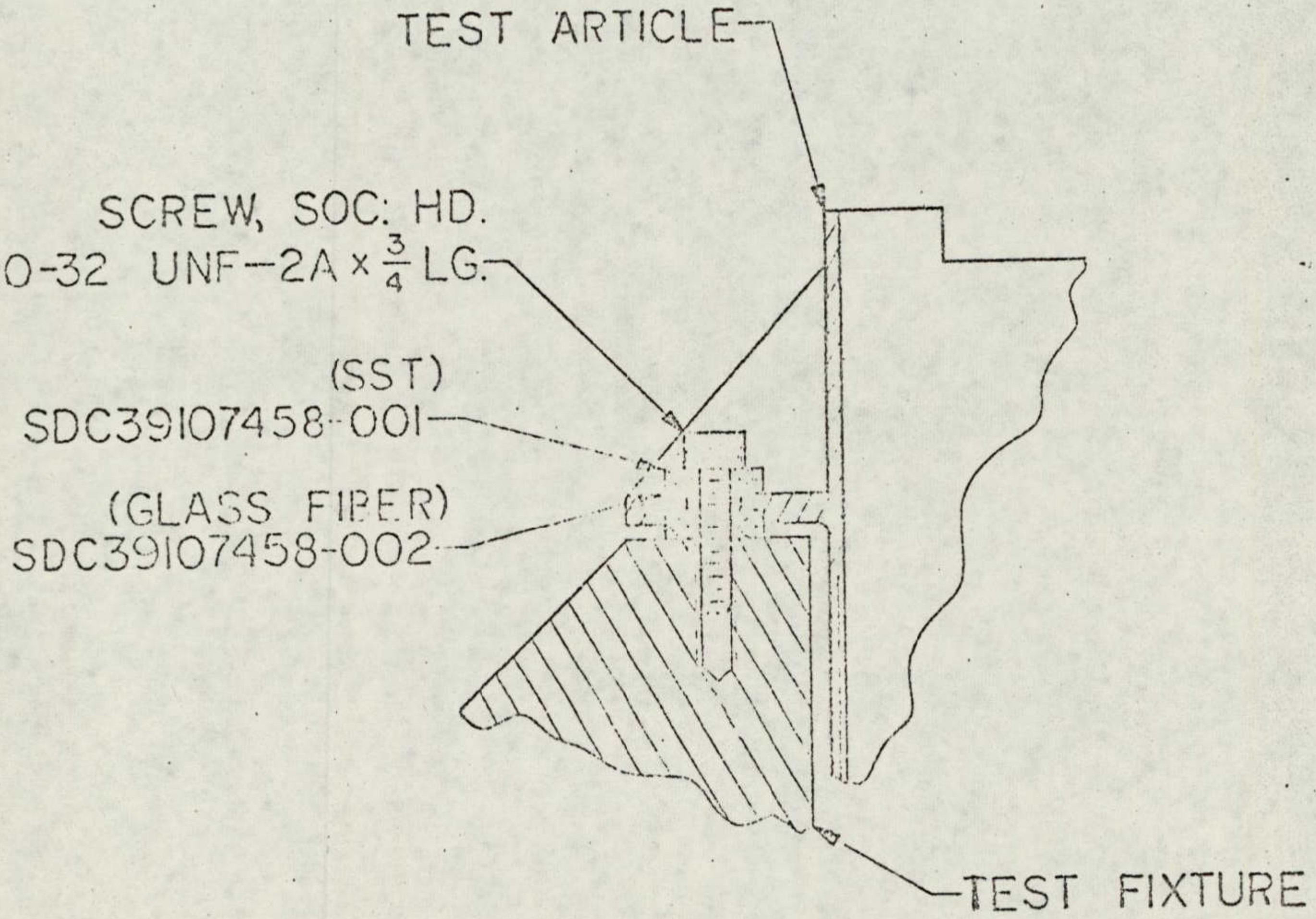

TEST ARTICLE
SCREW, SOC. HD.
10-32 UNF-2A × $\frac{3}{4}$ LG.
(SST)
SDC39107458-001
(GLASS FIBER)
SDC39107458-002
TEST FIXTURE

FIG. 9

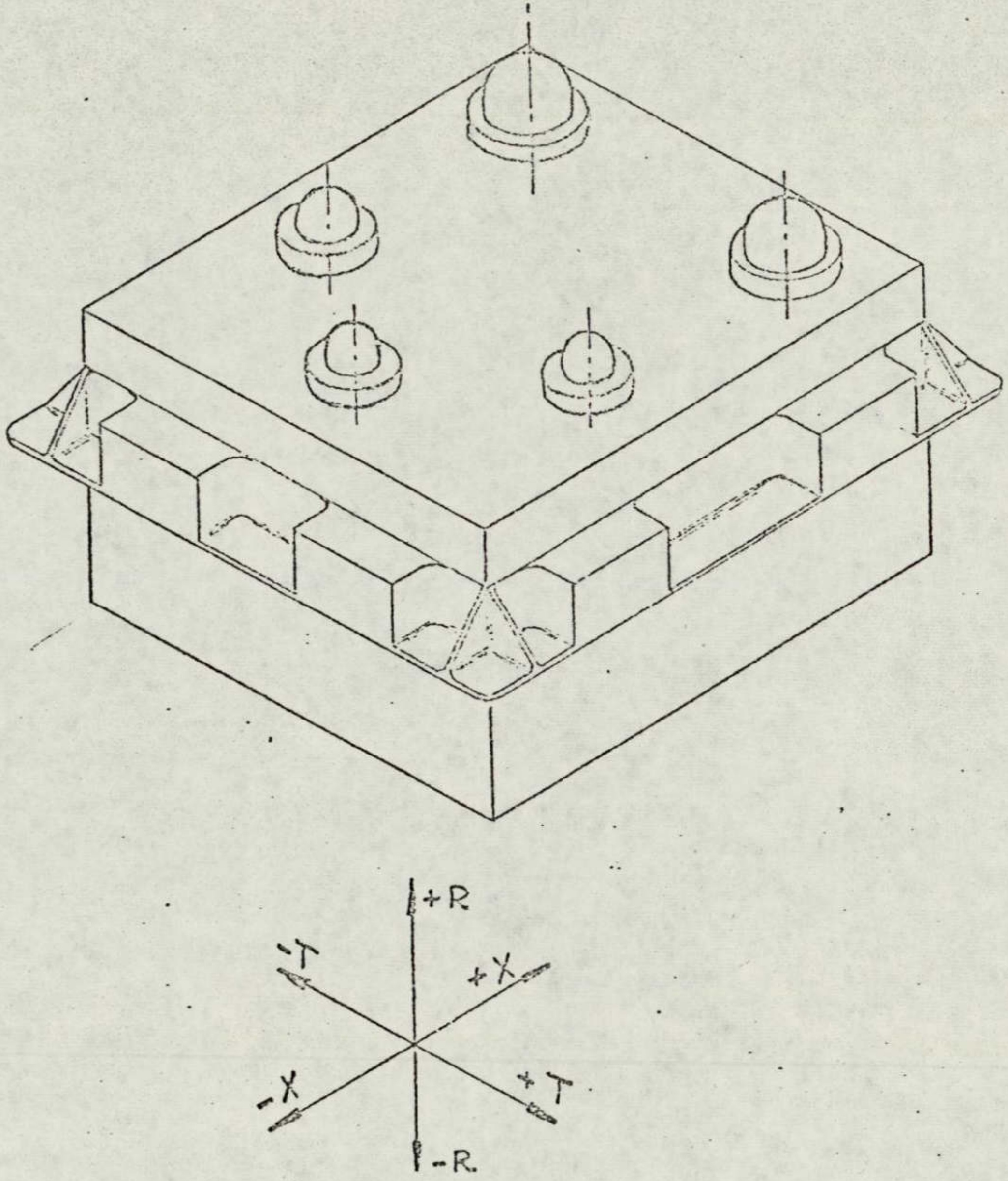


FIG. 10 — INSTRUMENT AXES.

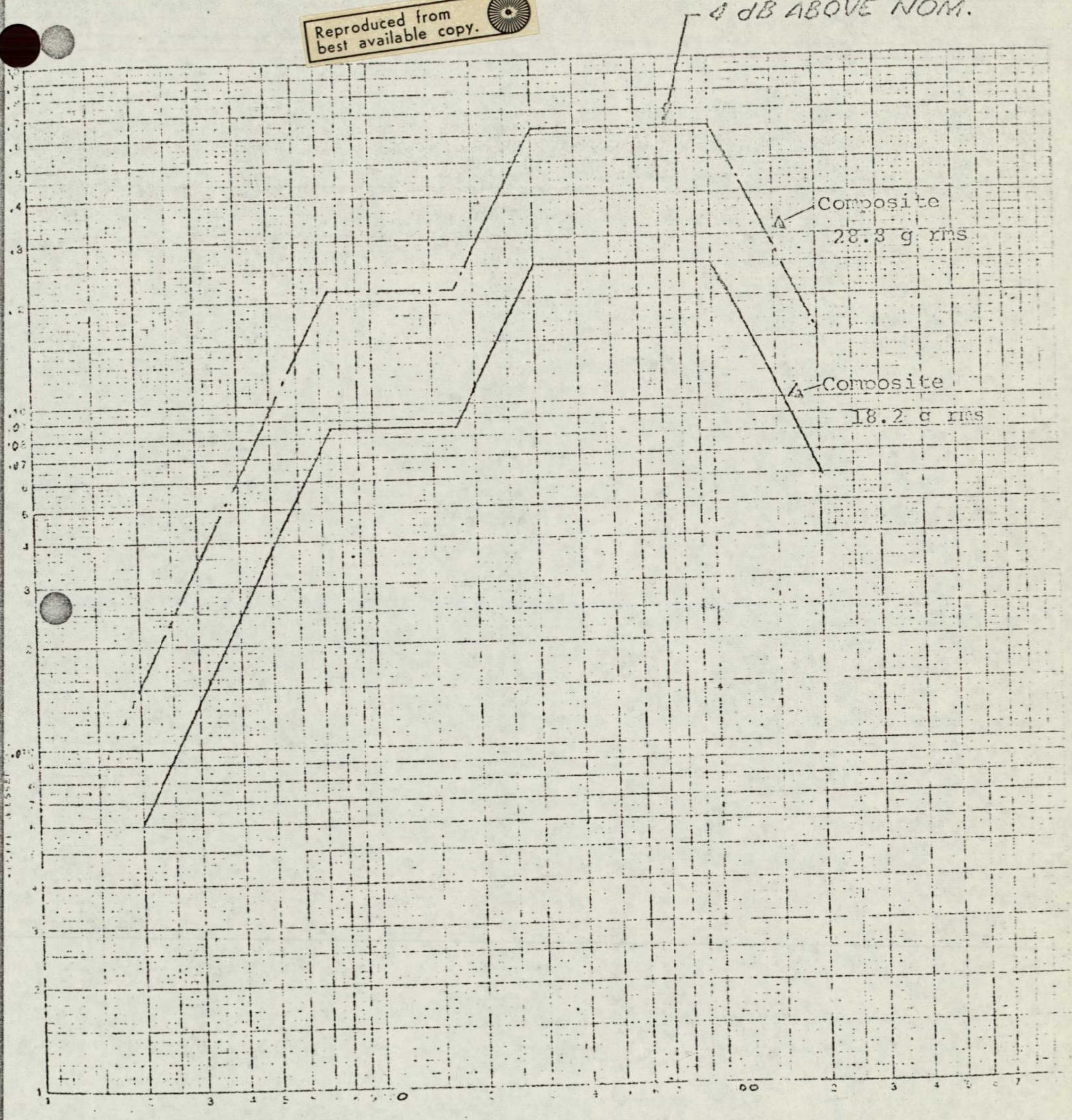


Figure 11 - X Axis

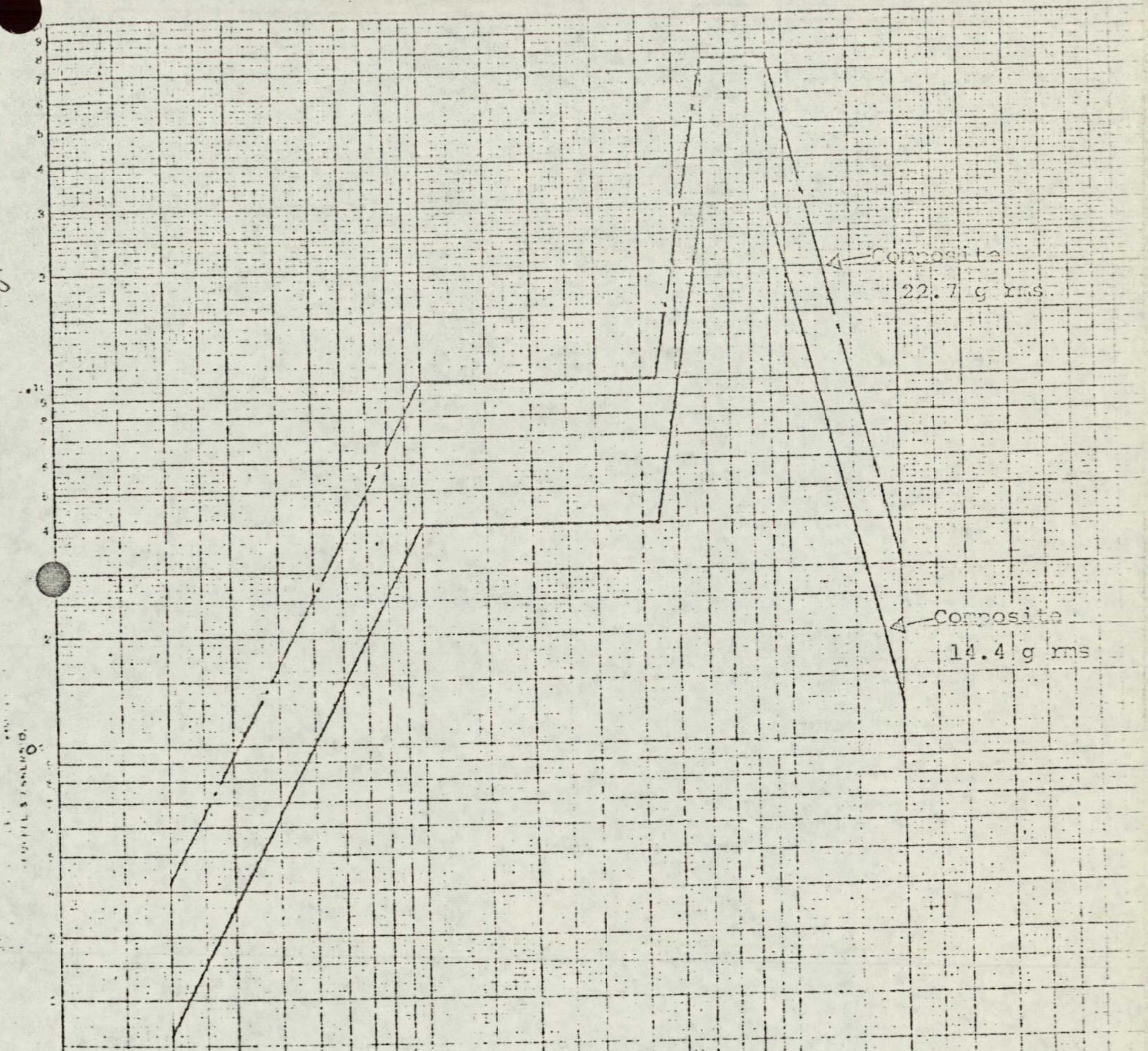


Figure 12 - 'T' AXIS.

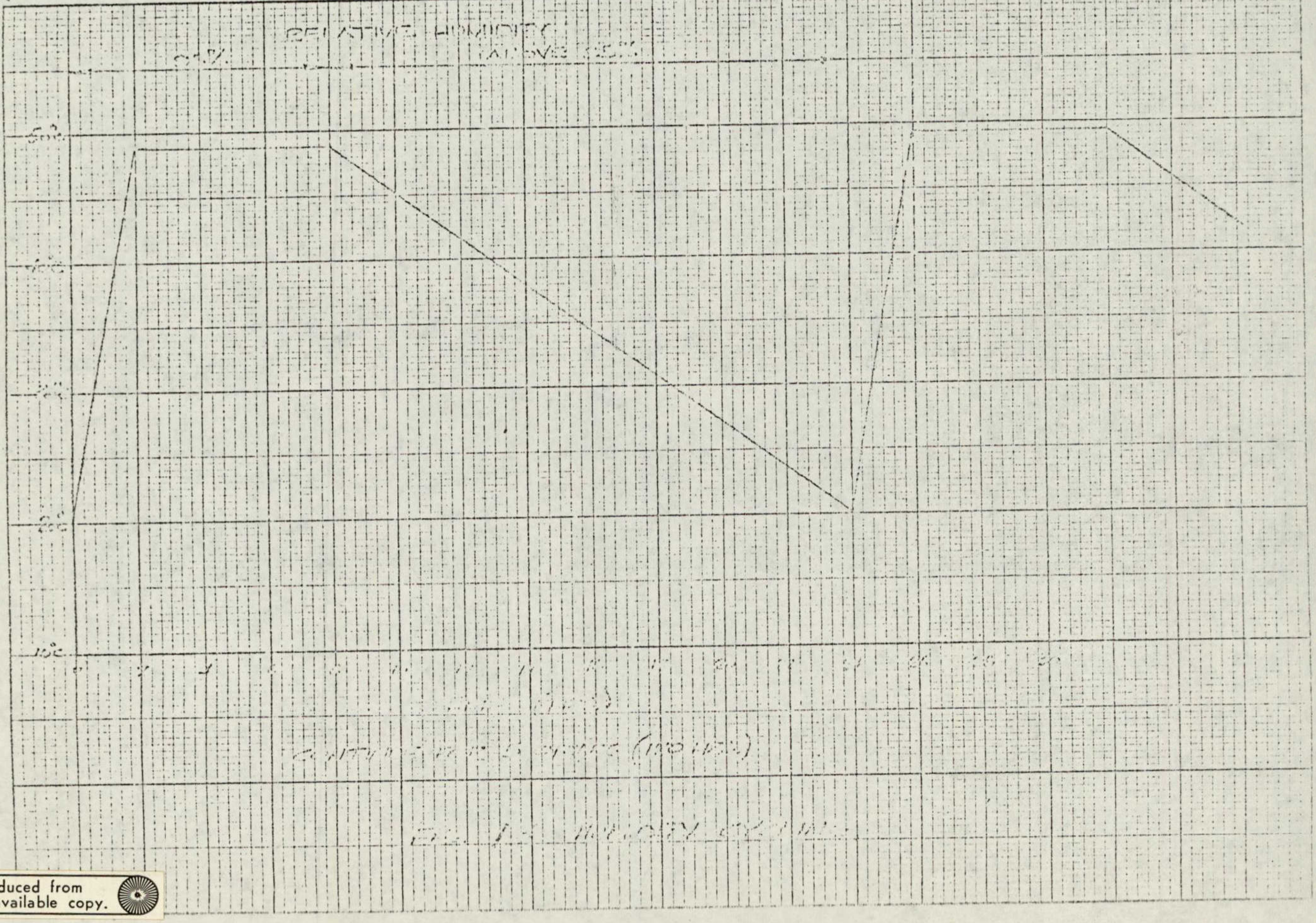


FIG. 1 - HUMIDITY CYCLE

DATA SHEET 1 (Cont.)

2.1.6 Electronic Power

Measured Value	Acceptable Value
________________	+27.5 ± 0.5 Vdc

Insp. ____________ Date ____________

2.1.7 Medium Voltage Electronics Current

Measured Value	Maximum Value
________________	560 mA

Insp. ____________ Date ____________

2.1.8 Detector Bias

Measured Value	Acceptable Value
________________	+27.5 ± 0.5 Vdc

Insp. ____________ Date ____________

2.1.9 Medium Voltage Detector Bias Current

Measured Value	Maximum Value
________________	30 mA

Insp. ____________ Date ____________

DATA SHEET 1 (Cont.)

2.1.11 Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	______________ Vdc	+0.025±0.010 Vdc
+0.050±0.001	______________	0.050±0.010
+0.100±0.001	______________	0.100±0.010
+1.000±0.001	______________	1.000±0.010
+2.000±0.001	______________	2.000±0.010
+3.000±0.001	______________	+3.000±0.010
+4.000±0.001	______________	+4.000±0.015
+4.900±0.001	______________	+4.900±0.020

______________ ______________

Insp. Date

DATA SHEET 1 (Cont.)

2.1.13 Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	Vdc	+5.00±0.25 Vdc
+8V Monitor	A		+8.10±0.15
-8V Monitor	A		-8.15±0.15
+25V Monitor	A		+25.50±0.75
+350V Monitor	A		+350.±15.
-15V Monitor	A		-15.0±1.0
-5V Monitor	A		-5.25±0.25
Disc Ref Mon.	A		+3.00±0.02
+5V Monitor	B		+5.00±0.25
+8V Monitor	B		+8.10±0.15
-8V Monitor	B		-8.15±0.15
+25V Monitor	B		+25.50±0.75
+350V Monitor	B		+350.±15.
-15V Monitor	B		-15.0±1.0
-5V Monitor	B		-5.25±0.25
Disc Ref Mon.	B		+3.000±0.02

Insp. Date

2.1.14

	Actual Value	Acceptable Value
Heater		+25.0 ± 0.5 Vdc
Electronics		+25.0 ± 0.5 Vdc
Detector Bias		+25.0 ± 0.5 Vdc

Insp. Date

DATA SHEET 1 (Cont.)

2.1.15 Low Voltage Current Consumption

Current Sink	Measured Current	Acceptable Value
Heater	______________ mA	10 ± 5 mA
Electronics	______________	≤ 560
Detector Bias	______________	≤ 30

______________ Insp. ______________ Date

2.1.16 Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	______________ Vdc	+5.00±0.25 Vdc
+8V Monitor	A	______________	+8.10±0.15
-8V Monitor	A	______________	-8.15±0.15
+25V Monitor	A	______________	+25.50±0.75
+350 V Monitor	A	______________	+350.±15.
-15V Monitor	A	______________	-15.0±1.0
-5V Monitor	A	______________	-5.25±0.25
Disc Ref Mon.	A	______________	+3.00±0.02
+5V Monitor	B	______________	+5.00±0.25
+8V Monitor	B	______________	+8.10±0.15
-8V Monitor	B	______________	-8.15±0.15
+25V Monitor	B	______________	+25.50±0.75
+350V Monitor	B	______________	+350.±15.
-15V Monitor	B	______________	-15.0±1.0
-5V Monitor	B	______________	-5.25±0.25
Disc Ref Mon.	B	______________	+3.00±0.02

______________ Insp. ______________ Date

DATA SHEET 1 (Cont.)

2.1.17

	Actual Value	Acceptable Value
Heater	______________	+30.0 ± 0.5 Vdc
Electronics	______________	+30.0 ± 0.5 Vdc
Detector Bias	______________	+30.0 ± 0.5 Vdc

______________ ______________
Insp. Date

2.1.18 High Voltage Current Consumption

Current Sink	Actual Value	Acceptable Value
Heater	______________ mA	10 ± 5 mA
Electronics	______________	$\leq$ 560
Detector Bias	______________	$\leq$ 30

______________ ______________
Insp. Date

DATA SHEET 1 (Cont.)

2.1.19 High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	______ Vdc	+5.00±0.25 Vdc
+8V Monitor	A	______	+8.10±0.15
-8V Monitor	A	______	-8.15±0.15
+25V Monitor	A	______	+25.50±0.75
+350V Monitor	A	______	+350.±15.
-15V Monitor	A	______	-15.0±1.0
-5V Monitor	A	______	-5.25±0.25
Disc Ref Mon.	A	______	+3.00±0.02
+5V Monitor	B	______	+5.00±0.25
+8V Monitor	B	______	+8.10±0.15
-8V Monitor	B	______	-8.15±0.15
+25V Monitor	B	______	+25.50±0.75
+350V Monitor	B	______	+350.±15.
-15V Monitor	B	______	-15.0±1.0
-5V Monitor	B	______	-5.25±0.25
Disc Ref Mon.	B	______	+3.00±0.02

______ Insp. ______ Date

DATA SHEET 1 (Cont.)

2.1.20 Temperature Measurement

Parameter	Prime Frame	Measured Value	Acceptable Limits
Package Temperature Monitor	A	________ °C	50°F to 118°F = 10°C to 48°C
Package Temperature Monitor	B	________	↓
Detector Plate Temperature Monitor	A	________	X
Detector Plate Temperature Monitor	B	________	X

________________ ________________
Insp. Date

2.1.21 Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	________________ μA	1.0 μA
B	________________	2.0 μA
C	________________	2.0 μA
D	________________	2.0 μA
E	________________	2.0 μA

________________ ________________
Insp. Date

DATA SHEET 1 (Cont.)

2.1.22 Detector Resolution Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	________________ keV	50. keV
B	________________	50. keV
C	________________	50. keV
D	________________	50. keV
E	________________	50. keV

____________ ____________
Insp. Date

2.1.25 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	__________	14 or 16
B	E2	__________	14 or 16
C	E3	__________	14 or 16
D	E4	__________	14 or 16
E	P6	__________	14 or 16

____________ ____________
Insp. Date

DATA SHEET 1 (Cont.)

2.1.26 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	____________	14 or 16
B	P2	____________	14 or 16
C	P3	____________	14 or 16
D	P4	____________	14 or 16
E	P5	____________	14 or 16

____________ Insp. ____________ Date

2.1.28 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	____________	2032 or 2048
A	E2	____________	2032 or 2048
C	E3	____________	2032 or 2048
D	E4	____________	2032 or 2048
E	P6	____________	2032 or 2048

____________ Insp. ____________ Date

DATA SHEET 1 (Cont.)

2.1.29 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	______	2032 or 2048
B	P2	______	2032 or 2048
C	P3	______	2032 or 2048
D	P4	______	2032 or 2048
E	P5	______	2032 or 2048

______ Insp. ______ Date

2.1.31 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	______	260,096 or 262,144
B	E2	______	260,096 or 262,144
C	E3	______	260,096 or 262,144
D	E4	______	260,096 or 262,144
E	P6	______	260,096 or 262,144

______ Insp. ______ Date

DATA SHEET 1 (Cont.)

2.1.32 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	______________	260,096 or 262,144
B	P2	______________	260,096 or 262,144
C	P3	______________	260,096 or 262,144
D	P4	______________	260,096 or 262,144
E	P6	______________	260,096 or 262,144

______________ Insp. ______________ Date

2.1.34 Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	______________	33,292,288 or 0
B	E2	______________	33,292,288 or 0
C	E3	______________	33,292,288 or 0
D	E4	______________	33,292,288 or 0
E	P6	______________	33,292,288 or 0

______________ nsp. ______________ Date

DATA SHEET 1 (Cont.)

2.1.35 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1		33,292,288 or 0
B	P2		33,292,288 or 0
C	P3		33,292,288 or 0
D	P4		33,292,288 or 0
E	P5		33,292,288 or 0

Insp. Date

2.1.36 Visual inspection

Insp. Date

DATA SHEET 2

2.2 THERMAL/VACUUM TEST

2.2.1 Test article and BTE to Building 33, NASA/MSC

Insp. ________ Date 1-21-72 BEC

2.2.2 Prepare chamber and test fixture

Insp. ________ Date 1-21-72 BEC

2.2.3 Install test article

Insp. ________ Date 1-21-72 BEC

2.2.4 Connect BTE

Insp. ________ Date 1-21-72 BEC

DATA SHEET 2 (Cont.)

2.1.4 Heater Power

Measured Value: 27.54

Acceptable Value: +27.5 ± 0.5 Vdc

Insp.: NASA 1098

Date: 1-21-72

2.1.5 Medium Voltage Heater Current

Measured Value: 7

Acceptable Value: 10 ± 5 mA

Insp.: NASA 1098

Date: 1-21-72

DATA SHEET 2 (Cont.)

2.1.6 Electronic Power

Measured Value	Acceptable Value
27.44	+27.5 ± 0.5 Vdc

Insp. ______ Date 1-21-72

2.1.7 Medium Voltage Electronics Current

Measured Value	Maximum Value
508	560 mA

Insp. ______ Date 1-21-72

2.1.8 Detector Bias

Measured Value	Acceptable Value
OFF	+27.5 ± 0.5 Vdc

Ref Caution Page 10

Insp. ______ Date 1-21-72

2.1.9 Medium Voltage Detector Bias Current

Measured Value	Maximum Value
OFF	30 mA

Ref Caution Page 10.

Insp. ______ Date 1-21-72

DATA SHEET 2 (Cont.)

2.1.11 Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	.024 Vdc	+0.025±0.010 Vdc
+0.050±0.001	.048	0.050±0.010
+0.100±0.001	.097	0.100±0.010
+1.000±0.001	.997	1.000±0.010
+2.000±0.001	1.999	2.000±0.010
+3.000±0.001	2.996	+3.000±0.010
+4.000±0.001	3.998	+4.000±0.015
+4.900±0.001	4.897	+4.900±0.020

S NASA 139K
Insp.

1-21-72
Date

DATA SHEET 2 (Cont.)

2.1.13 Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	5,121 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8,145	+8.10±0.15
-8V Monitor	A	-8,209	-8.15±0.15
+25V Monitor	A	25,642	+25.50±0.75
+350V Monitor	A	24,24	+350.±15.
-15V Monitor	A	-16.042	-15.0±1.0
-5V Monitor	A	-5,433	-5.25±0.25
Disc Ref Mon.	A	2,995	+3.00±0.02
+5V Monitor	B	5,131	+5.00±0.25
+8V Monitor	B	8,155	+8.10±0.15
-8V Monitor	B	-8,193	-8.15±0.15
+25V Monitor	B	25.642	+25.50±0.75
+350V Monitor	B	24,24	+350.±15.
-15V Monitor	B	-16.042	-15.0±1.0
-5V Monitor	B	-5,433	-5.25±0.25
Disc Ref Mon.	-	3.000	+3.000±0.02

Det Bias OFF
Ref Caution
Page 10

DR EPS

Insp. Date 1-21-72

2.1.14

	Actual Value	Acceptable Value
Heater	25,37	+25.0 ± 0.5 Vdc
Electronics	24,49	+25.0 ± 0.5 Vdc
Detector Bias	OFF	+25.0 ± 0.5 Vdc

Ref Caution
Page 10.

Insp. H601 Date 1-21-71

DATA SHEET 2 (Cont.)

2.1.15 Low Voltage Current Consumption

Current Sink	Measured Current	Acceptable Value
Heater	7 mA	10 ± 5 mA
Electronics	543	≤ 560
Detector Bias	OFF	≤ 30.

Ref Caution
Page 10

Insp. 　 Date 1-21-72

2.1.16 Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5,121 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8,135	+8.10±0.15
-8V Monitor	A	-8,203	-8.15±0.15
+25V Monitor	A	25,642	+25.50±0.75
+350 V Monitor	A	24,24	+350.±15.
-15V Monitor	A	-16.026	-15.0±1.0
-5V Monitor	A	-5,430	-5.25±0.25
Disc Ref Mon.	A	2,995	+3.00±0.02
+5V Monitor	B	5,121	+5.00±0.25
+8V Monitor	B	8,145	+8.10±0.15
-8V Monitor	B	-8.187	-8.15±0.15
+25V Monitor	B	25.642	+25.50±0.75
+350V Monitor	B	24.24	+350.±15.
-15V Monitor	B	-15.984	-15.0±1.0
-5V Monitor	B	-5,417	-5.25±0.25
Disc Ref Mon.	B	3.000	+3.00±0.02

Ref Ca
Page 1

DR-EPS-007

Insp. 　 Date 7-21-71

DATA SHEET 2 (Cont.)

2.1.17	Actual Value	Acceptable Value
Heater	29.98	+30.0 ± 0.5 Vdc
Electronics	29.96	+30.0 ± 0.5 Vdc
Detector Bias	OFF	+30.0 ± 0.5 Vdc

Ref Caution
Page 10

Insp. ______ Date 1/21/72

2.1.18 High Voltage Current Consumption

Current Sink	Actual Value	Acceptable Value
Heater	7 mA	10 ± 5 mA
Electronics	490	≤ 560
Detector Bias	OFF	≤ 30

Ref Caution
Page 10

Insp. ______ Date 1-21-72

DATA SHEET 2 (Cont.)

2.1.19 High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.131 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.155	+8.10±0.15
-8V Monitor	A	-8.193	-8.15±0.15
+25V Monitor	A	25.642	+25.50±0.75
+350V Monitor	A	24.24	+350.±15.
-15V Monitor	A	-16.019	-15.0±1.0
-5V Monitor	A	-5.420	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.131	+5.00±0.25
+8V Monitor	B	8.155	+8.10±0.15
-8V Monitor	B	-8.193	-8.15±0.15
+25V Monitor	B	25.696	+25.50±0.75
+350V Monitor	B	24.24	+350.±15.
-15V Monitor	B	-16.019	-15.0±1.0
-5V Monitor	B	-5.420	-5.25±0.25
Disc Ref Mon.	B	3.000	+3.00±0.02

Ref Cont- Page 70

DR EB5

Insp.

Date 1-21-72

DATA SHEET 2 (Cont.)

2.1.20 Temperature Measurement

Parameter	Prime Frame	Measured Value
Package Temperature Monitor	A	31.18 °C
Package Temperature Monitor	B	31.18
Detector Plate Temperature Monitor	A	27.17
Detector Plate Temperature Monitor	B	27.17

N601 1374 Insp.

1-21-72 Date

2.1.21 Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output		Maximum Acceptable Value
A		µA	1.0 µA
B			2.0 µA
C			2.0 µA
D			2.0 µA
E			2.0 µA

Not as Per Required 2.1.6.21

B E Curtinger

N601 1374 Insp.

1-21-71 Date

DATA SHEET 2 (Cont.)

2.1.22 Detector Resolution Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	keV	50. keV
B		50. keV
C		50. keV
D		50. keV
E		50. keV

Not Required as per 2.1.22 G.E. Curtinger

NASA 1094
Insp.

1-21-72
Date

2.1.25 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	14	14 or 16
B	E2	16	14 or 16
C	E3	14	14 or 16
D	E4	14	14 or 16
E	P6	14	14 or 16

NASA 1094
Insp.

1-21-71
Date

DATA SHEET 2 (Cont.)

2.1.26 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	14	14 or 16
B	P2	14	14 or 16
C	P3	14	14 or 16
D	P4	14	14 or 16
E	P5	14	14 or 16

Insp. ____ Date 1-21-72

2.1.28 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	2032	2032 or 2048
A	E2	2048	2032 or 2048
C	E3	2032	2032 or 2048
D	E4	2032	2032 or 2048
E	P6	2032	2032 or 2048

Insp. 11601 Date 1-21-72

DATA SHEET 2 (Cont.)

2.1.29 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	2032	2032 or 2048
B	P2	2032	2032 or 2048
C	P3	2032	2032 or 2048
D	P4	2032	2032 or 2048
E	P5	2032	2032 or 2048

HC01
Insp.

1-21-72
Date

2.1.31 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	260,096	260,096 or 262,144
B	E2	260,096	260,096 or 262,144
C	E3	260,096	260,096 or 262,144
D	E4	260,096	260,096 or 262,144
E	P6	260,096	260,096 or 262,144

HC01
Insp.

1-21-72
Date

DATA SHEET 2 (Cont.)

2.1.32 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	260 096	260,096 or 262,144
B	P2	260 096	260,096 or 262,144
C	P3	260 096	260,096 or 262,144
D	P4	260 096	260,096 or 262,144
E	P6	260 096	260,096 or 262,144

Insp. NASA 109N Date 1-21-72

2.1.34 Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	33,292,288	33,292,288 or 0
B	E2	33,292,288	33,292,288 or 0
C	E3	33,292,288	33,292,288 or 0
D	E4	33,292,288	33,292,288 or 0
E	P6	33,292,288	33,292,288 or 0

Insp. NASA 109N Date 1-21-72

DATA SHEET 2 (Cont.)

2.1.35 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	33 292,288	33,292,288 or 0
B	P2	33,292,288	33,292,288 or 0
C	P3	33,292,288	33,292,288 or 0
D	P4	33,292,288	33,292,288 or 0
E	P5	33,292,288	33,292,288 or 0

S [illegible] 1994 Insp.

1-21-71 Date

DATA SHEET 2 (Cont.)

2.2.6 Pump down

Insp. ______ Date 1-24-71

2.2.7 Set test case 1

Insp. ______ Date 1-24-71

2.2.8 Output Power Voltage Switch to 'Medium'

Insp. ______ Date 1-24-71

2.2.9 Electronics Power Switch to 'ON'

Insp. ______ Date 1-24-71

2.2.10 Heater Power Switch to 'ON'

Insp. ______ Date 1-24-71

2.2.11 Detector Bias Switch to 'ON'

Insp. ______ Date 1-24-71

2.2.12 Activate BTE Controller and Display

Insp. ______ Date 1-24-71

2.2.13 Record temperatures Cont'd

Elapsed Time	Package Temp	Def Temp
14:30/11	2.439	-18.770
15:00/11.5	3.124	-18.379
15:30/12	3.710	-17.988
16:00/12.5	4.199	-17.499
16:30/13	4.687	-17.108
1700/13.5	5.18	-16.91

INSP

1-24-71
Date

DATA SHEET 2 (Cont.)

2.2.13 Record temperatures

Elapsed Time	Package Monitor	Detector Monitor	Elapsed Time	Package Monitor	Detector Monitor
0330/0 hrs	22.7	21.7	0900/5.5	8.40	-18.09
0400/.5 hrs	26.0	22.9	0930/6	6.35	-19.75
0430/1	29.0	13.5	10:00/6.5	3.417	-22.191
0500/1.5	28.0	5.4	10:30/7.0	2.342	-23.168
0530/2	25.8	-6.2	11:00/7.5	.582	-24.537
0600/2.5	23.06	-4.21	11:30/8	-.981	-25.807
0630/3	20.52	-7.14	1200/8.5	-1.274	-25.416
0700/3.5	17.79	-9.78	12:30/9	-.59	-22.093
0730/4	15.44	-12.03	13:00/9.5	+.91	-20.822
0800/4.5	12.90	-14.27	13:30/10	+.973	-20.040
0830/5	10.75	-16.13	14:00/11.5	1.755	-19.356

Con't on Back of Page 69

Insp. ______ Date 1-24-72

2.2.14 Soak at stabilized temperature

Elapsed Time	Package Monitor	Detector Monitor
1500/11.5	3.12	-18.38
1530/12	3.71	-18.0
1600/12.5	4.20	-17.5
1630/13	4.69	-17.11
1700/13.5	5.18	-16.91

Insp. ______ Date 1-29-71

SHEET 2 (Cont.)

2.1.4 Heater Power

Measured Value: 27.52

Acceptable Value: +27.5 ± 0.5 Vdc

Insp.

Date: 1-29-72

2.1.5 Medium Voltage Heater Current

Measured Value: 206 ma

Acceptable Value: 200 ± 25 mA

Insp.

Date: 1-24-72

DATA SHEET 2 (Cont.)

2.1.6 Electronic Power

Measured Value: 27.44

Acceptable Value: +27.5 ± 0.5 Vdc

Insp.: H601

Date: 1-24-72

2.1.7 Medium Voltage Electronics Current

Measured Value: 515 ma

Maximum Value: 560 mA

Insp.: H601

Date: 1-24-72

2.1.8 Detector Bias

Measured Value: 27.55

Acceptable Value: +27.5 ± 0.5 Vdc

Insp.: H601

Date: 1-24-72

2.1.9 Medium Voltage Detector Bias Current

Measured Value: 20 ma

Maximum Value: 30 mA

Insp.: H601

Date: 1-24-72

DATA SHEET 2 (Cont.)

2.1.11 Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	.024 Vdc	+0.025±0.010 Vdc
+0.050±0.001	.048	0.050±0.010
+0.100±0.001	.097	0.100±0.010
+1.000±0.001	.997	1.000±0.010
+2.000±0.001	1.994	2.000±0.010
+3.000±0.001	2.996	+3.000±0.010
+4.000±0.001	3.993	+4.000±0.015
+4.900±0.001	4.892	+4.900±0.020

KSC1 1-24-72

Insp. Date

DATA SHEET 2 (Cont.)

2.1.13 Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	5.102 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.126	+8.10±0.15
-8V Monitor	A	-8.160	-8.15±0.15
+25V Monitor	A	25.588	+25.50±0.75
+350V Monitor	A	346.33	+350.±15.
-15V Monitor	A	-16.049	-15.0±1.0
-5V Monitor	A	-5.386	-5.25±0.25
Disc Ref Mon.	A	2.989	+3.00±0.02
+5V Monitor	B	5.111	+5.00±0.25
+8V Monitor	B	8.126	+8.10±0.15
-8V Monitor	B	-8.160	-8.15±0.15
+25V Monitor	B	25.588	+25.50±0.75
+350V Monitor	B	346.33	+350.±15.
-15V Monitor	B	-16.049	-15.0±1.0
-5V Monitor	B	-5.386	-5.25±0.25 DR-EPS-
Disc Ref Mon.	-	2.995	+3.000±0.02

Insp. ________ Date 1-29-71

2.1.14

	Actual Value	Acceptable Value
Heater	25.36	+25.0 ± 0.5 Vdc
Electronics	25.00	+25.0 ± 0.5 Vdc
Detector Bias	25.01	+25.0 ± 0.5 Vdc

Insp. ________ Date 1-24-71

DATA SHEET 2 (Cont.)

2.1.15 Low Voltage Current Consumption

Current Sink	Measured Current	Acceptable Value
Heater	190 mA	180 ± 25 mA
Electronics	545	≤ 560
Detector Bias	20	≤ 30

Insp. ______ Date 1-24-71

2.1.16 Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.102 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.116	+8.10±0.15
-8V Monitor	A	-8.154	-8.15±0.15
+25V Monitor	A	25.535	+25.50±0.75
+350 V Monitor	A	345.84	+350.±15.
-15V Monitor	A	-16.013	-15.0±1.0
-5V Monitor	A	-5.383	-5.25±0.25
Disc Ref Mon.	A	2.989	+3.00±0.02
+5V Monitor	B	5.102	+5.00±0.25
+8V Monitor	B	8.116	+8.10±0.15
-8V Monitor	B	-8.138	-8.15±0.15
+25V Monitor	B	25.588	+25.50±0.75
+350V Monitor	B	346.33	+350.±15.
-15V Monitor	B	-16.013	-15.0±1.0
-5V Monitor	B	-5.370	-5.25±0.25
Disc Ref Mon.	B	2.995	+3.00±0.02

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Insp. ______ Date 1-24-71

DATA SHEET 2 (Cont.)

2.1.17	Actual Value	Acceptable Value
Heater	29.96	+30.0 ± 0.5 Vdc
Electronics	29.97	+30.0 ± 0.5 Vdc
Detector Bias	30.07	+30.0 ± 0.5 Vdc

Insp. ______ Date 1-24-71

2.1.18 High Voltage Current Consumption

Current Sink	Actual Value	Acceptable Value
Heater	224 mA	225 ± 25 mA
Electronics	490	≤ 560
Detector Bias	20	≤ 30

Insp. ______ Date 1-24-71

DATA SHEET 2 (Cont.)

2.1.19 High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.111 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.126	+8.10±0.15
-8V Monitor	A	-8.181	-8.15±0.15
+25V Monitor	A	25.588	+25.50±0.75
+350V Monitor	A	346.33	+350.±15.
-15V Monitor	A	-16.085	-15.0±1.0
-5V Monitor	A	-5.401	-5.25±0.25
Disc Ref Mon.	A	2.989	+3.00±0.02
+5V Monitor	B	5.111	+5.00±0.25
+8V Monitor	B	8.135	+8.10±0.15
-8V Monitor	B	-8.166	-8.15±0.15
+25V Monitor	B	25.588	+25.50±0.75
+350V Monitor	B	346.33	+350.±15.
-15V Monitor	B	-16.062	-15.0±1.0
-5V Monitor	B	-5.389	-5.25±0.25
Disc Ref Mon.	B	2.995	+3.00±0.02

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Insp. ______ Date 1-24-71

DATA SHEET 2 (Cont.)

2.1.20 Temperature Measurement

Parameter	Prime Frame	Measured Value
Package Temperature Monitor	A	5.274 °C
Package Temperature Monitor	B	5.274
Detector Plate Temperature Monitor	A	-16.815
Detector Plate Temperature Monitor	B	-16.815

109H
Insp.

1-24-71
Date

2.1.21 Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output		Maximum Acceptable Value
A	.007	μA	1.0 μA
B	.021		2.0 μA
C	.117		2.0 μA
D	.030		2.0 μA
E	.021		2.0 μA

109H
Insp.

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Date

DATA SHEET 2 (Cont.)

2.1.22 Detector Resolution Test

EPS Channel	Measured Engineering Unit Output		Maximum Acceptable Value
A	6	keV	50. keV
B	5		50. keV
C	5		50. keV
D	5		50. keV
E	6		50. keV

109H Insp. 1-24-72 Date

2.1.25 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	14	14 or 16
B	E2	16	14 or 16
C	E3	14	14 or 16
D	E4	14	14 or 16
E	P6	14	14 or 16

108H Insp. 1-24-72 Date

DATA SHEET 2 (Cont.)

2.1.26 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5. 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	14	14 or 16
B	P2	14	14 or 16
C	P3	14	14 or 16
D	P4	14	14 or 16
E	P5	14	14 or 16

1594 Insp. 1-24-72 Date

2.1.28 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	2032	2032 or 2048
A	E2	2032	2032 or 2048
C	E3	2032	2032 or 2048
D	E4	2032	2032 or 2048
E	P6	2032.	2032 or 2048

1594 Insp. 1-24-71 Date

DATA SHEET 2 (Cont.)

2.1.29 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	2032	2032 or 2048
B	P2	2032	2032 or 2048
C	P3	2032	2032 or 2048
D	P4	2032	2032 or 2048
E	P5	2032	2032 or 2048

1654 Insp.

1-24-71 Date

2.1.31 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	260 096	260,096 or 262,144
B	E2	260 144	260,096 or 262,144
C	E3	260 096	260,096 or 262,144
D	E4	260 144	260,096 or 262,144
E	P6	260 096	260,096 or 262,144

1654 Insp.

1-24-72 Date

DATA SHEET 2 (Cont.)

2.1.32 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	260 096	260,096 or 262,144
B	P2	260 096	260,096 or 262,144
C	P3	260 096	260,096 or 262,144
D	P4	260 096	260,096 or 262,144
E	P6	260 096	260,096 or 262,144

Insp. 100H Date 1-24-72

2.1.34 Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	0	33,292,288 or 0
B	E2	0	33,292,288 or 0
C	E3	33,292,288	33,292,288 or 0
D	E4	0	33,292,288 or 0
E	P6	33,292,288	33,292,288 or 0

Insp. 100H Date 1-24-72

DATA SHEET 2 (Cont.)

2.1.35 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	33,292,288	33,292,288 or 0
B	P2	33,292,288	33,292,288 or 0
C	P3	33,292,288	33,292,288 or 0
D	P4	33,292,288	33,292,288 or 0
E	P5	33,292,288	33,292,288 or 0

H601 1-24-72

Insp. Date

2.2.19 Record Temperatures

Elapsed Time	Package Monitor	Detector Monitor	Elapsed Time	Package Monitor	Detector Monitor
1800/0	5.47	-16.52	0300/9.0	-23.95	-36.07
1830/.5	2.93	-17.11	0330/9.5	-24.44	-36.46
1900/1	-.20	-18.87	0400/10.0	-24.93	-36.75
1930/1.5	-3.03	-20.72	0430/10.5	-25.32	-37.05
2000/2	-5.57	-22.58	0500/11.0	-25.71	-37.34
2030/2.5	-8.02	-24.34	0530/11.5	-26.10	-37.54
2100/3	-10.36	-26.00	0600/12.00	-26.39	-37.83
2130/3.5	-12.42	-27.57	0630/12.5	-26.59	-38.03
2200/4	-13.98	-28.84	0700/13.00	-26.88	-38.22
2[illegible]30/4.5	-15.64	-30.01	0730/13.5	-27.08	-38.32
2300/5	-17.11	-31.08	~~0800/14.00~~		
2330/5.5	-18.38	-32.06			
2400/6	-19.55	-32.94			
0030/6.5	-20.73	-33.72			
0100/7	-21.51	-34.31			
0130/7.5	-22.29	-34.90			
0200/8.0	-22.78	-35.39			
02.30/8.5	-23.36	-35.68			

INSP

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83(A)

DATA SHEET 2 (Cont.)

2.2.16 BTE to Housekeeping mode

Insp. ______ Date 1-24-72

2.2.17 Electronics Power Switch to 'OFF'

Insp. ______ Date 1-24-72

2.2.18 Detector Bias Switch to 'OFF'

Insp. ______ Date 1-24-72

2.2.19 Repeat step 2.2.13

Insp. ______ Date 1-25-72

2.2.20 Repeat step 2.2.14

Insp. ______ Date 1-25-72

DATA SHEET 2 (Cont.)

2.1.4 Heater Power

Measured Value 27.53

Acceptable Value +27.5 ± 0.5 Vdc

103-1 Insp.

1-25-72 Date

2.1.5 Medium Voltage Heater Current

Measured Value 206

Acceptable Value 200 ± 25 mA

[illegible] Insp.

1-25-72 Date

DATA SHEET 2 (Cont.)

2.1.6 Electronic Power

Measured Value	Acceptable Value
27.45	+27.5 ± 0.5 Vdc

Insp. ________ Date 1-25-72

2.1.7 Medium Voltage Electronics Current

Measured Value	Maximum Value
515	560 mA

Insp. ________ Date 1-25-72

2.1.8 Detector Bias

Measured Value	Acceptable Value
27.56	+27.5 ± 0.5 Vdc

Insp. ________ Date 1-25-72

2.1.9 Medium Voltage Detector Bias Current

Measured Value	Maximum Value
20	30 mA

Insp. ________ Date 1-25-72

DATA SHEET 2 (Cont.)

2.1.11 Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	.024 Vdc	+0.025±0.010 Vdc
+0.050±0.001	.048	0.050±0.010
+0.100±0.001	.097	0.100±0.010
+1.000±0.001	.997	1.000±0.010
+2.000±0.001	1.994	2.000±0.010
+3.000±0.001	2.991	+3.000±0.010
+4.000±0.001	3.993	+4.000±0.015
+4.900±0.001	4.887	+4.900±0.020

Insp. ________ Date 1-25-72

DATA SHEET 2 (Cont.)

2.1.13 Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	5.053 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.067	+8.10±0.15
-8V Monitor	A	-8.099	-8.15±0.15
+25V Monitor	A	25.373	+25.50±0.75
+350V Monitor	A	346.33	+350.±15.
-15V Monitor	A	-16.075	-15.0±1.0
-5V Monitor	A	-5.319	-5.25±0.25
Disc Ref Mon.	A	2.989	+3.00±0.02
+5V Monitor	B	5.063	+5.00±0.25
+8V Monitor	B	8.077	+8.10±0.15
-8V Monitor	B	-8.099	-8.15±0.15
+25V Monitor	B	25.427	+25.50±0.75
+350V Monitor	B	346.33	+350.±15.
-15V Monitor	B	-16.075	-15.0±1.0
-5V Monitor	B	-5.319	-5.25±0.25
Disc Ref Mon.	B	2.989	+3.000±0.02

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Insp. Date 1-25-72

2.1.14	Actual Value	Acceptable Value
Heater	25.36	+25.0 ± 0.5 Vdc
Electronics	25.01	+25.0 ± 0.5 Vdc
Detector Bias	25.01	+25.0 ± 0.5 Vdc

Insp. Date 1-25-72

8:25 Am Power Up in Bldg 33
PKG Temp = -27.76 °C
Det Plate Temp = -41.94 °C.

DATA SHEET 2 (Cont.)

2.1.15 Low Voltage Current Consumption

Current Sink	Measured Current		Acceptable Value
Heater	190	mA	180 ± 25 mA
* Electronics	555		≤ 560
Detector Bias	20		≤ 30

Insp. ______ Date 1-25-72

2.1.16 Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5,043 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8,047	+8.10±0.15
-8V Monitor	A	-8,087	-8.15±0.15
+25V Monitor	A	25.320	+25.50±0.75
+350 V Monitor	A	346.33	+350.±15.
-15V Monitor	A	-16.049	-15.0±1.0
-5V Monitor	A	-5,300	-5.25±0.25
Disc Ref Mon.	A	2.989	+3.00±0.02
+5V Monitor	B	5,043	+5.00±0.25
+8V Monitor	B	8,057	+8.10±0.15
-8V Monitor	B	-8,071	-8.15±0.15
+25V Monitor	B	25,320	+25.50±0.75
+350V Monitor	B	346.33	+350.±15.
-15V Monitor	B	-16.026	-15.0±1.0
-5V Monitor	B	-5,300	-5.25±0.25
Disc Ref Mon.	B	2,989	+3.00±0.02

DR #EPS 0071

Insp. ______ Date 1-25-72

DATA SHEET 2 (Cont.)

2.1.17

	Actual Value	Acceptable Value
Heater	29.96	+30.0 ± 0.5 Vdc
Electronics	29.97	+30.0 ± 0.5 Vdc
Detector Bias	30.07	+30.0 ± 0.5 Vdc

Insp.

Date 1-25-71

2.1.18 High Voltage Current Consumption

Current Sink	Actual Value	Acceptable Value
Heater	225 mA	225 ± 25 mA
Electronics	491	≤ 560
Detector Bias	20	≤ 30

Insp.

Date 1-25-71

DATA SHEET 2 (Cont.)

2.1.19 High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.053 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.067	+8.10±0.15
-8V Monitor	A	-8.099	-8.15±0.15
+25V Monitor	A	25.373	+25.50±0.75
+350V Monitor	A	346.33	+350.±15.
-15V Monitor	A	-16.075	-15.0±1.0
-5V Monitor	A	-5.319	-5.25±0.25
Disc Ref Mon.	A	2.989	+3.00±0.02
+5V Monitor	B	5.063	+5.00±0.25
+8V Monitor	B	8.077	+8.10±0.15
-8V Monitor	B	-8.083	-8.15±0.15
+25V Monitor	B	25.427	+25.50±0.75
+350V Monitor	B	346.33	+350.±15.
-15V Monitor	B	-16.052	-15.0±1.0
-5V Monitor	B	-5.306	-5.25±0.25
Disc Ref Mon.	B	2.989	+3.00±0.02

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Insp. ______ Date 1-25-72

DATA SHEET 2 (Cont.)

2.1.20 Temperature Measurement

Parameter	Prime Frame	Measured Value
Package Temperature Monitor	A	-27.86 °C
Package Temperature Monitor	B	-22.86
Detector Plate Temperature Monitor	A	-41.84
Detector Plate Temperature Monitor	B	-41.84

Insp.

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2.1.21 Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	0 µA	1.0 µA
B	.003	2.0 µA
C	.011	2.0 µA
D	.003	2.0 µA
E	0	2.0 µA

Insp.

Date 1-25-72

DATA SHEET 2 (Cont.)

2.1.22 Detector Resolution Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	4 keV	50. keV
B	5	50. keV
C	4	50. keV
D	3.5	50. keV
E	5	50. keV

Insp. ______ Date 1-25-72

2.1.25 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	14	14 or 16
B	E2	14	14 or 16
C	E3	14	14 or 16
D	E4	14	14 or 16
E	P6	14	14 or 16

Insp. ______ Date 1-25-72

DATA SHEET 2 (Cont.)

2.1.26 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	14	14 or 16
B	P2	14	14 or 16
C	P3	14	14 or 16
D	P4	14	14 or 16
E	P5	14	14 or 16

Insp. ______ Date 1-25-72

2.1.28 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	2032	2032 or 2048
A	E2	2032	2032 or 2048
C	E3	2032	2032 or 2048
D	E4	2032	2032 or 2048
E	P6	2032	2032 or 2048

Insp. ______ Date 1-25-72

DATA SHEET 2 (Cont.)

2.1.29 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	2032	2032 or 2048
B	P2	2032	2032 or 2048
C	P3	2032	2032 or 2048
D	P4	2032	2032 or 2048
E	P5	2032	2032 or 2048

Insp. Date 1-25-72

2.1.31 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	260 096	260,096 or 262,144
B	E2	260 144	260,096 or 262,144
C	E3	260 096	260,096 or 262,144
D	E4	260 096	260,096 or 262,144
E	P6	260 096	260,096 or 262,144

Insp. Date 1-25-72

DATA SHEET 2 (Cont.)

2.1.32 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	260 096	260,096 or 262,144
B	P2	260 096	260,096 or 262,144
C	P3	260 096	260,096 or 262,144
D	P4	260 096	260,096 or 262,144
E	P6	260 096	260,096 or 262,144

108 Insp.
1-25-72 Date

2.1.34 Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	33,292,288	33,292,288 or 0
B	E2	0	33,292,288 or 0
C	E3	33,292,288	33,292,288 or 0
D	E4	33,292,288	33,292,288 or 0
E	P6	33,292,288	33,292,288 or 0

Insp.
1-25-72 Date

2.1.35 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	33,292,288	33,292,288 or 0
B	P2	33,292,288	33,292,288 or 0
C	P3	33,292,288	33,292,288 or 0
D	P4	33,292,288	33,292,288 or 0
E	P5	33,292,288	33,292,288 or 0

Insp. _______ Date [illegible]

Elapsed Time	Package Temp.	Detector Temp.	Elapsed Time	Package Temp.	Detector Temp.
0900/0	-25.42	-39.2			
0930/.5	-21.702	-33.92			
10:00/1	-17.597	-29.424			
10:30/1.5	-13.296	-25.807			
11:00/2.0	-9.386	-22.777			
~~11:00/2.5~~	Duplicate	[illegible]			
11:30/2.5	-5.477	-19.943			
12:00/3.0	-2.251	-17.695			
12:30/3.5	+.680	-15.544			
13:00/4.0	3.417	-13.687			
13:30/4.5	5.958	-11.830			
14:00/5.0	8.108	-10.266			
14:30/5.5	10.161	-8.8			
15:00	11.627	-7.529			
15:30	11.725	-7.041			
16:00	11.823	-6.943			
16:30	11.823	-6.845			
17:00	11.92	-6.845			
17:30	11.92	-6.845 c4			
1800	11.43	+.19			

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DATE

DATA SHEET 2 (Cont.)

2.2.22 BTE to Housekeeping mode

Insp. Date 1-25-72

2.2.23 Set test case 3

Insp. Date 1-25-72

2.2.24 BTE (a) Electronics Power Switch 'ON'
(b) Detector Bias Switch 'ON'
(c) Heater Power Switch '~~OFF~~' → "(ON) BZC

Ref Par. 2.2.24

Insp. Date 1-25-72

2.2.25 Repeat step 2.2.13

Insp. Date 1-25-72

2.2.26 Repeat step 2.2.14

Insp. Date 1-25-72

DATA SHEET 2 (Cont.)

2.1.4 Heater Power

Measured Value	Acceptable Value
27.54	+27.5 ± 0.5 Vdc

Insp.	Date
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2.1.5 Medium Voltage Heater Current

Measured Value	Acceptable Value
7 MA	10 ± 5 mA

Insp.	Date
	1-25-72

DATA SHEET 2 (Cont.)

2.1.6 Electronic Power

Measured Value
27.44

Acceptable Value
+27.5 ± 0.5 Vdc

Insp.
Date 1-25-72

2.1.7 Medium Voltage Electronics Current

Measured Value
512
(512 MA)

Maximum Value
560 mA

Insp.
Date 1-25-72

2.1.8 Detector Bias

Measured Value
27.55

Acceptable Value
+27.5 ± 0.5 Vdc

Insp.
Date 1-25-72

2.1.9 Medium Voltage Detector Bias Current

Measured Value
20 MA

Maximum Value
30 mA

Insp.
Date 1-25-72

DATA SHEET 2 (Cont.)

2.1.11 Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	.024 Vdc	+0.025±0.010 Vdc
+0.050±0.001	.048	0.050±0.010
+0.100±0.001	.097	0.100±0.010
+1.000±0.001	.997	1.000±0.010
+2.000±0.001	1.994	2.000±0.010
+3.000±0.001	2.996	+3.000±0.010
+4.000±0.001	3.993	+4.000±0.015
+4.900±0.001	4.892	+4.900±0.020

Insp.

1-25-72

Date

DATA SHEET 2 (Cont.)

2.1.13 Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	+5.111 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	+8.135	+8.10±0.15
-8V Monitor	A	-8.166	-8.15±0.15
+25V Monitor	A	+25.588	+25.50±0.75
+350V Monitor	A	+346.330	+350.±15.
-15V Monitor	A	-16.062	-15.0±1.0
-5V Monitor	A	-5.401	-5.25±0.25
Disc Ref Mon.	A	+2.995	+3.00±0.02
+5V Monitor	B	+5.111	+5.00±0.25
+8V Monitor	B	+8.135	+8.10±0.15
-8V Monitor	B	-8.166	-8.15±0.15
+25V Monitor	B	+25.642	+25.50±0.75
+350V Monitor	B	+346.330	+350.±15.
-15V Monitor	B	-16.039	-15.0±1.0
-5V Monitor	B	-5.389	-5.25±0.25
Disc Ref Mon.	B	+2.995	+3.000±0.02

DR # EPS-007.

Insp. 1-25-72 Date

2.1.14

	Actual Value	Acceptable Value
Heater	25.37 ~~25.30~~	+25.0 ± 0.5 Vdc
Electronics	25.00	+25.0 ± 0.5 Vdc
Detector Bias	25.01	+25.0 ± 0.5 Vdc

Insp. 1-25-72 Date

DATA SHEET 2 (Cont.)

2.1.15 Low Voltage Current Consumption

Current Sink	Measured Current	Acceptable Value
Heater	7 MA mA	10 ± 5 mA
Electronics	543 MA	≤ 560
Detector Bias	20 MA	≤ 30

Insp. ______ Date 1-25-72

2.1.16 Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	+5.111 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	+8.126	+8.10±0.15
-8V Monitor	A	-8.160	-8.15±0.15
+25V Monitor	A	+25.588	+25.50±0.75
+350 V Monitor	A	+346.330	+350.±15.
-15V Monitor	A	-16.026	-15.0±1.0
-5V Monitor	A	-5.398	-5.25±0.25
Disc Ref Mon.	A	+2.995	+3.00±0.02
+5V Monitor	B	+5.111	+5.00±0.25
+8V Monitor	B	+8.126	+8.10±0.15
-8V Monitor	B	-8.160	-8.15±0.15
+25V Monitor	B	+25.588	+25.50±0.75
+350V Monitor	B	+346.330	+350.±15.
-15V Monitor	B	-16.003	-15.0±1.0
-5V Monitor	B	-5.386	-5.25±0.25
Disc Ref Mon.	B	+2.995	+3.00±0.02

DR #
EPS-007

Insp. ______ Date 1-25-72

DATA SHEET 2 (Cont.)

2.1.17	Actual Value	Acceptable Value
Heater	29.99	+30.0 ± 0.5 Vdc
Electronics	29.96	+30.0 ± 0.5 Vdc
Detector Bias	30.14	+30.0 ± 0.5 Vdc

Insp. Date 1-25-72

2.1.18 High Voltage Current Consumption

Current Sink	Actual Value	Acceptable Value
Heater	~~29.29~~ 7 mA	10 ± 5 mA
Electronics	490 MA	≤ 560
Detector Bias	20 MA	≤ 30

Insp. Date 1-25-72

DATA SHEET 2 (Cont.)

2.1.19 High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	+5.171 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	+8.135	+8.10±0.15
-8V Monitor	A	-8.187	-8.15±0.15
+25V Monitor	A	+25.588	+25.50±0.75
+350V Monitor	A	+346.330	+350.±15.
-15V Monitor	A	-16.075	-15.0±1.0
-5V Monitor	A	-5.404	-5.25±0.25
Disc Ref Mon.	A	+2.995	+3.00±0.02
+5V Monitor	B	+5.121	+5.00±0.25
+8V Monitor	B	+8.145	+8.10±0.15
-8V Monitor	B	-8.187	-8.15±0.15
+25V Monitor	B	+25.692	+25.50±0.75
+350V Monitor	B	+346.330	+350.±15.
-15V Monitor	B	-16.075	-15.0±1.0
-5V Monitor	B	-5.404	-5.25±0.25
Disc Ref Mon.	B	+2.995	+3.00±0.02

DR #
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DATA SHEET 2 (Cont.)

2.1.20 Temperature Measurement

Parameter	Prime Frame	Measured Value
Package Temperature Monitor	A	+11.920 °C
Package Temperature Monitor	B	+11.920
Detector Plate Temperature Monitor	A	-6.845
Detector Plate Temperature Monitor	B	-6.845

Insp. ____ Date 1-25-72

2.1.21 Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output		Maximum Acceptable Value
A	+.017	μA	1.0 μA
B	+.038		2.0 μA
C	+.248		2.0 μA
D	.065		2.0 μA
E	.050		2.0 μA

Insp. ____ Date 1-25-72

DATA SHEET 2 (Cont.)

2.1.22 Detector Resolution Test

EPS Channel	Measured Engineering Unit Output		Maximum Acceptable Value
A	.361	keV	50. keV
B	.312		50. keV
C	.308		50. keV
D	.337		50. keV
E	.347		50. keV

Insp. Date 1-25-72

2.1.25 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	14	14 or 16
B	E2	14	14 or 16
C	E3	14	14 or 16
D	E4	14	14 or 16
E	P6	14	14 or 16

Insp. Date 1-25-72

DATA SHEET 2 (Cont.)

2.1.26 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	14	14 or 16
B	P2	14	14 or 16
C	P3	14	14 or 16
D	P4	14	14 or 16
E	P5	14	14 or 16

Insp. 103 Date 1-25-72

2.1.28 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	2032 4064, 2048	2032 or 2048
A	E2	2048, 2032	2032 or 2048
C	E3	2048, 2032	2032 or 2048
D	E4	2032	2032 or 2048
E	P6	2048, 2032	2032 or 2048

Insp. 103 Date 1-25-72

DATA SHEET 2 (Cont.)

2.1.29 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	2032	2032 or 2048
B	P2	2032	2032 or 2048
C	P3	2032	2032 or 2048
D	P4	2632	2032 or 2048
E	P5	2032	2032 or 2048.

Insp.	Date
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2.1.31 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	260096	260,096 or 262,144
B	E2	260096	260,096 or 262,144
C	E3	260096	260,096 or 262,144
D	E4	260096	260,096 or 262,144
E	P6	260096	260,096 or 262,144

Insp.	Date
	1-25-72

2.1.32 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	260096	260,096 or 262,144
B	P2	260,096	260,096 or 262,144
C	P3	260,096	260,096 or 262,144
D	P4	260,096	260,096 or 262,144
E	P6	260,096	260,096 or 262,144

Insp. ____________ Date 1-25-72

2.1.34 Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	33,292,288	33,292,288 or 0
B	E2	33,292,288	33,292,288 or 0
C	E3	33,292,288	33,292,288 or 0
D	E4	33,292,288	33,292,288 or 0
E	P6	33,292,288	33,292,288 or 0

Insp. ____________ Date 1-25-72

DATA SHEET 2 (Cont.)

2.1.35 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	33,292,288	33,292,288 or 0
B	P2	33,292,288	33,292,288 or 0
C	P3	33,292,288	33,292,288 or 0
D	P4	33,292,288	33,292,288 or 0
E	P5	33,292,288	33,292,288 or 0

Insp.

1-25-72
Date

2.2.30 RECORD TEMICNATURES

APSED TIME	PACKAGE TEMP.	DETECTOR TEMP.	ELAPSED TIME	PACKAGE TEMP.	DETECTOR TEMP.
1/25/72 1800/0	+11.43	+.19	0330/9.5	43.59	38.12
1830/.5	11.82	11.43	0400/100	44.27	38.70
1900/1	13.00	16.42	0430/10.5	44.76	39.09
1930/1.5	14.56	18.76	0500/11.0	45.06	39.39
2000/2	16.81	20.81	0530/11.5	45.54	39.58
2030/2.5	19.15	22.67	0600/12.0	45.84	39.88
2100/3	21.69	24.53	0630/12.5	46.13	39.97
2130/3.5	24.24	26.39	0700/13.0	46.33	40.17
2200/4	26.97	28.24	0730/13.5 Vented Chamber at 07:45 Turned LAmps off at 0825	46.52	40.27
2[illegible]0/4.5	29.32	29.81			
2300/5	31.57	31.27	0800	47.11	41.15
2330/5.5	33.52	32.45	0825	47.50	43.2
2400/6	35.28	33.52	0830	47.60	38.8
1/26/72 0030/6.5	37.14	34.50	0900	45.25	26.88
0100/7	38.70	35.48	0930	45.45	27.56
0130/7.5	39.88	36.26	13:10	34.303	29.22
0200/8.0	41.15	36.94			
0230/8.5	42.12	37.53			
[illegible]00/9.0	42.91	37.53			

1-26-72

DATA SHEET 2 (Cont.)

2.2.28 Set test case 4

Insp. ______ Date 1-25-72

2.2.29 BTE (a) Electronics Power Switch 'OFF'

(b) Heater Power Switch ~~[illegible]~~ ON

(c) Detector Bias Switch 'OFF'

BEC Ref Para. 2.2.29 in Proc.

Insp. ______ Date 1-25-72

2.2.30 Repeat step 2.2.13

Insp. ______ Date 1-26-72

2.2.31 Repeat step 2.2.14

Insp. ______ Date 1-26-72

2.2.32 Vacuum chamber to ambient

Insp. ______ Date 1/26/72

DATA SHEET 3
FUNCTIONAL TEST

2.3 FUNCTIONAL TEST DATA SHEET

2.1.4 Heater Power

Measured Value	Acceptable Value
27.54	+27.5 ± 0.5 Vdc

~~27.54~~ Insp. 1/26/72 Date

2.1.5 Medium Voltage Heater Current

Measured Value	Acceptable Value
7 MA	10 ± 5 mA

1/26/72 Insp. Date

DATA SHEET 3 (Cont.)

.1.6 Electronic Power

Measured Value	Acceptable Value
27.45	+27.5 ± 0.5 Vdc

Insp. ______ Date 1/26/72

.1.7 Medium Voltage Electronics Current

Measured Value	Maximum Value
512 MA	560 mA

Insp. ______ Date 1/26/72

2.1.8 Detector Bias

Measured Value	Acceptable Value
	+27.5 ± 0.5 Vdc

1/26/72 DET PLATE ABOVE 25°C SEE CAUTION 2.1.7

Insp. ______ Date ______

2.1.9 Medium Voltage Detector Bias Current

Measured Value	Maximum Value
	30 mA

1/26/72 SEE CAUTION 2.1.7

Insp. ______ Date ______

DATA SHEET 3 (Cont.)

2.1.11 Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	.024 Vdc	+0.025±0.010 Vdc
+0.050±0.001	.048	0.050±0.010
+0.100±0.001	.097	0.100±0.010
+1.000±0.001	.997	1.000±0.010
+2.000±0.001	1.994	2.000±0.010
+3.000±0.001	2.996	+3.000±0.010
+4.000±0.001	3.998	+4.000±0.015
+4.900±0.001	4.897	+4.900±0.020

Insp.

Date 1/26/72

DATA SHEET 3 (Cont.)

2.1.13 Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value	
+5V Monitor	A	+5.131 Vdc	+5.00±0.25 Vdc	
+8V Monitor	A	+8.145	+8.10±0.15	
-8V Monitor	A	-8.187	-8.15±0.15	
+25V Monitor	A	25.642	+25.50±0.75	
+350V Monitor	* A	+24.243	+350.±15.	"OFF"
-15V Monitor	A	-15.984	-15.0±1.0	
-5V Monitor	A	-5.417	-5.25±0.25	
Disc Ref Mon.	A	+2.995	+3.00±0.02	
+5V Monitor	B	+5.131	+5.00±0.25	
+8V Monitor	B	+8.155	+8.10±0.15	
-8V Monitor	B	-8.209	-8.15±0.15	
+25V Monitor	B	+25.642	+25.50±0.75	
+350V Monitor	* B	+24.243	+350.±15.	"OFF"
-15V Monitor	B	-16.019	-15.0±1.0	
-5V Monitor	B	-5.433	-5.25±0.25	
Disc Ref Mon.	B	+3.000	+3.000±0.02	

DR EPS 0071 — Insp.

1/26/72 — Date

2.1.14

	Actual Value	Acceptable Value
Heater	25.37	+25.0 ± 0.5 Vdc
Electronics	25.00	+25.0 ± 0.5 Vdc
Detector Bias	—	+25.0 ± 0.5 Vdc

* "OFF"

SEE 2.1.7

Insp.

Date

DATA SHEET 3 (Cont.)

2.1.15 Low Voltage Current Consumption

Current Sink	Measured Current	Acceptable Value
Heater	7.0 mA	10 ± 5 mA
Electronics	544 MA	≤ 560
Detector Bias	OFF	≤ 30

SEE 2.1.7

Insp. ____________ Date ____________

2.1.16 Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value	
+5V Monitor	A	+5.121 Vdc	+5.00±0.25 Vdc	
+8V Monitor	A	+8.135	+8.10±0.15	
-8V Monitor	A	-8.203	-8.15±0.15	
+25V Monitor	A	+25.642	+25.50±0.75	
+350 V Monitor *	A	+24.243	+350.±15.	"OFF"
-15V Monitor	A	-15.984	-15.0±1.0	
-5V Monitor	A	- 5.430	-5.25±0.25	
Disc Ref Mon.	A	+2.995	+3.00±0.02	
+5V Monitor	B	+5.121	+5.00±0.25	
+8V Monitor	B	+8.145	+8.10±0.15	
-8V Monitor	B	-8.187	-8.15±0.15	
+25V Monitor	B	+25.642	+25.50±0.75	
+350V Monitor *	B	+24.243	+350.±15.	OFF
-15V Monitor	B	-15.984	-15.0±1.0	
-5V Monitor	B	- 5.417	-5.25±0.25	
Disc Ref Mon.	B	+3.000	+3.00±0.02	

Insp. ____________ Date ____________

* See Caution 2.1.7

DATA SHEET 3 (Cont.)

2.1.17	Actual Value	Acceptable Value
Heater	29.98	+30.0 ± 0.5 Vdc
Electronics	29.97	+30.0 ± 0.5 Vdc
Detector Bias	OFF	+30.0 ± 0.5 Vdc

*
Insp. Date

2.1.18 High Voltage Current Consumption

Current Sink	Actual Value	Acceptable Value
Heater	7 MA mA	10 ± 5 mA
Electronics	489 MA	≤ 560
Detector Bias	OFF	≤ 30

*
Insp. Date

* SEE
CAUTION
2.1.7

1/24/72

DATA SHEET 3 (Cont.)

2.1.19 High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value	
+5V Monitor	A	+5.131 Vdc	+5.00±0.25 Vdc	
+8V Monitor	A	+8.155	+8.10±0.15	
-8V Monitor	A	-8.193	-8.15±0.15	
+25V Monitor	A	+25.642	+25.50±0.75	
+350V Monitor	A *	+24.243	+350.±15.	OFF
-15V Monitor	A	-15.997	-15.0±1.0	
-5V Monitor	A	-5.433	-5.25±0.25	
Disc Ref Mon.	A	+2.995	+3.00±0.02	
+5V Monitor	B	+5.141	+5.00±0.25	
+8V Monitor	B	+8.155	+8.10±0.15	
-8V Monitor	B	-8.193	-8.15±0.15	
+25V Monitor	B	+25.696	+25.50±0.75	
+350V Monitor	B *	+24.243	+350.±15.	OFF
-15V Monitor	B	-15.997	-15.0±1.0	
-5V Monitor	B	-5.420	-5.25±0.25	
Disc Ref Mon.	B	+3.000	+3.00±0.02	

Insp.

Date 1/26/72

* See Caution 2.1.7

DATA SHEET 3 (Cont.)

2.1.20 Temperature Measurement

Parameter	Prime Frame	Measured Value	Acceptable Limits
Package Temperature Monitor	A	+35.085 °C	50°F to 118°F = 10°C to 48°C
Package Temperature Monitor	B	+35.085	
Detector Plate Temperature Monitor	A	+29.416	
Detector Plate Temperature Monitor	B	+29.416	

Insp. ____________ Date 1/26/72

2.1.21 Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output		Maximum Acceptable Value
A		μA	1.0 μA
B			2.0 μA
C			2.0 μA
D			2.0 μA
E			2.0 μA

NOT TAKEN

1/26/72

DET PLATE TEMPERATURE +29.4 °C

SEE CAUTION 2.1.7

Insp. ____________ Date ____________

DATA SHEET 3 (Cont.)

2.1.22 Detector Resolution Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	.435 keV	50. keV
B	.405	50. keV
C	.391	50. keV
D	.464	50. keV
E	.396	50. keV

SEE CAUTION
201.7
1/26/72

↑
VOLTAGE
NOT
E.V.

Insp. ______ Date ______

2.1.25 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	14	14 or 16
B	E2	14	14 or 16
C	E3	14	14 or 16
D	E4	14	14 or 16
E	P6	14	14 or 16

Insp. ______ Date 1/26/72

DATA SHEET 3 (Cont.)

2.1.26 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	14	14 or 16
B	P2	14	14 or 16
C	P3	14	14 or 16
D	P4	14	14 or 16
E	P5	14	14 or 16

Insp. ____ Date 1/26/72

2.1.28 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	2032	2032 or 2048
A	E2	2032	2032 or 2048
C	E3	2032	2032 or 2048
D	E4	2032	2032 or 2048
E	P6	2032	2032 or 2048

Insp. ____ Date 1/26/72

DATA SHEET 3 (Cont.)

2.1.29 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	2032	2032 or 2048
B	P2	2032	2032 or 2048
C	P3	2032	2032 or 2048
D	P4	2032	2032 or 2048
E	P5	2032	2032 or 2048

Insp. ______ Date 1/26/72

2.1.31 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	260,096	260,096 or 262,144
B	E2	262,144	260,096 or 262,144
C	E3	262,144	260,096 or 262,144
D	E4	262,144	260,096 or 262,144
E	P6	260,096	260,096 or 262,144

Insp. ______ Date 1/26/72

DATA SHEET 3 (Cont.)

2.1.32 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	260,696	260,096 or 262,144
B	P2	260,096	260,096 or 262,144
C	P3	260,096	260,096 or 262,144
D	P4	260,096	260,096 or 262,144
E	P6	262,144	260,096 or 262,144

Insp. ______ Date 1/26/72

2.1.34 Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	33,292,288	33,292,288 or 0
B	E2	0	33,292,288 or 0
C	E3	33,292,288	33,292,288 or 0
D	E4	33,292,288	33,292,288 or 0
E	P6	33,292,288	33,292,288 or 0

Insp. ______ Date 1/24/72

DATA SHEET 3 (Cont.)

2.1.35 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	33,292,288	33,292,288 or 0
B	P2	33,292,288	33,292,288 or 0
C	P3	33,292,288	33,292,288 or 0
D	P4	33,292,288	33,292,288 or 0
E	P5	33,292,288	33,292,288 or 0

Insp. ______ Date 1/26/72

2.1.36 Visual inspection

Insp. ______ Date 1/26/72

DATA SHEET 4

2.4 VIBRATION

2.1.4 Heater Power

Measured Value	Acceptable Value
________________	+27.5 ± 0.5 Vdc

____________ ________________
Insp. Date

2.1.5 Medium Voltage Heater Current

Measured Value	Acceptable Value
________________	10 ± 5 mA

____________ ________________
Insp. Date

DATA SHEET 4 (Cont.)

2.1.6 Electronic Power

Measured Value	Acceptable Value
________________	+27.5 ± 0.5 Vdc

Insp. ____________ Date ____________

2.1.7 Medium Voltage Electronics Current

Measured Value	Maximum Value
________________	560 mA

Insp. ____________ Date ____________

2.1.8 Detector Bias

Measured Value	Acceptable Value
________________	+27.5 ± 0.5 Vdc

Insp. ____________ Date ____________

2.1.9 Medium Voltage Detector Bias Current

Measured Value	Maximum Value
________________	30 mA

Insp. ____________ Date ____________

DATA SHEET 4 (Cont.)

2.1.11 Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	________________ Vdc	+0.025±0.010 Vdc
+0.050±0.001	________________	0.050±0.010
+0.100±0.001	________________	0.100±0.010
+1.000±0.001	________________	1.000±0.010
+2.000±0.001	________________	2.000±0.010
+3.000±0.001	________________	+3.000±0.010
+4.000±0.001	________________	+4.000±0.015
+4.900±0.001	________________	+4.900±0.020

______________ ____________________
Insp. Date

DATA SHEET 4 (Cont.)

2.1.13 Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	____________ Vdc	+5.00±0.25 Vdc
+8V Monitor	A	____________	+8.10±0.15
-8V Monitor	A	____________	-8.15±0.15
+25V Monitor	A	____________	+25.50±0.75
+350V Monitor	A	____________	+350.±15.
-15V Monitor	A	____________	-15.0±1.0
-5V Monitor	A	____________	-5.25±0.25
Disc Ref Mon.	A	____________	+3.00±0.02
+5V Monitor	B	____________	+5.00±0.25
+8V Monitor	B	____________	+8.10±0.15
-8V Monitor	B	____________	-8.15±0.15
+25V Monitor	B	____________	+25.50±0.75
+350V Monitor	B	____________	+350.±15.
-15V Monitor	B	____________	-15.0±1.0
-5V Monitor	B	____________	-5.25±0.25
Disc Ref Mon.	B	____________	+3.000±0.02

____________ Insp. ____________ Date

2.1.14

	Actual Value	Acceptable Value
Heater	____________	+25.0 ± 0.5 Vdc
Electronics	____________	+25.0 ± 0.5 Vdc
Detector Bias	____________	+25.0 ± 0.5 Vdc

____________ Insp. ____________ Date

DATA SHEET 4 (Cont.)

2.1.15 Low Voltage Current Consumption

Current Sink	Measured Current	Acceptable Value
Heater	______ mA	10 ± 5 mA
Electronics	______	≤ 560
Detector Bias	______	≤ 30

______ Insp. ______ Date

2.1.16 Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	______ Vdc	+5.00±0.25 Vdc
+8V Monitor	A	______	+8.10±0.15
-8V Monitor	A	______	-8.15±0.15
+25V Monitor	A	______	+25.50±0.75
+350 V Monitor	A	______	+350.±15.
-15V Monitor	A	______	-15.0±1.0
-5V Monitor	A	______	-5.25±0.25
Disc Ref Mon.	A	______	+3.00±0.02
+5V Monitor	B	______	+5.00±0.25
+8V Monitor	B	______	+8.10±0.15
-8V Monitor	B	______	-8.15±0.15
+25V Monitor	B	______	+25.50±0.75
+350V Monitor	B	______	+350.±15.
-15V Monitor	B	______	-15.0±1.0
-5V Monitor	B	______	-5.25±0.25
Disc Ref Mon.	B	______	+3.00±0.02

______ Insp. ______ Date

DATA SHEET 4 (Cont.)

2.1.17	Actual Value	Acceptable Value
Heater	____________	+30.0 ± 0.5 Vdc
Electronics	____________	+30.0 ± 0.5 Vdc
Detector Bias	____________	+30.0 ± 0.5 Vdc

____________ Insp. ____________ Date

2.1.18 High Voltage Current Consumption

Current Sink	Actual Value	Acceptable Value
Heater	____________ mA	10 ± 5 mA
Electronics	____________	≤ 560
Detector Bias	____________	≤ 30

____________ Insp. ____________ Date

DATA SHEET 4 (Cont.)

2.1.19 High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	____________Vdc	+5.00±0.25 Vdc
+8V Monitor	A	____________	+8.10±0.15
-8V Monitor	A	____________	-8.15±0.15
+25V Monitor	A	____________	+25.50±0.75
+350V Monitor	A	____________	+350.±15.
-15V Monitor	A	____________	-15.0±1.0
-5V Monitor	A	____________	-5.25±0.25
Disc Ref Mon.	A	____________	+3.00±0.02
+5V Monitor	B	____________	+5.00±0.25
+8V Monitor	B	____________	+8.10±0.15
-8V Monitor	B	____________	-8.15±0.15
+25V Monitor	B	____________	+25.50±0.75
+350V Monitor	B	____________	+350.±15.
-15V Monitor	B	____________	-15.0±1.0
-5V Monitor	B	____________	-5.25±0.25
Disc Ref Mon.	B	____________	+3.00±0.02

____________ Insp. ____________ Date

DATA SHEET 4 (Cont.)

2.1.20 Temperature Measurement

Parameter	Prime Frame	Measured Value	Acceptable Limits
Package Temperature Monitor	A	________ °C	50°F to 118°F : 10°C to 48°C
Package Temperature Monitor	B	________	↓
Detector Plate Temperature Monitor	A	________	X
Detector Plate Temperature Monitor	B	________	X

________ Insp. ________ Date

2.1.21 Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	____________ µA	1.0 µA
B	____________	2.0 µA
C	____________	2.0 µA
D	____________	2.0 µA
E	____________	2.0 µA

________ Insp. ________ Date

DATA SHEET 4 (Cont.)

2.1.22 Detector Resolution Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	______________ keV	50. keV
B	______________	50. keV
C	______________	50. keV
D	______________	50. keV
E	______________	50. keV

____________ ________________
Insp. Date

2.1.25 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	__________	14 or 16
B	E2	__________	14 or 16
C	E3	__________	14 or 16
D	E4	__________	14 or 16
E	P6	__________	14 or 16

____________ ________________
Insp. Date

DATA SHEET 4 (Cont.)

2.1.26 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	____________	14 or 16
B	P2	____________	14 or 16
C	P3	____________	14 or 16
D	P4	____________	14 or 16
E	P5	____________	14 or 16

Insp. ____________ Date ____________

2.1.28 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	____________	2032 or 2048
A	E2	____________	2032 or 2048
C	E3	____________	2032 or 2048
D	E4	____________	2032 or 2048
E	P6	____________	2032 or 2048

Insp. ____________ Date ____________

DATA SHEET 4 (Cont.)

2.1.29 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	____________	2032 or 2048
B	P2	____________	2032 or 2048
C	P3	____________	2032 or 2048
D	P4	____________	2032 or 2048
E	P5	____________	2032 or 2048

____________ Insp. ____________ Date

2.1.31 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	____________	260,096 or 262,144
B	E2	____________	260,096 or 262,144
C	E3	____________	260,096 or 262,144
D	E4	____________	260,096 or 262,144
E	P6	____________	260,096 or 262,144

____________ Insp. ____________ Date

DATA SHEET 4 (Cont.)

2.1.32 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	______	260,096 or 262,144
B	P2	______	260,096 or 262,144
C	P3	______	260,096 or 262,144
D	P4	______	260,096 or 262,144
E	P6	______	260,096 or 262,144

______ Insp. ______ Date

2.1.34 Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	______	33,292,288 or 0
B	E2	______	33,292,288 or 0
C	E3	______	33,292,288 or 0
D	E4	______	33,292,288 or 0
E	P6	______	33,292,288 or 0

______ Insp. ______ Date

DATA SHEET 4 (Cont.)

2.1.35 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	____________	33,292,288 or 0
B	P2	____________	33,292,288 or 0
C	P3	____________	33,292,288 or 0
D	P4	____________	33,292,288 or 0
E	P5	____________	33,292,288 or 0

____________ Insp. ____________ Date

2.1.36 Visual inspection

____________ Insp. ____________ Date

DATA SHEET 4 (Cont.)

2.4.2 Test article to Building 49, NASA/MSC

10 FEB 72
~~10 FEB. 72~~
Insp. Date

2.4.3 Prepare control system

10 FEB 72
~~10 FEB. 72~~
Insp. Date

2.4.4 Mount fixture

10 FEB 72
~~10 FEB.~~
Insp. Date

2.4.5 Shape 'R' axis spectrum

14 FEB 72
Insp. Date

2.4.6 Install test article

14 FEB. 72
Insp. Date

2.4.7 Sinusoidal Sweep

14 FEB. 72
Insp. Date

DATA SHEET 4 (Cont.)

2.4.8 Random exposure: (Attach spectrum plot)

Nominal: Time ______________ seconds

g rms ______________

High Energy Time ______________ seconds

g rms ______________

SEE BELOW Insp. 14 FEB. 72 Date

2.4.9 Remove test article

Insp. 14 FEB. 72 Date

2.4.8

HIGH

SEG. 1 20-300HZ. NON. 33GRMS, 42 FOR 10 SEC.

SEG. 2 300-400HZ. NON. 26 GRMS, 32 " " "

① SEG. 3 400-600 HZ. NOM 36 GRMS 68/56 5 SEC

SEG. 4 600-800HZ. NOM 27 GRMS ~~56~~ 38 GRMS 10 SEC

SEG. 5 800-1KC " 24 GRMS 30 GRMS 10 SEC

SEG. 6 1KC-2KC 41 GRMS 52 GRMS 10 SEC.

① POWER AMPLIFIER OVERCURRENT DUMPED TEST AFTER 5 SECONDS OF HIGH LEVEL. RECYCLED AMPLIFIER AND RAN AN ADDITIONAL 5 SECONDS. TAT

DATA SHEET 4 (Cont.)

POST R AXIS

2.1.4 Heater Power

Measured Value	Acceptable Value
27.54	+27.5 ± 0.5 Vdc

Insp.

Date 2/15/72

2.1.5 Medium Voltage Heater Current

Measured Value	Acceptable Value
.002	10 ± 5 mA

Insp.

Date 2/15/72

DATA SHEET 4 (Cont.)

2.1.6 Electronic Power

Measured Value	Acceptable Value
27.45	+27.5 ± 0.5 Vdc

Insp. ____________ Date 2/15/72

2.1.7 Medium Voltage Electronics Current

Measured Value	Maximum Value
512 mA	560 mA

Insp. ____________ Date 2/15/72

2.1.8 Detector Bias

Measured Value	Acceptable Value
27.56	+27.5 ± 0.5 Vdc

Insp. ____________ Date 2/15/72

2.1.9 Medium Voltage Detector Bias Current

Measured Value	Maximum Value
20 mA	30 mA

Insp. ____________ Date 2/15/72

DATA SHEET 4 (Cont.)

2.1.11 Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	.024 Vdc	+0.025±0.010 Vd
+0.050±0.001	.048	0.050±0.010
+0.100±0.001	.097	0.100±0.010
+1.000±0.001	.997	1.000±0.010
+2.000±0.001	1.994	2.000±0.010
+3.000±0.001	2.996	+3.000±0.010
+4.000±0.001	3.993	+4.000±0.015
+4.900±0.001	4.892	+4.900±0.020

Insp.

Date 2/15/77

DATA SHEET 4 (Cont.)

2.1.13 Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	5.111 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.135	+8.10±0.15
-8V Monitor	A	-8.181	-8.15±0.15
+25V Monitor	A	25.588	+25.50±0.75
+350V Monitor	A	346.330	+350.±15.
-15V Monitor	A	-16.016	-15.0±1.0
-5V Monitor	A	-5.401	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.111	+5.00±0.25
+8V Monitor	B	8.135	+8.10±0.15
-8V Monitor	B	-8.166	-8.15±0.15
+25V Monitor	B	25.588	+25.50±0.75
+350V Monitor	B	346.330	+350.±15.
-15V Monitor	B	-16.016	-15.0±1.0
-5V Monitor	B	-5.401	-5.25±0.25
Disc Ref Mon.	B	3.000	+3.000±0.02

DR71 EPS-0021

Insp. ________ Date 2/15/72

2.1.14

	Actual Value	Acceptable Value
Heater	25.37	+25.0 ± 0.5 Vdc
Electronics	25.00	+25.0 ± 0.5 Vdc
Detector Bias	25.02	+25.0 ± 0.5 Vdc

Insp. ________ Date 2/15/72

DATA SHEET 4 (Cont.)

2.1.15 Low Voltage Current Consumption

Current Sink	Measured Current	Acceptable Value
Heater	7 mA	10 ± 5 mA
Electronics	539	≤ 560
Detector Bias	2.1	≤ 30

Insp.

Date 2/15/72

2.1.16 Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.111 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.126	+8.10±0.15
-8V Monitor	A	-8.160	-8.15±0.15
+25V Monitor	A	25.588	+25.50±0.75
+350 V Monitor	A	346.330	+350.±15.
-15V Monitor	A	-15.980	-15.0±1.0
-5V Monitor	A	-5.398	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.111	+5.00±0.25
+8V Monitor	B	8.126	+8.10±0.15
-8V Monitor	B	-8.160	-8.15±0.15
+25V Monitor	B	25.588	+25.50±0.75
+350V Monitor	B	346.330	+350.±15.
-15V Monitor	B	-15.980	-15.0±1.0
-5V Monitor	B	-5.398	-5.25±0.25
Disc Ref Mon.	B	3.000	+3.00±0.02

Insp.

Date 2/15/72

DATA SHEET 4 (Cont.)

2.1.17

	Actual Value	Acceptable Value
Heater	29.97	+30.0 ± 0.5 Vdc
Electronics	29.96	+30.0 ± 0.5 Vdc
Detector Bias	30.08	+30.0 ± 0.5 Vdc

Insp. ______ Date 2/15/72

2.1.18 High Voltage Current Consumption

Current Sink	Actual Value	Acceptable Value
Heater	7 mA	10 ± 5 mA
Electronics	492	≤ 560
Detector Bias	21	≤ 30

Insp. ______ Date 2/15/72

DATA SHEET 4 (Cont.)

2.1.19 High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.121 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.135	+8.10±0.15
-8V Monitor	A	-8.187	-8.15±0.15
+25V Monitor	A	25.588	+25.50±0.75
+350V Monitor	A	346.332	+350.±15.
-15V Monitor	A	-16.052	-15.0±1.0
-5V Monitor	A	-5.417	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.121	+5.00±0.25
+8V Monitor	B	8.145	+8.10±0.15
-8V Monitor	B	-8.187	-8.15±0.15
+25V Monitor	B	25.642	+25.50±0.75
+350V Monitor	B	346.332	+350.±15.
-15V Monitor	B	-16.029	-15.0±1.0
-5V Monitor	B	-5.417	-5.25±0.25
Disc Ref Mon.	B	3.005	+3.00±0.02

DR# EPS-002

Insp. ____ Date 2/15/72

C/5

DATA SHEET 4 (Cont.)

2.1.20 Temperature Measurement

Parameter	Prime Frame	Measured Value	Acceptable Limits
Package Temperature Monitor	A	24.627 °C	50°F to 118°F 10°C to 48°C
Package Temperature Monitor	B	24.725	↓
Detector Plate Temperature Monitor	A	23.552	
Detector Plate Temperature Monitor	B	23.552	

Insp. ______ Date 2/15/72

2.1.21 Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output		Maximum Acceptable Value
A	.194	uA	1.0 µA
B	.566		2.0 µA
C	1.968		2.0 µA
D	.695		2.0 µA
E	.753		2.0 µA

Insp. ______ Date 2/15/72

DATA SHEET 4 (Cont.)

2.1.22 Detector Resolution Test

EPS Channel	Measured Engineering Unit Output		Maximum Acceptable Value
A	.391	7.0 keV	50. keV
B	.410	7.0	50. keV
C	.405	6.5	50. keV
D	.884	18	50. keV
E	.361	7.0	50. keV

Insp.

Date 2/15/72

2.1.25 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	14	14 or 16
B	E2	14	14 or 16
C	E3	14	14 or 16
D	E4	14	14 or 16
E	P6	14	14 or 16

Insp.

Date 2/15/72

DATA SHEET 4 (Cont.)

2.1.26 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	14	14 or 16
B	P2	14	14 or 16
C	P3	14	14 or 16
D	P4	14	14 or 16
E	P5	14	14 or 16

	2/15/72
Insp.	Date

2.1.28 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	2032	2032 or 2048
A	E2	2032	2032 or 2048
C	E3	2032	2032 or 2048
D	E4	2032	2032 or 2048
E	P6	2032	2032 or 2048

	2/15/72
Insp.	Date

DATA SHEET 4 (Cont.)

2.1.29 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	2032	2032 or 2048
B	P2	2032	2032 or 2048
C	P3	2032	2032 or 2048
D	P4	2032	2032 or 2048
E	P5	2032	2032 or 2048

Insp. ______ Date 2/15/72

2.1.31 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	260 096	260,096 or 262,144
B	E2	260 096	260,096 or 262,144
C	E3	260 096	260,096 or 262,144
D	E4	262 144	260,096 or 262,144
E	P6	260 096	260,096 or 262,144

Insp. ______ Date 2/15/72

DATA SHEET 4 (Cont.)

2.1.32 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	260 096	260,096 or 262,144
B	P2	260 096	260,096 or 262,144
C	P3	260 096	260,096 or 262,144
D	P4	260 096	260,096 or 262,144
E	P6	260 096	260,096 or 262,144

Insp. ____ Date 2/15/72

2.1.34 Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	33 292,288	33,292,288 or 0
B	E2	0	33,292,288 or 0
C	E3	33,292,288	33,292,288 or 0
D	E4	14	33,292,288 or 0
E	P6	33 292 288	33,292,288 or 0

DR # EPS-0092

Insp. ____ Date 2/15/72

DATA SHEET 4 (Cont.)

2.1.35 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	33 292 288	33,292,288 or 0
B	P2	33 292 288	33,292,288 or 0
C	P3	33 292 288	33,292,288 or 0
D	P4	33 292 288	33,292,288 or 0
E	P5	33 292 288	33,292,288 or 0

Insp. Date 2/15/72

DATA SHEET 4 (Cont.)

2.4.10 Orient for 'X' axis

2.4.11
OK'd.

Insp. ________ Date 10 FEB. 72

2.4.12 Shape 'X' axis spectrum

Insp. ________ Date 10 FEB. 72

2.4.13 Repeat step 2.4.6

Insp. ________ Date 10 FEB. 72

2.4.14 Repeat step 2.4.7

Insp. ________ Date 10 FEB 72

2.4.15 Repeat step 2.4.8 for 'X' axis (attach spectrum plot)

Nominal Time 1 MIN 20 SEC seconds
g rms 19 G RMS
High Energy Time 10 SEC. seconds ~ 25.9
g rms NO READING SEE SPECTRUM ~~255~~29 G.RMS

24 M

Insp. ________ Date 10 FEB. 72

DATA SHEET 4 (Cont.)

2.4.16 Repeat step 2.4.9

34m 10 FEB 72
Insp. Date

2.4.17 Re-orient for 'T' axis

34m 10 FEB 72
Insp. Date

2.4.18 Shape 'T' axis spectrum

34m 10 FEB 72
Insp. Date

2.4.19 Repeat step 2.4.6

34m 10 FEB 72
Insp. Date

2.4.20 Repeat step 2.4.7

34m 10 FEB 72
Insp. Date

DATA SHEET 4 (Cont.)

2.4.21 Repeat step 2.4.8 for 'T' axis (attach spectrum plot)

Nominal Time 1 MIN 20 SEC. seconds

g rms 15G RMS -11DB

High Energy Time 10 SEC seconds

g rms ~~30G RMS [illegible]~~ 24G RMS

Insp. Date 10 FEB. 72

2.4.22 Repeat step 2.4.9

Insp. Date 10 FEB. 72

2.4.23 Return to Beta Building

Insp. Date 11 FEB. 72

DATA SHEET 5
FUNCTIONAL TEST

2.5 FUNCTIONAL TEST DATA SHEET

EMI FUNCTIONAL TEST

2.1.4 Heater Power

Measured Value	Acceptable Value
[illegible] 27.53V	+27.5 ± 0.5 Vdc

Insp. ______ Date 1-28-72

2.1.5 Medium Voltage Heater Current

Measured Value	Acceptable Value
[illegible] .006A 6 MA	10 ± 5 mA

Insp. ______ Date 1-28-72

DATA SHEET 5 (Cont.)

2.1.6 Electronic Power

Measured Value: 27.46

Acceptable Value: +27.5 ± 0.5 Vdc

Insp.

Date: 1-28-72

2.1.7 Medium Voltage Electronics Current

Measured Value: 509 mA

Maximum Value: 560 mA

Insp.

Date: 1-28-72

2.1.8 Detector Bias

Measured Value: 27.55

Acceptable Value: +27.5 ± 0.5 Vdc

Insp.

Date: 1-28-72

2.1.9 Medium Voltage Detector Bias Current

Measured Value: 20 mA

Maximum Value: 30 mA

Insp.

Date: 1-28-72

DATA SHEET 5 (Cont.)

2.1.11 Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	.024 Vdc	+0.025±0.010 Vdc
+0.050±0.001	.053	0.050±0.010
+0.100±0.001	.097	0.100±0.010
+1.000±0.001	.997	1.000±0.010
+2.000±0.001	1.994	2.000±0.010
+3.000±0.001	2.996	+3.000±0.010
+4.000±0.001	3.998	+4.000±0.015
+4.900±0.001	4.892	+4.900±0.020

Insp. ________ Date 1-28-72

DATA SHEET 5 (Cont.)

2.1.13 Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	5.111 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8,135	+8.10±0.15
-8V Monitor	A	-8,181	-8.15±0.15
+25V Monitor	A	+25,588	+25.50±0.75
+350V Monitor	A	346,330	+350.±15.
-15V Monitor	A	-16,039 DR EPS 0071	-15.0±1.0 ~
-5V Monitor	A	-5.401	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.111	+5.00±0.25
+8V Monitor	B	8,135	+8.10±0.15
-8V Monitor	B	-8,166	-8.15±0.15
+25V Monitor	B	+25,588	+25.50±0.75
+350V Monitor	B	346,330	+350.±15.
-15V Monitor	B	-16.016 DR EPS 0071	-15.0±1.0 ~
-5V Monitor	B	-5,401	-5.25±0.25
Disc Ref Mon.	B	+3,000	+3.000±0.02

Insp. ____ Date 1-28-72

KEY UK-EPS-0011

2.1.14

	Actual Value	Acceptable Value
Heater	25,36	+25.0 ± 0.5 Vdc
Electronics	25,00	+25.0 ± 0.5 Vdc
Detector Bias	25,01	+25.0 ± 0.5 Vdc

Insp. ____ Date 1-28-72

DATA SHEET 5 (Cont.)

2.1.15 Low Voltage Current Consumption

Current Sink	Measured Current	Acceptable Value
Heater	7 mA	10 ± 5 mA
Electronics	540 MA	≤ 560
Detector Bias	20	≤ 30

Insp. ____ Date 1-28-72

2.1.16 Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	+5,102 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8,126	+8.10±0.15
-8V Monitor	A	-8,160	-8.15±0.15
+25V Monitor	A	+25,535	+25.50±0.75
+350 V Monitor	A	+346,330	+350.±15.
-15V Monitor	A	-15,980	-15.0±1.0
-5V Monitor	A	-5,398	-5.25±0.25
Disc Ref Mon.	A	+2,995	+3.00±0.02
+5V Monitor	B	+5,111	+5.00±0.25
+8V Monitor	B	+8,126	+8.10±0.15
-8V Monitor	B	-8,160	-8.15±0.15
+25V Monitor	B	+25,588	+25.50±0.75
+350V Monitor	B	+346,330	+350.±15.
-15V Monitor	B	-15,980	-15.0±1.0
-5V Monitor	B	~~3,000~~ -5,386	-5.25±0.25
Disc Ref Mon.	B	3,000	+3.00±0.02

Insp. ____ Date 1-28-72

DATA SHEET 5 (Cont.)

2.1.17

	Actual Value	Acceptable Value
Heater	29.97	+30.0 ± 0.5 Vdc
Electronics	29.96	+30.0 ± 0.5 Vdc
Detector Bias	30.15	+30.0 ± 0.5 Vdc

Insp. Date 1-28-72

2.1.18 High Voltage Current Consumption

Current Sink	Actual Value	Acceptable Value
Heater	7 mA	10 ± 5 mA
Electronics	490	≤ 560
Detector Bias	20	≤ 30

Insp. Date 1-28-72

DATA SHEET 5. (Cont.)

2.1.19 High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.111 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.145	+8.10±0.15
-8V Monitor	A	-8.181	-8.15±0.15
+25V Monitor	A	+25.588	+25.50±0.75
+350V Monitor	A	+346.330	+350.±15.
-15V Monitor	A	-16.016 DR EPS 0071	-15.0±1.0
-5V Monitor	A	-5.401	-5.25±0.25
Disc Ref Mon.	A	+2.995	+3.00±0.02
+5V Monitor	B	5.111	+5.00±0.25
+8V Monitor	B	8.135	+8.10±0.15
-8V Monitor	B	-8.166	-8.15±0.15
+25V Monitor	B	+25.612	+25.50±0.75
+350V Monitor	B	+346.330	+350.±15.
-15V Monitor	B	-16.016 DR EPS 0071	-15.0±1.0
-5V Monitor	B	-5.401	-5.25±0.25
Disc Ref Mon.	B	+3.000	+3.00±0.02

Insp.

Date 1-28-72

DATA SHEET 5 (Cont.)

2.1.20 Temperature Measurement

Parameter	Prime Frame	Measured Value	Acceptable Limits
Package Temperature Monitor	A	24.431 °C	50°F to 118°F = 10°C to 48°C
Package Temperature Monitor	B	24.431	
Detector Plate Temperature Monitor	A	22.965	
Detector Plate Temperature Monitor	B	22.965	

Insp. Date 1-28-72

2.1.21 Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	~~.0929~~ .197 µA	1.0 µA
B	.522	2.0 µA
C	1.968	2.0 µA
D	.668	2.0 µA
E	.662	2.0 µA

Insp. Date 1-28-72

DATA SHEET 5 (Cont.)

2.1.22 Detector Resolution Test

EPS Channel	Measured Engineering Unit Output		Maximum Acceptable Value
A	.391	keV	50. keV
B	.4		50. keV
C	.410		50. keV
D	.527		50. keV
E	.371		50. keV

Insp.   Date 1-28-72

2.1.25 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

DR-EPS-005

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	14	14 or 16
B	E2	14	14 or 16
C	E3	14	14 or 16
D	E4	16	14 or 16
E	P6	14	14 or 16

Insp.   Date 1-28-72

DATA SHEET 5 (Cont.)

2.1.26 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	14	14 or 16
B	P2	14	14 or 16
C	P3	14	14 or 16
D	P4	14	14 or 16
E	P5	16	14 or 16

NASA 1024 1-28-72
Insp. Date

2.1.28 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	2032	2032 or 2048
A	E2	2032	2032 or 2048
C	E3	2032	2032 or 2048
D	E4	2032	2032 or 2048
E	P6	2032	2032 or 2048

NASA 1024 1-28-72
Insp. Date

DATA SHEET 5 (Cont.)

2.1.29 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	2032	2032 or 2048
B	P2	2032	2032 or 2048
C	P3	2032	2032 or 2048
D	P4	2032	2032 or 2048
E	P5	2032	2032 or 2048

Insp. ____ Date 1-28-72

2.1.31 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	260096	260,096 or 262,144
B	E2	260096	260,096 or 262,144
C	E3	260096	260,096 or 262,144
D	E4	260096	260,096 or 262,144
E	P6	260096	260,096 or 262,144

Insp. ____ Date 1-28-72

DATA SHEET 5 (Cont.)

2.1.32 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	260096	260,096 or 262,144
B	P2	260096	260,096 or 262,144
C	P3	262144	260,096 or 262,144
D	P4	260096	260,096 or 262,144
E	P6	260096	260,096 or 262,144

Insp.

Date 1-28-72

2.1.34 Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	33,292,288	33,292,288 or 0
B	E2	33,292,288	33,292,288 or 0
C	E3	33,292,288	33,292,288 or 0
D	E4	0	33,292,288 or 0
E	P6	33,292,288	33,292,288 or 0

Insp.

Date 1-28-72

DATA SHEET 5 (Cont.)

2.1.35 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	33,292,288	33,292,288 or 0
B	P2	33,292,288	33,292,288 or 0
C	P3	0	33,292,288 or 0
D	P4	0	33,292,288 or 0
E	P5	0	33,292,288 or 0

Insp. ____ Date 1-28-72

2.1.36 Visual inspection

Insp. ____ Date 1-28-72

09:10 - 20.326

[illegible]:05 - 23.063

11:30 - 21.6

14:30 . 20.033

15:30 20.717

PKG 26.386

PT 26.093

PT 26582

2.204 N .580 μa

DATA SHEET 6

2.6 ~~SHOCK~~ EMI POST TEST DATA

2.1.4 Heater Power

Measured Value	Acceptable Value
27.54	+27.5 ± 0.5 Vdc

Insp.

Date 2-2-72

2.1.5 Medium Voltage Heater Current

Measured Value	Acceptable Value
8 mA	10 ± 5 mA

Insp.

Date 2-2-72

DATA SHEET 6 (Cont.)

2.1.6 Electronic Power

Measured Value	Acceptable Value
27.45	+27.5 ± 0.5 Vdc

1024
Insp. Date 2-2-72

2.1.7 Medium Voltage Electronics Current

Measured Value	Maximum Value
511	560 mA

Insp. Date 2-2-72

2.1.8 Detector Bias

Measured Value	Acceptable Value
27.57	+27.5 ± 0.5 Vdc

1024
Insp. Date 2-2-72

2.1.9 Medium Voltage Detector Bias Current

Measured Value	Maximum Value
20	30 mA

Insp. Date 2-2-72

DATA SHEET 6 (Cont.)

2.1.11 Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	.019 Vdc	+0.025±0.010 Vdc
+0.050±0.001	.045	0.050±0.010
+0.100±0.001	.093	0.100±0.010
+1.000±0.001	.992	1.000±0.010
+2.000±0.001	1.994	2.000±0.010
+3.000±0.001	2.996	+3.000±0.010
+4.000±0.001	3.993	+4.000±0.015
+4.900±0.001	4.892	+4.900±0.020

109N
Insp.

2-2-72
Date

DATA SHEET 6 (Cont.)

2.1.13 Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	5.111 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.126	+8.10±0.15
-8V Monitor	A	-8.151	-8.15±0.15
+25V Monitor	A	25.558	+25.50±0.75
+350V Monitor	A	346.336	+350.±15.
-15V Monitor	A	-16.039	-15.0±1.0
-5V Monitor	A	-5.401	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	+5.111	+5.00±0.25
+8V Monitor	B	8.135	+8.10±0.15
-8V Monitor	B	-8.116	-8.15±0.15
+25V Monitor	B	25.637	+25.50±0.75
+350V Monitor	B	346.33[illegible]	+350.±15.
-15V Monitor	B	-16.016	-15.0±1.0
-5V Monitor	B	-5.401	-5.25±0.25
Disc Ref Mon.	B	+2.965	+3.000±0.02

Insp.   Date 2-2-72

REF EPS-0011
DR

2.1.14	Actual Value	Acceptable Value
Heater	25.37	+25.0 ± 0.5 Vdc
Electronics	25.00	+25.0 ± 0.5 Vdc
Detector Bias	25.02	+25.0 ± 0.5 Vdc

Insp.   Date 2-2-72

DATA SHEET 6 (Cont.)

2.1.15 Low Voltage Current Consumption

Current Sink	Measured Current	Acceptable Value
Heater	7 mA	10 ± 5 mA
Electronics	541	≤ 560
Detector Bias	20	≤ 30

Insp. ____ Date 2-2-72

2.1.16 Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.102 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.126	+8.10±0.15
-8V Monitor	A	-8.175	-8.15±0.15
+25V Monitor	A	25.535	+25.50±0.75
+350 V Monitor	A	346.330	+350.±15.
-15V Monitor	A	-16.003	-15.0±1.0
-5V Monitor	A	-5.398	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.111	+5.00±0.25
+8V Monitor	B	8.126	+8.10±0.15
-8V Monitor	B	-8.160	-8.15±0.15
+25V Monitor	B	25.588	+25.50±0.75
+350V Monitor	B	346.33[illegible]	+350.±15.
-15V Monitor	B	-15.980	-15.0±1.0
-5V Monitor	B	-5.323	-5.25±0.25
Disc Ref Mon.	B	3.000	+3.00±0.02

Insp. ____ Date 2-2-72

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DR EPS-0011

DATA SHEET 6 (Cont.)

2.1.17	Actual Value	Acceptable Value
Heater	29.97	+30.0 ± 0.5 Vdc
Electronics	29.96	+30.0 ± 0.5 Vdc
Detector Bias	30.09	+30.0 ± 0.5 Vdc

Insp. Date 2-2-72

2.1.18 High Voltage Current Consumption

Current Sink	Actual Value	Acceptable Value
Heater	7 mA	10 ± 5 mA
Electronics	492	≤ 560
Detector Bias	20	≤ 30

Insp. Date 2-2-72

DATA SHEET 6 (Cont.)

2.1.19 High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.111 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.135	+8.10±0.15
-8V Monitor	A	-8.166	-8.15±0.15
+25V Monitor	A	25.558	+25.50±0.75
+350V Monitor	A	346.338	+350.±15.
-15V Monitor	A	-16.616 EPS 0071	-15.0±1.0
-5V Monitor	A	-5.401	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.111	+5.00±0.25
+8V Monitor	B	8.135	+8.10±0.15
-8V Monitor	B	-8.166	-8.15±0.15
+25V Monitor	B	25.442	+25.50±0.75
+350V Monitor	B	346.338	+350.±15.
-15V Monitor	B	-16.616 EPS 0071	-15.0±1.0
-5V Monitor	B	-5.359	-5.25±0.25
Disc Ref Mon.	B	+2.995	+3.00±0.02

Insp. ____ Date 2-2-72

REF. EPS-0071

DATA SHEET 6 (Cont.)

2.1.20 Temperature Measurement

Parameter	Prime Frame	Measured Value	Acceptable Limits
Package Temperature Monitor	A	+21.910 °C	50°F to 118°F = 10°C to 48°C
Package Temperature Monitor	B	+21.890	
Detector Plate Temperature Monitor	A	+18.758	
Detector Plate Temperature Monitor	B	+18.958	

Insp. ____ Date 2-2-72

2.1.21 Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	.167 μA	1.0 μA
B	.451	2.0 μA
C	1.968	2.0 μA
D	.559	2.0 μA
E	.576	2.0 μA

Insp. ____ Date 2-2-72

DATA SHEET 6 (Cont.)

2.1.22 Detector Resolution Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	.391 keV	50. keV
B	.396	50. keV
C	.391	50. keV
D	.407	50. keV
E	.371	50. keV

Insp. ______ Date 2-2-72

2.1.25 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	14	14 or 16
B	E2	14	14 or 16
C	E3	14	14 or 16
D	E4	14	14 or 16
E	P6	14	14 or 16

DR/EPS-008
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Insp. ______ Date 2/2/72

DATA SHEET 6 (Cont.)

2.1.26 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5. 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	14	14 or 16
B	P2	14	14 or 16
C	P3	14	14 or 16
D	P4	14	14 or 16
E	P5	14	14 or 16

Insp.

Date 2-2-72

2.1.28 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	2032	2032 or 2048
A	E2	2032	2032 or 2048
C	E3	2032	2032 or 2048
D	E4	2048	2032 or 2048
E	P6	2032	2032 or 2048

Insp.

Date 2-2-72

DATA SHEET 6 (Cont.)

2.1.29 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	2032	2032 or 2048
B	P2	2032	2032 or 2048
C	P3	2032	2032 or 2048
D	P4	2032	2032 or 2048
E	P5	2032	2032 or 2048

Insp.

Date 2-2-72

2.1.31 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	260096	260,096 or 262,144
B	E2	260096	260,096 or 262,144
C	E3	260096	260,096 or 262,144
D	E4	262144	260,096 or 262,144
E	P6	260096	260,096 or 262,144

Insp.

Date 2-2-72

DATA SHEET 6 (Cont.)

2.1.32 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	260096	260,096 or 262,144
B	P2	260096	260,096 or 262,144
C	P3	260096	260,096 or 262,144
D	P4	266696	260,096 or 262,144
E.	P6	262144	260,096 or 262,144

100 2-2-72
Insp. Date

2.1.34 Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	33,292,288	33,292,288 or 0
B	E2	0	33,292,288 or 0
C	E3	0	33,292,288 or 0
D	E4	2441	33,292,288 or 0 REF PCR EPS 0072
E	P6	33,292,288	33,292,288 or 0

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Insp. Date

DATA SHEET 6 (Cont.)

2.1.35 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	33,292,288	33,292,288 or 0
B	P2	33,292,288	33,292,288 or 0
C	P3	33,292,288	33,292,288 or 0
D	P4	33,292,285	33,292,288 or 0
E	P5	33,292,288	33,292,288 or 0

Insp. Date 2-2-72

2.1.36 Visual inspection

Insp. Date 2-2-72

DATA SHEET 6 (Cont.)

2.6.2 Test article to Building 49, NASA/MSC

Insp. ______ Date 9 FEB.72

2.6.3 Prepare control system

Insp. ______ Date 9 FEB.72

2.6.4 Mount fixture

Insp. ______ Date 9 FEB 72

R AXIS

2.6.5 Shape shock pulse

Insp. ______ Date 9 FEB.72

2.6.6 Repeat step 2.4.6

Insp. ______ Date 9 FEB.72

2.6.7 Expose to shock pulse

Insp. ______ Date 9 FEB.72

2.6.8 Repeat step 2.4.9

Insp. ______ Date 9 FEB 72

DATA SHEET 6 (Cont.)

2.6.9 Setup for 'X' axis

Insp. ________ Date 9 FEB 72

2.6.10 Repeat step 2.6.5

Insp. ________ Date 9 FEB.72

2.6.11 Repeat step 2.4.6

Insp. ________ Date 9 FEB 72

2.6.12 Repeat step 2.6.7

Insp. ________ Date 9 FEB.72

2.6.13 Repeat step 2.4.9

Insp. ________ Date 9 FEB. 72

2.6.14 Repeat step 2.4.17

Insp. ________ Date 9 FEB 72

DATA SHEET 6 (Cont.)

2.6.15 Repeat step 2.4.6

Insp. ____________ Date 9 FEB 72

'T' AXIS

2.6.16 Repeat step 2.6.7

Insp. ____________ Date 9 FEB 72

2.6.17 Remove test article from fixture

Insp. ____________ Date 9 FEB. 72

2.6.18 Visual inspection

Insp. ____________ Date 9 FEB 72

2.6.19 Install test article in stand

Insp. ____________ Date 9 FEB 72

2.6.21 Drop test

Insp. ____________ Date 2/10/72

DATA SHEET 7
FUNCTIONAL TEST

2.7 FUNCTIONAL TEST DATA SHEET

2.1.4 Heater Power

Measured Value	Acceptable Value
27.54	+27.5 ± 0.5 Vdc

Insp. ____ Date 2/10/72

2.1.5 Medium Voltage Heater Current

Measured Value	Acceptable Value
7 mA	10 ± 5 mA

Insp. ____ Date 2/10/72

DATA SHEET 7 (Cont.)

2.1.6 Electronic Power

Measured Value	Acceptable Value
27.45	+27.5 ± 0.5 Vdc

Insp. ______ Date 2/10/72

2.1.7 Medium Voltage Electronics Current

Measured Value	Maximum Value
506 MA	560 mA

Insp. ______ Date FEB 10 '72

2.1.8 Detector Bias

Measured Value	Acceptable Value
27.68	+27.5 ± 0.5 Vdc

Insp. ______ Date FEB 10 '72

2.1.9 Medium Voltage Detector Bias Current

Measured Value	Maximum Value
20 MA	30 mA

Insp. ______ Date FEB 10 '72

DATA SHEET 7 (Cont.)

2.1.11 Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage		Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	.024	Vdc	+0.025±0.010 Vdc
+0.050±0.001	.048		0.050±0.010
+0.100±0.001	.097		0.100±0.010
+1.000±0.001	.997		1.000±0.010
+2.000±0.001	1.994		2.000±0.010
+3.000±0.001	2.996		+3.000±0.010
+4.000±0.001	3.993		+4.000±0.015
+4.900±0.001	4.892		+4.900±0.020

Insp.

FEB 10 '72
Date

DATA SHEET 7 (Cont.)

2.1.13 Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	5.111 ~~06.276~~ Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.126	+8.10±0.15
-8V Monitor	A	-8.160	-8.15±0.15
+25V Monitor	A	25.588	+25.50±0.75
+350V Monitor	A	346.330	+350.±15.
-15V Monitor	A	-16.039	-15.0±1.0
-5V Monitor	A	-5.401	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.111	+5.00±0.25
+8V Monitor	B	8.135	+8.10±0.15
-8V Monitor	B	-8.181	-8.15±0.15
+25V Monitor	B	25.588	+25.50±0.75
+350V Monitor	B	346.330	+350.±15.
-15V Monitor	B	-16.039	-15.0±1.0
-5V Monitor	B	-5.401	-5.25±0.25
Disc Ref Mon.	B	2.995	+3.000±0.02

DR# EPS-0071.

FEB 10 '72

Insp. Date

2.1.14

	Actual Value	Acceptable Value
Heater	25.37 [illegible]	+25.0 ± 0.5 Vdc
Electronics	25.00	+25.0 ± 0.5 Vdc
Detector Bias	25.02	+25.0 ± 0.5 Vdc

FEB 10 '72

Insp. Date

DATA SHEET 7 (Cont.)

2.1.15 Low Voltage Current Consumption

Current Sink	Measured Current	Acceptable Value
Heater	7 mA	10 ± 5 mA
Electronics	538	≤ 560
Detector Bias	21	≤ 30

Insp.

JUN10'72
Date

2.1.16 Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.111 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.126	+8.10±0.15
-8V Monitor	A	-8.160	-8.15±0.15
+25V Monitor	A	25.588	+25.50±0.75
+350 V Monitor	A	346.330	+350.±15.
-15V Monitor	A	-15.960	-15.0±1.0
-5V Monitor	A	-5.398	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.111	+5.00±0.25
+8V Monitor	B	8.126	+8.10±0.15
-8V Monitor	B	-8.160	-8.15±0.15
+25V Monitor	B	25.588	+25.50±0.75
+350V Monitor	B	3811 346.330	+350.±15.
-15V Monitor	B	-15.980	-15.0±1.0
-5V Monitor	B	-5.398	-5.25±0.25
Disc Ref Mon.	B	3.000	+3.00±0.02

Insp.

JUN10'72
Date

DATA SHEET 7 (Cont.)

2.1.17

	Actual Value	Acceptable Value
Heater	29.97	+30.0 ± 0.5 Vdc
Electronics	29.96	+30.0 ± 0.5 Vdc
Detector Bias	30.14	+30.0 ± 0.5 Vdc

Insp.

Date FEB 10 '72

2.1.18 High Voltage Current Consumption

Current Sink	Actual Value	Acceptable Value
Heater	7 mA	10 ± 5 mA
Electronics	490	≤ 560
Detector Bias	21	≤ 30

Insp.

Date FEB 10 '72

DATA SHEET 7 (Cont.)

2.1.19 High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.111 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.135	+8.10±0.15
-8V Monitor	A	-8.187	-8.15±0.15
+25V Monitor	A	25.588	+25.50±0.75
+350V Monitor	A	346.330	+350.±15.
-15V Monitor	A	-16.052	-15.0±1.0
-5V Monitor	A	-5.417	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.121	+5.00±0.25
+8V Monitor	B	8.145	+8.10±0.15
-8V Monitor	B	-8.187	-8.15±0.15
+25V Monitor	B	25.642	+25.50±0.75
+350V Monitor	B	346.330	+350.±15.
-15V Monitor	B	-16.029	-15.0±1.0
-5V Monitor	B	-5.417	-5.25±0.25
Disc Ref Mon.	B	3.000	+3.00±0.02

DR# EPS-0071

FEB10'72

Insp. Date

DATA SHEET 7 (Cont.)

2.1.20 Temperature Measurement

Parameter	Prime Frame	Measured Value	Acceptable Limits
Package Temperature Monitor	A	23.258 °C	50°F to 118°F = 10°C to 48°C
Package Temperature Monitor	B	23.356	↓
Detector Plate Temperature Monitor	A	23.161	
Detector Plate Temperature Monitor	B	23.161	

Insp. | Date FEB 10 '72

2.1.21 Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output		Maximum Acceptable Value
A	.175	µA	1.0 µA
B	.537		2.0 µA
C	1.968		2.0 µA
D	.682		2.0 µA
E	.711		2.0 µA

Insp. | Date FEB 10 '72

DATA SHEET 7 (Cont.)

2.1.22 Detector Resolution Test

EPS Channel	Measured Engineering Unit Output		Maximum Acceptable Value
A	.391 7	keV	50. keV
B	.405 6.5		50. keV
C	.552 13		50. keV
D	.620 12		50. keV
E	.711 14		50. keV

FEB 10 '72

Insp. Date

2.1.25 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	14	14 or 16
B	E2	14	14 or 16
C	E3	14	14 or 16
D	E4	14	14 or 16
E	P6	14	14 or 16

FEB 10 '72

Insp. Date

DATA SHEET 7 (Cont.)

2.1.26 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5. 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	14	14 or 16
B	P2	14	14 or 16
C	P3	14	14 or 16
D	P4	14	14 or 16
E	P5	14	14 or 16

Insp. ______ Date FB10 '73

2.1.28 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	2032	2032 or 2048
A	E2	2032	2032 or 2048
C	E3	2032	2032 or 2048
D	E4	2032	2032 or 2048
E	P6	2032	2032 or 2048

Insp. ______ Date FB10 '73

DATA SHEET 7 (Cont.)

2.1.29 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	2032	2032 or 2048
B	P2	2032	2032 or 2048
C	P3	2032	2032 or 2048
D	P4	2032	2032 or 2048
E	P5	2032	2032 or 2048

Insp. Date

2.1.31 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	260096	260,096 or 262,144
B	E2	260096	260,096 or 262,144
C	E3	260096	260,096 or 262,144
D	E4	262144	260,096 or 262,144
E	P6	260096	260,096 or 262,144

Insp. Date

DATA SHEET 7 (Cont.)

2.1.32 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	260096	260,096 or 262,144
B	P2	260096	260,096 or 262,144
C	P3	260096	260,096 or 262,144
D	P4	260096	260,096 or 262,144
E	P6	262144	260,096 or 262,144

Insp. ________ Date FEB 10 '72

2.1.34 Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	33,292,288	33,292,288 or 0
B	E2	33,292,288	33,292,288 or 0
C	E3	33,292,288	33,292,288 or 0
D	E4	33,292,288	33,292,288 or 0
E	P6	0	33,292,288 or 0

Insp. ________ Date FEB 10 '72

DATA SHEET 7 (Cont.)

2.1.35 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
	P1	33,292,288	33,292,288 or 0
	P2	33,292,288	33,292,288 or 0
	P3	33,292,288	33,292,288 or 0
	P4	33,292,288	33,292,288 or 0
	P5	33,292,288	33,292,288 or 0

FEB 10 '75

Insp. __________ Date __________

2.1.36 Visual inspection

DATA SHEET 8

2.8 ~~EMC~~ VIBRATION.

POST X & T AXIS FUNCTIONAL TEST

2.1.4 Heater Power

Measured Value	Acceptable Value
27,54	+27.5 ± 0.5 Vdc

12 [illegible] 11 '72

Insp. Date

2.1.5 Medium Voltage Heater Current

Measured Value	Acceptable Value
.007	10 ± 5 mA

[illegible] 11 '72

Insp. Date

DATA SHEET 8 (Cont.)

2.1.6 Electronic Power

Measured Value 27.45

Acceptable Value +27.5 ± 0.5 Vdc

Insp.

Date FEB 11 '72

2.1.7 Medium Voltage Electronics Current

Measured Value 509

Maximum Value 560 mA

Insp.

Date FEB 11 '72

2.1.8 Detector Bias

Measured Value 27.56

Acceptable Value +27.5 ± 0.5 Vdc

Insp.

Date FEB 11 '72

2.1.9 Medium Voltage Detector Bias Current

Measured Value 20

Maximum Value 30 mA

Insp.

Date FEB 11 '72

SHEET 3 (Cont.)

2.1.11 Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.011 Vdc	.029 Vdc	+0.025±0.010 Vdc
+0.050±0.011	.044	0.050±0.010
+0.100±0.011	.093	0.100±0.010
+1.000±0.011	.992	1.000±0.010
+2.000±0.011	1.994	2.000±0.010
+3.000±0.011	2.991	+3.000±0.010
+4.000±0.011	3.993	+4.000±0.015
+4.900±0.011	4.892	+4.900±0.020

Insp. ______ Date FEB 11 '72

DATA SHEET 8 (Cont.)

2.1.13 Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	5.111 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.126	+8.10±0.15
-8V Monitor	A	-8.181	-8.15±0.15
+25V Monitor	A	25.588	+25.50±0.75
+350V Monitor	A	346.330	+350.±15.
-15V Monitor	A	-16.039	-15.0±1.0
-5V Monitor	A	-5.401	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.111	+5.00±0.25
+8V Monitor	B	8.135	+8.10±0.15
-8V Monitor	B	-8.166	-8.15±0.15
+25V Monitor	B	25.588	+25.50±0.75
+350V Monitor	B	346.330	+350.±15.
-15V Monitor	B	-16.016	-15.0±1.0
-5V Monitor	B	-5.401	-5.25±0.25
Disc Ref Mon.	B	2.995	+3.000±0.02

DR# E125-002

Insp. U.S. NASA 12K

Date FEB 11 '72

2.1.14

	Actual Value	Acceptable Value
Heater	25.37	+25.0 ± 0.5 Vdc
Electronics	25.00	+25.0 ± 0.5 Vdc
Detector Bias	25.02	+25.0 ± 0.5 Vdc

Insp.

Date FEB 11 '72

DATA SHEET 8 (Cont.)

2.1.15 Low Voltage Current Consumption

Current Sink	Measured Current	Acceptable Value
Heater	7 mA	10 ± 5 mA
Electronics	540	≤ 560
Detector Bias	20	≤ 30

Insp.   Date FEB 11 '72

2.1.16 Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5,102 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8,126	+8.10±0.15
-8V Monitor	A	-8,175	-8.15±0.15
+25V Monitor	A	25,588	+25.50±0.75
+350 V Monitor	A	346,330	+350.±15.
-15V Monitor	A	-15,980	-15.0±1.0
-5V Monitor	A	-5,398	-5.25±0.25
Disc Ref Mon.	A	+2,995	+3.00±0.02
+5V Monitor	B	5 102	+5.00±0.25
+8V Monitor	B	8,126	+8.10±0.15
-8V Monitor	B	-8,160	-8.15±0.15
+25V Monitor	B	25,588	+25.50±0.75
+350V Monitor	B	346,330	+350.±15.
-15V Monitor	B	-15,980	-15.0±1.0
-5V Monitor	B	-5,398	-5.25±0.25
Disc Ref Mon.	B	+3,000	+3.00±0.02

Insp.   Date FEB 11 '72

DATA SHEET 8 (Cont.)

2.1.17	Actual Value	Acceptable Value
Heater	29.97	+30.0 ± 0.5 Vdc
Electronics	29.97	+30.0 ± 0.5 Vdc
Detector Bias	30.08	+30.0 ± 0.5 Vdc

Insp. 12 Date FEB 11 '72

2.1.18 High Voltage Current Consumption

Current Sink	Actual Value	Acceptable Value
Heater	12 7 mA	10 ± 5 mA
Electronics	~~4080~~ 493	≤ 560
Detector Bias	20	≤ 30

Insp. 12 Date FEB 11 '72

DATA SHEET 8 (Cont.)

2.1.19 High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.111 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.135	+8.10±0.15
-8V Monitor	A	-8.181	-8.15±0.15
+25V Monitor	A	25.588	+25.50±0.75
+350V Monitor	A	346.330	+350.±15.
-15V Monitor	A	-16.016	-15.0±1.0
-5V Monitor	A	-5.401	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.111	+5.00±0.25
+8V Monitor	B	8.135	+8.10±0.15
-8V Monitor	B	-8.166	-8.15±0.15
+25V Monitor	B	25.642	+25.50±0.75
+350V Monitor	B	346.330	+350.±15.
-15V Monitor	B	-15.943	-15.0±1.0
-5V Monitor	B	-5.401	-5.25±0.25
Disc Ref Mon.	B	3.000	+3.00±0.02

S NASA 12H DR# EPS-0091

S NASA 12H

Insp.

FEB 11 72

Date

DATA SHEET 8 (Cont.)

2.1.20 Temperature Measurement

Parameter	Prime Frame	Measured Value	Acceptable Limits
Package Temperature Monitor	A	23.747°C	50°F to 118°F = 10°C to 48°C
Package Temperature Monitor	B	23.717	↓
Detector Plate Temperature Monitor	A	23.258	X
Detector Plate Temperature Monitor	B	23.258	X

FEB 11 '72

Insp. Date

2.1.21 Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output		Maximum Acceptable Value
A	.185	μA	1.0 μA
B	.533		2.0 μA
C	.392		2.0 μA
D	.674		2.0 μA
E	.175		2.0 μA

FEB 11 '72

Insp. Date

DATA SHEET 8 (Cont.)

2.1.22 Detector Resolution Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	.391 7 keV	50. keV
B	.4 7	50. keV
C	.4 ~~8~~ 6	50. keV
D	.6 11	50. keV
E	.376 7	50. keV

Insp. Date FEB 11 '72

2.1.25 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	14	14 or 16
B	E2	16	14 or 16
C	E3	14	14 or 16
D	E4	14	14 or 16
E	P6	14	14 or 16

Insp. Date FEB 11 '72

DATA SHEET 8 (Cont.)

2.1.26 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	14	14 or 16
B	P2	14	14 or 16
C	P3	14	14 or 16
D	P4	14	14 or 16
E	P5	14	14 or 16

FEB 11 '72

Insp. Date

2.1.28 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	2032	2032 or 2048
A	E2	2032	2032 or 2048
C	E3	2032	2032 or 2048
D	E4	2048	2032 or 2048
E	P6	2032	2032 or 2048

FEB 11 '72

Insp. Date

DATA SHEET 8 (Cont.)

2.1.29 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	2032	2032 or 2048
B	P2	2032	2032 or 2048
C	P3	2032	2032 or 2048
D	P4	2032	2032 or 2048
E	P5	2032	2032 or 2048

FEB 11 '72

Insp. Date

2.1.31 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	260096	260,096 or 262,144
B	E2	260096	260,096 or 262,144
C	E3	260096	260,096 or 262,144
D	E4	260096	260,096 or 262,144
E	P6	260096	260,096 or 262,144

FEB 11 '72

Insp. Date

DATA SHEET 8 (Cont.)

2.1.32 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	260096	260,096 or 262,144
B	P2	260096	260,096 or 262,144
C	P3	260096	260,096 or 262,144
D	P4	260096	260,096 or 262,144
E	P6	262144	260,096 or 262,144

FEB 11 '72 FEB 11 '72

Insp. Date

2.1.34 Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count 33,292,288	Acceptable Count
A	E1	33,292,288	33,292,288 or 0
B	E2	0	33,292,288 or 0
C	E3	33,292,288	33,292,288 or 0
D	E4	33,292,288	33,292,288 or 0
E	P6	33,292,288	33,292,288 or 0

FEB 11 '72

Insp. Date

DATA SHEET 8 .(Cont.)

2.1.35 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	33,292,288	33,292,288 or 0
B	P2	33,292,288	33,292,288 or 0
C	P3	33,292,288	33,292,288 or 0
D	P4	33,292,288	33,292,288 or 0
E	P5	33,292,288	33,292,288 or 0

Insp. ______ Date FEB 11 '72

2.1.36 Visual inspection

Insp. ______ Date FEB 11 '72

~~2.8.2 Perform EMI Test per EMC-P-EB8-003~~ N/A

Insp. ______ Date ______

DATA SHEET 9

FUNCTIONAL TEST

2.9 FUNCTIONAL TEST DATA SHEET

~~Post Humidity~~

2.1.4 Heater Power

Measured Value	Acceptable Value
________________	+27.5 ± 0.5 Vdc

________________ Insp. ________________ Date

2.1.5 Medium Voltage Heater Current

Measured Value	Acceptable Value
________________	10 ± 5 mA

________________ Insp. ________________ Date

DATA SHEET 9 (Cont.)

2.1.6 Electronic Power

Measured Value	Acceptable Value
______________	+27.5 ± 0.5 Vdc

______________ Insp. ______________ Date

2.1.7 Medium Voltage Electronics Current

Measured Value	Maximum Value
______________	560 mA

______________ Insp. ______________ Date

2.1.8 Detector Bias

Measured Value	Acceptable Value
______________	+27.5 ± 0.5 Vdc

______________ Insp. ______________ Date

2.1.9 Medium Voltage Detector Bias Current

Measured Value	Maximum Value
______________	30 mA

______________ Insp. ______________ Date

DATA SHEET 9 (Cont.)

2.1.11 Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	________ Vdc	+0.025±0.010 Vdc
+0.050±0.001	________	0.050±0.010
+0.100±0.001	________	0.100±0.010
+1.000±0.001	________	1.000±0.010
+2.000±0.001	________	2.000±0.010
+3.000±0.001	________	+3.000±0.010
+4.000±0.001	________	+4.000±0.015
+4.900±0.001	________	+4.900±0.020

________ Insp. ________ Date

DATA SHEET 9 (Cont.)

2.1.13 Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	______________Vdc	+5.00±0.25 Vdc
+8V Monitor	A	______________	+8.10±0.15
-8V Monitor	A	______________	-8.15±0.15
+25V Monitor	A	______________	+25.50±0.75
+350V Monitor	A	______________	+350.±15.
-15V Monitor	A	______________	-15.0±1.0
-5V Monitor	A	______________	-5.25±0.25
Disc Ref Mon.	A	______________	+3.00±0.02
+5V Monitor	B	______________	+5.00±0.25
+8V Monitor	B	______________	+8.10±0.15
-8V Monitor	B	______________	-8.15±0.15
+25V Monitor	B	______________	+25.50±0.75
+350V Monitor	B	______________	+350.±15.
-15V Monitor	B	______________	-15.0±1.0
-5V Monitor	B	______________	-5.25±0.25
Disc Ref Mon.	B	______________	+3.000±0.02

________________ ________________

Insp. Date

2.1.14

	Actual Value	Acceptable Value
Heater	______________	+25.0 ± 0.5 Vdc
Electronics	______________	+25.0 ± 0.5 Vdc
Detector Bias	______________	+25.0 ± 0.5 Vdc

________________ ________________

Insp. Date

DATA SHEET 9 (Cont.)

2.1.15 Low Voltage Current Consumption

Current Sink	Measured Current	Acceptable Value
Heater	______________ mA	10 ± 5 mA
Electronics	______________	≤ 560
Detector Bias	______________	≤ 30

______________ Insp. ______________ Date

2.1.16 Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	______________ Vdc	+5.00±0.25 Vdc
+8V Monitor	A	______________	+8.10±0.15
-8V Monitor	A	______________	-8.15±0.15
+25V Monitor	A	______________	+25.50±0.75
+350 V Monitor	A	______________	+350.±15.
-15V Monitor	A	______________	-15.0±1.0
-5V Monitor	A	______________	-5.25±0.25
Disc Ref Mon.	A	______________	+3.00±0.02
+5V Monitor	B	______________	+5.00±0.25
+8V Monitor	B	______________	+8.10±0.15
-8V Monitor	B	______________	-8.15±0.15
+25V Monitor	B	______________	+25.50±0.75
+350V Monitor	B	______________	+350.±15.
-15V Monitor	B	______________	-15.0±1.0
-5V Monitor	B	______________	-5.25±0.25
Disc Ref Mon.	B	______________	+3.00±0.02

______________ Insp. ______________ Date

DATA SHEET 9 (Cont.)

2.1.17

	Actual Value	Acceptable Value
Heater	________________	+30.0 ± 0.5 Vdc
Electronics	________________	+30.0 ± 0.5 Vdc
Detector Bias	________________	+30.0 ± 0.5 Vdc

________________ ________________
Insp. Date

2.1.18 High Voltage Current Consumption

Current Sink	Actual Value	Acceptable Value
Heater	________________ mA	10 ± 5 mA
Electronics	________________	≤ 560
Detector Bias	________________	≤ 30

________________ ________________
Insp. Date

DATA SHEET 9 (Cont.)

2.1.19 High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	____________ Vdc	+5.00±0.25 Vdc
+8V Monitor	A	____________	+8.10±0.15
-8V Monitor	A	____________	-8.15±0.15
+25V Monitor	A	____________	+25.50±0.75
+350V Monitor	A	____________	+350.±15.
-15V Monitor	A	____________	-15.0±1.0
-5V Monitor	A	____________	-5.25±0.25
Disc Ref Mon.	A	____________	+3.00±0.02
+5V Monitor	B	____________	+5.00±0.25
+8V Monitor	B	____________	+8.10±0.15
-8V Monitor	B	____________	-8.15±0.15
+25V Monitor	B	____________	+25.50±0.75
+350V Monitor	B	____________	+350.±15.
-15V Monitor	B	____________	-15.0±1.0
-5V Monitor	B	____________	-5.25±0.25
Disc Ref Mon.	B	____________	+3.00±0.02

____________ ________________
Insp. Date

DATA SHEET 9 (Cont.)

2.1.20 Temperature Measurement

Parameter	Prime Frame	Measured Value	Acceptable Limits
Package Temperature Monitor	A	________ °C	50°F to 118°F 10°C to 48°C
Package Temperature Monitor	B	________	↓
Detector Plate Temperature Monitor	A	________	✕
Detector Plate Temperature Monitor	B	________	✕

____________ Insp. ____________ Date

2.1.21 Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	____________ μA	1.0 μA
B	____________	2.0 μA
C	____________	2.0 μA
D	____________	2.0 μA
E	____________	2.0 μA

____________ Insp. ____________ Date

DATA SHEET 9 (Cont.)

2.1.22 Detector Resolution Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	______ keV	50. keV
B	______	50. keV
C	______	50. keV
D	______	50. keV
E	______	50. keV

______ Insp. ______ Date

2.1.25 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	______	14 or 16
B	E2	______	14 or 16
C	E3	______	14 or 16
D	E4	______	14 or 16
E	P6	______	14 or 16

______ Insp. ______ Date

DATA SHEET 9 (Cont.)

2.1.26 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5. 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1		14 or 16
B	P2		14 or 16
C	P3		14 or 16
D	P4		14 or 16
E	P5		14 or 16

Insp. Date

2.1.28 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1		2032 or 2048
A	E2		2032 or 2048
C	E3		2032 or 2048
D	E4		2032 or 2048
E	P6		2032 or 2048

Insp. Date

DATA SHEET 9 (Cont.)

2.1.29 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	______________	2032 or 2048
B	P2	______________	2032 or 2048
C	P3	______________	2032 or 2048
D	P4	______________	2032 or 2048
E	P5	______________	2032 or 2048

______________ Insp.　______________ Date

2.1.31 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	______________	260,096 or 262,144
B	E2	______________	260,096 or 262,144
C	E3	______________	260,096 or 262,144
D	E4	______________	260,096 or 262,144
E	P6	______________	260,096 or 262,144

______________ Insp.　______________ Date

DATA SHEET 9 (Cont.)

2.1.32 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1		260,096 or 262,144
B	P2		260,096 or 262,144
C	P3		260,096 or 262,144
D	P4		260,096 or 262,144
E	P6		260,096 or 262,144

Insp. ______ Date ______

2.1.34 Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1		33,292,288 or 0
B	E2		33,292,288 or 0
C	E3		33,292,288 or 0
D	E4		33,292,288 or 0
E	P6		33,292,288 or 0

Insp. ______ Date ______

DATA SHEET 9 (Cont.)

2.1.35 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	____________	33,292,288 or 0
B	P2	____________	33,292,288 or 0
C	P3	____________	33,292,288 or 0
D	P4	____________	33,292,288 or 0
E	P5	____________	33,292,288 or 0

Insp. ____________ Date ____________

2.1.36 Visual inspection

Insp. ____________ Date ____________

DATA SHEET 10

Post Acoustic Functional Test.

2.10 ACOUSTIC

2.1.4 Heater Power

Measured Value	Acceptable Value
27.54	+27.5 ± 0.5 Vdc

Insp. ______ Date 2/9/72

2.1.5 Medium Voltage Heater Current

Measured Value	Acceptable Value
7 mA	10 ± 5 mA

Insp. ______ Date 2/9/72

DATA SHEET 10 (Cont.)

2.1.6 Electronic Power

Measured Value
27.54

Acceptable Value
+27.5 ± 0.5 Vdc

Insp.
Date 2/9/72

2.1.7 Medium Voltage Electronics Current

Measured Value
510 mA

Maximum Value
560 mA

Insp.
Date 2/9/72

2.1.8 Detector Bias

Measured Value
27.56

Acceptable Value
+27.5 ± 0.5 Vdc

Insp.
Date 2/9/72

2.1.9 Medium Voltage Detector Bias Current

Measured Value
20 mA

Maximum Value
30 mA

Insp.
Date 2/9/72

DATA SHEET 10 (Cont.)

2.1.11 Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	,024 Vdc	+0.025±0.010 Vdc
+0.050±0.001	,048	0.050±0.010
+0.100±0.001	,097	0.100±0.010
+1.000±0.001	,997	1.000±0.010
+2.000±0.001	1,994	2.000±0.010
+3.000±0.001	2.996	+3.000±0.010
+4.000±0.001	3.993	+4.000±0.015
+4.900±0.001	4,892	+4.900±0.020

Insp.

2/9/72
Date

DATA SHEET 10 (Cont.)

2.1.13 Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	5.111 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.135	+8.10±0.15
-8V Monitor	A	-8.181	-8.15±0.15
+25V Monitor	A	25.588	+25.50±0.75
+350V Monitor	A	346.33	+350.±15.
-15V Monitor	A	-16.016	-15.0±1.0
-5V Monitor	A	-5.401	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.111	+5.00±0.25
+8V Monitor	B	8.135	+8.10±0.15
-8V Monitor	B	-8.166	-8.15±0.15
+25V Monitor	B	25.692	+25.50±0.75
+350V Monitor	B	346.33	+350.±15.
-15V Monitor	B	-16.016	-15.0±1.0
-5V Monitor	B	-5.401	-5.25±0.25
Disc Ref Mon.	B	3.000	+3.000±0.02

REF: DR #EPS-0091

Insp. Date 2/9/72

2.1.14

	Actual Value	Acceptable Value
Heater	25.37	+25.0 ± 0.5 Vdc
Electronics	25.0	+25.0 ± 0.5 Vdc
Detector Bias	25.03	+25.0 ± 0.5 Vdc

Insp. Date 2/9/72

DATA SHEET 10 (Cont.)

2.1.15 Low Voltage Current Consumption

Current Sink	Measured Current	Acceptable Value
Heater	7 ma mA	10 ± 5 mA
Electronics	540 ma	≤ 560
Detector Bias	20 ma	≤ 30

Insp. ______ Date 2/9/72

2.1.16 Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.111 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.126	+8.10±0.15
-8V Monitor	A	-8.160	-8.15±0.15
+25V Monitor	A	25.588	+25.50±0.75
+350 V Monitor	A	346.33	+350.±15.
-15V Monitor	A	-15.98	-15.0±1.0
-5V Monitor	A	-5.398	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.111	+5.00±0.25
+8V Monitor	B	8.126	+8.10±0.15
-8V Monitor	B	-8.160	-8.15±0.15
+25V Monitor	B	25.588	+25.50±0.75
+350V Monitor	B	346.33	+350.±15.
-15V Monitor	B	-15.98	-15.0±1.0
-5V Monitor	B	-5.386	-5.25±0.25
Disc Ref Mon.	B	3.000	+3.00±0.02

Insp. ______ Date 2/9/72

DATA SHEET 10 (Cont.)

2.1.17	Actual Value	Acceptable Value
Heater	29.97	+30.0 ± 0.5 Vdc
Electronics	29.96	+30.0 ± 0.5 Vdc
Detector Bias	30.15	+30.0 ± 0.5 Vdc

Insp. ______ Date 2/9/72

2.1.18 High Voltage Current Consumption

Current Sink	Actual Value	Acceptable Value
Heater	7 ma mA	10 ± 5 mA
Electronics	490 ma	≤ 560
Detector Bias	20 ma	≤ 30

Insp. ______ Date 2/9/72

DATA SHEET 10 (Cont.)

2.1.19 High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.121 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.135	+8.10±0.15
-8V Monitor	A	-8.187	-8.15±0.15
+25V Monitor	A	25.588	+25.50±0.75
+350V Monitor	A	346.330	+350.±15.
-15V Monitor	A	-16.029	-15.0±1.0
-5V Monitor	A	-5.417	-5.25±0.25
Disc Ref Mon.	A	2.995	+3.00±0.02
+5V Monitor	B	5.121	+5.00±0.25
+8V Monitor	B	8.145	+8.10±0.15
-8V Monitor	B	-8.187	-8.15±0.15
+25V Monitor	B	25.642	+25.50±0.75
+350V Monitor	B	346.330	+350.±15.
-15V Monitor	B	-16.029	-15.0±1.0
-5V Monitor	B	-5.392	-5.25±0.25
Disc Ref Mon.	B	3.000	+3.00±0.02

REF. DR#EPS-0021

Insp. ____________ Date 2/9/72

DATA SHEET 10 (Cont.)

2.1.20 Temperature Measurement

Parameter	Prime Frame	Measured Value	Acceptable Limits
Package Temperature Monitor	A	25.604 °C	50°F to 118°F 10°C to 48°C
Package Temperature Monitor	B	25.604	↓
Detector Plate Temperature Monitor	A	24.334	
Detector Plate Temperature Monitor	B	24.334	

Insp. ______ Date 2/9/72

2.1.21 Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	.211 μA	1.0 μA
B	.587	2.0 μA
C	1.968	2.0 μA
D	.738	2.0 μA
E	.792	2.0 μA

Insp. ______ Date 2/9/72

DATA SHEET 10 (Cont.)

2.1.22 Detector Resolution Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	.405 7.5 keV	50. keV
B	.420 7.0	50. keV
C	.420 7.5	50. keV
D	.826 17.5	50. keV
E	.386 7.5	50. keV

Insp.

Date 2/9/72

2.1.25 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	14	14 or 16
B	E2	16	14 or 16
C	E3	14	14 or 16
D	E4	14	14 or 16
E	P6	14	14 or 16

Insp.

Date 2/9/72

DATA SHEET 10 (Cont.)

2.1.26 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	14	14 or 16
B	P2	14	14 or 16
C	P3	14	14 or 16
D	P4	14	14 or 16
E	P5	14	14 or 16

Insp.

Date 2/9/72

2.1.28 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	2032	2032 or 2048
A	E2	2032	2032 or 2048
C	E3	2032	2032 or 2048
D	E4	2048	2032 or 2048
E	P6	2032	2032 or 2048

Insp.

Date 2/9/72

DATA SHEET 10 (Cont.)

2.1.29 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	2032	2032 or 2048
B	P2	2032	2032 or 2048
C	P3	2032	2032 or 2048
D	P4	2032	2032 or 2048
E	P5	2032	2032 or 2048

Insp. ____________ Date 2/9/72

2.1.31 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	260096 ~~144~~	260,096 or 262,144
B	E2	~~260096~~ 262144	260,096 or 262,144
C	E3	260096	260,096 or 262,144
D	E4	260096	260,096 or 262,144
E	P6	260096	260,096 or 262,144

Insp. ____________ Date 2/9/72

DATA SHEET 10 (Cont.)

2.1.32 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	260,096	260,096 or 262,144
B	P2	260,096	260,096 or 262,144
C	P3	260,096	260,096 or 262,144
D	P4	260,096	260,096 or 262,144
E	P6	260,096	260,096 or 262,144

2/9/72

Insp. Date

2.1.34 Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	33,292,288	33,292,288 or 0
B	E2	0	33,292,288 or 0
C	E3 8	0 & 33,292,288	33,292,288 or 0
D	E4 152	0 & 0	33;292,288 or 0
E	P6	32,292,288	33,292,288 or 0

2/9/72

Insp. Date

DATA SHEET 10 (Cont.)

2.1.35 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	33,292,288	33,292,288 or 0
B	P2	33,292,288	33,292,288 or 0
C	P3	33,292,288	33,292,288 or 0
D	P4	33,292,288	33,292,288 or 0
E	P5	33,292,288	33,292,288 or 0

Insp. Date 2/9/72

2.1.36 Visual inspection

Insp. Date 2/9/72

DATA SHEET 10 (Cont.)

2.10.2 Test article to test facility

Insp. Date 8 FEB. 72

2.10.3 Prepare chamber

Insp. Date 8 FEB. 72

2.10.4 Install test article

Insp. Date 8 FEB. 72

2.10.5 Test

Insp. Date 8 FEB. 72

2.10.6 Remove test article

Insp. Date 8 FEB. 72

2.10.7 Return to Beta Building

Insp. Date 9 FEB 72

DATA SHEET 11
FUNCTIONAL TEST

2.11 FUNCTIONAL TEST DATA SHEET

2.1.4 Heater Power

Measured Value	Acceptable Value
____________	+27.5 ± 0.5 Vdc

____________ ____________
Insp. Date

2.1.5 Medium Voltage Heater Current

Measured Value	Acceptable Value
____________	10 ± 5 mA

____________ ____________
Insp. Date

DATA SHEET 11 (Cont.)

2.1.6 Electronic Power

Measured Value	Acceptable Value
____________	+27.5 ± 0.5 Vdc

____________ Insp. ____________ Date

2.1.7 Medium Voltage Electronics Current

Measured Value	Maximum Value
____________	560 mA

____________ Insp. ____________ Date

2.1.8 Detector Bias

Measured Value	Acceptable Value
____________	+27.5 ± 0.5 Vdc

____________ Insp. ____________ Date

2.1.9 Medium Voltage Detector Bias Current

Measured Value	Maximum Value
____________	30 mA

____________ Insp. ____________ Date

DATA SHEET 11 (Cont.)

2.1.11 Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	________ Vdc	+0.025±0.010 Vdc
+0.050±0.001	________	0.050±0.010
+0.100±0.001	________	0.100±0.010
+1.000±0.001	________	1.000±0.010
+2.000±0.001	________	2.000±0.010
+3.000±0.001	________	+3.000±0.010
+4.000±0.001	________	+4.000±0.015
+4.900±0.001	________	+4.900±0.020

________ Insp. ________ Date

DATA SHEET 11 (Cont.)

2.1.13 Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	____________ Vdc	+5.00±0.25 Vdc
+8V Monitor	A	____________	+8.10±0.15
-8V Monitor	A	____________	-8.15±0.15
+25V Monitor	A	____________	+25.50±0.75
+350V Monitor	A	____________	+350.±15.
-15V Monitor	A	____________	-15.0±1.0
-5V Monitor	A	____________	-5.25±0.25
Disc Ref Mon.	A	____________	+3.00±0.02
+5V Monitor	B	____________	+5.00±0.25
+8V Monitor	B	____________	+8.10±0.15
-8V Monitor	B	____________	-8.15±0.15
+25V Monitor	B	____________	+25.50±0.75
+350V Monitor	B	____________	+350.±15.
-15V Monitor	B	____________	-15.0±1.0
-5V Monitor	B	____________	-5.25±0.25
Disc Ref Mon.	B	____________	+3.000±0.02

____________ Insp. ____________ Date

2.1.14

	Actual Value	Acceptable Value
Heater	____________	+25.0 ± 0.5 Vdc
Electronics	____________	+25.0 ± 0.5 Vdc
Detector Bias	____________	+25.0 ± 0.5 Vdc

____________ Insp. ____________ Date

DATA SHEET 11 (Cont.)

2.1.15 Low Voltage Current Consumption

Current Sink	Measured Current	Acceptable Value
Heater	mA	10 ± 5 mA
Electronics		≤ 560
Detector Bias		≤ 30

Insp.   Date

2.1.16 Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	Vdc	+5.00±0.25 Vdc
+8V Monitor	A		+8.10±0.15
-8V Monitor	A		-8.15±0.15
+25V Monitor	A		+25.50±0.75
+350 V Monitor	A		+350.±15.
-15V Monitor	A		-15.0±1.0
-5V Monitor	A		-5.25±0.25
Disc Ref Mon.	A		+3.00±0.02
+5V Monitor	B		+5.00±0.25
+8V Monitor	B		+8.10±0.15
-8V Monitor	B		-8.15±0.15
+25V Monitor	B		+25.50±0.75
+350V Monitor	B		+350.±15.
-15V Monitor	B		-15.0±1.0
-5V Monitor	B		-5.25±0.25
Disc Ref Mon.	B		+3.00±0.02

Insp.   Date

DATA SHEET 11 (Cont.)

2.1.17	Actual Value	Acceptable Value
Heater	________________	+30.0 ± 0.5 Vdc
Electronics	________________	+30.0 ± 0.5 Vdc
Detector Bias	________________	+30.0 ± 0.5 Vdc

______________ __________________
Insp. Date

2.1.18 High Voltage Current Consumption

Current Sink	Actual Value	Acceptable Value
Heater	________________mA	10 ± 5 mA
Electronics	________________	$\leq$ 560
Detector Bias	________________	$\leq$ 30

______________ __________________
Insp. Date

DATA SHEET 11 (Cont.)

2.1.19 High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	Vdc	+5.00±0.25 Vdc
+8V Monitor	A		+8.10±0.15
-8V Monitor	A		-8.15±0.15
+25V Monitor	A		+25.50±0.75
+350V Monitor	A		+350.±15.
-15V Monitor	A		-15.0±1.0
-5V Monitor	A		-5.25±0.25
Disc Ref Mon.	A		+3.00±0.02
+5V Monitor	B		+5.00±0.25
+8V Monitor	B		+8.10±0.15
-8V Monitor	B		-8.15±0.15
+25V Monitor	B		+25.50±0.75
+350V Monitor	B		+350.±15.
-15V Monitor	B		-15.0±1.0
-5V Monitor	B		-5.25±0.25
Disc Ref Mon.	B		+3.00±0.02

Insp. ____________ Date ____________

DATA SHEET 11 (Cont.)

2.1.20 Temperature Measurement

Parameter	Prime Frame	Measured Value	Acceptable Limits
Package Temperature Monitor	A	__________ °C	50°F to 118°F 10°C to 48°C
Package Temperature Monitor	B	__________	↓
Detector Plate Temperature Monitor	A	__________	╳
Detector Plate Temperature Monitor	B	__________	╳

__________ Insp. __________ Date

2.1.21 Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	________________ μA	1.0 μA
B	________________	2.0 μA
C	________________	2.0 μA
D	________________	2.0 μA
E	________________	2.0 μA

__________ Insp. __________ Date

DATA SHEET 11 (Cont.)

2.1.22 Detector Resolution Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	keV	50. keV
B		50. keV
C		50. keV
D		50. keV
E		50. keV

nsp. Date

2.1.25 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1		14 or 16
B	E2		14 or 16
C	E3		14 or 16
D	E4		14 or 16
E	P6		14 or 16

Insp. Date

DATA SHEET 11 (Cont.)

2.1.26 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5. 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1		14 or 16
B	P2		14 or 16
C	P3		14 or 16
D	P4		14 or 16
E	P5		14 or 16

Insp. ____________ Date ____________

2.1.28 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1		2032 or 2048
A	E2		2032 or 2048
C	E3		2032 or 2048
D	E4		2032 or 2048
E	P6		2032 or 2048

Insp. ____________ Date ____________

DATA SHEET 11 (Cont.)

2.1.29 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	__________	2032 or 2048
B	P2	__________	2032 or 2048
C	P3	__________	2032 or 2048
D	P4	__________	2032 or 2048
E	P5	__________	2032 or 2048

__________ ______________
Insp. Date

2.1.31 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	__________	260,096 or 262,144
B	E2	__________	260,096 or 262,144
C	E3	__________	260,096 or 262,144
D	E4	__________	260,096 or 262,144
E	P6	__________	260,096 or 262,144

__________ ______________
Insp. Date

DATA SHEET 11 (Cont.)

2.1.32 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	____________	260,096 or 262,144
B	P2	____________	260,096 or 262,144
C	P3	____________	260,096 or 262,144
D	P4	____________	260,096 or 262,144
E	P6	____________	260,096 or 262,144

____________ ________________
Insp. Date

2.1.34 Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	____________	33,292,288 or 0
B	E2	____________	33,292,288 or 0.
C	E3	____________	33,292,288 or 0
D	E4	____________	33,292,288 or 0
E	P6	____________	33,292,288 or 0

____________ ________________
Insp. Date

DATA SHEET 11 (Cont.)

2.1.35 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	________	33,292,288 or 0
B	P2	________	33,292,288 or 0
C	P3	________	33,292,288 or 0
D	P4	________	33,292,288 or 0
E	P5	________	33,292,288 or 0

________ Insp. ________ Date

2.1.36 Visual inspection

________ Insp. ________ Date

DATA SHEET 12

2.12 HUMIDITY

2.1.4 Heater Power

Measured Value	Acceptable Value
________________	+27.5 ± 0.5 Vdc

____________ _________________

Insp. Date

2.1.5 Medium Voltage Heater Current.

Measured Value	Acceptable Value
________________	10 ± 5 mA

____________ _________________

Insp. Date

DATA SHEET 12 (Cont.)

2.1.6 Electronic Power

Measured Value	Acceptable Value
____________	+27.5 ± 0.5 Vdc

____________ Insp. ____________ Date

2.1.7 Medium Voltage Electronics Current

Measured Value	Maximum Value
____________	560 mA

____________ Insp. ____________ Date

2.1.8 Detector Bias

Measured Value	Acceptable Value
____________	+27.5 ± 0.5 Vdc

____________ Insp. ____________ Date

2.1.9 Medium Voltage Detector Bias Current

Measured Value	Maximum Value
____________	30 mA

____________ Insp. ____________ Date

DATA SHEET 12 (Cont.)

2.1.11 Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	____________ Vdc	+0.025±0.010 Vdc
+0.050±0.001	____________	0.050±0.010
+0.100±0.001	____________	0.100±0.010
+1.000±0.001	____________	1.000±0.010
+2.000±0.001	____________	2.000±0.010
+3.000±0.001	____________	+3.000±0.010
+4.000±0.001	____________	+4.000±0.015
+4.900±0.001	____________	+4.900±0.020

____________ Insp. ____________ Date

DATA SHEET 12 (Cont.)

2.1.13 Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	Vdc	+5.00±0.25 Vdc
+8V Monitor	A		+8.10±0.15
-8V Monitor	A		-8.15±0.15
+25V Monitor	A		+25.50±0.75
+350V Monitor	A		+350.±15.
-15V Monitor	A		-15.0±1.0
-5V Monitor	A		-5.25±0.25
Disc Ref Mon.	A		+3.00±0.02
+5V Monitor	B		+5.00±0.25
+8V Monitor	B		+8.10±0.15
-8V Monitor	B		-8.15±0.15
+25V Monitor	B		+25.50±0.75
+350V Monitor	B		+350.±15.
-15V Monitor	B		-15.0±1.0
-5V Monitor	B		-5.25±0.25
Disc Ref Mon.	B		+3.000±0.02

Insp. Date

2.1.14	Actual Value	Acceptable Value
Heater		+25.0 ± 0.5 Vdc
Electronics		+25.0 ± 0.5 Vdc
Detector Bias		+25.0 ± 0.5 Vdc

Insp. Date

DATA SHEET 12 (Cont.)

2.1.15 Low Voltage Current Consumption

Current Sink	Measured Current	Acceptable Value
Heater	mA	10 ± 5 mA
Electronics		≤ 560
Detector Bias		≤ 30

Insp. Date

2.1.16 Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	Vdc	+5.00±0.25 Vdc
+8V Monitor	A		+8.10±0.15
-8V Monitor	A		-8.15±0.15
+25V Monitor	A		+25.50±0.75
+350 V Monitor	A		+350.±15.
-15V Monitor	A		-15.0±1.0
-5V Monitor	A		-5.25±0.25
Disc Ref Mon.	A		+3.00±0.02
+5V Monitor	B		+5.00±0.25
+8V Monitor	B		+8.10±0.15
-8V Monitor	B		-8.15±0.15
+25V Monitor	B		+25.50±0.75
+350V Monitor	B		+350.±15.
-15V Monitor	B		-15.0±1.0
-5V Monitor	B		-5.25±0.25
Disc Ref Mon.	B		+3.00±0.02

Insp. Date

DATA SHEET 12 (Cont.)

2.1.17

	Actual Value	Acceptable Value
Heater	______________	+30.0 ± 0.5 Vdc
Electronics	______________	+30.0 ± 0.5 Vdc
Detector Bias	______________	+30.0 ± 0.5 Vdc

Insp. ______________ Date ______________

2.1.18 High Voltage Current Consumption

Current Sink	Actual Value	Acceptable Value
Heater	______________ mA	10 ± 5 mA
Electronics	______________	≤ 560
Detector Bias	______________	≤ 30

Insp. ______________ Date ______________

DATA SHEET 12 (Cont.)

2.1.19 High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	__________ Vdc	+5.00±0.25 V
+8V Monitor	A	__________	+8.10±0.15
-8V Monitor	A	__________	-8.15±0.15
+25V Monitor	A	__________	+25.50±0.75
+350V Monitor	A	__________	+350.±15.
-15V Monitor	A	__________	-15.0±1.0
-5V Monitor	A	__________	-5.25±0.25
Disc Ref Mon.	A	__________	+3.00±0.02
+5V Monitor	B	__________	+5.00±0.25
+8V Monitor	B	__________	+8.10±0.15
-8V Monitor	B	__________	-8.15±0.15
+25V Monitor	B	__________	+25.50±0.75
+350V Monitor	B	__________	+350.±15.
-15V Monitor	B	__________	-15.0±1.0
-5V Monitor	B	__________	-5.25±0.25
Disc Ref Mon.	B	__________	+3.00±0.02

__________ Insp. __________ Date

DATA SHEET 12 (Cont.)

2.1.20 Temperature Measurement

Parameter	Prime Frame	Measured Value	Acceptable Limits
Package Temperature Monitor	A	________ °C	50°F to 118°F = 10°C to 48°C
Package Temperature Monitor	B	________	↓
Detector Plate Temperature Monitor	A	________	X
Detector Plate Temperature Monitor	B	________	X

________ Insp. ________ Date

2.1.21 Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output		Maximum Acceptable Value
A	________	µA	1.0 µA
B	________		2.0 µA
C	________		2.0 µA
D	________		2.0 µA
E	________		2.0 µA

________ Insp. ________ Date

DATA SHEET 12 (Cont.)

2.1.22 Detector Resolution Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	____________ keV	50. keV
B	____________	50. keV
C	____________	50. keV
D	____________	50. keV
E	____________	50. keV

____________ ____________
Insp. Date

2.1.25 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	____________	14 or 16
B	E2	____________	14 or 16
C	E3	____________	14 or 16
D	E4	____________	14 or 16
E	P6	____________	14 or 16

____________ ____________
Insp. Date

DATA SHEET 12 (Cont.)

2.1.26 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	____________	14 or 16
B	P2	____________	14 or 16
C	P3	____________	14 or 16
D	P4	____________	14 or 16
E	P5	____________	14 or 16

____________ ____________
Insp. Date

2.1.28 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	____________	2032 or 2048
A	E2	____________	2032 or 2048
C	E3	____________	2032 or 2048
D	E4	____________	2032 or 2048
E	P6	____________	2032 or 2048

____________ ____________
Insp. Date

DATA SHEET 12 (Cont.)

2.1.29 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	__________	2032 or 2048
B	P2	__________	2032 or 2048
C	P3	__________	2032 or 2048
D	P4	__________	2032 or 2048
E	P5	__________	2032 or 2048

__________ Insp. __________ Date

2.1.31 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	__________	260,096 or 262,144
B	E2	__________	260,096 or 262,144
C	E3	__________	260,096 or 262,144
D	E4	__________	260,096 or 262,144
E	P6	__________	260,096 or 262,144

__________ Insp. __________ Date

DATA SHEET 12 (Cont.)

2.1.32 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	______________	260,096 or 262,144
B	P2	______________	260,096 or 262,144
C	P3	______________	260,096 or 262,144
D	P4	______________	260,096 or 262,144
E	P6	______________	260,096 or 262,144

______________ Insp. ______________ Date

2.1.34 Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	_	33,292,288 or 0
B	E2	_	33,292,288 or 0
C	E3	_	33,292,288 or 0
D	E4	_	33,292,288 or 0
E	P6	_	33,292,288 or 0

______________ Insp. ______________ Date

DATA SHEET 12 (Cont.)

2.1.35 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	____________	33,292,288 or 0
B	P2	____________	33,292,288 or 0
C	P3	____________	33,292,288 or 0
D	P4	____________	33,292,288 or 0
E	P5	____________	33,292,288 or 0

____________ ____________
Insp. Date

2.1.36 Visual inspection

____________ ____________
Insp. Date

DATA SHEET 12 (Cont.)

2.12.2 Install dummy plug

2/18/72
Insp. Date

2.12.3 Test article to facility

2/18/72
Insp. Date

2.12.4 Test article in chamber

2/18/72
Insp. Date

2.12.5 Raise temperature and humidity

2/18/72
Insp. Date

2.12.6 Maintain test condition for six hours

2/18/72
Insp. Date

2.12.7 Reduce temperature

2/18/72
Insp. Date

DATA SHEET 12 (Cont.)

2.12.8 Repeat steps 2.12.5 through 2.12.7 for 5 cycles

2/23/72
Insp. Date

2.12.9 Remove test article from chamber

2/23/72
Insp. Date

2.12.10 Visual inspection

2/23/72 DR # EPS 0089
Insp. Date

2.12.11 Return to Beta Building

2/23/72
Insp. Date

DATA SHEET 13
FUNCTIONAL TEST

2.13 FUNCTIONAL TEST DATA SHEET

POST HUMIDITY

2.1.4 Heater Power

Measured Value	Acceptable Value
27.53	+27.5 ± 0.5 Vdc

Insp. Date 2/23/72

2.1.5 Medium Voltage Heater Current

Measured Value	Acceptable Value
.007	10 ± 5 mA

Insp. Date 2/23/72

DATA SHEET 13 (Cont.)

2.1.6 Electronic Power

Measured Value	Acceptable Value
27.45	+27.5 ± 0.5 Vdc
	Insp. ______ Date 2/23/72

2.1.7 Medium Voltage Electronics Current

Measured Value	Maximum Value
511	560 mA
	Insp. ______ Date 2/23/72

2.1.8 Detector Bias

Measured Value	Acceptable Value
27.57	+27.5 ± 0.5 Vdc
	Insp. ______ Date 2/23/72

2.1.9 Medium Voltage Detector Bias Current

Measured Value	Maximum Value
20	30 mA
	Insp. ______ Date 2/23/72

DATA SHEET 13 (Cont.)

2.1.11 Medium Voltage ADC Checkout

Reference Input Voltage	Measured Electrical Unit Output Voltage	Acceptable Electrical Output Unit Voltage
+0.025±0.001 Vdc	.024 Vdc	+0.025±0.010 Vdc
+0.050±0.001	.044	0.050±0.010
+0.100±0.001	.092	0.100±0.010
+1.000±0.001	.988	1.000±0.010
+2.000±0.001	1.974	2.000±0.010
+3.000±0.001	2.961	+3.000±0.010
+4.000±0.001	3.949	+4.000±0.015
+4.900±0.001	4.843	+4.900±0.020

DR #1-705-0090

Insp.

Date 2/23/72

DATA SHEET 13 (Cont.)

2.1.13 Medium Voltage Housekeeping Parameter Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Engineering Unit Value
+5V Monitor	A	5.063 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.057	+8.10±0.15
-8V Monitor	A	-8.093	-8.15±0.15
+25V Monitor	A	25.320	+25.50±0.75
+350V Monitor	A	359.195	+350.±15.
-15V Monitor	A	-15.944	-15.0±1.0
-5V Monitor	A	-5.387	-5.25±0.25
Disc Ref Mon.	A	2.965	+3.00±0.02
+5V Monitor	B	5.063	+5.00±0.25
+8V Monitor	B	8.057	+8.10±0.15
-8V Monitor	B	-8.222	-8.15±0.15
+25V Monitor	B	25.323	+25.50±0.75
+350V Monitor	B	359.195	+350.±15.
-15V Monitor	B	-15.921	-15.0±1.0
-5V Monitor	B	-5.374	-5.25±0.25
Disc Ref Mon.	B	2.965	+3.000±0.02

DR # EPS-0090

Insp.

2.1.14

	Actual Value	Acceptable Value
Heater	25.37	+25.0 ± 0.5 Vdc
Electronics	25.0	+25.0 ± 0.5 Vdc
Detector Bias	25.02	+25.0 ± 0.5 Vdc

Insp.

Date 2/23/72

DATA SHEET 13 (Cont.)

2.1.15 Low Voltage Current Consumption

Current Sink	Measured Current	Acceptable Value
Heater	7 mA	10 ± 5 mA
Electronics	542	≤ 560
Detector Bias	21	≤ 30

Insp. ______ Date 2/23/72

2.1.16 Low Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.063 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.028	+8.10±0.15
-8V Monitor	A	-8.101	-8.15±0.15
+25V Monitor	A	25.320	+25.50±0.75
+350 V Monitor	A	357.215	+350.±15.
-15V Monitor	A	-15.804	-15.0±1.0
-5V Monitor	A	-5.342	-5.25±0.25
Disc Ref Mon.	A	2.965	+3.00±0.02
+5V Monitor	B	5.063	+5.00±0.25
+8V Monitor	B	8.028	+8.10±0.15
-8V Monitor	B	-8.101	-8.15±0.15
+25V Monitor	B	25.320	+25.50±0.75
+350V Monitor	B	357.215	+350.±15.
-15V Monitor	B	-15.804	-15.0±1.0
-5V Monitor	B	-5.342	-5.25±0.25
Disc Ref Mon.	B	2.971	+3.00±0.02

DR# ERS-0090

Insp. ______ Date 2/23/72

DATA SHEET 13 (Cont.)

2.1.17	Actual Value	Acceptable Value
Heater	29.97	+30.0 ± 0.5 Vdc
Electronics	29.96	+30.0 ± 0.5 Vdc
Detector Bias	30.13	+30.0 ± 0.5 Vdc

Insp. Date 2/23/72

2.1.18 High Voltage Current Consumption

Current Sink	Actual Value	Acceptable Value
Heater	2 mA	10 ± 5 mA
Electronics	493	≤ 560
Detector Bias	21	≤ 30

Insp. Date 2/23/72

DATA SHEET 13 (Cont.)

2.1.19 High Voltage Housekeeping Checkout

Parameter	Prime Frame	Measured Engineering Unit Output	Acceptable Value
+5V Monitor	A	5.072 Vdc	+5.00±0.25 Vdc
+8V Monitor	A	8.057	+8.10±0.15
-8V Monitor	A	-8.150	-8.15±0.15
+25V Monitor	A	25.373	+25.50±0.75
+350V Monitor	A	357.215	+350.±15.
-15V Monitor	A	-15.934	-15.0±1.0
-5V Monitor	A	-5.326	-5.25±0.25
Disc Ref Mon.	A	2.971	+3.00±0.02
+5V Monitor	B	5.072	+5.00±0.25
+8V Monitor	B	8.057	+8.10±0.15
-8V Monitor	B	-8.134	-8.15±0.15
+25V Monitor	B	25.373	+25.50±0.75
+350V Monitor	B	357.215	+350.±15.
-15V Monitor	B	-15.889	-15.0±1.0
-5V Monitor	B	-5.326	-5.25±0.25
Disc Ref Mon.	B	2.971	+3.00±0.02

DR #EPS-0090

Insp. ______ Date 3/23/72

DATA SHEET 13 (Cont.)

2.1.20 Temperature Measurement

Parameter	Prime Frame	Measured Value	Acceptable Limits
Package Temperature Monitor	A	26.825 °C	50°F to 118°F = 10°C to 48°C
Package Temperature Monitor	B	26.825	↓
Detector Plate Temperature Monitor	A	25.018	
Detector Plate Temperature Monitor	B	25.018	

Insp. Date 2/23/72

2.1.21 Detector Leakage Current Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	.309 µA	1.0 µA
B	.771	2.0 µA
C	1.968	2.0 µA
D	.759	2.0 µA
E	.405	2.0 µA

Insp. Date 2/23/72

DATA SHEET 13 (Cont.)

2.1.22 Detector Resolution Test

EPS Channel	Measured Engineering Unit Output	Maximum Acceptable Value
A	.459 8.5 keV	50. keV
B	.102 0	50. keV
C	.068 0	50. keV
D	.073 1.5	50. keV
E	.053 .5	50. keV

Insp. Date 2/23/72

2.1.25 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	14	14 or 16
B	E2	16	14 or 16
C	E3	14	14 or 16
D	E4	14	14 or 16
E	P6	14	14 or 16

Insp. Date 2/23/72

DATA SHEET 13 (Cont.)

2.1.26 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 14 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	14	14 or 16
B	P2	14	14 or 16
C	P3	14	14 or 16
D	P4	14	14 or 16
E	P5	14	14 or 16

Insp. ____ Date 2/23/72

2.1.28 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable
A	E1	2032	2032 or 2048
A	E2	2032	2032 or 2048
C	E3	2032	2032 or 2048
D	E4	2032	2032 or 2048
E	P6	2032	2032 or 2048

Insp. ____ Date 2/23/72

DATA SHEET 13 (Cont.)

2.1.29 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 2046 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	2032	2032 or 2048
B	P2	2032	2032 or 2048
C	P3	2032	2032 or 2048
D	P4	2032	2032 or 2048
E	P5	2032	2032 or 2048

Insp. _____ Date 2/23/72

2.1.31 Electron 1, Electron 2, Electron 3, Electron 4, and Proton 6 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	260096	260,096 or 262,144
B	E2	260096	260,096 or 262,144
C	E3	260096	260,096 or 262,144
D	E4	260096	260,096 or 262,144
E	P6	260096	260,096 or 262,144

Insp. _____ Date 2/23/72

DATA SHEET 13 (Cont.)

2.1.32 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 262,142 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	260096	260,096 or 262,144
B	P2	260096	260,096 or 262,144
C	P3	260096	260,096 or 262,144
D	P4	260096	260,096 or 262,144
E	P6	260096	260,096 or 262,144

Insp. ______ Date 2/23/72

2.1.34 Electron 1, Electron 2, Electron 3, Electron 4 and Proton 6 33,554,430 pulse data accumulation test.

EPS Channel	Threshold	Measured Count	Acceptable Count
A	E1	33,292,288	33,292,288 or 0
B	E2	0	33,292,288 or 0
C	E3	33,292,288	33,292,288 or 0
D	E4	[illegible]76	33,292,288 or 0
E	P6	33,292,288	33,292,288 or 0

Insp. ______ Date 2/23/72

DP#EPS-0072

2.1.35 Proton 1, Proton 2, Proton 3, Proton 4, and Proton 5 33,554,430 pulse data accumulation test

EPS Channel	Threshold	Measured Count	Acceptable Count
A	P1	33,292,288	33,292,288 or 0
B	P2	33,292,288	33,292,288 or 0
C	P3	33,292,288	33,292,288 or 0
D	P4	33,292,288	33,292,288 or 0
E	P5	33,292,288	33,292,288 or 0

Insp. ______ Date 2/23/72

2.1.36 Visual inspection

Insp. ______ Date 2/23/72

Appendix C

Thermal Test Log Sheets

EPS TEST CH. "N"

24 JAN 72

Time	-75° ±5 Skin GP1	0°±5 Cavity GP2		Ch. 17	Ch. 18							
0230	75.1	70.7		71.6	74.8							
Fixed Timer on Computer												
0253	73.7	71.5		71.8	74.4							
0300	73.0	71.6		71.8	74.8							
0315	76.0	71.6		71.9	74.6							
0330	75.8	71.4		71.7	74.0							
0345	77.0	71.5		71.7	74.2							
0400	73.2	71.6		71.8	74.0							
0415	74.3	71.7		71.6	73.6	Going cold wall						
0430	62.3	22.7	-	156.0	74.3							
0445	56.9	8.8	-	187.3	74.2							
0459	51.2	0.0	-	199.7	74.2							
0515	41.7	0.0	-	207.3	74.4							
0530	38.9	-0.1	-	212.0	74.4							
0545	29.5	1.0	-	215.7	74.0							
0600	27.8	-1.1	-	218.3	73.6							
0615	22.7	-2.0	-	221.1	74.0							
[illegible]30	15.8	1.7	-	223.3	74.1							
0647	16.7	- .6	-	225.1	74.2	Burned Ch. 7 - bad data						
0700	-15.7	-2.8	-	226.8	74.6							
0715	-20.1	-2.2	-	227.9	74.6							
0730	-25.3	-1.6	-	229.6	74.7							
0745	-29.8	-0.6	-	230.7	74.9							
0800	-33.5	-1.4	-	231.7	74.4							
0815	-37.5	-2.8	-	232.7	74.8							
0830	-41.2	-4.2	-	233.3	74.6							
0845	-44.6	-1.9	-	234.3	74.7							
0900	-47.8	+3.3	-	235.1	74.4							
0915	-50.9	÷1.7	-	235.7	74.3							
0930	-53.6	÷1.0	-	236.6	74.3							
0945	-56.3	÷ .5	-	237.1	73.9							
1000	-59.0	÷ .3	-	237.7	74.0							
1015	-61.6	-1.1	-	238.4	73.6							
1030	-63.8	-1.7	-	238.9	73.0							
1045	-66.0	-1.5	-	239.5	72.7							
1100	-68.0	-1.9	-	240.9	72.6							
1115	-70.1	-2.5	-	240.6	73.4							

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Time	-75° ±5 Skin GP1	0°±5 Cavity GP2		Ch. 17	Ch. 18							
1130	-72.2	-3.2		-241.1	73.2							
1145	-74.1	-4.1		-241.8	74.1							
1200	-75.8	-4.7		-242.1	74.3							
1215	-77.2	-2.4		-242.2	74.4							
1230	-78.1	-1.6		-242.1	74.4							
1245	-78.7	-1.4		-241.9	74.8							
1300	-78.4	-1.3		-241.8	74.8							
1315	-77.9	-1.2		-241.1	74.9							
1330	-77.3	- .5		-240.4	74.8							
1345	-76.1	-1.3		-240.3	74.3							
1400	-75.9	-1.1		-240.0	74.6							
1415	-75.1	- .9		-239.7	74.9							
1430	-74.5	- .7		-239.7	74.7							
1445	-73.8	- .5		-239.4	74.1							
1500	-73.2	-0.4		-239.2	74.6							
1515	-72.7	-0.2		-238.9	74.4							
1530	-72.1	0.0		-238.9	74.8							
1545	-71.5	+.03		-238.7	74.5							
[illegible]600	-70.8	+0.6		-238.6	74.4							
1615	-70.2	+0.9		-238.5	74.2							
1630	-69.9	1.2		-238.3	74.4							
1645	-70.1	1.4		-238.6	74.3							
1700	-70.7	1.6		-238.9	74.3							
1715	-71.2	1.8		-239.1	74.7							
1730	-71.9	1.8		-239.5	74.3							
1745	-72.5	1.6		-239.6	74.1							
1800	-73.1	1.4		-239.7	74.3	Start Cash 2						
1815	-73.7	1.2		-239.9	74.2							
1830	-74.2	1.0		-239.9	74.2							
1845	-74.8	0.8		-240.0	74.5							
1900	-75.3	0.4		-240.0	74.7							
1915	-75.6	0.8		-240.2	75.0							
1930	-75.9	0.5		-240.2	74.6							
1945	-76.0	0.3		-240.2	74.8							
2000	-75.9	0.3		-240.0	74.7							
2015	-75.8	0.3		-239.8	74.4							
2030	-75.6	0.3		-239.7	74.5							

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EPS TEST CHAMBER "N"

Time	75° ±5 Skin GP1	0°±5 Cavity GP2		Ch. 17	Ch. 18							
2045	-75.5	0.3		-239.6	74.4							
2100	-75.5	0.4		-239.6	74.5							
2115	-75.5	0.4		-239.6	74.5							
2130	-75.6	0.2		-239.6	74.6							
2145	-75.7	0.2		-239.5	74.3							
2200	-75.5	0.2		-239.6	74.6							
2215	-75.5	0.1		-239.6	74.2							
2230	-75.4	0.1		-239.5	74.3							
2245	-75.3	0.1		-239.5	74.6							
2300	-75.1	0.1		-239.3	74.5							
2315	-75.1	0.1		-239.0	74.8							
2330	-75.1	0.1		-239.3	74.9							
2345	-75.0	0.1		-239.1	74.8							
2400	-75.0	0.2		-239.1	75.1							
0015	-75.0	0.3		-239.2	74.7							
0030	-74.9	0.3		-239.1	74.7							
0045	-74.9	0.2		-239.1	73.9							
0100	-74.9	0.3		-239.1	74.6							
0116	-74.8	0.4		-239.0	74.9							
0130	-74.8	0.6		-238.9	75.0							
0145	-74.8	0.6		-238.9	74.9							
0200	-74.9	0.7		-238.9	74.9							
0215	-74.8	0.7		-238.9	75.1							
0230	-74.8	0.7		-238.9	75.4							
0245	-74.8	0.7		-238.9	75.4							
0300	-74.9	0.7		-238.9	75.6							
0315	-74.8	1.1		-239.1	75.4							
0330	-74.9	0.6		-238.9	75.7							
0345	-74.9	-1.1		-238.9	75.6							
0400	-75.0	-0.4		-239.1	75.7							
0415	-75.1	-0.2		-239.0	75.8							
0430	-75.0	-0.1		-238.9	75.8							
0445	-75.1	-0.1		-239.1	75.7							
0500	-75.0.	-0.4		-239.2	75.6							
0515	-75.1	-0.5		-239.2	75.4							
0530	-75.2	-0.4		-238.9	75.5							
0545	-75.1	-0.4		-239.3	75.1							

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NASA--MSC

EPS TEST CHAMBER "N"

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	-75° ±5	0°±5										
Time	Skin GP1	Cavity GP2		Ch. 17	Ch. 18							
0600	-75.2	-0.5		-239.1	75.1							
0615	-75.2	-0.6		-239.0	75.1							
0630	-75.3	-0.6		-239.1	75.3							
0645	-75.3	0.3		-239.1	75.6							
0700	-75.3	0.6		-239.1	75.6							
0715	-75.3	0.4		-239.1	75.6							
0730	-75.4	0.4		-239.1	75.6							
0745	-75.5	0.2		-239.1	75.8							
Lost	Power	to	Bldg.	@ 0756								
0830	-79.1	-22.8		-244.3	75.3							
0845	-79.6	-3.8		-242.7	76.8							
0900	-79.4	-0.5		-240.8	76.3							
0915	Starting	Case 3										
	-23°	+75°										
	±5	±5										
0915	-79.0	-19.5		-239.6	76.2							
0934	-79.9	+61.2		-230.6	75.7							
0945	-61.5	+69.5		-224.8	75.8							
1000	-42.7	+61.6		-213.2	75.7							
1015	-39.4	+63.4		-207.5	75.8							
1030	-26.7	72.7		-211.2	75.4							
1045	-26.0	66.3		-214.9	75.4							
1100	-26.0	74.0		-216.5	75.8							
1115	-26.4	73.0		-217.4	75.7							
1130	27.0	74.9		-218.2	75.3							
1145	27.6	74.4		-218.7	76.0							
1200	27.7	75.6		-218.9	75.8							
1215	27.5	75.7		-218.7	75.7							
1230	27.1	73.3		-218.9	75.7							
1245	26.5	77.6		-218.3	75.6							
1300	25.4	73.7		-217.8	75.0							
1315	23.6	75.7		-217.1	66.0							
1330	21.8	77.0		-216.0	75.8							
1345	-19.9	77.6		-215.2	76.1							
1400	-18.0	77.7		-214.4	75.8							
1415	-17.5	74.9		-214.9	75.7							
1430	-18.8	74.3		-216.3	75.0							

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NASA--MSC

EPS TEST CHAMBER "N"

25 JAN 72

Time	Skin GP1	Cavity GP2		Ch. 17	Ch. 18							
1445	-20.6	73.7		-217.7	75.8							
1500	-21.4	73.4		-218.2	75.4							
1515	-22.0	73.3		-218.3	75.4							
1530	-22.5	72.7		-218.3	75.4							
1545	-23.0	75.6		-218.4	75.2							
1600	-23.4	75.6		-218.6	74.7							
1615	-23.5	74.9		-218.3	74.7							
1630	-23.5	75.9		-218.2	74.7							
1645	-23.2	74.5		-217.9	74.8							
1700	-22.9	74.6		-217.7	74.2							
1715	-22.6	74.3		-217.7	74.1							
1730	-22.4	74.3		-217.6	73.8							
1745	-22.4	74.5		-217.7	74.0							
1800	-22.4	74.3		-217.6	73.7	Going to Test Case 4						
1815	-19.6	73.9		-216.5	74.1							
1830	- 5.3	75		-206.9	73.7							
1845	+29.7	74.5		-178.1	73.7							
1900	59.5	77.4		-159.2	73.5							
1915	90.4	79.1		-147.9	73.1							
1930	115.4	74.4		-138.3	73.2							
1945	136.7	77.9		-130.6	73.1							
2000	154.8	79.2		-126.3	73.7							
2015	169.8	77.1		-121.4	73.5							
2030	186.2	79.1		-115.8	73.9							
2045	202.5	78.6		-107.3	73.6							
2100	218.6	78.8		-100.2	73.1							
2115	231.3	78.2		- 98.2	73.4							
2130	241.4	77.9		- 95.5	73.3							
2145	244.6	78.0		- 98.1	73.1							
2200	246.4	77.9		- 99.3	73.6	Test Case 4 in spec						
2215	248.0	77.5		- 99.5	74.2							
2230	249.2	77.2		- 99.3	74.2							
2245	250.0	76.7		- 99.3	74.1							
2300	250.2	76.3		- 99.9	74.2							
2315	250.1	76.1		-100.4	73.8							
2330	250.1	76.1		-100.7	73.6							
2345	250.3	76.0		-100.5	73.3							

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EPS TEST CHAMBER "N"

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	250° ±5	75°±5										
Time	Skin GP1	Cavity GP2		Ch. 17	Ch. 18							
0000	250.2	75.6		-100.8	78.4							
0015	250.2	75.5		-101.0	76.8							
0030	250.6	75.6		-101.1	74.1							
0105	250.0	75.8		-101.1	73.8	Computer off line						
0115	250.2	76.0		-101.1	73.6							
0138	250.2	75.8		-101.7	73.7	Typewriter hung up						
0152	249.9	75.6		-101.9	73.7							
0200	249.9	75.6		-101.7	73.4							
0215	250.1	75.7		-101.3	73.2							
0230	250.5	75.8		-101.1	73.6							
0245	250.2	75.8		-101.6	73.6							
0300	249.9	75.7		-101.8	73.5							
0315	249.7	75.7		-101.9	73.3							
0330	249.7	75.6		-101.7	73.0							
0345	249.9	75.7		-101.6	72.7	Typewriter hanging up						
0465	250.1	75.9		-101.6	75.9							
0430	250.2	76.0		-101.7	73.3							
0444	249.9	75.9		-101.9	73.5							
0519	249.2	75.6		-102.0	73.8							
0530	249.0	75.4		-102.9	73.3							
0545	249.1	75.3		-102.2	73.1							
0600	249.2	75.3		-102.6	73.1							
0630	249.5	75.6		-102.0	73.4							
0645	249.5	75.7		-101.9	73.6							
0700	249.6	75.7		-101.9	73.1							
0715	249.7	75.7		-102.0	73.6							
0730	249.8	75.7		-102.0	73.1							
0745	249.9	75.8		-102.2	73.6	0740	Test over. Easing back on Variac					
0800	246.0	75.8		-97.6	73.4							
0815	241.7	91.6		-67.6	73.8							
0830	239.7	108.8		-22.6	73.9							
0845	236.4	113.0		+7.6	74.0							
0900	228.7	121.4		44.6	74.6							
0915	210.6	124.2		61.2	74.4							
0930	194.1	122.6		70.4	74.3							
0945	180.0	119.5		74.8	74.1							
1000	167.8	116.0		77.0	74.1							

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EPS TEST CHAMBER "N"

26 JAN 72

Time	Skin GP1	Cavity GP2		Ch. 17	Ch. 18							
1142	118.0	95.4		73.4	73.7							
1200	112.9	92.7		71.7	73.6							
1215	109.1	91.1		71.4	73.1							
1286	104.3	81.5		72.7	74.1							

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Appendix D

EMI Test Report

SKYLAB ELECTRON/PROTON SPECTROMETER
(P/N SEC 39106425-301)
ELECTROMAGNETIC INTERFERENCE AND SUSCEPTIBILITY QUALIFICATION TEST REPORT

MSC/TCSD DOCUMENT EMC-R-EB8-003

7 FEBRUARY 1972

PREPARED BY
LOCKHEED ELECTRONICS COMPANY
FOR
TELEMETRY AND COMMUNICATIONS SYSTEMS DIVISION

Approved By:

Project Engineer S. Villarreal

Section

Branch E. L. Chicoine

NASA MANNED SPACECRAFT CENTER

TELEMETRY AND COMMUNICATIONS SYSTEMS DIVISION

HOUSTON, TEXAS

ABSTRACT

Electromagnetic Interference and Susceptibility Qualification Testing of the Skylab Electron/Proton Spectrometer, Part Number SEC 39106425-301, Serial Number 1001, was completed on 2 February 1972. The tests were performed in accordance with NR Specification MH04-02057-234 and Interface Revision Notice (IRN) 9395 delineated in MSC/TCSD Document EMC-P-EB8-003.

The test data indicates that the Spectrometer meets all requirements of MH04-02057-234 and IRN 9395.

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LIST OF FIGURES

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Houston, Texas Document: EMC-R-EB8-

SKYLAB ELECTRON/PROTON SPECTROMETER
(P/N SEC 39106425-301)
ELECTROMAGNETIC INTERFERENCE AND SUSCEPTIBILITY QUALIFICATION TEST REPORT
MSC/TCSD DOCUMENT EMC-R-EB8-003

1.0 GENERAL

This document reports the results of Electromagnetic Interference and Susceptibility Qualification Tests performed on the Skylab Electron/Proton Spectrometer, Serial Number 1001. Testing was begun on 31 January, 1972 and completed on 2 February, 1972. Tests were performed in the MSC Building 14 Electromagnetic Interference Test Laboratory under the direction of the Electromagnetic Systems Branch of the Telemetry and Communications Systems Division. The tests were performed in accordance with the requirements of NR Specification MH04-02057-234 and Interface Revision Notice 9395 as delineated in MSC/TCSD Document EMC-P-EB8-003.

2.0 TEST EQUIPMENT

A list of the test equipment used in the performance of these tests is contained in Appendix A. Receiver noise level data for each RIFI meter used in these tests are presented in Appendix C.

3.0 TEST PROCEDURE DEVIATIONS

One deviation to the procedures of EMC-P-EB8-003 (Appendix D) was required in the performance of this test. Skylab telemetry transmitters operating in the frequency range 230 to 250 MHz generate fields in excess of the 1V/M radiated susceptibility field required by NR Specification MH04-02057-234 and IRN9395 in this frequency range. In order to insure the compatibility of the Spectrometer with these transmitters, the test signal amplitude was increased to 7V/M. An approved Test Procedure Deviation Sheet is contained in Appendix D.

4.0 TEST RESULTS

A photograph of the test setup is shown in Figure 1. The duct work shown in the photograph is a part of the cooling scheme contrived to divert cool air from the shielded enclosure air conditioning system directly to the Spectrometer to prevent over heating. The test cables shown protruding from the top of the spectrometer were used during pre and post-test checkout of the spectrometer and were removed during Electromagnetic Interference and Susceptibility Testing. Completed data sheets are contained in Appendix B. The test results are summarized in Table I. Power supply impedance data is contained in Appendix E.

5.0 EMC EVALUATION OF THE SPECTROMETER

The test data indicates that the Electron/Proton Spectrometer met all requirements of NR Specification MH04-02057-234 and IRN 9395.

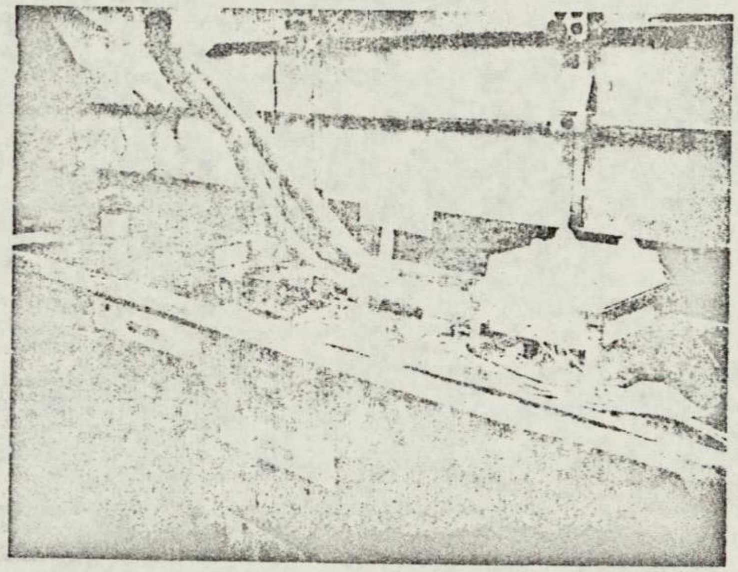

Figure 1, Basic Test Setup

APPENDIX A

TEST EQUIPMENT LIST

Component Electron/Proton Spectrometer	Document No. [illegible]
NASA Type No. SEC 39106425-301	Tested By Dolson/Fournet
NASA Serial No. 1001	Date Tested 131-72 thru 2-02-72
Test Run Time	Inspection Stamp

TEST EQUIPMENT LIST

NOMENCLATURE	MANUFACTURER AND MODEL	IDENTIFICATION NUMBER	CALIBRATION DUE DATE
RIFI Meter	Stoddart NM-40A	33010	3-11-72
RIFI Meter	Empire NF-105	31484	2-23-72
RIFI Meter	Stoddart NM-62B	47127	2-17-72
Oscilloscope	Tektronix 591A	63743	8-30-72
Plug In	TekTronix Type 82	64549	8-30-72
RIFI Meter	StoddART NM-30A	62380	2-03-72
Audio Oscillator	Hewlett Packard 200CD	59729	4-28-72
Signal Gen	Hewlett Packard 606A	35505	6-14-72
Sig. Gen.	HP-608D	31195	5-08-72
Sig. Gen.	HP-612A	35506	4-1-72
Sig. Gen.	HP-614A	30519	5-15-72
Sig. Gen	HP-616B	35507	5-15-72
Sig. Gen	HP-618B	30521	5-15-72
Sig. Gen	HP-620A	30522	5-15-72
Transient Gen	Solar 6471-1	61254	N/A
Oscilloscope	Tektronix Type 321	30949	8-11-72
VTVM	Hewlett Packard 416B	001709	5-26-72
Power Meter	HP-431B	54004	2-27-72
DC Power Supply	HP 6226A	52869	N/A
Directional Coupler	NARDA 3020A	87413	10-22-72
" "	NARDA 3042B-20	78235	4-02-72
" "	Narda 3003-20	PL6842	6-19-72
" "	Narda 3004-30	P20688	6-19-72
EPS Test set	NASA SEC 39106424	N/A	N/A
Biconical Ant.(2)	Honeywell 7825	87484, 84602	N/A
Spiral Ant.	Stoddart 93490-1	84601	N/A
Spiral Ant.	" "	87085	N/A
Spiral Ant.	" 93491-2	84600	N/A
Spiral Ant	Singer 93491-2	87086	N/A
Audio Amplifier	McIntosh 200AB	45908	N/A
Current Probe	Stoddart 91550-1	N/A	N/A

Component Electron/Proton Spectrometer	Document No. EB8-003 | Rev.
NASA Type No. SEC 39106425-301	Tested By Dolson/Faucett
NASA Serial No. 1001	Date Tested 1-31-72 thru 2-02-72
Test Run Time	Inspection Stamp

TEST EQUIPMENT LIST

NOMENCLATURE	MANUFACTURER AND MODEL	IDENTIFICATION NUMBER	CALIBRATION DUE DATE
Amplifier, RF	AEI Wideband	70119	N/A
Amplifier, RF	FAM Engineering Q100N	72303	N/A
Amplifier, RF	FAM Engineering P100N	72300	N/A
Amplifier, RF	FAM Engineering L100N	72299	N/A
Amplifier, RF	FAM Engineering S-100N	72302	N/A
Amplifier, RF	FAM Engineering C100N	72298	N/A
Amplifier, RF	FAM Engineering X100N	72301	N/A

APPENDIX B

TEST DATA SHEETS

COMPONENT: Electron/Proton Spectrometer | DOCUMENT NO: EB8-003 | REV:

NASA TYPE NO: SEC 3910 6425-301 | TESTED BY: Dolson/Fourn et
NASA SERIAL NO.: 1001 | DATE TESTED: 1-31-72
TEST RUN TIME: | INSPECTION STAMP:

TYPE OF TEST: Conducted Interference - Oscilloscope

R1F1 METER: MODEL Tek. 581/Type 82
S/N 63743-62549
DETECTOR N/A

PICKUP DEVICE: TYPE N/A
MODEL N/A
S/N N/A

TEST SAMPLE LINE VOLTAGE: 28VDC
LEAD TESTED: Parallel with Input Power

FREQ	METER READING V-P-P		CORRECTION FACTORS dB					INTERFERENCE LEVELS V-P-P			REMARKS
MHz	SIG	AMB	INPUT ATTEN	EXT NET LOSS	MTR CAL	BW	PICKUP DEVICE	SIGNAL	SPEC	AMBIENT	
0-90	<.02	<.02						<.02	0.8	<.02	

COMPONENT: Electron Proton Spectrometer	DOCUMENT NO: E88-003	REV:	
NASA TYPE NO: SEC39106425-301	TESTED BY: Fournet / Dolson		
NASA SERIAL NO.: 1001	DATE TESTED: 1-31-72		
TEST RUN TIME:	INSPECTION STAMP: NASA 1094		

TYPE OF TEST: Conducted Interference

RIFI METER: MODEL NM 40A
S/N 33010
DETECTOR Wideband - Peak

PICKUP DEVICE: TYPE Current Probe
MODEL 91550-1
S/N N/A

TEST SAMPLE LINE VOLTAGE: 28VDC

LEAD TESTED: +28VDC + 28VDC Ret.

FREQ	METER READING dB 1µV/kHz		CORRECTION FACTORS dB					INTERFERENCE LEVELS dBµV/20KHz			REMARKS
KHz	SIG	AMB	INPUT ATTEN	EXT NET LOSS	MTR CAL	BW	PICKUP DEVICE	SIGNAL	SPEC	AMBIENT	
		Rcvr Noisy		N/A		N/A				Rcvr Noise	
0-15	23	↓	20	↓	20	↓	35	98	100	↓	+28VDC
0-15	24	↓	20	↓	20	↓	35	99	100	↓	28VDC Ret

MSC Form 1359A (Rev Jun 69)

COMPONENT: Electron/Proton Spectrometer

DOCUMENT NO: EB8-003

REV:

NASA TYPE NO: SEC 39106425-501

TESTED BY: Dolson/Fournet

NASA SERIAL NO.: 1001

DATE TESTED: 1-31-72

TEST RUN TIME:

INSPECTION STAMP:

TYPE OF TEST: Conducted Interference

RIFI METER: MODEL NM 40A

S/N 33010

DETECTOR Carrier

PICKUP DEVICE: TYPE Current Probe

MODEL 91550-1

S/N N/A

TEST SAMPLE LINE VOLTAGE: 28VDC

LEAD TESTED: +28VDC

FREQ	METER READING dB/uV		CORRECTION FACTORS dB					INTERFERENCE LEVELS dBuA			REMARKS
MHz	SIG	AMB	INPUT ATTEN	EXT NET LOSS	MTR CAL	BW	PICKUP DEVICE	SIGNAL	SPEC	AMBIENT	
.030	22	Rcvr Noise	20	0	-20	N/A	37	59	N/A	Rcvr Noise	
.060	24		0				31	35			
.186	30		20				22	52			
.330	25		20				16	41			
.763	35		20				10	45			
.900	36		20				8	44			
1.2	20		40				5	45			
1.42	18		40				4	42			
1.6	18		40				3	41			
1.95	23		40				1	44			
2.2	22		40				0	42			
3.1	20		20				-3	17			
4.2	38		20				-5	33			
4.4	34		40				-6	48			
5.4	20		20				-8	12			
7.0	20		20				-10	10			
8.8	22		20				-12	10			
11.2	30		0				-14	-4			
13.2	20		20				-15	5			
13.8	19		20				-16	3			
15.2	28	↓	0	↓	↓	↓	-17	-9	↓	↓	

MSC Form 1359A (Rev Jun 69)

NASA — MSC

COMPONENT: *Electron/Proton Spectrometer*	DOCUMENT NO: *EB8-003*	REV:

NASA TYPE NO: *SEC 39106425-301*	TESTED BY: *Dolson/Fawcett*
NASA SERIAL NO.: *1001*	DATE TESTED: *1-31-72*
TEST RUN TIME:	INSPECTION STAMP:

TYPE OF TEST: *Conducted Interference*

RIFI METER: MODEL *NF-105*
S/N *31484*
DETECTOR *Carrier*

PICKUP DEVICE: TYPE *Current Probe*
MODEL *91550-1*
S/N *N/A*

TEST SAMPLE LINE VOLTAGE: *28VDC*

LEAD TESTED: *+28VDC*

FREQ	METER READING *dBuv*		CORRECTION FACTORS dB					INTERFERENCE LEVELS *dBuA*			REMARKS
MHz	SIG	AMB	INPUT ATTEN	EXT NET LOSS	MTR CAL	BW	PICKUP DEVICE	SIGNAL	SPEC	AMBIENT	
.014	NO MEAS SIG	RCVR NOISE	0	0	N/A	N/A	15	NO MEAS SIG	114	RCVR NOISE	
.023	2		0				11	13	106		
.033	14						8	22	98		
.050	11						4	15	84		
.060	10						2	12	80		
.080	12						-1	11	78		
.095	7						-2	5	72		
.105	10						-3	7	70		
.120	16						-3	13	69		
.150	20		-20				-6	-6	64		
.200	13		0				-8	5	58		
.400	2						-12	-10	44		
	NO MEAS							NO MEAS			
	SIG							SIG			
25	↓	↓	↓	↓		↓		↓		↓	

COMPONENT: *Electron/Proton Spectrometer*

DOCUMENT NO: *EBR-003*

REV:

NASA TYPE NO: *SEC 39106425-301*

TESTED BY: *Dolson/Fournet*

NASA SERIAL NO.: *1001*

DATE TESTED: *1-31-72*

TEST RUN TIME:

INSPECTION STAMP:

TYPE OF TEST: *Conducted Interference*

RIFI METER: MODEL *NM 40A*

S/N *33010*

DETECTOR *Carrier*

PICKUP DEVICE: TYPE *Current Probe*

MODEL *91550-1*

S/N *N/A*

TEST SAMPLE LINE VOLTAGE: *28VDC*

LEAD TESTED: *28V Return*

FREQ	METER READING *dB/uV*		CORRECTION FACTORS dB					INTERFERENCE LEVELS *dBuA*			REMARKS
KHz	SIG	AMB	INPUT ATTEN	EXT NET LOSS	MTR CAL	BW	PICKUP DEVICE	SIGNAL	SPEC	AMBIENT	
.020	*23*	*Rcvr Noise*	*20*	*0*	*-20*	*N/A*	*37*	*60*	*N/A*	*Rcvr Noise*	
.060	*25*		*0*		*-20*		*31*	*56*			
.180	*20*		*0*				*22*	*22*			
.320	*32*		*0*				*16*	*28*			
.330	*16*		*40*				*16*	*60*			
.700	*32*		*20*				*10*	*42*			
.9[illegible]	*35*		*20*				*8*	*43*			
1.2	*22*		*40*				*5*	*47*			
1.42	*22*		*40*				*4*	*46*			
1.6	*20*		*40*				*3*	*43*			
1.95	*24*		*40*				*1*	*45*			
2.2	*22*		*40*				*0*	*42*			
3.1	*24*		*20*				*-3*	*21*			
4.2	*40*		*20*				*-5*	*35*			
4.4	*35*		*40*				*-6*	*49*			
5.4	*29*		*20*				*-8*	*21*			
7.0	*21*		*20*				*-10*	*11*			
8.8	*28*		*20*				*-12*	*16*			
11.2	*17*		*20*				*-14*	*3*			
13.2	*24*		*20*				*-15*	*9*			
13.8	*25*		*20*				*-16*	*9*			
15.2	*28*		*0*				*-17*	*-9*			

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COMPONENT: Electron/Proton Spectrometer
DOCUMENT NO: EB8-003
REV:

NASA TYPE NO: SEC-39106425-301
TESTED BY: Dolson/Fournet
NASA SERIAL NO.: 1001
DATE TESTED: 1-31-72
TEST RUN TIME:
INSPECTION STAMP: 1005

TYPE OF TEST: Conducted Interference

RIFI METER: MODEL NF-105
S/N 31484
DETECTOR Carrier

PICKUP DEVICE: TYPE Current Probe
MODEL 91550-1
S/N N/A

TEST SAMPLE LINE VOLTAGE: 28VDC
LEAD TESTED: 28VDC Ret.

FREQ	METER READING dBuV		CORRECTION FACTORS dB					INTERFERENCE LEVELS dBuA			REMARKS
MHz	SIG	AMB	INPUT ATTEN	EXT NET LOSS	MTR CAL	BW	PICKUP DEVICE	SIGNAL	SPEC	AMBIENT	
.014	NO Meas Sig	Rcvr Noise	0	0	N/A	N/A		NO Meas Sig		Rcvr Noise	
↓	↓							↓			
.023	17						11	28	106		
.033	13						8	21	98		
.050	2		↓				4	6	84		
.060	20		-20				2	2	80		
.080	10		0				-1	9	78		
.095	20		-20				-2	-2	72		
.105	6		0				-3	3	70		
.120	14		0				-3	11	69		
.150	15		-20				-6	-11	64		
.200	3		0				-8	-5	58		
	NO Meas Sig							NO Meas Sig			
↓											
25	↓	↓	↓	↓	↓	↓		↓		↓	

COMPONENT: Electron/Proton Spectrometer	DOCUMENT NO: EB8-003	REV:
NASA TYPE NO: SEC 39106425-301	TESTED BY: Dolson/Fournet	
NASA SERIAL NO.: 1001	DATE TESTED: 1-31-72	
TEST RUN TIME:	INSPECTION STAMP:	

TYPE OF TEST: Conducted Interference

RIFI METER: MODEL NF-105
S/N 31484
DETECTOR Peak

PICKUP DEVICE: TYPE Current Probe
MODEL 91550-1
S/N N/A

TEST SAMPLE LINE VOLTAGE: 28VDC

LEAD TESTED: +28VDC

FREQ	METER READING dBμV/MHz		CORRECTION FACTORS dB					INTERFERENCE LEVELS dBμA/MHz			REMARKS
MHz	SIG	AMB	INPUT ATTEN	EXT NET LOSS	MTR CAL	BW	PICKUP DEVICE	SIGNAL	SPEC	AMBIENT	
.014	90	Rcvr Noise	N/A	0	N/A	N/A	15	105	136	Rcvr Noise	
.020	69						12	81	130		
.024	70						10	80	126		
.030	71						9	80	122		
.040	72						6	78	118		
.06	58						1	59	108		
	No Meas Sig							No Meas Sig			
.160	63						-6	57	92		
.240	60						-9	51	84		
.320	56						-10	46	78		
.355	55						-11	44	76		
.600	43						-13	30	66		
.800	63						-14	49	62		
1.0	42						-14	28	58		
	No Meas Sig							No Meas Sig			
25											

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NASA — MSC

COMPONENT: Electron/Proton Spectrometer	DOCUMENT NO: EB8-003 / REV:
NASA TYPE NO: SEC-39106425-301	TESTED BY: Dolson/Fournet
NASA SERIAL NO.: 1001	DATE TESTED: 1-31-72
TEST RUN TIME:	INSPECTION STAMP:

TYPE OF TEST: Conducted Interference

RIFI METER: MODEL NF-105
S/N 31484
DETECTOR Peak

PICKUP DEVICE: TYPE Current Probe
MODEL 91550-1
S/N N/A

TEST SAMPLE LINE VOLTAGE: 28VDC LEAD TESTED: 28V Ret

FREQ	METER READING dBµV/MHz		CORRECTION FACTORS dB					INTERFERENCE LEVELS dBµV/MHz			REMARKS
MHz	SIG	AMB	INPUT ATTEN	EXT NET LOSS	MTR CAL	BW	PICKUP DEVICE	SIGNAL	SPEC	AMBIENT	
.014	92	RCVR NOISE	N/A	0	N/A	N/A	15	107	136	RCVR NOISE	
.020	67						12	79	130		
.024	65						10	75	126		
.030	55						9	74	122		
.040	62						6	68	118		
.065	55						1	56	108		
	NO MEAS SIG							NO MEAS SIG			
.160	61						-6	55	92		
.240	55						-9	46	84		
.320	50						-10	40	78		
.355	45						-11	34	76		
.600	40						-13	27	66		
.800	53						-14	39	62		
1.0	37						-14	23	58		
	NO MEAS SIG							NO MEAS SIG			
25											

COMPONENT: Electron/Proton Spectrometer | DOCUMENT NO: EB8-003 | REV:

NASA TYPE NO: SEC 39106425-301 | TESTED BY: Delson/Fournet

NASA SERIAL NO.: 1001 | DATE TESTED: 1-31-72

TEST RUN TIME: | INSPECTION STAMP:

TYPE OF TEST: Radiated Interference

RFI METER: MODEL NF-105
S/N 31494
DETECTOR Peak

PICKUP DEVICE. TYPE Rod Antenna
MODEL See Remarks
S/N N/A

TEST SAMPLE LINE VOLTAGE: 28VDC LEAD TESTED: N/A

FREQ.	METER READING dBuV/MHz		CORRECTION FACTORS dB					INTERFERENCE LEVELS			REMARKS
MHz	SIG	AMB	INPUT ATTEN	EXT NET LOSS	MTR CAL	BW	PICKUP DEVICE	SIGNAL	SPEC	AMBIENT	
.015	NO MEAS SIG	RCVR NOISE	N/A	N/A	N/A	N/A		NO MEAS SIG		RCVR NOISE	VR-105
.020		41					50		103	91	
.030		49					47		98	96	
.045		37					46		93	83	
.060		35					46		89	81	
.090		32					46		84	78	
.120		36					46		82	82	
.150		RCVR NOISE								RCVR NOISE	VA-105
25											

Component *Electron/Proton Spectrometer*	Document No. *EPS-003* Rev.
NASA Type No. *SEB-39106425-301*	Tested By *Dolson/Fournet*
NASA Serial No. *1001*	Date Tested *2-02-72*
Test Run Time	Inspection Stamp

Type of Test: *Conducted Susceptibility - RF*

SIGNAL GEN: Model *HP 606-608*   INJECTION DEVICE: Type *Capacitor*

S/N *35505-31195*   Model *N/A*

Modulation *30% AM - 400 HZ*   S/N *N/A*

TEST SAMPLE LINE VOLTAGE: *28VDC*   LEAD TESTED: *Parallel Injection*

FREQ. MHz	INJECTED TEST SIGNAL		REMARKS	ENGINEERING INFORMATION	
	MEASURED LEVEL (1)	SPECIFICATION REQUIRED LEVEL (2) V RMS	NOTE: A measured level in column (1) lower than the required level in column (2) is a failure.	INJECTED SIGNAL LEVEL V RMS	TEST SAMPLE RESPONSE
.050	NO susceptibility	.1	Electron 4 Data	.1	NO susceptibility
↓	↓	↓	output Fluctuated	↓	↓
			in an intermittent		
			manner throughout		
			this test. This was		
			not due to the		
			susceptibility		
			test signal. Ref		
			DR #EPS-0072		
400					

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Electron Proton Spectrometer	Document No. EB8-003 Rev.
NASA Type No. SEC-39106425-301	Tested By Dolson/Fournet
NASA Serial No. 1001	Date Tested 2-02-72
Test Run Time	Inspection Stamp

Type of Test: Conducted Susceptibility - Audio

SIGNAL GEN: Model HP-200 CD

S/N 38729

Modulation N/A

TEST SAMPLE LINE VOLTAGE: 28VDC

INJECTION DEVICE: Type Isolation Xformer

Model 6220-1

S/N N/A

LEAD TESTED: +28VDC

	INJECTED TEST SIGNAL		REMARKS	ENGINEERING INFORMATION	
FREQ. Hz	MEASURED LEVEL (1)	SPECIFICATION REQUIRED LEVEL (2)	NOTE: A measured level in column (1) lower than the required level in column (2) is a failure.	INJECTED SIGNAL LEVEL	TEST SAMPLE RESPONSE
30	NO susceptibility	1V-P-P	Electron 4 Data	1V P-P	NO suscept.
			output Fluctuated		
			intermittently		
			throughout this		
			test. This was		
↓		↓	not due to Test		
15K		Logarithmic Decay	Signal. Ref.		
		From 1VP-P	DR0EPS-0072		
		to			
		.1VRMS			
↓		↓			
50K	↓	.1VRMS		↓	↓

MSC Form 1359B (Rev Jun 69)

Component Electron/ProtON Spectrometer
NASA Type No. SEC 39106425-301
NASA Serial No. 1001
Test Run Time
Document No. EB8-003
Rev.
Tested By Dolson/Fournet
Date Tested 2-02-72
Inspection Stamp

Type of Test: Conducted Susceptibility - Transient

SIGNAL GEN: Model Solar 6471-1
S/N 61254
Modulation N/A
TEST SAMPLE LINE VOLTAGE: 28VDC

INJECTION DEVICE: Type N/A
Model N/A
S/N N/A
LEAD TESTED: Parallel Injection

FREQ. PPS	INJECTED TEST SIGNAL		REMARKS	ENGINEERING INFORMATION	
	MEASURED LEVEL (1)	SPECIFICATION REQUIRED LEVEL (2)	NOTE: A measured level in column (1) lower than the required level in column (2) is a failure.	INJECTED SIGNAL LEVEL	TEST SAMPLE RESPONSE
11	NO susceptibility	+50	Power leads	+50	NO susceptibility
10	↓	+0.5	Pwr gnd to Chassis	+0.5	↓
10	↓	-0.5	↓	-0.5	↓
10	↓	+0.5	sig Gnd to Chassis	+0.5	↓
10	↓	-0.5	↓	-0.5	↓
			Electron 4 Data		
			Output Fluctuated		
			Throughout this		
			Test- Not due		
			to Test Signal-		
			Ref. DR# EPS-0072		

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Component Electron/Proton Spectrometer		Document No. EB8-003	Rev.
NASA Type No. SEC-39106425-301		Tested By Dolson/Fournet	
NASA Serial No. 1001		Date Tested 2-01-72	
Test Run Time		Inspection Stamp	

Type of Test: Radiated Susceptibility

SIGNAL GEN: Model HP606,608,612,614,616,618,62 INJECTION DEVICE: Type Broadband Antennas

S/N See Equipment List Model see Equipment List

Modulation 30% AM 400Hz/100% AM 1000Hz S/N N/A

TEST SAMPLE LINE VOLTAGE: 28VDC LEAD TESTED: N/A

FREQ. MHZ	INJECTED TEST SIGNAL		REMARKS	ENGINEERING INFORMATION	
	MEASURED LEVEL (1)	SPECIFICATION REQUIRED LEVEL (2)	NOTE: A measured level in column (1) lower than the required level in column (2) is a failure.	INJECTED SIGNAL LEVEL	TEST SAMPLE RESPONSE
140	NO Suscept.	1V/M	Electron 4 Data	2V/M	NO Suscept.
			output fluctuated		
			in an intermittent		
			manner throughout		
↓			this test. This was		
20			not due to the		
			susceptibility Test		
↓			Signal. Ref.		
200			DR# EPS-0023		
↓				↓	
230		↓		7V/M	
250		2V/M			
300		↓		↓	
320		1V/M		2V/M	
↓		↓		↓	
2000		15V/M		15V/M	
2300		↓		↓	
2400		1V/M		2V/M	
↓		↓		↓	
8000		7V/M		7V/M	
10,000	↓	↓		↓	↓

Component Electron/Proton Spectrometer
Document No. EB8-003
Rev.
NASA Type No. SEC 39106425-301
Tested By Dolson/Fournet
NASA Serial No. 1001
Date Tested 2-02-72
Test Run Time
Inspection Stamp

Type of Test: Induced Field Susceptibility

SIGNAL GEN: Model 400Hz Facility Power
S/N N/A
Modulation N/A
INJECTION DEVICE: Type 15' length of #19A
Model Solid Copper wire
S/N N/A
TEST SAMPLE LINE VOLTAGE: 28VDC
LEAD TESTED: N/A

FREQ. HZ	INJECTED TEST SIGNAL		REMARKS NOTE: A measured level in column (1) lower than the required level in column (2) is a failure.	ENGINEERING INFORMATION	
	MEASURED LEVEL (1)	SPECIFICATION REQUIRED LEVEL (2)		INJECTED SIGNAL LEVEL	TEST SAMPLE RESPONSE
400	NO Susceptibility	10A	Equipment	11.5A	NO susceptibility
400	↓	40 Amp-Ft.	Cables	69 Amp Ft.	↓
			Electron 4 Data		
			Fluctuated throughout		
			this Test -		
			NOT due to		
			Test Signal.		
			Ref DR# EPS-0072		

MSC Form 1359B (Rev Jun 69)

APPENDIX C

RECEIVER NOISE LEVEL MEASUREMENTS

RIFI METER: NM-40A	TESTED BY: L. Dolson
NASA CONTROL NO: 33010	DATE TESTED: 21 Dec 71
CAL DUE DATE: 11 MAR 72	ENGINEER: J. Christian

TYPE OF TEST: Receiver Noise Level Measurements

TUNING UNIT OR BAND	FREQ	MEASURED NOISE LEVELS			PICKUP DEVICE CORRECTIONS - dB			TEST CAPABILITY					
								CP		ANT		LIS	
		NB	BB	CHECK	CP	ANT	LISN	NB	BB	NB	BB	NB	BB
	kHz	dBμV	dBμV/ MHz		STODDART 91550-1			dBμA	dBμA/ MHz	dBμV	dBμV/ MHz	dBμ	
	.030	15	N/A		37	N/A	N/A	52	N/A	N/A	N/A	N/A	N/A
	.045	6			34			40					
	.060	7			31			38					
	.090	-7			28			21					
	.12	12			25			37					
	.18	8			22			30					
	.24	-7			19			12					
	.36	-15			16			1					
	.48	-20			13			-7					
	.72	-11			10			-1					
	.96	-13			7			-6					
	1.5	-14			3			-11					
	1.8	-15			2			-13					
	3.0	-15			-3			-18					
	3.6	-16			-4			-20					
	6.0	-16			-9			-25					
	7.2	-15			-10			-25					
	12	-16			-15			-31					
	15	-15			-16			-31					

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RIFI METER: NF-105	TESTED BY: L. Dolson
NASA CONTROL NO: 3148A	DATE TESTED: 21 Dec 71
CAL DUE DATE: 23 Feb 72	ENGINEER: J. Christian

TYPE OF TEST: Receiver Noise Level Measurements

TUNING UNIT OR BAND	FREQ	MEASURED NOISE LEVELS			PICKUP DEVICE CORRECTIONS - dB			TEST CAPABILITY					
								CP		ANT		LISN	
		NB	BB	CHECK	CP	ANT	LISN	NB	BB	NB	BB	NB	BB
	MHz	dBμV	dBμV/ MHz		STODDART 91550-1	EMPIRE ROD	STODDART 91221-1	dBμA	dBμA/ MHz	dBμV	dBμV/ MHz	dBμV	dBμV/ MHz
TX	.014	-25	36		14	52	N/A	-11	50	27	88	N/A	N/A
	.021	-27	37		12	49		-15	49	22	86		
	.030	-29	31		8	47		-21	39	18	78		
	.045	-33	30		4	46		-29	34	13	76		
	.060	-31	28		2	46		-29	30	15	74		
	.090	-30	28		-2	46		-32	26	16	74		
	.120	-31	26		-4	46		-35	22	15	72		
↓	.150	-30	28		-6	46	↓	-36	22	16	74	↓	↓
TA	.156	-18	36		-6	37	0	-24	30	19	73	-18	36
	.240	-15	35		-9	37		-24	26	22	72	-15	35
	.300	-15	35		-10	37		-25	25	22	72	-15	35
	.480	-18	28		-13	30		-31	15	12	58	-18	28
	.600	-18	29		-13	31		-31	16	13	60	-18	29
	.960	-15	31		-14	30		-29	17	15	61	-15	31
	1.2	-15	33		-15	27		-30	18	12	60	-15	33
	1.8	-15	32		-15	28		-30	17	13	60	-15	32
	2.4	-13	32		-15	25		-28	17	12	57	-13	32
	3.6	-13	30		-15	21		-28	15	8	51	-13	30
	4.8	-13	31		-15	24		-28	16	11	55	-13	31
	7.2	-13	32		-15	19		-28	17	6	51	-13	32
	9.6	-11	33		-15	18		-26	18	7	51	-11	33
	15	-10	36		-16	17		-26	20	7	53	-10	36
	20	-9	39		-16	15		-25	23	6	54	-9	39
↓	30	-10	35		-16	17	↓	-26	19	7	52	-10	35

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RIFI METER: NF-105	TESTED BY: L. Dolson
NASA CONTROL NO: 31484	DATE TESTED: 21 Dec 71
CAL DUE DATE: 23 Feb 72	ENGINEER: J. Christian

TYPE OF TEST: Receiver Noise Level Measurements

TUNING UNIT OR BAND	FREQ	MEASURED NOISE LEVELS			PICKUP DEVICE CORRECTIONS - dB			TEST CAPABILITY					
								CP		ANT		LISN	
		NB	BB	CHECK	CP	ANT	LISN	NB	BB	NB	BB	NB	BB
	MHz	dBµV	dBµV/ MHz		N/A	EMPIRE DIPOLES	N/A	dBµA	dBµA/ MHz	dBµV	dBµV/ MHz	dBµ	dBµ MHz
T-1	60	-1	34		N/A	8	N/A	N/A	N/A	7	42	N/A	N/
	80	-1	31							7	39		
	120	-.5	31							7.5	39		
	160	+3	31							11	39		
↓	200	5	35							13	43		
T-2	180	REJECT											
	220												
	360												
↓	400												
T-3	400	9	24							17	32		
	600	12	25							20	33		
	800	17	30							25	38		
↓	1000	12	29		↓	↓	↓	↓	↓	20	37	↓	↓

HSC Form 387 (Jul 68)

RIFI METER: NM-30A	TESTED BY: L. Dolson
NASA CONTROL NO: 62380	DATE TESTED: 3 Feb., 1972
CAL DUE DATE: 3 Feb., 1972	ENGINEER: J. Fournet

TYPE OF TEST: Receiver Noise Level Measurements

TUNING UNIT OR BAND	FREQ	MEASURED NOISE LEVELS			PICKUP DEVICE CORRECTIONS - dB			TEST CAPABILITY					
								CP		ANT		LISN	
		NB	BB	CHECK	CP	ANT	LISN	NB	BB	NB	BB	NB	BB
	MHz	dBμV	dBμV/MHz			dB		dBμA	dBμA/MHz	dBμV	dBμV/MHz	dBμV	dBμV/MHz
1	20	-6	15			8				2	23		
	30	-7	15							1	23		
2	40	-6	17							2	25		
3	60	-4	18							4	26		
	80	-4	18							4	26		
4	120	-1	22							7	30		
5	160	+5	28							13	36		
	240	+3	26							11	34		
6	320	+14	37							22	45		
	400	+14	40							22	48		

MSC Form 387 (Jul 68)

[illegible] NF-[illegible]

NASA CONTROL NO: 47127

CAL DUE DATE: 17 FEB 72

TESTED BY: L. DOLSON

DATE TESTED: 21 Dec 71

ENGINEER: J. CHRISTIAN

TYPE OF TEST: Receiver Noise Level Measurements

TUNING UNIT OR BAND	FREQ	MEASURED NOISE LEVELS			PICKUP DEVICE CORRECTIONS - dB			TEST CAPABILITY					
								CP		ANT		LISN	
		NB	BB	CHECK	CP	ANT	LISN	NB	BB	NB	BB	NB	BB
	GHz	dBμV	dBμV/MHz		N/A	STODDART DIRECTIVE	N/A	dBμA	dBμA/MHz	dBμV	dBμV/MHz	dBμV	dBμV/MHz
1	1.0	26	18		N/A	21	N/A	N/A	N/A	47	39	N/A	N/A
	1.5	23	17			21				44	38		
↓	2.0	21	14			21				42	35		
2	3.0	17	15			20				37	35		
↓	4.0	23	19			20				43	39		
3	6.0	27	27			18				45	45		
↓	7.0	26	27			18				44	45		
4	8.0	26	24			18				44	42		
↓	10.0	28	18		↓	18	↓	↓	↓	46	36	↓	↓

MSC Form 387 (Jul 69)

APPENDIX D

TEST PROCEDURE

SKYLAB ELECTRON/PROTON SPECTROMETER

QUALIFICATION PROCEDURE FOR
ELECTROMAGNETIC INTERFERENCE AND
SUSCEPTIBILITY TESTS

MSC/TCSD DOCUMENT EMC-P-EB8-003
6 OCTOBER 1971

PREPARED BY
LOCKHEED ELECTRONICS COMPANY
FOR
TELEMETRY AND COMMUNICATIONS SYSTEMS DIVISION

Approved By:

Project Engineer Salvador Villarreal

Section ______________________

Branch E L Chicoine

ND-5 ______________________

NASA MANNED SPACECRAFT CENTER
TELEMETRY AND COMMUNICATIONS SYSTEMS DIVISION
HOUSTON, TEXAS

ABSTRACT

This document establishes the procedures for the conduct of electromagnetic interference and susceptibility qualification testing of the Skylab Electron/Proton Spectrometer to North American Rockwell (NR) Interface Control Document (ICD) MH04-02057-234A as revised by Interface Revision Notice (IRN) 9395.

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LIST OF TABLES

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NASA - Manned Spacecraft Center

TEST PROCEDURE DEVIATION SHEET

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DOCUMENT NUMBER (*Test Procedure No. and/or TPS No.*): EMC-P-EB8-003

PART NUMBER: SEC 39106425-301

HARDWARE NOMENCLATURE: Skylab Electron/Proton Spectrometer

DATE OF TEST: 2-01-72

HARDWARE SERIAL NUMBER: 1001

MSC DIVISION: TCSD

DATE OF DEV.: 25 January, 1972

DEV. NO.	PAGE, SECTION, PARAGRAPH AND SEQUENCE NO.	DEVIATION	REASON	PERMANENT (P) OR TEMPORARY (T)	QC (Stamp and Date)
1	Page 10 Table I	Perform radiated susceptibility test with conical log spiral antenna over the frequency range 230 to 250 MHz at a field intensity of 7V/M instead of 1V/M. Specification limit remains 1 V/M.	Skylab workshop telemetry transmitters operating in the frequency range 230 to 250 MHz generate fields in excess of 1 V/M. The increase in test signal amplitude is required to assure compatibility with these transmitters.	P	

PREPARED BY (*Test Engineer*) — DATE: 26 January 1972

APPROVED BY (*Project Engineer - NASA*): S. Villarreal — DATE: 26 Jan. 1972

APPROVED BY (*Quality Engineer - NASA*) — DATE: 1/26/72

FINAL ACCEPTANCE QC STAMP — DATE: 2-1-72

MSC Form 1780 (Nov 69)

NASA — MSC

Date: 6 October 1971 NASA/MSC Page 1 of 11

Houston, Texas Document: EMC-P-EB8-003

SKYLAB ELECTRON/PROTON SPECTROMETER

QUALIFICATION PROCEDURE FOR ELECTROMAGNETIC INTERFERENCE AND SUSCEPTIBILITY TESTS

1.0 GENERAL

This document establishes the procedures for electromagnetic interference and susceptibility qualification testing of the Skylab Electron/Protron Spectrometer, hereinafter referred to as the Spectrometer.

The purpose of these tests is to to determine if the levels of interference emanating from the Spectrometer and the response of the Spectrometer to externally generated electromagnetic interference are within established limits.

The tests will be performed in the electromagnetic compatibility (EMC) test facilities located in Building 14 at the Manned Spacecraft Center under the direction of the Electromagnetic Systems Branch (ESB) of the Telemetry and Communications Systems Division (TCSD).

2.0 QUALITY ASSURANCE REQUIREMENTS

It is important that each step in the procedure be followed as shown to permit satisfactory evaluation of the test results. Where RECORD is indicated in the text, insert the values obtained for that measurement on the indicated data sheet. Read each step in its entirety prior to starting the test. Conduct all tests under the test conditions delineated in ICD MH04-02057-234A as revised by IRN 9395.

In the event of a failure during any portion of the EMC test program, report the failure to the Component Project Engineer in accord with MSCM 5312, Quality Operating Procedures, Part IV. The Project Engineer will determine the disposition of the reported failure.

A Quality Assurance Representative shall monitor the testing and recording of test data in accordance with the requirements of this test procedure. As a minimum, the inspector shall affix the applicable quality status stamp at the required inspection points. Other inspection points will be established at the discretion of the Quality Assurance Representative.

All devices utilized for measuring test parameters shall be calibrated in accordance with the applicable provisions of MSCM 8070, MSC Metrology Requirements Manual, prior to beginning the test.

Whenever a question of conformance with requirements arises, the inspector shall continue to witness testing and data recording. In such cases he shall prepare either a discrepancy report (DR) or a squawk, noting the questionable condition, that will be submitted for material review action if necessary. In addition, he shall sign and date the data sheet to indicate the inspection coverage and, upon resolution of the discrepancy, shall affix the applicable quality status stamp.

All deviations from this test procedure shall be at the discretion of the Project Engineer with the concurrence of the Cognizant Quality Assurance Representative. Each deviation shall be recorded on a test procedure deviation sheet with inspection verification of recorded data.

The inspector shall post information to the System and Component Historical Record Card, MSC Form 772, in accord with MSCM 5312, Quality Operating Procedures, Part IV.

3.0 APPLICABLE DOCUMENTS

ICD MH04-02057-234A	Electromagnetic Compatibility Design Criteria, CSM/GFE, NR/MSC
IRN 9395	Interface Revision Notice to ICD MH04-02057-234A
MSCM 5312	MSC Reliability and Quality Assurance Manual
Division Internal Note MSC 00168	Test Methods for Spacecraft Electromagnetic Interference (EMI) Control Requirements
MSCM 8070	MSC Metrology Requirements Manual

4.0 TEST EQUIPMENT

The items of test equipment listed in Table I, or equivalents approved by the test engineer, are required. During the test, RECORD the manufacturer, model number, identification number, and calibration due-date of the equipment used on a Data Sheet similar to that shown in Figure A-1.

5.0 SUSCEPTIBILITY DEFINITION

The Spectrometer shall be deemed to be susceptible when; 1) the output of any of the 6 proton detectors and 5 electron detectors, as displayed on the BME Cathode Ray Tube, is equal to or exceeds a count of 10, or 2) a loss of the sync word occurs as a result of the presence of the susceptibility test signal. Loss of the sync word is characterized by a complete loss of output data.

6.0 TEST PROCEDURE

6.1 General Requirements

All interference tests shall be performed within the shielded enclosures located in the Building 14 EMC test facility. The peak detector function of the interference measuring equipment shall be used when scanning in search of frequencies of maximum interference. Broadband and pulsed cw interference shall be measured by using the equipment's peak detector function; narrowband (CW) interferences shall be measured using the equipment's average detector function. Transient interference shall be measured using the peak detector and the aural slideback technique of measurement.

All interference measuring test equipment and general test support equipment shall be operated in accordance with the manufacturer's instruction manuals. Operating instructions for the Electron/Proton Spectrometer Bench Test Equipment (BTE) shall be included in the Test Preparation Sheet (TPS) authorizing the test.

The procedure for determining measurement frequencies prescribed in paragraph 2 of MSC-00168, Appendix A, will be utilized.

6.2 TEST SETUP

The spectrometer shall be mounted on and bonded to the EMI test fixture, which, in turn, shall be mounted on and bonded to the shielded enclosure ground plane. The basic test setup for the spectrometer is shown in Figure A-2. The Spectrometer pin functions and loading requirements for interference testing are shown in Figure A-3. During susceptibility testing, the Spectrometer BTE will replace the load box shown in Figures A-2 and A-3. The BTE shall be located outside the shielded enclosure. The basic test setup of Figure A-2 shall be modified as prescribed by the various test methods of MSC-00168 or Appendix B of this document. In those cases where MSC-00168 requires use of Line Impedance Stabilization Networks (LISN), use Solar type 6512-106R 10-ufd RF Capacitors instead of the LISN's. During all testing, except radiated interference testing, use the HP-6226A power supply. Locate it on the test bench with 24 ± 1" leads between the power supply and the Spectrometer. For radiated interference testing, the power supply shall be located external to the shielded enclosure.

6.3 TEST REQUIREMENTS

Tables II and III list the interference and susceptibility tests, respectively, to be performed on the Spectrometer. The tables also reference detailed test procedures contained in Division Internal Note MSC 00168 or Appendix B of this document. Each referenced test method contains a sample data sheet which will be used to record the results of the test.

At the conclusion of the test, the test technician will list all items of test equipment used in the test on the test equipment data sheet shown in Figure A-1. In addition, the test technician will prepare photographs of the Spectrometer test setup for inclusion in the test report.

TABLE I TEST EQUIPMENT LIST

NOMENCLATURE	MANUFACTURER AND MODEL
RIFI Meter	Empire Model NF-105
RIFI Meter	Fairchild Model EMC-10
RIFI Meter	Stoddart Model NM-62A
Current Probe*	Fairchild Model PCL-10
Current Probe*	Stoddart Model 91550-1
Directive Antenna*	Stoddart Model 91889-1
Directive Antenna*	Stoddart Model 91888-1
Directive Antenna*	Stoddart Model 91892-1
Biconical Antenna*	Honeywell Model 7825
Biconical Antenna*	Honeywell Model 7825
Log Spiral Antenna*	Stoddart Model 93490-1
Log Spiral Antenna*	Stoddart Model 93491-2
Rod Antenna*	Stoddart Model 92198-3
Rod Antenna*	Empire Model VA-105
Rod Antenna*	Empire Model VR-105
Dipole Antenna*	Empire Model T-1
Dipole Antenna*	Empire Model T-2
Dipole Antenna*	Empire Model T-3
Directional Coupler	Narda Model 3042B-20
Directional Coupler	Narda Model 3003-20
Directional Coupler	Narda Model 3000-10
Directional Coupler	Narda Model 3041-20
Directional Coupler	Narda Model 3004-20
Attenuator	Hewlett-Packard Model 354A
Attenuator	Narda Model 768-10
Power Supply*	Kepco Model SM-36-10M
Power Supply*	Harrison Lab Model 6226A

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*This equipment does not require calibration

TABLE I TEST EQUIPMENT LIST (Continued)

NOMENCLATURE	MANUFACTURER AND MODEL
Audio Amplifier**	McIntosh Model 200AB
Transient Generator	Solar Model 6471-1
Oscilloscope	Tektronix Type 321
Oscilloscope	Tektronix Type 581A
Power Meter	Hewlett-Packard Model 431B
RF Amplifier	Boonton Radio Model 230A
Amplifier**	FAM Model L100N
Amplifier**	FAM Model S100N
Amplifier**	FAM Model C100N
Amplifier**	FAM Model X100N
Signal Generator	Hewlett-Packard Model 606
Signal Generator	Hewlett-Packard Model 608
Signal Generator	Hewlett-Packard Model 612
Signal Generator	Hewlett-Packard Model 614A
Signal Generator	Hewlett-Packard Model 616B
Signal Generator	Hewlett-Packard Model 618B
Signal Generator	Hewlett-Packard Model 620A
Electron/Proton Spectrometer Bench Test Equipment**	Lockheed Electronics
Input/Output Unit**	Hazeltine 2000

**The critical performance parameters of this equipment are verified during the tests described herein. Therefore for the purposes of these tests, this equipment does not require current calibration stickers from the MSC Calibration Laboratory

TABLE II. INTERFERENCE TEST REQUIREMENTS

TYPE OF TEST	PARAGRAPH REFERENCES MH04-02057-234	MSC 00168	FREQUENCY RANGE	SPECIFICATION LIMITS	REMARKS
Conducted Interference Using Oscilloscope	3.6.1.1	N/A Appendix B Test Method 1	0 Hz-15 kHz	0.8 V P-P	Line Stabilization Capacitors (LSC) removed for this test
Conducted Interference Using Current Probe	3.6.1.1	Paragraph 4.4.b Test Method CI-02	BB 0 Hz-25 MHz CW 30 Hz-25 MHz	Figure 5 of MH04-02057-234	LSC in circuit for these tests
Radiated Interference Rod Antenna	3.6.1.2	4.5a Method RI-01	BB 15kHz-25MHz CW 15kHz-25MHz	Figures 3 & 4 of MH04-02057-234	LSC in circuit for these tests
Radiated Interference Dipole Antenna	3.6.1.2	4.5.b Test Method RI-02	BB 25MHz-400MHz CW 25MHz-1000MHz	Figures 6 & 8 of MH04-02057-234	LSC in circuit for these tests
Radiated Interference Directive Antenna	3.6.1.2	4.5.c Test Method RI-03	CW 1000MHz-10,000MHz	Figure 7 of MH04-02057-234	LSC in circuit for these tests

TABLE III. SUSCEPTIBILITY TEST REQUIREMENTS

TYPE OF TEST	PARAGRAPH REFERENCES MH04-02057-234	MSC 00168	FREQUENCY RANGE	SPECIFICATION LIMITS	REMARKS
Conducted Susceptibility RF	3.6.1.3.1	N/A Appendix B Test Method 2	50kHz-400MHz	100,000 μV	LSC removed for this test
Audio	3.6.1.3.1	4.6.a Test Method CS-01	20Hz-50kHz	Paragraph 3.6.1.3.1.2 MH04-02057-234	LSC removed for this test
50 V Transient	3.6.1.3.1	4.6.c Test Method CS-03	10PPS-2 min.	+50 V peak	LSC removed for this test
0.5 V Transient	3.6.1.3	4.6.c Test Method CS-03	10PPS-2 min.	±0.5 V peak	LSC removed for this test. Transient injected between each return and chassis ground. Each return grounded to chassis ground through a 1 ohm resistor.
Radiated Susceptibility Rod Antenna	3.6.1.4	4.7.c Test Method RS-03	0.14 to 20MHz	1.0 V/M	LSC in circuit for these tests. Antenna 1 meter from test sample. Measuring antenna 1 meter from transmitting antenna
Biconical Antenna	3.6.1.4	4.7.e Test Method RS-05	20 to 200 MHz	1.0 V/M	
Conical Log-Spiral Antenna	3.6.1.4	N/A Appendix B Test Method 3	200 to 10,000 MHz	1.0 V/M except as follows: 250-300MHz-2V/M 2270-2290-15V/M 9800-9850-7V/M	

Note: Amplitude modulate test signal 30 percent with a 400 Hz sine wave from 50 kHz to 1000 MHz. Use no modulation from 1000-10000 MHz.

TABLE III. SUSCEPTIBILITY TEST REQUIREMENTS (Cont.)

TYPE OF TEST	PARAGRAPH REFERENCES		FREQUENCY RANGE	SPECIFICATION LIMITS	REMARKS
	MH04-02057-234	MSC 00168			
Induced Field Susceptibility Equipment	3.6.1.5.1	N/A Appendix B Test Method 4	400 Hz	10 amperes through 5 feet of wire (50 ampere feet)	LSC in circuit for these tests
Cabling	3.6.1.5.2	N/A Appendix B Test Method 5	400 Hz	40 ampere feet	

APPENDIX A

TEST EQUIPMENT DATA SHEET
AND TEST SETUP FIGURES

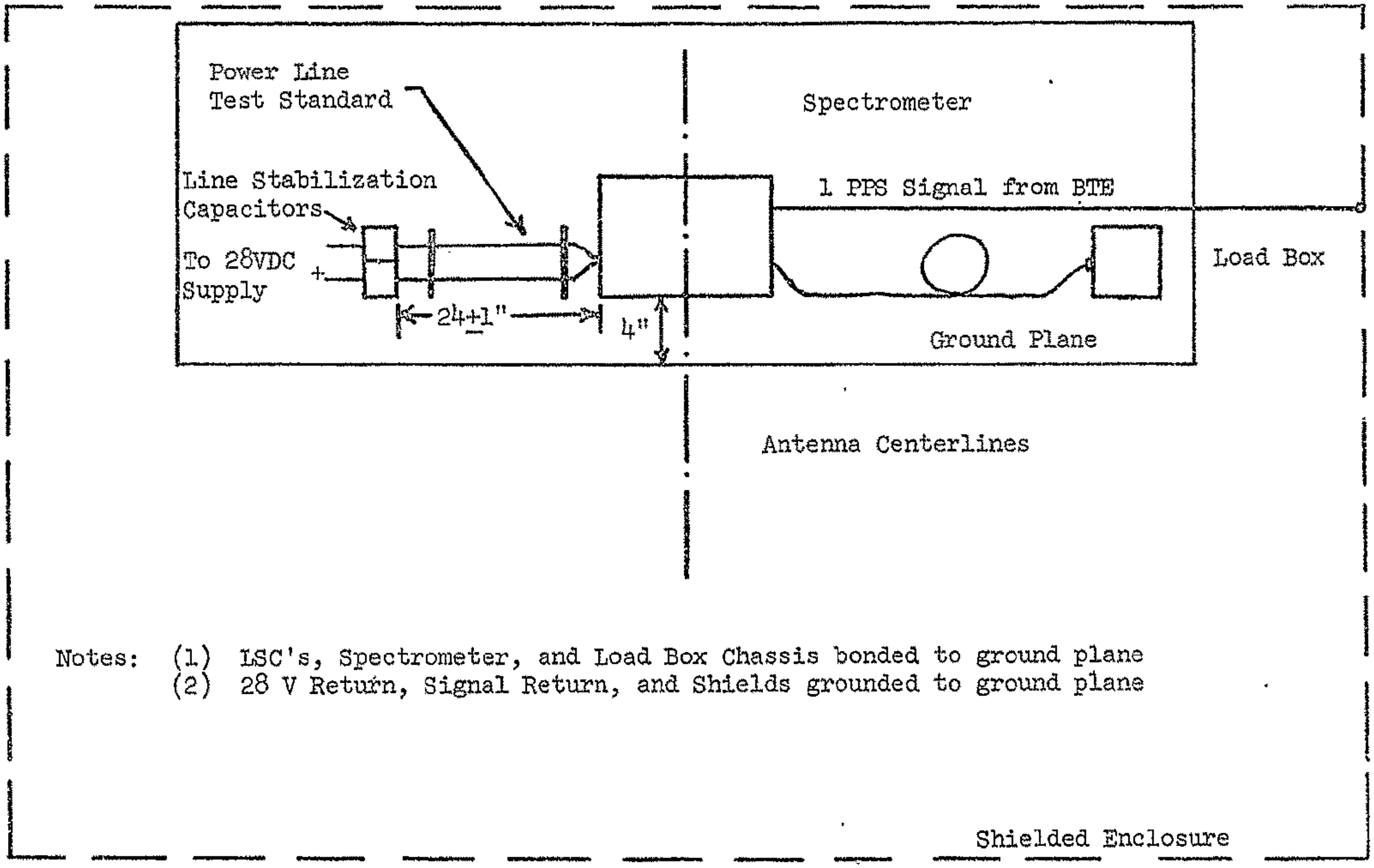
Component	Document No.	Rev.
NASA Type No.	Tested By	
NASA Serial No.	Date Tested	
Test Run Time	Inspection Stamp	

TEST EQUIPMENT LIST

NOMENCLATURE	MANUFACTURER AND MODEL	IDENTIFICATION NUMBER	CALIBRATION DUE DATE

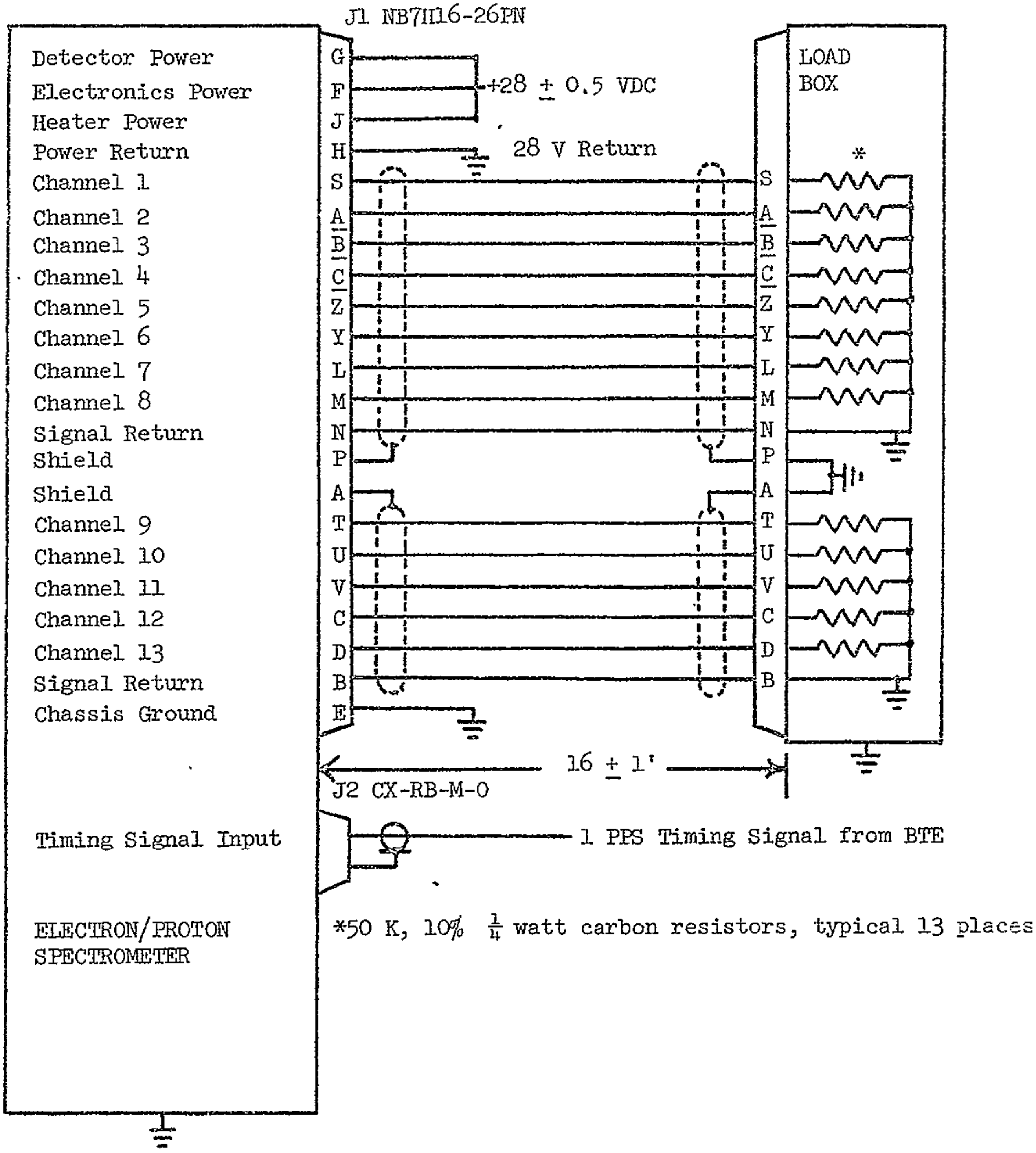
Figure 1. Test Equipment Data Sheet

C-7



Notes: (1) LSC's, Spectrometer, and Load Box Chassis bonded to ground plane
(2) 28 V Return, Signal Return, and Shields grounded to ground plane

Figure 2. Basic Test Setup



*50 K, 10% ¼ watt carbon resistors, typical 13 places

Figure 3. Spectrometer Cabling and Loading Requirements

APPENDIX B

SUPPLEMENTARY TEST METHODS

SUPPLEMENTARY TEST METHODS

Test Method 1: Conducted Interference Using an Oscilloscope on DC Input Power Leads

This test method is used to measure conducted interference voltages appearing on input power leads in the frequency range 0 to the Oscilloscope bandwidth.

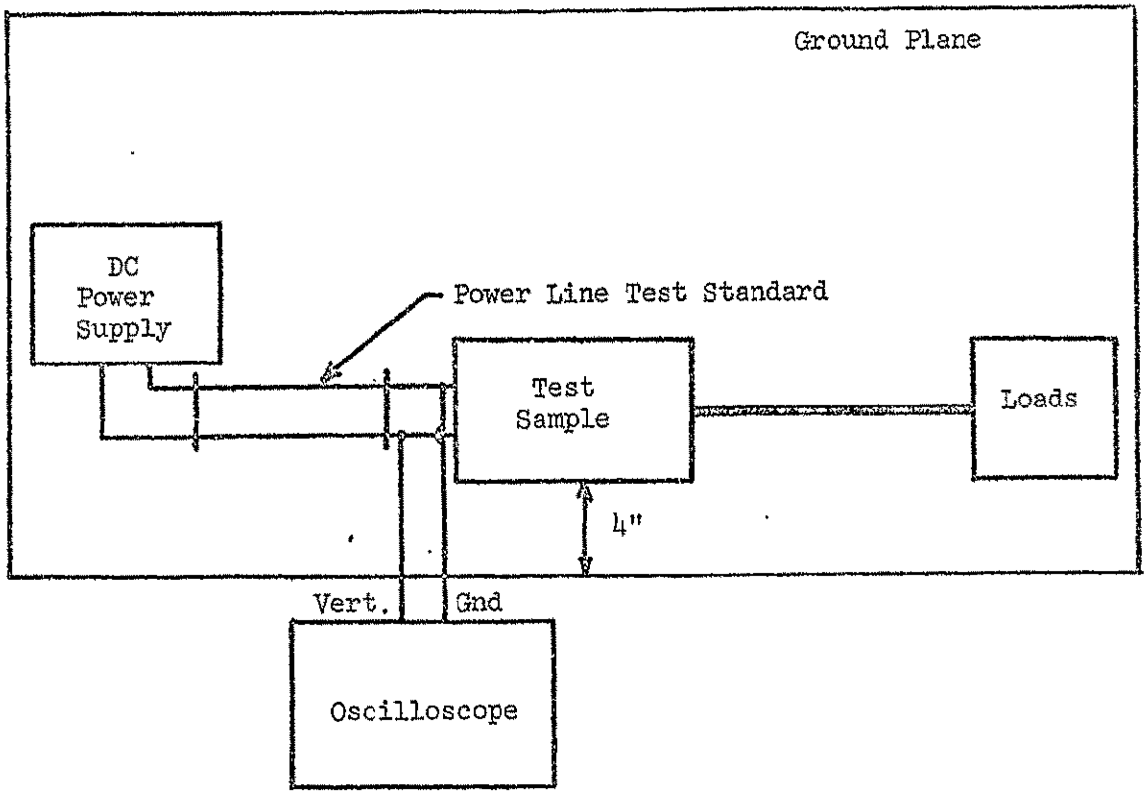
a. Test Setup: Figure B-1 shows a typical test setup for use with this test method. The power supply shall be located inside the shielded enclosure for this test. The lead length between the test sample and the power supply, including the length of the power line test standard, shall be as specified in the test procedure. If flight cables are available, they will be used instead of the power line test standard. Bonding or grounding of the test sample and/or shields to the ground plane will be as specified in the test procedure. The third pin on the oscilloscope power cord will be isolated from ground.

b. Test Equipment: The following items of test equipment (or equivalents) are required to perform this test method.

(1) Power supply meeting the impedance requirements of the governing EMI specification and capable of supplying the power requirements of the test sample.

(2) Power line test standard conforming to the requirements of the governing EMI specification.

(3) Oscilloscope with the bandwidth and sensitivity required by the governing EMI specification.



Notes: (1) Bond or ground test sample chassis, shields, and signal return as required in the test procedure.

(2) Third pin on oscilloscope power cord is not grounded.

Figure B-1. Conducted Interference Using Oscilloscope on DC Power Lines

c. Measurement Procedure

(1) Set up the equipment as shown in Figure B-1. The oscilloscope probe is connected to the power leads as close to the test sample power connector as is possible.

(2) Energize the test sample and test equipment and allow time for warmup. Adjust the oscilloscope vertical sensitivity and time base as required to measure the peak-to-peak voltage of the displayed composite signal without regard to frequency. The oscilloscope AC-DC switch shall be in the AC position. RECORD the peak-to-peak voltage of the composite signal.

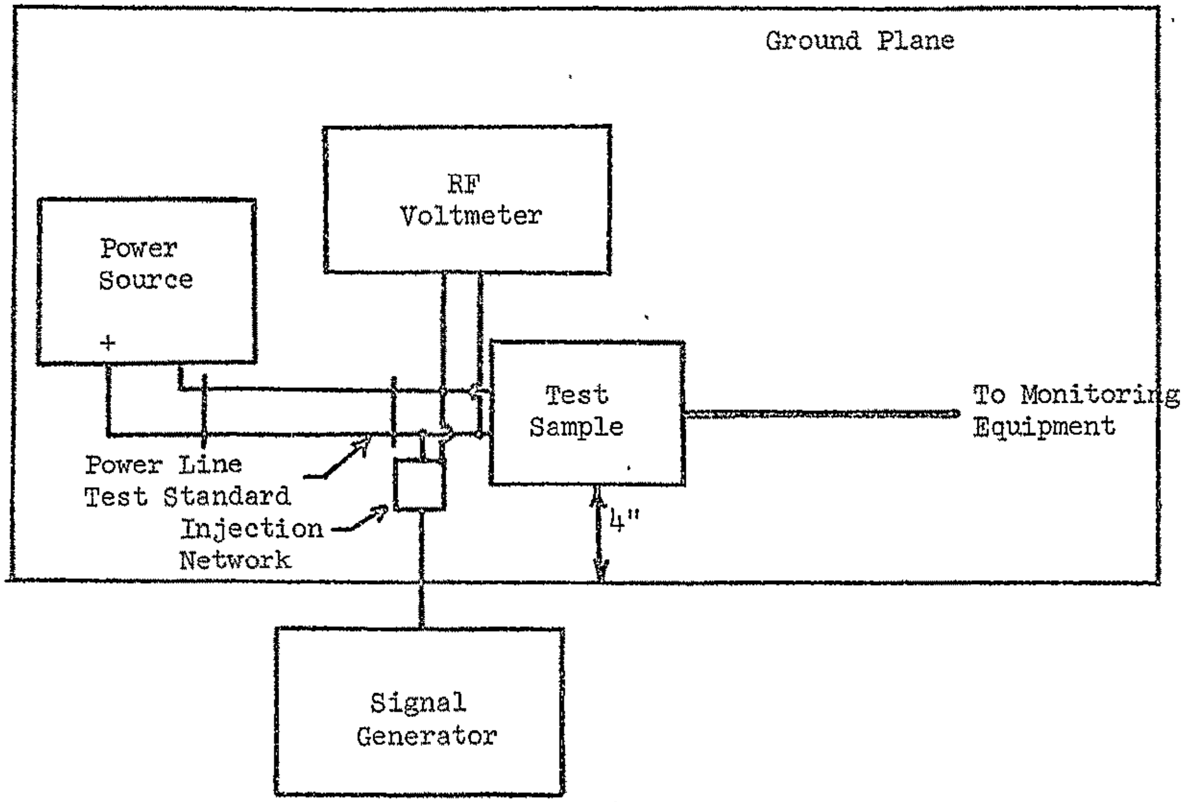
d. Data Sheet: Figure A-17 of MSC-00168 is a sample of a data sheet which is suitable for use with this test method.

2.0 Test Method 2: RF Conducted Susceptibility Using Injection Capacitors

This test method is intended to verify that the test sample is not susceptible to radio-frequency interference on its power leads.

a. Test Setup: Figure B-2 shows the typical test setup for use with this method. The line stabilization capacitors are removed for this test.

The bonding and grounding of the test sample and/or cable shields shall be as delineated in the test procedure. The power line test standard is inserted in the circuit between



Notes: (1) Bond or ground test sample chassis, power return, signal return, and shields as required by test procedure.

(2) Third pin on signal generator shall not be grounded.

Figure B-2. RF Conducted Susceptibility Using Injection Capacitors the test sample and the power supply interface. The test sample input simulation and monitoring equipment shall be as shown in the test procedure.

The lead length between the point of connection of the voltmeter probe and the test sample input connector shall be 2" or less.

b. Test Equipment

(1) Power line test standard.

(2) Six-foot length of double shielded coaxial cable.

(3) Signal generators capable of covering the frequency range and delivering the power levels required by the test procedure.

(4) Vacuum tube voltmeter capable of measuring to the requirements of the governing specification.

(5) Test sample input simulation and monitoring equipment as required by the test procedure.

c. Test Procedure

(1) Connect the equipment as shown in Figure B-2. Energize the test equipment and the test sample and allow time for warmup.

(2) Tune the signal generator to the lowest frequency required by the test procedure. Set the output

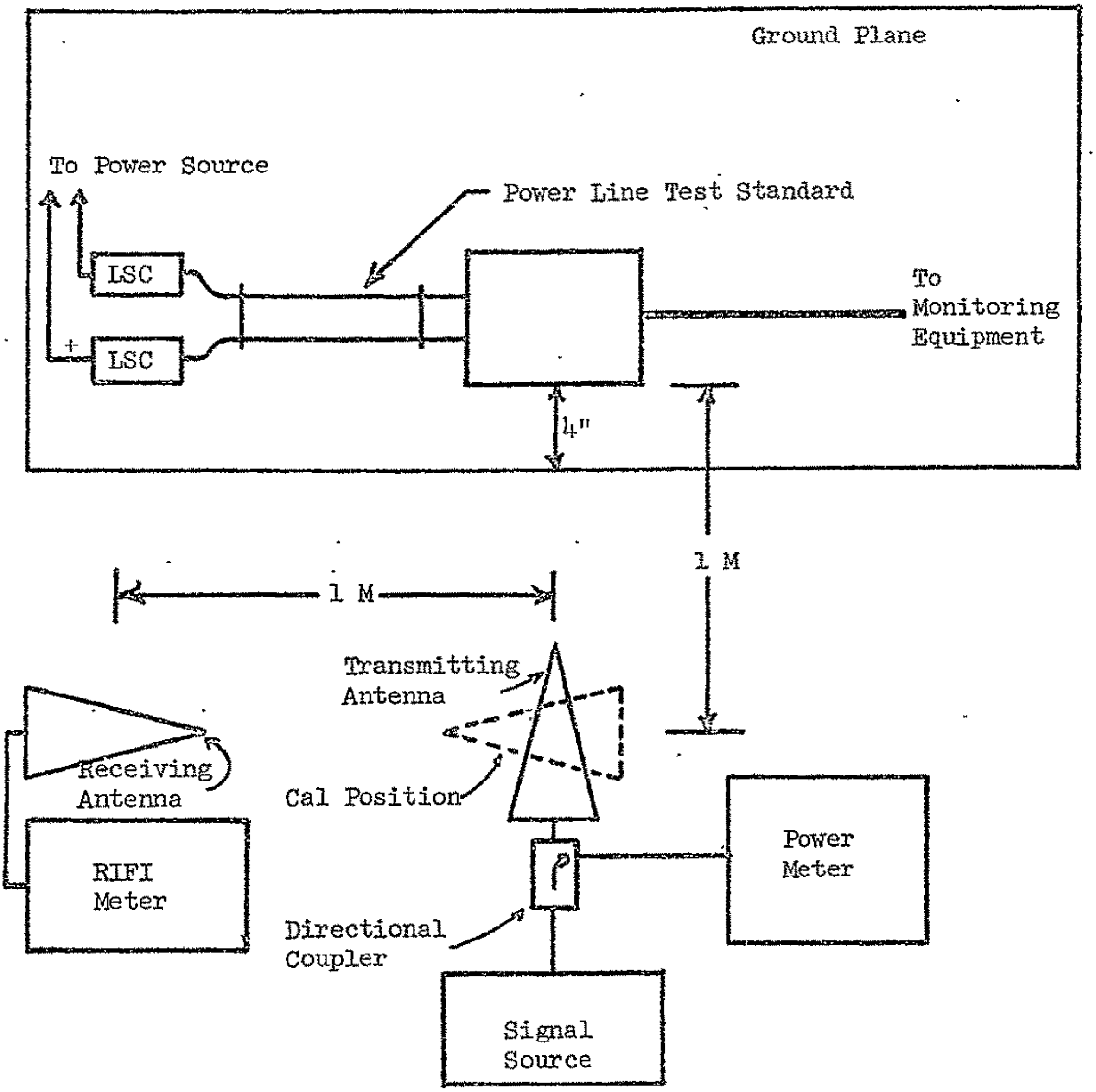
attenuator of the signal generator to provide the signal level required by the test procedure (as measured on the VTVM). Unless otherwise specified in the test procedure, the test signal shall be amplitude modulated 30 percent with either a 400 MHz or 1000 Hz sine wave as specified in the test procedure.

(3) Scan the frequency range required by the test procedure while maintaining the required output signal level. During the scan, monitor the test sample output for evidence of susceptibility. If such evidence is observed, RECORD the test sample response and decrease the output level of the signal generator until the evidence of susceptibility is just removed. RECORD the frequency and threshold level on the applicable data sheet.

d. Data Sheet: Figure A-18 of MSC-00168 is a sample of a data sheet which is suitable for use with this test method.

3.0 Test Method 3: Radiated Susceptibility - Conical Log-Spiral Antenna - Calibrated Field

a. Test Setup: The typical test setup for this test method is shown in Figure B-3. The LSC's are used with this method and are mounted on and bonded to the ground plane. The power line test standard is inserted in the circuit between the LSC's and the test sample. The bonding and grounding of the test sample and/or cable shields shall be as delineated in the test procedure. The transmitting antenna is located 1 meter away from the front surface of the test sample. The separation from the test sample is measured from the mid-point



Note: Bonding or grounding of test sample chassis, power return, signal return, and shields per the requirements of the test procedure

Figure B-3. Radiated Susceptibility - Conical Log-Spiral Antenna of the conical log spiral antenna. The antenna shall be positioned 12 inches above the ground plane. The receiving antenna shall be placed so that the angle formed by the line between the two antennas and the line between the test sample and the transmitting antenna is at least 90 degrees and, when the transmitting antenna is rotated through this angle about its vertical axis, the longitudinal center lines and planes of polarization of the antennas coincide (cal position). The distance between the antennas will be the same as the distance between the transmitting antenna and the test sample. The connection between the receiving antenna and receiver is made with a length of double-shielded coaxial cable. The cable loss shall be considered when calculating field intensity. The test sample input simulation and monitoring equipment shall be set up as delineated in the test procedure.

b. Test Equipment

(1) LSC per the requirements of the governing specification.

(2) Power line test standard per the requirements of the governing specification.

(3) Antennas per the requirements of the governing specification.

(4) RIFI meter capable of covering the frequency range in question.

(5) Signal source with an output impedance of 50 ohms and capable of producing the signal levels required by the governing specification.

(6) RF power meter.

(7) Directional couplers designed to operate over the frequency range of the test.

(8) Test sample input simulation and monitoring equipment per the requirements of the governing specification.

c. Test Procedure

(1) Set up the test equipment as shown in Figure B-3. Set the output attenuator of the signal generator and the gain of the amplifier for minimum output. Energize the test equipment and test sample and allow time for warmup.

(2) Tune the signal generator to the lowest frequency required by the test procedure for this test. Turn the transmitting antenna to the cal. position. Adjust the power level delivered to the transmitting antenna until the field intensity measured at the receiving antenna is 1 V/M unless otherwise specified by the test procedure. Note the power level indicated on the power meter. (This calibration of the field will be performed once per octave over the frequency range of the test and each time the signal generator, power amplifier, test antenna, or directional coupler is changed as the scan is made over the required frequency range.)

(3) Turn the transmitting antenna back to the test position. Increase the power level to the transmitting antenna by 3 dB as indicated on the power meter. Scan the frequency

range required by the test procedure while maintaining this power level into the transmitting antenna. Test antennas, signal generators, directional couplers, and power amplifiers will be changed as required during the scan so that the test frequencies remain within their design bandwidths. During the scan, monitor the output of the test sample for an undesired response.

(4) At each frequency to which the test sample exhibits susceptibility, RECORD the test frequency and test sample response. Decrease the power delivered to the test antenna until the power meter reads the same level noted in step (2) and again RECORD the test sample response. Decrease the power level delivered to the test antenna until the test sample no longer exhibits the undesired response. Turn the transmitting antenna to the CAL position and measure the field intensity at the receiving antenna. RECORD this field intensity as the threshold of susceptibility.

d. <u>Data Sheet</u>: Figure A-18 of MSC-00168 is an example of a data sheet which is acceptable for use with this test method.

4.0 <u>Test Method 4</u>: Induced Field Susceptibility - Equipment

a. <u>Test Setup</u>: The typical test setup for this method is shown in Figure B-4. The LSC's are used with this test method and are mounted on and bonded to the ground plane. The power line test standard is inserted in the circuit between the LSC's and the test sample. The bonding and grounding of the test sample and/or cable shields shall be as delineated in the test procedure. The wire segment is located 1 foot from the

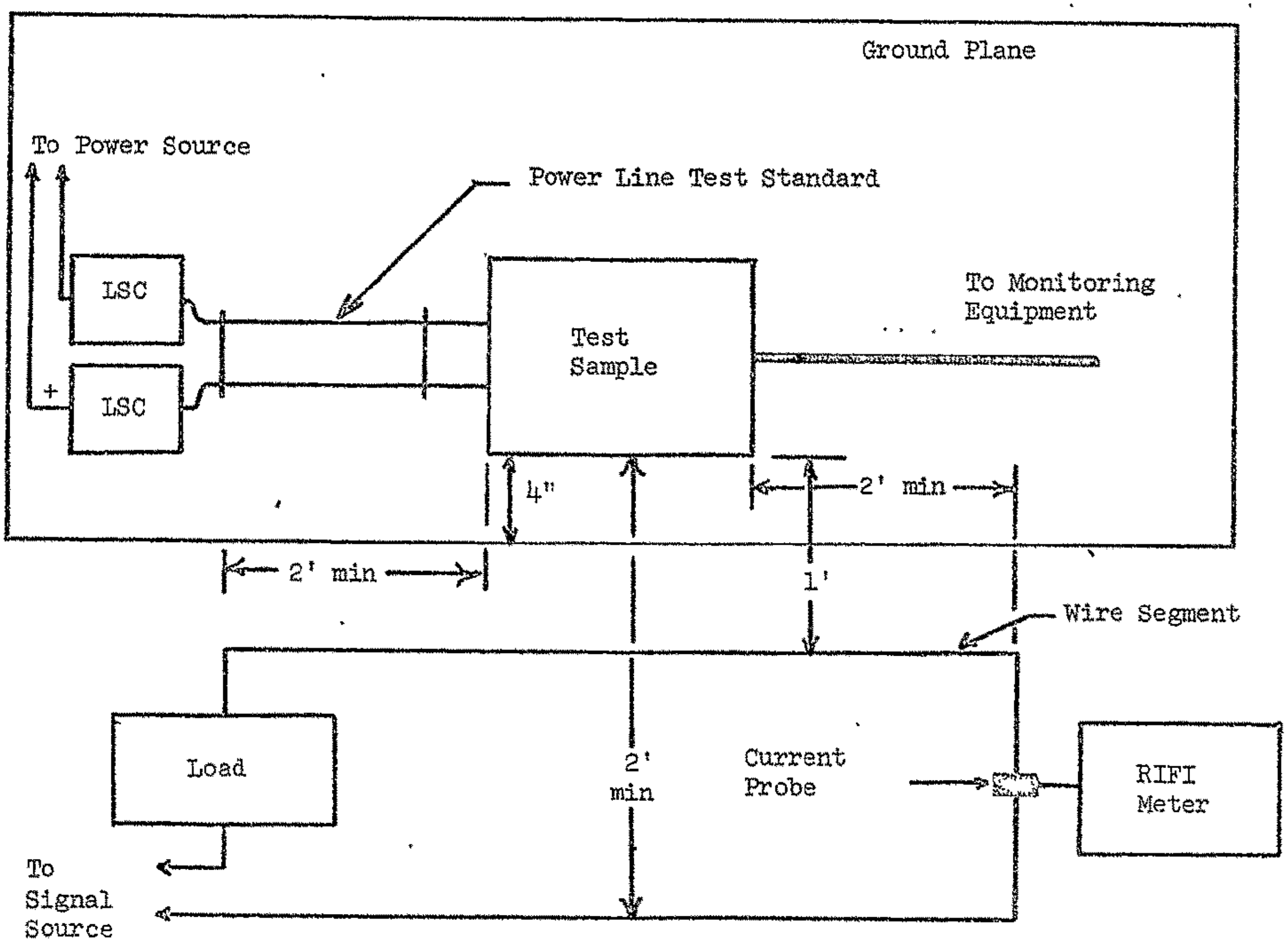


Figure B-4. Induced Field Susceptibility - Equipment

Note: Bond or ground test sample chassis, power return, signal return, and shields as required by test procedure.

test sample and interconnecting cables parallel to the horizontal centerline of the test sample. The length of the wire segment shall be such that it extends 2 feet past the unit under test at each end. The leads supplying current to the segment shall be routed at least 2 feet from the test sample and its interconnecting cables. The test sample input simulation and monitoring equipment shall be set up as delineated in the test procedure.

b. Test Equipment

(1) LSC's per the requirement of the governing specification.

(2) Power line test standard per the requirements of the governing specification.

(3) A segment of test wire of sufficient length and current carrying capacity to meet the requirements of the governing specification.

(4) A signal source capable of producing the frequency and amplitude of test signal required by the governing specification.

(5) A load capable of dissapating the power generated in the course of this test.

(6) RIFI meter and current probe capable of measuring the current generated in the wire segment at the test frequency.

(7) Test sample input simulation and monitoring equipment per the requirements of the test procedure.

c. Test Procedure

(1) Set up the equipment as shown in Figure B-4. Energize the test sample and test equipment and allow time for warmup.

(2) Tune the signal source to the (lowest) test frequency required by the test procedure for this test. Adjust the gain of the signal source and/or the resistance of the load as required so that the current flow in the wire segment, as measured with the RIFI meter, equals the current requirement of the test procedure.

(3) If a fixed frequency test is specified, allow the current to flow in the segment as long as is required to determine if the test sample is susceptible. If the test is to be performed in a scanning mode, slowly scan the frequency range of interest while monitoring the output of the test sample for evidence of susceptibility.

(4) When an undesired response is noted, RECORD the test frequency and response of the test sample. Reduce the amplitude of the current flowing in the wire segment until the undesired response is no longer present. Measure the current flow in the wire segment and RECORD the level as threshold of susceptibility.

d. Data Sheet: Figure A-18 of MSC-00168 is an example of a data sheet which is acceptable for use with this test method.

5.0 Test Method 5: Induced Field Susceptibility - Cables

a. Test Setup: The typical test setup for this method is shown in Figure B-5. The LSC's are used with this test method and are mounted on and bonded to the ground plane. The power line test standard is inserted in the circuit between the LSC's and the test sample. The bonding and grounding of the test sample and/or cable shields shall be as delineated in the test procedure. The wire segment is located adjacent to the test sample interconnecting cables. The wire segment shall break away from the test sample cabling at least 6 inches from the cable connectors. The cabling under test shall be routed 2 inches off the ground plane. The test sample input simulation and monitoring equipment shall be set up as delineated in the test procedure.

b. Test Equipment

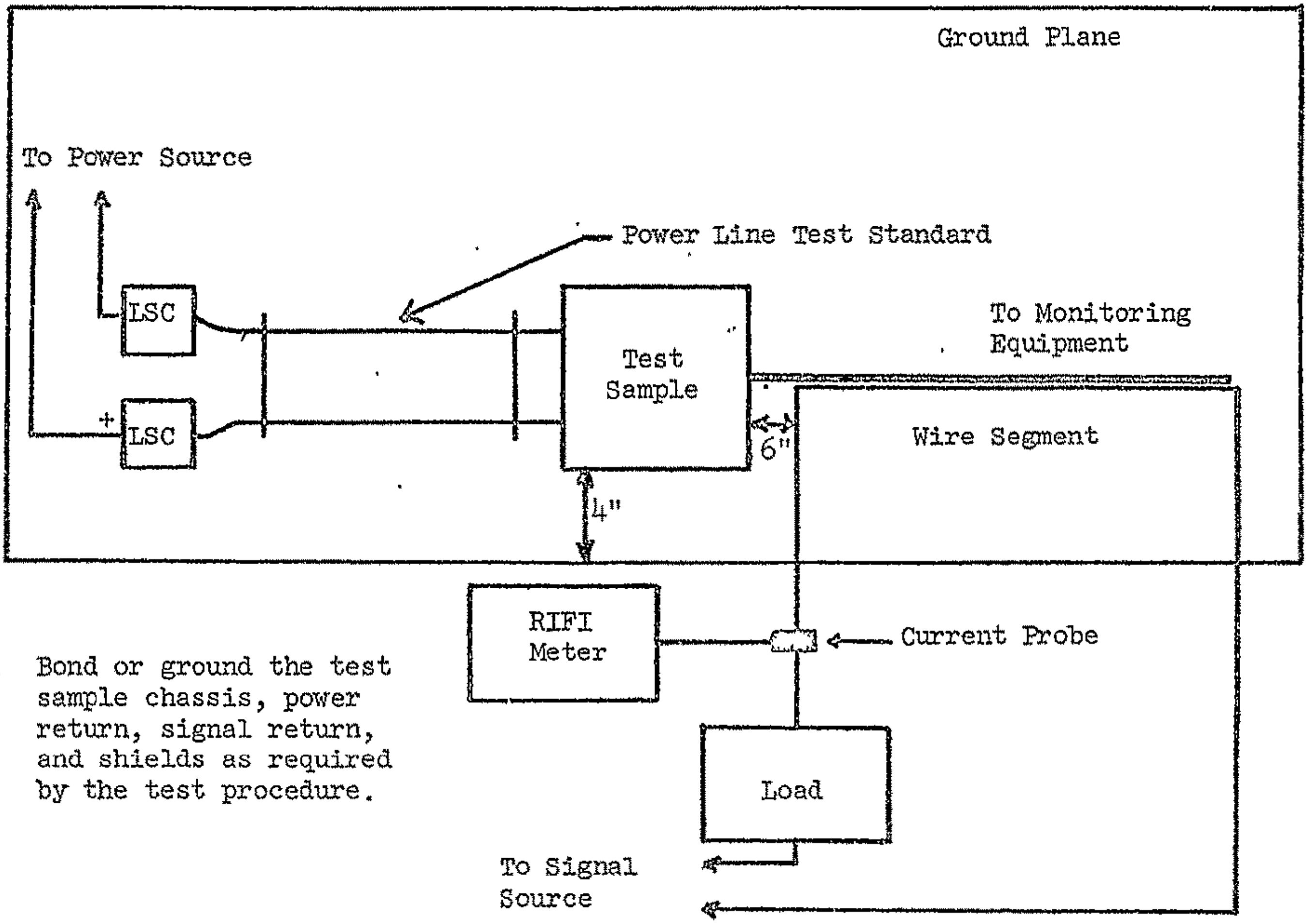
(1) LSC's per the requirements of the governing specification.

(2) Power line test standard per the requirements of the governing specification.

(3) A segment of test wire of sufficient length and current carrying capacity to meet the requirements of the governing specification.

(4) A signal source capable of producing the frequency and amplitude of test signal required by the governing specification.

(5) A load capable of dissapating the power generated in the course of this test.



ote: Bond or ground the test sample chassis, power return, signal return, and shields as required by the test procedure.

Figure B-5. Induced Field Susceptibility - Cables

(6) RIFI meter and current probe capable of measuring the current generated in the wire segment at the test frequency.

(7) Test sample input simulation and monitoring equipment per the requirements of the test procedure.

Test Procedure

(1) Set up the equipment as shown in Figure B-5. Energize the test sample and test equipment and allow time for warmup.

(2) Tune the signal source to the (lowest) test frequency required by the test procedure for this test. Adjust the gain of the signal source and/or the resistance of the load as required so that the current flow in the wire segment, as measured with the RIFI meter, equals the current requirement of the test procedure.

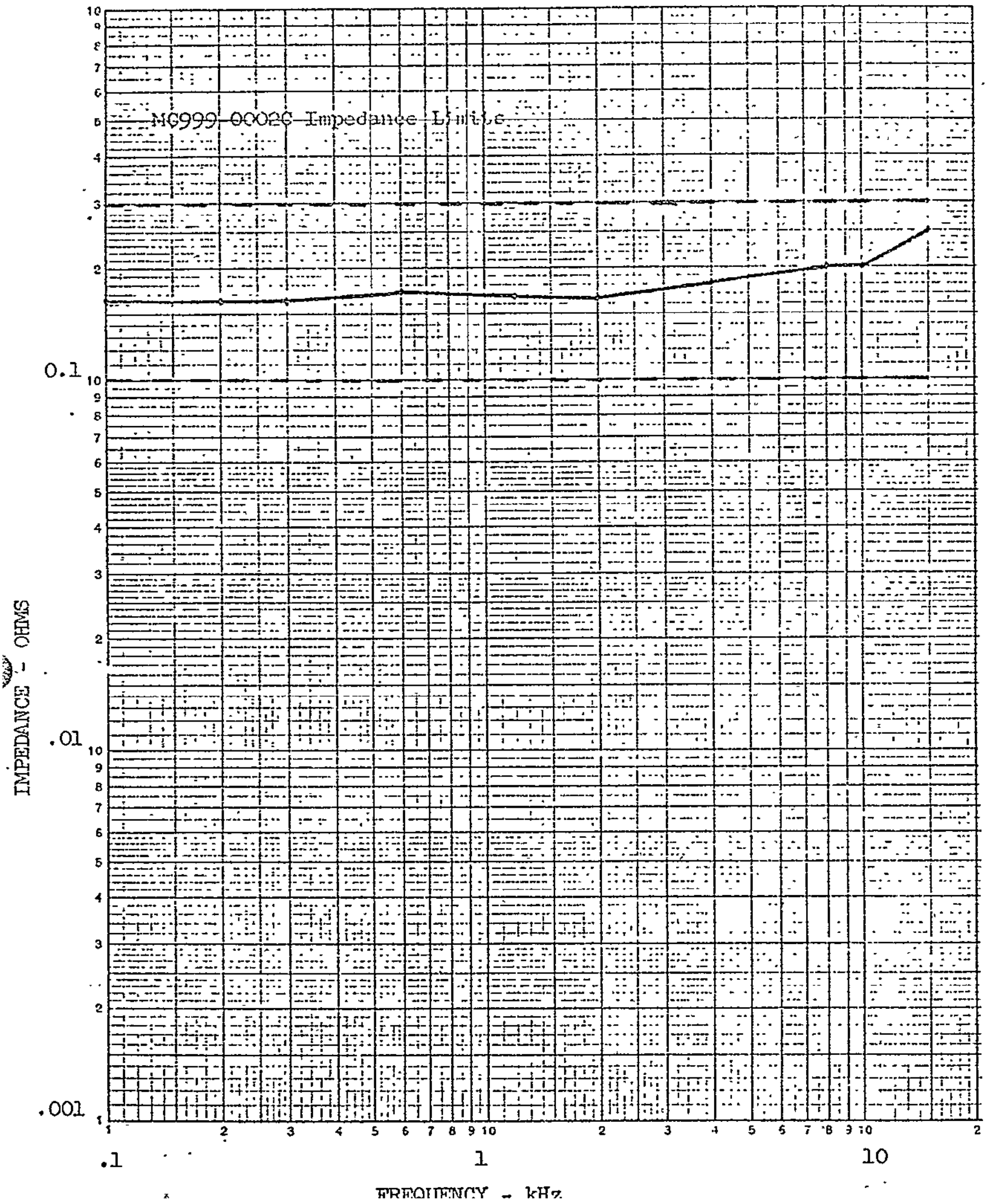
(3) If a fixed frequency test is specified, allow the current to flow in the segment as long as is required to determine if the test sample is susceptible. If the test is to be performed in a scanning mode, slowly scan the frequency range of interest while monitoring the output of the test sample for evidence of susceptibility.

(4) When an undesired response is noted, RECORD the test frequency and response of the test sample. Reduce the amplitude of the current in the wire segment until the undesired response is no longer present. Measure the current flow in the wire segment and RECORD the level as threshold of susceptibility.

d. Data Sheet: Figure A-18 of MSC-00168 is an example of a data sheet which is acceptable for use with this test method.

APPENDIX E

POWER SUPPLY IMPEDANCE DATA



OUTPUT IMPEDANCE
HP-6226 POWER WITH 24" LEADS

Appendix E

DR's and FIAR's

-15

2. Article Name: ELECTRON PROTON SPECTROMETER
3. Drawing Number: SEC 39106125-301
4. Serial/Lot Number: 1001
5. RECORD NUMBER
IDR
DR/MRR EPS-0071
6. Contractor's Name: LEC
7. Contractor's Drawing Number: N/A
8. Contractor's Serial Number: N/A
9. Supplier's Name: LEC
10. Supplier's Drawing Number: N/A
11. Supplier's Serial No: N/A
12. Next Higher Assy.: N/A
13. REF. Document No.: EPS-489
14. Spacecraft: N/A
15. Fault: EC1
16. Funct.: N/A
17. Cause/Origin: N/A
18. System: N/A
19. Disposition: N/A

DISCREPANCY

PAGE 24. -15.0 ± 1.0 VDC CHECKS -16.016
PAGE 27. -15.0 ± 1.0 VDC CHECKS -16.029
PAGE 40. -15.0 ± 1.0 VDC CHECKS -16.023
Page 50&51&53 -15.0 ± 1.0 VDC Checks -16.029
Page 66 -15.0 ± 1.0 VDC checks -16.023

20. Initiator's Signature: G. Harding
21. Stamp Number: 12 M
22. Organization and Location of Initiator: MSC - QA
23. Date: 1/19/72

DISPOSITION

24. MR Action Required? ☒ YES ☐ No
25. Replacement Part Number: N/A
26. Retest Required ☐ Yes ☒ No
27. Retest Accept Date: N/A
28. FIAR Number: N/A

29. MRB Decision
☒ USE "AS IS"
☐ REPAIR
☐ REWORK
☐ SCRAP

INSTRUCTIONS

1. Value for -15 V output as specified by EPS-489 (-15.0V) is in error. Value should be -16.5 V. This was corrected in Procedure EPS-437 (Acceptance Test for the EPS Low Voltage Power Supply). The readings obtained and listed above (-16 V) is the correct output for the LVPS -15 V output.

2. Procedure EPS-489 will be revised to correct this error.

QC STAMP
CONT | NASA
Checked with OK JH 8 Feb 72
Per Telecom w/ KB 2/8/72

30. DATE 4/26/72 FINAL ACCEPTANCE

MRB APPROVAL SIGNATURES

31. System Engineer (Contractor): R. E. Martinez — DATE 1-21-72
32. System Engineer (NASA) — DATE 1-21-72
33. Quality Control Rep. (Contractor): P. Gleason — DATE 4/25/72
34. Quality Control Rep. (NASA) — DATE
35. Govern. Office Rep. (Office Code) — DATE
36. Quality Engineer (NASA) — DATE 1/21/72

MSC FORM 2176 (Rev Apr 68) NASA—MSC—Coml., Houston, Texas

FAILURE INVESTIGATION ACTION REPORT

NO. [illegible]

1. PROJECT: SKYLAB

2. WHERE DETECTED — FACILITY: MSC — ORGANIZATION: LOCKHEED — LOCATION: B-7A BLD

3. ORIG. REPORT NO.: DETF EPS-0021

4. PROB. CLASSIF.: ☐ FAILURE ☒ UNSAT. COND.

5. DATE REPORTED: 1/18/72

6. MAKER: LOCKHEED

7. END ITEM NAME: ELECTRON PROTON SPECTROMETER

8. ITEM UNDER TEST: E.P.S.

9. NEXT ASSY. NAME: N/A

10. REPORTED ITEM: EPS

11. TPS NUMBER: N/A

7a. EI MODEL NO.: SEC 39106415-301

8a. CONTR. PART NO.: N/A

9a. CONTR. PART NO.: N/A

10a. CONTR. PART NO.: N/A

12. ROUTING VIA: N/A

7b. EI SERIAL NO.: 1001

8b. SUPPLIER PART NO.: N/A

9b. SUPPLIER PART NO.: N/A

10b. SUPPLIER PART NO.: N/A

13. SPEC/PROCESS NO.: EPS-489

DATE:

PARA: 24

8c. SERIAL NO.: N/A

9c. SERIAL NO.: N/A

10c. SERIAL NO.: N/A

14. COND.

15. CAUSE

16. SYMPT

17. FAIL TYP

18. DETECTED DURING

19.

20. SYSTEM NAME: E.P.S.

10d. TIME/CYCLES (ACUM)

21. DESCRIPTION OF FAILURE/CONDITION

−15.0 VDC ± 1.0 VDC CHECKS −16.029 VDC

Reproduced from best available copy.

22. CRITICALITY: III

23. INITIATOR CONTACT — ORG.: MSC-QA — DATE: 2/11/72

24. RIE — ORG. — DATE

25. HARDWARE ANALYSIS REQUESTED/INSTRUCTIONS

Determine cause of out of limit condition.

26. ASSIGNED TO — ORG. — DATE

27. REQUESTER — ORG. — DATE

28. CAUSE OF FAILURE/ANALYSIS RESULTS

The value for the -15V output as specified by Procedure EPS-489 is in error. Correct value is -16.0.

29. SYSTEM ENGINEER — ORG. — DATE

30. RIE — ORG. — DATE

31. CORRECTIVE ACTION REQUESTED

None, required since this is a procedural error.

32. ACTION ASSIGNED TO — ORG. — DATE

33. REQUESTER — ORG. — DATE

34. CORRECTIVE ACTION TAKEN

Revise Procedure EPS-489 to show the correct value.

REVISION 3/21/72

4/24/72

4/11/72

MSC 4-7-72

35. ACTION BY — ORG.: 62540 — DATE: 4/7/72

36. RIE — ORG.: 62540 — DATE: 4/7/72

37. CLOSE OUT — DATE

EB

Article Name: ELECTRON PROTON SPECTROMETER

3 Drawing Number: SEC 32106425 -301

4. Serial Lot Number: 1001

5. RECORD NUMBER

IDR

DR/MRR EPS-0072

ontractor's Name: LEC

7 Contractor's Drawing Number: N/A

8 Contractor's Serial Number: N/A.

9 S[illegible] s Name: LEC

10. Supplier's Drawing Number: N/A

11 Supplier's Serial No.: N/A

12. Next Higher Assy.: N/A

13 REF. Document No: EPS-489

14. Spacecraft: N/A

15. Fault: ECI

16 Funct.: N/A

17. Cause/Origin: N/A

18. System: N/A

19. Disposition: N/A

DISCREPANCY

1. PAGE 32 OF PROCEDURE PARA 36 EPS CHANNEL ACCEPTABLE COUNT ON CHANNEL D. 33,292,289 OR "0" CHECKS 38 COUNTS

2. PAGE 45 CHANNEL B 33,292,288 OR "0" CHECKS 118 COUNTS

3. Page 68 Channel D. 14 or 16 reads 22,784

4. Page 69 channel D. 14 or 16 reads 172 and 18688

20 Initiator's Signature:

21. Stamp Number: 12 M

22. Organization and Location of Initiator: MSC - QA

23. Date: 1/19/72

DISPOSITION

24. MR Action Required? ☒ YES ☐ No

25. Replacement Part Number: N/A

26 Retest Required ☐ Yes ☒ No

27. Retest Accept Date: N/A

28. FIAR Number: N/A

29. MRB Decision

☒ USE "AS IS"

☐ REPAIR

☐ REWORK

☐ [illegible]AP

INSTRUCTIONS

1. Only Electron Channels (Disc Setting of 300 KeV) gave problems. The Proton channels (with Disc settings 1 Mev or higher) gave no problems.

2. Problem did not occur when Def Plate Temp was below 0°C.

3. Based upon (1) & (2) above, it is concluded that the spurious counts are due to noise caused by the Detectors. Therefore, the EPS is operating properly. The Detectors will be removed during refurbishment of the Qual Unit.

4. The unit is OK for Qual Testing.

QC STAMP

CONT. | NASA

30. DATE 1/21/72 FINAL ACCEPTANCE

MRB APPROVAL SIGNATURES

31. System Engineer (Contractor) — DATE 1-21-72

32. System Engineer (NASA) — DATE 1-21-72

33. Quality Control Rep. (Contractor) — DATE

34. Quality Control Rep (NASA) — DATE

ons Office Rep. (Office Code) — DATE

36. Quality Engineer (NASA) — DATE 1/21/72

MSC FORM 2176 (Rev Apr 68) NASA—MSC—Coml., Houston, Texas

E13

NASA MANNED SPACECRAFT CENTER

3. RECORD NUMBER

IDR

DR/MRR E15-0072

QC STAMP

CONT. | NASA

5. Page 71 Channel D 33,292,255 or 0 reads 880
6. Page 84 Channel D " " " 344

DATE: 1/21/71 FINAL ACCEPTANCE

MSC FORM 2176A (AUG 66)

NASA - MANNED SPACECRAFT CENTER

FAILURE INVESTIGATION ACTION REPORT NO. EPS-0001

SKYLAB	2. WHERE DETECTED FACILITY MSC	ORGANIZATION LOCKHEED	LOCATION BLDG BLD	DR # EPS-0022	4. FRLS CLASSIF. ☒ FAILURE ☐ UNSAT. COND.	5. DATE REPORTED 1/18/72

CONTRACTOR LOCKHEED	7. END ITEM NAME E.P.S.	8. ITEM UNDER TEST EPS	9. NEXT ASSY. NAME EPS	10. REFERRED ITEM EPS
NUMBER N/A	7a. EI MODEL NO. SEC 39106425 -301	8a. CONTR. PART NO. N/A	9a. CONTR. PART NO. N/A	10a. CONTR. PART NO. N/A
ROUTING N/A	7b. EI SERIAL NO. 1001	8b. SUPPLIER PART NO. N/A	9b. SUPPLIER PART NO. N/A	10b. SUPPLIER PART NO. N/A
SPEC/PROCESS NO. EPS-459 NOTES PAGE 45 & 68		8c. SERIAL NO. N/A	9c. SERIAL NO. N/A	10c. SERIAL NO. N/A

CLAS.	15. CAUSE	16. SYMPT.	17. FAIL TYP	18. DETECTED EEPM ATT	19.	20. SYSTEM NAME EPS	10d. Time Cycles ACCUM N/A

DESCRIPTION OF FAILURE/CONDITION

CHANNELS B, & D ARE GETTING SPURIOUS COUNTS., CHANNEL B 23, 292, 288 OR "0" READS 118, CHANNEL D. . 14, OR 16 COUNTS READS 172, & 18688 COUNTS

CRITICALITY

INITIATOR CONTACT: J. Hoskins ORG. MSC-OA DATE 2/11/72 | 24. RIE ORG. DATE

HARDWARE ANALYSIS REQUESTED/INSTRUCTIONS

Conduct special test without detectors to determine if noise is from electronics or detectors.

ASSIGNED TO ORG. DATE | 27. REQUESTER ORG. DATE

CAUSE OF FAILURE/ANALYSIS RESULTS

Spurious counts are caused by the detectors installed in channels B and D. This was verified by additional testing performed on TPS #EPS-1214.

SYSTEM ENGINEER ORG. DATE | 30. RIE ORG. DATE

CORRECTIVE ACTION REQUESTED

Detectors installed were suspect prior to installation. These detectors will be replaced prior to flight.

ACTION ASSIGNED TO ORG. DATE | 33. REQUESTER ORG. DATE

CORRECTIVE ACTION TAKEN

During refurbishment of the Qual Test Unit, the detectors presently installed will be removed.

[illegible] detectors will be installed in the unit prior to flight.

Data obtained during special Testing (see 25 above) is attached.

4-27-72

J.O. Hill/KT 4/27/72 | RL/MC 4-17-72

ACTION BY ORG. DATE | 36. P E ORG. DATE | 37. CLOSE-OUT DATE

615-40 4/7/72

Configuration Change	
Non Configuration Change	X

TEST-PREPARATION SHEET
NASA - MANNED SPACECRAFT CENTER

2. TPS No. EPS-124
3. S C ___ Cat ___ No ___
5. Page 1 of 2

eet Number

No. [illegible] ial No.

7. Date 2-28-72
8. Time
9. Need Date

awings, Documents Dcp's. & Part Number(s) EC39106425

11. Contract Number NAS9-11373

12. Serial Number 1001

14. Ref. E. O Number

stem EPS

5 Short Title Testing of Qual Test Unit.

16. Wt Req

eason for Work: To perform necessary testing as required by Mr Disbro [illegible]/MSC & Mr. Lopez of Boeing to verify disposition of R EPS-0072.

18 DESCRIPTION (Print or Type)	21 Tech.	Insp. 22 CONT	23 NASA
Remove EPS P/N SEC39106425-301, S/N1001 from the Beta Bldg Bonded Storage.	2/28/72		
Remove Detectors from Channels B and D.	2/28/72		
Perform Steps 2.1.23 thru 2.1.35 of Procedure EPS-503 on Channels B and D. Record Data below.	2/28/72		

EPS Channel	Threshold	Measured Count	Acceptable Count
B	E2	14	14 or 16
D	E4	14	↕
B	P2	14	
D	P4	14	14 or 16
B	E2	2032	2032 or 2048
D	E4	2048	↕
B	P2	2032	
D	P4	2032	2032 or 2048

Prepared By BEC

20 Final Acceptance Date 2/28/72

REFER TO PROCEDURES FOR REQUIRED SIGNATURES

ctor	Date	NASA	Date
Joe E. Cartwright	2-28-72	Andrew J. Fowler	2-28-72
			2/28/72

Copy 1

TEST PREPARATION SHEET

CONTINUATION SHEET

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Task	[illegible]
S C ———	Cor ——— No ———
Page 2 of 2	

DESCRIPTION (Print or Type)				Tech	Insp Cont	Insp NASA
EPS Channel	Thresh-hold	Measured Count	Acceptable Count	2/28/73		
B	E2	260,096	260,096 or 262,144			
D	E4	260,096	↑			
B	P2	260,096	↓			
D	P4	260,096	260,096 or 262,144			
B	E2	33,292,288	33,292,288 or 0			
D	E4	0	↑			
B	P2	33,292,288	↓			
D	P4	33,292,288	33,292,288 or 0			

Return the EPS Cal Unit to the Beta Bldg Bonded Storage. 2/28/73

MSC Form 225A (JUL 65) NASA—MSC—Coml., Houston, Texas

2. Article Name ELECTRON PROTON SPECTROMETER

3. Drawing Number -301 SEC39106425

4. Serial/Lot Number 1001

5. RECORD NUMBER

IDR

DR/MRR EPS-0087

6. Contractor's Name ocKHEED ELECTRONICS

7. Contractor's Drawing Number N/A

8. Contractor's Serial Number N/A

Supplier's Name CHEED ELECTRONICS

10. Supplier's Drawing Number N/A

11. Supplier's Serial No N/A

12. Next Higher Assy. N/A

13. T.P. Document No. EPS-503

14. Spacecraft N/A

15. Fault T57

16. Funct N/A

17. Cause/Origin N/A

18. System N/A

19. Disposition N/A

DISCREPANCY

SEAL P/N ZX5176 IS LOOSE IN NUMEROUS PLACES ON MOUNT BASE OF EPS.

20. Initiator's Signature S. Harding

21. Stamp Number 12 M

22. Organization and Location of Initiator MSC-QA

23. Date 2/11/72

DISPOSITION

24. MR Action Required? ☒ YES ☐ No

25. Replacement Part Number N/A

26. Retest Required ☐ Yes ☒ No

27. Retest Accept Date N/A

28. FIAR Number EPS-0005

29. MRB Decision

☐ USE "AS IS"
☐ REPAIR
☒ REWORK
☐ SCRAP

INSTRUCTIONS

Seal was probably knocked loose during all the moving & handling of the EPS Qual Unit during Qualification testing.

~~[illegible]~~ Rebond seal to flange as per Drawing SEC39106425 prior to next Qual Test.

QC STAMP

CONT.	NASA
2/11/72	

30. DATE 2/11/72 FINAL ACCEPTANCE

MRB APPROVAL SIGNATURES

31. System Engineer (Contractor) B E Curtsinger DATE 2-11-72

32. System Engineer (NASA) Andrew Forbes DATE 2-11-72

33. Quality Control Rep. (Contractor) DATE

34. Quality Control Rep. (NASA) DATE

5. Program Office Rep. (Office Code) DATE

36. Quality Engineer (NASA) DATE 2/28/72

MSC FORM 2176 (Rev Apr 68) NASA—MSC—Coml., Houston, Texas

NASA - MANNED SPACECRAFT CENTER
FAILURE INVESTIGATION ACTION REPORT

NO. EPS-0005

1. PROJECT: SKYLAB
2. WHERE DETECTED — FACILITY: MSC — ORGANIZATION: LOCKHEED — LOCATION: BETA BLG
3. ORG. REPORT NO.: DCR EPS-0097
4. PROB. CLASSIF.: ☒ FAILURE ☐ UNSAT. COND.
5. DATE REPORTED: 2/11/72
6. CONTRACTOR: LOCKHEED
7. END ITEM NAME: E.P.S.
7a. EI MODEL NO.: SEC 39106425 -301
7b. EI SERIAL NO.: 1001
8. ITEM UNDER TEST: E.P.S.
8a. CONTR. PART NO.: N/A
8b. SUPPLIER PART NO.: N/A
8c. SERIAL NO.: N/A
9. NEXT ASSY. NAME: E.P.S
9a. CONTR. PART NO.: N/A
9b. SUPPLIER PART NO.: N/A
9c. SERIAL NO.: N/A
10. REPORTED ITEM: E.P.S.
10a. CONTR. PART NO.: N/A
10b. SUPPLIER PART NO.: N/A
10c. SERIAL NO.: N/A
10d. TIME/CYCLES (ACCUM): N/A
11. TPS NUMBER: N/A
12. ROUTING VIA: N/A
13. SPEC/PROCESS NO.: EPS-503
DATE:
PARA:
14. COND.:
15. CAUSE:
16. SYMPT:
17. FAIL TYP:
18. DETECTED DURING: QUAL
19.
20. SYSTEM NAME: EPS

21. DESCRIPTION OF FAILURE/CONDITION

SEAL P/N ZX 5176 IS LOOSE IN NUMEROUS PLACES ON MOUNT BASE OF EPS.

22. CRITICALITY: III

23. INITIATOR/CONTACT: [illegible] ORG.: MSC-QA DATE: 2/11/72
24. RIE ORG. DATE

25. HARDWARE ANALYSIS REQUESTED/INSTRUCTIONS

Determine cause of problem.

26. ASSIGNED TO ORG. DATE
27. REQUESTER ORG. DATE

28. CAUSE OF FAILURE/ANALYSIS RESULTS

Seal P/N ZX5176 was grossly abused during Qual Testing and became loose. This unit was subjected to abnormal handling during Qual Testing and moving from place to place. THERE IS NO DESIGN PROBLEM WITH SEAL. LOSS OF SEAL INTEGRITY WILL HAVE NO EFFECT ON EPS PREFORMANCE.

29. SYSTEM ENGINEER ORG. DATE
30. RIE ORG. DATE

31. CORRECTIVE ACTION REQUESTED

Due to fact that problem was caused by mishandling, seal will be ~~repaired~~ REBONDED and used for remainder of test.

32. ACTION ASSIGNED TO ORG. DATE
33. REQUESTER ORG. DATE

34. CORRECTIVE ACTION TAKEN

Rebonded seal to flange per drawing SEC39106425 prior to next testing series. Flight units will not be abused during installation.

35. ACTION BY: [illegible] ORG. DATE: 4/11/72
36. RIE: R. E. [illegible] ORG.: RE/TSC DATE: 4-7-72
[illegible] 625/40 4/7/72
37. CLOSE-OUT: [illegible] 2/7 DATE
[illegible] 2/2/7

NASA - MANNED SPACECRAFT CENTER

FAILURE INVESTIGATION ACTION REPORT

NO. EPS-0005

1. PROJECT: YLAB

2. WHERE DETECTED: FACILITY: MSC; ORGANIZATION: LOCKHEED; LOCATION: BETA BLS

3. ORG. REPORT NO.: DCR EPS-3087

4. PROB. CLASSIF.: ☒ FAILURE ☐ UNSAT COND.

5. DATE REPORTED: 2/11/72

6. CONTRACTOR: LOCKHEED

7. END ITEM NAME: E.P.S.

7a. EI MODEL NO.: SEC 39106425 -301

7b. EI SERIAL NO.: 1001

8. ITEM UNDER TEST: E.P.S.

8a. CONTR. PART NO.: N/A

8b. SUPPLIER PART NO.: N/A

8c. SERIAL NO.: N/A

9. NEXT ASSY. NAME: E.P.S

9a. CONTR. PART NO.: N/A

9b. SUPPLIER PART NO.: N/A

9c. SERIAL NO.: N/A

10. REPORTED ITEM: E.P.S.

10a. CONTR. PART NO.: N/A.

10b. SUPPLIER PART NO.: N/A

10c. SERIAL NO.: N/A

10d. TIME/CYCLES (ACUM): N/A

11. TPS NUMBER: N/A

12. ROUTING VIA: N/A

13. SPEC/PROCESS NO.: EPS-503

DATE:

PARA:

14. COND.:

15. CAUSE:

16. SYMPT:

17. FAIL TYP:

18. DETECTED DURING: QUAL

19.

20. SYSTEM NAME: EPS

21. DESCRIPTION OF FAILURE/CONDITION

SEAL P/N ZX5176 IS LOOSE IN NUMEROUS PLACES ON MOUNT BASE OF EPS,

22. CRITICALITY: III

23. INITIATOR/CONTACT: ORG.: MSC-QA DATE: 2/11/72

24. RIE: ORG.: DATE:

25. HARDWARE ANALYSIS REQUESTED/INSTRUCTIONS

Determine cause of problem.

26. ASSIGNED TO: ORG.: DATE:

27. REQUESTER: ORG.: DATE:

28. CAUSE OF FAILURE-ANALYSIS RESULTS

Seal P/N ZX5176 was grossly abused during Qual Testing and became loose. This unit was subjected to abnormal handling during Qual Testing and moving from place to place. THERE IS NO DESIGN PROBLEM WITH SEAL. LOSS OF SEAL INTEGRITY WILL HAVE NO EFFECT ON EPS PREFORMANCE.

29. SYSTEM ENGINEER: ORG.: DATE:

30. RIE: ORG.: DATE:

31. CORRECTIVE ACTION REQUESTED

Due to fact that problem was caused by mishandling, seal will be ~~repaired~~ REBONDED and used for remainder of test.

32. ACTION ASSIGNED TO: ORG.: DATE:

33. REQUESTER: ORG.: DATE:

34. CORRECTIVE ACTION TAKEN

Rebonded seal to flange per drawing SEC39106425 prior to next testing series. Flight units will not be abused during installation.

35. ACTION BY: ORG.: DATE: 4/11/72

36. RIE: R.E. [illegible] RE/MSC 4-7-72

ORG.: 62340 DATE: 4/7/72

37. CLOSE-OUT: DATE:

1. Category
EB

DISCREPANCY REPORT/MATERIAL REVIEW RECORD
NASA - MANNED SPACECRAFT CENTER

PAGE 1 OF 1

2. Article Name: Electron/Proton Spectrometer
3. Drawing Number: SEC 39106425
4. Serial/Lot Number: 1001
5. RECORD NUMBER
IDR
DR/MRR EPS0089
Contractors Name: LOCKHEED Elect.
7. Contractors Drawing Number: N/A
8. Contractor's Serial Number: N/A
9. Supplier's Name: N/A
10. Supplier's Drawing Number: N/A
11. Supplier's Serial No.: N/A
12. Next Higher Assy.: N/A
13. REF. Document No: EPS 503 PARA 2.12
14. Spacecraft: N/A
15. Fault: T13
16. Funct.: N/A
17. Cause, Origin: N/A
18. System: N/A
19. Disposition: N/A

DISCREPANCY

1. Signs of Rusting on Top of EPS near Detector "C" also on 1 washer same Location.

2. Paint Blisters on side of Isolator Housing & Central Test Point Coverplate.

20. Initiator's Signature
21. Stamp Number: 108M
22. Organization and Location of Initiator: MSC QC Bldg 15
23. Date: 2/23/72

DISPOSITION

24. MR Action Required? ☒ YES ☐ No
25. Replacement Part Number: N/A
26. Retest Required ☐ Yes ☒ No
27. Retest Accept Date: N/A
28. FIAR Number: EPS-0006

29. MRB Decision
☒ USE "AS IS"
☐ REPAIR
☐ REWORK
☐ SCRAP

INSTRUCTIONS

This EPS Instrument (S/N 1001) had been thru several Qualification tests (EMI, Thermal-Vacuum, Vibration, Shock etc) prior to the Humidity test. During these tests and transferring the EPS to the test location the thermal paint on the Instrument has been marred and scratched. This would allow moisture to penetrate the painted surfaces and possibly cause blistering.

The signs of rusting itemized in (1) above were caused by the humidity chamber rusting and dripping water (discolored water) onto the EPS during testing. This unit is OK for further testing.

QC STAMP
CONT. | NASA

30. DATE 4/21/72
FINAL ACCEPTANCE

a/ 2/24/72
2/24/72

MRB APPROVAL SIGNATURES

31. System Engineer (Contractor): Bruce E. Aurlinger
DATE
32. System Engineer (NASA)
DATE 4/25/72
33. Quality Control Rep. (Contractor)
DATE
34. Quality Control Rep (NASA)
DATE
35. Program Office Rep. (Office Code)
DATE
36. Quality Engineer (NASA)
DATE 4/21/72

MSC FORM 2176 (Rev Apr 68)

NASA - MANNED SPACECRAFT CENTER ACTION COPY

FAILURE INVESTIGATION ACTION REPORT EPS-0096

1. PROJECT SKYLAB	2. WHERE DETECTED FACILITY MSC	ORGANIZATION LOCKHEED	LOCATION BLDG.	3. DCR # EPS-0099	4. PROB. CLASSIF. ☐ FAILURE ☒ UNSAT. COND.
5. DATE REPORTED 2/23/72					
6. CONTRACTOR LOCKHEED	7. END ITEM NAME E.P.S.	8. ITEM UNDER TEST EPS.	9. NEXT ASSY. NAME N/A	10. FAILED ITEM EPS	
11. TPS NUMBER EPS 1210	7a. EI MODEL NO. SEC 39106425 -301	8a. CONTR. PART NO. N/A	9a. CONTR. PART NO. N/A	10a. CONTR. PART NO. N/A	
12. ROUTING VIA N/A	7b. EI SERIAL NO. 1001	8b. SUPPLIER PART NO. N/A	9b. SUPPLIER PART NO. N/A	10b. SUPPLIER PART NO. N/A	
13. SPEC/PROCESS NO. EPS-503 DATE: PARA: 2.12		8c. SERIAL NO. N/A	9c. SERIAL NO. N/A	10c. SERIAL NO. N/A	
14. COND.	15. CAUSE	16. SYMPT	17. FAIL TYP	18. DETECTED DURING QUAL	19.
20. SYSTEM NAME EPS	10d. TIME CYCLES ACCUM N/A				

21. DESCRIPTION OF FAILURE, CONDITION QUAL TEST

POST HUMIDITY VISUAL INSPECTION DISCLOSED THE FOLLOWING.

1. SIGNS OF RUSTING ON TOP OF EPS NEAR DETECTOR "C" ALSO ON WASHER SAME LOCATION

2. PAINT BLISTERS ON SIDE OF ISOLATOR HOUSING & CENTRAL TEST POIN COVER PLATES.

22. CRITICALITY 004

23. INITIATOR CONTACT ORG. MSC-QA DATE 2/23/72

24. RIE ORG. DATE

25. HARDWARE ANALYSIS REQUESTED/INSTRUCTIONS

Determine cause of rust and paint blisters.

Reproduced from best available copy.

26. ASSIGNED TO ORG. DATE

27. REQUESTER ORG. DATE

28. CAUSE OF FAILURE/ANALYSIS RESULTS This unit had been subjected to EMI, thermal-vacuum, vibra tion, shock, etc. Qualification Testing prior to the humidity test. Durin these tests and while transferring the EPS to the test location, the thermal paint was marred and scratched. This allowed moisture to penetra the painted surfaces and cause the blistering.

The detector 'C' dome is made of aluminum and the washer is made of 18/8 CRES, both items being fabricated by NASA/MSC TSD with full QA coverage. They could not be the cause of the apparent rust-marks on the EPS. The si of rusting were caused by rust colored wafer dripping off of the NASA/MSC humidity chamber onto the EPS.

29. SYSTEM ENGINEER ORG. DATE

30. RIE

31. CORRECTIVE ACTION REQUESTED

Refinish unit during refurbishment to become back-up spare.

32. ACTION ASSIGNED TO ORG. DATE

33. REQUESTER ORG. DATE

34. CORRECTIVE ACTION TAKEN EPS Flight Units will not receive the rough handling and treatment that the Qual Unit received and will not be placed in the NASA/ MSC humidity chamber, therefore, these problems will not occur on these units.

The EPS Qual Unit is scheduled to be refurbished into the Flight Spare (Backup) unit and will be repainted.

4/24/72

J. A. Gill/KT 4/27/72 RC/TBC 4-18-72

35. ACTION BY ORG. EXT DATE 4/11/72

36. RIE ORG. 625/00 DATE 6/7/72

37. CLOSE OUT DATE

MSC, 11/15/72

MSC FORM 2174 (JUL 68) PAGE__OF__

1. Category
EB

DISCREPANCY REPORT/MATERIAL REVIEW RECORD

NASA - MANNED SPACECRAFT CENTER

PAGE 1 OF 2

2. Article Name: ELECTRON PROTON SPECTROMETER

3. Drawing Number: SEC 34106425 -301

4. Serial-Lot Number: 1001

5. RECORD NUMBER

IDR

DR/MRR EPS-0090

6. Contractor's Name: LEC

7. Contractor's Drawing Number: N/A

8. Contractor's Serial Number: N/A

9. Supplier's Name: LEC

10. Supplier's Drawing Number: N/A

11. Supplier's Serial No.: N/A

12. Next Higher Assy.: N/A

13. REF. Document No.: EPS-503 PAGE 269

14. Spacecraft: N/A

15. Fault: EC1

16. Funct.: N/A

17. Cause/Origin: N/A

18. System: EPS

19. Disposition: N/A

DISCREPANCY

POST HUMIDITY FUNCTIONAL TEST DISCLOSED THE FOLLOWING

1. MEDIUM VOLTAGE ADC CHECKOUT 1.0, 2.0, 3.0, 4.0, & 4.9 VDC INPUT VOLTAGE. OUT PUT VOLTAGE CHECKS LOW. PAGE 269.

2. PAGE. 270, 271, & 273. DISC REF MON. CHECKS 2.965 VDC SHOULD BE 3.0 ± .02 VDC

20. Initiator's Signature: G. D. Harding

21. Stamp Number: 12 M

22. Organization and Location of Initiator: MSC - QA

23. Date: 2/23/72

DISPOSITION

24. MR Action Required? ☒ YES ☐ No

25. Replacement Part Number: N/A

26. Retest Required ☒ Yes ☐ No

27. Retest Accept Date: 2/24/72

28. FIAR Number: EPS-0007

29. MRB Decision

☒ USE "AS IS"

☐ REPAIR

☐ REWORK

☐ SCRAP

INSTRUCTIONS

QC STAMP CONT. NASA

1. Release the EPS S/N 1001 from the Beta Bldg Bonded Storage. 2/23/72

2. Connect the EPS to the BTE and apply power to the EPS. Allow power to Remain on the EPS for 3 hours. 2/23/72

3. Repeat the medium ADC Checkout test. 2/23/72
a) .025 = .019 b) .050 = .043 c) .100 = .092 d) 1.0 = .987
e) 2.0 = 1.989 f) 3.0 = 2.986 g) 4.0 = 3.983 h) 4.9 = 4.882
Readings d) thru h) are still out of Spec.

4. Allow power to remain on EPS for an additional ~~3~~ 2.0 hours then repeat Step 3. above. 2/23/72

5. a) .025 = .019 b) .050 = .043 c) .100 = .092 d) 1.0 = .992 2/23/72
e) 2.0 = 1.989 f) 3.0 = 2.991 g) 4.0 = 3.988 h) 4.9 = 4.887
Reading e) only is out of Spec.

30 DATE 4/22/72 FINAL ACCEPTANCE

MRB APPROVAL SIGNATURES

31. System Engineer (Contractor): Wayne E. Gutierrez DATE 2/24/72

32. System Engineer (NASA): Andrew J. Farkas DATE 2/24/72

33. Quality Control Rep. (Contractor) DATE

34. Quality Control Rep. (NASA) DATE

35. Program Office Rep. (Office Code) DATE

36. Quality Engineer (NASA) DATE 4/27/72

MSC FORM 2176 (Rev Apr 68)

1. CATEGORY

EB

DISCREPANCY REPORT/MATERIAL REVIEW RECORD
CONTINUATION SHEET
NASA MANNED SPACECRAFT CENTER

2. PAGE 2 OF 2

3. RECORD NUMBER
IDR
DR/MRR EPS-004C

QC STAMP
CONT. | NASA

6. Transport the EPS P/N SEC39106425-301, S/N1001 to the MSC Bldg 265 Van de Graaff Lab. 2/23/72

7. Install the EPS in a vacuum chamber and pump the system down (using only a roughing pump) for 1½ hours. 2/23/72

8. Return the EPS Unit S/N 1001 to the Beta Bldg and repeat Step 3. above. 2/23/72

a).025 = .019 b).050 = .043
c) .100 = .092 d). 1.0 = .992
e) 2.0 = 1.989 f) 3.0 = 2.986
g) 4.0 = 3.988 h) 4.9 = 4.887

Farley 4/24/72
2/24/72

9. Repeat Steps 6 thru 8, except leave unit in vacuum chamber overnight. 2/24/72
a) .025 = 0.019 b) .050 = .044 c) .100 = .093
d) 1.0 = .992 e) 2.0 = 1.989 f) 3.0 = 2.491
g) 4.0 = 3.988 h) 4.9 = 4.887

10. Repeat Step 3. using maximum tolerance allowed by Procedure (i.e., +.001 VDC to each input voltage). 2/24/72
a) .026 = .019 b) .051 = .044 c) .101 = .093
d) 1.001 = .992 e) 2.001 = 1.994 f) 3.001 = 2.991
g) 4.001 = 3.993 h) 4.901 = 4.842
All readings are in specification

DATE: 4/27/72 FINAL ACCEPTANCE

MSC FORM 2176A (AUG 66)

NASA - MANNED SPACECRAFT CENTER
FAILURE INVESTIGATION ACTION REPORT

ACTION CO NO. EPS-0061

1. PROJECT: SKYLAB
2. WHERE DETECTED — FACILITY: MSC — ORGANIZATION: LOCKHEED — LOCATION: BETA BLD.
3. ORG. REPORT NO.: DRR # EPS-0090
4. PROB. CLASSIF.: ☒ FAILURE ☐ UNSAT. COND.
5. DATE REPORTED: 2/23/72
6. CONTRACTOR: LOCKHEED
7. END ITEM NAME: ELECTRON PROTON SPECTROMETER
SEC 39106425
8. ITEM UNDER TEST
7. NEXT ASSY. NAME
10. REPORTED ITEM →
11. TPS NUMBER: EPS-1210
7a. EI MODEL NO: SEC 39106425 -301
8a. CONTR. PART NO.: N/A
9a. CONTR. PART NO.: N/A
10a. CONTR. PART NO.: N/A
12. ROUTING VIA: N/A
7b. EI SERIAL NO.: 1001
8b. SUPPLIER PART NO.: N/A
9b. SUPPLIER PART NO.: N/A
10b. SUPPLIER PART NO.: N/A
13. SPEC/PROCESS NO.: EPS-503
DATE:
PARA:
8c. SERIAL NO.: N/A
9c. SERIAL NO.: N/A
10c. SERIAL NO.: N/A
14. COND.: 336
15. CAUSE:
16. SYMPT: 245
17. FAIL TYP:
18. DETECTED DURING: QUAL.
19.
20. SYSTEM NAME: EPS
10d. Time/Cycles (ACCUM)

21. DESCRIPTION OF FAILURE/CONDITION POST HUMIDITY FUNCTIONAL TEST DISCLOSED THE FOLLOWING
1. MEDIUM VOLTAGE ADC CHECKOUT PAGE 269 OF SPEC, 1.0, 2.0, 3.0, 4.0, & 4.9 VDC INPUT VOLTAGE. OUT PUT VOLTAGE IS LOW.
2. PAGE 270, 271, & 273 DISC, REF, MON. CHECKS 2.965 V.D.C. SHOULD BE 3.0 ± .02 VDC

22. CRITICALITY: 004

23. INITIATOR/CONTACT: G Harding — ORG.: MSC-QA — DATE: 2/23/72
24. RIE — ORG. — DATE

25. HARDWARE ANALYSIS REQUESTED/INSTRUCTIONS

Conduct analysis to determine cause and determine method for meeting specification.

26. ASSIGNED TO — ORG. — DATE
27. REQUESTER — ORG. — DATE

28. CAUSE OF FAILURE/ANALYSIS RESULTS Moisture condensed upon a very high impedance circuit mode causing excessive current leakage and therefore, the out of specification reading. Also, during initial calibration of the ADC, the circuit was adjusted such that it was on the low end of the spec. and therefore, could not vary over the allowable tolerances without being out-of-spec. Instrument warmup and vacuum soak brought the voltage within limits. During calibration of all EPS Flight Units (including the refurbished Qual Unit) the ADC will be calibrated to the middle of the allowable tolerance range.

29. SYSTEM ENGINEER — ORG. — DATE
30. RIE — ORG. — DATE

31. CORRECTIVE ACTION REQUESTED

Determine action to be taken to insure that problem will not exist on flight units.

32. ACTION ASSIGNED TO — ORG. — DATE
33. REQUESTER — ORG. — DATE

34. CORRECTIVE ACTION TAKEN

During calibration of all EPS Flight Units (including the refurbished Qual Unit) the ADC will be calibrated to the middle of the allowable tolerance range. J. A. Zill 5/5/72 [illegible] 5/3/72
Data obtained during additional testing is attached. Procedures for calibrating and testing the ADC are: EPS-401, 403A, 449, 505 and 506.

35. ACTION BY: [illegible] — ORG.: 1.73-4C — DATE: 4/14/72
36. MIR [illegible] — DATE 4/17/72 — 4/19/72
37. CLOSE-OUT: [illegible] — DATE: 4/24/72

EB

DISCREPANCY REPORT/MATERIAL REVIEW RECORD
NASA - MANNED SPACECRAFT CENTER

PAGE 1 OF 1

2. Article Name: ELECTRON PROTON SPECTROMETER

3. Drawing Number: SEC39106425 -301

4. Serial/Lot Number: 1001

5. RECORD NUMBER

IDR

DR/MRR EPS-0091

6. Contractor's Name: LEC

7. Contractor's Drawing Number: N/A

8. Contractor's Serial Number: N/A

9. Supplier's Name: LEC

10. Supplier's Drawing Number: N/A

11. Supplier's Serial No.: N/A

12. Next Higher Assy.: N/A

13. REF. Document No.: EPS-1216 TPS.

14. Spacecraft: N/A

15. Fault: T13

16. Funct.: N/A

17. Cause/Origin: N/A

18. System: N/A

19. Disposition: N/A

DISCREPANCY

1. UNPLATED AREAS WHERE SHOCK MOUNT STRAPS ATTACH TO SLICE ASSYS IS CORRODED. FOUND AFTER QUAL TESTING

2. NUMEROUS BLISTERS AND EVIDENCE OF CORROSION ON GOLD PLATED AREAS ON SLICE ASSYS.

20. Initiator's Signature: G. D. Harding

21. Stamp Number: 12 M

22. Organization and Location of Initiator: MSC-QA

23. Date: 2/29/72

DISPOSITION

24. MR Action Required? ☒ YES ☐ No

25. Replacement Part Number: N/A

26. Retest Required: ☐ Yes ☒ No

27. Retest Accept Date: N/A

28. FIAR Number: EPS-0008

29. MRB Decision
☒ USE "AS IS"
☐ REPAIR
☐ REWORK
☐ SCRAP

INSTRUCTIONS

QC STAMP: CONT. | NASA

1. To prevent corrosion from occuring on the EPS Flight Units, the slices will ~~[illegible]~~ have a brushed-on alodine coating applied in the unplated areas. CHEMICAL FILM PER MIL-C-5541, TYPE I OR II, GRADE B, CLASS 1,

2. The small areas of corrosion and/or blisters do not affect the structural design of the EPS. Since the percentage of gold-plated surface area that showed evidence of corrosion is very small (much less than 1% of the total area) the thermal design of the EPS will not be affected.

30. DATE 3/20/72 FINAL ACCEPTANCE ✓

MRB APPROVAL SIGNATURES

31. System Engineer (Contractor): Bruce E. [illegible] | DATE 3/2/72

32. System Engineer (NASA): | DATE 3/7/72

33. Quality Control Rep. (Contractor) | DATE

34. Quality Control Rep. (NASA) | DATE

35. Program Office Rep. (Office Code) | DATE

36. Quality Engineer (NASA) | DATE 3/7/72

MSC FORM 2176 (Rev Apr 68)

NASA - MANNED SPACECRAFT CENTER
FAILURE INVESTIGATION ACTION REPORT ACTION [illegible] NO. EPS-0008

1. PROJECT: SKYLAB
2. WHERE DETECTED: FACILITY: MSC ORGANIZATION: LOCKHEED LOCATION: BFM BLD
3. ENG. REPORT NO.: DR # EPS-0091
4. PROB. CLASSIF.: ☐ FAILURE ☒ UNSAT. COND.
5. DATE REPORTED: 2/29/72
6. CONTRACTOR: LOCKHEED
7. END ITEM NAME: ELECTRON PROTON SPECTROMETER
8. ITEM UNDER TEST: ←
9. NEXT ASSY. NAME:
10. REPORTED ITEM: →
11. TPS NUMBER: EPS-1216
7a. EI MODEL NO.: SEC 39106425 -301
8a. CONTR. PART NO.: N/A
9a. CONTR. PART NO.: N/A
10a. CONTR. PART NO.: N/A
12. ROUTING VIA: N/A
7b. EI SERIAL NO.: 1001
8b. SUPPLIER PART NO.: N/A
9b. SUPPLIER PART NO.: N/A
10b. SUPPLIER PART NO.: N/A
13. SPEC/PROCESS NO: N/A DATE: PARA:
8c. SERIAL NO.: N/A
9c. SERIAL NO.: N/A
10c. SERIAL NO.: N/A
14. COND.:
15. CAUSE:
16. SYMPT:
17. FAIL TYP:
18. DETECTED DURING: QUAL
19.
20. SYSTEM NAME: E.P.S.
10d. Time/Cycles (ACUM):

21. DESCRIPTION OF FAILURE/CONDITION

1. UNPLATED AREAS WHERE SHOCK MOUNT STRAPS ATTACH TO SLICE ASSYS. IS CORRODED. FOUND AFTER QUAL TESTING

2. NUMEROUS BLISTERS AND EVIDENCE OF CORROSION ON GOLD PLATED AREAS ON SLICE ASSYS.

22. CRITICALITY: 004

23. INITIATOR/CONTACT: MSC-QA. ORG. DATE: 2/29/72
24. RIE ORG. DATE

25. HARDWARE ANALYSIS REQUESTED/INSTRUCTIONS

Perform analysis to determine cause of problem.

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SIGNED TO ORG. DATE
27. REQUESTER ORG. DATE

28. CAUSE OF FAILURE/ANALYSIS RESULTS

1. The corrosion and/or deposits on the bare aluminum areas (match-machined for vibration isolator mounting straps) were caused by chemical or elect chemical attack in the presence of moisture containing enough contamination to make it conductive and therefore corrosive, in the presence of a dissimilar metal junction. (Aluminum and gold-plating of strap.) Recommend use of chemical conversion coating to convert the surface of the active metal (aluminum) to a less chemically active or inert surface. ~~(Continued on attached~~ sheet)

29. SYSTEM ENGINEER ORG. DATE
30. RIE ORG. DATE

31. CORRECTIVE ACTION REQUESTED

Indicate corrective action to be taken on flight units to insure corrosion does not occur.

32. ACTION ASSIGNED TO ORG. DATE
33. REQUESTER ORG. DATE

34. CORRECTIVE ACTION TAKEN 1. Applied chemical film to exposed metal surfaces of the slices individually per MIL-C-5541, Type I or II, Grade B, Class 1. 2. The area per side contains more than 50 square inches of surface a whereas the total blistered area is certainly less than 1/2 square inch or less than 1%. The extremely small percentage of area that blistered will not affect the thermal control quality of the gold plating. Surface regarded as satisfactory with up to 2% loss of area.

5/3/72 4-22-72

35. ACTION BY ORG. DATE
36. RIE ORG. DATE
37. CLOSE OUT

28. Cause of Failure/Analysis Results (Continued)

2. The small "blisters and evidence of corrosion" on slice assemblies resulted from either (1) moisture behind the gold plating (entering either thru a pinhole or other flaw in the plating) or (2) where the gold plating was missing when the unit was received from NASA/MSC TSD. The finish of the slices is (1) zincate immersion coating followed by (2) copper flash, (3) bright nickel using sulfamate process (.0002" thk.), and (4) a bright gold plate using Sel-Rex BDT-200 process type 1, Grade C, .00008" to .0001 thk. per MIL-G-45204. This finish is required on the outside surfaces of the slices for thermal control. Since the plating is a composite of four separate layers, it is difficult to establish any reason for the blistering other than the extremely thin gold coating did have flaws which allowed moisture to enter.

DRAWING CHANGE NOTICE

18508

DATE 3/6/72

SHEET 1

DRAWING NO SEC39107463

REV. B

TITLE SPECIFICATION CONTROL DRAWING, INNER ELECTRONICS

PROJECT EPS

DRAWING TO BE CHANGED ☑ YES ☐ NO

REASON FOR CHANGE

FINISHING SPECIFICATION ADDITION

ORIGINATOR	R.P. Dunn	DATE 3/6/72
APPROVED	R.P. Dunn	3/6/72
APPROVED	P. E. Ortvemiger	3/6/72
AUTH.		

RELEASE

DISPOSITION OF EXISTING MAT'L/PARTS

USE AS IS ☐ N/A

RETURN TO STOCK ☐ N/A

REWORK ☑

CONDEMN ☐ N/A

EFFECTIVITY

MODEL	SERIAL NO.
N/A	ALL 1001 →

DESCRIPTION OF CHANGE

ADD NOTE 9:

"NOTE 9: AFTER MACHINING THE SLICES (ITEMS 1,2,3 & 4) FOR MATCH-FIT WITH MOUNTING STRAPS, APPLY CHEMICAL FILM TO EXPOSED SURFACES OF THE SLICES INDIVIDUALLY PER MIL-C-5541, TYPE I OR II, GRADE B, CLASS 1.

<u>CAUTION</u>: ANY CLEANING, FINISHING, OR APPLICATION MUST NOT AFFECT THE GOLD-PLATED OR THERMAL-COATED SURFACES.

NOTE: SLICES MAT'L - 6061-T651 AL"

	PART NUMBER	DESCRIPTION	MATERIAL	SPECIFICATION	CHANGE

MSC Form 1820A