ACCEPTANCE TEST

PROCEDURE

for

FIFTH DIMENSION

MULTICODER

Model

HDA4M-839

NASA Contract #

NAS9-4590

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Prepared And
Issued By

FIFTH DIMENSION
INC.

on

September 26, 196

ACCEPTANCE TEST PROCEDURE

FOR

FIFTH DIMENSION MULTICODER

Model HDA4M-839

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J. S. Ksepka QC Mgr.

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M. N. Norris Chief Elect. Eng.

NASA MANNED SPACECRAFT CENTER

Approved by ______________________ Date ____________

Approved by ______________________ Date ____________

ELECTRICAL TEST PROCEDURE

5-D Model HDA4M-839

VII

Product Specification

Fifth Dimension Inc. No. 839

ELECTRICAL TEST PROCEDURE

5-D Model HDA4M-839

VIII

Outline Drawing and Wire Data

Fifth Dimension Inc. No. C 2900A

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36D Pulse rise time

37D Linearity

38D Pulse width stability

39DP Output current amplitude

40DP Pulse width

41DP Pulse rise time

II Equipment Required

1. DC Voltmeter - Fluke, Model 801B or equivalent

2. Electronic Counter - Hewlett Packard, Model 5245L with model 5262A Plug-In Unit or equivalent

3. Oscilloscope - Tektronix Model 535A with type C/A, type D and type Z Plug-In unit or equivalent

4. DC Ammeter - Sensitive Research, Model C or equivalent

5. Ohmmeter - Simpson Model 262 or equivalent

6. DC Power Supply - Power Designs Model 4005 or equivalent

7. Temperature Chamber - Delta Designs Model 1060W or equivalent

8. High Level Signal Source - 0 to 30V @ 0Ω to $10K\Omega$ impedance

9. Current Probe - Tektronix Model 131 or equivalent

10. Square Wave Generator - Hewlett Packard, Model 211A or equivalent

11. Pulse Generator - Rutherford, Model B7B or equivalent

12. Sine Wave Generator - Hewlett-Packard Model 200CD or equivalent

13. Power Supply - 0 to 50VDC capability @ 1.5 amps

III Test Sequence Key

1. S = System Test

2. A = PAM Test

3. D = PDM Test

4. DP = DPDM Test

TEST CONDITIONS: - Unless otherwise specified

1. Room ambient temperature and humidity.

2. Running time of multicoder shall be accumulated and recorded.

3. Power input voltage to be 28.0 ± 1.0 VDC.

4. Test sequence to be scheduled to effectively make use of required engineering and technical capabilities as well as test facility availability and need not be conducted in the exact sequence herein listed.

IV Test Procedure

1s Wiring

a) Power Connector

1. Check with ohmmeter to see that J-2 pin 2H is connected to case ground.

2. Check with ohmmeter to see that J-2 pins 3H, 3J, 1K and 2K are isolated from case ground.

3. Check with ohmmeter to see that J-2 pins 3H and 3J are common and pins 1K and 2K are common.

b) Data Channels

1. Set up test equipment as shown in figure 1 and adjust power input voltage to 28.0VDC.

2. Observe 38 data channels as shown in figure 2.

2s Reverse Polarity Protection

1. Apply 28VDC with polarity reversed across the power input terminals and measure the current.

3s Warm Up Time

1. Buss all data channels and connect to signal return.

2. Observe the PAM and PDM outputs and record the length of time for each to reach a stable position after power is switched on.

4s Ripple

a) Sine Wave

1. Set up equipment for power input as shown in figure 3.

2. Open switch S1.

3. Adjust sine wave generator output to zero.

4. Adjust power supply to 40VDC. Then

adjust pot. R-1 for 28.0VDC output to multicoder.

5. Connect oscilloscope to 28V output and adjust sine wave generator until a 3V P-P output is obtained.

6. While varying the pulse generator frequency from 0 to 100K CPS, check sampling rate, PAM noise, PDM jitter and DPDM pulse amplitude as called out in para. 6S, 21A, 34D, and 39DP.

b) Square Wave

1. Remove the sine wave generator and install the square wave generator in its place.

2. Switch S1 remains open.

3. Set pulse generator output to zero.

4. Adjust power supply to 50VDC. Then adjust pot. R-1 for 28V output to multicoder.

5. Connect oscilloscope to 28V output and adjust square wave generator until a 4V P-P output is obtained.

6. While varying the pulse generator frequency from 0 to 2K CPS, check sampling rate, PAM noise, PDM jitter, and DPDM pulse amplitude as called out in para. 6S, 21A, 34D and 39DP.

5s Transient Susceptibility

1. Remove the square wave generator and install the Rutherford pulse generator in its place.

2. Close switch S1.

3. Set pulse generator output to zero.

4. Adjust power supply to 50VDC. Then adjust pot. R-1 for 28.0VDC output to multicoder.

5. Connect oscilloscope to 28V output and adjust pulse generator for plus 15V, 20ms duration, 8 millisecond or less rise time pulses on the 28V line.

6. Check sampling rate, PAM noise, PDM jitter and DPDM pulse amplitude, as called out in para. 6S, 21A, 34D and 39DP.

7. Reverse the polarity of the pulse generator and increase the amplitude of the pulses to minus 30V.

8. Repeat step 6.

6S Output Frame Rate and Stability

1. With power connected per figure 1, set counter to 10 period average mode and trigger from the frame sync. output.

2. Record frame rate in milliseconds per revolution at input voltage settings of 22.0, 24.0, 28.0 and 32.0VDC.

3. Convert millisecond reading to RPS by dividing milliseconds per revolution into 1000.

4. Frame rate stability shall be calculated from data taken during the temperature test.

7S Supply Current

1. Adjust system input voltage to 28.0VDC.

2. Record maximum current as indicated on ammeter.

8S Feedback on Input Power Supply

1. Install a one ohm $\pm 1\%$ resistor in the system power line.

2. Adjust supply voltage to 32.0VDC.

3. Connect oscilloscope input across the resistor and record the P-P current observed.

9S Input Impedance

1. Adjust supply voltage to 28.0VDC.

2. Set signal input voltage to 5.0VDC.

3. Calibrate Z preamp @50mv/cm and measure the PAM amplitude.

4. Place a 15K ohm resistor, bypassed with a 1.0 mf cap., in series with the source voltage and again measure the PAM amplitude.

5. Input Z = $\frac{ER \cdot RI}{ES - ER}$

   ES = voltage measured in step 3.
   ER = voltage measured in step 4.
   RI = 15000 ohms.

10S Source Impedance

1. Set signal input voltage to 50.0VDC at Zero source impedance.

2. Measure the PAM amplitude.

3. Increase signal input source impedance to 10,000 ohms.

4. Again measure the PAM amplitude.

11S Overvoltage

1. Power supply input voltage to be set at 37.0VDC for a period of 10 minutes while following tests are performed.

2. Measure the output frame rate per para. 6S.

3. Measure the PAM amplitude per para. 26A.

4. Measure the PDM jitter per para. 34D.

12S Reverse Current

1. With signal voltage set at Zero, measure the pulse amplitude of PAM channel #1.

2. Place a 15K ohm resistor, bypassed with 1.0 mf, in series with wiring group #1 and the signal return.

3. Measure the change in amplitude of channel #1.

4. Calculate reverse current by dividing the change of pulse amplitude, converted to input voltage by 15K ohms.

13S Crosstalk

1. With signal voltage at zero for all data channels, measure the pulse amplitude of channel #2.

2. Apply 5.0V to wiring group #1, with remaining groups still at zero, and again measure the pulse amplitude of channel #2.

3. Convert change in amplitude to percentage of full scale.

14A Waveform (PAM)

1. Set signal voltage to 5.0VDC.

2. Check the PAM output for the presence of 88 data channels plus master pulse.

15D Waveform (PDM)

1. Connect the PDM output to oscilloscope and check for the presence of 88 data channels and a two channel sync. gap.

16DP Waveform (DPDM)

1. Install type C/A preamp in oscilloscope and connect the PDM output to A input and the DPDM output to the B input.

2. Check for 88 minus and plus current pulses plus sync. gap, coincident with the leading and trailing edges respectively of the PDM output.

17A Duty Cycle

1. Install type Z preamp in oscilloscope.

2. Set signal voltage to zero.

3. Display PAM output on oscilloscope with all channels superimposed.

4. Measure duty cycle as shown in figure 4.

18A Pulse Spacing

1. Use the delayed sweep of oscilloscope with "A" sweep calibrated at 10 μ sec./cm.

2. Adjust "B" sweep for all channels superimposed displaying a complete channel period.

3. Measure maximum leading edge to leading edge jitter.

19A Channel Scatter

1. Install type "D" preamp in oscilloscope and calibrate to 10 mv/cm.

2. Set signal source voltage to zero and measure the maximum offset between any PAM channel and any other PAM channel.

3. Repeat step 2 at 5.0V signal input.

20A Output Noise

1. Set signal voltage to 5.0VDC.

2. Calibrate D preamp at 10 mv/cm.

3. Adjust "A" sweep so the PAM "on time" equals 10 cm sweep.

4. Calibrate "B" sweep at 10 ms/cm.

5. Use delayed sweep and record the P-P noise on individual channels.

21A Pulse Spikes

1. Install type Z preamp in oscilloscope and calibrate at 50 mv/cm.

2. Set signal input voltage to 5.0VDC.

3. Display the PAM channel "on time" and record amplitude of spikes on the first and last 5% of the "on time."

22A Synchronization

1. With Z preamp calibrated at 50 mv/cm, record the amplitude of the PAM master pulse.

23A Off Time Voltage

1. Calibrate Z preamp at 50 mv/cm and record the P-P variation in the off time of all channels.

24A Rise and Decay Time

1. Set signal input voltage to 5.0VDC.

2. Adjust scope vertical sensitivity for a PAM pulse amplitude of 5 cm.

3. Measure the rise and fall time between the 10% and 90% level.

25A Zero Data Pedestal

1. Set signal input voltage to zero.

2. Calibrate Z preamp to 50 mv/cm and record the amplitude of the PAM output.

26A Full Scale Output Amplitude

1. Set signal input voltage to 5.0V.

2. Calibrate Z preamp to 50 mv/cm and record the amplitude of the PAM output.

27A Limiting

1. Calibrate Z preamp at 50 mv/cm.

2. Set signal input voltage to plus 30VDC.

3. Record the PAM pulse amplitude.

4. Reverse the polarity of the 30V signal input voltage.

5. Again record the PAM pulse amplitude.

28A Linearity

1. Record the PAM pulse amplitude of any one channel at signal input voltages of 0, 1, 2, 3, 4, and 5VDC.

2. Determine dynamic-range by subtracting zero scale reading from full scale reading.

3. Determine theoretical straight line data by dividing the dynamic-range by 5 (the number of increments plotted) and adding this quotientto the zero scale reading in multiples of 1 through 5 thereby computing the 5 straight line theoretical values.

4. Note the maximum difference between the computed and measured incremental data.

5. Convert this peak deviation to a percentage of full scale by dividing it by the full scale reading and multiplying the answer by 100.

29A Positive Pulse Stability

1. Data taken for zero and full scale pulse amplitude during the linearity temperature run will be used to calculate pulse stability.

2. Find maximum zero and full scale pulse amplitude variation between temperatures of +72°F., - 30°F., and +160°F., and calculate maximum variation from best straight line.

30D Pulse Amplitude

1. Connect the PDM output to oscilloscope.

2. Calibrate Z preamp at 50 mv/cm and record the pulse amplitude of the PDM output.

31D Zero Data Pulse Width

1. Set signal input voltage to zero.

2. Trigger counter from "vertical signal output" and set mode to time interval with microsecond time units.

3. Record the PDM pulse width as indicated by counter.

32D Full Scale Pulse Width

1. Set signal input voltage to 5.0VDC.

2. Record the PDM pulse width as indicated by counter.

33D Limiting

1. Set signal input voltage to plus 30VDC.

2. Record the PDM pulse width as indicated by counter.

3. Reverse the polarity of the 30V signal input voltage.

4. Again record the PDM pulse width.

34D Pulse Width Jitter

1. Set signal input voltage to zero.

2. Use delayed sweep and calibrate "A" sweep at 20 μ sec./cm.

3. Calibrate "B" sweep at 10 ms/cm.

4. Use the 5X magnification for a composite sweep calibration of 4 μ sec./cm.

5. Record the P-P trailing edge variation of individual channels.

35D Pulse Width Scatter

1. Set signal input voltage to zero.

2. Calibrate "B" sweep at 20 μ sec./cm with positive internal trigger.

3. Calibrate "A" sweep at 1 μ sec./cm with trigger free running.

4. Use "A" delayed by "B" sweep and adjust delay time multiplier until trailing edges of channels are displayed.

5. Record P-P variation of all channels.

36D Pulse Rise Time

1. Set signal input voltage to 5.0VDC.

2. Adjust the vertical sensitivity of scope for a PDM pulse amplitude of 5CM.

3. Measure the rise and fall time from the 10% to 90% amplitude.

37D Linearity

1. Using delayed sweep, record the pulse width of any one channel at signal input voltages of 0, 1, 2, 3, 4, and 5 VDC.

2. Determine dynamic-range by subtracting zero scale reading from full scale reading.

3. Determine theoretical straight line data by dividing the dynamic-range by 5 (the number of increments plotted) and adding this quotient to the zero scale reading in multiples of 1 through 5, thereby computing the 5 straight line theoretical values.

4. Note the maximum difference between the computed and measured incremental data.

5. Convert this peak deviation to a percentage of full scale by dividing it by the full scale reading and multiplying the answer by 100.

38D <u>Pulse Width Stability</u>

1. Data taken for zero and full scale pulse width during the linearity temperature run will be used to calculate pulse width stability.

2. Find maximum zero and full scale pulse width variation between temperatures of +72°F., - 30°F., and +160°F.

39DP <u>Output Current Amplitude</u>

1. Calibrate Z preamp at 50 mv/cm.

2. Place 1 mh, 15 ohm choke between DPDM output and signal return.

3. Connect current probe to oscilloscope and the pick-up to the DPDM output.

4. Record the maximum zero to peak amplitude of the plus and minus current pulses.

40DP <u>Pulse Width</u>

1. ~~Remove~~ Use current probe and connect DPDM output to scope with 1 mh, 15 ohm load.

2. Calculate 10 per cent of zero to peak pulse amplitude for plus and minus pulses.

3. Calibrate oscilloscope at 2μ sec./cm.

4. Using Z preamp variable balance voltage, position the 10% level at the center graticule on scope and record the pulse width of the plus and minus pulses.

5. Check to see that the reverse overshoot is less than 30 per cent of the pulse amplitude and decays to zero within 50 sec.

41DP <u>Pulse Rise Time</u>

Remove Current Probe

1. Adjust preamp vertical gain for a voltage pulse of 5 centimeters.

2. Record the rise time between the 10% and 90% amplitude level.

ELECTRICAL TEST PROCEDURE

5-D Model HDA4M-839

V

Sample Test Data Sheets

Model No. ____________ Date ____________

Serial No. ____________ Customer P.O. ____________

5-D Spec. ____________ 5-D M.O. No. ____________

ELECTRICAL INSPECTION

PARA. REF.	TEST	DATA	SPECS.
	System		
2S	Power Reversal Protection		≦ 25 ma
3S	Warm Up Time	Sec.	≦ 60 Sec.
1S	Wiring: Power Connector		Per. Dwg.
	Data Connectors		Per. Dwg.
4S	Ripple: Sine Wave	%	≦ ± 1% FS
	Square Wave	%	≦ ± 1% FS
5S	Transient Susceptibility		Check
6S	Sampling Rate & Stability	%	10 RPS ± 3%
7S	Input Current	ma	≦ 200 ma
8S	Power Noise Feedback	mv	≦ 30 mv P-P
9S	Input Impedance	mΩ	≧ 1.5 megohms
10S	Source Impedance		≦ ± 1% FS
11S	Overvoltage	%	≦ 10% Error
12S	Reverse Current	μa	≦ 1.0 μa
13S	Crosstalk	%	≦ 0.1% FS

PARA. REF.	TEST	DATA	SPECS.
	PAM		
14A	Waveform	________	Check
17A	Duty Cycle	________ %	49 - 51%
18A	Pulse Spacing	________ µSec.	≤ ± 50µ sec.
19A	Channel Scatter	________ mv	≤ 10 mv
20A	Output Noise	________ mv	≤ 10 mv
21A	Pulse Spikes	________ %	≤ 3%
22A	Synchronization Pulse	________ VDC	4.9 - 5.1 VDC
23A	Off Time Voltage	________ mv	≤ ± 50 mv
24A	Pulse Rise & Decay Time	________ µSec.	≤ 30 µSec.
25A	Zero Data Pedestal	________ VDC	0.9 - 1.1 VDC
26A	Full Scale Output Amplitude	________ VDC	4.9 - 5.1 VDC
27A	Limiting: Positive	________ VDC	≤ 6.25 VDC
	Negative	________ VDC	≤ 0.5 VDC
28A	Linearity	________ %	≤ 0.25% FS
29A	Positive Pulse Stability	________ %	≤ ± 1% FS

PARA. REF.	TEST	DATA	SPECS.
	PDM		
15D	Waveform	______	Check
30D	Pulse Amplitude	______ VDC	4.1 - 5.1 VDC
31D	Zero Data Pulse Width	______ μSec.	100 - 120 μSec.
32D	Full Scale Pulse Width	______ μSec.	650 - 670 μSec.
33D	Limiting: Positive	______ μSec.	≤ 325 μSec.
	Negative	______ μSec.	≥ 50 μSec.
34D	Pulse Width Jitter	______ μSec.	≤ 1.4 μSec.
35D	Pulse Width Scatter	______ μSec.	≤ 1.4 μSec.
36D	Pulse Rise Time	______ μSec.	≤ 5 μSec.
37D	Linearity	______ %	≤ 0.25% FS
38D	Pulse Width Stability	______ μSec.	≤ 10 μSec.
	DPDM		
16DP	Waveform	______	Check
39DP	Output Current Amplitude	______ ma	12 - 20 ma.
40DP	Pulse Width	______ μSec.	10 - 20 μSec.
41DP	Pulse Rise Time	______ μSec.	≤ 8 μSec.
40 DP	Overshoot	______ %	≤ 30%
40DP	Decay Time	______ μSec.	≤ 50 μSec.

PERFORMANCE DATA OVER TEMPERATURE

PAM

Temp. Deg. F.	Pulse Amp..	Signal Input In VDC						Power In VDC
		0	1.0	2.0	3.0	4.0	5.0	
+ 72	VDC							28.0
+ 160	VDC							28.0
+ 230	VDC							28.0
- 30	VDC							28.0
+ 72	VDC							28.0

PDM

Temp. Deg.F.	Pulse Width	Signal Input In VDC						Power In VDC
		0	1.0	2.0	3.0	4.0	5.0	
+ 72	Sec.							28.0
+ 160	Sec.							28.0
+ 230	Sec.							28.0
- 30	Sec.							28.0
+ 72	Sec.							28.0

PERFORMANCE DATA OVER TEMPERATURE

Frame Rate

Temp. Deg. F.	Frame Rate	Power Input Voltage in VDC				Current @ 28.0 VDC
		22.0	24.0	28.0	32.0	
+72	ms/Rev.					
+160	ms/Rev.					
+230	ms/Rev.					
-30	ms/Rev.					
+72	ms/Rev.					

Parameter		Temp. Deg. F.					Power In VDC
		+72	+160	+230	-30	+72	
PAM Noise	mv						28.0
PDM Jitter	μSec.						28.0
DPDM Amp.	ma.						28.0

Running Time ______________________

Electrical Inspection by ______________

INSTRUMENT CALIBRATION

TYPE & MODEL	SERIAL NO.	DATE CAL. DUE	STANDARDIZED TOL.

Mechanical Inspection

Outline Size

Finish

Mating Connectors

Total Running Time

Mechanical Inspection By ______________________________

Final Acceptance By ______________________________

ELECTRICAL TEST PROCEDURE

5-D Model HDA4M-839

VI

Drawings

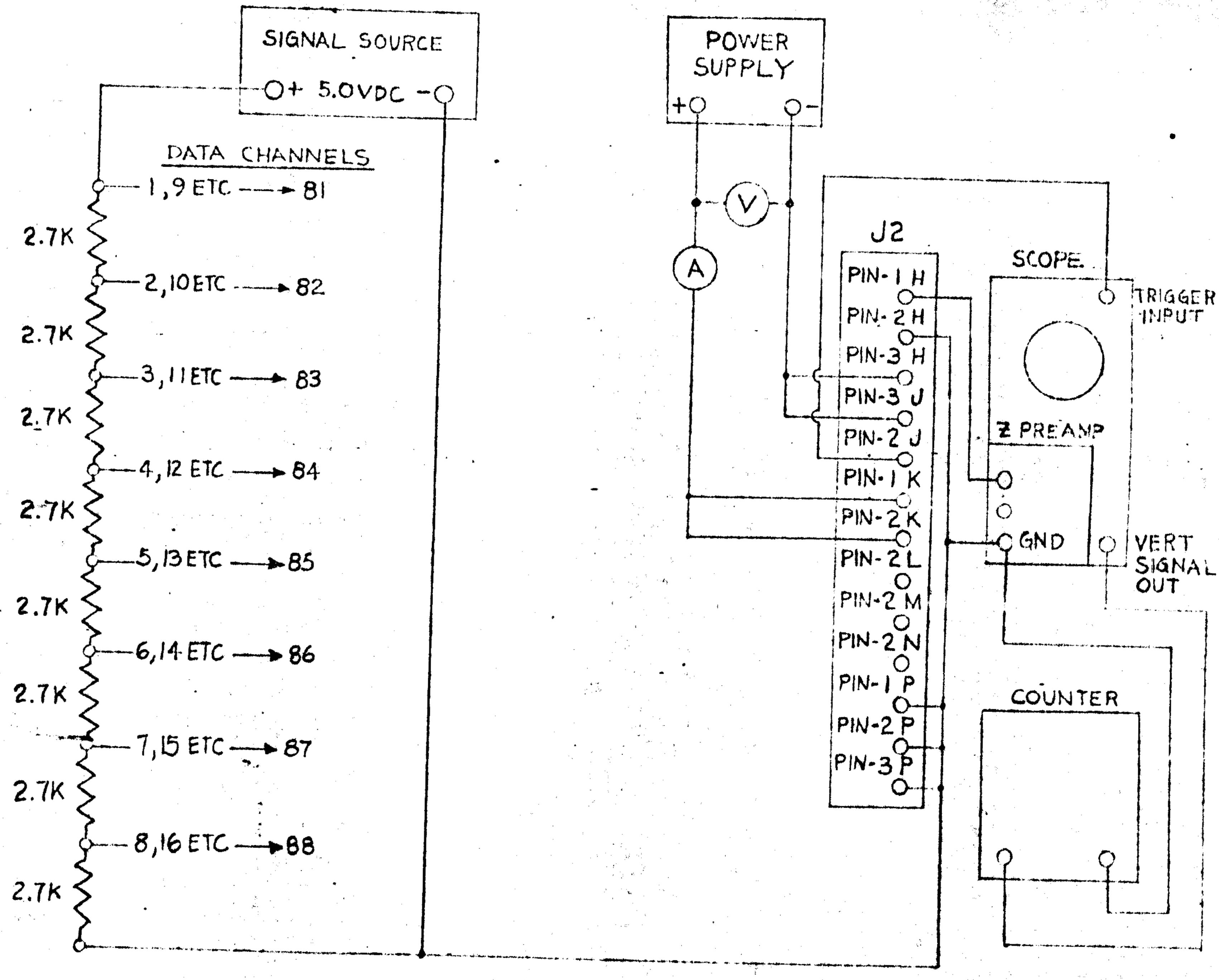
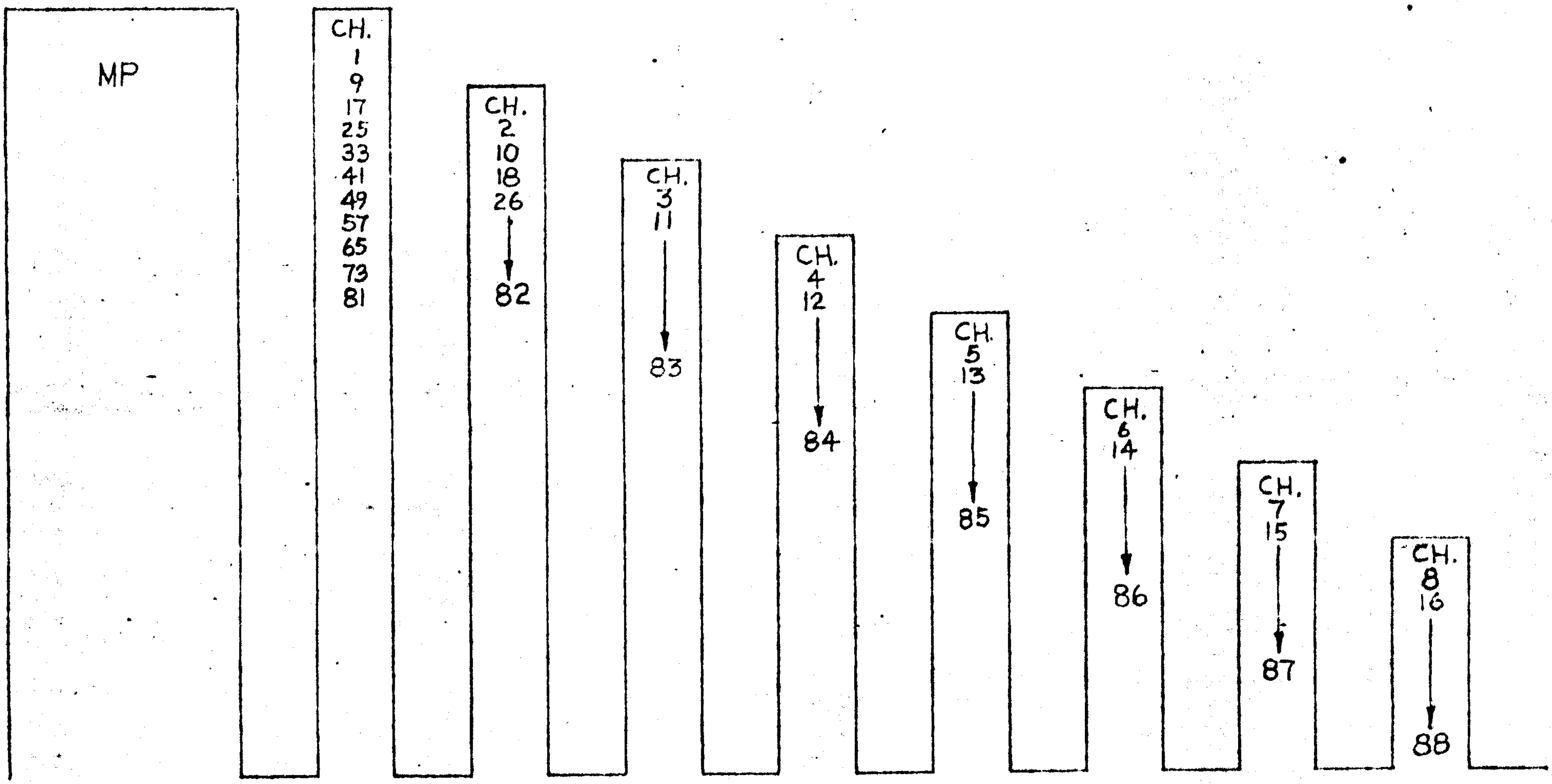

SIGNAL SOURCE
+ 5.0VDC -
DATA CHANNELS
1,9 ETC → 81
2,10 ETC → 82
3,11 ETC → 83
4,12 ETC → 84
5,13 ETC → 85
6,14 ETC → 86
7,15 ETC → 87
8,16 ETC → 88
2.7K
2.7K
2.7K
2.7K
2.7K
2.7K
2.7K
2.7K
POWER SUPPLY
+ -
V
A
J2
PIN-1 H
PIN-2 H
PIN-3 H
PIN-3 J
PIN-2 J
PIN-1 K
PIN-2 K
PIN-2 L
PIN-2 M
PIN-2 N
PIN-1 P
PIN-2 P
PIN-3 P
SCOPE
TRIGGER INPUT
Z PREAMP
GND
VERT SIGNAL OUT
COUNTER

FIGURE 1


MP
CH.
1
9
17
25
33
41
49
57
65
73
81
CH.
2
10
18
26
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CH.
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4
12
84
CH.
5
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85
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6
14
86
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FIGURE 2

FIFTH DIMENSION INC.

PRINCETON, NEW JERSEY

FROM SCIENCE TO APPLICATION

NO

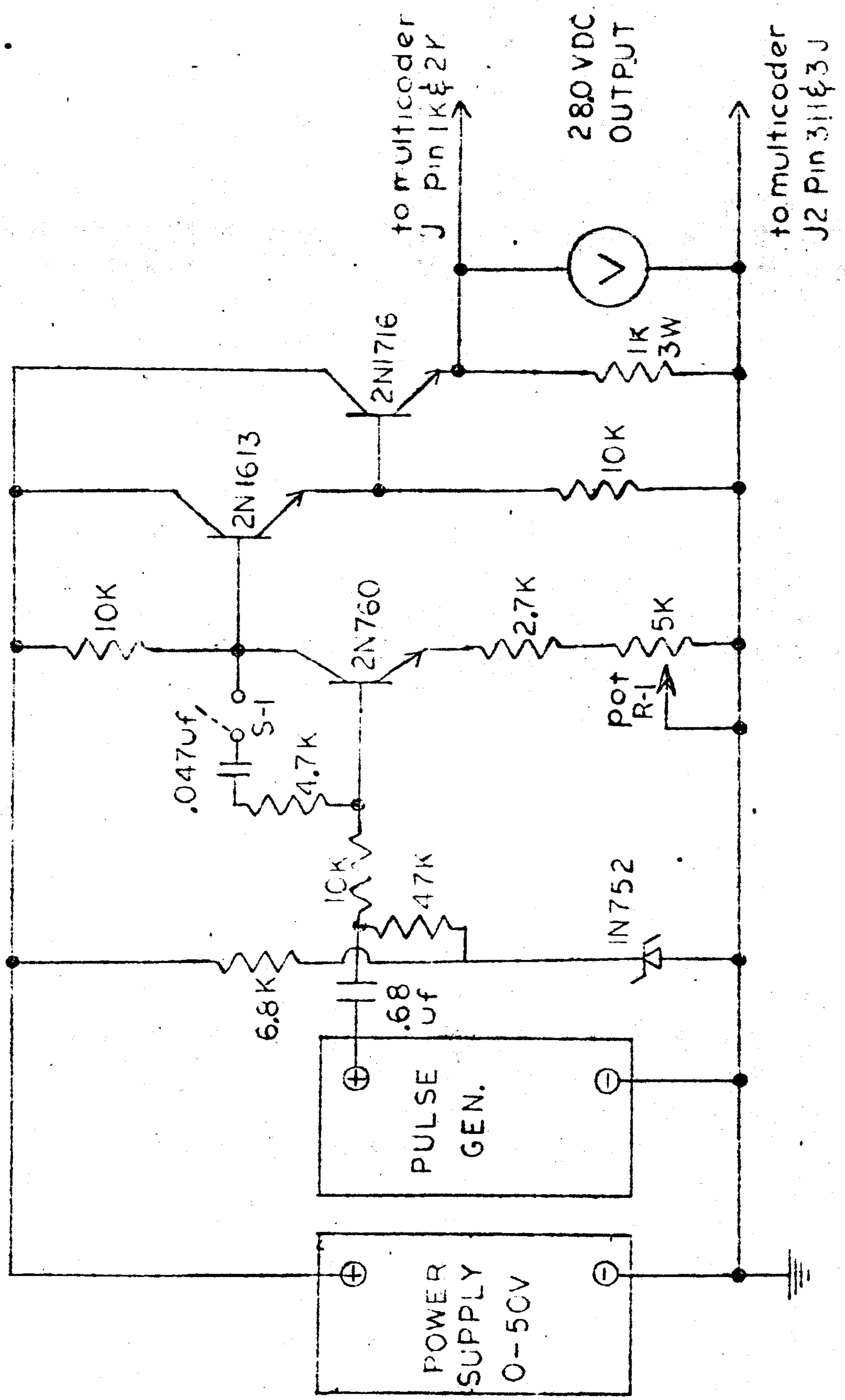


FIGURE 3

Prepared	Checked	Approved	Rev.							
Date	Date	Date	Date							

50E-6

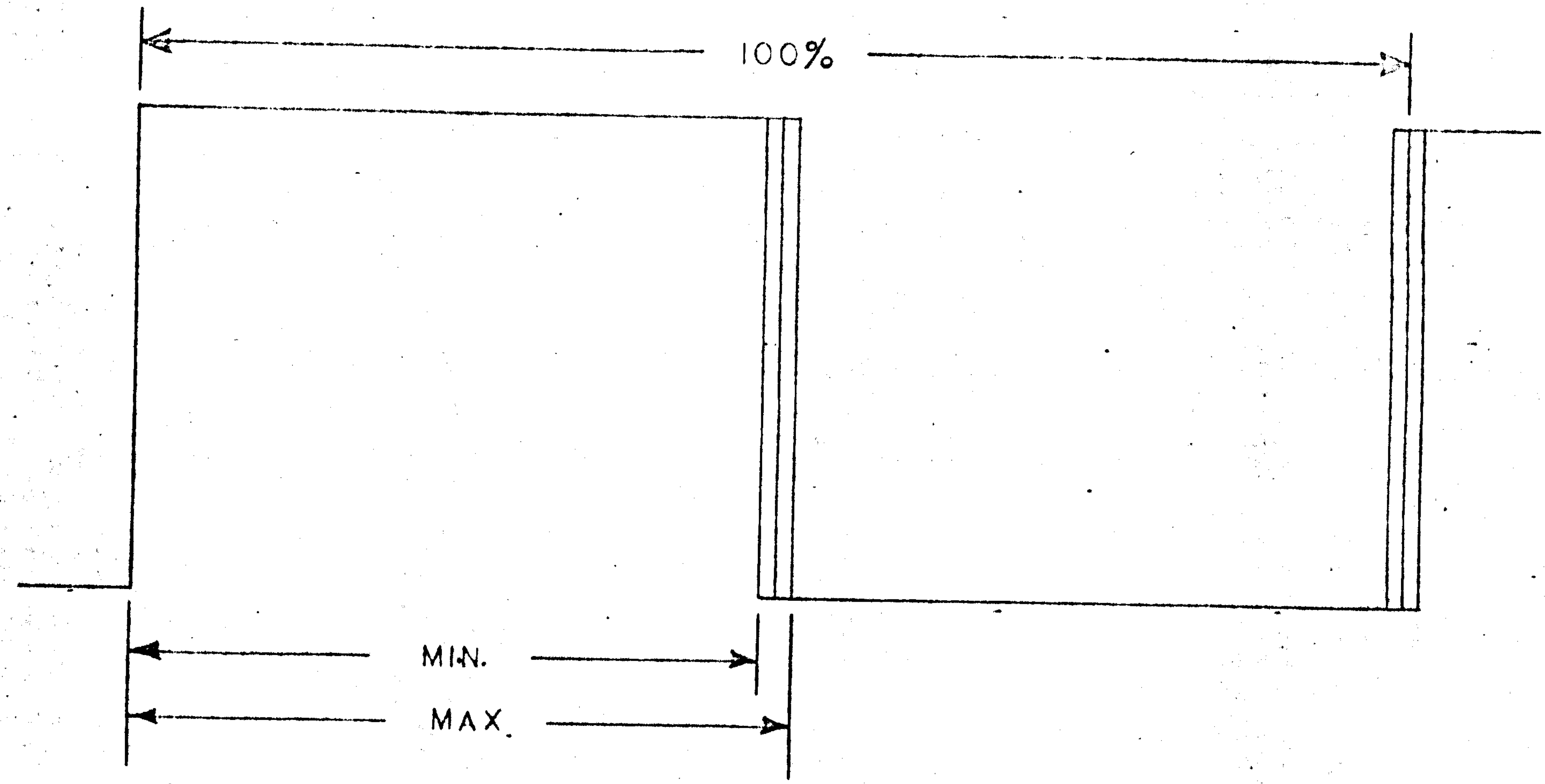


FIGURE 4

ENVIRONMENTAL TEST PROCEDURE

SECTION B

I Parameters Covered By This Procedure:

1. Temperature
2. Altitude
3. Acceleration
4. Shock
5. Acoustic Noise
6. Vibration
7. Oxygen Atmosphere
8. Salt Fog
9. Humidity
10. Sand and Dust
11. Fungus
12. R F I

II Equipment Required

1. Equipment common to all environmental tests.

   a) DC Voltmeter - Fluke Model 801B or equivalent.

   b) Electronic Counter - Hewlett-Packard, Model 5245L with Model5262A Plug-In unit or equivalent.

   c) Oscilloscope - Tektronix Model 535A with type Z Plug-In unit or equivalent.

   d) DC Ammeter - Sensitive Research Model C or equivalent.

   e) DC Power Supply - Power Designs Model 4005 or equivalent.

   f) High Level Signal Source - Zero to five volts at zero to ten thousand ohms impedance.

   g) Current Probe - Tektronix Model 131 or equivalent.

2. Temperature Test (Additional Equipment)

   a) Temperature Chamber - Delta Designs Model 1060W or equivalent.

3. Altitude Test (Additional Equipment)

   a) Oscilloscope - Tektronix Model 535A with Type C/A Plug-In unit or equivalent.

   b) Oscilloscope - Tektronix Model 535A with Type M Plug-In unit or equivalent.

   c) Space Simulator - NRC Equipment Company.

4. Acceleration Test (Additional Equipment)

   a) Oscilloscope - Tektronix Model 535A with Type C/A Plug-In unit or equivalent.

   b) Oscilloscope - Tektronix Model 535A with Type M Plug-In unit or equivalent.

c) Radial Accelerator - Associated Testing Laboratories, Inc. Model AC-10,000.

5. Shock Test (Additional Equipment)

   a) Oscilloscope - Tektronix Model 535A with Type C/A Plug-In unit or equivalent.

   b) Oscilloscope - Tektronix Model 535A with Type M Plug-In unit or equivalent.

   c) Shock Machine - Associated Testing Laboratories, Inc. Model SH-150-400.

6. Acoustic Noise (Additional Equipment)

   a) Oscilloscope-Tektronix Model 535A with Type C/A Plug-In unit or equivalent.

   b) Oscilloscope-Tektronix Model 535A with Type M Plug-In unit or equivalent.

   c) Acoustic Noise Test Chamber-Skewed Cube Shaped chamber, designed to produce sound pressure levels up to 144db above 0.0002 microbar (in conjunction with acoustic noise console) Frequency range: 37.5CPS to 10KC. Sound pressure level gradient through total volume: ± 2.5% around desired level.

   d) Acoustic Noise Control Console- Provides facilities for generation and analysis of conditions used in sound pressure vibration testing. Frequency range: 37.5CPS to 10KC (shaped or white noise spectra) maximum sound pressure level: 144db above 0.0002 microbar.

7. Vibration Test (Additional Equipment)

   a) Oscilloscope - Tektronix Model 535A with Type C/A Plug-In unit or equivalent.

   b) Oscilloscope - Tektronix Model 535A with Type M Plug-In unit or equivalent.

   c) Vibration Exciter - Ling Electronics Corporation Model 177A.

   d) Power Cubicle - Ling Electronics Corporation Model PP/20/200.

   e) Remote Control Console - Ling Electronics Corporation Model R-1001.

f) Random Noise Control Console-Ling Electronics Corporation Model R-1001-3.

g) Accelerometer - Endevco Corporation Model 2215C.

h) Vibration Pick Up - MB Manufacturing Company Model 125.

i) Vibration Meter - MB Manufacturing Company Model M-3.

j) Dial-A Gain-Unholtz-Dickie Model 603.

k) Random Noise Generator - General Radio Model 1390B.

l) True RMS AC Voltmeter - Balantine Laboratories, Model 320 S/2.

8. Oxygen Atmosphere (Additional Equipment)

a) Pressure Chamber - Associated Testing Laboratories Inc. Model PC-300.

9. Salt Fog (Additional Equipment)

a) Salt Spray Chamber - Associated Testing Laboratories Inc. Model SS-3-16.

10. Humidity (Additional Equipment)

a) Humidity Test Chamber (High, Low, Temp.) Associated Testing Laboratories Inc. Model ELHH-8-LC-1.

11. Sand and Dust (Additional Equipment)

a) Sand and Dust Chamber - Associated Testing Laboratories Inc. 51"x38"x38" chamber, Temperature Range +70°F to +200°F, velocities to 2000 Feet per minute.

12. Fungus (Additional Equipment)

a) Fungus Test Chamber - Associated Testing Laboratory Inc., 72"x72"x74", temperature range - 100°F to +240°F, 90-95% RH, with indicating instrumentation.

13. RFI (Additional Equipment)

a) Signal Generator 9 KC to 50 MC. General Radio Type 805A or equivalent.

b) Signal Generator 50 to 250 MC. General Radio oscillator 1215-C or equivalent.

c) Signal Generator 180 to 600 MC. General Radio oscillator Type 1209 CL or equivalent.

d) Signal Generator 500 to 1000 MC. General Radio UHF oscillator Model 1361A or equivalent.

e) Signal Generator 750 to 2750 MC. Narda Microwave Signal Source # 451 or equivalent.

f) Signal Generator 2 to 4 GC. Polorad Microwave Signal Source Model 1206 or equivalent.

g) Signal Generator 4 to 8 GC. FXR C772A Signal Source or equivalent.

h) Signal Generator 7 to 11 GC. FXR X772A Signal Source or equivalent.

i) Audio Oscillator 50 to 15,000 CPS. H.P. #200 AB or equivalent.

j) Audio Amplifier EICCO HF60 or equivalent.

k) Audio Isolation transformer. Solar type 6220-1 or equivalent.

l) Current Probe Stoddart Model 91550-1 or equivalent.

m) 50 volt spike circuit as prescribed in addendum 10A to MIL-I-26600.

n) Receivers NM40A Stoddart, NF105 Empire TX-T1-T2-T3, Antennas-41 inch rod on tuned dipole, NF 112 Empire, antenna AT 112.

III Test Procedure

1.0 Temperature Test

1.1 Place unit in temperature chamber..

1.2 With unit operating, raise temperature to to +122°F and allow to stabilize.

1.3 Raise temperature to +230°F for a period of 10 minutes and perform the following tests.

1.3.1 Zero data pedestal. Ref. Electrical test procedure para. 25A.

1.3.2 Full scale output amplitude. Ref. ETP para. 26A.

1.3.3 Zero data pulse width. Ref. ETP para. 31D.

1.3.4 Full scale pulse width. Ref. ETP para. 32D.

1.3.5 Output current amplitude. Ref. ETP para. 39DP.

1.3.6 Sampling rate. Ref. ETP para. 6S.

1.3.7 Input Current. Ref. ETP para. 7S.

1.4 Lower temperature to +160°F and allow multicoder case to stabilize prior to performing following tests.

1.4.1 Sampling rate. Ref. ETP para. 6S.

1.4.2 Input Current. Ref. ETP para. 7S.

1.4.3 PAM output noise. Ref. ETP para. 20A.

1.4.4 Pulse width jitter. Ref. ETP para. 34D.

1.4.5 Output current amplitude. Ref. ETP para. 39DP.

1.4.6 PAM Linearity. Ref. ETP para. 28A.

1.4.7 PDM Linearity. Ref. ETP para. 37D.

2.2 The multicoder shall be operated throughout the test and monitored for the following performance characteristics.

2.2.1 Sampling rate

2.2.1.1 Set up multicoder and test equipment using figure 1 of the electrical test procedure as a guide.

2.2.1.2 Adjust power supply to 28.0 VDC.

2.2.1.3 With counter set to period mode, and triggered from the frame sync output, record the maximum frame rate variation observed.

2.2.2 Input Current

2.2.2.1 Install ammeter in the system power line as shown in figure 1 of the electrical test procedure and record the maximum current observed.

2.2.3 PAM Noise

2.2.3.1 Connect PAM output to scope #1, input "A" and set signal input voltage to Zero VDC.

2.2.3.2 Calibrate Z preamp at 50 mv/cm and sweep time at 10 ms/cm.

2.2.3.3 Record maximum peak to peak noise on individual channels.

2.2.4 PDM Jitter

2.2.4.1 Connect PDM output to scope #2, input "A" and set signal input voltage to zero.

2.2.4.2 Calibrate "A" sweep at 20 μs/cm and "B" sweep at 10 ms/cm.

1.5 Lower temperature to -30°F and allow multicoder case temperature to stabilize prior to performing following tests.

1.5.1 Sampling rate. Ref. ETP para. 6S.

1.5.2 Input Current. Ref. ETP para. 7S.

1.5.3 PAM output noise. Ref.ETP para. 20A

1.5.4 Pulse width jitter. Ref. ETP para. 34D.

1.5.5 Output current amplitude. Ref. ETP para. 39DP.

1.5.6 PAM linearity. Ref. ETP para. 28A.

1.5.7 PDM linearity. Ref. ETP para. 37D.

1.6 Raise temperature to +72°F and allow multicoder case temperature to stabilize prior to performing following tests.

1.6.1 Sampling rate. Ref. ETP para. 6S

1.6.2 Input Current. Ref. ETP para. 7S

1.6.3 PAM output noise. Ref. ETP para. 20A

1.6.4 Pulse width jitter. Ref. ETP para. 34D

1.6.5 Output current amplitude. Ref. ETP para. 39DP

1.6.6 PAM linearity. Ref. ETP para. 28A

1.6.7 PDM linearity. Ref. ETP para. 37D

2.0 Altitude Test

2.1 The unit will be placed in an altitude chamber and all electrical connections on instrumentation necessary will be made through chamber feed throughs. The pressure shall be decreased from ambient to 200,000ft. equivalent in 10 minutes or less then decreased to a pressure of 1×10^{-6} millimeters of mercury.

2.2.4.3 Use "A" delayed by "B" sweep mode and 5X magnifier for a composite calibration of 4 μsec./cm.

2.2.4.4 Record the maximum P-P jitter on individual channels.

2.2.5 Output Current Amplitude

2.2.5.1 Connect DPDM output to scope #2, input "B"

2.2.5.2 Insert 1 mh, 15 ohm choke between the DPDM output and the signal return.

2.2.5.3 Connect current probe to to oscilloscope and pick-up to DPDM output.

2.2.5.4 Monitor DPDM output for proper operation.

2.2.6 Channel Presence

2.2.6.1 Observation of channel presence will be made by displaying the PAM, PDM, and DPDM outputs simultaneously by use of a type M preamp in conjunction with a type 535A oscilloscope.

2.3 Following the altitude exposure, the unit shall be visually inspected for evidence of structural damage and performance tested for the following parameters.

2.3.1 Sampling Rate

2.3.1.1 With counter set to period mode, and triggered from the frame sync output, record sampling rate at power supply input voltages of 22.0, 24.0, 28.0, and 32.0 VDC.

2.3.2 Input Current

2.3.2.1 Install ammeter in the system power line and record maximum current at 28.0 VDC power input voltage.

2.3.3 PAM Zero and Full Scale Pulse Amplitude

2.3.3.1 Set power supply input voltage to 28.0 VDC.

2.3.3.2 Set signal input voltage to zero.

2.3.3.3 Calibrate Z preamp at 50 mv/cm and record the PAM pulse amplitude.

2.3.3.4 Set signal input voltage to 5.0 VDC, and again record the PAM pulse amplitude.

2.3.4 PDM Zero and Full Scale Pulse Width

2.3.4.1 Set signal input voltage to zero.

2.3.4.2 Trigger counter from "vertical signal output" and set mode to time interval with micro-seconds time units.

2.3.4.3 Adjust oscilloscope sweep for all channels super-imposed and record zero pulse width as indicated on counter.

2.3.4.4 Set signal input voltage to 5.0 VDC and record the full scale pulse width.

2.3.5 DPDM Pulse Amplitude

2.3.5.1 Connect current probe to Z preamp, calibrated at 50 mv/cm.

2.3.5.2 Record the maximum zero to peak amplitude of the plus and minus current pulses.

2.3.6 PAM Noise

2.3.6.1 Connect PAM output to Z preamp calibrated at 50 mv/cm.

2.3.6.2 Set signal input voltage to 5.0 VDC.

2.3.6.3 Adjust "A" sweep unitl the PAM "on time" is equal to 10 cm.

2.3.6.4 Calibrate "B" sweep at 10 ms/cm.

2.3.6.5 Use delayed sweep and record the peak-peak noise on individual channels.

2.3.7 PDM Jitter

2.3.7.1 Connect PDM output to oscilloscope.

2.3.7.2 Calibrate "A" sweep at 20 μsec./cm and "B" sweep at 10 ms/cm.

2.3.7.3 Use delayed sweep and 5X magnification for a composite calibration of 4 μsec./cm.

2.3.7.4 Record the maximum P-P jitter on individual channels.

2.3.8 Channel Presence, PAM, PDM, DPDM

2.3.8.1 Observation of channel presence will be made by displaying the PAM, PDM, and DPDM outputs simultaneously by use of a type M preamp in conjunction with a type 535A oscilloscope.

3.0 Acceleration Test

3.1 The multicoder will be rigidly mounted to an acceleration test fixture and securely fastened to the beam of the radial accelerator. All electrical connections will be accomplished through slip rings provided with the radial accelerator.

3.2 The multicoder shall be subjected to 40 g's of acceleration for three minutes in each direction of the three multually perpendicular axis which are indicated in figure 1.

3.3 The multicoder shall be operated throughout the test and monitored for the following performance characteristics.

3.3.1 Sampling rate. Ref. para. 2.2.1

3.3.2 Input current. Ref. para. 2.2.2

3.3.3 PAM noise. Ref. para. 2.2.3

3.3.4 PDM jitter. Ref. para. 2.2.4

3.3.5 Output current amplitude. Ref. para. 2.2.5

3.3.6 Channel presence. Ref. para. 2.2.6

3.4 Following the acceleration test, the unit shall be visually inspected for evidence of structural damage and performance tested for the following parameters.

3.4.1 Sampling Rate. Ref. para. 2.3.1

3.4.2 Input Current. Ref. para. 2.3.2

3.4.3 PAM Zero and full scale pulse amplitude Ref. para. 2.3.3

3.4.4 PDM Zero and full scale pulse width.

Ref. para. 2.3.4

3.4.5 DPDM pulse amplitude. Ref. para. 2.3.5

3.4.6 PAM noise. Ref. para. 2.3.6

3.4.7 PDM jitter. Ref. para. 2.3.7

3.4.8 Channel presence. Ref. para. 2.3.8

4.0 Shock Test

4.1 The multicoder shall be mounted to a test fixture and securely fastened to the shock machine.

4.2 The multicoder shall be operated and subjected to three 50 g shock impulses with a duration of 11 milliseconds in each direction of the three mutually perpendicular axis which are defined in figure 1.

4.3 During the shock test, the unit shall be monitored for the following performance characteristics.

4.3.1 Sampling rate. Ref. para. 2.2.1

4.3.2 Input Current. Ref. para. 2.2.2

4.3.3 PAM noise. Ref. para. 2.2.3

4.3.4 PDM jitter. Ref. para. 2.2.4

4.3.5 Output current amplitude. Ref. para. 2.2.5

4.3.6 Channel presence. Ref. para. 2.2.6

4.4 Following the shock test, the multicoder shall be visually inspected for evidence of structural damage and performance tested for the following parameters.

4.4.1 Sampling rate. Ref. para. 2.3.1

4.4.2 Input current. Ref. para. 2.3.2

4.4.3 PAM Zero and full scale pulse amplitude. Ref. para. 2.3.3

4.4.4 PDM Zero and full scale pulse width. Ref. para. 2.3.4

4.4.5 DPDM pulse amplitude. Ref. para. 2.3.5

4.4.6 PAM noise. Ref. para. 2.3.6

4.4.7 PDM jitter. Ref. para. 2.3.7

4.4.8 Channel presence. Ref. para. 2.3.8

5.0 Acoustic Noise Test

5.1 The multicoder will be suspended in an acoustic noise chamber, with electrical connections made through approximately 6ft cables.

5.2 The unit shall be subjected to random noise at a level of 144 db $\pm$ 5db referenced to 0.0002 dynes/cm^2 within the range of 37.5 to 9600 CPS. for a period of 5 minutes.

5.3 The unit shall be operated throughout the test and monitored for the following performance characteristics.

5.3.1 Sampling rate. Ref. para. 2.2.1

5.3.2 Input Current. Ref. para. 2.2.2

5.3.3 PAM Noise. Ref. para. 2.2.3

5.3.4 PDM jitter. Ref. para. 2.2.4

5.3.5 Output current amplitude. Ref. para. 2.2.5

5.3.6 Channel presence. Ref. para. 2.2.6

5.4 Following the acoustic noise test, the multicoder shall be visually inspected for evidence of structural damage and performance tested for the following parameters.

5.4.1 Sampling rate. Ref. para. 2.3.1

5.4.2 Input Current. Ref. para. 2.3.2

5.4.3 PAM Zero and full scale pulse amplitude. Ref. para. 2.3.3

5.4.4 PDM Zero and full scale pulse width.

Ref. para. 2.3.4

5.4.5 DPDM pulse amplitude. Ref. para. 2.3.5

5.4.6 PAM Noise. Ref. para. 2.3.6

5.4.7 PDM jitter. Ref. para. 2.3.7

5.4.8 Channel presence. Ref. para. 2.3.8

6.0 Vibration Tests

6.1 The multicoder shall be mounted to a vibration fixture and attached to the the vibration machine.

6.2 The unit shall be operated during subjection to vibration along each of three mutually perpendicular axis as defined by figure 1.

6.2.1 Random motion with 3 sigma cutoff

a) 15 g RMS for 15 seconds

10 CPS - 0.0573 g2/CPS.

10-75 CPS-Linear increase to 0.1607 g2/CPS.

75-220CPS-Constant 0.1607 g2/CPS.
220-2000CPS-Linear decrease to 0.0573 g2/CPS.

b) 12 g RMS for 180 seconds.

10 CPS- 0.0367 g2/CPS

10-75 CPS-Linear increase to 0.1028 g2/CPS

75-220 CPS-Constant 0.1028 g2/CPS.

220-2000CPS-Linear Decrease to 0.0367 g2/CPS.

6.2.2 Sinusodial motion; swept logarithmically from 5CPS to 2KC to 5CPS in 10 minutes.

a) 5-10 CPS Constant 0.20 inch D.A.
10-18CPS Constant 1 g.
18-56CPS Constant 0.06 inch D.A.
56-2000CPS Constant 10 g

6.3 During the vibration tests the unit shall be monitored for the following parameters.

6.3.1 Sampling rate. Ref. para. 2.2.1

6.3.2 Input Current. Ref. para. 2.2.2

6.3.3 PAM noise. Ref. para. 2.2.3

6.3.4 PDM jitter. Ref. para. 2.2.4

6.3.5 Output current amplitude. Ref. para. 2.2.5

6.3.6 Channel presence. Ref. para. 2.2.6

6.4 Following the vibration tests, the multicoder shall be visually examined for evidence of structural damage and performance tested for the following parameters.

6.4.1 Sampling rate. Ref. para. 2.3.1

6.4.2 Input Current. Ref. para. 2.3.2

6.4.3 PAM Zero and full scale amplitude. Ref. para. 2.3.3

6.4.4 PDM Zero and full scale pulse width. Ref. para. 2.3.4

6.4.5 DPDM pulse amplitude. Ref. para. 2.3.5

6.4.6 PAM noise. Ref. para. 2.3.6

6.4.7 PDM jitter. Ref. para. 2.3.7

6.4.8 Channel presence. Ref. para. 2.3.8

7.0 Oxygen Atmosphere Tests

7.1 The multicoder shall be placed in an altitude chamber with an atmosphere of 100% oxygen at a pressure of 7 PSIA. Electrical connections necessary will be made through chamber feed throughs.

7.2 The multicoder shall be operated for at least one hour in the O_2 atmosphere and the performance characteristics specified below shall be monitored.

7.2.1 Sampling rate. Ref. para. 2.2.1

7.2.2 Input Current. Ref. para. 2.2.2

7.2.3 PAM noise. Ref. para. 2.2.3

7.2.4 PDM jitter. Ref. para. 2.2.4

7.2.5 Output Current amplitude. Ref. para. 2.2.5

7.2.6 Channel presence. Ref. para. 2.2.6

7.3 Following the O_2 atmosphere exposure, the multicoder shall be visially examined for evidence of structural damage, corrosion or arcing and shall be performance tested for the following parameters.

7.3.1 Sampling rate. Ref. para. 2.3.1

7.3.2 Input Current. Ref. para. 2.3.2

7.3.3 PAM Zero and full scale amplitude. Ref. para. 2.3.3

7.3.4 PDM Zero and full scale pulse width. Ref. para. 2.3.4

7.3.5 DPDM pulse amplitude. Ref. para. 2.3.5

7.3.6 PAM noise. Ref. para. 2.3.6

7.3.7 PDM jitter. Ref. para. 2.3.7

7.3.8 Channel presence. Ref. para. 2.3.8

8.0 Salt Fog Test

8.1 The multicoder shall be placed within a salt fog chamber and be subjected to salt spray for a period of 48 hours as specified in MIL-STD-810A Method 509.1

8.2 The multicoder shall be operated throughout the salt fog test and electrically checked during the 1st. and 48th. hour for the following parameters.

8.2.1 Sampling rate. Ref. para. 2.2.1

8.2.2 Input Current. Ref. para. 2.2.2

8.2.3 PAM noise. Ref. para. 2.2.3

8.2.4 PDM jitter. Ref. para. 2.2.4

8.2.5 Output current amplitude. Ref. para. 2.2.5

8.2.6 Channel presence. Ref. para. 2.2.6

8.3 Following the salt fog environment the multicoder shall be removed from the chamber and visually examined for evidence of deterioration or corrosion. All salt deposits will then be removed and the unit electrically checked for the following parameters.

8.3.1 Sampling rate. Ref. para. 2.3.1

8.3.2 Input current. Ref. para. 2.3.2

8.3.3 PAM Zero and full scale amplitude. Ref. para. 2.3.3

8.3.4 PDM Zero and full scale pulse width. Ref. para. 2.3.4

8.3.5 DPDM pulse amplitude. Ref. para. 2.3.5

8.3.6 PAM noise. Ref. para. 2.3.6

8.3.7 PDM jitter. Ref. para. 2.3.7

8.3.8 Channel presence. Ref. para. 2.3.8

9.0 Humidity Test

9.1 The multicoder shall be placed within a temperature humidity test chamber with all test connectors installed and electrical cables extended through a chamber port.

9.2 The relative humidity shall then be increased to 95% ±5% over a temperature range of 80°F, to 160°F for a period of 240 hours with temperature cycling as specified in MIL-STD-810A Method 507.1.

9.3 The multicoder shall be continuously operated throughout the humidity test and the parameters specified below shall be checked during the 1st. and 240th. hour of the test.

9.3.1 Sampling rate. Ref. para. 2.2.1

9.3.2 Input current. Ref. para. 2.2.2

9.3.3 PAM noise. Ref. para. 2.2.3

9.3.4 PDM jitter. Ref. para. 2.2.4

9.3.5 Output current amplitude. Ref. para. 2.2.5

9.3.6 Channel presence. Ref. para. 2.2.6

9.4 Following the humidity environment the multicoder shall be removed from the chamber and visually examined for evidence of damage and electrically checked for the following parameters.

9.4.1 Sampling rate. Ref. para. 2.3.1

9.4.2 Input current. Ref. para. 2.3.2

9.4.3 PAM Zero and full scale amplitude.

9.4.4 PDM Zero and full scale pulse width. Ref. para. 2.3.4

9.4.5 DPDM pulse amplitude. Ref. para. 2.3.5

9.4.6 PAM noise. Ref. para. 2.3.6

9.4.7 PDM jitter. Ref. para. 2.3.7

9.4.8 Channel presence. Ref. para. 2.3.8

10.0 Sand and Dust Test

10.1 The multicoder shall be exposed to a sand and dust and temperature environment for a period of not less than four hours as specified in MIL-STD 810A Method 510.1.

10.2 The multicoder shall be operated continuously throughout the sand and dust test and monitored for the following electrical parameters.

10.2.1 Sampling rate. Ref. para. 2.2.1

10.2.2 Input current. Ref. para. 2.2.2

10.2.3 PAM noise. Ref. para. 2.2.3

10.2.4 PDM jitter. Ref. para. 2.2.4

10.2.5 Output current amplitude. Ref. para. 2.2.5

10.2.6 Channel presence. Ref. para. 2.2.6

10.3 Following the sand and dust test, the multicoder shall be removed from the chamber and visually inspected for damage and electrically checked for the following parameters.

10.3.1 Sampling rate. Ref. para. 2.3.1

10.3.2 Input current. Ref. para. 2.3.2

10.3.3 PAM Zero and full scale amplitude.

Ref. para. 2.3.3

10.3.4 PDM Zero and full scale pulse width. Ref. para. 2.3.4

10.3.5 DPDM pulse amplitude. Ref. para. 2.3.5

10.3.6 PAM noise. Ref. para. 2.3.6

10.3.7 PDM jitter. Ref. para. 2.3.7

10.3.8 Channel presence. Ref. para. 2.3.8

11.0 Fungus Test

11.1 The multicoder shall be subjected to fungus as specified in MIL-STD-810A method 508.1 for a period of 28 days.

11.2 The multicoder will not be operated during the fungus test but will be visually inspected for damage and electrically tested for the following parameters at the end of the 28 day period.

11.2.1 Sampling rate. Ref. para. 2.3.1

11.2.2 Input current. Ref. para. 2.3.2

11.2.3 PAM Zero and full scale amplitude. Ref. para. 2.3.3

11.2.4 PDM Zero and full scale pulse width. Ref. para. 2.3.4

11.2.5 DPDM pulse amplitude. Ref. para. 2.3.5

11.2.6 PAM noise. Ref. para. 2.3.6

11.2.7 PDM jitter. Ref. para. 2.3.7

11.2.8 Channel presence. Ref. para. 2.3.8

12.0 RFI Tests

12.1 The multicoder will be placed within a sereened enclosure and subjected to RFI as specified in MIL-I-26600 and MSC-ASPO-EMI-10A for class I equipment. Tests will be conducted according to RFI test plan number HDA4M-839 . Typical set up shown in figure 2 and 3.

12.2 The multicoder will be operated during the test and the performance characteristics listed below will be monitored for degredation of performance.

12.2.1 Sampling rate. Ref. para. 2.2.1

12.2.2 Input Current. Ref. para. 2.2.2

12.2.3 PAM noise. Ref. para. 2.2.3

12.2.4 PDM jitter. Ref. para. 2.2.4

12.2.5 Output current amplitude. Ref. para. 2.2.5

12.2.6 Channel presence. Ref. para. 2.2.6

12.3 Following the RFI environment the multicoder shall be performance tested for the following parameters.

12.3.1 Sampling rate. Ref. para. 2.3.1

12.3.2 Input current. Ref. para. 2.3.2

12.3.3 PAM Zero and full scale amplitude. Ref. para. 2.3.3

12.3.4 PDM Zero and full scale pulse width. Ref. para. 2.3.4

12.3.5 DPDM pulse amplitude. Ref. para. 2.3.5

12.3.6 PAM noise. Ref. para. 2.3.6

12.3.7 PDM jitter. Ref. para. 2.3.7

12.3.8 Channel presence. Ref. para. 2.3.8

ENVIRONMENTAL TEST PROCEDURE

5-D Model HDA4M-839

IV

Sample Test Data Sheets

ENVIRONMENTAL TEST DATA SHEET

Model No. ____________ Environment ____________

Serial No. ____________ Date ____________

Test Conducted By ____________ Running Time ____________

TEST	DURING ENVIRONMENT						AFTER
AXIS	X		Y		Z		
PARA ~~REF.~~							
2.3.1 Sampling Rate @ 28.0 VDC							
@ 22.0 VDC							
@ 24.0 VDC							
@ 32.0 VDC							
2.3.2 Input Current @ 28.0 VDC							
2.3.3 PAM Noise							
2.3.7 PDM Jitter							
2.3.5 DPDM Amplitude							
2.3.8 Channel Presence							
2.3.3 PAM Output Amp: Zero							
Full Scale							
2.3.4 PDM Pulse Width: Zero							
Full Scale							

ENVIRONMENTAL TEST DATA SHEET

Model No. ____________________ Environment ____________________

Serial No. ____________________ Date ____________________

Test Conducted By ____________________ Running Time ____________________

During Environment			After Environment		
PARA. REF.	TEST	DATA	PARA. REF.	TEST	DATA
2.2.1	Sampling Rate @ 28.0 VDC		2.3.1	Sampling Rate @ 22.0 VDC	
				@ 24.0 VDC	
2.2.2	Input Current @ 28.0 VDC			@ 28.0 VDC	
				@ 32.0 VDC	
2.2.3	PAM Noise			@ 28.0 VDC	
			2.3.2	Input Current @ 28.0 VDC	
2.2.4	PDM Jitter		2.3.3	PAM Output Amp: Zero	
				Full Scale	
2.2.5	DPDM Amplitude		2.3.4	PDM Pulse Width: Zero	
				Full Scale	
2.2.6	Channel Presence		2.3.5	DPDM Amplitude	
			2.3.6	PAM Noise	
			2.3.7	PDM Jitter	
			2.3.8	Channel Presence	

ENVIRONMENTAL TEST PROCEDURE

5-D Model HDA4M-839

V

Drawings

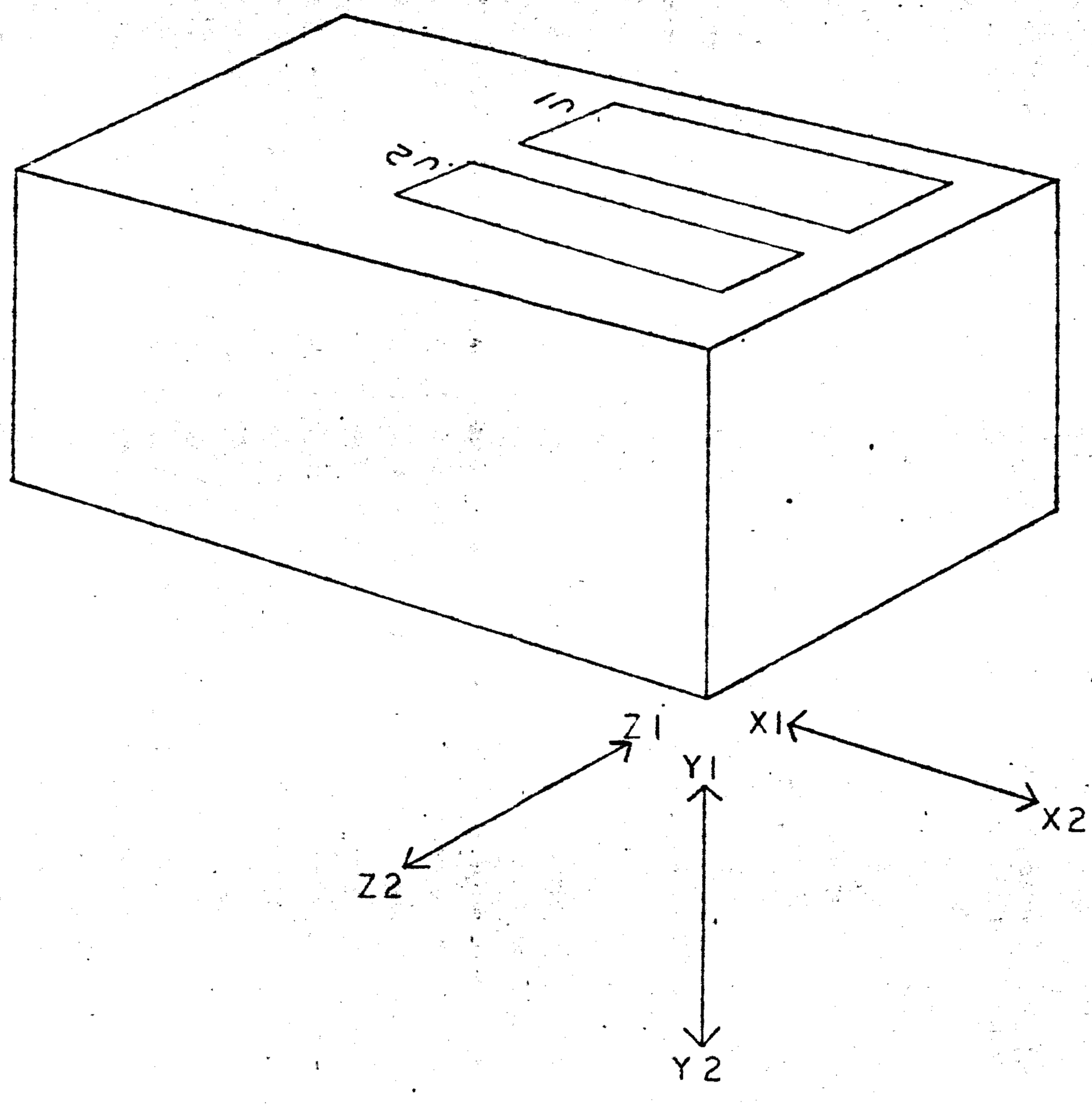
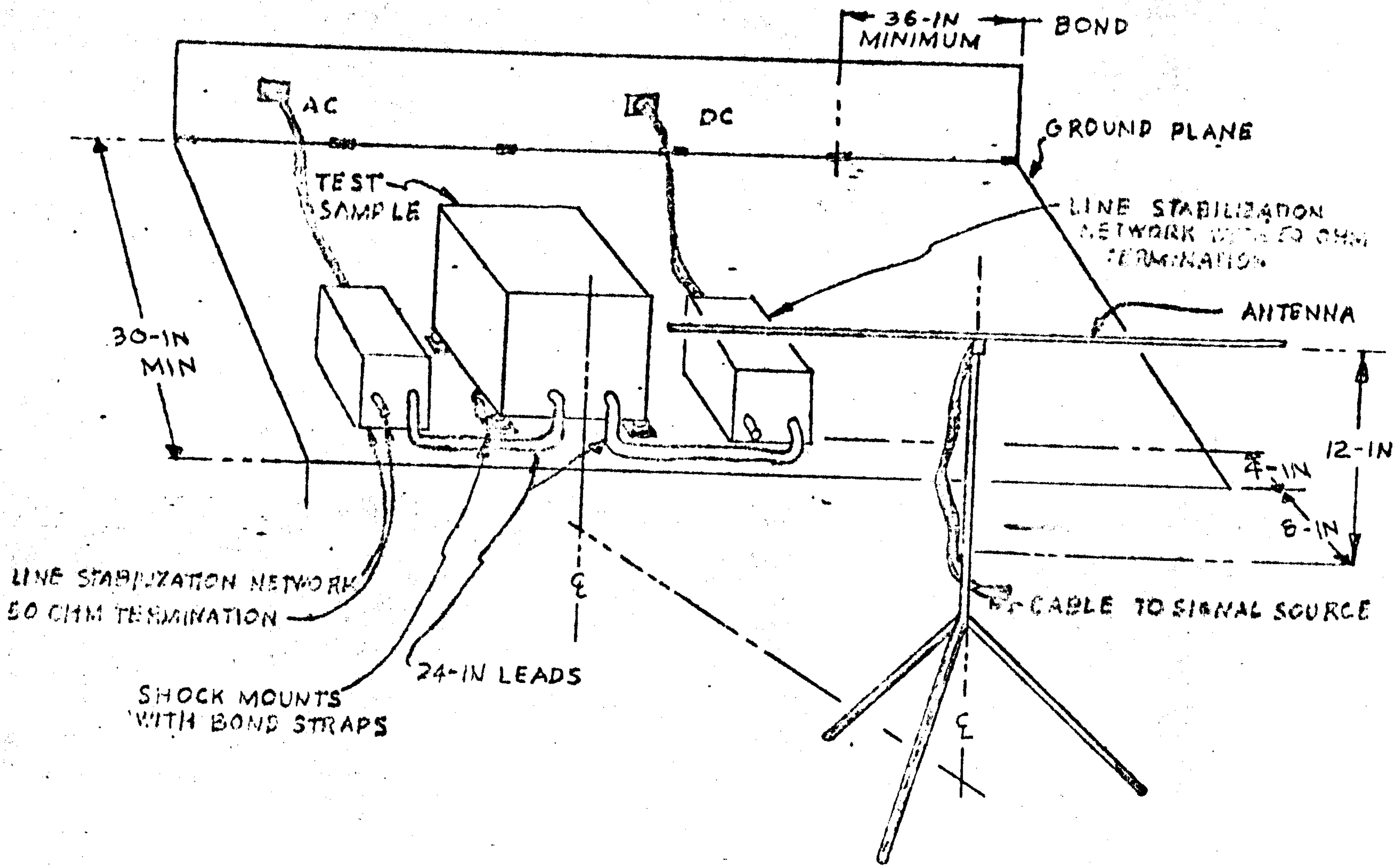


FIGURE 1

FIFTH DIMENSION INC.
PRINCETON, NEW JERSEY
FROM SCIENCE TO APPLICATION

NO



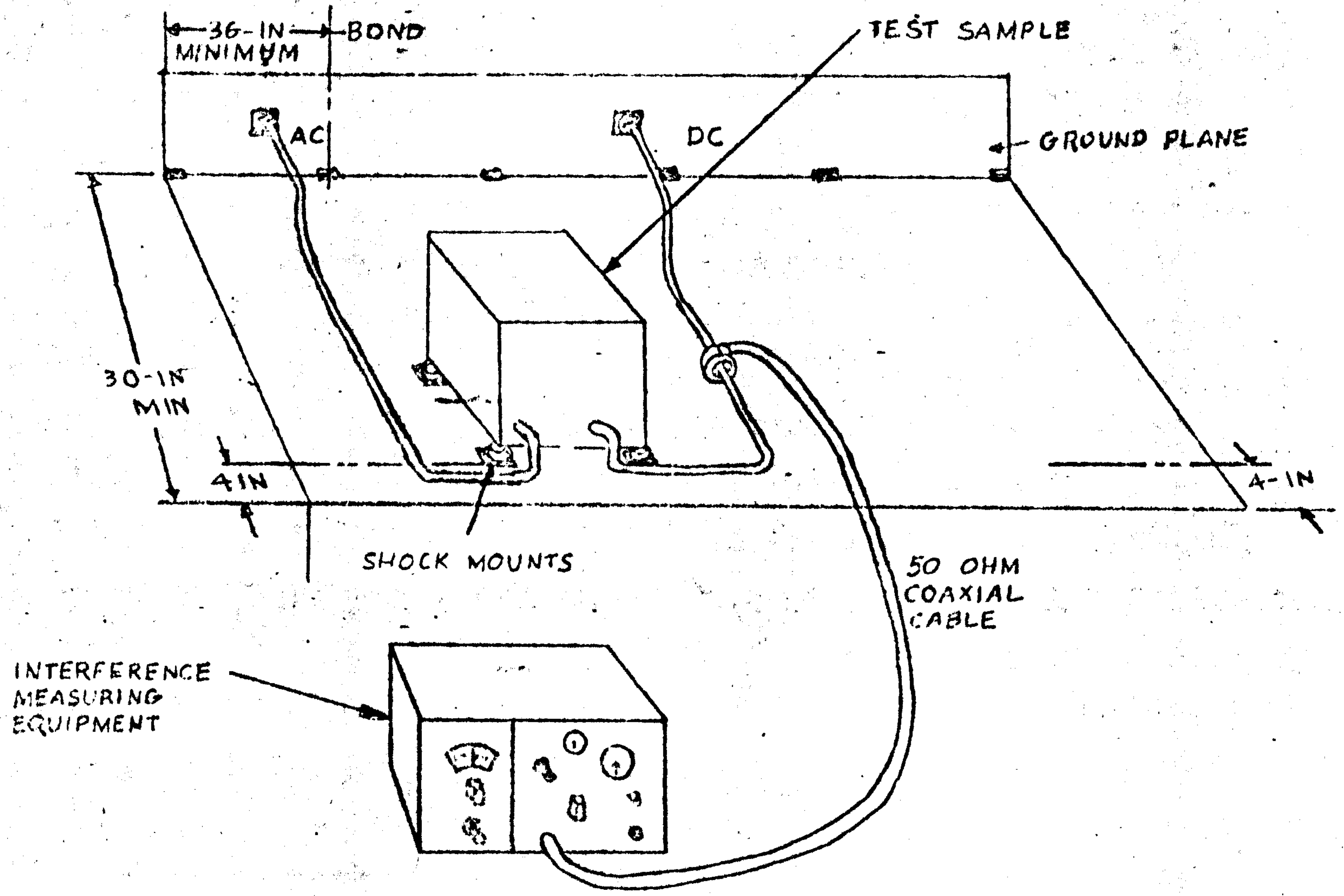
TYPICAL TEST SETUP FOR RADIATED MEASUREMENTS

FIGURE 2

Prepared	Checked	Approved	Rev.
Date	Date	Date	Date

FIFTH DIMENSION INC.
PRINCETON, NEW JERSEY
FROM SCIENCE TO APPLICATION

NO



TYPICAL TEST SETUP FOR CONDUCTED INTERFERENCE MEASUREMENTS

FIGURE 3

Prepared	Checked	Approved	Rev.
Date	Date	Date	Date

5DE-6