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PROGRESS REPORT NUMBER 23

FOR

FEBRUARY 1, 1963 TO MARCH 31, 1963

DESIGN, DEVELOPMENT AND FABRICATION OF
BAROSWITCH, REMOTE XM-10; BAROSWITCH,
PRESET XM-11; AND CONTROL BAROSWITCH
SETTING: XT-4126

CONTRACT NO. DA-36-034-ORD-2890A

FOR

PICATINNY ARSENAL, DOVER, NEW JERSEY
ATTN: NUCLEAR WEAPONS GROUP
ORDBB - TV4 - OMS - 5210.12.13210.01.07

PREPARED BY:

THE BENDIX CORPORATION
FRIEZ INSTRUMENT DIVISION
BALTIMORE 4, MARYLAND

APRIL 10, 1963

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APRIL 10, 1963

REF:
FR-92167
32-0376

PROGRESS REPORT NUMBER 23

Period Covered: February 1, 1963 to March 31, 1963

Design, Development and Fabrication of Baroswitch, Remote XM-10; Baroswitch, Preset XM-11; and Control, Baroswitch Setting: XT-4126

Contract No. DA-36-034-ORD-2890A

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PROGRESS REPORT NUMBER 23

DEVELOPMENT OF

BAROSWITCH, XM-10

BAROSWITCH, XM-11

SETTER, XT-4126

I. INTRODUCTION

Included in this report is a discussion of the work done on this project from February 1, 1963 to March 31, 1963. It includes the status of development of the XM-10 and XT-4126 Control Setter.

Also included in this report is a schedule for the work to be done during the period which follows this report period.

II. PROJECT ACTIVITIES DURING REPORT PERIOD

A. Baroswitch XM-10

During this report period, 11 XM-10 baroswitches (S/N 0070, 0071, 0072, 0073, 0074, 0076, 0078, 0079, 0081, 0082, 0084) were shipped to Picatinny Arsenal on Contract Modification 7. S/N 0075 and 0080 were retained at Bendix Friez for vibration testing. In addition, seven baroswitches were placed on 60 day drift tests. S/N 0068 was returned by Picatinny Arsenal to render the motor inoperative and set the elements at 14,000 ft., 24,000 ft., 34,000 ft. and 44,000 ft. This was done, and the unit was returned to Picatinny Arsenal.

A schedule of baroswitches delivered or on drift test under contract modification 7 is included as Appendix "C", and will be included as part of future progress reports until delivery is complete.

During a visit to Bendix-Friez, in the week ending 3-23-63, Mr. J. J. Woods, Picatinny Arsenal Project Officer, gave approval for use of the large diameter (.281 + .005) shoe for the XM-10 program. This item was originally developed for the XM-18 baroswitch program to improve element shift characteristics.

Preliminary copies of the XM-10 Mandatory Process have been given to Picatinny Arsenal for review and comment. Upon completion of this review, the Mandatory Process will become part of the XM-10 drawing system.

During this period two major vibration tests have been conducted. Appendix "A" is a report on testing of two baroswitches solidly mounted to the vibration table to seek minimum "G" levels for contact chatter. Appendix "B" reports on contact chatter tests with Lord mounts permitting a maximum excursion of .125" during 4 "G" testing. Upon reviewing the data in Appendix "B", Mr. Woods gave approval for use of Lord mounts with this elastomer in subsequent deliveries of XM-10 baroswitches.

B. Barosetter, XT-4126A

During this report period the investigation into the instability of the phase angle was continued. As stated in the previous progress report, the phase angle stability could be improved by placing a small capacitance across the primary of the amplifier input transformer, a capacitance in the feedback circuit and padding capacitances across the primary and secondary windings

of the driver transformer. Four setters were modified to receive the phase angle stabilizing capacitors. In achieving optimum performance, it was found that the values of the padding capacitors for both the primary and secondary windings of the driver transformer varied from unit to unit.

On March the twentieth Mr. G. J. Schechter of Picatinny Arsenal visited Bendix Friez to discuss the Evaluation Test Procedure and the general progress of the setter. The problem of the varying padding capacitor values was brought to Mr. Schechter's attention. It was decided that fixed values must be found. Using the four units available, compromise values were found without sacrificing any significant phase angle stability.

In the previous progress report the problem of the circuit breaker tripping frequently for high input voltages and exposure to the low temperature extreme was mentioned. This problem was rectified with a redesigned power supply transformer. It was agreed that all units would have the redesigned power supply transformer installed.

In reviewing the Evaluation Test Procedure, Mr. Schechter stated that all connectors must be protected from exposure to moisture, salt spray and dust. Since the setter did not have these features, it was decided that connector caps and a dummy receptacle will be incorporated on the units and its cables. This necessitated revisions in several of the environmental test procedures. These revisions have been completed and the Acceptance Test Procedure and Evaluation Test Procedure have been submitted to Bendix Friez Quality Control for their approval. Following the approval of the test procedures by Quality Control, they will be submitted to Picatinny Arsenal for approval. The revised Purchase Description is completed and will accompany the test procedures.

A schedule for the environmental tests has been drawn up making use of three setters and is included as Appendix D.

Mr. Schechter agreed that all units presently at Bendix Friez would be retained for the evaluation test. The use of a setter by the Baroswitch group will constitute the setting cycle life test.

The total time for completion of the evaluation test as scheduled is four weeks.

C. Summary

At this time, 22 of the 44 XM-10 Baroswitches of Contract Modification 7 are either delivered or in drift test. The large diameter shoe is now part of the XM-10 Baroswitch program. The Mandatory Process has been written and is being reviewed. Picatinny Arsenal has given approval for the .125" excursion Lord Mounts (see Appendix B) on the remainder of XM-10 baroswitch deliveries.

Four setters have been modified to stabilize the phase angle. Connector caps, dummy receptacles and new power supply transformers are on order to complete the final modifications. The Evaluation Test Procedure, Acceptance Test Procedure, and the revised Purchase Description have been completed and submitted for approval.

D. Man-Hours Expended during Report Period

During this report period, there have been expended approximately:

1113 Hours on Engineering

3578 Hours on Fabrication

III. PROJECT PLANNING SCHEDULE FOR THE NEXT REPORT PERIOD

A. Baroswitch, XM-10

1. Complete assembly of the 44 XM-10 baroswitches under Contract Modification 7, and start assembly of the 50 XM-10 baroswitches required under Contract Modification 9.
2. Continue 60 Day Drift Testing of all XM-10 baroswitches to be delivered.
3. Include the Mandatory Process in the XM-10 Baroswitch drawing system.

B. Setter, XT-4126A

1. Complete modification of the four units presently at Bendix Friez.
2. Install connector protective caps, dummy receptacle and new power supply to the four units.

3. Complete the acceptance test on the four units and begin evaluation testing.
4. Review drawings and submit to Picatinny Arsenal.

Prepared By:



D. M. Potter
Engineer



G. F. Hobday
Engineer

Approved By:



F. K. Davey
Chief Engineer
Special Products Group

APPENDIX "A"

CONTACT CHATTER TEST
ON
SOLIDLY MOUNTED XM-10 BAROSWITCHES

INTRODUCTION:

This report is submitted to Picatinny Arsenal to provide information on recently conducted sinusoidal vibration tests utilizing XM-10 baroswitches of the current design. The baroswitches were solidly mounted to the vibration equipment to determine minimum "G" levels at which contact chatter occurs with a 6 mb contact opening.

Data is presented in tabular and graphic form.

TEST EQUIPMENT AND PROCEDURES:

The XM-10 baroswitches used in this test, Serial Nos. 0075-B3 and 0080-B3, were of the latest design and contained platinum-tungsten crossed-wire contacts, padding resistors to compensate for capsule error, and plate-and-bellows assemblies brazed with Lithobrazo BT brazing alloy. The baroswitches passed Government Acceptance Tests prior to vibration.

Each baroswitch was solidly mounted to an orienting fixture by use of aluminum side plates (see attached sketch). The orienting fixture was mounted directly to the vibration equipment.

The baroswitches were set at 50,000 feet for all tests, and a contact aperture of 6 mb was maintained during testing. All elements were set at 116.0 mb prior to testing.

Chatter readouts were made on oscilloscopes, with no provision made in the readout equipment for filtering contact chatter of 50 microseconds or less.

Tests were conducted over the 5 to 2000 cps range, increasing the "G" level until contact chatter was observed or the capacity of the vibration equipment was reached. Limiting factors in the vibration equipment were the amplitude of excursion at the low frequency range, and the allowable field current at the upper frequency ranges.

Data was taken in the X-2, Y-2 and Z-1 axes (see sketch on first graph attached to report).

"G's" were measured with an accelerometer mounted on the orienting fixture.

Tests were conducted on February 11 to 14, 1963.

RESULTS:

The attached tables present information obtained from the two baroswitches during testing. "Lim" following an acceleration value in the table indicates that the capacity of the vibration equipment was reached without any contact chatter occurring.

Graphs attached present the same information.

DISCUSSION:

Inspection of the tables and graphs show low "G" levels at points listed in the tables below.

X AXIS:

65 cps (12.0 G's)
210 cps (6.7 G's)
230 cps (6.0 G's)
325 cps (3.3 G's)
420 cps (6.0 G's)
560 cps (1.0 G's)
825 cps (2.1 G's)
845 cps (1.5 G's)
1650 cps (<.10 G's)
1660 cps (<.10 G's)

Y AXIS:

330 cps (5.0 G's)
425 cps (9.5 G's)
575 cps (3.6 G's)
625 cps (2.5 G's)
860 cps (2.5 G's)
1000 cps (2.2 G's)
1675 cps (.10 G's)

Z AXIS:

280 cps (6.0 G's)
332 cps (2.2 G's)
650 cps (3.5 G's)
815 cps (1.9 G's)
850 cps (1.7 G's)
1650 cps (.28 G's)
1675 cps (.18 G's)

The above listing does not include every low point on the graphs, but gives an excellent feeling for the isolation characteristics required.

The 1650-1675 cps figures represent the resonant points of the diaphragm assemblies, and the 825-860 cps and 420-425 cps figures are sub-harmonics of that resonant point. Many of the baroswitch components (gear assemblies, element assemblies, motor armature) go into resonance in the 300-500 cps range.

The cause of the 12 "G" reading at 65 cps on Baroswitch No. 0080-B3 is not known, but proper elastomer selection for the Lord mounts will avoid contact chatter in this area at the 4 "G" level.

TABLE 1aX-2 Axis

<u>CPS</u>	<u>G's</u> Baroswitch No.		<u>CPS</u>	<u>G's</u> Baroswitch No.	
	<u>0075-B3</u>	<u>0080-B3</u>		<u>0075-B3</u>	<u>0080-B3</u>
5	1.5 (Lim)	2.0 (Lim)	40	30.0	30.0
6	2.3 "	2.3 "	42	29.0	30.0
7	4.5 "	3.7 "	44	30.0	26.0
8	7.0 "	6.5 "	46	30.0	30.0 (Lim)
9	8.5 "	8.5 "	48	30.0	30.0
10	10.0 "	10.0 "	50	25.0	30.0
12	10.2 "	10.5 "	55	25.0	30.0 (Lim)
14	13.5 "	14.5 "	58	24.0	-
16	15.5 "	16.2 "	60	18.0	30.0 (Lim)
18	19.0 "	19.2 "	63	-	21.0
20	22.0 "	22.5 "	65	30.0	12.0
22	26.0 "	28.0 "	70	20.0	24.0
24	30.0 "	33.0 "	75	29.0	24.0
26	30.0 "	35.0 "	80	26.0	22.5
28	30.0 "	32.0 "	85	23.0	23.0
30	30.0 "	35.0 "	90	21.0	23.0
32	30.0 "	30.0 "	95	30.0	20.0
34	30.0 "	30.0 "	100	27.0	22.0
36	30.0 "	30.0 "	105	18.0	17.0
38	30.0 "	25.0	110	24.0	23.5

TABLE 1a
- continued -

X-2 Axis

<u>CPS</u>	<u>G's</u> Baroswitch No.		<u>CPS</u>	<u>G's</u> Baroswitch No.	
	<u>0075-B3</u>	<u>0080-B3</u>		<u>0075-B3</u>	<u>0080-B3</u>
115	18.0	22.5	230	18.0	6.0
120	23.0	16.0	235	-	19.0
125	20.0	16.0	240	15.0	14.0
130	21.0	17.0	245	-	21.0
135	22.5	18.0	250	20.0	21.0
140	19.0	15.0	260	15.0	23.0
145	25.0	23.0	270	14.0	18.0
150	15.0	21.0	275	-	9.2
155	21.0	-	280	14.5	10.0
160	21.0	22.0	285	-	10.5
170	22.0	25.0	290	17.0	17.0
180	19.0	18.0	295	-	13.0
190	18.0	20.0	300	13.0	7.8
200	23.0	21.0	305	-	7.6
205	-	21.0	310	15.0	11.0
210	17.0	6.7	320	10.0	16.0
215	-	17.0	325	3.3	5.8
220	16.0	18.0	330	8.0	4.8
225	-	16.0	333	-	4.0

TABLE 1a
- continued -

X-2 Axis

<u>CPS</u>	<u>G's</u> <u>Baroswitch No.</u>		<u>CPS</u>	<u>G's</u> <u>Baroswitch No.</u>	
	<u>0075-B3</u>	<u>0080-B3</u>		<u>0075-B3</u>	<u>0080-B3</u>
335	-	4.0	565	-	1.4
340	9.4	6.0	575	1.4	1.0
345	-	12.0	590	-	2.6
350	17.0	13.0	600	4.0	5.6
360	17.0	11.0	625	6.5	9.5
370	10.0	12.0	650	9.5	6.5
380	12.0	13.0	675	8.0	8.8
390	12.0	10.0	700	6.0	15.0
400	14.0	9.6	725	6.8	14.5
410	-	10.0	750	8.5	11.5
420	-	6.0	775	10.0	12.0
425	11.0	10.0	800	11.5	11.0
450	14.0	11.5	825	2.1	5.5
475	10.0	11.5	845	-	1.5
500	7.5	13.0	850	4.5	2.8
525	5.0	11.0	900	15.0	3.5
540	-	4.8	950	14.0	5.8
550	3.5	2.6	1000	10.0	8.2
560	1.0	2.3	1050	11.0	13.0

TABLE 1a
- continued -

X-2 Axis

<u>CPS</u>	<u>G's</u>		<u>CPS</u>	<u>G's</u>	
	<u>Baroswitch</u>	<u>No.</u>		<u>Baroswitch</u>	<u>No.</u>
	<u>0075-B3</u>	<u>0080-B3</u>		<u>0075-B3</u>	<u>0080-B3</u>
1100	9.5	10.0	1950	12.0	4.5
1150	6.0	8.0	2000	13.0	4.0
1200	15.0	17.0			
1250	12.0	14.0			
1300	12.0	20.0			
1350	12.0	15.0			
1400	9.0	11.0			
1450	7.5	5.0			
1500	8.8	4.8			
1550	6.5	5.0			
1600	1.9	1.4			
1625	.16	.55			
1650	<.10	.18			
1660	-	<.10			
1700	.45	.50			
1750	3.2	1.0			
1800	7.0	4.5			
1850	15.0	4.0			
1900	14.0	6.0			

TABLE 1bY-2 Axis

<u>CPS</u>	<u>G's</u> <u>Baroswitch No.</u>		<u>CPS</u>	<u>G's</u> <u>Baroswitch No.</u>	
	<u>0075-B3</u>	<u>0080-B3</u>		<u>0075-B3</u>	<u>0080-B3</u>
5	1.5 (Lim)	2.7 (Lim)	40	27.0 (Lim)	23.0 (Lim)
6	2.0 "	3.0 "	42	27.0 "	23.0 "
7	4.0 "	4.5 "	44	27.0 "	25.0 "
8	5.5 "	5.0 "	46	27.0 "	25.0 "
9	6.5 "	6.5 "	48	27.0 "	25.0 "
10	8.0 "	8.0 "	50	27.0 "	25.0 "
12	8.0 "	8.0 "	55-135	27.0 "	25.0 "
14	10.0 "	7.5 "	140	22.0	25.0 "
16	14.0 "	14.0 "	145	27.0 (Lim)	25.0 "
18	17.0 "	17.5 "	150	20.0	25.0 "
20	20.0 "	21.0 "	160	27.0 (Lim)	25.0 "
22	23.0 "	23.0 "	170	21.0	25.0 "
24	23.0 "	23.0 "	180	27.0	25.0 "
26	24.0 "	23.0 "	190	27.0 (Lim)	25.0 "
28	24.0 "	23.0 "	200	27.0 "	25.0 "
30	24.0 "	23.0 "	210	10.0	25.0 "
32	24.0 "	23.0 "	220	27.0 (Lim)	25.0 "
34	26.0 "	23.0 "	230	26.0	25.0
36	27.0 "	23.0 "	240	9.5	20.0
38	27.0 "	23.0 "	250	27.0	25.0 (Lim)

TABLE 1b
- continued -

Y-2 Axis

<u>CPS</u>	<u>G's</u>		<u>CPS</u>	<u>G's</u>	
	<u>Baroswitch No.</u>			<u>Baroswitch No.</u>	
	<u>0075-B3</u>	<u>0080-B3</u>		<u>0075-B3</u>	<u>0080-B3</u>
260	16.0	25.0	500	18.0	17.0
270	8.0	23.0	525	11.0	13.0
280	10.0	22.0	550	7.0	6.4
290	16.0	25.0	575	4.5	3.6
300	18.0	25.0 (Lim)	600	9.5	7.0
310	12.0	17.0	625	2.1	7.0
320	10.0	7.2	650	3.5	4.0
330	5.0	5.2	660	-	2.1
335	-	3.5	675	3.5	2.6
340	8.0	6.0	680	-	8.0
350	18.0	13.0	700	6.0	19.0
360	20.0	19.0	725	11.0	21.0
370	20.0	25.0	750	15.0	19.0
380	21.0	25.0	775	17.0	16.0
390	24.0	30.0 (Lim)	800	5.5	11.0
400	25.0	10.0	825	3.7	5.0
425	9.5	25.0 (Lim)	850	2.6	3.5
450	26.0 (Lim)	23.0	860	-	2.5
475	25.0	13.0	875	-	5.0

TABLE 1b
- continued -

Y-2 Axis

<u>CPS</u>	<u>G's</u>		<u>CPS</u>	<u>G's</u>	
	<u>Baroswitch No.</u>	<u>Baroswitch No.</u>		<u>Baroswitch No.</u>	<u>Baroswitch No.</u>
	<u>0075-B3</u>	<u>0080-B3</u>		<u>0075-B3</u>	<u>0080-B3</u>
900	6.5	7.0	1800	16.0	19.0
950	2.8	6.0	1850	19.0	19.0
1000	2.2	4.0	1900	17.0	17.0
1050	3.0	4.0	1950	28.0	18.0
1100	4.5	4.0	2000	21.0	14.0
1150	3.0	4.0			
1200	7.5	5.0			
1250	8.0	7.5			
1300	9.0	11.5			
1350	12.0	9.2			
1400	14.0	7.0			
1450	11.0	5.0			
1500	9.5	6.0			
1550	2.1	7.0			
1600	1.2	6.5			
1650	.21	.75			
1675	-	.10			
1700	.8	2.5			
1750	6.0	16.0			

TABLE 1cZ-1 Axis

<u>CPS</u>	<u>G's</u>				<u>CPS</u>	<u>G's</u>			
	Baroswitch		No.			Baroswitch		No.	
	<u>0075-B3</u>		<u>0080-B3</u>			<u>0075-B3</u>		<u>0080-B3</u>	
5	1.5 (Lim)		1.3 (Lim)		40	25.0 (Lim)		27.0 (Lim)	
6	2.1	"	2.6	"	42	26.0	"	27.0	"
7	4.5	"	4.5	"	44	25.0	"	27.0	"
8	5.5	"	5.5	"	46	26.0	"	27.0	"
9	6.5	"	7.5	"	48	28.0	"	27.0	"
10	7.0	"	8.5	"	50	28.0	"	27.0	"
12	7.2	"	8.5	"	55	28.0	"	30.0	"
14	9.5	"	11.0	"	60	27.0	"	30.0	"
16	12.0	"	14.0	"	65	27.0	"	30.0	"
18	15.0	"	17.0	"	70	27.0	"	30.0	"
20	22.0	"	21.0	"	75	26.0	"	30.0	"
22	22.0	"	23.0	"	80	27.0	"	30.0	"
24	25.0	"	22.0	"	85	27.0	"	30.0	"
26	23.0	"	22.0	"	90	27.0	"	30.0	"
28	23.0	"	23.0	"	95	27.0	"	30.0	"
30	23.0	"	23.0	"	100	27.0	"	30.0	"
32	24.0	"	22.0	"	105	27.0	"	30.0	"
34	24.0	"	22.0	"	110	27.0	"	30.0	"
36	25.0	"	23.0	"	115	27.0	"	30.0	"
38	25.0	"	26.0	"	120	27.0	"	30.0	"

TABLE 1c
- continued -

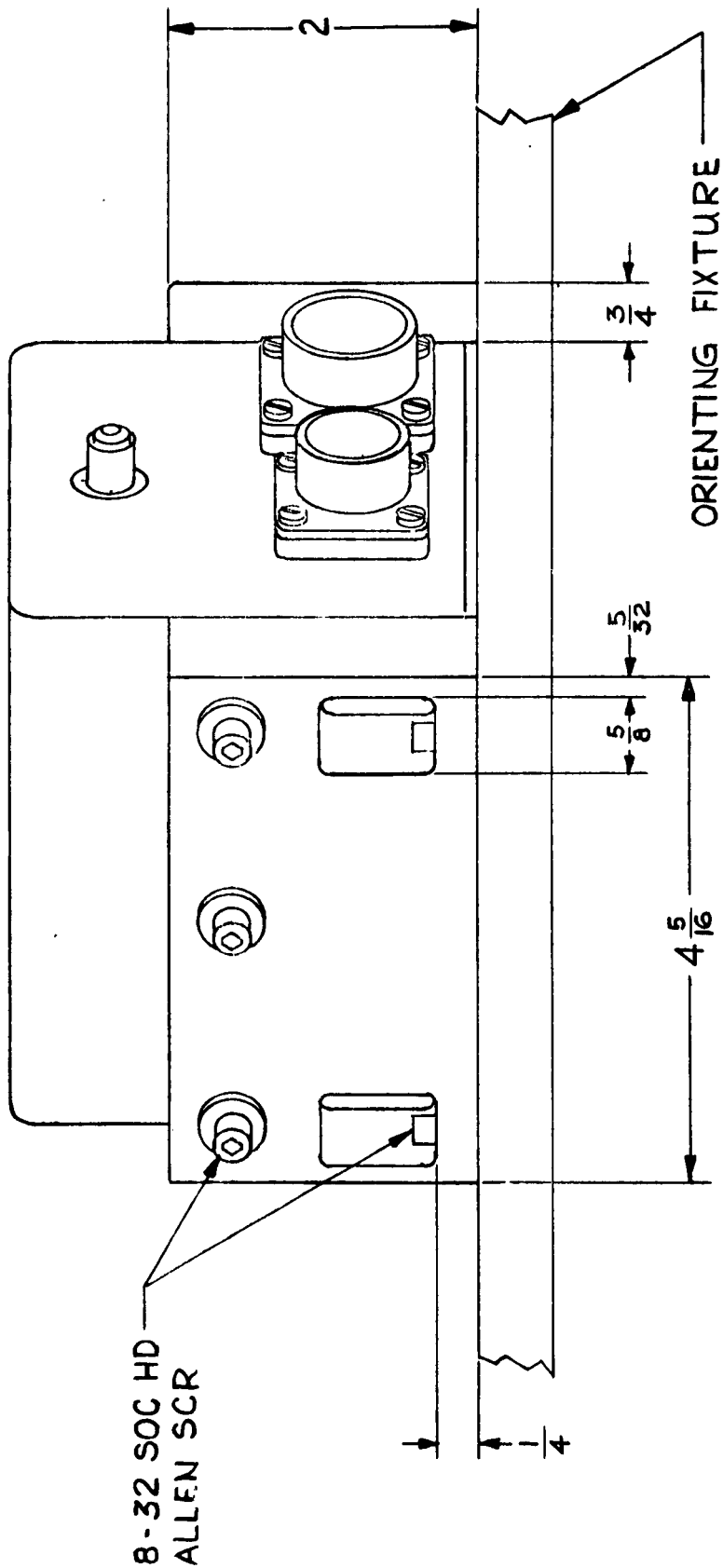
Z-1 Axis

<u>CPS</u>	<u>G's</u> Baroswitch No.		<u>CPS</u>	<u>G's</u> Baroswitch No.	
	<u>0075-B3</u>	<u>0080-B3</u>		<u>0075-B3</u>	<u>0080-B3</u>
125	27.0 (Lim)	30.0 (Lim)	332	-	2.2
130	19.0	30.0 "	335	-	4.7
135-190	27.0 (Lim)	30.0 "	340	25.0	9.0
200	27.0 "	29.0	350	27.0 (Lim)	19.5
205	-	28.0	360	27.0 "	25.0 (Lim)
210	27.0 (Lim)	10.0	370	27.0 "	25.0 "
215	-	29.0	380	27.0 "	25.0 "
220	27.0 (Lim)	29.0	390	27.0 "	25.0 "
230	27.0 "	26.0	400	27.0 "	25.0 "
240	12.0	10.0	420	7.0	-
250	27.0	26.0 (Lim)	425	20.0	19.0
260	26.0 (Lim)	26.0 "	450	25.0 (Lim)	25.0 (Lim)
270	27.0 "	26.0	475	23.0	25.0 "
280	6.0	9.0	500	15.0	22.0
290	27.0 (Lim)	26.0	525	11.0	20.0
300	27.0 "	26.0 (Lim)	550	8.5	13.5
310	27.0 "	21.5	575	8.0	8.8
320	26.0	14.0	600	6.5	14.0
330	13.0	5.4	625	4.5	10.0

TABLE 1c
- continued -

Z-1 Axis

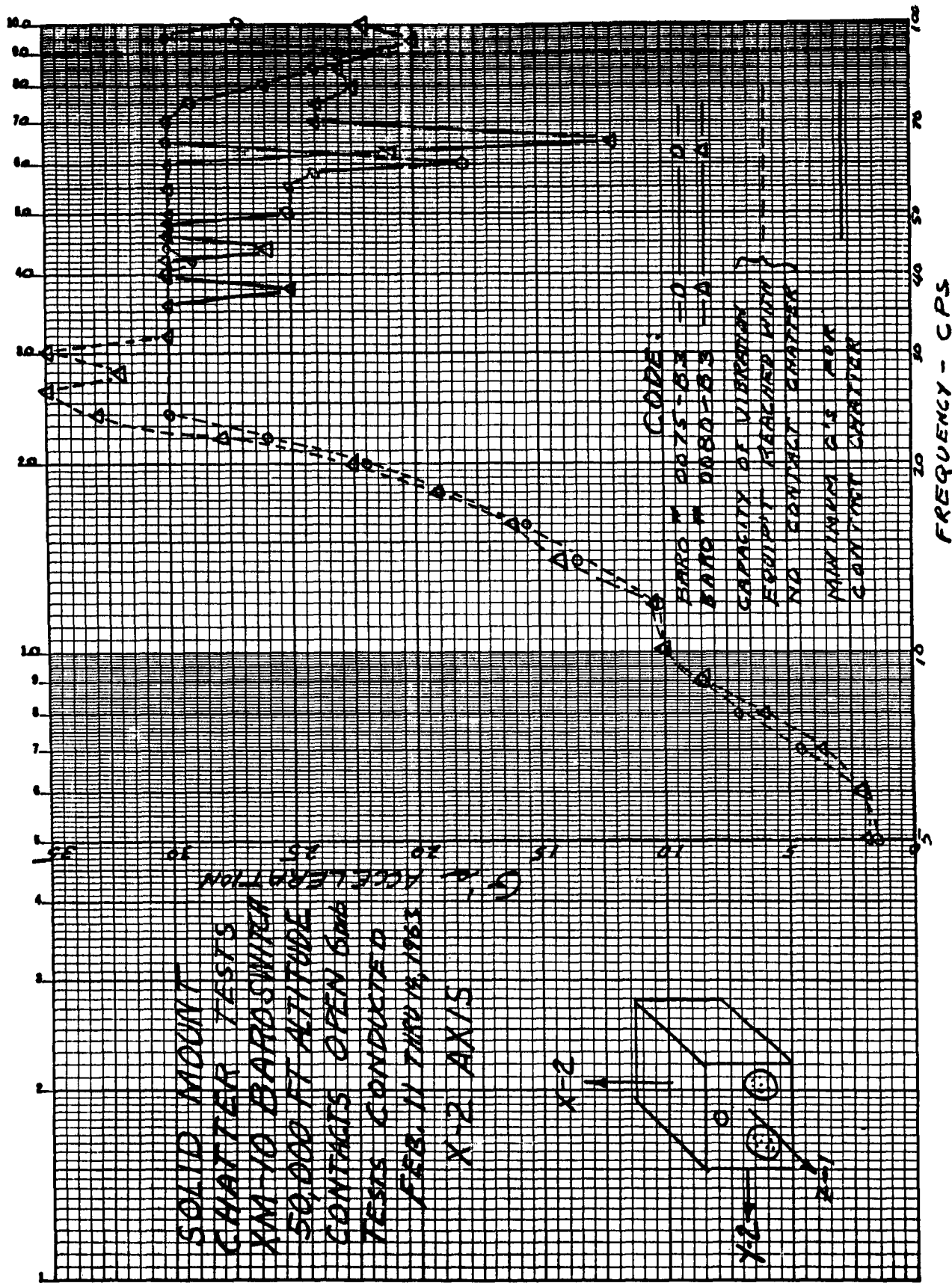
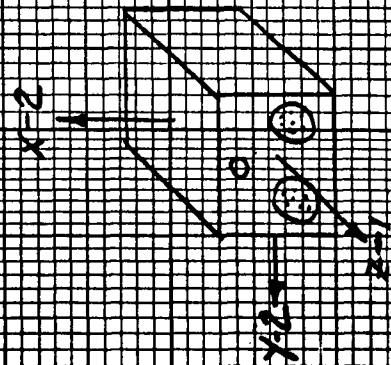
<u>CPS</u>	<u>G's</u>		<u>CPS</u>	<u>G's</u>	
	<u>Baroswitch</u>	<u>No.</u>		<u>Baroswitch</u>	<u>No.</u>
	<u>0075-B3</u>	<u>0080-B3</u>		<u>0075-B3</u>	<u>0080-B3</u>
650	3.5	4.0	1150	3.0	5.5
660	-	4.3	1200	8.0	8.5
675	4.0	6.5	1250	7.0	9.5
700	11.0	13.0	1300	8.0	11.0
725	18.0	17.0	1350	7.0	13.0
750	22.0	22.0	1400	5.0	8.5
775	21.0	20.0	1450	4.0	7.0
800	15.0	11.0	1500	4.0	6.2
815	-	1.9	1550	3.5	7.5
825	8.5	3.0	1600	1.9	2.2
835	-	5.5	1650	.28	4.0
850	1.7	2.1	1675	-	.18
860	-	1.7	1700	1.1	1.9
875	2.6	7.0	1750	2.1	3.5
900	7.0	7.5	1800	10.0	10.0
950	4.2	10.0	1850	10.0	16.0
1000	3.6	5.5	1900	10.0	19.0
1050	3.0	4.0	1950	11.0	16.0
1100	7.0	4.5	2000	11.0	14.0

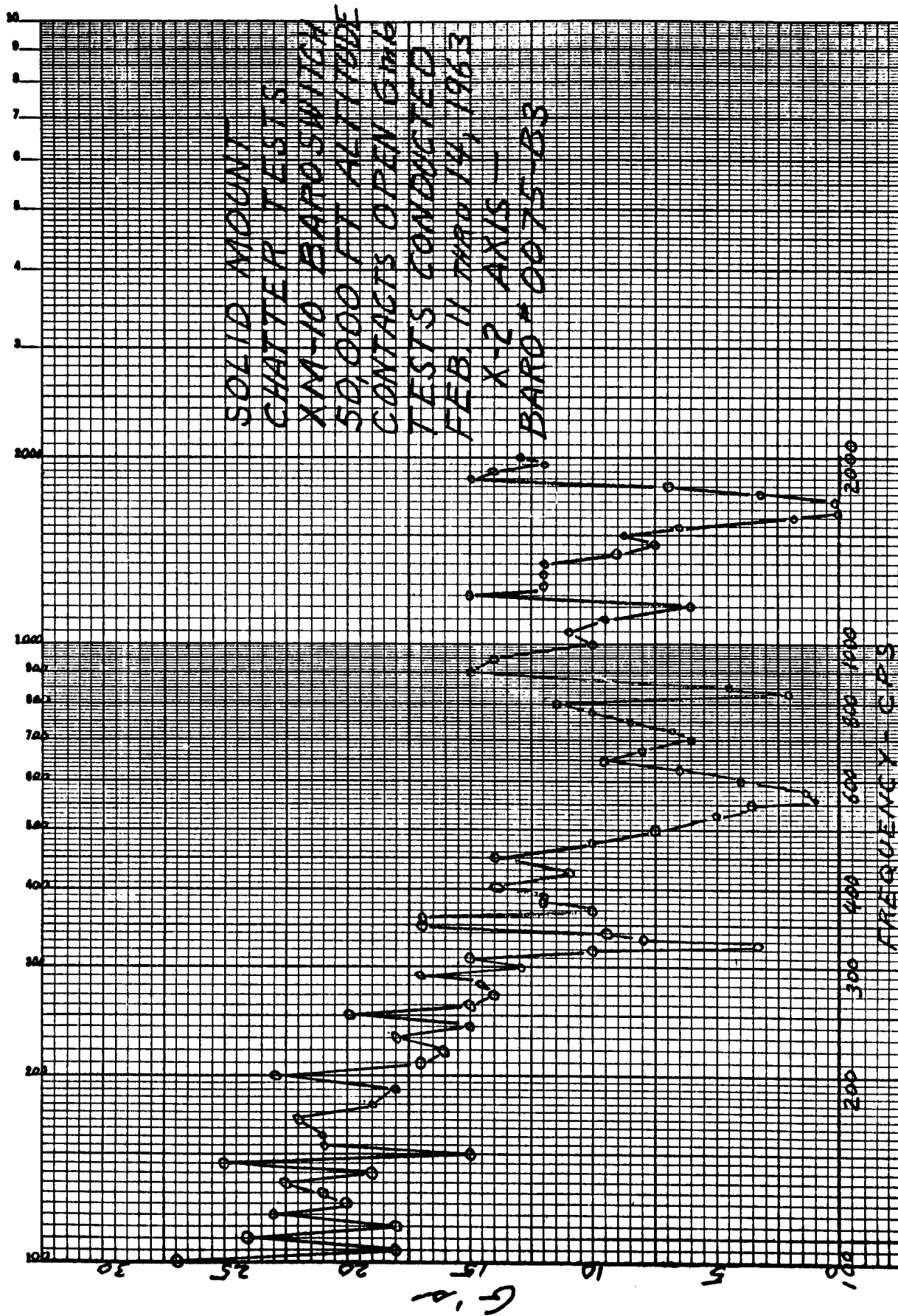


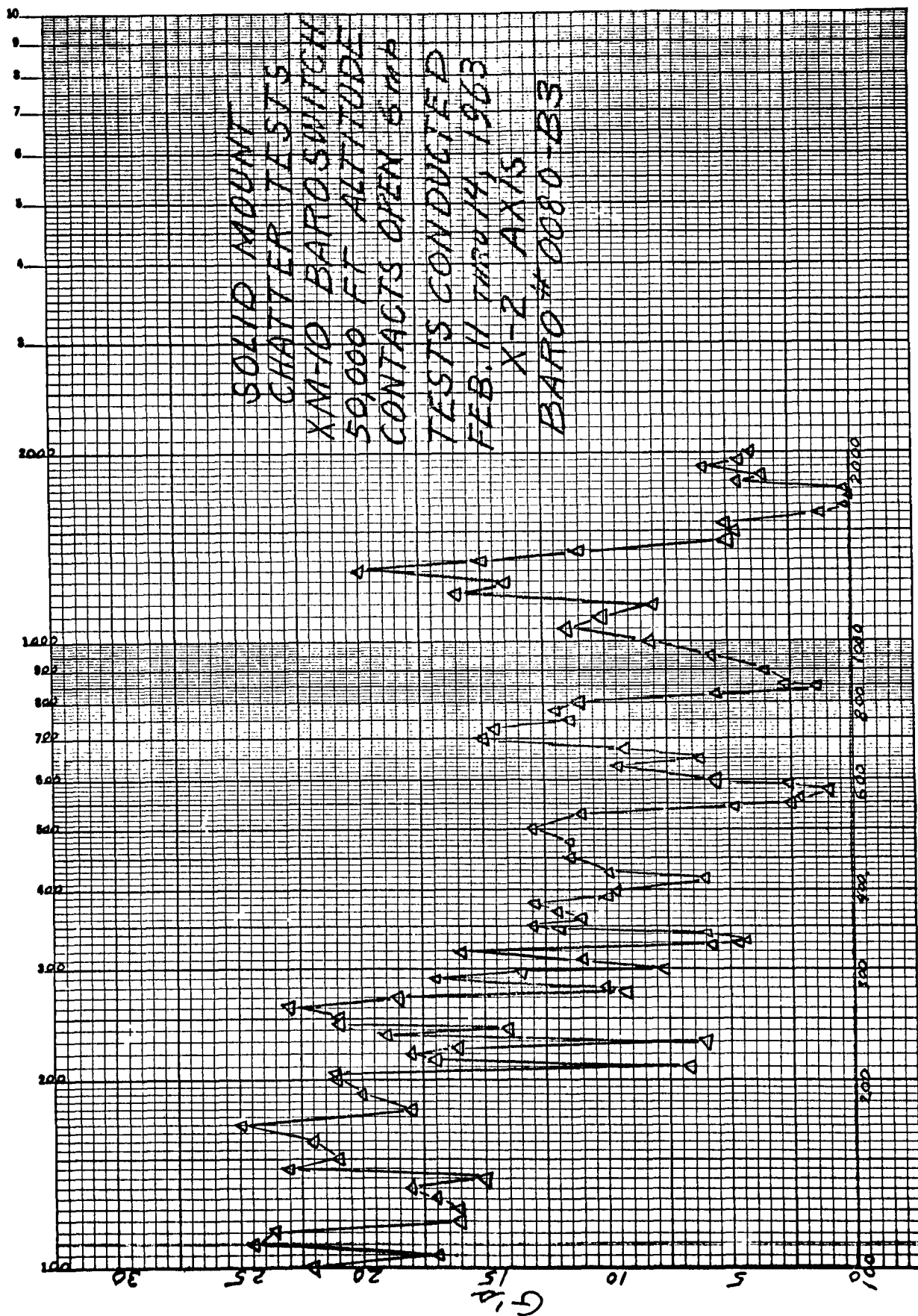
XM-10 BAROSWITCH
MOUNTED TO ORIENTING FIXTURE
WITH ALUMINUM SIDE PLATES

SOLID MOUNT
 CHATTER TESTS
 XM-10 BAROSWITCH
 50,000 FT ALTITUDE
 CONTACTS OPEN 600
 TESTS CONDUCTED
 FEB 11 THRU 13, 1963

X-2 AXIS







MADE IN U.S.A.
IONS

25 20 15
ACCELERATION



FAO # 0075-3311-0101

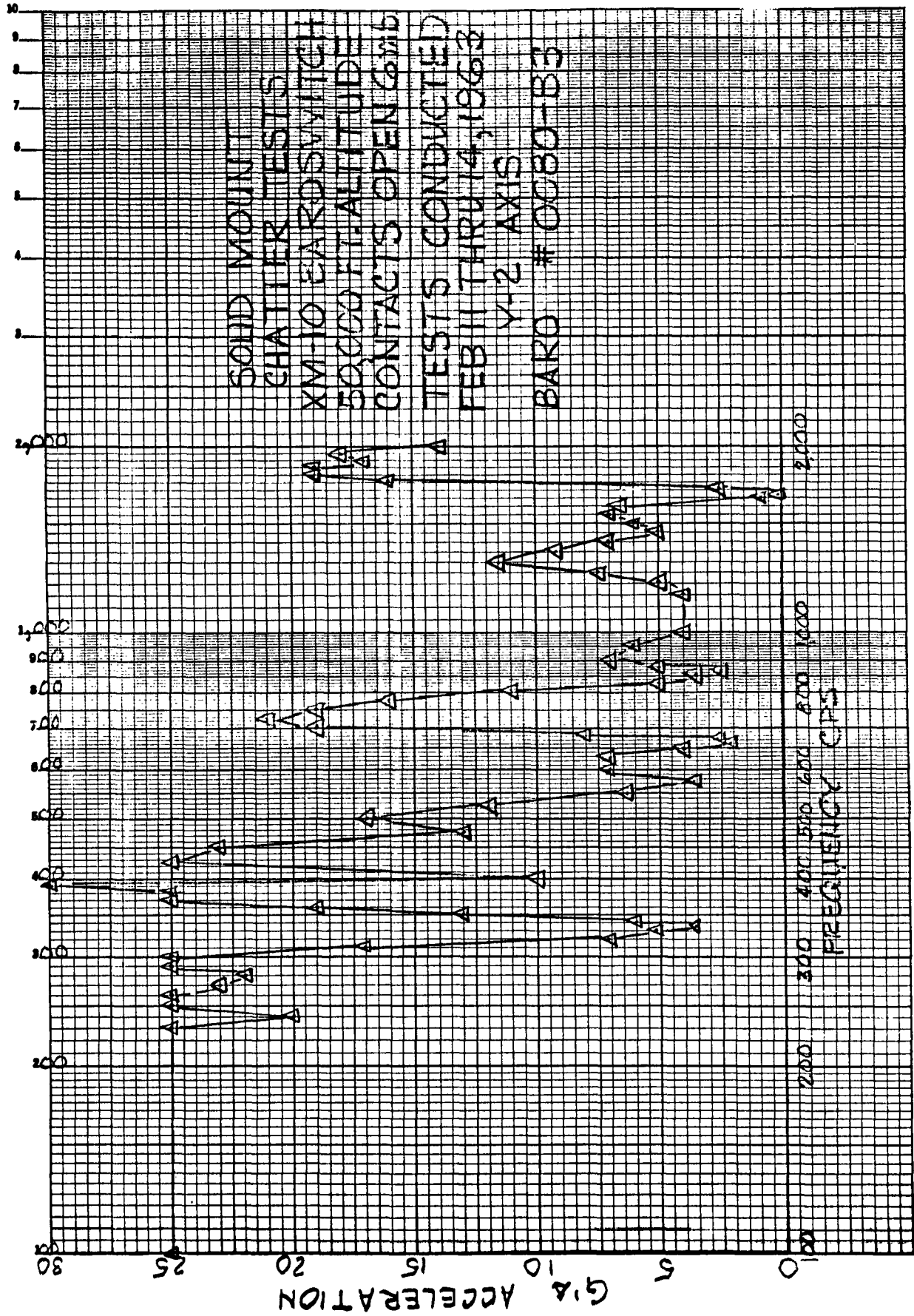
BAPO* 0080:33=X=A

CAPACITY OF VIBRATION

THE MATHS OF THE WORLD

EDUCATION OFFICER

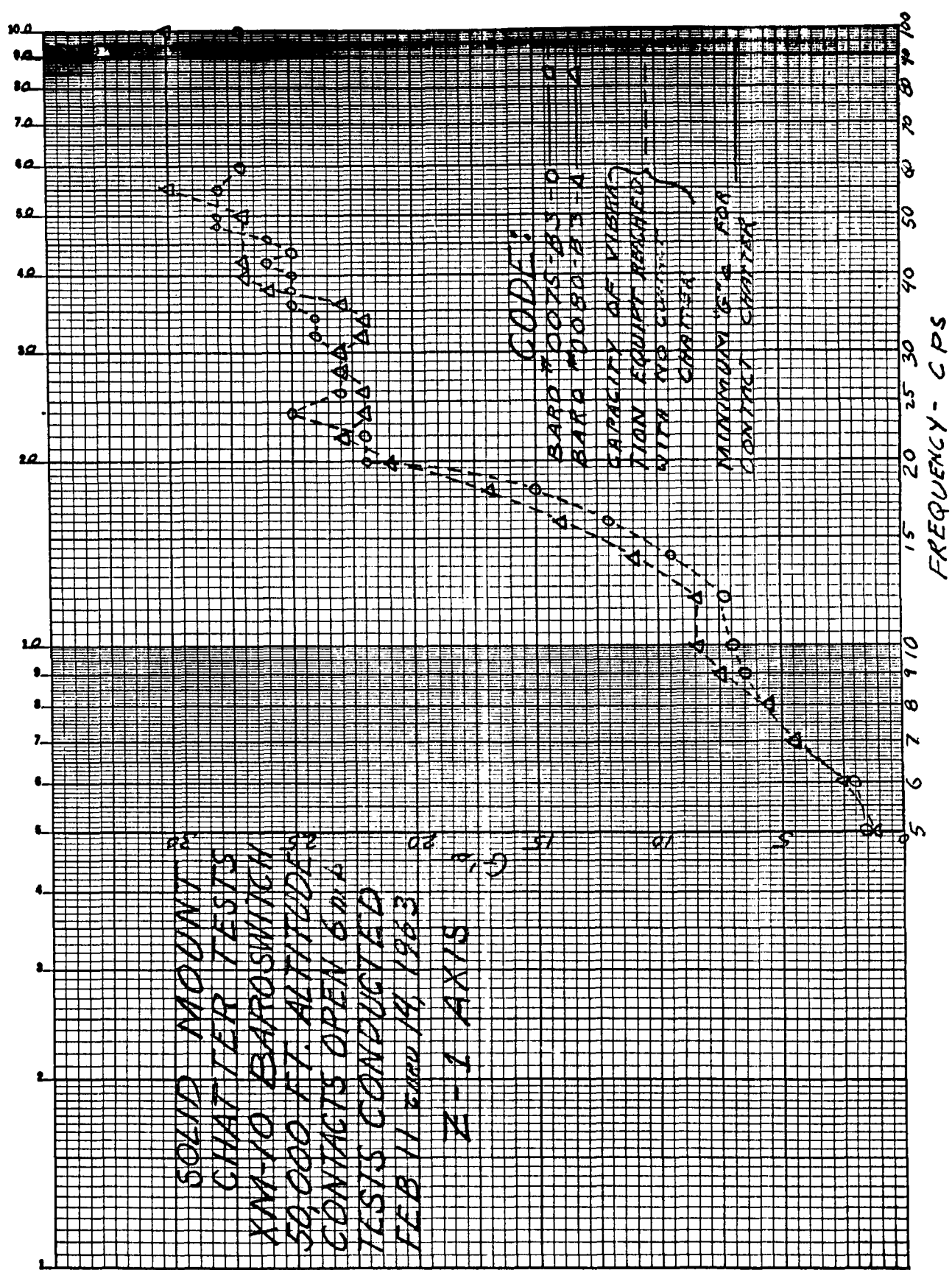
MINIMUM G'S FOR
CONTACT CHATTER



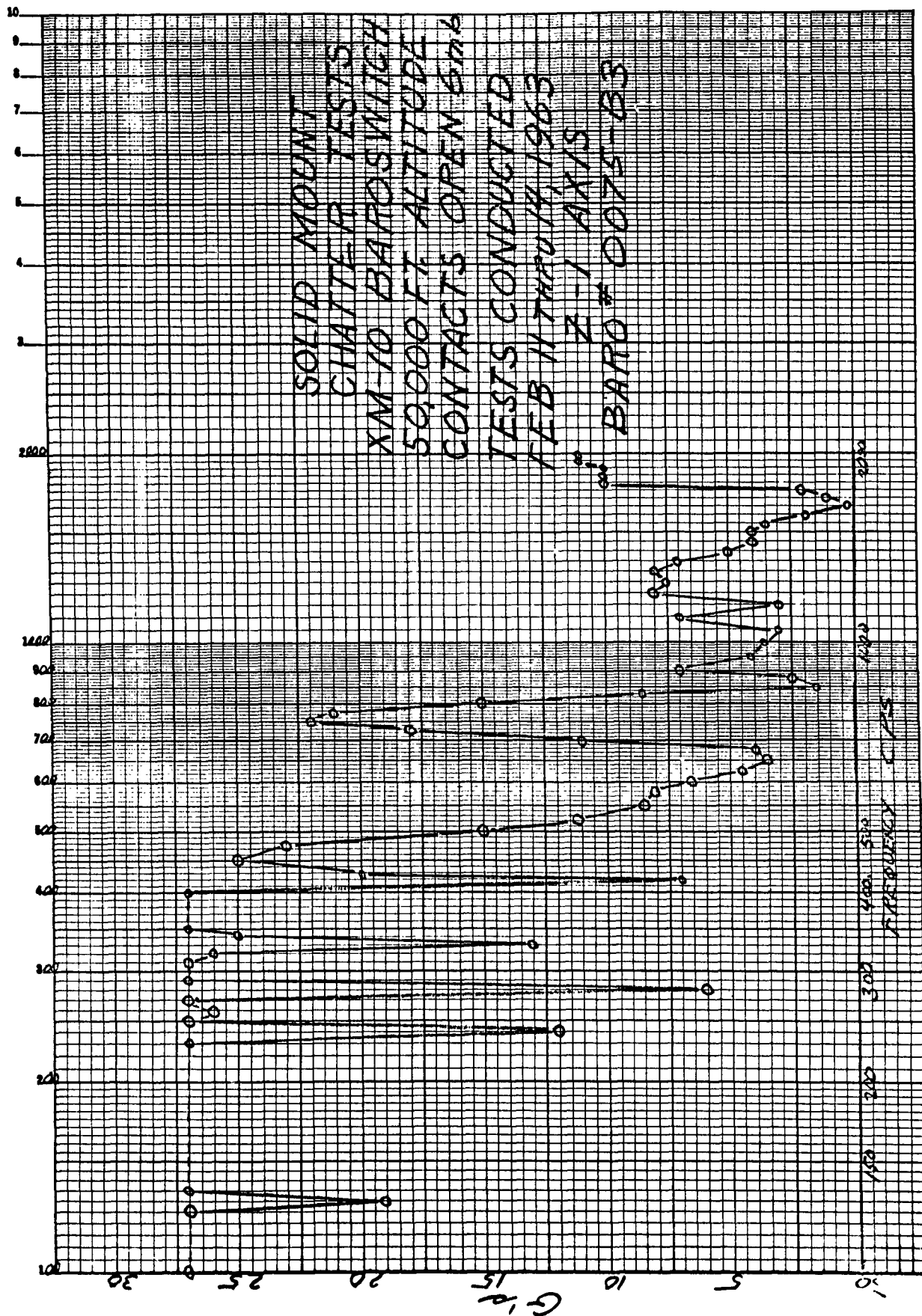
SOLID MOUNT
 CHAPTER TESTS
 XM-10 BAROSWITCH
 50,000 FT. ALTITUDE
 CONTACTS OPEN 601.6
 TESTS CONDUCTED
 FEB 11 6000 14 1963

Z-1 AXIS

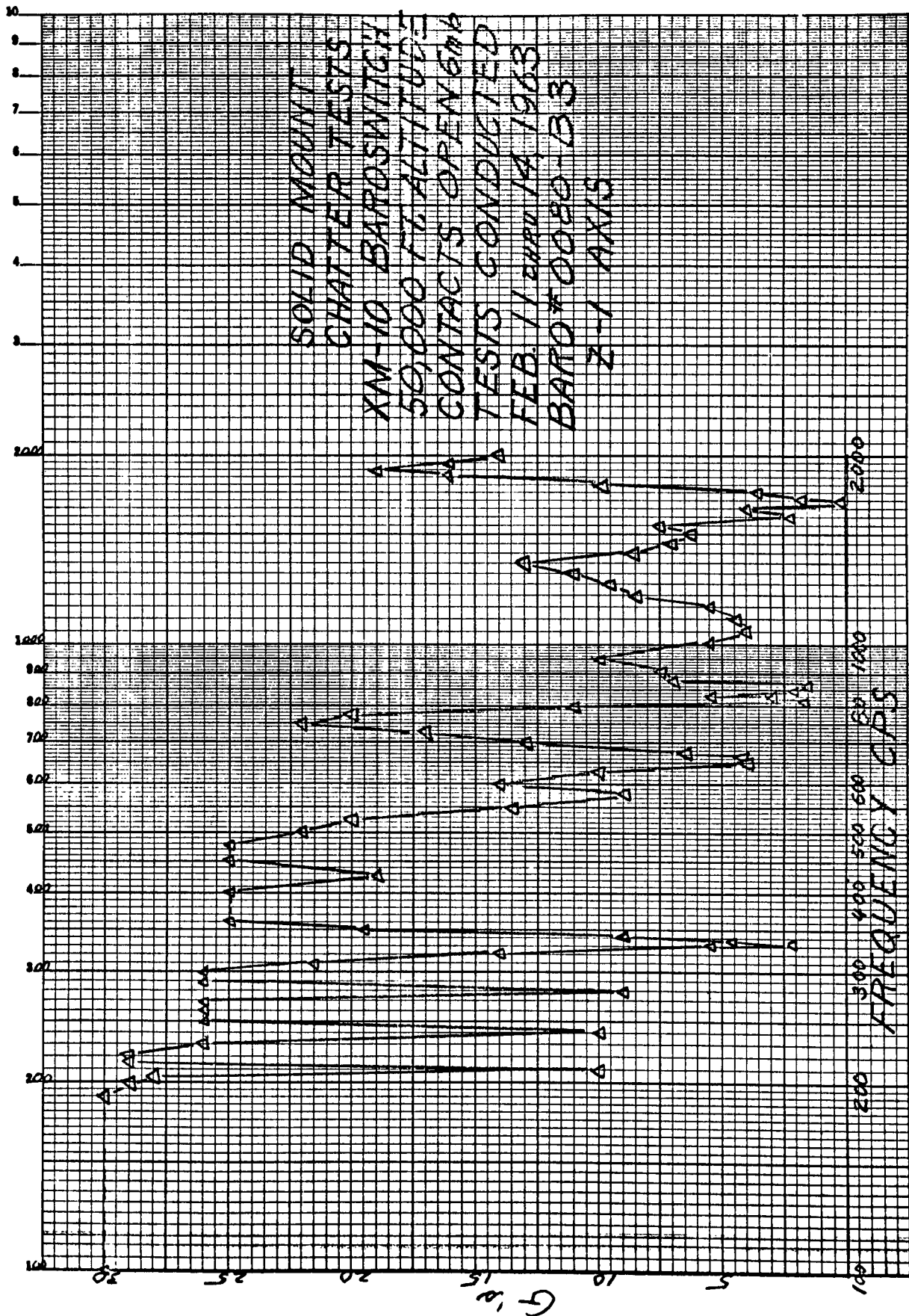
CODE:
 BARO POINTS - 0
 BARO POINTS - 0
 CAPACITY OF VIBRA-
 TION EQUIP. REACHED
 WITH NO CURRENT
 CHARTER
 MINIMUM 5% FOR
 CONTACT CHARTER



R02 S. JGAR...C -J-61
KEUFFEL & ESSER CO. MADE IN U.S.A.
2 CYCLES X 70 DIVISIONS



K-E SEMI-LOGARITHMIC 359-61
KEUFFEL & ESSER CO. MADE IN U.S.A.
2 CYCLES X 70 DIVISIONS



File Ref: 32-0376-7
Contract No.: DA-36-034-ORD-2890A

APPENDIX "B"

VIBRATION TEST ON XM-10 BAROSWITCHES
USING .125" EXCURSION LORD MOUNTS

INTRODUCTION:

This report is submitted to Picatinny Arsenal to provide information on recently conducted vibration tests on the XM-10 Baroswitch, utilizing Lord mounts with a .125" excursion. Data is presented in tables and graphic form, and a summary analysis of the data is included.

TEST EQUIPMENT AND PROCEDURES:

The XM-10 baroswitches used in this test, Serial Nos. 0075-B3 and 0080-B3, were of the latest design, with platinum-tungsten crossed-wire contacts. These baroswitches were used in the previously reported solid-mount contact chatter tests. The mounts were experimental units from Lord Manufacturing, utilizing an elastomer which permitted a .125" excursion in the X axis at mount resonance during 4 "G" testing.

A set of mounts was placed on each baroswitch and these were used throughout testing.

Testing was started on 3-8-63 and completed on 3-15-63. A synopsis of the testing procedure is as follows:

A. Vibration Inputs:

5-15-5 cps at 0.35" D.A. constant

15-2000-15 cps at 4g's constant

B. Sweep Times:

Four minutes, 10 minutes (each sweep time encompassing both inputs).

C. Altitudes:

10,216 ft. (3114 meters) (691 mb)

20,187 ft. (6153 meters) (462 mb)

49,995 ft. (15,238 meters) (116 mb)

D. Orientations:

X-2 Axis, Y-2 Axis, Z-1 Axis (stated axis pointed upward - see Figure 1)

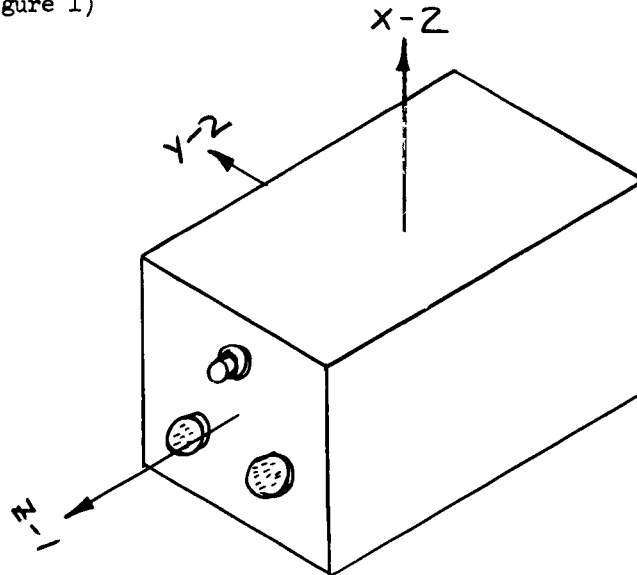


Figure 1

E. Contact Setting:

Contacts were set open 6 mb, test was conducted. If necessary, contacts were opened in increments of 2 mb until contact closures during vibration were eliminated. Contacts were set closed 6 mb, test conducted.

F. Sequence followed during Vibration Testing.

<u>Test No.</u>	<u>Unit No.</u>	<u>Axis</u>	<u>Sweep Time</u>	<u>Altitude</u>
1	0075-B3	X-2	4 Min.	10,216 Ft.
2	0075-B3	X-2	10 Min.	10,216 Ft.
3	0075-B3	X-2	4 Min.	20,187 Ft.
4	0075-B3	X-2	10 Min.	20,187 Ft.
5	0075-B3	X-2	4 Min.	49,995 Ft.
6	0075-B3	X-2	10 Min.	49,995 Ft.
7	0080-B3	X-2	4 Min.	10,216 Ft.
8	0080-B3	X-2	10 Min.	10,216 Ft.
9	0080-B3	X-2	4 Min.	20,187 Ft.
10	0080-B3	X-2	10 Min.	20,187 Ft.
11	0080-B3	X-2	4 Min.	49,995 Ft.
12	0080-B3	X-2	10 Min.	49,995 Ft.
13	0080-B3	Z-1	4 Min.	10,216 Ft.
14	0080-B3	Z-1	10 Min.	10,216 Ft.
15	0080-B3	Z-1	4 Min.	20,187 Ft.
16	0080-B3	Z-1	10 Min.	20,187 Ft.
17	0080-B3	Z-1	4 Min.	49,995 Ft.
18	0080-B3	Z-1	10 Min.	49,995 Ft.
19	0075-B3	Z-1	4 Min.	10,216 Ft.
20	0075-B3	Z-1	10 Min.	10,216 Ft.
21	0075-B3	Z-1	4 Min.	20,187 Ft.
22	0075-B3	Z-1	10 Min.	20,187 Ft.
23	0075-B3	Z-1	4 Min.	49,995 Ft.
24	0075-B3	Z-1	10 Min.	49,995 Ft.
25	0075-B3	Y-2	4 Min.	10,216 Ft.
26	0075-B3	Y-2	10 Min.	10,216 Ft.
27	0075-B3	Y-2	4 Min.	20,187 Ft.
28	0075-B3	Y-2	10 Min.	20,187 Ft.
29	0075-B3	Y-2	4 Min.	49,995 Ft.
30	0075-B3	Y-2	10 Min.	49,995 Ft.
31	0080-B3	Y-2	4 Min.	10,216 Ft.
32	0080-B3	Y-2	10 Min.	10,216 Ft.

<u>Test No.</u>	<u>Unit No.</u>	<u>Axis</u>	<u>Sweep Time</u>	<u>Altitude</u>
33	0080-B3	Y-2	4 Min.	20,187 Ft.
34	0080-B3	Y-2	10 Min.	20,187 Ft.
35	0080-B3	Y-2	4 Min.	49,995 Ft.
36	0080-B3	Y-2	10 Min.	49,995 Ft.

G. Readout Equipment:

A 28 VDC, 50 micro-ampere load was impressed across each contact. Contact closures were monitored with oscilloscopes. No provision for filtering contact closures of 50 microseconds or less duration was included in the test setup.

H. Mount Transmissibility:

Transmissibility tests were made prior to contact chatter testing in the specified axes.

RESULTS:

Attachment No. 1 presents contact chatter data in tabular form. Descriptive symbols used are defined below:

NC = No contact chatter

Hold -6 = Holding contacts open by 6 mb

Hold +6 = Holding contacts closed by 6 mb

60-75, etc. = Constant or near constant chatter from 60 to 75 cps

65,1700, etc. = Isolated chatter at these points

Set Point = Actual pressure reading where contacts indicate closure

Graphs plotting contact chatter vs. frequency for each test are attached.

Mount Transmissibility information is tabulated in Attachment No. 2. Graphs of transmissibility vs. frequency are attached.

Mount transmissibility and excursion envelopes by the V-scope method at the resonant frequencies are tabulated below:

<u>X-2 Axis</u>	<u>Resonant Freq.</u>	<u>Mount Trans.</u>	<u>Excursion Envelope</u>
0075-B3	60 cps	5.75:1	0.125"
0080-B3	63.5 cps	5.75:1	0.125"
<u>Y-2 Axis</u>			
0075-B3	145 cps	7.5:1	-
0080-B3	140 cps	8.25:1	-
<u>Z-1 Axis</u>			
0075-B3	63 cps	6.13:1	0.109"
0080-B3	60 cps	5.65:1	0.109"

Excursions during Y-axis testing were too small to be read on the V-scope.

DISCUSSION AND CONCLUSIONS:

A comparison of this test program and tests reported in Progress Reports Nos. 19 and 20, using Lord mounts with .093" excursion shows that in most direct comparisons between the two test programs, the .125" excursion mounts required less contact aperture to eliminate chatter than did the .093" excursion mounts. However, the peak transmissibility showed an increase for the .125" excursion mounts, as shown below:

PEAK TRANSMISSIBILITIES

	<u>X-Axis</u>	<u>Y-Axis</u>	<u>Z-Axis</u>
.093" Elastomer	3.12:1 (110 cps)	7.5:1 (190 cps)	2.85:1 (100 cps)
.125" Elastomer	5.75:1 (63.5 cps)	8.25:1 (140 cps)	5.65:1 (60 cps)

The absence of contact chatter in the Z-1 Axis for the .125" Elastomer is worth noting.

ATTACHMENT NO. 1

Test No. 1					Test No. 7				
Unit No. 0075-B3					Unit No. 0080-B3				
Axis (X-2) Mount Resonance 60 cps					Axis (X-2) Mount Resonance 63.5 cps				
Transmissibility 5.75:1 - Sweep 4 Min.					Transmissibility 5.75:1 - Sweep 4 Min.				
4 G's Const. - 10,216 Ft. Alt.					4 G's Const. - 10,216 Ft. Alt.				
<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	
Set Point	694.5	697	694	694.5	694	692	694	694	
Hold	-6.5	-9.0	-6.0	-6.5	-8.0	-6.0	-8.0	-8.0	
5-2000	1700	NC	NC	65	55-70	55-70	55-70	53-70	
2000-5	70	NC	NC	70,60	70-55	70-55	70-55	70-55	
Hold	-8.5	-11.0	-8.0	-8.5	-10.0	-8.0	-10.0	-10.0	
5-2000	NC	NC	NC	70	55-70	55-70	55-70	50,55-70	
2000-5	NC	NC	NC	NC	70-55	70-55	70-55	70-55	
Hold	-10.5	-13.0	-10.0	-10.5	-12.0	-10.0	-12.0	-12.0	
5-2000	NC	NC	NC	NC	55-70	55-70	55-70	55-70	
2000-5	NC	NC	NC	NC	70-55	NC	70-55	70-55	
				Hold	-14.0	-12.0	-14.0	-14.0	
				5-2000	NC	NC	NC	55,65-70	
				2000-5	57	NC	NC	57	
				Hold	-16.0	-14.0	-16.0	-16.0	
				5-2000-5	NC	NC	NC	NC	

Test No. 1 (continued)

<u>(CLOSED)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	694	696	693	693.5	694	692	694	694
Hold	+8.0	+6.0	+9.0	+8.5	+6.0	+8.0	+6.0	+6.0
5-2000-5	NC	NC	NC	NC	NC	NC	NC	NC

Test No. 2

Unit No. 0075-B3
Axis (X-2) - Sweep 10 min.
4 G's Const. 10,216 Ft. Alt.

Test No. 8

Unit No. 0080-B3
Axis (X-2) - Sweep 10 min.
4 G's Const. 10,216 Ft. Alt.

<u>OPEN</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	694	696	693	693.5	694	692	694	694
Hold	-7.0	-9.0	-6.0	-6.5	-8.0	-6.0	-8.0	-8.0
5-2000	60,1700	NC	NC	60	55-72	65	65	50-72
2000-5	NC	NC	NC	65	70-54	70-60	70-60	70-54
Hold	-9.0	-11.0	-8.0	-8.5	-10.0	-8.0	-10.0	-10.0
5-2000	NC	NC	NC	NC	52-70	52-70	52-70	52-70
2000-5	NC	NC	NC	NC	72-55	70-55	70-55	70-55
				Hold	-12.0	-10.0	-12.0	-12.0
				5-2000	55-72	55-65	55-65	55-72
				2000-5	72-55	72-55	72-55	72-55
				Hold	-14.0	-12.0	-14.0	-14.0
				5-2000	55-70	65	65	55-70

Test No. 2 (continued)				Test No. 8 (continued)				
<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
				2000-5	70-65	65	65	70-57
				Hold	-16.0	-14.0	-16.0	-16.0
				5-2000	NC	NC	NC	55-70
				2000-5	NC	NC	NC	57
				Hold	-18.0	-16.0	-18.0	-18.0
				5-2000	NC	NC	NC	57,65,70
				2000-5	NC	NC	NC	65,57
				Hold	-20.0	-18.0	-20.0	-20.0
				5-2000-5	NC	NC	NC	NC
<u>(CLOSED)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	693	695	692.5	693.5	694	692	694	694
Hold	+8.0	+6.0	+8.5	+7.5	+6.0	+8.0	+6.0	+6.0
5-2000-5	NC	NC	NC	NC	NC	NC	NC	NC

Test No. 3	Test No. 9
Unit No. 0075-B3	Unit No. 0080-B3
Axis (X-2) - Sweep 4 Min.	Axis (X-2) - Sweep 4 Min.
4 G's Const. 20,187 Ft. Alt.	4 G's Const. 20,187 Ft. Alt.

<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	459	458	460	458.5	460	457	459.5	459
Hold	-7.0	-6.0	-8.0	-6.5	-9.0	-6.0	-8.5	-8.0

Test No. 3 (continued)				Test No. 9 (continued)				
<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
5-2000	NC	NC	NC	60,65	54-70	54-70	54-70	54-70
2000-5	NC	NC	NC	70-60	70-60	70-60	70-60	75-54
Hold	-9.0	-8.0	-10.0	-8.5	-11.0	-8.0	-10.5	-10.0
5-2000	NC	NC	NC	NC	55-65	55-65	55-65	55-65
2000-5	NC	NC	NC	65	70-52	70-52	70-52	70-52
Set Check	459	458	460	458	460	457	459.5	459
Hold	-11.0	-10.0	-12.0	-10.0	-13.0	-10.0	-12.5	-12.0
5-2000	NC	NC	NC	NC	NC	NC	57-65	NC
2000-5	NC	NC	NC	NC	70	NC	70-65	70-65
				Hold	-15.0	-12.0	-14.5	-14.0
				5-2000	NC	NC	65	NC
				2000-5	NC	NC	65-60	NC
				Hold	-17.0	-14.0	-16.5	-16.0
				5-2000-5	NC	NC	NC	NC
<u>(CLOSED)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	459	458	460	458	460	457	459.5	459
Hold	+7.0	+8.0	+6.0	+8.0	+5.5	+8.5	+6.0	+6.5
5-2000-5	NC	NC	NC	NC	NC	NC	NC	NC

Test No. 4

Unit No. 0075-B3

Axis (X-2) - Sweep 10 Min.

4 G's Const. 20,187 Ft. Alt.

Test No. 10

Unit No. 0080-B3

Axis (X-2) - Sweep 10 Min.

4 G's Const. 20,187 Ft. Alt.

<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	459	458	460	458	460.5	457	459.5	458.5
Hold	-7.0	-6.0	-8.0	-6.0	-9.5	-6.0	-8.5	-7.5
5-2000	NC	60-70 1700	NC	55 60-72	56-73	56-73	56-73	56-73
2000-5	NC	1700 70-60	65	72-56	70-58	70-58	70-58	70-58
Hold	-9.0	-8.0	-10.0	-8.0	-11.5	-8.0	-10.5	-9.5
5-2000	NC	NC	NC	55,61,65	58-67	56-67	56-72	56-72
2000-5	NC	NC	NC	70,68	72-65	72-65	72-65	72-65
Hold	-11.0	-10.0	-12.0	-10.0	-13.5	-10.0	-12.5	-11.5
5-2000	NC	NC	NC	56	56-68	56-68	56-68	56-68
2000-5	NC	NC	NC	NC	NC	NC	68-55	68-55
Hold	-13.0	-12.0	-14.0	-12.0	-15.5	-12.0	-14.5	-13.5
5-2000	NC	NC	NC	NC	NC	NC	58-67	58-67
2000-5	NC	NC	NC	NC	NC	NC	58	68-60
				Hold	-17.5	-14.0	-14.5	-13.5
				5-2000	NC	NC	68	NC
				2000-5	NC	NC	58	NC

Test No. 4 (continued)

<u>(OPEN)</u>	<u>Ele. #1</u>	<u>Ele. #2</u>	<u>Ele. #3</u>	<u>Ele. #4</u>	Test No. 10 (continued)			
				Hold	<u>Ele. #1</u>	<u>Ele. #2</u>	<u>Ele. #3</u>	<u>Ele. #4</u>
				5-2000-5	NC	NC	NC	NC
<u>(CLOSED)</u>	<u>Ele. #1</u>	<u>Ele. #2</u>	<u>Ele. #3</u>	<u>Ele. #4</u>	<u>Ele. #1</u>	<u>Ele. #2</u>	<u>Ele. #3</u>	<u>Ele. #4</u>
Set Point	459	458	460	458	460.5	457	459.5	458.5
Hold	+7.0	+8.0	+6.0	+8.0	+6.0	+9.0	+7.0	+8.0
5-2000-5	NC	NC	NC	NC	NC	NC	NC	NC

Test No. 5

Unit No. 0075-B3
Axis (X-2) - Sweep 4 Min.
4 G's Const. 49,995 Ft. Alt.

<u>(OPEN)</u>	<u>Ele. #1</u>	<u>Ele. #2</u>	<u>Ele. #3</u>	<u>Ele. #4</u>	<u>Ele. #1</u>	<u>Ele. #2</u>	<u>Ele. #3</u>	<u>Ele. #4</u>
Set Point	118	118	114.5	116.5	120	113	118	115
Hold	-7.5	-7.5	-4.0	-6.0	-13.0	-6.0	-11.0	-8.0
5-2000	NC	63-65	58,63-65 1700	63-65	NC	60	NC	NC
2000-5	70-58	70-58	70-58	70-58	65-60	65-60	65-60	65-60
Hold	-10.0	-10.0	-6.5	-8.5	-15.0	-8.0	-13.0	-10.0
5-2000	60-70	60-70	60-70	60-70	60-65	60-65	60-65	60-65
2000-5	70-65	70-65	70-65	70-65	60	NC	60	NC
Hold	-12.0	-12.0	-8.5	-10.5	-17.0	-10.0	-15.0	-12.0

Test No. 11

Unit No. 0080-B3
Axis (X-2) - Sweep 4 Min.
4 G's Const. 49,995 Ft. Alt.

Test No. 5 (continued)

<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
5-2000	NC	NC	68	NC	60	NC	60	NC
2000-5	65	NC	65	NC	NC	NC	NC	NC
Hold	-14.0	-14.0	-10.5	-12.5	-19.0	-12.0	-17.0	-14.0
5-2000	NC	NC	NC	NC	60	NC	60	NC
2000-5	NC	NC	NC	NC	NC	NC	NC	NC

Hold

5-2000-5

(CLOSED)

<u>(CLOSED)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	118	118	115.5	117.5	120	113	118	115
Hold	+6.0	+6.0	+8.5	+6.5	+6.0	+13.0	+8.0	+11.0
5-2000-5	NC	NC	NC	NC	NC	NC	NC	NC

Test No. 6

Unit No. 0075-B3
Axis (X-2) - Sweep 10 Min.
4 G's Const. 49,995 Ft. Alt.

Test No. 12

Unit No. 0080-B3
Axis (X-2) - Sweep 10 Min.
4 G's Const. 49,995 Ft. Alt.

<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	118.5	118	115.5	118	120	113	118	115
Hold	-6.5	-6.0	-3.5	-6.0	-13.0	-6.0	-11.0	-8.0
5-2000	57-72	57-72	57-72 1700	57-72	60-65	60-65	60-65	60-65

	Test No. 6 (continued)				Test No. 12 (continued)			
	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
(OPEN)								
2000-5	70-55	70-52	75,70-55	70-55	65-60	NC	65-60	NC
Set Check	118.5	118	116	118	120	113	118	115
Hold	-8.5	-8.0	-6.0	-8.0	-15.0	-8.0	-13.0	-10.0
5-2000	65	60-75	60-75	60-75	60-65	60-65	60-65	60-65
2000-5	70-57	70-57	75	70-57	NC	NC	63	NC
Hold	-10.5	-10.0	-8.0	-10.0	-17.0	-10.0	-15.0	-12.0
5-2000	57	NC	60-65	NC	60-63	NC	63	60-63
2000-5	68	NC	60	NC	NC	NC	63	NC
Hold	-12.5	-12.0	-10.0	-12.0	-19.0	-12.0	-17.0	-14.0
5-2000	65	NC	60	NC	NC	NC	60	NC
2000-5	57	NC	60	NC	NC	NC	NC	NC
Hold	-14.5	-14.0	-12.0	-14.0	-21.0	-14.0	-19.0	-16.0
5-2000	65	NC	60,65	NC	NC	NC	NC	NC
2000-5	NC	NC	64	NC	NC	NC	NC	NC
Hold	-16.5	-16.0	-14.0	-16.0				
5-2000	65	NC	60	NC				
2000-5	NC	NC	NC	NC				
Hold	-18.5	-18.0	-16.0	-18.0				
5-2000-5	NC	NC	NC	NC				

Test No. 6 (continued)

<u>(CLOSED)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	118.5	118	115.5	118	120	113	118	115
Hold	+6.0	+6.5	+9.0	+6.5	+6.0	+13.0	+8.0	+11.0
5-2000-5	NC	NC	NC	NC	NC	NC	NC	NC

Test No. 25

Unit No. 0075-B3
Axis (Y-2) Mount Resonance 145 cps
Transmissibility 7.5:1 - Sweep 4 Min.
4 G's Const. 10,216 Ft. Alt.

Test No. 31

Unit No. 0080-B3
Axis (Y-2) Mount Resonance 140 cps
Transmissibility 8.25:1 - Sweep 4 Min.
4 G's Const. 10,216 Ft. Alt.

<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	695.5	698	695	694	694	691.5	692	693.5
Hold	-7.5	-10.0	-7.0	-6.0	-8.5	-6.0	-6.5	-8.0
5-2000	140	140	140 1700	140	140	NC	140	140
2000-5	130	130	1700 130	130	NC	NC	NC	NC
Hold	-9.5	-12.0	-9.0	-8.0	-10.5	-8.0	-8.5	-10.0
5-2000	NC	NC	NC	NC	140	NC	140	140
2000-5	NC	NC	NC	NC	NC	NC	NC	NC
				Hold	-12.5	-10.0	-10.5	-12.0
				5-2000	NC	NC	140	NC
				2000-5	NC	NC	NC	NC

Test No. 25 (continued)

(OPEN) Ele.#1 Ele.#2 Ele.#3 Ele.#4 Ele.#1 Ele.#2 Ele.#3 Ele.#4

Hold -14.5 -12.0 -12.5 -14.0 -14.0 -12.0 -12.5 -14.0

5-2000 NC NC NC NC NC NC NC NC

2000-5 NC NC NC NC NC NC NC NC

Hold -16.5 -14.0 -14.5 -14.5 -14.5 -14.0 -14.5 -16.0

5-2000 NC NC NC NC NC NC NC NC

2000-5 NC NC NC NC NC NC NC NC

Hold -18.5 -16.0 -16.5 -16.5 -16.5 -16.0 -16.5 -18.0

5-2000-5 NC NC NC NC NC NC NC NC

Test No. 31 (continued)

(CLOSED) Ele.#1 Ele.#2 Ele.#3 Ele.#4 Ele.#1 Ele.#2 Ele.#3 Ele.#4

Set Point 695.5 698 695 694 694 691.5 692 693.5

Hold +8.5 +6.0 +9.0 +10.0 +6.0 +8.5 +8.0 +6.5

5-2000-5 NC NC NC NC NC NC NC NC

Test No. 26

Unit No. 0075-B3
Axis (Y-2) - Sweep 10 Min.
4 G's Const. 10,216 Ft. Alt.

Test No. 32

Unit No. 0080-B3
Axis (Y-2) - Sweep 10 Min.
4 G's Const. 10,216 Ft. Alt.

(OPEN) Ele.#1 Ele.#2 Ele.#3 Ele.#4 Ele.#1 Ele.#2 Ele.#3 Ele.#4

Set Point 694 696 692 692 694 691.5 692 693.5

Hold -8.0 -10.0 -6.0 -6.0 -8.5 -6.0 -6.5 -8.0

5-2000 NC NC 120-140 120-140 NC NC 140-145 140-145

1700

Test No. 26 (continued)		Test No. 32 (continued)			
<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	
2000-5	NC	NC	140-130	1700 140-130	NC 140 140
Hold	-10.0	-12.0	-8.0	-8.0	-10.5 -8.0 -10.0
5-2000	135-140	135-140	135-140	135-140	NC 140-145 140-145
2000-5	140-130	NC	140-130	1700 140-130	NC 140 140
Set Check	692	695	691.5	690.5	694 691.5 692 693.5
Hold	-11.5	-14.5	-11.0	-12.0	-12.5 -10.0 -10.5 -12.0
5-2000	NC	NC	135	140	NC 140 NC
2000-5	NC	NC	NC	135	NC 140 140
Hold	-13.5	-16.5	-13.0	-14.0	-14.5 -12.0 -12.5 -14.0
5-2000	NC	NC	NC	140	NC 140 NC
2000-5	NC	NC	NC	140	NC 140 NC
Hold	-15.5	-18.5	-15.0	-16.0	-16.5 -14.0 -14.5 -16.0
5-2000	NC	NC	NC	NC	NC 140 140
2000-5	NC	NC	NC	NC	NC 140 140
				Hold	-18.5 -16.0 -16.5 -18.0
				5-2000	NC NC NC
				2000-5	NC 140 NC

Test No. 26 (continued)				Test No. 32 (continued)				
<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
				Hold	-20.5	-18.0	-18.5	-20.0
				5-2000-5	NC	NC	NC	NC
<u>(CLOSED)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	690	693	689.5	688	694	691.5	692	693.5
Hold	+9.0	+6.0	+9.5	+11.0	+6.0	+8.5	+8.0	+6.5
5-2000-5	NC	NC	NC	NC	NC	NC	NC	NC

Test No. 27					Test No. 33				
Unit No. 0075-B3					Unit No. 0080-B3				
Axis (Y-2) - Sweep 4 Min.					Axis (Y-2) - Sweep 4 Min.				
4 G's Const. 20,187 Ft. Alt.					4 G's Const. 20,187 Ft. Alt.				
<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	
Set Point	460.5	460.5	462	460	462	458.5	460	460	
Hold	-6.5	-6.5	-8.5	-6.0	-9.5	-6.0	-7.5	-7.5	
5-2000	140	140	140	140	140	140	140	140	
2000-5	130	130	130	130	140	NC	NC	NC	
Set Check	459.5	459.5	460.5	458.5	462	458.5	460	460	
Hold	-9.0	-9.0	-10.0	-8.0	-11.5	-8.0	-9.5	-9.5	
5-2000	NC	140	140	140	140	NC	140	NC	
2000-5	NC	NC	NC	NC	NC	NC	NC	NC	
Hold	-11.0	-11.0	-12.0	-10.0	-13.5	-10.0	-11.5	-11.5	

[illegible]

Test No. 28				Test No. 34				
Unit No. 0075-B3				Unit No. 0080-B3				
Axis (Y-2) - Sweep 10 Min.				Axis (Y-2) - Sweep 10 Min.				
4 G's Const. 20,187 Ft. Alt.				4 G's Const. 20,187 Ft. Alt.				
<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	459.5	459.5	460.5	458.5	462	460	460	460
Hold	-7.0	-7.0	-8.0	-6.0	-8.0	-6.0	-6.0	-6.0
5-2000	130	130	130 1700	130 1650	140-170 1700	140-150	140-150 1700	140-150 1700
2000-5	140-130	120	140-130	1650 140-130	1700 140	NC	1700 340 140	1700 140
					460.5	458	460	460
				Set Check				

	Test No. 28 (continued)				Test No. 34 (continued)			
	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
(OPEN)								
Hold	-9.0	-9.0	-10.0	-8.0	-10.5	-8.0	-10.0	-10.0
5-2000	135-140	135-140	135-140	135-140	140	140	140	140
2000-5	NC	NC	135	130	140	NC	NC	140
Hold	-11.0	-11.0	-12.0	-10.0	-12.5	-10.0	-12.0	-12.0
5-2000	NC	140	NC	140	145	NC	NC	145
2000-5	NC	NC	NC	130	NC	NC	NC	145
Hold	-13.0	-13.0	-14.0	-12.0	-14.5	-12.0	-14.0	-14.0
5-2000	NC	135	135	135	NC	NC	NC	NC
2000-5	NC	NC	135	135	NC	NC	NC	NC
Hold	-15.0	-15.0	-16.0	-14.0				
5-2000	NC	135	135	NC				
2000-5	NC	NC	NC	NC				
Hold	-17.0	-17.0	-18.0	-16.0				
5-2000	NC	NC	NC	NC				
2000-5	NC	NC	NC	NC				
(CLOSED)								
Set Point	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Hold	458.5	456.5	457	456	460.5	458	460	460
5-2000-5	+6.0	+8.0	+7.5	+8.5	+6.0	+8.5	+6.5	+6.5
	NC	NC	NC	NC	NC	NC	NC	NC

Test No. 29

Unit No. 0075-B3
Axis (Y-2) - Sweep 4 Min.
4 G's Const. 49,995 Ft. Alt.

<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	119	118.5	116	118	121.5	114	118.5	115.5
Hold	-9.0	-8.5	-6.0	-8.0	-13.5	-6.0	-10.5	-7.5
5-2000	NC	NC	140 1700	140	140	140 1700	140 1700	140 1700
2000-5	NC	NC	1700 140	1650	NC	140	1700 140	1700 140
Hold	-11.0	-10.5	-8.0	-10.0	-15.5	-8.0	-12.5	-9.5
5-2000	NC	NC	140	NC	NC	140	NC	NC
2000-5	NC	NC	140	NC	NC	140	NC	NC
Hold	-13.0	-12.5	-10.0	-12.0	-17.5	-10.0	-14.5	-11.5
5-2000	NC	NC	140	NC	NC	NC	NC	NC
2000-5	NC	NC	140	NC	NC	NC	NC	NC
Hold	-15.0	-14.5	-12.0	-14.0				
5-2000-5	NC	NC	NC	NC				
<u>(CLOSED)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	119	118.5	116	118	121.5	114	118.5	115.5
Hold	+6.0	+6.5	+9.0	+7.0	+6.0	+13.5	+9.0	+12.0
5-2000-5	NC	NC	NC	NC	NC	NC	NC	NC

Test No. 35

Unit No. 0080-B3
Axis (Y-2) - Sweep 4 Min.
4 G's Const. 49,995 Ft. Alt.

Test No. 30

Unit No. 0075-B3
Axis (Y-2) - Sweep 10 Min.
4 G's Const. 49,995 Ft. Alt.

<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	119	118.5	116	118	121	114	118.5	116
Hold	-9.0	-8.5	-6.0	-8.0	-13.0	-6.0	-10.5	-8.0
5-2000	NC	135-140	135-140 1700	NC	NC	140,160	1600	NC
2000-5	NC	NC	1700 140	NC	150	NC	NC	1700
Hold	-11.0	-10.5	-8.0	-10.0	-15.0	-8.0	-12.5	-10.0
5-2000	NC	NC	140	NC	NC	140	1700	NC
2000-5	NC	NC	135	NC	NC	NC	1700	1600
Set Check	119	118	116	118.5				
Hold	-13.0	-12.0	-10.0	-12.5	-17.0	-10.0	-14.5	-12.5
5-2000	NC	NC	135	NC	NC	140	1700	NC
2000-5	NC	NC	NC	NC	NC	NC	1700	NC
Hold	-15.0	-14.0	-12.0	-14.5	-19.0	-12.0	-16.5	-14.5
5-2000	NC	NC	135	NC	NC	NC	NC	NC
2000-5	NC	NC	NC	NC	NC	NC	1700	NC
Hold	-17.0	-16.0	-14.0	-16.5	-21.0	-14.0	-18.5	-16.5
5-2000	NC	NC	NC	NC	NC	NC	NC	NC

Test No. 36

Unit No. 0080-B3
Axis (Y-2) - Sweep 10 Min.
4 G's Const. 49,995 Ft. Alt.

Test No. 30 (continued)

<u>(CLOSED)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	119	118	116	118.5
Hold	+6.0	+7.0	+9.0	+6.5
5-2000-5	NC	NC	NC	NC

Test No. 19

Unit No. 0075-B3
Axis (Z-1) Mount Resonance 63 cps
Transmissibility 6.13:1 - Sweep 4 Min.
4 G's Const. 10,216 Ft. Alt.

<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	694.5	696.5	694	694.5
Hold	-6.5	-8.5	-6.0	-6.5
5-2000	NC	NC	NC	NC
2000-5	NC	NC	NC	NC
<u>(CLOSED)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	694.5	696.5	694	694.5
Hold	+8.0	+6.0	+8.5	+8.0
5-2000-5	NC	NC	NC	NC

Test No. 36 (continued)

<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
121	114	118.5	116
+6.0	+13.0	+8.5	+11.0
NC	NC	NC	NC

Test No. 13
Unit No. 0080-B3
Axis (Z-1) Mount Resonance 60 cps
Transmissibility 5.65:1 - Sweep 4 Min.
4 G's Const. 10,216 Ft. Alt.

<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
694.5	691	694.5	694.5
-6.0	-2.5	-6.0	-6.0
NC	60	NC	NC
NC	NC	NC	NC
<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
694.5	691	694.5	694.5
+6.0	+9.5	+6.0	+6.0
NC	NC	NC	NC

Test No. 20

Unit No. 0075-B3

Axis (Z-1) - Sweep 10 Min.

4 G's Const. 10,216 Ft. Alt.

<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	694.5	696.5	694	694.5	694	691	694	694
Hold	-6.5	-8.5	-6.0	-6.5	-6.0	-3.0	-6.0	-6.0
5-2000-5	NC	NC	NC	NC	NC	NC	NC	NC
<u>(CLOSED)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	694.5	696.5	694	694.5	694	691	694	694
Hold	+8.0	+6.0	+8.5	+8.0	+6.0	+9.0	+6.0	+6.0
5-2000-5	NC	NC	NC	NC	NC	NC	NC	NC

Test No. 14

Unit No. 0080-B3

Axis (Z-1) - Sweep 10 Min.

4 G's Const. 10,216 Ft. Alt.

<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
694	691	694	694
-6.0	-3.0	-6.0	-6.0
NC	NC	NC	NC
<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
694	691	694	694
+6.0	+9.0	+6.0	+6.0
NC	NC	NC	NC

Test No. 21

Unit No. 0075-B3

Axis (Z-1) - Sweep 4 Min.

4 G's Const. 20,187 Ft. Alt.

<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	459.5	459.5	461.5	459.5	462	459	460	460
Hold	-6.0	-6.0	-8.0	-6.0	-9.0	-6.0	-7.0	-7.0
5-2000-5	NC	NC	NC	NC	NC	NC	NC	NC
<u>(CLOSED)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	459.5	459.5	461.5	459.5	462	459	460	460
Hold	+6.0	+6.0	+8.0	+6.0	+6.0	+9.0	+8.0	+8.0
5-2000-5	NC	NC	NC	NC	NC	NC	NC	NC

Test No. 15

Unit No. 0080-B3

Axis (Z-1) - Sweep 4 Min.

4 G's Const. 20,187 Ft. Alt.

<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
462	459	460	460
-9.0	-6.0	-7.0	-7.0
NC	NC	NC	NC
<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
462	459	460	460
+6.0	+9.0	+8.0	+8.0
NC	NC	NC	NC

Test No. 22

Unit No. 0075-B3
Axis (Z-1) - Sweep 10 Min.
4 G's Const. 20,187 Ft. Alt.

<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	459.5	459.5	461	459	460.5	458	459	460
Hold	-6.5	-6.5	-8.0	-6.0	-8.5	-6.0	-7.0	-8.0
5-2000-5	NC	NC	NC	NC	NC	NC	NC	NC
<u>(CLOSED)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	459.5	459.5	461	459	460.5	458	459	460
Hold	+7.5	+7.5	+6.0	+8.0	+5.5	+8.0	+7.0	+6.0
5-2000-5	NC	NC	NC	NC	NC	NC	NC	NC

Test No. 16

Unit No. 0080-B3
Axis (Z-1) - Sweep 10 Min.
4 G's Const. 20,187 Ft. Alt.

Test No. 23

Unit No. 0075-B3
Axis (Z-1) - Sweep 4 Min.
4 G's Const. 49,995 Ft. Alt.

<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	119	118.5	115	118	122	114.5	118	116
Hold	-10.0	-9.5	-6.0	-9.0	-13.5	-6.0	-9.5	-7.5
5-2000-5	NC	NC	NC	NC	NC	NC	NC	NC
<u>(CLOSED)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	120	118	116	118	122	114.5	118	116
Hold	+6.0	+8.0	+10.0	+8.0	+4.0	+11.5	+8.0	+10.0
5-2000-5	NC	NC	NC	NC	NC	NC	NC	NC

Test No. 17

Unit No. 0080-B3
Axis (Z-1) - Sweep 4 Min.
4 G's Const. 49,995 Ft. Alt.

Test No. 24

Unit No. 0075-B3

Axis (Z-1) - Sweep 10 Min.

4 G's Const. 49,995 Ft. Alt.

<u>(OPEN)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	120	118.5	116	118.5
Hold	-10.0	-8.5	-6.0	-8.5
5-2000-5	NC	NC	NC	NC
<u>(CLOSED)</u>	<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
Set Point	120	118	116	118
Hold	+6.0	+8.0	+10.0	+8.0
5-2000-5	NC	NC	NC	NC

Test No. 18

Unit No. 0080-B3

Axis (Z-1) - Sweep 10 Min.

4 G's Const. 49,995 Ft. Alt.

<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
122	113.5	118	116
-14.5	-6.0	-10.5	-8.5
NC	NC	NC	NC
<u>Ele.#1</u>	<u>Ele.#2</u>	<u>Ele.#3</u>	<u>Ele.#4</u>
122	113.5	118	116
+6.0	+14.5	+10.0	+12.0
NC	NC	NC	NC

ATTACHMENT NO. 2

Transmissibility
Lord Mounts (.125" excursion) on XM-10 Baro #0075-B3

4 G's Constant Input

(X-2)			(Y-2)			(Z-1)		
<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>	<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>	<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>
15	4.0	1:1	15	5.2	1.3:1	15	5.3	1.33:1
20	4.2	1.05:1	20	4.8	1.2:1	20	5.5	1.38:1
25	4.5	1.13:1	25	4.7	1.18:1	25	5.6	1.4:1
30	4.7	1.18:1	30	4.4	1.1:1	30	5.6	1.4:1
35	6.5	1.63:1	35	4.4	1.1:1	35	5.8	1.45:1
40	7.4	1.85:1	40	4.4	1.1:1	40	5.8	1.45:1
45	8.7	2.18:1	45	4.5	1.13:1	45	7.6	1.9:1
50	12.0	3.0:1	50	4.5	1.13:1	50	9.5	2.38:1
55	18.0	4.5:1	55	4.5	1.13:1	55	12.5	3.13:1
60 (max.)	23.0	5.75:1	60	4.8	1.2:1	60	20.0	5.0:1
65	20.0	5.0:1	65	5.0	1.25:1	63 (max.)	24.5	6.13:1
70	14.0	3.5:1	70	5.2	1.3:1	65	22.0	5.5:1
75	9.5	2.38:1	75	5.6	1.4:1	70	16.5	4.13:1
80	8.2	2.05:1	80	6.0	1.5:1	75	12.0	3.0:1
85	5.6	1.4:1	85	6.4	1.6:1	80	8.5	2.13:1
90	4.4	1.1:1	90	6.8	1.7:1	85	6.5	1.63:1
95	3.7	0.925:1	95	7.6	1.9:1	90	5.2	1.3:1

(X-2)			(Y-2)			(Z-1)		
<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>	<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>	<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>
100	3.2	0.80:1	100	8.2	2.05:1	95	4.3	1.08:1
110	2.4	0.60:1	110	7.8	1.95:1	100	3.6	0.9:1
120	1.9	0.475:1	120	8.0	2.0:1	110	2.6	0.65:1
130	1.6	0.40:1	130	12.0	3.0:1	120	2.0	0.5:1
140	1.4	0.35:1	140	19.5	4.88:1	130	1.6	0.4:1
150	1.2	0.30:1	145 (max.)	30.0	7.5:1	140	1.3	0.325:1
160	1.0	0.25:1	150	30.0	7.5:1	150	1.1	0.275:1
170	0.90	0.22:1	155	23.5	5.9:1	160	0.94	0.235:1
180	0.85	0.21:1	160	18.5	4.63:1	170	0.95	0.238:1
190	0.76	0.19:1	170	7.8	1.95:1	180	0.75	0.188:1
200	0.66	0.17:1	180	6.0	1.50:1	190	0.65	0.163:1
220	0.56	0.14:1	190	4.9	1.22:1	200	0.55	0.138:1
240	0.49	0.12:1	200	4.2	1.05:1	225	0.45	0.113:1
260	0.43	0.107:1	225	2.6	0.65:1	250	0.36	0.09:1
280	0.38	0.095:1	250	1.7	0.425:1	275	0.31	0.078:1
300	0.32	0.08:1	275	1.3	0.325:1	300	0.26	0.065:1
320	0.15	0.038:1	300	1.0	0.25:1	325	0.22	0.055:1
340	0.79	0.198:1	325	0.9	0.22:1	350	0.19	0.0475:1
360	0.58	0.145:1	350	0.74	0.185:1	375	0.16	0.04:1
380	0.59	0.148:1	375	0.50	0.125:1	400	0.15	0.038:1
400	0.74	0.185:1	400	0.40	0.10:1	425	0.13	0.033:1
430	1.7	0.425:1	425	0.38	0.095:1	450	0.13	0.033:1
450	0.63	0.158:1	450	0.36	0.09:1	475	0.12	0.03:1

(X-2)			(Y-2)			(Z-1)		
<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>	<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>	<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>
100	3.2	0.80:1	100	8.2	2.05:1	95	4.3	1.08:1
110	2.4	0.60:1	110	7.8	1.95:1	100	3.6	0.9:1
120	1.9	0.475:1	120	8.0	2.0:1	110	2.6	0.65:1
130	1.6	0.40:1	130	12.0	3.0:1	120	2.0	0.5:1
140	1.4	0.35:1	140	19.5	4.88:1	130	1.6	0.4:1
150	1.2	0.30:1	145 (max.)	30.0	7.5:1	140	1.3	0.325:1
160	1.0	0.25:1	150	30.0	7.5:1	150	1.1	0.275:1
170	0.90	0.22:1	155	23.5	5.9:1	160	0.94	0.235:1
180	0.85	0.21:1	160	18.5	4.63:1	170	0.95	0.238:1
190	0.76	0.19:1	170	7.8	1.95:1	180	0.75	0.188:1
200	0.66	0.17:1	180	6.0	1.50:1	190	0.65	0.163:1
220	0.56	0.14:1	190	4.9	1.22:1	200	0.55	0.138:1
240	0.49	0.12:1	200	4.2	1.05:1	225	0.45	0.113:1
260	0.43	0.107:1	225	2.6	0.65:1	250	0.36	0.09:1
280	0.38	0.095:1	250	1.7	0.425:1	275	0.31	0.078:1
300	0.32	0.08:1	275	1.3	0.325:1	300	0.26	0.065:1
320	0.15	0.038:1	300	1.0	0.25:1	325	0.22	0.055:1
340	0.79	0.198:1	325	0.9	0.22:1	350	0.19	0.0475:1
360	0.58	0.145:1	350	0.74	0.185:1	375	0.16	0.04:1
380	0.59	0.148:1	375	0.50	0.125:1	400	0.15	0.038:1
400	0.74	0.185:1	400	0.40	0.10:1	425	0.13	0.033:1
430	1.7	0.425:1	425	0.38	0.095:1	450	0.13	0.033:1
450	0.63	0.158:1	450	0.36	0.09:1	475	0.12	0.03:1

(X-2)			(Y-2)			(Z-1)		
<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>	<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>	<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>
500	0.24	0.06:1	475	0.35	0.088:1	500	0.10	0.025:1
550	0.18	0.045:1	500	0.34	0.085:1	550	0.09	0.023:1
600	0.18	0.045:1				600	0.075	0.0188:1
650	0.14	0.035:1	550	0.33	0.083:1	650	0.065	0.0163:1
700	0.26	0.065:1				700	0.08	0.02:1
750	0.26	0.065:1	600	0.32	0.08:1	750	0.065	0.0163:1
800	0.26	0.065:1	650	0.36	0.09:1	800	0.06	0.015:1
850	0.28	0.07:1	700	0.65	0.162:1	850	0.06	0.015:1
900	0.22	0.055:1	750	0.75	0.188:1	900	0.055	0.0138:1
950	0.12	0.03:1	800	0.48	0.12:1	950	0.055	0.0138:1
1000	0.14	0.035:1	850	0.33	0.083:1	1000	0.06	0.015:1
1100	0.10	0.025:1	900	0.30	0.075:1	1100	0.06	0.015:1
1200	0.04	0.010:1	950	0.36	0.09:1	1200	0.045	0.0113:1
1300	0.025	0.0063:1	1000	0.50	0.125:1	1300	0.04	0.01:1
1400	0.035	0.00875:1	1100	0.66	0.165:1	1400	0.07	0.0175:1
1500	0.08	0.020:1	1150	0.50	0.125:1	1500	0.05	0.0125:1
1600	0.05	0.0125:1	1200	0.22	0.055:1	1600	0.12	0.03:1
1700	0.04	0.010:1	1300	0.42	0.105:1	1700	0.16	0.04:1
1800	0.05	0.0125:1	1400	0.28	0.07:1	1800	0.27	0.068:1
1900	0.05	0.0125:1	1500	0.37	0.093:1	1900	0.22	0.055:1
			1550	0.55	0.137:1			
2000	0.10	0.025:1	1600	0.40	0.10:1	2000	0.14	0.035:1
			1700	0.34	0.085:1			

(X-2)			(Y-2)			(Z-1)		
<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>	<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>	<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>
			1750	0.40	0.10:1			
			1800	0.25	0.065:1			
			1900	0.14	0.035:1			
			2000	0.08	0.02:1			

Transmissibility

Lord Mounts (.125" excursion) on XM-10 Baro #0080-B3

4 G's Constant Input

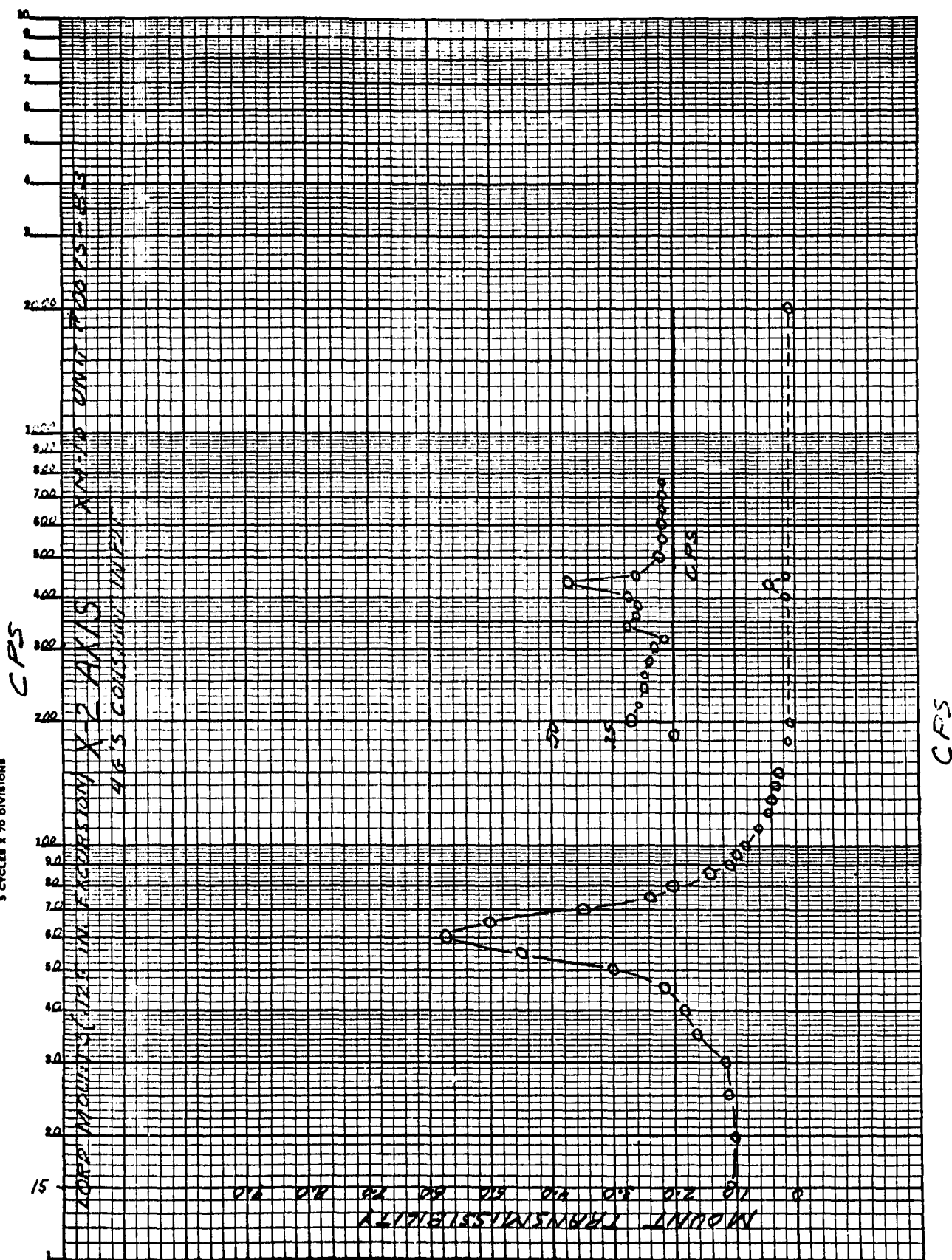
(X-2)			(Y-2)			(Z-1)		
<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>	<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>	<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>
15	4.4	1.1:1	15	4.3	1.07:1	15	3.0	0.75:1
20	4.3	1.07:1	20	4.3	1.07:1	20	4.0	1.0:1
25	5.3	1.32:1	25	4.3	1.07:1	25	5.0	1.25:1
30	6.0	1.5:1	30	4.3	1.07:1	30	5.2	1.30:1
35	4.8	1.2:1	45	4.4	1.1:1	35	5.8	1.45:1
40	5.3	1.32:1	40	4.4	1.1:1	40	6.5	1.63:1
45	6.1	1.53:1	45	4.5	1.13:1	45	7.9	1.98:1
50	7.7	1.93:1	50	4.7	1.18:1	50	11.0	2.75:1
55	10.5	2.63:1	55	4.8	1.2:1	55	14.5	3.63:1
60	16.5	4.13:1	60	5.0	1.25:1	60 (max.)	22.5	5.65:1
63.5 (max.)	23.0	5.75:1	65	5.4	1.35:1	65	20.0	5.0:1
65	19.5	4.88:1	70	5.8	1.45:1	70	13.5	3.3:1

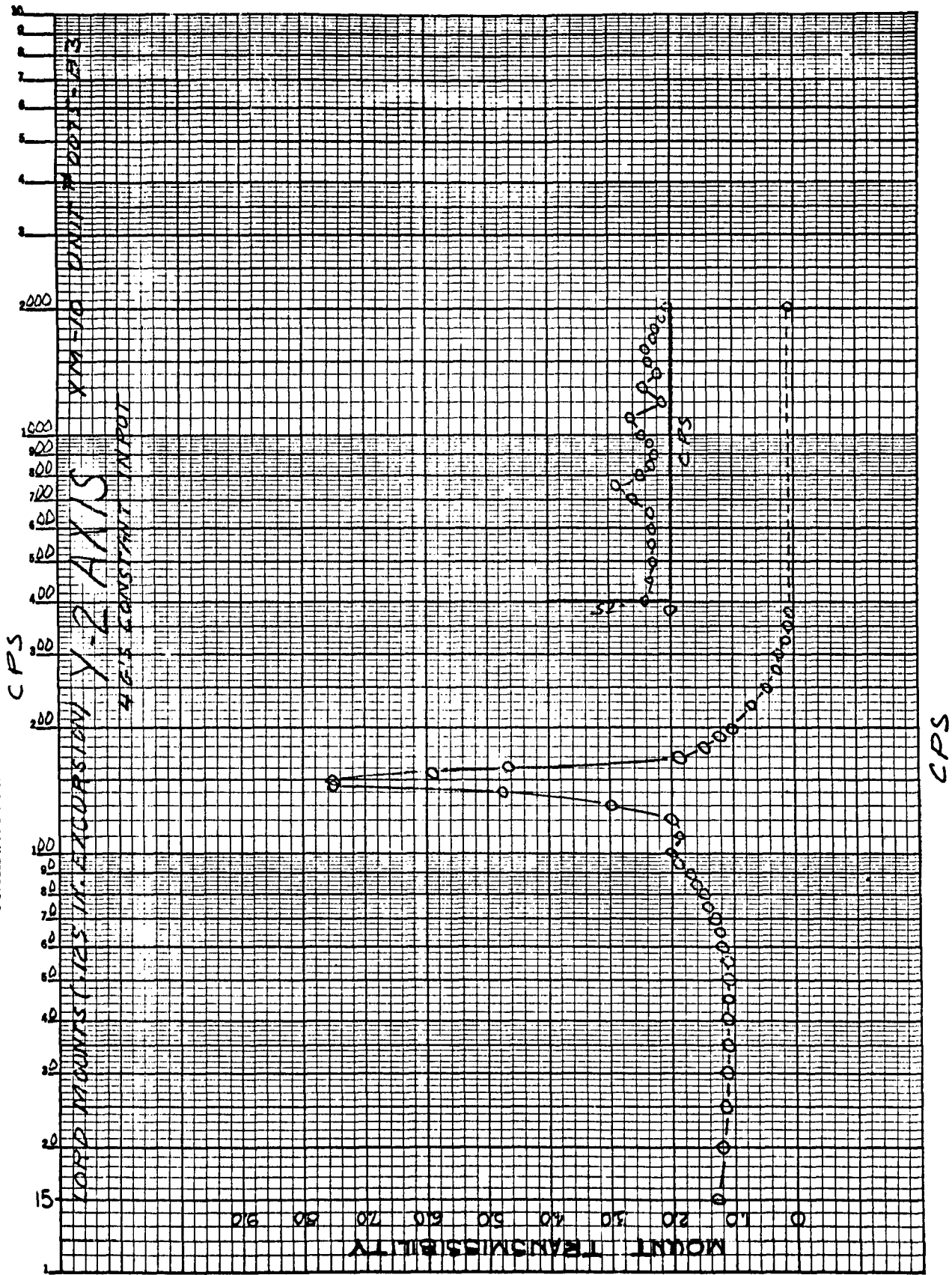
(X-2)			(Y-2)			(Z-1)		
<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>	<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>	<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>
70	12.0	3.0:1	75	6.2	1.55:1	75	9.5	2.38:1
75	8.4	2.1:1	80	6.8	1.65:1	80	7.0	1.75:1
80	6.0	1.5:1	85	7.5	1.87:1	85	5.3	1.33:1
85	4.0	1.0:1	90	8.5	2.13:1	90	4.3	1.08:1
90	3.8	0.95:1	95	10.0	2.5:1	95	3.5	0.88:1
95	3.1	0.78:1	100	12.5	3.13:1	100	3.9	0.98:1
100	2.6	0.65:1	110	11.0	2.75:1	110	3.2	0.8:1
110	2.1	0.53:1	120	9.5	2.38:1	120	1.8	0.45:1
120	1.6	0.40:1	130	13.0	3.25:1	130	1.4	0.35:1
130	1.4	0.35:1	135	21.5	5.4:1	140	1.2	0.3:1
140	1.2	0.30:1	140 (max.)	33.0	8.25:1	150	1.1	0.275:1
			145	32.0	8.0:1			
150	1.0	0.25:1	150	25.0	6.25:1	160	0.95	0.238:1
160	0.88	0.22:1	160	17.0	4.25:1	170	0.75	0.188:1
170	0.80	0.20:1	170	11.0	2.75:1	180	0.63	0.157:1
180	0.78	0.195:1	180	8.5	2.13:1	190	0.56	0.14:1
190	0.75	0.188:1	190	7.0	1.75:1	200	0.55	0.138:1
200	0.76	0.19:1	200	5.6	1.40:1	225	0.43	0.108:1
220	0.69	0.173:1	225	3.7	0.93:1	250	0.35	0.088:1
240	0.66	0.165:1	250	2.6	0.65:1	275	0.28	0.07:1
260	0.65	0.163:1	275	1.9	0.475:1	300	0.22	0.055:1
280	0.77	0.193:1	300	1.5	0.375:1	325	0.18	0.045:1
300	1.1	0.275:1	325	1.3	0.325:1	350	0.15	0.0375:1

(X-2)			(Y-2)			(Z-1)		
<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>	<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>	<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>
320	2.5	0.625:1	350	1.5	0.375:1	375	0.13	0.0325:1
340	1.7	0.425:1	375	1.1	0.275:1	400	0.12	0.030:1
360	0.59	0.148:1	400	0.95	0.238:1	450	0.10	0.020:1
380	0.28	0.07:1	450	0.76	0.19:1	500	0.075	0.019:1
400	0.17	0.043:1	500	0.66	0.165:1	550	0.075	0.019:1
450	0.065	0.016:1	550	0.69	0.173:1	600	0.068	0.017:1
500	0.045	0.013:1	600	0.60	0.15:1	650	0.060	0.015:1
550	0.04	0.01:1	650	0.56	0.14:1	700	0.056	0.014:1
600	0.035	0.009:1	700	0.68	0.17:1	750	0.062	0.0155:1
650	0.05	0.013:1	750	0.28	0.07:1	800	0.050	0.0125:1
700	0.04	0.01:1	800	0.60	0.15:1	850	0.068	0.017:1
750	0.14	0.035:1	850	0.56	0.14:1	900	0.068	0.017:1
800	0.10	0.025:1	900	0.50	0.13:1	950	0.062	0.0155:1
850	0.06	0.015:1	950	0.54	0.14:1	1000	0.062	0.0155:1
900	0.085	0.021:1	1000	0.76	0.19:1	1100	0.060	0.015:1
950	0.19	0.048:1	1100	0.80	0.20:1	1200	0.060	0.015:1
1000	0.17	0.043:1	1200	1.0	0.25:1	1300	0.11	0.028:1
			1250	0.47	0.18:1			
1100	0.16	0.040:1	1300	0.22	0.055:1	1400	0.13	0.033:1
1200	0.10	0.025:1	1400	0.11	0.028:1	1500	0.09	0.023:1
1300	0.05	0.013:1	1500	0.12	0.03:1	1600	0.07	0.018:1
1400	0.07	0.018:1	1600	0.31	0.078:1	1700	0.09	0.023:1
1500	0.05	0.013:1	1700	0.50	0.125:1	1800	0.045	0.011:1

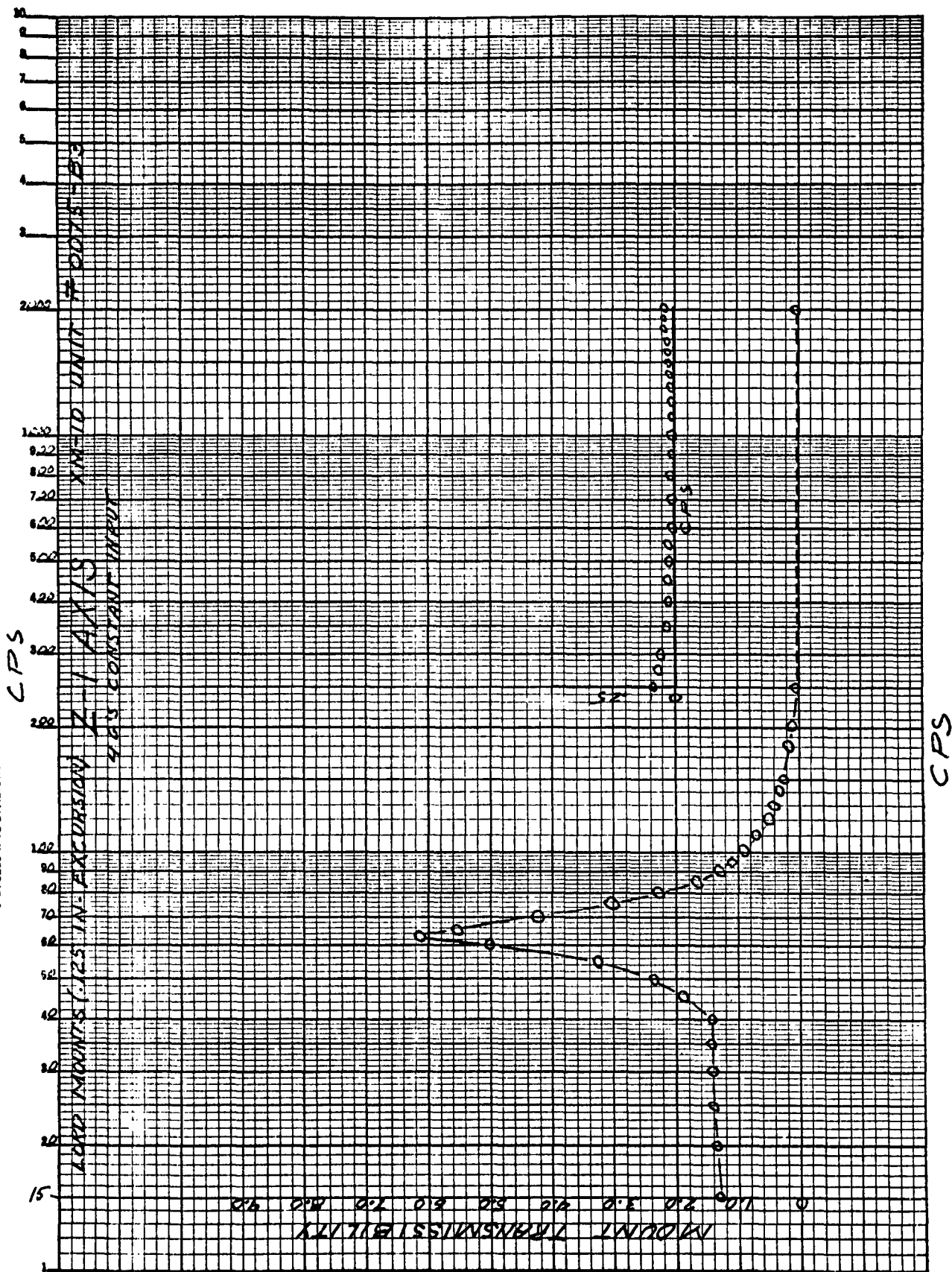
(X-2)			(Y-2)			(Z-1)		
<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>	<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>	<u>CPS</u>	<u>G's Out</u>	<u>Trans.</u>
1600	0.04	0.01:1	1800	0.095	0.024:1	1900	0.05	0.013:1
1700	0.05	0.013:1	1900	0.062	0.0155:1	2000	0.11	0.028:1
1800	0.04	0.01:1	2000	0.060	0.015:1			
1900	0.04	0.01:1						
2000	0.04	0.01:1						

K·E
SEMI-LOGARITHMIC 359-71
KEUFFEL & ESSER CO. MADE IN U.S.A.
3 CYCLES X 70 DIVISIONS





K-E SEMI-LOGARITHMIC 359-71
 KEUFFEL & ESSER CO. MADE IN U.S.A.
 3 CYCLES X 70 DIVISIONS



K&E SEMI-LOGARITHMIC 359-71
KEUFFEL & ESSER CO. BAKEN N.Y.A.
3 CYCLES X 70 DIVISIONS

CPS

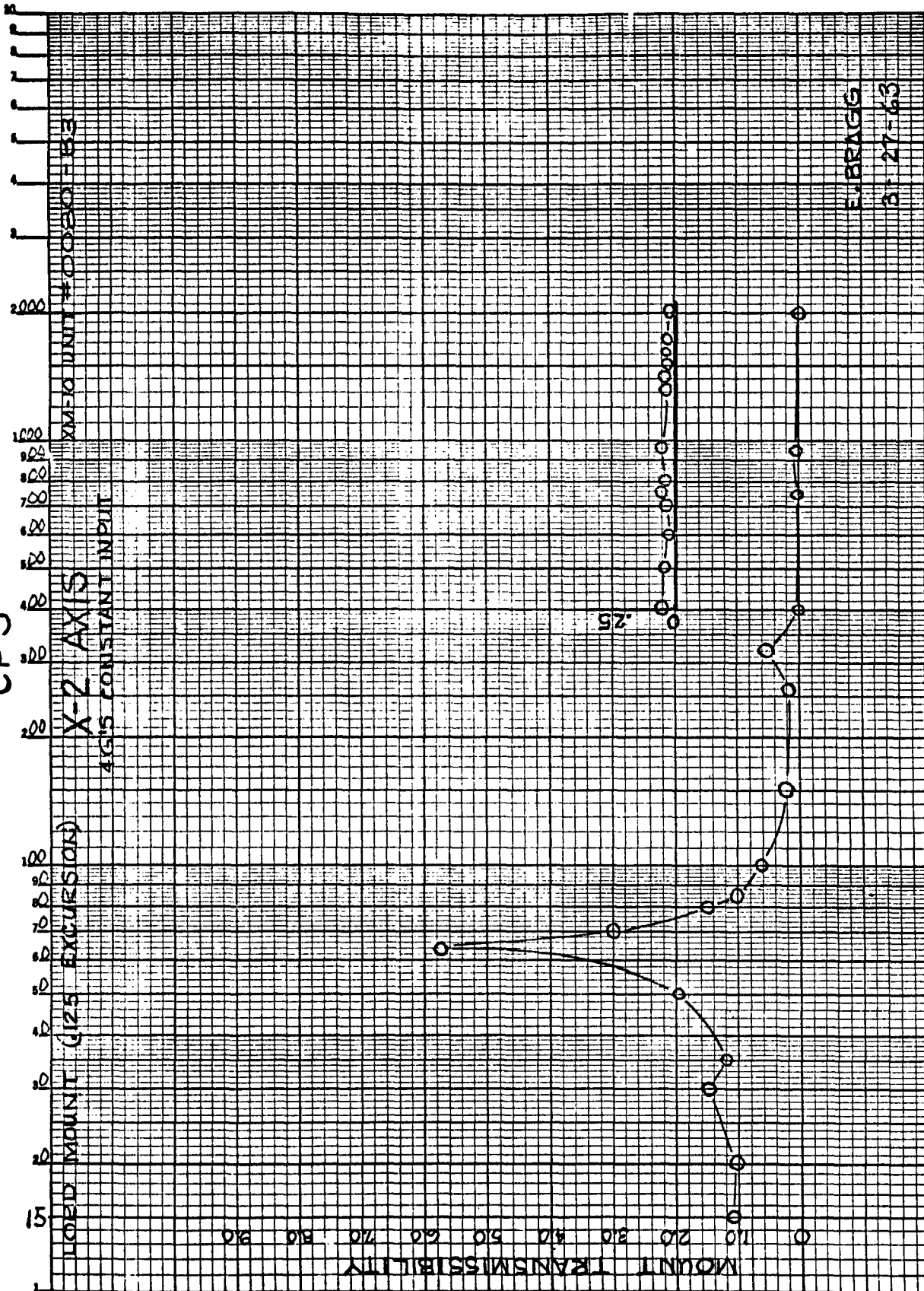
LOAD MOUNT (125 EXCURSION)

X-2 AXIS

4G'S CONSTANT INPUT

XM-10 UNIT #0020-183

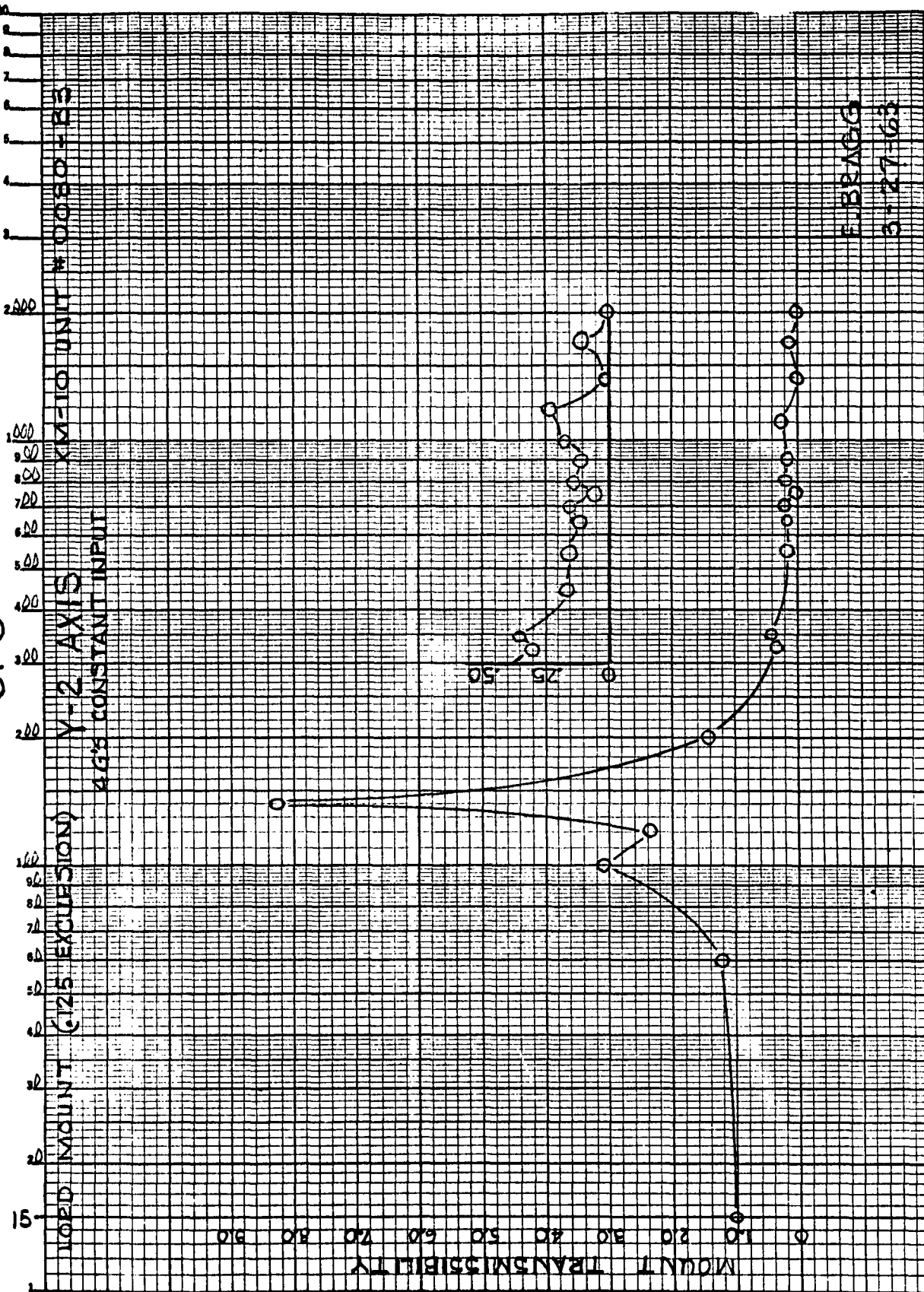
MOUNT TRANSMISSIBILITY



E. BRAGG
3-27-63

K+E SEMI-LOGARITHMIC 359-71
KEUFFEL & ESSER CO. MADE IN U.S.A.
3 CYCLES X 70 DIVISIONS

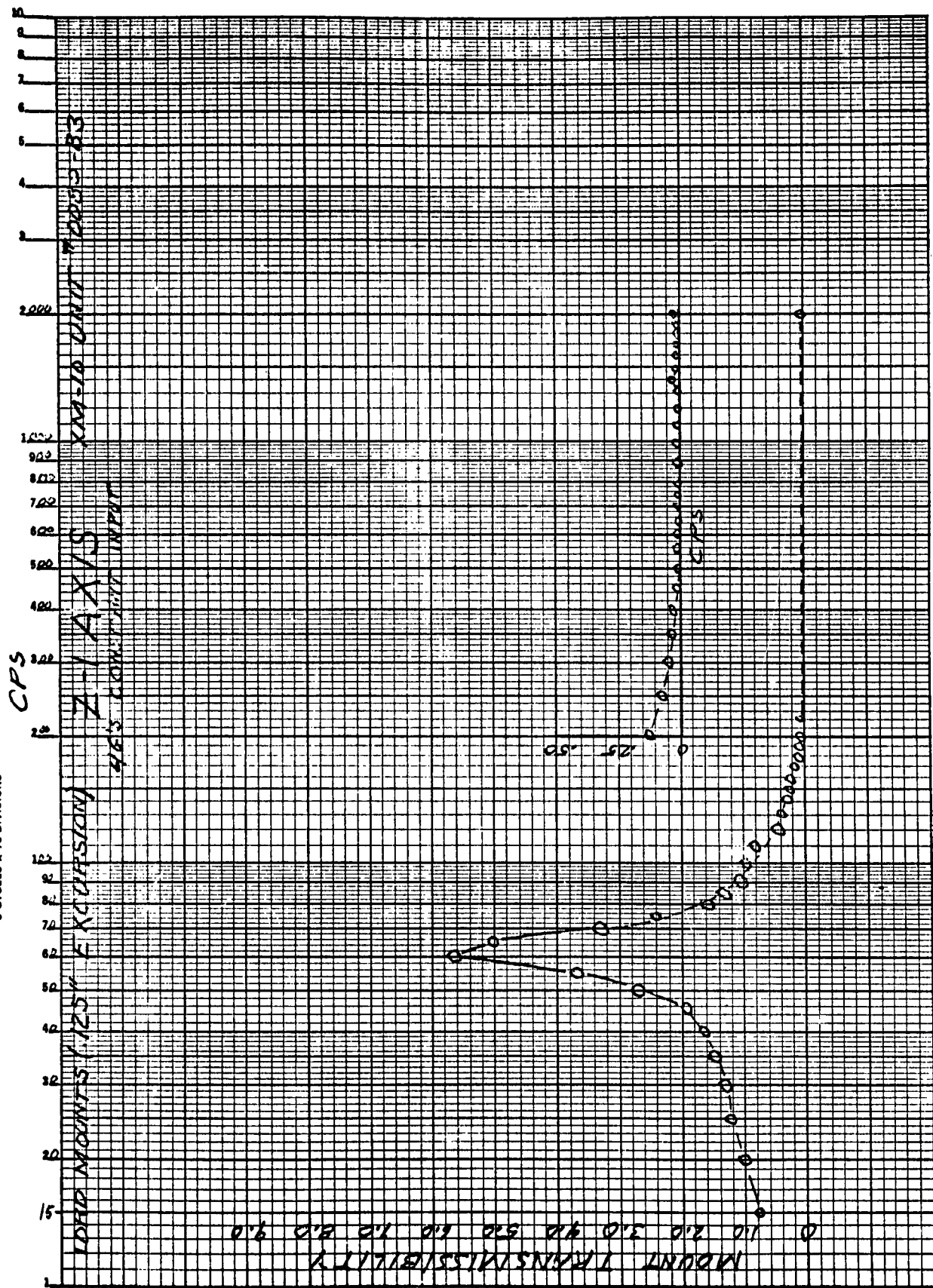
CPS



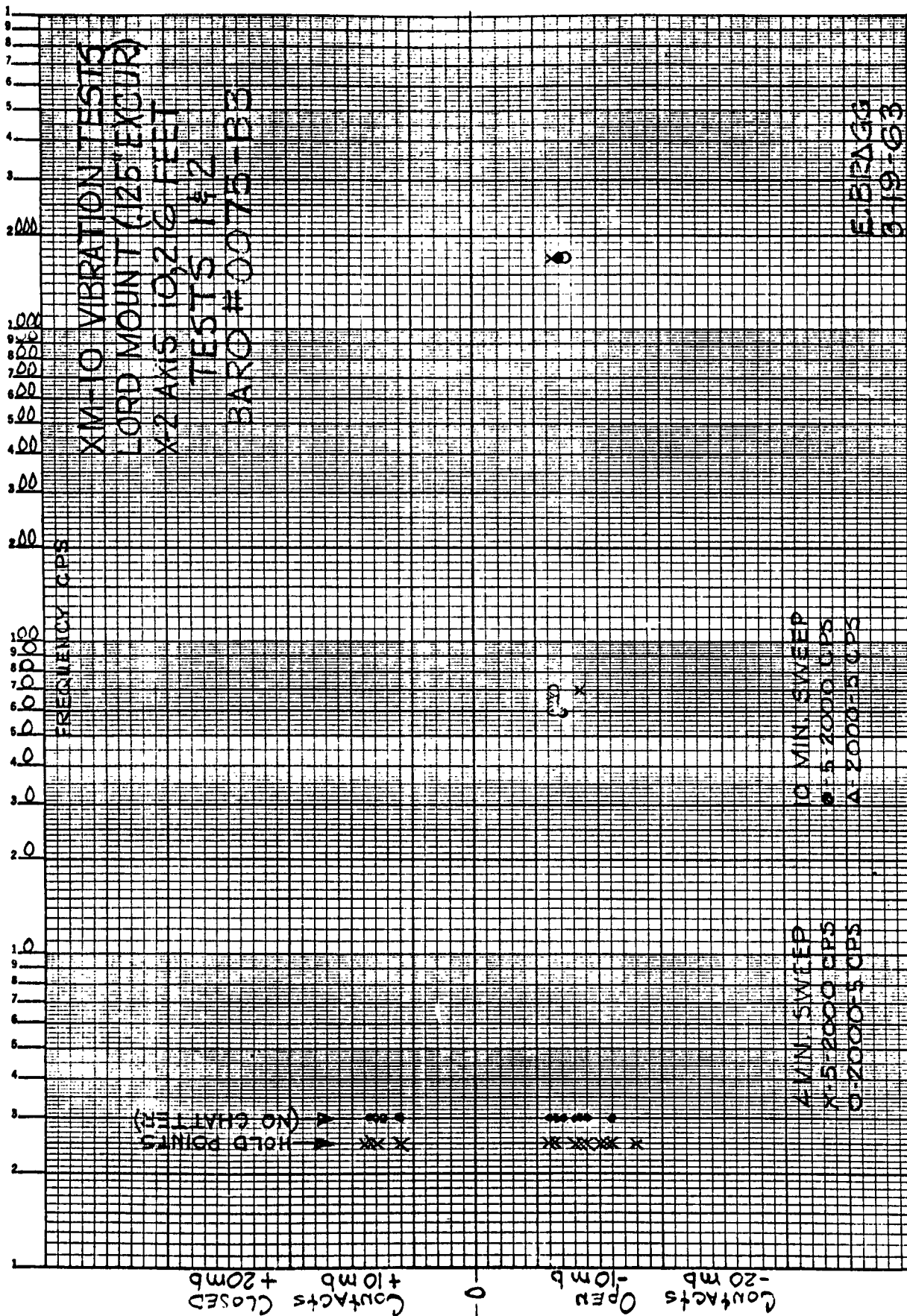
F. BRAGG

3-27-63

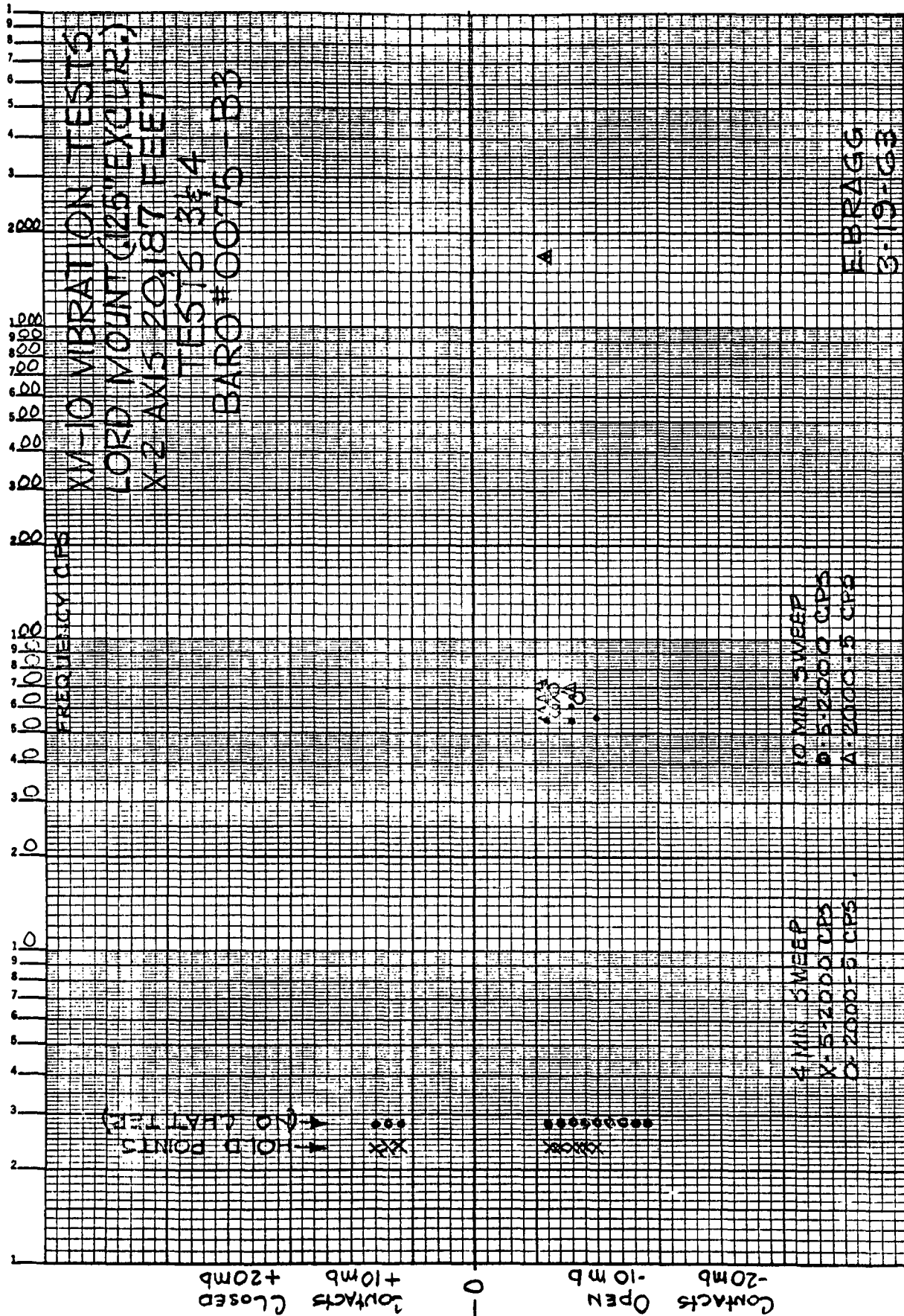
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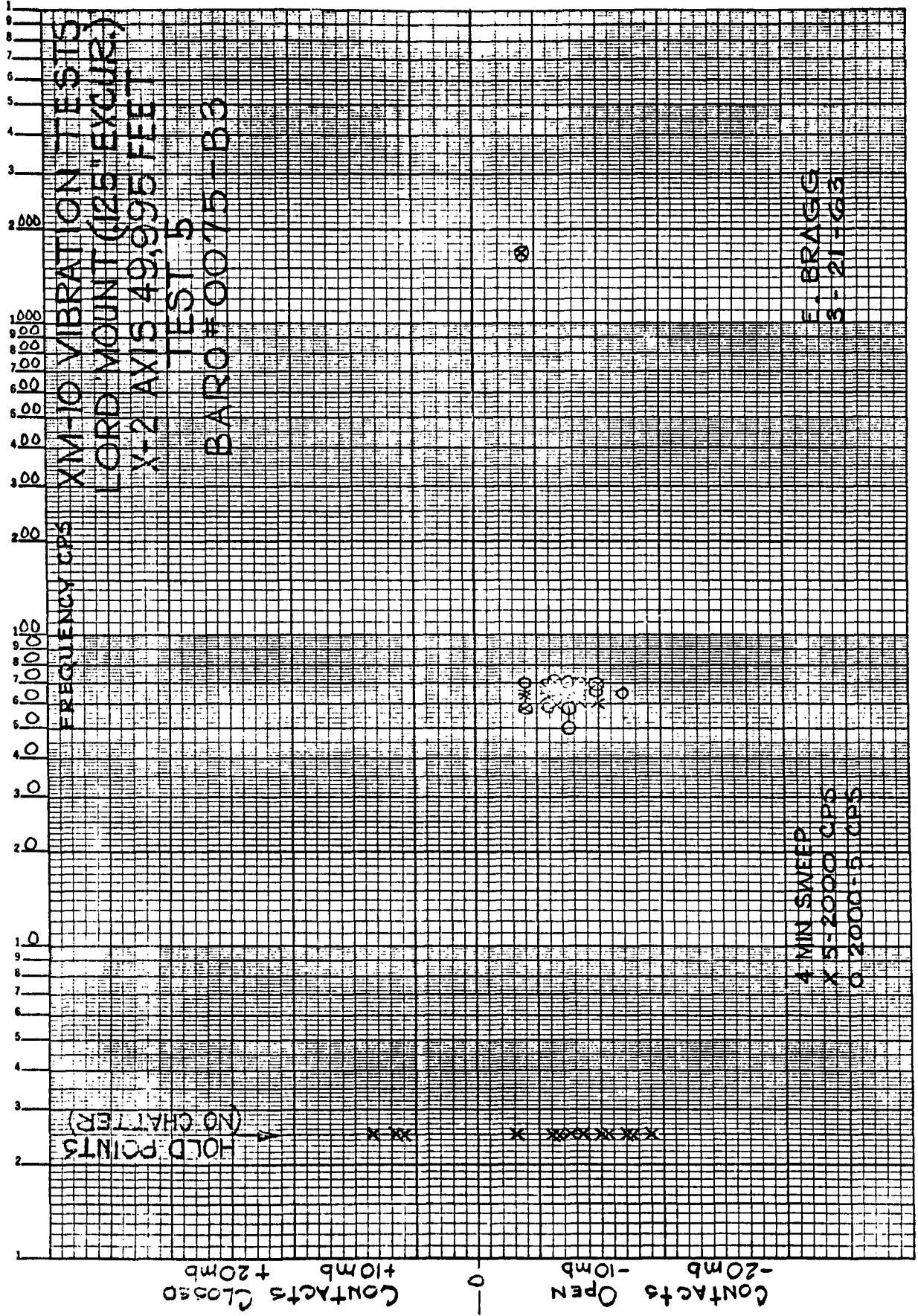


543

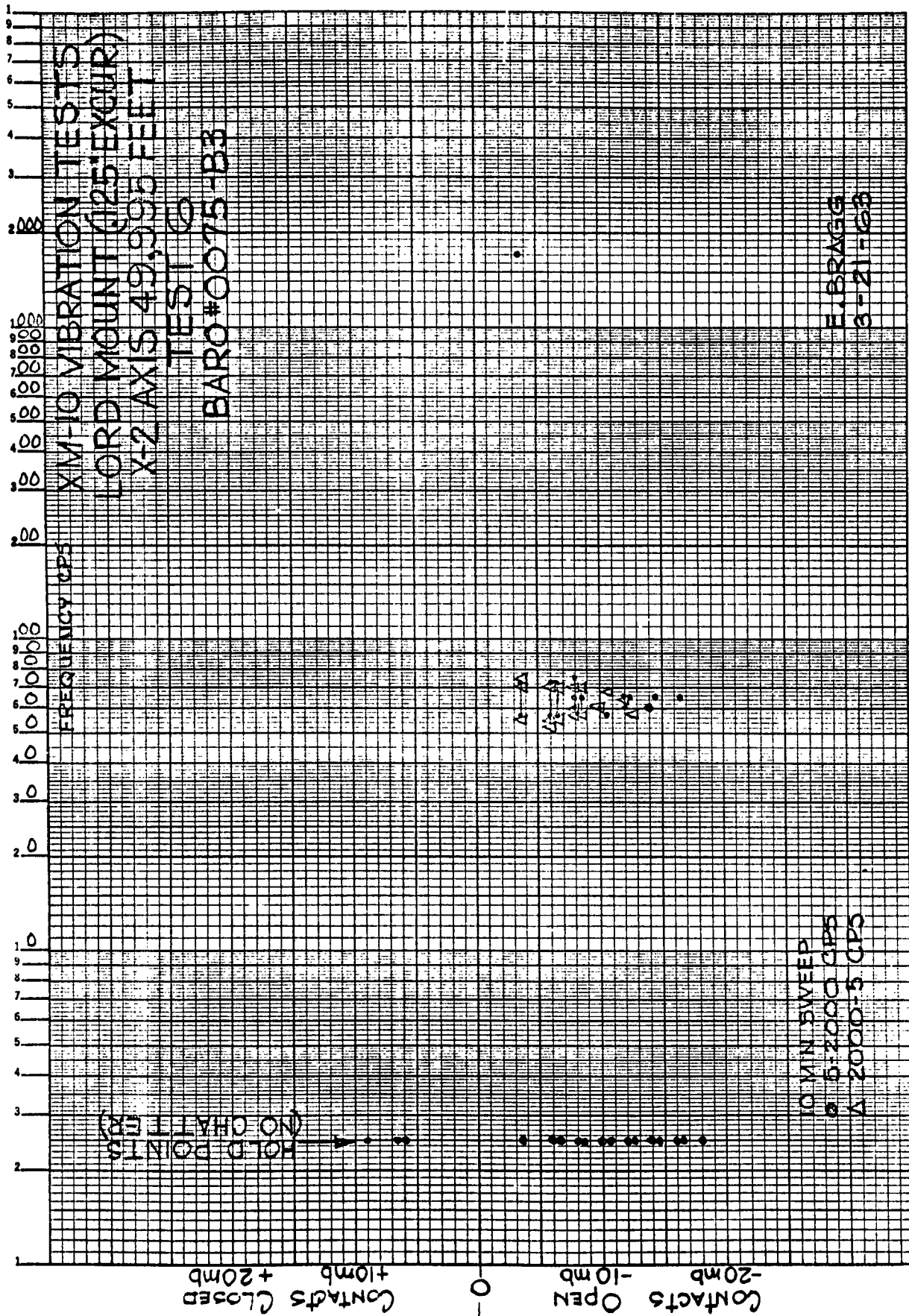


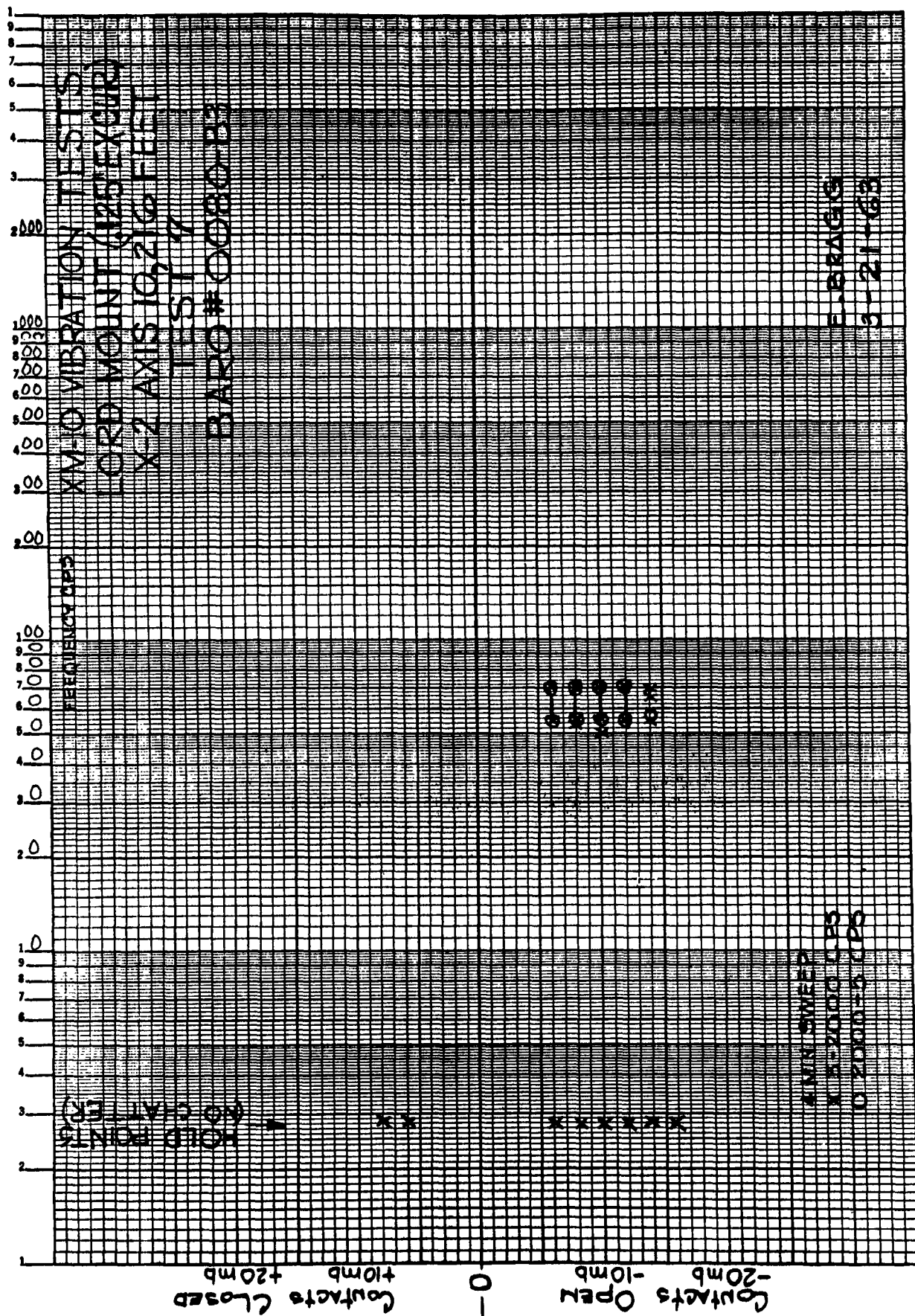
5-19-63
 5-19-63

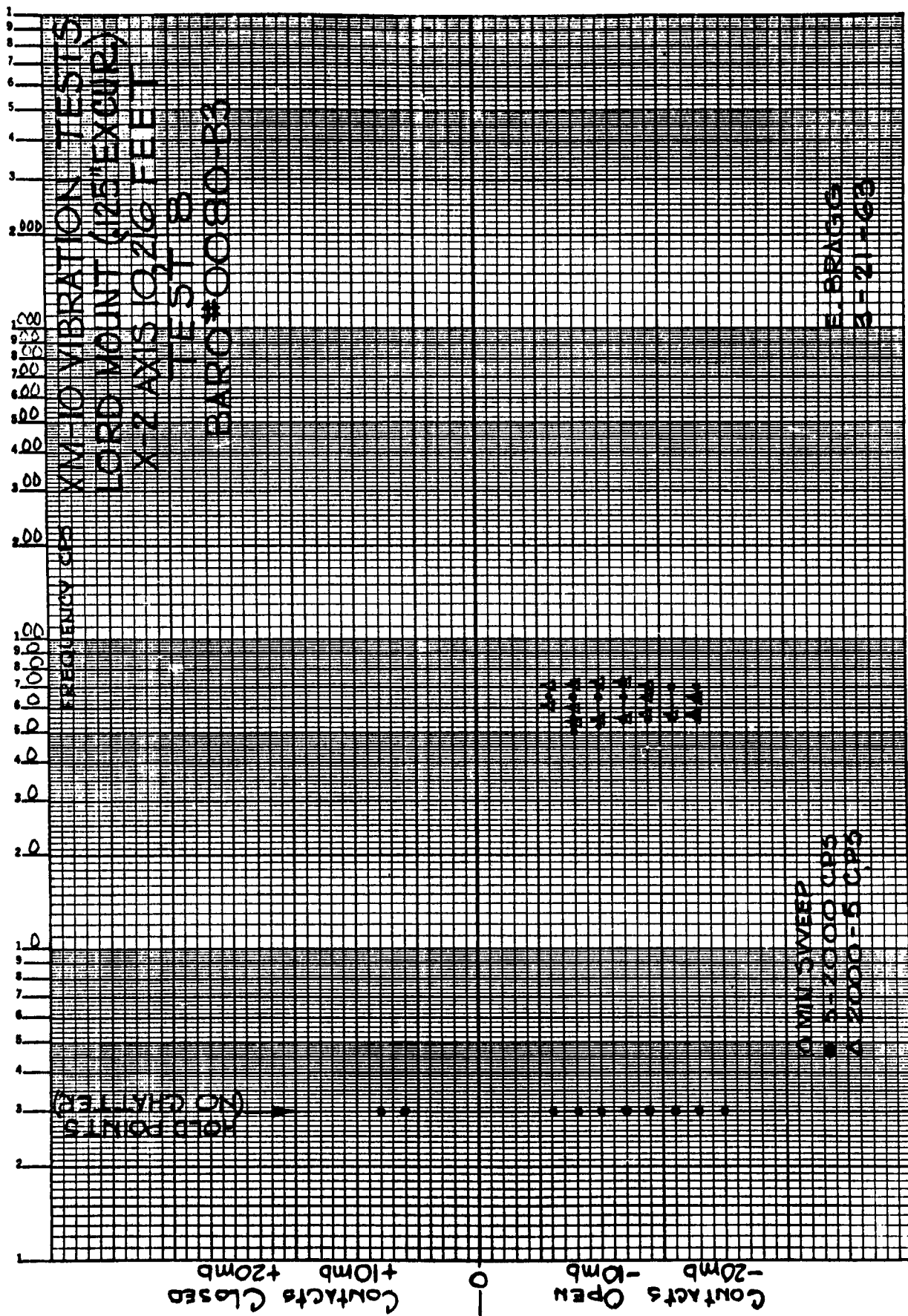


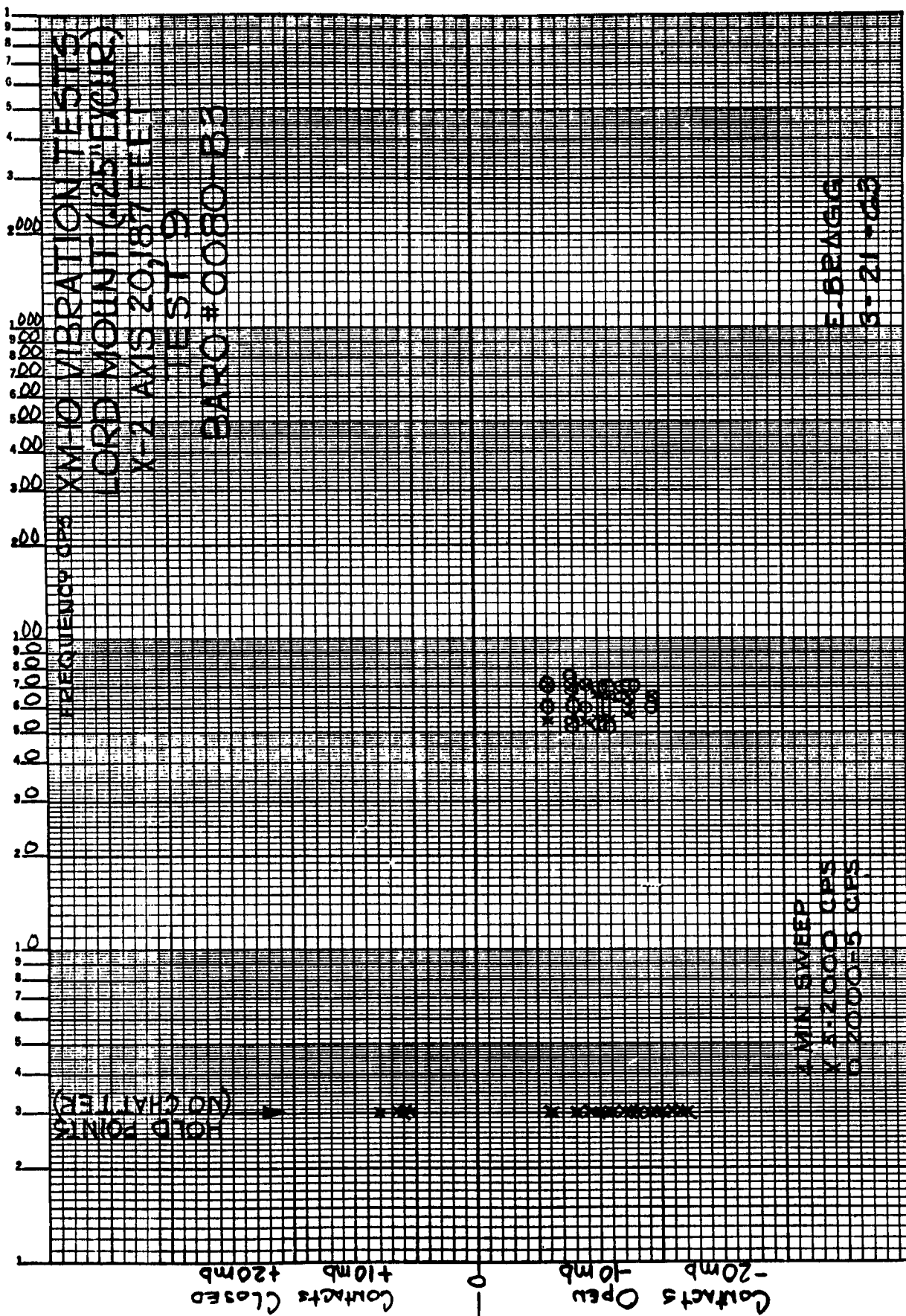


KOE SEMI-LOGANTHMIC 303-81
 REUFFELT & CO. "AUGUST 1963"
 4 CYCLES X 70 DIVISIONS

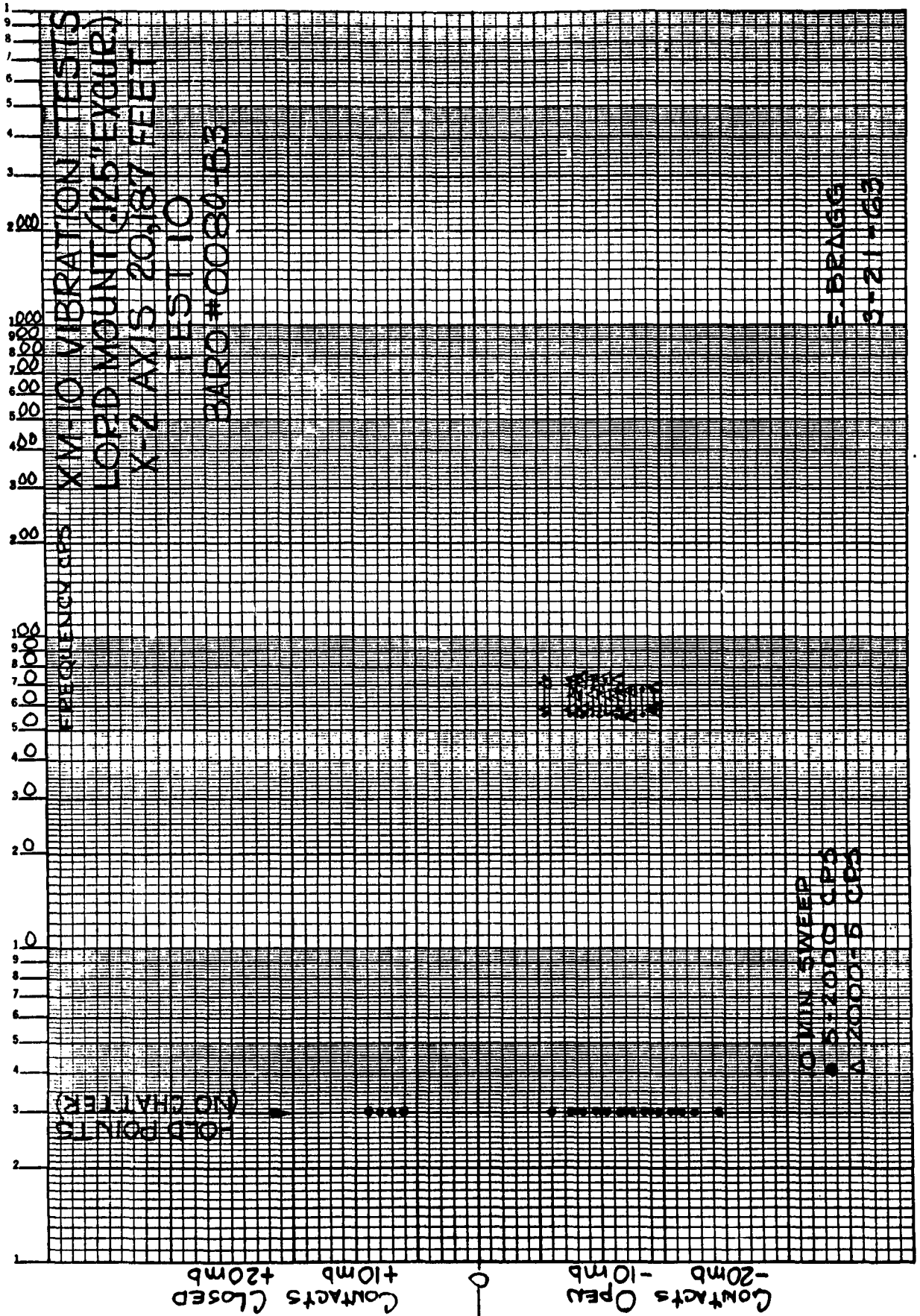








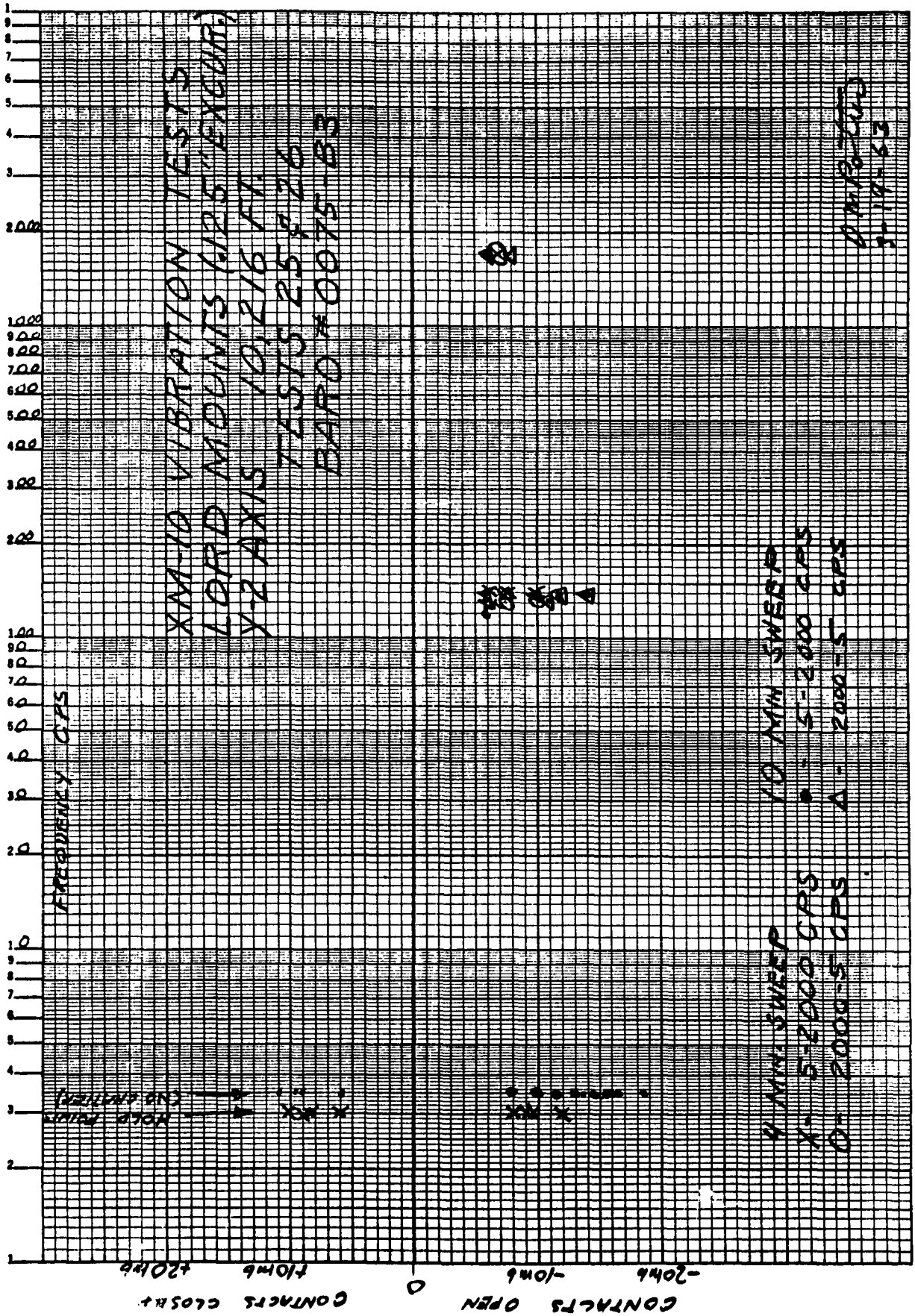
K-E SEMI-LOGARITHMIC 359-81
 KRUEFF & ESSER CO. MADE IN U.S.A.
 4 CYCLES X 70 DIVISIONS

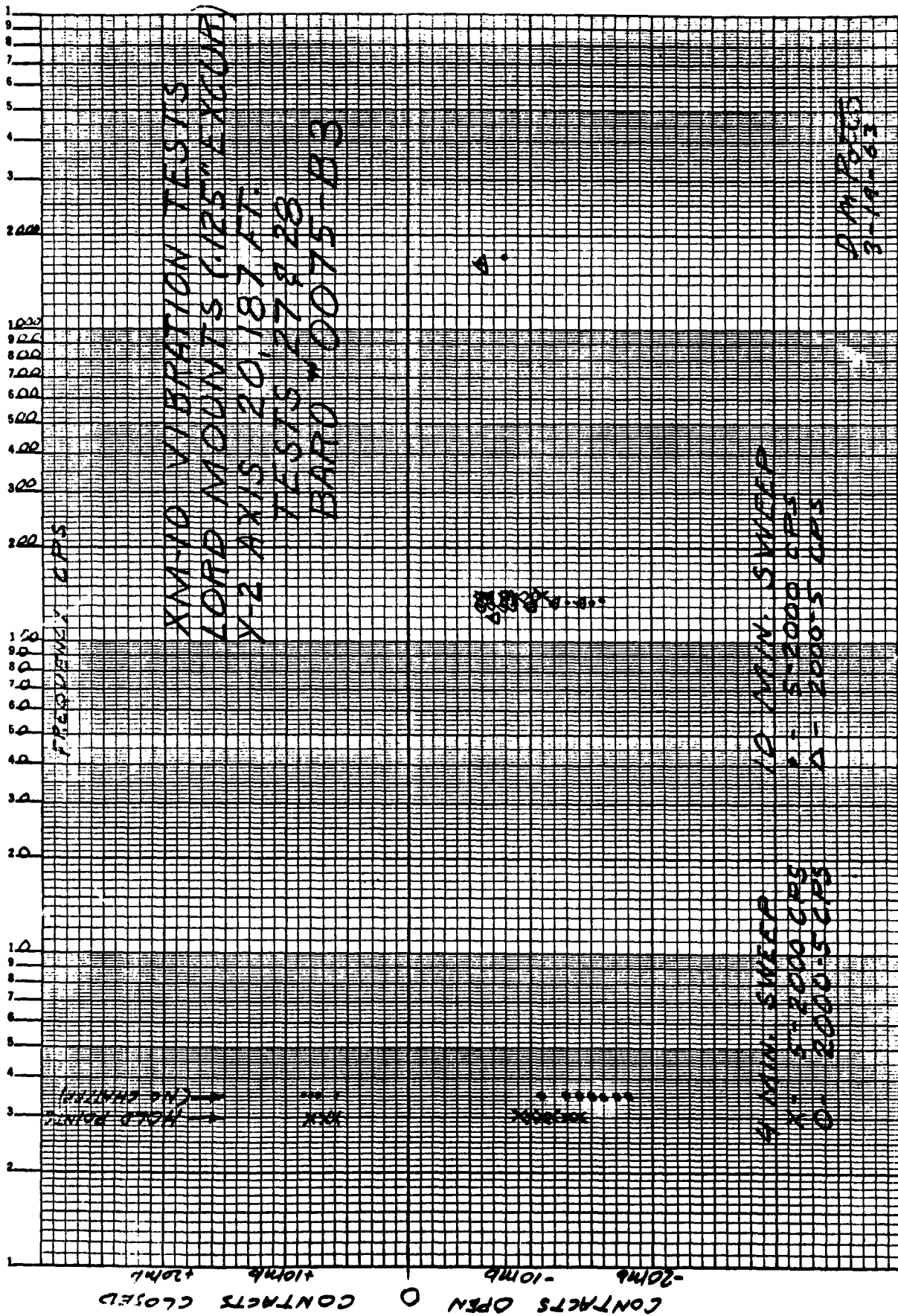


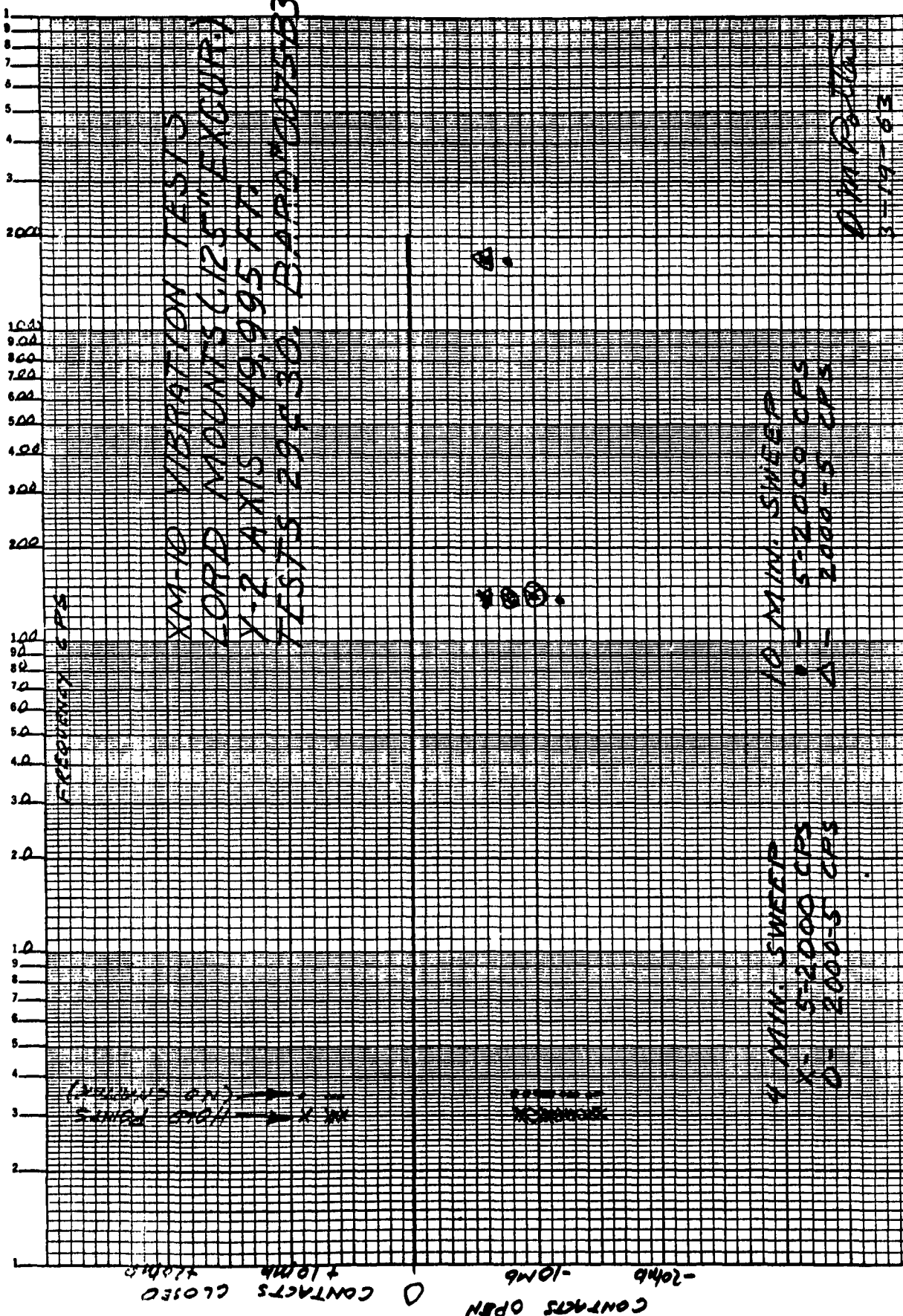
E. BRAGG
 3-21-63

4 MIN SWEEP 0 MIN SWEEP
X 5-2000 CPS X 5-2000 CPS
0 2000-5 CPS 0 2000-5 CPS

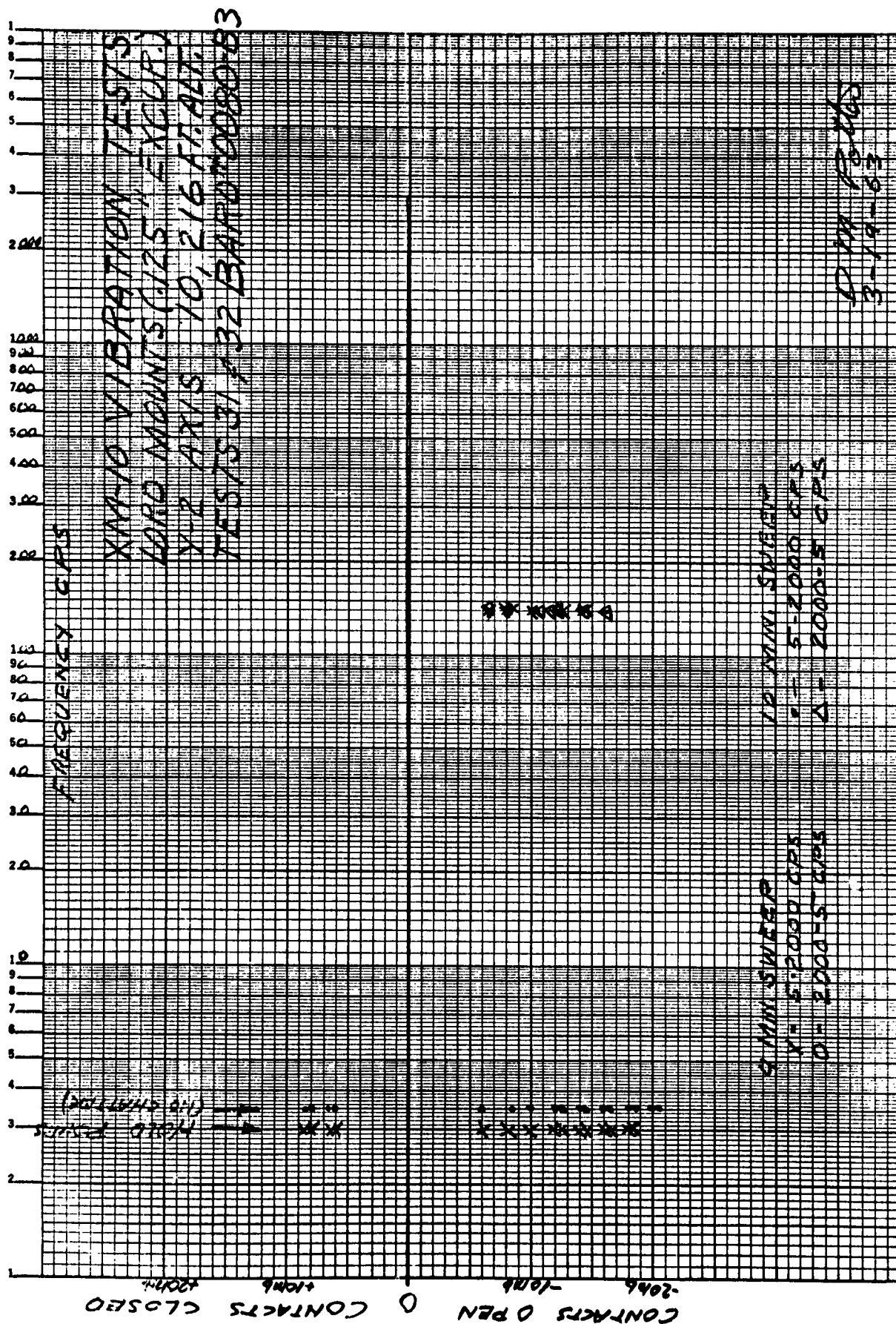
K-9E LOGA MIC 9-8
KEUFFEL & ESSER CO. MADE IN U.S.A.
4 CYCLES X 70 DIVISIONS

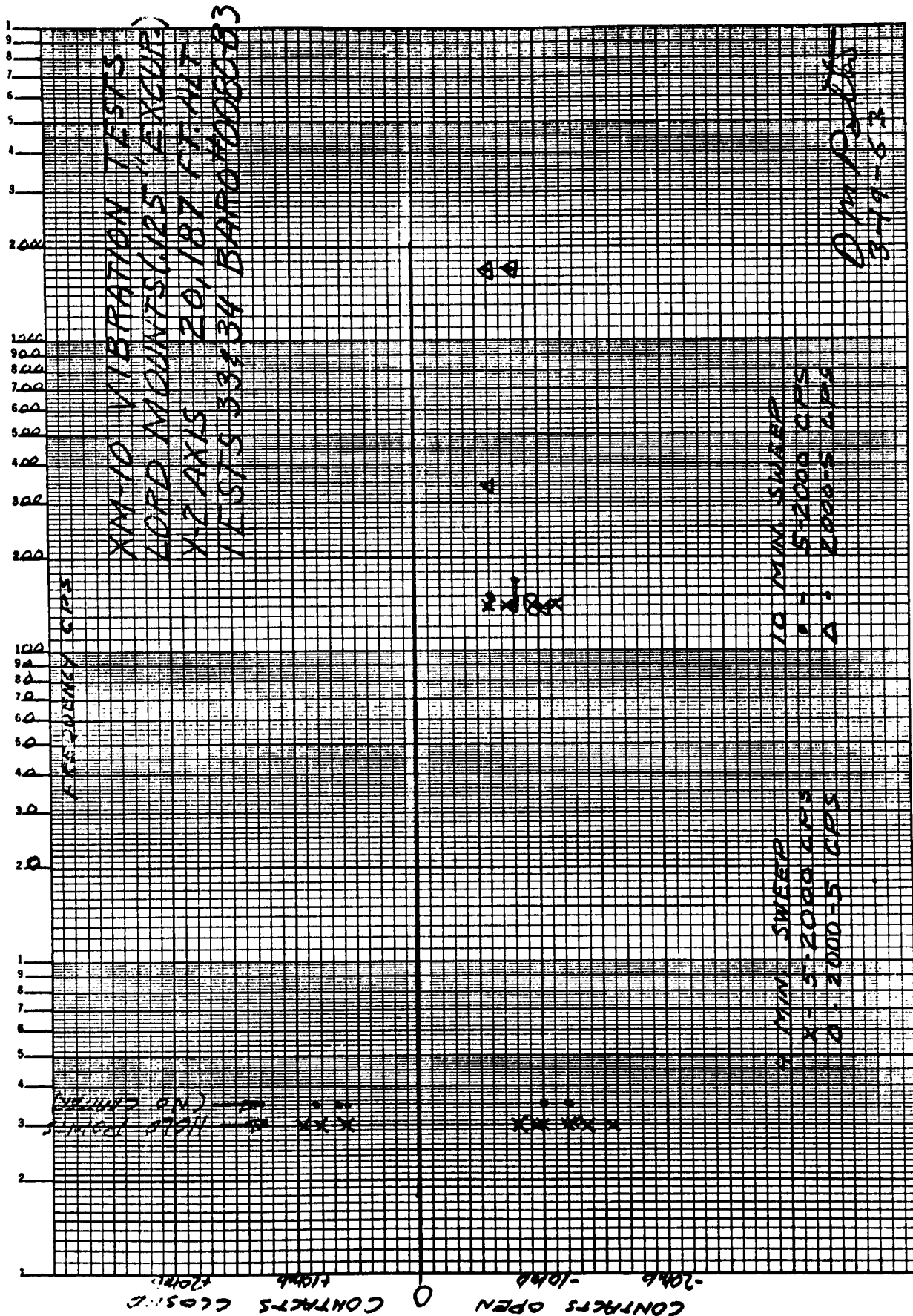




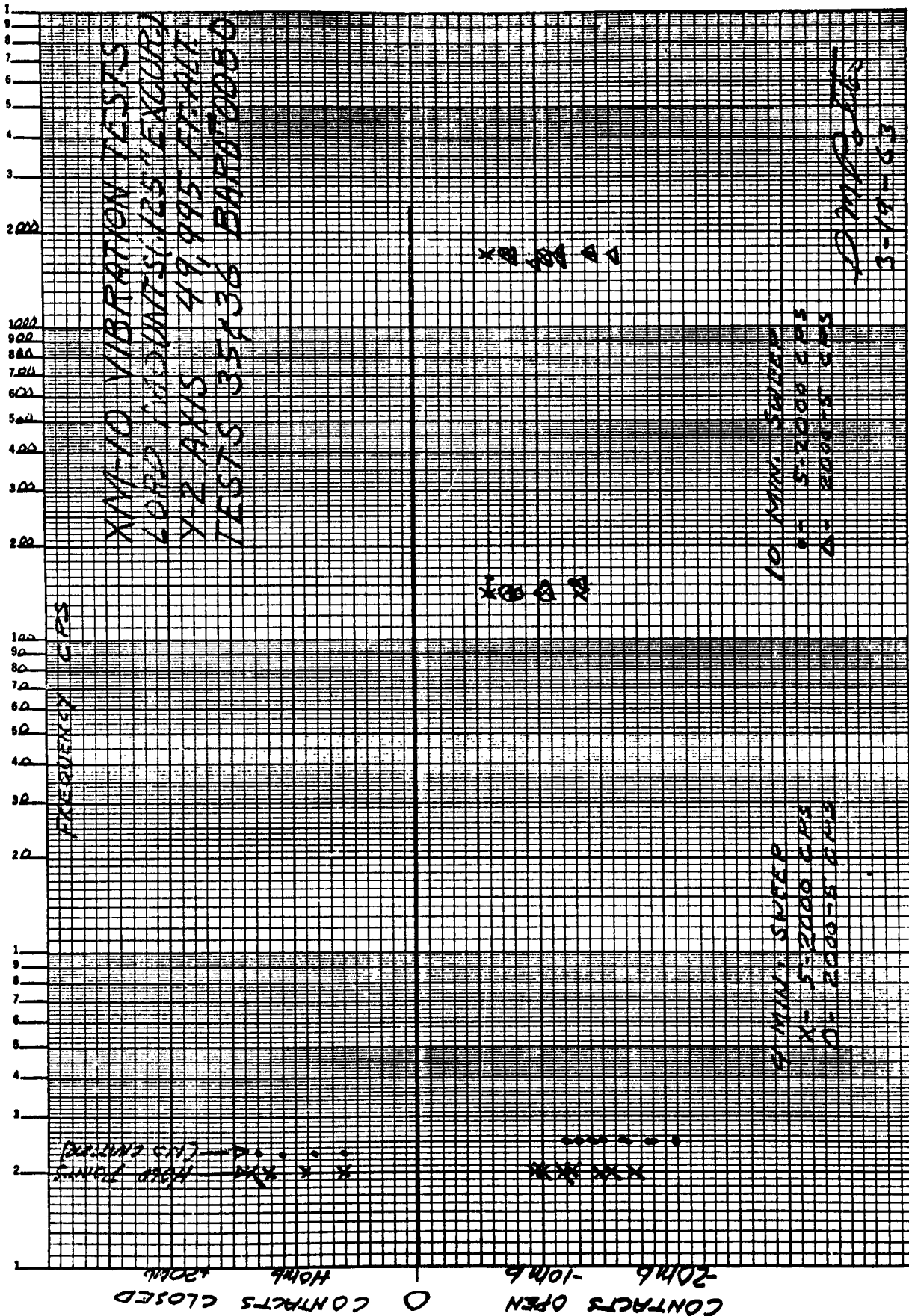


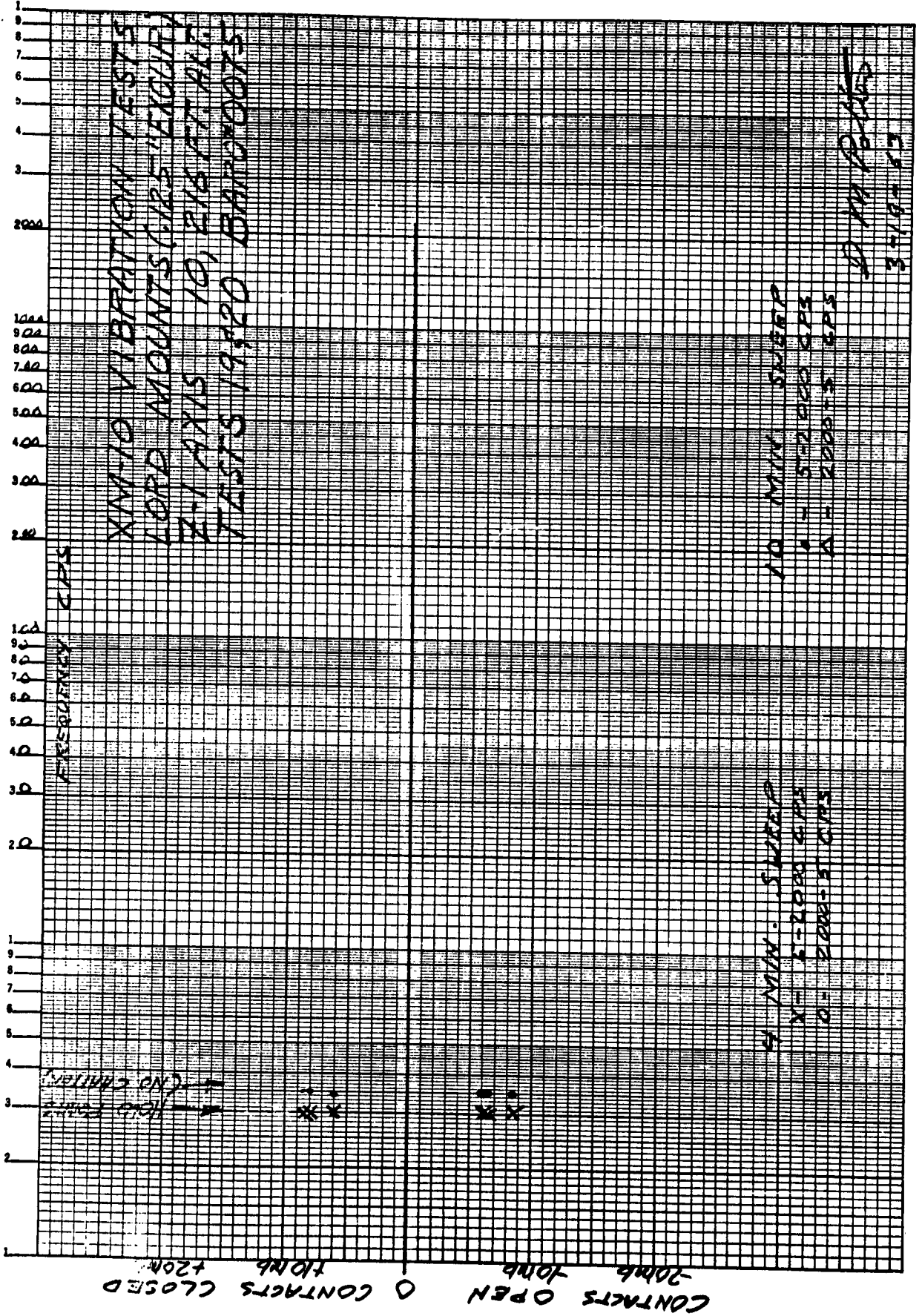
K₊E SEMI-LOGARITHMIC 359-81
KEUFFEL & ESSER CO. MADE IN U.S.A.
4 CYCLES X 70 DIVISIONS

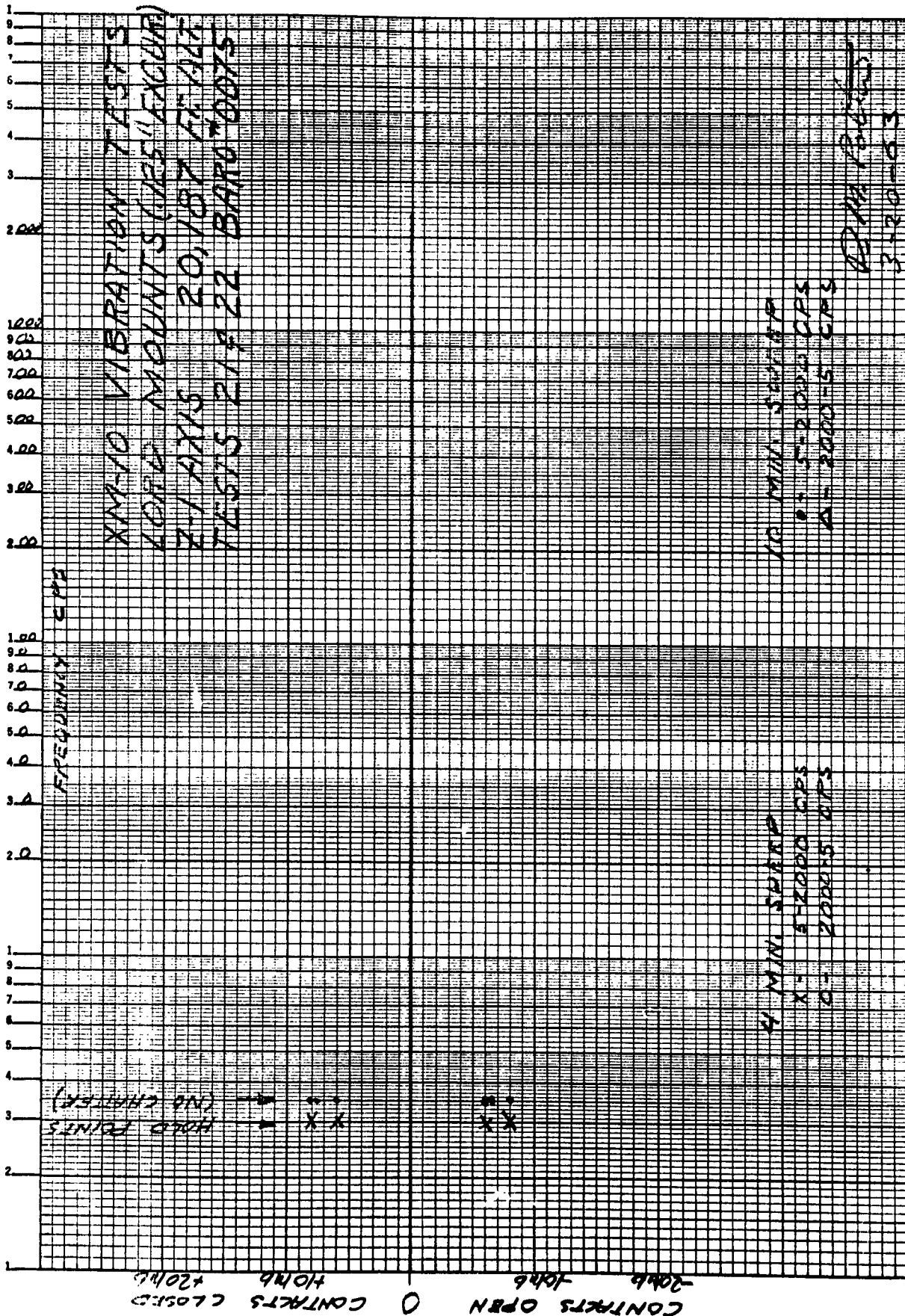


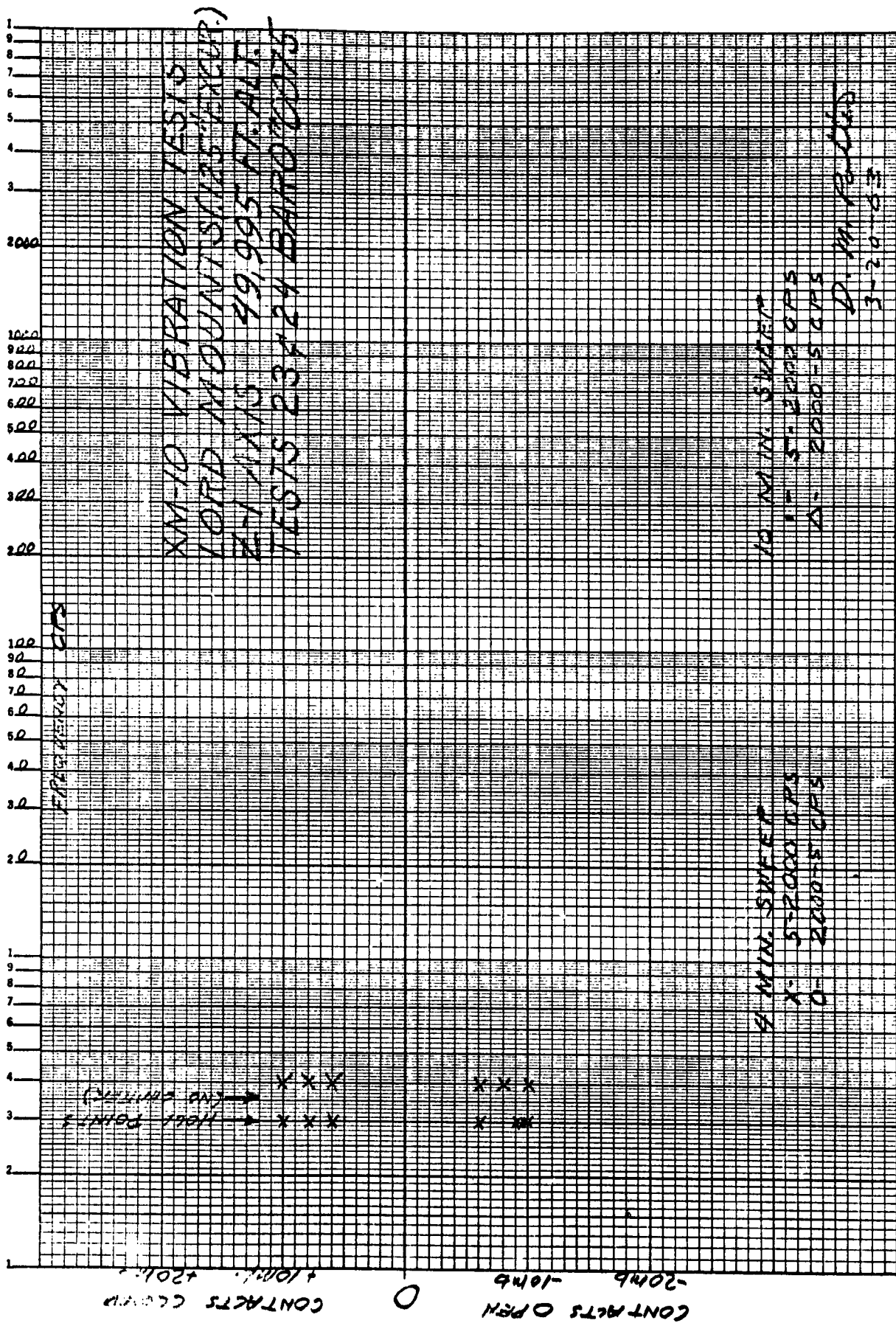


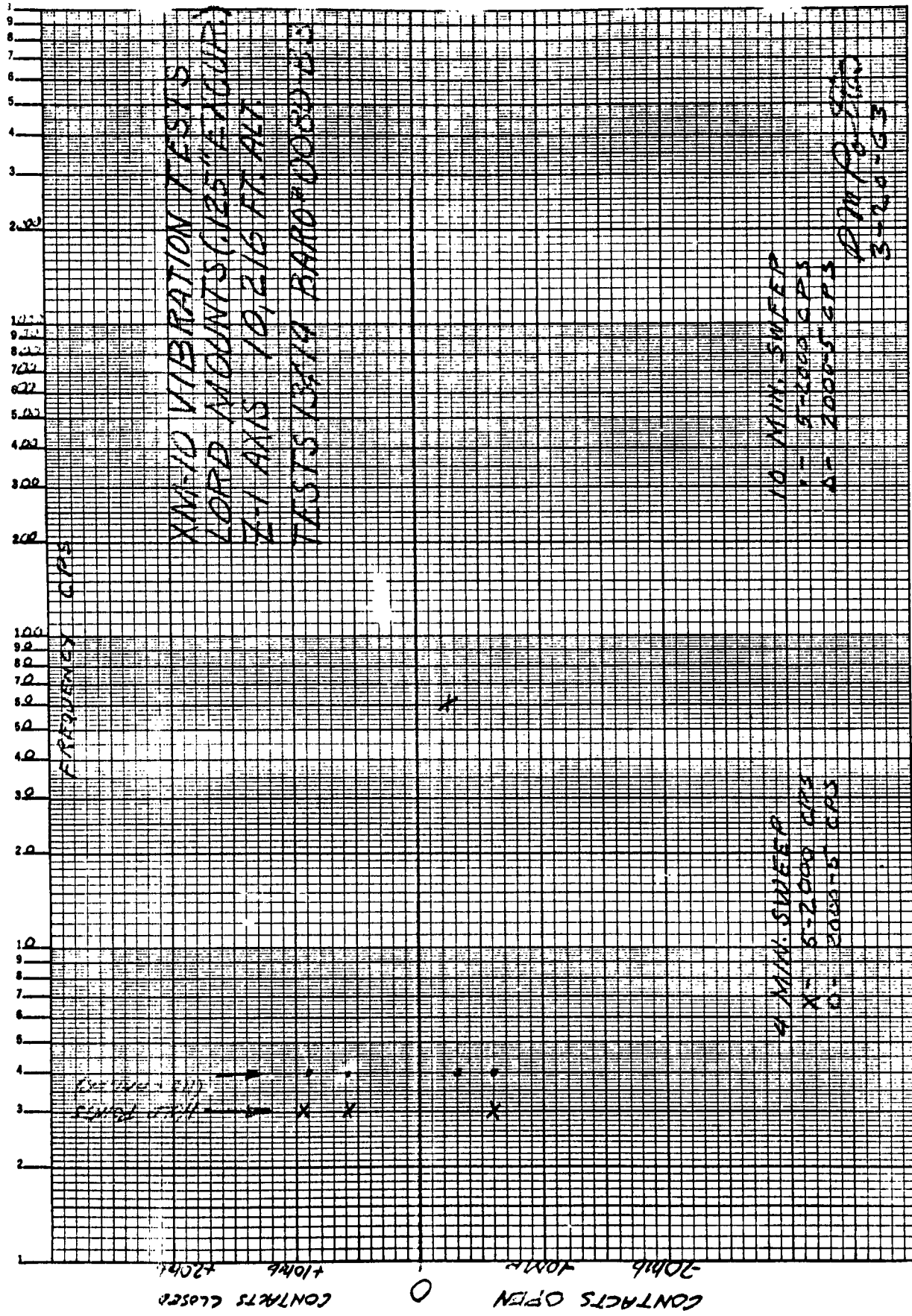
D. M. Parker
3-19-83

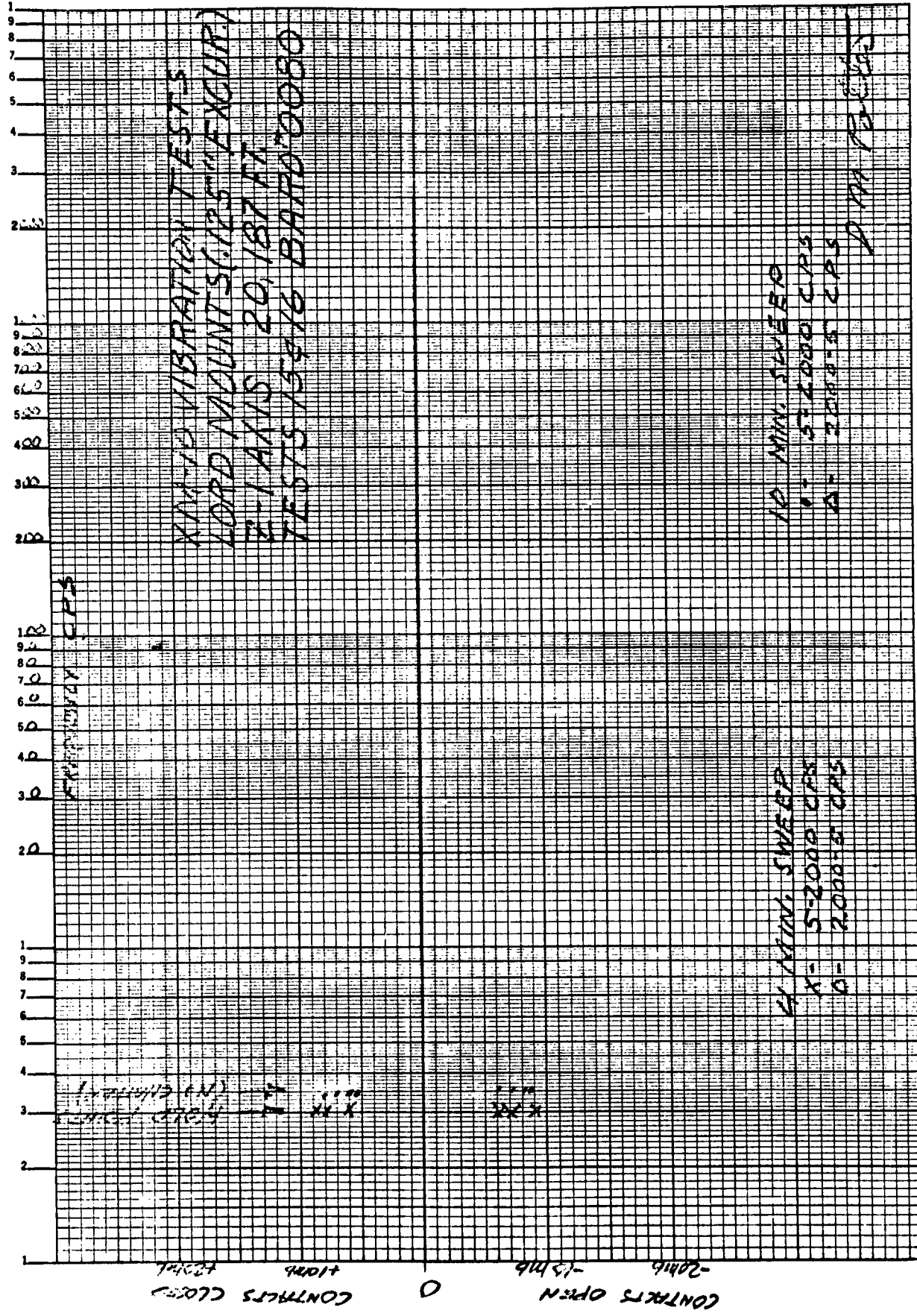




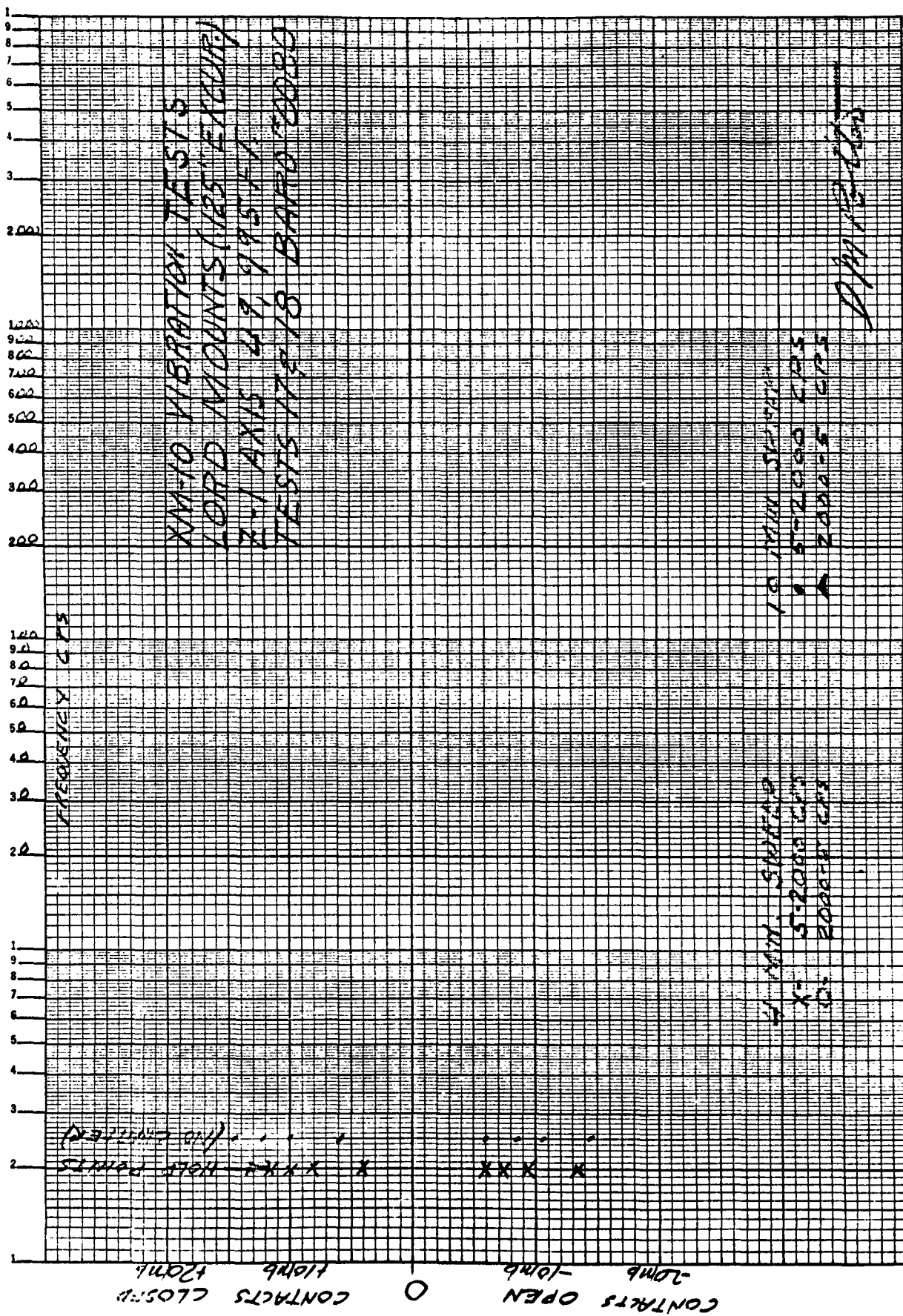








K₂W SEMI-LOGARITHMIC 359-81
KEUFFEL & ESSER CO. MADE IN U.S.A.
4 CYCLES X 70 DIVISIONS



APPENDIX "C"

SUMMARY TABLE OF XM-10 BAROSWITCHES DELIVERED UNDER CONTRACT MODIFICATION 7

<u>S/N</u>	<u>Contact Material</u>	<u>Vibration Isolators</u>	<u>Date Shipped</u>	<u>Remarks</u>
0068-L2	Pt-W	Lord (2)	1-7-63	Note 3
0069-L2	Pt-W	Lord (2)	1-7-63	
0070-A3	Pt-W	Lord (2)	2-6-63	
0071-A3	Pt-W	Lord (2)	2-6-63	
0072-A3	Pt-W	Lord (2)	2-6-63	
0073-A3	Pt-W	Lord (2)	2-6-63	
0074-A3	Pt-W	Lord (2)	2-6-63	
0075-B3	Pt-W	-	-	Retained at Friez for Vibration Tests
0076-B3	Pt-W	Lord (2)	2-6-63	
0078-B3	Pt-W	Lord (2)	2-6-63	
0079-A3	Pt-W	Lord (2)	2-6-63	
0080-B3	Pt-W	-	-	Retained at Friez for Vibration Tests
0081-B3	Pt-W	Lord (2)	2-11-63	
0082-B3	Pt-W	Lord (2)	2-6-63	
0083	Pt-W	-	-	On 60 Day Drift Test 3-14-63
0084-B3	Pt-W	Lord (2)	2-11-63	

APPENDIX "C"
- continued -

<u>S/N</u>	<u>Contact Material</u>	<u>Vibration Isolators</u>	<u>Date Shipped</u>	<u>Remarks</u>
0085	Pt-W	-	-	On 60 Day Drift Test 3-14-63
0087	Pt-W	-	-	On 60 Day Drift Test 3-14-63
0088	Pt-W	-	-	On 60 Day Drift Test 3-14-63
0089	Pt-W	-	-	On 60 Day Drift Test 3-14-63
0090	Pt-W	-	-	On 60 Day Drift Test 3-21-63
0092	Pt-W	-	-	On 60 Day Drift Test 3-14-63

NOTES:

1. Contacts: 91% platinum, 9% tungsten cross-wire configuration.
2. Elastomer selected to permit .093" max. excursion at 4 "G's" constant sinusoidal vibration.
3. Returned to Friez for rework (see Progress Report No. 23). Reshipped March 20, 1963.

APPENDIX D

EVALUATION TEST SCHEDULE FOR SETTER XT-4126-A

PERIOD STARTING APRIL 29, 1963

ENVIRONMENTAL TEST	1st Week	2nd Week	3rd Week	4th Week
<u>First Setter</u>				
Low Temperature	██████████			
Altitude	████			
High Temperature		██████████		
Temperature Shock		██████████		
Humidity			██████████	██████████
<u>Second Setter</u>				
Vibration		██████████	██████████	
Shock			██████████	
Salt Spray				██████████
<u>Third Setter</u>				
Sand and Dust	██████████	██████████		
Rain		██████████		
Explosion			██████████	██████████