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SEP 1[redacted]961

File No: M41, 3-2
T-17378
Date Completed: 1-61

0472

9-11-61

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SEP 12 1961

CENTRAL RECORD FILE

MR. E. L. HARLEY - 7118
Attn: R. Neel - 7118-1

Re: Acoustical Noise Test of TX-41 Fuzing and Firing Components (U)

SUMMARY OF RESULTS

This test was conducted in an attempt to duplicate by acoustic means the accelerations experienced by the fuzing and firing components in the afterbody of the TX-41 during explosive parachute deployment. With the equipment presently available accelerations of no greater than 1% of those experienced during explosive parachute deployment can be obtained. The explosive test sound pressure level of approximately 145 db was obtained but the method exciting the afterbody and components could not be duplicated.

OBJECT OF TEST

The object of this test was to duplicate by acoustic means the accelerations experienced by the various fuzing and firing components in the afterbody of the TX-41 during explosive parachute deployment tests to aid in determining the ability of these components to satisfactorily withstand the explosive parachute deployment.

AUTHORIZATION FOR TEST

This test was requested in a Work Order Authorization from E. L. Harley, 7118 to E. H. Copeland, 7321, dated 11-15-60. R. Neel, 7118 was the consultant.

SETUP FOR TEST

A block diagram of the setup used for analyzing the shock pulses received by the fuzing and firing components in the afterbody of the TX-41 during explosive parachute deployment is shown in Fig. 1. The signal to be analyzed is fed into the audio frequency spectrometer and the outputs of each 1/3 octave band filter sent to cathode followers, amplifiers, and then recorded on visicorders.

CENTRAL RECORD FILE
ACCOUNTABILITY CARD BB
FILE No. TX 41 3-2

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
DOWNGRADING OR DECLASSIFICATION STAMP
CLASSIFICATION CHANGED TO: U
Emelda Sech 9/28/98
PERSON CHANGING MARKING & DATE
Carmelita Delisa 9/28/98
PERSON VERIFYING MARKING & DATE
AUTHORITY: R.B. Craner
RECORD ID: 98SN3904
DATED: 9/14/98

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
1st Review Date: 9-9-98
Authority: ☐ ADC ☒ ADD
Name: N. Lopez
2nd Review Date: 9/14/98
Authority ADD
Name: RBCraner
Determination (Circle Number(s)):
1 Classification Retained
2 Classification Changed to: U
3 Contains No DOE Classified Information
4 Coordinate With:
5 Contains UCNI? N
6 Comments:
OFFICIAL

UNCLASSIFIED

[redacted]

Fig. 2 shows the afterbody of the TX-41 suspended by bungee cord in the 200 cu. ft. chamber. Fig. 3 is a block diagram of the setup for duplicating these accelerations obtained on the fuzing and firing components in the afterbody of the TX-41 during explosive parachute deployment. A sawtooth wave from the oscilloscope was modified in the waveform filter and observed on the oscilloscope. The + gate output of the oscilloscope was used to operate a gate circuit to feed a single pulse of this waveform to the amplifier and driver.

Fig. 4 is the setup for applying a shock pulse to a single component. Shown is an MC-955 Sequential Timer suspended by rubber bands in front of the opening of the matching horn for the low frequency driver.

A list of components tested is shown in Table I.

Table II is a list of test equipment used. One Columbia Research Laboratories crystal accelerometer, type 302, Serial No. 683, was used in this test.

PROCEDURE

A tape recording of the accelerations experienced by the fuzing and firing components in the afterbody of the TX-41 during explosive parachute deployment was furnished by the consultant. This was analyzed with the setup shown in Fig. 1.

Using the setup in Fig. 3 a single pulse was applied to the afterbody as shown in Fig. 2 and the output of these accelerometer mounted on the MC-955 Sequential Timer monitored with the setup shown in Fig. 1.

With maximum power applied to the driver the accelerations measured on the MC-955 Sequential Timer were less than 1g and the duration of these accelerations was much greater than the accelerations measured during explosive parachute deployment.

In an attempt to obtain the correct waveshape of the measured accelerations the setup shown in Fig. 4 was used.

RESULTS

Figs. 5 through 13 are graphs of the acceleration levels vs frequency obtained by the analysis of the tape recording of the accelerations experienced by the fuzing and firing components in the afterbody of the TX-41 during explosive parachute deployment.

With the components mounted on the afterbody of the TX-41 and suspended in the 200 cu. ft. chamber less than 1g accelerations could be obtained and

the waveshape of these accelerations did not resemble those measured during explosive parachute deployment.

Using an MC-955 not mounted to the afterbody the waveshape could be made to approximate that which was measured during explosive parachute deployment but the amplitude was still a small fraction of the explosive test acceleration.

CONCLUSIONS

The accelerations experienced by the fuzing and firing components in the afterbody of the TX-41 during explosive parachute deployment cannot be duplicated acoustically with the equipment presently available.

J. S. COLBURN - 7323-1

7321 Project Eng: R. A. MIKKELSEN - 7321-5

Original Signed By
R. S. HOOPER

Approved By: R. S. HOOPER - 7321-5

JSC:7323-1:mw

Encl: Fig. 1 thru 13
Tables I, II

Copy to:
C. Winter, 8141, Attn: W. L. Morehouse
D. M. Bruce, 7182, Attn: W. Murfin
J. M. Wiesen, 1442
L. S. Bliss, 2344
E. H. Copeland, 7321
C. L. Johnson, 7523
K. Smeltzer, 3421-3

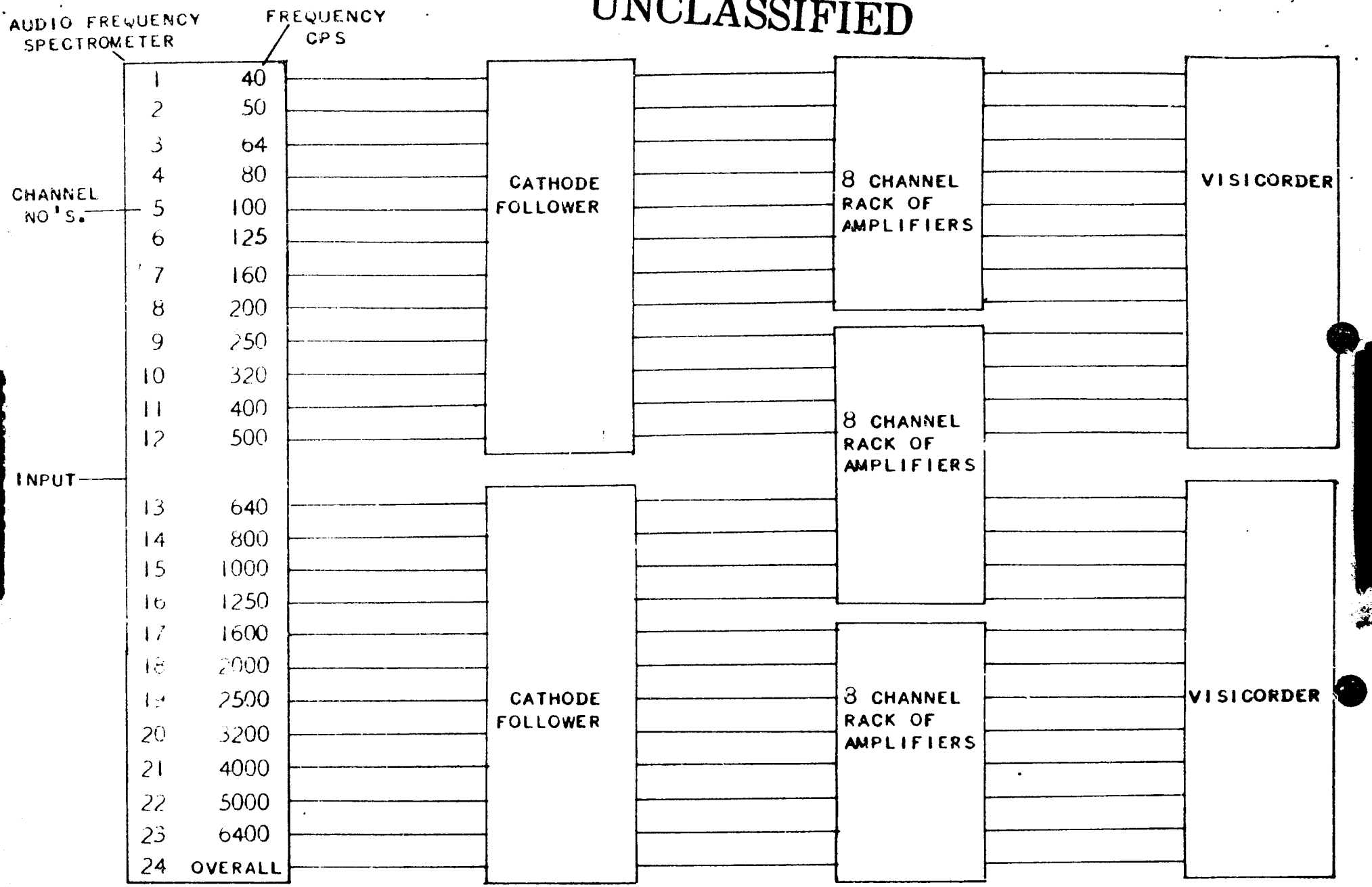

FIGURE 1 - BLOCK DIAGRAM OF SYSTEM FOR ANALYZING TRANSIENT SHOCK PULSES -- ACOUSTICAL NOISE TESTS OF THE TX-41 FUZING AND FIRING COMPONENTS

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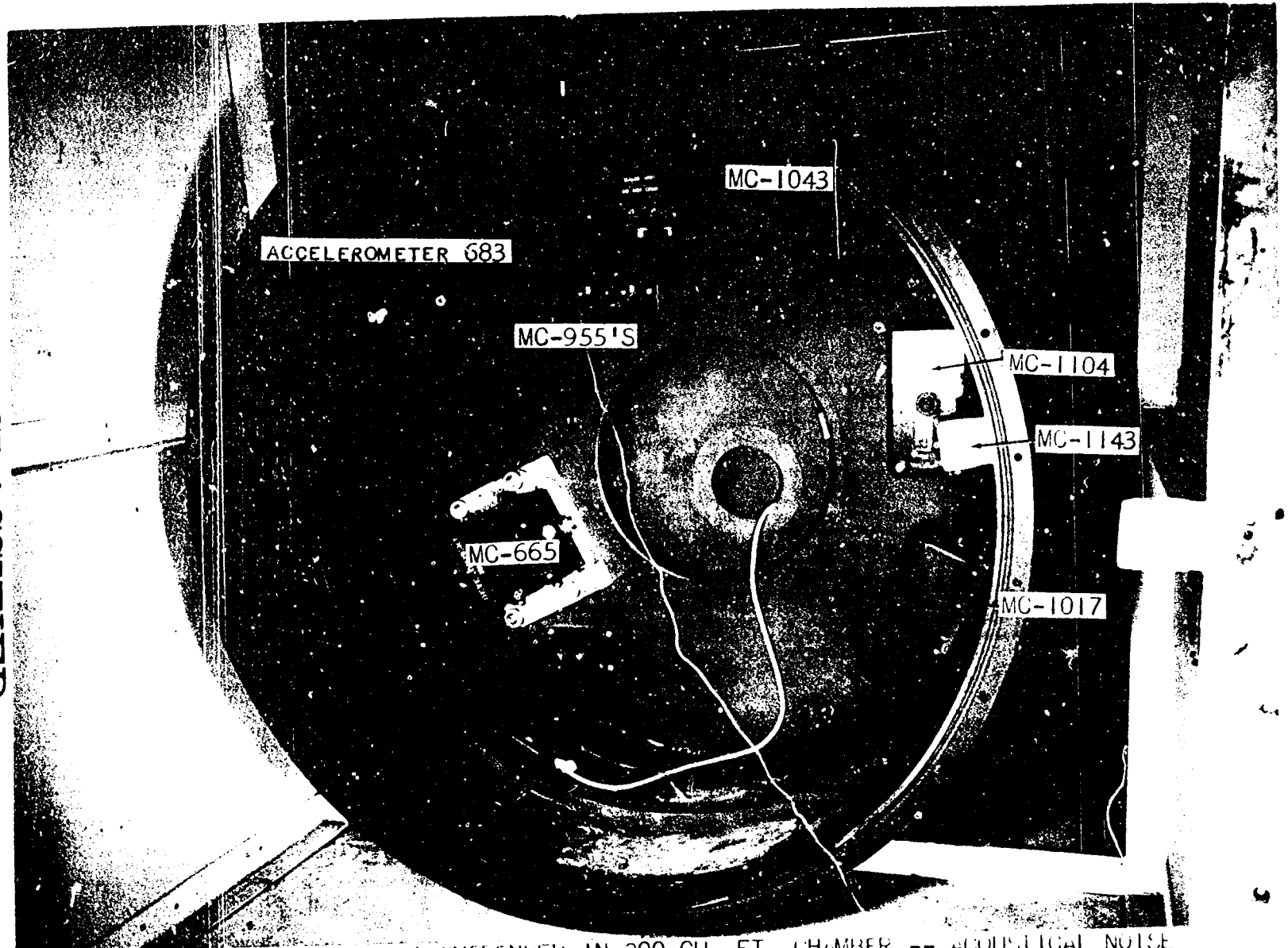

FIGURE 2 - AFTERBODY OF TX-41 SUSPENDED IN 200 CU. FT. CHAMBER -- ACOUSTICAL NOISE TESTS OF THE TX-41 FUZING AND FIRING COMPONENTS

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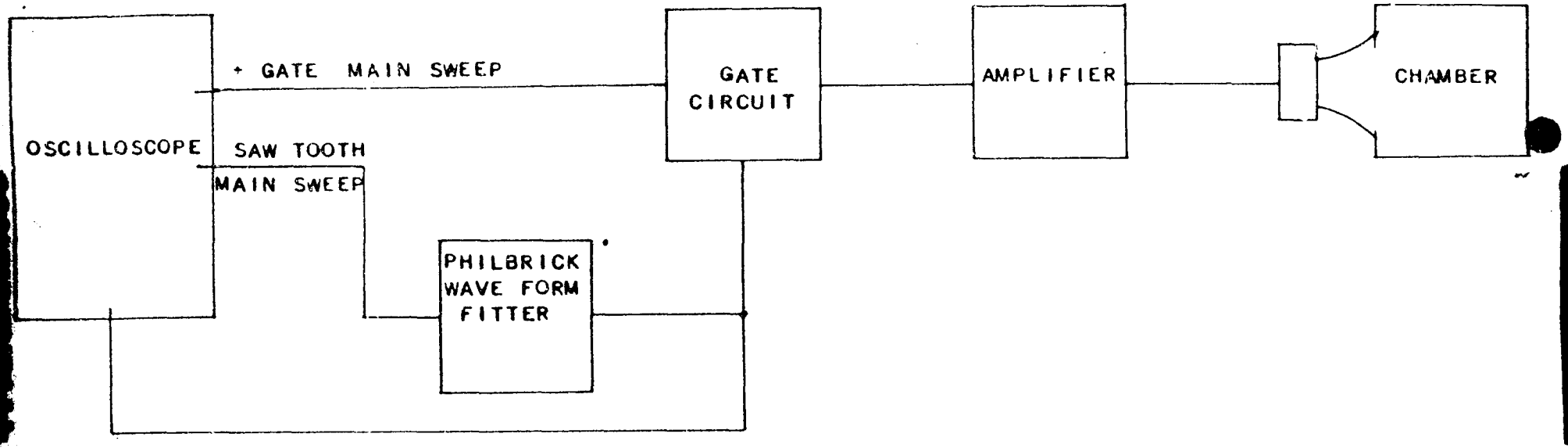

FIGURE 3 - BLOCK DIAGRAM OF SETUP USED TO PRODUCE SINGLE PULSE USED TO SHOCK THE AFTERBODY OF THE TX-41 -- ACOUSTICAL NOISE TESTS OF THE TX-41 FUZING AND FIRING COMPONENTS

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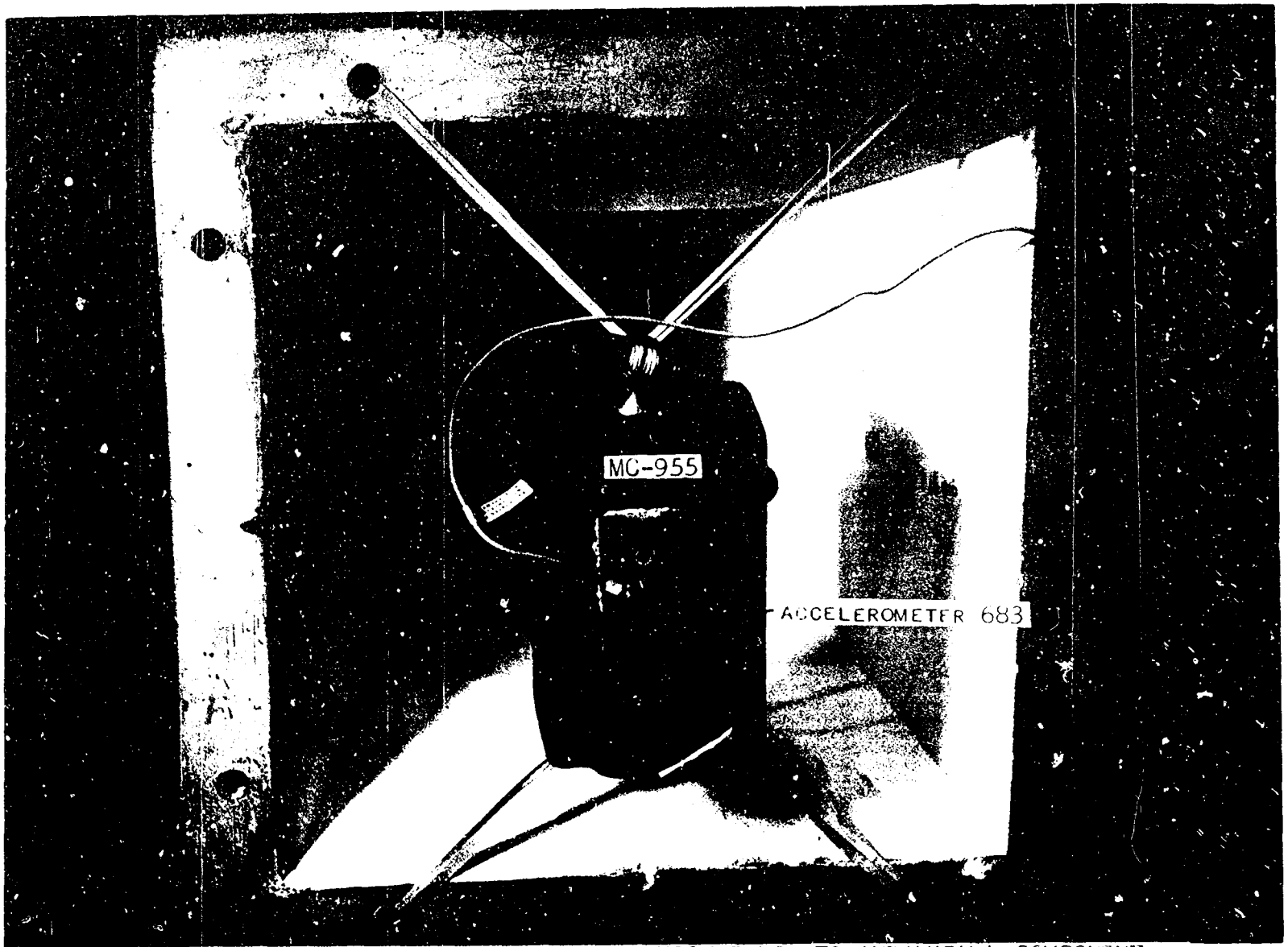

FIGURE 4 - SETUP USED TO APPLY SINGLE SHOCK PULSE TO INDIVIDUAL COMPONENT -- ACOUSTICAL NOISE TESTS OF THE TX-41 FUZING AND FIRING COMPONENTS

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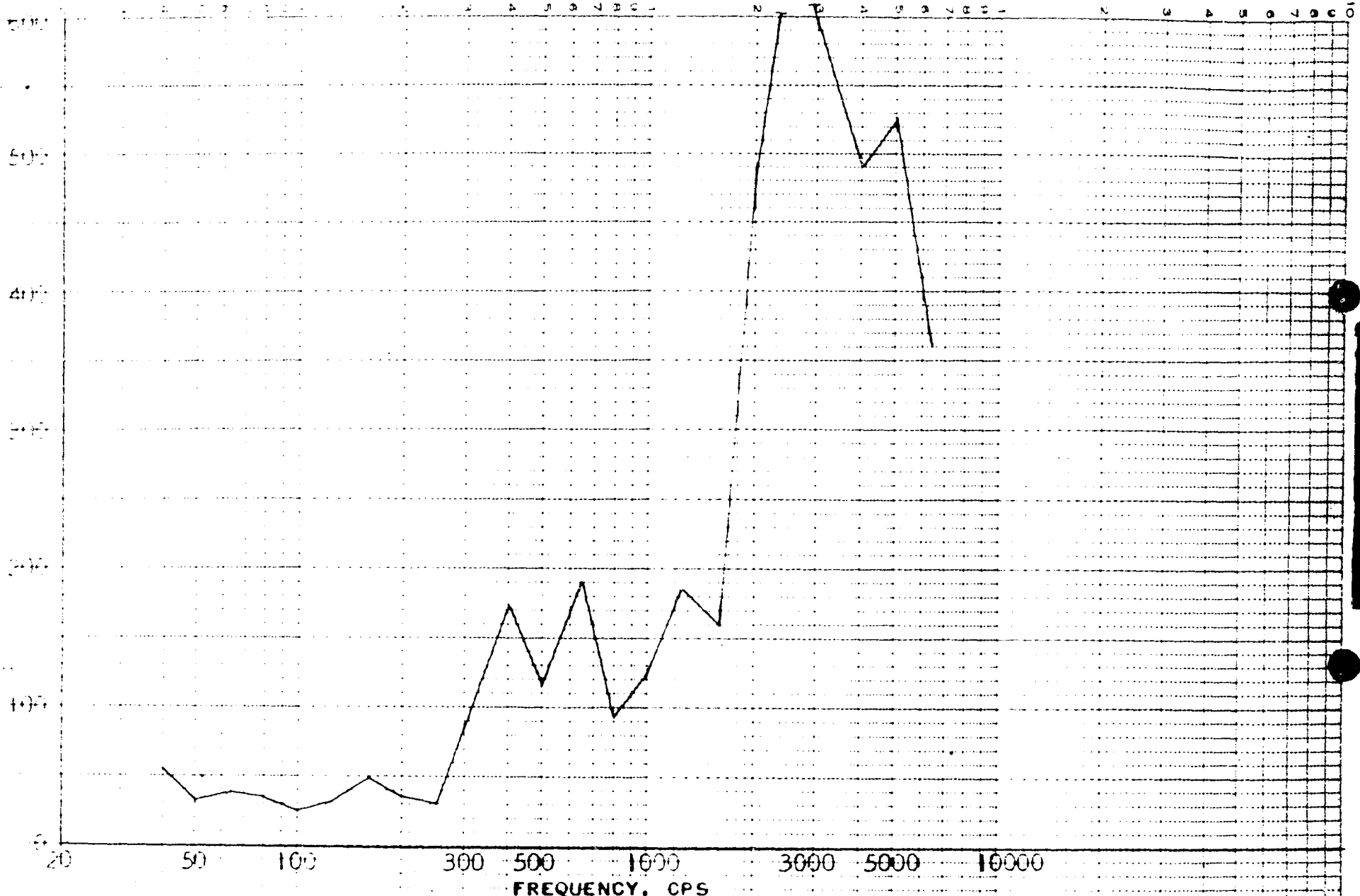

FIGURE 5 - ACCELERATIONS EXPERIENCED BY MC-955, SEQUENTIAL TIMER, DURING EXPLOSIVE PARACHUTE DEPLOYMENT -- ACOUSTICAL NOISE TESTS OF THE TX-41 FUZING AND FIRING COMPONENTS

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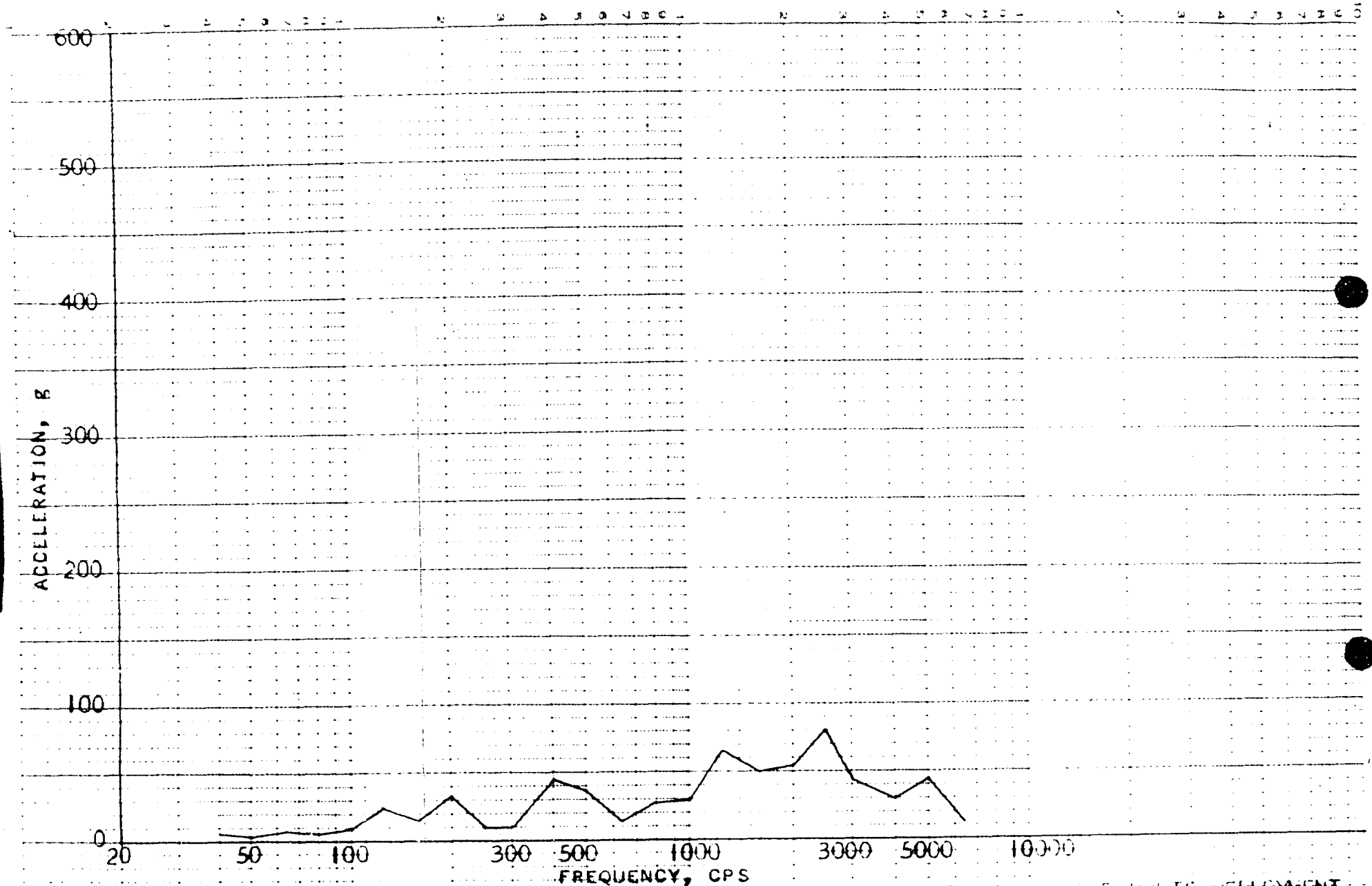

FIGURE 6 - ACCELERATIONS EXPERIENCED BY MC-1088, FIRING SET, DURING EXPLOSIVE PARACHUTE DEPLOYMENT -- ACOUSTICAL NOISE TESTS OF THE TX-41 FUZING AND FIRING COMPONENTS

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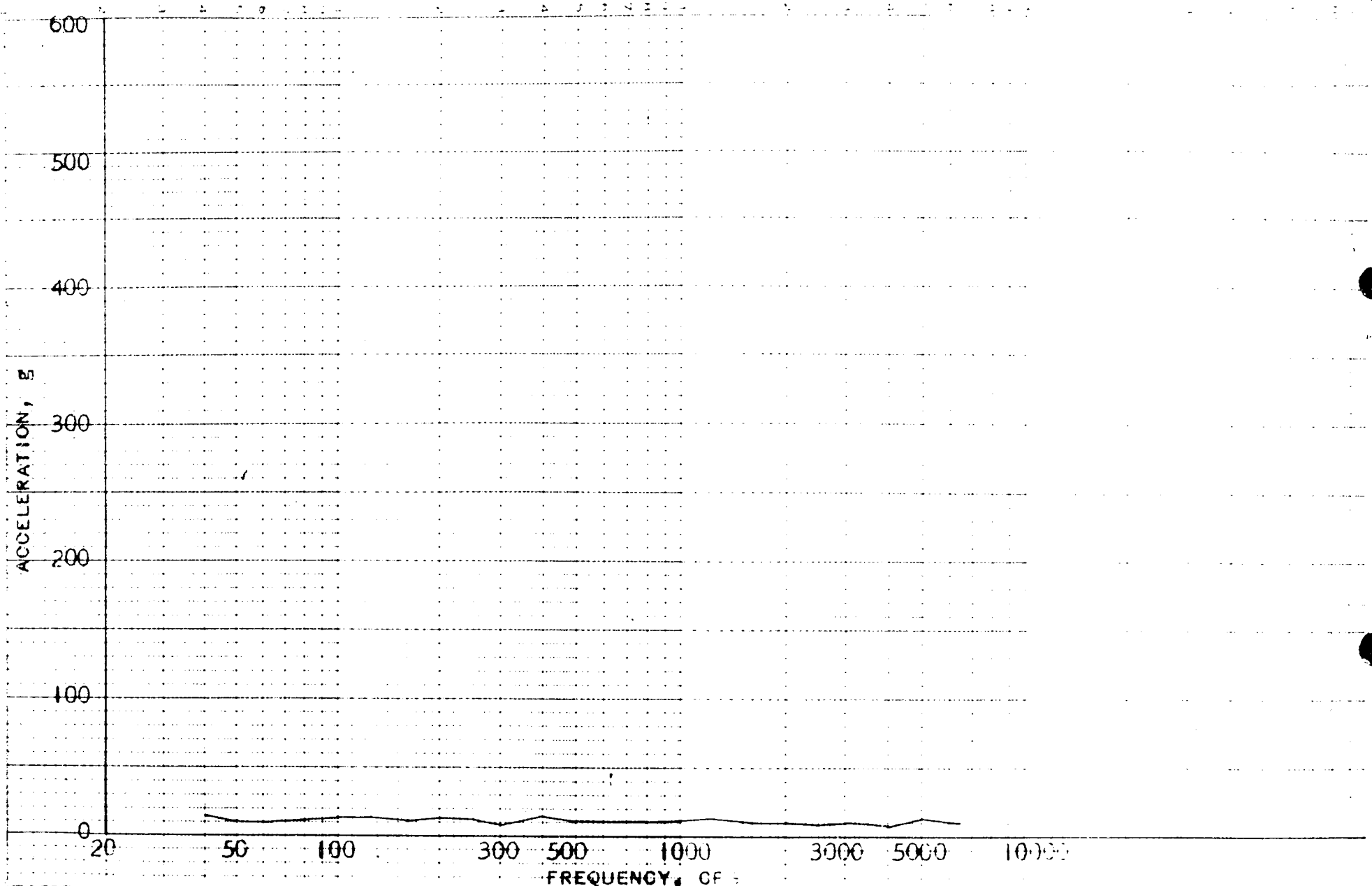

FIGURE 7 - ACCELERATIONS EXPERIENCED INSIDE THE MC-663, BAROSWITCH, DURING EXPLOSIVE PARACHUTE DEPLOYMENT -- ACOUSTICAL NOISE TESTS OF T.E. IX-41 FUZING AND FIRING COMPONENTS

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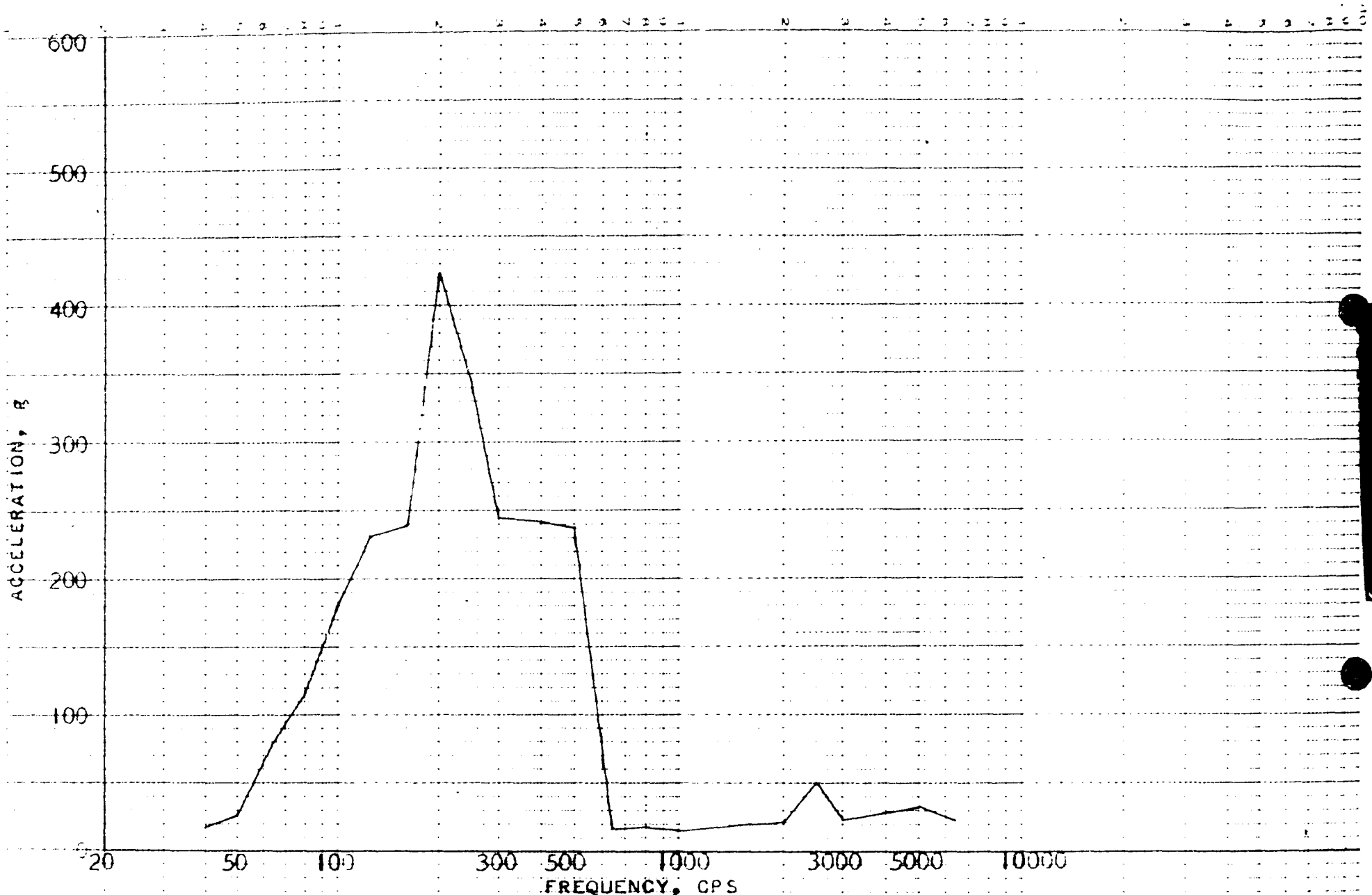

FIGURE 8 - ACCELERATIONS EXPERIENCED BY THE MC-1104, THERMAL BATTERY PACK, DURING EXPLOSIVE PARACHUTE DEPLOYMENT -- ACOUSTICAL NOISE TESTS OF THE TX-41 FUZING AND FIRING COMPONENTS

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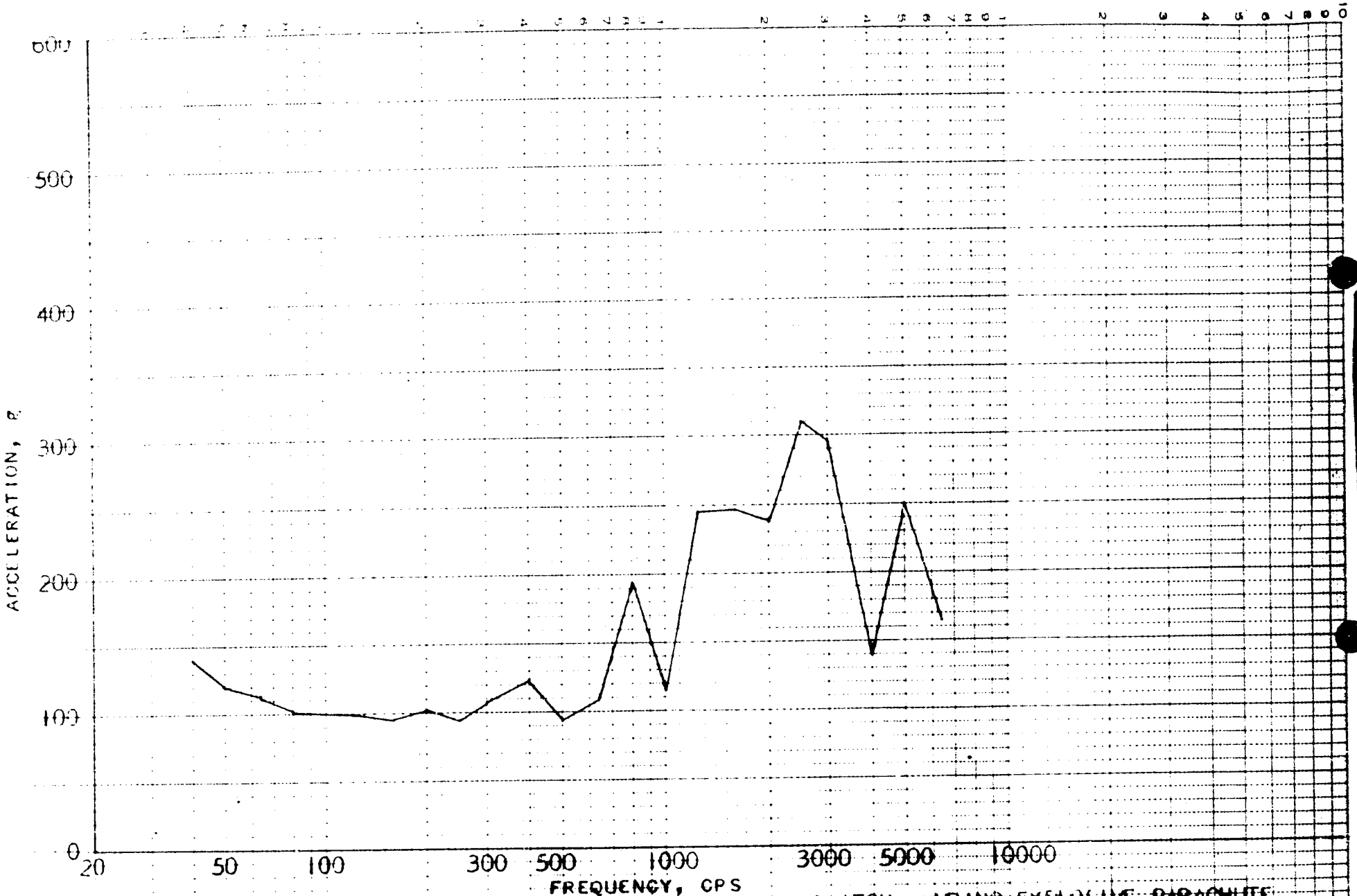

FIGURE 9 - ACCELERATIONS EXPERIENCED BY THE MC-1017, SAFING SWITCH, DURING EXPLOSIVE PARACHUTE DEPLOYMENT -- ACOUSTICAL NOISE TESTS OF THE TX-41 FUZING AND FIRING COMPONENTS

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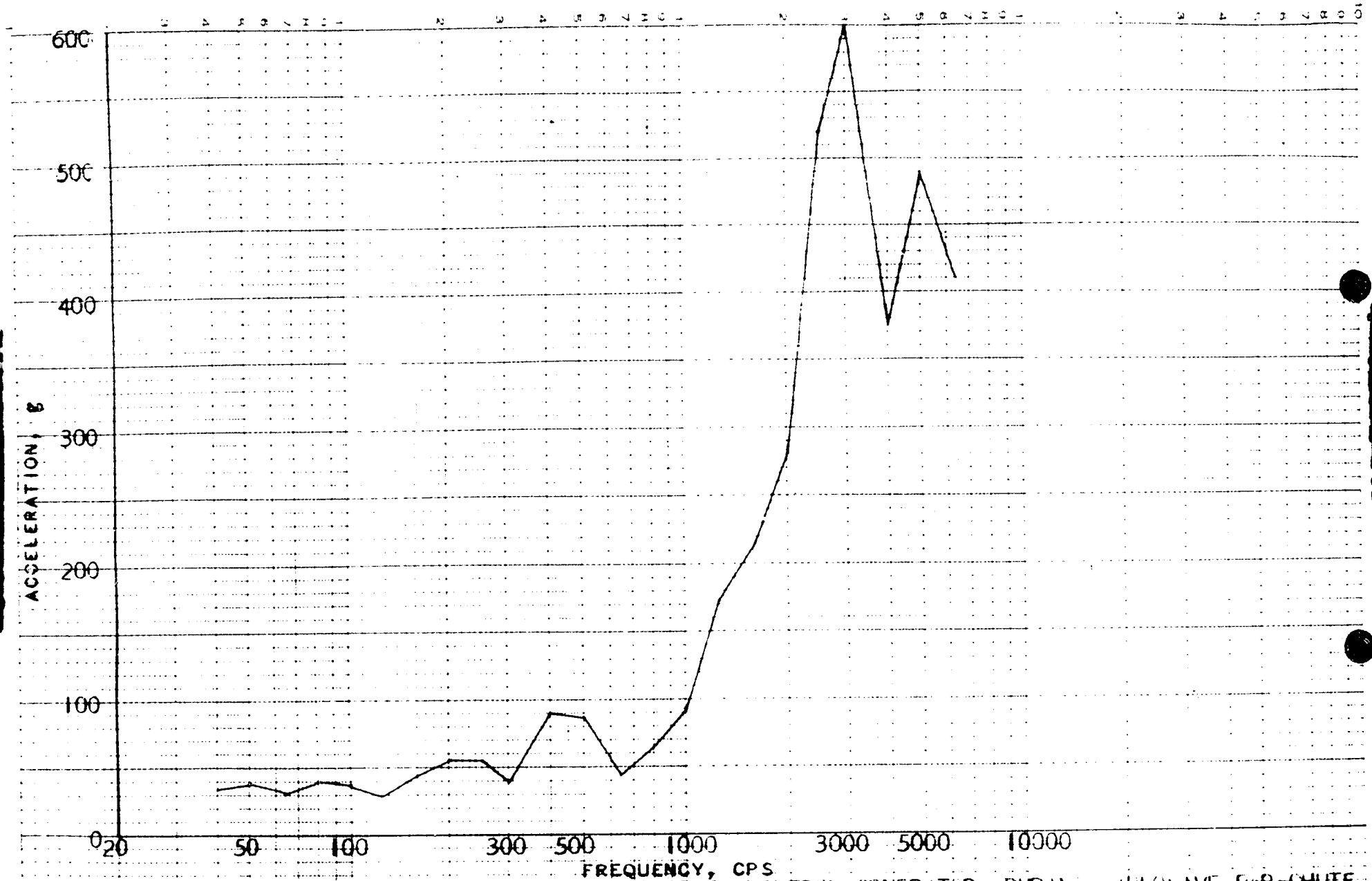

FIGURE 10 - ACCELERATIONS EXPERIENCED BY THE MC-1027, NEUTRON GENERATOR, DURING EXPLOSIVE PARACHUTE DEPLOYMENT -- ACOUSTICAL NOISE TESTS OF THE TX-41 FUZING AND FIRING COMPONENTS

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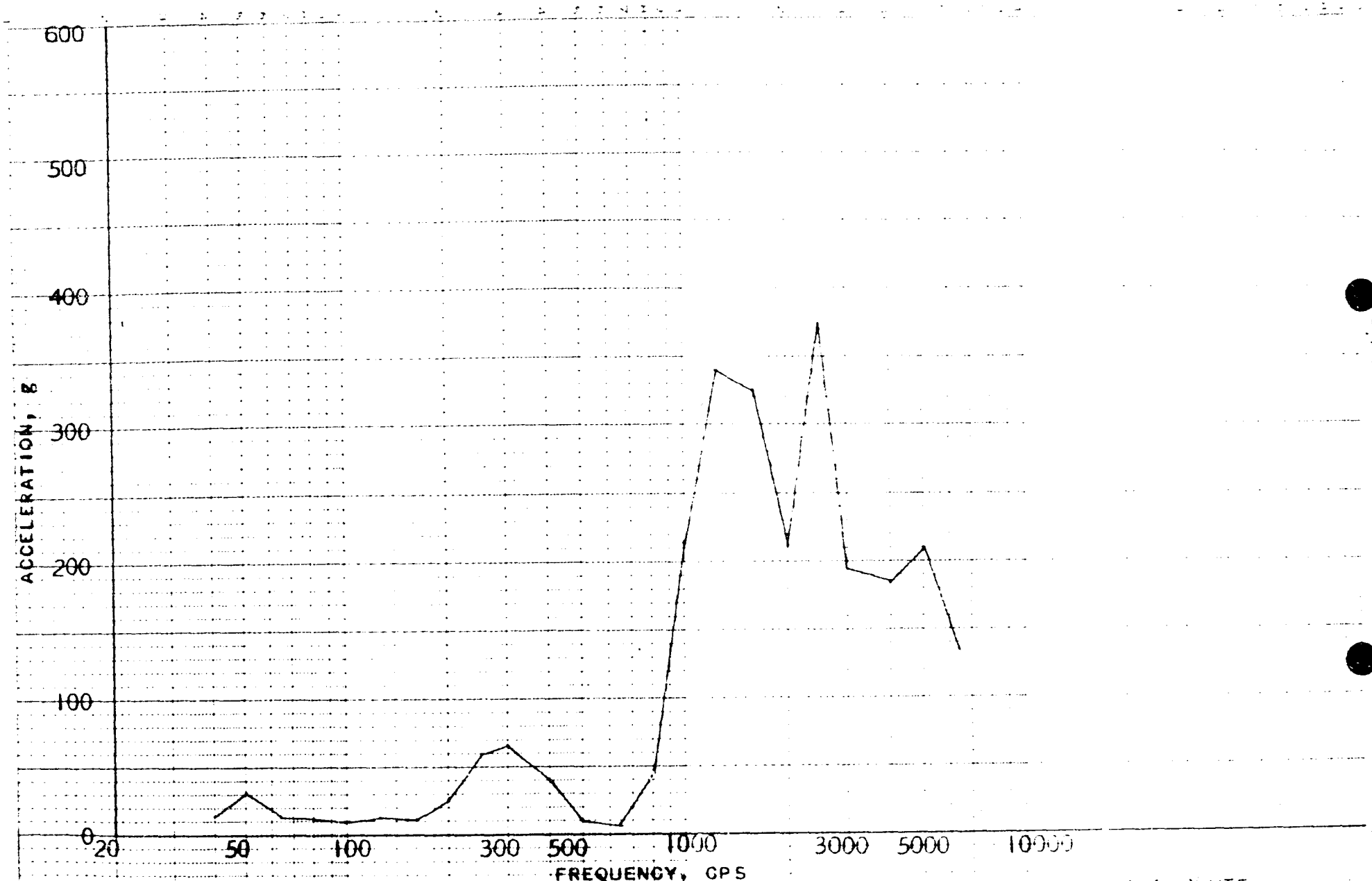

FIGURE 11 - ACCELERATIONS EXPERIENCED BY THE MC-663, BAROSWITCH, DURING EXPLOSIVE PARACHUTE DEPLOYMENT -- ACOUSTICAL NOISE TESTS OF THE TX-41 FUZING AND FIRING COMPONENTS

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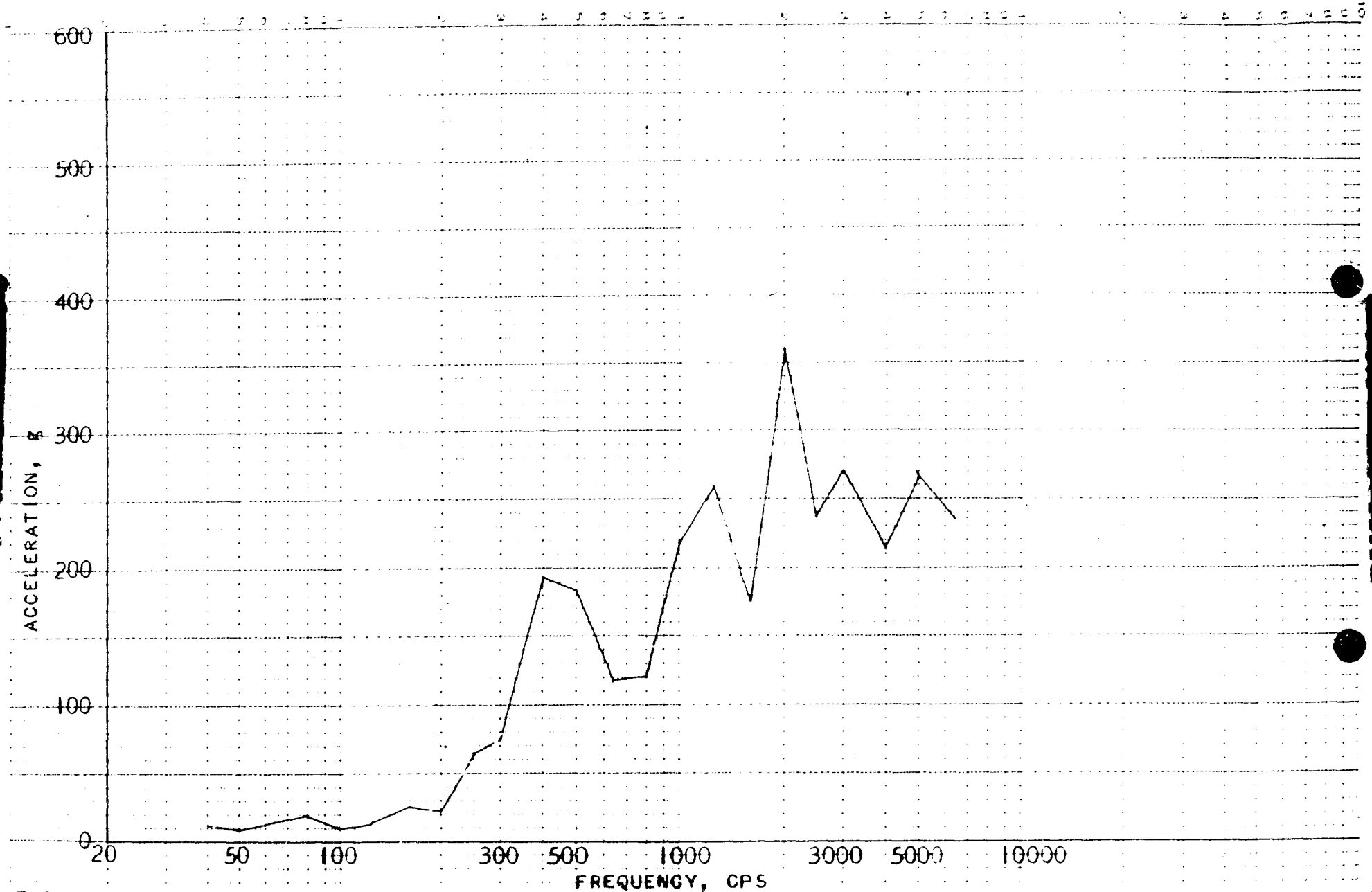

FIGURE 12 - ACCELERATIONS EXPERIENCED BY A COVERED XMC-955, SEQUENTIAL TIMER, DURING EXPLOSIVE PARACHUTE DEPLOYMENT -- ACOUSTICAL NOISE TESTS OF THE TX-41 FUZING AND FIRING COMPONENTS

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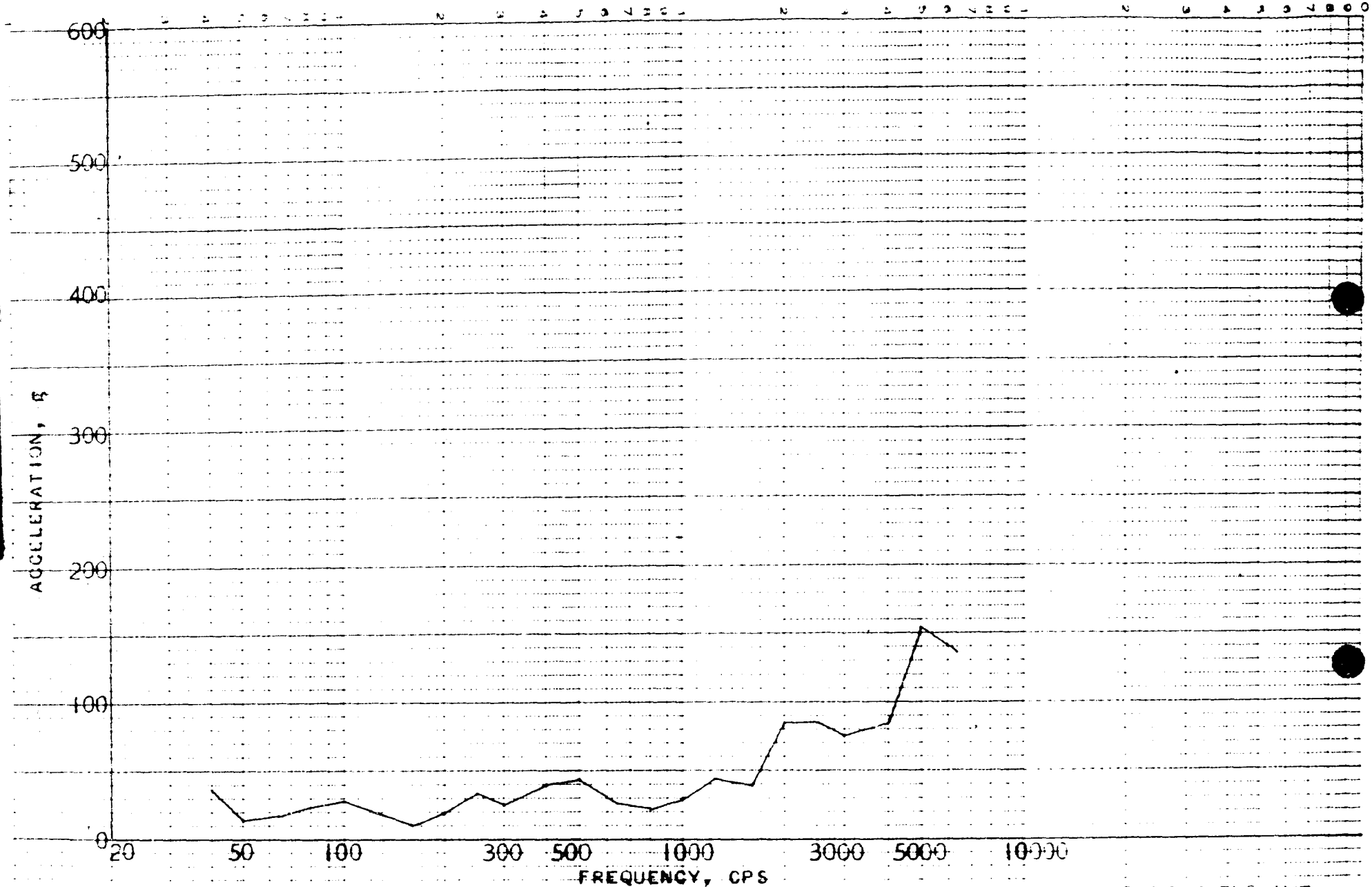

FIGURE 13 - ACCELERATIONS EXPERIENCED BY A SUSPENDED XMC-955, SEQUENTIAL TIMER, DURING EXPLOSIVE PARACHUTE DEPLOYMENT -- ACOUSTICAL NOISE TESTS OF THE TX-41 FUZING AND FIRING COMPONENTS

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TABLE I
LIST OF FUZING AND FIRING COMPONENTS MOUNTED ON THE MC-1073 AFTERBODY OF THE TX-41
ACOUSTICAL NOISE TESTS OF THE TX-41 FUZING AND FIRING COMPONENTS

COMPONENT	DRAWING NO.	SERIAL NO.
XMC-955, SEQUENTIAL TIMER	310863	T99
XMC-955, SEQUENTIAL TIMER	310863	T57
MC-665, BAROSWITCH	310229	BL-1212-F7
MC-1104, THERMAL BATTERY PACK	310881	AA-3028-A9
XMC-1043, SELECTOR	310794	AA-6004-C9
MC-1017, SAFING SWITCH	310753	
MC-1143, PRESSURE SWITCH	310938	AS-04-E9
MC-1088, FIRING SET	310861	

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TABLE II
TEST EQUIPMENT WAS USED
ACOUSTICAL NOISE TESTS OF THE TX-41 FUZING AND FIRING COMPONENTS

CHANNEL	ITEM	MANUFACTURER	MODEL OR TYPE NO.	SERIAL NO.	SANDIA PROPERTY NO.
1 - 24	AUDIO FREQUENCY SPECTROMETER	BRUEL AND KJAER	2109		S-73079
1 - 12	CATHODE FOLLOWER	SANDIA CORPORATION		121-9	
13 - 24	CATHODE FOLLOWER	SANDIA CORPORATION		121-16	
1 - 8	POWER SUPPLY	CONSOLIDATED ENGINEERING CORP.	2-105A	9065	S-82824
9 - 16	POWER SUPPLY	CONSOLIDATED ENGINEERING CORP.	2-105	371V5	S-34579
17 - 24	POWER SUPPLY	CONSOLIDATED ENGINEERING CORP.	2-105	933Y8	S-43267
1 - 4	CASE	CONSOLIDATED ENGINEERING CORP.	14120	940AD11	S-42079-2
5 - 8	CASE	CONSOLIDATED ENGINEERING CORP.	14120	496V6	
9 - 12	CASE	CONSOLIDATED ENGINEERING CORP.	14120	509V6	
13 - 16	CASE	CONSOLIDATED ENGINEERING CORP.	14120	969AD11	S-42079-2
17 - 20	CASE	CONSOLIDATED ENGINEERING CORP.	14120	501V6	
21 - 24	CASE	CONSOLIDATED ENGINEERING CORP.	14120	16829	
1	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	589AD6	S-44096
2	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	612AD6	S-44124
3	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	659AD6	S-44120
4	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	672AD6	S-44119
5	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	674AD6	S-44123
6	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	636AD6	
7	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	648AD6	S-44104
8	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	663AD6	S-44122
9	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	627AD6	
10	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	653AD6	S-44127
11	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	633AD6	S-44102
12	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	635AD6	S-44116
13	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	630AD6	S-44113
14	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	647AD6	S-44118
15	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	606AD6	S-44098
16	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	657AD6	S-44103
17	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	660AD6	S-44109
18	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	676AD6	S-44111
19	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	641AD6	S-44101

20	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	641AD6	S-44110
21	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112C	7077	S-83201
22	AMPLIFIER, LINEAR	KINTEL COHU	111BF		S-93352
23	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	602AD6	S-44105
24	AMPLIFIER, LINEAR	CONSOLIDATED ENGINEERING CORP.	1-112B	603AD6	
1 - 12	VISICORDER	HEILAND	906A169FGO	9-6734	S-99274
13 - 24	VISICORDER	HEILAND	906B168FGO	9-7168	S-106565
1	GALVONOMETER	HEILAND	M-1650	7550	
2	GALVONOMETER	HEILAND	M-1650	9548	
3	GALVONOMETER	HEILAND	M-1650	25044	
4	GALVONOMETER	HEILAND	M-1650	24133	
5	GALVONOMETER	HEILAND	M-1650	24985	
6	GALVONOMETER	HEILAND	M-1650	7746	
7	GALVONOMETER	HEILAND	M-1650	18345	
8	GALVONOMETER	HEILAND	M-1650	21323	
9	GALVONOMETER	HEILAND	M-1650	22028	
10	GALVONOMETER	HEILAND	M-1650	17673	
11	GALVONOMETER	HEILAND	M-1650	17533	
12	GALVONOMETER	HEILAND	M-3300	9213	
13	GALVONOMETER	HEILAND	M-1650	16436	
14	GALVONOMETER	HEILAND	M-3300	17641	
15	GALVONOMETER	HEILAND	M-3300	7408	
16	GALVONOMETER	HEILAND	M-3300	7731	
17	GALVONOMETER	HEILAND	M-3300	10137	
18	GALVONOMETER	HEILAND	M-3300	20366	
19	GALVONOMETER	HEILAND	M-3300	10081	
20	GALVONOMETER	HEILAND	M-3300	22329	
21	GALVONOMETER	HEILAND	M-3300	18966	
22	GALVONOMETER	HEILAND	M-3300	19306	
23	GALVONOMETER	HEILAND	M-3300	24497	
24	GALVONOMETER	HEILAND	M-3300	23659	
1 - 24	CATHODE FOLLOWER	GULTON MFG. CO.	F406	126	S-64234
1 - 24	TAPE RECORDER	CONSOLIDATED ENGINEERING CORP.	5-752A	F01465	
	OSCILLOSCOPE	TEKTRONIX INC.	535		S-75075
	PREAMP	TEKTRONIX INC.	H		S-106393
	WAVE FORM FITTER	GEORGE A. PHILBRICK RESEARCHER, INC.	FFR		S-73972
	GATING AMPLIFIER	SANDIA CORPORATION			
	AMPLIFIER	LING ELECTRONICS	PP7/8	03-51	S-106416
	DRIVER	AVCO ADVANCED RESEARCH AND DEVELOPMENT, INC.	AG-012	1001	
	200 CU. FT. CHAMBER	SANDIA CORPORATION			