[redacted]

UNCLASSIFIED

1434

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
1st Review Date: 7/15/98
Authority: DADC, RADD
Name: W Pope
2nd Review Date: 7/23/98
Authority: ADR
Name: R B Craner
Determination (Circle Number)
1. Classification Retained
2. Classification Changed to: U
3. Contains No DOE Classified Information
4. Coordinate With:
5. Contains UCNI? N
6. Comments:

FEB 8 1963
File: T-1100
T-18999
Test Completed: 9/14/62

MR. T. J. HOBAN, JR. - 7212
Attn: M. B. Leeman

Re: Vibration Test of the 53.73-5 Telemetry Package (u)

Test Summary

The XW-53 telemetry package was subjected to a sinusoidal vibration along each of its three axes. Each test was a 7-minute cycle from 10-150-10 cps, with an input of 0.1 inch DA from 10-30 cps and 5.0 g from 30-150 cps.

As a result of recording the output of the telemetry package, the equipment was found to be operational throughout the series of tests. Also, there was no structural damage to the telemetry package or container during the tests.

In the vertical and lateral axes, the internal components were found to have critical frequencies of approximately 115 cps and/or 145 cps. However, based upon the construction of the telemetry package, it was concluded that one particular component is resonating and thus driving the other components.

The responses for the longitudinal vibration test were not found to be critical. In no case did the response, either in the direction of shake or transversly, exceed the input level.

Object of Test

The object of this test was to determine the structural integrity and functional capability of the XW-53 telemetry package when subjected to the vibration similar to that encountered during flight.

Authorization

The test was authorized in Environmental Test Order T-18999 to R. S. Hooper, 7321-5, dated September 7, 1962. M. B. Leeman, 7212, was the consultant.

Test Setup

For the vibration test along each of the three axes, the internal accelerometers were mounted as shown in Figures 1 and 2.

The test setup and all external accelerometer locations for the vertical axis are shown in Figures 3 through 5. Figures 6 through 10 show the test setup and accelerometer locations for the lateral and longitudinal axes.

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW
DOWNGRADING OR DECLASSIFICATION STAMP
CLASSIFICATION CHANGED TO: U
AUTHORITY: R B Craner
Emelda Sepeh 7/30/98
PERSON CHANGING MARKING & DATE
RECORD ID: 98SN3004
W C Pope 7/30/98
PERSON VERIFYING MARKING & DATE
DATED: 7/23/98

RECEIVED
FEB 11 1963
CENTRAL RECORD FILE

FILE No. 53/Titan II

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Procedure

Prior to any vibration testing, the XW-53 telemetry package was removed from the TM container and instrumented.

The first vibration test was along the vertical axis. The input, during a 7-minute cycle (10-150-10 cps), was 0.1 inch DA from 10-30 cps and 5.0g from 30-150 cps. Throughout the test for each axis, all accelerometer responses were recorded on magnetic tape. From these recordings, plots of acceleration versus frequency were obtained. The records from the magnetic tape were filtered through a low-pass filter set at twice the fundamental frequency.

The same test procedure was next used for the lateral axis and then the longitudinal axis.

During each 7-minute test cycle, personnel from 7212 recorded the output of the telemetry package. This was done to determine that all components, such as the sub-carrier oscillators and the power supply, were operational throughout the test.

Results

During the series of vibration tests, there was no structural damage to the container or telemetry package. Also, the telemetry system functioned satisfactorily.

The acceleration responses for all three axes are shown in Figures 11 through 40. The inputs for the vertical and lateral axes are shown in Figures 11 and 13.

The input for the longitudinal axis was not obtained due to a calibration error.

The TM container does not have a critical or resonant frequency between 10-150 cps. The responses, at the cg of the TM container, for the vertical and lateral axes are shown in Figures 15 through 17.

The responses of the internal accelerometers for the vertical and lateral axes are shown in Figures 18 through 24 and Figures 25 through 31 respectively. These records show that all of the internal components have critical frequencies of approximately 115 and/or 145 cps. However, it is not possible to determine whether one of these frequencies is the resonant point. Considering the construction of the telemetry package, (Figure 1 and 2) these results strongly suggest that one particular component is resonating and feeding back to the other components.

Due to a calibration error, the longitudinal input is not shown. However, previous tests show that the response at the base of the fixture gives a very close approximation of the input. This recording is shown in Figure 32.

The responses for the longitudinal test are shown in Figures 32 through 40. In no case was the response, at the stations monitored, in excess of the input.

Conclusions and Recommendations

The XW-53 telemetry package functioned satisfactorily during all vibration tests. However, the high responses of the internal components at this critical frequencies should not be neglected. If prolonged vibration at these frequencies is possible during field environment, a test whereby the telemetry package was vibrated at these critical frequencies for a prescribed period of time is recommended. This would be a more positive test on the functional and structural integrity of the components in the telemetry package. It may prove necessary to make the bulkheads more rigid, thus raising the critical frequency out of the 10-150 cps frequency range.

J. V. Otis

J. V. OTIS - 7324-2

D T Judd

TEST PROJECT ENGINEER: D. T. JUDD - 7331-1

APPROVED BY: R. S. HOOPER - 7331-1

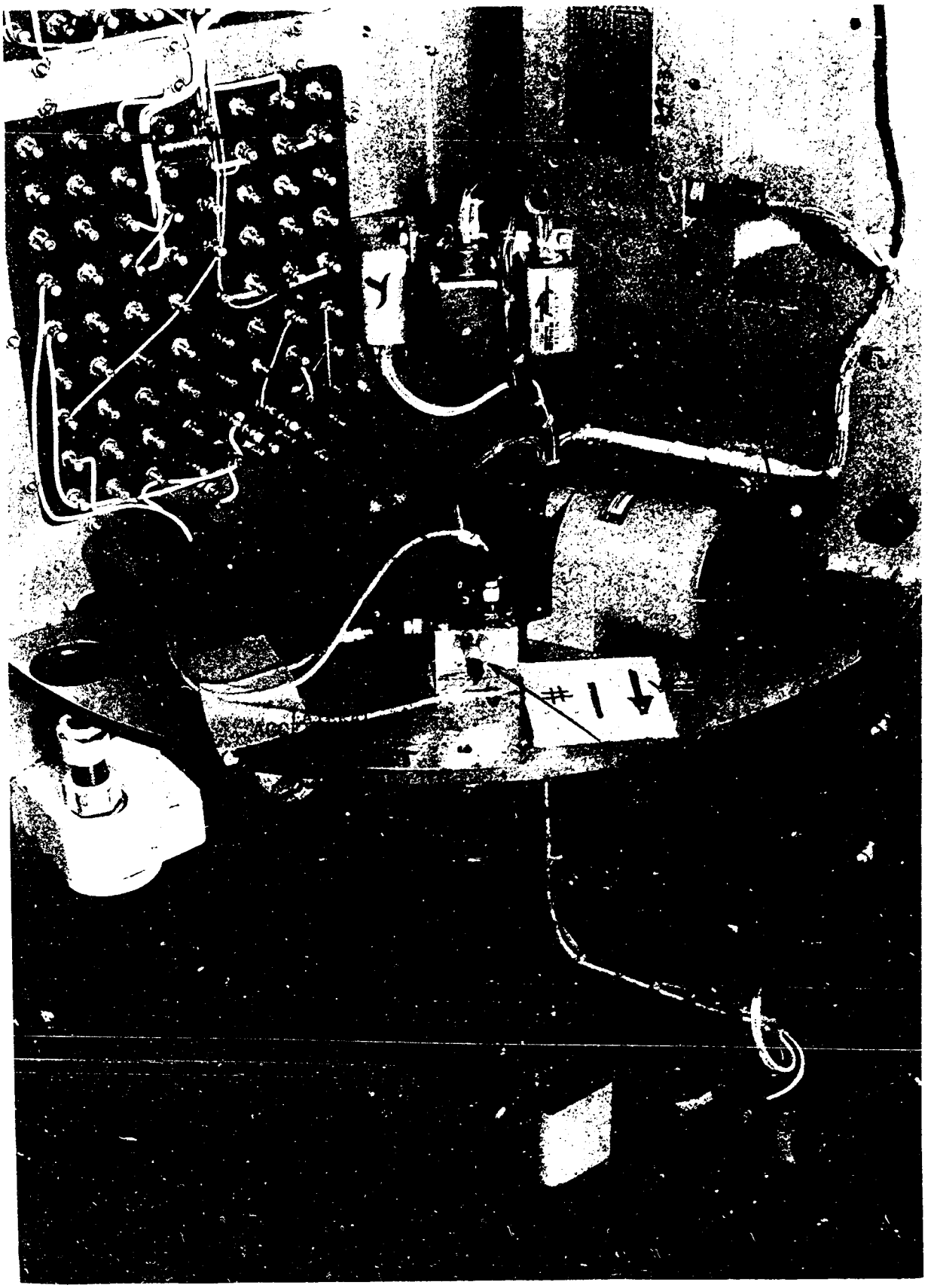
JVO:7324-2:pw

Encls: Figures 1 through 40

Copy to:
C. S. Williams, Jr. 1442
D. S. Bliss, 2344
C. L. Johnson, 7523
E. H. Copeland, 7331
Central Records File, 3421-3

UNCLASSIFIED [redacted]

1437



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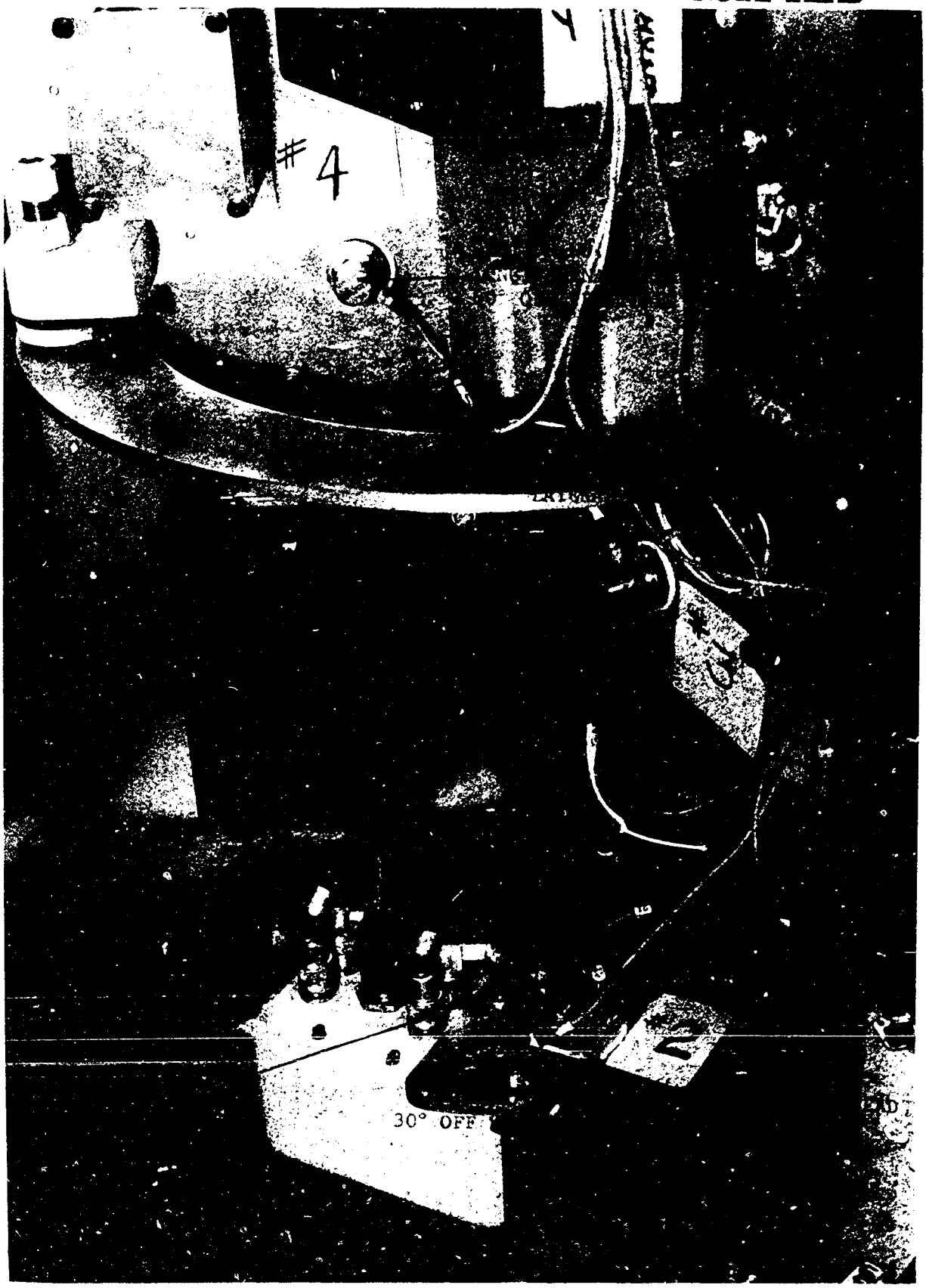
1438



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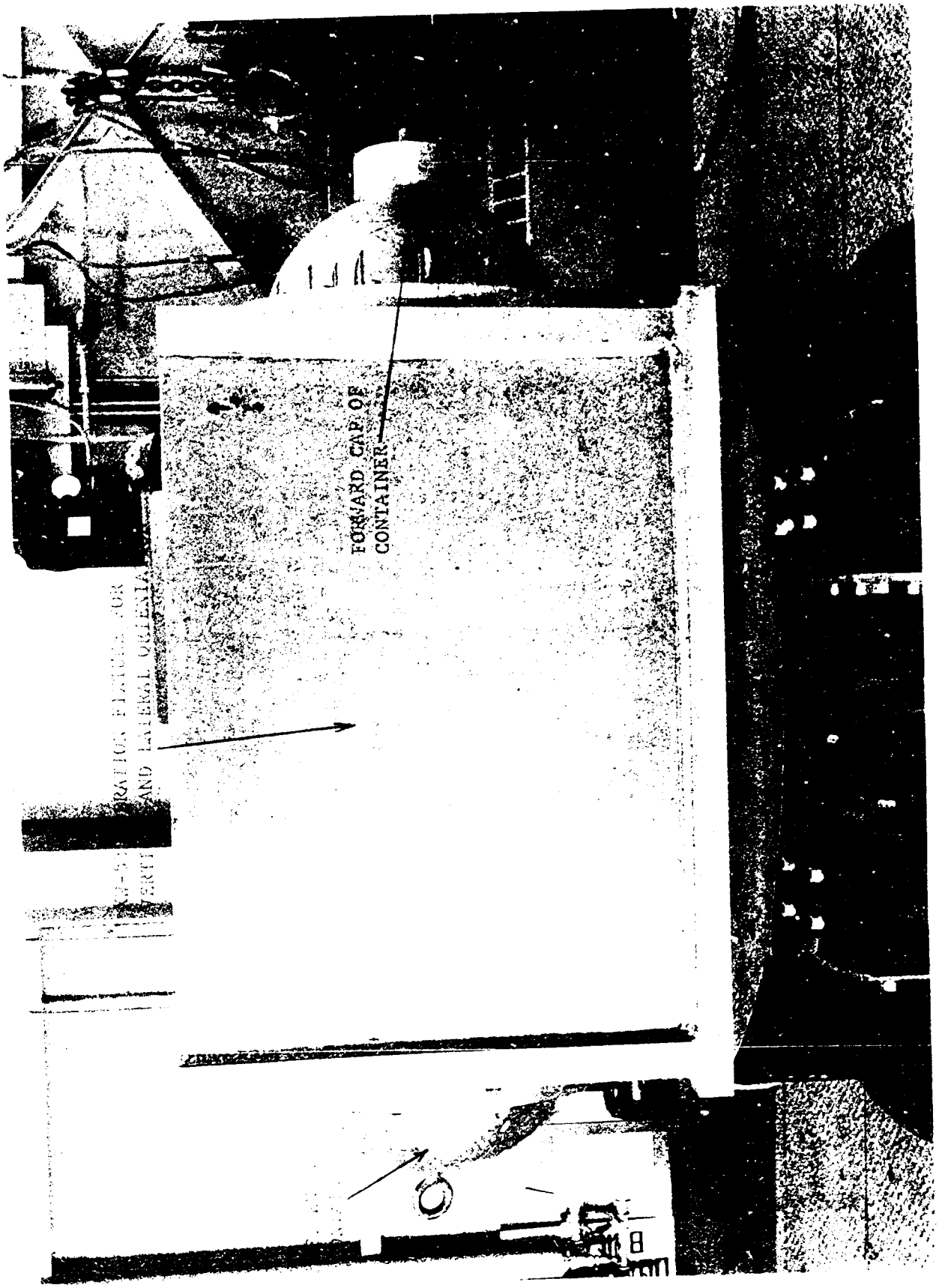
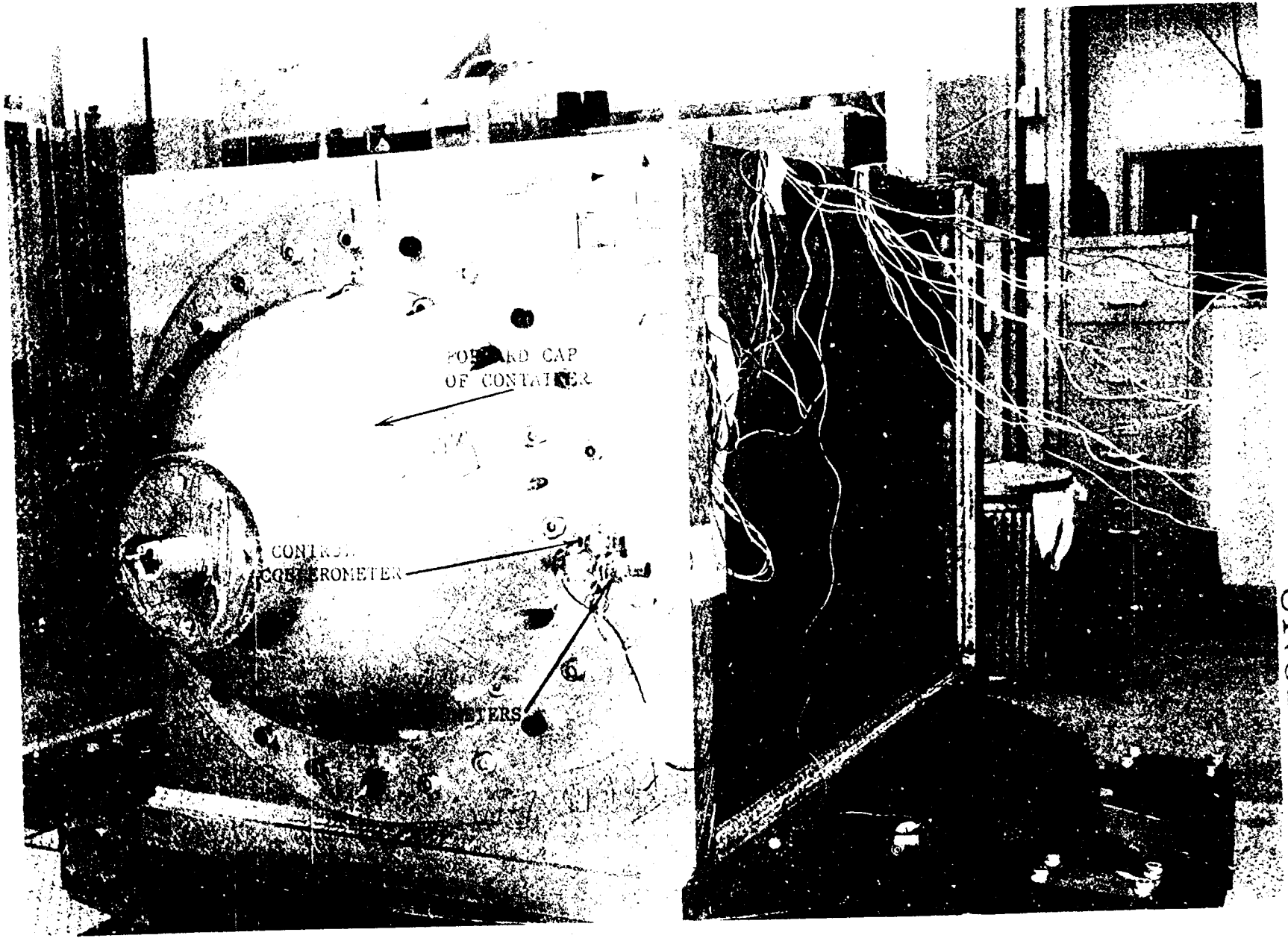

FORWARD CAP OF
CONTAINER

UNCLASSIFIED



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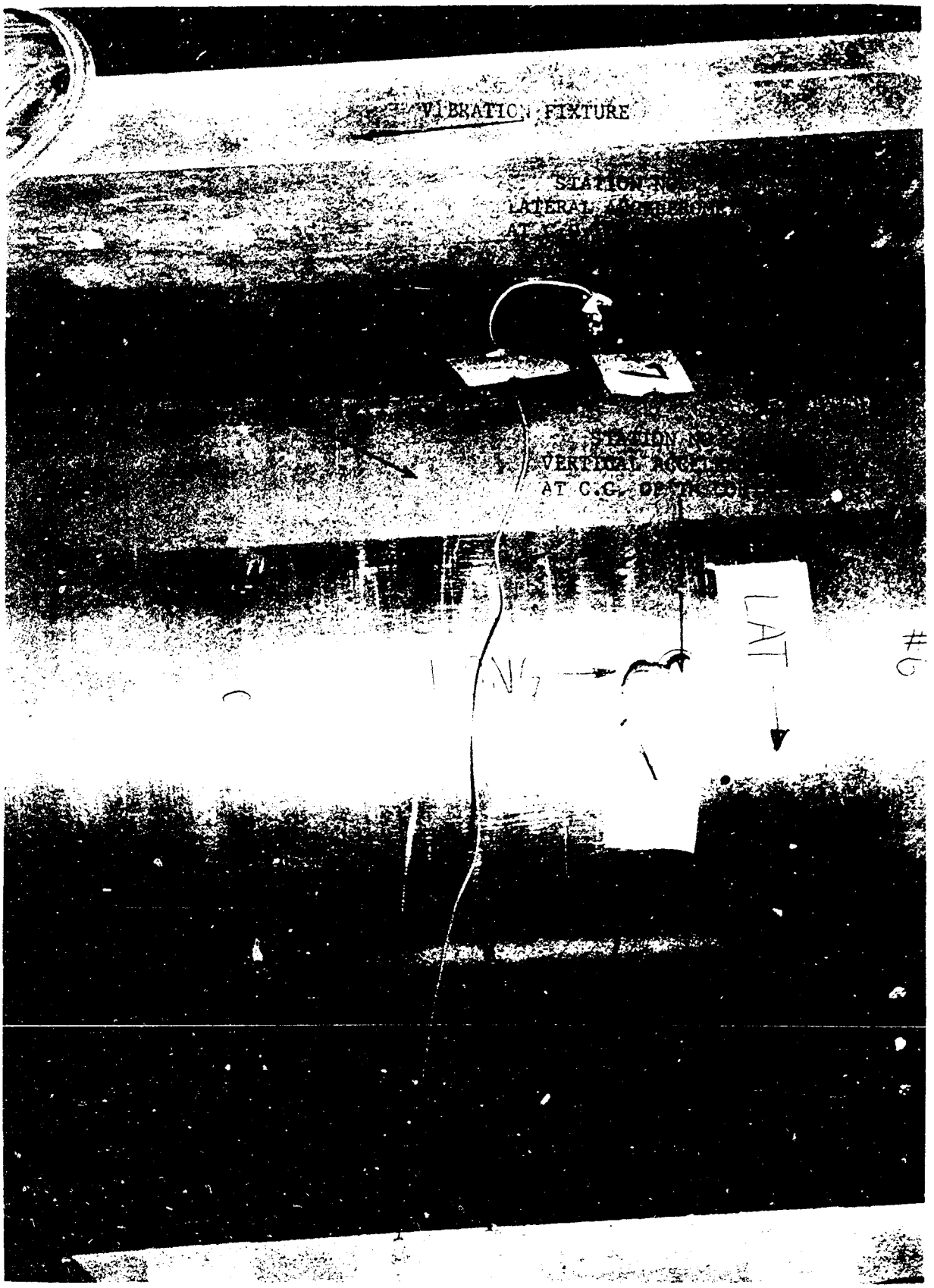

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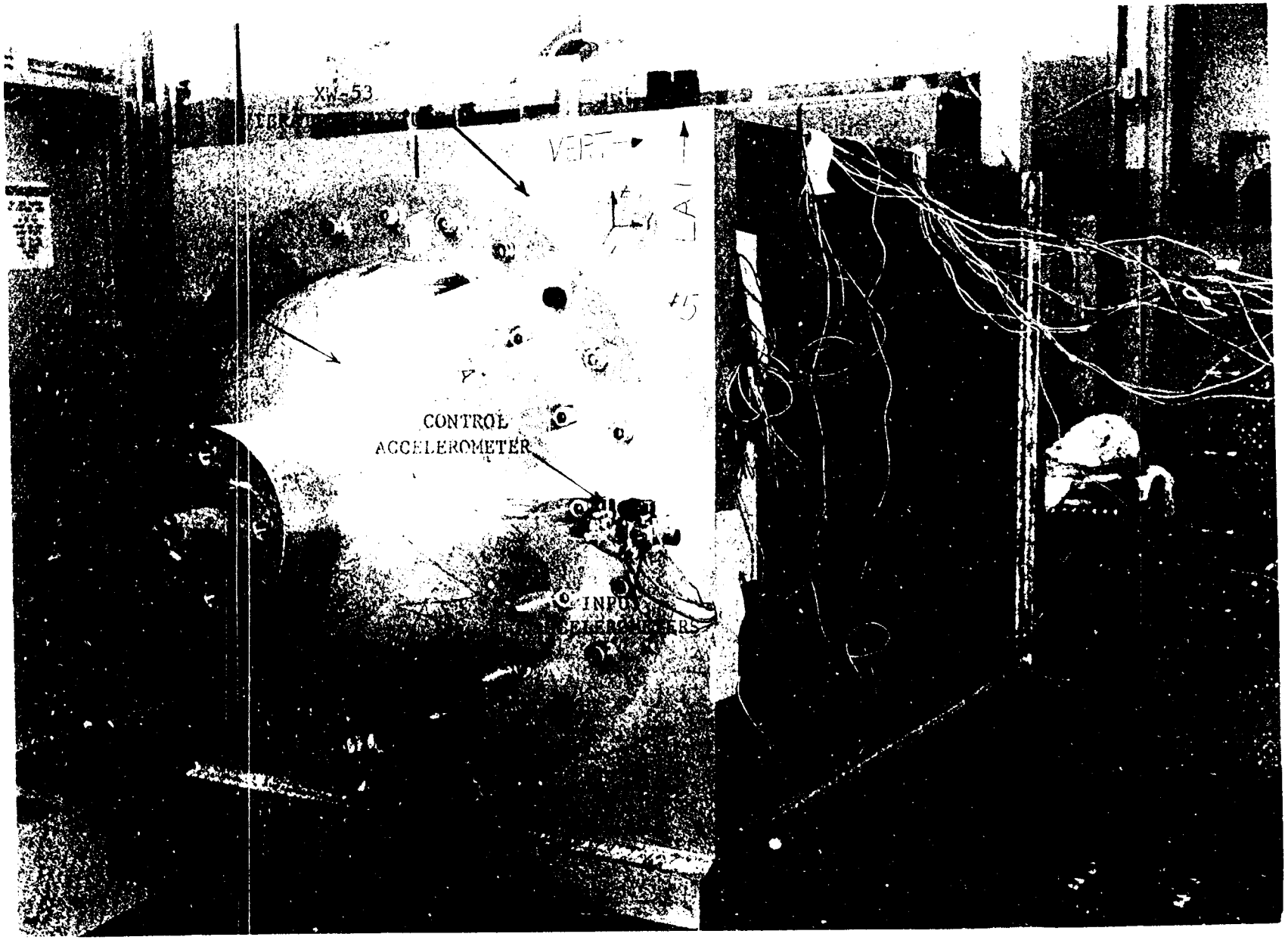

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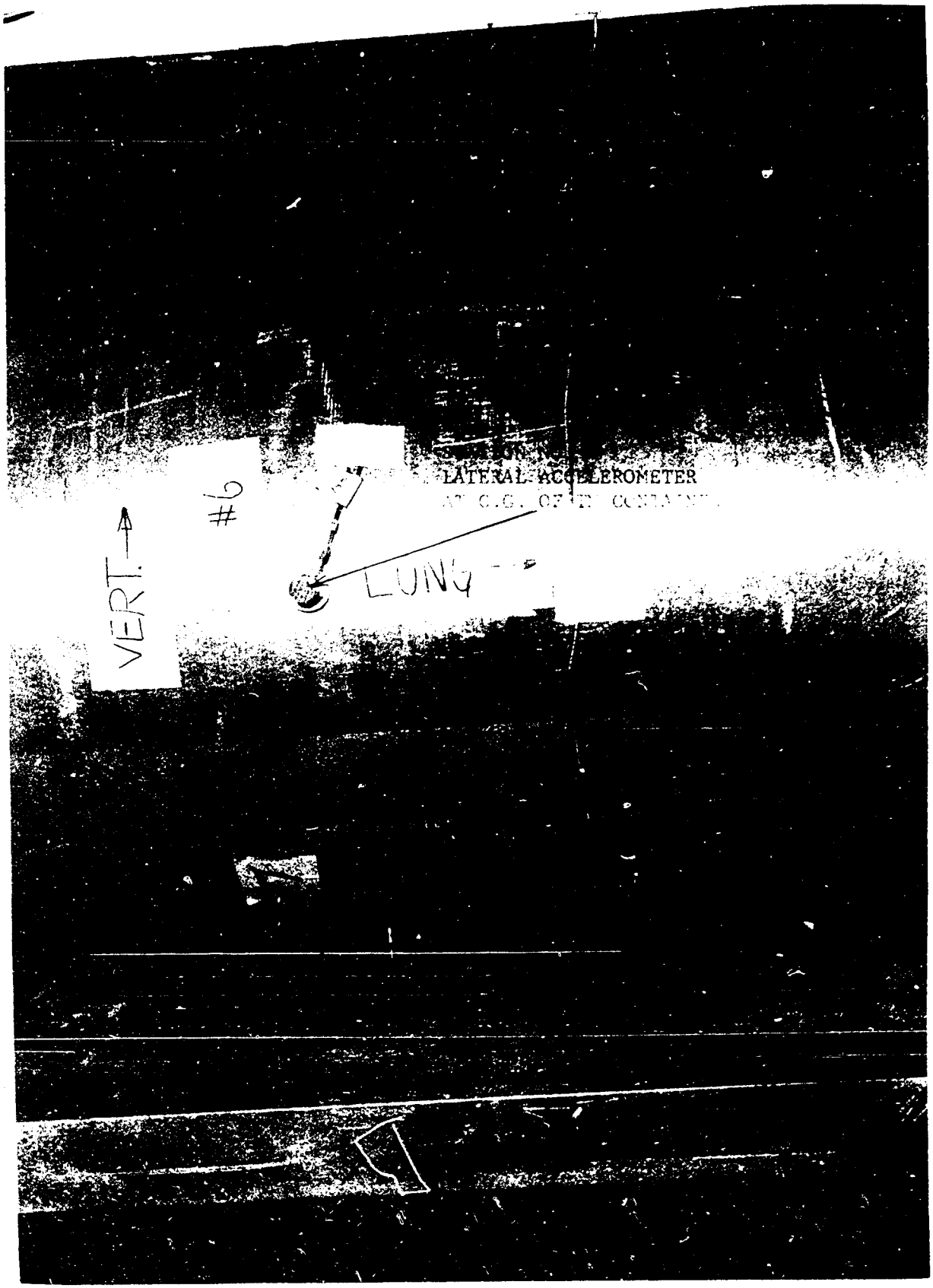

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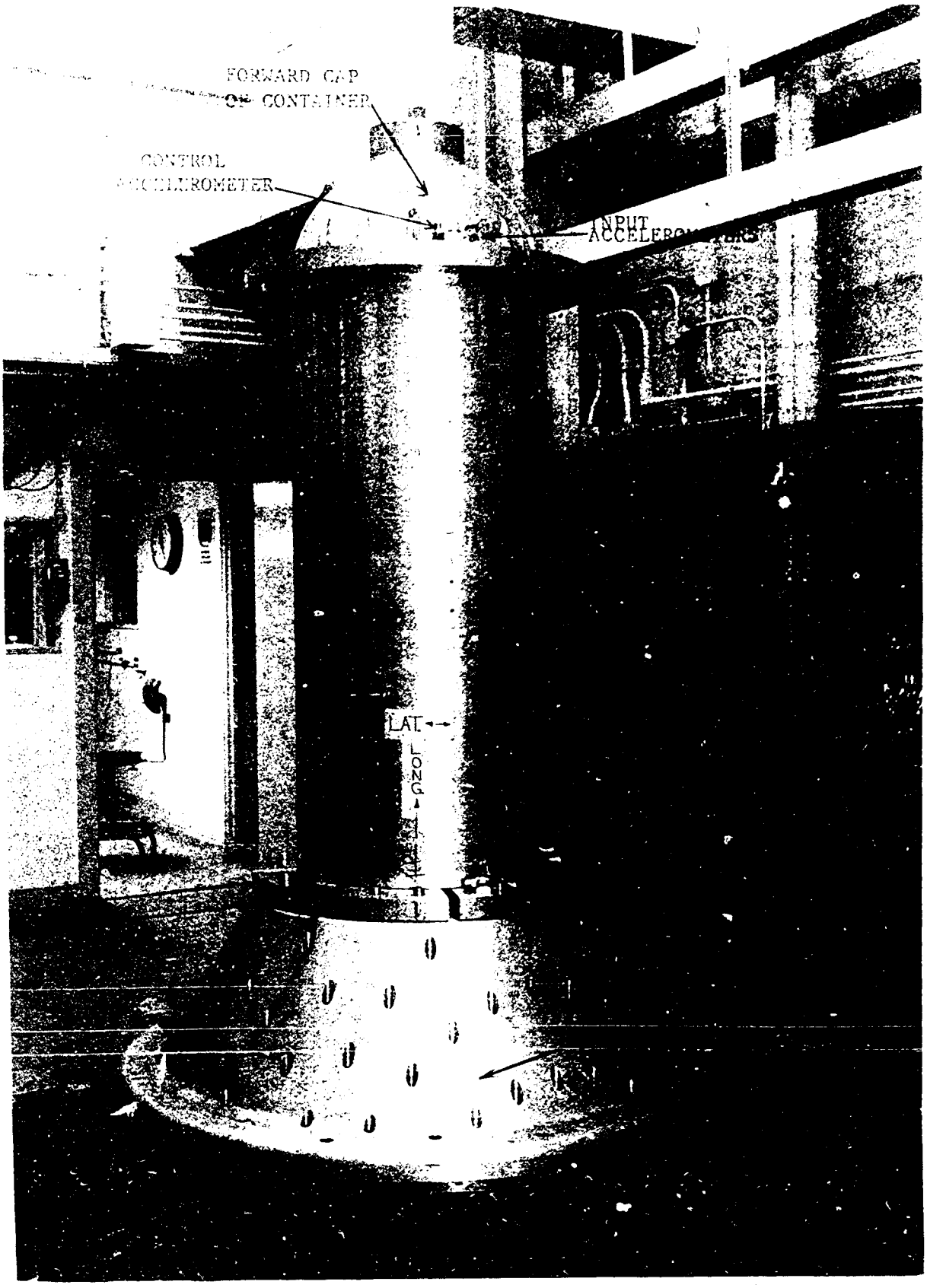

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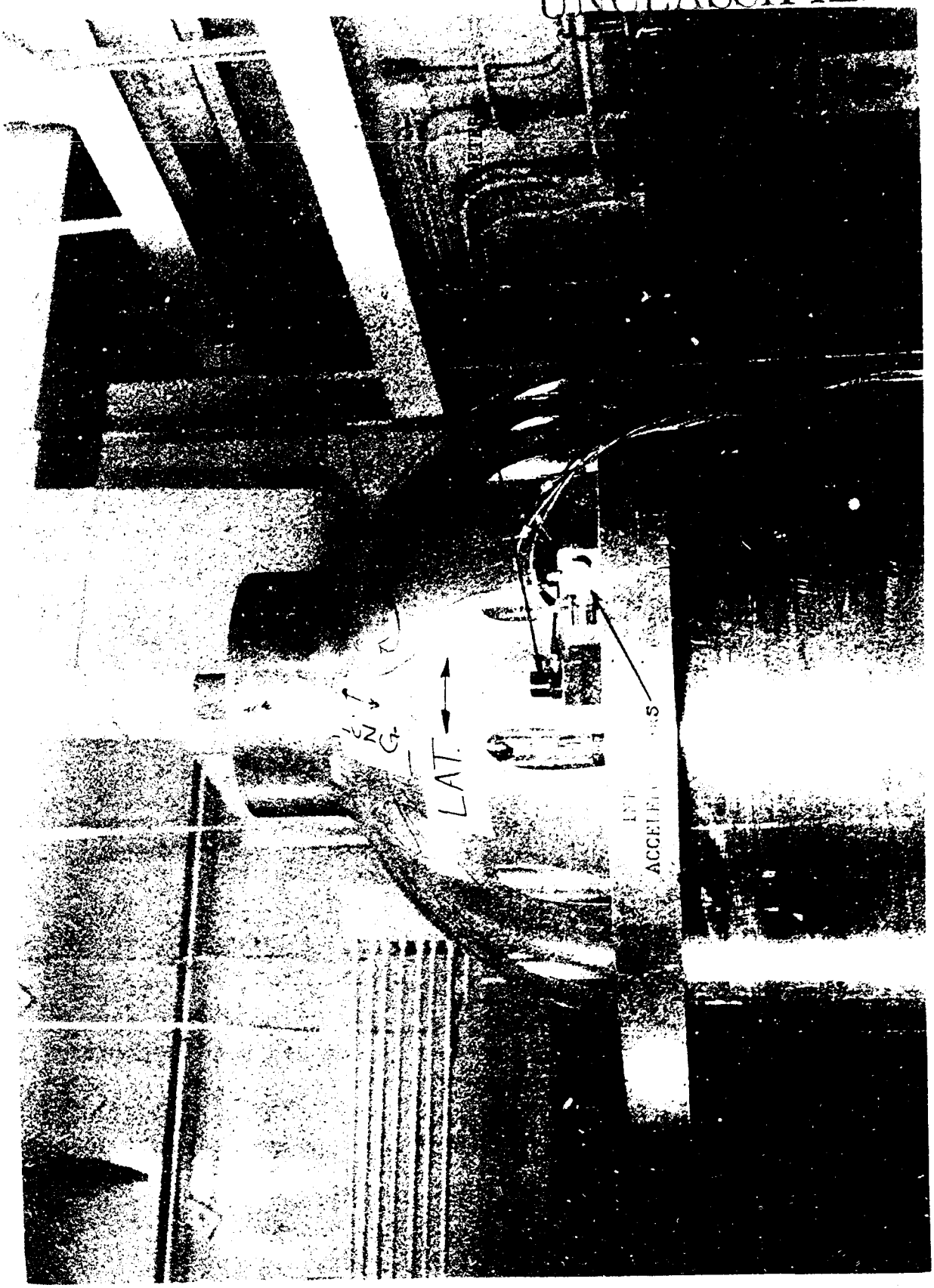

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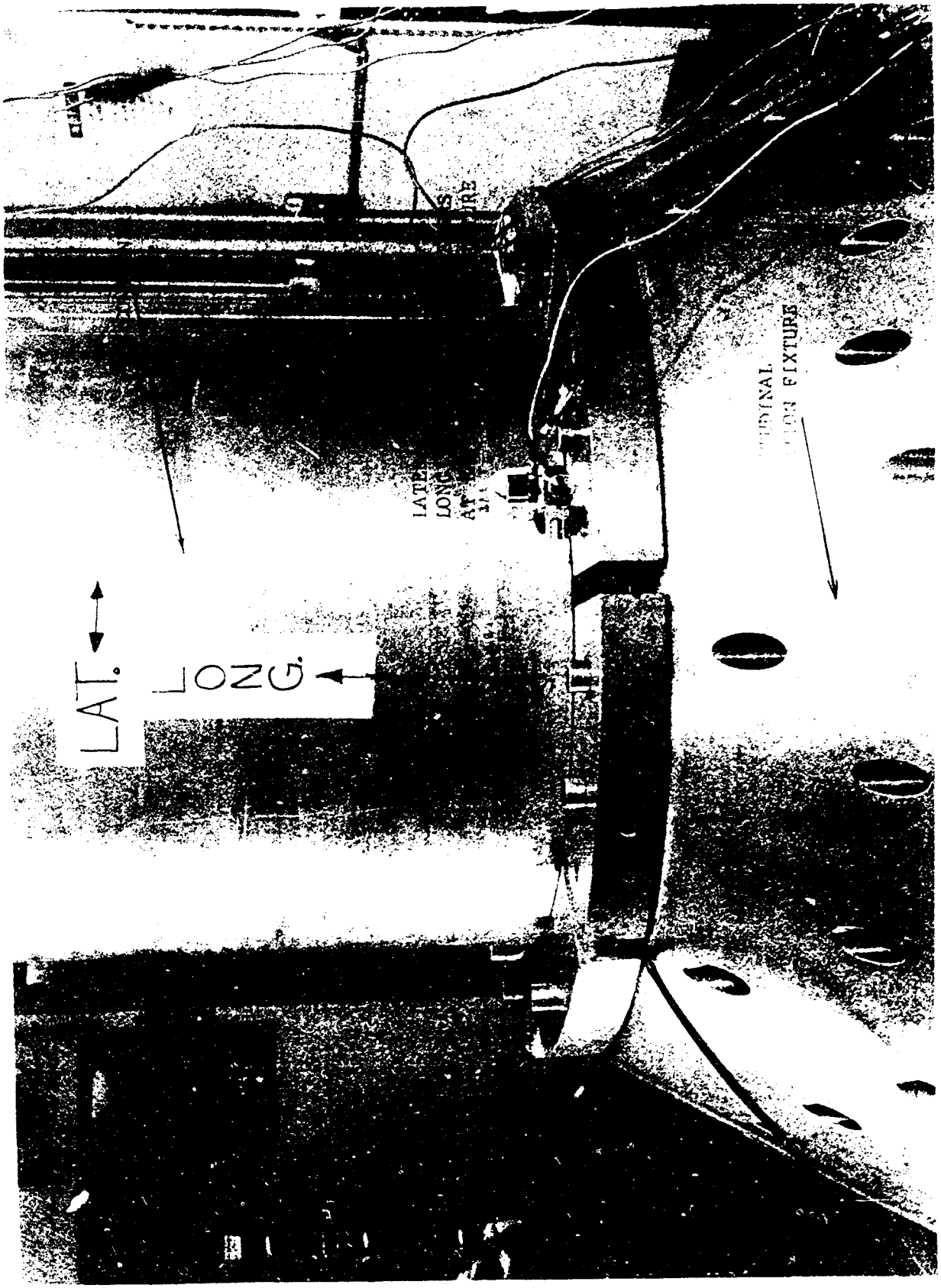

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UNCLASSIFIED

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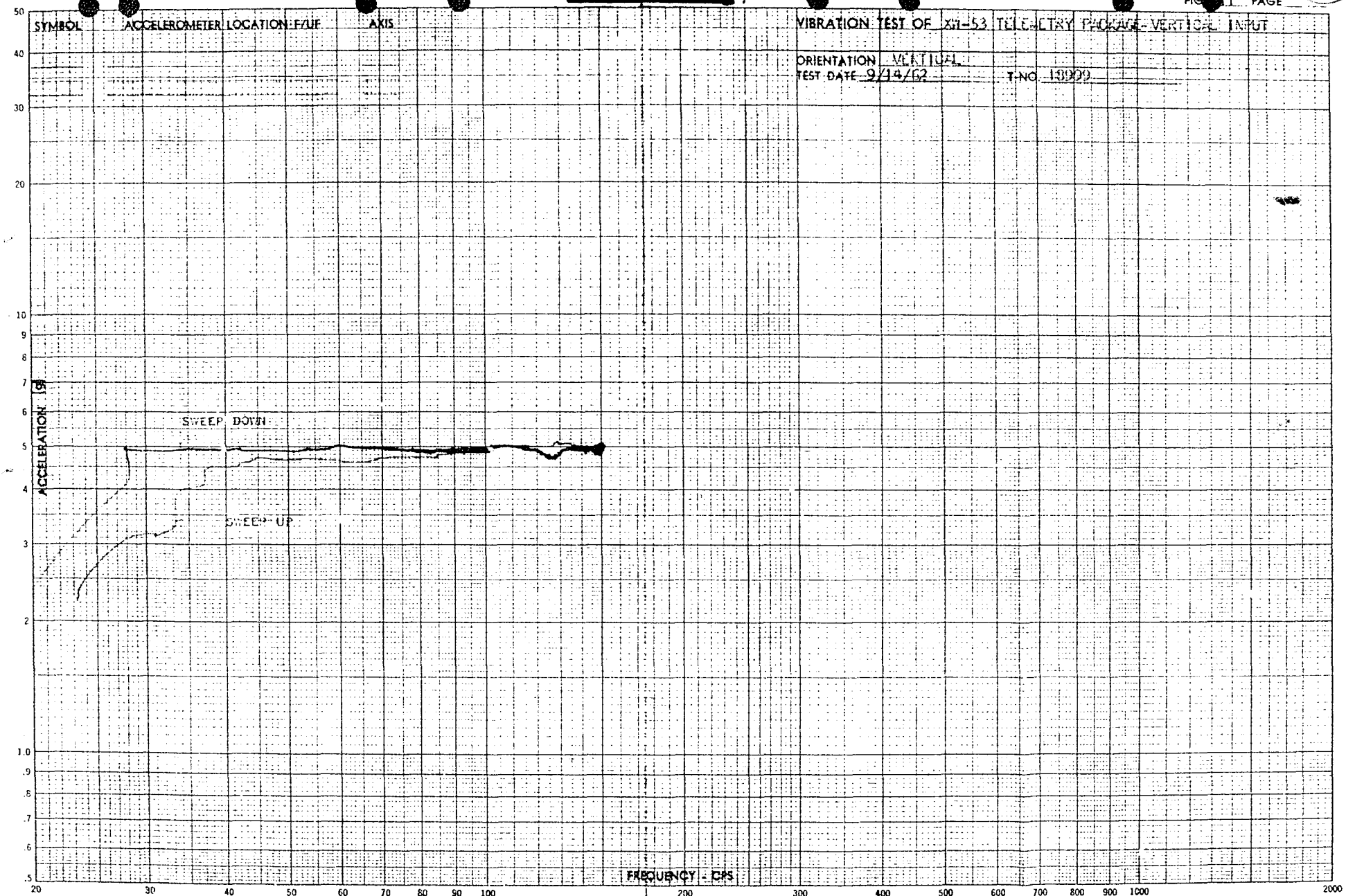
FIG. 1 PAGE 1447

SYMBOL ACCELEROMETER LOCATION F/UF AXIS

VIBRATION TEST OF XM-53 TELEMETRY PACKAGE - VERTICAL INPUT

ORIENTATION VERTICAL
TEST DATE 9/14/62 T-NO. 13909



K&E CO., N.Y. 65062
FOR USE WITH SYSTRON RESONANT PLOTTER SYSTEM

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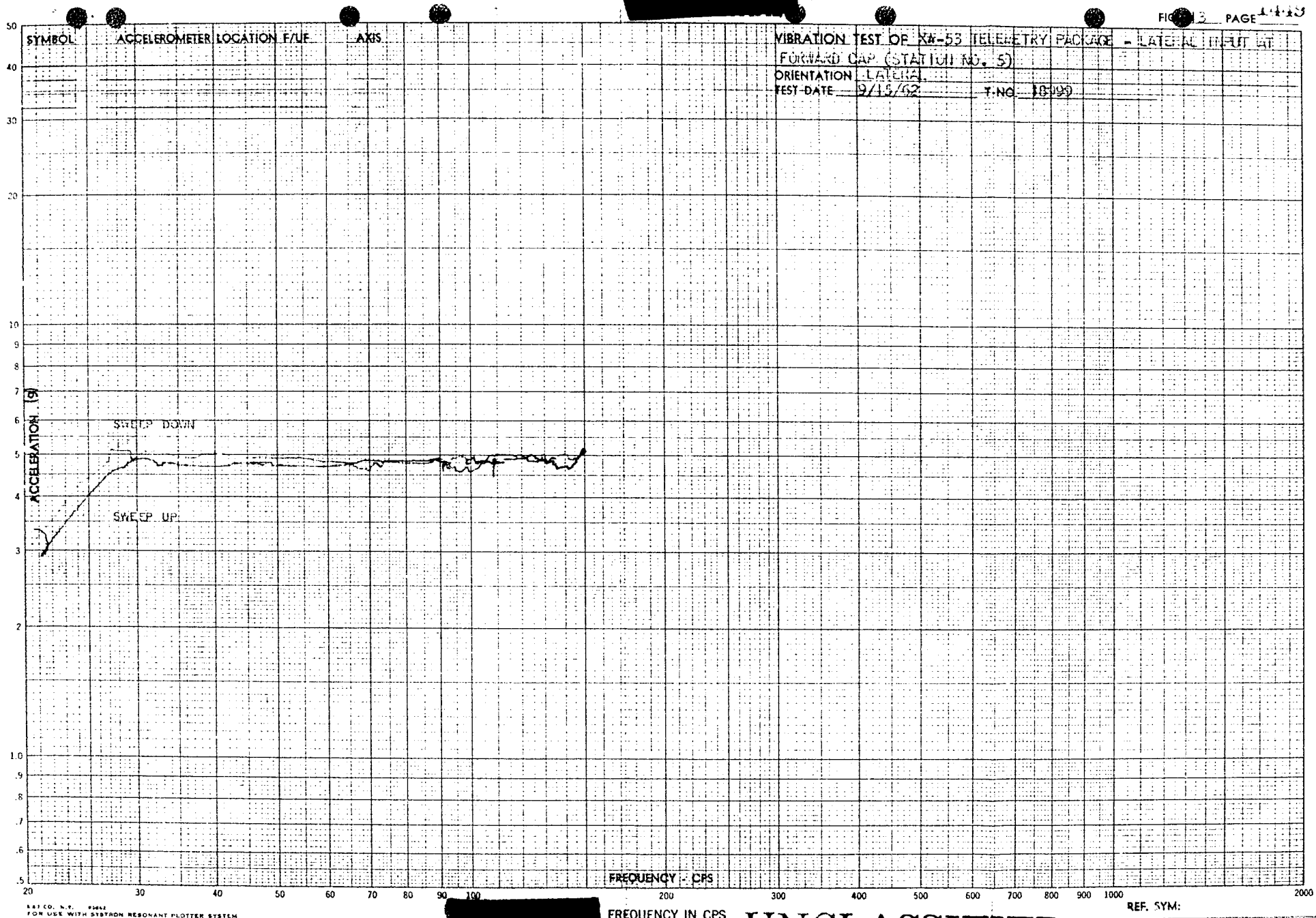

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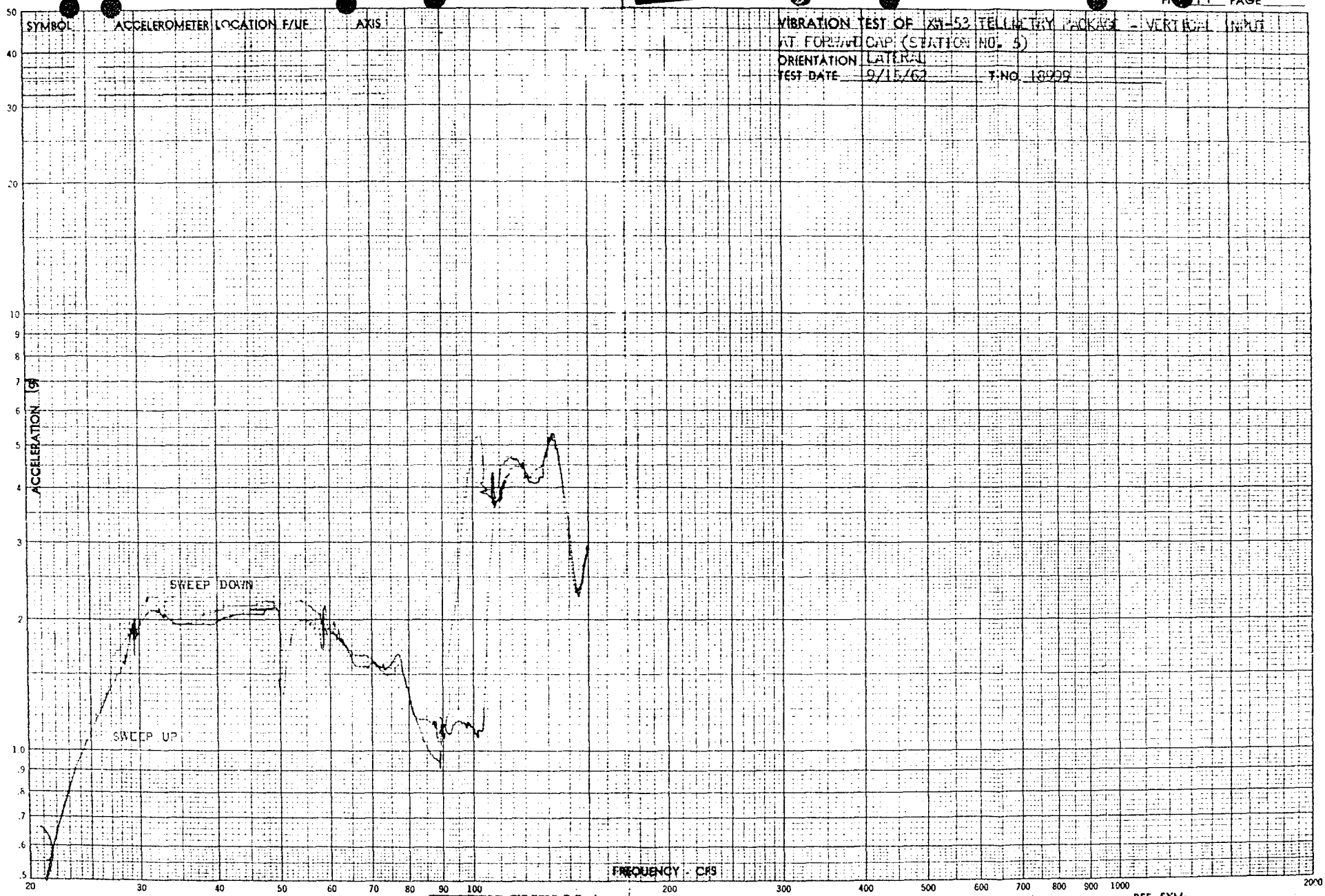

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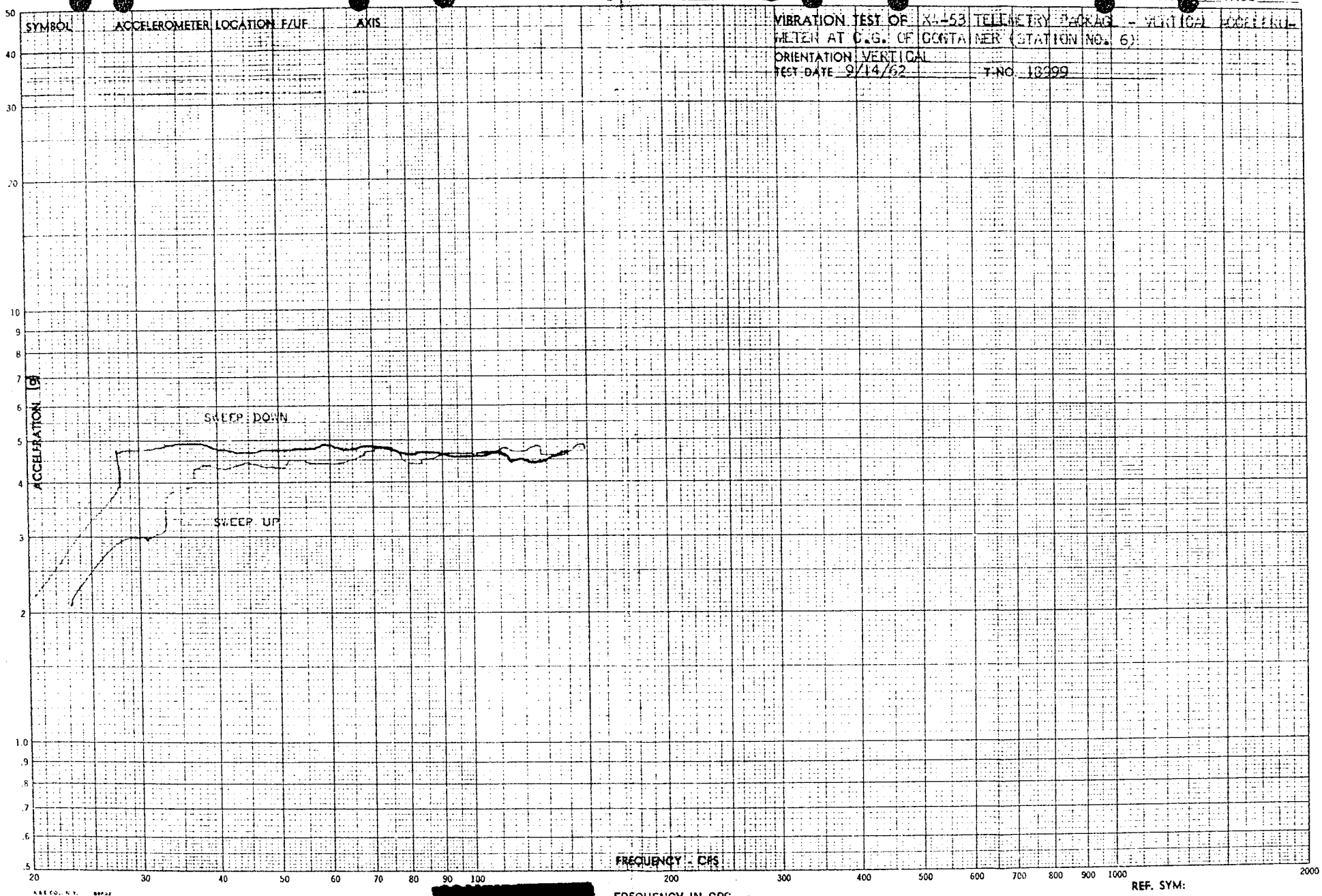

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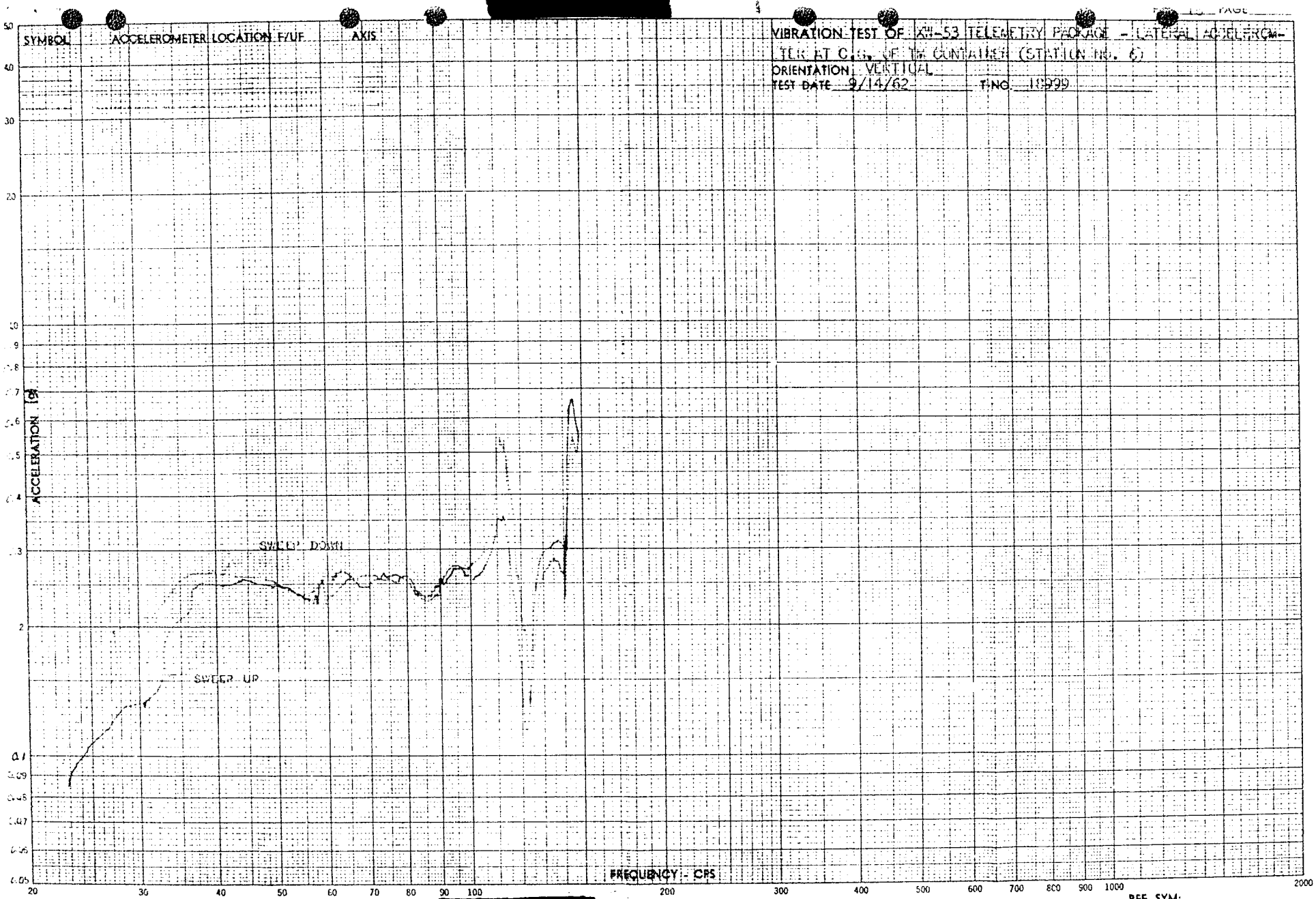

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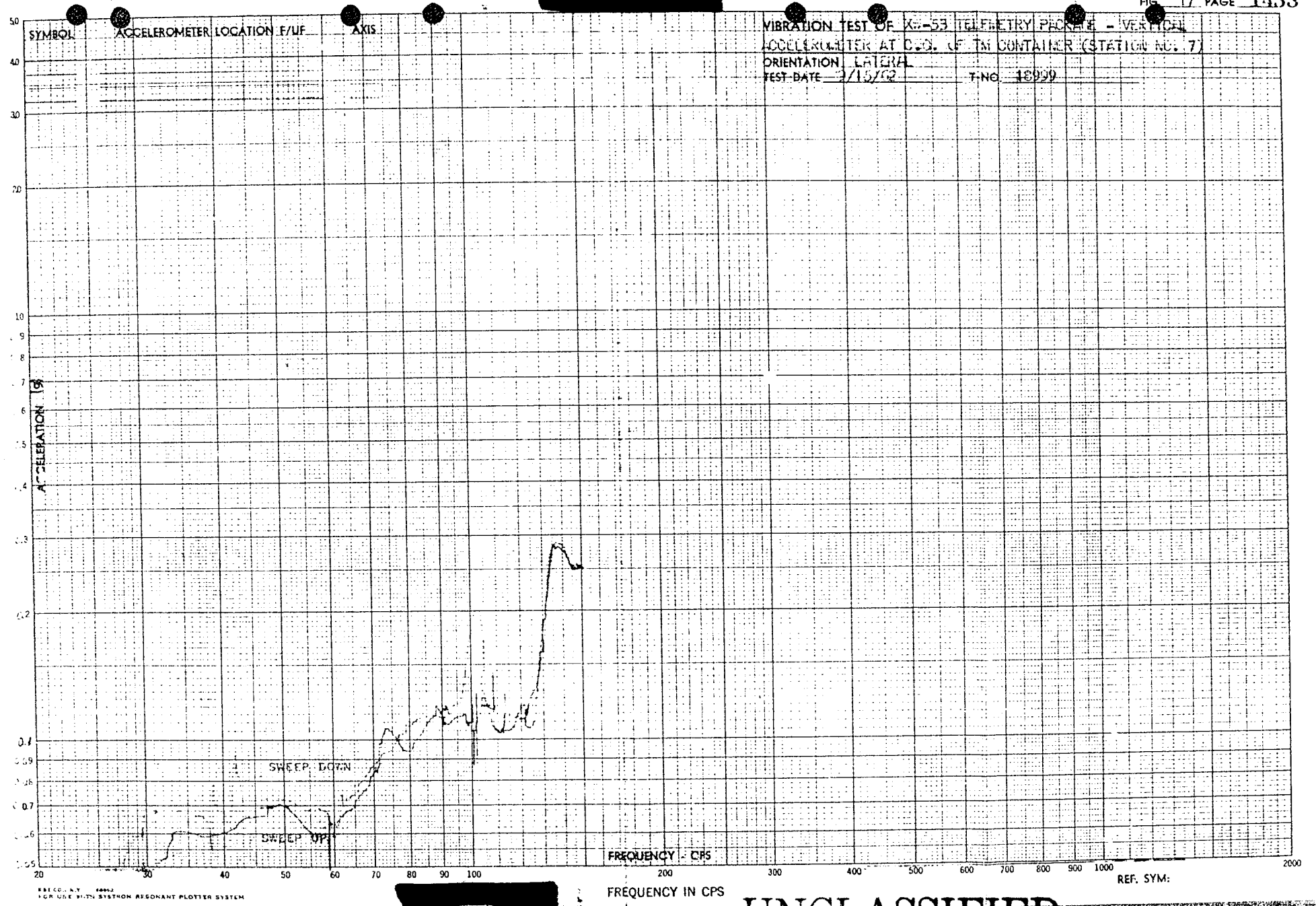

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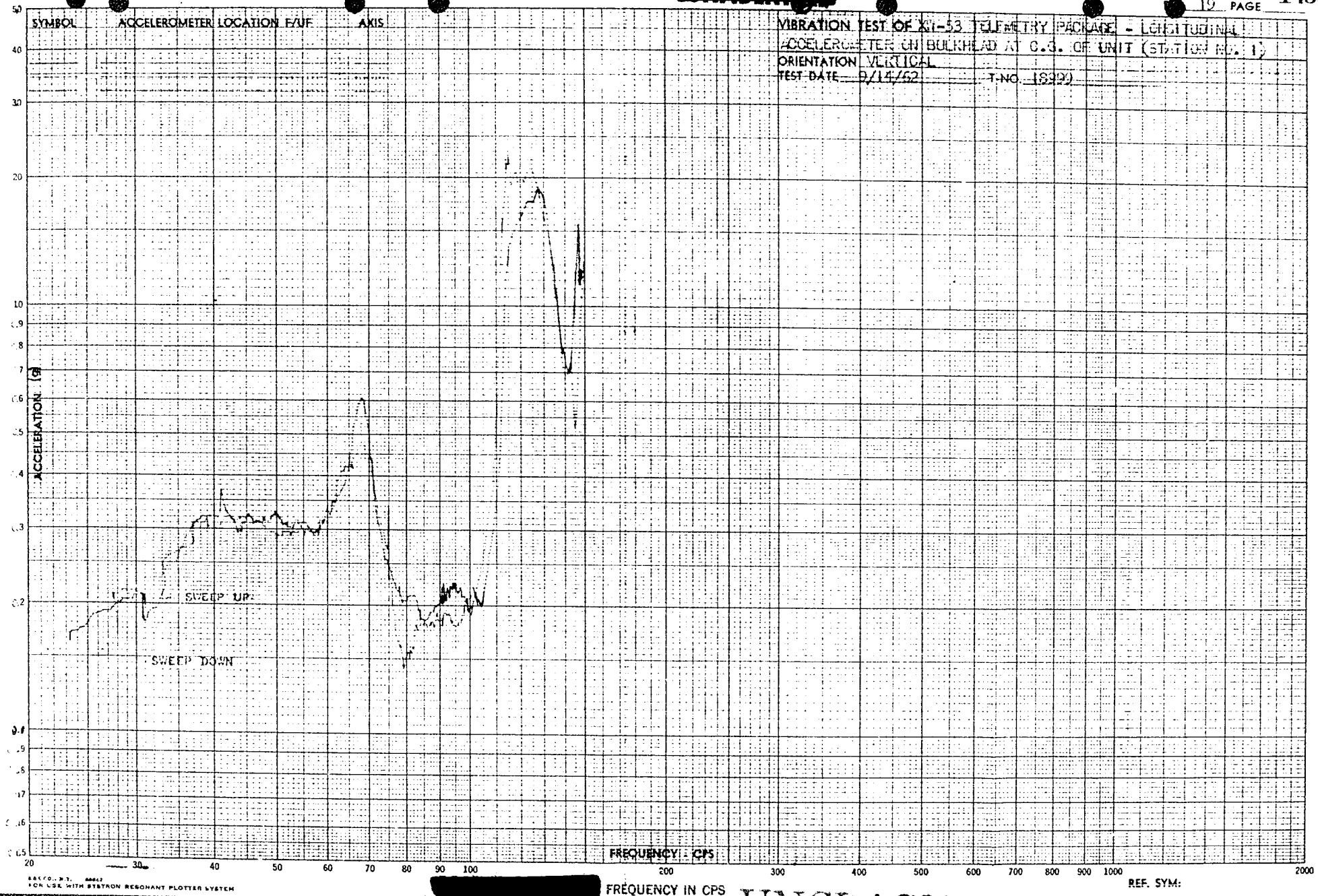

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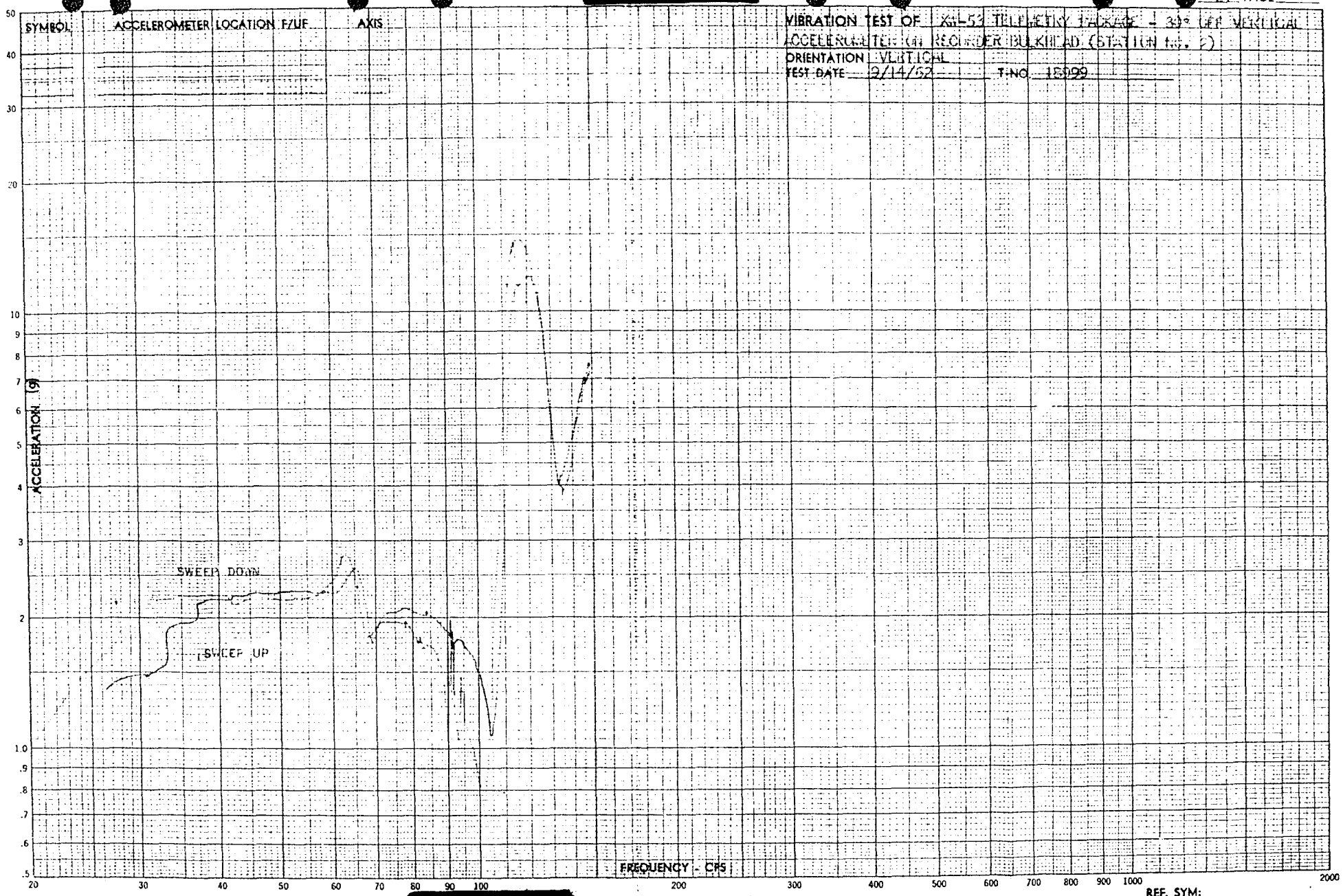

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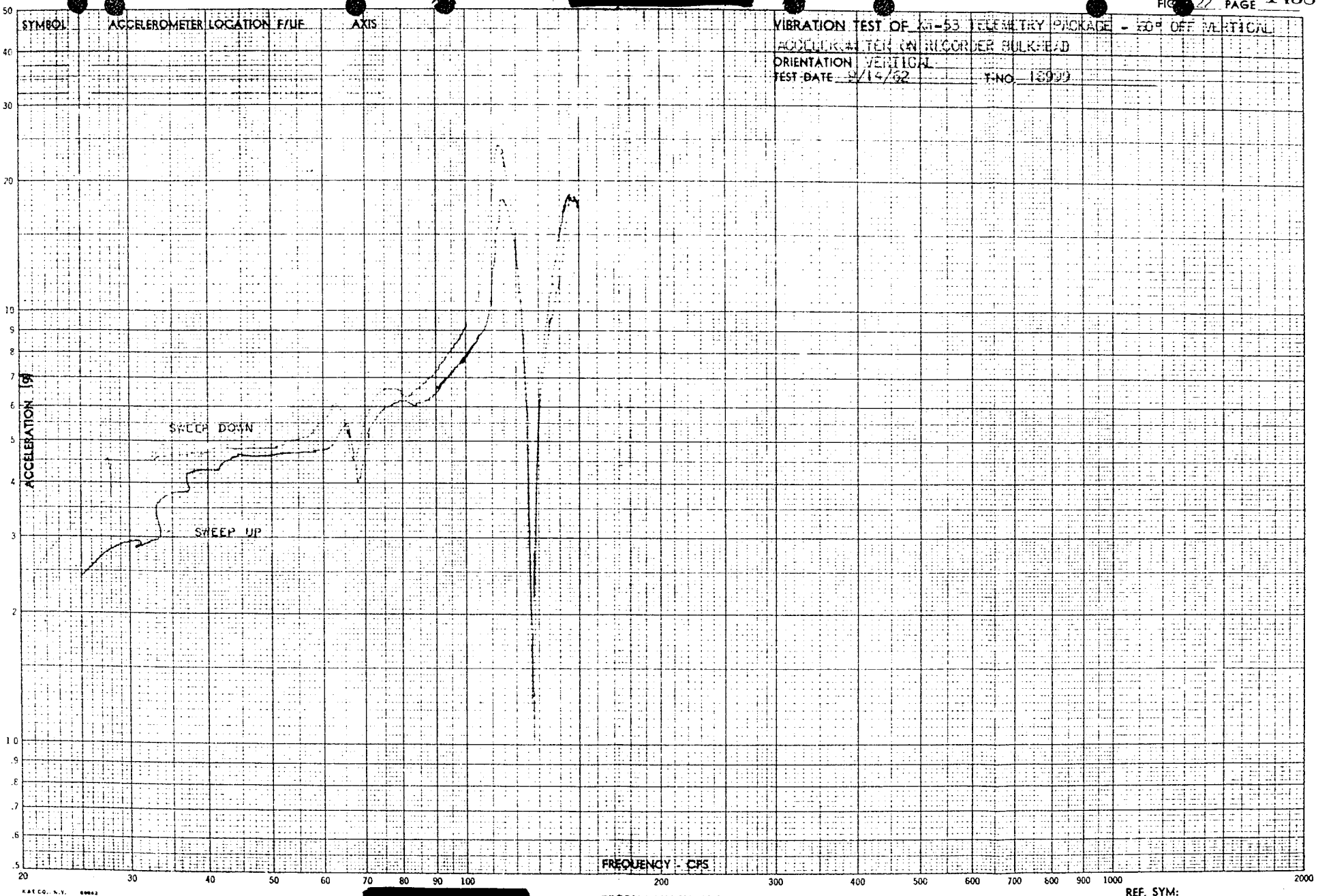

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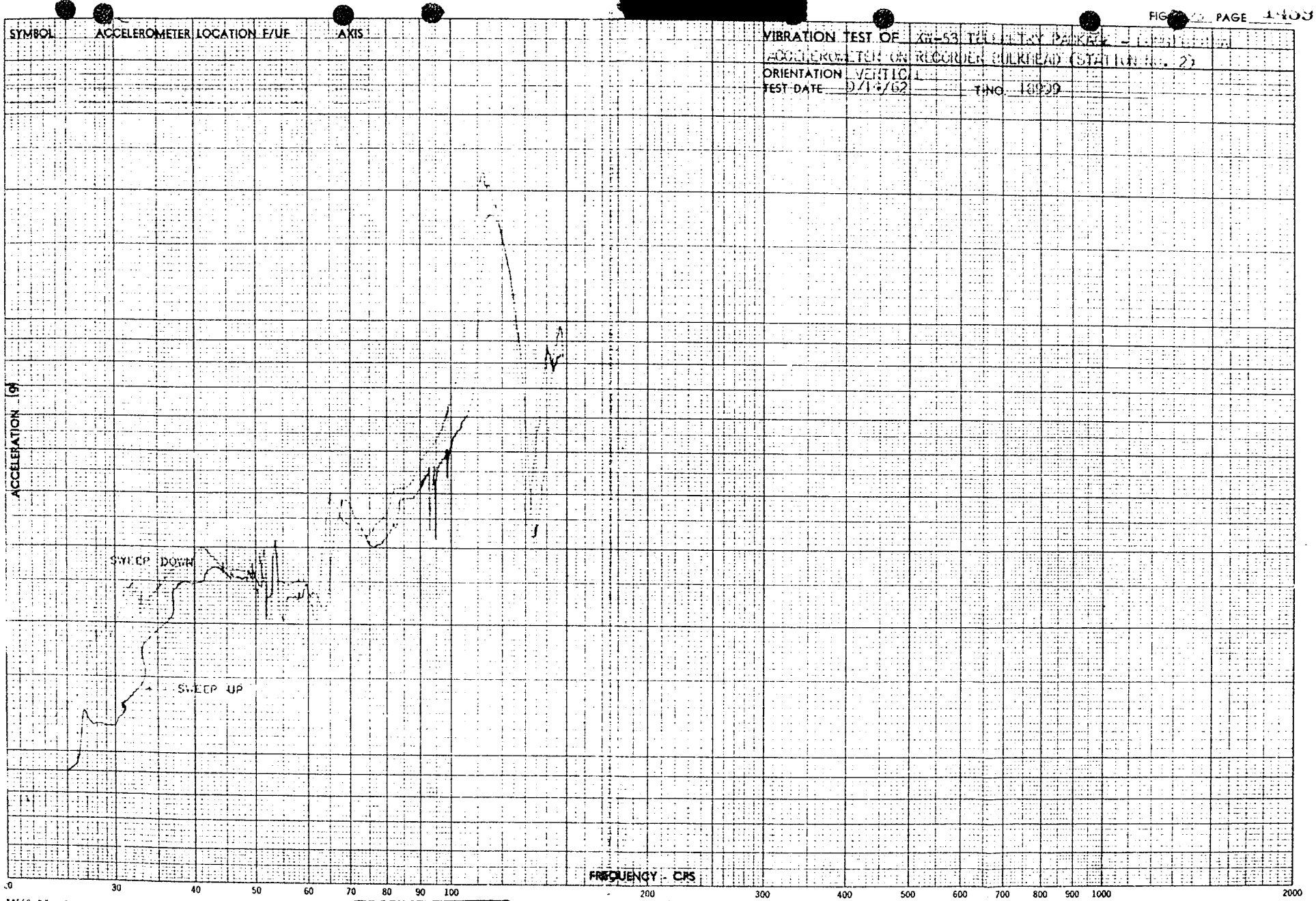

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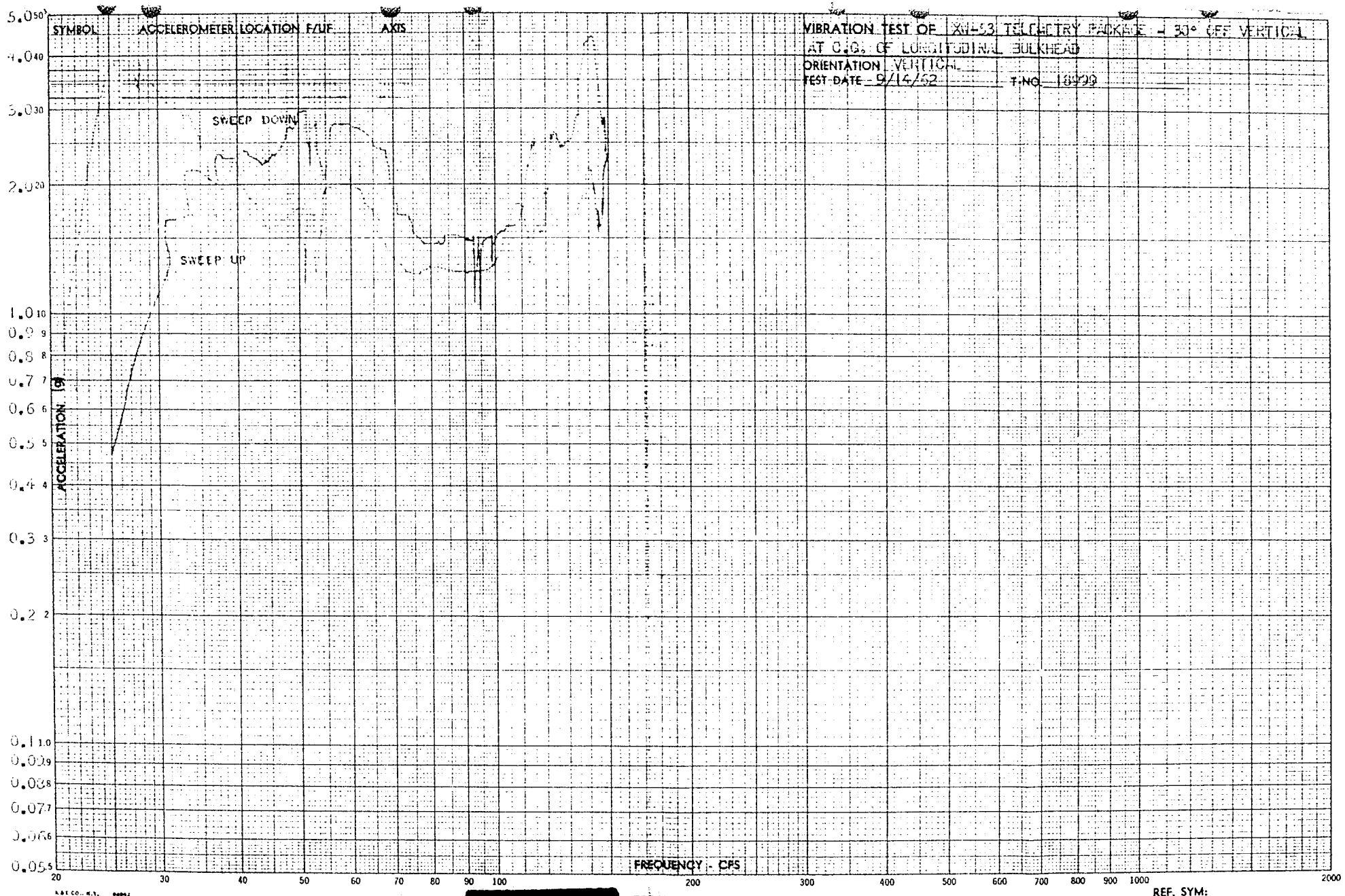
SYMBOL
ACCELEROMETER LOCATION F/UF
AXIS
VIBRATION TEST OF XW-53 TELEMETRY PACKAGE - 30° OFF VERTICAL
AT C.G. OF LONGITUDINAL BULKHEAD
ORIENTATION VERTICAL
TEST DATE 9/14/62
T.NO. 18999
SWEEP DOWN
SWEEP UP
ACCELERATION (g)
5.0 50
4.0 40
3.0 30
2.0 20
1.0 10
0.9 9
0.8 8
0.7 7
0.6 6
0.5 5
0.4 4
0.3 3
0.2 2
0.1 1.0
0.09
0.08
0.07
0.06
0.05
FREQUENCY - CPS
20
30
40
50
60
70
80
90
100
200
300
400
500
600
700
800
900
1000
2000
REF. SYM:
FOR USE WITH SYSTRON RESONANT PLOTTER SYSTEM
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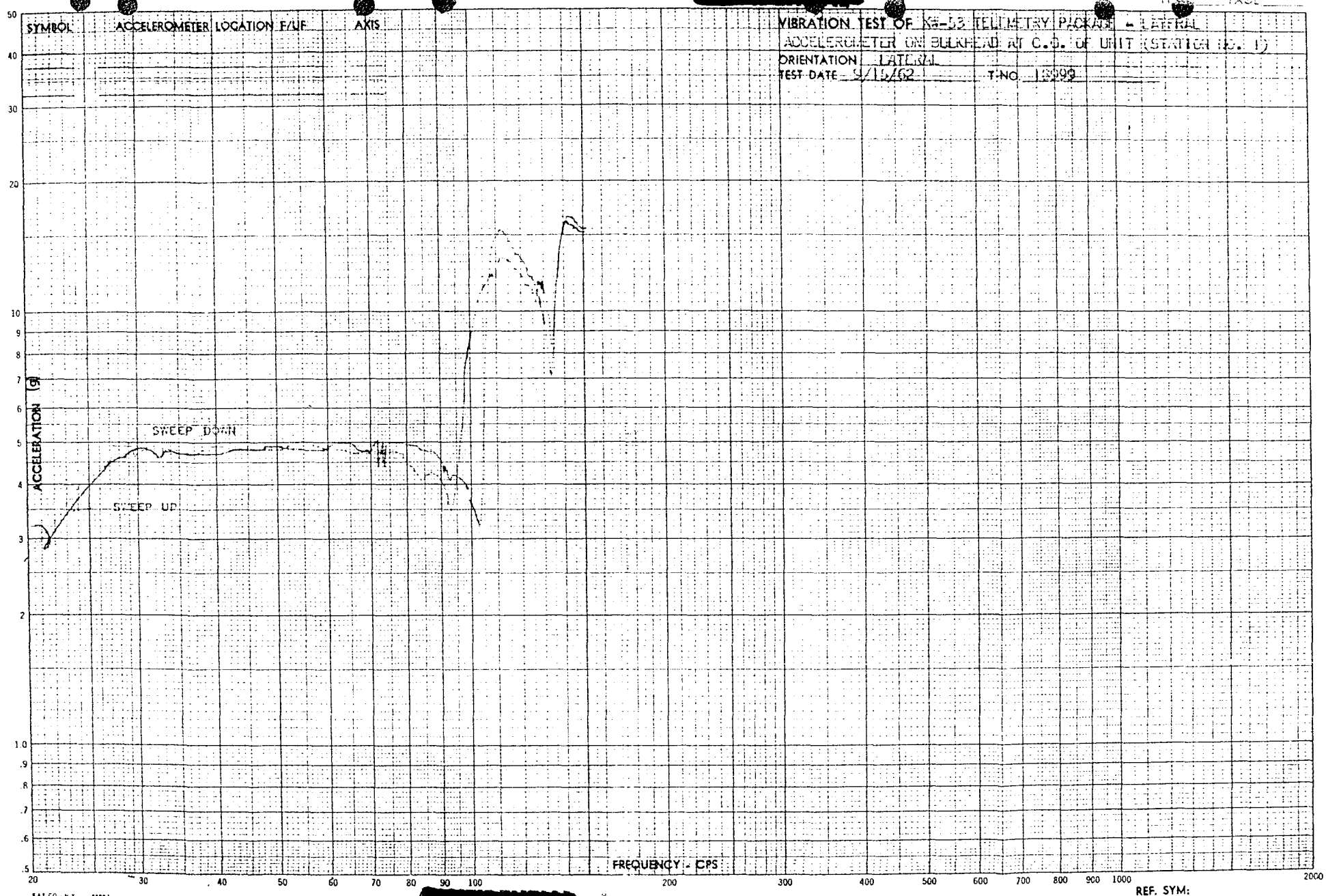

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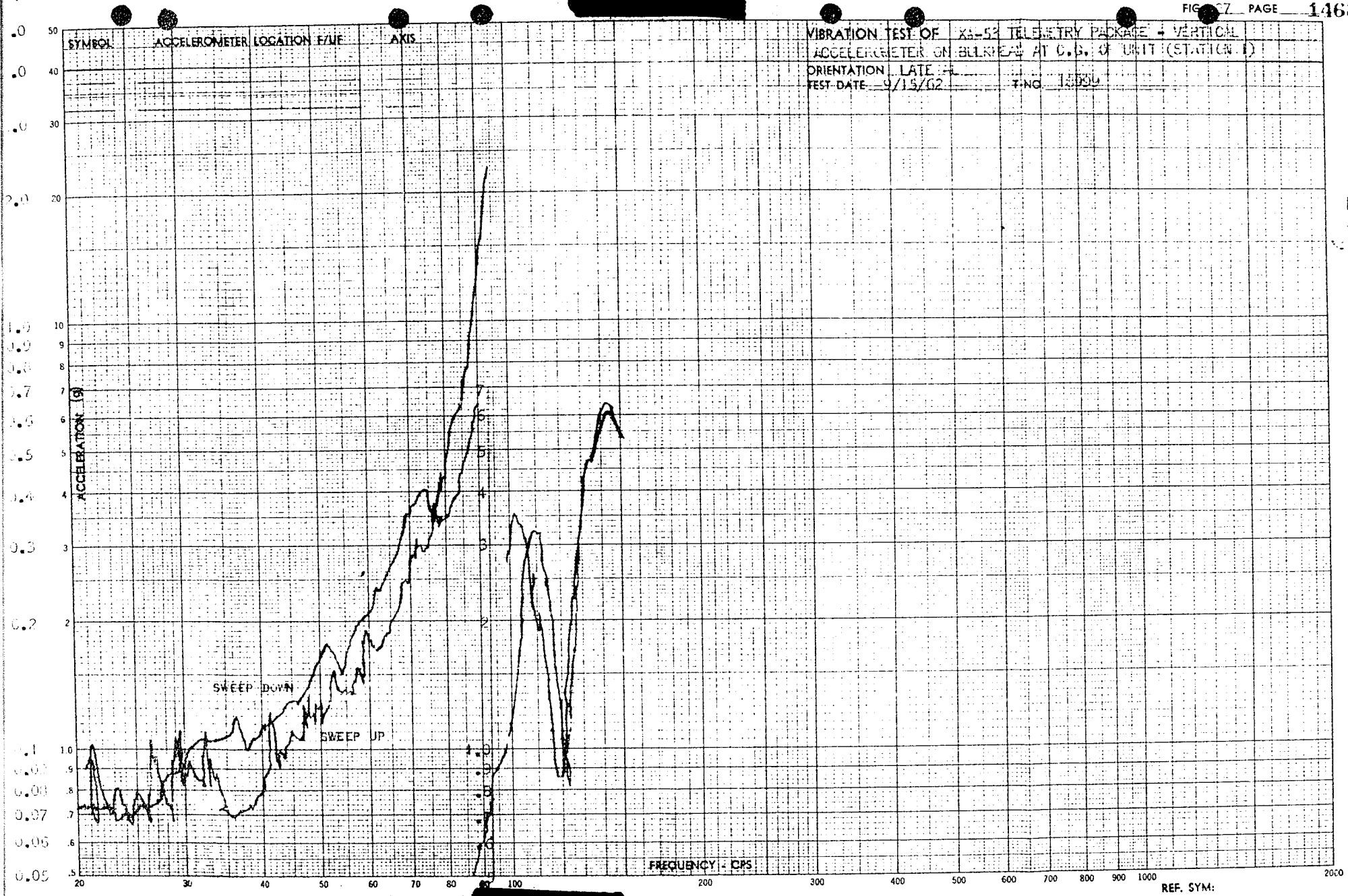

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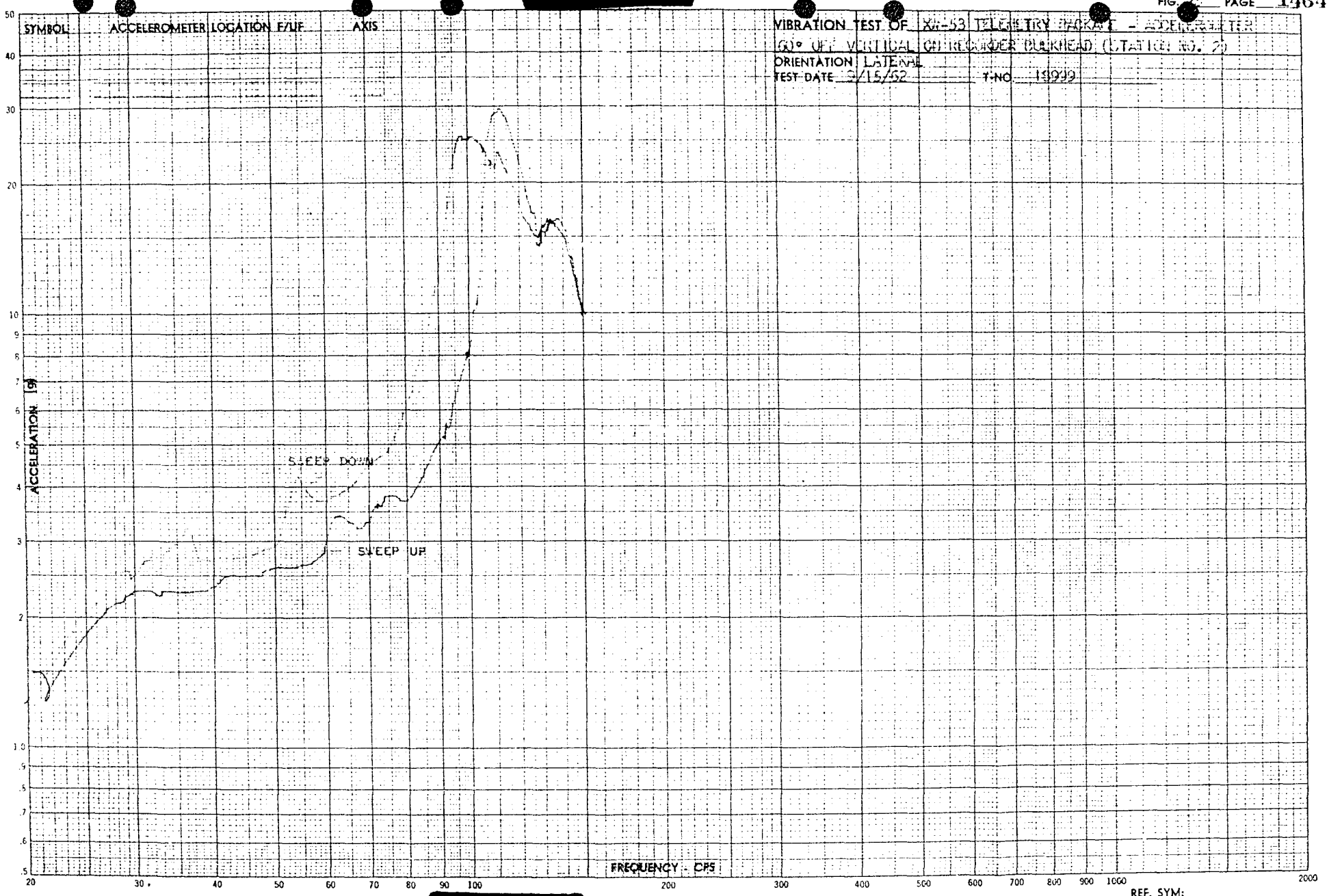

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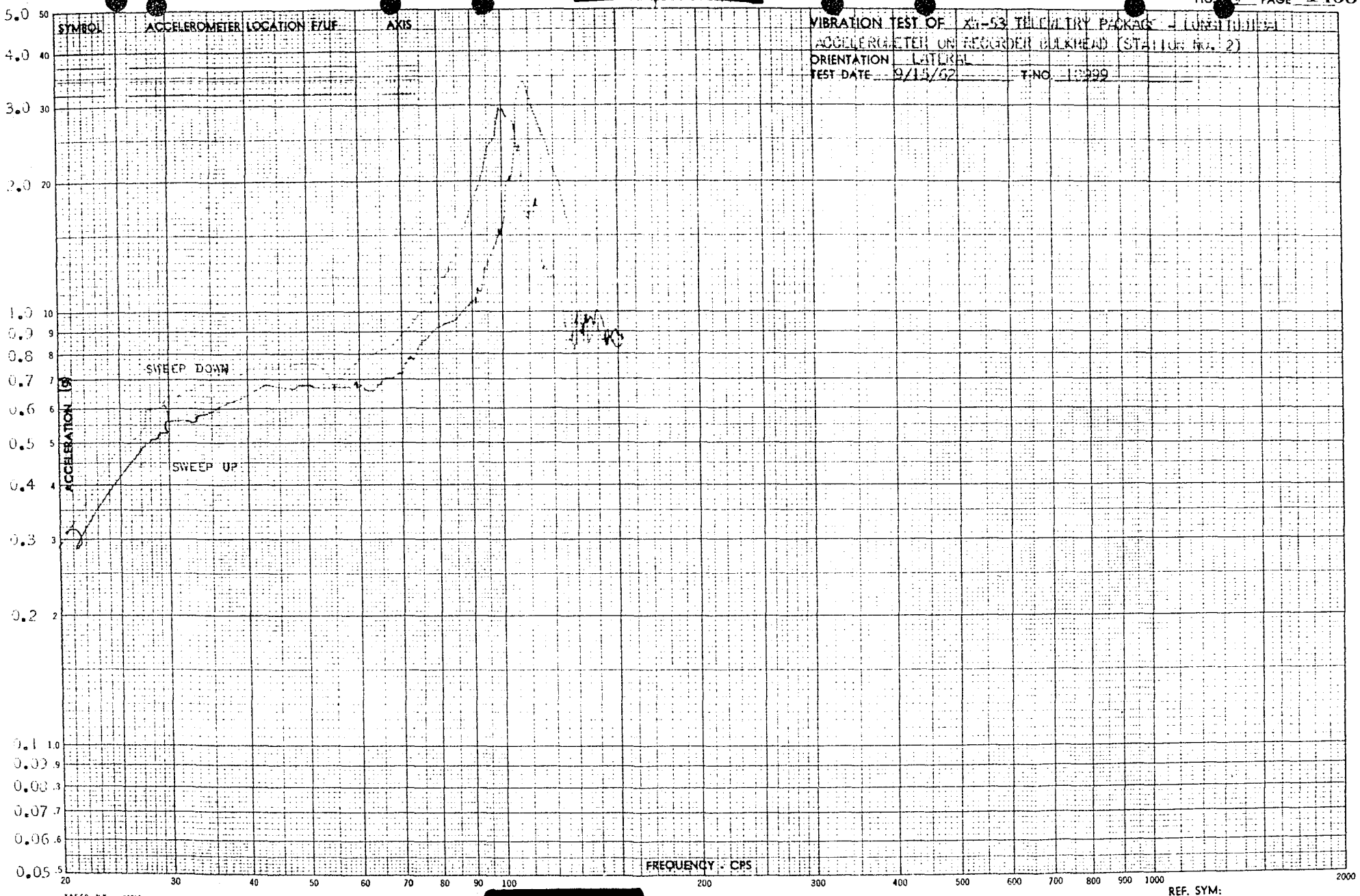

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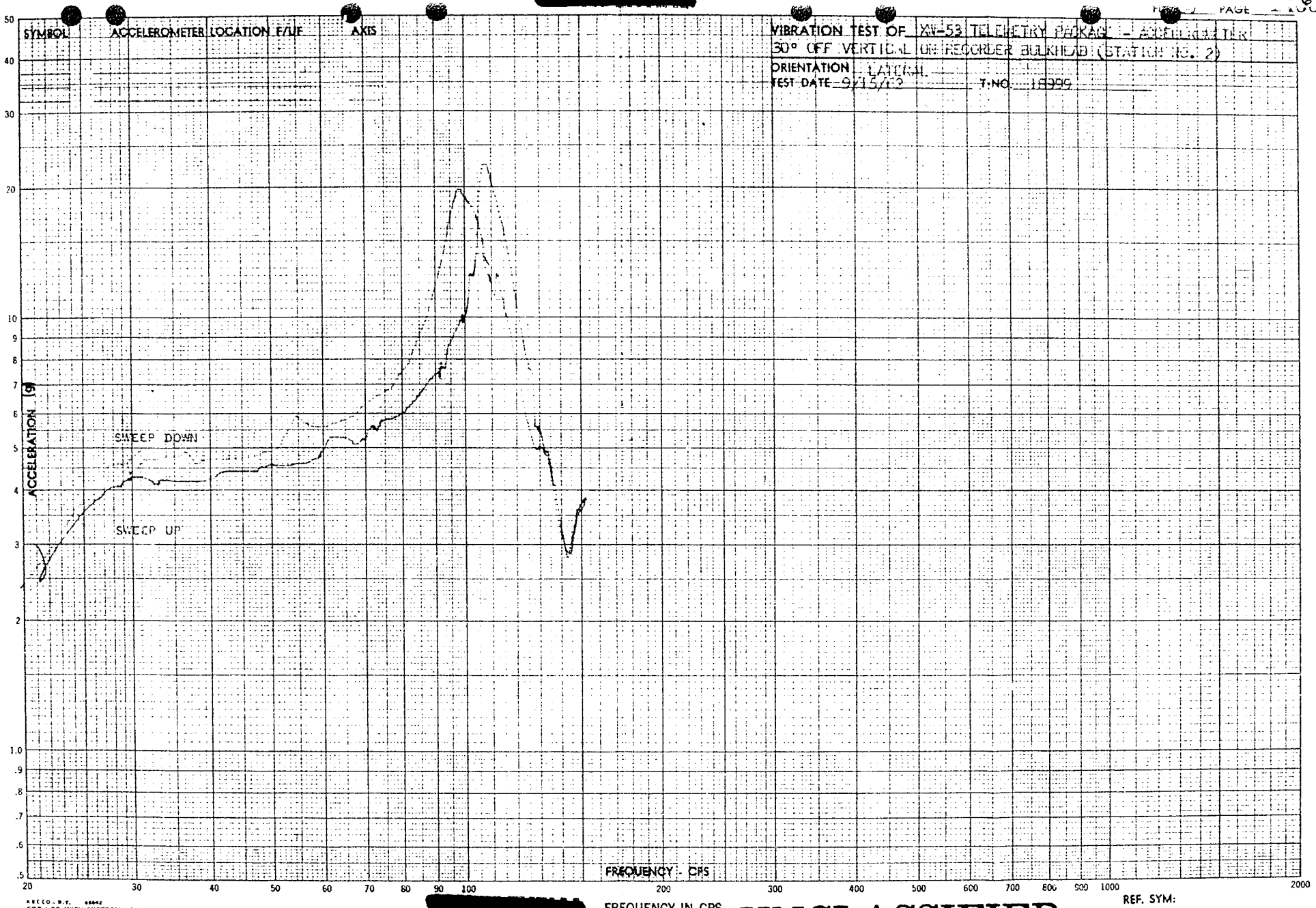

RECO. N.Y. 66642
FOR USE WITH SYSTRON RESONANT PLOTTER SYSTEM

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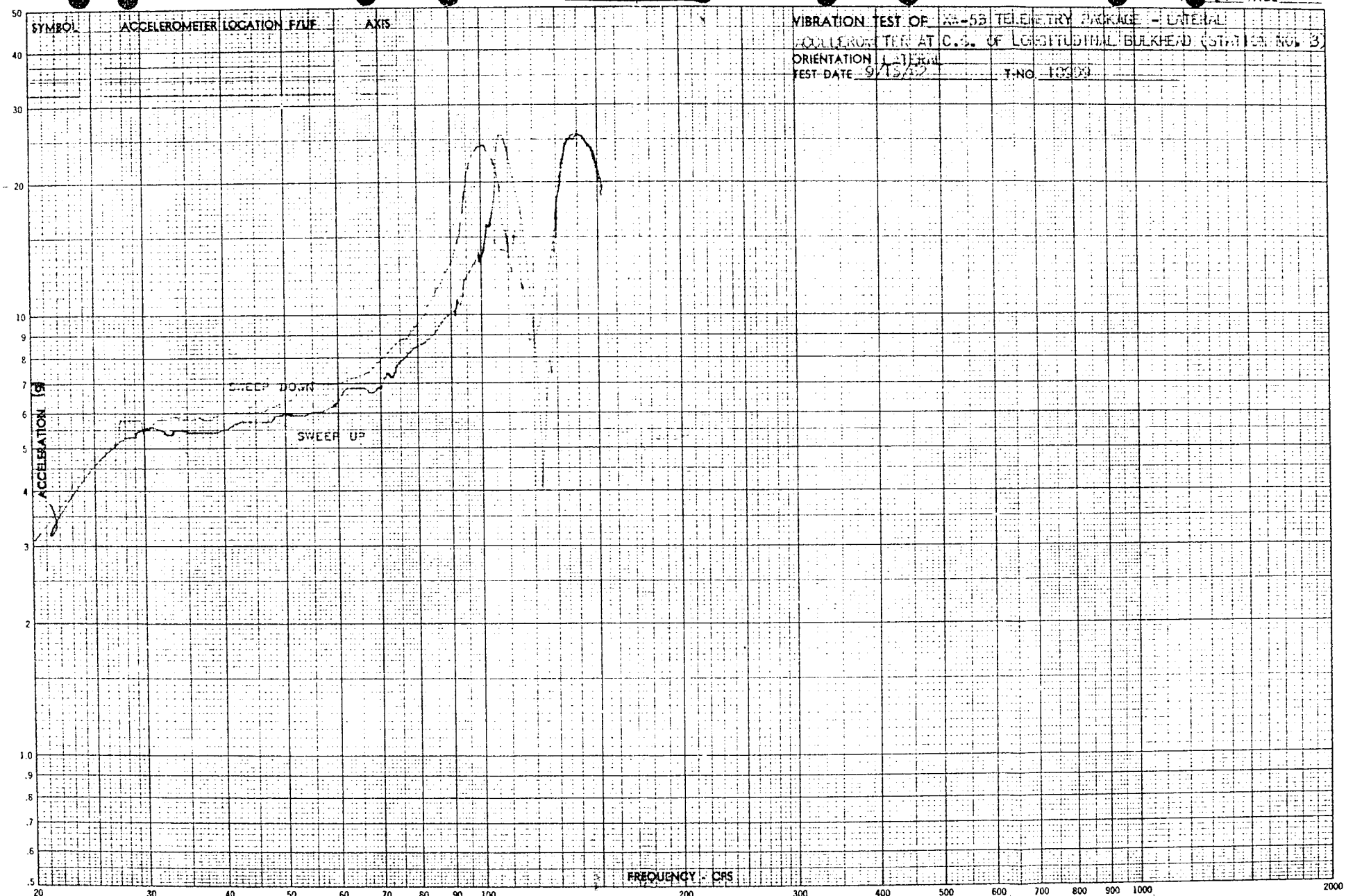

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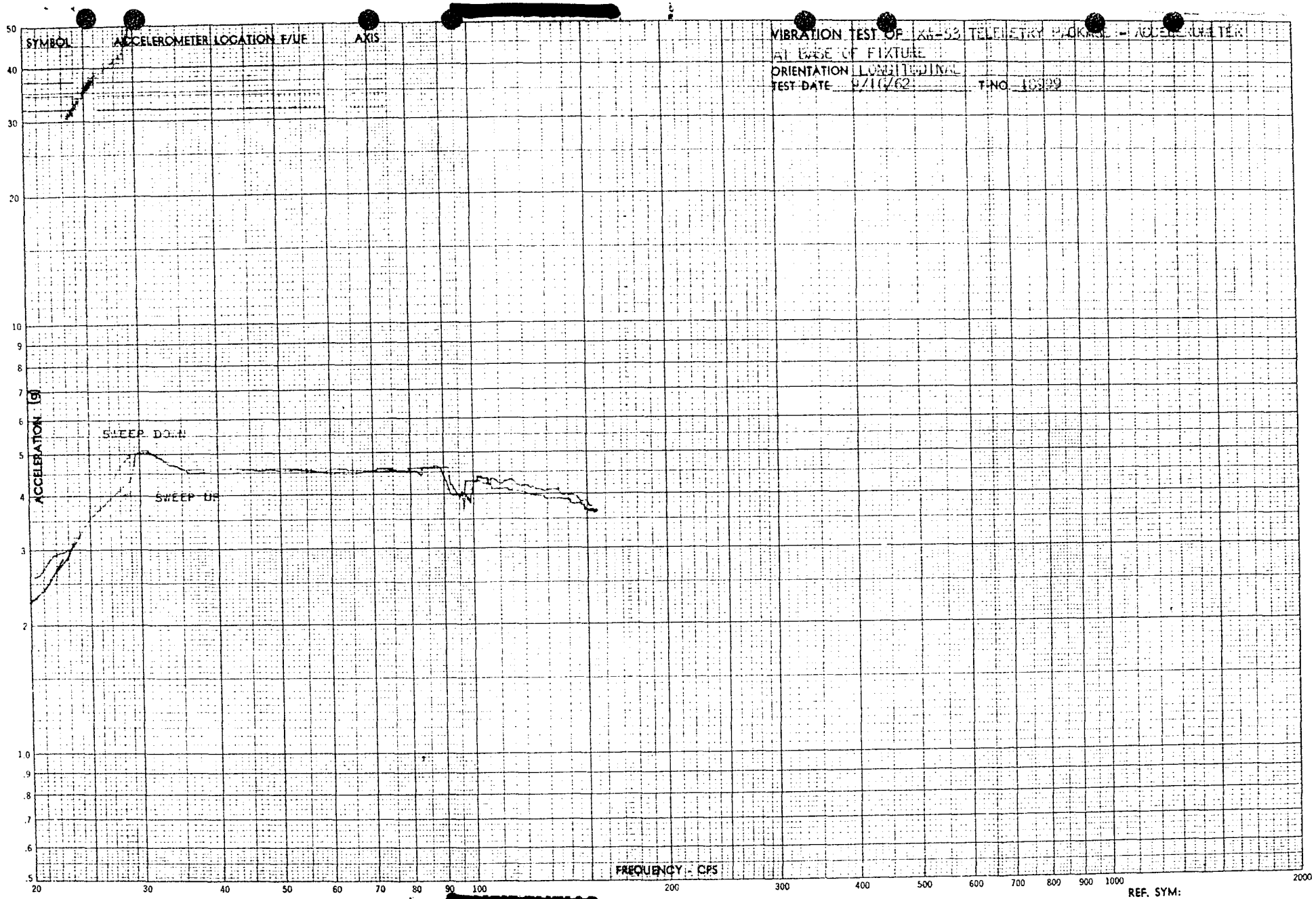

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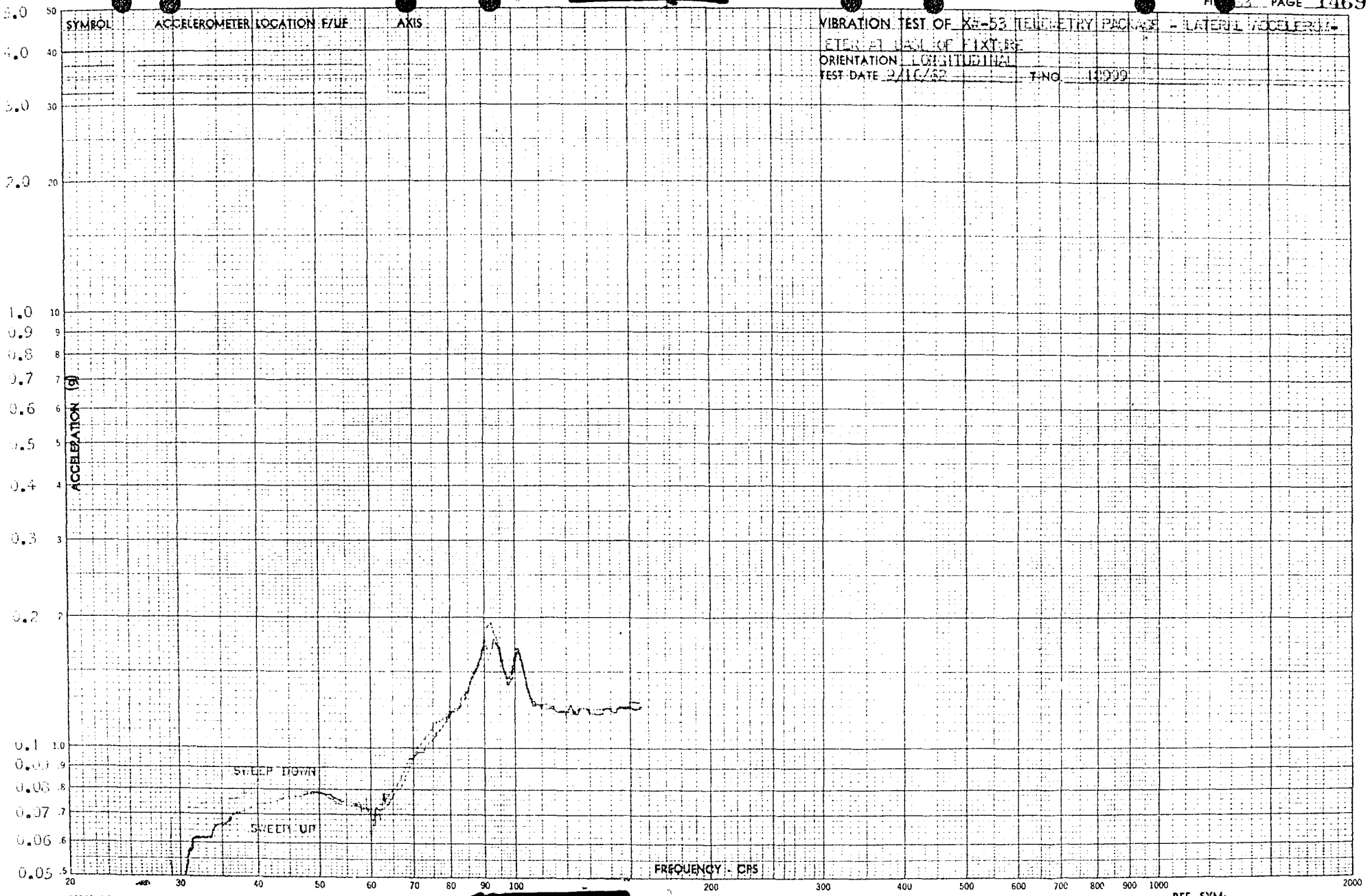

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UNCLASSIFIED

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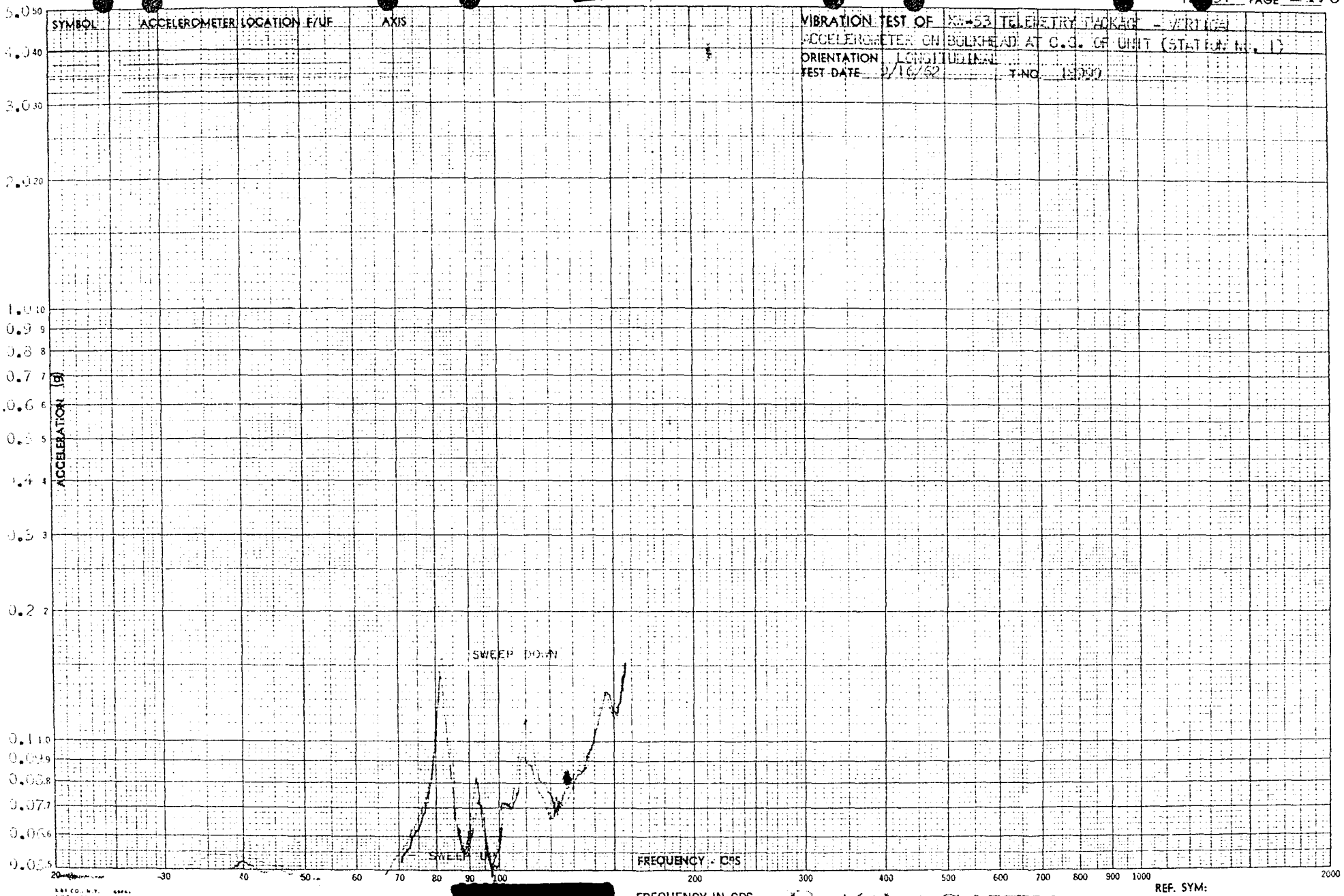
SYMBOL | ACCELEROMETER LOCATION F/UF | AXIS

VIBRATION TEST OF XM-53 TELEMETRY PACKAGE - VERTICAL
ACCELEROMETER ON BULKHEAD AT C.G. OF UNIT (STATION NO. 1)
ORIENTATION LONGITUDINAL
TEST DATE 9/16/62 T-NO. 1500



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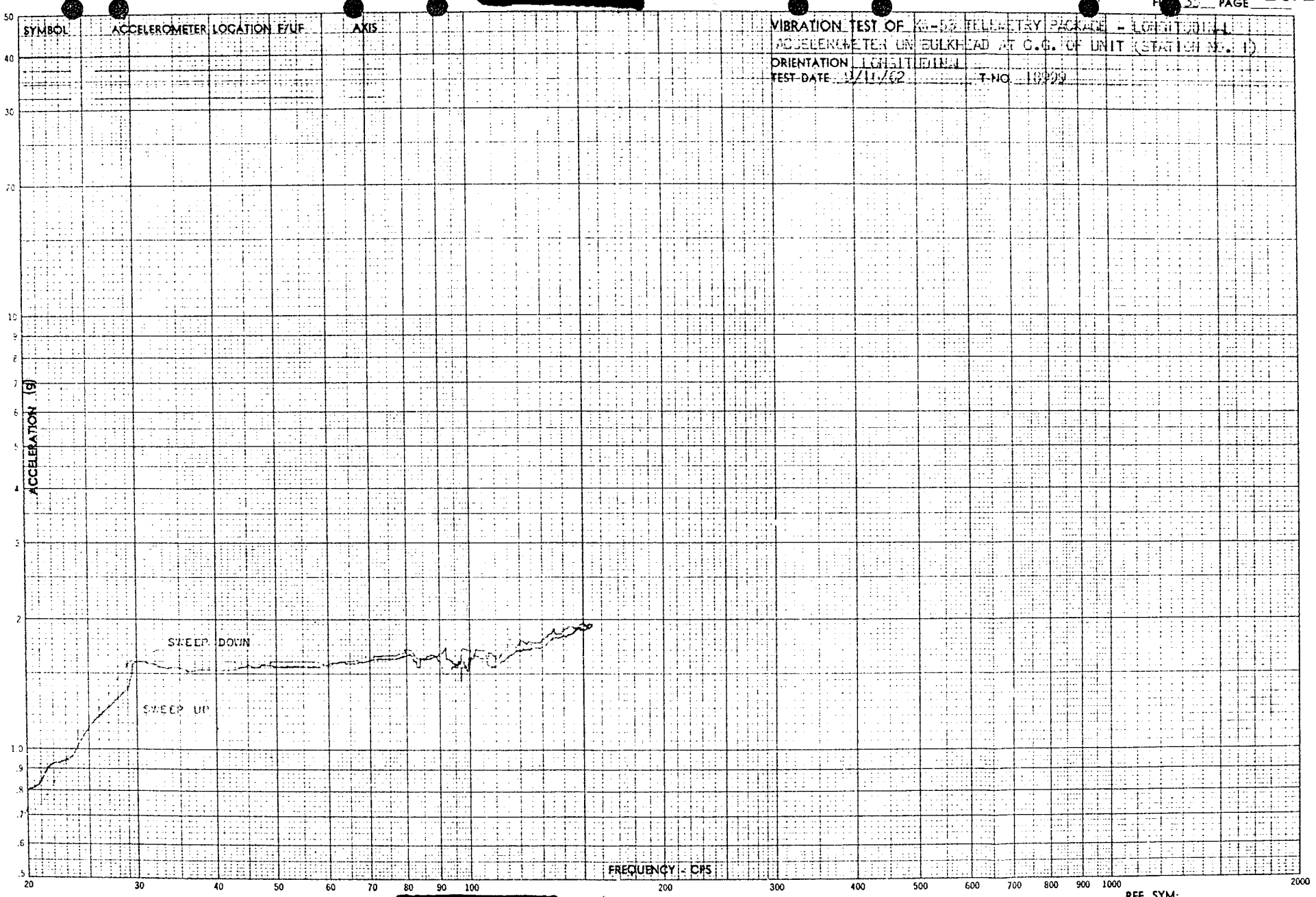

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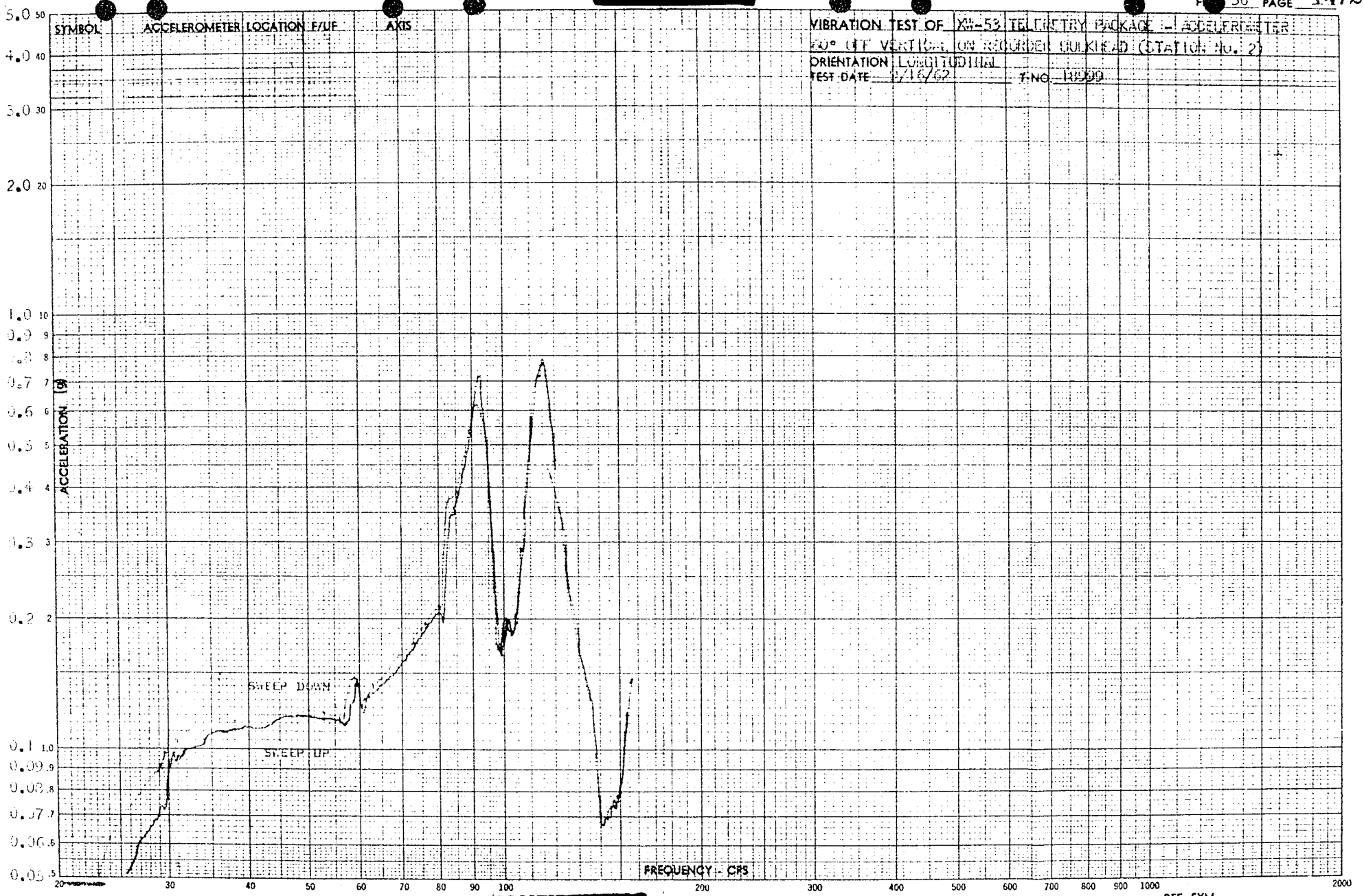

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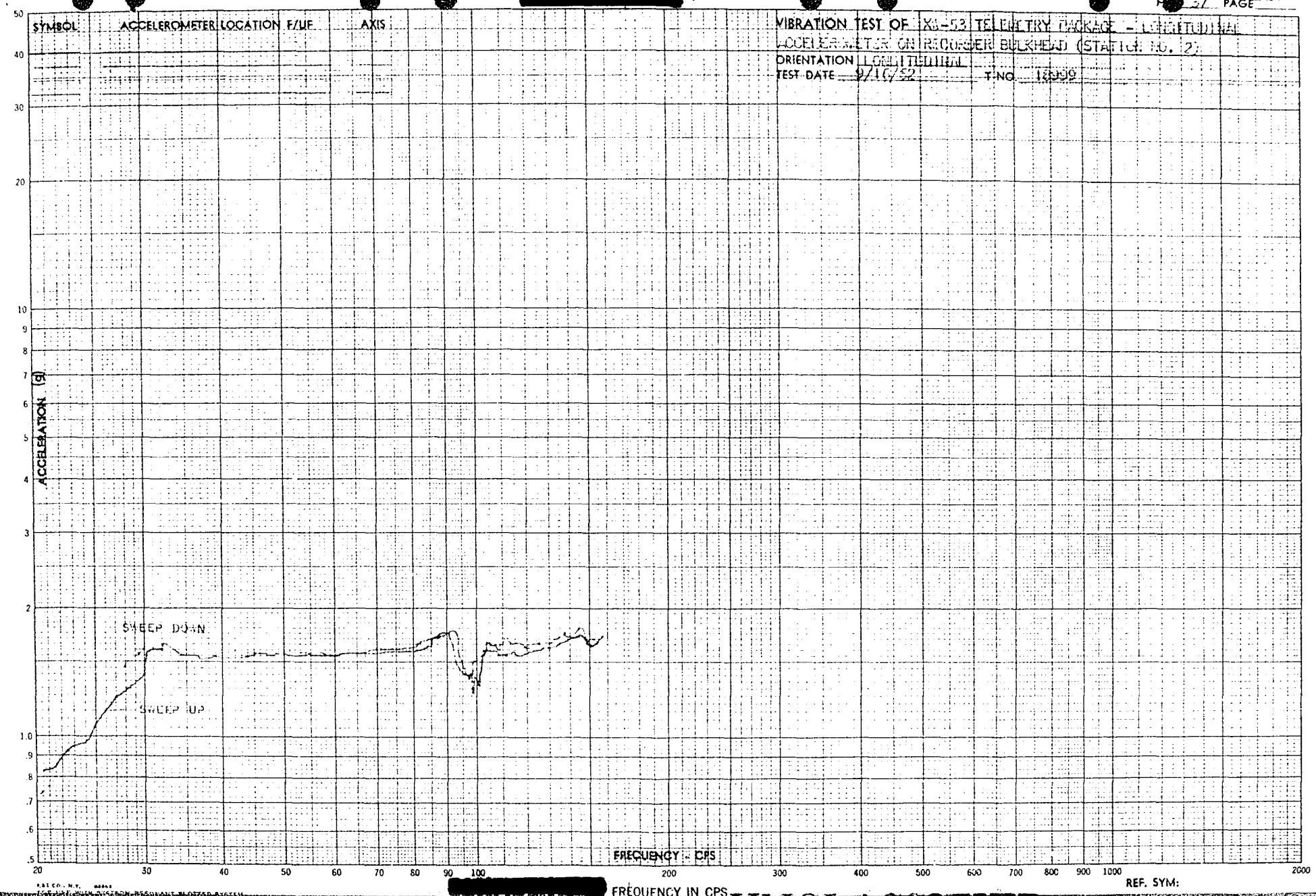

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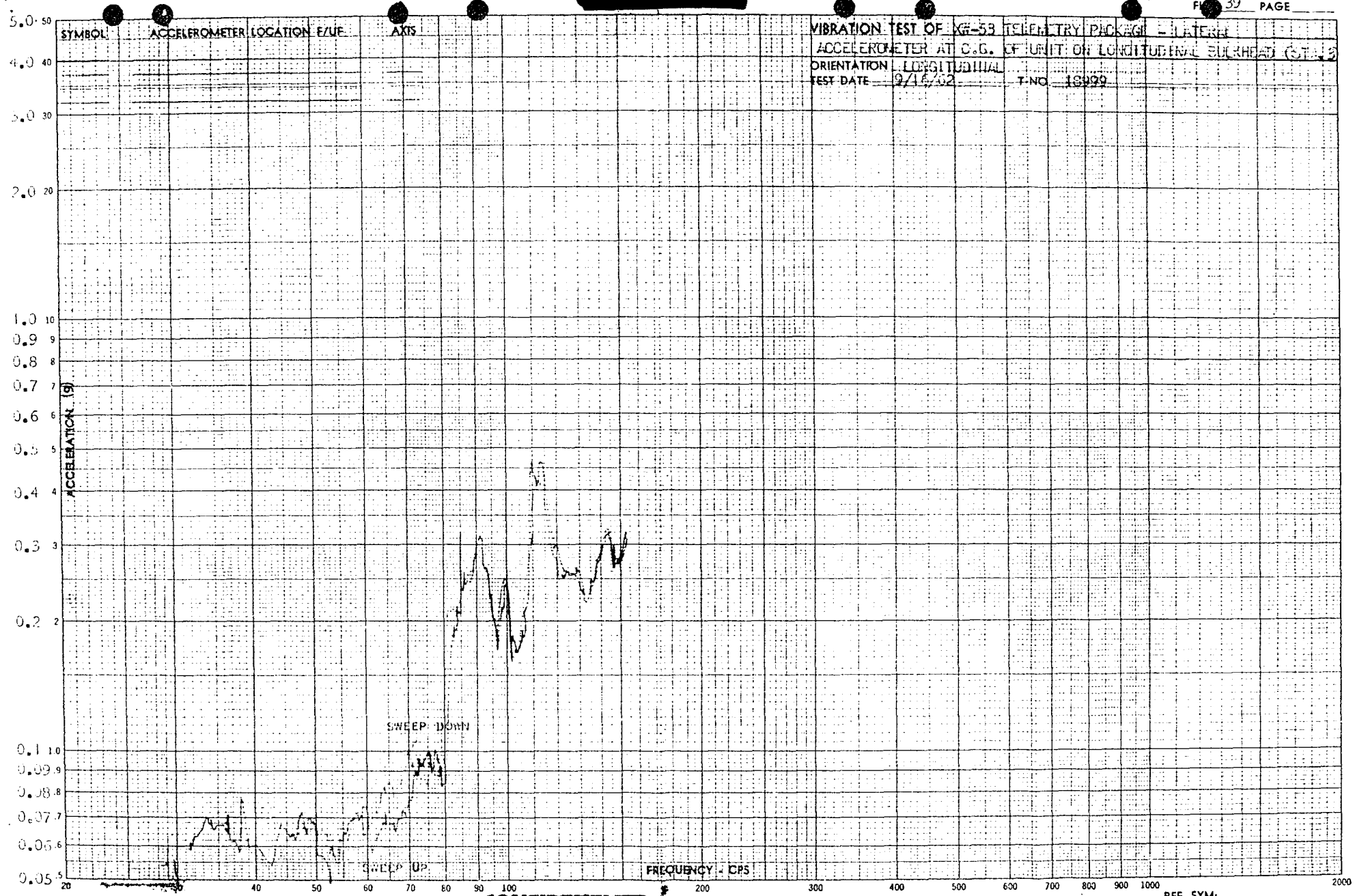
FIG. 39 PAGE



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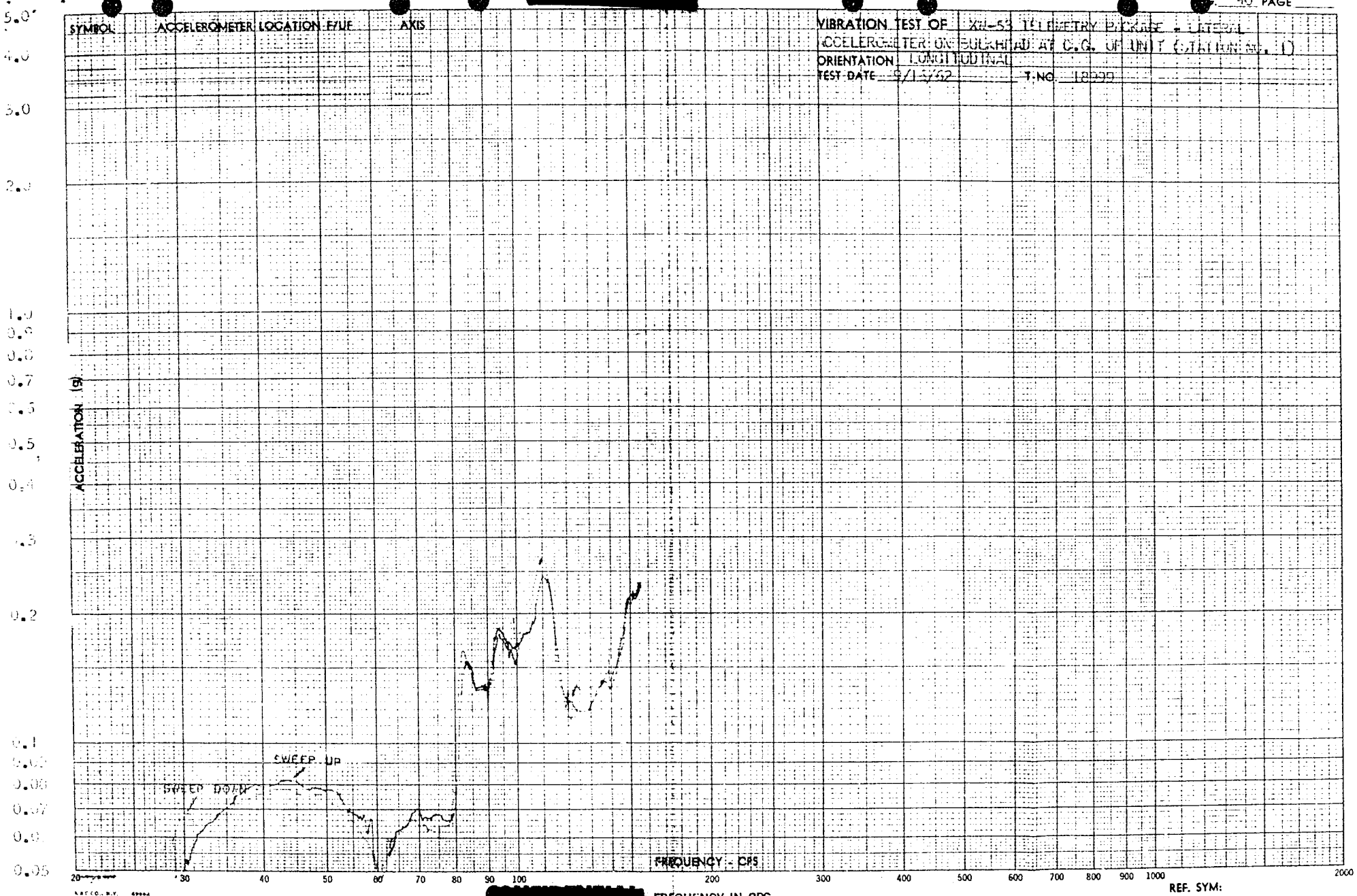
SYMBOL
ACCELEROMETER LOCATION F/UE
AXIS
VIBRATION TEST OF XW-53 TELEMETRY PACKAGE - LITERAL
ACCELEROMETER ON BULKHEAD AT C.G. OF UNIT (STATION NO. 1)
ORIENTATION LONGITUDINAL
TEST DATE 9/15/62
T.NO. 18999
ACCELERATION (g)
5.0
4.0
3.0
2.0
1.0
0.8
0.6
0.7
0.5
0.4
0.3
0.2
0.1
0.09
0.08
0.07
0.06
0.05
SWEEP UP
SWEEP DOWN
FREQUENCY - CPS
20
30
40
50
60
70
80
90
100
200
300
400
500
600
700
800
900
1000
2000
REF. SYM:
FREQUENCY IN CPS