

AD-781 792

STATIC RADAR CROSS SECTION OF LIGHT  
AIRCRAFT. VOLUME III. PIPER PA-18  
SUPER CUB AT L-, S-, AND C-BANDS

Test Group (6585 th)

Prepared for:

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16. Abstract  Static radar cross section (RCS) of a single-engine fabric-covered Piper PA-18 Super Cub high wing monoplane was measured at 2700, 2800 and 2900 MHz over a range of aircraft attitudes of +10° pitch, 0° to 45° roll, and also at 1250, 1350, 5000, and 5400 MHz at 0° roll, 0° pitch. Median RCS was independent of frequency in linear polarization and in circular polarization. The RCS was insensitive to roll, pitch, and yaw except in the two broadside directions under conditions of increasing roll angle. The report includes copies of the original recorded RCS patterns.					
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Table of Contents

Section I	Page
1. Introduction	1
2. Description of Target	1
3. Instrumentation	1
4. Procedure	2
5. Results	5
6. References	6
Appendix A - Site Introduction	A-1
1. General	A-1
2. Capabilities	A-1
3. Calibration	A-1
4. Operating Procedures	A-5
Appendix B - Target Orientation and Data Format	B-1
1. Coordinate System	B-1
2. Data Format	B-5

## List of Figures and Tables

Figure	Title	Page
1.	Piper PA-18 Super Cub Mounted on Columns for RCS Measurements at 0° Roll, 0° Pitch	8
2.	Elements of the Radar Measurement Range	9
3.	Aircraft Mounting Geometry Showing Location of Pitch Axis, Yaw Axis and Designation of Target Height	10
4.	Affect of Roll Angle on Median RCS at 2800 MHz, VV Polarization	11
A-1	Map of RAT SCAT Site	A-2
A-2	Plot of Error Induced by Background Interference	A-6
B-1	Vehicle Coordinate System	B-2
B-2	Target Orientation - Roll	B-3
B-3	Target Orientation - Pitch	B-4
B-4	Comparison of Pitch and Tilt Orientations	B-6
B-5	Target Orientation - Azimuth	B-7
B-6	Format for Rectilinear Plots	B-8
Table	Title	Page
I	RCS Measurement Matrix	3
II	Test Range Parameters for Super Cub RCS Measurements	7
III	Data Plot Index	12
A-1	RAT SCAT Characteristics of Electronic Equipment	A-3

## SECTION I

### 1. Introduction

This document is Volume III of a three-volume set (References 1 and 2) on measurement of static radar cross section (RCS) of light aircraft. The measurement program comprised three types of single-engined aircraft:

- a. All-metal high wing
- b. All-metal low wing
- c. Fabric-covered (high wing)

Type (c), represented by a Piper PA-18 Super Cub is the subject of this report. Measurements on a Cessna 150L, typical of type (a), are presented in Volume I (Reference 1), and the data on type (b), a Cherokee 140, are given in Volume II (Reference 2).

The objective of the program was to measure static RCS of typical light aircraft over a range of frequencies, polarizations, and aspect angles. These data would aid in defining the need for and amount of RCS enhancement on light aircraft to improve their visibility on FAA airport surveillance radars.

The data measurements were made at the Radar Target Scatter Division (RAT SCAT) of the 6585th Test Group located on the Alkali Flats, Holloman Air Force Base, New Mexico.

### 2. Description of Target

The RCS data presented in this report were measured on a Model PA-18 Super Cub manufactured by the Piper Aircraft Corporation, Lock Haven, Pennsylvania.

The aircraft was being re-furbished by the owners and was not in flying condition at the time of test although the basic structure and equipment were complete in all respects. The aircraft was trucked to the RAT SCAT test site where it was assembled and rigged. Figure 1 shows the aircraft mounted for test at zero degrees roll and zero degrees pitch. There were no antennas on the aircraft. The control surfaces were locked in neutral and the cabin door on the starboard side was closed.

### 3. Instrumentation

Data measurement was achieved with a long-pulse radar system operating on a ground plane range. Figure 2 illustrates the components

of the measurement range. The radar transmitter, receiver, control console, and data recorders were housed in a mobile van. The antennas were supported on a mobile tower. Rotation of the target in azimuth was controlled from the van through underground electrical conduit that also returned azimuth synchro signals to the van. A mobile test van was used on this program in order to operate over a range length not available on the RAT SCAT fixed ranges. Sections 1 and 2 of Appendix A and Table A-1 of Appendix A summarize the characteristics of RAT SCAT facilities and equipment. This information applies to the mobile-mounted equipment used for this program as well as to the fixed installations.

The RCS measurements presented in this report were obtained on a ground plane range wherein the target is measured near to the ground. The ground is present as a scattering object and in such a circumstance coupling between orthogonal components of the transmitted and received fields may exist other than the coupling introduced by the target. This coupling (or depolarizing) can be a problem only for measurement in circular polarization. References 3 and 4 describe the theoretical and experimental studies made on the subject specifically for the RAT SCAT range. It was shown that circular polarization measurements can be made on a ground plane range. The size of the useful target region is approximately the same when circular polarization is used as that obtained when linear polarization is used. The amplitude curvature in the vertical plane is the limiting factor in both cases. Standardized calibration procedures used at RAT SCAT assure the accuracy of RCS measurements using circular polarization.

The primary calibration standard for linear polarization was a 26.6 inch diameter precision aluminum sphere and was used at all measurement frequencies. The calibration standard for circular polarization was a ninety-degree dihedral corner with square faces 0.85 meters in each dimension. This corner was calibrated against the precision sphere, making use of a 45° dipole to transfer from linear to circular polarization. The secondary reference standard was a trihedral corner placed approximately at mid-range (see Figure 2). The RCS level of this reference standard was used to set the decibel scale on all recorded RCS patterns and was utilized for both linear and circular polarization.

The radar antennas were parabolic dishes with dipole feeds for linear polarization and planar spiral feeds for circular polarization. Circularity was better than 0.7 dB at all frequencies.

#### 4. Procedure

Data on this program were obtained at seven frequencies and three polarizations over a range of roll and pitch angles as summarized in Table I.

Table I - RCS Measurement Matrix

Freq. (MHz)	Polarization	Roll Angle (Degrees)	Pitch Angle (Degrees)
1250	VV,HH,RR	0	0
1350	VV,HH,RR	0	0
2700	VV,--,RR	0,5,10,20,30,45	-10,-5,0,+5,+10
2800	VV,HH,RR	0,5,10,20,30,45	-10,-5,0,+5,+10
2900	VV,--,RR	0,5,10,20,30,45	-10,-5,0,+5,+10
5000	VV,HH,--	0	0
5400	VV,HH,--	0	0

The first letter designating polarization defines the polarization of the transmit antenna, the second letter defines polarization of the receive antenna. The nomenclature follows common practice in which only the spatial orientation of the electric field vector is specified: V for vertical, H for horizontal, R for right-hand circular.

The aircraft was supported at the azimuth turntable on two dielectric columns. The two columns were expanded polystyrene foam fabricated in vertical wedge sections to form a cone with circular cross section. On top of each column was a cylindrical transition section of polystyrene contoured on the upper ends to match the curvature of polystyrene rings attached to the aircraft fuselage. The rings transferred the mounting loads into the fuselage welded steel tube framework in order to avoid damage to the outer fabric covering. The forward ring was in the plane of the firewall.

The aircraft was lifted by a mobile crane and carefully lowered onto the transition sections on top of each column. Lengths of parachute cord tied to the fuselage, tail wheel, and wing struts were anchored to winches fastened on the azimuth turntable. The transition sections on the two columns established the aircraft pitch angle while roll angle was achieved simply by rolling the aircraft on the support rings. Final adjustment of pitch and roll was achieved by altering tension in various tie-down cords in whatever combination was necessary. Roll and pitch angle were measured at the propeller hub. With the propeller rotated to an index line roll angle was measured with a transit sighting on a protractor fixed to the propeller hub. Pitch angle was measured on the front



of the propeller hub with an inclinometer. Pitch angle thus was measured with respect to the axis of the engine crankshaft. Both roll and pitch were set to an accuracy of  $\pm 0.5$  degrees.

Figure 1 shows the Super Cub mounted on the columns and ready for measurement at zero degrees roll, zero degrees pitch. The two support rings were made of two pound per cubic foot density expanded polystyrene foam and were in place for all RCS measurements.

Target height was 14 feet at L- and C-Bands, 16 feet at S-Band. Target height is the vertical distance between ground level and a horizontal line (the pitch axis) through the half height of the fuselage midway between aircraft nose and tail, measured with the aircraft in level flight attitude. Figure 3 illustrates the relation between target height and the axes of pitch and yaw.

A target being measured on a ground plane range is in an electromagnetic field that is the vector sum of (1) the wave energy that travels directly from antenna to target, (2) the wave energy reflected from the surface of the earth, and (3) the wave energy that travels along the surface of the earth. The vector sum produces an interference pattern. Antenna height is adjusted so that the target is located in the first lobe of the interference pattern described by the equation

$$H_a = \frac{\lambda R}{4H_t}$$

where  $H_a$  is antenna height,  $H_t$  is target height,  $\lambda$  is wavelength, and  $R$  is range length. In order to obtain accurate RCS measurements the following steps are required:

- (a) Adjust antenna height and pointing direction for best field uniformity across the volume occupied by the target.
- (b) Tilt the azimuth turntable so the target rotates in the plane of the antenna beam.
- (c) Minimize reflections from target supports, tie-downs and turntable.
- (d) Calibrate the range at all frequencies and polarizations.

The range parameters used on the program after the above steps were carried out at each frequency are summarized in Table II.

Measurement of RCS began with the three frequencies in S-Band: 2700 MHz, 2800 MHz and 2900 MHz. Because of the large effort required

to mount the target for measurement it was prudent to record as many RCS patterns as possible for each mounting of the target. For that reason four antennas were used: one pair for linear polarization, the other pair for circular polarization. The antenna pairs were switched to the radar transmitter and receiver as required. That arrangement allowed measurement of seven RCS patterns for each roll/pitch attitude of the target. If weather conditions remained favorable upon completion of such a pattern group the target was set to the next roll/pitch attitude and RCS measurement continued until dark at which time a post-test calibration was then made. If weather became unfavorable (wind velocity above 10 knots, or rain) the target was removed from the turntable and the post-test calibration was made as quickly as possible. In any event the aircraft was not measured in wind velocity above 10 knots or after dark, and the range was calibrated before and after a sequence of measurement. The post-test calibration for one day was not used as the pre-test calibration for the next sequence of measurement. Each day began with a new calibration.

At L-Band (1250 MHz and 1350 MHz) one pair of antennas was used instead of two pair because only one target roll/pitch attitude was measured (see Table I). The two linear patterns were measured at each frequency followed by the post-test calibration. The linear feeds were replaced by the circular feeds and a new calibration was made at the two frequencies. The required patterns in circular polarization were then measured and were followed by a post-test calibration.

## 5. Results

The RCS patterns presented in this report are copies of the original recorded data. Each pattern includes a calibration reference level from which the decibel scale was labelled. Each pattern also is marked with azimuth angle (horizontal scale at the bottom), and is identified as to pitch and roll angle, all of which are defined in Appendix B.

The RCS of the Super Cub was fairly insensitive to roll, pitch and yaw (azimuth angle) except in the broadside directions with increasing roll angle. The aircraft structure consisted of a metal framework covered by fabric that had a fire-retardent plastic finish. The outer surface of the aircraft was thus a thin dielectric layer. The aircraft RCS was the combination of reflections from the dielectric surface and from the large number of conductive elements (pipe, angles, plates) making up the aircraft load-bearing structure. The conductive elements presented to the incident radar field a wide range of lengths, polarizations, and areas that changed only slightly with aspect angle (except in the broadside directions at increasing roll angles). The result was a uniform RCS response.

With the aircraft at zero degrees roll and zero degrees pitch the median RCS in linear polarization and in circular polarization was independent of frequency over the range of measurement. In linear polarization the median RCS was the same for VV as for HH.

The measured RCS patterns show the effect of frequency only for the zero degrees roll, zero degrees pitch attitude of the aircraft. It can be noted that the ratio of fuselage length (6.88m) to wavelength is between 288 and 124 over the measured frequency range, indicating that RCS is in the geometric optics region. From this it can be inferred that median RCS may be independent of frequency at all attitudes of the aircraft.

Figure 4 indicates the effect of positive roll angle (at zero degrees pitch) on median RCS at 2800 MHz, VV polarization. Contours of median RCS in dbsm are plotted in the azimuth-roll plane. (Median RCS was computed for a 10 degree azimuth increment with a 5 degree overlap). Vertical lines through the plot indicate the effect of roll angle at a given azimuth direction. Variation of RCS with roll angle was greatest in the two broadside directions, i.e. near 90° azimuth and 270° azimuth. In the 270° azimuth direction where the radar viewed the underside of the wing and fuselage as the aircraft rolled the RCS displayed three peaks and two 5 db deep nulls in rolling to 45 degrees. In the 90° azimuth direction (the radar viewed the upper surface of wing and fuselage) the RCS displayed two peaks and one 8 db deep null for the same 45 degrees of roll. In other azimuth directions the RCS varied 2 db or less over 45 degrees of roll.

#### 6. References

1. AFSWC-TR-73-46, Volume I, Static RCS of Light Aircraft, Cessna 150L at L-, S-, C-Band, December 1973.
2. AFSWC-TR-73-46, Volume II, Static RCS of Light Aircraft, Cherokee 140 at L-, S-, C-Band, December 1973.
3. RADC-TDR-63-484, An Analysis of the Polarization Capabilities of a Ground Plane Cross Section Range, October 1963.
4. RADC-TDR-64-380, Experimental Results of Circular Polarization and Scattering Matrix Measurements, June 1964.

Table II Test Range Parameters for Super Cub RCS Measurements

Freq. (MHz)	Target Ht. (ft)	Antenna Ht.	Antenna Diameter (ft)	Range (ft)	Table Tilt (Min)
1250	14	12'-6"	10	1150	42
1350	14	12'-6"	10	1150	42
2700	16	12'-6"	6	2100	26
2800	16	12'-6"	6	2100	26
2900	16	12'-6"	6	2100	26
5000	14	6'-5"	4	2100	23
5400	14	5'-10"	4	2100	23

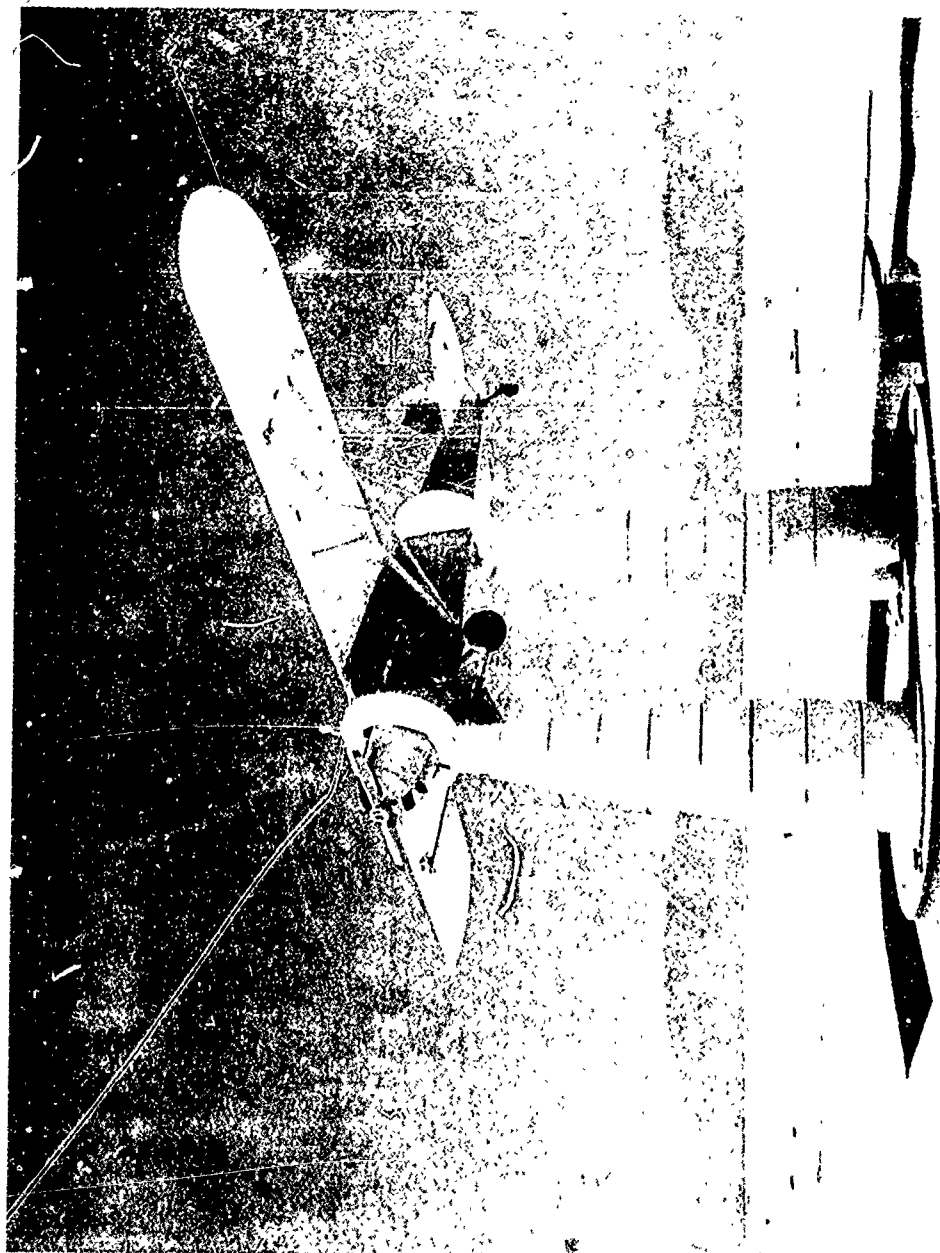


Figure 1. PIPER PA-18 Super Cub Mounted On Columns For  
RCS Measurements at  $0^\circ$  Roll,  $0^\circ$  Pitch.

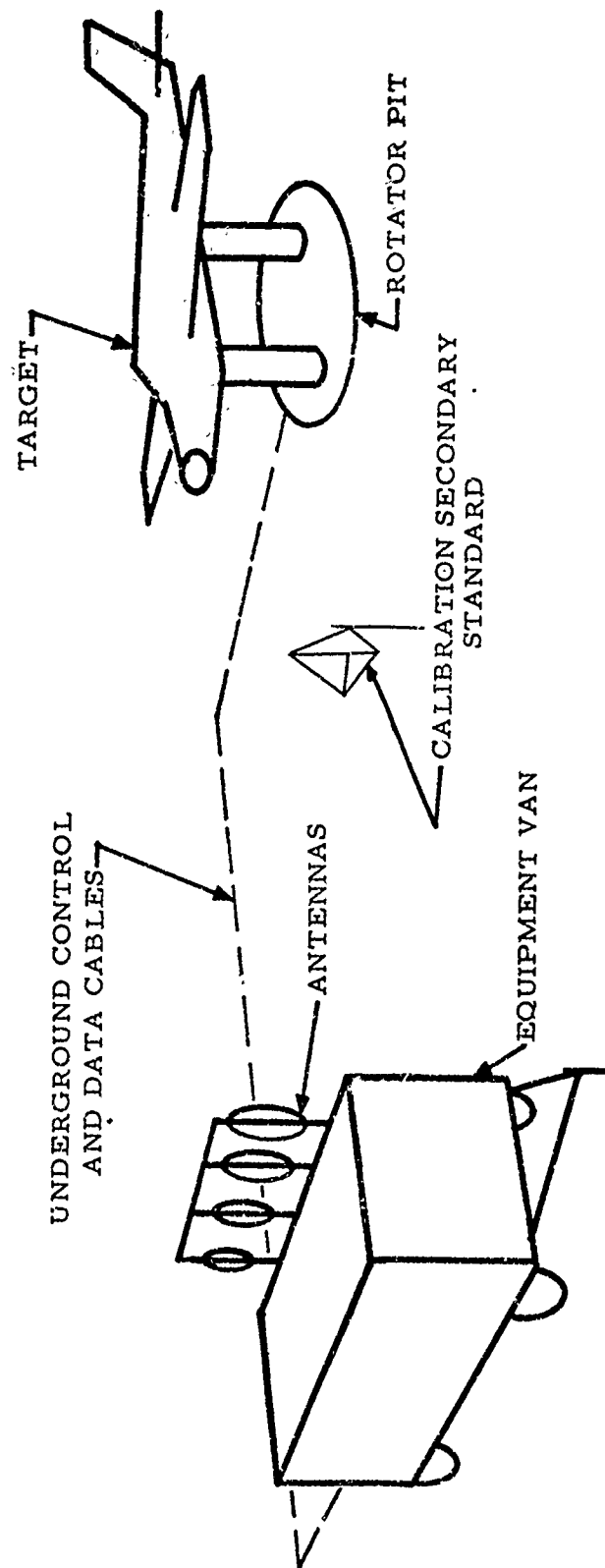


Figure 2. Elements of the Radar Measurement Range

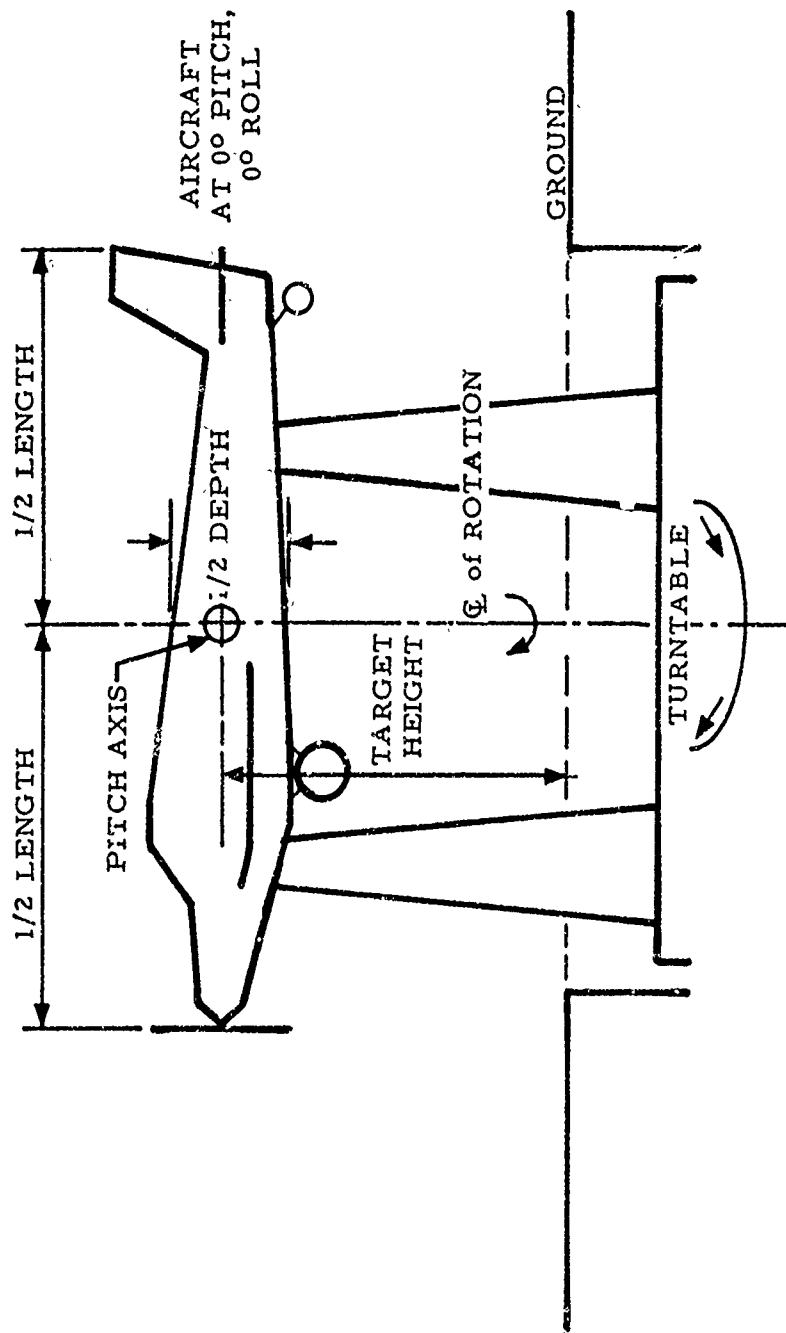


Figure 3. Aircraft Mounting Geometry Showing Location of Pitch Axis, Yaw Axis and Designation of Target Height

CONTOURS OF EQUAL dbsm

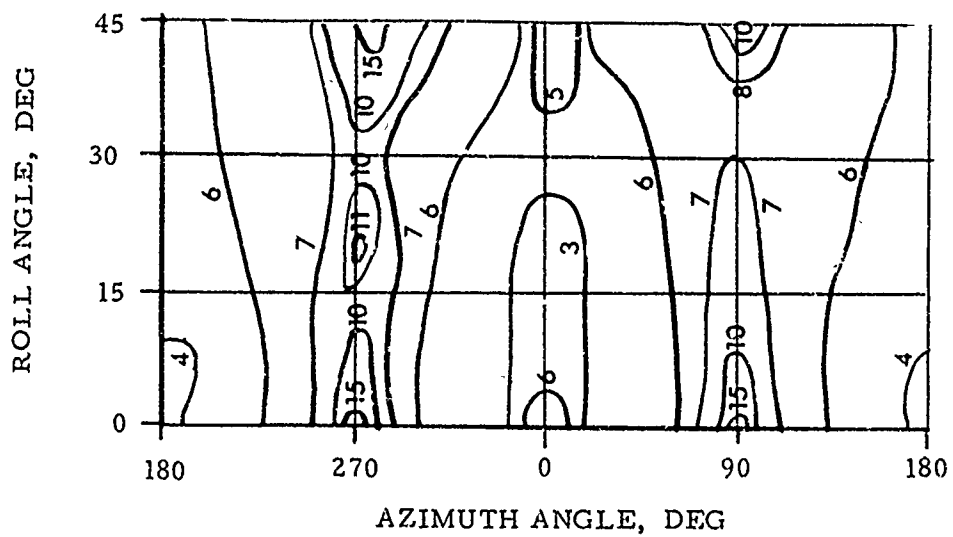


Figure 4. Affect of Roll Angle on Median RCS at 2800MHz, VV Polarization



PAGE NO.	RUN	FREQ (MHz)	POLARIZATION	PITCH ANGLE	ROLL ANGLE	TARGET CONFIGURATION AND REMARKS
20	1023	2700	VV	-10	0	Super Cub PA-18 Airplane
21	1035	2700	VV	-5	0	Super Cub PA-18 Airplane
22	892	2700	VV	0	0	Super Cub PA-18 Airplane
23	1113	2700	VV	+5	0	Super Cub PA-18 Airplane
24	1134	2700	VV	+10	0	Super Cub PA-18 Airplane
25	1022	2700	VV	-10	5	Super Cub PA-18 Airplane
26	1037	2700	VV	-5	5	Super Cub PA-18 Airplane
27	905	2700	VV	0	5	Super Cub PA-18 Airplane
28	1100	2700	VV	+5	5	Super Cub PA-18 Airplane
29	1135	2700	VV	+10	5	Super Cub PA-18 Airplane
30	1009	2700	VV	-10	10	Super Cub PA-18 Airplane
31	1058	2700	VV	-5	10	Super Cub PA-18 Airplane
32	906	2700	VV	0	10	Super Cub PA-18 Airplane
33	1099	2700	VV	+5	10	Super Cub PA-18 Airplane
34	1148	2700	VV	+10	10	Super Cub PA-18 Airplane
35	1007	2700	VV	-10	20	Super Cub PA-18 Airplane
36	1071	2700	VV	-5	20	Super Cub PA-18 Airplane
37	913	2700	VV	0	20	Super Cub PA-18 Airplane
38	1086	2700	VV	+5	20	Super Cub PA-18 Airplane
39	1149	2700	VV	+10	20	Super Cub PA-18 Airplane
40	982	2700	VV	-10	30	Super Cub PA-18 Airplane
41	1072	2700	VV	-5	30	Super Cub PA-18 Airplane
42	934	2700	VV	0	30	Super Cub PA-18 Airplane
43	1085	2700	VV	+5	30	Super Cub PA-18 Airplane
44	1156	2700	VV	+10	30	Super Cub PA-18 Airplane
45	969	2700	VV	-10	45	Super Cub PA-18 Airplane
46	948	2700	VV	-5	45	Super Cub PA-18 Airplane
47	947	2700	VV	0	45	Super Cub PA-18 Airplane
48	1197	2700	VV	+5	45	Super Cub PA-18 Airplane
49	1184	2700	VV	+10	45	Super Cub PA-18 Airplane
50	1163	2700	VV	N/A	N/A	Super Cub PA-18 Airplane Background with columns and transitions

NBD 72-007

CONTROL NUMBER 73-01

DATA PLOT INDEX

Sheet 2

Table III

PAGE NO.	RUN	FREQ (MHz)	POLARIZATION	PITCH ANGLE	ROLL ANGLE	TARGET CONFIGURATION AND REMARKS
51	1024	2700	RR	-10	0	Super Cub PA-18 Airplane
52	1036	2700	RR	-5	0	Super Cub PA-18 Airplane
53	893	2700	RR	0	0	Super Cub PA-18 Airplane
54	1112	2700	RR	+5	0	Super Cub PA-18 Airplane
55	1133	2700	RR	+10	0	Super Cub PA-18 Airplane
56	1021	2700	RR	-10	5	Super Cub PA-18 Airplane
57	1038	2700	RR	-5	5	Super Cub PA-18 Airplane
58	904	2700	RR	0	5	Super Cub PA-18 Airplane
59	1101	2700	RR	+5	5	Super Cub PA-18 Airplane
60	1136	2700	RR	+10	5	Super Cub PA-18 Airplane
61	1010	2700	RR	-10	10	Super Cub PA-18 Airplane
62	1059	2700	RR	-5	10	Super Cub PA-18 Airplane
63	907	2700	RR	0	10	Super Cub PA-18 Airplane
64	1098	2700	RR	+5	10	Super Cub PA-18 Airplane
65	1147	2700	RR	+10	10	Super Cub PA-18 Airplane
66	1006	2700	RR	-10	20	Super Cub PA-18 Airplane
67	1070	2700	RR	-5	20	Super Cub PA-18 Airplane
68	914	2700	RR	0	20	Super Cub PA-18 Airplane
69	1087	2700	RR	+5	20	Super Cub PA-18 Airplane
70	1150	2700	RR	+10	20	Super Cub PA-18 Airplane
71	983	2700	RR	-10	20	Super Cub PA-18 Airplane
72	1073	2700	RR	-5	30	Super Cub PA-18 Airplane
73	935	2700	RR	0	30	Super Cub PA-18 Airplane
74	1084	2700	RR	+5	30	Super Cub PA-18 Airplane
75	1157	2700	RR	+10	30	Super Cub PA-18 Airplane
76	970	2700	RR	-10	45	Super Cub PA-18 Airplane
77	949	2700	RR	-5	45	Super Cub PA-18 Airplane
78	946	2700	RR	0	45	Super Cub PA-18 Airplane
79	1196	2700	RR	+5	45	Super Cub PA-18 Airplane
80	1145	2700	RR	+10	45	Super Cub PA-18 Airplane
81	1164	2700	RR	N/A	N/A	Super Cub PA-18 Airplane
						Background with columns and transitions
						-----

RBD 72-007

CONTROL NUMBER 73-01

Table III

DATA PLOT INDEX

Sheet 3

PAGE NO.	RUN	FREQ (MHz)	POLARIZATION	PITCH ANGLE	ROLL ANGLE	TARGET CONFIGURATION AND REMARKS
82	1027	2800	VV	-10	0	Super Cub PA-18 Airplane
83	1034	2800	VV	-5	0	Super Cub PA-18 Airplane
84	896	2800	VV	0	0	Super Cub PA-18 Airplane
85	1109	2800	VV	+5	0	Super Cub PA-18 Airplane
86	1132	2800	VV	+10	0	Super Cub PA-18 Airplane
87	1020	2800	VV	-10	5	Super Cub PA-18 Airplane
88	1041	2800	VV	-5	5	Super Cub PA-18 Airplane
89	901	2800	VV	0	5	Super Cub PA-18 Airplane
90	1102	2800	VV	+5	5	Super Cub PA-18 Airplane
91	1139	2800	VV	+10	5	Super Cub PA-18 Airplane
92	1013	2800	VV	-10	10	Super Cub PA-18 Airplane
93	1062	2800	VV	-5	10	Super Cub PA-18 Airplane
94	910	2800	VV	0	10	Super Cub PA-18 Airplane
95	1095	2800	VV	+5	10	Super Cub PA-18 Airplane
96	1146	2800	VV	+10	10	Super Cub PA-18 Airplane
97	1001	2800	VV	-10	20	Super Cub PA-18 Airplane
98	1067	2800	VV	-5	20	Super Cub PA-18 Airplane
99	917	2800	VV	0	20	Super Cub PA-18 Airplane
100	1090	2800	VV	+5	20	Super Cub PA-18 Airplane
101	1153	2800	VV	+10	20	Super Cub PA-18 Airplane
102	980	2800	VV	-10	30	Super Cub PA-18 Airplane
103	1076	2800	VV	-5	30	Super Cub PA-18 Airplane
104	938	2800	VV	0	30	Super Cub PA-18 Airplane
105	1081	2800	VV	+5	30	Super Cub PA-18 Airplane
106	1160	2800	VV	+10	30	Super Cub PA-18 Airplane
107	973	2800	VV	-10	45	Super Cub PA-18 Airplane
108	952	2800	VV	-5	45	Super Cub PA-18 Airplane
109	943	2800	VV	0	45	Super Cub PA-18 Airplane
110	1193	2800	VV	+5	45	Super Cub PA-18 Airplane
111	1188	2800	VV	+10	45	Super Cub PA-18 Airplane
112	1166	2800	VV	N/A	N/A	Becker's sound with columns and transitions

CONTROL NUMBER 73-01

DATA PLOT INDEX

Sheet 4

Table III

PAGE NO.	RUN	FREQ (MHz)	POLARIZATION	PITCH ANGLE	ROLL ANGLE	TARGET CONFIGURATION AND REMARKS
113	1025	2800	HH	-10	0	Super Cub PA-18 Airplane
114	1032	2800	HH	-5	0	Super Cub PA-18 Airplane
115	895	2800	HH	0	0	Super Cub PA-18 Airplane
116	1111	2800	HH	+5	0	Super Cub PA-18 Airplane
117	1131	2800	HH	+10	0	Super Cub PA-18 Airplane
118	1019	2800	HH	-10	5	Super Cub PA-18 Airplane
119	1039	2800	HH	-5	5	Super Cub PA-18 Airplane
120	902	2800	HH	0	5	Super Cub PA-18 Airplane
121	1104	2800	HH	+5	5	Super Cub PA-18 Airplane
122	1138	2800	HH	+10	5	Super Cub PA-18 Airplane
123	1012	2800	HH	-10	10	Super Cub PA-18 Airplane
124	1061	2800	HH	-5	10	Super Cub PA-18 Airplane
125	908	2800	HH	0	10	Super Cub PA-18 Airplane
126	1097	2800	HH	+5	10	Super Cub PA-18 Airplane
127	1145	2800	HH	+10	10	Super Cub PA-18 Airplane
128	1002	2800	HH	-10	20	Super Cub PA-18 Airplane
129	1068	2800	HH	-5	20	Super Cub PA-18 Airplane
130	915	2800	HH	0	20	Super Cub PA-18 Airplane
131	1089	2800	HH	+5	20	Super Cub PA-18 Airplane
132	1152	2800	HH	+10	20	Super Cub PA-18 Airplane
133	979	2800	HH	-10	30	Super Cub PA-18 Airplane
134	1075	2100	HH	-5	30	Super Cub PA-18 Airplane
135	937	2800	HH	0	30	Super Cub PA-18 Airplane
136	1082	2800	HH	+5	30	Super Cub PA-18 Airplane
137	1159	2800	HH	+10	30	Super Cub PA-18 Airplane
138	972	2800	HH	-10	45	Super Cub PA-18 Airplane
139	951	2800	HH	-5	45	Super Cub PA-18 Airplane
140	944	2800	HH	0	45	Super Cub PA-18 Airplane
141	1194	2800	HH	+5	45	Super Cub PA-18 Airplane
142	1187	2800	HH	+10	45	Super Cub PA-18 Airplane
143	1167	2800	HH	N/A	N/A	Background with columns and transitions

CONTROL NUMBER 73-01

Table III

DATA PLOT INDEX

Sheet 5

PAGE NO.	RUN	FREQ (MHz)	POLARI-ZATION	PITCH ANGLE	ROLL ANGLE	TARGET CONFIGURATION AND REMARKS
144	1026	2800	RR	-10	0	Super Cub PA-18 Airplane
145	1033	2800	RR	-5	0	Super Cub PA-18 Airplane
146	894	2800	RR	0	0	Super Cub PA-18 Airplane
147	1110	2800	RR	+5	0	Super Cub PA-18 Airplane
148	1130	2800	RR	+10	0	Super Cub PA-18 Airplane
149	1018	2800	RR	-10	5	Super Cub PA-18 Airplane
150	1040	2800	RR	-5	5	Super Cub PA-18 Airplane
151	903	2800	RR	0	5	Super Cub PA-18 Airplane
152	1103	2800	RR	+5	5	Super Cub PA-18 Airplane
153	1137	2800	RR	+10	5	Super Cub PA-18 Airplane
154	1011	2800	RR	-10	10	Super Cub PA-18 Airplane
155	1060	2800	RR	-5	10	Super Cub PA-18 Airplane
156	909	2800	RR	0	10	Super Cub PA-18 Airplane
157	1096	2800	RR	+5	10	Super Cub PA-18 Airplane
158	1144	2800	RR	+10	10	Super Cub PA-18 Airplane
159	1008	2800	RR	-10	20	Super Cub PA-18 Airplane
160	1069	2800	RR	-5	20	Super Cub PA-18 Airplane
161	916	2800	RR	0	20	Super Cub PA-18 Airplane
162	1088	2800	RR	+5	20	Super Cub PA-18 Airplane
163	1151	2800	RR	+10	20	Super Cub PA-18 Airplane
164	978	2800	RR	-10	30	Super Cub PA-18 Airplane
165	1074	2800	RR	-5	30	Super Cub PA-18 Airplane
166	936	2800	RR	0	30	Super Cub PA-18 Airplane
167	1083	2800	RR	+5	30	Super Cub PA-18 Airplane
168	1158	2800	RR	+10	30	Super Cub PA-18 Airplane
169	971	2800	RR	-10	45	Super Cub PA-18 Airplane
170	950	2800	RR	-5	45	Super Cub PA-18 Airplane
171	945	2800	RR	0	45	Super Cub PA-18 Airplane
172	1195	2800	RR	+5	45	Super Cub PA-18 Airplane
173	1186	2800	RR	+10	45	Super Cub PA-18 Airplane
174	1165	2800	RR	N/A	N/A	Super Cub PA-18 Airplane Background with columns and transitions

NBD 72-007

CONTROL NUMBER 73-01

Table III

DATA PLOT INDEX

Sheet 6

PAGE NO.	RUN	FREQ (MHz)	POLARIZATION	PITCH ANGLE	ROLL ANGLE	TARGET CONFIGURATION AND REMARKS
175	1028	2900	VV	-10	0	Super Cub PA-18 Airplane
176	1030	2900	VV	-5	0	Super Cub PA-18 Airplane
177	898	2900	VV	0	0	Super Cub PA-18 Airplane
178	1107	2900	VV	+5	0	Super Cub PA-18 Airplane
179	1128	2900	VV	+10	0	Super Cub PA-18 Airplane
180	1016	2900	VV	-10	5	Super Cub PA-18 Airplane
181	1042	2900	VV	-5	5	Super Cub FA-18 Airplane
182	899	2900	VV	0	5	Super Cub PA-18 Airplane
183	1106	2900	VV	+5	5	Super Cub PA-18 Airplane
184	1141	2900	VV	+10	5	Super Cub PA-18 Airplane
185	1015	2900	VV	-10	10	Super Cub PA-18 Airplane
186	1064	2900	VV	-5	10	Super Cub PA-18 Airplane
187	911	2900	VV	0	10	Super Cub PA-18 Airplane
188	1093	2900	VV	+5	10	Super Cub PA-18 Airplane
189	1142	2900	VV	+10	10	Super Cub PA-18 Airplane
190	1004	2900	VV	-10	20	Super Cub PA-18 Airplane
191	1065	2900	VV	-5	20	Super Cub PA-18 Airplane
192	918	2900	VV	0	20	Super Cub PA-18 Airplane
193	1092	2900	VV	+5	20	Super Cub PA-18 Airplane
194	1155	2900	VV	+10	20	Super Cub PA-18 Airplane
195	976	2900	VV	-10	30	Super Cub PA-18 Airplane
196	1078	2900	VV	-5	30	Super Cub PA-18 Airplane
197	940	2900	VV	0	30	Super Cub PA-18 Airplane
198	1079	2900	VV	+5	30	Super Cub PA-18 Airplane
199	1162	2900	VV	+10	30	Super Cub PA-18 Airplane
200	975	2900	VV	-10	45	Super Cub PA-18 Airplane
201	954	2900	VV	-5	45	Super Cub PA-18 Airplane
202	941	2900	VV	0	45	Super Cub PA-18 Airplane
203	1191	2900	VV	+5	45	Super Cub PA-18 Airplane
204	1190	2900	VV	+10	45	Super Cub PA-18 Airplane
205	1169	2900	VV	N/A	N/A	Background with columns and transitions
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RBD 72 - 007

CONTROL NUMBER 73-01

Table III

DATA PLOT INDEX

Sheet 7

PAGE NO.	RUN	FREQ (MHz)	POLARIZATION	PITCH ANGLE	ROLL ANGLE	TARGET CONFIGURATION AND REMARKS
206	1029	2900	RR	-10	0	Super Cub PA-18 Airplane
207	1031	2900	RR	-5	0	Super Cub PA-18 Airplane
208	897	2900	RR	0	0	Super Cub PA-18 Airplane
209	1108	2900	RR	+5	0	Super Cub PA-13 Airplane
210	1129	2900	RR	+10	0	Super Cub PA-18 Airplane
211	1017	2900	RR	-10	5	Super Cub PA-18 Airplane
212	1043	2900	RR	-5	5	Super Cub PA-18 Airplane
213	900	2900	RR	0	5	Super Cub PA-18 Airplane
214	1105	2900	RR	+5	5	Super Cub PA-18 Airplane
215	1140	2900	RR	+10	5	Super Cub PA-18 Airplane
216	1014	2900	RR	-10	10	Super Cub PA-18 Airplane
217	1063	2900	RR	-5	10	Super Cub PA-18 Airplane
218	912	2900	RR	0	10	Super Cub PA-18 Airplane
219	1094	2900	RR	+5	10	Super Cub PA-18 Airplane
220	1143	2900	RR	+10	10	Super Cub PA-18 Airplane
221	1003	2900	RR	-10	20	Super Cub PA-18 Airplane
222	1066	2900	RR	-5	20	Super Cub PA-18 Airplane
223	919	2900	RR	0	20	Super Cub PA-18 Airplane
224	1091	2900	RR	+5	20	Super Cub PA-18 Airplane
225	1154	2900	RR	+10	20	Super Cub PA-18 Airplane
226	977	2900	RR	-10	30	Super Cub PA-18 Airplane
227	1077	2900	RR	-5	30	Super Cub PA-18 Airplane
228	939	2900	RR	0	30	Super Cub PA-18 Airplane
229	1080	2900	RR	+5	30	Super Cub PA-18 Airplane
230	1161	2900	RR	+10	30	Super Cub PA-18 Airplane
231	974	2900	RR	-10	45	Super Cub PA-18 Airplane
232	953	2900	RR	-5	45	Super Cub PA-18 Airplane
233	942	2900	RR	-5	45	Super Cub PA-18 Airplane
234	1192	2900	RR	+5	45	Super Cub PA-18 Airplane
235	1189	2900	RR	+10	45	Super Cub PA-18 Airplane
236	1168	2900	RR	N/A	N/A	Background with columns and transitions

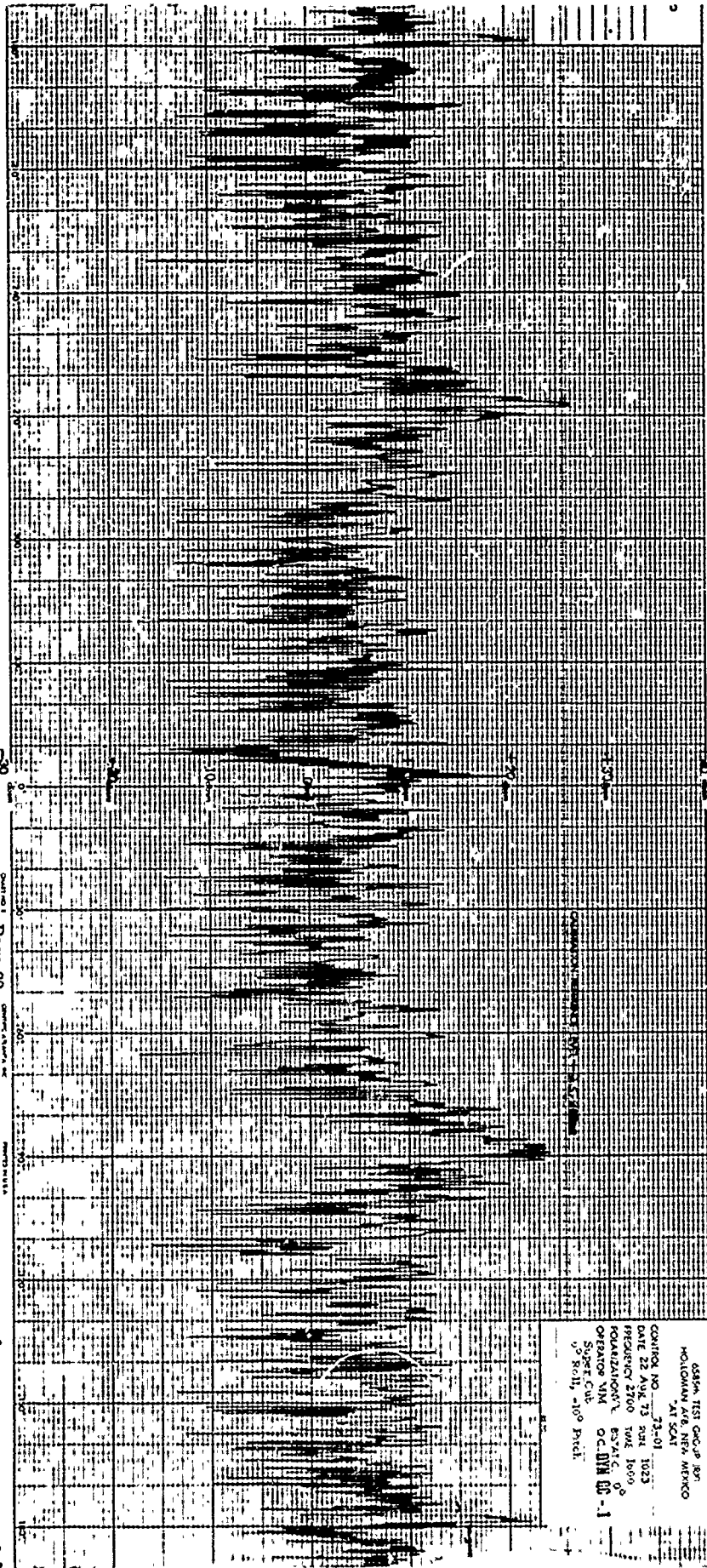
NBJT - ON:

Reproduced from  
best available copy.

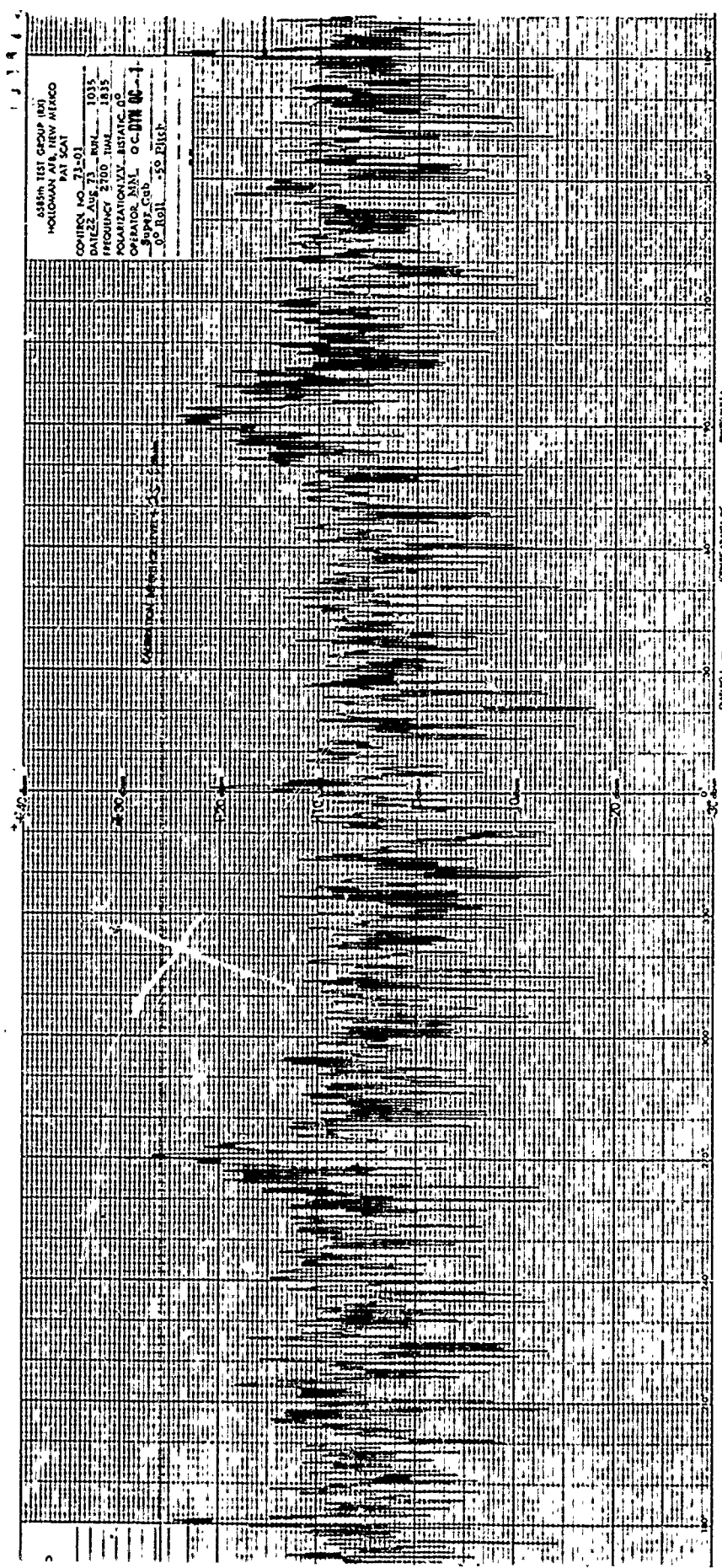






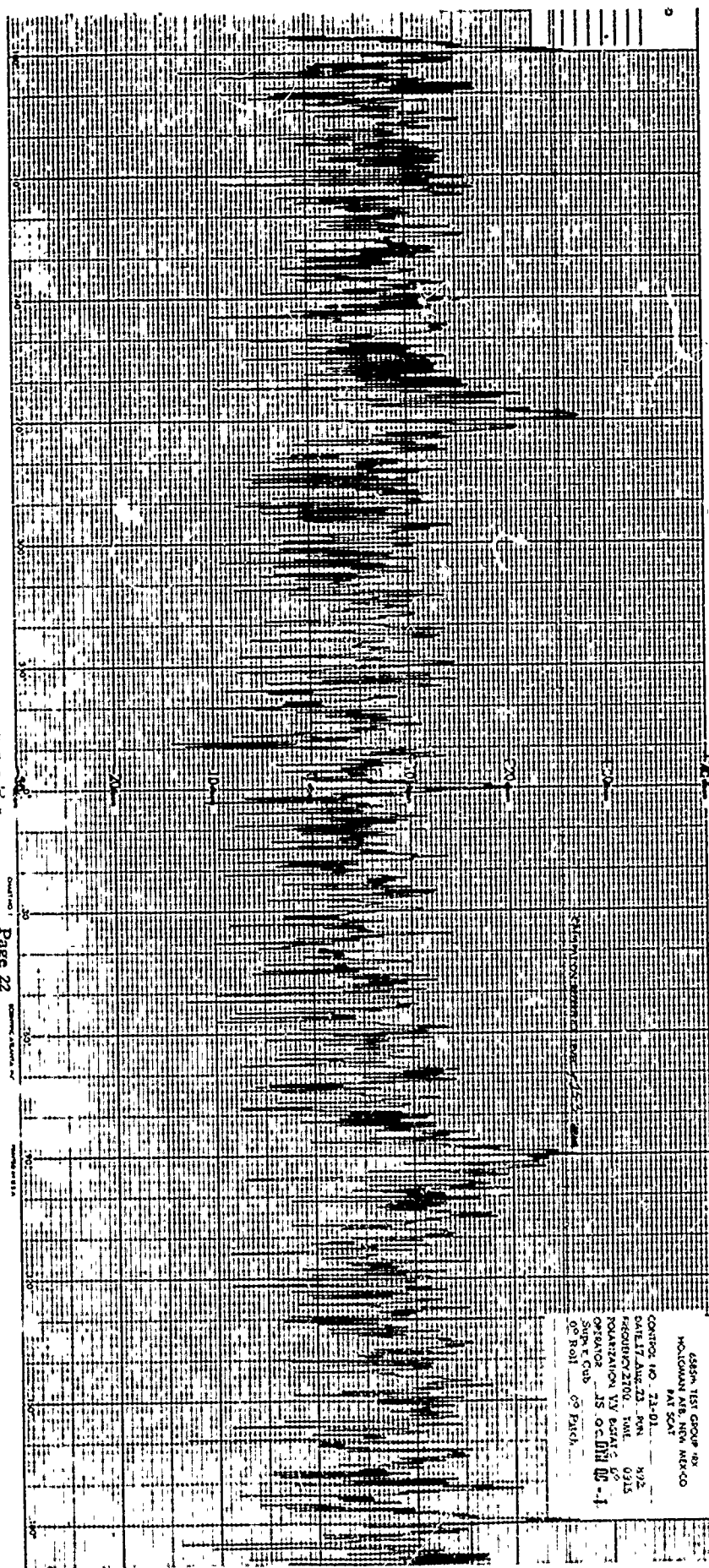


638th TEST GRC-P 187  
 HOLLAND AFB, TEXAS  
 21 5001  
 CONTROL NO. 73-01 1023  
 DATE 22 AUG 75 RUN 1023  
 FREQUENCY 2700 1000 1000  
 ORGANIZATION 638th G  
 OPERATOR NIM OC-DIM 00-1  
 SUPERVISOR  
 97 Roll, -10° Pitch

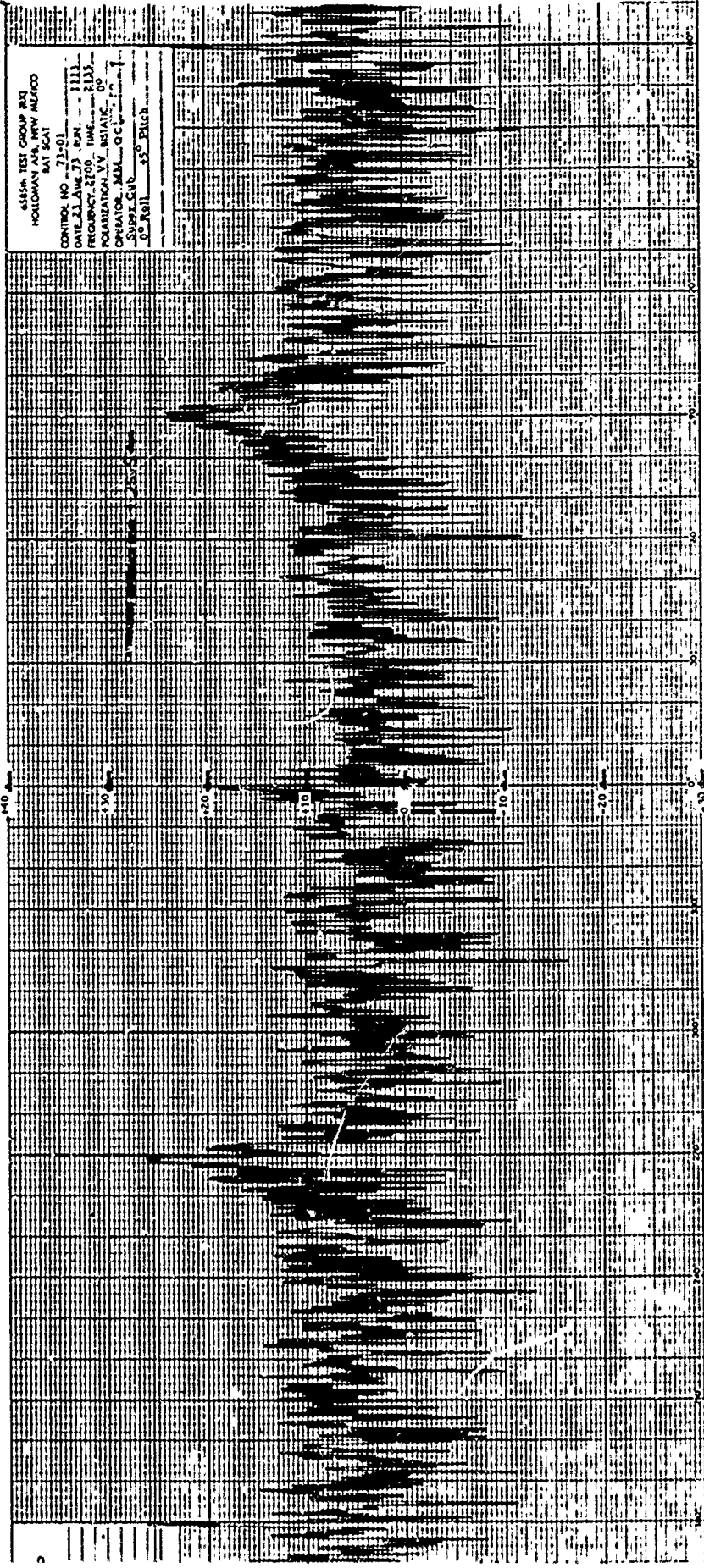


ASBTH TEST GROUP (BT)  
 HOLLOMAN AFB, NEW MEXICO  
 PAT SCAT

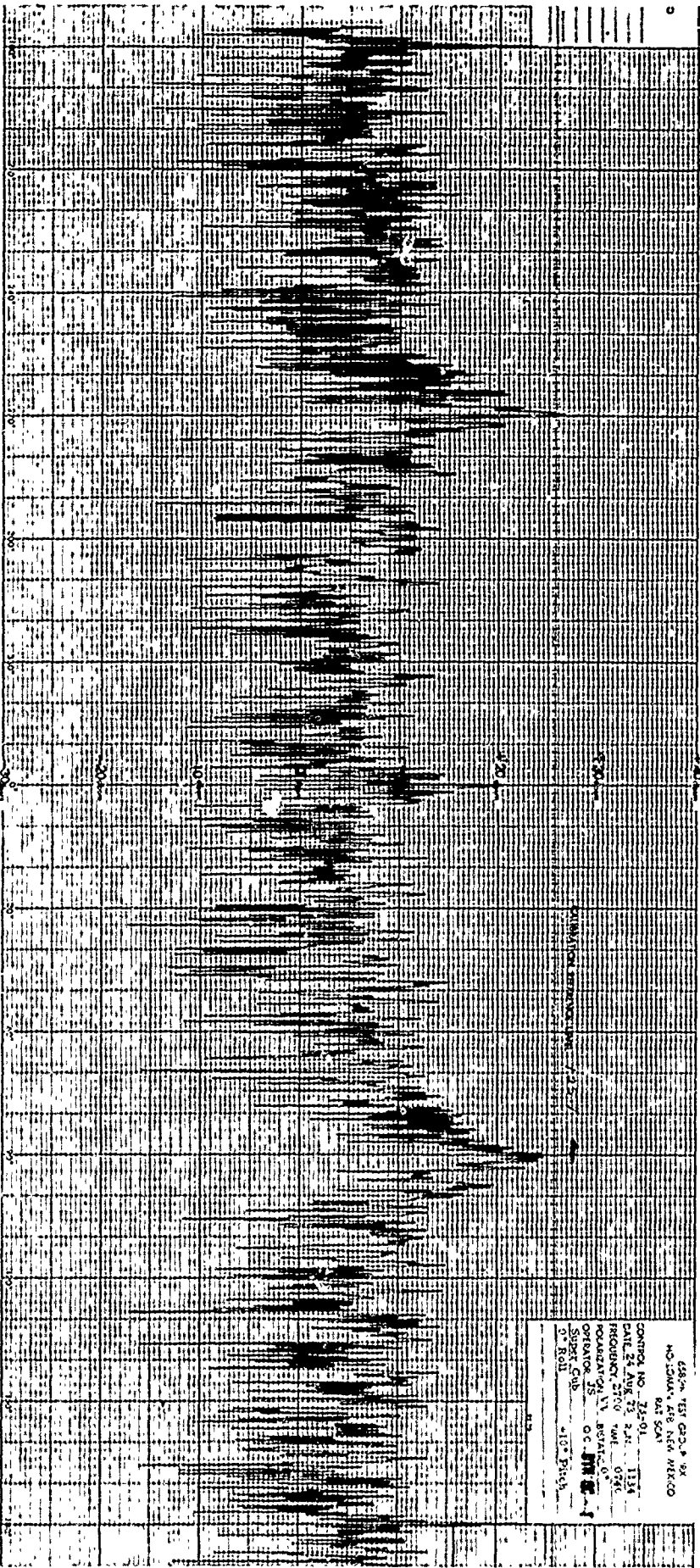
CONTROL NO. 71-01  
 DATE 22 AUG 73 RWL 1035  
 FREQUENCY 2700 TIME 1835  
 POLARIZATION V. H. STATIC. 0  
 OPERATOR MIA C. DW 0-1  
 Supp. Cab  
 0° Roll - 50 Pitch



6585th TEST GROUP #18  
 HOLLAMAN AB, NEW MEXICO  
 MAT SCAT  
 CONTROL NO. 21-01  
 DATE 17 AUG 51. RUN 892  
 FREQUENCY 2700. TIME 0915  
 POLARIZATION VY BSAI  
 OPERATOR JS OC DMH DC-1  
 Supr & Cub  
 of Roll 09 Patch

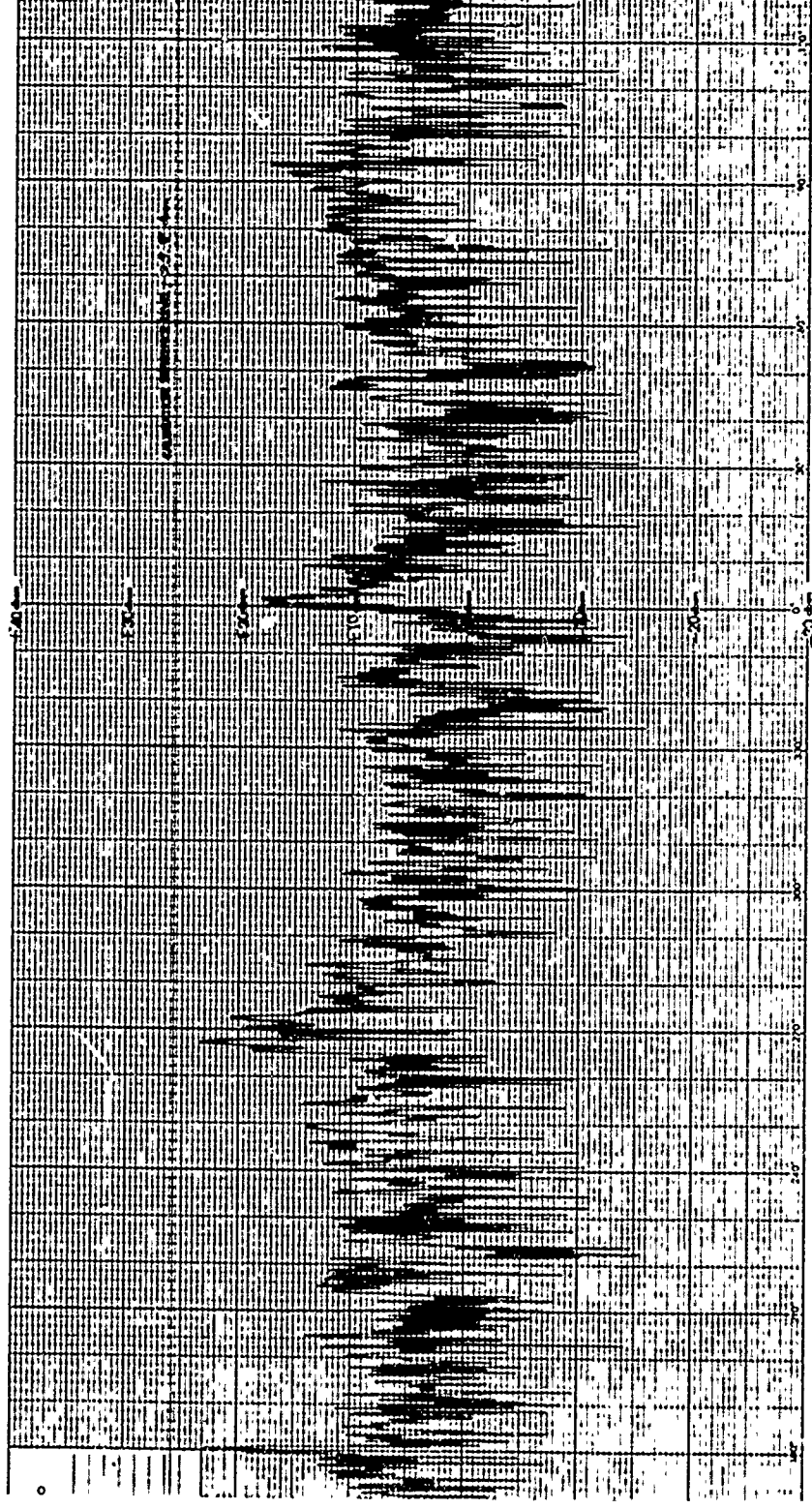


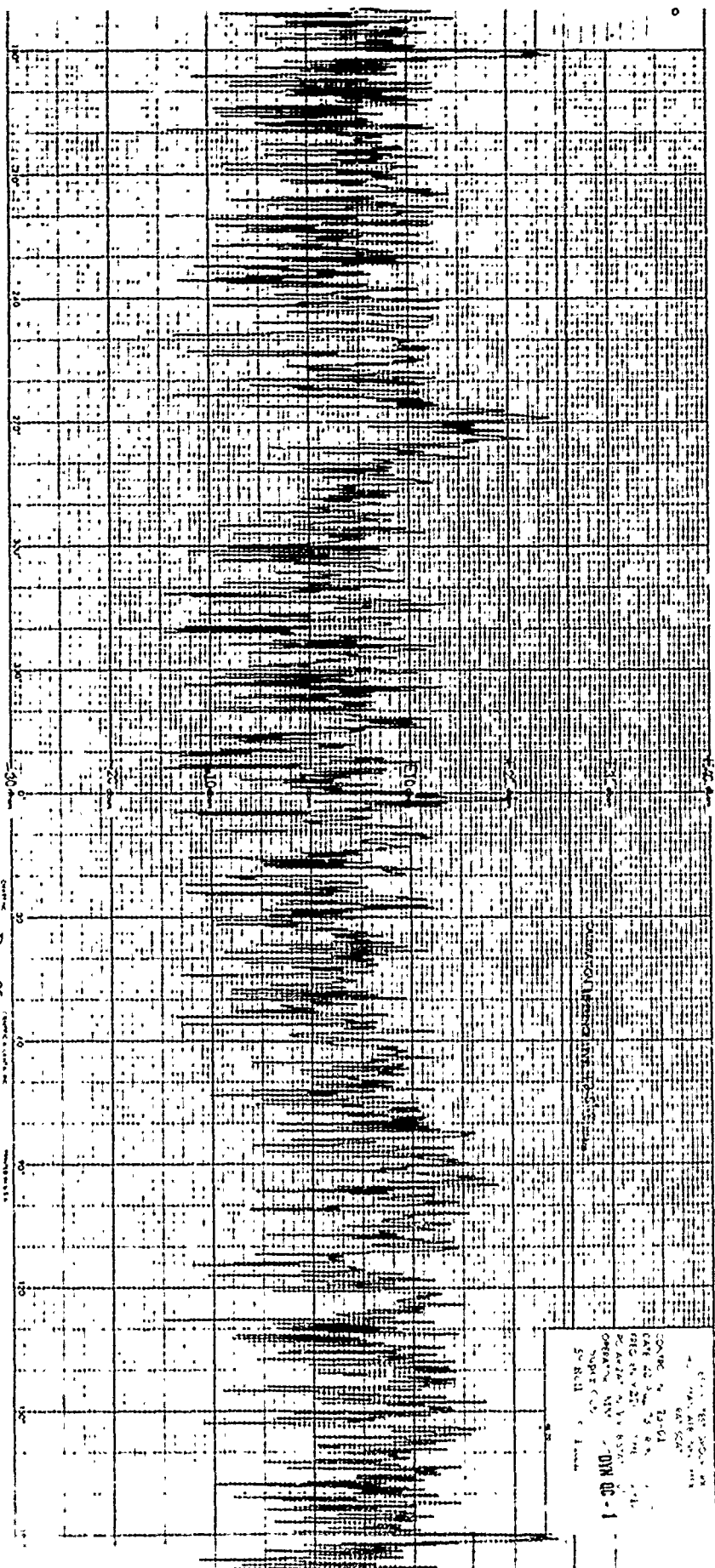
65384 TEST GROUP BK1  
 NATIONAL BUREAU OF STANDARDS  
 CONTROL NO. 73-01  
 DATE RECEIVED: 7/11/51  
 FREQUENCY: 41.00 MHz  
 MODULATION: VV  
 OPERATOR: J. M. ...  
 SUBJECT: ...



4.8m TEST CD-4 9K  
 HQ JMWAVE, AFB NEW MEXICO  
 RAI SCAT  
 CONTROL NO. 75-01  
 DATE 24 Aug 75 24K 1134  
 FREQUENCY 2700 MHz 074C  
 POLARIZATION VV ASIAN-0  
 OPERATOR JS OC JMWAVE  
 SUPER CD# 4103 Pich  
 0 Roll

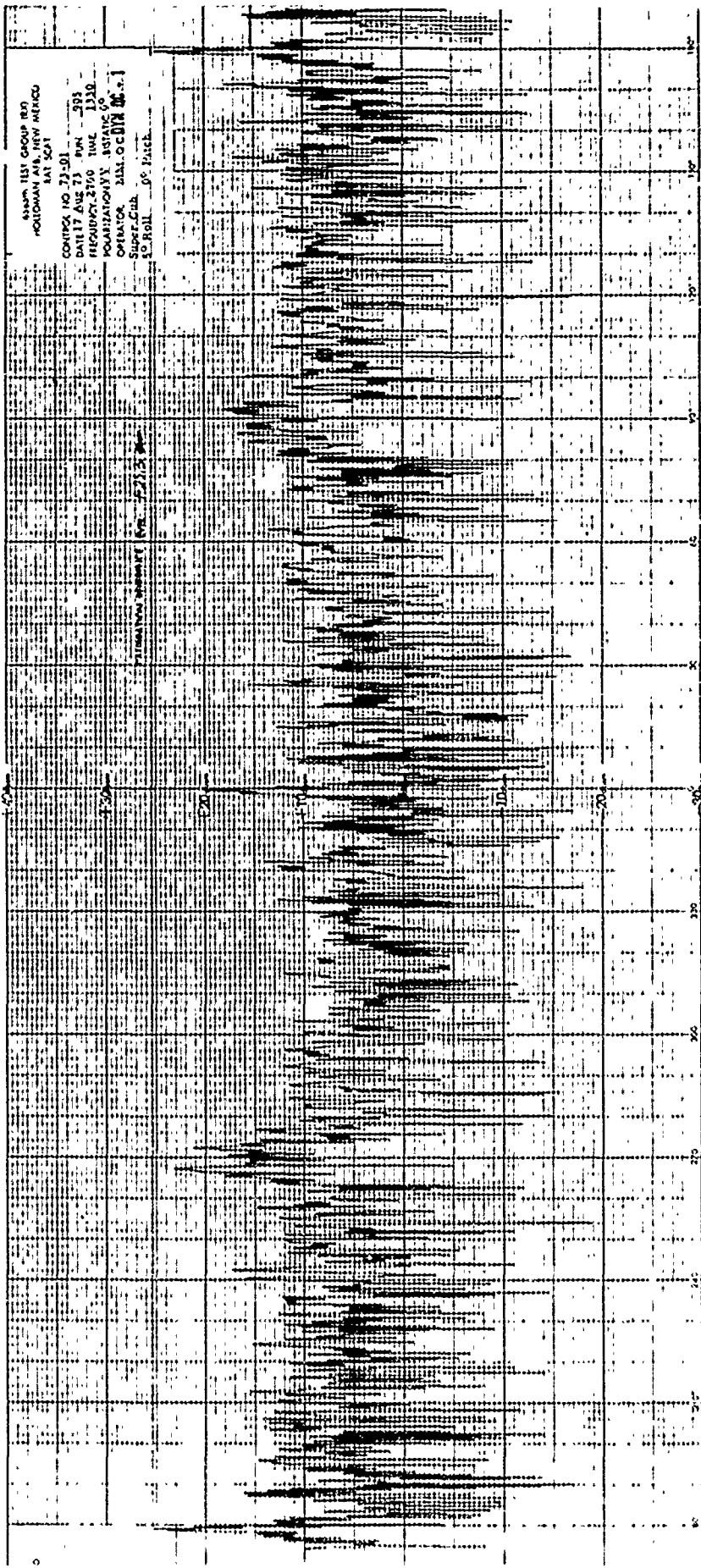
ASSIN TEST GROUP 120  
HOLLOWAY AVE. NEW VERCO  
EAT SCAT  
CONTROL NO. 73-01  
DATE 22. AUG. 73 PCN 1022  
FREQUENCY 2700 100 1133  
OPERATOR M.M. OC. 0111  
SUPER. Cub. 1107



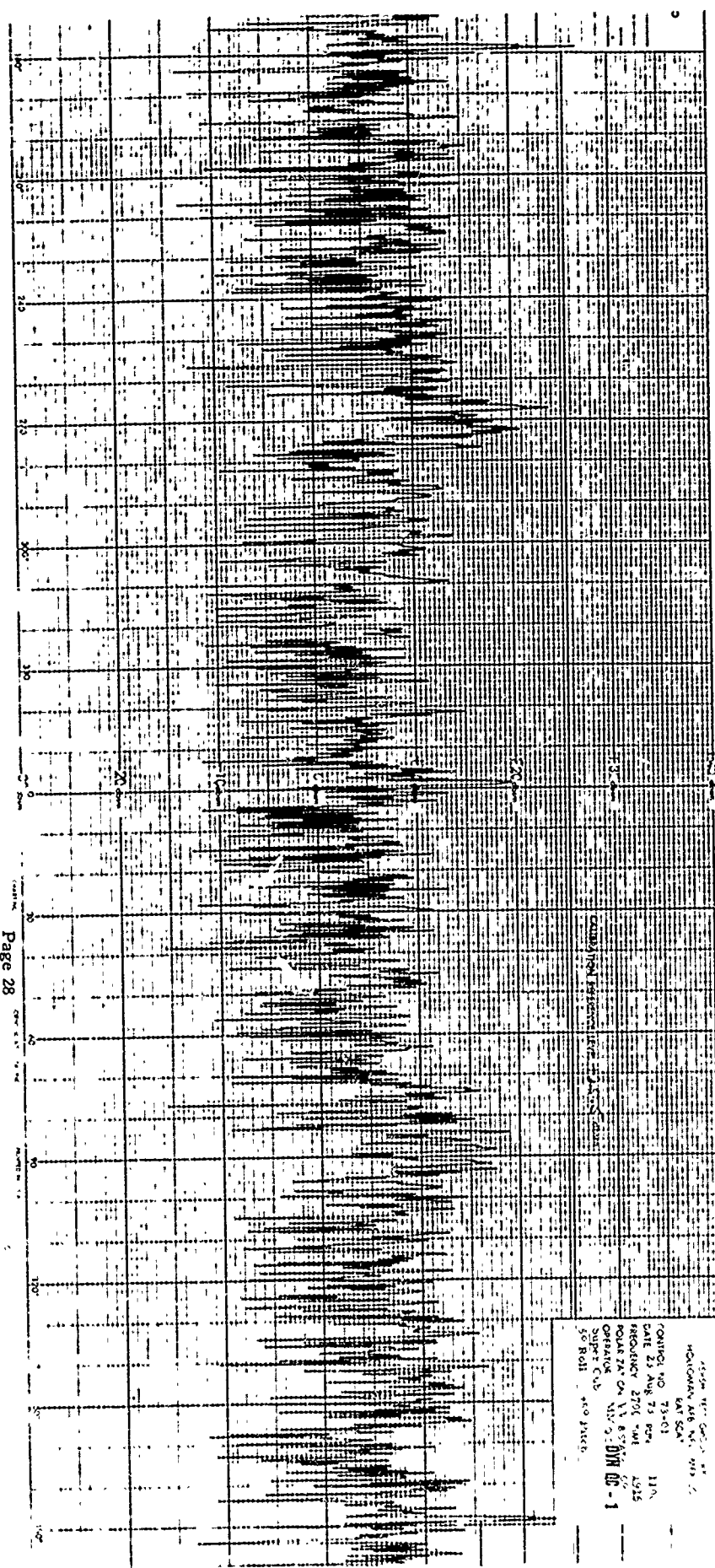


Page 26

CONVEYANCE  
 DATE 12/21/54  
 BY [illegible]  
 FOR [illegible]  
 OFFICE OF THE  
 DISTRICT ATTORNEY  
 STATE OF NEW YORK  
 ALBANY, N.Y.  
 12242

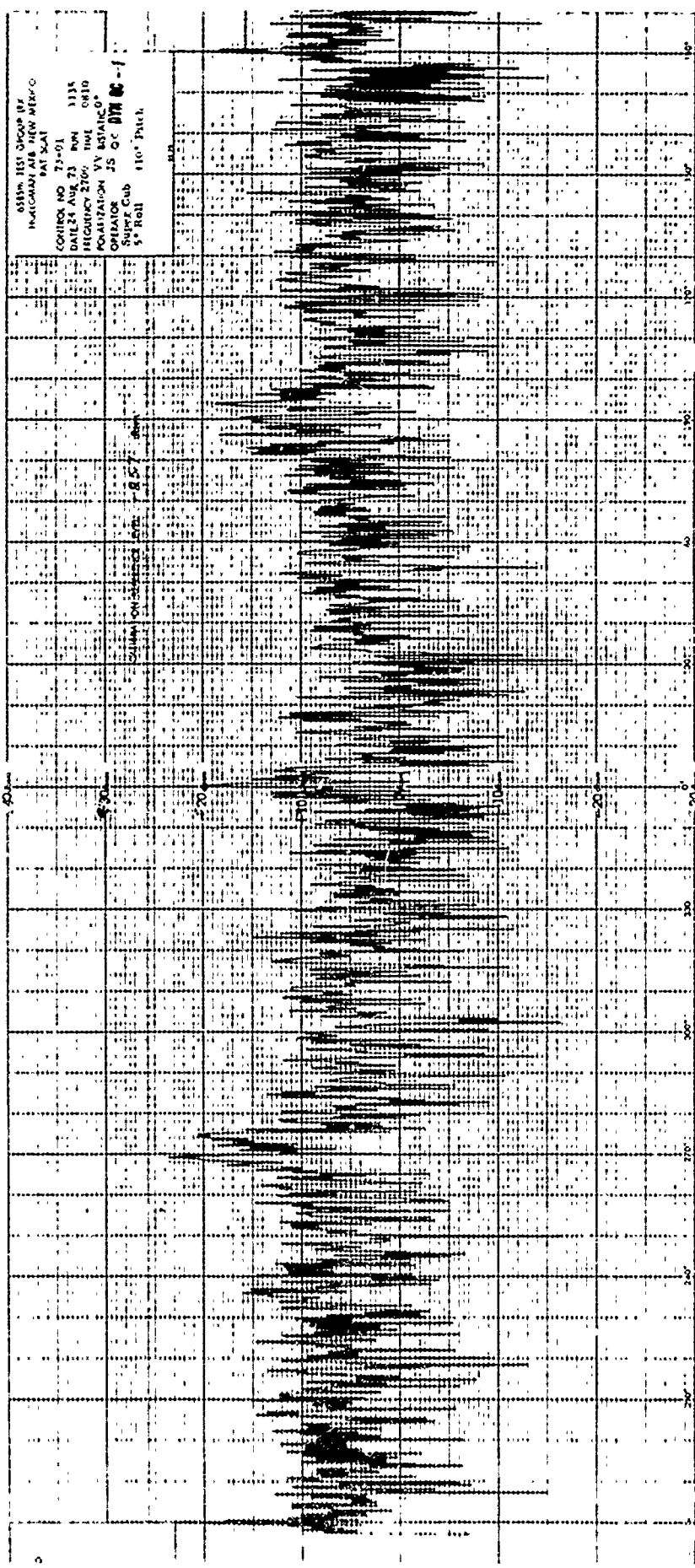




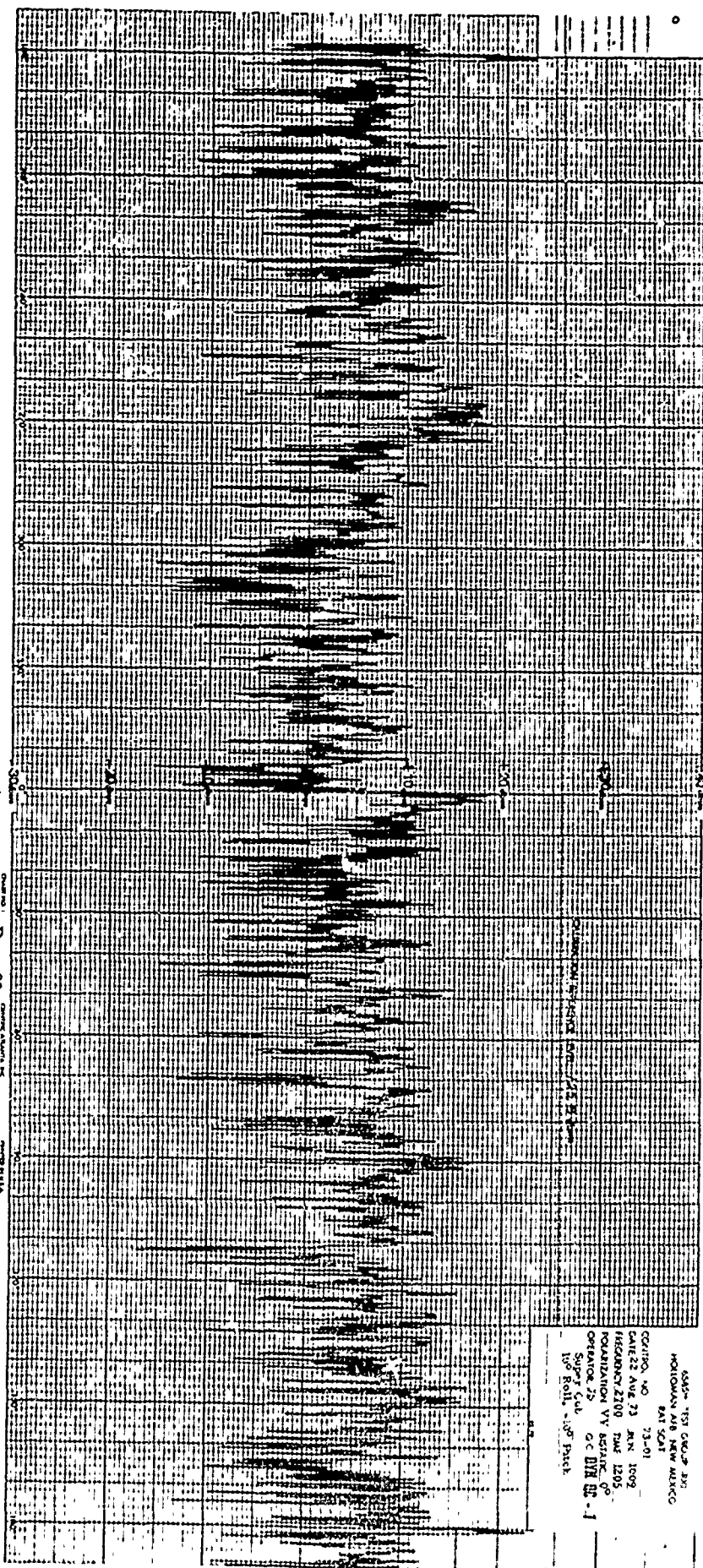


Page 28

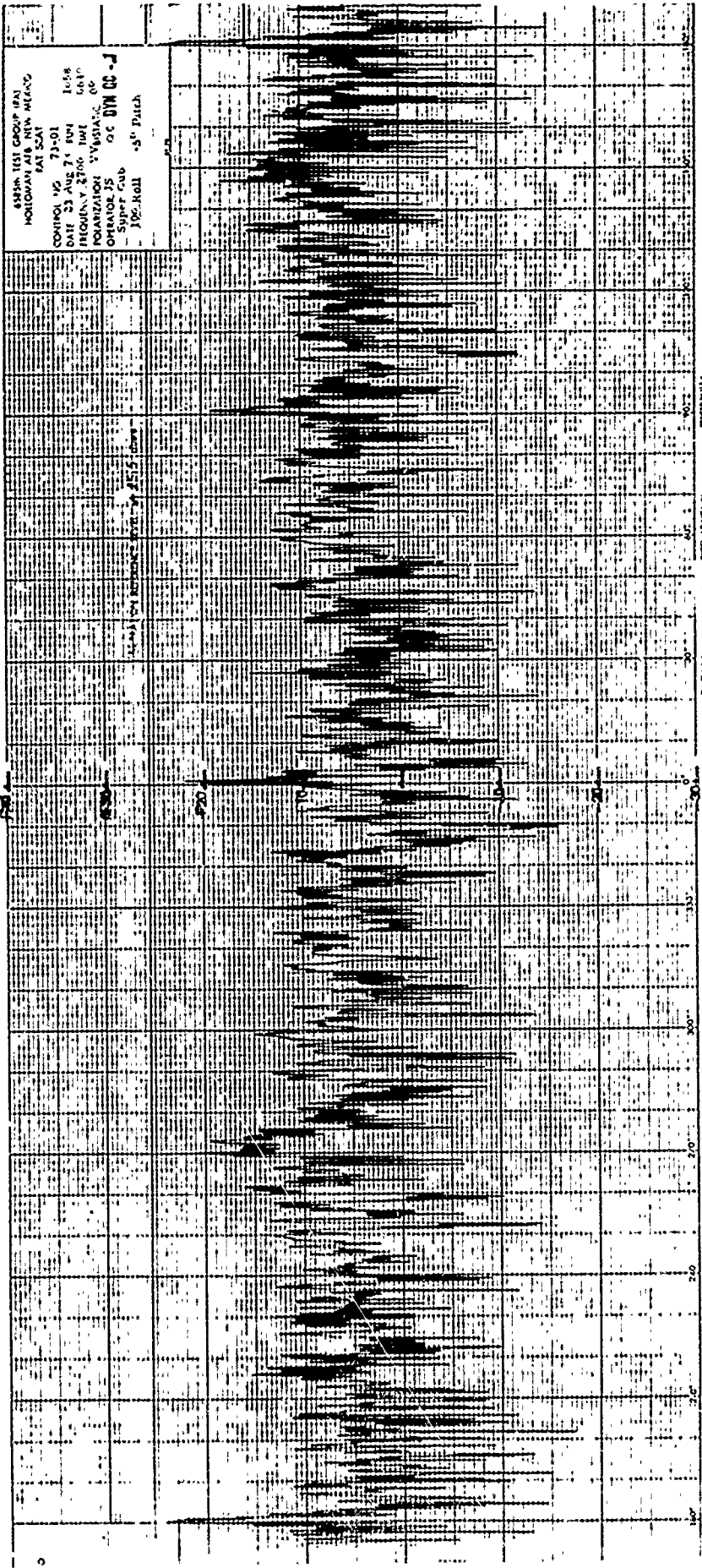
15000 Hz  
 HORIZONTAL AXIS: 100 Hz  
 DATE: 25 AUG 73  
 TIME: 11:00  
 FREQUENCY: 2000 Hz  
 1975  
 HORIZONTAL AXIS: 100 Hz  
 50 dB  
 50 dB



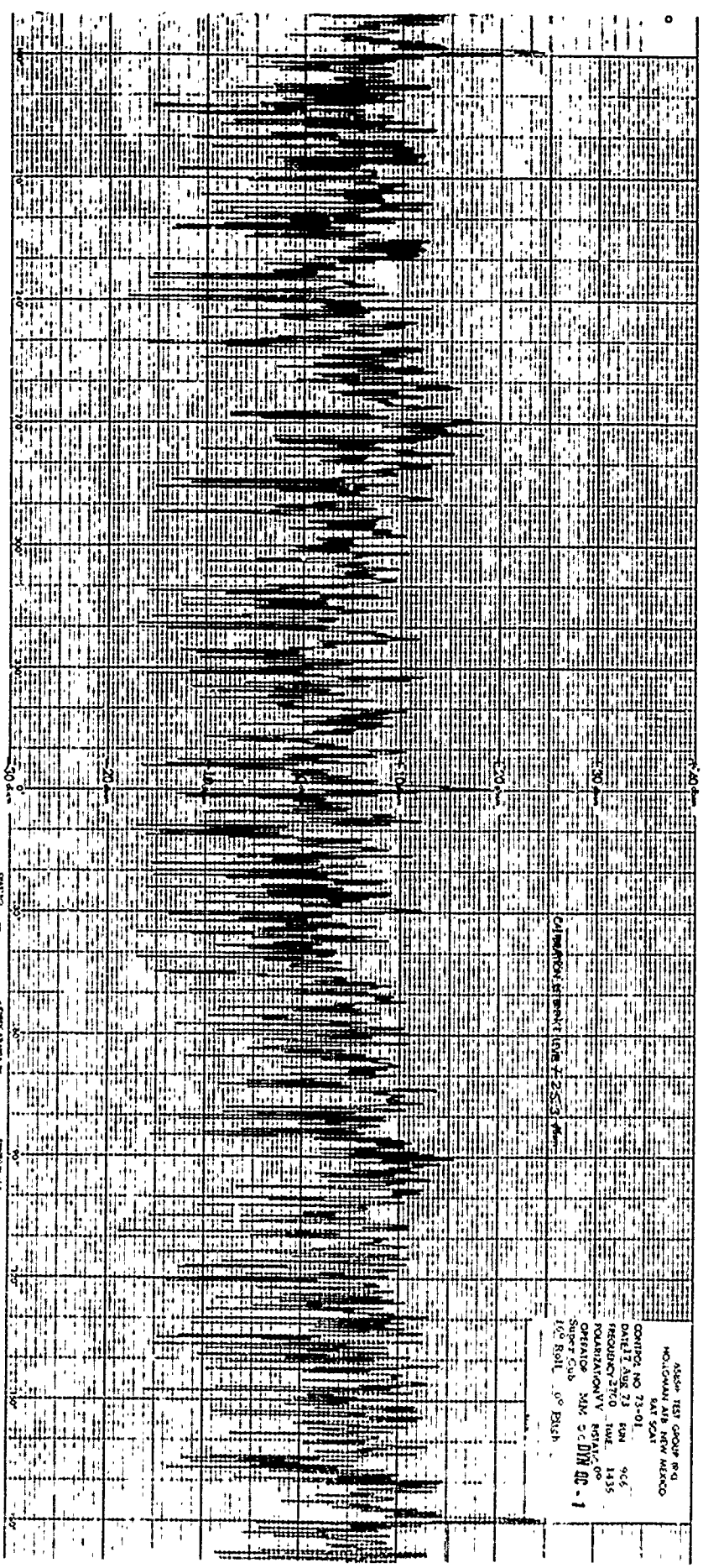
6583N TEST GROUP BY  
 IN-ALCANTAR AIR NEW MEXICO  
 PAT SCAT  
 CONTROL NO 73-01  
 DATE 24 AUG 73 RW 1135  
 FREQUENCY 2700 THRU 0810  
 POLARIZATION VV EASTING  
 OPERATOR JS OC 07M 00-1  
 Super Cub 110' Pitch  
 5' Roll



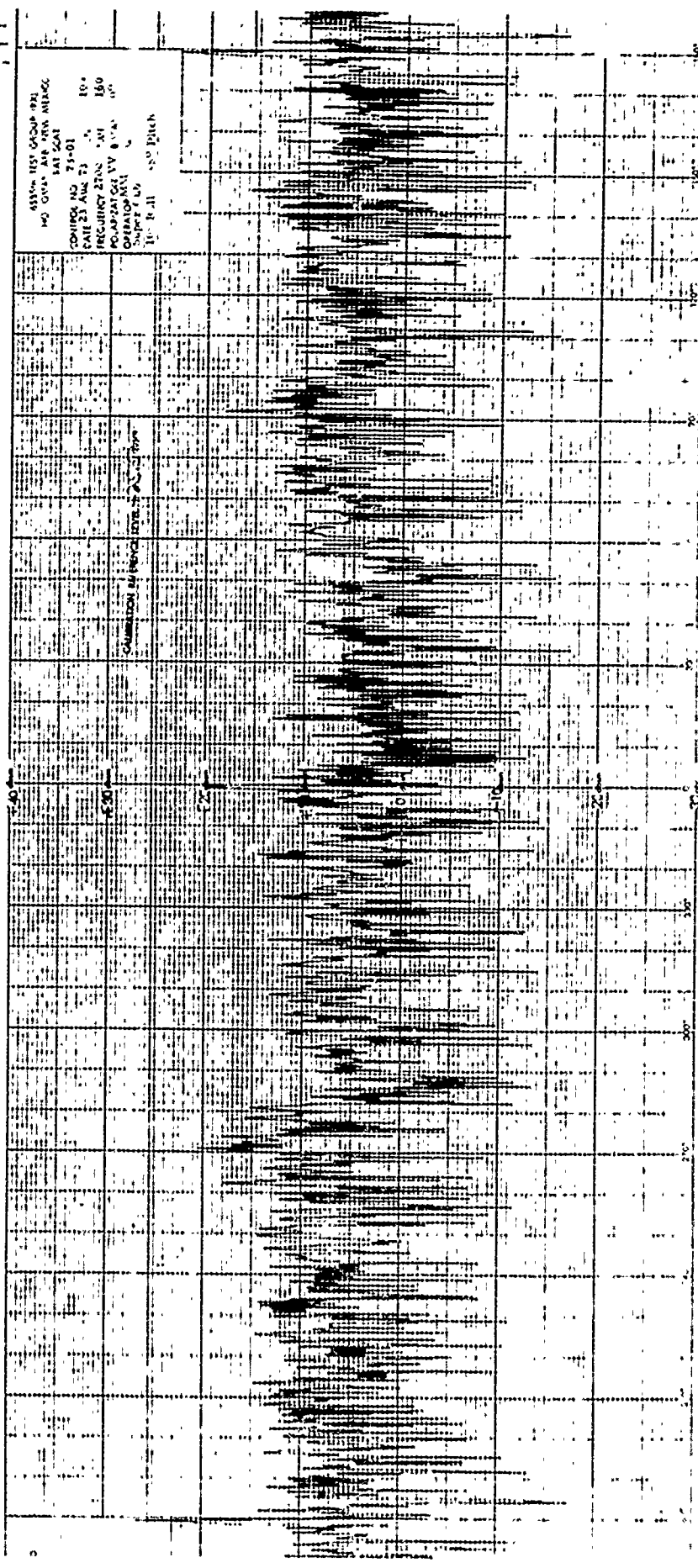
6548- TEST GROUP 371  
 HOTTOMAN AFB NEW MEXICO  
 BNT SCAT  
 CONTROL NO 73-01  
 DATE 22 AUG 73 RUN 1002  
 FREQUENCY 2100 PWR 1205  
 POLARIZATION VY RESIDUAL 00  
 OPERATOR JS CC DIM 00 - 1  
 Super Sub  
 100 Bolt - sup' Patch

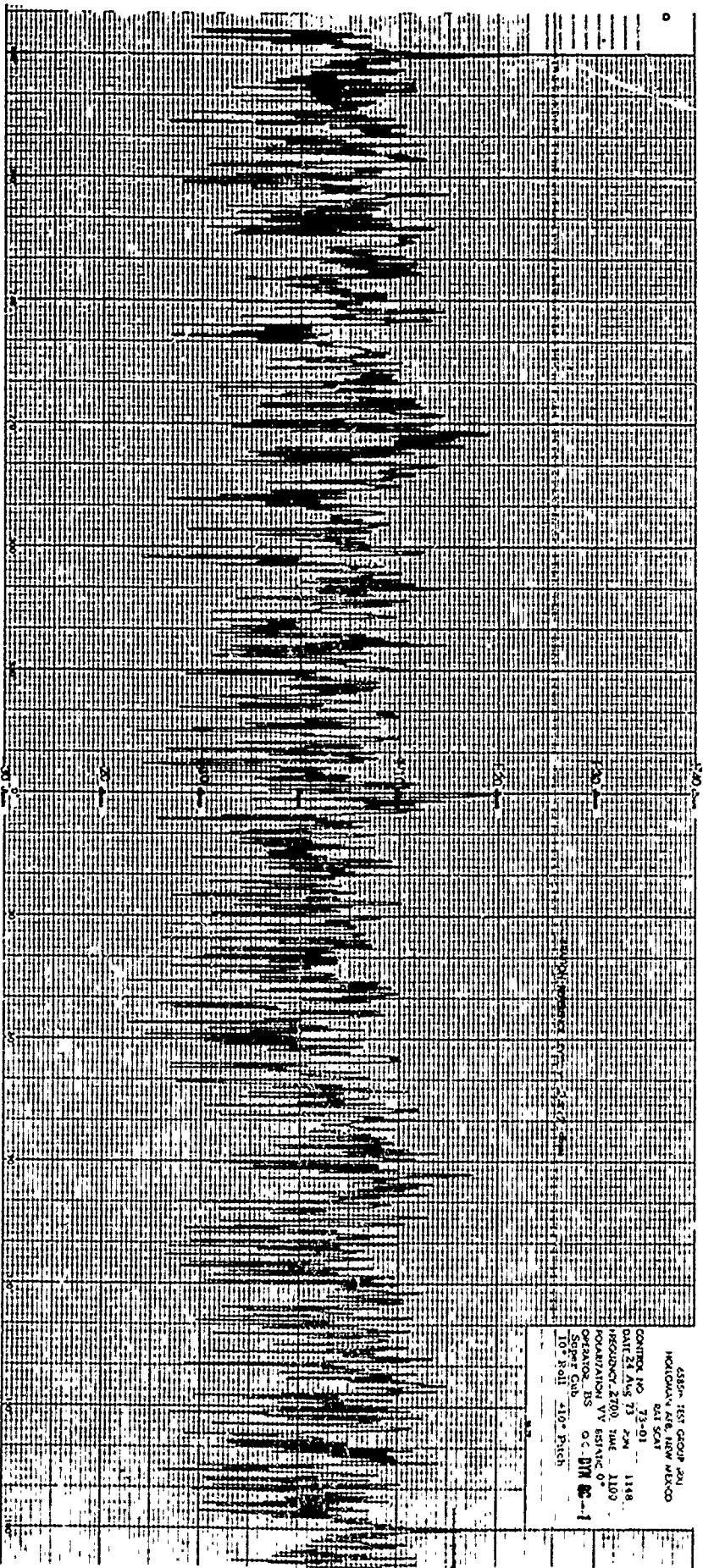


15884 TEST GROUP 021  
 HOLDMAN LAB. NIN. MEASG  
 AT SCAT  
 CONTROL VS 73-01  
 23 AUG 74 RM 608  
 REGIONAL VVASTAC, CO  
 OPERATOR J.S.  
 SUPER GRB 22C DYN CC - J  
 JOC:hell 54 Patch



Also: 131 GOUR RD  
 HOLBROOK, KAN  
 COMPANY NO 23-01  
 DATE 2-25-70 966  
 FREQUENCY 2710 TWE 1835  
 OPERATOR VY RSTAL/09  
 OPERATOR MR S. C. DIM DC - 1  
 SITE 801b  
 ICE 801L 09 Bush



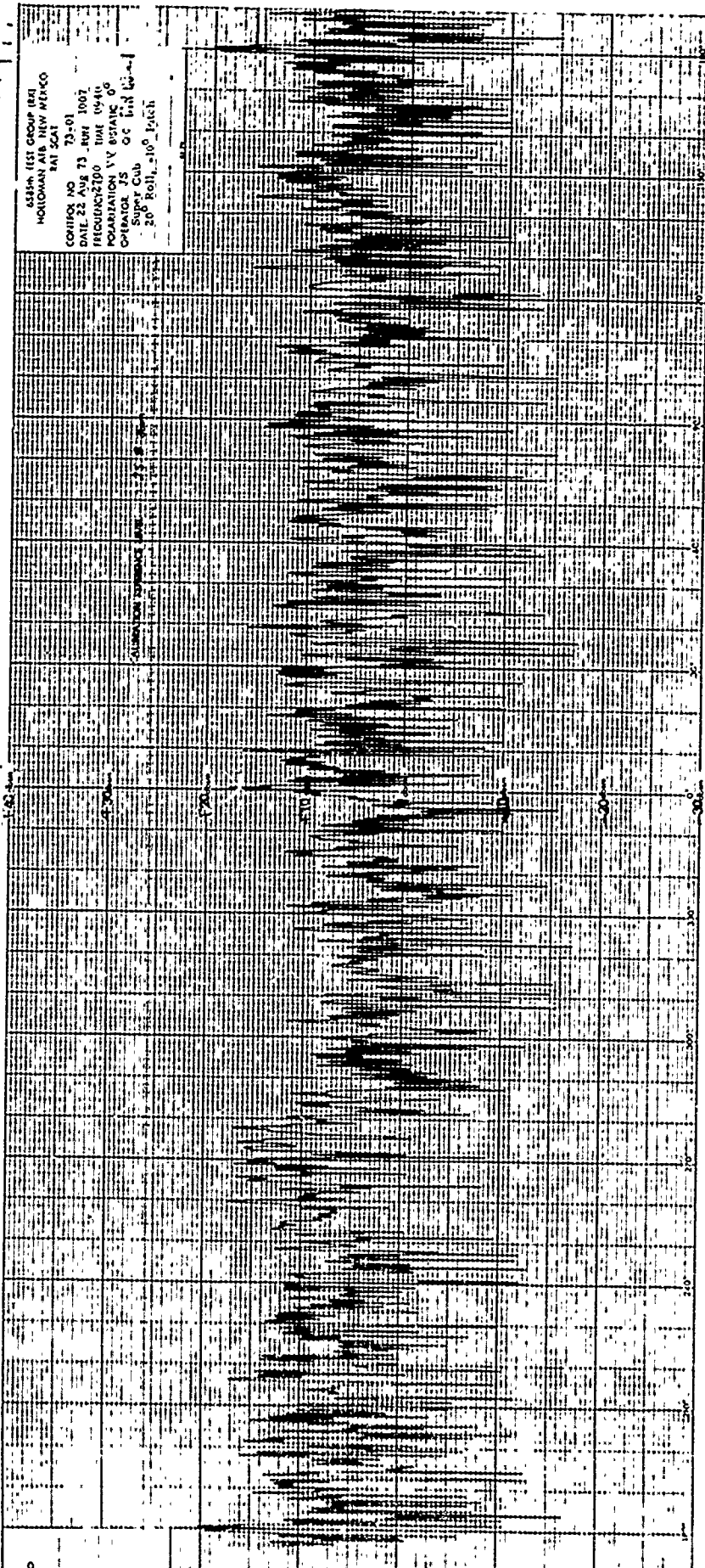


Page 34

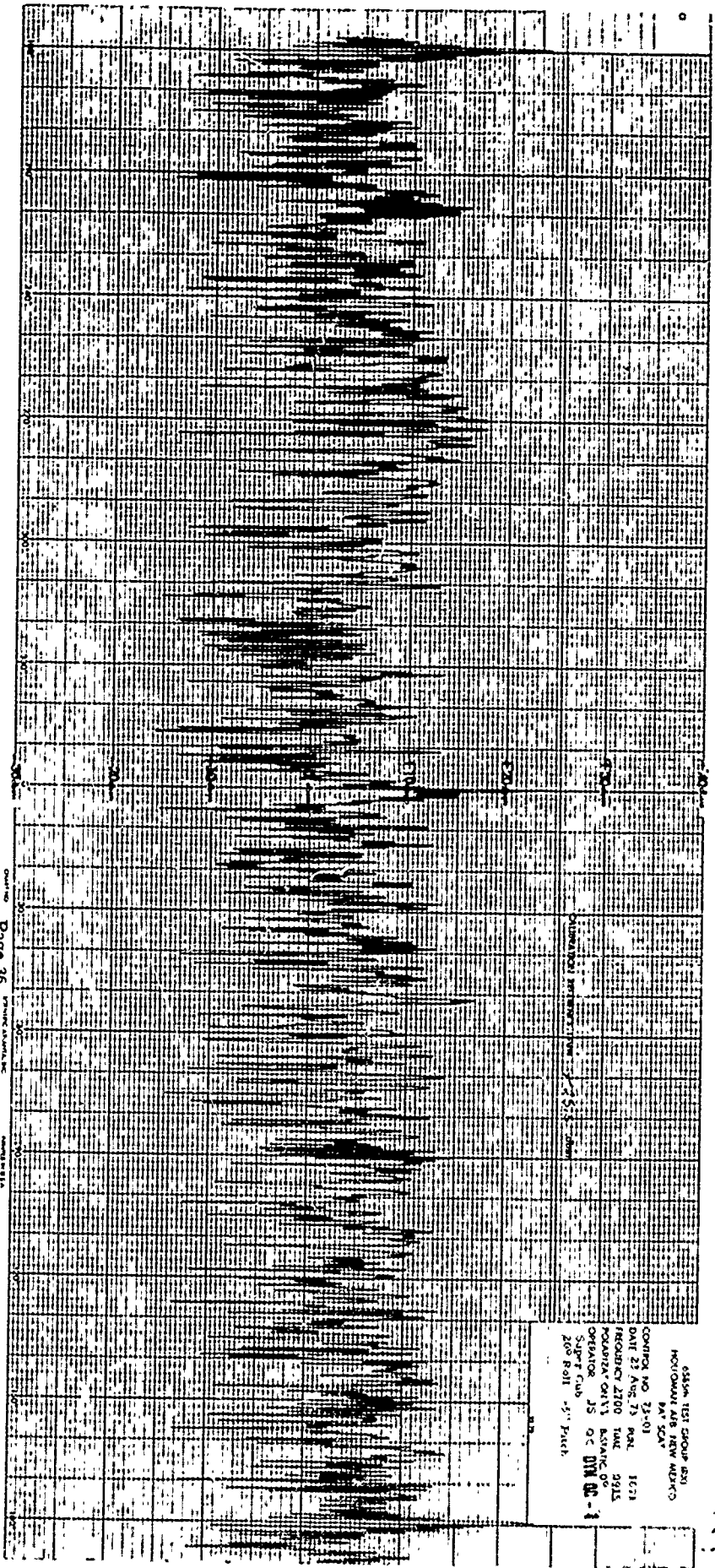
435th 1ST GROUP 2nd  
 MOUNTAIN CO. 10th AIRBORNE DIV.  
 6th SGT  
 CONTROL NO. 73-01  
 DATE 24 AUG 73 TIME 1148  
 FREQUENCY 2700 MHz  
 POLARIZATION VV  
 OPERATOR BS OC DM 8-1  
 SPECT GRAB  
 10° Roll 40° Pitch

538th TEST GROUP (BT)  
HOLLAMAN AIR NEW MEXICO  
TAT SCAT

CONTROL NO 73-01  
DATE 22 AUG 73 RWY 1007  
FREQUENCY 2100 TIME 0940  
POLARIZATION VV BYSTATIC 0°  
OPERATOR JS OC 1111 40-41  
Supply Cub  
20° Roll, 10° Pitch



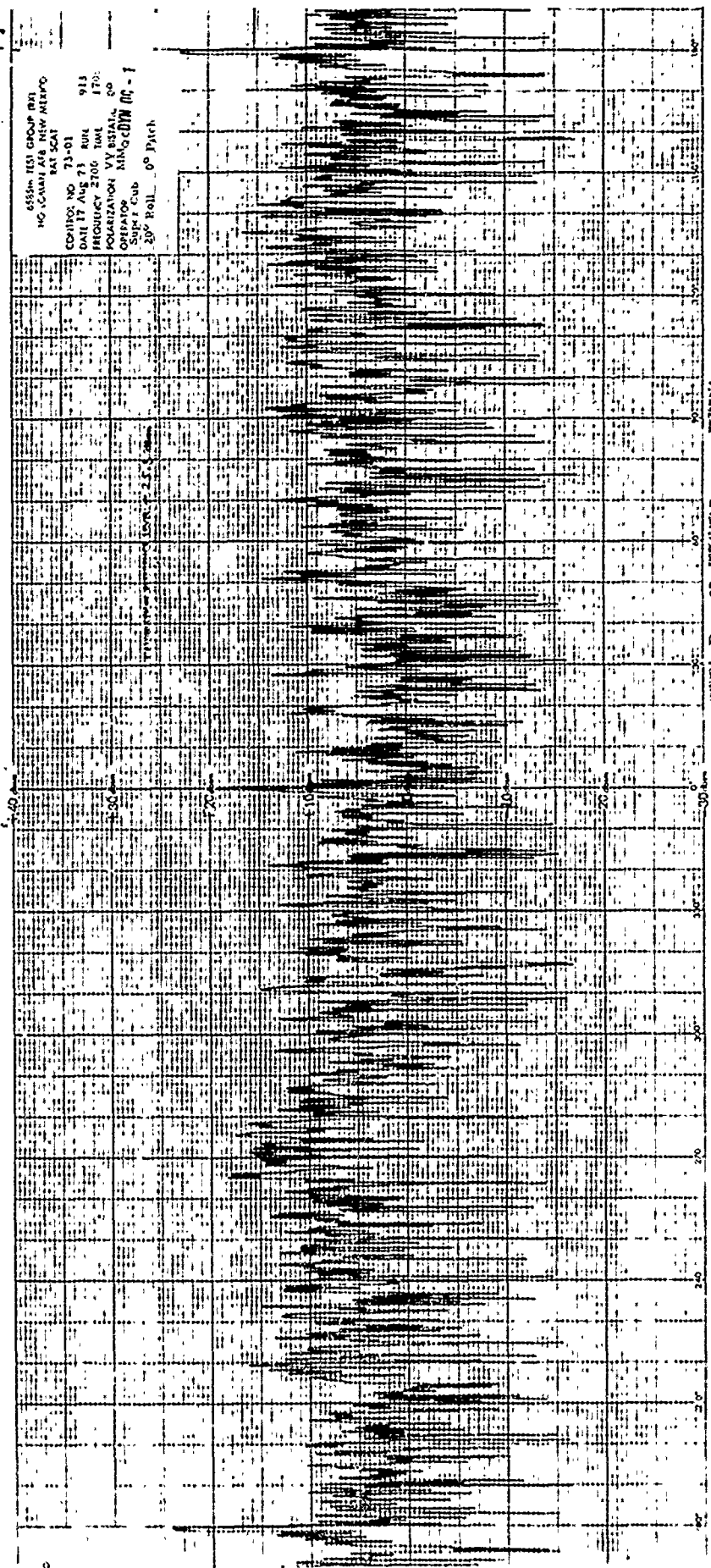


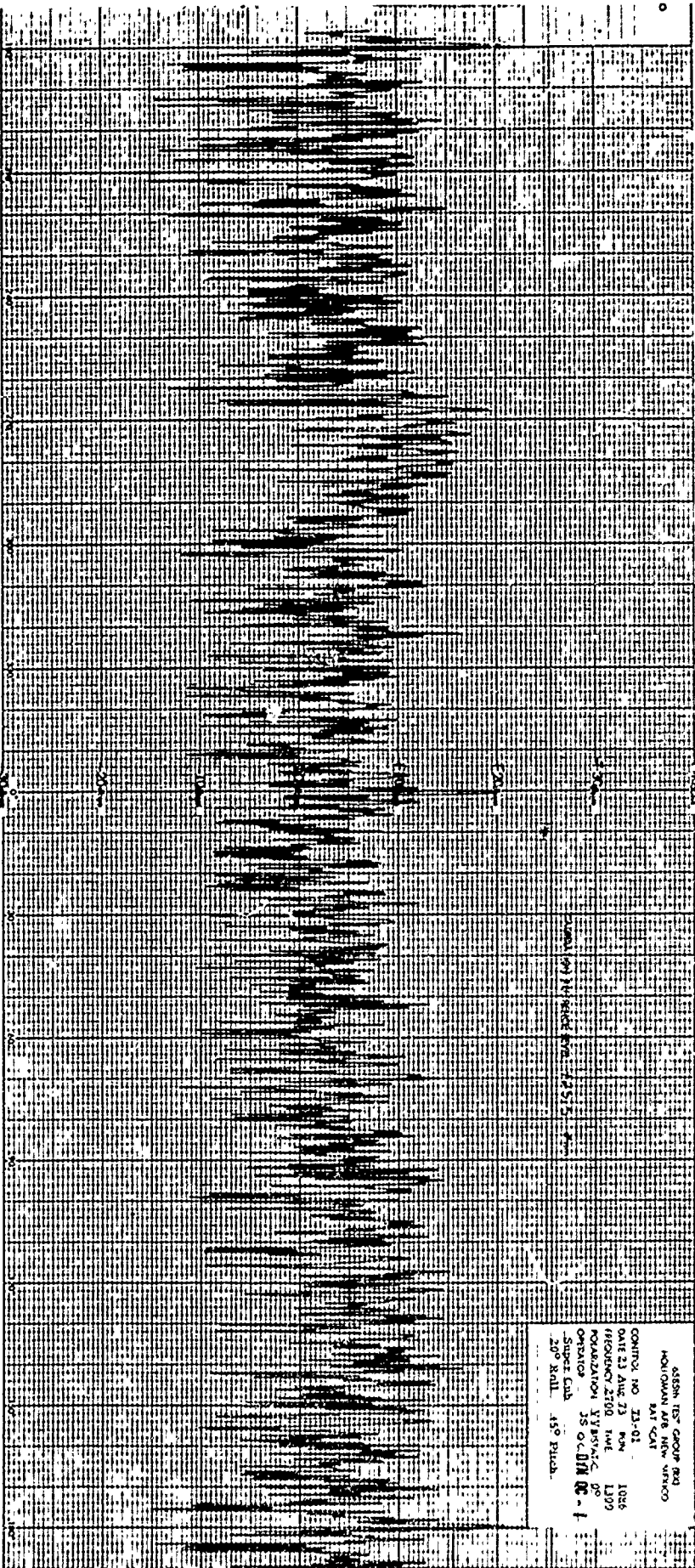


Page 36

6355A TEST GROUP 8201  
 HONOLULU AFB HAWAII  
 MA 504  
 CONTROL NO 23-01  
 DATE 23 AUG 75 MAL 1673  
 FREQUENCY 2700 TWT 9915  
 POLARITY ONLY BSMARK OF  
 OPERATOR JS OC DIM 02-1  
 SUPER Club  
 200 Ball 5" Patch

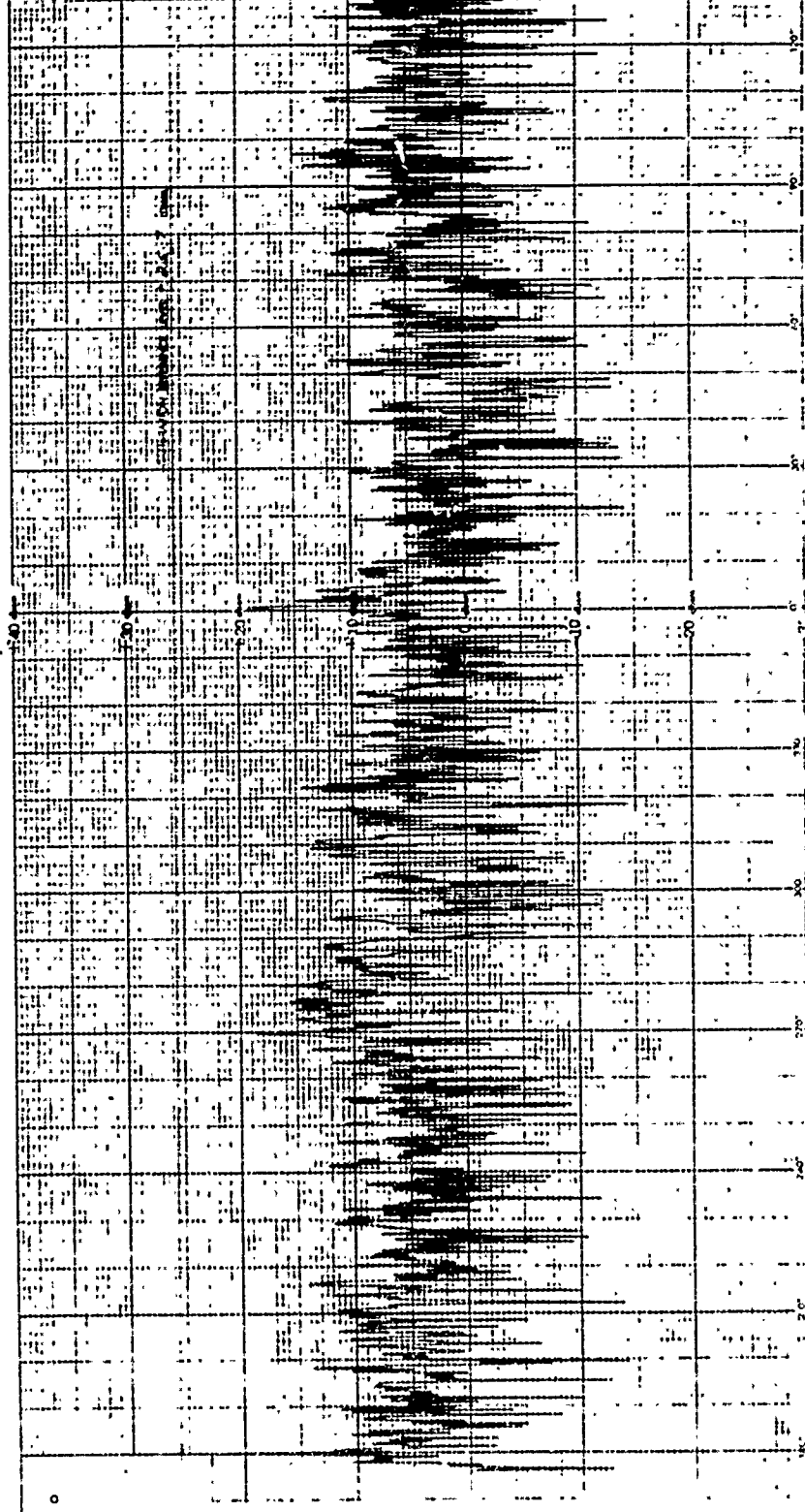
655th IES GROUP (BT)  
HQ 655th IES AW HARP  
BAT SCAT  
CONTROL NO. 73-01  
DATE 17 AUG 71 RUC 914  
PRECEDENCE 2706 RUC 170  
ORGANIZATION VY 80000 00  
OPERATOR MIN GORDON (P) - 1  
SUPERVISOR  
30° Roll 0° Pitch

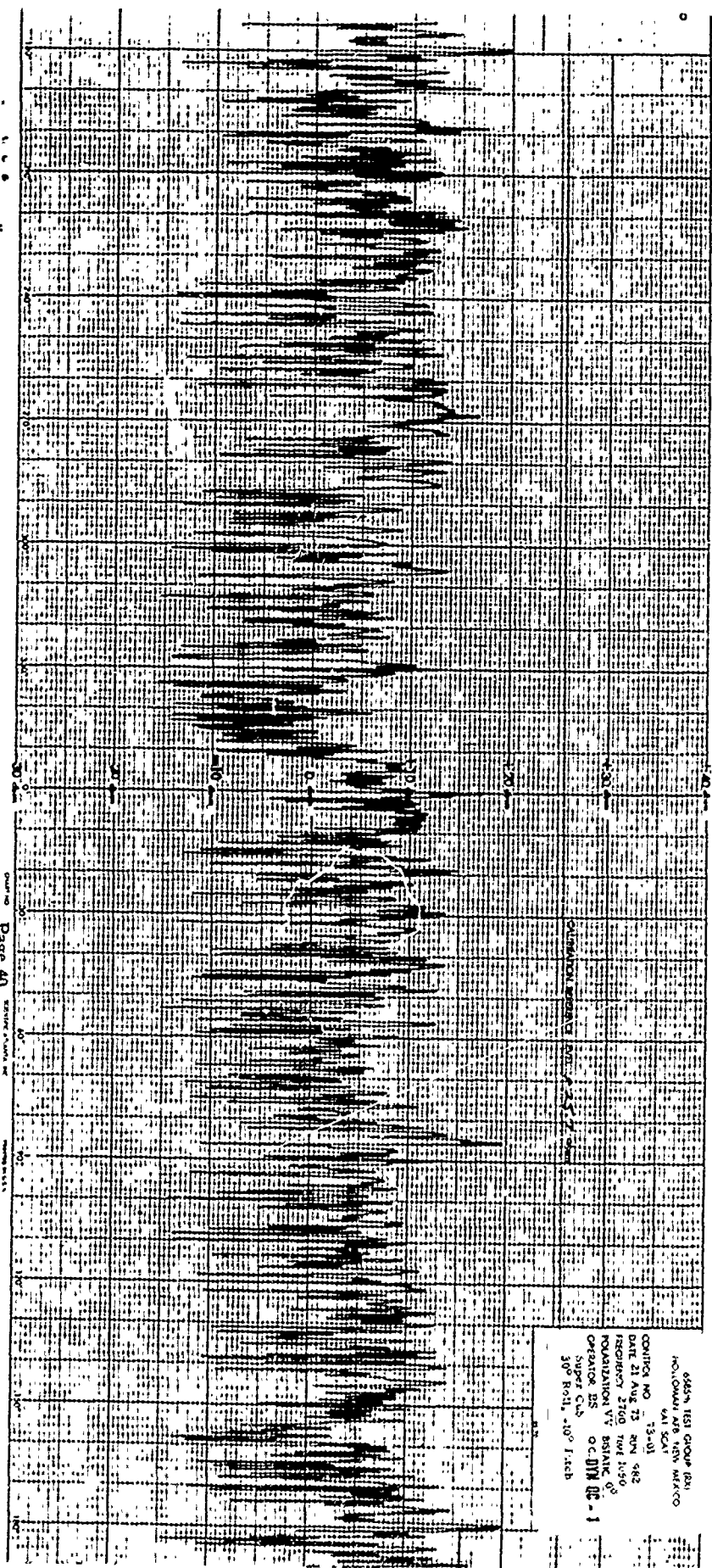




455th TST GROUP Bld  
 HOUQUAN AFB NEW MEXICO  
 BMT CAT  
 CONTROL NO 23-01  
 DATE 23 Aug 73 RW 1046  
 RECORDING 2300 TIME 1309  
 ORGANIZATION YV 9374C 90  
 OPERATOR JS OCLM DC - 1  
 Super Club  
 20° RLL 45° PRAH.

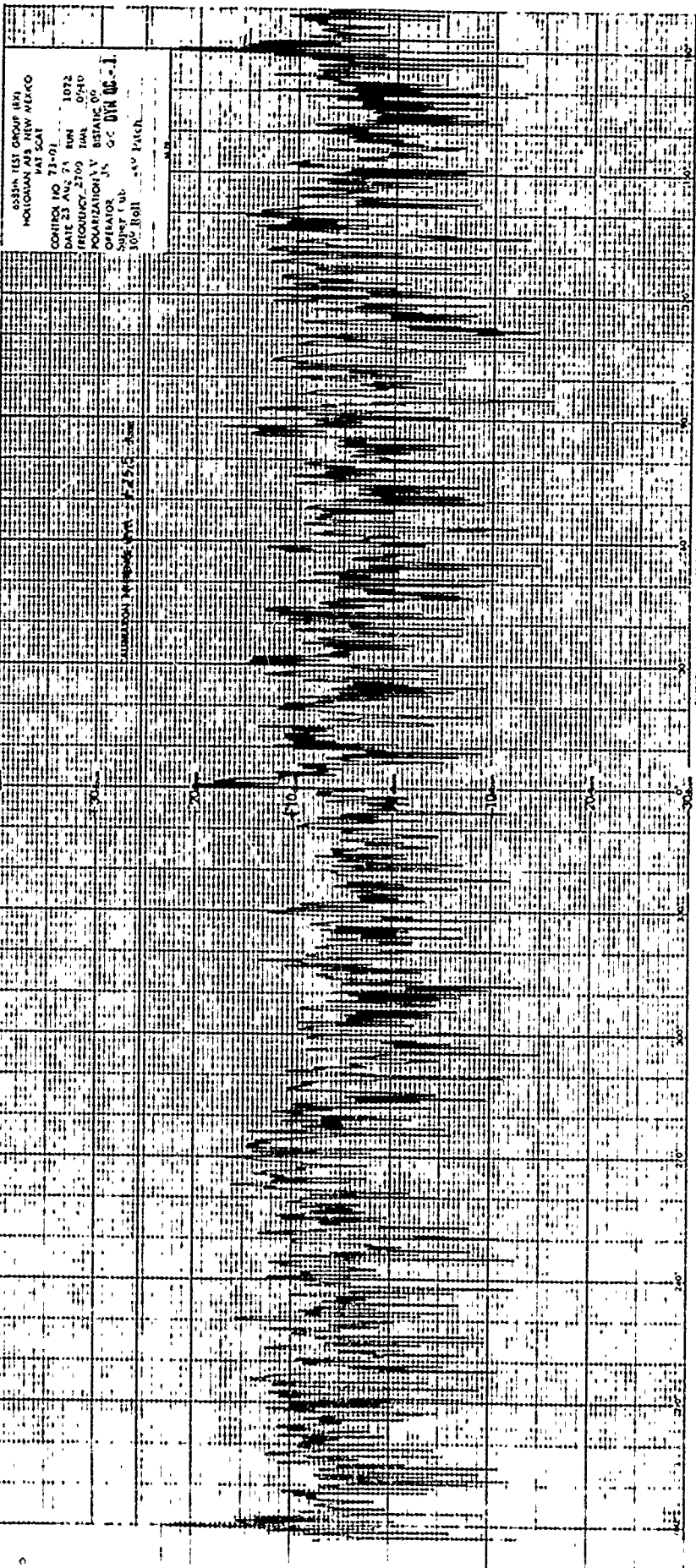
6333A (SI) GROUP (SI)  
HORIZONTAL AIR WIND  
CONTROL NO. 73-01  
DATE 21 AUG 73 AIR 1140  
RECORDING UNIT 1001 1000  
POLARIZATION 55 BEARING 00  
OBTAINED BY GC DIR 8C-1  
Scale: 100' 1000' 100' 100'



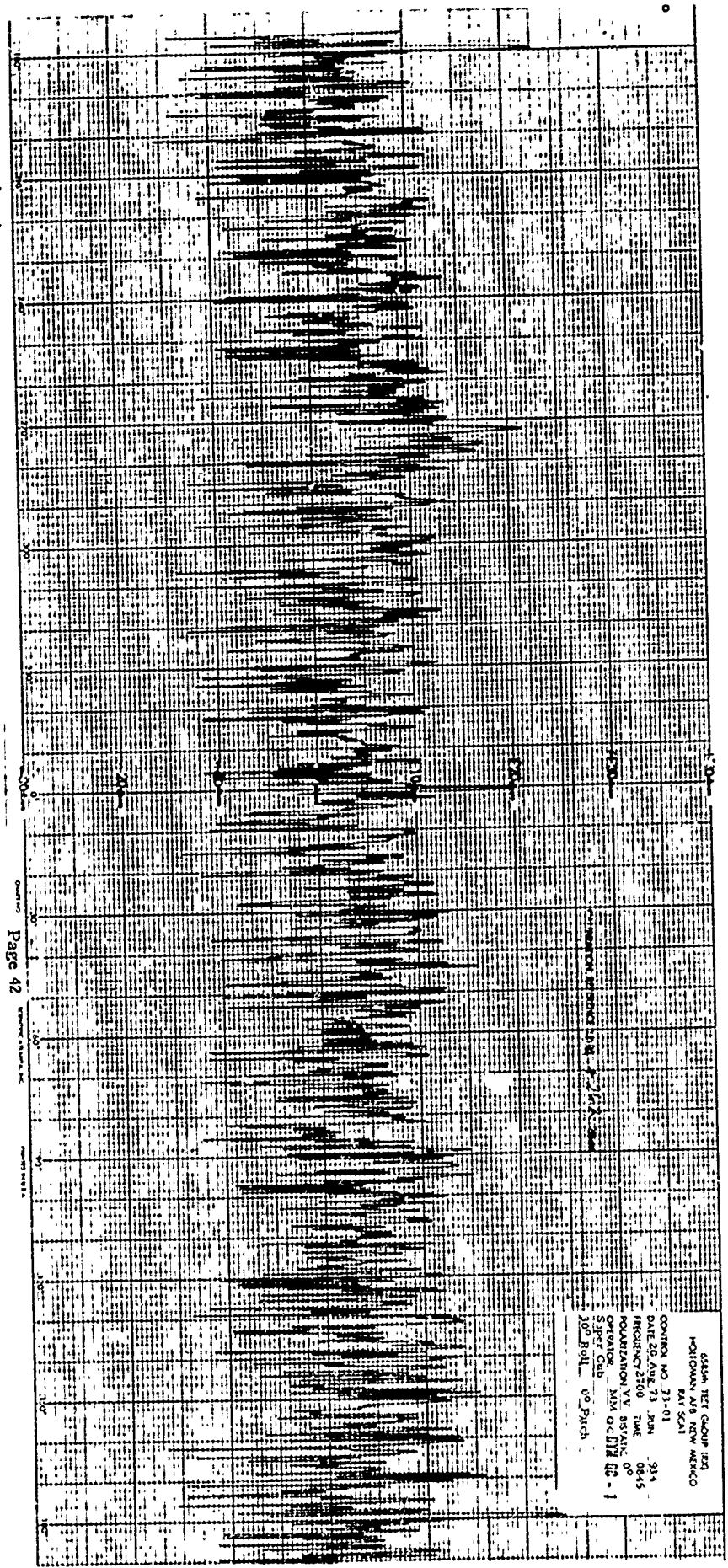


Page 40

64854 1531 GROUP (24)  
 HOLLOWAY AFB NEW MEXICO  
 641 SCAT  
 CONTROL NO. 13-01  
 DATE 21 AUG 73 REV 982  
 REVISION 2700 TIME 1050  
 ORGANIZATION VV BRIGADE OF  
 OPERATOR BS O C DIM 02-1  
 SUPER CLB  
 300 Roll, 100 Pitch



02314 TEST GROUP (BX)  
 HOLSTON AFS NEW MEXICO  
 PAT SCAT  
 CONTROL NO 71-01  
 DATE 23 AUG 71 RUN 1072  
 FREQUENCY 2709 TIAL 0740  
 POLARIZATION J5 BSTATIC 00  
 OPERATOR JS CC DVM 00-1  
 Super C ub  
 30' Roll 15' Patch

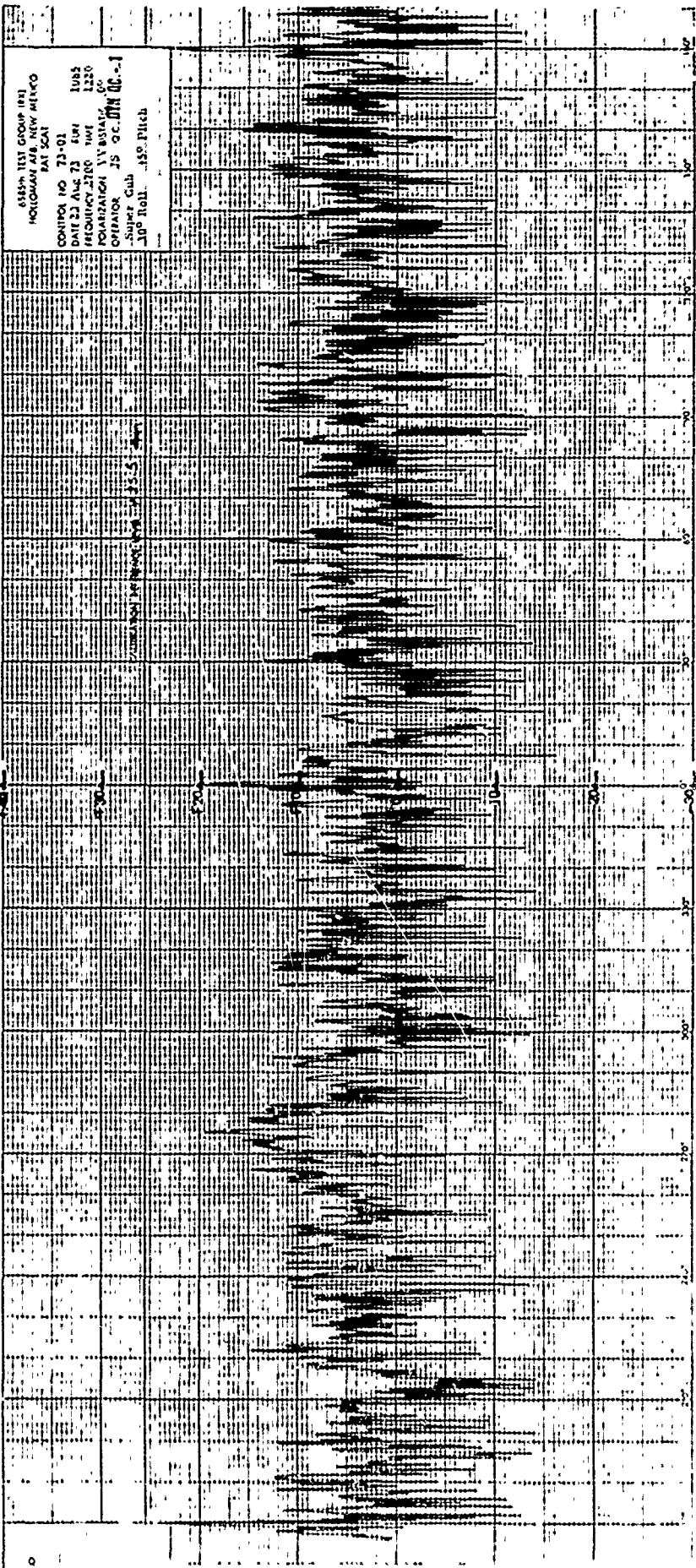


6.34

Page 42

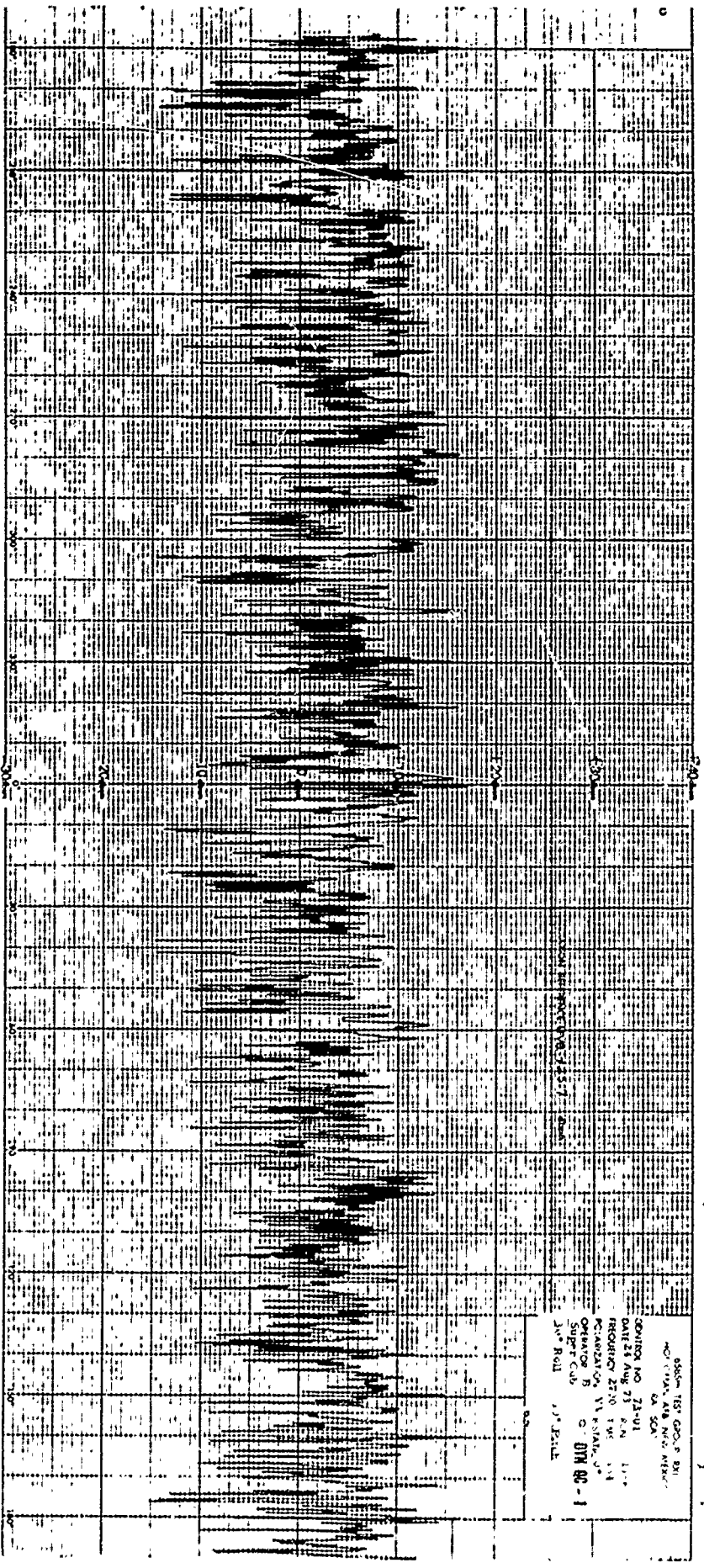
45544 7171 6404P 1291  
 HONOLULU, HAWAII, U.S.A.  
 CONTROL NO. 71-01  
 DATE OF RECEIPT 10/21/50  
 RECEIVED BY TIME 8:45  
 ORGANIZATION VIA SYSTEM OF  
 ORIGINATOR 1111 OCEAN BLVD - 1  
 1000 Bell 00 3944

17011

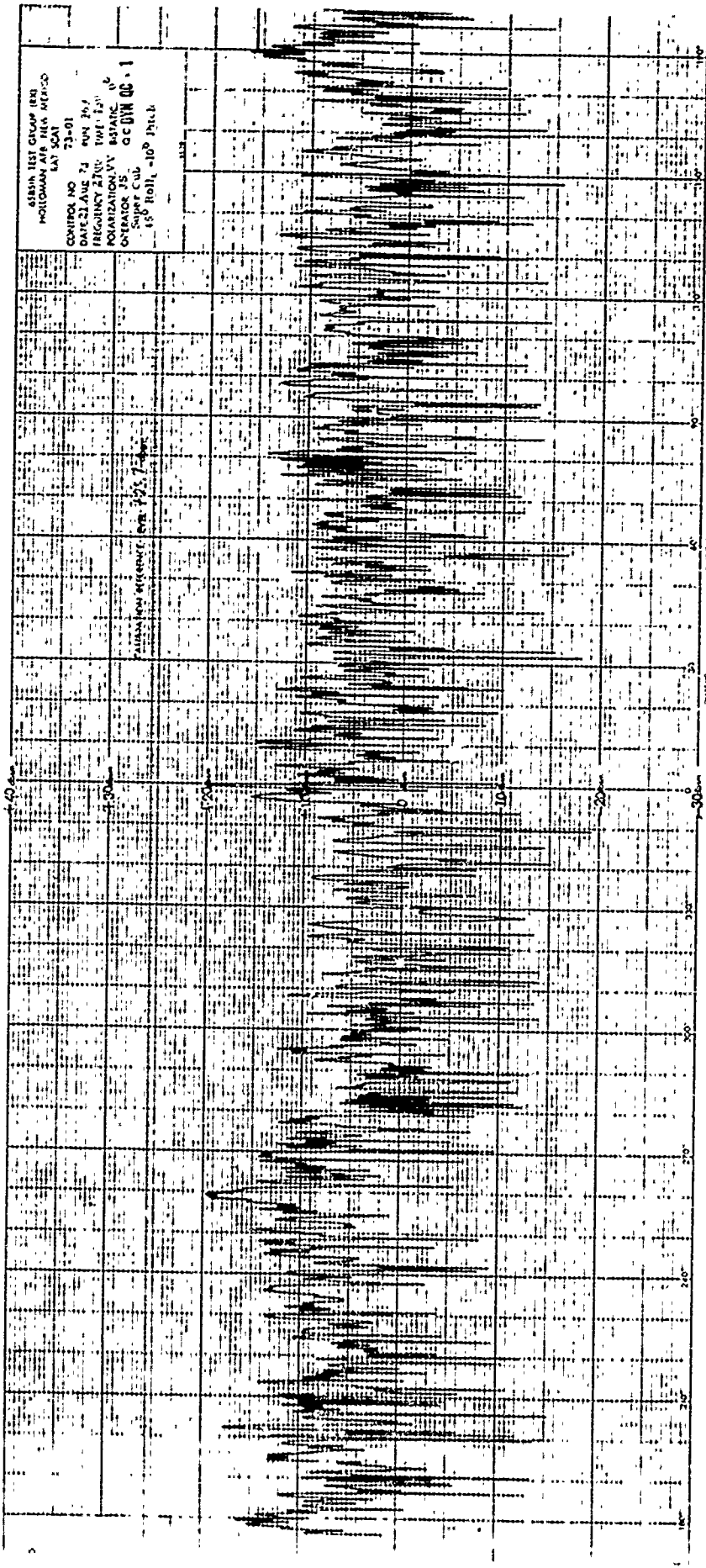


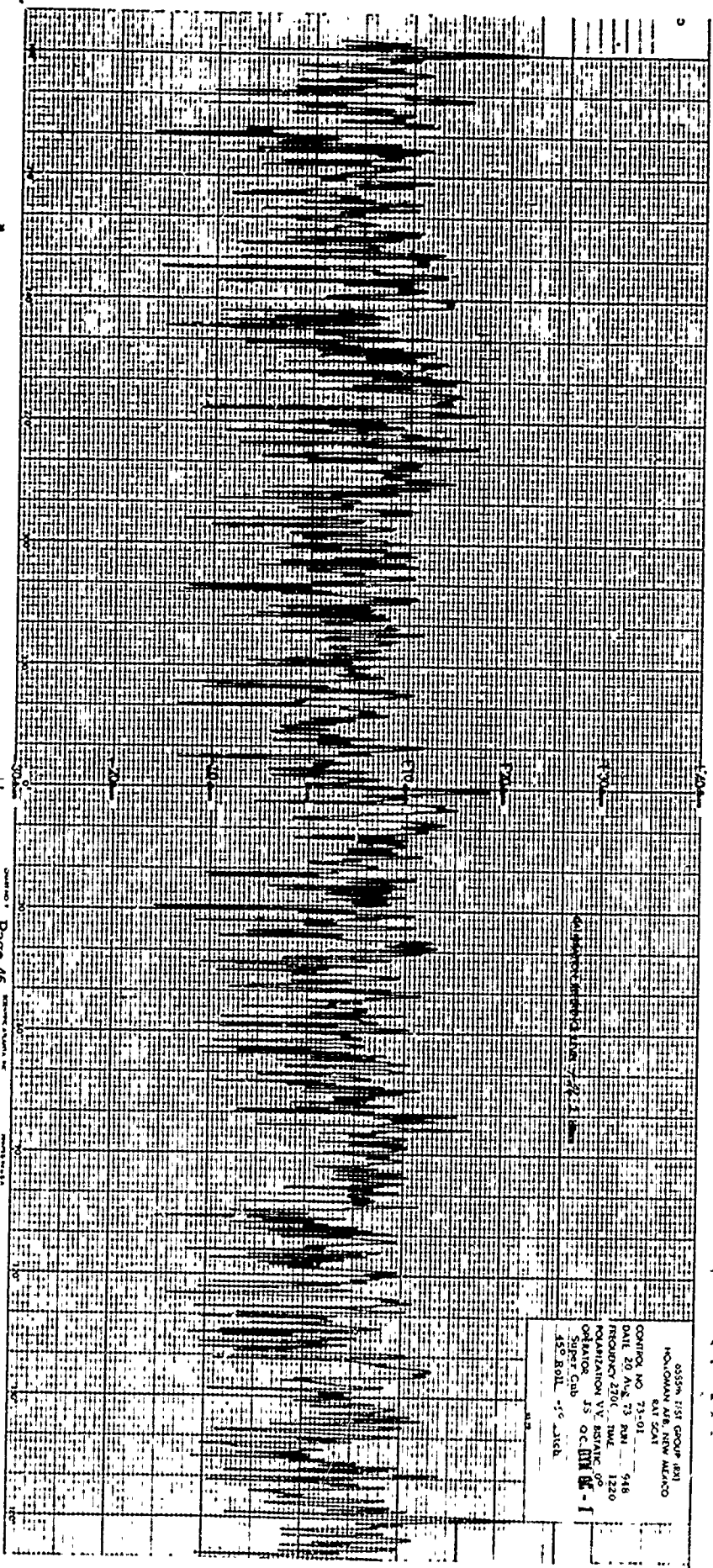
155th ST GROUP (R)  
 HOLLAND LAB NEW MEXICO  
 PAT SCAN  
 CONTROL NO. 73-01  
 DATE 23 AUG 73  
 INSTRUMENT 2700 1000 1250  
 POLARIZATION VV MONTAGE  
 OVIDA 25 OC 1973 (C-1)  
 Super Cub .150 Pitch  
 30° Roll





SECTION 1537 GPO, P. 211  
 NO. 1734 SA  
 SECTION NO. 21-01  
 DATE: Aug 73  
 RECORDING 2710 1W  
 OPERATOR: V. K. SMITH, JR.  
 SURVEYOR: O. D. M. JR.  
 SURVEYOR: J. J. BELL

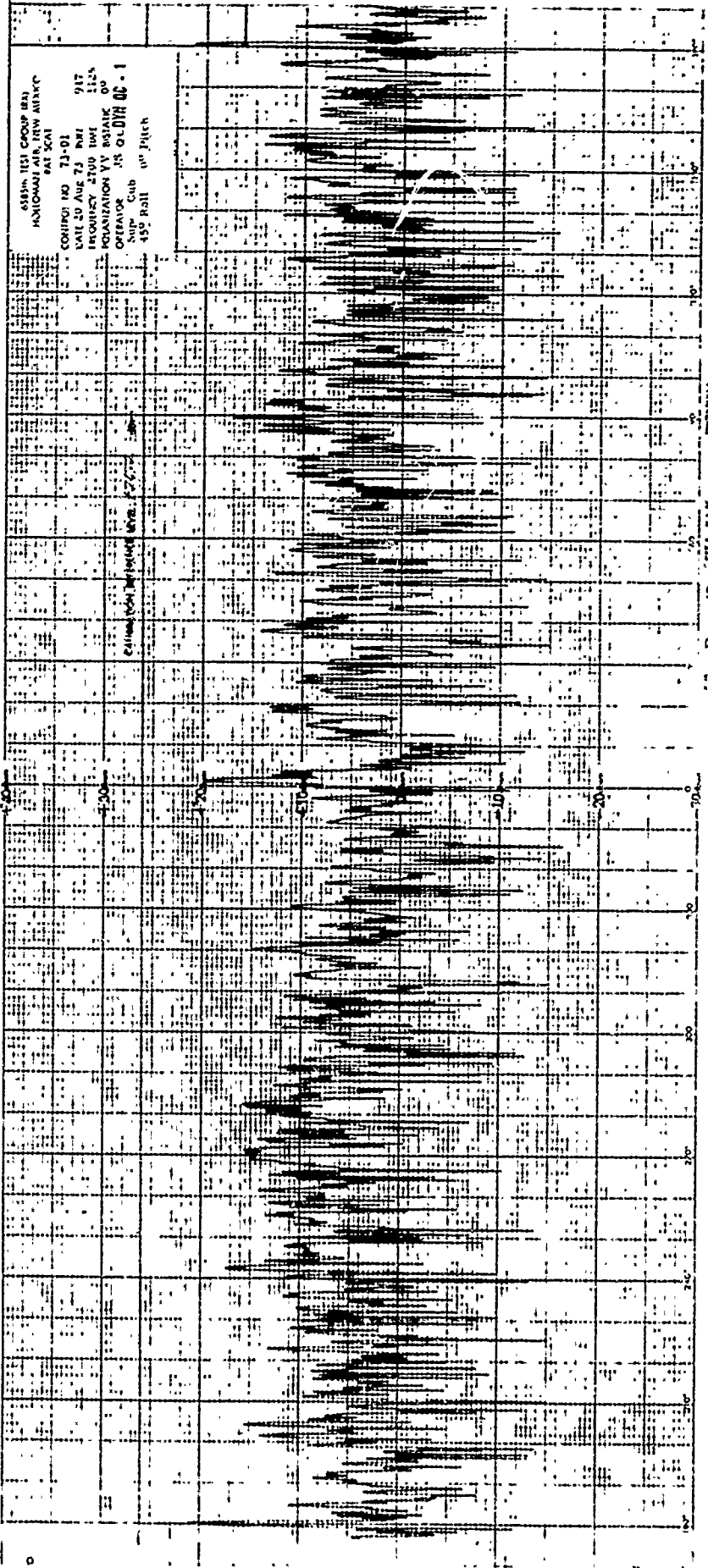


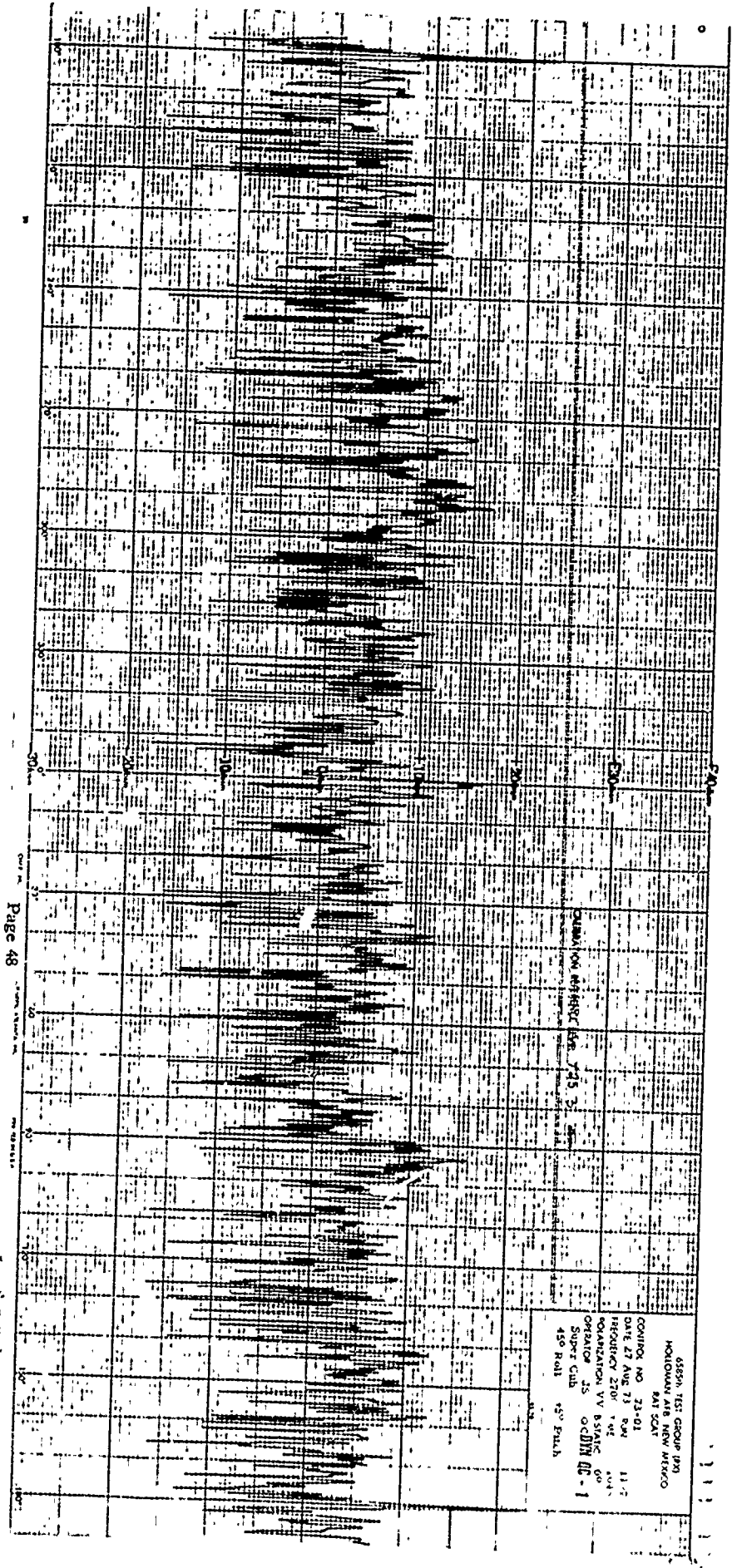


ASSN. 151 GROUP 801  
NO. 00000000000000000000  
SAT 2001  
CONTROL NO. 73-01  
DATE 20 AUG 73 PM 548  
POSITION 270C TIME 1220  
OPERATOR J.S. DEWITT JR.  
SUPER GRP  
450 BOLL. 56 JTB

688th TEST GROUP (M)  
NATIONAL TEST CENTER  
BRIEF ROOM

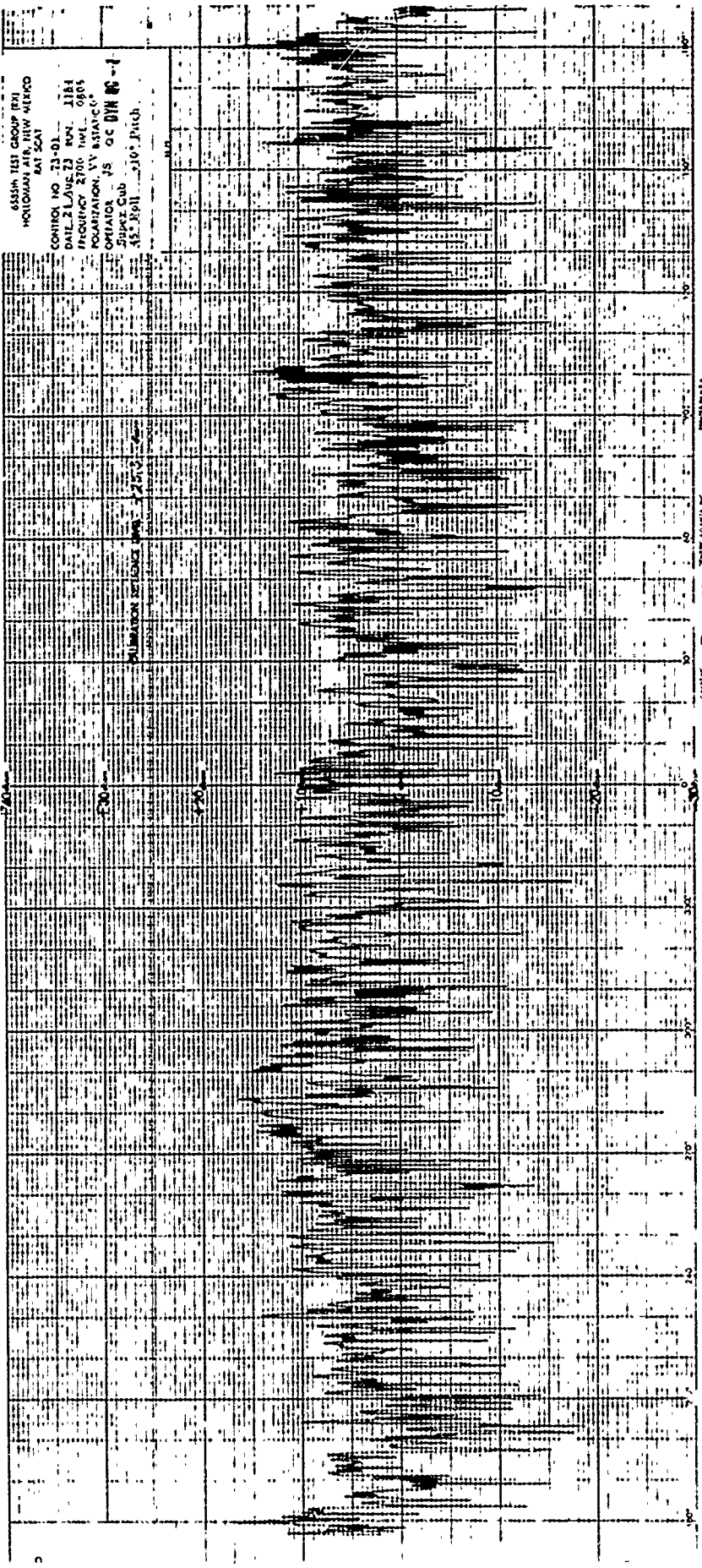
COMPTON HQ 72-01  
DATE 20 AUG 72 RMI 917  
FREQUENCY 2500 UHF 1125  
ORGANIZATION VV BOSTON 01  
OPERATOR JS OGDH QC - 1  
Ship Cub 459 Hall 1st Pitch



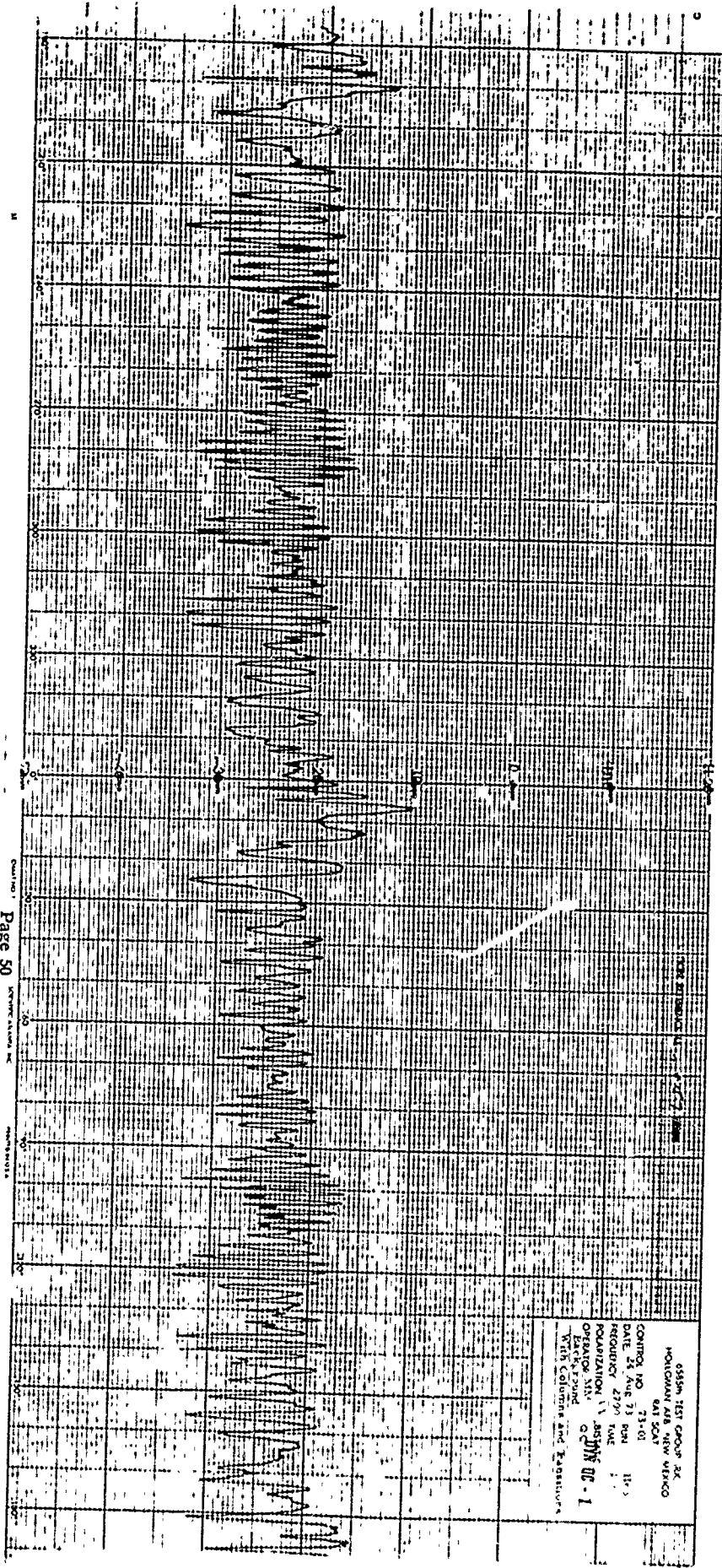


Page 48

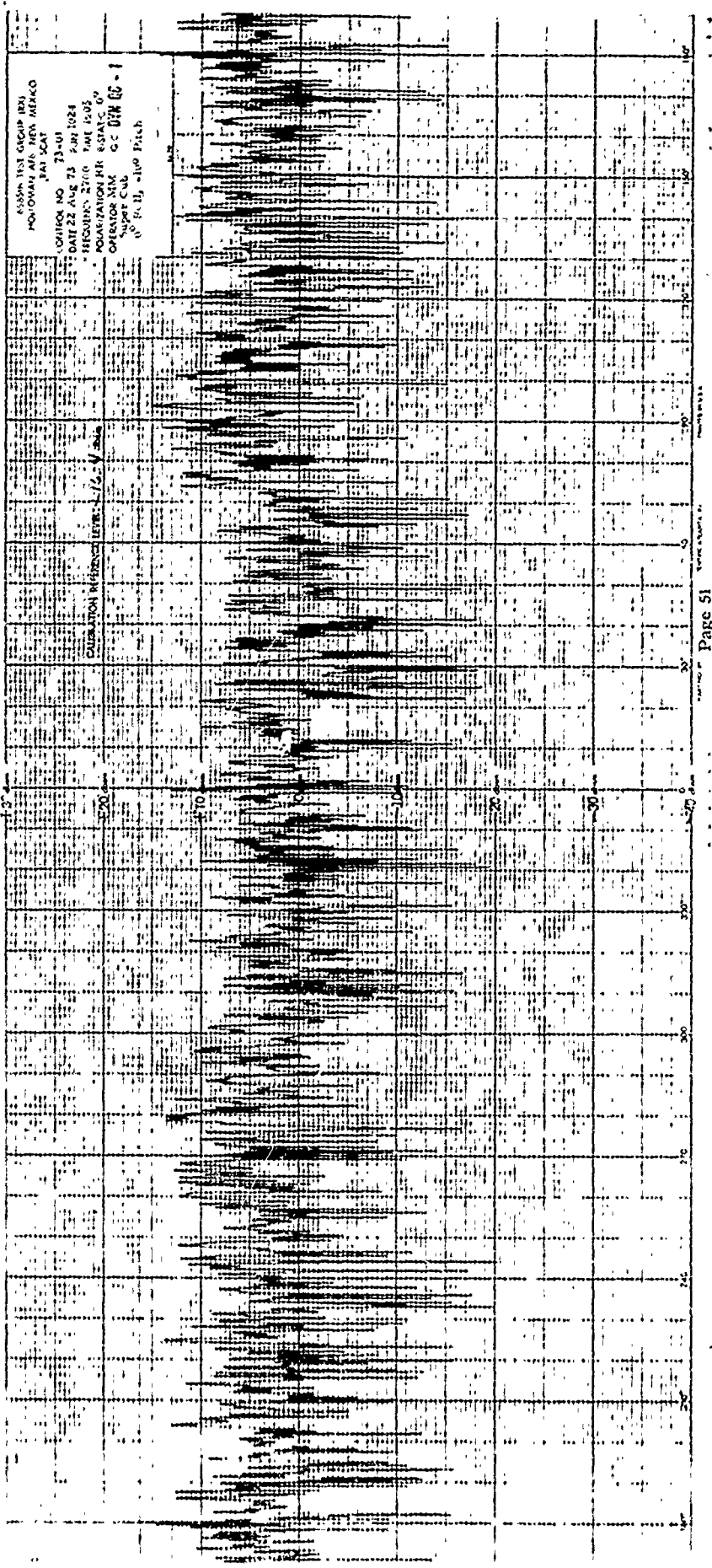
6825a TEST GROUP 880  
 HOKIQUAN AFB NEW MEXICO  
 RAI 504  
 CONTROL NO 73-01  
 DATE 27 AUG 73 RAN 11:5  
 FREQUENCY 2700 V 02  
 ROTATION VV BSIANK 00  
 OPERATOR JS OCDIM DC - 1  
 SUPER CUB 450 PAUL



65MHz TEST GROUP BY  
 HOLLOWAY AND RYAN METHOD  
 RAT SCAT  
 CONTROL NO. 23-01  
 DATE 21 Aug 73  
 PROGRAM 2700 Hz  
 ROTATION VV 8000  
 OPERATOR JS OC 01H 00-1  
 Ship's Cub 310° Pitch  
 45° Roll



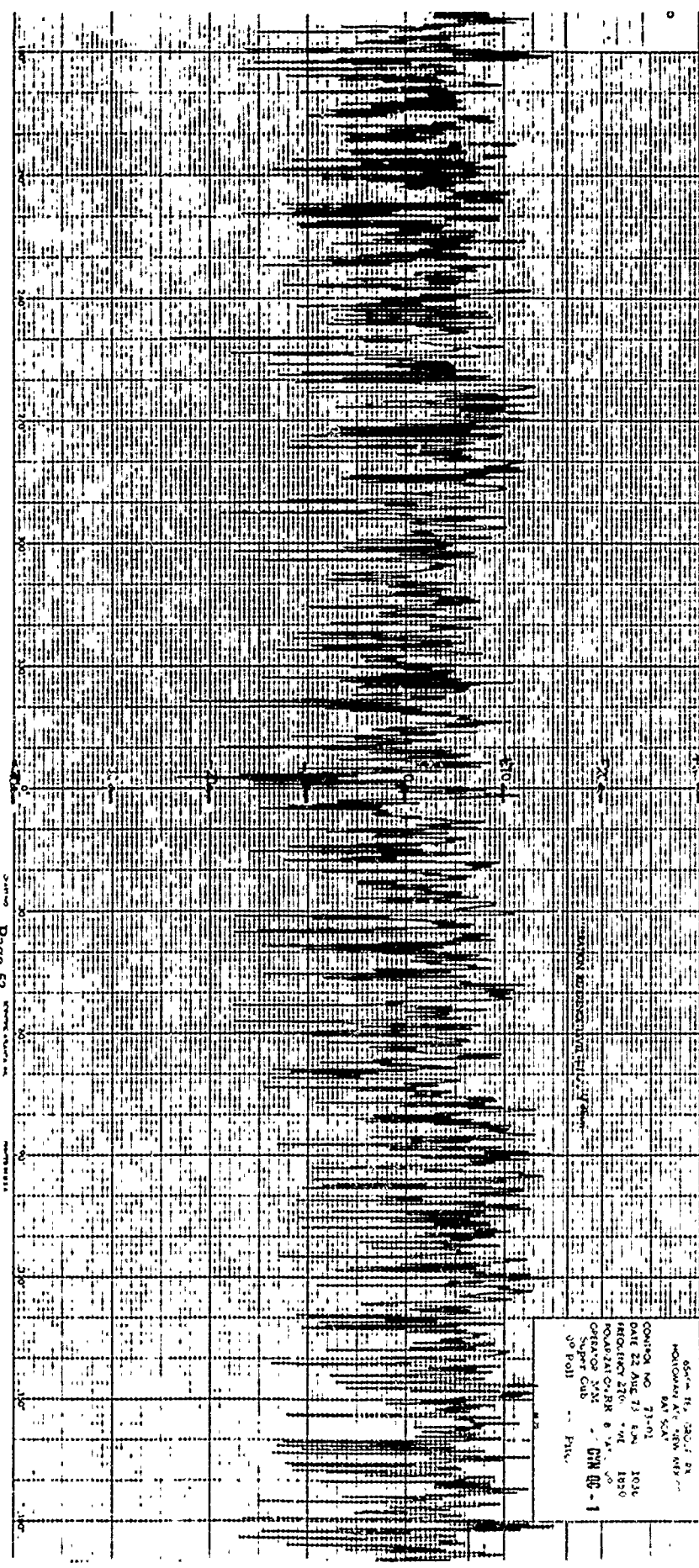
0558 TEST GROUP 32  
 HOLLAND AFB, NEW MEXICO  
 841 5047  
 CONTROL NO. 73-01  
 DATE 24 Aug 73 841 11-3  
 FREQUENCY 2700 KHZ  
 POLARIZATION 11 850V DC - 1  
 OPERATOR SAU  
 MARKED  
 With Columbia and Experimenters



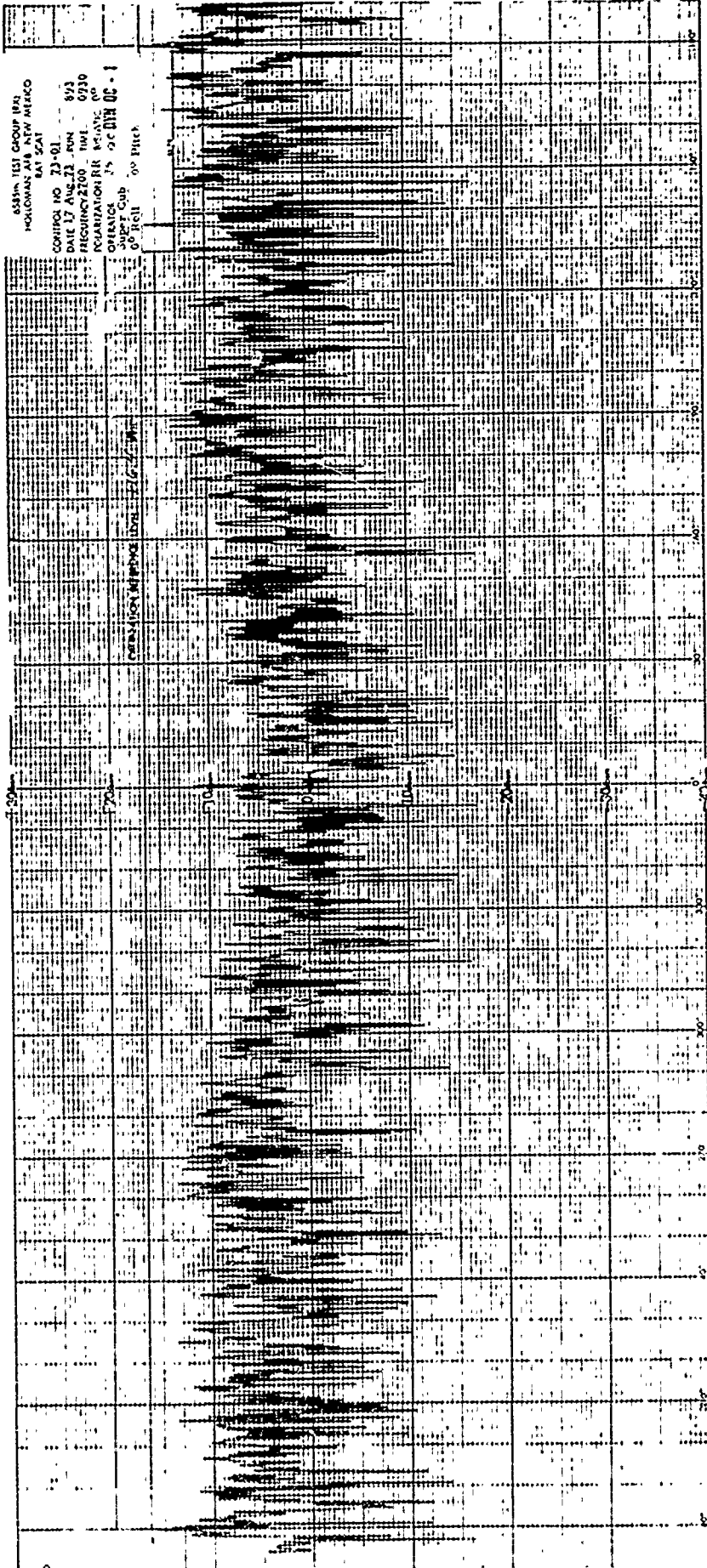
6550m TEST GROUP 1831  
 POLYGRAPHIC TEST MEXICO  
 JAPAN  
 CONTROL NO. 73-01 1824  
 DATE 22 AUG 73 TIME 1503  
 PROGRAMMER ESPALC  
 OPERATOR G. C. DIAZ  
 SUPERVISOR G. C. DIAZ  
 NO. 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100

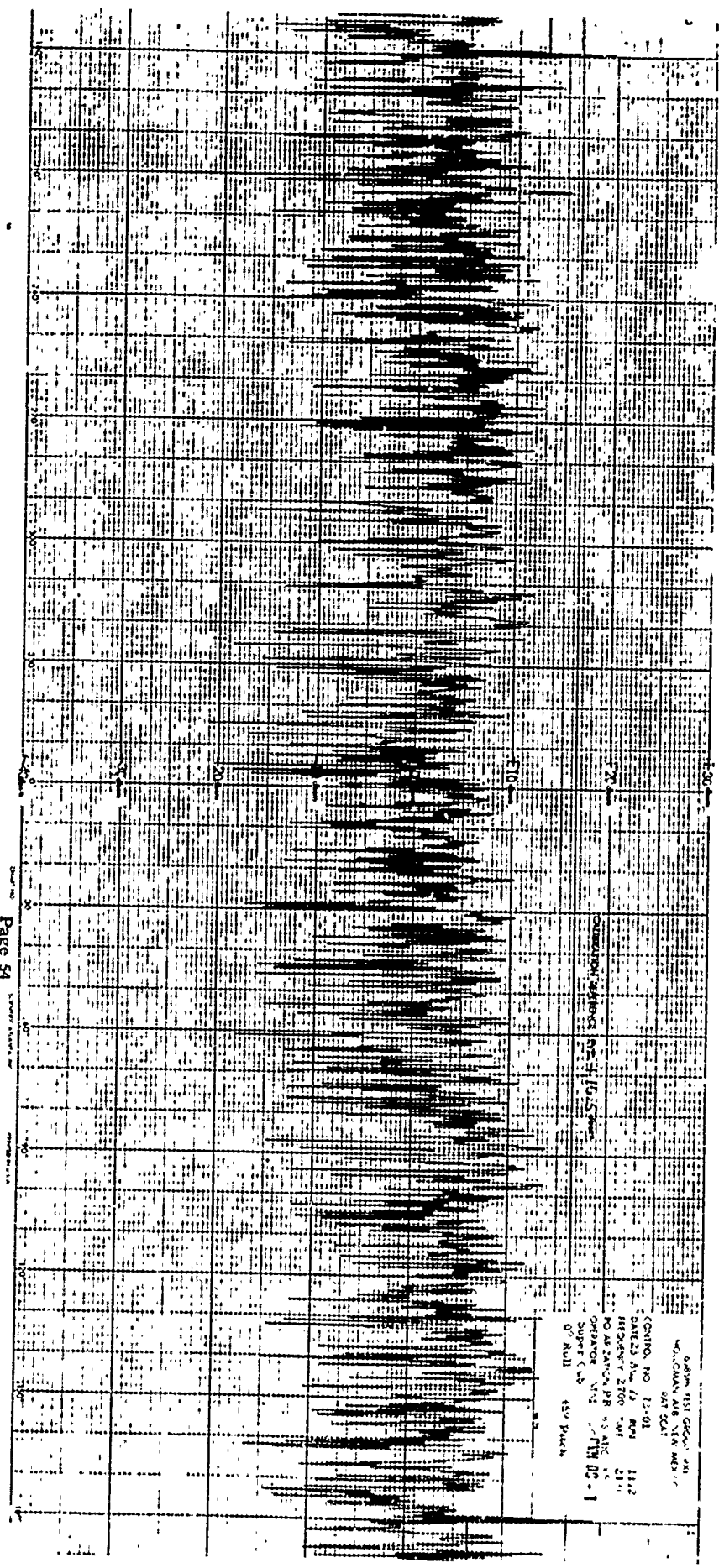
CALIBRATION REFERENCE FROM 1/2-1/2 inch





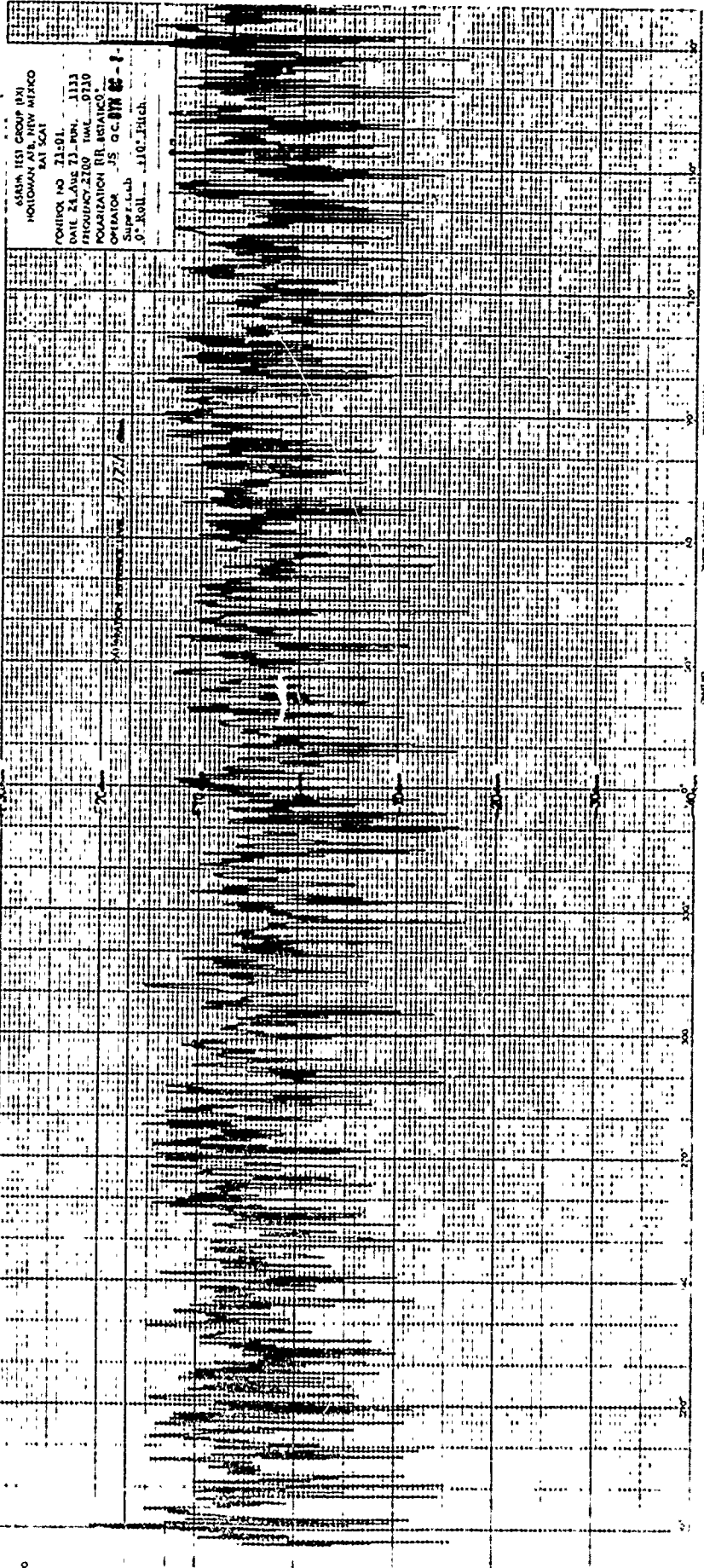
6000 Hz, 2000 ft. 2x  
 HOLLOWAY A.C. VIEW KIT  
 BAY 50A  
 CONTROL NO. 73-01  
 DATE 24 APR 73 ERM 1036  
 RECORDING SITE VIE 1830  
 QUALIFICATION 8 1/2 10  
 OPERATOR JCN  
 REPORT CDR  
 30 P011  
 P116

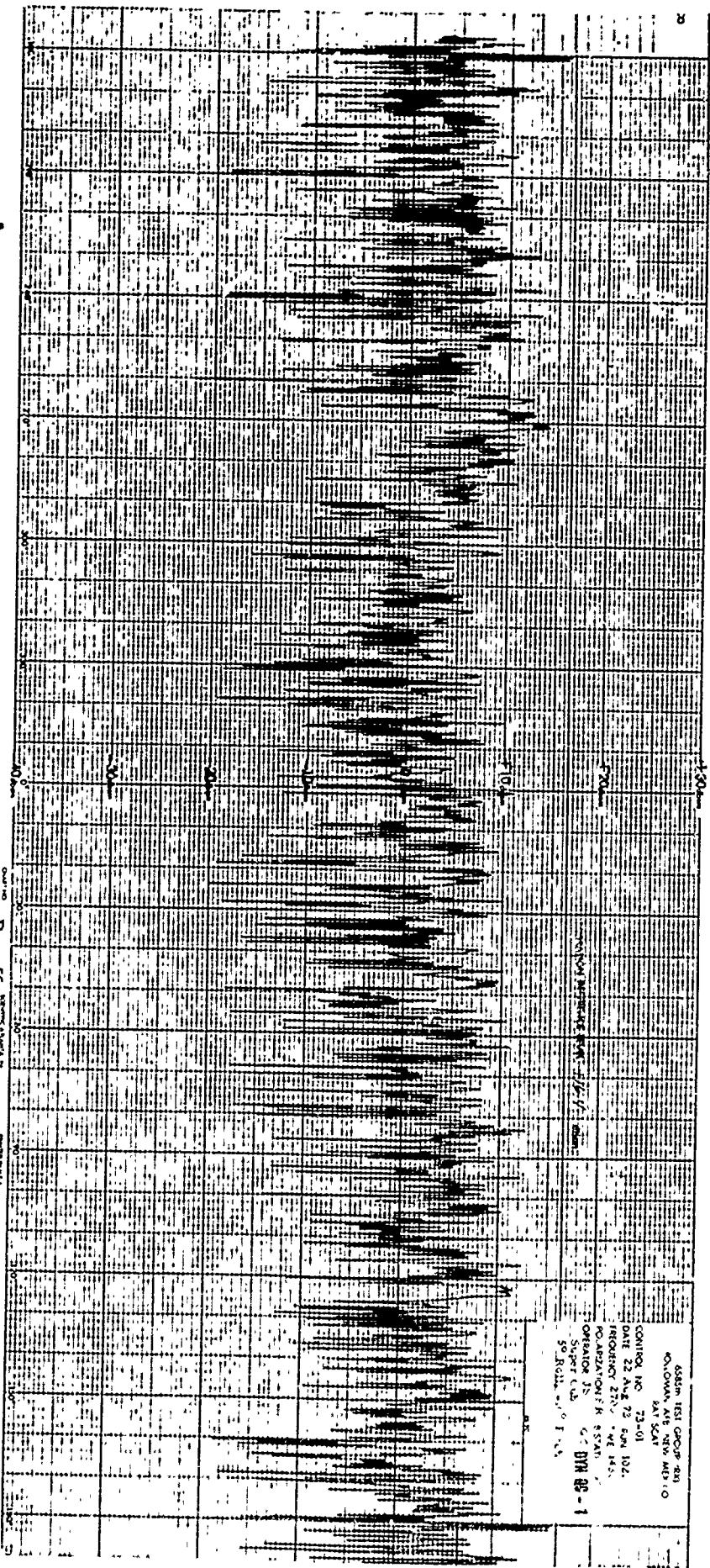




Page 54

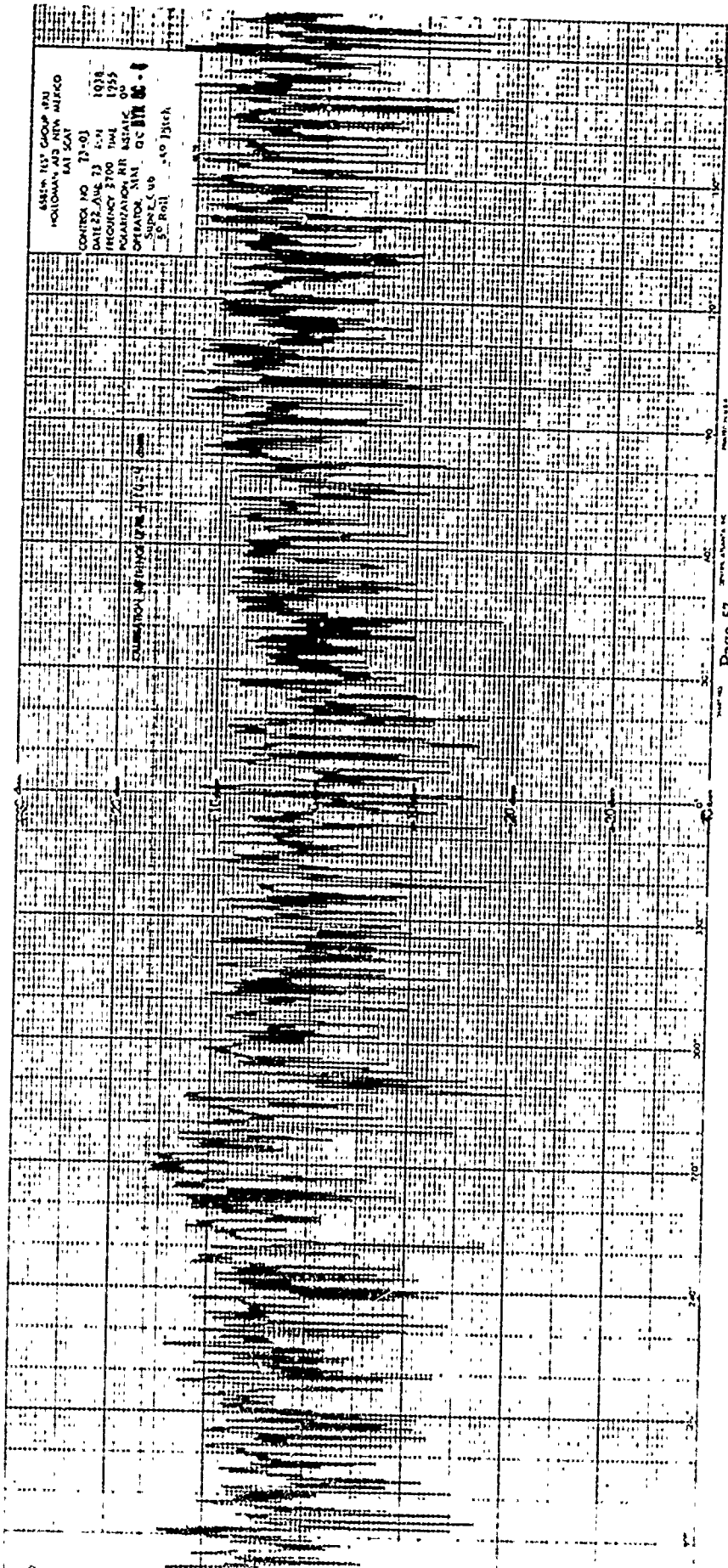
6489 151 G600-21  
 W. CHAMBERS AFB TEX 48157  
 647 5041  
 CONTROL NO 12-01  
 DATE 23 Aug 69 094 11:2  
 FREQUENCY 2700 200 210  
 NO OF STATIONS 18 15 AIR 16  
 OPERATOR VIK  
 SUPERVISOR  
 OF ALL 450 PAGES

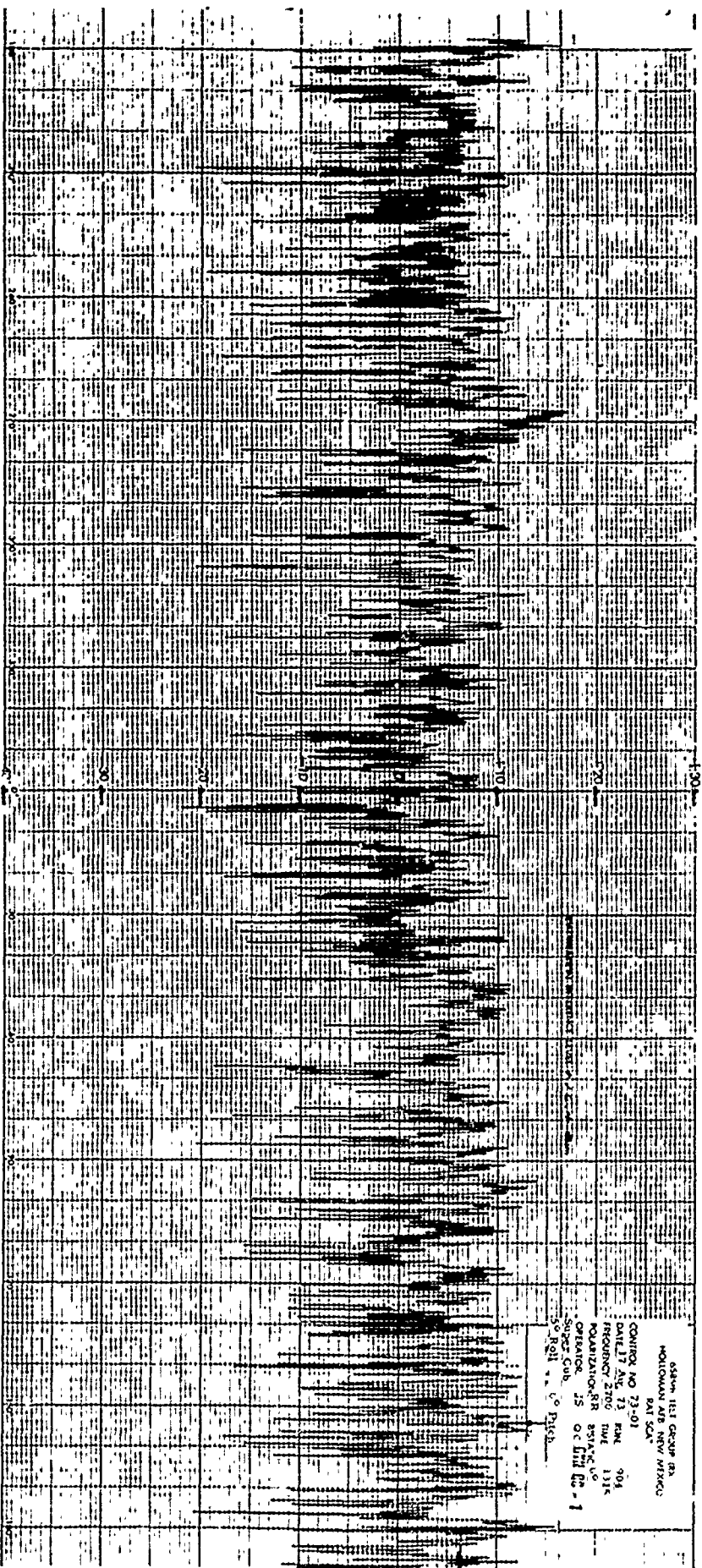




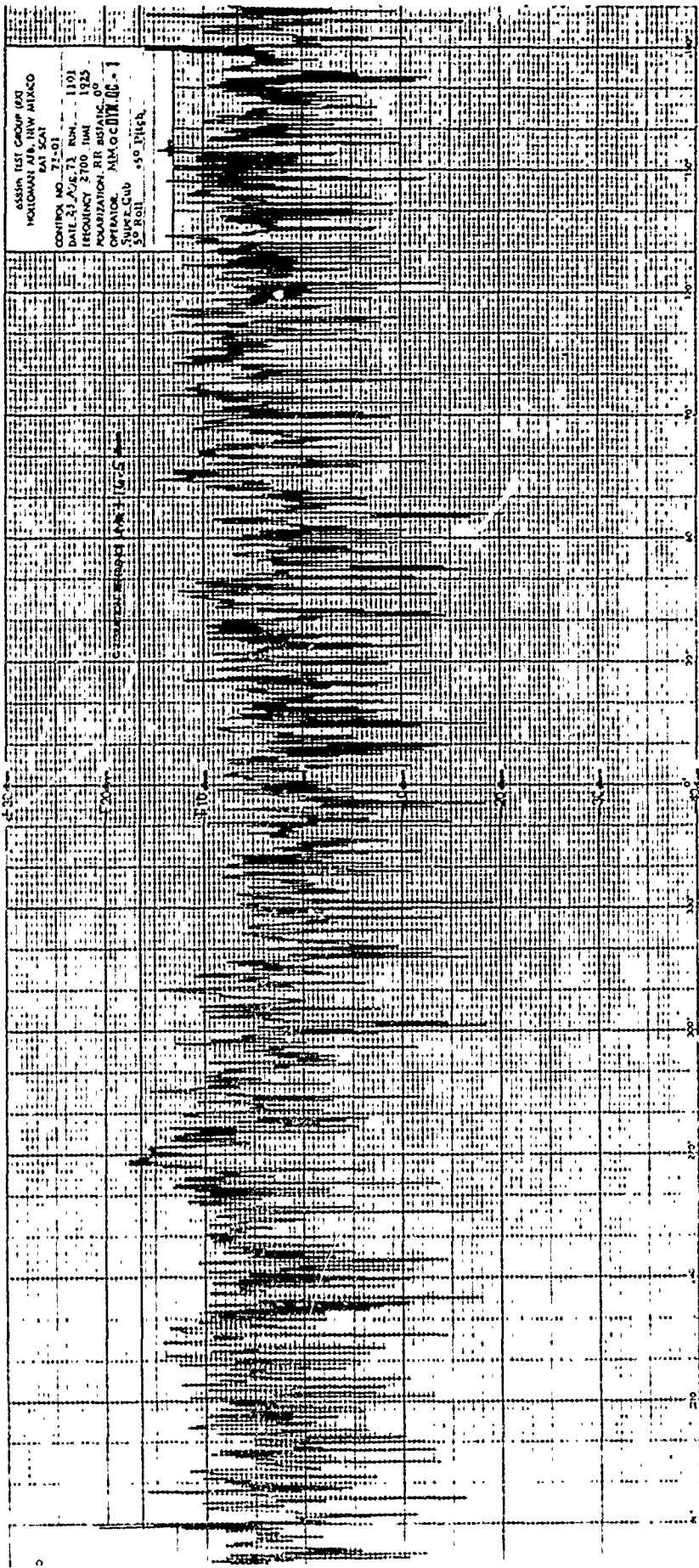
6050m 1511 GROUP 481  
 04/01/61 AT 5:41  
 CONTROL NO. 23-01  
 DATE 22 AUG 73 6PM 10Z  
 RECORDING CENTER WE 443  
 OPERATOR J.S. G.C. DYN 82-1  
 OPER. C.D.  
 STATION NO. 1511

ASST. DIST. CLERK IN CHARGE  
HOLLOWAY, AD. RITA ALBANO  
LAI SCAT  
CONTROL NO. 71-01  
DATE 22 AUG 73 1038  
FREQUENCY 3700 MHz 1955  
OPERATOR NIN GC 116 6-4  
Supervisor  
50 Roll 400 Jitch



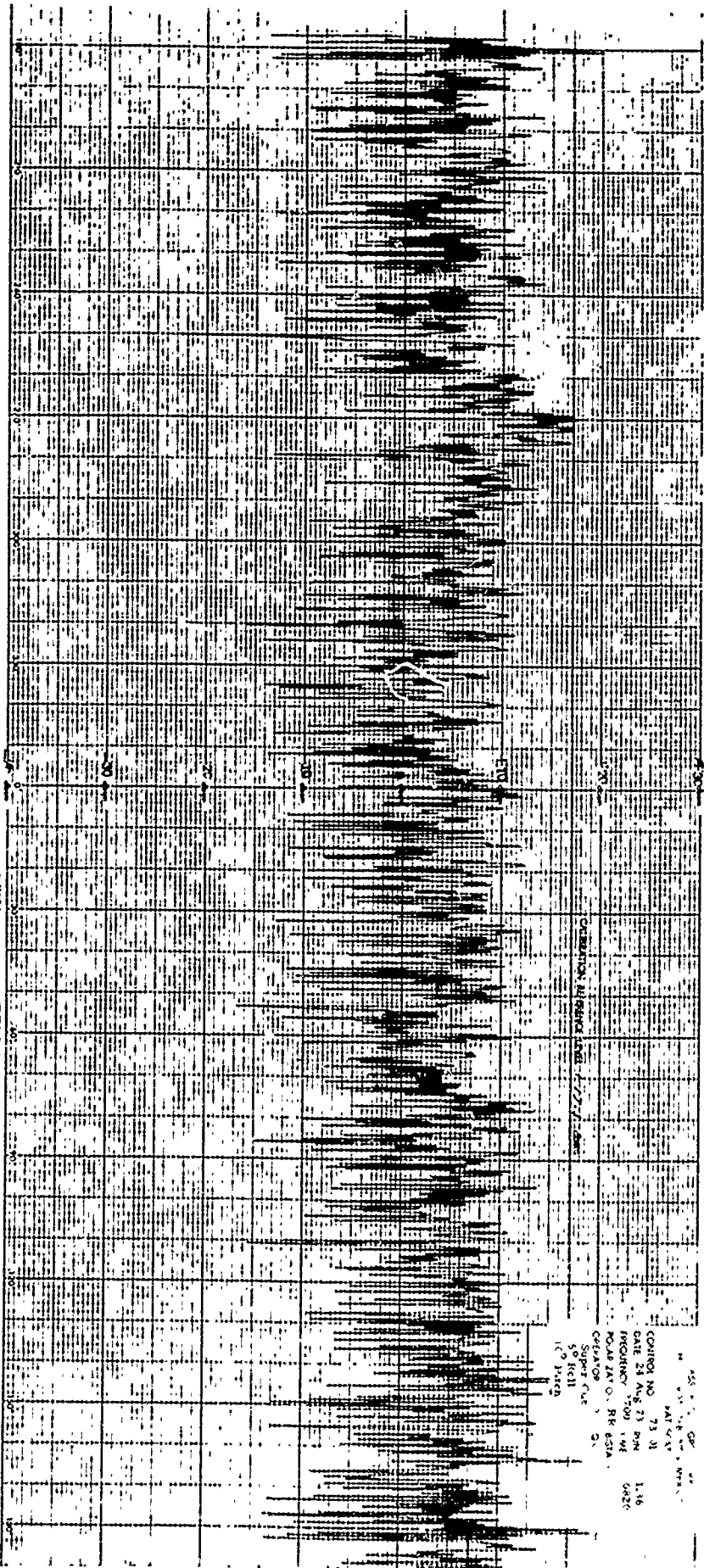


658m 1411 GROUP (B)  
 HOLLANDIAN AIR NEW MEXICO  
 BAI SCA  
 CONTROL NO 73-01  
 DATE 17 AUG 73 FAN 904  
 FREQUENCY 2700 TIME 1315  
 MODULATOR-RR STATION W  
 OPERATOR JS OC 1711 82-1  
 Super Cub  
 50 Feet 1/2 50 Pitch



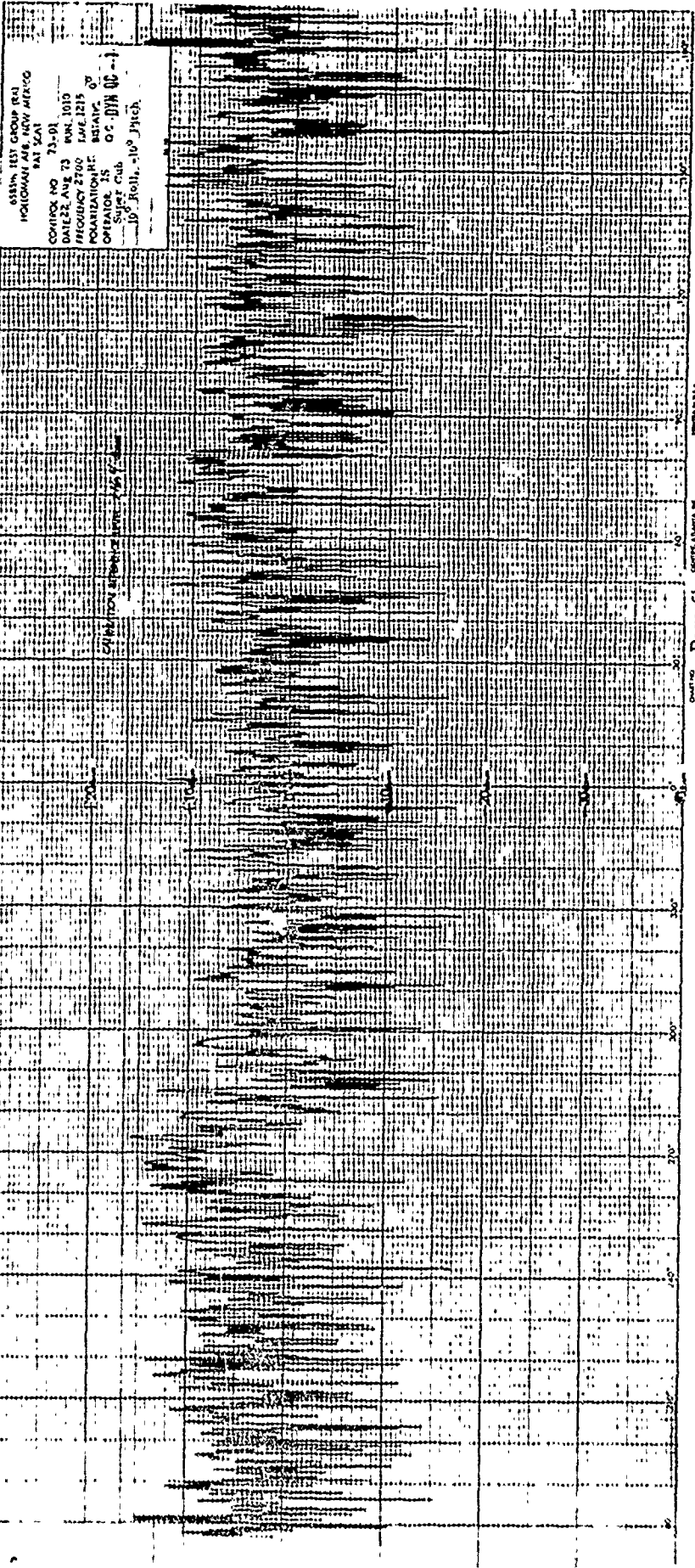
6583R TEST GROUP 1003  
 HOLLOWAY AFB, NEW MEXICO  
 CONTROL NO. 21-01  
 DATE 31 JUL 73 RUN - 1191  
 FREQUENCY 5700 THz  
 MODULATION RR BISTATIC  
 OPERATOR ALMO CUBA CC - 1  
 7000L Cub  
 50 Post 50 1146A



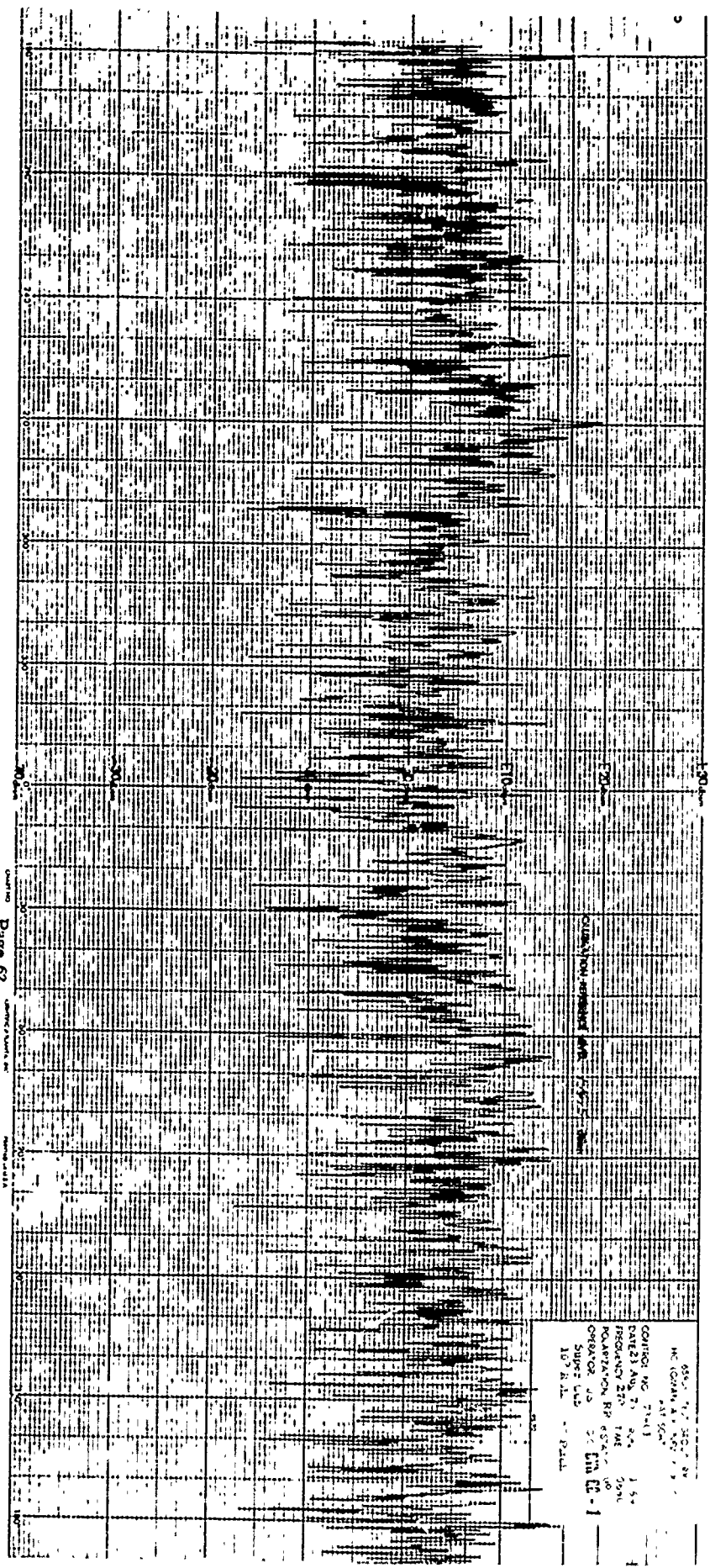


Page 60

CONTROL NO. 73 31  
 DATE 24 Aug 73 PM 1.16  
 FREQUENCY 750 Hz  
 POLARITY O. BK 52A  
 OPERATOR  
 Support Cue  
 50 ftch  
 100 ftch



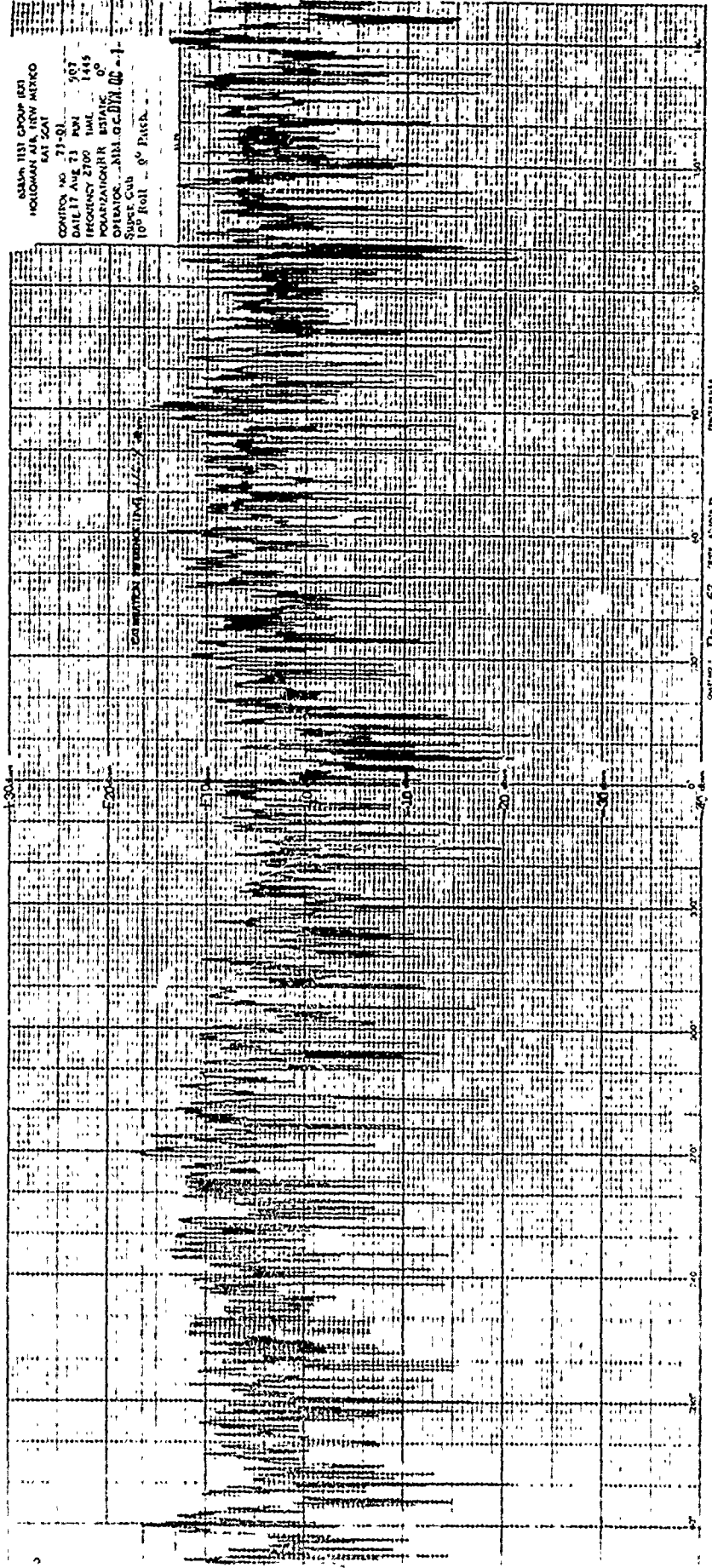
655th TEST GROUP (R1)  
 HICKORY AVE, NEW MEXICO  
 TAI 501  
 CONTROL NO 73-01  
 DATE: Aug 73 RUN: 1019  
 FREQUENCY: 2700 TAVE: 1215  
 POLARIZATION: BISTATIC  
 OPERATOR: JS CC DYN QC -1  
 Super cub  
 19" Roll, -10" Pitch

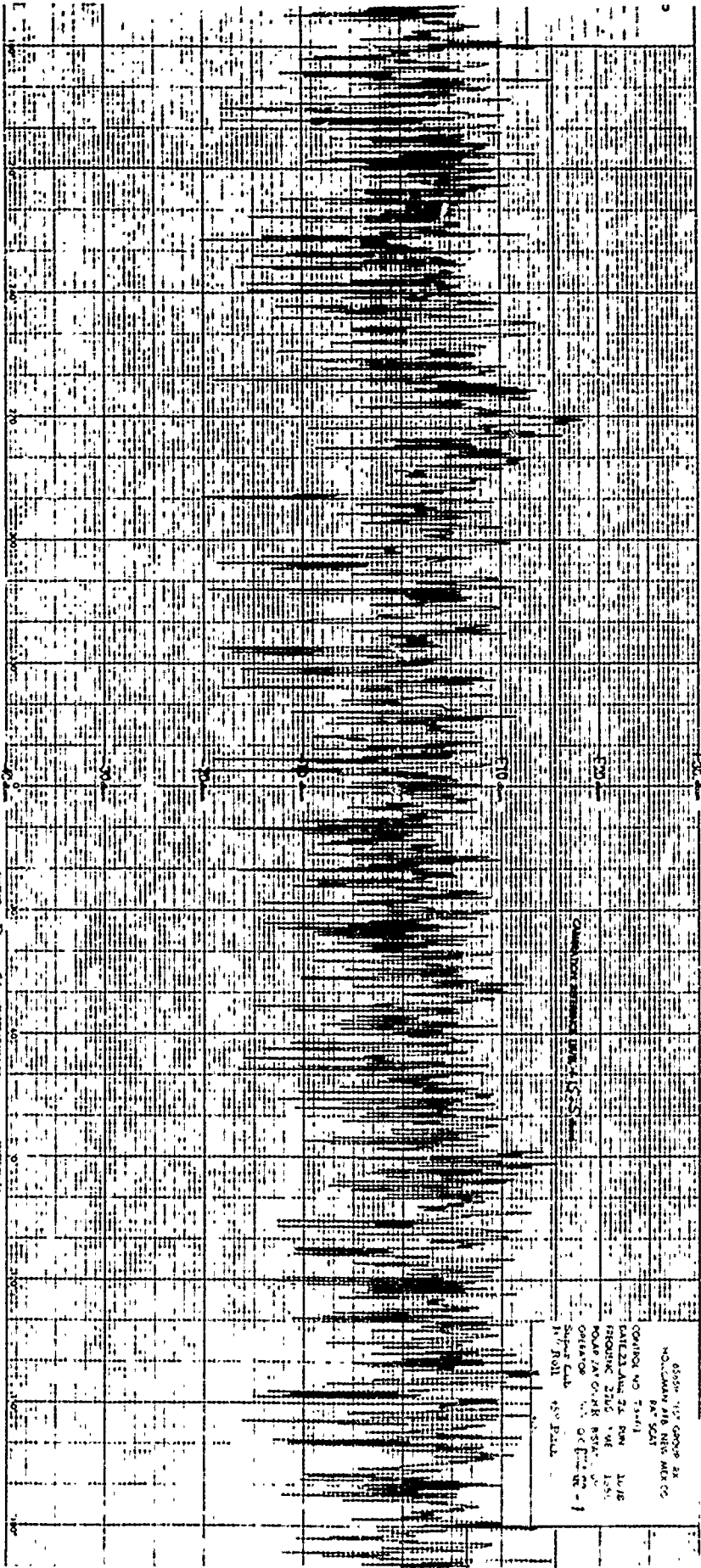


Page 62

6500 707 3000 20  
 MC (GAIN 1.5) 1.5  
 AIR 500  
 CONTROL NO 71411  
 DATE 21 AUG 71 200 1.5  
 FREQUENCY 210 100 200  
 POLARIZATION RP 6500 10  
 OPERATOR JS 22 51M 62-1  
 SUPER VUB  
 107 A.L. 10 PALL

CALL: 1137 GROUP 1831  
HOLLOWAY AVE, NEW MEXICO  
LAT 3641  
CONTROL NO. 71-81  
DATE: 17 AUG 73 PUN 301  
FREQUENCY 2700 THRU 1465  
POLARIZATION ESTIMATE 0°  
OPERATOR: BILL G. JIN (W-1)  
SUPER: CUB  
10" Roll - 8" PAPER



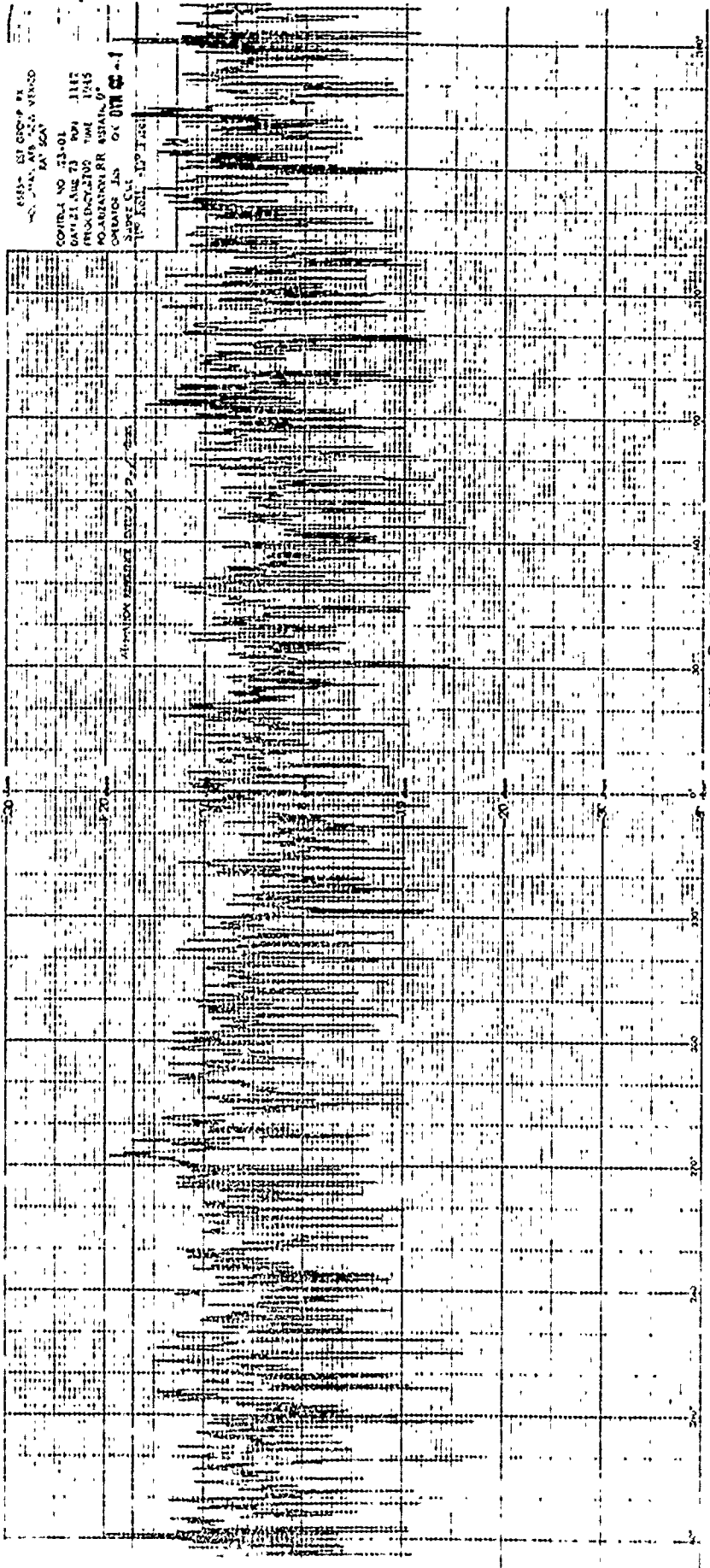


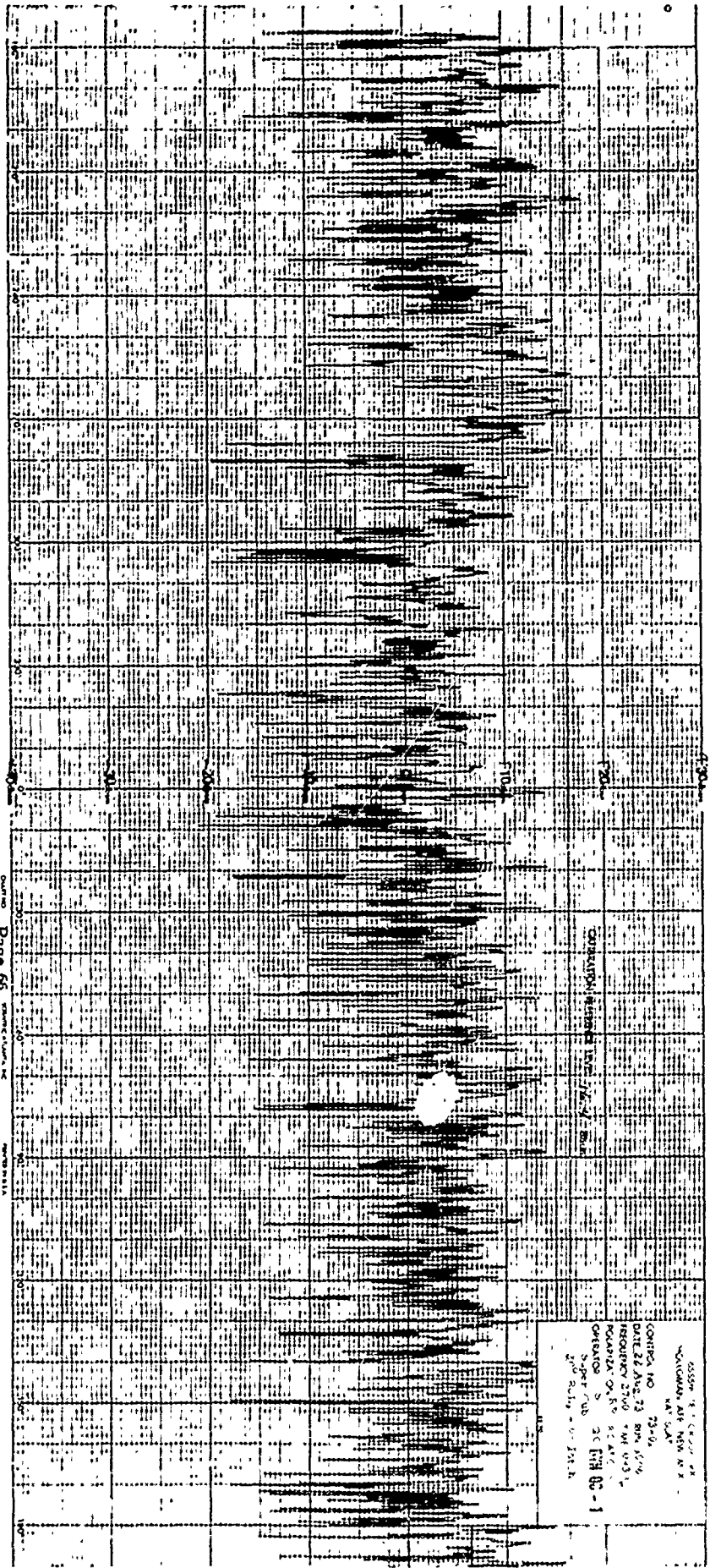
Page 64

8500-107 GROUP 28  
 VOL. 10000  
 DATE: 1/20/50  
 TIME: 10:15  
 BY: J. W. B.  
 CHECKED: J. W. B.  
 APPROVED: J. W. B.  
 DRAWN: J. W. B.  
 SCALE: 1/2"

4552-151 GROUP BK  
NO. 1141, 1142, 1143, 1144, 1145  
BY 504

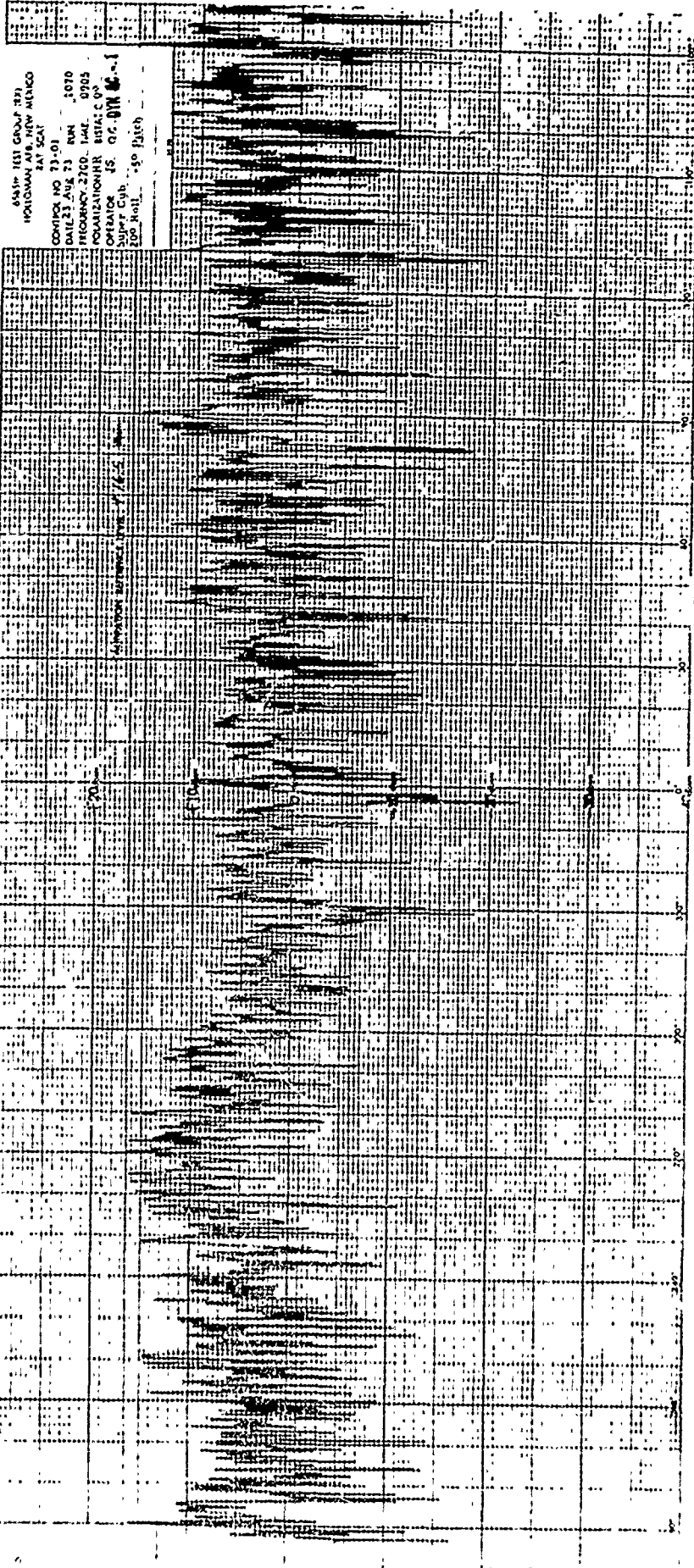
CONTROL NO 23-01  
DATE 21 AUG 73 RPH 1147  
PROXIMATE TIME 1145  
MO. ADRIANO RR. STATION, D.  
OPERATOR JAS. O. OUN





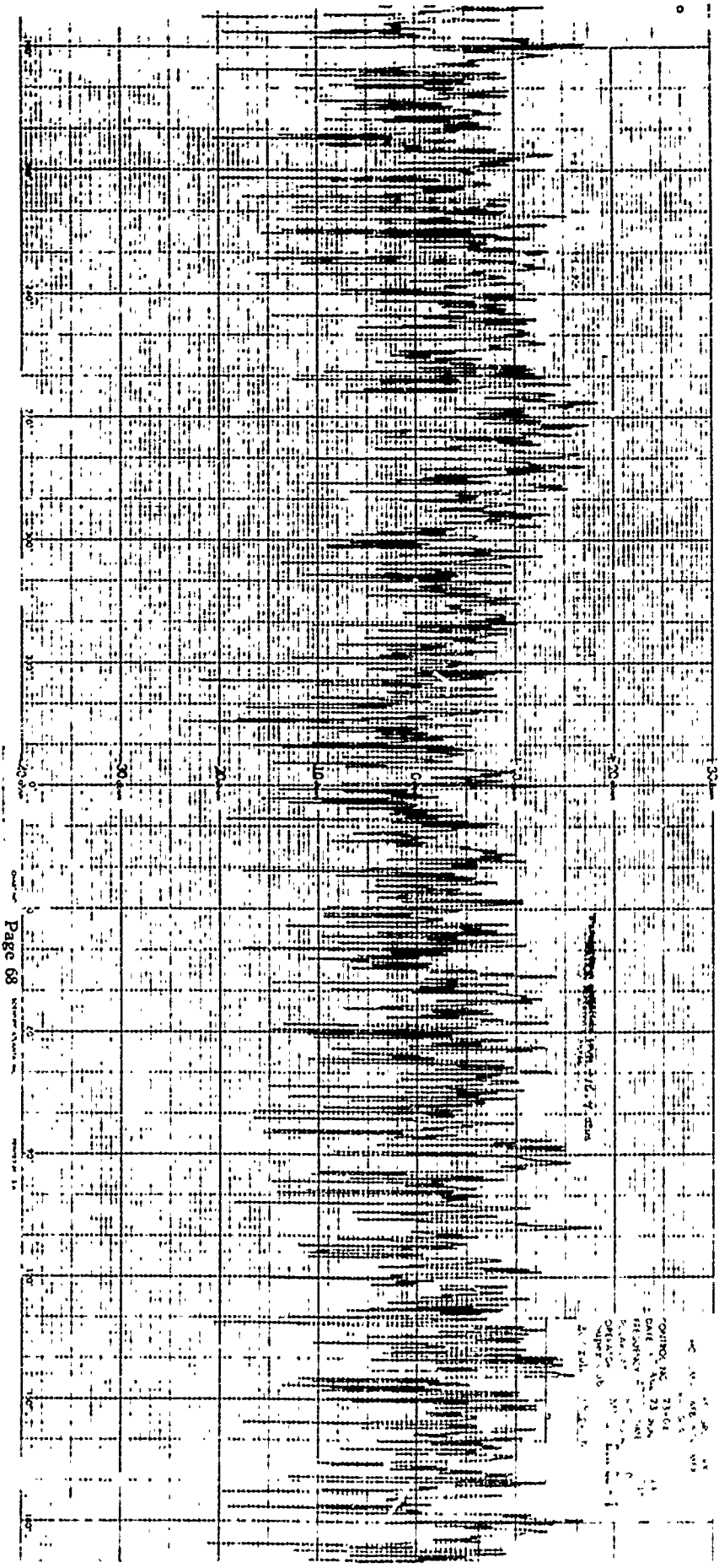
Page 66

ASSIGN 11 (C) 1971  
 VOLUNTEER AIR NEW MEX  
 KAV 5141  
 CONTROL NO 73-01  
 DATE 22 AUG 73 8PM 1570  
 FREQUENCY 2700 KHZ V43  
 POSITION 01.50 82.417  
 ORBITER 2 30 [H] 03-1  
 Super CUB  
 2nd Subj - 01.5141

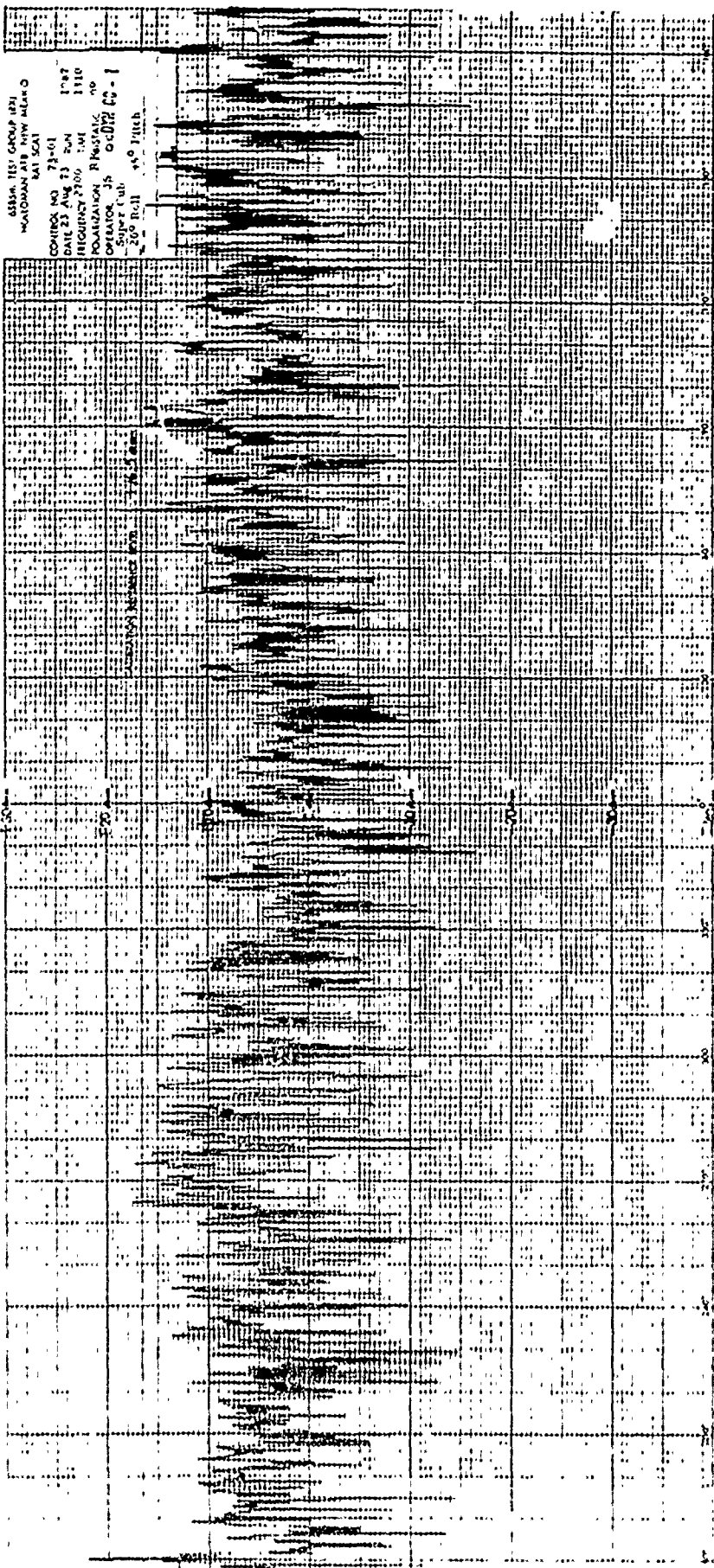


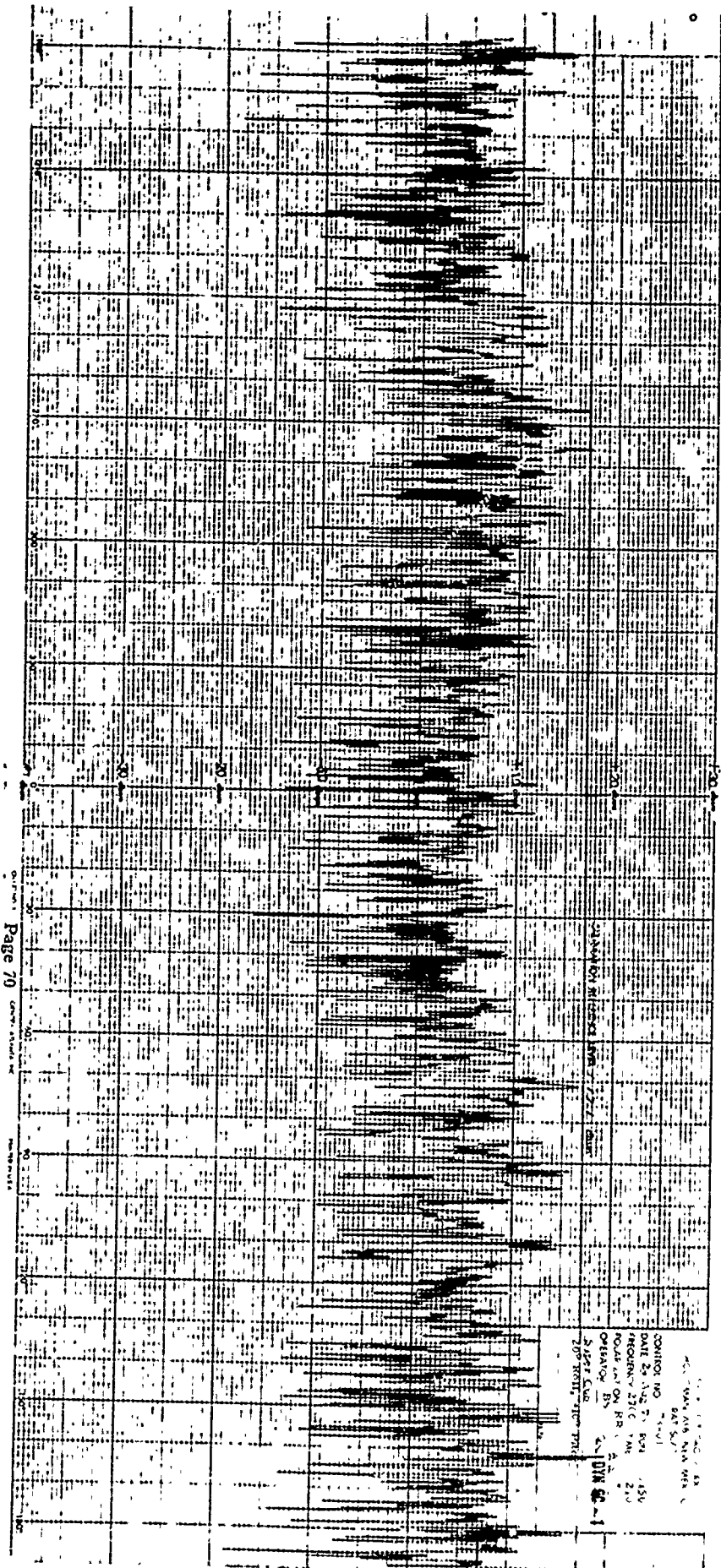
45514 1511 GDS-F 734  
 HORTONMAN LAB, HAWAII  
 SAT SCAT  
 COMPACT NO 73-01  
 DATE 23 Aug 73 RUN 1070  
 FREQUENCY 2760 HAZ 0705  
 POLARIZATION HR BISTATIC 0°  
 OPERATOR JS GC-011  
 Super Cub. 40 Patch  
 Top Rail.





ASSR TEST GROUP 821  
MADISON AIR HW ALKO  
SAT SAT  
CONTROL NO 71-01  
DATE 23 AUG 53 SW 1747  
FREQUENCY 27.89 MHz 1110  
POLARIZATION RHETALIC 90  
OPERATOR JS OGD/22 60-1  
SUPERVISOR J. O. MILLER

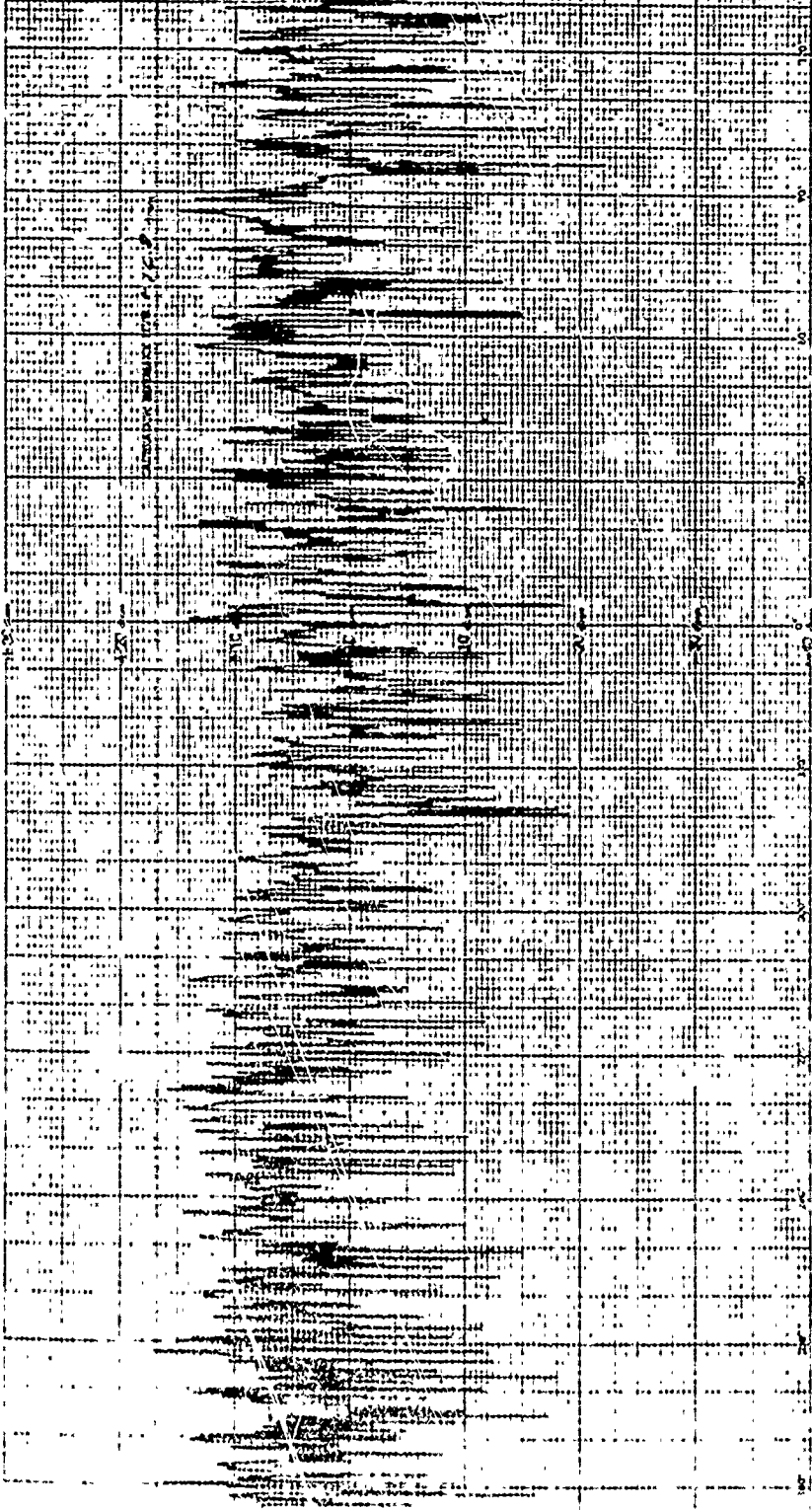


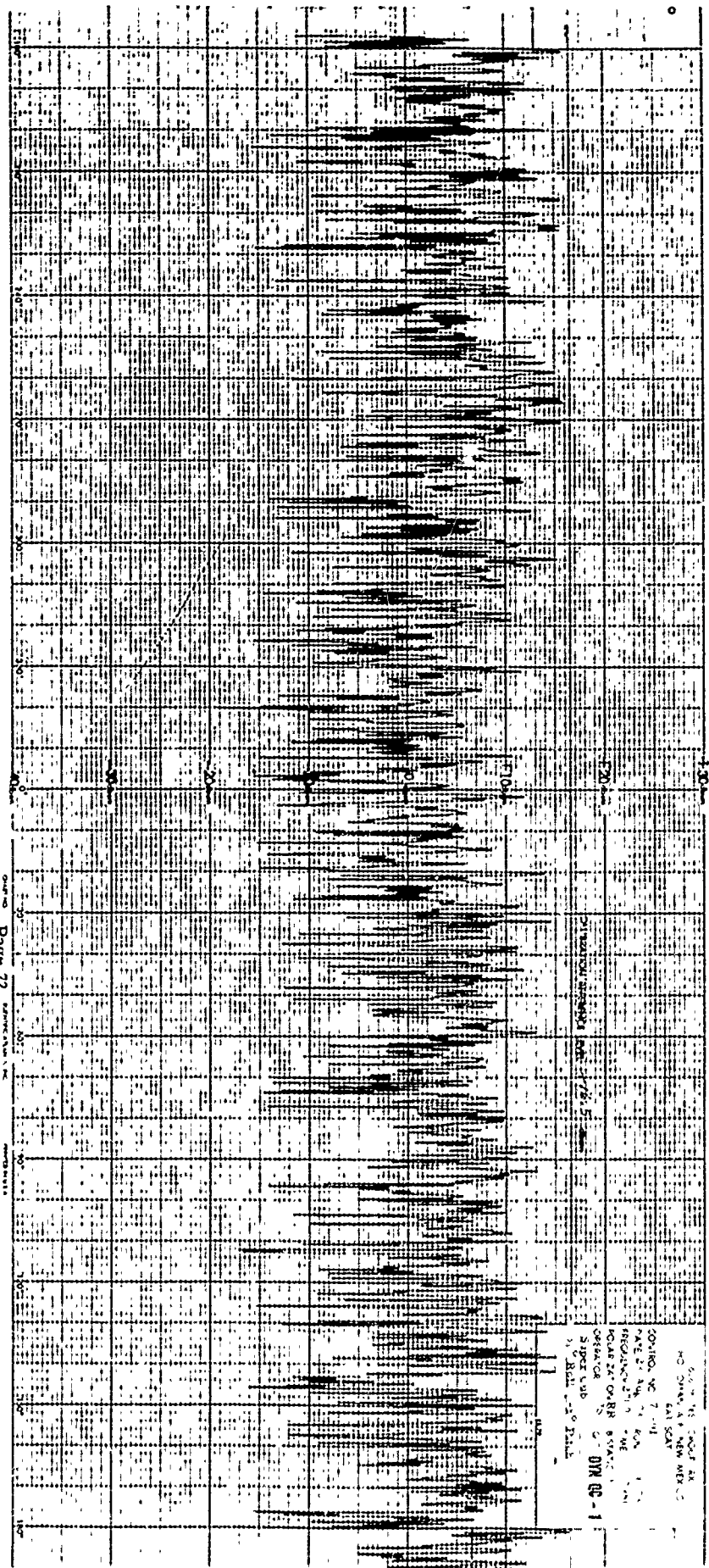


Page 70

CONTROL NO. 44  
 DATE 25 JUL 57  
 RECORDING TIME 210  
 OPERATOR B. J. A. D. W. S. 1  
 SUPERVISOR J. W. T.

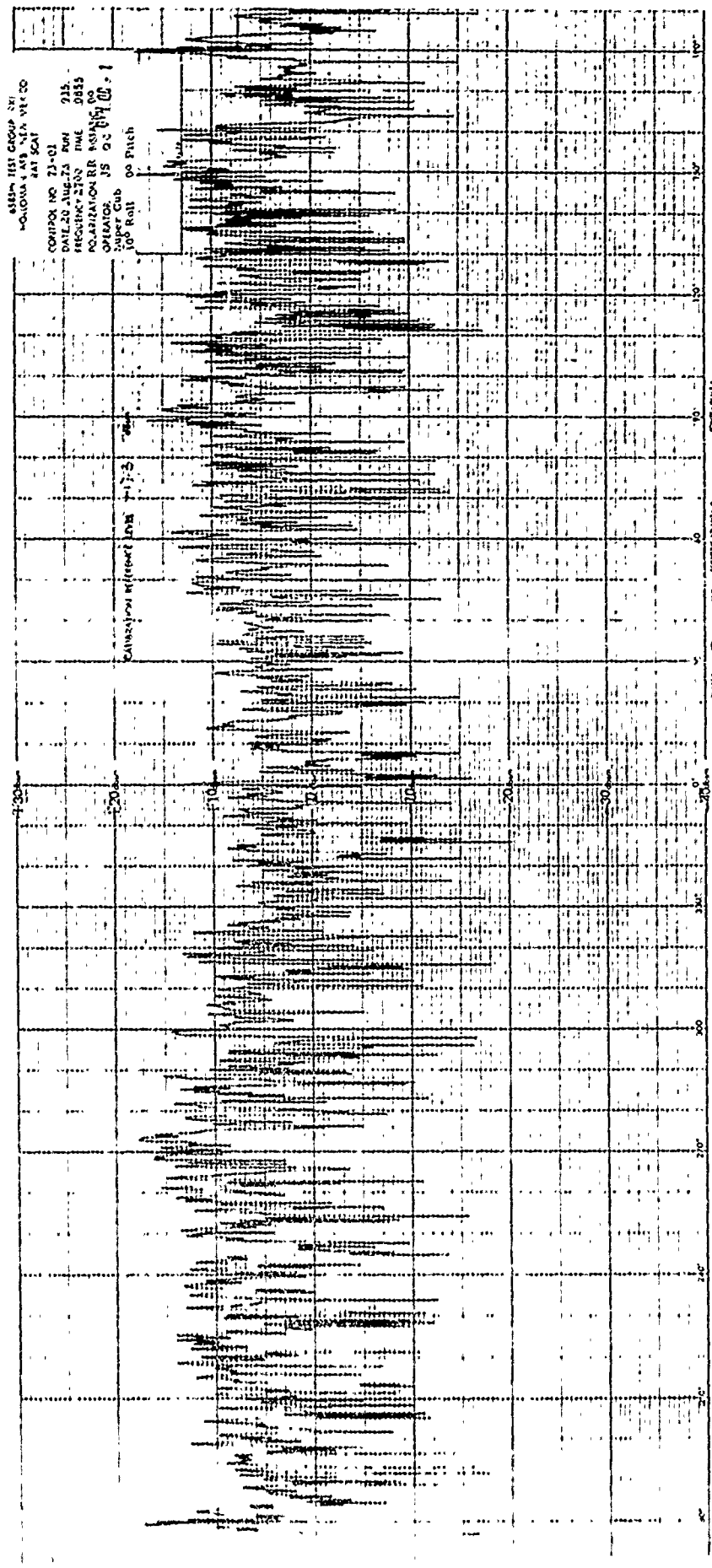
6838 1157 GROUP 18U  
HOLBURN AIA, NEW AREA-C  
LAT 5041  
CONTROL NO. 73-01  
DATE 21 AUG 75 PER 5AS  
FREQUENCY 2700 THRU 3100  
POLARIZATION RR ROTARY, N  
OPERATOR JN QL-DTR 86-1  
SUFF CAP  
NO. E.H.L. - 19 - 1st

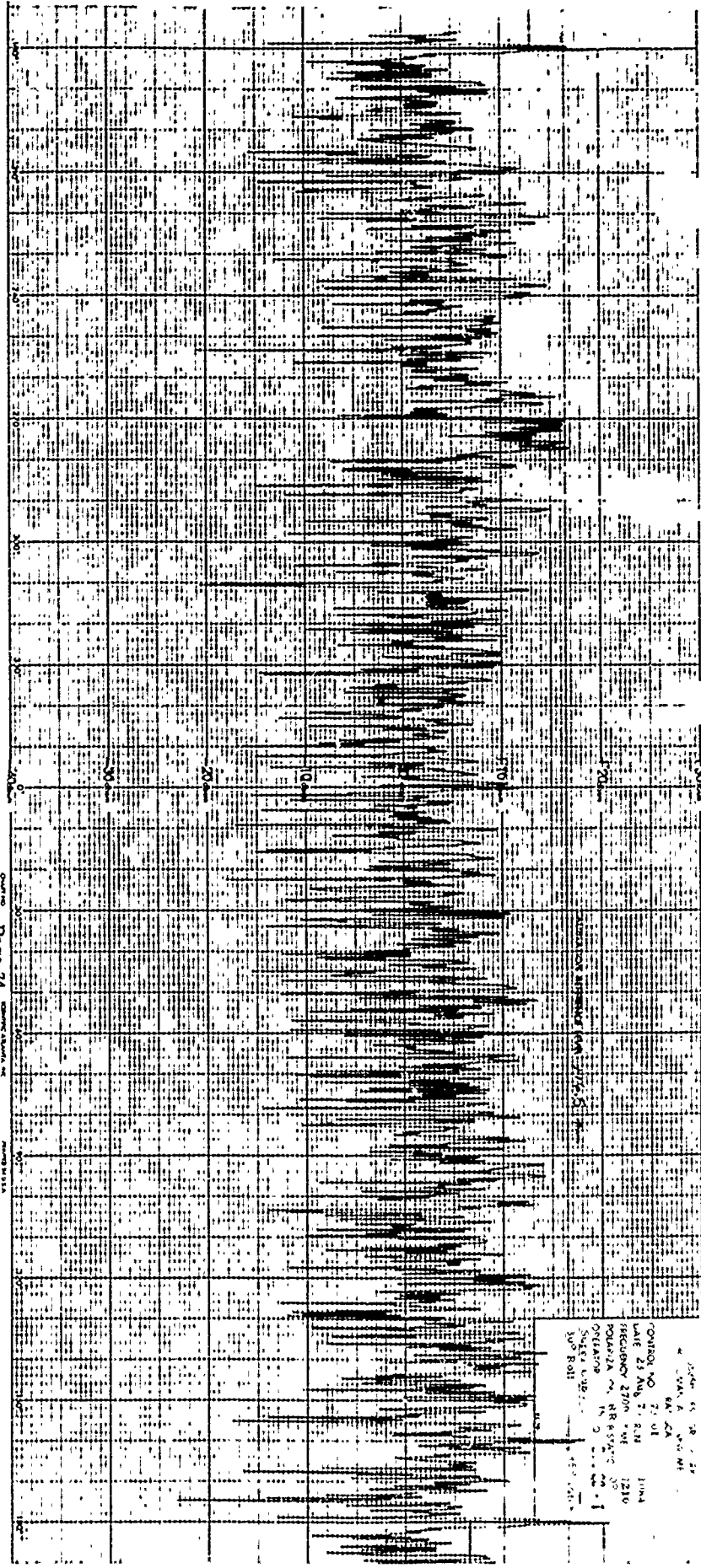




Page 72

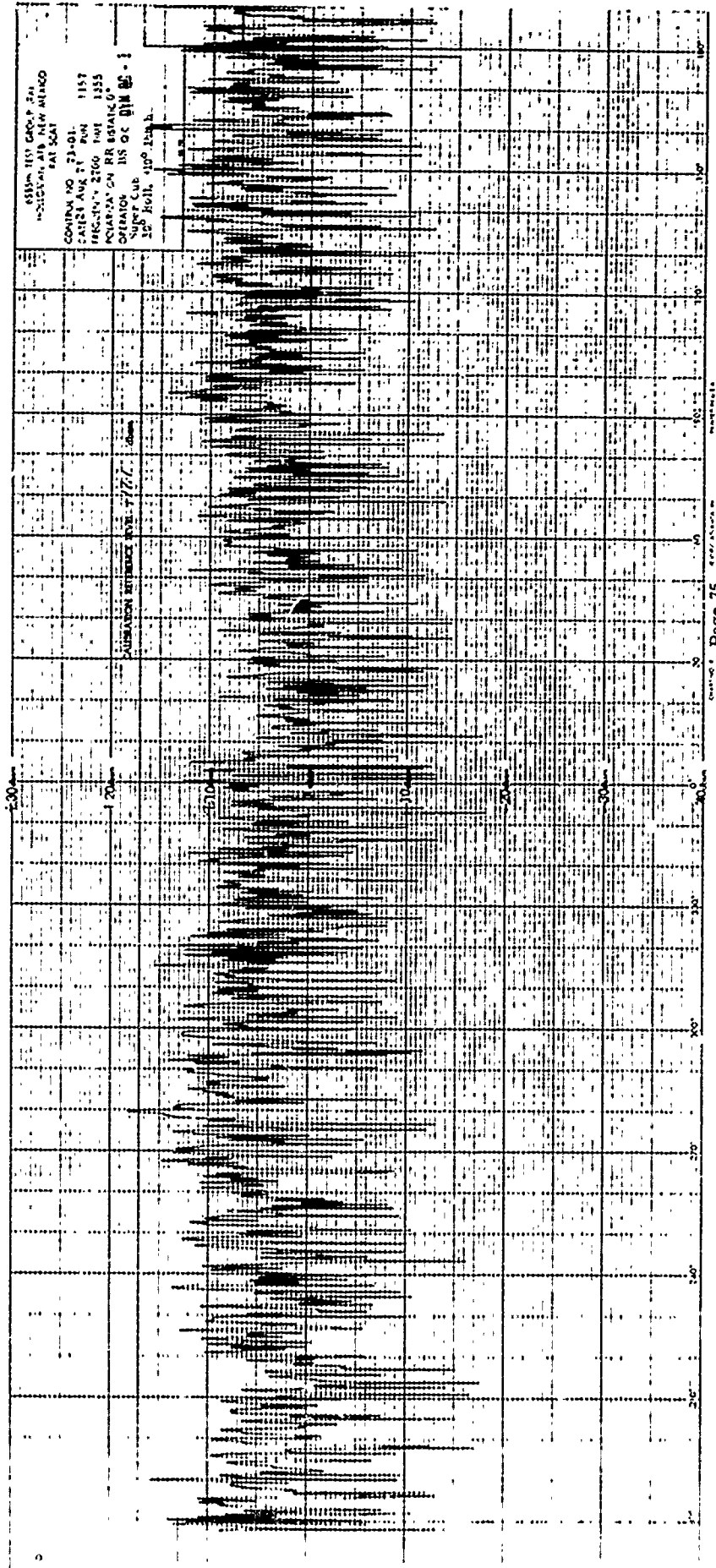
CONTINO, NC 7 101  
 AVE 21 Aug 1968  
 RESOLUTION 1 ME  
 LOCATION ON RR STATE  
 DISTANCE 15 C. DMG DC-1  
 SUPER LAB  
 10. Roll - 20 1/2"



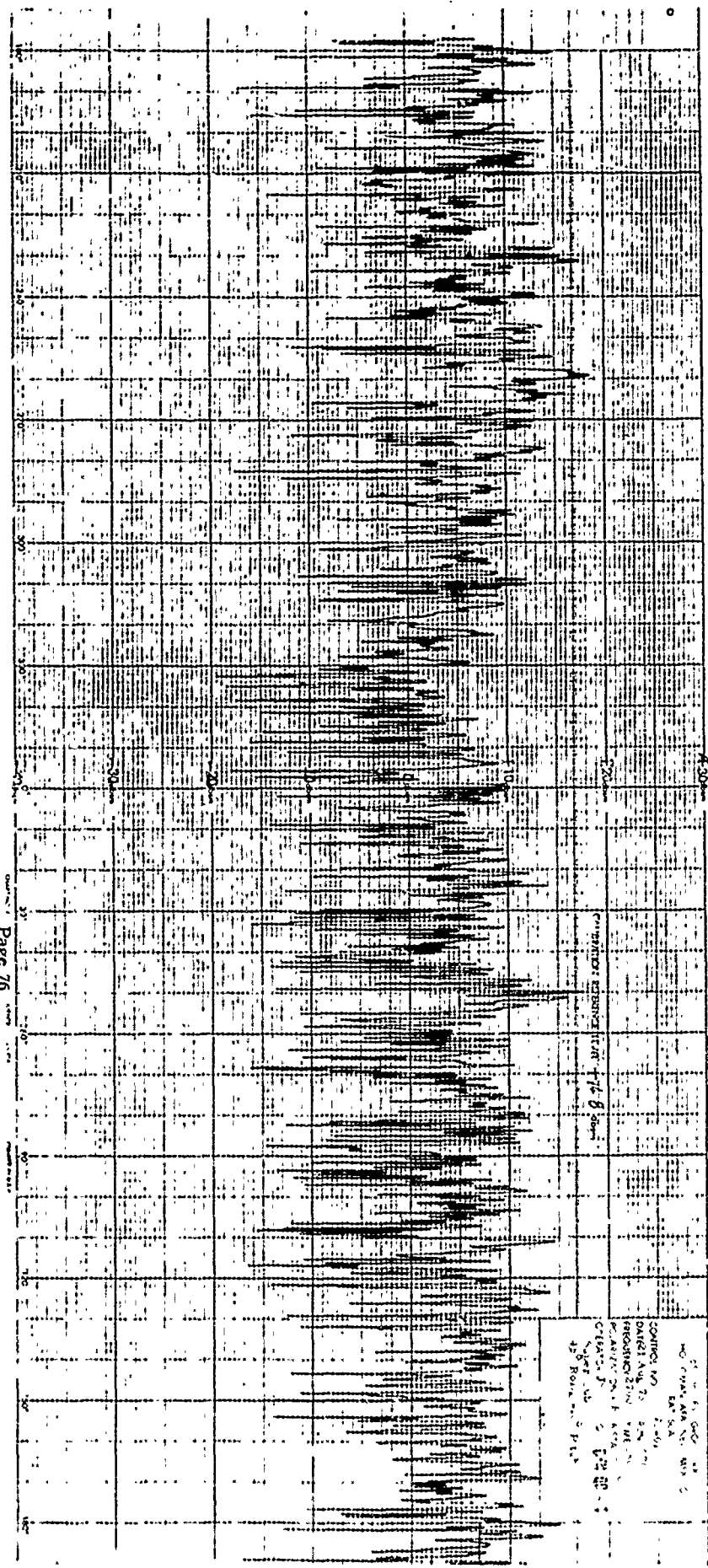


Page 74

CONTROL NO. 71-11  
 DATE 23 AUG 51 2:31 PM  
 FREQUENCY 2000 CPS  
 POLARIZATION R  
 SENSITIVITY 100  
 SCALE 1:1  
 30" Ball

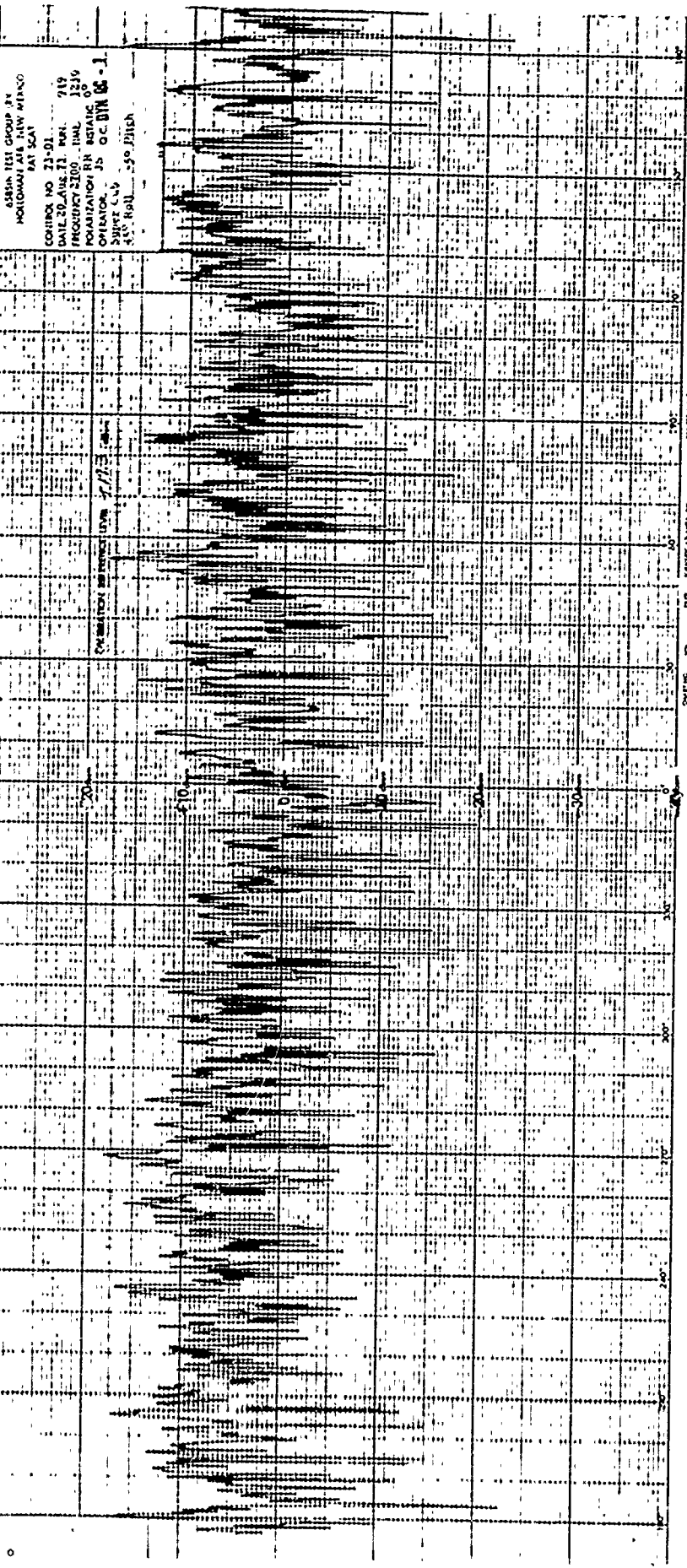




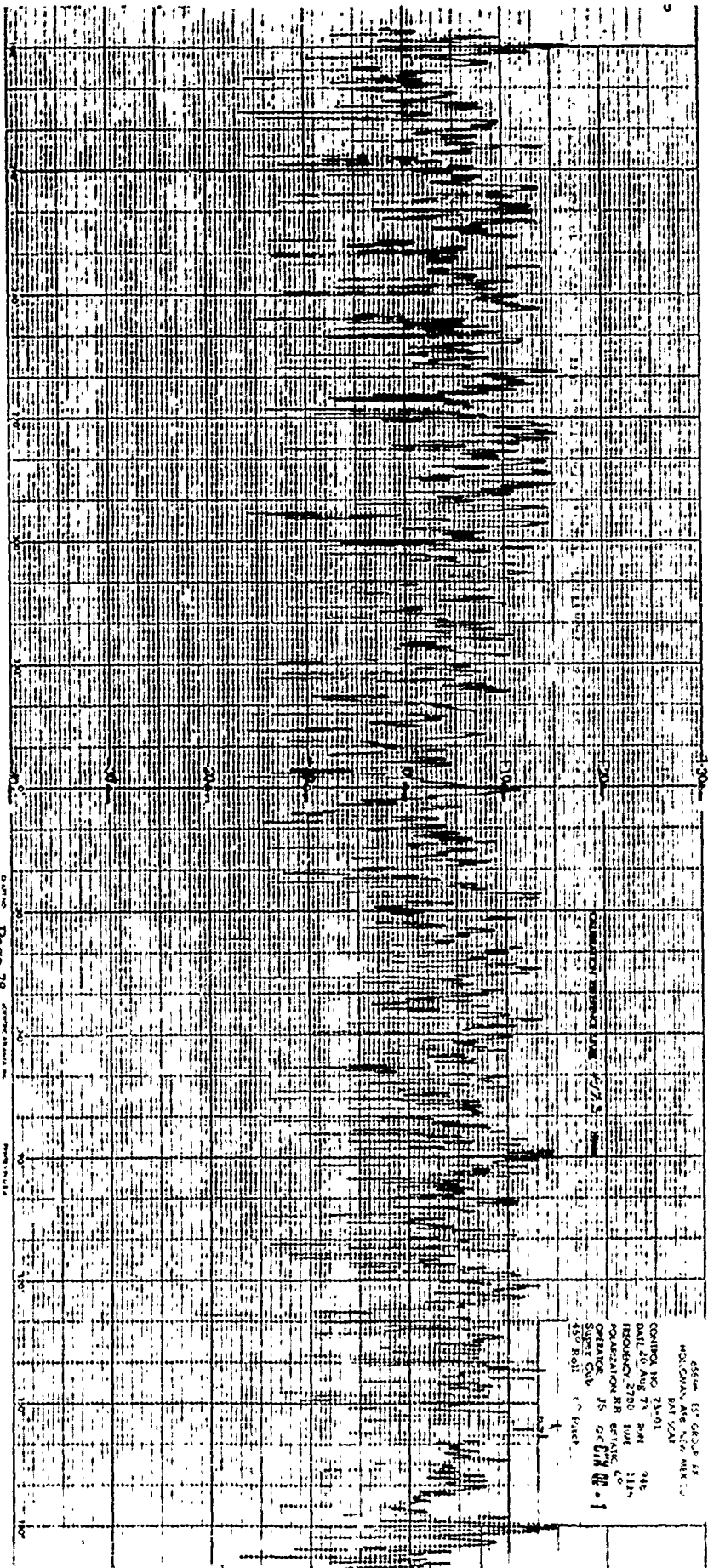


Page 76

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 CONTROL NO. 1002  
 CONTROL NO. 1003  
 CONTROL NO. 1004  
 CONTROL NO. 1005  
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 CONTROL NO. 1007  
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 CONTROL NO. 1009  
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 CONTROL NO. 1018  
 CONTROL NO. 1019  
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 CONTROL NO. 1024  
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 CONTROL NO. 1080  
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 CONTROL NO. 1097  
 CONTROL NO. 1098  
 CONTROL NO. 1099  
 CONTROL NO. 1100

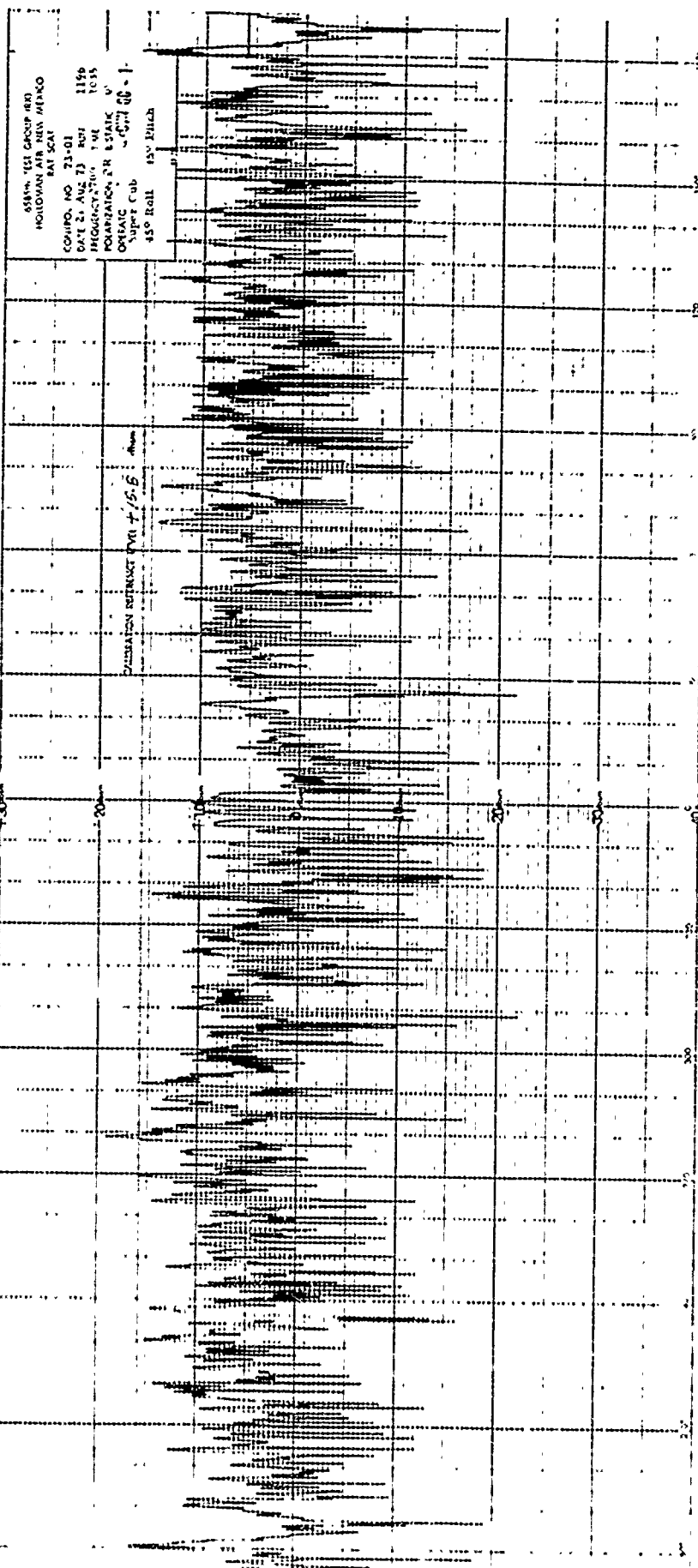


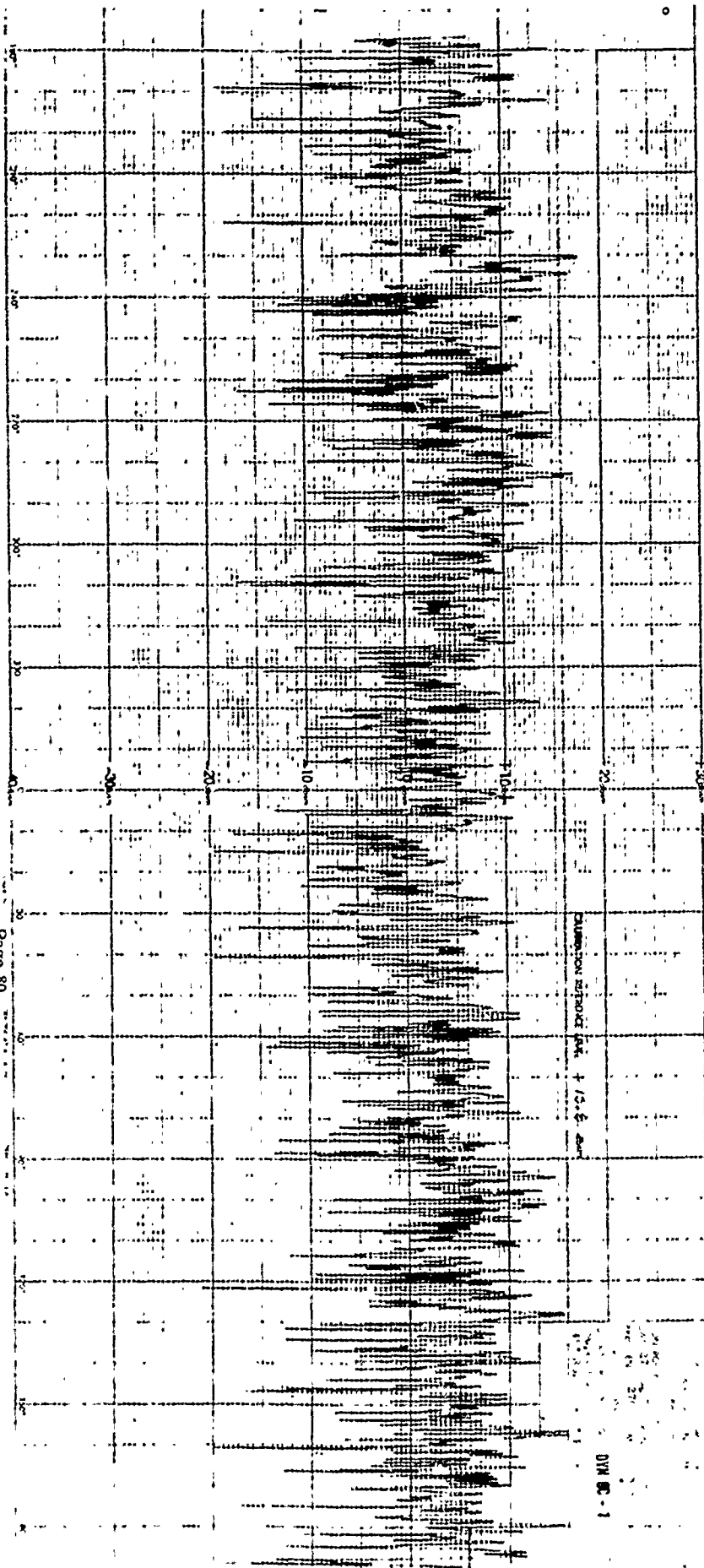
ASSRA TEST GROUP BY  
 HOLLOWAY LAW RENCO  
 PAT 547  
 CONTROL NO. 71-01  
 DATE 20 AUG 71 919  
 FREQUENCY 2000 HZ  
 POSITIVE IN METRIC  
 OPERATOR JS CC 0111 00-1  
 SHEET 64 59 DLEN



55174 151 GROUP (R0)  
HOLLOWAY ATR NEW MEXICO  
BAT SCAT  
COMPO. NO 73-01  
DATE 21 AUG 73 RPT 1159  
INTEGRATION TIME 1035  
POLARIZATION P R 5/161K V  
ORFAC  
Super Cub  
45° Roll 15° Roll

EXPLANATION REFRACT (VI) + 15.5

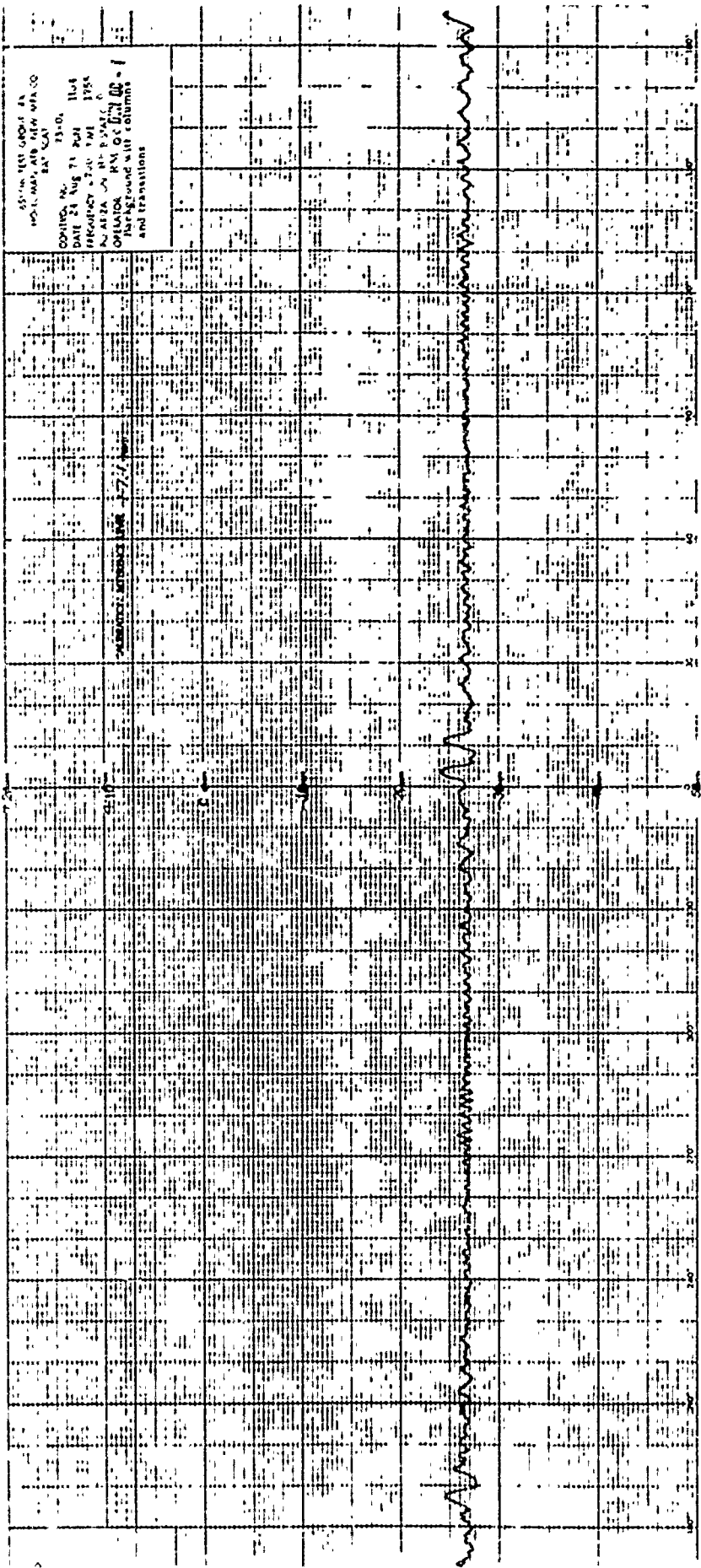




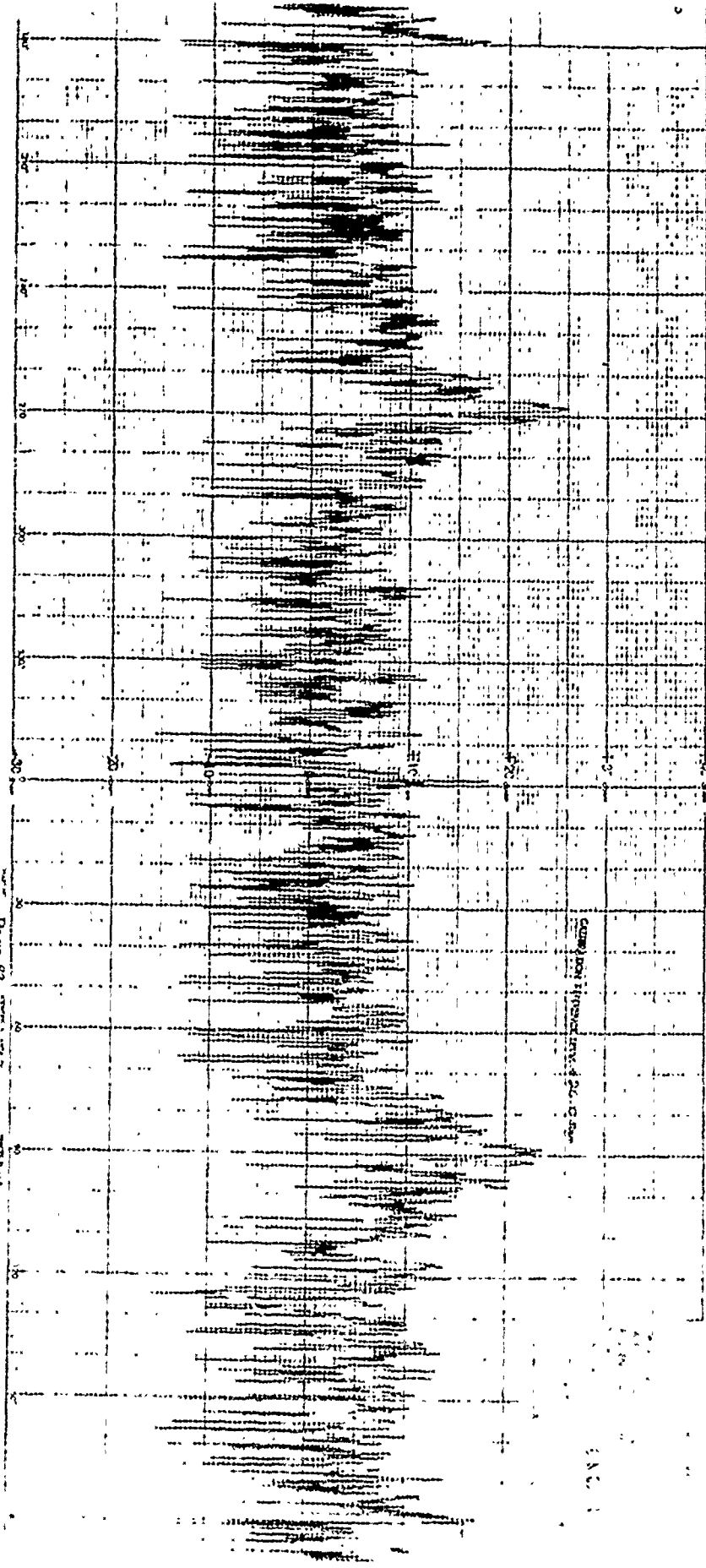
Page 80

Dimension standard part + 1/32 - 200

DVM 8-1

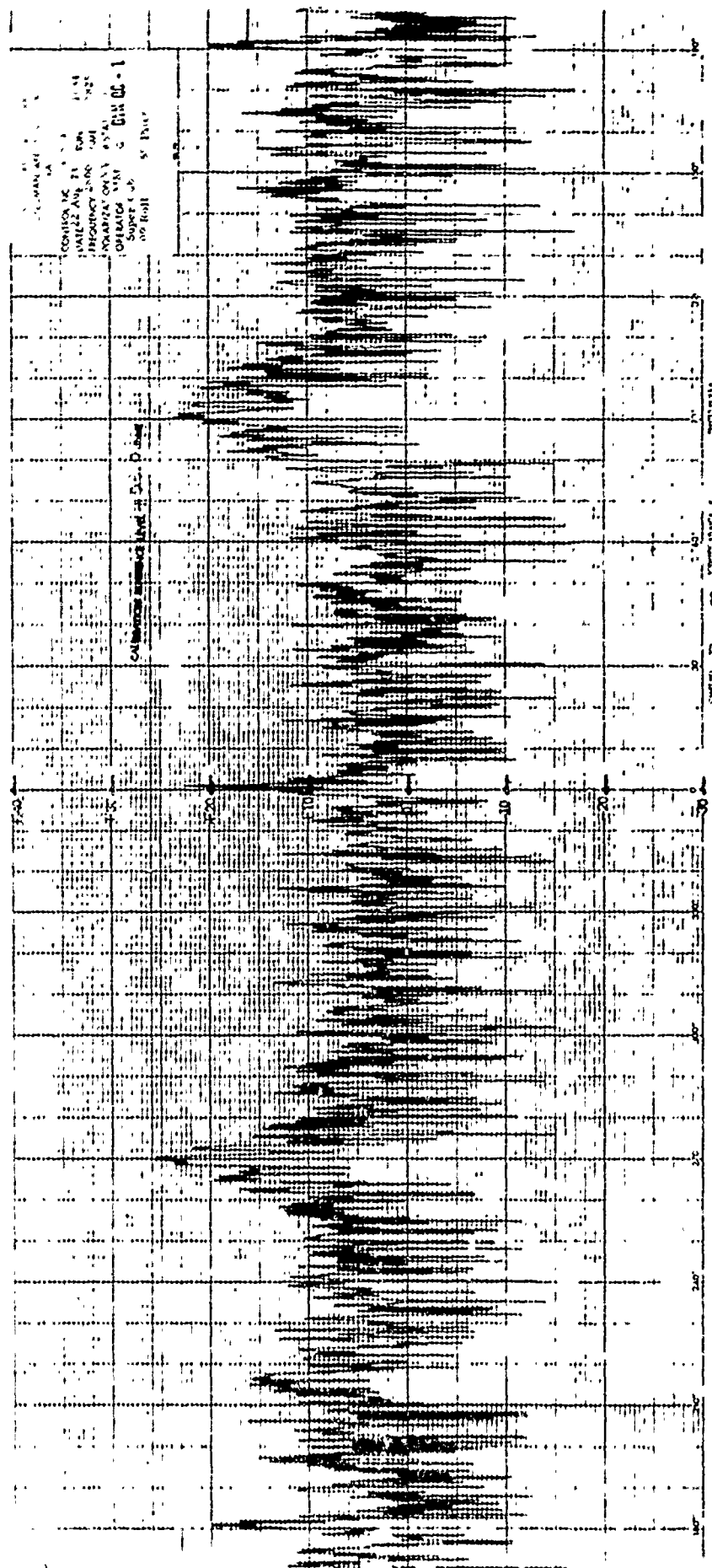


6



General Inspection of 24-10-82

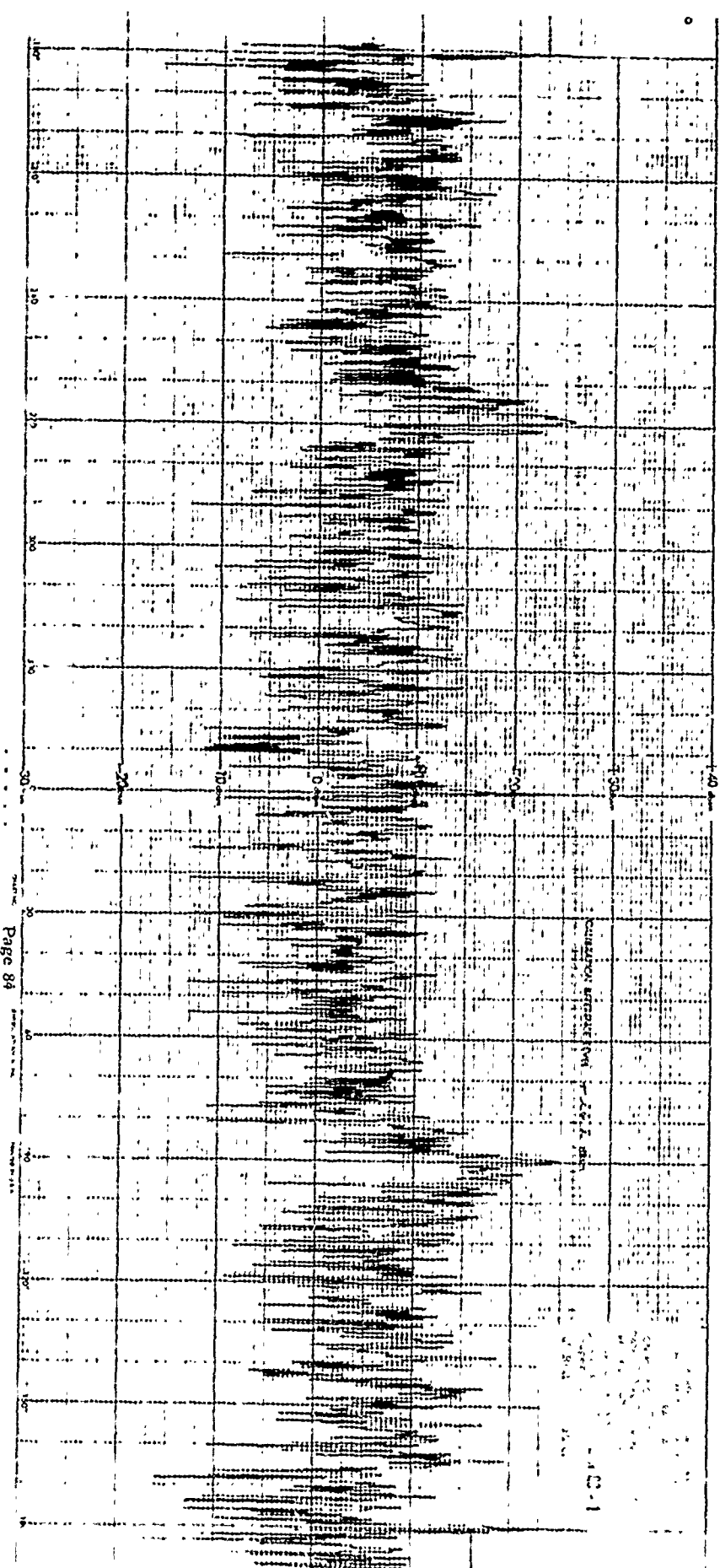
Page 1



COMMERCIAL BANK  
100 BOSTON ST. BOSTON  
MASSACHUSETTS  
CORPORATED  
1852  
PROPERTY BANK  
INCORPORATED  
1852  
CHICAGO  
SUPERIOR  
ST. PAUL

Calligraphic material used in this drawing

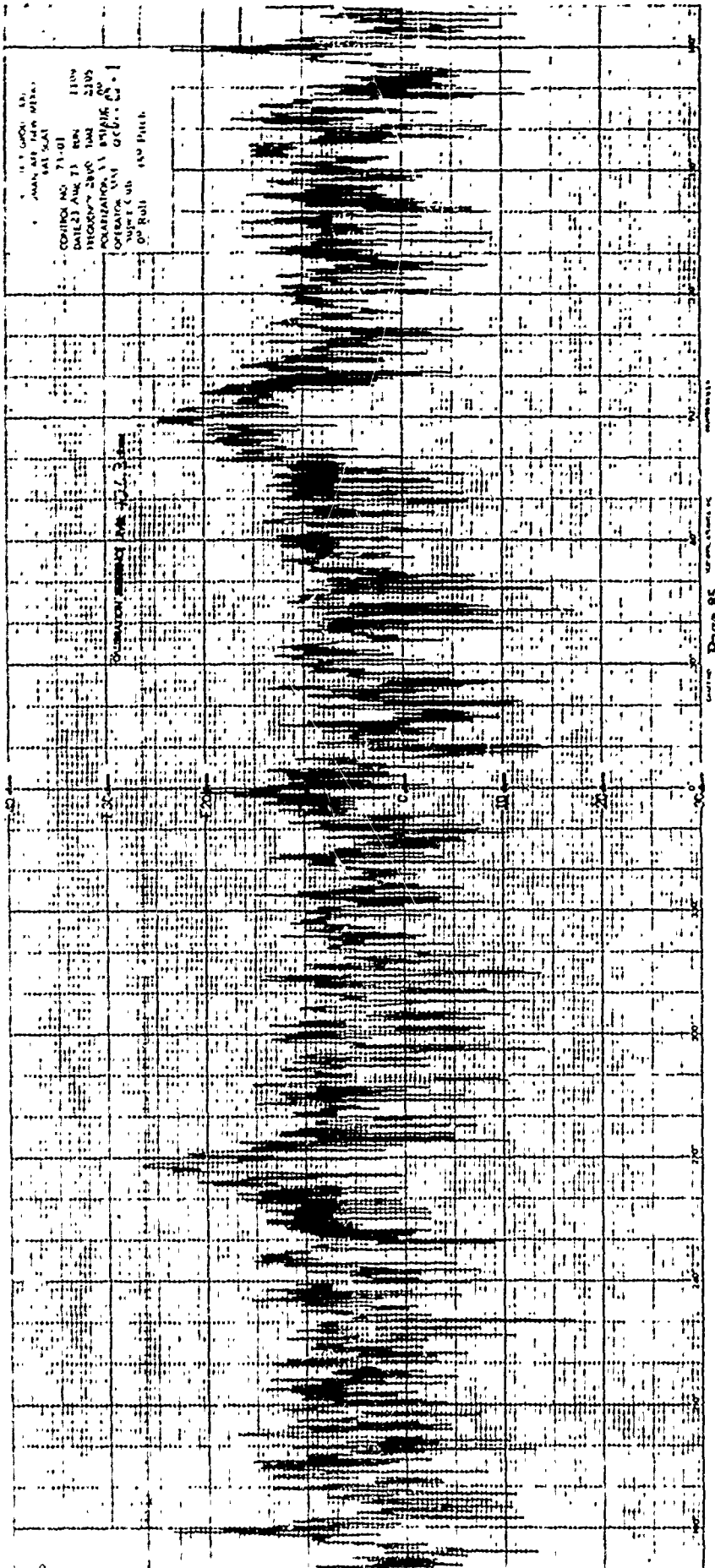




Page 84

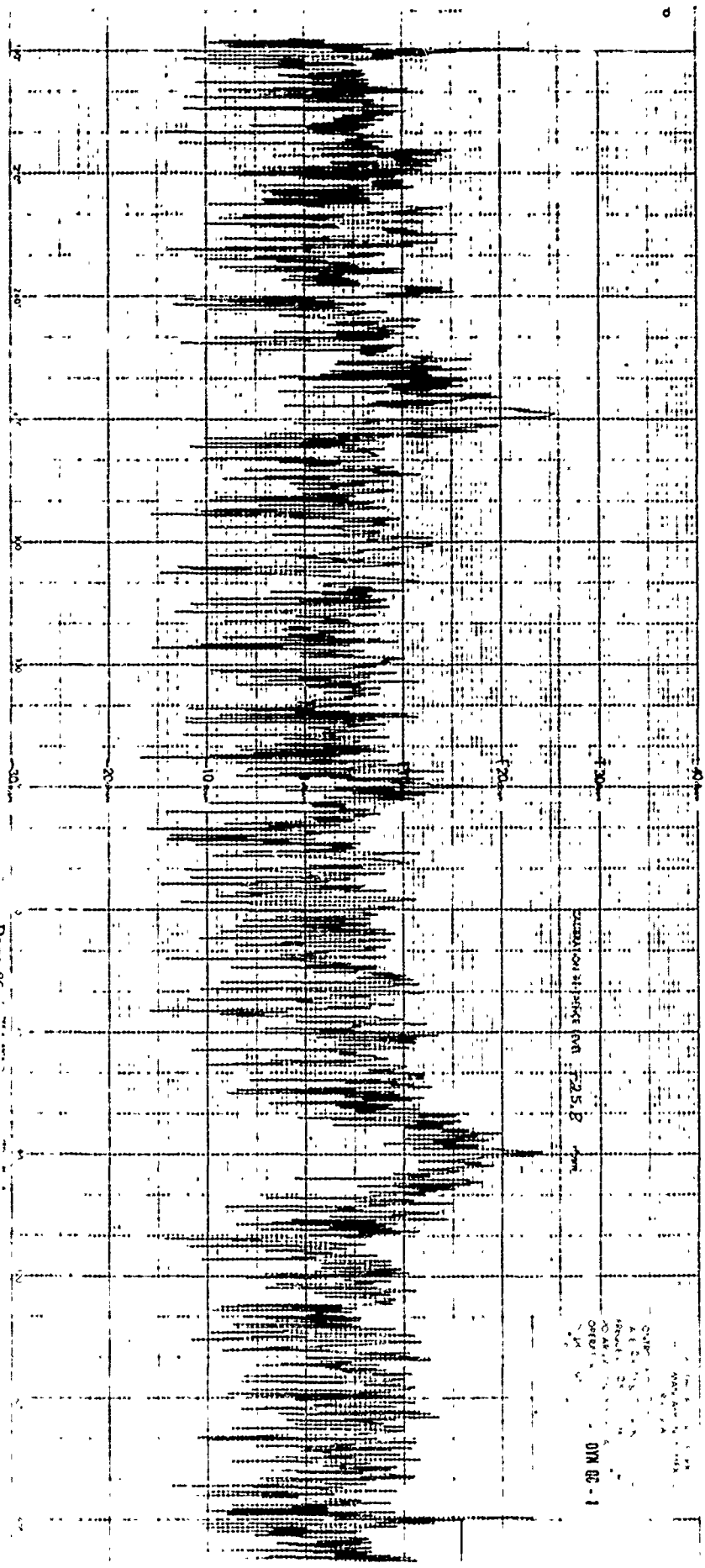
CONSTRUCTION SPECIFICATIONS

SECTION 12000

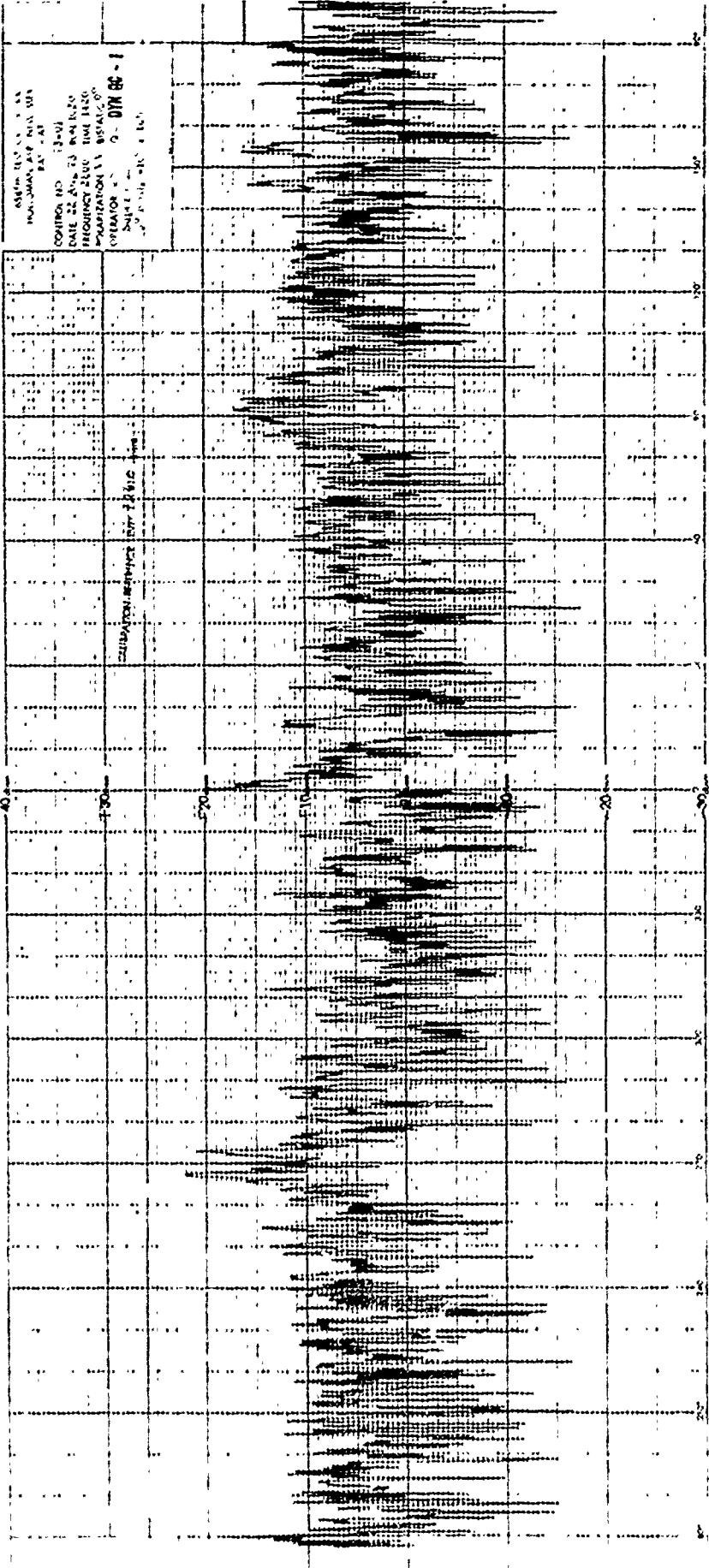


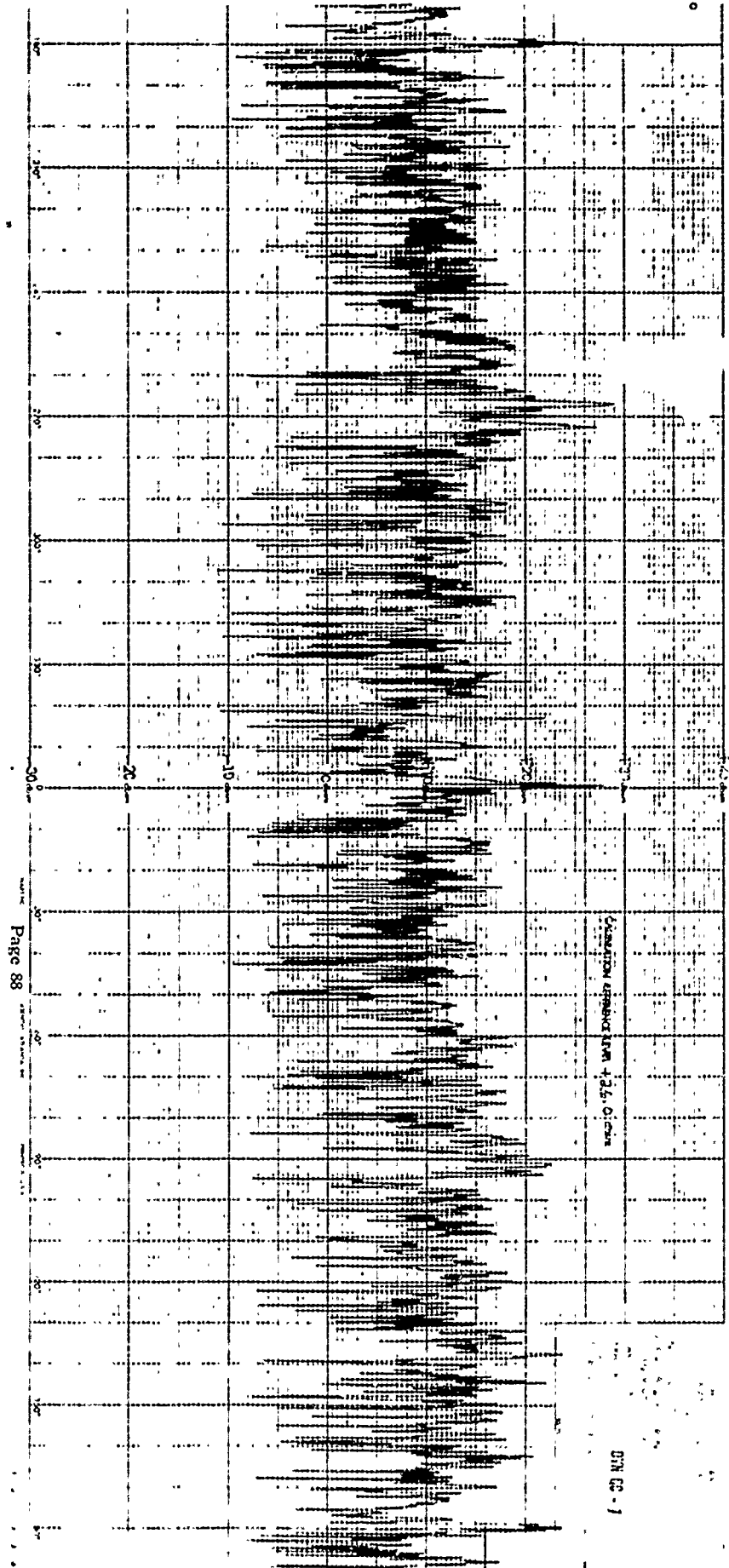
15 15000 45  
 JAPAN AIR FORCE METER  
 SAT. 5041  
 CONTROL NO. 71-01  
 DATE 27 AUG 73 RUN 1100  
 THORNTON SINC 1001 2105  
 POLARIZATION 11 051216 00  
 OPERATOR VVA GCB 22 1  
 Super C ub 450 Patch  
 0th Roll

SUMMARY NUMBER 200 207 208  
 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000



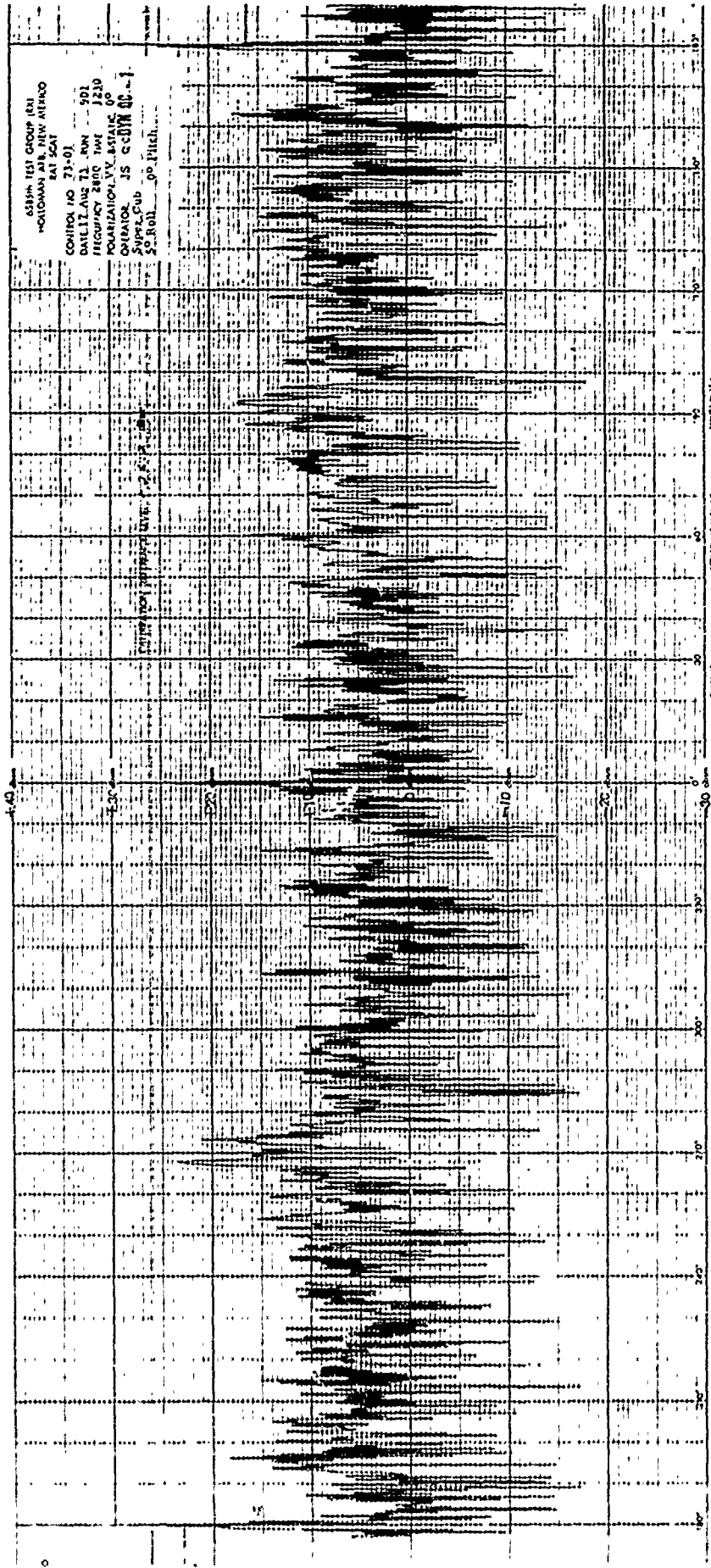
1-88 NIO  
 A. L. C.  
 C. J. P.  
 MAY 1988

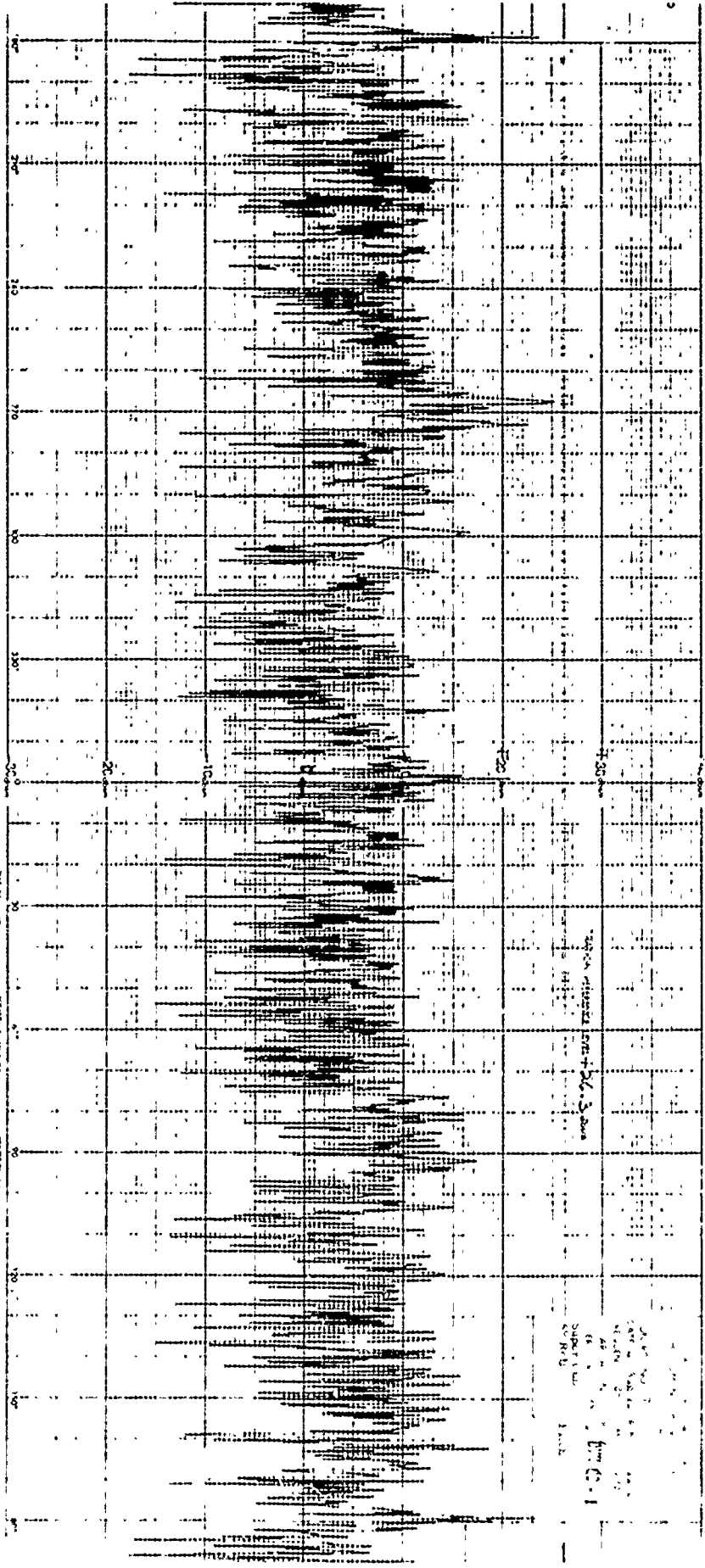




OPERATION OF THE UNIT AT 2.0 GHz

DN 60 - 1

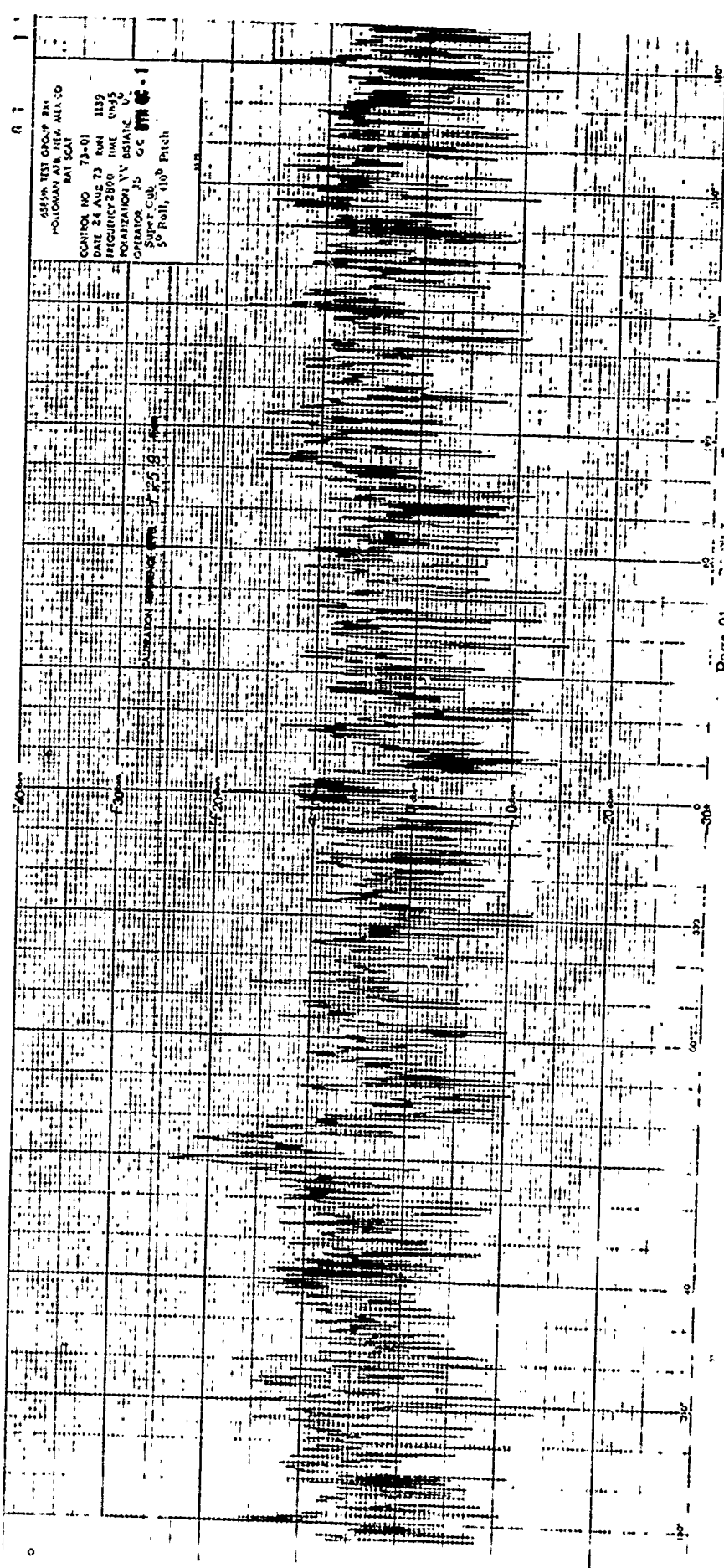




Page 90

Approved by  
 \_\_\_\_\_  
 Superintendent  
 of Mills

Form C-1

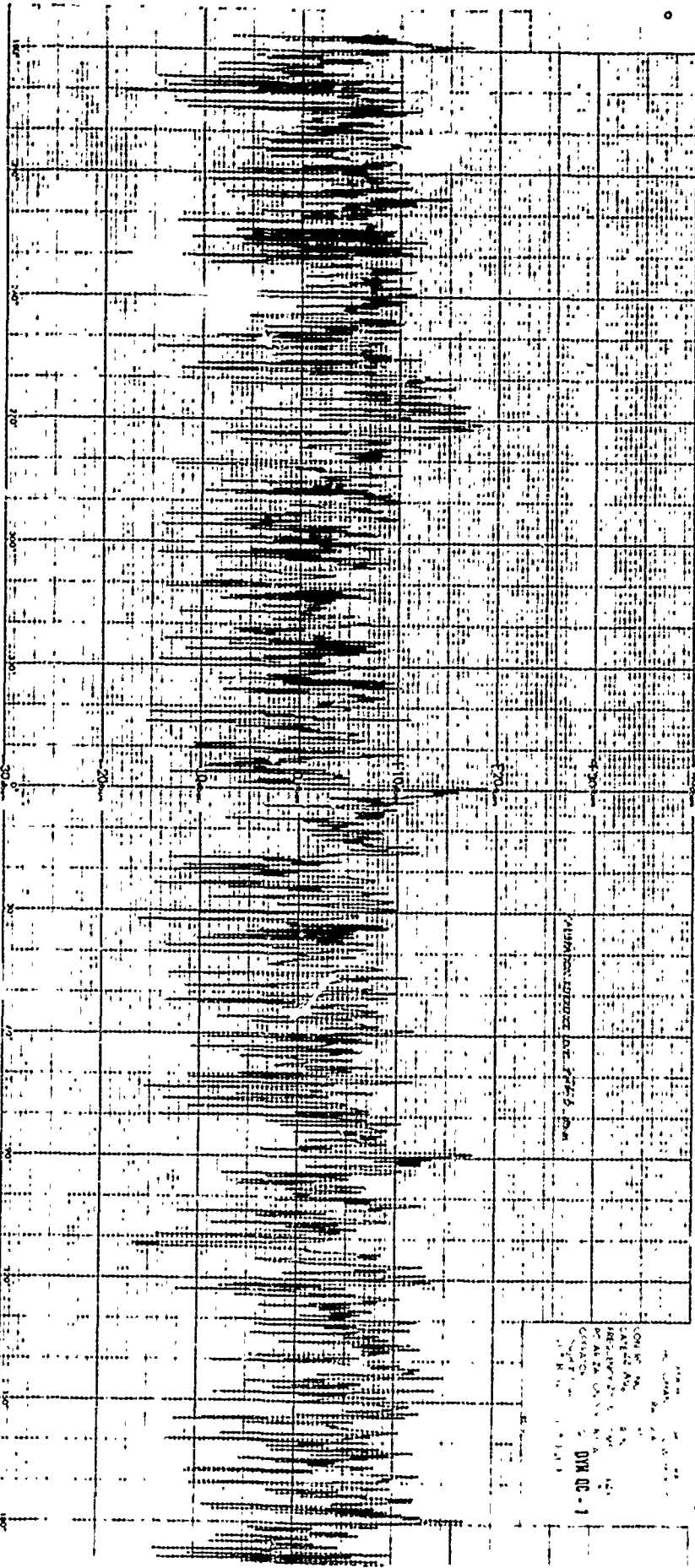


R 1

15594 151 GROUP BK  
 POLYMER 172, 181, 180  
 MAY 1964  
 CONTROL NO 73-01  
 DATE 24 AUG 73 RMA 1139  
 REGISTRY 2800 TIME 0935  
 ORGANIZATION VV BSI/ALC U  
 OPERATOR JS GC  
 50 Roll, 410 Pitch

ALTIMETER 10000 FT. 11-25-68

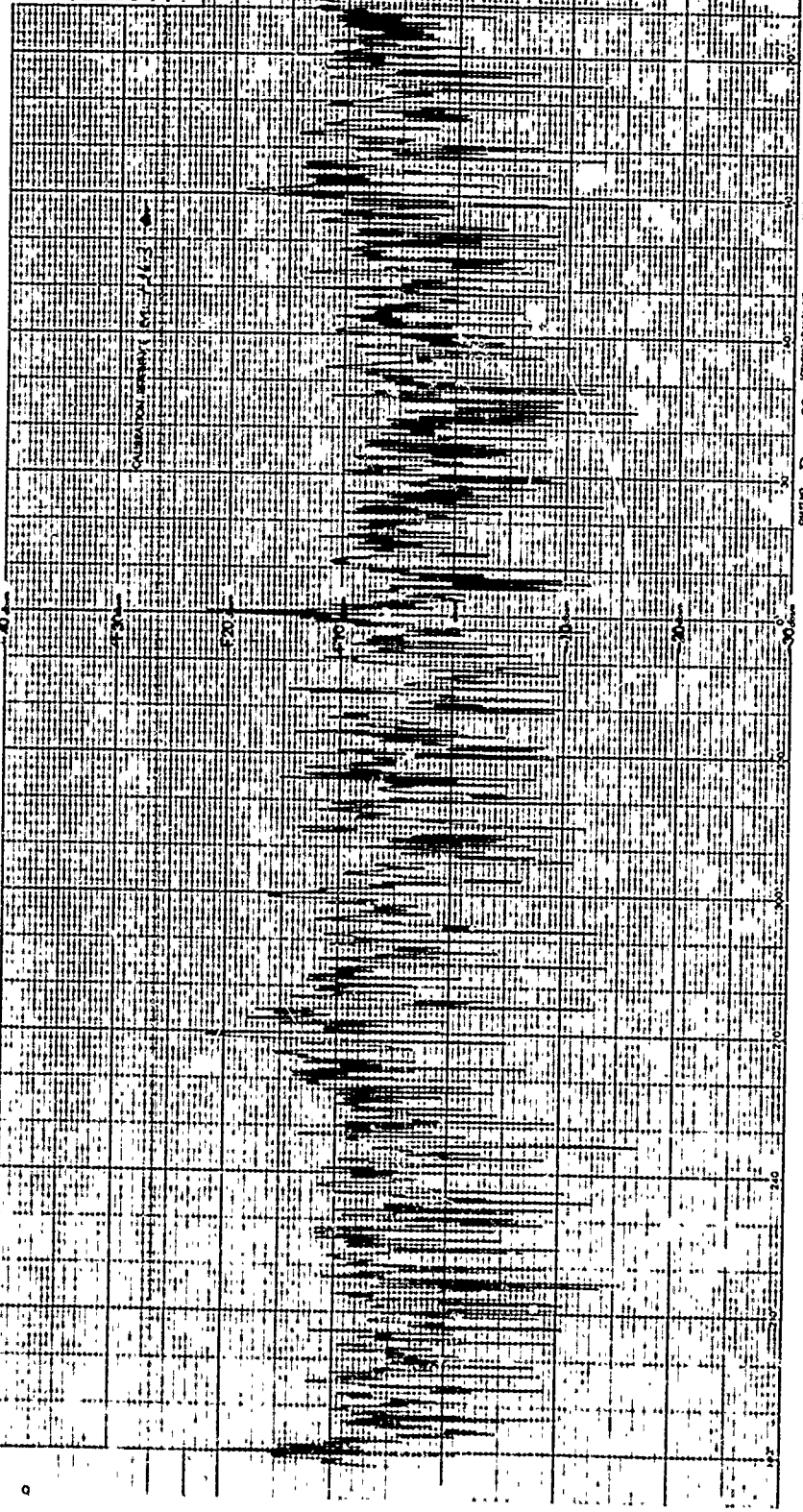


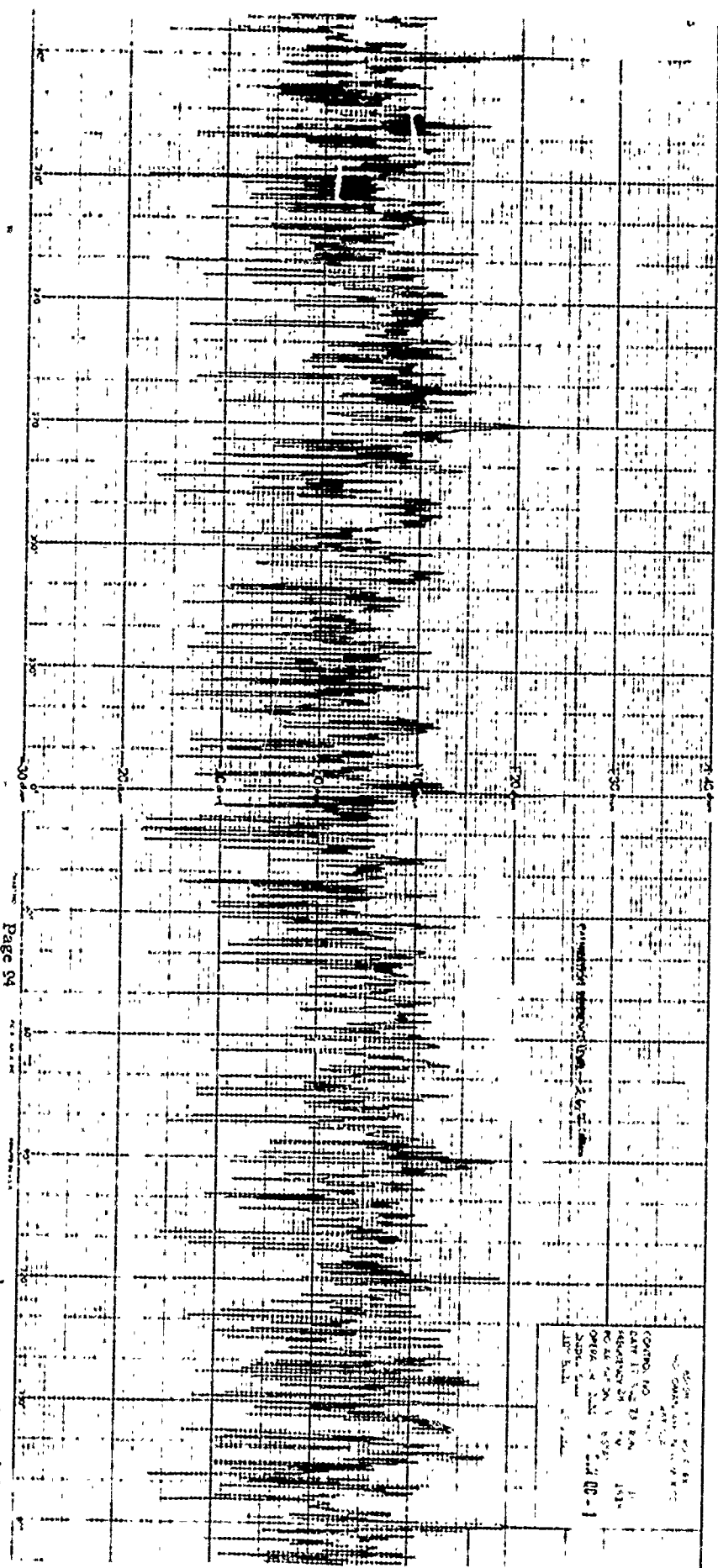


Page 92

DIVISION OF  
 RECORDS &  
 COMMUNICATIONS  
 U.S. AIR FORCE  
 WASHINGTON, D.C. 20330  
 FORM NO. 1  
 1-64

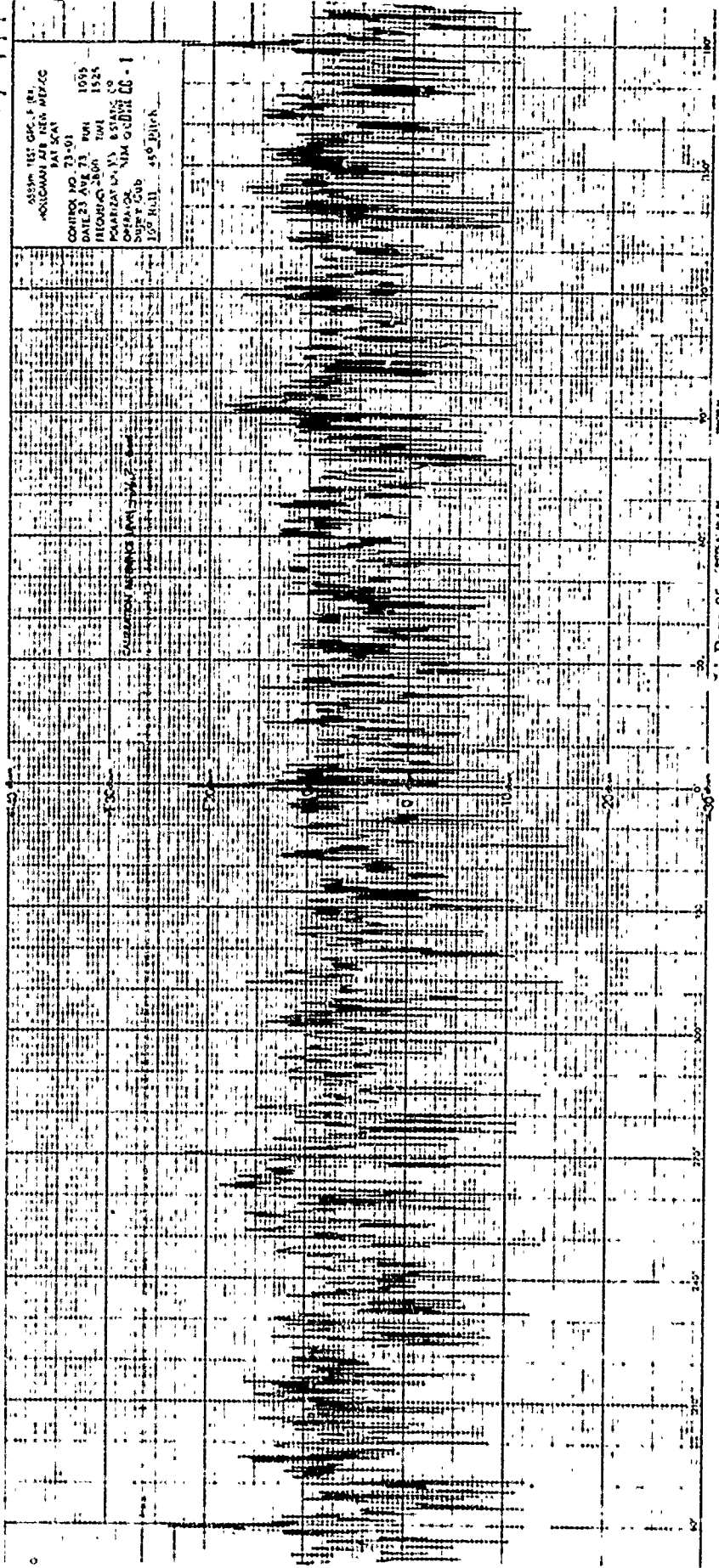
45814 151 OSCIP 101  
MONTGOMERY AIR STATION  
CONF. NO. 73-01 1042  
DATE 23 AUG 22 1942  
FREQUENCY 2830 TIME 0720  
OPERATION TV BISTATIC  
SITE 7. CUB  
10. 1011 -9. 11114

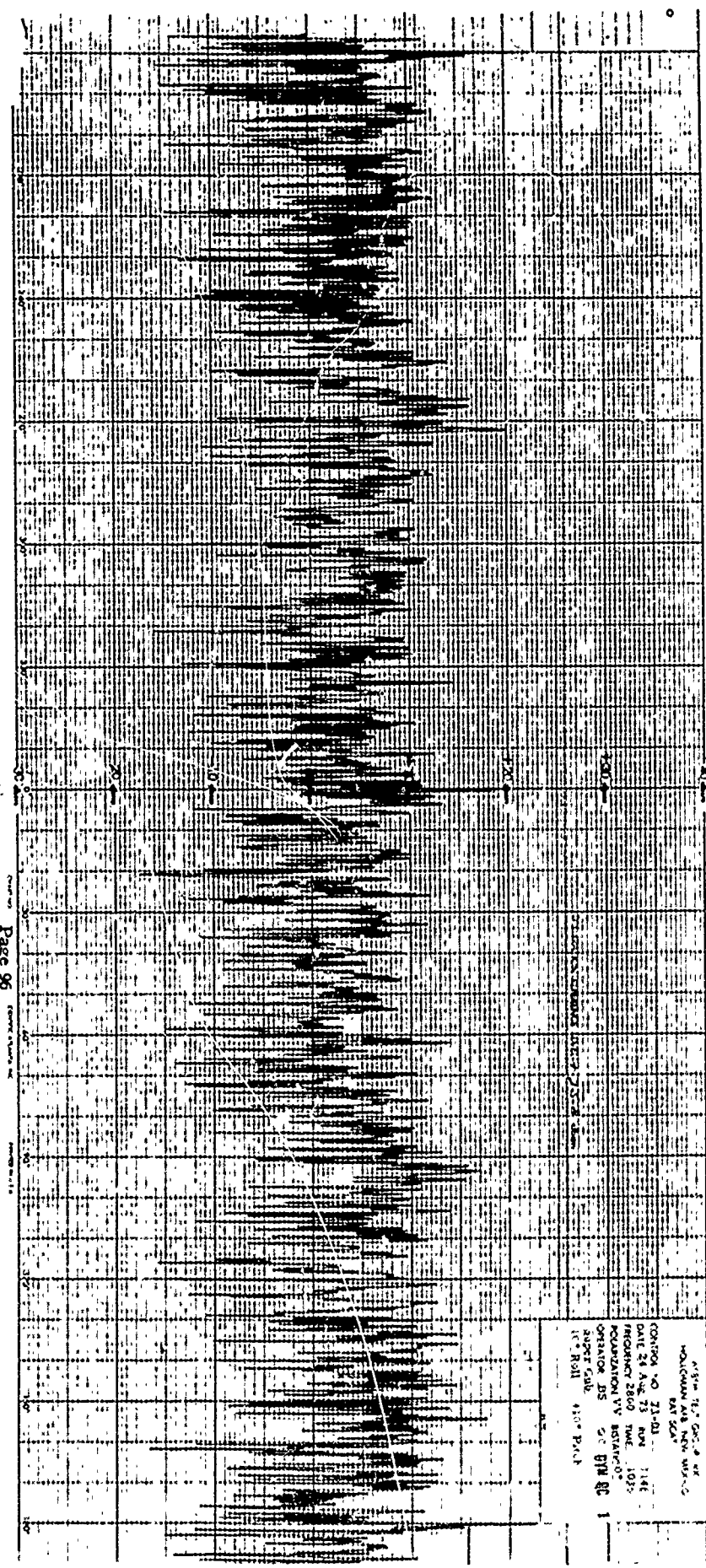




Page 04

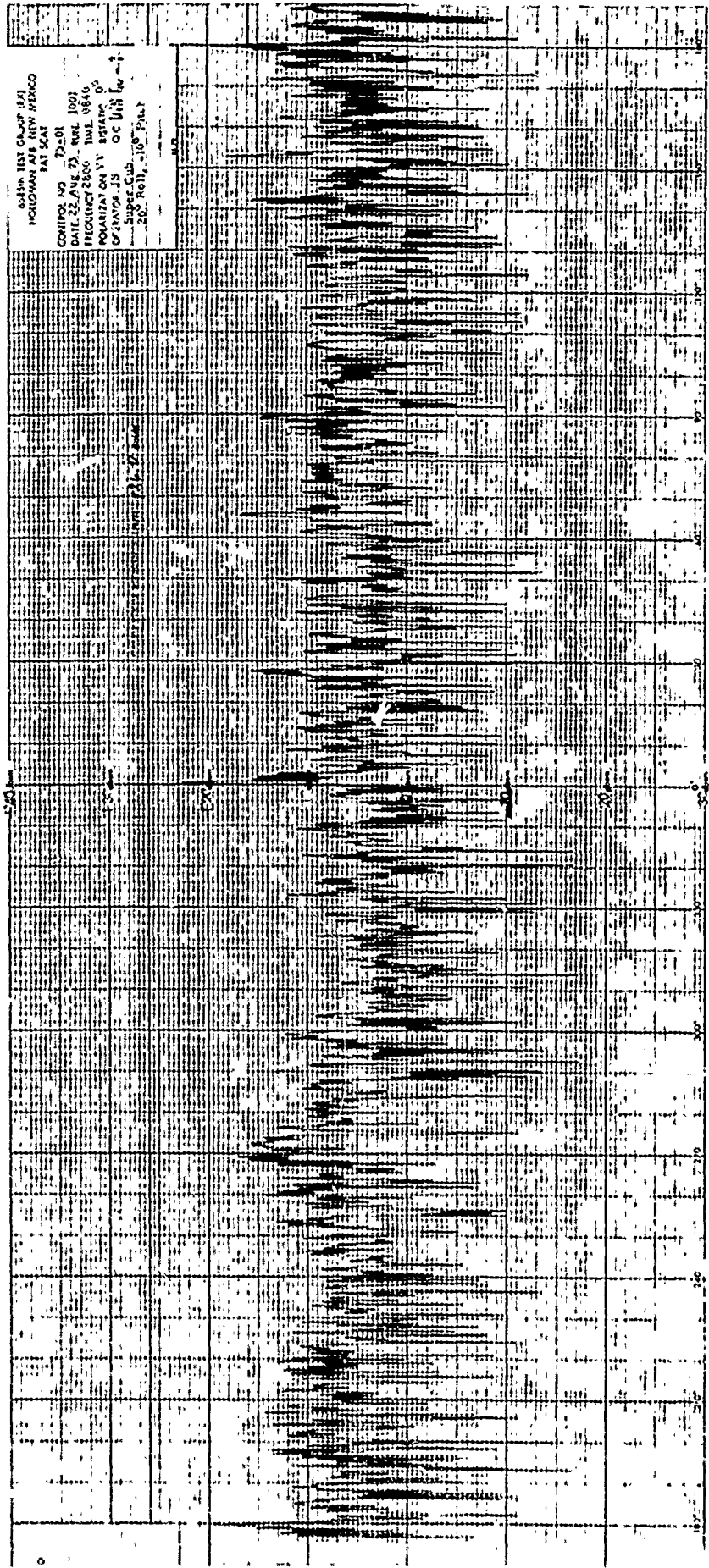
CONCRETE  
 FOUND. NO. 100-1  
 DATE 11-15-54  
 DRAWING BY  
 CHECKED BY  
 APPROVED BY  
 100-1

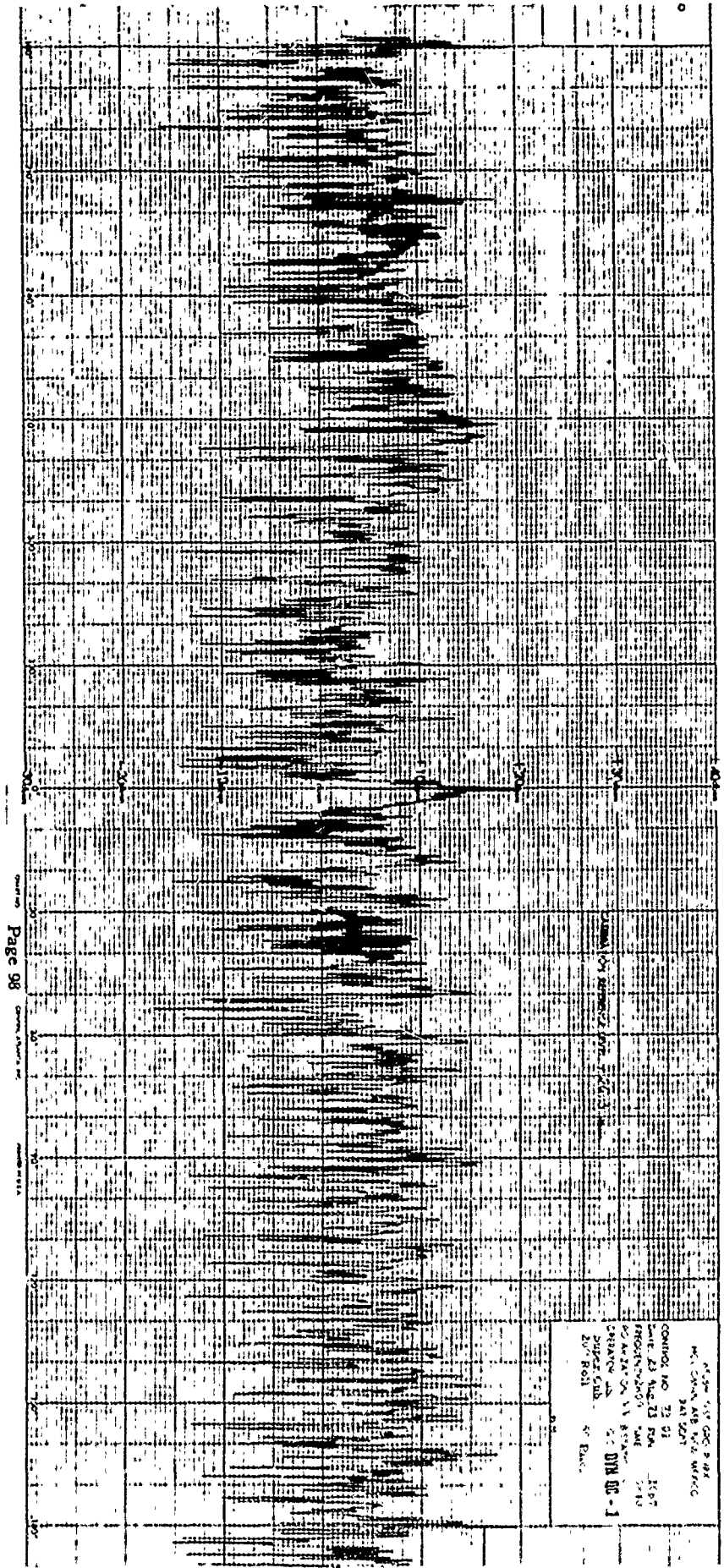




Page 96

11/15/74 7:00 AM  
 MONITORING UNIT  
 1147  
 DATE 11/15/74  
 PRECINCT 1035  
 COUNTY 1035  
 OPERATOR JES  
 REPORT MADE BY JES  
 11/15/74



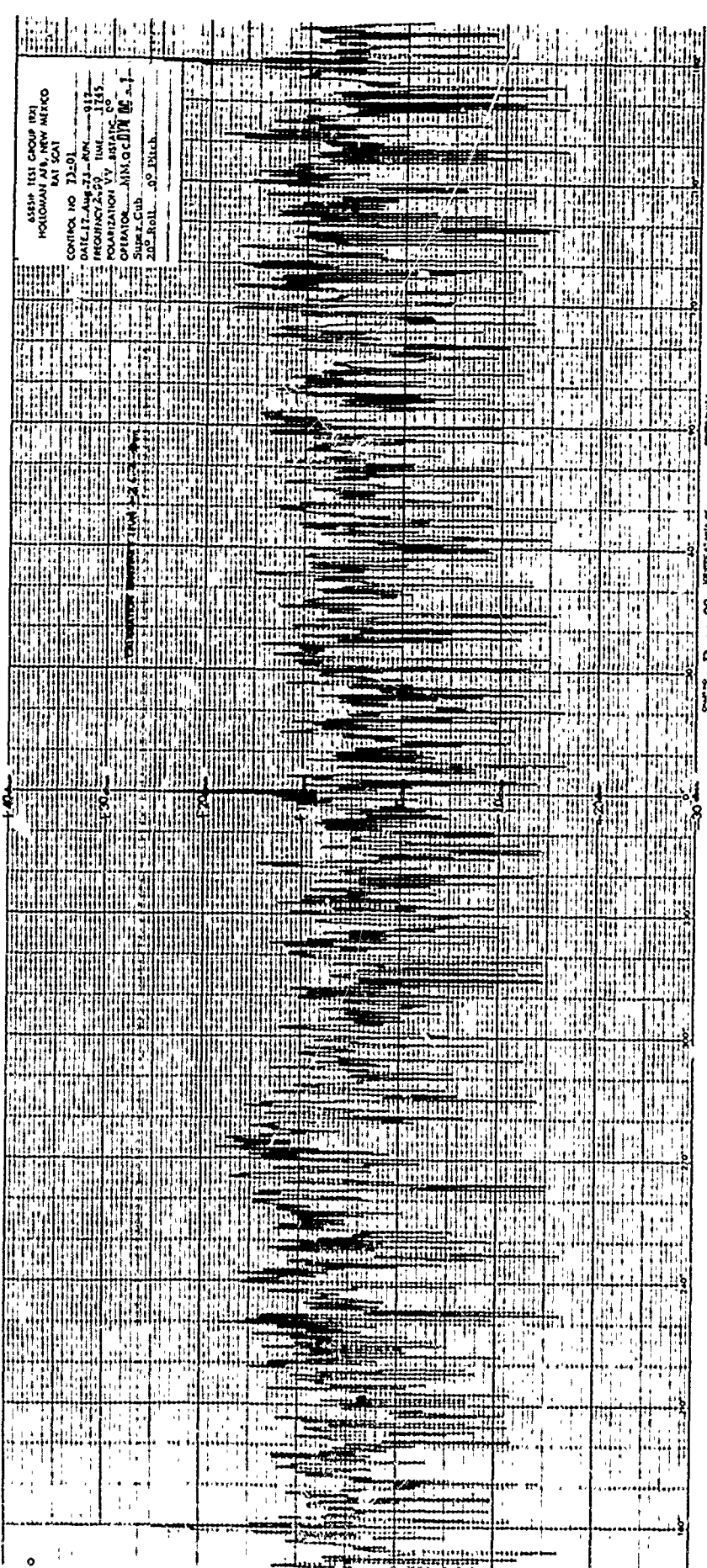


Page 98

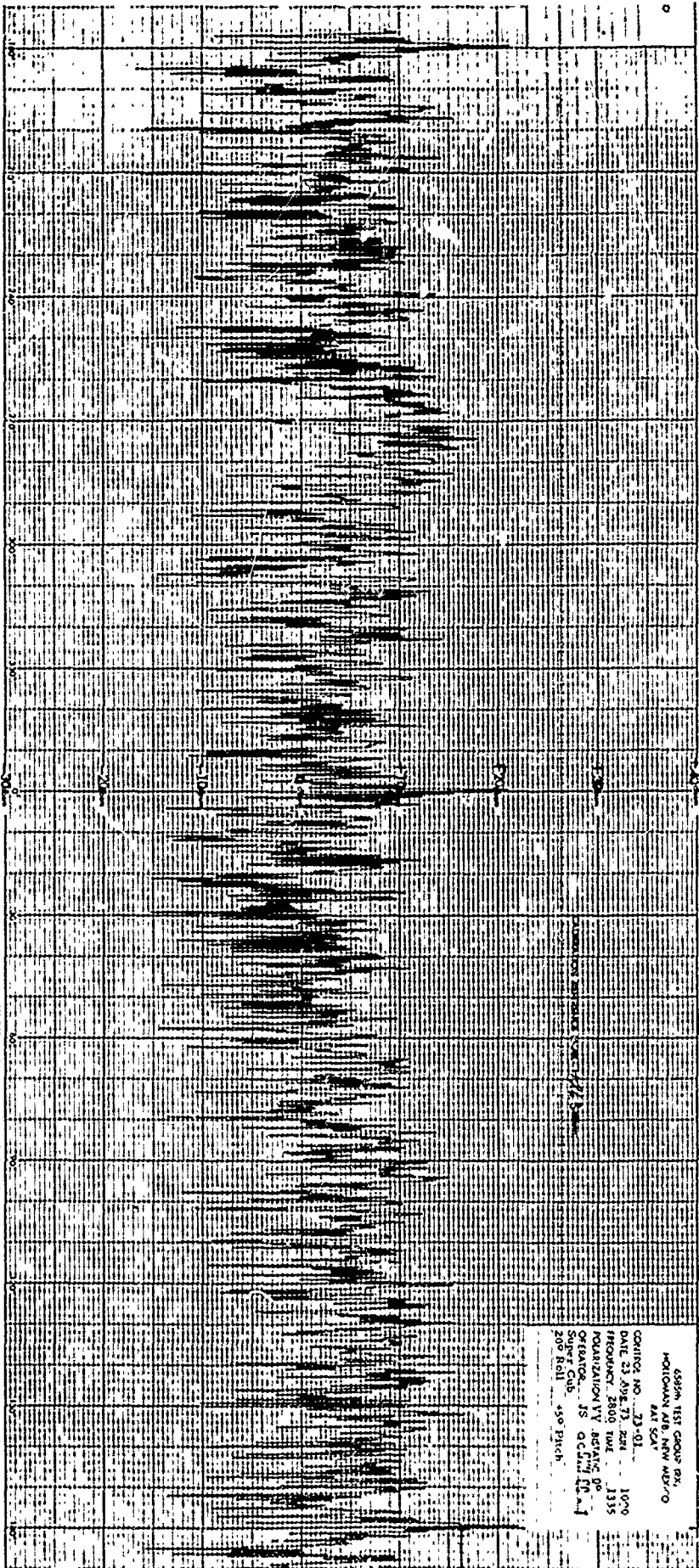
CONTROL NO 23 91  
 DATE 23 91  
 TIME 11 30 AM  
 LOCATION 2000 144 210  
 OPERATOR V. V. BROWN  
 STATION 20  
 SURF. SUB.  
 SURF. BOAT  
 W. PAC.

WMO DC - 1

ASSTA 1ST GROUP (21)  
HOLCOMAN 1ST CO  
CONTROL NO 11-91  
DATE 17-Aug-53 - RWK - 117  
REGISTRATION BY TIME - 015  
OPERATION - VY BRN - 00  
OPERATOR - AMM, G. G. J. W. G. A. I.  
Sigsbee Club - 200 Birch - 20 Birch







4594A 181 GROSS BX  
 MORTONVILLE, MISSISSIPPI  
 441 S.W.  
 COUNTY NO. 23-01  
 DATE 23 Aug 73  
 FREQUENCY 2800 Hz  
 RESOLUTION 1V 1315  
 OPERATOR JS  
 SUPER CLUB  
 200 Roll 450 Pitch

4545A TEST GROUP (P)  
HOLLOMAN AFB, NEW MEXICO  
MAY 5 1961

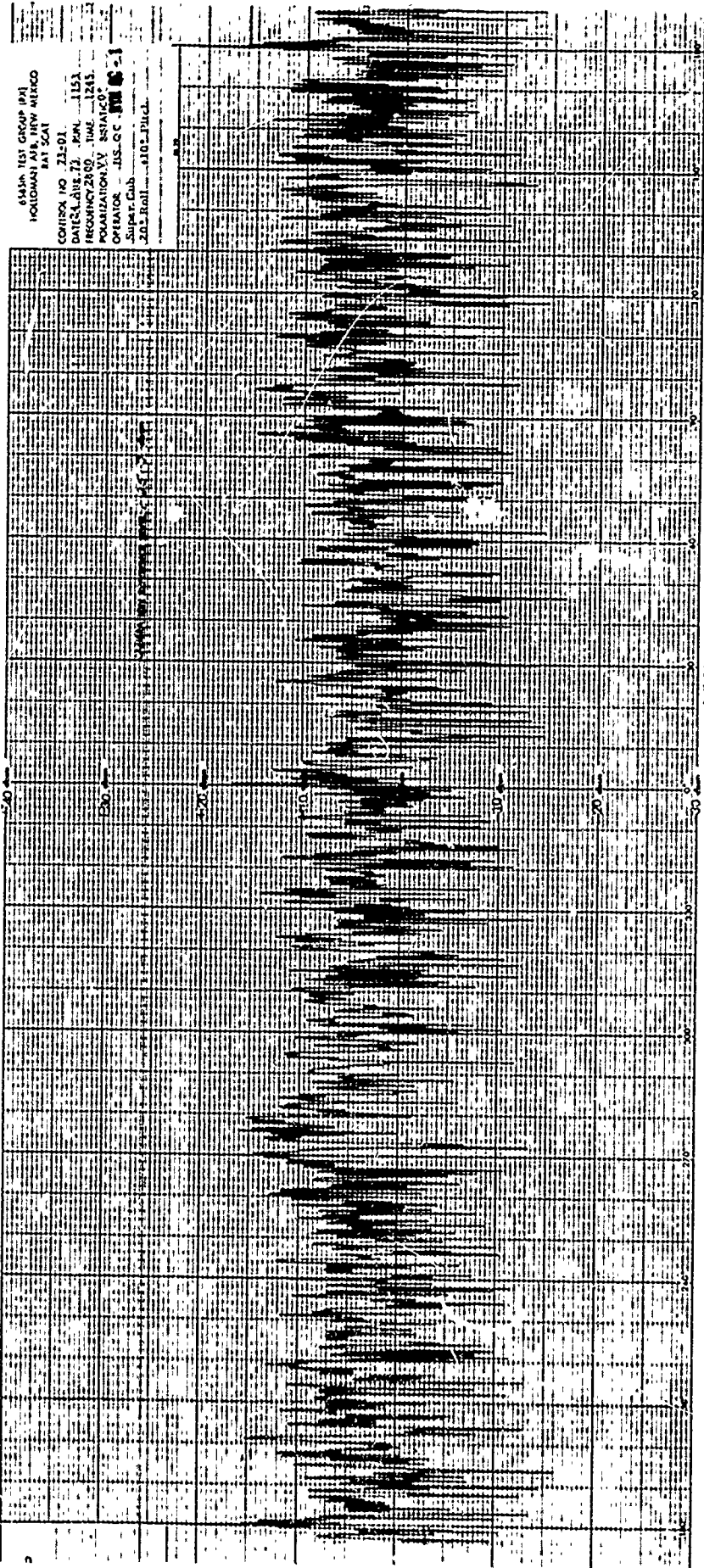
CONTRACT NO. 33-01

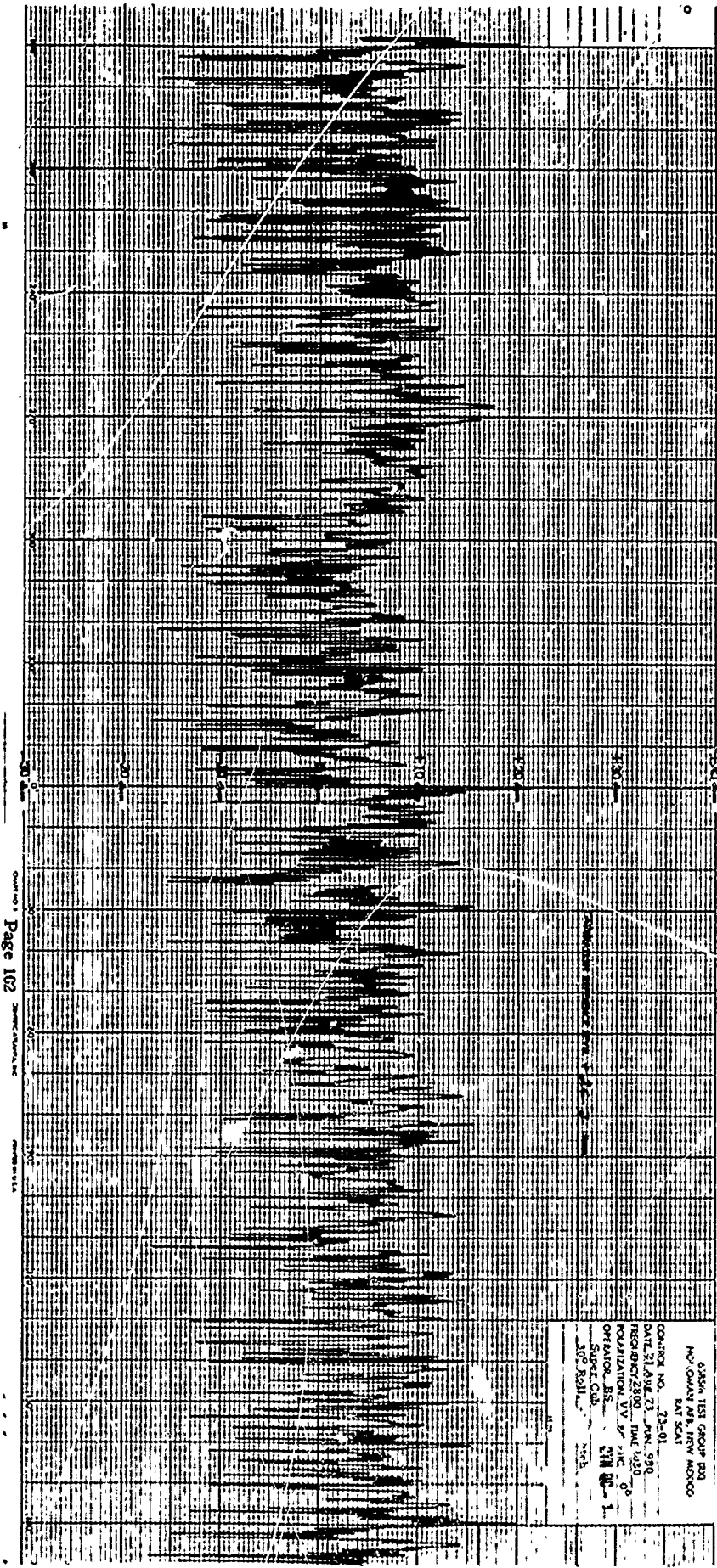
DATE: 2 APR 61

FREQ: 2850 KMC

OPERATOR: J.S. CC

201 Roll

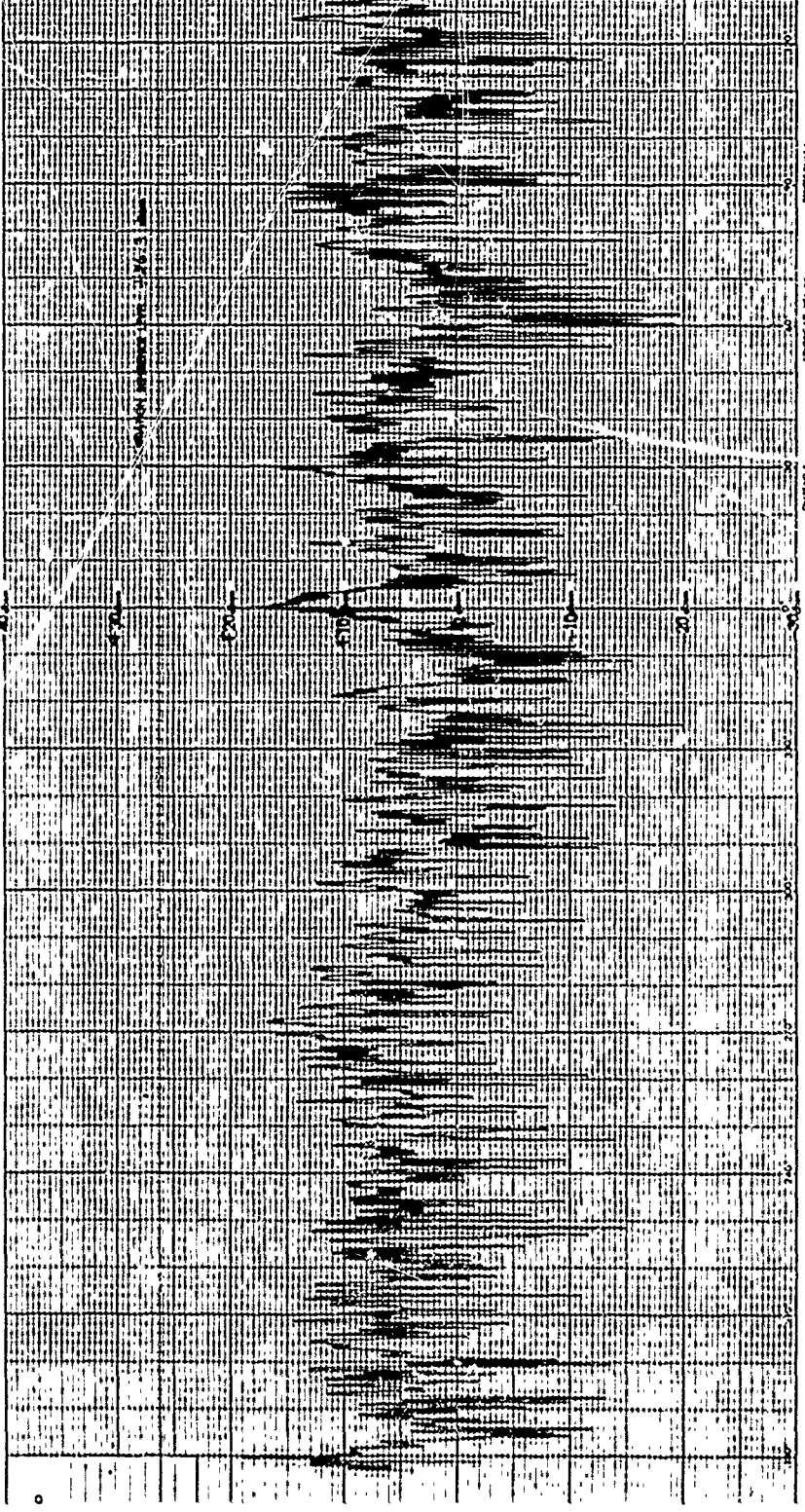


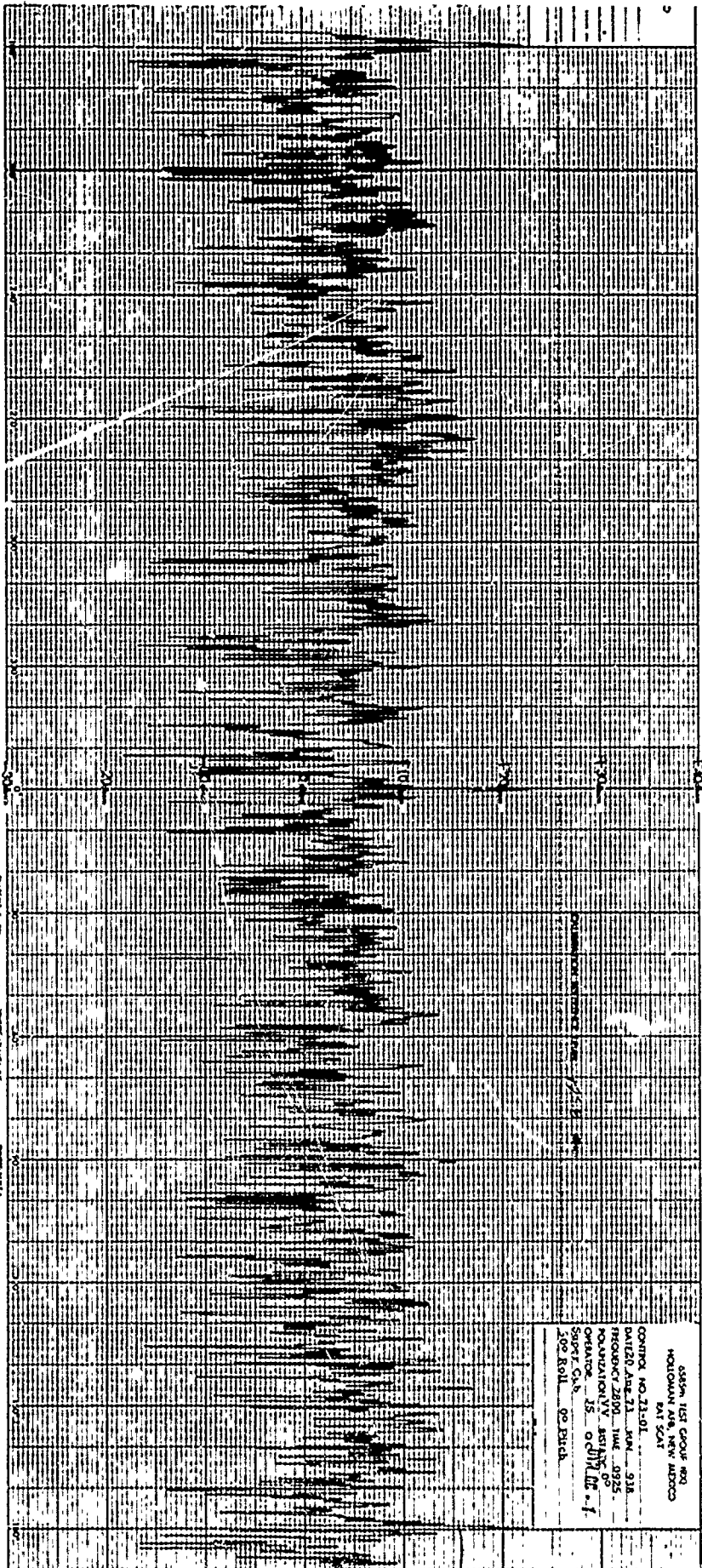


6:55AM 1151 GROUP B/D  
 H/O GWANT AIR, NEW MEXICO  
 BAT SCAN  
 CONTINUM NO. 72-01  
 DATE 21 JUL 73 JAN 990  
 RESIDENCY 2800 TIME 1230  
 LOCALIZATION VV 5' HIC 0  
 OPERATOR JS S/M 00-1  
 Super Cal.  
 30° BSH

6558K TEST GROUP (B)  
MORCOMAY AIR, NEW MEXICO  
LAT SCAT

CONTROL NO. 13-01  
DATE 23 AUG 71. RUN. 1076  
FREQUENCY 2800. TIME 1050  
POLARIZATION VV. AZIMUTH 0°  
OPERATOR JS. OC. 01W 10-1  
Super Cub. 50° Pitch

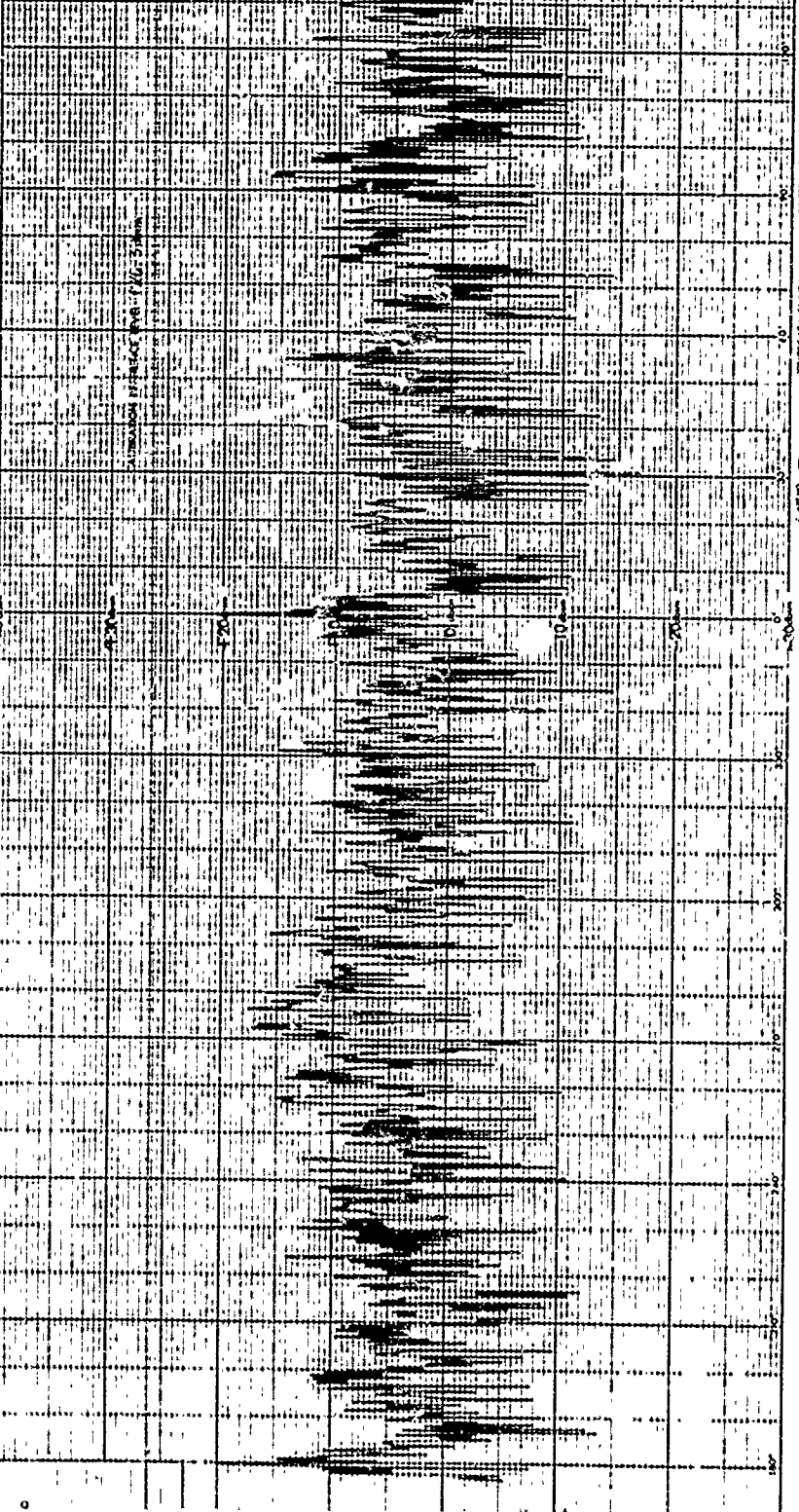


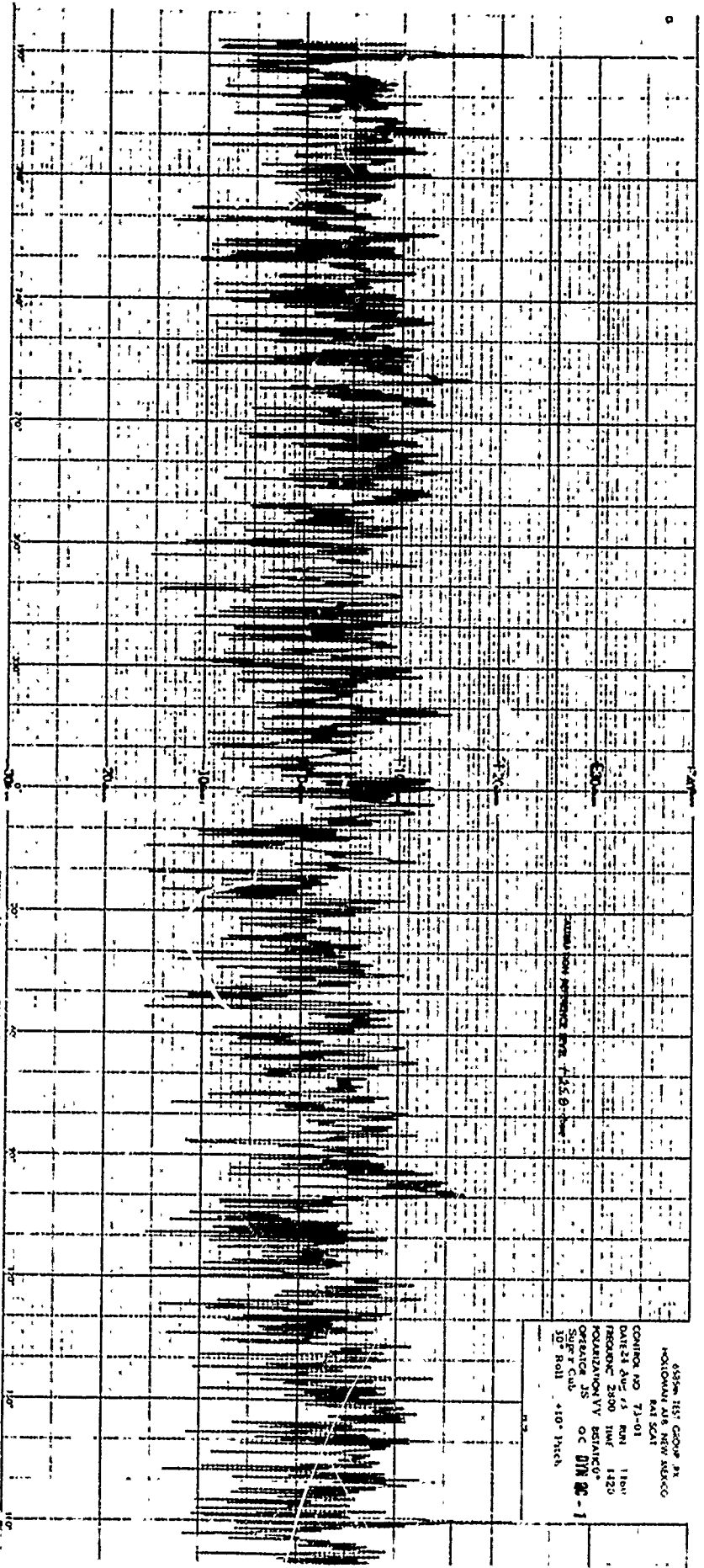


Page 104

655th TEST GROUP 409  
 HOLLOWAY AFB, NEW MEXICO  
 241 SCAT  
 CONTROL NO. 11-01  
 DATE: AUG 21 1944 918  
 PRODUCE 2000 144 0925  
 ORGANIZATION ASSISTANT  
 OPERATOR JS 001111  
 Supt. C. B. 00 Patch  
 See Roll 00 Patch

65834-151 GRC-P 1B  
 HOLDING AIR WIND  
 341 SCA  
 CONTROL NO 23-01  
 DATE 23 AUG 53 RUN 108L  
 FREQUENCY 2800. TMC 1140  
 ORGANIZATION T.Y. BISHOP  
 OPERATOR JS GCE/11 60  
 SUPER GRU  
 30° REL. 50° Pitch

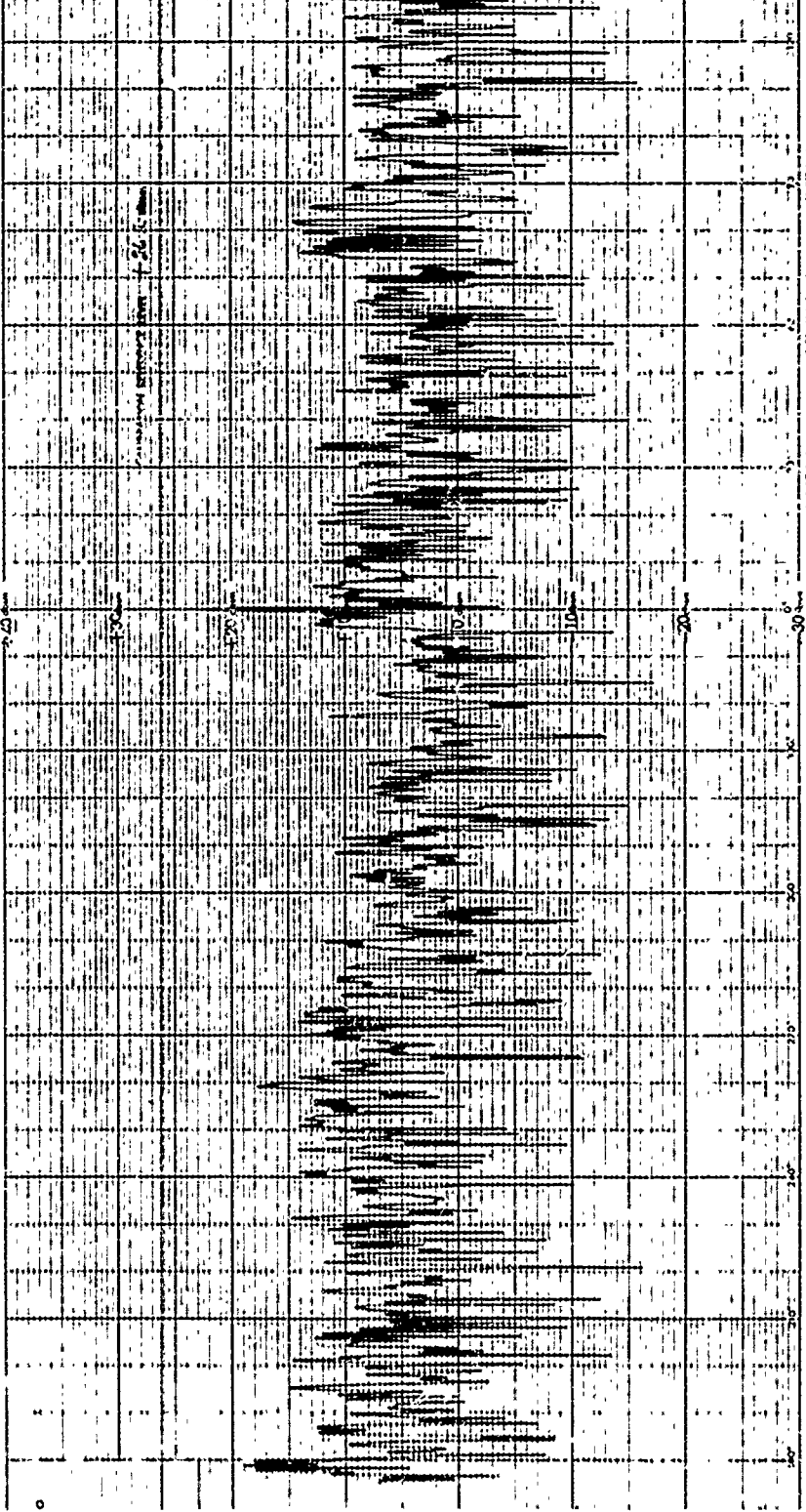




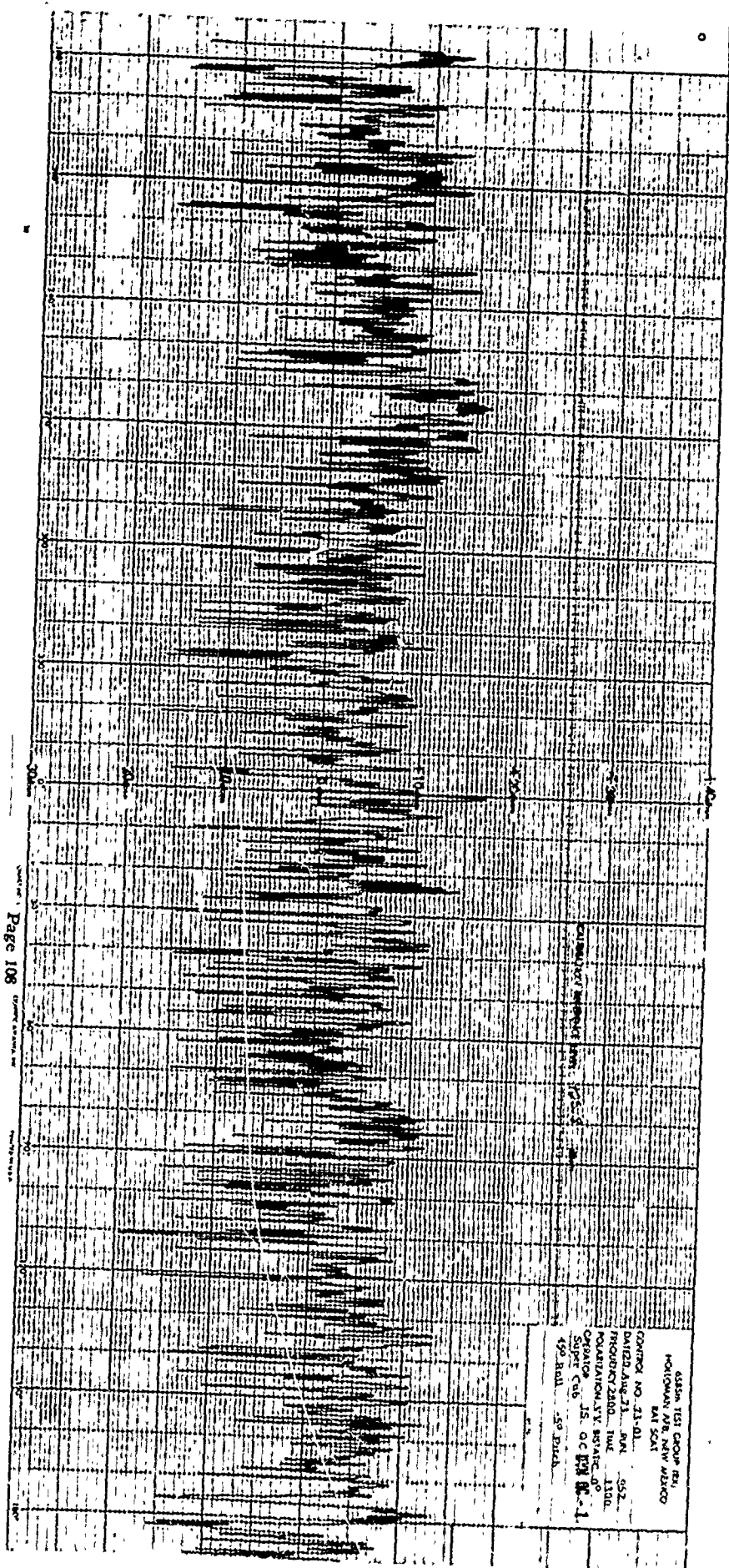
635th TST GROUP IN  
 HONOLULU AIR NEW BRUNSWICK  
 MAI SGT  
 CONTROL NO 73-01  
 DATE 24 Aug 45 RUN 1101  
 FREQUENCY 2800 SWF 1420  
 HONOLULU VV BRANING  
 OPERATOR JS OC DM - 1  
 SUPER CAL  
 100' Roll +10' Pitch

SEISMIC TEST GROUP, INC.  
MADISON, ILL. NEW ARKCO  
PAT. 157

CONTRACT NO. 71-01  
DATE 2/1/53  
PROJECT NO. 100-0010  
ORGANIZATION: V. P. RESEARCH  
D. SAUNDERS, CH. (11) (0-1)  
S. C. ROY, = 100-0111



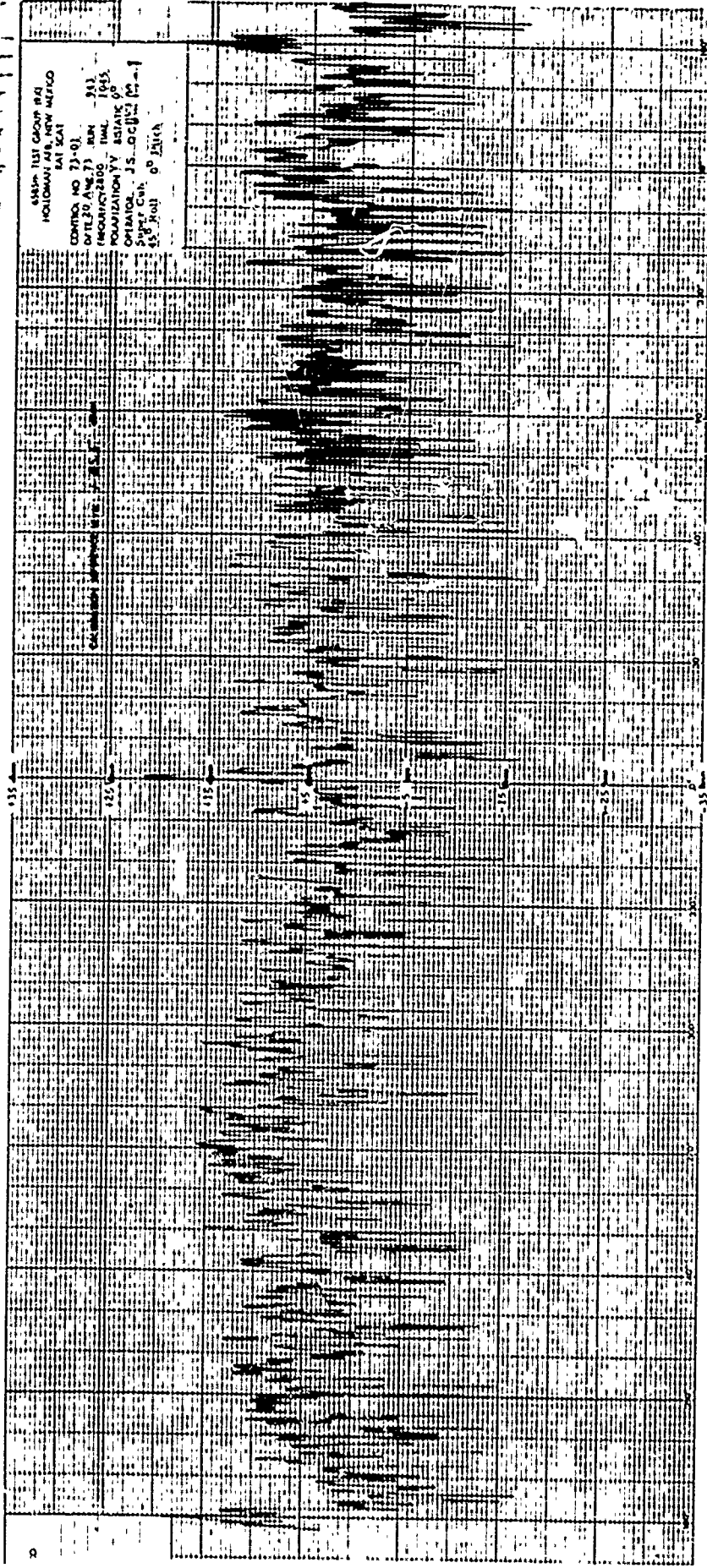


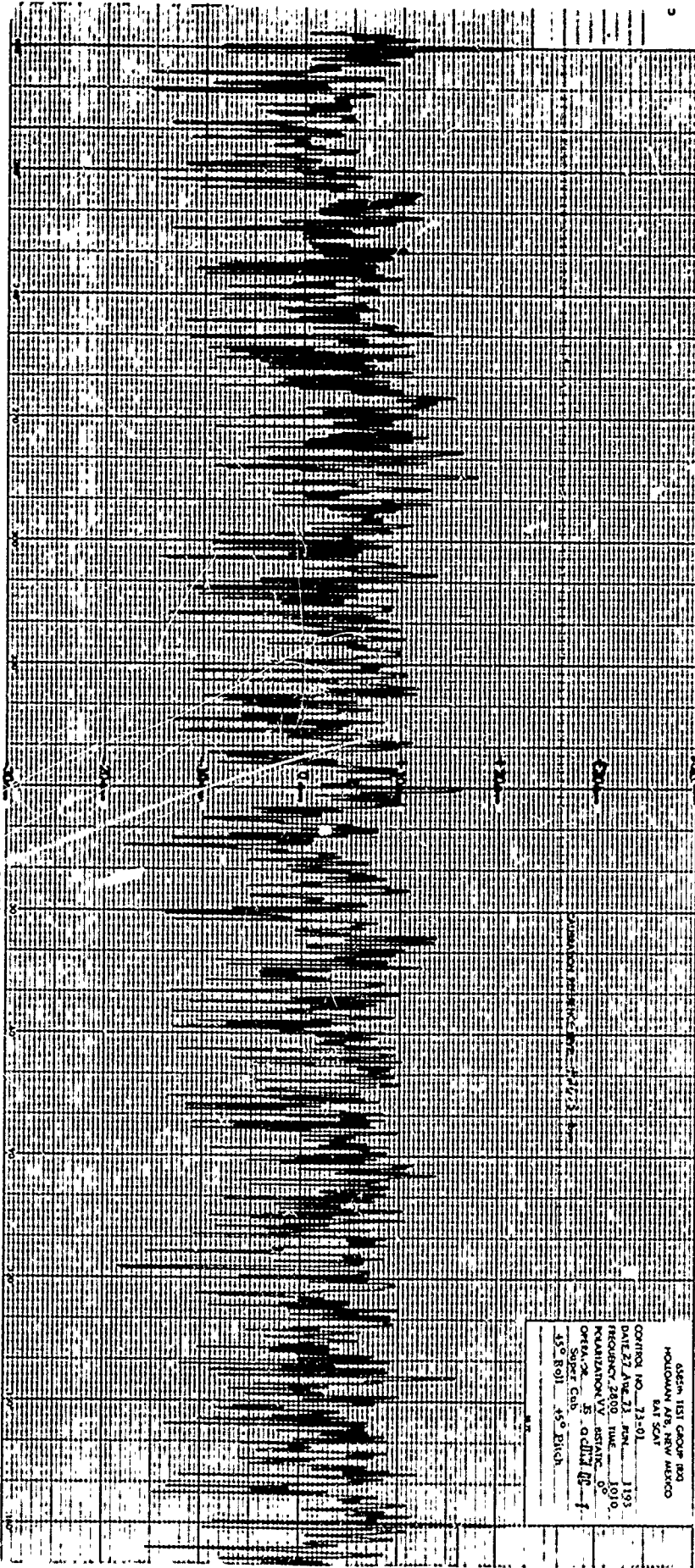


Page 108

655m 151 GROUP 831  
 HOLLOWAY AVE, NEW MEXICO  
 LAT 3041  
 CONTROL NO. 21-01  
 DATE 22 AUG 51 9M 55Z  
 FREQUENCY 2800 1MC 1300  
 POLARIZATION VV 85VAIR 0°  
 OPERATOR J.S. OC RPN BC-1  
 SUPER CUB  
 490 Baud 50 PPM

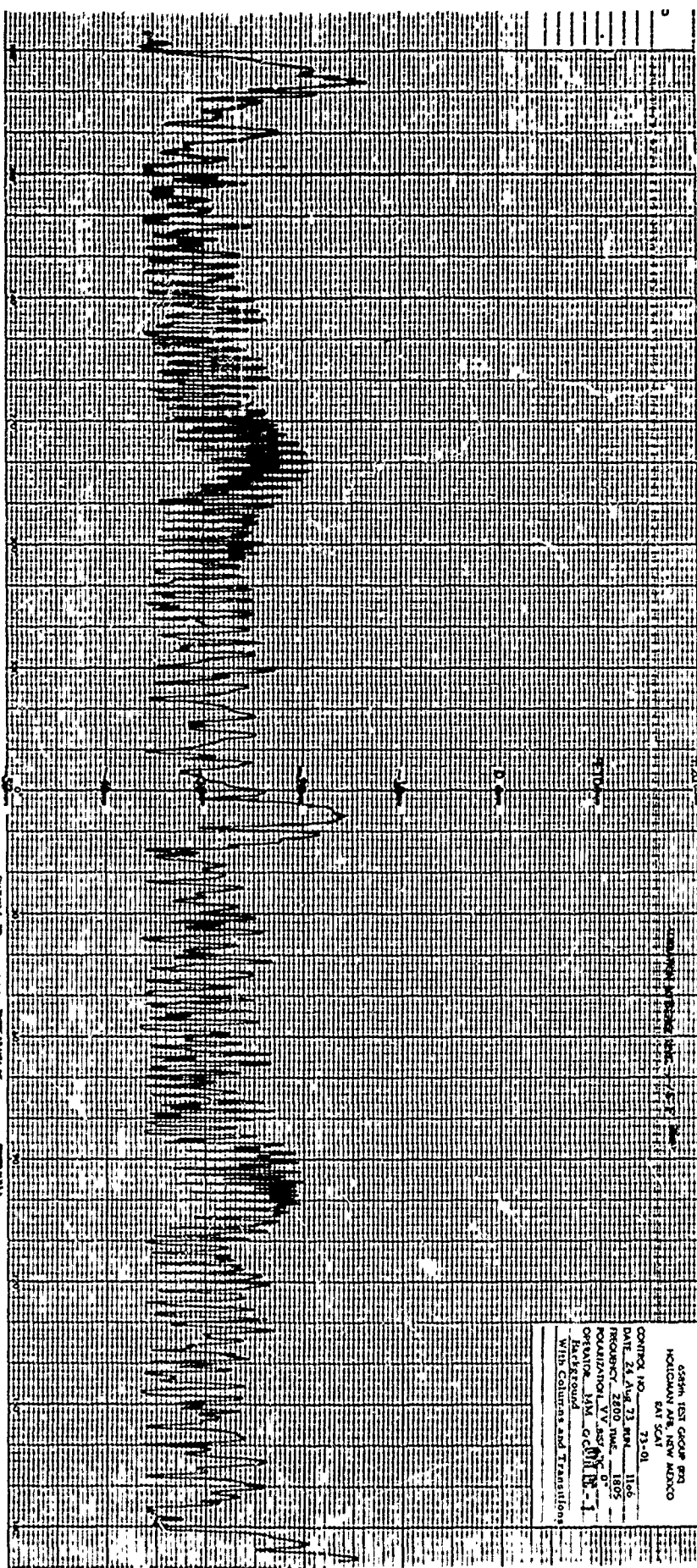
ASPH. TEST GROUP #71  
HOLLAND, AIR NAV METRO  
LAT SCAT  
CONTROL NO 71-01  
DATE 20 Aug 71  
INSTRUMENTS  
ORGANIZATION VV  
OPERATOR J.S. ...  
SUPERV. ...





6524 1ST CAQUR BQ  
 HOLLOWAY AFB, NEW MEXICO  
 BAT SCAT  
 CONTROL NO. 73-101  
 DATE 27 AUG 73 RUN 1193  
 FREQUENCY 2800 MHz 1010  
 MODULATION V. STATIC 0  
 OPERATOR 55 00111 10-1  
 Super Csb  
 450 Roll 450 Pitch



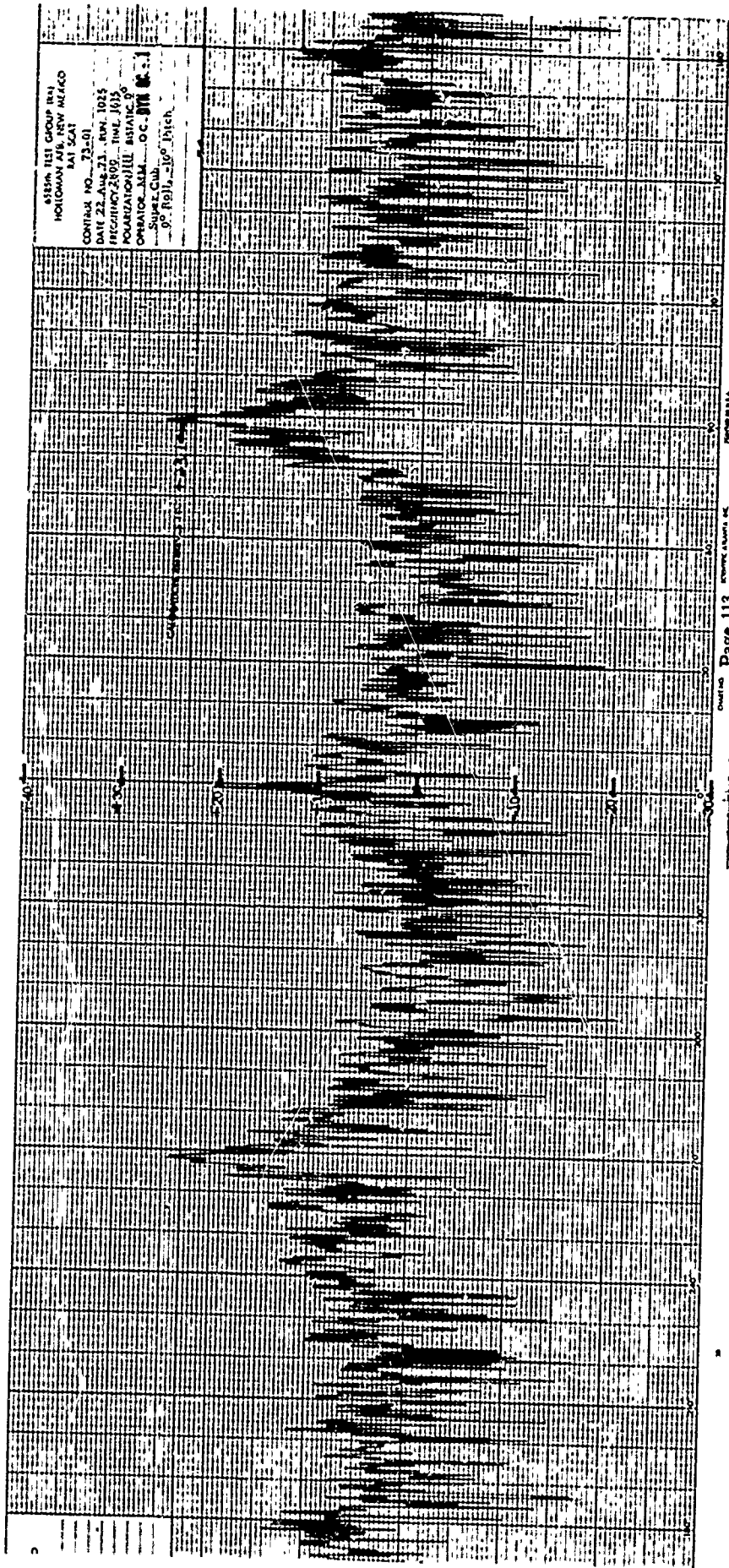


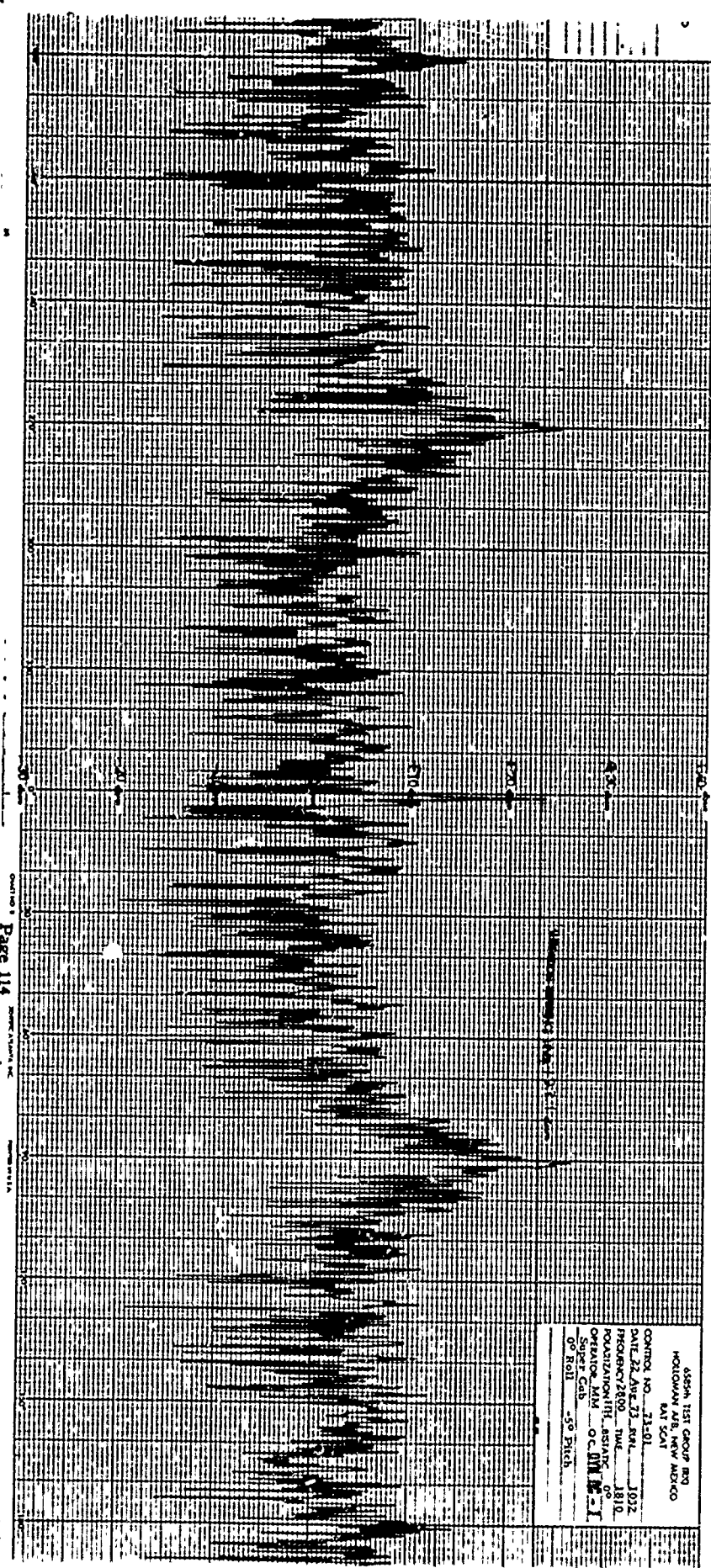
Page 112

55th TEST GROUP B33  
 HOLCOMB AFB, NEW MEXICO  
 SAT SCAT  
 CONTROL NO. 73-01  
 DATE 24 AUG 73 MIN. 11:06  
 FREQUENCY 2800 MHz 1805  
 POLARIZATION VV ASST  
 OPERATOR JMM GCM  
 BACKGROUND  
 With Columns and Transitions

11102311

STEIN TEST GROUP (B)  
HOLBORN AVE. NEW ALBANY  
CONTRACT NO. 73-301  
DATE 22 Aug 73. REV. 1023  
FREQUENCY 2800. TIME 1015  
OPERATOR JLM. O.C. JIM M. : 1  
S.W. C.W. :  
- 9° 10' 10" High

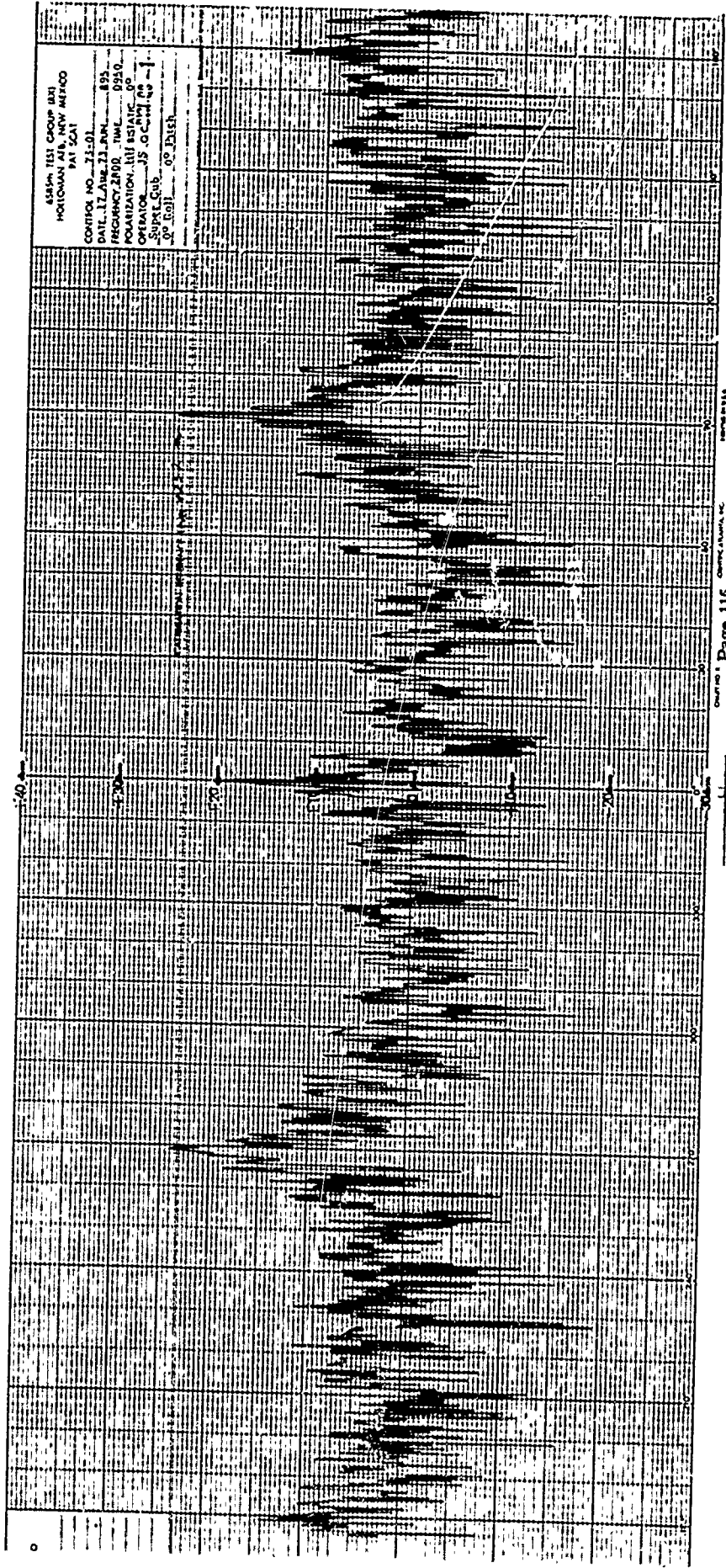




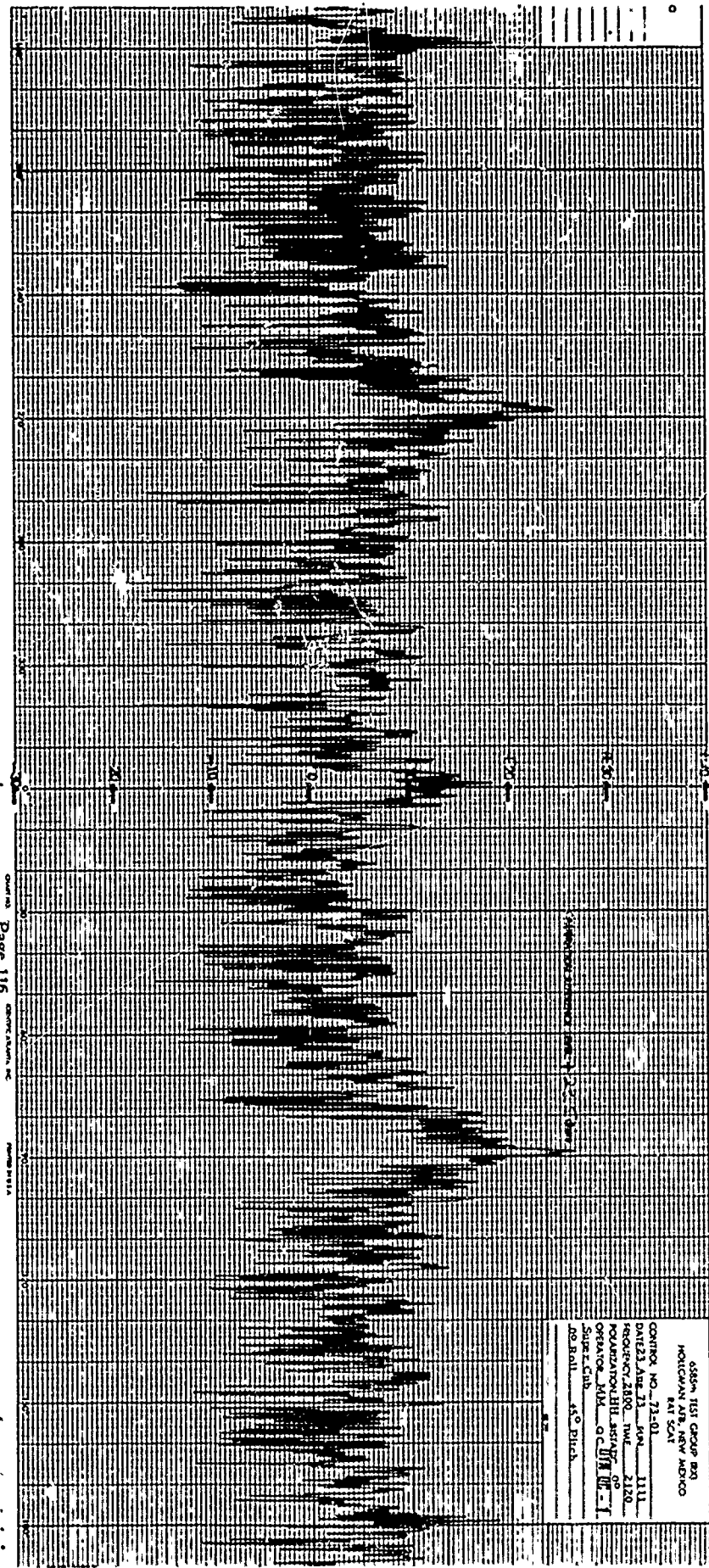
4594 TEST GROUP B93  
 HOSPITAL NEW ARKCO  
 BAY SC1  
 CONTROL NO. 21-501  
 DATE 22 JUL 52 TIME 1002  
 PROBANT 2609 TIME 1810  
 ORGANIZATION 111, ASSISTANT  
 OF THE AIR FORCE  
 OF BOSTON - 50 PITCH

455PM 151 GROUP 1511  
MORTON AVENUE, NEW ARKCO  
PAT 521

CONTROL NO. 21-01  
DATE 17 APR 23 1954  
FREQUENCY 2000 PHASE 0950  
POLARIZATION HORIZONTAL  
OPERATOR JS GCH/10  
Supt. Sub. 00 Patch



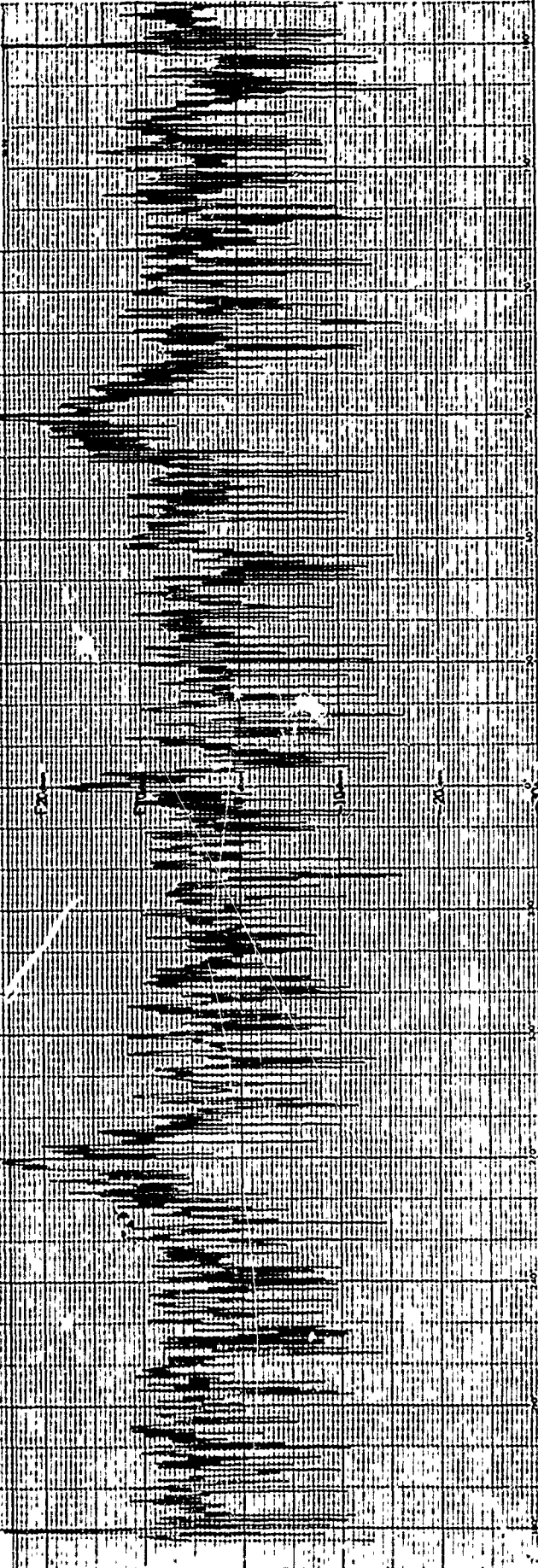




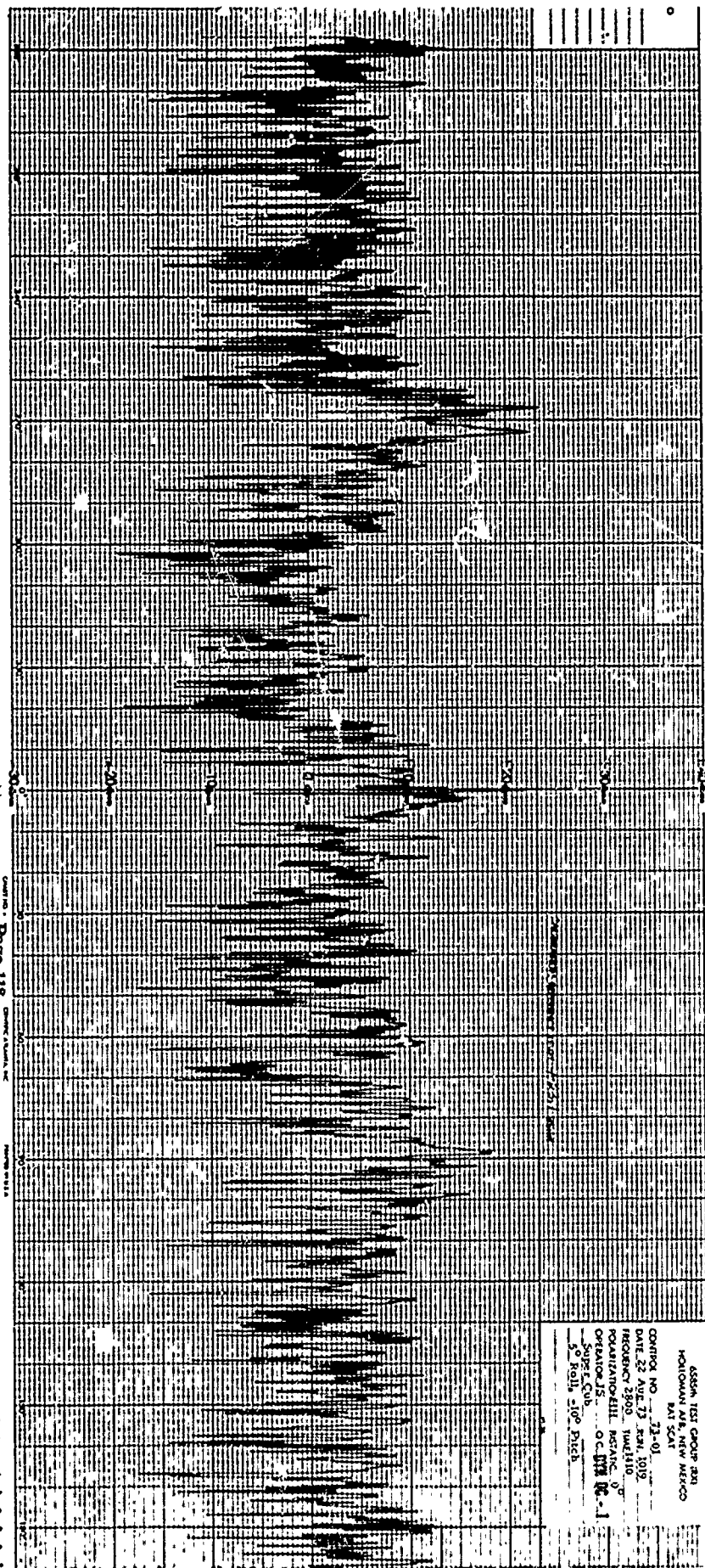
6856m TEST GROUP 800  
 HOLLISMAN AFB, NEW MEXICO  
 141 SCAT

CONTROL NO. 72-01  
 DATE 23 APR 71 RUN 1111  
 RECORDING 2800 TIME 2120  
 POLARIZATION 1111 ASIA 00  
 OPERATOR MM O C 1111  
 Supr. Club 45° Black  
 NO Ball

SEVEN 151 GROUP BEN  
WATSONIAN AIA NEW MEXICO  
WATSONIAN AIA SCAT  
CONTROL NO. 21-01  
DATE LAID 21 NOV 1111  
REGIMENT 2810 104 0710  
ORGANIZATION 1111 BRIG 00  
SERIAL NO. 0000  
SPEC. CON. GC 0000  
OP. PROJ. 1100 Blush



FORM NO. 17  
CONTRACT NO. 17

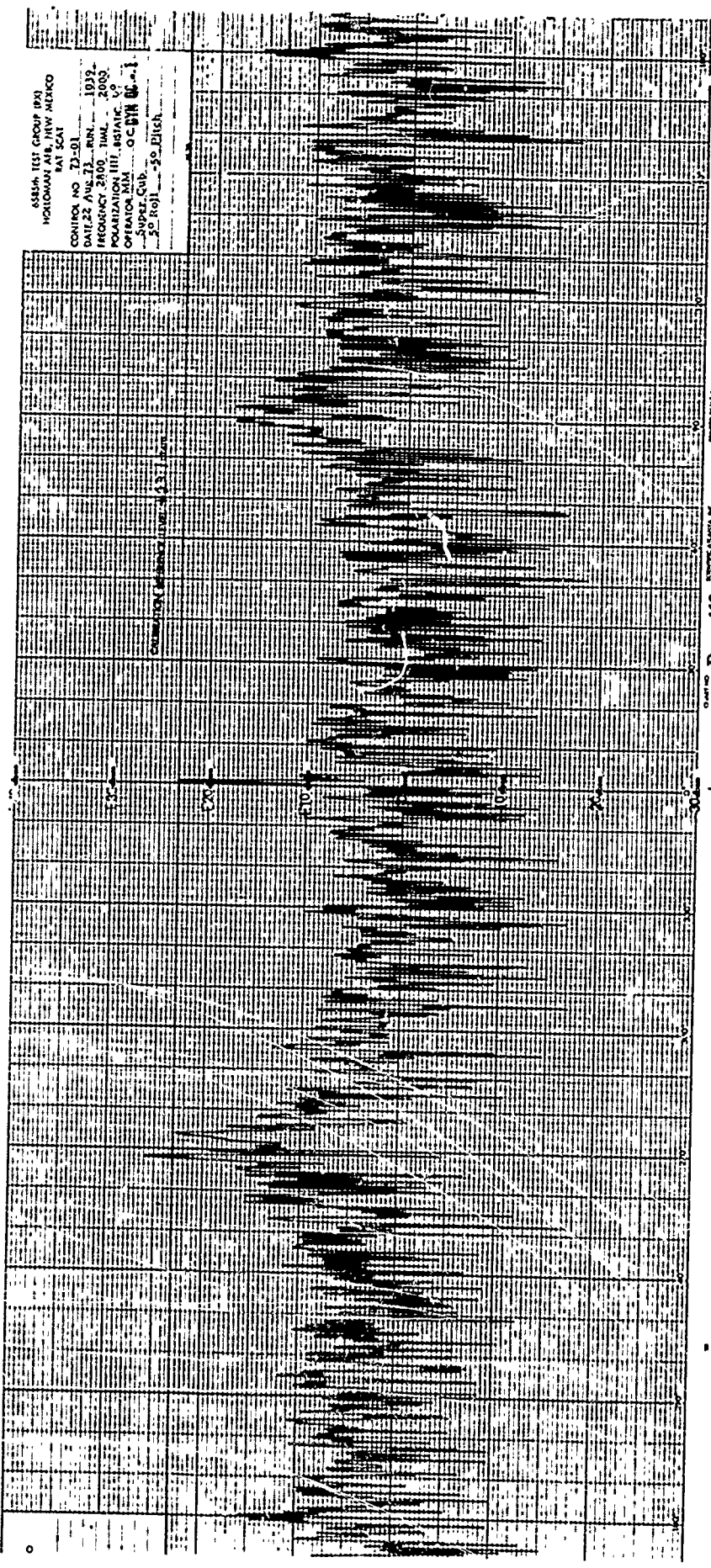


Page 118

ASSIGN TEST GROUP 221  
 HOLLOWAY AFB, NEW MEXICO  
 15 JUL 51  
 CONTROL NO. 7-12-01  
 DATE 22 JUL 51 10:10  
 FREQUENCY 2500 IMPL 100  
 MODULATION 50  
 ORGANIZATION ILL. INST. INC.  
 OPERATOR J.S. OC 118 10-1  
 OPER. CODE  
 5-ROLL 5109 P125

ASSEMBLY TEST GROUP 1918  
HORIZONTAAL AER. NAV. MEXICO  
RAN SCAT

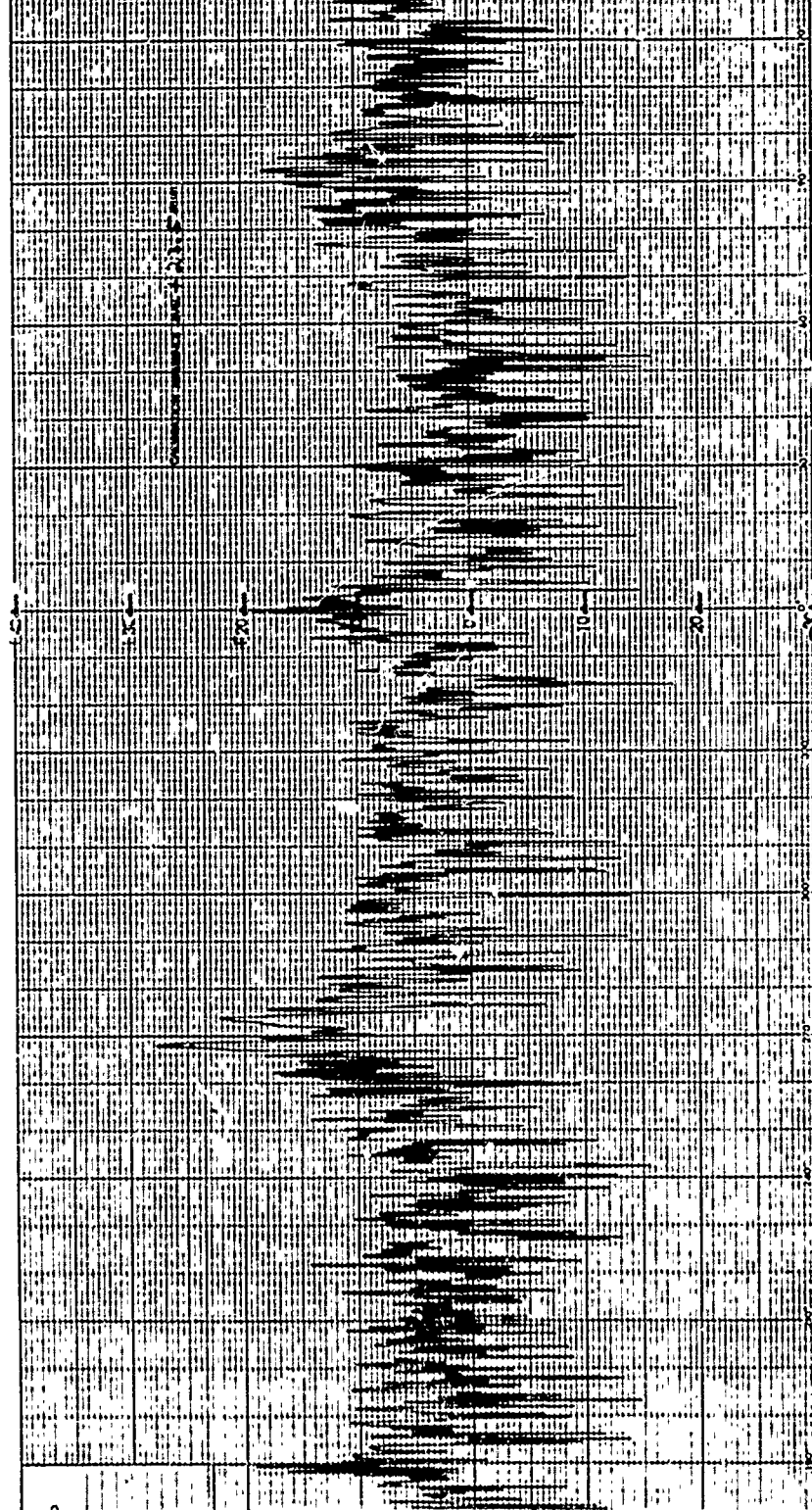
CONTROL NO 73-01  
DATE 22 AUG 73 BIN 1019  
FREQUENCY 2800 MHz 2003  
POLARIZATION III. BEYOND V  
OPERATION MIN. OCCUR 0-1  
Super. Cub. -50 dBm

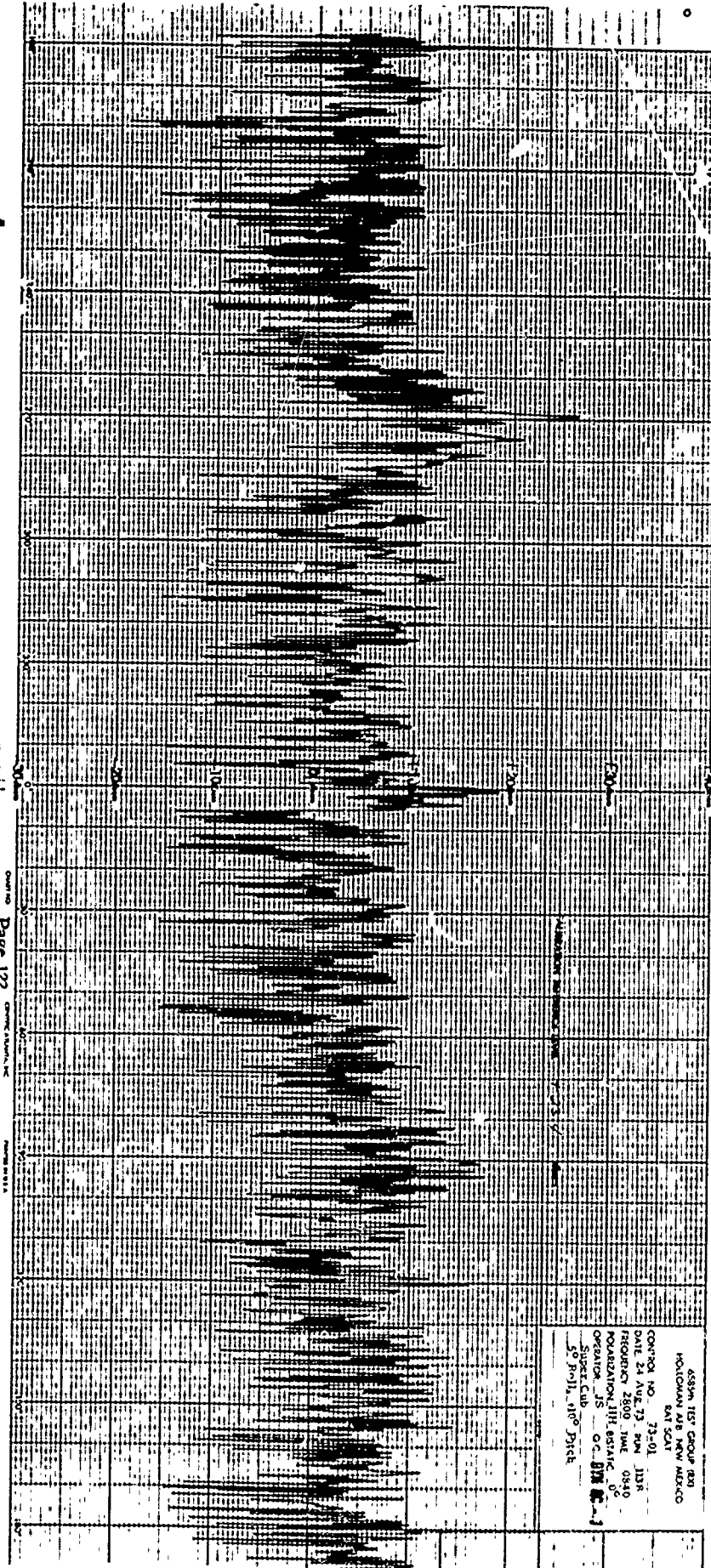


OPERATION BEYOND V

65954, 151 GROUP 890  
HOLLOMAN AFB, NEW MEXICO  
FBI SGT  
CONTROL NO 73-01  
D. RIZAVE 71 629 902  
RECORD# 2800 TWT 1245  
OPERATOR J. C. DUM 88-1  
Super Cab 92 Pitch  
50 Roll

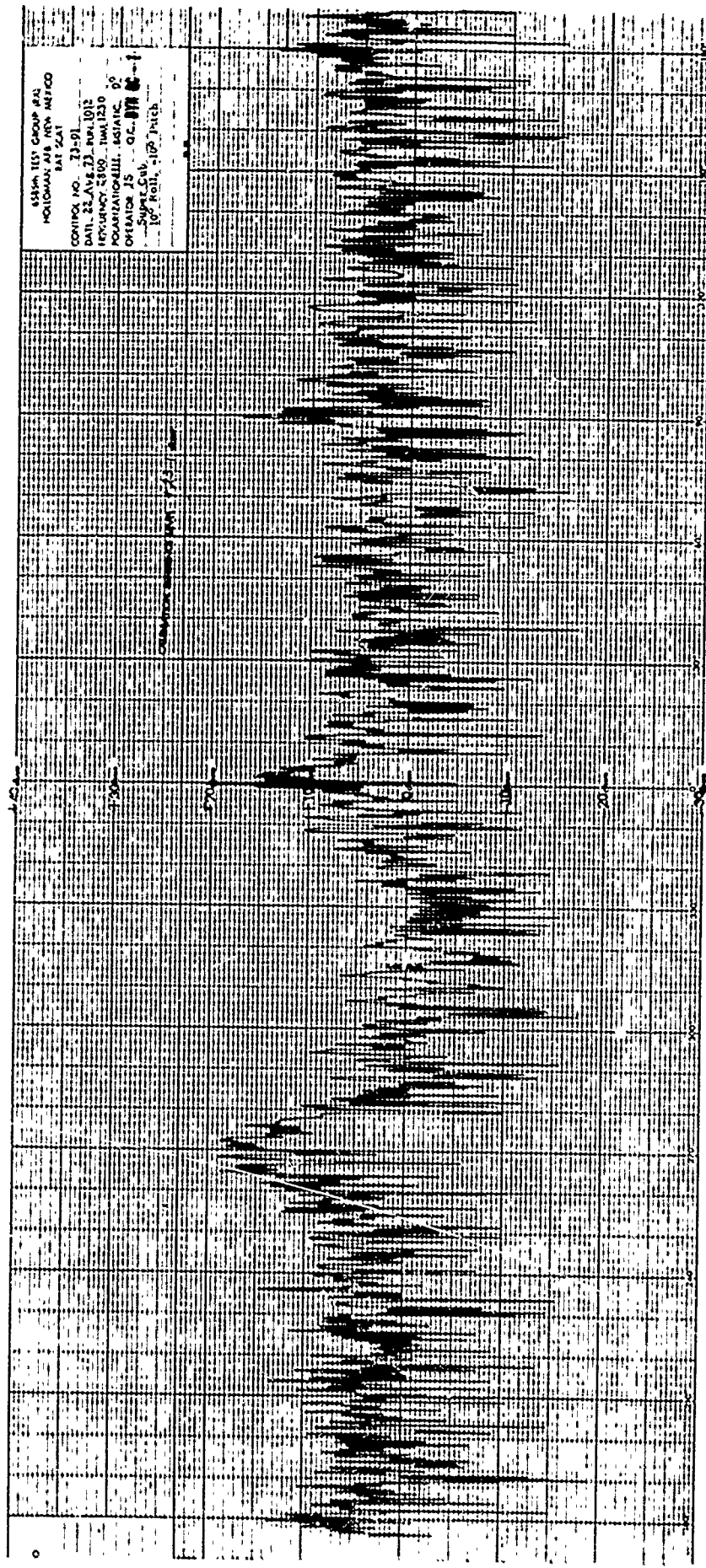
4555th TEST GROUP (103)  
 HOLDMAN, AIR, NEW MEXICO  
 "41 SCAT"  
 CONTROL NO. 71-01  
 DATE 27 JUN 73, ANN. 1104  
 FREQUENCY 2800, TIME 1945  
 POLARIZATION III, INST. 1104  
 OPERATOR JMM, O. C. 1104  
 Support Club  
 30 Ball 450, Pitch





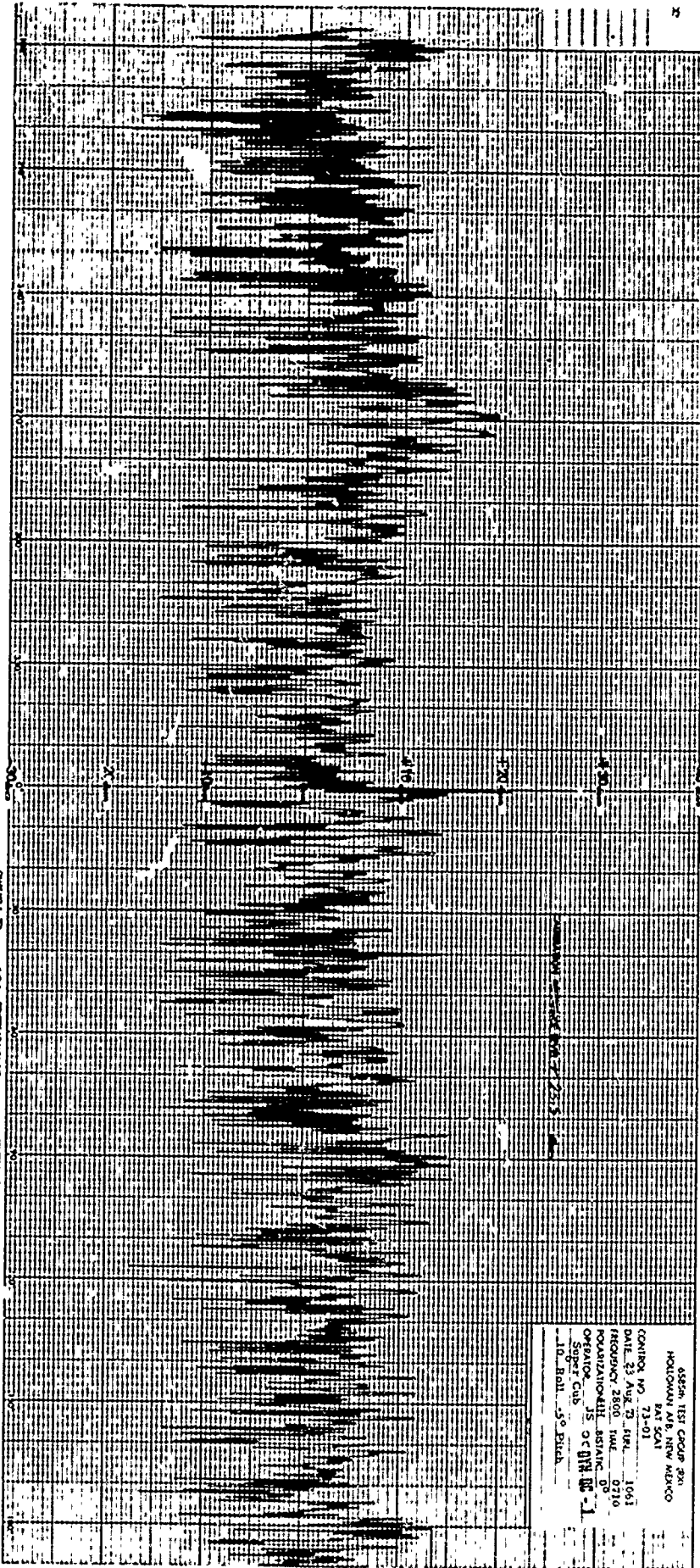
Page 122  
 CHINESE TELETYPE  
 1948

4535m TEST GROUP B31  
 HOLLAND AIR NAV MET-CO  
 BMT SCAT  
 CONTROL NO. 73-01  
 DATE 24 AUG 73 AM 1138  
 FREQUENCY 2800 MHz 0840  
 MODULATION J1H ESTIMATE 02  
 OPERATOR JS OC B1M  
 SUPER-CUB  
 20 Pm, 110° Dist



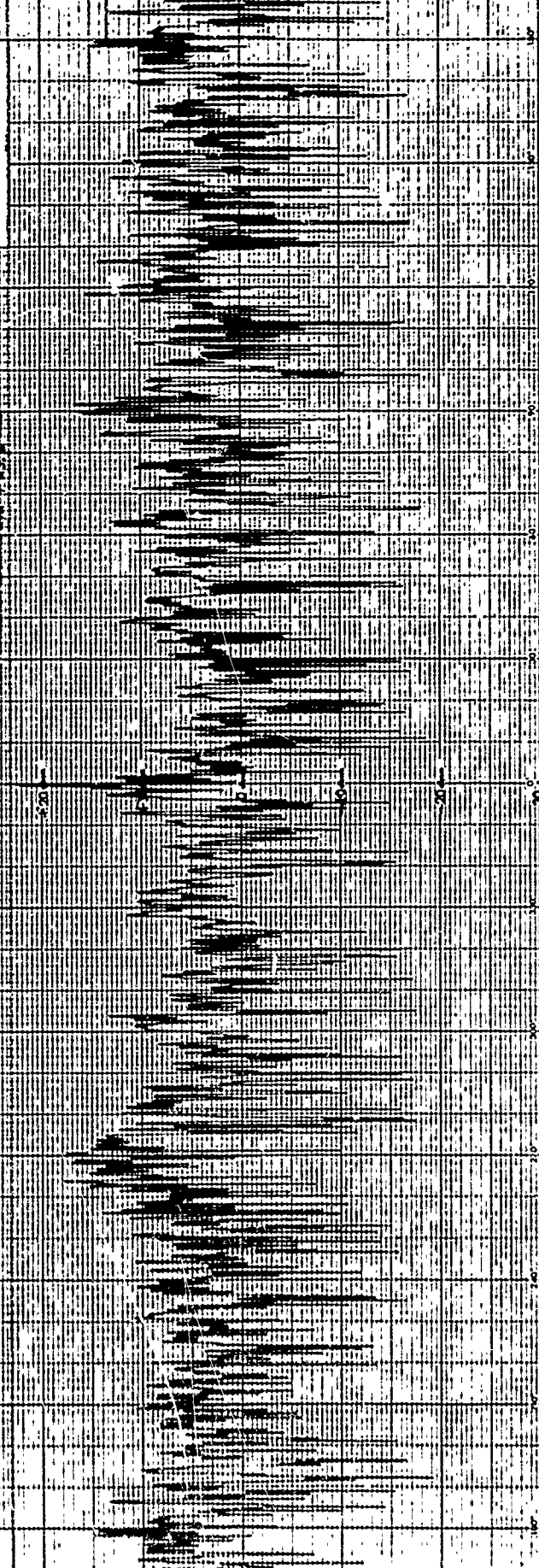
6554A TEST GROUP #13  
 HOLDMAN, J.B. NEW METHOD  
 DAT 241  
 CONTOUR NO. 13-01  
 DATE 22 Aug 73 - 1041 1913  
 FREQUENCY 5800 - 1041 1230  
 POLARIZATION III - 181514C 0°  
 OPERATOR JS - OC - 078 8-1  
 - Suppl. 500 -  
 10" Roll, 410" Pitch

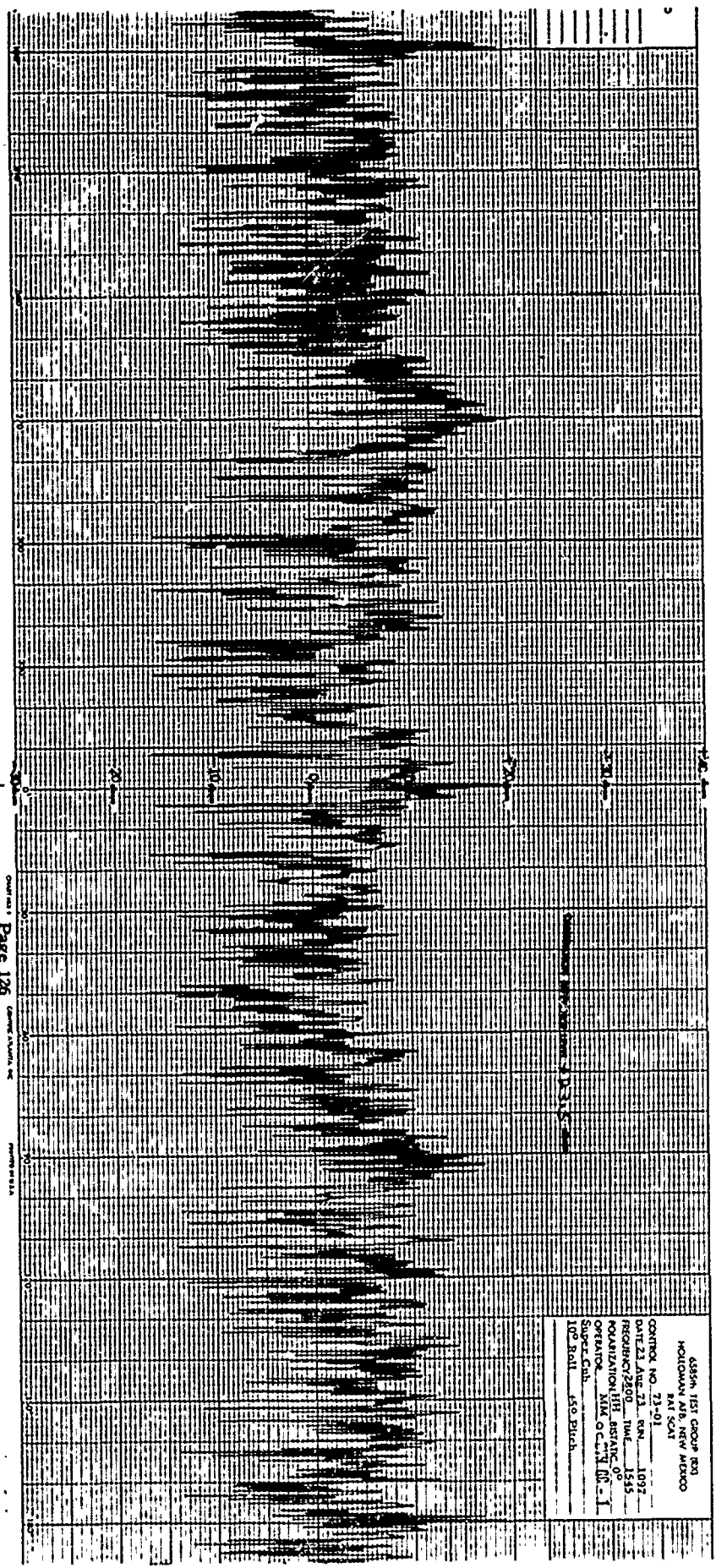




6828N TEST GROUP 301  
 HOLLAND AFB, NEW MEXICO  
 CONTROL NO. 73-01  
 DATE 23 AUG 53 SWL 1063  
 FREQUENCY 2800 TWC 0710  
 ORGANIZATION 4411 ASSISTANT DTIC  
 OPERATOR J.S. O'NEIL JR.  
 SUPER CALS  
 -10. Roll -50 Pitch

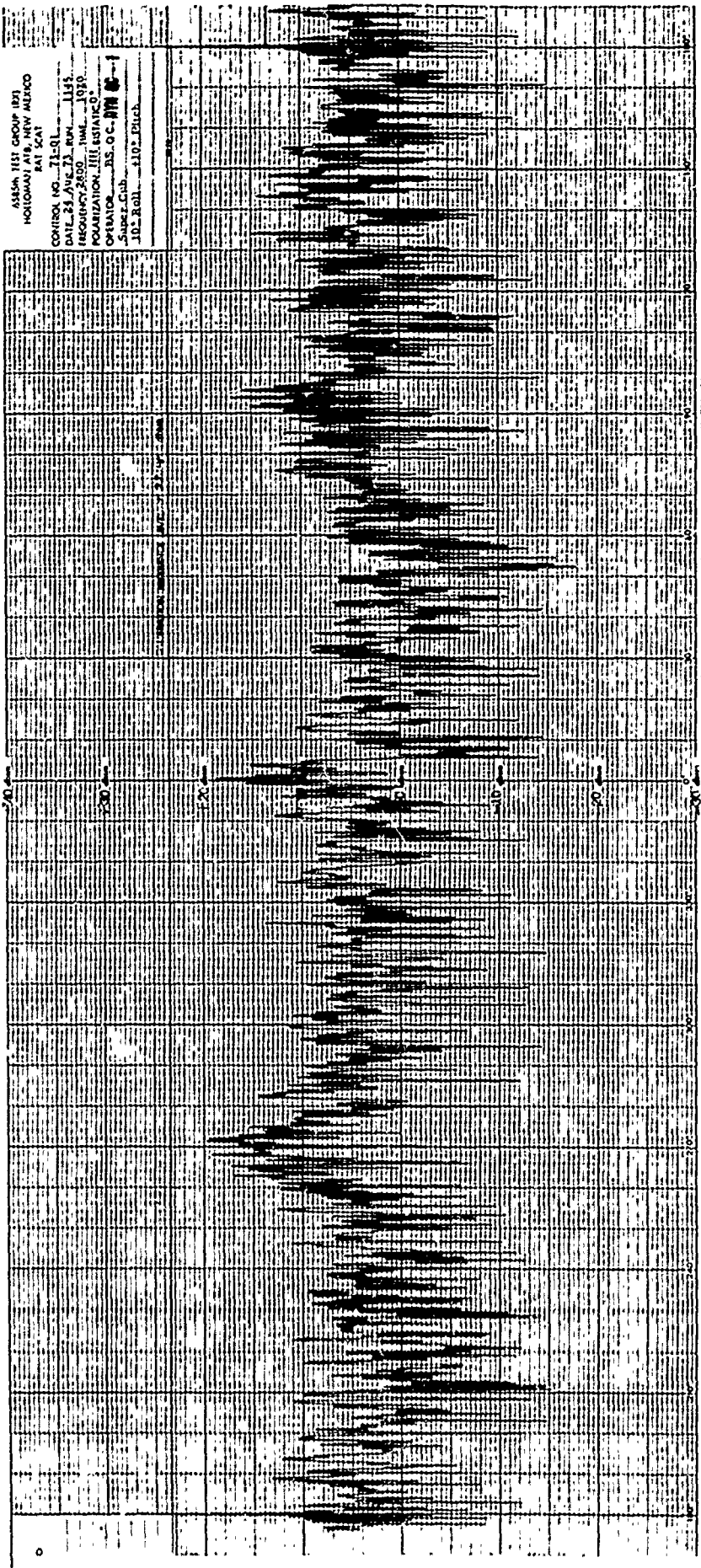
6544m TEST GROUP 021  
 NATIONAL BUREAU OF STANDARDS  
 CONTROL NO. 72-01  
 DATE 1/14/53  
 FREQUENCY 1000 Hz  
 MODULATION 100%  
 OPERATOR J. H. ...  
 L. ...

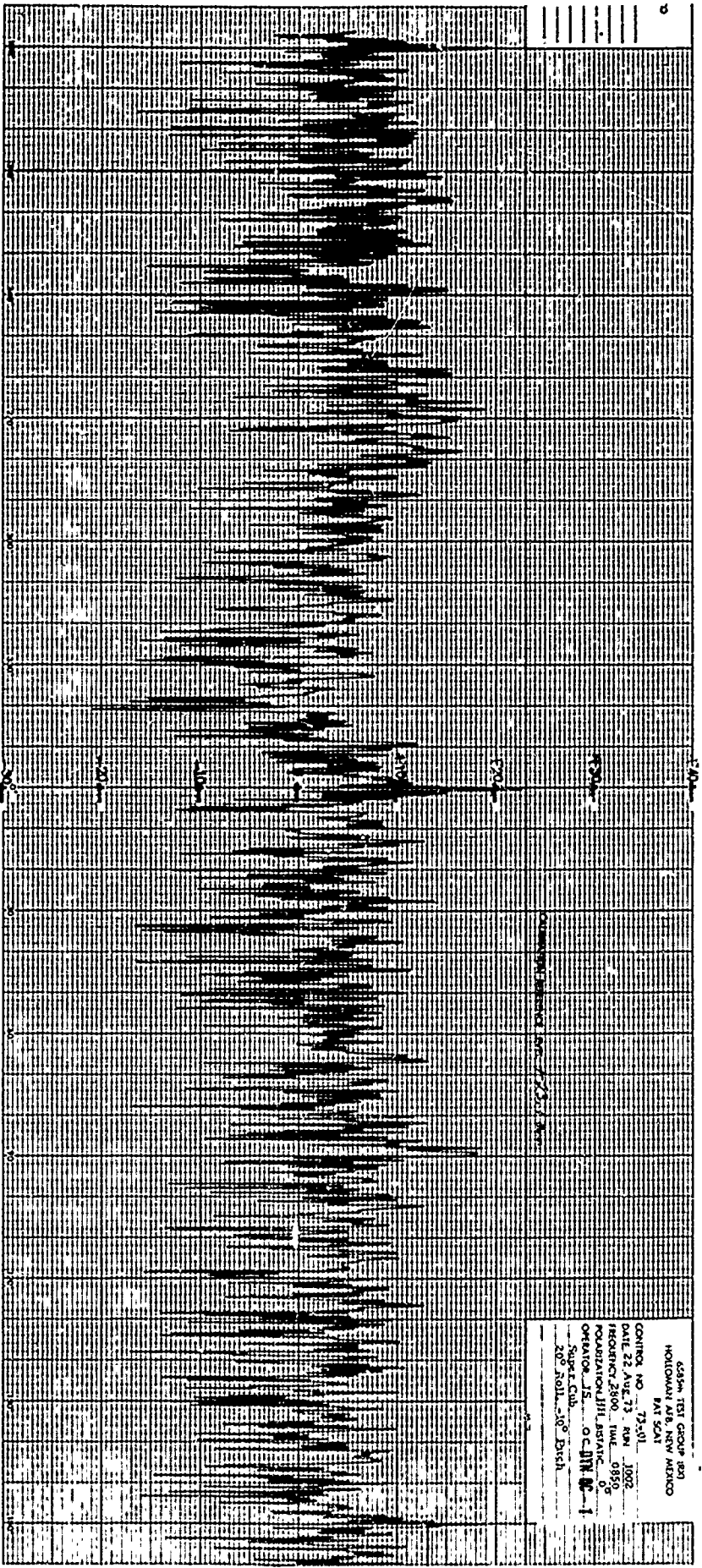




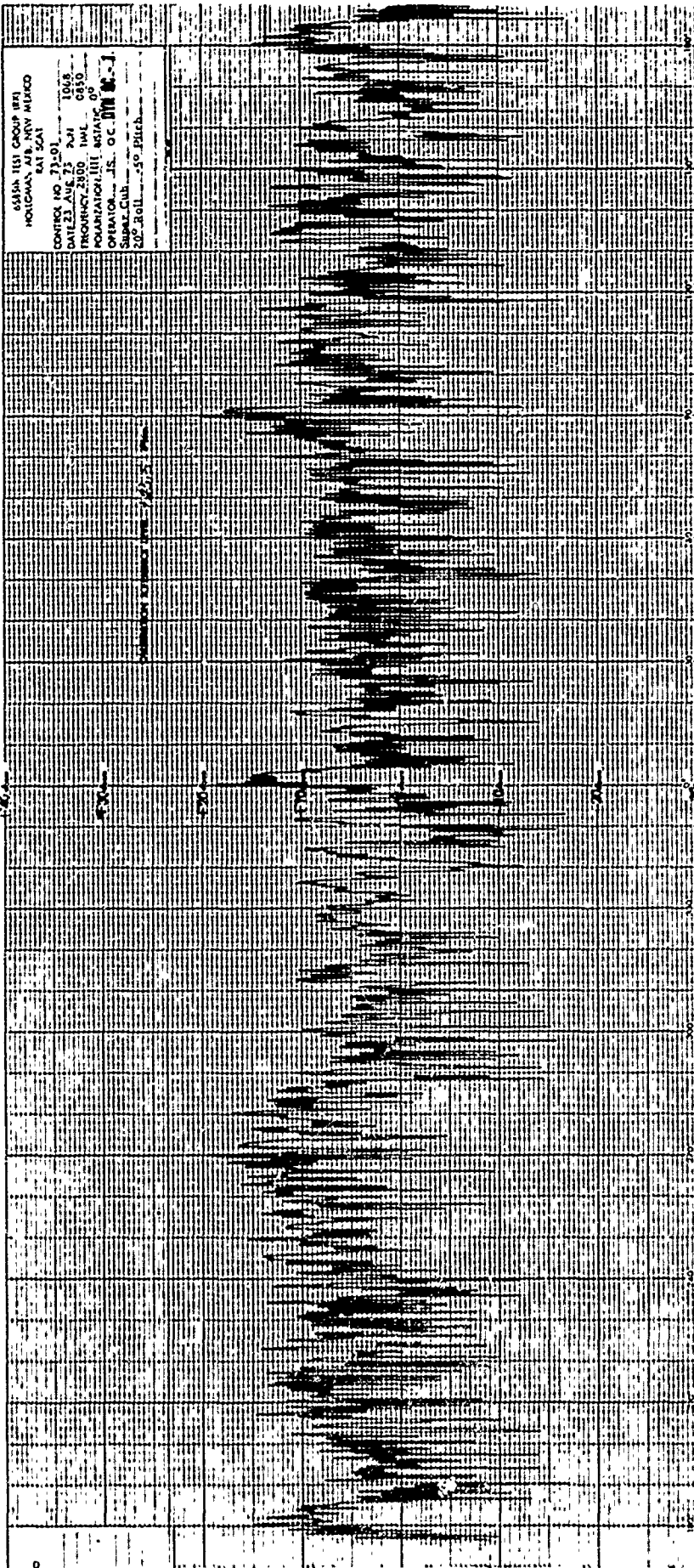
4355th 151st GROUP RBX  
 HOLLAMAN AFB, NEW MEXICO  
 RAT SCAT  
 CONTROL NO. 73-01  
 DATE 23 AUG 73 TIME 1097  
 FREQUENCY 2800 TIME 1545  
 POLARIZATION HORIZONTAL  
 OPERATOR MIA O'NEILL  
 Super. Ch. 450 Puch  
 1st Roll

ASSEN TEST GROUP (BT)  
HOLLOMAN ATB, NEW ALZECO  
PAT SCAT  
CONTROL NO. 71-01  
DATE 24 Aug 73 RMA 1145  
FREQUENCY 2800 TIME 1970  
OPERATOR J.S. O.C. JN  
Super. Club 210° Patch  
10° Roll

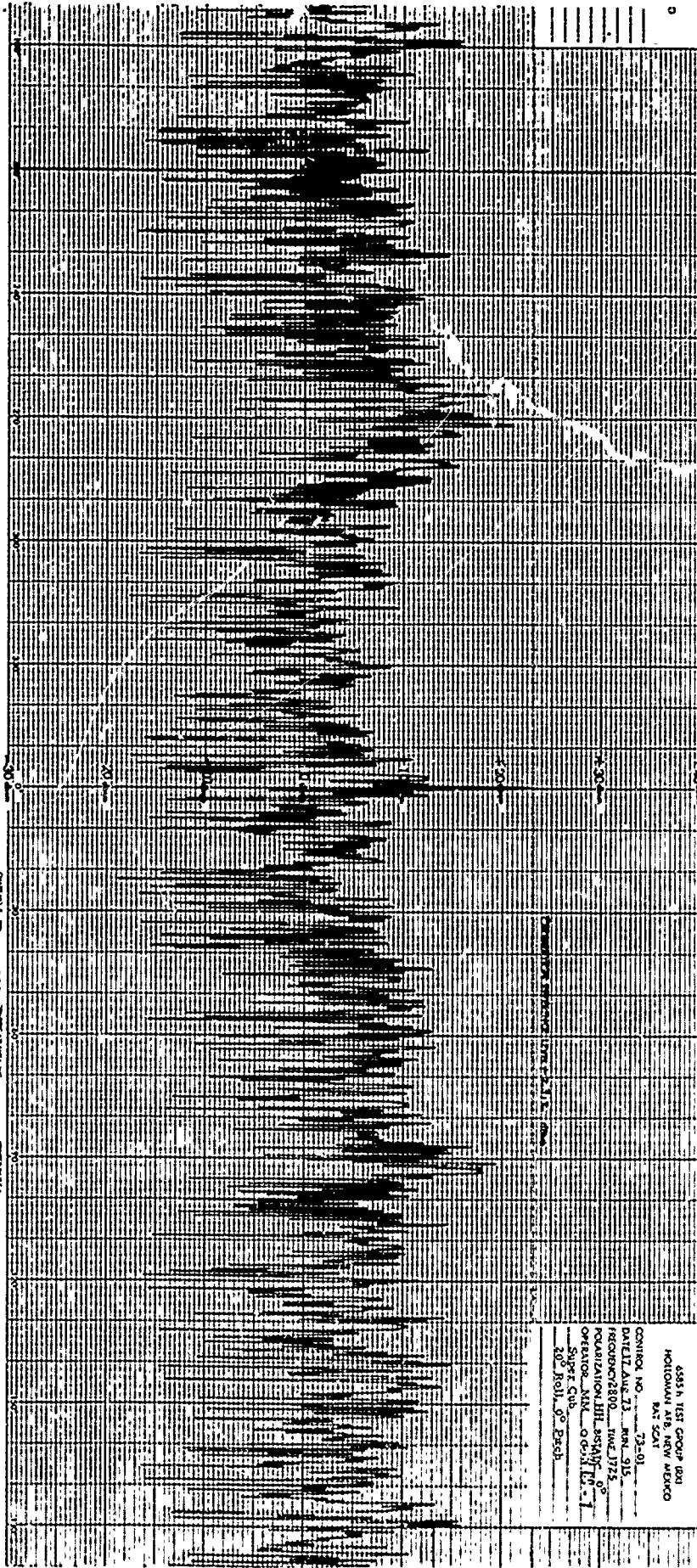




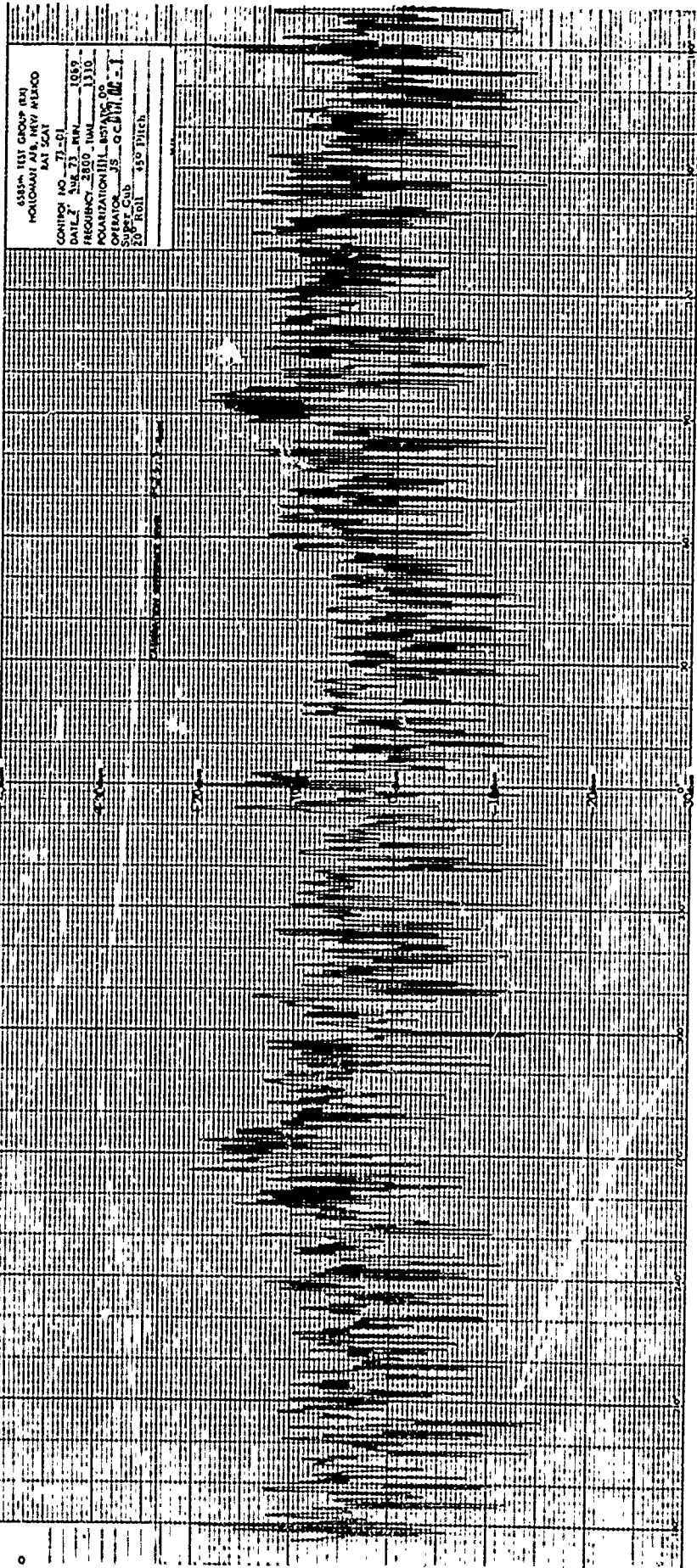
4549A TEST GROUP 891  
 HOLLAND AFB, NEW MEXICO  
 FAT 50A1  
 DATE 22 Aug 73 844 1002  
 REFERENCE 2800 TIME 0950  
 OPERATOR JHE ASTINE  
 OPERATOR JS O C DTR 1  
 Super Club  
 200 Roll 300 Ditch



GSAIA TEST GROUP (BT)  
 HOLLAND, AFB, NEW MEXICO  
 SAT 5041  
 CONTROL NO. 71-01  
 DATE 23 AUG 75 PM 1008  
 FREQUENCY 2800 MHz 6850  
 POLARIZATION (L) (R) (A) (S) (C) (M) (W) (J)  
 OPERATOR J.S. OC  
 Super. Club  
 20° Roll 50° Pitch



4585A TEST GROUP 021  
 HOLLAMAN AFB, NEW MEXICO  
 MAT SCAT  
 CONIRO NO. 73-01  
 DATE: AUG 23, 1954  
 REC'D BY: 2800, TIME: 1225  
 OPERATOR: JHJ, 251, 0°  
 OPERATOR: JHJ, 002, 12.1  
 SUPER: CUB  
 20° Roll, 0° Pitch

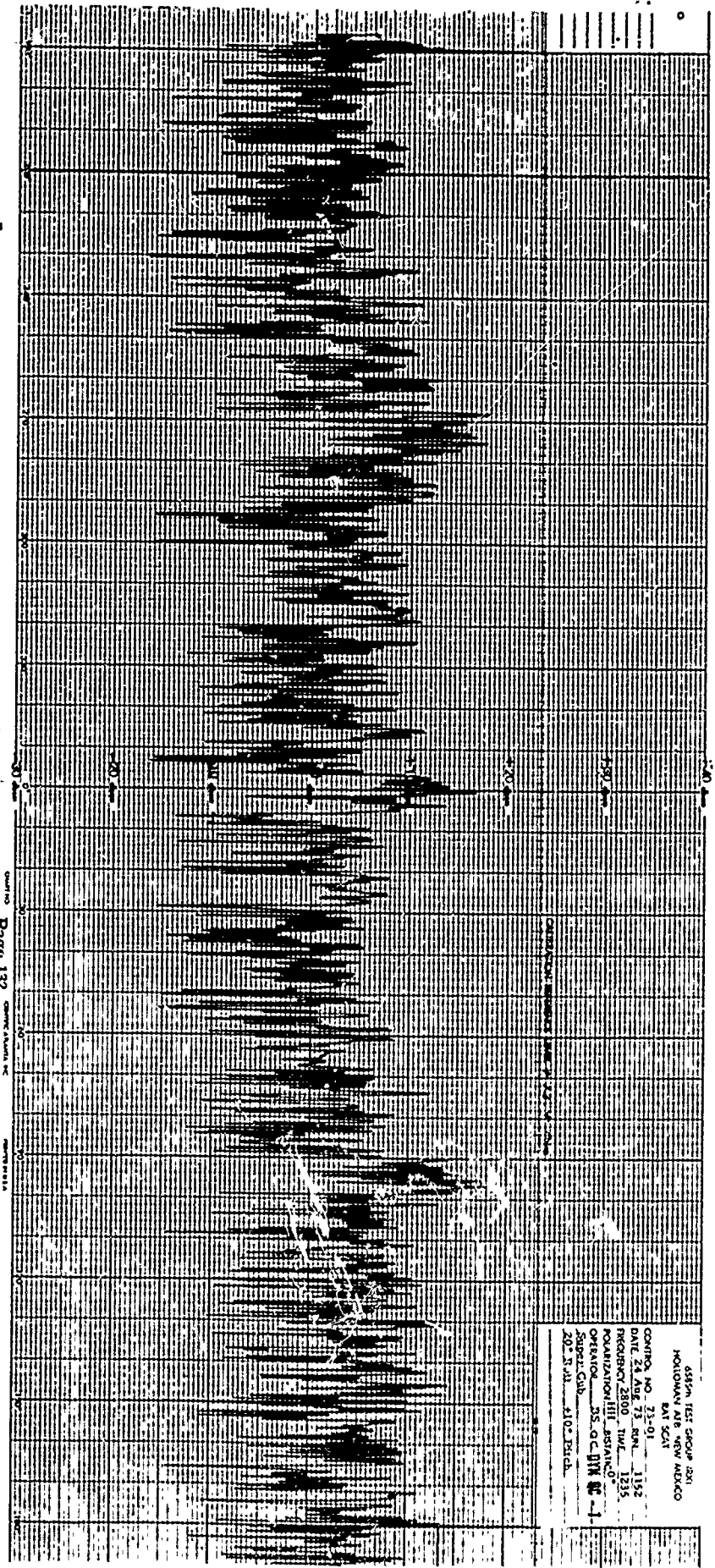


FORM 1011-1

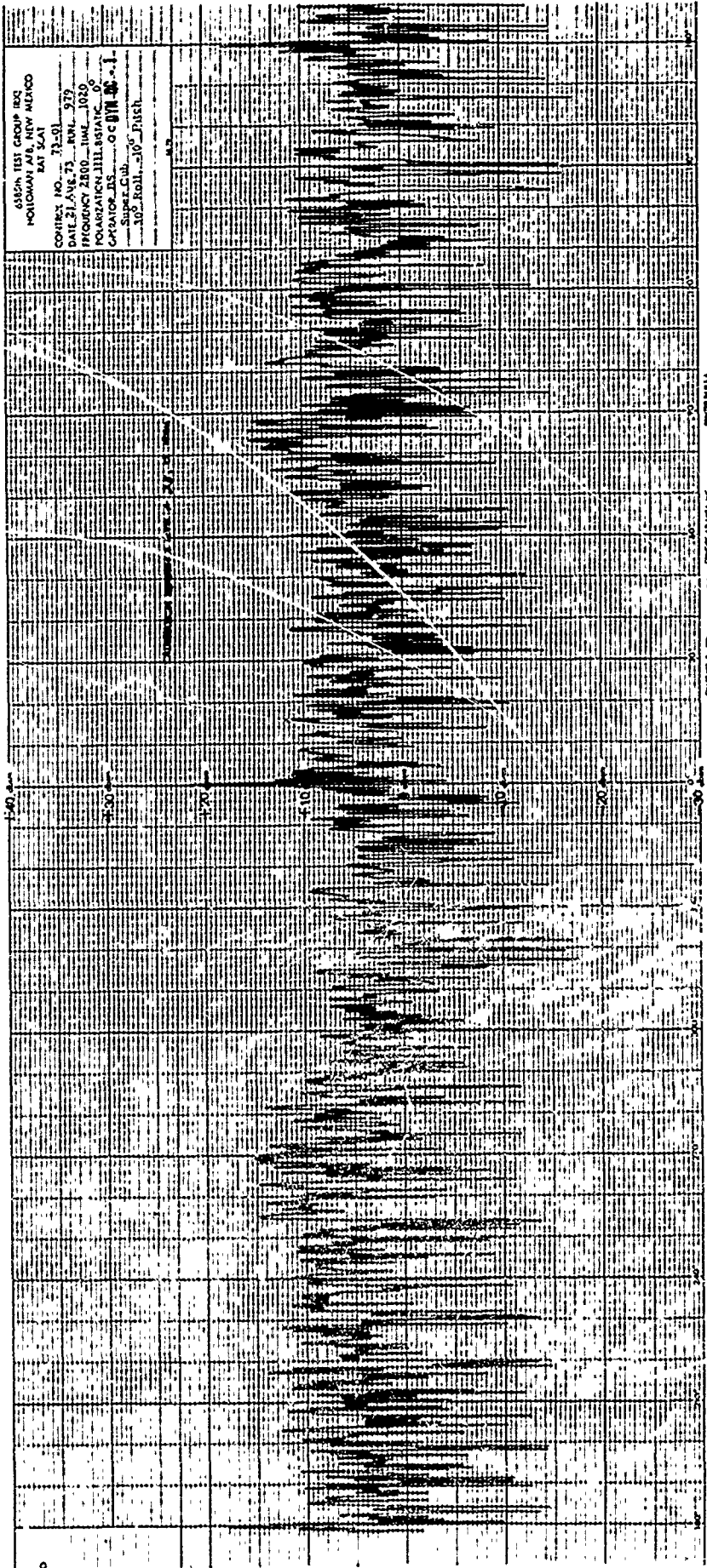
UNITED STATES AIR FORCE

Page 131

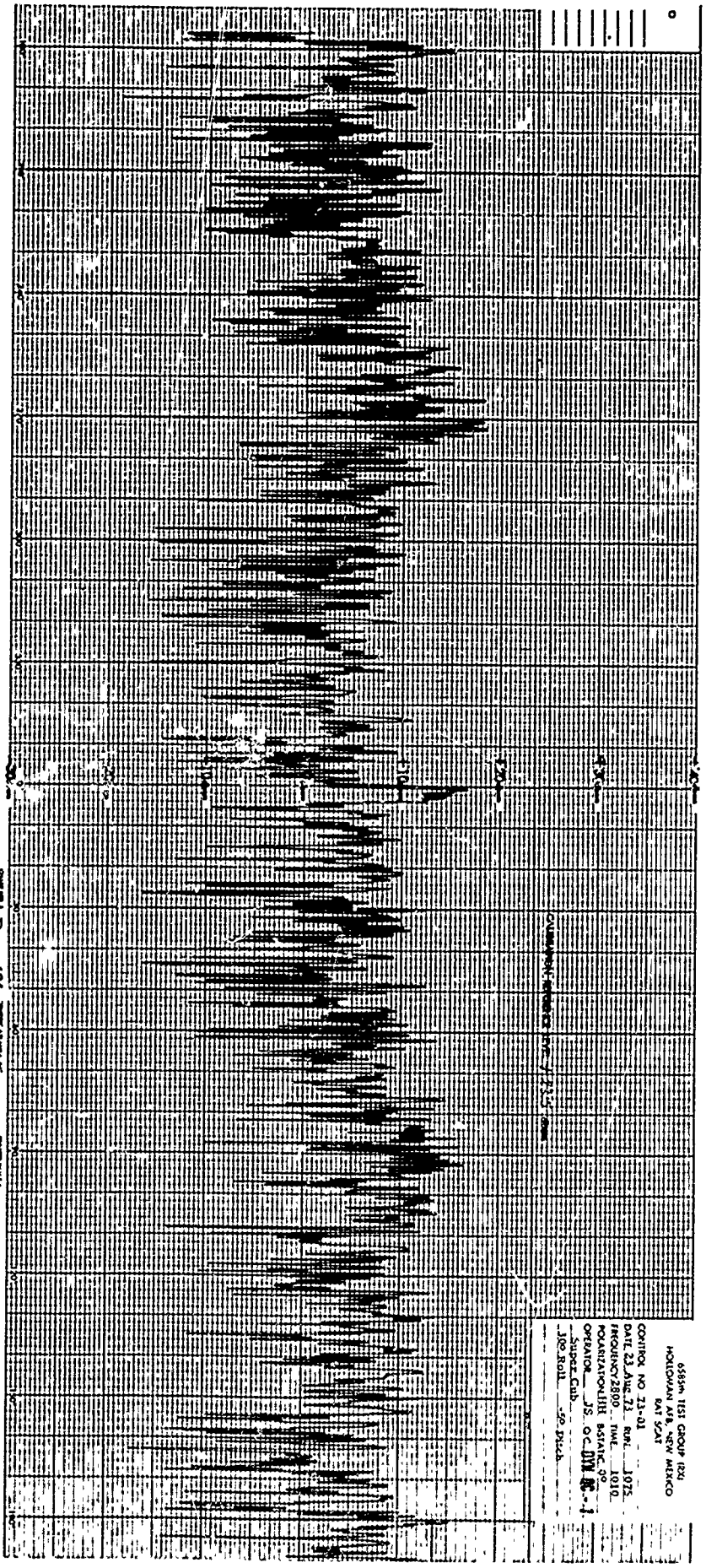




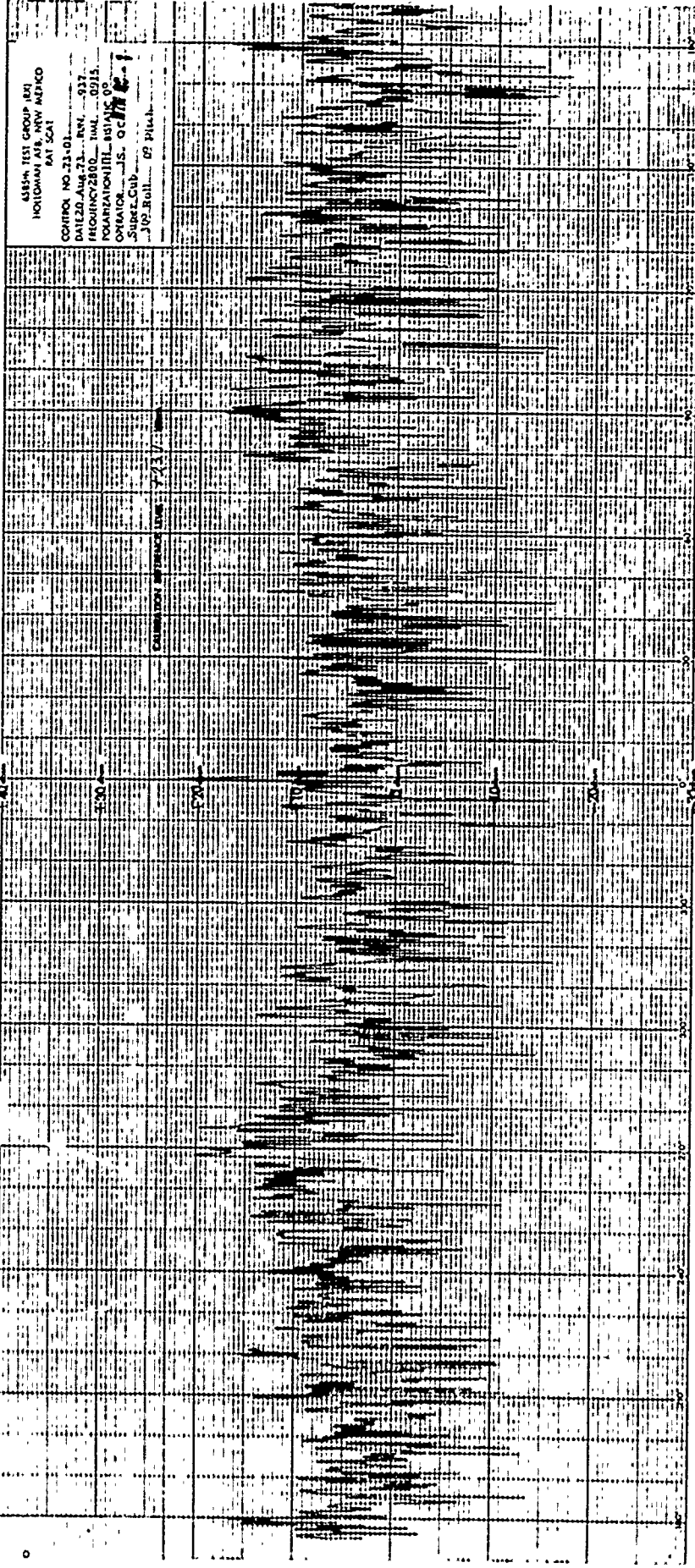
6810m TEST GROUP 301  
 HOLLAND AIR NAV AID/DCO  
 SAICAI  
 CONTROL NO. 75-01 1152  
 DATE 24 APR 53 RIM 1533  
 FREQUENCY 2800 TWT 0533  
 POLARIZATION VERTICAL  
 OPERATOR SS, O C DM  
 SUPERVISOR  
 207 S 411 4107341 d

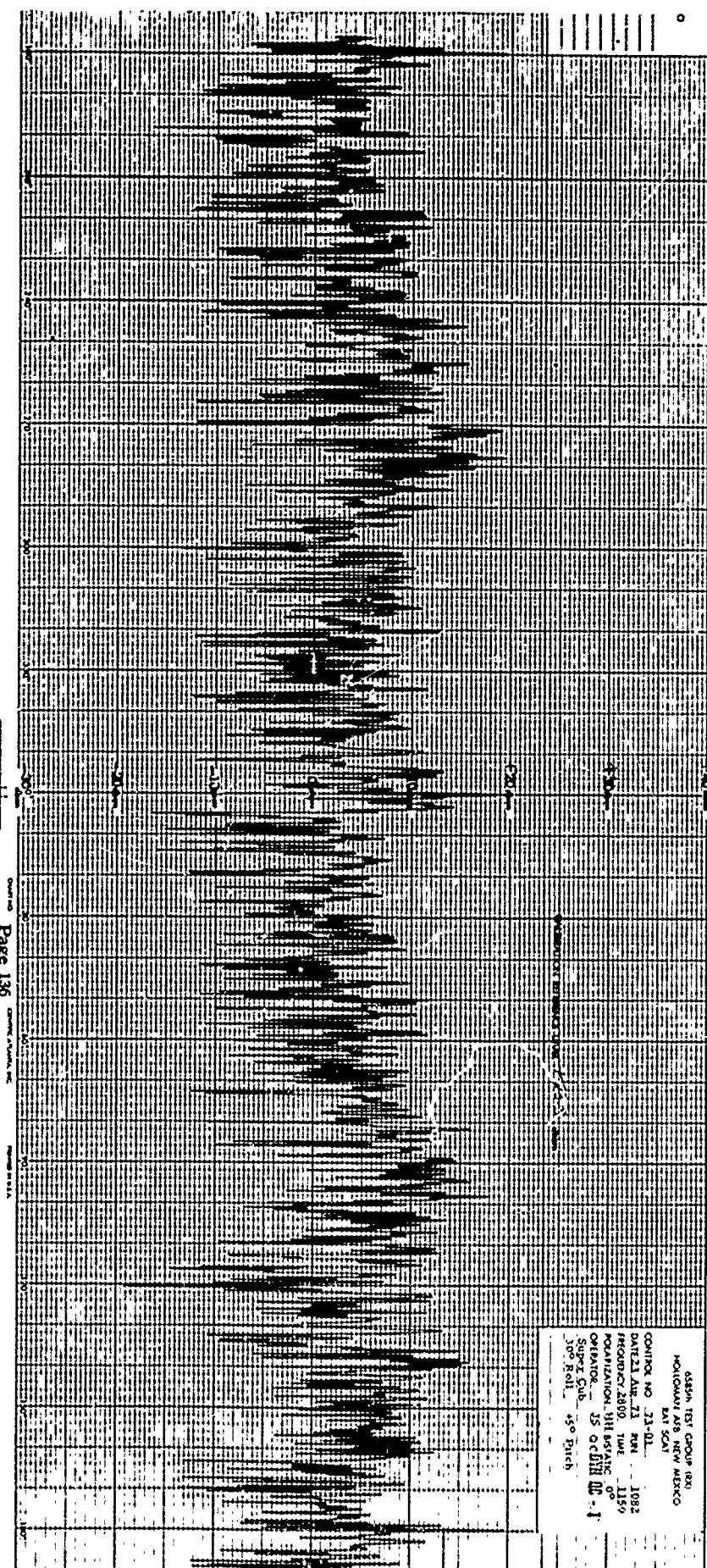


COURSE Page 133 OPERATIONAL USE

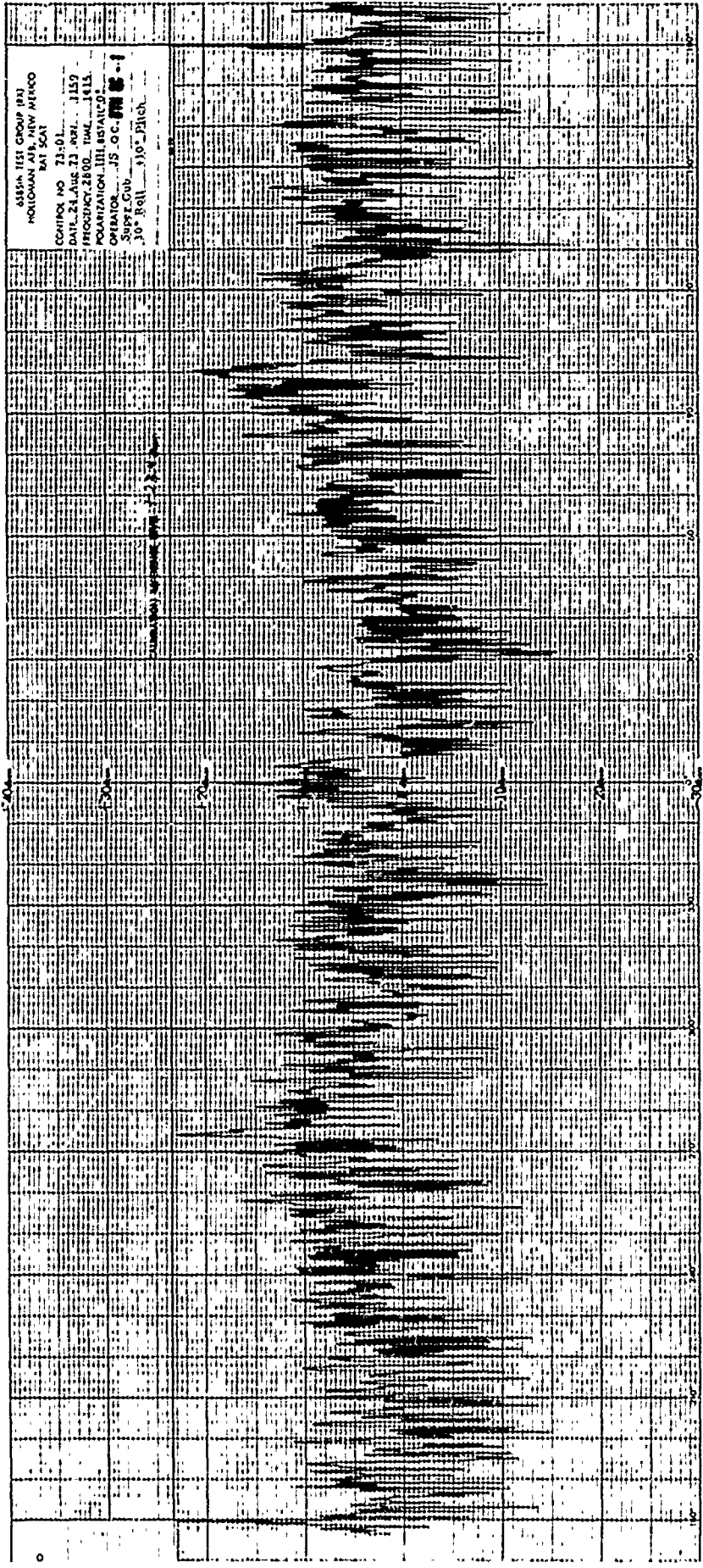


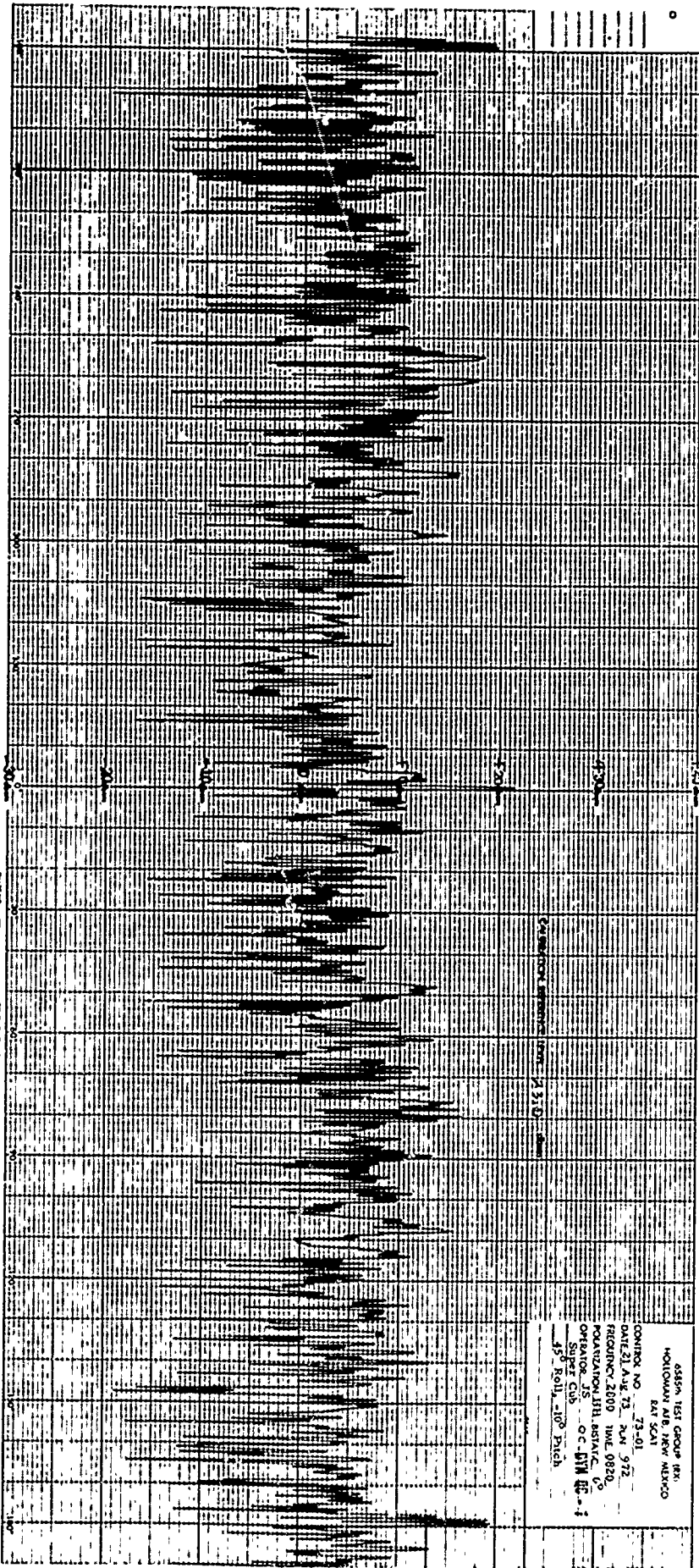
6554-1151 GROUP 102  
 HOSPITAL 101 STAN  
 CONTROL NO 11-01  
 DATE 23 AUG 72 800 1072  
 FREQUENCY 2500 TIME 1010  
 MODULATOR BOSTON  
 OPERATOR JS O C 111 R-1  
 SUPERGRAB  
 JEC Hall - 50 Ditch



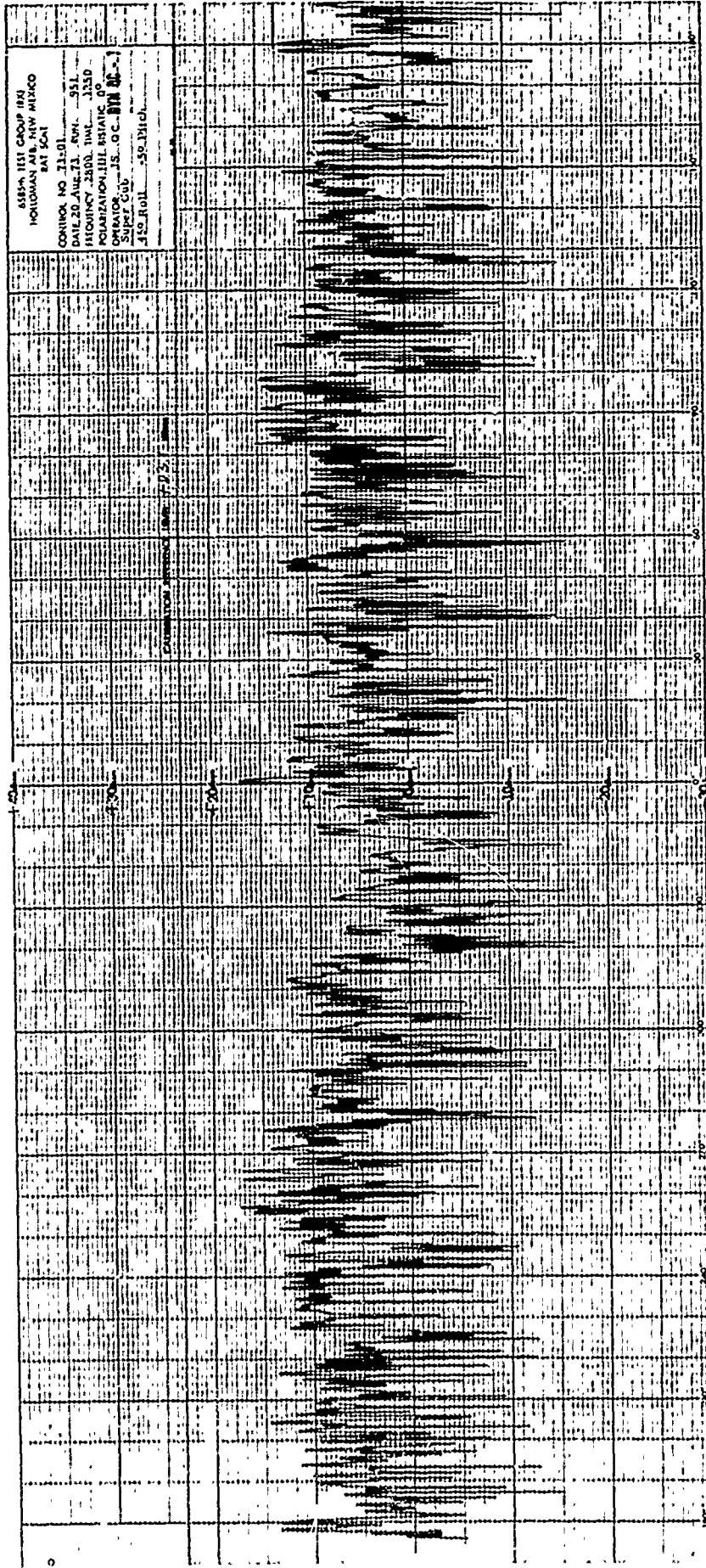


43534 TEST GROUP 1001  
 HOLLAND AIR NEW MEXICO  
 341 301  
 CONTROL NO 34-101  
 DATE 21 APR 73 RUN 1092  
 FREQUENCY 2800 TUNE 1150  
 MODULATION 511 85 1/2  
 OPERATOR US OCHH DC - 1  
 Super Club  
 30° Roll 49° Pitch

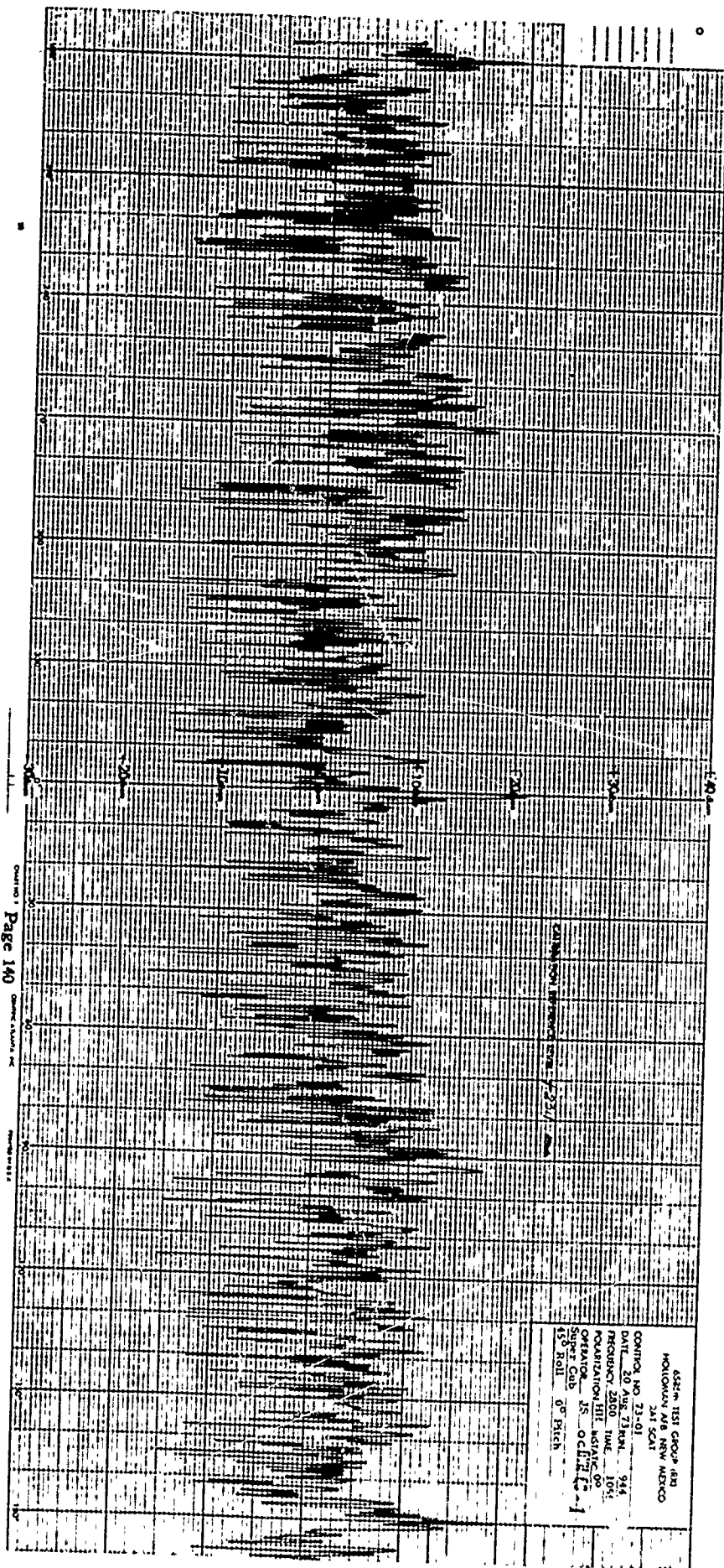




0585M 1831 GROUP (R)  
 HOLLAND AFB, NEW MEXICO  
 RAY SCAT  
 CONTROL NO. 73-01  
 DATE 21 AUG 73 PM 972  
 FREQUENCY 2000 TIME 0820  
 POSITION HONOLULU, HAWAII  
 OPERATOR JS O.C. DMV  
 SUPER GRB  
 45° Roll, 10° Pitch

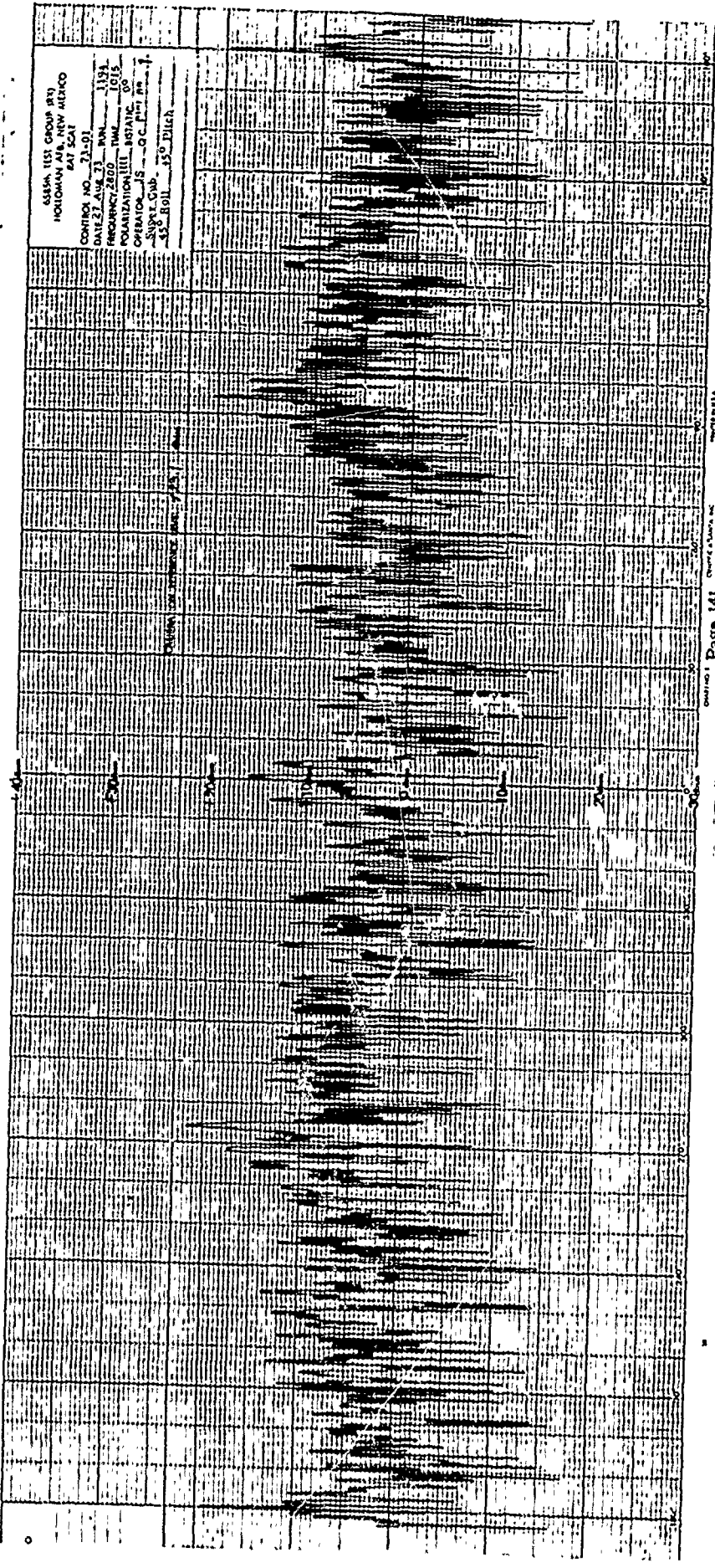


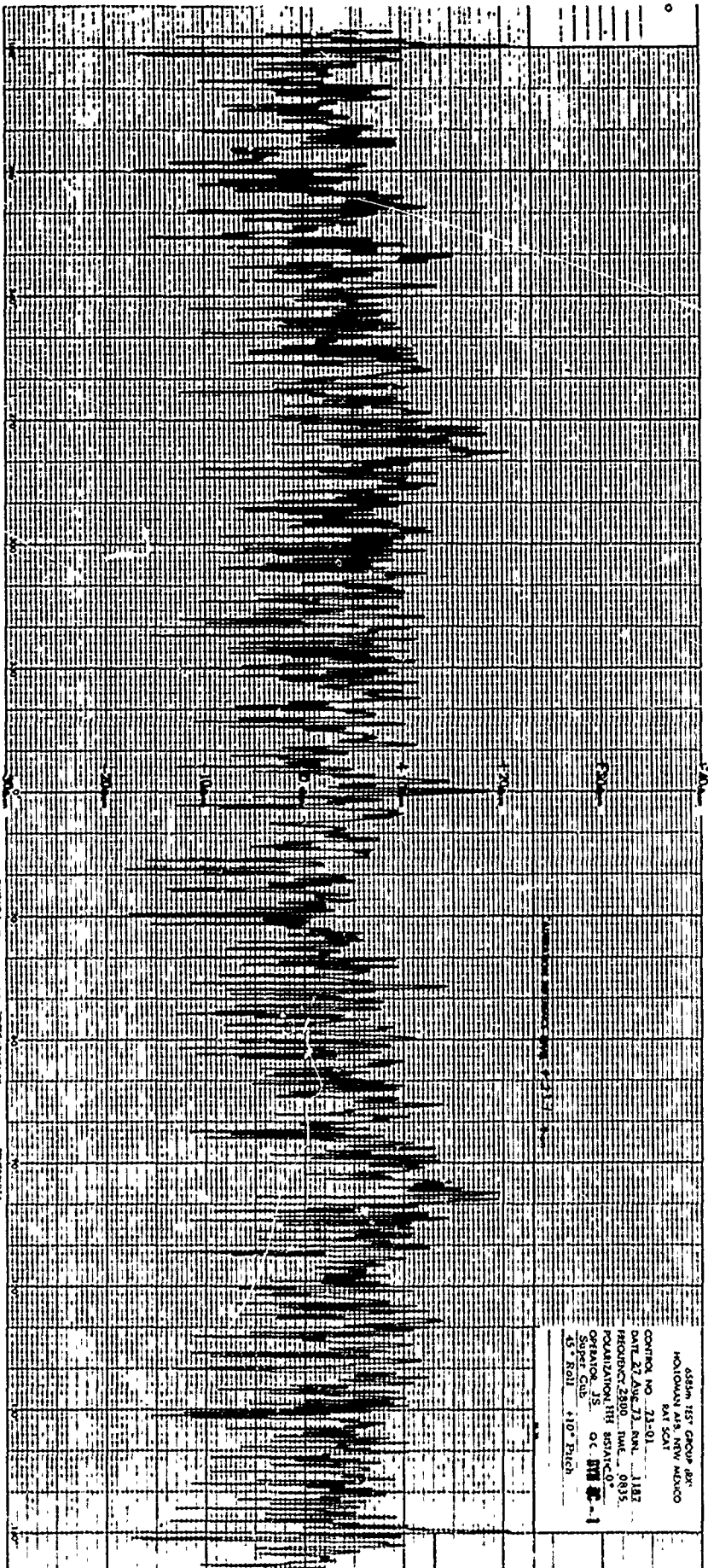




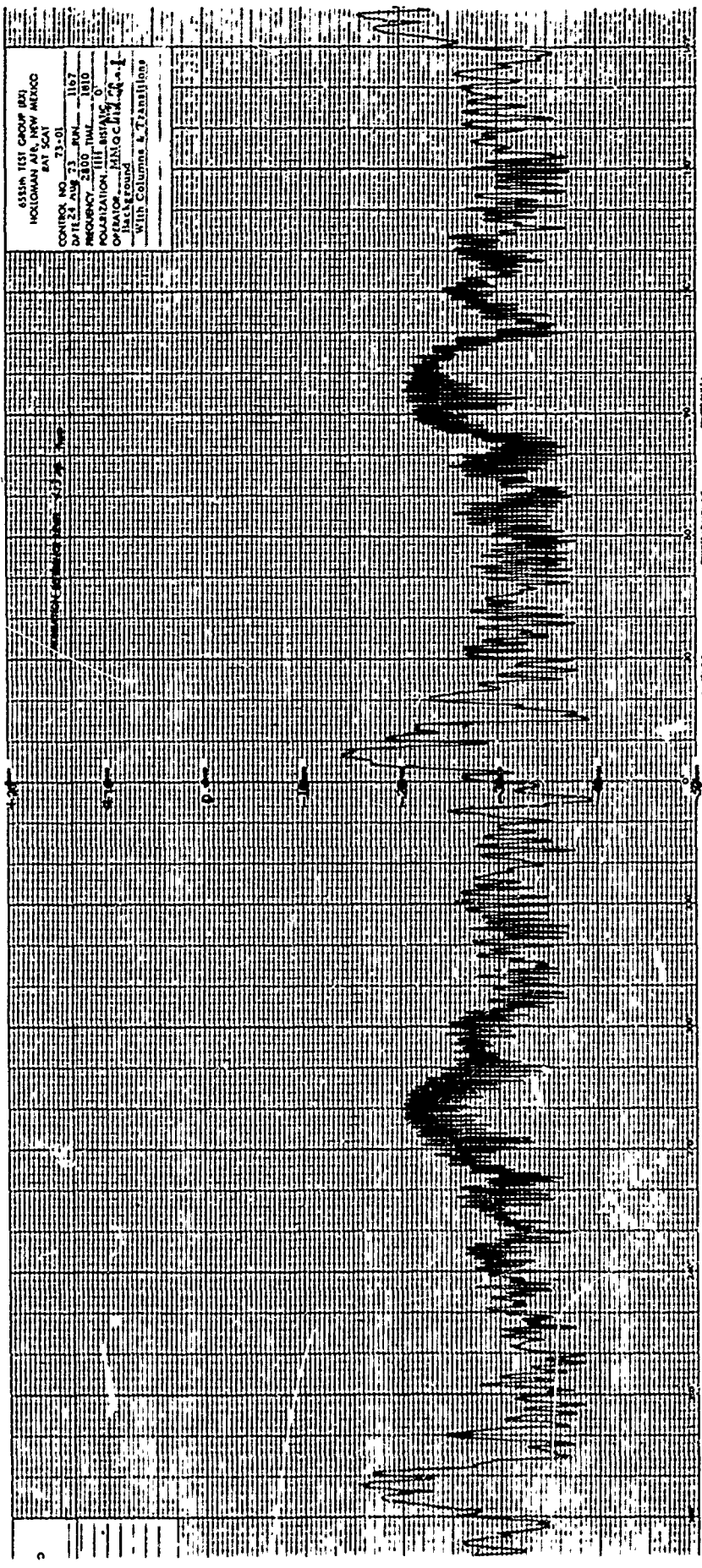
457m 151 GPOA AIR  
 HOLLOWAY AIR NEW MEXICO  
 241 SCAI  
 CONTROL NO 73-01  
 DATE 20 Aug 71mm 944  
 RECORDING 2400 TIME 104  
 CALIBRATION 100  
 OPERATOR JS - OCL 10/71  
 Super Cub 05 Pitch  
 150 Roll

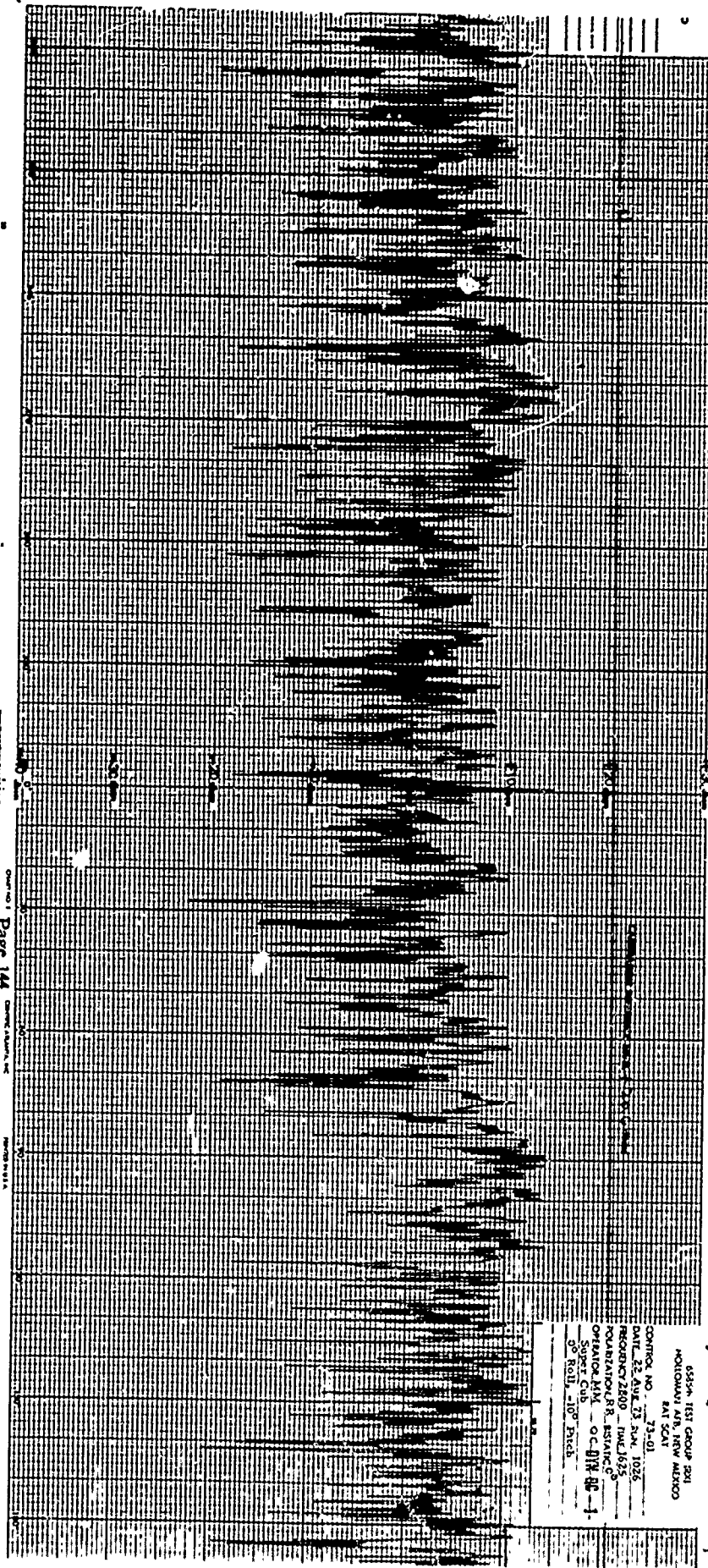
3354A TEST GROUP (RT)  
HOLLOMAN AFB, NEW MEXICO  
BAT SCAT  
CONTROL NO. 73-01  
DATE 27 AUG 73  
FREQ 2800  
POLARIZATION III - INSTANT. 00  
OPERATOR JS - O.C. P.M. 80  
SUPPL. GRP 350 DILCH





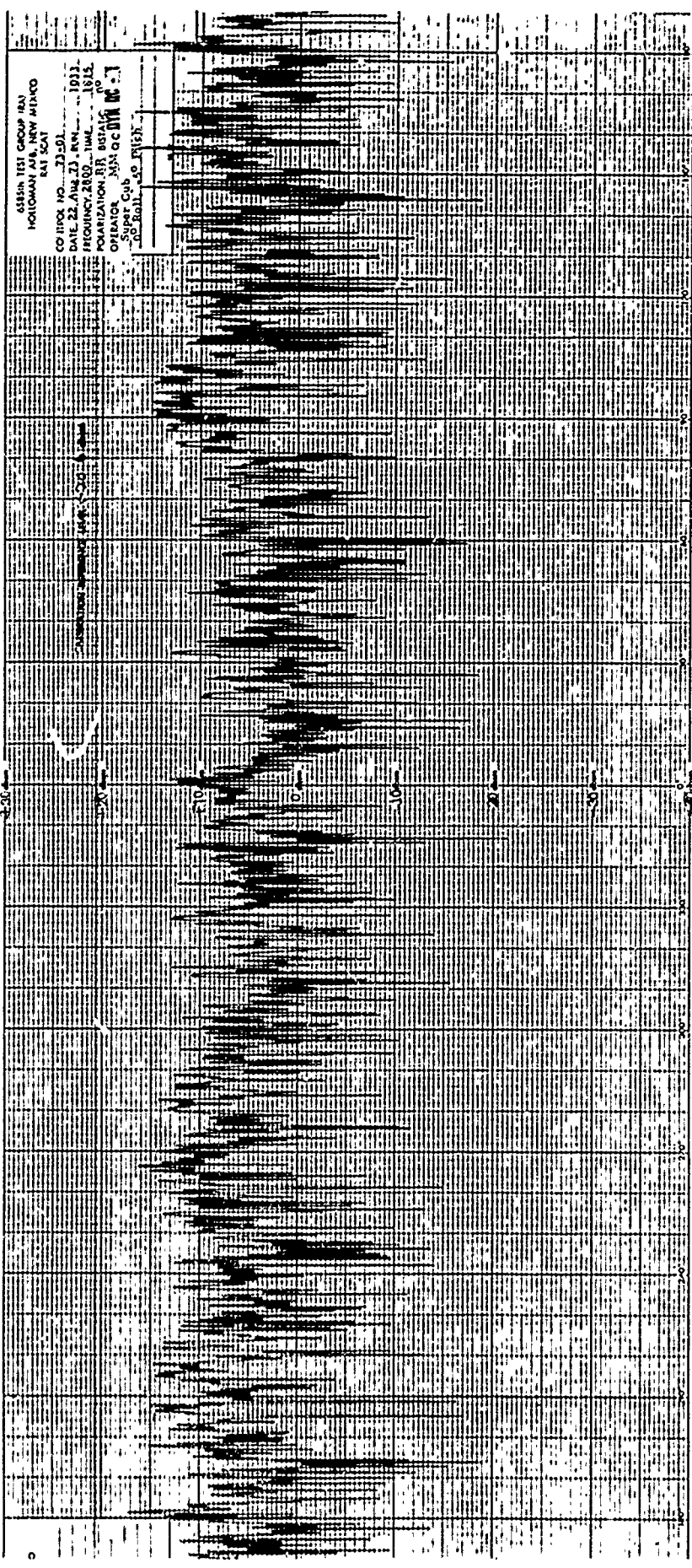
455th TEST GROUP BR.  
 HOLLOMAN AFB, NEW MEXICO  
 5th SQUAD  
 CONTROL NO. 71-01  
 DATE 27 AUG 73, RUN 1187  
 RECORDING 2800 TIME 0835  
 POLARIZATION TH 851A1C.0  
 OPERATOR JS. O.C. [initials]  
 Super CUB  
 4° Roll 110° Pitch





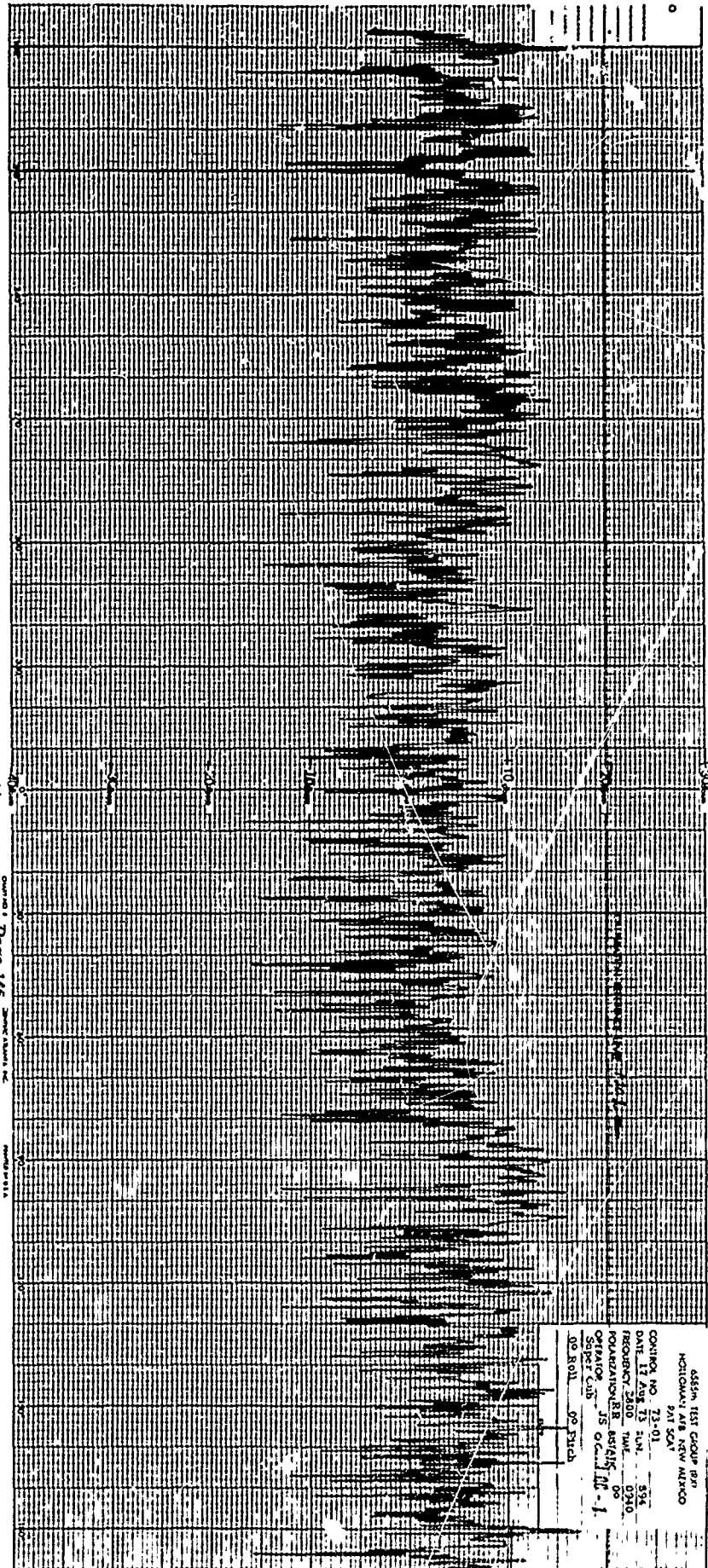
Control No. Page 144

6535th TEST GROUP B21  
 HOLLAMAN AFB, NEW MEXICO  
 F41 SCAT  
 CONTROL NO. 73-01  
 DATE 22 AUG 73 AM 1026  
 RECORDING 2800 - TIME 1625  
 POSITION 104.8R - 35.14N  
 OPERATOR M.M. - OC 0174-01  
 SUPERVISOR  
 OF ROLL - 100 Pitch



65341 TEST GROUP 181  
MICHIGAN AT NEW HAVEN  
RAT 101  
CO 1105 NO. 21501  
DATE 22 MAR 53 RW. 1953  
FREQUENCY 2000 TUNE 16.5  
POLARIZATION BR BR 1/2  
OPERATOR J. G. G. B. H. M. 5.1  
CORRECTION 0.001 1/2

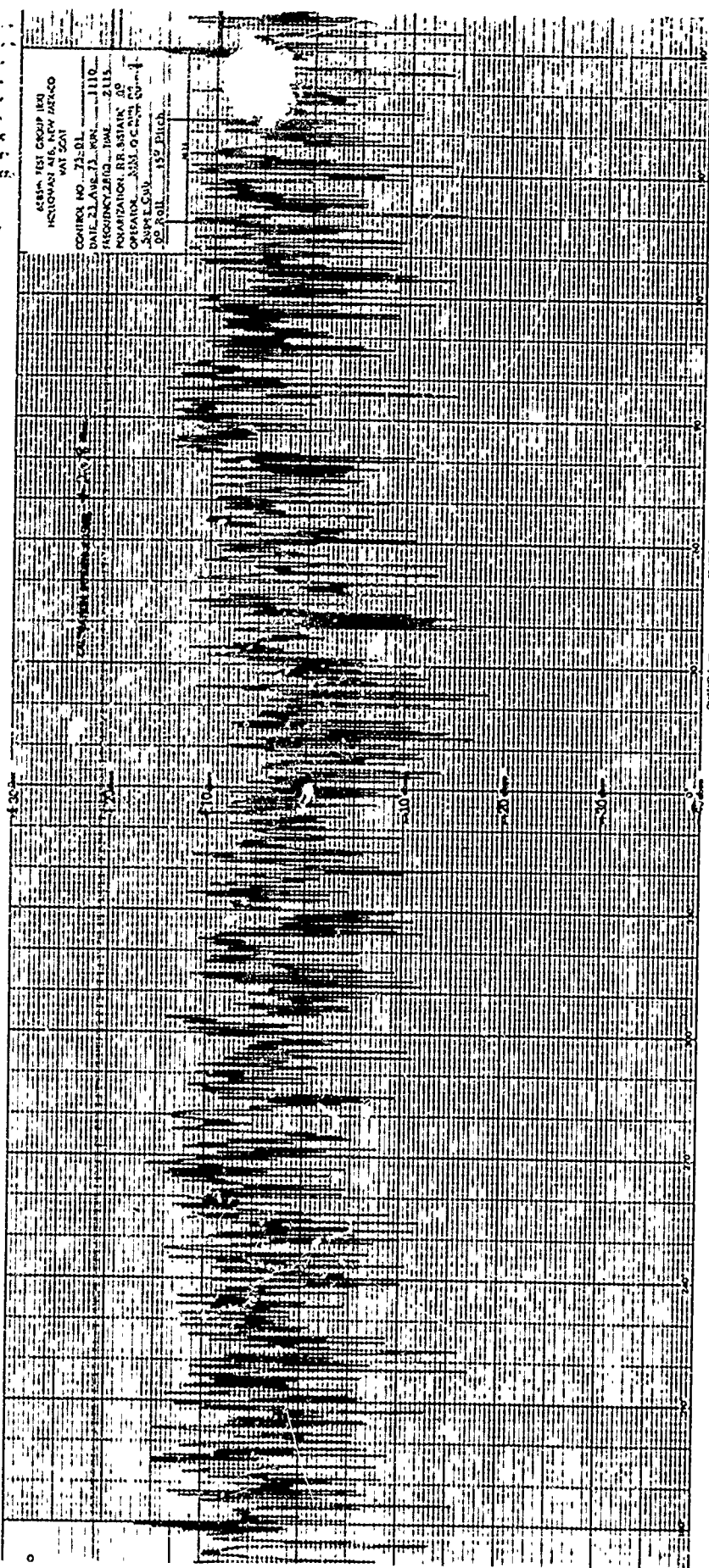
Page 145



5535th TEST GROUP 1871  
 HORTONDALE AFB NEW MEXICO  
 311 SCN  
 CONTROL NO 72-9-01  
 DATE 11 AUG 75 5:45 PM 854  
 FREQUENCY BAND 100-1000  
 POLARIZATION 45 45/45  
 ORIFACE 45 45 0-111-1  
 OPER 45 45  
 DE ROLL 92 1524

ASSEM. TEST GROUP 180  
HAYWARD AVE. NEW BRUNSWICK  
WAY 204

CONTROL NO. 72-01  
DATE 21 AUG 72. RMN. 1110  
REGISTRY 2610 - DIAL 2115  
ORGANIZATION RR. BOSTON CO  
OPERATOR. M.M. O.C. 1000  
SUPPLY. CUB. 132. Pitch



Continued on Page 147

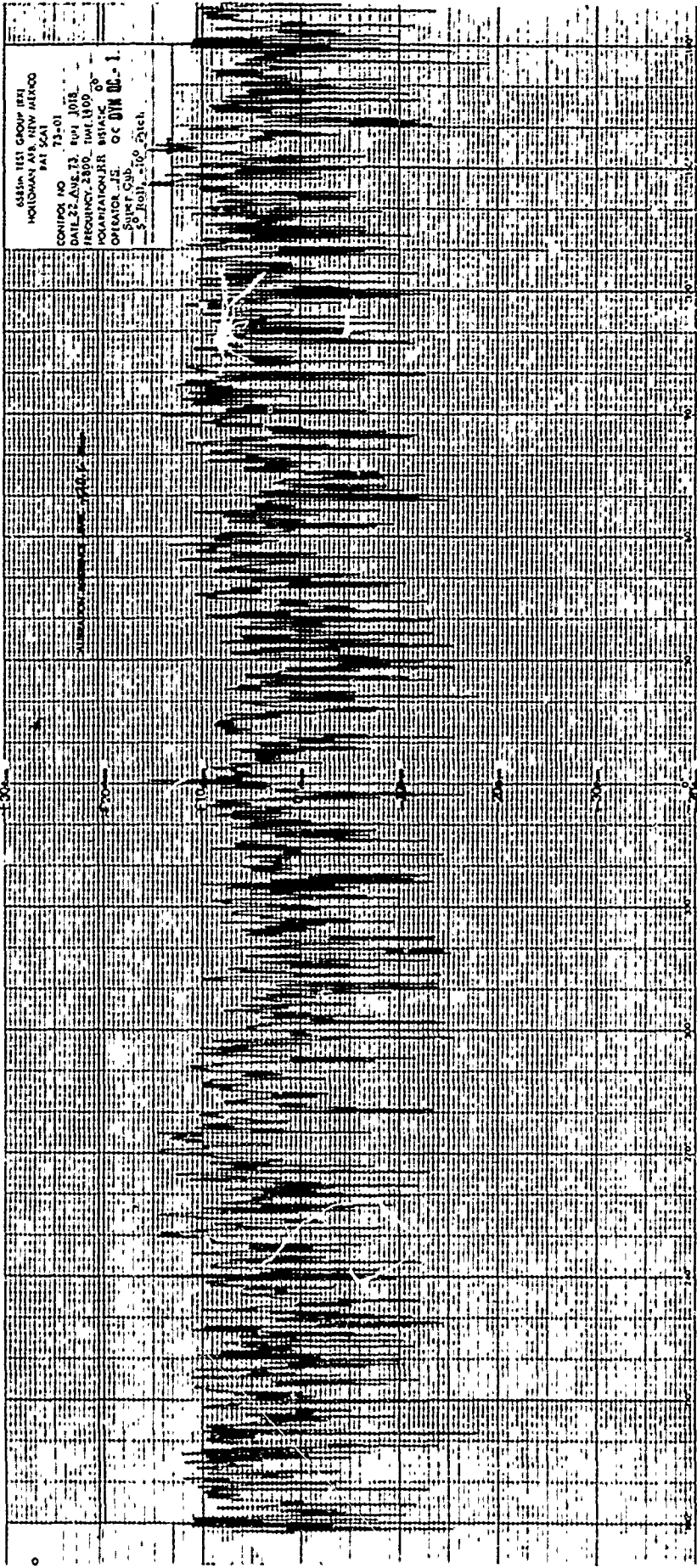


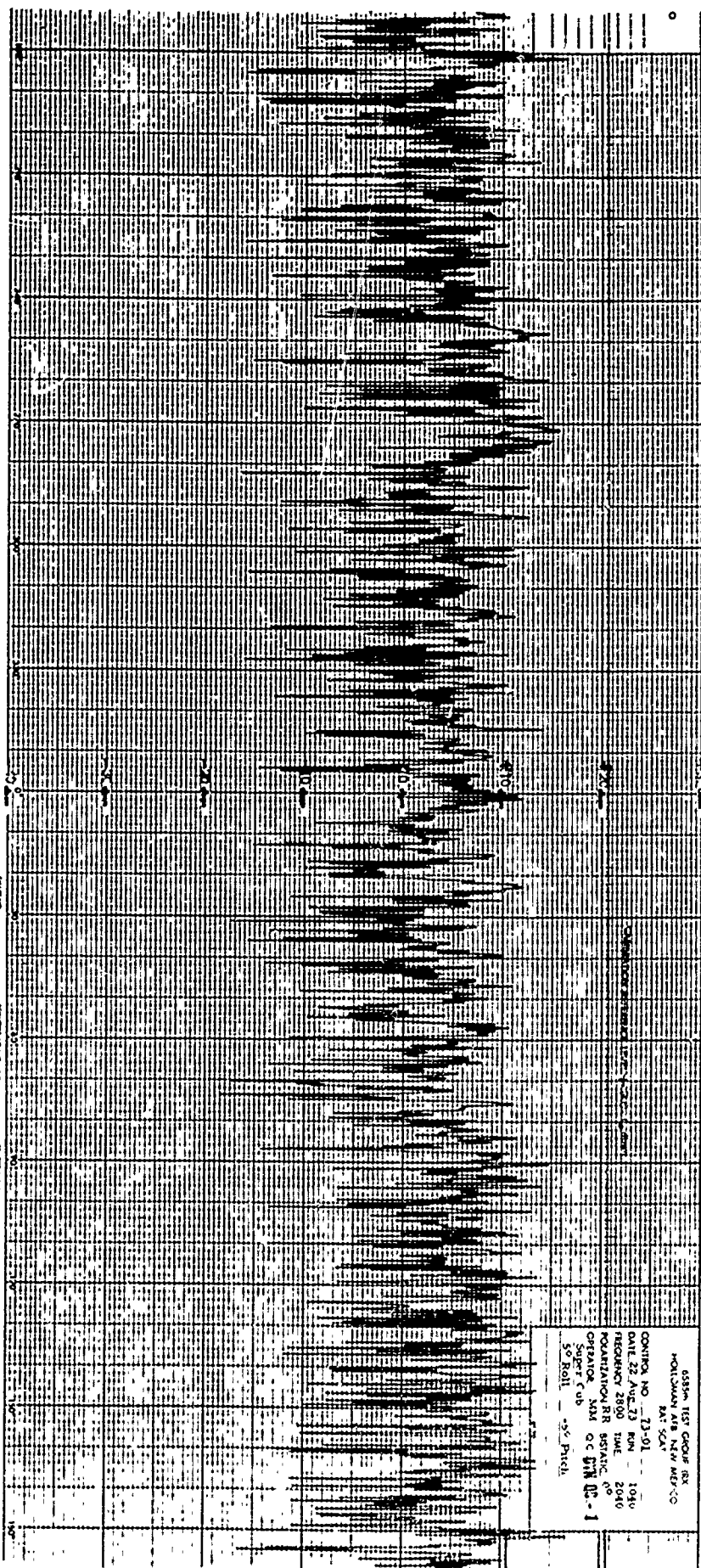
Contract No. 1109

11/11/11

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24:00		

555th TST GROUP 482  
 HOLDMAN AIR ARW AFRCO  
 EAST SON  
 CONTROL NO. 73-01  
 DATE 24 AUG 1946 1110  
 FREQUENCY 2800 MHz 0700  
 OPERATOR JR BECHTOLD  
 STATION JS O-3111 E-1  
 SPEC. TAB 1109 P. 148

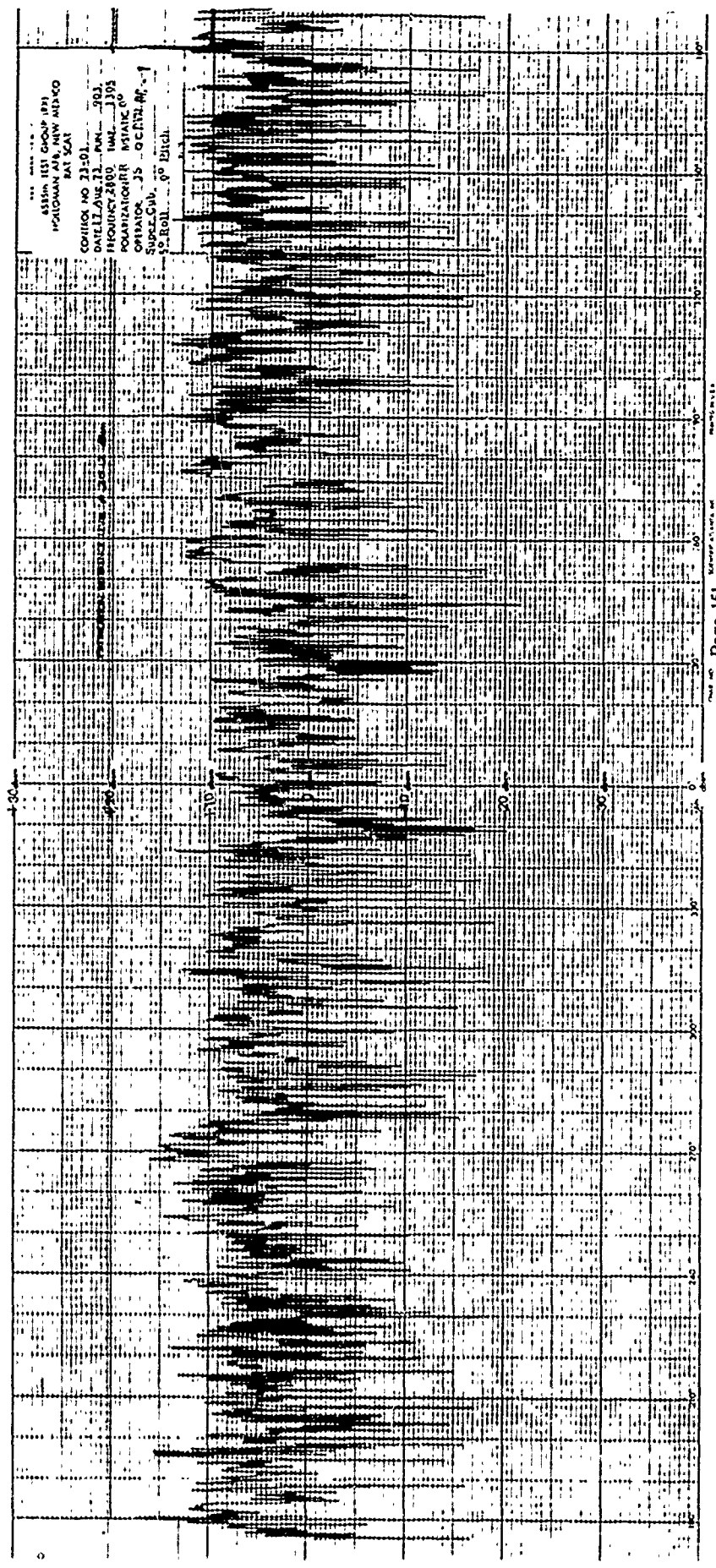


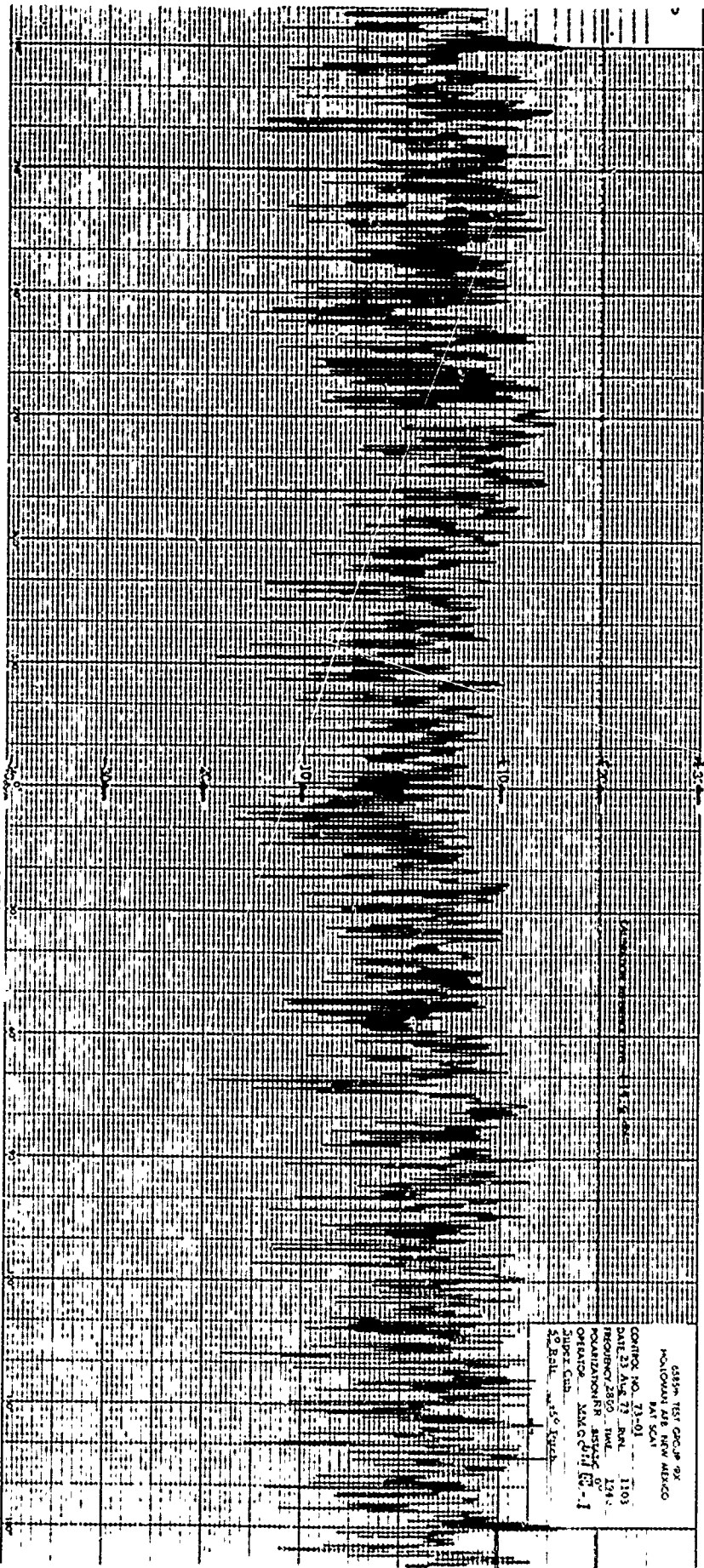


Page 150

4534A 150 GROUP BX  
 HOLLISMAN AIR NAV MET-CO  
 NAT SCAL  
 COUNTY NO - 73-01 - 1000  
 DATE 22 AUG 71 MON 2040  
 RECORDING 2800 TIME  
 OBSERVATION BR BRSTANIC 00  
 STATION NM 00 WTR DC - 1  
 SQUAD CUB  
 50 Roll -55 Pitch

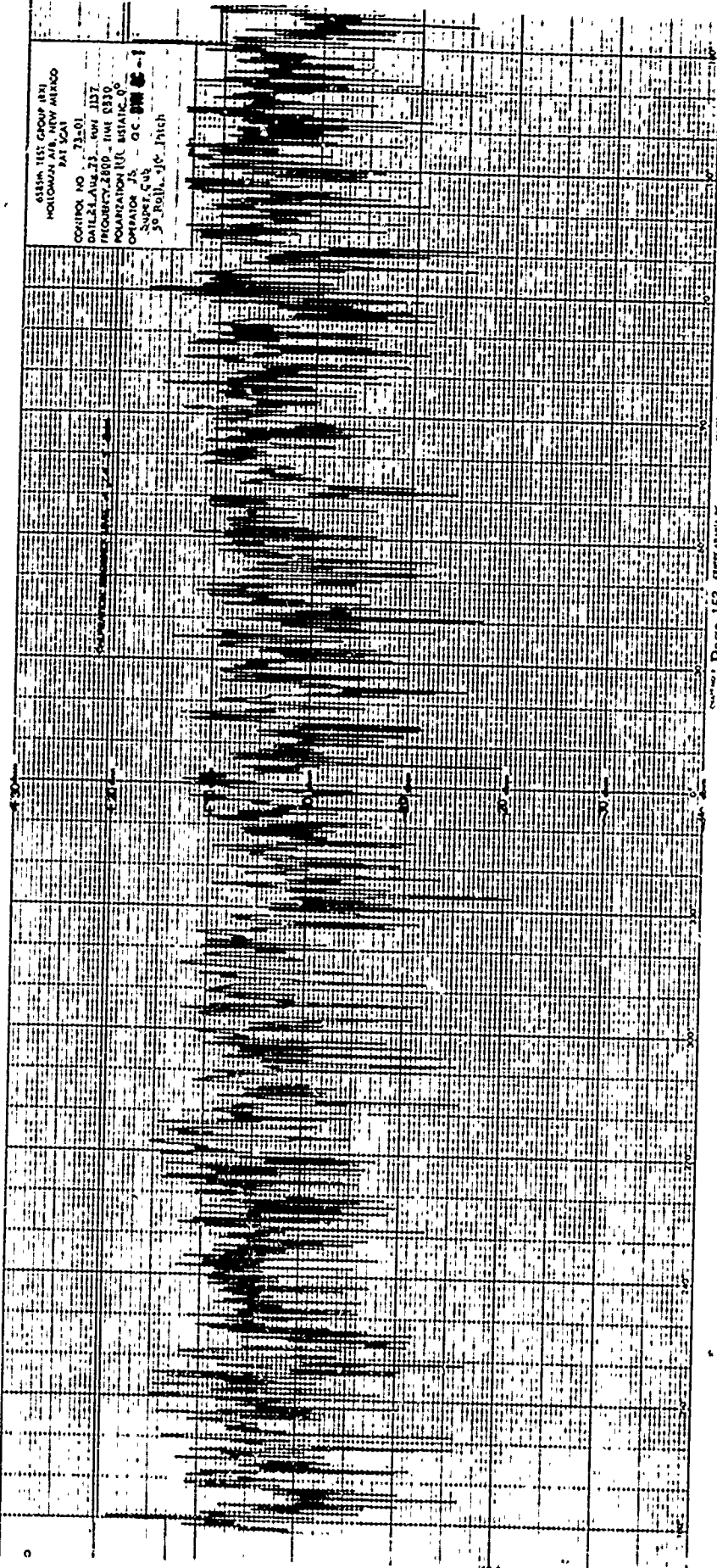
ASPHALT GROUP (PT)  
MICHIGAN AAS NEW MEXICO  
KAT SCAI  
CONTROL NO 21-01  
DATE 11 AUG 71 PM 203  
PROJECT 2400 HWY 1105  
POLAROGRAPH INSTANT  
ORANGE 35 - OCT 1971  
Spec. Cub. 00 Bitch.

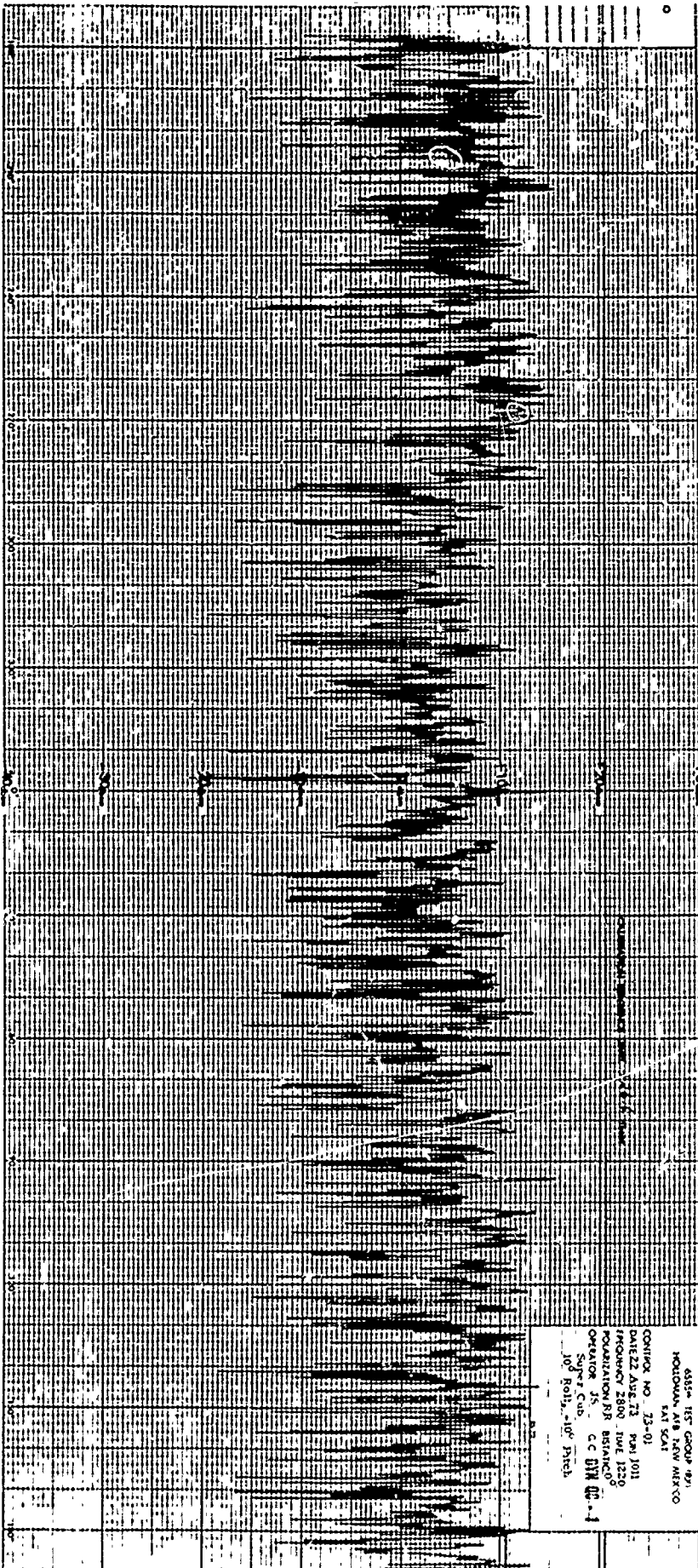




6559 TEST GROUP 92  
 HONOLULU AFB HAWAII  
 IAT SCAI  
 CONTROL NO. 73-01  
 DATE 23 AUG 73 AM 1103  
 PROBNOV2850 IMC 124  
 POSITION FOR ASSTG OF  
 ORANGE - MAAC 011 02 - 1  
 SUPER CAB  
 50 Bulb - 45' Tuck

ASPH. TEST GROUP (BT)  
HOT-COMPACTED BY METHOD  
CONTROL NO. 71-01  
DALLAS AVENUE - BOX 117  
HOUSTON, TEXAS 77001  
OPERATION - LINE 8330  
COMPANY - G.C. [unclear]  
SUPERVISOR - J.C. Pritch





4554- 157 GROUP 491  
 HOLLOWAY 1414 NEW MEXICO  
 EAST 5041  
 CONTROL NO 23-01  
 DATE 22 APR 73 TIME 1011  
 FREQUENCY 2500 TIME 1220  
 ORGANIZATION FOR BISMARCK  
 OPERATOR J.S. C.C. G.M.  
 SUPERVISOR  
 10" Roll, -10" Patch

65TH TEST GROUP (B)  
HOLMAN AIR, NEW MEXICO

FAT SCAT

CONTROL 120 75-001

DATE 21 AUG 73 PM 1060

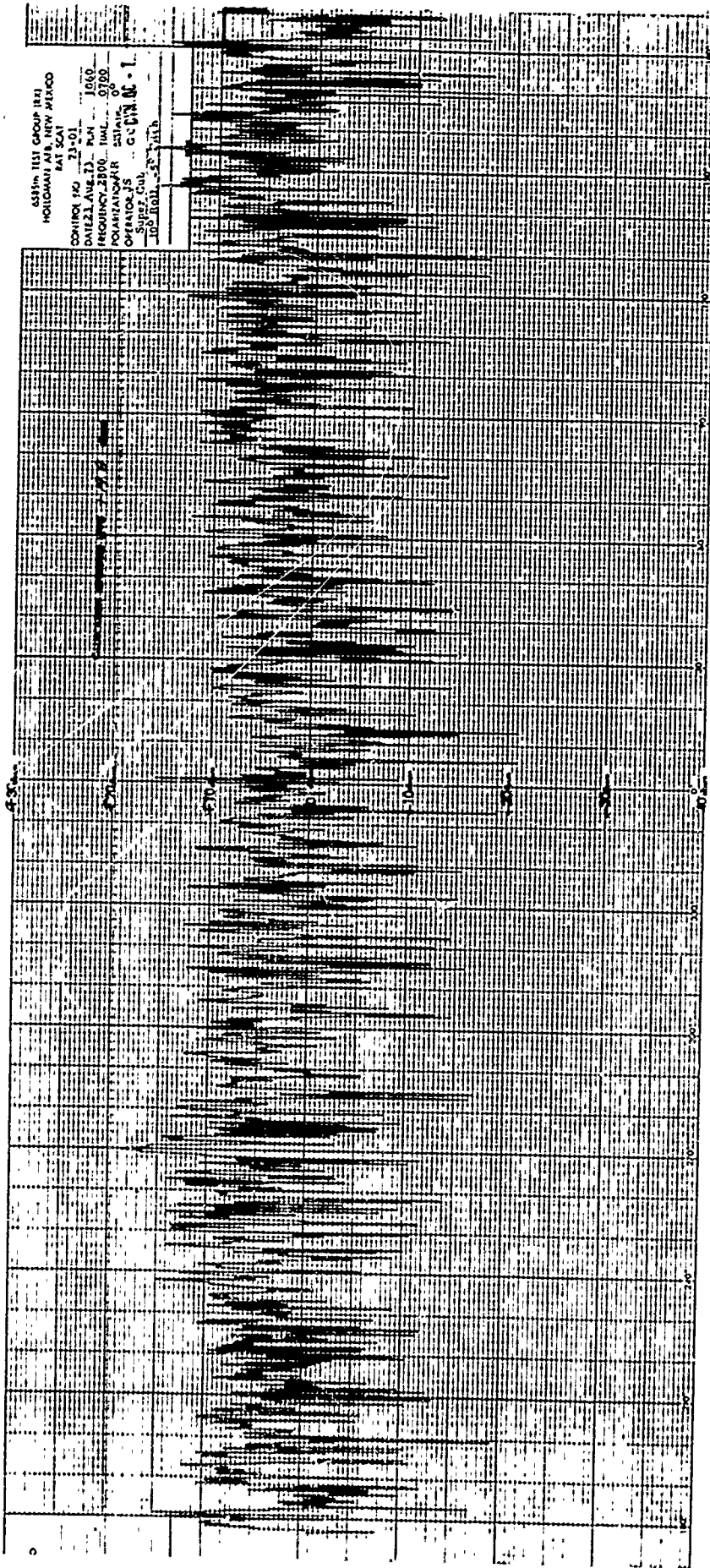
FREQUENCY 2800 IMC 0700

POLARIZATION AIR STATION 00

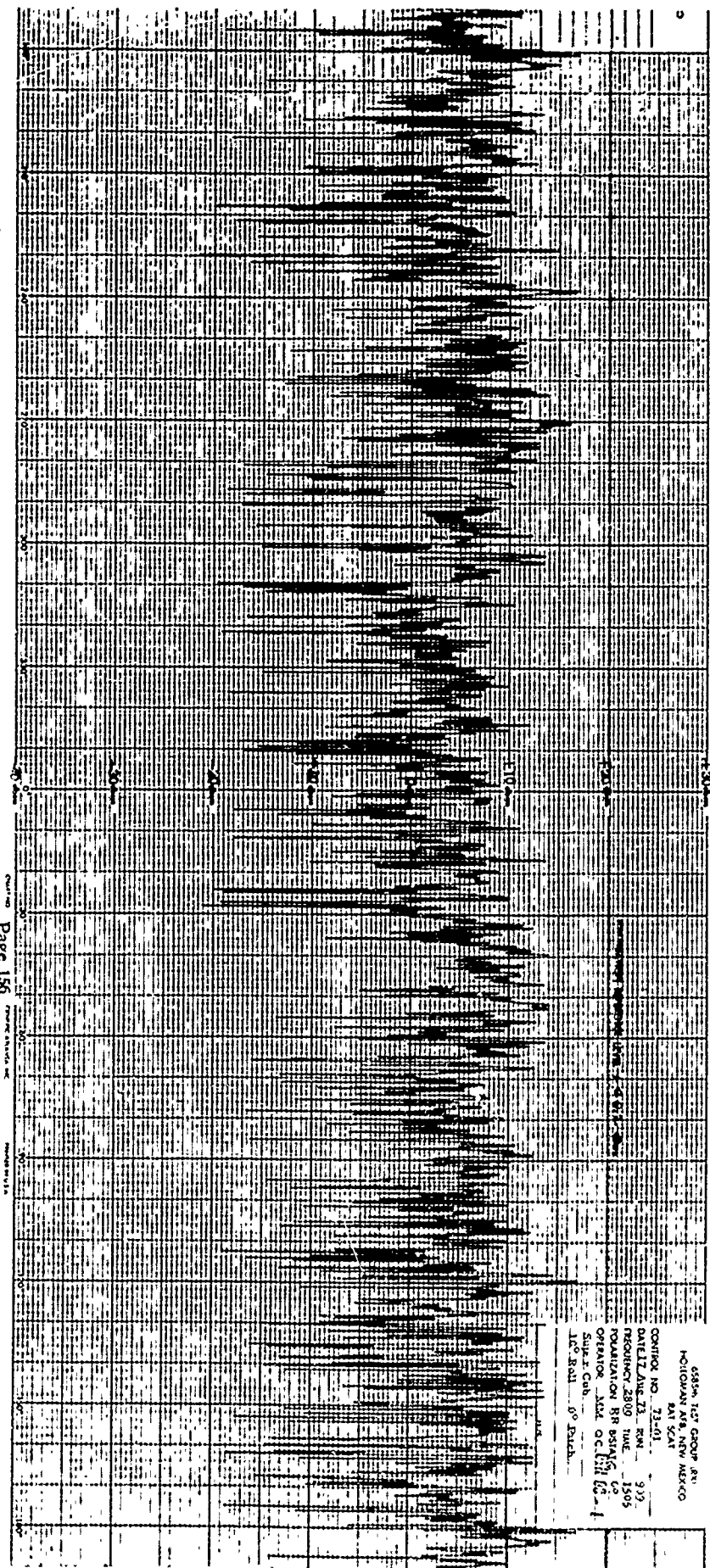
OPERATOR JS C. C. P. N. C. L.

SUPERVISOR

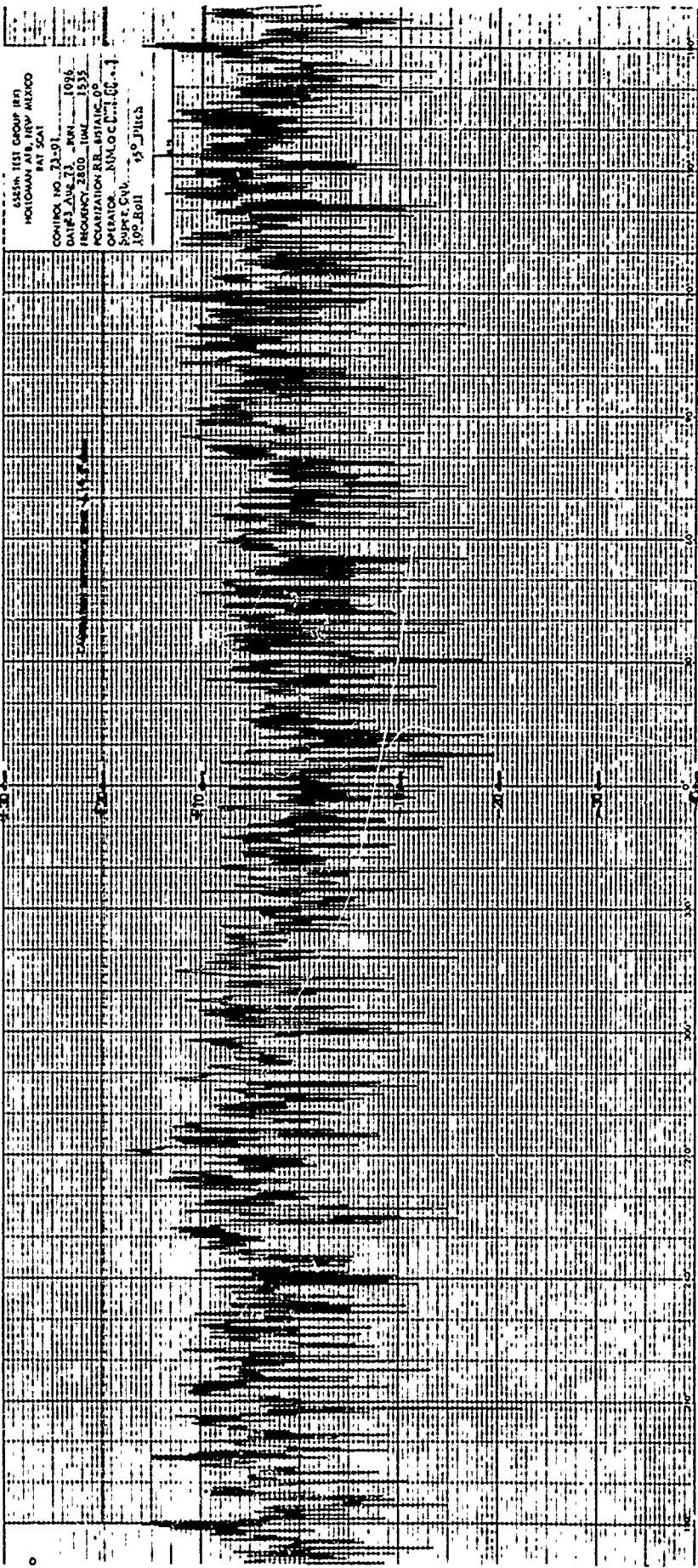
205 1060L 53.5 MIB



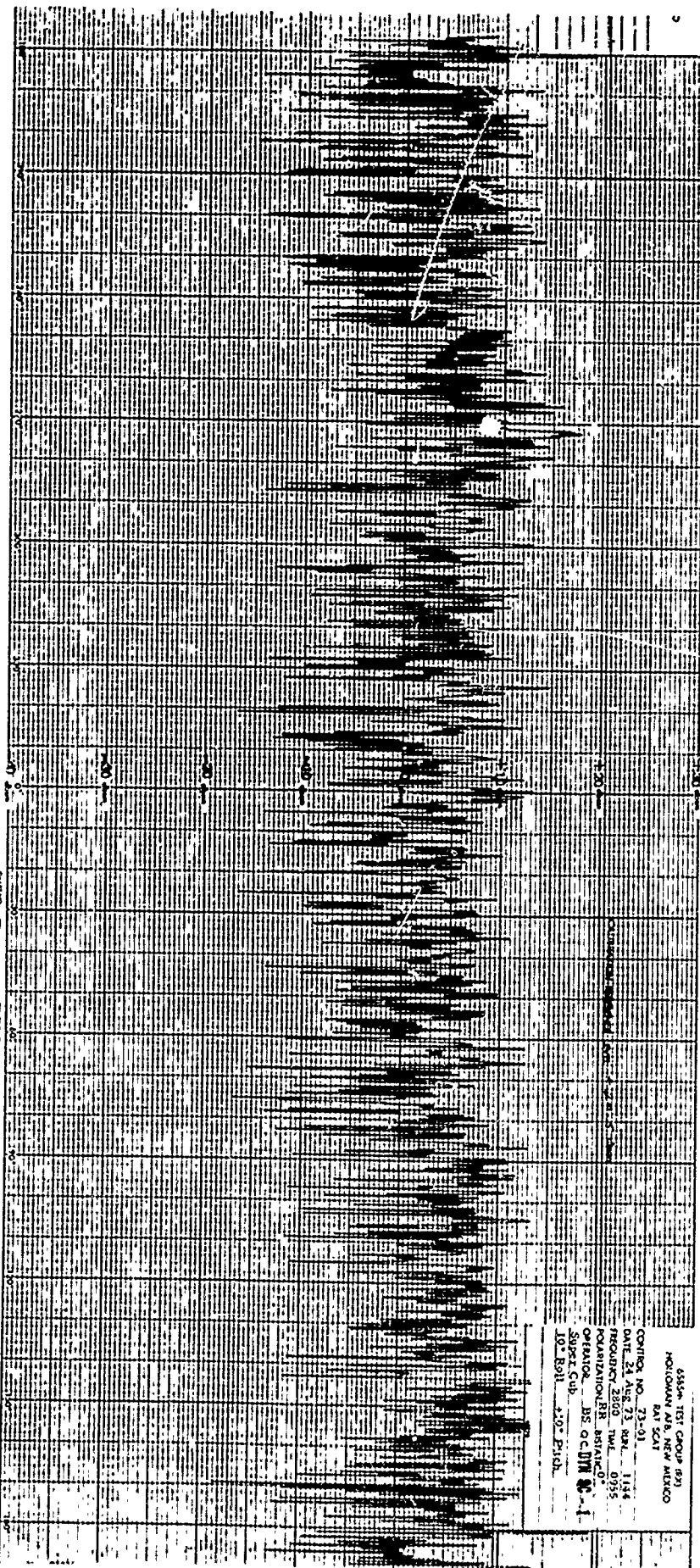




6555N 140° GROUP ARI  
 HOTOJAN ARI, NEW MEXICO  
 SAN JACI  
 CONTROL NO. 73-01  
 DATE 12 AUG 73 RW 919  
 MEASUREMENT 2800 TIME 1505  
 ORGANIZATION BR BRISTOL  
 OPERATOR JMD OC LHM  
 SUPERVISOR  
 140 Roll 90 Data



GSRM TEST GROUP (RT)  
 HOLLAND AFB, TEXAS  
 FAT SCAT  
 CONTROL NO. 72101  
 DATE 1 AUG 73 RUN 1098  
 FREQUENCY 2800 TIME 1533  
 POLARIZATION RR - INSTAIC. 00  
 OPERATOR NMLC  
 Supt. C. V. 19° Pitch

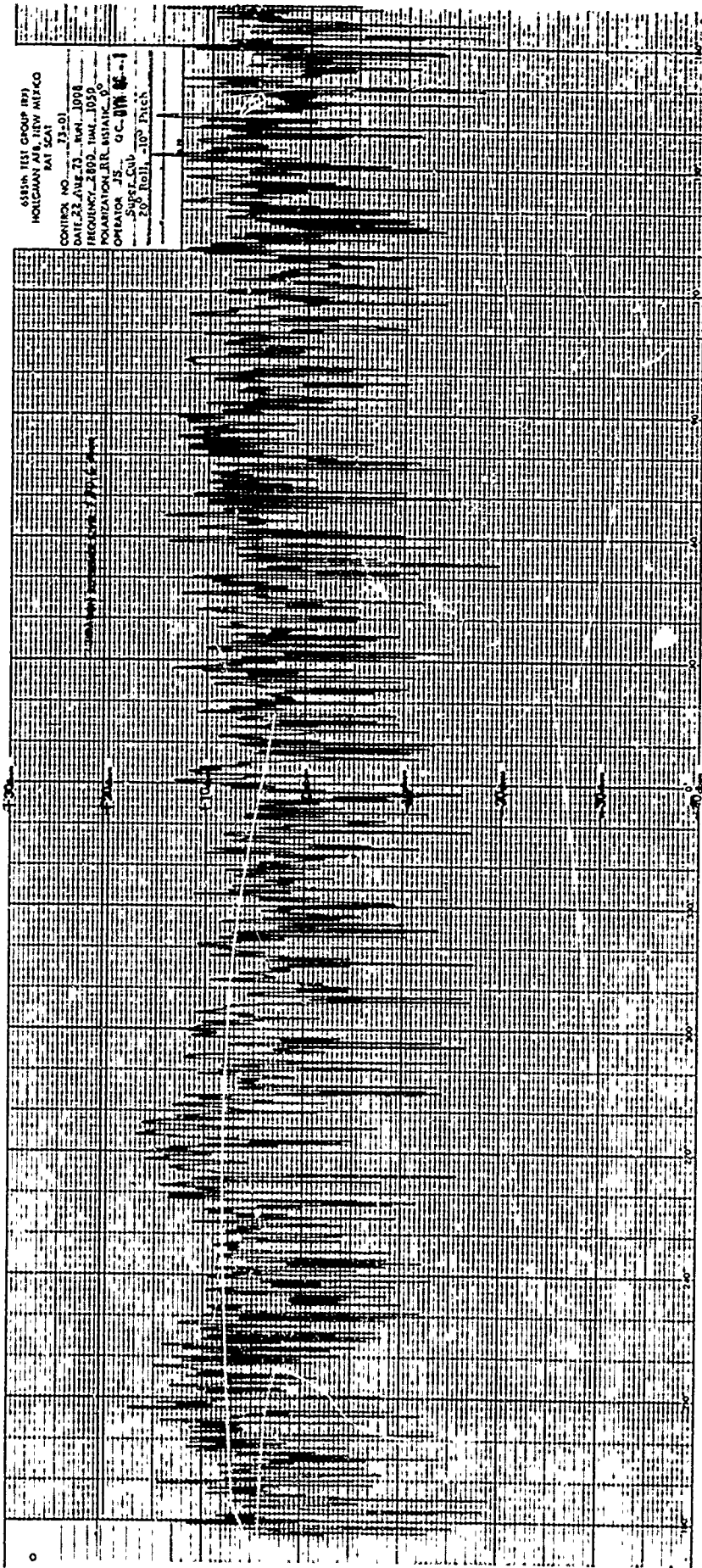


53504 TEST GROUP 83X1  
 MORCOMAN AB, NEW MEXICO  
 101 SCAT

CONTROL NO. 73-01  
 DATE 24 APR 73 1144  
 FREQUENCY 2800 TWT 0755  
 POLARIZATION RH, RH, RH  
 OPERATOR BS O DM  
 SPECT. CUB  
 101 RBH 101 P101

ASIAN TEST GROUP (PT)  
HOLLANDIA AIR UNIT HIRAGO  
RAT SAT

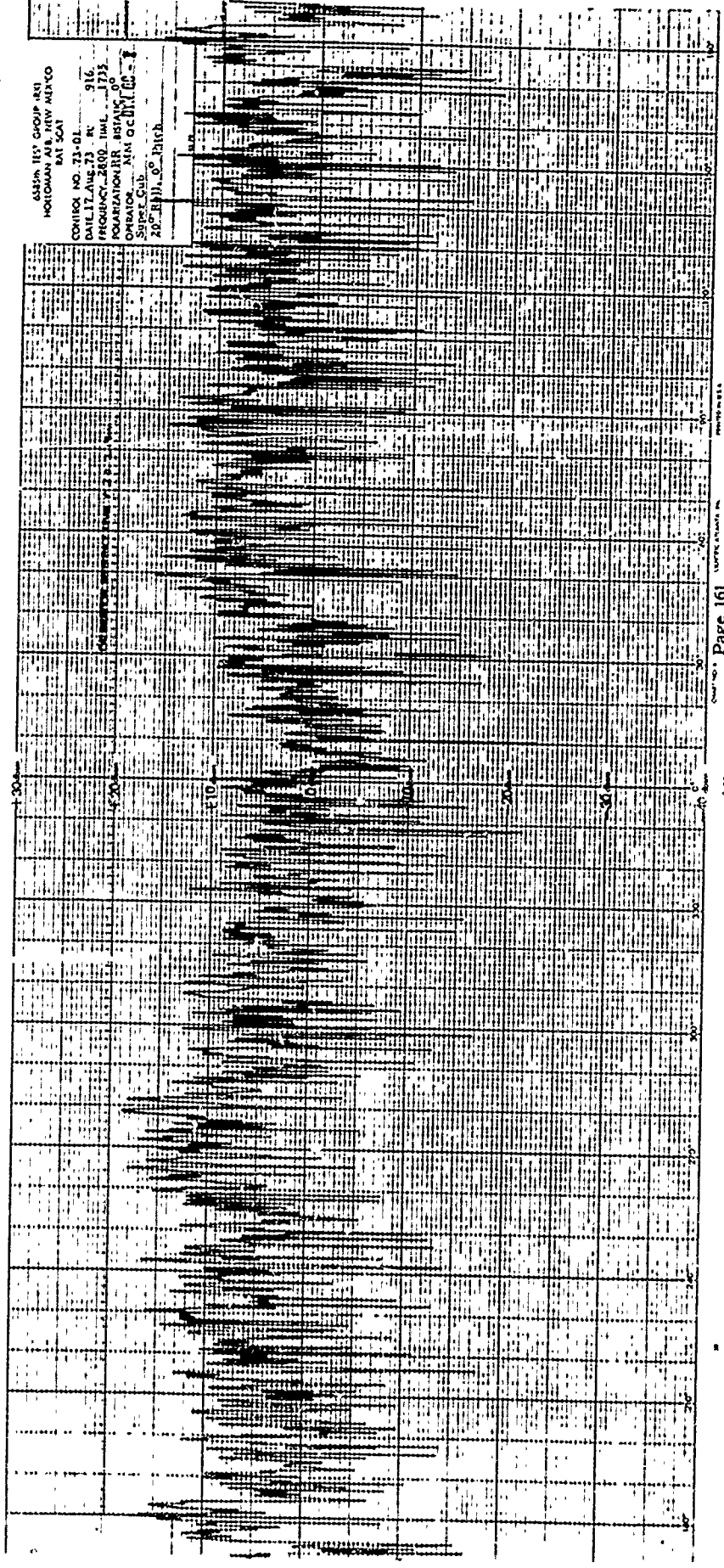
CONTROL NO. 13-01  
DATE 22 AUG 73 - 041 1078  
FREQUENCY 4.892 - 4.914 MHz  
POLARIZATION VERT. INSTANT.  
OPERATOR J.S. CC-011 (C-1)  
SPT-500 - 100 FT/SEC

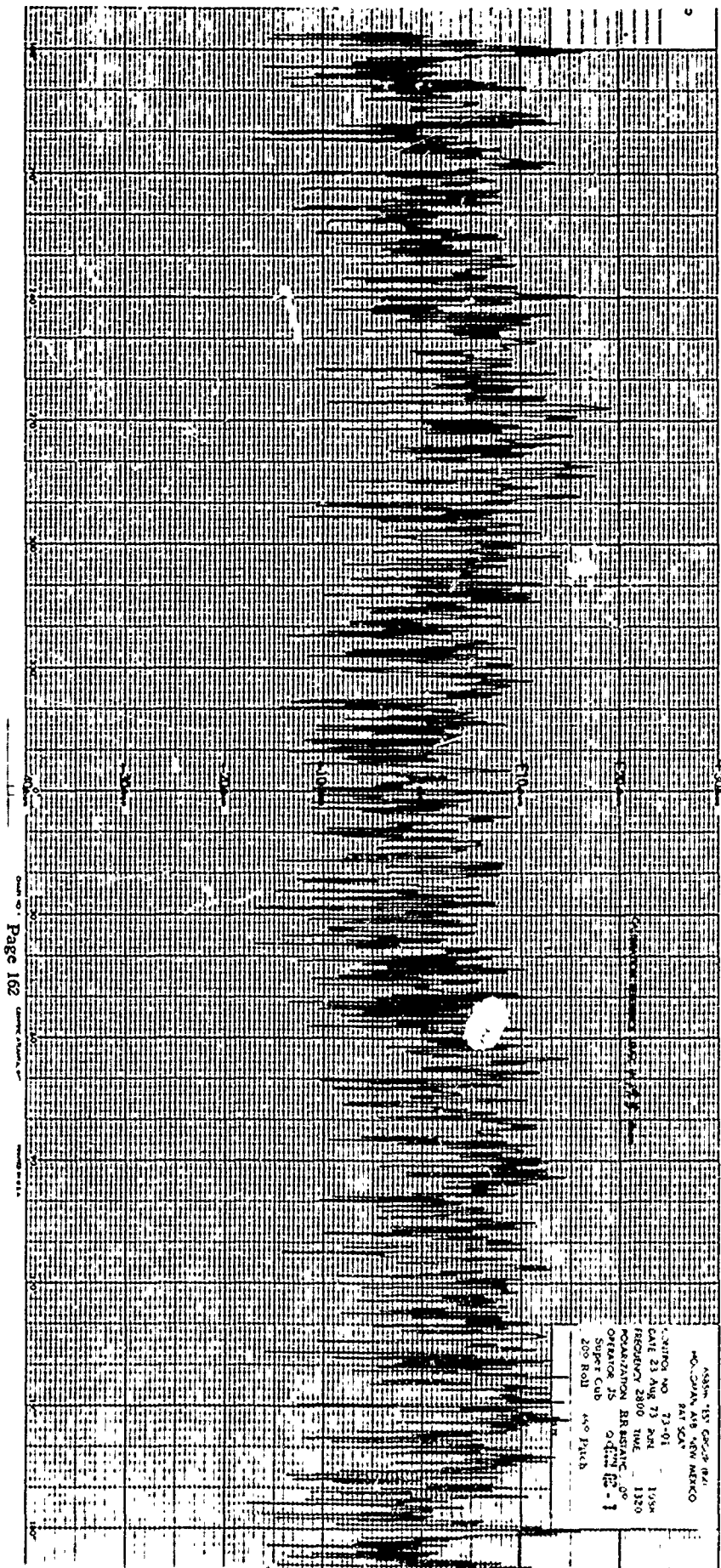




ASSTN TEST GROUP ASI  
HORIZONAL AIR NEW MEXICO  
BAT SCAT

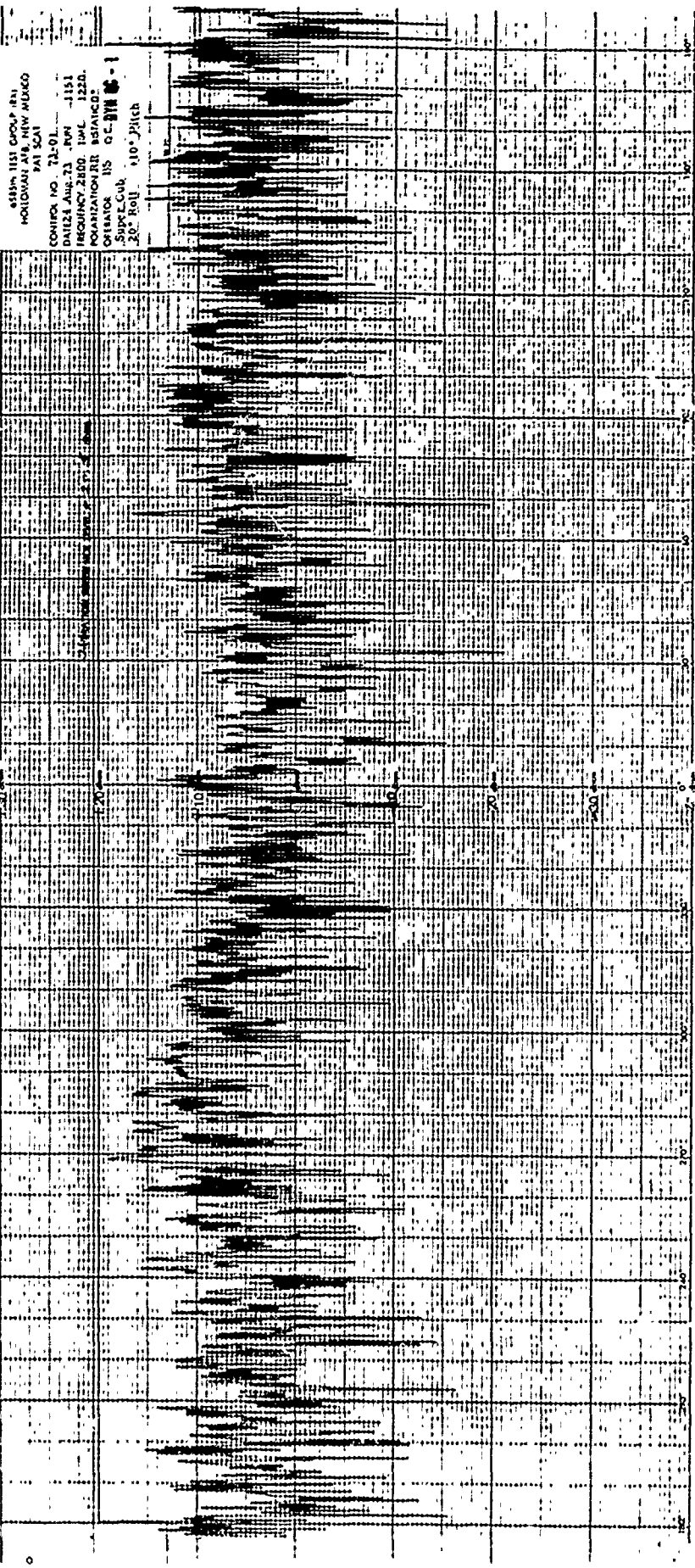
CONTRNO. NO. 21-01  
DATE 17 AUG 71  
FREQUENCY 2400 HZ  
FOURATION BR 85745  
OPERATOR MM GCH/ML  
SUPER. CUB. 100  
20-1511-0-1010



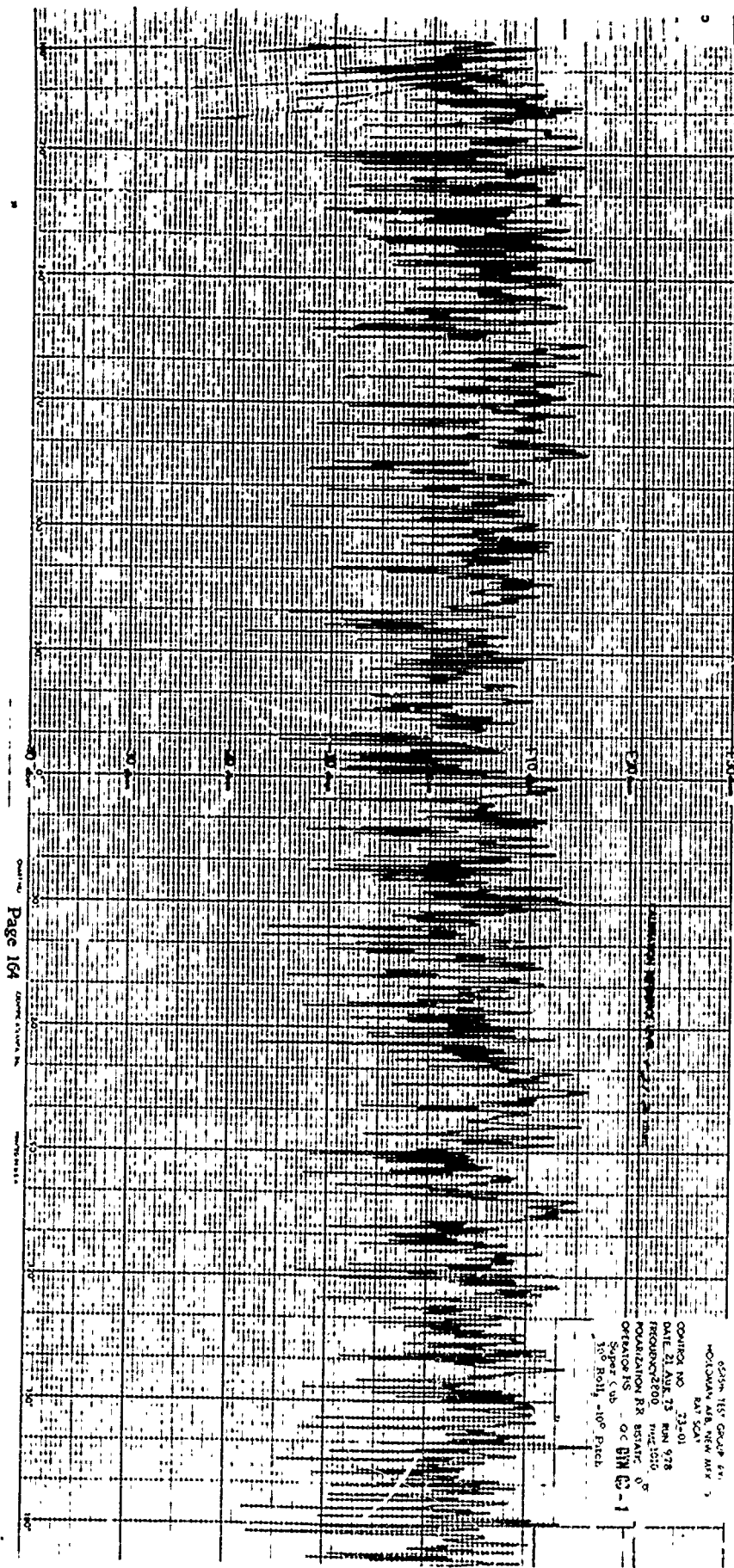


Page 162

4858m 151 GARDEN BL  
 NO. 2000 AIR NEW MEXICO  
 RAYSON  
 CALLING NO 73-01  
 DATE 23 AUG 75 TIME 1954  
 RECORDING 2800 TIME 1320  
 ORGANIZATION BR BRSTAC  
 OPERATOR JS O. O. O.  
 Super Cub  
 200 Roll  
 400 Pitch

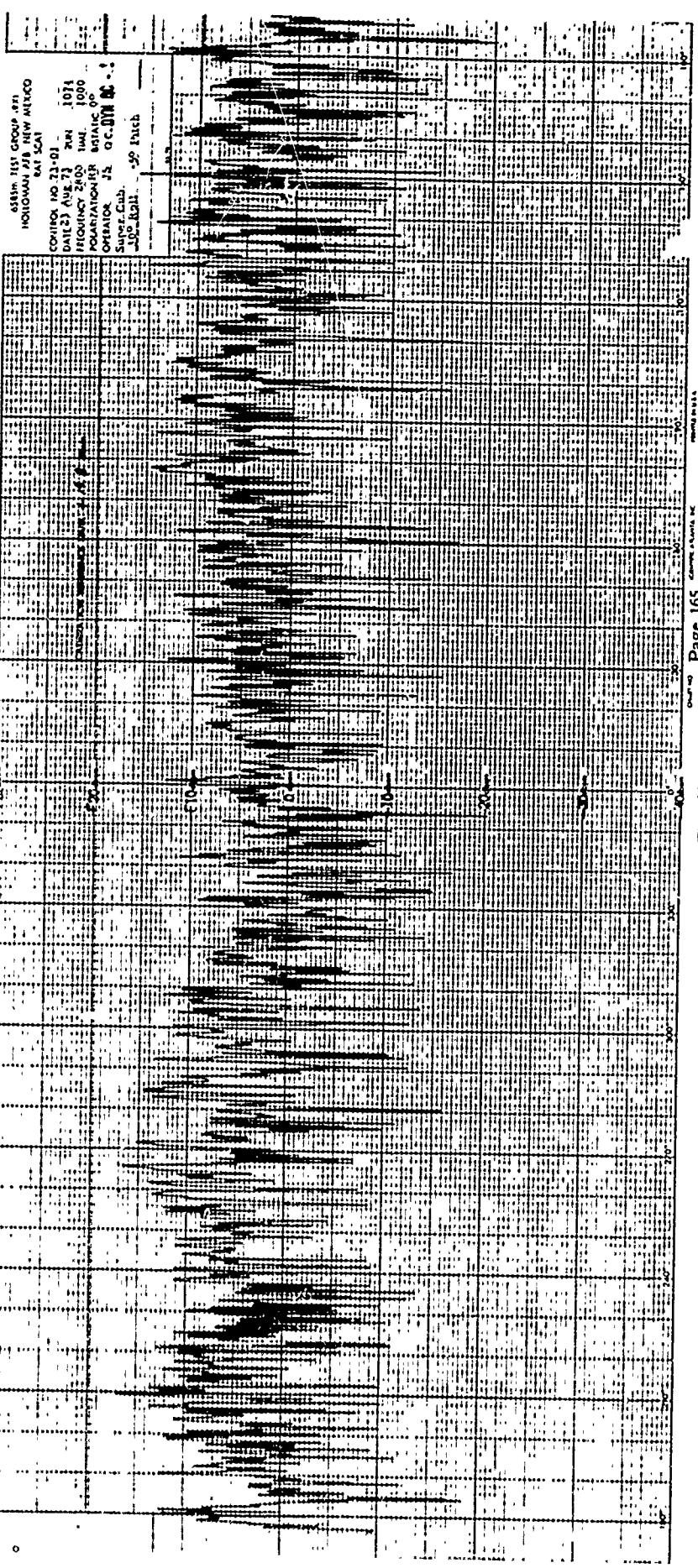




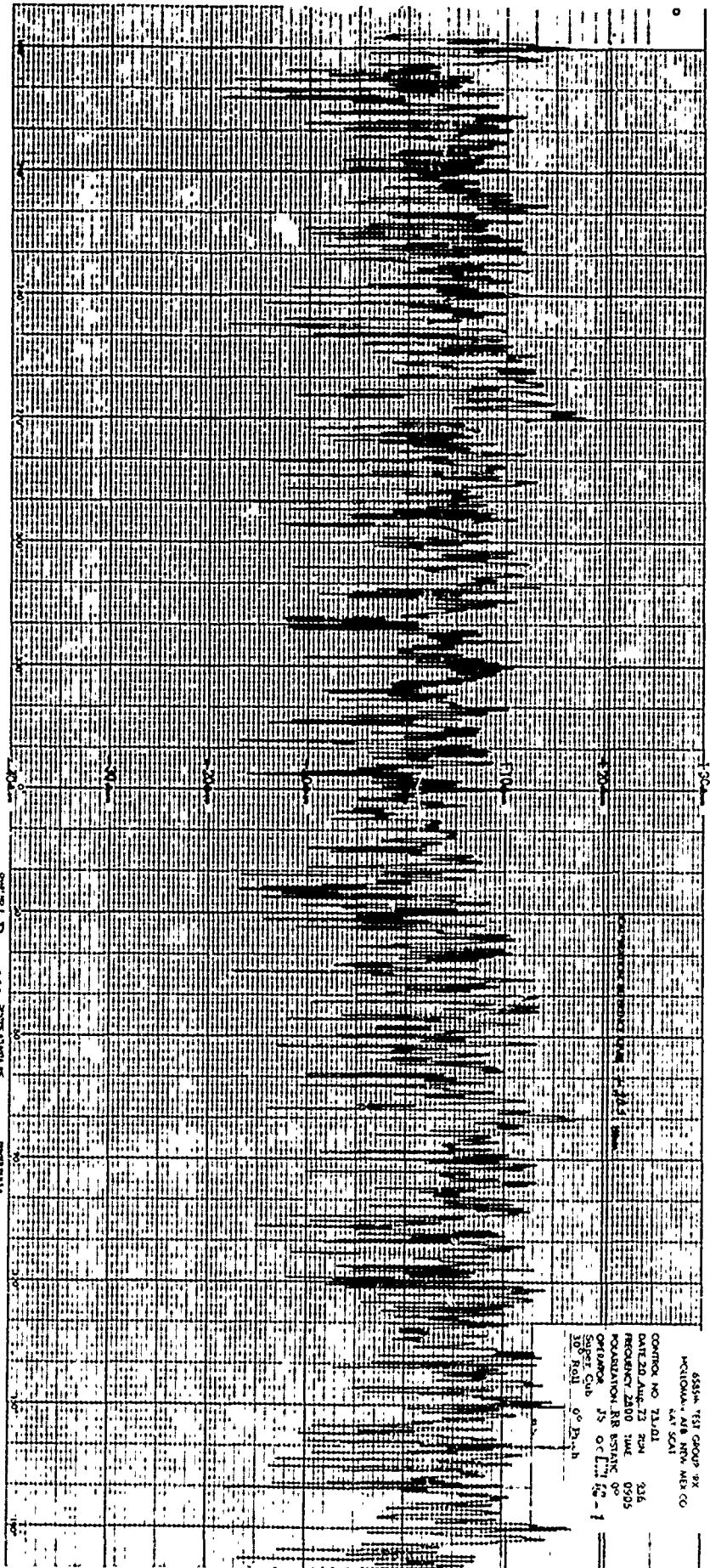


Page 164

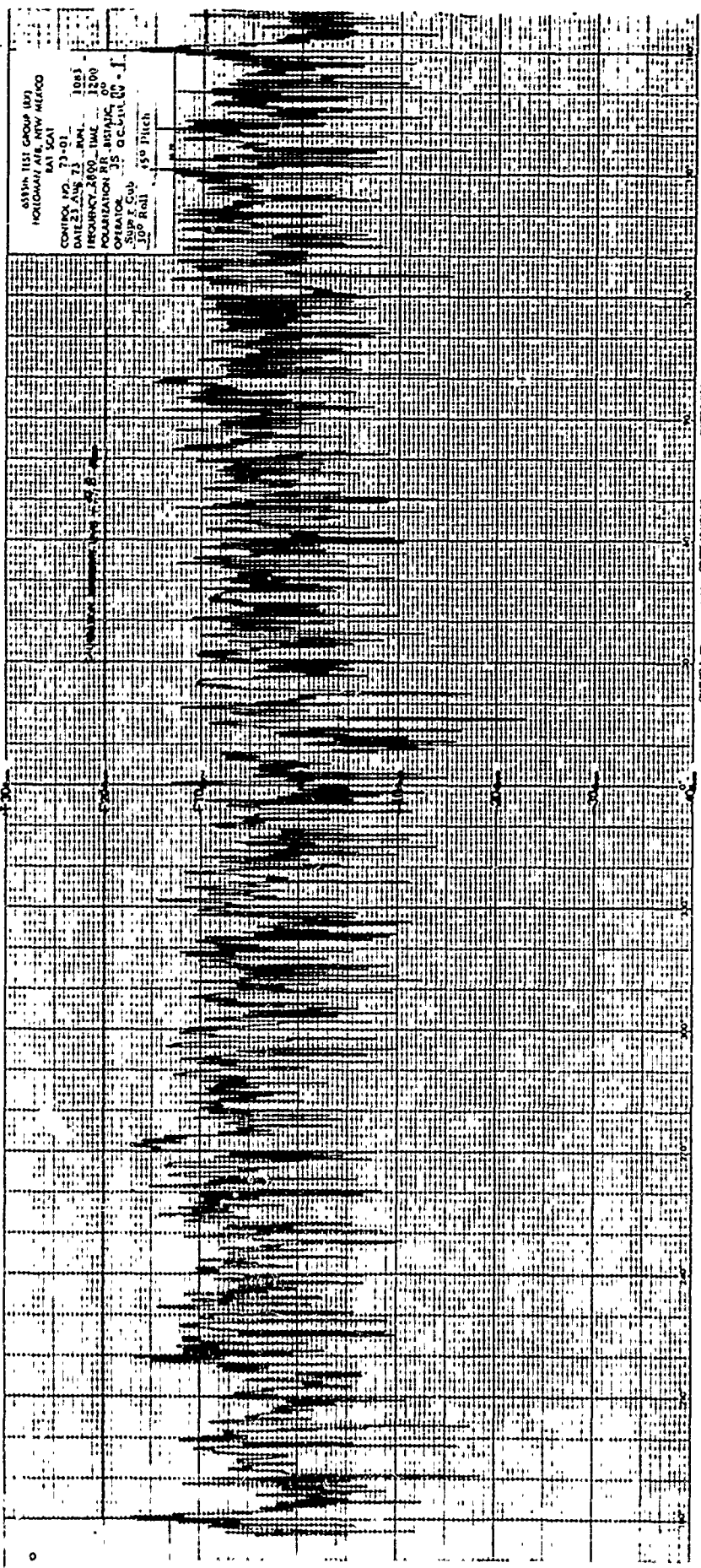
6515m 1137 GROUP 5th  
 WOLMAN AIR, NEW AIR 5  
 BATHS  
 CONTROL NO. 23501  
 DATE 21 JUL 75 RUN 978  
 PROGRAM 22200 TIME 1510  
 POLARIZATION RR STATIC 0°  
 OPERATOR JS - OC BHM CD-1  
 Super Cub  
 5th Roll, -10° Pitch



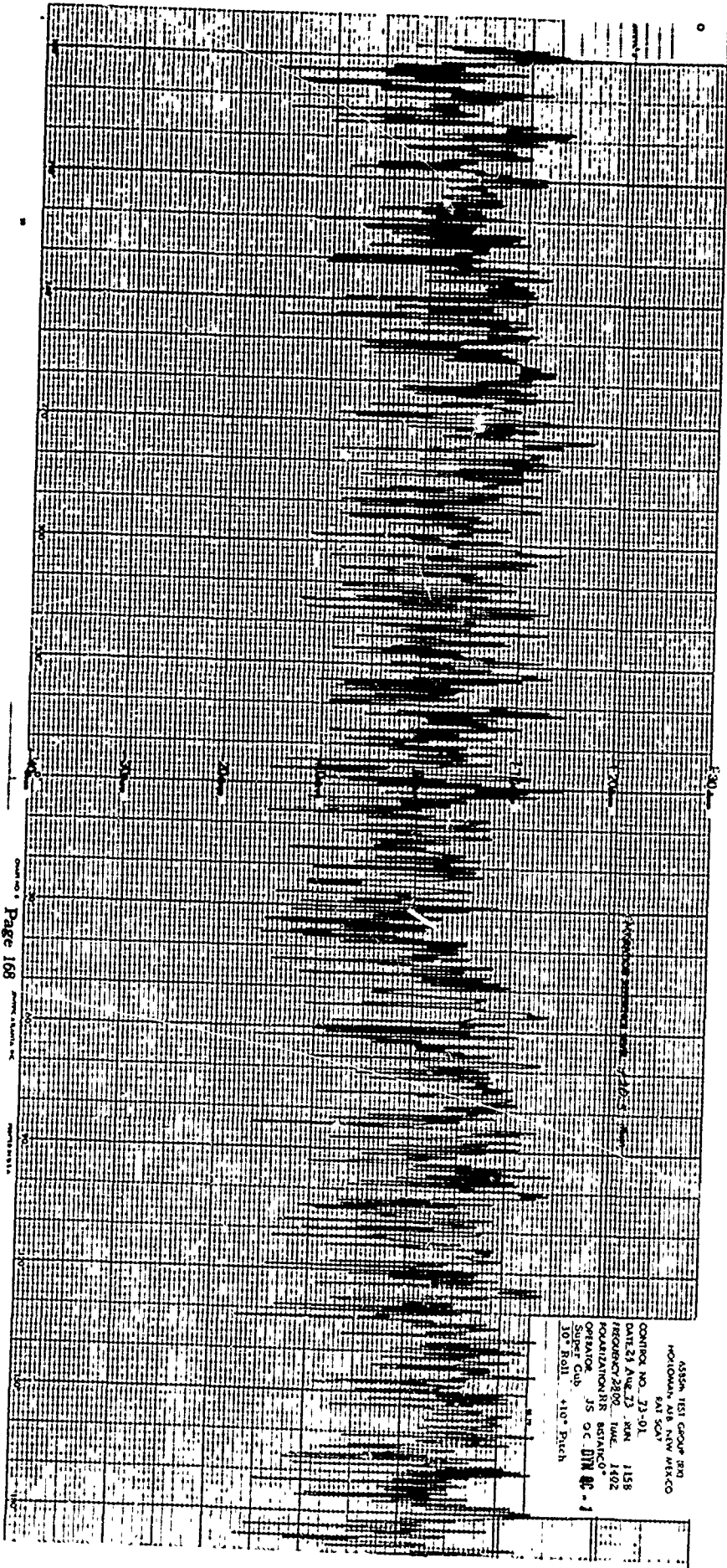
658m TEST GROUP 471  
HOLLAND 278 NEW MEXICO  
SAT SCAN  
CONTR NO 73-01  
DATE 27 AUG 73 FRI 1071  
FREQUENCY 2600 MHz 1000  
POLARIZATION STATIC 0°  
OPERATOR JS OC-DIN DC  
Super. Club  
Log. RCH  
50 Pkch



65314 TEST GROUP 7X  
 MCILONIA, AIR RMW MEX CO  
 LAT SOAT  
 CONTROL NO 71101  
 DATE 20 AUG 73 RUN 336  
 FREQUENCY 2000 HZ 0905  
 FOUNDATION RB ESTAK 00  
 OPERATOR JS O'Connell  
 Super Club  
 10' Hall 00 20' h

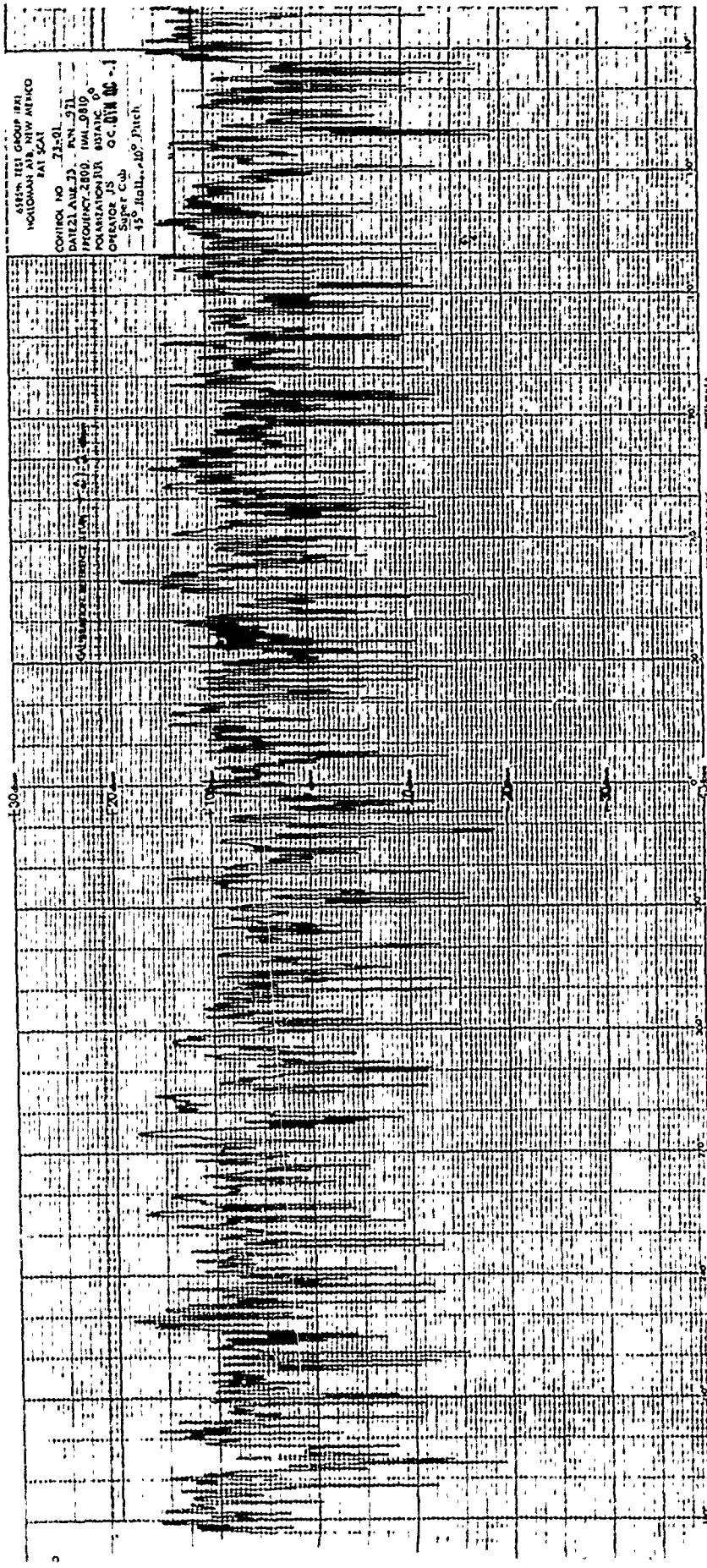


65534N TEST GROUP (B2)  
 HOLLANDAY AVE, NEW ALBANY  
 PAI SCAT  
 CONTROL NO. 73-01  
 DATE 21 AUG 73 - 1963  
 FREQUENCY 2800 - 1000  
 POLARIZATION RR - ANTENNA  
 OPERATOR JS C. L. H. 60 - J.  
 Strip 7 Cup  
 150 Pitch

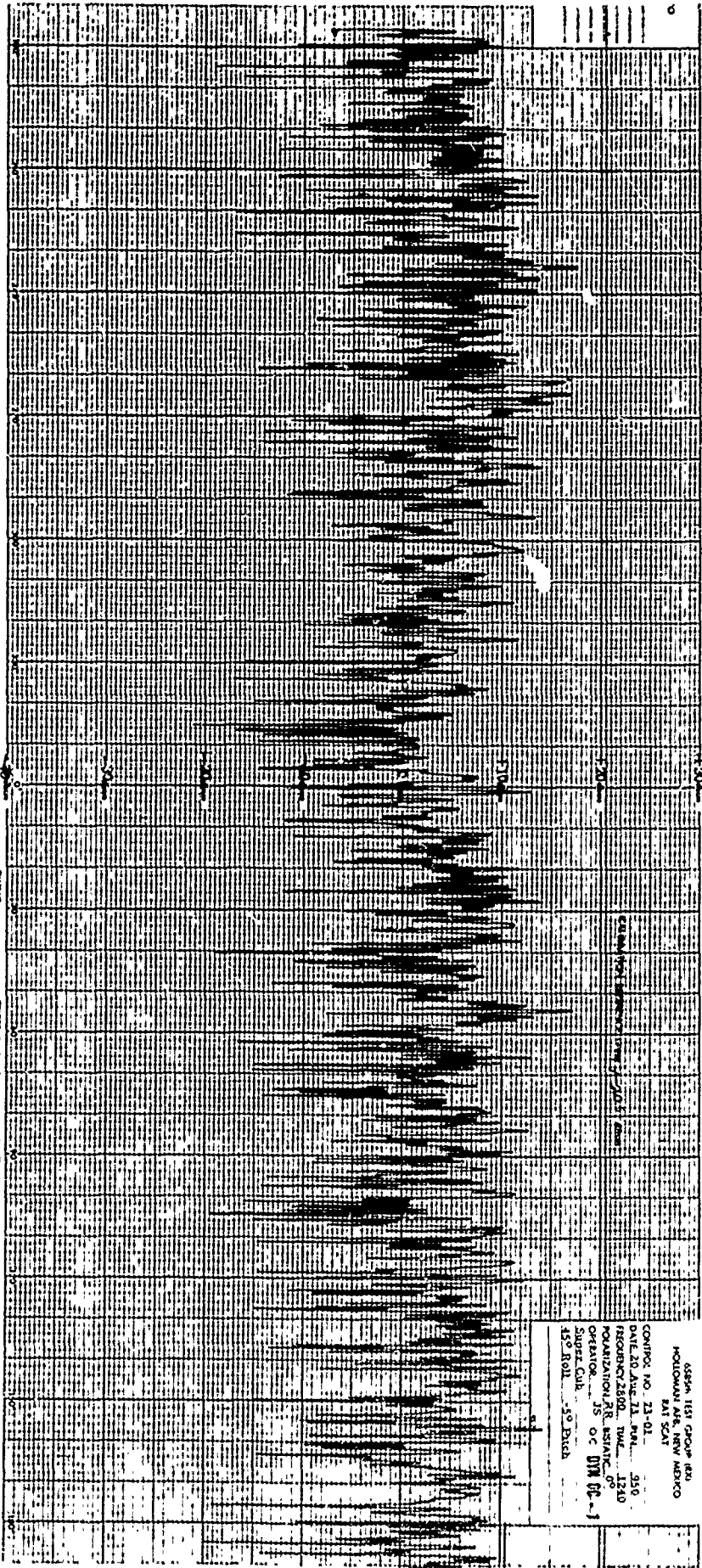


Page 168

ASSIGN 151 GROUP BRN  
 HOLLAND, AIR NEW MEXICO  
 SAI SCAT  
 CONTROL NO. 73-01  
 DATE 21 Aug 73 - 158  
 RECORD 2800 - TIME 1402  
 POSITION 38° 15' N 107° 15' W  
 OPERATOR JS OC DTM #1  
 SUPER CUB  
 10" Roll 410" Pitch

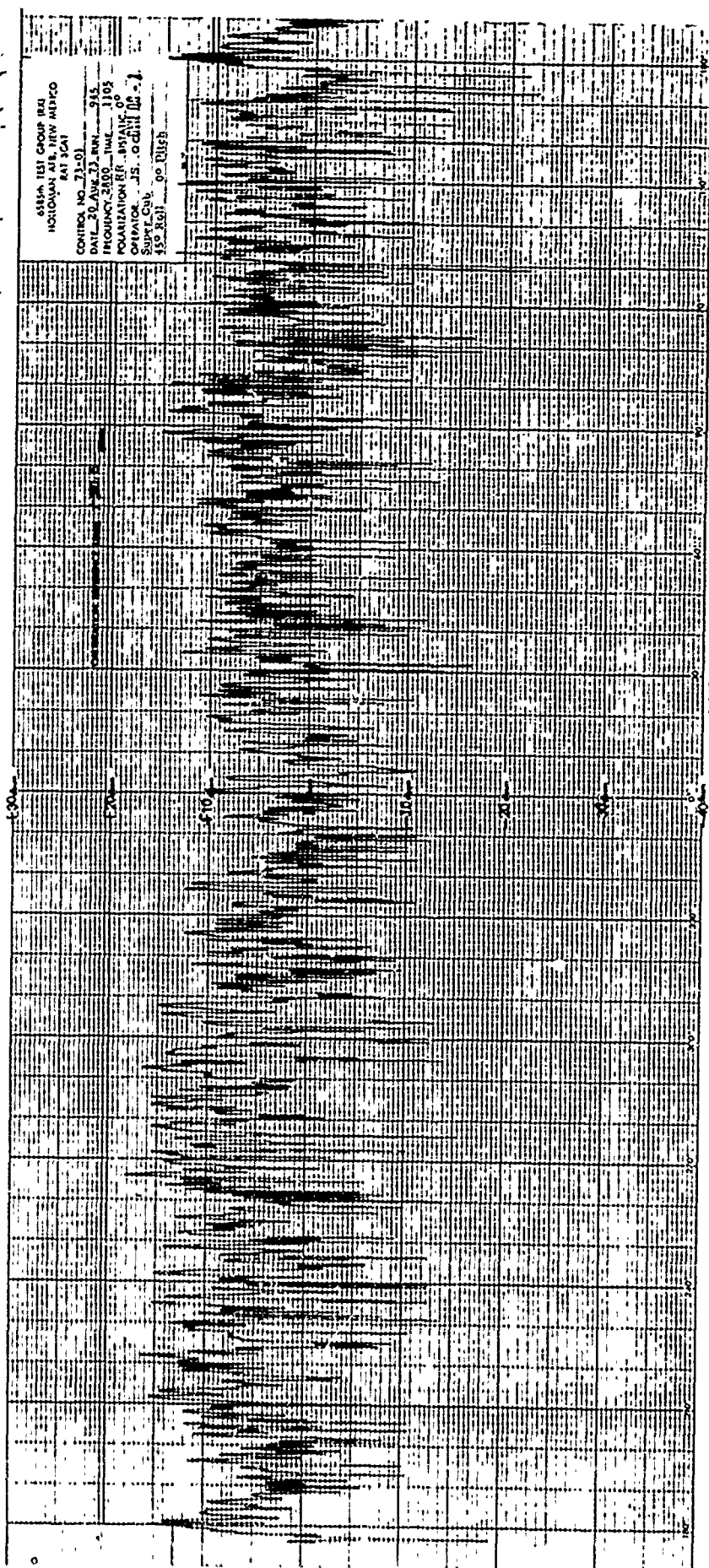


GREEN TEST GROUP (HAI)  
 HOLDMAN AT NEW METHOD  
 (AI 50A)  
 CONTROL NO. 72581  
 DATE 21 AUG 53. RUN 311  
 FREQUENCY 2800. IMAL 5810  
 POLARIZATION 100. 80% IN 0  
 ORIENTOR 70. GC 0.1N 00-1  
 Speed 60  
 15" Ball, 10" Pitch



6589A 151 GROUP 830  
 HOLLOWAY AVE, NEW MEXICO  
 FBI SCAI  
 CONTROL NO. 23-01  
 DATE 28 AUG 11 PM 1950  
 RECORD 2800 TIME 1240  
 ORGANIZATION JR. AIRMAIL CO  
 OPERATOR JS OC DM GC-1  
 Super. Club  
 45° Roll 40 Pitch

6584A TEST GROUP (BA)  
HONOLULU AFB, HAWAII  
RAT 3041  
CONTROL NO. 71-01  
DATE 20 Aug 73 RWK 245  
FREQUENCY 2000 MHz 1105  
POLARIZATION RH - RH/AINC 00  
OPERATOR J.S. O'CONNOR  
SUPERVISOR  
150 3001 00 0128

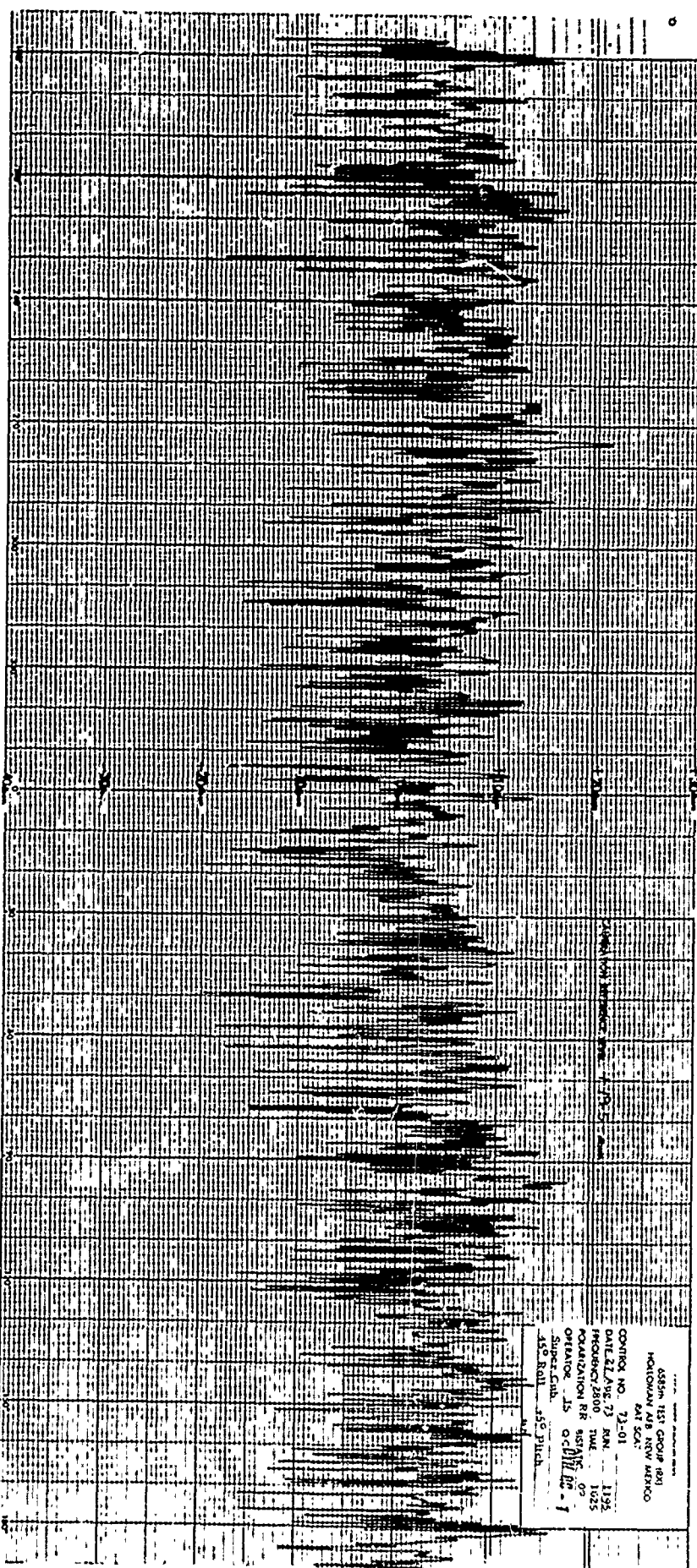


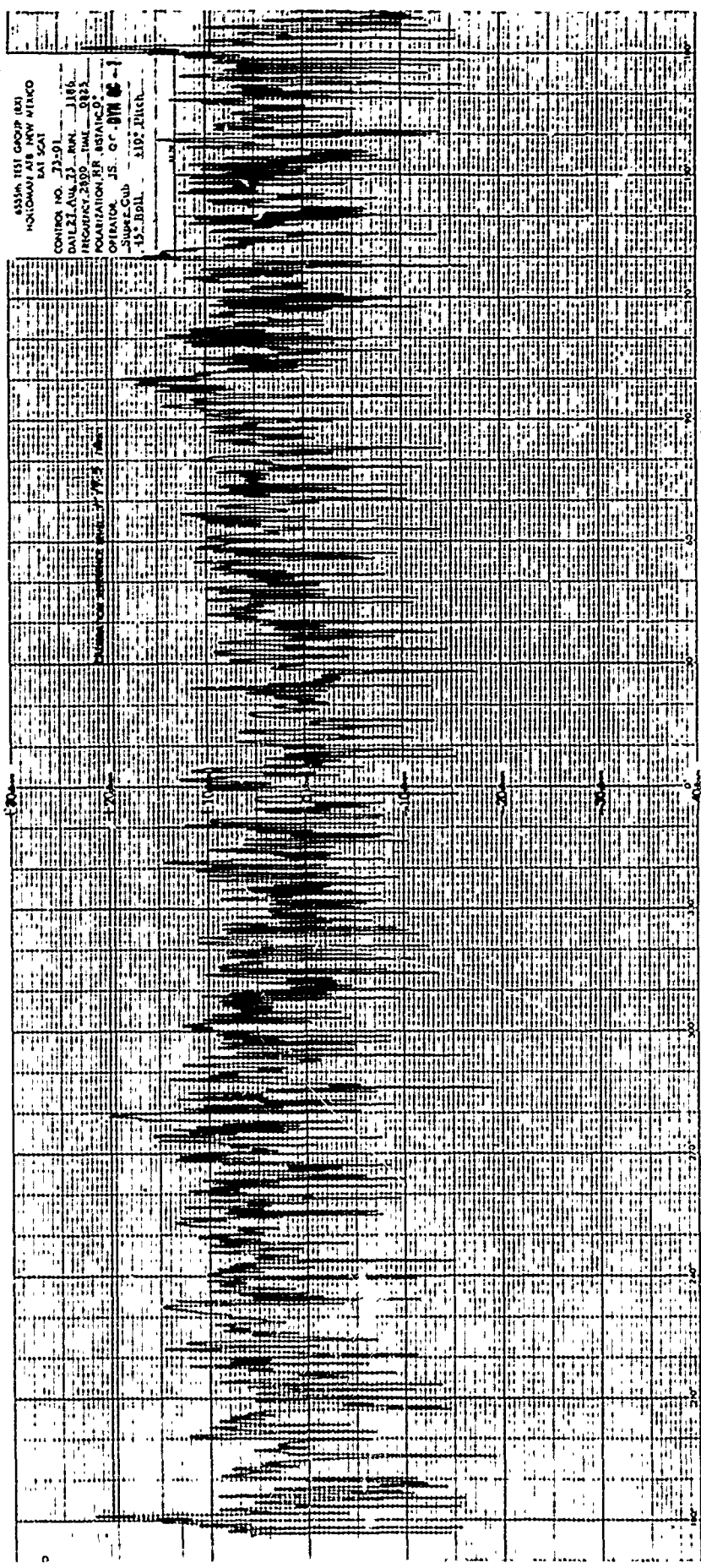


OPERATOR: [Illegible]

DATE: [Illegible]

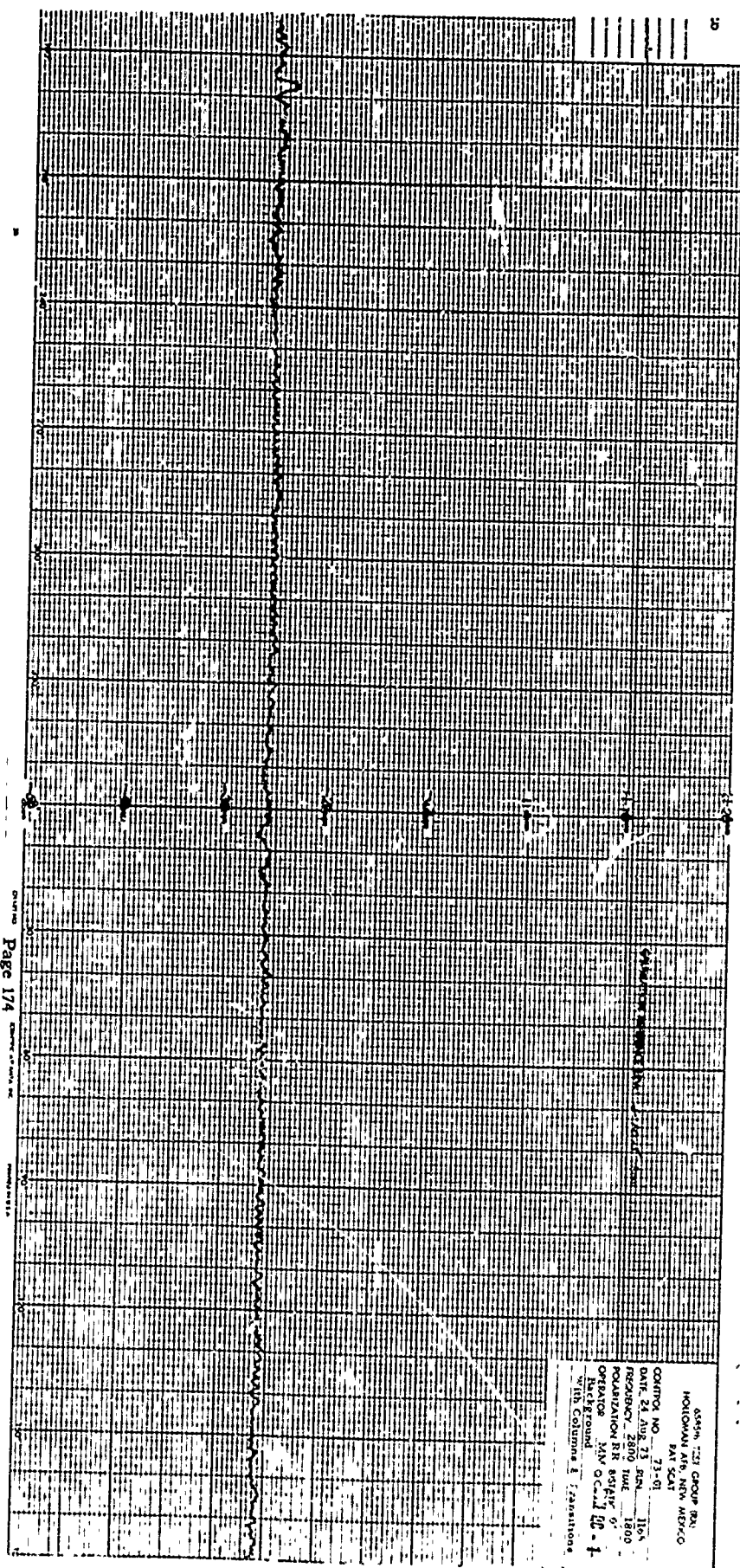
4584- 1ST GROUP 881  
 HOLDWAY 44 NEW MEXICO  
 447 501  
 CONTROL NO. 73-01  
 DATE 22 AUG 73 5M 1192  
 PROGRAM/2800 1M 1023  
 OPERATOR RF 00 01/11/73  
 Operator 15  
 Super. Cont. 458 Jhd  
 458 Roll





13354 TEST GROUP (M)  
 HONOLULU AIR NAVY ATTACH  
 BAI SCAI  
 CONTROL NO. 73-91  
 DATE/TIME 21 JUL 68 1145  
 PROJECT/REP. TIME 0833  
 POSITION/REP. STATION 20  
 OPERATOR JS. G. OF. 018  
 SUPERVISOR JIP. J. J. J.

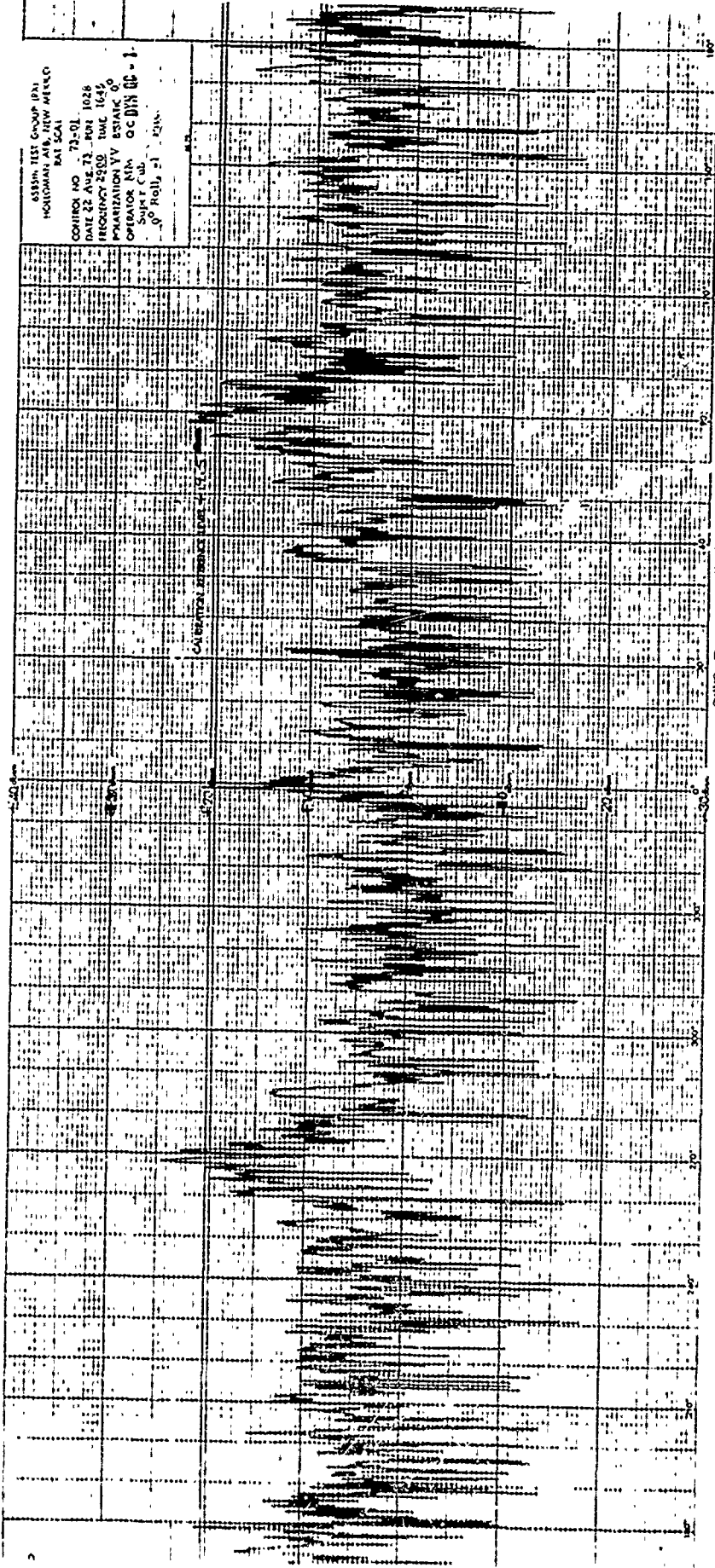
GEOPHYSICAL RESEARCH CORPORATION  
 GEOPHYSICAL RESEARCH CORPORATION  
 GEOPHYSICAL RESEARCH CORPORATION

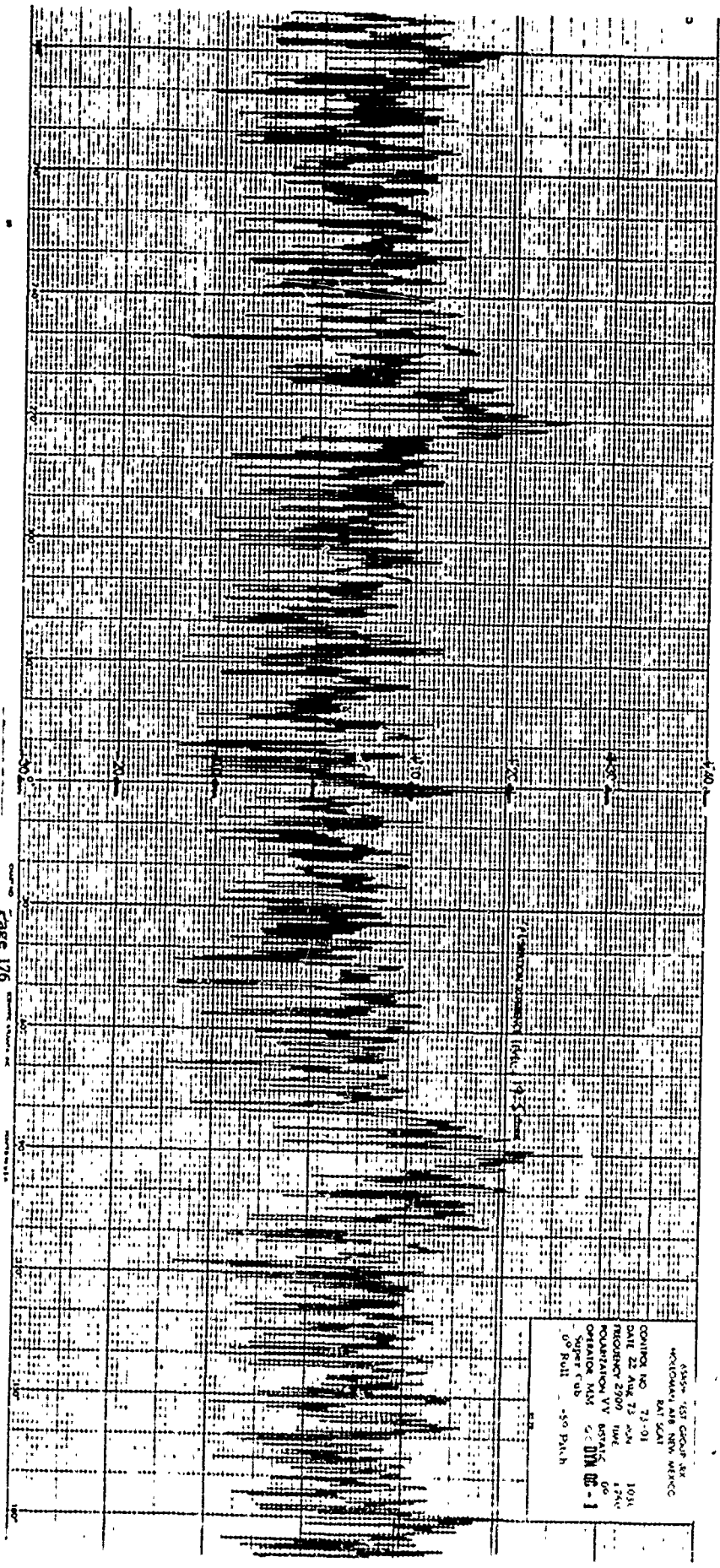


Page 174

65544, 23 GROUP BAI  
 HOLLAND AIR, NEW MEXICO  
 BAI SCAT  
 CONTROL NO. 73-01  
 DATE 24 AUG 73 11:00  
 FREQUENCY 2800 HZ  
 POLARIZATION RR 8541V 9  
 OPERATOR MM O C 1 10 - 1  
 Background  
 With Columns 1 Transitions

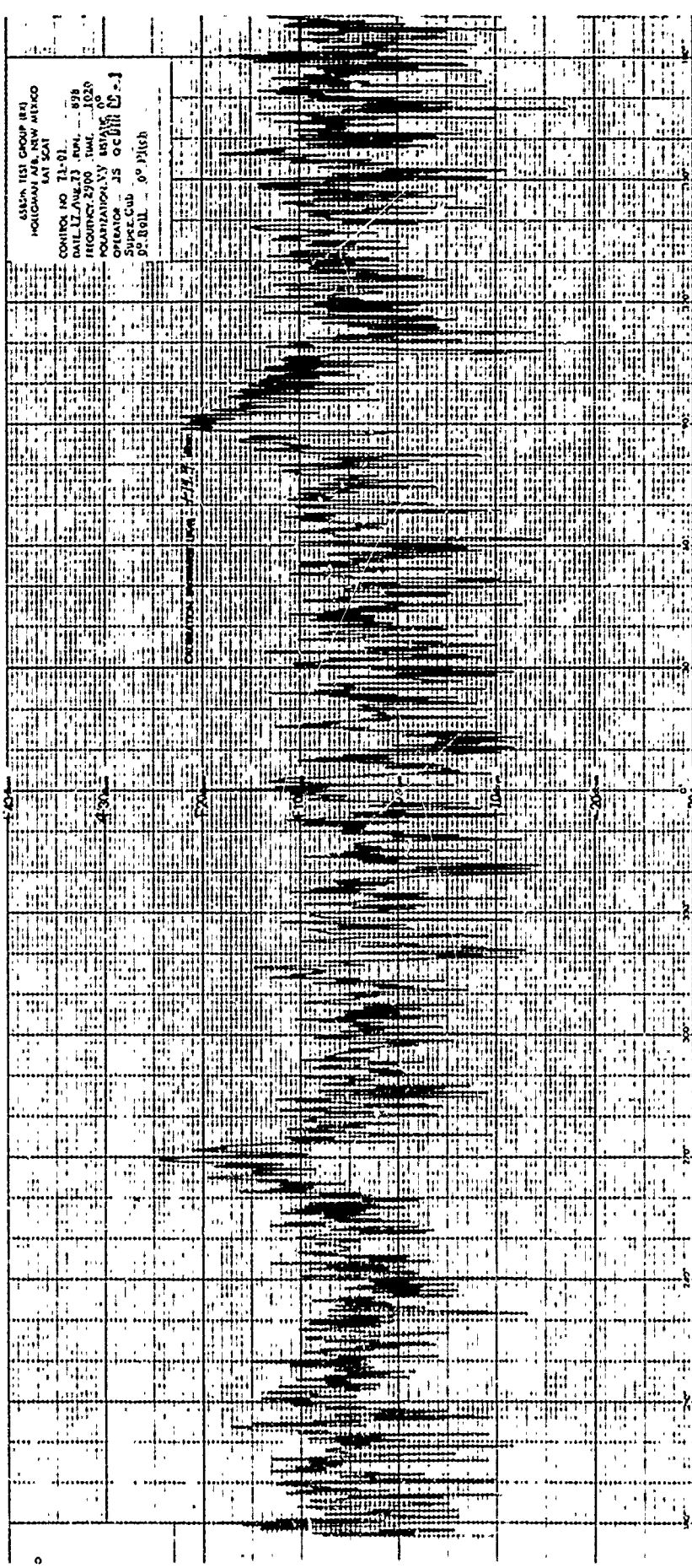
6330m TEST GROUP (P1)  
HOLDING AREA  
DATE 22 AUG 73 FOR 1026  
FREQUENCY 2530 TONE 1026  
OPERATOR RIN CC DTN 00-1  
SOPFC CD  
07 Roll 21 121N



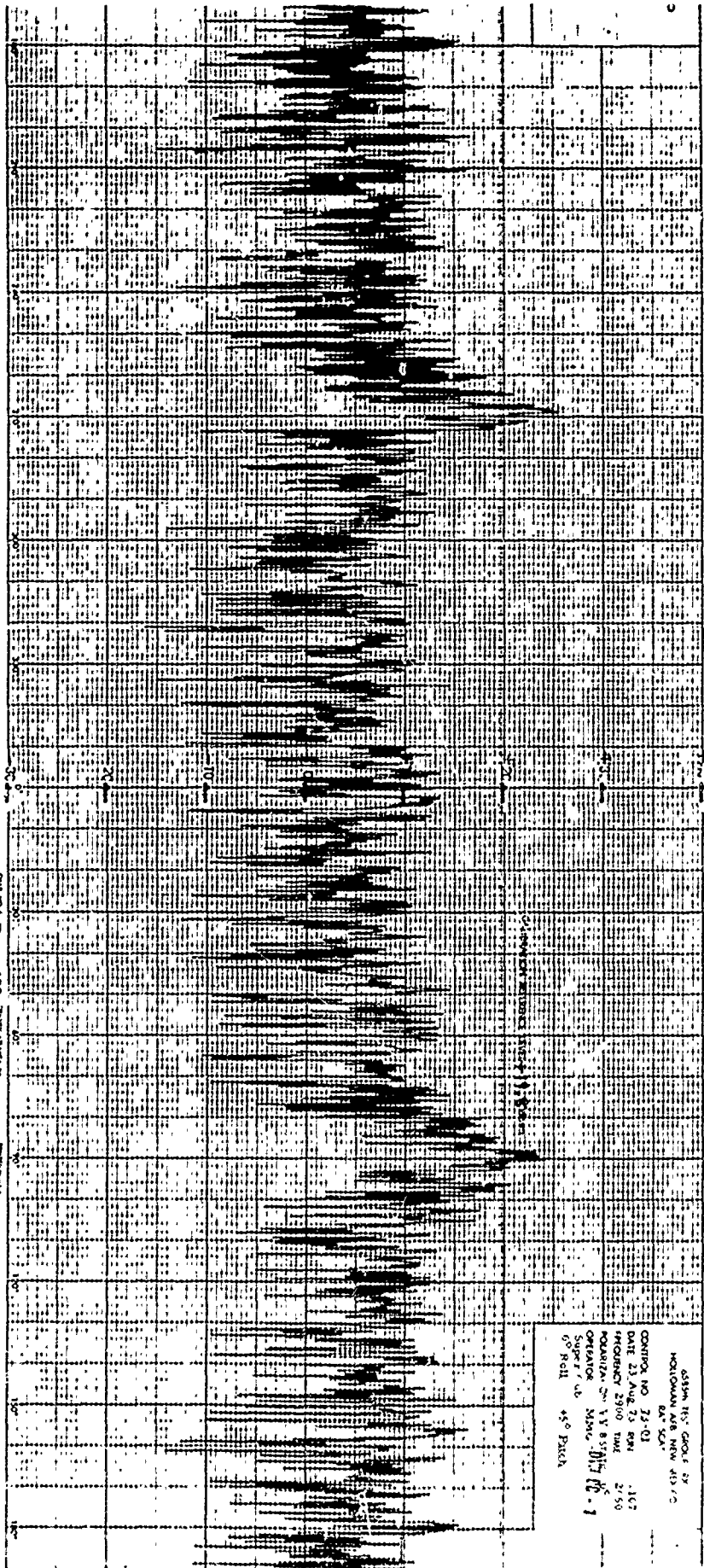


Page 176

4550 - 1ST GROUP BR  
 MCLEODMAN AIR NEW MEXICO  
 BAI 5041  
 CONTROL NO 73-01  
 DATE 22 AUG 73 03N 1031  
 FREQUENCY 2907 MHz 1740  
 POLARIZATION VV BRNALS  
 OPERATOR MMS C. DIV  
 Super Tab  
 50 Path  
 OF Path

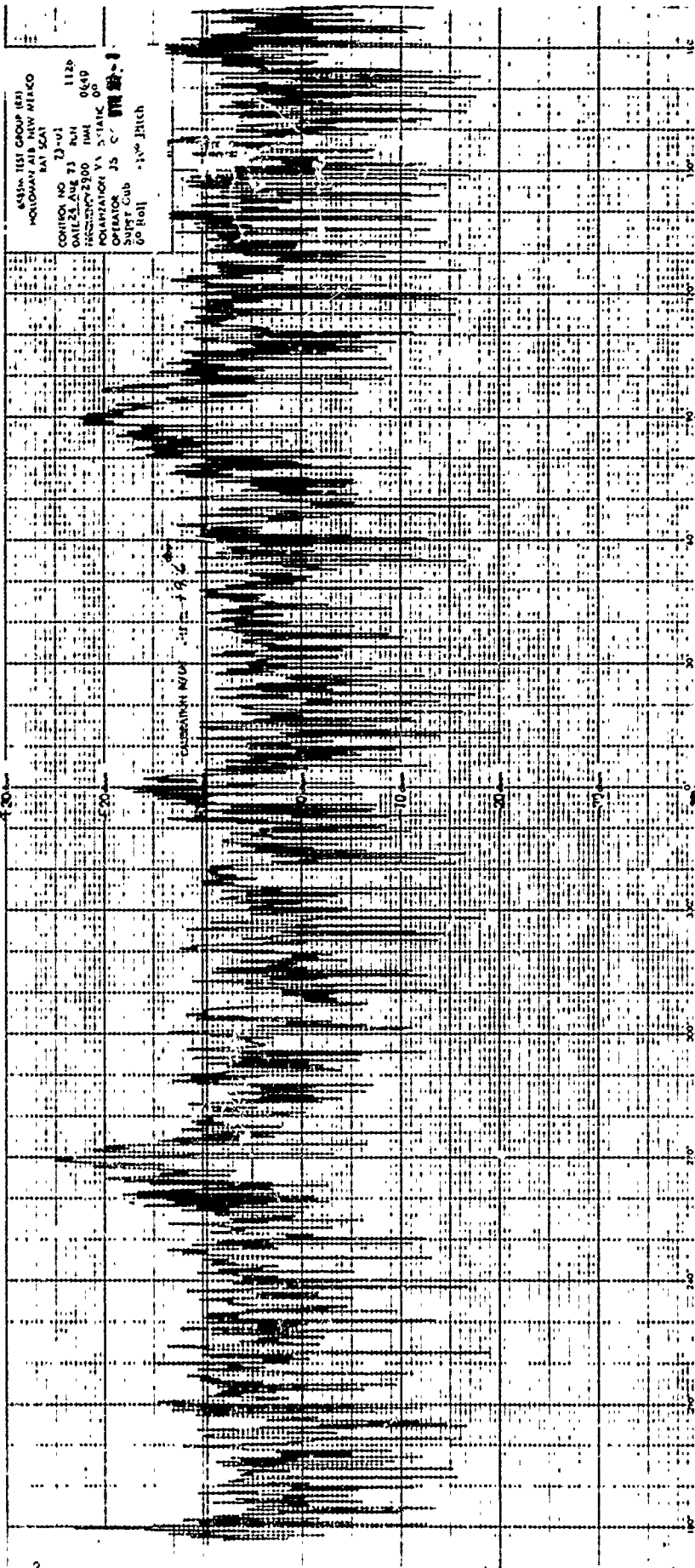


6326 TEST GROUP (R)  
 HOLLAND AFB, NEW MEXICO  
 LAT 34° 17' 00" N  
 LONG 106° 51' 00" W  
 CONTROL NO 71-01  
 DATE 17 AUG 73 RWK - 898  
 FREQUENCY 2500 MHz 1020  
 MODULATION VV MIAVLS 00  
 OPERATOR JS oc 0111 0.3  
 Supp. Cub 0° Pitch



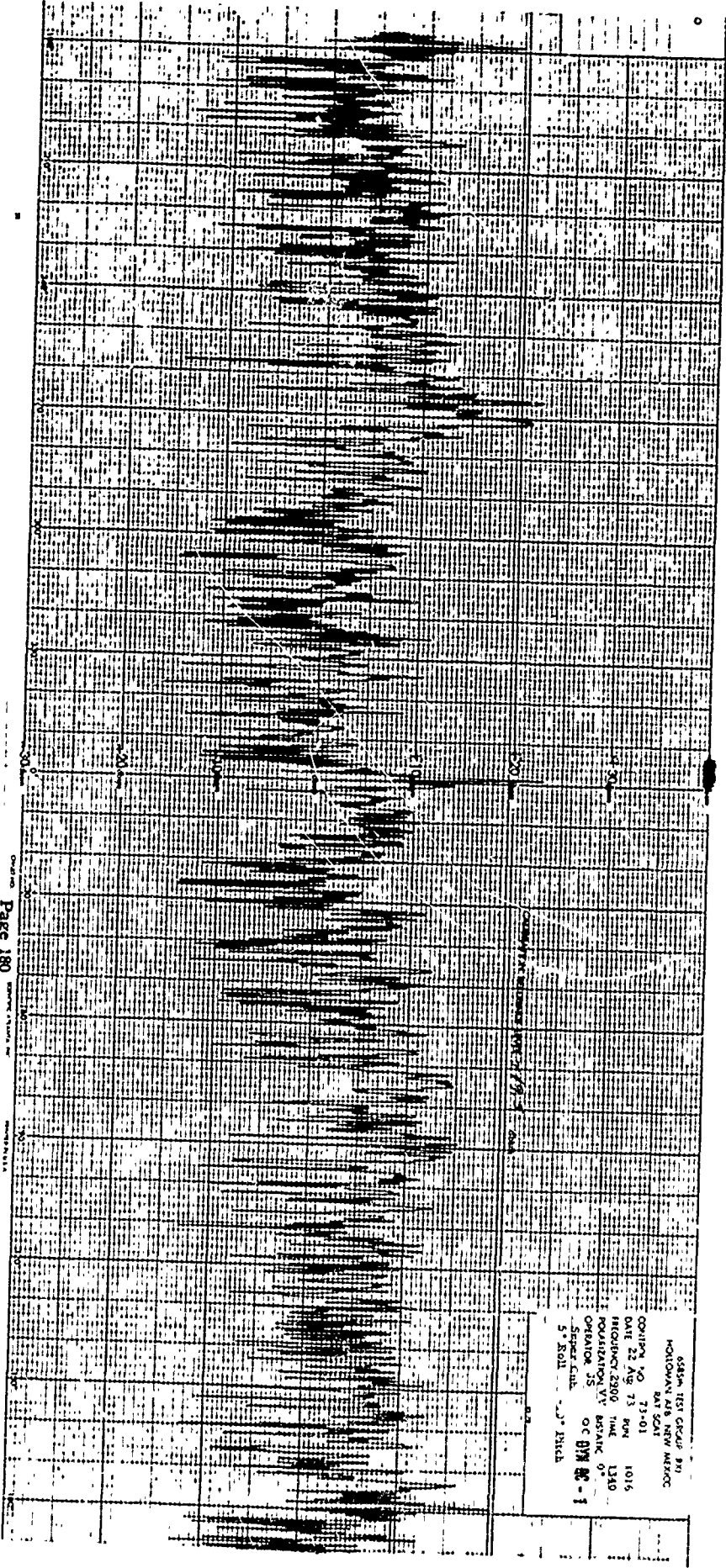
Page 178

6534h 157 GROUP 27  
 HOLLAND AIR NEW 417.0  
 847 SCA  
 CONTROL NO. 27-01  
 DATE 23 Aug 73 09M 107  
 HOUR:MIN:SEC 2300 1000 2750  
 LOCALIZATION VY 855  
 OPERATOR Matic 017  
 SUPERVISOR  
 45° Patch

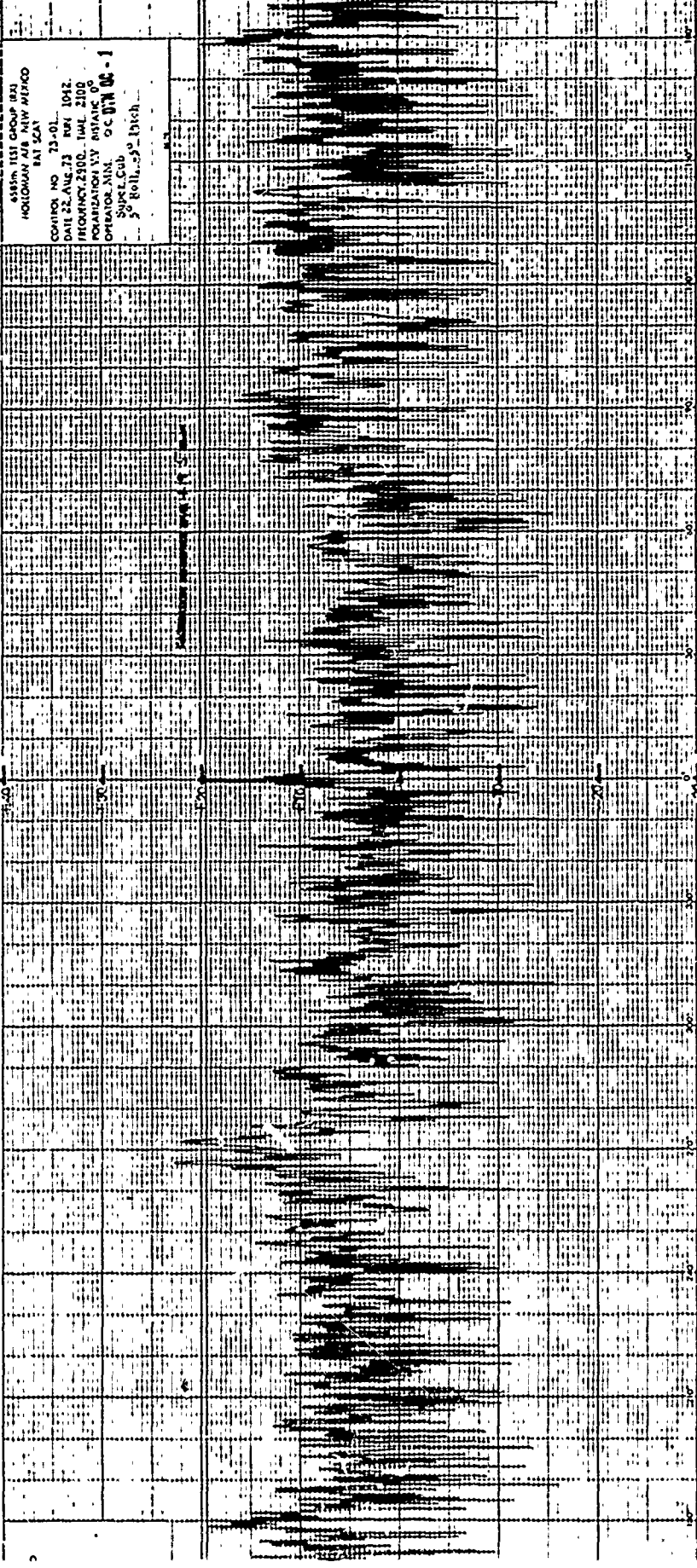


455th TEST GROUP (B1)  
 HOLDWAY A1B NEW MILKO  
 MAY 50AT  
 CONTROL NO. 73-02 1128  
 DATE 25 Aug 73 RMA 0640  
 FACILITY 2500 RMA  
 POSITION VA 512AK 00  
 SUPERVISOR JS C  
 SUPER Cub 1st Batch  
 60 Roll

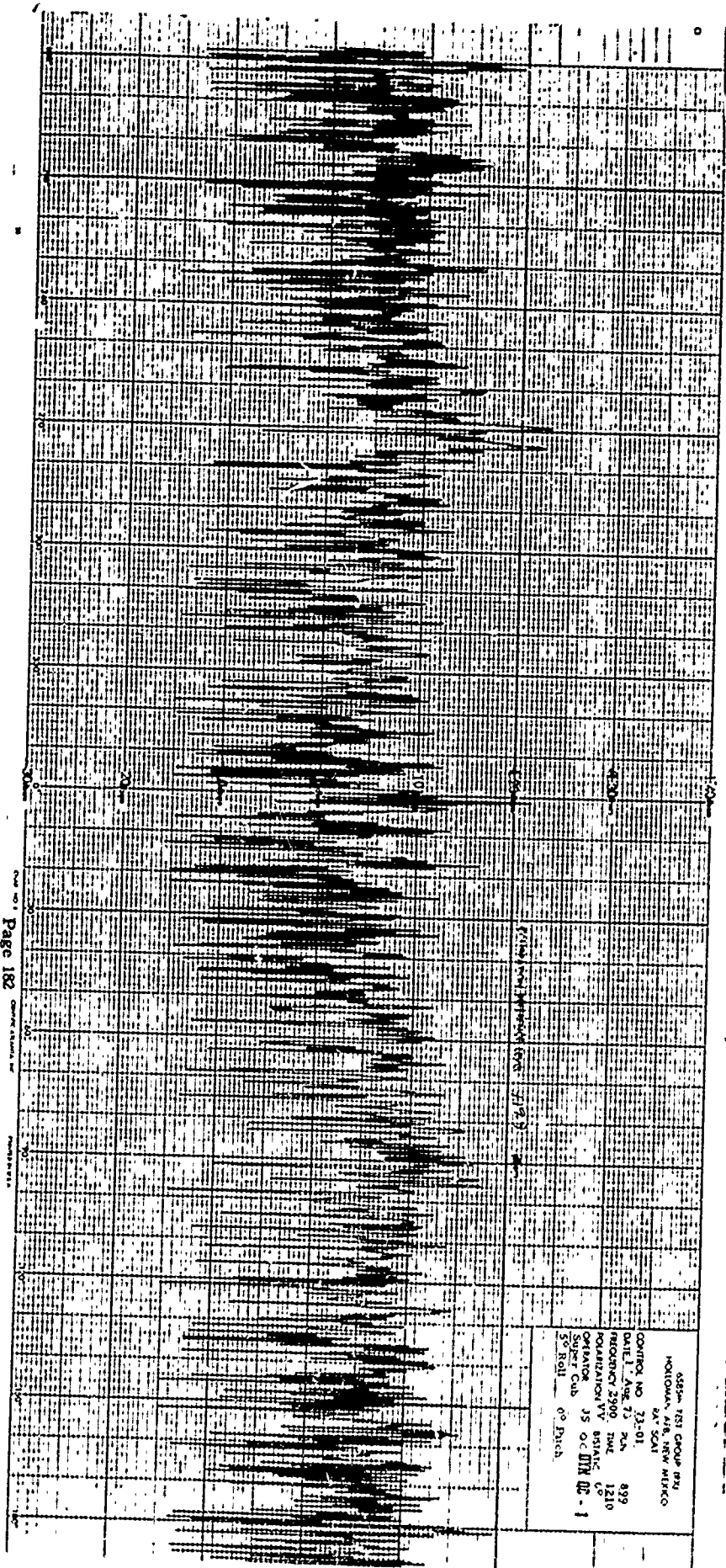




688th TEST GROUP B71  
 HOLLAMAN AFB NEW MEXICO  
 BAY SCOT  
 CONTROL NO 73-01  
 DATE 22 Aug 73 PM 1016  
 FREQUENCY 2300 TIME 1330  
 POSITIONIZATION VV BOSTAIR 0°  
 OPERATOR JS OC 01M 00-1  
 Super Club  
 5° Roll  
 3° Pitch



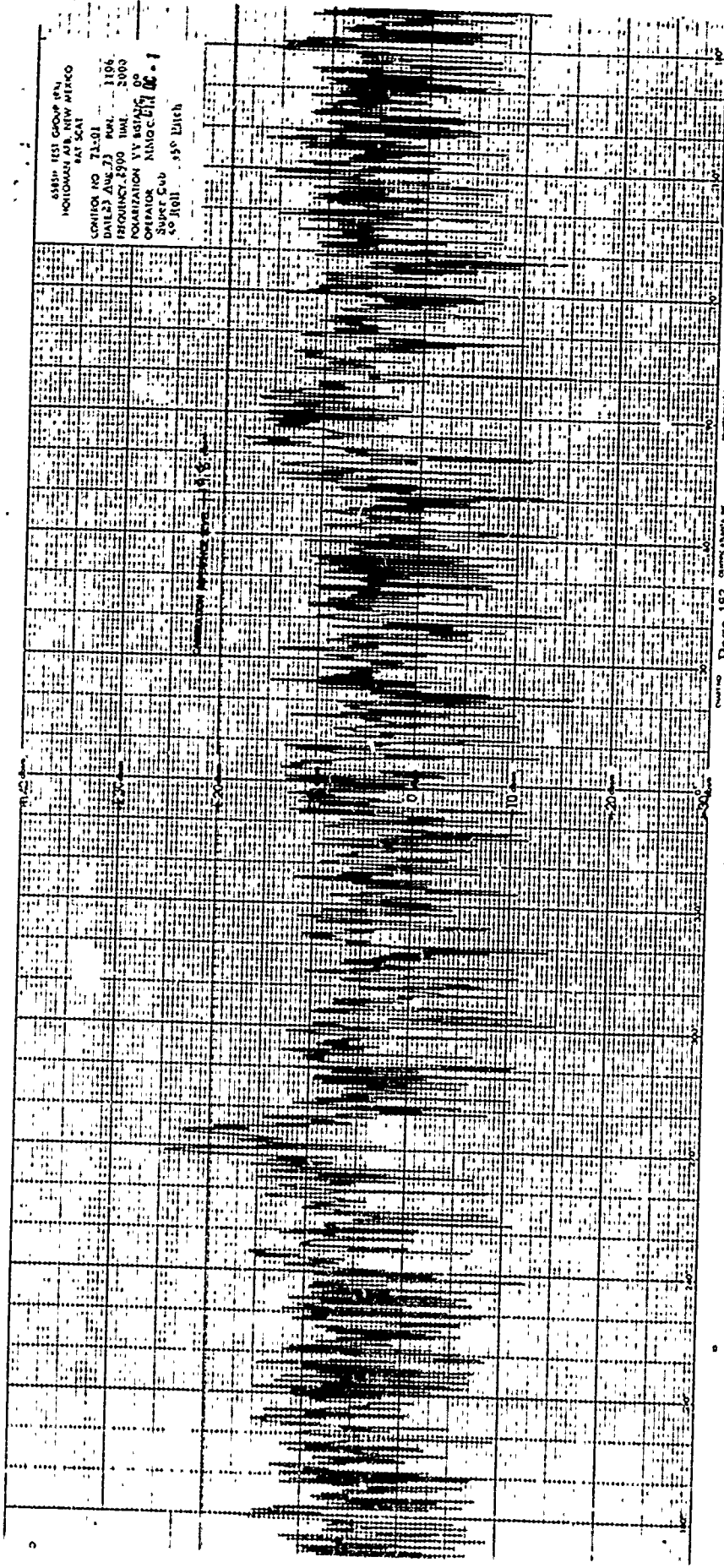
4587th TEST GROUP (B3)  
 HOLLOWAY AFB NEW MEXICO  
 PAT 5241  
 CONTROL NO. 73-01  
 DATE 22 AUG 73 BY 1042  
 FREQUENCY 2900 TIME 2100  
 OPERATOR NIN NIN  
 OPERATOR NIN OC 011 00 - 1  
 SUPPL. Cub 50 Roll 50 Inch

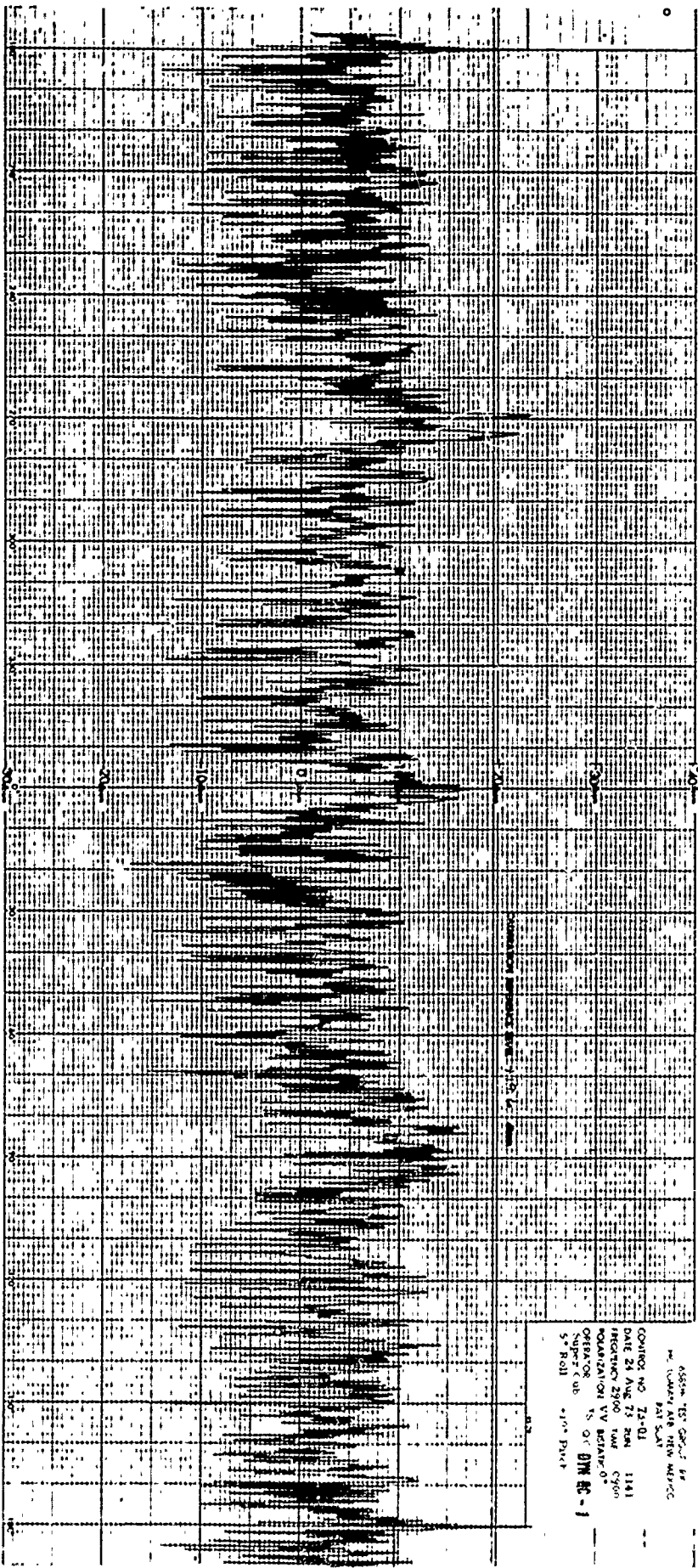


Page 182

03824 1231 GROUP 18X  
 HORTON, A.B. NEW MEXICO  
 34 3041  
 CONTROL NO 73-01  
 DATE 1 Aug 73 P.M. 899  
 PROPORTION 2500 TIME 1210  
 MODIFICATION V BR14K C  
 ORIGINATOR JS OC DTR DE - 1  
 50 1001 09 Patch

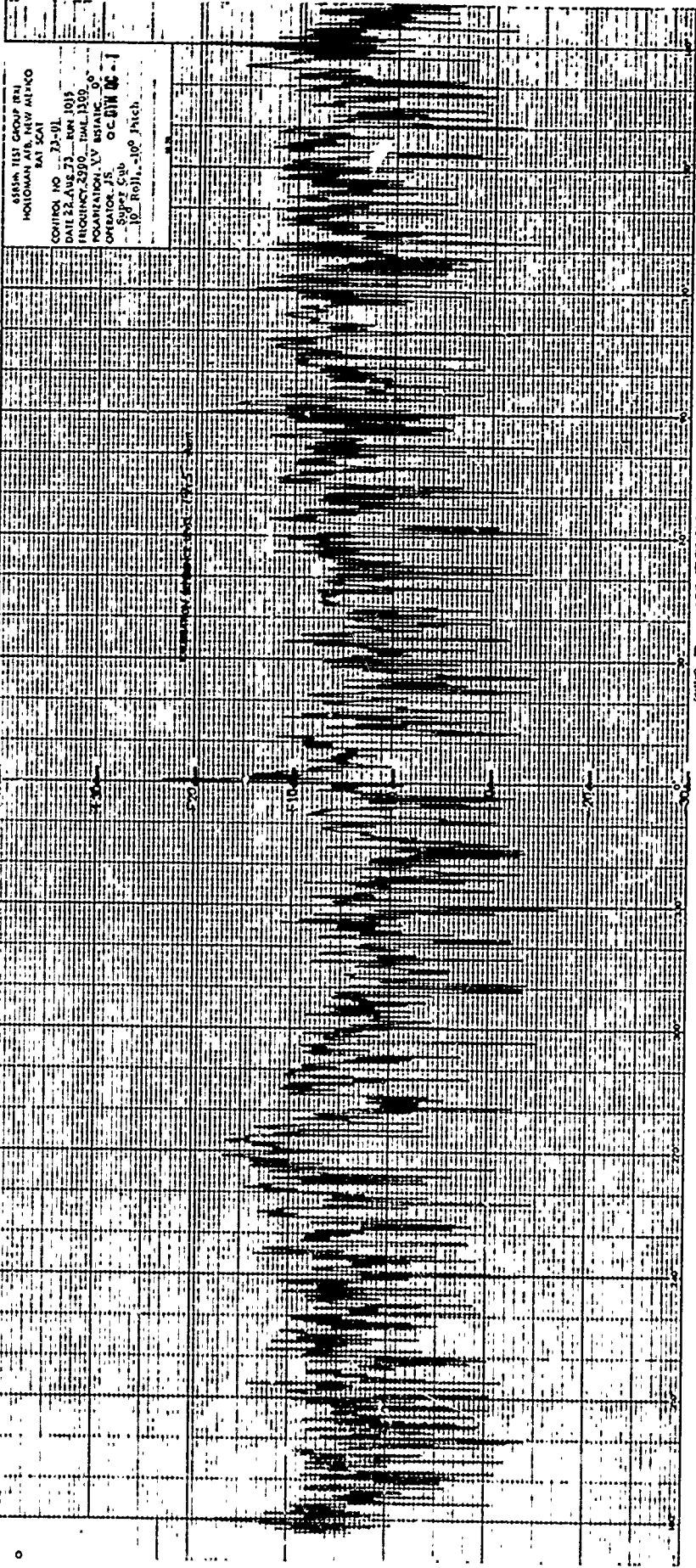
655th TEST GROUP (FN)  
HOLLAND AFB, NEW MEXICO  
BAT SCAT  
CONTR NO 71-01  
DAILY AUG 73 PWA 1106  
FREQUENCY 2900 MHz 2000  
POLARIZATION VV EST 195  
OPERATOR MMDG B. J. M. 1  
SURET CUB  
CO TOLL 550 Dutch



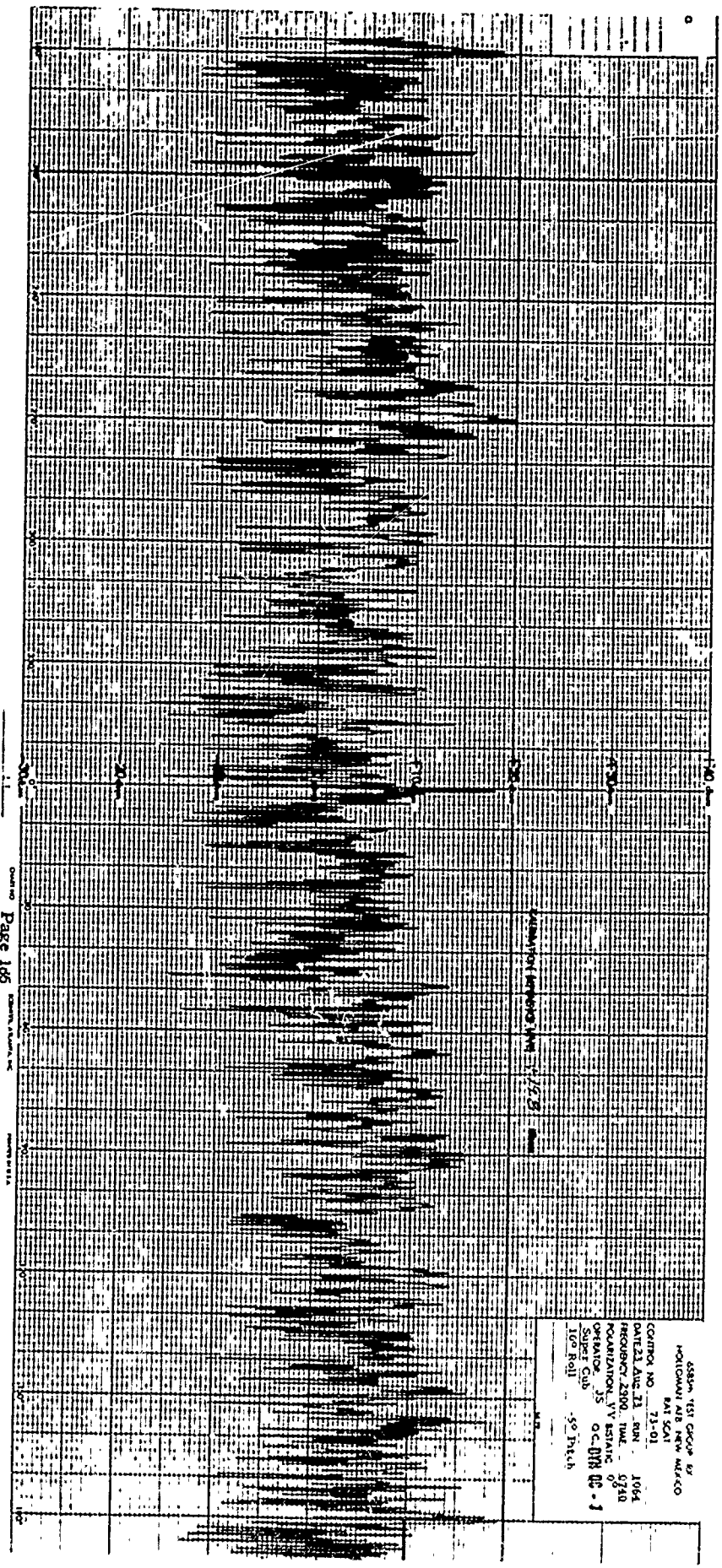


Page 184

ASSIGN TO CONTROL  
 BY (NAME) AND (TIME) (DATE)  
 AIR SQUAD  
 CONTROL NO. 72-01 1141  
 DATE 24 Aug 75 0800  
 POSITION 2900 5900  
 LOCATION VV 02141400  
 OPERATOR TS OF 01M 00-1  
 TYPE of use 400 PWT  
 5th Roll



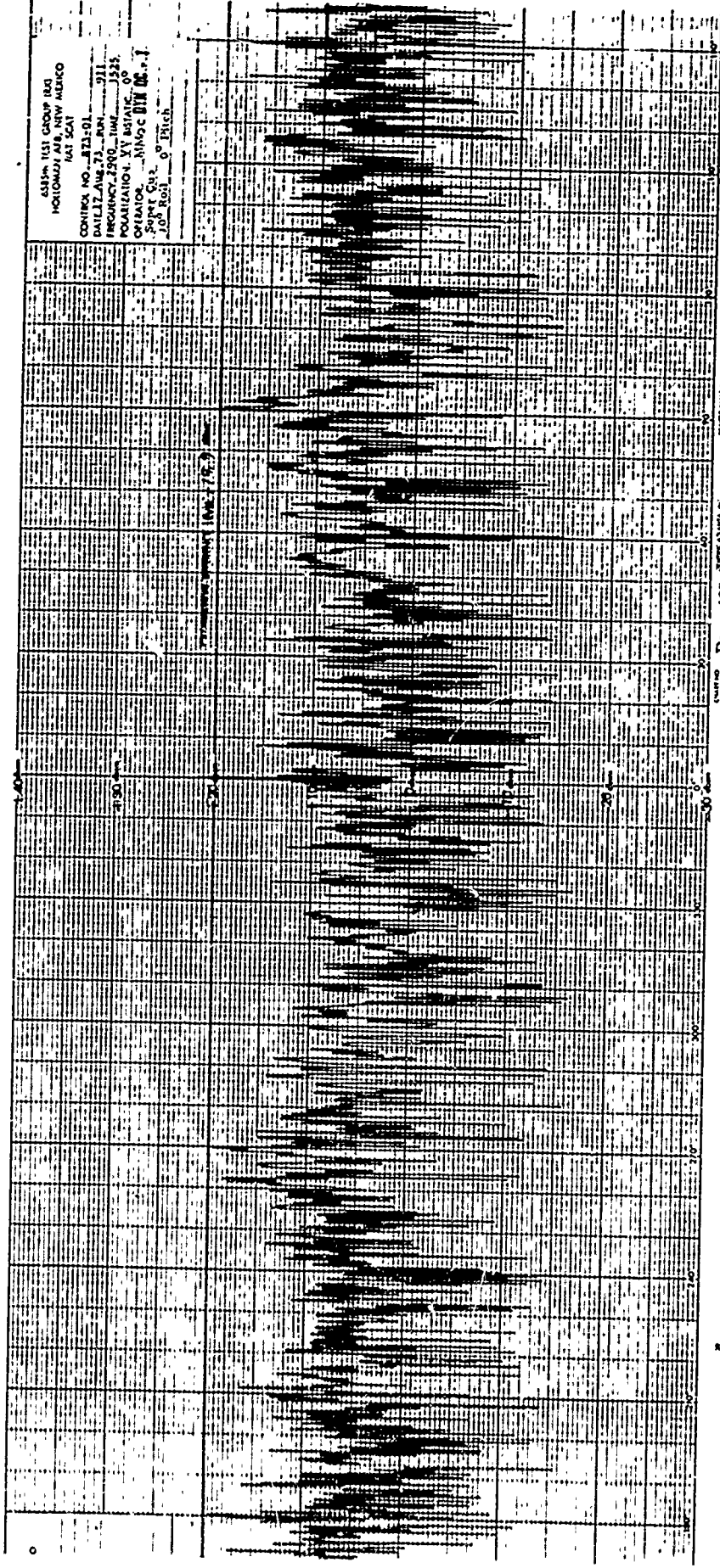
8555th TEST GROUP PER  
 HONOLULU AFB, HAWAII  
 BAI SCAT  
 CONTROL NO 23-01  
 DATE 22 AUG 53 FROM 1015  
 INSTRUMENT 2900 FROM 1100  
 ORGANIZATION VV BRLIC  
 OPERATOR JIS  
 Super Cub GC 011 06-1  
 10° Roll, 10° Pitch



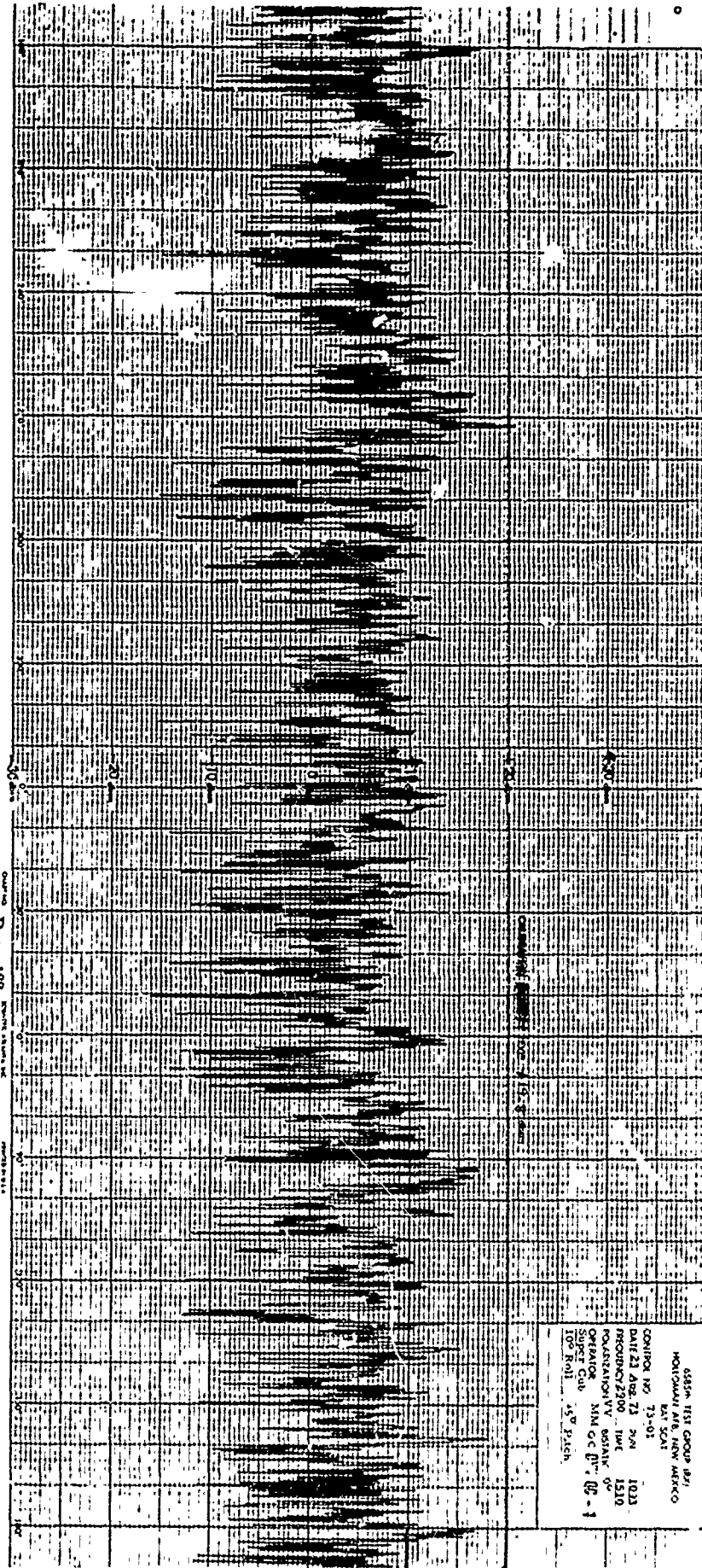
CONTROL Page 186 CONTROL SYSTEMS

488th TSI GROUP BY  
 HOLLAND AIR NEW MEXICO  
 BATS  
 CONTROL NO. 73-01  
 DATE 21 AUG 73  
 RESOURCE 2300 TIME 0740  
 ORGANIZATION IV ESTIMATE  
 OF  
 ORIGINATOR 35 O.C. DRN DC - J  
 SUPER CLUB  
 100 Roll  
 90 Inch

6354 1131 GROUP (B)  
HOLCOMB AFB, NEW MEXICO  
IAT SCAT  
CONTRAC NO. 713-01  
DATE 17 Aug 71  
FREQ 2900  
POLARIZATION XV  
OPERATOR NING C DIM  
Super Cnt.  
10th Reel 0th Pitch



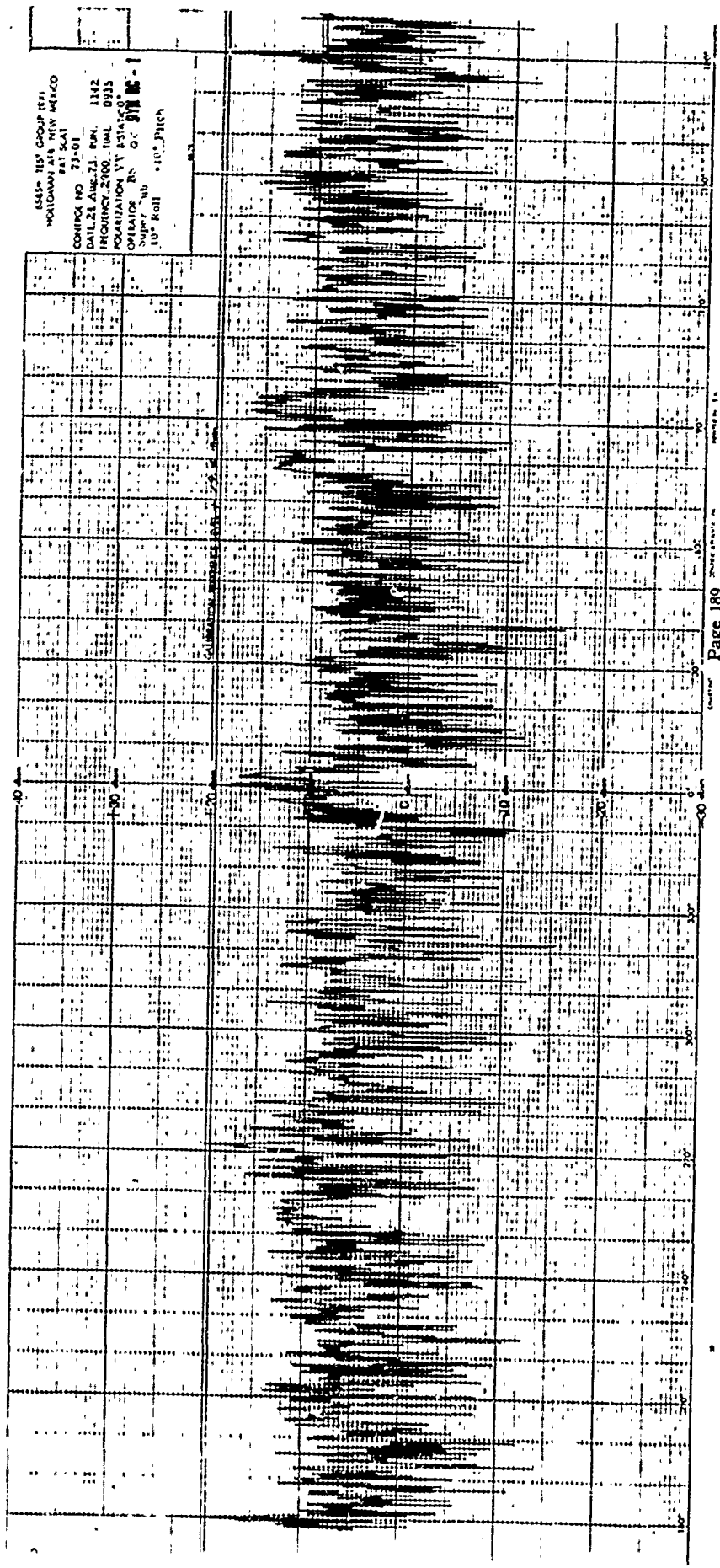


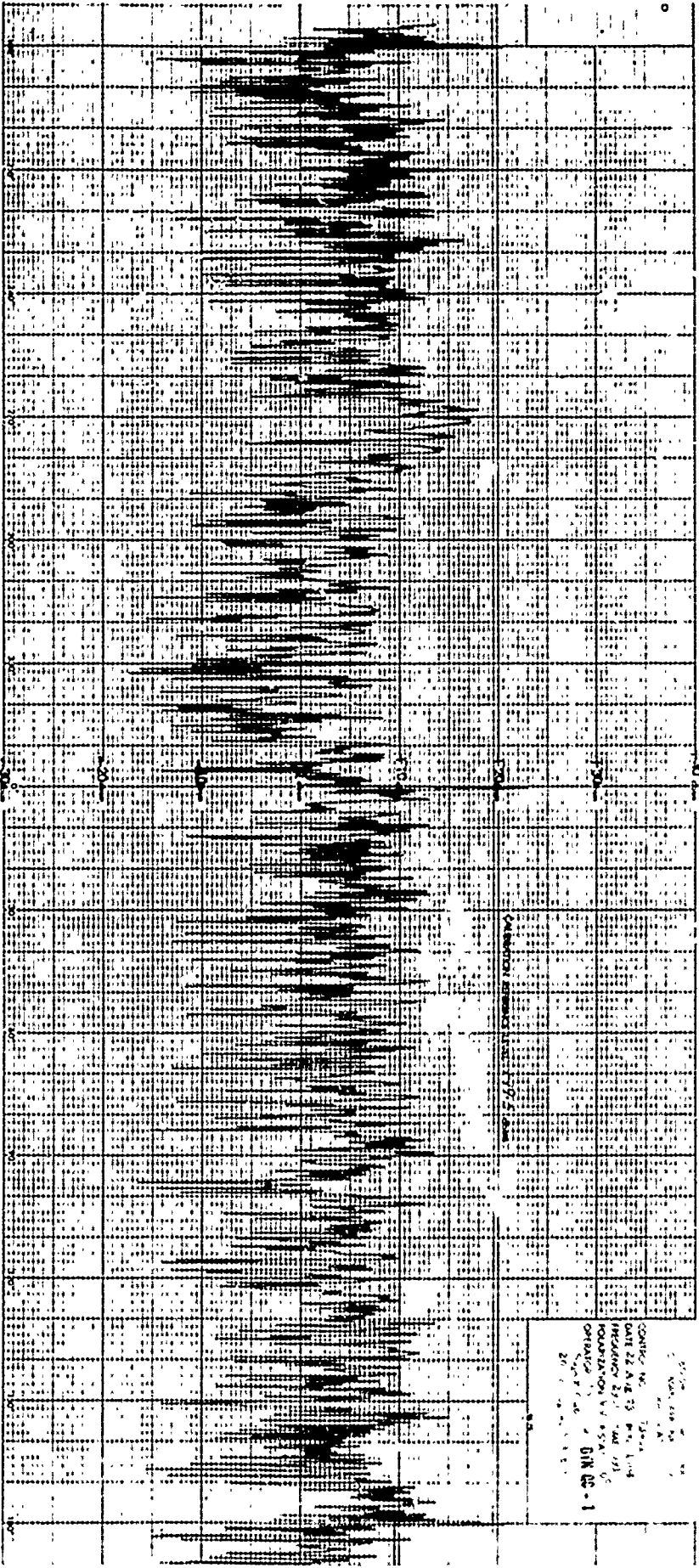


Page 188

655th TEST GROUP 847  
 HOLFORD AFB, NEW MEXICO  
 15130  
 CONTROL NO 73-01  
 DATE 23 AUG 73  
 FREQUENCY 2300  
 POSITION 1000V  
 OPERATOR SIM OC  
 SUPER GRAB  
 100 Roll 15 P/Sec

5855- 1157 GROUP 193  
HOLLAND AIR NEW MEXICO  
PAT SCAT  
CONTROL NO 73-01  
DATE 21 AUG 21 1942  
FREQUENCY 2100. TUAL 0935  
POLARIZATION VV ESTABCO  
OPERATOR BN OC 8111 MC-1  
Super sub 10" Roll 110° Pitch

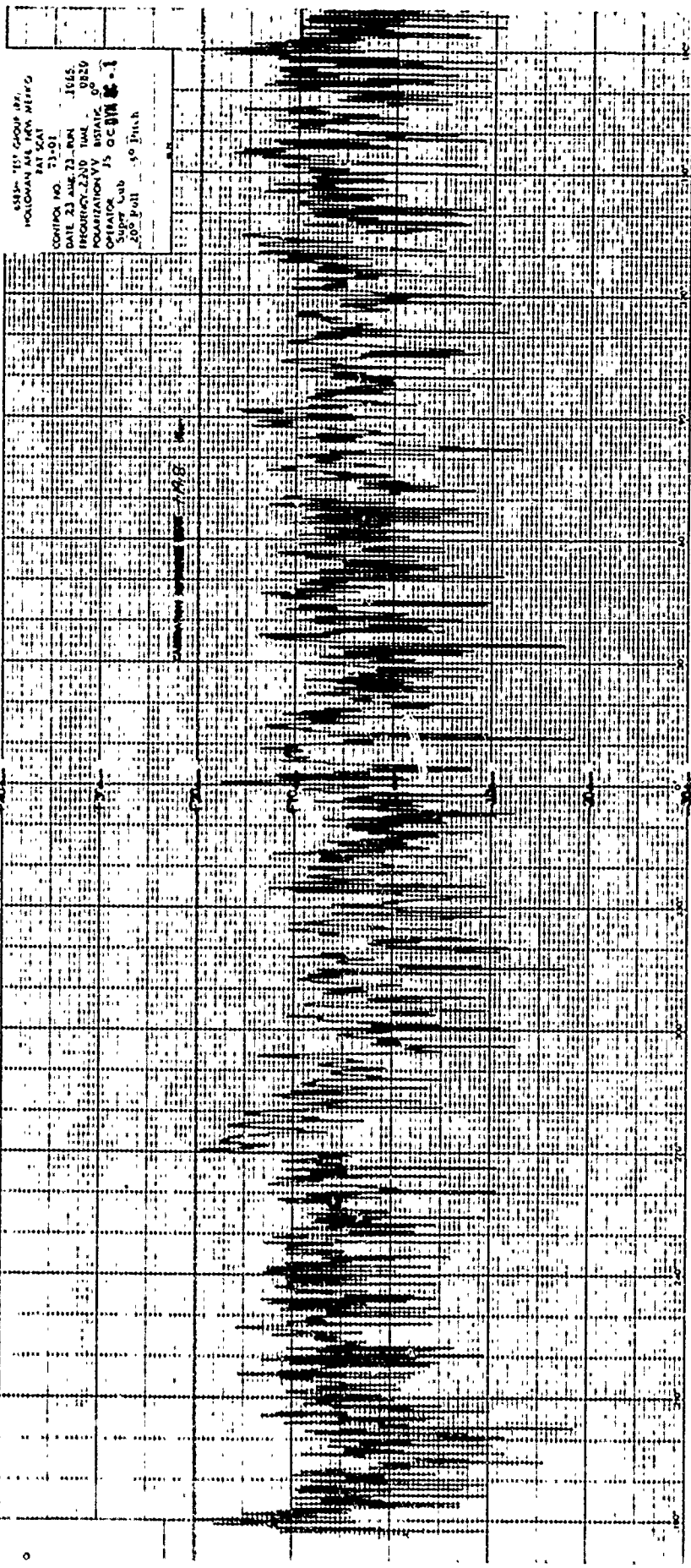




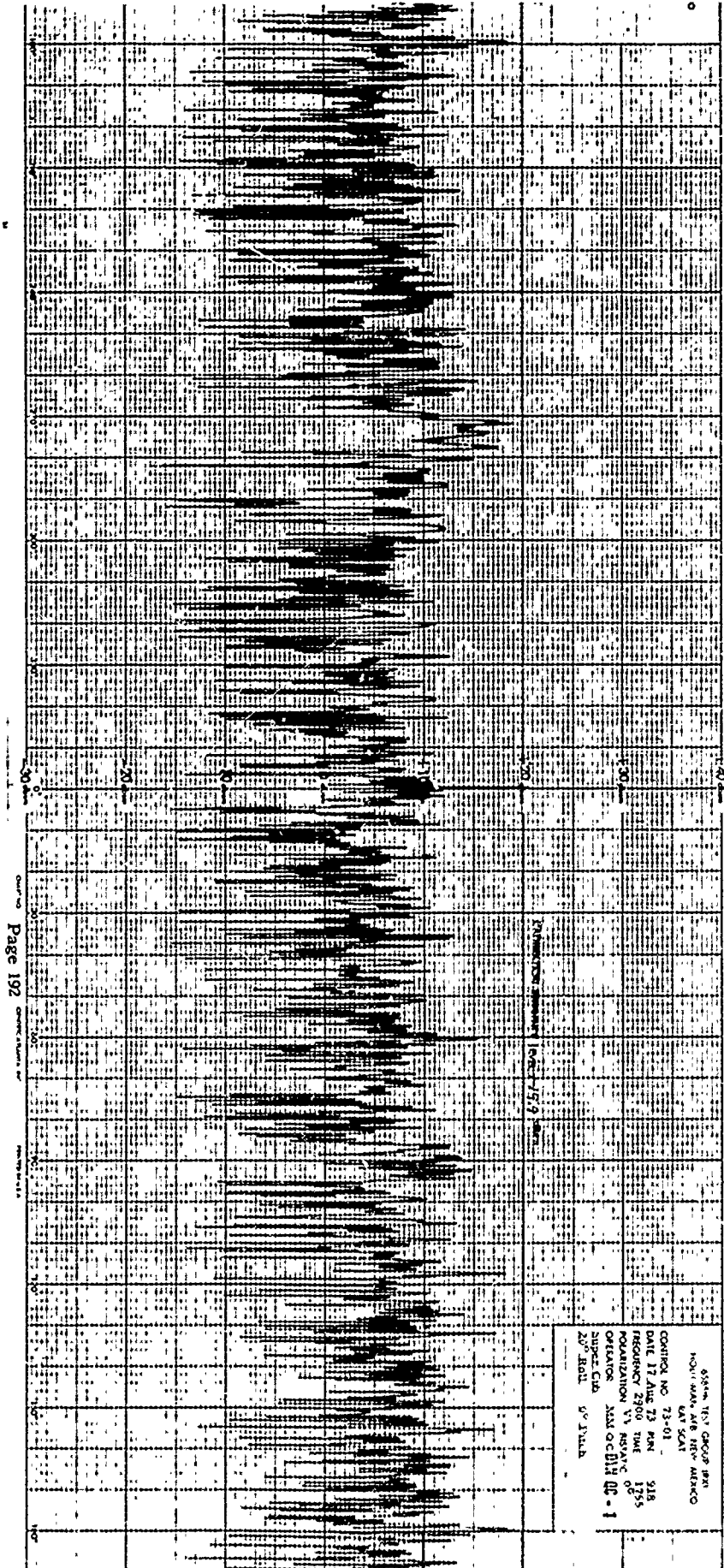
Page 190

CONTROL NO. 7344  
 DATE 22 AUG 59  
 FREQUENCY 2000  
 FOUNDATION V. 55A  
 ORIENTED  
 20'

GIN 02-1

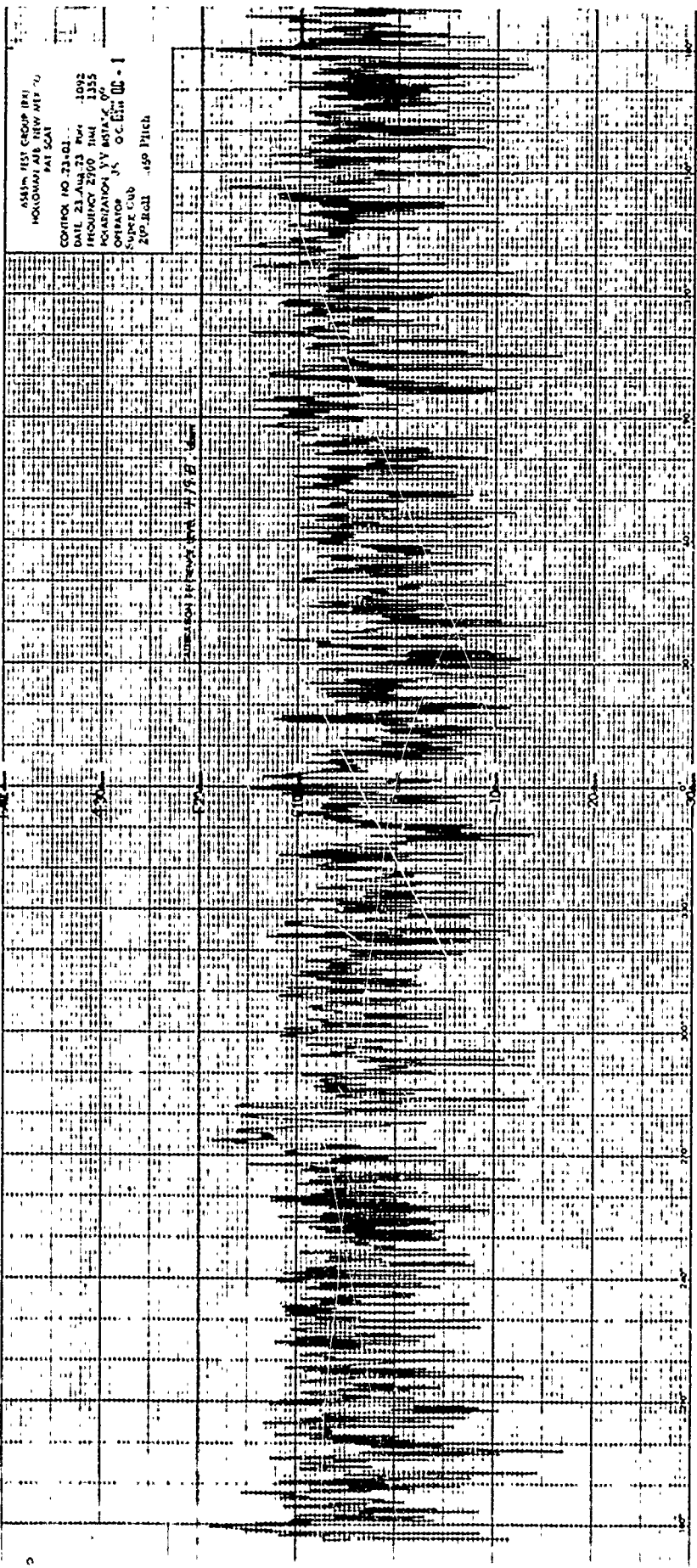


5554-101 GROUP 107  
HULLMAN AVE NEW MEWS  
PAT 541  
CONTROL NO 73-01  
DATE 23 AUG 73 1965  
FREQUENCY 2.10 MHz  
POLARIZATION VV  
OPERATOR JS  
Super Cab  
200 ft  
50 ft  
10 ft



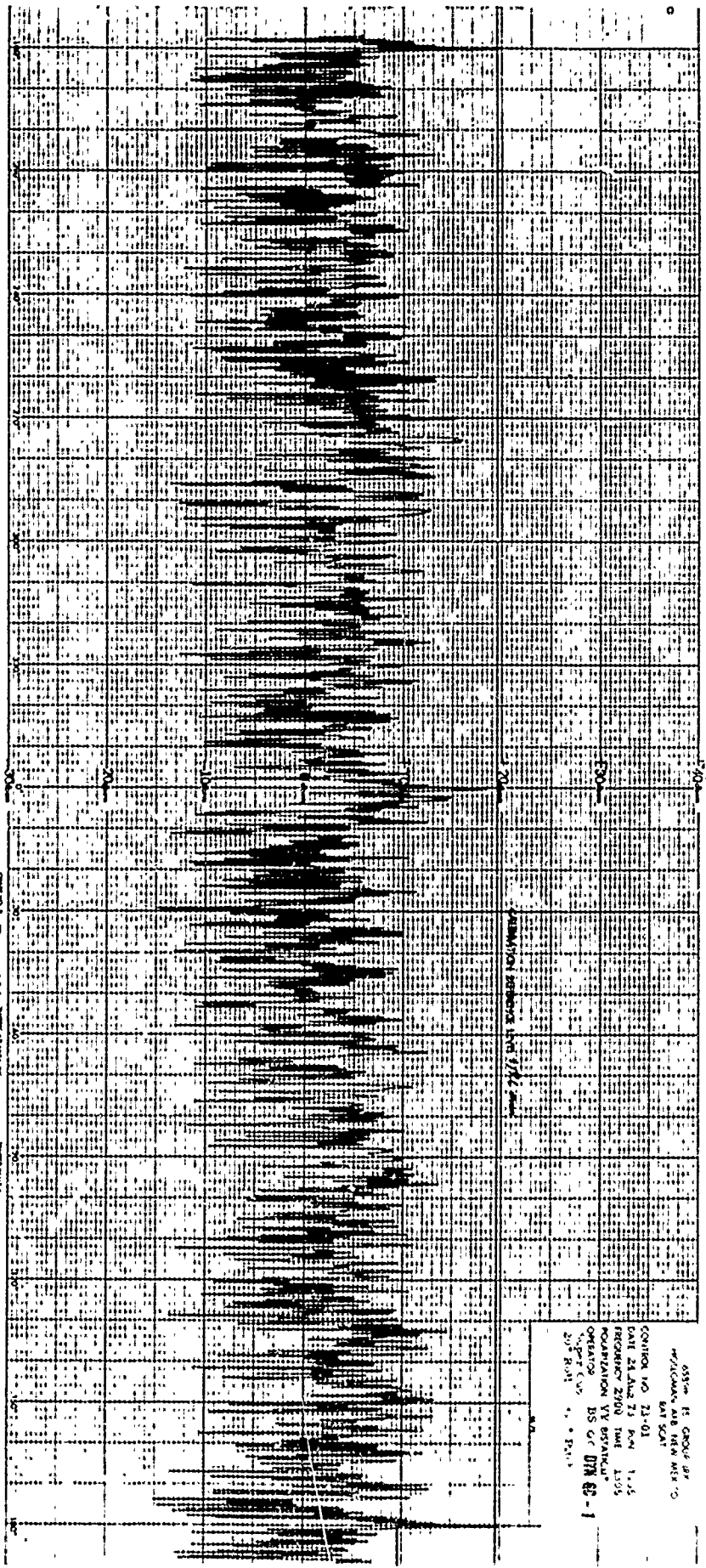
Page 192

SYSTEM TEST GROUP BRT  
 NORTH WALKER TEST RANGE  
 CONTROL NO 73-01  
 DATE 17 AUG 73  
 FREQUENCY 2700 MHz  
 MODULATION FM  
 OPERATOR ASM OGDH UC - 1  
 SUPER GRD 5° 17.5dB  
 ZVR HOLD



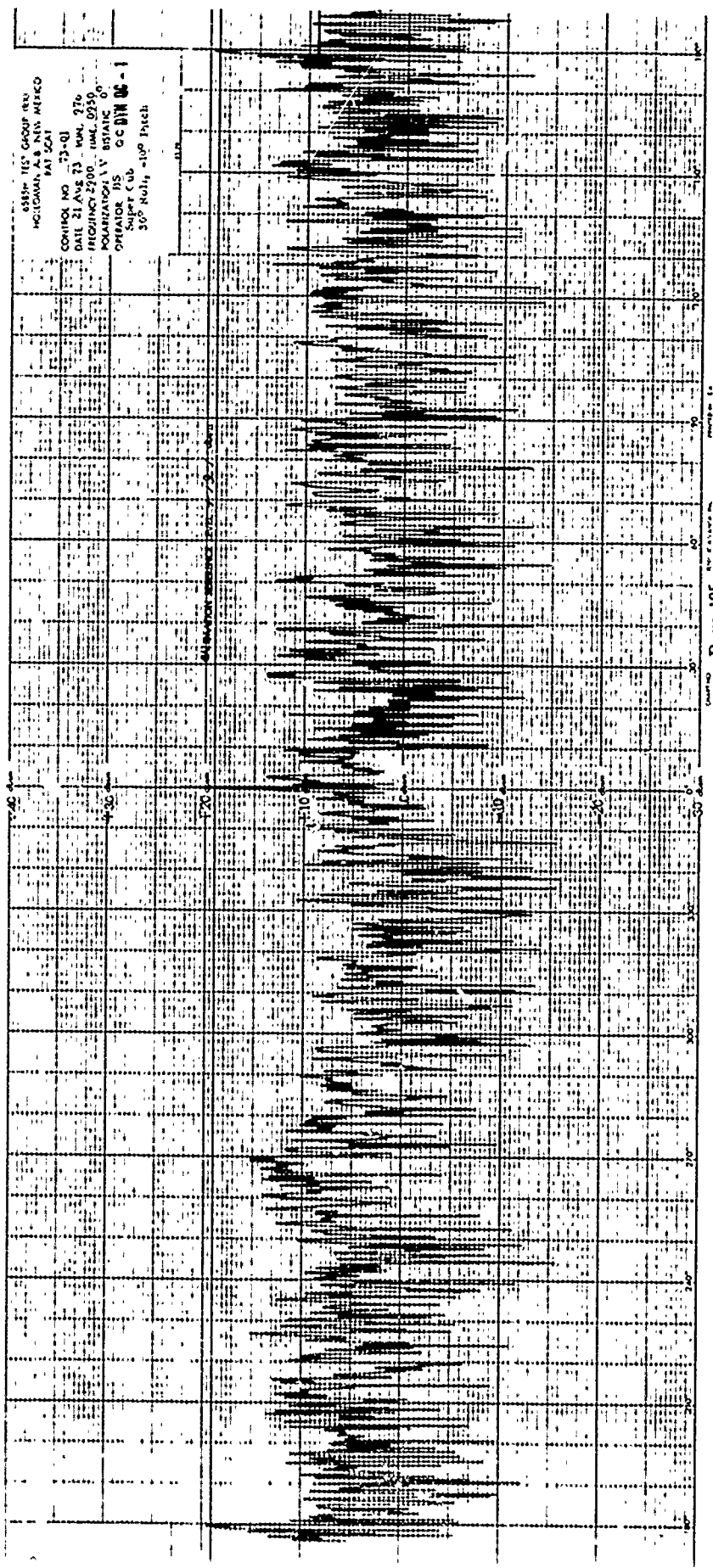
ASIN TEST GROUP (BY)  
 MONITOR (DATE) (TIME)  
 PAT. NO. 23-01  
 DATE 23-Aug-53 Per 1092  
 PROJECT 2300 Ind 1355  
 ORGANIZATION BY BRAC 00  
 OPERATOR J. C. Elin (P-1)  
 SUP. CUB  
 230-1001 -4sp Pitch

JAMES BOY 1948-1953 (P-1) (P-1)

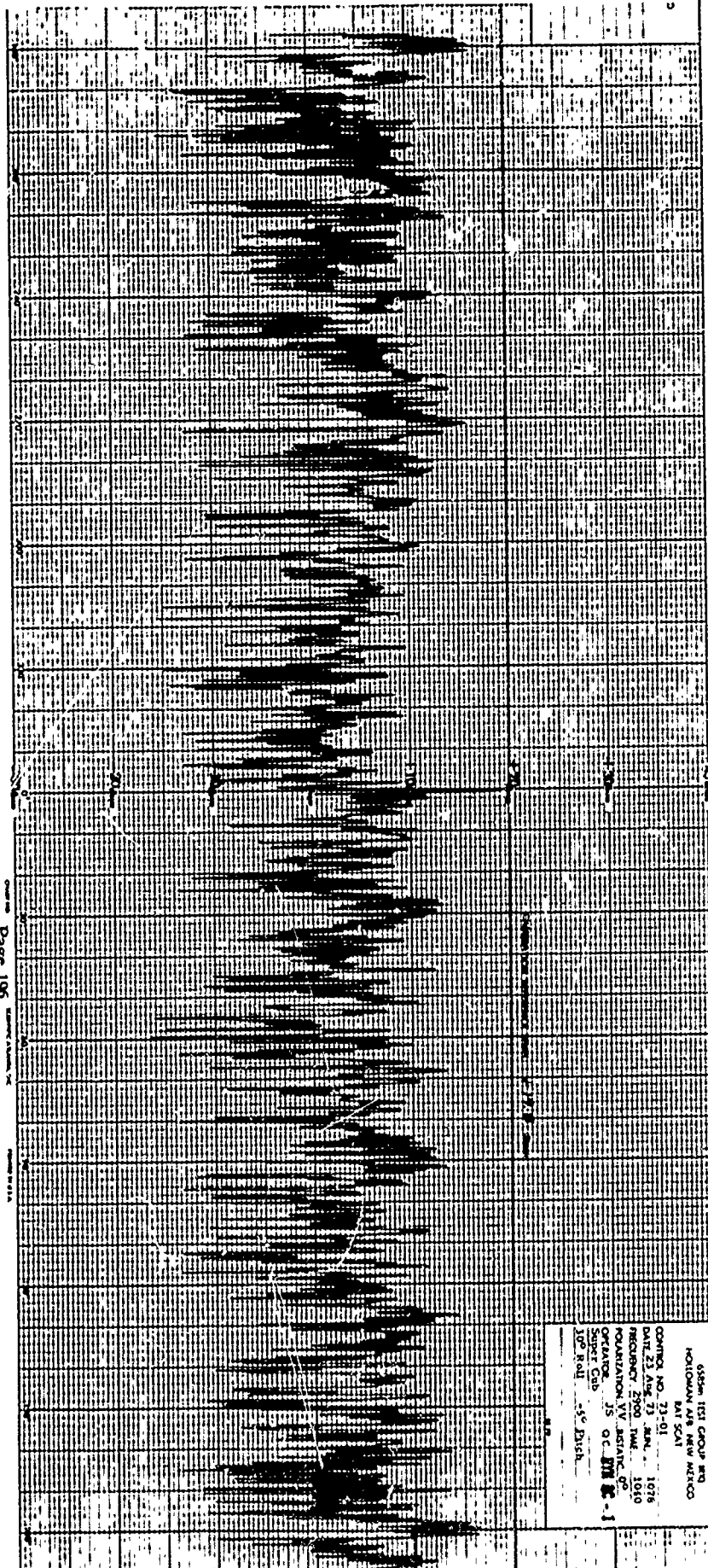


05500 FT GROUP 887  
 W/LOCATOR AND ITEM REF TO  
 841 SCAT  
 CONTROL NO. 23-01  
 DATE 24 Aug 73 PM 1:45  
 PROGRAM 2800 TIME 1305  
 POLARIZATION VY 0741KALP  
 OPERATOR BS CC DTN 65-1  
 205 PAUL

65534-1157 GROUP (REV)  
 HOLIDAY, A. B. NEW MEXICO  
 PAT 5041  
 CONTROL NO. 73-01  
 DATE 21 AUG 73 - MWL 276  
 FREQUENCY 2900 - MWL 0250  
 POLARIZATION V. BISTATIC 0°  
 OPERATOR JIS CC BYW 06-1  
 Superf Cub  
 50° Roll, +10° Pitch



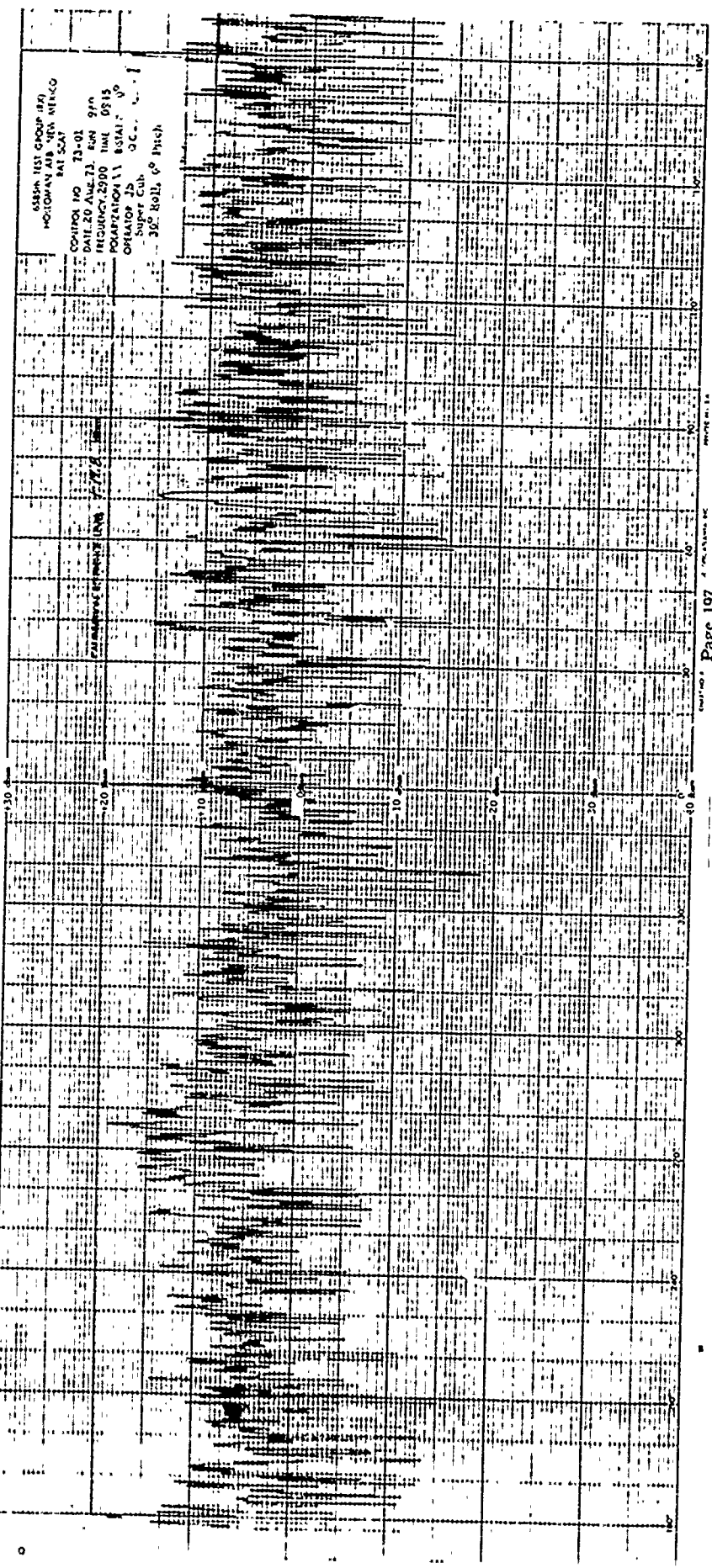


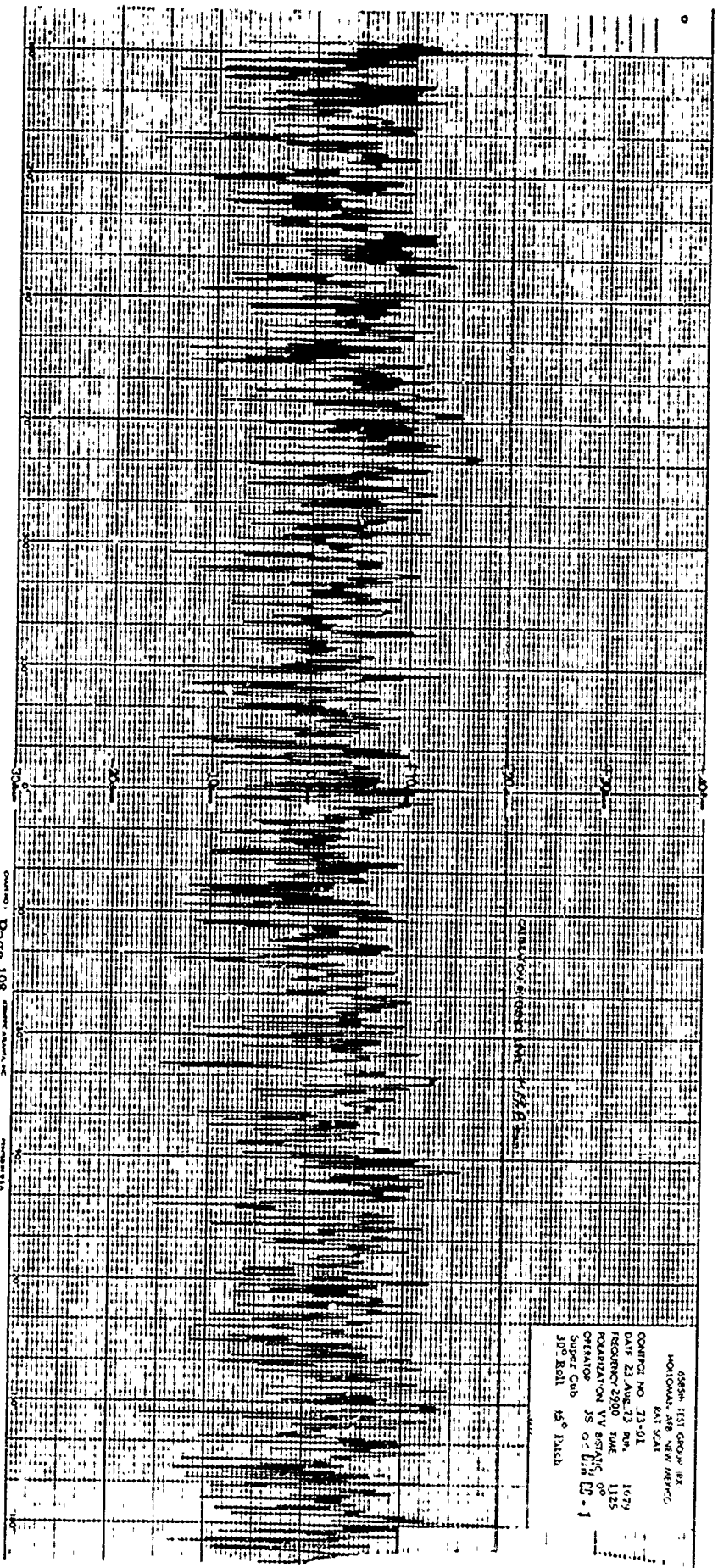


Page 196

658m 133 GROUP HQ  
 HONOLULU AIR NAVY STATION  
 HI 96111  
 CONTROL NO. 73-01  
 DATE 23 AUG 73 AM 1676  
 FREQUENCY 2500 MHz 1670  
 POLARIZATION VV ASTANG OF  
 OPERATOR JS OC 311  
 SUPER GRP  
 1st Roll - 5° Distn

65834 TEST GROUP (R)  
HOLLOWAY AIR MEN, MEXICO  
BAT SCAT  
CONTROL NO 73-01  
DATE 20 AUG 73 RUN 916  
FREQUENCY 2900 TIME 0815  
POLARIZATION V B31A1  
OPERATOR JS  
Super Cub  
30° Roll, 0° Pitch

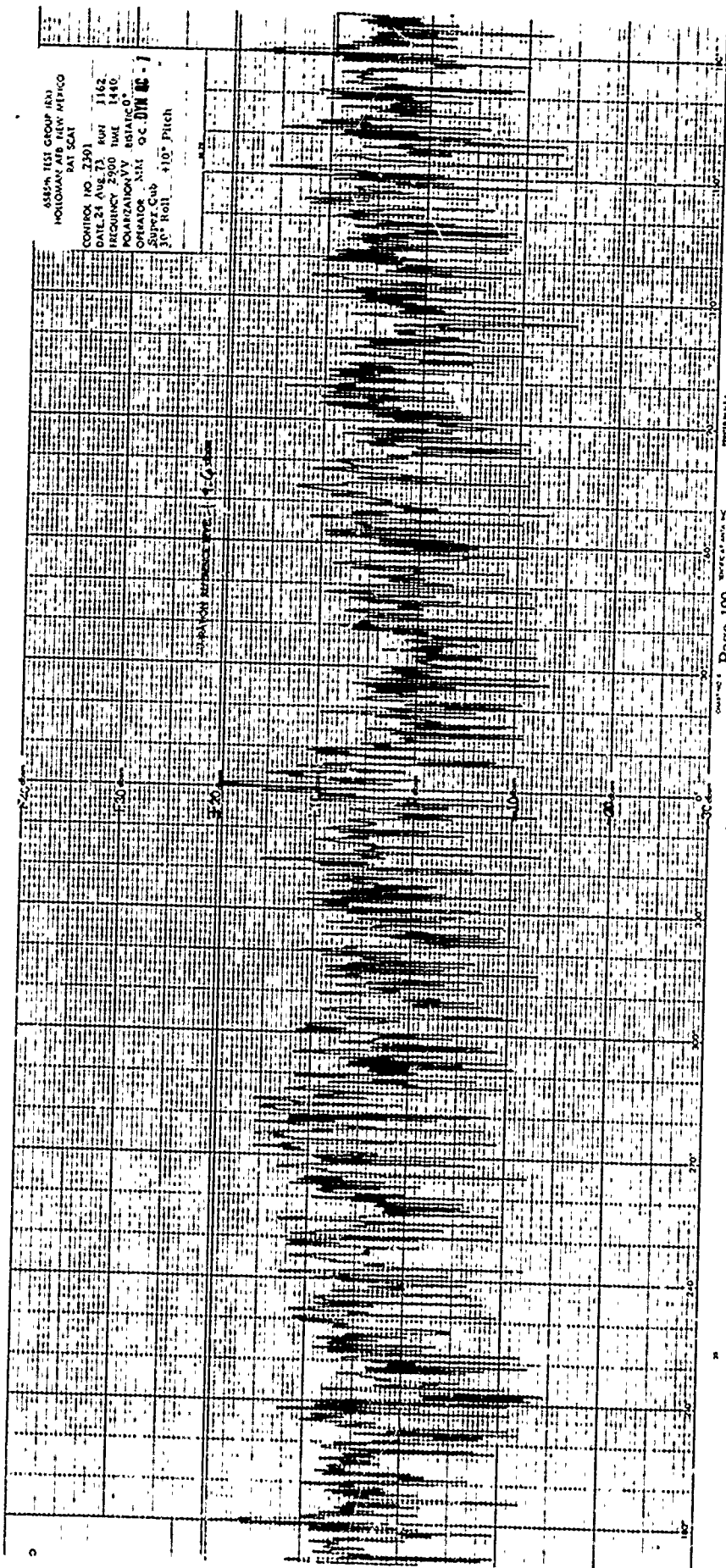


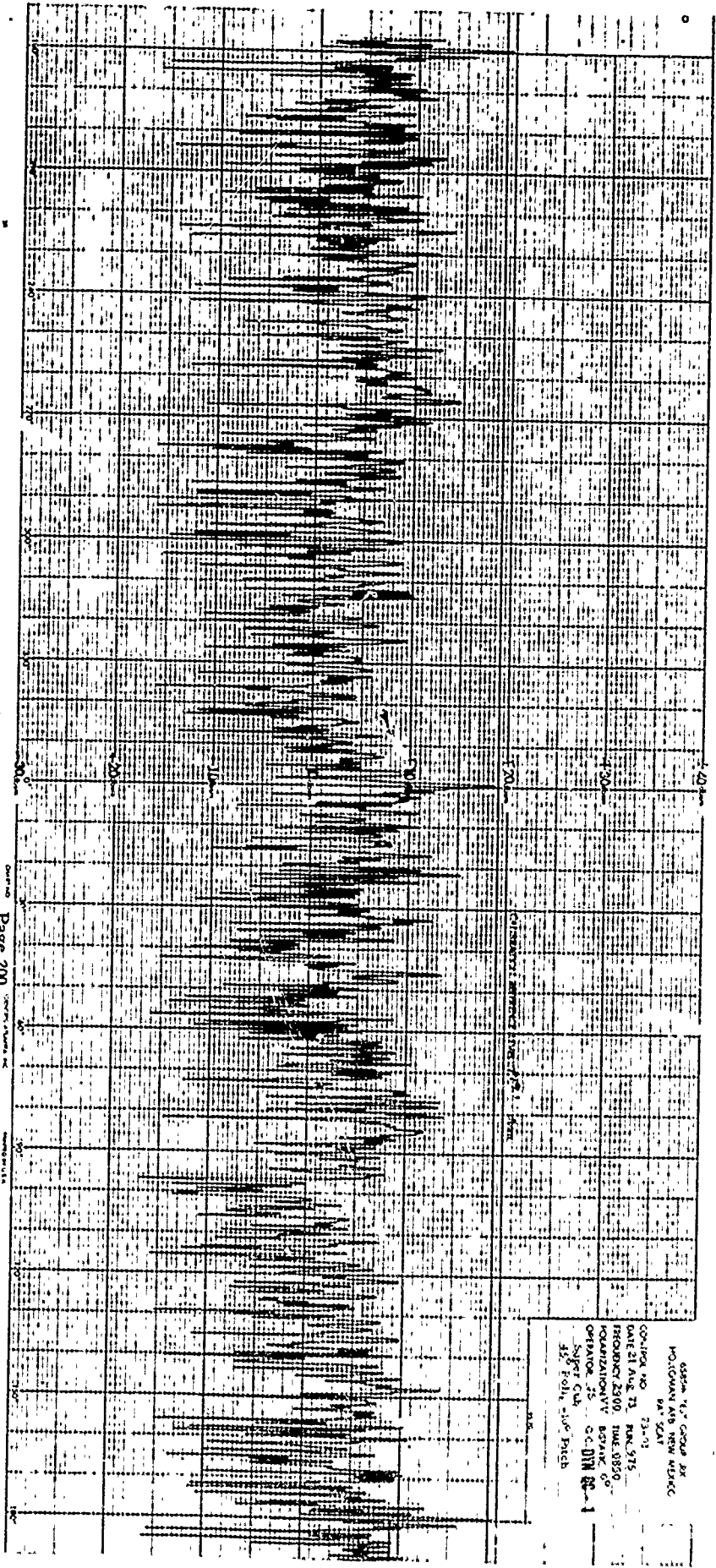


48884-1131 GROUP BK1  
 HORTONVILLE, MISS. SWN  
 COUNTY NO. 23-01 1079  
 DATE 23 AUG 70 806  
 RECORDING 2500' TIME 1125  
 OBSERVATION 15 07 00  
 OPERATOR JS of DWH  
 307-3011 45° North  
 1079

65524 TEST GROUP (R)  
MOLLOMAN AFB NEW MEXICO  
BAT SCAT

CONTROL NO. 2291  
DATE 24 AUG 73 RPT 1162  
FREQUENCY 2500 TIME 1440  
POLARIZATION VV STATIC O  
OPERATOR NMI OC JVN AC - 1  
Super Cub  
30" Roll - 410" Pitch

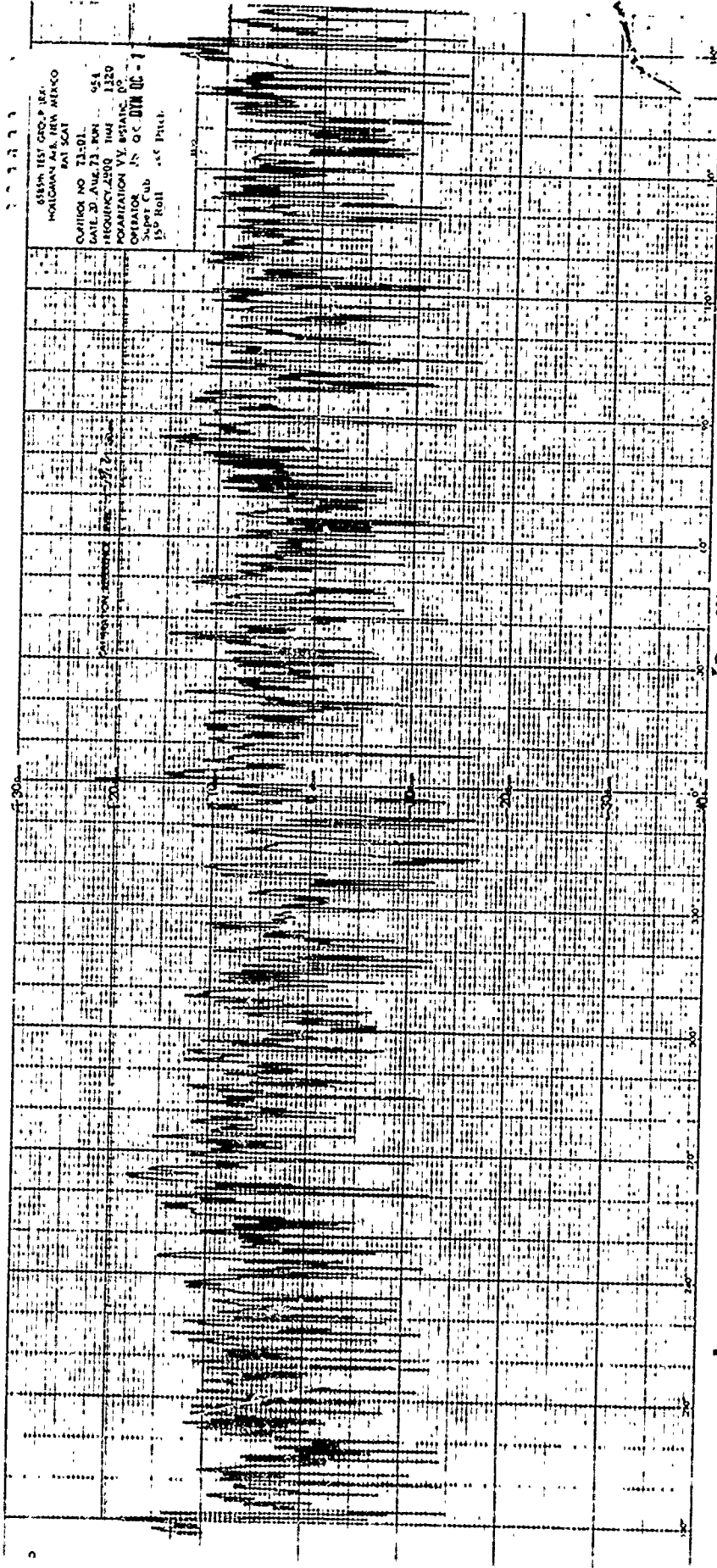


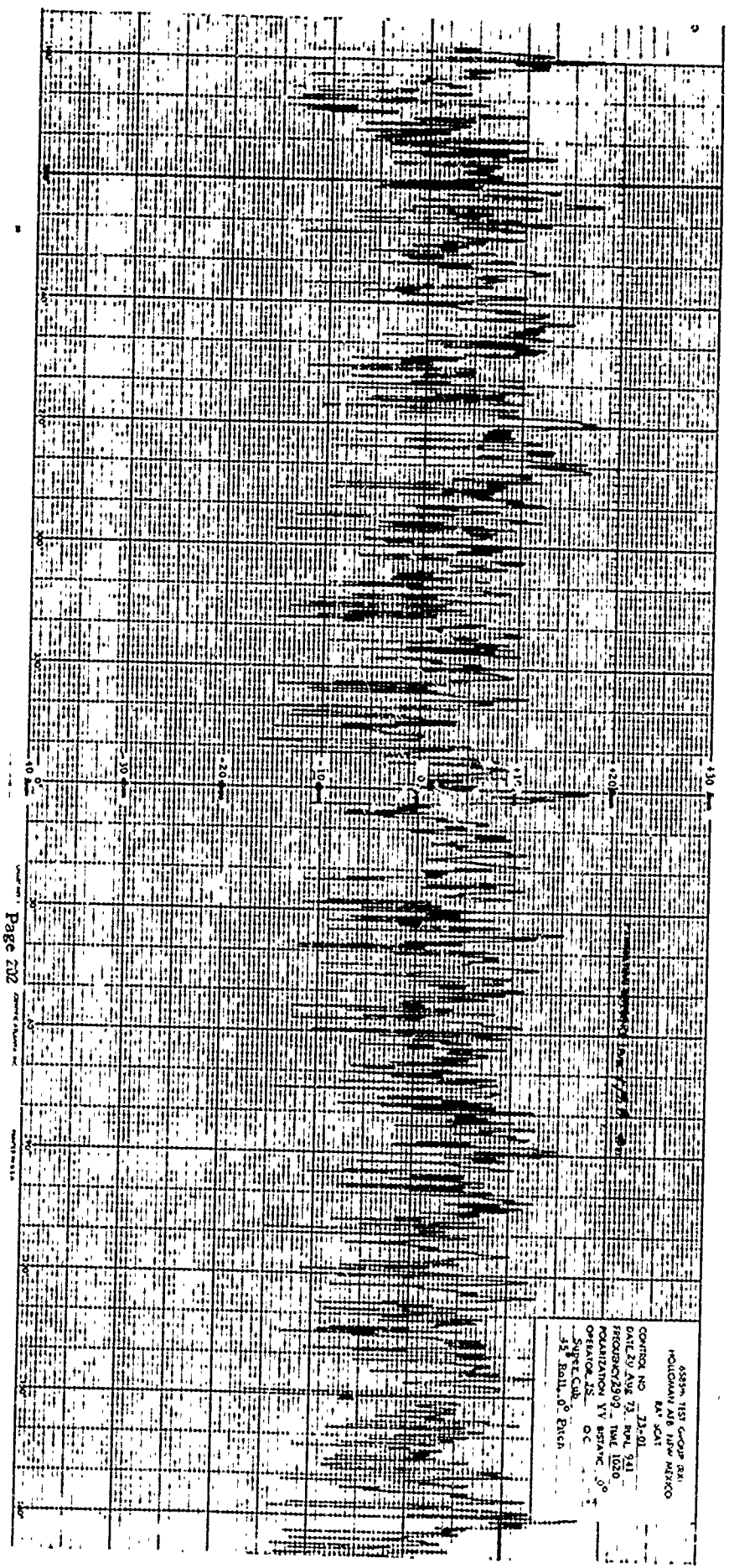


6555m 147' COND BY  
 HOLLOWAY AFB NEW MEXICO  
 8/21/51  
 DATE 21 AUG 51 RNL 575  
 FREQUENCY 2900 TIME 0850  
 ORGANIZATION BRYAN CO  
 OPERATOR J.S. O'DIN RC-1  
 SUPERVISOR  
 320 Poles, 100 Poles

11111

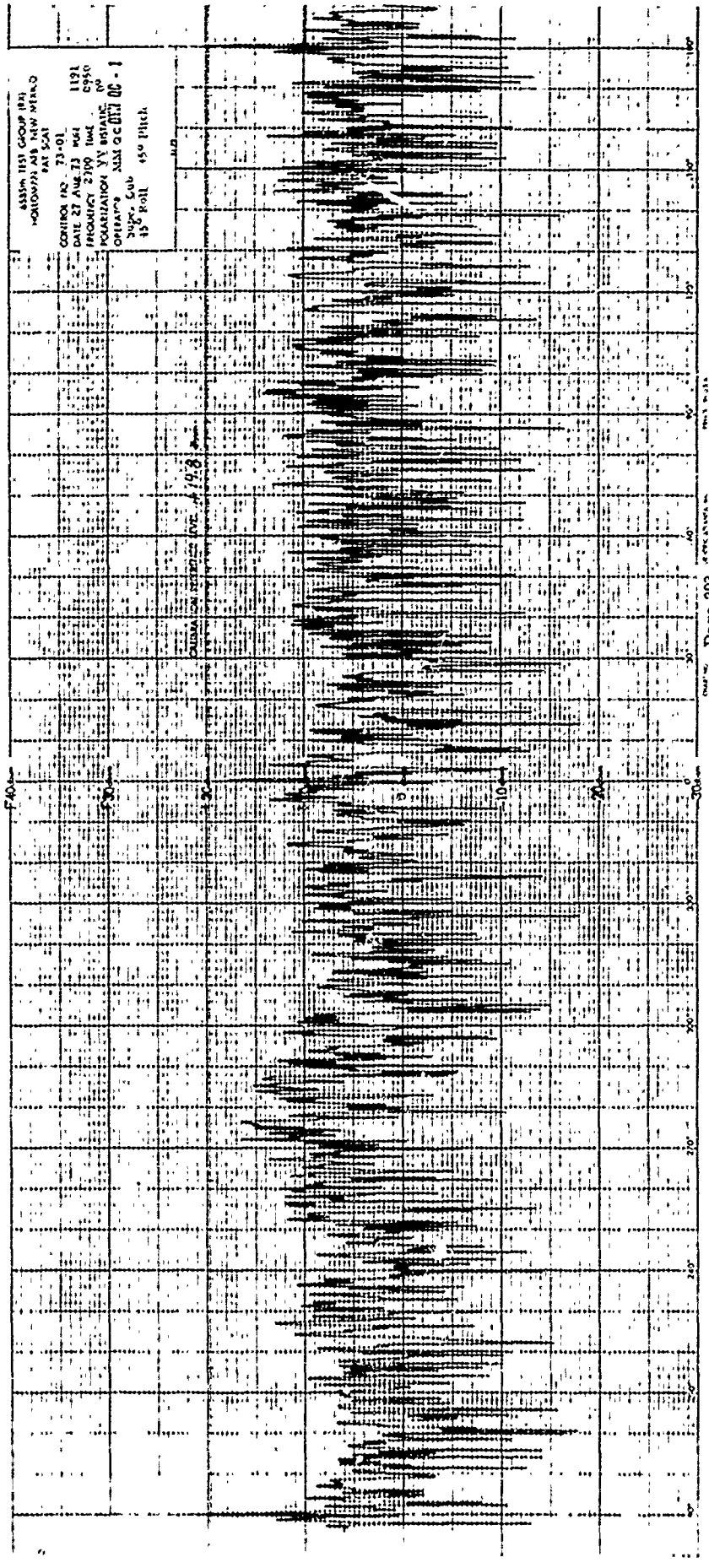
SEISMIC TEST GROUP, INC.  
HOUSTON, TEXAS  
CARTON NO. 11-01  
DATE: 20 AUG. 71. FOR: 54  
PROJECT: 2500. HUB: 120  
OPERATION: Y. L. ESTAB. 0.  
SERIAL: 155 Roll 455 Print





Page 102

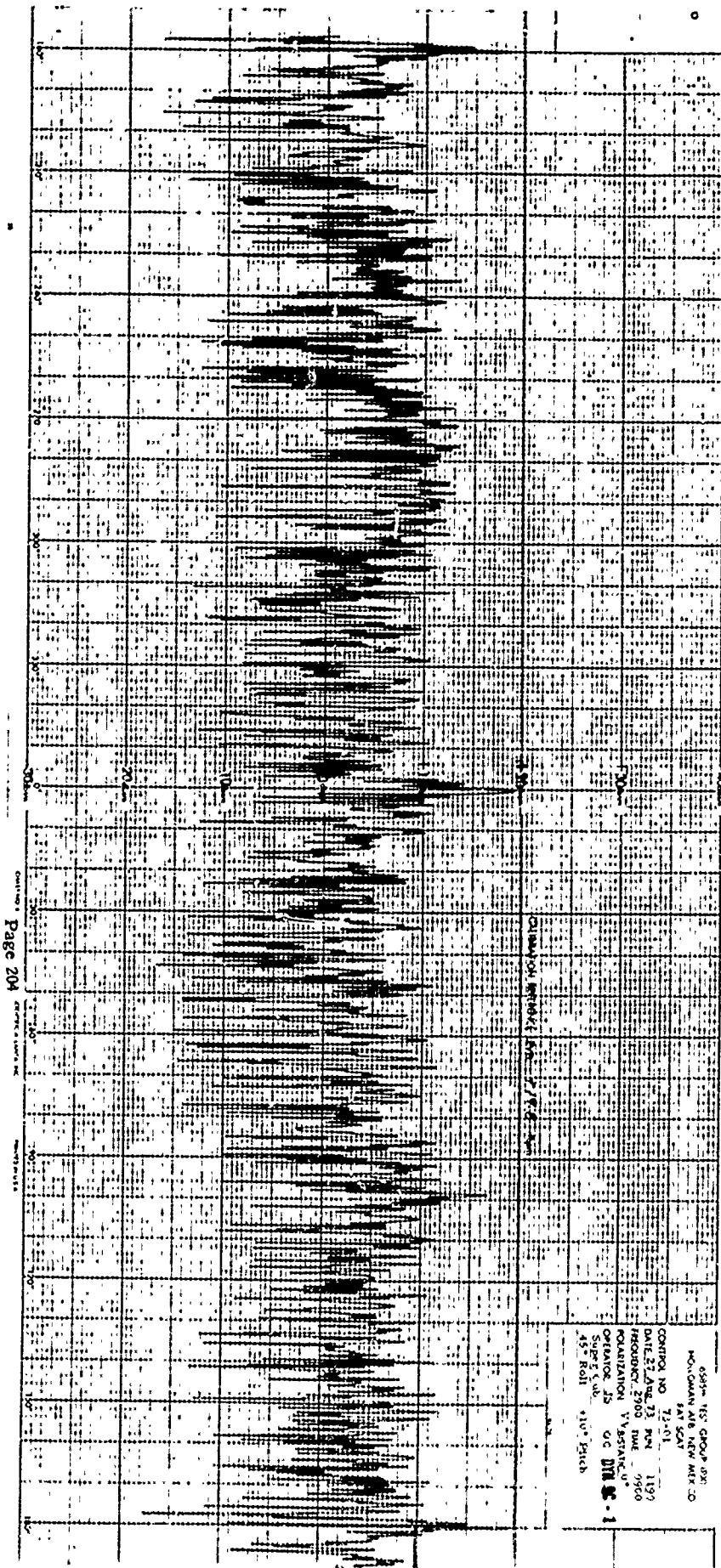
655th TST Group Bn  
 HOLLAND AFB TX 76626  
 EAT SAT  
 CONTROL NO 13-01  
 DATE 20 Aug 73, RWL 941  
 FREQUENCY 2300 - TIME 1020  
 POLARIZATION TV STATION 00  
 OPERATOR JS OC  
 SuperCub  
 58 Ball, 00 Pwr



ALBANY TEST GROUP (B)  
 MONITORING AIR RAIN WATER  
 PAT 5-21  
 CONTROL NO. 73-01  
 DATE 27 Aug 73 W61 1191  
 PROJECT 2700 TMS 0950  
 ORGANIZATION NY STATE  
 OPERATOR MAX 0000 00-1  
 SUPER. CUB 450 thich  
 15' Roll

CALIBRATION RESISTANCE (VOLT) 19.8



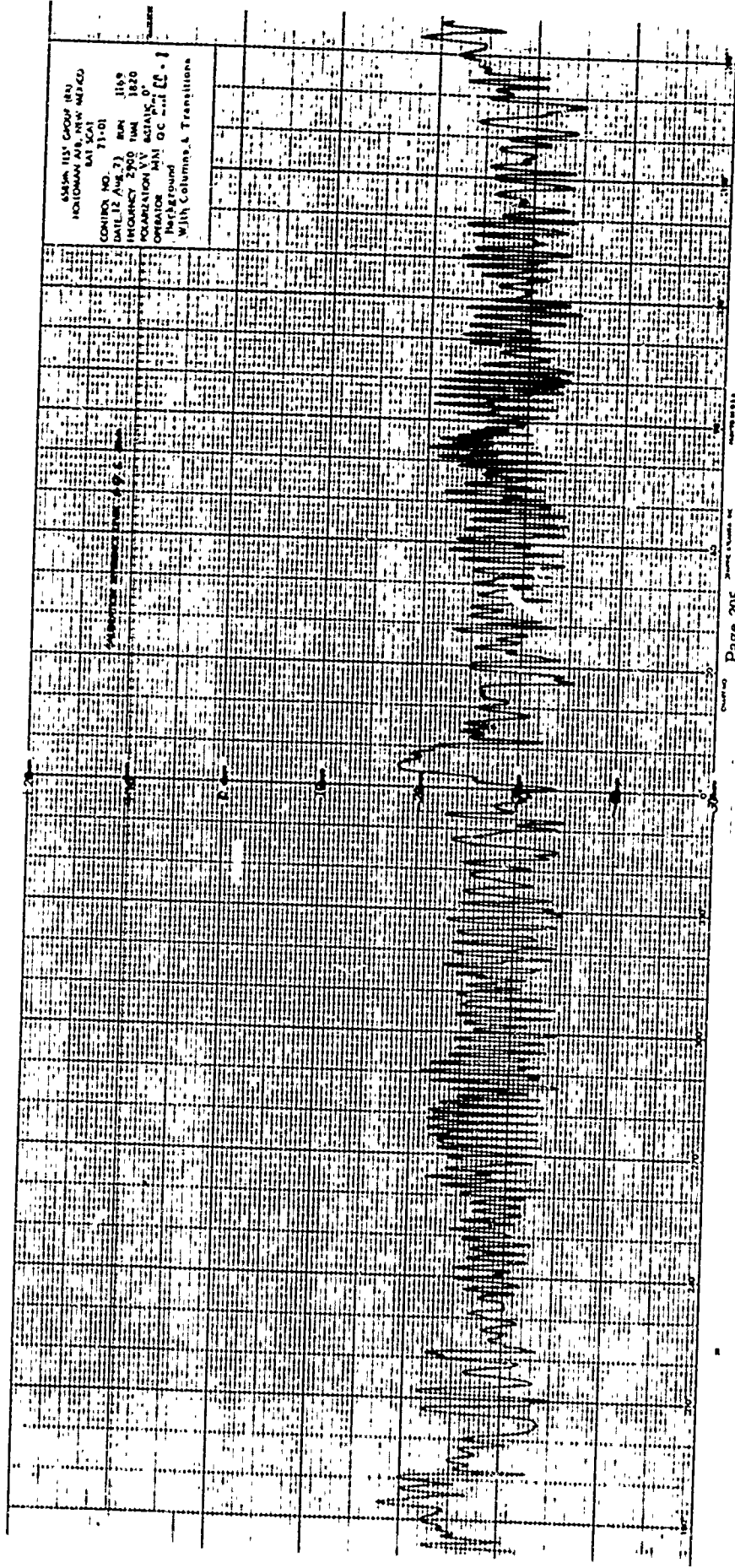


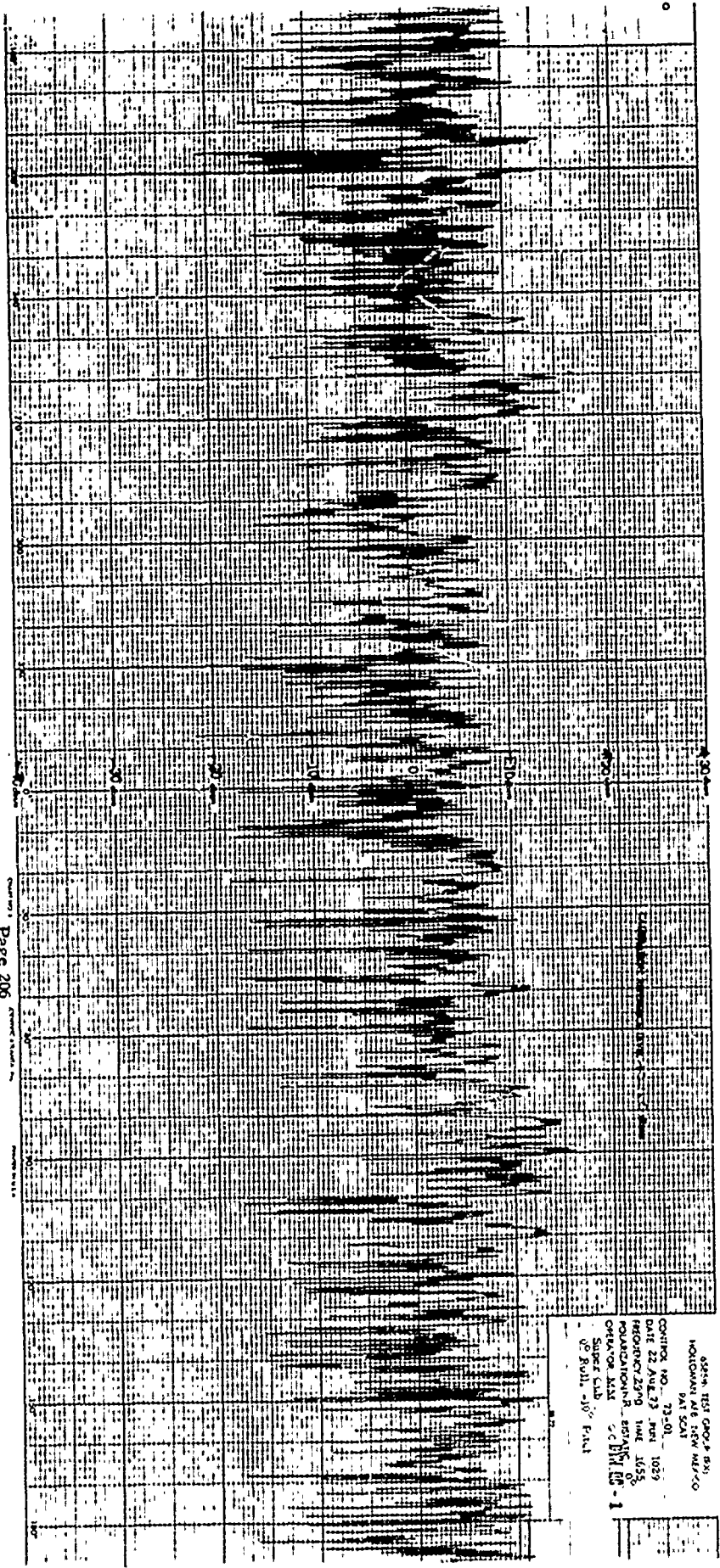
Page 204

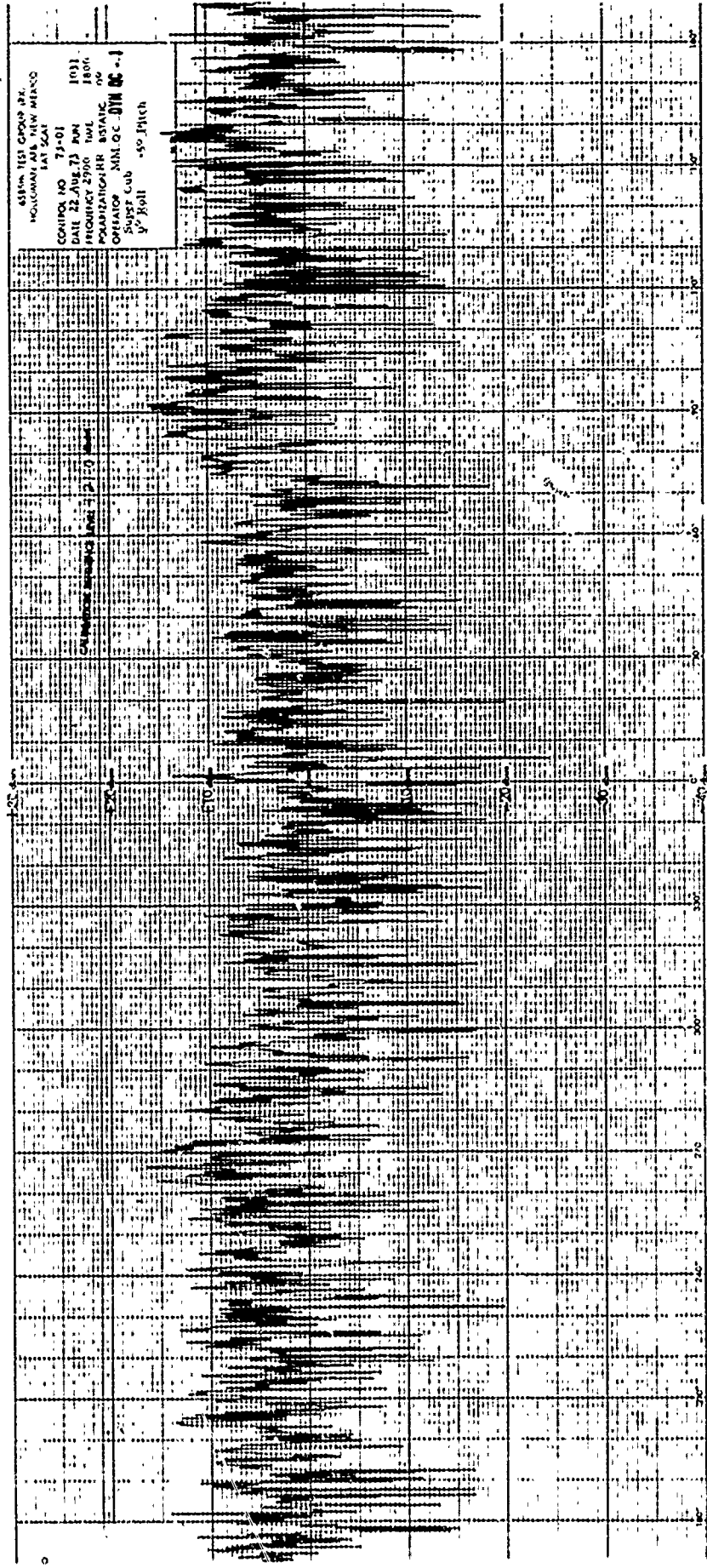
6595-157 GROUP 3X1  
 HOLLAND AIR NEW MIX 0  
 FAT SCAT  
 CONTROL NO 72-01  
 DATE 21 AUG 73 RW 1197  
 FREQUENCY 2980 MHz 0960  
 POLARIZATION V VERTICAL  
 ORATOR 25 DC DIM 8-1  
 Supersub  
 45° Roll  
 110° Pitch

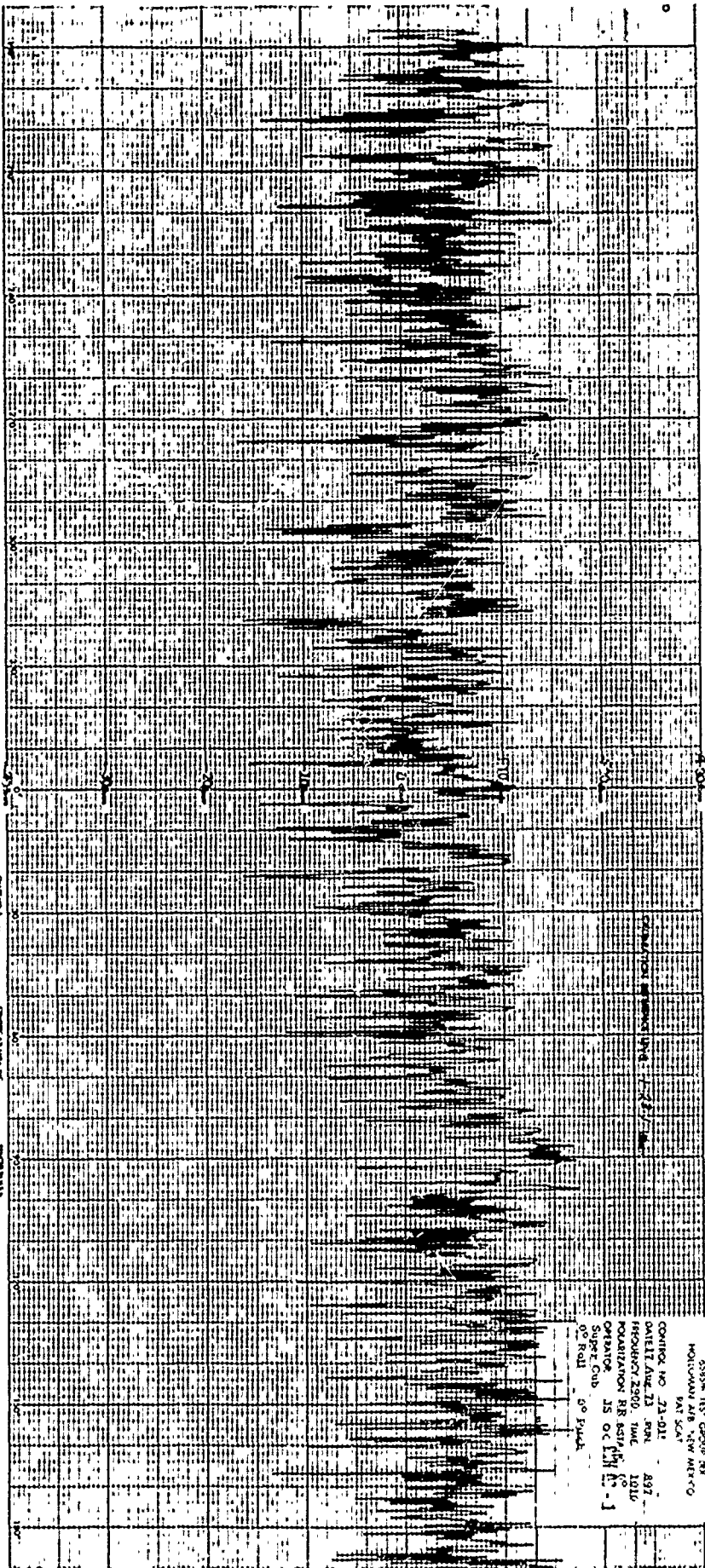
ASAP 1157 GROUP (RU)  
HOLCOMB AIRWAY MED CO  
PAT SCAT

CONTROL NO. 71-01  
DATE 12 Aug 71 RUN 1155  
FREQUENCY 2500 TUNE 0200  
MODULATION VV BEAT 02  
OPERATOR MAI GC and CC - J  
Background  
With Columns & Transitions



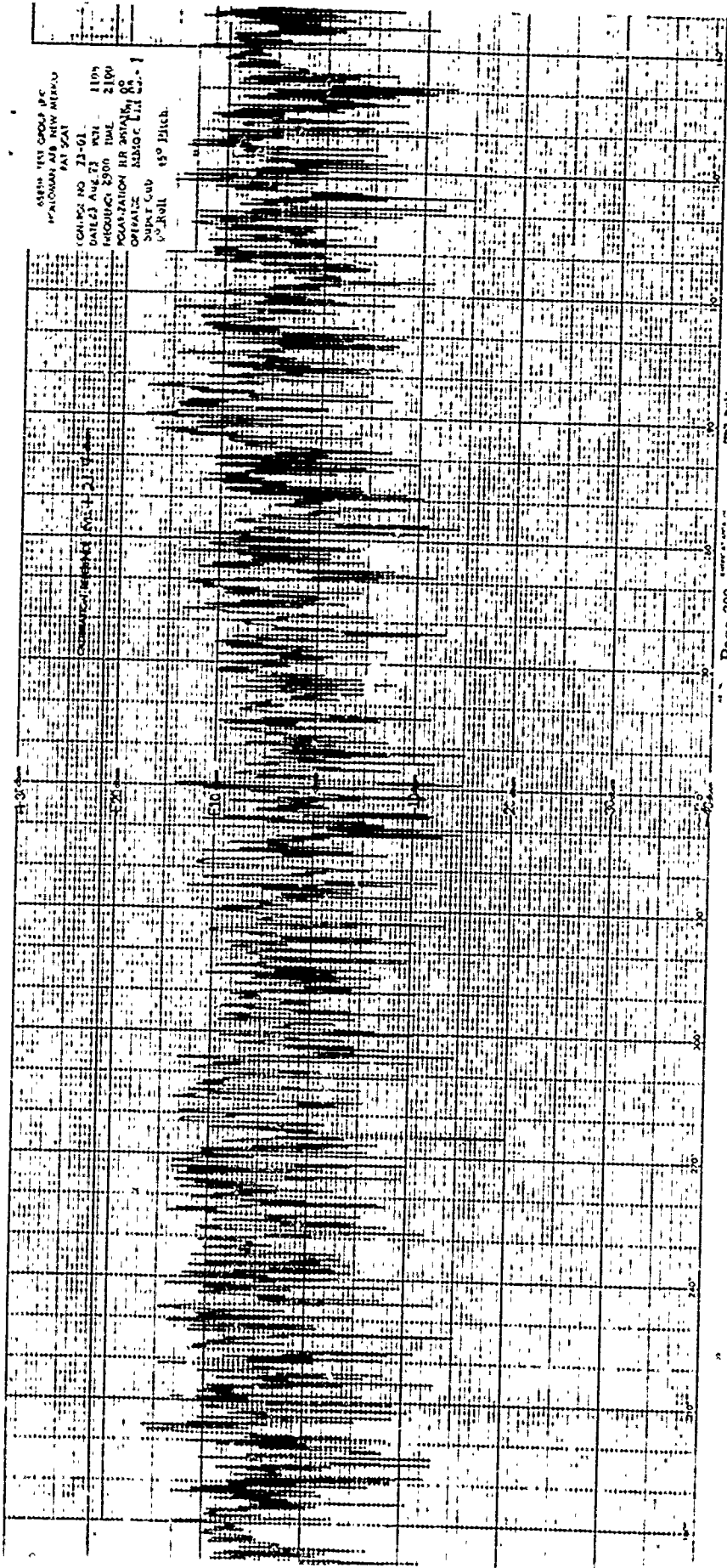


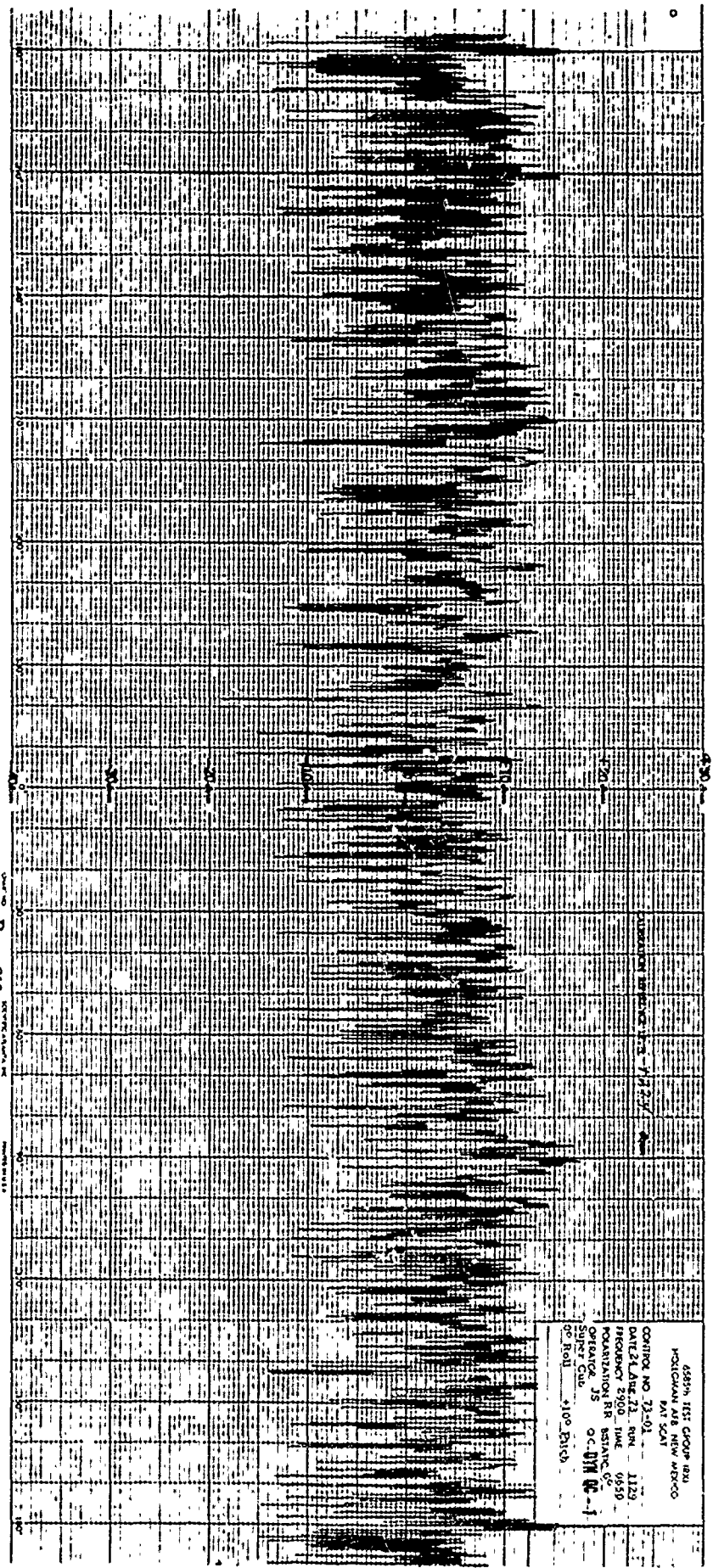




4555a 157 Group 34  
 HOLLAND AIR NEW MEXICO  
 141 SCAT  
 CONTROL NO 21-011 897  
 DATE/TIME 23 SEP 1950  
 FREQUENCY 2300 TIME 1010  
 POSITION/COORDINATES BR 4510  
 OPERATOR JG  
 SUPERVISOR JS OC 1511  
 00 Read 00 Puck

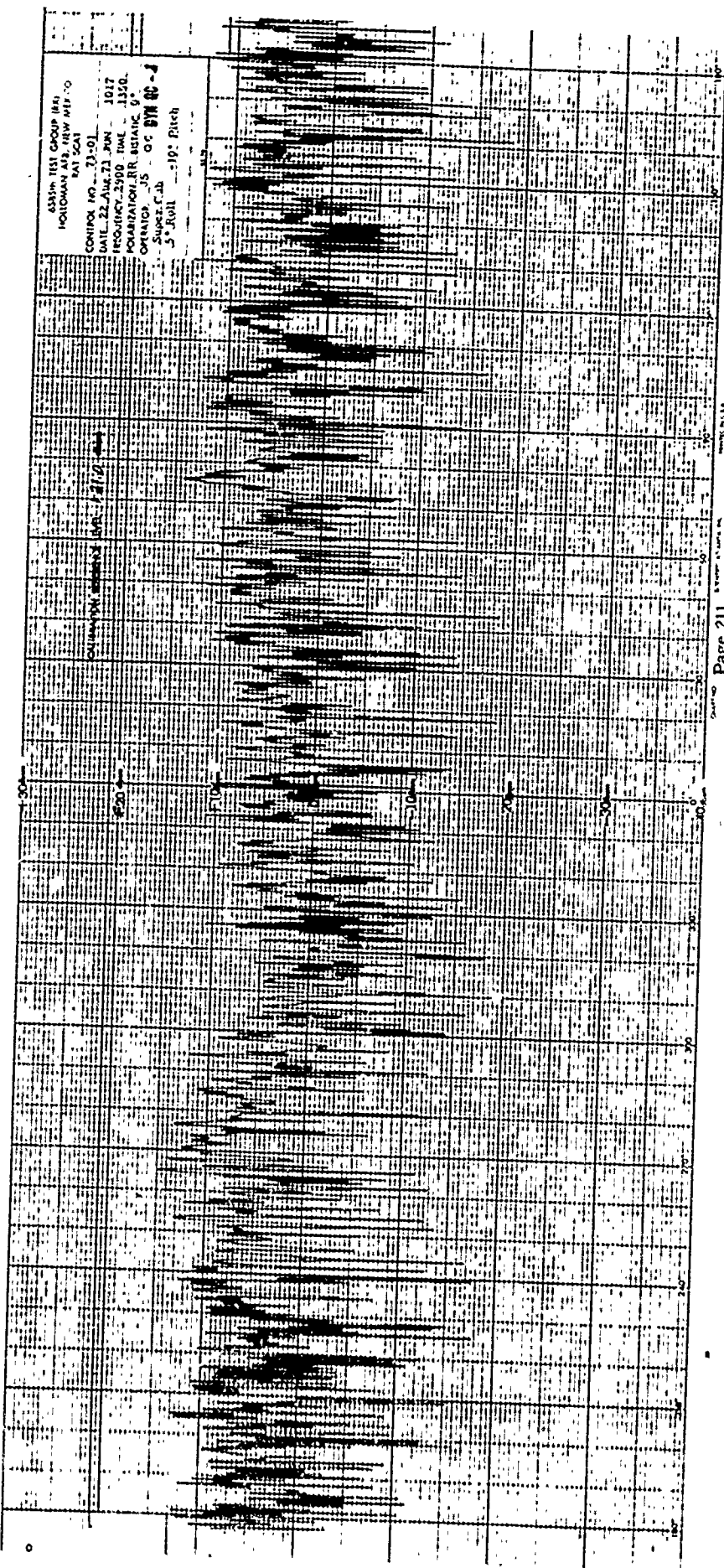
SEISMIC TEST GROUP, INC.  
12100 W. 12TH AVE.  
DENVER, CO. 80202  
CONTACT NO. 72-01  
DATE: AUG 27, 1974  
PROJECT NO. 2100  
OPERATION: HR. AREA, 100  
SPECIAL: ASBGC 111, 112, 113  
DEPTH: 150 FEET



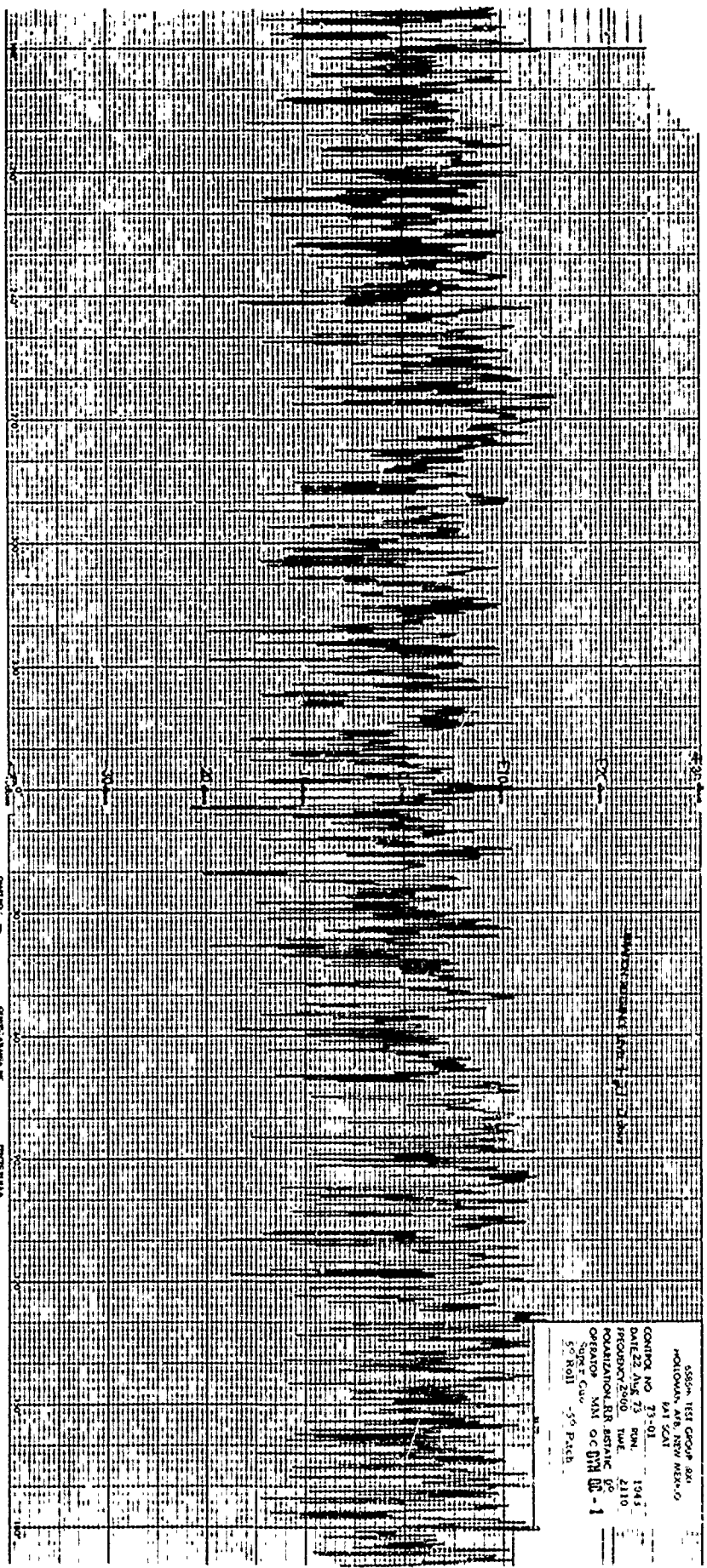


4837th 1131 GROUP B&I  
 HOLLAND PA 15041  
 CONTROL NO 72-01  
 DATE 1/14/50  
 PROJECTOR 1131  
 OPERATOR BR BOSTON  
 SUPERVISOR OC-UM  
 DE Roll 4100 2100

6353th TEST GROUP BRN  
HOLLANDIAN A13, NEW REP. 0  
BAT SCAT  
CONTROL NO. 73-01  
DATE 22 Aug 73 RUN 1017  
FREQUENCY 2500 HZ 1350  
POLARIZATION RR, STATIC 9°  
OPERATOR JS - OC 87H 80-4  
Super. Cab - 19: Puch  
3° Roll





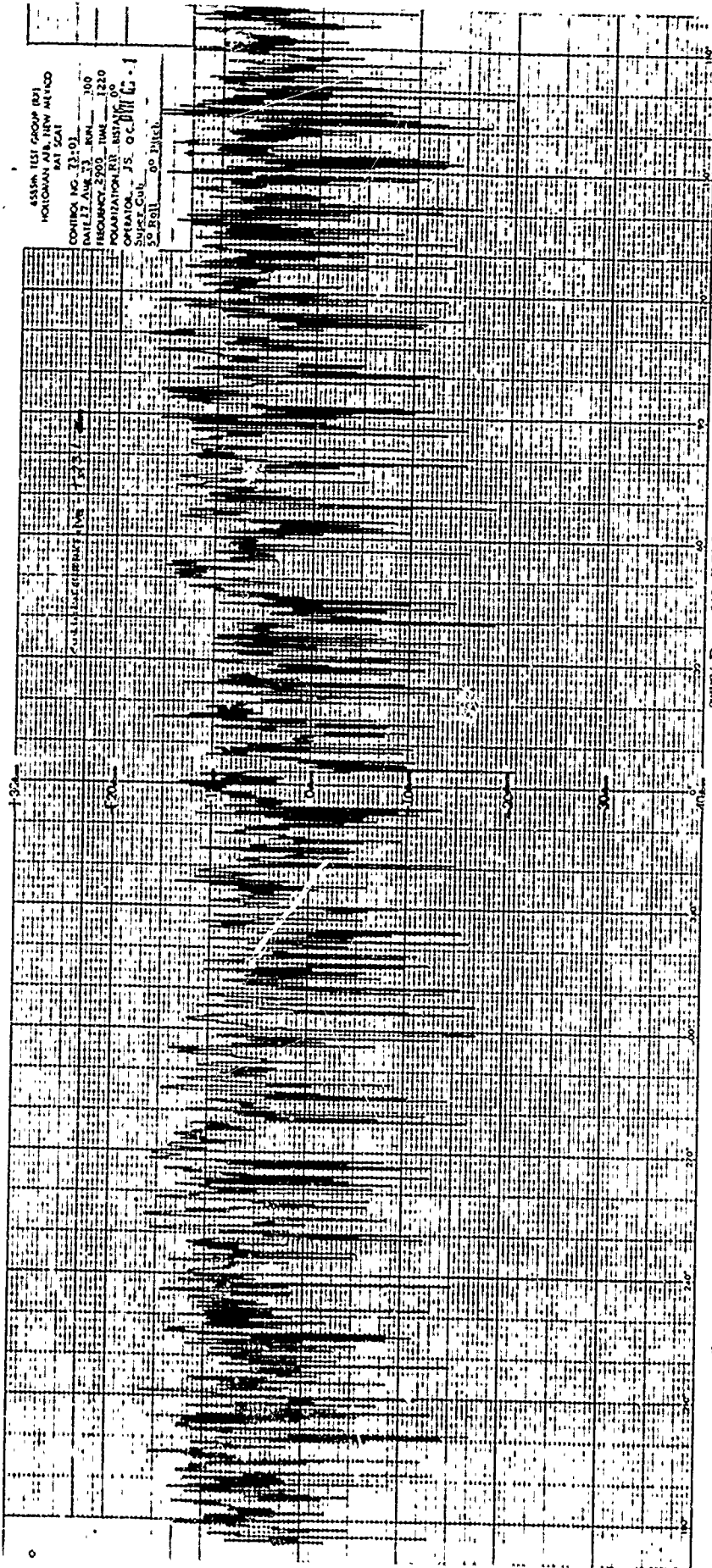


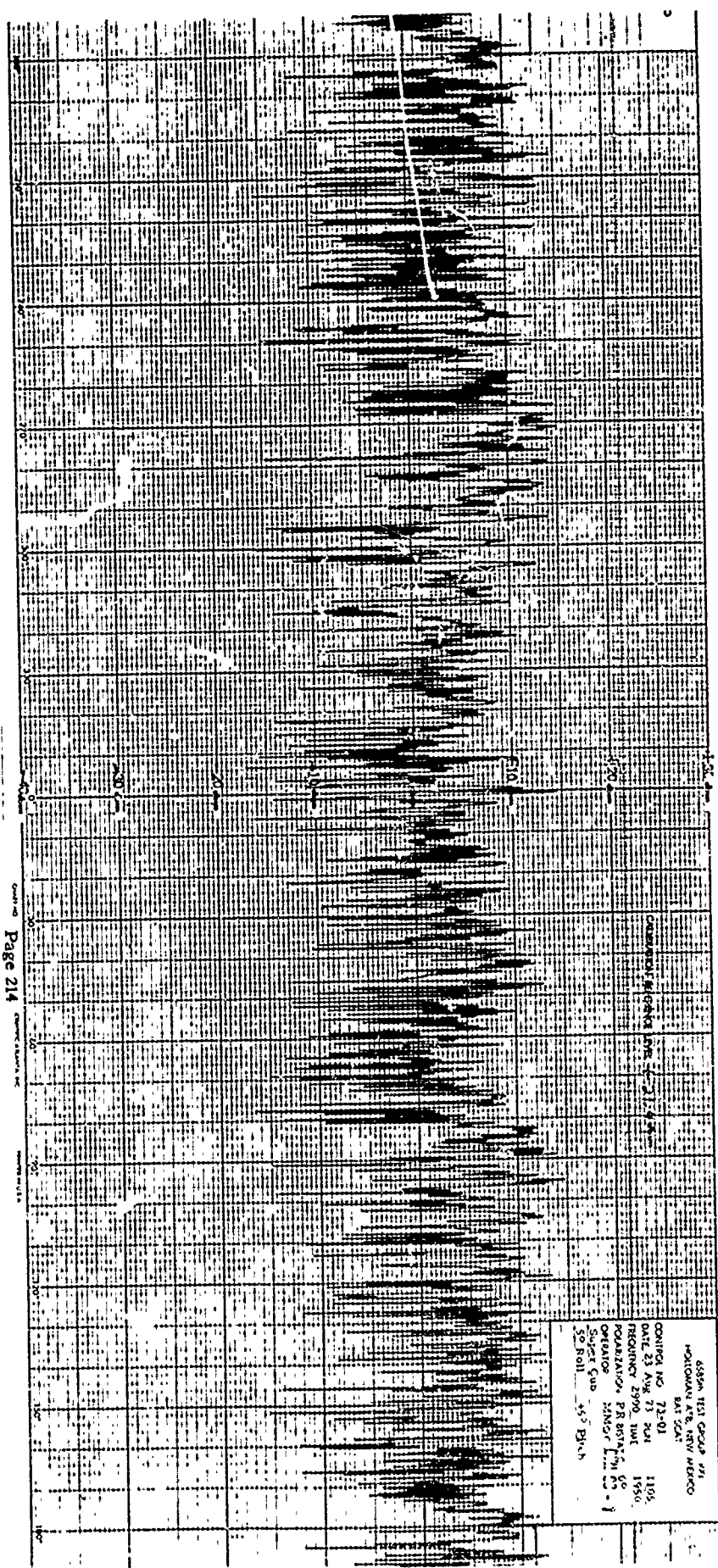
Page 212

555th TEST GROUP 887  
 HOLLAND AFB, NEW MEXICO  
 541 SGT  
 CONTROL NO 73-01  
 DATE 22 AUG 73 RUN 1945  
 FREQUENCY 2900 TIME 2110  
 POLARIZATION RR ASTATIC 90  
 OPERATOR MAN OF DVM 88-1  
 Super Cue  
 50 Roll 50 Patch

455th TEST GROUP (BT)  
HOLCOMB AFB, NEW MEXICO  
PAT SCAT

CONTROL NO. 73-01  
DATE 17 AUG 53 RPN 300  
FREQUENCY 2500 TIME 1220  
POLARIZATION BT  
OPERATOR JS O.C. [unclear]  
Subject: C-1  
So Bell Co. Hitch.

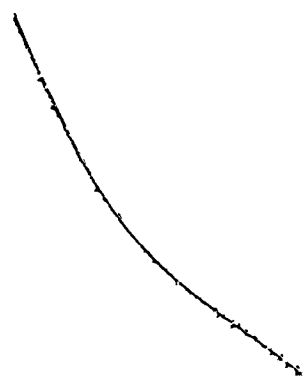
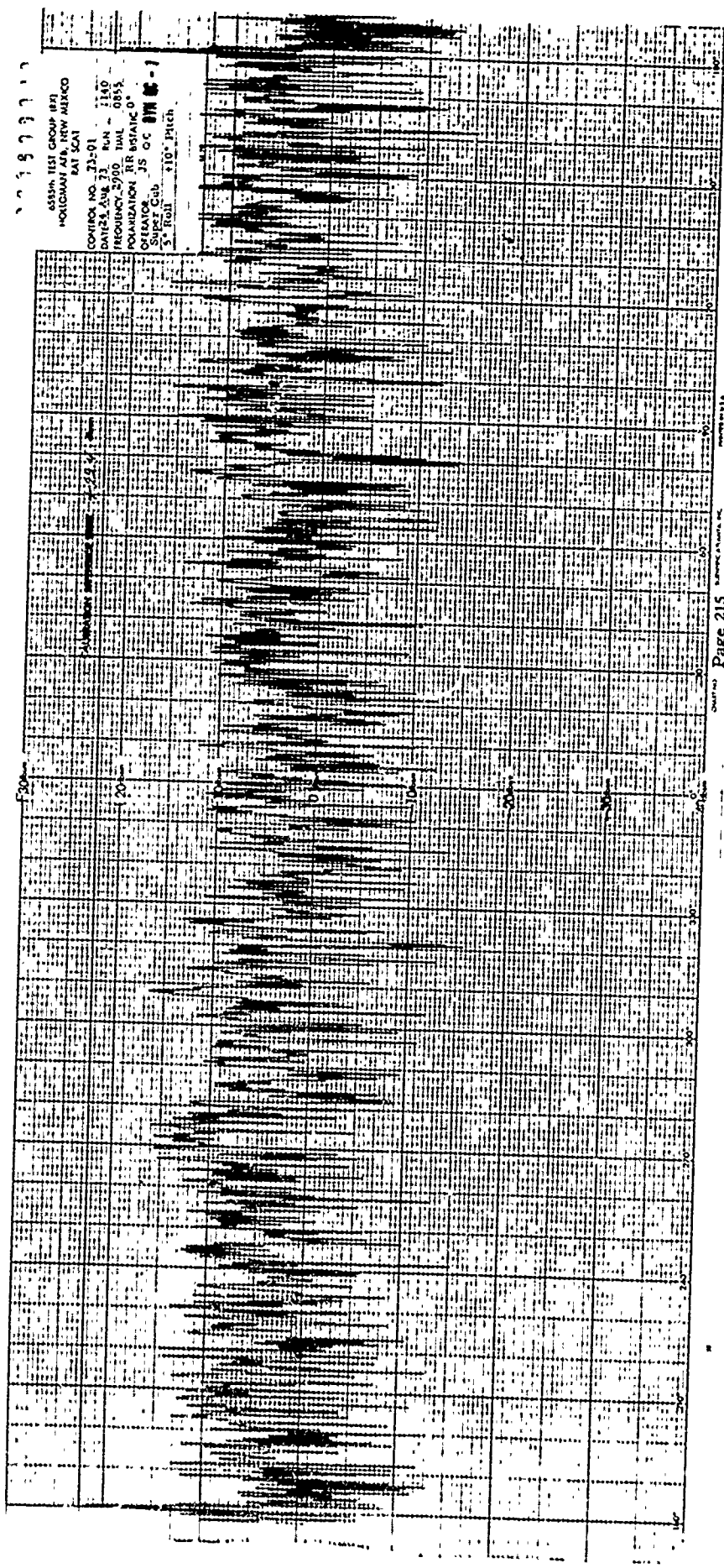


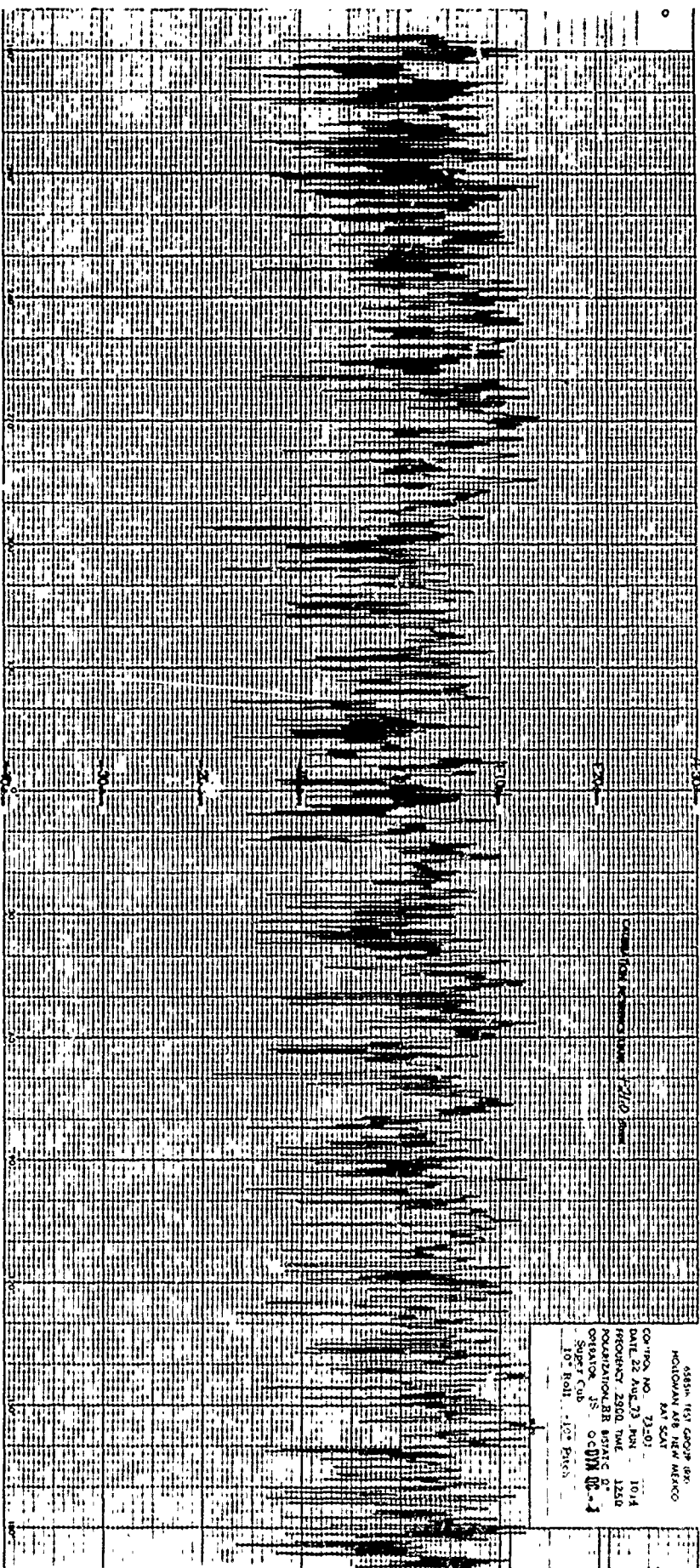


Page 214

655th TEST GROUP 771  
 HORTONVALE AFB, TEXAS  
 BATT 504  
 CONTROL NO 72-01  
 DATE 23 Aug 73 241 1100  
 FREQUENCY 2990 1000 1950  
 POLARIZATION PR 85%  
 OPERATOR JANCOR LHM  
 Supter Cup  
 50 Roll 455 B74h

22 1999 11  
 ASSEA TEST GROUP (PT)  
 HOKICHAJI AFB, HIW AIRCRO  
 PAT SCAI  
 CONTROL NO. 73-01  
 DATE 28 AUG 73 1140  
 REVISION 3700 RUN - 0855  
 OPERATOR RIR BRITAK 0\*  
 OPERATOR JS GC  
 SUPER CAB #10 Pitch  
 5" Roll



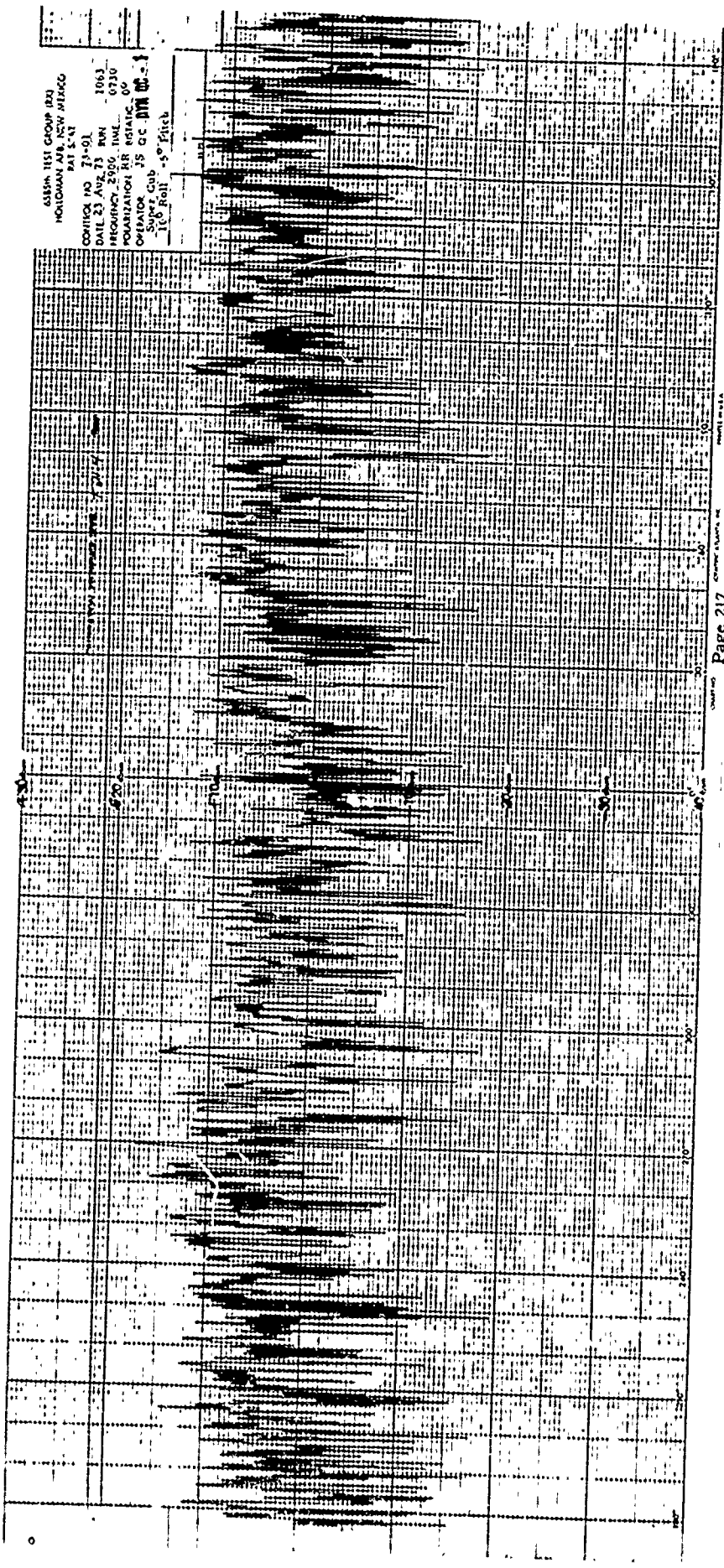


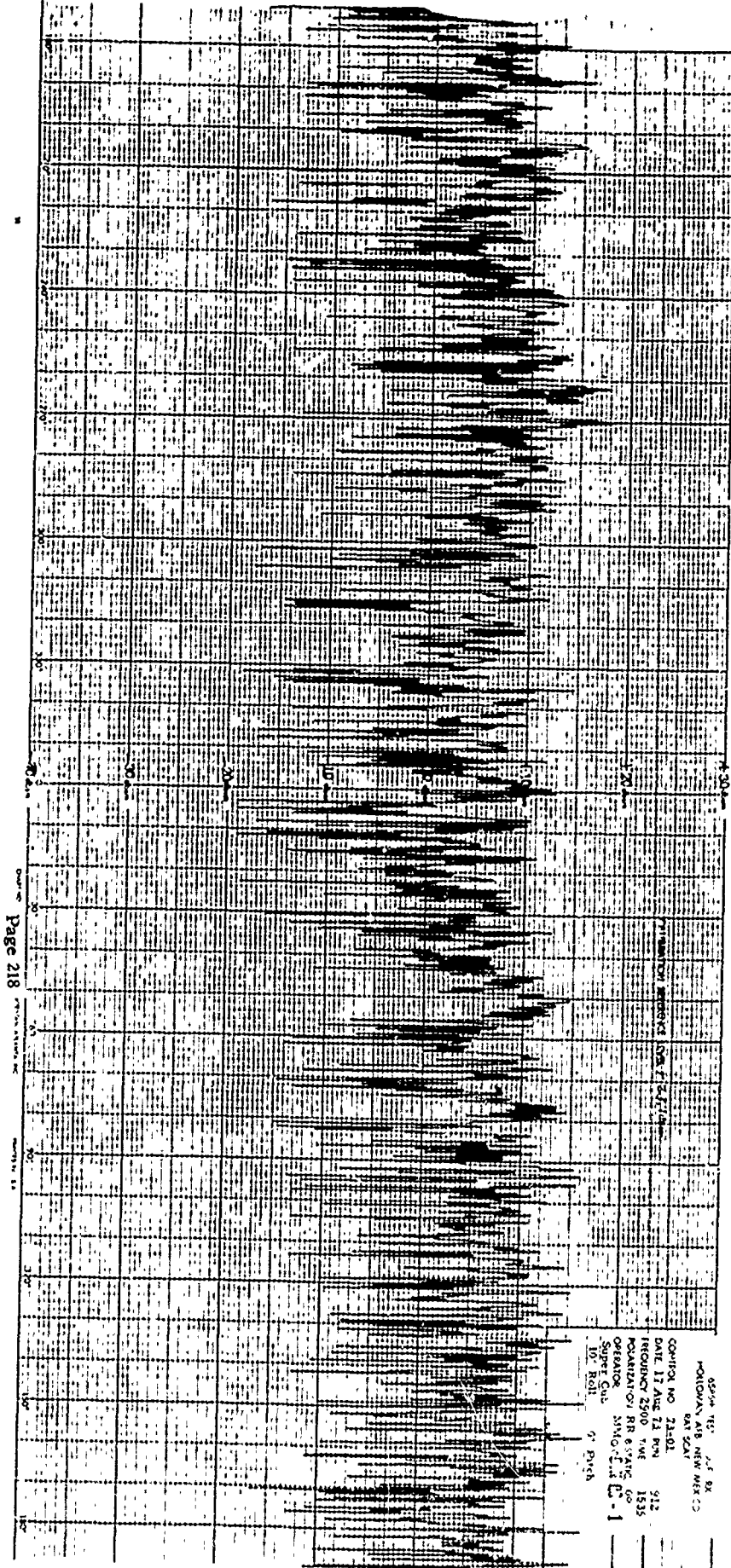
Page 216

ASSIN 101 GADP BX  
 MONTANA AT SCOT  
 DATE REC'D 3 JUN 1974  
 FREQUENCY 2500 KHZ 1250  
 RECORDATION SYSTEM OF  
 ORGANIZATION OF OCEANIC  
 STATE COOP  
 100 Feet 100 Pitches

63534 151 GROUP (B)  
HOLDMAN AFB, NEW MEXICO  
241 5 41

CONTROL NO 71-91  
DATE 23 AUG 73 RUN 1063  
FREQUENCY 5.950 MHz 0730  
POLARIZATION RH RHATIC 00  
OPERATOR GUB JS GC DM (C-3)  
-16 Roll -50 Pitch

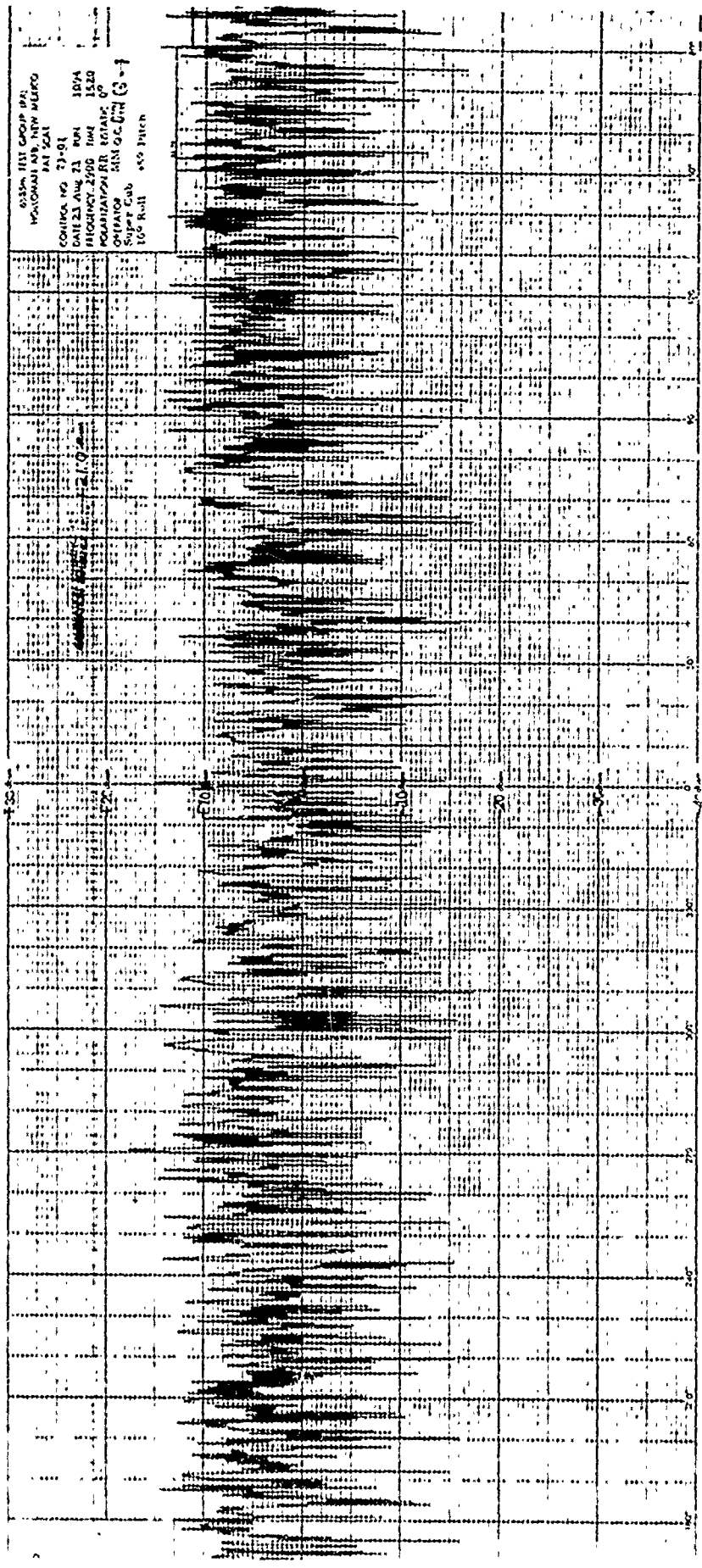




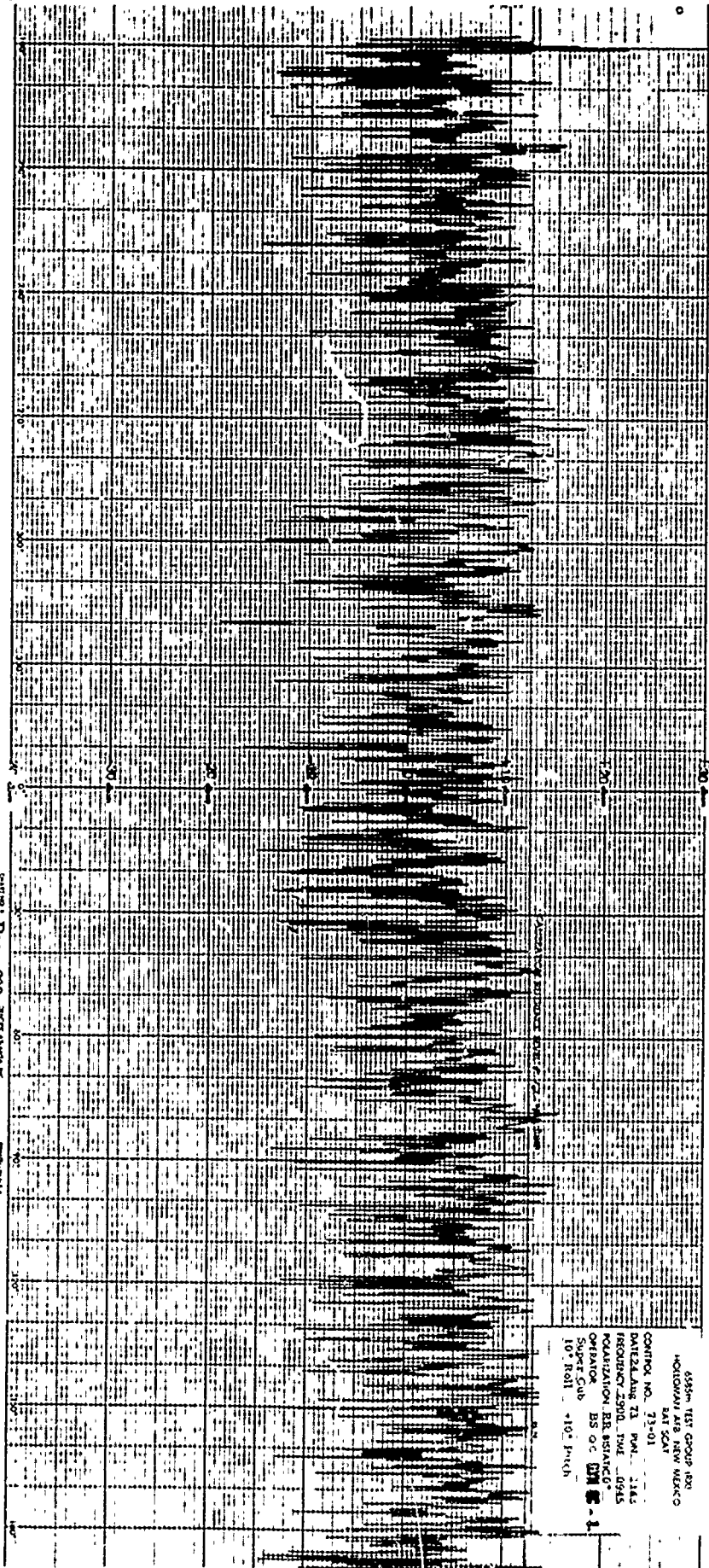
Page 218

0254 10: 4.5 B  
 PORTLAND AIR NEW MEX CO  
 DAT 241  
 CONTROL NO 21-01  
 DATE 17 Aug 74 PM 912  
 FREQUENCY 2500 MHz 1535  
 LOCATION OF RR 6 STARS 00  
 OPERATOR SIMO-C 24 00 - 1  
 Super Out  
 10 Roll 07 Pch

6354- TEST GROUP 171  
NATIONAL AIR NEW MEXICO  
AT 5241  
CORNER NO. 23-51  
DATE 21 AUG 73 WPA 18VA  
FREQUENCY 2950 TIME 1520  
POSITION AIR INITIALS  
OPERATOR MSN G.C. 074 G-1  
TYPE CAB 440 PITCH

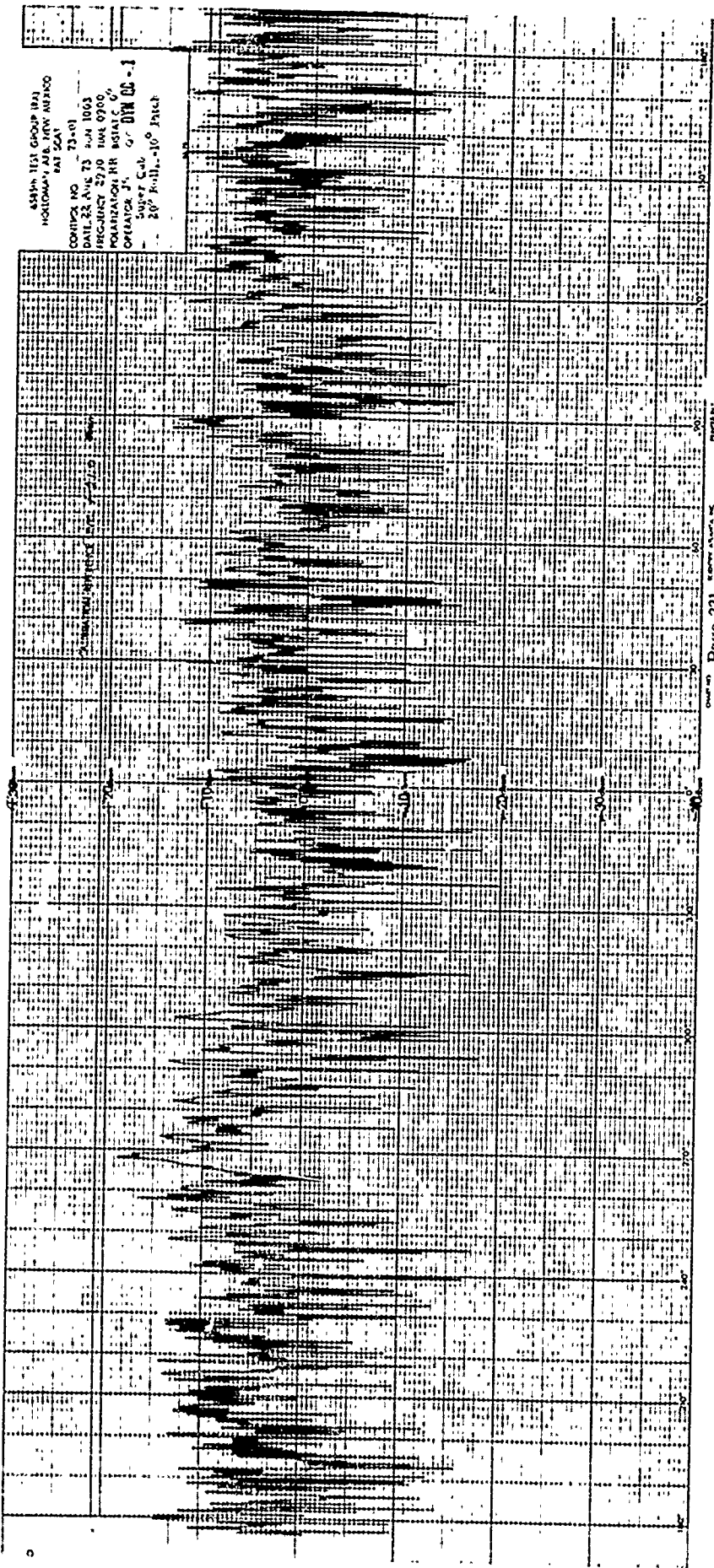


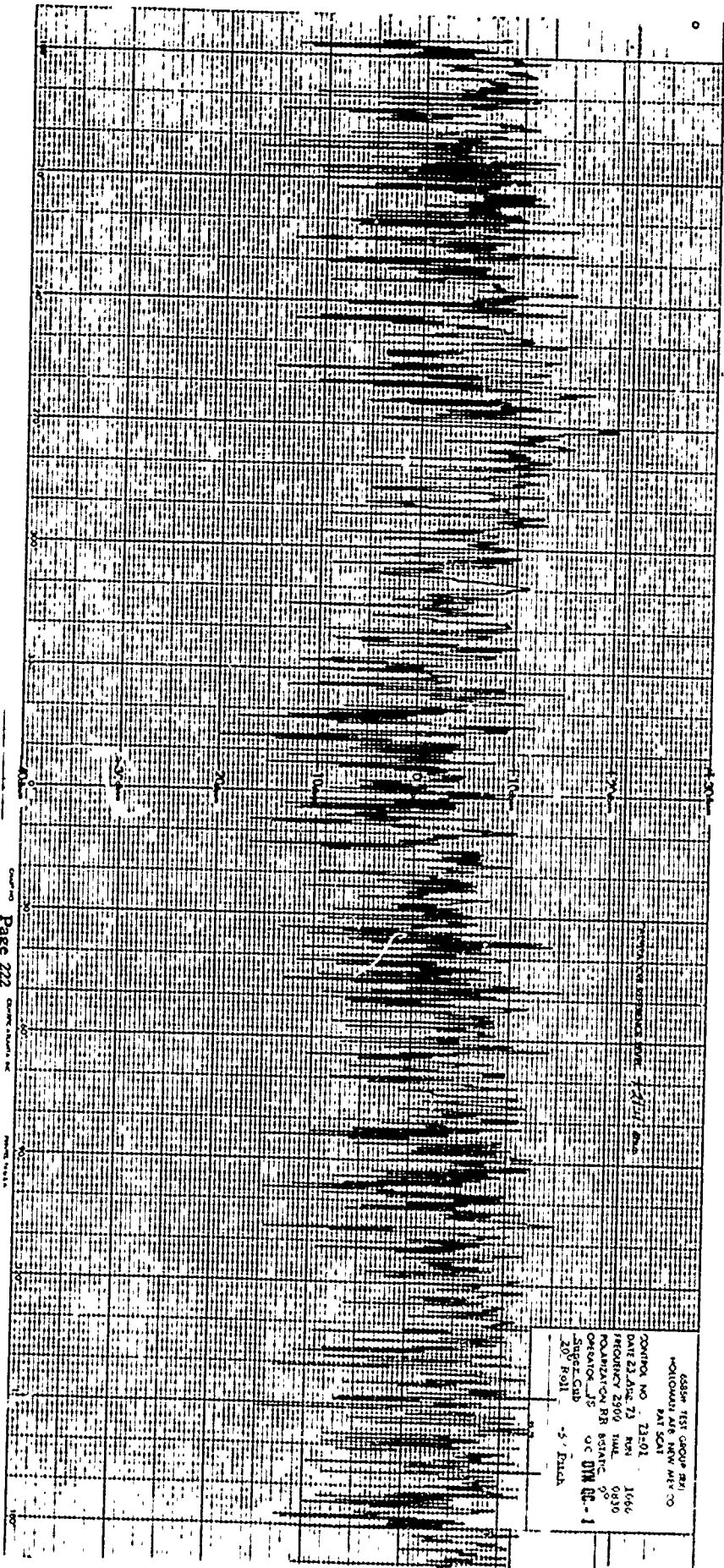




555th TEST GROUP (BX)  
 HOLLAND AFB, NEW MEXICO  
 RAT SCAN  
 CONTROL NO. 73-01  
 DATE: Aug 21 PM. 3:45  
 FREQUENCY: 2900 MHz 4945  
 POLARIZATION: RR BRANCO  
 OPERATOR: BS O.C. DM - 1  
 Super. Sub  
 10" Roll \*10" Pitch

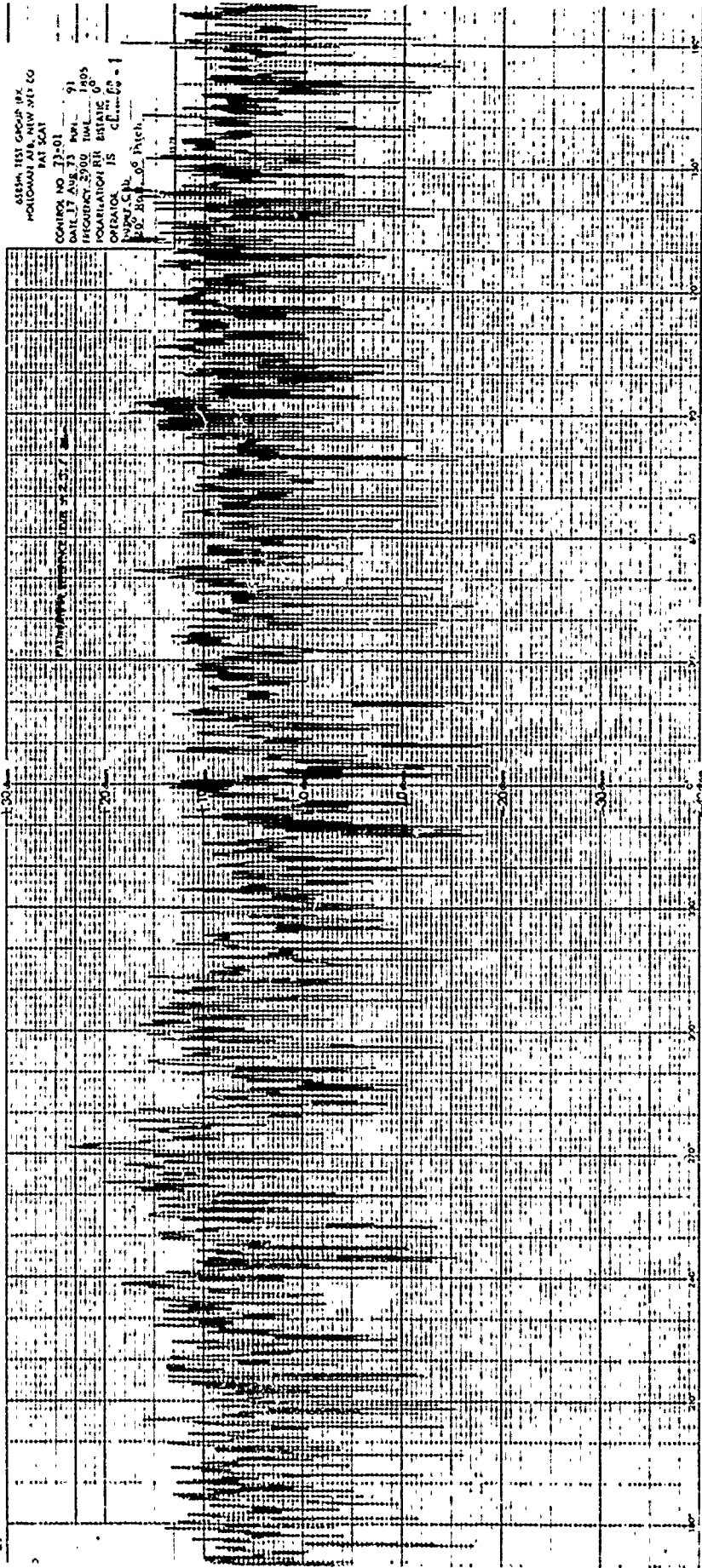
ASPH TEST GROUP (BA)  
HOLLOMAN, A.B. NEW METHOD  
PAT 5641  
CONTROL NO. 73-01  
DATE 22 AUG 73 RUN 1003  
FREQUENCY 2730 MHz 0200  
POLARIZATION HR VSTAT C  
OPERATOR J. G. DW 00-1  
Super Cal  
20° Bull. -10° Patch



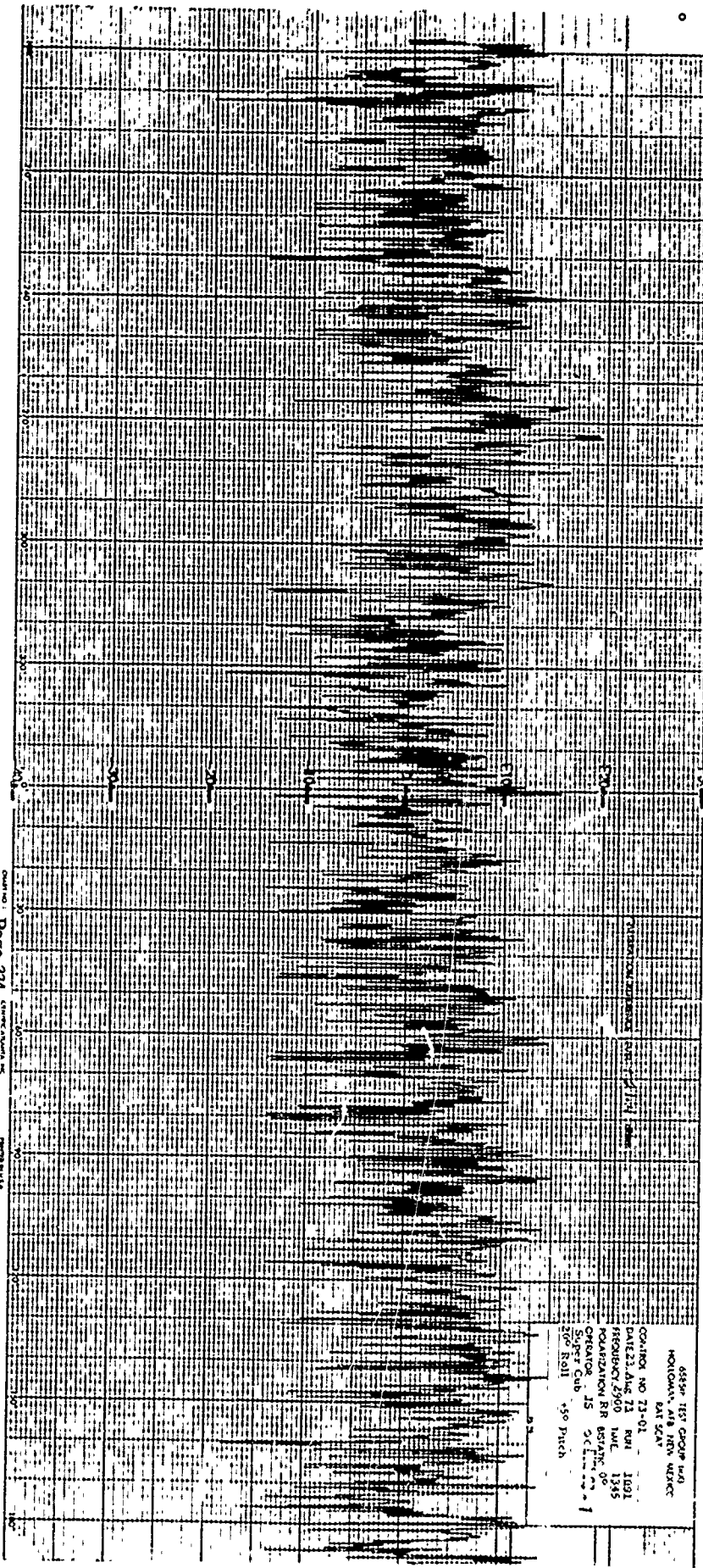


Page 222

4550 1ST GROUP 241  
 HOLLAND AVE NW/ NW 70  
 PAT 501  
 CONTROL NO. 23-01 1566  
 DATE 23 AUG 71 NW  
 FREQUENCY 2000 Hz 600  
 POLARIZATION BB SWAVE 90  
 OPERATOR JS VC DM GR-1  
 SINGER CUB  
 20' Roll  
 -5' Data



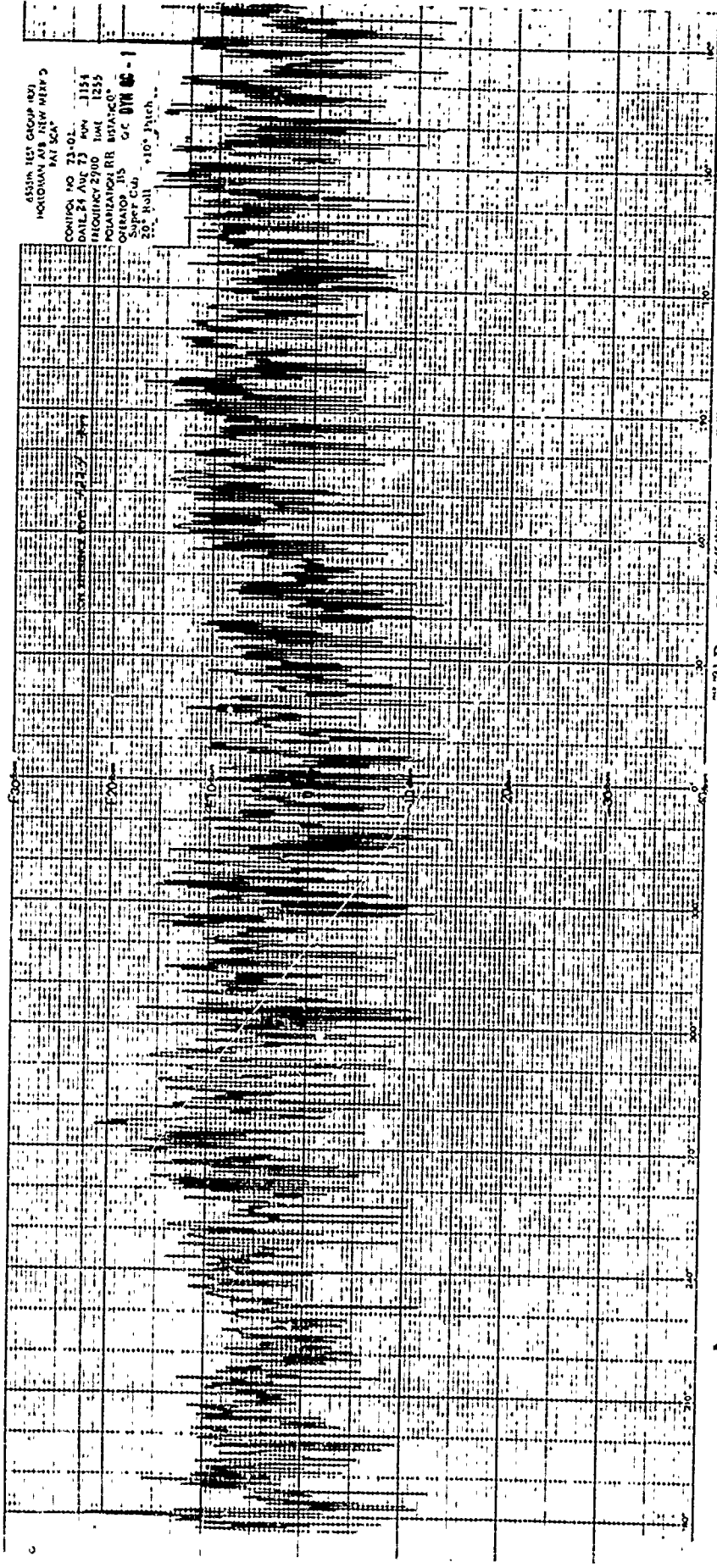
SYSTEM TEST GROUP, INC.  
 HOLLAND AFB, NEW JERSEY  
 PAT. SCAT  
 CONTROL NO. 77-01  
 DATE 17 AUG 73  
 FREQUENCY 2500 Hz  
 POLARIZATION RH  
 OPERATOR IS  
 PUPPY CLUB  
 802 Elm St.

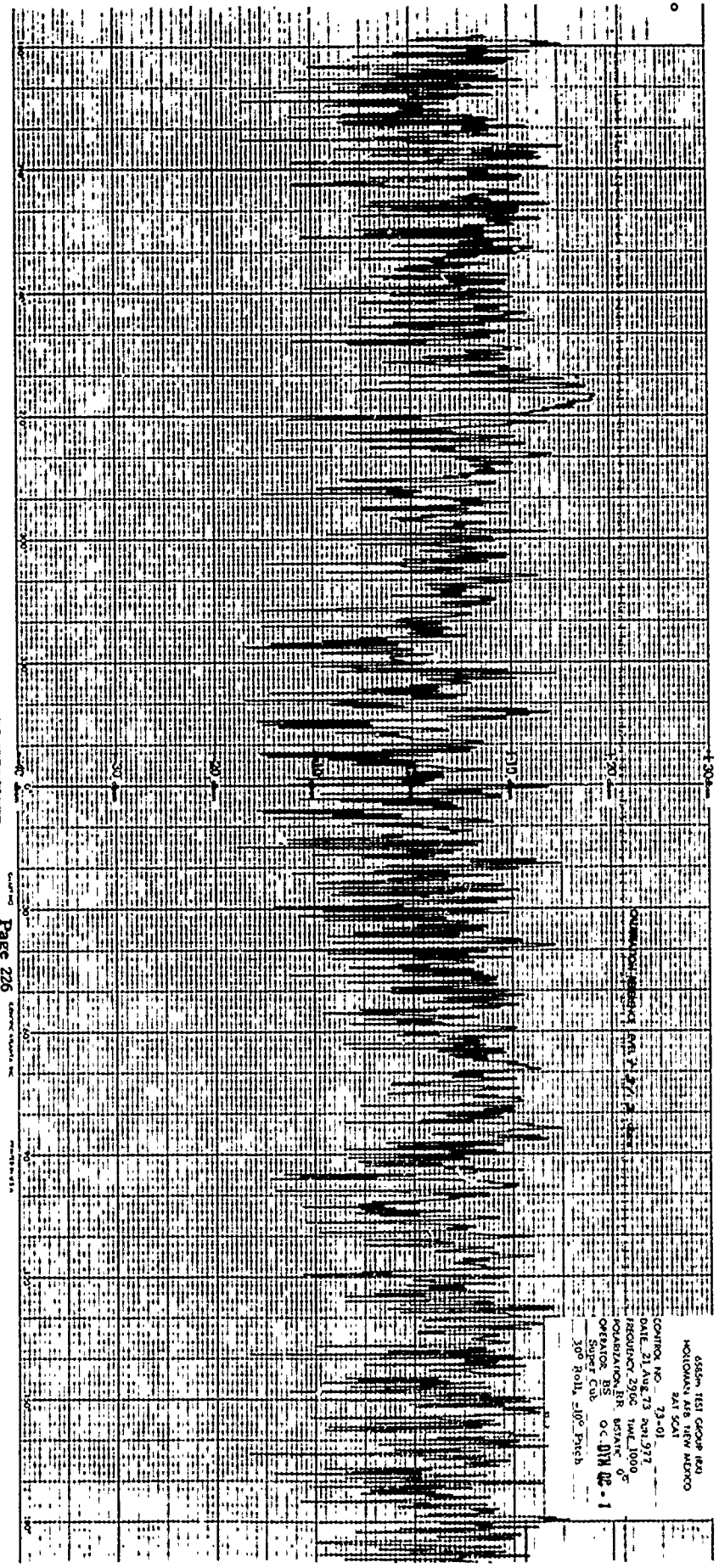


4550 157 GROUP W4  
 HOLLOWAY, AIR WITH WEXEC  
 DAT SCAN  
 CONTROL NO 73-01  
 DATE 23 AUG 73 RUN 1091  
 FREQUENCY 2900 MWL 1345  
 POLARIZATION RR BEARING 00  
 OPERATOR JS 2 OCT 73  
 5000' Cab \*90 Pitch  
 500' Hsll

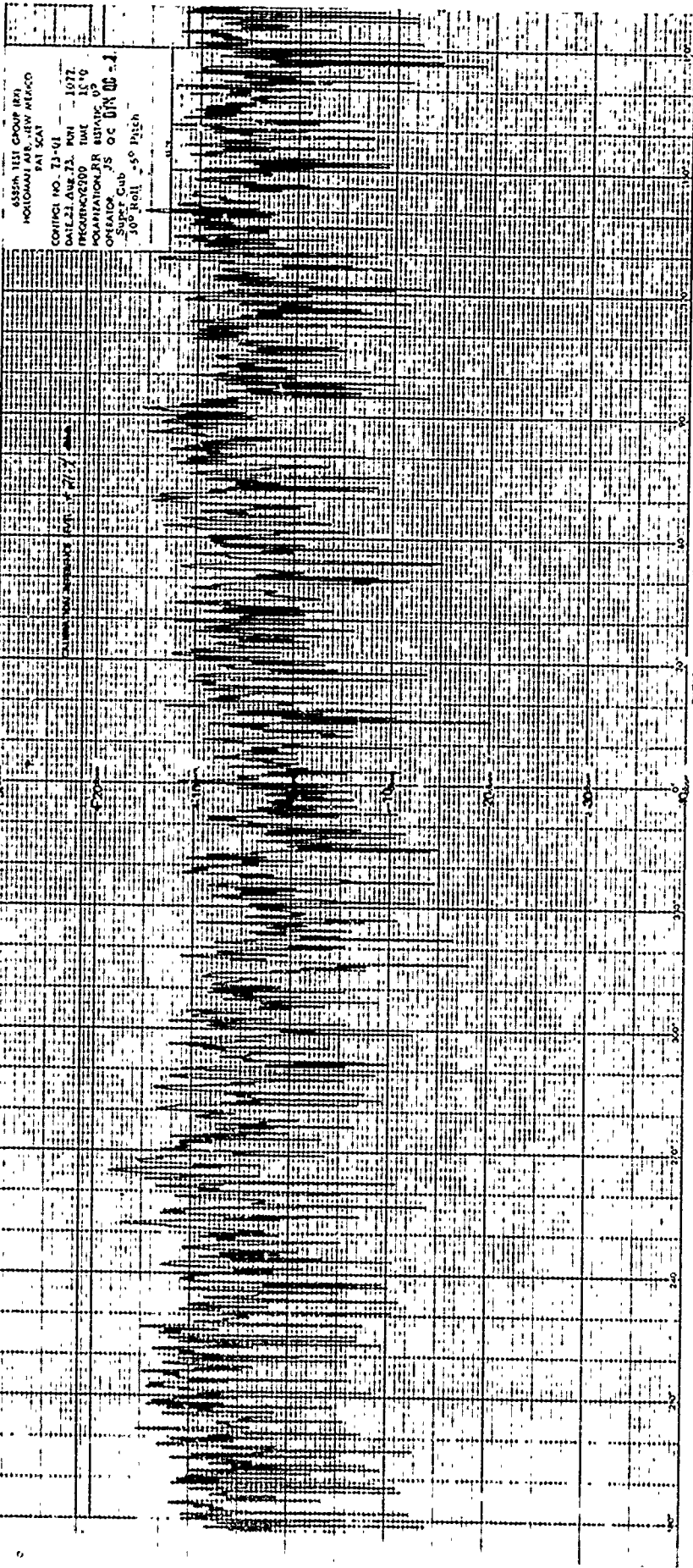
65534-101 GROUP (01)  
MCDONALD AIR NEW MEXICO  
TAL SCA

CONTRACT NO 23-01  
DATE 24 AUG 73 RW 1154  
FREQUENCY 2700 TWT 1255  
POLARIZATION RR BISTATIC  
OPERATOR JIS GC 07M 05-1  
Super-Gain  
20° Azim 10° Pitch





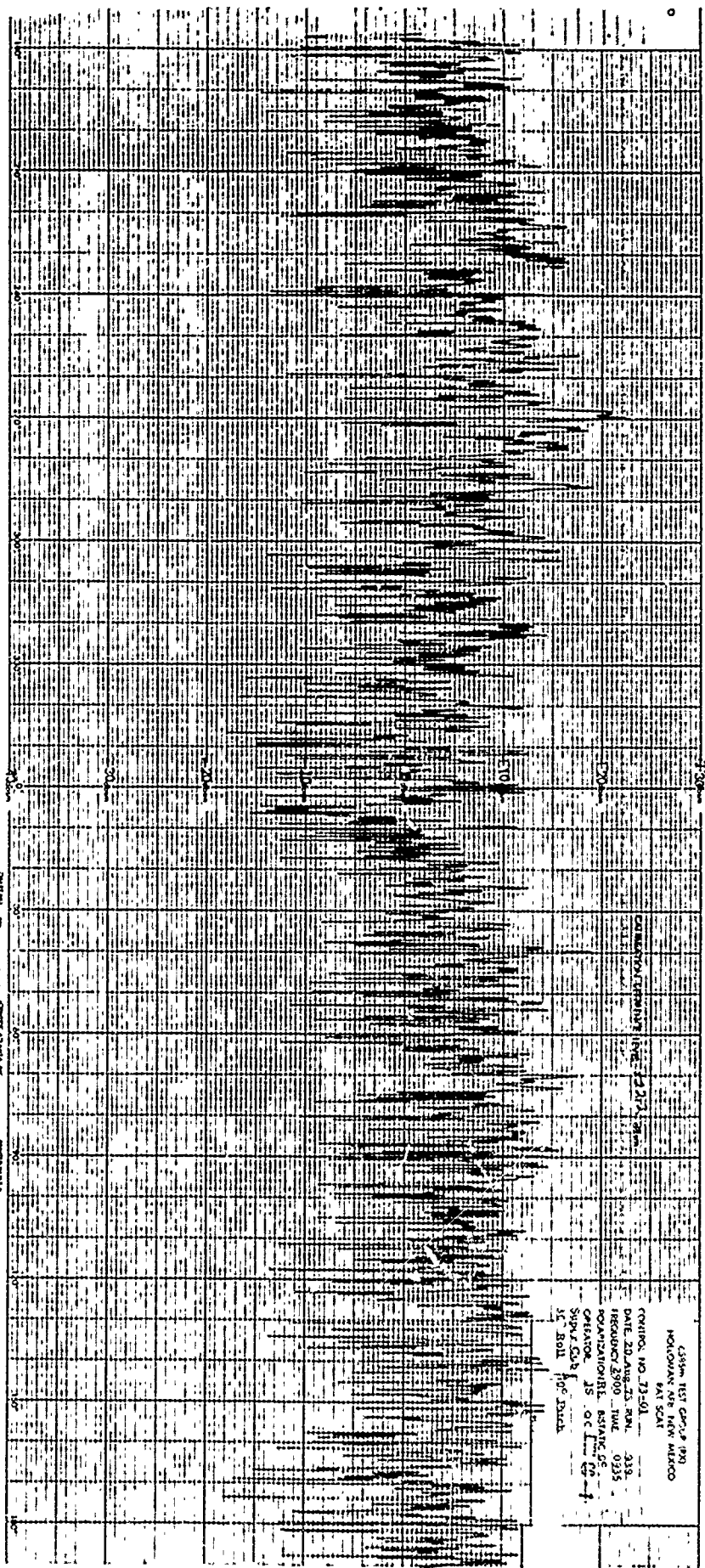
455m 1511 GCRP 180  
 HOLLOWAY AIR NEW MEXICO  
 241 SCAI  
 CONTROL NO. 73-01  
 DATE 21 Aug 73 run 977  
 INSURANCE 296c TIME 1000  
 OPERATOR BR BRANK OF  
 OPERATOR BS OC DM 02-1  
 Super Cub  
 3rd roll, 10c Pitch



655th TEST GROUP (RT)  
 HOLLAND AFB, NEW MEXICO  
 FAT SCAT  
 CONTROL NO. 73-01  
 DATE 21 AUG 73 PWT 1072  
 FREQUENCY 6000 TIME 10:16  
 POLARIZATION LR BISTATIC OS  
 OPERATOR JS OC DTN 08 -1  
 Super Cub  
 30" Roll -6° Pitch

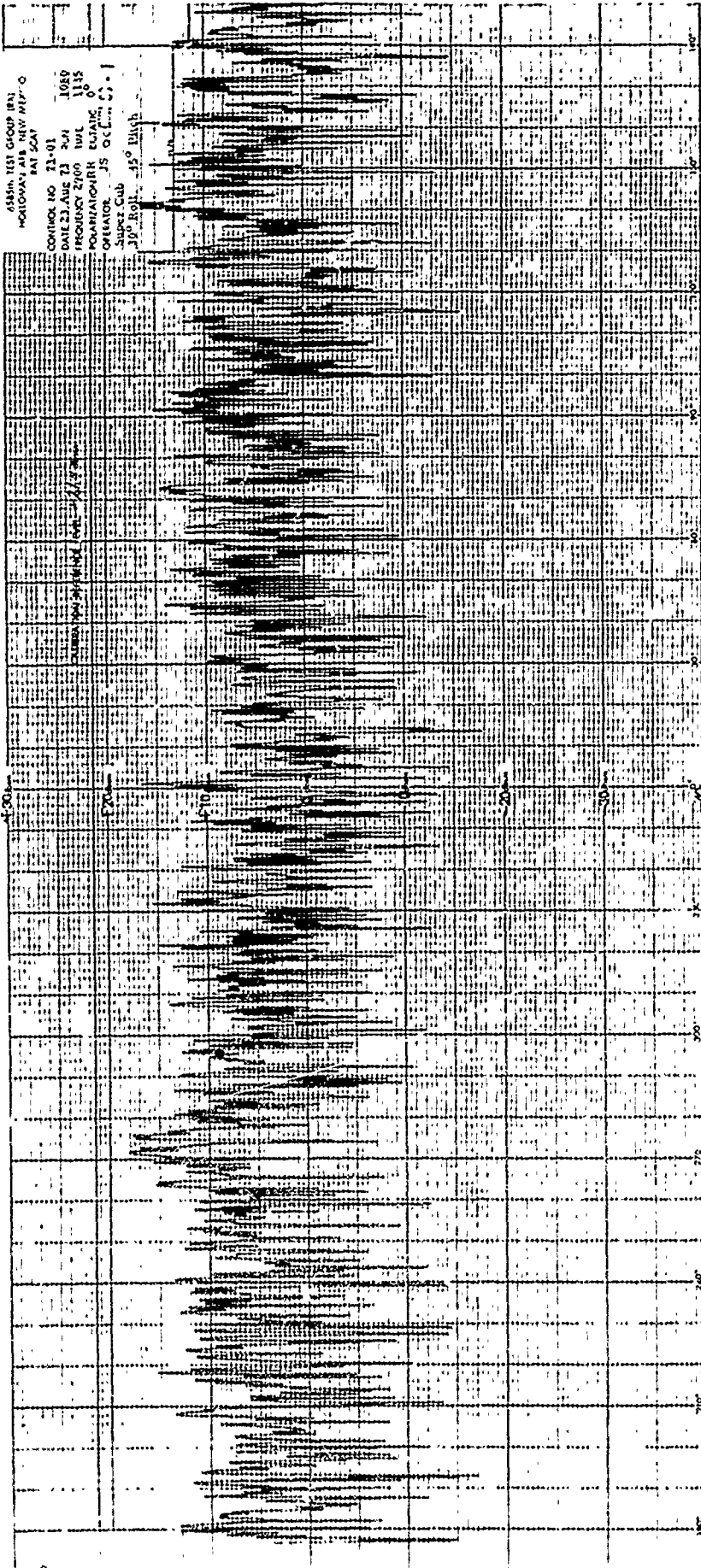
GEOPHYSICAL SURVEY COMPANY, INC.  
 Page 227

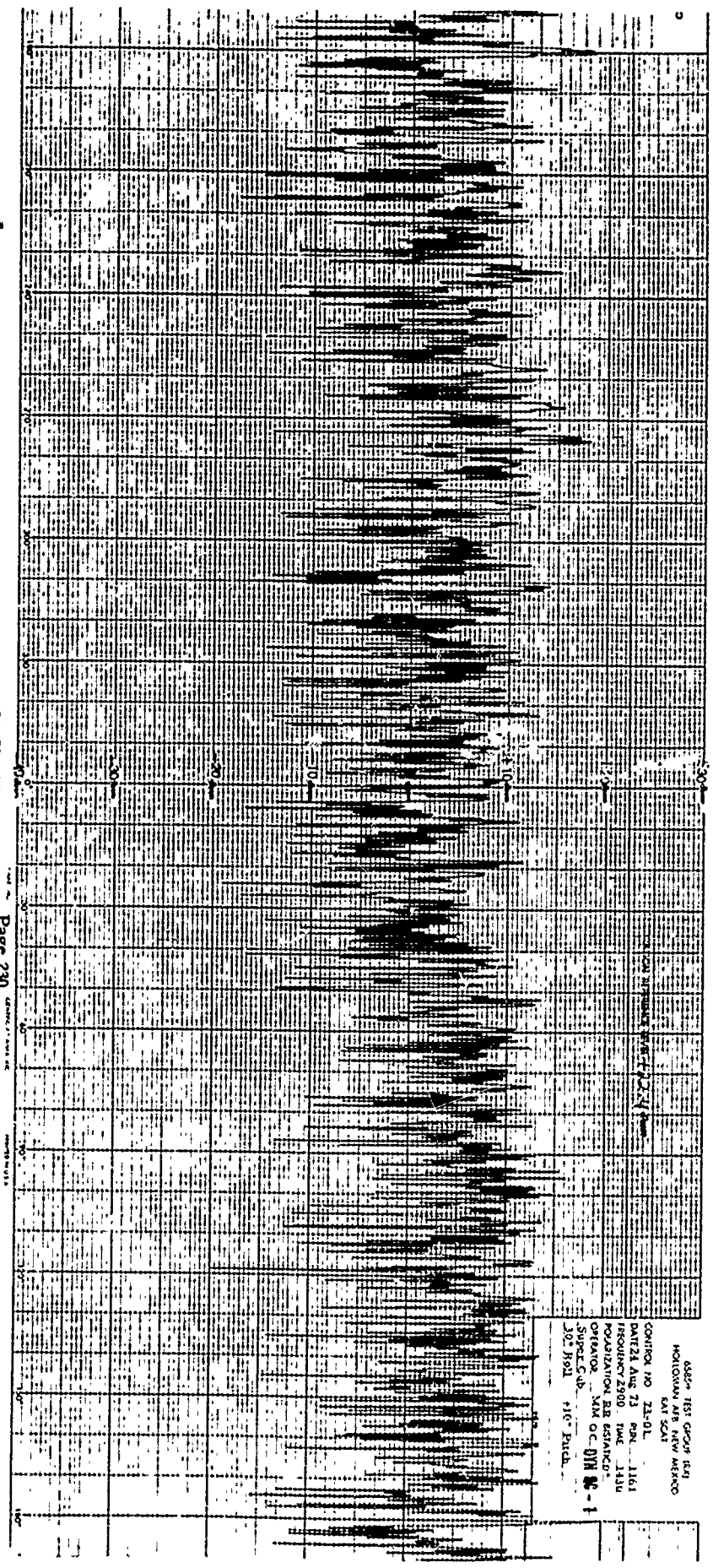




13584 1ST GEN 2 100  
 HONOLULU NR NEW ALIHOLO  
 AT SCAT  
 CONIRO. NO 23-01  
 DATE 20 AUG 25 1944 0315  
 FREQUENCY 2500 1000 0315  
 ORGANIZATION BEL. ESTABL. CE  
 CREATOR JS. G. L. ...  
 SIGNATURE ...  
 AT BOLD ...

555th TEST GROUP (B)  
MONTGOMERY, ALA NEW MEY-O  
PAT SCAY  
CONTROL NO 73-01  
DATE 23 AUG 73 244 1080  
FREQUENCY 2700 MHz 1115  
POSITION/ARR EJA/10  
OPERATOR JS O'Connell  
Super Cub  
30" Roll -45° Pitch



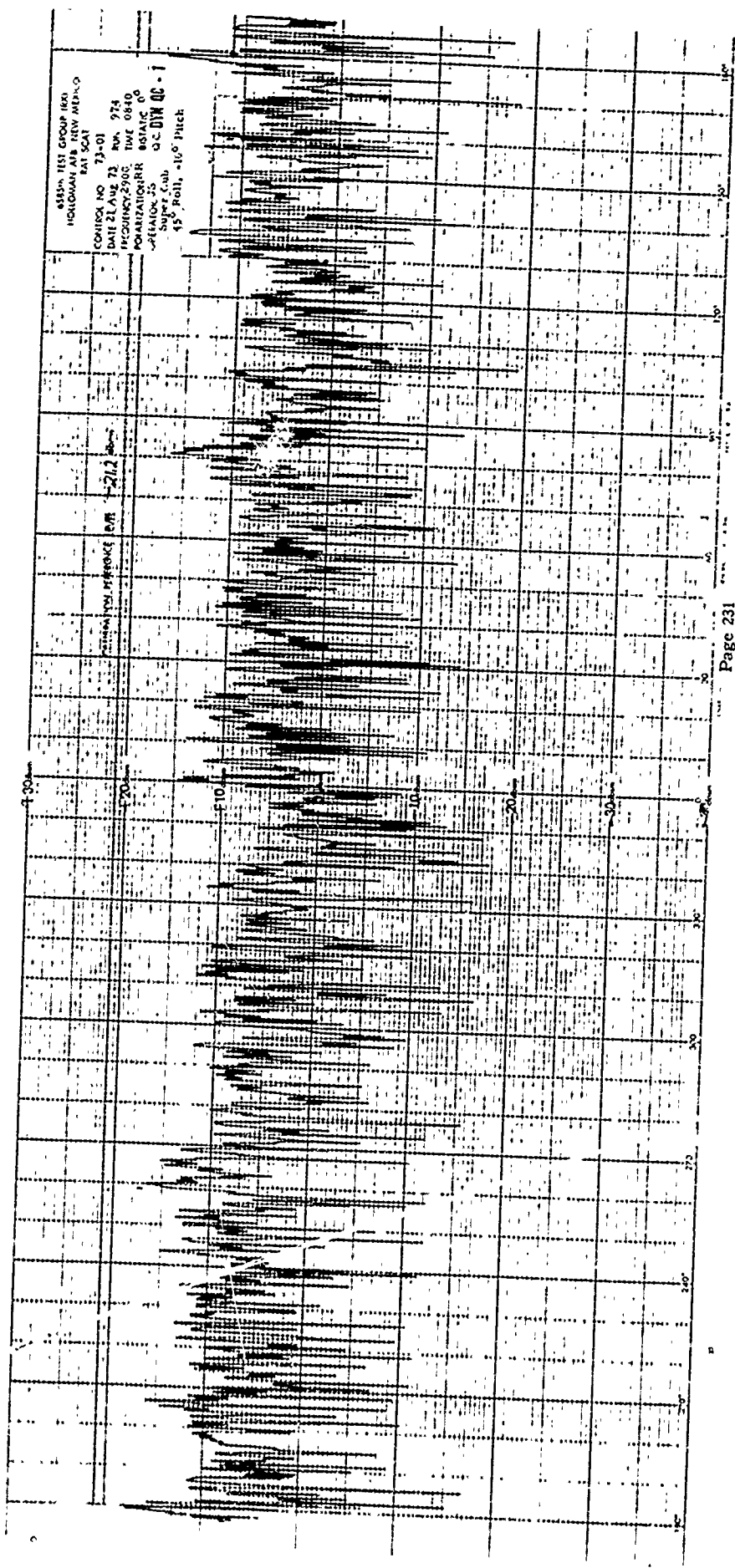


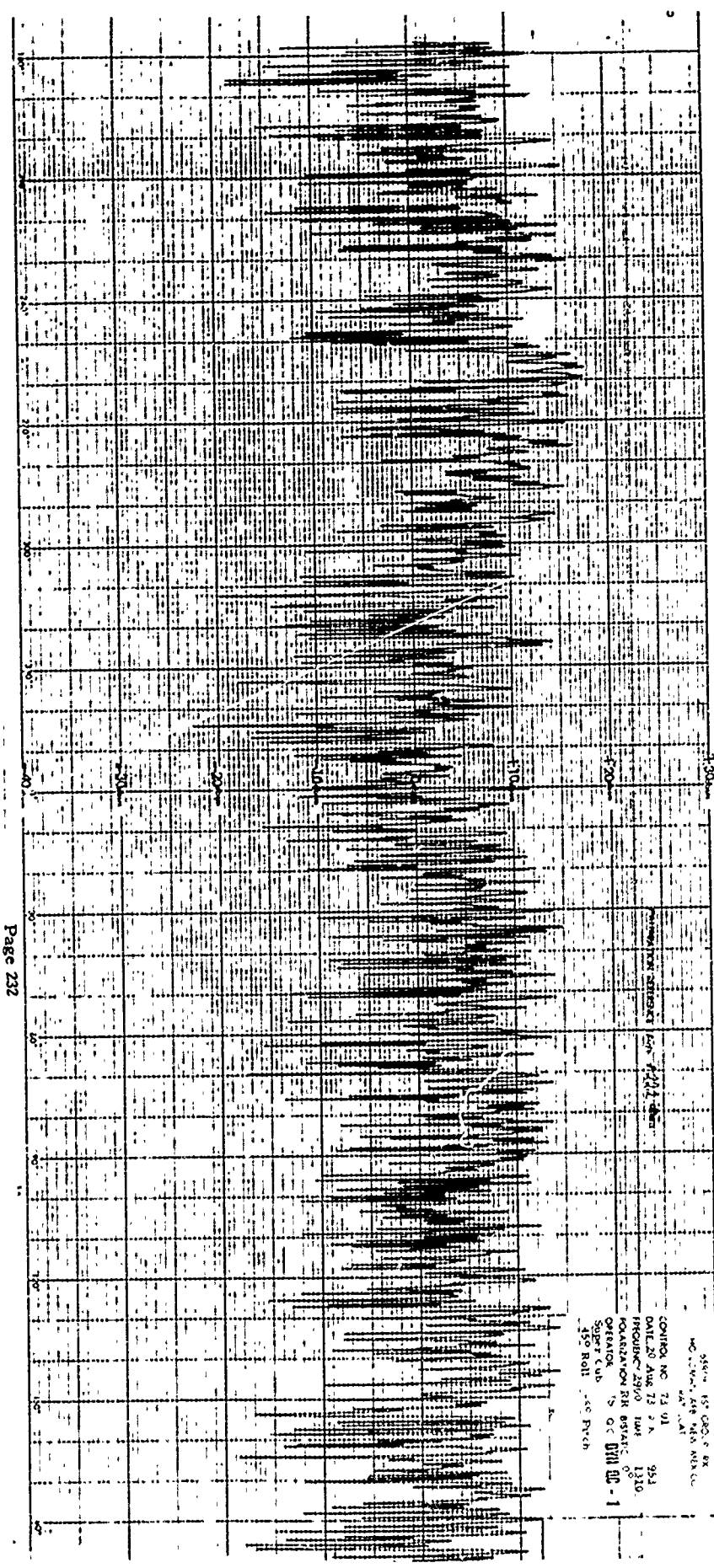
Page 230

6837 1ST QUART 1971  
 MONTHLY REPORT  
 AT 201  
 CONDUCT NO 21-01  
 DATE 21 AUG 71 P.M. 1161  
 RESOLUTION 2500 TIME 1130  
 POPULATION 88 RESANCO  
 OPERATOR M.M. O.C. D.M. 86-1  
 SUBJECT ID 110-101  
 201 101 110-101

43204 TEST GROUP 663  
HONOLULU LAB NEW MEDICAL  
PAT SCAT  
CONTRACT NO 73-01  
DATE PLANT 22 MAR 73  
REGISTRATION TIME 0840  
OPERATOR RRR BOSTON  
SERIAL 25  
45" Roll, 10" Pitch

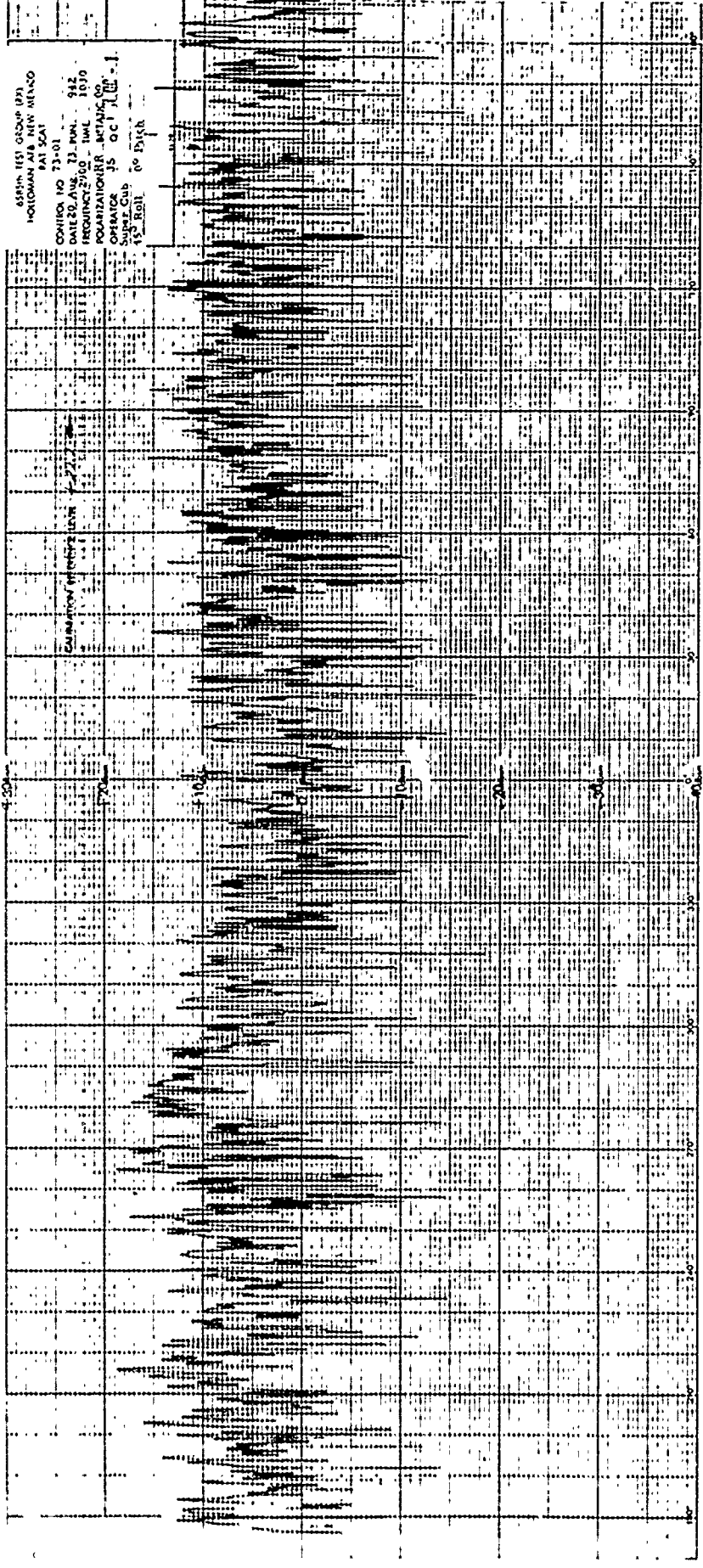
STATION YOU PREPARE RUM - 212

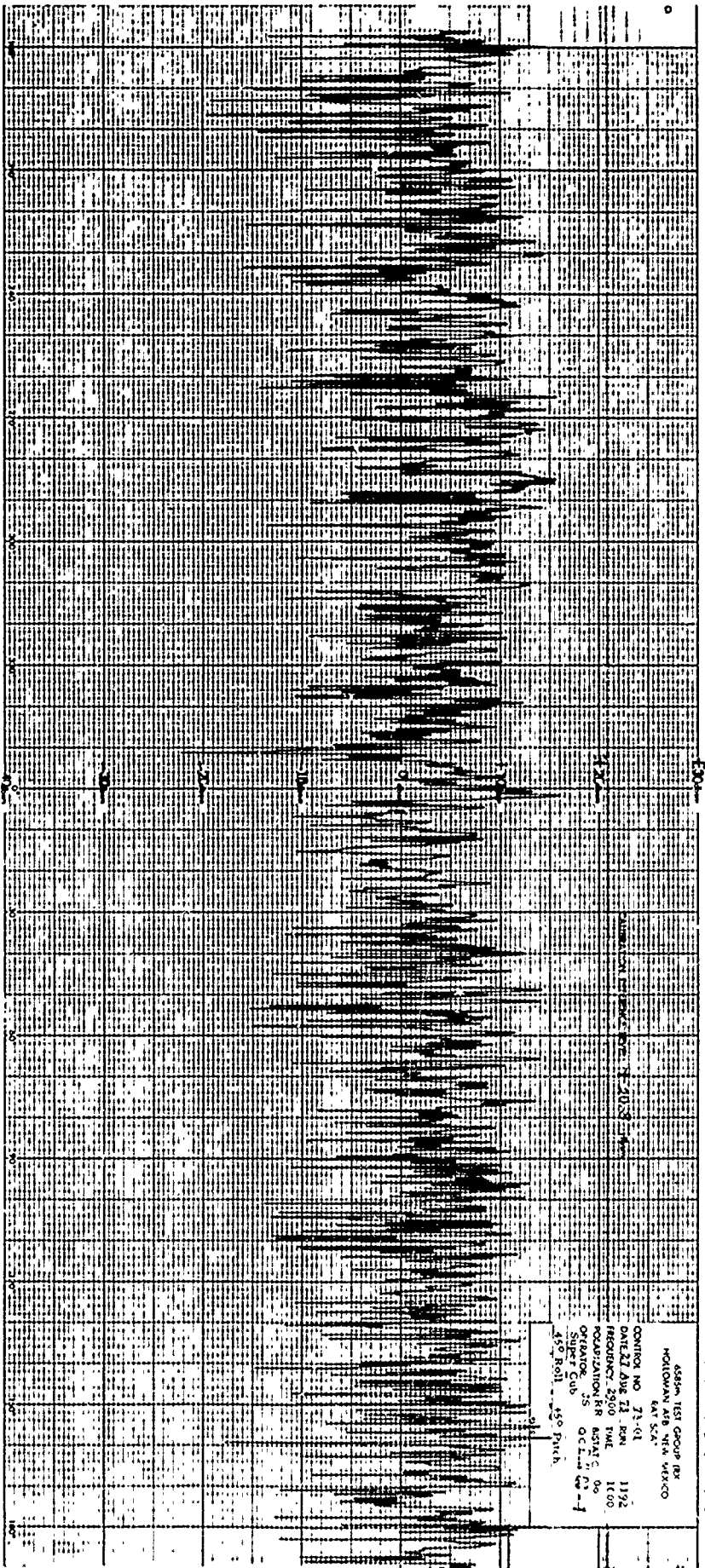




SYSTEM 100 000 P BR  
 NO. 100 000 P BR  
 DATE: 28 AUG 73 P M 984  
 CONTRACT NO. 74 01  
 PROJECT: 2570  
 LOCATION: 100 000 P BR  
 OPERATOR: S. O. C. D. H. B. C. - 1  
 100 000 P BR  
 100 000 P BR

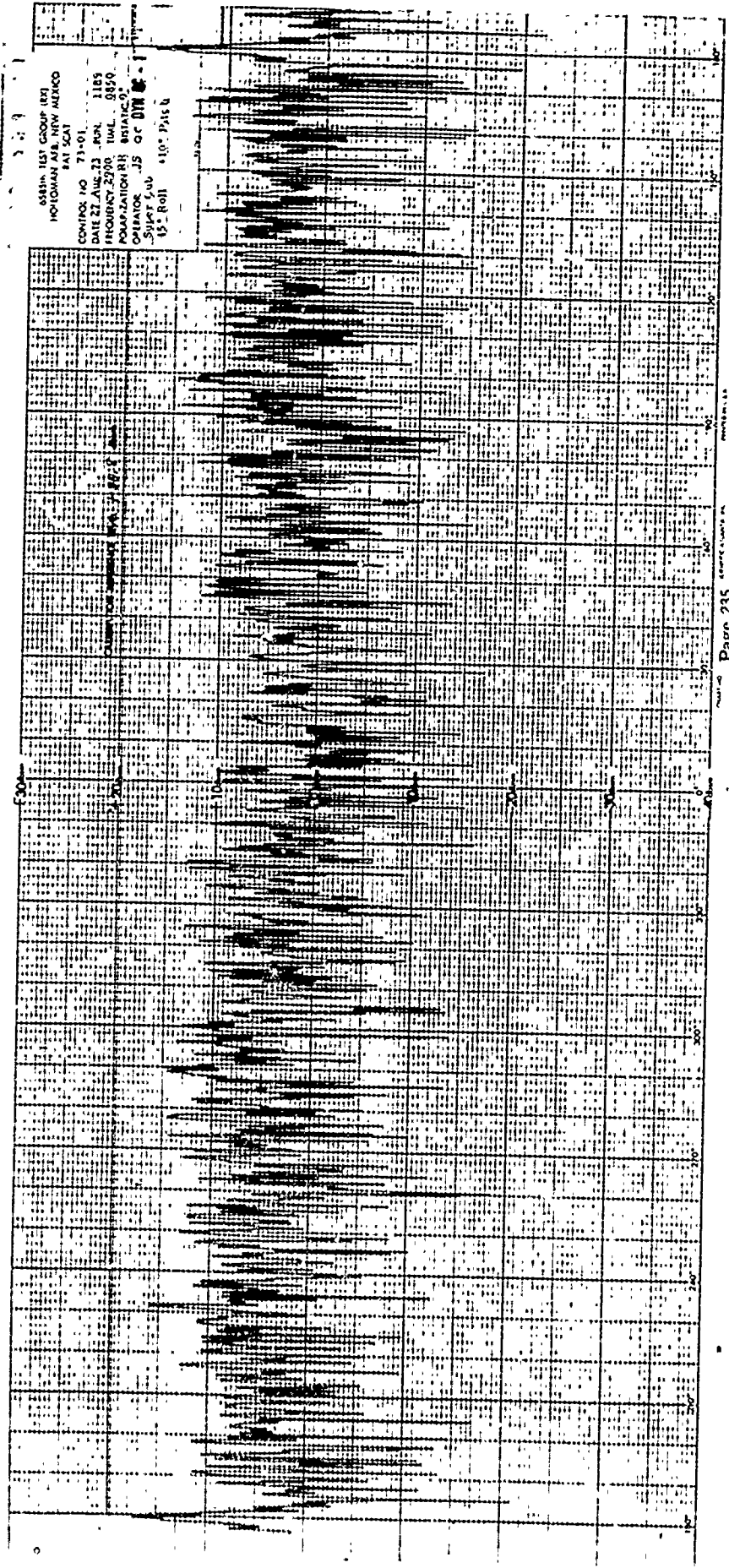
6587H (15) GROUP (73)  
HOLCOMAN AIR NEW MEXICO  
PAT SCAT  
CONTROL NO 73-01  
DATE 20 APR 73 RWL 942  
FREQUENCY 2700 - 1440 - 1030  
POLARIZATION RR - ANTENNA NO.  
OPERATOR JS Oct 1 1973  
Super Cub 60 Dyck



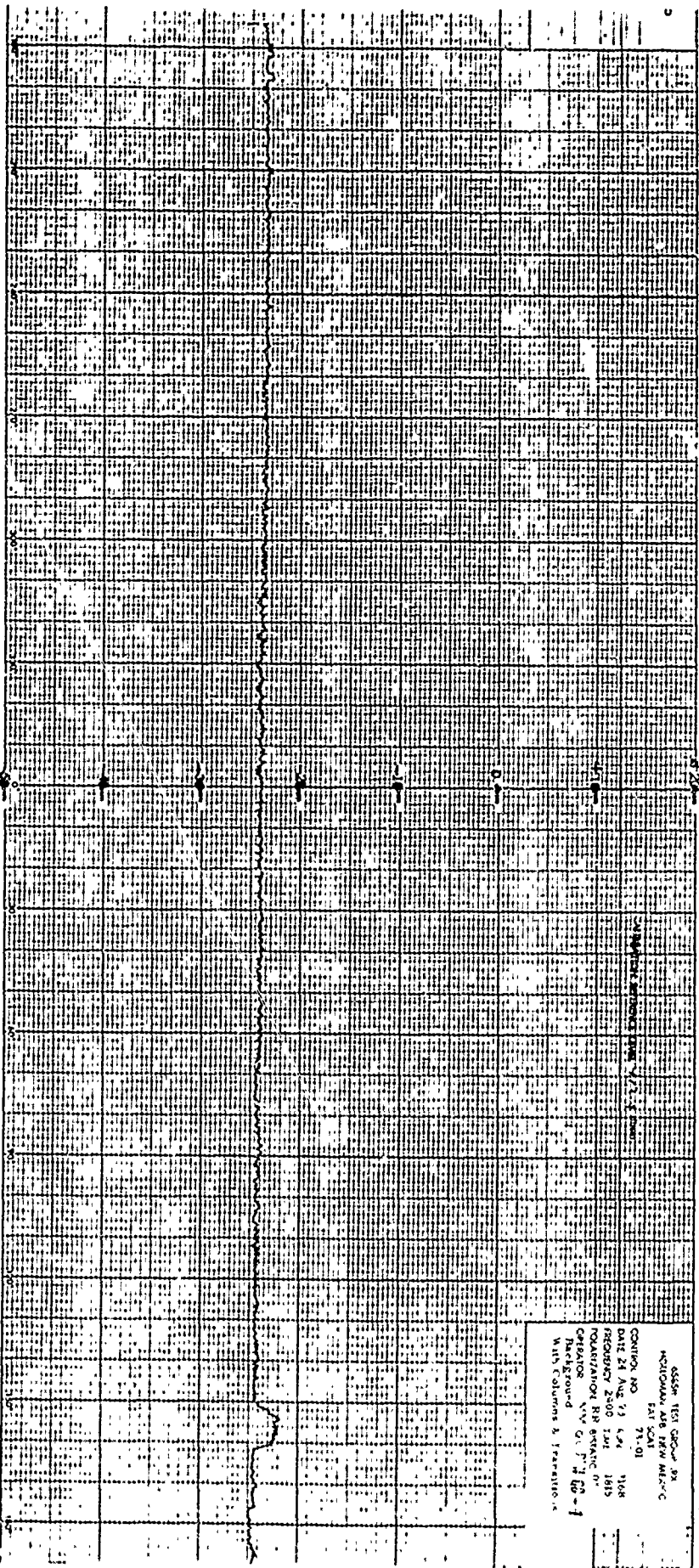


455th TEST GROUP BX  
 HOLLOWAY AFB NEW MEXICO  
 LAT 34°  
 CONTROL NO 71-01  
 DATE 21 Aug 71 1192  
 FREQUENCY 2900 TME 1600  
 ORGANIZATION RR 831415 06  
 OPERATOR JS OCL 11-01-71  
 SUPER CUB  
 450 Roll - 450 Pitch

655th TEST GROUP (RT)  
HOTTOMAN AFB, NEW MEXICO  
FAT SCAT  
COMPOS NO 71-01  
DATE 27 AUG 73 ASN 1185  
FREQUENCY 2700 TIME 0850  
POLARIZATION RH BSTRATIC  
OPERATOR JS GC DTM  
SHEET 506  
15" Roll 110" Pat B





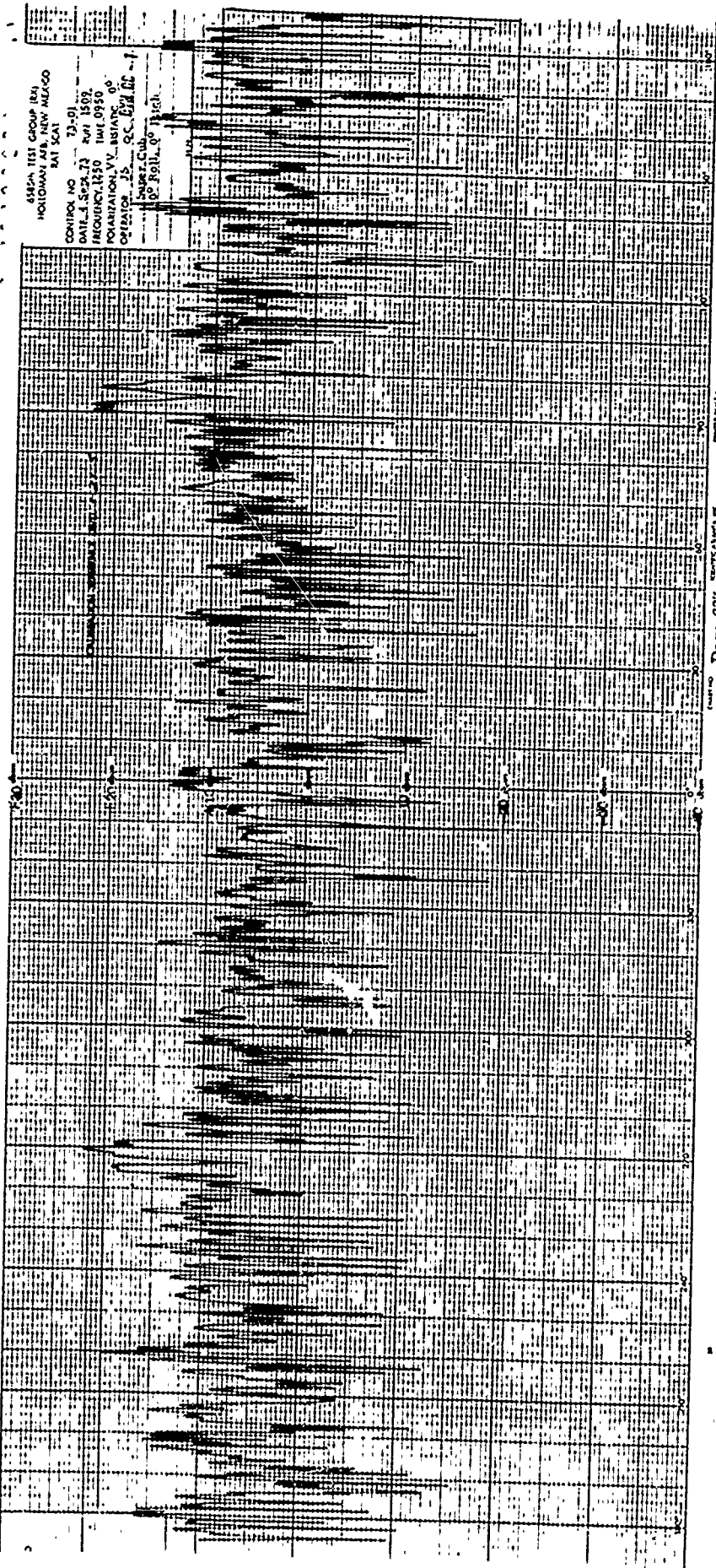


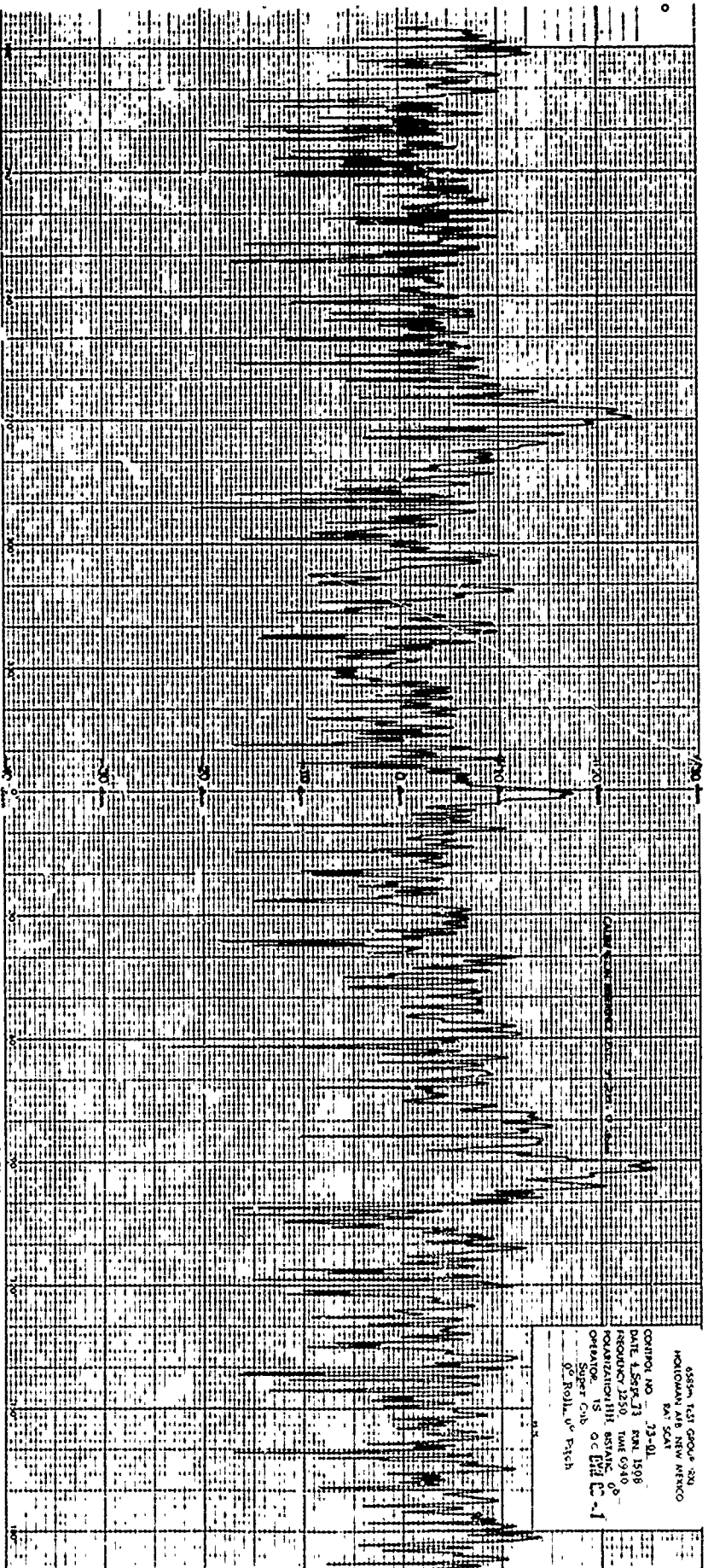
Page 236

ASSAY TEST PROC. BY  
 MICROANAL. LAB. FROM ANALYST  
 CONTROL NO. 71-01  
 DATE 21 AUG 71 1:41 PM 1971  
 RECORDED 2:00 PM 1971  
 QUANTITATION BY GRAVIMETRY  
 REPRODUCED BY G. J. B. - 1  
 With Columns 8, 7, 6, 5, 4, 3, 2, 1

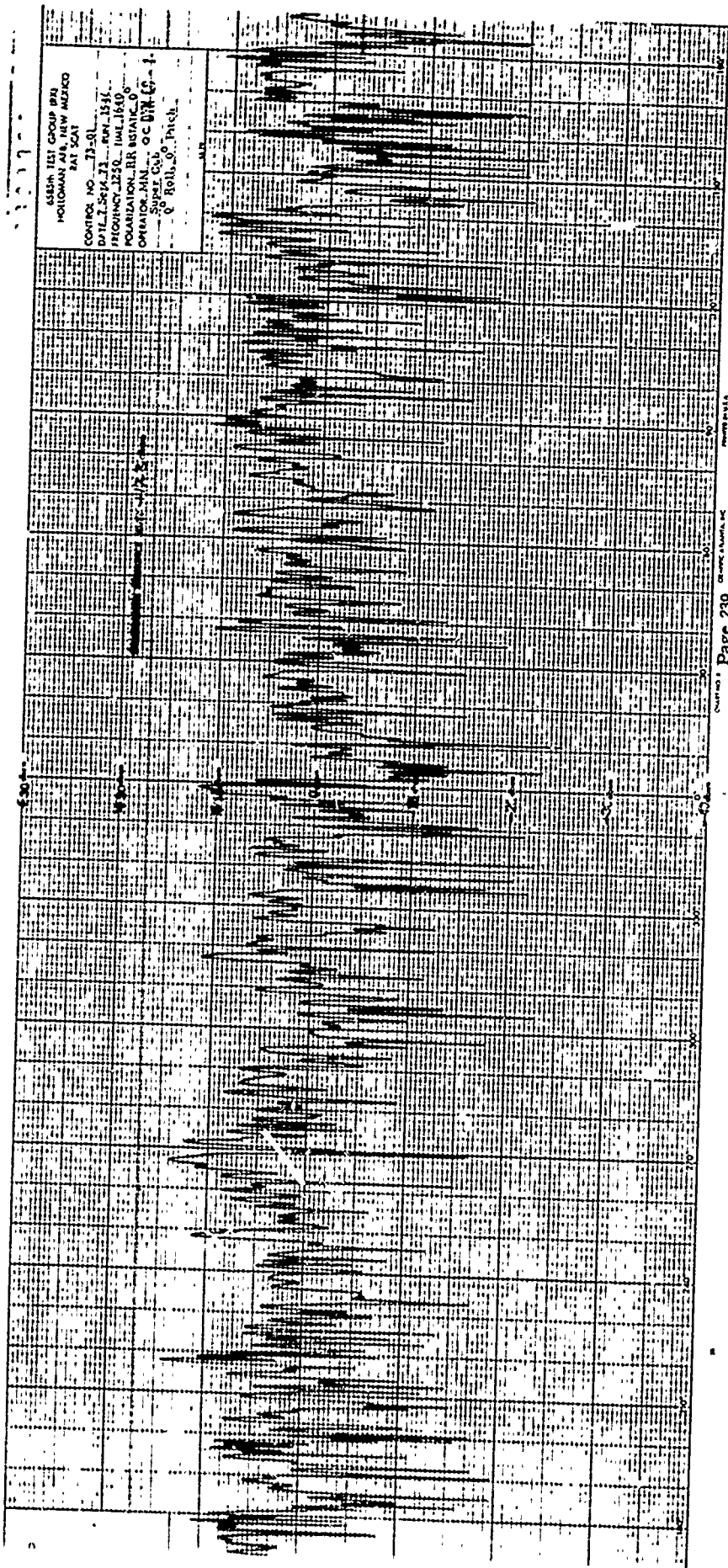
684PA TEST GROUP (R)  
HOLDONAU, AB, NEW MEXICO  
SAT SCAT

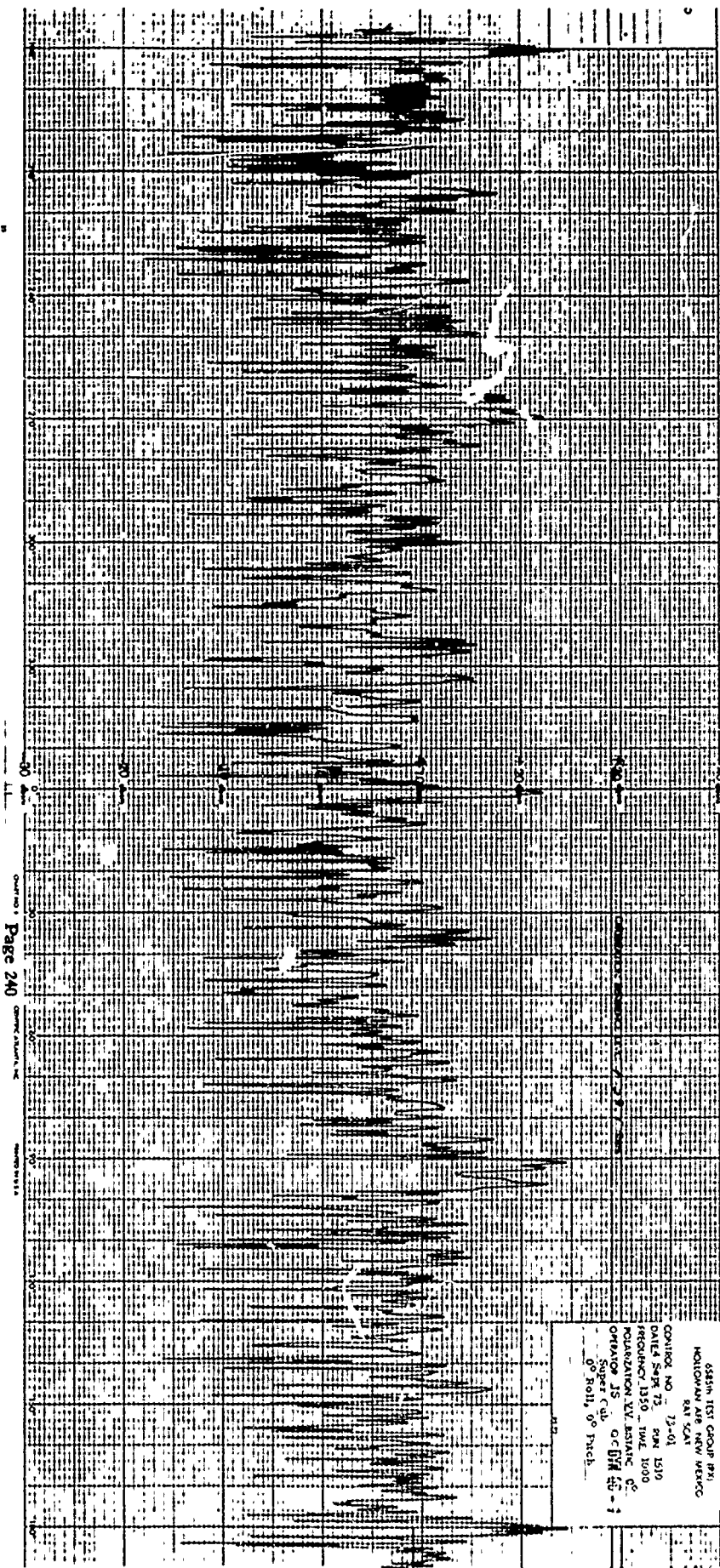
CONTROL NO. 73-01  
DATE: 3-29-73 APR 1972  
FREQUENCY: 1650 MHz 0950  
POLARIZATION: V.V. ARBITRARY  
OPERATOR: J.S. G.C. [unclear]  
Super. Club  
0° Roll, 0° Pitch





4555m EAST GROUP 201  
 HORTONMAN AIR NEW MEXICO  
 BN SCAT  
 CONTROL NO. 73-01  
 DATE 15 SEP 73 TIME 1508  
 RECORDING 2250 TIME 0910  
 ORGANIZATION IIII ASTIANC 00  
 OPERATOR 15 OC PVT C-1  
 Super Cub  
 of Roll, of Pitch

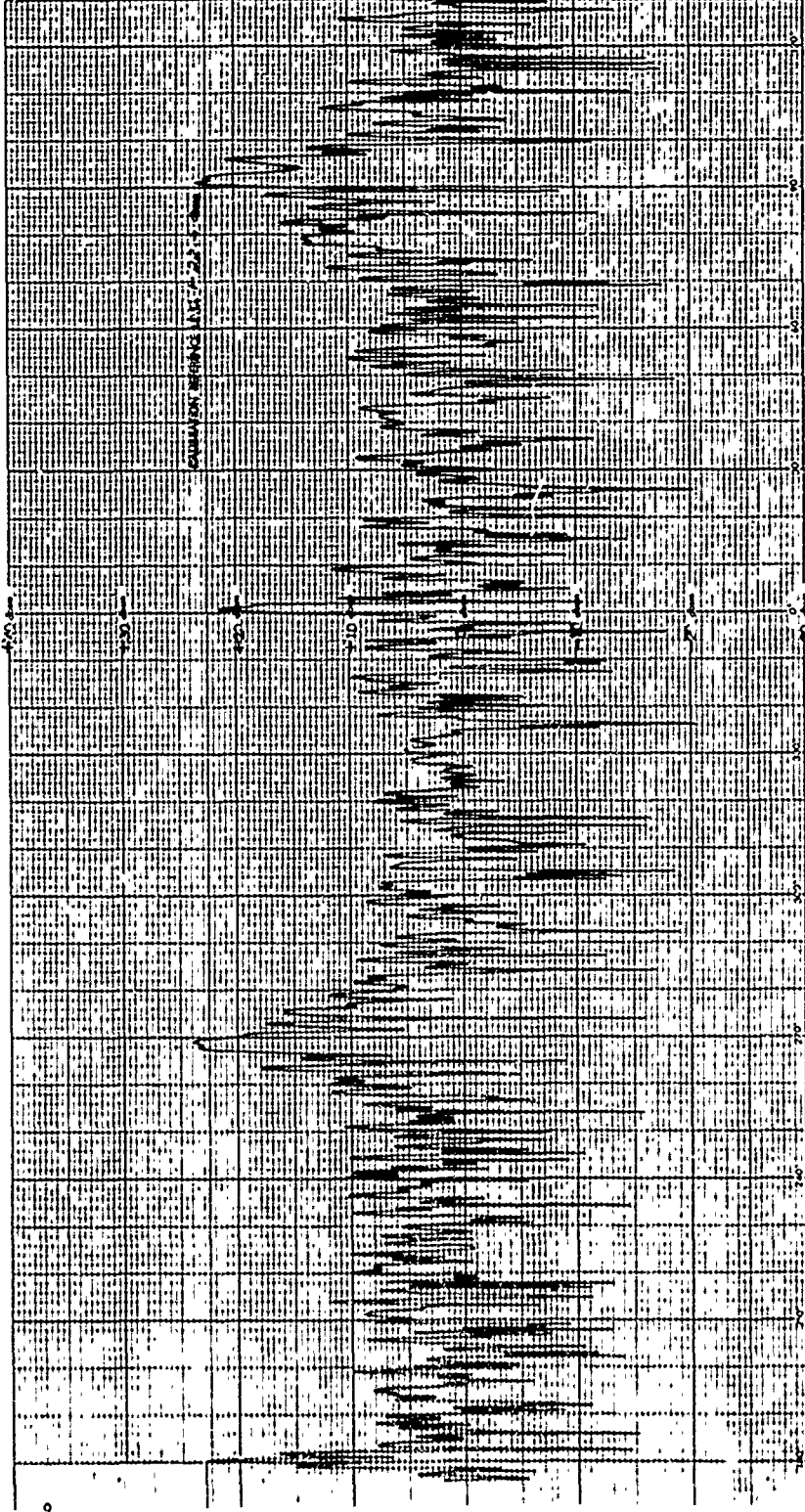


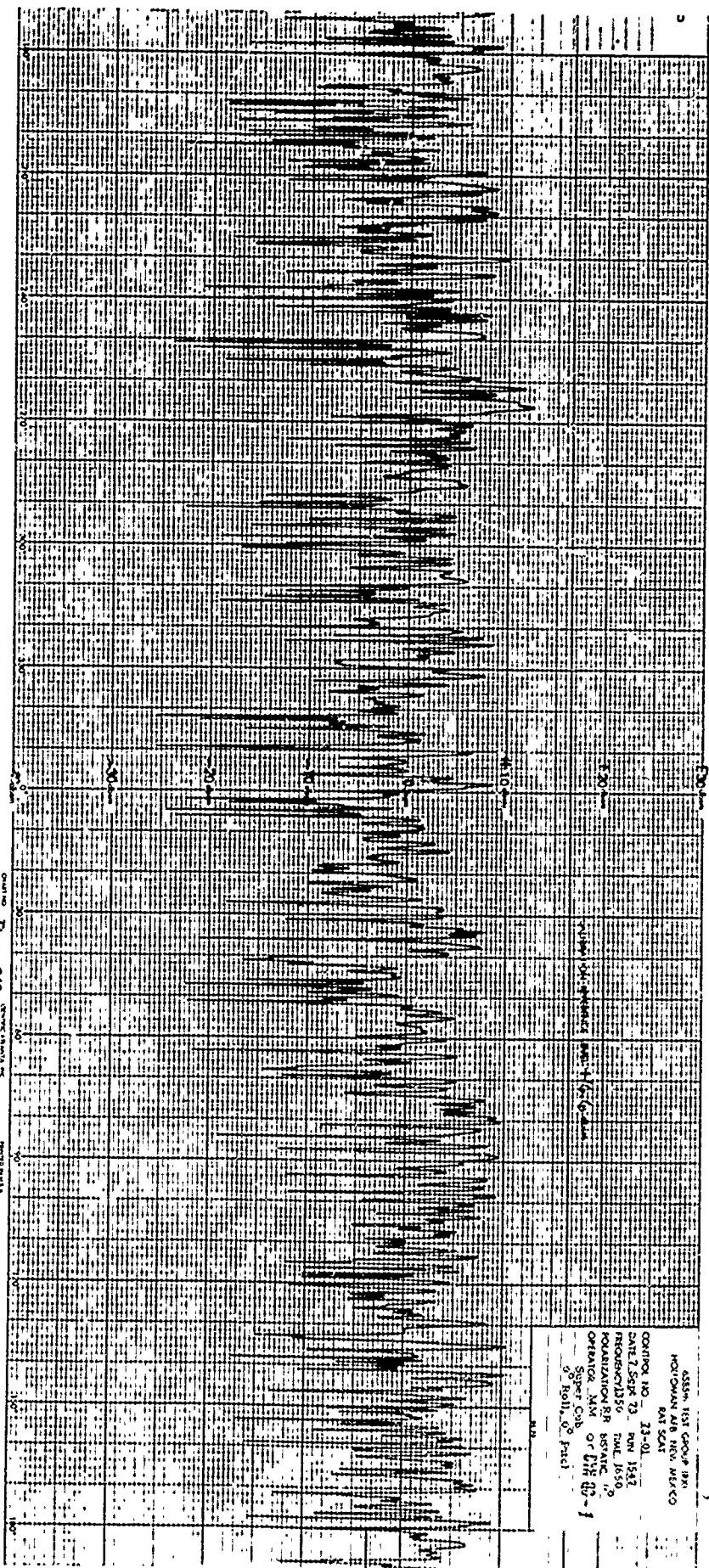


6585th TEST GROUP PH  
 HOLLOWAY AFB NEW MEXICO  
 RAY SCAT  
 CONTROL NO - 73-01  
 DATE 4 SEP 73 - 8PM 1510  
 FREQUENCY 1350 - TIME 1000  
 POLARIZATION LV. ASTATIC G  
 ORIENTATION JS OC DIV 45 - 1  
 Super Club  
 00 Roll, 00 Pitch

685PM TEST GROUP #27  
 HOLLAND J28, NEW MEXICO  
 PAT 504

CONTR NO. 7250  
 DATE 4 FEB 53 ANN 111  
 FREQUENCY 3300 IMA 100  
 POSITION HONOLULU, HAWAII  
 OPERATOR JS OCBH 66-1  
 UNIT 504  
 ROLL 9 JALB

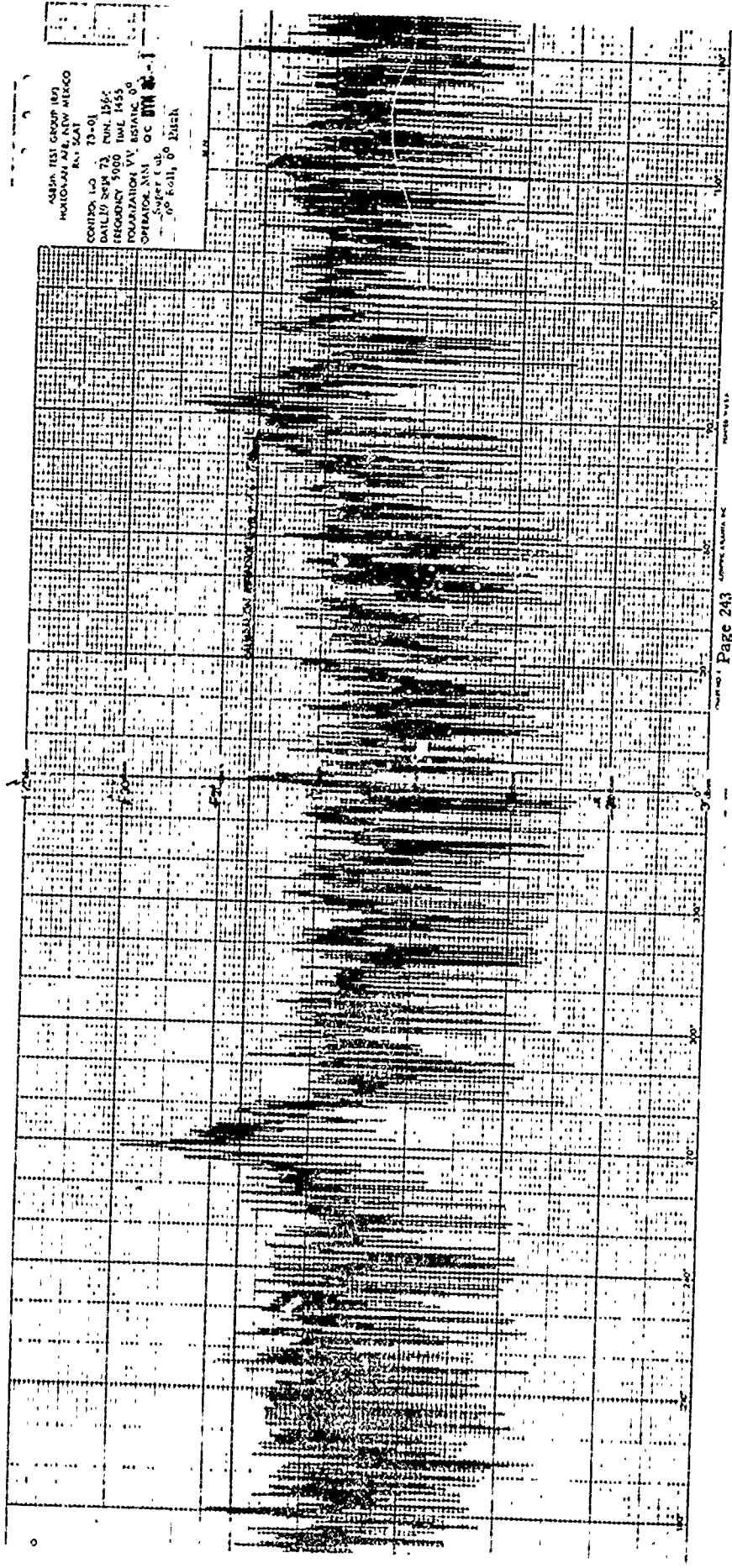




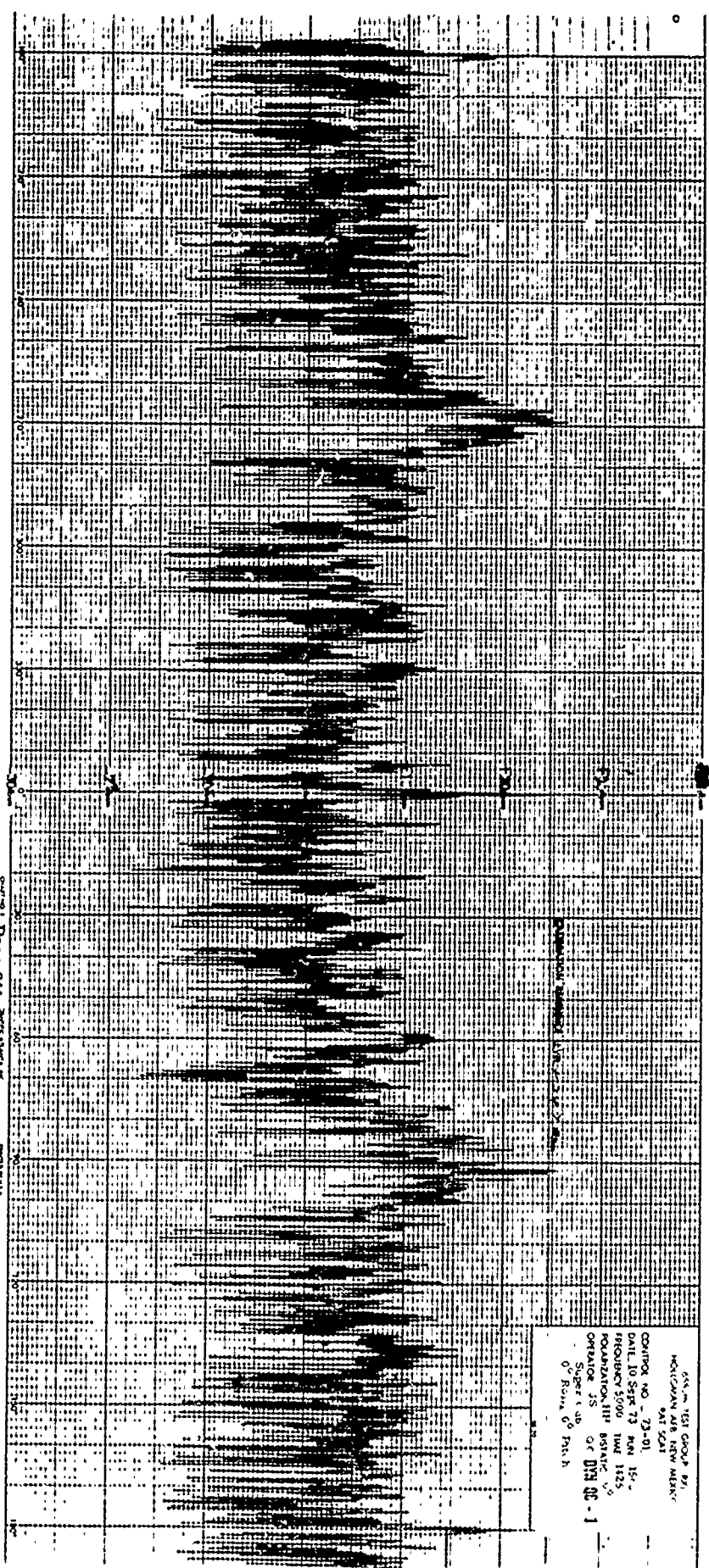
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ASBPA TEST GROUP (R)  
MADISON AVE, NEW MEXICO  
Rt. 5441

CONTROL L.O. 73-01  
DAILY REP. 72, RUN. 1566  
FREQUENCY 3000 TIME 1455  
POLARIZATION VV, STATIC 00  
OPERATOR NIN OC BTM  
Super C. 00  
00 Roll, 00 Dash

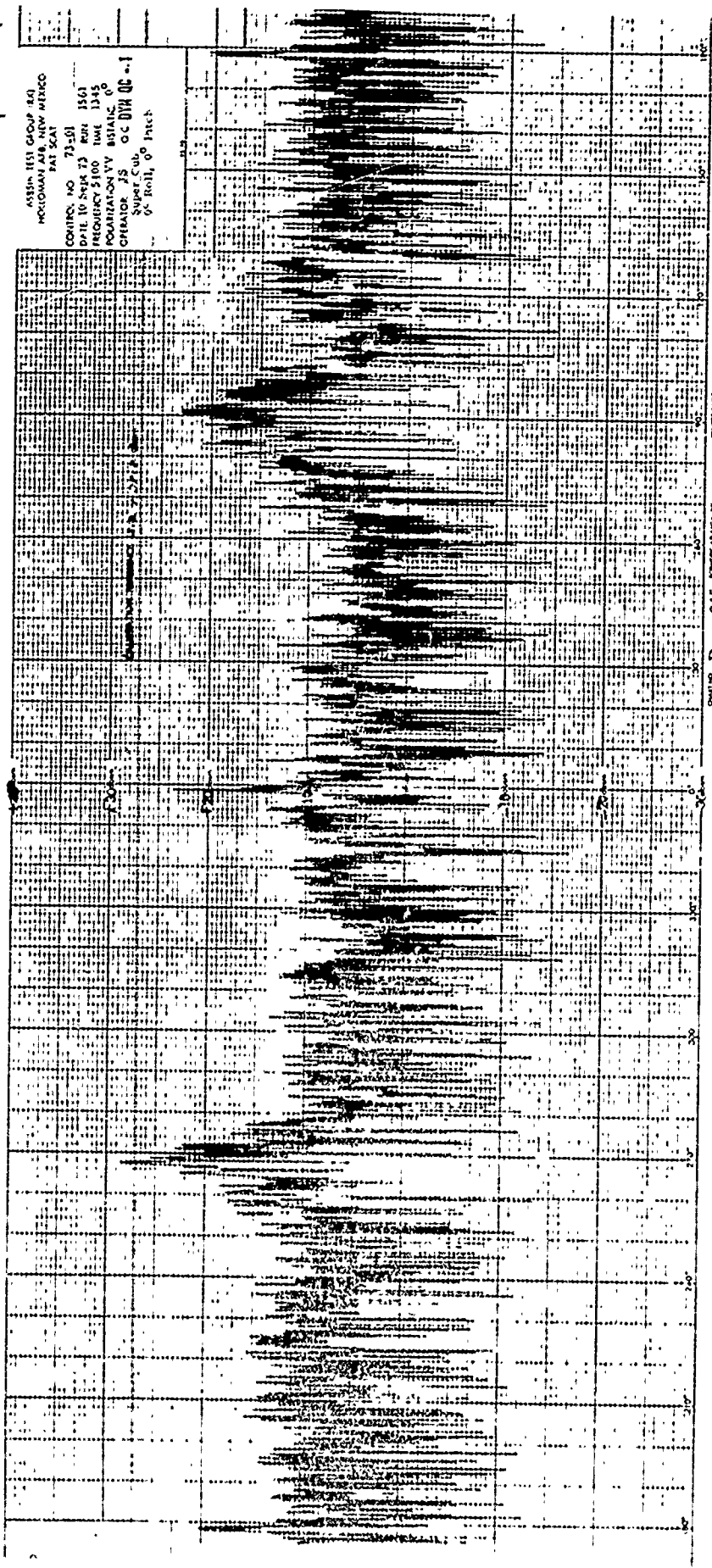


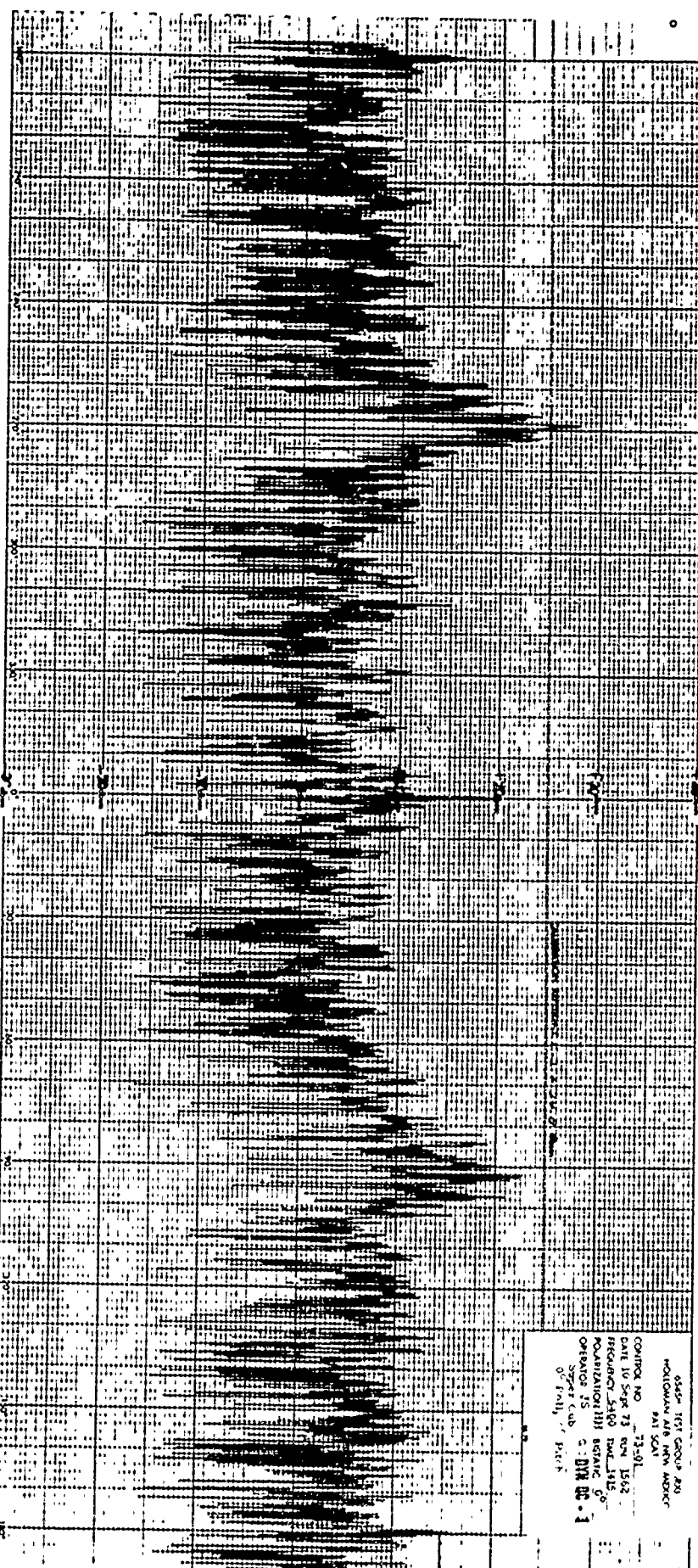




454th TEST GROUP B1  
MONTANA PATROL  
DATE 10 SEP 73 15:00  
REQUENCY 5000 MHz 142.0  
POLARIZATION HORIZONTAL  
ORBITAL JS  
OPERATOR  
O. Rouse, 6 Park

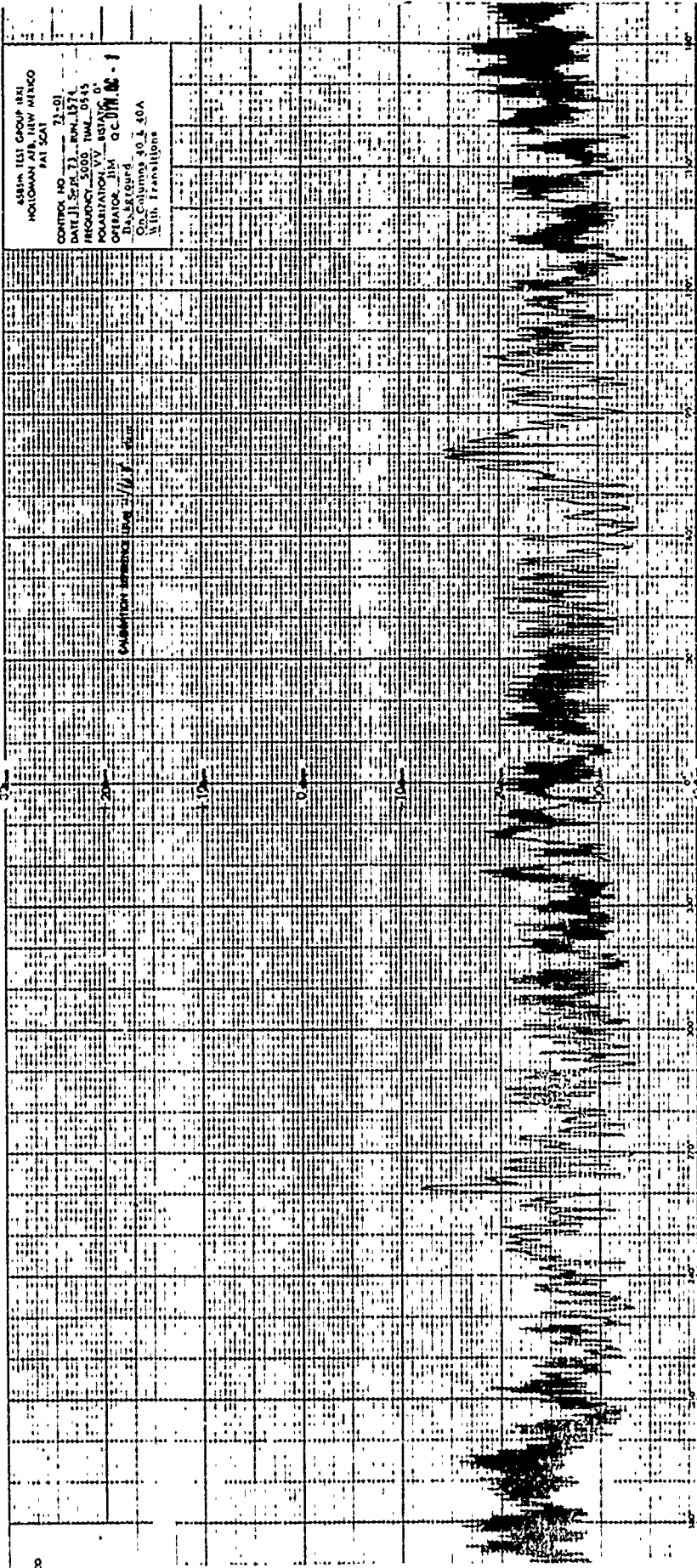
ASSIN 1ST GROUP 443  
MEXICAN AIR, NEW MEXICO  
PAT SCAT  
COUNT NO 73-01 1361  
DATE TO START 23 APR 1961  
FREQUENCY 5100 KMH 1345  
POSITION VV DISTANCE 0  
OPERATOR JS CC DTH UC  
Super Cub, CC DTH UC  
6x Roll, 0° Pitch





6544 1ST GROUP 241  
HOLLOWAY AIR RMN AMCRIC  
PAT SCAT  
CONTROL NO. 13-91  
DATE 10 Sept 73 RMN 1562  
FREQUENCY 3100 TIME 1415  
POLARIZATION (H) BEARING 0°  
OPERATOR JS C: DYN DC-1  
OPER CLUB  
OF INTL. PITCH

533775

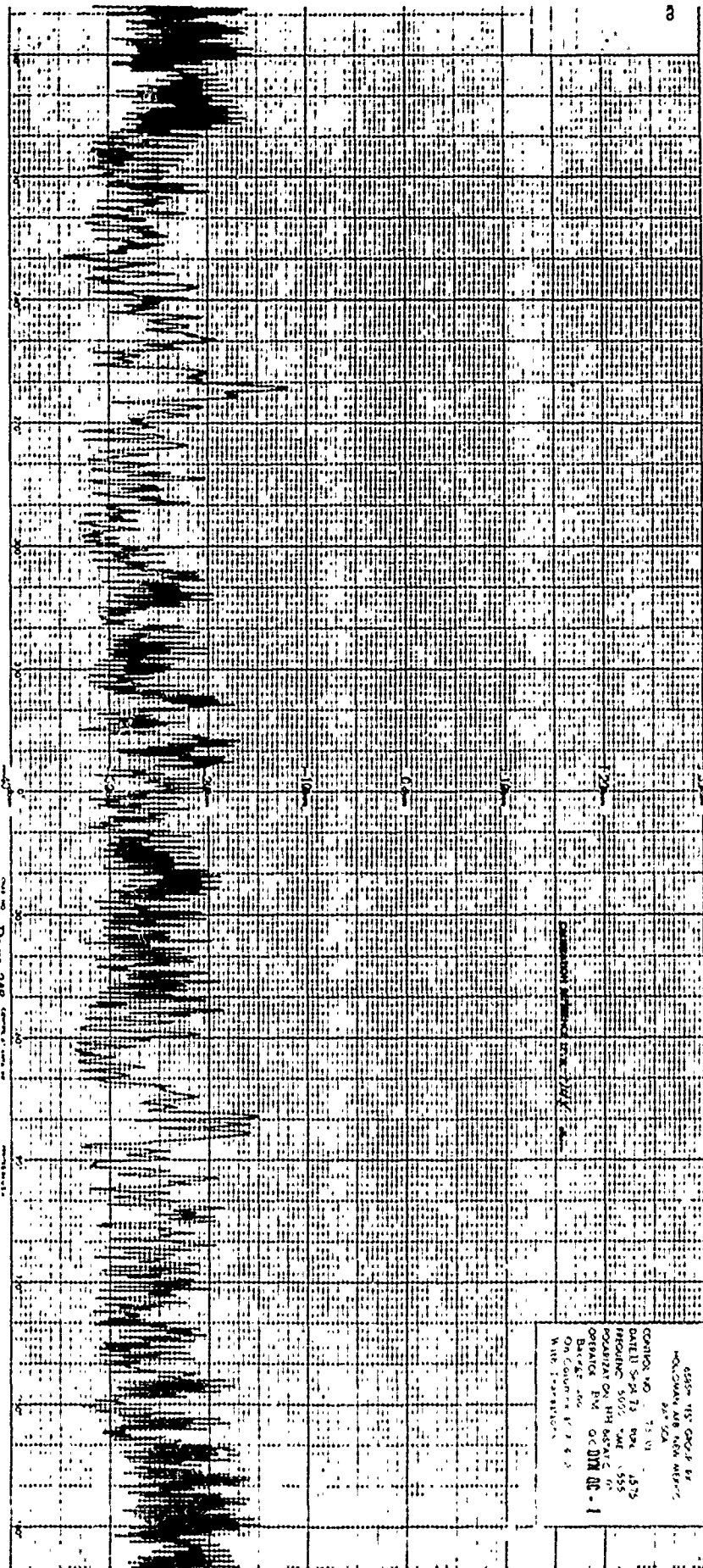


4834A TEST GROUP 1831  
 HOLLAND AFB, TEXAS  
 PAT SCH

CONTROL NO. 31-201  
 DATE: J. SEP. 23. 1954  
 FREQUENCY: 5000. 1000. 0145  
 POLARIZATION: V. 185  
 OPERATOR: JIM G.C. DR. 1831

On Column 30. 1. 40A  
 With Transitions

Calibration Reference: 1000. 1000. 0145



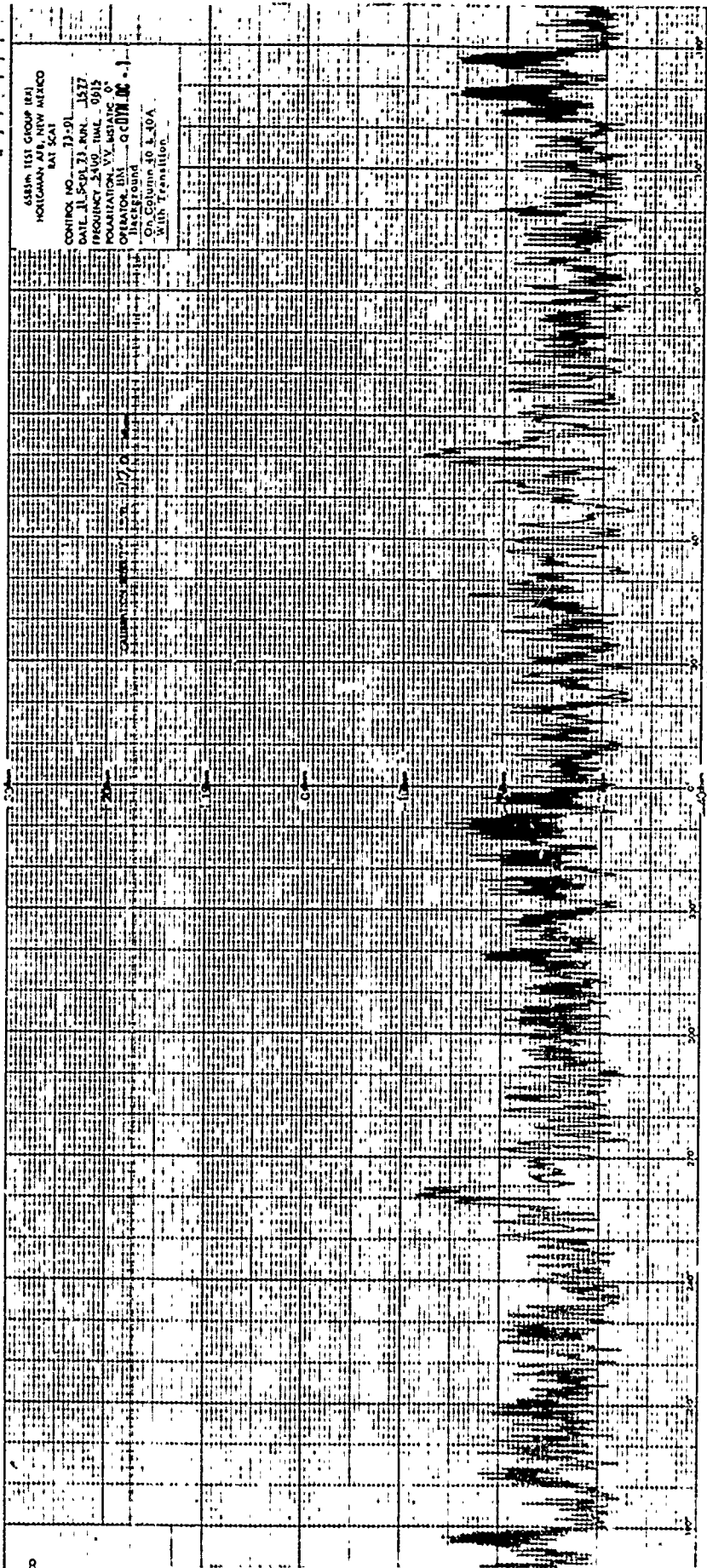
Page 248

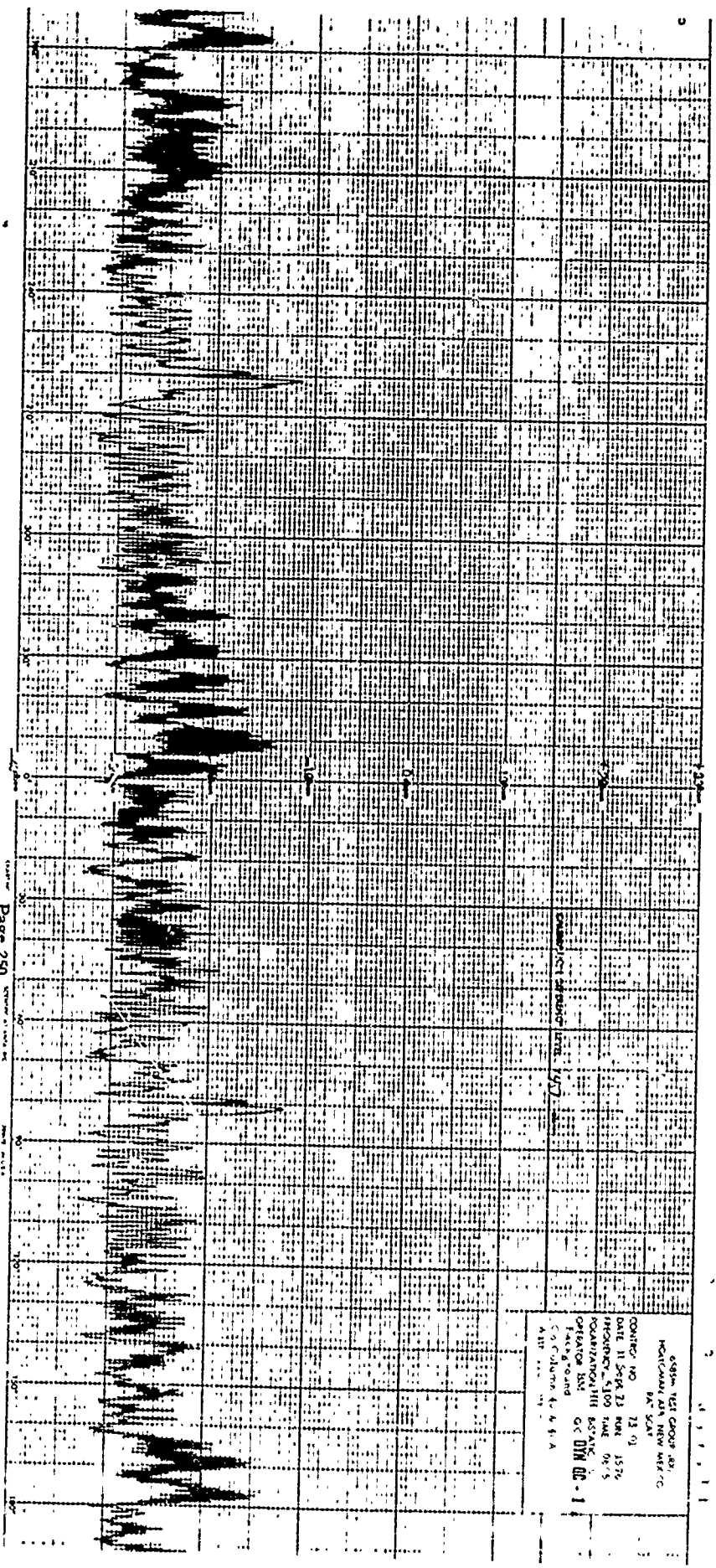
4555-1157 GOLF BY  
 HOLLANDY AIR MOB MFRS  
 247504  
 CONTROL NO. 73 01  
 DATE 11 SEP 73 BY 1575  
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 POSITION ON THE BASIS IN  
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 DATES AND  
 ON COURSE 1 2 3 4 5  
 WITH 157504

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6839 TEST GROUP (R1)  
 HOLGAMAN AFB, NEW MEXICO  
 BMT SCAT

CONTROL NO. 73-91  
 DATE 11-20-57  
 FREQUENCY 2500 KMC - 0915  
 POLARIZATION V.V. HORIZONTAL  
 OPERATOR E.M. O'CONNOR  
 Jack Ground  
 On Column 40 L 30A  
 X 1/4 In Transition





031m TEST CHOO 481  
 HOLLAND AIA NEW MEX CO  
 8m 50m  
 DATE 11 SEP 73 TIME 1530  
 FREQUENCY 5100 MHz BW 5  
 MODULATION 11111111111111111111  
 OPERATOR BMT OC DYM GC - 1  
 Faded sound  
 Co. Column 4, 6, 8, 10  
 AMT ... ..

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APPENDIX A  
SITE INTRODUCTION

1. GENERAL

RAT SCAT is a static ground plane radar cross section measurement site, located on Alkali Flats near Holloman Air Force Base, New Mexico. It is authorized by the DOD for use by governmental agencies. It is under the auspices of the 6585th Test Group, Air Force Special Weapons Center, Kirtland Air Force Base, New Mexico.

A ground plane range utilizes radar energy reflected from the earth as well as radar energy traveling directly to the target through the atmosphere. When the antennas and target are adjusted to proper heights, coherent phase addition of these electromagnetic waves into a flat wave front, enhances the system sensitivity. Radar returns from objects near the earth's surface are reduced thus suppressing target area interference. Target area interference is reduced further through the use of special polyfoam support columns, radar absorptive materials (RAM), and rotators located below the earth's surface (in pits).

Pulsed transmitters are employed to enable utilization of the range gated receiving system, which can selectively measure radar returns from the target area or the range displaced transfer standard. Background interference outside the target range is eliminated by range gating. Operation without background cancellation is therefore practical.

2. CAPABILITIES

The RAT SCAT electronic equipment and controls are housed in a permanent building. Three separate range lengths (458 feet, 1158 feet, and 2458 feet) are provided for range variation as shown in Figure A-1. This allows the use of convenient antenna and target heights while satisfying the far field criterion for most targets. (Special 40-foot antenna towers are attached to the building for antenna height positioning.) Further versatility is provided by two mobile equipment vans, one for monostatic range length variation and one for bistatic measurements. A duplicate set of control and data consoles in the main building enables simultaneous operation of any two of the three ranges. A summary of the RAT SCAT characteristics is contained in Table A-1.

3. CALIBRATION

The normal method of calibration at RAT SCAT is to mount a primary standard (precision sphere) scatterer with a known radar cross section and record the corresponding signal level. Then the return from another secondary standard (corner or Luneberg lens) scatterer



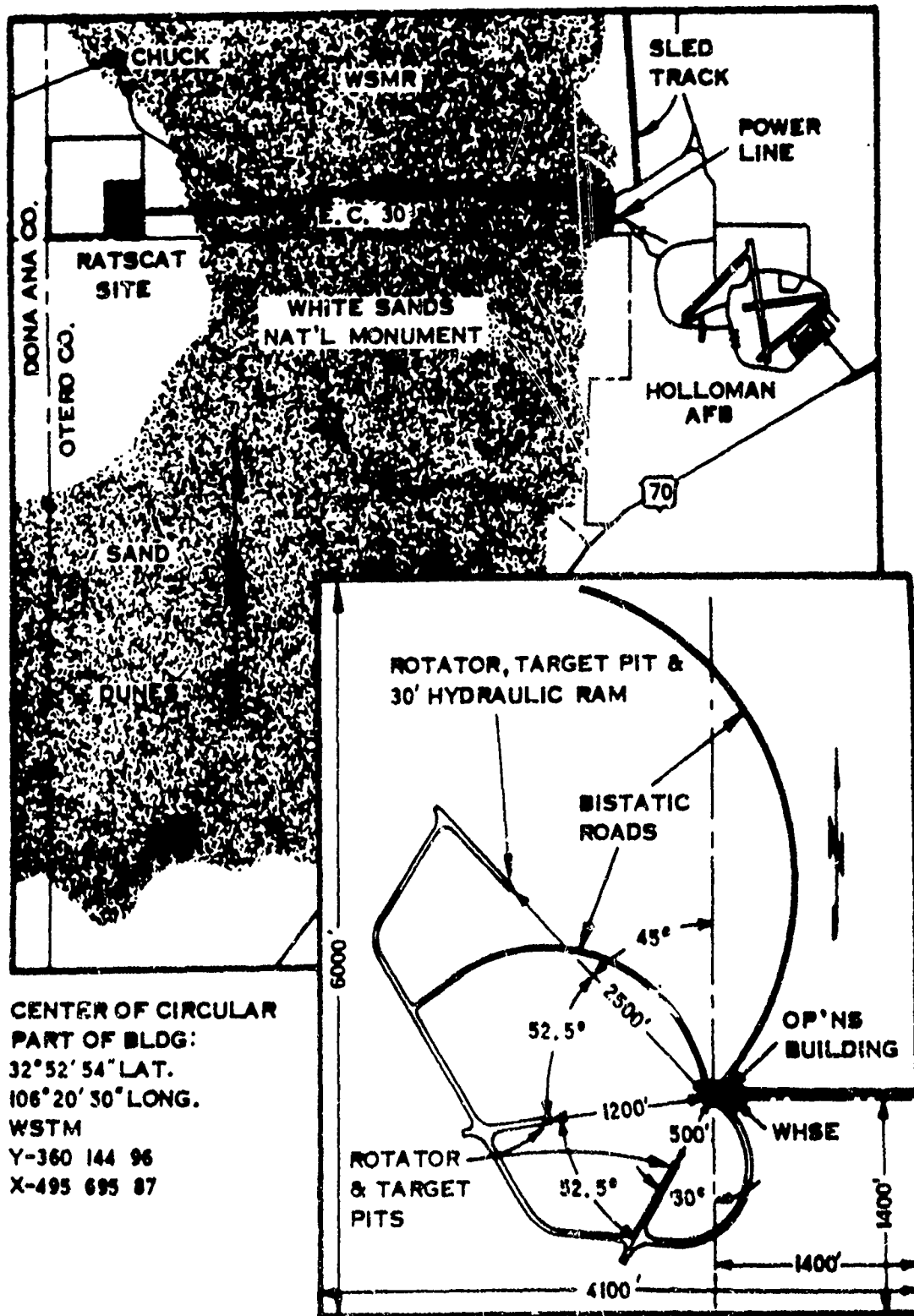


Figure A-1 MAP OF RAT SCAT SITE

A-2

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TABLE A-1

## RAT SCAT CHARACTERISTICS OF ELECTRONIC EQUIPMENT

Power Output	1 KW nominal bands 1 through 8, 25 KW nominal Ku, Ka bands
Pulse Width	0.1 to 1.0 microsecond
Pulse Repetition Frequency	500 to 5000 pps
No. of Receiving Systems	Two per band, (one monostatic and one bistatic)
Receiver Minimum Detectable Signal	-94 dbm nominal
Receiver Bandwidth	2 or 10 Mhz (selectable)
Range Gate Width	0.1 to 1.0 microsecond (50 to 500 feet)
Dynamic Range	70 db
Linearity	+0.5 db
Equipment Stability	0.1 db/hour (Average)
Analog Data Format	Polar and rectangular plots of cross section, glint and phase vs aspect angle
Digital Data Format	7 or 9 track magnetic (see Appendix C)
Antennas	1, 2, 3, 4, 6, 10, and 16 foot parabolic dishes (smaller and larger dishes available for special tests)
Antenna Feeds	Linear and circular horns with VSWR less than 2.0 to 1.0
Polarization	Horizontal, vertical, circular, elliptical in any transmitting and receiving configuration.
Background Level	As low as -80 dbsm (frequency dependent)
Background Reduction	Tuned columns and vector subtraction by using phase and amplitude measurements to reduce background by 20 db
Phase Measurement	Unique RAT SCAT capability for vector subtraction or scattering matrix applications
Azimuth Resolution	0.1 or 0.01 degree as applicable
Maximum Target Weight	40,000 pounds
Target Size	Greater than 60-foot length
Bistatic Capability	Primary ranges of 458 , 1158 , and 2458 feet for 0 to 160 degree bistatic angle
Frequency Coverage	100 to 18,000 MHz continuous, Ku, Ka bands and 95 GHz

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Band 1 - 100 to 250 MHz  
Band 2 - 250 to 500 MHz  
Band 3 - 500 to 1000 MHz  
Band 4 - 1000 to 2000 MHz  
Band 5 - 2000 to 4000 MHz  
Band 6 - 4000 to 8000 MHz  
Band 7 - 8000 to 12,000 MHz  
Band 8 - 12,000 to 16,000 MHz

Ku, Ka bands;  
95 GHz

Range Length

300 feet minimum

Building/Pit 1 - 458 ft  
Building/Pit 2 - 1158 ft  
Building/Pit 3 - 2458 ft  
Monostatic Van/Pits 1, 2, or 3 - variable range length

displaced in range is recorded as a transfer standard. Both the precision standard return and the transfer standard return are recorded on the same plot. Thereafter, radar cross section calibration is determined by referencing the transfer standard return for every run. Thus every run is recalibrated. The comparisons of primary and transfer standards accomplished before and after each measurement series are identified respectively as calibration and post-calibration. If the direct ratio of primary to secondary readings is not maintained before and after the measurement series, then all runs between are invalid and must be repeated.

The calibration reference level marked on each data plot is related to the transfer standard level. This reference level may under controlled conditions differ from the actual transfer standard signal level since precision calibrated attenuation is sometimes inserted in the receiver line. When such attenuation is inserted, returns from the transfer standard are reduced to a level compatible with the scale used for the target measurements. The 70 db dynamic range of the plot is placed to include the range of returns expected from the vehicle being measured. In some cases two runs are necessary to be plotted for direct overlay to include the dynamic range of the vehicle if it exceeds 70 db. Calibration plots are included with the target data when requested by the user.

The sphere calibration plots will not necessarily be straight lines. If the background return is within 20 db of the sphere return, for example, a variation in sphere return of approximately 1 db can result. For calibration the sphere is intentionally placed at least 1/2 wavelength off the center of table rotation to insure sufficient phasing with the background return. The average sphere return is then chosen for a calibration level. This avoids the peak errors involved with coherent addition of sphere return and background return and allows the minimum errors involved with non-coherent addition of the returns. This is indicated in Figure A-2.

#### 4. OPERATING PROCEDURES

The following step-by-step procedure is standard in obtaining monostatic radar cross section measurements after frequency, feeds, antennas, antenna height, target height, and pit (range length) have been chosen:

1. Calibration - As described in previous section.
2. Horizontal and vertical probes (field strength measurements at the target area) - Horizontal probes at the target area have been shown to be redundant for azimuthal boresighting. For this reason, these probes are taken only upon request for examination of near field effects.

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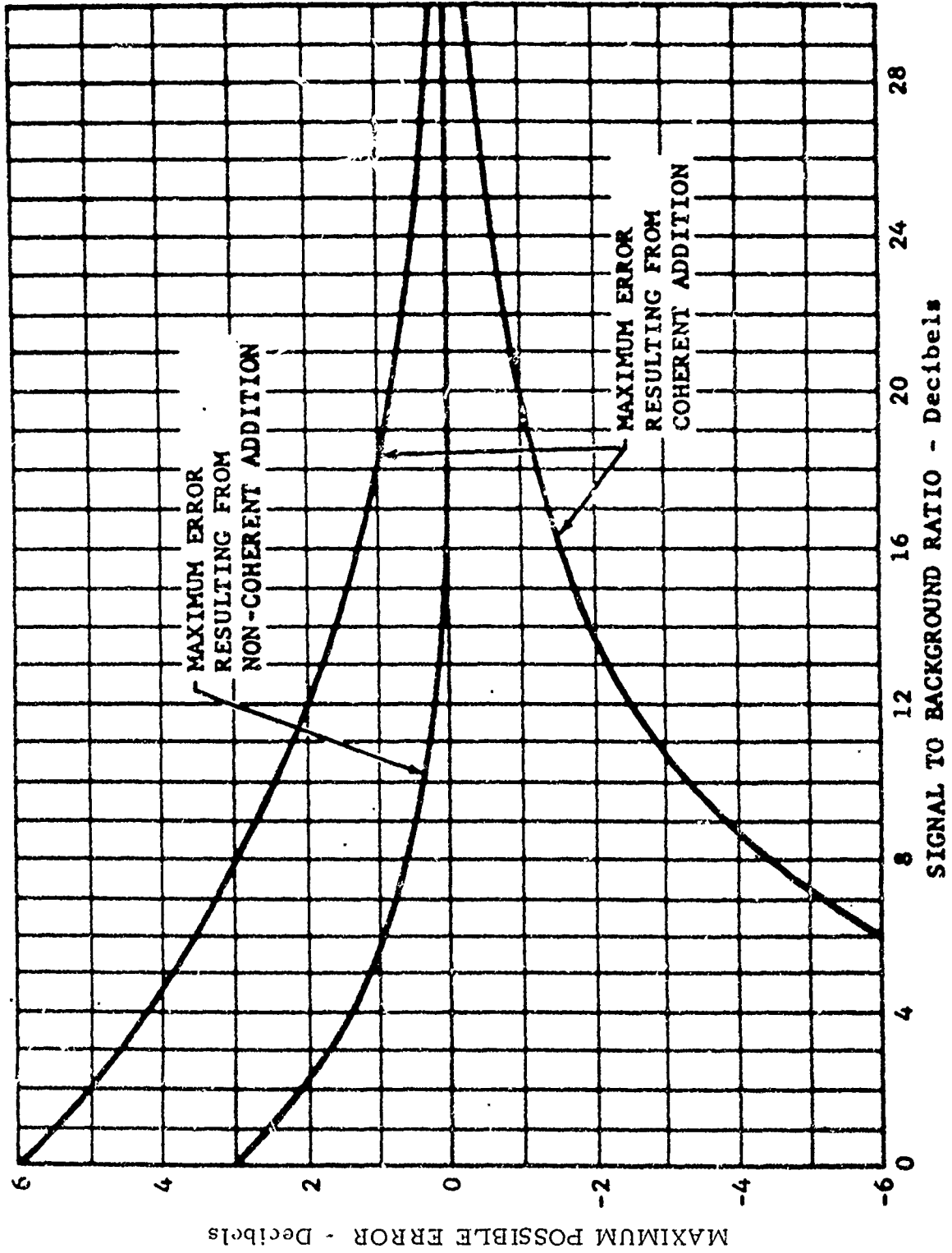


Figure A-2 PLCT OF ERROR INDUCED BY BACKGROUND INTERFERENCE

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Vertical probes are taken at the target area to determine power variation as a function of target height. If necessary, antenna height is varied to obtain an acceptable vertical probe which then necessitates a new calibration.

3. Background - The background level with the target mount in place is measured in each polarization to be used.

4. Measurement - The measurement is made with the vehicle in the position previously occupied by the primary standard.

5. Calibration - The primary calibration is repeated to verify calibration (post calibration).

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APPENDIX B  
TARGET ORIENTATION AND DATA FORMAT

1. COORDINATE SYSTEM

The coordinate system described herein has been adopted as a standard for RAT SCAT operations. The system is referenced both to the vehicle being measured and to the measurement site.

a. Vehicle Reference

A three-axis system, referenced to an arbitrary vehicle, is illustrated in Figure B-1. In this system three mutually perpendicular planes (yaw, pitch, and roll) are passed through the vehicle so that the pitch and yaw planes mutually intersect on the longitudinal axis of the vehicle. These planes remain fixed with respect to the vehicle, regardless of vehicle rotation with respect to the radar or ground plane. The yaw plane, which includes the pitch axis and the roll axis, is numbered from 0 degrees to 360 degrees in a clockwise direction when the vehicle is viewed from above. The nose-on aspect corresponds to 0 degrees, the starboard side of the vehicle corresponds to 90 degrees, and the port side to 270 degrees. The pitch plane, which contains the roll axis and the yaw axis is numbered from 0 degrees to  $\pm 180$  degrees; the + 90 degree point is below the center line, and the - 90 degree point is above the center line. The roll plane contains the yaw axis and the pitch axis. It is numbered from 0 degrees to 360 degrees, and the numbers increase in a counterclockwise direction when the vehicle is viewed from the rear.

b. Site Reference

As previously stated the coordinate system is fixed with respect to the vehicle. It is referenced to the site by means of three index marks. The exact value of any of the three angles is determined by noting the value of the vehicle coordinate opposite the index marks. Index marks come from such devices as bubble levels, inclinometers and transits.

As illustrated in Figure B-2, the index for roll angles is normal to the axis of rotation. As illustrated in Figure B-3, the index for pitch angles is normal to the axis of rotation and in line with the apparent source of radiation. For measurements at the RAT SCAT Site, targets can be mounted to provide desired pitch and roll angles.

c. Coordinate System Tilt

For small targets another angle, tilt, can be utilized in recording useful data. This angle, equipment-limited to less than 15 degrees, is formed by the axis of rotation and the normal to the line of sight to the

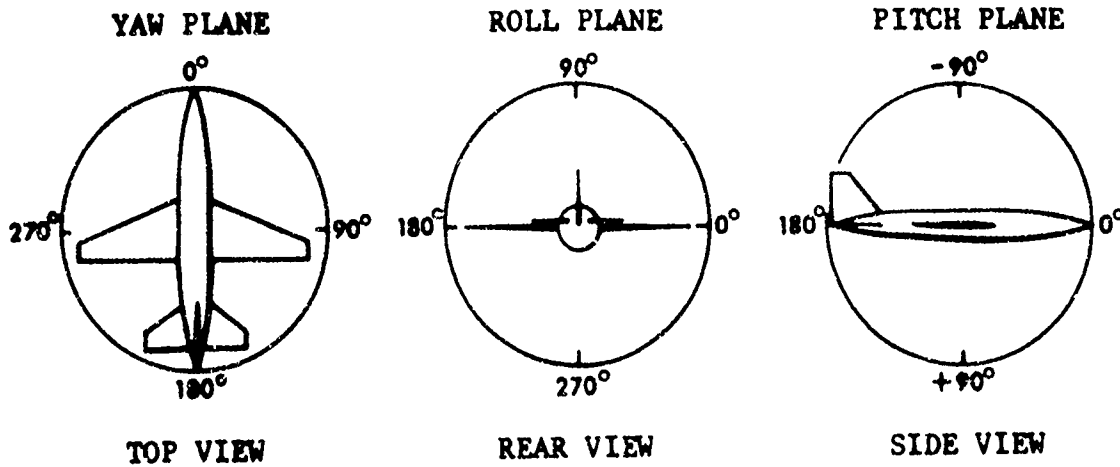
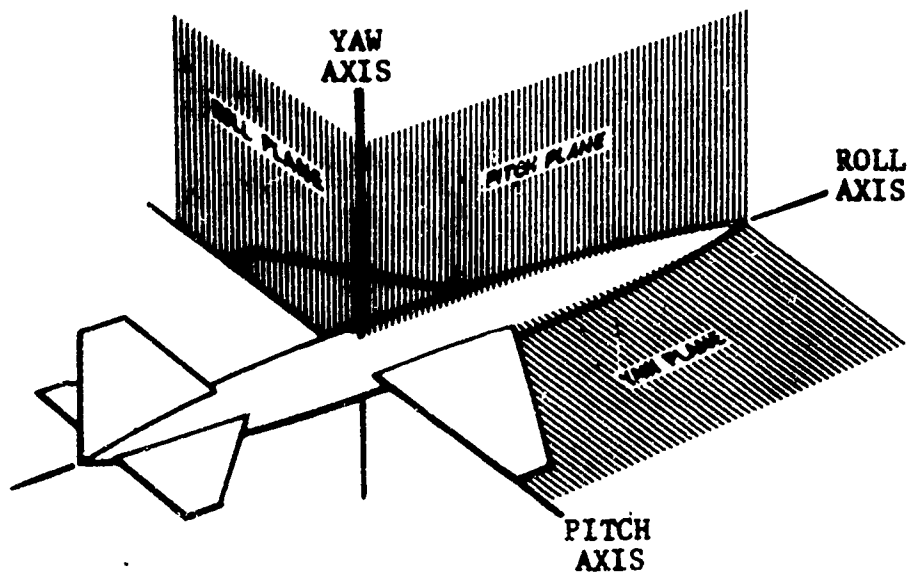
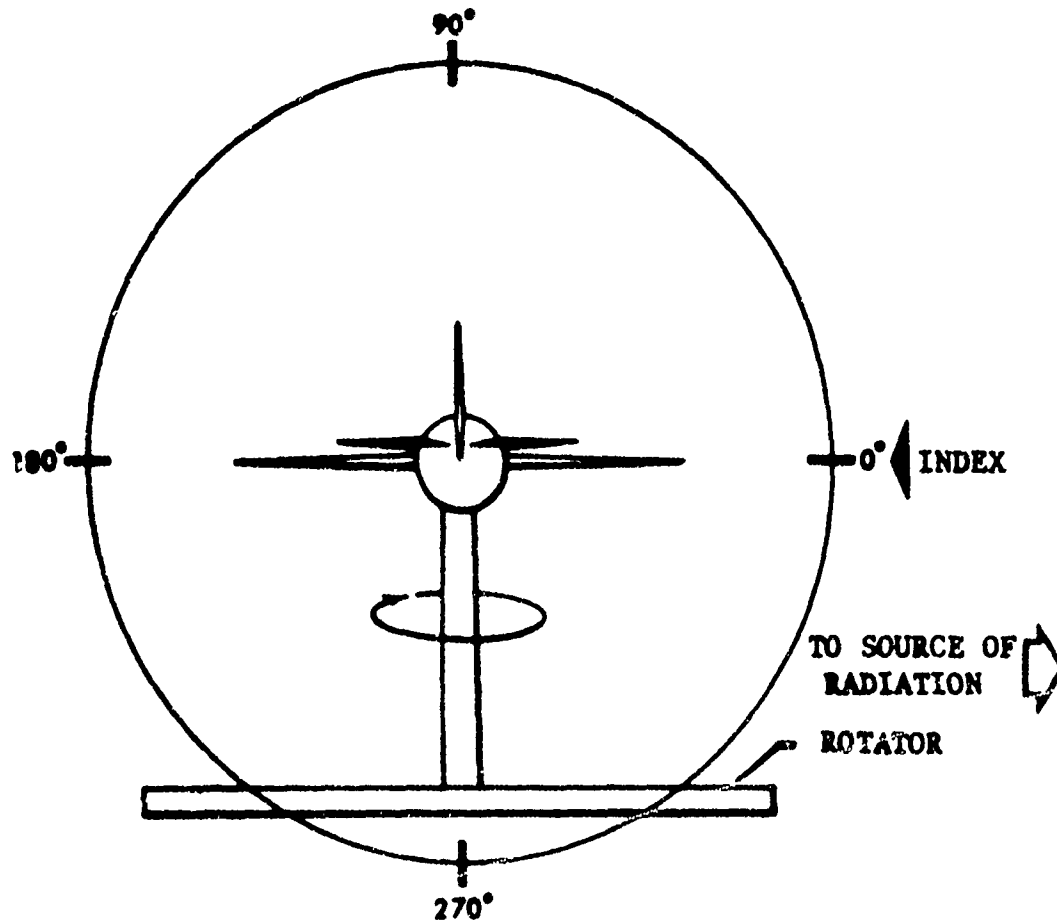


Figure B-1 VEHICLE COORDINATE SYSTEM



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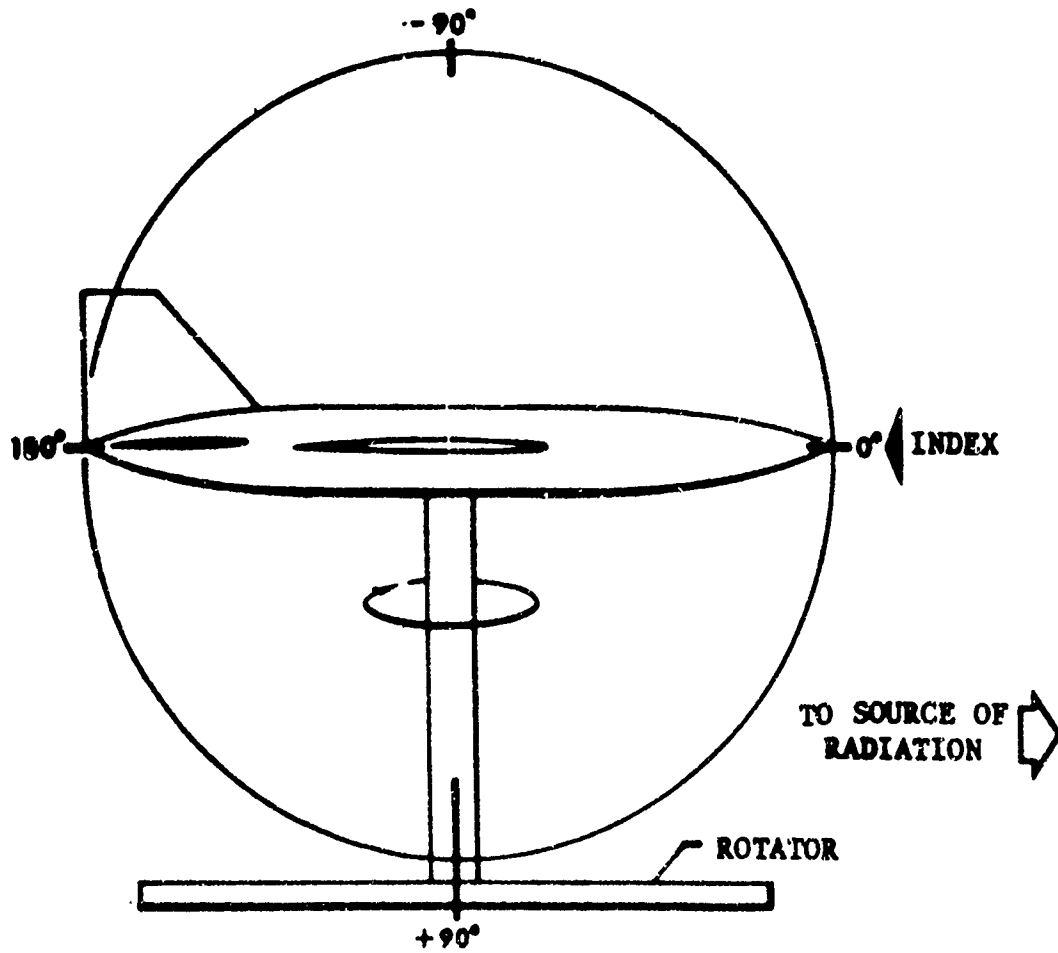
**NOTE:** The roll scale is fixed to the vehicle. The amount of roll is determined by noting the number of degrees opposite the index. Clockwise rotation of the target (when viewed from the rear) increases the roll angle.

Figure B-2 TARGET ORIENTATION - ROLL

B-3

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NOTE: The pitch scale is fixed to the vehicle.  
The number of degrees of pitch is determined  
by noting the scale value opposite the index.

Figure B-3 TARGET ORIENTATION - PITCH

B-4

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apparent source of radiation. Since, in a ground plane range, radiation can be considered to emanate from a point with zero height directly beneath the antennas, a zero-degree tilted axis of rotation is slightly off the geometrical vertical. This small deviation from the geometrical vertical is neglected in the following discussions.

A target mounted with a pitch angle other than zero displaces the yaw axis from the vertical, but not the axis of rotation. The axis of rotation is displaced from the vertical only when non-zero tilt is employed. Tilting toward the radar is considered positive tilt and away from the radar is negative tilt. For monostatic measurements tilt will be measured in the vertical plane containing the line of sight between the radar and the target. The difference between pitch and tilt is shown in Figure B-4.

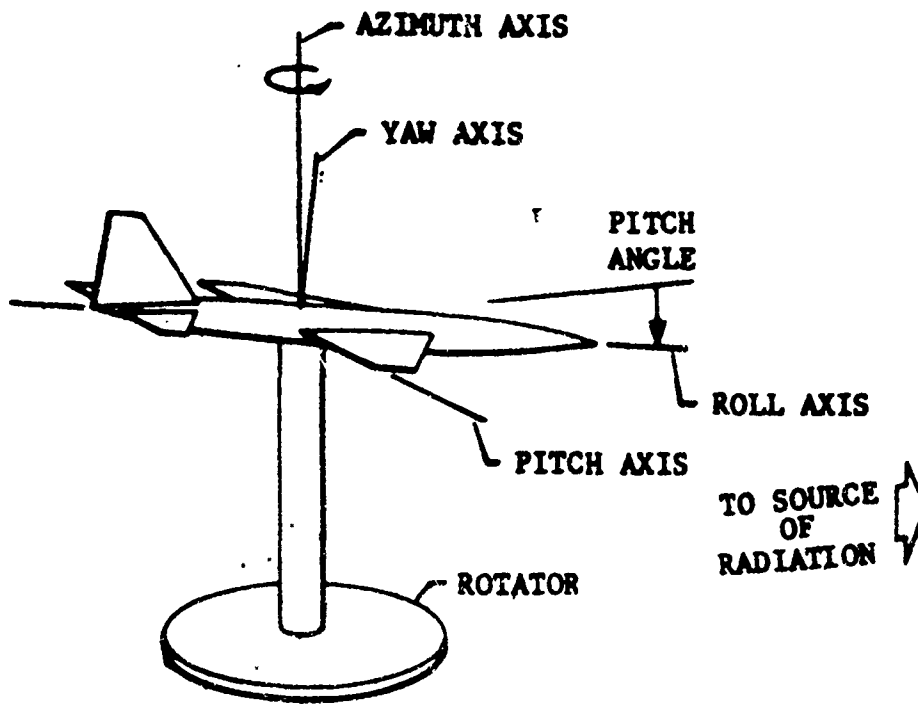
## 2. DATA FORMAT

Data recorders obtain azimuth angle information by means of precision synchro signals from the position of the rotating table. The line of sight from the antennas to the center of the rotator, as illustrated in Figure B-5, indexes azimuth angles. As used here the term azimuth refers to the position of the target rotator table. With zero degrees of pitch and roll, azimuth and yaw are identical. It is standard practice to turn the rotator in a clockwise (cw) direction as viewed from above. Consequently, the azimuth angle varies, for example from 180 degrees (tail-on) to 90 degrees (starboard-side) to 0 degrees (nose-on) to 270 degrees (port-side).

### a. Polar and Rectilinear Plots

Essential information pertinent to each plot is contained in the information block located in the upper right hand corner of the rectilinear plots and in the second quadrant of the polar plots. Each rectilinear plot has the recording of the return from the left side of the vehicle on the left side of the plot, 0 degrees at the center, and the recording of the return from the right side of the vehicle on the right side of the plot; 180 degrees (tail-on) appears at the right and left extremities of the plot, as shown in Figure B-6. Since the paper moves from left to right under the recorder pen, it should be noted that measurements are limited at 180 degrees in order to obtain continuous measurements on the recorder paper. The table on the polar recorder is rotated in the same directions as the target so the 90-degree point appears on the right side of the polar plot, the 270 degree point on the left, and the zero or 360 degree point at the top of the plot.

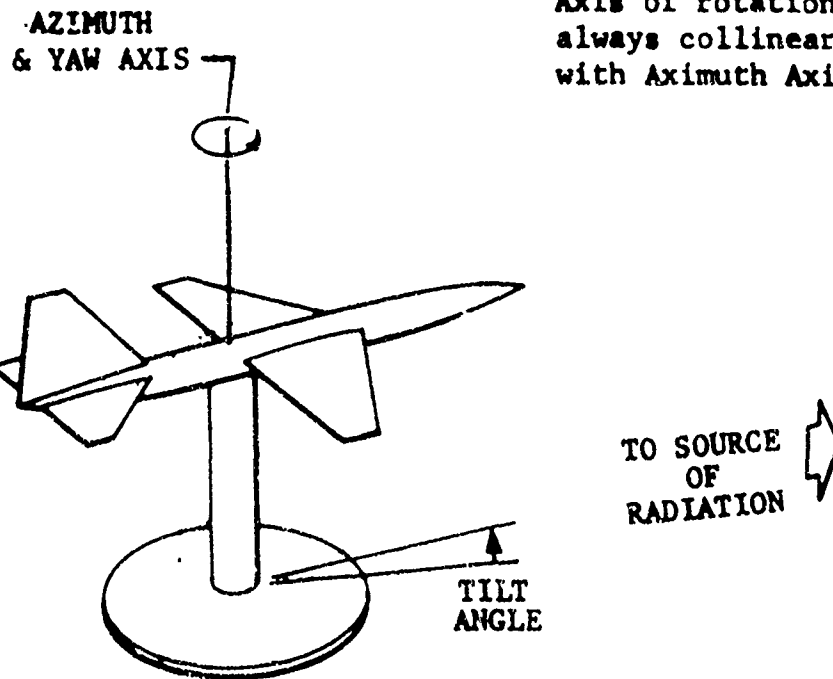
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PITCH

NOTE:

Axis of rotation is  
always collinear  
with Azimuth Axis



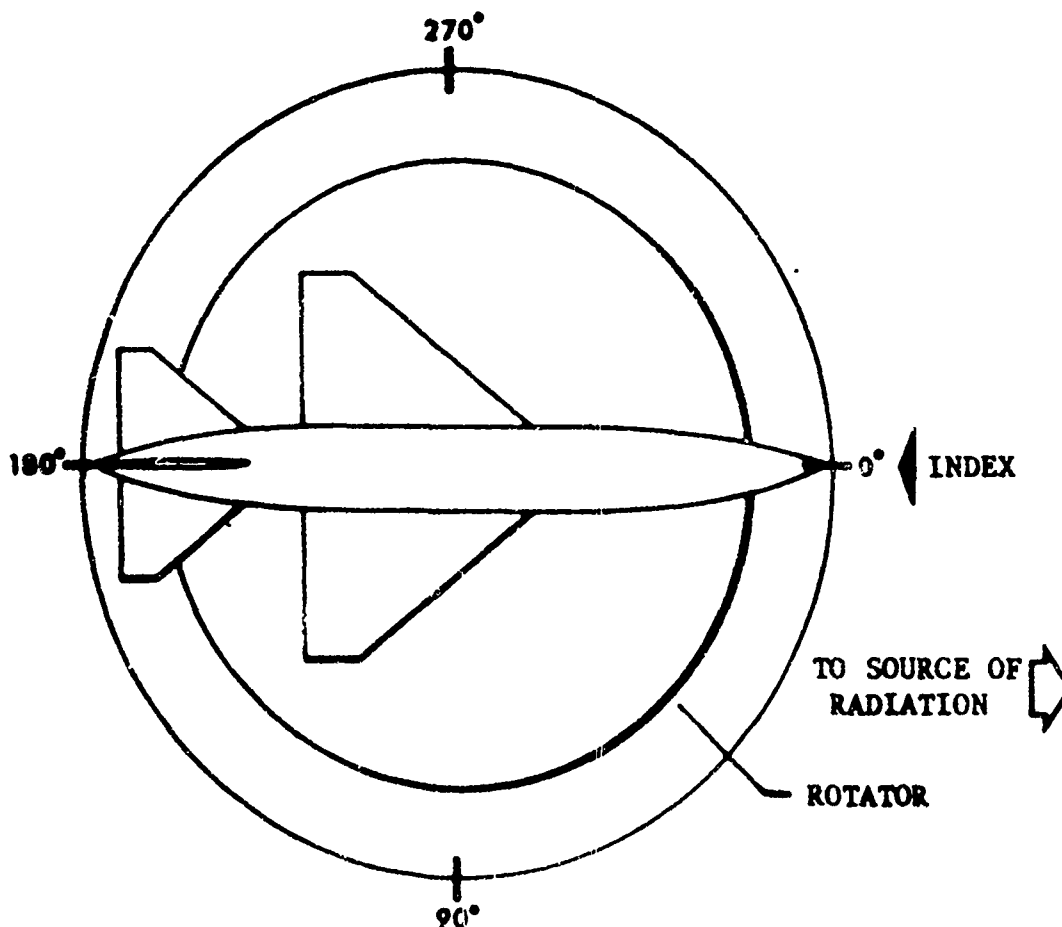
TILT

Figure B-4 COMPARISON OF PITCH AND TILT ORIENTATIONS

B-6

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NOTE: The azimuth scale is fixed to the target rotator. The azimuth value is determined by noting the value of the scale opposite the index mark as the rotator and scale revolve. The index is the line-of-sight from the radar antennas to the center of the rotator. (Azimuth angle data are transmitted to the data recorders by means of synchro signals.) The standard direction of rotation will be clockwise.

Figure B-5 TARGET ORIENTATION - AZIMUTH

B-7

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RECTILINEAR  
RECORDER

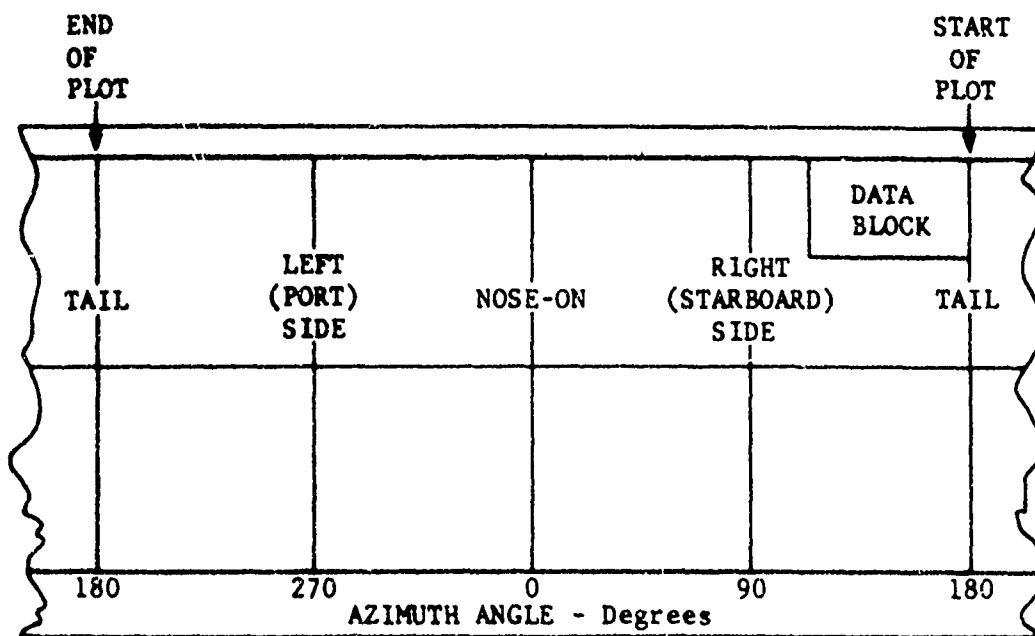
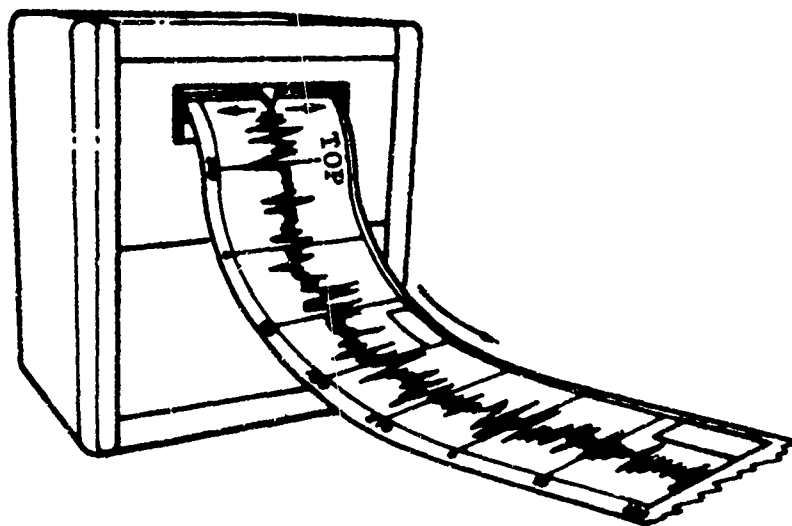


Figure B-6 FORMAT FOR RECTILINEAR PLOTS

B-8

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