CONFIDENTIAL

6 August 1958

MEMORANDUM FOR: THE RECORD

SUBJECT : [redacted] 25X1

1. TIME AND PLACE OF MEETING: The meeting was held 24 July 1958 in [redacted] 25X1

2. ATTENDANCE: [redacted] 25X1

3. DISCUSSION:

a. The following hardware program covering several varieties of items was worked out:

(1) [redacted] will run response curves of the BK-6B microphone with the probe housings supplied by APD. They will also run response curves of the MC-14 microphone with the probe housing supplied by APD. It should be noted that these probe attachments were obtained from ASD as representatives of a program done in Frankfurt. 25X1

(2) [redacted] will deliver, by 30 September, the remaining items called for under Task Order 6 with the exception of the composite summary report. Every effort will be made to finish the report as soon thereafter as practical. 25X1

(3) The hardware schedule under Task Order 7 was changed to call for delivery of the following: Six Type F microphones of 75 ohms, six FA microphones (Type F with integral preamplifiers), and three Type F microphones at 2000 ohms output impedance. In addition, six Type AP units to remotely power the FA microphone will be built. It should be noted that the first Type F prototype was returned to [redacted] to check its characteristics. Tests conducted by the undersigned indicated that the microphone was not up to its earlier performance level. 25X1

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25X1

(4) Evaluate a foreign microphone given to the undersigned by ASD.

b. [redacted] was asked to consider the design requirements for a 25X1
non-magnetic type of microphone that would have the following parameters:

(1) Have an absolute minimum of metal associated with its construction

(2) Be able to operate in an environment of 100% relative humidity and a temperature of 140° F

(3) Have a probe capability

(4) Be relatively small in volume (The size of BA-110 was used as an example.)

(5) Frequency response of 200-6000 cps

(6) Maximum output consistent with the above parameters

This microphone design would probably use Barium Titanite as the active element. The undersigned asked that preliminary thought be given to the subject and that further discussion would be held in the near future.

c. [redacted], upon the request of the undersigned, displayed 25X1
the latest model of a condenser microphone they are presently working on. For possible consideration by APD, its pertinent characteristics are outlined below:

(1) Size - 5/8" dia. x 2-1/2" long

(2) Output - approximately -50 dbm (note output of BK-6B under same conditions is -67 dbm)

(3) Output Impedance - 250 ohms

(4) Frequency Response - at least 200-7000 cps

(5) Tube used is a CK547DX

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[redacted] 25X1

This microphone represents a high output, high quality microphone consistent with reasonable size. Its one serious drawback is that a vacuum tube is needed integral with the microphone. (See attached circuit diagram for circuit details.) This tube is necessary because of the high input impedance necessary for use with a condenser microphone.

The undersigned believes that some possible use could be made of a microphone of this general type and believes that one or two models should be obtained for evaluation. It is proposed that 25X1 [redacted] be asked to make two models under existing task orders (it is not believed that too much money is involved as most of the design work is accomplished) and that their usefulness be further discussed with TSS/ASD.

d. Attached to this memorandum are two [redacted] reports covering studies recently conducted by [redacted] One deals with additional data obtained concerning the audio noise reduction problem while the second deals with a discussion of the articulation index of 3 microphones with different response characteristics. 25X1 25X1

[redacted] 25X1

TSS/APD/EB

Attachments:
1. Circuit Diagram
2. Report-Articulation Index Calculations
3. Report-Audio Noise Reduction Circuit

Distribution:
Orig. - P-189 w/atts 1 & 2
1 - P-185 w/att 3
1 - Chrono

SPK:ls (6 Aug 58)

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AH-3

Work
Covering the Period
March 15, 1958 to June 30, 1958

Report Date: July 1, 1958

AUDIO NOISE REDUCTION CIRCUIT

ADDITIONAL DATA

25X1

During the period since the final report was prepared, several additional tests have been performed using the threshold noise reducer. The following circuit conditions have been used.

1A. 110 channel band pass filters with bandwidths similar to the sample shown in upper part of Figure 32 of the Final Report were used with a square law non-linear characteristic. Refer to Figure 1A.

2A. 110 channel band pass filters with bandwidths similar to the sample shown in the lower part of Figure 34 of the Final Report were used with a square law non-linear characteristic. Refer to Figure 1A.

3A. 110 channel band pass filters with bandwidths similar to the sample shown in the lower part of Figure 34 of the Final Report were used with a fourth power non-linear characteristic. Refer to Figure 2A.

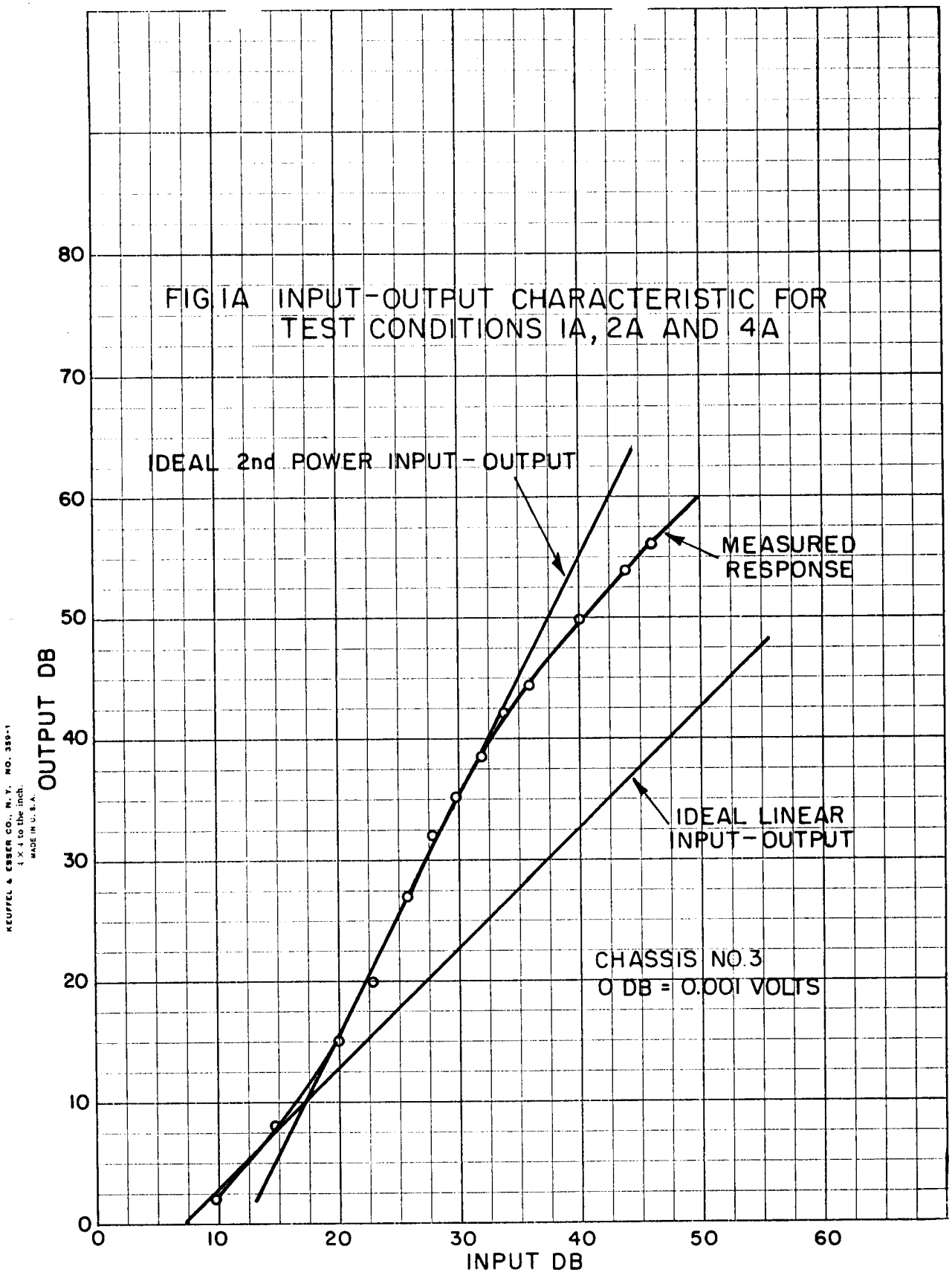
4A. 11 chassis band pass filters as shown in Figure 14 of the Final Report were used with a square law non-linear characteristic. Refer to Figure 1A for this characteristic.

5A. 11 chassis band pass filters as shown in Figure 14 of the Final Report were used with a sharp cut-off non-linear characteristic. Refer to Figure 3A for this characteristic.

In cases 4A and 5A the 110 channel filters were by-passed; only the 11 chassis filters were used. These five additional circuit conditions were tested in the same manner as described in the Final Report. Oscillograms of the test results are shown in Figures 4A through 6A.

The square law and fourth power characteristics provided an increase in the signal-to-noise ratio as is evident in the oscillograms. They also eliminated the sharp switching transients or "birdies" caused by sharp non-linear characteristics. It was felt that some words were heard very clearly through the noise reducer with the 4th power characteristic, but none of these additional circuit conditions provided a substantial improvement in intelligibility over the signal as heard through the by-pass circuit.

The tests reported here conclude the presently scheduled evaluation measurements.



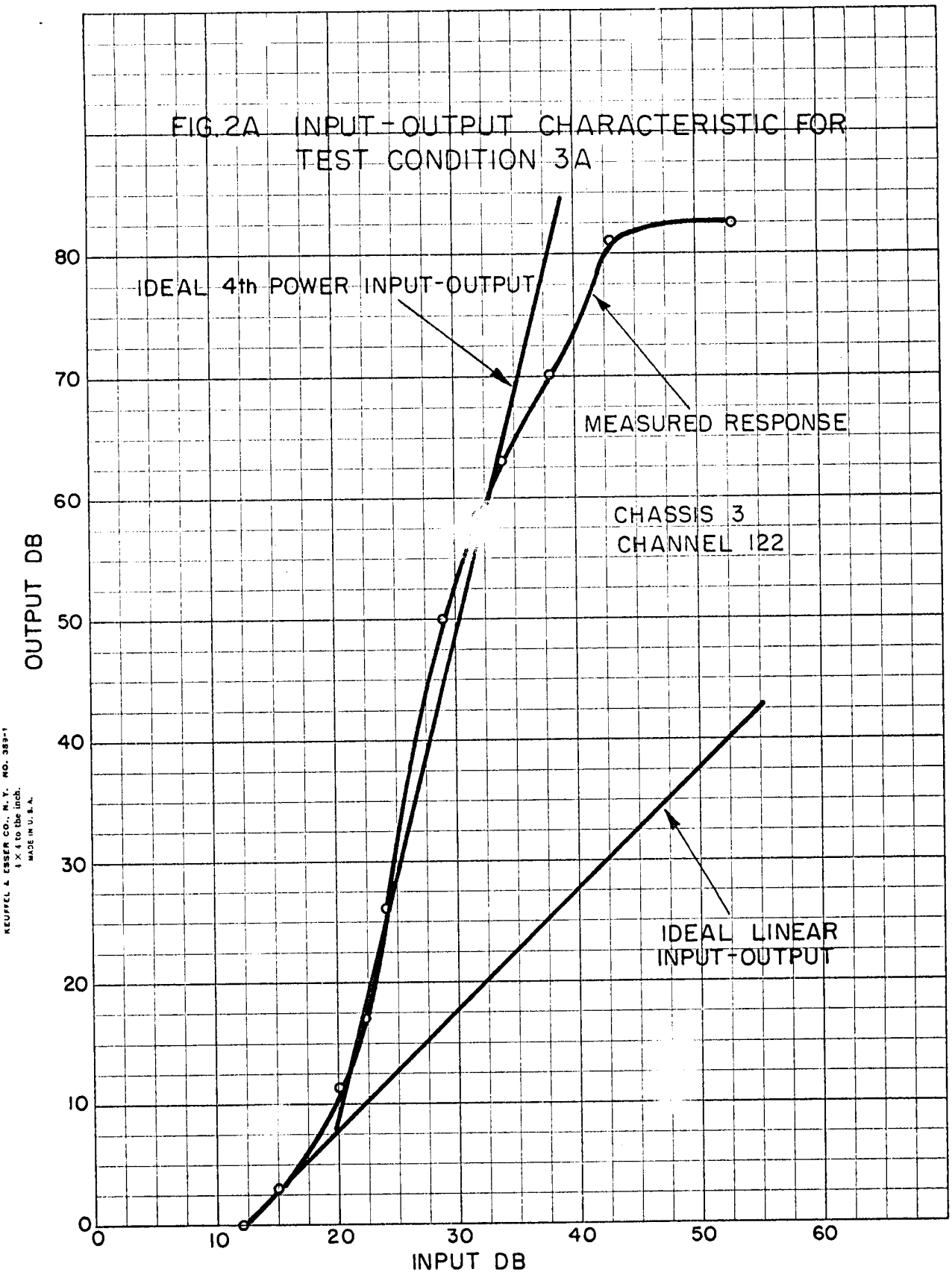
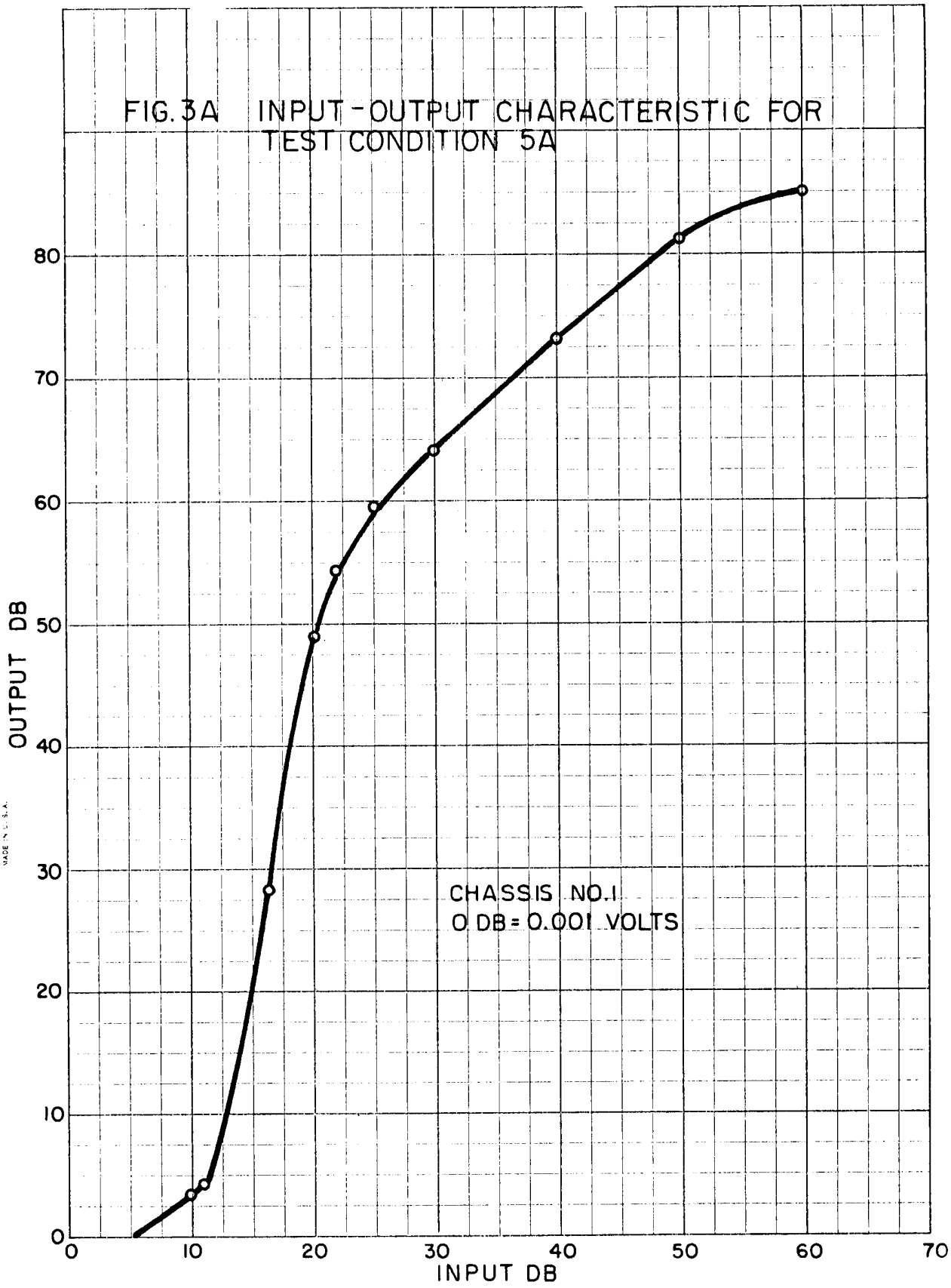
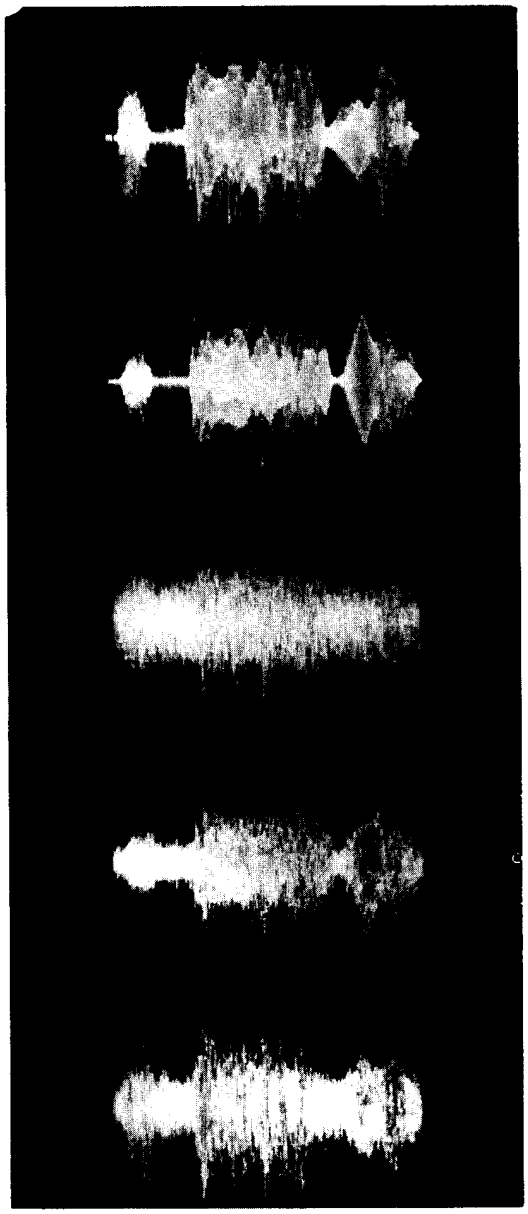


FIG. 3A INPUT - OUTPUT CHARACTERISTIC FOR TEST CONDITION 5A



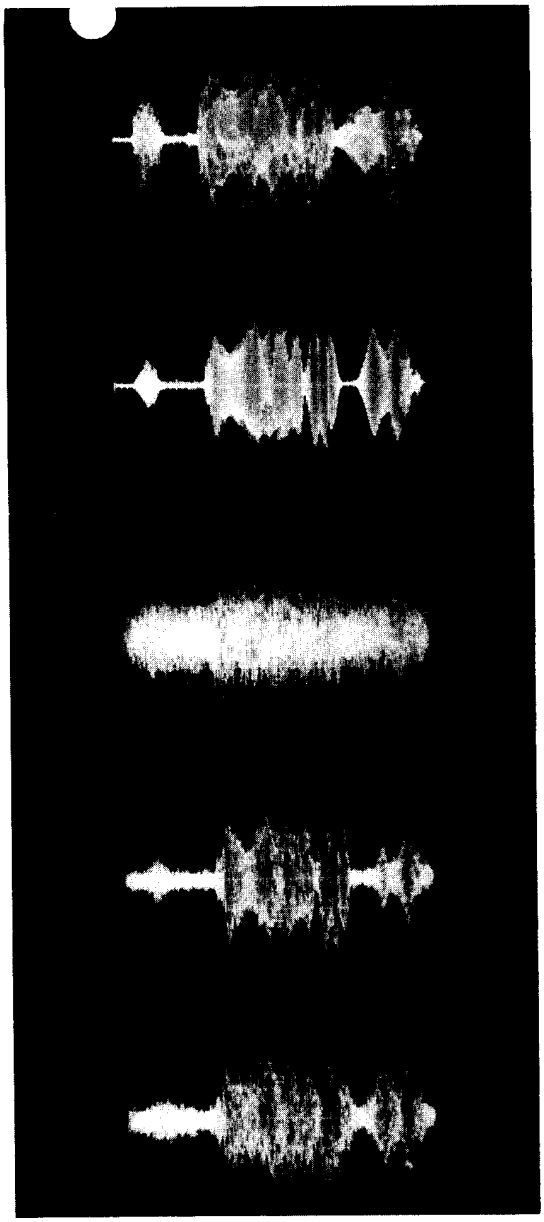
KEUFFEL & ESSER CO., N.Y. NO. 353-1
1 × 1 to the inch.
MADE IN U.S.A.



BANDWIDTH = -3DB
THRESHOLD SETTINGS - FLAT
NOISE SPECTRUM - FLAT
NON-LINEAR CHARACTERISTIC = 2nd POWER

FIGURE 4A

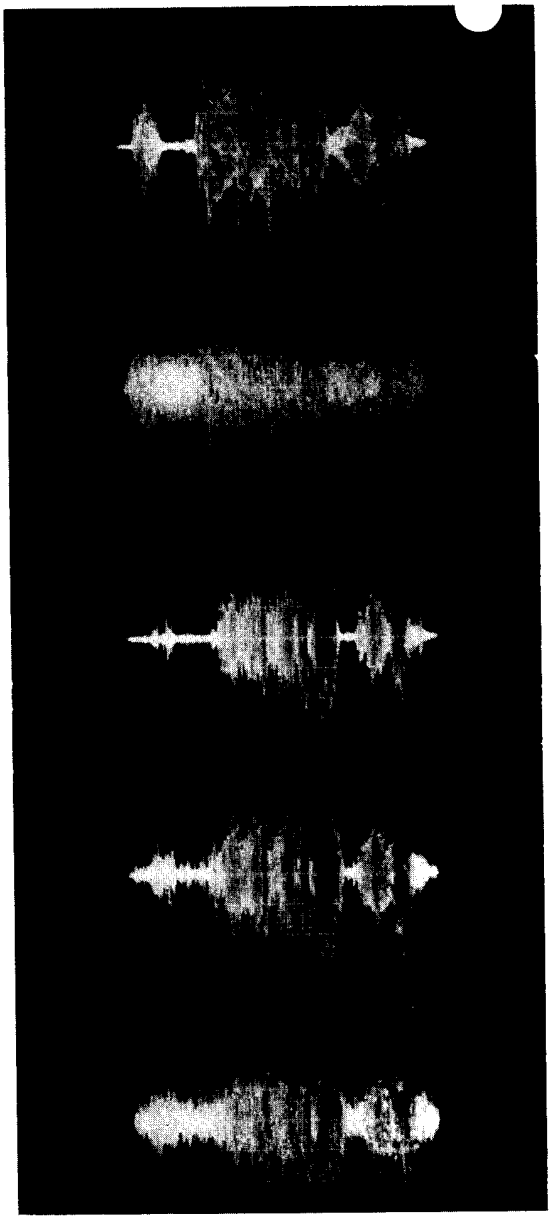
OSCILLOGRAMS SHOWING EFFECTIVENESS OF NOISE REDUCER, CONDITION 2A



BANDWIDTH = −3 DB
THRESHOLD SETTING — FLAT
NOISE SPECTRUM — FLAT
NON-LINEAR CHARACTERISTIC = 4th POWER

FIGURE 5A

OSCILLOGRAMS SHOWING EFFECTIVENESS OF NOISE REDUCER, CONDITION 3A



11 CHASSIS FILTERS
THRESHOLD SETTINGS — FLAT
NOISE SPECTRUM — FLAT
NON-LINEAR CHARACTERISTIC = SHARP CUTOFF

FIGURE 6A

OSCILLOGRAMS SHOWING EFFECTIVENESS OF NOISE REDUCER, CONDITION 5A