SOUNDS OF FREQUENCY

The purpose of this record is to provide a standard by which record playing equipment can be checked for frequency response and distortion.

78 RPM: ——————————

Frequency test run from -15.6 cps to 22,500; Sine Waves.

33 1/3 RPM: ——————————

Frequency test run; Square Waves; and Three variations of Music to check Longplay phonograph record characteristics.

Notes and Recordings by Peter Bartok Oscilloscope Ill. Science Series

A TEST RECORD

Ronald Clyne

FOLKWAYS RECORDS N.Y.

FX 6100

FOLKWAYS FX 6100

SOUNDS OF FREQUENCY

FX 6100

SOUNDS OF FREQUENCY

SIDE I
78 RPM

Band 1. 1000, 4000, 15000 cps.
Band 2. 1000 cps. (odb.)
Band 3. 22.5 kc., 16 kc., 11.5 kc. (odb.)
Band 4. 8 kc., 5.66 kc., 4 kc. (odb.)
Band 5. 2.83 kc., 2 kc., 1.4kc. (odb.)
Band 6. 1 kc. (odb.)
Band 7. 707 cps., 500 cps., 354 cps . (odb.)
Band 8. 250 cps., 177 cps., 125 cps. (odb.)
Band 9. 83.3 cps., 62.5 cps., 44.2 cps. (odb.)
Band 10. 31.3 cps., 22.1 cps., 15.6 cps. (odb.)
Band 11. 1000 cps. (odb.)
Band 12. 444 "A"
Band 13. 435 "A"
Band 14. 440 "A"
Band 15. 1000 cps., 5000 cps. 15000 cps. same level as Band 1.
Recorded by Peter Bartok

SIDE II
33-1/3 RPM

Band 1. 100 cps. square wave (500 cps. turnover, no pre-emphasis)
Band 2. 1000 cps. square wave (500 cps. turnover, no pre-emphasis)
Band 3. 100 cps. square wave (500 cps. turnover, pre-emphasis from 2000 cps. on)
Band 4. 1000 cps. square wave (500 cps. turnover, pre-emphasis from 2000 cps. on)
Band 5. 16 kc. sine wave with 60 cps. amplitude modulation
Band 6. 8 kc. sine wave with 60 cps. amplitude modulation
Band 7. 16 kc., 8 kc., 4 kc., 2 kc., 1 kc., 500 cps., 250 cps., 125 cps., 63 cps., 31 cps., (at appr. - 10 db.)
Band 8. Bartok-Serly: Mikrokosmos Suite, piece no. 8 (500 cps. turnover, no pre-emphasis)
Band 9. Same music (500 cps. turnover, pre-emphasis from 2000 cps. on)
Band 10. Same music, (630 cps. turnover, pre-emphasis from 1600 cps. on)
Recorded by Peter Bartok

FOLKWAYS RECORDS FX 6100

FOLKWAYS RECORDS Album No. FX 6100

SOUNDS OF FREQUENCY

The purpose of this record is to provide a standard by which record playing equipment can be checked for frequency response and distortion.

78 RPM: ———————————————

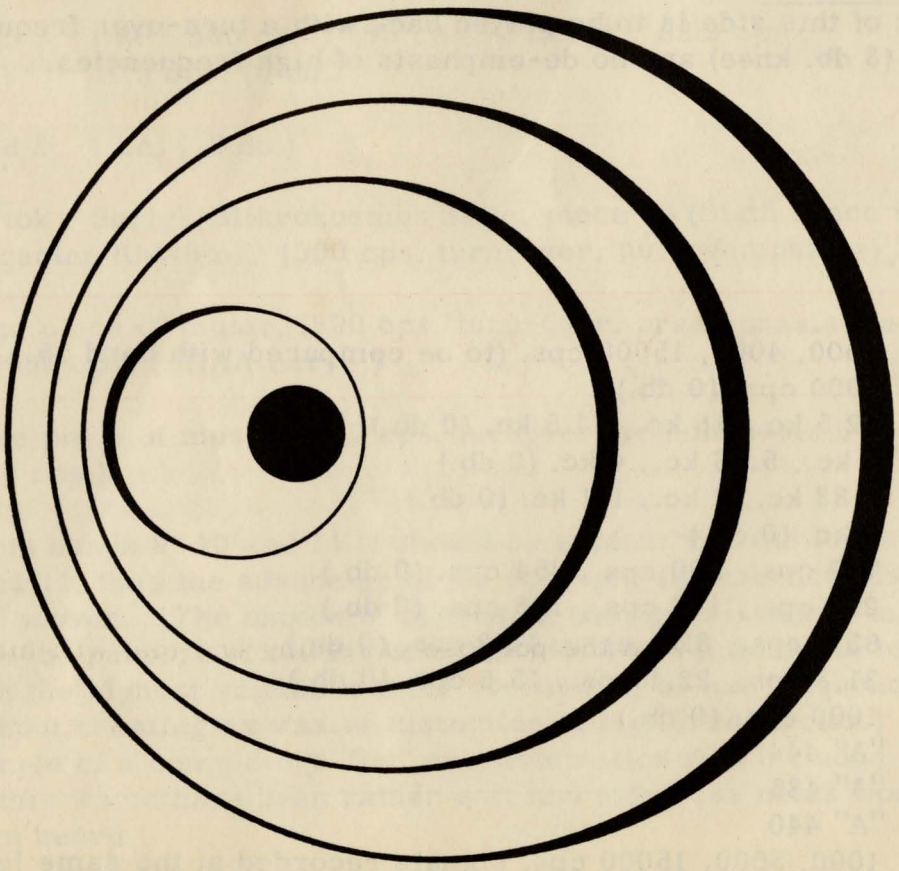
Frequency test run from -15.6 cps to 22,500; Sine Waves.

33 1/3 RPM: ———————————————

Frequency test run; Square Waves; and Three variations of Music to check Longplay phonograph record characteristics.

Notes and Recordings by Peter Bartok *Science Series*

A TEST RECORD



NOTES BY PETER BARTOK

The purpose of this record is to provide a standard by the use of which record playing equipment can be checked for frequency response, and distortion, without equipment other than an oscilloscope and volume indicator. In addition, signals are provided for demonstrating the loss of high frequencies at the inside of a record as compared with the same type of loss on the outside; for checking turntable speed by using a pitchpipe (if no stroboscope is available), and for demonstrating the reason for using the peculiar recording curve long-playing records have to have.

The portion of the record intended for frequency-response measurement provides test signals which are always the same musical distance apart, so that it does not take longer time to check the high frequency part of the entire band than to check the low frequency part, nor is the accuracy of this testing any less at the low end than it is at the high end.

Both sides of the record can be played with any stylus whose tip radius is not less than 3/4 mil. Side "A" was recorded at 78 RPM and side "B" at 33.33 RPM.

CONTENTS:

Side "A": (78 RPM)
Each part of this side is to be played back with a turn-over frequency of 500 cps., (3 db. knee) and no de-emphasis of high frequencies.

Band 1: 1000, 4000, 15000 cps. (to be compared with band 15.)
Band 2: 1000 cps. (0 db.)
Band 3: 22.5 kc., 16 kc., 11.5 kc. (0 db.)
Band 4: 8 kc., 5.76 kc., 4 kc. (0 db.)
Band 5: 2.83 kc., 2 kc., 1.4 kc. (0 db.)
Band 6: 1 kc. (0 db.)
Band 7: 707 cps., 500 cps., 354 cps. (0 db.)
Band 8: 250 cps., 177 cps., 125 cps. (0 db.)
Band 9: 83.3 cps., 62.5 cps., 44.2 cps. (0 db.)
Band 10: 31.3 cps., 22.1 cps., 15.6 cps. (0 db.)
Band 11: 1000 cps. (0 db.)
Band 12: "A" 444
Band 13: "A" 435
Band 14: "A" 440
Band 15: 1000, 5000, 15000 cps. signals recorded at the same level as on band 1. For demonstration of high frequency loss and increased distortion on the inside of a record.

Side "B" (33 1/3 RPM)

Band 1: 100 cps. square wave. (500 cps. turn-over, no preemphasis)

(With proper low-frequency characteristics, this signal should play back approximately like a square wave)

Band 2: 1000 cps. square wave.

(With proper 500 cps. turn-over point, this signal should play back approximately like a square wave)

Band 3: 16 kc. sine wave with 60 cps. amplitude modulation. (If the equipment under test has no appreciable distortion, there should be no 60 cps. signal audible) (630 cps. turn-over, preemphasis starts at 1.6 kc.)

Band 4: 8 kc. sine wave with 60 cps. amplitude modulation. (Same use and recording characteristics as in band 3.)

Band 5, 6, 7, 8: For checking equipment adjusted to play long playing records recorded with 630 cps. turn-over point and high-frequency pre-emphasis starting at 1.6 kc. (See enclosed diagram)

Band 5: 1000 cps. (-2 db.)

Band 6: 16 kc., 8 kc., 4 kc., 2 kc., (0 db.)

Band 7: 1 kc., 500 cps., 250 cps., 125 cps., 62.5 cps., 31.3 cps. (0 db.)

Band 8: 1 kc. (-2 db.)

Band 9: Bartok - Serly: Mikrokosmos Suite, piece #8 (Sixth dance in Bulgarian Rhythm). (500 cps. turn-over, no preemphasis)

Band 10: Same piece of music, (500 cps. turn-over, preemphasis starts at 2000 cps. **(RIAA curve)**

Band 11: Same piece of music, (630 cps. turnover, preemphasis starts at 1600 cps.)

From bands 9, 10 and 11 it should be evident that the loudest is Band 11, thus the advantage of the long-playing characteristics are proven. (The choice of recording characteristics is made with the purpose of finding one that will make it possible to record with the highest volume without overcutting at low frequencies and without creating excessive distortion at high frequencies.) No sample of a completely "flat" characteristics was included inasmuch as this would have been rather soft and only bass notes would have been heard.

Without any instruments it may be decided if the playing equipment has proper characteristics for long playing records. The last band should be played. If it sounds good, and the other two sound bad (too dull), then the equipment is reasonably correctly equalized.

If band 2 sounds good, and band 1 sounds dull and band 3 sounds shrill, the equipment is correctly equalized for records made with 500 cps. turnover and 13 **db down** at 10 kc. (AES curve)

If band 1 sounds good and the other two too shrill, the equipment has no hf. de-emphasis and all records will sound too shrill and noisy.

This record should be useful in selecting from various pickups the one that best suits a system.

Bands 3 and 4 on side B should help in selecting one which does not distort the preamplifier (e.g., a Pickering pickup, plugged into a G.E. type pre-amplifier will tend to produce distortion.)

Furthermore, many so-called "flat" pickups have exaggerated high-frequency response sometimes as much as 10 db. which will tend to make records sound unduly bright and noisy. In fact, the writer has not encountered a single pickup with 1 mil. stylus tip radius that gave a frequency reponse within ±2 db., although some 3 mil. tip radius pickups conform to this specification.

It may be shown that, contrary to accepted opinion, pickups with 3 mil styli have an all around better performance than the same pickups with 1 milt styli. Try playing the 16000 cps. signal on the outside of the 78 RPM side (band 1, third signal) with a pickup with a stylus of 1 mil tip radius. Then take a pickup of the same make and model, but with a 3 mil stylus. The latter should have the greater output. Using the frequency run on this side it may be shown that the 1 mil pickup will have a "peak" at a frequency lower than the peak frequency of the 3 mil pickup.

Additional consideration is the input resistance an amplifier must have in order to provide for pickup with a proper load. Thus, an amplifier may load a Pickering pickup properly, but this load resistance may be too low for a G.E. pickup which may have a higher inductance. In the same way, the input capacitance may cause the circuit to function improperly. One of the effects of such mis-matched properties is a frequency response which is anything but flat. Side A of this record will give a quick means of checking it, and provide an explanation why the same record played with two different pickups of supposedly similar characteristics should not sound similar.

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