NO. TTR-101

33⅓ - STEREO

"AN AUDIO OBSTACLE COURSE"

THE SHURE TRACKABILITY TEST RECORD

ABOUT THIS RECORDING

This recording is unique. Its purpose is to demonstrate a heretofore neglected factor in phono pickup design—namely, the ability of the pickup to stay in contact with the groove modulations over a wide range of frequencies and intensities; in other words, to track the groove.

Recording engineers have known for many years that the tracking ability of pickups is the main factor in determining the dynamic range of the records which they may cut. Sometimes, tracking demands may be so severe as to make some recorded passages unplayable. The needle will simply jump to the next groove; or, mistracking may be so subtle as to cause a piano note to buzz, a bell to sound leaden, or cymbal clashes to resemble sandpaper sheets rubbed together.

We'll explore tracking demands in this record by reproducing a number of musical sounds, first at a very mild recorded level, then at progressively higher recorded levels. As the recording level increases, the velocity* of the stylus increases enormously. Eventually, even the best stylus cannot follow the wildly undulating grooves and mistracking takes place. It may be only a momentary "click," or a severe, sustained, gross distortion and noise. (See other side of this sheet for further details on trackability.)

Most cartridges should be able to effectively track the mildest level at their rated needle force, but only a truly exceptional pickup will track the 4th level without breakup. Each level is 4 db or **58%** higher than the preceding one, and consequently the 4 steps encompass a total increase of **400%!** Actually the recorded levels are so high and the velocity increase so great that it seems a near miracle that **any** cartridge could successfully track level 4—but the V-15 Type II Improved does so, and well at 1¼ grams in a Shure-SME Tone Arm with a professional quality turntable. With other equipment, the V15 Type II Improved may also track level 4 at 1¼ or 1½ grams, depending on the quality of the other equipment.

Side 1 is designed to test tracking ability at very high and very low frequencies and is recorded in both channels. Side 2 has single channel stereo tests for 1,000 cycle level, channel balance, phasing and tracking ability using several musical instruments.

* Velocity perpendicular to the groove.

GENERAL CONSIDERATIONS

- DO NOT PLAY THIS RECORD WITH A MONOPHONIC CARTRIDGE.

Use only a stereo cartridge. Set tracking force to lightest recommended force. Sometimes, increasing the force (but **never** above the recommended maximum) helps trackability. Avoid repeated playing of this record with low trackability cartridges because high frequency characteristics of the record will be erased by the groove-deforming action of the stylus.

- All four recorded levels of any one instrument have been taken from identical **master** tapes of the same recorded intensity. The levels on the record have been increased electronically at the **cutting** head —the balance of the recording equipment, settings, etc., remain exactly the same for all four levels. All limiters and compressors were taken out of the record-cutting circuit.

- You are urged to keep a "score chart" of the cartridge. (See below.) Audio "memory" is demonstrably too limited to be relied upon in these precise tests.

- ALWAYS compare the sound of levels 2, 3, & 4 against the sound of level 1. The sound of level 1 of any instrument **should** be the way that the other levels sound. This is especially important because your ear may have been "conditioned" to improper **timbre, etc., by many, many years of hearing various** of these recorded instruments distorted by mistracking.

- Insofar as each instrument is recorded alone, mistracking distortion is easy for the ear to isolate on this record. In a commercial recording, because several instruments are usually playing at once, the mistracking of any one instrument may be harder to pinpoint, but be assured it exists. In the past you may have blamed this mistracking distortion on poor pressings, damaged record grooves, loudspeaker breakup or a host of other reasons.

- It is possible that your present stereo cartridge won't track well at its minimum rated tracking force. If so, it probably will track better at a heavier force; however, you will have to pay the price in greater record wear and shorter stylus life.

- The built-in calibration adjustments on some tone arms are not necessarily accurate. It is recommended that you acquire a separate gauge, such as the Shure SFG-2 Stylus Force Gauge, to double check the calibration of your tone arm.

SIDE 1.

This side is recorded in both channels simultaneously. It does not create the stereo effect, rather, the same sound will be heard coming from both speakers.

RECORDED MATERIAL	WHAT TO LISTEN FOR
BAND 1—INTRODUCTION A completely self-explanatory introduction to the recorded material that follows.	NOTE: READ "GENERAL CONSIDERATIONS" ABOVE THOROUGHLY BEFORE LISTENING FURTHER.
BAND 2—ORCHESTRAL BELLS The most severe high frequency trackability test on this record. Even though the fundamental tones are well within the singing range, and are not really very loud even at level four, the recorded harmonics (particularly the higher ones) have so much energy that the stylus has "fits" trying to remain in the groove. **Stylus velocities actually exceed 25 cm/sec (!) at 10,000 Hz (cps).**	Listen to the sound of the bells at the first level. Judge the sound of levels 2, 3, and 4 against the sound of level 1. Mistracking sounds like a "rasping, knocking" sound.
BAND 3—DRUM AND CYMBAL The drum-roll serves only as a lead-in and "warning" for the upcoming cymbal sound and may be disregarded. This band is an excellent test for mistracking of strong transients.	The first indication of mistracking is a "sandpapery," pulled-apart sound at the initial cymbal stroke. There may be a "tick," or a sound like a wood-block striking simultaneously. The reverberant "tail" of sound is usually unaffected.
BAND 4—ANTI-SKATING BAND Place the stylus midway in the wide blank band. It should not "skate" in toward the center or toward the edge. The anti-skating force should be adjusted so that the tone arm does not move rapidly in either direction.	This should be considered only a rough indication of skating force compensation. For precise adjustment follow the instructions provided with your tone arm or changer. This test is explained on the recording. The sound of the test is immaterial.
BAND 5—BASS DRUM This is an excellent low-frequency trackability test. Make certain that the mistracking sound you hear is due to the record and cartridge, and not to some object or piece of furniture (especially the loudspeaker) in the room rattling about because of the low frequency vibrations.	The sound should be smooth—especially at the beginning of the drum stroke. First effect of mistracking is a rattle at the stroke and shortly thereafter. The sound will be deep, harsh and noticeably resonant. In severe mistracking, the needle will actually jump the groove on this band.
BAND 6—SILENT GROOVES These grooves are unmodulated and serve as tests for hum, rumble and surface noise.	Ideally, you should "hear" silence from these grooves.

SIDE 2.

This side is recorded in stereo; band one, both channels; bands 2-5, left channel; and bands 6-9 incorporate the same instruments as bands 2-5 but in the right channel.

RECORDED MATERIAL	WHAT TO LISTEN FOR
BAND 1—CHANNEL BALANCE AND PHASING Enables you to check your system. Voice on recording describes exactly what to listen for, etc.	NOTE: READ "GENERAL CONSIDERATIONS" ABOVE THOROUGHLY BEFORE LISTENING FURTHER.
BAND 2—LEFT CHANNEL **BAND 6—RIGHT CHANNEL** **ELECTRIC ORGAN** These bands constitute an effective test for low and mid-range mistracking. It is interesting to note that the tones of the electric organ are virtually "pure" with very few transients.	Compare the sound of levels 2, 3, and 4 against level number 1. First effect of mistracking is a buzzy, "hummy," fuzzy tone, particularly in the closing chord. Listen also for false internal dissonance in the closing chord.
BAND 3—LEFT CHANNEL **BAND 7—RIGHT CHANNEL** **PIANO** The piano, never an easy instrument to record because of its wealth of overtones, makes an excellent mid-range trackability test.	Mistracking effect can be heard as a buzz, crackle or rattle in the initial "attack" portion of each tone. Notice especially the attack of the closing chord. The effect can be like two pianos playing together, very slightly out of time and tune.
BAND 4—LEFT CHANNEL **BAND 8—RIGHT CHANNEL** **ACCORDION** The accordion is well suited to our tests because of its many harmonics and lack of an initial attack or stroke (the sound "swells" up.)	Mistracking has an effect similar to the electric organ. There is often a "tearing-apart" of the sound—and not always during the "loudest" sections.
BAND 5—LEFT CHANNEL **BAND 9—RIGHT CHANNEL** **HARPSICHORD** Combines many of the difficulties of percussion and string instruments. Excellent instrument for trackability tests in the middle to high ranges. Actually some commercial recordings of harpsichords mistrack far worse than this example (even to the point of sustained gross distortion) when other instruments are playing at the same time.	Effect of mistracking is a "knocking" in the initial plucking attack. Fuzzy, smeary sounds throughout are other common symptoms of harpsichord mistracking.

HOW TO "KEEP SCORE" OF CARTRIDGE TRACKABILITY

Rule one in comparing cartridge trackability is DO NOT TRUST TO MEMORY. For one thing, audio memory is amazingly short . . . even among "experts." An A-B test would be ideal for comparing cartridges, but this takes expensive equipment and precise setups. We recommend that you use the chart at the right. Simply grade the cartridge "O," "S," "X," or "★" for its ability to track various bands. (See "Scoring Table.") Then you can compare one cartridge against another . . . even days later. Abbreviations in the chart are:

OB—Orchestral Bells
D&C—Drum and Cymbal
BD—Bass Drum
O—Electric Organ
P—Piano
A—Accordion
H—Harpsichord

SCORING TABLE

O—Tracking
S—Mistracks Slightly
X—Mistracks
★—Crackles Considerably

	SIDE 1—MONO				SIDE 2—STEREO Left Channel				SIDE 2—STEREO Right Channel			
Level	Stylus Force	OB	D&C	BD	O	P	A	H	O	P	A	H
1												
2												
3												
4												

PRODUCED BY:
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see other side for information on the Shure V-15 Type II Improved Super-Track Cartridge

what the critics say about the

SHURE

V-15 Type II Improved:

The results of performance tests on the Shure V-15 Type II Improved by Hirsch-Houck Laboratories were published in a recent issue of **Stereo Review.**

They said of its trackability:

"The 'trackability' score for the V-15 Type II Improved is by a comfortable margin the best we have measured to date."

In describing its tone burst response, they said:

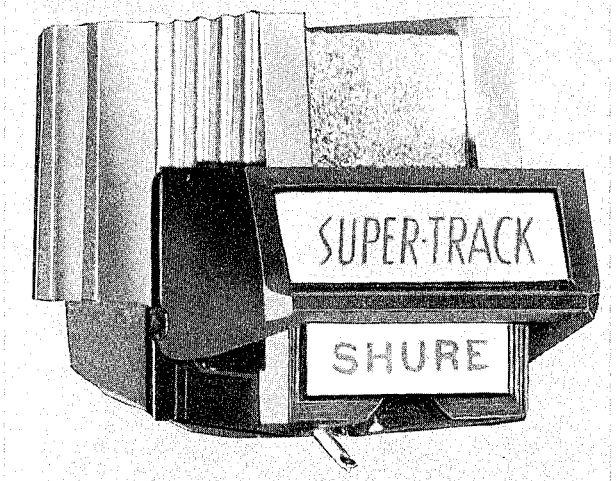
"Tone burst response, using the Stereo Review SR-12 test record, was perfect up to the highest frequencies . . ."

And of its sine wave response:

". . . Tracked the heavy bass bands on the Cook Series 60 test record at 0.75 grams, and the 30 cm/sec, 1,000 Hz bands of the Fairchild 101 test record at 1 gram . . . (and) produces a visually perfect sine wave — the first cartridge we have tested that has done so."

And finally, describing its total performance, Hirsch-Houck said the Shure V-15 Type II Improved was:

"As neutral a cartridge as we have heard . . . unstrained, effortless, and a delight to listen to."



...highest trackability at the lightest tracking forces

THE SHURE V-15 TYPE II (improved)

now...with improved trackability in the bass and mid-frequency range

The world-famous, computer-designed Shure V-15 Type II Super Trackability phono cartridge heralded a new epoch in high performance cartridges. Now, Shure has **improved** the trackability of the bass and mid-frequency range of the V-15 Type II without affecting its redoubtable treble . . . so that even recordings with very heavily modulated low frequency passages can be tracked at super-light, record-saving forces!

WHAT TRACKABILITY MEANS TO YOU & YOUR RECORDINGS

The "secret" of High Trackability is to enable the stylus tip to follow the hyper-complex record groove up to and beyond the theoretical cutting limits of modern recordings—not only at select and discrete frequencies, but across the entire audible spectrum—and at light tracking forces that are below both the threshold of audible record wear and excessive stylus tip wear.

THE SHURE V-15 TYPE II IMPROVED GIVES SUPERIOR TRACKABILITY AT LIGHT FORCES

No cartridge that we have tested (and we have repeatedly tested random off-the-dealer-shelf samples of all makes and many models of cartridges) can equal the Shure V-15 Type II in fulfilling all of the requirements of a High Trackability cartridge—both initially and after prolonged testing, especially at record-and-stylus saving low tracking forces. The Shure V-15 Type II Improved "Super-Track" Cartridge is capable of tracking the majority of records at ¾ gram!* However, state-of-the-art advances in the recording industry have brought about a growing number of records which require 1 gram tracking force in order to fully capture the expanded dynamic range of the recorded material.

THE PRACTICAL EFFECT OF IMPROVED BASS TRACKABILITY

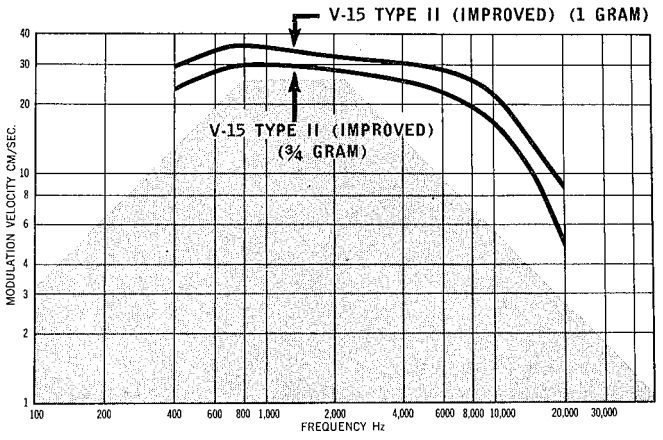
Where, in the past, you may have been required to increase tracking forces to track heavily modulated bass drum, tympani, organ pedal, bassoon, tuba, or piano passages, you can now play these passages without increasing tracking force, without bass flutter, or IM distortion. This means that you can reduce 1¼ gram tracking force to 1 gram, or 1 gram to ¾ gram for records with high velocity bass material.

YOU CAN IMPROVE YOUR PRESENT V-15 TYPE II

You can attain this superior bass trackability with your present V-15 Type II by using the VN15E IMPROVED stylus listed at right. Look for the word "Shure" in red letters on the stylus grip.

TRACKABILITY AS A MEANINGFUL SPECIFICATION

This chart depicts the new performance specification of trackability. Unlike the over-simplified and generally misunderstood design parameter specifications of compliance and mass, trackability is a measure of total performance. The chart shows frequency across the bottom, and modulation velocities in CM/SEC up the side. The grey area represents the maximum theoretical limits for cutting recorded velocities; however, in actual practice many records are produced which exceed these theoretical limits. The smoother the curve of the individual cartridge being studied and the greater its distance above the grey area, the better the trackability. The trackability of the Shure V-15 Type II Improved is shown by the top (solid black) lines.



***SPECIAL NOTE:**

¾ gram tracking requires not only a cartridge capable of effectively tracking at ¾ gram, but also a high quality manual arm (such as Shure SME) or a high quality automatic turntable arm capable of tracking at ¾ gram.

SPECIFICATIONS

Trackability at 1 gram tracking force using a Shure/SME Arm:
28 CM/SEC at 400 Hz — 30 CM/SEC at 5,000 Hz
35 CM/SEC at 1,000 Hz — 22 CM/SEC at 10,000 Hz

Frequency Response: From 20 to 25,000 Hz

Output Voltage: 3.4 mv per channel at 1,000 Hz at 5 CM/SEC peak velocity

Channel Separation: Over 25 db at 1,000 Hz
Over 17 db at 500 to 10,000 Hz

Channel Balance: Output from each channel within 2 db

Stylus: VN15E Bi-Radial Elliptical Stylus, Diamond Tip.
.0007 Inch (18 microns) frontal radius;
.0002 Inch (5 microns) side contact radii;
.0010 Inch (25 microns) wide between record contact points
VN7—.0007 inch diameter, spherical stylus

Tracking Force ¾ to 1½ grams

Recommended Load Impedance: Nominally 47,000 ohms (per channel). Can be used up to 70,000 ohms with almost inaudible change in frequency response.

Input Capacitance: 400-500 Pico-Farads per channel, including tone arm wiring.

Inductance: 720 millihenries

D.C. Resistance: 630 ohms

Terminals: 4 terminals (with loop pinjack for 3-terminal connection)

Weight: Net weight—6.8 grams

Mounting: Standard ½ inch (12.7 mm) mounting centers.

MODEL V-15 TYPE II IMPROVED SUPER-TRACK CARTRIDGE

MODEL VN15E IMPROVED ELLIPTICAL STYLUS
fits V-15 Type II Improved, V-15 Type II, or V-15 II-7

MODEL V-15 II-7 SUPER-TRACK CARTRIDGE WITH .0007" SPHERICAL STYLUS

MODEL VN7 STYLUS—.0007" DIAMOND STYLUS
fits V-15 II-7 Cartridges