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SHURE V15 TYPE V PHONO CARTRIDGE

Manufacturer's Specifications

Tracking Force, at Stylus Tip: Optimum, 10 mN (1.0 gram); maximum, 12.5 mN (1.25 grams).

Tracking Force, Total Tonearm Setting with Dynamic Stabilizer: Optimum, 15 mN (1.5 grams); maximum, 17.5 mN (1.75 grams).

Force Exerted by Dynamic Stabilizer: 5 mN (0.5 gram).

Tip Geometry: Hyperelliptical, 5 × 38 microns (0.2 × 1.5 mils), long contact area.

Trackability at 10 mN (1 gram) Tracking Force: At 400 Hz, 30 cm/S; at 1 kHz, 46 cm/S; at 5 kHz, 80 cm/S; at 10 kHz, 60 cm/S; all figures typical in cm/S peak velocity.

Total Trackability Index (TTI): 91.7, minimum.

Vertical Tonearm Resonance: Less than 5 dB rise at 14 Hz in SME Series III arm (without SME damper).

Channel Balance: Within 1.5 dB.

Channel Separation: At 1 kHz, 25 dB or greater; at 10 kHz, 18 dB or greater.

Output Voltage: 3.2 mV rms at 1 kHz at 5 cm/S peak velocity, typical.

Frequency Response: 10 Hz to 28 kHz.

Recommended Load: 47 kilohms in parallel with 250 pF (including tonearm wiring, connecting cables, and preamplifier input). Capacitive loading from 100 to 400 pF will cause negligible change from the recommended 250-pF loading.

Resistance: 950 ohms d.c., typical.

Inductance: 330 mH at 1 kHz, typical.

Weight: 6.6 grams.

Replacement Styli: V15V-VN5HE, nude hyperelliptical tip, 5 × 38 microns (0.2 × 1.5 mils); V15V-G-VN5G, nude spherical tip, 0.6 mil.

Optional 78 rpm Stylus: VN578E, biradial (elliptical) tip, 13 × 63 microns (0.5 × 2.5 mils).

Price: $250.00.

Company Address: 222 Hartrey Ave., Evanston, Ill. 60204.

For literature, circle No. 92

After reviewing Shure's specifications, I was highly impressed by the claim of even greater trackability by the V15 Type V over that of its predecessor, the V15 Type IV. With such high-frequency trackability as 80 cm/S peak velocity at 5 kHz and 60 cm/S peak velocity at 10 kHz, there positively is no commercial record currently available that the V15 Type V could not track. I feel, however, that in the not too distant future, some record company will probably attempt to produce a recording that will cause the Type V to mistrack.

To achieve such tracking ability, there had to be a major reduction in effective tip mass, which automatically meant that its cantilever had to be redesigned for an even lower effective mass than the Type IV's. Shure accomplished this by using beryllium, which has the highest stiffness-to-mass ratio of any metal, for the ultra-thin walled cantilever. Specially developing the process, Shure forms the "Microwall/Be" cantilever out of beryllium foil, and claims for it the lowest effective mass of any stylus shank. The effective stylus assembly mass of the Type V is 0.175 mg as opposed to the Type IV's 0.290 mg. The mechanical resonance frequency has been raised to 33 kHz, which is well beyond the audio range.

The hyperelliptical nude diamond tip configuration, with a 50% reduction in tip mass, has a cylindrical stem that allows for precise orientation of the contact surfaces. Bonding cement is carefully controlled to prevent excessive build-up. Although the entire diamond is polished, the areas in contact with the record groove are additionally polished using Shure's "Māsar" technique to further reduce surface noise and to retard record wear.

The Type V, like its predecessor, continues to use the moving-magnet generator but with a slightly longer magnet due to the increased length of the cantilever. The magnetic circuit utilizes laminated pole pieces to eliminate the sag in the mid-frequencies, thus providing an overall flatter frequency response. The V15 Type V features high output levels with fewer turns of wire, resulting in a lower output impedance. As a consequence, the frequency response is less sensitive to capacitive and resistive loading.

"Shure's mounting jig, the Duo-Point Alignment Gauge, minimizes lateral tracking angle errors to less than one degree."

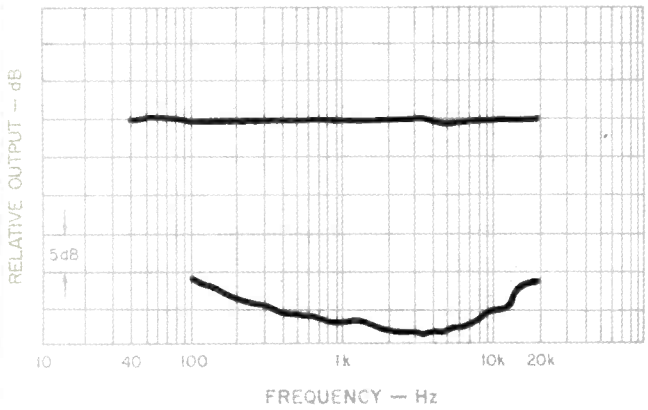

Fig. 1—Frequency response using the Columbia STR-170 test record.

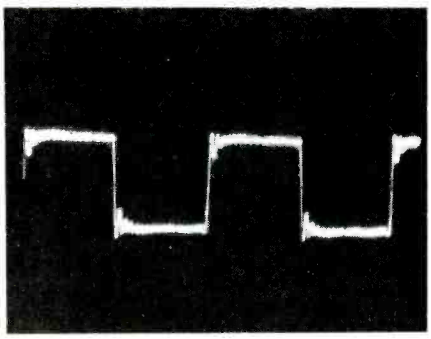

Fig. 2—Response to a 1-kHz square wave.

To eliminate resonances that might color or distort the signal, the Type V cartridge body is formed by an encapsulation molding technique that holds the internal components rigidly in place. The side-guard stylus protection system, first developed by Shure, helps prevent accidental stylus damage. This often results from careless handling of the tonearm or stylus, such as when the cartridge accidentally slides across the record or is lowered against the edge of the record or turntable platter. Should this happen, the entire stylus shank and tip withdraws into the stylus housing before it can be bent or broken.

Another carry-over from the V15 Type IV to the Type V is the much misunderstood Dynamic Stabilizer and Destaticizer. It is not a brush, per se, despite the fact that its more than 10,000 carbon fibers also manage to sweep away microscopic dust particles. Actually, its primary purpose is to act as a miniature shock absorber (stabilizing or damping both the vertical and horizontal extraneous motions of the tonearm). By maintaining a constant cartridge-to-record distance and uniform tracking force, it eliminates such warp-related problems as groove skipping, cartridge bottoming, signal wow, and even amplifier and speaker overload. The viscous-damped Dynamic Stabilizer attenuates the arm-cartridge system resonance effect which causes large increases in subaudible output and possible mistracking. In addition, the Dynamic Stabilizer protects the stylus and record from damage if the arm is accidentally dropped onto the record, by providing additional vertical damping.

There are over 10,000 tiny (each 0.3 mil in diameter), electrically conductive carbon fibers or bristles in the Dynamic Stabilizer. When the record is rotating, the fibers immediately rearrange themselves into V-shaped groups, engaging the groove and remaining so as long as the record is playing. This action (interfiber friction of the bristles) with the groove makes possible the lateral damping. These electrically conductive fibers simultaneously neutralize or discharge the upper or playing surface static electricity, thus eliminating the effects of a charged record during playback. However, it must be understood that the static charge on the underside of the record is not accessible to the carbon fibers and remains when the record is removed from the turntable.

No record in existence ever has all of the microscopic dust particles removed from its grooves, even after being cleaned by a record-cleaning machine. So it's good that the Dynamic Stabilizer also manages to provide a "bonus" function—sweeping away the remaining microscopic dust particles from the record groove bottom near the point of playback. Since the carbon fibers do pick up dust particles, it is necessary to clean the fibers regularly with the brush provided for this purpose. In no way, however, are the carbon fibers to be considered as a replacement for the usual record-cleaning brush or techniques that should be applied to the record surface just prior to playing.

The optimum tracking force for the Type V's 5 × 38 micron contact stylus is 1.0 gram. The turntable's tracking force should be set to 1.5 grams to compensate for the Dynamic Stabilizer when it is used. The maximum tracking force permitted is 1.25 grams, plus 0.5 gram for the Dynamic Stabilizer.

The proper mounting and alignment of a phono cartridge on the headshell is a frustrating chore, to say the least, but it must be done and with great accuracy. To overcome this frustration, Shure has devised a mounting jig, officially called the Duo-Point Alignment Gauge. Its primary purpose is to assist in aligning the Type V so that it is tangent to the record grooves at the two precise points (2.6 and 4.76 inches) so as to minimize distortion caused by lateral tracking angle error. This procedure is far more accurate than the traditional overhang adjustment. Since there is only one visual alignment to make, the possibility of error is reduced to less than 1°. The cartridge body itself rests in a closely fitted "nest," providing both a precision work station for mounting to the headshell and a holder that facilitates cartridge body alignments on the gauge. The Shure Leveling-Alignment Stylus fits into the cartridge in place of the stylus to enable the cartridge body to be rotated and/or shimmed so that its horizontal plane is precisely aligned in relation to the record surface. This minimizes crosstalk while providing maximum channel separation.

Finally, each V15 Type V phono cartridge is supplied with its own computer printout of important parameters such as output level, channel balance, separation at 1 and 10 kHz, phase, and the frequency response above 1 kHz.

To make it easier for audiophiles to compare the overall quality of one phono cartridge with another, Shure has introduced a new test record (available free to purchasers of the V15 Type V), the Audio Obstacle Course—TTR-117.

"The 1-kHz square-wave response is the flattest I have ever seen, with very little or no overshoot."

With this test record, it is a simple matter to determine the Total Trackability Index (TTI) of any cartridge as a single numerical figure. Trackability is defined as the ability of a cartridge to maintain contact with record-groove walls in the presence of high-amplitude, high-velocity, and high-acceleration audio signals. The TTR-117 contains three test tones, representing low, medium, and high musical frequencies combined and weighted to create a single trackability test signal. At graduated velocity levels, the signal is representative of actual recorded music. By following directions on the record jacket, it is possible to determine the TTI for any phono cartridge. In addition to the TTI, the TTR-117 test record provides for testing arm-cartridge resonance, level, channel balance, and skating compensation. The skating compensation band provides an excellent way to accurately set the anti-skating adjustment of practically any tonearm one might use.

Measurements

The Shure V15 Type V phono cartridge was mounted in a Technics EPA-A501H interchangeable arm unit used with the Technics EPA-500 tonearm mounted on a Technics SP-10 Mk II turntable. The cartridge was oriented in the headshell and tonearm with the Shure Duo-Point Alignment Gauge and Leveling Alignment Stylus. The cartridge alignment was then checked with the Dennesen Geometric Soundtracktor and the two gave identical results. The vertical stylus alignment was made with the Shure Leveling Alignment Stylus.

Laboratory tests were conducted at an ambient temperature of 72° F (22.22° C) and a relative humidity of 65% ±3%. The tracking force for all reported tests was 1.0 gram, with an anti-skating force of 1.6 grams. The load resistance was 47 kilohms, and load capacitance was 262 pF. All reported measurements were made without using the Dynamic Stabilizer except when measuring the arm-cartridge resonance, where the measurements were made both with and without the damping device. By using this technique, I was able to measure the actual phono cartridge parameters. The listening tests were also done with and without the Dynamic Stabilizer. As is my practice, measurements are made on both channels, but only the left channel is reported unless there is a significant difference between the two channels, in which case both channels are reported for a given measurement.

The following test records were used in making the reported measurements: Columbia STR-170, STR-100, STR-112; Shure TTR-103, TTR-109, TTR-110, TTR-115, TTR-117; Deutsches HiFi No. 2; Nippon Columbia Audio Technical Record (PCM) XL-7004; B & K QR-2010, and Ortofon 0002, A5906A-1, and A5906B-1.

Frequency response, using the Columbia STR-170 test record (Fig. 1), was +0.75, −0.5 dB from 40 Hz to 20 kHz, and +0, −0.5 dB from 1 kHz to 20 kHz. Separation was 28.5 dB at 1 kHz, 29.25 dB at 4 kHz, 25.25 dB at 10 kHz, 27.25 dB at 12 kHz, 23.75 dB at 15 kHz, and 21.75 dB at 20 kHz. From these data it is quite evident that the V15 Type V has an excellent frequency response and a very good high-frequency separation. I believe this is the flattest cartridge frequency response I have ever measured.

The 1-kHz square-wave response, Fig. 2, is the flattest I have ever seen, with very little or no overshoot followed by very low-level ringing that was probably cut into the record at the time it was made. This square-wave response was produced without the use of the Dynamic Stabilizer. The arm-cartridge low-frequency resonance was almost impossible to measure with the EPA-A501H arm unit. It was necessary to disable the arm's anti-resonance unit and, also, not use the Dynamic Stabilizer. Following this procedure, two lateral low-frequency resonance points were identified—one at 8 Hz with a 1 dB rise and the second at 12 Hz with a 4.5 dB rise. Vertical resonance is at 7 Hz with a 4.5 dB rise. Neither the lateral nor the vertical arm-cartridge low-frequency resonance was measurable when the arm's anti-resonant unit and the Dynamic Stabilizer were used. The high-frequency resonant point is at 37 kHz.

Using the Dynamic Sound Devices DMA-1 Dynamic Mass Analyzer, the arm-cartridge dynamic mass was measured as 10.25 grams, and the dynamic vertical compliance as 30×10^{-6} cm/dyne at the vertical resonant frequency of 7 Hz. Both the anti-resonant unit on the arm and the Dynamic Stabilizer were defeated for this test.

The harmonic distortion components of the 1-kHz, 3.54 cm/S rms 45° velocity signal from the Columbia STR-100 are: 1.8% second harmonic and 0.5% third harmonic, with less than 0.2% higher order terms.

The vertical stylus angle measured 24.5° using the Vertical Tracking Angle Meter (Inclination Meter), Model 3002, developed by the CBS Technology Center (227 High Ridge Rd., Stamford, Conn. 06905). Other measured data are:

Wt., 6.76 g; d.c. res., 884 ohms; ind., 384.5 mH; opt. tracking force, 1.0 g without and 1.5 g with the Dynamic Stabilizer; opt. anti-skating force, 1.6 g; output, left 0.93, right 0.99 mV/cm/S; IM distortion (4:1): +9 dB lateral, 200/4000 Hz, left: 1.2%, right: 3.1%; +6 dB vertical, 200/4000 Hz, left: 1.5%, right: 2.9%; crosstalk (using Ortofon A5906B-1) left: −30 dB, right: −26.4 dB; channel balance, 0.5 dB; trackability: high freq. (10.8 kHz, pulsed), 30 cm/S, mid-freq. (1000 and 1500 Hz, lat. cut), 31.5 cm/S, low freq. (400 and 4000 Hz, lat. cut), 30 cm/S; Deutsches HiFi No. 2, 300-Hz test band was tracked cleanly to 86 microns (0.0086 cm) lateral at 16.2 cm/S at +9 dB and 43.1 microns (0.00431 cm) vertical at 8.12 cm/S at +3.64 dB. I checked this parameter with two other Type Vs and obtained the same results with this test record as well as with other manufacturers' similar test records.

The Shure V15 Type V phono cartridge played all the test bands cleanly on both the Shure Obstacle Course—Era III and the Era IV musical test records, at 1.0 gram, without mistracking. The newest Shure test record, the Audio Obstacle Course—117, presented no problem to the Type V as it played the six trackability test bands without mistracking. Accordingly, the Total Trackability Index for the V15 Type V measured 103. I doubt that very many cartridges will be able to accomplish this feat.

Use and Listening Tests

When listening to records I find the need for absolute stylus cleanliness imperative, regardless of who made the cartridge, for no stylus is immune to its natural enemy—dust

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particles! It is a well-known fact that even the cleanest of record grooves contain microscopic dust particles that have a way of collecting on the stylus. Therefore, it is most important to clean the stylus before each play to prevent stylus dust particle build-up that eventually will produce sound distortion.

The following equipment was utilized in the listening evaluation of the Shure V15 Type V phono cartridge: Technics SP-10 Mk II turntable, Technics EPA-500 tonearm fitted with the Technics EPA-A501H interchangeable arm unit, Crown IC-150 preampifier, Audire DM-700 power amplifier, Crown DC300A power amplifier, Hafler 500 power amplifier, dbx Model 224 Type II noise-reduction system, Benchmark ARU ambience recovery system, Phase Linear 220 CX decoder, a pair of stacked Duntech DL-15B speakers in each channel, a pair of Boston A40 speakers, a pair of Cerwin-Vega 211R speakers, a pair of Janis W-1 subwoofers with their Interphase 1A units, and the Audio-Technica AT666EX vacuum disc stabilizer. Monster Cable was used for the Duntech speakers, and the turntable was equipped with the Hiraoka Disk-SE22 turntable mat except when the vacuum disc stabilizer was used.

As usual, I performed many hours of listening tests both before and after measurement. In fact, this report has been delayed because of the many listening tests I wished to perform with the V15 Type V. Besides the ordinary stereo listening, I also listened to many dbx-encoded records for a better aural evaluation since there was no surface noise to compete with the music as was true with the classical Columbia CX-encoded records. For pleasure listening, the Benchmark ambience recovery system setup was used, utilizing three amplifiers and speakers on each channel.

Like all record owners, I have many warped records that are difficult, if not impossible, to play cleanly with practically any cartridge. Although the Dynamic Stabilizer is an efficient device, it too has limitations when confronted with some of the warpage present on many commercial discs. I was not surprised to find that some of the very bad warps could not be played cleanly with the Type V, even when using the Dynamic Stabilizer. However, the Type V was able to play these badly warped records cleanly when the Audio-Technica vacuum disc stabilizer was placed on the turntable in place of the mat and a vacuum used to flatten out the records, thus rigidly coupling the record to the platter. (*Editor's Note:* A review of the AT stabilizer will probably appear in the December issue.—*E.P.*)

The V15 Type V was able to cleanly reproduce *The Sheffield Drum Record* (Lab 14) and, using the Dynamic Stabilizer, all the high-velocity cannon fire present on the Tchaikovsky *1812* recording (Telarc DG-10041) in a truly awesome manner. While listening to various recordings and, in particular, the Respighi *Feste Romane* and *The Pines of Rome* (Mobile Fidelity MFSL 1-507) and the Boito *Prologue to Mefistofele* and Verdi *Te Deum* (Telarc DG-10045), I noted an excellent sonic clarity, transparency of sound, transient response, and stereo imaging, as well as the lack of detectable coloration, particularly when reproducing the high recorded velocities present on most current direct-to-disc recordings. The bass was sonically well defined and tight. All voices were reproduced extremely well, and applause definition was excellent. In general, the cartridge acquitted itself superbly, and the sound is truly silky-smooth.

After listening to the Shure V15 Type V over a five-month period I must conclude that it towers over all previous Shure cartridges and probably has no peer among moving-magnet cartridges currently available. In fact, those enamored with the vaunted moving-coil cartridges and their mystique would find it profitable and ear-opening to audition this remarkable cartridge.

B. V. Pisha