INTRODUCING THE V15 TYPE V

A STEP BEYOND EXTRAORDINARY
No other cartridge, at any price, offers so many benefits.

FEATURING MICROWALL/Be™ TECHNOLOGY

SIDE-GUARD PROTECTION SYSTEM
Protects stylus from accidental breakage by withdrawing shank assembly into stylus housing.

MASAR™-POLISHED HYPERELLIPTICAL STYLUS TIP
Assures accurate, distortion-free tracking—plus reduced record and stylus tip wear.

BERYLLIUM MICROWALL/Be™ STYLUS SHANK
Unprecedented high frequency trackability due to this revolutionary new high stiffness, low mass stylus shank.

DYNAMIC STABILIZER/ DESTATICIZER
Exclusive! Functions like a miniature shock absorber to eliminate warp-related problems such as signal wow, groove skipping, and cartridge bottoming. Simultaneously discharges surface static electricity and sweeps away microdust.

PLUS!
As an extra bonus, you get a certificate good for a copy of the new TTR117 Trackability Test Record —a $15 value—FREE! Send for our fact-filled brochure. Ask for AL694.

SHURE

Shure Brothers Inc., 222 Hartrey Ave., Evanston, IL 60204
CIRCLE NO. 43 ON READER SERVICE CARD

Equipment Test Reports

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Shure V15 Type V Phono Cartridge

- **Shure V15 Type V Phono Cartridge**
- **Tracking Force: 1 gram**
- **Weight: 6.6 grams**
- **Price: $250**

SHURE coined the term "trackability" some time ago to describe a key criterion of cartridge performance. It is the ability of the stylus system to trace the groove modulation accurately, neither gouging the soft vinyl nor losing contact with it, over the full range of recorded frequencies and groove velocities likely to be encountered when playing records.

Different aspects of a cartridge's electromechanical design affect its trackability in different frequency ranges. Compliance of the moving system is the controlling factor at low frequencies, and effective tip mass ultimately limits the ability of the stylus to follow very-high-frequency groove modulation. The damping of the moving system is the key to tracking in the midrange frequencies.

In planning a successor to the V15 Type IV, Shure gave high priority to further improvement of high-frequency trackability, and this required a radical reduction in effective tip mass. The key to this was in the design of the cantilever, or stylus shank, which accounts for a large part of the effective tip mass. Shure engineers concluded that a thin-wall hollow tube was the ideal configuration for the cantilever because it would provide the highest ratio of stiffness to mass.

Tubular cantilevers have been used in many cartridges, but the tubes have had relatively thick walls. Shure's thin-wall stylus shank has a diameter of 18 mils and a wall thickness of only 0.5 mil. Not every material can be formed into a thin-wall tube of these proportions. An analysis of available materials, from the prosaic aluminum to the exotic diamond, showed that beryllium was the optimum choice. Using a proprietary process, Shure created the "Microwall/Be" stylus shank with an effective mass less than half that of the shank in the V15 Type IV. The result is a 50 per cent higher stylus-resonance frequency (33 kHz).

The hyperelliptical diamond stylus tip, whose contact surfaces are highly polished, is nude-mounted on the end of the cantilever. The generating system of the cartridge is basically the moving-magnet type used in other Shure cartridges, with high-efficiency laminated pole pieces to provide a flat frequency response through the midrange (the older and less efficient core and pole structures tended to give a "sway-backed" response curve). Another feature carried forward from the Type IV is the dynamic stabilizer, which combines the functions of an arm-resonance damper, static discharger, record brush, and stylus guard. The V15 Type V also has the side-guard stylus protector previously offered in Shure's professional cartridges. It retracts the stylus and cantilever safely into the cartridge body during rough handling (the standard factory test of the efficacy of this feature involves scrubbing a test pickup one hundred times across a record).

The 0.2 x 1.5-mil-long contact stylus is designed to track at 1 gram. Unlike most cartridges, the Type V is *not* rated for use over a range of stylus forces, since the 1-gram force is necessary to establish the rated 20-degree vertical stylus angle (there is, however, a maximum rating of 1.25 grams). To compensate for the stabilizer, the tracking force of the tone arm must be set to 1.5 grams in normal operation.

The frequency-response limits of the cartridge are specified as ±1 dB from 20 to 8,000 Hz, gradually increasing to ±2 dB at 20,000 Hz. The rated channel separation is at least 25 dB at 1,000 Hz and 18 dB at 10,000 Hz; recommended cartridge load is 47,000 ohms and 250 picofarads. The trackability of the V15 Type V is specified as 30 cm/sec at 400 Hz, 46 cm/sec at 1,000 Hz, 80 cm/sec at 5,000 Hz, and 60 cm/sec at 10,000 Hz.

● ***Laboratory Measurements.*** We tested the Shure V15 Type V in a relatively massive S-shape tone arm (about 18 grams effective mass). The installation of the cartridge was by far the easiest we have yet experienced (barring, of course, premounted cartridges or those integrated with headshells). The body of the cartridge holds plastic insert nuts, and, with the cartridge firmly mounted in the installation fixture supplied, it was a simple matter to attach it to the low-mass headshell we used. The two-step overhang and offset-angle adjustment took perhaps a minute to make and resulted in a perfectly mounted cartridge. With the special plastic alignment "stylus" replacing the regular stylus assembly, it took but a moment to set the cartridge-reference surface exactly parallel to the record surface.

We used the recommended 1-gram tracking force (a total applied downward force of 1.5 grams) for our measurements, decreasing it temporarily to 0.75 gram when check-

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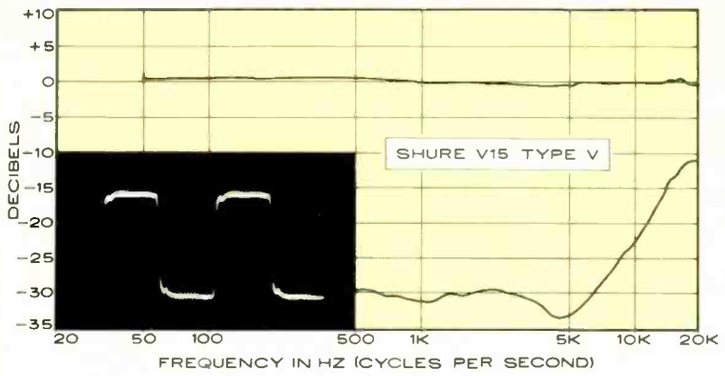

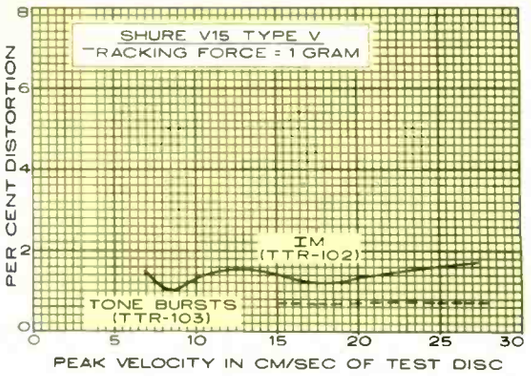

In the graph at left, the upper curve represents the frequency response of the cartridge. The distance (measured in decibels) between it and the lower curve represents the separation between the two channels (anything above 15 dB is adequate). The inset oscilloscope photo shows the cartridge's response to a recorded 1,000-Hz square wave, which indicates resonances and overall frequency response (see text). At right is the cartridge's response to the intermodulation-distortion (IM) and 10.8-kHz tone-burst test bands of the TTR-102 and TTR-103 test records. These high velocities provide a severe test of a phono cartridge's performance. The intermodulation-distortion (IM) readings for any given cartridge can vary widely, depending on the particular IM test record used. The actual distortion figure measured is not as important as the maximum recorded-signal groove velocity that the phono cartridge is able to track before a sudden and radical increase in distortion takes place. There are very few commercial phonograph discs that embody musical audio signals whose average recorded groove velocities are much higher than about 15 centimeters per second.

Shure V15 Type V Phono Cartridge

● ***Comment.*** Our tests show that the Shure V15 Type V not only lives up to the claims made for it, but in virtually every respect outperforms the best cartridges we have previously tested. In its record-playing performance the Type V is a surpassingly fine cartridge, in every way a worthy successor to the Type IV. We doubt that any commercially pressed record could tax the tracking abilities of this cartridge. Any distortions or other unpleasant sounds can safely be assumed to originate in the record or other part of the system.

The V15 Type V also has several features not directly related to sound that make it a more nearly ideal pickup. These include the highly effective Dynamic Stabilizer (which dramatically enhances the warp-tracking ability of the pickup system) and the relatively unpublicized but nonetheless important Side-Guard protective system. Those who have never made a careless mistake and ruined an expensive stylus may feel no need for such a feature, but for the majority of the record-playing public it could be as important as a foolproof amplifier or speaker-protection system.

I must admit to being most impressed by the installation gauge supplied with the Type V, since I have always found cartridge installation to be one of the most exacting chores in setting up a music system. Trying to position a cartridge in the headshell with an accuracy of perhaps 1/32 inch or better is an exercise in frustration. The importance of this degree of mounting precision is usually exaggerated by audio purists (or manufacturers of mounting and alignment accessories), but there is no doubt that it is desirable if one is to realize the full potential of a record-playing system.

The Shure gauge is a flat plate that slips over the turntable spindle and contains a precision-machined metal block into which the cartridge body fits snugly (Shure refers to it as a "nest"). It takes longer to describe the alignment process than to do it (only a minute or two), but the end result is a cartridge aligned and positioned for perfect tangency at radii of 2.6 and 4.76 inches, which are usually considered to be the optimum points for this adjustment. Best of all, the process requires no squinting at the stylus or its cantilever (the stylus is not even installed in the cartridge during the procedure) or even at the edges of the cartridge body or headshell. The precision and accuracy of the installation are determined by the dimensional tolerances of the cartridge and stylus assemblies themselves (and, of course, of the gauge), which are far "tighter" than could be achieved by eye.

If I sound enthusiastic, it is only because I am. At this time, it is hard to imagine how the V15 Type V could be improved significantly. It offers the most performance in the most areas, plus the most convenience and safety in installation and operation. What more could one ask for? Only a lower price, perhaps, but good things rarely come cheap. It is reasonable to expect that some of the Type V's features will eventually appear in lower-price Shure cartridges, as has already occurred with the Dynamic Stabilizer and the hyperelliptical stylus, both originally developed for earlier models in the V15 series.

—Julian D. Hirsch

ing the cartridge's trackability. High trackability is the forte of the Type V, so we were not too surprised to find that it could play every level on the Shure Audio Obstacle Course records (ERA III, ERA IV, and the new TTR-117) at 1 gram with no audible mistracking. In fact, it breezed through *all* the high-level test records in our collection without a trace of strain, with but one small exception. The 300-Hz tones of the German Hi-Fi Institute test record could be played only up to the 70-micrometer level without distortion. This is good performance, to be sure, but this test was the only one in which the V15 Type V failed to surpass or match the performance of any cartridge we have ever tested.

The low-frequency resonance in the tone arm used was between 8 and 9 Hz, with its amplitude damped very strongly by the Dynamic Stabilizer (in fact, we had to disable the stabilizer in order to identify the resonance frequency clearly). The cartridge output was 3.4 millivolts with the channel levels balanced within 0.4 dB. The vertical stylus angle was 20 degrees as rated. The cartridge's frequency response was measured with a range of load capacitances in parallel with a 47,000-ohm resistance. The output dropped about 2 dB in the 5,000- to 15,000-Hz range with a 70-picofarad load, and with 440 pF it was almost perfectly flat (±0.3 dB) up to 12,500 Hz but fell off 4 dB at 20,000 Hz. We used 280 pF for our other tests, since it gave the best combination of flatness and extended high-frequency response. With the CBS STR 100 test record, the response of the poorer of the two channels was +0, −1 dB from 40 to 17,000 Hz, and it was +0, −1 dB from 40 to 20,000 Hz on the other channel. The channel separation averaged about 26 dB over most of the audio range up to 10,000 Hz, falling to about 14 dB at 20,000 Hz. The square-wave response of the Type V was nearly ideal, with negligible overshoot and only very low-level ringing visible on the square-wave

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signals of the CBS STR 112 test record.

The final measurement was of tracking distortion, using Shure's TTR-102 and TTR-103 test records. With the Type V, it is probable that we were reading the residual distortion levels of the record and test fixtures. The 400- and 4,000-Hz intermodulation-distortion readings from the TTR-102 varied randomly between 1 and 1.7 per cent for velocities from 6.9 to 27.1 cm/sec. The 10.8-kHz tone-burst distortion from the TTR-103 was a constant 0.7 per cent for test-disc velocities from 15 to 30 cm/sec. Shure's new TTR-117 record (available free to purchasers of the Type V cartridge) contains complex three-tone test signals, rather than music, to test the trackability of a cartridge. We found it less easy to interpret than the earlier "Audio Obstacle Course" records, in part because the Type V steadfastly refused to distort audibly at its rated 1-gram force. By reducing the force to 0.75 gram, we were finally able to detect mistracking at level 6, the highest on the record. We tried the TTR-117 test record with several other good-quality cartridges and found that some would play level 6 and others would mistrack audibly at level 4 at their rated forces. Thus the TTR-117 is effective in distinguishing between cartridges of a very high quality level. The record also contains an excellent antiskating-adjustment band that is easy to use and unambiguous in its results.

Circle 140 on reader service card

- **Ohm Walsh 2 Speaker System**
- **Rated Frequency Response: 45-16,000 Hz ±4 dB**
- **Size: 11½ inches square (bottom), 9¼ inches square (top), 32½ inches high**
- **Weight: 30 pounds**
- **Price: $700 per pair**

THE late Lincoln Walsh, a pioneer in hi-fi some thirty-five years ago, invented a loudspeaker unlike any other in its principle of operation. It creates a coherent cylindrical sound field that is omnidirectional in the horizontal plane. All frequencies, from bass to treble, are radiated from a single cone in time (and phase) synchronism, with the intention that the speaker will create an acoustic waveform that is a close analog to the electrical input signal.

Walsh's speaker patents are now owned by Ohm Acoustics. Some years ago the company developed the Ohm A and Ohm F, both very large, heavy, expensive, and inefficient speakers that could indeed generate an omnidirectional sound field that preserved the waveform of the driving signal to an unprecedented degree.

Ohm has now incorporated much of the Walsh technology in a much more affordable and practical product with a much broader market appeal. The Ohm Walsh 2 is a compact floor-standing system using a Walsh driver to handle the frequencies from low bass through most of the treble range, augmenting it with a more conventional dome radiator in the uppermost audible octave. The Walsh 2 system is a gently tapered truncated pyramid in shape. The enclosure is covered in veneers of genuine oak or walnut (teak or rosewood are available at extra cost). The upper part, which contains the drivers, is covered by a removable black cloth grille, and the drivers themselves are completely hidden by a cylindrical, nonremovable perforated metal cage.

The Walsh driver's specially designed and tapered cone radiates the highest frequencies from its top (near the voice coil).

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