Townshend Allegri Reference

LINE LEVEL PASSIVE VOLUME CONTROL WITH REMOTE

It is several years – back in 2012 to be precise – since we reviewed the first compact Townshend line level control based on a 'fractal' miniature auto-transformer wound with cryogenically-treated wire. This was and still is the Allegri, which is still offered in Allegri Plus form as a six input, single-winding passive volume control or ATVC, with minor changes including an additional 3.5mm front input socket. The design remains single-ended throughout. The price is currently £2,400 and I continue to use the 'Plus as a reference despite its relatively coarse loudness steps and wholly manual operation as I find it remains highly transparent and revealing.

However, with my carpet showing signs of a well-trodden path from chair to rack and back for the inevitably frequent fine tuning of the Allegri level control for each recording and track, a loan over the December break of the less costly but nevertheless well reviewed Life Changer Audio icON4 (HIFICRITIC vol13 no4 Oct-Dec 2019) seduced me once again to the delights of an effective remote control of volume. Enter, stage left, the Townshend Allegri Reference...

Some nine years ago (HIFICRITIC Vol 5 No 3), I reviewed the Music First Reference and the Townshend Glastonbury Pre-1, two excellent sounding and versatile transformer 'pre-amps' (more accurately described as 'TVC control units'). Both units were unquestionably costly at around £9,000, and both brands subsequently announced 'stripped down' versions that sell at a rather less than those originals. A short-lived Townshend TVC 'preamplifier' appeared a couple of years ago, complete with remote control and a headphone amplifier: it used problematic motorised rotary switches, but certainly had a promising sound quality.

That led to a complete about-face concerning both the technical design and the user interface, leading to a reworked high-performance version, this culminating in the new Allegri Reference, floating on miniature adjustable levelling versions of Townshend's proprietary air damped anti-vibration suspension units.

The two infuriating aspects of the Allegri Plus, namely large volume steps and the absence of remote control, have been addressed in the new Reference, at about three times the cost, currently £8,000. With the necessary complications including new surface mount circuitboards, aerospace-grade hermetically-sealed relays (replacing hard-wired switches), a control microprocessor, power supplies, upgraded auto-transformers, the inclusion of continuous fine resolution 0.5dB steps, an infrared receiver with its own and other integrated circuits, plus a numeric electronic display, and not least, an external power supply, would that famed Allegri sound quality be maintained?

Well burnt and twice shy, Max Townshend and his design team have laboured mightily to get this one right, and on the face of it the omens are very promising. It still has those highly favoured nickel/iron alloy Mu-Metal transformer cores, dimensioned and gapped to avid any hint of magnetic flux saturation which could lead to harmonic distortion or compression, here also taking into account the number of turns which ultimately drive the intensity of core magnetisation. The optimised 50% nickel/iron lamination core assemblies are constructed for low stress and good mechanical damping. This avoids potential colouration in the audio band, while the winding continues to be of Townshend's own 'fractal', deep cryogenically treated, fine 0.1mm insulated copper wire, all 260m (or 845ft) of it per channel; if it's not broken, don't mend it.

The Glastonbury had a 24 x 2dB-step main volume control and here finer 1dB interpolated steps were accessed via the remote handset. Incidentally the chosen single-winding auto transformer type is preferred to a full transformer as leakage inductance may be held very low, thus maintaining a wider bandwidth, even in the face of the very wide tap ratios present. Note that the screen covers which can be seen over the autotransformers are electrostatic – i.e. of aluminium – and are thus non-magnetic.

Allegri Reference has benefited from a comprehensive rethink of how to do the job, aiming to avoid any significant compromise to sound quality. This work began with tests to certify the audio transparency of the hermetically sealed, glass encapsulated, aerospace grade, 30 million plus

operational life, gold contact-in-vacuum, reed-relay switches, made by Pickering. Actuated by super low noise DC current, these are designed with subtle action wiping contacts for best signal transparency, while this array of 96 relays is controlled in programmed combinations via a microprocessor.

Keeping things quiet

While this latter section could potentially induce some low-level noise or RFI, this is avoided by 'sleeping' the micro when the unit almost instantaneously settles in 'listen' mode. The 'oscillator' clock for the microprocessor then wakes up, responding to user commands with alacrity, either when the remote, or the front panel control is engaged. In addition, the operation of those sealed relays is essentially silent; there are no whirring motors or clicking rotary switches.

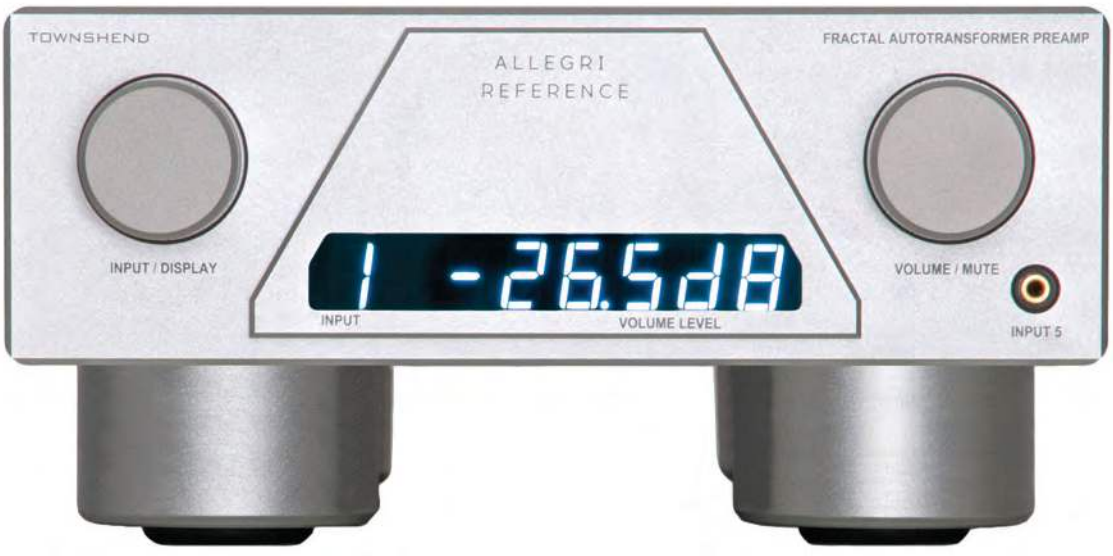
In computed combinations the upper 120 x 0.5dB volume steps are precise, as shown on a large white LED display, readable from 20 feet, while the final 10 step sizes towards the lowest volume will inevitably vary a little due to the finite number of winding taps. From this coding limitation, the mute '0' to step 1 comes out as 'zero volume to -72.4dB' certainly suitably quiet, while the next step to '2' is 0.5dB, and to '3' is also 0.5dB. But in the absence of a half turn winding, step '4' is necessarily large at 5dB. Fortunately, the step sequence settles down to a constant 0.5dB resolution from about 10 steps up, or 10dB, from lowest volume (-72.5dB). Thus the remaining 120 steps of the upper control range are available at a valuable and consistent 0.5dB resolution. (see test results) That lowest volume setting is also very useful.

The inputs and outputs are worthy of some attention as there are some inevitable quirks, while offering universal inputs and outputs. Nominally providing both single-ended and balanced inputs and outputs, internally the unit is single-ended throughout. Here the conventional practice of using the plus polarity only of a balanced input signal, when available, while terminating the input minus to ground, is also reflected at the 'balanced' output. Here the positive output is driven and the negative is terminated to ground.

This is common audio practice for line level signals of high inherent signal to noise ratio where fully balanced circuitry is frequently not present. This practice also assumes that the balanced input of a following power amplifier has proper differential summing. The much more common single ended input power amplifiers require no such complication. This connection practice allows balanced signal cables to be used when required. At the input the two balanced connections are consecutively wired in parallel with RCA inputs 1 and 2. Input labelling continues from 3- 5 for the RCA sockets on the back, and for 'input 5', this also wired in parallel with a 3.5mm input jack socket, conveniently located on the front panel.

There are three stereo output pairs all wired in parallel, the first two for the balanced and RCA connection while the third output is straight RCA. All terminals are good quality, wear resistant, and heavily gold plated. There is also a DC jack socket for the external 12V low noise, transformer type linear power supply: 12V batteries were tried during development to remove the mains power connection completely, but Townshend reports these gave no discernible improvement, so a country-specific outboard 12 Volt DC transformer supply is provided.

This 'passive controller' has no active or amplifying audio electronics in the signal path. However, the sources used must have sufficient output to drive the following power amplifier via the controller to the required maximum output power, with some headroom for those quieter recordings. Also some phono preamplifier/ head amps may have insufficient output with some pickup cartridges.



The System

Constellation Inspiration 1.0 pre, Townshend Allegri Plus and Reference control units; Naim NAP500DR power amplifier, Constellation Performance Centaur II 500 stereo power amplifier, Naim SuperLine phono pre, with Linn LP12 player with Keel chassis and Radikal motor control, Naim ARO arm, Lyra Delos cartridge, Naim UnitiCore network server and S/PDIF source; Linn Klimax Katalyst streamer-DAC; Naim ND555 Streamer-DAC, 555 PS(DR) dual supply, Wilson Audio Sabrina and Sasha DAW, Magico M2-MPods and Magico S5II-SPods, Quad ESL63, BBC LS3/5a (15ohm) speakers; Naim FRAIM racks; Transparent XL MM2, Naim NAC A5 speaker cables, Naim Super Lumina, Transparent MM2 and Van den Hul Carbon TFU interconnect cables.

Townshend specifies certain parameters for its best use, nominally with a 20kohm typical output load, such as provided by the input of a typical following power amplifier. Note that some amplifier designs have rather higher input loading – e.g. Audio Research tube designs at 200kohm balanced – and with these the Allegri performance may vary a little. Nevertheless, it is hard to argue with the data provided, indicating a wideband 'four decade' frequency response (8Hz to 80kHz at a very tight +, - 0.1dB tolerance), suggesting substantial neutrality, a hallmark of the genre. The claimed overload margin is ample for domestic use, if not quite to studio mixing-desk levels: for 20Hz to 20kHz the input overload point is a generous 10Vrms, 14dB above 2V nominal CD output level.

As is the nature of these designs, the Allegri Reference doesn't respond well to stray DC direct current at the input, e.g. from a direct coupled source lacking optimal DC balancing, though this situation is very rarely encountered now. If present, even a small amount of DC will begin to magnetise the core, increasing distortion and reducing overload margins. The suggested maximum input signal offset is 5mV DC though this level is very rarely encountered. An input capacitor would deal with this possible difficulty, but its inclusion was found long ago to mildly impair sound quality.

These are very low distortion devices, and Townshend simply gives a ballpark claim of better than -80dB, 0.01% distortion in the mid band, here for second and third harmonics (and with no higher harmonics found) this figure holding for signals less than 10V RMS input. Such distortion is essentially below audible thresholds.

At an improbable 'full volume' setting the input impedance becomes input loading of the following power amplifier, e.g. 20kOhm for a 20kOhm power amplifier, while for a 100kOhm amplifier load, the input loading will approach that second 100kOhm value. However, for normal volume settings from '-10' and below, auto transformers multiply the load impedance by the square of the step-down ratio. Thus, for a 10dB attenuation, e.g. vol '109', this comprising 20 x 0.5dB steps down from the nominal '129' flat out condition, that previous 20kOhm input loading has sailed up to 200kOhms, this barely loading the source component. It is thought that some of the fine dynamic expression heard with this type of control is a function of this very light touch loading.

(Note that most signal sources, DACs, streamers and CD players do have some form of loading resistor present at their output to null charges on coupling capacitors and to help define bandwidth).

Nicely styled and well finished, there are two large rotary controls on the fascia, the left hand for input selection and the right for volume settings, both read out on a large, clear, LED numeric display in neutral white. Responding to ambient light intensity the display adjusts brightness accordingly. You may also set a dB display attenuation readout in 0.5dB steps or alternatively use the simple numeric: 0-129. That auxiliary 3.5mm front panel input socket, (in parallel with input 5) is located below the volume control.

Simple handset

The popular little Apple remote control handset, a slim alloy wafer, has convenient wide-angle, uncritical operation, its facilities including input selection, also setting of a volume offset for inputs 2-5 to help level up different sources. In addition, the remote may be magnetically retained on the accessible central underside of the unit near the front. There's also programmed operation, short remote pulses stepping the volume by 0.5dB, while longer pulses allow sweeping, e.g. to max or min volume, in about 10 seconds, this feeling operationally like those more familiar motor driven volume controls.

Input 4 may also be set at 'max' for a home theatre bypass function, and the display can be switched off, These supplementary details helping confer fine versatility, while very careful isolation methods were used to separate those wholly passive audio circuits from the control and display sections.

The Reference remains quite compact at just 234 mm wide, 120mm high and 380 mm deep and is primarily built from hard anodised aluminium with a choice of silver or black finishes. It weighs a solid 9kg (or 20lb), partly due to the constrained layer damping vibration countermeasures incorporated in the construction. To control vibration – and thus maximise subjective dynamic range – four custom-designed air piston damped spring feet use the familiar Townshend Seismic vibration isolation technology for reducing induced vibration, support and shelf borne, from above 3-4Hz, although some vibration will of course still arrive via the connecting cables.

Sound Quality

After a few days of informal listening, comparisons began in earnest, the key question being whether Townshend has improved on the very fine Allegri Plus, notwithstanding the addition of remote control and the related automation circuitry. A/B comparisons showed just how transparent and neutral the manually operated Allegri Plus is, but time and again the Reference had the edge. At first sight hardly possible in the circumstances, it was found to be more dynamic and expressive, more

transparent, more resolving of detail, of image focus, depth and width, and was equally (and excellently) upbeat and well-timed. Bass tunes were judged clearer and seemed to run deeper, and the Reference seemed more commanding in respect of dynamic expression and also in conveying the excitement of musical events. It portrayed space and atmosphere very well, such as the audience murmur at a live concert and that sense of being present at a performance.

The overall sound quality was compelling, taking listeners a little nearer to the origins of recorded performances, and with no detectable bias in respect of pop, rock, jazz, classical or folk recordings. It offers outstanding transparency and also strongly engages the listener; and who could possibly argue with that?

Conclusions

With lab results at, or very close to, the state of the art, it was to be hoped that the sound quality would be commensurate. It was: the feed from this level control is virtually indistinguishable from the input signal, an ideal result. It has almost no character of its own, so readily does it transmit all the valued qualities of the program source – such as exemplary pace, rhythm and timing with excellent stereo images, commanding all aspects including focus, width and depth. Exceptionally transparent it provides a clear window into the sound stage, making it a very worthy entry to the HIFICRITIC Audio Excellence category.

Lab measurements

Resolution: The lowest nine settings had varying attenuation steps of 0.5 to 4 dB, mainly the former. From indicated '10' upwards the remaining 100 steps held to a consistently accurate 0.5dB step size with better than 0.05dB channel matching and step size matching over the main 60dB control range. It doesn't get much better than this.

Set to 20dB attenuation, a healthy 2Vrms input at 1kHz delivered distortion at a very low -113dB, 0.0002%, in fact indistinguishable from the generator, while a much higher 10V input still delivered a still tiny -96dB, 0.0014% distortion. A test at 2V, 20kHz high frequency, also yielded a very low 0.003% or -90dB, reducing further at lower input levels. Understandably distortion for a TVC is marginally higher at very low frequencies due to the technical limitation of a finite winding inductance: an infrasonic 10Hz for a 2 volt output showed slightly greater total harmonic distortion, but was still excellent, at 0.005%, -86dB. For the record, at the upper '100' indicated volume level, the output impedance remains quite low at about 150 ohms, even down at 10Hz, and thus the unit remains largely unperturbed by cable or amplifier impedance variations. In addition, such a low source impedance at the output helps suppress vibration induced electrical cable noise.

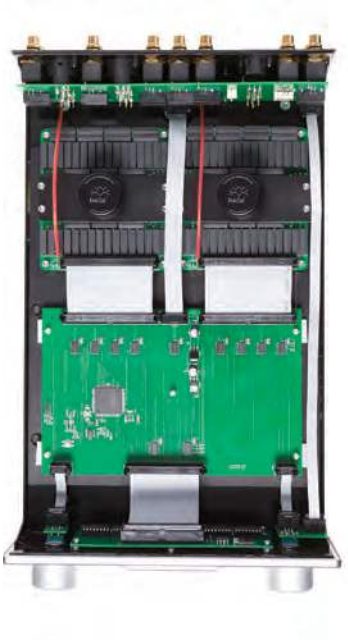
Channel balance was excellent throughout, while frequency response does vary a little with loading and settings. At 10dB attenuation, it was accurate at low frequencies to -0.03dB at 10Hz, but with a small rise at high frequencies, of +0.32dB at 15kHz and + 0.4dB for 20kHz, which at close to full volume, could just be detected by ear, noting that this rise is mainly in connection with the high 100k ohm lab test loading. The frequency response above 20kHz will vary a little with both loading and the attenuation settings, but this aspect is considered inconsequential. With lower loading at the output, e.g. from the usual following power amplifier, and also at lower volume settings, this mild ultrasonic response peaking and associated transient ringing quickly diminishes to inaudibility.

For 20Hz at 2V input the distortion was also ridiculously low at -115dB, 0.00014 % here with almost too many zeroes to record! For the more taxing two-tone intermodulation tests, for 19/20kHz, here for a 2V input, the results were still excellent at typically -86dB or 0.005% and were found to be essentially independent of load and level setting. Channel separation was also excellent, typically better than 110dB over the whole frequency range 20Hz to 20kHz. By definition the unit should not generate any hum or noise and does not: the 'auto-formers' used in this construction appear to be essentially immune to hum fields. All in all, this is a decidedly close approach to the state of the art for a line control.

Specifications

Frequency response	8Hz-80kHz +/- 0.1dB
Maximum signal level	4V RMS 8Hz; 10V RMS 20Hz and up
Maximum DC input offset	5mV (For undistorted use down to 8Hz)
Distortion	Less than 0.01% at 400Hz for 10V (2nd and 3rd harmonics)
Impedance	At 0dB, input impedance is 20k ohm At -10dB (normal listening) input impedance is 200k ohm (for a power amplifier load of 20kohm)
Inputs	Five pairs of RCA phono sockets (gold plated) Two pairs of XLRs in parallel with inputs 1 and 2 One 3.5mm stereo jack on front panel, in parallel with input 5
Outputs	Two pairs of RCA phono sockets (gold plated) One pair of XLRs
Power	External DC supply 12V Linear, external
Dimensions W x H x D	234mm (5.3in), 100mm (4in), 380mm (15in)
Weight	9kg (20lb).
Power supply	Linear 12V 0,5W, Input 120V to 240V, 50-60Hz. Country specific.
Price	£ 8,000 including vat

HIFICRITIC AUDIO EXCELLENCE



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