

UPGRADING TANNOY WESTMINSTER ROYAL LOUDSPEAKERS

1. BACKGROUND

I have been a Tannoy enthusiast for many years. In 2005 I purchased a pair of Westminster Royal HE's new. I used them in completely standard form for over 5 years. As a matter of principle generally I do not normally modify components. My rationale is that the manufacturer will have meticulously researched every aspect of the design and therefore understand precisely how to extract the best performance from the product and will be ready to share this both through the owner's manual and by answering technical enquiries from customers directly if required. When I do modify equipment it is with reluctance and taking great care not to change anything irreversibly and also taking care not to change the 'active' elements of the design. In this case 'active elements' means drivers and crossovers, so that at the end of the modification process it remains, as close as possible, to the original product.

I won't go into detail, but over a period I learned that there were elements of the design of the Westminster Royal HE that were sub-optimal and which were likely to be masking large reserves of untapped performance. The particular areas of concern related to the internal wiring and connectors and the support system. Over the last 12 months I have systematically assessed and where necessary changed various aspects relating to these areas. At each stage, with the help of a group of audiophile friends, I evaluated the changes by means of group listening tests.

The improvements which I will describe relate specifically to the use of sonically poor construction methods and components particularly in the Westminster Royal HE. However the observations and conclusions are likely to be applicable to other models in the Prestige range, including the later Westminster Royal SE, which I will cover separately later in the paper.

At the end of the process I was truly astonished by the scale (no pun intended!) of the improvements. So much so that I decided that I would share them with fellow Tannoy enthusiasts, hence this paper, which I hope you may find helpful. The differences really are of the 'night and day' variety. One of my friends commented that it was a completely different loudspeaker after the modifications.

NB:

This paper simply describes what I have done. I cannot accept responsibility for any damage or other problems which arise if anyone chooses to implement these changes in their own systems

2. THE SYSTEM & LISTENING ENVIRONMENT

In order to add context to the discussion I thought it would be helpful for me to describe my listening environment and system.

The System

The system is made up as follows:

LP

- SME Model 20/3 Turntable with SME Series V Tonearm & Denon DL304 MC phono cartridge
- Whest PS30R Phono Preamplifier

CD

- Meridian G08.2 CD Player

Radio

- Denon TU1800 DAB Tuner

Amplification

- Meridian G02 Dual Mono Control Unit/Preamplifier
- Meridian G57 Dual Mono Power Amplifier

Note

Whilst LP and CD sources and amplification all provide facility for balanced operation they are currently used in single ended mode.

Loudspeakers

- Tannoy Westminster Royal HE (bi-wired)

Cabling

- Mains: Isotek Supreme (Russ Andrews fuses)
- Interconnects: Crystal Cable Piccolo
- Speakers: Van den Hul Magnum
(WBT Nextgen terminations)

Mains Power

- Mains Power is provided via a dedicated ring main with its own consumer unit.
- All mains connections are via MK Logic twin surface mounted switchless sockets.

Equipment Racks

- Hi Fi Racks Podium stands

Accessories

- With exception of equipment mentioned above, the system does not employ any aftermarket accessories and specifically all equipment is plugged directly into wall sockets. No multi-socket connector blocks are used

Music Room

The system is situated in a dedicated music room of 4500ft³ (23' x 20' x 10')
The flooring is carpet over concrete. The photograph below shows the layout of the equipment in situ.



MUSIC ROOM

Evaluation of Changes

All changes were assessed and evaluated in the Music Room and care was taken to ensure that any modifications requiring new solder joints and or new connectors were allowed to settle down fully after completion before listening tests. This generally involved running in periods of c.500hrs and up to 700hrs when required. See Figure 1

The individuals who carried out the auditioning were all highly experienced audio enthusiasts and because of this I am confident that the extraordinary performance improvements achieved are genuine and can be readily replicated by others.

In addition, the wiring changes were implemented in five separate stages, with each stage tested thoroughly and benefits assessed and understood before moving on to the next stage. This approach provided additional confidence in the results, as each stage produced consistent incremental performance improvements. See Fig 1 for details of change process

Note: All equipment other than the speakers remained unchanged during this process.

3. THE MODIFICATIONS

There are four areas that I found required attention in the Westminster Royal HE's. These were:

- a) Internal Wiring Connectors
- b) Driver Connecting Plug
- c) Binding Posts
- d) Speaker Support System

Internal Connectors

The internal connections in the standard speaker to binding posts and crossovers are achieved by means of gold plated automotive type push-on spade connectors. These are sonically poor and degrade further over time. They need to be removed and the wires soldered directly to the connecting tags.

Drive Unit Connector

The driver is connected using a very poor quality polyethylene bodied connector containing four inferior quality alloy pins and sockets. These are unsatisfactory both mechanically and sonically (but very easy to install at point of manufacture). The construction of the connector is such that it prevents the pins and sockets connecting optimally. The female section of the plug incorporates a clipping mechanism which locates in a recess in the cast chassis of the driver. This connector should ideally be removed completely if possible*. Ironically of all the driver connectors I have seen in Tannoy Prestige range models this one, from their flagship model, is the worst.

The new connection method I adopted was to install a simple tag block which was fixed to the removable panel behind the driver which forms the seal on the bass horn. The wires from the LF & HF drive units ** are soldered to one side of the block and the wires from the crossover to the corresponding pins on the other side of the block.

Notes

**It is important also that the hole in the chassis left by the discarded connector plug is filled to ensure that the horn has an airtight seal once more. I used Blutak which proved very effective.*

*** It is helpful to colour code the loudspeaker coil wires as once they are detached it is easy to get them mixed up creating unnecessary problems when re-connecting. I used indelible felt tip pens which worked well.*

Note: This is the trickiest of the modifications and unless you are very confident in your own ability I strongly recommend that this task is done by a qualified engineer



Westminster Royal Driver Connector - Male Section



Westminster Royal Driver Connector - Female Section

Binding Posts

The standard binding posts of the Westminster Royal HE are bog standard gold plated brass models and they are mechanically and sonically inferior. They need to be removed and replaced with high quality ones. I used WBT Nextgen 0710ag posts which are superb, though like all WBT products they are expensive. Furutech are another possibility, also very good - the choice is yours. The effect of this change is dramatic. The sound appreciably is louder for a given volume setting because the impedance 'seen' by the amplifier is reduced by the one-piece silver conductors in the WBT's. More importantly, the sound is better defined

throughout the frequency range, and stereo imaging is also greatly improved particularly for off axis listening.

Speaker Support System

The standard support system supplied with the Westminster consists of steel cone feet attached to the cabinets with M8 threads locating in the standard Tannoy alloy inserts recessed in the underside of the cabinets. These sit in turned steel cups which have to be manoeuvred into place under the cones after the final operating position of the speakers has been determined.

When moving the speakers I noticed that, when reinstalled, they sounded different each time, even when replaced in exactly the same position. It transpired that the reason for this was that because of the nature of the supports it was very difficult to get the cups and feet locating together consistently each time. In addition the cups took several days to sink fully into the carpet even with the huge weight of the speakers bearing down on them. Even when the cups were fully seated into the carpet there was still some potential for rocking which is guaranteed to ruin speaker performance.

With help from my friends, I experimented with and prototyped eight alternative support methods. These varied from minor tweaks to the standard supports, to hardened steel spikes, to bespoke stainless steel feet. As with the wiring mods each change was evaluated with group listening tests. Interestingly, all of the support variants tested were an improvement on the Tannoy standard solution.

I will not describe all of the alternatives in detail, but suffice it to say that the bespoke conical stainless steel support system, which I adapted from another design, proved far superior to the other solutions.

Two important points came to light in the course of this work, notably:

- The plinths of the speakers need to be raised slightly clear of the carpet to remove mechanical interference which degrades definition. The acid test is whether a sheet of paper can be passed between plinth and carpet freely.
- The castors fitted to the speakers for transportation and to facilitate installation on hard floors need to be removed when they are in use, as if they are left in place, on carpeted floors, they may also cause mechanical interference with consequent deleterious effect on definition.



Bespoke Stainless Steel Feet & Shims for Westminster Royal

The conical feet shown are 35mm long from shoulder to tip and 25mm diameter across the shoulder. The thread is M8 and fits into the standard Tannoy alloy insert in the cabinet. Note the shoulders which permit tightening with a 16mm spanner. The shims are 38mm diameter and 4mm thick. Unlike a spike which couples only with the alloy insert providing a poor mechanical link allowing some lateral movement, the conical feet couple firmly against the underside of the cabinet. When fitted the feet provide a consistent and solid coupling to the floor which permits no rocking whatsoever.

I specified the design of the support system and had it made to order by a precision engineering company. It was relatively expensive at but in the context of a loudspeaker costing £22,000 they were actually inexpensive measured alongside the scale of the benefits they produced.

Note:

The feet do not need to be over tightened as the sheer mass of the loudspeaker provides the necessary stability.

This support system improves definition throughout the frequency range. It also has a markedly beneficial effect on soundstage, bass extension and dynamics

Note:

All comments in this section relate to my own listening environment with a concrete floor covered with fitted carpet and underlay. I have no experience of using Westminster Royals on sprung wooden floors or uncovered hard floors and so cannot comment on how the feet might work in that situation.

4. WESTMINSTER ROYAL SE

In 2007 Tannoy launched an updated model of the Royals with a new crossover and silver wiring following market pressure. The revised model was designated 'SE'. Unfortunately they left some of the worst features of the HE unchanged, notably the driver connector, which would be more at home in a washing machine than a world class loudspeaker, the push on spade connectors and the unsatisfactory support system which also remained unchanged. The good news is that whilst these problems should not be there, they can be eliminated relatively simply, with significant benefit. In addition, while they changed the binding posts and terminal block, the new replacements are still mediocre sounding and so upgrading these will also prove worthwhile.

5. SUMMARY OF PERFORMANCE GAINS

Tannoy Prestige products have a reputation for musicality, good point source imaging, great dynamics, a smooth extended frequency response but with a very slightly woolly sound or imprecision in the midrange and treble.

The modifications in this paper build on the loudspeaker's strengths by improving clarity, definition, bass extension whilst retaining and further enhancing their very smooth character with no hard edges and completely eliminating the wooliness. Dynamics are breath-taking, handling the tiniest whisper of orchestral sound to the full panoply of orchestra, organ and chorus with equal aplomb and all this combined with near electrostatic levels of clarity. As one of my friends would say "there is absolutely nothing here that hurts"

The soundstage, always a strong point is huge, but now with the ability to position performers and instruments with uncanny pinpoint accuracy. This is surround sound from two speakers. Before the changes any listening position other than the central sweet spot was slightly disappointing. Post modification the sound is very good in all normal listening positions but exceptional in the sweet spot. I find myself simply getting lost in the music, and the system at that point, becomes completely irrelevant.

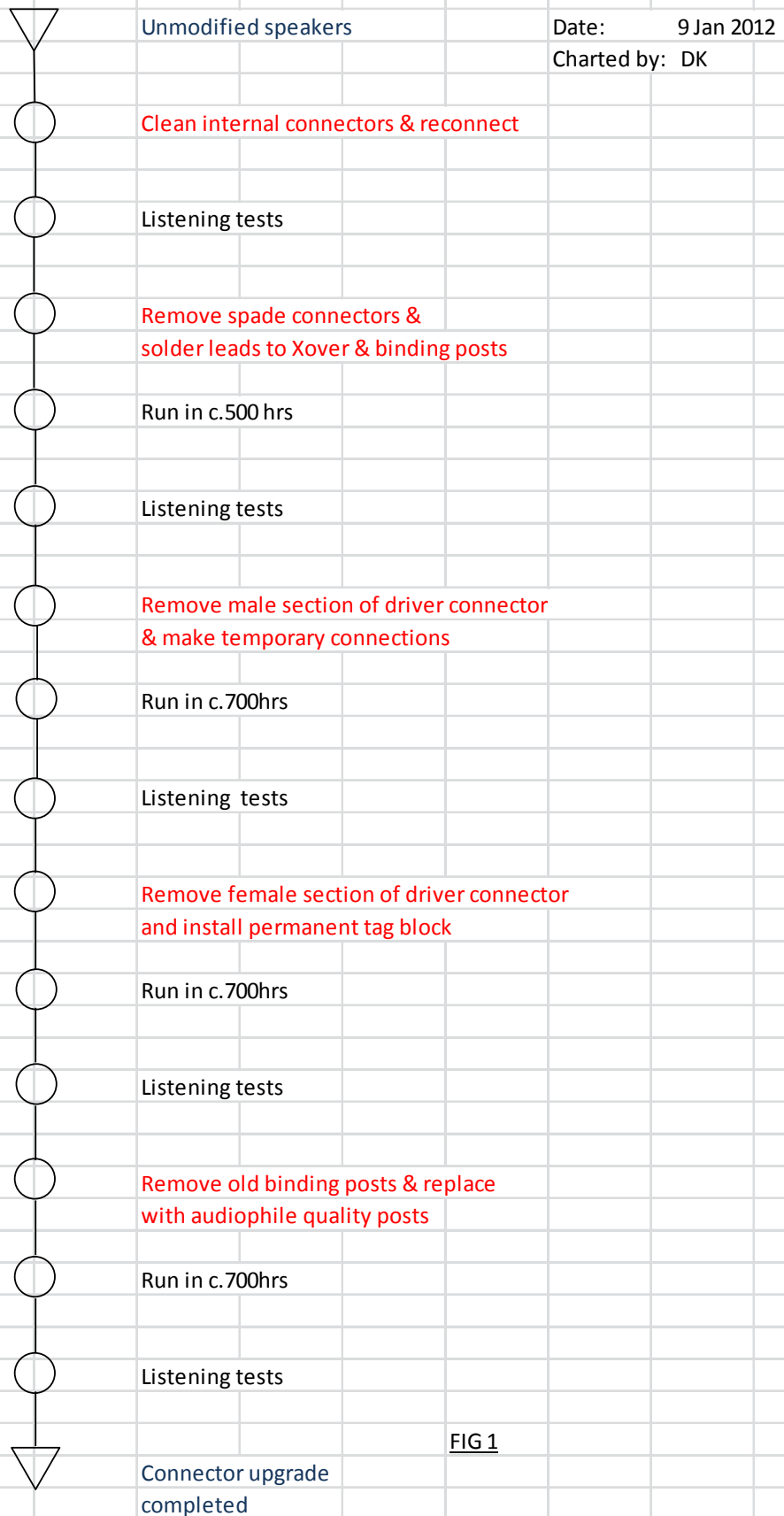
For me by far the most rewarding aspect of this upgrade process has been its effect on my listening. The improved performance of the speakers has opened up the 'no go' areas of my CD and record collections. Those records which for various reasons were previously not enjoyable are now sounding acceptable. Excluding the odd really poor recording which no system can deal with, everything is now playable across all genres.

These upgrades turn an already good loudspeaker into a very special one. Any Tannoy enthusiasts who worry that the modifications might change the character of the loudspeaker need not be concerned. All of the traditional strengths are still there in spades, but significantly enhanced.

Good luck if you decide to try the some or all of these suggestions and as a final helpful hint - do make haste slowly and think very carefully about every aspect of each change before implementing it. For me this was a terrific and thoroughly worthwhile learning experience and I trust that you will also find it so.

OUTLINE PROCESS CHART

TANNOY WESTMINSTER ROYAL CONNECTOR UPGRADE



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FIG 1