# Valenta HST

HST@40 SPECIAL

**The scream of turbochargers epitomised the High Speed Trains when they entered service. PAUL CHETTER sets out to recreate the spectacle with digital sound in 'OO' gauge.**

THE 40th ANNIVERSARY OF THE introduction of the High Speed Train (HST) provided the impetus to create Valenta engine sound projects for Zimo decoders and to fit decoders and speakers to a pair of Hornby Class 43 power cars in celebratory tribute to these long lasting trains.

The models chosen for this feature are Hornby Class 43s from the era when they were equipped with Paxman Valenta engines. The cooler group roof detail will be different on later versions, but the general principles will still apply.

Using a sound decoder in each power car adds to the costs, but does allow the appropriate sounds to emanate from the correct end, depending upon direction.

Only one of the power cars is actually motorised, meaning that the internals of what outwardly appear to be similar units are quite different, as can be seen from the photographs.

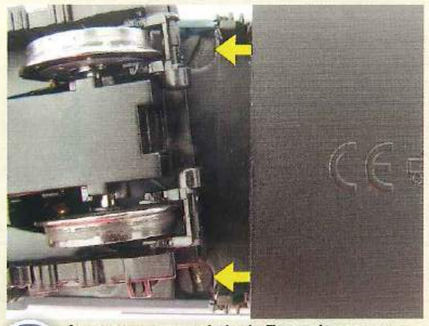
I decided to install decoder and speakers into the motorised unit first as this presented the least amount of space for conversion. I would then use a similar setup in the other unit to aim for a comparable audio output from each power car.

## COMPONENT CHOICES

As these models use the 8-pin Digital Command Control (DCC) socket with adequate space for a standard sized decoder, I decided to use the Zimo MX645R which comes with the option of straightforward 'stay alive' capacitor connection if required.

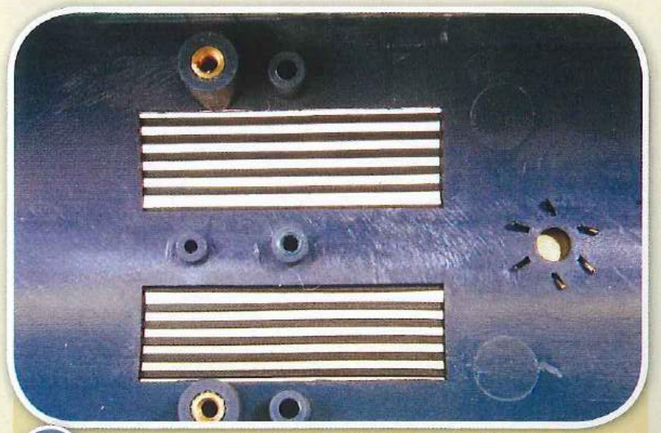
Speakers can often be the most difficult items to accommodate. Zimo has recently introduced a small range of speakers based upon the same 13mm x 18mm drivers used in the acclaimed SLW Class 24 (HM111). These have the advantage of small format with straight sides and edges and are deployed in 3D printed enclosures of various depth and orientations. »

**With sound installed these original condition HST powers don't just look good, they sound good too.**



**1** Steps 1 to 4 are common to both units. There are four screws to release before removing the body. One is shown here, there is one concealed by the bogie and a similar pair exists at the other end.

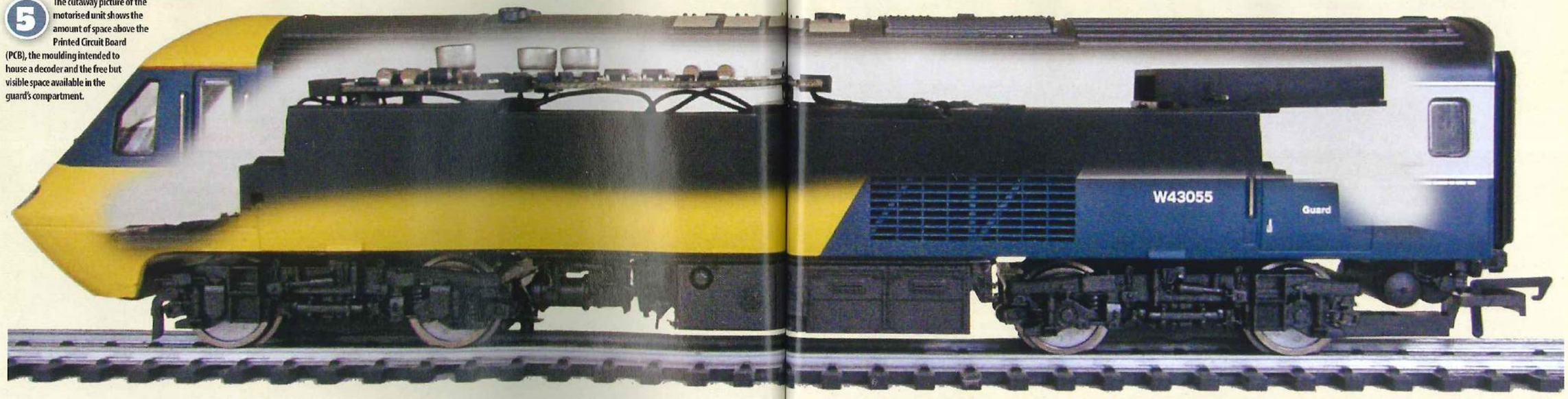
**2** With the body removed there is a 'V' shaped moulding fitted below the cooler group grille. This could be a source of obstruction for a speaker.



**3** Removing the moulding creates more space for a speaker, but it will be clearly visible through the grilles. A reduced height speaker would be an advantage. One which would fit partly between the chassis frames would be even better suited.

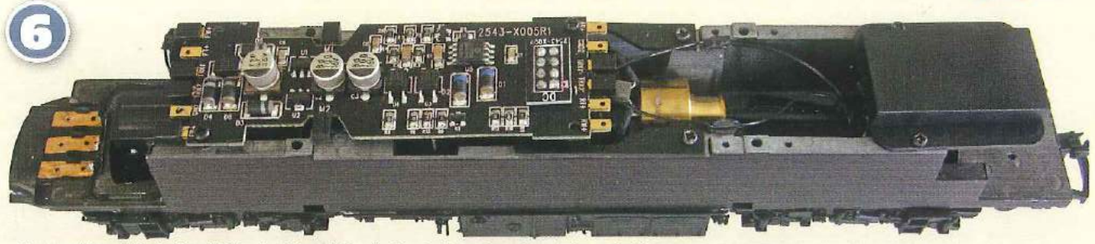

**4** Zimo has recently released a small range of high performance speakers designed to make it easier to install quality speakers in a low profile environment. From these I have selected the LS40x22x09 twin driver 3D speaker for the HST project.

**5** The cutaway picture of the motorised unit shows the amount of space above the Printed Circuit Board (PCB), the moulding intended to house a decoder and the free but visible space available in the guard's compartment.




Intermediate
Beginner SKILL LEVEL Advanced

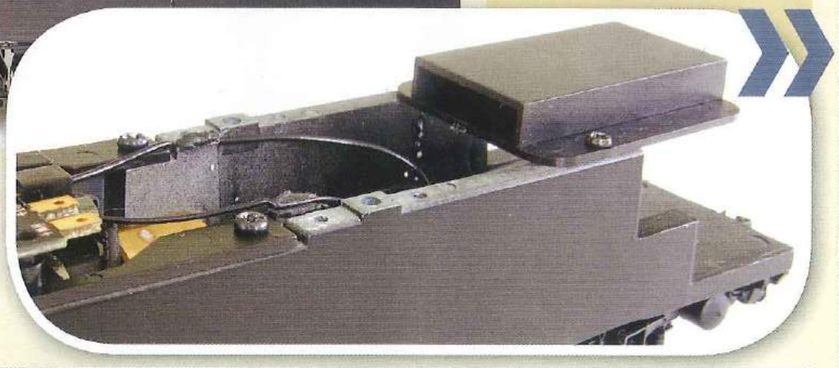
**6**



The general layout of the chassis and PCB showing the intended location for a decoder can be seen here. Unfortunately, this is not deep enough for a standard sized sound decoder and its position would compromise speaker fitment in the same area.

**7** There may be enough clearance for the decoder to fit above the PCB, but there are a number of components which might interfere. I decided to locate the decoder below the PCB and between the chassis frames.

**8** A non-sound decoder would probably fit into this moulding, but not a sound decoder. Two screws secure it to the chassis making it a moment's work to remove.

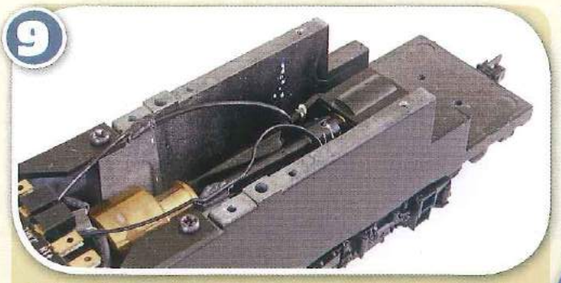


**TIP**

**Factory positions don't always give the best output for sound - it depends on what you are installing. Investigation and trial fitting are essential.**

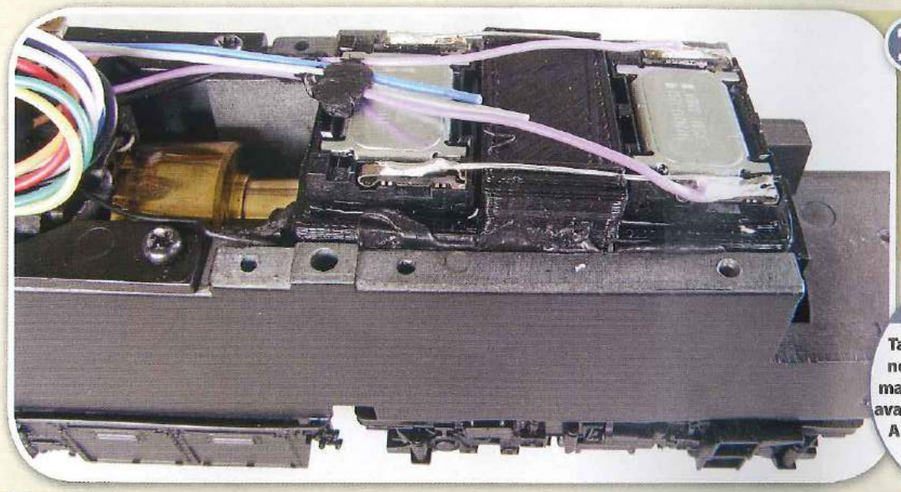
STEP BY STEP **INSTALLING DCC SOUND IN HORNBY HST POWER CARS**

Intermediate
Beginner SKILL LEVEL Advanced



**9** With the moulding removed, there is a large amount of space revealed above the cardan shaft and rear bogie gearbox. Additional space is available at the rear of the chassis where the guard's compartment is located. There are windows in the model in this area so components here may be visible from normal viewing angles.

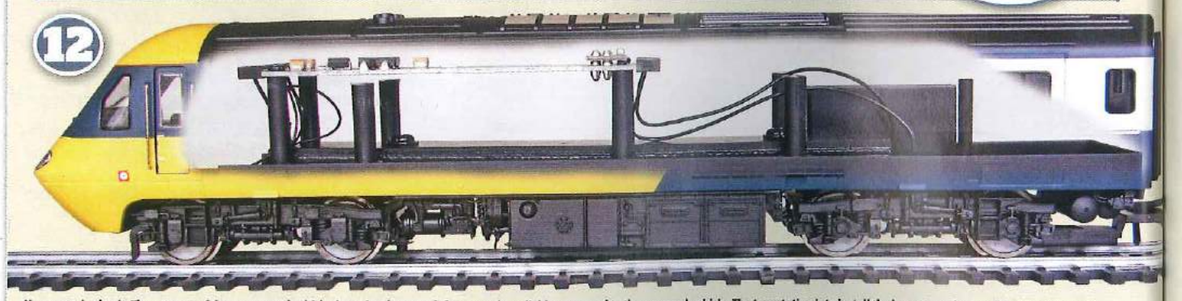

**10** The LS40x22x09 twin driver 3D speaker offers high performance in a compact format which will not interfere with the guard's compartment space or appearance.



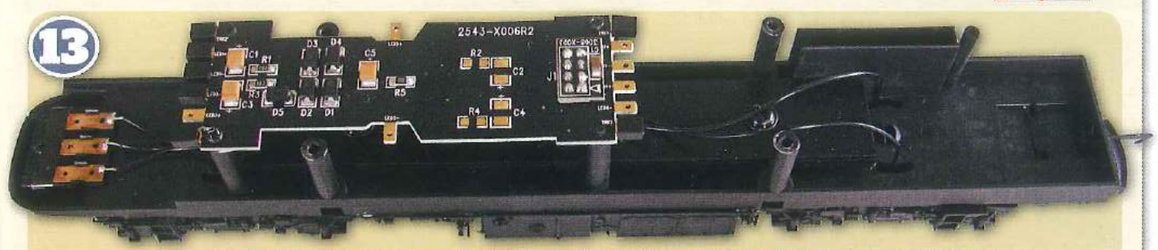
**11** The speaker design fits easily between the chassis shoulders without protruding into the guard's compartment space at the rear. A 'stay alive' capacitor could be accommodated here if required. The blue and grey wires from the decoder which connect to the capacitor can be seen here too.

**TIP**

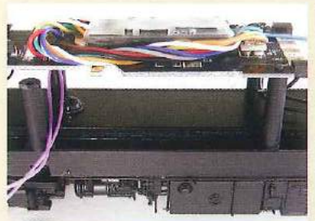
**Take care to route wiring neatly as modern chassis make the most of the space available inside a bodyshell. A trapped wire could get broken and cause a short circuit.**



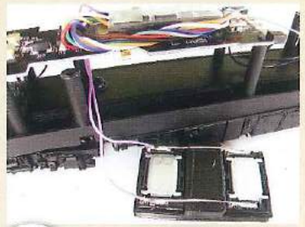
**12** Non-motorised unit: The cutaway of the unpowered vehicle shows just how much free space is available compared to the powered vehicle. The temptation is to install the largest speaker possible, but that would sound out of character compared with the speaker design in the powered vehicle.



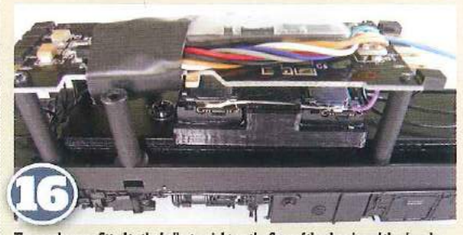

**13** The dimensions of the decoder housing render it unuseable for a sound decoder and if used would leave the multi-coloured wires visible through the bodyside grilles.



**14** There are few large components on the upper surface of the PCB so the decoder can be fitted here.

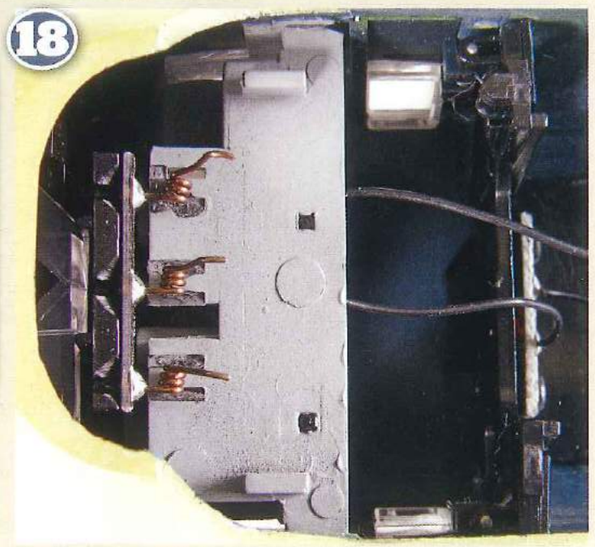


**15** The purple speaker wires from the decoder were connected to the speaker next preparing the speaker enclosure for final installation.



**16** The speaker was fitted to the ballast weight on the floor of the chassis and the decoder end was wrapped with black tape to secure it in position and to disguise the view of the wires through the exhaust ports - not obvious until the body has been refitted.

**17** On both vehicles these three contacts in the chassis align with spring connectors in the body to complete the lighting circuits. Care needs to be exercised to ensure they align correctly. Fortunately on the latest generation models from Hornby this system has been replaced with wired connections which use a multi-pin plug to connect to the main PCB board making dismantling and reassembly considerably simpler.



**18** When sliding in the chassis, ensure that these three spring connectors engage correctly with the chassis contacts. This will enable the body to fit correctly to the chassis and the external lighting to operate when required.

**WHAT WE USED**

| Product | Supplier | Price |
|---|---|---|
| Hornby Class 43 Train Pack | *www.hornby.com* | £219.99 |
| Zimo MX645R Sound Decoder | *www.digitrains.co.uk* | £94.00 |
| Zimo LS40x22x09 3D speakers x2 | *www.digitrains.co.uk* | £36.00 |

Based on a combination of comparative audio performance and physical dimensions, I selected the small twin driver speakers for use in each model. The non-motorised unit would accept a much larger speaker but would likely result in a very dissimilar sound quality.

## INSTALLATION

Body and chassis are held together with four screws in each case. With these removed, I separated them at the rear before carefully sliding the chassis backwards to disengage the front end. There are three springs fitted to the lower cab moulding which make contact with connectors in the chassis to complete the lighting circuits. Care is needed to ensure they do not become entangled or dislodged. Other than this, the procedure is straightforward.

Hornby has provided a moulding to accept a decoder at the rear of the chassis. This is intended to keep the decoder above the window line in the guard's compartment. Unfortunately, it is not deep enough for a double sided sound decoder and is positioned in what would be the best location for the speaker.

The cutaway picture suggests that, as an alternative, there would be sufficient space to fit the decoder between the locomotive's Printed Circuit Board (PCB) and the roof. I decided to utilise the free space below the PCB and between the chassis shoulders, securing the MX645R with mastic to the underside of the PCB.

The Zimo LS40x22x09 speaker fits comfortably between the chassis without encroaching into the guard's compartment. I used mastic to hold the speaker in situ, although adhesive or styrene strip 'shims' could be used instead.

Fitting the speaker in this location puts it immediately below the cooler group grille for easy access to free air above. The height above the chassis was adjusted to avoid fouling the internal moulding fitted below the exhaust ports.

Although it would be possible to fit an SC68 'stay alive' supercapacitor to the floor of the guard's compartment and connected to the blue and grey wires from the decoder, testing indicated that these were not required in such a long wheelbase vehicle with all-wheel pick-up.

The chassis of the non-motorised unit separates from its body in the same way as above, and similar care is required to avoid damaging the spring connectors. I again decided to workaround the Hornby provided decoder location on the grounds that it was of an inadequate size and that if used, the multicolour wiring would be visible through the bodyside grilles.

The cutaway picture reveals a large space below the PCB which I used to locate the same type of speaker with sticky mastic. I used black insulating tape wrapped around the decoder and PCB to keep all parts in place and to disguise the coloured wiring which would otherwise be visible via the exhaust ports.

Reassembling the power cars is straightforward with the right method. The cab end of each chassis was slid forward so that the front was within the front skirt moulding, taking due care of the three spring connectors in each case. The rears were then mated to the body inside its rear wall and all four screws fitted.

## THE SOUND PROJECT

I have created a slightly different sound project for each decoder. This is to both simulate two separate engines and to allow sounds to emanate from the appropriate end whichever the direction of travel.

For example, the horns are allocated to the same Function (F) keys on each decoder, but they only sound in the unit at the leading end of the formation. Similarly, the guard's whistle is activated by the same F key whatever the direction of travel, but only sounds from the rear in each case. Its the small things which really make the difference.