Grand ambitions

This month **PAUL CHETTER** turns his attention to fitting DCC sound to a Heljan Class 26 - this time in 'O' gauge to see how the senior scale differs to its smaller counterparts.

HAVING FITTED a Zimo MX645 and 28mm Hi Bass speaker to my Heljan 'OO' gauge (4mm) Class 26, I thought it would be interesting to convert one of its 'O' gauge models for display alongside each other during my sound clinics on the *Hornby Magazine* stand at the Hornby Magazine LIVE! in Hartlepool show in July. At least, that's how I justified it to myself when I bought the 'senior scale' model. At a list price just short of £600, it needed some justification!

The first thing of note is the weight. At 2.6kg it is clearly more than just a larger version of the 4mm version (420 grams). Sight, through the side windows, of two large brass flywheels gives a hint of what is inside that bodyshell.

I had just Thursday evening for this conversion, before travelling to the show. Before commencing work I give each new model a thorough survey to decide on the possibilities and plan the installation. Immediately obvious from the pre-formed grille on the underside of the locomotive was the provision in the fuel tanks for a speaker to be fitted (**Figure 1**). There looked to be plenty of space to exploit. This would make this an easy installation... or so I thought!

I located the four crosshead screws which hold the body to the chassis (**Figure 2**). The illustration shows two of these screws; the other two are in a similar position relative to the other bogie. When these are unscrewed it is possible to remove the body by easing it away from the chassis. I suggest you support the chassis firmly during this process. It is heavy and unwieldy, so it is better safe than sorry. It's also worth noting that the plastic 'light pipes' inside each end of the body can be easily dislodged, so ensure that the body is removed vertically and evenly.

Confused wiring

Figure 3 shows the massive chassis and twin motors with flywheels, each driving one bogie. One look at the wiring reveals that, unusually, red and black wire has been used almost exclusively inside the Class 26.

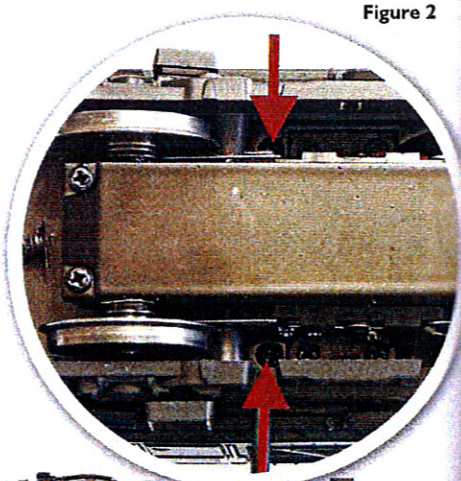
The locomotive ran beautifully on DC straight out of the box, but in no way is this model DCC ready in the conventional meaning of the phrase as we would expect for a 'OO' gauge model. The simple instructions supplied describe how to fit an ESU decoder. I intended to fit the more advanced and higher powered Zimo MX695 KV, so this was of little use to me.

The lack of any typical DCC colour-coding was a drawback which could have been largely overcome with a good wiring diagram. This meant I had to get the multimeter out.

It's not all bad news, though. There is a circuit board with the existing wiring connected. Removing that reveals a large space that I noted for future use. I decided to remove the existing board to give maximum space available and to allow independent connection to the red and white lamps. This, in turn, will allow prototypical operation of red lamps depending upon whether anything is coupled. Beware that this decision has consequences that you must be aware of. I mention this regularly in my articles, but don't forget that LEDs cannot withstand anything like track voltage. They need to be protected with a resistor to drop the voltage. Without

Heljan's 'O' gauge Class 26 arrived in June this year (HM49) and offers great potential for a sound project. The model has been produced in BR green and BR blue liveries.

Figure 2



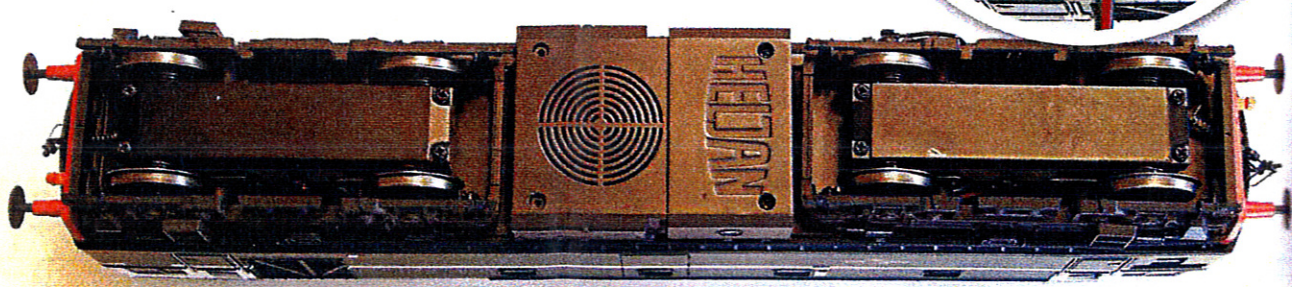


Figure 1

this, or some method of supplying very low voltage, LEDs will burn out instantly. Like many locomotive circuit boards, this one contains appropriate resistors for the lighting. If you remove the board, your LEDs are unprotected. You must take adequate steps to reinstate that protection before reconnecting power to the locomotive.

The instructions tell you to connect black and red wires together, but do not explain why. This is confusing for the end user, but perfectly logical in the manufacturing process. It is clear that whilst the bogies appear to be a mirror image of each other, they are actually identical units with motor and track connections wired in the same way in each case. So, if the red wires are always connected to the right of the motor and black to the left, and when the locomotive is assembled one bogie is reversed, that means the colours are reversed too.

If you do not notice this or read the instructions correctly, and you join red wires from each motor to the same polarity on the decoder (and both blacks to the other) then your bogies will be pulling in opposite directions. If you also test your installations on a rolling road as I do, you may not notice the mistake until you have completely reassembled the model and try to run it on some track.

You must reverse the drive direction of one motor, which will mean a rather counter-intuitive connection of red from one to the black of the other. The same logic applies to the track pick-up wiring from the bogies, too. **Figure 4** shows a wiring diagram for the MX695. It will help if you think in the terms shown in diagram, left and right, rather than colours.

Wiring the chip

One of the joys of working with 'O' gauge is that components are physically larger and easier to handle. **Figure 5** shows the newly released Zimo MX695 KV sound decoder which I installed in this model. Connecting the wiring to the decoder is very simple once you have worked out what to connect where. There are banks of screw connectors, each legibly labelled with their function. This provides a very secure connection which is rated much higher than the anticipated electrical loads passing through them.

Amongst the special features of the MX695 KV decoder is its relatively small size, and lack of a heatsink. The source of heat is mainly from the diodes in the decoder's rectifier. The Zimo MX695 family uses different technology called mosfets to avoid these diodes and so far less heat is produced. This means the decoder runs cooler and therefore a heatsink is unnecessary. A welcome benefit is that it makes it easier to locate in some of the smaller models.

In addition to the usual array of Function Outputs (14 in this case) there are a few extra features which make the MX695 KV special. There are two low voltage outputs, one at 10V, the other notionally 5V. There is a variable resistor in the 5V circuit so that you can reduce the voltage further, to as low as 1.5V. Zimo recommends using this for LEDs. This should eliminate the need for additional resistors to protect your LEDs. There is even provision »

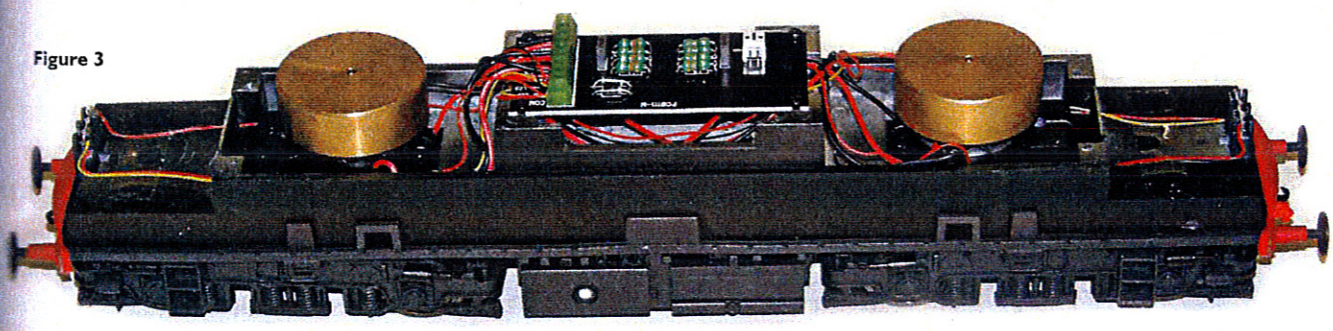


Figure 3

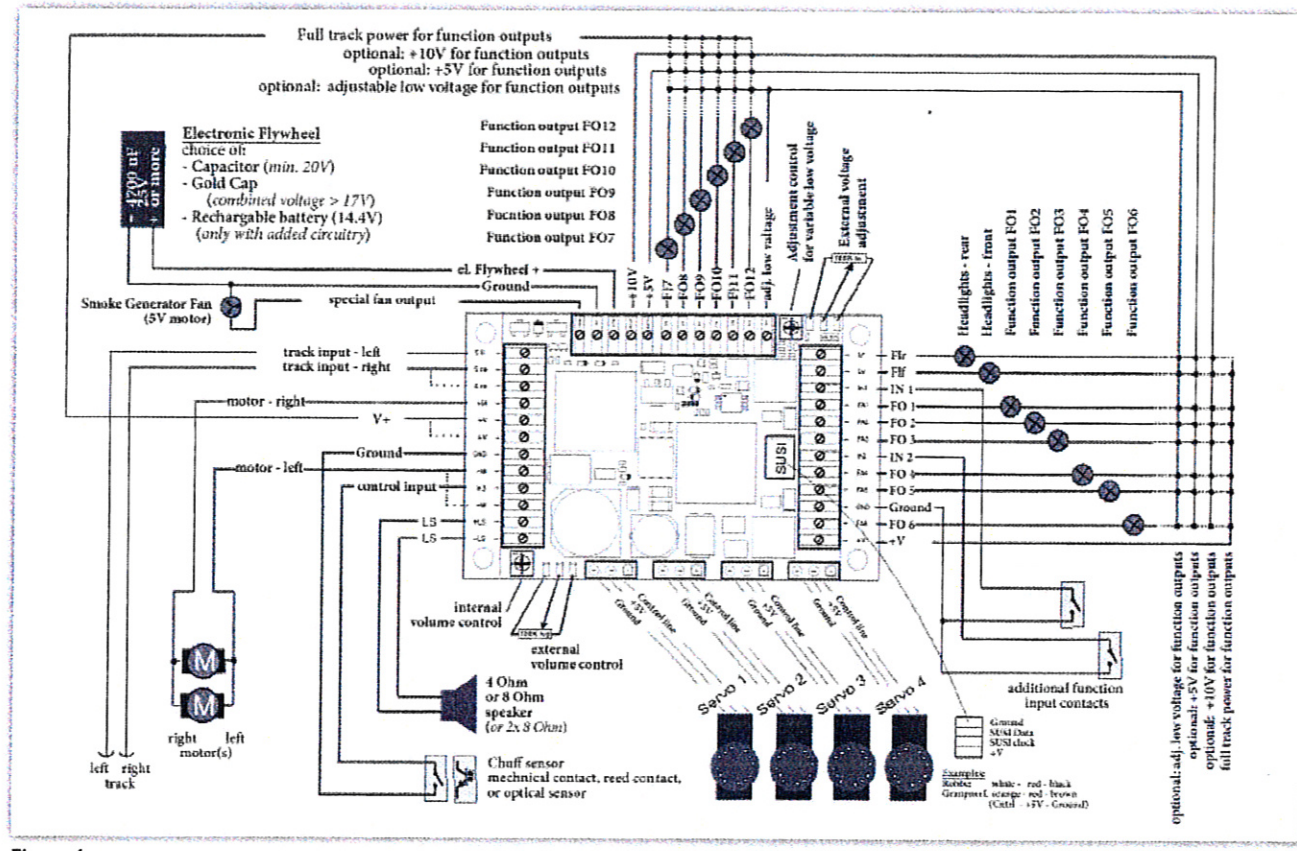


Figure 4

to connect an external potentiometer so that they can be dimmed by a physical 'knob' or screwdriver rather than by CV programming.

Another feature is an extension of the special circuits for 'Stay Alive' capacitor connections already available on most Zimo decoders. There is now the possibility to connect a battery pack for back-up power supply instead of capacitors. I am currently looking into the feasibility of this, but additional circuitry will be needed. This will be potentially of great value to garden railways since scrupulous track cleanliness is difficult to maintain in an outdoor environment.

The MX695 was selected for its sheer 'bangs per buck'. The maximum continuous motor output is a massive 6A with a peak output of 10A and each of the function banks can handle up to 2A. The amplifier has a 10W output, which will offer plenty of volume and is particularly suitable to this project.

The fan drive system, used to synchronise steam puffs with the chuffs, or force out 'diesel exhaust' with increase in revs, has an electronic brake to stop the fan instantly rather than just letting it spool down. This will enable more realistic smoke control.

After ensuring that there was no possibility of electrical shorting, a few blobs of blu-tack were used to hold it securely in place. If necessary, it will be easy to remove.

Fitting the speaker

Heljan has given some thought to speaker fitment, but frankly, not enough. Yes, there is provision to fit a speaker in the tanks but there is no provision for a proper sealed enclosure. If you simply fitted a speaker of the correct size and rating that the model has mounting points for, sound from the rear of the speaker would flood out through the many gaps and cancel out the required sounds from the front, spoiling the effect. The easy fitment I had envisaged turned into a late night session involving a sharp knife, some styrene sheet, and liquid cement!

Figure 6

Digitrains stock a number of suitable 'low height' speakers from which to choose. Most of these would have been easy to fit into the space available with headroom to spare. However, I picked a larger, 40mm version of the Hi Bass speakers I frequently deploy in my 4mm models. Because of the large magnet that sets this range apart from the usual offerings and the need to accommodate a sealed enclosure, this was going be a very tight fit in the tanks.

I removed the tank mouldings by releasing the four crosshead screws holding them to the chassis and dismantled them to provide access for me to file away the Heljan speaker mounting points.

This gained a couple of precious millimetres in height. **Figure 6** shows what material I removed from preformed speaker

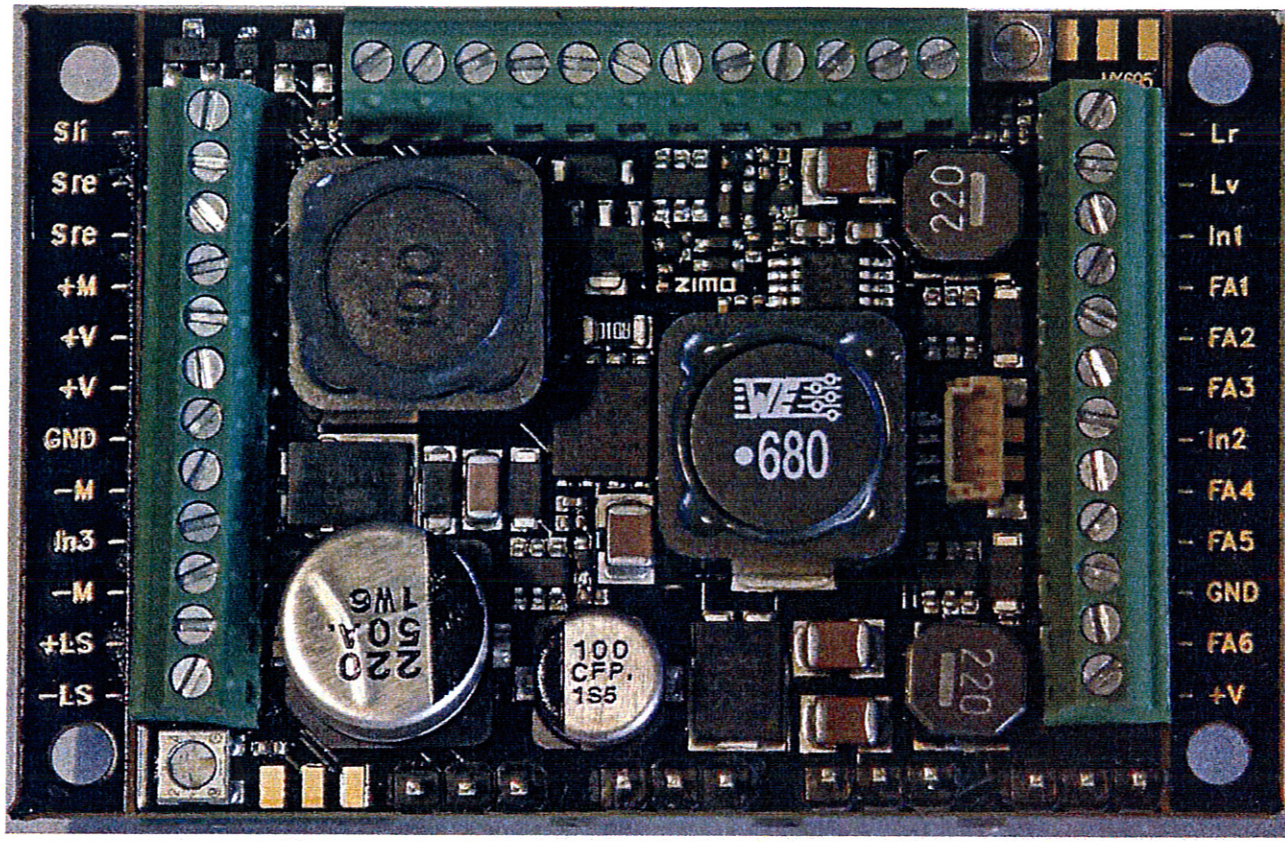


Figure 5

WHAT WE USED

Product	Cat No.	Manufacturer	Price
Class 26	26701	*www.heljan.dk*	£599.00
Sound decoder	MX695 KV	*www.zimo.at*	£174.95
40mm Hi Bass speaker	1-800-671-0641	*www.digitrains.co.uk*	£6.50

Figure 7

mounting. **Figure 7** shows the tank moulding reassembled ready to remount on the chassis.

I created a simple enclosure for the speaker and sealed it all together before painting it matt black to help disguise its presence. I used a pad of very thin double sided tape to fix it in place on the underside of the chassis (**Figure 8**). I then replaced the tanks which now surrounded my sealed enclosure and the preformed grille provided some protection for the speaker.

I use the term 'protection' quite loosely. During the first run with this Class 26 on a layout at a model railway exhibition, the speaker magnetically swept up lots of tiny bits of metal, iron filings and the like so it was coated with debris that caused it to buzz a little. This was difficult to clean effectively as the magnet continued to attract the metal whilst it was being removed!

I have subsequently fitted a piece of black material internally over the grille. This prevents the debris from reaching the speaker during a running session. Any that remains afterwards can be easily disposed of by removing the tank mouldings and shaking them over a waste bin away from the magnet.

The sounds

To provide the authentic Class 26 Sulzer beat, I loaded my own 'Manual Notching' sound project to the decoder. This sounds very good in 4mm, but in the larger scale it is even better. Digitrains can supply this sound project preloaded on any new Zimo decoder, whatever the scale.

I have lots of plans for this model, including relocating the speaker, however, a chance purchase of an interesting second hand locomotive at the show turned into a big project which will feature in a future series of articles here in *Hornby Magazine*.

Figure 8