

# HORNBY GOES INDUS

With a Zimo MX648 decoder and an 8mm x 12mm miniature speaker inside Hornby's Sentinel diesel shunter takes on a whole new sound with Paul Chetter's latest recordings.



**H**ORNBY'S Sentinel has had an impact amongst British outline modellers far in excess of its physical size. This is the first really serious attempt by a major manufacturer to produce a scale model of a prototype designed specifically for industrial use.

For such uses the priorities were to be able to negotiate tight curves, run on uneven track, be turned on wagon turntables and traverse temporarily laid track common in open cast coal and ironstone workings. These design parameters resulted in short wheelbase, compact locomotives with gearing to provide good low speed tractive effort. Maximum speeds of 15-20mph were typical.

The wagons in the photograph give a good indication of the size of the prototype and this model. It is against these dimensional challenges I set out to add DCC sound to bring *Cattewater* to life.

## Disassembly

After removing the NEM coupling at the rear two retaining screws are visible. The rearmost of these retains the fuel tank moulding and the other holds the rear of the cab to the chassis. Remove these screws. The fuel tank must be removed first as its forward edge prevents removal of the main body. Gently prise out the lower ends of the rear handrails from the die-cast chassis and it will come away easily.

Similarly release the front handrails. Raise the rear of the cab in an arcing movement pivoting on the lower edge of the radiator until free of the pair of retaining tabs on the chassis and lift the body clear.

Useable space is at a premium. Provision has been made for a special Hornby DCC decoder with a non-standard 4-pin connector. Unfortunately, this results in the need to model the cab with a raised floor and a covered channel to accommodate the decoder fitted edge-on. Fortunately, this does not detract too much from the overall representation as it remains below window level.

After the usual survey and careful measuring I decided to fit a Zimo MX648 miniature sound decoder and 'small' sugar cube speaker. These

can be fitted without being seen from any viewing angle or any visible modification to the model. Zimo offers three different sizes of these handy and relatively powerful speakers, which are great for use in space-restricted installations.

I decided to dispense with the DCC socket and use the space released to house the decoder. This in turn frees up space in the fuel tank originally designed to partly house the decoder. With a little work, this proved to be just large enough to accommodate a Zimo 8mm x 12mm speaker.

## Modifications needed

The decoder and the speaker as supplied are not quite miniature enough to fit the spaces available without a little modification. Modifying the locomotive may affect your warranty.

The decoder comes with a relatively thick insulating sleeve pre-shrunk. It would have been possible to leave this in place but would have resulted in removing a portion of the inner false floor support. The decoder would have then been visible on close inspection.

As all the surroundings which the decoder could touch are plastic, I judged it would be

**PAUL CHETTER** describes how to add an invisible sound installation to Hornby's brand new Sentinel industrial locomotive.

# TRIAL



safe to remove the insulation, thereby reducing the decoder dimensions to the bare minimum. This also allowed easy access to the decoder's solder pads. Zimo says this will not invalidate the warranty, provided that it was not the direct cause of any subsequent failure.

After removing the DCC socket and wiring, the gearbox guard and rear walls of the enclosure need to be thinned by about 50% to allow the decoder to fit snugly. I used a scalpel but a sharp knife or, if you are proficient, a mini-grinder would serve the same purpose.

Soldered and insulated wiring joints are durable and convenient but can be unwelcome additional bulk in space-critical applications. I avoided such problems by soldering direct to the decoder, but this is not absolutely essential. There is sufficient space for either method. To reduce clutter and maximise headroom, I also de-soldered all of the unused wires from the decoder. This allowed for the possibility of lowering the false floor later.

The driving desk and floor moulding has four locating legs. The front pair can remain but the rear pair interferes with the decoder and must be partly removed. The resulting loss of the fitting clips requires an alternative method

to fix the floor at the rear. I used the ever trustworthy medium of Blu Tac.

I ran the speaker wires through the ducting provided and re-attached the main body, engaging the front tabs and arcing it down at the rear. This was then secured with a retaining screw from below, through the chassis.


This process is not too difficult but a steady, cautious approach will smooth the way. There are several wire handrails to locate correctly during re-assembly. It is vital that each of the vertical pair behind the cab is accurately fitted to the holes in the footplate or the body will not sit correctly. Furthermore, the strain could cause the top ends to rip from their thin plastic locations.

The speaker will not immediately fit inside the fuel tank due to internal mouldings. To create the required space I shaved the semi-cylindrical moulding on the rear of the cab. Be

very careful not to remove too much material as this is where the locating screw holds the cab to the footplate. Retry the speaker fitting regularly between cuts. I strongly suggest you do this with the body fitted as the screw inside will prevent your blade going too deep.

If you need to, you may also shave a little from the corresponding moulding inside the fuel tank. I chose not to because the cab is partly held in place by the front of the fuel tank, so the only fixing which has been weakened is one separately supported by the fit of the fuel tank.

## Other options

I will later fit LEDs to the main lights, though the marker lamps look to be a significant challenge, if not an impossibility. Whilst the body is off again for this work, I also intend to lower the cab floor and add a driver, but that is for another time... 

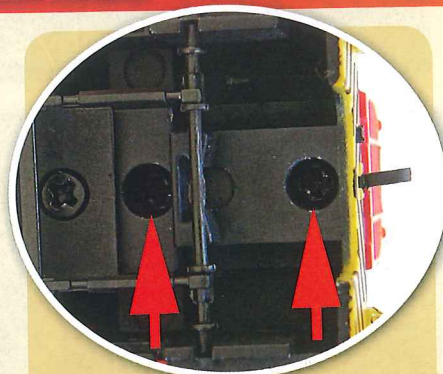
## WHAT WE USED

PRODUCT	SUPPLIER	PRICE
Hornby Sentinel diesel shunter	<a href="http://www.digitrains.co.uk">www.digitrains.co.uk</a>	£50.40
Zimo MX648 Sound Decoder	<a href="http://www.digitrains.co.uk">www.digitrains.co.uk</a>	£90.00
Zimo 8mm x 12mm miniature speaker	<a href="http://www.digitrains.co.uk">www.digitrains.co.uk</a>	£7.00

## STEP BY STEP INSTALLING DCC SOUND IN A HORNBY SENTINEL.



**1** In this general underside view the partly visible gears show that each axle is driven. The screw retaining the cab can be seen, but the NEM coupling, arrowed, must first be removed to reveal the screw holding the fuel tank in place.

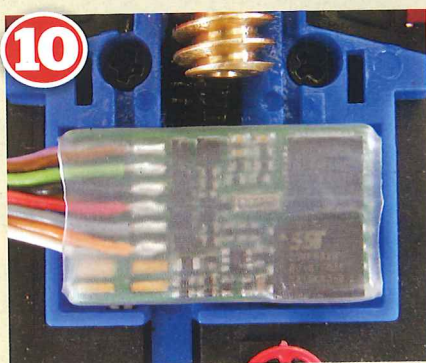


**2** With the coupling extracted, both retaining screws, arrowed, can be removed.

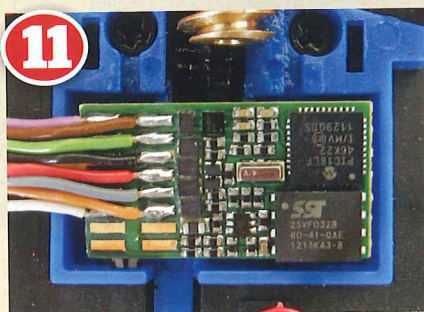


This view of the driving desk shows the extraordinary detail of the twinned control levers. They consist of two moulded handles and a separate metal wire linking bar. Some white paint would pick out the dials nicely, black for the knobs.

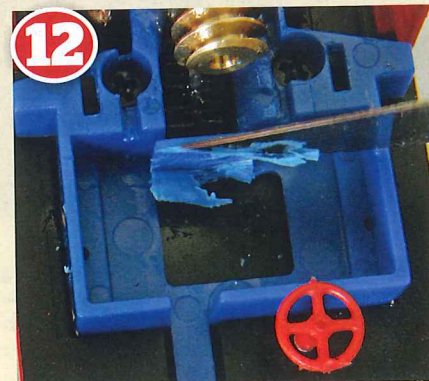
**6** The driving desk/false floor moulding can be unclipped from the lower part which houses the DCC socket.



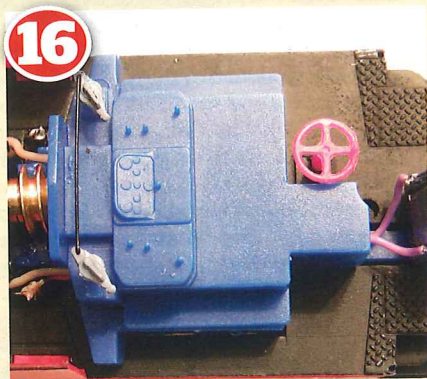
The MX648 sound decoder has a thick insulating sleeve as standard. It will fit with this in place if the rear wall of the enclosure has been removed, but I decided to retain the enclosure's external appearance.



Removing the sleeve reduces the width of the decoder, whilst also exposing the wiring solder pads. There are no metal parts which can come into contact with the decoder once in place, so this is safe to do. But, exercise caution as all exposed decoders may be damaged by static electrical discharge.



For a snug fit the guard protecting the gears and the rear wall of the enclosure must be trimmed to about half their normal thickness. I used a scalpel for this.



With the top moulding replaced, there is no visible evidence that any changes have been made – just how I like it!



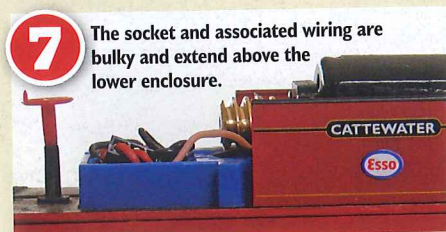
**17** This shot of the inverted fuel tank shows the 8mm x 12mm small sugar cube speaker loosely fitted. For the future, there will be enough space left over to fit LED lighting if required.

**18** After re-fitting the main superstructure and securing with the retaining screw from below, the speaker can be seen roughly in its final position. To avoid potential damage, very great care should be taken to locate the lower ends of each cab rear handrail correctly into its respective hole in the footplate before tightening the screw fully.





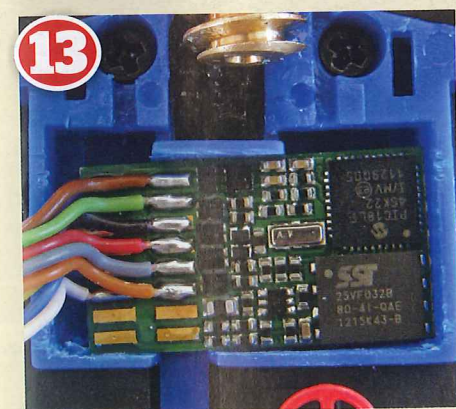
**3** The fuel tank must be released before the main part of the body can be lifted clear by tilting forward as shown here.



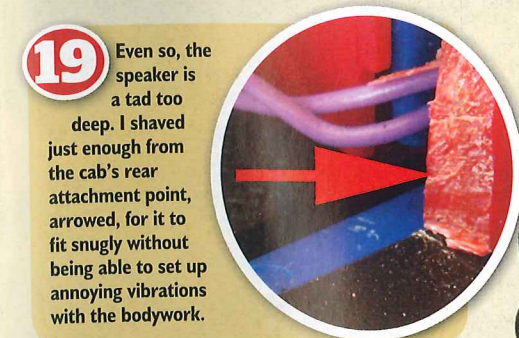
**7** The socket and associated wiring are bulky and extend above the lower enclosure.

## HEAR IT ONLINE!

Despite their small dimensions the MX648 and Zimo speaker produce a very acceptable sound output, and runs very smoothly. See this model running here: [www.hornbymagazine.com](http://www.hornbymagazine.com)



Test fitting will establish when the process is complete - a little more work required here.

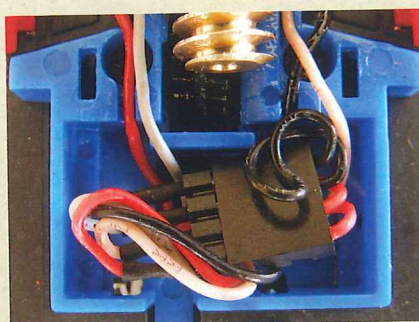


**19** Even so, the speaker is a tad too deep. I shaved just enough from the cab's rear attachment point, arrowed, for it to fit snugly without being able to set up annoying vibrations with the bodywork.

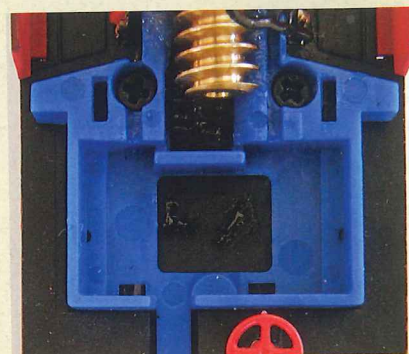
**20** Finally, the fuel tank is refitted over the speaker, secured with the remaining screw from below and the handrails guided into their respective location holes in the outside of the bufferbeams.



**4** The lower edge of the radiator moulding locates on these tabs, arrowed. This view also shows the general layout of the main components.



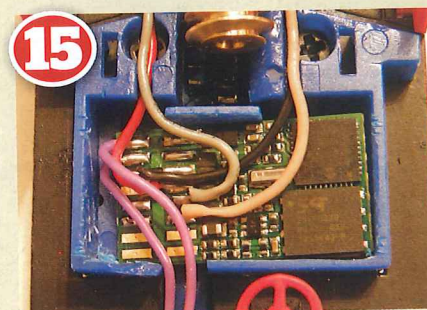
**8** Here's another view of the non-standard DCC socket provision. All of this has to go.



**9** From the general disposition of the components here, it can be seen that a small but reasonably unobstructed space becomes available after the supplied DCC provision has been cleared out.



The two rear lugs, arrowed, clip into the enclosure and would interfere with the MX648. They need to be shortened so that they protrude only about 3mm into the enclosure.



I removed all the unnecessary wires from the decoder and soldered the track and motor wires direct to the decoder, all with the aim of saving space. You can avoid this by joining the wires from the decoder to those of the model; there will be sufficient space to accommodate the insulated joints.

