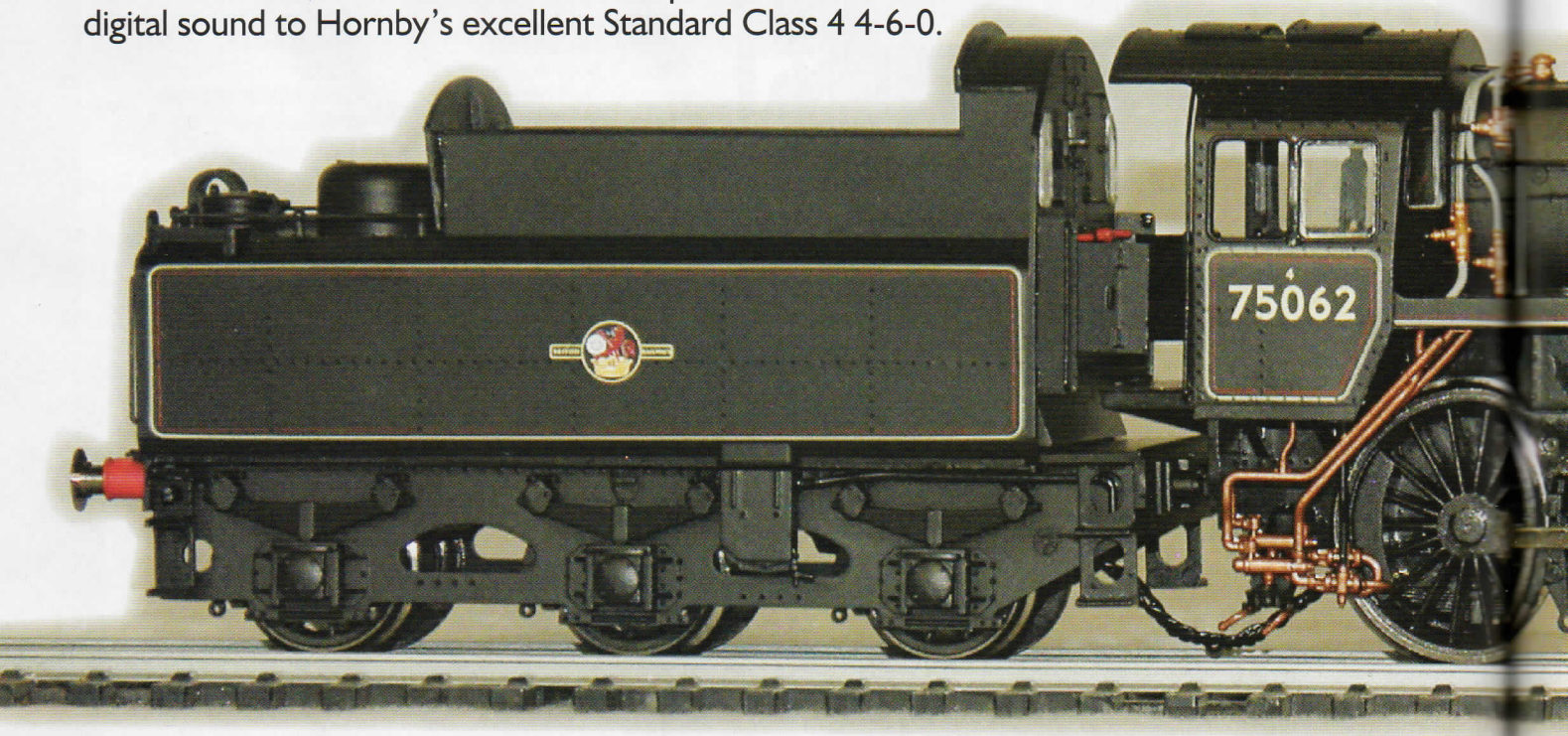
Got class?

In the first of a series of articles on customising a ready-to-run locomotive, **PAUL CHETTER** explains how he fitted digital sound to Hornby's excellent Standard Class 4 4-6-0.



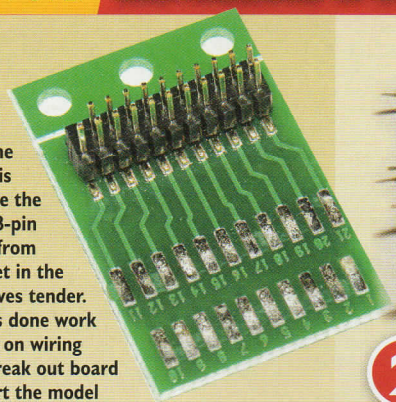
AFTER READING the review of Hornby's newly-released British Railways '4MT' in HM27, I felt this impressive model would be an ideal base for a customised locomotive - and after acquiring one I immediately set about configuring it with Digital Command Control sound. It proved a sometimes tricky but extremely worthwhile project.

I opted for the Midland Region based model which has a BR2 tender. The detail is excellent, but this aspect soon proved challenging. At first glance it looked as if there would not be sufficient space inside the tender to fit the sound decoder and speaker. The BR2 tender's inset coal bunker intended on the real thing to allow better rearward visibility for the crew already offers the modeller less space than other designs and the sloping floor of the accurately modelled coal bunker interior reduces this further.

Oddly, this DCC onboard locomotive was a few pounds cheaper than the DCC ready alternative which doesn't include a factory fitted chip so I simply removed the Hornby decoder to use elsewhere and cracked on.

Internally, the 8-pin socket is fitted to raised mountings which take up more of the scarce remaining space. The most compact solution would be to install a sound decoder fitted with an 8-pin plug and leading manufacturers all supply decoders in this format. However, my long term plan is to utilise all of the extra functions of the decoder, but they are not fully supported by the NMRA 8-pin format. The most obvious shortcoming is that there are no

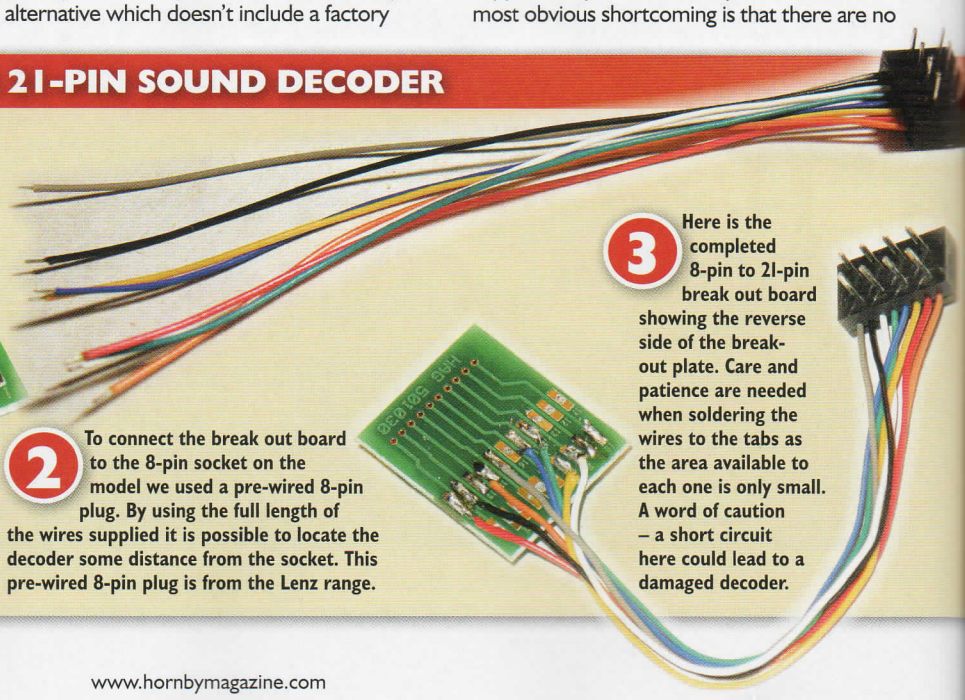
STEP BY STEP INSTALLING A 21-PIN SOUND DECODER

1 

The first part of the upgrade is to remove the existing 8-pin decoder from the socket in the locomotives tender. With this done work can start on wiring up the break out board to convert the model from an 8-pin to a 21-pin connection. However, care is needed to ensure the correct wires are soldered to the correct pads – see Table 1 for full details.

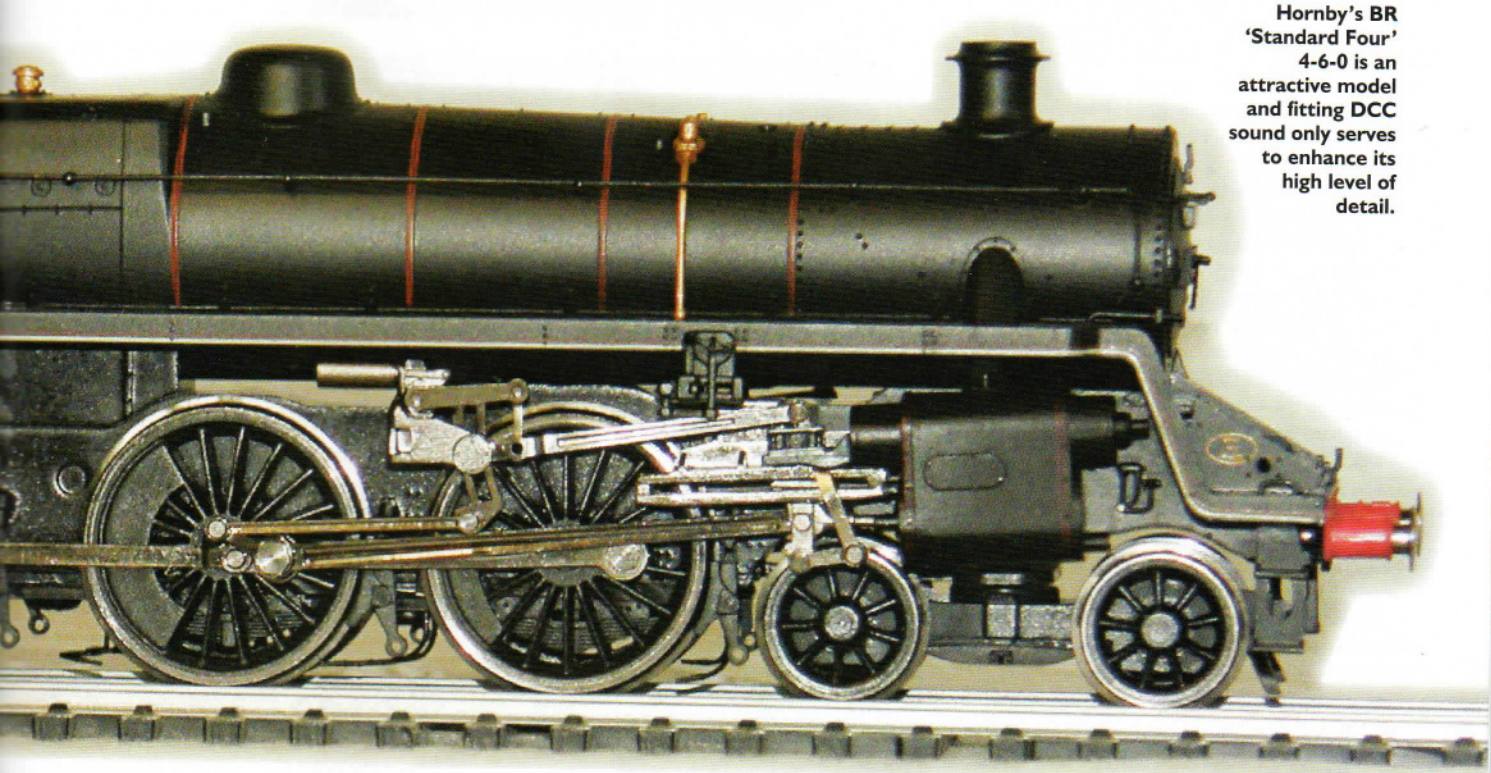
2

To connect the break out board to the 8-pin socket on the model we used a pre-wired 8-pin plug. By using the full length of the wires supplied it is possible to locate the decoder some distance from the socket. This pre-wired 8-pin plug is from the Lenz range.

3 

Here is the completed 8-pin to 21-pin break out board showing the reverse side of the break-out plate. Care and patience are needed when soldering the wires to the tabs as the area available to each one is only small. A word of caution – a short circuit here could lead to a damaged decoder.

Add sound!



Hornby's BR 'Standard Four' 4-6-0 is an attractive model and fitting DCC sound only serves to enhance its high level of detail.

speaker connections to the plug and socket, meaning the installation would be part plugged in and part hard wired. To avoid this I decided to use an adaptor to convert to the MTC 21-pin configuration.

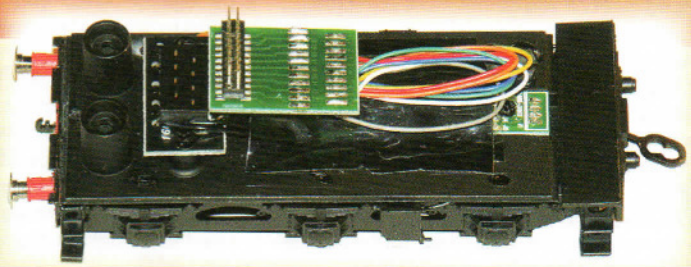
The 21-pin socket is now employed widely by both Bachmann and Hornby in their DCC Sound locomotives and allows a 21-pin chip to work in an 8-pin socket. Using this allows the model to be easily returned to its original condition if needed and be able to remove or change decoders without de-soldering. It also removes the need to solder function wires directly to the decoder, a much safer option given the high cost of sound decoders.

Making the connection

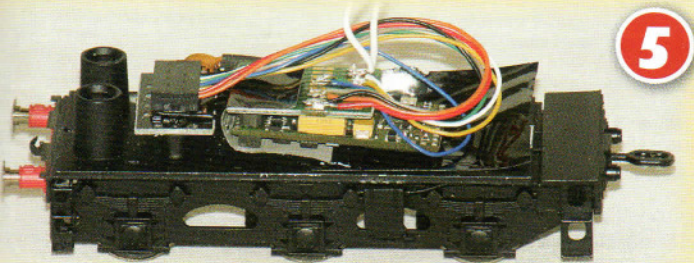
DCC Concepts sells an adapter to allow an 8-pin decoder to fit a 21-pin socket. Unfortunately, at the time of writing, there are no adaptors available to allow a 21 pin decoder to fit an 8 pin socket but it is possible to make one from the readily available parts shown. ESU makes a break-out board, Cat No. 51967 which is ideal for the job at hand.

The MTC 21 plug fitted to the board actually has 22 pins. One of these, pin 11, has been removed to ensure the decoder is fitted correctly. The decoder does not have a hole corresponding to the position of pin 11 either. This means that the solder pad numbers only agree with the pin numbers up to 10.

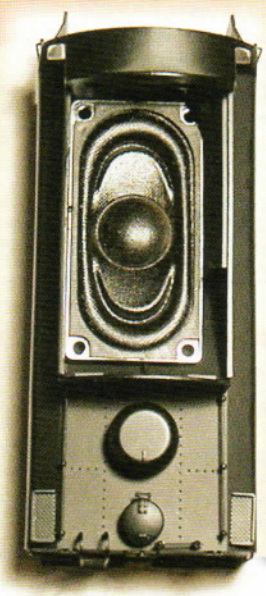
The instructions are in German, and include both pin and solder pad numbers which do not agree in all cases so there is some room for confusion. Use Table 1 for the definitive »



4 At this point the converter plug is now connected to the 8-pin socket on the model. A decoder can now be attached to complete the basic installation.



5 The Zimo MX640 sound decoder can now be attached to the 21-pin break out board. To ensure it remains in good working order the decoder has been insulated, inverted and secured in place with double sided tape.



6 Finding space for a suitable speaker was difficult in the '4MT', but in the end this 20mm x 40mm speaker fitted perfectly into the empty coal bunker. A removable coal load was then added on top to conceal the speaker using a foam pad and crushed coal.

WARNING!

The solder pad tables provided by ESU are in German so care is needed when selecting the pads to connect to on break out board. Table 1 shows the number and wire colour for a standard 8-pin plug. Speaker wires are fixed to pads number 9 and 10.

positions. You will also need either an 8-pin plug, separate wires and some solder, or a pre-wired 8-pin plug and solder. For simplicity I used a Lenz pre-wired plug but they are also available from other manufacturers. By using the correct length wires it is possible to locate the decoder some distance from the socket if the particular installation requires it - handy when space is limited near the socket.

The break-out board allows a 21-pin decoder to be fitted and provides 21 numbered solder pads on both faces. But choose carefully which side you solder to. I originally connected to the pin side for neatness but the wires interfered with the correct fitment of the decoder. This increased the size to be accommodated and produced unreliable performance. I had to relocate the soldering to the reverse side, so I recommend you start there.

As supplied, the break-out board has a small snap-off section with mounting holes. This was not needed, so I removed it to reduce the overall length and fitted the decoder. Modern decoders are fairly robust in my experience, but like all electronic components they are not immune from permanent damage by static electricity and 21 pin decoders usually have no external insulation. Sound decoders represent a substantial investment so it makes sense to take adequate precautions when handling them. Ideally, wear an anti-static wristband. At the very least, ground yourself beforehand by touching something metal such as a central heating radiator.

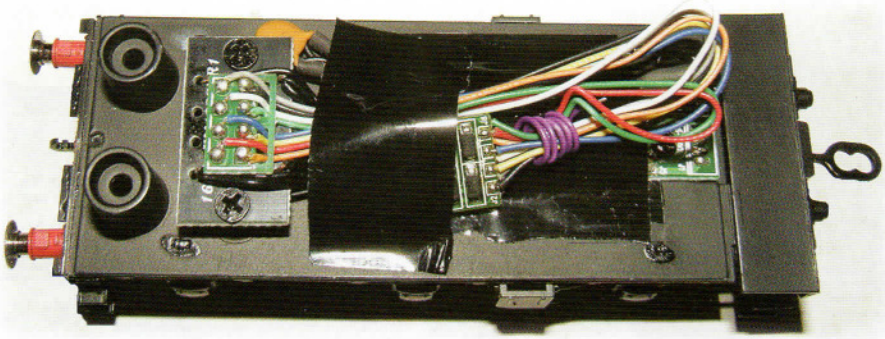
The decoder used here is the ZIMO MX640 sound decoder. It comes preloaded with sound files for five different steam locomotives and one diesel, all of German origin. However, it is possible to create, customise and load your own sounds, and this is what I have done for this model, of which more later.

First of all I moved the existing wiring to one side (there is plenty of slack) to gain as much height as possible. I then fixed some insulating tape on the chassis and decoder ends and used double sided tape to mount it all, decoder side down. No ventilation is built into the tender, so I reassembled it and test ran it for an hour at 75% throttle to ensure there was no excessive build up of heat.

Clear sounds

The most important thing for effective digital sound is that the impedance of your speaker must be matched to the decoder's output.

With the coal removed from the bunker the detail and the lack of space can be clearly seen. The general layout of Hornby's DCC equipped interior is neat but cramped.



WHAT WE USED

Product	Cat No.	Manufacturer	Price
BR 'Standard Four'	R2715X	www.hornby.com	£127.19
Break-out plate	51967	www.loksound.de	£7.90
Wired 8-pin plug	LY014	www.lenz.com	£3.51
8-pin to 21-pin adapter	DCC218	www.dccconcepts.com	£3.50
Sound decoder	MX640D	www.zimo.at	£84.00

If you are using a single speaker with a Loksound decoder, 100ohms is a must: ESU produces a good range of quality speakers at reasonable prices. However, Zimo's MX640 and other brands need the much more commonly used 8ohms. Such speakers are often cheaper and are available in a wide range of qualities and sizes. The choice is yours.

In the '4MT' there is simply no room to fit a base reflex speaker into the tender without cutting out the coal bunker. Although it would not be visible when finished, this would not allow me to return the model to its original state so I ruled this out. In order to obtain good sound quality I then experimented with a 16mm x 35mm speaker which fitted deep into the coal bunker. It would have allowed a convincing part load of coal and acceptable sound quality if you cannot avoid going this small but the volume available was totally inadequate so it proved to be a compromise too far. Again, Hornby's high level of detail - this time the fireiron locker - reduces the available width in the coal bunker and adds a taper at the front end. It was time to think again.

After very careful measuring, I was able to fit a 20mm x 40mm speaker into the coal bunker space. This is the size commonly used in ready-to-run sound equipped locomotives and I was optimistic it would fit. By carefully filing one edge and one corner of the metal frame to make a snug fit, the speaker is held in place without the need for screws or adhesives, a welcome bonus.

Speakers perform better when fitted with an enclosure which isolates sounds from the rear of the speaker and prevents them from interfering with those at the front so I decided to fit one to the '4MT'. For once this was fairly straightforward. There is no space available for a proprietary enclosure, but the close fit of the speaker and the coal bunker interior space serve well enough in themselves. To seal this enclosure, I filled the screw holes and any gaps with Blu Tack. This works well and is completely removeable, unlike if I had used glue or filler. A couple of 1.5mm holes drilled through the bunker floor allowed speaker wires to pass to the break-out board for soldering.

To conceal the speaker I added a coal load which I made from some black foam coated with real coal and stuck with diluted PVA glue. Whilst this is not a new idea, it does provide more than a passing resemblance to the real thing - but some of those lumps are going to need some stern attention from the fireman's pick!

TABLE 1: BREAK OUT BOARD SOLDER PAD POSITIONS

7	8	14	15	17	18	20	21
Yellow	White	Green	Blue	Grey	Orange	Black	Red

Please note these are the numbers of the solder pads. They do not correspond exactly to the pin numbers since pin 11 is used only to give the correct orientation to the socket.

Next issue...

I will explain how to capture, edit and save your own sounds in the correct format. In the meantime, have a look at the video at *www.hornbymagazine.com*