'Hoover' SOUND

The Class 50s had a distinctive and impressive soundtrack which can be replicated in model form with high-quality digital sound files. **MIKE WILD** picks the Heljan 'O' gauge Class 50 to show how this large-scale main line diesel can be equipped with realistic sound.

TOOLS
Sound decoder installation

- Crosshead screwdriver
- Flatblade screwdriver
- Soldering iron
- Heatshrink insulation
- Insulation tape
- Black Tack

THE CLASS 50S EARNT a huge enthusiast following in their final years of service. Their distinctive exhaust sound made them thrilling to ride behind as they powered through the countryside on expresses from London to the West on routes like the famous Waterloo-Exeter run.

Recreating the sounds of the Class 50 in miniature is a great way to make the most of modern models. In the past we have shown

Named and numbered, our sound fitted Class 50 stands on shed at Seven Mill Depot awaiting its next duty.

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how to do this in 'OO' gauge using the Hornby model and a ZIMO MX645R 8-pin decoder (HM123) with a high-performance twin speaker, but in this feature we are going to look at how Heljan's new 'O' gauge model can be upgraded to sound for even greater effect.

Since arrival in December 2019, Heljan's 'Hoover' has been immensely popular – and especially the BR 'large logo' blue model. There are still examples available off-the-shelf in Network SouthEast livery as well as 50007 *Sir Edward Elgar* and 50149 *Defiance* in their unique colour schemes. Sound will definitely be a popular choice for these impressive 478mm long Co-Co diesels, not least because there is plenty of space inside to install a powerful speaker to recreate the distinctive rumble of the Class 50 with even greater realism.

The Heljan Class 50 has been designed with sound in mind. There is space in the fuel tanks for a 42mm diameter round speaker and multi-coloured wiring has been used. However, while the wiring follows the correct colours for the motor (orange and grey) and track pick-ups (red and black), the lighting wiring doesn't follow correct DCC protocol as the blue has been used for the negative wires where it should be the common positive for each lighting function. Nevertheless, the colours do help establish what wire does what, but be prepared to do a little tracing before connecting wires to a decoder.

TECHNICAL DETAILS	
Manufacturer:	*www.heljan.dk*
First released:	2019
Description:	Class 50 Co-Co diesel-electric
Gauge:	'O'/32mm
Scale:	7mm:1ft
Length (over buffers):	478mm
Price:	£699.00
Era:	6-8
Couplings:	Screw link couplings
DCC:	DCC compatible
Speaker space:	42mm diameter in fuel tanks
Exterior lights:	Directional head and taillights
Interior lights:	None
Motor type:	Two - five-pole
Flywheel:	Two – one per motor
BR power classification:	Type 5
Wheel arrangement:	Co-Co
Purpose:	Express passenger
Haulage capacity (expected):	Ten+ coaches
Haulage capacity (actual):	11 (maximum tested)

The interior space within the Class 50 offers a perfect space to install a much more capable speaker than what could be fitted into the fuel tanks, with only minimal modifications to remove the four posts which originally supported the main printed circuit board.

Our decoder choice for this model is the MX696KS. This is another powerful ZIMO large scale decoder but, unlike the MX699KS, it doesn't have a built in stay alive energy storage facility. Instead we have to add that separately. Following our initial tests, we decided to upgrade the stay alive pack connected to the model to a Digitrains 860009 which offers up to 20 seconds of on-board charge to keep the model running should there be an interruption in track power. This is a straight swap for the part shown in the step by step guide.

The end result is a locomotive which looks and sounds the part of the real locomotives and, at the head of a rake of matching BR blue and grey Mk 1 stock, our completed model numbered and named as 50049 *Defiance* is a pleasure to run.

The following step by step guide shows how a ZIMO large-scale MX696KS decoder, stay alive and a high-performance bass speaker were installed in this recent addition to the Heljan 'O' gauge portfolio. HBm

SOUND FUNCTIONS	
F0	Lights on/off (if fitted)
F1	Sound on/off
F2	Brakes
F3	High horn (variable length)
F4	High-low horn
F5	Light engine mode
F6	Engine idle/coasting
F7	Speed lock
F8	Engine speed-up
F9	Flange squeal
F10	Buffering up
F11	Guard to driver instructions
F12	BIS and fire bell
F13	Fuel lift pump
F14	Manual lubrication priming pump
F15	Fan (plus roof fan – see Note 1)
F16	Traction motor blowers
F17	Guard's whistle
F18	Door slam
F19	Fade all sounds
F20	Taillights, directional (see Note 2)
F21	Shunt mode
F22	Spirax valves
F27	Volume down
F28	Volume up

Note 1: To set the roof fan to work on F15 with the fan sound, connect the black wire from the roof fan to FA3 on the decoder and the red wire to the common positive feed. **Then set the following CVs:** CV448=15, CV450=3, CV452=3.

Note 2: To set the taillights to operate independently on F20, connect the purple negative wires to FA1 and FA2 on the decoder. **Then set the following CVs:** CV430=20, CV432=2, CV434=1.

Intermediate
Beginner SKILL LEVEL Advanced

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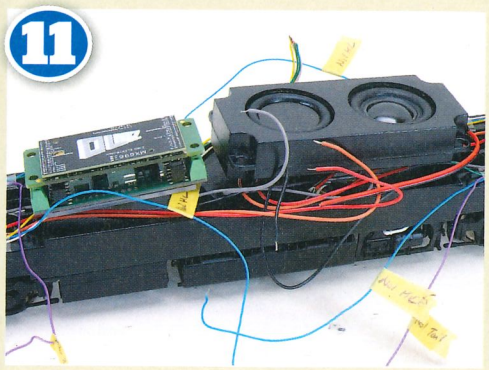
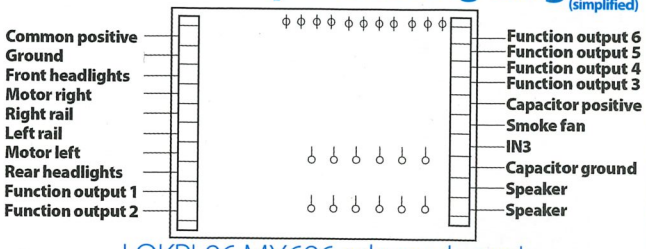


Next we established the arrangement of the parts inside the locomotive. There is a large space between the two motors which is big enough to accommodate the decoder and a 100mm x 45mm twin speaker from Roads and Rails. However, a small modification is required to the chassis to make space for this setup.

DIAGRAM 1

MX696KS baseplate wiring diagram (simplified)



LOKPL96 MX696 adapter board

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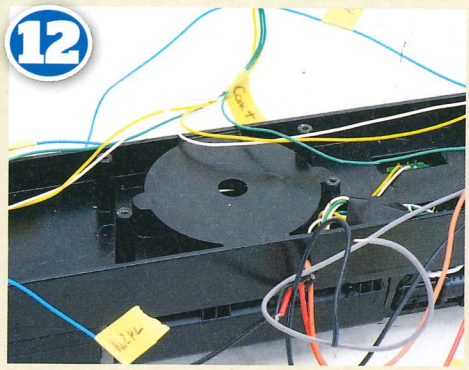

The four metal supports which originally held the decoder need cutting down to the same height as the circular casting at the centre of the chassis. This can be done with a hacksaw or a cutting disc in a mini drill. In either case, ensure the motors are protected with masking tape before starting the cutting process to keep metal filings from entering the motors.

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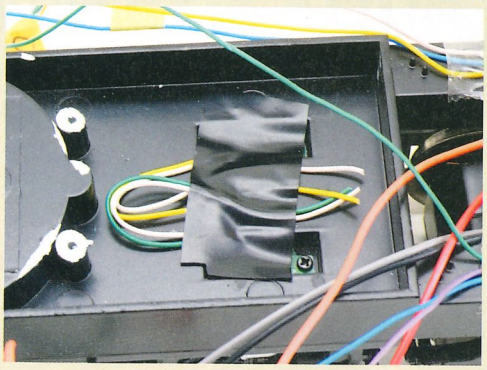

The supports have now been cut down and we've also shortened the redundant wires from the chassis switches and taped them to the floor. These switches are no longer required in our installation as their functions are taken care of by the decoder.

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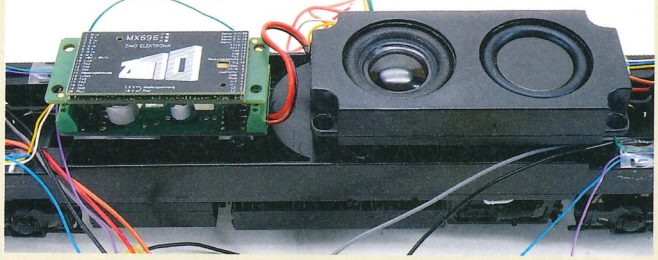
The speaker has now been fixed in place with Black Tack and the decoder positioned behi it. We connected the speaker to the LS terminals on the baseplate, but then realised the decoder needed to be mounted the other way around to avoid lengthening a large number of wires to reach it.



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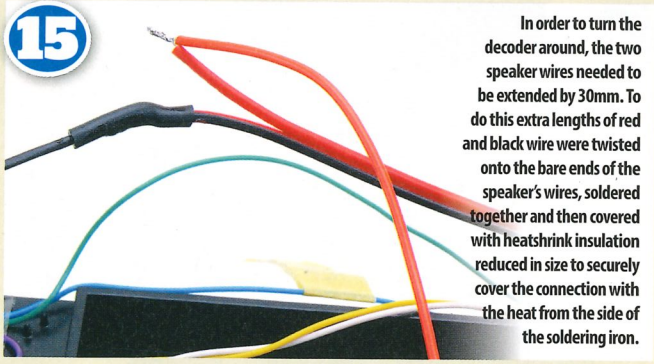

In order to turn the decoder around, the two speaker wires needed to be extended by 30mm. To do this extra lengths of red and black wire were twisted onto the bare ends of the speaker's wires, soldered together and then covered with heatshrink insulation reduced in size to securely cover the connection with the heat from the side of the soldering iron.

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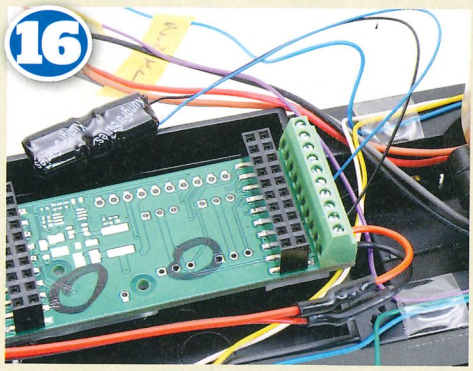

The decoder baseplate has now been rotated through 180 degrees (as has the locomotive) and the speaker has been reconnected. We've also connected a stay alive pack to the Capacitor Positive (blue wire) and Capacitor Ground (black wire) terminals on the decoder, as per the diagram. This was later replaced with a longer lasting 860009 stay alive pack.

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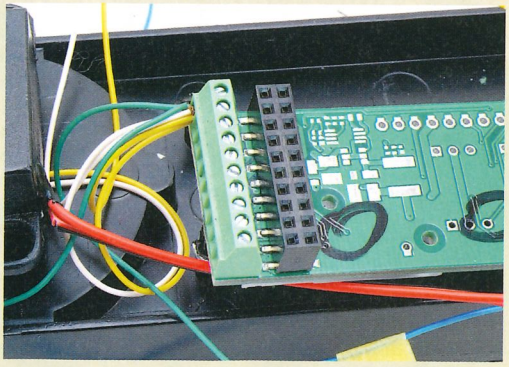

At the other end of the baseplate we will make most of the connections. The first is the group of common positive wires from the lighting functions which go into the first connection on the terminal block.

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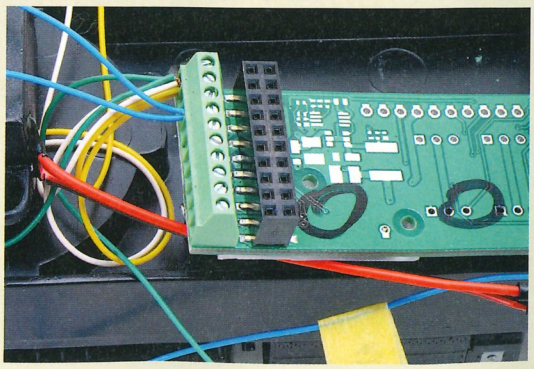
Miss the ground connection, then add the headlight and headbox light blue negative wires to the third terminal from the top for the No. 1 end.



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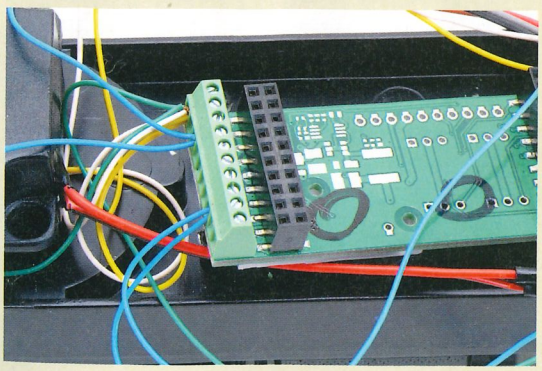
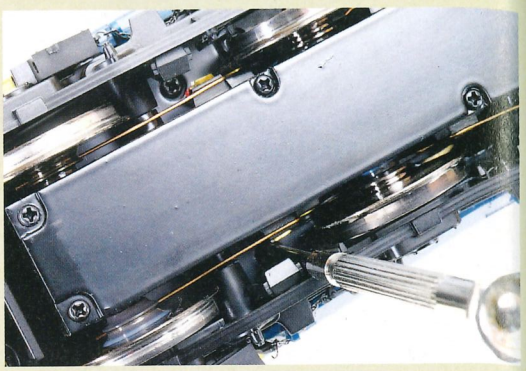
The blue negative wires from the No. 2 end are then connected to the third terminal from the bottom of the terminal strip, as illustrated here.

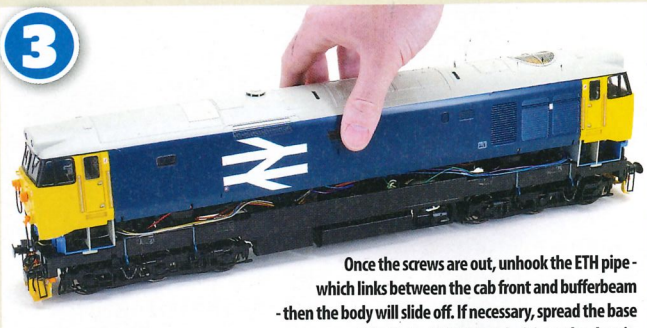


INSTALLING SOUND IN A HELJAN CLASS 50

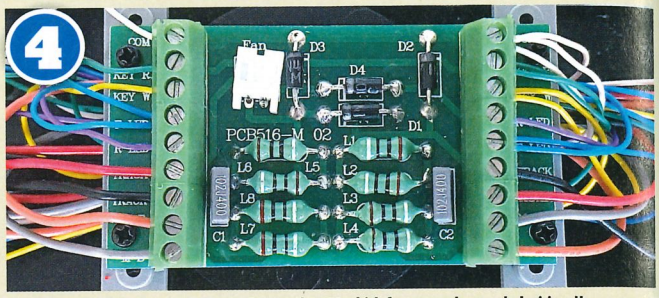
1 Heljan's 'O' gauge Class 50 arrived at the end of 2019 and was an instant hit. It has colour-coded wiring inside to make it digital friendly and ample space for a speaker and large-scale sound decoder, as we will show.



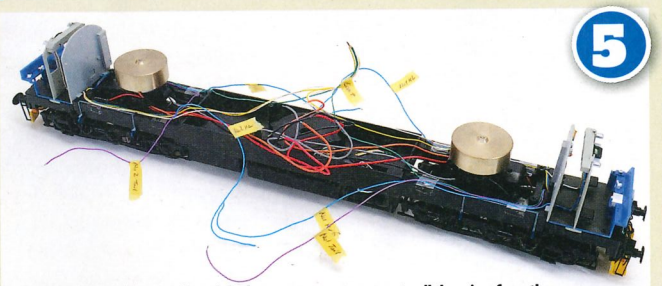
2 The chassis is fixed to the body with four crosshead screws. These are in pairs located above the bogies between the leading and centre axles. Undo all four to release the body.



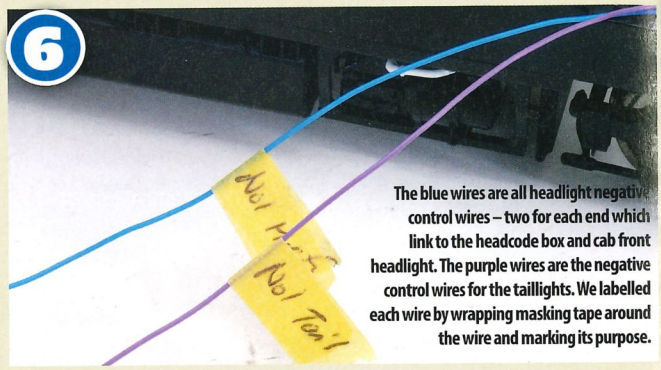
3 Once the screws are out, unhook the ETH pipe - which links between the cab front and bufferbeam - then the body will slide off. If necessary, spread the base of the body slightly to take it over the chassis.



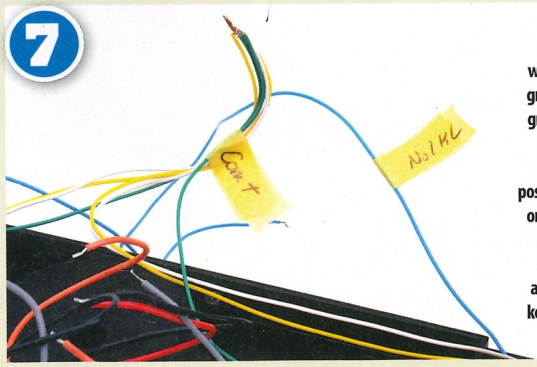
4 Heljan has developed a new PCB type for the Class 50 which features colour-coded wiring. However, while the motor and track connections are correctly coloured for DCC protocol, the lighting wiring isn't, as the blue wires (which should be common positive) are all negative control wires.



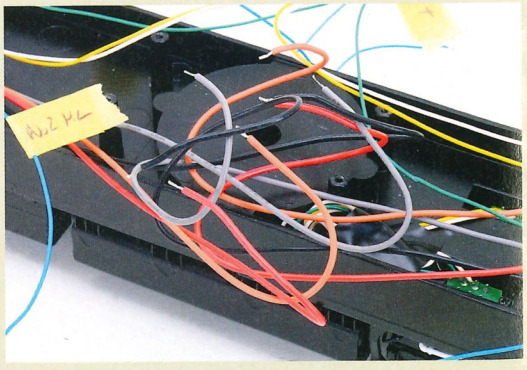
5 To sort out the wiring, we found the best route was to separate all the wires from the original PCB and trace them back to the source to work out what does what. The result is that the common positive wires for the lighting are white, yellow and green.



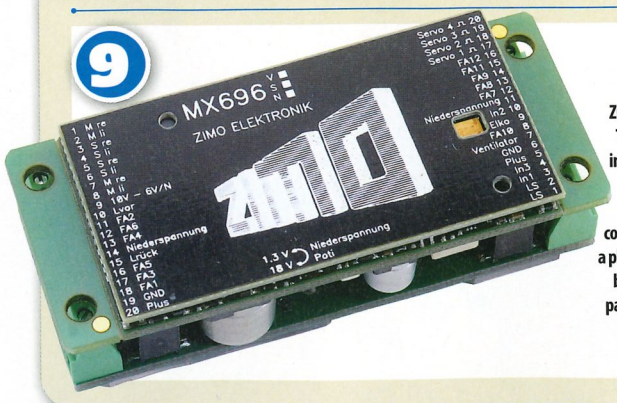
6 The blue wires are all headlight negative control wires – two for each end which link to the headcode box and cab front headlight. The purple wires are the negative control wires for the taillights. We labelled each wire by wrapping masking tape around the wire and marking its purpose.



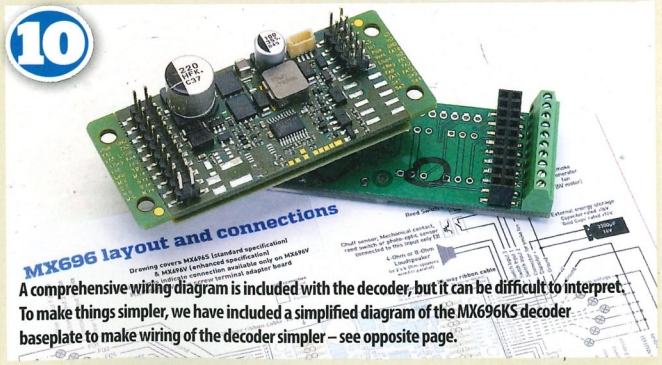
7 The common positive wires – white, yellow and green - need to be grouped together to be connected to the common positive connection on the decoder. As per the negative wires, we added a label to them to keep track of their purpose.



8 It looks more complex than it really is here. The remaining wires are all correctly coloured – red and black for track feeds, grey and orange for motor connections.

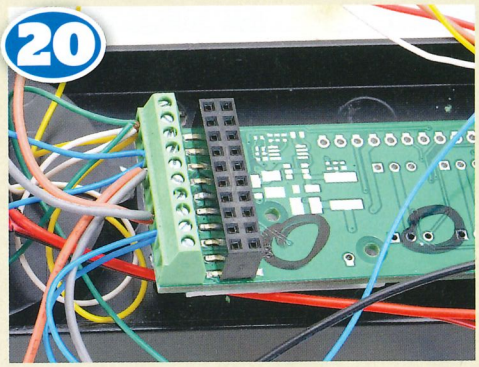


9 Our decoder choice for the Class 50 is the Zimo MX696KS. This decoder is in two parts – a baseplate to make the connections and a plug-in decoder board. The two parts need to be separated for installation.

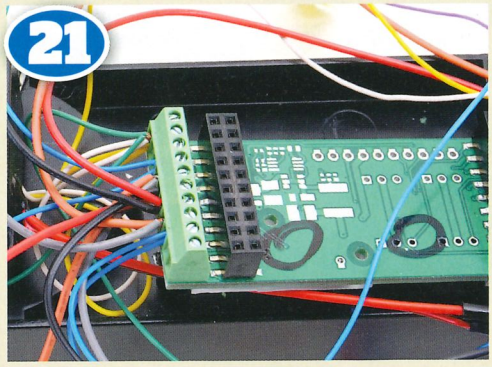


10 A comprehensive wiring diagram is included with the decoder, but it can be difficult to interpret. To make things simpler, we have included a simplified diagram of the MX696KS decoder baseplate to make wiring of the decoder simpler – see opposite page.

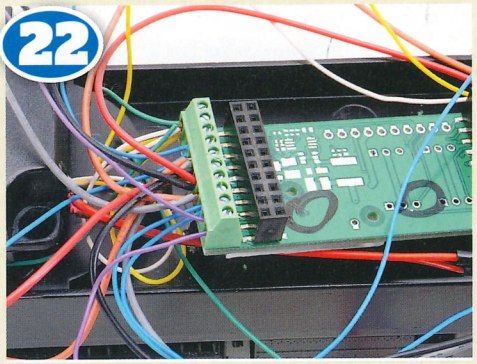
INSTALLING SOUND IN A HELJAN CLASS 50



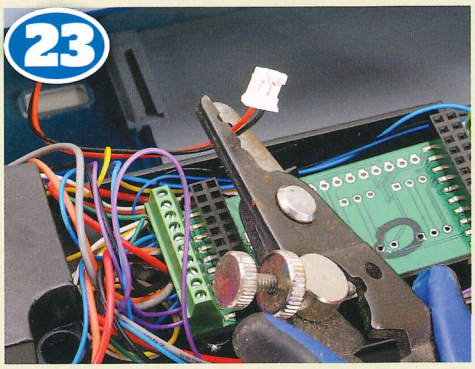
20 Next the motor connections are added. Note that the orange wire from the left-hand motor is joined to the grey wire of the right-hand motor and connected to the Motor Right terminal. The grey wire from the left-hand motor is joined to the orange wire from the right-hand motor and connected to the Motor Left terminal.



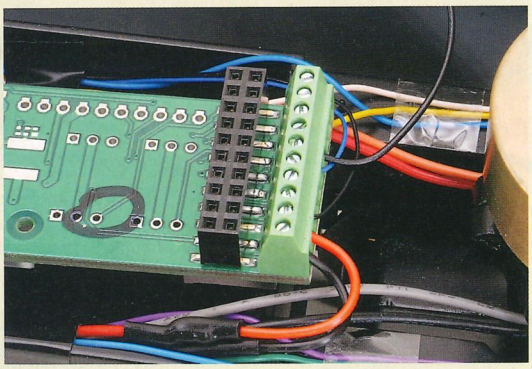
21 Completing the main connections, the left-hand red pick-up wire is joined to the right-hand end black pick-up wire and joined to the Right Rail terminal. The left-hand black pick-up wire is joined to the right-hand red pick-up wire and connected to the Left Rail terminal on the baseplate.



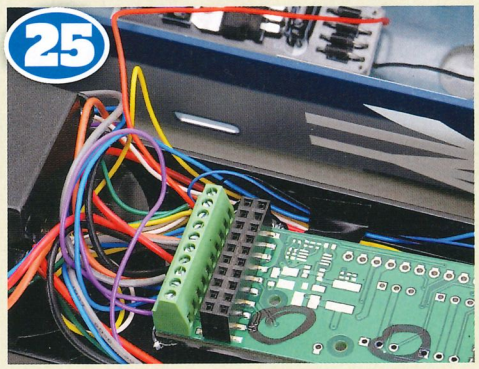
22 The pair of purple negative function wires from the taillights are connected to FA1 (No. 1 end) and FA2 (No. 2) on the baseplate.
A trio of Configuration Variables (CVs) need to be changed on the decoder to make these work correctly with a specific function button on a digital handset (see function table).



23 As an optional extra we can connect the roof fan to a separate function output on the decoder and make it work with the fan sound on F15. First, cut off the original plug from the red and black wires from the roof fan circuit board. Cut as close to the plug as possible to maximise the wire length available.



24 The black wire from the roof fan goes to the Function Output 3 (FA3) terminal on the baseplate next to the blue wire from the capacitor.



25 The red wire from the roof fan connects to the common positive terminal (where we joined the white, yellow and green wires in step 17). We removed the previously connected bunch and twisted the bare end of the red wire onto them before reconnecting them to the Common Positive terminal.

26 The decoder can now be plugged in, ensuring it is aligned correctly. Digitrains, the supplier of our MX696KS, marks circles on the baseplate the same size as the cylinders on the decoder to assist in orientating it correctly. Now that we have the decoder plugged in, the locomotive can be tested and the sound checked.

27 The body of the Class 50 can now be permanently refitted to the chassis. Take care to ensure all wires are neatly positioned around the chassis so they don't foul any moving parts. We found it necessary to tape the black wire from the roof fan to the top of the decoder to prevent it from leaning against the flywheel at the No. 2 end.

28 To make the sound project function as we wanted it to, we need to allocate FA1 and FA2 to function 20 on a digital handset (and make them directional). To do this set CV430=20, CV432=2 and CV434=1. We also need to change CVs to set FA3 (for the roof fan) to turn on with the fan sound on F15. To do this, set CV448=15, CV450=3 and CV452=3. Once this is done all of the functions will operate as per the function list on page 87. These CV changes only work for the Digitrains ZS50ASL sound file.

EXCLUSIVE ONLINE FEATURE!

● Visit our new website – *www.keymodelworld.com* - to see an online guide to adding transfers and nameplates to this Class 50.

WHAT WE USED

PRODUCT	SUPPLIER	CAT NO.
Zimo MX696KS large scale decoder	*www.digitrains.co.uk*	MX696KS
Zimo Class 50 ActiveDrive sound file	*www.digitrains.co.uk*	ZS50ASL
100mm x 45mm twin speaker	*www.roads-and-rails.co.uk*	n/a
Stay alive pack, up to 20 seconds	*www.digitrains.co.uk*	860009