One, two... a DIGITAL '3MT'!

PAUL CHETTER shows how he installed a sound decoder, speaker and 'stay alive' supercapacitor in a Bachmann '3MT' 2-6-2T giving it a new level of driving capability.

ON THE FACE OF IT, tank engines look to have lots of useable space inside that wide cross-section which is not available in tender locomotive boilers. Such assumptions may prove to be unfounded if the manufacturer has used some or all of it for other purposes. In the case of the Bachmann '3MT' 2-6-2T, the tanks have been filled with metal to increase weight to give added traction. This is not unusual and recent models such as the 'E4' 0-6-2T and '64XX' 0-6-0PT leave little available space for sound installations.

A Digital Command Control (DCC) ready model such as this will have some space set aside for a decoder, but what about a speaker and capacitors? As usual, a thorough survey with the body off and maybe partly dismantled is the only way to be sure. You also need to decide if using space which will be visible in normal running condition is acceptable or not. I prefer to keep all my installed components hidden, so I avoid using space in the cabs if at all possible.

This model has three major structures. First up is the chassis with motor, gearbox and wheels. Next, a metal casting forms the front and side footplates, front buffer beam and

Bachmann's BR '3MT' 2-6-2T made its debut in November 2010 (HM31) and has been a popular addition to the range of BR Standards for 'OO' gauge. The addition of digital sound enhances it still further.

internally provides weight inside each side tank with an extension forming the cab floor and support for the coal bunker. Finally there is the locomotive body made of plastic.

If fitting a decoder only, or a sound decoder and speaker, with the right choice of equipment there is sufficient space to accommodate them in the smokebox and boiler voids. In this case there is no need to separate the body and casting from each other. Access to the internal bunker space will require the body to be removed from the metal casting. Some care will be needed as the plastic is glued to the metal in places, and whilst separated, the structural integrity of the plastic body is compromised.

COMPONENTS

The Zimo MX645 family has a powerful 3W amplifier and onboard circuitry to manage external capacitors as standard. The smaller MX646 and miniature MX648 would be powerful enough for this model and being smaller would be easier to accommodate, but both require extra circuitry to manage 'stay alive' capacitors and cost a few pounds more.

Zimo's cube speakers are compact and self-contained and are capable of a surprising volume and frequency range. The larger 12mm x 15mm version is available in a two heights, the taller of which can fit easily inside the smokebox of the '3MT'. Finally, the Zimo SC68 supercapacitor is compact enough to fit within the bunker after a small modification, yet has a significant 'stay alive' capacity.

WHAT WE USED

PRODUCT	SUPPLIER	PRICE
BR 'Standard Four' sound file	www.digitrains.co.uk	£0.01
Zimo MX645 Sound Decoder	www.digitrains.co.uk	£83.00
Zimo 10mm x 15mm cube speaker	www.digitrains.co.uk	£8.50
Zimo SC68 supercapacitor	www.digitrains.co.uk	£22.00

GETTING STARTED

I removed the two screws fixing the chassis at the rear and slackened the screw holding the front pony truck which allows the leading wheels to be moved aside sufficiently to allow access to the forward chassis securing screw.

The body is a very close fit in parts and can be reluctant to separate. If the separation is conducted carefully, noting these pinch points, excessive force can be avoided. This is also worth noting for reassembly. Some preliminary measuring showed that it would not be possible to fit all three components into the smokebox and boiler cavities, so I removed the three screws holding the plastic body to the metal casting to separate them for access to the bunker's interior space.

Care is needed again as the plastic is glued to the metal in several places. The bond was easily severed on this example without damaging the plastic body by running a scalpel blade between metal and plastic. The relatively large space inside the coal bunker is compromised by a central column used to secure the substructure, as well as the tapering sides of the upper bunker area. Whilst the column did not pose a problem, the taper prevented the SC68 supercapacitor fitting correctly, so I cut off one of the negative connecting lugs to allow it to sit deeper into the cavity. I decided to reunite the body and casting in order to maintain the body's rigidity. This meant I had to fit the SC68 and run its connecting wires first. I soldered a grey and a blue wire to the negative and positive tabs respectively, cut a small 'V' in the lower bunker bulkhead and a corresponding one at the foot of the firebox backhead to allow the wires to run at footplate level across the cab floor. Before reassembly, I painted the wires matt black in the cab area to camouflage their presence. You could use black wire for this instead, but you will need some indication of polarity at the free end because the SC68 connections will by now be invisible and correct connection is essential for capacitors.

DCC MODIFICATIONS

A substantial amount of space is used by the 8-pin DCC socket and its mounting posts. This is no hindrance to fitting a standard motor control decoder, but when a (generally) larger sound decoder and a speaker must be accommodated, this space must be reclaimed. I released the track and motor wires from the socket's solder pads, removed the single screw holding it in place and discarded the socket.

It may just be possible to fit the MX645 decoder with the socket supporting pillars still in place, but to avoid any possibility of physical damage when screwing chassis to body on reassembly, I removed them cleanly using a pair of side cutters.

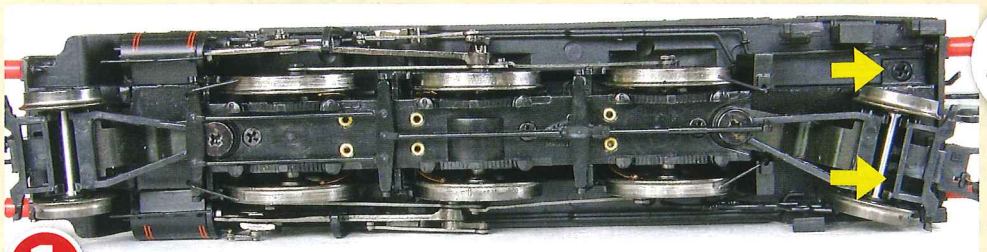
I made a few modifications on the way. The small value suppression capacitors serve no useful purpose in a DCC equipped locomotive but can be the source of poor motor control as they can affect the back-EMF measurements the decoder uses to smooth the motor's response. So I removed them too. With the socket removed, I hardwired the red and the black decoder leads to the track pick-up wires, insulating the joint with heatshrink tubing, and the orange and the grey decoder wires directly to the respective motor terminals.

The wiring was completed by joining and insulating the blue and the grey wires from the decoder to those from the SC68, and shortened purple wires to the terminals of the Zimo cube speaker. I used a spot of mastic to secure the speaker longitudinally inside the smokebox, before fixing the decoder to the inside roof of the boiler, partly inserted into the boiler behind the speaker to avoid contact with the front of the gearbox.

Finally, working with the model upside down, I fed in the slack wiring whilst lowering the chassis into place after which the three chassis retaining screws were refitted completing the installation. The sound file used in the '3MT' is similar to that available from Digitrains for the BR 'Standard Four' 4-6-0 with the exhaust beat modified to match the driving wheel size of the '3MT' through CV267.

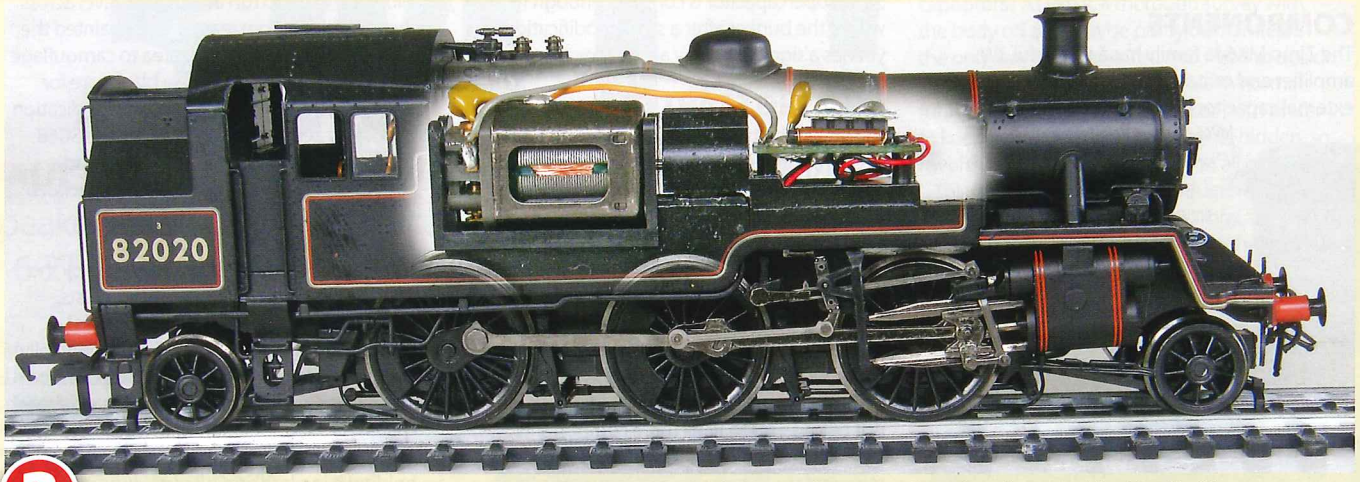
Any completed sound installation changes the character for a model, but there is something particularly satisfying about adding sound to a tank engine – and particularly when all the components are fully hidden inside spaces in the locomotive. HM

INSTALLING DCC SOUND AND STAY ALIVE IN A BR '3MT'



1 In this general view of the underside of the model, the position of the two rear securing screws is indicated by the yellow arrows.

2 Access to the front screw (yellow arrow) is greatly eased by slackening the front pony truck retaining screw which allows the pony truck to be moved to one side. Be careful not to dislodge the cylinder drain cocks when doing this.



3 Viewed from the outside, this cutaway shows the available space inside the Bachmann '3MT' bodyshell. There isn't a huge amount of space due to the metal weights either side of the motor, but with careful selection of components a full sound installation with totally hidden features is possible.

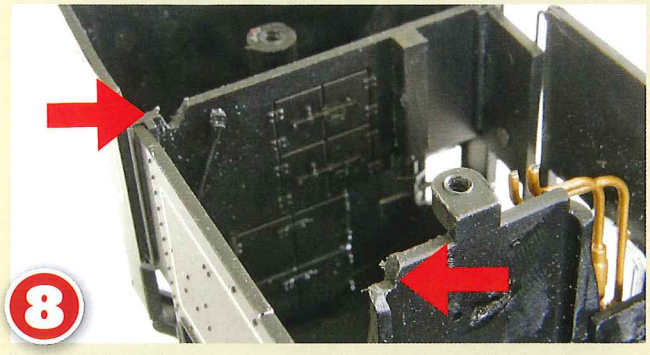
4 When the screws are removed the chassis, motor and gearbox can be removed by sliding them out vertically, revealing the metal weight and the space available forward of the motor and gearbox. Remove the three screws along the centreline. If you do not intend to fit a stay alive capacitor, jump to Step 15.

5 The plastic body is glued to the metal in several positions. I used a scalpel blade to sever the bonds, thus allowing the weight to be removed temporarily.

6 The metal part requires no modification so can be set aside for now.

Intermediate
Beginner SKILL LEVEL Advanced

7 The bunker is only lightly fixed to the rear of the cab roof and without the weight screwed and glued in place the body is severely weakened so much care will be required. If the two parts become detached, some liquid solvent can be applied to join them together later. Here the space inside the coal bunker can be seen.

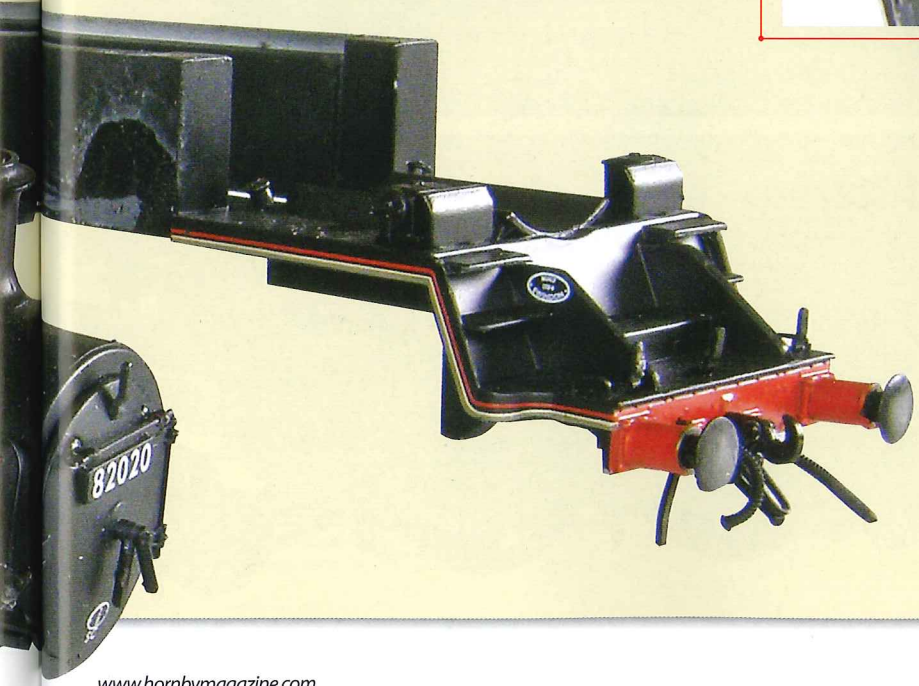


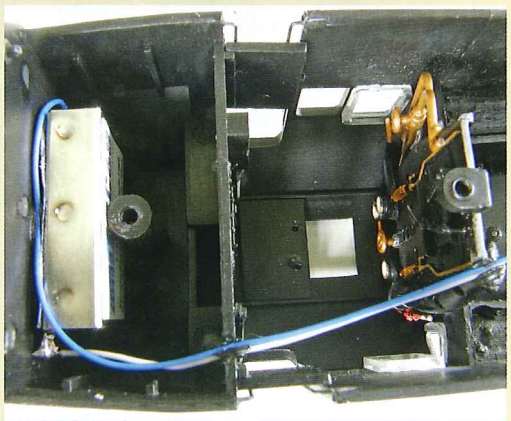
8 To allow wires from the bunker to pass across the cab footplate without getting pinched, I removed a little plastic from the areas indicated, cutting a 'V' shape to accommodate the wires.

9 A test fitting of the SC68 showed the lower connecting tab to be preventing the capacitor from seating correctly, probably interfering with the refitting of the weight.

10 There are two such tabs on the negative side, so I removed the lower one completely before soldering a grey wire to the one remaining and a blue wire to the gold plated tab on the positive side. Be careful not to bend these tabs as internal damage might otherwise ensue.

11 The SC68 now fits comfortably within the bunker, so I secured it in place with a small spot of mastic.





12 I fed the wires across the cab, holding them in place with mastic. I used colour coded wires so the polarity would be clear when I no longer could see the SC68.

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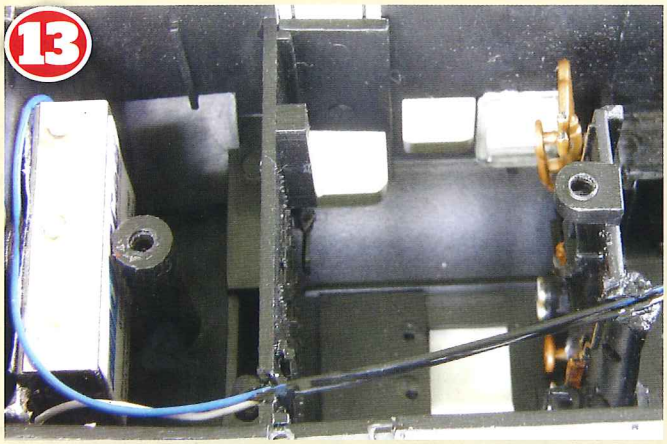

Through the open cab area I painted these wires matt black all around to complete their disguise on the cab floor, but left the free ends in their original colours to identify the positive and negative leads.

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Rigidity was restored when the weight was fixed in place with the three screws and a few drops of cyano type adhesive in the relevant places. The body was set aside whilst the work moved onto preparing for the decoder and speaker installation.

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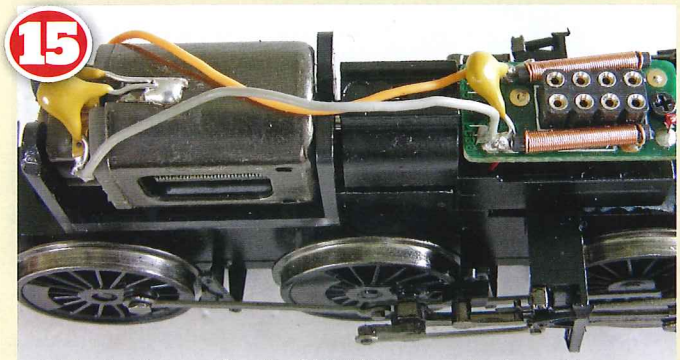

This view shows the general disposition of the DCC fitting components and motor wiring. The amber coloured suppression capacitors play no useful role in a DCC fitted model but can interfere with smooth running in some cases, so I removed them.

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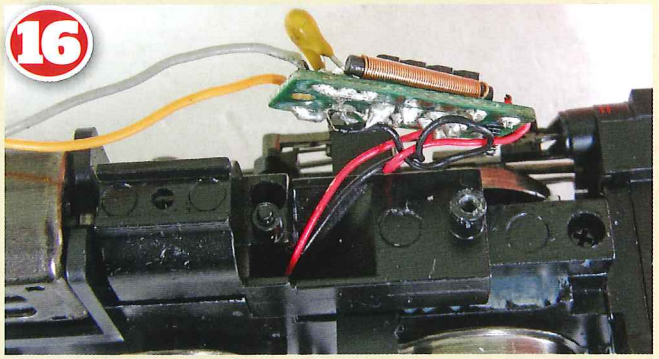
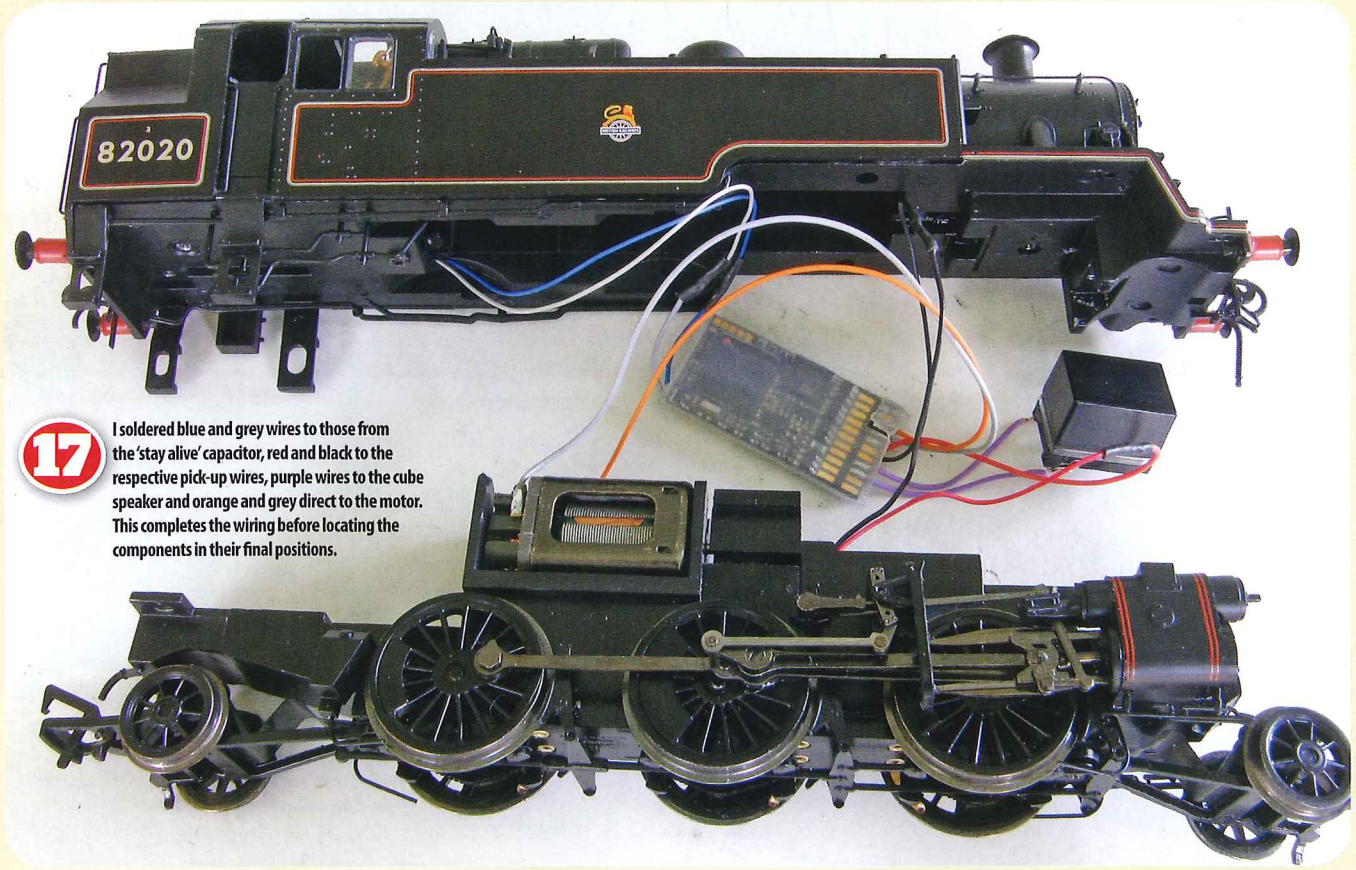


The DCC socket takes up far too much of the available space. After releasing the single screw at the leading edge, it can be moved to one side. Detaching the track and motor wires allows complete removal.



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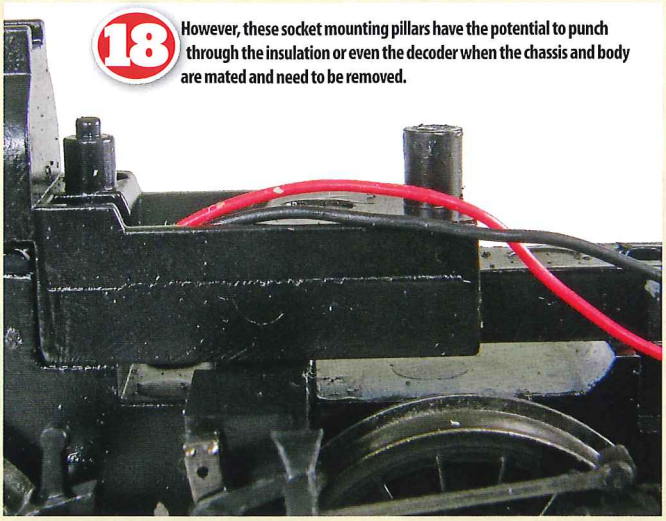
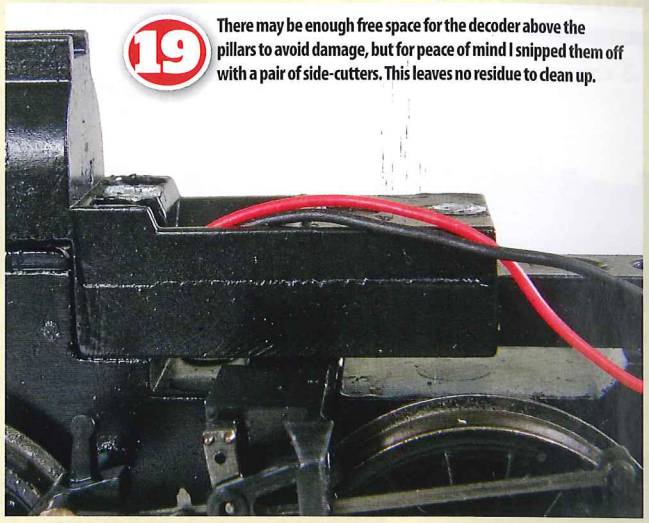
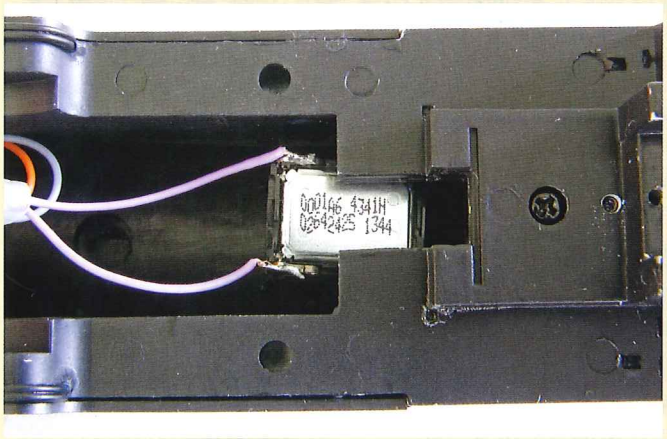
I soldered blue and grey wires to those from the 'stay alive' capacitor, red and black to the respective pick-up wires, purple wires to the cube speaker and orange and grey direct to the motor. This completes the wiring before locating the components in their final positions.



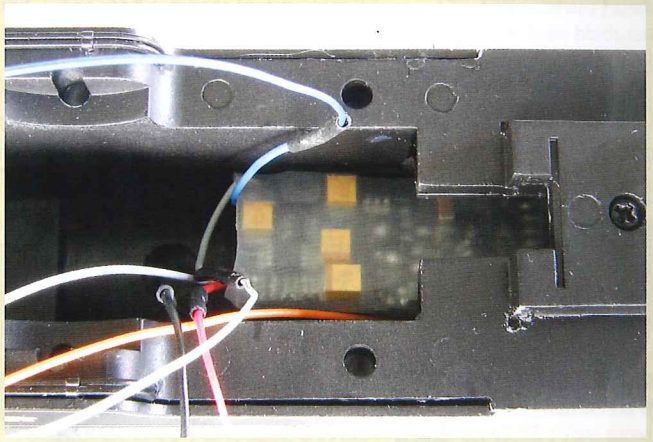
18 However, these socket mounting pillars have the potential to punch through the insulation or even the decoder when the chassis and body are mated and need to be removed.



19 There may be enough free space for the decoder above the pillars to avoid damage, but for peace of mind I snipped them off with a pair of side-cutters. This leaves no residue to clean up.



20 Final assembly begins. The cube speaker fits easily inside the smokebox: some double-sided tape or mastic will hold it in place and prevent it buzzing against the plastic body.



21 Partially inserting the decoder into the boiler forward end gives enough clearance to avoid the top of the gearbox when reassembled.

22 Fully assembled, the speaker, decoder and capacitor are all totally hidden from view in the '3MT'.