THE finer POINTS

PAUL CHETTER
concludes his latest series by programming a Class 37 with digital sound - and reveals why authentic operation requires a completely new driving technique.

HAVING FITTED SPEAKERS to the project ViTrains Class 37 the next step is to make sure it sounds right. In HM40 I explained how to use the Audacity sound editing programme to capture and prepare files for inclusion in a steam locomotive sound project using a Zimo decoder, and although this differs slightly the use of Audacity remains the same. If you missed the tutorial first time round, it's on the *Hornby Magazine* website at *www.hornbymagazine.com/?p=1035*

Some of the ways that sound files are used in the Zimo Sound Programme (ZSP) are similar whether steam or diesel, but the way the driving sounds operate is completely different. That is why I will show how to compile driving sounds, and for good measure, in three different ways. On the Hornby Magazine website you will find a downloadable ZSP Diesel Tutorial which accompanies this article. Even if you do not plan to programme sound decoders, you may find seeing how they are set up helps your understanding of why the locomotive sounds the way it does.

The Zimo sound decoder files written for the ViTrains Class 37 project can simulate a real locomotive in great detail through all types of operation. With a heavily laden container train from Felixstowe Docks 37057 and 37067 climb Belstead bank from Ipswich in 1988. Brian Stephenson.
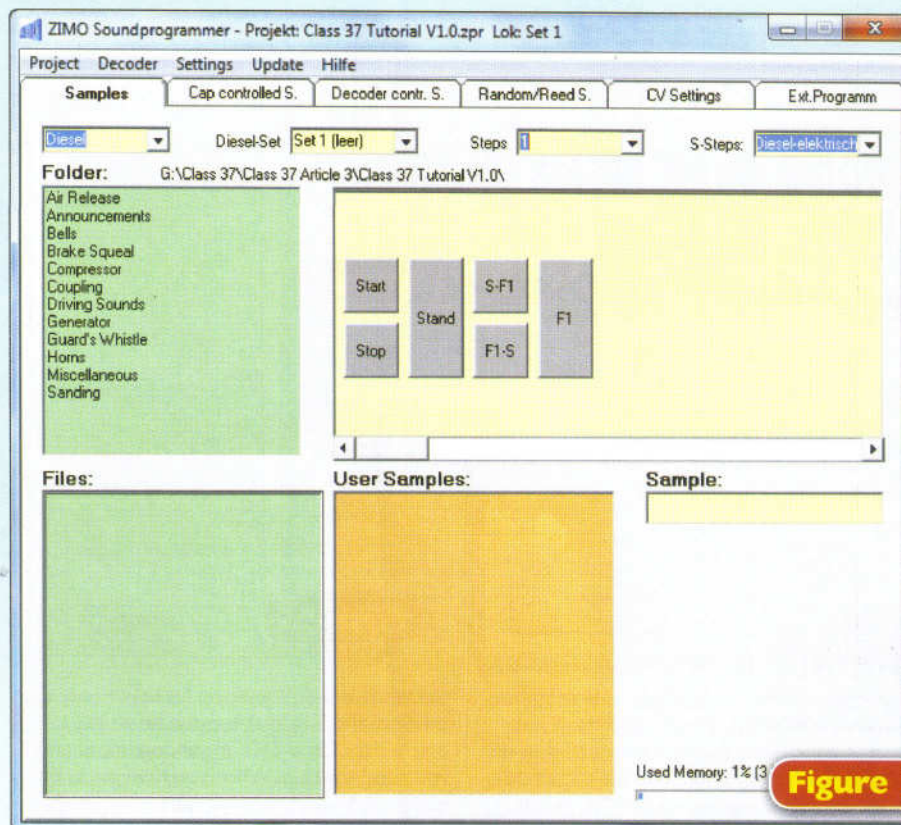

Figure 1

Planning

Figure 1 shows the main ZSP screen. The windows to the left are the folders and files located on your computer in the same folder as the project file, Class 37 ZSP Tutorial V1.0. The yellow window is where the driving sounds are assigned, and the orange, 'User Samples', window is where all the other sounds you wish to load to the decoder are stored. All sounds must be 8 Bit, 11kHz or 22kHz .wav files to be usable in ZSP.

The basic principle is that you copy the files from the left to the yellow or orange windows as appropriate. You need to select the file you wish to copy with a single mouse click. Then Drag and Drop the file to the correct location. You can listen to any sound by quickly double clicking on the file name, which is useful for checking before assignment.

Driving sounds

If you wish to have the sounds of the diesel engine at various speeds and power levels, you will need to expand the basic one step driving sound scheme. Just select the number required from the drop down menu. I've used four steps in this project (Figure 2). These

placeholders or 'sound slots' are grey when no sound is assigned, turning green when a file is dropped in.

The first group of three, Start, Stand and Stop, are where you will copy your startup routine, engine idling, and shutdown sounds (Figure 3). These sounds play only when the DCC controller is at zero speed. Switching sound on, usually Function key 1, will play the Start file. Your locomotive will not be able to move until that file stops and the idle sound automatically starts. If sound is switched off while stationary, the full shutdown routine will play. In order to avoid delays when operating in fiddle yards you should either switch the sound on or off when the locomotive is in motion, or use the mute function which will allows sounds to fade in or out.

There are a number of double height slots – F1, F2, F3 and so forth. Copy the steady state driving sounds here. The sounds here are 'looped' and will play indefinitely unless instructed to stop, either by turning the sound off or changing speed steps until a transition threshold is reached. You will hear the terms 'notch' or 'notching up' used in model railway circles to describe the process of increasing »
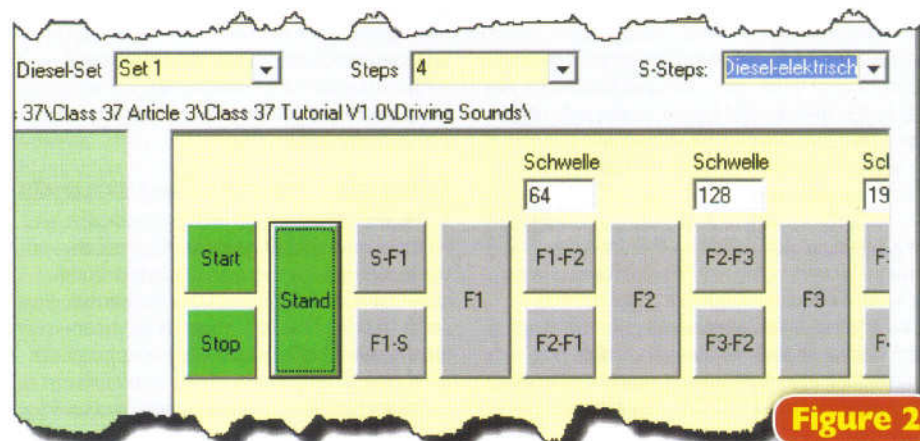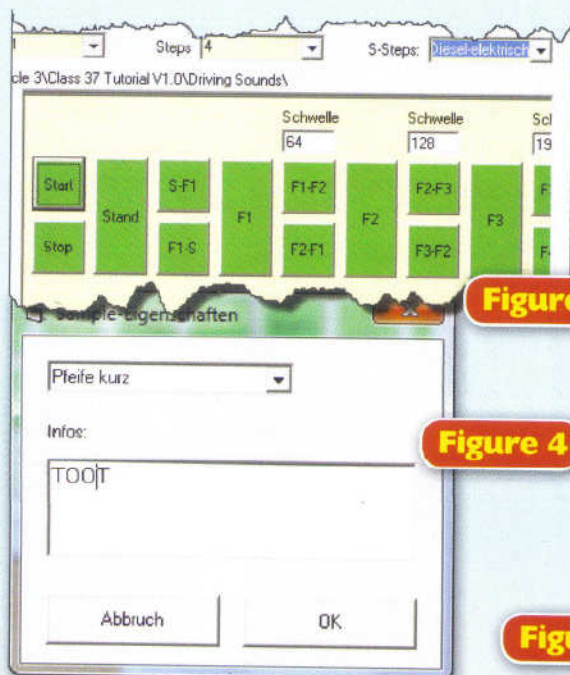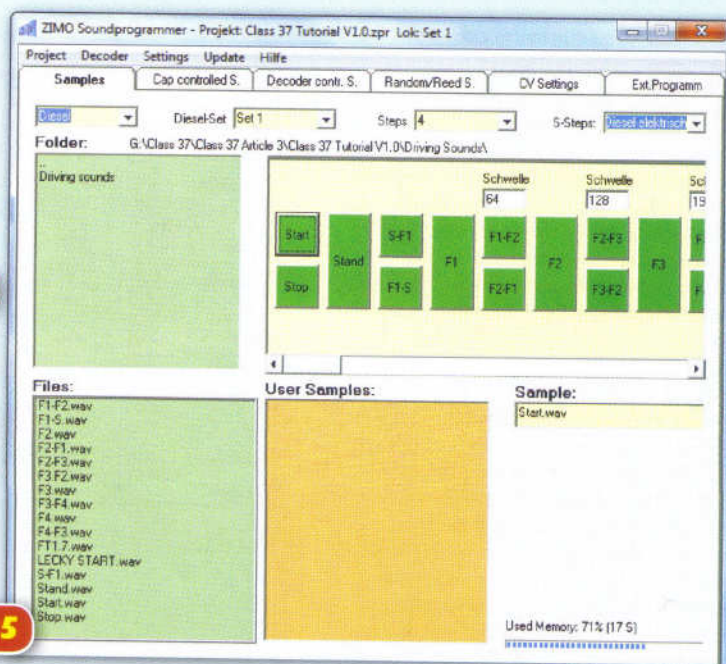

Figure 2

Figure 3

Figure 4

Figure 5

engine power. For most UK diesel prototypes, this is a misnomer, but most understand it to be the equivalent of the F slots, even if they do not express it that way. In this case you could consider them as representing ¼, ½, ¾ and full power. Note that refers to power and not speed. This is an important distinction.

Between these are pairs of single height slots e.g., S-F1, F1-S. These are for the transition sounds. In this example the engine revolutions increase and the timbre changes from idling to ¼ power, and reduces back to idling. There are similar pairs of transition sounds between each steady state, and you need to copy the relevant files here. The numbers above these transition slots are the threshold values at which the F slot sound ceases to play and the transition sounds begin. When they have started, each transition sound plays once through to the end. At this point the next appropriate F slot sound automatically plays.

That's how the driving sounds are assigned and the diagram will look something like this (Figure 4). You will just need to tweak the transition thresholds by changing the numbers to something more suitable - and that depends very much on your own preference.

User samples

Only the sounds shown in this window will be available for allocation to an F key. Highlight, then Drag and Drop other sound files here.

When a file 'lands' here, a dialogue box opens (Figure 5). It's here that you will tell the programme what type of sound it is so that the decoder knows what type of event will trigger it to play. You will also be able to give the sound a name that you will recognise later when assigning sounds to keys.

'Pfeife Kurz' is the default category; there is a selection available from the drop down menu. However, since it means 'short whistle' it's close enough for our purposes. Unless you are fluent in German, you should change the default name in the 'infos' window to something memorable and descriptive. In this instance, I've used 'TOOT'. Unfortunately

the items in the drop down list have not been translated to English. Most can be worked out, but try Zimo-DCC@yahoogroups.com if you need any help. When you have put in the name, click OK, and it will appear in the User Samples area (with the original file name).

Cab sounds

Here is where you can allocate sounds to various F keys (Figure 6). Sound can be allocated to any vacant slot (or overwritten to an occupied slot) using the drop down menu selection. All sounds loaded onto the decoder
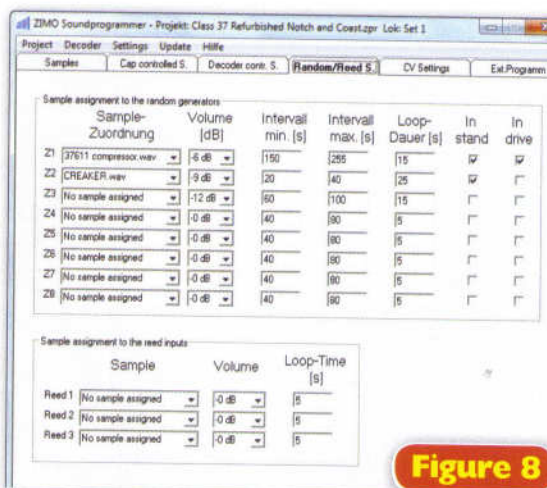

Figure 8

will be available, though you do not have to assign them all now. For example, you may load several horn sounds but only allocate one. You may use Zimo's ability to make sound selections and change volume levels from your DCC controller to 'unlock' any loaded sounds without reprogramming.

Decoder controlled sounds

Some sounds can be played automatically when certain criteria are met. Figure 7 shows the screen where these are assigned. In this case I have added automatic brake squeal, set at -6.0dB. The 'idle' sound is for steam locomotives' boiler hiss and is not appropriate for diesels. This sound will play continuously. Leave this as 'No sample assigned' You could

assign an air release type sound to 'Water outlet.' This would play a 'brakes off' sound before the locomotive moves. Similarly, you could assign a horn sound to 'Start Whistle.' This would play a 'movement warning horn' before the locomotive moves. It's worth remembering that if you assign these here, they will play each time the controller is moved from 'Idle' to speed step 1. I like to sound the horn myself, so I do not usually set it to auto play. You can safely leave blank any categories that are not required.

Random sounds

Some sounds appear, to the casual observer, to be entirely random. This is seldom the case, usually arising from some action or inaction of the locomotive or its crew. ZSP has a 'Random Generator' (Figure 8) where you programme in the parameters, and the decoder simulates these types of sound.

There is one special case. When the brakes have been applied the operating pressure (or vacuum) in the system is partially depleted. The compressor is usually one of the first sounds that commences after a stop. The decoder will play the compressor sound when the locomotive stops. To cover all other times, I have set the minimum time in which the sound will start again at 60 seconds and the maximum time before there will be a repeat at 180 seconds. I also want this random sound to play both. By ticking the relevant boxes I have told the decoder to play this sound when stationary or when driving. Repeat the process for any other random sounds you may need, and remember that a sound file can be assigned to both Cab control and Random generator if you wish.

CV tab

You might chose to leave this section out altogether - there's not much to say and it's a full sized screen shot (Figure 9).

This is where you can view and edit CVs, either individually or in any multiples.

Remember that whatever is set here when you 'Save' your project will be stored along
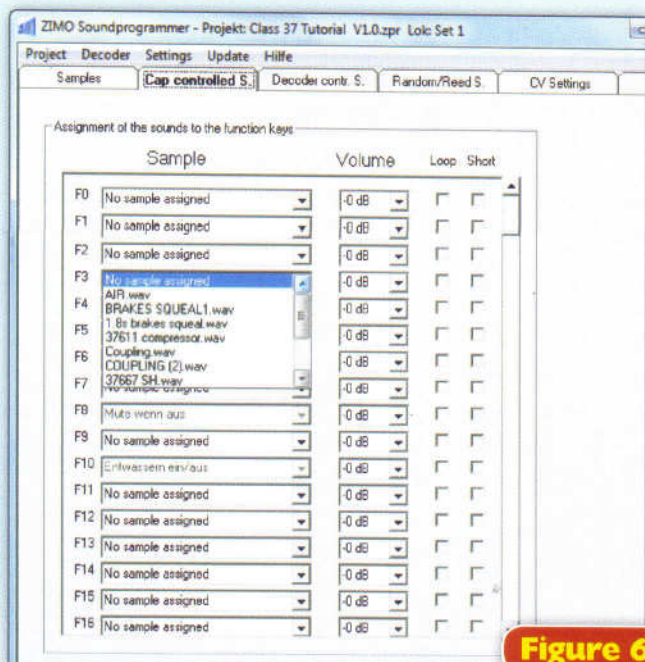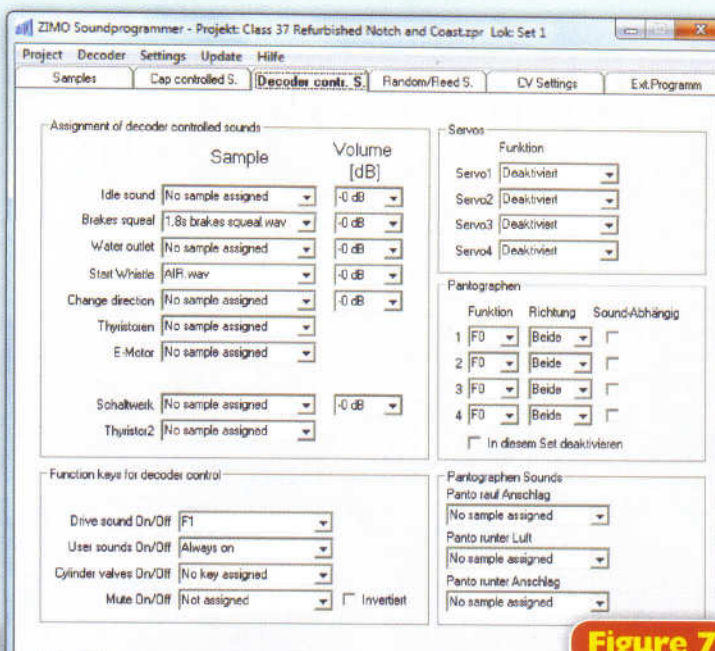
Figure 6

Figure 7

with the sound file settings.

Of course, CVs may be individually amended on the track later, but it saves work if you can set them correctly prior to loading.

Shunting sounds

What if you want to shunt the yard? The last thing you should wish to hear is your locomotive constantly revving hard when moving at low speed, light engine or with just one or two wagons. In order to provide some movement with just idling sounds, a member of ukdccsounds@yahoogroups.com came up with the following amendments.

Into the S-F1 transition slot, copy the S-F1 file as usual, but in both F1 and F1-S slots, load the 'idling' file, Stand. The remaining slots are filled as before.

This results in an initial surge of PM sounds (S-F1) which subsides into idling (F1). The locomotive can be driven with only idle sounds playing, within a small speed step range. When the next transition threshold is reached, the original driving sound scheme takes over and operates in the usual way.

This is how the standard Digitrains Zimo Class 37 is set up, although it includes further enhancements which are not included in the tutorial files.

The third way...

When I first decided to produce a diesel sound project, I talked to experienced railwaymen including drivers, listened to how real diesel locomotives sounded when working and compared that to the rather 'tinny' sounds emitted, apparently randomly, by the couple of sound fitted diesels I had bought.

I concluded that the best way to simulate prototypical sound with infinitely varying operating conditions was to completely decouple the link between model speed and sounds playing. How else could I get a heavy train to slow down on an upward gradient, whilst increasing the engine power sounds?

This is my personal method which I prefer to operate. It will not suit everyone, but it will do what I claim. It is not an easy to use alternative as it demands more skill and concentration of the driver. It also requires an understanding of

how diesel-electric locomotives work in order to have the correct sounds playing to match the model's movement.

It is possible that your locomotive can temporarily lose driving sounds, depending on your driving.

You can see the control possible here: www.youtube.com/watch?v=AntprBe7-Cg

I suggest you create a new sound project rather than modifying an existing one. Begin with a simple one-step driving sounds scheme. Assign the relevant start up, idle, and shut-down sound files as normal into the Start,
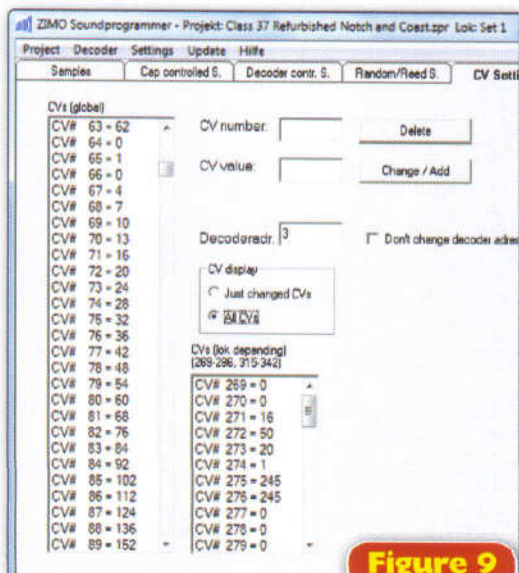

Figure 9

Stand and Stop slots respectively. Then add the Stand file to both S-F1 and F1-S sound slots. Do not assign any more driving sounds to the scheme. This means that F1 will remain grey. Next, copy the other sound files to the 'User Samples' window, including the 'notch' and 'idle' files. Name them appropriately when requested. Assign the special 'notch' files to F keys using the 'Cab controlled' tab. I then assigned 'notches' 1, 2 and 3 to F3, F4 and F5 respectively, and 'Idle' to F6.

Complete the assignment of all other sounds as required, and save your project with an appropriate name. Then you can load the

project to your decoder.

The driving technique is quite different so before you start, ensure that the F keys on your DCC controller, which have the notch and idle sounds assigned are set to 'Latched'. (This is the default setting on many systems). The decoder will run the start up routine into idle and then to operate all automatic sounds you may have assigned in the 'Decoder Controlled' tab. This will occur as speed step one is selected.

There will be an initial short period of idling sounds. If you do nothing else at this point, the engine sounds will cease. As the idling sound sample reduces in volume, but before it stops completely, press F3, F4, or F5 to apply power, or F6 to continue idling.

Any of these sounds can be played at any speed step, so for instance, a locomotive running at say, speed step 90/128 can have the 'idle' sound playing, thus simulating the engine sounds during coasting. A locomotive slowing down as a long, heavy train is dragged onto an upward gradient can have the highest power engine sounds playing, which is again, prototypical. There's almost no end to the permutations.

Whenever you deselect any of the keys F3-F6 there will be a brief spool down sequence before silence. The technique is to blend the sound transitions to match the locomotive's current operating conditions, whilst avoiding an embarrassing silence if you miss your cue. When you halt your locomotive, the automatic idle sound will commence, so deselect any of the F3-F6 files you may have running. Switching F1 key off will commence the shut-down routine.

The authenticity of your sounds will depend a great deal on your knowledge of locomotive operations, driving skills, and ability to press the correct F key at the right moment - but it certainly adds an extra element of performance and in my view, fun, to running model trains. 🔲