

This programme is Sound!

In the third article in this series **PAUL CHETTER** examines some decoder options and installs his sound files for Hornby's '4MT' 4-6-0.

W E FINISHED last issue's instalment with a promise to reveal the mystery object I used to create a safety valve sound for the Hornby British Railways '4MT' 4-6-0, so for those who didn't work it out, it was, in fact, an aerosol deodorant. It sounds good and it smells nice too.

Choosing a decoder can be a real minefield and Table 1 lists the manufacturers' data for six readily available sound decoder types. It's not conclusive as not all data is readily

available but it may help to provide some insight. As this project aims to produce British steam locomotive sounds, it means only ESU LokSound V3.5 and ZIMO MX640 are capable of this as they are fully programmable by the user. Each can be upgraded with free firmware downloads and both manufacturers provide sound projects you can download for free.

The decoder is only one part of the picture - each brand uses its own proprietary software. The way this works and their programming

hardware prices are also important factors to take into account. Due to their price, RailCom bi-directional communication and large memory I chose Zimo - but other makes may be more suitable for your requirements. As ever, the choice is yours.

Detailed instructions can be downloaded from www.hornbymagazine.com while Zimo-DCC@yahoo.com provides support. ZSP's Austrian origin shows through in places, but the manual includes English translations.

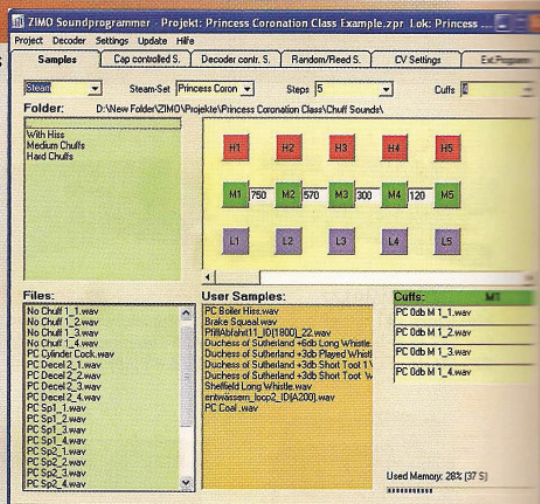
Selecting the sounds

Figure 1 shows the Zimo Sound Programmer already opened. The files and folders available are displayed in the green background boxes on the left: non-driving sounds needed in your project are copied from here to User Samples, whilst Chuffs are assigned to the sound diagram. On the **Samples** tab, Steam is selected. To the right is the Steam-set name. Up to 32 different sets are possible. This is an important benefit of the Zimo decoder.

The Steps box is next. The number of sound changes can be between 1 and 10. The more steps, the smoother the transitions should be. In reality, this depends heavily on the quality of the original recordings and the editing.

Finally we come to the Chuff rate. The '4MT' has two cylinders so we need 4 in this box. If your locomotive is a three cylinder machine, then 6 would be appropriate (or 8 for a four-cylinder 'Lord Nelson' 4-6-0). This represents the number of chuffs per wheel revolution. Synchronisation of exhaust beat (chuffs) and rotation can be achieved with a cam sensor or CV adjustments later.

CV stands for Configuration Variable, the way that instructions in the decoder are set or modified. Some are fixed during manufacture but others can be changed by the user, usually on the track without having to touch the model at all. The number of user-programmable CVs a decoder offers is a useful guide to its capabilities.



Driving sounds

The Class 4 Chuff 1_1, Chuff 1_2, etc file naming that we used last time becomes useful here. When the Chuff 1_1 file is copied to the box marked M, any other files where only the last digit is different will be loaded automatically. You will need to assign chuffs to each step.

Numbers appear between the steps in the driving diagram. These display the chuff lengths in milliseconds before transition to the next set. These are important when modelling the sound progression with speed. Large numbers relate to slow speeds, smaller numbers to higher speeds. You can get rough guidelines as to what figures you should enter by analysing other projects. However, there's usually a bit of fine tuning required.

For each step, there are three possible sound assignments, H (acceleration), M (normal running) and L (deceleration). The minimum

required is that there is a set of chuffs copied to M as described above. The same chuffs are automatically assigned to H and L also. It is possible, with CV changes, to alter the balance of these so that the file plays more loudly when accelerating and very softly when decelerating.

When a real steam locomotive accelerates, it's not just the volume that increases, but the timbre alters too. It's not that difficult to detect by ear whether a steam locomotive is accelerating or maintaining speed and getting this right can make a big difference. If you have acceleration exhaust beats recorded, your project will usually be improved by assigning them to H in the sound diagram.

When a locomotive is decelerating it is very unusual to hear any exhaust beats at all. That's not surprising when you consider that the chuff is produced when exhaust steam is fed through the blastpipe. The driver will have shut off the

steam to allow the locomotive to decelerate. No steam, no exhaust beat.

You would be surprised at how many sound projects are let down when the model chuffs ever more slowly to a halt.

For greater realism, try to obtain the drifting sounds of the real thing. Often, mechanical noises normally swamped by the chuffs come to the fore. If you load this to the L boxes, your hard work will be rewarded.

The video I shot to accompany the first article in this series illustrates these different approaches. (see the *Hornby Magazine* website). In the first part, the sound project does not have separate acceleration or deceleration files - it uses CVs to alter the volume only. The second part has my Class 4 sound project which features separate H, M and L files. And it uses CVs for volume balancing too.

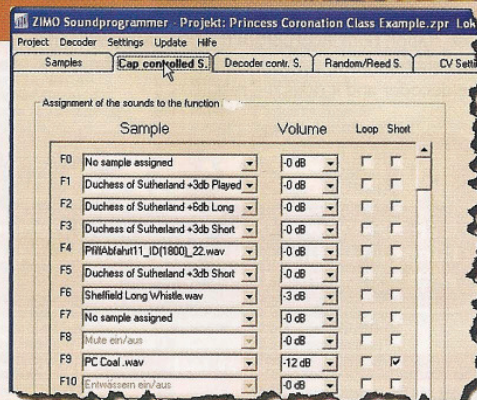


Function Sounds

You can play manually controlled sounds at will: whistles, buffering up, coupling, coal shovelling and many more. These are set through the **Cab Controlled Tab**. Any sounds in User Samples can be assigned to function keys F0 to F19 for manual control. There's no universal scheme for allocating functions except F0 which is normally used for lights. By default, Zimo reserves some for specific uses but these can easily be altered if you wish. One thing I would say though is that it will make operating easier if you use similar allocations for each of your projects.

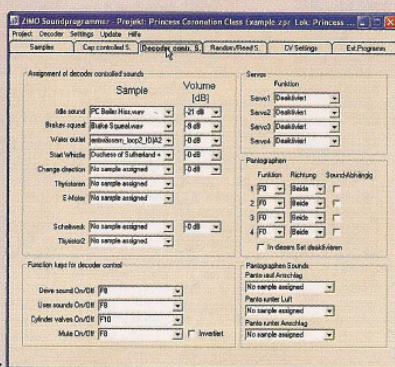
The volume of each sound can be adjusted individually to achieve an overall balance – steam whistles should be much louder than the sound of coal shovelling! Without reprogramming, you can rapidly substitute individual sounds and balance volumes on the track using Zimo's MX31 or MX32 controllers.

Finally, you can stipulate whether the sound should be looped until the function key is deselected, or simply give a 'short' single play.

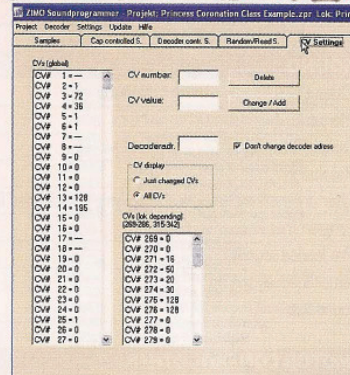


In the **Decoder Controlled Sounds Tab** sounds can be assigned and volumes set for sounds to be played automatically under specified conditions. These can be new sounds or ones that you have already set to operate manually. Brake squeal is usually set to be generated automatically, but some people like to have it under manual control too.

Some categories on this tab will not apply to steam projects. Pantographs and thyristors are not fitted to steam engines, for instance.



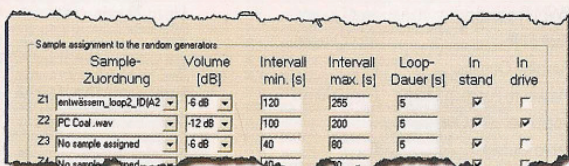
The **CV Tab** has two main purposes. It can display the current values of every CV in the project. It is also possible to amend individual or multiple CVs. This can save time later. The CVs held here will be loaded to the MX640 along with the sounds.



Real operations produce sounds which appear intermittently which can be replicated with the **Random/Reed Tab**. Blowers, injectors and sudden steam blasts are typical examples. It's possible to allocate up to eight of these types of sound to the random generator.

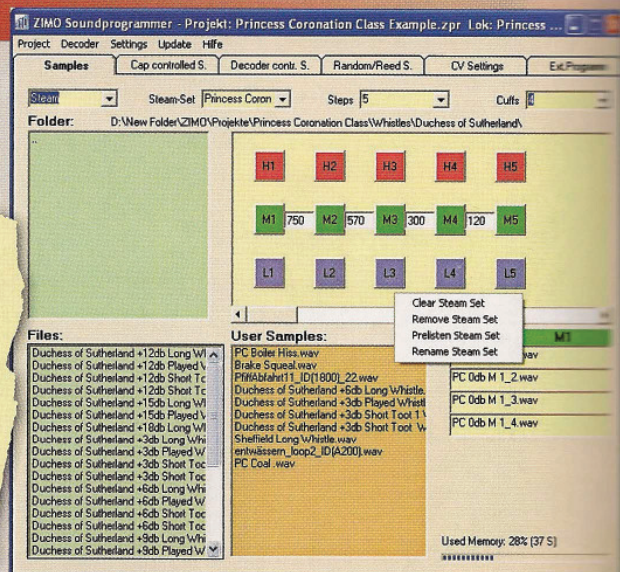
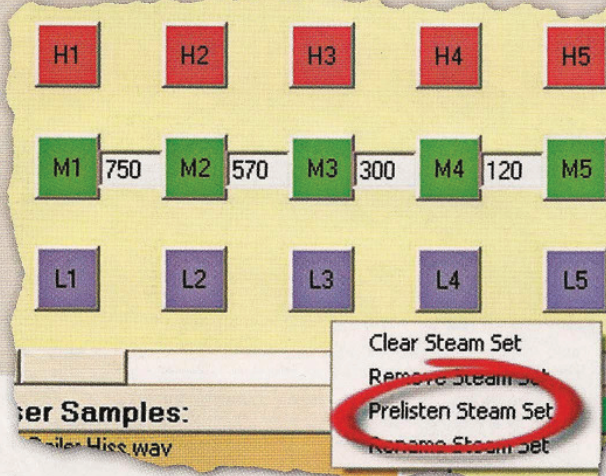
Adjust the volumes individually as for other sounds. The parameters which tell the generator the minimum and maximum time between which it will randomly trigger the sound, the length of time to play it and whether it should happen when the locomotive is stationary, in motion or both are all set here.

Don't set too short an interval, especially for attention grabbing events like safety valves lifting. It can become tedious during an operating session, although it may keep everyone awake!



Sounds good?

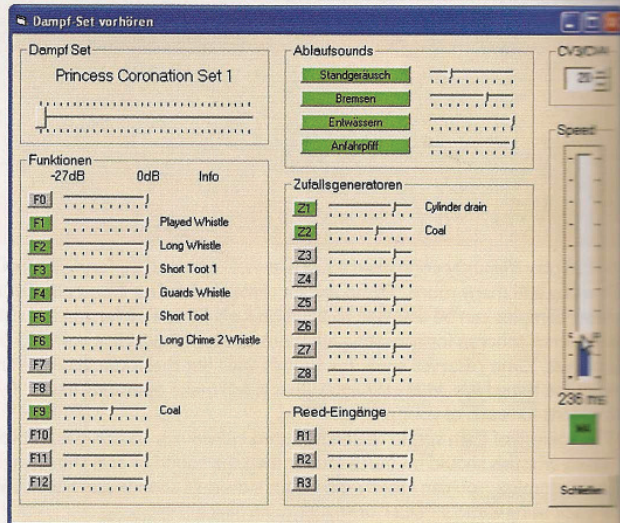
Concealed on the **Samples** tab there is a hidden function. By right clicking in the yellow area, a menu allows you to select **Prelisten Steam Set**. On the page that opens, you will find a slider which acts like a regulator. This is a unique Zimo feature which allows you to audition your driving and user sounds even without a decoder! Make sure your speakers are connected and the sound is switched on.



Right: To programme the decoder you will need a Zimo MX640 and the special programming hardware, MXDECUP, for this. Alternatively, Zimo MX31 ZL controller and the imminent MX10 base station both incorporate this interface. In essence, you connect everything up, instruct ZSP to load the sound project to the decoder and it does the rest.

NEXT ISSUE

● In HM42 we'll look at how to fit working lamps and synchronise coal shoveling sounds with a flickering firebox.



	Digitrax 164D	ESU LokSound	MRC 1823	QSI Revolution	Soundtrax Tsunami	Zimo MX640
Typical UK price	£35	£107	£62	£84	£85	£69
Dimensions in mm	32.4x16.9x6.3	31x15x6.5	40x17x6.5	55.4x16.8x6.4	42.7x17.3x6.3	31.5x15.5x6
SOUND						
Output	1.0 Watts	0.6 Watts	Not Quoted	2.0 Watts	1.0 Watts	1.1 Watts
Memory	4 Mbits	16 Mbits Circa 2 minutes	Not Quoted	Not Quoted	Not Quoted	32 Mbits Circa 6 Minutes
Sample Rate	Not Quoted	16kHz	Not Quoted	Not Quoted	None Quoted	11 kHz and 22 kHz
Resolution	8 Bit	8 Bit	None Quoted	Not Quoted	16 Bit	8 Bit
User programmable Sounds	Modifying downloaded files	Fully	No	Cut/Paste and Edit	No	Fully
Programmer Price	£57	£127	Programmer Not Available	£91	Programmer Not Available	£80
Pre-loaded sounds	Yes	Yes	24	Yes	Yes, Model Specific	5 Steam plus 1 Diesel
Simultaneously stored sound sets	1	1	24	1	1	Up to 32
MOTOR CONTROL/OTHER						
Maximum continuous load	1.0 Amps	1.1 Amps	1.5 Amps	1.3 Amps	1.0 Amps	1.2 Amps
PWM Frequency	Not Quoted	Up to 32 kHz	Not Quoted	Not Quoted	22 kHz Fixed	Up to 40 kHz
Back EMF	Not Quoted	Yes	None Quoted	Yes	Yes	Yes
Function Outputs	6	4	Not Quoted	6	Not Quoted	6
Maximum Function Load	Each 200mA	Each 250mA Total 500mA	Not Quoted	100mA	Each 100mA	Each 800mA Total 800mA
Additional LED Outputs	0	0	Not Quoted	0	Not Quoted	5 x 10mA
Servo Outputs	0	0	None Quoted	0	0	2
Firmware upgradeable	Not Quoted	Yes	Not Quoted	Yes	No	Yes
RailCom enabled	No	No	No	No	No	Yes
Speaker Included	Yes	Yes	Yes	No	No	No