DIGITRAINS

ZS08P Class 08 ProtoDrive User Notes V18.12

(Individual features described in these notes may not be available in versions prior to V18.12)

Please spend a few moments to read these notes which have been produced so that you may obtain the maximum satisfaction from your new sound scheme.

The sounds should work perfectly when the decoder is fitted correctly. Individual locos may require some fine tuning that you can achieve with your DCC controller.

Engine and traction motor sounds recorded from different locomotives have been used in each variant and there are minor operational differences. Please refer to the correct instructions for your chosen variant when using these Notes.

What is ProtoDrive?

This is a system developed to allow more prototypical sounds to be deployed across a wide range of operating conditions.

The sounds have been programmed in such a way that you, the user, may change the way that the sounds respond to your driving style or needs. This avoids the need for reprogramming and all the additional costs that would imply.

Engine Start Up.

Fuel is transferred to a header tank with a pump prior to starting if required. F14 has the sound of this pump which can be played before switching on the main engine sounds.

I have separated this from the start up sounds so that you can choose to use it or not.

Warm Start

F1 will crank and start the engine which will then settle down into Idle

Cold Start

Engage F5 before starting the engine with F1. The duration of engine cranking will be increased. F5 can be disengaged at any subsequent time.

Driving your model.

It is normal for the control lever on a real Class 08 to get to 'Notch 2' before the engine sound changes. This is due to the gearing, the tick-over speed and the way that the generator is set up. This means that when lightly loaded a Class 08 can be moved without the engine note increasing. This sound project provides a way to simulate this.

Engaging F5 before opening the throttle will avoid the power ramp-up sounds until speed step 25 is reached.

You can, of course, also use the well proven ZIMO feature on F6 to 'hold' the engine sounds in Fast Idle if you find that the engine ramping response is still too sensitive for your needs.

Throttle Response Scheme.

As supplied, the decoder will produce the sounds of a Class 08 with a train on the hook.

After the start-up routine the loco will stand with the diesel engine, the Prime Mover (PM), ticking over at idle.

The sounds will respond to the throttle control in the following way:

Select speed step 1. The brakes will release, the PM will increase power to get the loco moving, and will continue until at higher speed, a further ramp up will be initiated until the final high speed running sounds begin. The precise speed steps will depend upon your model, so I suggest you make a note of the actual figures for your later use.

The sounds will spool down at similar points on deceleration.

The model can be driven in this way without ever needing to use any control other than the throttle.

For those of you who prefer something more immersive, in this custom version there are extra control features to further enhance your driving pleasure.

Coasting

No matter what actual speed your model is travelling at, or which engine note range is playing, reducing the throttle by 10 speed steps (of 128) will spool down the engine sounds to 'Coasting'

The coasting sound will continue until you accelerate; at which point the sounds will change to those relevant to the current speed.

Alternatively, to force the engine to play idling sounds, or to avoid engine ramp up when pottering about the yard, use F6 at any time

Notch Down

During any driving sound 'loop', at any speed, it is possible to cause the engine power to spool down to the level immediately below. This is easily achieved by reducing the speed by one step only E.g., if the loco is playing power band 3 sounds, reducing speed with your throttle by one step will cause the sound to immediately spool down to the sound of power band 2, if in power band 1, it will spool down to idle.

Acceleration of one speed step or more will immediately ramp the sound back up to the higher power. So you can now, at any road speed, vary the engine note by reducing or adding a single speed step.

Heavy Train/Light Engine Mode Selection

The default setting is for 'heavy train'. Inertia is high so acceleration (and deceleration) is restricted.

Activated by F5, Light Engine enables multi-function changes with one key. The switched features include reduced inertia setting to allow more rapid acceleration and engine sounds which accelerate differently.

F5 can be operated at any speed to give another way in which the engine sounds at a given road speed may be modified instantly.

The 08 has a top seed of 15mph, and the decoder has been set to a similar maximum speed. If you open the throttle gently, it is possible to drive with engine sounds only.

(To increase top speed, increase the value in CV5)

However, flicking the throttle wide open will cause the sound of the Traction Motors to sound before fading.

With a moving loco, try flicking the throttle open and some slow, gentle accelerations to gauge the difference, and use 'Notch Down' to bring another variation to the loco's sounds

Note. This works best if you switch F5 on or off whilst the engine sounds are playing in idle. Once switched, you can leave it that way, but any further change should also be made with the engine sound again playing the idle loop. Just to be clear, the actual speed is unimportant, but the engine sound must be idling. You can achieve this in several ways as discussed above.

Dynamic Inertia

A combination of new features is included in the automatic operation of the throttle which will affect how the model responds to your control inputs.

The operation is identical in either 'heavy' or 'light' mode.

Put in simple terms, the wider you open the power controller, the quicker the engine sounds ramp up and *for the first time on any decoder*, the acceleration *rate* increases correspondingly.

What does this mean in practice?

If you use your controller's throttle gently, with modest speed step increases, then the engine will rise and fall automatically and the model will accelerate according to the momentum setting. This is by default high for 'heavy' and low for 'light'.

If however, you open the throttle rapidly, the engine will ramp up to full power and acceleration will be approximately 3 times quicker. This change in acceleration rate is variable and dependent upon throttle operation.

Note. Although this feature is enabled, the low top speed may make it difficult to spot the difference. (It's much more obvious on mainline locos).

Brakes

F2 will give the sound of air brake applications. They can be 'dabbed' or held for varying length. The sound will respond accordingly.

Additionally, if the throttle is reduced beforehand, as a real driver would do before braking, a braking force will be applied which will actually slow the road speed of the model progressively, that is the brake force applied will continue to increase the longer F2 is held. Short dabs will provide speed trimming, held down continuously will result in a controlled 'Emergency Stop'.

PowerCab users please note that the Horn/Whistle button operates the same sound/function as the F2 Key, but set as 'momentary'. This facilities the precise operation of the brakes and should be used instead of F2.

Other systems may have F2 set to operate as 'momentary' by default, or can be set to do so.

If the Brake Key is latched on whilst at standstill, opening the throttle will operate the engine sounds (i.e. can be used to apply more 'power') but the loco will not move until the Brake key is released. This can be used to simulate brake testing before operations begin, or for systems checks on a load bank.

The Brake Key must be in the 'disengaged' state when you wish to depart.

Speed Lock

This feature allows the road speed to be locked whilst the throttle control is used to control the engine power sounds playing.

Accurately simulating the sound of a heavy train slowly climbing a gradient with engine at full power is as easy as depicting it coasting down a gradient with the engine at Idle with this single new feature.

Here's how it works.

Engage the SpeedLock Key, (F7) to fix the model's road speed temporarily. The throttle now directly controls the engine sounds only. Increase speed steps to apply more power, decrease speed steps to spool the engine down to lower power bands or to Idle.

Disengage the SpeedLock Key when you wish to return control of the model's speed to the throttle.

Working Loco Brakes

In a real locomotive, acceleration, speed and deceleration are under control of the driver. He will use his experience of the locomotive type, the train weight and knowledge of the route (or 'Road') to anticipate the control movements required to achieve the required performance and safety.

Deceleration is often achieved by reducing power only, allowing the locomotive to 'coast' to lower speeds. Typically, the brakes are only used to fine tune this rate of deceleration or make a halt at a specific point. Other times, strong braking will be required even at high speed.

A feature notably lacking in all other programmable decoder brands with UK sounds, is the ability to apply a variable braking force to increase the rate of deceleration when desired. This makes stopping a heavy train at a signal or station platform more difficult than it is on a real loco.

Without brake force, the locomotive's dynamics are only partially modelled. There is no point in having the sound of brakes being applied if the rate of deceleration is unaffected.

I designed a Brake Force feature for ZIMO decoders and worked for months with ZIMO software engineers to turn this into a reality.

The objective is to simulate the real driving experience as closely as possible, so here's how it works.

For optimum control and convenience, the feature needs to be assigned to a non-latching (or momentary) key. On many non-European designed DCC controllers, the only momentary key is F2. Some, like NCE PowerCab have a designated separate key which operates F key 2 from a dedicated Horn/Whistle button. The sound project has been constructed to take these limitations into account, so the Horn/Whistle button becomes the Brake Key. (Don't worry, the horn will not blow when you apply the brakes!).

Reduce the throttle setting to zero. The loco will coast, gradually decelerating and the engine will spool down directly to idle.
Engage Brakes with F key 2.

A short 'dab' will produce a short air release sound and a modest increase in deceleration rate. You can think of this as 'Speed trimming'. This can be repeated if required, and is entirely prototypical in operation.

A longer application will produce a longer air release sound and a higher rate of deceleration.

The longer the Brake Key is held 'on', the greater the brake force applied

Holding the Brake Key down continuously will produce a long air release sound and the loco will perform a prototypically modelled emergency stop, i.e. Brake force increases with time; maximum brake force and deceleration rate is achieved immediately prior to coming to a halt.

Automatic brake squeal will accompany the final moments before halting.

The Brake Key can also be used to simulate 'brake dump' testing.

The Brake Key may also be operated during deceleration between different speeds, e.g. speed restricted areas. In this case, reduce the throttle to a suitable lower setting. The engine sound will change according to the features described earlier, so may result in a different power sound rather than engine idle. To increase the rate of deceleration, use the Brake Key as before, and the speed of the loco will be 'trimmed' to the newly selected speed step.

So there are no excuses available for a SPAD event.

Please note that real locos do not stop dead even during an emergency stop. To reflect this, an emergency stop will be reasonably abrupt but not sudden.

If your DCC controller is equipped with a 'panic button' to avert imminent catastrophe, this will still operate as usual, and will have more immediate, though less prototypical, effect than the Brake Key.

Fuel Transfer Pump

Fuel is delivered to the diesel pump by gravity from a small header tank. Fuel is held in the main tank and must be transferred to the header tank by a hand pump in the cab. This pumping is typically needed before starting and at intervals to maintain sufficient fuel in the header tank. In later years, some locos were fitted with an electrical lift pump

F 14 provides the sound of the mechanical pump and can be used whenever required.

Train Brakes

The loco brakes are air operated so all 08s have a compressor fitted to provide pressure.

A variety of train brakes have been used on this class over their long working life.

Some had no train brakes fitted at all

Some had Vacuum operated train brakes either from new or fitted later. Needed for some coaching stock and 'fitted freight' wagons. A special Vacuum pump called an Exhauster was fitted to these locos.

Others had Air operated train brakes either from new or fitted later. Required for air braked stock movements. A second compressor was fitted to these locos.

So called 'Dual Braked' were equipped with both air and vacuum train brakes.

The outward signs are the number of cabinets fitted to accommodate the additional pumps required, above the side footplates and any pneumatic pipes fitted to each end of the loco.

You will need to research what was fitted to the loco you choose to model in the period you are recreating.

The sound project has sounds on-board for each option, so some may not be applicable in every case.

Enhanced Sound Features

I have changed the way in which some sounds work or are triggered in order to enhance the simulation of real railway sounds.

Flange Squeal.

Enabled with the F Key 9; if it is not engaged, the Flange sounds will not play under any circumstances.

If the key is engaged, sounds will operate in the following automated way:

Loco is stationary or comes to a halt. The wheels are not turning and so there would be no flange squeal in reality. No flange sound will play in your model.

Loco is moving slowly. A slow speed flange squeal will play.

Loco is moving more quickly. A faster speed flange squeal will play.

Wagons Buffering

Enabled with F Key 13; if it not engaged, the wagon Snatching and Buffering sounds will not play under any circumstances.

If the key is engaged, and the Light Engine Mode (F key 5) *is also* engaged, the sounds will not play under any circumstances. (No wagons coupled in Light Engine Mode).

If the key is engaged, and the Light Engine Mode (F key 5) *is not* engaged, sounds will operate in the following automated way:

Loco is stationary. The sounds are not played.
Loco moves off/accelerates gently. The sounds are not played.
Loco moves off/accelerates more rapidly. The sound of the couplings taking up slack as the train stretches plays. This is also the case if the loco accelerates further when already moving.
Loco decelerates gently. The sounds are not played.
Loco decelerates more rapidly. The sound of several wagons buffering up is played each time.
Loco comes to a halt with the Brake Key (F key 2) engaged. The sound of several wagons buffering up is played after it comes to a halt.

Doors

Class 08 loco were fitted with either wooden or metal cab doors. The project has the sound of wooden doors opening and closing by default.

This can be changed to the sound of metal cab doors by selecting a different value in CV564

Audible Warning Device

Class 08 locos were originally fitted with a compressed air whistle. In later years, some were re-equipped with an air horn.

The project has a whistle by default. CVs 519 and 522 determine the sound played by F3 and F4 respectively. Whistles can be replaced by air horns by changing the values in these CVs to 15 and 16.

Lights

When used, one red lamp and one white lamp each over a buffer and illuminated at each end of the loco simultaneously was the norm for BR when shunting. These are operated by F19.

A directional top lamp is provided on the model, switched by F0 in the project.

A cab light is provided on F10.

All lamps have a 'soft' fade in or out to simulate tungsten bulbs, and exterior lamps have been dimmed to be closer to realistic illumination levels. (To make them brighter if you wish, increase the value in CV60).

Light switch sounds will accompany the switching on or off of each set of lamps.

Radio Controlled Shunting

Propelling a rake of cars or wagons requires the assistance of signals from a Shunter. In more recent times, Duplex Radios have been used to facilitate communication. The Shunter becomes the eyes and ears for the driver from the distant end of the train.

To enhance your operational realism, I've included some radio coms recorded from a real operating Class 08 locomotive.

Fkeys 20 to 26 control a sequence of typical instructions given, some of which the driver 'acknowledges' when the key is released. The driver still operates the loco, brakes and whistle/horn, but under the instruction of the Shunter.

Live Volume Control

Provided the sound is switched on and the 'fade' button is not active, it is possible to change the overall volume to suit changing needs.

Engage F27 and the sound levels will gradually reduce, eventually to silence

Engage F28 and the sound levels will gradually increase, eventually to maximum.

In each case, disengage the F key when the desired level is attained. Set F27 and F28 as 'momentary' if your DCC controller allows you to do so.

Note: If the volume controls appear to not function, check that F19, F27 and F28 are disengaged before making a further attempt.

Alternative Sounds

To add to your long term enjoyment of this sound project, there are a number of alternative sounds included on your ProtoDrive equipped decoder which are not assigned by default to any F key. (There are only 29 keys available).

The default sounds are shown in the Functions List below.

This is how to use the alternative sounds. In Functions List Sound ID column, find the CV corresponding to the F key you wish to use. Put the ID of the sound you require as the value of that CV.

e.g. to change the default Wooden Doors (ID 28) sound to Metal Doors (ID 23), make CV564 = 23, and vice versa to change back again.

Default	**Alternative**
Whistle, ID 18	Air Horn Toot, ID 15
Whistle Toot Toot, ID 19	Air Horn Acknowledgement, ID 16
Wooden Cab Doors, ID 27	Metal Cab Doors, ID 22
-	Air Release 1, ID 42
-	Air release 2, ID 20

You may need to adjust the volume of the replacement sound, use the appropriate CV shown in the Functions List.

If you get mixed up, don't panic. CV8 = 8 reset will restore all defaults (including loco address) but will preserve all sounds.

Alternative lighting CV for later Dapol 2 lamp models

CV=Value, 3 Swiss mapping groups in columns;

430=29	436=10	442=19
432=14	437=29	444=3
433=1	438=4	446=3
434=15	439=0	
435=2	440=4	
	441=0	

Function List

F Key	Function/Sound	Latch/ Momentary	Sound ID CV	Volume CV
0	Directional Top Light	L	570	571
1	Sound On/Off	L	-	-
2	Brake Key (non-latching)	M	516	517
3	Toot	M	519	520
4	Toot Toot	M	522	523
5	Light Engine Mode	L	-	-
6	Coasting/Idle Key	L	-	-
7	Speed Lock	L	-	-
8 ON	Buffering up	L	534	535
8 OFF	Coupling/uncoupling	L	534	534
9	Enable Speed Related Flange Squeal	L	-	-
10	Shunt Lights	L	540	541
11	Exhauster (Vacuum Train Brakes)	L	543	544
12	Spirax Valves	L	546	547
13	Enable Automatic Wagons Buffering	M	-	-
14	Fuel Transfer Pump	L	552	553
15	Windscreen Wipers	L	555	556
16	Compressor	L	558	559
17	Guard's whistle	M	561	562
18 ON	Cab Door Opened	L	564	565
18 OFF	Cab Door Closed	L	564	565
19	Cab Lights	L	567	568
20 ON	'Shunter to Driver'	L	673	674
20 OFF	'Receiving'			
21 ON	'Will You Set Back, Please'	L	676	677
21 OFF	'Setting Back'			
22	'Keep Coming Keep Coming'	L	679	680
23	'Slow Down, Slow Down'	L	682	683
24	'Sound your Horn, Please'	L	685	686
25	'Six Feet to Buffer-up'	L	688	689
26	Pull Away, Pull Away'	L	691	692
27	Volume Down	M	-	-
28	Volume Up	M	-	-

It's now down to your skill and knowledge to simulate any eventuality!

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