

Important: Please read this sheet before running your locomotive.

Many thanks for purchasing one of our **Graham Farish** Castle Class DCC Sound fitted Locomotives. Please take the time to read through this sheet carefully before running your locomotive to ensure you get the most out of your model.

Loco Decoder Address.

This model is set with a default decoder address of 3.

Running on DC & DCC.

The default settings for this model allow it to be run on a DC power supply but with exhaust & motion, automatic and randomised sounds only.

For DCC users, there are additional controls and features which, if used correctly, will enable you to get closer to the real thing.

Operation.

Please read these notes which have been prepared to help you gain the optimal operational and auditory experience.

The four main controls that a real driver uses which has an impact on the sounds a steam locomotive makes are the Whistle, Regulator, Reverser and Brake, each of which feature in this model.

Here are short, very simplified, explanations of the real life sound variations and how to manually alter the model's sounds to recreate them.

Whistle

GWR locomotives were equipped with two whistles; a high pitched whistle used as a warning that the locomotive is about to move, or is approaching a potentially dangerous position (a level crossing or a tunnel) and a lower pitched whistle intended to alert Signalmen and to signal braking requests to the train's Guard.

Variations of each tone are included either singly or in combination. More flamboyant use of the two whistles can often be heard on today's preserved railways, so we've included some examples of these too.

Please note: These individual sounds cannot be accessed on DC, but an automatically played whistle will sound before movement begins.

Exhaust Sounds (Chuffs)

Chuffs are created by steam released from the blast pipe in the locomotive's smoke box which then passes out through the chimney. The character and loudness of these sounds is dependent upon the volume and pressure of the exhausted steam. It is equally important to know that if there is no steam being used there will be no exhaust sounds. This is why there are no chuffs when the locomotive is coasting or decelerating.

Regulator

The Regulator is the control which varies the amount of steam available to enter the cylinders. All other things being equal, to an observer the Regulator's main impact is to increase the loudness of the exhaust when opening and to reduce or eliminate it entirely when closing.

Your controller, DC or DCC, will have a speed control of one type or another. This corresponds to the Regulator of the real loco.

The loudness of the exhaust produced by the model will increase automatically whenever the model is accelerating and for a few seconds after the new steady speed is reached. At this point, the sound level will be reduced to 'cruising' volume until such time as a new speed is requested.

Each acceleration event will trigger this sequence.

Closing the Regulator will reduce or prevent steam reaching the cylinders, reducing the exhaust sounds completely or to a

barely audible whisper. At this point, other mechanical sounds which are being generated all the time but which are normally drowned out by the much louder exhaust beats, begin to be heard. These are the Coasting or Drifting sounds.

Whenever the model is decelerating, the sound changes from predominantly exhaust sounds to the drifting sounds. This sound persists for a few seconds after the new lower speed has been reached at which point the sounds automatically change to the Cruising volume Chuffs.

If the speed control is reduced to 0, the drifting sounds will continue until the model stops. This avoids the, normally atypical, 'Chuffing to a Stop' syndrome.

In any event, increasing the Regulator opening will cause the sound to transition from Drifting to Acceleration sounds.

Reverser

On a real locomotive this may be operated by a wheel and screw thread as on the Castle, or by a lever with a fixed number of notched positions.

Maximum power is available when a large volume of high pressure steam is admitted by the valves to the cylinders for the full duration of the piston's stroke.

However, this is the most inefficient way to operate since the exhausted steam is often close to boiler pressure. This is why a locomotive 'lifting' a heavy train typically using such a setting produces very loud and sustained chuffs.

This is the default mode in the sound project, though as we have seen, this will be quietened automatically after acceleration changes to cruising.

To increase efficiency once on the move, the position of the valves can be adjusted by using the Reverser so as to restrict the duration in which steam is admitted to the cylinders by 'cutting-off' the supply before the piston has completed its stroke.

The impact on the exhaust sound is to soften

the overall timbre whilst giving a more staccato sound.

Engaging Function 5 (F5) will simulate the use of the Reverser by changing the exhaust sounds from 'maximum power' to 'higher efficiency'. A real driver will use his skill and knowledge of the road to select the best combination of Reverser and Regulator positions for optimal efficiency commensurate with maintaining time.

Model locos are not subject to such efficiency consideration so operators may use either variation at any speed. To simulate reality more closely, F5 would probably be engaged more often than not when running. Note. This feature is not available on DC.

Brakes

Closing the Regulator cuts off the power supply (steam) to the cylinders. Locomotives and rolling stock have a high mass and will continue to drift for long distances unless some opposing force is applied.

Locomotive and or train brakes are the way in which the crew can apply a variable retarding force to overcome this momentum. The ability to automatically simulate coasting with a heavy train has a profound impact on the perceived mass of any model, but particularly so for the smaller gauges. By default, the momentum is set high to achieve this prototypically extended coasting effect. With high momentum there is a need for a counteracting force to retain control of stopping distances. A Brake Key feature has been added to your model operated with Function No. 2.

This key was chosen since most DCC controllers have the facility for F2 to be either 'Latching' or 'Trigger'. The latter mode is preferable for the braking function since it is operative only whilst pressed, disengaging immediately when released.

Here's how it works: reduce the Regulator opening, to zero if you wish to come to a halt. The sound will change as previously described and the model will very gradually decelerate. A short 'dab' of the Brake Key will produce a short brake application sound and a short period of braking. A

longer brake application will extend the brake sound duration and provide a more powerful retarding force and the model will visibly slow down. A sustained application will provide maximum braking force and the model will decelerate rapidly in a controlled emergency stop.

Please note: This feature is not available on DC.

Variable Acceleration Rate

This feature is operated by the way in which you open the throttle on your controller.

Gradually increasing the Regulator opening will result in the modest acceleration expected of a heavy train.

Opening the Regulator fully will result in an acceleration rate up to 3 times greater.

If that's not enough variation for your needs, switch to 'Light Engine' mode with F14. These features are designed to operate together seamlessly, making it possible to simulate realistic acceleration and deceleration rates for any size of train without the need to change CVs to do so.

User Operated Sounds

Other sounds generated by the operation of steam locomotives may be more intermittent in nature. When to add coal to the fire, water to the boiler, or additional 'draft' in the chimney will vary with operating conditions. Raising the correct amount of steam for the varying circumstances is the Fireman's duty, as well as being a second pair of eyes for the driver.

Much of the footplate conversation would not be audible outside of a moving loco, but an observer close to the cab when the crew are making preparations to move may well hear their voices.

DCC users will have access to a range of such sounds by using the appropriate F keys on their controllers, see the Function List overleaf.

Some keys will operate one sound when engaged and a different but complementary sound when released.

The volume of each sound can be adjusted in isolation by varying the value in the appropriate CV as shown. The allowable range is 1 -255 within which larger values give louder sound.

Randomly Generated Sounds

These will operate on DC or DCC and are included to play from time to time when the loco is stationary, in order to give the impression that although not moving, the crew are still on board performing their duties. You may add the sound of the safety valves lifting to the random generator if you wish.

To add write CV744 = 121
To remove it write CV744 = 0

Overall Volume Control

Useful for entering tunnels or fiddle yards, engaging F15 will gradually reduce overall volume to zero where it will remain until F15 is disengaged whereupon the sound will gradually increase to the previous volume setting. With a little practice, this feature can also be used to simulate the locomotive moving away from or towards your position. Full control over sound levels is provided by F27 and F28 which turn the volume down or up respectively. Engage one or other and the volume will gradually fall or rise, eventually reaching zero or maximum. When the desired volume is reached, disengage the appropriate F key and the sound level will remain set until it requires adjustment for changed circumstances.

Speed Step Graduations.

On DCC the speed graduation between 0 and full speed is broken down into a series of steps. The greater the number of steps the smoother the locomotive operates. **This model comes with a default setting of 28 Speed Steps.**

Options for 14 & 128 Speed Steps are also available, controlled by CV29, Bit 1. **Please note: the use of 14 speed steps is not recommended as it may have an adverse effect on other functions.**

Function List - Castle Class

No.	Function/Sound	Type	Sound CV	Volume CV	Sound ID
0	Reserved	Latch	-	-	-
1	Sound On/Off	Latch	-	-	-
2	Brake Key	Trigger	516	517	119
3	Cylinder Drain Cocks	Latch	-	-	-
4	Rising Toot	Trigger	522	523	133
5	Reverser	Latch	-	-	-
6	Coal Shovelling	Latch	528	529	116
7	Injector	Latch	531	352	122
8	Blower	Latch	534	535	114
9	Flange Squeal	Latch	537	538	128
10	Safety Valves Lifted	Trigger	540	541	121
11	Hand Brake	Trigger	543	544	123
12	Tender Water Tank Filling	Latch	546	547	125
13	Coupling	Trigger	549	550	117
14	Light Engine Mode	Latch	-	-	-
15	Fade All Sounds	Latch	-	-	-
16	Guard's Whistle	Latch	558	559	124
17	High Toned Whistle	Trigger	561	562	139
18	High and Low Whistles	Trigger	564	565	136
19	High Toned Rising Whistle	Trigger	567	568	134
20	Low Toned Whistle	Latch	673	674	141
21	Long High Toned Whistle	Latch	676	677	140
22	Long High & Low Toned Whistles	Latch	679	680	138
23 on	'Going under, Bill'	Trigger	682	683	126
23 off	'RightHo Norm'	Trigger	682	683	126
24	'Right 'o way from the Guard'	Latch	685	686	127
25	'Clear my side'	Latch	688	689	129
26 on	'Green Flag'	Trigger	691	692	130
26 off	'RightyHo'	Trigger	691	692	130
27	Volume Down	Trigger	-	-	-
28	Volume Up	Trigger	-	-	-

Decoder.

This locomotive is fitted with a Zimo MX658 Next18 DCC Sound Decoder, for full details of the decoder please refer to information sheets on **Zimo MX658N18** available from www.bachmann.co.uk



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