# Auscision Models
NSWGR Mark 1, 44 Class Diesel Locomotive Operating Information

Your Auscision Models 44 class locomotive's main printed circuit board and associated lighting has been designed to function as a **DC** and **DCC Sound Decoder Installed Model**. In these notes reference is made to the No.1 Front End and No.2 Rear End of the model. This diagram will assist in identifying which end is which.

Number 1, Front End.

Number 2, Rear End.
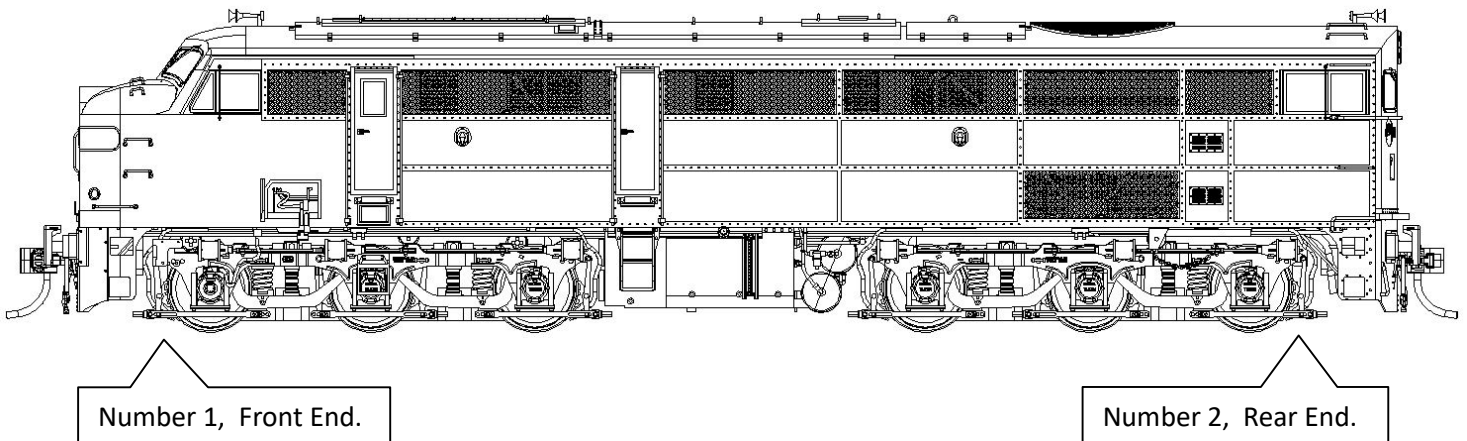
DC Model

The DC model is able to control the locomotives lighting via the micro switches on the bottom of the fuel tank. The lighting is directional. The switches are able to isolate, turn on/off:

1. The Locomotives Headlights
2. The Locomotives Number Boards and White Marker Lights.
3. The Locomotives Red Marker Lights.

The lighting connection for the **DC model** has the Front and Rear lights connected to the main printed circuit board at the two plugs marked **'DC'**. (See image on page 3)

If you're going to operate your model on a DC system /controller, then read no further. If you plan on fitting an aftermarket decoder or your model is a DCC Sound Ready model, please read on.

DCC Ready Model - fitting an aftermarket decoder

The 44 class models main printed circuit boards have been specifically designed to function through the '**NEM660 standard**' 21 pin connector and integrate with an **ESU Loksound V5 decoder**. Via the 21 pin connector this decoder functions with four individually powered auxiliary outputs (Headlight front, Headlight rear, Aux 1 and Aux 2) and four individual logic outputs (Aux 3, 4, 5, 6) which the main circuit board has electronic components included for their operation. The **DCC Sound Decoder Installed** models lighting connects via 2 separate plugs. Front and Rear lighting connection is via the plugs marked **'DCC'**. (See image on page 3)

When selecting an aftermarket decoder a few details may need to be considered first. As there are two standards of decoder 21pin connections available on the market, the **NEM660** version and the **NRMA** version, two lighting connection possibilities are available on the Main PCB.

The lighting connection will be dependent on the brand and version of the aftermarket decoder being used. Generally speaking, any aftermarket 21 pin decoder can be fitted.

With several aftermarket decoders available that have a reduced number of auxiliary lighting outputs, the Locomotives **Reversible Headlights** along with **Aux 1** (Front Number Boards, Front White Marker Lights, Rear Red Markers lights) and **Aux 2** (Rear White Marker Lights, Front Red Markers lights) will function as long as connection is via the plugs marked 'DC'.

Decoders with the ability to run 8 auxiliary light functions will connect to the plugs marked 'DCC'.

For auxiliary light mapping refer to the below graph and NEM660 21 pin image.

NEM660 21 Pin Connection	DC (4 Light Function Decoder)	DCC (8 Light Function Decoder)
F Light, Pin 8	Front Headlight	Front Headlight
R Light, Pin 7	Rear Headlight	Rear Headlight
Aux 1, Pin 15	Front Number Boards, White Marker Lights, Rear Red Marker Lights	Front Number Boards
Aux 2, Pin 14	Rear White Marker Lights, Front Red Marker Lights	XXX
Aux 3, Pin 13	XXX	Front White Marker Lights
Aux 4, Pin 4	XXX	Rear White Marker Lights
Aux 5, Pin 17	XXX	Front Red Marker Lights
Aux 6, Pin 3	XXX	Rear Red Marker Lights
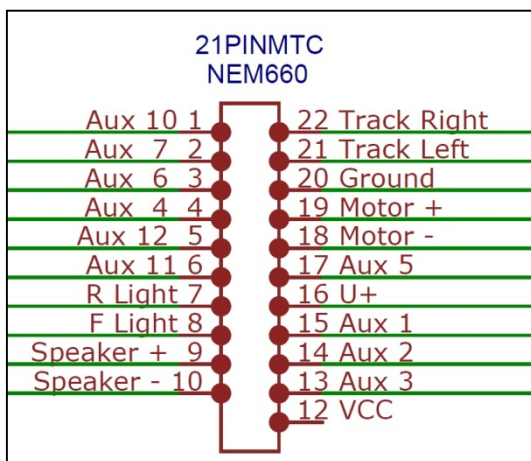
Note: Using the DC (4 Light Function Decoder) lighting functions can also be isolated with the micro switches on the bottom of the fuel tank. (E.g. turning the opposing end, red marker lighting off).

Refer to the link below for further decoder possibilities. This is an excellent source of information which addresses the 21pin NEM660/NMRA standards and their associated differences and functionality issues, along with a chart identifying which other brand decoders and versions that may also be suitable.

http://www.sbs4dcc.com/tutorialstipstricks/21mtcconnector.html

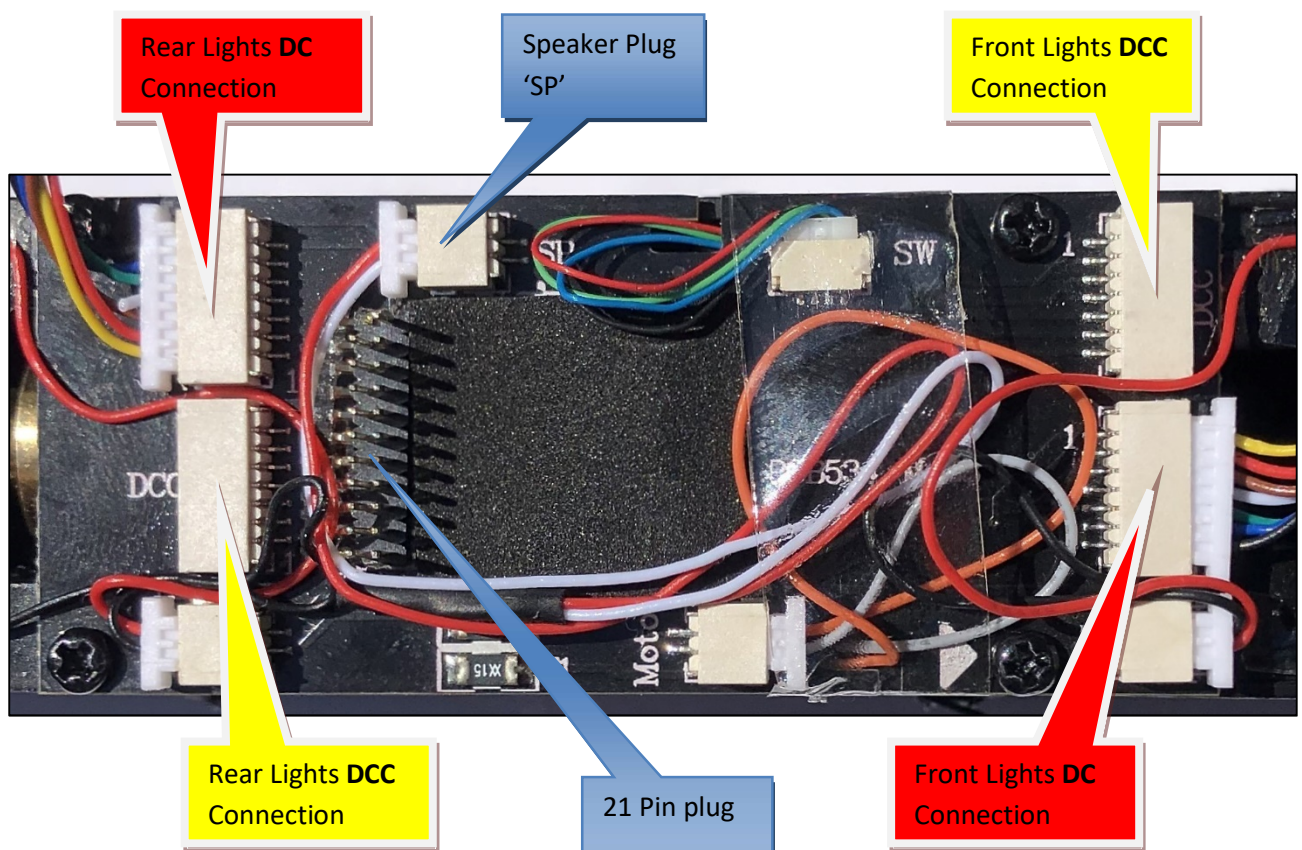**Fitting the decoder -** (See PCB image below)

Note: All 44 class lighting and associated wiring is attached to the models body / shell. To remove the body completely it will require the lighting to be unplugged at two positions on the chassis PCB.

Once the model's body is removed from the chassis, remove the small 21pin DC Adaptor PCB from the Main PCB. Removal of the DC adaptor PCB also removes the components associated with motor noise suppression for DC function. Then, and paying close attention to the pin alignment, firmly push the decoder onto the 21 pin plug.

Note: When altering the Lighting plug connection between DC and DCC, inadvertently plugging the lighting into the wrong plug should pose no risk of damaging any circuitry, although care should be taken to ensure the lighting is connected to the correct plug for the decoder that has been selected.

Speaker connection is via the supplied connector plug/wiring harness, fitted to the plug marked 'SP' (see image below). Keep in mind matching your chosen speaker and decoder's minimum amplifier impedance.

44 Class PCB Top View

Rear Lights **DC** Connection

Speaker Plug 'SP'

Front Lights **DCC** Connection

Rear Lights **DCC** Connection

21 Pin plug

Front Lights **DC** Connection

ESU Loksound V5 DCC Decoder Installed Model

Your **DCC Sound Installed Model** is fitted with an **ESU Loksound V5 Decoder**. All switches on the bottom of the fuel tank are to remain in the turned-on position. The Decoder connects to the main printed circuit board via the 21pin connector, with the lighting wiring connection via two plugs at the Main PCB marked DCC (see image on page 3)

The decoders default settings have been adjusted to ensure your model operates smoothly straight out of the packaging. Please take a moment to read through the following information as it relates to the functionality and features along with further information as to individualising your model.

- In order to adjust the running qualities of your model for your personal preference, reference to suggested settings in the form of a quick start guide is available in the following notes. Alternatively for full decoder adjustment details refer to the ESU Loksound V5 Decoder Manual and Full Throttle Description available at the following links:

    http://www.esu.eu/en/downloads/instruction-manuals/digital-decoders/

    http://www.esu.eu/en/products/loksound/loksound-full-throttle-diesel-features/

- If required, adjustments and individual finetuning of your DCC model and decoder can be made primarily in two ways.

    1. The most simple and effective way is with an ESU Lokprogrammer interfaced with a Windows operating system PC.

        The details of which can be found here:

        Note: An updated Lokprogrammer software Version 5.0.0 or newer will be required to function with the V5 decoder.

        Product Information... http://www.esu.eu/en/products/lokprogrammer/

        Instructions................. http://www.esu.eu/en/downloads/instruction-manuals/lokprogrammer/

        Updated Software...... http://www.esu.eu/en/downloads/software/lokprogrammer/

    2. Alternatively adjustments can be made via your DCC operating system controller or with other PC based software such as JRMI. Refer to your operating system manual and the ESU V5 decoder manual.

Quick Start Guide

Care has been taken in order for your model to perform straight out of the packaging. In general, it has been programmed to ESU Loksound's V5 Decoder default values. As modellers we all have different ideas and preferences as to how our models perform. Should you wish to further adjust how your model performs, the following is a quick start guide to some of the primary settings required to do so.

Excerpts from the ESU Loksound V5 and Lokprogrammer references are included in the description and are as follows. (Refer to the V5 Decoder Manual, the Lokprogrammer Manual or your DCC systems programming section for full programming details)

- The Default Locomotive Address for your 44 class model is **3.**

  In order to change the locomotive address, refer to chapter 9.1, 9.2 'Address Settings' of the ESU V5 Decoder Manual. Individual DCC controller systems may also have a programme track output and function available for this purpose.

- Decoders operating within a **DC operating system** will function as per ESU's default DC settings. For further detail also refer to the DC notes contained within the 48 class operating information document.

  http://www.auscisionmodels.com.au/PDFs/Auscision%20HO%20Scale%2048-830%20class%20DCC%20Operating%20Information%20v4.pdf

Motor Auto Tune Procedure

Should you encounter any running performance issues the following Auto Motor Tune procedure may help resolve the problem.

This feature will automatically adjust the Motors Back-EMF in most cases. This is not meant to be a "cure all" solution. In most cases this will be all that is required, however there still may be the need to perform some manual adjustments.

- To use this automatic adjustment, you will first need to place your locomotive on a section of track paying attention to the set direction of travel.

- Write a value of 0 to CV54. Activate function F1.   **(Be sure to have plenty of clear space ahead of your locomotive. Allow 2 metres of available track)**

- Your locomotive will quickly take off at full speed and then stop while reading the motor responses. This will automatically set the motor values required in CV51, 52, 53, 54, and 55.

- Original file default values for these CV's will alter following this adjustment.
  Depending on the user's operating system /power supply from which the autotune was performed, variations in the CV values can occur.

 Following a motor autotune the value in CV53 (Regulation Reference Voltage) may need further manual adjustment. Typically using a 28-speed step controller, ensure your model has a gradual speed increase across all 28 steps. If a maximum speed is reached at a lower position with a flat response across the remaining steps, then the value in CV53 will require adjusting to obtain the optimal setting. Values in the CV53 range are as follows, 0 = 0v through to 255 = 25.5v.

For further detail refer Loksound V5 instruction manual, chapter 11 for full motor adjustment details.

Minimum and Maximum Speeds

As default, the decoder will automatically detect the user's controller speed step settings, with the controller using 14, 28 or 128 steps (28 being common).

- Default is the **Exponential 1 28 step speed table** as per the graph below utilising minimum and maximum speed settings.

- Defaults are **CV2 = 2** (minimum speed value) and **CV5 = 255** (maximum speed value).

- These two values define the compression of the curve while automatically adjusting the 28 individual speed steps in between that make up the curve. Alternatively, and using Lokprogrammer, there are several other speed pre-set tables available, as well as being able to adjust each of the 28 individual speed steps by changing the values at CV67 through to CV94 with values in the range between 1 and 255. Full details can be found in Chapter 10 'adaptive driving behaviour' of the Loksound V5 instruction manual.
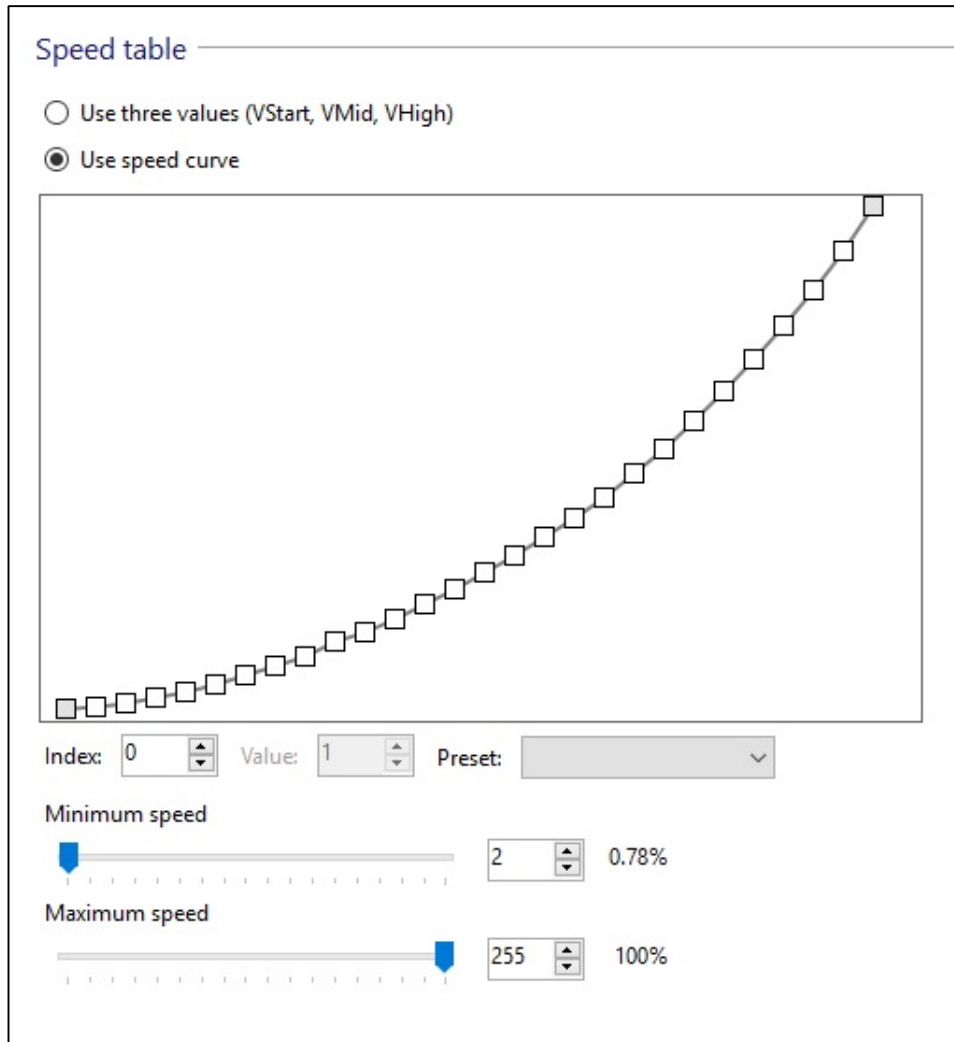
Acceleration Momentum and Deceleration Momentum

The models acceleration momentum time and deceleration momentum time can be adjusted individually.

The time for accelerating from 0 to maximum speed is adjusted in CV 3 (default value = 21, which equates to 18.82 seconds) while deceleration is set in CV 4 (default value = 21, which equates to 18.82 seconds). Value Range is from 1 to 255 or from 0.9 to 228.48 seconds. (Approximately 0.89 seconds for each increment of value)

The times set in these CVs work speed dependant. Therefore, the acceleration distance and the brake distance are longer at higher speeds. In other words, the faster the locomotive moves, the longer the distance until it stops.

DCC Function Table

F0 **Directional Headlights**

F1 Not in use.

F2 **Playable Air horn**

F3 **Drive Hold   (Full throttle feature)**

F4 **Dynamic Brake**

F5 **Locomotive Brake   (Full throttle feature)**

F6 **Headlight Dimmer Control**

F7 **Front Number 1 End. Marker Light and Number Board Logic (See notes below)**

F8 **Prime Mover Locomotive Sound   (Start/Stop)**

F9 **Rear Number 2 End. Marker Light logic   (See notes below)**

F10 **Manual Coupler sounds**

F11 **Coast   (Full throttle feature)**

F12 **Run 8   (Full throttle feature)**

F13 **Manual Radiator Cooling Fan on/off**

F14 **Acceleration / Shunting mode   (Turns off any momentum settings. Runs at half speed)**

F15 **Volume Fade Control   (set at 50% normal volume level - ideal for loud multiple unit consists)**

F16 **Manual Sanding Valve on/off**

F17 **Manual Compressor on/off**

F18 Not in use.

F19 **Ratchet Handbrake – Apply and Release (When applied, locks to Speed Step 0)**

F20 **Flange Squeal (Sound will begin to function at Speed Step 4 and above)**

F21 **Headlight, #1 / Front End (not directional)**

F22 **Headlight, #2 / Rear End (not directional)**

F23 **Number Boards #1 / Front End**

F24 **Number Boards #2 / Rear End**

F25 **White Marker Lights #1 / Front End**

F26 **White Marker Lights #2 / Rear End**

F27 **Red Marker Lights #1 / Front End**

F28 **Red Marker Lights #2 / Rear End**

F29 **Manual Engine Sound Notching. Used in conjunction with F11 and F12**

F30 **Cab Door**

F31 **Locomotive Brake Sound and Functioning Logic. Default is On. Functions automatically when the model is moving and then via the throttle setting being moved to 0, or manually via Function 5**

Random Sounds

With previous Loksound Select and V4 decoders Random Sounds such as 'Compressor' were turned on as default and would start and stop automatically. The parameters within the sound flow in most cases made it difficult to alter their condition.

The V5 decoder along with the updated Lokprogrammer software allows more flexibility to use and control random sounds. The following is an overview on how to activate and adjust these sounds using Lokprogrammer. With reference to the below screenshot the following settings can be adjusted to your personal preferences if required. The random compressor sound will be used as the example, although virtually any sound contained in the default file can be used.

Refer to the default function table: Compressor being mapped to Function 17.

As default the sound file has the compressor turned on as a Random Sound to function when stationary with the below settings.

Under the **Decoder – Function Settings – Random functions** tab in Lokprogrammer, select position 'Random 1' and select triggered function **F17**, along with the **Stop** and **Only Play When Driving Sound Is Enabled** check boxes. If the **'Drive'** check box is ticked the random compressor sound will also function when the locomotive is moving. **Active Minimum** and **Active Maximum** is the variable length of time the random sound will occur, while **Passive Minimum** and **Passive Maximum** is the variable time frame in which the random sound will turn on and function. These values once selected will then require writing to the decoder in order for them to function.

For further information refer to Chapter 13 'Adjusting the Sound Effects' in the Loksound V5 instruction manual.
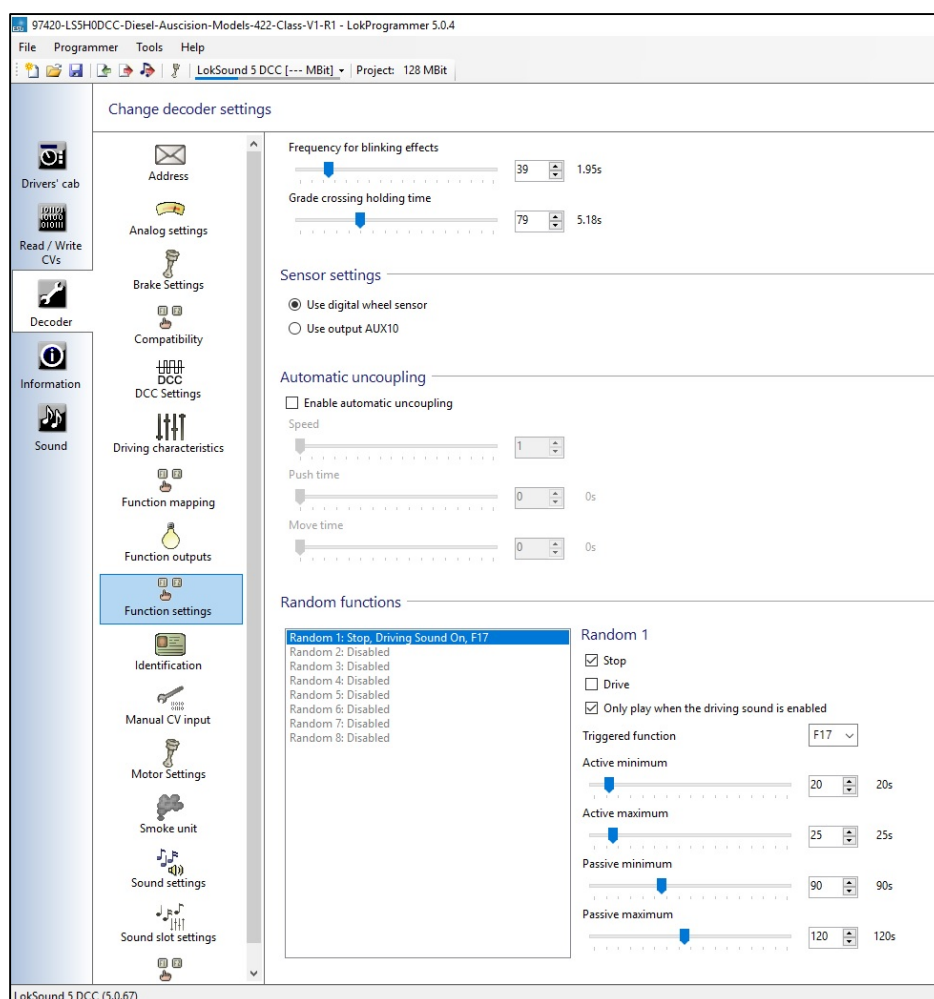
Function button 7 (Number 1 End Auxiliary Lighting Logic)
Function button 9 (Number 2 End Auxiliary Lighting Logic)

The lighting for each end of the locomotive has been divided into four separate lighting states. By pressing the function key repetitively, the following applies:

State 1. All Lighting Off.

State 2. Number Boards On. White Marker Lights On. (As in leading end mainline running)

State 3. Number Boards On. Red Marker Lights On. (As in yard shunting. Both ends)

State 4. Red Marker Lights On. (As in the trailing end of a light engine movement)

(State 4 is followed by State 1)

Note: The Number 2 end of the Mark 1, 44 class model has no Number Board lighting, therefor you will notice no visible difference using function 9 between states 3 and 4.

If required, the individual light brightness can be controlled / adjusted separately. Refer to the ESU V5 Decoder Manual, with reference to the auxiliary outputs 1 through 6.

Number 1 end Auxiliary Lighting

Aux 1 - Number Boards, Aux 3 - White Marker Lights, Aux 5 - Red Marker Lights

Number 2 end Auxiliary Lighting

Aux 4 - White Marker Lights, Aux 6 - Red Marker Lights

PLEASE NOTE:

The following notes are relevant for the previously used Loksound Select Series Decoder as used in the Auscision 48 class model which had the following possible issue. The new Loksound V5 decoder utilises an extra 2 sound processing channels, (now 10 in total) and, following thorough testing, the problem appears to no longer exist in the V5. However, if the issue should reoccur the following details can be followed in order to remedy the problem.

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In order for the Function 7 and Function 9 auxiliary lighting feature to work, ESU Loksound had to create a lighting logic template. This template is NOT built into the decoders function logic, however, utilises two of the eight available sound processing flow channels.

Therefore, under certain circumstances and especially when BOTH ends of the model's F7/F9 auxiliary lighting are turned on, then some of the secondary sounds may not function. (For example brake squeal when stopping) This is due to the non-availability of spare sound channels at that particular moment in time, and is not a fault with your decoder.

If any activated secondary sound function (including the F7 and F9 lighting) appears erratic/frozen turn off the locomotive prime mover (F8). This will then allow the processes selected and queued the available space to function and complete. Once complete the prime mover (F8) can be turned back on as normal.

If this type of sound response becomes an operating issue, then to free up sound channels the auxiliary lighting has also been mapped to be individually controlled with the Logic Functions F21 through to F28. (See function table)

Locomotive Horn Sounds

Your 44 class model has been fitted with Brass Castings of the Westinghouse A/B combination horns as originally and most commonly fitted to the prototype.

Using Lokprogrammer **Sound SV9 = 9** is the default Westinghouse Single A/B horn that was commonly used on the prototype.

 The prototype also had examples of Westinghouse twin AA/BB, and Nathan Airchime P5 horns located only on the number 1 end of the locomotive.

Included in the sound file two AA/BB versions exist with a value of **7** or **8**, and two Nathan Airchime P5 versions exist with a value of **0** or **1**.

The **CV** for horn selection is **163** which has a default value of **9**.

Please Note: To complete the change in CV value, it is recommended that power to the decoder be interruption after writing.

Dynamic Brake Sounds

Many of the prototype Mark 1 44 class locomotives had their dynamic brake disabled and permanently removed during overhaul in the 1970's and 80's. The dynamic brake grids were removed and the roof panel containing the ventilation grills were replaced with a plain sheeted panel in its place - see the diagram below.

Dynamic Brake as Original

Dynamic Brake Removed
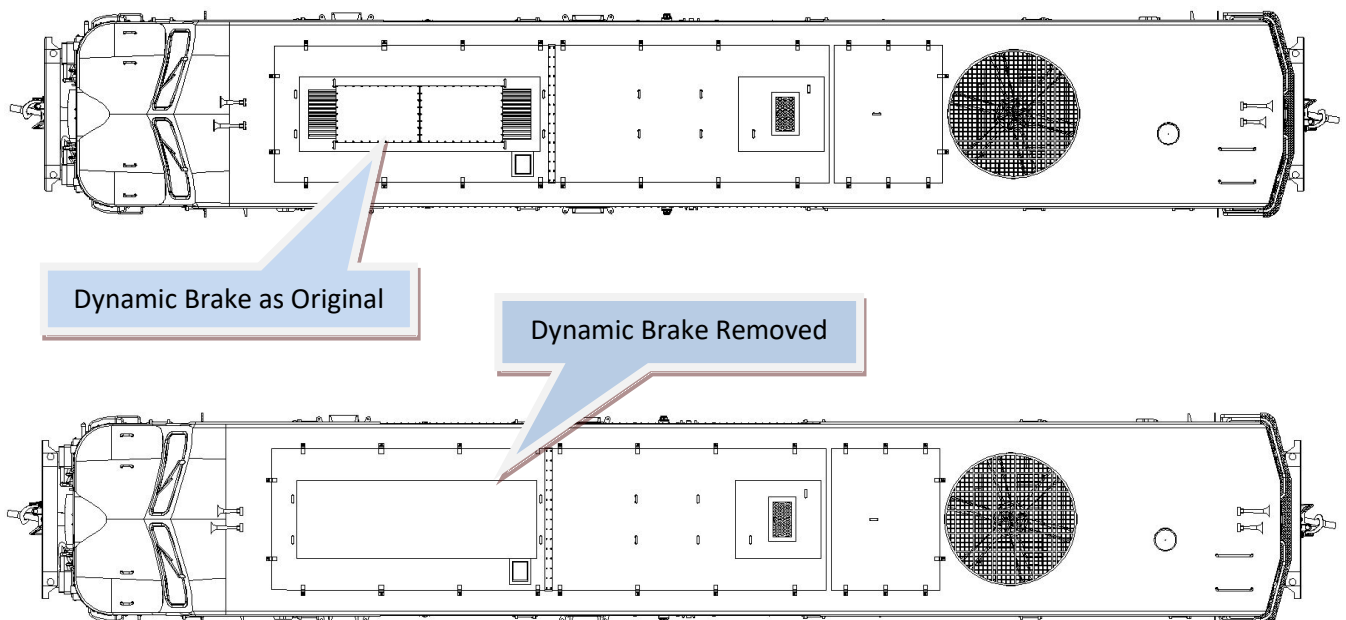
With the dynamic brake removed, these locomotives lost all dynamic brake functionality including engine rpm's increasing and the grid fans no longer sounding.

A prototypical trailing 44 class locomotive with a disabled dynamic brake, and when in a multiple unit consist with a functioning dynamic brake leading locomotive, the 44 class would simply remain in engine idle rpm's when the lead locomotive had the dynamic brake active.

The Mark 1 44 class sound project has been designed to also replicate the sound function of those units that had the dynamic brake disabled.

See the below instruction of how to disable the dynamic brake functionality and sound. This change will enable the disabled dynamic brake idle sound timeframe to run for the same period as an enabled dynamic brake model. This then allows for both enabled and disabled sound loops to run and resume normal function in sync once the dynamic brake function is turned off and completed.

Dynamic Brake Active: Via Lokprogrammer Sound CV12 = 1 **OR** CV166 = 1   (Default ON)

Dynamic Brake Disabled: Via Lokprogrammer Sound CV12 = 0 **OR** CV166 = 0   (Off)

Auscision Models - Dynamic brake equipped models			
4401	Yes	**4415**	No
4403	Yes	**4431**	No
4410	Yes	**4450**	No
4449	Yes	**4402**	No
4453	Yes	**4421**	No
4414	Yes	**4434**	No
4432	Yes	**4405**	No
4442	Yes	**4451**	No
4420	Yes	**4427**	No
4455	Yes	**4456**	No

Decoder Reset

If at any point your model's decoder becomes unresponsive, it may simply require a reset in order to regain normal function. You can reset the decoder to the current memory default settings at any time.

In most cases POM (Programming on the Main) will not work to reset a decoder. Please use a separate programming track.

To reset the decoder:

- **Refer to the ESU V5 Decoder manual for full details.**
- **Enter the value 8 into CV8.**
- **To complete the reset, power to the decoder must be interrupted.**

For ease of connection to the web links attached within this document, an online version of the 44 class Operating Information can be found on the Auscision website at the below link:

https://auscisionmodels.com.au/44%20Class%20Locomotive%20MK1.htm