



# Using the ESU LokProgrammer A Closer Look

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Largo, Florida**



# Acknowledgements

- Matt Herman – ESU
- Nick Santo – <https://nixtrainz.com>
- Jüergen Linder – ESU
- Jeff Aley – Prototype Rails Cocoa Beach
- Bill Schneider – Rapido Trains

# Comparison of Popular ESU Decoders

Feature	Loksound Select	Loksound V 4.0	Loksound V 5.0	LokPilot
Can be modified w/ LokProgrammer	Yes	Yes	Yes	Yes
Rated Speaker Impedance	4 Ohms	4 Ohms	4 Ohms	N /A
Audio Quality	8 bit	8 bit	<b>16 bit</b>	N/A
Rated Output in Watts	1 Watt	1 Watt	<b>2 Watts</b>	
Simultaneous Audio Channels	8 channels	8 channels	<b>10 channels</b>	N/A
Number of Functions	8	8	<b>10</b>	Up to 6
Can modify/change/add individual sound per decoder	No	Yes	Yes	N/A
Future Features can be added via Firmware upgrades	Yes*	Yes*	Yes	Yes
Supported Protocols	Marklin, M4, Selectrix, DCC	Marklin, M4, Selectrix, DCC	Marklin, M4, Selectrix, DCC*	Marklin, M4, Selectrix, DCC
Can accept PowerPack (stay alive circuit)	Yes	Yes	Yes	Yes

For a copy of the handout from this clinic:



Websites with useful ESU Loksound Information

ESU's Official Website:  
<http://www.loksound.com> OR <http://www.esu.eu/en/start/>

ESU Mini-Clinics and YouTube Videos:  
<https://www.youtube.com/user/ESUDCC/videos>

Intermountain Railway's ESU Help page:  
<https://www.intermountain-railway.com/customerservice/dccwebpage/ESU-FAQ-Page.html>

Bowser-Trains.com's DCC & Sound Information Page:  
<http://bowser-trains.com/history/dccdetails.html>

Atlas Model Railroad Co's User Manuals Page:  
<https://shop.atlasrr.com/t-manuals.aspx>

SBS4DCC – Streamlined Back Shop's info on ESU Decoders and Setup:  
<http://www.sbs4dcc.com/tutorialsipstricks.html>

Facebook - ESU CabControl and LokSound Installations Group  
<https://www.facebook.com/groups/184528766245221>

Decoder Buddy  
<https://nixtrainz.com/>

<http://www.dccgeek.com/downloads.html>

# Why get a LokProgrammer?

- Change the sound(s) saved on the decoder.
- Ease the programming process. Setting of all digital parameters of the Loksound decoder such as address of the loco, operation speed, maximum speed, braking deceleration, brightness of bulbs etc; are set with your computer very easily - no cumbersome entering of CVs (configuration variables) with your command station.
- **Rearrange / reconfigure your sounds and transfer them to the LokSound decoder.**
- **You can use all sounds that can be downloaded to your computer hard disk.**
- **Sound can be allocated to different events.**
- **Additional sounds can be activated via function buttons.**

# Objectives For This Clinic

- How to upgrade a Loksound/LokPilot decoder
- How to change the locomotive ID
- How to setup functions to use in a consist
- Understanding ESU Function Mapping
- How to adjust your speed, momentum and braking
- How to change your sound file set.
- How to add/change individual sounds
- How to change your individual sound levels and master volume
- How to add custom sounds to your decoder (For V.4 and V.5 only)

# The ESU LokProgrammer

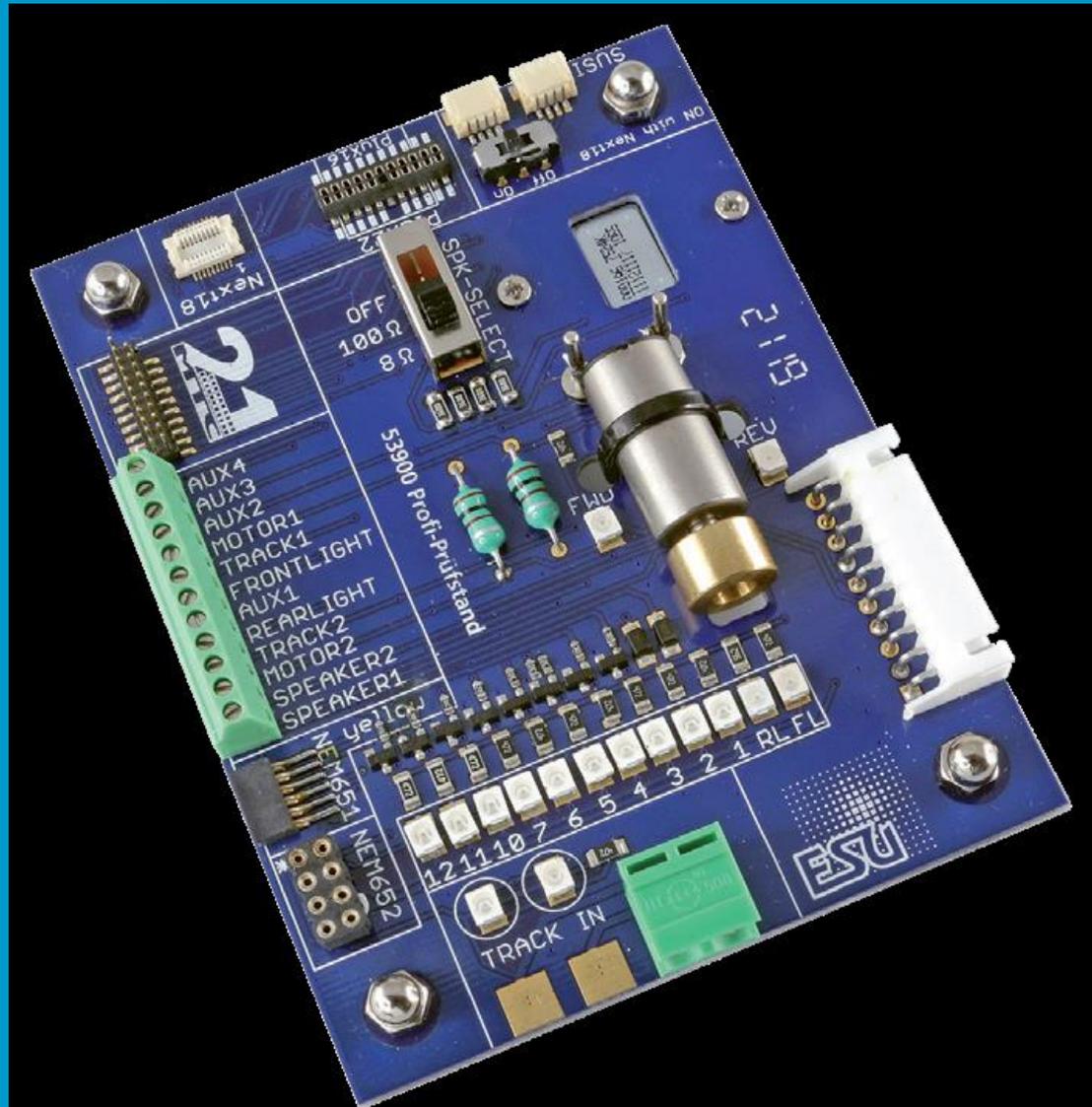


Latest Style



Previous Style

# Recommended accessory: the ESU Decoder Tester



# Upgrading Your Locomotive



Download  
The File from  
ESU's website



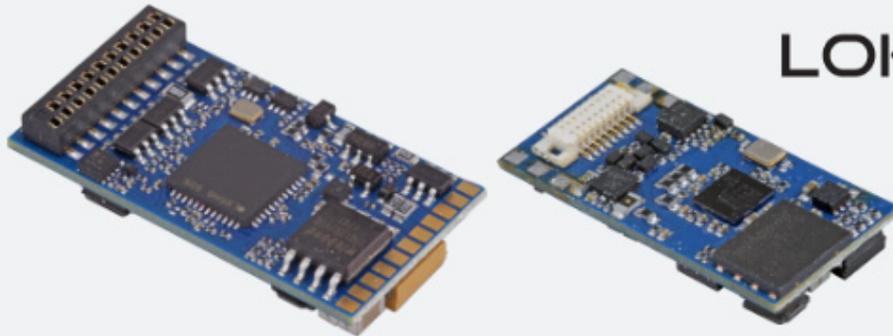
Open the  
downloaded file in the  
LokProgrammer software



Program the decoder and when  
appropriate, upload newer sounds  
and features into the decoder



Test run the locomotive  
with the LokProgrammer



**LOK SOUND**  
EST. 1999

### LokSound 5

Do you want the best sound and motor control in the industry? Then you want to install the LokSound 5 into your locomotives!



### Breaking News:

23.08.2019  
LokProgrammer Software 5.0.8. released

25.05.2018  
New Video "Side Button Programming on ESU Mobile Control II Throttles" online!

25.05.2018  
New Video "How to Update the CabControl WiFi DCC System" online!

17.05.2018  
ECoS & CabControl Firmware 4.2.3. & Mobile Control II App Version 1.1.4. published

*The ESU LLC USA office will be closed from Dec 23<sup>rd</sup> 2019 thru Jan 5<sup>th</sup> 2020 to celebrate the Christmas Holiday with our families. We will be back in the office to serve you again on Jan 6<sup>th</sup> 2020.*

*The ESU germany office will be closed from december 23<sup>rd</sup> trough Jan 6<sup>th</sup>2020. ESU germany will be back on Jan 7<sup>th</sup> 2020. Merry Christmas and Happy New Year from all of us at ESU!*

<https://loksound.com>

## Downloads

- Sounds
- Software
- Instruction manuals
- Loco pictures
- Catalogues

## Downloads

### ”Service - For us more than just a promise”

A comprehensive customer service also means for us to keep you steadily informed about news and updates. Please check our download section for instruction manuals, additional information and catalogues about our products. Furthermore we offer a variety of sounds for free download. Help yourself!



#### Sound files Go here to download your sound schemes

This section is a true repertory for fans of sound: Rummage in our steadily growing fund of original sounds. Fore sure there will also be an appropriate sound for your locomotive.



#### Firmware and software Go here for the LokProgrammer software

Here you can download the latest LokProgrammer software as well as the recent firmware for our decoders.



#### Instruction manuals Download the pdf files and save them!

You need further information? Here you will find the instruction manuals for all our products. Find out what ESU products achieve, even before purchase...



#### Loco Icon Bazaar

Here you are able to download free loco icons for your ECoS or provide your self-created images to other ECoS users.



#### Catalogues

Of course you can see over our catalogues online or even print it.

# Download the Latest LokProgrammer Software



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Software

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Downloads » Software » LokProgrammer

## LokProgrammer - PC software

Being able to use the LokProgrammer you need a software for your computer. This software is steadily advanced, so stay "up-to-date" and get the latest version of it. The software was developed for Microsoft Windows (Windows XP, 7, 8, 8.1, 10). We cannot grant a proper function in combination with former Windows systems.

Further information

[LokSound V3.5 ZIP archive](#)

### LokProgrammer

LokProgrammer PC-Software for all LokSound 5 and LokSound V4.0 Decoders. Language: , Date: 05.12.19, Version: 5.0.10  [Download \(80.14 MB\)](#)

▼ [Additional informationen](#)

LokProgrammer PC-Software for all LokSound 5 and LokSound V4.0 Decoders. Language: , Date: 13.11.19, Version: 5.0.9.  [Download \(77.89 MB\)](#)

▼ [Additional informationen](#)

LokProgrammer PC-Software for all LokSound 5 and LokSound V4.0 Decoders. Language: , Date: 23.08.19, Version: 5.0.8.  [Download \(68.89 MB\)](#)

▼ [Additional informationen](#)

LokProgrammer PC-Software for 4th generation decoders. Language: , Date: 27.07.18, Version: 4.7.2.  [Download \(40.48 MB\)](#)

▼ [Additional informationen](#)

LokProgrammer PC-Software. Language: , Date: 13.09.11, Version: 2.7.9.  [Download \(10.32 MB\)](#)

▼ [Additional informationen](#)

### LokSound Template Pack

Sound library for LokProgrammer 4.4.24 or newer. Language: , Date: 20.09.17, Version: 1.9.  [Download \(205.42 MB\)](#)

▼ [Additional informationen](#)

Downloads

Sounds

LokSound 5

Generation 4.0

Generation 3

Generation 2

Generation 1

Software

Instruction manuals

Loco pictures

Catalogues

[Downloads](#) » Sounds

## Sounds - A whole variety of our capabilities...



... this is what we offer you on this website for free download. Thanks to our unique sound technology you are able to transfer every sound available onto your decoder (via the Lokprogrammer). Have fun while rummaging in our sound archive!

By the way: It's worth to stop by from time to time as we steadily extend our choice of sounds.

### LokSound 5 family

Here you can find soundfiles for our current line of LokSound 5 and LokSound 5 DCC decoders

More sounds...

...are available from our distributors in Italy and the UK:



### LokSound V4.0 Family, LokSound Select

Here you can find soundfiles for our current line of LokSound V4.0 and LokSound Select decoders.

V.5 Files

V.4 and Select Files

### LokSound V3

Please find here the sounds for the LokSound V3.5 decoder, LokSound XL V3.5, LokSound micro V3.5, LokSound M4 V3.0 and LokSound V3.0 decoder. You also find here sounds for many locos of Brawa, Mehano, Roco, etc.

### LokSound2

The LokSound2 decoder was introduced in 2001 and was a huge success: It was installed in many locos, e. g. Mehano or Roco. Here you find all sounds for the second generation of LokSound - also for XL V2.1.

### LokSound "classic" - the prime father of all LokSounds

In 1999, the LokSound "classic" decoder laid the foundations for ESU: He was not only the first LokSound decoder in due time, but also one of the first ESU products for model railway. Here you can still download appropriate sounds for your locos.



### LokSound 5 European Sound files

Here you can find sound files for LokSound 5 Decoders of European prototypes

[> Browse projects](#)

### LokSound 5 factory equipped sounds

LokSound 5 Factory Equipped Sound files

[> Browse projects](#)

### LokSound 5 North American and Australian Sound files

Here you can find sound files for LokSound 5 Decoders of North American and Australian prototypes. We make some Canadian files as well...

[> Browse projects](#)

### LokSound 5 North American & Australian factory Equipped Sound files

Here you can find LokSound 5 project files we created especially for the usage with selected LokSound factory equipped locomotives

[> Browse projects](#)

### LokSound V4.0 European Soundfiles

Here you can find sound files for LokSound V4.0 Decoders of European prototypes

[> Browse projects](#)

### LokSound V4.0 & LokPilot V4.0 for Factory Equipped Locomotives

Here you can find LokSound and LokPilot V4.0 project files we created especially for the usage with selected LokSound factory equipped locomotives. All settings done according to the locomotive printed circuit board.

[> Browse projects](#)

### LokSound V4.0 American & Australian Sound files

Here you can find sound files for LokSound V4.0 Decoders of North American and Australian prototypes. We make some Canadian files as well...

[> Browse projects](#)

### LokSound Select Retail Soundfiles

Here you can find sound files for LokSound Select Decoders

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### LokSound North American & Australian Factory Equipped Sound files

Here you can find LokSound North American and Australian Sound files we created especially for the usage with selected LokSound factory equipped locomotives.

[> Browse projects](#)

# Key Items Using the LokProgrammer

The Name / Description of the Decoder File you are working in



73402-LSSelect-Diesel-ALCO251-R3 - LokProgrammer 5.0.10

File Programmer Tools Help



LokSound Select [--- MBit] ▾

Project: 32 MBit

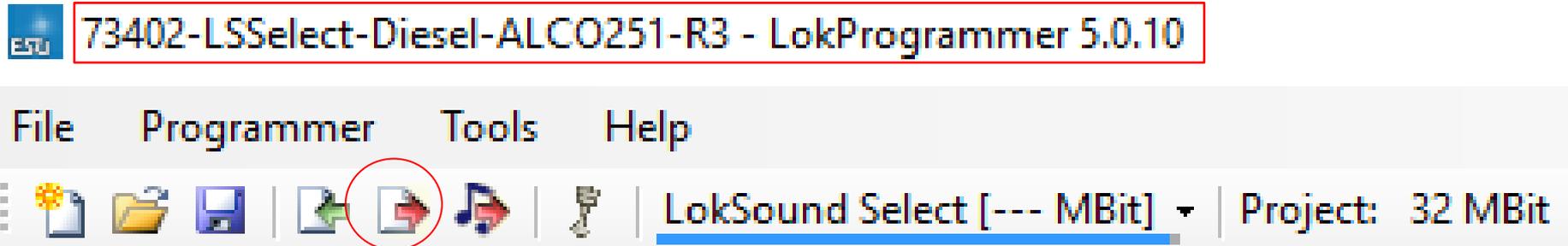
# Key Items Using the LokProgrammer



## Read the Decoder

This uploads the existing CV settings  
Into the decoder file

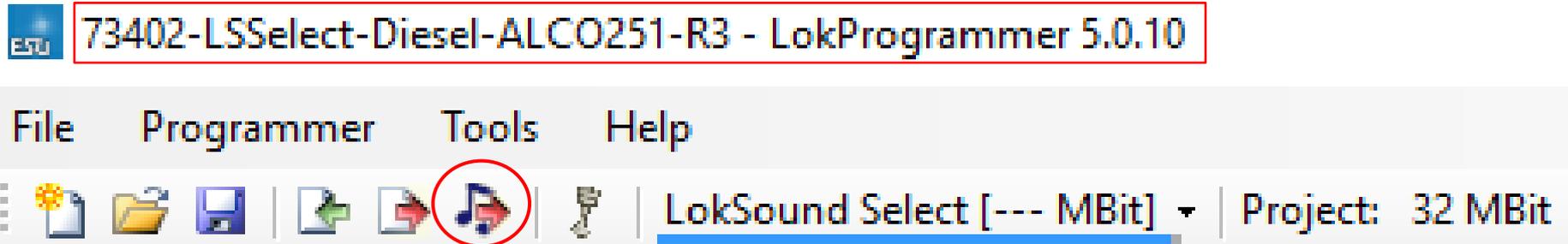
# Key Items Using the LokProgrammer



## Write to the Decoder

This will save CV settings, and also allow you to make the settings permanent

# Key Items Using the LokProgrammer



## Upload Sound Changes to the Decoder

Upload new, changed, or modified sounds to the Decoder (takes 20 -30 minutes) AND Optionally allowing you to save the CV settings in the process!

A decorative graphic on the left side of the slide consists of several interlocking puzzle pieces. The pieces are arranged in a vertical column, with some overlapping. The pieces are a light blue color with a white outline, set against a darker blue background. The puzzle pieces are scattered along the left edge, extending from the top to the bottom of the slide.

Ready?

Let's program a decoder!

# Get Information For Horn and Bell

File Programmer Tools Help

LokSound 5 DCC [128 MBit] Project: 128 MBit

### Change additional informations

Drivers' cab

Read / Write CVs

Decoder

Information

Functions

General

#### Locomotive

Name:

Type:

Country:

Locomotive image



Description:

- 1st Generation Horn Pack 2
- Horns (SoundCV9):
  - CV163=0 Nathan P5
  - CV163=1 Nathan K5LA
  - CV163=2 Nathan M3H
  - CV163=3 Leslie RS-2M
  - CV163=4 Nathan K3HA
  - CV163=5 Nathan K3L
  - CV163=6 Nathan K3H
  - CV163=7 Nathan K5H
  - CV163=8 Nathan P5A
  - CV163=9 Nathan P5 (Old Cast)
  - CV163=10 Nathan M3RT1
  - CV163=11 Leslie S3L (Default)
  - CV163=12 Leslie S5T
  - CV163=13 Nathan K5LR24
  - CV163=14 Leslie S5TRF

ALCO Bell Template Pack 1  
Bells (SoundCV10):

- CV164=0 ALCO Bronze Bell 003
- CV164=1 ALCO Bronze Bell 005
- CV164=2 ALCO Bronze Bell 006
- CV164=3 ALCO Bronze Bell 010

1st Generation Brake Squeal Template Pack 1  
Brake Squeal (SoundCV11)

- CV165=0 Composition Shoe #1
- CV166=1 Cast Iron Shoe #1

ALCO Air Dryer Template Pack 1  
Air Dryer (SoundCV12)

- CV166=0 S-1 Air Dryer 1
- CV166=1 C-425 Air Dryer 1
- CV166=2 RS-18 Air Dryer 1
- CV166=3 RS-18 Air Dryer 2

Project

Get info

ALCO Bell Template Pack 1  
Bells (SoundCV10):

# Setting the Address and Consist Functions

The screenshot shows the 'Change decoder settings' window in the LokSound 5 DCC software. The interface includes a menu bar (File, Programmer, Tools, Help), a toolbar, and a sidebar with icons for Drivers' cab, Read / Write CVs, Decoder, Information, and Sound. The 'Decoder' icon in the sidebar is highlighted with a red box. The main panel is titled 'Change decoder settings' and contains several sections:

- Address:** The 'Address' icon is highlighted with a red box. The 'Locomotive address' is set to 2000. Below it, 'Use long address [CV29.5]' is selected with a radio button. A red annotation says 'Use long for addresses > 127'.
- DCC consist address:** The 'Enable DCC consist address [CV19.6:0]' checkbox is highlighted with a red box. A red annotation says 'For NCE – do not click this box ; for MRC, Digitrax and Others click the box'.
- Activate functions in consist mode:** A section titled 'Select the functions that should respond to the consist address [CV21, 22, 109, 110]' contains a grid of checkboxes for functions F1 through F30. The following functions are checked: F7, F8, F9, F10, F12, F4, and F5.

The bottom of the window contains a red annotation: 'The functions selected above are the common functions for all the locomotives in a consist; set these and leave them set; no need to change them for single loco operation.'

# Speed Step Mode and RailCom

Change decoder settings

Drivers' cab

Read / Write CVs

**Decoder**

Information

Sound

Address

Analog settings

Brake Settings

Compatibility

**DCC Settings**

Driving characteristics

Function mapping

Function outputs

RailCom settings

- Enable RailCom feedback [CV29.3]
- Enable RailComPlus automatic announcement [CV28.7]

Send following information to the command station:

- Send address via broadcast on channel 1 [CV28.0]
- Allow data transmission on channel 2 [CV28.1]

Speed step mode

- Detect speed step mode automatically [CV49.4]
- Use 14 speed steps [CV29.1]
- Use 28 or 128 speed steps [CV29.1]

For use with systems that support RailCom i.e., ESU and Zimo

This is the recommended setting.

The functions selected above are the common functions for all the locomotives in a consist; set these and leave them set; no need to change them for single loco operation.

# Momentum and Speed Trimming

File Programmer Tools Help

LokSound 5 DCC [128 MBit] Project: 128 MBit

### Change decoder settings

**Decoder** (highlighted in red box)

- Address
- Analog settings
- Brake Settings
- Compatibility
- DCC Settings
- Driving characteristics** (highlighted in red box)
- Function mapping
- Function outputs
- Function settings
- Identification
- Manual CV input

#### Acceleration and deceleration — a.k.a Momentum

Enable Acceleration time [CV3]

Time from stop to maximum speed: [CV3] 23 20.61s

Acceleration adjustment [CV23.6:0] 0 0s

Enable brake time (deceleration) [CV4]

Time from maximum speed to stop: [CV4] 45 40.32s

Deceleration adjustment [CV24.6:0] 0 0s

**Use these to tweak the rate of acceleration and deceleration: negative values subtract for the total time(s); positive values add to the total time(s)**

#### Reverse mode

Reverse direction (forward becomes reverse) [CV29.0]

#### Trimming

Forward trimming [CV66] 128 1x Voltage

Reverse Trimming [CV95] 128 1x Voltage

Trim when "Switching Mode" is enabled [CV101] 64 0.5x Voltage

**Here is where you can fine tune your speed matching; values > 128 increase the overall speed; values < 128 decrease overall speed; these changes reduce each speed step proportionally.**

# Function Output Configuration

Change decoder settings

Physical output configuration

Front light [1]: Front Headlight  
Front light [2]: Manual Headlight  
Rear light [1]: Rear Headlight  
Rear light [2]: Manual Rear Headlight  
AUX1 [1]: Flashing Ditch Light 1  
AUX1 [2]: Stationary Ditch Light 1  
AUX2 [1]: Flashing Ditch Light 2  
AUX2 [2]: Stationary Ditch Light 2  
AUX3: Emergency Light  
**AUX4: Ground Light**  
AUX5: Rear Ditch light right  
AUX6  
AUX7: PowerPackControl  
AUX8  
AUX9: PowerPackControl  
AUX10  
**AUX11**  
AUX12  
AUX13  
AUX14  
AUX15  
AUX16  
AUX17  
AUX18

Items in **BOLDFACE** are assigned to a function

Notice Front Light, Rear Light, AUX1 and AUX2 have two modes or options indicated by the [1] and [2] IDs. These outputs can have two scenarios or lighting effects, i.e, having one function assigned to flashing ditch lights, another function assigned to the same physical lights in a non-flashing mode

AUX11

Name:

Power on delay:  0s

Power off delay:  0s

Enable function timeout

Time until automatic power off:  0.41s

Output mode (effect):

Brightness:

Enable following special functions:  
 Rule 17 forward  Rule 17 reverse  Dimmer  LED mode

(Disabled)  
Dimmable headlight  
Dimmable headlight (fade in/out)  
Firebox  
Smart firebox  
Single strobe  
Double strobe  
Rotary beacon  
Strato light  
Ditch light type 1  
Ditch light type 2  
Oscillating headlight  
Flash light  
Mars light  
Gyra light  
End of train flasher  
Neon light  
Low-energy light  
Single Strobe Random  
Brake light  
Smoke unit (controlled by sound)  
Ventilator  
Seuthe smoke unit  
Trigger smoke chuff  
Servo output 5  
Coupler  
Power pack control  
Servo Power

You can set rule 17 (dim when stopped), or assign the output to a function for dimming, and whether the behavior is adjusted for LEDs or incandescent bulbs

# Function Output Configuration – (continued)

Change decoder settings

Drivers' cab  
Read / Write  
CVs  
**Decoder**  
Information  
Sound  
Function outputs  
Function settings  
Identification  
Manual CV input  
Motor Settings

Address  
Analog settings  
Brake Settings  
Compatibility  
DCC Settings  
Driving characteristics  
Function mapping  
**Function outputs**  
Function settings  
Identification  
Manual CV input  
Motor Settings

Physical output configuration

Front light [1]: Front Headlight  
Front light [2]: Manual Headlight  
Rear light [1]: Rear Headlight  
Rear light [2]: Manual Rear Headlight  
AUX1 [1]: Flashing Ditch Light 1  
AUX1 [2]: Stationary Ditch Light 1  
AUX2 [1]: Flashing Ditch Light 2  
AUX2 [2]: Stationary Ditch Light 2  
AUX3: Emergency Light  
**AUX4: Ground Light**  
AUX5: Rear Ditch light right  
AUX6  
AUX7: PowerPackControl  
AUX8  
AUX9: PowerPackControl  
AUX10  
**AUX11**  
AUX12  
AUX13  
AUX14  
AUX15  
AUX16  
AUX17  
AUX18

Items in **BOLDFACE** are assigned to a function

AUX11

Name: [ ]

The delay settings can emulate an incandescent bulb, halogen light, etc., as well as enhance MARS and Gyalites

Power on delay: [ 0 ] 0s

Power off delay: [ 0 ] 0s

Enable function timeout

If you want your effect to run for a short time choose this box and set the time limit.

Time until automatic power off: [ 1 ] 0.41s

Output mode (effect):  
Dimmable headlight

Brightness: [ 31 ]

Enable following special functions:  
 Rule 17 forward  Rule 17 reverse  Dimmer  LED mode

You can set rule 17 (dim when stopped), or assign the output to a function for dimming, and whether the behavior is adjusted for LEDs or incandescent bulbs

# Function Mapping

You can assign to any FUNCTION (F0, F1, F2, etc.) one or more of the following:

- **CONDITIONS**
  - Logical (i.e., If F8 is ON and F6 is OFF, enable the output or effect)
  - Directional (choose FWD, REV, or standing still)
- **PHYSICAL OUTPUTS** – Lighting outputs, smoke generators, mini relays, etc.
- **LOGIC FUNCTIONS** – Grade Crossing (ditch light flashing), brake sounds, dynamic brakes, idle, light dimmer, etc.
- **SOUNDS** – horn, bell, engine exhaust, loco startup, fans, traction motors, etc.
- You can combine any of the above to create the condition or effect you want.

# Function Mapping (Continued)

File Programmer Tools Help

LokSound 5 DCC [--- MBit] Project: 128 MBit

Change decoder settings

- Drivers' cab
- Read / Write CVs
- Decoder**
- Information
- Sound
- Address
- Analog settings
- Brake Settings
- Compatibility
- DCC Settings
- Driving characteristics
- Function mapping**
- Function outputs
- Function settings
- Identification
- Manual CV input
- Motor Settings
- Smoke unit
- Sound settings
- Sound slot settings
- Special options

Function mapping

Restore default mapping

Use this to restore your functions to the default mappings

Conditions	Physical outputs	Logical functions	Sounds
Forward, F0, not F6	→ Front light [1]: Front Headlight	-	-
Reverse, F0, not F6	→ Rear light [1]: Rear Headlight	-	-
F1	→ -	-	ALCO Bell Template Pack 1
F2	→ -	Grade crossing	1st Generation Horn Pack 2
F3	→ -	-	Coupler 1
F4	→ -	Shift Mode 1, Brake 3	M-636 Dynamic Brake 1
F5	→ AUX4: Ground Light	-	-
F6	→ Front light [2]: Manual Headlight, Rear light [2]: ...	-	-
Drive, F7	→ -	-	Flange Squeal 1
F8	→ -	-	ALCO 12-251C Single Exhaust
Stop, F8	→ -	-	C-425 Reverser 1
Stop, F8, not F15	→ -	-	Starting Delay
Drive, F8	→ -	-	B23-7 GE-752AF Traction Motor 1
F9	→ -	Disable brake sound, Drive Hold	-
F10	→ -	Brake 1	C-425 26UL Independent Brake 1
F11	→ -	-	C-425 Radiator Fan 1
F12	→ -	Shift Mode 3	-
F13	→ -	Dimmer	-
F14	→ -	-	C-425 Hand Brake Ratchet 1
F15	→ -	Shift Mode 4	C-425 Isolation Switch 1
not F8, not F16	→ -	-	ALCO Air Dryer On Shutdown Template Pack 1
F17	→ -	-	C-425 26UL Brake Set/Release Automatic 1
F18	→ -	-	C-425 Sanding Valve 1
F19	→ -	-	S-1 Short Air Let Off 1
F20	→ -	-	C-420 Air Compressor 1
F21	→ -	-	ALCO Air Dryer Template Pack 1
F22	→ -	-	C-425 Cab Door 1
F23	→ -	-	C-425 Engine Compartment Doors 1
F24	→ -	Shift Mode 5	C-425 Reverser Center 1
F25	→ -	-	T-6 Shutters Open/Closed 1
F26	→ -	Shift Mode 2	-
F27	→ -	Shift Mode 3	-
F28	→ -	-	Manual Notching Logic
F29	→ -	Brake 2	C-425 26UL Automatic Brake Emergency 1
F30	→ -	Brake 2	C-425 26UL Automatic Brake 1
F31	→ -	Fade out sound	-
-	→ -	-	-
-	→ -	-	-
-	→ -	-	-
-	→ -	-	-

# Function Mapping (Continued)

## Function mapping

Conditions	Physical outputs	Logical functions	Sounds
Forward, F0, not F6	→ Front light [1]: Front Headlight	-	-
Reverse, F0, not F6	→ Rear light [1]: Rear Headlight	-	-
F1		-	ALCO Bell Template Pack 1
F2		Grade crossing	1st Generation Horn Pack 2
F3		-	Coupler 1
F4		Shift Mode 1, Brake 3	M-636 Dynamic Brake 1
F5		-	-
F6		Rear light [2]: ...	-
Drive, F7		-	Flange Squeal 1
F8		-	ALCO 12-251C Single Exhaust
Stop, F8		-	C-425 Reverser 1
Stop, F8, not F15		-	Starting Delay
Drive, F8		-	B23-7 GE-752AF Traction Motor 1
F9		Disable brake sound, Drive Hold	-
F10		Brake 1	C-425 26UL Independent Brake 1
F11		-	C-425 Radiator Fan 1
F12		Shift Mode 3	-
F13		Dimmer	-
F14		-	C-425 Hand Brake Ratchet 1
F15		Shift Mode 4	C-425 Isolation Switch 1
not F8, not F16		-	ALCO Air Dryer On Shutdown Template Pack 1

↑ ↓ ✕ 🏠 Restore default mapping

Each column has a drop down list

Forward, F0, not F6

Driving ignore

Direction Forward

F0 On

F1 ignore

F2 ignore

F3 ignore

F4 ignore

F5 ignore

F6 Off

# Function Mapping – (continued)

## Function mapping

↑ ↓ ✕ ⌨ Restore default mapping				
Conditions	Physical outputs	Logical functions	Logical functions	Sounds
▶ Forward, F0, not F6	→ Front light [1]: Front Headlight	-	-	-
Reverse, F0, not F6	→ Rear light [1]: Rear Headlight	-	-	-
F1	→ -	-	-	ALCO Bell Template Pack 1
F2	→ -	Grade crossing	-	1st Generation Horn Pack 2
F3	→ -	-	-	Coupler 1
F4	→ -	Shift Mode 1, Brake 3	-	M-636 Dynamic Brake 1
F5	→ AUX4: Ground Light	-	SHIFT MODE 1 – Dynamic Brake	-
F6	→ Front light [2]: Manual Headlight, Rear light [2]: ...	-	-	-
Drive, F7	→ -	-	-	Flange Squeal 1
F8	→ -	-	-	ALCO 12-251C Single Exhaust
Stop, F8	→ -	-	-	C-425 Reverser 1
Stop, F8, not F15	→ -	-	-	Starting Delay
Drive, F8	→ -	-	-	B23-7 GE-752AF Traction Motor 1
F9	→ -	Disable brake sound, Drive Hold	-	-
F10	→ -	Brake 1	-	C-425 26UL Independent Brake 1
F11	→ -	-	-	C-425 Radiator Fan 1
F12	→ -	Shift Mode 3	SHIFT MODE 3 – Coast Mode	-
F13	→ -	Dimmer	-	-
F14	→ -	-	-	C-425 Hand Brake Ratchet 1
F15	→ -	Shift Mode 4	SHIFT MODE 4 – Isolation Mode	C-425 Isolation Switch 1
not F8, not F16	→ -	-	-	ALCO Air Dryer On Shutdown Template Pack 1

SHIFT MODE – Prepackaged logical events created for the sound file. They change the behavior of the locomotive when that specific function is enabled.

# Function Mapping – (continued)

F19	→	-	-	S-1 Short Air Let Off 1
F20	→	-	-	C-420 Air Compressor 1
F21	→	-	-	ALCO Air Dryer Template Pack 1
F22	→	-	-	C-425 Cab Door 1
F23	→	-	-	C-425 Engine Compartment Doors 1
F24	→	-	Shift Mode 5	C-425 Reverser Center 1
F25	→	-	-	T-6 Shutters Open/Closed 1
F26	→	-	Shift Mode 2	-
F27			Shift Mode 3	-
F28			-	Manual Notching Logic
F29			Brake 2	C-425 26UL Automatic Brake Emergency 1
F30	→	-	Brake 2	C-425 26UL Automatic Brake 1
F31	→	-	Fade out sound	-
-	→	-	-	-
-	→	-	-	-
-	→	-	-	-
-	→	-	-	-

You can add additional SCENARIOS using the empty areas below; for example DRIVING = NO, F0 set to turn on AUX4 (Cab Light)

**SHIFT MODE** – Prepackaged logical events created for the sound file. They change the behavior of the locomotive when that specific function is enabled.

# Motor Settings – Speed and Back EMF

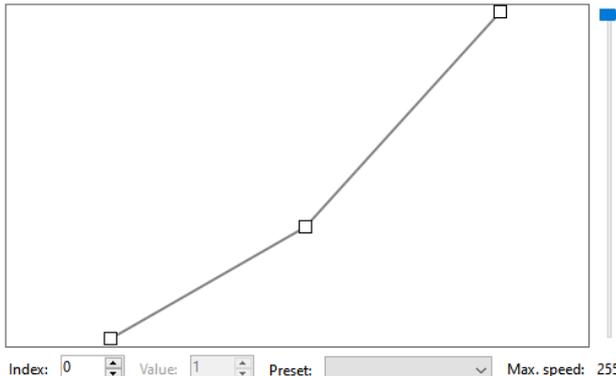
Change decoder settings

You can either use the three point speed adjustments or use the speed table (see Figure 1)

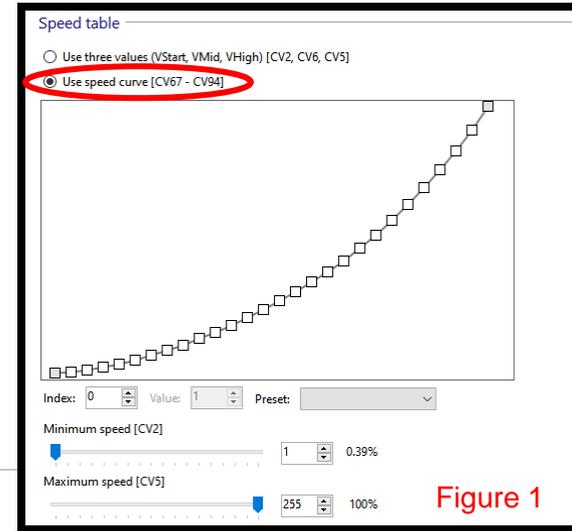
- Drivers' cab
- Read / Write CVs
- Decoder**
- Information
- Sound
- Address
- Analog settings
- Brake Settings
- Compatibility
- DCC Settings
- Driving characteristics
- Function mapping
- Function outputs
- Function settings
- Identification
- Manual CV input
- Motor Settings**
- Smoke unit
- Sound settings
- Sound slot settings
- Special options

## Speed table

- Use three values (VStart, VMid, VHigh) [CV2, CV6, CV5]
- Use speed curve [CV67 - CV94]



OR



## Load control / back EMF

- Enable load control / back EMF [CV49.0]

### Basic settings

- Regulation reference [CV53] 140 14V
- Regulation parameter "K" [CV54] 50
- Regulation parameter "I" [CV55] 100 200ms

CV53 sets the maximum voltage reference for your speed range. **TIP:** you can use this as part of your speed matching or to restore your maximum speed after performing a Back EMF auto set procedure (SET CV 54 =0, then press F1)

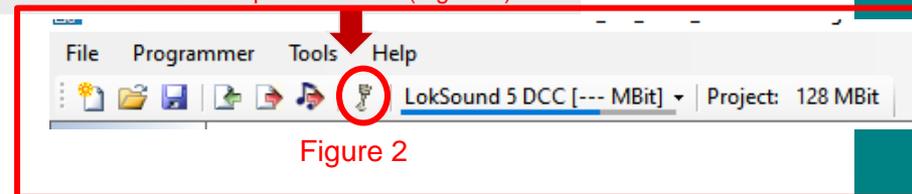
### Slow Speed settings

- Regulation parameter "K slow" [CV52] 0
- Largest internal speed step that uses „K slow“ [CV51] 0
- Regulation influence during slow speed [CV56] 255 100%

### Back EMF settings

- Slow Speed Back EMF sampling period [CV116] 100 10ms
- Full Speed Back EMF sampling period [CV117] 150 15ms

**TIP:** find an OEM ESU File that closely matches your locomotives motor and start with the values for the CVs on this page, then tweak/adjust from there. Alternately, you can choose from a list of preset motors (Figure 2)



# Motor Settings – Speed and Back EMF

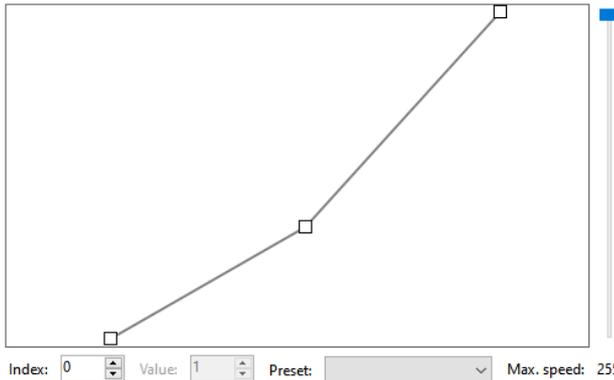
Change decoder settings

You can either use the three point speed adjustments or use the speed table (see Figure 1)

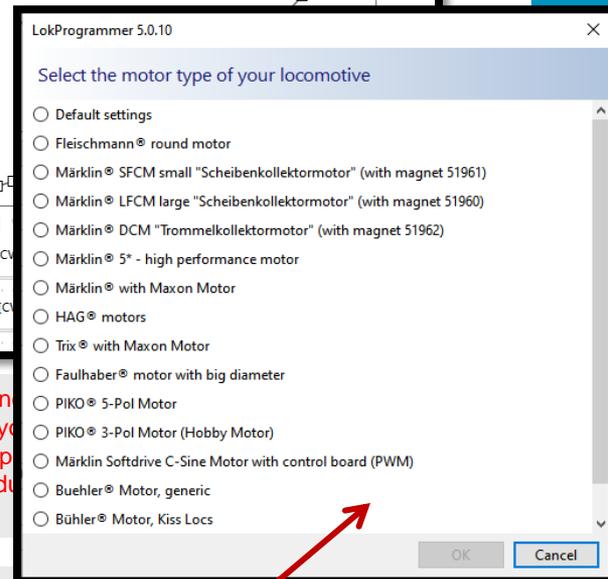
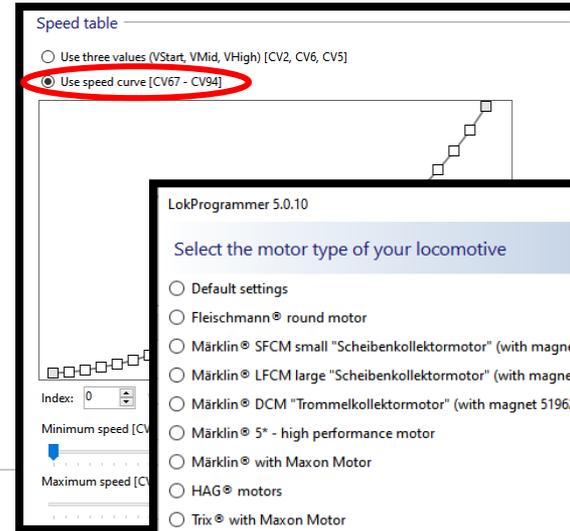
- Drivers' cab
- Read / Write CVs
- Decoder**
- Information
- Sound
- Address
- Analog settings
- Brake Settings
- Compatibility
- DCC Settings
- Driving characteristics
- Function mapping
- Function outputs
- Function settings
- Identification
- Manual CV input
- Motor Settings**
- Smoke unit
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- Sound slot settings
- Special options

## Speed table

- Use three values (VStart, VMid, VHigh) [CV2, CV6, CV5]
- Use speed curve [CV67 - CV94]



OR



## Load control / back EMF

Enable load control / back EMF [CV49.0]

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### Slow Speed settings

- Regulation parameter "K slow" [CV52] 0
- Largest internal speed step that uses „K slow“ [CV51] 0
- Regulation influence during slow speed [CV56] 255 100%

### Back EMF settings

- Slow Speed Back EMF sampling period [CV116] 100 10ms
- Full Speed Back EMF sampling period [CV117] 150 15ms

TIP: find an OEM ESU File that closely matches your locomotives motor and start with the values for the CVs on this page, then tweak/adjust from there. Alternately, you can choose from a list of preset motors (Figure 2)

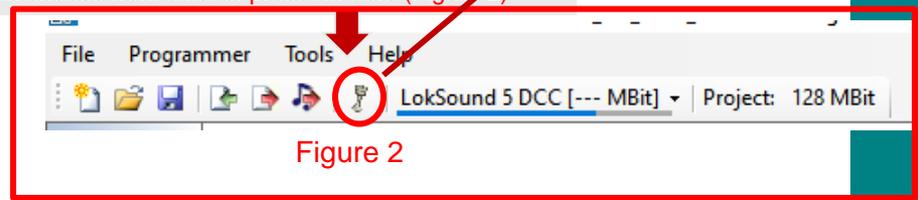


Figure 2

# Motor Settings – Speed and Back EMF (cont)

## ESU's Autotune

ESU has an *autotune* feature on some of their decoders. BEMF should be enabled before running the autotune function.

The Autotune is enabled by setting a CV (CV54 =0), and then activating the feature on a test track(Press F1).

The locomotive will take off, but stop in a few seconds. It will attempt to optimize the BEMF parameters for that particular locomotive's motor and drivetrain.

ESU uses the letters *KPI* for various BEMF parameters, where several CVs are used to set each of these values. I is Inertia. K is power/load control. P is the reference voltage. The K and I parameters are referenced in their manuals. (from [https://dccwiki.com/Back\\_EMF](https://dccwiki.com/Back_EMF) )

# Motor Settings – Speed and Back EMF (cont)

## Back EMF settings

Slow Speed Back EMF sampling period [CV116]

100 10ms

Full Speed Back EMF sampling period [CV117]

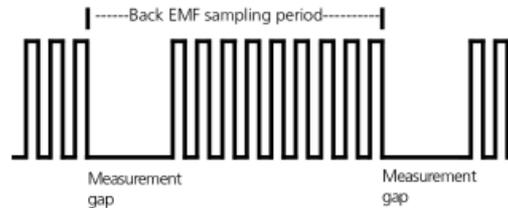
150 15ms

Slow Speed Length of Measurement Gap [CV118]

20 2ms

Full Speed Length of Measurement Gap [CV119]

25 2.5ms



Use load control values from preset motor types

## PWM Frequency

Motor pulse frequency [CV9]

40 40000Hz

These settings affect the overall performance of the BEMF control and can have unwarranted side effects on the motor. It is recommended to change these CAREFULLY. Best practice is to *Use load control from preset motor types option*

## Motor overload protection

Enable motor overload protection [CV124.5]

## Automatic parking brake

Enable automatic parking brake [CV124.6]

# Sound Settings

File Programmer Tools Help  
LokSound 5 DCC [--- MBit] Project: 128 MBit

### Change decoder settings

- Drivers' cab
- Read / Write CVs
- Decoder**
- Information
- Sound

- Address
- Analog settings
- Brake Settings
- Compatibility
- DCC Settings
- Driving characteristics
- Function mapping
- Function outputs
- Function settings
- Identification
- Manual CV input
- Motor Settings
- Smoke unit
- Sound settings**

#### Steam chuffs

Play steam chuffs according to speed [CV57]  
 Use external wheel sensor [CV57]

Trigger impulses per steam chuff: [CV58]  
1

Enable secondary trigger [CV250]  
Reduce secondary trigger distance by: [CV250]  
1 0

Enable minimum distance of steam chuffs [CV249]  
Minimum distance of steam chuffs: [CV249]  
1 0s

While an external wheel sensor can be used, the trigger setting feature is quite accurate.

Setting Formula CV58:  
[time in seconds for one wheel revolution] / 4; round to nearest whole number

#### Volume

Master volume [CV63]  
188 146.88%

Fade sound will reduce volume to: [CV133]  
0 0%

Soundfader fade-out fade-in time [CV135]  
6 6s

Master Volume reduces ALL of the sounds simultaneously.

If you are using the Audio Fade feature (its one of the logical functions found on the Function Mapping page) use these to set the faded volume and the time it takes to fade the sound.

#### Brake sound

Switching on threshold: [CV64]  
18

Switching off threshold: [CV65]  
1

On Threshold – the higher the setting, the earlier the brake squeal occurs as you reduce your speed (it will start squealing at a faster speed the higher you set it).

Off Threshold – the default of 1 will allow the brake squeal to last until the locomotive is stopped. The higher the setting the sooner the sound will stop as you slow down the locomotive

## Sound Slot Settings

The Loksound V.5 technology introduces the Sound CV; these are not NMRA CVs, rather, they represent controls for sounds assigned to a subcategory to adjust as a group or sound effect set. Please refer to the Information tab for your specific project to see how they are used.

All single sounds are subdivided in *sound slots*. Each sound slot controls a certain sound and its volume can be individually adjusted. The following charts show how the CVs are allocated to each sound slot. Please note that all the single sound projects are likely to have a different sound allocation. Thus you will find notes about the corresponding functions keys and soundslots to all sound projects available in the download area of the ESU website. This information will help you to find the appropriate CV volume very easily.

# Sound Slot Settings (cont)

Change decoder settings

## Sound Slot Example - ALCO 12-251C file

- Drivers' cab
- Read / Write CVs
- Decoder
- Information
- Sound
- Address
- Analog settings
- Brake Settings
- Compatibility
- DCC Settings
- Driving characteristics
- Function mapping
- Function outputs
- Function settings
- Identification
- Manual CV input
- Motor Settings
- Smoke unit
- Sound settings
- Sound slot settings
- Special options

### SoundCV configuration

- SoundCV1: Notch 1
- SoundCV2: Notch 2
- SoundCV3: Notch 3
- SoundCV4: Notch 4
- SoundCV5: Notch 5
- SoundCV6: Notch 6
- SoundCV7: Notch 7
- SoundCV8: Notch 8
- SoundCV9: Horn
- SoundCV10: Bell
- SoundCV11: Brake Squeal
- SoundCV12: Air Dryer
- SoundCV13: Starting Delay Timer
- SoundCV14
- SoundCV15
- SoundCV16

### SoundCV9: Horn

Name:

Value: [CV163]

Use the table on the right (from Information window) to adjust the settings for CV163

- 1st Generation Horn Pack 2 Horns (SoundCV9):**
- CV163=0 Nathan P5
  - CV163=1 Nathan K5LA
  - CV163=2 Nathan M3H
  - CV163=3 Leslie RS-2M
  - CV163=4 Nathan K3HA
  - CV163=5 Nathan K3L
  - CV163=6 Nathan K3H
  - CV163=7 Nathan K5H
  - CV163=8 Nathan P5A
  - CV163=9 Nathan P5 (Old Cast)
  - CV163=10 Nathan M3RT1
  - CV163=11 Leslie S3L (Default)
  - CV163=12 Leslie S5T
  - CV163=13 Nathan K5LR24
  - CV163=14 Leslie S5TRF

### Sound slot configuration

- Sound slot 1: ALCO 12-251C Single Exhaust
- Sound slot 2
- Sound slot 3: 1st Generation Horn Pack 2
- Sound slot 4: ALCO Bell Template Pack 1
- Sound slot 5: Coupler 1
- Sound slot 6: M-636 Dynamic Brake 1
- Sound slot 7: C-420 Air Compressor 1
- Sound slot 8: C-425 Radiator Fan 1
- Sound slot 9: C-425 26UL Automatic Brake Emergenc...
- Sound slot 10: C-425 26UL Independent Brake 1
- Sound slot 11: C-425 26UL Independent Brake 1
- Sound slot 12: C-425 26UL Independent Brake Bail Of...
- Sound slot 13: C-425 Sanding Valve 1
- Sound slot 14: C-425 Hand Brake Ratchet 1
- Sound slot 15: C-425 Cab Door 1
- Sound slot 16: C-425 Engine Compartment Doors 1
- Sound slot 17: ALCO Air Dryer Template Pack 1
- Sound slot 18: ALCO Air Dryer On Shutdown Templat...
- Sound slot 19: C-425 Reverser 1
- Sound slot 20: C-425 Reverser Center 1
- Sound slot 21: C-425 Isolation Switch 1
- Sound slot 22: C-425 Alarm Bell 1
- Sound slot 23: Flange Squeal 1
- Sound slot 24: S-1 Short Air Let Off 1
- Sound slot 25: B23-7 GE-752AF Traction Motor 1
- Sound slot 26: Starting Delay
- Sound slot 27: Manual Notching Logic
- Sound slot 28
- Sound slot 29: C-425 26UL Brake Set/Release Automa...
- Sound slot 30
- Sound slot 31
- Sound slot 32: T-6 Shutters Open/Closed 1
- Brake sound: 1st Generation Brake Squeal Template P...
- Gear shift sound

### Sound slot 3: 1st Generation Horn Pack 2

Preview Stop

Volume [CV275 (CV32=1)]  100%

Minimum sound speed [CV277 (CV32=1)]  100%

Maximum sound speed [CV278 (CV32=1)]  100%

Play only if drive sound is enabled [CV276.0 (CV32=1)]

Adjust the individual sound volume of the Sound Slot

### Sound selection

Sound configuration: [CV279 (CV32=1)]

**TIP:** if you have multiple locomotives of the same engine type, you can adjust the sound speed (think pitch control) of each loco's engine (Sound Slot 1) to a unique value so the locomotives do not sound identical

Change additional informations

Locomotive Name:

Type:

Country:

Description: 1st Generation Horn Pack 2  
Horn (SoundCV9)  
CV163=0 Nathan P5  
CV163=1 Nathan K5LA  
CV163=2 Nathan M3H  
CV163=3 Leslie RS-2M  
CV163=4 Nathan K3HA  
CV163=5 Nathan K3L  
CV163=6 Nathan K3H  
CV163=7 Nathan K5H  
CV163=8 Nathan P5A  
CV163=9 Nathan P5 (Old Cast)  
CV163=10 Nathan M3RT1  
CV163=11 Leslie S3L (Default)  
CV163=12 Leslie S5T  
CV163=13 Nathan K5LR24  
CV163=14 Leslie S5TRF

Project:

Version:

## Special Horn Demonstration

The following video shows how to use two sound slots to create a realistic horn quill effect

<https://youtu.be/sGYA9nUa-CE>

## How to wire an ESU PowerPack TO A Nixtrainz DECODER BUDDY Y Mainboard

The following shows how to connect an ESU PowerPack to a Decoder Buddy for use with **ESU LOKSOUND** decoders (only). **Do not use an ESU PowerPack with a decoder that is not an ESU decoder!**

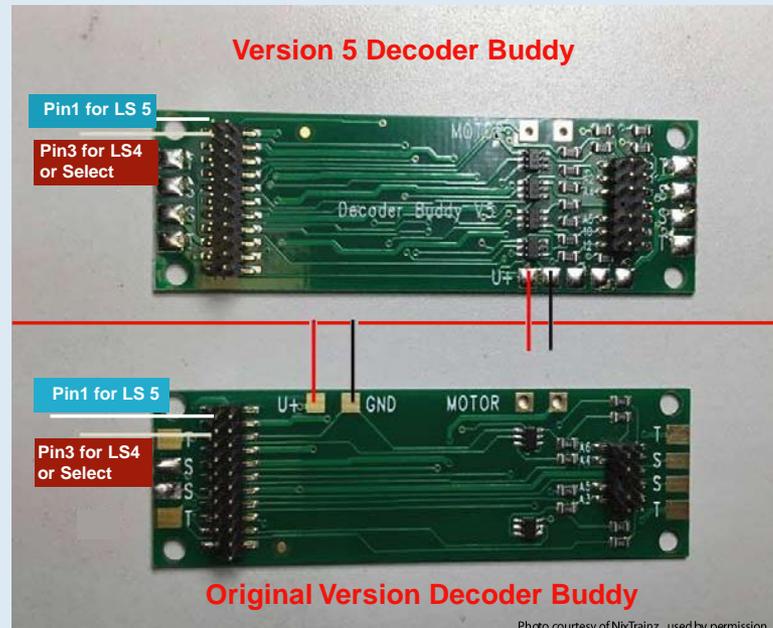
### V4 and Select Notes:

1. The **WHITE** wire is connected to PIN 3 on the Decoder Buddy 21 pin connector for older ESU Loksound V4 or Select decoders;
2. When programming V4 or Select decoders with the LokProgrammer, be sure to **DISABLE AUX 6** while programming. **Re-enable AUX 6 to activate the PowerPack** after making programming changes.

### V5 Notes:

1. The **WHITE** wire connects to PIN 1 on the Decoder Buddy 21 pin connector with Loksound V5 decoders.
2. **NOTE:** you **MUST SELECT Power Pack Control** on **AUX 10** for V5 decoders to activate the PowerPack

Loksound V4 & Select MTC 21		Loksound V5 MTC 21	
WHITE WIRE GOES TO	USE FUNCTION	WHITE WIRE GOES TO	USE FUNCTION
PIN 3	Aux 6	PIN 1	Aux 10
Note: set Aux 6 output to DISABLED when programming w/ LokProgrammer		Note: Select Power Pack Control	



## Version 5 Decoder Buddy

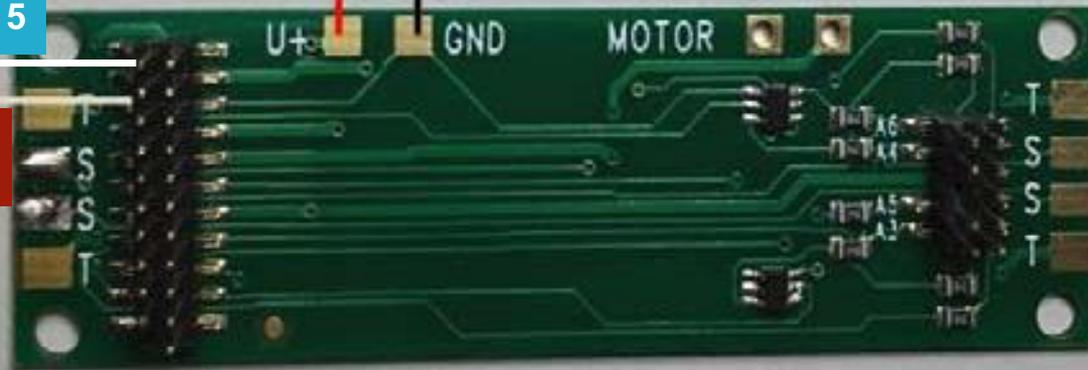
Pin1 for LS 5

Pin3 for LS4  
or Select



Pin1 for LS 5

Pin3 for LS4  
or Select



## Original Version Decoder Buddy

Photo courtesy of NixTrainz , used by permission.

## How to wire an ESU PowerPack TO A Nixtrainz DECODER BUDDY Mainboard

The following shows how to connect an ESU PowerPack to a Decoder Buddy for use with **ESU LOKSOUND** decoders (only). **Do not use an ESU PowerPack with a decoder that is not an ESU decoder!**

### V4 and Select Notes:

1. The **WHITE** wire is connected to PIN 3 on the Decoder Buddy 21 pin connector for older ESU Loksound V4 or Select decoders;
2. When programming V4 or Select decoders with the LokProgrammer, be sure to **DISABLE AUX 6** while programming. **Re-enable AUX 6 to activate the PowerPack** after making programming changes.

### V5 Notes:

1. The **WHITE** wire connects to PIN 1 on the Decoder Buddy 21 pin connector with Loksound V5 decoders.
2. **NOTE:** you **MUST SELECT Power Pack Control** on **AUX 10** for V5 decoders to activate the PowerPack

Loksound V4 & Select MTC 21		Loksound V5 MTC 21	
WHITE WIRE GOES TO	USE FUNCTION	WHITE WIRE GOES TO	USE FUNCTION
PIN 3	Aux 6	PIN 1	Aux 10
Note: set Aux 6 output to DISABLED		Note: Select Power Pack Control	
when programming w/ LokProgrammer			

# Common Shift Modes



SHIFT MODE 1 – assigned to F4 : Dynamic Brake

SHIFT MODE 2 – assigned to F26: Manual Notching UP (F28 ON) or Notch 8 (F28 OFF)

SHIFT MODE 3 – assigned to F27: Manual Notching DOWN (F28 ON) or Coast Mode (F28 OFF)

SHIFT MODE 4 – assigned to F15: Isolation Switch when standing still. Pressing F15 while not moving will lower the prime mover and lock the motor. F15 must be turned off to begin moving.

SHIFT MODE 5 - assigned to F24: "Reverser In Center Position". When pressing F24 while stopped, the motor will lock so you can throttle through the notches like the prototype in neutral. F24 must be turned off to begin moving.



Questions?

Thank **YOU** for attending!