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HORNBY®



DIGITAL SOUND

CLASS A4

6 7 8 9 10 11 12

Operating Manual



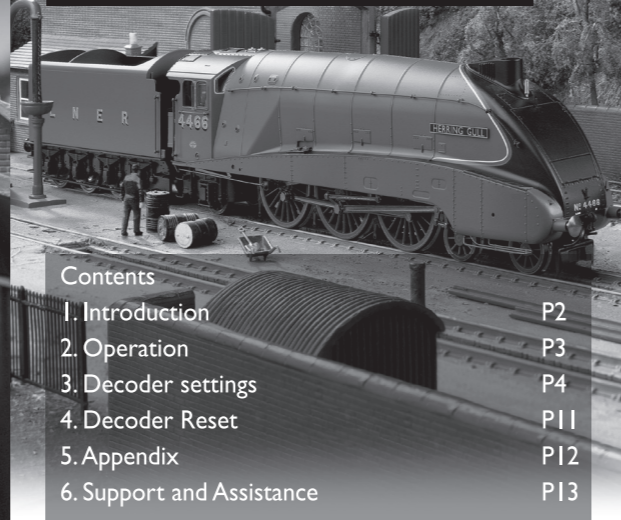
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Contents

1. Introduction	P2
2. Operation	P3
3. Decoder settings	P4
4. Decoder Reset	PI1
5. Appendix	PI2
6. Support and Assistance	PI3

1. Introduction

The LokSound V4.0 decoder by ESU is a versatile digital decoder integrating a full-featured, 8 channel sound system, various lighting outputs and a 1.1A motor controller. This key component of your newly acquired "Class A4" is responsible for all functions, such as motor control, control of all lighting functions and all sound and special sound functions.

LokSound V4.0 decoders are compatible with all NMRA DCC standards & RPs, support short and long addressing. Advanced consisting, 14, 28, 128 speed steps and also support RailCom-Plus®. RailComPlus® allows for the automatic recognition of your locomotive by your DCC system on supported DCC systems. LokSound V4.0 decoders also support Märklin® Motorola® and can be used on legacy AC and DC layouts as well.

The "Class A4" is preset at the factory for immediate operation. Nevertheless, we kindly ask you to first read these instructions before you set this locomotive onto a power track.

Please note that some aspects of this Decoder User manual may not be applicable to your particular purchase, dependant on choice of Controller, and also Functions available, such as Lighting.

1.1. Decoder ratings

The "Class A4" can be operated straight out of the box. The selection of the appropriate operating mode happens automatically. You do not have to change any parameters.

Track voltage	47 volts maximum
Operation modes	DCC, Motorola, AC & DC
Steady state motor current	1.1A
Function output current	0.25A each

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Number of function outputs	4 + 2 logic outputs
Total current of function outputs	0.5A
Audio amplifier	2W @ 4 Ohms load
Speaker impedance	4 - 8 Ohms
Memory capacity	32 MBit
Number of sound channels	8
Dimensions	28mm diameter

Important Warning:

- This LokSound decoder is designed for use in Hornby "Class A4" only.
- Do not expose to wet and humid conditions.
- Do not remove Heat shrink sleeve if fitted to Decoder.
- Always disconnect the circuit when installing the decoder. Please install the body shell before applying voltage.
- Make sure that not any blank wire ends may come into contact with the locomotive (a risk of short circuit!)
- Make sure that no wires are squeezed or cut by the model's transmission parts when reassembling the locomotive.
- Handle the speaker with extreme care: Do not touch the membrane or apply pressure!

2. Operation

2.1. Function assignments

Function	Key	Effect
F0	Not applicable	F4 Airpump
F1	Sound on / off	F5 Injector
F2	Steam whistle	F6 Shunting mode
F3	Coupler clank	F7 Coal shovelling
		F8 Conductors signal
		F9 Brake release
		F10 Signal whistle #1
		F11 Signal whistle #2

The default address for DCC operation is "03".

2.2. Using your LokSound decoder under DCC

The default address assigned to the LokSound decoder is 3. Simply set your controller to this locomotive number and place it on the mainline. If everything is set up properly, the "Class A4" should react as shown on the table 3.1.

If you use a DCC system which supports RailComPlus®, it will most likely ask you to change the locomotive address. All function button icons will be displayed correctly after the assignment of the new address.

2.3. Using your LokSound decoder under Märklin® Motorola®

The default address assigned to the LokSound decoder is 3. Simply set your controller to this locomotive number and place it on the mainline. If everything is set up properly, the "Class A4" should react as shown on the table 3.1. Usually, under Motorola® system, you can control the function buttons F0, F1 to F4 only. However, you can enable a LokSound special feature. Besides the normal locomotive address the decoder then "listens" also for the next address. If you use this address with your 6021, you can activate the functions F5 to F8 by pressing F1 to F4. To enable the second Motorola® address, you may change CV49, Bit 3 (see programming table).

2.4. Using your LokSound decoder under DC or AC

Although we highly recommend the use of a DCC system in order to enjoy all features of the LokSound, you may also use your conventional DC or AC controller. You will be able to control the motor of the locomotive and will also hear the engine sounds. However, you can not control any additional sound effects such as horn because of the lack of any function buttons.

The table starting on page 10 covers setting of the most important parameters of the LokSound decoder. A full list of CVs can be found in the reference manual available for download under www.esu.eu

3. Decoder settings

3.1. Basics of DCC programming

The hardware determines some features such as the number of function outputs as well as the maximum permitted current of the motor output and therefore they are not programmable. Nevertheless, there are plenty of possibilities to influence the behaviour of the LokSound decoder by adjusting software-governed properties. There is at least one memory space within the decoder reserved for each adjustable parameter where numbers or letters can be stored.

You could visualise the storage spaces as index cards in a large file box. In order to enable you to find the right card again, they all have numbers and / or names outlining the properties of this particular card such as "locomotive address" or "maximum speed." Then imagine that you can write information onto these cards. Adjusting the settings means nothing else but erasing one entry and replacing it with another. Moreover, you could do that at any time. However, you cannot write onto every card: some bits of information like the manufacturer's code are firmly encoded.

Thus, you can determine the content of the storage spaces in the decoder even during operation and of course, the decoder will follow the instructions. Via the procedure known as "Programming", you can enter the desired data into the storage spaces.

3.1.1. Configuration variables (CV)

The LokSound decoders follow the CV concept developed in the US. CV stands for "Configuration Variable" and indicates that the storage cells described above are not only variable but they also determine the behaviour of the decoder.

3.1.2. Standardisation in the NMRA

The NMRA (National Model Railroad Association) has defined which CVs determine certain parameters of a decoder. The DCC standard allocates fixed numbers for certain CVs (adherence is obligatory). This greatly simplifies things for the user since decoders of most manufacturers comply with this standard and therefore dealing with CVs requires the same process with the same CV-numbers regardless of the manufacturer.

The DCC concept permits you to enter numbers ranging from 0 to 255 into CVs. Each CV carries only one number.

While the position number is predetermined, the range of values may vary. Not all CVs must accept values ranging from 0 to 255. The permitted values for LokSound decoders are listed in the table starting on page 10, showing the most important available CVs.

3.1.3. Bits and Bytes

Most CVs contain numbers: CV 1 for instance contains the locomotive address. This can be any number between 1 and 127. While most CVs expect numbers to be entered, some others are rather like a "collection point" of various "switches", that administer different functions in one CV (mainly "on" or "off"): CVs 29 and 49 are good examples: you must calculate the value for these CVs yourself. The value depends on which settings you want to programme:

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Have a look at the explanations for CV 29 in the table on page 10: firstly, decide which options should be active. The column "Value" has two numbers for each option. If the option is switched off, the value is 0. Otherwise, it is a number between 1 and 128. Add all the values for the respective options to arrive at the correct value for this CV.

3.1.4. Programming methods

LokSound decoders support all NMRA programming modes as there are the programming track modes (Direct Mode, Register Mode, Paged Mode) and the mode for the main ("POM", "Programming on the Main").

3.1.4.1. Programming on The Main

Programming on the Main (also called "Operations Mode programming") enables you to programme your decoders comfortably without having to remove the locomotive from the layout. In this case, the command station talks directly to the decoder by using its locomotive address, for instance:

"Locomotive number 50, write the value 7 into CV 3!". Thus knowing the locomotive address is a precondition.

3.1.4.2. Service Mode Programming

This programming mode usually requires the locomotive to be placed on a special programming track output of the command station. CVs can only be read on the service track unless your DCC command stations supports RailCom. You can also reprogramme the locomotive address without knowing the old address since the command station simply transmits the command "Write value 7 in CV 3!".

In order to be able to read back the CV values from your decoder, the motor terminals must be properly connected to the motor. The motor is used to produce the "feedback" current detected by the command station.

3.1.5. Programming procedure using various DCC systems

As each DCC system is different, the procedure for changing a CV will vary depending upon the system. We are very sorry that we are unable to provide detailed instructions to cover every system on the market. We need to assume that you are familiar with your system. Please consult your DCC system manual for detailed specification. We tested the LokSound with almost every DCC system available on the market (as of end of 2010), so there should not be any general problem.

3.1.6. Programming with the ESU LokProgrammer

The LokProgrammer 53450 / 53452 offers the easiest and most comfortable way of setting the CVs of the LokSound decoders: simply by a few mouse clicks on an MS-Windows® computer. The computer helps you look for the various CV numbers and values. More information is contained in the manual for the LokProgrammer. You can access all properties of ESU decoders with the LokProgrammer. You even can erase the sound and download a new soundpackage. Please see our website for more details.



3.2. Setting up your LokSound

3.2.1. Address Settings

Each LokSound decoder requires a definite address to be addressable for the central unit. Depending on the type of decoder and the digital system, there are several possibilities how to allocate addresses. The LokSound may be setup to listen to either the primary address (also called "short" address), which provides a range of 1 to 127 or the extended ("long") address, which has a range of up to 9999. Based on your preferences and your command station's capabilities, you may select either the primary address or the extended address for usage. Be aware that some DCC systems do not support the full range of available addresses. Bit 5 in CV 29 switches between short and long address. The decoder can only respond to one address at a time.

If CV 29, Bit 5 is cleared, the decoder listens to the primary address stored in CV 1.

If CV 29, Bit 5 is set, the decoder listens to the extended address stored in CV 17 AND CV 18.

3.2.1.1. Primary Address

Normally you would control LokSound decoders with the short address that is stored in CV 1. In DCC mode, the permitted values range from 1 to 127. In order to enable the decoder to "listen" to the short address you must delete bit 5 in CV 29.

Some digital systems (e.g. ROCO® Lokmaus2, Lenz® digital plus, Lenz compact) only support the values 1 - 99 as short addresses.

3.2.1.2. Extended Address

You can also operate LokSound decoders with extended addresses (4-digit addresses). The supported values range from 128 - 10239. The extended address is stored in CVs 17 and 18. You must activate the usage of the extended address by setting bit 5 in CV 29.

If you want to use your LokSound with the extended address it is practical to programme this address directly with your digital system: most modern digital systems have a menu for programming long addresses. The command station not only programmes CV 29 correctly but also assures the correct storage of the values for the long address in CV 17 and 18.

Both the primary and the extended address may be changed at any time using service mode (on the programming track).

Some DCC systems (such as ESU ECoS, ESU Navigator) will allow the decoder address to be modified using Programming On The Main. LokSound will accept the programming commands, but the following restrictions apply:

- If the decoders primary address is enabled, the decoder will accept a new primary address and follow this immediately.
- If the decoders primary address is enabled, the decoder will accept a new secondary address (write of CV 17, 18)
- If the decoders extended address is enabled, the decoder will only accept a new primary address. You can not change an extended address to another number using Programming On The Main.

3.2.1.3. Motorola® Address

You can also operate LokSound decoders with the Motorola® format. The address for this operating mode is stored in CV 1.

This address is identical to the short address in DCC mode. The LokSound decoder responds both to commands in DCC and in Motorola® mode at the same time.

Märklin® digital devices (6020, 6021, Delta®) can only work with addresses from 1 to 80. Should you have entered a higher value in CV 1 you will not be able to drive this locomotive with these central units.

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