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HORNBY®

30932

**DIGITAL
(((SOUND)))**

**SCHOOLS
CLASS**

6 7 8 9 10 11 12

Operating Manual

For more information visit: www.hornby.com

HORNBY®

30932

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1. Introduction

The LokSound V3.0 decoder by ESU represents a key component of your newly acquired Schools Class. The LokSound V3.0 Circuitry is responsible for all drive control functions as well as special functions of the Hornby Schools Class:

- Motor control forward and reverse.
- Sound and special sound functions.

The LokSound V3.0 decoder supports the most commonly used control systems: Analogue operation with DC or AC, digital operation with Märklin® digital (Motorola® format) or DCC-Systems (i.e. Lenz®, etc.).

The Schools Class is preset at the factory for immediate operation (the LokSound V3.0 decoder recognizes the required operating mode automatically). Nevertheless we kindly ask you to first read these instructions before you set this locomotive onto a power track.

Chapter 2 provides an overview of the permitted operating mode and which functions may be activated in which mode (many functions can only be utilised in digital operation).

If you intend to change the factory settings (i.e. the address, or the sound volume), we strongly recommend studying chapter 3 first. There you will find out about all parameters of the LokSound V3.0 decoder and how to set them with the commonly available digital command stations. You will also find instructions of how to re-programme the factory settings.

In Chapter 4 we provide answers to frequently asked questions.

For more information visit: www.hornby.com

Chapter 5 is written for the experts amongst our customers who want to know more about the LokSound V3.0 decoder and its technology, which has been awarded many distinctions.

Should you still have questions please study Chapter 6, which tells you how to obtain support and assistance.

We wish you lots of fun with your new Hornby Schools Class.

ESU electronic solutions ulm GmbH & Co. KG

Important Warning:

- This LokSound V3.0 decoder is designed for use in Hornby's Schools Class only.
- Do not expose to wet and humid conditions.
- Make sure that no bare wire ends come into contact with the locomotive (risk of a short circuit).
- Make sure that no wires are squeezed or cut by the model's transmission parts when re-assembling the locomotive.
- Handle the speaker with extreme care: Do not touch the membrane or apply pressure!

2. Set-up and Installation

The Schools Class 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.

2.1 Permitted Operating Mode of the Schools Class

The Schools Class may be operated on conventional (analogue) as well as on digital layouts. The number of functions available varies considerably:

Analogue Operation

Motor control forwards-stop-reverse
Directional lighting

Digital Operation

Motor control forwards-stop-reverse

Digital address: "03" (DCC and Märklin® Motorola®)

14 Speed steps with Märklin® Motorola® automatic recognition of steps with DCC

- | | |
|----------------------|-----------------------|
| F0: Light on/off | F7: Coal Shovelling |
| F1: Sound on/off | F8: Blow Out |
| F2: Whistle | F9: Valve |
| F3: Coupler | F10: Whistle Short #2 |
| F4: Whistle Short #1 | F11: Wheel Flange |
| F5: Injector | F12: Rail Clank |
| F6: Shunting Mode | |

2.1.1 Analogue Operation

Any DC (i.e. the Hornby HM2000) or AC controller (i.e. from Märklin®, Titan) is suitable for analogue operation.

Please Note: That not all electronic controllers which supply pulsed DC (PWM Operation) guarantee 100% reliable operation. Since there are so many different products commercially available we can only recommend you carry out your own tests.

DC Operation

DC Operation is possible without any difficulties, however, there is one difference compared to operating DC vehicles without a decoder:

AC Operation (Märklin®)

This works in the same way as you know it from other models: Speed control is achieved through turning the control knob.

Change of direction is achieved by pushing the control knob beyond the stop position towards the left.

The Schools Class must come to a complete standstill before you activate the change of direction command. Never try to change direction while the locomotive is still moving.

Sound effects cannot be activated in AC operation.

For more information visit: www.hornby.com

2.1.2 Digital Operation

For prototypical operation we recommend the use of a digital command control system. Besides the fact that special functions are only available in digital mode, the LokSound V3.0 decoder offers silent, load compensated motor control.

The LokSound decoder 'understands' commands from the Märklin® 6021 command station based on the widely used Motorola®-Protocol as well as from DCC-systems from Hornby®, Lenz®, ZIMO® and Uhlenbrock®, which are based on the NMRA DCC Protocol. Therefore it does not matter which commercially available system you use since LokSound V3.0 decoders auto-detect the protocol and then operate accordingly.

Nevertheless, there are considerable differences between the various commercially available digital systems. Therefore the remainder of Chapter 2 is focusing purely on driving the Schools Class with different systems and also to highlight typical problems and limitations.

Please read Chapter 3 if you intend to change the factory settings of the LokSound V3.0 decoder.

Digital Operation with DCC Systems

The detection does not function when operated with Lenz® Digital plus V3.0 if you wish to run 14 speed steps. Use 28/128 speed steps.

Each time that the LokSound V3.0 Digital Decoder receives a current (i.e. after the system is switched on) and the light is switched on it tries to detect the speed steps settings. If you switch over the speed steps settings during operation you must briefly switch off the current supply to the Premium Digital Decoder so that the automatic mode functions as desired. The detection takes up to 30 seconds.

Functions F1 to F8 allow you to activate the various sound effects when using DCC systems.

Digital Operation with Märklin® Digital (6021)

The Schools Class will operate reliably with the Märklin® 6021 command station. However, the LokSound V3.0 decoder offers a special feature: Besides the normal locomotive address (factory default: 03) the decoder also "listens" 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 chapter 3). Please put in a value of "27" in CV49.



3. Programming of Parameters for Digital Operation

Even though the LokSound V3.0 decoder has been adapted optimally to the Schools Class you may adapt many of the characteristics to suit your own preferences. All parameters are internally stored as numbers (values) in the LokSound V3.0 decoder. According to the NMRA-DCC Standards all parameters are stored in memory cells called CV's (Configuration Variable). Whenever you change a CV the decoder will adjust its behaviour accordingly.

All CV's may be changed by programming with the aid of a digital command control station. Depending on which type of command station you have the procedure varies:

- If you use a DCC command station i.e. Hornby®, Lenz® Digital plus, ZIMO® MX1 or Uhlenbrock® Intellibox®, please refer to Chapter 3.1.
- Users of the Märklin® 6021 find relevant information in Chapter 3.2.
- If you prefer to change the settings of the Schools Class by using the LokProgrammer by ESU we recommend you first study Chapter 5. There you will find out many important details.

3.1 Programming with DCC Systems (Hornby®, Lenz®, ZIMO®)

Any digital command station, which offers the programming features according to the NMRA-DCC specification, can be used to programme the LokSound V3.0 decoder. Depending on the type and features of your command station you may be able to read and write CV's (Hornby Elite, Lenz® LH100, Uhlenbrock® Intellibox®, ZIMO® MX1, Arnold® digital) or you may only be able to write CV's (Lenz® digital compact, Lenz® LH200, ROCO® LokMaus II).

3.1.1 Which Settings may be changed?

Figure 1 on page 8/9 shows the adjustable parameters.

CV's 29, 49, 50 and 51 are different to other CV's: Generally you would write a value into a CV whereas for CV29, 49, 50 or 51 the actual value has to be calculated. This depends on the desired settings:

First you decide which option should be switched on or off. In the column 'value' you find two numbers for each option. If the option is switched off the value is zero otherwise the value is any number between 1 and 32. Add all the values for each option to get the total which has to be written into the CV.

Example: You want to activate the Märklin® brake section while load compensation remains active. Therefore you write (1) in CV51. Now you have to deactivate the analogue recognition CV29 since it is not advisable to activate the Märklin® brake section and analogue operation at the same time. Therefore you write 0 + 0 + 0 + 0 = 0 in CV29.

3.1.2 How to set parameters

We cannot provide a general instruction for programming with all DCC systems since there are so many differences in the way they operate. You should always try to use the DCC direct mode if possible (byte-by-byte CV-programming with Uhlenbrock®) or the DCC paged mode.

The relevant information for users of the Intellibox® are found in Chapter 9 "programming" of the technical manual. You should take particular notice of Chapter 9.5 "Programming of DCC decoders". Programming should always be done in "CV-programming byte-by-byte".

3.1.3 Decoder Reset

You can reinstate the factory settings at any time if you cannot get any further:

Set CV8 to the value 8 for automatic resetting

Lenz digital plus

There are various software versions available for the Lenz® digital plus command station. You need firmware version 2.3 or higher in order to programme LokSound V3.0 decoders. Contact Lenz® for more details regarding upgrades of older versions.

3.2 Programming with Märklin® 6021

With the Märklin® command station you cannot modify standard CV's as it does not comply with the NMRA-DCC standards.

However, the most important CV's of LokSound V3.0 decoders may be changed.

3.2.1 Programming mode of the 6021

Set the drive control knob to 0. Remove any other engines from the track. Observe the blinking signals of the engine! To get into programming mode: Press the "stop" and "go" keys simultaneously on the 6021 to activate a reset (or pull the plug of the power pack). To switch off the track voltage, press the "stop" key. Enter the current decoder address (alternative "80").

- Activate the change of direction feature (turn the control knob far left until you hear a "click"), hold the knob in position and press the "go" key.
- The LokSound V3.0 decoder is now in programming mode (the headlights are flashing for indication).
- Enter the CV number you want to change. Make sure you always enter a two digit number (e.g. "01" and not "1").
- To confirm any entry turn the knob far left (change of direction feature).
- Now enter a new value for the CV as a two digit number.
- Turn the knob far left to confirm (the headlights are on for about 1 second).
- Enter further CV's you wish to modify.
- Exit the programming mode by selecting CV "80" or switch the track voltage off and on (press "stop" key then "go" key on 6021).

Note that you may only enter values 01 to 80 with the 6021. Value "0" is missing, enter "80" instead.

Programming Table – List of most important CVs

CV	Name	Description	Range	Default
1	Locomotive short address	DCC/Motorola® address of locomotive	1-119	03
2	Starting voltage	Sets the minimum speed of the locomotive	0-63	03
3	Acceleration	This value multiplied by 0.869 is the time from stop to maximum speed	0-63	15
4	Deceleration	This value multiplied by 0.869 is the time from maximum speed to stop	0-63	12
5	Maximum speed	Maximum speed of locomotive	0-63	49
6	Vmid	Medium speed of locomotive	0-63	17
17	Extended locomotive address	Long address of locomotive CV17 contains byte with higher value (Bit 6 and Bit 7 must always be active), CV18 contains byte with lower value. Only active when function in CV 29 is switched on. (see below).	192-10239	192128
18				
29	Configuration register	The most complex CV within the DCC standards. This register contains important information, which is only relevant in DCC operation.	–	06
		Bit Function Value		
	0	Reverse direction of travel (forward becomes reverse) normal direction reversed direction	01	
	1	Speed steps (only for DCC operation) 14 speed steps 28 or 128 speed steps	02	
	2	Analogue operation analogue operation switched off analogue operation permitted	04	
	4	Selection of speed curve speed curve through CV 2,5,6 speed curve through CV 67-96	016	
	5	Selection of loco address (only for DCC operation) short addresses (CV 1) in DCC operation long addresses (CV 17 + 18) in DCC operation	032	

CV	Name	Description	Range	Default
49	Extended configuration	Additional configuration options	–	19
		Bit Description Value		
		0 Load control activated	1	
		1 Motor PWM (0 = 15kHz, 1 = 30kHz)	2	
		3 Enable second Motorola® address	8	
	4 DCC automatic speed step detection	16		
50	Analogue mode	Selection of desired analogue mode	0-3	03
		Bit Description Value		
		0 AC analogue mode AC analogue mode off AC analogue mode on	01	
		1 DC analogue mode DC analogue mode off DC analogue mode on	02	
		51 Brake mode	Selection of desired brake mode	–
		Bit Description Value		
	0	Märklin® brake mode Märklin® brake mode off Märklin® brake mode on	01	
	1	Zimo® brake mode Zimo® brake mode off Zimo® brake mode on	02	
	2	not used		
	3	Lenz® DC brake mode Lenz® brake mode off Lenz® brake mode on	08	
63	Sound volume	0 = low, 64 = max. volume	01-64	64

4. Frequently asked questions

"I would like to install LokSound V3.0 decoders in other locomotives. Are suitable decoders available for particular locomotives?"

- LokSound V3.0 decoders are designed for HO/OO gauge model trains. Several types are available and one of them will most likely fit into your model. Please contact your local dealer to obtain information on all available decoders as well as our installation service. A list of qualified dealers/hobby shops is available on our website <http://www.esu.eu>

"I already know your decoders, but the type installed in the Schools Class seems to offer less options regarding the settings of parameters than the others?"

- The decoder installed in the Schools Class has been specifically adapted to this locomotive and the requirements of Hornby. It is based on the LokSound V3.0 technology and offers more options than can be described in this short manual. Please read the following chapter 5 for more information.

5. Additional information

The LokSound V3.0 decoder installed in your Schools Class locomotive offers more options than described in this manual. However, they have already been optimally adjusted to the model and thus there is no need to adjust them.

The experts amongst you can use the information as outlined in the comprehensive "LokSound V3.0 Installation and Operating Manual". You can download this manual free of charge from our website <http://www.esu.eu> under the section "Downloads", sub-section "Instruction manuals".

For easy programming of the numerous options offered by the LokSound V3.0 decoder we recommend the use of the "LokProgrammer". With the aid of this interface and the software that is supplied with the LokProgrammer you can easily adjust all parameters on your PC. System requirements are Windows 2000 or XP. No need to study tables or calculate values – everything can be done by mouse clicks while you have all the important information readily available on the screen.

Please note: you require at least the LokProgrammer Nr. 5345 I to be able to programme your Hornby Schools Class locomotive. An update is available from our website.

6. Service – Support and Assistance

Your first contact should always be the model train or hobby shop where you have purchased your Hornby Schools Class. Your dealer is your competent partner for all your questions regarding model trains and also LokSound V3.0 decoders.

You may also contact us directly. For enquiries please use either email or fax (don't forget to provide your own fax no.) and we will reply within a few days.

We also offer a telephone hotline service. However, please call our hotline only in case of complex enquiries that can't be dealt with by email or fax. The hotline is often very busy and you may encounter delays.

Also check our website for more information. You will find many hints regarding FAQ and even feed-back from other users.

Of course we are always available to provide support:

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