Product Overview

2013

Content

Dear ESU friends,

„Hurray, we´re still alive." Admittedly, this statement directly occurring on the first page is not meant very seriously. However, following the news and press right before Christmas no matter if in print or on TV screens world-wide, you could mostly get the impression the world´s end lies immediately ahead. Fortunately the presumed experts were wrong about the Maya´s old prophecy. In wise foresight, we have been preparing ourselves for this year and may now present you as usual our new ESU articles.

First of all we´d like to introduce our new **LokPilot V4.0 M4** decoder to all 3-rail model railroading fans. This LokPilot decoder is a real quad-protocol decoder and speaks beside DCC with RailComPlus®, Motorola®, Selectrix® and now also M4. The decoder can be automatically recognised and configured by every modern command station. It also offers all the great possibilities of a LokPilot decoder. Beside the 5th generation of load control including the "Auto-Adjust" function, a SUSI interface to control C-Sinus motors and a connection available for an external PowerPack module, the latest descendant of our LokPilot V4.0 family also comes with the most extended and ultra-flexible function mapping of all ESU V4 decoders This combined with extended lighting effects and the pushing and pulling function, this decoder leaves no desires unfulfilled in terms of flexibility and quality.

Also it´s "big brother", the new **LokPilot XL V4.0**, cannot hide his origins and does also speak four data protocols perfectly. Among automatic recognition, it stops on all brake sections including Lenz® ABC and can be perfectly adjusted to the motor settings. Since the LokPilot XL V4.0 may easily supply up to 4A current, the decoder is the first choice for being operated in garden model trains such as LGB® or PIKO®, respectively in gauges 1 & 0 locomotives. As we know there´s a lot to switch in this locomotives, there are 8 function outputs for lights available, also 4 additional servo outputs for couplings, pantographs or other mechanical devices. Of course, the decoder generates all necessary auxiliary supplies by itself. Like its forerunner the LokPilot XL V4.0 is supplied with a PowerPack energy store directly soldered on its pcb board. This will help especially smaller locomotives with less axles to pass over dirty tracks without any problems. Thus this decoder is the perfect choice for all model railroaders who do not need a LokSound decoder but like to use an ESU V4 decoder.

No one has to do without RailCom® anymore. If your loco has an older decoder installed, you may now just simply add the small **RailCom® Transmitter Unit** to the loco and it will send out the address. When used with our ECoSDetector feedback modules it will be very easy to find out the loco´s position. This will also work with (older and newer) Märklin® decoders.

Another new decoder for this year will be our latest function decoder, the **LokPilot Fx V4.0**. This small, but practical function decoder perfectly fits into control vehicles or functional models. It can be used with all common digital command stations as it understands DCC with RailCom® as well as Motorola® and Selectrix®. It shares its flexible function mapping and various light effects with all other ESU V4 decoders.

Moreover, you will find a lot of useful new products in our range of ESU accessories.

For LGB® and gauge 0 fans, both the **new smoke units** will be surely interesting. With its dimensions, the big smoke unit is compatible with many LGB® and PIKO® locomotives, whereas the smaller version is meant for gauge 0 locomotives.

Both smoke units will work perfectly with the LokSound XL V4.0 as well as other decoders with SUSI interface. Since the smoke units are equipped with smart electronics and a temperature sensor, they will produce, independently from the track voltage, a lot of smoke and will not burn through when the fuel tank is empty.

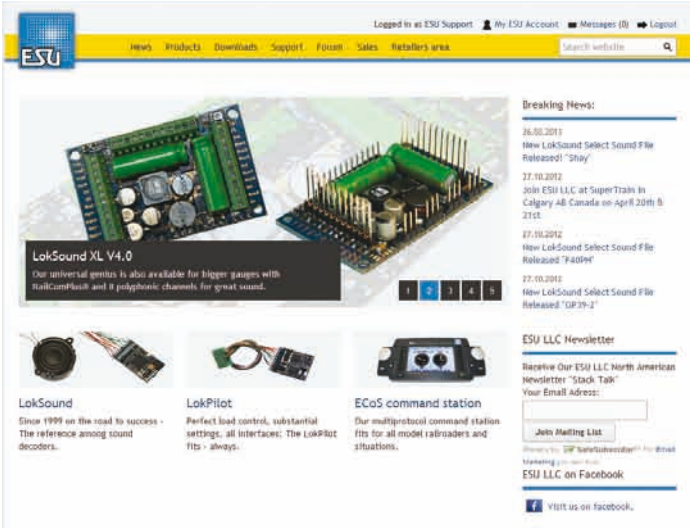
The **new adapter board** for LokSound XL V4.0 decoders **with PIN connectors** will make any instalment much easier: The decoder will simply be plugged on and the wiring will be directly carried out on the adapter board.

Last but not least we´d like to mention our **new loudspeakers**. The new 40mm loudspeaker can be used with either a smaller LokSound V4.0 decoder or also with a LokSound XL V4.0 decoder. The new Visaton FRS 7 fits perfectly in many PIKO® locomotives.

"Yes, this is what I was looking for" is what will hopefully cross your mind when reading these lines. In fact our new products should reinforce the pleasure for your model railway hobby and we really hope to succeed this year once more.

Sincerely,

The ESU team



ECoS ESU command station

The ECoS 50200 is already the second generation of our successful ECoS command station. ECoS offers state-of-the-art digital technology combined with a contemporary functional range and easy handling. All this, for a fair price-performance ratio.

A fully graphic-capable, illuminated TFT display with excellent contrast values shows all information in plain text.

For operation the ECoS has a touch-sensitive display which can be operated either by hand or with the delivered stylus.

In combination with its ground-breaking and easy-to-use user interface ECoS reaches unprecedented ergonomics. All symbols and text are clearly marked and structured.

This is how model railway operation should be in 2013!. Why keep a black-and-white screen when everything appears livelier in colour?

What ECoS can do

With an ECoS command station you acquire an open system. ECoS was created to be as open and compatible as possible with all present systems and norms. As a multi-protocol command station, ECoS supports:

- **DCC** with **RailCom®** and **RailComPlus®** (up to 9999 addresses, 128 speed steps, 24 functions)
- **Märklin® Motorola®** (up to 255 addresses, up to 8 functions)
- **Selectrix®** (Driving operation and programming of decoders)
- **M4** (mfx® compatible, with automatic recognition of the locos)

ECoS is therefore the only digital command station worldwide that unifies four data protocols. This is important, as you can even continue to use almost all of your present loco decoders.

ECoS controls turnouts and magnetic accessories: a graphical control panel provides you access for up to 1200 turnouts (DCC or Motorola® protocol).

With ECoS you can plan and control routes: simply put turnouts and magnetic accessories graphically in groups and switch them together.

With ECoS you can operate shuttle trains.

For the connection of external digital components every ECoS comes with an ECoSlink, a high-speed bus system, based on CAN. Every ECoS command station has a network connection and can therefore communicate with a computer.

Thanks to the integrated booster and the delivered power supply you can immediately start! You won´t need any more than that!

Who needs ECoS?

ECoS is basically the command station for all. Beginners, who are looking for a simple-to-operate cab, will be at home right away: the large, graphic touch screen display shows all information clearly in plain text. Never has it been easier to switch to digital control. Thus ECoS runs DC or AC driven trains and is equally appropriate for all gauges from N to G.

Model railroaders, who look for a new digital command station, should also step up to ECoS: next to the possibilities for route-and shuttle train programming, you will learn to appreciate the easy handling of the device as well as the manifold programming features for decoders.

You can connect your present equipment (e.g. Märklin® 6021, Lenz® Digital Plus®, ROCO®) to the input of the ECoSniffer, and continue to use it as a handheld.

It gets even more comfortable when you switch from a Loconet® command station (such as Intellibox, Digitrax®) to an ECoS: the optional L.Net converter allows the integration of those devices into the ECoS system.

ECoS features in detail

Run locos

The ECoS command station has two control panels on which the locos can be independently controlled of each other. The ECoS comes with two cabs with motorised throttle knobs and 9 function keys each, plus a two-axis, center-click joystick each.

Especially the big throttle knob is considered comfortable by many customers since the highest speed can still be set during 128 speed steps without a big effort in terms of cranking.

A loco selection key helps to select the respective locomotive, which enables you to call up all in all 24 functions per loco.

The ECoS command station can manage up to 16384 locos. Each loco´s characteristics is memorised by the loco database, so in the future you can call each engine by name.

Also you can assign a loco symbol and these symbols keep you abreast of the function of each loco, regardless of whether it's latching or non-latching. The operation of locos with RailComPlus® and the mfx®-compatible M4 protocol is much easier. Within these operational modes the information between ECoS and loco will be exchanged automatically.

A navigation menu with substantial sorting and filtering options make fast finding and immediate control of your locos possible.

Of course, ECoS supports all DCC addresses (up to 9999) and 128 speed steps, during Motorola® operation up to 255 addresses and 27 speed steps are possible, depending on the decoder´s features.

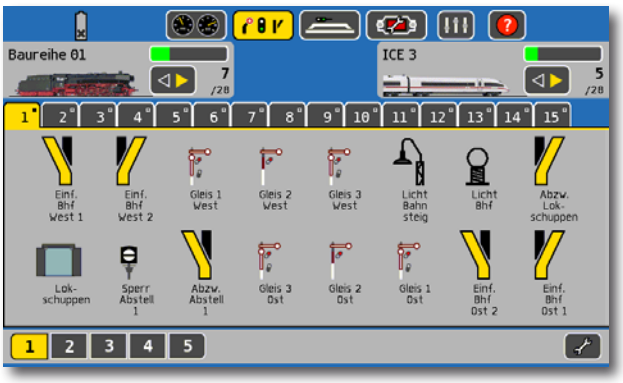
Locos equipped with an mfx® decoder will be recognised automatically by the ECoS and can be driven without any restrictions.

ECoS ESU command station

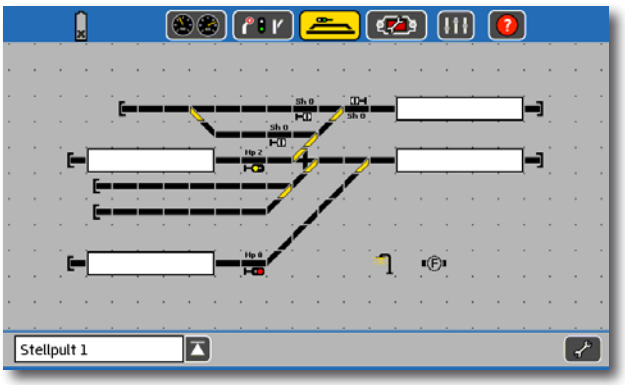
Operate turnouts and magnetic accessories

Just like with locos, you can name turnouts and magnetic accessories. The large signal box on the screen of your ECoS shows you all turnouts and their switch-position. You can put turnouts in the depot area and to each magnetic accessory you can assign its exact function, so you can tell simple-, double or 3-way turnouts apart from de-coupler tracks or even streetlights, etc.

If you use a RailCom®-compatible turnout decoder like e.g. the SwitchPilot, it is possible to synchronise the actual turnout settings with those displayed on the ECoS. If the turnout isn´t set correctly, it will be shown on the control panel.



Left knob:
Single screen
1 loco in detail



Track diagrams

By drawing a track diagram on the screen you can represent the topology of your layout fully graphical. You can switch any turnouts or signals simply by touching the appropriate symbol.

Even larger layouts can be displayed on the 16-page track diagram. By using the link element you can directly switch between connected pages of the track diagram. To make the allocation simple you can give each page its own name. The accessories shown in the track diagram correspond in function and state (track switch position) with the signal box, so that a new data entry or configuration of the accessories is not necessary.

It is also possible to link elements with feedback outputs, by doing so you will quickly recognise in the track diagram, which tracks are occupied.

A unique feature is that you are able to have the exact position of your loco´s displayed: just equip your locos with RailCom®- compatible decoders and use our ECoSDetector feedback modules; from this moment on you will always know where your locos are at!

Right knob:
Multi-screen
5 locos in quick access

Large, easy-grip throttle knob with mechanical stop. Motor drives throttle knob automatically in correct position when loco exchange takes place!

Function keys with precise click for light and 8 of the first loco functions; reliable touch-function without eye-contact.

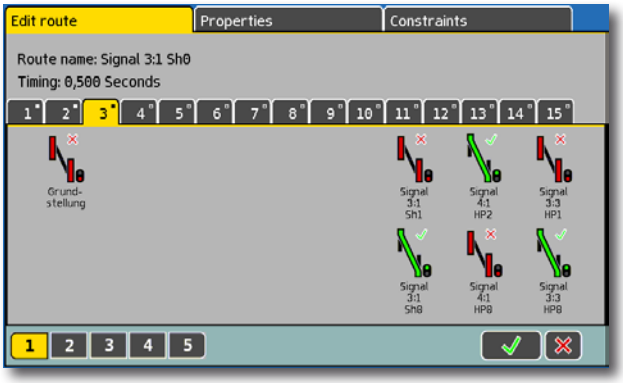
Analogue two-way joystick with center click; ideal for analog control functions of loco; just define e.g. length of whistle blow and kind of sound of LokSound V4.0 - prototype-like; also for navigation in menu.

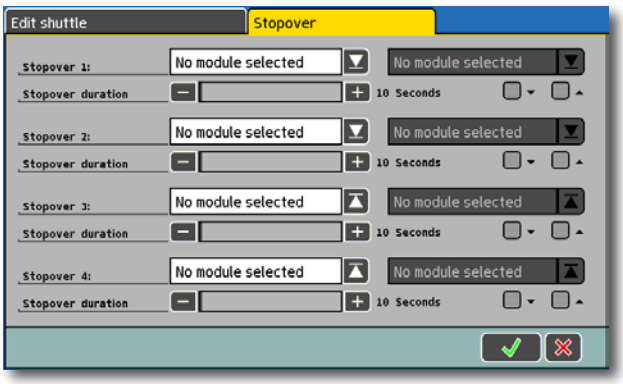
Switch between single and multi-screen

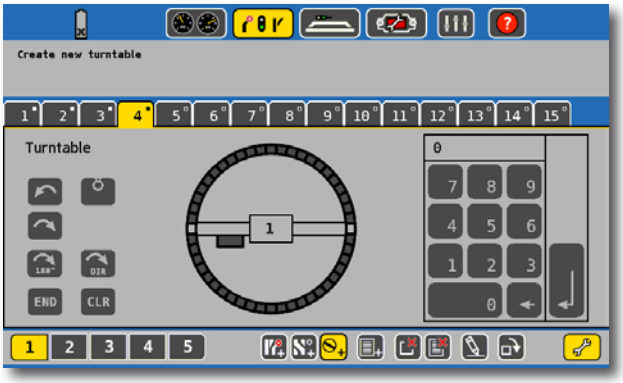
Full graphic TFT colour display with touch panel.

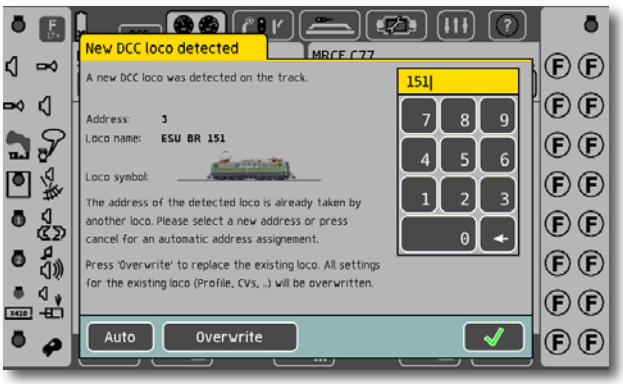
(Symbolic display only: actual screen contents may vary.)

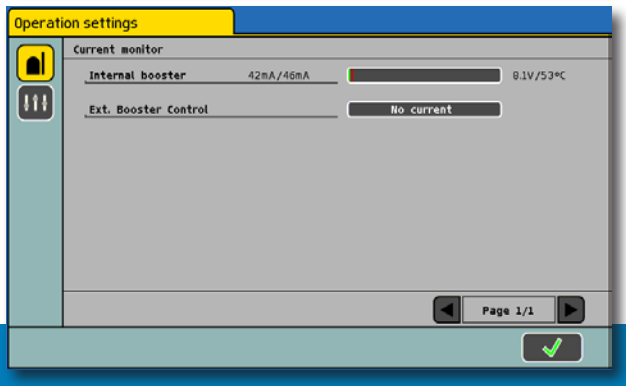
ECoS ESU command station











Routes

Several magnetic accessories can easily be grouped as routes. Routes can then be switched like singular turnouts or they can be tied to an occupancy detector: Thus extensive block-control management is already possible. ECoS can manage up to 1024 routes with up to 256 magnetic accessories each.

Hereby, the logic for controlling routes is ground-breaking: Up to 8 single conditions (feedback contacts, but also the setting of turnouts and other routes) can be linked and thus be used for route triggering. This makes a real start-destination operation possible as well as a (simple) control of fiddle yards!

Shuttle train control

The integrated shuttle train control enjoys big popularity due to its simple handling: here you only need an occupancy detector at each end of the track, which you assign via Software to a loco: length of layover, acceleration - and deceleration, or in-between stops can easily be programmed on the ECoS screen. You are, of course, able to define stopovers. This works with any decoder because the brain of the system sits in the central unit.

Turntable control

It is possible to control the well-known Märklin® turntables graphically with the ECoS command station; ECoS is able to control the specific Märklin® decoder, respectively compatible decoders, directly.

When it comes to turntable control the ECoS is not limited to one turntable alone, theoretically you may create up to 75 turntables.

RailCom® and RailComPlus®

ECoS is fully compatible with RailCom®. This means for ESU not only that the installed booster creates the required RailCom® synch pulse but also a built-in "global detector" that helps to reprogram the loco on the main track, as well as read old values and have them shown on the display.

Furthermore, thanks to the RailComPlus® function, the operation of new RailComPlus® compatible DCC decoders will be considerably simplified:

If you put a new loco equipped with a RailComPlus® decoder on the track, the ECoS will recognise it immediately and take over the decoder´s saved parameters for name, function symbols and loco symbol. You do not need to change any of the loco´s configurations. If necessary, the loco´s address will be reprogrammed automatically.

Current monitor

The current monitor shows the actual voltage set as well as the current power consumption of your layout at any time on the screen.

Decoder programming

Programming a decoder means to adjust it in the best way possible: your ECoS will try to simplify this rather unpopular procedure for you, as the programming often turns out to be very complex and is likely to be sensitive for errors. The following possibilities are available:

Programming track

The classic solution for programming a decoder is to place it onto a separate programming track. This track is connected to the ECoS via a special programming track output and works independently from your main track. Therefore the operation of your layout will continue whilst programming.

If you use an ESU decoder you will be able to read out all CVs and features of the decoder directly in the next step and adjust it full-graphically on the screen.

The so-called "decoder profiles" make this possible: All parameters of supported decoders are shown in plain text. The search for / of CV's and bits and bytes is a thing of the past.

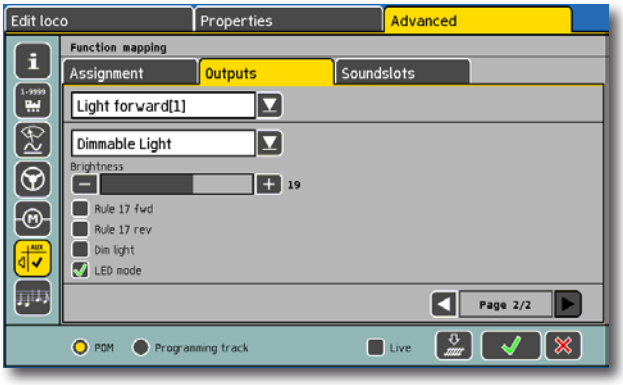
If you prefer to program the CVs of your decoders directly, the ECoS offers you an appropriate solution: via the comfortable programming menu you get direct access to all CVs.

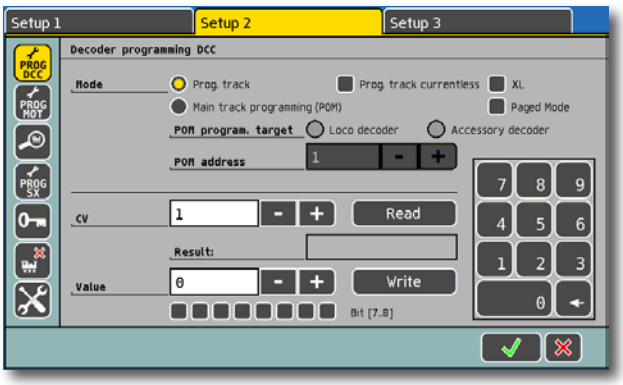
The ECoS also offers a possibility to ascertain the addresses of your old Motorola® decoders automatically - never again do you have to take your engines apart and check the DIP switch...

Programming on the main (POM)

Programming your decoders is even more simple when they are RailCom®-compatible: In most cases you can do it without a programming track and change all CVs on the main track via POM („Programming on the Main"). You can also read out current values!

All M4 and Märklin® mfx® compatible decoders will be directly programmed on the main track: ECoS can read out all of the decoders parameters and directly change them on the screen. Fully compatible!





Self-made Loco Images

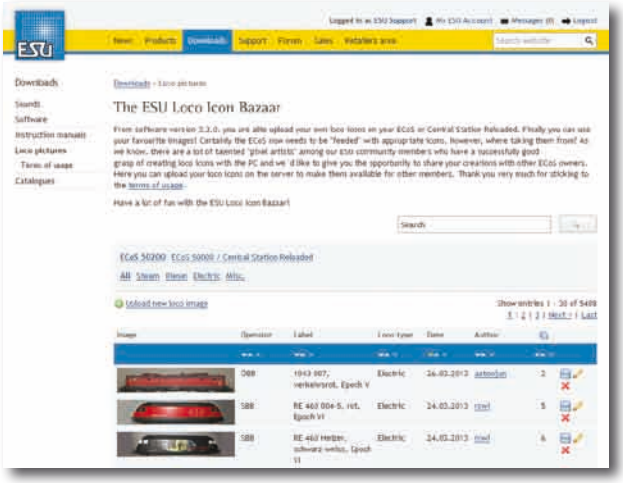
Via the integrated web interface it is not only possible to create back-ups, to display and download object list or upgrade your software with regularly published updates.

Further to these functions you are able to transmit self-made loco icons to your ECoS command station.

We provide substantial how-to-do manuals on our website that will surely make you succeed creating your own loco images!

Furthermore you are able to upload your loco icons online and add them to the ESU Loco Icon Bazaar, which has been developed especially for this purpose, namely to share your images with other ECoS users.

Of course, you may also download the images of other users as well for use on our ECoS. The ESU Loco Icon Bazaar already includes far beyond 4000 different loco images!



ECoS ESU command station

Booster

Every ECoS command station comes with an integrated booster that offers a permanent output current of 4A. ESU supplies a stabilised 90VA power supply with every ECoS. This can be easily adjusted to give an output of between 15 and 21 volts.

Feedback

ECoS offers a factory built-in galvanically isolated (!) s88 feedback interface for up to 31 of the very popular s88-modules. They serve as track occupancy detectors and may be used for controlling routes and shuttle train operations.

Keep using old systems

We have made your transfer to ECoS as comfortable as possible, simply keep using your "old" system. This is made possible through the built-in ECoSniffer: The rail output of your present digital command station is simply connected to the input of the ECoSniffer module. The module listens to all DCC and Motorola® packets and translates them for the ECoS command station.

Support

Our online support forum sets guidelines in the model railway sector: Discuss your questions and ideas with other users and our support team and share your experience and knowledge with others. Go to **www.esu.eu/en/forum** for further information.

Ordering information

	Art.No.	Description
	50200	ECoS 2 command station, 7" TFT colour display, MM/DCC/SX/M4, set with power supply input 240V Euro, output 15V-21V, German & English manual

Technical data

Hardware	H4 booster with 4.0 A continuous-load output; RailCom® bidirectional feedback detector with integrated cutout device ("global detector"); H4 programming track connection, 0.6 A rated
	7 inch TFT colour display with touchscreen, 800x480 (pixels) display resolution
	32-Bit ARM 720T controller, 64 MByte flash ROM, 64 MByte RAM, Linux® operation system; 16 Bit real-time co-processor
	2 motor-driven potentiometer throttles with end stop; two 2-way analogue joysticks; two 9-function keys plus Stop- and Go-key
	3 input sockets for ECoSlink systems; connection for ECoSlink bus expansion
	Galvanically isolated booster input for external DCC or Märklin® 6017 boosters; galvanically isolated ECoSniffer input for connection of old units
	Galvanically isolated s88-bus input for feedback devices; 10/100 Mbit ethernet connection (RJ45)
	1 ECoSlot module for "radio receiver" input
Software	DCC with 14, 28, 128 speed steps, LGB® compatible function key handling; RailCom®
	Märklin® Motorola® old, new, with 14 or 27 speed steps (2 modes, depends on availability of decoder)
	Selectrix® track format; M4 data protocol with automatic recognition
	Up to 9999 addresses for DCC protocol. Up to 20 function keys per loco; up to 255 addresses for Motorola® protocol (depends on availability of decoder)
	Märklin® Motorola® and DCC track protocol for control of electromagnetic accessories
	Up to 16384 locos, 2048 turnouts and 1024 route objectives; 32 MU´s (multiple consists) with up tp 16 locos each; up to 16 shuttle trains at the same time
	All DCC service modes programming on programming track, POM (programming on the main). Programming of Motorola® and Selectrix® on programming track.
Included in delievery	ECoS central unit; stylus for touch screen, power supply output voltage adjustable from 15V to 21V / 5A (90VA); terminals for mail track and programming track connection, ECoSniffer; substantial instruction manual

Expandibility

If all the features and functions shown so far are not suffient, it is possible to expand your ECoS command station with further modules at any time. These are e.g, further handheld throttles, booster, feedback modules or converters. All these devices have to be connected to the ECoS to exchange data. In order to do so, ESU has developed a powerful bus system, the ECoSlink.

ECoSlink

ECoSlink is high-performance bus which is based on the CAN industrial standard. You may connect (up to 128!) external handheld unit throttles.

It offers a transmission rate of 250 kBit (and is therefore 10 times faster than e.g. LocoNet®) and is „hot-plug" capable. All devices report automatically to the system and can be removed or reconnected during operation.

To wire the ECoSlink devices 6-, 7-, 8-, 9- or 11-pin circular connectors or sockets are used, which are protected against polarity reversal. The differing amount of pins is to ensure error-free wiring.

You can basically connect a device at any spot of the ECoSlink. Thanks to the "plug&play" technology it will be automatically recognised and integrated into the system by the command station and will be directly configured on screen. Programming is not necessary. ECoSlink devices will receive automatic software updates if required.

The ECoSLink is suitable for a maximum cable length of 100 metres and provides excellent data transmission. Most of the devices draw their operation voltage directly from the ECoSlink. The required signal lines are a component of the ECoSlink bus system, as well as the booster control lines.

ECoS is able to provide up to 1000mA current for connected devices. If this current is exceeded, an additional ECoSlink power input will be required.

The ECoSlink has to have a so-called bus topology. This means that the bus has exactly one starting point (usually the ECoS command station) and one ending, like the legs of a millipede the devices will be led away from the bus as short branches.

ECoSlink Terminal

For bigger layouts we recommend to use the ECoSlink Terminal. It provides further connecting sockets and is able to supply current.

ECoSControl Radio

ECoS is well prepared for the application of our wireless ECoSControl Radio remote control unit: A special receiver card fits into a module terminal, called ECoSlot The ECoSControl Radio integrates perfectly into the ECoS-system and acts like a fully featured cable-bound throttle.

ECoSBoost

Of course all DCC conform boosters can be connected to the ECoS command station, as well as Märklin® 6017 boosters (or compatible products). There is a corresponding socket.

However, we recommend to use our ECoSBoost devices. They are directly connected via the ECoSlink bus which has an integrated M4 and RailComPlus® feedback module/function making an automatic recognition of all locomotives everywhere on the layout possible. Every ECoSBoost will show the current booster voltage in the current monitor.

ECoSDetector

If you do not want to use the s88 system anymore or even replace it, the ECoSDetector is the perfect choice. It finally makes a reliable track occupancy detection possible.

Beyond this, the module recognises, in combination with a RailCom® compliant decoder, any loco on the controlled area.

L.Net converter

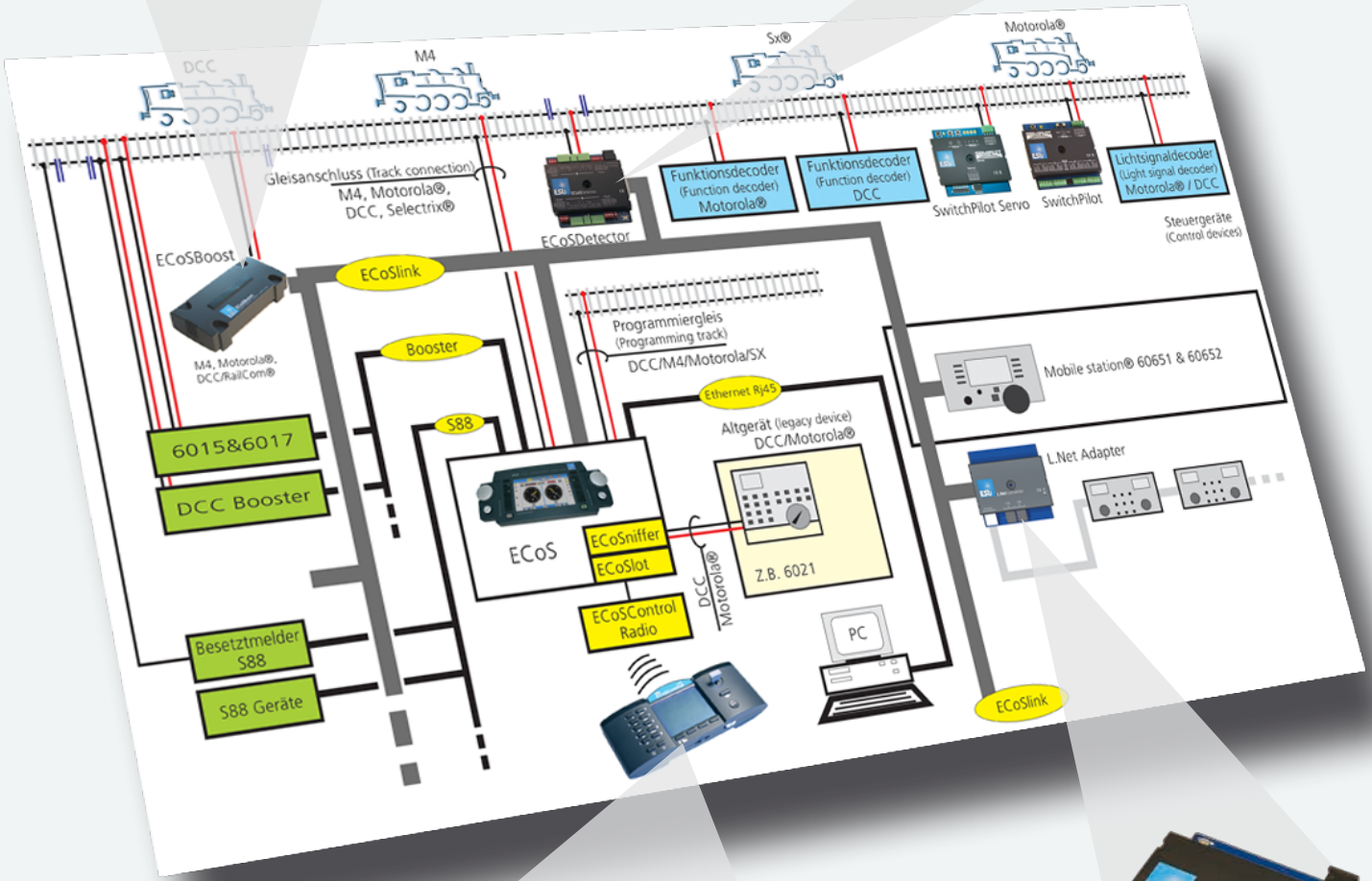
With the L.Net converter you can already use existing handheld throttles and feedback modules fully and bi-directionally integrate in the ECoS system. Thus nothing more should stand in the way of using Daisy®-, Fred®- or ProfiBoss® handheld throttles!

Mobile Station®

The most well-known device compatible with ECoSlink is the mobile station® 1 by Märklin®. With mobile station® you are able to control up to 10 locomotives.

ECoSlot expansion port for ECoSControl Radio
Power-In jack
Programming track connection
Main track connection
ECoSlink systems input socket
ECoSlink systems input socket
ECoSlink systems input socket
ECoSlink systems expansion socket
Ethernet connection
DCC Booster out
ECoSniffer input
S88 input

ECoS Accessories



ECoSDetector

Automatic operation

Many model railway fans like to control their layout automatically. Trains should run without manual Handelling , stop in front of signals and run in and out of station tracks. Also within fiddle yards the loco should be able to find itself a free track and of course, collisions are to be avoided during this procedure – meaning a proper block operation like their big prototypes.

The ESU digital components make that dream come true and to make this work, two important conditions must be given:

- The systems needs to know the condition of all tracks at any time. Is the track free or is a train running on it? For this purpose you need feedback modules.
- The system has to take influence on running locos which is done by the ECoS.

Since the actual influence on trains is taken by the ECoS, the most important task for model railroaders is the installation of feedback modules which have to be connected to the track and then recognise if a train is present or not. This information will be transmitted via the ECoSlink bus, to the ECoS for processing.

Feedback types

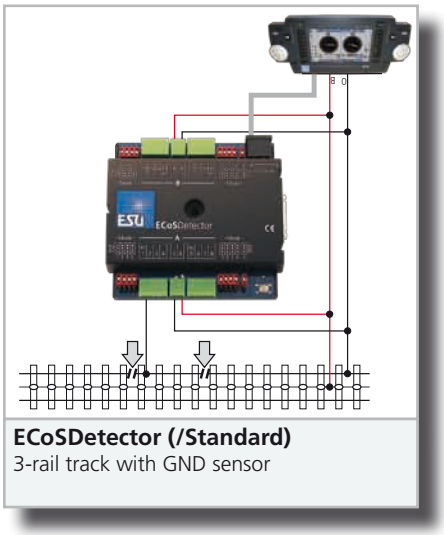
The track system determines how the feedback module is connected to the track section.

- 3-rail systems mostly work with one isolated and separated track side. Vehicles will be connected via their conducting axles with the ground contact of the feedback module.
- On 2-rail layouts the feedback module will measure the current flowing through the track section. Thus the locos as well as illuminated wagons and conductive axles will be recognised as soon as a current of more than 1mA is flowing. When the current is switched off no current measurement is carried out. This is why the feedback module has to detect the current and freeze the state to avoid an incorrect message from the tracks to be free.
- If you wish to know exactly, beside the track occupancy detection, which loco is operated on the track section you can use the RailCom® feedback technology in combination with compatible decoders.

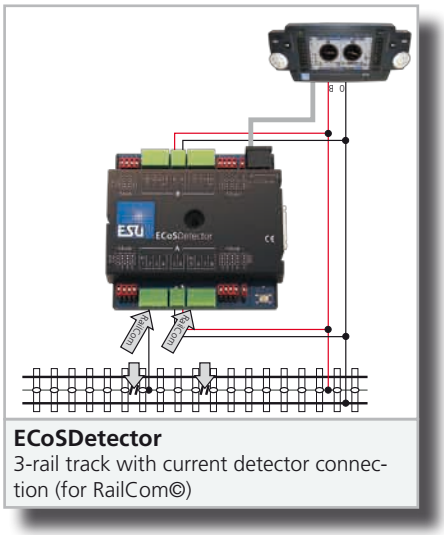
ECoSDetector family

ESU offers two ECoSDetector feedback modules and both solve the above-schemed task perfectly. The can be operated with every ECoS or Central Station Reloaded. Every ECoSDetector can detect up to 16 track sections. The ECoSDetector and ECoSDetector Standard of course differ on their connection possibilities to the track as follows:

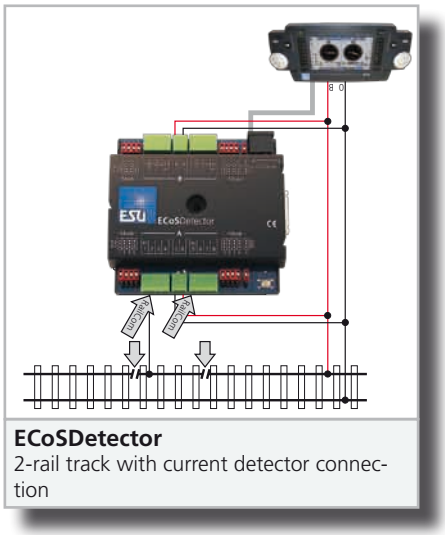
Connection possibilities	ECoSDetector	ECoSDetector Standard
Amount of inputs	16	16
Input usuable as switch input for 3-rail systems	Yes	Yes
Input usuable as current sensor for 2-rail systems	Yes, 3A duration each	-
Input configurable as RailCom® feedback module	Yes, 4 inputs	-
Electronic debouncing of feedbacks	Yes	Yes



ECoSDetector (/Standard)
3-rail track with GND sensor



ECoSDetector
3-rail track with current detector connection (for RailCom©)



ECoSDetector
2-rail track with current detector connection

Ordering information

Art.No.	Description
50094	ECoSDetector feedback module, 16 digital inputs, of that 4 RailCom® feedbacks. For 2-digit or 3-digit operation, OPTO coupling
50095	ECoSDetectior Extension. 32 digital outputs 100mA for little bulbs or LEDs, illumination for track plans
50096	ECoSDetector Standard feedback module for 3-digit operation, 16 digtal Inputs, OPTO

ECoSDetector / ECoSDetector Standard

ECoSDetector Standard

Switch inputs

The ECoSDetector Standard offers 16 switch inputs to connect isolated track sections, contact tracks, reed contacts as well as switches (and toggle switches). Operation with every 3 rail track is possible, no matter if you have M-, K-, or C-tracks. Also the well-known Märklin® contact tracks will be no problem.

The ECoSDetector Standard is thus made for 3-rail model railroaders who look for an affordable feedback module, but do not want the reliability of the ECoSlink bus system.

ECoSDetector

Current sensor

The ECoSDetector is also able to detect up to 16 track sections. The inputs can be switched individually via a jumper between the input switch (ground input) or current sensor. The ECoSDetector can be used on all track systems and is thus the first choice for all users of 2-rail layouts. Inputs should have a maximum current of 3A and can be separately supplied with current when split in two groups. Therefore every ECoSDetector is able to monitor up to two booster circuits with current. Opto-couplers are used to provide a reliable detection.

Train ID detection

Beside conventional track occupancy detection, each ECoSDetector has the additional ability to monitor four of the 16 track sections for train identification, Via the RailCom® technique (so-called „local detectors") you will not only easily find out that there's currently a loco on this track section, but also identify which specific loco it is (train ID detection). However, this only works with RailCom®-compatible loco decoders.

Smart

With the knowledge of the train specific position, new functions can be implemented, using the route control module of the ECoS command station. For example, you can automatically activate the horn of a loco when it is about to pass a railway crossing or determine which loco is parked in the hidden yard. It is also possible to debounce switch inputs or track occupancy detectors electronically to ensure a reliable feedback in case of unreliable contact or very dirty tracks.

ECoSlink connection

Every ECoSDetector can be directly connected to the command station via the ECoSlink bus. Beside all ECoS command stations you can also use the Central Station® (updated with the Central Station® with software upgrade by ESU). The galvanic isolation of the bus systems and the command station guarantees the best-possible reliable operation and a reliable data transmission to the command station. All ECoSDetector modules will be detected automatically by the command station and the information integrated in the operation. The configuration of the devices can also be carried out directly with the command station after installation.

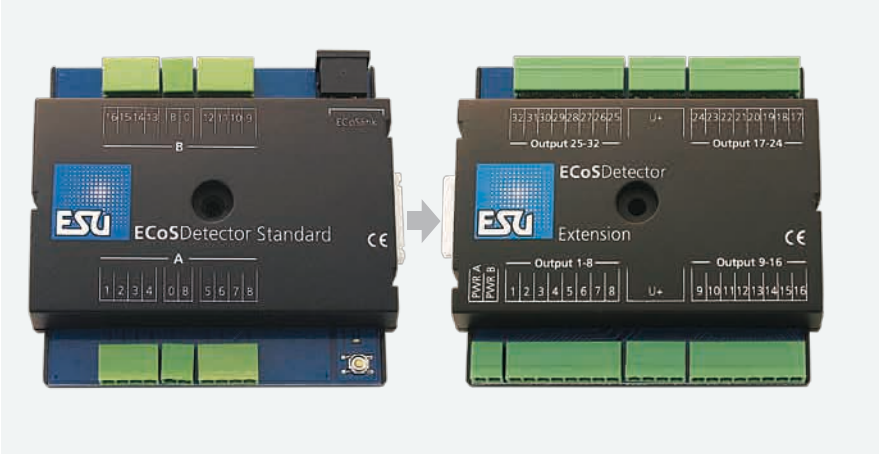
Upgradeable

When required, the ECoSDetector software can be upgraded to add new functionalities. The command station will perform the required updates completely automatically. This will guarantee at all times that the ECoSDetector remains at the most current technical status.

Technical data ECoSDetector

Operational modes	Direct bus connection to ECoSlink. Operation with ECoS or Central Station Reloaded V3.0.0. is possible.
Feedback section	16 feedback modules. Configurable by using jumpers as digital inputs (e.g. for contact tracks or reed switches) or as track occupancy detectors (current sensor).
	Galvanical isolation of feedback modules and command station.
	Max. 3A current load per feedback input.
RailCom®	4 of 16 feedback sections can be used as RailCom feedback sections ("local detector"), if desired. Recognition of loco address.
Dimensions	86mm x 86mm x 25mm
Included in delivery	ECoSDetector feedback module, terminals, ECoSlink bus connection cable, extensive instruction manual.

ECoSDetector Extension



The ECoSDetector Extension module is connected sideways to the ECoSDetector. It receives all its commands by the ECoS-Detector. The extension will not work without the ECoSDetector.

ECoSDetector Extension

ECoSDetector Extension is meant for building an external track diagram via the ECoSDetector module, which will be connected with the ECoS. A track control panel is needed for comfortable switching of routes, especially within (shunting) yards and when the command station is operated in a distance further away.

Our philosophy is in the connection only and NOT to sell you a complete commercial track control panel. We rather like to offer you a solution which makes a completely self-build track diagram possible, or you might use a commercially available system (e.g. by Erbert®).

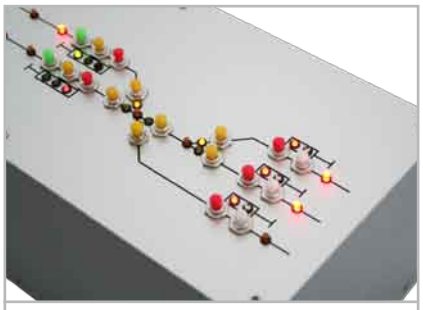
The ECoS will appropriately switch the LEDs installed for illuminating track occupancy sections or to display turnouts / signal settings. Moreover, should you wish to switch your turnouts and signals directly, external pushbuttons can be arranged. The input channels of the ECoSDetector module will read in the position of the buttons and forward the analysis to the ECoS. The ECoS will then carry out the respective commands. The track control panel needs inputs for the pushbuttons (those will be provided by the ECoSDetector) as well as outputs for illuminating LEDs (which are provided by the ECoSDetector Extension).

Outputs

Each one of the 32 outputs provides current up to 100mA max. Since these outputs are conducted as „open collectors", you are able to connect either small light bulbs or LEDs with a current limiting resistor directly to it.

The total current of all outputs must not exceed 1.5A! Any DC or AC transformer (15V - 19V) can be used for supply.

The transistor outputs of the ECoSDetector Extension module can be easily programmed within the required operational mode via your ECoS command station.



Example of a typical track diagram

Technical data ECoSDetector Standard

Operational modes	Directly connected to ECoSlink bus.
	Operation with ECoS command station and Central Station Reloaded V3.0.0 possible.
Feedback section	16 feedback modules as digital inputs (e.g. for contact tracks or reed switches).
	Galvanical isolation of feedback modules and command station.
Dimensions	86mm x 86mm x 25mm
Included in delivery	ECoSDetector Standard feedback module, terminals, ECoSlink bus connection cable, extensive instruction manual.

Technical data ECoSDetector Extension

Operational modes	Extension module for ECoSDector, is powered and controlled by it.
	Transistor outputs are powered externally.
Outputs	32 transistor outputs, 100mA output load each.
	Construction as "open collector" is connected to ground.
	Total current of all outputs is max. 1.5A
Dimensions	86mm x 86mm x 25mm
Included in delivery	ECoSDetector Extension module, terminals, extensive instruction manual.

ECoSlink Terminal

If your train layout is growing and you need additional ECoSBoost boosters and ECoSDetector feedback modules to connect to your ECoS command station or Central Station®, and you are running out of connectors, you should get yourself the ECoSlink Terminal.

More scope

The ECoSlink Terminal will be connected to the ECoS or Central Station® via the provided bus cable to the „Extend“ jack.

It offers on the front panel two jacks for hand controllers (e.g. mobile station®) and at the back four sockets for devices mounted under the layout. These include mainly ECoSBoost booster and ECoSDetector feedback modules.

The ECoSlink Terminal can provide power to all attached devices either with the help of the command station´s power supply, or supply a section by itself.This is especially useful for larger systems with many hand controls, boosters and feedback modules. In this case, an extern transformator should be connected.

More distance

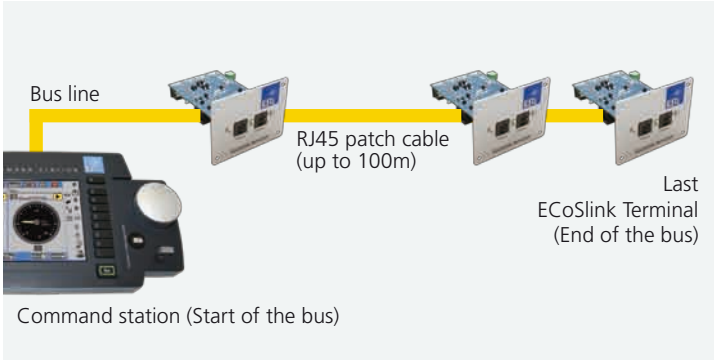
If more than one ECoSlink Terminal is used, the terminals can be connected to each other with standard Ethernet patch cables with RJ45 connectors. These patch cables can be purchased in any computer store in any length.

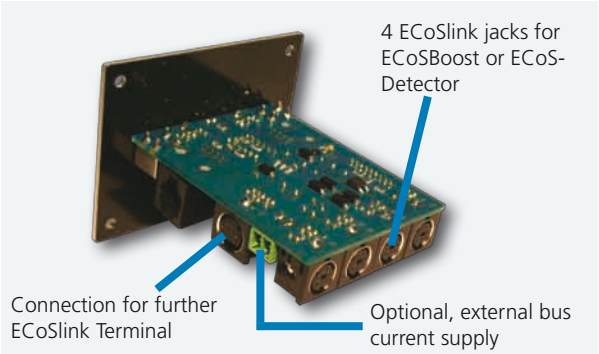
More organisation

Each ECoSlink Terminal is usually at the front panel of the layout installed: Only the front panel is visible. This reduces the cable clutter under the layout.

More flexibility

The ECoSlink Terminal can be used on ECoS and Central Station®. The CAN bus is only passively distributed together with the supply and booster cables and the termination is ensured. The function is transparent for the digital control unit. Since an interference in the communication of the bus does not take place, thus alone decide the control unit and the connected devices whether they will work together.





Ordering information

Art.No.	Description
50093	ECoSLink Terminal bus distribution board, 6 connect sockets with 0.9m cable

L.Net converter

The great variety of the ESU ECoS command station is so convincing to many model railroaders that they would like to replace their present digital station with an ECoS. This also has been inspiring the desire to continue to use the existing handheld throttles and feedback modules. The ECoSniffer input offered at least a solution for handheld throttles (in combination with „older"digital command stations), whereas the feedback modules couldn't be integrated into the system.

For the first time, it is possible to connect Uhlenbrock® or Digitrax® handheld throttles directly to the ECoS or Central Station 60212 „Reloaded", thanks to the ESU L.Net converter. Additionally, you can continue to use switch modules as well as feedback devices or integrate the infra-red Lissy® devices which support the well-known Loconet® communication protocol. The L.Net converter will offer the so-called Loconet™ „Master" and translate the received commands via the ECoSlink in a way the ECoS can understand them.
So, what can the L.Net converter actually do?

Handheld throttle throughout

With the L.Net Converter you are able to operate Loconet™-compatible handheld throttles directly with your ECoS. Hereby, the handheld throttle´s display will always stay synchronised with the ECoS. Furthermore there is no restriction to one data format. You can control an unlimited number of locos speaking DCC, Motorola®, Selectrix® or M4®, even if the handheld throttle alone does not have the capability to do this.

Particularly in Germany the popular Daisy®-, Fred®- or ProfiBoss® handheld throttles can be used, as well as e.g. DT400 or UT2 by Digitrax®.

The L.Net converter fully integrates them into the ECoS system. Via the ECoS you are able to assign the locos desired and call them up on the handheld throttle; or respectively use the easy-to-handle Fred® handheld throttles to assign the loco desired conveniently to the ECoS („dispatcher" function).

The power supply can be carried out by the L.Net converter, as long as the connected devices do not exceed a limit of 250mA.

Turnouts

Also Loconet™ switch modules can be operated. For the ECoS won´t make any difference if the turnout or respectively signal is controlled by a usual decoder or hangs directly on the Loconet™: All operation commands will be send to both systems parallely.

Feedback modules

You might already have Loconet® feedback modules for track occupancy detection. With the aid of the L.Net converter you may now continue to use those devices. The ECoS allows you to use the contacts for activating routes or shuttle train control.

Of course you can simultaneously use s88, Loconet® and ECoSDetector feedback modules.

To avoid any kind of electrical problems during such a mixed operation of systems, the L.Net converter is galvanically decoupled from LocoNet™.

Communication

Just larger layouts are operated with the support of a PC. Often there is used a self-made software, which has been optimised for Loconet™. The switch to an ECoS system which comes as an innovative and object-based communication model is thus quite rocky. However, the L.Net converter will solve this problem. From now on, the ECoS will send loco and turnout commands as well as feedback occurrences via the Loconet™ which can be read by appropriate modules, too.

The intelligent ESU L.Net converter allows you finally to replace your »old« command station completely with an ECoS without great effort.

Ordering information

Art.No.	Description
50097	L.Net converter to connect handhelds and feedback modules to the ECoS or CS 1 "Reloaded"

ECoSBoost

Indispensable components of any large model railroad are amplifiers (also called „booster"): If the power consumption of all of your moving trains including their functions, car illumination, and function models is larger than the current the command station is able to put out, you have to split up your layout into several blocks, the power for which is supplied by their own booster.
The ECoSBoost is designed for precisely that task: It is matched perfectly for the use with our ESU ECoS or the Märklin® Central Station®. The ECoSBoost is being offered in two variants: The 4 Amp version is perfect for H0 and smaller, while an 8 Amp version is suitable for the garden railroader. Just like ECoS, each booster comes with its own suitably dimensioned power supply.

Mode of operations

The ECoSBoost is connected directly to the ECoSlink jack from where it gets its control signals. Basically it is capable of amplifying and delivering to the track these data formats: DCC with RailComPlus®, Motorola®, Selectrix® and M4. Which data format will be put out in a given case depends, of course, entirely upon the command station that's being used and its capabilities: Therefore the booster, connected to an ESU ECoS, will handle DCC, Motorola® Selectrix® and M4, while, if attached to an original Märklin® Central Station® (without ESU update), it will amplify and deliver Motorola®-, respectively mfx® data signals.

Thanks to „Plug&Play", all ECoSBoost(ers) are included automatically into a list of extern ECoSlink components, and can be controlled and configured centrally on the ECoS display.

The correct firmware status is essential to make the ECoSBoost work properly with these command stations: If the interior software is too old, the booster will possibly not be recognised. Please check the system requirements.

Functions

ECoSBoost amplifies data signals generated by the digital central station, and delivers them to the designated track outlet. Depending upon model, there are 4, respect. 8 Amps continuous current available. Subject to current draw, the 4 Amp version, designed for H0 and smaller gauges, can handle up to 10 locos, according to their power requirements. ECoSBoost power comes from an included power supply, featuring a stabilised DC output. Each ECoSBoost is controlled and configured comfortably directly by the ECoS:

For each booster you can individually determine its max permissible output current. What's more, the display can be dialled up to show you the present power consumption of each booster, so you know how much „reserves" you still got.

Extremely useful is the option to tell each booster individually, weather or not to shut down its section in case of a layout short circuit. For example, if you have your switch (turnout) decoders hooked up to a separate ECoSBoost, you can still control your switches reliably in case of a track short.

Feedback

An ECoSBoost can do more than amplify and deliver track current: Each one has incorporated, as a standard feature, a feed back function (Global Detector) for the NMRA Bidirectional Communication (RailCom®). This is immensely helpful to either read out CVs on the main track or find RailComPlus®-capable decoders within the booster section, which we be automatically detected.

The ECoSBoost is additionally able to operate M4 feedback: All mfx®-locos, which are energised by the booster, act exactly the same like being operated directly by the command station. They will, of course, be immediately recognised or will transfer changes in configuration.

Protection

Each ECoSBoost of course meets the relevant requirements regarding safety and operation on a layout: The track outlet is protected against overload as well as short circuits. Of course ECoSBoost can differentiate between a „genuine" short, and a momentary current drain when passing over switches or gaps. We place value on the indestructibility of the device, just like we do with our loco decoders.

Future built-in

The operational software of each, in an ECoSBoost integrated micro controller can be updated. The required upgrade is performed automatically by the ECoS command station, if necessary. No action on your part is required! This means you don't have to worry about a thing! Your ECoSBoost is literally always „up to date"!

FAQ

Is the ECoSBoost suitable for three rail layouts? What do I have to consider?
Of course, you are able to use the ECoSBoost for three rail layouts, too. If you use ESU booster only, a separation of the middle conductor between the track sections is enough. Should you wish to use boosters of different manufacturers, we recommend you, in order to prevent short circuits, to in install a „slider lifter" at the passing of the dividing point between two track sections.

Can the ECoSBoost be operated with the Central Station® 2?
No, I can´t. This command station speaks an incompatible CAN bus protocol.

Is the booster able to amplify all different digital protocols at the same time?
Oh yes, it is. You can chose via the command station the order of the data formats and also which data formats should be used.

How many ECoSBoost can be operated with one ECoS?
As up to 128 devices are allowed for the EcoSlink Bus, you could theoretically use up to 128 ECoSBoost devices.

Do I have to send the Booster in to have an update done?
No. This will happen automatically when you connect your ECoSBoost with a ESU ECoS command station. The ECoS command station always includes the latest firmware and will update the ECoSBoost automatically via the ECoSlink bus.

Ordering information

	Art.No.	Description
	50010	ECoSBoost ext. Booster, 4A, MM/DCC/SX/mfx, set with power supply 120-240V, EURO + US, English manual
	50011	ECoSBoost ext. Booster, 8A, MM/DCC/SX/mfx, set with power supply 120-240V, EURO + US, English manual

Technical data 4A

Hardware	H4-Booster with 4.0 A continuous-load output. Outputs short circuit proof. Thermal overload protection. Galvanically isolated ECoSlink and track connection.
	Integrated NMRA DCC BiDirectional feedback detector with cutout device.
	Integrated M4 feedback device.
Operational modes	To use with ESU ECoS or Märklin® Central Station®.
	Supported protocols (depends on command station): NMRA DCC, Motorola®, Selectrix®, M4.
Dimensions	180 x 76 x 40 mm
Included in delivery	ECoSBoost with 4.0 A continuous-load output, power supply 15V-21V / 5A (90VA), terminals for track- and programming connection, extensive instruction manual.

Technical data 8A

Hardware	H4-Booster with 8.0 A continuous-load output. Outputs short circuit proof. Thermal overload protection. Galvanically isolated ECoSlink connection.
	Integrated NMRA DCC BiDirectional feedback detector with cutout device.
	Integrated M4 feedback device.
Operational modes	To use with ESU ECoS or Märklin® Central Station®.
	Supported protocols (depends on command station): NMRA DCC, Motorola®, Selectrix®, M4.
Dimensions	180 x 76 x 40 mm
Included in delivery	ECoSBoost with 8.0 A continuous-load output, power supply 19V / 9.5A (180VA), terminals for track- and programming connection, extensive instruction manual.

ECoSControl Radio

Today we are proud to present the ideal expansion for your ESU ECoS command station or your Central Station „Reloaded“ with the ESU Update V3.0.0 to you: The ECoSControl Radio gives you the opportunity to control locos, stationary decoders and routes via state of the art radio communication.

Wireless radio communication

The ECoSControl Radio remote control unit is equipped with ultra-modern radio technology that enables it to communicate with a radio receiver. The radio receiver is plugged into the ECoSlot terminal of your ECoS command station or your Central Station® „Reloaded“ and the regarding command station powers it.

This modern, fast and duplex communicating radio technology achieves a range that allows a reliable operation of your layout under normal circumstances at any time. Due to its radio technology you do not necessarily need intervisibility between the remote control unit and the radio receiver; radio waves even pervade walls and there is no interference by sun or neon light, whether outside or in the basement.

Ergonomics and functions

Once you hold the ECoSControl Radio in your hands you will immediately find that its shape was influenced by ESU´s long lasting experience about the design of throttles: Due to its ergonomically engineering you can reach all function keys very easily, the arrangement and marking of the buttons is plausible. A large display informs you about your locos and turnouts. The remote control unit is to handle as easy as your mobile phone.

One unique feature is the thumb joystick. The more it is pushed up, the more acceleration the loco gets. This kind of innovative operation, developed by ESU, can even be controlled blindly: You can concentrate your attention to your layout and locos.

Interaction

The ECoSControl Radio remote control unit is perfectly adjusted to be used in combination with your ECoS command station. The ECoSControl Radio allows to switch magnetic-electric accessories and routes directly on the display. Your ECoS will synchronise the data with your remote control unit, so you do not need to enter the data locally. All basic properties such as the name of the loco, its symbol and function key assignment (latching or non-latching) will be transmitted and correctly indicated on the display.

For magnetic articles and routes the correct symbols, names and addresses will be shown, too, of course.

How to operate a loco

The ECoSControl Radio is capable of controlling up to 100 locomotives. It naturally recognises 14, 28 or 128 speed steps and takes over all settings of the respective locomotive. Each loco controlled by the ECoS command station can also be controlled by the ECoSControl Radio remote control unit, independent of its protocol. For each of the (up to 20) function keys assigned to a loco you can decide whether it will be latching or non-latching.

Switch stationary decoders

All in all you can transmit and control up to 8 ECoS keyboards together with respectively 16 accessories such as turnouts or signals. The difference between 2, 3 and 4 aspect magnetic- electronic accessories will be, of course, retained and the correct symbol will be shown on the display.

More fun at play

A dot-matrix backlit LCD display always informs you about the most important operational parameters such as loco address, loco symbol, current speed step (speed) as well as function key status.

The ECoSControl Radio indicates if a loco was assigned by another operator or if there is an emergency stop on the layout.

Extension

When your layout is growing, you can, of course, use up to 6 ECoSControl Radio remote control units per receiver module. In this way every family member is able to control his or her locos independently.

FAQ

Which radio frequency is used by the ECoSControl Radio?
The device works within a 2.4GHz band. That makes operation both in the USA and Europe possible.

Do the ECoSControl Radio and the mobile control 50100 handheld work together?
Unfortunately not. Due to its different radio frequency the ECoSControl Radio and the mobile control do not work together.

Will the mobile control handheld still be produced?
No. The ECoSControl Radio is intended to replace the mobile control handheld completely.

Is it possible to use it in combination with other command stations?
The ECoSControl Radio was especially developed for the use with the ECoS command station, respectively for the Märklin® Central Station® 60621 with the ESU Update V3.0.0 Reloaded. The use with all other command stations is, unfortunately, not possible.

How big is the hand controller?
The size is approximately 18.0cm x 7.5cm x 2.5cm and is compact enough to be operated even with one hand.

What is the difference betw. the ECoSControl Radio and the Bachmann® Dynamis®?
ESU developed the Bachmann® Dynamis®. It uses Infra-Red technology to connect to the receiver, the full functionally system is an affordable DCC-System (incl. Booster) for beginners and users they like to switch to a modern digital system.
The ECoSControl Radio uses radio technology to work as a wireless full function remote control unit with the ESU ECoS. The remote control unit looks like the Dynamis® but inside the enclosure it is totally different. The display has a full graphics capability and the unit can control more locos and accessories as the Dynamis®.
It is possible to connect the Dynamis® system to the ECoS sniffer port und use it.

Can I also use rechargeable batteries?
Certainly. The ECoSControl Radio works with both (alkaline) batteries and rechargeable NiCad or NiMH batteries.
With each ECoSControl Radio we will supply a kit of 4 NiMH rechargeable batteries and a charger as well.

Ordering information

Art.No.	Description
50111	ECoSControl Radio, wireless handheld + receiver set for ECoS or Central Station «Reloaded», English manual
50112	ECoSControl Radio, wireless handheld for ECoS or Central Station «Reloaded», single handheld, English manual

Navigator

The Navigator is an independent digital command station for model railroaders who operate a small or a midsize layout. Thanks to its bi-directional infrared technique, the Navigator allows wireless control of your locos!

Run locos

The Navigator controls up to 40 locomotives; locos speaking DCC or Motorola® are appropriate. Depending on the decoders´ abilities, the Navigator switches up to 21 functions per locomotive and is able to handle up to 9999 addresses in DCC mode or up to 255 addresses in Motorola® mode. Of course every loco can be named and assigned individually with an adequate symbol. You can also drive multiple consists with the Navigator; up to 6 locomotives can be moved at the same time.

Switch magnetic accessories

The Navigator also switches magnetic accessories and turnouts. It doesn´t matter whether you still use the original Märklin® k83 or k84, or the SwitchPilot; you may construct up to 100 magnetic accessories on your layout and switch them. The Navigator handles Motorola® and DCC decoders.

Technical data

Central unit	H4 booster with 3.0A continuous output-load.
	H4 programming track output with 0.25A.
	USB computer interface.
	Märklin® Motorola® old and new, with 14 or 28 speed steps. DCC with 14, 28, 128 speed steps.
	Up to 9999 addresses in DCC operation; up to 21 functions per loco; in Motorola® operation up to 4+1 functions.
	Up to 255 addresses in Motorola® operation (depending on decoder available).
	Märklin® Motorola® and DCC track formats to control magnetic accessories.
	Up to 40 loco objects and 100 switching objects possible.
	All DCC service modes programming on programming track, POM (programming on the main). Programming of Motorola® decoders on programming track.
Remote control unit	Wireless bi-directional IR communication.
	Backlit FSTN LC dispay (custom designed); displays name of loco, speed, driving direction, state of function keys.
	11 function keys + shift key to activate 21 functions each per each.
	4 menu keys. Emergency stop and direction switch key.
	4-way joystick for speed control and loco selection.
	2 battery cases for rechargable batteries (current supply).
IR receiver	Wide range receiver including 5 IR transmitter diodes and 2 receivers.
	Direct connection possible or extension via 8-pin plug cable. Wall fastening possible.
Included in delivery	IR receiver module, IR remote control unit, power supply 15V-21V (90VA), terminals for mail track & programming track connection, carrying strap for remote control unit, set of 4 batteries (Alkaline, "AAA"), instruction manual

Locomotive settings

The Navigator supports you with the programming of the decoders via its clearly structured operation interface. All CVs of DCC decoders can be read out (!) and changed on the programming track. If you use programmable Motorola® decoders (e.g. Märklin® mfx® decoders), you are able to change all appropriate registers (01-80) without any difficulty.

Features and operation

The Navigator remote control unit communicates via a wireless infrared technique with the central unit (receiver), as long as you are within a radius of approximately 22 feet (7 m). The wide-angle optic-infrared communication will take care that you only have to produce a visual contact; you do not need to target the receiver.

The advantageously shaped and well-balanced body with a centered back-lit (FSTN) display allows you direct access to the speed and the first ten functions of the selected locomotive.

Your thumb easily controls the locomotive's speed with the unique „joystick".

The Navigator is operated with 4x AAA batteries and can be worn around the neck using the provided strap.

Central unit

The receiver unit includes a complete central unit and a booster with 3A output current for the main track connection, a programming track output for reading and reprogramming decoders and a computer interface.

The Navigator can be connected to a PC via the USB computer interface; thus you are able to directly control your locomotives and turnouts.

Usually, the infrared (IR) receiver will be plugged into the central unit. It establishes a connection to the remote control unit, and has to be placed in a reachable position so that a visual contact is provided. Thanks to its special wide-angle optics, it covers a distance of almost 180 degrees. If the IR receiver and the central unit are to be separated due to space limitations, it is possible to attach an extension cable.

Power supply

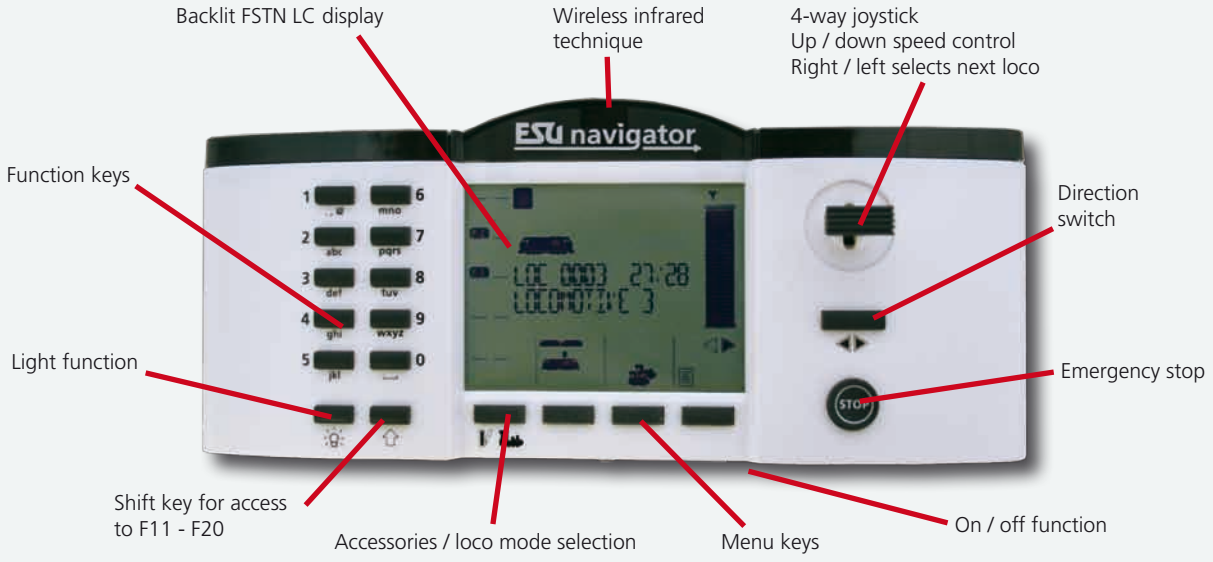
Every Navigator system comes with an appropriate power supply. The output current can be set between 15V - 21V, suitable for the gauge of your layout.

Additional handhelds

Quickly, the wish for additional remote control units will arise. You can use up to 4 devices in combination with your Navigator without any restrictions. Every player has access to all locomotives, multiple consists and switches. A dynamic transfer of locos from one remote control unit to another increases the fun to play.

PC connection

Of course you are able to connect the Navigator to your PC and control your model railway layout - appropriate software is a must.



Ordering information

Art.No.	Description
50300	Navigator digital system, MM/DCC, wireless infrared, 3A, Set including power supply input 240V Euro, output 15-21V, German & English manual
50301	Navigator digital system, single handheld for extension, including accessories (batteries, lanyard)
50305	Cable harness, 7-pin Mini-Din plug on 6-pin Mini-Din plug to connect ECoSBoost / Navigator to ECoS

Switch & magnetic accessory decoders

On all model railway layouts there are stationary devices switched and controlled by a digital command station, such as turnouts, form signals, light signals, railroad crossings, water cranes or other functional models.

Especially the digitalisation of turnouts and signals is absolutely necessary if you want automatic layout operation or if you like to work with routes.

In order to be able to control turnouts and routes the so-called accessory decoders will be required. Those are usually mounted firmly on the layout board and receive their commands directly from the digital command station.

The command station will send control commands which will be understood and processed by the switch accessories.

Depending on the nature of the to-be-controlled function, we usually distinguish between several decoder types:

- **Magnetic accessory decoders** are typically used to control turnouts with magnetic coil drives (e.g. PECO® PL10 is a low current option). Two decoder outputs per drive are needed. The drive receives just a short impulse to switch in order to avoid any overheating or burning.
- **Switch accessory decoders** are able to switch light signals or street lighting. The decoder output remains typically switched on until manually switched off again.

An important question regarding the use of switch accessory decoders is, if a consumer should be only switched or if a potential-free separation has to be carried out.

For the last case you will need a relays, e.g. in order to be able to switch of the track voltage with the decoder in front of a red signal or feed a track section with either brake or digital voltage.

Relays are also needed if you use a motor-switch drive (e.g. Tortoise®, Tillig®): In this case the polarity of the turnout motor needs to be switched with the help of two relay outputs.

In other cases (e.g. light signal), the consumer (e.g. LED) can be directly supplied by the switch accessory decoder´s voltage.

- If you like to use a servo to control your turnouts or models instead of coil or motor drives, you will need a specialised **servo decoder**. They generate the required voltage for the servos as well as the special control signal. The servo decoder also determines the rotating speed and the final position of the servo.

ESU´s solution

ESU offers a solution for the three above-sketched issues in regard of our SwitchPilot decoder family including two SwitchPilot decoders and a relay extension module which can be, if needed, additionally purchased and docked on to the side. Depending on its operation, several solutions are possible:

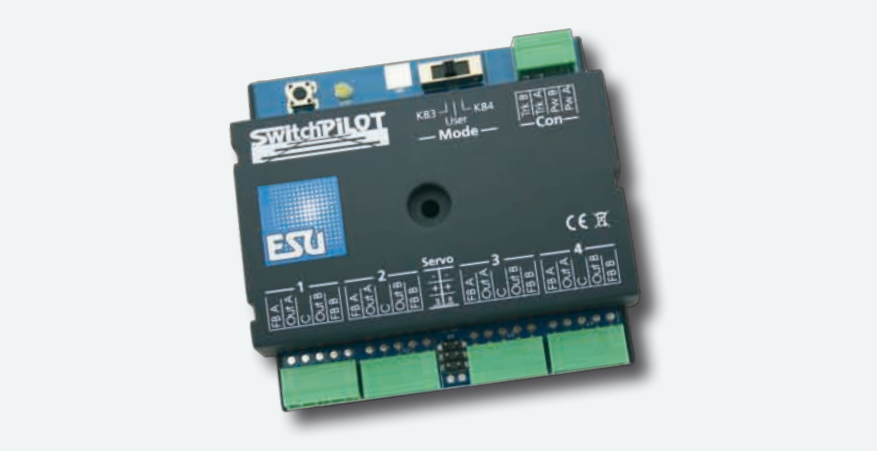
- The **SwitchPilot** switches turnouts with coil drives and generates the required impulses. It is fully-programmable and multiprotocol-capable.
- If you wish to control light signals or street lightings which are directly supplied by the decoder, the **SwitchPilot** will also be the perfect choice.
- If you wish to control servos you should go for the **SwitchPilot Servo**. It controls 4 servos separately.
- If you like to use motor-switch drives (e.g. Tortoise® or Tillig®), you will need a **SwitchPilot** and the relay **SwitchPilot Extension**.
- Should you wish to polarise frogs, you will need the **SwitchPilot Extension** as well the **SwitchPilot**, respectively the SwitchPilot Servo.
- The combination of **SwitchPilot** and **SwitchPilot Extension** will be a perfect solution if you like to switch a block section currentlessly or supply it with a brake signal beside the light signal.

On the following pages we will introduce the single SwitchPilot modules in detail. Whatever you want to switch on our layout, the Switch Pilot should be able to handle it.

Ordering information

Art.No.	Description
51800	SwitchPilot V1.0, 4-pin magnet article decoder, 2xServo, DCC/MM, 1A
51801	SwitchPilot Extension, 4x relay output, extension for SwitchPilot V1.0
51802	SwitchPilot Servo V1.0, 4-fach Servo decoder, DCC/MM, RailCom®
51804	Servo Motor, precision miniature servo, operated by a micro controller with plastic gear drive, including mounting kit
51805	Servo Motor, precision miniature servo, operated by a micro controller with metal gear drive, including mounting kit
51810	Servo extension cable: 3-pole J/R plug on J/R / Futaba socket, length: 75cm

SwitchPilot



The SwitchPilot is a tough multiprotocol switch, and turnout decoder for activating up to 4-twin coil magnetic accessories (e.g. turnouts) or 8 loads, like remote uncoupling tracks, or lamps (e.g. turnout,-street,-or building illumination). Due to its intelligent software it can be utilised with DCC or Motorola® and comes in a robust housing.

Modes of operation

SwitchPilot can be used with DCC or Motorola®. It is compatible with the DCC-Norm and reacts to switch commands. In Motorola® mode, addresses 01 – 127 are possible. Recognition of control mode is fully automatic.

Functions

The SwitchPilot can be powered either directly by the digital central station itself, or separately by a DC-or AC source (transformer). Up to 4 twin coil actuators of all known manufacturers can be connected to its 8 transistorised outputs, each delivering 1 Amp steady current.

In order to avoid coil burn out of actuators without built-in protection, the switch-pulse length at each outlet can be chosen freely between 0.1 and 1 second. In this mode the SwitchPilot performs k83-compatible.

Alternatively, each output can deliver continuous power for setting up light signals or other consumers such as routes, or illumination of streets and buildings. Special effects, such as cross fading ("zoom") or Mars Lights help to realise prototypical lighting situations, e.g. warning at crossings etc.

Here the SwitchPilot assumes the more important features of the well known k-84 decoder.

Servo control

The SwitchPilot can do even more, apart from the transistorised outlets, two conventional RC-Servos can be controlled directly through the SwitchPilot. For each Servo not only lever speed can be adjusted individually, but also its end positions. Thus it is possible to operate prototypically slow and powerful turnout motors, independent of track- gauge and system, e.g. for driving signal arms or crossing gates.

Feedback

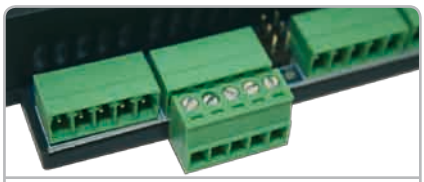
However, SwitchPilot wouldn't be a typical ESU-product, if it couldn't do even more. In combination with an ECoS command station as an ideal partner, SwitchPilot can detect and show the actual position of the switch points, if you rig the turnout mechanically. At last you can be sure the turnout is really thrown correctly!

Programming

The SwitchPilot can be programmed comfortably. For one thing it supports all DCC-modes of programming, including POM (Programming on the main). Assuming a central station with an outlet for a programming track, all adjustments can be controlled and modified. On the other hand, you can allocate addresses via the programming key directly from the SwitchPilot. Push a button – a command is triggered at the center – finished!

Protection

As was the case already with our mobile (loco) decoders, in the design phase greatest emphasis has been placed upon near indestructibility of the SwitchPilot. All transistorised outputs are protected against overload and short circuits. That means ESU-quality is also built into our stationary (turnout) decoders. You can rely on it!

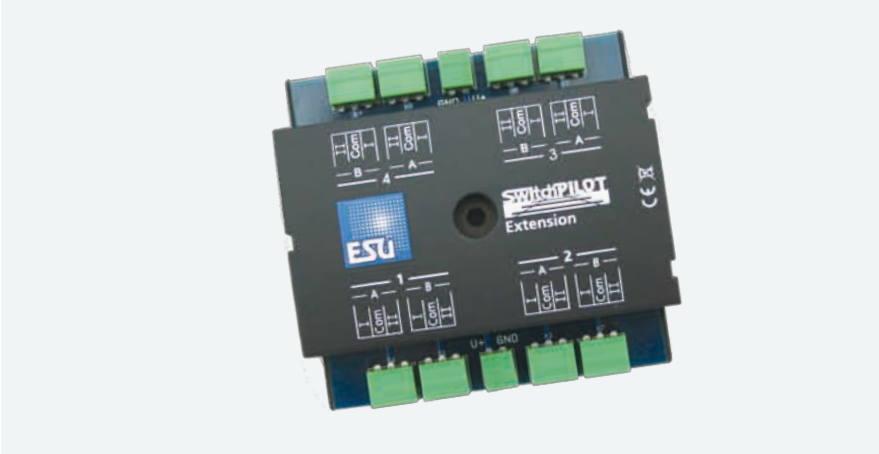


Removable connection terminals

Technical data

Operational modes	NMRA/DCC "Accessory decoder" compatible.
	Motorola® with up to 127 addresses. K83 compatible.
	Powered either by command staton or separately DC - or AC source (transformer) up to 18V AC.
Transistor outputs	8 Transistor outputs, 1.5A (2.0A) load per output, grouped by 4 double outputs.
	Outputs short circuit proof and protected against overlad. Selectable switch pulse length from 0.1s to 1.0 s (or continous output). Flashing or cross fading also available.
Servo Control	Controls up to 2 RC-Servos (Graupner® JR® or Futaba® compatible), 1.0ms to 2.0mS pulses, positive. Separately adjustuble lever spped and end positions.
Feedback	8 feedback inputs, detects actual position of the switch points. Display on ECoS screen.
	RailCom® transmitter for sending the data to the digital command station.
Dimensions:	86mm x 86mm x 25mm
Included in delivery	SwitchPilot 51800, detailed instruction manual.

SwitchPilot Extension



▶ If required, SwitchPilot and SwitchPilot Servo can be augmented with the SwitchPilot Extension module. Plugged in at the side of the SwitchPilot, it offers four relay-driven outputs, used for switching potential-free loads, or for polarising the frog; the ideal supplement for tricky circuitry.

Modes of operation

The SwitchPilot Extension module only works in conjunction with a SwitchPilot. Plugged in at the side, it gets its electrical power directly from the SwitchPilot.

It contains a total of 4 Twin-Relays (2 x DPDT), of which each is dedicated to a pair of transistorised SwitchPilot outputs. The respective relay's switch position is directly dependent upon the state of this pair of outputs.

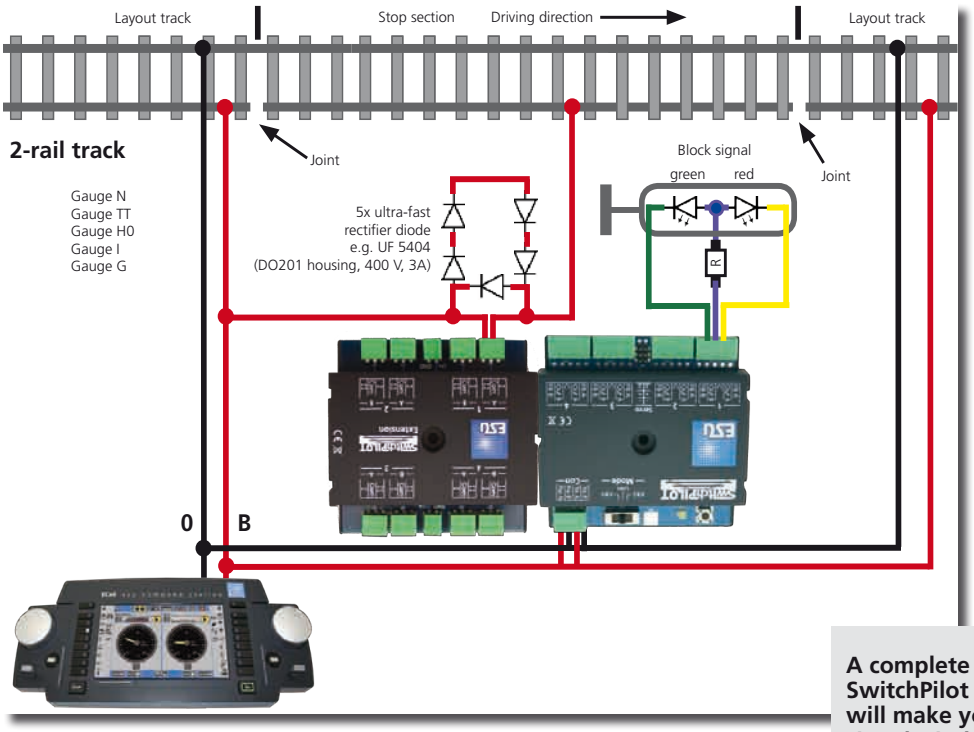
With the relay's help, loads can be switched, galvanically separated from the rest of the track (it functions like a k84), or a motorised turnout can be polarised.

With the relay's 1.5 Amp continuous rating, either frogs can be polarised-, or blocks powered signal dependent, or motorised devices, such as (water) pumps may be switched.

Especially intricate is the option to control motorised turnouts: Of course the SwitchPilot Extension module easily handles the necessary motor polarisation for this purpose as well.

While being used with the SwitchPilot Extension, The SwitchPilot can be used for building block sections.

ESU SwitchPilot decoders will also help to control the light signals as well as carry out train control via the ABC brake technique.

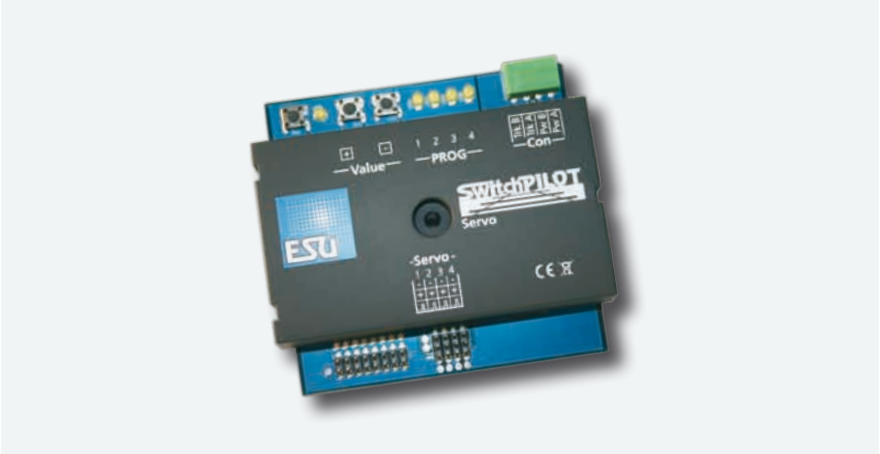


A complete track section with SwitchPilot, SwitchPilot Extension and ABC-brake technique will make your locomotives stop in front of a red signal. Find more infomation on our website.

Technical data

Operational modes	Accessory module for use with SwitchPilot, supplied by it. Control of relay outputs by SwitchPilot.
Outputs	4 relay outputs 2x UM (DPDT) equipped with terminal block for switching of potential-free loads or polarising the frog.
	Alternatively, each relay output could be used to reverse the polarity for motorised turnouts.
Dimensions	86 x 86 x 25mm
Included in delivery	SwitchPilot Extension Modul, detailed instruction manual.

SwitchPilot Servo



The SwitchPilot Servo is a specialist among functional accessory decoders: it was specifically developed for controlling up to four remote-controlled servo motors. The SwitchPilot Servo controls these actuators very precisely and thus is able to control not only switches, but also other slow motion sequences.

Modes of operation

The SwitchPilot Servo can be used with DCC or Motorola® protocols. It is compatible with the DCC norm and reacts to switch commands. It is possible to operate turnouts from 01 to 508 under Motorola® use. Recognition of control mode is fully automatic.

Functions

The SwitchPilot Servo can be powered either directly by the digital central station itself or separately by a DC- or AC source (transformer). RC servos or ESU servo motors can be directly connected to its four servo outputs. The 5V voltage needed as well as the special control impulse is generated by the SwitchPilot Servo itself. For each servo, not only lever speed can be adjusted individually but also its two end positions. Thus it is possible to operate especially prototypically slow and powerful turnout motors, independent of track- and gauge systems. You could also employ the SwitchPilot Servo for driving signal arms or railway crossings. Also the automatic opening of engine shed doors does not need to remain a dream.

Programming

The SwitchPilot Servo can be programmed comfortably. For one it supports all DCC modes of programming including POM (programming in the main). Assuming a command station with an outlet for a programming track, all adjustments can be controlled and modified. As RailCom® is integrated, it is also possible to read out and control recent settings, even during operation.

Alternatively you can use the comfortable three-button input. You are able to control addresses, the end positions of all four servos and the corresponding motion speed directly, during operation and without any complicated programming, on all command stations!

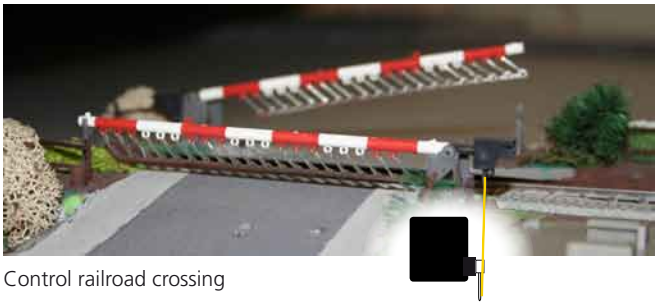
Analogue operation

The Switch Pilot Servo would not be a typical ESU product, if it had not even more to offer: You can operate the decoder without the use of a command station! Conventional switches can be controlled with the help of eight switch inputs. Therefore fans of "classic" analog model railway can benefit from the advantages of the servo motor.

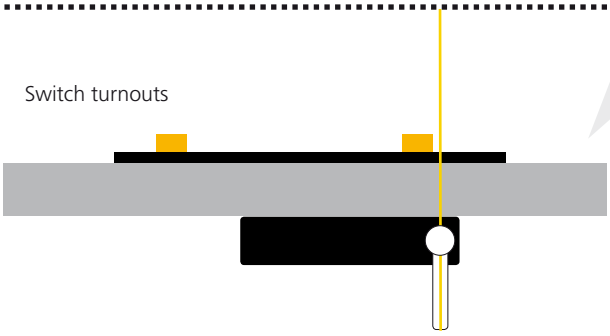
In other words: the SwitchPilot Servo does not need a command station to switch and set servo paths as well as speed.

Technical data

Operational modes	NMRA/DCC "Accessory Decoder" compatible
	Motorola® compatible up tp 127 addresses. K83 compatible.
	Powered either by command station or separately DC- or AC source (transformer) up to 18V AC.
Servo outputs	4 servo outputs for RC servos (ESU, Graupner® JR® or Futaba® compatible), 1.0ms to 2.0mS pulse length, positive. Lever speed and end positions separately adjustable.
RailCom®	Integrated RailCom® feedback for reading CVs on the main track and reporting the servo position to the command station.
Input keys	Programming either directly to command station via DCC or input key, consisting of 3 buttons and LED display (5 LEDs) for direct address indication as well as two end positions and lever speed of all 4 servos.
Dimensions	86 x 86 x 25mm



Control railroad crossing

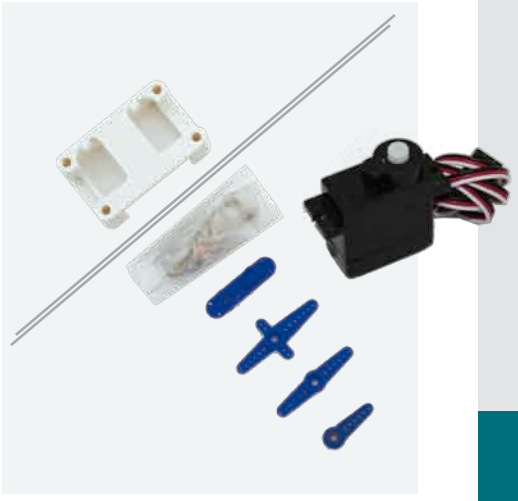


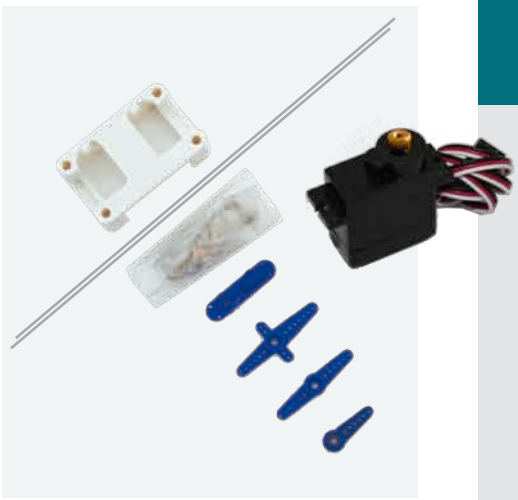
Servo motors

The Precision Servo Motors are two high-performance actuators, introduced by ESU, suitable for the SwitchPilot decoders. They use a classical mechanical system known from RC model-making and were perfectly adjusted for the use with model railway systems. Since these servos are adjusted for model railway use, they are not typical "common servos" in the usual sense of the phrase.

There are two versions of the servo, one comes with plastic gearing for normal applications; the other one with metal gearing for extreme requirements. All in all the functions are identical.

A SwitchPilot or (even better) a SwitchPilot Servo will be required to control the servos.





Applications

The most important application regarding the Precision Servo Motor is to throw points. With the help of the servo motor you are able to move your model railway switches like the original ones. The switch blade moves slowly and powerfully from one position to another. While doing this the servo motor works almost noiselessly due to the precision gearing made of long-lasting plastic.

It is mere child's play to motorise railway crossings with the servo motor. At last you can let the gates down at your keyboard in due time. Furthermore the servo motor enables you to open and close the doors of your engine shed by remote control.

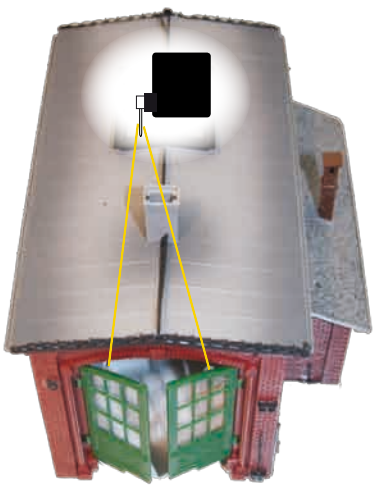
Mini servo

The most important component of the servo motor is a tiny, 9-gram-light mini servo which has been specially developed and optimized for all demands of a model railway layout. Despite its small dimensions of only 26 mm x 13 mm x 24 mm, it reaches a power of up to 1.0 kg/cm (the metal gearing version even 1.8 kg/cm). Its cable length of 30cm (almost twice as long as cables of other standard servos on the market) allows for a longer distance between the servo motor and decoder. Beyond that, an electronic processor-controlled servo enables a precise heading for the required position without bucking.

However, one of the most important improvements of the new Precision servo motor has to do with the switching-on: The well-known tremor when switching on the layout, which occurs with a lot of conventional RC-servos, is 100% choked during every operation mode. You will hear absolutely nothing from the servo when switching your layout on, no railway crossing will bounce. Furthermore, the ESU servo motor will not "press" any further, the "growling" within the end positions known from other servos will not appear!

Accessories

To make the application of the Precision Servo Motor as easy as possible, we have included substantial accessories: among some, diverse control horns, there is a special servo horn for a direct insert of the controlling wire. The controlling wire is, of course, included as well as the mounting screws. The most important accessory is a special servo holder: it enables you to install the Servo Motor either horizontally or vertically - depending on the application.



Open loco shed doors

Technical data

Mini servo	Supply voltage: 4.8V - 6.0V DC (default 5V)
Power	Up to 1.0 kg/cm (plastic gearing) Up to 1.8 kg/cm (metal gearing)
Length of wire harness	approx. 120mm
Accessories	• Servo holder • Servo horn for controlling wire • Control horn • Mounting screws • Controlling wire • Drilling template
Dimensions	26 x 13 x 24 mm

Drive better with the 4th...

The new generation of ESU decoders

Often neglected by many model railroaders but, however, one of the most important components for a smooth operation on the layout: the digital decoder. Internally installed, they act as the loco´s "brain" and do the mental work, such as determining the driving characteristics and operation possibilities of every single motorised vehicle on the layout.

Although there is an immense multiplicity of digital decoders on the market, thousands of model railway fans and manufacturers trust in the superior quality of ESU decoders, since 2001. There are multiple reasons for their decision.

Beside the robust and durable hardware design, the unproblematic operation on (almost) all layouts is for sure of significant importance.

Right from the beginning, we consistently relied on multi-protocol decoders equipped with a fully automatic recognition of the operational mode and the ability to switch it "on-the-fly".

A substantial support of analogue modes and – most important – all common brake distances is essential for us, as well as consequently using new technologies, such as RailComPlus®.

Our current decoders of the 4th generation shine once again with a carefully selected blending of proven functions and new ideas. We would like to provide you with the general features of all ESU V4 decoders first, before we introduce each decoder in detail on the following pages.

There should be an appropriate decoder for every use and environment available. We basically distinguish between two types of ESU decoders:

- **LokPilot:** Mobile decoder to control locos or functional models.
- **LokSound:** The "classic" ESU product combines a mobile decoder plus an extensive sound part. A LokSound decoder is literally a LokPilot + sound in one module.

Both decoder types are available in several versions for all different gauges, micro decoders are primarily meant for N gauge locomotives whereas "XL" decoders are made for all fans of larger scales.

There are additional versions offering all different data protocols, enabling you to select the appropriate decoder type for your layout, according to your preferences.

At last you may even choose the suitable interface connector for your locomotives.

Operational modes

ESU V4 decoders are normally multi-protocol decoders, meaning they speak all common data formats such as **DCC, Motorola®** and **Selectix®**. In DCC mode 14-128 speed steps are possible, as well as 2- and 4-digit addresses. You can activate up to 28 functions, if desired also with a serial function mapping transmission required by the older LGB® MZS® or Lokmaus®.

Thanks to **RailComPlus®**, the decoders will be automatically recognised by a suitable command station (e.g. ECoS) as quick as lightning and will receive a new address, if necessary. Forget about the annoying programming of addresses.

ESU V4 decoders are able to control all **DCC** programming modes und thus can be driven and programmed by all DCC-compatible digital command stations. Beside the classic programming track function, CV values can be read out on the main track with corresponding command stations, thanks to RailCom®. There are indexed CVs for command stations which are only able to program CVs from 1-255 (e.g. ROCO® Multimaus) to ensure that you can also reach higher CVs.

Motorola® users benefit from – depending on the command station – up to 28 speed steps with 256 addresses. Three further Motorola® addresses allow the activation of 16 functions. The installed programming mode makes re-programming with the Control Unit® 6021 also possible.

Beyond that, some decoders speak a fourth data format, the so-called **M4 protocol**. It ensures an automatic recognition of the decoder by mfx®-compatible command stations (e.g. Märklin® Central Station or mobile station®). Reprogramming of M4 decoders is still possible with the mentioned command stations, like with original Märklin® decoders. ESU is a 100% compatible.

Moreover, all ESU V4 decoders can be operated on **analogue DC layouts**. Of course, the decoder needs considerably more power until the loco starts to drive – if so, then start-up delay has to be set. Most of the decoders also work on **AC layouts**.

The most important feature of all ESU V4 decoders is the support of **brake sectors**. Every brake section module generates a typical signal current which has to be recognised by the decoder to initiate the braking procedure.

Braking can either be accomplished with the braking delay set in CV 4 or by defining a constant braking distance. In this case the locomotive will stop after a certain distance regardless of the speed it was travelling before the brake command.

ESU V4 decoders auto-detect the known Märklin® braking sectors as well as the ZIMO® HLU braking commands or the Lenz® ABC system. Braking with DCC brake generators or with DC ("Brake on DC") is supported.

Furthermore you will be able to stop your train by using the Selectrix® braking diode. If provided you may be able to trigger slow movement besides the normal stopping.

As you would not expect anything else from ESU decoders, the decoder automatically switches between the different operating modes "on-the-fly". In most cases one does not have to adjust anything.

Motor control

All ESU V4 decoders (with the exception of the pure function decoder for models without a motor) are equipped with fifth generation load compensation. The control frequency can be adjusted – if so desired - to the speed and facilitates an even better, very soft, absolutely silent drive with most motors.

Load control can either be adjusted to the model manually with the aid of 5 parameters or by using the **"auto tune"** feature of the decoder. This results in automatic adjustment of the motor characteristics in a test run. Never was it easier to adapt the control parameters to the motor.

ESU decoders control all motor types without any problem, regardless if they are "classic" Märklin® motors, Fleischmann® round motors or coreless motors (e.g. Faulhaber®) or modern motors with flywheel(s).

With **Dynamic Drive Control (DDC)** You can limit the influence of load control and thus you will be able to finely control your locomotive in the yard and when traversing turnouts while the speed will be prototypically reduced while travelling (at higher speeds) on a gradient on the mainline.

Functions

Since there is always something to be switched virtually in a locomotive all ESU V4 decoders offer 4 up to 12 function outputs. Generally speaking they supply 250mA each for the connected loads and are all protected against overload and short circuit.

Each function output can be adjusted to certain effects. All important lighting functions such as blinking lights, flashing lights, alternate blinking, simulation of the firebox, fluorescent lamps, etc. are supported. The brightness can be adjusted separately for each output. If so desired, it is also possible to provide dimming (upper beam headlights vs. low beam). The LED mode assures the fading up and down also look prototypical with state-of-the-art LED lighting.

Furthermore the decoders support automatic couplers including the necessary movements (backing up to the train, uncoupling and subsequent forward movement for ROCO®, Krois® and Telex® couplers (the so called "coupler waltz") and also have special settings for operating Seuthe smoke generators.

In addition to the 4 function outputs you may connect 4 additional servos to the "XL" decoders. Power supply is taken care of by the decoder.

All ESU V4 decoders with 21MTC or PluX16 interface, as well as all "XL" decoders, have a SUSI interface for controlling external switching modules or for the Märklin® C Sinus motors.

Free function mapping allows for assigning any function output to any of the available F buttons. Even complex switching conditions (e.g.: "Switch output AUX 1 if F3 and F4 are "on", but F5 is "off") are due to comprehensive function mapping supported. Time controlled switching does not represent a problem for ESU decoders either. For easy programming of complex function mapping tasks we recommend using the ESU ECoS command station or the ESU LokProgrammer.

Performance reliability

You can connect all ESU V4 decoders to an external PowerPack module (ESU part number 54670). This energy storage module provides the decoder with energy even when the normal power supply is interrupted, perhaps due to dirty tracks. All "XL" decoders have an integral PowerPack. Direction of travel, speed and any functions already switched on can be automatically memorised. This is important for computer controlled operation.

Ready for future updates

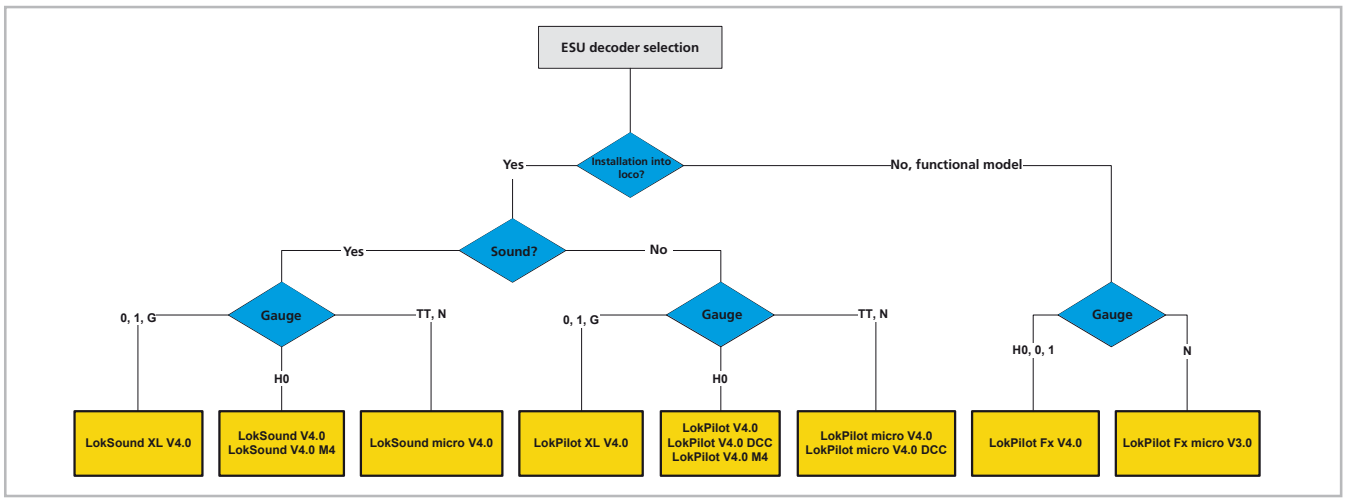
ESU V4 decoders are update capable. That means that the internal software of the decoder can be replaced by a more current version at any time. Generally this is done with the aid of the ESU LokProgrammer and PC software without removing the decoder from the locomotive. Thus you may also enjoy the benefits of new features!

Which decoder goes where?

Even though we endeavour to keep the number of different decoder types to a minimum we have to acknowledge that the selection has increased somewhat over the past years. This may possible lead to some confusion in terms of finding the "right" decoder. Basically it is not really difficult to select the best suited product. Perhaps you will also find the flow chart below useful.

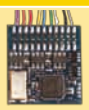
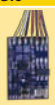
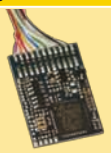
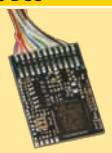
As you can see there are many multi-protocol decoders, some pure DCC versions (always marked with the suffix DCC in the product name) and some quad protocol versions (with the suffix "M4" in the name). Which decoder is best suited for your purposes depends on the type of command station:

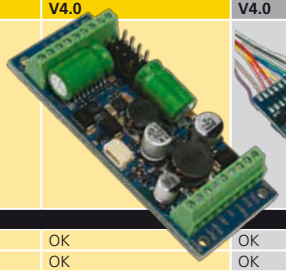
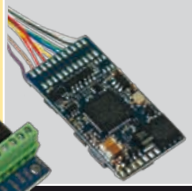
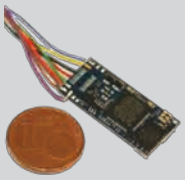
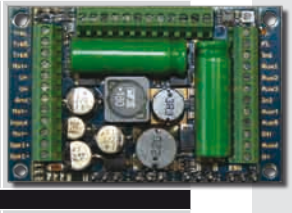
- If you have a two-rail layout and wish to only use DCC with RailComPlus® you can save some money and select the "DCC" versions.
- Modellers running Selectrix® will choose the multi protocol versions regardless of the gauge.
- If you operate a three-rail layout with a Märklin® central unit you have to make one more decision before choosing your decoders.
  - If you have an older Control Unit 6021®, an Intellibox® or another command station and wish to run your trains with the Motorola® format then the multi protocol version could be the right type for you.
  - If you have a Märklin® Central Station® and you do not want to miss out on the M4 comfort then the "M4" version is the right thing for you. M4 offers everything in one decoder.
- All „XL"decoders are always quad protocol decoders. Here it is easy to make your choice.
- If you are not sure which central unit/ command station you want to use in future then the multi protocol version is your future-proof choice and a save investment.



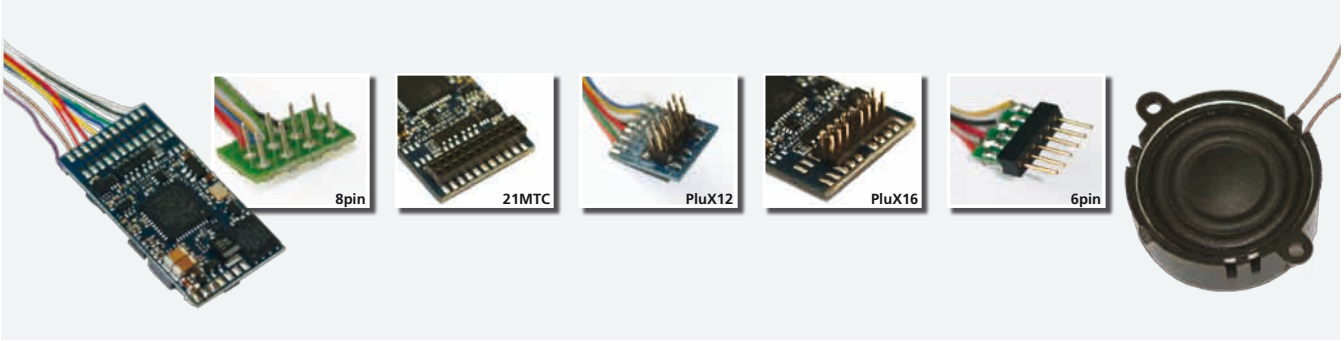
ESU Decoder overview

▶ You will find the basic characteristics of all ESU V4 decoders listed in the following table. Please note that decoders with different plugs also have their own part number.

	LokPilot Basic V1.0	LokPilot Fx V4.0	LokPilot Fx micro V3.0	LokPilot V4.0	LokPilot V4.0 DCC	LokPilo V4.0 M
						
Operational modes						
DCC 14, 28, 128 speed steps	OK	OK	OK	OK	OK	OK
DCC long and short addresses	OK	OK	OK	OK	OK	OK
DCC traction address (Consist Mode)	-	OK	OK	OK	OK	OK
DCC LGB pulse control	-	OK	OK	OK	OK	OK
Automatic speed step detection	-	OK	OK	OK	OK	OK
Lenz® LG 100, ROCO® brake unit	OK	OK	OK	OK	OK	OK
Lenz® ABC brake unit	-	OK	-	OK	OK	OK
ZIMO® HLU commands	-	OK	-	OK	OK	OK
DC analogue operation	OK	OK	OK	OK	OK	OK
Motorola® 14 speed steps	-	OK	OK	OK	-	OK
Motorola® 28 speed steps	-	OK	OK	OK	-	OK
Motorola® address 1 - 80	-	OK	OK	OK	-	OK
Motorola® address 1 - 127	-	OK	OK	OK	-	OK
Motorola® address 1 - 255	-	OK	-	OK	-	OK
M4 data protocol (mfx® compatible)	-	-	-	-	-	OK
Selectrix®	-	OK	OK	OK	-	OK
Märklin® brake unit	-	OK	OK	OK	-	OK
AC analogue operation	-	OK	-	OK	-	OK
Automatic detection of operational mode	OK	OK	OK	OK	OK	OK
Throttle						
DC and coreless motors, AC motors with magnet	OK	-	-	OK	OK	OK
PWM frequency	31,25 kHz	-	-	40,00 kHz	40,00 kHz	40,00 k
Load control in digital operation	OK	-	-	OK	OK	OK
Load control in analogue operation	-	-	-	OK	OK	OK
Adj. start / maximum speed in analogue operation	-	-	-	OK	OK	OK
Mass simulation for 14 speed step operation	-	-	-	OK	OK	OK
"Autotune" function for load control	-	-	-	Ok	Ok	OK
DDC (Dynamic Drive Control)	-	-	-	OK	OK	OK
Continious motor current	0,7A	-	-	1,1A	1,1A	1,1A
Short circuit protection	OK	-	-	OK	OK	OK
Function outputs						
Amplified function outputs with short-circuit protection	3	6	4	4	4 / 6 (PluX16)	4 / 6 (P
Current of each output	180mA	250mA	140mA	250mA	250mA	250mA
Logic level outputs	-	2 (switchable)	-	(2) 21MTC	(2) 21MTC	2 (21M
Servo outputs	-	-	-	-	-	-
Output dimming	altogether	separate	separate	separate	separate	separat
Light effects like Blinking lights, Marslight, Fire box flickering etc.	-	OK	OK	OK	OK	OK
Time-controlled function outputs	-	OK	OK	OK	OK	OK
Function Mapping according to ESU (F0 - F15)	-	-	OK	-	-	-
Function Mapping V4.0 ESU (F0 - F28)	-	OK	-	OK	OK	OK
Function Mapping M4® compatible	-	-	-	-	-	OK
Shunting mode (de-selectable)	OK	-	-	OK	OK	OK
ABV (de-selectable)	OK	-	-	OK	OK	OK
Serial protocol (for SUSI)	-	OK	-	OK	OK	OK
Sound						
Polyphonic Sound. Number of channels	-	-	-	-	-	-
Flash memory for sound data	-	-	-	-	-	-
Power of BTL amplifier (sinus)	-	-	-	-	-	-
Programming						
DCC service mode programming modes (Register Mode, Address Only, Direct Mode)	OK	OK	OK	OK	OK	OK
DCC POM (Programming On the Main)	-	OK	OK	OK	OK	OK
Programming mode for Märklin® 6021	-	OK	OK	OK	-	OK
M4® configuration on the main track	-	-	-	-	-	OK
Specials						
M4® feedback system	-	-	-	-	-	OK
RailCom® feedback system	-	OK	OK	OK	OK	OK
RailComPlus® automatic recognition	-	-	-	OK	OK	OK
Storage of current operational state (memory)	-	OK	-	OK	OK	OK
Motorola® wrong-direction bit	-	OK	OK	OK	-	OK
»PowerPack« energy storage	-	-	-	optional	optional	optiona
Construction						
Dimensions in mm	25,5x15,5x4,5	17,5x15,5x5,5	13,5x9,0x3,0	21,4x15,5x5,5	21,4x15,5x5,5	21,4x1
8-pin plug NEM652 with cable harness	52690	54620	-	54610	54611	64610
6-pin plug NEM651 with cable harness	-		52624	54612	54613	64613
6-pin plug NEM651	-		-	-	-	-
21MTC interface	52692	54621	-	54614	54615	64614
Screw terminals	-		-	-	-	-
PIN connector	-		-	-	-	-
PluX12 interface NEM658 on cable harness	-		-	54616	-	64616
PluX16 interface	-		-		54617	64617
Next18 interface	-		-	-	-	-

ot 14	LokPilot micro V4.0	LokPilot micro V4.0 DCC	LokPilot XL V4.0	LokSound V4.0	LokSound V4.0 M4®	LokSound micro V4.0	LokSound XL V4.0
							
	OK	OK	OK	OK	OK	OK	OK
	OK	OK	OK	OK	OK	OK	OK
	OK	OK	OK	OK	OK	OK	OK
	OK	OK	OK	OK	OK	OK	OK
	OK	OK	OK	OK	OK	OK	OK
	OK	OK	OK	OK	OK	OK	OK
	OK	OK	OK	OK	OK	OK	OK
	OK	OK	OK	OK	OK	OK	OK
	OK	OK	OK	OK	OK	OK	OK
	OK	-	OK	OK	OK	OK	OK
	OK	-	OK	OK	OK	OK	OK
	OK	-	OK	OK	OK	OK	OK
	OK	-	OK	OK	OK	OK	OK
	OK	-	OK	OK	OK	OK	OK
	-	-	OK	-	OK	-	OK
	OK	-	OK	OK	OK	OK	OK
	OK	-	OK	OK	OK	OK	OK
	-	-	OK	OK	OK	-	OK
	OK	OK	OK	OK	OK	OK	OK
	OK	OK	OK	OK	OK	OK	OK
Hz	40,00 kHz	40,00 kHz	40,00 kHz	40,00 kHz	40,00 kHz	40,00 kHz	40,00 kHz
	OK	OK	OK	OK	OK	OK	OK
	OK	OK	OK	OK	OK	OK	OK
	OK	OK	OK	OK	OK	OK	OK
	OK	OK	OK	OK	OK	OK	OK
	Ok	Ok	Ok	Ok	Ok	Ok	Ok
	OK	OK	OK	OK	OK	OK	OK
	0,75A	0,75A	4,0A	1,1A	1,1A	0,75A	4,0A
	OK	OK	OK	OK	OK	OK	OK
uX16)	2	2	8	4	6	4	12
	150mA	150mA	500mA	250mA	250mA	180mA	500mA
TC)	2	2	-	2	(2) 21MTC	2	-
	-	-	4	-	-	-	4
e	separate	separate	separate	separate	separate	separate	separate
	OK	OK	OK	OK	OK	OK	OK
	OK	OK	OK	OK	OK	OK	OK
	-	-	-	-	-	-	-
	OK	OK	OK	OK	OK	OK	OK
	OK	OK	OK	-	OK	-	OK
	OK	OK	OK	OK	OK	OK	OK
	OK	OK	OK	OK	OK	OK	OK
	-	-	OK	OK	OK	-	OK
	-	-	-	8	8	8	8
	-	-	-	32 MBit	32 Mbit	32 Mbit	32 Mbit
	-	-	-	1,8 W	1,8 W	1,8 W	13 W (Dual)
	OK	OK	OK	OK	OK	OK	OK
	OK	OK	OK	OK	OK	OK	OK
	OK	OK	OK	OK	OK	OK	OK
	-	-	OK	-	OK	-	OK
	-	-	OK	-	OK	-	OK
	-	OK	OK	OK	OK	-	OK
	OK	OK	OK	OK	OK	OK	OK
	OK	OK	OK	OK	OK	OK	OK
	OK	-	OK	OK	OK	OK	OK
l	optional	optional	integrated	optional	optional	optional	integrated
5,5x5,5	10,5x8,1x2,8	10,5x8,1x2,8	55,0x25,0x10	31,0x15,5x6,5	31,0x15,5x6,5	28,0x10,0x5,0	51,0x40,0x14,0
	54683	-	-	54400	64400	56899	-
	54687	54684	-	56499	66499	54800	-
	54688	54685	-	-	-	-	-
	-	-	-	54499	64499	-	-
	-	-	54640	-	-	-	54500
	-	-	-	-	-	-	54499
	-	-	-	55400	65400	55800	-
			-	56498	66498	-	-
	54689	54686	-	-	-	54898	-

LokSound V4.0



LokSound – The reference

Since the "Great-grandfather LokSound Classic" our LokSound decoders are the yardstick for excellent sound on your model train layout. A LokSound expands the properties of ESU decoders by providing prototypical sound. With a LokSound decoder your locomotives do not only run like their full scale counterparts – they also sound like them!

LokSound V4.0

The LokSound V4.0 is the most important member of the LokSound family. Due to the combination of digital decoder and sound module on one circuit board we achieve very compact dimensions of only 30mm x 15.5mm. This, of course, makes installation in H0 and 0 gauge models so much easier. This decoder is supplied with all popular types of plugs.

Sound

When developing the concept of the sound module our vast experience of all previous generations has been taken into account. The result is a unique composition: A 32MBit chip can store and play 276 seconds of original sounds. The latter are assigned to internal channels 8 (!) of which can be played simultaneously. Thus it is possible to run two diesel prime movers, for instance, and the horn, the compressor and the fan at the same time while there are still 3 channels available for announcements, audio warning sounds, etc. The result is sound which is even closer to the prototype; engine noise synchronised to the revs of the engine or brakes, which stop squealing precisely when the locomotive comes to a standstill, are now possible. The LokSound V4.0 decoder plays sound via the 16Bit mixer, the D/A converter and a "class D" audio output stage and the speaker (4-8 Ohms). The volume of all sounds can be individually.

The innovative sound engine facilitates the simulation of all potential prototype locomotives: besides steam engines with two, three or four cylinders mallet locomotives do not present a problem either. You will hear the typical rhythm of the exhaust chuffs in all types of locomotives. Of course, you can synchronise the exhaust chuffs with the revs of the wheels.

Listening to the sounds of a diesel engine is also pure pleasure: no matter if there is one engine or two, diesel electric or hydraulic or with manual gear box: LokSound will always sound like its prototype. Of course you hear the locomotive working hard when accelerating.

Electric locomotives also have their own unique sounds: the "newly developed electric locomotives of the 1950-ties and 1960-ties generate the appropriate sounds like the hum of the transformers or the "howl" of the Tatzlager gear boxes while modern electrics with thyristor activated controls play the "musical scales."

Besides the automatic sequence of the engine sounds LokSound decoders offer a number of user sounds that can be activated by pressing a function button: whistle and horn, bells, station announcements, closing doors and shovelling coal are just some examples. Furthermore automatically triggered sounds such as the compressor, releasing air etc. provide for even more realistic operation.

Decoder

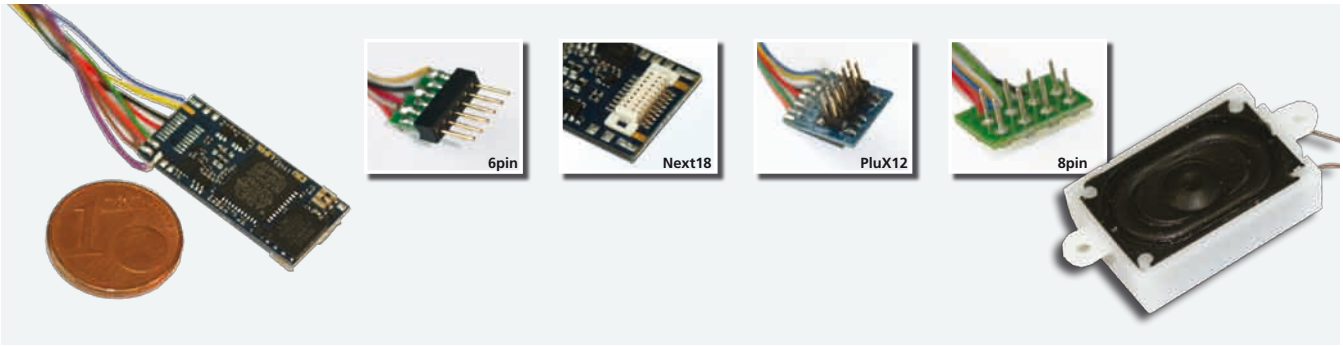
- The LokSound V4.0 supports all three data formats DCC with RailComPlus®, Motorola® and Selectrix® and registers automatically at the ESU ECoS.
- It also works with analogue AC or DC. Its motor output can handle up to 1.1A. This is quite sufficient even for locomotives with two motors as well as for smaller 0 gauge or 1 gauge locomotives.
- The audio end stage provides up to 1.8W (sinus) and thus generates up to three times more volume compared to its predecessors.
- Since 2013 the decoders with wire harnesses as per NEM651 and NEM652 have six amplified function outputs capable of 250mA each. The type with 21MTC plug offers 4 amplified and two logic outputs as per NEM660.
- A SUSI interface is available for the types with PluX16 and 21MTC interface and facilitates the connection of external modules or of Märklin® C Sinus control circuit boards.
- Should you need more function outputs the LokSound V4.0 decoder with 21MTC interface can be extended with the I/O extension board (part number 51970).
- Each LokSound V4.0 decoder is supplied with 23mm speaker and sound chamber. The sounds can be modified or replaced with the LokProgrammer at any time.

Ordering information

A selection of sound decoders programmed ex-factory are to find from page 60.

Art.No.	Description
54400	LokSound V4.0 "Universal sound for reprogramming", with 8-pin NEM652 interface, Gauge: 0, H0
54499	LokSound V4.0 "Universal sound for reprogramming", 21MTC, Gauge: 0, H0
55400	LokSound V4.0 "Universal sound for reprogramming", PluX12 on cable harness, Gauge: 0, H0
56498	LokSound V4.0 "Universal sound for reprogramming", NEM658 (PluX16), Gauge 0, H0
56499	LokSound V4.0 "Universal sound for reprogramming", 6-pin NEM651, Gauge: 0, H0

LokSound micro V4.0



Small decoder, big performance!

LokSound V4.0 decoders help many H0 model railroaders to operate their locos with realistic sounds, something that friends of the smaller N and TT gauges do not need to do without. With a size of only 25mm x 10.6mm x 3.8mm (0.98 x 0.42 x 0.15 inch) it is the world´s smallest LokSound decoder!

Since there are also no more mechanical obstacles in the way, it is a pleasure to enjoy all the decoder´s features: the LokSound micro V4.0 incorporates two light outputs and a sound section, equal to that of its bigger brothers as well as two additional function outputs.

The LokSound micro V4.0 will be shipped with all important interfaces. Even a Next18 standard for e.g. BEMO® locos is available.

Sound

When developing the concept of the sound module our vast experience of all previous generations has been taken into account. The result is a unique composition: A 32MBit chip can store and play 276 seconds of original sounds. The latter are assigned to internal channels 8 (!) of which can be played simultaneously. Thus it is possible to run two diesel prime movers, for instance, and the horn, the compressor and the fan at the same time while there are still 3 channels available for announcements, audio warning sounds, etc. The result is sound which is even closer to the prototype; engine noise synchronised to the revs of the engine or brakes, which stop squealing precisely when the locomotive comes to a standstill, are now possible.

The LokSound micro V4.0 decoder plays sound via the 16Bit mixer, the D/A converter and a "class D" audio output stage and the speaker (4-8 Ohms). The volume of all sounds can be individually.

The innovative sound engine facilitates the simulation of all potential prototype locomotives: besides steam engines with two, three or four cylinders mallet locomotives do not present a problem either. You will hear the typical rhythm of the exhaust chuffs in all types of locomotives. Of course, you can synchronise the exhaust chuffs with the revs of the wheels.

Listening to the sounds of a diesel engine is also pure pleasure: no matter if there is one engine or two, diesel electric or hydraulic or with manual gear box: LokSound will always sound like its prototype. Of course you hear the locomotive working hard when accelerating.

Electric locomotives also have their own unique sounds: the "newly developed electric locomotives of the 1950-ties and 1960-ties generate the appropriate sounds like the hum of the transformers or the "howl" of the Tatzlager gear boxes while modern electrics with thyristor activated controls play the "musical scales."

Besides the automatic sequence of the engine sounds LokSound decoders offer a number of user sounds that can be activated by pressing a function button: whistle and horn, bells, station announcements, closing doors and shovelling coal are just some examples. Furthermore automatically triggered sounds such as the compressor, releasing air etc. provide for even more realistic operation.

Decoder

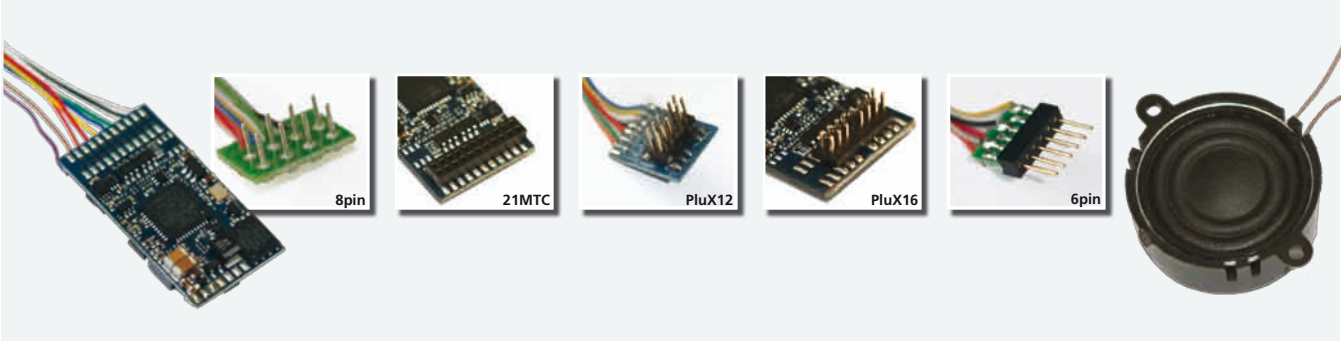
- The LokSound micro V4.0 supports all three data formats DCC with RailComPlus®, Motorola® and Selectrix® and registers automatically at the ESU ECoS.
- It also works with analogue DC, however, in this case without sound, unless a PowerPack is connected.
- Its motor output can handle up to 0.75A. This is quite sufficient even for all N or TT locomotives as well as for smaller H0 gauge locomotives.
- The audio end stage provides up to 1.8W (sinus) and thus generates up to three times more volume compared to its predecessors.
- All in all there are four amplified function outputs capable of 180mA each.
- Each LokSound micro V4.0 decoder is supplied with a 16x25mm speaker and sound chamber.
- The sounds can be modified or replaced with the LokProgrammer at any time.

Ordering information

A selection of sound decoders programmed ex-factory are to find from page 60.

Art.No.	Description
54800	LokSound micro V4.0 "Universal sound for reprogramming", with 6-pin NEM651 interface, Gauge: N,TT
54898	LokSound micro V4.0 "Universal sound for reprogramming", with Next18 interface, Gauge: N,TT
55800	LokSound micro V4.0 "Universal sound for reprogramming", PluX12 on cable harness, Gauge: N,TT
56899	LokSound micro V4.0 "Universal sound for reprogramming", with 8-pin NEM652 interface, Gauge: N,TT

LokSound V4.0 M4



The Compatible

▶ The LokSound V4.0 M4 is our most intelligent decoder since it is a quad-protocol decoder! Aside from DCC, Motorola® and Selectrix®, all incorporated into the LokSound V4.0, the LokSound V4.0 M4 also speaks the M4 protocol! Thus the decoder is a 100% compatible to all mfx®-compatible command stations on the market. This makes the decoder "first choice" for all Märklin fans who do not want to do without mfx® or wish to have the most possible flexibility to all digital systems.

To ensure that almost all locomotives can be retrofit with this multi-talented decoder, we offer the LokSound V4.0 M4 with many different interface versions.

Sound

The LokSound V4.0 M4 has the same sound part like all the other LokSound V4.0 decoders: Its 32MBit chip can store and play 276 seconds of original sounds. The latter are assigned to internal channels 8 (!) of which can be played simultaneously. Thus it is possible to run two diesel prime movers, for instance, and the horn, the compressor and the fan at the same time while there are still 3 channels available for announcements, audio warning sounds, etc. The result is sound which is even closer to the prototype; engine noise synchronised to the revs of the engine or brakes, which stop squealing precisely when the locomotive comes to a standstill, are now possible.

The LokSound V4.0 M4 decoder plays sound via the 16Bit mixer, the D/A converter and a "class D" audio output stage and the speaker (4-8 Ohms). The volume of all sounds can be individually.

The innovative sound engine facilitates the simulation of all potential prototype locomotives: besides steam engines with two, three or four cylinders mallet locomotives do not present a problem either. You will hear the typical rhythm of the exhaust chuffs in all types of locomotives. Of course, you can synchronise the exhaust chuffs with the revs of the wheels.

Listening to the sounds of a diesel engine is also pure pleasure: no matter if there is one engine or two, diesel electric or hydraulic or with manual gear box: LokSound will always sound like its prototype. Of course you hear the locomotive working hard when accelerating.

Electric locomotives also have their own unique sounds: the "newly developed electric locomotives of the 1950-ties and 1960-ties generate the appropriate sounds like the hum of the transformers or the "howl" of the Tatzlager gear boxes while modern electrics with thyristor activated controls play the "musical scales."

Beside the automatic sequence of the engine sounds LokSound decoders offer a number of user sounds that can be activated by pressing a function button: whistle and horn, bells, station announcements, closing doors and shovelling coal are just some examples. Furthermore automatically triggered sounds such as the compressor, releasing air etc. provide for even more realistic operation.

Decoder

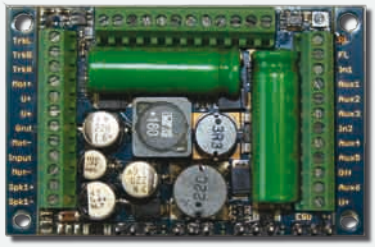
- The LokSound V4.0 M4 supports the four data formats DCC with RailComPlus®, Motorola® and Selectrix® and M4.
- It registers automatically at the ESU ECoS as well as mfx®-compatible command stations and can be full-graphically programmed.
- It also works with analogue AC or DC.
- Its motor output can handle up to 1.1A. This is quite sufficient even for locomotives with two motors as well as for smaller 0 gauge or 1 gauge locomotives.
- The audio end stage provides up to 1.8W (sinus) and thus generates (in combination with 4Ohms speakers) up to three times more volume compared to its predecessors.
- The decoders with wire harnesses as per NEM651 and NEM652 have six amplified function outputs capable of 250mA each. The type with 21MTC plug offers 4 amplified and two logic outputs as per NEM660.
- A SUSI interface is available for the types with PluX16 and 21MTC interface and facilitates the connection of external modules or of Märklin® C Sinus control circuit boards.
- Should you need more function outputs the LokSound V4.0 M4 decoder with 21MTC interface can be extended with the I/O extension board (part number 51970).
- Each LokSound V4.0 M4 decoder is supplied with 23mm speaker and sound chamber.
- The sounds can be modified or replaced with the LokProgrammer at any time.

Ordering information

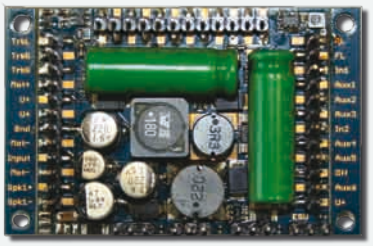
▶ **A selection of sound decoders programmed ex-factory are to find from page 60.**

Art.No.	Description
64400	LokSound V4.0 M4 "Universal sound for reprogramming", with 8-pin NEM652 interface, Gauge: 0, H0
64499	LokSound V4.0 M4 "Universal sound for reprogramming", 21MTC NEM660, Gauge: 0, H0
65400	LokSound V4.0 M4 "Universal sound for reprogramming", PluX12 on cable harness, Gauge: 0, H0
66498	LokSound V4.0 M4 "Universal sound for reprogramming", NEM658 (PluX16), Gauge: 0, H0
66499	LokSound V4.0 M4 "Universal sound for reprogramming", with 6-pin NEM651 interface, Gauge: 0, H0

LokSound XL V4.0



With screw terminals



With PIN connector

Big sound for big engines

The LokSound XL V4.0 decoder is a real "brick" and of course it has to be, since it is meant to be used with larger scales such as gauge I or G. It comes with unprecedented functions you won´t find else where.

The LokSound XL V4.0 has a size of 51x40mm and comes in two different interface versions: Beside a version with robust screw terminals, which can be easily installed - into older models – there will be a version with PIN-connectors. The PIN-connector version fits into all locos that have installed a LokSound XL V3.5 decoder. All you need to do is to pull off / remove the old decoder and plug in the new LokSound XL V4.0 decoder, Finished! The "new one" is a 100% compatible to the current model.

Sound

When developing the concept of the sound module our vast experience of all previous generations has been taken into account. The result is a unique composition: A 32MBit chip can store and play 276 seconds of original sounds. The latter are assigned to internal channels 8 (!) of which can be played simultaneously.

Thus it is possible to run two diesel prime movers, for instance, and the horn, the compressor and the fan at the same time while there are still 3 channels available for announcements, audio warning sounds, etc. The result is sound which is even closer to the prototype; engine noise synchronised to the revs of the engine or brakes, which stop squealing precisely when the locomotive comes to a standstill, are now possible.

The LokSound XL V4.0 decoder transmits the sound via the 16Bit mixer, the low-noise D/A converter and a "class D" dublex audio output stage to the loudspeaker. Connected with two different 8 Ohms loudspeakers you are able to bring out a maximum performance of up to 13 Watts and hear your locos anytime from the furthest corners of your garden. If desired, you are also able to set the volume separately with the help of two (optional) rotary potentiometers.The volume of all sounds can be individually.

The innovative sound engine facilitates the simulation of all potential prototype locomotives: besides steam engines with two, three or four cylinders mallet locomotives do not present a problem either. You will hear the typical rhythm of the exhaust chuffs in all types of locomotives. Of course, you can synchronise the exhaust chuffs with the revs of the wheels.

Listening to the sounds of a diesel engine is also pure pleasure: no matter if there is one engine or two, diesel electric or hydraulic or with manual gear box: LokSound will always sound like its prototype.

Also the sound of old or modern electric locomotives can be realistically portrayed.

Besides the automatic sequence of the engine sounds LokSound decoders offer a number of user sounds that can be activated by pressing a function button. Furthermore automatically triggered sounds such as the compressor, releasing air etc. provide for even more realistic operation.

Decoder

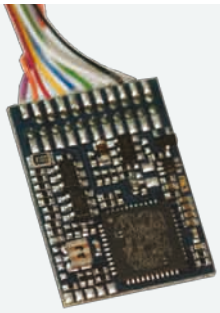
- The LokSound XL V4.0 is a quad-protokoll decoder and supports the four data formats DCC with RailComPlus®, Motorola® and Selectrix® and M4.
- It registers automatically at the ESU ECoS as well as mfx®-compatible command stations.
- Fully compatible with LGB® MZS® and Massoth®.
- It also works with analogue AC or DC.
- Its motor output can handle up to 4.0A (even 5A for a short time). Thus there will be enough steam for PIKO® locos or heavier two-motor engines. The LokSound XL V4.0 is able to control all known motors in the G gauge or outdoor railway sector, especially Mabuchi®, Bühler® or Faulhaber®.
- Unique: A dublex audio output stage for two loudspeakers.
- There are 12 function outputs with 500mA each available. The output current can be selected from different voltages.
- 4 RC servos can be directly controlled. The decoder produces the required 5V.
- Of course you can synchronise motor, sound and special functions.
- This makes remote controlled coupling possible including the prototypical automatic pushing and pulling of the loco.
- The LokSound XL V4.0 decoder controls external smoke generators. No matter if it is the KM-1® Dynamic-Smoke module, the smoke unit by Massoth® or TrainAmerica®: the decoder creates the required synchronisation impulse.
- Of course we recommend our new, especially developed for the LokSound XL V4.0 smoke units. More on page 49.
- A SUSI interface allows to control external components.
- The directly installed PowerPack will reliably buffer all of the decoder´s functions and help small locos with a small number of axles to easily "rush" over dirty spots.
- The sounds can be modified or replaced with the LokProgrammer at any time.

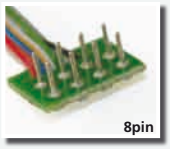
Ordering information

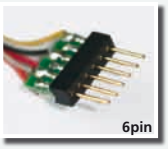
A selection of sound decoders programmed ex-factory are to find from page 60.

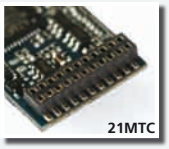
Art.No.	Description
54500	LokSound XL V4.0 "Universal sound for reprogramming", terminal screws, Gauge G, I
54599	LokSound XL V4.0 "Universal sound for reprogramming", with MULTI-PIN connector, Gauge G, I

LokPilot V4.0









At this point we like to present to you the LokPilot V4.0 decoder. It is the most important member of the ESU V4 decoder generation and suits perfectly into almost every kind of H0 locomotive.

The LokPilot V4.0 is available in all contemporary plug and interface versions: beside the common interfaces we introduced also a new PluX16 version in 2013.

Operational modes

The LokPilot V4.0 is multi-protocol decoder meaning it speaks all common data formats such as DCC, Motorola® and Selectix®. In DCC mode 14-128 speed steps are possible, as well as 2- and 4-digit addresses. You can activate up to 28 functions. Thanks to RailComPlus®, the decoders will be automatically recognised by a suitable command station (e.g. ECoS).

It is able to control all DCC programming modes und thus can be driven and programmed by all DCC-compatible digital command stations. CV values can be read out on the main track with corresponding command stations, thanks to RailCom®. There are indexed CVs for command stations which are only able to program CVs from 1-255 (e.g. ROCO® Multimaus).

Motorola® users benefit from up to 28 speed steps with 255 addresses. Three further Motorola® addresses allow the activation of 16 functions. The installed programming mode makes re-programming with the venerable Control Unit® 6021 also possible.

The LokPilot V4.0 decoder auto-detects the known Märklin® braking sectors as well as the ZIMO® HLU braking commands or the Lenz® ABC system. Braking with DCC brake generators or with DC ("Brake on DC") is supported. Furthermore you will be able to stop your train by using the Selectrix® braking diode.

The LokPilot 4.0 decoder can be used for both analogue DC or AC locomotives. The motor control function is teaching the motor »good manners« and is thus ideal for DC locos, which are too fast with a conventional reverser relay.

As you would not expect anything else from ESU decoders, the decoder automatically switches between the different operating modes "on-the-fly". In most cases one does not have to adjust anything.

Motor control

The LokPilot V4.0 decoder is equipped with fifth generation load compensation. The control frequency can be adjusted – if so desired - to the speed and facilitates an even better, very soft, absolutely silent drive with most motors. Load control can either be adjusted to the model manually with the aid of 5 parameters or by using the "auto tune" feature of the decoder. This results in automatic adjustment of the motor characteristics in a test run. Never was it easier to adapt the control parameters to the motor. ESU decoders control all motor types without any problem, regardless if they are "classic" Märklin® motors, Fleischmann® round motors or coreless motors (e.g. Faulhaber®) or modern motors with flywheel(s).

With Dynamic Drive Control (DDC) you can limit the influence of load control and thus you will be able to finely control your locomotive in the yard and when traversing turnouts while the speed will be prototypically reduced while travelling (at higher speeds) on a gradient on the mainline.

SoftDrive® sinus motors, as used in many Märklin® models, can also be controlled by the LokPilot V4.0 decoder. Thanks to SUSI this will also work for Trix® locos.

Functions

The LokPilot V4.0 decoder has at least 4 function outputs. Beside that (with 21MTC) there are two unamplified outputs which can be also used for both light or special functions if connected with the appropriate adapter board (e.g. ESU 51968).

All important light functions are available. The brightness of each output can be adjusted separately. Of course, the decoder is able to control the automatic decoupling move and push time for ROCO®, Krois® and Telex® couplers.

Safe operation

If desired it is possible to connect a PowerPack (ESU 54670, see »Accessories«) to the LokPilot V4.0, as to all other ESU decoders of the 4th generation.

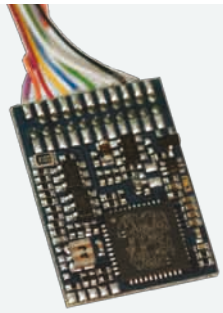
Protection

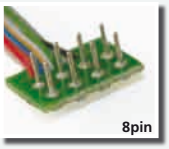
Of course, all function outputs and the motor current output are overload protected. We want you to have fun with your decoder as long as possible!

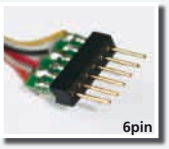
Ordering information

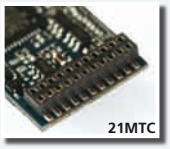
Art.No.	Description
54610	LokPilot V4.0, Multiprotocol MM/DCC/SX, 8-pin plug NEM652, cable
54612	LokPilot V4.0, Multiprotocol MM/DCC/SX, 6-pin plug NEM651, cable
54614	LokPilot V4.0, Multiprotocol MM/DCC/SX, 21MTC interface
54616	LokPilot V4.0, Multiprotocol MM/DCC/SX, PluX12 plug, cable harness

LokPilot V4.0 DCC









The LokPilot V4.0 DCC is the twin of the LokPilot V4.0. Both decoders have the same features with only one exception: the LokPilot V4.0 DCC is a pure DCC decoder. Even by sacrificing all flexibility, you will, however, benefit from a lower price.

The LokPilot V4.0 DCC decoders are also available in all contemporary plug and interface versions.

Operational modes

The LokPilot V4.0 DCC is a "pure" DCC decoder meaning 14-128 speed steps are possible, as well as 2- and 4-digit addresses. You can activate up to 28 functions. Thanks to RailComPlus®, the decoders will be automatically recognised by a suitable command station (e.g. ECoS).

It is able to control all DCC programming modes und thus can be driven and programmed by all DCC-compatible digital command stations. CV values can be read out on the main track with corresponding command stations, thanks to RailCom®. There are indexed CVs for command stations which are only able to program CVs from 1-255 (e.g. ROCO® Multimaus).

The LokPilot V4.0 DCC decoder auto-detects the known Märklin® braking sectors as well as the ZIMO® HLU braking commands or the Lenz® ABC system. Braking with DCC brake generators or with DC ("Brake on DC") is supported.

The LokPilot 4.0 decoder can be used for analogue DC locomotives.

As you would not expect anything else from ESU decoders, the decoder automatically switches between the different operating modes "on-the-fly". In most cases one does not have to adjust anything.

Motor control

The LokPilot V4.0 DCC decoder is equipped with fifth generation load compensation. The control frequency can be adjusted – if so desired – to the speed and facilitates an even better, very soft, absolutely silent drive with most motors. Load control can either be adjusted to the model manually with the aid of 5 parameters or by using the "auto tune" feature of the decoder. This results in automatic adjustment of the motor characteristics in a test run. Never was it easier to adapt the control parameters to the motor. ESU decoders control all motor types without any problem, regardless if they are "classic" Märklin® motors, Fleischmann® round motors or coreless motors (e.g. Faulhaber®) or modern motors with flywheel(s).

With Dynamic Drive Control (DDC) you can limit the influence of load control and thus you will be able to finely control your locomotive in the yard and when traversing turnouts while the speed will be prototypically reduced while travelling (at higher speeds) on a gradient on the mainline.

SoftDrive® sinus motors, as used in some Trix® models, can also be controlled by the LokPilot V4.0 decoder. Thanks to SUSI.

Functions

The LokPilot V4.0 DCC decoder has at least 4 function outputs. The PluX16 version even six. Beside that (with 21MTC) there are two unamplified outputs which can be also used for both light or special functions if connected with the appropriate adapter board (e.g. ESU 51968).

All important light functions are available. The brightness of each output can be adjusted separately. Of course, the decoder is able to control the automatic decoupling move and push time for ROCO®, Krois® and Telex® couplers.

Safe operation

If desired it is possible to connect a PowerPack (ESU 54670, see »Accessories«) to the LokPilot V4.0 DCC, as to all other ESU decoders of the 4th generation.

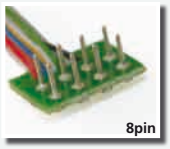
Protection

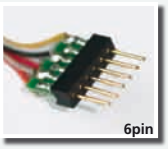
Of course, all function outputs and the motor current output are overload protected. We want you to have fun with your decoder as long as possible!

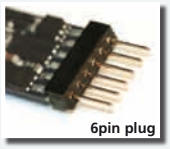
Ordering information

	Art.No.	Description
	54611	LokPilot V4.0, DCC, 8-pin plug NEM652, cable harness
	54613	LokPilot V4.0, DCC, 6-pin plug NEM651, cable harness
	54615	LokPilot V4.0, DCC, 21MTC interface
NEW	54617	LokPilot V4.0 DCC, PluX16 NEM558

LokPilot micro V4.0







The LokPilot micro V4.0 is compared to its forerunners a significantly shrunk, but still genuine power house: the smallest member of the LokPilot V4.0 family has now a size of only 10.5mm x 8.1mm x 2.8mm and should thus fits into the smallest N-/TT-gauge locos.

LokPilot micro V4.0 decoders are available in all common plug and interface versions such as 6-pin NEM651 (with or without cable harness), 8-pin NEM652 or the brand-new wireless Next18 interface version.

Operational modes

The LokPilot micro V4.0 is multi-protocol decoder meaning it speaks all common data formats such as DCC, Motorola® and Selectix®. In DCC mode 14-128 speed steps are possible, as well as 2- and 4-digit addresses. You can activate up to 28 functions. Thanks to RailComPlus®, the decoders will be automatically recognised by a suitable command station (e.g. ECoS).

It is able to control all DCC programming modes und thus can be driven and programmed by all DCC-compatible digital command stations. CV values can be read out on the main track with corresponding command stations, thanks to RailCom®. There are indexed CVs for command stations which are only able to program CVs from 1-255 (e.g. ROCO® Multimaus).

Motorola® users benefit from up to 28 speed steps with 256 addreses. Three further Motorola® addresses allow the activation of 16 functions. The installed programming mode makes re-programming with the venerable Control Unit® 6021 also possible.

The LokPilot V4.0 decoder auto-detects the known Märklin® braking sectors as well as the ZIMO® HLU braking commands or the Lenz® ABC system. Braking with DCC brake generators or with DC ("Brake on DC") is supported. Furthermore you will be able to stop your train by using the Selectrix® braking diode.

The LokPilot micro 4.0 decoder can be used for DC locomotives. The motor control function is teaching the motor »good manners« and is thus ideal for DC locos, which are too fast with a conventional reverser relay.

As you would not expect anything else from ESU decoders, the decoder automatically switches between the different operating modes "on-the-fly". In most cases one does not have to adjust anything.

Motor control

The LokPilot micro V4.0 decoder is equipped with fifth generation load compensation. The control frequency can be adjusted – if so desired - to the speed and facilitates an even better, very soft, absolutely silent drive with most motors. Load control can either be adjusted to the model manually with the aid of 5 parameters or by using the "auto tune" feature of the decoder. This results in automatic adjustment of the motor characteristics in a test run. Never was it easier to adapt the control parameters to the motor. The LokPilot mirco V4.0 controls all kind of motor types installed in N and TT locos without any problem, regardless if Fleischmann®, MiniTrix®, PIKO® or Tillig®. With Dynamic Drive Control (DDC) you can limit the influence of load control and thus you will be able to finely control your locomotive in the yard and when traversing turnouts while the speed will be prototypically reduced while travelling (at higher speeds) on a gradient on the mainline. 0.75A permanent current is more than required and offers enough reserves of power, also for longer block trains.

Functions

The LokPilot micro V4.0 decoder has at two function outputs with 150mA current load each. Beside that, there are also two unamplified outputs which can be used for both, control or special functions if connected with an external transistor. All important light functions are available. The brightness of each output can be adjusted separately. Of course, the decoder is able to control the automatic decoupling move and push time.

Safe operation

If desired it is possible to connect a PowerPack (ESU 54670, see »Accessories«) to the LokPilot micro V4.0, as to all other ESU decoders of the 4th generation.

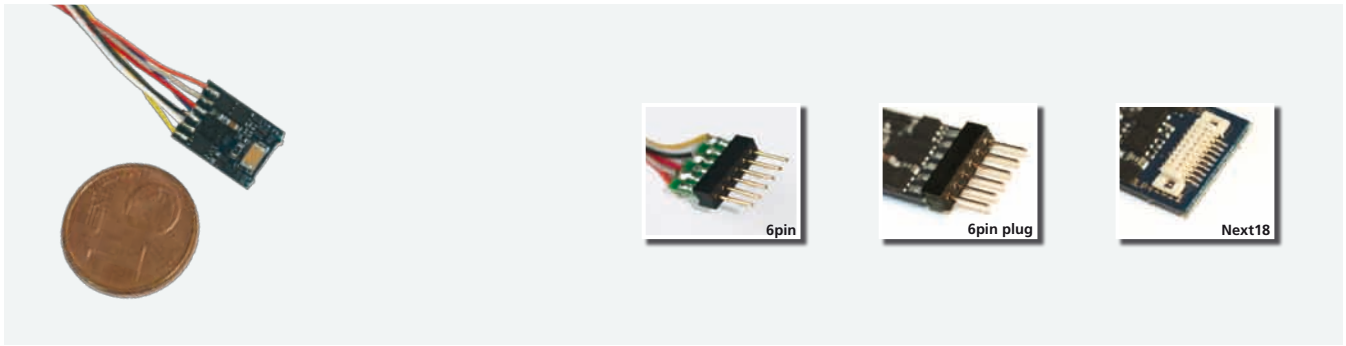
Protection

Of course, all function outputs and the motor current output are overload protected. We want you to have fun with your decoder as long as possible!

Ordering information

Art.No.	Description
54683	LokPilot micro V4.0, MM/DCC/SX, 8-pin NEM652 with cable
54687	LokPilot micro V4.0, MM/DCC/SX, 6-pin NEM651 with cable
54688	LokPilot micro V4.0, MM/DCC/SX, 6-pin NEM651 direct connection
54689	LokPilot micro V4.0, MM/DCC/SX, Next18 interface

LokPilot micro V4.0 DCC



The LokPilot micro V4.0 DCC is the twin of the LokPilot micro V4.0. Both decoders have the same features with only one exception: the LokPilot micro V4.0 DCC is a pure DCC decoder. With a size of only 10.5mm x 8.1mm x 2.8mm and should thus fits into the smallest N-/TT-gauge locos.

LokPilot micro V4.0 decoders are available in all common plug and interface versions such as 6-pin NEM651 (with or without cable harness), 8-pin NEM652 or the brand-new wireless Next18 interface version.

Operational modes

The LokPilot micro V4.0 is a "pure" DCC decoder meaning 14-128 speed steps are possible, as well as 2- and 4-digit addresses. You can activate up to 28 functions. Thanks to RailComPlus®, the decoders will be automatically recognised by a suitable command station (e.g. ECoS).

It is able to control all DCC programming modes und thus can be driven and programmed by all DCC-compatible digital command stations. CV values can be read out on the main track with corresponding command stations, thanks to RailCom®. There are indexed CVs for command stations which are only able to program CVs from 1-255 (e.g. ROCO® Multimaus).

The LokPilot micro V4.0 DCC decoder auto-detects the known Märklin® braking sectors as well as the ZIMO® HLU braking commands or the Lenz® ABC system. Braking with DCC brake generators or with DC ("Brake on DC") is supported.

The LokPilot micro 4.0 DCC decoder can be used for DC locomotives.

As you would not expect anything else from ESU decoders, the decoder automatically switches between the different operating modes "on-the-fly". In most cases one does not have to adjust anything.

Motor control

The LokPilot micro V4.0 DCC decoder is equipped with fifth generation load compensation. The control frequency can be adjusted – if so desired - to the speed and facilitates an even better, very soft, absolutely silent drive with most motors. Load control can either be adjusted to the model manually with the aid of 5 parameters or by using the "auto tune" feature of the decoder. This results in automatic adjustment of the motor characteristics in a test run. Never was it easier to adapt the control parameters to the motor. The LokPilot mirco V4.0 controls all kind of motor types installed in N and TT locos without any problem, regardless if Fleischmann®, MiniTrix®, PIKO® or Tillig®.

With Dynamic Drive Control (DDC) you can limit the influence of load control and thus you will be able to finely control your locomotive in the yard and when traversing turnouts while the speed will be prototypically reduced while travelling (at higher speeds) on a gradient on the mainline. 0.75A permanent current is more than required and offers enough reserves of power, also for longer block trains.

Functions

The LokPilot micro V4.0 DCC decoder has at two function outputs with 150mA current load each. Beside that, there are also two unamplified outputs which can be used for both, control or special functions if connected with an external transistor.

All important light functions are available. The brightness of each output can be adjusted separately. Of course, the decoder is able to control the automatic decoupling move and push time.

Safe operation

If desired it is possible to connect a PowerPack (ESU 54670, see »Accessories«) to the LokPilot micro V4.0 DCC, as to all other ESU decoders of the 4th generation.

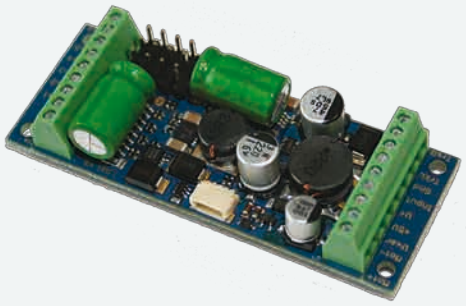
Protection

Of course, all function outputs and the motor current output are overload protected. We want you to have fun with your decoder as long as possible!

Ordering information

Art.No.	Description
54684	LokPilot micro V4.0 DCC, 6-pin NEM651 with cable
54685	LokPilot micro V4.0 DCC, 6-pin NEM651 direct connection
54686	LokPilot micro V4.0 DCC, Next18 interface

LokPilot XL V4.0



The biggest of all LokPilot decoders is truly the new LokPilot XL V4.0. It speaks DCC with RailCom-Plus®, Motorola®, Selectrix® and M4 as well as auto-detection. With its high motor-output performance, 8 function and 4 servo channels as well as an integrated PowerPack it is perfectly made for outdoor railway and large scales. Screw terminals make a simple instalment possible.

Operational modes

The LokPilot XL V4.0 is multi-protocol decoder meaning it speaks all common data formats such as DCC, Motorola® and Selectix®. In DCC mode 14-128 speed steps are possible, as well as 2- and 4-digit addresses. You can activate up to 28 functions. Thanks to RailComPlus®, the decoders will be automatically recognised by a suitable command station (e.g. ECoS).

It is able to control all DCC programming modes und thus can be driven and programmed by all DCC-compatible digital command stations. CV values can be read out on the main track with corresponding command stations, thanks to RailCom®. There are indexed CVs for command stations which are only able to program CVs from 1-255 (e.g. ROCO® Multimaus).

Motorola® users benefit from up to 28 speed steps with 255 addresses. Three further Motorola® addresses allow the activation of 16 functions. The installed programming mode makes re-programming with the venerable Control Unit® 6021 also possible.

The M4 protocol ensures an automatic recognition of the decoder by mfx®-compatible command stations (e.g. Märklin® Central Station or mobile station®). Reprogramming of M4 decoders is still possible with the mentioned command stations, like with original Märklin® decoders. ESU is a 100% compatible.

The LokPilot XL V4.0 decoder auto-detects the known Märklin® braking sectors as well as the ZIMO® HLU braking commands or the Lenz® ABC system. Braking with DCC brake generators or with DC ("Brake on DC") is supported. Furthermore you will be able to stop your train by using the Selectrix® braking diode.

The LokPilot XL 4.0 decoder can be used for both, analogue DC or AC locomotives. The motor control function is teaching the motor »good manners«.

As you would not expect anything else from ESU decoders, the decoder automatically switches between the different operating modes "on-the-fly". In most cases one does not have to adjust anything.

Motor control

The LokPilot XL V4.0 decoder is equipped with fifth generation load compensation. The control frequency can be adjusted – if so desired - to the speed and facilitates an even better, very soft, absolutely silent drive with most motors. Load control can either be adjusted to the model manually with the aid of 5 parameters or by using the "auto tune" feature of the decoder. This results in automatic adjustment of the motor characteristics in a test run. Its motor output can handle up to 4.0A (even 5A for a short time). Thus there will be enough steam for PIKO® locos or heavier two-motor engines. The LokSound XL V4.0 is able to control all known motors in the G gauge or outdoor railway sector, especially Mabuchi®, Bühler® or Faulhaber® without any problems. With Dynamic Drive Control (DDC) you can limit the influence of load control and thus you will be able to finely control your locomotive in the yard and when traversing turnouts while the speed will be prototypically reduced while travelling (at higher speeds) on a gradient on the mainline.

Functions

Since we know that there is a lot to switch in large scale locos we equipped the decoder with function outputs for lights as well as 4 additional servo outputs for coupling, pantographs or other mechanical toys. Of course, the decoder generates all power required itself. All important light functions are available. The brightness of each output can be adjusted separately. Of course, the decoder is able to control the automatic decoupling move and push time for ROCO®, Krois® and Telex® couplers.

Safe operation

Like its forerunner, the LokPilot XL V4.0 also has an energy storaging PowerPack directly soldered on its board. It helps small locos with a small number of axles to "rush" easily over dirty spots.

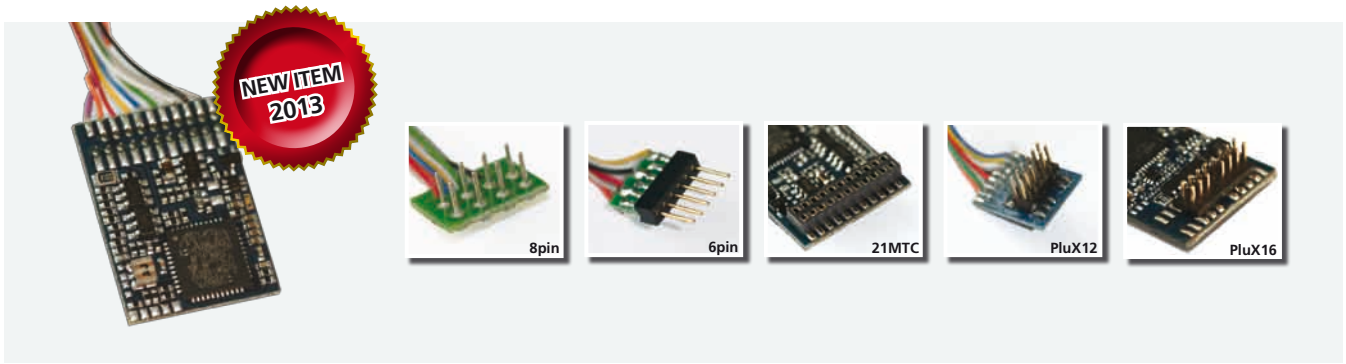
Protection

Of course, all function outputs and the motor current output are overload protected. We want you to have fun with your decoder as long as possible!

Ordering information

	Art.No.	Description
NEW	54640	LokPilot XL V4.0 MM/DCC/SX/M4, 8 outputs, 4 servos, PowerPack, with screwing terminals

LokPilot V4.0 M4



At this point we like to present to you the latest offspring of the LokPilot V4.0 decoder family. This LokPilot decoder is a real quad-protocol decoder and speaks, aside from DCC, Motorola® and Selectrix®, the M4 protocol! This makes the decoder "first choice" for all Märklin fans who do not want to do without mfx® or wish to have the most possible flexibility to all digital systems. The LokPilot V4.0 is available in all contemporary plug and interface versions, also including a PluX16 version.

Operational modes

The LokPilot V4.0 M4 is multi-protocol decoder meaning it speaks all common data formats such as DCC, Motorola® and Selectix® as well as M4. In DCC mode 14-128 speed steps are possible, as well as 2- and 4-digit addresses. You can activate up to 28 functions. Thanks to RailComPlus®, the decoders will be automatically recognised by a suitable command station. It is able to control all DCC programming modes und thus can be driven and programmed by all DCC-compatible digital command stations. CV values can be read out on the main track with corresponding command stations, thanks to RailCom®. There are indexed CVs for command stations which are only able to program CVs from 1-255. Motorola® users benefit from up to 28 speed steps with 255 addresses. Three further Motorola® addresses allow the activation of 16 functions. The installed programming mode makes re-programming with the venerable Control Unit® 6021 also possible. The M4 protocol ensures an automatic recognition of the decoder by mfx®-compatible command stations (e.g. Märklin® Central Station or mobile station®). Reprogramming of M4 decoders is still possible with the mentioned command stations, like with original Märklin® decoders. The LokPilot V4.0 M4 decoder auto-detects the known Märklin® braking sectors as well as the ZIMO® HLU braking commands or the Lenz® ABC system. Braking with DCC brake generators or with DC ("Brake on DC") is supported. Furthermore you will be able to stop your train by using the Selectrix® braking diode. The LokPilot 4.0 decoder can be used for both analogue DC or AC locomotives. The decoder automatically switches between the different operating modes "on-the-fly". In most cases one does not have to adjust anything.

Motor control

The LokPilot V4.0 M4 decoder is equipped with fifth generation load compensation. Load control can either be adjusted to the model manually with the aid of 5 parameters or by using the "auto tune" feature of the decoder. This results in automatic adjustment of the motor characteristics in a test run. Never was it easier to adapt the control parameters to the motor. ESU decoders control all motor types without any problem, regardless if they are "classic" Märklin® motors, Fleischmann® round motors or coreless motors (e.g. Faulhaber®) or modern motors with flywheel(s). With Dynamic Drive Control (DDC) you can limit the influence of load control and thus you will be able to finely control your locomotive in the yard and when traversing turnouts while the speed will be prototypically reduced while travelling (at higher speeds) on a gradient on the mainline. SoftDrive® sinus motors, as used in many Märklin® models, can also be controlled by the LokPilot V4.0 M4 decoder. Thanks to SUSI this will also work for Trix® locos.

Functions

The LokPilot V4.0 M4 decoder has at least 4 function outputs, the PluX16 version even six. Beside that (with 21MTC) there are two unamplified outputs which can be also used for both light or special functions if connected with the appropriate adapter board (e.g. ESU 51968). All important light functions are available. The brightness of each output can be adjusted separately. Of course, the decoder is able to control the automatic decoupling move and push time for ROCO®, Krois® and Telex® couplers.

Safe operation

If desired it is possible to connect a PowerPack (ESU 54670, see »Accessories«) to the LokPilot V4.0 M4, as to all other ESU decoders of the 4th generation.

Protection

Of course, all function outputs and the motor current output are overload protected. We want you to have fun with your decoder as long as possible!

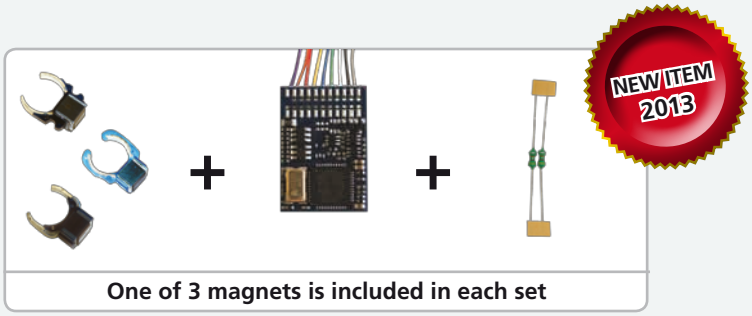
Ordering information

	Art.No.	Description
NEW	64610	LokPilot V4.0 M4, multiprotocol MM/DCC/SX/M4, 8-pin plug NEM652, cable harness
NEW	64613	LokPilot V4.0 M4, Multiprotocol MM/DCC/SX/M4, 6-pin plug NEM651, cable harness
NEW	64614	LokPilot V4.0 M4, Multiprotocol MM/DCC/SX/M4, 21MTC- NEM660
NEW	64616	LokPilot V4.0 M4, Multiprotocol MM/DCC/SX/M4, PluX12 plug on cable harness
NEW	64617	LokPilot V4.0 M4, Multiprotocol MM/DCC/SX/M4, PluX16 NEM558

LokPilot digital sets

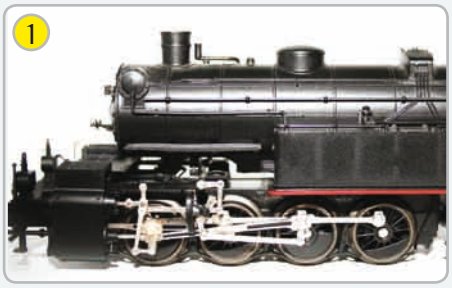
To simplify conversion of your Delta® locos as much as possible, we offer the LokPilot digital set: It contains a LokPilot V4.0 M4 decoder 64610, an appropriate permanent magnet and 2 choke coils. You do not need to buy every single item: benefit from the price advantage of the whole set.

Conversion is simple - you can easily do it yourself!

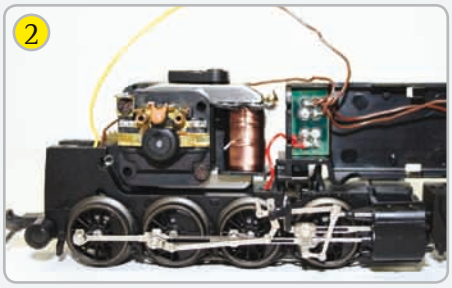


One of 3 magnets is included in each set

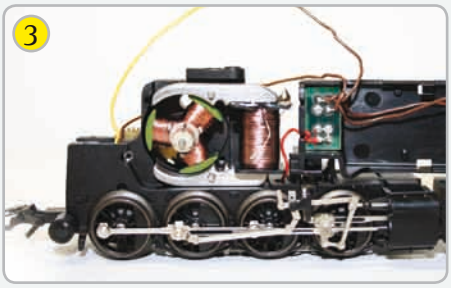
Here we show you, how it works:



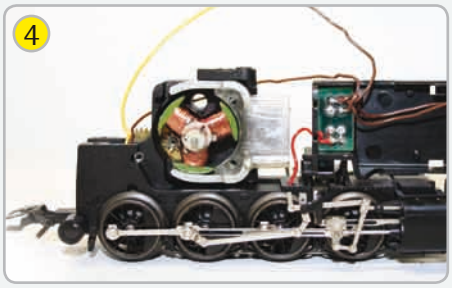
We start with a locomotive equipped with a Delta® motor.



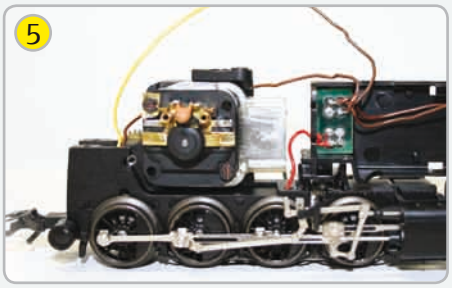
Universal motor with connected Delta® decoder: Remove all wires betw. motor and decoder. Remove all choke-coils and -capacitors except the one between the motor leads.



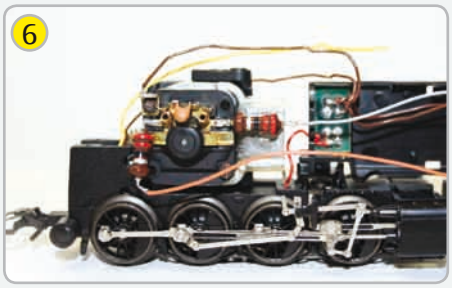
Remove the two screws at the motor bearing assembly and carefully lift off the assembly. Take care not to lose the coal brushes and retainer springs!



Pull off the universal field coil and replace it with the appropriate permanent magnet.



Carefully replace the bearing assembly again: Wiggle the brushes a bit or gently pull them apart, so that you can mount the bearing assembly over the commutator..



Solder one end of a choke coil to each motor terminal and connect the other end to the grey, resp. orange wire of the LokPilot/LokSound decoder. Conversion is done!

Ordering information

	Art.No.	Description
NEW	64630	LokPilot digital set 1, LokPilot V4.0 M4 64610 (MM/DCC/SX/M4), permanent magnet 51960, choke coils
NEW	64631	LokPilot digital set 1, LokPilot V4.0 M4 64610 (MM/DCC/SX/M4), Feldmagnet 51961, choke coils
NEW	64632	LokPilot digital set 1, LokPilot V4.0 M4 64610 (MM/DCC/SX/M4), Feldmagnet 51962, choke coils

LokPilot digital sets 21 MTC

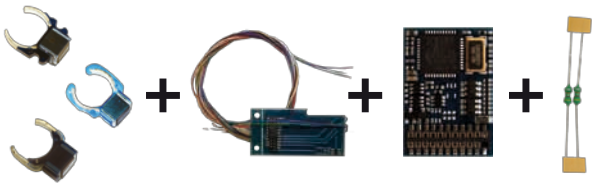
Many model railroaders would like to exchange their old interface for the modern 21MTC version when converting their aged Märklin® locomotives and look for a simple and affordable opportunity to do so.

For this application, we offer our new digital conversion sets. Besides a LokPilot V4.0 M4 (64614) multi-protocol digital decoder with 21MTC interface, the set includes one of three appropriate permanent magnets, two choke coils as well as the appropriate adapter board 51968. The adapter board 51968 simulates the well-known Delta® bzw. 6090x decoders in shape and size and in most cases, can be plugged directly into the specified holding.

Another advantage of the interface is that a subsequent decoder change can be carried out without soldering. The model railroader also benefits from the price advantage of buying the whole set.

Conversion is simple - you can easily do it yourself!

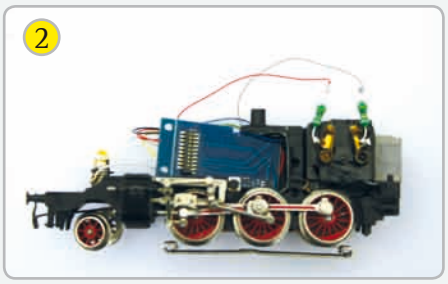
Here we show you, how it works:



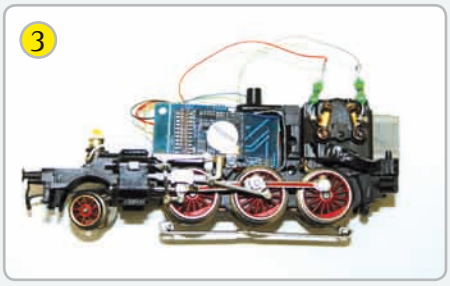
One of 3 magnets is included in each set

NEW ITEM 2013

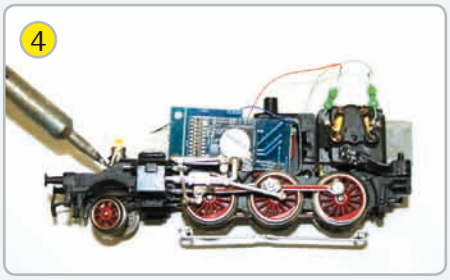
After adding the permanent magnet to the motor of your Delta® loco (as shown on the left page), remove the old Delta® decoder.



Install the 21MTC adapter board directly into the holding of the previous decoder. Mostly it can be easily plugged into the plastic holding.



Plug the decoder onto the adapter board. At first wire the connections between the motor and the track. Leave the cables for lighting out for the time being and make your first driving test.



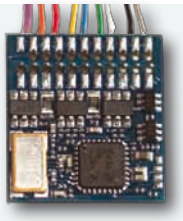
After a successful check connect the lighting cables. You may cut the cables of the adapter board as you please. Please make sure that the cables run properly!

To finish the conversion you only need to reassamble the body of the loco und make sure that none of the cables gets clamped.

Ordering information

	Art.No.	Description
NEW	64633	LokPilot digital set 21MTC, LokPilot V4.0 M4 64614 (MM/DCC/SX/M4), 51968, magnet 51960, choke coils
NEW	64634	LokPilot digital set 21MTC, LokPilot V4.0 M4 64614 (MM/DCC/SX/M4), 51968, magnet 51961, choke coils
NEW	64635	LokPilot digital set 21MTC, LokPilot V4.0 M4 64614 (MM/DCC/SX/M4), 51968, magnet 51962, choke coils

LokPilot Fx V4.0



One of the new items this year is also the LokPilot Fx V4.0. This small but nice function decoder has no motor output and is perfectly made for control cars or functional models. As it speaks DCC with RailCom® as well as Motorola® and Selectrix® it can be operated with all common digital command stations. Its flexible function key allocation and the various light effects are typical ESU V4 decoder features.

The LokPilot V4.0 is available in two interface versions: the "classic" 8-pin NEM 652 wire harness version as well as a 21MTC interface version.

Operational modes

The LokPilot Fx V4.0 is multi-protocol decoder meaning it speaks all common data formats such as DCC, Motorola® and Selectix®. In DCC mode 14-128 speed steps are possible, as well as 2- and 4-digit addresses. You can activate up to 28 functions. Thanks to RailComPlus®, the decoders will be automatically recognised by a suitable command station (e.g. ECoS).

It is able to control all DCC programming modes und thus can be driven and programmed by all DCC-compatible digital command stations. CV values can be read out on the main track with corresponding command stations, thanks to RailCom®. There are indexed CVs for command stations which are only able to program CVs from 1-255 (e.g. ROCO® Multimaus).

Motorola® users benefit from up to 28 speed steps with 255 addresses. Three further Motorola® addresses allow the activation of 16 functions. The installed programming mode makes re-programming with the venerable Control Unit® 6021 also possible.

The LokPilot Fx V4.0 decoder auto-detects the known Märklin® braking sectors as well as the ZIMO® HLU braking commands or the Lenz® ABC system. Braking with DCC brake generators or with DC ("Brake on DC") is supported. Furthermore you will be able to stop your train by using the Selectrix® braking diode.

Although this decoder has no motor it is, however, important for the functional decoder as well as the car decoder that they recognise the entrance of a brake section.

The LokPilot Fx 4.0 decoder can be used for both analogue DC or AC locomotives.

The decoder automatically switches between the different operating modes "on-the-fly". In most cases one does not have to adjust anything.

Interaction

The LokPilot Fx V4.0 can also be operated with a LokSound V4.0 and a LokPilot V4.0 decoder: Therefore it´s possible to e.g. install a LokSound V4.0 decoder into the loco of a trainset and equip the control car with a LokPilot Fx V4.0. Provided they have the same address, the decoders will act absolutely identical. The identical CV arrangement makes the synchronisation of both decoders easier.

Functions

The LokPilot Fx V4.0 decoder has 6 function outputs. The wire harness version is usually amplified. For the 21MTC version you can select between an amplified or a logic level for AUX3 and AUX4. All important light functions are available. The brightness of each output can be adjusted separately.

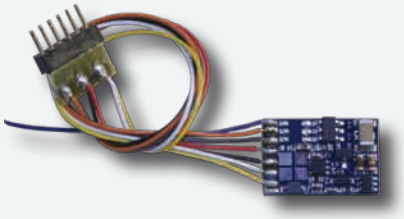
Protection

Of course, all function outputs and the motor current output are overload protected. We want you to have fun with your decoder as long as possible!

Ordering information

	Art.No.	Description
NEW	54620	LokPilot Fx V4.0, functional decoder MM/DCC/SX, 8-pin plug NEM652, cable
NEW	54621	LokPilot Fx V4.0, functional decoder MM/DCC/SX, 21MTC NEM660

LokPilot Fx micro V3.0



Motorless rolling stock can be digitalised with the LokPilot Fx micro V3.0, for which the LokPilot Fx V3.0 is not small enough. To this end, LokPilot Fx micro V3.0 offers four function outputs, which can activate typical functions, such as car interior illumination, head- or rear (-end, warning-) lights on cars, and function models. Of course, LokPilot Fx micro V3.0 is multi-protocol capable and with a dimension of 13.5mm x 9.0 mm x 3.5 mm (0.54 x 0.36 x 0.12 inch) small enough for most any application. LokPilot Fx micro V3.0 comes with a 6-wire NEM 651 harness.

Operational modes

LokPilot Fx micro V3.0 can handle DCC with 14, 28 or 128 speed steps as well as Motorola® and Selectrix®.

The decoder recognises the speed steps automatically. It supports Lenz® LG100 resp. ROCO® braking sections in addition to Zimo®'s HLU-commands, or braking in DC sections with reversed polarity as well as Märklin® braking sections (also for DCC). You can either use short-, or four digit addresses, or assign a consist address.

The Motorola® protocol enables the LokPilot Fx micro V3.0 decoder to run with Märklin® stations 6020®, 6021®, Delta®, mobile station® and Central Station®. For those, the decoder handles addresses 01 – 255, and comes to a halt correctly on the Märklin® braking section. On Selectrix® layouts you can choose between addresses 01 – 112.

LokPilot Fx micro V3.0 converses during operation fully automatically between all control modes (Motorola®, DCC, DC, AC, Selectrix®).

Analogue operation

There are no restrictions for LokPilot Fx micro V3.0-equipped rolling stock, of course, when operating in analogue mode.

Functions

LokPilot Fx micro V3.0 comes with four function outputs, 140mA each, and each can be assigned individually to a function: There is flash light, alternate flash, (or ditch lights), strobe light, firebox flicker as well as Mars-or Gyra light for US models. There is also a high frequency-, time controlled output available for digitally operated couplings.

All function outputs can be dimmed individually in 15 steps. In DCC mode, each function output can be assigned to function keys F0 - F12. F0 – F8 will be recognised in Motorola® mode, the same in Selectrix® mode, depending on the station.

Programming

The LokPilot Fx micro V3.0 supports all DCC programming modes, including POM (Programming on the main). For Märklin® stations 6020®, 6021®, mobile station®, and Central Station® all programming is also done electronically. For these units LokPilot Fx micro V3.0 employs a time proven, easily acquired programming procedure.

The programmed changes during Motorola® operation are also valid during DCC- and Selectrix® operation – and vice verse. Programming parameters is especially simple for owners of our ECoS command station: All options are displayed in plain language on the large screen, and can easily be modified – even during operation on the layout!

Interaction

LokPilot Fx micro V3.0 is designed for optimum interaction with LokSound V4.0 and LokPilot V4.0 decoders: For example it is possible to equip the cab of an A-A consist with a LokSound V4.0 decoder and the controlling car with a LokPilot Fx micro V3.0. Given both the same address, they work absolutely identically. Identical grouping of the CVs facilitates synchronisation of both decoders.

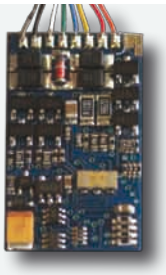
RailCom®

RailCom® is activated ex works. You are able to read CVs on the main track if you use an appropriate command station like our ECoS.

Ordering information

Art.No.	Description
52624	LokPilot Fx micro V3.0, functional decoder MM/DCC/SX, 6-pin plug NEM652, cable

LokPilot Basic V1.0



8-pin plug

21MTC interface

In the past, every once in a while we received inquiries for a robust, affordable DCC decoder, which would meet the basic standards.

We are now proud to present you our answer to the challenge: The LokPilot V1.0 was developed from scratch with the aim to bring you a decoder which would satisfy the needs of the majority of model railroaders. On the one hand it offers all the fundamental functions, while on the other hand it is easy on the wallet.

The result is convincing: The LokPilot Basic V1.0 is surely not a stripped down, technically obsolete decoder, on the contrary: It contains the most modern, on the world market presently available technology.

Like all other LokPilot decoders, the LokPilot Basic V1.0 is convincing due to its excellent load control, good slow speed characteristics, three function outputs and its robust build-up. Simple handling and practical programmability are self-evident.

The LokPilot Basic V1.0 lends itself to all popular DCC-systems and, thanks to the concentration for the essential features, sports a so far unbeatable price/performance ratio. At last, you do not need to work without a decoder featuring load control for your locos anymore, but have access the a fully matured brand.

We ship the LokPilot Basic V1.0 with an 8-wire NEM interface or with a 21MTC connector. Installing it into the locos with a digital interface is especially simple: Open up loco - remove dummy plug - plug in the decoder - close the loco - that´s the very it!

Operational modes

The LokPilot Basic V1.0 supports the worldwide recognised DCC protocol. In this mode it can be utilised with 14, 28 or 128 speed steps or on analogue DC layouts. It supports Lenz®, LG 100 resp. ROCO® braking sections as well as braking in DC sections with reverse polarity. You can use addresses 1 - 119. During operation, the LokPilot Basic V1.0 converses fully automatically between operational modes (DC, DCC). That is important in case you run parts of your layout (fiddle yard) in analogue mode.

Motor management

All popular DC - or coreless motors regardless whether from ROCO®, Fleischmann®, Brawa®, Mehano®, Liliput®, Bachmann®, Kato®, Bemo®, Faulhaber®, or Maxon® will be driven by the 0.75A continuous-current last stage of the LokPilot Basic V1.0 decoder.

The 31 kHz high-frequency load control takes care of silky smooth, absolutely quiet motor operation and lets your engines crawl slowly on the layout. The load control can be optimised via 3 CVs for the motor in use. Thanks to mass-simulation the loco will not jerk, even with only 14 speed steps.

Analogue world

The LokPilot Basic V1.0 works also with no problems on analogue DC layouts, which means in spite of the club you belong to being analogue; you can still run your locos.

Functions

The LokPilot Basic V1.0 offers three 180mA steady-current outputs, dimmable together in 7 steps. Therefore you can wire up the cab illumination or a smoke generator besides the two standard reversing head lights. The built-in switching speed mode and the option to switch off the acceleration and deceleration rate with the touch of a key, helps you to glide smoothly around the depot area.

Programming

All programmable adjustments are done electronically. It's not necessary to open up the loco anymore. Since the LokPilot Basic V1.0 knows all DCC programming modes, and all values are inserted with two digits, programming with all known command stations is a cinch. Especially comfortable is the programming of parameters for owners of our ECoS command station: all modifications are displayed on the large screen in plain language, and can be changed most easily.

FAQ

For whom is the Basic LokPilot V1.0 made?

The LokPilot Basic is made for users as a reliable, load controlled decoder without all the „Bell & Whistles".

Is the current for H0 engines not too low?

No. The LokPilot Basic V1.0 provides a constant current of 0.7 A. This allows the most modern 5-pole motors like those of Fleischmann®, Brawa®, ROCO®, Mehano®, Electrotren, Bemo, Liliput or PCM easily be driven. For the round motors of Märklin® or Fleischmann®, we recommend the LokPilot V3.0/V4.0.

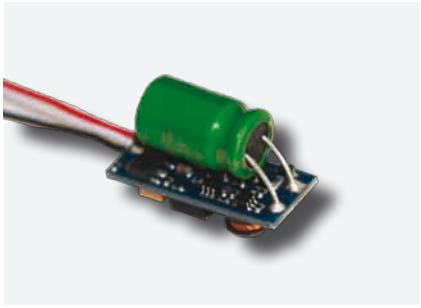
What can LokPilot more than the LokPilot Basic?

A lot. The LokPilot V4.0 can handle 4-digit as well as traction addresses (Consist mode) and brings enough output for the older Fleischmann® - or Märklin® - round motors and also locomotives with two motors.
The LokPilot V4.0 provides four function outputs and the brightness can be adjusted individually and comes also with lighting effects such as flashing light or flickering fire box. You can change the assignments of the function keys in any way you want.
With the LokPilot V4.0 you can set the acceleration and maximum speed in the analogue operation of the loco.

Ordering information

Art.No.	Description
52690	LokPilot Basic V1.0, with 8-pin plug according to NEM652, blister packaging
52692	LokPilot Basic V1.0, with 21MTC interface, blister packaging

PowerPack



The ESU PowerPack can be wired to all LokPilot V4.0, LokPilot micro V4.0, LokSound V4.0 or LokSound micro V4.0 decoders and supplies your locomotive reliably with energy when traversing dirty track sections or extended routes over many turnouts. Both sounds and lights and motor functions will be maintained. Thus your models will continue to run for up to three seconds without power.

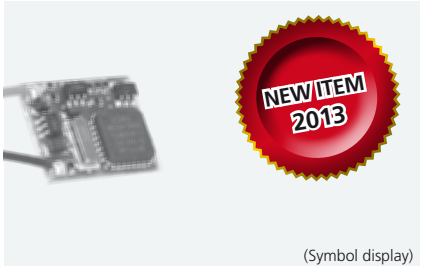
The PowerPack has an integral re-charging circuit controlled by the decoder. Therefore it may remain in the locomotive during programming. In order to prevent an excessive load of the booster in case of several models running at the same time the charge current is limited.

The buffering time can be limited by setting a CV in the decoder. This may become necessary to avoid overrunning track sectors without power in front of red signals.

The dimensions of the PowerPack are about 22 x 10 x 14 mm and, of course, have to be taken into account, when installing the module.

A three-pole cable is required to connect the decoder and the PowerPack.

RailCom® transmitter module



(Symbol display)

A RailCom® capable decoder is necessary for use with the RailCom® location detection. If you do not wish to or cannot replace an older decoder with a modern ESU V4 decoder then the RailCom transmitter module comes in handy: this small transmitter is installed in addition to the locomotive decoder or individually in a cab driving trailer and is simply soldered to the wheel pickups. Due to its small dimensions of only 11.0 x 9.0mm it fits in almost any locomotive and can then be programmed like any other DCC decoder. Of course, the module supports 2-digit and 4-digit addresses. With an ESU ECoS you can employ RailCom® also in conjunction with (older or more recent) Märklin® mfx® decoders: The ECoS will be able to generate the connection between the RailCom transmitter module and the locomotive decoder.

Smoke units

(Art.No. 54679, Symbol display)

Art.No. 54678
No figure avialble at the moment.

For many modellers running their trains in the garden smoke generators are a must. Besides sound reproduced by the LokSound XL decoders one finds the exhaust smoke synchronous with the exhaust chuffs most exciting. Prototype diesel locomotives also make their presence known by clearly visible exhaust fumes.

Although our LokSound XL decoder can handle many commercially available smoke generators we would like to recommend our new smoke generators. Both work perfectly with the LokSound XL V4.0 decoders.

Integral electronics control both the fan and the heating system of the smoke generator. Since we did not forget to include a temperature sensor the amount of smoke is independent of the track voltage. We have also made sure that nothing will burn if the tank is empty.

The amount of smoke and the revs of the fan can be determined by the LokSound XL V4.0 decoder. Of course both steam smoke plumes as well as typical diesel exhaust plumes can be realised. The steam exhaust plumes can be synchronised with external triggers or can be determined by the LokSound XL decoder.

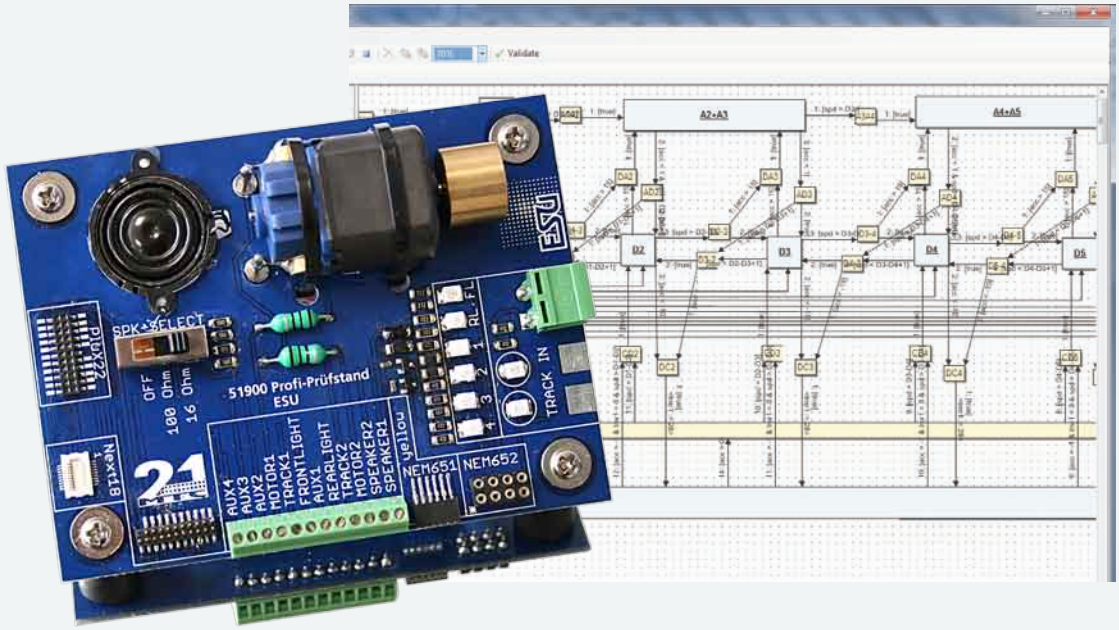
If you do not wish to use an ESU decoder you may still use the smoke generator: It also accepts commands via the SUSI interface.

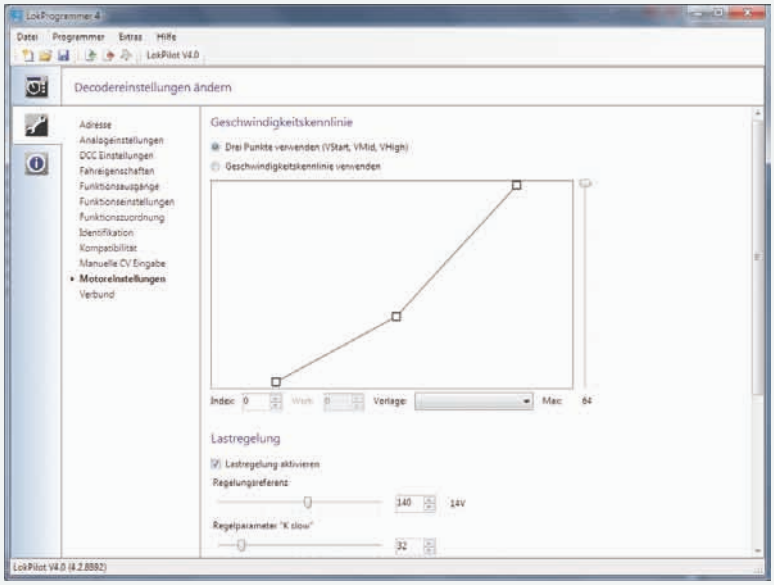
The larger smoke generator 54679 with its dimensions of ca. 50 x 28 x 30mm is compatible to many LGB® and PIKO® locomotives while the smaller version is intended for 0 gauge locomotives. You can flexibly extend the exhausts on both types by means of a silicone tube.

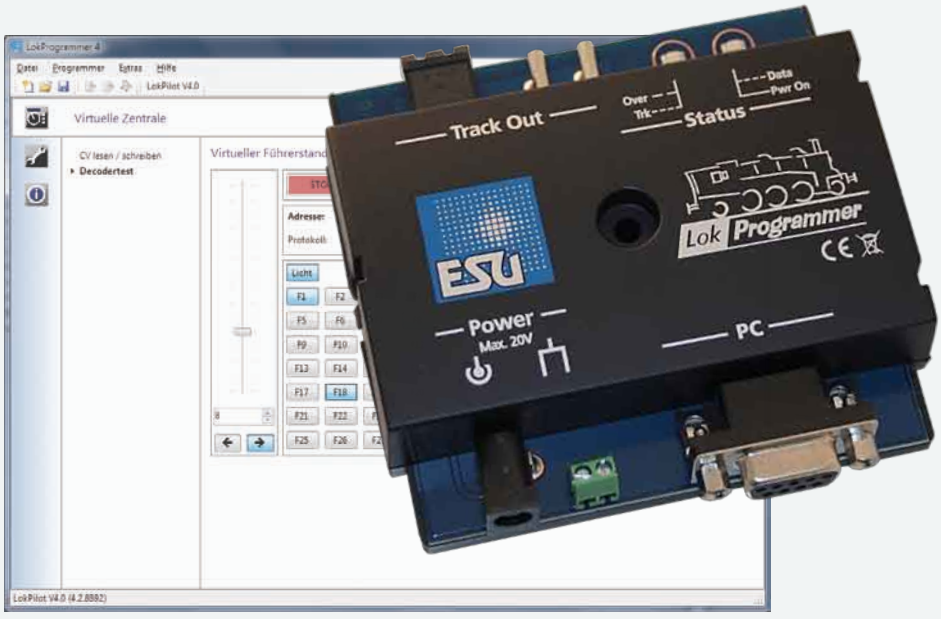
Ordering information

	Art.No.	Description
	54670	PowerPack, energy storage for LokPilot V4.0, LokSound (micro) V4.0 decoders
NEW	54680	RailCom® transmitter unit, with wire harness, set including 5 pcs.
NEW	54678	Smoke unit, small size (Gauge 0) for LokSound XL V4.0 or SUSI
NEW	54679	Smoke unit, big size (Gauge G) for LokSound XL V4.0 or SUSI

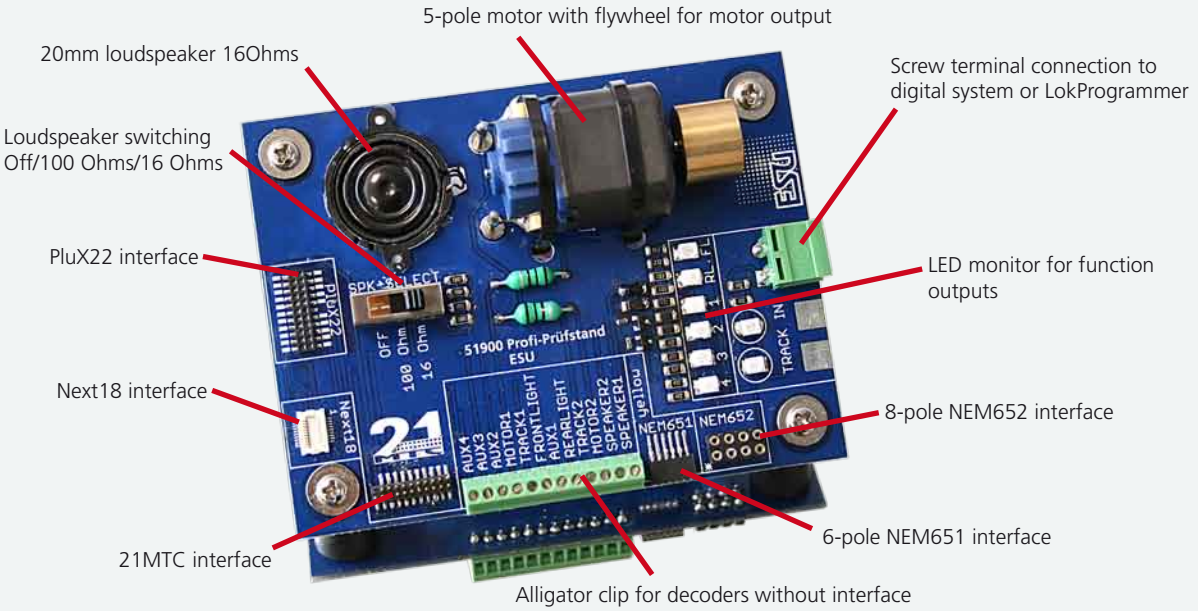
Test & Programm







Decoder Tester



May be you know the situation: In front of you there is a digital decoder on the workbench and before you undertake its complicated installation into the loco, you would like to know if the decoder works as advertised. But, how do you test it?

The Decoder Tester will help you with that: It's designed for testing decoders before these are installed into a loco. The Decoder Tester is simply hooked up to your digital central station or the LokProgrammer.

It allows you to test every decoder without the influence factors of a locomotive.

Configuration

To make this as simple as possible for you, the Decoder Tester comes with useful features: To connect the decoder, there is a 6-wire NEM 651 harness and an 8-wire NEM 652 interface, as well as a 21MTC connector available. Plug it on – bingo!

We also offer a PluX22 interface as well as the loudspeaker switching function and a Next18 interface since 2013. You can now choose freely, if you want to switch the speaker on Off / 100 Ohms / 16 Ohms.

Furthermore we extended the Decoder Tester with a terminal block, you are now able to connect it to your digital system or to the ESU LokProgrammer.

Locos without an interface board can be hooked up with alligator clips. A high-quality, 5-pole skewed armature can motor with flywheel serves to check the motor output: It's this simple to test the slow-, and constant speed characteristics of your decoder.

A LED-monitor informs you about the function of the head-, and rear light output, as well as function outputs AUX 1 (green), AUX 2 (violet), AUX 3 and AUX 4.

A 20mm loud speaker is included for testing LokSound decoders. A screw terminal assures safe connection between your Decoder Tester and the digital command station or LokProgrammer.

Due to its sensible features and simple handling, the Decoder Tester will soon become an indispensable helper in your workshop.

Ordering information

Art.No.	Description
51900	Testing device for decoders, connection for NEM652, 651, 21MTC, PluX22 interface, Next18, separate cable, with motor, LED monitor and 20mm loudspeaker

LokProgrammer

You want to listen to the sound spectrum of your favourite loco on your model railroad? No problem with ESU's LokProgrammer! One prerequisite: A PC with sound card, serial interface or USB port as well as Windows XP or Windows 7. Simply record the original sound of your engine and edit it at home with your computer.

With the LokProgrammer, you can also change the settings of all ESU decoders such as LokSound, LokPilot as well as SwitchPilot decoders according to personal requirements. This makes a realistic railway feeling possible.

Thanks to the graphical user interface of Windows the best-possible decoder adjustment can be carried out, even without any programming experience. Never has the adjustment of a digital decoder been easier!

Settings

The most important function of the LokProgrammer is the tuning and adjustments of new decoders. No matter if it is a DCC, multi-protocol or M4 decoder. With the help of the LokProgrammer you are able to change almost each of the decoder´s settings in an easy and convenient way. Depending on the decoder type the amount of available options varies. You can change all of the decoder´s digital parameters, such as address of the loco, operation speed, maximum speed, braking deceleration, brightness of bulbs etc.

Furthermore you can change the parameters of the total load control or the function key allocation as well as for brake distance or analogue modes. Also the speed table can be conveniently manipulated by mouse click. In short, all decoder settings can be displayed and modified.

Of course you can also edit the settings of M4 decoders such as loco symbol, function key symbols and the loco name, just like it is shown later on the command station. If your ESU decoder already speaks RailComPlus®, you are able to modify the respective values as well.

Thus you can set all options with your computer very easily - no cumbersome entering of CVs (configuration variables) with your command station!

Sound

With the LokProgrammer you can erase the sound data of any LokSound decoder as many times as you wish, and replace it with a different sound. To this end we offer on our homepage more than 400 different, fully matching sounds of various prototypes and locos for downloading on your computer. Also you can edit just parts of a sound project: You don't like the decoder's whistle? Just replace it with one of the many others.

Suitable sources beside those offered by us, are in Windows *.wav format available. Sound – even voice or music is no problem for our decoders. With the LokProgrammer's aid you use the entire flexibility and functionality offered by LokSound decoders.

Test run

With the virtual driver´s cabin the LokProgrammer offers you the possibility to test your locos quickly and directly at your desk. Beside Motorola® it also supports all DCC modes and can activate up to 28 function keys.

Upgrades

The LokProgrammer can also be instrumental in updating decoders. Almost all ESU decoders are updatable, in case you desire a new software version. To do this, you only need the LokProgrammer as well as the appropriate software. It is either available separately or included in the LokProgrammer V.4 software. By doing so, you will keep your ESU decoders up-to-date with current developments and benefit from product enhancements.

Open

We recommend the LokProgrammer not only for our ESU decoders: many well-known manufacturers meanwhile equip their locomotives with ESU decoders ex works. Depending on their technical specifications, the settings of the so-called OEM decoders can be also modified and changed. The purchase of a LokProgrammer is therefore a worthwhile investment in any case!

With the LokProgrammer you can also modify settings of other decoders, provided that they completely correspond to the DCC specifications; such decoders can only be edited in the single CV mode.

Ordering information

Art.No.	Description
53451	LokProgrammer set: LokProgrammer, power supply 240V EU, serial cable, instruction manual, CD-Rom, USB adapter
51952	Cable USB-A 2.0 FTDI on RS232, 1.80m for Lokprogrammer

Connection

It's this that simple: The LokProgrammer is a small programming box, which is wired between the PC and a programming track. To connect it you need either a vacant serial interface, or you use the included USB adapter cable (works with Windows XP or Windows 7). For power we include a 500mA wall power supply. If you need more power (e.g. for gauge I engines), you can also use a conventional model railroad transformer.

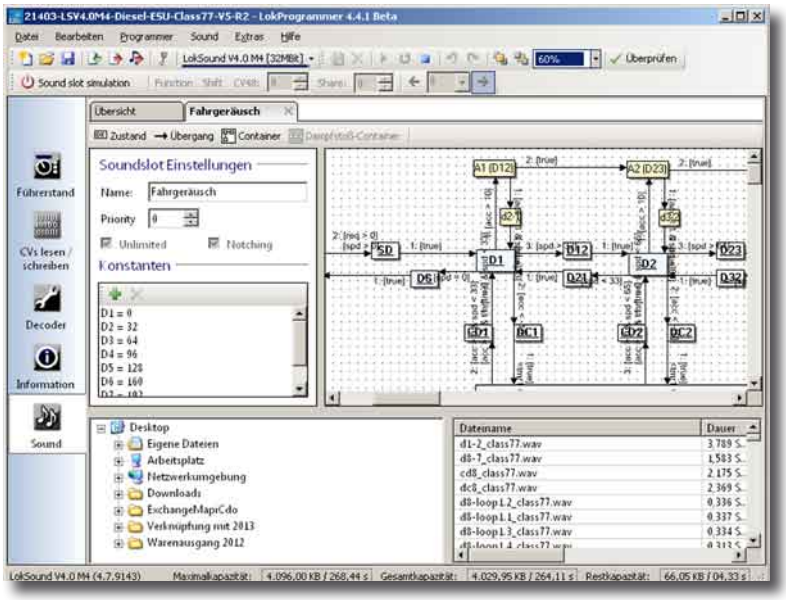
Software

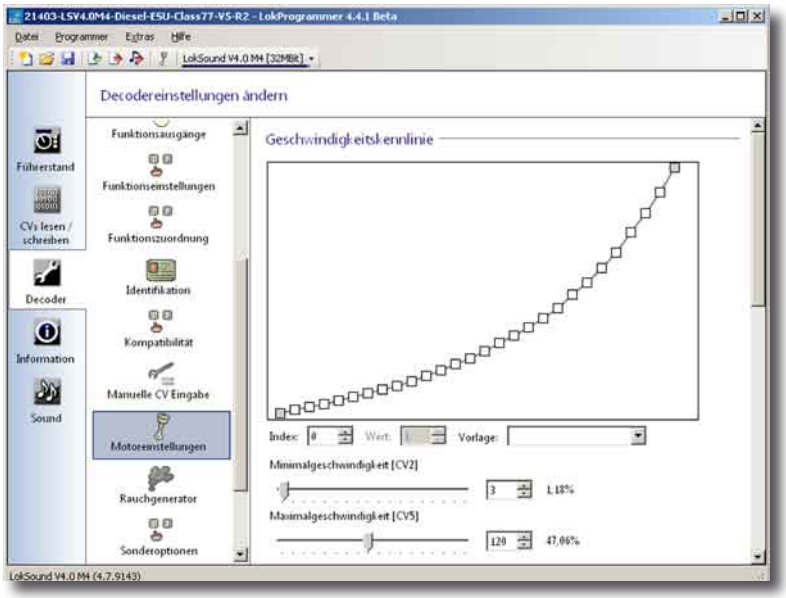
After having connected the LokProgrammer with your PC you start up the especially user-friendly LokProgrammer software, which is included on CD-ROM. For LokSound V4.0 & LokSound micro V4.0 decoders we offer the brand-new software V4, which has been specifically developed for the decoders from the scratch. This runs on all modern Windows-systems from Windows XP to Windows 7.

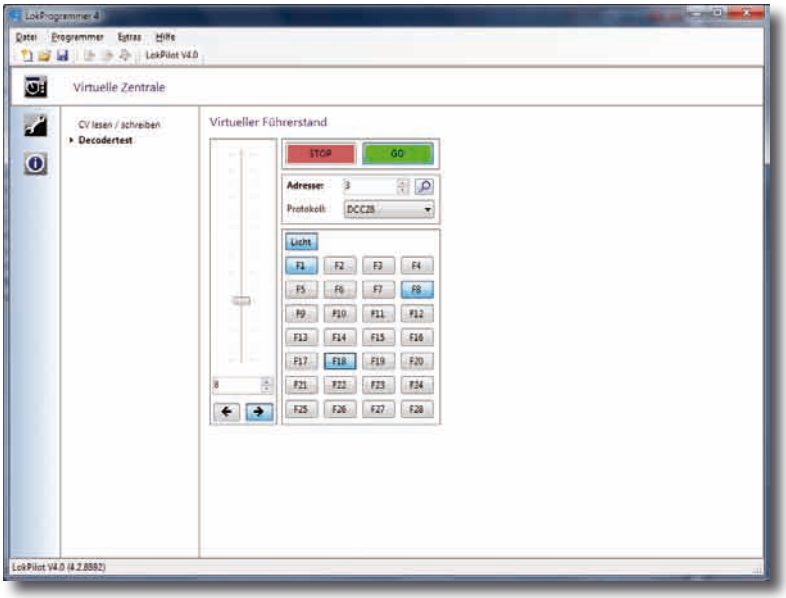
Just put the loco with the ESU decoder on your programming track, and right away you can read, edit or program it. The Programmer automatically recognises the decoder in the engine.

The future

LokProgrammer software is being reviewed continuously. The latest, pertinent version can always be downloaded from our website.







As contemporary computers do not have a serial interface anymore we include a USB adapter cable.

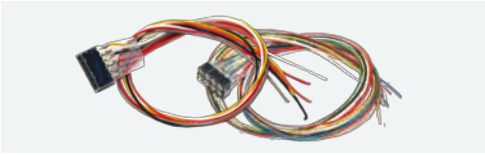
If your LokProgrammer has been in use for a considerable time and you intend to switch to Windows 7, you will need a new USB cable.

The USB cable can be ordered at your ESU retailers shop, art. no. **51952**.


MRCE

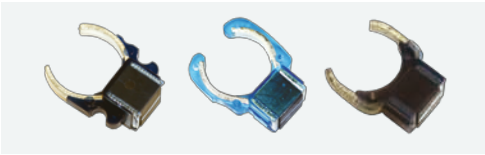
Thin cables

Who doesn't know the problem: if you work on locos and decoders (e.g. run wires from loco to tender) you need thin, extremely flexible cables. These are not always easy to get. Responding to many requests from our customers, as of now we offer you super thin cables (AWG 36) with an outside diameter of only 0.5 mm (0.02 inch) in all common DCC colors.



Cable harnesses

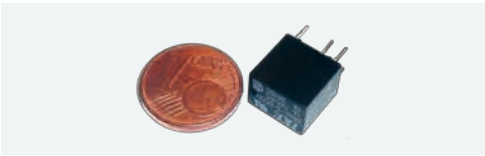
If the loco in question features no digital interface and you don't want to cut off the interface-plug of your loco, simply make use of one of our harnesses 51950 resp. 51951: Solder in the harness and then plug in the decoder. That's how the Pro's do it!



Permanent magnets

For the retrofit of old Märklin® all-current motors you need a permanent magnet. It replaces the present field winding, and in combination with a LokSound – or LokPilot decoder, helps to make your loco run astonishingly smooth.

We offer 3 different magnets, depending on the particular armature. You find the armature code number on a spare-parts sheet, which you can download from www.maerklin.de.



Miniature relays

Mit unserem kleinen Schaltrelais lassen sich Lasten schalten, die mehr Strom benötigen als ein Funktionsausgang des Decoders leisten kann. Schalten Sie in diesem Fall einfach das Relais dazwischen.

Ordering information

	Art.No.	Description
	51940	Thin cable, Diameter 0.5mm, AWG36, 2A, 10m wound up, white
	51941	Thin cable, Diameter 0.5mm, AWG36, 2A, 10m wound up, purple
	51942	Thin cable, Diameter 0.5mm, AWG36, 2A, 10m wound upl, black
	51943	Thin cable, Diameter 0.5mm, AWG36, 2A, 10m wound up, red
	51944	Thin cable, Diameter 0.5mm, AWG36, 2A, 10m wound up, orange
	51945	Thin cable, Diameter 0.5mm, AWG36, 2A, 10m wound up, green
	51946	Thin cable, Diameter 0.5mm, AWG36, 2A, 10m wound up, grey
	51947	Thin cable, Diameter 0.5mm, AWG36, 2A, 10m wound up, yellow
	51948	Thin cable, Diameter 0.5mm, AWG36, 2A, 10m wound up, brown
	51949	Thin cable, Diameter 0.5mm, AWG36, 2A, 10m wound up, blue
	51950	Cable harness with 8-pin plug acc. to NEM652, DCC cable coloured, 30cm
	51951	Cable harness with 6-pin plug acc. to NEM651, DCC cable coloured, 30cm
	51963	Relay 1 Ampere miniature switching relay, 16Volt
	51960	Permanent magnet as No. 220560, for Anker 217450, D=24.5mm, for engine plates 216730, 211990, 228500
	51961	Permanent magnet as No. 220450, for Anker 200680, D=18.0mm, for engine plate 204900
	51962	Permanent magnet as No. 235690, for Anker 231440, D=19.1mm, for engine plate 231350
NEW	51965	Permanent magnet, for Märklin 3015, ET800, ST800, Gauge 1, all-current motors

I/O Extension board

With this expansion board you can easily expand your LokPilot V4.0 or LokSound V4.0 decoder (with 21MTC interface!): All you need to do is to plug the decoder onto the expansion board and benefit from using 8 additional function outputs (AUX5 through AUX8) for lighting effects, coupler etc. In addition, you are able to connect 4 RC-servos! The 5V voltage needed (for this) will be also provided.

Two outputs for hall sensors or reed contacts enable to trigger sounds or functions.

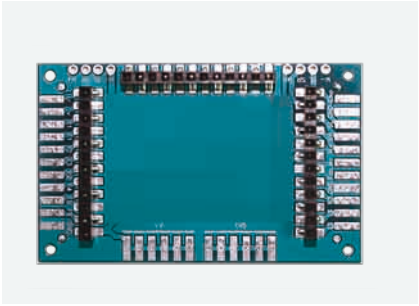
The highlight of the expansion board is surly the control electronics for synchronised smoke units. You just need to install an ESU smoke unit (from Class 215) into your locomotive that allows you to generate synchronised steam chuffs or Diesel smoke.

With the help of the LokPilot / LokSound V4.0 decoder all functions can be controlled in a direct way and are fully integrated into function mapping. The I/O board measures 15.5mmx 30mmx 5.5mm and has therefore the exact size of a LokSound V4.0 decoder, which can be plug onto the board.

The module can be directly plugged into a 21MTC interface of a loco (if enough height available) or freely wired via its cable connections.

Plug the decoder onto the I/O extension board

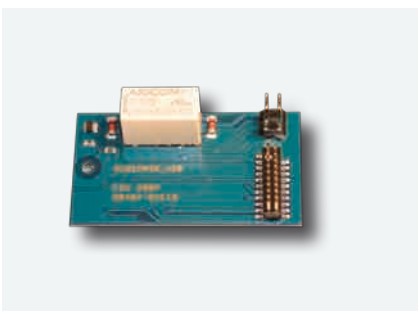
Adapter board for LokSound XL V4.0 with multi-pin plugs



For professionals in digital model railroading there is a new adapter board. This makes installation easier and safer. First all wires are connected to the soldering points of the adapter board. All contact points (terminals) are present on both - top and bottom.

After that the LokSound XL V4.0 decoder is plugged on with the multi-pin connector. Finished. Finally you can remove and reinsert your decoder at any time.

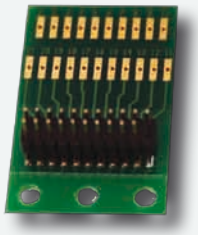
Change over-skis



Many railcars are equipped with a ski at both ends. In order to function correctly in block sections, and timely braking in front of red signals, it is vital for the decoder to employ only one ski for (voltage) pick up – depending on direction of travel.

To achieve this is precisely the responsibility of our ski change-over electronics: It is hooked up between pick up and a 21TMC connector of a LokPilot- or LokSound V3.5 / V4.0 decoder. After reprogramming, all ESU decoders (not LokPilot Basic V1.0) can send a control-pulse that talks to the change-over electronics and then selects the "correct" ski. This combination works perfectly and without interference in digital – and analogue mode.

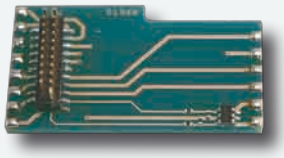
21MTC adapter board



The adapter board offers a possibility for installing a decoder with 21MTC connector. This decoder is simply plugged onto the board. At the other end 21 annular rings make a clean wiring of your loco possible.

A neat conversion can be made via this adapter board and enables you to use all additional functions of the 21MTC connector (e.g. loud speaker outputs).

21MTC adapter board 2



The 21 MTC adapter board 2 is also suitable for digitising a loco without interface. It is very helpful, if you do not intend to wire the decoder freely or if you wish to use more than four function outputs on your LokPilot or LokSound decoder. This adapter board simulates the typcial size and shape of Märklin® 6090x-decoders and can be installed in every suitable position.

Decoders with 21MTC connectors (ESU LokPilot or LokSound favoured) are simply plugged onto the adapter board.

On the output side, the adapter offers already soldered cables (appr. 20cm length) for all contacts needed. Thus the wiring of your loco is child´s play. There are amplifiers (appr. 250mA each) for function AUX3 and AUX4 (the decoder´s logical outputs) so that ESU decoders have up to 6 available physical function outputs.

PluX Adapter board

If you own a loco with a PluX jack and would like to install a normal decoder with an 8-pin NEM652 plug? No problem, you just need the ESU PluX adapter board.

This adapter board can be easily plugged into your loco with a PluX12, PluX16 or PluX22 jack, then you are able to install any decoder with a conventional 8-pin plug.

Ordering information

	Art.No.	Description
	51966	Change over of skis for LokSound V3.5/V4.0, LokPilot V3.0/V4.0, with 21MTC interface
	51967	Adapter board for LokSound V3.5/V4.0, LokPilot V3.0/V4.0, with 21MTC interface
	51968	Adapter board #2, L-shape as 6090x, with AUX3+AUX4, for LokSound V4.0, LokPilot V4.0 with 21MTC interface
	51969	Adapter board #3, for decoders with 8-pin NEM652 interface for locos with PluX12, 16, 22 interface
	51970	I/O Extension board for LokSound, LokPilot V4.0 21MTC (4x AUX, 2x Servo, Smokeunit)
NEW	51971	Adapter board for LokSound XL V4.0 with PIN connectors

Loud speakers

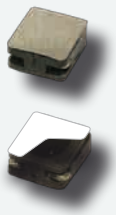
For LokSound H0, micro

A very important part of the LokSound system is the speaker.

Therefore, we only use specially developed loudspeakers geared to the sound decoder. Here we recommend the following old saying, the bigger the speaker, the better the sound. As such, we offer loudspeakers in various sizes, one of them will surely fit into your loco. Should there not be enough space, you can also install the speaker in a 'ghost waggon' directly behind the loco.

Another crucial accessory is the sound chamber. This helps create the necessary sound pressure for the speaker´s membrane and comes with most loudspeakers.

We especially like to draw your attention to the self-adhesive loudspeaker which is up to now unique in the model railway sector. With a size of only 12mm x 14mm (0,47 x 0,55 inch) it can be fixed into the tiniest corners and onto almost all kind of appliances. The sound of this specially designed loudspeaker, despite its small size, is amazingly good as it uses the surface it is fixed or respectively stuck on as an additional resonance chamber.



50326

50327

50328

50330

50331

50332

50333

50334

50338

NEW ITEM 2013

50324

50337

If you are not sure about which loudspeaker fits into your loco we generally recommend to open the loco and measure the dimensions with a ruler. Since model railway manufacturers often tend to change (tacitly) the inner modifications of their locos we are not able to make recommendations in general. Therefore rely on your own observations!

When selecting the loudspeaker the used decoder type is important. Depending on the decoder, different loudspeakers can be used as follows:

LokSound V4.0, LokSound micro V4.0 & LokSound V4.0 M4 decoders need a new speaker with an impedance of 4 Ohms. With the present 100 Ohms loudspeakers you would hardly hear anything.

Conversely, you must never use the new 4 Ohms speakers with the previous LokSound V3.5 decoder. The decoder could be destroyed! When the decoder is replaced, the speaker must(!) be changed as well.

For the well-proven LokSound V3.5, LokSound micro V3.5 and LokSound V3.0 M4 decoders we offer loudspeakers in the following sizes: 2x13mm (50 Ohms each), 2x16mm (50 Ohms each), 16x25mmm, 20mm, 23mm, 28mm, 20x40mm and 40mm.

By virtue of the internal design of the decoders, the speakers feature a specially customised impedance of 100 Ohms.

Only these speakers may be used!

For LokSound XL

LokSound XL decoders work with loud speakers which have an impedance from 4 - 32 Ohms. ESU offers you a selection of the sizes 40mm, 57mm and 78mm including sound chamber as well as some high-class Visation XL loudspeakers without sound chamber.

Visaton loudspeakers offer a powerful bass and a high-quality audio playback, whereas ESU loudspeakers are also suitable for open-land vehicles due to their plastic membrane.

50336

50323

50445

50446

Ordering information

	Art.No.	Description
		Loudspeakers for LokSound V4.0 & LokSound micro V4.0 & LokSound V4.0 M4
	50326	Loudspeaker 14mm x 12mm, square, 8 Ohms, with integrated sound chamber, self-adhesive, 1~2W
	50327	Two loudspeakers 16mm, oval, 8 ohms, 1~2W, with common sound chamber
	50328	Two loudspeakers 13 mm, 8 ohms, round, 1~2W, with sound chamber
	50330	Loudspeaker 16mm x 25mm, square, 4 ohms, with sound chamber
	50331	Loudspeaker 20mm, round, 4 ohms, 1~2W, with sound chamber
	50332	Loudspeaker 23mm, round, 4 ohms, 1~2W, with sound chamber
	50333	Loudspeaker 28mm, round, 4 ohms, 1~2 W, with sound chamber
	50334	Loudspeaker 20mm x 40mm, square, 4 ohms, 1~2 W, with sound chamber
		Loudspeakers for V3.5 & LokSound micro V3.5 & LokSound V3.0 M4
	50335	Loudspeaker 32mm, round, 100 Ohms, without sound chamber
	50339	Two loudspeakers 13 mm, 50 Ohms, round, with sound chamber
	50440	Loudspeaker 16mm x 25mm, square, 100 Ohms, with sound chamber
	50441	Loudspeaker 20mm, round, 100 Ohms, with sound chamber
	50442	Loudspeaker 23mm, round, 100 Ohms, with sound chamber
	50443	Loudspeaker 28mm, round, 100 Ohms, with sound chamber
	50444	Loudspeaker 40mm, round, 100 Ohms, with sound chamber
	50447	Two loudspeakers 16mm, oval, 100 Ohms, with common sound chamber
	50448	Loudspeaker 20mm x 40mm, square, 100 Ohms, with sound chamber
		Loudspeakers for LokSound XL V3.5 & LokSound XL V4.0
NEW	50323	Loudspeaker 40mm round, 8 Ohms, with sound chamber for LokSound H0, LokSound XL
NEW	50324	Loudspeaker Visaton FRS 7, 70mm, round, 8 Ohms, for LokSound XL V4.0
	50336	Loudspeaker Visaton SC 4.7 ND, 41mm x 71mm, square, 8 Ohms
	50337	Loudspeaker Visaton FRS 5, 50mm, round, 8 Ohms, with sound chamber
	50338	Loudspeaker Visaton FRS 8, 78mm, round, 8 Ohms
	50445	Loudspeaker 57mm, round, 16 Ohms, with sound chamber
	50446	Loudspeaker 78mm, round, 32 Ohms, with sound chamber

VISATON GERMANY

Programmed LokSound decoders

Sound selection

ESU is the market leader in terms of sound, therefore we take your high demand for good sound very seriously. Here you will find a selection of standard sounds for popular locomotives. You will find even more sounds for free within our sound library on our website: you will surely find your sound among our selection of more than 400 sound files, which have directly been recorded from the original loco.

Article description	LokSound V4.0	LokSound micro V4.0	LokSound V4.0 M4	LokSound XL V4.0	New in	Available
LokSound V4.0 Steam "Universal 2 Zyl. Narrow line (Prototype: BR99)"	54401	54801	64401	54501	2011	
LokSound V4.0 Steam "Univers. 3 Zyl. Main line (BR 44)"	54402	54802	64402	54502	2011	
LokSound V4.0 Steam "Univ. 2/4 Zyl. Main line (BR 64)"	54403	54803	64403	54503	2011	
LokSound V4.0 Steam "BR 38 P8"	*54404*	*54804*	*64404*	*54504*	*2013*	
LokSound V4.0 Steam "BR 18 S 3/6"	54405	54805	64405	54505	2011	
LokSound V4.0 Steam "BR 01"	54406	54806	64406	54506	2011	
LokSound V4.0 Steam "BR 03"	54407	54807	64407	54507	2011	
LokSound V4.0 Steam "BR 23"	*54408*	*54808*	*64408*	*54508*	*2013*	*Q1/13*
LokSound V4.0 Steam "BR 96 Mallet"	54409	54809	64409	54509	2011	
LokSound V4.0 Steam "BR 50 NMBS-SNCB type 25"	*54410*	*54810*	*64410*	*54510*	*2013*	*Q1/13*
LokSound V4.0 Steam "Universal US-Steam (Big Boy Mikado)"	54411	54811	64411	54511	2011	
LokSound V4.0 Steam "Tenweeler Mountain Hudson"	54412	54812	64412	54512	2011	
LokSound V4.0 Steam "BR 80"	54413	54813	64413	54513	2011	
LokSound V4.0 Steam "BR 01.10 Coal"	54414	54814	64414	54514	2011	
LokSound V4.0 Steam "BR 52 Kondenstender"	54415	54815	64415	54515	2011	
LokSound V4.0 Steam "Adler"	54416	54816	64416	54516	2011	
LokSound V4.0 Steam "BR 06"	54417	54817	64417	54517	2011	
LokSound V4.0 Steam "BR 05"	54418	54818	64418	54518	2011	
LokSound V4.0 Steam "18 201"	54419	54819	64419	54519	2011	
LokSound V4.0 Steam "BR 55 NMBS-SNCB type 81"	54420	54820	64420	54520	2011	
LokSound V4.0 Steam "BR 24 / BR 64"	54421	54821	64421	54521	2011	
LokSound V4.0 Steam "BR 78"	54422	54822	64422	54522	2011	
LokSound V4.0 Steam "BR 93"	54423	54823	64423	54523	2011	
LokSound V4.0 Steam "BR 41 Coal"	54424	54824	64424	54524	2011	
LokSound V4.0 Steam "BR 41 Oil"	54425	54825	64425	54525	2011	
LokSound V4.0 Steam "BR 01.10 Oil"	54426	54826	64426	54526	2011	
LokSound V4.0 Steam "BR 03.10 Oil"	54427	54827	64427	54527	2011	
LokSound V4.0 Steam "BR 44 Oil"	54428	54828	64428	54528	2011	
LokSound V4.0 Steam "BR 86"	54429	54829	64429	54529	2011	
LokSound V4.0 Diesel "V 36 / BR 236"	*54430*	*54830*	*64430*	*54530*	*2013*	*Q1/13*
LokSound V4.0 Diesel "V 60 / BR 260"	*54431*	*54831*	*64431*	*54531*	*2013*	*Q1/13*
LokSound V4.0 Diesel "V 100 / BR 212"	54432	54832	64432	54532	2011	
LokSound V4.0 Diesel "Universal Diesel (Prototype: BR 218)"	54433	54833	64433	54533	2011	
LokSound V4.0 Diesel "Belgian Bombardier Diesel loco"	54434	54834	64434	54534	2011	
LokSound V4.0 Diesel "V60 DR (BR 106 BR 346) 12 Cylinder"	54435	54835	64435	54535	2011	
LokSound V4.0 Diesel "Universal US-Diesel (Prototype: F7)"	54436	54836	64436	54536	2011	
LokSound V4.0 Diesel "DR V100"	54437	54837	64437	54537	2011	
LokSound V4.0 Diesel "Nohab"	54438	54838	64438	54538	2011	
LokSound V4.0 Diesel "VT 11.5 Lyntog"	*54439*	*54839*	*64439*	*54539*	*2013*	*Q1/13*
LokSound V4.0 Diesel "VT 18 / SVT 18.16"	54440	54840	64440	54540	2011	
LokSound V4.0 Diesel "VT 628"	54441	54841	64441	54541	2011	
LokSound V4.0 Diesel "BR 130, 131, 132 DR, 232 Ludmilla"	*54442*	*54842*	*64442*	*54542*	*2013*	*Q1/13*
LokSound V4.0 Diesel "SBB TEE Ram / NS DE IV"	54443	54843	64443	54543	2011	
LokSound V4.0 Diesel "PA-1"	54444	54844	64444	54544	2011	
LokSound V4.0 Diesel "Renfe D319"	54445	54845	64445	54545	2011	
LokSound V4.0 Diesel "V 200.0 BR 220"	54446	54846	64446	54546	2011	
LokSound V4.0 Diesel "SNCF Y6200/6400 Poyaud"	54447	54847	64447	54547	2011	
LokSound V4.0 Diesel "V 320"	54448	54848	64448	54548	2011	
LokSound V4.0 Diesel "ICE VT"	54449	54849	64449	54549	2011	
LokSound V4.0 Diesel "SVT 137 / VT 08"	54450	54850	64450	54550	2011	
LokSound V4.0 Diesel "VT 610"	54451	54851	64451	54551	2011	
LokSound V4.0 Diesel "VT 650" "Regioshuttle"	54452	54852	64452	54552	2011	
LokSound V4.0 Diesel "V 36 Doppeltes Lottchen"	54453	54853	64453	54553	2011	
LokSound V4.0 Diesel "VT 98 Schienenbus"	54454	54854	64454	54554	2011	
LokSound V4.0 Diesel "V 80"	54455	54855	64455	54555	2011	
LokSound V4.0 Diesel "ÖBB 2016 'Hercules' (ER20)"	*54456*	*54856*	*64456*	*54556*	*2013*	*Q1/13*
LokSound V4.0 Diesel "SNCF 68000"	54457	54857	64457	54557	2011	
LokSound V4.0 Diesel "Adtranz Blue Tiger"	54458	54858	64458	54558	2011	
LokSound V4.0 Diesel "V 120 DR Taigatrommel"	54459	54859	64459	54559	2011	
LokSound V4.0 Electric "E 10 / BR 110"	54460	54860	64460	54560	2011	
LokSound V4.0 Electric "Universal Einheits-Electric (Prototype: E40)"	54461	54861	64461	54561	2011	
LokSound V4.0 Electric "E 75"	54462	54862	64462	54562	2011	
LokSound V4.0 Electric "E 03 / BR 103"	54463	54863	64463	54563	2011	
LokSound V4.0 Electric "E 94 / BR 194"	54464	54864	64464	54564	2011	
LokSound V4.0 Electric "E 120"	54465	54865	64465	54565	2011	
LokSound V4.0 Electric "E 50 / BR 150"	54466	54866	64466	54566	2011	
LokSound V4.0 Electric "ICE"	54467	54867	64467	54567	2011	
LokSound V4.0 Electric "Universal Neubau - Electric (Prototype: Re 460)"	54468	54868	64468	54568	2011	
LokSound V4.0 Electric "BR 143"	54469	54869	64469	54569	2011	
LokSound V4.0 Electric "E 44"	54470	54870	64470	54570	2011	
LokSound V4.0 Electric "Crocodile Be 6/8 - Ce 6/8"	54471	54871	64471	54571	2011	

Article description	LokSound V4.0	LokSound micro V4.0	LokSound V4.0 M4	LokSound XL V4.0	New in	Available
LokSound V4.0 Electric "Re 4/4 II"	54472	54872	64472	54572	2011	
LokSound V4.0 Electric "Taurus"	54473	54873	64473	54573	2011	
LokSound V4.0 Electric "Ae 6/6"	54474	54874	64474	54574	2011	
LokSound V4.0 Electric "ÖBB 1044"	54475	54875	64475	54575	2011	
LokSound V4.0 Diesel "BR 118 (V180 DR)"	54476	54876	64476	54576	2011	
LokSound V4.0 Steam "BR 89 / T3"	54477	54877	64477	54577	2011	
LokSound V4.0 Diesel "BR 643 Talent"	54478	54878	64478	54578	2011	
LokSound V4.0 Diesel "KEG 2100"	54479	54879	64479	54579	2011	
LokSound V4.0 Diesel "MaK Vossloh G1200 Serie"	54480	54880	64480	54580	2011	
LokSound V4.0 Diesel "VT 11.5 TEE Gasturbine"	54481	54881	64481	54581	2011	
LokSound V4.0 Diesel "VT 12.5 Stuttgarter Rössle"	54482	54882	64482	54582	2011	
LokSound V4.0 Electric "BR 185 BR 189 SBB 482 SBB 489"	54483	54883	64483	54583	2011	
LokSound V4.0 Electric "E 101"	54484	54884	64484	54584	2011	
LokSound V4.0 Electric "BR 141 / E 41"	54485	54885	64485	54585	2011	
LokSound V4.0 Electric "Eurosprinter"	54486	54886	64486	54586	2011	
LokSound V4.0 Electric "Akkutriebwagen ETA/ESA 176 Limburger Zigarre"	54487	54887	64487	54587	2011	
LokSound V4.0 Steam "Sächsische IV k"	54488	54888	64488	54588	2011	
LokSound V4.0 Diesel "Köf II"	54489	54889	64489	54589	2011	
LokSound V4.0 Electric "Straßenbahn Epoche III-V"	54490	54890	64490	54590	2011	
LokSound V4.0 Diesel "Kleindiesel (z.B. Feldbahn-Loks)"	54491	54891	64491	54591	2011	
LokSound V4.0 Electric "E 18/118 (E 19/119)"	54492	54892	64492	54592	2011	
LokSound V4.0 E-Llok "Elektrotriebw. Ep.III (ET 65 ET 85 ET 87)"	54493	54893	64493	54593	2011	
LokSound V4.0 Diesel "Triebwagen Desiro"	54494	54894	64494	54594	2011	
LokSound V4.0 Electric "LKAB IORE 105-106"	54495	54895	64495	54595	2011	
LokSound V4.0 Electric "LKAB Dm3 Serie 1200"	54496	54896	64496	54596	2011	
LokSound V4.0 Electric "SBB TEE RAe Gottardo"	54497	54897	64497	54597	2011	
LokSound V4.0 Electric "SNCB/NMBS HLE 13 - ALSTOM"	55401	55801	65401	55501	2011	
LokSound V4.0 Electric "SNCB/NMBS HLE 15 - ACEC"	55402	55802	65402	55502	2011	
LokSound V4.0 Electric "SNCB/NMBSHLE 16 - ACEC"	55403	55803	65403	55503	2011	
LokSound V4.0 Electric "SNCB/NMBS HLE 20 - BN ACEC"	55404	55804	65404	55504	2011	
LokSound V4.0 Electric "SNCB/NMBS HLE 11/12/21/27 - BN ACEC"	55405	55805	65405	55505	2011	
LokSound V4.0 Electric "SNCB/NMBS HLE 23 - ACEC"	55406	55806	65406	55506	2011	
LokSound V4.0 Electric "SNCB/NMBS HLE 26 - BN - ACEC"	55407	55807	65407	55507	2011	
LokSound V4.0 Diesel "SNCB/NMBS DMU 41 Diesel - Alstom 6 cyl."	55408	55808	65408	55508	2011	
LokSound V4.0 Diesel "SNCB/NMBS HLD 62 - EMD 567C 12 cyl."	55409	55809	65409	55509	2011	
LokSound V4.0 Diesel "SNCB/NMBS HLD 55 - EMD 567 16 cyl."	55410	55810	65410	55510	2011	
LokSound V4.0 Diesel "SNCB/NMBS HLD 59 - Cockerill 12 cyl."	55411	55811	65411	55511	2011	
LokSound V4.0 Electric "SNCF BB 427000/437000 Fret"	55412	55812	65412	55512	2011	
LokSound V4.0 Diesel "SNCF X2800"	55413	55813	65413	55513	2011	
LokSound V4.0 Electric "SNCF BB 25100 Savoie"	55414	55814	65414	55514	2011	
LokSound V4.0 Electric "ETA150/ESA150"	*55415*	*55815*	*65415*	*55515*	*2013*	*Q1/13*
LokSound V4.0 Electric "Straßenbahn GT4"	55416	55816	65416	55516	2011	
LokSound V4.0 Diesel "ÖBB 2043"	55417	55817	65417	55517	2011	
LokSound V4.0 Electric "Ge 4/4"	55418	55818	65418	55518	2011	
LokSound V4.0 Steam "Glaskasten"	55419	55819	65419	55519	2011	
LokSound V4.0 Diesel "BR 119 DR "U-Boot" (BR 219 DB)"	55420	55820	65420	55520	2011	
LokSound V4.0 Electric "BR 420 S-Bahn Elektrotriebwagen"	55421	55821	65421	55521	2011	
LokSound V4.0 Steam "French Steam loco 140C"	55422	55822	65422	55522	2011	
LokSound V4.0 Electric "SNCB/NMBS Type15 LS-Version" 21MTC	55423	-	65423	-	2011	
LokSound V4.0 Electric "SNCB/NMBS HLE 11122127 LS-Version" 21MTC	55424	-	65424	-	2011	
LokSound V4.0 Electric "SNCF BB 16500 LS-Version" 21MTC	55425	-	65425	-	2011	
LokSound V4.0 Diesel "Feuerwehrlok"	55426	55826	65426	55526	2011	
LokSound V4.0 Diesel "V 90"	55427	55827	65427	55527	2011	
LokSound V4.0 Diesel "LINT"	55428	55828	65428	55528	2011	
LokSound V4.0 Electric "Stadler FLIRT"	55429	55829	65429	55529	2011	
LokSound V4.0 Steam "BR 58 / 58.30"	55433	55833	65433	55533	2011	
LokSound V4.0 Electric "DB 181/184"	55438	55838	65438	55538	2011	
LokSound V4.0 Diesel "Schienenzeppelin"	55439	55839	65439	55539	2011	
LokSound V4.0 Diesel "V 160"	55440	55840	65440	55540	2011	
LokSound V4.0 Diesel "T 44 SJ"	55441	55841	65441	55541	2011	
LokSound V4.0 Diesel "V 300"	55442	55842	65442	55542	2011	
LokSound V4.0 Steam "Kittel Steamtriebwagen"	55443	55843	65443	55543	2011	
LokSound V4.0 Electric "BR 180 DB AG"	55444	55844	65444	55544	2011	
LokSound V4.0 Electric "Ae 3/6 I"	55445	55845	65445	55545	2011	
LokSound V4.0 Electric "Ae 3/6 II"	55446	55846	65446	55546	2011	
LokSound V4.0 Electric "BLS Re 4/4"	55447	55847	65447	55547	2011	
LokSound V4.0 Electric "Re 6/6"	*55448*	*55848*	*65448*	*55548*	*2013*	*Q1/13*
LokSound V4.0 Diesel "SBB Bm 4/4 II"	55449	55849	65449	55549	2011	
LokSound V4.0 Electric "RhB Ge 4/4 III"	55450	55850	65450	55550	2011	
LokSound V4.0 Electric "BLS Ce 4/4 311"	55451	55851	65451	55551	2011	
LokSound V4.0 Steam "US Heissler"	55452	55852	65452	55552	2011	
LokSound V4.0 Steam "BR 91"	55453	55853	65453	55553	2011	
LokSound V4.0 Steam "US Mogul 2-6-0"	55454	55854	65454	55554	2011	
LokSound V4.0 Diesel "VW Draisine"	55455	55855	65455	55555	2011	
LokSound V4.0 "Pferdebahn"	55456	55856	65456	55556	2011	
LokSound V4.0 "Steam BR 95"	55457	55857	65457	55557	2011	
LokSound V4.0 "Steam BR 53"	55458	55858	65458	55558	2011	
LokSound V4.0 Diesel "Kö 1"	55459	55859	65459	55559	2011	

Programmed LokSound decoders

Article description	LokSound V4.0	LokSound micro V4.0	LokSound V4.0 M4	LokSound XL V4.0	New in	Available
LokSound V4.0 Diesel "DSB MZ I" 21MTC	55490	-	65490	-	2011	
LokSound V4.0 Diesel "DSB MZ II" 21MTC	55491	-	65491	-	2011	
LokSound V4.0 Diesel "DSB MZ IV" 21MTC	55492	-	65492	-	2011	
LokSound V4.0 Diesel "DSB ME"	55493	-	65493	-	2011	
LokSound V4.0 Diesel "DSB MT/MH" 21MTC	55494	-	65494	-	2011	
LokSound V4.0 Diesel "Me26/Di6" 21MTC	55495	-	65495	-	2011	
LokSound V4.0 Diesel "DSB MO" 21MTC	55496	-	65496	-	2011	
LokSound V4.0 Steam "DSB D" 21MTC	55497	-	65497	-	2011	
LokSound V4.0 Diesel "VT 612 Triebwagen"	55498	55898	65498	55598	2011	
LokSound V4.0 Diesel "FS DE 753 Taucherbrille"	55499	55899	65499	55599	2011	
LokSound V4.0 Steam "SNCF 231"	56400	56800	66400	56500	2011	
LokSound V4.0 Diesel "ÖBB 5081"	56403	56803	66403	56503	2011	
LokSound V4.0 Diesel "SBB ICN"	56404	56804	66404	56504	2011	
LokSound V4.0 Steam "BR 76"	56405	56805	66405	56505	2011	
LokSound V4.0 Diesel "VT 610"	56406	56806	66406	56506	2011	
LokSound V4.0 Diesel "LINT41"	56407	56807	66407	56507	2011	
LokSound V4.0 Diesel "VT 614"	56408	56808	66408	56508	2011	
LokSound V4.0 Diesel "ÖBB 2050"	56409	56809	66409	56509	2011	
LokSound V4.0 Diesel "ÖBB 2095"	56411	56811	66411	56511	2011	
LokSound V4.0 Steam "BR 39"	56412	56812	66412	56512	2011	
LokSound V4.0 Steam "BR 43"	56413	56813	66413	56513	2011	
LokSound V4.0 Diesel "G1700"	56414	56814	66414	56514	2011	
LokSound V4.0 Diesel "RENFE 333"	*56415*	*56815*	*66415*	*56515*	*2013*	*Q1/13*
LokSound V4.0 Electric "BR 111"	*56416*	*56816*	*66416*	*56516*	*2013*	*Q1/13*
LokSound V4.0 Electric "BR 403 ICE3"	56417	56817	66417	56517	2011	
LokSound V4.0 Electric "ÖBB 1042"	56418	56818	66418	56518	2011	
LokSound V4.0 Electric "BR 151"	56419	56819	66419	56519	2011	
LokSound V4.0 Diesel "BR 246 TRAXX P160 DE"	56420	56820	66420	56520	2011	
LokSound V4.0 Electric "RailAd / ÖBB 1116" 21MTC (With Function Mapping for this loco)	56424	-	66424	-	2011	
LokSound V4.0 Electric "RailAd / ÖBB 1216" 21MTC (With Function Mapping for this loco)	56425	-	66425	-	2011	
LokSound V4.0 Electric "RhB Ge 4/6"	56426	56826	66426	56526	2011	
LokSound V4.0 Steam "Lokalbahn BR98 (Gtl 4/4)"	*56427*	*56827*	*66427*	*56527*	*2013*	*Q1/13*
LokSound V4.0 Diesel "Class 66 / 77"	*56428*	*56828*	*66428*	*56528*	*2013*	*Q1/13*
LokSound V4.0 Steam "KM1 BR 50"	-	-	-	*56529*	*2013*	
LokSound V4.0 Electric "SBB RBDe560 NPZ-Domino"	*56430*	*56830*	*66430*	*56530*	*2013*	*Q3/13*
LokSound V4.0 Electric "SBB-RABe511-Dosto"	*56431*	*56831*	*66431*	*56531*	*2013*	*Q3/13*
LokSound V4.0 Diesel "V 200.1 BR 221"	*56432*	*56832*	*66432*	*56532*	*2013*	*Q1/13*
LokSound V4.0 Diesel "Piko VT 11.5"	-	-	-	*56533*	*2013*	
LokSound V4.0 Diesel "Henschel DHG 500CA"	*56434*	*56834*	*66434*	*56534*	*2013*	*Q2/13*
LokSound V4.0 Diesel "O&K MV9B / WLH19 Rangierdiesel"	*56435*	*56835*	*66435*	*56535*	*2013*	*Q2/13*
LokSound V4.0 Steam "BR 18.3 / Badische IVh"	*56436*	*56836*	*66436*	*56536*	*2013*	*Q2/13*
LokSound V4.0 Diesel "Vossloh Euro 4000"	*56437*	*56837*	*66437*	*56537*	*2013*	*Q1/13*
LokSound V4.0 Diesel "Henschel DHG 500"	*56438*	*56838*	*66438*	*56538*	*2013*	*Q2/13*

Find more sounds on our website www.esu.eu

Interior lighting sets

ESU is very proud to present to you the interior LED lighting system for passenger cabins. This system allows you to retrofit your cars with a prototypical and steady interior lighting. The passenger car interior lighting is available in three different versions to match the desired location:

255mm length, 9mm width

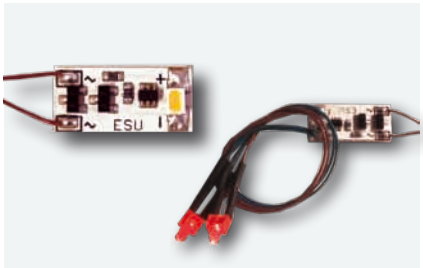
For the gauges N, TT and H0 imaginary, 255mm long lightings will be offered in two versions: With warm white LEDs (50700) or yellow LEDs (50702).

380mm length, 15mm width

The long car interior lighting with the Art.No. 50703 is designed for use in G gauge cars. It features both white and yellow LEDs, which can be adjusted separately in brightness. For the first time you can adjust to the desired hue by yourself. Because of the digital interface (21MTC) a LokPilot Fx function decoder can be simply retrofitted at any time.

Cabin & Taillights

Small, easy to install kits for cabs and taillights are also available.



Current collector (Wheel cont.)

Our new current collectors make an optimal current supply on all common waggons (freight/passenger cars) possible and can be mounted very easily: Just glue the current collector onto the bottom of the vehicle body. The off-standing wheel contacts will now touch the back of the wheel (flange). Since every current collector has two steel sheets, one per axle will be enough. Appropriate for all axle distances, for H0 DC and AC or N gauge. Set includes 8 current collectors which is sufficient for 8 axles.

Advantages

The ESU passenger car lighting system offers crucial advantages:

Warm-White LEDs

SMD LEDs, the latest design, insure a uniform illumination of the cars at extremely low power consumption.

Constant voltage

Thanks to built-in voltage control the brightness remains almost constant even when conventional driving.

Adjustable brightness

With the help of a small variable resistor (potentiometers) you can individually adjust the brightness according to your wishes.

Variable length

The lighting strips can be arbitrarily cut to fit the cars of all manufacturers.

Buffer capacitor

The 255mm long luminaries include a buffer capacitor to bridge small power interruptions.

PowerPack

To bridge prolonged power interruptions, the 255mm long lighting strip can be retrofitted with an optional „Power Pack". This capacitor with extremely high capacity is standard at the 380mm illumination.

Taillights included

Each lighting strip comes with a red taillight. When not in use, this lighting strip can be easily removed.

Ordering information

Art.No.	Description
50700	Interior lighting set including taillight, 255mm, separable, PowerPack option, 11 LED, warm white, Gauge: N, TT, H0
50702	Interior lighting set including taillight, 255mm, separable, PowerPack option, 11 LED, yellow, gauge: N, TT, H0
50703	Interior lighting set including taillight, 380mm, separable, PowerPack, 32 LED, yellow/white switchable, 21MTC interface, gauge: 0, G, I
50704	Interior lighting, driver´s cabin, 1 LED pure white, brightness selectable
50705	Interior lighting, taillight, 2 LED red, brightness selectable
50706	Interior lighting, PowerPack energy store 0,1F, double pack
50707	Interior lighting, current collector for waggons N / H0, 8-piece set (sufficient for 8 axes), gauge: N, TT, H0

ESU International 2013

Benelux

Train Service Danckaert bvba
Hamiltonpark 14
BE-8000 BRUGGE
Phone +32 (486) 982 857
(Support: Dinsdag/Mardi - 20-21 h.)
Fax +32 (70) 660 919
tsd@tsdbvba.be
www.loksound.be / www.loksound.nl

Italy

Essemme S.R.L. - Modellismo
Via G.B. Piranesi, 17
IT-20137 MILANO
Phone +39 (27) 38 41 51
Fax +39 (27) 38 41 51
essemme.model@tiscali.it
www.essemmemodel.com

Spain

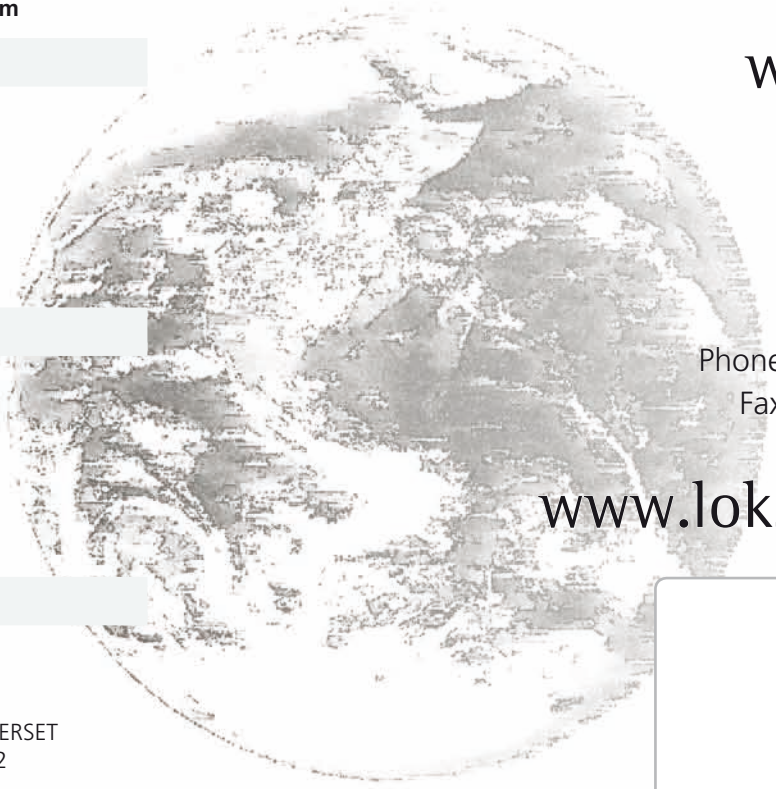
Hornby Espana S.A.
Federico Chueca s/n
ES-28806 Alca de Heneras
Phone +34 (918) 79 63 33
Fax +34 (918) 79 63 32
electrotren@hornby.es
www.electrotren.es

Switzerland

Arwico AG
Brühlstrasse 10
CH-4107 ETTINGEN
Phone +41 (61) 7 22 12 22
Fax +41 (61) 7 22 12 42
sekretariat@arwico.ch
www.arwico.ch

United Kingdom

South West Digital Ltd.
1 Savernake Road
Weston Super Mare
GB-BS229HQ NORTH SOMERSET
Phone +44 (1934) 51 53 82
info@swd4esu.co.uk
www.southwestdigital.co.uk



ESU electronic solutions ulm GmbH & Co. KG
Edisonallee 29
D-89231 Neu-Ulm
GERMANY
Tel.: +49 (0) 731 - 18 47 80
Fax.: +49 (0) 731 - 18 47 82 99
info@esu.eu

www.esu.eu

USA & Canada
ESU LLC
477 Knopp Drive
US-17756 Muncy
Phone +1 (570) 6 49 50 48
Fax +1 (866) 5 91 64 40
info@loksound.com

www.loksound.com

Your Model Railway Retailer

4 044645 529317