

50093 ECoSLink Terminal

Unofficial Translation

User Manual

1st Edition, July 2009

PLEASE NOTE:

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1. Declaration of Conformity

We, ESU electronic solutions ulm GmbH & Co KG, Industriestraße 5, D-89081 Ulm, declare in sole responsibility that the product

ECoSlink terminal, order no. 50 093

To which this declaration relates is in conformity with the following standards: EN 71 1-3: 1988 / 6: 1994 - EN 50088: 1996 - EN 55014, Part 1 + Part 2: 1993 EN 61000-3-2: 1995 - EN 60742: 1995 - EN 61558-2-7: 1998

Under the provisions of Directive 88 / 378 / EEC - 89 / 336 / EEC - 73 / 23 / EEC

2. WEEE Declaration

Disposal of old electrical and electronic equipment (valid in the European Union and other European countries with separate collection systems)



This symbol on the product, its packaging or its literature indicates that this product may not be treated as household waste.

Instead, take this product to the appropriate disposal point for recycling of electrical and electronic equipment. If the product is disposed of correctly, you will help prevent negative effects to the environment and health that could be caused by improper disposal. The recycling of materials will preserve our natural resources. For more information about recycling this product, please contact your local Citizen's Advice Bureau, your household waste disposal service or the shop where you purchased this product.

3. Important - Please read this first

Congratulations on your purchase of a ESU ECoSlink terminal. This manual will guide you step by step through the possibilities offered by, and the use of the device in detail.

Please read this manual thoroughly before installing or using the device. Although the board is very robust, an incorrect connection may result in the destruction of the ECoSlink Terminal. Avoid "costly" experiments.



The ECoSlink Terminal is solely for use with model railways. It may only be operated with the equipment as described in this manual. All other uses are prohibited.



- All connections must be made with the power supplies to the Master Controller, the ECoSlink Terminal, and to the items being connected to it turned off.
- Avoid sudden shocks such as dropping the device or placing heavy items on top of it.
- Protect from water and moisture.
- The circuit board must not come into contact with metal objects or wires, particularly the wires carrying the DCC supply to the track.

4. ECoSlink Bus Structure

The ECoSlink Bus is based on the CAN (Controller Area Network) protocol. This was originally designed for use in the automobile industry where robustness and the capacity to handle high data flow rates is essential. CAN allows all data to be transmitted at 250 kbit/second over the ECoSlink bus. The ECoSlink cable carries both data as well as the power supply for the ECoSlink Terminals themselves.

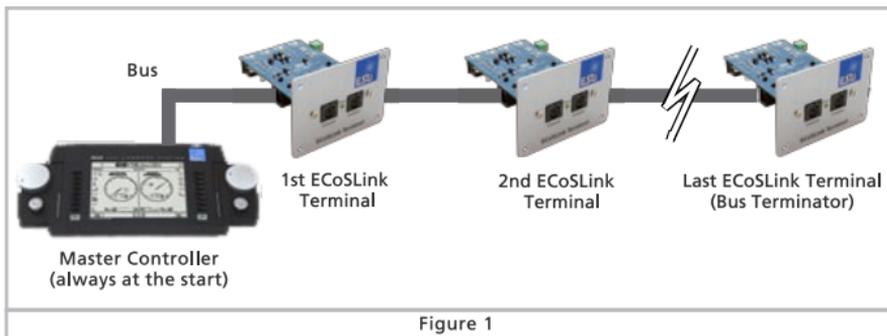
An ECoSlink Bus can be up to 100metres long. All units must be wired up in series, with the first Terminal only being connected to your Master Controller. The last module in the chain will automatically configure itself to terminate the Bus electronically. This prevents false signals being generated within the Bus.

ECoSlink Terminals automatically recognise the two different types of equipment that can be connected to them, namely:

- Bus Connection Modules (such as the ECoSlink Terminal or Märklin® Terminal)
- Equipment using the Bus (such as hand throttles, boosters (e.g. ECOSBoost), and feedback modules (e.g. ECOSDetector or EcoSDetector Standard).

4.1. Bus Connection Modules

Bus Connection Modules extend the bus and add extra connection points. The first Bus Connection Module must always be connected directly to the Master Controller. Each additional Module must be connected to the previous Module, forming a single chain of Modules.



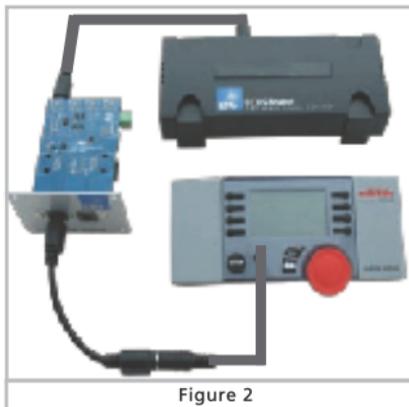
By using different connectors and appropriate cables incorrect wiring is not possible.

4.1.1. Bus Input and Output Connections

Each ECoSLink Terminal has an input and an output socket for the ECoSLink Bus itself. A 9-pin plug connector is used for the input socket and a 9-pin mini-DIN connector for the output socket. The ECoS and CS1 each has only one output jack (labeled "ECoSLink Extend"), as this is always the beginning of the bus.

4.2. Equipment Attached to the Bus

Equipment such as hand throttles, boosters etc, are connected to the bus via ECoSLink 7-pin mini-DIN connectors. These connectors are also installed on the ECoS and CS1. The connection cable between the ECoS or CS1 and the first Terminal must not exceed 1.8m (6 feet).



These cables are virtually "stubs" from the main bus terminal.



The cable connecting the first Terminal to the Master Controller must not be lengthened or it will upset the signal timing. If the cable supplied with equipment to be connected to the bus is too short, the bus must be extended with extra ECoSLink Terminal modules as necessary.

5. Overview

If your layout is growing and you want to connect additional ECoSBoost boosters or ECoSDetector feedback modules or more than 3 Märklin® mobile station 60652 hand controllers, then you need one or more ECoSLink terminals. The ECoSLink module is intended for permanent installation on your layout and connection to the ECoSLink Extend socket on your ECoS or Märklin® central station connected. Each Terminal has two ECoSLink connection sockets on the front and four sockets on the back for connecting devices. The Terminals themselves are either powered through the ECoSLink bus by the ECoS or CS1 or via an (optional) external power supply. The individual ECoSLink Terminals are connected together with standard computer Cat 5e ethernet network cables (sometimes called "patch cable" with RJ45 connectors). Thus, a total run of up to 100m is possible with the appropriate cabling.



Making the correct connections is made easier by the use of different connector types. Wrong connections are almost impossible.

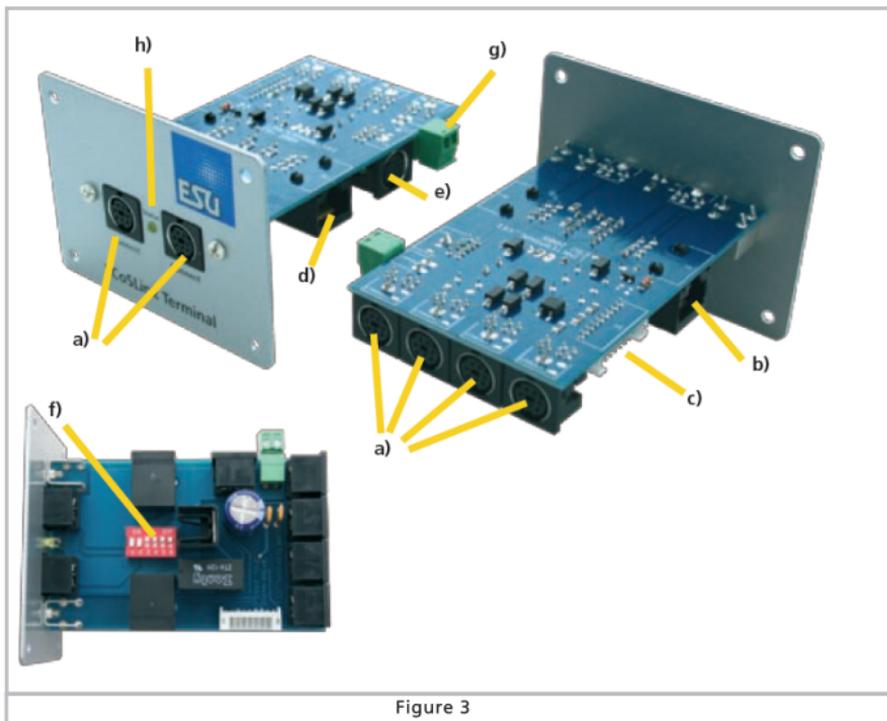


Figure 3

- a) EcoSLink connectors
- b) Bus input RJ45 socket
- c) Bus input white pin plug
- d) Bus output RJ45 socket
- e) Bus output mini-DIN connector
- f) DIP Switches
- g) External power supply input
- h) Status LED

5.1. Assembly

Before making any connections the front panel must first be fitted to the circuit board. To do this, first remove the two fixing screws as arrowed. Then align the front panel to the circuit board and fix the panel to the board with the two screws provided in the holes as indicated on Figure 4. To avoid damage to the retaining bushes take care that you do not overtighten the screws.

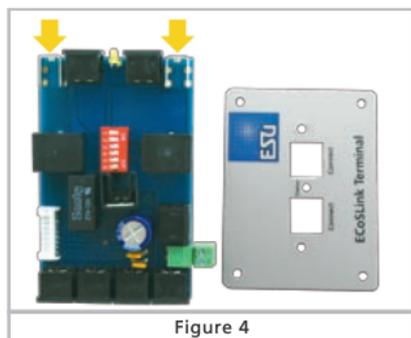


Figure 4



Make sure that you have the circuit board the right way round. The connectors must be on the underside of the board when the printing on the faceplate is the right way up.

5.2. ECoSLink Connect Sockets

The items using the bus are connected to the ECoSLink Connect sockets. ECoSLink Connect sockets can be recognized by their 7-pin mini-DIN connector. Devices suitable for connection are, for example:

- ECoSBoost boosters
- ECoSDetector and ECoSDetector Standard feedback modules
- Märklin® mobile station 60651 or 60652 (An adapter cable for the mobile stations is required which can be obtained from Märklin spares, item number 610479)
- ESU Navigator Base Units
- Bachmann Dynamis Pro Box Units

As shown in Figure 3 the ECoSLink Terminal has two sockets on the front and four sockets at the rear. The front sockets are primarily intended for hand throttles or controllers. The hand controller can always be unplugged and plugged in at another location as the ECoSLink bus is "hot plug" capable. The rear jacks are provided for Booster and feedback modules.

5.3. Bus Input and Output Connections

Only one Bus input and one Bus output can be used at any one time on a Terminal. The signals are routed through each Terminal in turn, as described in Section 4. It is possible to use different connections at each end of the cable connecting two ECoSLink Terminals together.



Each ECoSLink Terminal can only have one bus input and one bus output in use at any one time.

5.3.1. RJ45 Bus Input and Output Sockets

To make the wiring as flexible as possible, use computer ethernet network cable with 8-pin RJ45 connectors. These pre-assembled cables are available in all lengths from computer shops. They need to be fully wired (with eight wires in the cable). We recommend using CAT5 cable or better.



Never mix ECoSLink cables with other cables used for model railways such as Loconet®, XPressNet®, s88-N which also use 8-pin Ethernet cable. Never connect these other bus systems directly to the ECoSLink bus. The result could be a short circuit and the destruction of your ECoS or CS1. Just because the connectors are physically the same does not automatically mean that the items are compatible electrically!

5.3.2. Bus Input Flat Connector and Bus Output Mini-DIN Socket

The first ECoSLink Terminal must be connected to the Master Controller with the supplied for this purpose. An second Terminal can be connected as required to the first ECoSLinkTerminal.

5.4. Status LED

ECoSLink cables carry both the data signals and a power supply from the Master Controller. The ECoS/CS1 can deliver up to 1A at 12V to the connected devices. Once the ECoSLink bus is activated by turning on the power, the status LEDs light up.



The LED shows only the general bus status. It does not show when data is being transmitted.

6. Suitable Master Controllers

The ECoSLink Terminal is suitable for connection to the following Master Controllers:

- ESU ECoS 50000 with monochrome display
- ESU ECoS 50200 with colour display
- Märklin® central station 60212 with Märklin® Firmware
- Märklin® central station 60212 with ESU Firmware 3.0.0. "Reloaded"
- Märklin® central station 60213 with colour display

Use your ECoSLink Terminal only with a suitable Master Controller. A list of ESU retailers is available on our Web site.

7. Connection to the Controller

The first ECoSLink Terminal must be connected as shown in Figure 5 to the Master Controller with the 0.9m long cable supplied with the Terminal.

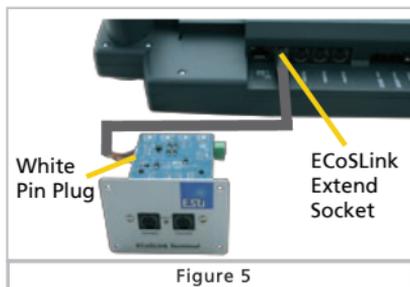


Figure 5

- First insert the white plug on the cable into the white socket on the Terminal. Ensure the plug is the right way round. The cable can only be used one way round.
- Next, insert the mini-Din plug into the ECoSLink Extend socket on the Master Controller, again making sure that you have properly aligned the pins on the plug with the holes in the socket.



Do not use excessive force to insert the plug. The plug only fits one way into the socket. If the plug does not go in easily, then the pins on the plug are not properly aligned with the socket.



Make sure any external power to the ECoSLink Terminal is turned off, and that the power supply to your Master Controller is also turned off.

8. Adding More ECoSLink Terminals

If you need to to add more ECoSLink Terminals, connect each new one to the one you added most recently. In this way a chain of modules is built up.

8.1. Using Computer Ethernet Cable

If you want to connect two Terminals that are far apart, use normal ethernet network cable with RJ45 connectors.

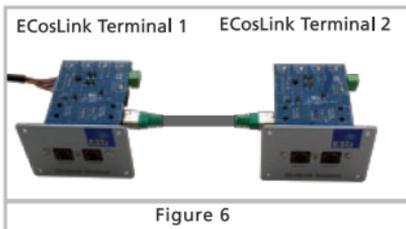


Figure 6

- Connect one end of the cable to the bus output RJ45 socket of the first ECoSLink Terminal, see Figure 3, item d, and then,
- Connect the other end of the cable to the bus input RJ45 socket of the second ECoSLink Terminal, see Figure 3, item b. Take great care not to confuse the input and output sockets.



Never connect two outputs or two inputs together. This could result in damage to your Master Controller!



Do not mix ECoSLink cables with other cables used for model railways. 8-pin Ethernet cable is also used to connect up Loconet ®, XPressNet ®, s88-N systems. Never connect these systems directly to the ECoSLink bus as this would cause a



short circuit and significant internal damage to your ECoS/CS1. Even though cables may use the same type of plugs and sockets, it does not automatically mean that the items you want to connect are electrically compatible!

Likewise, never connect the ethernet cable from an ECoSLink Terminal to the ethernet network port on your ECoS/CS1!

8.2. Using the Supplied Cable

If the distance between the Terminals that you want to connect is short, use the cable supplied with the ECoSLink Terminal.

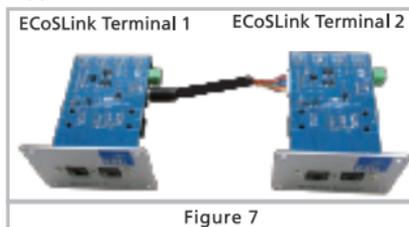


Figure 7

- Insert the Mini-DIN plug into the mini-DIN outlet socket on the first ECoSLink Terminal Module, aligning it correctly.
- Then push the white trailing socket onto the white pin plug on the second module. Make sure that you have the socket connector the right way round as it can only be inserted one way one way on to the pin plug.

9. Adding an External Power Supply

For larger layouts, the number of hand throttles, boosters and feedback modules may require more power than the ECoS/CS1 can supply. Typical power requirements of such items are:

Mobile Station	approx. 100mA
ECoSBoost	approx. 25mA
ESU Navigator	approx. 25mA
Bachmann ProBox	approx. 25mA
ECoSDetector	approx. 75mA
ECoSLink Terminal	approx. 15mA

An ESU ECoS can typically provide about 1A current. It will therefore be necessary only very rarely to add an external power supply unit (PSU) for the ECoSLink bus.

9.1. Suitable Power Supply Units

If you do use an external PSU, then most

of the usual model railway PSUs, whether DC or AC, can be used provided the following requirements are met:

- DC: Voltage Range 16-22 Volts DC
- AC: Voltage Range 14-16 Volts AC
- Current: Minimum Output of 1 Amp

 Do not use a traditional 12 Volt DC output PSU, the voltage is too low.

 The PSU must only be connected to the ECoSLink Terminal!

 The operating temperature of the ECoSLink Terminal will depend on the output voltage of the PSU. The higher the voltage, the warmer the Terminal will become during use.

9.2. Connection and Sections Supplied

The PSU is connected to the external power supply input, see Figure 3, item g, on the ECoSLink Terminal. Removable terminal blocks make wiring easier. The polarity of the connecting wires does not matter. Once the PSU is turned on, this is recognised by the Terminal. The remaining bus sections are then supplied with power from this PSU. All devices on the bus BEFORE the Terminal connected to the PSU are still supplied by the Master Controller. Figure 8 shows this relationship.

 The status LEDs light up on the ECoSLink Terminals only when the bus has been turned on by the Master Controller.

10. DIP Switch Settings

Occasionally it is necessary to change the settings of the DIP Switch on an ECoSLink Terminal. The factory default settings are:

1	Off/Aus
2	Off/Aus
3	On/An
4	On/An
5	On/An
6	On/An

10.1. ECoSBoost Control Line Termination
The necessary control lines for external ECoSBoost boosters are built into the ECoSLink bus cable. Very long cable lengths can sometimes cause problems if many ECoSBoost units are used. We recommend that all ECoSBoost units are connected within the first 15-25m (49-82 feet) of the ECoSLink bus. The start of the bus is always the Master Controller itself. The Booster control lines are terminated separately with DIP switches 1 to 4 thus:

1	2	3	4	Result
On	On	Off	Off	Booster control lines are terminated. Do not attach a booster after this point in the chain as control lines have been disconnected at this ECoSLink Terminal.
Off	Off	On	On	Booster control lines are not terminated. You can connect more boosters to ECoSLink Terminals after this one as the control lines are still connected through.

11. Installing ECoSLink Terminals

The ECoSLink Terminal should be installed on the fascia panel of your layout. The maximum thickness of the fascia must not exceed 20mm. To help you install the ECoSLink Terminal a mounting template has been provided on page 9. Cut out a rectangular hole 63mm x 40mm as marked on the template and drill four holes in the positions shown on the mounting template.

 The ECoSLink Terminal must be installed so that the circuit board does not touch any wood panels or come into contact with exposed wires or metallic objects below the baseboard.

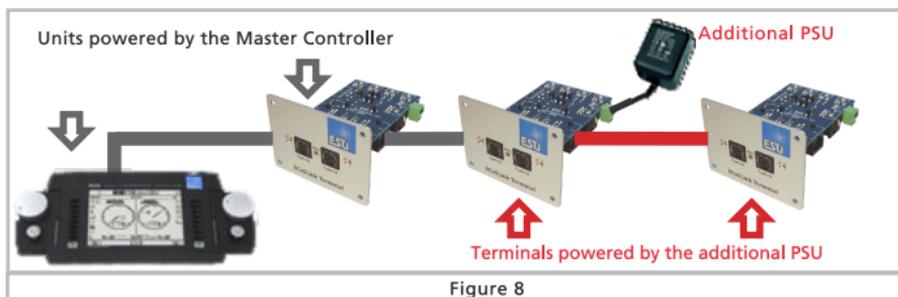
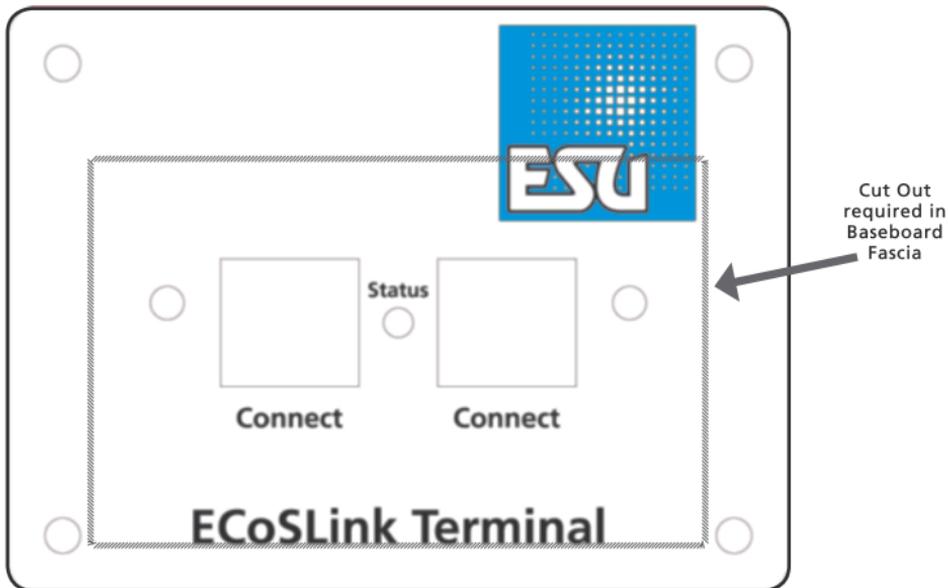


Figure 8

12. Mounting Template



13. Goods Return Note

1. Customer Details

(Please print in CAPITALS)

Name: _____
Street:..... _____
Post Code:..... _____
Country..... _____
E-Mail:..... _____
Telephone:..... _____
Date:..... _____
Signature:..... _____

3. Description of Problem

(Please use a separate sheet if necessary)

4. Proof of Purchase. e.g. Sales slip or invoice

6. Dealer Details

Proof of Purchase must be sent with the Item or the repair will not be covered by the Guarantee!

Dealer Stamp or Dealer Address Details

15. Warranty Card

24 Months Warranty from Date of Purchase

Dear customer,

Congratulations on your purchase of this ESU product. This high tech quality product has been manufactured according to the latest production processes and has passed stringent quality checks and tests.

Therefore ESU electronic solutions ulm GmbH & Co KG offers you in addition to the national warranty rights as governed by law, a special

Manufacturer's Warranty of 24 Months from the Date of Purchase.

Warranty conditions:

- This warranty is valid for all ESU products, purchased from an ESU dealer.
- Any repair or replacement under this warranty is subject to proof of purchase. The warranty certificate completed by your ESU dealer together with the receipt serve as the proof of purchase. We recommend that you keep the receipt together with the certificate.
- In the event of a warranty claim, please fill in the goods return note on page 9 and return it with the item for repair

Scope of warranty / exemptions:

The warranty of ESU electronic solutions ulm GmbH & Co KG comprises the free of charge repair or replacement of any faulty part due to faulty design, manufacturing or material or transport damage.

Any further claims are excluded.

This warranty expires:

1. In case of failure due to wear and tear.
2. If ESU products have been modified with parts not approved by ESU.
3. If parts have been altered, especially missing shrink sleeves, or wires soldered directly to the decoder.
4. If the product is used for a different purpose to the one intended by the manufacturer.
5. If recommendations issued by ESU electronic solutions ulm GmbH & Co. KG are not adhered to.

For reasons of liability no examination or repairs can be carried out on parts built into locos or coaches.

The warranty period will not be extended due to repairs or replacement.

You may submit your claim by either returning the faulty product to your dealer or by shipping it directly to ESU electronic solutions ulm GmbH & Co KG together with the warranty certificate, the receipt and a detailed description of the fault to:

ESU electronic solutions ulm GmbH & Co. KG

- Warranty department -

Industriestrasse 5

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