ZEUS | s88-BiDiB-Link

BiDiB-Interface
and/or
PC-Interface for the s88 bus

Manual

BiDiB **s88-N**

Item nos. 44-05106 | 44-05107
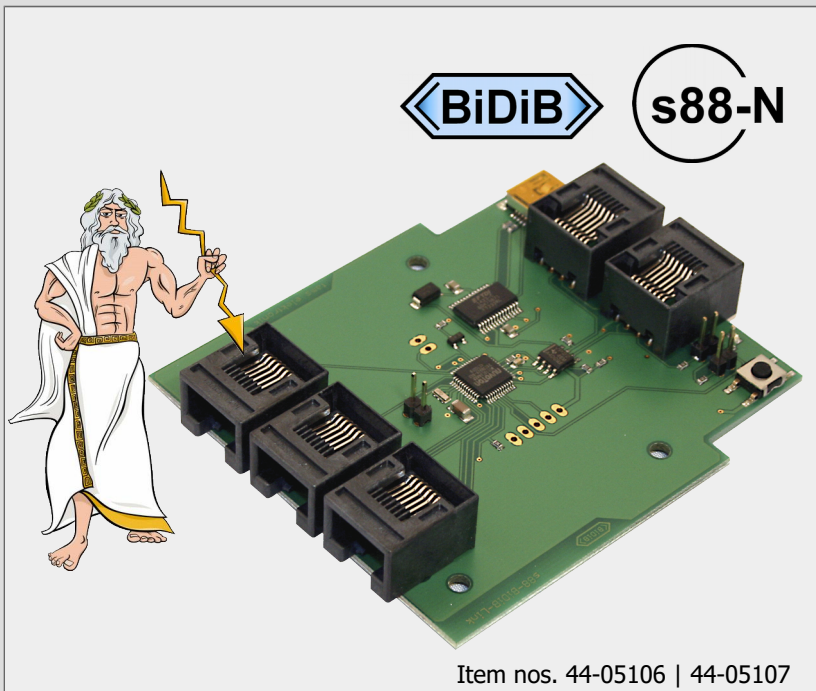
tams elektronik

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Printing the manual

The formatting is optimised for double-sided printing. The standard page size is DIN A5. If you prefer a larger display, printing on DIN A4 is recommended.

Notes on BiDiB®

The BiDiB devices described in this manual comply with the standards of the BiDiB specification (status V0.7). The BiDiB specification has been published on: www.bidib.org.

BiDiB® is a registered trademark. Copyrights and trademarks to BiDiB are held by Wolfgang Kufer, OpenDCC.de.

In order to increase the readability of this text, we have dispensed with referring to this with every use of the term BiDiB.

Contents

1. Getting started

The instructions will help you step by step with the safe and proper installation and use of your interface. Before you put the interface into operation, read this manual completely, especially the safety instructions and the section on possible errors and their elimination. You will then know what you have to pay attention to and thus avoid errors that sometimes can only be rectified with a lot of effort.

Keep the instructions in a safe place so that you can restore functionality later in the event of any malfunctions. If you pass the interface on to another person, also give the instructions with it.

1.1. Contents of the package

- 1 ready-built and tested circuit board ZEUS (item no. 44-05106-01) or
  1 interface ZEUS in housing (item no. 44-05107-01)
- 1 USB cable 2.0, 4-core, plug connector A <> plug connector Mini-B
- 3 short-circuit jumpers

1.2. Accessories

Connection cables

In order to connect the s88 feedback modules and/or the BiDiB-knots to the interface you need Ethernet patch cables (RJ-45). In order to provide a clear arrangement, it is recommended to use cables of different colours, e.g.:

- blue for the s88 bus lines
- green for the BiDiBus lines

Connection to devices with 6-pole s88 interface

In order to connect s88 feedback modules not providing a connection according to the standard s88-N but only a 6-pole connector, you need a suitable adapter, e.g. an adapter S88-A. These are available in different versions for various mounting situations (item numbers 44-09100, 44-09110, 44-09200, 44-09210).

1.3. Intended use

The interface is intended for use in model railway layouts as specified in the instructions. Any other use is not in accordance with the intended use and will result in the loss of the warranty claim. Intended use also includes reading, understanding and following all parts of the instructions. The interface is not intended to be used by children under the age of 14.

1.4. Safety instructions

> ⚠ **Note:**
>
> The interface contains integrated circuits (ICs). These are sensitive to electrostatic charging. Therefore, do not touch these components until you have "discharged" yourself. For this purpose, e.g. a grip on a radiator is sufficient.

Improper use and non-observance of the instructions can lead to incalculable hazards. Prevent these dangers by carrying out the following measures:

- Only use the interface in closed, clean and dry rooms. Avoid moisture and splash water in the environment. After condensation has formed, wait two hours for acclimatisation before use.
- Disconnect the interface from the power supply before carrying out wiring work.
- Supply the interface only with extra-low voltage as specified in the technical data. Use only tested and approved transformers.
- Only plug the mains plugs of transformers into properly installed and fused earthed sockets.
- When making electrical connections, ensure that the cable cross-section is sufficient.
- Heating of the interface during operation is normal and harmless.
- Do not expose the interface to high ambient temperatures or direct sunlight. Observe the information on the maximum operating temperature in the technical data.
- Regularly check the operational safety of the interface, e.g. for damage to the connection cables.
- If you notice damage or if malfunctions occur, disconnect the connection to the power supply immediately. Send the interface in for inspection.

1.5. Care

Do not use any cleaning agents to clean the interface. Only wipe the interface dry. Disconnect the interface from the power supply before cleaning.

2. Definitions

S88, HSI-88 and BiDiB are protocols for the transmission of data between model railway layouts and PC.

S88

s88 is the most simple bus system to feedback PC conform data. At the s88 modules´ inputs is determined whether they are connected to earth or not (or in other words are closed or open). These feedback data are transferred from the s88 modules via an s88 interface to the PC, where they serve as a basis for the PC control.

HSI-88

HSI-88 was developed to transmit the s88-feedback signals from a PC-interface with connection possibility for three s88-bus lines into the PC.

BiDiB

BiDiB is a protocol which allows bidirectional communication

- between the different stationary components of a model railway control system (e.g. digital control units, boosters, accessory decoders, feedback modules) and
- between the stationary components of the model railway control and the PC.
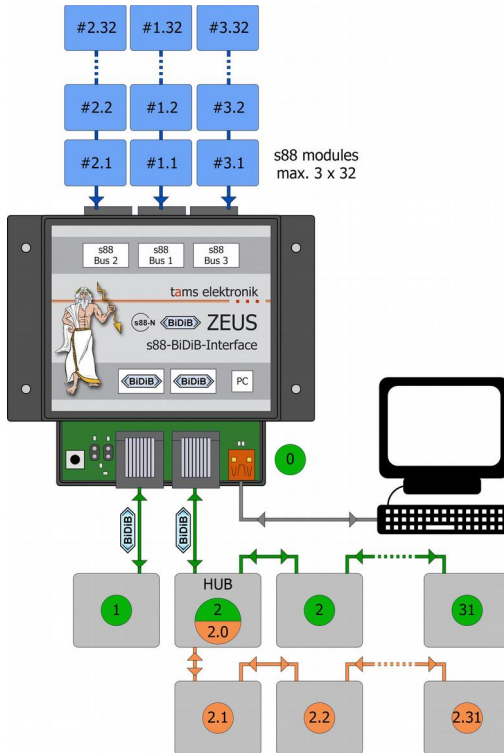
Via an interface can be transmitted

- BiDiB feedback signals to the PC and
- switching and control commands from the PC to the stationary components of the model railway control system.

3. Operation overview

The interface ZEUS can be used as a

- PC interface for the s88 bus and/or
- BiDiB interface

The interface (ZEUS) provides the connection between PC control, s88 modules and the BiDiB-nodes on the different levels of the system. The hub (BiDiB node 2) provides an additional level. BiDiB-nodes have different functions, e.g.: feedback modules (class "Occupancy") or stationary decoders (class "Accessory Control").

In contrast to conventional digital control systems there is no need for a digital control unit and a booster for this BiDiB controlled layout part.

Use as a BiDiB interface

You can connect a maximum of 31 additional BiDiB knots to one interface ZEUS via two RJ-45 sockets. The assignment of the BiDiB knots to the two RJ-45 sockets is optional.

Use as a PC interface for the s88 bus

The interface ZEUS has three RJ-45 sockets according to S88-N for the connection of three s88 bus lines.

s88-N **Background information:** The standard s88-N regulates the assignment of commercial Ethernet patch-cables for use in s88 feedback systems. Unlike the 6-conductor connecting cables frequently used, the patch-cables used in computer networks are screened against outside electric signals. Thus using patch-cables reduces the liability to interference considerably.

You can connect to each of the three RJ-45 sockets 512 earth contacts or

- 32 x 16-fold feedback modules or
- 64 x 8-fold feedback modules,

which corresponds to 1536 feedback sections in total.

For the data transfer to the PC you can choose between:

- HSI-88-mode. Hint: It is used the HSI-88 protocol for **serial** interfaces, not the HSI-88-USB protocol.
- BiDiB-protocol. The connected s88 modules are administered as BiDiB knots by the interface.

### Simulaneous use as a s88 and a BiDiB interface

It is possible to use the interface simultaneously as a s88 interface and a BiDiB interface. There are no restrictions according to the number of s88 modules or BiDiB knots to be connected. In this case, the BiDiB protocol is mandatory for the transfer of the s88-data to the PC. In this case data transfer to the PC according to the BiDiB protocol is mandatory.

4. Connecting ZEUS

Connect the interface via RJ-45 patch cables to the s88 modules or the BiDiB knots. For the sake of clarity, we recommend to use different coloured patch cables for different types of bus lines, e.g.

- green for the BiDiBus
- blue for the s88 bus
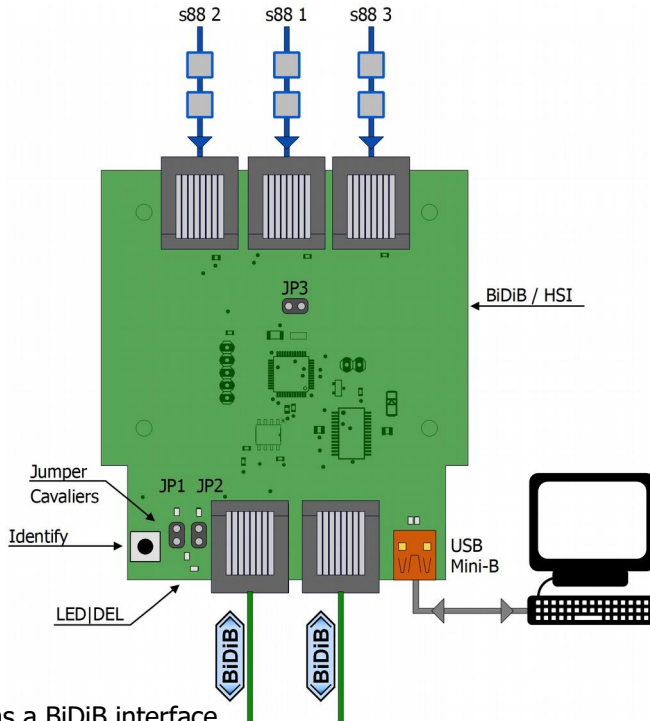
4.1. Use as a BiDiB interface

Connecting the BiDiB knots

You can connect up to 31 BiDiB nodes to the ZEUS interface (ZEUS is one of 32 possible nodes in level 1). The assignment to the two BiDiB connections is optional.

Setting the protocol

When using ZEUS as a BiDiB interface, you have to choose the BiDiB protocol for the data transfer from the interface to the PC. For this, the connection JP3 must be open (i.e. the jumper must not be plugged into JP3).

Mounting the terminating jumpers

When the interface is installed at one end of the BiDiBus-line (i.e. with only one branching RJ 45 cable), you have to mount the terminating jumpers JP1 and JP2. When subsequently connecting one ore more additional devices to a BiDiBus-line you have to dismount the terminating jumpers from the interface.
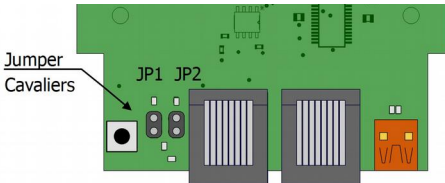
> **Please note:** When not mounting terminating jumpers with the interface at one end of a bus line, interferences in data transfer due to distortion of the electrical signals possibly occur. With a device with mounted terminating jumpers but not installed at one end of bus line data transfer possibly collapses.
>
> Faulty mounted or missing terminating jumpers cannot cause damages at the interface.

4.2. Use as a s88 interface

Connecting the s88 bus lines

You can connect a maximum of 512 earth contacts to each of the three s88 connections, or worded differently:

- 32 x 16-fold feedback modules or
- 64 x 8- fold feedback modules.

When connecting s88 feedback modules not providing a RJ-45 connection according to S88-N but only a 6-pole plug connector, you need an additional adapter S88-A. These are available in different versions for various mounting situations.

Settings

In order to transfer feedback data from the interface to the PC in HSI-88 mode, you have to insert a short circuit jumper on JP3. As long as the connection is open, data are transferred according to the BiDiB protocol.
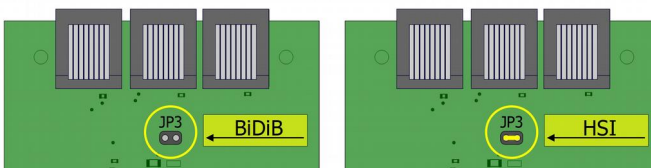
Please note: When using ZEUS simultaneously as a s88 and a BiDiB interface, you have to choose the BiDiB protocol for the data transfer (to keep the connection JP3 open).

4.3. Connecting the PC

Connect ZEUS via the USB cable included in the package to you PC. In case the USB interface has not been installed on your PC, you will receive an appropriate indication. You have to download the driver from the internet then.

Settings in the software for HSI mode

When transferring data from the interface to the PC in HSI-88-mode, you have to make the following settings in your software:

▪ data transfer according to the HSI-88-protocol for **serial** interfaces,

▪ number of s88 modules connected to the three bus lines. Hint: Observe the numbers of the bus lines (see figure in section 4).

Settings in the software for BiDiB

BiDiB has been designed that way connected BiDiB-knots log in themselves at the software.

S88 modules are administered by the interface as BiDiB-knots when data transfer to the PC is effected via the BiDiB-protocol.

5. Settings

When switching on the BiDiB system all interfaces and nodes are identified automatically by the interface, and displayed on the screen.

5.1. Identify button

In order to identify an interface ZEUS in the screen display of the control software, you have to push the identify button on the PCB. Then, the assigned interface is highlighted in the screen display, and the LED on the ZEUS flashes.
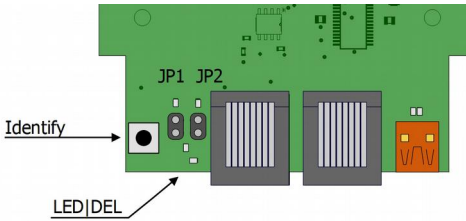
5.2. Firmware update and configuration

By means of the applicactions BiDiB-Wizard and BiDiB-Monitor (both available as free downloads), you can perform a firmware update for the interface ZEUS. Please check the description to determine whether a particular program provides these possibilities as well.

Firmware update

The current firmware is available as a free download under:

http://tams-online.de/download/firmware

For starting the update mode, you must keep the identify button pushed while making contact to the PC (via the USB cable). ZEUS will be logged in as "bootloader" then and you can perform the update according to the information given by the software. Meanwhile no other BiDiB nodes are displayed.

When not having integrated ZEUS in a BiDiB-control, you can send in the interface for updating.

6. Checklist for troubleshooting and error correction

> ⚠️ **Warning:** If you notice a strong heat development, immediately disconnect the connection to the supply voltage. **Fire hazard!**

Possible causes:

- One or more connections are faulty. → Check the connections.
- The interface is defective. → Send the interface in for inspection.

Faulty data transmission

Data are not transferred properly.

Possible causes:

- The connection(s) between ZEUS and the feedback modules / the BiDiB knots are interrupted. → Check the connections.
- The terminating jumper has not been inserted although ZEUS is installed at the end of a BiDiBus line or the terminating jumper has been inserted although ZEUS is not installed at the end of a BiDiBus line → Check the terminating jumpers.

6.1. Technical Hotline

If you have any questions about the use of your interface, our technical hotline will help you (telephone number and e-mail address on the last page).

6.2. Repairs

You can send us a defective interface for repair (address on the last page). In the event of a warranty or guarantee claim, the repair is free of charge for you. As proof of any warranty or guarantee claim, please enclose the proof of purchase with your return.

If there is no warranty or guarantee claim, we are entitled to charge you the costs of the repair and the costs of the return shipment. We charge a maximum of 50% of the new price for the repair according to our valid price list. We reserve the right to refuse the repair if it is technically impossible or uneconomical.

If you want to clarify whether a repair is possible or economical before sending it in, please contact our Technical Hotline (telephone number and email address on the last page).

Please do not send us repair shipments freight collect. In the event of a warranty or guarantee claim, we will reimburse you for the regular shipping costs.

7. Technical data S88-5

Data protocols and interfaces

Data protocols	S88 (HSI-88) BiDiB
Interfaces for s88 bus	3 RJ-45 sockets according to S88-N for 512 earth contacts each
Interfaces for BiDiBus	2 RJ-45 sockets for a maximum of 31 additional BiDiB knots
PC interface	USB 2.0 (connector: Mini-B)

Electrical characteristics

Supply voltage	via the USB connection
Current consumption (without connected devices)	max. 40 mA

Protection

Protection class	Ready-made module (without housing): IP 00 Meaning: No protection against foreign bodies, contact and water.
	Ready device (in housing): IP 20 Meaning: Protected against solid foreign bodies with diameter ≥ 12.5 mm and access with a finger. No protection against water.

Environment

	For use in closed rooms
Ambient temperature during operation	0 ~ + 30 °C
Permissible relative humidity during operation	10 ~ 85% (non-condensing)
Ambient temperature during storage	- 10 ~ + 40 °C
Permissible relative humidity during storage	10 ~ 85% (non-condensing)

Other features

Dimensions (approx.)	Circuit board: 72 x 82 mm
	Ready device including housing: 100 x 90 x 35 mm
Weight (approx.)	Assembled board (ready-made module): 27 g
	Ready device including housing: 75 g

8. Warranty, EU conformity & WEEE

8.1. Guarantee bond

For this product we issue voluntarily a guarantee of 2 years from the date of purchase by the first customer, but in maximum 3 years after the end of series production. The first customer is the consumer first purchasing the product from us, a dealer or another natural or juristic person reselling or mounting the product on the basis of self-employment. The guarantee exists supplementary to the legal warranty of merchantability due to the consumer by the seller.

The warranty includes the free correction of faults which can be proved to be due to material failure or factory flaw. With kits we   guarantee the completeness and quality of the components as well as the function of the parts according to the parameters in not mounted state. We guarantee the adherence to the technical specifications when the kit has been assembled and the ready-built circuit connected according to the manual and when start and mode of operation follow the instructions.

We retain the right to repair, make improvements, to deliver spares or to return the purchase price. Other claims are excluded. Claims for secondary damages or product liability consist only according to legal requirements.

Condition for this guarantee to be valid, is the adherence to the manual. In addition, the guarantee claim is excluded in the following cases:

- if arbitrary changes in the circuit are made,
- if repair attempts have failed with a ready-made module or device,
- if damaged by other persons,
- if damaged by faulty operation or by careless use or abuse.

8.2. EU Declaration of Conformity

CE This product fulfils the requirements of the following EU directives and therefore bears the CE marking.

2001/95/EU Product Safety Directive

2015/863/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)

2014/30/EU on electromagnetic compatibility (EMC Directive). Underlying standards:

DIN-EN 55014-1 and 55014-2: Electromagnetic compatibility - Requirements for household appliances, electric tools and similar electrical appliances. Part 1: Emitted interference, Part 2: Immunity to interference

> To maintain electromagnetic compatibility during operation, observe the following measures:
>
> Only connect the supply transformer to a professionally installed and fused earthed socket.
>
> Do not make any changes to the original components and follow the instructions, connection and assembly diagrams in this manual exactly.
>
> Only use original spare parts for repair work.

8.3. Declarations on the WEEE Directive

This product is subject to the requirements of the EU Directive 2012/19/EC on Waste Electrical and Electronic Equipment (WEEE), i.e. the manufacturer, distributor or seller of the product must contribute to the proper disposal and treatment of waste equipment in accordance with EU and national law. This obligation includes

- registration with the registering authorities ("registers") in the country where WEEE is distributed or sold
- the regular reporting of the amount of EEE sold
- the organisation or financing of collection, treatment, recycling and recovery of the products
- for distributors, the establishment of a take-back service where customers can return WEEE free of charge
- for producers, compliance with the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive.

> The "crossed-out wheeled bin" symbol means that you are legally obliged to recycle the marked equipment at the end of its life. The appliances must not be disposed of with (unsorted) household waste or packaging waste. Dispose of the appliances at special collection and return points, e.g. at recycling centres or at dealers who offer a corresponding take-back service.

Further Information and Tips:

http://www.tams-online.de

Warranty and Service:

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