

Manual

# BiDiBooster

Item no. 40-19507



tams elektronik  
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To increase the text's readability we have refrained from referring to this point in each instance.

## 1. Why Boosters?

The three essential functions of boosters are:

1. Supplying the power needed for the operation of digital controlled locomotives and points and other digital consumers.
2. Bringing the voltage to the rails, in order to make sure that all vehicle and accessory decoders receive the digital switching and control commands.
3. Making sure the current is switched off in case of a short-circuit on the layout (e.g. when a vehicle derailed), in order to prevent damages at rails and vehicles.

In layouts monitored by RailCom the booster also provides the so-called RailCom-cutout needed to transfer RailCom-feedback data.

You can measure the power consumption as follows:

1 locomotive gauge N	600 mA
1 locomotive gauge H0	800 mA
1 locomotive gauge 0	1.000 mA
wagon light	50 - 200 mA
another consumer (such as a sound module)	100 - 300 mA
reserve for points	10% of the calculated sum of power consumption

The BiDiBooster can provide 2 to 4 A current depending on the settings. If your overall power demand exceeds the capacity of one booster you have to connect additional boosters according to the special requirements of your layout.

## 2. Getting started

### **How to use this manual**

This manual gives step-by-step instructions for safe and correct connecting of the booster, and operation. Before you start, we advise you to read the whole manual, particularly the chapter on safety instructions and the checklist for trouble shooting. You will then know where to take care and how to prevent mistakes which take a lot of effort to correct.

Keep this manual safely so that you can solve problems in the future. If you pass the booster on to another person, please pass on the manual with it.

### **Intended use**

The BiDiBooster is designed to be operated according to the instructions in this manual in model building, especially in digital model railroad layouts. Any other use is inappropriate and invalidates any guarantees.

The BiDiBooster should not be mounted by children under the age of 14.

Reading, understanding and following the instructions in this manual are mandatory for the user.

### **Checking the contents**

Please make sure that your package contains:

- BiDiBooster;
- one 3-pin and one 4-pin connector;
- four short-circuit jumpers;
- a CD (containing the manual and further information).

## Required materials

In order to connect the booster you need:

- Wire. Recommended diameter:
  - for the connection to the transformer and the rails:  $\geq 1,5 \text{ mm}^2$
  - for the connection to the digital control unit:  $\geq 0,25 \text{ mm}^2$
- A transformer. The recommended voltage and the minimum power of the transformer depend on the desired settings.

## Determining the transformer's voltage

Desired track voltage	Recommended transformer's voltage	
	AC voltage	DC voltage
10 – 12 V	12 V	desired track voltage + 2 V
12 – 15 V	15 V	
15 – 18 V	16 V	
18 – 22 V	18 V	
> 22 V	20 V	

## Determining the transformer's minimum power

desired track voltage  $\times$  desired interrupting current  
= minimum transformer's power

Example:  $18 \text{ V} \times 3 \text{ A} = 54 \text{ VA}$



### Please note:

Use a transformer with a nominal voltage not much higher than the desired track voltage. The power resulting has to be dissipated as heat by the booster otherwise. When this power is too high, the booster overheats and switches off.

### 3. Safety instructions



#### **Risk of fire**

The BiDiBooster possibly gets very warm during operation. Thus be careful to allow the air to flow unhindered around the ventilation slits. If the air exchange is blocked components can overheat and catch fire.

#### **Risk of electric shock**

- Touching powered, live components,
  - touching conducting components which are live due to malfunction,
  - short circuits and connecting the circuit to another voltage than specified,
  - impermissibly high humidity and condensation build up
- can cause serious injury due to electrical shock. Take the following precautions to prevent this danger:
- Only operate indoors in a dry environment.
  - Wiring should only be carried out when the booster is disconnected.
  - Only use low power for this device as described in this manual and only use certified transformers.
  - Only connect the transformer in an authorised manner to the house power supply.
  - Use adequately thick cable for all wiring. Too thin a cable can overheat.
  - If the layout is exposed to condensation, allow at least two hours for drying out.

## 4. Your BiDiBooster

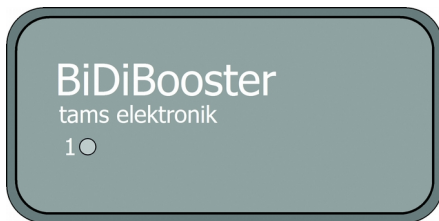
### Technical specifications

Supply voltage	12 – 20 V AC voltage 12 – 26 V DC voltage
Maximum output current	2, 3 or 4 A
Output voltage	10 – 24 Volt digital voltage
Power	max. 120 Watt
Digital formats	DCC, Motorola, mfx (control commands only)
Feedback logs	RailCom, BiDiB
Interfaces	DCC-conforming booster port (3-pole), BiDiB-port (RJ 45)
Track signal	symmetrical
Protected to	IP 00
Ambient temperature in use	0 ... +60 °C
Ambient temperature in storage	-10 ... +80 °C
Comparative humidity allowed	max. 85 %
Dimensions	approx. 95 x 135 x 45 mm
Weight -	approx. 172 g



**Fig. 1:**  
**Front side of**  
**BiDiBooster**

1 LED



## Ports

The BiDiBooster has 2 different booster ports:

- DCC-conforming booster port (3-pole): for the connection to the control unit's DCC booster connection or if the control unit does not have a DCC booster connection: the control unit's track output
- BiDiB-port (RJ 45): for the connection to the BiDiB-port of a BiDiB-device with track output or a BiDiB-interface.

In order to activate the one or other port you have to set jumpers or CVs.

You can connect further boosters either via the DCC-conforming booster port (3-pole) or the BiDiB-port (RJ 45).

You can configure the BiDiBooster that way, a closed-circuit connection is made between the DCC-conforming booster port and the BiDiB-port. The track signals incoming from the control unit connected via the DCC-conforming booster port are transferred to further boosters via the RJ 45 connection then. This allows to connect consecutive boosters simply and quickly via RJ 45 cables.

## Data formats

The BiDiBooster is a multi protocol booster and capable of amplifying data sent in the Motorola or the DCC format (both via the DCC-conforming booster port and the BiDiB-port). It transmits control commands in mfx-format as well, but no mfx feedback signals.

## **RailCom**

The BiDiBooster can provide the so-called RailCom-cutout needed to transfer RailCom-feedback data in RailCom-monitored sections.

When using the BiDiBooster with control units sending a DCC signal but not compatible to RailCom, providing the RailCom-cutout can cause malfunction. Some older DCC vehicle decoders and current decoders (especially of US American manufacturers) which are not designed for use with RailCom, do not react to driving commands properly with the RailCom cutout activated. With sound decoders not compatible to RailCom interferences in the sound playback can occur.

Thus with the BiDiBooster it is possible to switch RailCom on or off (at delivery RailCom is switched on).

With pure Motorola control units, malfunction due to sending the RailCom-cutout is impossible on principle.

## **Integrated global RailCom-detector**

There is a global RailCom-detector integrated in the BiDiBooster receiving the decoders' feedback signals in channel 2. According to the RailCom standard channel 2 is assigned to transmit feedback signals of decoders to whose addresses a DCC command has been sent before.

The RailCom feedback signals are transmitted from the BiDiBooster to RailCom display devices or the PC via the BiDi-data bus.

## **BiDiB**

In a layout controlled and monitored via BiDiB the BiDiBooster serves as a BiDiB-knot. The connection is done with patch cables (RJ45) – as usual with BiDiB.

The interface allows the direct connection of the booster to a PC interface bypassing the digital control unit. For this reason it is easy to divide the digital control into the parts "controlling" (via the digital control unit) and "switching" (via the PC).

It is possible to transmit track signals as well as current performance

data via the interface (e.g. current, voltage and temperature). The booster's performance data are used as a basis for the booster management of the PC control.

### Using the ABC-braking method

The booster amplifies the track signal completely symmetrically. This allows the ABC-braking method to be used in DCC-controlled layouts. The DCC-input of the BiDiBooster is isolated through an opto-coupler.

### Balanced track voltage

The BiDiBooster provides a regulated track voltage, which can be set to a value between 10 and 24 V in 1 V-steps. At delivery the track voltage is set to 18 V.

Regulating the track voltage to a constant value prevents changes in locomotive speeds and lighting brightness, resulting from voltage variations.

Rated size	Recommended track voltage	Value in state of delivery
Z	12 V	
N and TT	14 V	
H0	18 V	18 V
0, I and II	20 - 24 V	

## Short-circuit protection

The BiDiBooster provides an integrated short circuit breaking in shape of an integrated current limitation. This causes the booster to switch off automatically when a short circuit occurs at the track output and thus prevents damages to the booster, the tracks and the vehicles. The time elapsing till the short-circuit protection switches off the booster can be set to a value between 1 and 250 milliseconds.

When the short circuit feedback line is connected to the booster port of the control unit, the BiDiBooster sends a feedback to the DCC control unit when a short circuit occurs and then the control unit switches off the booster.

The short circuit sensitivity or the interrupting current, can be set to 2, 3, or 4 A. In order to prevent damage effectively when a short circuit occurs, the short circuit sensitivity should not be set too high.

Rated size	Recommended short circuit sensitivity (= interrupting current)	Value in state of delivery
Z and N	2 A	
TT and H0	3 A	3 A
0, I and II	$\geq 4$ A	



### Please note:

The set short circuit sensitivity should **not** exceed the maximum transformer's current. In case the maximum interrupting current is higher than the maximum transformer's current, the booster cannot detect an overcurrent and thus does not switch off the current to protect electronic components, vehicles and the tracks from damage.

**Risk of fire !**

### **Automatic switching on after a short circuit**

After a short circuit the BiDiBooster switches on automatically after 4 to 10 seconds (adjustable). If the short circuit is still there, it switches off again immediately.

In state of delivery, the automatic switching on will be interrupted for one minute after the booster has been switched on and off five times. This autostarting time can be set individually:

- to the set autostarting time after a short circuit (4 to 10 seconds) or
- to an individual autostarting time between 0 and 90 seconds (adjustable in 10 sec.-steps).

### **Switching off at overtemperature**

When overheating the booster switches off automatically for safety reasons. Possible causes:

- Hindrance to the flow of air through the ventilation slits.
- Significantly higher rated voltage of the transformer than the set track voltage in combination with a high current consumption.

### **Watchdog function**

With this function the control unit (usually controlled by a PC software) sends in intervals of 5 seconds a DCC points switching command to an address assigned to the BiDiBooster. As soon as the booster does not receive these commands any longer, it switches off automatically.

After switching on the booster the watchdog function is initially inactive. It will be activated by sending a switching command to the assigned points address. This allows you to run the layout without a PC control and without deactivating the watchdog function.

As soon as the BiDiBooster is connected to an interface via the BiDiB-port, the watchdog function is inactive.

## **Switching on and off the BiDiBooster with a DCC points switching command**

The BiDiBooster can be switched on and off via a a DCC point switching command sent to an assigned points address.

Points "straight" → booster on

Points "branch" → booster off

As soon as the BiDiBooster is connected to an interface via the BiDiB-port, it is impossible to switch the booster on or off via DCC point switching commands, but only via the PC software.

## **Inrush-current limiting**

The total charging current of buffer capacitors of vehicle decoders (especially of sound decoders) and other additional external supporting capacitors can be so high when switching on the layout, that the short-circuit protection switches off the booster immediately. Thus putting the layout into operation can be difficult with an active short circuit protection.

The BiDiBooster is able to supply an increased current for a short time after switching on (to be set to max. 500 ms) and then tolerates a temporary break down of the voltage. This time is sufficient to charge buffer capacitors and supporting capacitors.

If after a short time, the current does not decrease and the voltage does not increase, then the booster's short-circuit switch-off reacts as a "real" short-circuit has to be assumed.

Further information on inrush-current limiting see RailCommunity standard RCN 530 ([www.railcommunity.de](http://www.railcommunity.de)).

## **Updates**

In order to adapt the booster to new developments, you can perform a software update via BiDiB.

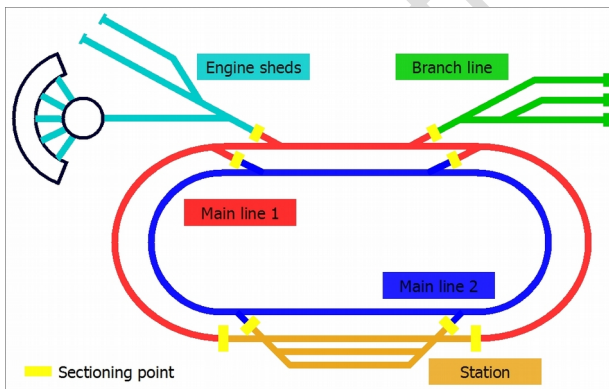
When not having integrated the BiDiBooster in a BiDiB-control, you can send in the booster for updating.

## 5. Splitting your model railway layout

Split your model railway layout in several track sections electrically isolating them from each other. Every section has to be supplied by a booster of its' own. In each section a maximum of three to five locomotives should run at the same time. The following divisions are useful:

- station
- engine sheds
- the main lines (if necessary in several sections)
- the branch lines (if necessary in several sections)

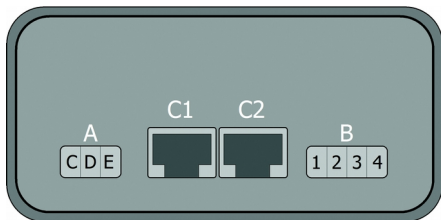
Make sure that section borders are not crossed too often.



Isolate the borders between the booster sections as follows:

- With 2-rail systems: one rail. Be sure to isolate in all booster sections on the same rail ("left" or "right"). In large confusing layouts it is recommended to isolate both rails.
- With 3-rail systems: the middle conductor.

## 6. Connecting the BiDiBooster



**Fig. 2:**  
Rear side of the  
BiDiBooster

<b>A</b>	DCC-conforming booster port → Connections to the control unit and following boosters (alternative 1)
C	data (+)
D	earth / data (-)
E	short circuit feedback line
<b>B</b>	Connections to the transformer and the tracks
1	transformer
2	transformer
3	outer conductor / left rail
4	middle conductor / right rail
<b>C</b>	BiDiB-port (RJ 45) → Connections to the control unit and following boosters ( alternative 2)
C1	Both connections are closed-circuit with each other and for that reason can be used optionally.
C2	



 **Please note:**

Do not block the flow of air through the ventilation slits, otherwise the booster can overheat. **Risk of fire!** You should never cover the ventilation slits. When connecting the booster be sure to keep sufficient distance to other devices, walls, and the like.

## 6.1. Using patch cables

The BiDiBooster has – as an alternative to the DCC-conforming booster port – RJ 45 connectors (C1 and C2) for the connection of the control unit and additional boosters. When using the RJ 45 connectors data transfer between the components follows the BiDiB protocol.

With BiDiBoosters installed at the end of a BiDi-bus line (i.e. with only one branching RJ 45 cable), you have to mount the terminating jumpers JP5 and JP6 according fig. 4. In state of delivery JP5 and JP6 are not mounted.

When subsequently connecting additional devices to a BiDi-bus line you have to dismount the terminating jumpers with the device so far being installed at the end of the bus line.

 **Please note:**

When not mounting terminating jumpers with the BiDiBooster 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.

In both cases damages at the devices are excluded.

## 6.2. Connecting the control unit

For the connection to the control unit you can use either

- the DCC booster port (connection A) or
- the BiDiB port (connection C).

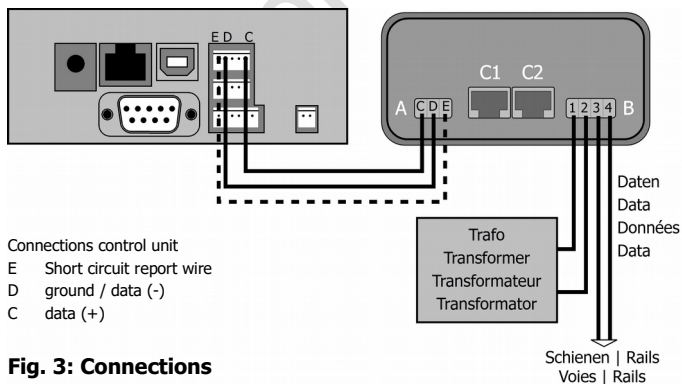
In state of delivery the BiDiBooster is set to the use of the DCC-conforming port. When you want to use the BiDiB port, you have to alter the settings (→ section 7).

### Connection A: DCC-conforming (3-pole) port

Via the connection "A" you can connect the booster either to

- the control unit's DCC booster connection or
- if the control unit does not have a DCC booster connection: the control unit's track output.

In order to connect the cables to the booster use the enclosed connectors which are designed to screw on the cables.



**Fig. 3: Connections**

Check that the pin assignment of the control unit's booster interface corresponds to that of the booster.

If you want the control unit to switch off the booster when a short circuit occurs, you have to connect the short circuit feedback line. If you do not connect the short circuit feedback line, the booster will be switched off automatically when a short circuit occurs and automatically on again after a set time.

### **Connection C: BiDiB-port (RJ 45)**

Via the connection C (optionally C1 or C2) you can connect the BiDiBooster with RJ 45-cables to the BiDiB interface of your control unit or a PC interface with track output.

Hint: If necessary you have to mount the terminating jumpers (→ section 6.1).



Please note:

Some control units have RJ 45 ports, but are not designed for the connection of BiDiB-devices. When using these for the connection of the BiDiBooster, damages at one or both devices possibly occur.

Hint: For the sake of clarity, we recommend to use different coloured patch cables for different types of bus lines, e.g.

- green for the BiDi bus
- blue for the s88 bus
- red for the data bus of the digital control

### 6.3. Connection of a BiDiB interface

When using a BiDiB interface with track output to control your layout, you have to connect it like a central unit to the BiDiB port (→section 6.2).

In order to integrate the booster in a layout controlled and monitored by BiDiB, you can use a BiDiB interface not providing a track output in addition to the control unit.

### 6.4. Connection of additional boosters

You can use the same port for the connection of an additional booster as used for the connection of the control unit.

A special feature of the BiDiBooster is the possibility to connect the control unit via the 3-pole DCC booster port and additional boosters via RJ 45 cables to the BiDiB port. In this case the BiDiBooster has to be set accordingly (→section 7). Then, a closed-circuit connection is made between the DCC-conforming booster port and the BiDiB-port.



Please note:

It is not possible to connect the control unit via the BiDiB port and an additional booster via the DCC booster port. In this case no track signals are transmitted.

#### **Connection A: DCC-conforming (3-pole) port**

In order to connect an additional booster connect an additional cable to each of the three pins of "A".

#### **Connection C: BiDiB-port (RJ 45)**

In order to connect an additional booster use a patch cable (RJ 45) and connect it optional to C1 or C2.

Hint: If necessary you have to mount or dismount the terminating jumpers (→ section 6.1).

**Connection A + Connection C:**

This version allows an easy and quick connection of an additional booster via a RJ 45 cable even in the case, the control unit is connected via the 3-pole DCC booster port to the booster.

Hint: If necessary you have to mount or dismount the terminating jumpers (→ section 6.1).

**Please note:**

When using this connection version you have to connect all additional booster via the BiDiB-port. It is not possible to make a connection from the BiDiB port to the DCC-conforming port.

**Hint**

Only use boosters of one type and made by one manufacturer to avoid problems such as:

- Problems with data transfer to the decoders.
- Current leakage that make locomotives move by themselves when other locomotives cross the borders between two track sections.
- Short circuits when crossing sections.

## 6.5. Connecting the tracks

Connect the booster's track port to both rails (with 2-rail systems) or to one rail and the middle conductor (with 3-rail systems). These connections should be repeated every 2-3 meters, because the resistance at the connection points of the tracks is quite high. When choosing too high intervals, problems with the short circuit indication or the power supply of the vehicles may occur.

### **Please note:**

The connection order of the rails (or the rail and the middle conductor) to the two poles of the track port is not significant, if you haven't already connected a booster to your layout. If you have then please note:

The left pole of the second booster's track port has to be connected to the same rail as the left pole of the booster already connected. The same goes of course for the right pole of the boosters' track ports. In case the connections are mixed up short circuits will occur when vehicles cross the boundaries of the track sections.

## 6.6. Connecting the power supply

Connect the transformer to the booster's transformer port. The required voltage and the minimum power of the booster depend on the desired track voltage and the desired interrupting current. See section "Determining the necessary transformer's voltage" on page 6.

### **Please note:**

You must not interchange the connections to the tracks and to the transformer. Interchanging these connections normally causes damages at the booster, in the worst case beyond repair.

## 7. Settings

The BiDiBooster can be set to individual requirements

- via BiDiB with a PC software or
- by programming on main (POM) or
- by inserting short-circuit terminations (jumpers).

	Possible settings	Manu- facturers settings	Setting with jumpers
Track voltage	10 – 24 V, to be set in 1 V-steps	18 V	no
Autostarting time after a short circuit	4 – 10 sec., to be set in 1 sec.-steps	4 sec.	no
Max. track current (interrupting current after a short circuit)	2 – 4 A, to be set in 1 A-steps	3 A	yes
RailCom	active or inactive	active	no
Switching off with a DCC points switching command	active or inactive / assigning the points address	inactive	no
Watchdog	active or inactive / assigning the points address	inactive	no
Time elapsing til the short circuit switch off reacts	1- 255 ms	100 ms	no
Autostarting time after 5 short circuits	0 – 90 sec.	60 sec.	no

	Possible settings	Manu- facturers settings	Setting with jumpers
Time for inrush current limiting	2 - 500 ms	100 ms	no
Determining the port	BiDiB-interface, DCC-interface or reception of the booster signals via the DCC-booster port and transmission via the RJ 45-booster port	DCC- interface	yes

## 7.1. Programming via BiDiB

As soon as the BiDiBooster is connected to a BiDiB controlled and monitored layout, it is integrated automatically into the PC layout control. By aid of the PC control software or (when not possible with this software version) special tools (e.g. BiDiB-Monitor or BiDiB-Wizard) the booster specific configuration variables (CVs) and the BiDiB feature settings are programmed. It is also possible to make a software update via BiDiB.



## 7.2. Programming on main (POM)

The configuration variables of the booster BiDiBooster can be set by programming on main (POM). This is possible only with control units supporting this programming mode.

In order to start programming the booster, input the value "62" for CV#7 of any DCC locomotive address. Proceed as described in the manual of your control unit. This input has no effect on a decoder with the chosen address, as locomotive decoders do not allow setting a value for CV#7 (= version).

After having started the programming mode (input the value "62" for CV#7), the LED flashes quickly with a yellow light. You can now alter the booster's settings by choosing CV#7 again and inputting a value from the following list.

If you do not input a value for CV#7 within 30 seconds, the programming mode will be switched off. After setting the value the programming mode is ended automatically. If you want to alter further settings, you have to start the programming mode again by inputting the value "62" for CV#7.

Function	Value for CV#7	Settings / Remarks
Reset	8	Reset. Sets the values back to the default values.
Track voltage (output value) Default value: 18 V	10	10 V
	11	11 V
	12	12 V
	...	13 ... 23 V
	24	24 V

Function	Value for CV#7	Settings / Remarks
Autostarting time after a short circuit Default value: 4 sec.	34	4 sec.
	35	5 sec.
	36	6 sec.
	...	7 ... 9 sec.
	40	10 sec.
Max. track current (interrupting current) Default value: 3 A	42	2 A
	43	3 A
	44	4 A
RailCom. Default value: active	51	active
	52	inactive
Determining the interface	53	BiDiB-booster port
	54	DCC-booster port
	55	Reception of the booster signals via the DCC-booster port and transmission via the RJ 45-booster port
Switching off with a DCC points switching command Default value: inactive	71	active
	72	inactive
	73	Change over into the progr. mode. When within 30 sec. a DCC points switching command is set, the BiDiBooster takes over the corresponding points address to release the switching off function. Condition: Switching off function = "active".

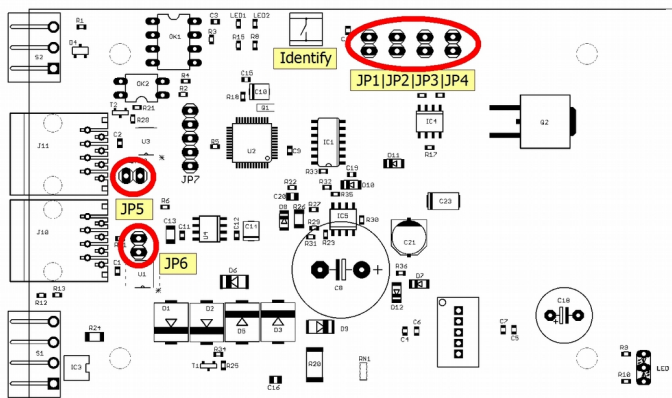
Watchdog Default value: inactive	74	active
	75	inactive
	76	Change over into the programming mode. When within 30 sec. a DCC points switching command is set, the BiDiBooster takes over the corresponding points address to release the watchdog function. Condition: Watchdog function = "active".
Autostarting time after 5 short circuits Default value: 60 sec.	100	= set autostarting time after a short circuit
	101	10 sec.
	102	20 sec.
	103	30 sec.
	...	40 - 80 sec.
Time elapsing til the short circuit switch off reacts	110	20 ms
	111	40 ms
	112	60 ms
	...	80 ... 180 ms
	119	200 ms
Time for inrush current limiting	120	40 ms
	121	80 ms
	122	120 ms
	...	160 ... 360 ms
	129	400 ms

### 7.3. Setting the BiDiBooster with jumpers

With control units not supporting programming on main (POM) the BiDiBooster can be set by inserting short-circuit terminations (jumpers). Please note: It is not possible to set the whole range of values by inserting jumpers.

Before inserting the jumpers you have to open the booster's housing. In order to release the clips bolting the two red half shells of the housing, press in the housing on it's side above / underneath the ventilations slits. It is recommend to release the clips on one side first and then on the opposite side.

Set the jumpers on the PCB is shown in fig. 4. When no jumper is inserted the programmed values are set.



**Fig. 4: PCB with assignment of the programming jumpers and identify-button**

Jumper		Einstellung
JP1	open	Max. track current (interrupting current) = programmed value. Default value: 3 A
	inserted	Max. track current (interrupting current) = 4 A
JP 2, 3 and 4	open	Determining the port as programmed. Default value: DCC-booster port
JP2	inserted	Reception of the booster signals via the DCC-booster port and transmission via the RJ 45-booster port
JP3	inserted	BiDiB booster port
JP4	inserted	DCC booster port

## 8. Operation

### **Shunting the boundry between two booster sections**

You should take care not to allow locomotives or trains to halt directly on the boundary between two sections. This would lead to a connection between the outputs and possible damaging of the two connected boosters. The short circuit indication does not work under these circumstances.

### **Operation with BiDiB**

In order to push the identify button you have to open the booster's housing. Proceed as described in section 7.3.

When the BiDiBooster is installed at one end of the BiDi bus line (i.e. with only one branching RJ 45 cable), you have to mount the terminating jumpers JP5 and JP6 according to fig. 4. Otherwise interferences in data transfer due to distortion of the electrical signals possibly occur.

When subsequently connecting additional devices to a BiDi-bus line you have to dismount the terminating jumpers with the device so far being installed at the end of the bus line. Otherwise data transfer possibly collapses.

### **Update via BiDiB**

In order to adapt the booster to new developments, you can perform a software update via BiDiB. For that purpose start the suitable PC software. As an alternative (e.g. when the software does not provide an update function) you can perform the update with special tools (e.g. BiDiB-Monitor or BiDiB-Wizard). Start the suitable part of the program and follow the instructions.

**LED**

The LED on the front lights or flashes indicating the operation modes or problems that occur.

LED	Meaning
yellow – constantly lighting	The Booster is in operation.
yellow – slowly flashing (approx. 1 sec. cycle)	No signal from the control unit, BiDiB not connected.
yellow – quickly flashing	Programming has been started.
yellow – 2x flashing   break   2x flashing	The booster has been switched off by a points switching command.
red – slowly flashing (approx. 1 sec. cycle)	The booster has been switched off due to exceeding the maximum temperature. After cooling it will be switched on automatically (digital signal from the control unit provided).
red – quickly flashing	The booster has been switched off after a short circuit. After x seconds it will be switched on automatically (digital signal from the control unit provided).
red – 2x flashing   break   2x flashing	The watchdog has been released and the booster has been switched off in consequence.
orange - flashing	No signal from the control unit, BiDiB connected.
orange – constantly lighting	The booster has been switched off via a BiDiB command, the digital signal is still provided.

## 9. Check list for troubleshooting

- The booster is getting very hot and / or starts to smoke.



Disconnect the system from the mains immediately!

Possible reason: The connections to the track and the power supply have been mixed up. → Alter the connections. Possibly the booster has been damaged.

### **Problems with switching on and data transfer**

- The LED at the booster does not light and the locomotives cannot be driven.

Possible reason: The power supply has been interrupted. → Check the connections to the power supply (transformer).

- The booster cannot be switched on or it transfers faulty signals (locomotives do not react as intended).

Possible reason: The terminating jumpers have not been mounted although the booster is installed at one end of the data line.

Possible reason: The terminating jumpers have been mounted although the booster is not installed at one end of the data line.

### **The LED flashes in the colour yellow**

- The LED flashes slowly in the colour yellow.

Possible reason: The control unit has been switched off or the connection to the control unit has been interrupted. → Check the control unit and the connections.

Possible reason: The wrong port (DCC conformin / BiDiB) has been determined. Check the settings in CV## 53 – 55 or the setting of the jumpers JP2, JP3 and JP4.



- After a points switching command the booster has been switched off, the LED flashes yellow.

Possible reason: The points address in question has been assigned to the function "switching off by a DCC switching command". → Set the function inactive or avoid using the points address in question.

### **The LED flashes in the colour red**

- The LED flashes quickly in the colour red.

Possible reason: There is a short circuit at the track output. Therefore the booster switches off automatically and after the set autostarting time automatically on again. In case the short circuit is still there after autostarting, the booster switches off immediately. This procedure is repeated five times, followed by a one minute break. → Eliminate the short circuit.

- After a points switching command the booster has been switched off, the LED flashes red.

Possible reason: The points address in question has been assigned to the watchdog function, but there is no PC Control with this function in use. → Set the function inactive or avoid to use the points address in question.

- The booster switches off, the LED flashes slowly in the colour red.

Possible reason: The booster is poorly ventilated. → Ensure the ventilation slits allow the air to flow unhindered.

Possible reason: The nominal voltage is a lot higher than the set track voltage. The power resulting from the difference between the real transformer's voltage and the desired track voltage and the taken current has to be dissipated as heat by the booster. If this power is too high, the booster overheats and switches off due to overtemperature. → Use a transformer with a nominal voltage minimally higher than the set track voltage.

### **The LED flashes in the colour orange**

- The LED flashes slowly in the colour orange.

Possible reason: The control unit has been switched off or the connection to the control unit has been interrupted. → Check the control unit and the connections.

### **Problems with the watchdog function**

- The watchdog function is not active after switching on the booster although it has been set active.

Possible reason: The watchdog function will only be activated after a switching command has been sent to the assigned points address.  
→ Enter a switching command for the points address.

**Hotline:** If problems with your device occur, our hotline is pleased to help you (mail address on the last page).

**Repairs:** You can send in a defective device for repair (address on the last page). In case of guarantee the repair is free of charge for you. With damages not covered by guarantee, the maximum fee for the repair is 50 % of the sales price according to our valid price list. We reserve the right to reject the repairing of a device when the repair is impossible for technical or economic reasons.

Please do not send in devices for repair charged to us. In case of warranty we will reimburse the forwarding expenses up to the flat rate we charge according to our valid price list for the delivery of the product. With repairs not covered by guarantee you have to bear the expenses for sending back and forth.

## 10. 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-built module or device,
- if damaged by other persons,
- if damaged by faulty operation or by careless use or abuse.

## 11. EU declaration of conformity

 This product conforms with the EC-directives mentioned below and is therefore CE certified.

2004/108/EG on electromagnetic. Underlying standards: EN 55014-1 and EN 61000-6-3. To guarantee the electromagnetic tolerance in operation you must take the following precautions:

- Connect the transformer only to an approved mains socket installed by an authorised electrician.
- Make no changes to the original parts and accurately follow the instructions, connection diagrams and PCB layout included with this manual.
- Use only original spare parts for repairs.

2011/65/EG on the restriction of the use of certain hazardous substances in electrical and electronic equipment (ROHS). Underlying standard: EN 50581.

## 12. Declarations conforming to the WEEE directive



This product conforms with the EC-directive 2012/19/EG on waste electrical and electronic equipment (WEEE).

Don't dispose of this product in the house refuse, bring it to the next recycling bay.

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