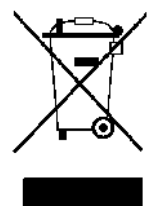
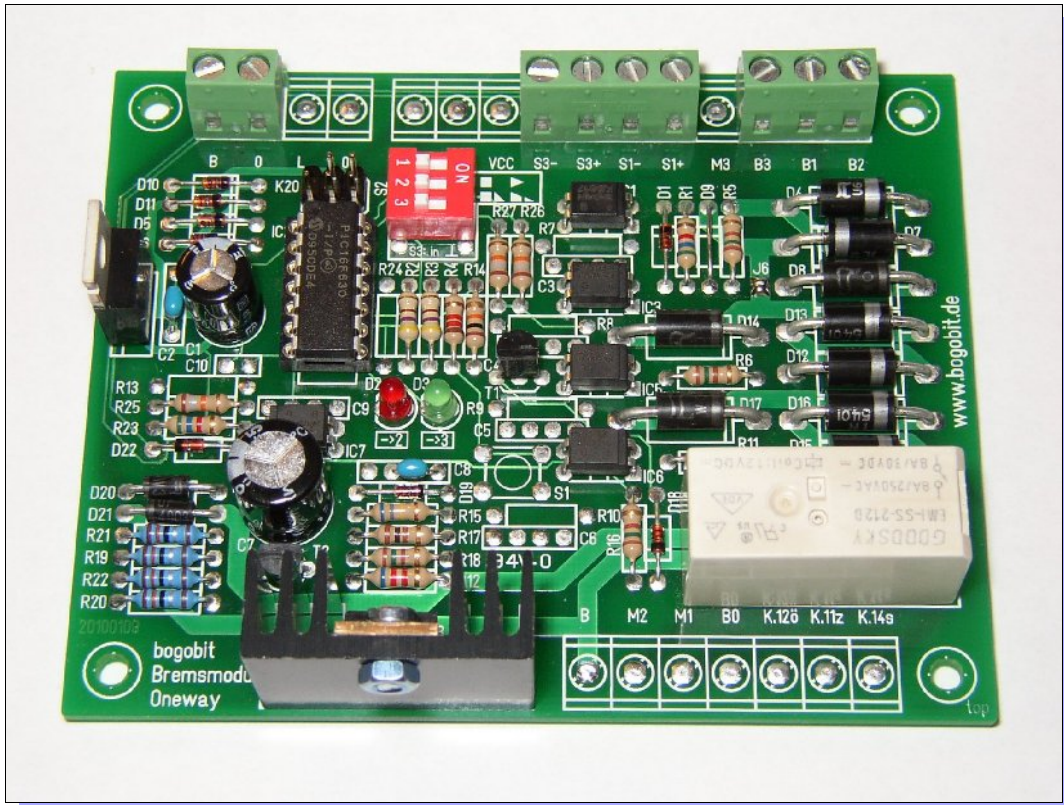


## Bogobit Bremsmodul Oneway – Manual



# 1 Introduction

Please read the instructions completely before using the product. Observe all operating and safety instructions!

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# 2 Intended Use

The Bogobit Bremsmodul Oneway is a brake module for digitally controlled model railways. The module generates a “brake voltage” that is applied to the track depending on the aspect of a signal. This lets locos brake smoothly if they are equipped with a suitable decoder. It can be used on model layouts with center stud tracks (Märklin H0), and for certain applications also with two-rail tracks. It can be used on digitally control model railways using the Märklin/Motorola/mfx protocol and, depending on decoder characteristics, also with the DCC protocol.

This product is no toy. It is not suitable for children up to 14 years of age.

Any use other than that described before is not permitted.

The product may not be modified or reassembled.

# 3 Safety Instructions

## 3.1 General

In case of damage incurred by disregarding these operating instructions, the warranty claim is void. Liability for any and all consequential damage is excluded!

We do not assume any liability for damage to property or personal injury caused by improper use or the failure to observe the safety instructions! The warranty is voided in these cases.

- For safety and licensing reasons (CE), it is not permitted to change or modify the product. Only use original or equivalent replacement parts for repair.
- Ensure that all electrical connections and connection cables conform to the regulations and comply with the operating instructions.
- Upon sudden change of climatic conditions (e. g. transfer from a cold place to a warm room) water may condense on the device, which may lead to damage. Allow approx. 2 hours to acclimate before powering on the device.
- Do not operate the device near easily inflammable objects, liquids or gases. Danger of explosion!
- Do not expose the device to high temperatures, strong vibrations, high humidity or chemically aggressive environment.
- Operate the device only in dry indoor rooms (below 80 % humidity, non condensing) and at normal room temperature (0 °C to 40 °C).
- Do not operate the device unattended.

- When in doubt about safety, or the connection or operation of the device, which is not explained in these operating instructions, please contact us or a recognized expert.

## 3.2 Electrical Safety

- Operate the module only with low voltage according to the specifications in the technical data chapter. Only use power supplies, such as transformers or digital control stations, that are certified for use in model railway applications. Connection of higher voltages (e.g. 230 V mains voltage) is not permitted, also not on relay contacts. There is danger to life through an electric shock and a risk of fire!
- Adhere to the limits on maximum allowable current according to the specifications in the technical data chapter. Exceeding the limits leads to overload and destruction of the device and bears the risk of fire or electric shock.
- Switch off the power supply before working on the electrical connections.
- Pay attention to appropriate wire cross sections (rule of thumb: 0,1 mm<sup>2</sup> per 1 A maximum possible current, e. g. 0,5 mm<sup>2</sup> cross section for 5 A maximum current).

## 3.3 Heat Generation

Electronic components on the product may heat up significantly during operation.

- When mounting the product, ensure sufficient air circulation around the device to prevent heat build-up and overheating. This especially applies when installing the board in a housing.
- When mounting the product, keep sufficient distance to heat sensitive and inflammable objects (e. g. wood or plastic surfaces, cable insulation).
- When touching the product, there is danger of skin burn.

# 4 Function of the bogobit Bremsmodul

## 4.1 General Function

The Bogobit Bremsmodul Oneway is a brake module for digitally controlled model railways. The module generates a “brake voltage” that is applied to the track depending on the aspect of a signal. This lets locos brake smoothly if they are equipped with a suitable decoder.

With the Bogobit Bremsmodul Oneway the braking prototypically happens only in one driving direction. So, if the loco approaches the signal from behind, it continues to drive along. To detect the driving direction, the track is divided into two consecutive sections, whose occupancy is detected by the brake module through a current sensor. In summary:

Operational mode 1 – e. g. on free track:  
The brake module is used at *one* signal with braking in *one* direction.

If station tracks are passed in both directions, a signal is placed at each end of the track. One Bogobit Bremsmodul Oneway can observe the signals at both ends and brake an approaching train

in either direction at its corresponding exit signal. The module thus combines two directional brake modules in one device. This requires the track to be divided into two or three consecutive sections.

Operational mode 2 – track in a station:

The brake module is used at *two* signals with braking in *either* direction.

On model layouts using center stud tracks (Märklin H0), the Bogobit Bremsmodul Oneway can be used in both operational modes. On layouts with two-rail tracks it can be used in mode 1 (at one signal); the use in mode 2 (station track with *two* signals) is possible on two-rail track only if the loco decoders support "Brake on DC" independently from track polarity.

The Bogobit Bremsmodul Oneway kit may be built in two hardware versions:

- The version "Oneway Station" supports both operational modes.
- The version "Oneway Simplex" only supports mode 1 (at one signal).

The version Oneway Station is the full featured version. On the Oneway Simplex some electronic components are left out as this version only supports one signal signal input and two instead of three track sections.

The brake voltage is basically just negative DC voltage. This working principle is known to märklin users as the "märklin brake module" and to DCC users as "brake on dc". It works with most of the original märklin decoders and most compatible decoders. It also works with many DCC decoders, some of which need special configuration (CV programming) to support it.

In some DCC decoders the voltage polarity is evaluated to achieve direction dependent braking. Thus, for two rail track applies: From the driver's perspective when facing the signal, the *right* rail of two rail track is equivalent to the center studs of Märklin three-rail track.

The brake voltage is output through an electronic current-limiting circuit. Therefore, when driving over a track isolation gap, no short circuit occurs and there is no disruption of service.

## 5 Connection and Operation

### 5.1 Handling

The product consists of sensitive electronic components. Improper handling may destroy them. Prior to handling the board, please discharge yourself from electrostatic charge. To do this, touch a metal object (earthed), e.g. a metal PC casing. Try to touch the board only at the edges and avoid touching any electronic components or copper routes on the board.

### 5.2 Mounting

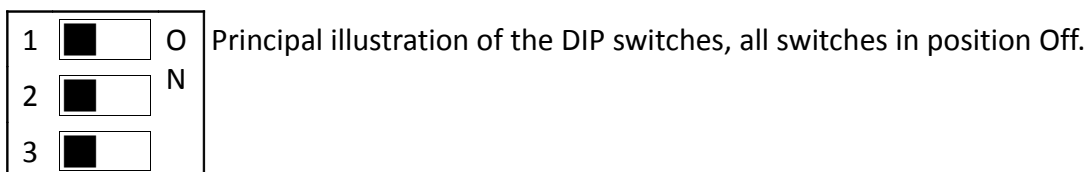
Mount the module properly to the model railway framework. The module has holes with 3 mm diameter for mounting. Use of wood screws with 3 mm diameter and a flat pan head is recommended. Use spacers (little plastic tubes) between circuit board and mounting surface. Tighten the screws carefully, so that the circuit board does not warp. Also consider the instructions related to heat generation in chapter 3.3.

### 5.3 Configuration of the Operational Mode (DIP Switches)

The module has three DIP switches. These configure the operational behaviour.

In position “Off” the switch lever is in the left position near the number.

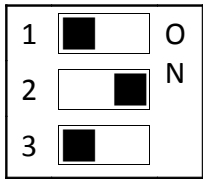
In position “On” the switch lever is in the right position near the text ON.



The function of each switch is as follows:

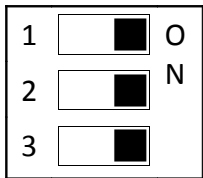
Switch	Function
1	Polarity of the signal inputs: Off: Voltage is applied if the signal shows red (set-up for signals with LEDs) On: Voltage is applied if the signal shows green (signals with internal switch)
2	Braking starts in the first or last track section: Off: Braking starts in the last section (typical for mode 2 – station track) On: Braking starts in the first section (typical for mode 1 – one signal)
3	Substitute for an unused signal input S3 (mode 1): Off: Signal input S3 is connected to a signal (mode 2) Off: Signal input S3 is not connected, DIP switch 1 is Off On: Signal input S3 is not connected, DIP switch 1 is On

### 5.3.1 Examples of DIP Switch Settings



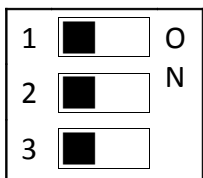
**Example 1: one LED signal** (uses connections S1, B1, B2)  
 - operational mode 1 – one signal, braking in one direction  
 - signal has LEDs, the voltage of the red LED is connected to S1.  
 - braking starts in the first section (B1)

Variant of example 1: If braking shall start at the second section (B2), then switch 2 is Off.



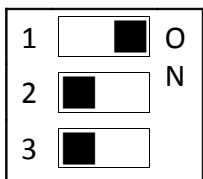
**Example 2: one signal with internal contact** (uses connections S1, B1, B2)  
 - operational mode 1 – one signal, braking in one direction  
 - signal has an internal switch, a switched voltage is connected to S1.  
 - braking starts in the first section (B1)

Variant of example 2: If braking shall start at the second section (B2), then switch 2 is Off.



**Example 3: two LED signals** (uses connections S1, S3; B2, B1, B3)  
 - operational mode 2 – two signals, braking in two directions  
 - signals have LEDs, the voltage of the red LED is connected to S1 or S3 resp.  
 - braking only in the last section (B2 or B3 resp.)

Annotation to example 3: Instead of three track section in sequence B2–B1–B3, also the variant with two sections B2–B3 can be used.



**Example 4: two signal with internal contacts**(uses connections S1, S3, B2, B1, B3)  
 - operational mode 2 – two signals, braking in two directions  
 - signals have an internal switch, a switched voltage is connected to S1 or S3.  
 - braking only in the last section (B2 or B3 resp.)

Annotation to example 4: Instead of three track section in sequence B2–B1–B3, also the variant with two sections B2–B3 can be used.

### 5.4 Connections

All external connections of the brake module are labelled on the board and explained in the table below:

Label	Function
0	digital track voltage center stud track: B is the red wire to the center studs, 0 is the brown wire to the rails ground.
B	two-rail track: B is the wire to rail on the right hand side (only this right rail is divided into track sections), 0 is the wire to the continuous rail on the left hand side. Note: the color code or polarity of the electrical track connection is irrelevant, essential is right and left rail as seen when approaching the signal.

B1	(brake segment 1) brake voltage or digital voltage, to be connected to the isolated center studs, or isolated right rail resp., of the track segment B1.
B2	(brake segment 2) brake voltage or digital voltage, to be connected to the isolated center studs, or isolated right rail resp., of the track segment B2.
B3	(brake segment 3) brake voltage or digital voltage, to be connected to the isolated center studs, or isolated right rail resp., of the track segment B3. <i>This connection does not exist on the Oneway Simplex.</i>
S1+	(signal input 1) control voltage input that corresponds with the aspect of the signal located at segment B2. This input is captured via an optocoupler. The applied control voltage can be alternating current (AC), direct current (DC) or digital track voltage. When using DC voltage, connect with correct polarity.
S1-	
S3+	(signal input 3) control voltage input that corresponds with the aspect of the signal located at segment B3. Connection and electrical characteristics same as S1+/-. <i>This connection does not exist on the Oneway Simplex.</i>
S3-	

Any other connector terminals are reserved for possible future use and shall not be connected.

#### 5.4.1 Notes on Signal Inputs and Track Connections

When speaking of track sections, this means for center stud tracks an isolation of the center stud rail.

With two-rail track the isolation must be made to the right rail of the track only. The right rail of the normal track (outside any brake section) is connected to B. The individual brake track sections are connected to their respective terminals B2, B1 or B3. The left rail does not have isolations but is continuous, and is connected to 0.

In operational mode 2 with braking in either direction, please consider:

- The station track has to be separated into three sections. These three sections are designated B3-B1-B2 in this sequence. Important: B1 must be the segment in the middle. This middle segment B1 can be left out if this is appropriate for the expected braking distance.
- To "S1+" and "S1-" a control voltage must be connected. This control voltage must depend on the aspect of the signal located at segment B2.
- To "S3+" and "S3-" a control voltage must be connected. This control voltage must depend on the aspect of the signal located at segment B3.

In operational mode 1 with braking in one direction only, please consider:

- The track has to be separated into two sections. These three sections are designated B1-B2 in this sequence.
- To "S1+" and "S1-" a control voltage must be connected that depends on the signal aspect.

If LED signals are used, these LED equipped signals have one wire as the common positive connection, and individual wires for each LED representing the negative connection. Connect the LED sig-

nal as usual. Connect the brake module's "S1+" with this common positive wire, and connect "S1-" with the negative wire of the particular red LED that lights only when showing a stop aspect (the "Hp00" aspect at German exit signals).


Signals, especially semaphore signals, often have a switch built in their drive mechanism. This switch is primarily meant for switching on or off the voltage to the track as a simple means to stop a train. With the brake module, the difference is now that the switched voltage is not applied to the track, but connected to the brake module "S1+" and "S1-" instead.


Note that there is no such track segment often called transition segment, as required with many other commercial brake modules. The bogobit Bremsmodul does not require this. Furthermore, there is no such segment often called stop segment, as required with many other commercial brake modules. The bogobit Bremsmodul does not support this.

Several wiring diagrams for various application scenarios can be found in [1].

## 5.5 LED Indicators on the Brake Module

On the module there are two LEDs. They indicate, whether at least one of the track segments is occupied, and which direction has been detected.

LED D2 is labelled  and is on, if the destination of the train is segment B2.

LED D3 is labelled  and is on, if the destination of the train is segment B3 – or B1 in operational mode 1, because B3 is not used in this mode.



## 6 Maintenance and Care

The product does not require maintenance. If cleaning is necessary, the product should only be cleaned with a dry cloth or a brush to remove dust etc. Do not use aggressive cleaning agents or chemical solutions.

## 7 Technical data

### 7.1 Operating Voltage and Current

The power supply (connections B and 0) of the device shall be the digital track voltage generated by a digital control unit that is supplied from a transformer of max. 18 V AC or from a power supply with max. 25 V DC.

The track segment connections (B1, B2, B3) maintain the digital track voltage when in driving state, or a current-limited DC voltage when in braking state. The max. allowed current per track segment is 2 A.

The max. sum of all track segment currents is 3 A.

The maximum relay switching capacity is 2 A current and 30 V DC or AC voltage.

### 7.2 Signal Input Control Voltage

The threshold of a control voltage applied to S1+ and S1– (equivalently to S3+ and S3–) is approx. 4,0 V. It depends to some extent on varying properties and tolerances of the corresponding optocoupler and resistor.

The maximum allowed voltage is 24 V AC or DC.

### 7.3 Track Segment Current Sensors

The occupancy of a track segment is sensed by a current detector. The threshold depends to some extent on varying component (e. g. the optocoupler) properties and tolerances.

Typically, occupancy is detected if the resistance between B1 (or B2 or B3) and 0 is less than approx. 10 k $\Omega$ . This corresponds to a minimum required current consumption by the loco of approx. 2 mA.

## 8 Further Notes

### 8.1 CE Marking

The following declaration only applies to products that are manufactured by Bogobit.

The product Bogobit Bremsmodul Oneway complies with the following directives:



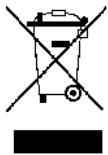
- EC Directive 2004/108/EC on electromagnetic compatibility
- EU Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment

For the evaluation of the compliance with EC Directive 2004/108/EC, the following harmonised standards are applied:

- EN 55014-1:2006
- EN 55014-2:1997 + A1:2001

The manufacturer keeps the EC declaration of conformity and corresponding technical documentation and provides this to a competent national authority upon a reasoned request.

### 8.2 Hazardous Substances, Disposal



The product – if manufactured by Bogobit – complies with the Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment, implemented in Germany through the Elektro- und Elektronikgerätesetz (ElektroG).

The manufacturer complies with the Directive 2002/96/EC on waste electrical and electronic equipment (WEEE), implemented in Germany through the Elektro- und Elektronikgerätesetz (ElektroG).

Electrical and electronic devices must not be disposed of with domestic waste. Please dispose of the device at the end of its service life in accordance with legal regulations, e. g. return the device to public collection points.

### 8.3 Address of Manufacturer

For technical enquiries please contact:

bogobit – Siegfried Grob  
Burgstr. 8  
89192 Rammingen  
Germany

E-Mail: [anfrage@bogobit.de](mailto:anfrage@bogobit.de)

## 9 References

The following documents have further information on putting into service:

- [1] Wiring schemes (German: Anschlussbeispiele) Bogobit Bremsmodul Oneway, see:  
<http://bogobit.de/bremsmodul/oneway>  
chapter "Weiterführende Informationen"
- [2] Website on recommended decoder settings:  
<http://bogobit.de/bremsmodul/decodereinstellung>