Uhlenbrock Elektronik

Power 2

Part No. 63 200

Intelligent booster

Use with an analogue System

General Description

Power 2 is a small powerful add-on booster with intelligence for analogue and digital systems.

It can be installed as

- Booster for digital controller
- Control system for conventional DC locomotives along with a hand control or control station equipped with a LocoNet connector
- Auxiliary booster for a further circuit on an analogue layout
- Turnout control system using DCC-format in a conventional model railway layout
- Power supply for a DAISY digital system.

Technical Specification

max. AC input voltage	18V
Variable output voltage	15V – 20V
max. output current	2A
max. current load on LocoNet	300mA
Transformer (Part No. 20 040):	16V/45VA
LocoNet Output:	in booster signal

Usable Cable

Use only original Uhlenbrock LocoNet cables or so called ‘standard LocoNet’ cable, or short circuits can occur when trains are passing between circuits from different boosters.

LED status indication for Power 2

Power 2 LEDs provide status information for the device. These are:

- **LED always on**

Track power output is switched on.

- **LED on, and turns off quickly every 2 seconds**

Track power output is switched off.

- **LED blinks regularly 4 times every second**

Overload or short circuit at the track power output or the output stage has overheated.

- **LED on, once every second it is turned off momentarily**

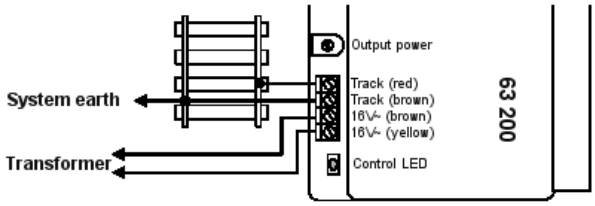
Overload or short circuit at the LocoNet or DAISY socket.

Wiring

Track

Connect the track to the connector block terminals, Track (red) and Track (brown).

Note: If a 2-rail track layout uses a number of boosters to power number of track sections which are isolated from one another, it is important that the system earth (brown) is connected to the same side of the track throughout the layout.



Transformer

Connect the transformer to screw terminals 16V~ (brown) and 16V~ (yellow)

The output voltage can be adjusted with the potentiometer from 15V (right extreme) to 20V (left extreme)

Important: All transformers must be switched on simultaneously (e.g. using a power board) so that automatic ‘recognition’ of the module operates correctly.

Power 2 for conventional control

Power 2 can be used together with hand controllers FRED or DAISY and conrol panels IB-Control or Profi-Control to control conventional DC locomotives.

The locomotives are controlled using pulse width modulation which permits extremely slow running. As in digital control, inertia, shunting and the operation of bell armature motors can be independently set up for each track circuit.

Up to 63 individual track circuits can be controlled, however they have to be controlled by their own individual Power 2. All Power 2 are connected with each other by LocoNet cables.

Every controller connected to this chain of devices can independently control any of the track circuits by simply selecting its identification number. When the locomotive leaves for the adjacent track circuit the actual settings can 'come with' the locomotive.

It is possible to use Power 2 to control turnouts, signals and routes without disturbing the operation of the locomotives.

The following Uhlenbrock devices can be used alone or in combination to control analogue locomotives:

- DAISY handcontroller 66 200
- FRED handcontroller 66 000
- IB-Control 65 200
- Profi-Control 65 500

Wiring

On a conventional layout each Power 2 uses its own transformer and is connected to its own section of track.

Interconnect the Power 2 by connecting the LocoNet socket of the 'new' Power 2 to the vacant DAISY socket in the existing system. Up to 63 devices (track corcuits) can be connected that way.

Hand controller (Fred, DAISY) and control panel (IB-Control, Profo-Control) are connected to the vacant LocoNet socket in the last Power 2.

Note: The total current used by the devices connected to this socket must not exceed 300mA.

At power up of the system an automatic numbering sequence is carried out. The Power 2 with the vacant DAISY socket becomes number 1. Starting with this booster the others are sequencially numbered with the device having the vacant LocoNet socket having the highest number.

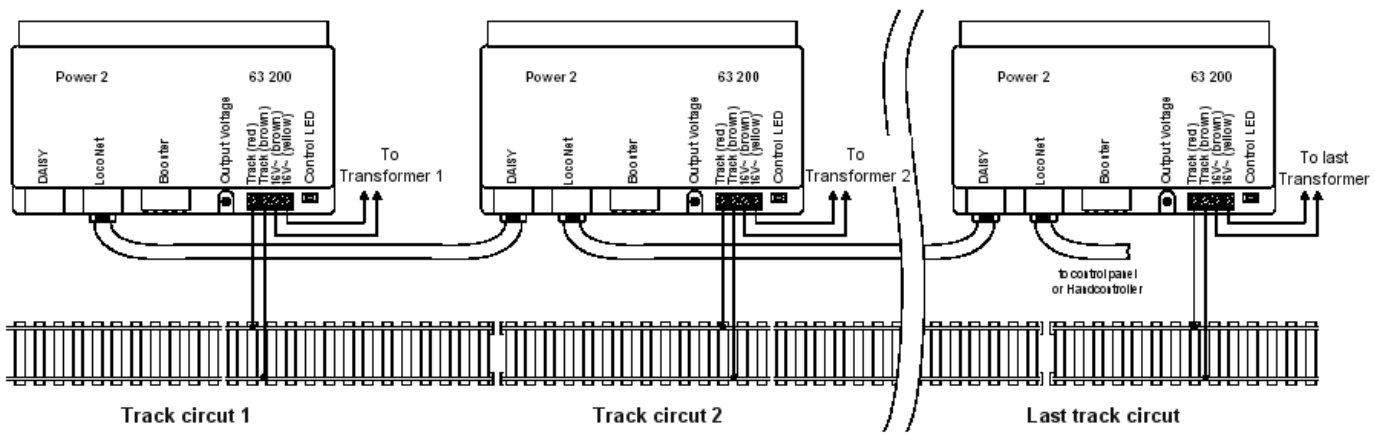
Important: The Power 2 devices can only be daisy chained via direct connections. Distributer sockets must not be used, or the automatic numbering of the devices will not function.

If a new Power 2 (with its new track section) is to be added to a fully wired layout, without altering the numbering the of existing devices, it must be connected to the last of the existing devices. It will therefore be assigned the new highest number.

The individual track circuits can be called up by the LocoNet controllers in the same way as a locomotive address. In this instance address 1 is for track circuit 1, address 2 for track circuit 2 etc.

Controllers without address selection e.g. FRED, can be used to select from 4 track circuits when operating in 'extended mode'. Controllers that operate only in 'dispatch mode' can be used if they are connected via a control panel that can interpret the dispatched locomotive address.

If the control panel has selected a track circuit then it can be controlled like a locomotive with a digital decoder. For controlling the speed and travel direction from the control panel refer to its instruction manual.



Track Circuit selection

Track circuit selection varies according to the control device being used. In the following section each device is briefly described. For more detailed description refer to the manual for that device.

Track Circuit selection with DAISY

A DAISY handcontroller connected to the LocoNet socket of a Power 2 automatically recognises analogue operation and displays the letter “A” as the data format. With factory setting it will control track circuit 1. The [lok] key can be used to select another track circuit.

Track Circuit selection with FRED

Firstly FRED must be configured as for operating with a TwinCenter. Using the function keys you can change FRED’s LocoNet ID. The meaning of the ID selection is:

ID 1 – track circuits 1 to 4 (factory setting) etc. to ID 16 – track circuits 61 to 64

After this is set up one of the 4 track circuits can be selected by pressing the [lok] key followed by one of the function keys [f1] to [f4].

Track Circuit selection with IB-Control

No setting up is required. The track circuits are selected as in selecting a locomotive decoder.

- Press [lok]-key
- Enter the address of the track circuit using the numeric keys
- Press the [↵]-key for it to take effect

Track Circuit selection with Profi-Control

8 track circuits can be controlled with each Profi-Control. Which 8 is determined by the LocoNet ID:

ID 1 – track circuits 1 to 8 (factory setting) etc. to ID 8 – track circuits 57 to 64

After this is set up one of the 8 track circuits can be selected by pressing the [stop] key followed by one of the function keys [f1] to [f8].

Coupling two track circuits

With a DAISY system it is possible to momentarily couple the track circuit where the locomotive is with the next track circuit. All the locomotive’s parameters, such as speed, direction and state of the special functions can then be transferred between the sections. As soon as the locomotive has left the old circuit, the coupling is released.

Method:

- Press [function] or [Light] key on the controller or control panel. The control LED flashes.
- Select the new track circuit on the controller and switch the light function on. Both track circuits are now controlled with the settings of the first track circuit.

Important: The DAISY system can only process one coupling operation. That is, you must complete one coupling operation before you can start the next.

- As soon as the locomotive has reached the new section (circuit) the coupling in which the light was switched off will be released.

Handling a short circuit

If a short circuit occurs on the layout only the Power 2 connected to that circuit will shutdown.

The shut down Power 2 can be turned back on, if:

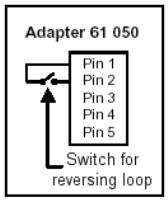
- a DAISY handcontroller has the [stop] key is pressed
- a FRED for the selected track circuit has the [stop] key is pressed
- an IB-Control has the [go] key is pressed
- a Profi-Control for the selected track circuit has the travel direction lever is set to 0 and then to the desired speed.

Operation of a reversing loop on an analogue layout

Power 2 is compatible with reversing loop trimmings that are provided by the track manufacturers.

The reversing loop automation cannot be used as most switch the polarity of the outer part of the track via a reversing switch. In a DAISY system the system earth must always be on the same side of the track to prevent short circuits when the locomotive crosses to another track circuit.

Wiring



In order to automate or partially automate a reversing loop in a layout Power 2 uses one input to switch the present direction over for the controller. To reverse the direction Pin 1 and Pin 2 of the booster input must be connected. Adapter plug 61 050 can be used for this connection.

Important: The last Power 2 in the chain of analogue boosters - to whose LocoNet socket the controllers are connected – must not be fitted with this polarity control.

Special functions in analogue systems

Via the special function of each of the connected controllers you can achieve things in an analogue system that are normally only possible in digital systems.

Note: The function only operates in the track circuit connected to the Power 2 for which the function has been activated.

[f1], [f2] Startup Inertia mode selection

[f1] off, [f2] off = no inertia control
[f1] on, [f2] off = next higher setting
[f1] off, [f2] on = medium setting
[f1] on, [f2] on = maximum operation

[f3] Shunting

[f3] off = shunting active

[f3] on = shunting inactive

[f4] Startup inertia on/off

[f4] off = inertia activated

[f4] on = inertia deactivated e.g. for shunting

[f5] Motor control

[f5] off = PWM frequency of 104 Hz to control conventional DC motors

[f5] on = PWM frequency of 16.7 KHz to control bell armature DC motors

[f7] Operation of reversing loop

[f7] off = closing the switch reverses the direction opening the switch reverses the direction

[f7] on = closing the switch reverses the direction opening the switch does not reverse the direction

Turnout booster in analogue layouts

Power 2 booster can be installed to control turnouts and signals fitted with decoders in DCC format and controls them via LocoNet devices without the need of a central digital controller.

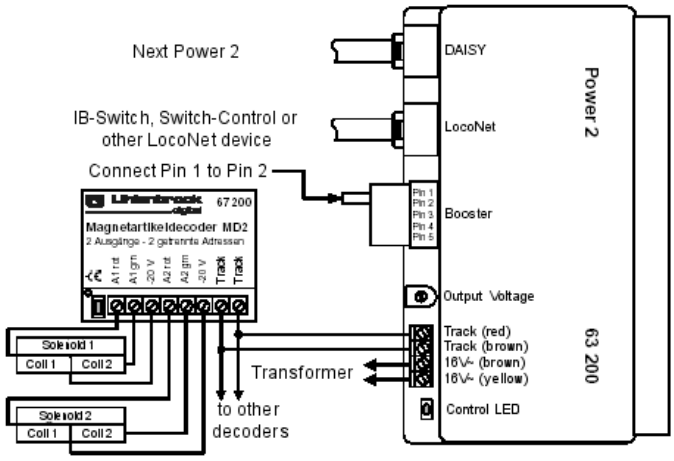
In this way a Power 2 can be used as a turnout booster or in a DAISY system, together with an IB-Switch or Switch-Control as a digital turnout control system, in a conventional layout. With the IB-Switch or Switch-Control turnouts, signals and routes can be switched.

In order for turnouts to function correctly after a power down of the LocoNet control panels, in this type of installaton, it must have at least one DAISY handcontroller connected. This handcontroller must be configured so that it saves the turnout settings when the layout is turned off (see chapter “Special Options” in the DAISY manual).

If the Power 2 without a DAISY handcontroller is connected with an IB-Switch or Switch-Control the state of turnouts will not be displayed after a powerdown. The LEDs will only indicate after the turnout has been switched once.

Turnout booster wiring

To operate a Power 2 as a turnout booster Pin 1 and Pin 2 must be connected. Adapter 61 050 can be used for this purpose.



Connect Power 2 to a separate transformer (e.g. 20 040). The track connectors are used connect the decoders.

If the Power 2 turnout booster is to be used in a DAISY system on an analague layout, it is connected into the systems daisy chain as shown in the previous section. The last booster in the chain must have the controllers connected to it. To this booster you can connect the IB-Switch, or Switch-Control as a turnout controller.

Turnout addresses in the range 1 to 1024 are supported.

The preset turnout switching time of 1.3 seconds can be saved for the selected track circuit by pressing [f7] on the controller.

0 20 45 85 83 - 27	If you have any questions call us. Hotline times are: Mon - Tue - Thu - Fri., 14:00-16:00 and Wednesdays 16:00-18:00

This product has two year warrantee.
If it is defective send decoder along with the receipt of purchase to the following address:

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Transformer (Part No. 20 040):	16V/45VA
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Usable Cable

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Overload or short circuit at the LocoNet or DAISY socket.

Wiring

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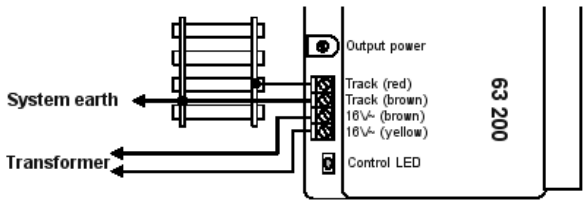

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Connect the transformer to screw terminals 16V~ (brown) and 16V~ (yellow)

The output voltage can be adjusted with the potentiometer from 15V (right extreme) to 20V (left extreme)

Important: All transformers must be switched on simultaneously (e.g. using a power board) so that automatic ‘recognition’ of the module operates correctly.

Power 2 as booster for digital layouts

Power 2 can be used as a current booster in a digital layout.

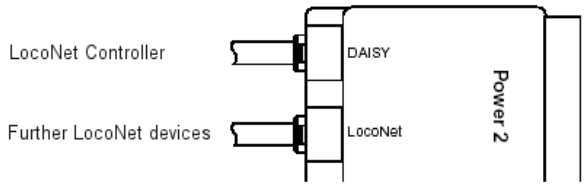
The data format depends on the central controller being used. i.e. with DAISY and the Intellibox, Motorola and DCC format are used, with the TwinCenter the DCC format is used, with Märklin centers the Motorola format is used.

Every booster powers its own track section with up to 2A digital current, which must be isolated from the remainder of the layout.

Connection of various devices

LocoNet controller

The DAISY system's LocoNet output i.e. the LocoNet-B output from the Intellibox or TwinCenter is connected to the DAISY socket on the Power 2.



Important: Boosters must not be daisy chained.

If a number of Power 2 boosters are required they should be connected to the LocoNet output of the controller via a LocoNet distributor (Uhlenbrock 62 250) and each booster is connected to the distributor via its own LocoNet cable.

LocoNet devices

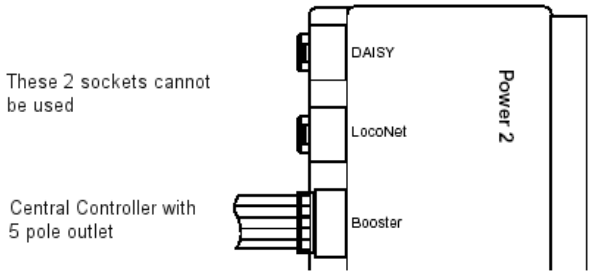
If the Power 2 is connected to the central controller (e.g. DAISY or Intellibox) via its DAISY socket then other LocoNet devices, such as FRED, DAISY handcontroller, IB-Control, Profi-Control or LocoNet feedback unit, can be connected to its LocoNet socket.

The total current usage of all devices must not exceed 300mA.

If higher a current is needed on the LocoNet you insert a LocoNet power feeder (63 100).

Digital Center with 5 pole booster output

Connect the 5 pole booster output from the Märklin Digital Center in Motorola format (e.g. 6020, 6021), from Intellibox or TwinCenter to the booster socket on Power 2.



Note: LocoNet data can not be transferred via this connection. For this type of connection the DAISY and LocoNet sockets are provided.

Power 2 as DAISY system expansion

Together, the DAISY handcontroller and Power 2 form the DAISY system. A DAISY system can control locomotives and turnouts in Motorola or DCC format. The connection method and description of the DAISY system can be found in the DAISY manual 66 200.

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