

MODELLBAHN DIGITAL PETER STÄRZ

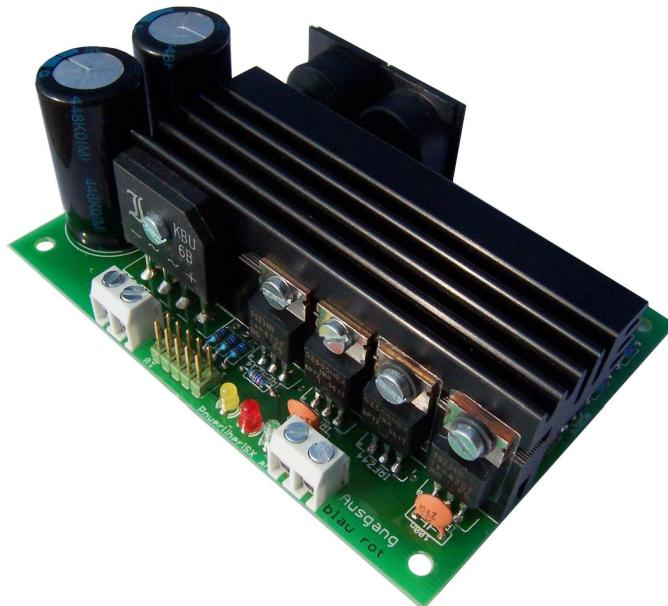
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Power-Pack for the Selectrix®-System

3A continuous output current and
electronic short circuit protection

PPS3A
v1-2006



Degree of difficulty: easy
average
difficult

The Booster module Power-Pack PPS3A is a power amplifier for Selectrix controlled model railways to increase the maximum track current capacity of the system. The digital format amplified by the Power-Pack corresponds to what is provided via the PX-bus.

Necessary skills:

- Extensive assembling and soldering of the PCB
- Exact mounting of power transistors

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Technical specifications

Size

104mm x 77mm x 40mm

Power feed connection

The Power-Pack required a suitable external power supply.

Alternating current: about 15V, 70W, resp.

Direct current: about 20V, 70W

Output current

Continuous current 3A, sustained short circuit proof:

Electronic short circuit protection with a red indicator LED and an automatic reset function once the short circuit is. Load warning indicator activating at 80% of the maximum load level.

Connections

2x 2-pin screw clamp for power feed (AC-IN) and power output

2x mounted DIN sockets for PX-Bus

1x 10-pin double row pin header for 3 status LED's, ammeter and 5V output

Indicators:

Yellow LED: Power-Pack's power feed

Green LED: SX-bus signal on (Central Unit)

Red LED: Overload/short circuit

Selectrix PX-bus connection

The Power-Pack is connected to Central Unit's PX-bus using the cable shipped with the kit.

The Power-Pack must never be connected to Selectrix SX-bus!

Assembly notes

The Power-Pack module kit PPS3A is assembled following the instructions on the next page. For soldering the components on the printed circuit board, a soldering iron of 12 to 25 Watts or a soldering station with the temperature set to approx. 350°C is necessary together with 0.5 or 1.0 mm soldering wire with rosin flux. No special tools are required. Do not use soldering flux! Pay attention to solder in a speedy way not to overheat and destroy devices.

Kit contents

Please first verify that the kit contains all the devices according to the kit contents listed on the right side.

Non use of the kit

When the Power-Pack is not used it shall be stored at a dry and clean location.

Installation site

The module should be located in a dry, ventilated and clean area being easily accessible and lying beside or next to the model railway layout.

The module must be kept free of coarse dirt or electro conductive parts falling down.

Due to the heat development this module may not be placed in a confined site in the model railway layout (e.g. between Styrofoam), but instead must be placed at a location where a constant heat exchange with the surrounding is possible.

If the module is equipped with housing, then pay attention to not cover the heat sink.

The module may be arranged without a housing needed. In that case the module shall be put on an insulating sub floor by means of the plastic spacer rings and screws delivered.

Keep all electro conductive tools, assembly kits and cables away from the module during operation.

A negligently and by external circumstances caused short-circuit (impinging on the module from above or from the bottom) may destroy the module. If that happens, all terms of warranty will become invalid.

Accessory and expendabilities

The following equipment is available:

Accessory:

- Convenient transformer 14V, 70W Art. 250

Expendabilities:

- Track current display Art. 253

For any questions please consult the FAQ-Section of our website, first: www.firma-staerz.de.

Kit contents

Please first verify that the kit contains all the listed items below.

General parts:

1x printed circuit board 104x77mm

1x IC LM339

1x rectifier KBU6B

3x LED's (red, yellow, green)

2x 2-pin screw clamps

2x mounted DIN sockets for PX-bus

1x double row pin header

1x heat sink

2x mica insulator

2x insulating sleeve

7x machine screws

4x wood screws

4x spacer rings

1x PX-bus cable

Transistors:

2x IRFZ44

2x IRF9Z34 (or SFP9Z34)

5x BC557B

7x BC547B

Capacitors (marked):

3x ceramic 100nF (104Z)

1x ceramic 470nF (474M Z5U50)

4x ceramic 150pF (151K)

1x ceramic 1nF (102Z)

2x electrolytic 10µF

2x electrolytic 4700µF (4700µF35V)

Diodes (marked):

1x BZX55/C5V1 (C5V1)

4x ZPD15V (C15)

5x ZPD4V3 (C4V3)

8x 1N4148 (4148)

Resistors (marked):

1x SMD 0,01Ohm (R010)

1x power resistor 0,18Ohm

3x 100kOhm (brown, black, black, orange, brown)

7x 10kOhm (brown, black, black, red, brown)

1x 1MOhm (brown, black, black, yellow, brown)

9x 22kOhm (red, red, black, red, brown)

5x 2,2kOhm (red, red, black, brown, brown)

9x 2,7kOhm (red, lilac, black, brown, brown)

1x 330kOhm (orange, orange, black, orange, brown)

1x 470Ohm (yellow, lilac, black, black, brown)

Assembly instructions

Assemble the kit in the order of these instructions. All the components are placed on the top side of the printed circuit board (marked „Top“) as close to the PCB as possible and soldered on the bottom side of the board (marked „Bottom“). Use a bending tool (for example Conrad 425869) to bend devices. Cut the leads of components flush using a wire cutter after soldering.

Be careful when soldering components!

1. SMD resistor (R35)

Resistor R35 is soldered on the top side of the PCB. Attach the resistor on its place using a small piece of scotch to hold and solder the ends of the resistor. Make sure that the solder forms a bridge to the bottom side of the PCB and fix the soldering if this is not the case.

2. Resistors

Bend the resistor leads for 7.5 mm pitch. To facilitate placing components on the PCB, support the edges of the board with the help of two books, for instance, in order to leave enough space for the leads under the board. Insert the resistors on board aligning the coloured rings of all the resistors in the same way to make it easier to verify the size of resistors later. Place a suitable piece of wood or similar on top of the resistors on board. Turn the board together with the wood upside down. The underside of the board is now conveniently accessible for soldering the components.

Solder one end of each resistor and check that they are positioned properly before soldering the other end of each resistor.

Solder resistors by groups of similar value before proceeding to the next group.

Description of operation

Power supply and wiring

The Power-Pack should have its' own dedicated power supply, a transformer with about 15V, 70W output. Use wire thick enough for Power-Pack current (minimum 1mm² wire) to avoid voltage drop. To feed the track of the Power-Pack, we recommend observing the wire colour coding marked on the Power-Pack (rot = red, blau = blue). If there is a momentary short circuit when a locomotive moves between circuits powered by different Power-Packs or central unit, the polarity of the two circuits is opposite. In such a case the polarity of one of the circuits should be corrected.

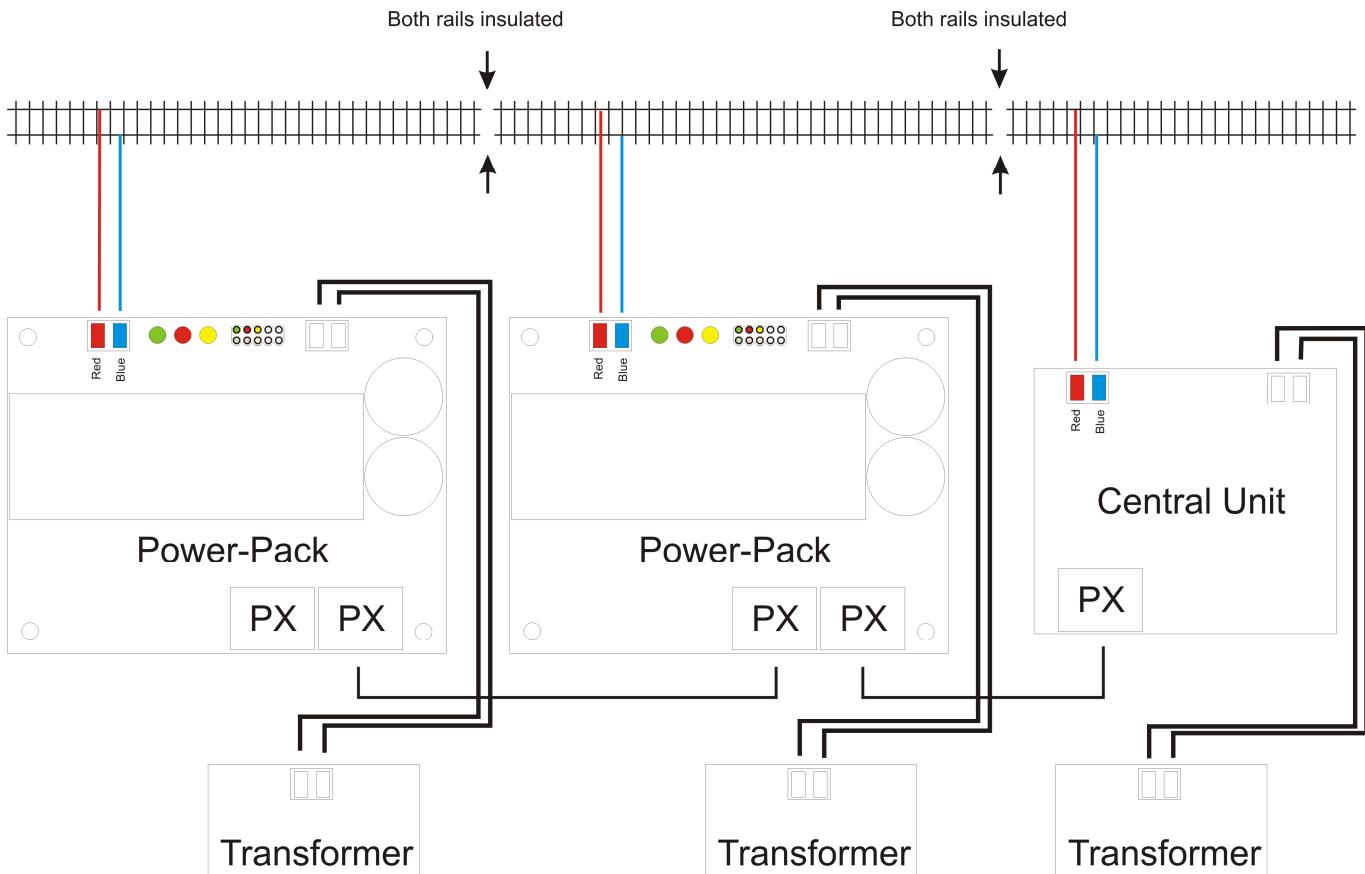
Heat

With constant maximum output current of Power-Pack (3A) the heat sink will reach the temperature of about 70°C. Therefore the Power-Pack should not be placed inside the layout (e.g. next to polystyrene scenery). Place the Power-Pack in a spot where the air can circulate freely around it.

Indicator LED's

Power-Pack is equipped with three status indicator LED's. Yellow LED is the power indicator. When the Power-Pack is powered from its' power transformer, yellow LED is on. Green LED is on when the Power-Pack is feeding current to the track. The system is in On or Start state. Red LED is an indicator of short circuit or overload situations. When the Power-Pack output current is close to the maximum output, the red LED starts to blink. At 80% level of the maximum output (about 2.6 A), the light stays on. When the Power-Pack reaches its' maximum output current it switches itself off. The green light is off in this situation and the Power-Pack will attempt to turn the track power on in regular intervals. This is indicated by blinking green and red lights. If the short circuit situation has been solved, the Power-Pack will restore its' normal operation.

Connection scheme



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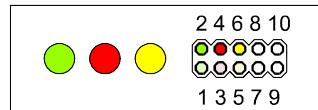
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Illustrations and technical data are subject to change. We are not responsible for printing or typographical errors.

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Pin header

The double row pin header allows connecting external status indicator LED's and an ammeter to Power-Pack. The pin arrangement is shown in the picture below. The three LED's are connected to pin pairs 1-2, 3-4 and 5-6. The cathodes (shorter legs) of LED's must be connected to even numbered pins (2, 4, 6). Pins 7 and 8 are for connecting an ammeter to indicate the output current of the Power-Pack. An ordinary standard multi meter or panel meter can be used (e.g. Conrad cat. no. 121142). The voltage in pins 7 and 8 is proportional to the Power-Pack output current. The range of the voltage measuring instrument should be 100mV (200mV). 1A direct current of Power-Pack output corresponds to 10mV. For powering the instrument there is a 5V direct current output in pins 9 and 10 (pin 9 = 5V, pin 10 = ground) available.



Connection to PX data bus

Use the included cable to connect the Power-Pack's PX socket to the PX socket of the central unit.
Do not connect the Power-Pack to Selectrix data bus (SX)!

Maintenance and care

Dust clumping together can, in combination with condensating liquids, become conductive and deteriorate the functionality of the module. It is therefore important to remove dust regularly by blowing it off or vacuuming the module.

CAUTION: A liquid cleaning of the part is prohibited!