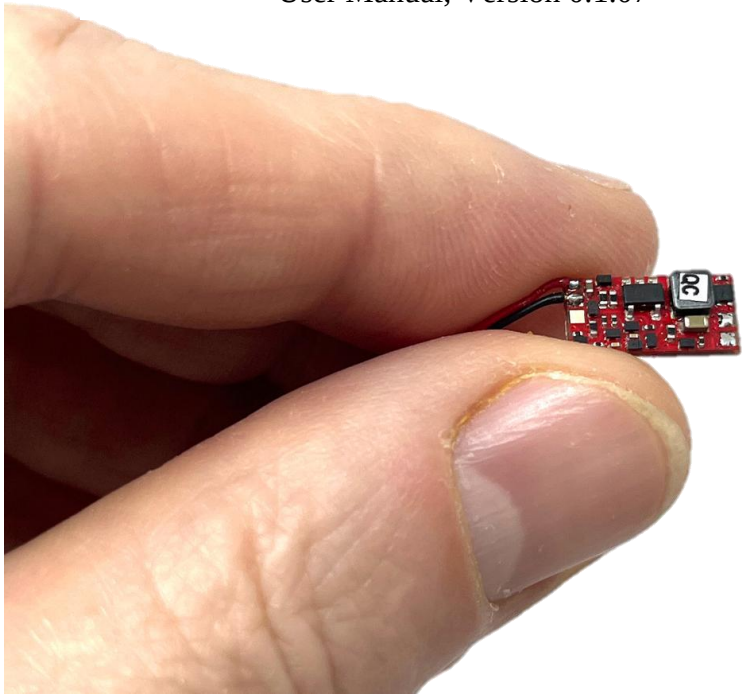
Smart Power Pack

SPP-Nano

User Manual, Version 0.1.07



by TEHNO LOGISTIC

This document is subject to technical modification

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Contents

1. Important information

Please read the manual carefully before carrying out the installation!!! Although our products are very robust, incorrect wiring may destroy the module!

- The SPP devices are exclusively designed for model trains. Any other use is not supported.
- Completely remove power when connecting or disconnecting the SPP devices.
- Avoid mechanical stress or compressed air blows to the SPP devices printed circuit board.
- Do not remove the heat shrink tube form the SPP devices (if present).
- Avoid electrical contact of the SPP devices printed circuit board and wires (including unused ones) to the locomotive chassis. Strip the ends of unused cables.
- Do not solder any extension cables to the SPP devices printed circuit board unless this is necessary
- Do not wrap the SPP devices in any material (like insulating tape). This will cause board overheating.
- Connect the wires as described in the user manual. Misusage / misconnection can cause malfunction or can even damage the SPP devices.
- A soldering tool may be necessary for the installation and/or connection of the SPP devices, which requires special care.
- During the operation of the SPP devices the specified technical parameters shall always be met.
- The SPP devices must not be exposed to moisture and direct sunshine.

2. Technical Specifications

• Supply voltage:	12-24 V
• Current consumption when fully charged:	<5 mA
• maximum current at charging:	25 mA
• maximum buffering time (depending on current consumption):	up to 4 seconds
• Dimensions (without wires, without capacitors):	12.5 x 6.0 x 2.5 mm
• Weight (with wires and capacitors):	2 g
• protection class:	IP00
• Operating temperature:	0 ÷ +60 ºC
• Storage temperature:	-20 ÷ +60 ºC
• Humidity:	max 85 %

3. General description of the Smart Power Pack Nano

The Smart Power Pack Nano can be attached optionally to all Lokommander and FD Micro decoders and supplies your locomotive/coaches with storage energy when running over dirty tracks and long points. The sound, the lights and engine functions are buffered so the locomotive/coach can continue running up to 4 seconds after it loses power. (Actual time will vary depending on certain conditions).

The Smart Power Pack Nano contains an integrated automatic charging circuit. It can remain connected to the decoder even during programming. The charging current is limited, in order to prevent an excessive load on the boosters if several models are in use.

4. Installation of the Smart Power Pack Nano

The Smart Power Pack Nano is delivered with a pair of RED/BLACK wires for the decoder connection, and a readily wired/connected two-capacitor pack.

All Lokommander and FD Micro decoders accepts the connection of a Smart Power Pack Nano. The decoders have soldering pads for soldering the Smart Power Pack Nano two wires.

The manuals of the Lokommander and FD Micro decoders indicates the typical soldering locations. Refer to the figure on the next page for the most common wiring diagram.

The RED wire of the decoder connection is the positive, the BLACK wire is the negative terminal of the SPP Nano. The capacitor pack contains two 0.3 Farad / 2.7V supercapacitors connected in series. The polarity of the capacitors is critical. Please use the polarity marking in the illustration above if you are disassembling, relocating and reassembling the two series connected capacitors. The BROWN wire of the capacitor pack is the positive, the BLACK wire of the capacitor pack is the negative terminal. Connecting the capacitor pack with the wrong polarity will damage the capacitors.

Optionally the two series connected capacitors can be replaced by two series connected 1 Farad / 2.7V capacitors, which will result in an increased storage time of the SPP Nano.

The bottom side of the printed circuit board of the SPP Nano is flat and doesn't contain electronic components. However, direct contact of the bottom surface with any metal parts is not recommended. Please use a double adhesive tape to attach the SPP Nano which will also offer electrical insulation.

Follow the next steps for the connection of the wires to the Lokommander / FD Micro decoders:

- Solder the RED wire of the SPP Nano to the Vcc/U+ soldering surface of the decoder.
- Solder the BLACK wire of the SPP Nano to the GND soldering surface of the decoder.
- No Charge connection is needed for the SPP Nano.

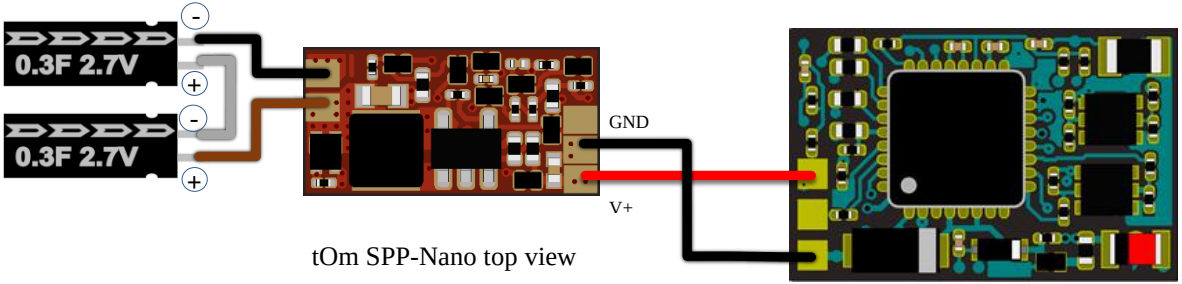

Fig. 1 Connecting the SPP Nano to a Lokommander II Micro N18 decoder

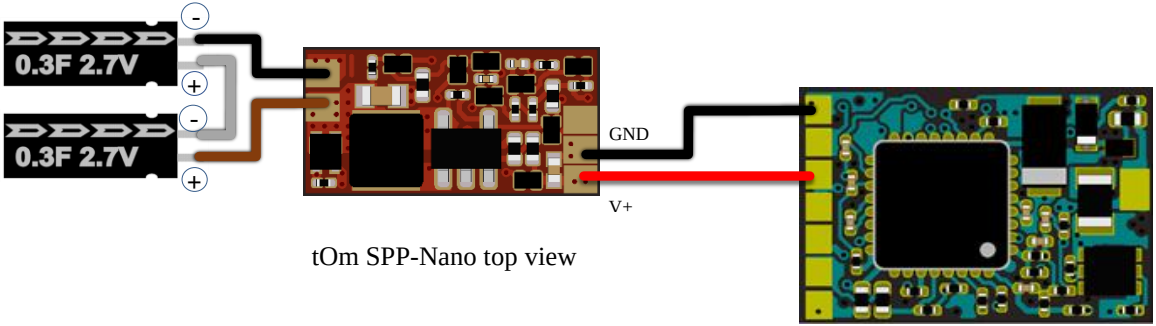

Fig. 2 Connecting the SPP Nano to a Lokommander II Micro 6P, 6P90, 6P90R, W6P and W decoder

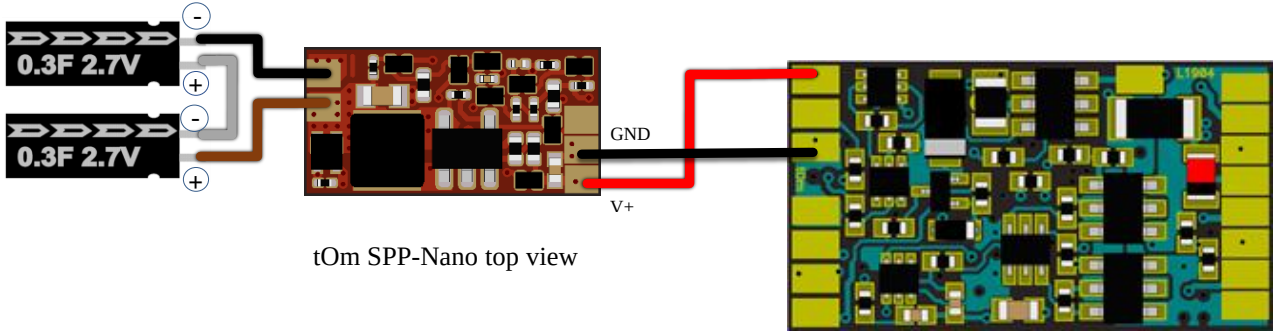

Fig. 3 Connecting the SPP Nano to a Lokommander II Mini P12, P16, W6P and W8P decoder

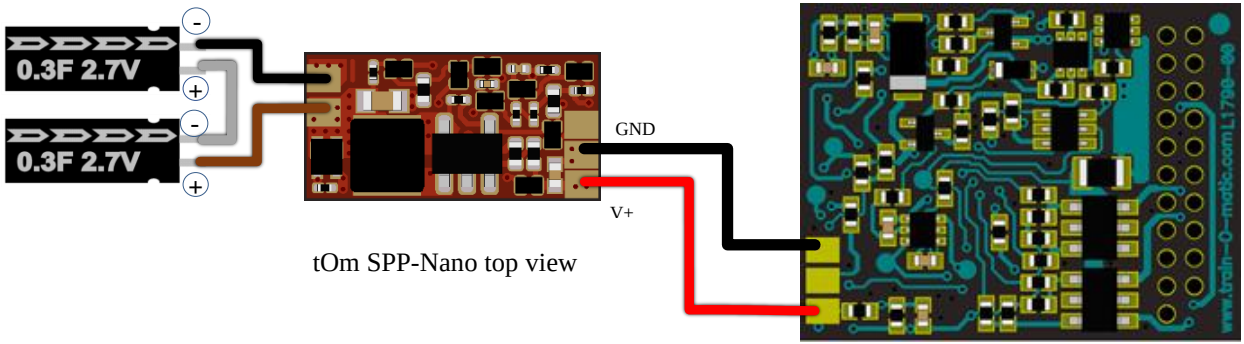

Fig. 4 Connecting the SPP Nano to a Lokommander II Mini M21, M21S and M21SP decoder

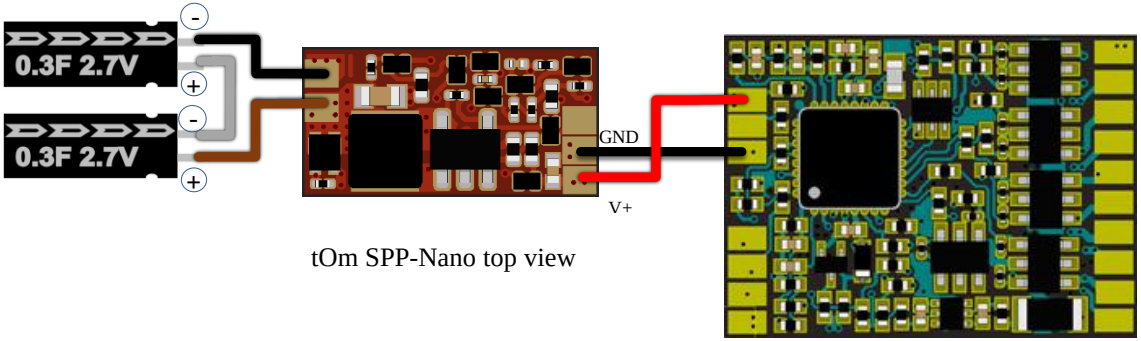

Fig. 5 Connecting the SPP Nano to a Lokommander II Mini P22, W22 and W22M decoder

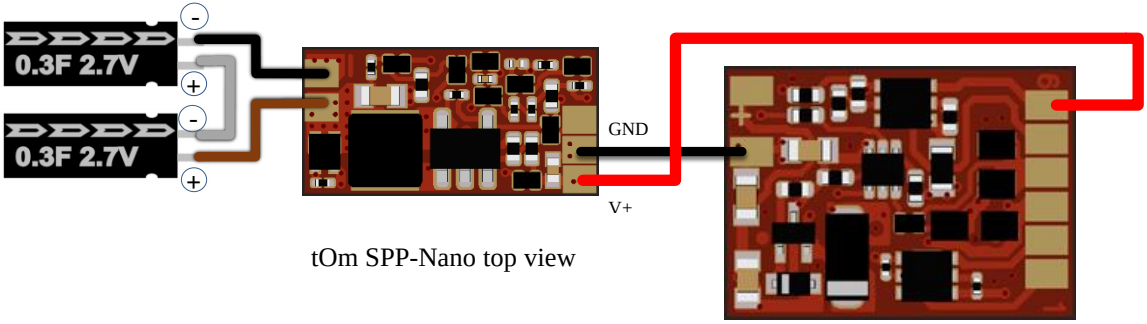

Fig. 6 Connecting the SPP Nano to a FD Micro II decoder

Absolutely make sure when soldering, that you do not make short circuits between the soldering surfaces or to other components on the decoder circuit board! A short circuit might damage the decoder!

The Smart Power Pack will generate moderate heat during operation, which is normal. Leaving some space around the SPP Nano is recommended.

5. Analog operation (DC)

When operated on analogue layouts, the Smart Power Pack Nano operation will depend on the used decoder. Please consult the decoder manual for details.

6. Storage and charging time of the Smart Power Pack Nano

The power consumption of the motor of the locomotive or the interior light of the coaches influences the storage time of the SPP Nano. The higher the power consumption of the motor/lights, the faster the storage module will be discharged.

The charging current is typically 25 mA and the charging time (full) of a SPP Nano (with the standard double 0.3 Farad/2.7V capacitor pack) is ~ 30 seconds at a nominal track voltage of 16V.

7. CV settings

The SPP Nano basically doesn't need any special CV configuration, but certain decoders require the disabling of DC operation, to be able to run with a Smart Power Pack. This must to be done in CV29, setting bit 2 to zero value (please see the Lokommander II manual for example).

The Lokommander II series locomotive decoders allow the locomotives to run up to 4 seconds in the absence of DCC signal from rails (fully loaded, depending on locomotive consumption). This is not a characteristic of the SPP, it is a safety measure implemented in the decoder.

This duration is set in CV123, in steps of 16ms (default value 16, timeout = CV123 value * 16ms = 0.25 seconds). After this time expires in the absence of the DCC signal, even if the Smart Power Pack is not fully discharged, the locomotive will perform an emergency stop (as a safety measure). The movement will be resumed only after the DCC signal reappears.

8. Technical support

If you have any questions or suggestions about the train-O-matic products, you can write to us at support@train-o-matic.com

Any positive feedback or constructive criticism is very much encouraged. We are continually working on the improvement of our products by adding new functionality and correcting any unforeseen bugs that that may still exist.

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