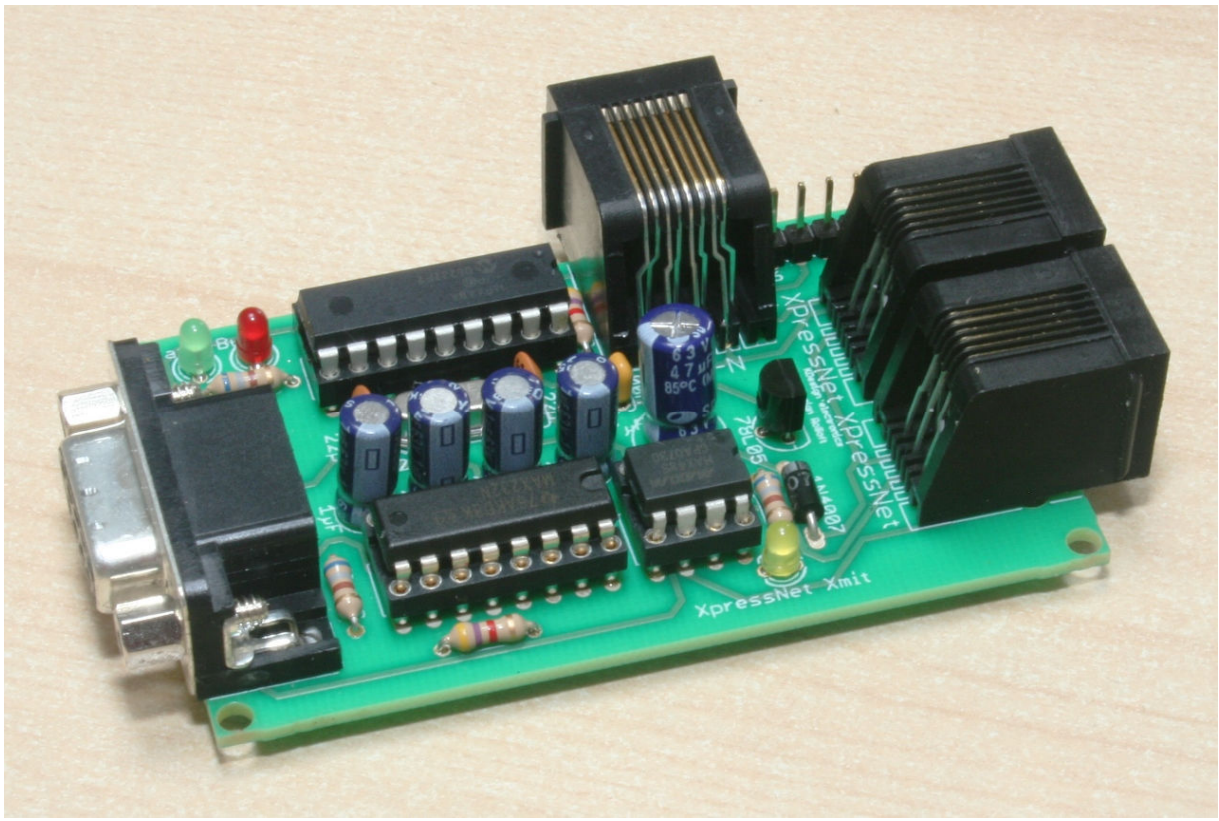
S88XPressNetLI v1.0

Installation, user and reference manual



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1 Introduction

As of with the arrival of the attractively priced ROCO® starter sets, including the multiMAUS® digital system, digitally controlled model railroading became affordable to the big public.

The ROCO® multiMAUS® system is an almost complete digital control system. It is based on the XpressNet® protocol invented and used by Lenz®.

To also control this system by one of the many, often freeware, model railroad control programs, the only affordable missing component was a feedback component.

Although in the form of Rocomotion® such facilities can be obtained from ROCO®, the price tag as an entry level solution, in harmony with the starter set's pricing, seems rather high.
Apart from interface and software, additional feedback hardware has to be purchased.

With the introduction of the S88SD16 feedback module created by Wim Ros, it became feasible to develop digital control system interfaces for systems that thus far had no possibility for using these inexpensive, s88® based, feedback modules.
Amongst others, the here presented S88XPressNetLI interface is one of them.

It adds to the multiMAUS® system interface to PC capabilities, as well as to feedback module connections. In contrast to the Rocomotion® system, the S88XPressNetLI uses the standard Lenz® XpressNet® protocol. This enables the use of many popular model railroad control programs.

All in all, the combination of the ROCO® starter sets and the S88XPressNetLI plus s88 modules, e.g. S88SD16, now can be used and acquired as a true entry level, low cost, computer controlled model railroad system!

Happy training and many pleasant hours with the S88XpressNetLI.

Yours sincerely,

Karst Drenth

Disclaimer:
We reserve the right to make changes in line with technical progress, product maintenance or changes in production methods. We accept no responsibility for errors which may occur for similar reasons. We accept no responsibility for direct or indirect damage resulting from improper use, non-observance of instructions, electrical equipment which is not authorized for use with model railways, or which has been altered or adapted or which is faulty. Nor can we accept responsibility when damage results from unsupervised adjustments to equipment or from acts of violence or from overheating or from the effects of moisture etc. Furthermore, in all such cases guarantees become invalid.

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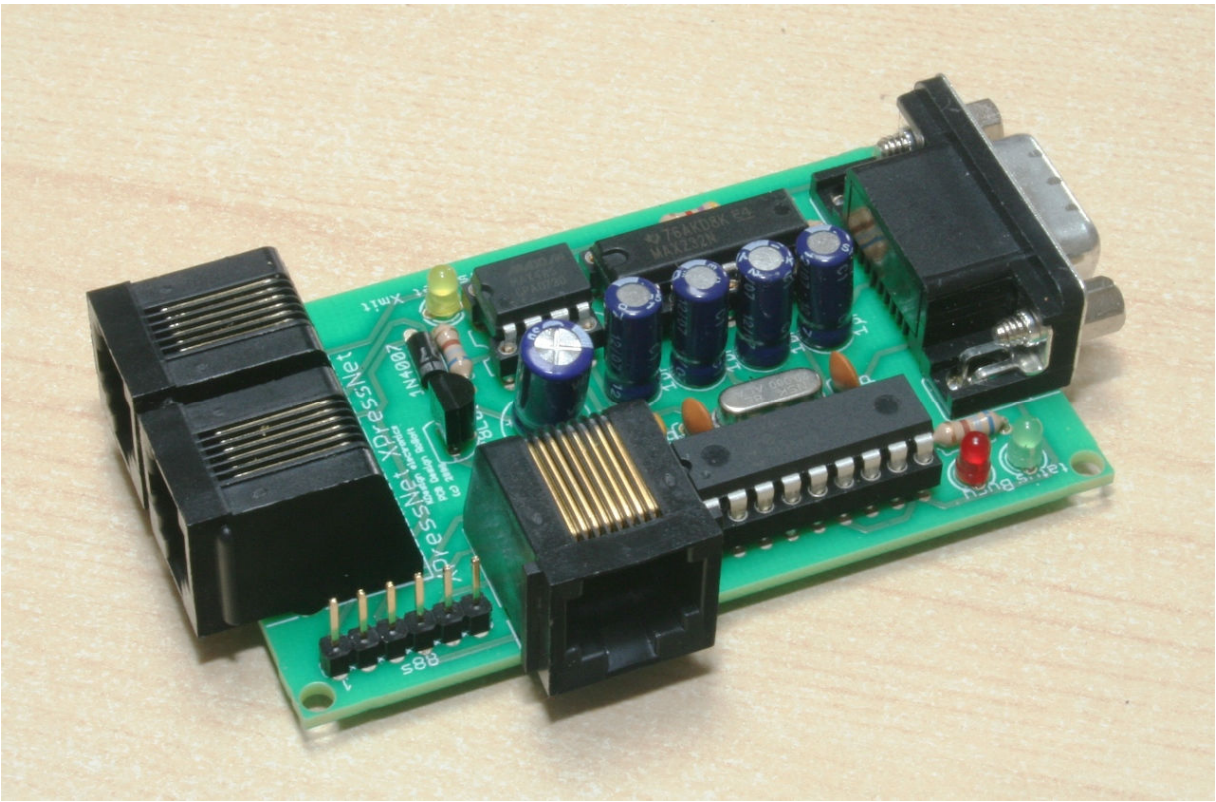
2 Specifications

S88XPressNetLI's specifications are rather modest

- Works with XpressNet® implementations of 2.3 and higher.
  (tested with Lenz® Set 01 v2.3, multiMAUS® and Lokmaus 2®)
- Two, daisy chained 6p6 Western XpressNet® connectors.
- Software and hardware compatible with Lenz® LI100, understands and responds to Lenz® LI100F®/LI101® configuration commands.
- 9600 baud fixed rate RS232 PC interface.
- 9 pins sub D female in 'modem' configuration for direct connect to PC COM ports.
- Supports from 1 eight bits s88 module up to 16 sixteen bits s88 modules, totaling a maximum of 256 feedback contacts.
- Standard s88 6-pin header.
- RJ45 s88-N Connector.
- Fully configurable by software, no dipswitches nor jumpers.
- Led indicators for: operating status (green), RS232 CTS (Busy) and XpressNet® transmissions (yellow).
- Software controllable test mode.
- Software controllable programming mode.



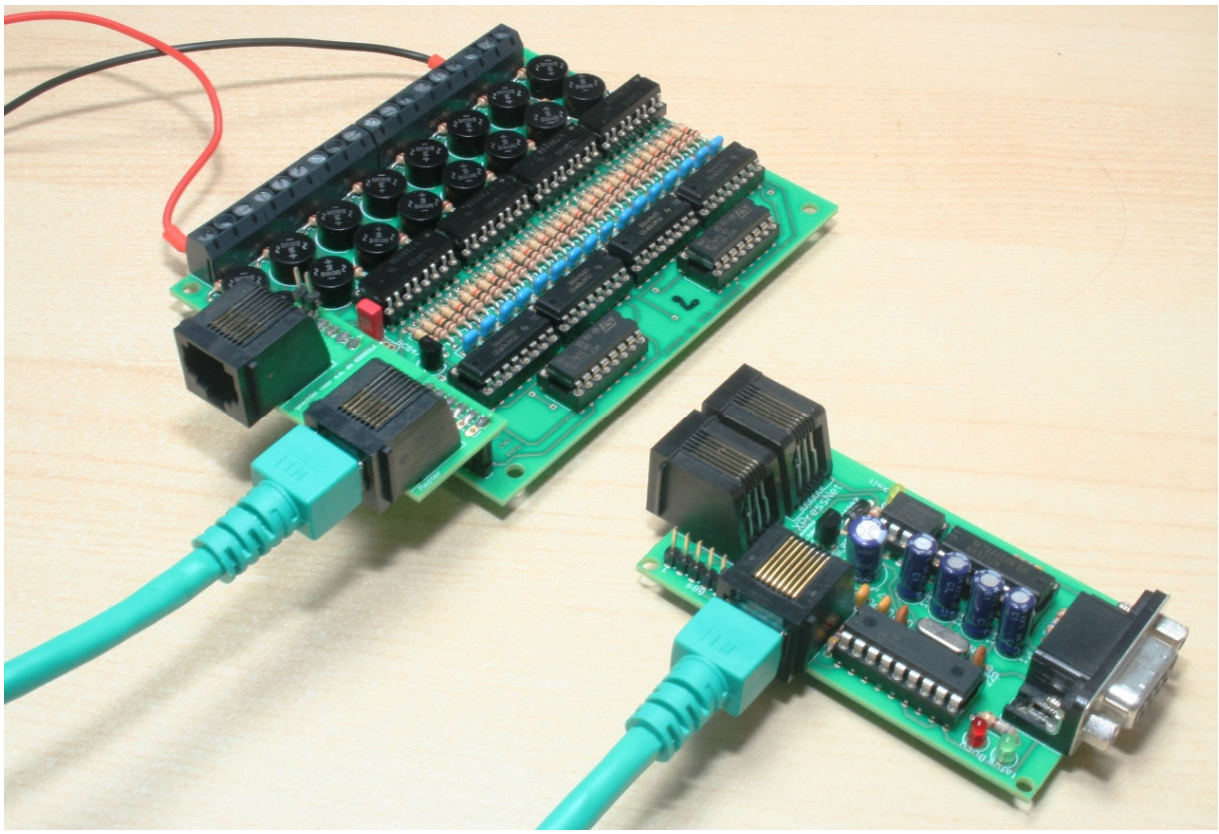
The S88XPressNetLI with all its connectors, from left to right: Dual 6-pole XpressNet connectors, one to connect to the XpressNet, the other to daisy-chain other XpressNet devices like a second multiMAUS®; 6 pin s88 header; RJ 45 S88-N connector; RS 232 9 pin female RS 232 connector

3 Installation

Installation is very straightforward due to the presence of industry standard connectors.

3.1 Connecting the S88XPressNetLI to s88-N modules

The S88XPressNetLI can handle up to 16 sixteen bit s88 modules.
For more easy and reliable connection, S88XPressNetLI includes a RJ45 s88-N connector.
Connection then is straight forward. Just plug the RJ 45 Patch cable into both S88XPressNetLI and the first s88-N module.



Picture with S88XPressNetLI connected to S88SD16 with S88-N adaptor board.

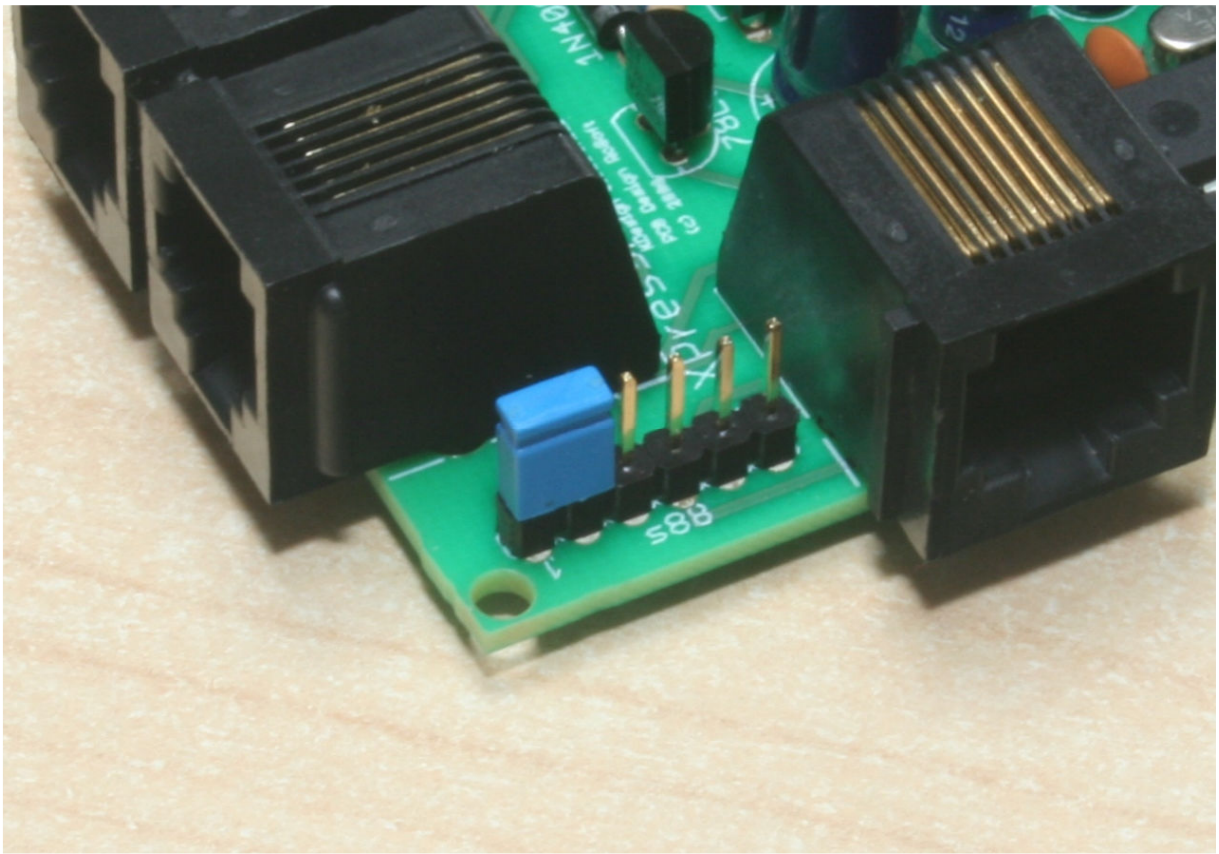
For older modules, S88XPressNetLI also comes with the standard 6 pin s88 header. Pin number 1 (indicated on the printed circuit board) is connected to the ‘Data’ signal, pin number 6 to ‘+5v’.

3.2 Using the S88XPressNetLI without s88 modules

The S88XPressNetLI can also be used as an Interface Only solution. In this configuration the S88XPressNetLI mimics the behavior of a Lenz® LI100®.

Since the minimum number of modules the S88XPressNetLI van handle is 1 (one) the number of scanned, 8-bit s88, modules should be set to 1. As well as the module base address to 127.

This will not prevent the S88XPressNetLI to send its initial feedback status on power-up however! To prevent spurious feedback reports, a jumper is placed between pin 1 and pin 2 of the s88 header on the S88XPressNetLI.



Jumper set on pin 1 and 2 of the s88 header.

CAUTION!! When the shown jumper is present, NEVER connect a patch cable to the S88-N!!

3.3 Connecting the S88XPressNetLI to the ROCO® amplifier

Since the S88XPressNetLI was designed with the ROCO multiMAUS® system in mind, it's obvious that a simple connection to this system exists.

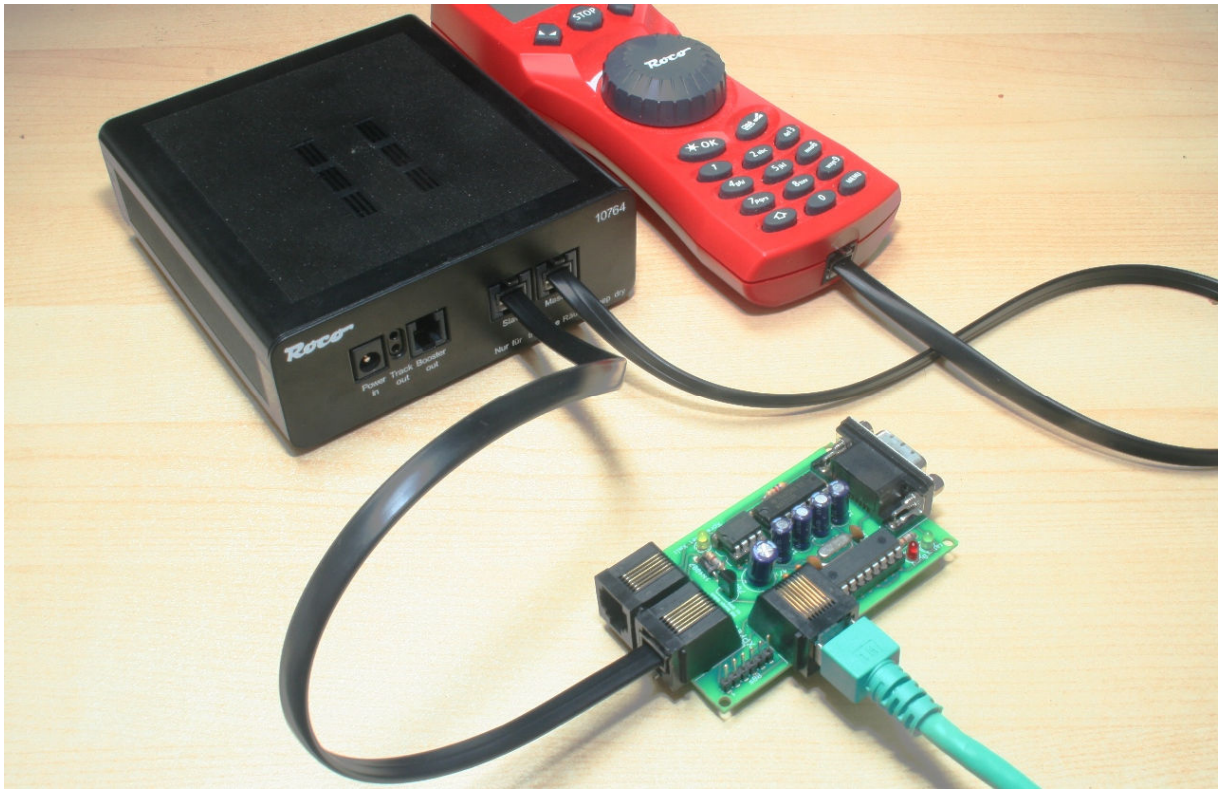
Connect an XpressNet cable between either of the S88XPressNet 6-pole XpressNet connectors and the **SLAVE** connector of the ROCO® amplifier.

Picture showing the connection of the S88XPressNetLI to the ROCO® amplifier's SLAVE port, note that also the s88-N port has been connected.

3.4 Using the S88XPressNetLI in a Single multiMAUS® setup

As mentioned in the introduction, the S88XPressNetLI was designed for the ROCO® multiMAUS starter sets.

To complete the installation for a Single multiMAUS® setup, just plug the multiMAUS®'s cable into the MASTER connector of the ROCO® amplifier.

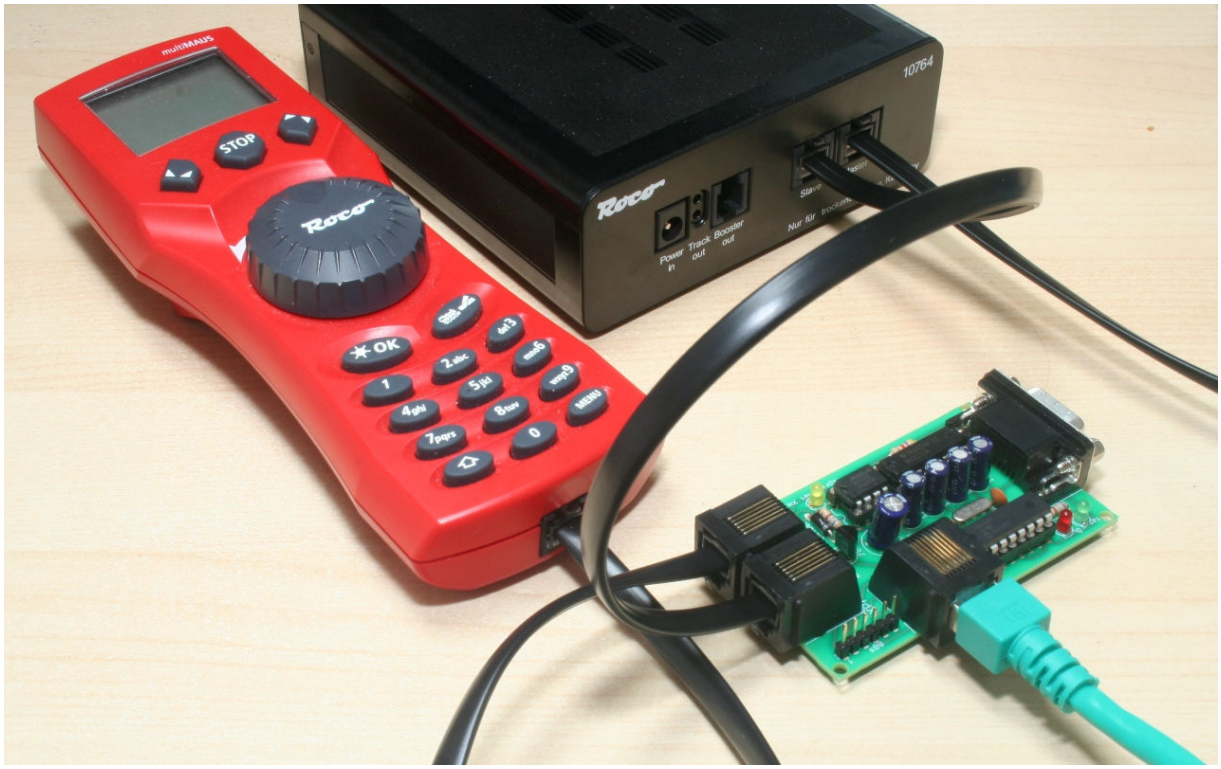


Picture showing the Single multiMAUS® setup.

3.5 Using the S88XPressNetLI in a Dual multiMAUS® setup

Due to the presence of the S88XPressNetLI's XpressNet daisy chain connector, the configuration can be easily extended to use a second multiMAUS®.

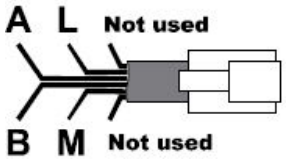
Just plug the multiMAUS®'s cable into the free XpressNet connector on the S88XPressNetLI.



Picture showing the Dual multiMAUS® setup.

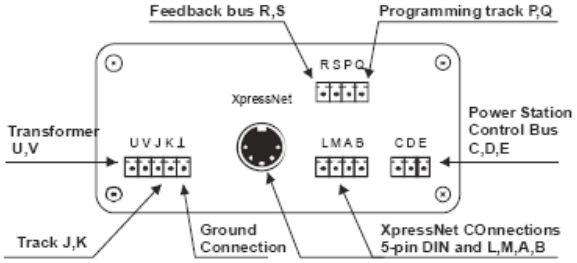
3.6 Connecting the S88XPressNetLI to a Lenz® System

To be able to connect the S88XPressNetLI's to a Lenz® set, a special cable must be manufactured.



Note that the drawing shows top view, with the latch facing upward.

One end of the cable has the 6-pole Western XpressNet® connector, the other end is connected directly to the set's screw terminals.



After completing the cable and its connection to the set, the western connector can be plugged in either one of S88XPressNetLI's XpressNet® sockets.

Alternatively the setup shown below can be used, if no further XpressNet® connectivity is used.

Photo: JAB van Ree

Thus, simply connect the standard spiral cable to the S88XPressNetLI, and connect the LHxxx with another 6p5c cable as well to the S88XPressNetLI.

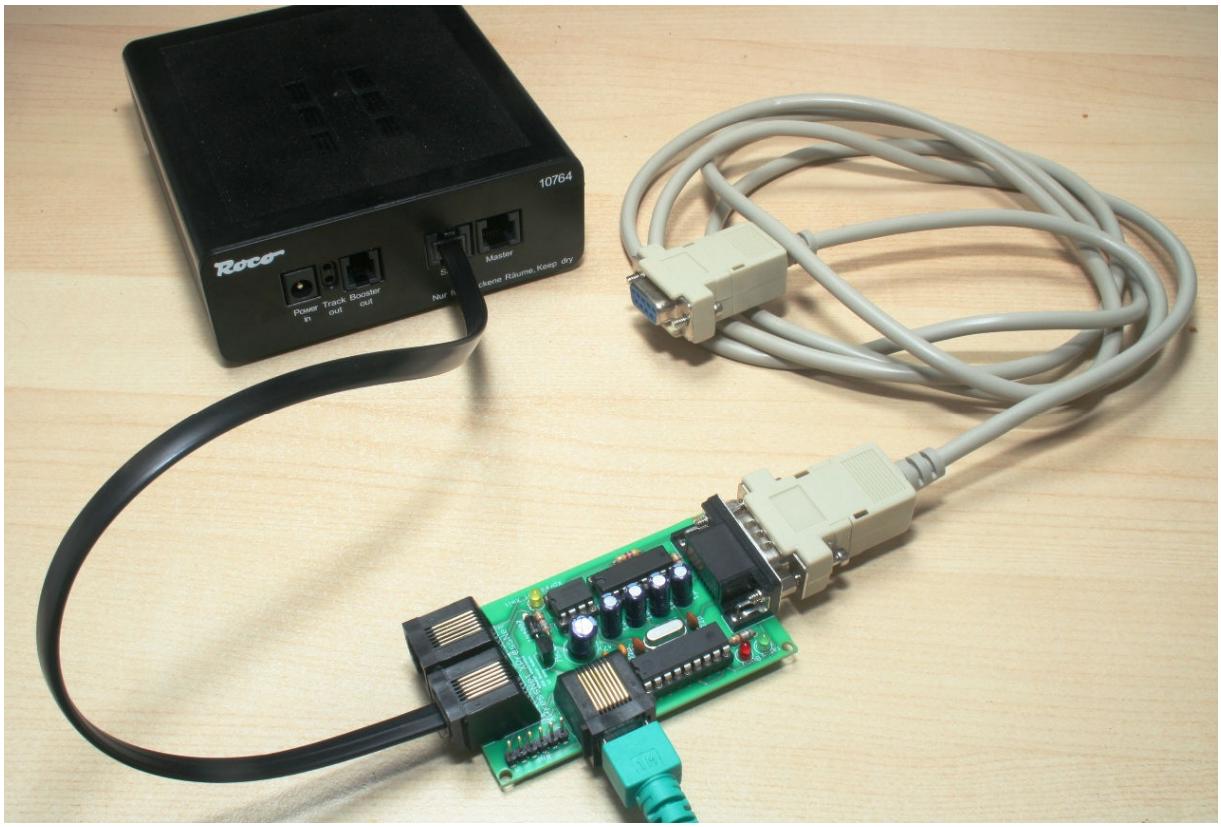
3.7 Connecting the S88XPressNetLI to a PC

To really benefit from the S88XPressNetLI's capabilities, a connection to a PC, or other control computer, is required.

The physical connection can be made in two ways:

- Using a standard RS-232, 9 pin, extension cable:

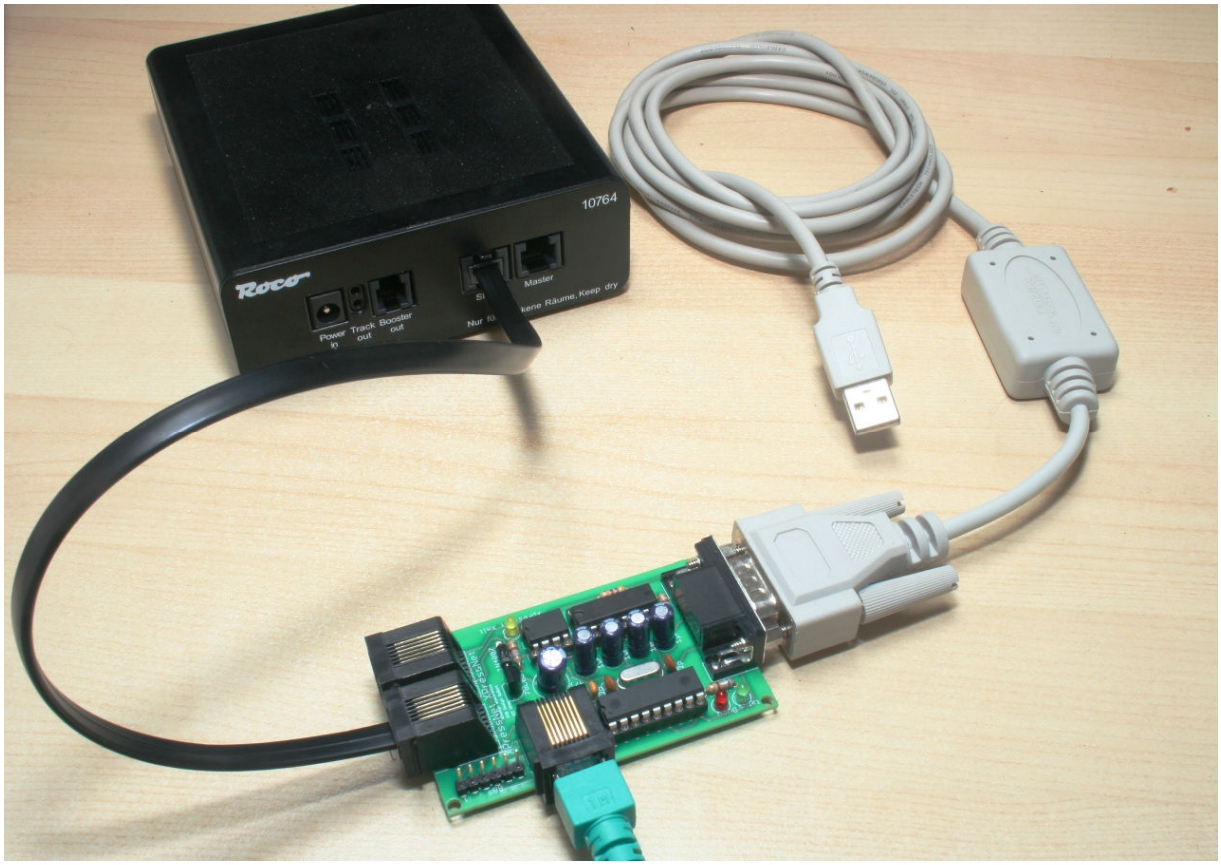
  A standard, fully connected male – female RS 232 is enough to make the proper connections.



Picture showing a standard RS-232 extension cable connected to the S88XPressNetLI's serial port.

Note, in case of older PCs with a DB-25 serial connector, an adaptor will be needed. Or a special 25 to 9 converter cable has to be used.

- Using a USB to Serial adaptor



Picture showing a USB to Serial Adaptor connected to the S88XPressNetLI's serial port.

In both cases make sure the model railroad control program is set to:

- 9600 baud
- 1 start bit
- 8 data bits
- 1 stop bit
- no parity
- RTS/CTS handshake

Important advice!

Make sure that you do not create any electrical connection between the computer and the model railway apart from those via the S88XPressNetLI. Otherwise you might damage the S88XPressNetLI and/or your digital control system and/or your PC.

4 Powering up for the first time

Only after making the connections mentioned in chapter 3, it is time to apply power to the system.

Steps to follow:

1. Make sure, that there is no connection between PC and S88XPressNetLI. That is, disconnect the interface cable or USB to serial adapter from the S88XPressnetLI.

2. Check whether the S88XPressNetLI's solder side does not make contact with any conductive material.

3. Double check whether the s88 cable (flat- or patch cable) to the first s88 module is connected to the correct s88 socket.

4. Turn on the power of your digital command system.

5. In case of correct operation, the **red** led will flash shortly indicating power is supplied to the S88XPressNetLI. Immediately after this the **green** led should start blinking at a rate of approximately 2 Hz.

6. In case you will not see a blinking status led, turn off the power immediately and check the cabling. Owners of the kit version: check for proper assembly of the S88XPressNetLI. Specially check the orientation of the integrated circuits, voltage regulator, led's and electrolytic capacitors.
   Fix an eventual problem and retry from point 4.

7. Now power down the digital control system.

8. (Re-)Connect the interface cable between PC and S88XPressNetLI.

9. Re-power up the digital control system

10. Your system is ready to use with your favorite model railroad control program or…

11. Start the S88XPressNetLIConfig program to configure your S88XPressNetLI.

Note.
Since the S88XPressNetLI has been designed in accordance with the XpressNet® specifications, it can be plugged and un-plugged from the XpressNet® without the need to power down the digital control system. **Connections between PC and S88XPressNetLI and between s88 and S88XPressNetLI however, should be carried out with either a, from the XpressNet®, disconnected S88XPressNetLI or a powered down digital control system.**

5 Operating the S88XpressNetLI

Operating the S88XPressNetLI is very straight forward. During normal operation it can be totally unattended. Some operational features might be interesting however.

5.1 Visual operating feedback (LED's)

The S88XPressNetLI is equipped with three led's to give visual feedback about the operating status of the device.

The **GREEN** led, this is the *status* led:

- Normal operation: Steady blinking with a 2 Hz frequency and 50% on-time duty cycle. The blinking has also been designed to indicate proper microcontroller operation. Irregularities in the blink pattern indicate microcontroller malfunction.
- Programming mode: Steady flashing with a 2 Hz frequency and 25% on-time duty cycle.
- Test mode: Rapidly blinking with a 10 Hz frequency and 50% on-time duty cycle.

The **RED** led, this is the *busy* led:

- Normal operation: off.
- S88XPressNetLI input buffer full: On.
  When lit, also the CTS line of the S88XPressNetLI goes inactive to stop the PC from sending more data. As soon as the buffer becomes empty again, this led's state will return to *normal operation*.

The **YELLOW** led, this is the *XpressNet® transmit* led:

- No data transmitting to the XpressNet®: Off.
  Note, if valid data sent from the PC, does not seem to arrive at the digital control system, check whether this led flashes after every command. Also in case the red led stays lit, this led may indicate whether the S88XPressNetLI is being addressed by the command station.
- Data transmitting to the XpressNet®: Flashes on during the transmission time.

5.2 Startup sequence

After power on of the S88XPressNetLI, the device will initialize it self.
Initialization is ready when the green led starts blinking. After this, a delay of 250mS is obeyed before s88 scanning is started. The first s88 scan is completely being transmitted to the PC interface, reporting the current state of all connected contacts.

6 Configuring the S88XPressNetLI

The S88XPressNetLI is fully configurable by software. To configure it, send one or more commands mentioned in the Addendum or use the S88XPressNetLIConfig program. This program can be used to change the S88XPressNetLI's settings and/or to verify proper installation and operation.

6.1 Installing the configuration program

To install the program, simply download the .zip file from:

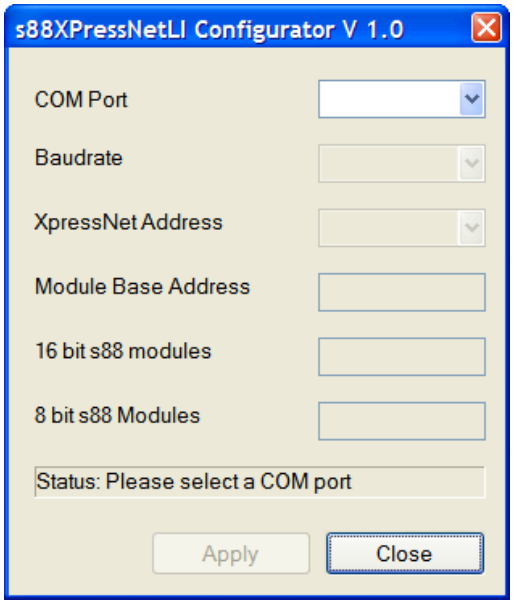
http://www.sleutelspoor.nl/technieken/s88xpressnetliconfig.zip

And unzip it into any directory. The program does not require any setup activity and is directly ready for use.

6.2 Starting the configuration program

To start the program, simply double-click the s88xpressnetliconfig.exe file.

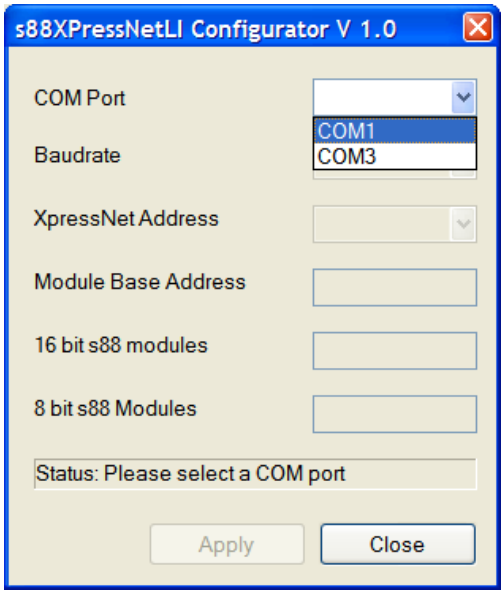
The program will present the COM port selection screen.



The next step is to select the COM port to which the S88XPressNetLI is connected.

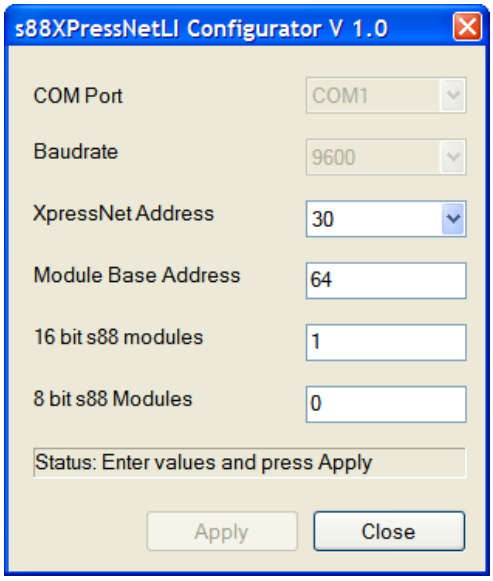
6.3 Selecting the COM port

To set the connected COM port, open the ‘COM port’ Combo Box, and select the desired port.



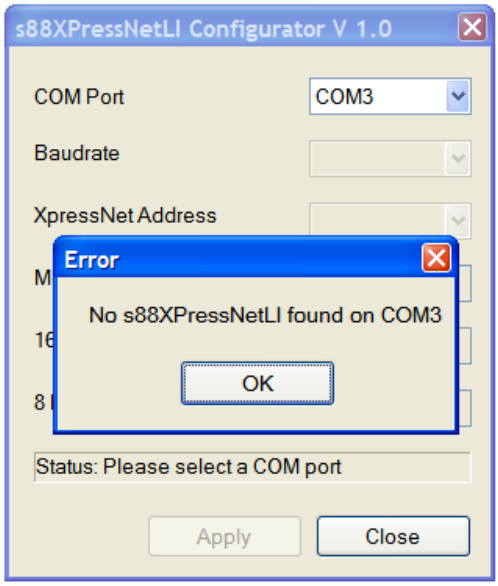
Note! The program will only show present and FREE ports in the system. Therefore nor your model railroad control program nor any other program that opens the S88XPressNetLI’s COM port should be started and/or active!

The program will now try to communicate with the S88XPressNetLI and read the S88XPressNetLI’s settings.



Picture showing the read-in factory default settings

In case communication with the S88XPressNetLI could not be established, the following message will be displayed.

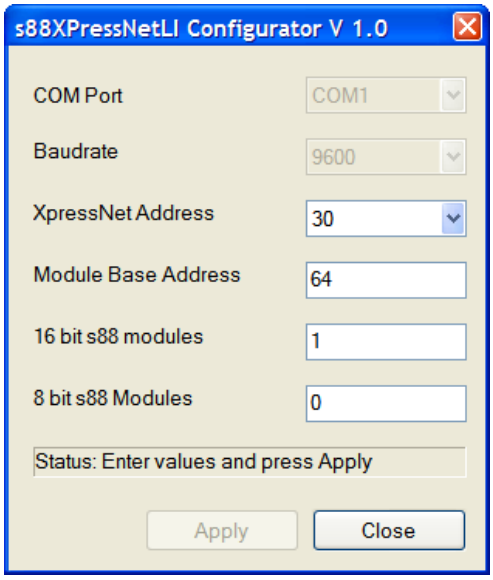


Picture showing an error message.

In this case, verify the correctness of the selected COM port, check whether the S88XPressNetLI is operating and/or check the cabling between S88XPressNetLI and the PC.

6.4 Configuration values and their meaning

The image below shows the values to be set:



- **XpressNet Address:**
  The S88XpressNetLI's XpressNet® Address is used in communication with the command station (multiMAUS®). It can range from 1 to 31 inclusive and its default value is 30.
  Unless other XpressNet® equipment, other than additional multiMAUS®'s, are connected to the XpressNet®, this setting never needs to be changed.

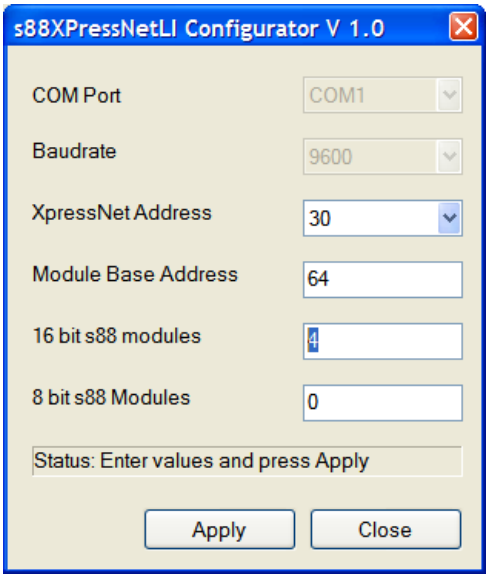
- **Module Base Address:**
  This is the starting address which will be used to report feedback events. Every 8-bit s88 module will have the next higher number. It can range from 0 to 127 inclusive and its default value is 64.
  When a 16-bit s88 module (e.g. S88SD16 from the starter kit) is connected it will be reported as two modules. E.g. module base address = 64 -> lower 8 inputs will report module 64, higher 16 inputs will report module 65.

- **16 bit s88 modules:**
  This value is a user-convenience aid. It simply multiplies the number of modules by two, to obtain the number of 8-bit s88 modules. It can range from 0 to 16; its factory default is 1.

- **8 bit s88 modules:**
  This value can be used to either set the total amount of 8-bit s88 modules, or to enter an odd number of modules in combination with '16 bit s88 modules'. It can range from 1 to 32; its factory default is 0.

6.5 Changing the values

To change a value, simple navigate to the field to be changed and type or select the desired value. The ‘Apply’ button, so far disabled, will now be enabled.



To write the entered values to the S88XPressNetLI, press ‘Apply’, to leave the program without changing S88XPressNetLI’s setup, press ‘Close’.

Note, after pressing ‘Apply’, the program will re-read the setup form S88XPressNetLI. It will also return to the state as described after selecting the COM port. To exit the program, simply press ‘Close’.

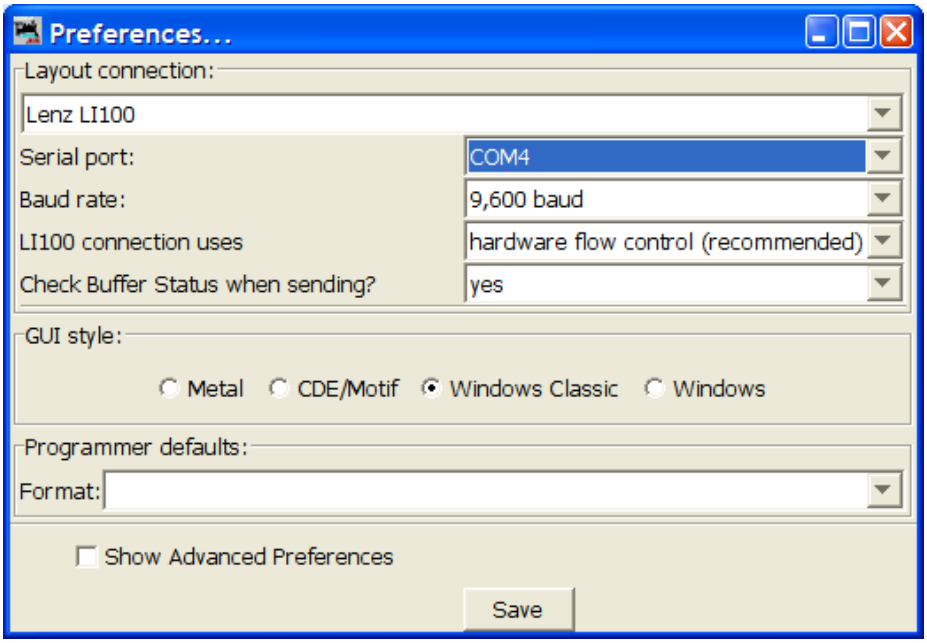
7 Model railroad control program settings

This manual describes a very limited number of control programs. Generic settings however should normally be:

- Digital control system: Lenz®
- Interface: LI100
- XpressNet® protocol: V3 if available, otherwise down to V2.3 has been tested
- Baud: 9600
- Bits: 1 start, 8 data, no parity, 1 stop
- Handshake: RTS/CTS hardware

7.1 JMRI

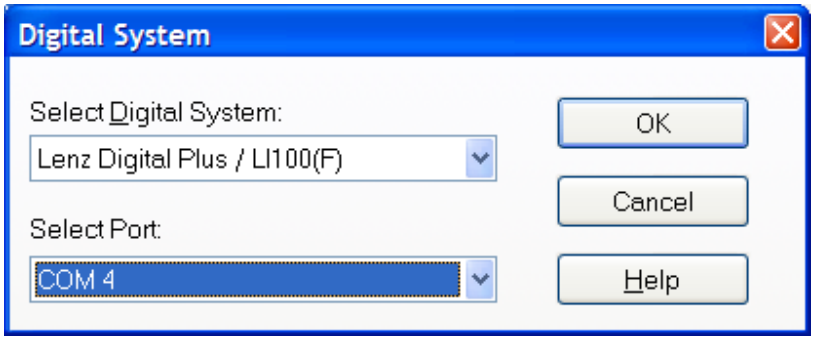
Tested with version 2.0. Lower versions do not properly recognize the multiMAUS®



Some versions also allow LI101F, in which case the S88XPressNetLI's XpressNet® address can be set by software.

7.2 Railroad & Co, TrainController

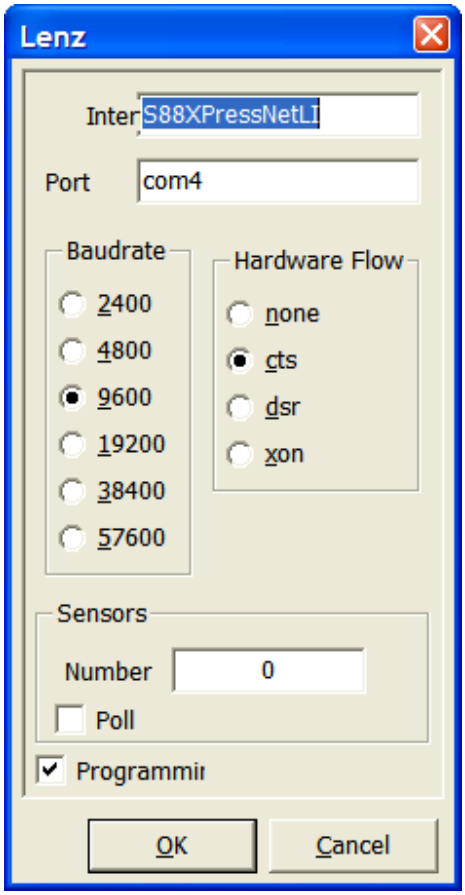
Tested with version 5.8.



TrainController will determine the baud rate by it self.

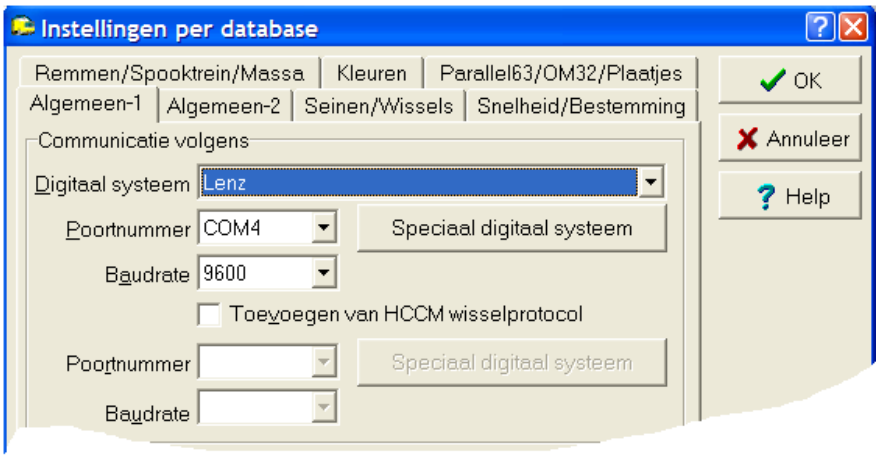
7.3 RocRail

Tested with version 1.0.0.



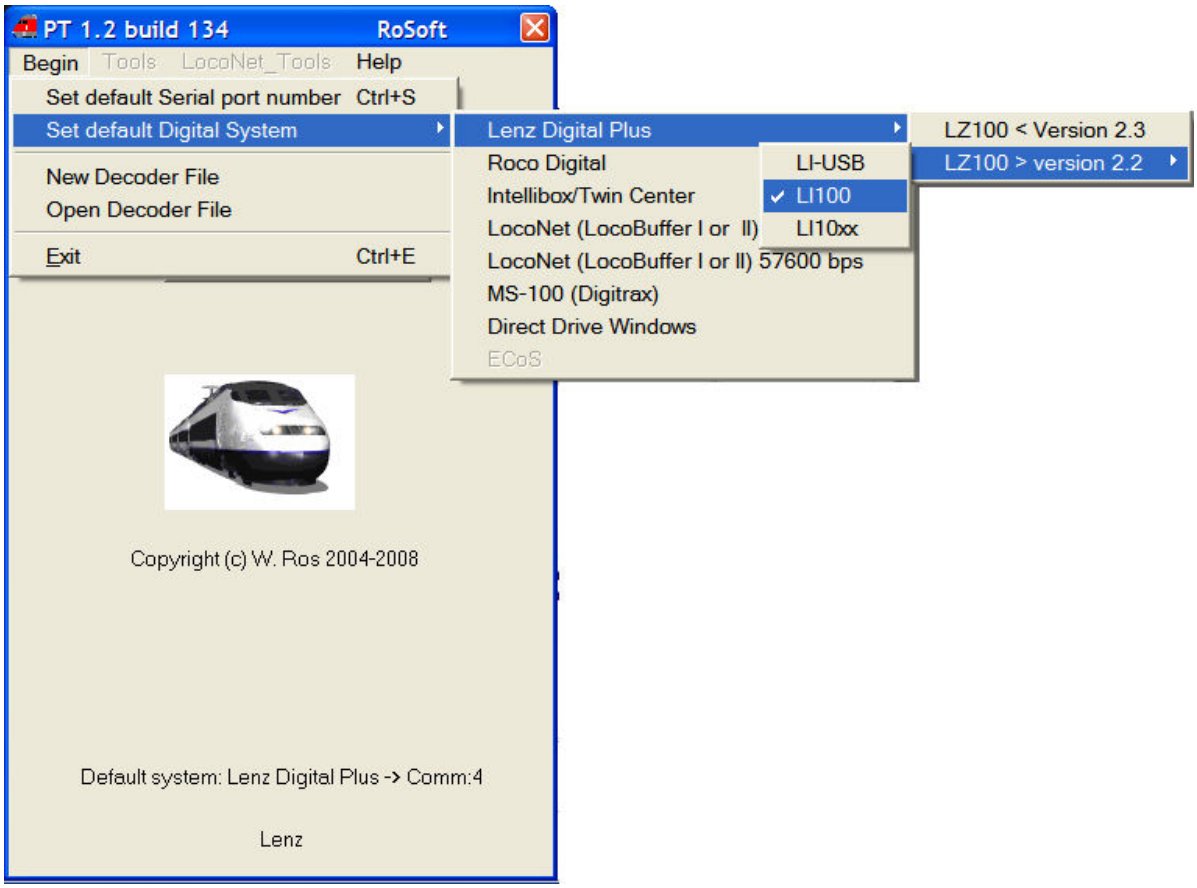
7.4 Koploper

Tested with version 6.5 build 515



Note: Koploper counts its feedback modules 1 higher than the S88XPressNetLI's module base address. So the first feedback module in Koploper will be address **65** instead of the expected 64.

7.5 Wim Ros' PT.exe



8 Addendum to the XpressNet Specification for the S88XPressNetLI

XpressNet Specification: http://www.lenz.com/manuals/xpressnet/xpressnet.pdf

8.1 Determining and changing the XpressNet address for the S88XPressNetLI

The S88XPressNetLI's XpressNet address is set in software. This is an action, which takes place only between PC and S88XPressNetLI. The instruction structure and the associated S88XPressNetLI response correspond to the XpressNet format described in chapters 2 of the *XpressNet Specification*.

Instruction for setting the S88XPressNetLI's XpressNet address:

	Header byte	Data Byte 1	Data Byte 2	X-Or-byte
Binary:	1111 0010	0000 0001	ADDRESS	X-Or-byte
Hex:	0xF2	0x01	ADDRESS	X-Or-byte
Decimal:	242	1	ADDRESS	X-Or-byte

The response from the S88XPressNetLI:

	Header byte	Data Byte 1	Data Byte 2	X-Or-byte
Binary:	1111 0010	0000 0001	ADDRESS	X-Or-byte
Hex:	0xF2	0x01	ADDRESS	X-Or-byte
Decimal:	242	1	ADDRESS	X-Or-byte

Description:
ADDRESS in Data Byte 1 of the request indicates the XpressNet device address, which the S88XPressNetLI should use. The permitted range of XpressNet addresses lies between 1 and 31 Decimal. The actual XpressNet address currently being used by the S88XPressNetLI is contained in Data Byte 2 of the S88XPressNetLI response. Usually the XpressNet address transmitted in the request and received in the response are identical.

Comments:
If the device address transmitted in Data Byte 2 of the request is not within the range of 1 to 31, then the S88XPressNetLI answers with its XpressNet address currently in use. This allows the address to be determined, without changing it. It is recommended practice to send **Data Byte 2** as **0xFF/255** in this case.

8.2 Determining the Baud rate for the S88XPressNetLI

The S88XPressNetLI's baud rate is set in software. This is an action, which takes place only between PC and S88XPressNetLI. The instruction structure and the associated S88XPressNetLI response correspond to the XpressNet format described in chapters 2 of the *XpressNet Specification*.

Instruction for determining the S88XPressNetLI Baud Rate:

	Header byte	**Data Byte 1**	**Data Byte 2**	**X-Or-byte**
Binary:	1111 0010	0000 0010	BAUD	X-Or-byte
Hex:	0xF2	0x02	BAUD	X-Or-byte
Decimal:	242	2	BAUD	X-Or-byte

The response from the S88XPressNetLI:

	Header byte	**Data Byte 1**	**Data Byte 2**	**X-Or-byte**
Binary:	1111 0010	0000 0010	BAUD	X-Or-byte
Hex:	0xF2	0x02	BAUD	X-Or-byte
Decimal:	242	2	BAUD	X-Or-byte

Description:
In the request BAUD gives the desired new transmission baud rate, which the S88XPressNetLI should begin using for communication over the serial interface. The coding reads as follows:

BAUD = 0 9600 baud (default baud rate)
BAUD = 1 19200 baud
BAUD = 2 38400 baud
BAUD = 3 57600 baud
BAUD = 4 115200 baud

The S88XPressNetLI currently (V1.0) only supports BAUD=0 (9600 baud).

Comments:
If the baud rate transmitted in Data Byte 2 of the request is not within the range of 0 to 4, then the S88XPressNetLI answers with its baud rate currently in use. This allows the baud rate to be determined, without changing it. It is recommended practice to send **Data Byte 2** as **0xFF/255** in this case.

Currently (V1.0) the S88XPressNetLI will only return BAUD = 0.

8.3 Determining and changing the Base feedback module address for the S88XPressNetLI

The S88XPressNetLI's Base feedback module address is set in software. This is an action, which takes place only between PC and S88XPressNetLI. The instruction structure and the associated S88XPressNetLI response correspond to the XpressNet format described in chapters 2 of the *XpressNet Specification*.

Instruction for setting the S88XPressNetLI Base feedback module address:

	Header byte	Data Byte 1	Data Byte 2	X-Or-byte
Binary:	1111 0010	1111 0001	MOD.ADDR.	X-Or-byte
Hex:	0xF2	0xF1	MOD.ADDR.	X-Or-byte
Decimal:	242	241	MOD.ADDR.	X-Or-byte

The response from the S88XPressNetLI:

	Header byte	Data Byte 1	Data Byte 2	X-Or-byte
Binary:	1111 0010	1111 0001	MOD.ADDR.	X-Or-byte
Hex:	0xF2	0xF1	MOD.ADDR.	X-Or-byte
Decimal:	242	241	MOD.ADDR.	X-Or-byte

Description:
In the request MOD.ADDR gives the desired new Base feedback module address, which the S88XPressNetLI should begin using for reporting feedback events.
For further explanation about Feedback module addresses see: *LR100 Feedback Encoder Info*.

LR100 Feedback Encoder Info: http://www.lenz.com/manuals/modules/lr100.pdf

Comments:
If the MOD.ADDR transmitted in Data Byte 2 of the request is not within the range of 0 to 127, then the S88XPressNetLI answers with its MOD.ADDR currently in use. This allows the MOD.ADDR to be determined, without changing it. It is recommended practice to send **Data Byte 2** as **0xFF/255** in this case.

The S88XPressNetLI is delivered with a default address of 0x40 hex/64 decimal.

Note for 'Koploper' users: Base address 64 is translated by 'Koploper' into occupancy detector address **65!!**

8.4 Determining and changing the number of 8 bit s88 modules for the S88XPressNetLI

The S88XPressNetLI's number of 8 bit s88 modules is set in software. This is an action, which takes place only between PC and S88XPressNetLI. The instruction structure and the associated S88XPressNetLI response correspond to the XpressNet format described in chapters 2 of the *XpressNet Specification*.

Instruction for setting the S88XPressNetLI Base feedback module address:

	Header byte	Data Byte 1	Data Byte 2	X-Or-byte
Binary:	1111 0010	1111 0010	MOD.COUNT	X-Or-byte
Hex:	0xF2	0xF2	MOD.COUNT	X-Or-byte
Decimal:	242	242	MOD.COUNT	X-Or-byte

The response from the S88XPressNetLI:

	Header byte	Data Byte 1	Data Byte 2	X-Or-byte
Binary:	1111 0010	1111 0010	MOD.COUNT	X-Or-byte
Hex:	0xF2	0xF2	MOD.COUNT	X-Or-byte
Decimal:	242	242	MOD.COUNT	X-Or-byte

Description:
In the request MOD.COUNT gives the desired new number of 8 bit s88 modules, which the S88XPressNetLI should scan to report feedback events.

Comments:
If the MOD.COUNT transmitted in Data Byte 2 of the request is not within the range of 1 to 32, then the S88XPressNetLI answers with its MOD.COUNT currently in use. This allows the MOD.COUNT to be determined, without changing it. It is recommended practice to send **Data Byte 2** as **0xFF/255** in this case.

In the 's88 world' it's common to have 16 bit s88 modules. In which case the number of 16 bit modules should be multiplied by 2 to obtain the MOD.COUNT.

Setting the correct number of 8 bit s88 modules is important, since 'over scanning' (more modules configured than physically present) can cause spurious feedback events to be sent to the PC.

The S88XPressNetLI is delivered with a module count of 2.

8.5 Setting the test mode for the S88XPressNetLI

The S88XPressNetLI can be set into and out of test mode by software. This is an action, which takes place only between PC and S88XPressNetLI. The instruction structure and the associated S88XPressNetLI response correspond to the XpressNet format described in chapters 2 of the *XpressNet Specification*.

Instruction for setting the S88XPressNetLI test mode:

	Header byte	Data Byte 1	Data Byte 2	X-Or-byte
Binary:	1111 0010	1111 1110	TESTMODE	X-Or-byte
Hex:	0xF2	0xFE	TESTMODE	X-Or-byte
Decimal:	242	254	TESTMODE	X-Or-byte

The response from the S88XPressNetLI:

	Header byte	Data Byte 1	Data Byte 2	X-Or-byte
Binary:	1111 0010	1111 1110	TESTMODE	X-Or-byte
Hex:	0xF2	0xFE	TESTMODE	X-Or-byte
Decimal:	242	254	TESTMODE	X-Or-byte

Description:
In the request TESTMODE = 0 takes the S88XPressNetLI out of test mode. Any other value sets it into test mode.

Comments:
Setting the S88XPressNetLI into test mode reports periodically the complete s88 bus scan and changes the rhythm and duty-cycle of the green status LED.

8.6 Setting the programming mode for the S88XPressNetLI

The S88XPressNetLI can be set into and out of programming mode by software. This is an action, which takes place only between PC and S88XPressNetLI. The instruction structure and the associated S88XPressNetLI response correspond to the XpressNet format described in chapters 2 of the *XpressNet Specification*.

Instruction for setting the S88XPressNetLI programming mode:

	Header byte	Data Byte 1	Data Byte 2	X-Or-byte
Binary:	1111 0010	1111 1111	PROGMODE	X-Or-byte
Hex:	0xF2	0xFF	PROGMODE	X-Or-byte
Decimal:	242	255	PROGMODE	X-Or-byte

The response from the S88XPressNetLI:

	Header byte	Data Byte 1	Data Byte 2	X-Or-byte
Binary:	1111 0010	1111 1111	PROGMODE	X-Or-byte
Hex:	0xF2	0xFF	PROGMODE	X-Or-byte
Decimal:	242	255	PROGMODE	X-Or-byte

Description:
In the request PROGMODE = 0 takes the S88XPressNetLI out of programming mode. Any other value sets it into programming mode.

Comments:
Setting the S88XPressNetLI into programming mode, stops the s88 bus scanner and changes the rhythm and duty-cycle of the green status LED.