



help guide

Quick Glance

This guide is meant to give a more practical description on the use and set up of the Display Controller ND5134. Hopefully, it will be of use both to clarify possible ways of using the card – and as a time saver during difficult installations or service.

We are always eager to help you out via email or phone – do not hesitate to call us. Our products are designed to be reliable and predictable, but in order to constantly improve, we need all sorts of feedback from experts like you!

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NOTE

This document may refer to new or redefined properties of the product. The ND5134 you have in your hands may therefore behave somewhat different than this text describes.

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PREPARATION FOR INSTALLATION

If possible, clarify what instrument (manufacturers name and model) and which type of interface is used (serial: RS-232, RS-485, TTY20mA / Ethernet, radio, etc). Best practise would be to connect it all together on the bench at home before field installation.

Make sure you know the set up procedure for the transmitting instrument. Most equipment have a selection of different message formats/protocols plus a variety of outputs and regimes for sending data to a display.

If possible, pre program the ND5134 and instrument before the field trip.

SERVICE TRICKS

The majority of service calls are due to over voltage incidents, most often caused by lightning. As many devices are interconnected without galvanic isolation and often inconsistent grounding, more than one device may fail or be degraded.

From our experience, the transmitter in the connected equipment is most likely to fail. Next thing would be the receiver in the display.

As a service part, the ND5134 could be used in a box with a 9V battery clip and some test leads. The intent of this is to show how the Controller could be used as a simple tester.

To test the transmitter of the weighing instrument, disconnect the line (note that TTY20mA, if used, must be active!) and connect the battery driven ND5134. If all is ok, it should display some sensible data.

This is also a good time to correctly set all parameters for communication on the Controller.

To test the display, you may use RS-232 or RS-485 output to insert some data on the line. Do not expect the display to show any values, because the message format will probably be wrong. But you should be able to see sensible data received in the display – or a comms LED blink.

MENU HANDLING

Factory Default

If someone has played too much with the ND5134, you could have it restored to factory default by entering the menu and selecting BOARD SETUP | RESET TO FACTORY DEFAULT SETTINGS and press OK.

Refer to the User's Guide for ND5134 where the menu system is described.

SERIAL INTERFACE ISSUES

Connecting to a serial line is now and again a challenge. To help you do things right – or to assist sorting out trouble, read on:

A general note on cabling:

- **Use shielded cables where possible** – and make sure you connect the shield at one end only! You may splice the shield as you do the other conductors.
- **Do NOT use the shield as a signal or 0V conductor!**
- Sensible dimensions for the conductors are 0,2 to 0,75mm².
- Try to avoid crossing or co-locating with high voltage (supply lines) or high current (motors & machinery) lines. Induced power from such lines could be significant!
- High baud rates and long lines could increase noise problems.

RS-232

Used for short cable lengths; preferable less than 3-4m. However, we know installations stretching this to 100m+. Doing this may be risky business as the line protection may prove insufficient. The Controller protection uses a series resistor plus a voltage suppressor (tranzorb). These may be permanently damaged by eg lightning or induced voltages from motors etc.

RS-232 requires the Controllers RxD (receive signal) to connect to the sender/instrument TxD (transmit signal).

RS-485/422

Longer lines need terminating resistors (typ 100-150 ohm), and these are increasingly important the higher the baud rate. Only end points are terminated by resistors!

Note that RS-485/422 refers to 0V, giving a challenge to ensure potential differences are kept small – or better: use a separate conductor to carry 0V.

Some times, we see that A and B signal has switched names. If data look garbled, try switching them around.

The RS485 interface on ND5134 is heavily protected for both over voltage and over current. If the voltage/current is constantly high (14V and above), the auto fuse will not reset and thus data will not flow.

RS-485 data out (ie data from the ND5134 to external equipment) must be enabled through the menu.

Current Loop / TTY 20mA

Is an old fashioned but also quite reliable way of transmitting serial data. Avoid high baud rates and be careful to check that the current flowing is close to 20mA (12 to 25 is good). This is measured when data is idle.

Note that the inputs I+/I- and C+/C- are passive, needing transmitters to be active, or the line biased with a 20mA current source (or more practical: a voltage; normally 8-24Vdc).

These inputs are protected to a certain point from reverse voltage, excess current and voltage.

NORMAL PROCEDURE FOR INSTALLATION

When a new ND5134 card is installed in your display, you normally need to it set up correctly:

1. Power up – you may use the USB micro connector to power it on your desk, otherwise a regulated DC voltage of 5-30V is required.
2. If mounted in the scoreboard, connect display and communication leads as well
3. After the power up sequence, enter the menu by pressing **OK** and **BACK** simultaneously, release and then confirm the question with **OK**. See the chapter on Setting up Display.
4. Now the potentially tricky part: PROTOCOL SETTING

See the chapter Setting up Communication.

Under COMMUNICATIONS | COM0 PORT SET you will set the baud rate, data bits, parity and stop bits to make the incoming data look correct. To be able to see a representation of incoming data, you have to exit the menu....so guessing & checking may take some time. However, just adjust the baud rate at first. Data will look almost or intermittent correct when bit rate is set correct. Then adjust data bits and parity.

COMMUNICATIONS | COM0 PORT SET | CONNECT TO A MANUFACTURER may have the shortcut you need. If not; ask for listing of your favorite setups.

Otherwise:

Under COMMUNICATIONS | COM0 PORT SET | PROTOCOL SETUP you need to consider:

COM0: START CHAR	often set to 2 (STX). Set to 0 means no start character.
COM0: END CHAR	most often 13 (CR)
COM0: MANUAL PROT	not used here
COM0: PROT PROCES	special handling protocol; made for various manufacturers. Your company should have this information.
COM0: TIMEOUT SEC	blanking of the display after XX seconds if no meaningful data has been received.
COM0: TEXT IGNORE	in a message, you may ignore some character before data
COM0: TEXT LENGTH	from the start of data (after TEXT IGNORE), max TEXT LENGTH characters are processed.
COM0: SUPR ZEROS	You may want to have leading zeroes removed from the displayed value. Normally set to 1 to allow this.

..... and more

When all done, exit the menu!

SPECIAL FEATURES

You may want to use the alarm settings to turn on or off the red/green light or to start other actions when the displayed value is under a given value or over another value;

SETTING UP THE VISIBLE DISPLAY

The ND5134 should be able to connect to all older displays from Norsk Display. Note that NEWER displays may not be supported by an 'outdated' ND5134. Firmware update may fix that.

Under the menu selection BOARD SETUP, find DISPLAY SETUP.

The various DISPLAY TYPE are listed in clear text, but sometimes there are more than one version. Try the latest version first.

DISPLAY LENGTH is important as it defines the rightmost position and where the designator could end up. Number of characters should NOT incorporate the specific designator display, as in N5+1/1-100 (5 numeric digits + 1 designator display).

INTENSITY INVERT = 0 means that backlight will decrease with ambient light (used with LCD). Set the value to 1 if used with LED signs; the intensity will then increase in sunlight and dim down at night. TO BE REVISED

DISPL MAX INTENS let you make the intensity more or less at the peak,
DISPL MIN INTENS defines eg how low the intensity should be in total darkness.

POWER SAVE defines how to save power (and usable life of the LEDs)
0 = no power save

POWER TIMEOUT = 0 means POWER SAVE is inactive

DISPLAY MIRROR = 1 will make the display readable through a mirror (eg on a truck)

DISPLAY AT PWRUP = 1 will list various parameters when power is applied to the controller; version number, address, baudrate etc will be displayed on the connected display. Set to 0 for fast power up.

SETTING UP COMMUNICATION

Most often, the communication parameters (baud rate, data bits, parity and stop bits) and message format is more or less unknown. Good guessing is essential, but additional features of the ND5134 may prove effective:

- auto baud rate finder
- auto protocol finder

You could use it fully automagic. Note however that many protocols come with small deviations; new versions and old versions are not always the same! Plus, some manufacturers use approximate versions.

We will help you as best we can, and new protocol handlers are added monthly.

FIRMWARE UPDATE

Updates of the firmware (controller software) will be available for registered and approved customers only.

As new and enhanced functions and improved protocol support are added, updates may be a valuable tool for old and new installations.

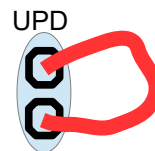
Note however that the pre-installed firmware delivered with ND5134 when you do the original purchase is the only warranted setup. Updates are done at your own risk.

You will need:

- A Windows v7 or v10 PC with USB
- Download TeraTerm (TT) and make sure virtual ports are installed on your PC.
- USB virtual port drivers (normally done more or less automatic when connecting a card)
(for windows: CP210xVCPInstaller_x64.exe look at <http://www.silabs.com/products/mcu/pages/usbtouartbridgevcdrivers.aspx>)
- A USB-A to USB-micro cable to power and transfer data.
- Pliers or connector to short out 2 pins at power-up



OR



- Connect the micro USB to the card
- The new file (ND5134v054xxxx.bin)

When pins are shorted and the ND5134 is connected+powered through the USB cable, the ND5134 card seem unresponsive. TeraTerm is started and correct serial comm port at 115200, N, 8, 1 is selected. The card should respond to TT by 'i' command for info telling:

```
"Bootloader version x.xx. Chip ID xxxxxxxxxxxxxx"  
?
```

Use the 'u' command by typing 'u' to upload; A ready-message should appear in TT.
Upload using TeraTerm: Fil | Transfer | XMODEM | Send and select the file plus option CRC.
A minimum of sensible response should be noted from TT.

Reboot by disconnect and reapply power. The new version number should appear. Note that you generally have to re-program the operative parameters after firmware updates.

More help? Check <https://www.silabs.com/Support%20Documents/TechnicalDocs/AN0042.pdf>

ND STANDARD PROTOCOL

Based on a simple message format, the Norsk Display standard reflects the minimum recommended old format:

<STX> data <CR> where start character = (ASCII 02) and stop character = (ASCII 13d)
this could be extended with addressing:

<STX><SOH>aa<STX> data <CR> where aa is two ASCII characters '0'...'9'

From ND5134 v054.007 and up:

To allow more information to be processed, we have added an optional ESC-sequence:

[<STX><SOH>aa]<STX>[<ESC>xx] data [_UUU]<CR> where aa is two ASCII characters '0'...'9'

The address field, the ESC field and the Unit field are optional to make the format backwards compatible. The ESC must immediately follow the STX, and only one ESC is allowed per message.

The ESC field has some immediate uses:

To control the traffic lights in the display, these must accompany the data:

<ESC>R<GS> – turn on Red light

<ESC>G<GS> – turn on Green light

Response: not used

<ESC>C means a command is following as data. Only one command at a time & no group separator. These are normally only used in RF controlled systems.

Response: OK or ack

[_UUU] is exact 4 bytes; a space (ASCII 32d) followed by space and /or designator.

MODBUS

The Modbus RTU protocol is isolated as its own function selected under

BOARD SETTINGS | MAIN FUNCTION.

By default, it is set up to display Register0 (hex representation).

The Modbus implementation is rudimentary, basically covering only simple memory accesses on a server.

You need to set the RegisterN address for your application, and the value representation (hex, BCD or floating point).

You may combine the content of two locations given by Register0 and Register1 by setting the ACTION parameter to (0=none, 1=alternate in time, 2=alternate on input, 3=add, 4=subtract, 5=multiply, 6=divide).

For special applications, contact factory.

Example of special applications:

Precia Molen I-400 used as belt weigher will allow two weight cells. Setting MODBUS parameters:

Register0 = 010A (hex) = 0266 (dec) will read partial scale 1

Register1 = 0119 (hex) = 0281 (dec) will read partial scale 2

Register2 = 0 will read scale 1 decimal point position and some status

Register3 = 0 will read scale 2 decimal point position and some status

Action = 2 will display Scale 1 for passive input C+/- (opto input) and Scale 2 if active.

Extra = 0 (no use)

To allow this special handling, PP=15 must be set.

Contact factory for updates and requests!