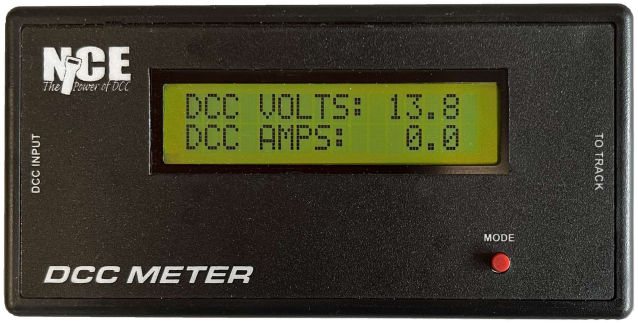
Warranty
This device is fully factory tested and warranted against manufacturing defects for a period of 1 year. As the circumstances under which this decoder is installed can not be controlled, failure of the decoder due to installation problems can not be warranted. This includes misuse, miswiring, operation under loads beyond the design range of the decoder or short ciruits in the locomotive manufacturer's factory wiring. If the decoder fails for non-warranted reasons NCE will replace the decoder, no questions asked, for $10 U.S. plus $2 shipping. For warranty or non-warranty replacement send the decoder (and any payment, if required) to:

NCE Warranty Center
82 East Main Street
Webster, New York 14580

8 16757 01207 0

NCE The Power of DCC



DCC Meter/Analyzer

Simple hookup, easy connection to track

Age 14+

Meter Features:
- DCC volt Meter function measures up to 25 volts DCC
- DCC Amp meter function measures up to 11.5 Amps

Packet Analyzer Features:
- View DCC packets sent by command station on a computer screen
- Selectively filter out idle, reset, accessory, function and or speed packets
- Opto-isolated to prevent ground loops from DCC system to computer
- Powered from track no extra power supply needed
- Display in Hex or Verbose mode

Additional Requirements:
- PC/Mac/Linux computer
- USB cable

5240326

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Warning: This product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

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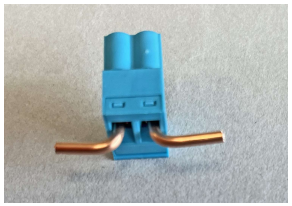
Usage as a DCC Voltmeter and Amp Meter:

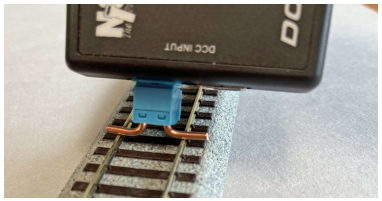
Your DCC meter is normally hooked up such that the track power coming from your DCC system flows through the meter to the track.
Hook up the power coming from your DCC booster to the blue connector that plugs into the left side of the meter labeled “DCC INPUT”. Next hook up power for the track to the blue connector that plugs in to the right side of the meter labeled “TO TRACK”

The meter will measure DCC voltages from 7 to 25 volts and Amps from 0 to 11.5 amps.

NOTE: The meter will only begin display volts and amps when hooked to DCC power.

You can also use the meter as a portable DCC voltmeter by installing 2 bent wires into one of the blue connectors as shown in the photos below (connection to right side not needed) An extra blue connector is included for this purpose.





Format for locomotive long form OPS write byte: L1234 CV0044=123
Short and long locomotive addresses are are indicated by 3 or 4 digits as in speed packets.
The CV number in the above example is 44 (always displayed with 4 digits) and the value for the CV is 123 (always displayed with 3 digits)

Format for locomotive long form OPS write bits: L1234 CV0044 b3=1
Short and long locomotive addresses are are indicated by 3 or 4 digits as in speed packets.
The CV number in the above example is 44 (always displayed with 4 digits) and bit 3 is to be programmed to a 1.

Format for locomotive long form OPS verify byte: L1234 OPS VFY
Short and long locomotive addresses are are indicated by 3 or 4 digits as in speed packets. The command is not completely decoded by the analyzer

Format for locomotive short form OPS write byte: L1234 CV23=123
Short and long locomotive addresses are are indicated by 3 or 4 digits as in speed packets.
The CV number in the above example is 23 (only CV23 or CV24 can be programmed with short form) and the value for the CV is 123 (always displayed with 3 digits). If the analyzer doesn't understand the CV number indicated it will display
L1234 OPS?

Format for consist control setup packets: L1234 CON=123R
Short and long locomotive addresses are are indicated by 3 or 4 digits as in speed packets. In the example above CV19 (consist address) will be set to 123 with the direction of operation to be reverse.

Format for accessory control (paired outputs): A1234N
The accessory address is always displayed with 4 digits. "N" or "R" follows to indicate normal (on) or reverse (off) for the turnout position.

Format for accessory OPS write byte (legacy Ops mode): A1234*CV0513=123
The accessory address is always displayed with 4 digits. The CV number in the above example is 513 (always displayed with 4 digits) and the value for the CV is 123.
The distinction between legacy mode and new mode (see below) is the asterisk (*) between the accessory address and the CV address for legacy mode.

Format for accessory OPS write byte (new Ops mode): A1234 CV0513=123 The accessory address is always displayed with 4 digits. The CV number in the above example is 513 (always displayed with 4 digits) and the value for the CV is 123.
Only the write byte portion of this command is decoded by the analyzer.
The distinction between legacy mode (see above) and new mode is the asterisk (*) between the accessory address and the CV address for legacy mode

Format for signal ("extended") accessory address control: S1234 2F
The signal address is always displayed with 4 digits followed by the signal aspect byte displayed in hex.

Format for signal OPS write byte: S1234 CV0513=123
The signal address is always displayed with 4 digits. The CV number in the above example is 513 (always displayed with 4 digits) and the value for the CV is 123.
Only the write byte portion of this command is decoded by the analyzer.

Format for day/time packet: T/D MON 16:11 R=10:1
MON is the day of the week (MON-SUN), 16:11 is time in 24 hour format and R is the fast clock ratio (10:1 above).

Format for month/date packet: T/D 06/23/1986
The date is displayed in mm/dd/yyyy format

Format for system time packet: mSEC=F034
Number of milliseconds (in hex) since system startup.

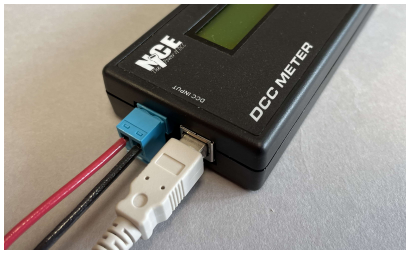
Usage as a DCC Packet Analyzer:

Analyzer connections:

The following connections are needed to use the DCC Packet Analyzer.

- DCC power is connected to the blue connector on the left side of the meter
- A USB cable is connected to the USB connector also found on the left side of the meter.

Pressing the "MODE" button on the meter will toggle back and forth between Volt meter and Analyer modes.



Data Communications
We've had good luck using Brays Terminal Program which can be downloaded for free from https://sites.google.com/site/terminalbpp. Do not use version 1.93b - scroll down to download Terminal20130116.zip. Version 1.93b does not scroll the screen correctly

This is an excellent program that works on virtually all versions of Windows from 98 up to Win11. It does not install anything on your computer. We have also used Hterm (works on Linux too), Termite-3.1 and Tera Term with success.

- The communications are 115200bps, 8 data bits, 1 stop bit, no parity.
- Use the 'No Flow Control' option.
- Turn on 'Append line feeds to incoming line ends' under the Properties->Settings->ASCII Setup menu.

Analyzer Operations
The analyzer will continuously receive DCC packets, parse, interpret and transmit packet data through its USB port. You may find that you computer cannot keep up with the data coming from the track in verbose mode. If this is the case you can block display of certain packet types.

Any packet that isn't understood by the analyzer will be displayed in hex.

Commands: Type the command in the left column (below) such as "A+"

V Display packets in 'verbose' mode (able to be interpreted by humans)
H Display packets as hex bytes

H1 Set hex display mode 0 (see hex display table)
H2 Set hex display mode 1 (see hex display table)

A+ Display all accessory packets
A- Don't display accessory packets

I+ Display all idle packets
I- Don't display idle packets

L+ Display all locomotive packets
L- Don't display locomotive packets

R+ Display all reset packets
R- Don't display reset packets

S+ Display all signal packets
S- Don't display signal packets

? Display list of commands supported

Space bar pauses/resumes display

The analyzer remembers the last display mode after power up.

Hex mode displays:

H1 mode:
Only the packet payload bytes are displayed with a space between each byte.

Example: 03 68 6B

H2 mode:
Displays packets in hex mode with and indication of how many preamble bits denoted by a P followed by the number of preamble bits.

Example: P0E 03 68 6B
Three byte packet following with Preamble byte of 14 bits with three payload bytes 0x03, 0x68, 0x6B

Verbose mode displays:

Verbose mode displays are intended to allow humans to interpret packet contents. The display is cryptic but understandable. Unless stated otherwise all numbers are displayed in decimal. Any packet that isn't understood by the analyzer will be displayed in hex.

Reset packets will be displayed as: "RESET"

Idle packets are displayed as: "IDLE"

Format of locomotive speed packets: L1234 S123F
A short loco address is displayed with 3 digits (ie, L003) and a long address is displayed with 4 digits (ie.L1234).
14/28 speed commands are displayed with 2 digits (S08) and 128 speed commands are displayed with 3 digits (S123). The last character displayed is the direction. F for forward and R for Reverse.
Emergency stop packets are displayed as such: L1234 ESTOP.

Format for locomotive function group F0-F4: L1234 F:00,01,02,03,04
Function group F0-F4: L1234 F:00,01,02,03,04
If a function is on it will display the number of the function. If it is off the number is not on
Example: L1234 F:,,02,03
F2, F3 are on and F0, F1, F4 are off.

Format for locomotive function group F5-F8: L1234 F:05,06,07,08
If a function is on it will display the number of the function. If it is off the number is not on
Example: L1234 F,06,08
F8,F6 are on and F5,F7 are off.

Format for locomotive function group F9-F12: L1234 F:09,10,11,12
Similar to F5-F8 display

Format for locomotive function group F13-F20: L1234 F:13,14,15,16,17,18,19,20
Number of any function that is to be on is displayed. If not displayed the function is off
Example: L1234 F:13,,15,16,,,,20
F13,F15,F16,F20 are on and F14,F17,F18 and F19 are off.

Format for locomotive function group F21-F28: L1234 F:21,22,23,24,25,26,27,28
Number of any function that is to be on is displayed. If not displayed the function is off
Similar to F13-F20

Format for locomotive function group F29-F36: L1234 F:29,30,31,32,33,34,35,36
Number of any function that is to be on is displayed. If not displayed the function is off
Similar to F13-F20

Format for locomotive function group F37-F44: L1234 F:37,38,39,40,41,42,43,44
Number of any function that is to be on is displayed. If not displayed the function is off
Similar to F13-F20

Format for locomotive function group F45-F52: L1234 F:45,46,47,48,49,50,51,52
Number of any function that is to be on is displayed. If not displayed the function is off
Similar to F13-F20

Format for locomotive function group F53-F60: L1234 F:53,54,55,56,57,58,59,60
Number of any function that is to be on is displayed. If not displayed the function is off
Similar to F13-F20

Format for locomotive function group F61-F68: L1234 F:61,62,63,64,65,66,67,68
Number of any function that is to be on is displayed. If not displayed the function is off
Similar to F13-F20