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 addresses) 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.

05240231

NCE Corporation   82 E. Main Street   Webster, New York 14580

NCE
The Power of DCC

Packet Analyzer

$49.95
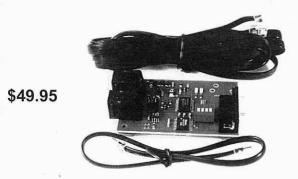
Convenient, easy connection to track or control bus

Features:
- √ View DCC packets being sent by command station in Hex or plain english
- √ Selectively filter out idle, reset, accessory, function and or speed packets
- √ Opto-isolated to prevent ground loops from DCC system to computer
- √ Can be powered from track or Cab Bus jack
- √ ICC packet analyzer compatibility mode (hex only display)
- √ Verbose mode makes it easy to decipher packets
- √ Additional Bonus: display NCE Cab Bus activity

Additional Requirements:
- √ PC or Mac running dumb terminal program capable of 38.4Kbps, 8 data bits
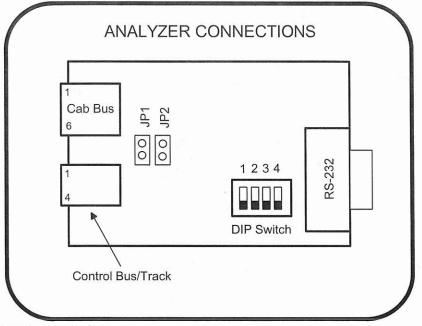- √ 9 pin serial cable

05240231

Age 14+

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

Analyzer connections:

The following connections are needed to use the DCC Packet Analyzer.
- The RS232 connector provides data to your PC via a standard (pin 1 to pin 1) serial cable. There is no hardware or software flow control. Only pins 2,3, and 5 are used.
- Pins 2 and 3 of the Control Bus "RJ" jack connect to the track.
- Normally power for the analyzer is supplied from the Cab Bus RJ-12 connector (pin 2 -ground, pin 5 -positive). The DCC Analyzer can also be powered from the track by installing jumpers JP1 and JP2 if you are sure there is NO ground sneak path (such as when a laptop computer is used). **DO NOT USE THE CAB BUS CONNECTION AND JP1/JP2 AT THE SAME TIME** (there is a small chance you can damage the control bus output of your command station if both connections are used at the same time).

ANALYZER CONNECTIONS

Data Communications
We've had good luck using Hyperterminal supplied with Win98 and Win XP. The communications settings are 38.4kbps, 7 data bits, 1 stop bit. Use the 'No Flow Control' option. The analyzer does not echo characters so you may also want to turn echo on. Also turn on 'Append line feeds to incoming line ends' under the Properties->Settings-> ASCII Setup menu.
Note: On some computers you may need to set the Hyperterminal setting for 8 data bits for proper operation.

Before connecting the analyzer to the track or command station verify communications by pressing '?' to get a menu of commands and the analyzer software version.

A very good public domain terminal program is: "Bray's Terminal Program" down loadable from:
    http://www.ncecorporation.com/usb_drivers/terminal1.exe   (do not capitalize any letters)
Save the program to your computer. It does not install anything on your PC when it runs.
This program is known to work with USB to Serial converters.

Operations
The analyzer will continuously receive DCC packets, parse, interpret and transmit packet data through its RS232 port. It is possible to block transmission of certain packet types. At power up, if DIP switch 4 is OFF the analyzer will analyze DCC packets. If switch 4 is ON it will analyze the NCE cab bus. Switches 1, 2 and 3 are not used.

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 1 packets: L1234 FL1234
Short and long locomotive addresses are are indicated by 3 or 4 digits as in speed packets. The function numbers, if off, are indicated by a dash (-). If on the function numbers are indicated by L for F0 and 1-4 for F1-F4.

Example: L1234 F--32- means function 2 and 3 are on and function 0,1 and 4 are off.

Format for locomotive function group 2 packets: L1234 F8765
Short and long locomotive addresses are are indicated by 3 or 4 digits as in speed packets. The function numbers, if off, are indicated by a dash (-). If on the function numbers are indicated by 5-8 for F5-F8.

Example: L1234 F8-6- means function 8 and 6 are on and function 5 and 7 are off.

Format for locomotive function group 3 packets: L1234 FCBA9
Short and long locomotive addresses are are indicated by 3 or 4 digits as in speed packets. The function numbers, if off, are indicated by a dash (-). If on the function numbers are indicated by 9,A,B,or C for F9-F12.

Example: L1234 FC-A- means function 12 and 10 are on and function 9 and 11 are off.

Format for locomotive function group 4 packets: L1234 FKJIHGFED
Short and long locomotive addresses are are indicated by 3 or 4 digits as in speed packets. The function numbers, if off, are indicated by a dash (-). If on the function numbers are indicated by D,E,F,G,H,I,J,K for F13-F20.

Example: L1234 F----G-E- means functions 14 and 16 are on.

Format for locomotive function group 3 packets: L1234 FSRQPONML
Short and long locomotive addresses are are indicated by 3 or 4 digits as in speed packets. The function numbers, if off, are indicated by a dash (-). If on the function numbers are indicated by L,M,N,O,P,Q,R and S,T for F21-F28.

Example: L1234 F----O-M- means functions 22 and 24 are on.

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).