LEVITON
LIGHTING CONTROL DIVISION
Building A Connected World

User Guide

Network Protocol Converter

Software Revision 3.10 and above

DHV

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Overview

Network Protocol Converter

The Network Protocol Converter by Leviton's Lighting Control Division provides exceptional convenience and flexibility as an interface for remote devices, displays, and networking of theatrical and architectural control devices. The Network Protocol Converter (NPC) is installed as a node on an Ethernet network communicating using the ColorNet 2.0 and TCP/IP protocols.   The Network Protocol Converter, when combined with other network devices supporting ColorNet 2.0 system, allows for the following types of devices to communicate over the ColorNet network:

ColorNet 2.0 Enabled Control Consoles (Innovator)

i Series Dimmer Racks

Hand Held Focus Remotes

Dimension D8000/D4200 Architectural Control Stations

NPC DHV

NPC DLR

NPC XP

Figure 1: NPC Product Line XP, DHV and DLR

Currently there are three models of the NPC available, each of which support the following interfaces:

Model	DMX Inputs	DMX Outputs	Handheld Remote	Keyboard	Video Outputs	LunaNet Lan's	Memory Cards	Analog Inputs
XP	3	3	1	1	2	2	1	16
DHV	3	3	1		2			
DLR	1	1				1		

To facilitate communication between these devices your NPC allows you to:

> Create quick port to network patches
> Create quick network to port patches
> Patch channels from the network to channels on a port
> Patch channels from a port to channels on the network
> View video displays produced by other ColorNet enabled equipment

Although the concepts, routines, and functions for installation and configuration are similar for all three models, this manual is specifically tailored for the DHV model.

Definitions

Here are some common words you will find in this manual which may require a little more definition.

Channel – A channel usually refers to an individual unit of control on the Luma-Net network. However the word channel sometimes is used to reference an individual DMX address or a fader on a control device or theatrical console. If you pay careful attention, you will be able to determine the meaning by it's context.

ColorNet – ColorNet is Leviton's network protocol used to carry lighting control signals over Ethernet wiring using TCP/IP. For additional information on ColorNet see the appendices to this document.

DMX – (Short for DMX512, a USITT Standard) A digital multiplexed control protocol used to control lighting devices like dimmers, effects, and automated lighting.

DMX Universe – A DMX universe is a virtual or physical group of 512 DMX addresses. In the physical world, a DMX universe represents a DMX input or output from a source of control like a control console or NPC. In the virtual world, like on the ColorNet network, a DMX universe is just simply a common group of 512 DMX channels. All DMX signals on the ColorNet network belong to a virtual DMX Universe.

Ethernet – Ethernet is a networking term which describes the physical devices and equipment used to inter-connect networking equipment. When a network is referenced as an 'Ethernet network' it describes a certain set of components used to interconnect computing equipment.

IP Address – An IP (Internet Protocol) address is a way to reference a particular node on a network which speaks the TCP/IP protocol. The IP address can be user defined and set via the software for the device. All IP addresses on the same network must only reference one node.

LC-Net- Leviton's "CAN" based network which carries data for some of our architectural products.

Lighting Group – Lighting Groups are used to delineate groups of Luma-Net channels which operate together (within the same room) when using room separate/combine Luma-Net functions.

Luma-Net – Leviton's RS-485 based network which carries control data for our architectural stations.

MAC Address – a unique network address which identifies a piece of networking hardware to be used on an Ethernet network. The MAC address of a device can not be changed.

TCP/IP – is a networking protocol or rather suite of protocols commonly used on Ethernet networks and the internet. **TCP** is an acronym for **T**ransmission **C**ontrol **P**rotocol and **IP** is an acronym for **I**nternet **P**rotocol.

Part 1- Initial Set-up & Basic Configuration

This section of the manual will cover the installation and basic configuration of the NPC. There are (4) steps required to make your NPC work:

1.   Physical Installation
2.   Set General & Network Settings
3.   Set Device Connections
4.   Create Basic Patches

Until these steps are complete, your NPC will not be operational. For advanced configuration of the NPC, please reference Part 2 of this guide.

Part 1 Contents

Physical Connections

The information in this chapter identifies and describes all of the physical connections, controls, and indicators of the NPC.

The images below show the front and back views of the NPC. They are designed to give you an overview of the physical attributes to the NPC. Use the numbered callouts to cross reference with the legend/descriptions below.

Figure 2: NPC DHV Front and Back Views

1) Hand Held Remote Port: A Theatrical Control Console Hand Held Remote can be plugged into this port to control any ColorNet 2.0 console connected to the network.

2) Power Indicator: This LED will be lit if the NPC is receiving DC input power.

3) Reset Hole: Push a paperclip through this hole to access the reset switch.

4) DMX512 Indicators: Each DMX512 input and output LED indicators will light green to show activity on their respective ports.

5) ColorNet Indicators: There are two sets of LED indicators; one set for each ColorNet port. The Link LED indicates whether the port has established a connection to the ColorNet network. TX & RX indicates any transmitting or receiving data to or from the network.

6) Navigation & Operation Buttons: Buttons used when performing local configuration functions. See the chapter titled "Navigation Button Operation & Requirements"

7) Video Ports: Ports used to connect VGA compatible video monitors. Each monitor can be configured to display a local or remote network device video display.

8) Ethernet Ports: Ethernet ports used for connection to a ColorNet 2.0 TCP/IP Ethernet network.

9) DMX512 Output Ports: Output a standard DMX512 control signal from the ColorNet network.

10) DMX512 Input Ports: Any device that supplies a DMX512 signal can be connected to these ports. The dimmer information contained within the DMX512 signal can be patched to any location on the ColorNet network or directly to an output port.

11) Hand Held Remote Hardwired Port: This port is to be used for connecting external hardwired connections for a Hand Held Remote to the NPC. Note: The front panel HHR connector and the back panel HHR connector are internally connected to each other, therefore, only one can be used at a time. If either HRR port is used, the Luma-Net A port must not be used.

12) Power Input Port: Plug the supplied DC Power supply into this port to supply power to the NPC. The NPC requires +12-24VDC, and has a load of 800mA excluding any external loads like

Luma-Net stations or analog devices. The NPC is supplied with a 12VDC, 2.5A power supply.

13) DMX512 Input Termination Switches: Placing one of these switches in the "1" position connects a 120 ohm resistor across the signal pins 2 and 3. This should only be done if the connection to the port is the end of the DMX512 run.

Installation

The installation and physical connections to the NPC should be pretty straight forward and for many may be self explanatory. However, here is a brief explanation of the required steps and any important notes.

Physical Installation & Power

Install the device into it's physical location. If the device is to be rack mounted, install it into the rack. If it's to be table top mounted, set it up on the table.

NOTE Observe clearances as required for proper device operation. Front panel access for local configuration and visual status indication, and rear access for connections. Be sure to leave enough room for the connector!

Prepare the power connections, but do not yet connect power. Power should be the last thing connected after all other connections have been made.

ColorNet Network Connections

1   Connect ColorNet Port A to your Ethernet hub for interface to other ColorNet devices.

2   If your NPC is near an i Series dimming rack, and your system requires it, you may connect ColorNet port B to the dimming rack processor.

NOTE Connect a video monitor to Video Port #1 and/or #2 as required. Remember when connecting to a network hub, a straight through network patch cable should be used. If connecting directly to another device, a special type of cable referred to as a "crossover cable" should be used. This type of cable swaps the send/receive pairs so that network integrity is maintained.

Video Connections

To Video Monitors

NOTE Even if a video monitor is not being used in the permanent installation, it is helpful if not required for initial setup/configuration.

DMX Connections

Connect any required DMX input or output devices

Connect any required DMX Inputs or Outputs

DMX Data Output

DMX Data Input

(Not all required connections)
0,1,2,3 Outputs
0,1,2,3 Inputs

DMX Pinout			
Pin	Function	Wire (Belden 9829)	
		Pair	Color
1	Common	-	Shield
2	Data 1-	1	Black
3	Data 1+		Red
4	Data 2-(N/C)	2	Black
5	Data 2+(N/C)		White

Figure 3: Device Connections

Handheld Remotes

Connect Handheld remote to front or back of NPC.

Front

To Handheld Remote
Terminal

Back

To hardwire building
HHR Wiring

NOTE

If a handheld remote is used, either hardwired or otherwise, you must abandon the Luma-Net A port.

Handheld Remote (HHR)			
Pin/ Terminal	Function	Wire (Belden 9830)	
		Pair	Color
1	Common	-	Shield
1	Common	1	White/Blue
2	+12VDC		Blue/White
3	RX-	2	White/Orange
4	RX+		Orange/White
5	TX-	3	White/Green
6	TX+		Green/White

Figure 4: Handheld Remote Physical Connections

System Status Check

Make your final power connections and apply power.

At this point in time, your NPC should be operational. There's a bit of configuration which must still be done, but all your connections are made. To checkout the system, observe the LED's on the front of the unit.

Figure 5: Successful Status of LED

NOTE   LED's may not be lit as expected with default configuration.

Navigation Button Operation & Requirements

Figure 6: NPC Front Panel Buttons

The basic operation of the NPC is made simple through the use of the seven buttons located on its front panel. These buttons have two primary sets of functions, the first group of buttons, **[UP]**, **[DOWN]**, **[LEFT]** and **[RIGHT]**, are purely for navigation. They are used to move the cursor around the video display. The second group of buttons is used to modify parameter values or settings. **[SELECT]** is used to "select" a menu choice, save changes, or return to the previous screen. **[PREV]** (short for "previous") and **[NEXT]** are used to step through the parameter options or to increment/decrement a number.

NOTE   Sometimes, you will be using the **[NEXT]** and **[PREV]** buttons to scroll through a large range of values, like the alphabet. In this situation, you can press and hold the button which will quickly scroll through the values instead of repeatedly pressing the buttons.

Generally, a typical use of the navigation & operation buttons will be as follows:

Step 1 From the Main Menu, use the **[UP][DOWN][LEFT][RIGHT]** navigation buttons to select the main menu option you desire.

Step 2 When you've reached your desired main menu option, press the **[SELECT]** button.

Step 3 You now will be looking at a configuration or status screen. From this point you use a combination of the **[UP][DOWN][LEFT][RIGHT]** arrow keys to get to your desired option.

Step 4 Then use the **[NEXT][PREV]** button to make changes.

Step 5 Repeat steps 3 & 4 until all settings have been changed.

Step 6 Press the **[SELECT]** button. This will either return you to the previous screen or ask if you want to save changes. If you are asked if you want to save changes, pressing the **[SELECT]** button again will save them. Pressing any other key will cancel the changes.

These are the basics of using the navigation & operation buttons. In some screens there are additional options or requirements which will be covered in the section of the manual which describes those areas.

Part 2- Quick Start

This chapter is designed to quickly get you up and running with the basic functionality of the NPC. However, it's certainly not all inclusive. If after performing the steps in this chapter your NPC is not operating correctly or you need additional configuration options, please reference the remainder of the manual.

Step 1- Installation, Connections and Power

Install the NPC as required, make all data connections and apply power as discussed in the previous chapter.

Step 2- Device Connections

Verify all device connections from the "Device Connections" options from the main menu. The port setting should be set correctly to no *no device* or otherwise based on whether or not something is connected to that port, and the port status should read active or inactive based on their current connection state.

Figure 7: Quickstart Device Connections Screens

Step 3- Quick "Simple" Patching

From the "Universe Numbers" option off of the main menu you can create a set of basic patches which assign physical ports on the NPC to ColorNet Universes. Simply use the arrow keys to move through the display and change each number to your requirements. The screen shown above only has DMX-A and DMX-B available because in the device connections screen (see step 2) DMX-C was set to "no device". When you are done setting up your basic patches, press the **Select** button to exit and save your settings.

Figure 8: Quick Start Universe Patching

That is all there is to Quick Start Configuration. If you require advanced patching or other custom configuration options, you will find detailed information throughout the remainder of this document.

Part 3: Wrapping Up

This section of the manual will show you the basic procedure steps to advanced configuration without spending anytime explaining the "why's" of what you are doing. Each procedure references a section of the manual in Part 3 where you can find additional information on the procedure.

Setting the IP Address

Procedure: Setting the IP Address or Configuring the NPC to use DHCP

Step 1 From the Main Menu, use **[UP] [DOWN]** to navigate to "General Set-up", then Press **[SELECT]**.

Step 2 Use **[UP] [DOWN]** to navigate to the hard-coded IP address.

Step 3 Use **[PREV] [NEXT]** and **[LEFT] [RIGHT]** to enter your desired IP address field

 -OR-, if DHCP is desired

Step 4 Use **[UP] [DOWN]** to Navigate to the DHCP for IP address field.

Step 5 Use **[NEXT] [PREV]** to set the value to yes.

Step 6 Press **[SELECT]** once to exit then press **[SELECT]** a second time when requested to confirm the save.

Procedure: Enabling the power loss memory restore feature

Used to determine the behavior of the NPC upon power loss and restore. If set to yes, NPC will periodically memorize the current look. Then, upon power failure, will restore the look. If set to no, this feature is not enabled.

Step 1 From the Main Menu, use **[UP] [DOWN]** to navigate to "General Setup" and then press [Select].

Step 2 Use **[UP] [DOWN]** to navigate to "Luma-Net" levels non-volatile save.

Step 3 Use **[NEXT] [PREV]** to set the setting to "YES".

Step 4 Press **[SELECT]** once to exit then press **[SELECT]** a second time when requested to confirm the save.

Procedure: Creating a quick local port to ColorNet patch

Step 1 From the Main Menu, use **[UP] [DOWN]** to navigate to "DMX Universe Numbers" and then press **[SELECT]**.

Step 2 Use **[UP] [DOWN]** to navigate to the desired local input port.

Step 3 Use **[NEXT] [PREV]** to set the ColorNet Universes.

Step 4 Press **[SELECT]** once to exit then press **[SELECT]** a second time when requested to confirm the save.

Procedure: Creating a quick ColorNet to local port patch

Step 1 From the Main Menu, use **[UP] [DOWN]** to navigate to "DMX Universe Numbers" and then press **[SELECT]**.

Step 2 Use **[UP] [DOWN]** to navigate to the desired local output port.

Step 3 Use **[NEXT] [PREV]** to set the ColorNet Universe.

Step 4 Press **[SELECT]** once to exit then press **[SELECT]** a second time when requested to confirm the save.

Procedure: Set a Display to show a DMX output

Step 1 From the Main Menu, use **[UP] [DOWN]** to the "Select Video 1 Display" or other display as desired and press **[SELECT]**.

Step 2 Use **[UP] [DOWN]** to highlight "DMX512 Output Trace" and press **[SELECT]**

Step 3 If you want this display to be the "Default" display, meaning that it is the display shown on boot: Use **[UP] [DOWN]** to highlight "Set Default" and press **[SELECT]**.

Step 4 Use **[UP] [DOWN]** to highlight "Exit" and press **[SELECT]**.

Step 5 You are now viewing the DMX output trace.

Step 6 Use **[NEXT] [PREV]** to toggle between all DMX output ports.

Part 4: Advanced Config. & Operation

This section of the manual covers all advanced configuration options and operation of the NPC.

Configuration of the NPC can be as simple or as complex as you need it to be. Every installation is unique with it's own requirements so to tell you how to explicitly configure your unit for your environment would be inappropriate. Instead we show you all of the configuration options and parameters so that once you understand how the NPC works, you'll be able to take advantage of it's powerful features.

We will assume for purposes of this guide that you are configuring the NPC locally meaning that you have a video display device attached to the video port of the NPC and are configuring using the front panel navigational buttons. If you are configuring the device via the Telnet interface, you will find it helpful to review the chapter on Configuration by Telnet or keyboard. The concept will be the same, the interface and keystrokes are just slightly different.

Part 4 Contents

Main Menu

This chapter outlines all options off of the main menu and the configuration and/or actions which can be achieved upon their selection. A more in depth discussion of each option and its usage can be found later in this manual.

Figure 9: NPC - Main Menu

NOTE If the Main Menu is not visible when you approach the NPC, pressing the [SELECT] button will toggle between the default display and the main menu.

The available options on this menu are as follows:

Exit menu – This option will clear the screen of the Main Menu and begin displaying the selected default display, or a Trace screen if no default has been defined.

Device connections – is used to set which physical ports will accept or send data and show which connections the NPC believes to have connected devices.

DMX512 universe numbers – this is a quick way to set some universe based patches.

General setup – from this screen you can set the general, network, and identification settings for this NPC.

Patching – this is where you define what data is routed to all of the input/output connections on this NPC.

Channel options – allows you to define what happens upon loss or competition among input signals

Lighting Groups – Lighting groups are used to define the groups of Luma-Net channels which operate together or apart in a room separate/combine scenario.

Event Log – For use by tech services when troubleshooting problems.

Select Video 1/Video 2/ Telnet Display – Allows you to define what screen displays on the NPC Video 1/Video 2/Telnet display other than the main menu.

General Setup

The General Setup screen is where you define most of the basic information which is required for operation.

Figure 10: General Setup

A. Host Name

The Host name is a means of identifying the NPC node in a human way. The host name can be any text up to 12 characters long and should not contain any spaces. Although not a requirement at this time, it is recommended that each host name be unique. When inventorying the network with the LumaEdit configuration application, or viewing remote devices, each NPC will display both it's IP address and it's host name.

B. Current Network settings

This section displays which Ethernet ports are active. For each active port, the NPC also shows the current IP and MAC address of the NPC. The MAC address is factory set and is not user changeable. A MAC address is a means of identifying a particular piece of networking hardware which is guaranteed to be unique—even across different manufacturers.

C. IP Address Assignment Method

The concept of the IP address is significant because this address is what allows the software of all networking devices on the ColorNet network the ability to uniquely identify this device. On a TCP/IP Ethernet network, each device must have it's own unique IP address. No two devices may share the same address. (see appendix on TCP/IP Ethernet Networking for more information)

These fields allow you to determine how the NPC gets it's IP address. There are three methods by which an NPC can gets it's IP addresses assigned:

1. Hard coding the address,
2. DHCP,
3. NPC Auto-Addressing Algorithm

IP Address Assignment: Hard Coding the Address

Hard coded IP addresses should be used when you know exactly what you want the IP address of the NPC to be.

NOTE   A hard coded IP address can not be set for Port B, for Port B either DHCP or the NPC Auto Addressing Algorithm is used to set the IP address.

Procedure: To use a hard coded IP Address:

Step 1 From the general setup screen, scroll to the hard-coded IP address field

Step 2 Using the **[PREV] [NEXT]** arrow keys, enter your desired IP address

Step 3 Verify that the DHCP for IP address setting is set to no. If not,
a. Use the arrow keys to navigate to the DHCP for IP address setting
*b. Use **[PREV][NEXT]** to select **NO***

Step 4 Press **[SELECT]** to initiate a return to the main menu and **[SELECT]** again to save changes.

To use a hard coded address, simply enter a valid and unique IP address into the hard-coded IP address field. A hard coded IP address is used at all times when a hard coded IP address is defined and the DHCP for IP address field is set to NO.

IP Address Assignment: DHCP

If you have a DHCP server on your network, you can allow it to assign your IP addresses. This will ensure that there are no IP address conflicts on your network. For this to take place, simply leave the hard-coded IP address alone and set the DHCP for IP address field to **yes**. When the DHCP for IP address field is set to yes, it does not matter what the hard-coded IP address is set to. Upon boot-up, the NPC looks for a DHCP server. If one is found, it gets an IP address lease. If one is not found, it defaults to the hard-coded IP address or the auto assignment algorithm.

IP Address Assignment: Automatic by NPC

The final method by which your NPC can get an IP address is with the NPC auto-addressing algorithm. The auto-addressing is guaranteed to assign unique addresses when ONLY Leviton LCD ColorNet 2.0 products exist on the network. That is to say that if ethernet products from other manufacturers are used, IP address duplication may occur rendering the network inoperative.

Summary of Settings

Step 1 If DHCP= YES and DHCP server IS found, the DHCP server will return an IP address.

Step 2 IF DHCP= YES and DHCP server IS NOT found, hard coded IP address is used.

Step 3 IF DHCP= NO or DHCP server IS NOT found and hard coded address is set to an IP address, the hard coded address is use.

Step 4 IF DHCP= NO or DHCP server IS NOT found and hard coded address has 0's in the right most octet(s), the auto-assignment algorithm is used.

NOTE

The first, leftmost number of the IP address is not allowed to be zero. If the NPC detects a zero is recorded in that position, it will default to 100 when the NPC generates the actual IP address.

D. Automatic return for default video

By setting this function to **yes**, the video monitor will be switched to the default screen after 5 minutes of inactivity. The default screen is set under the "select video 1(2)" display options on the main menu. See this section of the manual for additional information. With this option set to "no," the default display is only recalled upon power up.

E. Date, Time, & Location

These settings allow you to set some basic environmental information.

The **Date and Time** set the current date and time. If you have a network time server on your network, or have direct access to the internet, you can set it's IP address in the **Network Time Server** field and the NPC will use this information to override the local settings.

The Network Time Server is a device used on IP Ethernet networks which gets it time from an authoritative source of time and then allows other devices to set their time from it. An authoritative source of time is simply a computer on the network which has the current date and time AND this information is guaranteed to be correct within a reasonable and predictable margin of error. Traditionally, an authoritative source is defined as a first or second tier time server. The first tier servers have usually a Radio Wave receiver which receives a broadcast of the Greenwich Mean Time and Julian date information. These servers then in turn have a Network Time Server connected to the internet running multiple time service protocols. The second tier servers then set their time from the first tier servers. It's recommend that all Third Tier servers and other clients set their time from the second tier servers so as not to over burden the first tier servers. A third tier is usually a network time server on your local network. The NPC uses the

> *NTP network time protocol. If you have an NTP server on your local network, set the IP address to this server. If you don't but the NPC does have access to the internet, you can allow it to set it's time from a second tier server. In this case, use the factory default setting of 204.34.198.41 which points to the authoritative time source at the Naval Observatory at Falcon AFB, Colorado. If neither of these conditions exist, than just make sure the local Date and Time settings are correct.*

Time Zone sets the time zone for the system astronomical time clock.

The Daylight saving time setting can either be set to automatic US, automatic Europe, +1 hour, or none.

Location defines the longitude and latitude of the NPC for use by the systems astronomical time clock.

F. LUMA-NET levels non-volatile save

This setting is used to determine the action upon a restored power condition after power is lost for one reason or another.

When set to yes, the NPC will periodically save the current channel levels as set by the incoming Luma-Net and DMX signal. Then, if the NPC loses power for one reason or another, upon the restoration of power, the NPC automatically recalls the last saved look.

- **no** – this setting defeats the save option.
- **yes** –this setting enables the option.
- **clear** – this setting clears the non-volatile memory on board the NPC.

G. DMX levels percent or hex

The setting changes the scale of displayed information between percent, 0-100, and hexadecimal, 00-FF (0-255 in decimal).To display levels in hex, change this setting to hex, and to display in percent/decimal notation, set it to percent. This setting can effect more than just DMX levels.

Levels, which are affected by this setting, are all DMX levels, Luma-Net levels, and Luma-Net address settings.

Unless a qualified user is performing some very specific debugging of a system, leave this value set to percent; it is much easier to comprehend.

H. DMX non-significant level change

When two controllers, which control the same channels, are operating in a "take control" manner, (when two controlling device control the same channel and the last device with a change takes control over the previous device regardless of the level of change) this setting defines how much of a change the last device must make before the take control occurs. This is necessary because some sources, like DMX, tend to flutter. You don't want a flutter resulting in a 1/10% change to cause a take control to occur. This could result in erratic behavior. This setting prevents this from becoming an issue by defining the amount of change required for take control to occur.

I. Configuration Protection

When NPC's are permanently installed, you might want to restrict access to those who can make configuration changes. To enable this feature, set the **Configuration change** field to **locked**. Then, when prompted, enter a password. Next time you need to make configuration changes, you must enter this password into the **password** field before attempting to save changes.

NOTE

The default password used for FTP access can be changed by setting the password on this screen to anything other than 0000. When the password here is not 0000, that is also the password for FTP. (Make sure configuration change is set to 'locked')

DEVICE CONNECTIONS

This page allows you to view the connection status of every port on the NPC and on some can manually enable or disable the port. An enabled device/port is said to be active and a disabled or non-existent device/port is said to be inactive.

Physical Ports

Port Status   Port Assignment

Figure 11: Device Connections

From the main menu, use the cursor keys to highlight the item **"device connections."** Pressing the **[SELECT]** button will bring up the display shown in figure 4.3. This display shows the status of inputs and outputs of this NPC. To make changes, simply use the arrow keys to move the cursor to the desired item. Then, use the **[NEXT]** or **[PREV]** buttons to cycle through the available options. The available options are listed below.

NOTE

On all of the available connections below, the status column will indicate either active or inactive. A port is active if either the NPC detects presence of input signal on that particular port or if the NPC is generating a signal on that particular port. If the status of this port is not what you expect, first verify that your patching at the NPC is correct. In the case of an input port, verify that your input signal exists and is transmitting data. If you are still having trouble, contact tech services.

A. Enet-A and Enet-B

The word active or inactive is shown to indicate if the NPC detected a connected device. The options for this item are Ethernet, i-Series or no device. These settings should be set to Ethernet if that port is connected to a ColorNet network. I-Series, if it's connected only to an i-Series dimmer rack, or optionally no-device, you want to forcibly disable communications on that particular port.

B. DMX-A, DMX-B and DMX-C

The word active or inactive is shown to indicate if the NPC is receiving or outputting DMX512 data. The options for the input and output lines are either DMX512 or no device. A setting of no-device will completely disable this particular DMX input or output.

NOTE If and hand held remote is used, either hardwired to the back of the unit or plugged into the port on the front of the NPC, the Luma-Net A port can not be used and **MUST** be set to hand-held remote in the Device Connections.

C. VIDEO1:

Video 1 is always active and cannot be turned off.

C. VIDEO2:

The option for this item is either VGA video or no device. The word active is displayed if this selection is set to VGA video and inactive if it is set to no device.

Changing Port Assignments to:

No Device

There is significant advantage to setting any unused ports to "no device" frees up the processor for other tasks. The NPC processor is very busy answering/responding to network requests such as processing Luma-Net fade commands, patching DMX, and other

responsibilities of the NPC. Setting ports to "no device" indicates to the NPC that the processor can ignore that port and move on to other tasks.

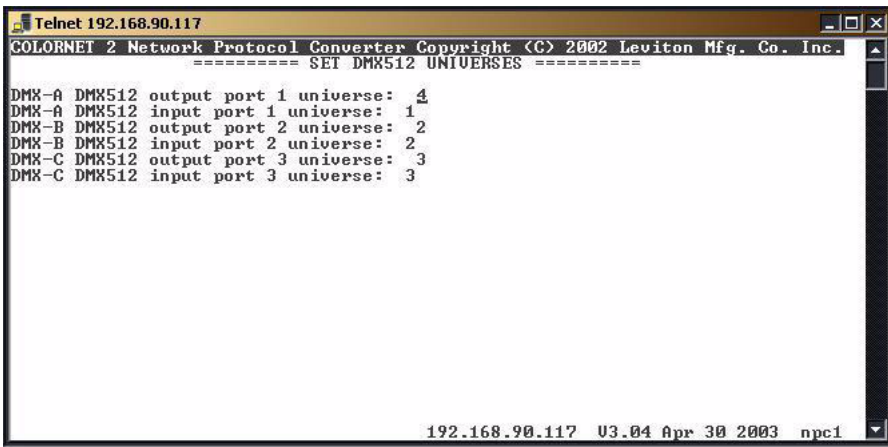## Saving Changes

When any changes are made, pressing **[SELECT]** will display the question "save changes" Pressing **[SELECT]** again will save the changes and exit back to the main menu. Pressing **ANY** other button will discard the changes and exit back to the main menu.

DMX Universe Numbers

This area of configuration is designed to give you a quick means to create and maintain some basic patches. The patches are between a physical port on your NPC and a ColorNet universe.

Figure 12: DMX512 Universes

To assign a physical port to a ColorNet port, use the following procedure:

Procedure: Quick Physical Port Patch

Step 1 From the Main Menu, press **[UP][Down]** as required until "DMX Universe Numbers" is highlighted, then press **[SELECT]**.

Step 2 Us **[UP][Down]** until the desired port is selected.

Step 3 Use **[NEXT][PREV]** to make changes to the selected option.

Step 4 Repeat steps 2 and 3 as necessary.

Step 5 Set ports to '0' for ports you do not want patched.

Step 6 Press **[SELECT]** once to exit the screen, and **[SELECT]** a second time to save changes if prompted.

NOTE

Assigning a universe number of 0 to any of the ports is same as saying "I don't want a patch set for this port." This is the option you want if you either want to manually define a patch in the patching screen, or you just want to simply cut down on NPC processor or network overhead.

Patching

The patching screens are perhaps the heart of the power of the NPC. These are the screens which control the routing of all ColorNet data as it passes into and out of the NPC.   As you will recall from the information in the appendices on ColorNet information, ColorNet carries DMX Universe data, handheld remote data, and video display data.

Patching is covered in two chapters. The first, which you are reading now, discusses the concept of *Patching*. The second, titled "Patch Manipulation", discusses the management of Patches.

For procedure used to ADD/EDIT/DELETE/CHANGE patches see page 44.

When selecting the Patching options off of the Main Menu, you will see a screen which looks similar to the following:

Figure 13: Patching

The information on this screen is a list of all of the patches which are set for this NPC. Each line represents a patch. The information on the left side of the greater than (>) sign shows the source or FROM port information. The information on the right side shows the destination or TO port information.

Patching

The concept of patching is very similar to old slide or plug patch. The idea then was that you had a finite number of dimmers and an infinite number of circuits. The patch you created simply connected the circuits to the dimmers.

When it comes to the NPC & ColorNet, patching is a similar concept just applied differently. Refer to the appendices for detailed information on ColorNet, but for now let's just picture ColorNet as a whole bunch of universes where each universe has 512 control channels.

The patch takes input sources attached to an NPC or coming from other control device and assigns them to a range of channels on one of the ColorNet universes. Once the patch is made, your data is on the ColorNet network.

Now…to get it off of the ColorNet network, you create an output patch. You take the data from the ColorNet network and assign it to one of the NPC output ports. Once the patch is made, your data is routed from the ColorNet Network to your device.

There are two types of patches which can be created, Devices Patches and Universe Patches.

Device Patches

Device Patches are patches from a local device (port) to another local device (port) or to ColorNet. An example of a device patch could be as follows:

DMX p1 C1-512>DMX u4

This patch takes channels 1-512 from incoming DMX port 1 and patches them to the ColorNet, DMX universe #4.

A second example of a device patch of a device patch could be as follows:

-hheld p1 > 192.168.90.116 cons p1

This patches the hand held remote connected to HHR port 1 (the only port) to the on line console at IP 192.168.90.116, port 1.

Universe Patches

Universe Patches are designed to patch from ColorNet to a local device/port.

Consider the following patch:

-univ p12 C1-48 > DMXp3 c49

This patch has the effect of taking ColorNet universe #12, channels 1-48 and patching them to the local DMX output port #3, starting at channel 49 (actually destination channels 49-96, but only the starting channel is listed).

Legend

By now you have noticed that there is a miscellany of nomenclature involved with patching. Here is a brief key which will help with your understanding. You will find that even without the key the nomenclature makes practical sense and with a little practice you will quickly become an expert.

Types:

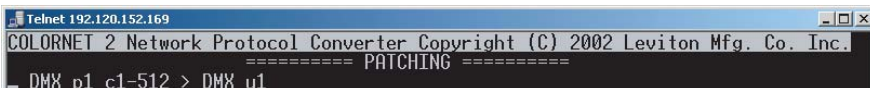|	
DMX p1	-DMX Port #1. If a source, it's an input. If a destination, an output.
DMX p2	-DMX Port #2. If a source, it's an input. If a destination, an output.
DMX p3	-DMX Port #3. If a source, it's an input. If a destination, an output.
hheld p1	-Hand Held Remote, at Port 1.
univ p1	-ColorNet Universe #1 (also p2-p256 for other universes).

Destination Types:

> **DMX p1**   -DMX Output Port #1 (also p2 or p3).
>
> **x.x.x.x**   -an IP address of another ColorNet device
>
> **DMX u1**   -ColorNet Universe #1, (also can be u2-u256 for other universes).
>
> **i-ser p1**   -Indicates i Series dimmer rack, port #1.

Other Nomenclature:

> **c**   -Indicates channel. C1-48 indicates channels 1-48.

That covers most of the nomenclature. You will see it referenced throughout the remainder of this chapter and in the next chapter on patch manipulation.

Let's look at a couple of examples using the information we just learned.

From this information, we can discover that the input to DMX port #1, channels 1-512 is patched to ColorNet Universe #1.

Now, let's look at another example,

<div align="center">

univ p1 c1-24 > DMX p3 c25

</div>

This patch takes ColorNet Universe #1, channels 1-24, and patches them into the DMX output port #3 of this NPC, starting at channel 25 consequently ending at channel 48.

Patch Manipulation

To add, change, or delete patches, you access the patch menu by pressing the **[SELECT]** button. When pressed, the following menu appears

Exit	Finalize changes, return to main menu
Add Device Patch	Patch from a local device
Add Universe Patch	network data sent to a universe
Change	Change the highlighted patch
Delete	Delete the highlighted patch
List	Return to patch display

Both the "add device patch" and the "change" functions follow the same format of question and answer:

Procedure

> **Step 1** first you define the input device,
> **Step 2** then input channels,
> **Step 3** next the destination channels and
> **Step 4** finally then the destination

from device: DMX512 input P1
channels: 1-512
into channel: 1
destination: universe

The available destinations are "universe", "local device", "online remote device" and "remote device". When you have set all these fields, press the down key to get to the output device definition. What you'll be asked depends on what patch type you want:

- **to universe:** universe number
- **to local device:** actual local device

- **to on-line remote device:** you scroll through the choices
- **to remote device:** IP address (255.255.255.255 will mean "any"), device type, port number

The choice of output devices will depend on the input device.

The "add universe patch" allows you to patch data from the ColorNet network to a local port. The series of questions and expected answers are similar to the device patch above.
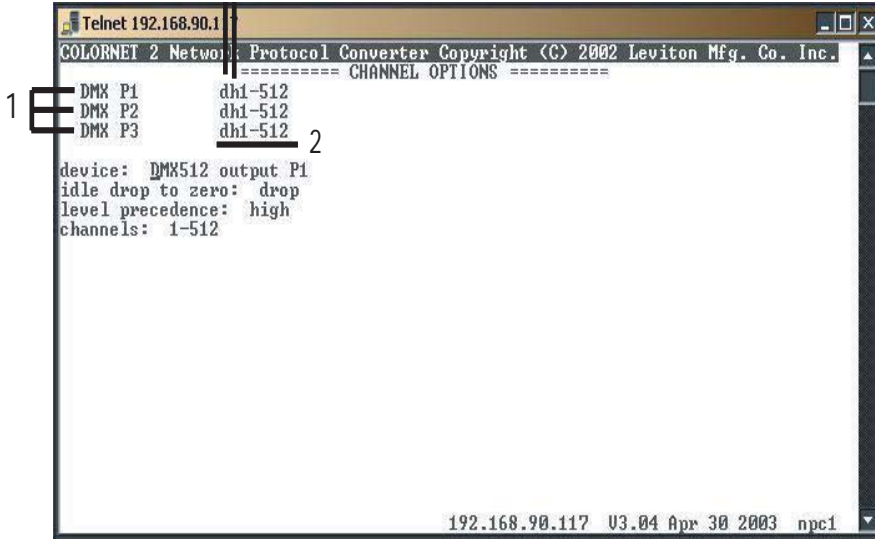
Example of typical responses:

    from universe: 1

        channels: 1-512

      into channel: 1

        destination: local device

     output device: DMX512 output P1

When creating Patches, use the [Down] button to move through Channel Options

The Channel Options configuration screen is used to control the behavior of the individual channels or range of channels on a DMX universe. These settings are used to describe the effects of two scenarios, the first, what happens when a source signal is abruptly removed and secondly what behavior shall occur when two competing sources have the same destination (merging.)

Channel options can be set for each of the DMX output ports.

Figure 14: DHV Channel Options

1. DMX Output Port: This describes which Output Port the Channel Options apply to. **DMX P1** references **DMX Output Port DMX P2** references **DMX OUtput Port 2** or **(B)**, etc. Depending on your particular model of NPC, the listing of available ports may vary.

2. Channel Option Settings: This shows the particular options set for particular ranges of channels for that particular port. The first few characters depict the options for the specific numeric range of channels located adjacent to the characters. The character legend is as follows:

3. idle drop to 0

> d= drop to 0

> k= keep last level indefinitely

Determines what happens when a DMX in out which was transmitting data suddenly disappears. The cause for this could be power failure (at the source, cable interruption, etc.).

A drop to setting says that upon loss of signal, the output will immediately stop outputting DMX.

A keep setting tells the NPC to keep the last level received indefinitely until new instructions are received.

4. DMX Level Precedence

> H= highest level takes precedence
>
> L= last action takes precedence

Determines the plan of action when two patched DMX Channel Levels are different yet patched to the same output. If level precedence is set to highest, the highest level will be the output level at all times. This option is usually considered a straight merge. If level precedence is set to last, the last action by any input determines the output level. Last action precedence is also referenced as "take control".

Procedure used to set these channel options:

Procedure: DMX Output Port 1

Step 1 Use **[UP][DOWN]** to get the cursor to the device field.

Step 2 Use **[NEXT][PREV]** until "DMX 512 output P1" is selected.

Step 3 Press **[DOWN]** to advance to the next field.

Step 4 Use **[NEXT][PREV]** to set idle drop to zero to "drop"

Step 5 Press **[DOWN]** to advance to the next field.

Step 6 Use **[NEXT][PREV]** to set DMX level precedence to high.

Step 7 Press **[DOWN]** to advance to the next field.

Step 8 Use **[NEXT][PREV]** to set the start channel to 1.

Step 9 Press **[RIGHT]** to advance past the '-' to set the end channel.

Step 10 Use **[NEXT][PREV]** to set the end channel to "512".

Step 11 Press **[DOWN]** to complete the entry.

Procedure: DMX Output Port 2

Step 1 Use **[UP][DOWN]** to get the cursor to the device field.

Step 2 Use **[NEXT][PREV]** until "DMX 512 output P2" is selected.

Step 3 Press **[DOWN]** to advance to the next field.

Step 4 Use **[NEXT][PREV]** to set idle drop to zero to "keep"

Step 5 Press **[DOWN]** to advance to the next field.

Step 6 Use **[NEXT][PREV]** to set DMX level precedence to high.

Step 7 Press **[DOWN]** to advance to the next field.

Step 8 Use **[NEXT][PREV]** to set the start channel to 1.

Step 9 Press **[RIGHT]** to advance past the '-' to set the end channel.

Step 10 Use **[NEXT][PREV]** to set the end channel to "512".

Step 11 Press **[DOWN]** to complete the entry.

Procedure: DMX Output Port3

Step 1 Use **[UP][DOWN]** to get the cursor to the device field.

Step 2 Use **[NEXT][PREV]** until "DMX 512 output P3" is selected.

Step 3 Press **[DOWN]** to advance to the next field.

Step 4 Use **[NEXT][PREV]** to set idle drop to zero to "drop"

Step 5 Press **[DOWN]** to advance to the next field.

Step 6 Use **[NEXT][PREV]** to set DMX level precedence to high.

Step 7 Press **[DOWN]** to advance to the next field.

Step 8 Use **[NEXT][PREV]** to set the start channel to 1.

Step 9 Press **[RIGHT]** to advance past the '-' to set the end channel.

Step 10 Use **[NEXT][PREV]** to set the end channel to "96".

Step 11 Press **[DOWN]** to complete the entry.

Step 12 Use **[NEXT][PREV]** until "DMX 512 output P3" is selected.

Step 13 Press **[DOWN]** to advance to the next field.

Step 14 Use **[NEXT][PREV]** to set idle drop to zero to "keep"

Step 15 Press **[DOWN]** to advance to the next field.

Step 16 Use **[NEXT][PREV]** to set DMX level precedence to "last".

Step 17 Press **[DOWN]** to advance to the next field.

Step 18 Use **[NEXT][PREV]** to set the start channel to 97.

Step 19 Press **[RIGHT]** to advance past the '-' to set the end channel.

Step 20 Use **[NEXT][PREV]** to set the end channel to "144".

Step 21 Press **[DOWN]** to complete the entry and advance to the device field.

Step 22 Use **[NEXT][PREV]** until "DMX 512 output P3" is selected.

Step 23 Press **[DOWN]** to advance to the next field.

Step 24   Use **[NEXT][PREV]** to set idle drop to zero to "drop".

Step 25   Press **[DOWN]** to advance to the next field.

Step 26   Use **[NEXT][PREV]** to set DMX level precedence to "high".

Step 27   Press **[DOWN]** to advance to the next field.

Step 28   Use **[NEXT][PREV]** to set the start channel to 145.

Step 29   Press **[RIGHT]** to advance past the '-' to set the end channel

Step 30   Use **[NEXT][PREV]** to set the end channel to "512".

Step 31   Press **[DOWN]** to complete the entry.

Step 32   Press **[SELECT]** to exit the screen.

Step 33   Press **[SELECT]** a second time to save changes.

So what do these values mean?

Idle drop to Zero: This setting determines what happens upon less input source signal. For example, let's say you have a control source plugged into the DMX input port #1 which you have patched to DMX output ports #1, #2, & #3. Let's also say that DMX output #1 is outputting to a dimmer rack which controls the house lighting. You're in the middle of intermission and the control console is instructing all of the house lighting dimmers to full brightness. Someone walks by the console and trips over the DMX cable which pulls it out of the console. If the idle drop to zero setting is set to drop, then all of the house lighting in the room will immediately go black. If on the other hand this setting is set to keep, the house lighting will remain at it's previously set level until it receives further instructions.

Level Precedence: This setting determines what happens when more than one control source is available for a single output. The options are either **high** or **last**. If the setting is **high**, then the

output will be set to the highest setting of all the control sources. If the setting is **last** then the level of the output will be set to the level of the source which most recently made the change.

The options used to control these behaviors are set for ranges of output channels on a particular output. The ranges could be as large as an entire universe, or as small as a single channel.
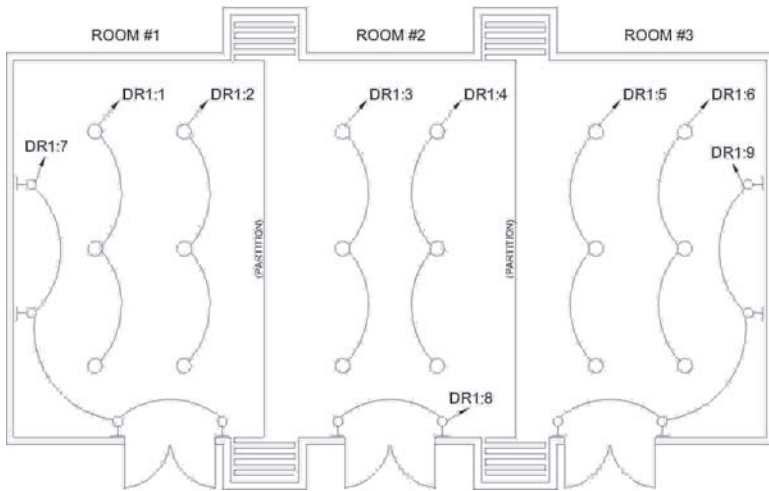
Lighting Groups

Lighting groups are used in the configuration of room separate/ combine behavior. When rooms are combined, all channels within that room which are in the same group will be combined and operate together. When rooms are separated, they operate independently with each local control.

Note: This selection only appears if Luma-Net is active in "device connections" and is used to configure as many as 255 lighting groups using as many as 255 Luma-Net channels in 255 rooms.
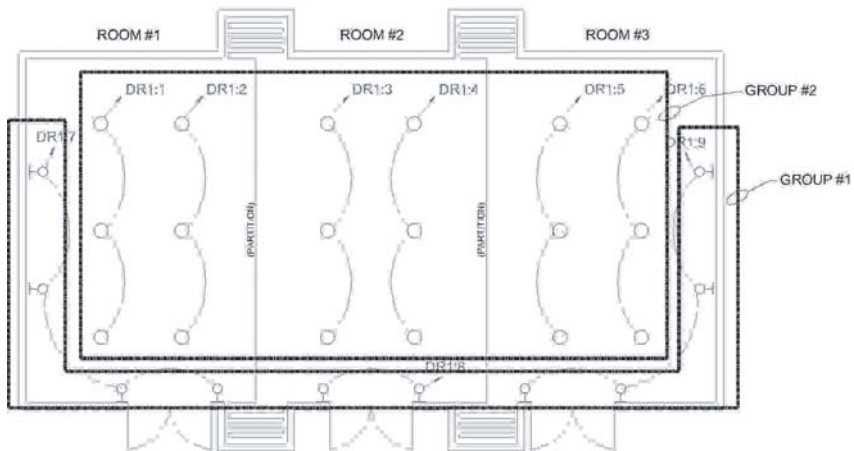
For example, consider the following lighting layout in a room:

Now consider the following lighting groups:

Figure 15: Typical Room with Two Partitions

This hypothetical large room can be split into three smaller rooms by closing the partitions. Lighting circuits 1,2,3,4,5 and 6, all are connected to down lights which are designed for general room lighting. The wall sconces, connected to circuits 7, 8, & 9 are

designed to warm up the walls a little bit and contribute to the visual aesthetics of the room.

Figure 16: Grouping of Control Channels

This group as illustrated in the figure above groups all of the down lights together into group #2 and all of the wall sconces together in group #1. The implication of this is that when the NPC is configured with this grouping, and the room is configured as a large room, any changes to any channel with **group #1** will automatically be transferred to all other channels within the same group. The same is true for **group #2**.

When entered into the NPC, the groups which would achieve the
desired result would be as follows:

Figure 17: Lighting Groups

To add, edit, modify, connected, or separate groups, use press the
[SELECT] button to bring up the menu which will give you the
following choices:

Exit – returns you to the main menu
Connect rooms – allows you to select two rooms to connect
Separate rooms – allows you to select two rooms to separate
Add channels – allows you to add channels into a group
Delete channels – allows you to remove channels from a group
Show – shows you the current groupings (returns to the Lighting
Groups screen)

Procedure for Creating a group:

> **Step 1** Press [SELECT] to bring up the menu.
> **Step 2** Press [UP][DOWN] until "Add Channels" is
> selected.
> **Step 3** Press [SELECT].
> **Step 4** Enter Group Number.

Step 5 Press [DOWN].

Step 6 Enter Room Number.

Step 7 Press [DOWN].

Step 8 Enter Channel Number.

Step 9 Press [DOWN].

Step 10 Repeat steps 1-9 for all required groups, rooms and channels.

Step 11 Select "exit" from the menu.

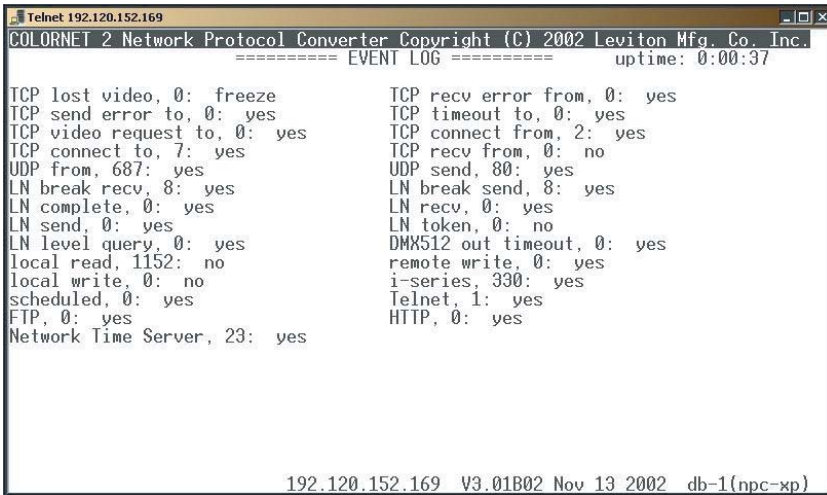**Step 12** Press [SELECT] a second time to save changes.

NOTE If Luma-Net Network Broadcast is enabled, all room numbers in a facility must be unique.

Event Log

The event log is for use by authorized factory technicians or as directed by technical support, when troubleshooting NPC operation.

Figure 18: Event Log
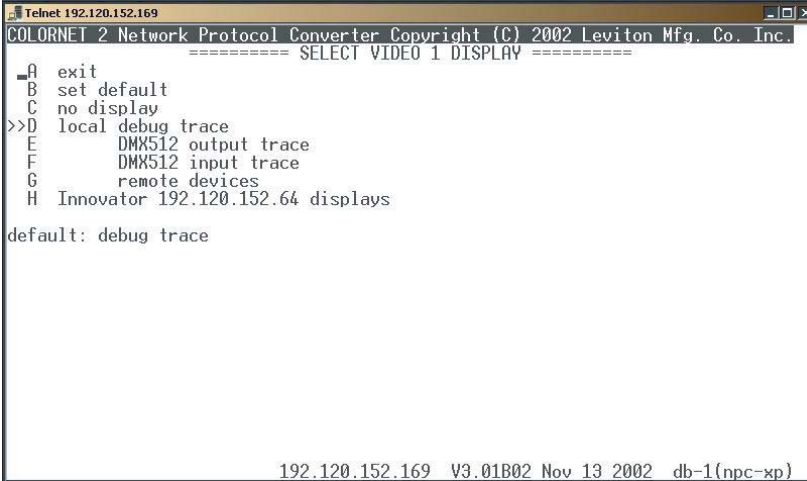
Selecting Displays

This section addresses the following menu options:

- Select Video 1 Display
- Select Video 2 Display
- Select Telnet Display

The result of these settings is the determination of what is displayed on each of the two video outputs, or remotely on the Telnet display.

NOTE   The display selection will not become active until the exit option is selected from the display menu.

Figure 19: Select Video 1 Display

The currently selected option is shown by a '>>' adjacent to the selection.

Available Options:

Exit- Exits the select video display menu and actives the selected display.

Set Default and Exit- Used to set the video setting selected and marked on the display with a >> to the power up default setting and the screen the NPC returns to.

Local Debug Trace- Displays codes used to debug NPC unit.

DMX 512 Output Trace- Displays intensity information for the particular DMX output.

DMX 512 Input Trace- Used to display intensity information for the particular DMX input.

Remote Devices- Displays a list of all remote devices currently sensed on network with IP address.

Innovator X.X.X.X. Displays- Displays any available displays from any detected consoles. If available and once selected a menu list would appear with options for the type of display to assign.

iSeries Feedback Displays- Displays feedback from a selected iSeries Dimmer Rack.

There's a menu line for each local video, and one for Telnet if this is active. What i Series and Innovator displays are available depends of course on the actual network connections.

NOTE

Figure 24 shows also that the NPC is communicating with an Innovator console and that the "STAGE" display is selected. When the user exits the main menu, the Innovator's Stage Display will appear on the video 1 display monitor. Further, this is an active display and will show changes as they occur in real time. Pressing **[RIGHT][LEFT]** when viewing innovator display cycles through all available displays.
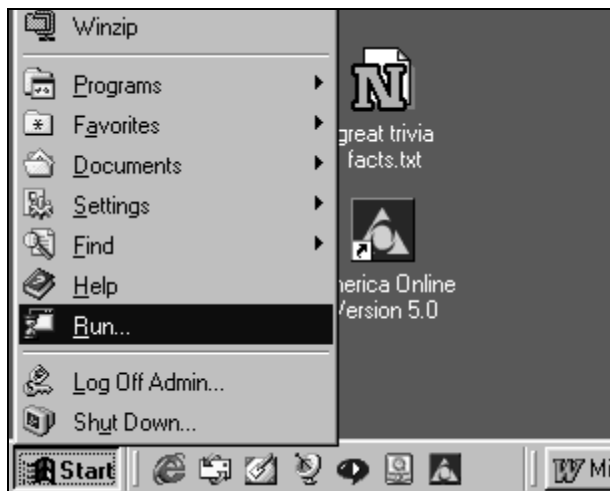
Configuration by Telnet or Keyboard

Telnet can be used to configure your NPC from any PC anywhere on the network. These instructions are designed to show you how to use telnet based on the Microsoft Windows telnet client.
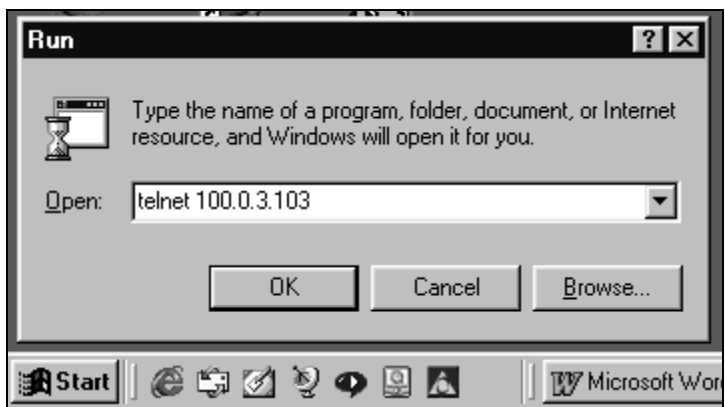
The following instructions and screen captures are applicable for Windows 95/98/Me/NT4 and 2000. Minor variations may exist in the format of the screens. For networks with routers, you may need to contact your system administrator to insure your workstation and the NPC are able to connect.

Starting the TELNET Client

Figure 20: Windows Start Menu

Microsoft, beginning with Windows 95 included a TELNET client as part of the operating system. To begin a TELNET session on your PC, press the **START** button on the Taskbar and then select **RUN**.

Figure 21: Typical Windows Run Dialog Box

The system will respond with a **RUN** dialog box. Type **TELNET** followed by the **IP** address of the NPC you wish to send or receive data with. Then press the **ENTER** key or use your mouse and click once on the **OK** button.

Figure 22: Windows Telnet Session Showing NPC Main Menu

At this point, your PC will open a **"Telnet" session**. If you have entered the IP address properly and the NPC is operational, it will respond by connecting to the NPC and displaying the main menu.

The keyboard works the same way in telnet as it does when connected to the front of an NPC-XP.

Keyboard Use

The following table shows the special keyboard functions for Telnet and keyboard.

Front Panel	Telnet	Keyboard
Select	Esc	Esc
Down	Cursor Down	Cursor Down
Up	Cursor Up	Cursor Up
Next	Tab	Tab
Previous		
Left	Cursor Left	Cursor Left
Right	Cursor Right	Cursor Right
Next / Prev	Y	Y
Next / Prev	N	N

File Transfer

There are three types of files which can be transferred to/from an NPC:

- NPC System Software
- NPC System Configuration
- Luma-Net Device Programming

All file transfers to/from the NPC are done with an ftp client.

Code File and Configuration File

Two of the kinds of files you can transfer to and from the NPC are: **code files** (extension "cod") and **configuration files** (extension "dat"), using the FTP file transfer protocol.

The **code file** is the application code or software that makes the NPC operate.

The **configuration file** contains the entire NPC. Retrieving the file from an NPC allows you to backup configuration transfer the same configuration to/from multiple NPC's or send configuration to the factory for analysis.

The NPC knows whether to send or receive a code or configuration by the extension of the file. If a file is sent or requested with **a .cod** extension, the firmware code is sent or received. If a file is sent or requested with **a .dat**, the configuration data is sent or received.

Luma-Net Files

The last kind of file you can transfer to/from your NPC is the Luma-Net configuration files. These files contain all of the programming data contained in a Luma-Net device. The determination of which devices programming is retrieved is determined by the name of the file requested. The filename follows the following format:

P[port #]L[device address].lda

For example, if a device connected to port #2, or the Luma-Net B port, with address 18 from which you wanted to retrieve configuration, you would enter the ftp command
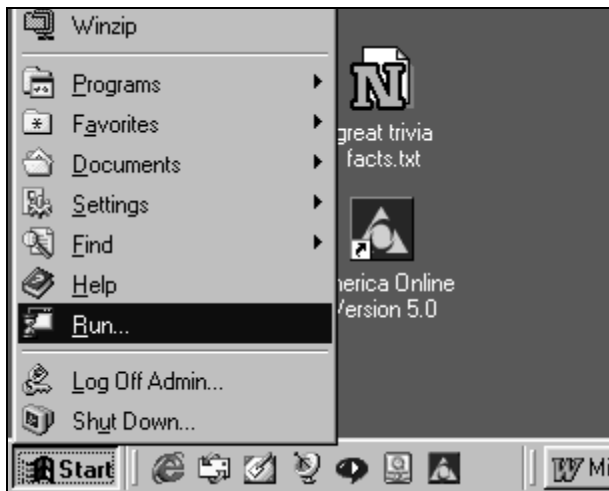
get P2L18.lda

Real World ftp Examples

The following pages will walk you through a sample ftp session.

NOTE

The following instructions and screen captures are applicable for Windows 95/98/Me/NT4 and 2000. Minor variations may exist in the format of the screenwriter to insure your workstation and the NPC are able to connect.
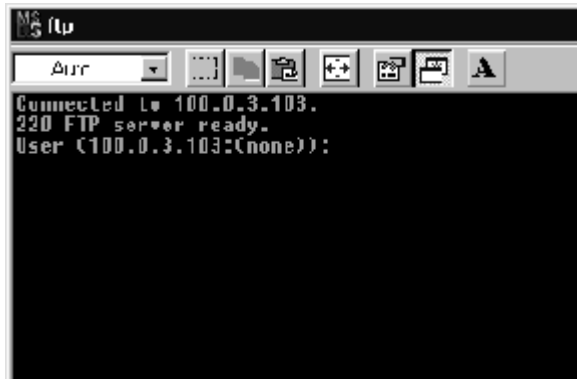

Figure 23: Windows Start Menu

To begin an FTP session on your PC, press the **START** button on the task bar and then select **RUN**.

Figure 24: Windows RUN Dialog Box

The system will respond with a **RUN** dialog box. Type FTP followed by the IP address of the NPC you wish to communicate with. Then press the **ENTER** key or use your mouse and click once on the **OK** button.

Figure 25: WIN98 FTP Screen (Partial)

At this point, your PC will open a "dos session" or for NT systems a "command" session. If you have entered the IP address properly and the NPC is operational, it will respond with the above prompt for a user name. The current user name for all NPC versions is **NSI**.

Using the FTP Client

Although FTP as a protocol supports many commands, the NPC currently only utilizes 3 of them. They are:

Command	Function
Get	Retrieve configuration (.dat) or firmware code (.cod) from the NPC and store it to the client's local disk. **p[port#]L[address].lda** Luma-Net Device Configuration
Put	Send to the NPC configuration of firmware code from the ftp client's disk
	Restart
Del boot	
Del data	restore to standard defaults after next boot.

In the following examples, user commands are in boldface. Start the client, log in.

Procedure:

> **ftp 100.1.1.61**
> Connected to 100.1.1.61
> 220 FTP server ready.
> User (100.1.1.61:(none)): **NSI (or your defined password)**

Password:

231 User name accepted.

ftp>

ftp> **delete boot**

Connection closed by remote host.

Retrieve the configuration file from the NPC and named confa.dat.

ftp> **get confa.dat**

200 OK.

150 ready to send file.

226 closing.

ftp: 11481 bytes received in 0.17 Seconds 67.54 Kbytes/sec.

ftp> **quit**

221 Goodbye.

Install a new application version from npc2.cod.

ftp> **put npc2.cod**

200 OK.

150 ready to take file.

226 closing.

ftp: 122340 bytes sent in 0.32 Seconds 382.31 Kbytes/sec.

ftp> **quit**

221 Goodbye.

The NPC will automatically initialize after this.

Get Luma-Net port A(1), station at address #2 confirmation data.

ftp> **get p1l2.lda**

2a OK

150 ready to send file

226 closing

```
ftp: 56 bytes sent in .08 seconds
ftp> quit
221 Goodbye
```

Warranty

Leviton Lighting Control Division of Leviton Manufacturing CO Inc., warrants this product to be free of material and workmanship defects for a period of two years after system acceptance or 26 months after shipment, whichever comes first. This warranty is limited to repair of replacement of defective equipment returned F Freight Pre-Paid to Leviton Lighting Control Division at 20497 Teton Ave., Tualatin, Oregon 97062, USA. User shall call 1-800-959-6004 and request a return authorization number to mark on the outside of the returning carton, to assure that the returned material will be properly received at Leviton. All equipment shipped back to Leviton must be properly packed to avoid shipping damage. Replacements or repaired equipment will be returned to sender freight prepaid, F.O.B. factory. Leviton is not responsible for removing or replacing equipment on the job site, and will not honor charges for such work. Leviton will not be responsible for any loss of use time or subsequent damages should any of the equipment fail during the warranty period, but agrees only to repair or replace defective equipment returned to its plant in Tualatin, Oregon. This Warranty is void on any product that has been improperly installed, overloaded, short circuited, abused, or altered in any manner. Neither the seller nor Leviton shall be liable for any injury, loss or damage, direct or consequential arising out of the use of or inability to use the equipment. This Warranty does not cover lamps, ballasts, and other equipment which is supplied or warranted directly to the user by their manufacturer. Leviton makes no warranty as to the Fitness for Purpose or other implied Warranties.

Notice

Although the information contained within this user guide is believed to be accurate at the time of printing, it is not guaranteed to be without fault and is subject to change without notice. Future software releases may change the features or operation of this product. For current information contact:

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