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# Overview

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## 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



***Figure 1: NPC Product Line XP, DLR and QT***

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
DLR	1	1				1		
QT	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

## 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 phrase 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 its context.

**ColorNet** – Leviton’s network protocol used to carry lighting control signals over Ethernet wiring using TCP/IP.

**DMX** – 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** – 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 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.

**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

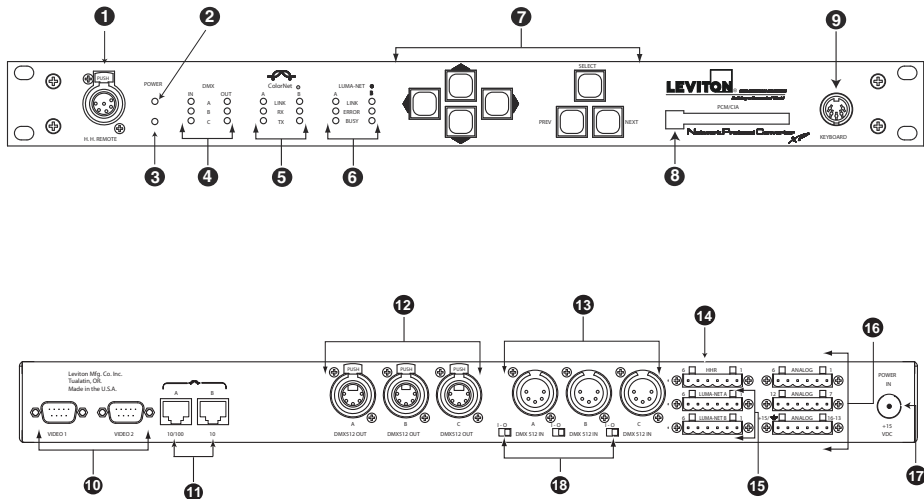
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# Physical Connections

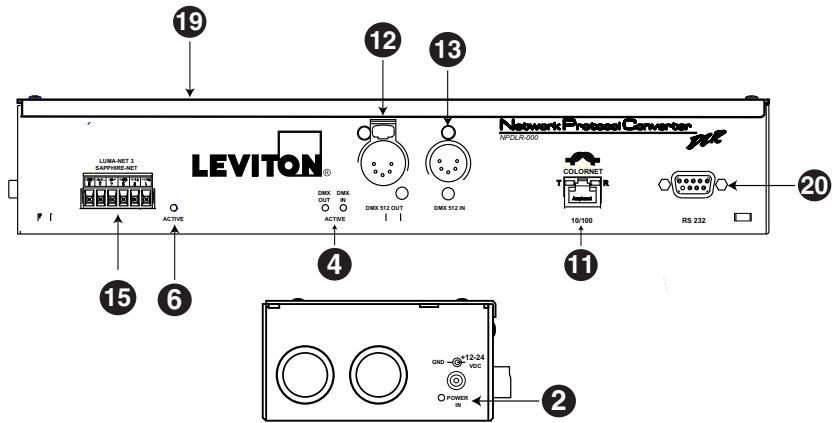
The information in this chapter identifies and describes all of the physical connections to, controls, and indicators of the NPC.

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



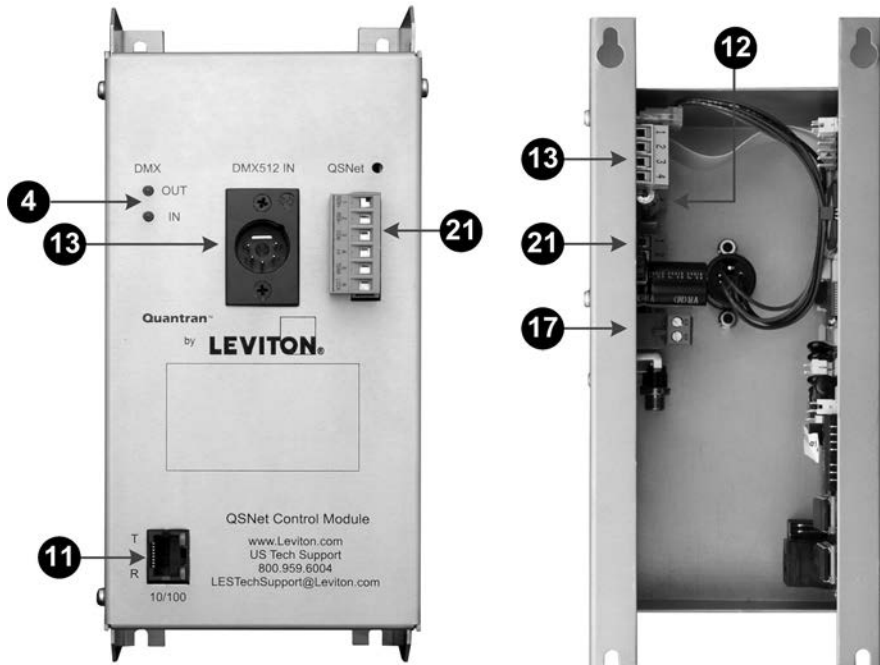
**Figure 2: NPC XP Front and Back Views**

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



**Figure 3: NPC DLR I/O Reference Diagram**

The image below shows the front view of the NPC QT. It is designed to give you an overview of the physical attributes to the NPC QT. Use numbered callouts to cross reference with the legend/ descriptions below.



**Figure 4: NPC QT Reference Diagram**

- 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) Luma-Net Indicators:** Show status of the Luma-Net ports.

**LINE** indicates a properly operating Network

**ERROR** indicates no network present or other problem

**BUSY** indicates a transmitted or received command

**7) Navigation & Operation Buttons:** Buttons used when performing local configuration functions. See the section titled "Navigation Button Operation & Requirements"

**8) Memory Card:** This slot is for a PCMCIA memory card used to store and fetch configuration and application files.

**9) Keyboard Port:** This port is used to attach an IBM style keyboard with AT connector used for editing and input of alpha numerical data.

**10) 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.

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

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

**13) 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.

**14) Hand Held Remote Hard wired Port:** This port is to be used for connecting external hard wired 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.

**15) Luma-Net Port(s):** These ports are used to connect Luma-Net control networks to the NPC.

**16) Analog Ports:** These programmable ports are used to connect as many as 16 analog levels 0 – 10 VDC or contact closures to the NPC. These can be used to directly activate channels on any local device or network universe. Contact closures are ideal to control room separate/combine functionality.

**17) Power Input Port:** Plug the supplied DC Power supply into this port to supply power to the NPC. The NPC requires a +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.

**18) 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.

**19) Cover:** Reversible cover for surface mount applications.

**20) RS-232:** Luma-Net programming port.

**21) Luma-Net Data Connections:** These Terminals are used to connect Luma-Net and QS-Net control networks to the NPC.

# 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

The NPC has a variety of installation options which you can choose depending on your particular needs. **First**, it can either be used in table top applications, permanently installed surface mount applications or rack mounted (XP only). **Second**, you can either use the internal terminations or external terminations. And **Third**, the cover can be installed in two orientations to either hide or make available the external receptacles (DLR only). The QT model is designed to be installed in QT Racks only.

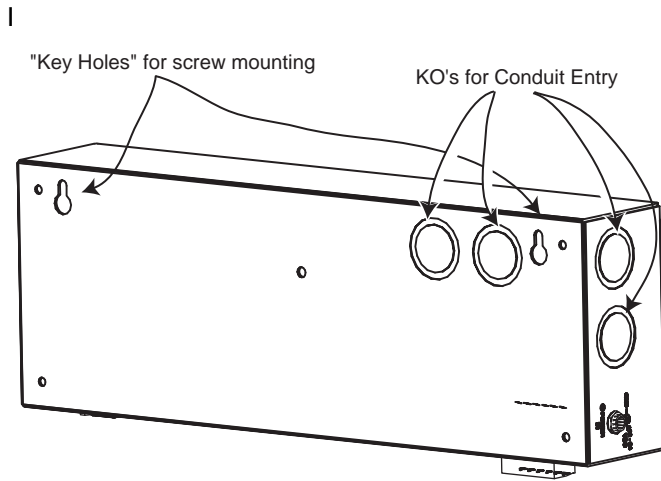
### NOTE

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!

## Physical Installation

If the NPC DLR is to be used in a portable scenario or mounted to a surface to which the DLR could cause damage, simply install the supplied rubber feet to the bottom of the unit, one in each corner.

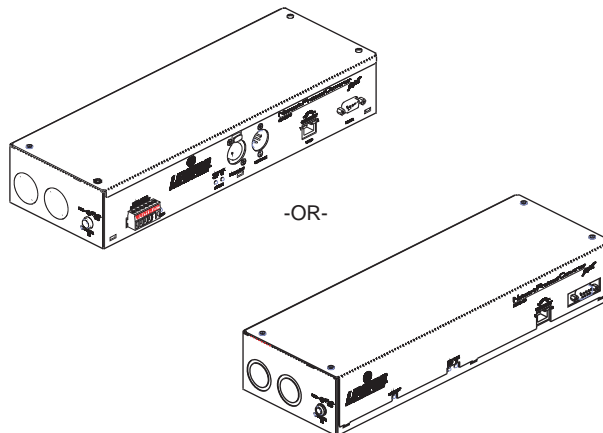
If the NPC DLR is to be permanently installed in a surface mounted fashion, locate an area on your wall or other surface suitable for the device and clear of obstructions, then use the keyholes on the back to attach the device to the surface. Use screws suitable for your particular application (**see figure 5 following**).



*Figure 5: NPC DLR Permanent Installation*

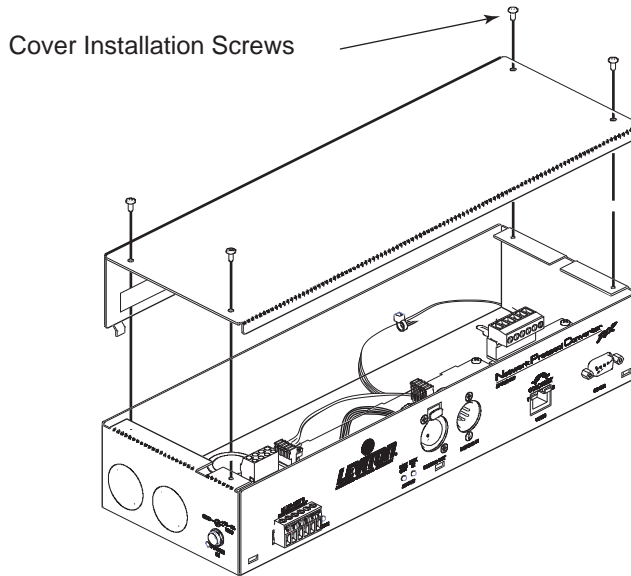
## NPC DLR Cover Installation Options

Although the orientation of the cover is perhaps the last thing you will need to address, it is important to recognize and plan for the options early on. The cover can be installed in two fashions, either making all exterior receptacles visible or hiding them.



*Figure 6: DLR Front Cover*

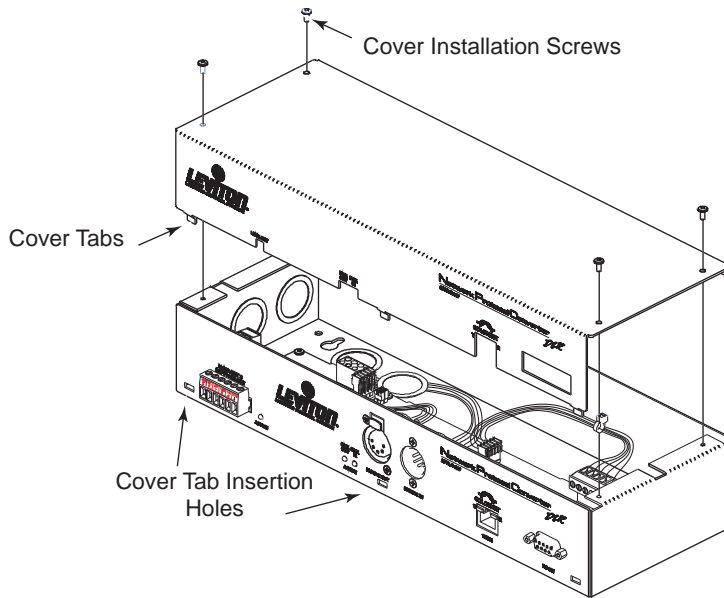
If you will be using the **external terminations**, install the cover such that the external receptacles are visible.



**Figure 7: DLR Open Cover Terminations**

If you will be using the **internal terminations**, install the cover such that the external receptacles are hidden (reference Figure 6-7). Make sure that you insert the cover tabs into the cover tab insertion holes on the front of the device.





**Figure 8: DLR Cover Tabs**

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

## NPC XP Connections

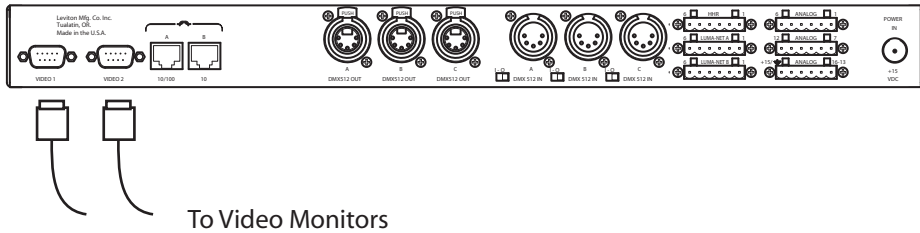
## ColorNet Network Connections

- 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.

## Video Connections

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.



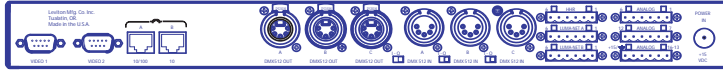
**Figure 9: XP Video Connections**

**NOTE**

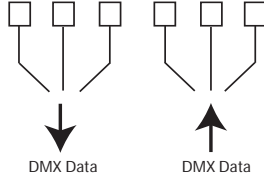
Even if a video monitor is not being used in the permanent installation, it is helpful if not required for initial setup/configuration.

## DMX Connections

Connect any required DMX input or output devices



Connect any required  
DMX Inputs or Outputs



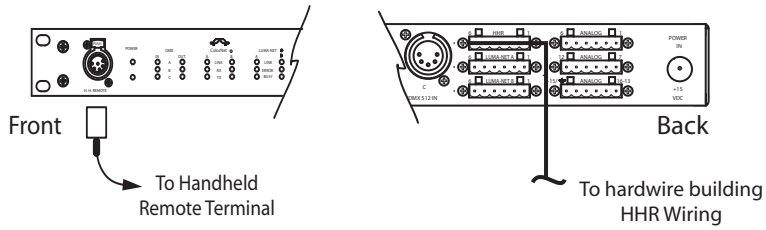
(Not all required connections)  
0,1,2,3 Outputs  
0,1,2,3 Inputs

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 10: Device Connections**

## Handheld Remote

Connect Handheld remote to front or back of NPC.



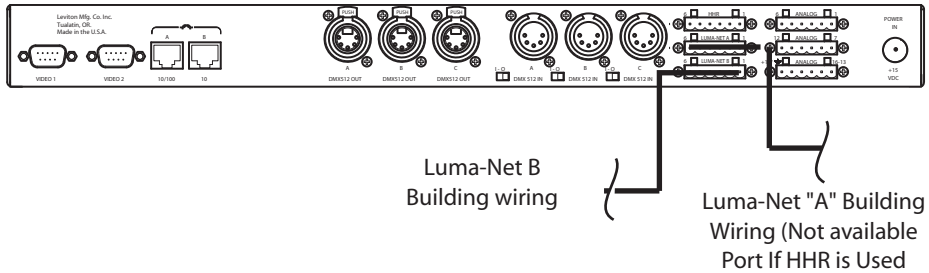
**NOTE** If a handheld remote is used, either hard wired or otherwise, you must abandon the Luma-Net A port.

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

**Figure 11: Handheld Remote Physical Connections**

# Luma-Net

Connect any Luma-Net station to one of the two Luma-Net ports.



Luma-Net			
Terminal	Function	Wire (Belden 9829+(2)#14)	
		Pair	Color
1	Rem +	1	White/Blue
2	Rem-		Blue/White
3	Common	#14AWG	Black
4	+V		Red
5	Term	3	N/C
6	N/C		N/C

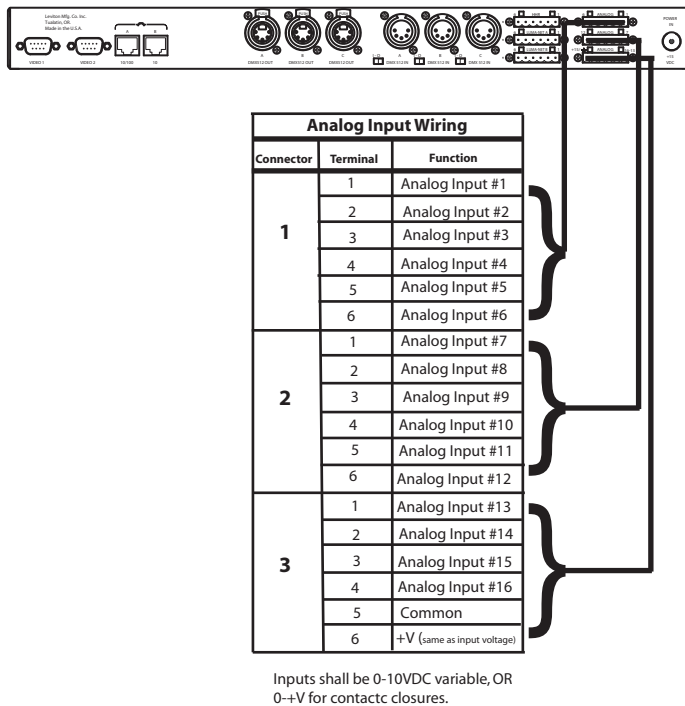
Note: pair #2 has no connections.

**Figure 12: Luma-Net Connections**

## Analog Inputs

Connect any analog inputs, like photocells, or dry contact closures, to the analog input ports. Contact closures should be connected between +V and the analog input.

When using the analog inputs as a contact closure, the closure requires a minimum of +10VDC to trigger. When using them to sense a variable analog control signal, the range of measurement is +0-10VDC. The maximum rated input of an analog input is +24VDC.

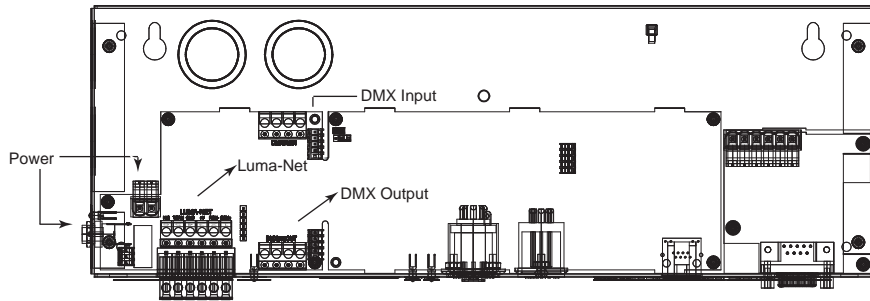


**Figure 13: Analog Inputs**

## NPC DLR Connections

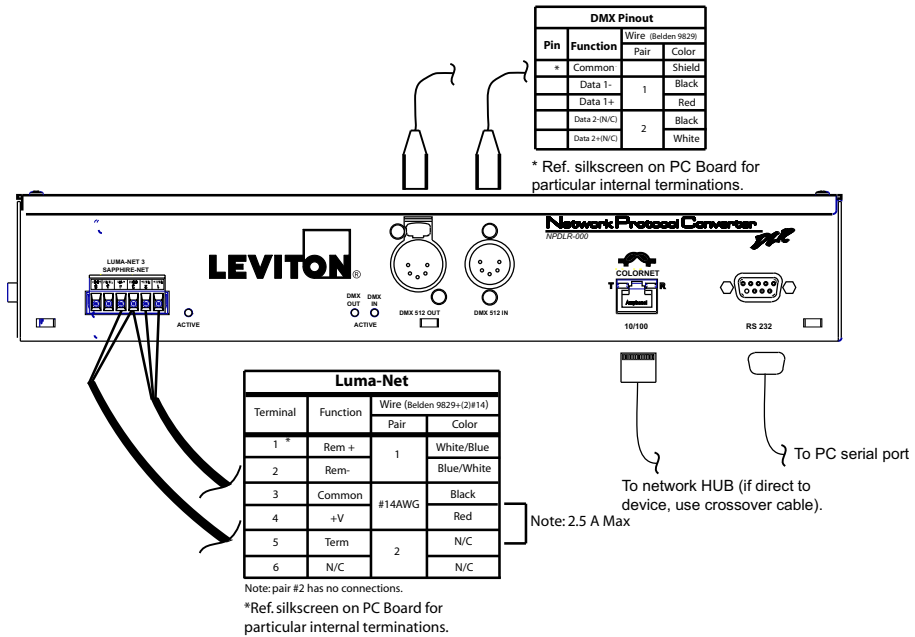
### Terminations

Reference the diagram and charts below for termination location of terminations for both internal and external termination methods.



Internal Terminations, Top View, Cover Removed (see wiring charts below)

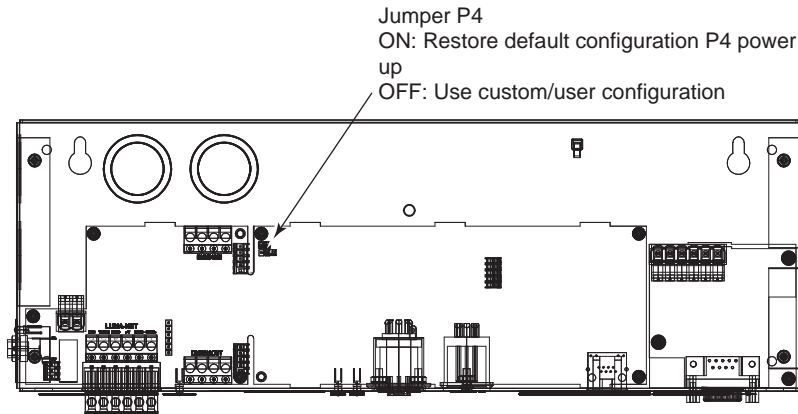
*Figure 14: Internal Terminations*



**Figure 15: External Terminations**



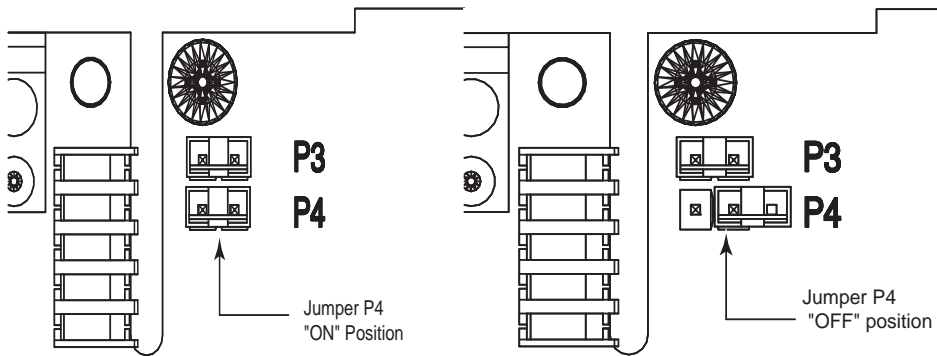
## Jumper P 4



*Figure 16: Jumper P4, DLR, Top View*

The NPC DLR has a feature unique to this model of NPC in that it allows default factory configuration to be restored upon power up, regardless of any changes which have been made. Additionally, there are many configuration changes which are prohibited when this feature is enabled.

To enable this feature, jumper P4 should be "ON". That means a jumper connects the two pins on the header labeled as "P4" (see figure 17).



**Figure 17: Jumper P4 "ON" position Jumper P4 "OFF" position**

The default settings create the following patches:

LUMA-NET INPUT	————>	ColorNet Universe #1
DMX INPUT	————>	ColorNet Universe #1
ColorNet Universe #1	————>	DMX OUTPUT

Luma-Net respond to level query:	Yes (effective release 3.1.1)
Relay Group Data:	No
Status Message Broadcast:	No
Broadcast Receive:	Yes
Time & Date Broadcast:	No
Operating Mode:	Send & Receive
DHCP for IP Address:	Yes

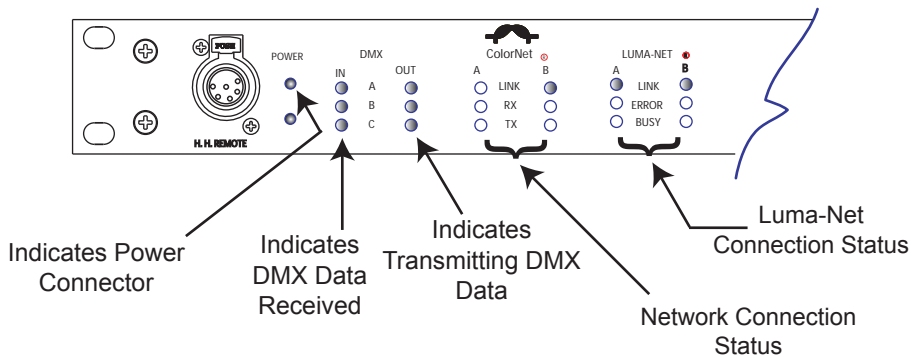
To disable this feature and allow for custom configurations, jumper P4 should be in the "OFF" position. That means that the jumper does not connect the two pins on the header labeled as "P4" (see figure 17).

## System Status Check

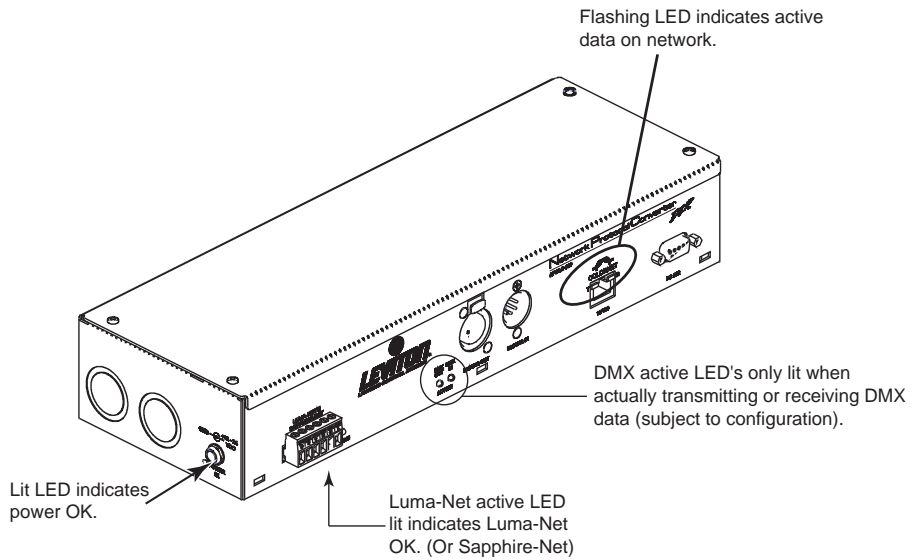
Make your final power connections and apply power.

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 LEDs on the front of the unit.

If you have problems with your NPC or it is not operating as expected, reference the troubleshooting section at the end of part 2.



**Figure 18: NPC XP Successful Status of LED**



**Figure 19: NPC DLR Successful Status of LED**

**NOTE** LEDs may not be lit as expected with default configuration.

## Navigation Button Operation & Requirements

---

This section applies to the NPC XP only.



*Figure 20: NPC XP Front Panel Buttons*

The basic operation of the NPC XP 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: 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 its 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 its 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 section on Configuration by Telnet or keyboard. The concept will be the same, the interface and keystrokes are just slightly different.

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## 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.

```

COLORNET 2 Network Protocol Converter Copyright (C) 2002 Leviton Mfg. Co. Inc.
----- MAIN MENU -----
_A exit menu
_B device connections
_C DMX512 universe numbers
_D general setup
_E patching
_F channel options
_G memory card operations
_H lighting groups
_I A/D devices
_J LUMA-NET B operations
_K event log
_L select video 1 display
_M select video 2 display
_N select Telnet display

IP Address      Software Version  Current Date      Name of NPC
-----
192.168.90.158  U3.01J          Dec 18 2002      db-npcxp-1
    
```

The screenshot shows a terminal window with the title 'COLORNET 2 Network Protocol Converter Copyright (C) 2002 Leviton Mfg. Co. Inc.' and a subtitle '----- MAIN MENU -----'. The menu lists options A through N. Annotations include a bracket for 'Menu Options' covering items B through N, a line for 'Menu Title' pointing to the title, and four brackets at the bottom identifying 'IP Address', 'Software Version', 'Current Date', and 'Name of NPC'.

*Figure 21: NPC - Main Menu*

### NOTE

If the Main Menu is not visible when you approach the NPC, pressing the **[SELECT]** or **[ESC]** 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 with 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

**Memory Card Options** - used to load/save configurations to the memory card. (Applies to NPC XP only)

**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.

**Contact Closure Keys** – allows you to define the behavior of the analog inputs (only if contact device is selected in 'device connections' of the NPC XP).

**A/D Devices**- allows you to set the behavior of analog, 0-10v devices like slide pots or photo cells (only if A/D device is set in 'device connections' of the NPC XP).

**Luma-Net A/B Operations** – sets up Luma-Net network addressing information and provides Luma-Net diagnostic information.

**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.

```

COLORNET 2 Network Protocol Converter Copyright (C) 2003 Leviton Mfg. Co. Inc.
===== GENERAL SETUP =====
A → host name: npc1
B → Port A IP address: 192.168.8.1      MAC address: 00 10 e4 ff 00 01
   hard-coded IP address: 100.0.0.0  hard-coded IP mask: 255.0.0.0
C → DHCP for IP address: no          TCP 24 hour watchdog: disabled
   static gateway: 0.0.0.0
D → BACnet over Eth/IP: none        BACnet device ID [6dig]: 255
   BACnet default priority: 0      Block relq at def prior: yes
   BACnet learn as AO/BO: BO
E → automatic return to default video: no

Network Time Server: 204.34.198.41
F → time zone: -8 Pacific          12/24 hour mode: 12
   daylight saving time: automatic, US
   date and time: 3/27/2014 2:55:23p (Thursday)
   location: 45°36'N 122°36'W

G → LUMA-NET level save: yes      K → BAS auto-relq Priority: 9
H → DMX levels percent or hex: percent  DMX non-significant change: 5
I → zero-level DMX drop minutes: 30    custom service code: 0000
J → configuration change: allowed      password: 0000

U3.27C2 Mar 26 2014 npc1 UGA1

```

*Figure 22: 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 its IP address and its 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 its 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 its IP address. There are three methods by which an NPC can get its 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 NPC XP 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 or **[TAB]**, 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]** or **[TAB]** to select **NO***

**Step 4** Press **[SELECT]** or **[ESC]** to initiate a return to the main menu and **[SELECT]** or **[ESC]** 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**

- If DHCP= YES and DHCP server IS found, the DHCP server will return an IP address.
- IF DHCP= YES and DHCP server IS NOT found, hard coded IP address is used.
- IF DHCP= NO or DHCP server IS NOT found and hard coded address is set to an IP address, the hard coded address is used.
- 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. BACnet Settings

BACnet over Eth/IP - Enables/disables BACnet communication on this NPC

BACnet default priority - Priority number for BACnet communication. Default value is 8 and ordinarily shouldn't be changed. Some systems may require different settings. If this is the case, the BACnet programmer will provide the requires priority level. Valid values are 1-16 with 1 being high.

BACnet learn as AO/BO - Determines whether NPC channels are presented to the BACnet network as Analog Outputs (AO) or Binary Outputs (BO). The BACnet programmer may have a preference IF the system is all relays. If the system is a mix of relays and dimmers, or, all dimmers, this should be set to AO.

BACnet Device ID - Sets to the BACnet identification number for this device. Must be set to an available number for the BACnet system as directed by the BACnet programmer. Default value is 255.

Block Relq (relinquish) at Default Priority - Issues a relinquish at the default priority level when the channel level is at 0. This allows lower priorities to take control.

## E. 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.

## F. 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 its 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 its 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 usually have 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 its 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.

## G. 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 save option.
- **clear** – this setting clears the non-volatile memory on board the NPC.

## H. 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.

## I. DMX non-significant level change

When two controllers, which control the same channels, are operating in a "take control" manner, (when two controlling devices 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.

## J. Configuration Protection

When an NPC is 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.

## K. BAS Auto-Relq Priority

BAS Auto-relq priority - Any BO or AO writes that cause a change in the current value at this priority will cause an automatic relinquish of the default priority thereby giving control of the lighting system to the BMS. Valid values are 1-16.

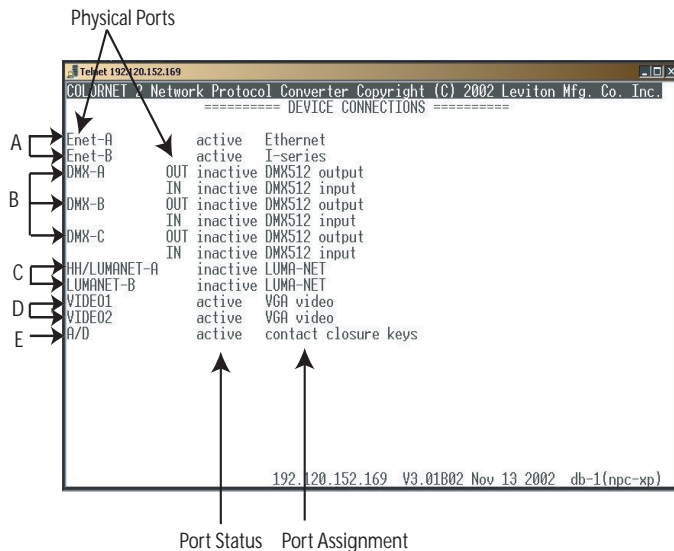
### NOTE

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.



**Figure 23: Device Connections**

From the main menu, use the cursor keys to highlight the item **“device connections.”** Pressing the **[SELECT]** or **[ESC]** button will bring up the display shown in figure 23. 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]** or **[TAB]** 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, if you want to forcibly disable communications on that particular port. (ENet-B applies to NPC XP only)

## 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. (DMX-B and DMX-C apply to NPC XP only)

## C. HH/Luma-Net A

The word active or inactive is shown to indicate whether the NPC detected a connected device. For the NPC DLR this should be set to Luma-Net or no device. For the NPC XP the options are either hand held remote, Luma-Net or no device. If a hand held remote is connected either to the front or the rear of your NPC, this menu item must be set to hand held remote in order for it to operate correctly.

### NOTE

If a hand held remote is used, either hard wired 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. Luma-Net B

The word active or inactive is shown to indicate whether the NPC detected a connected device. The option for this item is either Luma-Net or no device. (Applies to NPC XP only)

**D. VIDEO1:** Video 1 is always active and cannot be turned off. (Applies to NPC XP only)

**D. 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. (Applies to NPC XP only)

### E. A/D

The word active or inactive is shown to indicate whether the NPC detected a connected device. The option for this item is either contact closure keys, analog input. (Applies to NPC XP only)

## 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.

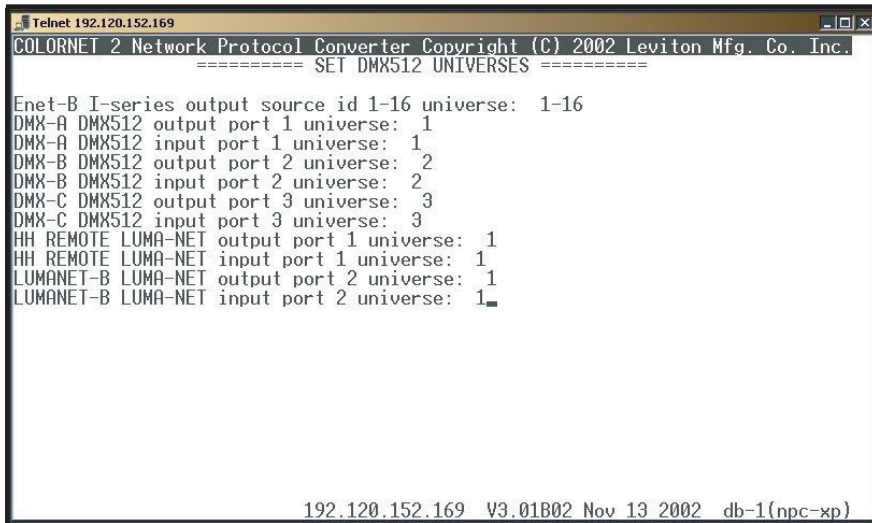
### Saving Changes

When any changes are made, pressing **[SELECT]** or **[ESC]** will display the question “save changes” Pressing **[SELECT]** or **[ESC]** 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.



```

Telnet 192.120.152.169
COLORNET 2 Network Protocol Converter Copyright (C) 2002 Leviton Mfg. Co. Inc.
===== SET DMX512 UNIVERSES =====

Enet-B I-series output source id 1-16 universe: 1-16
DMX-A DMX512 output port 1 universe: 1
DMX-A DMX512 input port 1 universe: 1
DMX-B DMX512 output port 2 universe: 2
DMX-B DMX512 input port 2 universe: 2
DMX-C DMX512 output port 3 universe: 3
DMX-C DMX512 input port 3 universe: 3
HH REMOTE LUMA-NET output port 1 universe: 1
HH REMOTE LUMA-NET input port 1 universe: 1
LUMANET-B LUMA-NET output port 2 universe: 1
LUMANET-B LUMA-NET input port 2 universe: 1

192.120.152.169 V3.01B02 Nov 13 2002 db-1(npc-xp)

```

*Figure 24: 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** Use **[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]** or **[ESC]** once to exit the screen, and **[SELECT]** or **[ESC]** 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.

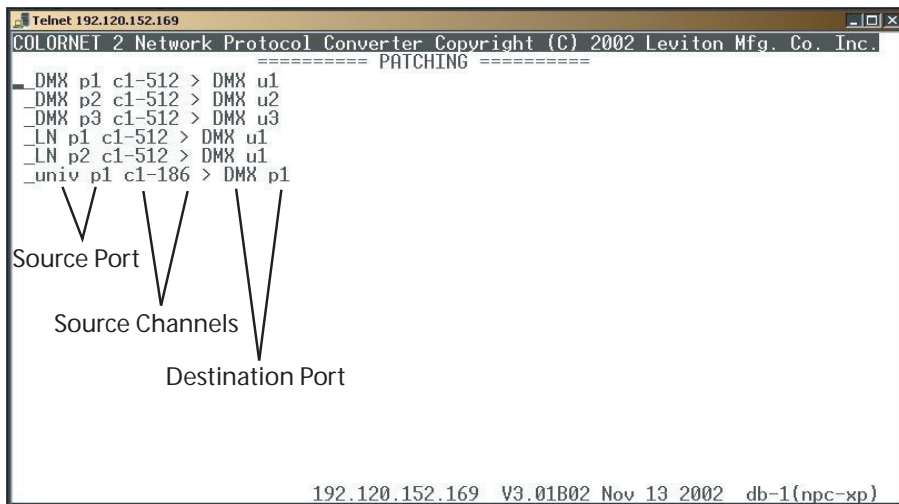
## Patching

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 sections. 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 51.

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



**Figure 25: 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, Device 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 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.

**LN p1** -Luma-Net port 1 (also can be p2 for p2).

**analog p1** -Analog Input, #1 (also can be p2-p16).

**univ p1** -ColorNet Universe #1 (also p2-p256 for other universes).

**Destination Types:**



- DMX p1** -DMX Output Port #1 (also p2 or p3).
- LN p1** -Luma-Net port 1 or port 2
- 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.



```

Telnet 192.120.152.169
COLORNET 2 Network Protocol Converter Copyright (C) 2002 Leviton Mfg. Co. Inc.
===== PATCHING =====
DMX p1 c1-512 > DMX u1

```

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,

**univ p1 c1-24 > DMX p3 c25**

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]** or **[ESC]** button. When pressed, the following menu appears

<b>Exit</b>	Finalize changes, return to main menu
<b>Add Device Patch</b>	Patch from a local device
<b>Add Universe Patch</b>	network data sent to a universe
<b>Change</b>	Change the highlighted patch
<b>Delete</b>	Delete the highlighted patch
<b>List</b>	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 the fields.

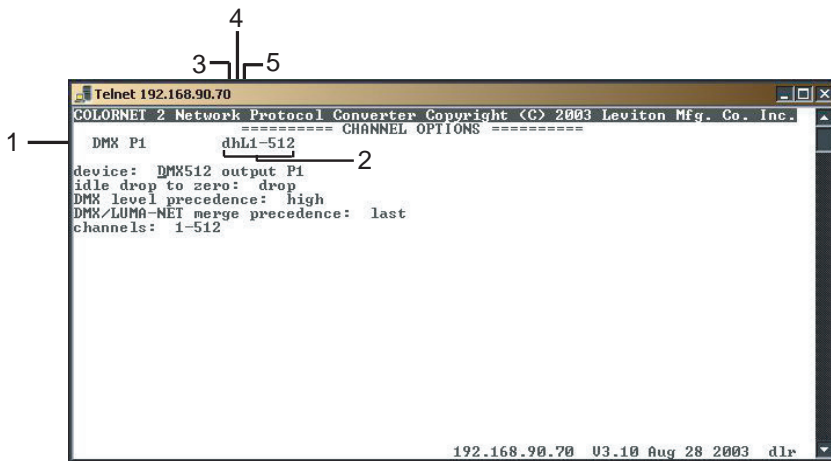
### **Procedure: To create a Patch from analog input #1, to ColorNet Universe #28, channel 72,**

- Step 1 From the Patching Screen, **[SELECT]** or **[ESC]**
- Step 2 **[DOWN]** to “Add Device Patch”, then **[SELECT]** or **[ESC]**
- Step 3 **[NEXT]** to “Analog Input p1”
- Step 4 **[DOWN]** to “into channel”
- Step 5 **[NEXT] [PREV]** to “72”
- Step 6 **[DOWN]** to “destination”
- Step 7 **[NEXT] [PREV]** to “universe”
- Step 8 **[DOWN]**
- Step 9 **[NEXT] [PREV]** to “28”  
**[DOWN]** *Now the Patch should be in the Patch List.*

## 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 26: DLR 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".

### 5. DMX/Luma-Net Merge Procedure

H= highest level takes precedence

L= last action takes precedence

Determines the precedence between all DMX levels and the Luma-Net inputs.

#### For example:

Channel Options as set in the above figure 26 will have the following result: DMX Output port 1 for all 512 channels will immediately drop to 0 upon loss of signal. All patched DMX source channels and all patched Luma-Net source channels will be merged in a highest channel takes precedence mode.

DMX Output port 2, for all 512 channel, will keep levels upon loss of signal. All patched DMX source channels will be merged together in a highest takes precedence mode, however, Luma-Net will be combined with the

merged DMX in a last action takes precedence mode implicating that Luma-Net can “take control” over DMX at any point in time.

DMX Output port 3 has a combination of results depending on which channels you’re talking about. Channels 1-96 and 145-512 will drop to 0 upon loss of signal. They also merge all DMX and Luma-Net on a highest level takes precedence mode. However, channels 97-144 work differently. In this example, the levels will be kept upon loss of signal and for both DMX and Luma-Net the last action will take precedence.

## 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]** or **[TAB]** until “DMX 512 output P1” is selected.
- Step 3** Press **[DOWN]** to advance to the next field.
- Step 4** Use **[NEXT]** **[PREV]** or **[TAB]** to set idle drop to zero to “drop”
- Step 5** Press **[DOWN]** to advance to the next field.
- Step 6** Use **[NEXT]** **[PREV]** or **[TAB]** to set DMX level precedence to high.
- Step 7** Press **[DOWN]** to advance to the next field.
- Step 8** Use **[NEXT]** **[PREV]** or **[TAB]** to set DMX/Luma-Net merge precedence to “high”.
- Step 9** Press **[DOWN]** to advance to the next field.
- Step 10** Use **[NEXT]** **[PREV]** or **[TAB]** to set the start channel to 1.
- Step 11** Press **[RIGHT]** to advance past the ‘-’ to set the end channel.

- Step 12** Use **[NEXT]** **[PREV]** or **[TAB]** to set the end channel to "512".
- Step 13** Press **[DOWN]** to complete the entry.
- Step 14** Press **[SELECT]** or **[ESC]** to save.

**Procedure: DMX Output Port 2 (Applies to NPC XP only)**

- 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 DMX/Luma-Net merge precedence to "last".
- Step 9** Press **[DOWN]** to advance to the next field.
- Step 10** Use **[NEXT]** **[PREV]** to set the start channel to 1.
- Step 11** Press **[RIGHT]** to advance past the '-' to set the end channel.
- Step 12** Use **[NEXT]** **[PREV]** to set the end channel to "512".
- Step 13** Press **[DOWN]** to complete the entry.

**Procedure: DMX Output Port3 (Applies to NPC XP only)**

- 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 DMX/Luma-Net merge precedence to "high".
- Step 9** Press **[DOWN]** to advance to the next field.
- Step 10** Use **[NEXT]** **[PREV]** to set the start channel to "1".
- Step 11** Press **[RIGHT]** to advance past the '-' to set the end channel.
- Step 12** Use **[NEXT]** **[PREV]** to set the end channel to "96".
- Step 13** Press **[DOWN]** to complete the entry.
- Step 14** Use **[NEXT]** **[PREV]** until "DMX 512 output P3" is selected.
- Step 15** Press **[DOWN]** to advance to the next field.
- Step 16** Use **[NEXT]** **[PREV]** to set idle drop to zero to "keep"
- Step 17** Press **[DOWN]** to advance to the next field.
- Step 18** Use **[NEXT]** **[PREV]** to set DMX level precedence to "last".



- Step 19** Press **[DOWN]** to advance to the next field.
- Step 20** Use **[NEXT] [PREV]** to set DMX/Luma-Net merge precedence to "last".
- Step 21** Press **[DOWN]** to advance to the next field.
- Step 22** Use **[NEXT] [PREV]** to set the start channel to 97.
- Step 23** Press **[RIGHT]** to advance past the '-' to set the end channel.
- Step 24** Use **[NEXT] [PREV]** to set the end channel to "144".
- Step 25** Press **[DOWN]** to complete the entry and advance to the device field.
- Step 26** Use **[NEXT] [PREV]** until "DMX 512 output P3" is selected.
- Step 27** Press **[DOWN]** to advance to the next field.
- Step 28** Use **[NEXT] [PREV]** to set idle drop to zero to "drop".
- Step 29** Press **[DOWN]** to advance to the next field.
- Step 30** Use **[NEXT] [PREV]** to set DMX level precedence to "high".
- Step 31** Press **[DOWN]** to advance to the next field.
- Step 32** Use **[NEXT] [PREV]** to set DMX/Luma-Net merge precedence to "high".
- Step 33** Press **[DOWN]** to advance to the next field.
- Step 34** Use **[NEXT] [PREV]** to set the start channel to 145.
- Step 35** Press **[RIGHT]** to advance past the '-' to set the end channel
- Step 36** Use **[NEXT] [PREV]** to set the end channel to "512".
- Step 37** Press **[DOWN]** to complete the entry.

**Step 38** Press **[SELECT]** to exit the screen.

**Step 39** Press **[SELECT]** a second time to save changes.

## So what do these values mean?

**Idle drop to Zero:** This setting determines what happens upon loss 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 its 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.

## Memory Card Operations

This section applies to the NCP XP only.

Using the memory card option allows you to load/save information to/from a memory card.

```

Telnet 192.120.152.169
COLORNET 2 Network Protocol Converter Copyright (C) 2002 Leviton Mfg. Co. Inc.
===== MEMORY CARD OPERATIONS =====
no card
A exit
B save application and configuration
C save configuration
D save all LUMA-NET configurations
E restore LUMA-NET configuration
F fetch configuration
G fetch application and boot

192.120.152.169 V3.01B02 Nov 13 2002 db-1(npc-xp)

```

Indicates Type, Model, MFG of installed Memory Card

**Figure 27: Memory Card Operation**

This selection controls the reading and writing of application and configuration data to and from a PCMCIA memory card for storage or re-configuration of a NPC XP unit.

The selections are as follows:

**“exit”** – used to exit **“Memory Card Operations”**

**“save application and configuration”** – used to save all application and configuration to PCMCIA memory card.

**“save configuration”** – used to save all configuration data to PCMCIA memory card.

**“save all Luma-Net configurations”** – used to save Luma-Net configurations of all connected Luma-Net stations to memory card for backup or later retrieval.

**“restore all Luma-Net configuration”** – used to recall and restore Luma-Net configuration from memory card.

**“fetch configuration”** - used to load configuration data stored on memory card to NPC unit.

**“fetch application and boot”** – used to load application data stored on memory card and boot the NPC XP unit using this information.

A typical use of the memory card could be to save configuration of all connected Luma-Net control stations.

### Procedure:

- 1 INSERT Memory Card.
- 2 SELECT “Memory Card Operations” from the Main Menu.
- 3 SELECT “Save All Luma-Net Configurations”.
- 4 You will be notified when the save has completed.

### NOTE

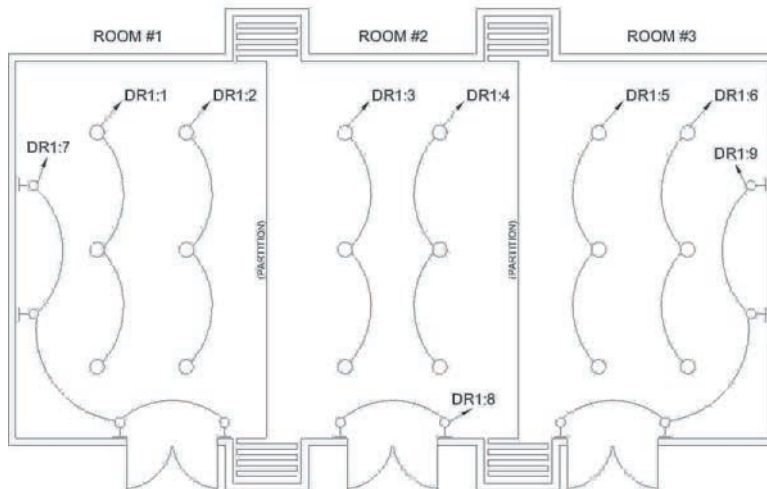
When restoring configurations the ID numbers must be the same as when they were saved or restoration will not work as expected.

## 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 each with 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.

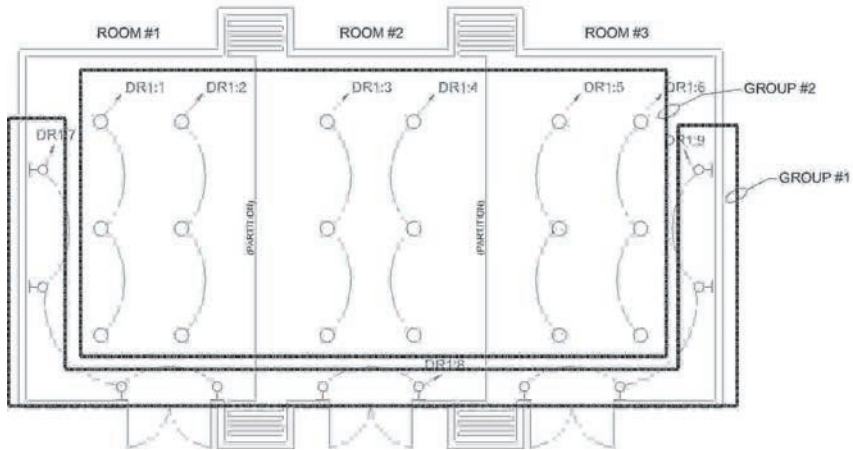
For example, consider the following lighting layout in a room:  
Now consider the following lighting groups:



**Figure 28: 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 29: 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:

```

Telnet 192.120.152.169
COLORNET 2 Network Protocol Converter Copyright (C) 2002 Leviton Mfg. Co. Inc.
===== LIGHTING GROUPS =====
In-room groups: connected
Room connections:
5-6
Group 1 channels by room:
1-4 2-6 3-2
Group 2 channels by room:
1-3 2-10 3-1

192.120.152.169 V3.01B02 Nov 13 2002 db-1(npc-xp)

```

**Figure 30: Lighting Groups**

To add, edit, modify, connect, or separate groups, use press the **[SELECT]** or **[ESC]** 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]** or **[ESC]** to bring up the menu.

**Step 2** Press **[UP]** **[DOWN]** until “Add Channels” is selected.

**Step 3** Press **[SELECT]** or **[ESC]**.

- 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]** or **[ESC]** a second time to save changes.

**NOTE**

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



## Contact Closure Keys

This part of the NPC configuration applies only to the NPC XP and is used when you are using the analog ports to indicate a contact closure. Currently, the only option supported by contact closure is the separation/combination of rooms.

### NOTE

This menu option is only available if A/D inputs are set to "Contact Closure Keys" on the Device Connection Screen.

Contact closures are triggered when the analog input pin receives +10-24VDC. You will find that the supply for this power is also located on the analog terminals at the rear of the device, the common and +V.

```

COLORNET 2 Network Protocol Converter Copyright (C) 2002 Leviton Mfg. Co. Inc.
===== CONTACT CLOSURE KEYS =====
Key 1: link/unlink on close/open rooms: 7-8
Key 2: link/unlink on open/close rooms: 5-6
Key 3: link on close rooms: 1-2
Key 4: link on open rooms: 3-4
Key 5: unlink on close rooms: 1-2
Key 6: unlink on open rooms: 3-4
Key 7: link/unlink on close/open rooms: 0-0
Key 8: no action
Key 9: no action
Key 10: no action
Key 11: no action
Key 12: no action
Key 13: no action
Key 14: no action
Key 15: no action
Key 16: no action

192.120.152.169 V3.01B02 Nov 13 2002 db-1(npc-xp)

```

*Figure 31: Contact Closure Keys*

The above figure shows all of the available room separate / combine (unlink / link) options. Let's look at what each one of them does:

**no action** – this option will cause no action on close/open and is the default setting of the unit.

**link/unlink on close/open** – this option will link the specified rooms when the contact closure is closed and unlink the rooms when it is open.

**link/unlink on open/close** – this option will link specified rooms when the contact closure is open and unlink the rooms when it is closed.

**link on close** – this option will link the specified rooms when the contacts are closed. To unlink the rooms another analog port would be assigned to the opposite function. This setting is great for multi entrance/exit room combine.

**link on open** - this option will link the specified rooms when the contacts are open.

**unlink on close** – this option will unlink the specified rooms when the contact closure is closed.

**unlink on open** – this option will unlink the specified rooms when the contact closure is open.

Use the navigation and operational buttons to select and change these options. When complete, press the **[SELECT]** button to save.

## A/D Devices

The following section applies only to the NPC XP.

This screen is used to set the behavior of the analog input when used as a photocell input or direct control of a channel.

### NOTE

This menu item appears only when the A/D setting on the “device connections” page is set to “analog”.

```

Telnet 192.120.152.169
COLORNET 2 Network Protocol Converter Copyright (C) 2002 Leviton Mfg. Co., Inc.
***** A/D CHANNELS *****
fade seconds: 0    level tolerance: 0
1 level 0 target 0 type none
2 level 0 target 0 type none
3 level 0 target 0 type none
4 level 0 target 0 type none
5 level 0 target 0 type none
6 level 0 target 0 type none
7 level 0 target 0 type none
8 level 0 target 0 type none
9 level 0 target 0 type none
10 level 0 target 0 type none
11 level 0 target 0 type none
12 level 0 target 0 type none
13 level 0 target 0 type none
14 level 0 target 0 type none
15 level 0 target 0 type none
16 level 0 target 0 type none
Photocell 1 active channels:
Photocell 1 inactive channels:
192.120.152.169 V3.01B02 Nov 13 2002 db-1(npc-xp)
  
```

*Figure 32: A/D Channels*

#### Figure Callouts Defined:

- 1 **# of Analog Input:** This shows the number of the input.
- 2 **Level:** This is the current level being received by the analog input. Its valid range is 0-255, 0 representing +0V on the analog channel, and 255 representing +10V or higher on the analog channel. It is updated only when you enter the

A/D Channels screen and is not a “real time” display.

- 3 **Target:** This is the target level for the photocell...or rather the level you want to be reported by the photocell. The NPC will adjust the levels of any assigned channels until the target level is reached.
- 4 **Type:** The type of device attached to the NPC at this channel. The choices are:
  - Photocell-** used when a photocell is attached, or this channel is patched on the patching screens
  - CCKey-** For use by Tech Services ONLY
- 5 **Photocell # active channels:** shows channels which are currently assigned to the photocell and are under photocell control.
- 6 **Photocell # inactive channels:** shows channels which are currently assigned to the photocell yet are not under photocell control.
- 7 **Fade Seconds:** indicates the amount of time it takes to fade up or down the Luma-Net channels to reach the target. This setting must be set to a large value or the NPC will not be able to stabilize the level. Recommended setting is  $\geq 20$  seconds. If your NPC “blinks” the level or fades are erratic, increase the fade time.
- 8 **Level tolerance:** sets the tolerance for the photocell level. Before the NPC will raise/lower channel levels to meet target level, the tolerance threshold must first be crossed. For example, if the tolerance is set to 5 and the target is 25, a level of 20-30 is acceptable. If the levels change to 0-19, or 21-255, the NPC will adjust the channel levels as appropriate to reach a target of 25.

## Procedure: Using a photocell in a daylight harvesting application

- Step 1** Assumption: Photocell is connected to analog input #1 and Luma-Net channels 1,2,3,4,and 5 are controlling the lights in the area of the photocell. The desire is for a level of 35fc to be maintained which is equivalent to a photocell return reading of 120.
- Step 2** Verify that the setting for A/D on the Device Connections screen is set to "analog input" (see page 62.
- Step 3** From the main menu, use **[UP]** **[DOWN]** to navigate to A/D devices and press **[SELECT]**.
- Step 4** Use **[UP]** **[DOWN]** to navigate to the "target" field for photocell #1.
- Step 5** use **[NEXT]** **[PREV]** until the target is set to 120.
- Step 6** Press **[DOWN]** to advance to the "type" field.
- Step 7** Use **[NEXT]** **[PREV]** until the type is set to "photocell".
- Step 8** Use **[UP]** **[DOWN]** to navigate to the "fade seconds" field.
- Step 9** Use **[NEXT]** **[PREV]** until the fade seconds is set to 30.
- Step 10** Press **[DOWN]** to navigate to the "level tolerance field".
- Step 11** Use **[NEXT]** **[PREV]** until the tolerance is set to 5.
- Step 12** Press **[SELECT]** to activate the menu.
- Step 13** Use **[NEXT]** **[PREV]** to select "LN add".
- Step 14** Press **[DOWN]** to advance to the "LN channel" field.

- Step 15** Use **[NEXT]** **[PREV]** to enter the channel number, 1.
- Step 16** Press **[DOWN]** to add the channel.
- Step 17** Repeat steps 15 and 16 for channels 2,3,4, and 5.
- Step 18** Use **[UP]** **[DOWN]** to return to the function menu.
- Step 19** Use **[NEXT]** **[PREV]** until "exit" is selected, then press **[SELECT]**.
- Step 20** Press **[SELECT]** a second time when requested to save changes.

**Available Menu Options:**

**LN Add-** Adds a Luma-Net channel to the selected photocell

**LN Delete-** Deletes a Luma-Net channel from the selected photocell

**LN Enable-**Used to forcibly set a particular Luma-Net channel to an active status. An active channel is one which is currently assigned to the photocell and under control of the photocell.

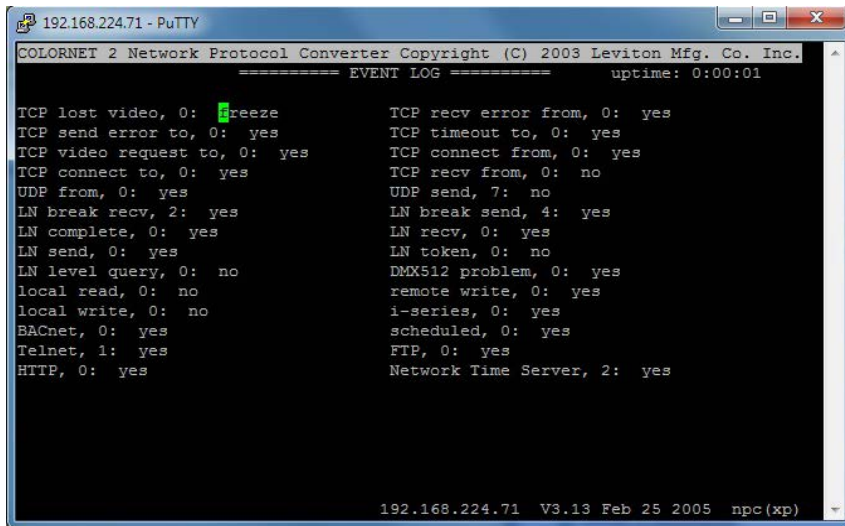
**LN Disable-** Used to forcibly set a particular Luma-Net channel to an inactive status. An inactive channel is one which is currently assigned to the photocell yet is not under the control of the photocell. This situation can occur because control has been "taken over" by another device, or it has been disabled either from the NPC or from a connected Luma-Net device.

**Exit-** saves your entries and exits the A/D channels screen

## Event Log

---

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



```
192.168.224.71 - PuTTY
COLORNET 2 Network Protocol Converter Copyright (C) 2003 Leviton Mfg. Co. Inc.
===== EVENT LOG =====          uptime: 0:00:01

TCP lost video, 0: freeze
TCP send error to, 0: yes
TCP video request to, 0: yes
TCP connect to, 0: yes
UDP from, 0: yes
LN break recv, 2: yes
LN complete, 0: yes
LN send, 0: yes
LN level query, 0: no
local read, 0: no
local write, 0: no
BACnet, 0: yes
Telnet, 1: yes
HTTP, 0: yes

TCP rcv error from, 0: yes
TCP timeout to, 0: yes
TCP connect from, 0: yes
TCP rcv from, 0: no
UDP send, 7: no
LN break send, 4: yes
LN rcv, 0: yes
LN token, 0: no
DMX512 problem, 0: yes
remote write, 0: yes
i-series, 0: yes
scheduled, 0: yes
FTP, 0: yes
Network Time Server, 2: yes

192.168.224.71 V3.13 Feb 25 2005 npc(xp)
```

*Figure 33: Event Log*

## Selecting Displays

---

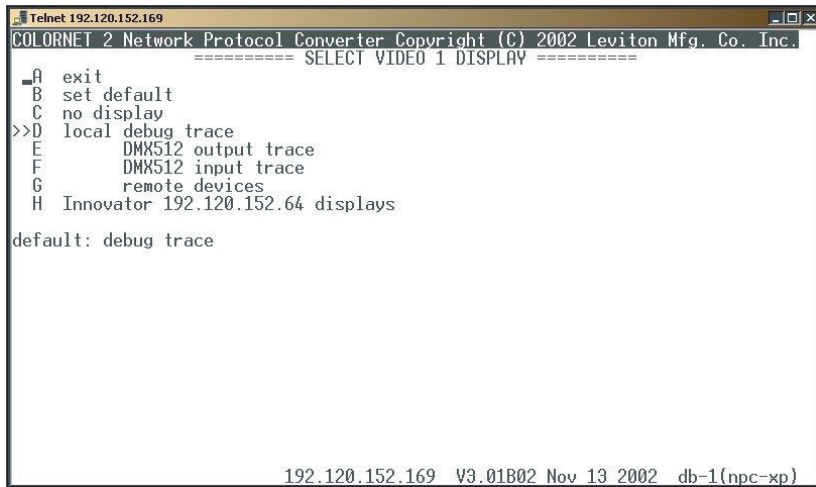
This section addresses the following menu options:

- 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.



```
Telnet 192.120.152.169
COLORNET 2 Network Protocol Converter Copyright (C) 2002 Leviton Mfg. Co. Inc.
===== SELECT VIDEO 1 DISPLAY =====
A exit
B set default
C no display
>>D local debug trace
E DMX512 output trace
F DMX512 input trace
G remote devices
H Innovator 192.120.152.64 displays

default: debug trace

192.120.152.169 V3.01B02 Nov 13 2002 db-1(npc-xp)
```

**Figure 34: 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 activates 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 34 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 Innovators 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.

## Luma-Net Operations

This selection only shows on the main menu when Luma-Net is active at the “HH/Luma-Net-A” option of “connected devices” and is used to set the address of the Luma-Net port as well as to issue commands and specific configuration parameters to the Luma-Net network from the NPC.

```

COLORNET 2 Network Protocol Converter Copyright (C) 2003 Leviton Mfg. Co. Inc.
----- LUMA-NET B OPERATIONS -----
A exit                network address: 127
B NPC setup           bits per second: 38400
C send query          operating mode: send and receive
D send reset          time and date broadcast: none
E send break          respond to level query: yes
F hold break          relay group data: no
G press switch        status message broadcast: no
H change personality  status broadcast receive: yes
I set master/slave mode display full packet: no
J simulate Fade To    fade command broadcast: no
K request current     fade broadcast receive: yes
L start bus test      poll dimmer levels: no
                     broadcast BACnet: yes
                     10 minute watchdog: disabled

                                U3.27C2 Mar 26 2014 npc1 UGA1

```

*Figure 35: Luma-Net A Operations*

The following configuration operations are available:

**NPC setup** – Used to configure the setup of the Luma-Net port and has the following options:

**Network Address:** The address of this network port. Each device requires its own unique address. The default for Luma-Net Port A is 127, and Port B is 126.

**Bits per Second:** Baud rate of the Luma-Net network.

**Operating Mode:**

Send and Receive- allows the NPC to both generate and receive Luma-Net messages.

Receive Only- only allows the NPC to process messages received from the local Luma-Net network and not generate Luma-Net messages.

**Time and date broadcast:** Enables the periodic broadcast of the current time and date to other Luma-Net devices.

**Respond to level query:** Enables/Disables the reporting of channel levels when requested by Luma-Net devices. Used for snapshot and other reporting functions.

**Status message broadcast:** Enables the broadcasting of Luma-Net Status and Extended messages generated on the local Luma-Net ports to other NPCs located on the same ColorNet Network.

**The following maintenance/utility options are available and are for use by factory technicians:**

**Send Query** – used to poll an address on the network as a function test.

**Send Reset** – used for resetting a station on the network that has been replaced, reprogrammed or seems to be “hung up” on the network.

**Send Break** – used as a troubleshooting function to reconfigure the Luma-Net network.

**Hold Break** – used to hold the break until “released”. When this function is used the menu item will change to “release break”.

**Press Switch** – used to “virtually” press any button on any station on the network.

**Change Personality** – used to call up different personalities or presets residing in the network control units from the NPC.

**Set Master/Slave** – used to set any station as master and others as slaves to this master. Great for cutting down on programming where network stations are programmed alike.

**Simulate Fade To** – used to fade groups of channels in the network up to any intensity.

**Request Current** – Used with Z-Max system to get the current (Amperage) level from the CT when installed. No longer used.

**Start Bus Test** – used to stress test the Luma-Net bus.

**Broadcast BACnet** – used to Forward BACnet commands to Z-Max over Luma-Net, otherwise only the local DMX level is affected. No longer used.

**10 minute Watchdog** – Feature currently not supported.

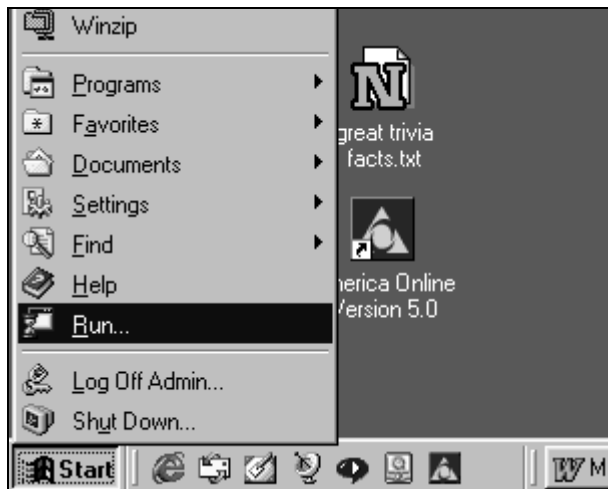
## Configuration by Telnet or Keyboard

---

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.

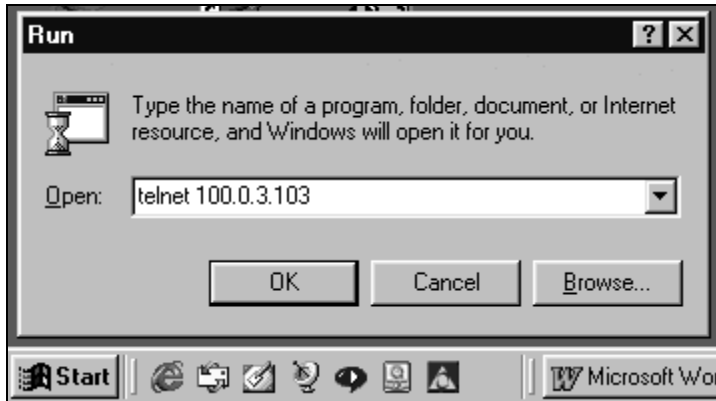
The following instructions and screen captures are applicable for Windows 95/98/Me/NT4 and 2000. Minor variations may exist in the format of the screens. For networks with routers, you may need to contact your system administrator to ensure your workstation and the NPC are able to connect.

### Starting the TELNET Client



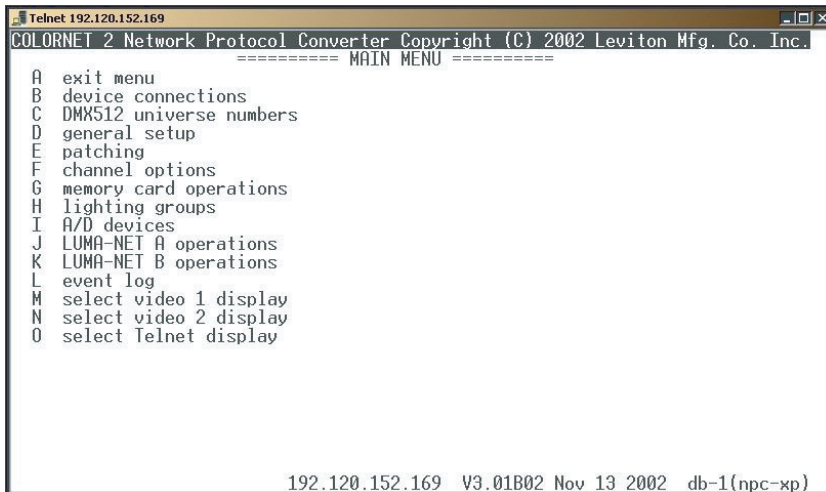
*Figure 36: Windows Start Menu*

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 Task bar and then select **RUN**.



*Figure 37: 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 38: 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 NPCs 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**

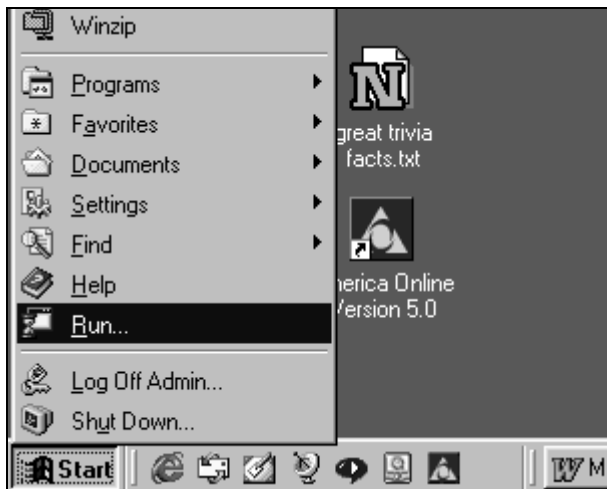


## Real World FTP Examples

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

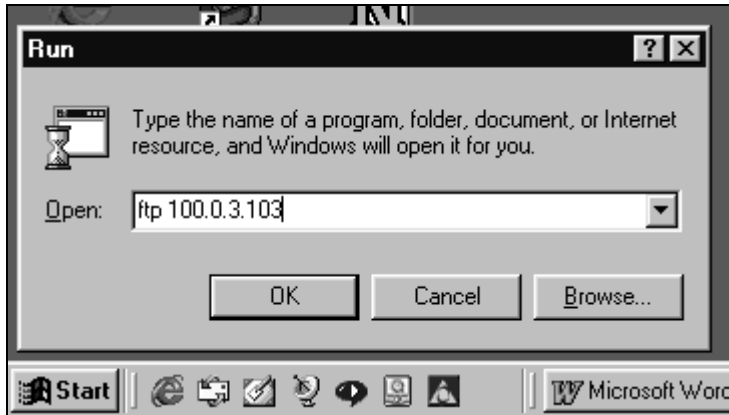
### NOTE

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.



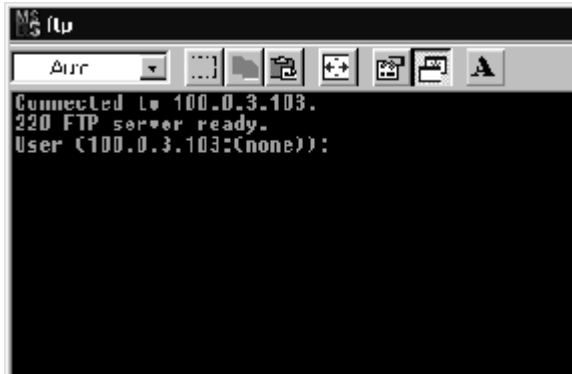
*Figure 39: Windows Start Menu*

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



*Figure 40: 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 41: 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. <b>p[port#]L[address].lda</b> 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 p112.lda  
2a OK  
150 ready to send file  
226 closing
```

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

## **Warranty**

Leviton Lighting & Energy Solutions a 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 or replacement of defective equipment returned Freight Pre-Paid to **Leviton Lighting & Energy Solutions 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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