

PixieLink
Cosmic Color E1.31
Adapter

User Manual
September 12, 2020
V1.03

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Introduction

The Light-O-Rama (LOR) PixieLink sACN adapter converts standard E1.31 (streaming ACN) into six RS485 output networks. Each output network can be configured as a DMX universe, an Enhanced LOR network, or a PixieLink protocol network. The output port protocol (DMX, ELOR, PixieLink) is individually configurable for each port.

The PixieLink adapter receives sACN or Art-Net over a standard 10/100 Mbps LAN. It will process broadcast messages, and/or messages to its specific IP address.

When a port on the PixieLink adapter is configured as a DMX universe, the adapter will pick the first configured universe out of the LAN traffic and output it as a DMX512 RS485 network.

LOR Pixie controllers use one unit ID for each string of pixels on the controller. E.g. for a Pixie2 with an assigned unit ID of 03, the first pixel string on the controller is referenced with unit ID 03, and the second string on the controller is referenced with unit ID 04.

When a port on the PixieLink adapter is configured as an Enhanced LOR network, the adapter will pick up to 32 universes out of the Ethernet traffic. The intensities associated with a universe will be converted into Enhanced LOR commands and the first universe in the list will be sent to LOR unit ID 01, the second universe in the list to unit ID 02, ... the 32nd universe in the list to unit ID 20 (unit IDs are base 16). The ELOR conversion done by the PixieLink adapter is a lot less efficient than the

compression done by PCs and Show Directors, which is across pixel strings and controllers.

When a port on the PixieLink adapter is configured as a PixieLink network, the adapter will pick up to 32 universes out of the Ethernet traffic. The intensities associated with a universe will be sent uncompressed to Pixie controller(s). The first universe in the list will be sent to LOR unit ID 01, the second universe in the list to unit ID 02, ... the 32nd universe in the list to unit ID 20 (unit IDs are base 16).

The advantage of a PixieLink network over an Enhanced LOR network is guaranteed bandwidth to the Pixie controllers. A PixieLink network (port) supports 16 DMX universes of 510 intensities, each universe being refreshed 44 times/second. PixieLink8 supports 32 universes refreshed 38 times/second. PixieLink17 supports 32 universes refreshed more than 44 times/second.

Hardware Utility

Normally, LOR devices are configured with the Hardware Utility. This is not the case with the PixieLink adapter. It is configured using a web browser.

The Hardware Utility is used to update the firmware of a PixieLink adapter. See the *Updating the PixieLink Firmware* section.

Firmware Version

PixieLink firmware v1.02 supports everything described in this manual. There is a USB port on the PixieLink adapter which is not currently active.

Important Considerations

Async Network Protocols and Speeds

The Async RS485 ports on the PixieLink adapter can be configured at the following speeds:

- DMX -- 250Kbps
- ELOR -- 19.2Kbps, 57.6Kbps, 115.2Kbps, 500Kbps, 1Mbps
- PixieLink – 4.25Mbps, 8.5Mbps, 17Mbps

Note: PixieLink protocol is only understood by Pixie controllers at this time. Pixie firmware version 1.06 or higher is required. All Pixies will support the 4.25M speed because all Pixies were shipped with RS485 driver ICs capable of at least 5Mbps. Usually, the 5Mbps chip will work with the 8.5Mbps speed, but that cannot be guaranteed. The 10Mbps RS485 chip is required for 17Mbps.

The driver IC is the socketed 8-pin chip near the RJ45 jacks. The main two chips we use are:

ISL	62ALPFM
81487EIPZ	65HVD08
LI527AAGB	

The number bolded is usually in the middle, surrounded by manufacturer designation/date codes. The **81487EIPZ** is a 5Mbps part. The **65HVD08** is a 10Mbps part. If you have a different part number, go to digikey.com and type it in the search bar. It should take you to an RS485 chip or a list of them. Click one and check the maximum speed. You may have to download the data sheet. Look for Mbps.

Art-Net

The PixieLink adapter understands and will process Art-Net in the same way it does streaming-ACN. UDP packets received by the Pixie that are either Art-Net or E1.31 (streaming ACN) will be processed. See next section.

Streaming-ACN

The main purpose of a PixieLink adapter is to take standard streaming-ACN (or Art-Net) protocol and allow it to be used with Pixie controllers. Users not using LOR software can readily use Pixie controllers, or any LOR G3 controllers. G3 controllers understand Enhanced LOR network protocol. The PixieLink adapter cannot convert to the older style regular LOR network protocol.

Pixies have the advantage of being cheaper and easier to configure than Ethernet based pixel controllers. You can get into pixels without a large investment or learning anything about Ethernet using Pixie controllers. Later, if you find that you want to be in pixels in a big way, you can use a PixieLink adapter to move your Pixies into an Ethernet environment. One PixieLink adapter can control a minimum of 19,000 pixels.

Also, you can create props based on one of the Pixie controllers (2, 4, 8, or 16 ports) and not have to use power injection or null pixels needed to make efficient use of larger, more expensive Ethernet based controllers. The Pixies also allow for the props to be self-contained, requiring only power and a daisy chained RS485 data cable between them.

Pixie firmware 1.05 or later supports 200 pixels/port. LOR low power pixel strings permit up to 150 pixels/port to be used without power injection. If you choose to put 200 pixels/port on a Pixie, LOR software will send a non-standard protocol data unit in the sACN stream because 512 intensities are not enough for 200 pixels. LOR will send 600 intensities.

Configuration

The adapter should not be running a show when configuring it. Configuration is done using a web browser. The factory default host name is “PixieLink” – use <http://pixielink/> in the address bar. The factory default is to try DHCP, if this fails, the adapter will use its fixed IP address. The factory default is 192.168.1.206 (network mask 255.255.255.0).

Status (Home) screen

The screenshot shows the PixieLink Status (Home) screen in a web browser. The page has a header with the Light-O-Rama logo and navigation tabs for Status, Network Config, and Port Config. The main content area is divided into three sections:

Network Device Name: PixieLink	
Version	PLink6 v1.01
Fixed IP address	192.168.1.80
IP Mask	255.255.255.0
LAN Total Data Receive Rate	139,977
LAN Total Data Used Rate	70,180
Sequence Errors	0
Loop Count	70,058

Port	Data Transmit Rate	Packet Transmit Rate	Packets Dropped Rate
Port 1	9,650	19	0
Port 2	9,342	19	0
Port 3	9,240	19	0
Port 4	9,240	18	0
Port 5	9,240	18	0
Port 6	9,753	19	0

On the right side, there are control buttons: Push Button (up arrow), Switch 1 (down arrow), Switch 2 (down arrow), LED 1 (black dot), LED 2 (green dot), and Status LED (green dot).

PixieLink

This home screen shows an idle adapter with the Light-O-Rama ShowTime software running. The data rates shown are zero intensity packets being sent.

All data rates are in bytes/second. The LAN Total Data Receive Rate is the number of bytes/second directed to this adapter. The LAN Total Used Rate is the amount of data the adapter is using. They are different because the PC is sending data for 192 universes, but the adapter is configured for 96.

Sequence errors/second indicate lost/missing packets. It should be zero.

The Loop Count is a measure of adapter busy. It drops as the adapter is forced to do more work.

All Packet rates are in packets/second.

Network Configuration Screen

The screenshot shows the 'Network Config' tab in the PixieLink web interface. It features a header with the 'Light-O-Rama' logo and 'PixieLink' text, along with navigation buttons for 'Status', 'Network Config', and 'Port Config'. Below the header, there is a form for network configuration. The 'Network Device Name' field is set to 'PixieLink'. The 'Enable DHCP' checkbox is unchecked. The 'IP Address' field is set to '192.168.1.80' and the 'IP Mask' field is set to '255.255.255.0'. At the bottom of the form, there are two buttons: 'Save Configuration' and 'Load Configuration'.

PixieLink

The Network Device Name is registered with the DHCP request. If a fixed IP address is used, it is used as a [NetBIOS] hostname.

Check Enable DHCP if you want the device to try DHCP before using the fixed IP address.

If you are using a fixed IP address, set the IP address and network mask here.

The “Save Configuration” button must be pressed to save the new configuration. It will also write a Network configuration file for the adapter to your download directory. This can be used to upload that configuration with the “Load Configuration” button.

Port Configuration Screen

The screenshot shows the 'Port Config' tab in the PixieLink web interface. It features a header with the 'Light-O-Rama' logo and 'PixieLink' text, along with navigation buttons for 'Status', 'Network Config', and 'Port Config'. Below the header, there is a form for port configuration. The form has three columns for 'Port 1', 'Port 2', and 'Port 3', each with a dropdown menu set to 'PixieLink8'. Below each dropdown is a 'Pixels' field. The 'Port 1' column has 16 rows (1-14 and a, b, c, d, e, f). The 'Port 2' column has 16 rows (1-14 and a, b, c, d, e, f). The 'Port 3' column has 16 rows (1-14 and a, b, c, d, e, f). At the bottom right of the form, there are two buttons: 'Save Configuration' and 'Load Configuration'.

This screen is used to set the port protocol and map universes to pixel strings. In this example, the screen has been made narrow for clarity. Only 3 ports are visible, you must scroll down to see the other 3 ports. You can widen the screen to see all ports at once.

The drop-down next to the Port n: selects the protocol for that port. The options are:

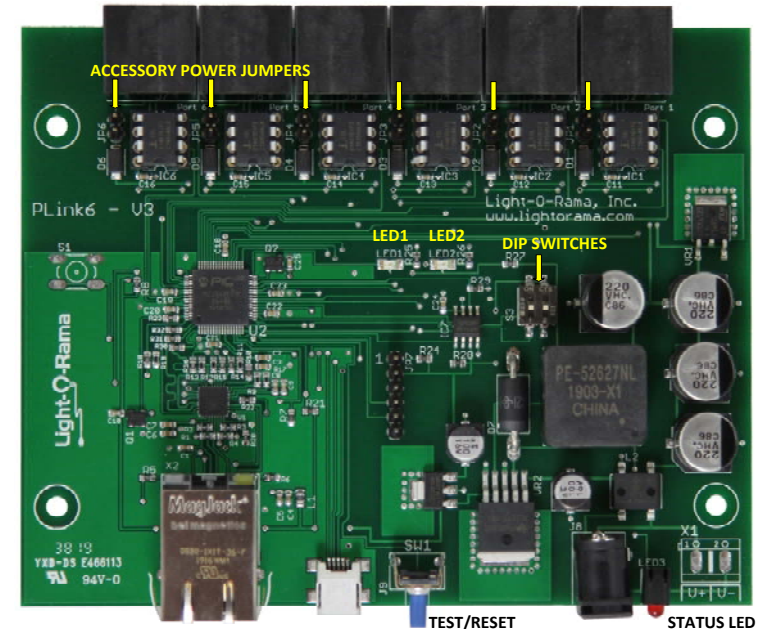
DMX	250Kbps
ELOR19200	Enhanced LOR at 19,200bps
ELOR 57600	
ELOR 115200	
ELOR 500000	
ELOR 1000000	
PixieLink	Pixielink protocol at 4.25Mbps
PixieLink8	8.5Mbps
PixieLink17	17Mbps

The “Pixels:” box allows you to limit the number of pixels/string sent to the Pixies. This can be used to save bandwidth on the ports because E1.31 tends to send full size packets. If you are using 100 pixel strings, these only require 300 intensities/packet rather than the full 510.

The numbers under “Pixels:” are LOR unit IDs. The box to the right of each unit ID is the universe to be sent to that unit ID. This maps an E1.31 universe to a pixel string on a Pixie. Under Port 2 in the previous figure, universe 17 is being sent to LOR unit ID 1.

To save your port configuration, click the “Save Configuration” button. This will also write a Port Configuration file to your download directory. You can use this file to upload this configuration to any PixieLink adapter.

Hardware Description



DIP Switches

These are used for special conditions. See the Reset button and loading firmware sections.

LAN RJ45 Jack

10/100Mbps LAN port. Auto MDI- X (cross over cable not required).

LEDs

Status LED – flashes once per second when the PixieLink adapter is up but not connected to an IP network. It is on solid when connected to an IP network. A long on, short off flash sequence means the adapter needs to have its firmware loaded.

LED1 – comes on for 3 seconds and then flashes when the test pattern is being output.

LED2 – flashes once per second when the TCP/IP stack is up.

Light-O-Rama Outputs (RS485 ports)

These six ports have LOR network wiring. They can be connected to LOR controllers using ordinary Cat5/6/7 LAN cables.

There is an internal jumper behind each Output RJ45 jack that allows LOR accessory power to be provided by the jack.

If you are using this device as a DMX bridge, you will need to make crossover cables to change from LOR network wiring to E1.27.

Power barrel connector

Use a 12V 1A DC power supply, polarity of the barrel connector does not matter.

Test/Reset Button

If both DIP switches are ON, press and hold this button when powering up the adapter to reset the configuration to the **factory default**. Wait until the LED flashes rapidly, then release the test button and the device will reboot with the default configuration.

Press this button momentarily after the adapter has booted to run a simple test pattern on the pixel strings. The test will run until you momentarily press the button again or five minutes go by. The test pattern runs red, then green, then blue down the pixel strings for 100 pixels. This pattern then repeats. The test pattern does not rely on data from

the LAN port, or even the current configuration except for the Port Protocol (DMX, ELORnnn, or PixieLinkn).

On a DMX port, the first 100 pixels will run the test pattern. On an Enhanced LOR port or a PixieLink protocol port the first 32 unit IDs will run the test pattern on the first 100 pixels.

Press and hold this button for 5 seconds after the adapter has booted to reboot the adapter. Release the button when the status LED flashes rapidly, the adapter will then reboot.

The adapter disconnects from the IP network or ignores sACN traffic during reboot or when the test pattern is running.

When there is no IP network activity, the adapter will stop sending DMX packets on DMX ports, and it will stop sending heartbeats on Enhanced LOR and PixieLink protocol ports. These actions result in the attached controllers thinking the network has gone away and they will shut down their lights.

NOTE Because heartbeats may not be being sent when you momentarily press the test button, the adapter will start sending heartbeats and wait 3 seconds before starting the test pattern. This should give the controllers enough time to lock up at the correct protocol and speed.

USB Port

(future)

Connecting the Adapter to a PC

Ethernet Connection

The PixieLink adapter can obtain an IP address from your router using DHCP, or you can assign it a fixed IPv4 address on your LAN. It is preferable to use a fixed IP address, and configure your show playing software to send the appropriate universes to that IP address.

The easiest way to get the adapter up and running is to allow it to do DHCP to obtain an IP address and then use broadcast in your show playing software. In this case, you do not care what the IP address of the adapter is because all devices on your LAN will see the broadcast messages. If you only have one PixieLink adapter, this method is fine. A maxed out adapter can consume over 40Mbps of your LAN bandwidth, and because of the broadcast, all other devices on your LAN will likely have to process this traffic.

You should change the hostname of the adapter when you do the network configuration. You will be able to find the adapter with this name in the address bar of your browser.

Updating the PixieLink Firmware

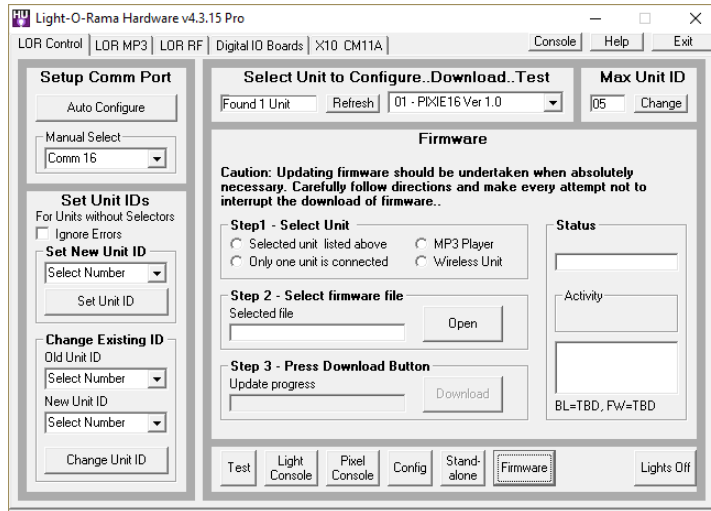
- Firmware updates done by Hardware Utility versions distributed before September 1, 2020 will be **extremely** slow.
- The adapter is not a normal LOR controller and will respond to Hardware Utility Refresh commands only when in bootloader mode.
- Connect a LOR RS485 adapter to Port 1 on the PixieLink adapter to update firmware.

Get the latest firmware. www.lightorama.com ► *Support* ► *Firmware* section. Save the firmware file on your PC. Note where on your PC you have saved the firmware file.

Start the LightORama Control Panel if it is not running by clicking **start ► Light-O-Rama ► Light-O-Rama Control Panel**. The Light-O-Rama light bulb icon will appear in the system tray on the lower right of your screen.

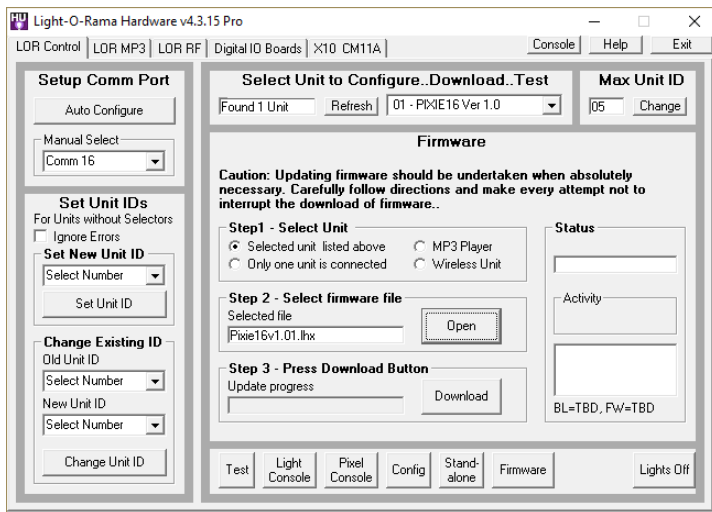
Start the **Hardware Utility** by right-clicking the Light-O-Rama Control Panel light bulb and selecting **Hardware Utility** from the menu. On the upper left of the Hardware Utility screen, select the comm port of the RS485 adapter you intend to use. Connect the RS485 adapter to Port 1 on the PixieLink adapter. Power the PixieLink adapter OFF.

Click the **Firmware** button in the **LOR Control** tab and you will see this window:



In **Step 1 – Select Unit**, Choose *Only one unit is connected*.

In **Step 2 – Select firmware file**, click the **Open** button. Use the *Open* file box to select the firmware file. This is the .lhx file you saved. Click the **Open** button. The window will look like this:



Power the PixieLink adapter up while holding the test button. It will stay in the boot loader for one minute, or forever if there is no valid application firmware loaded. The status LED flash pattern will be long on, short off, <repeat>.

In **Step 3 – Press Download Button**, click the **Download** button – the firmware download will start in ten seconds or so.

The *Update progress* bar will fill from left to right. When the new firmware is loaded, the *Status* will change to “Successful” and the PixieLink adapter will reboot.

DIP Switch Settings

Both switches should be off for normal operation.

Both switches ON and holding the button while powering up will reset the adapter to the factory default configuration. Once the adapter comes up, power it off and turn the switches off.

Specs

PixieLink sACN Adapter	
Configuration	One 10/100 LAN Port One USB 2.0 port Six RS485 Output Ports
Power	9-15vdc @ 1amp
Operating Temp	-40° F to 140° F
Dimensions	6"w x 1½"h x 4¼"d

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