# HolidayCoro.com Pixel Controller Board #611

For board revision 1.0 / Firmware version 101 / Document Revision 1.0 / 22-Jul-13

# Pixel Controller Overview

The HolidayCoro Pixel Controller, item #611, is a controller design primarily for distributed pixel elements or for elements that need an inexpensive, self-contained pixel controller. This pixel controller requires the following items for operation:

- **A 5v to 12v DC power source**
  - This power source will provide power to the pixels and the controller.
  - No adjustments or jumpers are required when using the different voltages.
  - Only one voltage maybe used at a time and this voltage must the same as the pixel voltage.
- **A DMX Data Source / Dongle**
  - This controller is designed for use with standard RS-485 based (see our website and blog for more information about RS-485), DMX output which is commonly found on most USB "dongles". Examples include the Enntec Pro/Open, DMX King, LOR iDMX-1000, SanDevices E682 (using their "2-wire balanced DMX Outputs"), HolidayCoro ActiDongle (item #53), LOR USB "Dongle" (see our website for wiring requirements), DIYLA Lynx Dongle (standard DMX mode) and many others.
  - Since this controller uses standard RS-485 DMX, this allows you to run long distances (as much as hundreds of feet) between controllers in a daisy chain fashion (there are in/out DMX connections on the controller), unlike centralized E1.31 Ethernet based controllers with home runs.

- **USB to RS-485 "Dongle"**
  - When designing this controller, we wanted it to be packed with features which rules out the use of dip switches for settings such as those found on other controllers. In order to do this, we need to be able to send programming commands to the controller over the RS-485 data line. This is typically done with the HolidayCoro programmer cable, item #54-2 which is an FTDI based, USB Serial to RS-485 adapter (much like that of the Enttec Open and Light-o-Rama USB dongle.) HolidayCoro fully supports the use of this dongle, with the free provided pixel controller programming software to set the settings. It is possible that other FTDI232R based adapters will work, though they are not supported by HolidayCoro. Please note that it is not possible to wire directly from your USB port to the pixel controller for programming, there must be an FTDI converter chip to output the correct data.
- **RGB Pixels**
  - A pixel is defined as a single, controllable light (the term pixel is sometimes confused with the term RGB which only defines the colors used.) This controller is designed to only control smart, intelligent, pixel based lights. It will not control dumb or basic lights.
  - This controller works with a variety of different pixel protocols on the market today:
    - 2811 (three wires)
    - 2801 (four wires)
    - 6803 (four wires)
    - 180x (three wires)
    - 3001 (four wires)
  - HolidayCoro supports full troubleshooting with RGB pixels sold by HolidayCoro. We will do our best to assist you with third-party pixels but we cannot assure you of interoperability. For information about power requirements, color output order, pixel protocol, wiring colorings and other pixel specific information, see our website or the vendor from which your pixels were purchased.
- **Pixel Controller Programming Software**
  - This software is included free with your purchase. Information on how to download the programming software can be found at this link:

    http://www.holidaycoro.com/kb_results.asp?ID=2
  - This software is intended for use on Windows computers. We are unable to determine if it will operate properly in virtualized (parallels for Mac, etc) environments. It has been tested with Windows XP, Windows 7 and Windows 8.

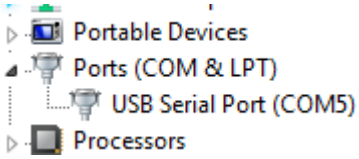
# Configuring the Programmer Cable

The first step is to connect the programmer cable, HolidayCoro item #54-2 to your computer. Depending on your version of Windows and other FTDI based items you may have already installed on your PC, you may or may not be required to install the drivers.

- IMPORTANT: Unplug ANY other USB to RS-485 or RS-232 adapter you may have on your computer. This includes LOR "dongles", the Enttec dongle or the HolidayCoro ActiDongle. All these devices include the FTDI chip which can cause problems for the programming software when it attempts to identify the correct programming interface.
- Close ANY application that may conflict or use a serial port. We have found car interface applications, security monitoring applications and most importantly, the LOR "Control Panel" (the little blue light bulb) all need to be closed prior to opening the programming application. If you receive any warning notice when opening the programming application, this is an indication that another application is current open and attempting to use the programming cable port.
- Insert the programmer into a free USB port. We generally recommend a port directly on the PC as opposed to a port on a hub. It will work in any USB version port 1.1, 2.0 and 3.0.
- You will hear a confirmation beep and after a few seconds to a minute or so, you will either be prompted for drivers or Windows will indicate that the programmer has been correctly installed.
- If you need to download drivers, you can download them from here:

  http://www.ftdichip.com/Drivers/D2XX.htm

  Select the correct version (x86 for 32-bit or x64 for 64-bit) and for the correct OS (Windows). The drivers should be the "D2XX" drivers, not the "VCP" or Virtual Comm port drivers.
- Once you have configured the drivers properly, you should now be able to see the programmer cable in device manager (varies by Windows version) under "Ports (COM & LPT)":

  NOTE: Your number for the COM port may vary.
  If you wish to confirm that this entry is the correct one for your programmer, remove the programmer and the "USB Serial Port (COMx)" should disappear, then when re-inserted, it should appear again in device manager.

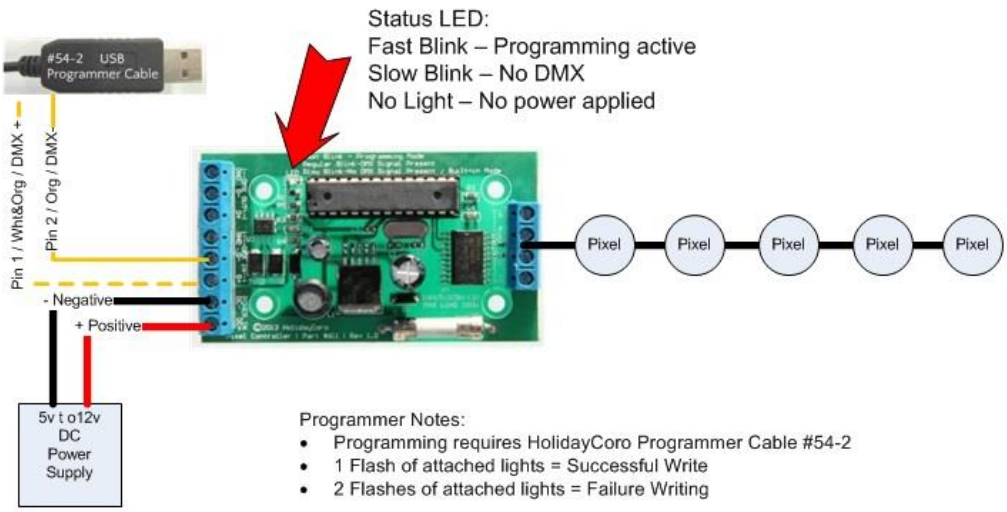
At this point you should have the driver installed and the programmer is ready to be used to adjust the settings on your TinyPix.

# Wiring the TinyPix

In order to program the TinyPix, it must be powered up and connected to the programmer. We have produced a video which shows the entire process here:

## http://youtu.be/928JbSrJ928

Here is a diagram that provides a basic overview on wiring of the controller:



# Adjusting the TinyPix Configuration

There are a number of configuration options available on the TinyPix, here is a description of each option and its default configuration within the software:

- DMX Start Address
  - The DMX start address is the DMX address you wish to have the first addressed pixel start at. This number can be from 1 to 510. The first pixel selected will be addressed as the number you select plus the next two consecutive addresses, such as a DMX start address of 1 would be DMX addresses 1, 2 and 3.
  - Default as shipped: 1
- Total Active Pixels
  - The total number of pixels being used on the string, plus the number of null pixels (pixels used only for repeating purposes), attached to the controller or the number you wish to have considered for addressing purposes. This number can be from 1 to 170. Please note that this number is for addressing purposes only. When connecting pixels, be aware that there is a maximum of 150 watts of connected pixels or the limit imposed by power and wire limits of the pixels you have selected.
  - Default as shipped: 170
- Pixel Chip Type
  - Each pixel type has a specific chip used to control the RGB lights used. Select the protocol type used by the lights you are connecting. If you are not sure which type of protocol to use, request this information from your pixel lighting vendor.
  - **Default as shipped: 2811**
- Control Level
  - In the Individual Pixel Control mode allows you to address each of the attached pixels individually. In 3 Channel DMX Macro Mode Control, all the attached pixels act as just a single, 3 channel, RGB light. This feature allows you to still attached pixels but only require 3 DMX channels for control of the entire string of pixels.
  - Default as shipped: Individual Pixels
- Reverse DMX Addressing
  - When reverse addressing is not enabled, DMX addresses will start at the first pixel after the null pixel, closest to the controller and when reverse addressing is enabled, the DMX addressing will always start with the last pixel in the string, farthest from the controller.
  - Default as shipped: Disabled

- Pixel Color Order
    - Not all pixels are wired in the order of Red, Green Blue or RGB which is commonly configured in software. To ensure that the pixels are addressed correctly and that the demo sequences (when used) work correctly, select the order in which your pixels have their colors. If you are unsure of this order, consult with your lighting vendor for the color order.
    - Default as shipped: RGB
- Null/Ghost Pixels
    - Nulls or Ghost pixels are pixels at the start of the string that are not addressed and only serve to repeat the signal over longer distances. Normally you can reach 5 to 25 feet (10-15 feet being normal) from the controller output to the first pixel in the string but in some cases, you may wish to be farther from the controller than the allowed distance. By selecting this option and entering the number of pixels, these pixels will only be used for purposes of repeating the signal and will not count against either DMX addressing or the total number of pixels attached to the controller.
    - Default as shipped: 0 / None
- Demo Mode
    - This is a list of built-in sequences that will automatically execute when the controller is no longer receiving a DMX signal. These can be useful for testing, demo purposes or off-season uses. Normally for a production display, you will select Off so that no sequence will play, even when you turn off the DMX source.
    - Default as shipped: Red, Green, Blue Alternating
- Demo Speed
    - This option allows you to speed up or slow down the demo mode sequence to create additional variations of a sequence.
    - Default as shipped: 4 (middle speed)
- RGB Mapping
    - As many software applications default to the RGB order of pixel color order, this option forces the controller to re-map non-RGB pixel orders to the RGB order. For example, if your lights were physically designed with the order BGR and you wish to have them appear as RGB, you would turn on this option and then select the Pixel Color Order of BGR which is the actual order of the lights on the pixel itself.
    - Default as shipped: Yes / Map as RGB

Once you have downloaded the programmer application (see this page for how to do download):

http://www.holidaycoro.com/kb_results.asp?ID=2

You can now extract the programming application from the ZIP file (HC-611-PixelProgrammer.zip) and simply just place it into any directory (it doesn't install into your program menu.) Run the application titled "TinyPix.exe" that you extracted from the ZIP file.

For step-by-step video instructions on how to download, extract and setup and configure all the options on the controller, see the following video:

http://youtu.be/ceMZjq8jLUE

# Testing your TinyPix Controller

Once you have programmed your settings, we HIGHLY recommend that you perform testing of your controller and its operation using the xLights application (this application is free.) If you contact HolidayCoro for support, we will always require testing using xLights before we can assist you with any additional software / sequencing application setup or troubleshooting. This video shows step-by-step how to test the TinyPix using xLights:

http://youtu.be/lAc_GUD2olA

# Additional Suggestions

- Always test in xLights prior to configuration in your sequencing application to ensure the controller has been setup properly.
- Each pixel string has a limit to the number of pixels that can be connected to the controller at any given time without power injection. Consult with your pixel vendor to determine the maximum number of pixels that can be connected before power injection is required.
- Never hook up more than 150 watts of pixels to the controller; otherwise the fuse will blow to protect the controller. To determine the wattage of the pixels you are connecting, here is an example:
    - You are connecting square pixel modules to the controller. The vendor shows a power consumption of 50ma (milliamps) per module.
    - The modules are 12 volts DC.
    - You want to connect 80 of these modules to the TinyPix. So, multiply 50 x 80 for 4,000 mA or 4 amps of power.
    - Multiply 4 (amps) times 12 (volts) for a total of 48 watts of total power consumption.
    - Add a 20% safety margin, or 10 watts to the total to account for power losses and power supply efficiency. You now will be using 58 watts.
    - You will need a power supply that can produce 58 watts of power and that is 12v DC. Since 58 watts is below the 150 watt limit of the controller, the controller will be able to control the entire string on one controller.
- Your TinyPix controller can be weatherproofed by installation into standard, 2” PVC pipe with pipe caps