Custom Protocol Creation Guide

A convenient and time-saving DIY solution for users to control pixel fixtures (two criteria apply).

Document Version:	6.0
Last Updated:	13th October 2025

COMPATIBLE FIRMWARE

Custom protocol creation is featured in the following ENTTEC pixel controllers:

SKU	Product	Firmware Version
73539	DIN PIXIE	V2.0 or above
70067	PIXELATOR MINI	V2.0 or above
70068	PIXELATOR MINI MK2	V1.0 or above
71521	OCTO MK2	V4.0 or above
71522	OCTO MK3	V1.0 or above

INTRODUCTION

ENTTEC Pixel controllers support more than 20 pixel protocols by default. In the event of missing protocol, this custom feature allows the users to create a custom protocol for the desired pixel fixture anytime without having to submit a support request for new firmware.

This feature enables users to adjust the voltage timing based on the supported protocols if the data transmission method matches any of our supported protocols.

This document provides setup instructions for creating a custom pixel protocol and verifying the criteria.

SETUP REQUIREMENTS

The following are required to create a custom protocol:

1. **Datasheet:** Obtain the datasheet of the desired pixel fixture to gather necessary information. Contact the dealer or manufacturer for this document.
2. **Device:** Use a computer to access the device settings page.
3. **For ENTTEC Ethernet Controller:** Obtain the device IP address, which can be either DHCP or static based on your network settings. Discover the IP using the ENTTEC EMU app.
4. **For DIN PIXIE:** Use the EMU Software for configuration.

GUIDE TO CUSTOM PROTOCOL CREATION

This feature allows users to adjust the data voltage timing to meet specific protocol needs.

To create a custom protocol:

1. Verify datasheet for the compatible pixel protocol.
2. Navigate to Device's User Interface to enable custom protocol feature.
3. Adjust the pixel fixture's data voltage timing via the web interface as per the manufacturer's datasheet.

Step 1: Verify datasheet for the compatible protocol

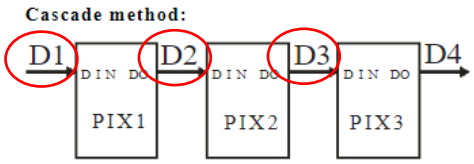
1. **Verify the data transmission method of your desired protocol from the datasheet.**

1.1 The data transmission method implies how the data is forwarded. Below demonstrated the common data transmission methods:

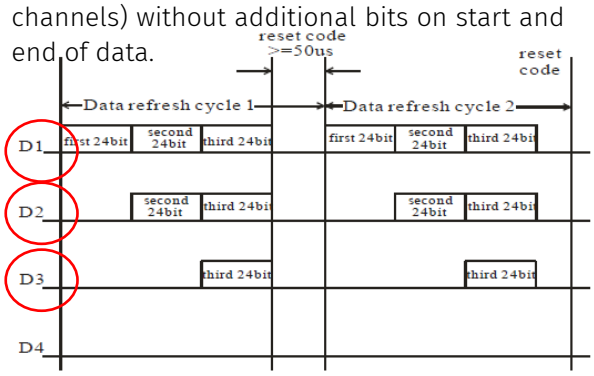
a. The most common method transmits data without additional bits (e.g., D1-D2-D3…Dn).

Example: Information captured from WB2812B's datasheet

Datasheet indicates data transmission by D1-D2-D3-D4 between pixels.



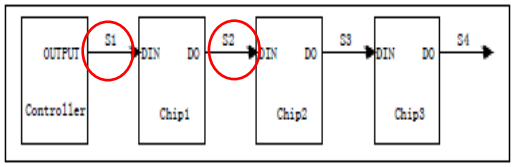
Datasheet shows each D1, D2, D3 are transmitted with data batch of 24bit (8bit x 3 channels) without additional bits on start and end of data.



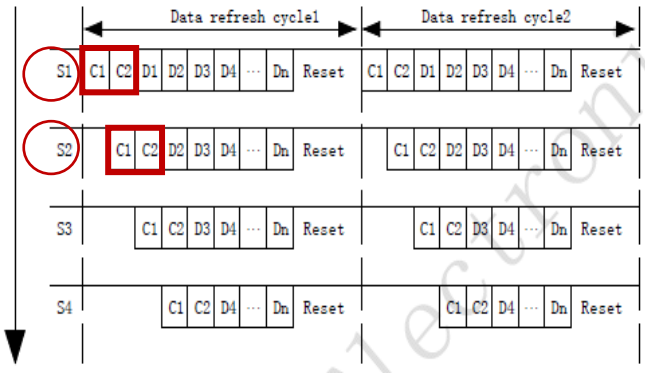
b. Some protocols, like TM1814, include additional data at the front (e.g., C1-C2-D1-D2…Dn).

Example: Information captured from TM1814's datasheet

Datasheet indicates '*Data receiving and forwarding*' with S1-S2-S3-S4 between pixel (chip)



Datasheet shows how S1, S2, S3 are transmitted with extra C1-C2 in the front of data batch.



2. **Nominate the matching protocol supported by the device (or choose from the above example) that shares the same data transmission method of your desired pixel protocol.**

3. **Proceed to Step 2 for further configuration.**

Step 2: Navigate to Device's Settings page to enable custom protocol feature

In this step, the OCTO/PIXELATOR MINI Series and Din PIXIE are guided accordingly due to their distinct interfaces.

For ENTTEC Ethernet Controllers (OCTO/PIXELATOR MINI Series)

1. Access to OCTO/PIXELATOR MINI web interface

1.1 Google Chrome is suggested as the web browser to access the OCTO/PIXELATOR MINI's web interface.

1.2 Free ENTTEC app, EMU can be used to discover OCTO/PIXELATOR MINI's IP address. See ENTTEC website www.enttec.com to download the app.

1.3 After entering the IP address of OCTO/PIXELATOR MINI, the user will land on the Home page of OCTO/PIXELATOR MINI's User Interface.

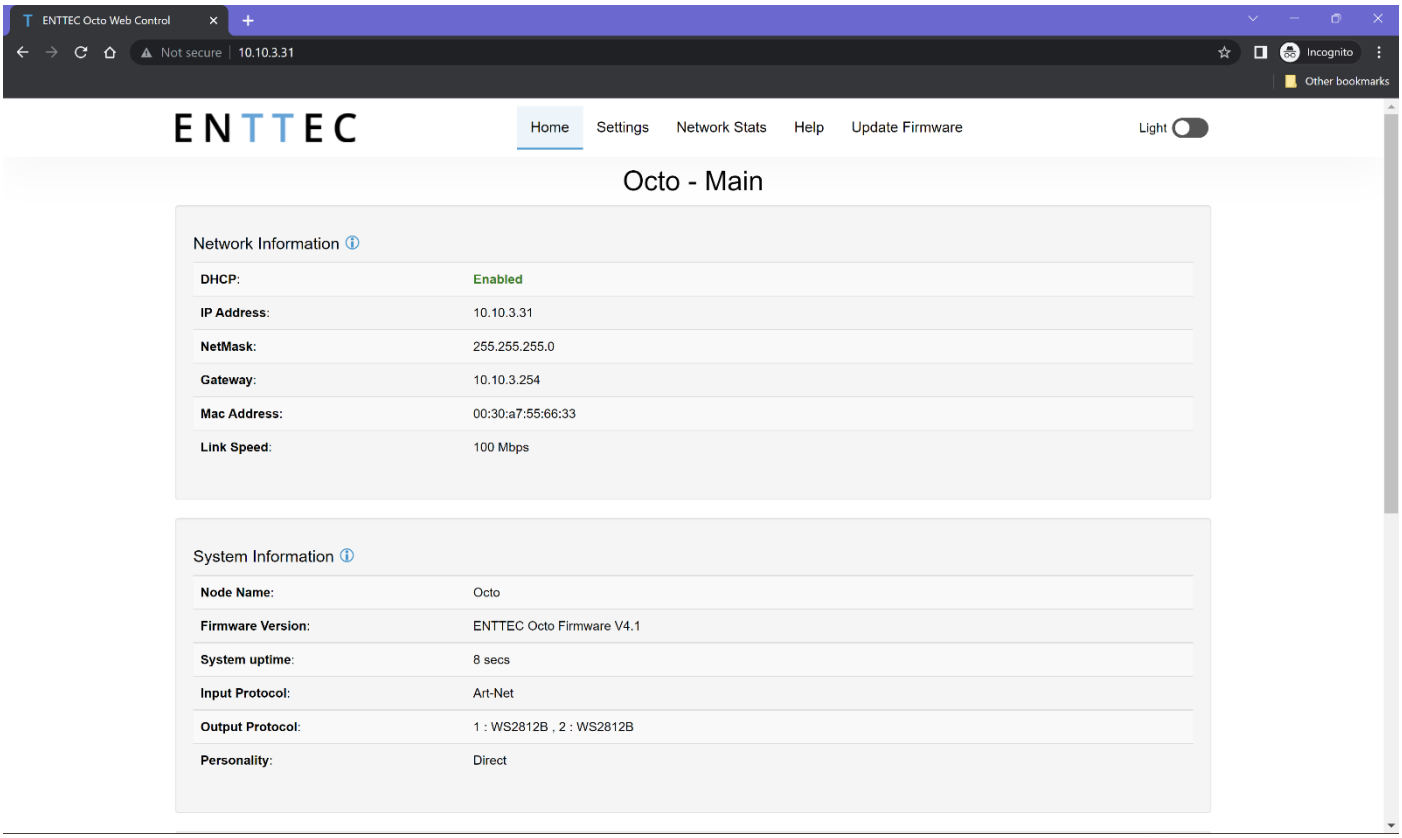


Figure 1 – Example of OCTO Home Page

Example of OCTO homepage in Figure 1 indicates IP address 10.10.3.31, which was assigned by the DHCP server. For out-of-box OCTO/PIXELATOR MINI that is connected directly to a computer (no DHCP server), the default IP address is 192.168.0.10.

See OCTO/PIXELATOR MINI User Manual 'Networking' section for more information.

2. Navigate to Settings page – Output Setting

Go to the output where the desired pixel fixture is connected to. Pick a pixel protocol from dropdown list that shares the same transmission method verified in Step 1.

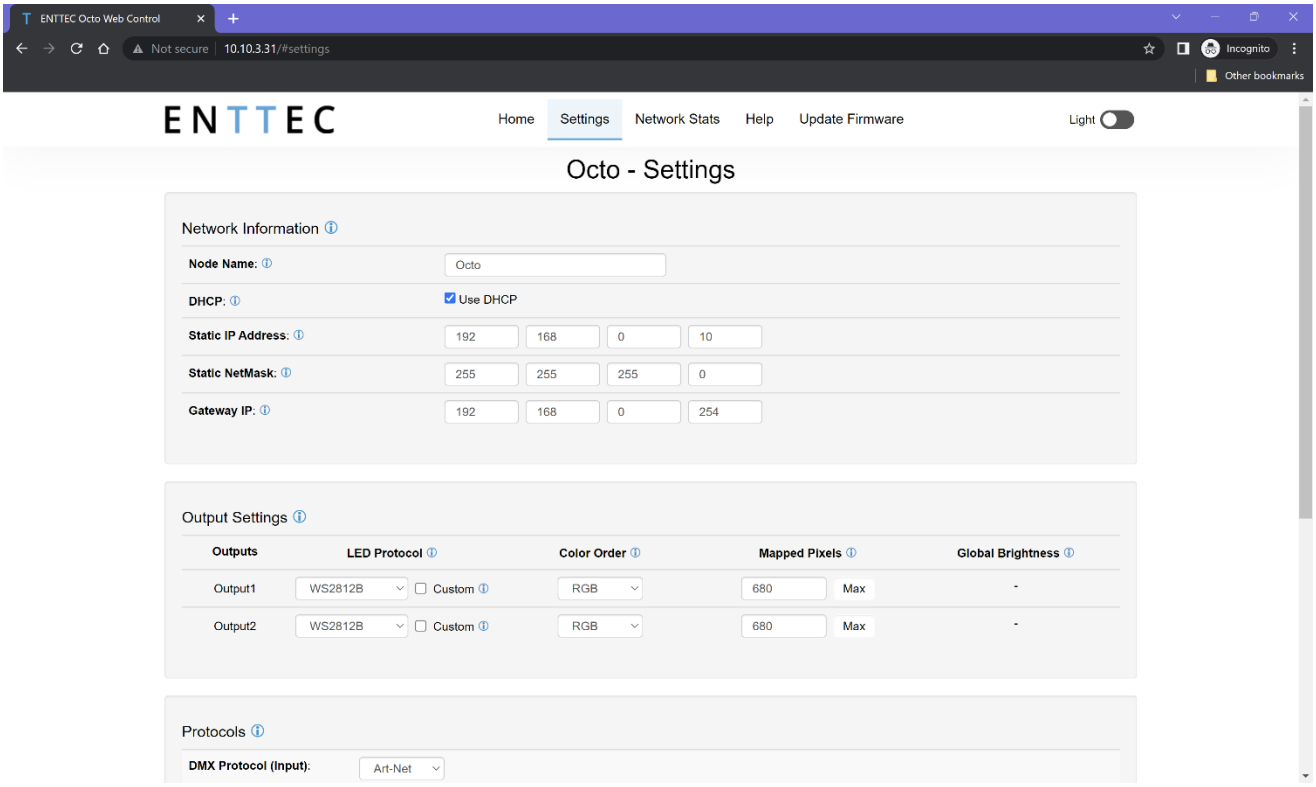


Figure 2 – Example of OCTO Settings Page

3. Enable Custom protocol (Continue to Step 3)

Enable the 'Custom' tick box to access the data voltage timing setup. Untick to disable the custom protocol.

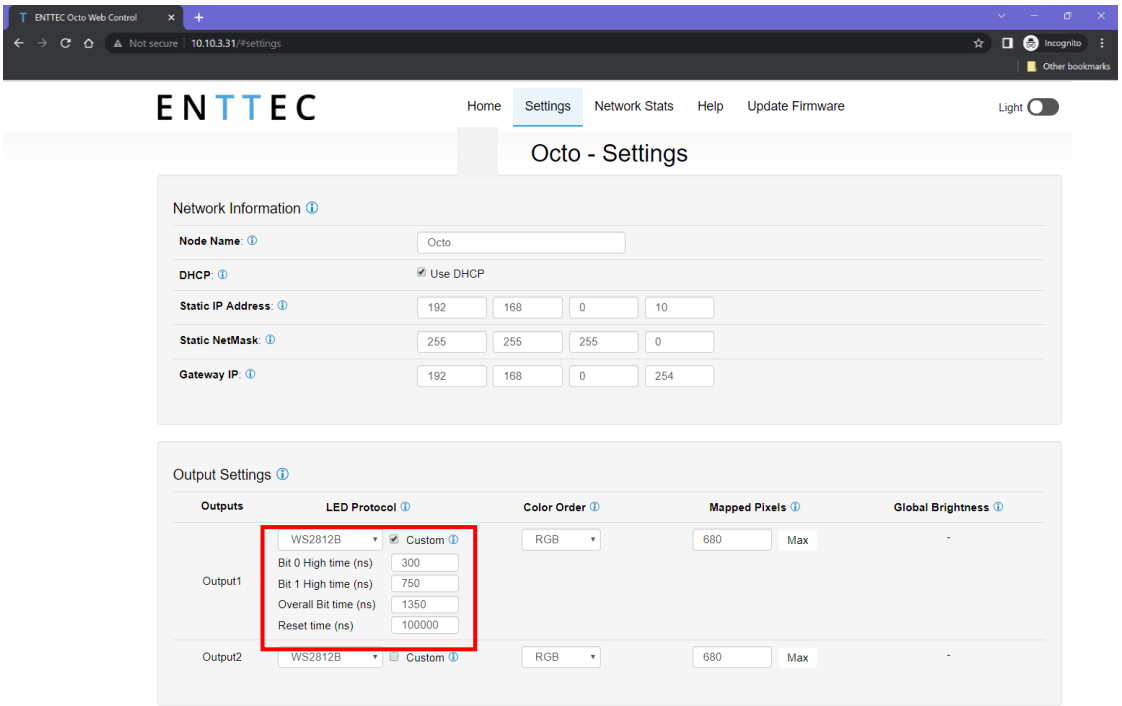


Figure 3 -Example of OCTO Custom field after enabling 'Custom' tick box

For DIN PIXIE

1. Connect DIN PIXIE to a computer using USB Type-B.
2. Launch EMU Software.
3. Scan for the device and click on the Conf of the discovered DIN PIXIE.

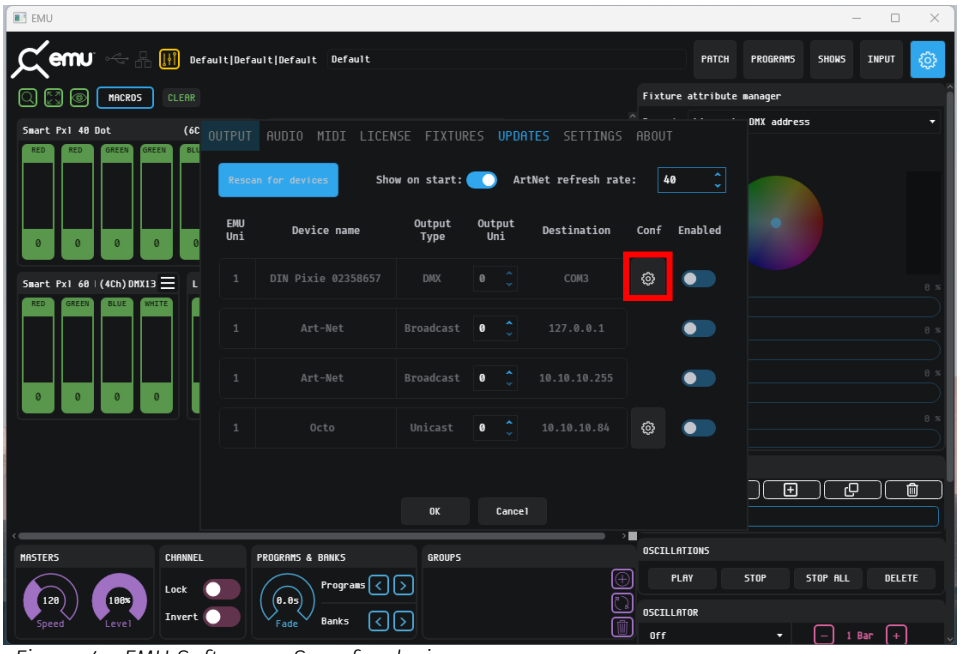


Figure 4 - EMU Software - Scan for device

4. Enable Custom Protocol (Continue to Step 3)

   Pick a pixel protocol from dropdown list that shares the same transmission method verified in Step 1 and enable Custom.

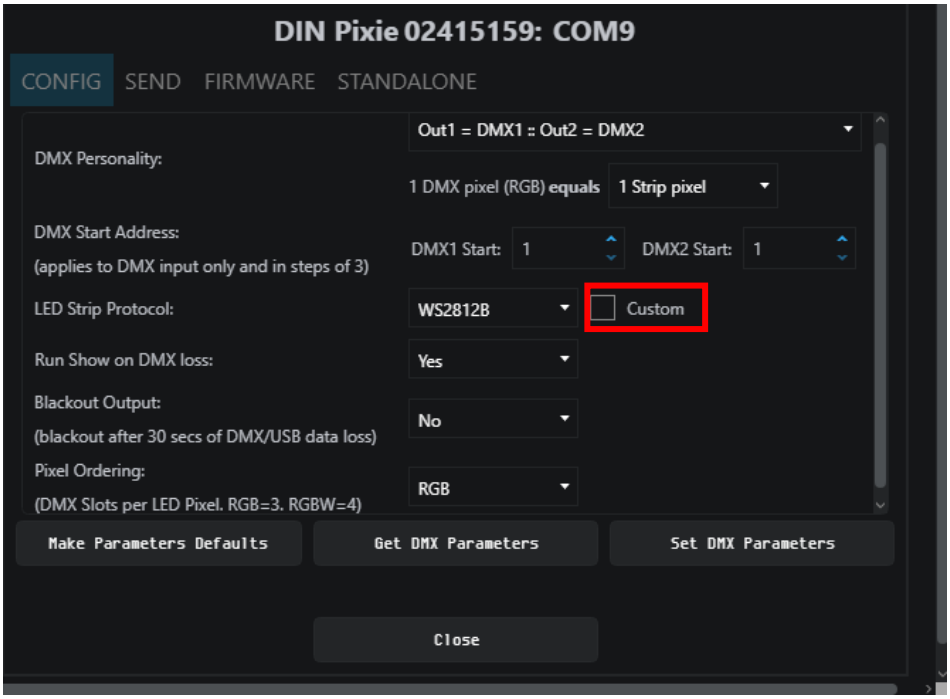


Figure 5 - DIN PIXIE Configuration in EMU

Step 3: Set custom voltage timing

1. Match the voltage timing on the datasheet of your desired protocol. Custom Protocol requires 4 inputs to complete data voltage timing adjustment:

Voltage Timing Definition	
Bit 0 High Time (T0H)	The voltage high time required for code 0.
Bit 1 High Time (T1H)	The voltage high time required for code 1.
Overall Bit Time:	The total voltage time for a single bit. Lower limit = T0H+T0L Upper limit = T1H+T1L
Reset Time	The total voltage low time required to reset the data transmission between each data batch.

Table 1 - Definition of Voltage Timing values

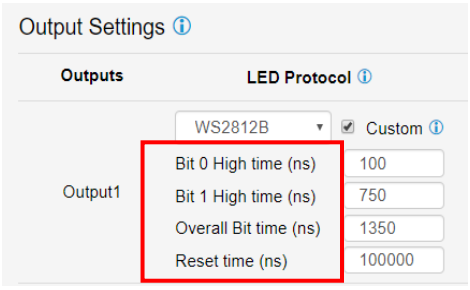
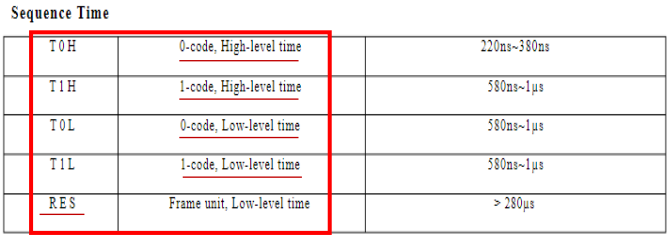


Figure 6 - Custom Voltage Timing values

2. Datasheet - Data voltage timing info Example

From WB2818B's datasheet

Locate '**Sequence Time**' table in WB2818B's datasheet for voltage timing range.



Sequence Time

T0H	0-code, High-level time	220ns~380ns
T1H	1-code, High-level time	580ns~1μs
T0L	0-code, Low-level time	580ns~1μs
T1L	1-code, Low-level time	580ns~1μs
RES	Frame unit, Low-level time	> 280μs

Figure 7 - Voltage Timing from WB2818B Datasheet

Fill the voltage timing range in the custom field in Output Settings.

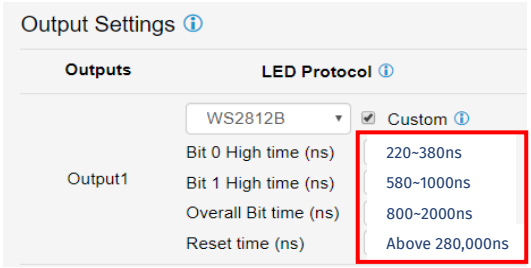


Figure 8 - Datasheet information interpreted into LED Protocol's custom field

IMPORTANT

- ENTTEC recommend taking the median value of the range for start.
- The user will have to SAVE settings for modified value to take effect.
- Fine adjustment of value required, follow by actual output test to optimise custom protocol for pixel fixture control.
- ENTTEC recommend a trial run on the actual setup before finalising the custom protocol setup.
- Typical issue of incorrect setup includes and not limited to failure to light up and output flickering.

CONCLUSION

This guide demonstrated how to set up a custom protocol for eligible ENTTEC devices and provided technical knowledge on verifying the datasheet of your desired pixel fixtures.

By following these steps, users can create a custom pixel protocol not found in the drop-down list without waiting for technical support or a new firmware release. If you have questions or difficulty finding the right information, reach out to our friendly support team at the local offices.