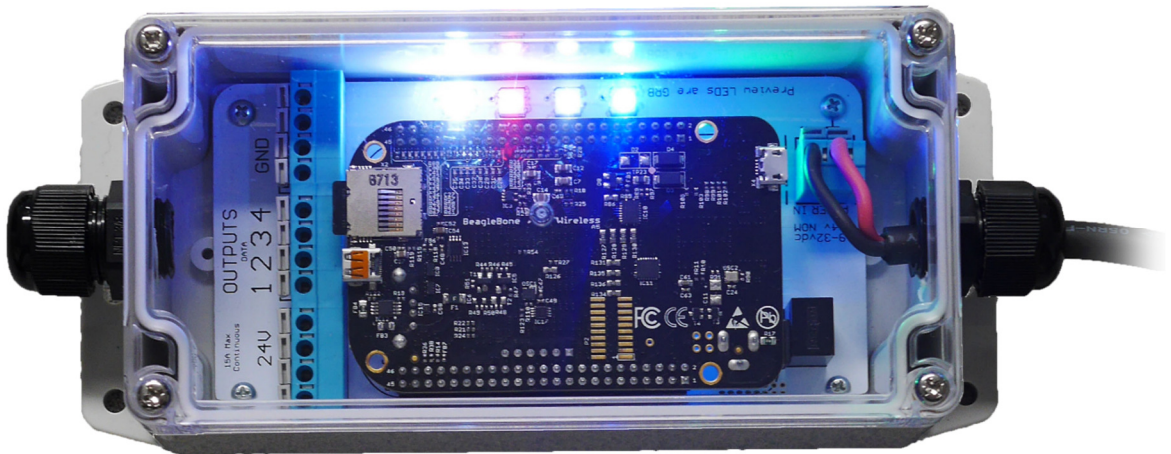# 4 Channel
Beagle Board Black
Pixel Driver

Apr. 2022

Thank you for your purchase of our pixel driver board!

The 4 channel BBB pixel driver was designed to be a ready-to-run weathertight solution for when a mess of wires or building a sealed control box with multiple parts is just not practical.

Power Specs and info

The board provides a power supply input on one end, and power connections for 4 strings on the other end. All power and ground pins are connected so it is OK to supply power on the output end of the board. Power is a direct Pass-Through for ease of wiring in the enclosure. The blue connectors are rated for 15 amps per pole continuous. The board was designed to handle 40 amps so throughput is limited strictly by the connectors. There is NO fuse on the pixel power so it is appropriate to use a power supply with a maximum output of 20A to protect wiring if a short occurs in the cabling leading to your pixels. If greater power is required, distribution needs to be handled externally, just simply connect the grounds of each string back to the driver board.

The Beagle Board and driver circuitry supply is reverse input and overvoltage protected.

The board can run on and pass through 9-32VDC. It is designed for a nominal voltage of 12 or 24VDC. There is NO option to run on 5V at this time (this is to maintain a robust controller with onboard regulation while still keeping it simple).

The driver board consumes a little less than an amp at 12v or a little under half an amp on 24v.

The blue "tool-free" wire connectors are suitable for conductors between 24 and 14 AWG

Pixel Data Outputs

The 4 data outputs on the board provide the standard 5V "TTL" signal level used by almost all pixels. All data timing and protocol comes from the FPP software. This board is strictly a data driver in that it simply provides level translation and robust chips to send the high speed data through as much wire length as possible without glitching.

The "special feature" of our boards is the data power level DIP switch. The normal position is "OFF" or "LOW". Through many hours of research we arrived at a driver output impedance that provided the cleanest signal over the greatest amount of wire scenarios. Nevertheless, sometimes things aren't perfect when trying to string wire all over the place and you need a little more juice to push that data out there. Now all you have to do is switch the affected channels to "ON" or "HIGH" to lower the output impedance and likely eliminate any glitching. This isn't a miracle cure that will make bad wiring work every time but we found that it solves problems often enough to make it worthwhile adding to every board.

All channels are TVS protected from static electricity or wiring mishaps. We've made this as strong as was reasonable but please don't try to blow them up on purpose!

Preview LEDs

The built-in RGB LEDs are in parallel with the data outputs (through additional current limiting resistors to ensure that a fluke failure in the pixel does not kill your whole string). This allows them to show the contents of the first pixel in your string without affecting any addresses or needing null pixels or any other nonsense! Note that the preview LEDs are G-R-B color order (the only way they're available) so if you have RGB pixels the red and green would be swapped on the preview. The LEDs are mostly on the board to determine if data is actively being sent. If they are not lighting up, one of three things is going on; no data being sent from FPP on that channel, null data being sent by FPP for that address, or the string is shorted externally. Technically, an output driver could be blown up but we have taken many precautions to make that as difficult as possible to do!

Attaching the BeagleBoard

The BeagleBoard can only plug on one way. Other components on this board block it from being plugged on when turned 180 degrees. Make note of the board outline on the PCB and make sure to align all of the pins on the tall headers... all 92 of them!

USB Precautions

The USB connector on the BeagleBoard is useful for connecting to a PC to configure network settings for the first time. Note that the USB port ground is bonded to the string negative of the power on the driver board (no reasonable way to avoid this). It is strongly recommended NOT to use the USB connection when the board is powered from an external power supply. If there is a ground differential between your computer and your pixel power supply, many unavoidable problems arise which result in blowing up the beagle board or USB port on the PC. This can be avoided by using a laptop computer (not plugged in to AC power), or by simply removing the BeagleBoard from the driver when using the USB tether. Fortunately USB tether is not needed once proper network settings are applied. WiFi tether can usually handle all setup needs anyway.

Setting up FPP to use the Pixel Driver Board

If you have used FPP on BBB before, skip to step 5

1. Download the latest FPP image for BeagleBoneBlack from the Github page
   https://github.com/FalconChristmas/fpp/releases

2. Use "Balena Etcher" or similar software to "burn" the SD card image onto a new card. Note that this will erase anything that was on the card.

3. Insert the card into the BeagleBoard

4. Connect to the FPP web interface

   - Use USB cable to power and connect (192.168.7.2)

   - Power with driver board and use WiFi generated by the BBB
     More info on these steps is available in the FPP manual
     https://github.com/FalconChristmas/fpp/releases/download/5.5/FPP_Manual.5.5.pdf

5. Navigate to the FPP status page by typing in the Board's IP address in the browser of your choice

6. Locate the "Input/Output Setup" tab near the upper right corner of the page

7. Select "Channel Outputs"

8. Select the "Pixel Strings" tab

For Revisions 0 and 1, there is no "cape" autodetect functionality built into the driver board. There are two solutions for configuring the pixel outputs.

Solution 1

The driver board can be used as-is by selecting "Cape-Type"

F8-B (No Serial)   Version 2.x

Note that 20 channels are available. The first 4 are used on the 4 channel driver board. Take care to "zero out" all unused channels as <u>erroneous information on this page will cause FPP to not run</u>.

Solution 2

We are working on getting the driver board definition incorporated for auto detecting, in the mean time we have the cape's definition file available to be manually added to FPP on your SD card.

If you purchase an SD card from us, we can do this in advance for you

1. Download the cape definition JSON file from the ledpixeldriver.com page
2. Plug the SD (with FPP already installed) into a card reader on a linux computer such as a raspberry pi with keyboard, mouse, and monitor which is already booting and running on its own SD card.
3. Copy the JSON file into "/opt/fpp/capes/bbb/strings" on the BBB SD card

Now on the "Pixel Strings" page, you can select "Cape-Type" "**ARBP-4CH**"

This way, only 4 channels are available so that no problems occur from unused channels and setup is much less intimidating.

For further information about setting up the attributes for each string channel, consult the FPP manual or forum. This setup is the same for ALL FPP devices and is beyond the scope of the driver board.

Support

For all inquiries please contact

support@ledpixeldriver.com

Please let us know if you would like anything added to or elaborated in the manual.