HANSON ELECTRONICS

HE123 BeagleboneBlack pixel controller

User Manual

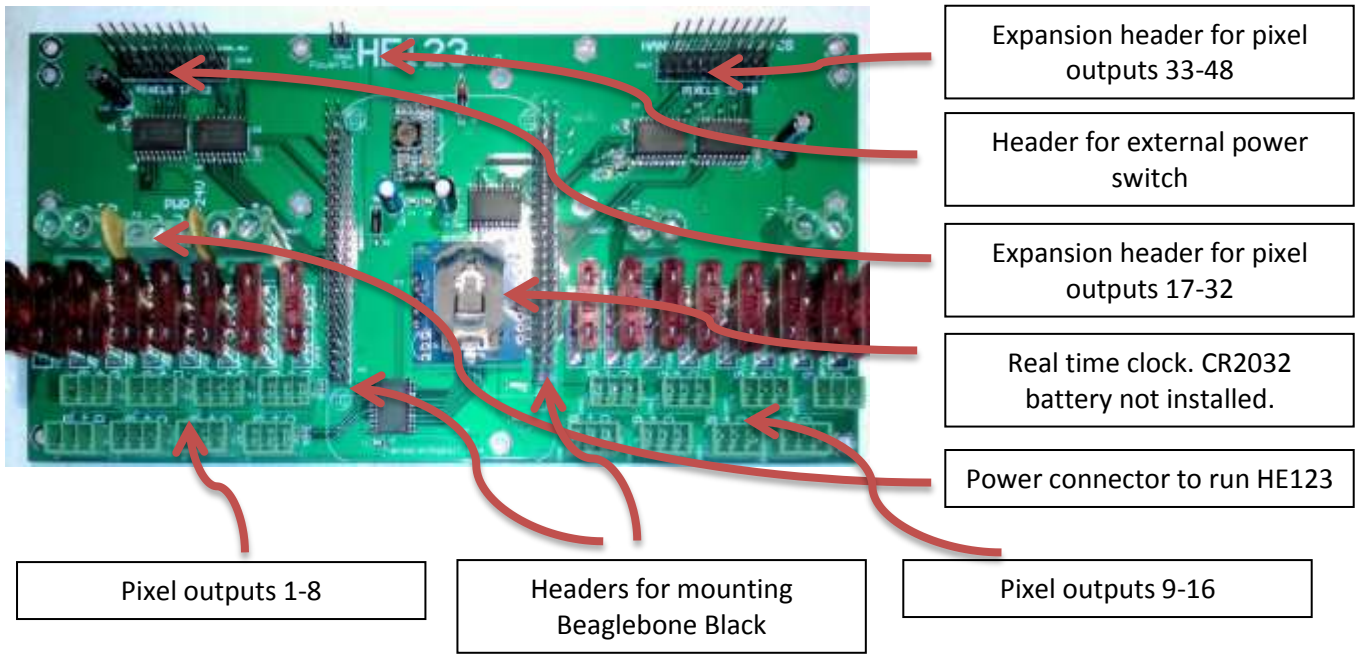
The HE123 is a pixel board based on the single board computer BeagleBone Black (BBB). It uses design elements of the RGB123 48 output pixel board that can be controlled with Falcon Player (FPP). The HE123 is the motherboard that the BBB plugs into. Up to 2 optional daughter boards (of 3 types) plug onto it as well. The 48 outputs are for 2811 and compatible pixels.

Dimensions and user manuals are available on website where applicable.

Revision 1.0
12-July-2017
http://www.hansonelectronics.com.au

HE123 motherboard

-16 fused pixel outputs with 4 outputs per power input
-2 expansion headers of 16 each
-inbuilt real time clock
-connects to HE123RJ, HE123TX, HE123PX
-header to take the Beaglebone Black power switch to the outside of an enclosure. A normally open switch can be connected to this header for powering off the BBB.
-can be powered by 5V or 12V



The HE123 is a motherboard designed to be run off a Beaglebone Black (BBB) single board computer and is compatible with the RGB123 48 output cape that it is designed around.

The HE123 has 16 fused pixel outputs and 2 expansion headers to allow for the addition of an additional 32 outputs. The additional outputs can be facilitated by the HE123-RJ, the HE123-TX or HE123-PX. The HE123 can be run off either Falcon Player (FPP http://falconchristmas.com/forum/index.php?board=8.0) or the Ledscape library (https://github.com/Yona-Appletree/LEDscape). As Falcon Player is the most common control method and uses parts of the LEDscape library it will be the only method discussed.

The HE123 is supplied with no output fuses and without a Beaglebone Black (unless ordered with 1). It can be power from either 5V or 12V. The 5V supply should be stable and vary no more than +/- 0.1V. The 12V supply can actually be anywhere in the range of 8-24V but 12V is the nominal voltage. Reversing the power or connecting up to both the 5V and 12V inputs at the same time may damage components on the board or the BBB. The BBB is powered from the same power as the HE123.

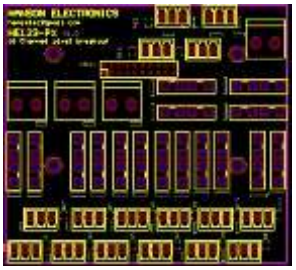
There is a real time clock (RTC) that can be used for scheduling a show. It uses a CR2032 battery which isn't supplied.

Care should be taken when plugging the BBB on top of the HE123 to ensure that no pins are bent and that there is no mis-alignment of the header pins. The Ethernet connector comes out the same end as the pixel connectors (see above picture).

The real time clock (RTC) on the HE123 can be configured and set with the FPP web interface. It requires a CR2032 battery. The RTC doesn't need to be used if the HE123 will have a connection through a network to the internet.

Daughterboards

HE123-PX powered pixel expansion daughterboard



-16 outputs. 4 power inputs. 4 fuses per output
-maximum of 30A per power input and 10A per pixel output
-plugs on top of HE123 to give an additional 16 fused 2811 outputs

HE123-RJ pixel breakout daughterboard

-16 outputs. no electronics. pixel outputs match standard RJ45 pairs
-plugs on top of HE123 to give an additional 16 unfused 2811 outputs on 4 RJ45 connectors
-mates with 4 HE123-EX
-up to several metres between HE123-RJ and HE123-EX
http://www.hansonelectronics.com.au/product/he123-rj/

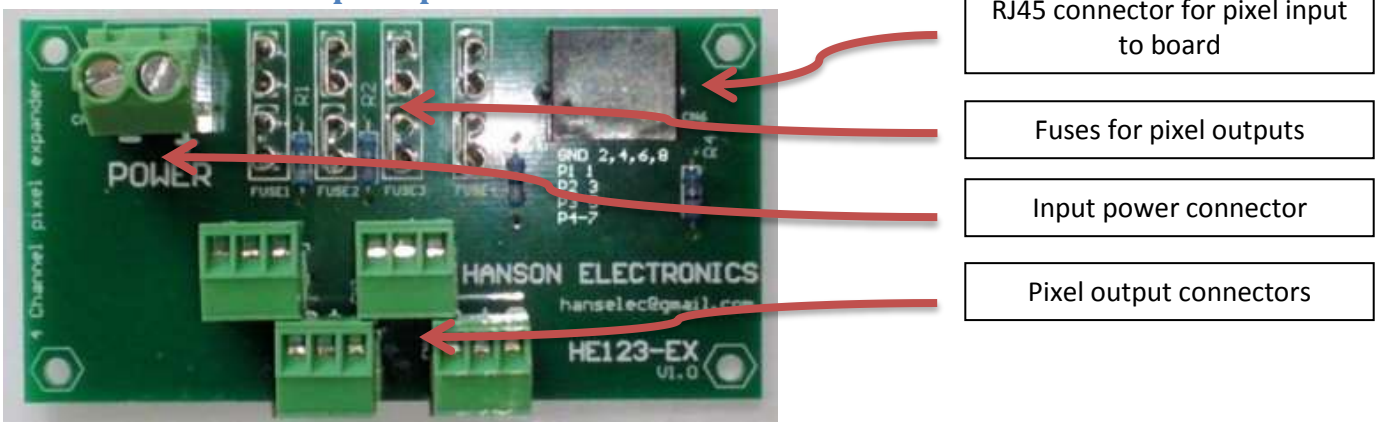
HE123-TX pixel differential expansion daughterboard

-16 RS422 balanced pair outputs for long range tx
-16 outputs. pixel outputs on standard RJ45 pairs
-mates with 4 HE123-RX
-up to several hundred metres between HE123-TX and HE123-RX
http://www.hansonelectronics.com.au/product/he123-tx/

BeagleBone Black for running Falcon Player and running Octoscroller for P10 boards, He123 pixel controller and other lighting gear
http://www.hansonelectronics.com.au/product/beaglebone-black/

Receivers

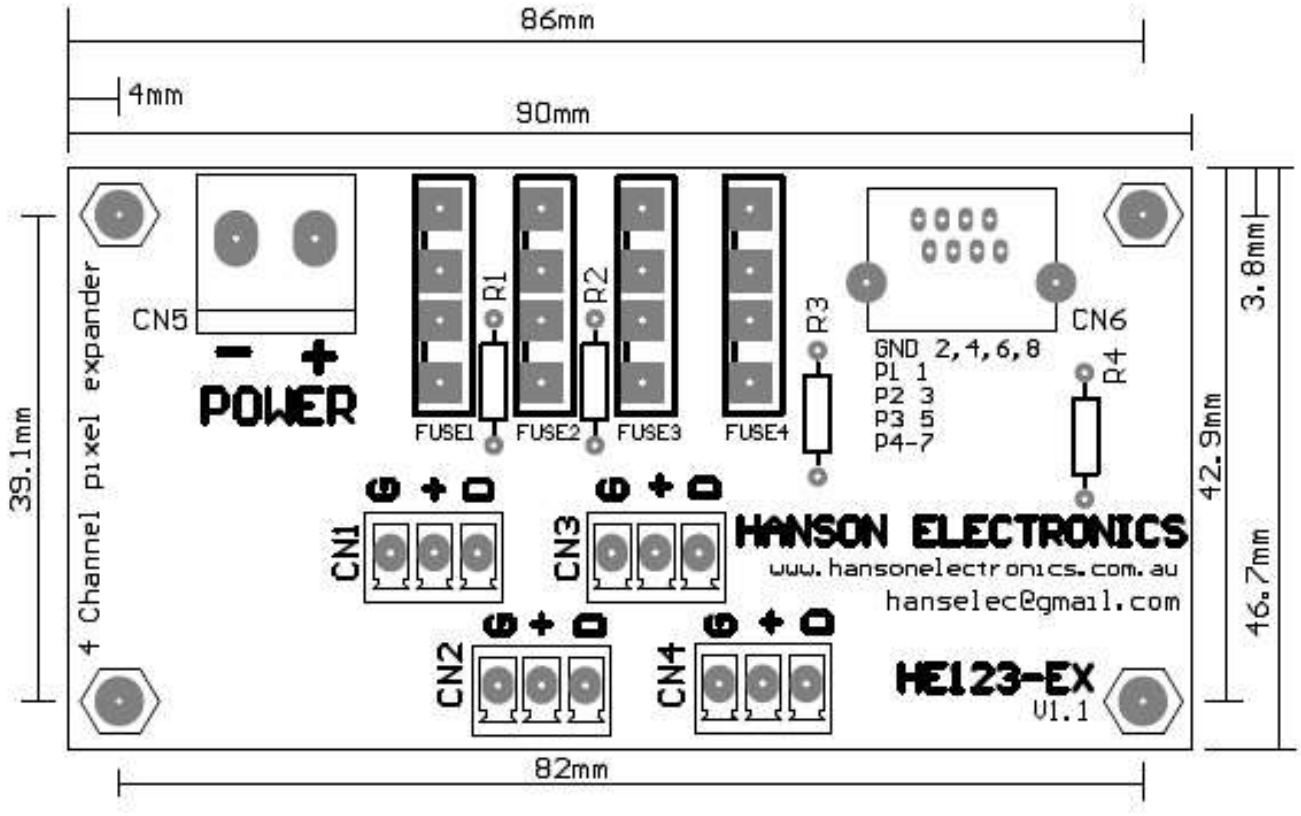
HE123-EX 4 channel pixel power breakout



-RJ45 connector to 4 channels fused pixel outputs
-mates with HE123RJ
-can be used as a breakout to power unfused pixel outputs like on rPi-28D or J1Sys P2
-connects to HE123-RJ via RJ45 connector. Can be connected to other pixel boards to provide output fusing.
-maximum of 30A input to pcb via power connector
-maximum of 10A fuse to any pixel output
-up to several metres between pixel controller and HE123-EX. Distance depends on cable and also distance between HE123-EX and pixels.

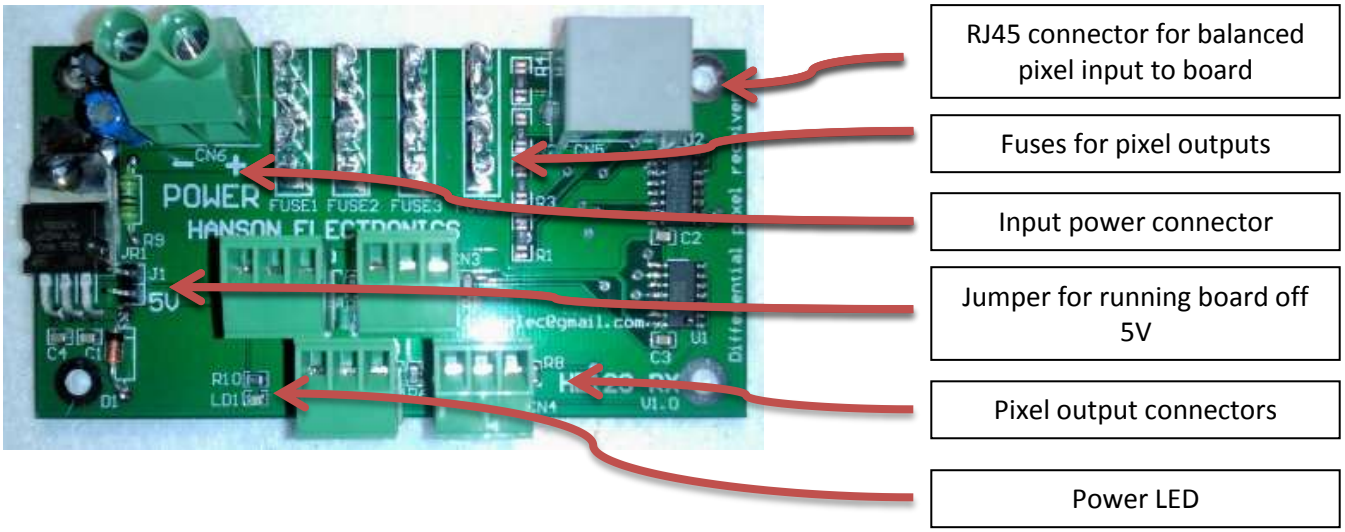
The connections used on the RJ45 connector for the 4 pixel connections is marked on the pcb.
GND Pins 2,4,6,8
Pixel 1 Pin 1
Pixel 2 Pin 3
Pixel 3 Pin 5
Pixel 4 Pin 6

http://www.hansonelectronics.com.au/product/he123-ex/



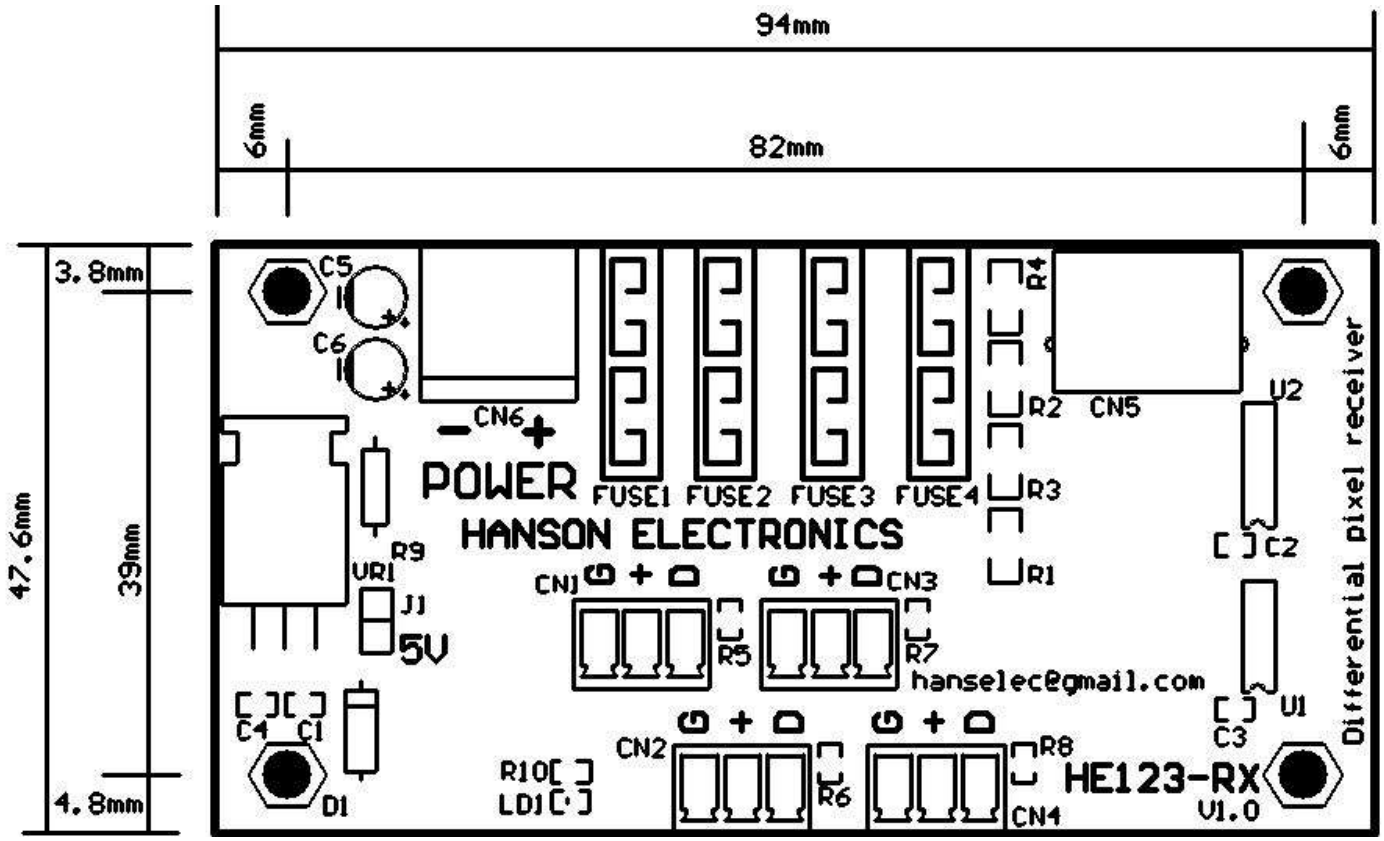
HE123-EX Drilling/mounting template (not to scale)

HE123-RX 4 channel RS422 to pixel receiver



-RJ45 connector to 4 channels powered, buffered pixel outputs
-mates with HE123-TX
-can be powered from 5V or 12V (whichever the pixel voltage is)
-jumper to select 5V input power. Powering the board with more than 5.1V while the 5V jumper is installed will damage the board.
-maximum of 30A input to pcb
-maximum of 10A fuse to any pixel output
-up to several hundred metres between HE123-4T (or HE123-TX) and HE123-RX

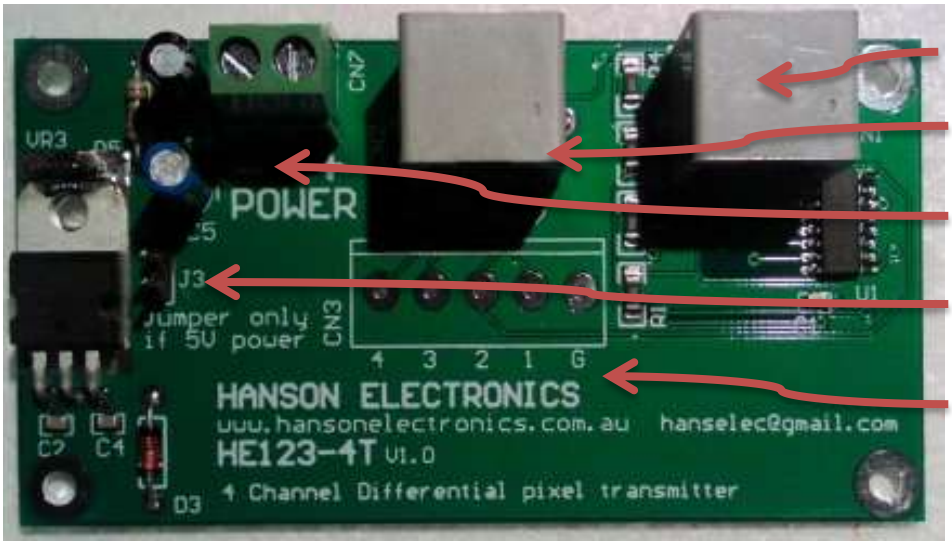
http://www.hansonelectronics.com.au/product/he123-rx/



HE123-RX Drilling/mounting template (not to scale)

Standalone transmitter

HE123-4T 4 channel pixel to 4 RS422 pixel transmitter



RJ45 connector for balanced pixel output from board

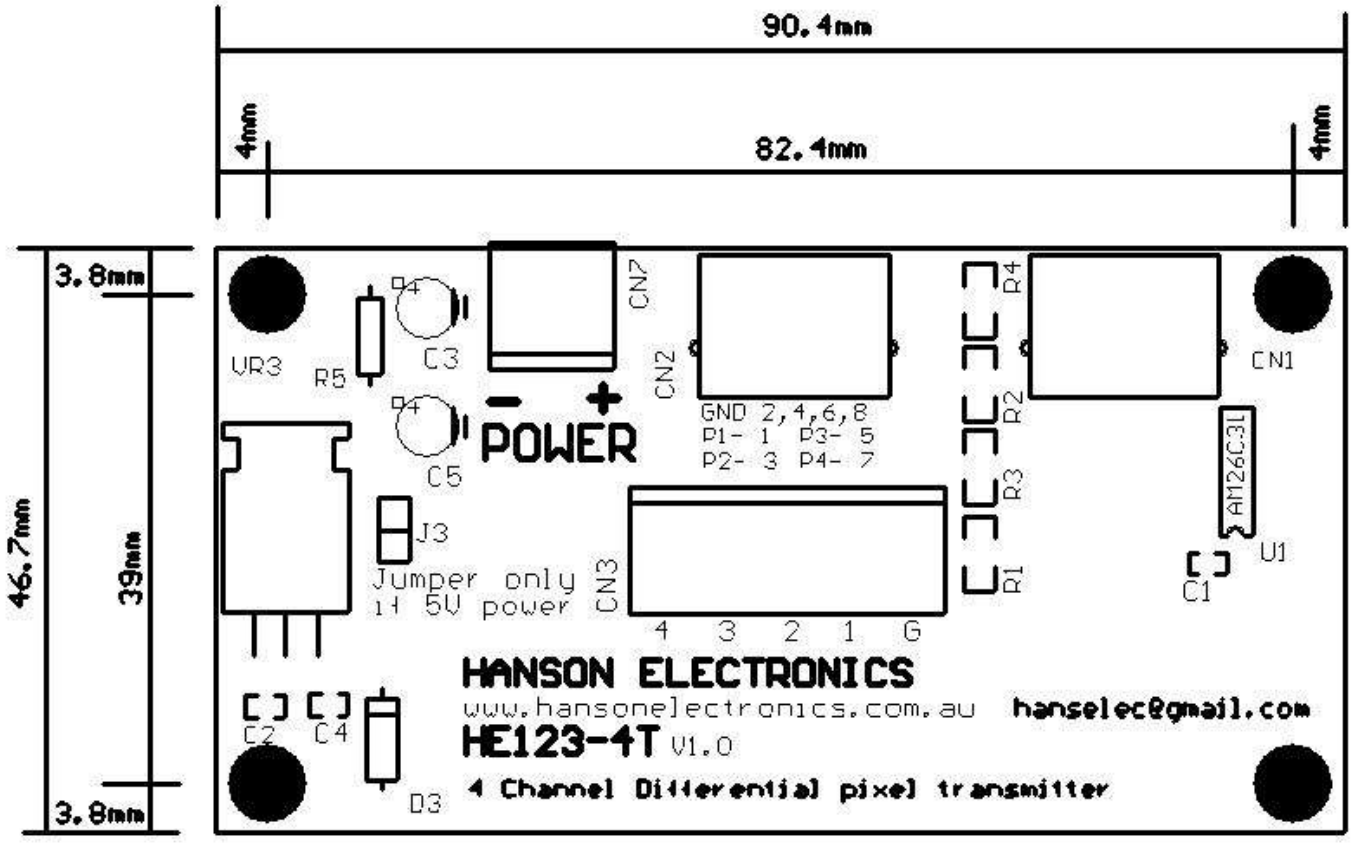
RJ45 connector for pixel input to board

Input power connector

Jumper for running board from 5V

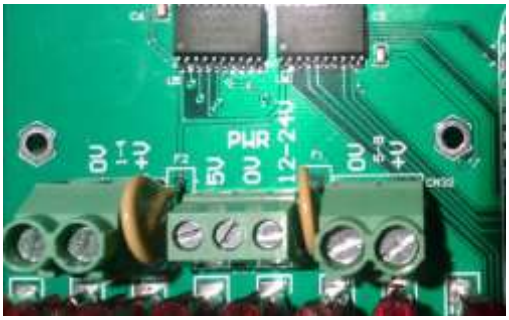
Mounting holes for 5mm terminal as alternative pixel input to board

-balanced pair outputs for long range transmission
-connects to any 2811 pixel board to allow long range transmission.
-mates with 1 HE123-RX
-connects via RJ45 to HE123-RX or other pixel board. Pads are supplied to allow fitting of a 5 way 5mm terminal block.
http://www.hansonelectronics.com.au/product/he123-4t/

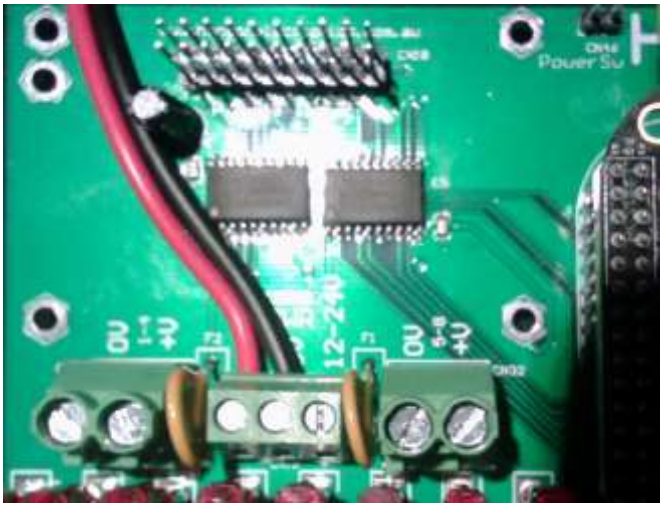


HE123-4T Mounting/drilling template (not to scale)

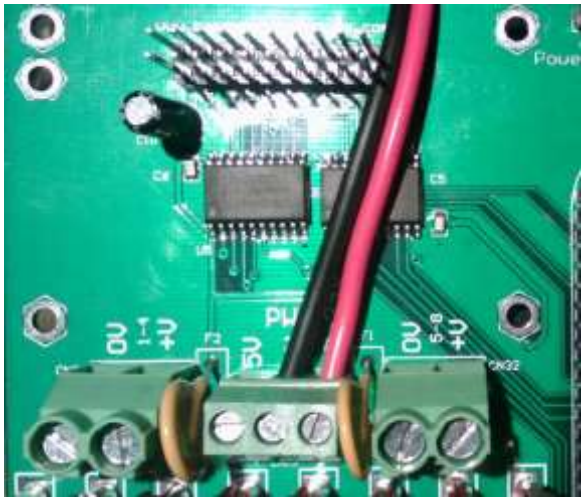
Connection Examples



HE123 power connector (between pixel power connectors 1-4 and 5-8)



HE123 powered from 5V



HE123 powered from 12V

HE123-TX connected to HE123-RX
HE123-4T connected to HE123-RX
HE123-RJ connected to HE123-EX

Falcon Player (FPP) Configuration

The below screenshots show some of the configurations accessible via the FPP web interface required when setting up and using the HE123. The appearance and potentially placement of some configurations may change with different versions of Falcon Player.

The BBB the screenshots are of is configured with a static IP of 10.0.0.160 and was configured with a hostname of FPPBBB.

Falcon Player can be ran in bridge mode if being used as an E1.31 pixel controller ran by Xlights or by another BBB or Pi running FPP. The E1.31 can also be ran as Standalone, Master or as a Slave. If running in Bridge mode then sequences, schedules and playlists don't need to be uploaded or configured.

See http://falconchristmas.com/forum/index.php?board=8.0 for information on using and configuring Falcon Player.

Channels that will be used for the pixel outputs need to be configured under Input/Output Setup -> Channel Outputs -> E1.31. If not using as Master then there is no need to tick the Enable E1.31 output but all of the required FPP channels, universes and universe sizes need to be configured.

Once configured and saved change to the BBB tab, select RGBCape48C as the cape type, configure whichever of the 48 outputs are used and save. The 1st 16 outputs are on the HE123 motherboard and the other 2 groups of 16 are from the two optional daughterboards. Save after configuring.