DMX *SLOW LANE* Pi-hat from BGtek

Introduction

The DMX SLOW LANE hat for the Raspberry Pi will capture eight channels of DMX data and retransmit the data at a slower data rate to the UART Rx input of the Raspberry Pi.

In addition to performing the electrical level translation from the RS-485 level used by DMX, the microcontroller on the DMX Slow Lane decodes the 250kbit data rate and the special signal timing around break and mark after break of DMX and transmits them to the Raspberry Pi at a rate and format that the Pi can handle.

Since most devices connected to a DMX stream only use a subset of the 512 channels of the DMX data stream to control light levels, colors or other effects, the DMX SLOW LANE captures eight channels of DMX data starting at the address set by its onboard dip switch and transmits the eight bytes at 19200 bps to the connected Raspberry Pi. This means that up to 64 DMX slow lane devices can be addressed on one DMX universe

Features

- The board physically mounts on the Raspberry Pi and connects through the Pis I/O connector.
- Standard XLR connectors to connect to DMX signals
- Decodes 8 channels of DMX data
- Address setting by dip switch
- Test/ setup mode generates dummy data for configuration
- Up to 64 DMX slow lanes on one universe
- LED to indicate DMX decode
- LED that may be controlled from the Pi to provide feedback.

Physical Description

The DMX SLOW LANE hat conforms to the Raspberry Pi Hat physical dimensions of 65 x 56mm with mounting holes and connectors in the correct place to mount the board on to a Raspberry pi.

In addition to the general Pi Hat format the module contains;

- A 3 pin XLR DMX input connector.
- A 3 pin XLR DMX output pass-through connector. Note that the input and output are not isolated.

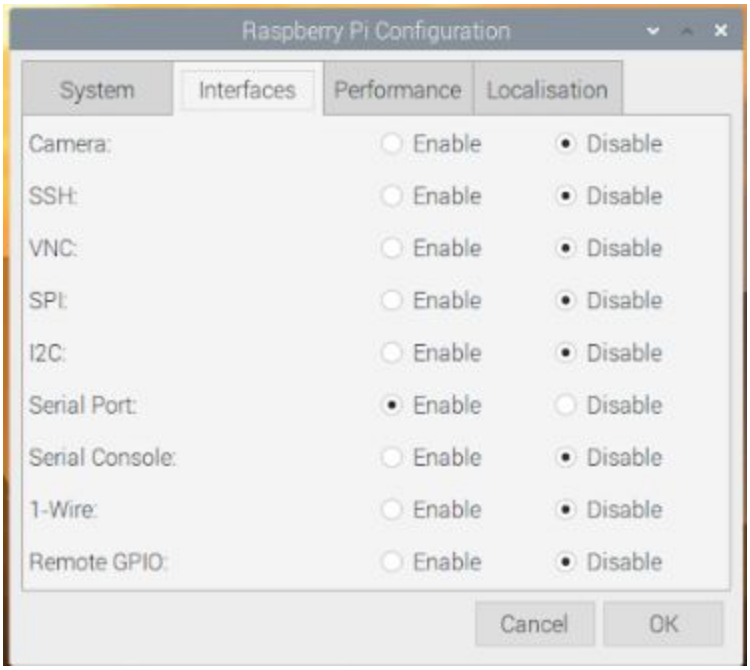
- A 10-way dip switch for setting DMX address. The first nine are used to set the starting address up to 512. The tenth switch is used to configure the DMX slow lane into the test mode.
- LED to indicate that the board is receiving DMX signals and transmitting them to the PI
- LED for feedback from the PI. This LED is connected to a GPIO pin on the Pi and can be used by software in the Pi to indicate that data has been received and is dependent on the software running on the Pi.
- Size 65mm x 56mm x 26mm
- Power, the DMX slow requires approximately 20ma at 3.3volts which it derives from the Raspberry Pi via the I/O connector.

Installation

Note that before installing and running the DMX slow lane hat, the serial console must be disabled and the serial port enabled on the Raspberry Pi. The following are the steps to do this.

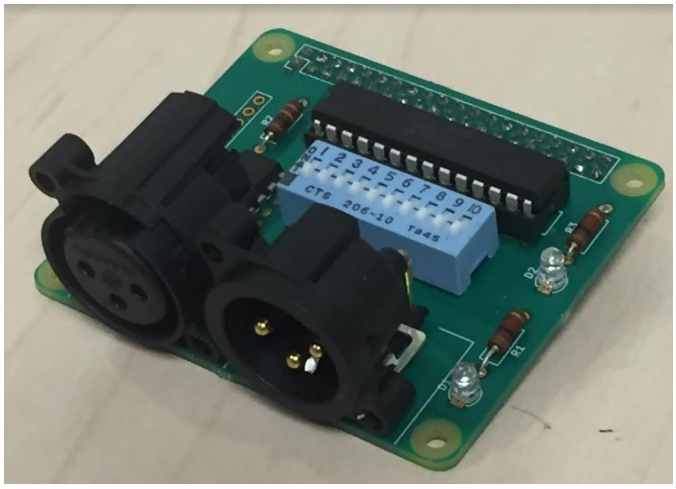
- Go to the Raspberry Pi start window
- Select Preferences
- Then Select Raspberry Pi Configuration
- Select the Interfaces tab
- Disable the Serial Console and enable the Serial Port.

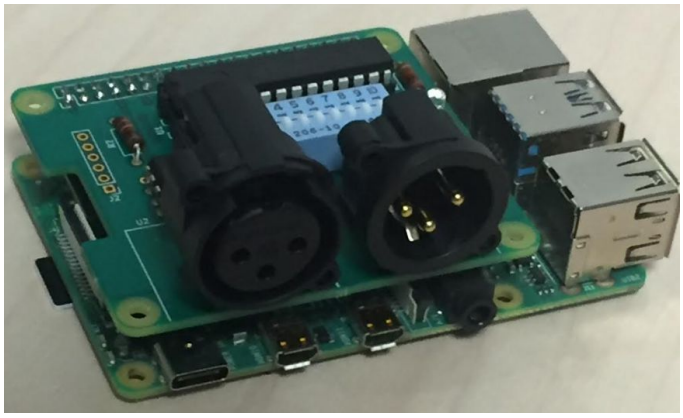
See below;



Once this has been completed, power down the Pi and continue with the installation.

After unpacking the board module and with the PI unpowered, plug it into the Raspberry I/O connector and then install the provided standoffs and screws.





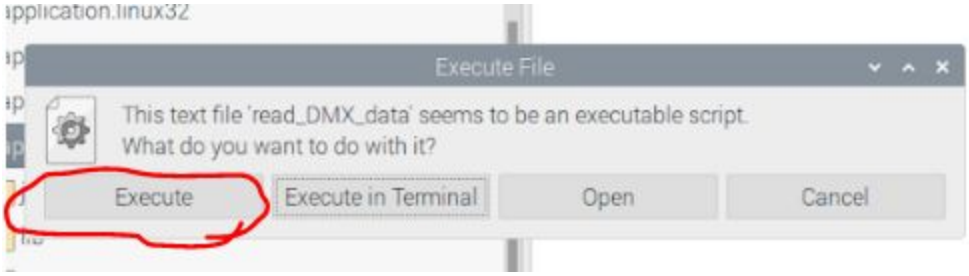
Testing the DMX slow lane interface to the Raspberry Pi.

The DMX slow lane has a test mode that will continuously send data to the Pis Rx input so that the port and setup can be tested. A simple test program is provided that will configure the UART port and display the data on the screen of the Pi.

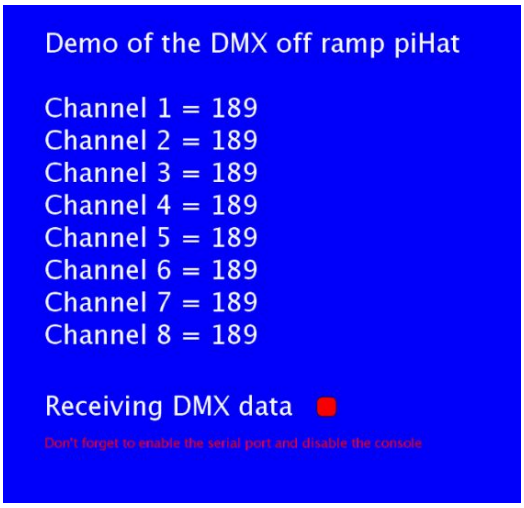
Set switch 10 to the on position. In this position, the DMX slow lane will send a continuous stream of data to the Raspberry pi input at 19,200, 8bit, 1 stop no parity.

- Power up the Raspberry Pi/ DMX slow lane.
    - The DMX receive LED will flash.

- After the Raspberry Pi has powered up, go to WWW.http://www.bgtek.net/DMXSL and download the test_files.apk. Extract the program to a convenient folder. Run the test application by double clicking it. The display will show;



- The display will show the data in each of the channels incrementing at approximately 2 times per second the red indicator will flash indicating that the Pi is receiving the data.



Testing DMX receive

Once the test code works, it's time to test that the unit can receive DMX data from a control console. In order to complete this test, you will need a device that can transmit DMX signals and the correct cable to connect to the DMX input of the DMX slow lane.

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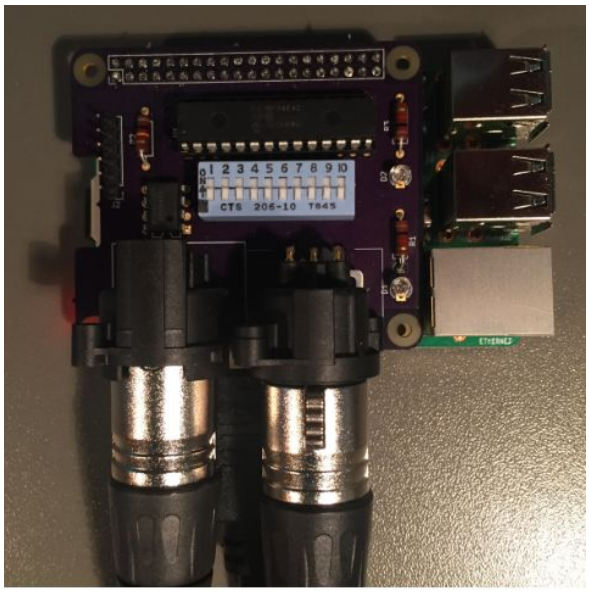
- Turn off the Pi/DMX slow lane
- Turn off the test mode by setting switch 10 to off.
- Set the DMX address switch to the starting address for the 8 channels of DMX data.
- Connect the DMX input cable from a DMX control console.



    - The DMX receive LED will begin flashing.
- Turn the Raspberry pi/ DMX slow lane on
- Run the DMX test program.
    - The RPI led will flash, indicating the Raspberry Pi is receiving data.
- Adjust the levels on the appropriate channels
    - The levels will change on the screen indicating the settings on the control console, as shown below.

Once you observe the data changing on the Raspberry Pi screen. The DMX slow lane is receiving DMX data and transmitting it to the Raspberry Pi. You can now write your own code to respond to the DMX data that is being received.

Appendix

Data format

The DMX slow lane will send data into the UART Rx of the Raspberry Pi in the following format

Data rate - 19200
Data bits - 8
Stop bits - 1
Parity - none

Eight data bytes are sent as follows;

Byte 1	DMX data from start address (0-254)
Byte 2	DMX data from start address + 1 (0-254)
Byte 3	DMX data from start address + 2 (0-254)
Byte 4	DMX data from start address + 3 (0-254)
Byte 5	DMX data from start address + 4 (0-254)
Byte 6	DMX data from start address + 5 (0-254)
Byte 7	DMX data from start address + 6 (0-254)
Byte 8	DMX data from start address + 7 (0-254)
Byte 9	End of file character always 255 or 0FFh

Contribute Applications.

If you come up with some great software applications you can post them to this GitHub location.