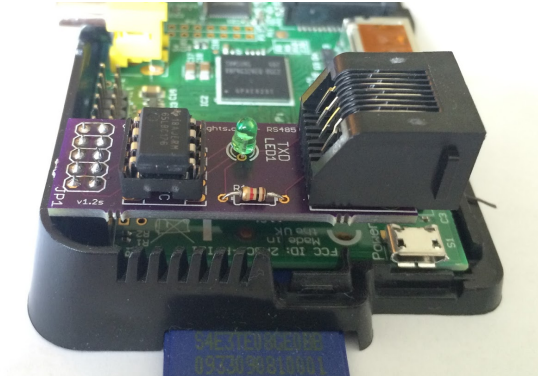


SJLights.com - RS485 Slim - Design Doc



Objective

Build a RS485 interface utilizing the Raspberry Pi GPIO ports, and make it DIY friendly.

Background

Many people have begun to use the [Falcon Pi Player](#) (FPP) as a controller for their holiday light shows. The FPP requires a USB port for a USB flash drive, and many people use a second USB port for a WiFi dongle. Many of the Raspberry Pi's models (A, A+, & B) are constrained to one or two USB ports, making the ports a precious commodity. The GPIO ports have an often untapped UART capability, that could be used instead of a USB to RS485 adapter.

Design Details

General Component Selection - The component part numbers are mostly borrowed from the Renard SS BOMs, to allow for ease of acquisition, compatibility, and spare parts considerations.

RJ45 Connector - This is the main interface type used by many of the AC light controllers, including the Renard SS series. Most USB-to-RS485 require an adapter to connect via RJ45, and this element eliminates that kind of need.

GPIO Socket - The minimum amount of GPIO pins are used, allowing access to the remaining pins for other purposes.

RS485 Chip - The chip (SN65LBC176P) is one of the standard used with the Renard SS series, but pinout is compatible with a variety of ICs. It has been tested with the Maxim MAX485, STMicroelectronics ST485BN, and TI SN65LBC176P.

Caveats

Transmit Only

Due to the way that UART is presented on the GPIO, it isn't very practical to have the adapter also provide receiving functionality. The device is specifically a transmit only device. In the planned use case of controlling light controllers, this should not be a problem.

Hack Required to Work with FPP

As of v1 of FPP, a symlink is required after each reboot, followed by a restart of 'fppd.'