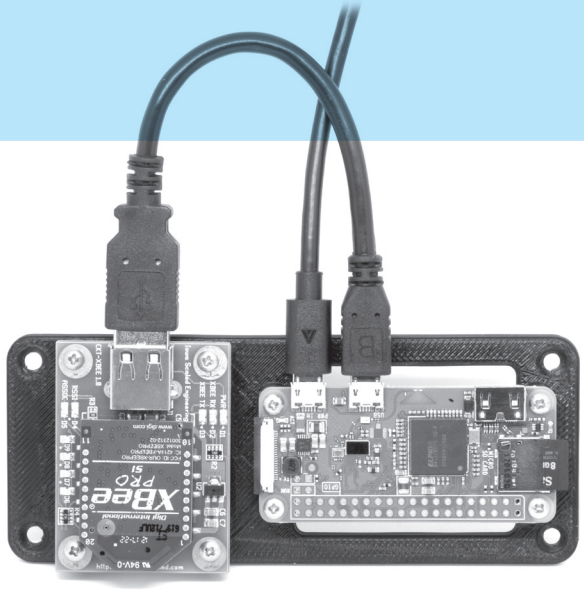
Visit the Iowa Scaled Engineering website and store to learn more about our full line of model railroad electronics.

www.iascaled.com



# ProtoThrottle™

## Realistic Control Stand Throttle



Receiver for ESU CabControl,
JMRI WiFi Throttle, and Digitrax LNWI

**IOWA SCALED ENGINEERING – ELECTRONICS MADE EASY!**

**www.protothrottle.com**

## Getting Started

When using the receiver with an ESU Cab Control system using default settings, go right to Step 1. If you are using the receiver with JMRI WiFi Throttle or Digitrax LNWI-based systems, or need to change the network settings, see the System Setup instructions.

**Step 1:** Connect the short USB cable between the Raspberry Pi board and the XBee board as shown above.

**Step 2:** Verify that the SD card is seated firmly in the socket

**Step 3:** Connect the long USB cable from power supply as shown above. Plug in the power supply.

**Step 4:** Wait about 30 seconds for Raspberry Pi to boot. During this time the activity light on the Raspberry Pi will blink and D6, D7, D8, and D9 may light dimly. Once D8 and D9 are on fully, the receiver is ready and connected to the command station. If a mini-HDMI cable is plugged in when power is applied to the Raspberry Pi, and connected to a monitor, a running log of debug information will be displayed.

**Step 5:** Configure the ProtoThrottle. The default receiver base address is zero (0).

***Have Fun!***

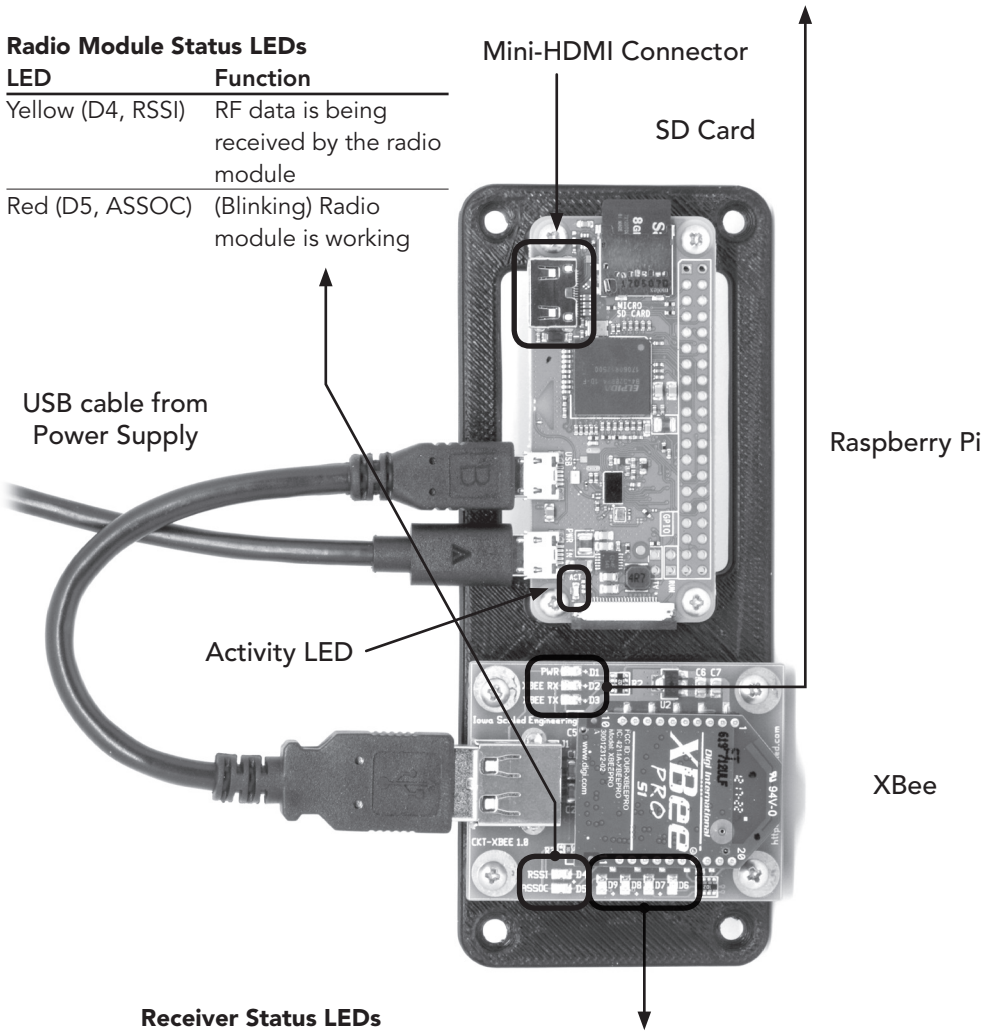


**Power and Data LEDs**

| LED | Function |
|---|---|
| Green (D1, PWR) | Power is present |
| Orange (D2, XBEE RX) | Data received from XBee module |
| Orange (D3, XBEE TX) | Data transmitted to XBee module |

**Radio Module Status LEDs**

| LED | Function |
|---|---|
| Yellow (D4, RSSI) | RF data is being received by the radio module |
| Red (D5, ASSOC) | (Blinking) Radio module is working |



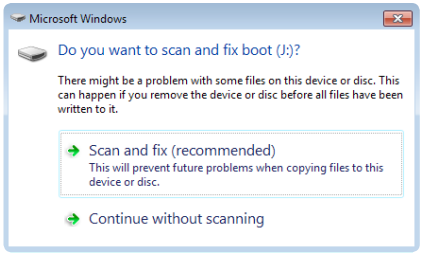

**Receiver Status LEDs**

| LED | Function |
|---|---|
| Blue (D9) | The RasPi is running and communicating with the XBee |
| Blue (D8) | A command station was found |
| Blue (D7) | A valid ProtoThrottle command was received |
| Red (D6) | (Blinking) Another receiver is transmitting on the same Base Address |

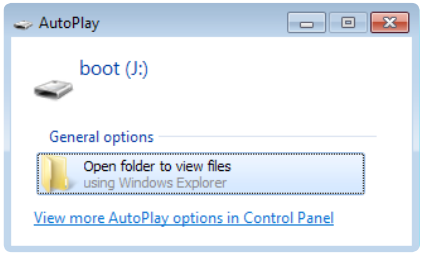
# System Setup

Follow the steps below to configure the receiver to work with JMRI WiFi Throttle or Digitrax LNWI-based systems, to change the wireless network setup, or to change the receiver base address.

1. Remove the SD card from the Raspberry Pi
2. Insert the SD card into the provided adapter
3. Insert the adapter into your computer or laptop's card reader slot
4. If prompted to "Scan and Fix", select "Continue without scanning"




5. When prompted, select "Open folder to view files"




## Wireless Configuration

Open the file wireless-config.txt. Make sure only one network configuration is active (uncommented). All other network configurations should be commented out (# at the beginning of the line). See the wireless-config.txt file for examples.



**ESU Cab Control:** If you changed the ESU Cab Control network settings from their factory defaults, the receiver needs to be reconfigured. Change the ssid and psk strings to match the custom SSID and password of your ESU Cab Control system.

```
network={
        ssid="MY-ESU-SSID"
        psk="MY-ESU-PASSWORD"
}
```

**Digitrax LNWI:** Uncomment the following lines by deleting the pound sign (#). Change the SSID string to match the ssid of your LNWI module. **NOTE:** this string MUST be changed to match the unique string of your module – the default value listed is just an example. Make sure all other network configurations are commented out.

```
network={
        ssid="Dtx1-LnServer_0ACC-7"
        key_mgmt=NONE
}
```

**Home Network:** Uncomment the following lines by deleting the pound sign (#). Change the SSID and psk strings to match the ssid and password of your home network. Make sure all other network configurations are commented out.

```
network={
        ssid="MY-HOME-NETWORK-NAME"
        psk="MY-HOME-NETWORK-PASSWORD"
}
```

## Receiver Configuration

Open the file protothrottle-config.txt. Change the mode line to match the system you are using.

**ESU Cab Control:**
mode = esu
**JMRI Wifi Throttle (a.k.a. WiThrottle or Engine Driver):**
mode = withrottle
**Digitrax LNWI (subset of JMRI WiFi Throttle protocol):**
mode = lnwi

To change the receiver base address, put a new value in the baseAddress line. Example:

```
baseAddress = 3
```

**Note:** the throttle and receiver ship with a default base address of zero (0). Any address will work as long as both the throttle and receiver are configured to the same value. The only time to change it would be to avoid conflicts with other ProtoThrottle systems nearby.

**Advanced Options**

The "serverIP" option in the protothrottle-config.txt file can be set if the server cannot be found from scanning your network.

If your JMRI WiFi Throttle server is running on a port other than 12090, you will need to set the "serverPort" option in the protothrottle-config.txt file.

## Notes



The ProtoThrottle Receiver is based on a stripped-down but otherwise stock version of Raspbian, an open source Linux distribution available from the Raspberry Pi Foundation website:
**https://www.raspberrypi.org/downloads/raspbian/**

The ProtoThrottle Receiver code is open source under the GPL v3 and is available from Github:
**https://github.com/IowaScaledEngineering/esu-bridge**