USING A RASPBERRY PI TO CONTROL YOUR MODEL RAILROAD

HOW TO CONTROL YOUR DCC LOCOS AND LAYOUT WIRELESSLY FROM YOUR ANDROID OR IPHONE.

HISTORY

- For some time we have been using wireless throttles to control our locos, throw turnouts and operate accessories. Digitrax, NCE and several other manufacturers offer us this ability today.

PROBLEM

- Because some of the components in the simplex version of Digitrax wireless throttles and UR91 receivers have reached end-of-life they are no longer available.
- Upgrading to the duplex version hardware is a significant capital investment.
- We now have an alternative – the use of smart phones as throttles and a wireless network as a receiver.

RECENTLY

- The use of the Java Model Railroad Interface (JMRI) on personal computers to control layouts, along with our existing wireless (wi-fi) networks, has recently allowed us to connect our Android phones and iPhones to our networks and thereby connect them to our model railroads.

ENGINE DRIVER

- The application that you can run on your Android phone and control your locos and your railroad was written by our esteemed Secretary, Steve Todd. Steve's app is used all over the world and is very popular.
- Steve freely gave all his development effort so that Engine Driver can be obtained at no cost from Google Play.

THE NEXT STEP

- When the Raspberry Pi arrived on the scene not long ago Steve saw the opportunity to replace the desktop computer that we were using to host JMRI and the wireless interface to the layout with a Raspberry Pi.

WHAT IS IT?

- The "Pi" is actually a fully functional computer. It runs the Linux operating system – a version that can look a lot like Windows but is more robust and is free. It is fast enough to meet our needs. You can attach a monitor, like a PC, but you don't have to. You can add a keyboard and a mouse, even wireless, but again, you don't have to. You can connect a network cable and browse the internet. You can plug in ear phones and a camera.

WHAT CAN IT DO?

- The "Pi" runs Java, just like a PC, so we can and do run JMRI on the Pi. The Pi can do everything in JMRI that a PC or Apple can do.
- You need a wireless "dongle" for the Pi, like the one you plug into a PC to run a wireless mouse or keyboard.

HOW?

- The Pi runs on 5V, like you get from a phone charger. It starts up and runs its program as soon as you supply power to it.
- If we power it from the same supply as our layout, it will come up and run JMRI as soon as we turn on layout power. What could be simpler?

HOW TO RUN JMRI?

- The Pi reads its instructions and data from an SD micro chip, like the ones in some cameras and phones.
- It treats the chip like a hard drive on a PC. So we tell it what to do by putting the appropriate code on its micro chip.
- This is something you could do if you are a guru or you could ask your grandson or daughter how to do it.

WHAT WI-FI NETWORK DOES IT USE?

- The Pi uses the wireless dongle to create a stand-alone network.
- It is unrelated to your home network and is therefore not a security threat.
- Its SSID, to which you will connect your phone, is RPi-JMRI.
- The IP address of the Pi is set to 192.168.6.1
- You can control it through this IP address.

TO MAKE IT EASY

- Steve, as you might expect, has the expertise and the perseverance to do this. To make life really easy for the rest of us Steve programmed a Pi to run JMRI from startup, to connect to the railroad, to establish a wi-fi network and to listen for log-ins from devices running Engine Driver or Wi-Throttle (the iPhone version). All with no hands!

HOW ABOUT US?

- Recognizing that we might not all be able to replicate his setup, Steve has made an "image" of the SD chip that he will make available to us.
- You can download this image and "burn" it to an 8GB SD microchip using available free software.
- Alternatively, Steve can provide you with a pre-programmed chip for a nominal fee.

WELL, NOT EXACTLY

- You do need a few parts and pieces besides the Pi. Following is a list of the minimum pieces that you need to make this work.

ATTACH TO YOUR LAYOUT

- In order for a PC or a Mac to run JMRI on your layout it has to be connected to your command station.
- For Digitrax systems you can use a LocoBuffer-USB from RR-Cirkits, a PR3 from Digitrax or a SPROG.
- For NCE you need is a USB to Serial cable.
- All of these same devices will work equally well with the Pi.

A CHALLENGE

- Some of you know that connecting a PC or an Apple Mac to the layout's command station can be a challenge. Getting JMRI to find the right port and configuring the PC with the right drivers and setting up the connection in JMRI can be a hassle.

STEVE AGAIN!

- Steve foresaw that we might be challenged by getting the Pi and JMRI to talk to the layout.
- To help make it bullet proof Steve programmed a Pi to identify the layout connection device and respective command station when it powers up.
- Regardless which device; Locobuffer, NCE serial, PR3, the Pi will figure it out and set up the corresponding connection in JMRI without help from us. WOW!

WHAT YOU NEED

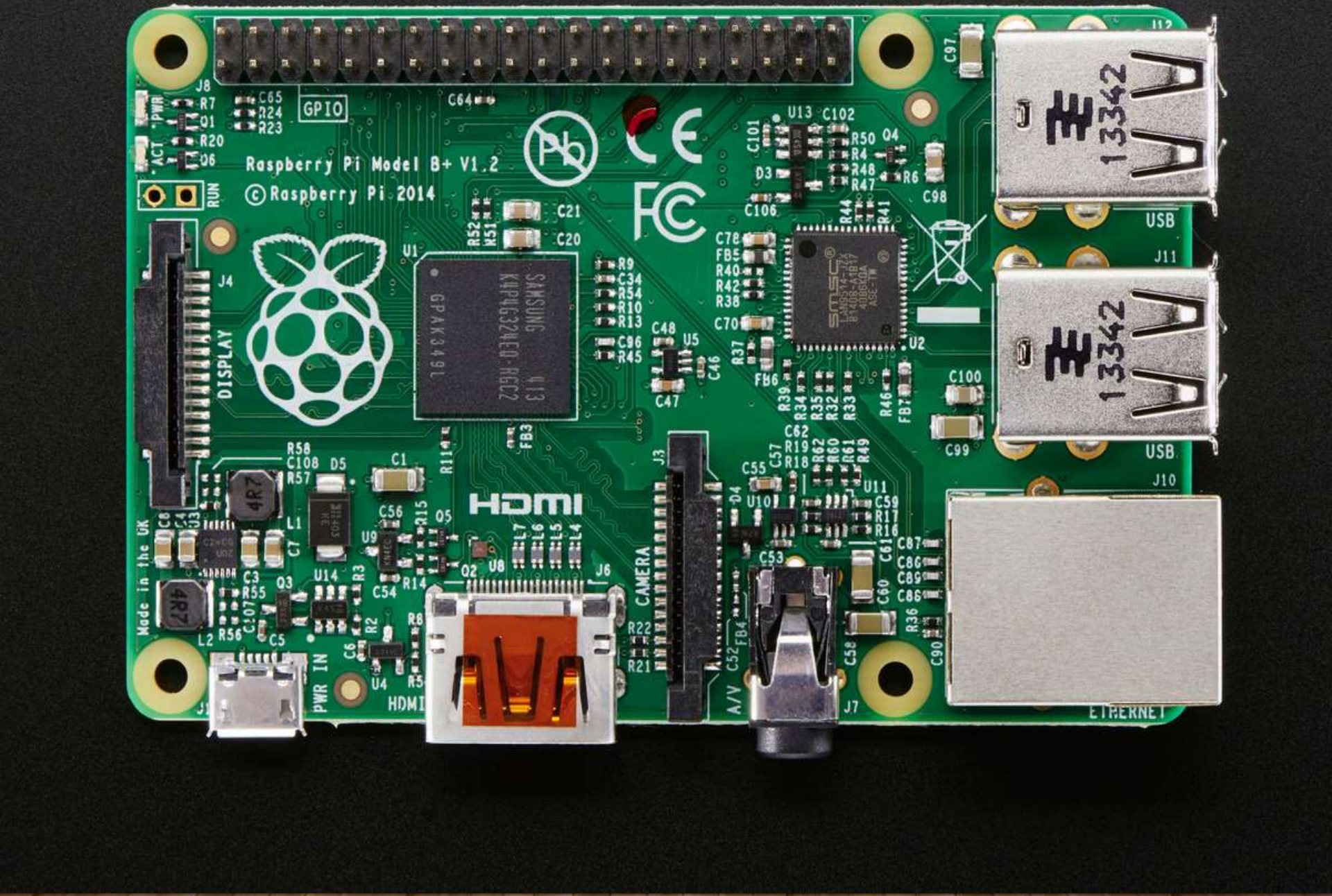
- A Raspberry Pi – $35.00 on line
- An EDI-Max wi-fi dongle – about $10.00 on line
- 5V Power supply – you probably have one
- Your favorite connection device:
- LocoBuffer-USB $56 (NMRA)
- PR3
- USB-Serial (NCE) ~ $50
- SPROG-II ~ $90

WHAT NEXT?

- Buy a Pi Model 2 or 3 (latest)
- Get the SD chip image from Steve
- Connect it to your layout
- Turn it on
- Have fun!

BONUS

- Many of you have seen JMRI PanelPRo on a PC or Mac controlling a layout. You can throw switches, sense occupancy of blocks, control signals and much more.
- JMRI, as you probably know, also has DecoderPro for programming decoders in your locomotives and other devices.
- A Raspberry Pi can do all of that too!


Raspberry Pi Model B+ V1.2
© Raspberry Pi 2014
GPIO
DISPLAY
HDMI
CAMERA
A/V
USB
USB
ETHERNET
PWR IN
HDMI
Made in the UK