Raspberry Pi and Ham

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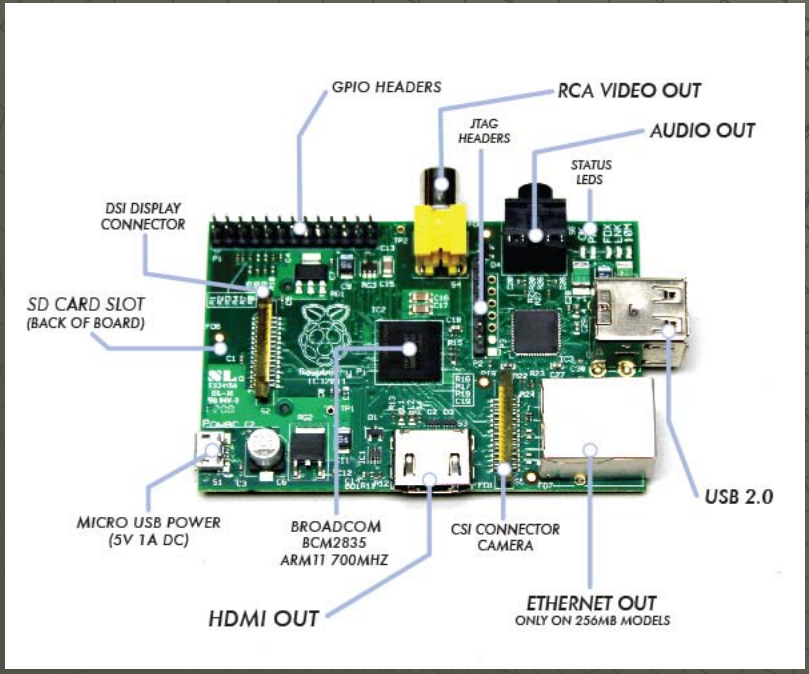
Objectives

- What is this Raspberry Pi (RPi) thing anyway?
- Describe a NTP-based clock with dual zones (local and UTC) based on the RPi
- Some links that might be of interest

What is a Raspberry Pi?

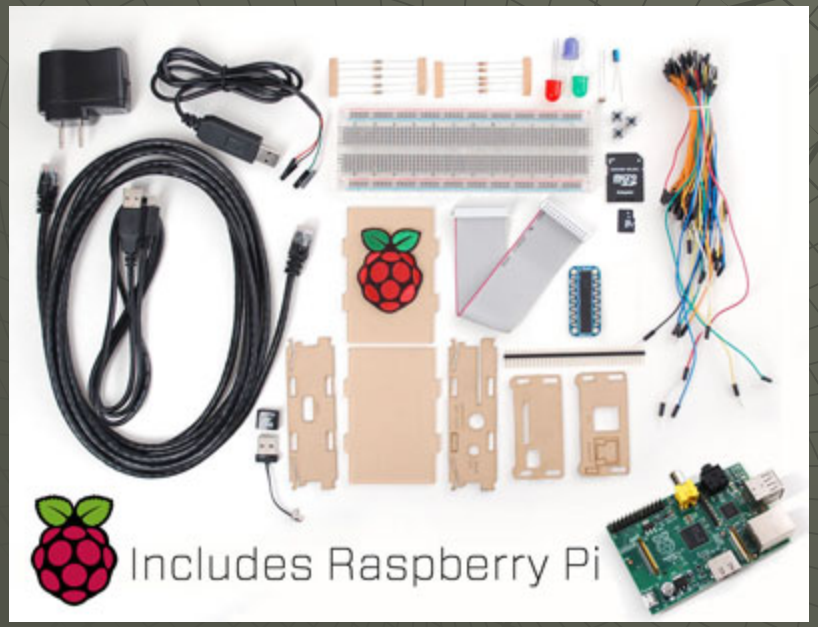
- Small Single Board Computer
- Inexpensive ($35)
- Open Source tools (Linux) – FREE!!
- VERY popular (600,000 sold in past 9 months)

More Pi Please!



- ARM11 CPU 700MHz
- 512 MB of RAM
- HDMI video/audio
- Composite Video
- 2xUSB
- Ethernet
- SD Card for OS
- GPIO (I2C & SPI)
- Standard USB Charger used for power supply

Some Other Pi Goodies!



A RPi based NTP Clock

What is NTP anyway?

- NTP stands for Network Time Protocol. It is an Internet protocol used to synchronize the clocks of computers to a master clock over the internet.
- RPi uses NTP for its system clock to avoid the expense of a clock chip and battery backup.

How does the NTP Clock work?

- The RPi runs Debian Linux (Wheezy) which automatically starts NTP services running.
- A script was written that causes a Python program, written to send Local and UTC time to the LCD, to automatically run on start-up.
- A USB WiFi adapter connects to the internet.

Is There Much Programming?

- Standard Library (written by Adafruit) used to control LCD
- Standard Linux system calls obtain Local and UTC time/date
- Standard Python commands format the time/date for display
- A dozen lines of code!

A Dozen Lines of Python Code

```
from Adafruit_I2C import Adafruit_I2C
from Adafruit_MCP230xx import Adafruit_MCP230XX
import smbus
import datetime
from time import strftime

lcd.clear()
lcd.setCursor(0,0)
local = datetime.datetime.now()
utc = datetime.datetime.utcnow()
lcd.message(local.strftime('%b %d %H:%M:%SE'))
lcd.setCursor(0,1)
lcd.message(utc.strftime('%b %d %H:%M:%SZ'))
```

Any Challenges?

- Figuring out how to set up a script to automatically run the program on start-up
- Getting the USB WiFi setup for my home network and cell phone
- Figuring out how to make a two-line clock update simultaneously (update only what is needed; seconds mostly, then minutes)
- Getting Debian Wheezy onto the SD card

Some Useful Links

- (General Info) http://www.raspberrypi.org/
- (Wiki) http://en.wikipedia.org/wiki/Raspberry_Pi
- (Starter kit) http://www.adafruit.com/products/1014
- (RPi) www.newark.com/Raspberry-PI
- (LCD) http://www.adafruit.com/products/1115
- (Case) http://www.adafruit.com/products/859
- (Power) http://www.adafruit.com/products/501
- (Power Cable) http://www.adafruit.com/products/592
- (WiFi) www.amazon.com/D-Link-DWA-121-Wireless-N-Pico-Adapter

Ham Radio & Pi – A Great Combo