Stuff You Need (to make GoodAir)

June 28, 2015

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Connectibles - The “Things” in Industrial Internet of Things (IIoT)

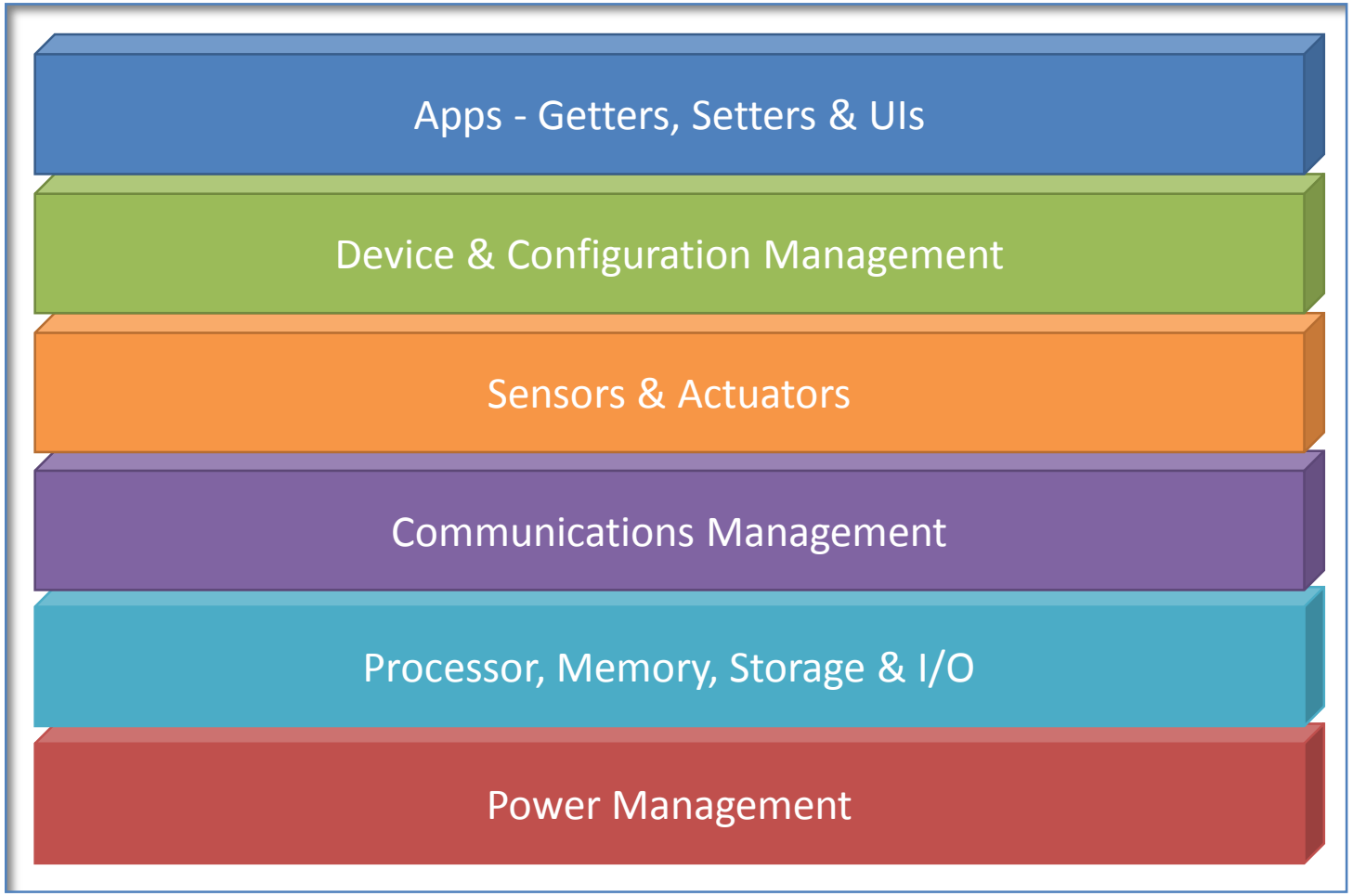
AT&T’s IIoT approach to designing a “connectible” starts with the basics:

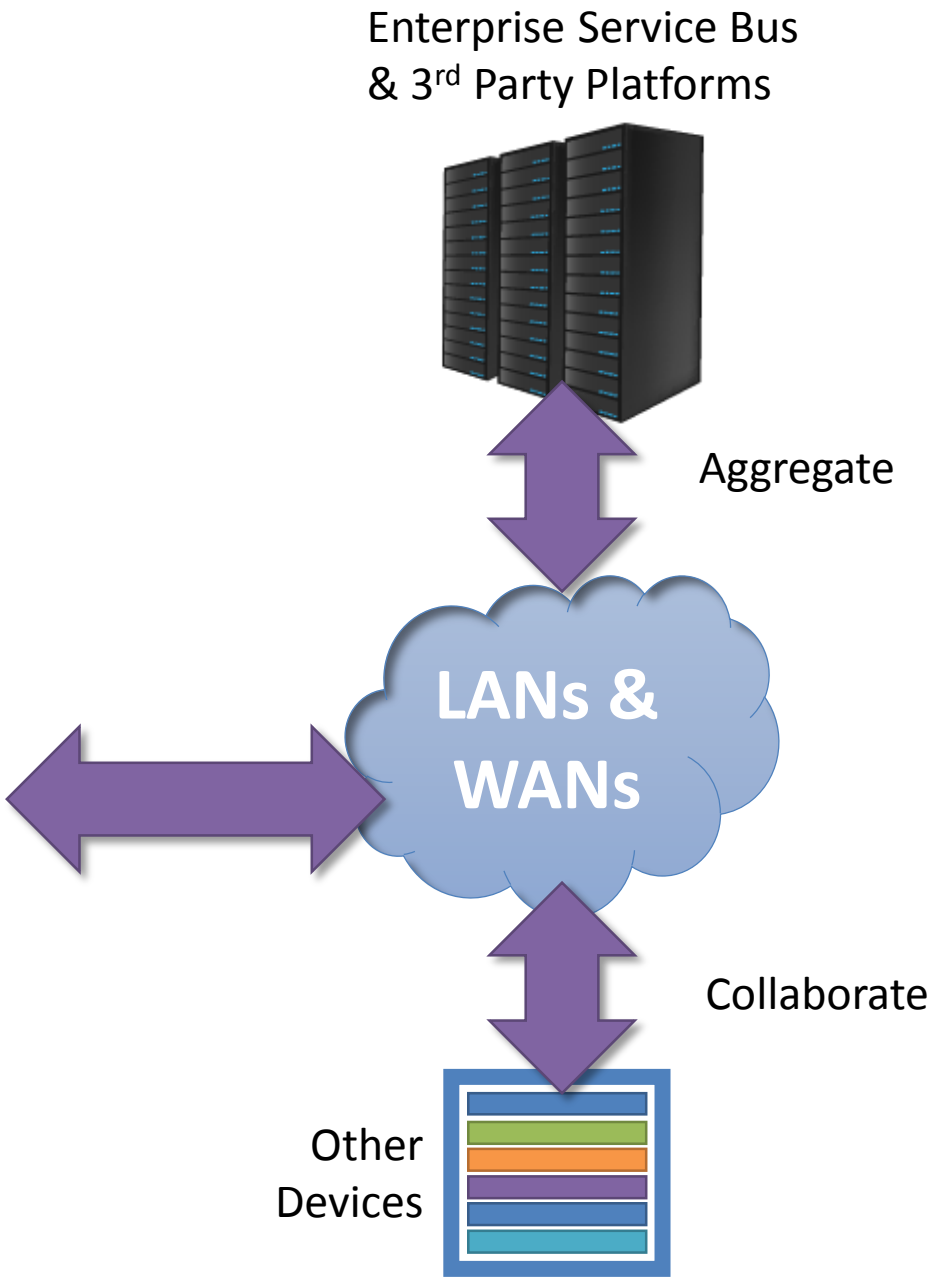
- Understand the **goal** (what will this thing do?)
- Know the **environment** (where will this thing live and work?)
- Understand the **users** (who’s going to interact with the thing?)
- Understand the **operational** needs (who’s in charge?)
- Expect the **unexpected** (what could possibly go wrong?)

IIoT end point “things” are computers with a specific range of functions that collect data, interact with local surroundings, and share with authorized remote services. As computers, they require the same basic collection of technology enablers to make them power on, follow instructions, and communicate.

IIoT “Thing” Building Blocks

6-functional layers that “things” need





Making your first GoodAir

The Components to get you started…

The Basic Steps in the Journey

A 10-step program…

1. Get your hardware and tools
2. Install Linux operating system on your Raspberry Pi
3. Install supporting Linux applications for communications and management
4. Assemble sensors on breadboard
5. Install device flows (on Node-Red application server)
6. Install supporting utilities on GoodAir device
7. Create GoodAir device in M2X (for storing sensor readings)
8. Create flow in AT&T Flow (for collaborating with GoodAir device and M2X)
9. Test, test, test…
10. Optimize and Improve (and share with others!)

Power Management

2.5A 5V Power Supply w/Micro-USB Connector

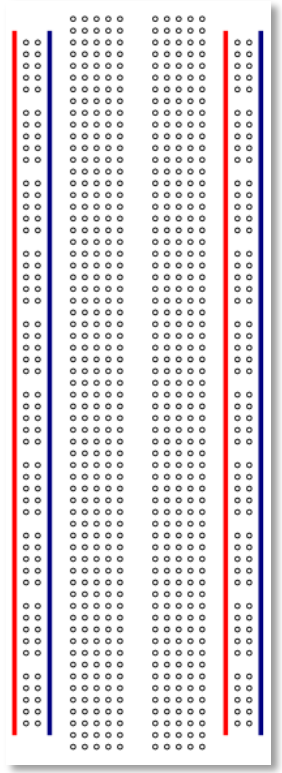
2.4A/1A 5V Battery Pack. 5000mAh or greater if you want to go mobile
(2.4A output is important!)

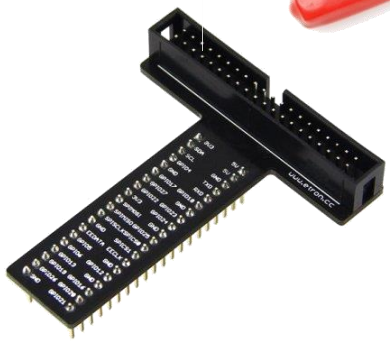
USB to micro-USB cable (if you are going to connect up a battery pack

Raspberry Pi 2

SanDisk Ultra 8GB Micro-SD Card

Processing, Memory, Storage & I/O





- 24-gauge solid core wire
- Wire strippers
- Needle-nosed Pliers
- Optional fixed-length jumpers

Other hardware you'll want…

- Pack of ¼ Watt Resistors (1-Ohm to 1-M Ohm)
- Breadboard
- RPi 40-pin header extender
- 40-pin ribbon cable w/connectors
- Multimeter

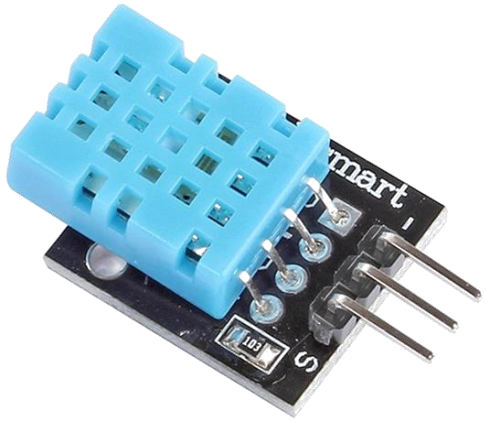
Communications

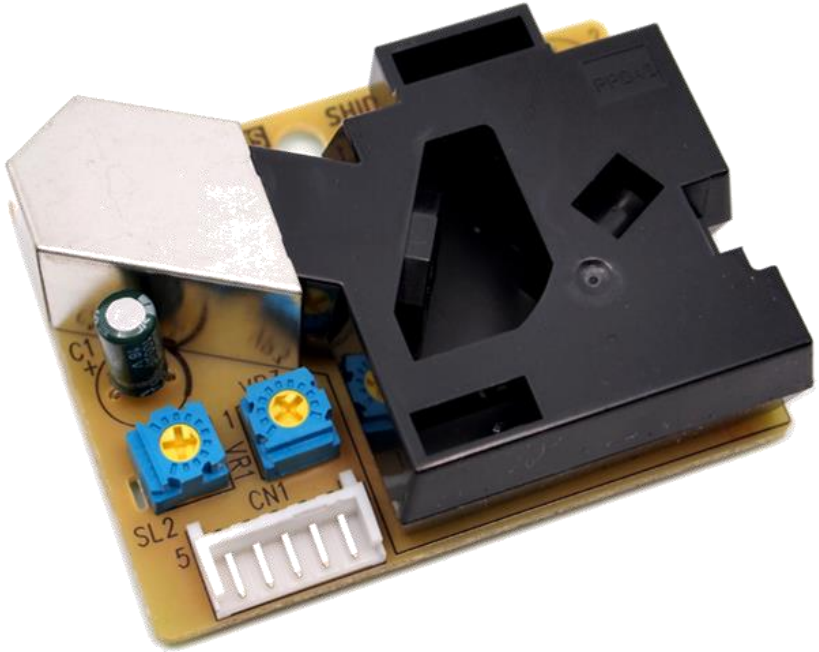
Tenda or CanaKit mini WiFi
USB Adapter

MultiTech QuickCarrier 3G
USB Modem for IIOT

IO-Gear Bluetooth
4.0 USB Adapter

Digital Temperature & Humidity Sensor (DHT11 or DHT22)

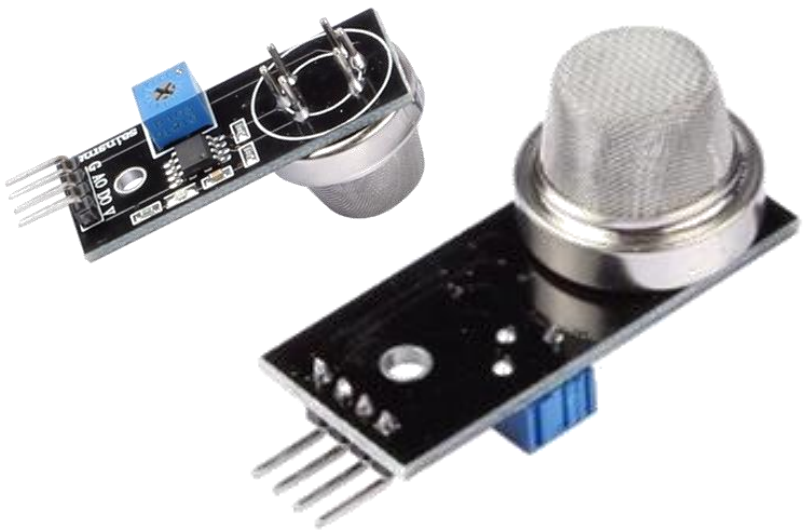




Shinyei PPD42NS Particulates Sensor w/ Pulse Width Modulation

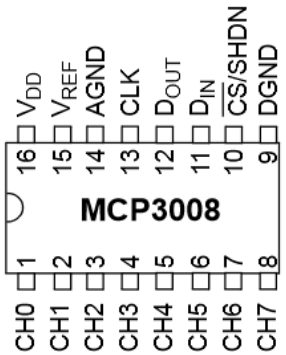
Globalsat BU-353-S4 USB GPS Receiver

Sensors!!!

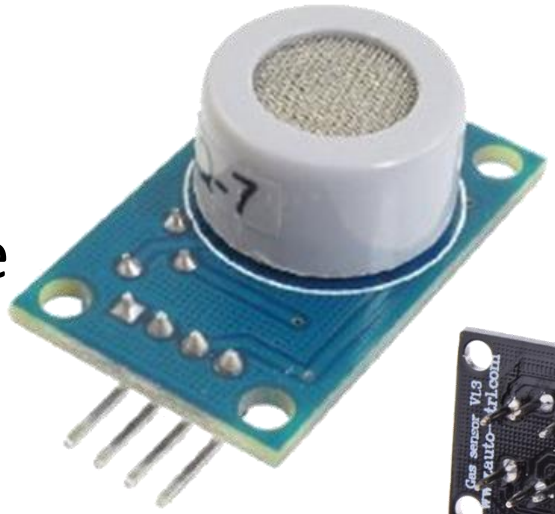


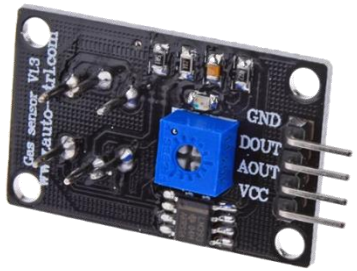
MQ-4 Methane / Natural Gas Analog Sensor

MicroChip MCP3008 Analog-2-Digital Converter IC



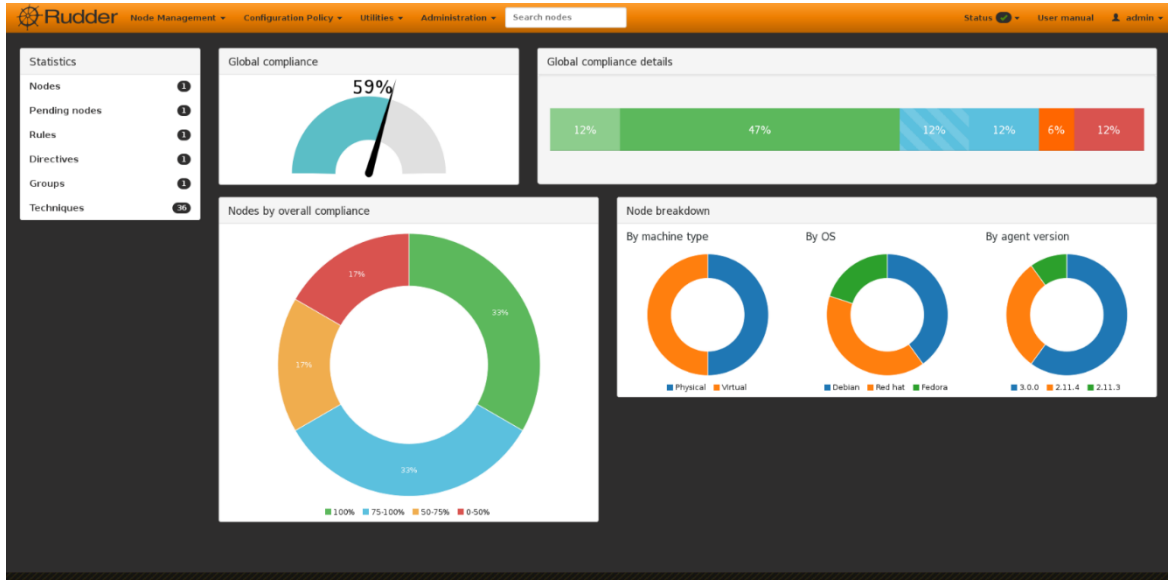
MQ-7 Carbon Monoxide Analog Sensor

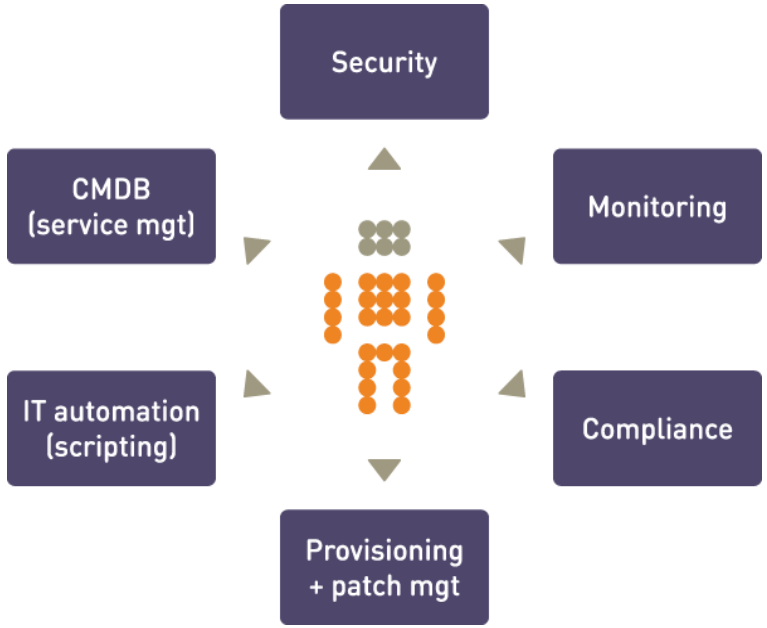




More Sensors!!!

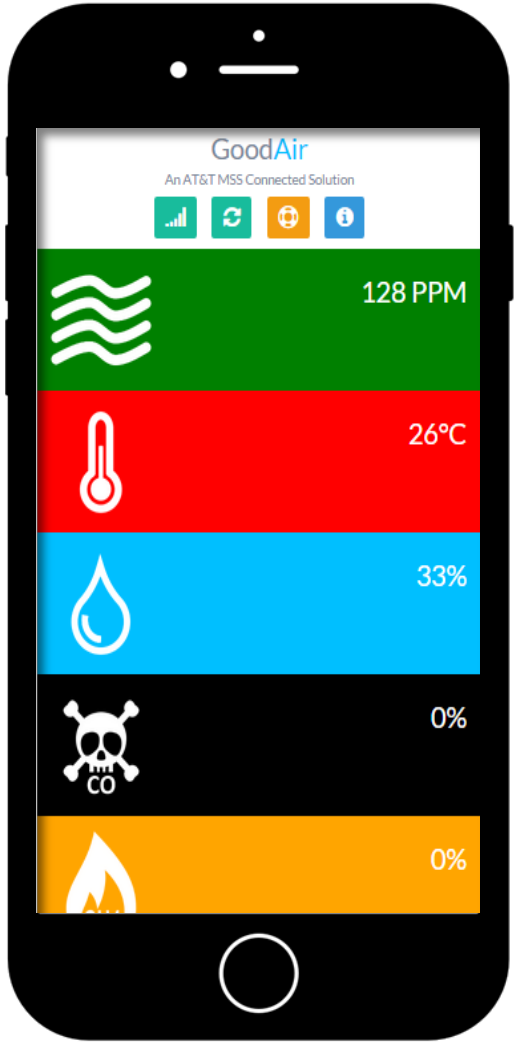
Rudder-
Project
Automation &
Compliance
Platform





CFEngine
software
agent for
flexible
device
control

Device Configuration & Management



Real-Time device information with time-series storage via AT&T M2X

Responsive Design for broadest range of user interaction

Device Apps

Developers always work for free!

http://flow.att.com

http://m2x.att.com

M2X

Time-series storage for the Industrial Internet of Things

FLOW

Cloud-based application workflow for the Industrial Internet of Things

Solution-Wide Information Management & Analytics

Now What?

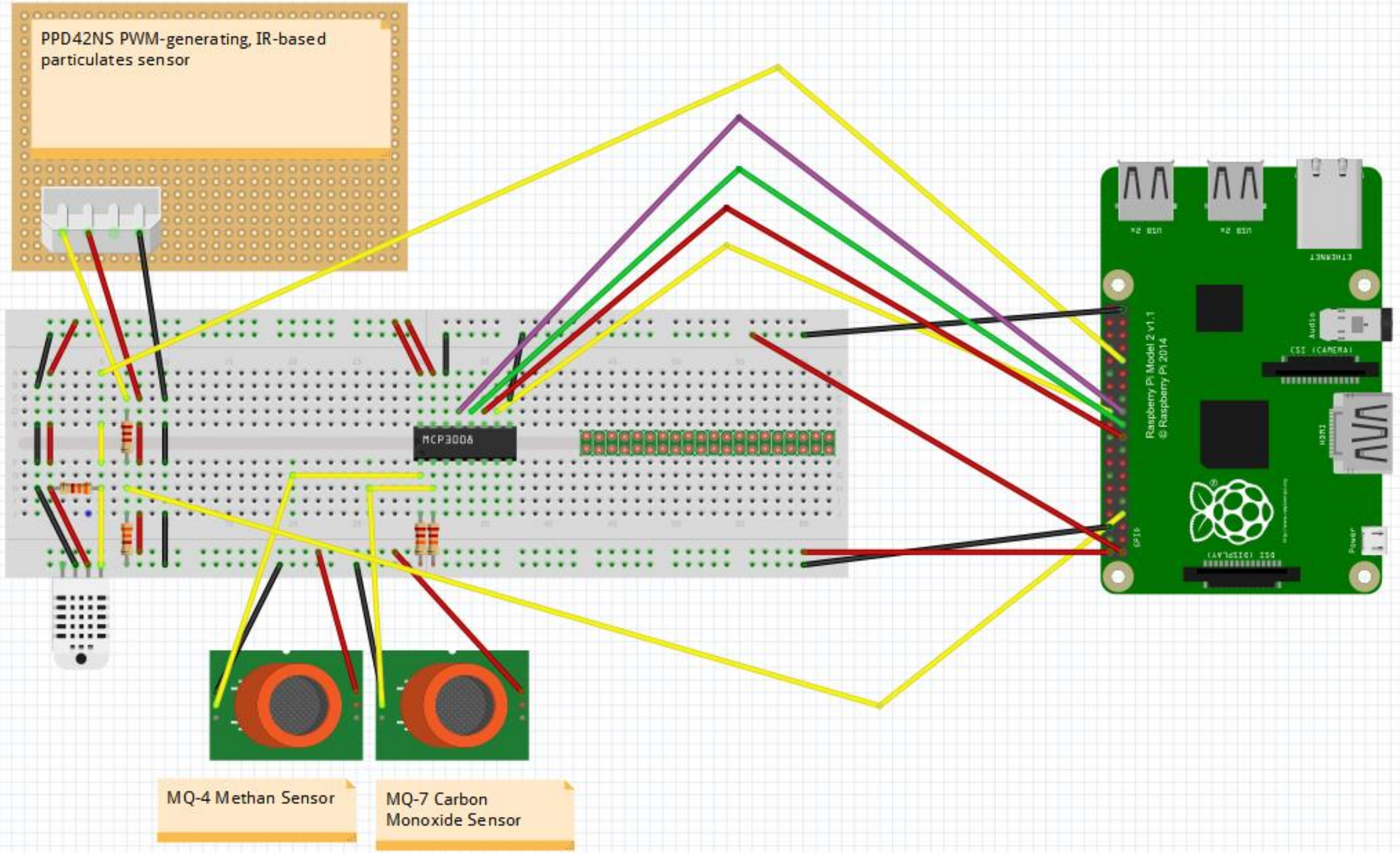
“Git” Started…

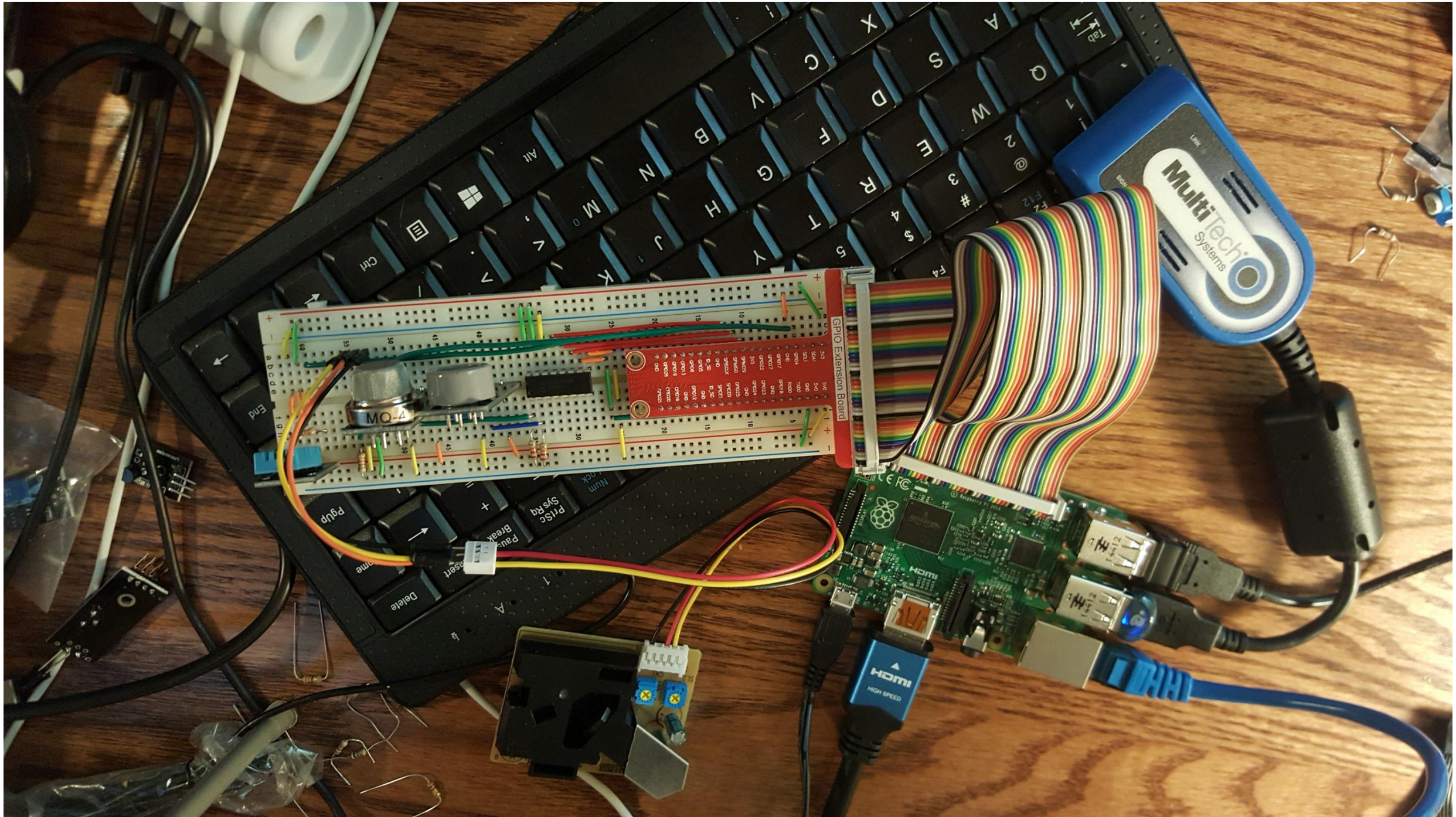
You can find the entire source code for all flows and utilities as well as the directions turning a Raspberry Pi into a GoodAir connectible here:

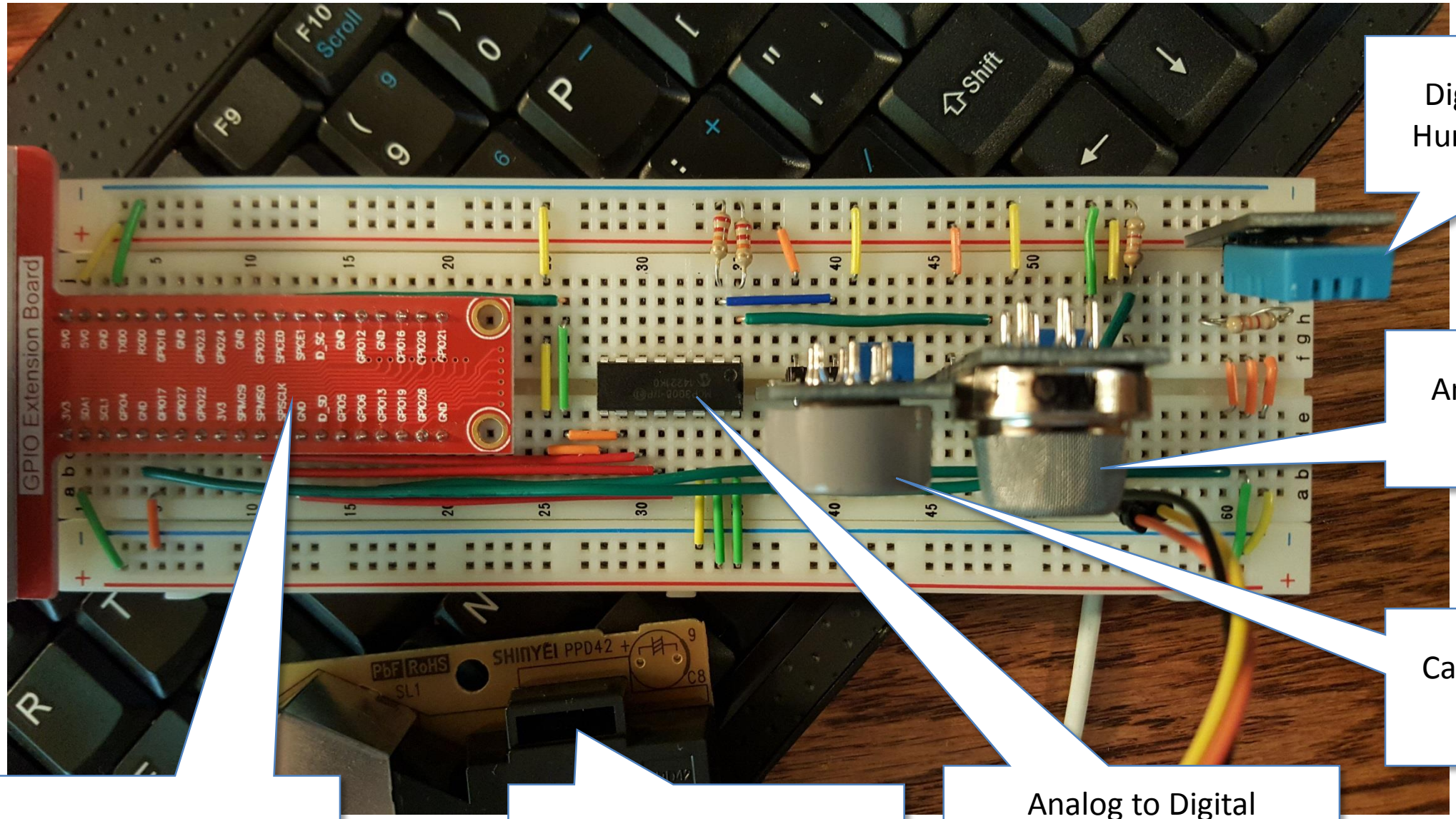
<Github link goes here>

A Fritzing View of GoodAir hardware

Made with Fritzing




MQ-4
GPIO Extension Board
MultiTech
Systems
HDMI
HIGH SPEED


GPIO Extension Board
SHINYEI PPD42
PbF RoHS
Digital Temp & Humidity Sensor
Analog Methane (CH4) Sensor
Carbon Monoxide (CO) Sensor
Raspberry Pi Header Extension
Digital Dust Particulates Sensor
Analog to Digital Converter (ADC) Integrated Circuit (IC)