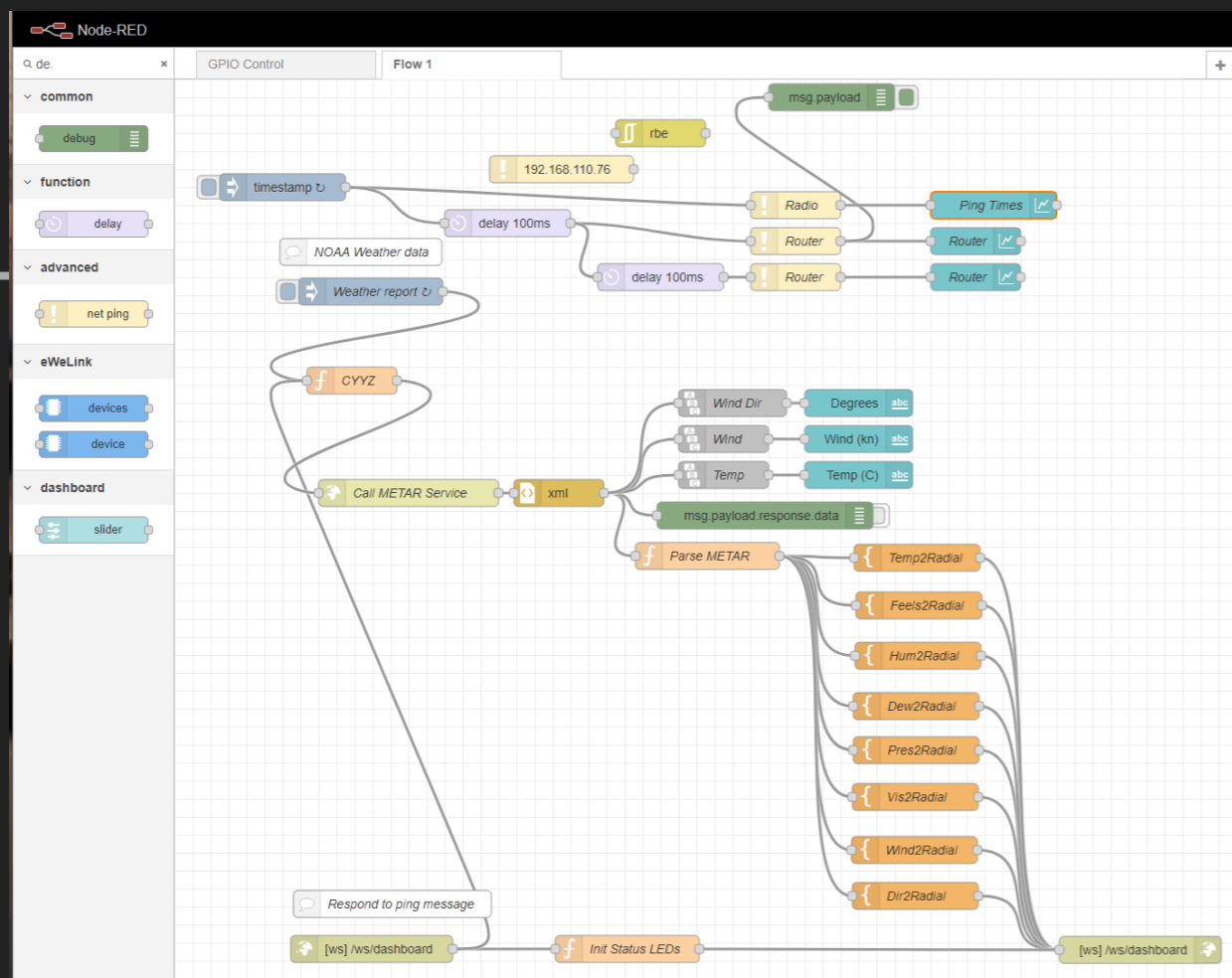


# Node-RED in the HamShack

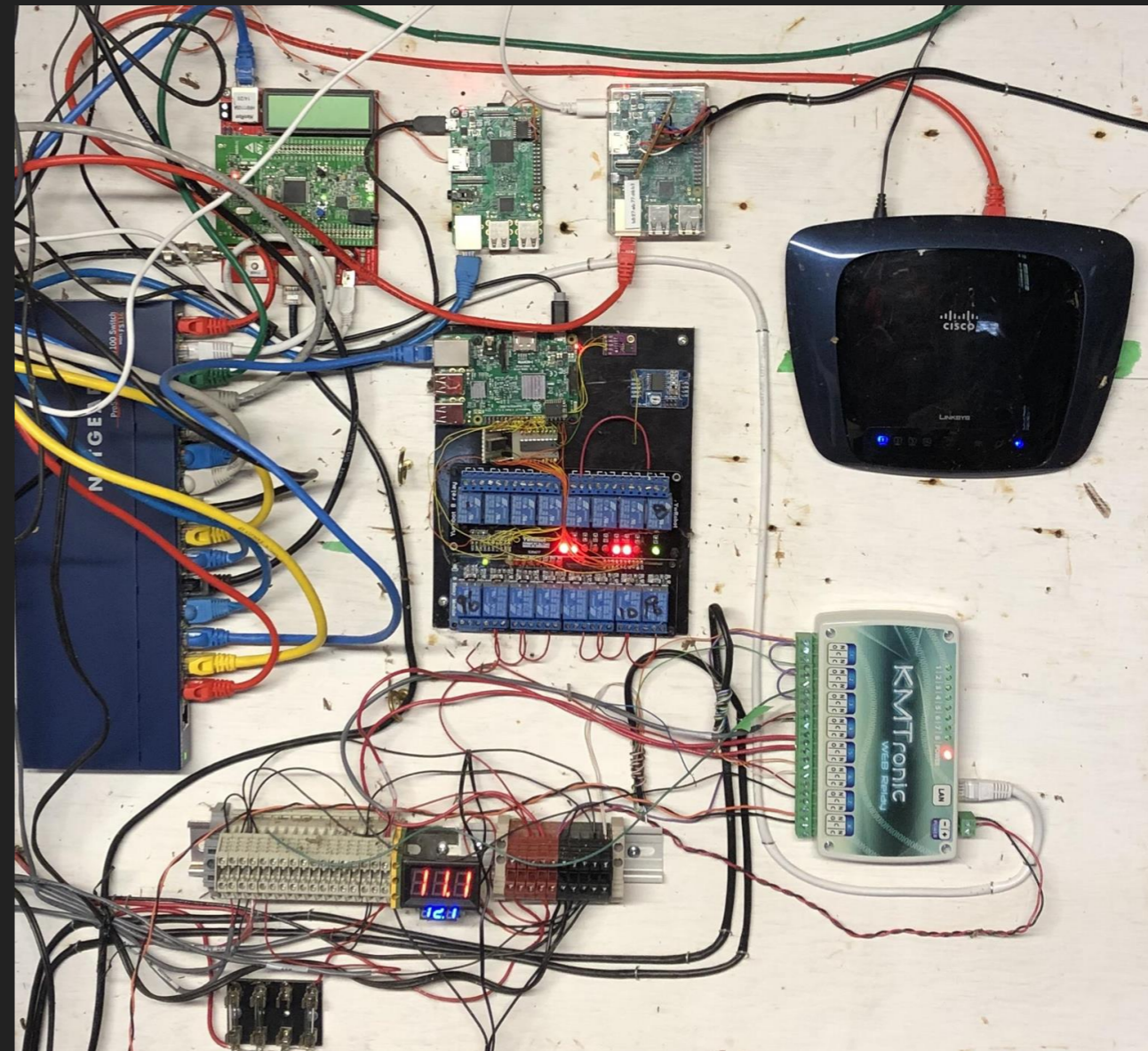
## An improvement on Station Automation



MICHAEL WALKER  
VA3MW  
Feb. 2021

# WHY OPERATE REMOTE?

- ▶ Noise
- ▶ Location
- ▶ Downsizing
- ▶ Your buddy is a shut-in
- ▶ My new QTH is an apartment
- ▶ My hobby needs a hobby
- ▶ And more



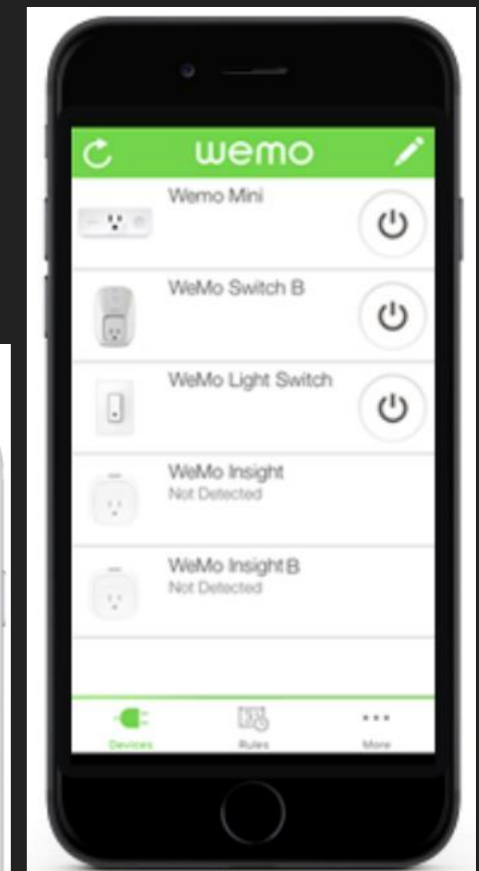
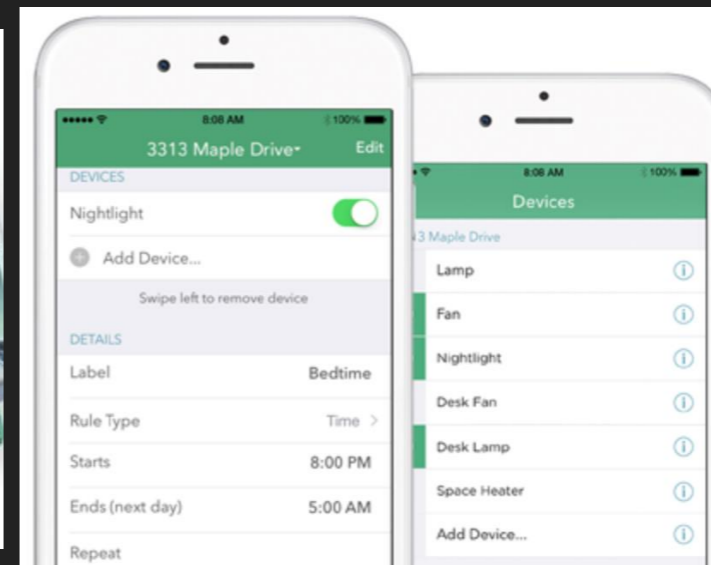
Welcome to bread boarding

# THINGS TO CONSIDER - KEY MODULES

- ▶ Radio choices - FlexRadio has remote designed in from the ground up.
- ▶ Your Internet - the backbone of the system.
- ▶ Remote Power control (AC and DC)
- ▶ Remote Antenna control
- ▶ Remote Rotator control
- ▶ How to you control something when you can't reach up and touch the button that goes with it

## REMOTE SWITCHES - 2 TYPES OF SOLUTIONS

- ▶ iHome, Wemo, Stitch, etc
  - ▶ All use a 3rd party broker (good and bad)
- ▶ RemoteQTH server, KMTronic, Digital Logger (and more)
  - ▶ No third party routing, but require VPN or Port-forwarding



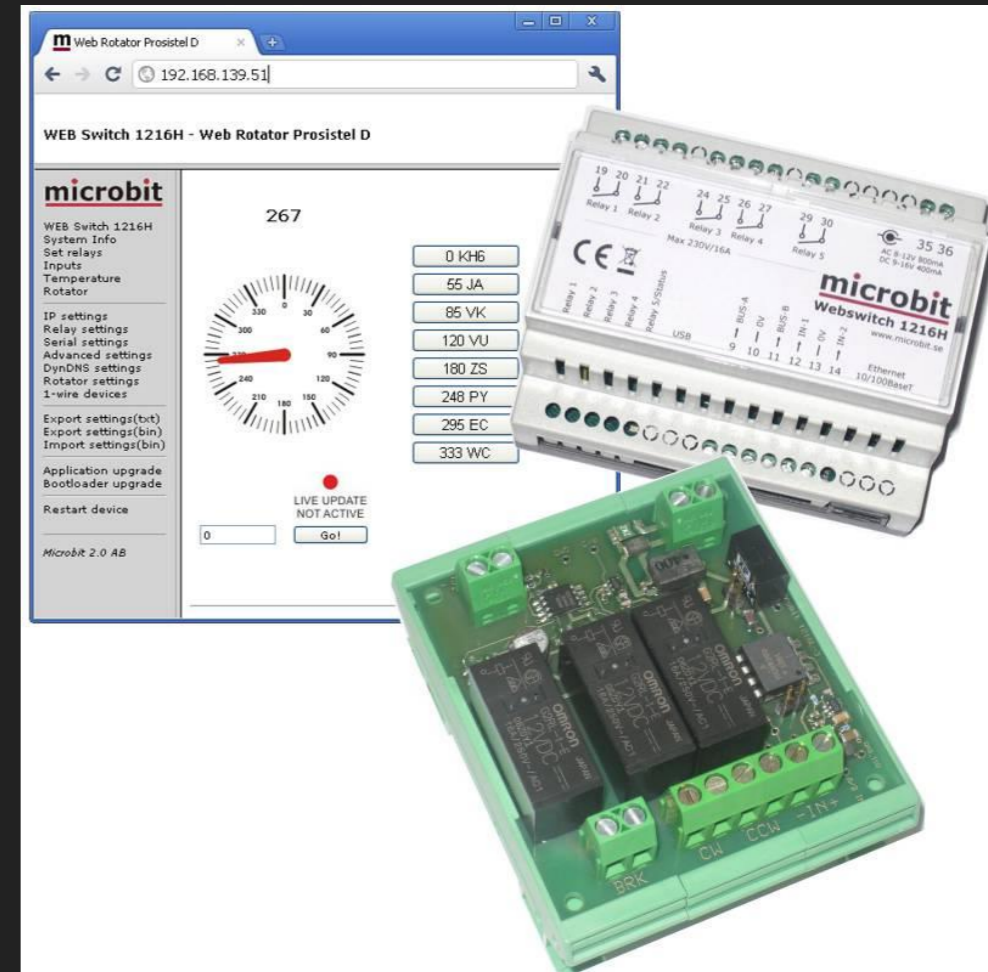
# ROTATOR CONTROL - SOFTWARE

- ▶ PSTRotatorAZ on a local PC with a Web interface as well
- ▶ K3NG - awesome Arduino project
- ▶ RemoteQTH Server linked to the K3NG controller



# ROTATOR CONTROL - HARDWARE

- ▶ IdiomPress EZ Rotator
  - ▶ For Hy-Gain and Yaesu rotators
- ▶ K3NG
- ▶ Green Heron
- ▶ MFJ RC1 Series



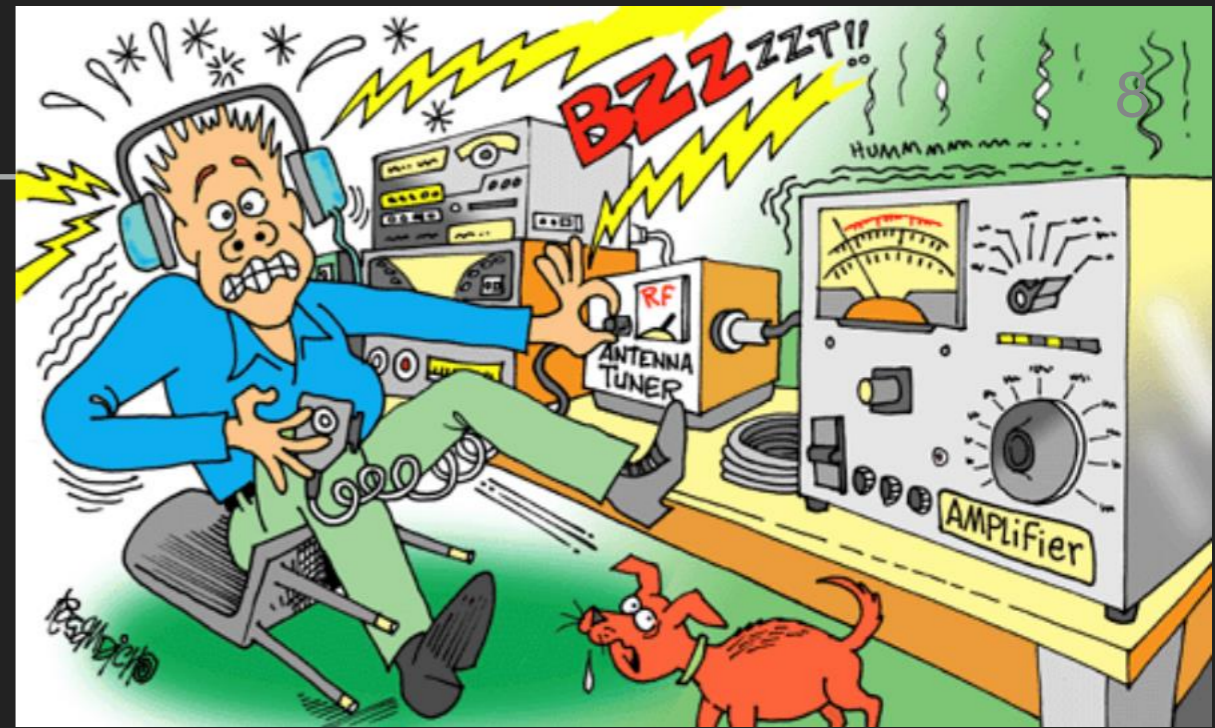
# WHAT ABOUT ???

- ▶ Lightning
  - ▶ You need to have a way to remote disconnect antennas
  - ▶ This is a risk that cannot be removed, but we just do the best we can.
  - ▶ (Google “ham radio lightning protection”)
- ▶ Ward Silver on Lightning



# OPERATING COMPONENTS

- ▶ Operating
  - ▶ How the operator controls the radio (VFO, Memories, etc)
- ▶ Command and control - Where?
  - ▶ Having all the remote 'buttons' local to your operating position
  - ▶ Having all the remote 'buttons' local to the radio



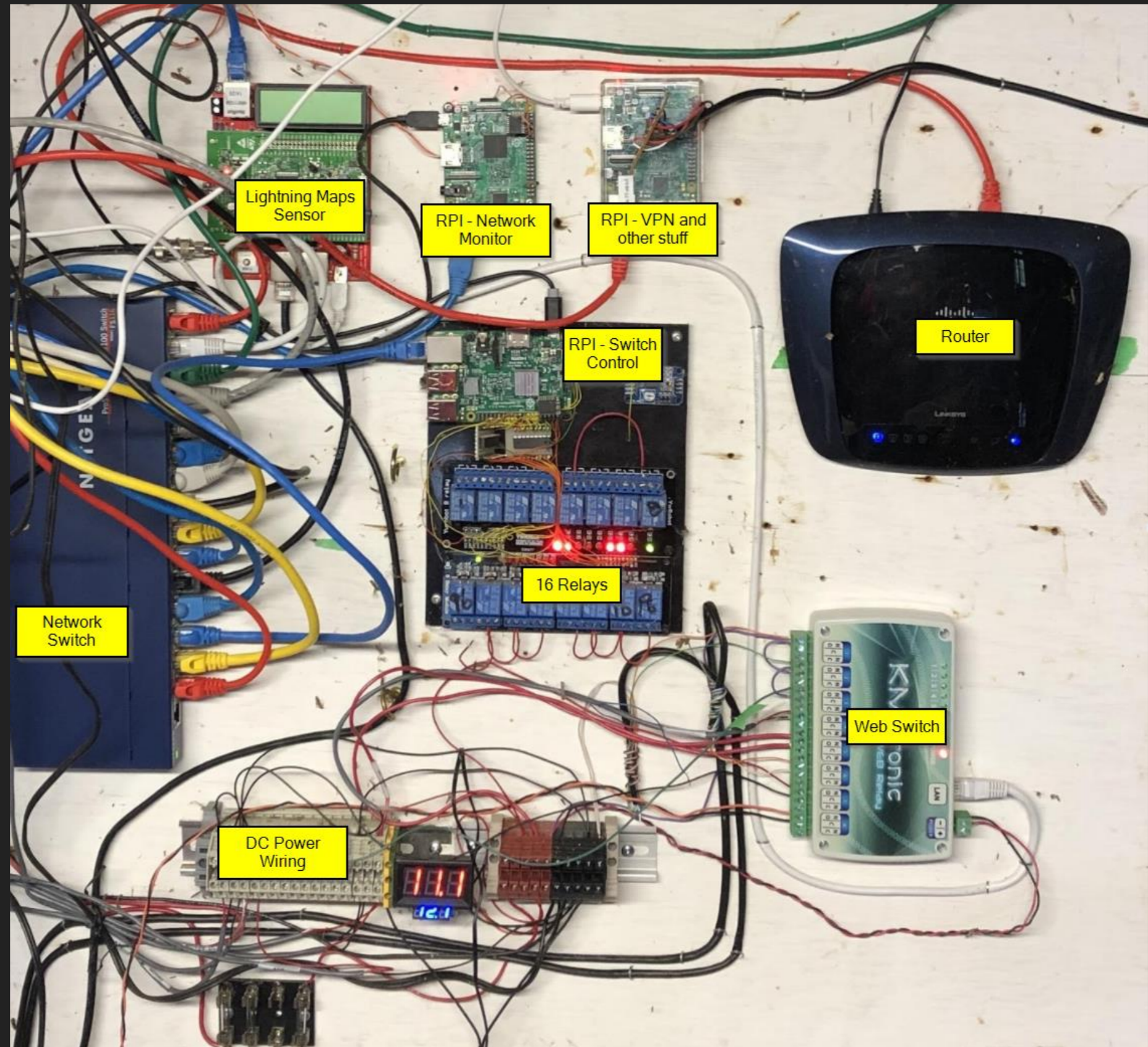


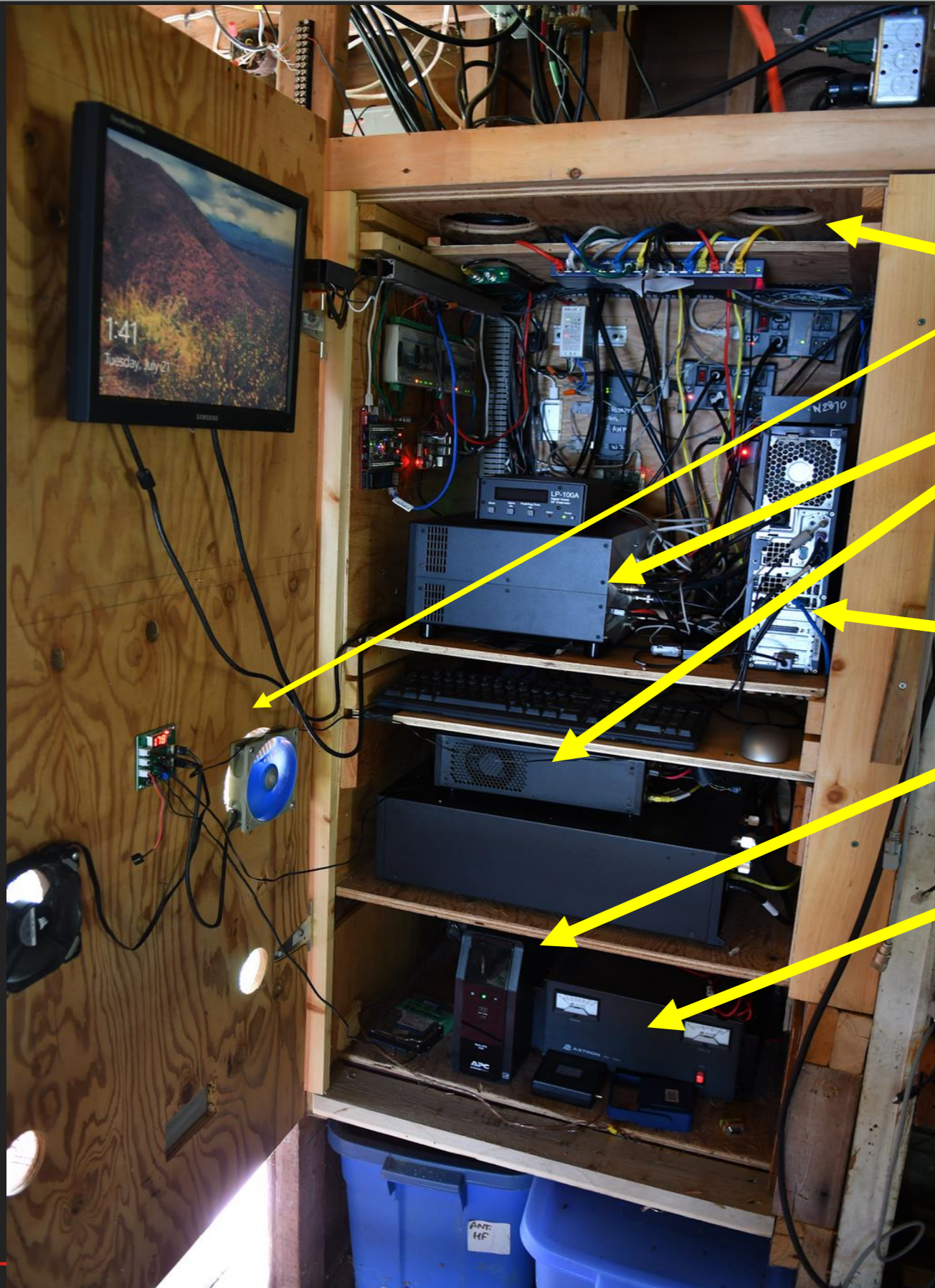
# 2018 - Command and Control

Breadboard design for  
easy debugging

Not very pretty

Very functional though





Fans

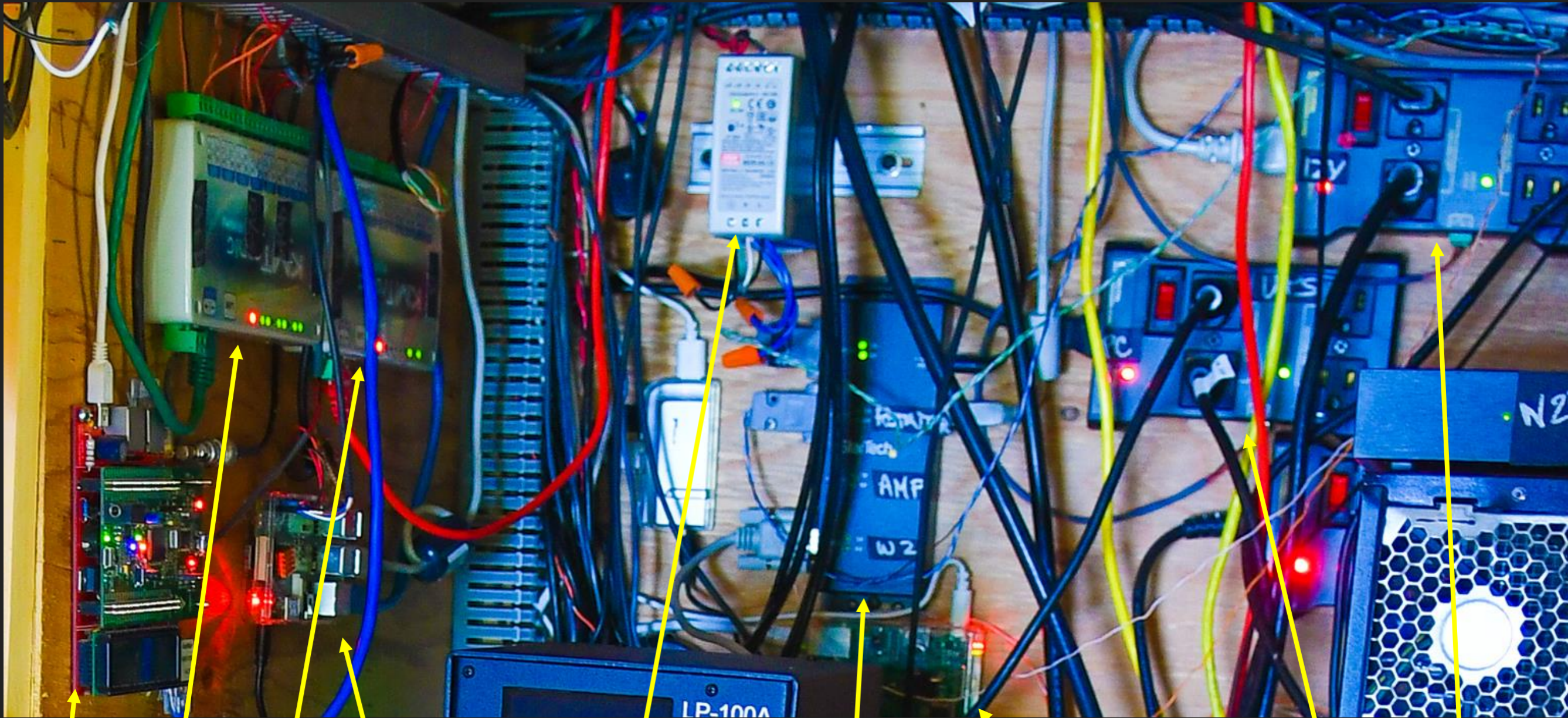
Flex 6600 and 6700

Power Genius XL Amp

Windows 10 Pro PC

UPS

70A Astron Power Supply



KMTronics Web  
Switches

12V Accessory  
Supply

RPI - NodeRed

120V AC Power  
Switch

Lightning Map

RPI - Monitoring  
Tools

4 Port RS232 for  
NodeRed



# IBM's Node-RED

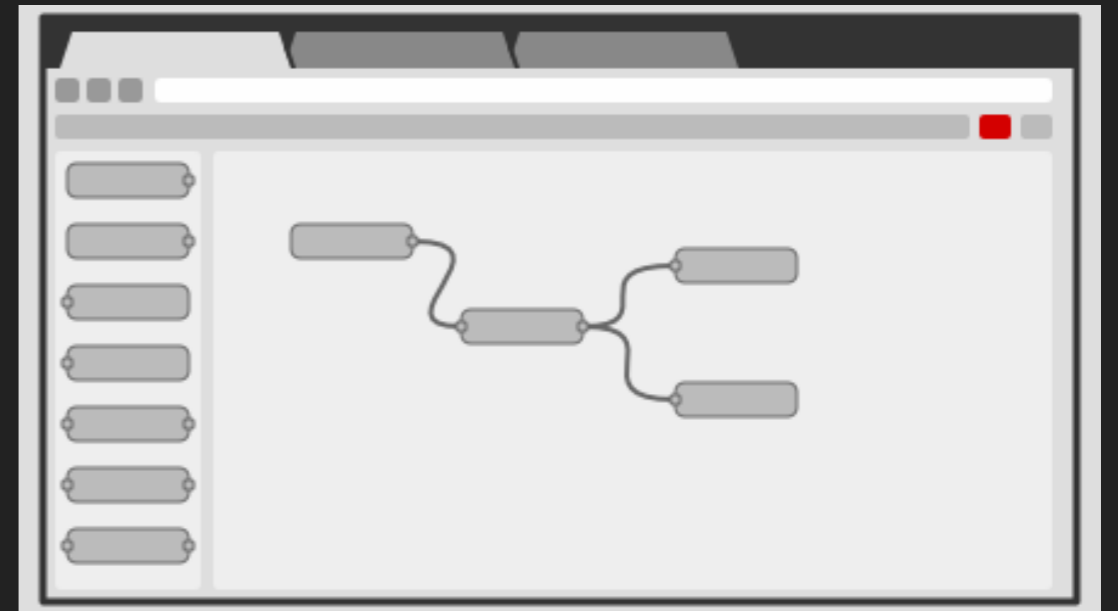
Node-RED is a programming tool for **wiring** together hardware devices, APIs and online services in new and interesting ways.

Born in 2013. It is a model that lends itself very well to a visual representation and makes it more accessible to a wider range of users. If someone can break down a problem into discrete steps they can look at a flow and get a sense of what it is doing; without having to understand the individual lines of code within each node.

It provides a browser-based editor that makes it easy to wire together flows using the wide range of nodes in the palette that can be deployed to its runtime in a single-click.

<https://nodered.org/>

# Browser-based flow editing



## Browser-based flow editing

Node-RED provides a browser-based flow editor that makes it easy to wire together flows using the wide range of nodes (your program) in the palette (your workspace). Flows can be then deployed in a single-click.

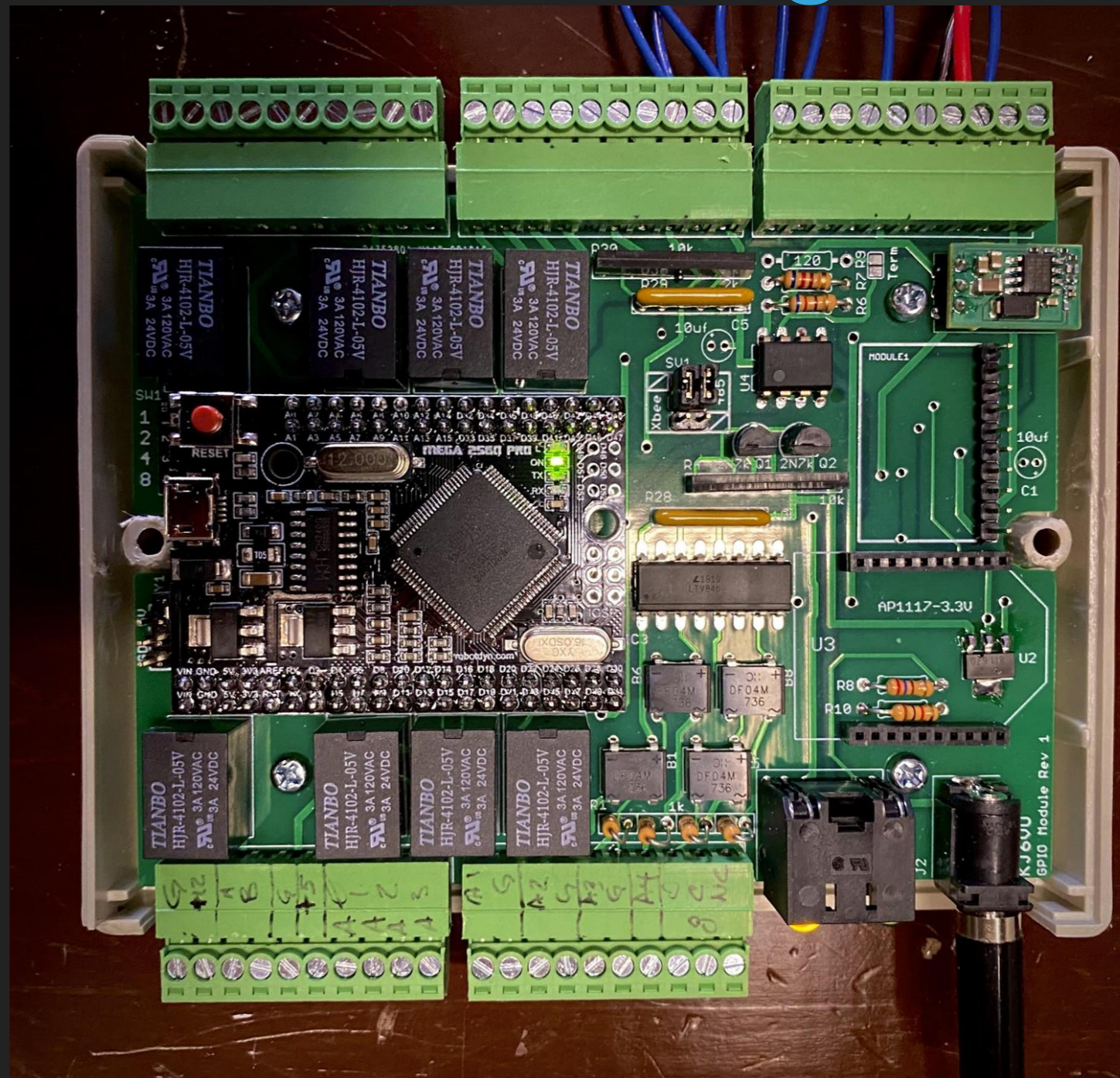
JavaScript functions can be created within the editor using a rich text editor.

A built-in library allows you to save useful functions, templates or flows for re-use.

# I get this in the mail from George

- ▶ 12V Station Controller
- ▶ 8 Relays
- ▶ 4 Voltage Monitors
- ▶ 2 Voltage Differential Monitor
- ▶ 4 Logic low or high sensors
- ▶ RS485
- ▶ xBee

I am sure there are few other things he hasn't me about



# GPIO Command set

PING Pings device  
REBOOT Restart the device

## Relay commands

RY,01000000 Turns off all relays except relay 2 which is on  
RY3,1 Set relay 3 to be on (options: 1=on, 0=off, T=Toggle, P=Pulse)

## UPDATE return packet format

```
/0100:UPDATE,GPIO1,01000000,0110,12.000,13.700,13.850,4.950,48.200,26.850:XX
```

Where...

UPDATE This is a status update packet from a device  
GPIO1 Device type which tells the master the format of the following arguments  
01000000 State of relays 1..8  
0110 State of digital inputs 1..4  
12.000 Value of volt meter 1 (referenced to common ground)  
13.700 Value of volt meter 2 (referenced to common ground)  
13.850 Value of volt meter 3 (referenced to common ground)  
4.950 Value of volt meter 4 (referenced to common ground)  
48.200 Value of differential volt meter 1  
26.850 Value of differential volt meter 2  
XX CRC or LRC value. XX is dummy and this feature is not implemented

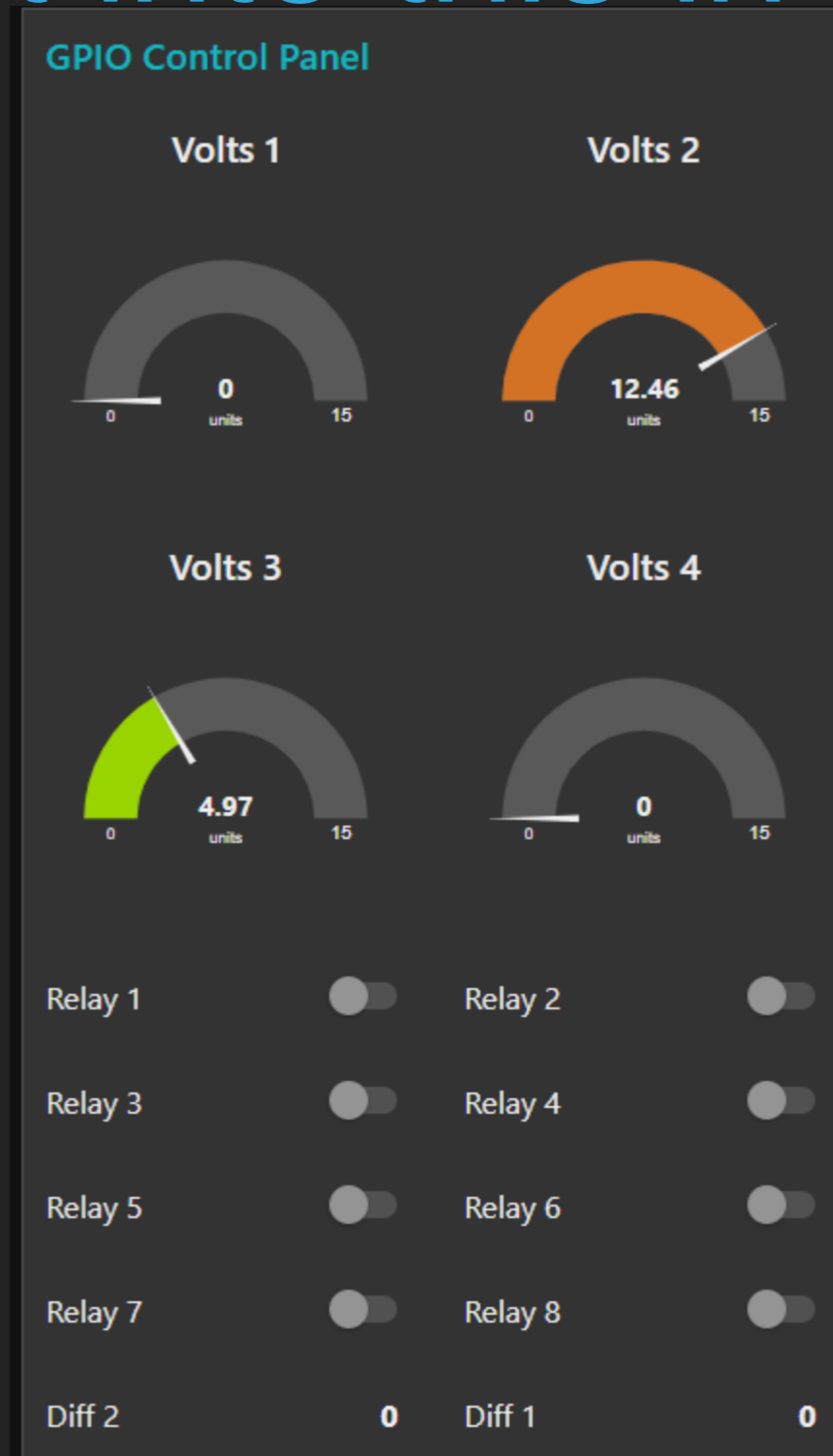
All commands must start with a / and can be addressed or broadcast.

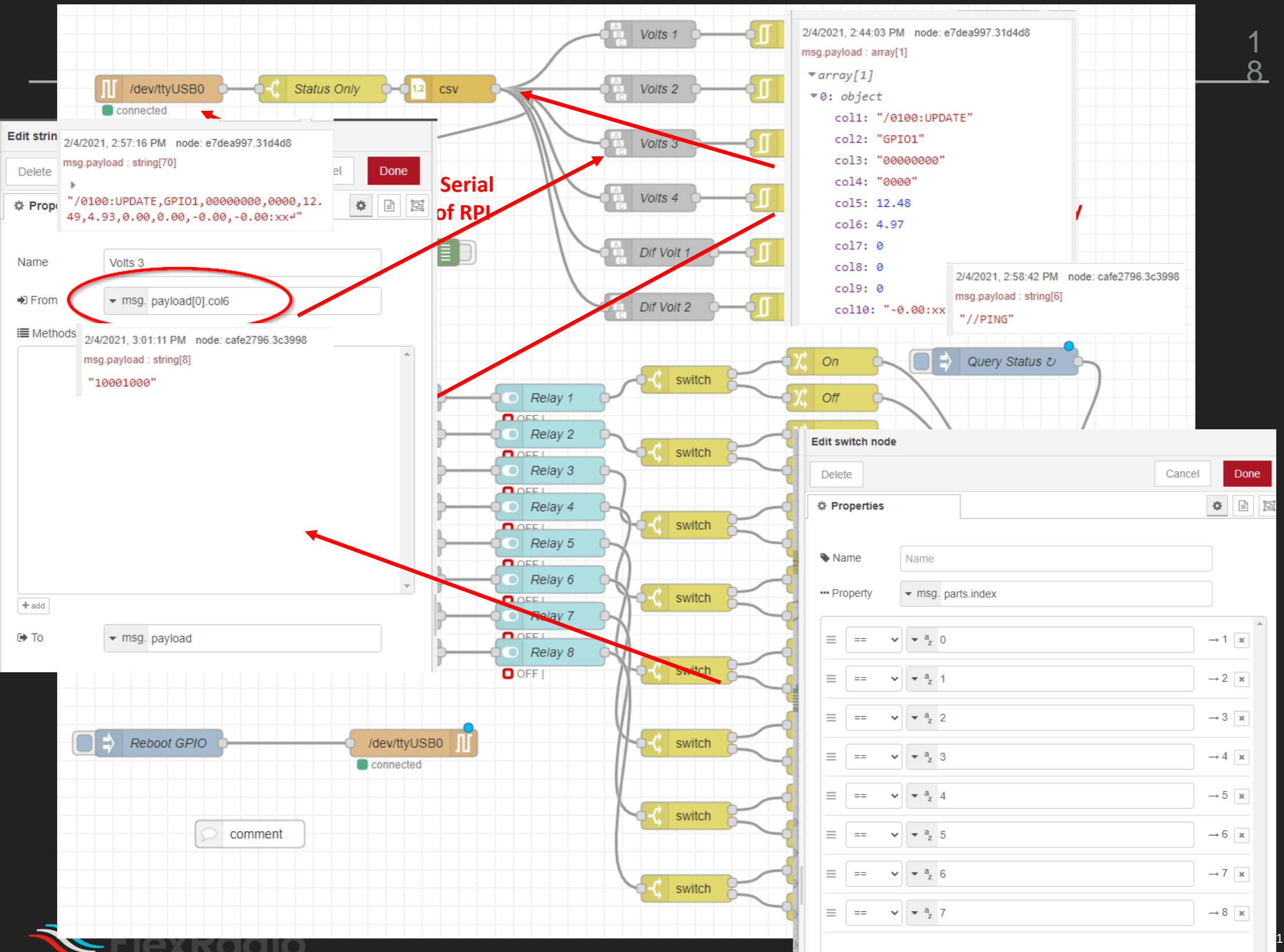
Broadcast format //ping Where // is the broadcast indicator followed by the command "ping"

Addressed format /0012:ping:xx Where / is start of packet, 00 is the from master address, 12 is the to address which must match the dip switches or jumpers on the board. :'s are delimiters and XX is the CRC or LRC value which is currently dummy "XX"



# And, I turn it into this in a few hours





**Edit string**  
 2/4/2021, 2:57:16 PM node: e7dea997.31d4d8  
 msg.payload : string[70]  
 "/0100:UPDATE,GPI01,00000000,0000,12.49,4.93,0.00,0.00,-0.00,-0.00:xx"

Name: Volts 3  
 From: **msg.payload[0].col6**

Methods  
 2/4/2021, 3:01:11 PM node: cafe2796.3c3998  
 msg.payload : string[8]  
 "10001000"

To: msg.payload

2/4/2021, 2:44:03 PM node: e7dea997.31d4d8  
 msg.payload : array[1]  
 array[1]  
 0: object  
 col1: "/0100:UPDATE"  
 col2: "GPI01"  
 col3: "00000000"  
 col4: "0000"  
 col5: 12.48  
 col6: 4.97  
 col7: 0  
 col8: 0  
 col9: 0  
 col10: "-0.00:xx"

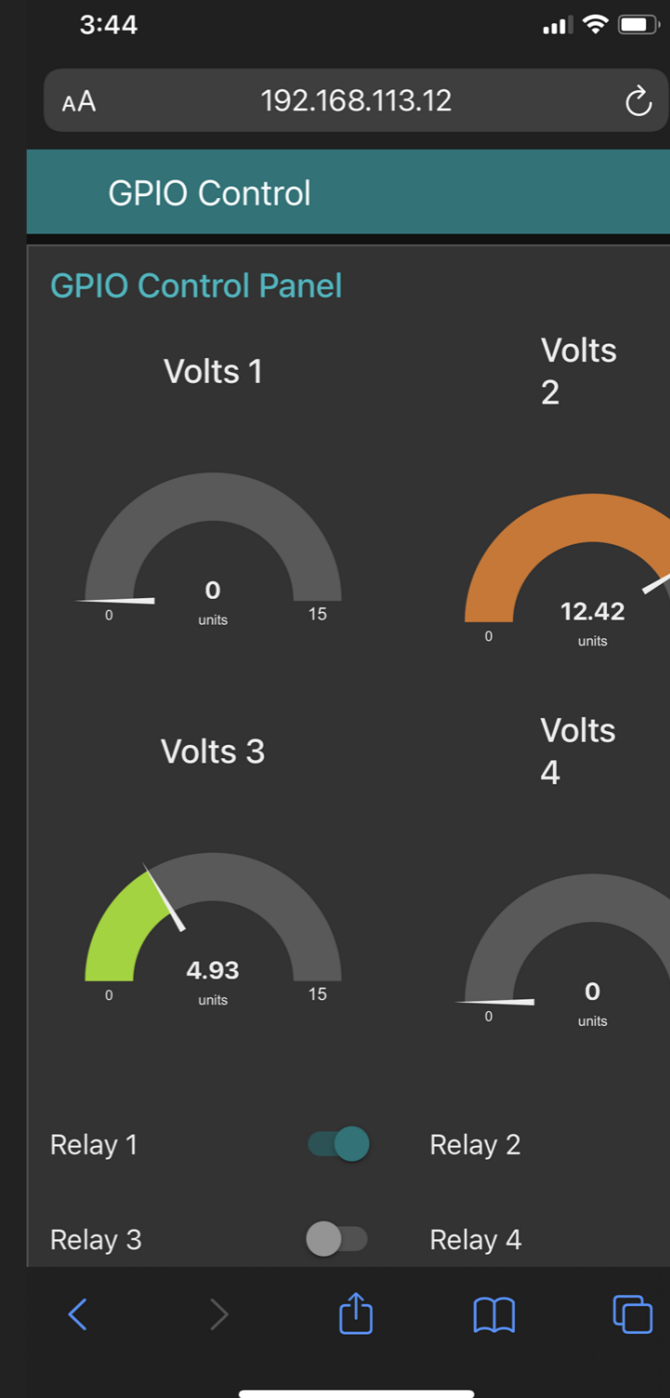
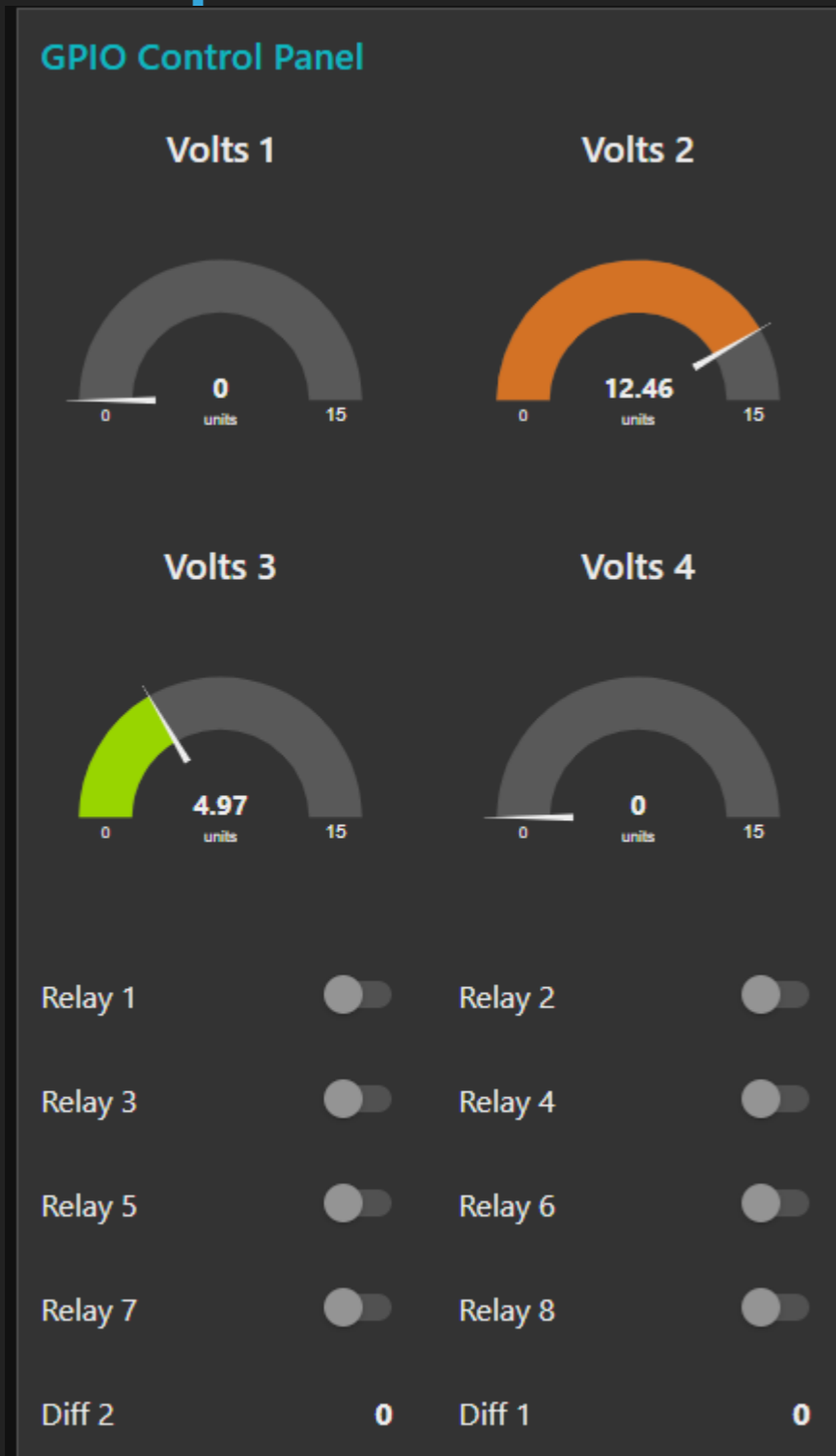
2/4/2021, 2:58:42 PM node: cafe2796.3c3998  
 msg.payload : string[6]  
 "//PING"

**Edit switch node**

Properties  
 Name: Name  
 Property: msg.parts.index

==	a <sub>z</sub> 0	→ 1
==	a <sub>z</sub> 1	→ 2
==	a <sub>z</sub> 2	→ 3
==	a <sub>z</sub> 3	→ 4
==	a <sub>z</sub> 4	→ 5
==	a <sub>z</sub> 5	→ 6
==	a <sub>z</sub> 6	→ 7
==	a <sub>z</sub> 7	→ 8

# Desktop & iPhone or any Web device



# How to get started

- ▶ Supported Node-RED computer
  - ▶ <https://nodered.org/#get-started>
  - ▶ RPI, Windows, Linux, etc

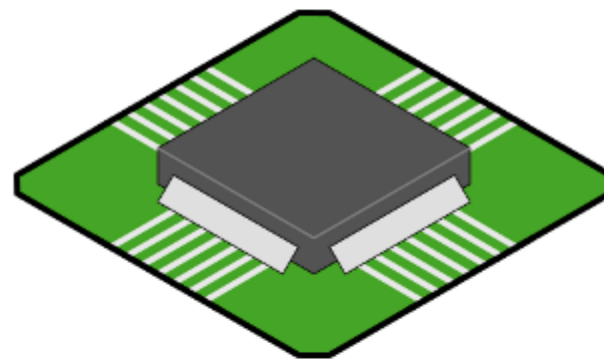
## Get Started

Node-RED is built on Node.js, taking full advantage of its event-driven, non-blocking model. This makes it ideal to run at the edge of the network on low-cost hardware such as the Raspberry Pi as well as in the cloud.



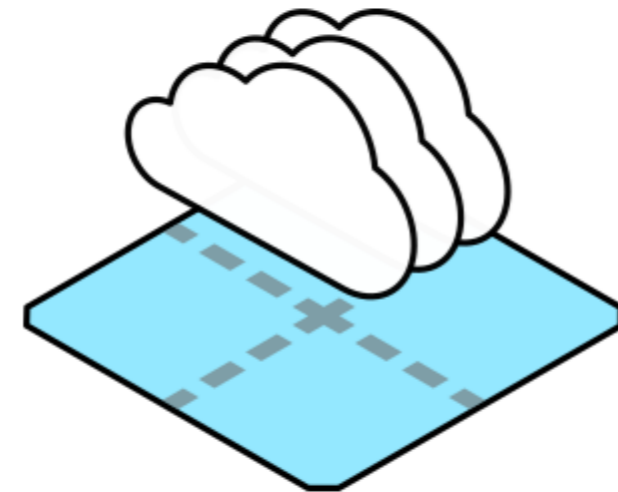
Run locally

- Getting started
- Docker



On a device


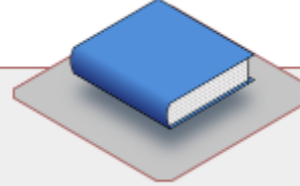

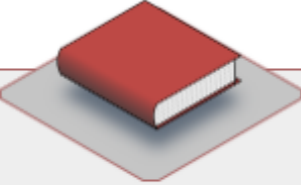

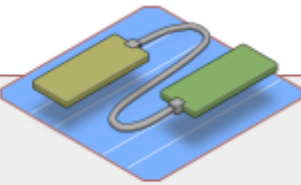
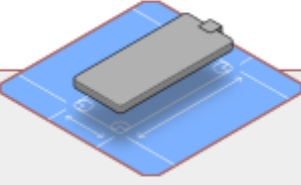
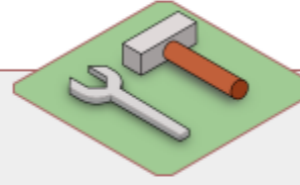

- Raspberry Pi
- BeagleBone Black
- Interacting with Arduino
- Android



In the cloud

- IBM Cloud
- SenseTecnica FRED
- Amazon Web Services
- Microsoft Azure

# Documentation - <https://nodered.org/docs/>

 <p><b>Getting Started</b> Everything from first install to deploying flows</p>	 <p><b>User Guide</b> The definitive guide to using Node-RED</p>	 <p><b>Frequently Asked Questions</b> And hopefully some answers</p>
 <p><b>Tutorials</b> Examples of what you can do, taken one step at a time</p>	 <p><b>Cookbook</b> Recipes to help you get things done with Node-RED</p>	 <p><b>Developing Flows</b> Best practices for creating clear and reusable flows</p>
 <p><b>Creating Nodes</b> How to create nodes to extend the Node-RED palette</p>	 <p><b>Developing the core</b> Help to develop the core of Node-RED</p>	 <p><b>API Reference</b> Admin, runtime and storage APIs</p>

# Flows - 'stuff' ready to go

The screenshot shows the Node-RED Library website. At the top, there is a navigation bar with links for home, about, blog, documentation, forum, flows, and github. Below the navigation bar is a search bar labeled "Search library" and a "Sign in with GitHub" button. The main content area is titled "Node-RED Library" and includes a sub-header "Find new nodes, share your flows and see what other people have done with Node-RED." Below this, there are three sections: "Recent nodes", "Recent flows", and "Recent collections". Each section displays a grid of items with their names, descriptions, and metadata like version, downloads, and stars.

**Node-RED Library**  
Find new nodes, share your flows and see what other people have done with Node-RED.

**Recent nodes** [see more \(3087\) ▶](#)

- node-red-contrib-ui-metabase**  
Embed Metabase dashboards and queries into node-red ui.  
v1.0.5 📄 68 node
- node-red-contrib-omnirobotic**  
The Omnirobotic palette  
v0.3.33 📄 163 ★ NaN node
- node-red-node-geofence**  
A simple node to filter based on location  
v0.2.1 📄 472 ★ 5.0 node

**Recent flows** [see more \(1792\) ▶](#)

- Virtual keyboard**  
This ui-template displays a virtual keyboard in the dashboard whenever a text input field receives focus. The virtual keyboard is based on Hugobox  
Hugobox flow
- Command Design Pattern**  
This is a node-red specific implementation of the command design pattern that helps keeping editor flows transparent.  
r0ller flow
- OSC to OBS**  
A Node-Red Flow that enables the use of OSC commands to control OBS.  
TheOtherLonestar flow

**Recent collections** [see more \(340\) ▶](#)

- Useful subflows**  
This list contains some useful subflows  
CreativeWarlock collection
- tools for me**  
I need to create this collection due to my course  
janmerkel collection
- Node Red to beeeee**  
grafana dashboard tool using Node red  
sujitrp collection

# Node-RED for HamRadio (groups.io)

**NodeRed-HamRadio** [nodered-hamradio@groups.io](mailto:nodered-hamradio@groups.io)

NodeRed is an IBM platform that can be used for machine-machine communication. <https://nodered.org/>

This is great for control remote ham stations.

This list is for the sharing and collaborating of NodeRed flows and ideas.

Housekeeping (in addition to groups.io policies)

- All emails will be friendly and constructive in nature
- Elmering of others is highly encouraged and welcomed
- No 'for sale' items, please
- Have fun
- Ask Questions - there is no stupid question
- Remember, we all learn from our mistakes
- Zero tolerance for any hostile emails - immediate banning

QSO?

- Members may also wish to use DMR for real-time discussions using Brandmeister TG 30299

# Wiki - Node-RED setup

The screenshot shows a Wiki page on Groups.io. The page title is "Setting up Node Red and FRStack on a 64 bit Raspberry Pi". The page is last edited on 12/25/20 and has 3 revisions. The content is organized into sections: Hardware Requirements, Download and Install Raspberry Pi OS, and Boot and Configure Pi. The Hardware Requirements section lists Raspberry Pi 3 or higher, with Pi 4 recommended for Node Red and FRStack together, and a 16 or 32 GB microSD card. The Download and Install Raspberry Pi OS section provides instructions on downloading the Raspberry Pi Imager, running it, and selecting the SD card and Write option. The Boot and Configure Pi section states that all commands to be typed in are in bold and provides instructions on booting the Pi with an Ethernet cable and skipping Putty if using a MAC or other OS with a terminal program.

Groups.io Your Groups Find or Create a Group Help Michael Walker

Home **Owner**

Subscription

Admin

Messages

Hashtags

New Topic

New Poll

Chats

Directory

Calendar

Photos

Files

Databases

**Wiki**

nodered-hamradio@groups.io / Wiki

Setting up Node Red and FRStack on a 64 bit Raspberry Pi

Search

Last edited 12/25/20 · 3 revisions

## Hardware Requirements

Raspberry Pi 3 or higher. Pi 4 recommended for Node Red and FRStack together  
I recommend a 16 or 32 GB microSD card and a card reader to load the Raspberry Pi OS from your PC or MAC.

## Download and Install Raspberry Pi OS

Download the Raspberry Pi Imager from  
Raspberry Pi OS – Raspberry Pi

Run the Raspberry Pi Imager and choose Raspberry Pi OS (32 bit) (top selection)  
Click Choose SD card and you should see your card.  
Select the SD card and click Write. It will take several minutes depending on the size of your SD card.

Once completed take the card out of the computer, wait a few seconds and put it back in.  
Open File Explorer and browse to the SD card. It will display the boot partition and a second partition. Right click the new boot partition and select new text file. Name it ssh with no extension (delete.txt). Remove the SD card and install it in the Raspberry Pi.

## Boot and Configure Pi

All commands to be typed in are in **bold**

Boot up the Pi with it connected to your network via an Ethernet cable.

If using a MAC or other OS with a terminal program, you can skip downloading Putty.



# Reference Stuff

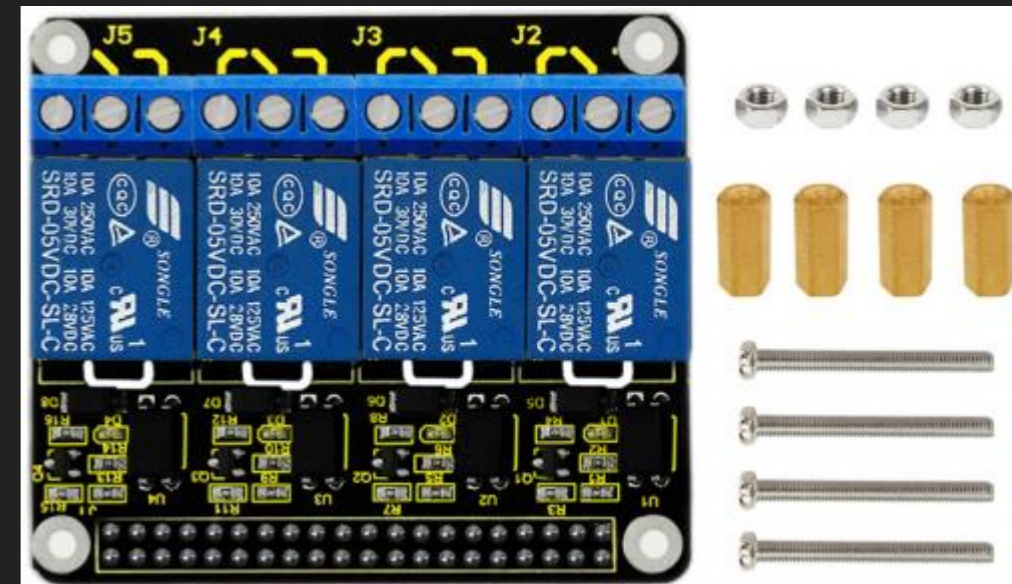
- ▶ Remote Station video: <https://youtu.be/QyOp0Xla8jo>
- ▶ Remote Station Overview: <https://youtu.be/QxapW0bMLc>
- ▶ Node Red site: <https://nodered.org/>
- ▶ Groups.io: <https://groups.io/g/nodered-hamradio>
- ▶ YouTube on Node-RED: <https://youtu.be/OSsYq1Wbua4>
- ▶ Opto Video on Node-RED: <https://youtu.be/3AR432bguOY>

# Flows ready for sharing

- ▶ Array Solutions Stack Master
- ▶ Freq Alarm and TX inhibit
- ▶ Flex TX power limiter
- ▶ Power Sequencer
- ▶ Green Heron RT21
- ▶ Weather Alerts and cool stuff
- ▶ KPA500, KPA1500
- ▶ KAT500
- ▶ Lightning disconnect
- ▶ Stream Deck integration
- ▶ HF-Auto & LA1K
- ▶ Steppir tuning
- ▶ SWR Alarms
- ▶ Flex meters (lots)
- ▶ MacDoppler
- ▶ 'Spot' the call and lookup
- ▶ WSJT Dashboard
- ▶ WSJT Log listener
- ▶ BCD to Band
- ▶ PST Rotator AZ EL
- ▶ LP-100 watt meter
- ▶ DLI Web Switch
- ▶ Elecraft W2 watt meter
- ▶ 403A antenna switch
- ▶ FRStack
- ▶ GPIO pin actions

# The simple web switch

- ▶ 4 dry contact relays
  - ▶ 10A contacts
- ▶ Web based - access it from any device
- ▶ Runs on a Raspberry PI
- ▶ Plugs on top
- ▶ No Soldering
- ▶ Very reliable
- ▶ An excellent practice device you can build on
- ▶ **\$8.99 on Amazon**



[https://wiki.keyestudio.com/KS0212\\_keyestudio\\_RPI\\_4-channel\\_Relay\\_Shield](https://wiki.keyestudio.com/KS0212_keyestudio_RPI_4-channel_Relay_Shield)

The dashboard is titled "VA3MW Shack Control" and is divided into four main columns:

- Control:** Displays status for Case Fan (red indicator), 6500 PWR (green), 6600 PWR (green), 6600 PTT and 6500 PTT (blue buttons), Astron 70A (green), WIN 10 PWR (green), 40M Beam (red), 110 VAC (green), 220V AC (green), 12v ACC PWR (green), 6600 Client IP (99.229.63.68), and 6500 Client.
- RF Info:** Shows TX/RX (green indicator), PGXL RF 0 Watts (meter), SWR 1 (meter), Case Temp 14.7 C, Amp Tray 13.0 C, Boathouse Temp 1.2 C, and Outside Temp -0.0 C.
- Rotator:** Displays Rotator Data (green indicator), Heading 55 Deg (circular gauge), and buttons for EU - 50, SA - 150, US - 200, VK - 300, JA - 330, and STOP!. It also includes an HDG control section with a dropdown and a value of 0, and an N1MM cmd input field.
- Steppir:** Shows Steppir Data (green indicator), Motor Ready, Direction Norm, NORMAL mode (yellow button) with a value of 180, DIR, DRV, and REF (green buttons), SteppIR 3755, 6600 Freq 3755.00, and TX Power 0.

<h3>Antenna A</h3> <p><b>NO ANTENNA!</b></p> <p>AUTO <input checked="" type="radio"/></p> <p>CLEAR</p> <p>6M LOOP</p> <p>10M DIPOLE</p> <p>15M DIPOLE</p> <p>20M,15M,10M DIPOLE</p> <p>40M DIPOLE</p> <p>80M DIPOLE</p> <p>160M VERT</p> <p>DUMMY LOAD</p> <p>DXEE DIPOLE</p> <p>20M DIPOLE</p> <p>WARC DIPOLE</p> <p>30M,17M DIPOLE</p> <p>14</p> <p>15</p>		<h3>Antenna B</h3> <p>80m Dipole</p> <p>AUTO <input type="radio"/></p> <p>CLEAR</p> <p>6M LOOP</p> <p>10M DIPOLE</p> <p>15M DIPOLE</p> <p>20M,15M,10M DIPOLE</p> <p>40M DIPOLE</p> <p>80M DIPOLE</p> <p>160M VERT</p> <p>DUMMY LOAD</p> <p>DXEE DIPOLE</p> <p>20M DIPOLE</p> <p>WARC DIPOLE</p> <p>30M,17M DIPOLE</p> <p>14</p> <p>15</p>		<h3>LP-100A</h3> <p>RF 0.0 Watts</p> <p>SWR 1.0</p> <p>Impedance: 047.0</p> <hr/> <h3>KAT500</h3> <p>RF PWR 0 Watts</p> <p>RF RFL 0 Watts</p> <p>VSWR 1 vswr</p> <p>SWR: 1.4    BYP SWR: 1.3</p> <p>TX Frequency: 3524</p> <p>Operating Band: 80M</p> <p>Mode: Auto</p> <p>BYPASS <input type="checkbox"/></p> <p>Power <input checked="" type="checkbox"/></p> <p>Alarm: None <input type="checkbox"/></p>		<h3>Flex 6400</h3> <p>FWD Power 0 w</p> <p>Flex Volts 13.6 v</p> <p>SWR 0</p> <p>Flex PA 43 F</p> <p>TX Band: GEN</p> <p>TX Frequency</p> <p>TX Mode</p> <p>Client: Select option</p> <p>Global: Select option</p> <p>MIC: Select option</p> <p>TX: Select option</p>		<h3>Weather - Tower 1</h3> <p>Clear Sky    Alarm <input checked="" type="checkbox"/></p> <p>Outside Temp: 36.14</p> <p>Outside Temp 36 F</p> <p>Inside Temp 50 F</p>		<h3>TIME/DATE</h3> <p><b>Tue Jan 12 2021</b></p> <p><b>8:23:29 PM</b></p> <p><b>02:23:29 UTC</b></p>	
--	--	---	--	---	--	---	--	--	--	--	--

FRStack

### ActiveSlice

Selected Select option

S6 -91 dbm

Slice B(1)

RX ANT1 - +

TX ANT1 - +

Frequency 10.136000 MHz - +

Step 10 Hz - +

Mode DL... DAX 2

Gain 50 Mute

Gain Medium - + Lvl 65

AGC - +

Filter Low 0 - +

### Radios

Radio(s) Santiago

Connected **Santiago**

Autoconnect

DISCONNECT

Client H18SMX

Bound Client **H18SMX**

### Options

Mute Others On Slice Active

Enable TX On Slice Active

Follow Active Slice

### Profiles

Global Select option

TX Default

MIC Default

### Radio Audio

Gain 100

Gain

H Gain 100

H Gain

BINAURAL  FDX

Slice B(1) - +

### TX Settings

RF POWER 100

TUNE POWER 10

CARRIER 100

ATU ManualBypass

START BYPASS CLR

### TX

MOX OFF Tune OFF

DAX  ACC

AMP  ATUMEM

TX INHIBIT

MOX TUNE

### VOX

VOX  Dly 13 Lvl 50

### MIC

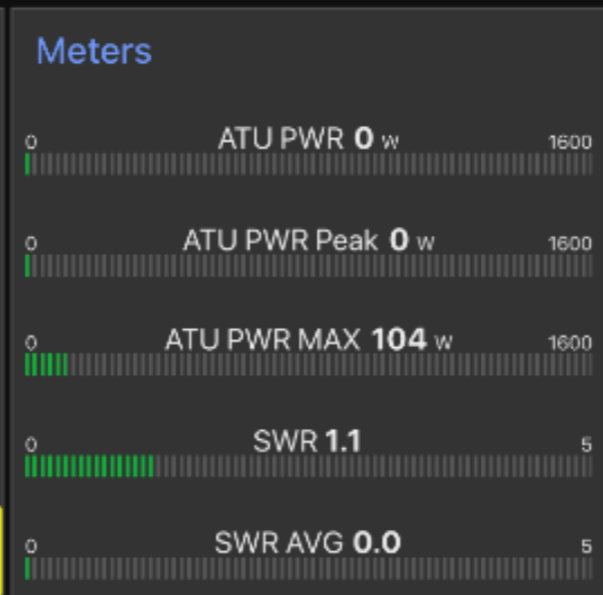
MIC PC - +

PROC  NORMAL

## HF-Auto

HF-Auto	
CAT Frequency	18.1
CAT Source	FRStack
ATU Freq	10.138
Mode	AUTO
ATU C	115
ATU L	196
ATU ANT	1
Ant Name	Hex
ANT SEL Method	AUTO
ATU Band	17m

HF-Auto			
CAT Source	FRStack		
C	115	L	196
CAT Frequency	18.1		
ATU Frequency	10.138		
BYPASS			
AUTO			



### MODE

BYPASS

AUTO

MANUAL

### Antenna

ANT 1


ANT 2

ANT 3


## HI8SMX Shack Control









### Rotor Dock

Azimuth



**52**  
Degrees

AZ Input 

- 
- 
- 
- 
- 
- 
- 
- 

### Radio Dock

Radio Model **Flex Radio 6300**

Radio Name **HI8SMX**

Client Names **HI8SMX**

Client IP's **10.0.0.78**

### Radio Connection

Connected **Santiago**

Client **HI8SMX**

Bound Client **HI8SMX**

**DISCONNECT**

Autoconnect

Mute Others On Slice Active

Enable TX On Slice Active

Follow Active Slice

### Tx Graphs

ATU PWR MAX **104 w**

ATU PWR **0 w**

SWR **1.1**

SWR AVG **0.0**

ATU PWR Peak **0 w**

Flex Power **0 w**

### Meters

Radio 12V **13.5 V**

Fwd Power **0.0 W**

Rev Power **0.0 W**

SWR **1.2**

PA Temp **102.9 °F**

PA Temp **39.4 °C**

Amp Power **W**


Amp Current **A**


Amp SWR


Amp Temp **°F**


Amp Temp **°C**


### Power Switch


PC 


Flex Power 


Flex Remote 


HF Auto 

DCU 2 

FT-991 

Pi 3 

MFJ Injector 

All Outlets 



### Power Control

REBOOT

SHUTDOWN

### Raspberry Control Panel

CPU Temperature: 80.1 °C

Memory free: [Gauge]

IP Address: 10.0.0.30

Disk Space: 35 %

CPU: 50.3 %

### Hosts Pings

Flex 6300	0.616 ms	Internet	36.5 ms
Flex 6300	0.8	Internet	36.5
Flex	[Green]	Internet	[Green]
Raspi	[Green]	PC	[Green]
PC	0.128 ms	PC	0.731 ms
PC	0.73	RPI - Modem	0.1
PC	[Green]	Raspi	[Green]

### Graphs

#### CPU Temperature

Time	Temperature (°C)
18:53:23	80.1
18:53:25	80.1
18:53:27	80.1
18:53:30	80.1

#### Internet

Time	Ping (ms)
17:53:00	~36
18:23:00	~36
18:54:00	~36

### Slice A

-150 **S9+10 -57** dbm 27

Slice A(0) RX ANT1 - +  
TX ANT1 - +

Frequency 18.100000 MHz - +  
Step 10 Hz - +

Mode DI... DAX 1

Gain 50 Mute

Gain  Lvl 65 - +

AGC

Filter Low 0 - +  
Filter High 3519 - +

### Slice B

-150 **S8 -79** dbm 27

Slice B(1) RX ANT1 - +  
TX ANT1 - +

Frequency 10.136000 MHz - +  
Step 10 Hz - +

Mode DI... DAX 2

Gain 50 Mute

Gain  Lvl 65 - +

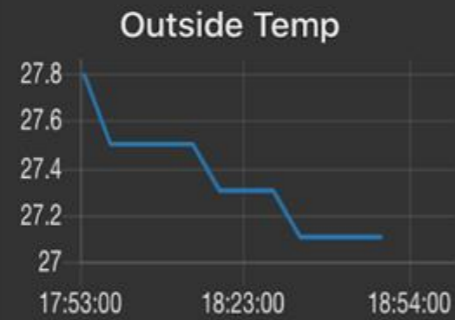
AGC

Filter Low 0 - +  
Filter High 3475 - +

## Weather Dock

Outside Temp **27.1**

Weather details **Few Clouds**



## Forecast

3.1 m/s  $\Rightarrow$  ESE    Sunrise **11:14**    Sunset **10:21**

11 pm 26°C	12 am 24°C	1 am 23°C	2 am 22°C	3 am 22°C	4 am 22°C
Wed <b>28/21°C</b>	Thu <b>28/21°C</b>	Fri <b>27/21°C</b>	Sat <b>28/22°C</b>	Sun <b>28/21°C</b>	Mon <b>28/21°C</b>

### W2 Wattmeter

Fwd Power **0.0** (0 to 2000)

Ref Power **0.0** (0 to 200)

SWR **0.00** (1 to 5)

TX Status

RANGE AUTO	SENSOR AUTO
RANGE 1	SENSOR 1
RANGE 2	SENSOR 2
RANGE 3	Serial <input checked="" type="checkbox"/>

### PG-XL HF Amp

STANDBY/IDLE

PG-XL AMP Power **1307**

PG-XL SWR **1.2**

PG-XL PA Temp **54.7** Celsius (0 to 85)

PG-XL AC Voltage **241** VOLTS (0 to 290)

PG-XL Current **50** AMPS (0 to 80)

### Flex Radio

TX Mode **LSB**

MOX TX

TX Band **40M**

TUNE - ON

Flex TX **READY**

Mode **LSB**

TX VFO **7.272000**

RF Power **43**

Tune Power **43**

Input Voltage **14** Volts (0 to 17)

PA Voltage **13.8** RPM (0 to 17)

PA Temp **34.1** Celsius (0 to 100)

### Flex Radio Users

F6700  6700 Ping Speed **0.1**

F6600  6600 Ping Speed **0**

### Radio

POWER ON

POWER OFF

CONNECT ANTENNA TO RADIO

CONNECT ANTENNA TO DUMMY LOAD

TUNER ON

TUNER OFF

PTT REGISTRATION

### Status

Power is On

Antenna Connected To Radio

Tuner is On

Internal voltage **13.4** Volts

Fan Speed **812** RPM

PA Temp **17.4** Celsius

### Radio Info

Internet Ping **18.2 ms**

Internet

Flex 6600 ping **1.9 ms**

Radio Model **Flex Radio 6600**

Radio Name **WD9GYM**

Client IP's

Client Names

TX Power **100**

6400 Freq **14074.00**

Flex TX **READY**

### Weather in Mundelein Illinois

Conditions **Clouds**

Temperature **33 F°**

Humidity **81 %**

Windspeed **3.91 mph**

☰ Antenna GPIO Relay Board

Antennas

- SOUTH NVIS OFF
- STEPPIR BEAM OFF
- STEPPIR VERTICAL ON
- NO OFF
- N NVIS OFF
- DUMMY LOAD OFF

## W9KXQ Dashboard

	<b>MANUAL SYNC</b> <b>MANUAL TRACK</b>	SWR <b>0</b>	<b>CALIBRATE</b>
<b>Flex Clients</b>		<b>SPE Amp</b>	<b>RETRACT</b>
Client Names <b>Maestro</b>		SPE Amp TX	
Client IP's <b>192.168.40.232</b>	<b>SDA-100 TRACK ON</b>	<b>SPE ANT FOLLOW - OFF</b>	<b>Alpha Wattmeter</b>
Radio Model <b>Flex Radio 6600</b>	<b>CALIBRATE</b>	Band MEM	Forward <b>0</b> w 2200
Radio Name <b>W9KXQ</b>	<b>RETRACT</b>	Pwr W SWR	Reflected <b>0</b> w 100
		V Amps	SWR <b>1.0</b> 10
<b>Rotator</b>	<b>Frequency Privileges</b>	TEMP °F	<b>SPE Power Limit</b>
Azimuth	<b>OFF</b> <b>7.035 MHZ &gt; GENERAL</b> <b>TX</b>	<b>Warnings</b>	<b>SPE OFF</b>
<b>48</b> Degrees	<b>7.035 MHZ &gt; CW</b>	<b>Alarms</b>	<b>LIMIT - ON</b>
<b>NORTH 0</b> <b>EAST 90</b>			
<b>SOUTH 180</b> <b>WEST 270</b>			
AZ Input			
<b>PARK</b>			

## W9KXQ Dashboard

<h3>Flex 6600</h3> <p><b>DESKTOP</b> <b>MAESTRO</b></p> <p>Client <u>Maestro</u></p> <p><b>MOX OFF</b></p> <p><b>HIGH SWR = 1</b></p> <p><b>TUNE</b></p> <p>TX Band <b>40M</b></p> <p>TX Mode <b>CW</b></p> <p>Mic <b>Default</b></p> <p>TX Frequency <b>7.035000</b></p> <h3>Flex Clients</h3> <p>Client Names <b>Maestro</b></p> <p>Client IP's <b>192.168.40.232</b></p>	<h3>Antenna Switch</h3> <p><b>SOUTH NVIS OFF</b> <b>STEPPIR BEAM OFF</b></p> <p><b>STEPPIR VERTICAL ON</b> <b>NO OFF</b></p> <p><b>N NVIS OFF</b> <b>DUMMY LOAD OFF</b></p> <h3>SteppIR Vertical</h3> <p><b>DISCONNECT</b></p> <p>FRS <input checked="" type="checkbox"/> SDA100 <input checked="" type="checkbox"/></p> <p>Band <u>Select option</u> <b>-</b> <b>+</b></p> <p>Slice Freq <b>7.035</b></p> <p>SteppIR Freq <b>7.000</b></p> <p><b>MANUAL SYNC</b> <b>MANUAL TRACK</b></p> <p><b>SDA-100 TRACK ON</b></p>	<h3>SPE Controls</h3> <p><b>AMP ON</b> <input type="checkbox"/> <b>AMP OFF</b></p> <p><b>ANT</b> <input type="checkbox"/> <b>INPUT</b> <input type="checkbox"/></p> <p><b>OPERATE</b> <b>POWER</b></p> <p><b>TUNE</b></p> <h3>Flex Meters</h3> <p>Flex PA <b>81 F</b></p> <p>Flex Volts <b>13 v</b></p> <p>FWD Power <b>0 w</b></p> <p>REV Power <b>0 w</b></p> <p>SWR <b>0</b></p> <h3>SPE Amp</h3> <p>SPE Amp <b>TX</b></p> <p><b>SPE ANT FOLLOW - OFF</b></p>	<h3>SteppIR-Beam</h3> <p><b>DISCONNECT</b></p> <p>FRS <input checked="" type="checkbox"/> SDA100 <input checked="" type="checkbox"/></p> <p>Band <u>Select option</u> <b>-</b> <b>+</b></p> <p>Slice Freq <b>7.035</b></p> <p>SteppIR Freq <b>7.016</b></p> <p><b>MANUAL SYNC</b> <b>MANUAL TRACK</b></p> <p><b>NORMAL ON</b> <b>180 OFF</b></p> <p><b>SDA-100 TRACK ON</b></p> <p><b>CALIBRATE</b></p> <p><b>RETRACT</b></p> <h3>Alpha Wattmeter</h3> <p>Forward <b>0 w</b></p>
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# Node-RED Dash Boards

The dashboard is titled "WO2X Shack Control" and is divided into several functional panels:

- KPA1500:** Shows power status (Operate), band (80M), SWR (0.0), temperature (33 c), fan level (0), and current fan speed (0 units). Includes "POWER ON" and "POWER OFF" buttons.
- Flex Radio:** Displays radio model (Flex Radio 6600M), callsign (WO2X), client names (DESKTOP-JBU77CQ), and IP address (10.0.0.119). Shows TX VFO (3.713000) and mode (LSB).
- ANTENNA GENIUS 2x8:** Shows antenna configuration for two antennas (80m and 20m) with selected models (5 B YAGI and 30/6 DIPOL).
- Rotor:** A table showing azimuth positions for various antennas.
- Power Switch:** Controls for PC, Monitor, 12 Volts, Outlet 4, Desk Switch, Outlet 6, 6600 Remote On, and Outlet 8.
- Hosts Pings:** Gauges for Flex 6600m (0.166 ms) and PC (0.332 ms).
- Hosts (ms):** Gauges for Raspi (0.056 ms) and Internet (15.6 ms).
- Hosts (ms) Internet:** A line graph showing ping times over time.
- Flex Meters:** Four gauges for Input voltage (14.8 V), PA Voltage (14.6 V), Fan Speed (992 RPM), and PA Temp (26.8 C).

The FlexRadio software interface shows two waterfall plots and a control panel:

- Waterfall Plot 1:** Frequency range 3620-3800 kHz, centered at 3.713.000 kHz. Shows a strong TX signal.
- Waterfall Plot 2:** Frequency range 14068-14096 kHz, centered at 14.074.000 kHz. Shows RX signal.
- Control Panel:** Includes sliders for RF Power, Tune Pwr, and various modes (TUNE, MOX, ATU, MEM). Shows "STATION: DESKTOP-JBU77CQ".

## K0VM Control

Connection	Radio	KPA500	KAT500	LP-100A
<b>CONNECT</b>	<b>F2-6600</b>	<b>KPA500</b>	<b>KAT500</b>	<b>LP-100A</b>
Radio(s) <b>F2-6600</b>	TX Frequency <b>3573</b>	Power : On <input checked="" type="checkbox"/>	Power : On <input checked="" type="checkbox"/>	RF <b>22.9 dbW</b> <input type="checkbox"/>
Connected : <b>F2-6600</b>	RF <b>9.7 Watts</b> <input type="checkbox"/>	RF <b>210 Watts</b> <input type="checkbox"/>	RF <b>222 Watts</b> <input type="checkbox"/>	RF <b>199.1 Watts</b> <input type="checkbox"/>
Autoconnect <input type="checkbox"/>	SWR <b>0.0</b> <input type="checkbox"/>	SWR <b>1.1</b> <input type="checkbox"/>	SWR: <b>1.2</b> BYPSWR: <b>3.0</b>	SWR <b>1.2</b> <input type="checkbox"/>
Client <b>Select option</b>	Radio : <b>14.5 V</b> Temp <b>35.2 °C</b>	Operating Band: <b>80m</b>	Operating Band: <b>80m</b>	Meter Mode : <b>Fast</b> <input checked="" type="checkbox"/>
Bound Client : <b>AG14</b>	<b>X Switch</b>	PA Mode : <b>Operate</b> <input checked="" type="checkbox"/>	Antenna 2 : <b>OCFD</b> <input checked="" type="checkbox"/>	SWR Alarm : <b>2.5</b> <input checked="" type="checkbox"/>
Force Disconnect <input type="checkbox"/>	<b>X SWITCH</b>	PA <b>64.8 V</b> <input type="checkbox"/> PA <b>6.6 A</b> <input type="checkbox"/>	ATU Mode : <b>Manual</b> <input checked="" type="checkbox"/>	
	<input type="checkbox"/> A-1 <input type="checkbox"/> A-2 <input checked="" type="checkbox"/> A-3 <input type="checkbox"/> A-4 <input type="checkbox"/> A-5	PA Temp <b>29 c</b> <input type="checkbox"/>	Tune Start <input checked="" type="checkbox"/>	
	R-1 11 <input checked="" type="checkbox"/> 12 <input type="checkbox"/> 13 <input type="checkbox"/> 14 <input type="checkbox"/> 15	Low Fan Speed <input type="checkbox"/> 0 <input type="checkbox"/>	Alarm : <b>None</b> <input checked="" type="checkbox"/>	
	R-2 21 <input type="checkbox"/> 22 <input type="checkbox"/> 23 <input type="checkbox"/> 24 <input checked="" type="checkbox"/> 25	Alarm : <b>None</b> <input checked="" type="checkbox"/>		
	R-3 31 <input type="checkbox"/> 32 <input type="checkbox"/> 33 <input checked="" type="checkbox"/> 34 <input type="checkbox"/> 35			
	R-4 <input checked="" type="checkbox"/> 41 <input type="checkbox"/> 42 <input type="checkbox"/> 43 <input type="checkbox"/> 44 <input type="checkbox"/> 45			
	RX Select <b>Select option</b>			



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