

HAMCLOCK ON A RASPBERRY PI

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Why Build a HamClock?

- Inspiration from Vendor Display at Northeast HamXposition
- Interest in building my own as a Raspberry Pi Project
- Learn about propagation
- Provides useful information for operating.



Photo courtesy of Scott, NE1RD

AB1QB HamClock Hardware



Raspberry Pi 3 Model B+



Touch Screen Monitor with Case,ROADOM 10.1" Raspberry Pi Screen, IPS FHD 1024x600,Responsive and Smooth Touch,Dual Built-in Speakers,HDMI Input,Compatible with Raspberry Pi 5/4/3/Zero,Versatile Stand

Visit the ROADOM Store

4.5 ★★★★★ 147 ratings | Search this page

Amazon's Choice

100+ bought in past month

\$109.99

Or \$18.96/mo (6 mo). Select from 2 plans

✓prime

FREE Returns

Coupon: \$15 off coupon applied Shop items | Terms

Save 5% on 2 select item(s) Terms

5% off with qualifying purchase Shop items

Best price

May be eligible for lower price from other sellers, potentially without



Power Supply w/on-off switch - Micro-USB for Rpi 3; USB-C for Rpi 4 and 5



Part	Cost
Raspberry Pi 3 Model B+	\$ 44.41
Power Supply w/on-off switch	\$ 10.99
32GB MicroSDHC Flash card	\$ 8.04
ROADOM 10.1" Touch Screen Monitor	\$109.99
Total	\$173.43

Raspberry Pi Models

Family ↕	Model ↕	SoC ↕	Memory ↕	Form factor ↕	Ethernet ↕	Wireless ↕	GPIO ↕	Released ↕
Raspberry Pi	B	BCM2835	256 MB	Standard ^[a]	Yes	No	26-pin	2012
			512 MB					2012 ^[49]
	A		256 MB		No			2013
	B+		512 MB	Yes	40-pin		2014	
	A+		256 MB	Compact ^[b]				No
			512 MB					
Raspberry Pi 2	B	BCM2836 / 7	1 GB	Standard ^[a]	Yes	No	40-pin	2015
Raspberry Pi Zero	Zero	BCM2835	512 MB	Ultra-compact ^[c]	No	No	40-pin	2015
	W / WH	Yes				2017		
	2 W	BCM2710A1 ^{[d][50]}						2021
Raspberry Pi 3	B	BCM2837A0 / B0	1 GB	Standard ^[a]	Yes	Yes	40-pin	2016
	A+	BCM2837B0	512 MB	Compact ^[b]	No	Yes ^[e]		2018
	B+		1 GB	Standard ^[a]	Yes ^[f]			2018
Raspberry Pi 4	B ^[51]	BCM2711B0 / C0 ^[52]	1 GB	Standard ^[a]	Yes ^[g]	Yes ^[e]	40-pin	2019 ^[53]
			2 GB					
			4 GB					
			8 GB					
		400		4 GB	Keyboard			
Raspberry Pi Pico	Pico	RP2040	264 kB	Pico ^[h]	No	No	40-pin	2021
	W		Yes ^[i]			2022		
	2	RP2350A	520 kB			No		2024
Raspberry Pi 5 ^[56]		BCM2712	2 GB	Standard ^[a]	Yes ^[g]	Yes ^[e]	40-pin	2024
			4 GB					2023
			8 GB					

Table from Wikipedia

Raspberry Pi 4 Model B 2019 Quad Core 64 Bit WiFi Bluetooth (4GB)
 Visit the Raspberry Pi Store
 4.7 ★★★★★ 18,621 ratings | Search this page
 1K+ bought in past month

\$61.29
 Or **\$10.57** /mo (6 mo). Select from 2 plans
 ✓prime Two-Day
 FREE Returns
\$ Save \$14

May be available at a lower price from other sellers, potentially without free Prime shipping.

Returnable until Jan 31, 2025 | Product support included ✓
 Size: 4GB

Brand Raspberry Pi
Ram Memory Installed Size 4 GB
Memory Storage Capacity 4 GB
CPU Model Cortex
Connectivity Technology Bluetooth, Wi-Fi, USB, Ethernet, HDMI, GPIO

Raspberry Pi 5, Single Board Computer, 4GB RAM, 2.4GHz 64-bit Quad-core Arm Cortex-A76 Processor, Bluetooth 5.0, BLE Wireless
 Visit the seed studio Store
 4.6 ★★★★★ 55 ratings | Search this page
 200+ bought in past month

\$75.99
 Or **\$13.10** /mo (6 mo). Select from 2 plans
 FREE Returns
 With Amazon Business, you would have saved **\$424.25** in the last year. Create a free account and save up to 2% today.
\$ Best price
 Unlock a **\$200 Amazon Gift Card** upon approval for Prime Visa.

Size: 4GB

4GB \$75.99
2GB \$59.99
4GB Starter Kit \$125.90
8GB \$88.00

8GB Starter Kit
 \$145.90
 FREE Delivery Tuesday

Brand seed studio
Model Name Raspberry Pi 5
Ram Memory Installed Size 4 GB
Memory Storage Capacity 4 GB
CPU Speed 2.4 GHz

Downloading the Software

Install Raspberry Pi OS using Raspberry Pi Imager

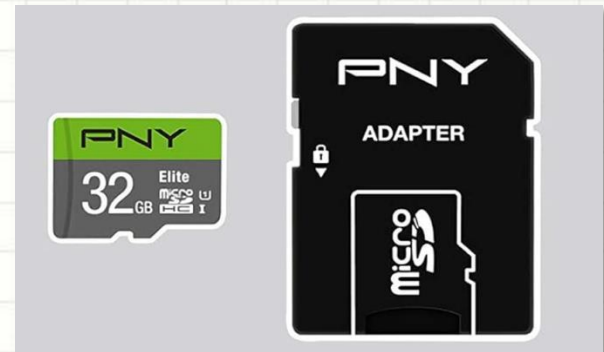
Raspberry Pi Imager is the quick and easy way to install Raspberry Pi OS and other operating systems to a microSD card, ready to use with your Raspberry Pi.

Download and install Raspberry Pi Imager to a computer with an SD card reader. Put the SD card you'll use with your Raspberry Pi into the reader and run Raspberry Pi Imager.

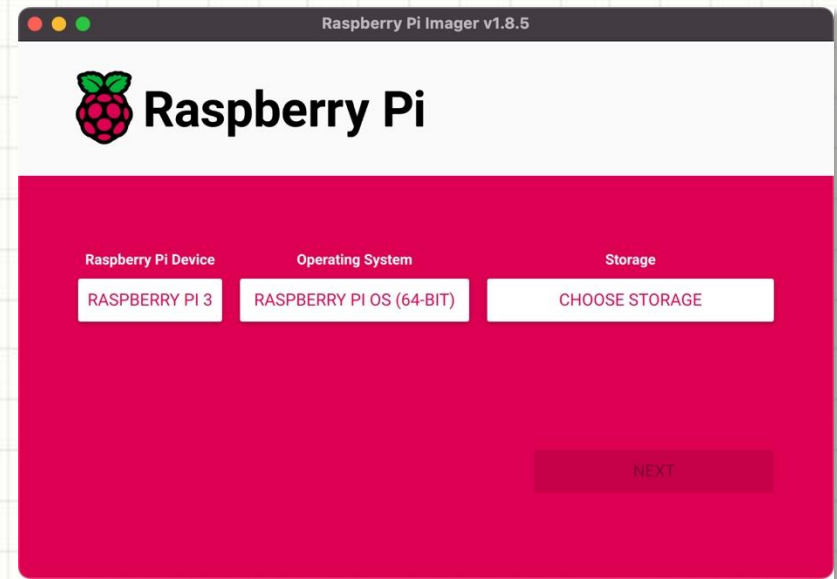
[Download for macOS](#)

[Download for Windows](#)

[Download for Ubuntu for x86](#)



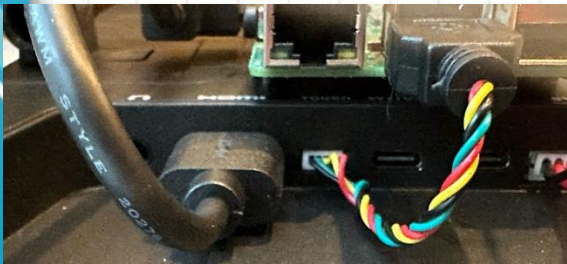
1. Download and install the Raspberry Pi Imager for your desktop OS from <https://www.raspberrypi.com/software/>
2. Use the Micro-SD card adapter to insert the micro-SD card into your machine's card reader.
3. Install and run the Raspberry Pi Imager. Just need to give it the type of device, OS, and choose your storage and it will download the RPi image to the Micro-SD card
4. It may be easier to insert the card into the slot on the RPi before you screw it to the board.



Assembling the Hardware

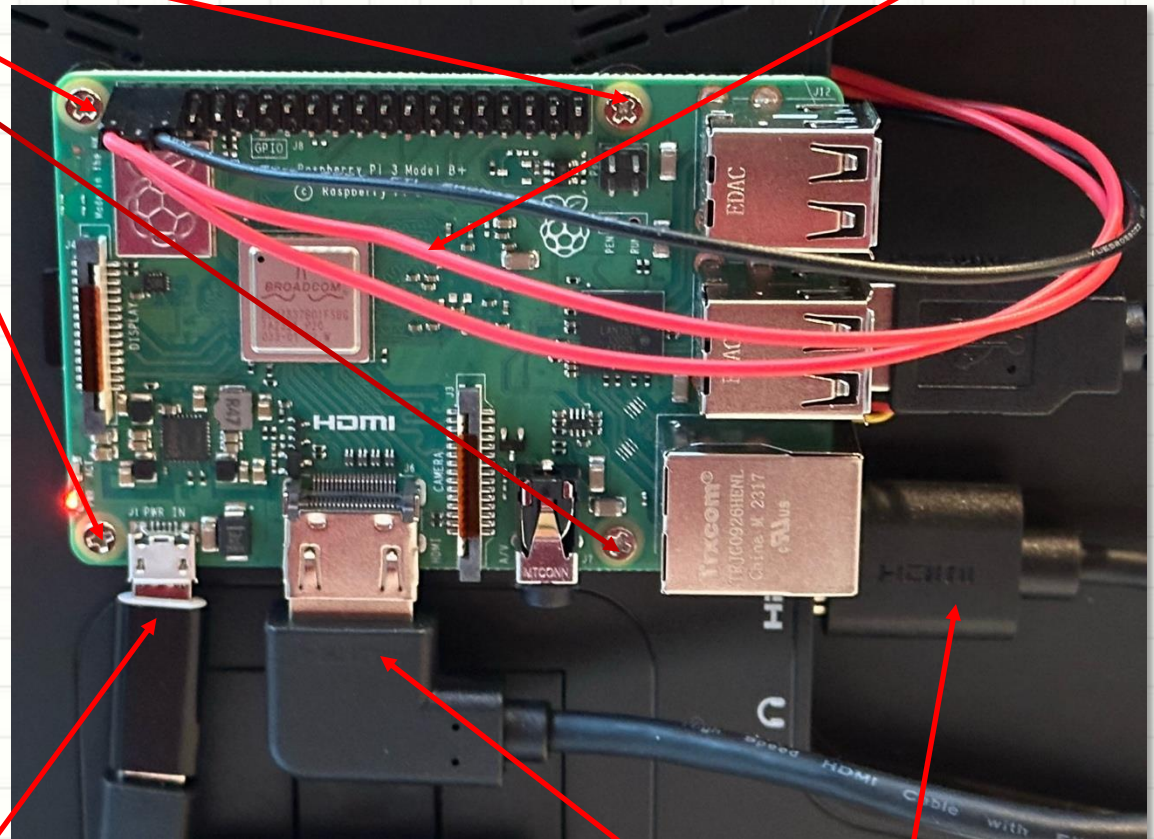
Step 1: Using 4 screws, fasten the RaspberryPi to the back of the monitor

Step 3: Connect 4-wire USB cable to enable touch feature



Step 5: Connect power cable

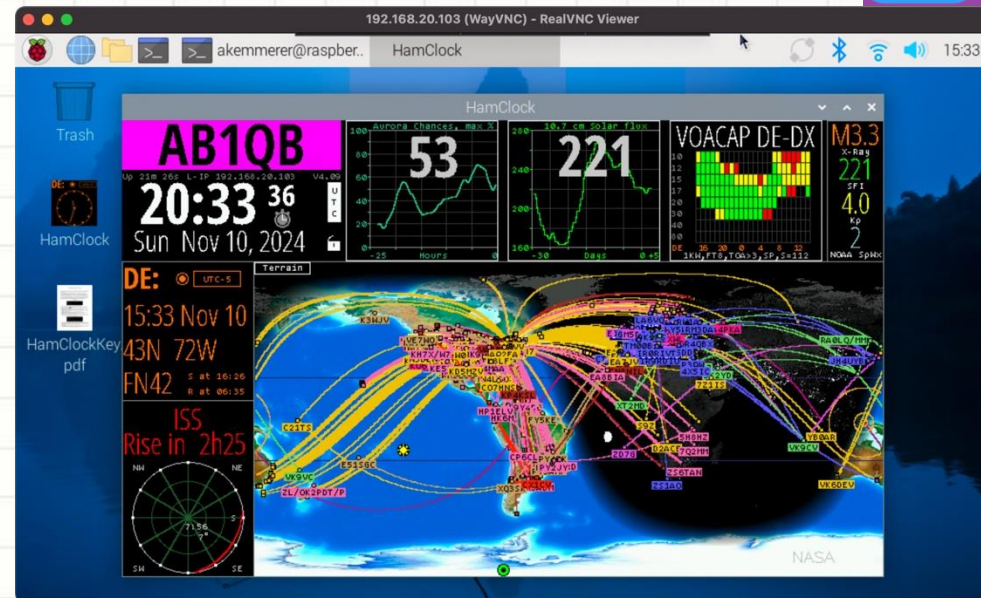
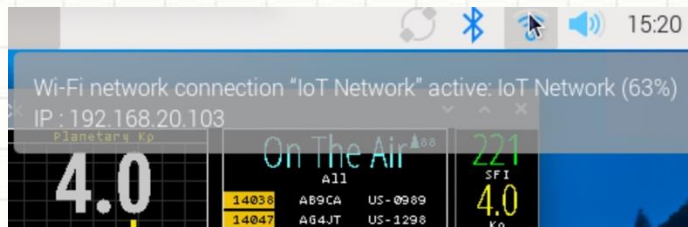
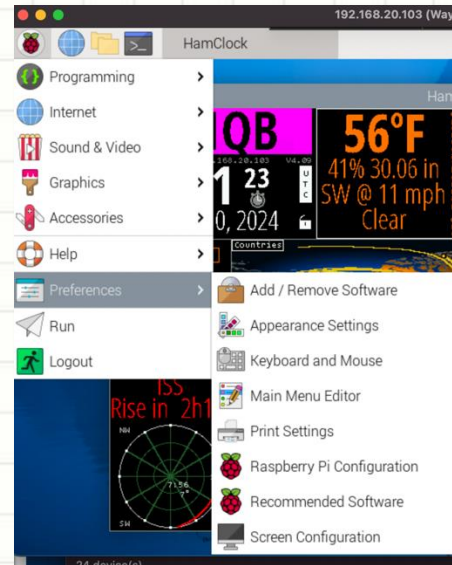
Step 2: Connect 3-pin GPIO cable to monitor



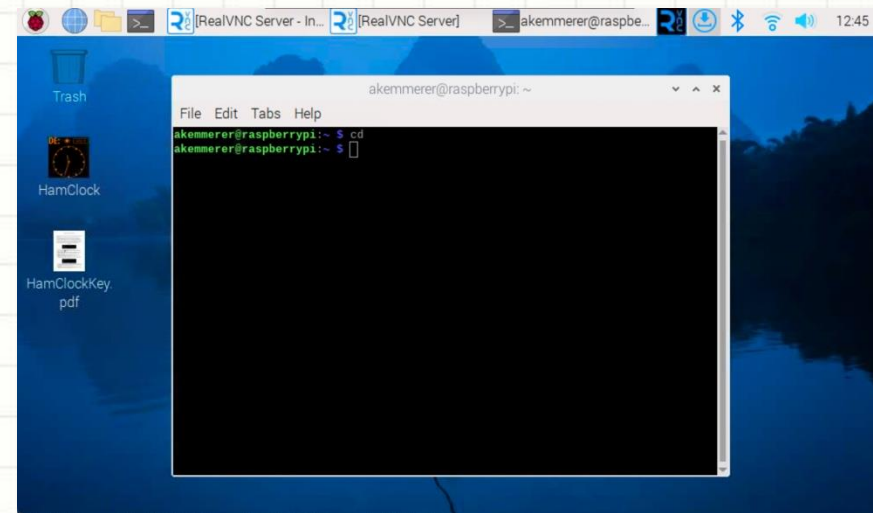
Step 4: Connect RPi HDMI port to Monitor

VNC: Remote Access to the Raspberry Pi

- To remotely access your Raspberry Pi from your desktop machine, use VNC
- Enable **VNC Server** in the Raspberry Pi Config options
- Download and install **VNC Viewer** on your desktop machine from <https://www.realvnc.com/en/connect/download/viewer/>
- Use the IP address of your Raspberry Pi to connect VNC Viewer to the Raspberry Pi



HamClock: Software Installation



Once installed, run HamClock using the desktop icon.

Install, Setup and Configuration instructions can be found at

<https://www.clearskyinstitute.com/ham/HamClock/>

Download and run the installer script by entering the following commands in a terminal window on the RPi desktop. Install the desktop icon.

```
$ cd
$ curl -O https://www.clearskyinstitute.com/ham/HamClock/install-hc-rpi
$ chmod u+x install-hc-rpi
$ ./install-hc-rpi
```


HamClock: Software Setup

Call: AB1QB <Page 1>

Enter DE Lat: 42.708N Lng: 71.667W Grid: FN42er

or use gpsd? No

or use NMEA? No

or IP Geolocate? No

NTP? Built-in

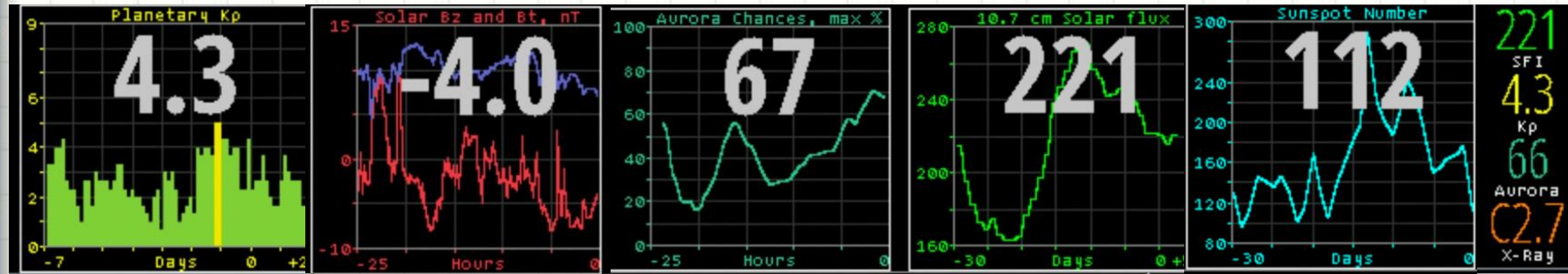
~ `	! 1	@ 2	# 3	\$ 4	% 5	^ 6	& 7	* 8	(9) 0	- _	+ =
q Q	w W	e E	r R	t T	y Y	u U	i I	o O	p P	{ [}]	\
	a A	s S	d D	f F	g G	h H	j J	k K	l L	: ;	" '	Del
	z Z	x X	c C	v V	b B	n N	m M	< ,	> .	? /	Done	
											<=>	=>

- **Page 1:** Set Call, Grid
- **Page 2:** Set Cluster – used k1ttt.net, my call for login, Port 7373
- **Pages 5,6:** Set display options per your preferences

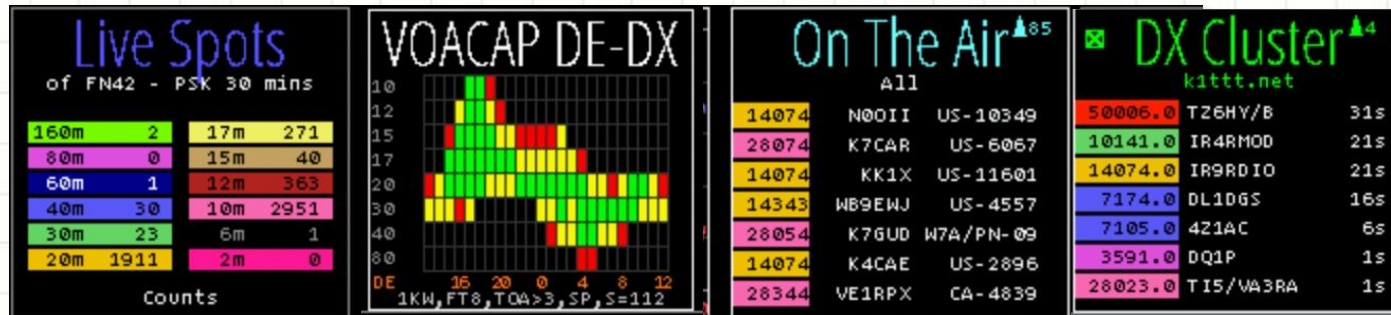
Install, Setup and Configuration instructions can be found at
<https://www.clearskyinstitute.com/ham/HamClock/>

HamClock: Data Panes

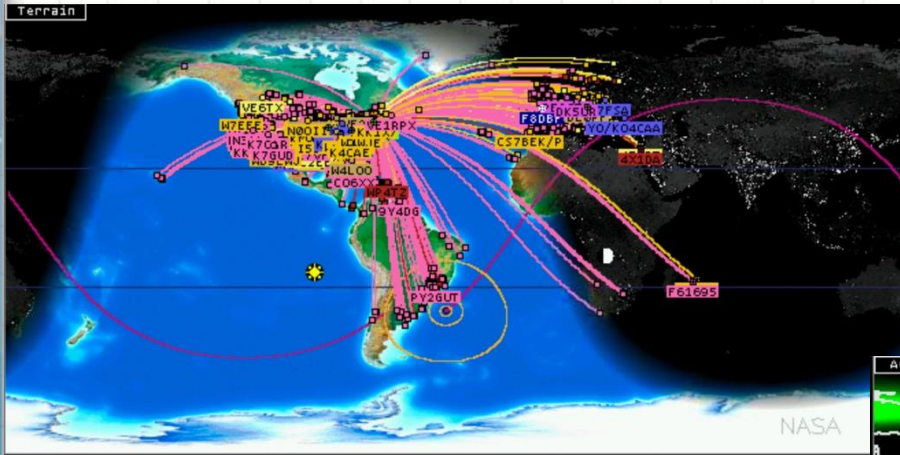
Solar Conditions



Operating / Finding DX



HamClock: Map Panes

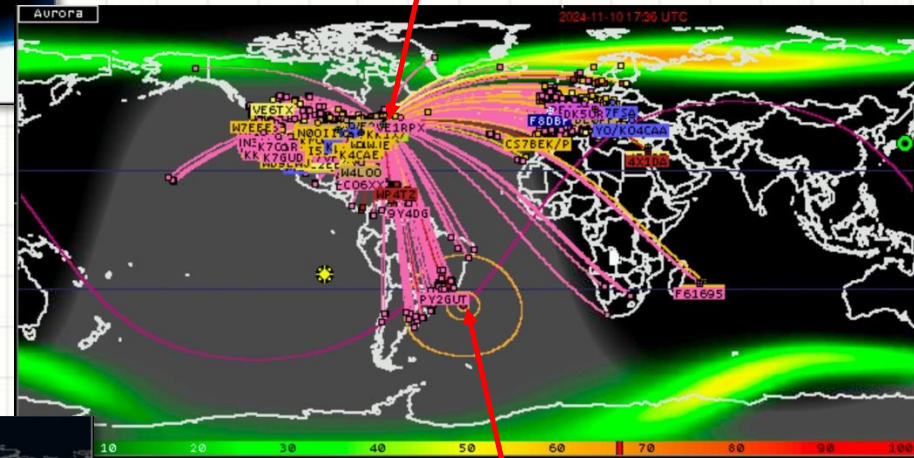


Terrain Map

Country Map



Aurora Map



Lessons Learned / Steps

- Use a Raspberry Pi Model 4
 - Better performance
 - Correct power supply included with the monitor
 - Raspberry Pi 5 is probably overkill – requires bigger power supply and fan/cooler
- Quicker/easier access for configuration
 - Use a wireless keyboard and mouse with the Raspberry Pi
 - Use VNC to access RaspberryPi from a desktop machine
- Alternative design
 - Build a standalone Raspberry Pi in a small case
 - Use with a regular monitor
 - Eliminates the expense of the touch screen monitor
- Learn additional capabilities of the HamClock
 - Run on Windows, Mac, or Docker
 - Customization of Spotting cluster data
 - External I/O Options

Questions?

