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# Tempest Home Weather Station

By Harvey Nelson

#### Outline

- Overview of the Tempest Weather Station
  - Description from the web site
  - Cost
- Weather station display
  - No dedicated monitor web browser or phone app
  - Interactive Demo (if available in meeting room) + Screen Captures
- My Installation
  - Physical & Software
  - Using a dedicated processor & display (Raspberry Pi Zero W)
- Summary

AI-Powered Weather App (from web site) https://weatherflow.com/tempest-weather-system/



- While weather apps abound, the Tempest app leverages real-time data, advanced forecast modeling and the oversight of inhouse meteorologists.
- Data from each Tempest is processed with advanced machine learning which checks the information for accuracy, allowing us to apply daily calibrations and ultimately improve your forecast over time.

### So Advanced, It's Simple (from web site)



- A revolutionary design with no moving parts, nearly zero maintenance, instant online data, a free personal webpage, and a rich API powering a growing list of third-party applications.
- Install the Tempest home weather system in less than five minutes and it will do the rest!

### Smart Home Enabled (from web site)

- Trigger your outdoor lights based on the actual brightness of the sky.
- Enable your thermostat to use the weather conditions outside your home to conserve heating and cooling use.
- Automate your sprinklers to operate based on rainfall.
- Get text alerts when lightning is approaching.
- Save time and money with a home that can optimize itself.
- I have not implemented any of these suggestions.

#### All About The Data (from web site)

- Accurate measurements from your location, along with data from other Tempest Systems, flows to our data processing center.
- There we also collect ALL other relevant weather data, including measurements from satellites, aircraft, radars and other surface weather stations.
- Our process ultimately yields standardized data and a real-time analysis product. Not every measurement is of equal value (e.g. wind 'shadows' affect how wind data is utilized) but our big data analytics adjust accordingly, meaning every Tempest System can make a difference.

### Hyper-Local Forecasting (from web site)

- Our forecast system initializes with the ECMWF, the highly acclaimed European global forecast model, the best of NOAA's forecast models and WeatherFlow's own in-house modeling suite .
- Over key areas, WeatherFlow's operational forecast system (WF WRF) assimilates the most valuable observations into this powerful baseline to provide detailed regional forecasts.

# Do Something About The Changing Weather (from web site)

- Tempest data, along with all our real-time useful information, is part of data sets which are shared with the National Weather Service (NWS-NOAA) and other met agencies across the world, supporting their mission of predicting dangerous weather and warning the public of potential risks.
- As forecasting becomes more difficult and weather patterns increasingly unpredictable, each Tempest helps contribute to a better global forecast.

#### Purchasing

- Cost: \$329 + tax (Free shipping)
- 60 Day Money Back Guarantee
- 2 Year Warranty
- 10 Year Extended Warranty

#### What's In the Box?

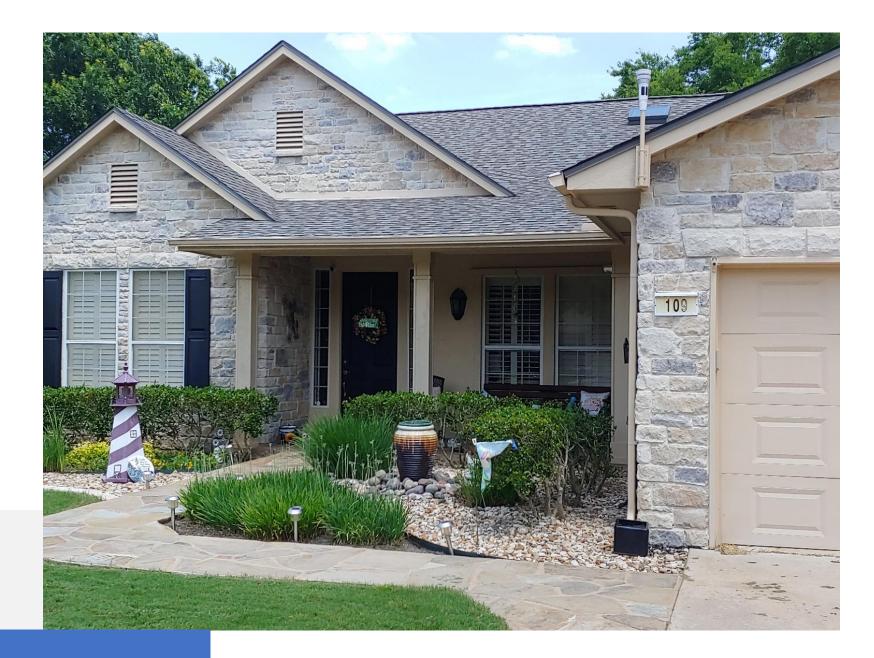


#### **Tempest Weather System Includes:**

- Tempest sensor device
- Flat base & pole mount attachments
- WiFi Hub (base station)
- Hub power supply
- Wood screw for temporary mounting

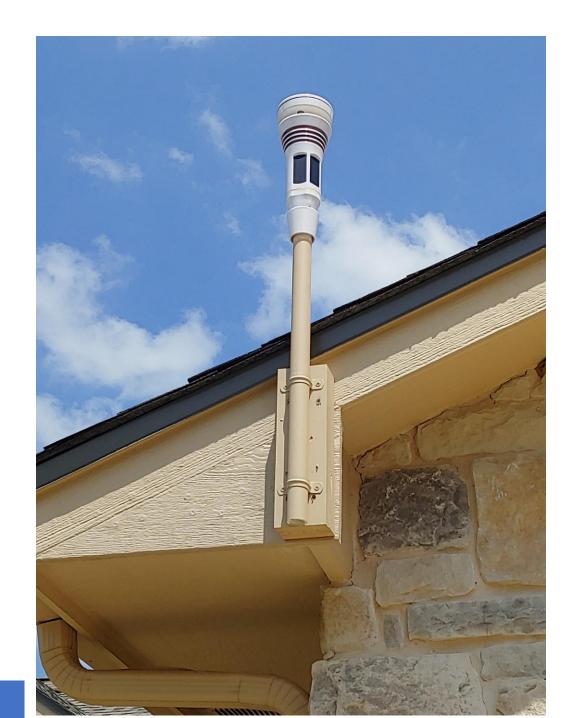
### Tempest Mounted On House

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## Tempest On Mount

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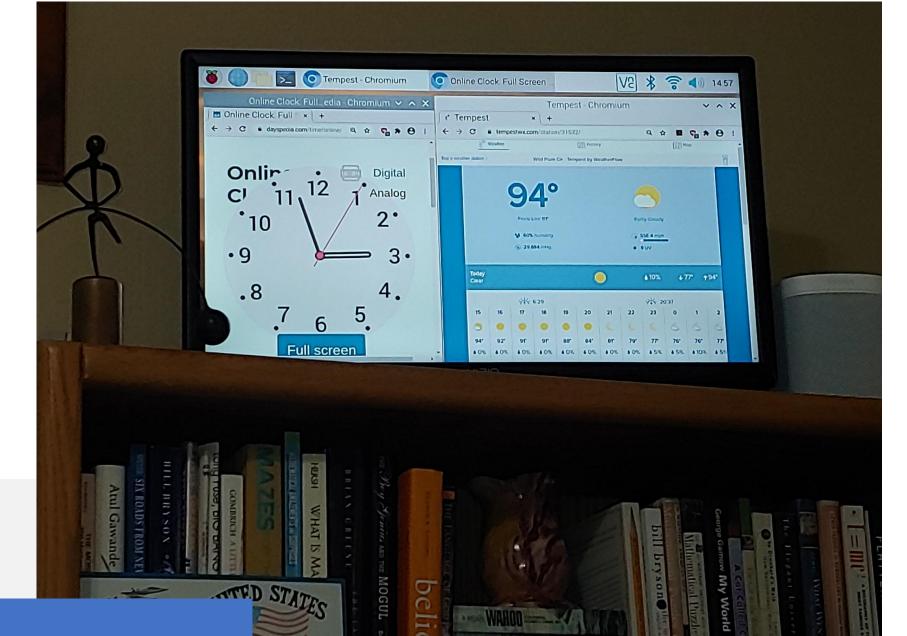
## Monitor on Bookcase

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#### Raspberry Pi Zero on Bookcase



#### My Station Web Page

- <u>https://tempestwx.com/station/31532/</u>
- On-line Demo (if'n it works!!!)

## Weather Page

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## Clicking on Today's Page (top half)

st-00019829 95.2 °F	FEELS LIKE HUMIDITY 113 °F 59%
≤T-00019829 29.844 inHg	trend FALLING
4 days	distance last 3 hrs 19 - 22 mi 0
en ENE 1.9 mph	сизтімс 0 – 6 mph
	brightness solar radiation 88519 lux 738 W/m2
ST-00019829 NONE	rain (today) rain (yesterday) 0.00" 0.00"
ST-00019829	
Station Pressure	29.002 inHg
Dew Point	78.6 °F
Wet Bulb Temperature	82.6 °F
Detta T	12.6 °F
Air Density	0.06929 lbs/ft3
Rain Duration (Today)	0 Minutes
Rain Duration (Yesterday)	0 Minutes

## History Pa Day View History Page –

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ST.00019829           Air Temperature - F         Avg           77.4         91.2         81.3           Relative Humidity - %         Max         Avg           63         90         82           See Level Pressure - Inhg         Max         29.934           29.934         29.9389         29.965           Lightning         Strikes         Avg           0         13.2         ESE 2.2           Rain         Duration - mins         Total - in           0.00         13.2         ESE 2.2           Rain         O.00         2.1           Solar Radiation - Wim2         Max         2.1           Min         115.8         2.19           Brightness - lux         Min         138945		6/25/2021	
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Wind - mph     Min     Max     Avg       Rain     Duration - mins     Total - in       Duration - mins     Total - in       O     0.00       UV Index     Avg       Nin     Max       O.O     11.8       Solar Radiation - W/m2     Avg       Min     Max       O     1158       Brightness - lux			
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## History Page – Month Summary

	Day Week Month Year All Time	
	June 2021	
ST-00019829		
Air Temperature - °F		
60.3 6/3	Max 99.5 6/13	Avg 80.2
Relative Humidity - %		
Min <b>43</b> 6/13	Max 98 6/1	Avg <b>79</b>
Sea Level Pressure - inhg		
29.714 6/6	30.119 6/1	Avg 29.931
Lightning Strikes 6454		
Wind - mph		
MIn 0.0 6/1	Max <b>31.4</b> 6/22	Avg E 1.3
Rain		
Duration - mins 1060	Total - In <b>3.67</b>	
UV Index		
0.0 6/1	Max <b>13.7</b> 6/4	Avg 2.3
Solar Radiation - W/m2		
MIn 0 6/1	<b>2445</b> <sub>6/4</sub>	Avg 262
Brightness - lux		
Min 0 6/1	<b>293384</b> 6/4	Avg 31518

#### Dedicated Processor & Monitor

- Why?
  - Free up my primary monitor space.
  - Wanted a dedicated display without my PC being powered up.
- Implementation
  - Raspberry Pi Zero W
  - Monitor: Spare VIZEO 24" D-Series, 1080P, LED

#### Dedicated Processor & Monitor (cont)

- Raspberry Pi Zero W with
  - Wireless keyboard & mouse
  - Wireless link to my router
  - Chromium Browser
  - Resolved display timeout on RPi using the following commands:
    - xset s off # Disable screen blanking
    - xset dpms 18000 (stays on for 18000 secs = 5 hours after last interaction)

#### Dedicated Processor & Monitor (cont)

#### • Experience

- Chromium Interaction, with the Zero, is **painfully** slow.
- RPi Zero W works fine once it is set up with desired pages on the display.
- Occasionally Hub loses internet (about once / week). Requires router reboot.
- Occasionally RPi freezes (every few days). Requires RPi reboot.
- Considering
  - Upgrading the processor to a spare RPi 3B +
  - Adding external wireless cameras (front and rear)
    - I have two Arlo HD cameras. Lots of mixed reviews online.

#### Issues with the Tempest System

- Initially for about a two months unit would go on and offline, sometimes several times a day. Then may be good for a week or so.
- WeatherFlow support good. Replaced Hub but didn't solve the issue.
- The problem resolved itself and has been solid and trouble free for the last 6 months.

#### Summary

- The WeatherFlow Tempest is a great system
  - But, a hassle (for me) without a dedicated display
  - Wonderful with the dedicated display
  - It's more than just a home weather system
    - Coupled with WeatherFlows total weather system it has great forecasting data.