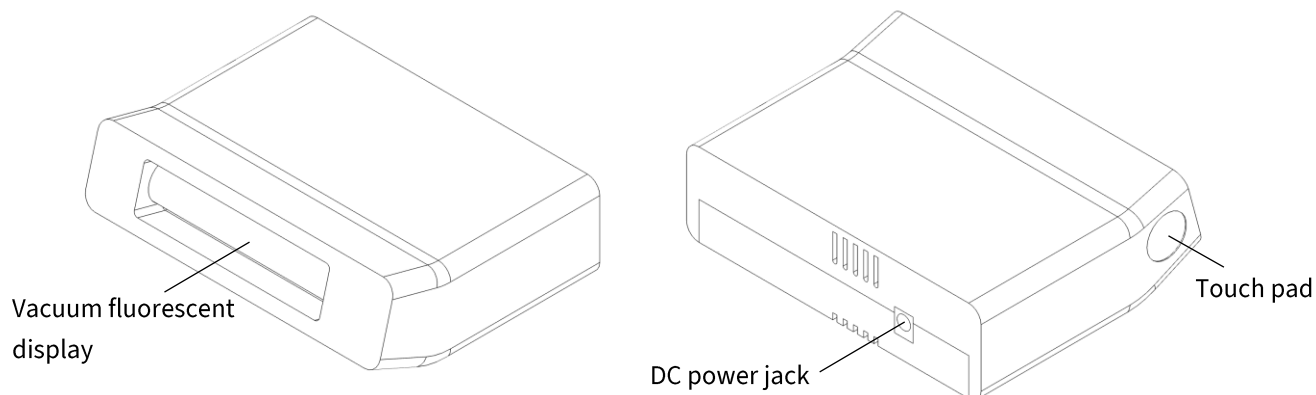


# Operating Instructions for Callisto

## 1. Features

Callisto is a clock that uses a vintage vacuum fluorescent display (VFD) tube as the indicator.



- **Vacuum fluorescent display**
  - Glowy!
  - Displays the time!
  - Auto-dims based on ambient light conditions!
- **DC power jack**
  - Use a 9V AC to DC wall adapter to power the clock.
- **Touch pad**
  - Tap to display the date during normal operation.
  - Momentarily wake up Callisto and display the time during night mode.
  - Tap and hold to enter configuration mode.

## 2. Initial Setup

1. Plug in Callisto using a 9V AC to DC wall adapter.
2. The display should show **Unsett**. Callisto is ready to be connected to Wi-Fi.
3. Using a PC or smartphone, connect to the Wi-Fi access point named **callisto\_config**. Use the password **12345678** to connect.
4. A web browser should open automatically. Enter your home Wi-Fi details so that Callisto can retrieve the current time.

**Note:** Callisto can only connect to 2.4 GHz Wi-Fi networks.

- Click on “save and reboot”. If Callisto does not reboot, and display still shows **Connect**, try refreshing the browser window to resend the data. If that does not work, go back to step 3.
- Callisto should now synchronize and show the time. All settings, including Wi-Fi credentials will remain, even when unplugged!

**Note:** Check [4. Configuration](#) to see how to change time zone settings or set the display format for time and date.

### 3. Display Modes

Mode	Display	Notes
Synchronizing time	<b>CALLISTO</b>	Callisto has successfully connected to Wi-Fi and is syncing the clock.
Time	<b>12 34 56</b>	The current time.
Date	<b>12/24/2021</b>	The current date. To show the date, tap the touch pad. The date will display for 5 seconds before returning to the time.
Configuration	<b>123</b>	See <a href="#">4. Configuration</a> for steps to configure Callisto. In configuration mode, Callisto will display the last digit of your IP address.
Wi-Fi error	<b>net Err</b>	Callisto was unable to connect to Wi-Fi. See <a href="#">5. Troubleshooting</a> for details.
Initial setup	<b>Connect</b>	Callisto needs to be set up. See <a href="#">2. Initial Setup</a> for details.

### 4. Configuration

- To enter configuration mode, tap and hold on the touch pad for 10 seconds.  
**Note:** If in night mode (by default from midnight to 6 AM), tap to wake Callisto. Once the time is displayed, tap again and hold down for 10 seconds.
- If successful, the display should no longer display the time, and instead show a 2- or 3-digit number. This number is the last digit of Callisto’s IP address.
- Using a PC or smartphone connected to the same network as Callisto, open a browser and enter **192.168.0.XXX** in the address bar, replacing the **XXX** with the number displayed on Callisto.  
**Note:** This will not work if you’ve changed your default gateway address to something other than 192.168.0.1. If you’ve done that, you can probably figure out what needs to be done yourself.
- You can use the page to change display settings for Callisto.

**Note:** Callisto isn't very fast and may run into issues showing you the configuration page. If it doesn't work, try refreshing your browser.

5. Use the buttons at the bottom of the page to save, cancel, or reset to factory settings. The browser window should show a message, indicating success.

**Note:** If Callisto is still showing the IP address and hasn't rebooted or gone back to displaying the time, try re-sending the data by refreshing the browser window.

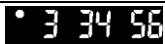


## 4.1. Configuration Details

### Network

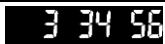

- **Wi-Fi SSID**  
The name of the network Callisto is connected to.
- **Wi-Fi password**  
Password for the Wi-Fi network.

### Time Display


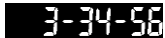
- **Hour format**  
How AM/PM is displayed

Setting	Display
12-hour (PM dot)	
12-hour (no PM dot)	
24-hour	

- **Padding**  
Show/hide leading zero.

Setting	Display
No pad	
Zero pad	

- **Dividers**  
Display symbols between digits

Setting	Display
Space	
Hyphen	

### Date Display

- **Display format**  
Day/month/year order

Setting	Display
Month, Day, Year	

Day, Month, Year	24 12 2021
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- **Padding**

Show/hide leading zero.

Setting	Display
No pad	1 12021
Zero pad	0 10 12021

- **Dividers**

Display symbols between digits

Setting	Display
Dot, full year	12.24.2021
Hyphen	12-24-21
Space	12 24 21

## Brightness

Callisto will automatically adjust display brightness based on ambient light.

**Note:** Allow 24 hours after booting for Callisto to learn how bright/dark it gets in your room.

## Night Mode

The display turns off at night in order to extend the tube's life. Default night hours are from midnight to 6 AM but can be configured here.

**Note:** Wake-up time and the time displayed when tapping the touch pad during night mode hours may be inaccurate by several minutes. This is because Callisto will enter deep sleep mode during night hours and will use a less accurate time-keeping method. Expect around 3 minutes of drift for every hour of night mode. Time will be re-synced once night mode ends.

## Time Zone

The time zone for Callisto is specified using the POSIX format. Click on the link to see some common time zones.

## Factory Reset

This will reset everything to factory defaults, including Wi-Fi credentials, and cannot be undone!

# 5. Troubleshooting

Callisto was designed by someone who wasn't quite sure if they were doing the right things. Configuration can especially be wonky. When using Callisto, be patient!

When troubleshooting, first try rebooting Callisto by unplugging and plugging it back in. If that doesn't work, check the table below potential solutions.

Problem	Solution
The display is blank	<ul style="list-style-type: none"><li>• Check if Callisto is plugged in.</li><li>• Display will initially be blank while Callisto boots and connects to Wi-Fi. Wait for 10 seconds to see if anything shows up.</li><li>• Callisto will turn off the display at night to extend the tube's life. Default night hours are from 12 midnight to 6 AM.</li></ul>
Display shows <code>WiFi Err</code>	<ul style="list-style-type: none"><li>• Callisto timed out while trying to connect to Wi-Fi. Try rebooting it first.</li><li>• If problem persists, the Wi-Fi credentials may be incorrect. With Callisto plugged in and displaying <code>WiFi Err</code>, use a PC or smartphone, search for the Wi-Fi access point named <code>callisto_config</code>, and use the password <code>12345678</code> to connect. A browser window should open automatically. Re-enter your Wi-Fi credentials and save.</li></ul>
Display is stuck showing <code>CALL IS OFF</code>	<ul style="list-style-type: none"><li>• Callisto has successfully connected to Wi-Fi but may be having trouble syncing the time. Wait for 5 minutes to see if the issue resolves itself.</li></ul>
The time and/or date is incorrect	<ul style="list-style-type: none"><li>• Check to see if the time zone has been configured correctly. See <a href="#">4. Configuration</a> for details.</li><li>• Callisto will use a less accurate time-keeping method during night mode hours. Expect around 3 minutes of drift for every hour of night mode. Time will automatically re-sync once night mode ends.</li></ul>

If none of the above work, Callisto may be broken! Please send in any issues you find to Callisto's GitHub page: <https://github.com/thekakkun/Callisto/issues>.

## 6. Miscellaneous

See source code, get hardware specifications, and contact me at GitHub:

<https://github.com/thekakkun/Callisto>

Heavily inspired by the following projects, so thank you!

- [Ice Tube Clock by Lady Ada](#)
- [Flora-ESP8266 by mcer12](#)