Raspberry Pi World Sun Clock Project

All Wesley Maynard's (N2WES) source material was copied from the http://www.kd2iff.com/node/20 website.

Comments, updates, and notes are provided by Eric Wooster (K4PYR), and code corrections provided by Eric Gildersleeve (KD7CAO).

Required Hardware:

- Raspberry Pi, model doesn't matter, but Wi-Fi is nice to have
- HDMI capable display (or HDMI to VGA adapter)
- Power Supply for Raspberry Pi
- SD Card with the latest Raspberry Pi Operating System. Instructions to do this are at this link: https://www.raspberrypi.org/documentation/installation/installing-images/README.md

Required Software:

- Latest **Raspberry Pi OS with desktop** may be downloaded from here: https://www.raspberrypi.org/software/ Unless you desire all the RPi OS recommended programs, I recommend using the desktop only version. Do not install the Lite version, as there is no GUI desktop available – which means you cannot see the map.
- During installation, you may encounter the RPi asking if there is a black band around the picture. This means that the images on the desktop will not fill the screen. Select the option to have a full screen displayed.
- Before starting with the instructions below, recommend adjusting the configuration files to add the SSH and VNC interfaces. Ensure your country, keyboard and wireless configurations are set for you location.

This document is formatted as a table to allow for instructions and the related code to be separated for clarity. Please read the instructions and understand the instructions.

Please note: Linux commands are CASE sensitive.

Instruction or Comment	Linux Command
From the desktop, open the command terminal and maximize it to the desktop to avoid word wrapping. At the prompt type sudo su <Enter>. This will bring you to another prompt at the /home/pi/directory. The Linux commands can be copied and pasted from this document into the command terminal.	
Update the Raspberry PI (RPi)	*sudo apt-get update* *sudo apt-get upgrade -y* *sudo apt autoremove*
Install the ntp server	*sudo apt-get install ntp -y*
Enter these commands to stop the current time sync, disable it, and then start the new ntp service.	*sudo systemctl stop systemd-timesyncd* *sudo systemctl disable systemd-timesyncd* *sudo /etc/init.d/ntp stop* *sudo /etc/init.d/ntp start*
Edit the ntp configuration file (if desired) to set the time servers.	*sudo nano /etc/ntp.conf*
Scroll down until you find 4 lines that look like this:	*server 0.us.pool.ntp.org* *server 1.us.pool.ntp.org* *server 2.us.pool.ntp.org* *server 3.us.pool.ntp.org*
To save and exit the file, type CTRL-X then press Y to confirm.	
The 4 lines on my system started with the word pool.xxx. I commented each of them out by placing the # sign in front of them and then typed the above lines directly below them. No problem was encountered	
These are the default servers for the United States. If you live somewhere else you can go to this website: https://www.ntppool.org/en/ and click on the continent you live in on the far right, then it will give you a menu to choose the country you live in (or close to) then at the top of the webpage is the server addresses you can copy.	
Restart the ntp service.	*sudo /etc/init.d/ntp restart*

Your time should set itself correctly a minute or two after you boot the pi. More information can be found at: http://raspberrypi.tomasgreno.cz/ntp-client-and-server.html	
This hides your mouse pointer after the RPi boots	*sudo apt-get install unclutter -y*
Install the sunclock program	*sudo apt-get install sunclock -y*
For the RPi to auto-start sunclock on boot, create and edit a startup script file.	*sudo nano /home/pi/sunclock_startup.sh* *#!/usr/bin/sh* *Sleep 8* */usr/bin/sunclock -twilight -image /usr/share/sunclock/earthmaps/jpeg/big/photo_big1.jpg* *Sleep 2* *unclutter -display 0:0 -noevents -grab*
To save and exit the file, type CTRL-X then press Y to confirm.	
Note: the -image and file following it refer to the map that I chose to use. You may need to locate and download this file if you want to use it. You can eliminate the -image and its file from the script if you wish to use the default map. More information on sunclock usage can be found here: http://manpages.ubuntu.com/manpages/impish/man1/sunclock.1.html The map images came from: https://goo.gl/ugeD9x	
Due to an OS change in 'Buster', the recommended *sudo pcmanfm* did not work. Install the free GNU Midnight Commander utility to ease file moving, editing and other functions. Installation instructions are available at: https://www.tecmint.com/midnight-commander-a-console-based-file-manager-for-linux/	
Using Midnight Commander extract the 'tar' file in /Downloads to provide the picture for the map.	
Right click on the file and type in: Hit extract.	*/usr/share/sunclock/earthmaps*
Make the file executable with the following command:	*sudo chmod +x /home/pi/sunclock_startup.sh*
Edit the RPi's autostart file to add the script	*sudo nano ~/etc/xdg/lxsession/LXDE-pi/autostart*
And add this line at the end of that file:	*@bash /home/pi/sunclock_startup.sh &*
To save and exit the file, type CTRL-X then press Y to confirm.	
To start sunclock maximized (with no title bar) edit the window manager preferences.	*sudo nano ~/etc/xdg/openbox/lxde-pi-rc.xml*
Type CTRL-W, and enter the search term: <applications>. After the last </application> entry add the following:	*<application class="Sunclock">* *<maximized>true</maximized>* *<decor>no</decor>* *</application>*
To save and exit the file, type CTRL-X then press Y to confirm.	
Now go to your terminal and enter:	*sudo apt-get install xscreensaver*
After installation, use the Desktop dropdown menu select preferences and disable the screensaver in "modes"	
From the Desktop, right click on the task bar and click "panels settings". **Go to advanced, check minimize when not in use, and set panel size to 0.**	
Reboot the RPi. It should auto-start sunclock, maximize it, and fill the screen.	
After the system boots, use the mouse to click on the bottom menu bar to bring up the programming and options pop-up menu bar.	