THESUNPAYS
SINCE 2007

Raspberry Pi User Manual

It is important that you read this manual before attempting the installation of your device.
Depending on your setup, certain steps will be needed to ensure compatibility.

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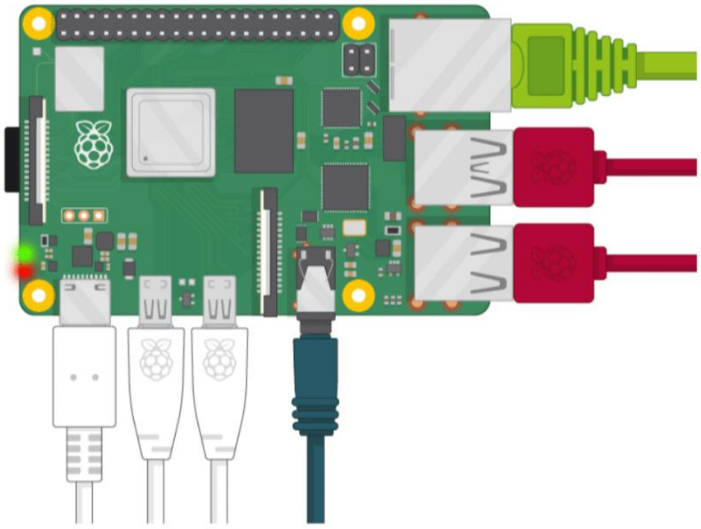
SECTION 1: Getting Started with Raspberry Pi

1. Introduction

The Raspberry Pi is a small computer which you plug into a monitor and attach a keyboard and mouse. It is used with TSP Solar Bot to log inverter and battery information to the cloud. The data can be remotely viewed in a user-friendly manner at www.tspsolarbot.com



What you will need to use with TSP Solar Bot monitoring software:

Hardware:

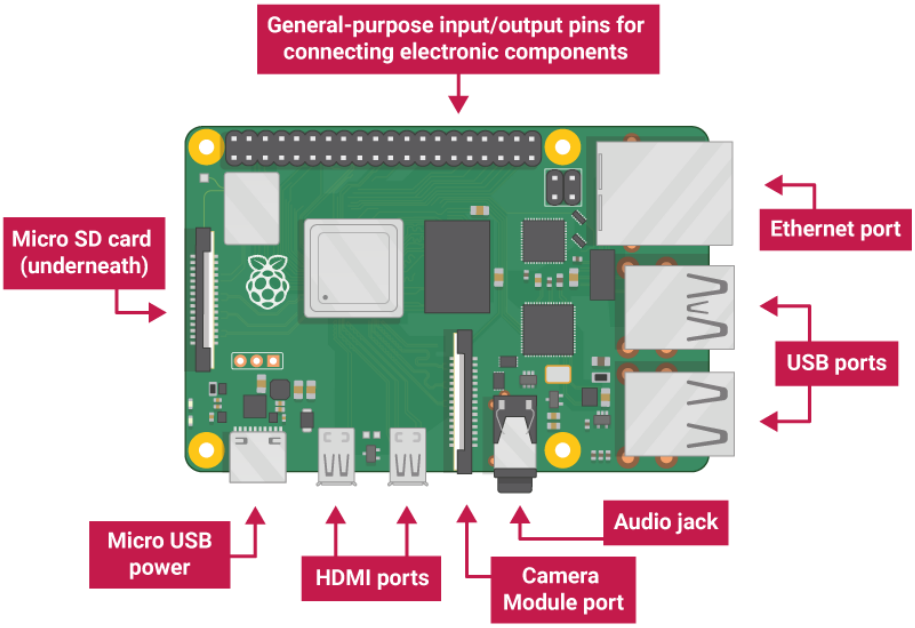
- A temporary monitor with HDMI connection to use during setup
- A USB keyboard and mouse to use during setup
- Permanent Wi-Fi connection

Software

- TSP Solar Bot software for inverter monitoring.

2. Getting to know your Raspberry Pi

You should have a Raspberry Pi computer in front of you for this. The computer shouldn't be connected to anything yet.

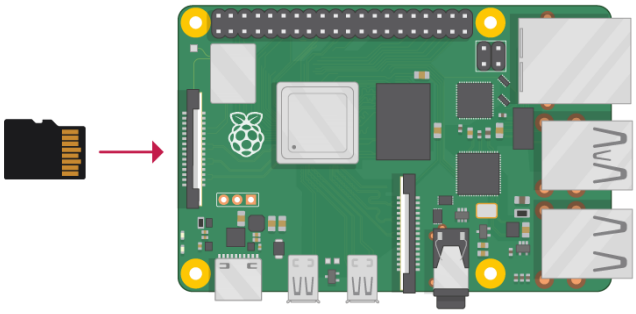


- USB ports – these are used to connect a mouse and keyboard. You can also connect other components, such as a USB drive.
- SD card slot – you can slot the SD card in here. This is where the operating system software and your files are stored.
- Ethernet port – this is used to connect Raspberry Pi to a network with a cable. Raspberry Pi can also connect to a network via wireless LAN.
- Audio jack – you can connect headphones or speakers here.
- HDMI port – this is where you connect the monitor (or projector) that you are using to display the output from the Raspberry Pi. If your monitor has speakers, you can also use them to hear sound.
- Micro USB power connector – this is where you connect a power supply. You should always do this last, after you have connected all your other components.
- GPIO ports – these allow you to connect electronic components such as LEDs and buttons to Raspberry Pi.

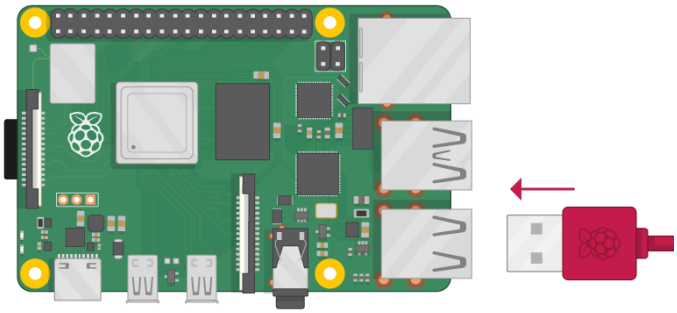
3. Connecting your Raspberry Pi

Let's connect your Raspberry Pi and get it running.

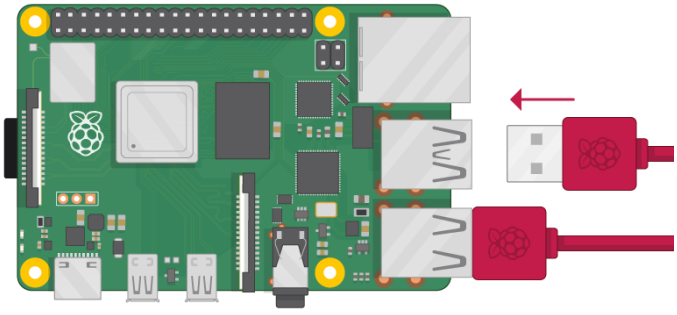
1. Insert the SD card into the slot on the underside of your Raspberry Pi.



2. Find the USB connector end of your mouse's cable and connect the mouse to a USB port on your Raspberry Pi (it doesn't matter which port you use).



3. Connect the keyboard in the same way.



4. Make sure your screen is plugged into a wall socket and switched on.
    - Look at the HDMI port(s) on your Raspberry Pi – notice that they have a flat side on top.
    - Use a cable to connect the screen to the Raspberry Pi's HDMI port – use an adapter if necessary.

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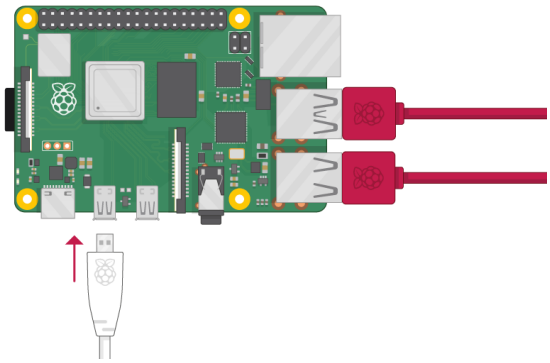
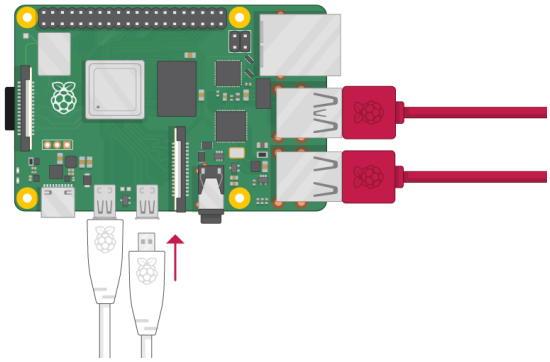
5. Connect your screen to the first of Raspberry Pi 4's HDMI ports, labelled HDMI0.

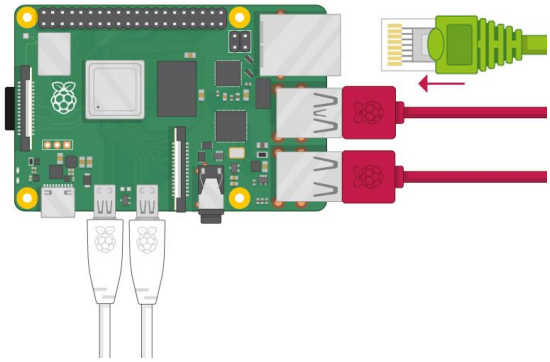


6. You could connect an optional second screen in the same way.



*Note: nothing will display on the screen as the Raspberry Pi is not running yet.

7. If you want to connect the Pi to the internet via Ethernet, use an Ethernet cable to connect the Ethernet port on the Raspberry Pi to an Ethernet socket on the wall or on your internet router. You don't need to do this if you want to use wireless connectivity, or if you don't want to connect to the internet.



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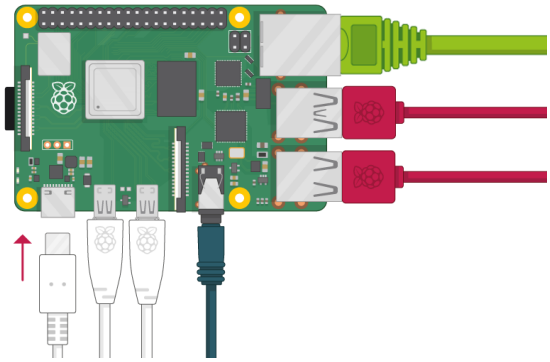
8. Plug the power supply into a socket and then connect it to your Raspberry Pi's USB power port.



- You should see a red light on your Raspberry Pi and raspberries on the monitor.
- Your Raspberry Pi then boots up into a graphical desktop.

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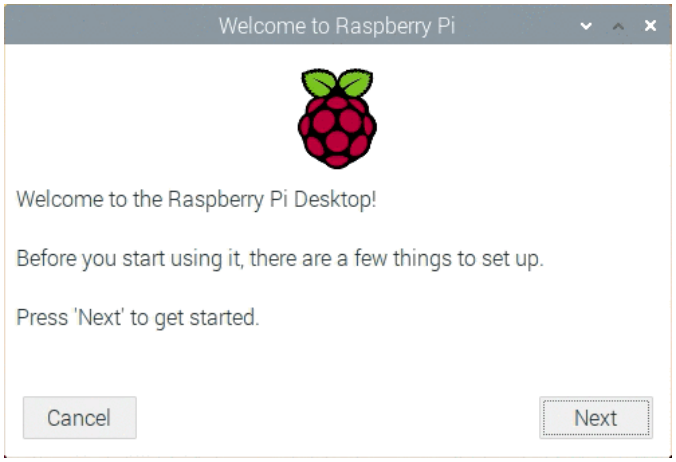
4. Finish the setup

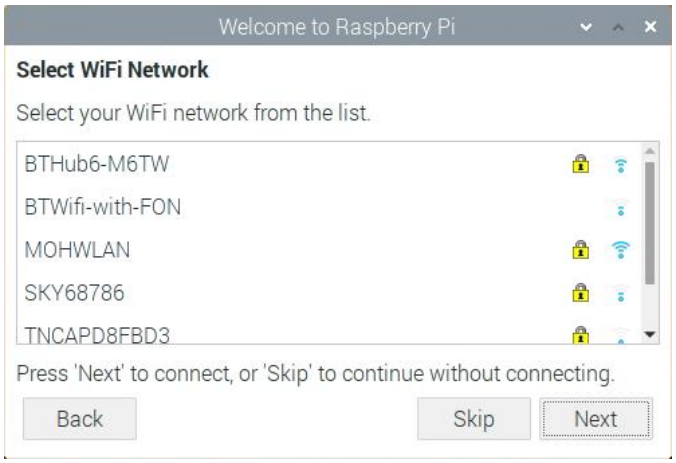
When you start your Raspberry Pi for the first time, the Welcome to Raspberry Pi application will pop up and guide you through the initial setup.



- Click Next to start the setup.
- Set your Country, Language, and Time zone, then click Next again.

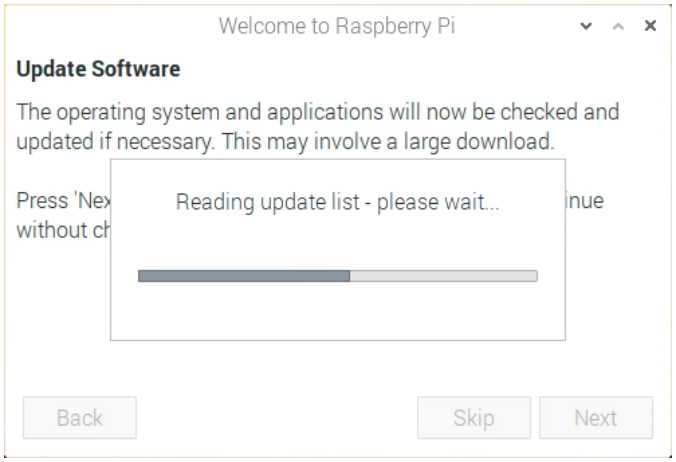
- Enter a new password for your Raspberry Pi and click Next.

- Connect to your Wi-Fi network by selecting its name, entering the password, and clicking Next.



Note: if your Raspberry Pi model doesn't have wireless connectivity, you won't see this screen.

- Click Next let the wizard check for updates to Raspbian and install them (this might take a little while).



- Click Done or Reboot to finish the setup.

  Note: you will only need to reboot if that's necessary to complete an update.

SECTION 2:

Connecting your Raspberry Pi to your system

1. Compatible products:

- The Sun Pays 100Ah, 200Ah Lithium battery
- The Sun Pays 4kW, 5kW and 5.5kW inverters 4kw and 5kw multiple inverters supported.
- Sacolar inverters (multiple inverters are not supported yet)
- Growatt inverters (multiple inverters are not supported yet)

2. Connections:

It is recommended to use communication cables from The Sun Pays, otherwise the program may not function as intended.

Battery connection:

Required cable:

- RS232-RJ11 (Battery)

TO

USB A (RaspberryPi)

Inverter connection:

Required cable:

- USB B (Inverter)

TO

USB A (RaspberryPi)

- RJ45 (Inverter)

TO

USB A (RaspberryPi)

3. Requirements:

- Internet connection. If the raspberry PI is disconnected from the internet, it will still log the data, but it will only send the data if the Pi is connected to the internet.
- Registration at tspsolarbot.com

4. Download:

- The Latest version of the TSP Solar Bot can be downloaded from https://shop.thesunpays.co.za/pages/online-solar-monitoring.

5. Limitations:

- As the software is still a work in progress, bugs and errors will be present. Feedback or recommendations can be sent to tspsolarbot@thesunpays.co.za
- Auto-update is not yet implemented. Please visit this page to obtain the latest copy of the logging software until the auto-update feature was added.
- Multiple inverter and battery logging is limited to The Sun Pays 4kW/5kW inverters and The Sun Pays lithium batteries. Growatt, Sacolar inverters to be added soon.
- Remote relay control (for geyser timer via the Raspberry Pi) from the dashboard to be updated soon.
- Internet is required for offline logging.

SECTION 3:

Setting up TSP Solar Bot

1. Installing Power

The Raspberry Pi is powered with 5Vdc by means of power adaptor. The adaptor must be plugged into a circuit connected to the backup of the inverter.

In other words, the Raspberry Pi must be powered by the inverter AC output. The process is as follows:

1. Make sure everything is powered off. The inverter, battery and Raspberry Pi must be off when connecting the communication cables.
2. Connect the USB cable (see section 2) to the Raspberry Pi and to the inverter.
3. Now connect the battery communication cable (see section 2) to the Raspberry Pi and to lithium battery - it plugs into the RS232 port on the battery.
4. Set the dipswitches of the battery accordingly (see the battery user manual for configurations).
5. Power on all systems.

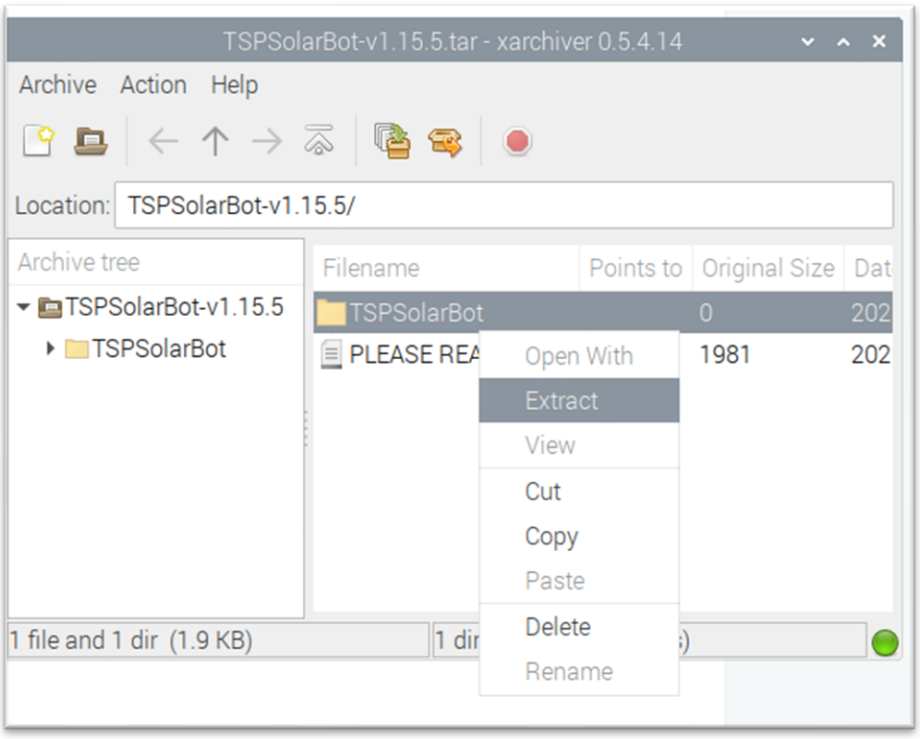
2. Configuration Setup

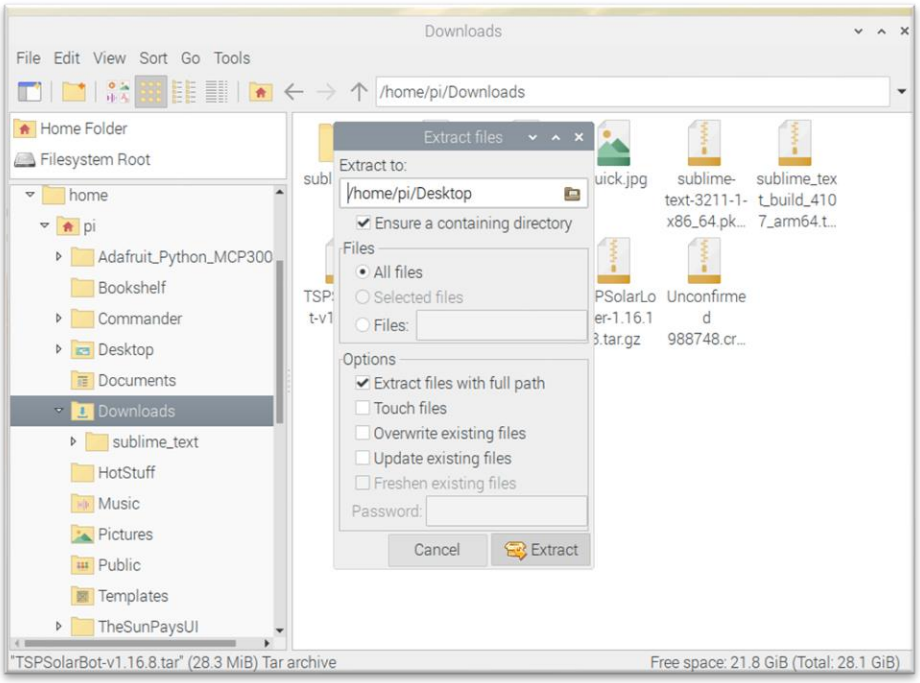
Installation:

1. Download the latest version TSP Solar Bot located under downloads.

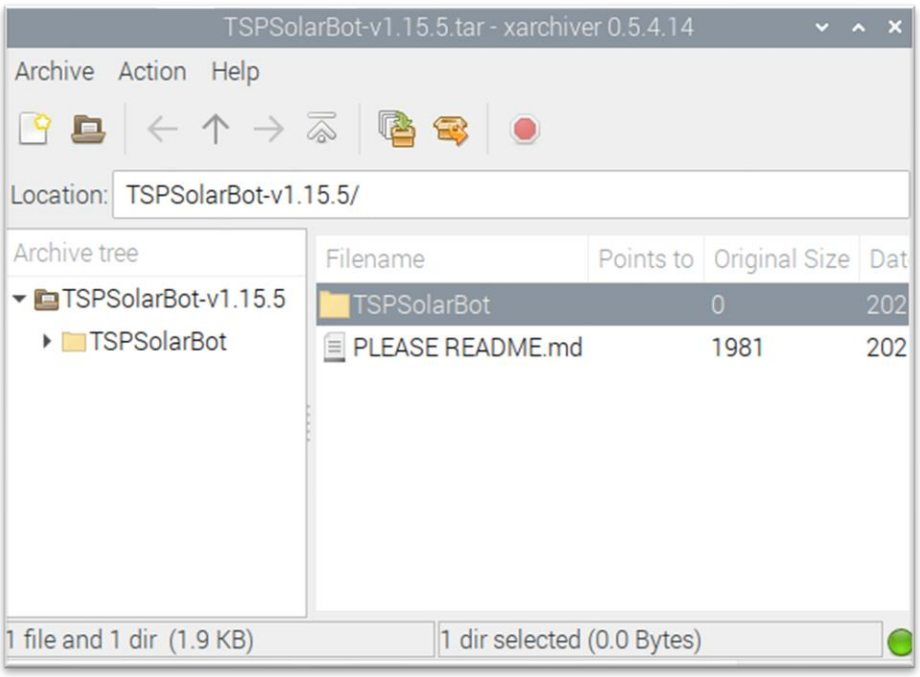
   - For Raspberry Pi devices, use the ARM version.
   - For other Linux distros (such as Mint), use deb64 version.

2. Extract the .tar file to your Desktop or your preferred destination. The tar file can be extracted by right clicking the .tar file and selecting extract.

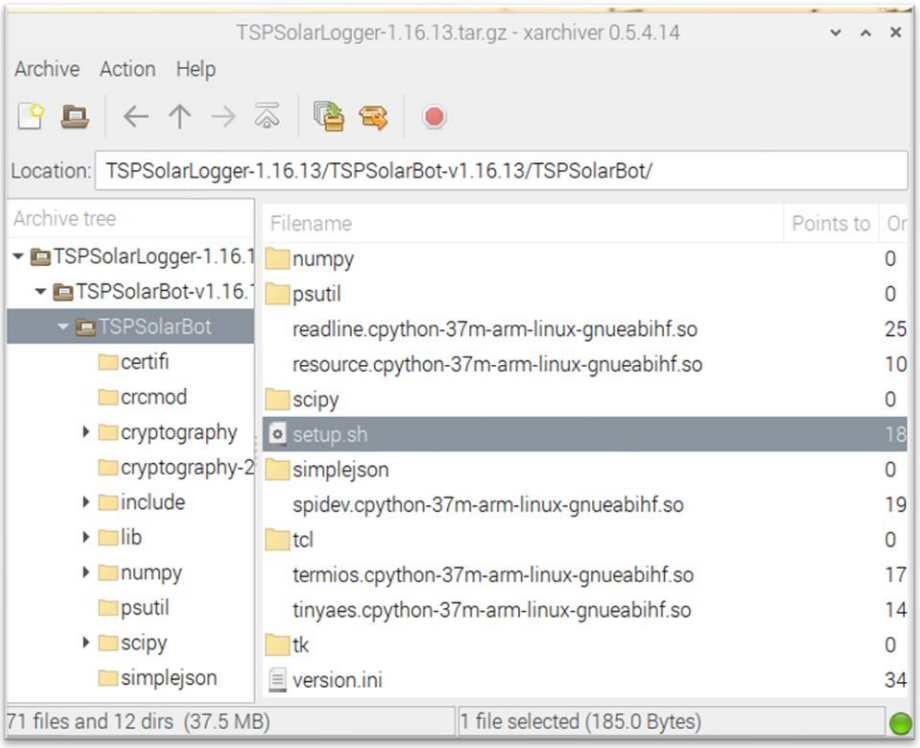


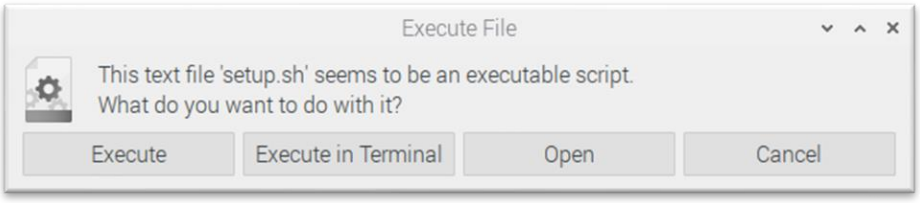


3. Browse into the folder where the .tar file was extracted.



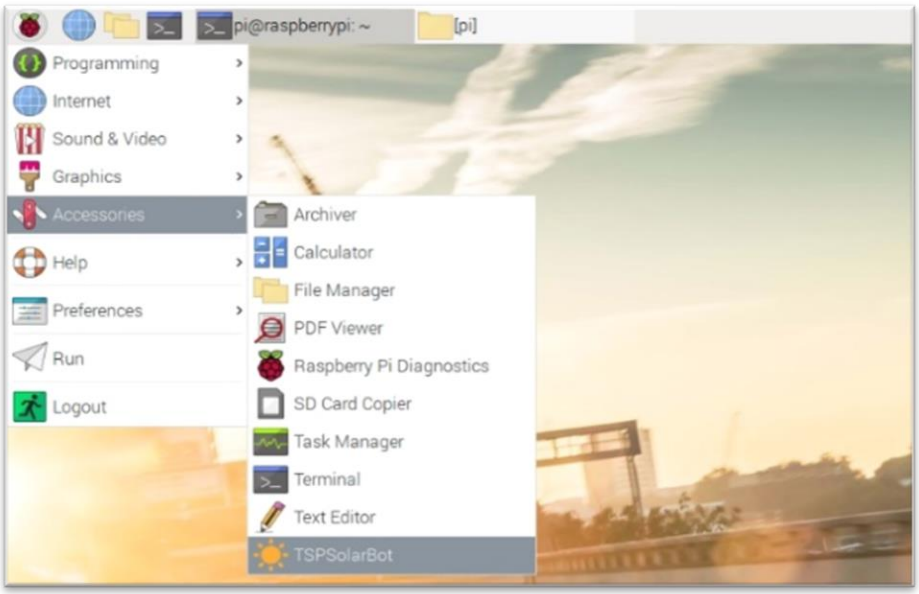
4. Double click on setup.sh. and select execute. It is located near the bottom of the TSPSolarBot folder. It is only necessary to run the file once. If you execute it again you will have to log in again.





- The TSPSolarbot should open, and the application will be installed.

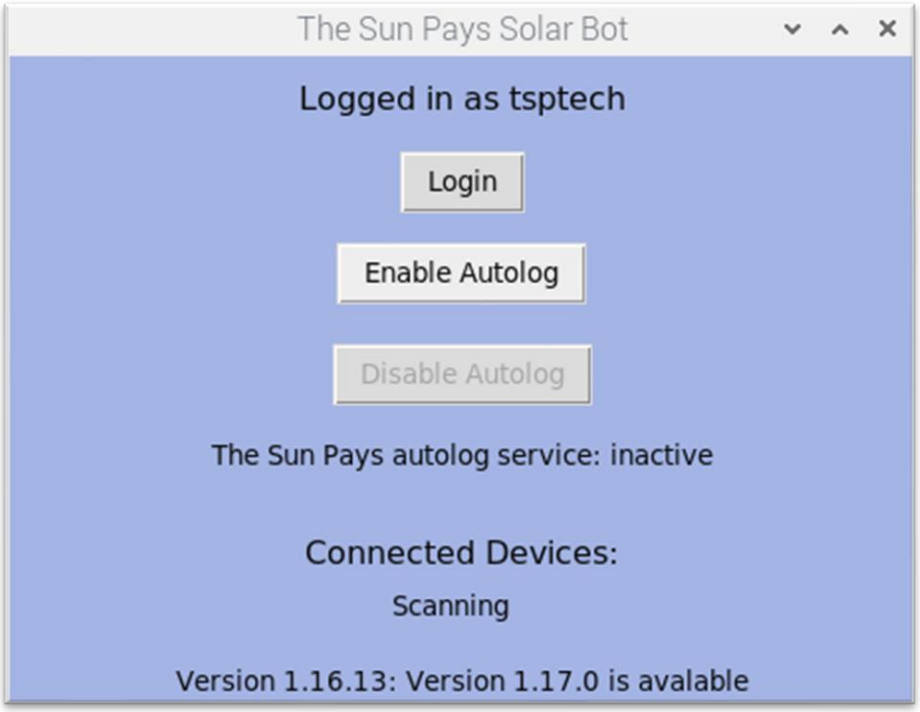
5. TSPSolarBot can now be accessed from the Applications menu under Accessories.



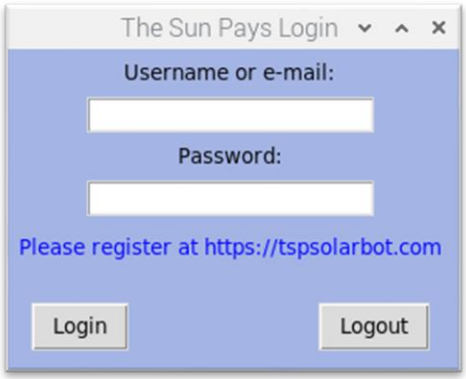
Note: If the application was copied via USB storage, allow executable permissions for all the executables: (1) TSPSolarBot and (2) setup.sh - config

*Permissions can be changed on the Raspberry Pi by right clicking the file and navigating to the Permissions tab. Under Access Control, ensure the execute setting is set to anyone.

6. Run TSPSolarBot to open the main program. The file does not have .sh or .exe extension.
7. The following Window should appear.



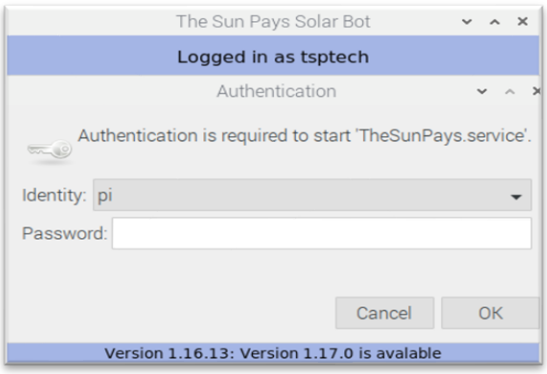
8. Click on "Login".
9. The below window should appear.



10. Enter the login details that was created on https://tspsolarbot.com/register
11. Click on "Login" and wait for a "Success" message. Close the window when completed.

*Note: If you forgot your username, your password can be retrieved, and your username will automatically be added to the email.

12. Click on "Enable Autolog". If the program was launched with the terminal (or other Linux Distros), the OS password will be required.



13. After successfully logging into TSP Solar Bot and enabling auto log, restart the Raspberry Pi. Allow a minute for the dashboard to update with live data when the system is running for the first time. If possible, disconnect / switch off the screen that is connected to the Raspberry pi. Rather view the online dashboard on a PC or mobile phone.

    *Note: A permanent internet connection is required for the data to be synced with the server