Tiny TV

Overview

The Tiny TV is equipped with custom software to allow playback of 640px x 480px h.264-encoded MP4 files.

The knobs on the right side independently control the left and right audio channels. There are no physical controls to start and stop playback, this is done remotely via SSH *(outlined in the "Controlling your Tiny TV" section.).*

Hardware

The hardware consists of a quad-core Raspberry Pi 3A+, a 2.8" IPS display, two discrete 2.5W Class D audio amplifiers with individual volume controls, and two Dayton Audio 8Ω speakers. Power is provided by a quality power supply from Anker.

Storage

The operating system and software are loaded to a 64GB San Disk Extreme micro-SD card. This is accessible from a small oval recess on the left side of the Tiny TV. Take care if you need to add or remove this card as it can easily be damaged.

⚠ **When you first receive your Tiny TV, the card has not yet been inserted in the slot. Please do not insert this until instructed to do so as part of the "Connecting to Wi-Fi" section.**

Video files are stored on a 64GB SanDisk Ultra Fit USB 3.1. This device is internal and requires disassembly of the TV to remove or replace.

Disassembly

CAUTION: There are many cables and components inside the Tiny TV that could potentially become dislocated or damaged when disassembling the TV. **Disassembly is performed at your own risk and without support.**

There is one captive M3 hex screw on the bottom of the TV. Removing this screw will allow you to slide the black sound box out of the main Tiny TV body.

Glue has been used to hold the volume control knobs and volume control potentiometers in place.

All other pieces are secured with metric cap head hex screws.

User Credentials

The Tiny TV is configured to use the following credentials:

Username: pi
Password: W@tchM3!

You can reset the password but are required to continue to use the Pi user as the application is configured to perform many of its actions using this user.

Optional: If you wish to reset your password, connect via SSH *(see below)* and type the following at a terminal prompt:

```
passwd
```

Follow the prompts to change the password.

Connecting to Wi-Fi

The Tiny TV is equipped with an 802.11 b/g/n/ac LAN that can operate on both the 2.4GHz and 5GHz bands.

Insert the micro-SD card into your computer. Use the micro-SD to SD card adapter if necessary.

Navigate to the */boot* folder of the micro-SD card and open the *wpa_supplicant.conf* in the plain text editor of your choice. For macOS and Linux, *nano* is the suggested editor. For Windows, *Notepad* is the suggested editor.

Change the values of the SSID and the PSK to match your network's SSID and password. Double-check to ensure you have not made any typographical errors. Then save your file.

⚠ Carefully remove the micro-SD card from your computer and insert it into the micro-SD slot of the Tiny TV. This accessible via an oval recess on the left side of the Tiny TV. The red and gold SanDisk logo should face the rear of the Tiny TV. The cards are small and easily damaged if bent or pinched.

Controlling your Tiny TV

The Tiny TV can be controlled via an SSH session. You will need to know the IP address of the Tiny TV. This can usually be found via your broadband router's administration page.

macOS and Linux:

From a terminal prompt type: `sudo ssh pi@<ipaddress>`

For example, `sudo ssh pi@192.168.1.20`

Windows

Unfortunately, Windows does not include an SSH client by default. You will need to download and install an SSH client such as the open-source PuTTy:
https://the.earth.li/~sgtatham/putty/latest/w64/putty-64bit-0.76-installer.msi

Once connected, you may be prompted to enter your user credentials. Enter the password as listed above.

You will now be at the all-powerful terminal prompt. Typing the right thing here can bring your Tiny TV to life. Typing the wrong thing here can send it to the grave. Choose wisely.

Playing a video

Typing the following at the terminal prompt should launch a Bugs Bunny reel:

```
tiny-tv 'category' --category 'cartoons'
```

Playback Controls

Key	Action
-	Decrease Volume
+	Increase Volume
space *or* p	Pause / Resume
q	Exit
1	Increase Playback Speed
2	Decrease Playback Speed
←	Seek -30
→	Seek +30

↓	Seek -600
↑	Seek +600

Command Usage

```
tiny-tv <input> [options]
tiny-tv-persist <input> [options]
tiny-tv-resume
backlight [power state]
```

Options

--input : Select the video to be played *(required, can be a file name, a Youtube URL, or the word 'category')*
--saveAs : Enter the name you would like the file saved as *(Used if downloading from YouTube only)*
--category : Select the category *(This will set the subfolder, for example* --category cartoons *will use the* /home/pi/videos/cartoons *folder)*
--maximumVideoHeight : Set the maximum height (in pixels) for downloaded videos *(default: 480)*
--removeVerticalBars : Remove the vertical black bars (pillar box) from the input file. This time-intensive process will also resize the video to the maximum video height. *(default: False)*
--removeHorizontalBars : Remove the horizontal black bars (letter box) from the input file. This time-intensive process will also resize the video to the maximum video height. *(default: False)*
--resize : Resize the video to the maximum video height. This is a time-intensive process.
--volume : Set the initial volume in decibels [db] *(default: -20, min: -60, max: 6`)*
--loop : Set whether video plays continuously in a loop *(default: True)*
--shuffle : Set whether category-based playback is shuffled *(default: False)*

Examples

- To download, crop, and play a video from YouTube:

  ```
  tiny-tv https://www.youtube.com/watch?v=h8NrKjJPAuw --
  saveAs 'Bugs Bunny.mp4' --category 'cartoons' --
  removeVerticalBars True
  ```

- To play a music video from your Raspberry Pi at a volume of 3db:

  ```
  tiny-tv 'Becky G - Mayores (featuring Bad Bunny).mp4' --
  category 'music' --volume 3
  ```

- Alternatively, you can type the video subfolder instead of using the category argument:

  ```
  tiny-tv 'music/Becky G - Mayores (featuring Bad Bunny).mp4'
  --volume -10
  ```

- To play all the cartoons in a loop:

  ```
  tiny-tv 'category' --category 'cartoons' --volume 0
  ```

- Keep Tiny TV playing even after SSH session ends

  ```
  tiny-tv-persist 'category' --category 'christmas' --volume
  3
  ```

  After the video begins playing, you may:

  1. Press **Ctrl-A**.
  2. Press **Ctrl-D**.
  3. Disconnect from your SSH session.

  To reconnect to the existing playback, you may:

  1. Connect via SSH
  2. Type `tiny-tv-resume`

Configure your Tiny TV to automatically play

Want to start the Tiny TV program every time you power it up? Here is how!

- Review */etc/systemd/system/tiny-tv.service*
  - If you would like to add any of the aforementioned options, you may do so by editing the service file.
- Run *~/tiny-tv/install-tiny-tv.service.sh*
- If you need to stop the Tiny TV service, run:

  ```
  sudo systemctl stop tiny-tv
  ```

Copying files to the Tiny TV

Unless you really like the Bugs Bunny reel, you likely want to copy your own media to the Tiny TV.

macOS and Linux

You can use SCP to transfer files to your Tiny TV, using a command syntax similar to:

```
scp -r /local/directory/ pi@192.168.1.20:/home/pi/videos/
```

Replace the */local/directory/* with the source directory and the *192.168.1.20* with the IP address of your Tiny TV.

macOS, Linux, and Windows

You also can use FTP to transfer files to your Tiny TV.

IP: *Tiny TV's IP Address*
Username: pi
Password: *your password*

When you connect via FTP you will start in the */home/pi/videos* folder. Create subfolders for each category you wish to create at this level. Place the videos inside these folders.

Tips and Tricks

Playback failure due to file size

If the video is too high of a resolution, it may not be playable on the Tiny TV. If you have a powerful computer, reencode the video to be 640px x 480px in resolution.

You can also do this directly on the Tiny TV but note that due to the relatively limited horsepower it may take quite a while. However, if you wish to take this route the syntax would be:

```
tiny-tv 'yoursourcevideo.mp4' --category 'yourcategoryfolder' --
maximumVideoHeight 480 --resize True
```

Performing updates

To periodically perform updates, connect to the Tiny TV via SSH and type the following at the terminal prompt.:

```
update
```

⚠ Do not power off your Tiny TV or cancel updates during the update process as it could leave your Tiny TV in an unusable state.

Shutting down

To avoid premature damage to the micro SD or USB drives, you should attempt to always safely shutdown your Tiny TV.

To safely shutdown, connect to the Tiny TV via SSH and type the following at the terminal prompt.

```
shutdown
```

Wait at least 60 seconds for the Tiny TV to completely power down before unplugging it from the power source.