IN SEARCH OF INCREDIBLE

Tinker Board Series

User Manual

E15215
First Edition
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Contents

Conventions used in this guide

To ensure that you perform certain tasks properly, take note of the following symbols used throughout this manual.

DANGER/WARNING: Information to prevent injury to yourself when trying to complete a task.

CAUTION: Information to prevent damage to the components when trying to complete a task.

IMPORTANT: Instructions that you MUST follow to complete a task.

NOTE: Tips and additional information to help you complete a task.

Typography

Bold text	Indicates a menu or an item to select.
Italics	Used to emphasize a word or a phrase.
<Key>	Keys enclosed in the less-than and greater-than sign means that you must press the enclosed key. Example: <Enter> means that you must press the Enter or Return key.
<Key1> + <Key2> + <Key3>	If you must press two or more keys simultaneously, the key names are linked with a plus sign (+).

1. Basic Requirements

- Power supply with micro USB connector (2.5A minimum, 3A recommended)
- MicroSD card (4GB or more)
- Monitor (with HDMI port)
- HDMI cable
- Keyboard and Mouse

2. Getting Started

Before setting up Tinker Board, please download an operating system image such as the Official ASUS Tinker OS, an Android OS, or other supported OS'.

- To download the Official ASUS Tinker OS, please visit https://www.asus.com/Single-Board-Computer/Tinker-Board/HelpDesk_Download/.
- For more information on other supported OS', please visit the **Software** section of the Tinker board Wiki.

If you are using a Tinker Board and not the Tinker Board S, please ignore the sections related to eMMC.

2.1 Setting up using eMMC (Tinker Board S only)

The UMS (USB Mass Storage) allows you to simulate the eMMC of the Tinker Board S as a recognizable device in Windows® and Linux. It is enabled automatically during the U-Boot when it detects that the Tinker Board S is connected to a PC. Please refer to the steps below to set up your Tinker Board OS using the onboard eMMC:

- Ensure to use the latest version of your downloaded OS to ensure the OS is supported by eMMC storage.
- Ensure the eMMC's U-Boot is functional, and contains a built-in UMS function.

1. Connect your Tinker Board S to a PC using a Micro USB cable, then wait for the PC to recognize the device.

- DO NOT format the device while your Tinker Board S is connected to your PC.
- If your PC doesn't recognize the device, please refer to the **OS Write Recovery** section of this manual.

2. Write the downloaded OS image to the Tinker Board S using a third-party ISO software, such as *Etcher* or *Win32DiskImager*. You may refer to the **Writing the OS image** section of this manual for more information on writing the OS image.

- Etcher is supported on Windows®, Mac, and Linux.
- Please refer to http://etcher.io/ for more information on *Etcher*.
- Please refer to http://sourceforge.net for more information on *Win32DiskImager*.

3. Once the image has been successfully written, connect your Tinker Board S to a power source using the bundled adapter to boot your Tinker Board S.

2.2 Setting up using a microSD card

You may use a mircoSD card to set up your Tinker Board OS. Please refer to the steps below.

1. Write the downloaded OS image to a microSD card using a third-party ISO software, such as *Etcher* or *Win32DiskImager*. You may refer to the **Writing the OS image** section of this manual for more information on writing the OS image.

- Etcher is supported on Windows®, Mac, and Linux.
- Please refer to http://etcher.io/ for more information on *Etcher*.
- Please refer to http://sourceforge.net for more information on *Win32DiskImager*.

2. Insert the microSD card to your Tinker Board.

Please refer to your Tinker Board product manual for the location of the microSD slot.

3. Connect your Tinker Board to a power source using the bundled adapter to boot your Tinker Board.

3. Writing the OS image

You may write your downloaded OS image to a microSD card or built-in eMMC using *Etcher* (supports Windows®, Mac OS, and Linux), or *dd command* (Linux only).

eMMC is only supported on Tinker Board S.

3.1 Using Etcher (Cross-platform)

Etcher is an image file utility used for burning image files, and supports Windows®, Mac OS, and Linux. Etcher also supports burning images directly from the zip file, without having to unzip the zip file first.

To write an image using Etcher:

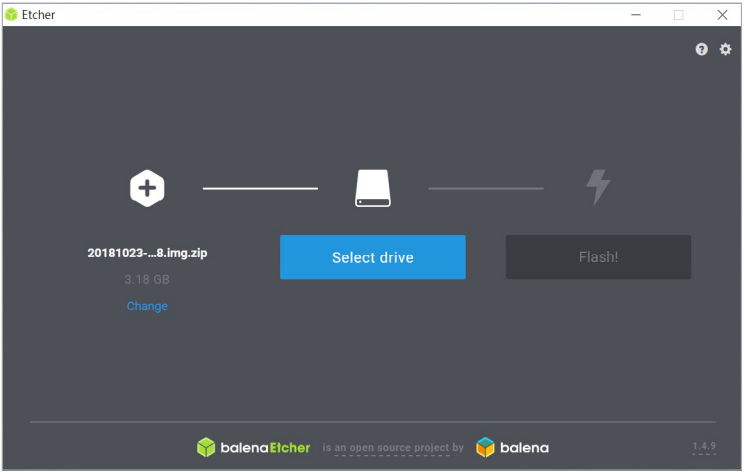
1. Insert a microSD card to a card reader connected to your PC,
   or
   connect your Tinker Board S to a PC via a micro USB cable. (Tinker Board S only)

   Please refer to your Tinker Board product manual for the location of the microSD slot.

2. Download *Etcher* from http://etcher.io/, then launch it.
3. Click on **Select image**, then select the downloaded OS image. Please refer to the screenshots below for **TinkerOS_Debian** and **Android** OS examples:

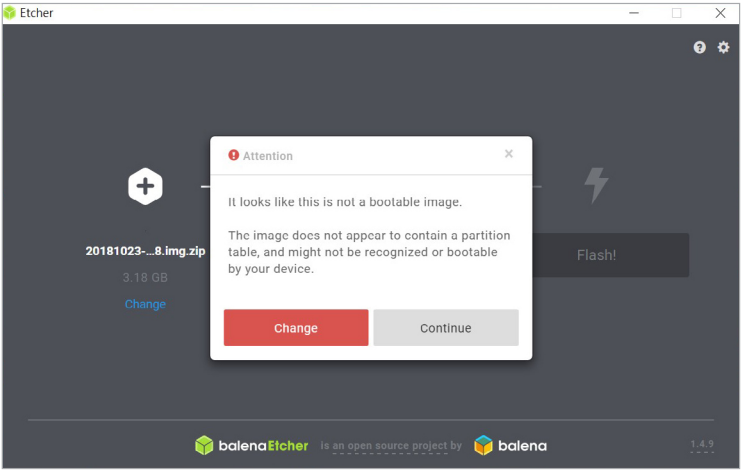
   The following screenshots are for reference only.

   TinkerOS_Debian



Android

If a message pops up when booting an Android image, click on **Continue**.



4. Click on **Select drive**, then select your connected device.
5. Click on **Flash!** to start the burning process.

3.2 Using dd command (Linux)

To write an image using dd command:

1. Insert a microSD card to your Tinker Board (or Tinker Board S),
   or
   connect your Tinker Board S to a PC via a micro USB cable (Tinker Board S only).

Please refer to your Tinker Board product manual for the location of the microSD slot.

2. Run the following command:

```
dd bs=4M if=/path/to/tinkeros.img of=/dev/sdx
```

   Replace **/dev/sdx** with your drive, e.g. /dev/sdc.

Do not append a partition number to your drive name, for example **/dev/sdc1**.

Use the *lsblk* command to find the drive name of your device. Make sure that no partition of the device is mounted.

3. Only remove the microSD card or disconnect the Tinker Board S from the PC once the command sync is completed to ensure the data was written completely.

4. OS Write Recovery (Tinker Board S only)

4.1 Rewriting the OS using UMS from eMMC

You can recover using the UMS from eMMC if your eMMC's U-Boot is still working properly and has a built-in UMS function. Please follow the steps below to re-write the OS using UMS mode:

- Ensure the eMMC has a working U-Boot.
- Please remove all other connected extension devices from your Tinker Board S.

1. Connect your Tinker Board S to a PC via a micro USB cable, it should boot and create partitions like any other USB drive.
2. Write the downloaded OS image to the Tinker Board S using a third-party ISO software, such as *Etcher* or *Win32DiskImager*. You may refer to the **Writing the OS image** section of this manual for more information on writing the OS image.

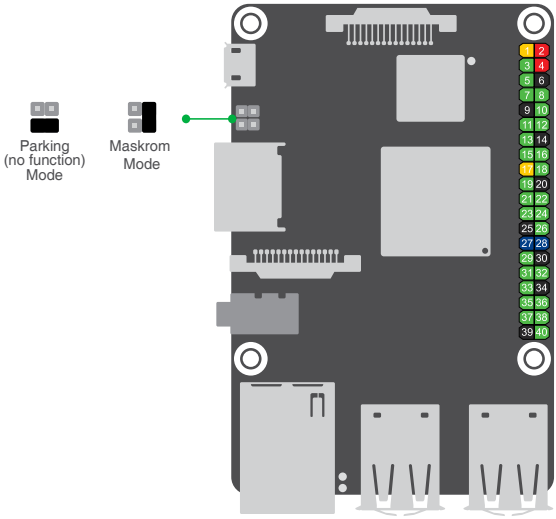
4.2 Rewriting the OS using UMS from a microSD card

When there is a problem booting from the eMMC's U-Boot, or if you are using a third-party custom OS image which does not have a built-in UMS function, you may follow the steps below to trigger the UMS mode from a microSD card:

1. Download a Tinker Board supported operating system image such as the Official ASUS Tinker OS, or an Android OS.
2. Insert a microSD card to a card reader connected to your PC.
3. Write the OS image (with built-in UMS U-Boot) to the microSD card using a third-party ISO software, such as *Etcher* or *Win32DiskImager*. You may refer to the **Writing the OS image** section of this manual for more information on writing the OS image.
4. Remove the microSD card from the card reader and insert it into your Tinker Board S.

Please refer to your Tinker Board product manual for the location of the microSD slot.

5. Disable eMMC booting priority and force boot from the microSD card by setting the jumper to **Maskrom Mode** as shown below



6. Connect your Tinker Board S to a PC using a micro USB cable, it should be recognized by the PC as a USB Mass Storage device.
7. Write the downloaded OS image to the Tinker Board S using a third-party ISO software, such as *Etcher* or *Win32DiskImager*.

Please refer to the Using **Etcher (Cross-platform)** section for more information on using *Etcher*.

8. After the image has been successfully written, remove the micro USB cable from the PC.
9. Set the jumper to **Parking (no function) Mode**.
10. Plug in the AC adapter to your Tinker Board S and boot it up. It should boot up successfully and create partitions like any other USB drive.

Please remove all other connected extension devices from your Tinker Board S.