# BIGTREETECH Pi V1.2 User Manual

## CONTENTS

Revision History
Product Profile
Feature Highlights
Specifications
<b>Dimensions</b>
Peripheral Port
Connector Diagram
Connection Description
Power Supply
<b>40 pins GPIO</b>
<b>ADXL345 Wiring</b>
SPI Display Wiring
Connecting a USB To CAN Module
Fan Wiring    9
HDMI Display Wiring
<b>OS Writing</b>
Download OS Image
Download and Install Writing Software
Start to Write OS
Using Raspberry Pi Imager
Using balenaEtcher
Network Configuration
Wired Network
<b>WiFi Setting</b>
Configure the Motherboard
SSH Connect to Device
Compile MCU Firmware
<b>Cautions</b>

## **Revision History**

Version	Revisions	Date
01.00	Original	2022/12/29

## **Product Profile**

BIGTREETECH Pi v1.2 has the same size and the same mounting hole location as Raspberry Pi, with 2.4GHz WiFi built in.

#### **Feature Highlights**

- 1. CPU: ALLWINNER H616, Quad-core Cortex-A53 @1.5GHz
- 2. GPU: Mali G31 MP2, Support OpenGL3.2
- 3. RAM: 1GB DDR3L SDRAM
- 4. Display: HDMI2.0A Port, 4K Supported
- 5. 4 x USB 2.0 Ports
- 6. Fast Ethernet + 100Mbps WiFi
- 7. Audio: 3.5mm Jack
- 8. 40-pin GPIO
- 9. Display: SPI Port
- 10. ADXL345 Port
- 11. Onboard connecting port for USB To CAN Module.
- 12. Built-in IR Receiver
- 13. The mounting holes are in the same location as Raspberry Pi.

#### **Specifications**

- 1. Product Dimensions: 85 x 56 mm
- 2. Mounting Size: 64 x 49.4 mm
- 3. Type-C Input Voltage: DC 5V±5%/2A
- 4. Input Voltage of Power IN Terminal: DC 12V-24V
- 5. Pi v1.2 Output Voltage: 3.3V±2%/100mA
- 6. Pi v1.2 WiFi: 2.4G/802.11 b/g/n Wireless LAN

#### Dimensions



## **Peripheral Port**

## **Connector Diagram**



## **Connection Description**

#### **Power Supply**

**USB Power Supply:** The SOC's UART converts USB signals through WCH340E. Connect this port to the PC to monitor Pi startup via the serial port tool, and identify faulty parts if there are any.



5V IN

#### DC12-24V:



## 40 pins GPIO

	40Pin-GPI0								
BTT Pi	CB1-eMMC	CB1	CM4			CM4	CB1	CB1-eMMC	BTT Pi
3. 3V	3. 3V	3. 3V	3. 3V	-		5V	5V	5V	5V
PC3	NC	NC	GPIO 2 (I2C1 SDA)	•		5V	5V	5V	5V
PC0	NC	NC	GPIO 3 (12C1 SCL)			GND	GND	GND	GND
PC7	PI14	PC7	GPIO 4 (GPCLKO)		•	GPIO 14 (UART TX)	ТХ	ТХ	ТХ
GND	GND	GND	GND		•	GPIO 15 (UART RX)	RX	RX	RX
PC14	PI 15	PC14	GPIO 17	•	•	GPIO 18 (PC∎ CLK)	PC13	PI7	PC13
PC12	PI6	PC12	GPI0 27	•	•	GND	GND	GND	GND
PC10	PI4	PC10	GPI0 22	•	•	GP10 23	PC11	PI5	PC11
3. 3V	3. 3V	3. 3V	3. 3V	•	•	GPIO 24	PC9	PI3	PC9
PH7	PH7	PH7	GPIO 10 (SPIO ∎OSI)	•	•	GND	GND	GND	GND
PH8	РН8	PH8	GPIO 9 (SPIO ∎ISO)		•	GPIO 25	NC	NC	PG13
PH6	PH6	PH6	GPIO 11 (SPIO SCLK)		•	GPIO 8 (SPIO CEO)	NC	NC	PG12
GND	GND	GND	GND		•	GPIO 7 (SPIO CE1)	PG8	PI11	PI9
PC2	NC	NC	GPIO O (EEPRO∎ SDA)		•	GPIO 0 (EEPRO∎ SCL)	PG7	PI 10	PI 10
PC4	NC	NC	GPIO 5		•	GND	GND	GND	GND
PI5	PI9	PG6	GPIO 6	•	•	GPIO 12 (P₩∎0)	PG 9	PI 12	PI6
PI14	NC	NC	GPIO 13 (PVII)	•	•	GND	GND	GND	GND
PC6	PI1	PC6	GPIO 19 (PC∎ FS)		•	GPIO 16	NC	NC	PG11
PC15	PI 13	PC15	GPIO 26		•	GPIO 20 (PCT DIN)	PH10	PH10	PH4
GND	GND	GND	GND	•	•	GPIO 21 (PC∎ DOUT)	PC8	PI2	PC8

## ADXL345 Wiring



## **SPI Display Wiring**



## **Connecting a USB To CAN Module**

Note: when using the U2C module, the SOC's USB2 is used for communication.



CAN-H GND CAN-L

## Fan Wiring



## **HDMI Display Wiring**



## **OS Writing**

### **Download OS Image**

Please download and install the OS image we provided: <a href="https://github.com/bigtreetech/CB1/releases">https://github.com/bigtreetech/CB1/releases</a>

#### **Download and Install Writing Software**

Install the official Raspberry Pi Imager: <u>https://www.raspberrypi.com/software/</u> balenaEtcher: <u>https://www.balena.io/etcher/</u> Choose one of the above software to download and install.

#### Start to Write OS

#### **Using Raspberry Pi Imager**

- 1. Insert a microSD card into your computer via a card reader.
- 2. Choose OS.



3. Select "Use custom", then select the image that you downloaded.

🍯 Ras	pberry Pi In	nager v1.7.2	- 🗆	×
		Operating System	x	
	÷	Emulation and game OS Emulators for running retro-computing platforms	>	
	:0:	Other specific-purpose OS Thin clients, digital signage and 3D printing operating systems	>	
	Ŋ	Misc utility images Bootloader EEPROM configuration, etc.	>	
	Ō	Erase Format card as FAT32		
	.img	Use custom Select a custom .img from your computer		

4. Select the microSD card and click "WRITE" (WRITE the image will format the microSD card. Be careful not to select the wrong storage device, otherwise the data will be formatted).



5. Wait for the writing to finish.

🤴 Raspberry	Pi Imager v1.7.2			×
	Write Successful	x		
	2022-04-04-raspios-bullseye-armhf.img.xz has been written to RPi-MSD- 0001			
	You can now remove the SD card from the reader			
202	CONTINUE			
		Ę	<u>.</u>	

#### Using balenaEtcher

- 1. Insert a microSD card into your computer via a card reader.
- 2. Select the image that you downloaded.

😂 Etcher							
		q	) balena Etche	er.		¢ 0	
	<b>€</b> —				4		
	Flash from file						
	🔗 Flash from URL						
	🕒 Clone drive						
		10	/ 00				

3. Select the microSD card and click "WRITE" (WRITE the image will format the microSD card. Be careful not to select the wrong storage device, otherwise the data will be formatted).

🔶 Etcher			- 🗆	×
	😭 balena Etcher		\$	?
<b>+</b>		4	7	
CB1_Debia09012.img	Select target			

4. Wait for the writing to finish.

🔶 Etcher			×
	📦 balena Etcher	\$	?
CB1_Debian12209012.img			
1 Successful target Effective speed- 20 1 MR/s	Want to try more projects like the	he one you just saw?	
Flash another	Go to balenaHr	ub	

## **Network Configuration**

#### Wired Network

For wired networks, no additional settings are needed. Just plug and play.

#### WiFi Setting

After the OS image writing is completed, the microSD card will have a FAT32 recognized by the computer, find "system.cfg".

BOOT (J:)			ٽ ~
	修改日期	类型	大小
📙 dtb	2022/11/9 2:50	文件夹	
dtb-5.16.17-sun50iw9	2022/11/9 2:50	文件夹	
📙 gcode	2022/11/9 10:35	文件夹	
.next	2022/11/9 2:50	NEXT 文件	0 KB
BoardEnv.txt	2022/11/9 2:53	文本文档	1 KB
🛋 boot.bmp	2022/11/9 2:52	BMP 图像	10 KB
loot.cmd	2022/11/9 2:48	Windows 命令脚本	4 KB
📧 boot.scr	2022/11/9 2:53	屏幕保护程序	4 KB
config-5.16.17-sun50iw9	2022/11/9 2:39	17-SUN50IW9	176 KB
📄 Image	2022/11/9 2:39	文件	20,631 KB
initrd.img-5.16.17-sun50iw9	2022/11/9 2:54	17-SUN50IW9	9,171 KB
system.cfg	2022/11/10 17:52	文本文档	1 KB
System.map-5.16.17-sun50iw9	2022/11/9 2:39	17-SUN50IW9	4,239 KB
📄 ulnitrd	2022/11/9 2:54	文件	9,171 KB
vmlinuz-5.16.17-sun50iw9	2022/11/9 2:39	17-SUN50IW9	20,631 KB

Open it with Notepad, replace WIFI-SSID with your WiFi name, and

#### PASSWORD with your password.

🌣 syste	m.cfg ×	
J: > 🔅	system.cfg	
1	<b>#</b>	
	check_interval=5	# Cycle to detect whether wifi is connected, time 5s
	router_ip=8.8.8.8	# Reference DNS, used to detect network connections
	eth=eth0 # Etherr	et card device number
	wlan=wlan0 # Wirele	ss NIC device number
	*****	**************
	# wifi name	
10	WIFI_SSID="Your SSID"	
11	# wifi password	
12	WIFI_PASSWD="Your Passwo	rd"
13		
14	*****	*****
15	WIFI_AP="false"	# Whether to open wifi AP mode, default off
16	WIFI_AP_SSID="rtl8189"	# Hotspot name created by wifi AP mode
17	WIFI_AP_PASSWD="12345678	# wifi AP mode to create hotspot connection password

## **Configure the Motherboard**

#### **SSH Connect to Device**

- 1. Install the SSH application Mobaxterm: <u>https://mobaxterm.mobatek.net/download-home-edition.html</u>
- 2. Insert the microSD card into the motherboard, and wait for the system to load after powering on, approx. 1-2min.
- 3. The device will automatically be assigned an IP address after successfully connecting to the network.
- 4. Find the device IP address on your router page.



5. Open Mobaxterm and click "Session", and click "SSH", enter the device IP into the Remote host, and click "OK" (Note: your computer and the device needs to be under the same network).

K MobaXterm Terminal Sessions View X server Tools Games Settings Macros Help	- L X
Image: Session     Session     Y     Image: Session     Image: Session     Y       Session     Servers     Tools     Games     Session     View     Split     MultiExec     Tunneling     Packages     Settings     Help	X server Exit
Quick connect	0
Constant Session settings	× \$
2 State Debut Debut Debut Viewage DDD View STE State Shall Reserve Mo	
I leinet Ksn Aunicp KUP VIVC FTP Senai File Snei blowsei No:	AWS 55 WOL
Basic SSH settings	
The Advanced CSH actions The Terminal actions the Network actions	
Marceu Soli setungs Martenninai setungs Artenwork setungs Touckinaik setungs	
Secure Shell (SSH) session	
4 OK Cancel	

6. Login



#### **Compile MCU Firmware**

1. After SSH is successfully connected to the device, enter in the terminal:

cd ~/klipper/

make menuconfig

The firmware is compiled based on the motherboard configuration, here we take Manta M4P as an example:

- \* [\*] Enable extra low-level configuration options
- \* Micro-controller Architecture (STMicroelectronics STM32) --->
- \* Processor model (STM32G0B1) --->
- \* Bootloader offset (8KiB bootloader) --->
- \* Clock Reference (8 MHz crystal) --->
- \* Communication interface (USB (on PA11/PA12)) --->

(lop)
[*] Enable extra low-level configuration options
Micro-controller Architecture (STMicroelectronics STM32)>
Processor model (STM32GOB1)>
Bootloader offset (8KiB bootloader)>
Clock Reference (8 MHz crystal)>
Communication interface (USB (on PAII/PAI2))>
()  (DIO nime to out of minute controllion starter
() GPIO pins to set at micro-controller startup
[Space/Enter] Teggle/enter [2] Help [/] Secret
[o] Ouit (normate for eace) [FSC] Leave ment
W Wit (prompts for save)  ESC  Leave menu

- 2. Press 'q' to exit, and "Yes" when asked to save the configuration.
- 3. Run **make** to compile firmware, 'klipper.bin' file will be generated in the **home/pi/klipper/out** folder when **make** is finished, download it onto your computer using the SSH application.



## Cautions

Pay attention to the heat dissipation of Pi. If the running application consumes too many system resources, it will get hot quite serious.

If you need other resources for this product, please visit <u>https://github.com/bigtreetech/</u> and find them yourself. If you cannot find the resources you need, you can contact our after-sales support.

If you encounter other problems during use, feel free to contact us, and we are answering them carefully; any good opinions or suggestions on our products are welcome, too and we will consider them carefully. Thank you for choosing BIGTREETECH. Your support means a lot to us!

#### FCC Caution

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**Note:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.