

MaaXBoard (AES-MC-SBC-IMX8M-G) Debian Linux User Manual V1.2



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Regulatory Compliance:

MaaXBoard single board computer has passed the CE & FCC certification.



MaaXBoard-Linux-Debian-UM-V1.2

Revision History

Rev.	Description	Author	Date
V1.0	Initial version	Sandy	20190301
V1.1	 Add MIPI displayer, USB Device and Demo Modify Wi-Fi and Camera operation 	Sandy	20190705
V1.2	 Add Bluetooth Audio Add Debian Weston system 	Sandy	20200119





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Chapter 1 Introduction

1.1 Feature List

- U-Boot version: 2018.03
- Kernel version: 4.14.78
- Evaluation image: Debian 10
- Qt 5.10.1 library
- Desktop (Weston 5.0)
- Development based on NXP i.MX 8M
- Micro SD boot
- HDMI display
- HDMI audio output
- 1 Gigabit Ethernet (RJ45)
- ◆ 2 USB 3.0 can work in host & device mode
- ◆ 2 UART (TTL) include debug port
- External interfaces(I2C, UART,SPI ,SAI and GPIO)
- WIFI & BLE 4.2
- LVDS display
- MIPI-DSI display
- MIPI camera
- Dual display (TBD)



Chapter 2 Quick Start

The default version of MaaXBoard support boot up from SD Card only. To burn the image to SD Card, refer to <u>Chapter 4</u>.For the hardware connection and accessories details, please check the QSG.

2.1 Boot from SDCard

Install the Serial Communication software (e.g. PUTTY), select the corresponding port number, baudrate as 115200, data bits as 8, stop bits as 1, parity as none.

Category:		
Category: Session Logging Terminal Keyboard Bell Features Window Appearance Behaviour Translation Selection Colours Colours Colours Colours Colours Selection Rogin Selection Sele	Options controlling Select a serial line Serial line to connect to Configure the serial line Speed (baud) Data bits Stop bits Parity Flow control	COM1
About	C	Open Cancel

 Connect the debug interface to PC with USB to TTL converter. Pin 6, 8 and 10 of J10 to the GND, RXD and TXD pin of the USB to TTL converter.



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- Insert the SD card (with pre-burned image) into the card slot J19.
- Powered the board with a 5V, 2A, Type-C interface power (to J4).
- When the system boot up, the serial terminal will print the following information:



- Enter username as "root" to login.
- Enter password as "avnet" to login

```
maaxboard login: root
Password:
Last login: Thu Jan 16 03:31:03 UTC 2020 on tty7
Linux maaxboard 4.14.78 #1 SMP PREEMPT Tue Jan 14 02:48:31 UTC 2020 aarch64
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
root@maaxboard:~#
```

After the boot, screen will show the desktop environment. Connect a HDMI monitor up to your MaaXBoard. Users could connect keyboard and mouse to MaaXBoard, to use it. For detail, refer to <u>Weston Desktop Environment</u>.



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Chapter 3 Feature Configuration & Introduction

First of all, please refer to the previous chapter and boot up the system. Then configure or use the functions according to the following guidance.

3.1 Preparation

Connect to Internet via the Ethernet interface, execute the following commands in serial terminal to install related tools:

apt update apt install evtest

3.2 USER LED

User can control the 2 single color LED indicators, LED0 and LED1 (corresponding to usr_led and sys_led) on MaaXBoard Board. Execute the following instructions in serial terminal to control them. Light out LED:

root@maaxboard:~# echo 0 | tee /sys/class/leds/usr_led/brightness

root@maaxboard:~# echo 0 | tee /sys/class/leds/sys_led/brightness

Light up LED:

root@maaxboard:~# echo 1 | tee /sys/class/leds/usr_led/brightness root@maaxboard:~# echo 1 | tee /sys/class/leds/sys_led/brightness

3.3 Button

MaaXBoard supports 3 buttons: S3-BACK, S4-HOME and S2-PWR.



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1. Test BACK and HOME button with following instructions:

Enter evtest command, then choose the event id for gpio_keys

root@maaxboard:~# evtest No device specified, trying to scan all of /dev/input/event* Available devices: /dev/input/event0: 30370000.snvs:snvs-powerkey /dev/input/event1: gpio_keys /dev/input/event2: bd718xx-pwrkey Select the device event number [0-2]: 1 Input driver version is 1.0.1 Input device ID: bus 0x19 vendor 0x1 product 0x1 version 0x100 Input device name: "gpio_keys" Supported events: Event type 0 (EV_SYN) Event type 1 (EV_KEY) Event code 102 (KEY_HOME) Event code 412 (KEY_PREVIOUS) **Properties:** Testing ... (interrupt to exit) Event: time 1571363047.449332, type 1 (EV_KEY), code 102 (KEY_HOME), value 1 Event: time 1571363047.449332, ------ SYN_REPORT ----



Event: time 1571363047.705857, type 1 (EV_KEY), code 102 (KEY_HOME), value 0 Event: time 1571363047.705857, ------- SYN_REPORT -------Event: time 1571363048.645842, type 1 (EV_KEY), code 412 (KEY_PREVIOUS), value 1 Event: time 1571363048.645842, ------- SYN_REPORT -------Event: time 1571363048.869859, type 1 (EV_KEY), code 412 (KEY_PREVIOUS), value 0 Event: time 1571363048.869859, ------ SYN_REPORT ------

2. Press PWR button, system will enter suspend mode, press PWR again for 1s, the system will reboot.

3.4 Displayer

MaaXBoard supports 3 kinds of displayer: HDMI, LVDS and MIPI-DSI screen. Users can connect the screen to the MaaXBoard before booting up the system according to the following table. When the system boots, the screen will print the related startup message and login UI. Users can connect keyboard to login the MaaXBoard file system. The default displayer is HDMI screen.

Screen Type	Interface		
HDMI (Default screen)	J9 (Standard HDMI Interface)		
MIPI-DSI	J16		
LVDS	J16		

Display device could be chosen by modify the fdt_file value in uEnv.txt.

Modification Method:

After the system start up, use **nano** or **vi** command to modify the uEnv.txt under path /boot, use **sync** command to synchronize, then reboot the system to make the modification effective.

3.4.1 HDMI

HDMI is the default displayer, the fdt_file value should be:

fdt_file=em-sbc-imx8m.dtb

The max HDMI screen resolution supported is 4K. (Need to use 4K HDMI displayer.)

3.4.2 MIPI-DSI Screen

Choose MIPI-DSI screen, the fdt_file value should be:

fdt_file=em-sbc-imx8m-dcss-dsi.dtb

MIPI-DSI supports backlight brightness adjustment. The backlight brightness has a range from 0 to 255,

in which 10 means highest brightness, 0 means lowest.

Execute the following instructions on the serial terminal to implement the backlight test:

root@maaxboard:~# echo 7 > /sys/class/backlight/backlight/brightness

3.4.3 LVDS Screen

Choose LVDS screen, the fdt_file value should be:

fdt_file=em-sbc-imx8m-dcss-lvds.dtb

LVDS supports backlight brightness adjustment. The backlight brightness has a range from 0 to 10, in which 10 means highest brightness, 0 means lowest.

Execute the following instructions on the serial terminal to implement the backlight test:

root@maaxboard:~# echo 5 > /sys/class/backlight/lvds_backlight/brightness

3.5 Touchscreen

The MIPI-DSI and LVDS screen support touch screen, users could touch the screen to control the Debian Weston Desktop Environment.

3.6 Audio

3.6.1 HDMI Audio

Choose HDMI screen as displayer, connect HDMI displayer and the Audio devices, play the audio file:

root@maaxboard:~# aplay audio_sample.wav

root@maaxboard:~# gst-play-1.0 audio_sample.wav

Note: **aplay** command support audio file in wav format, **gst-play** command support wav, mp3 and aac format.

3.6.2 USB Audio Device

MaaXBoard could support USB audio device (which do not need specified driver) to play audio. When using MIPI-DSI or LVDS screens, you can play audio from USB audio device.

root@maaxboard:~# aplay audio_sample.wav

root@maaxboard:~# gst-play-1.0 audio_sample.wav

If other audio device, such as HDMI Audio, is connected, use **aplay** command to check the card id, then specify the device when play the audio file.

root@maaxboard:~# aplay -l

**** List of PLAYBACK Hardware Devices ****

card 0: imxaudiohdmi [imx-audio-hdmi], device 0: imx8 hdmi i2s-hifi-0 []

Subdevices: 1/1

Subdevice #0: subdevice #0

card 2: Device [USB Audio Device], device 0: USB Audio [USB Audio]

Subdevices: 1/1



Subdevice #0: subdevice #0

root@maaxboard:~# aplay -D plughw:2,0 audio_sample.wav

3.6.3 Bluetooth Audio

Debian system also support play audio files via the Bluetooth audio device such as Bluetooth headset. Users can connect the Bluetooth device through the desktop application: Blueman-manager. For detail, refer to <u>Weston Desktop Environment</u>.

3.7 UART

MaaXBoard supports 2 UART interface.

MaaXBoard (CPU)	Interface Type		
UART1	UART TTL (Debug Interface)		
UART2	UART TTL		

3.7.1 UART 2

In the Yocto system, the node for UART2 is /dev/ttymxc1.

The system image provides a test application, uart_test, which could be used for a loop back test.

Short connect the pin 16 and 18 in J10, then enter the following instructions in serial terminal:



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root@maaxboard:~# ./uart_test -d /dev/ttymxc1 -b 115200 /dev/ttymxc1 RECV 10 total /dev/ttymxc1 RECV: 1234567890

The result of RECV as above, means test passed.

Note: Press "CTRL+C" to exit the test.



3.8 Gigabit Ethernet Interface

Connect the network cable to J13, enter the following instructions to set the IP address: (The below IP address are example, replace it with your real network environment)

3.8.1 Network Test

After connecting the network cable, MaaXBoard will automatically obtain the IP by default. You can use the **ifconfig** command to view the IP information and use the following command to perform the network test:

root@maaxboard:~# ifconfig eth0
eth0: flags=4163 <up,broadcast,running,multicast> mtu 1500</up,broadcast,running,multicast>
inet 192.168.22.126 netmask 255.255.255.0 broadcast 192.168.22.255
inet6 fe80::b093:522a:7bd4:5c15 prefixlen 64 scopeid 0x20 <link/>
ether 4a:e0:a6:6f:e9:06 txqueuelen 1000 (Ethernet)
RX packets 924 bytes 259139 (253.0 KiB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 928 bytes 74715 (72.9 KiB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
root@maaxboard:~# ping www.baidu.com

3.8.2 Configure IP Via Command Line

To Configure IP address, we can modify the parameter in command line or modify it from the desktop environment.

3.8.2.1 CONFIGURE STATIC IP

If you need to set a static IP, use **nano** command to modify **/etc/network/interfaces**, add following info in The primary network interface segment.

auto eth0	
iface eth0 inet static	
address 192.168.1.139	
gateway 192.168.1.1	
netmask 255.255.255.0	

Execute sync after the modification, then reboot the system to make it effect.

3.8.2.2 AUTOMATIC GET IP ADDRESS

If you need to set automatic get IP Address, use nano command to modify /etc/network/interfaces, add following info in The primary network interface segment.

auto eth0

iface eth0 inet dhcp

Execute **sync** after the modification, then reboot the system to make it effect.

3.8.3 Configure IP Via GUI

Debian Weston system support nmcli GUI version, users can modify the IP address, server, etc. If you've already configure IP via command line, delete or comment the eth0 configurations you've made in /etc/network/interfaces. For detail, refer to Weston Desktop Environment.

3.9 USB 3.0 Interface

The USB 3.0 interface J5 on have 2 USB Host Interface, the upper one is USB1, the lower one is USB0. USB0 and USB1 both support USB HOST function, USB0 support USB Device function.

3.9.1 USB Host

Insert a U-disk to USB0 or USB1, serial terminal will display the disk information:



Execute the following instructions on the serial terminal:

root@maaxboard:~# Is /dev/sd* /dev/sda /dev/sda1 root@maaxboard:~# Is /run/media/ sda1



The storage node for U disk is /dev/sda1, system will mount the storage device to /run/media path automatically.

MaaXBoard also supports other USB device such as key board, mouse, Camera, etc.

3.9.2 USB Device

USB0 support USB Device function could be used to burn the system image or use as USB Network adapter.

3.9.2.1 BURNING MODE

Connect USB0 and PC before power on the board. The system will not boot normally, it will enter burning mode. Then users could burn the system image to the development board using uuu tools. For the detail information, refer to MaaXBoard EMMC burning Guide.

3.9.2.2 USB NETWORK ADAPTER

To use USB0 as USB slave device: network adapter, users should modify the value of fdt_file in uEnv.txt and reboot the system.

fdt_file=em-sbc-imx8m-usb0-device.dtb

When choose this value, the displayer is HDMI.

Connect USB0 to PC after the system start up, open the device manager, and check if the following device is recognized:

┙ ҧ 其他设备 └── ҧ RNDIS/Ethernet Gadget

Please follow the steps listed below to finish USB Device test (Use Windows 7 as example).

1) Install Linux USB Ethernet driver (In release package: LinuxTools), then the device manager will list the Network Adapter: Linux USB Ethernet/RNDIS Gadget

▲ 🔮 网络适配器

Linux USB Ethernet/RNDIS Gadget

📲 Realtek PCIe GBE Family Controller

2) Execute the following instructions to set and view the IP address of USB OTG port

The below IP address are example, you can select any other IP, but make sure it is NOT the same network segment as your PC's Ethernet port.

root@maaxboard:~# ifconfig usb0 up root@maaxboard:~# ifconfig usb0 192.168.1.115 root@maaxboard:~# ifconfig usb0

The terminal window will print information as shown below

usb0 Link encap:Ethernet HWaddr 92:a9:b6:be:8b:3f inet addr:192.168.1.115 Bcast:192.168.1.255 Mask:255.255.255.0 inet6 addr: fe80::90a9:b6ff:febe:8b3f/64 Scope:Link UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1



RX packets:167 errors:0 dropped:0 overruns:0 frame:0 TX packets:28 errors:0 dropped:0 overruns:0 carrier:0 collisions:0 txqueuelen:1000 RX bytes:12180 (11.8 KiB) TX bytes:7075 (6.9 KiB)

3) Open Control Panel, in the search box, type adapter, and then, under Network and Sharing Center, select View network connections, you will find a new Local Area Connection as shown below



4) Right click the connection "Local Area Connection 5", select "Properties"-> "Networking" -> "Internet Protocol Version 4 (TCP/IPv4)", then select Properties to open the following window. Set an IP address that is in the same network segment as the USB OTG port, then click "OK".

Internet 协议版本 4 (TCP/IPv4) 属性	? ×
常规	
如果网络支持此功能,则可以获取目您需要从网络系统管理员处获得适应	自动指派的 IP 设置。否则, 当的 IP 设置。
◎ 自动获得 IP 地址(0)	
●● 使用下面的 IP 地址(S): -	
IP 地址(I):	192 .168 . 1 . 15
子网摘码(V):	255 .255 .255 .0
默认网关(0):	192 .168 . 1 . 1
 ● 自动获得 DNS 服务器地址(B) ● 使用下面的 DNS 服务器地址(B) 	D:
首选 DNS 服务器(P):	
备用 DNS 服务器(A):	· · ·
🔲 退出时验证设置 (L)	高级(V)
	确定 取消

5) Execute the following instruction to verify the network connection;

root@maaxboard:~# ping 192.168.1.15 PING 192.168.1.15 (192.168.1.15) 56(84) bytes of data. 64 bytes from 192.168.1.15: icmp_seq=1 ttl=64 time=0.865 ms 64 bytes from 192.168.1.15: icmp_seq=2 ttl=64 time=0.464 ms 64 bytes from 192.168.1.15: icmp_seq=3 ttl=64 time=0.259 ms

The information shown above indicates the network connection is working properly.



3.10 Wi-Fi

The on-board Wi-Fi module support 2.4G/5G network and hotspot.

To connect WIFI, execute the following instructions on the serial terminal:

Open Wi-Fi device:

root@maaxboard:~# nmcli r wifi on

Search Wi-Fi network:

root@maaxboard:~# nmcli dev wifi									
IN-USE	SSID	MODE	= (CHAN	RATE		SIGNAL	BARS	SECURITY
E	Embest_WiFi	Infra	6	270	Mbit/s	67		_ WPA	1 WPA2
е	3000-5G	Infra	36	65 N	/bit/s	60		WPA1	WPA2

Connect Wi-Fi network:

Currently we support these kinds of encryption: None,WEP,wpa-psk,wpa-psk2, use the following instruction to connect Wi-Fi network:

In below instruction: "Embest-WiFi" is the SSID of the WIFI, "12345678" is the password.

root@maaxboard:~# nmcli dev wifi con "Embest-WiFi " password "12345678" ifname wlan0

If the connection succeeds, it will print the following info:

Device 'wlan0' successfully activated with '12551227-ee19-4054-9f43-0c9b83b75995'.

Enter **nmcli dev wifi** to check: Connected with Embest-WiFi:

root@maaxboard:~# nmcli dev wifi								
IN-USE	SSID	MODE	CHAN RATE	SIGNAL BARS SECURITY				
*	Embest-WiFi	Infra 6	270 Mbit/s 67	WPA1 WPA2				

Test Wi-Fi network with ping command:

root@maaxboard:~# ping <u>www.avnet.com</u> -I wlan0

PING www.a.shifen.com (103.235.46.39) 56(84) bytes of data.

64 bytes from 103.235.46.39: icmp_seq=1 ttl=50 time=122 ms

3.10.1 Connect and Disconnect Wi-Fi Connection

Connect Wi-Fi connection:

root@maaxboard:~# nmcli device con wlan0

Disconnect Wi-Fi connection:

root@maaxboard:~# nmcli device dis wlan0

3.10.2 Delete Wi-Fi Connection

Delete the Wi-Fi Connection to "Embest-WiFi".

root@maaxboard:~# nmcli con del Embest-WiFi

Connection ' Embest-WiFi ' (12551227-ee19-4054-9f43-0c9b83b75995) successfully deleted. root@maaxboard:~# [2581.404408] IPv6: ADDRCONF(NETDEV_UP): wlan0: link is not ready [2581.950671] IPv6: ADDRCONF(NETDEV_UP): wlan0: link is not ready

3.10.3 Wi-Fi Hotspot

To open a Wi-Fi hotspot, disconnect Wi-Fi connection, connect the network cable to J13, and execute

the following instructions on the serial terminal:

root@maaxboard:~# nmcli dev wifi hotspot ifname wlan0 con-name MyHostspot ssid

MyHostspotSSID password 12345678

In above instruction: "MyHostspot" is connection name, "MyHostspotSSID" is the SSID, "12345678" is the password. Users could connect the hotspot with Wi-Fi device.

Close the Wi-Fi hotspot:

To temporary close the hotspot, see: <u>Connect and Disconnect Wi-Fi Connection</u> Delete the Wi-Fi hotspot:

root@maaxboard:~# nmcli con del MyHostspot

3.10.4 Configure Via GUI

Debian Weston system support nmcli GUI version, users can configure Wi-Fi connection from GUI. For detail, refer to <u>Weston Desktop Environment</u>.

3.11 Bluetooth 4.2

3.11.1 Initialize the Bluetooth Module

Execute the following instructions on the serial terminal:

root@maaxboard:~# hciattach /dev/ttymxc3 bcm43xx 115200

bcm43xx_init

Cannot open directory '/etc/firmware': No such file or directory

Patch not found, continue anyway

Set Controller UART speed to 115200 bit/s

Device setup complete

root@maaxboard:~# hciconfig hci0 up

3.11.2 Scan the Bluetooth Device

Execute the following instructions on the serial terminal:

root@maaxboard:~# hcitool scan

Scanning ... 94:87:E0:DF:90:2D 小米手机

3.11.3 Connect the Bluetooth Device

Execute the following instructions on the serial terminal:

root@maaxboard:~# hcitool cc {address}

Users could also connect the Bluetooth device from Debian Weston Desktop Environment. Open blueman-manager application to connect device, transmit-receive files, play audio. For detail, refer to Weston Desktop Environment.

3.12 CAN

MaaXBoard support USB to CAN module, connect the module to USB Host, then use the following instructions to control it.

3.12.1 Check CAN Module

Use the following command to check if a CAN module connected.

3.12.2 Configure and Open CAN

Set the CAN0 bitrate to 50000:

root@maaxboard:~# ip link set can0 type can bitrate 50000

Open CAN0:

root@maaxboard:~# ip link set can0 up

Note: bitrate range is 2000~100000.

3.12.3CAN Transmit and Receive

Connect the CAN module to another CAN device, set the same bitrate of 2 modules, then open CAN. Set CAN0 as receiver:

root@maaxboard:~# candump can0 &

Set CAN0 as transmitter:

root@maaxboard:~# cansend can0 123#01020304050607

Use **show** command to check the summary of CAN transmit-receive data: In following example, TX added 3 packets, 14 bytes. RX added 16 packets, 128 bytes.

root@maaxboard:~# ip -d -s link show can0									
3: can0: <noarp,up,lower_up,echo> mtu 16 qdisc pfifo_fast state UNKNOWN mode</noarp,up,lower_up,echo>									
DEFAULT group default qlen 10									
link/can promiscuity 0	link/can promiscuity 0								
can state ERROR-PASSIVE r	estart-ms	5 O							
bitrate 50000 sample-p	oint 0.87	5							
tq 1250 prop-seg 6 ph	ase-seg1	7 phase-	seg2 2 sjw 1						
gs_usb: tseg1 116 ts	eg2 18 s	jw 14 b	rp 11024 br	p-inc 1					
clock 48000000									
re-started bus-errors a	rbit-lost	error-wa	rn error-pass	s bus-off					
0 0	0	4	1	0	numtxqueues 1				
numrxqueues 1 gso_max_size 6	5536 gso_	_max_se	gs 65535						
RX: bytes packets errors	dropped	d overrui	n mcast						
128 16 0	0	0	0						
TX: bytes packets errors	dropped	d carrier	collsns						
14 3 0 0	0	0							

3.12.4 Shut down CAN

root@maaxboard:~# ip link set can0 down

3.13 GPU

Debian file system integrates GPU application, use **gputop** command to check GPU driver and info.

root@maaxboard:~#gputop Clients attached to GPU | 0 / 6 (sample_mode: TIME - 1.0 secs) Galcore version:6.2.4.163672, gpuperfcnt:e3c7de622a66, 1.4 3D:GC7000,Rev:6214 Core: 800 MHz, Shader: 800 MHz 3D Cores:1,2D Cores:0,VG Cores:0 DDR0: r:97.21,w:0.07 DDR1:



PID	RES(kB)	CONT(kB)	VIRT(kB)	Non-PGD(kB)	Total(kB)	CMD
7116	12819	0	0	0	12819	weston-desktop-
7115	3208	0	0	0	3208	weston-keyboard
7112	21348	0	0	0	21348	weston
TOT:	37376	0	0	0	37376	
TOT_CON:	-	-	-	-	224767	

Note: Press "CTRL+C" to exit the test.

3.14 Desktop Environment

Connect displayer to MaaXBoard, the desktop environment will start automatically after system boot. Users can connect keyboard and mouse to the board to operate it. For detail, refer to <u>Weston Desktop</u> <u>Environment</u>.

3.15 Camera

MaaXBoard support USB Camera and MIPI-CSI Camera. System provide a Camera application based on QT Lib, could be used with desktop environment to preview, photograph and record video. For detail, refer to <u>Weston Desktop Environment</u>

3.16 QT&GPU

File system integrated QT5.10 or higher version and GPU development Library, such as EGL, OpenCL and Open VG. It also provides several test programs.

GPU test program saved in path /opt/, users can execute them in serial terminal, e.g.:

root@maaxboard:~# /opt/qt_samples/gui/analogclock/analogclock root@maaxboard:~# /opt/imx-gpu-sdk/GLES3/Skybox/Skybox_Wayland root@maaxboard:~# /opt/imx-gpu-sdk/OpenVG/Example3/Example3_Wayland root@maaxboard:~# /opt/viv_samples/tiger/tiger

Note: Press "CTRL+C" to exit the test.

3.17 GPIO (40 Pin Sense Hat) (TBD)

TBD



Chapter 4 Weston Desktop Environment

Connect displayer to MaaXBoard, Weston Desktop Environment will run automatically after system boot. Users could connect keyboard and mouse to operate.

Here we use MIPI-DSI screen as example to introduce it.







4.1 Menu

Weston Desktop Environment support these applications, which could be open from the menu in the up side of the screen, they are:

lcon	Application Usage	Application Name
\$_	Terminal Tool	GNOME Terminal
D D	File Manager	Files Management
\bigcirc	Internet Explorer	Chromium
	Video Player	Totem Movie Player
	Text Editor	Gedit Text Editor
	Camera	Camera
	Network Manager	Network Connections
*	Bluetooth Manager	Blueman-manager



4.2 Terminal

Gnome Terminal is a Dash terminal application, connect keyboard and mouse to operate.

Open the terminal, then enter **bash** or **su** command to switch to bash terminal. Then you can get higher access to use more function.



Terminal application supports multiple windows, and adjusts the window size; click the x to close the application. To learn more about the usage of the Terminal, open a Help -> Content to view the Help documents.





4.3 File Manager



File manager could be used to view the files in the system. Double click to open files or folders. In the right click menu, users can choose operations such as: New Folder, Copy, Cut, Paste, Delete, Compress, and view their properties, etc.

The path to be open by default is /root, if you need to go to other directory, open root directory "/" first. Click Other Locations -> Computer, then open other path from here.

File manager supports multiple windows, and adjust the window size, click the x to close the application.



MaaXBoard-Linux-Debian-UM-V1.2





4.4 Chromium Explorer

Users could explore the internet with this application. Chromium support full screen, click the x to close the application.



Open Chromium, enter website address in address bar to view the internet pages.





4.5 Movie Player

Totem Movie Player support play video file in several format, the largest support resolution is 4K (use with 4K HDMI Displayer).

1. Open Totem, click + button, choose "Add Local Video" to add files to playlist.



	ž 🔘 🗢 🖇		Thu Jan 16, 09:37
Cancel		Add Videos	Q Ada
🔿 Recent	・ 🏠 root 🔸		
🔓 Home	Name		- Size Modified
A	📟 embest.mp4		21.6 MB Yesterday
inasn	Pictures		07:54
+ Other Locations			



2. Click the file in the playlist to play video file.



3. When playing the video files, users could full screen view, pause/resume a movie / song, change the audio volume, etc.



4. Click < button to back to playlist, click $\sqrt{}$ button or right click the file to select the file and delete form



the playlist.



5. Click this button to open the menu, set Preferences, keyboard shortcuts, view help document or exit the application.





6. If connected to internet, users could open Channels and play online video.



7. In file manager, double click the video / audio file, system will use Totem to play it.





8. To learn more about Totem, open Totem Movie Player Manual.

\$_	22	💿 🗖 🖉 💿 🤶 🕅		Sun Jan 19, 09:34 AM
Í	<	> Introduction Totem Movie Player Manual	<u>□</u> Q ≡ ×	
	Tote	m Movie Player Manual »		
	In	troduction	Previous Next	
	The libra	<i>Totem Movie Player</i> application is a movie player for the GNOME desktop based on the GStreamer f ry, and enables you to play movies or songs.	framework and xine	
	Tote	m Movie Player provides the following features:		
	•	Support for a variety of video and audio files.		
	•	A variety of zoom levels and aspect ratios, and a fullscreen view.		
	•	Seek and volume controls.		
	•	A playlist.		
	•	Subtitle support.		
	•	Complete keyboard navigation.		
	•	Comprehensive set of plugins, including a subtitle downloader, YouTube browser, and disc burner.		
		Totem Movie Player also comes with additional functionality such as:		A CARA
		Video thumbnailer for GNOME.		
		Nautilus properties tab.		
N N			Previous Next	
Ster 1-		A L L		

4.6 Text Editor

Gedit is a GUI text editor, support edit text file such as txt, shell script, etc.

1. Open Gedit, it will new a Untitled Document.

ि 🔄 📄 🧿 🗾 🐷 🕥 🤿		Thu Jan 16, 09:52 AM
Open 🔻 🖪	Untitled Document 1	Save = ×



2. Click "Open -> Other Documents" to open exist text file to edit.

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Open 👻		Untitled D
۹		
	Q No results	
	Other Documents	
Cancel	Open	Q Open
⊙ Recent	 ✓ ☑ boot → 	
🗈 Home	Name	 Size Modified
Trach	em-sbc-imx8m.dtb	38.7 kB Yesterday
iii asii	em-sbc-imx8m-dcss-dsi.dtb	40.4 kB Yesterday
	em-sbc-imx8m-dcss-lvds.dtb	40.8 kB Yesterday
L Other Leastions		з8.7 кв Yesterday 23.2 MB Yesterday
	uEnv.txt	189 bytes 03:52
	*	

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Open 👻 💽	uEnv.txt /boot	Save = ×
#fdt_file=em-sbc-imx8m.dtb #fdt_file=em-sbc-imx8m-dcss-lvds.dtb		

#101_IIte=em-sbc-imx&m-dcss-tvis.tb fdt_file=em-sbc-imx&m-dcss-dsi.dtb #fdt_file=em-sbc-imx&m-usb0-device.dtb console=ttymxc0,115200 console=tty1 fbcon=rotate:0

I

Plain Text 🕶 Tab Width: 8 💌 🛛 Ln 1, Col 1 🔍 INS



3. Click "+" to create new file.

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Open 🔻 🖪		Unti	tled Document 1	Save =	×
×-	uEnv.txt		Untitled Document 1		×

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4.	Click this button to use more function.					

n 🔻 🖪	Untitled Document 1	Save =
		G 🚍 🛃
		Save As
		Save All
		Find
		Find and Replace
		Go to Line
		View
		Tools
		Preferences
		Keyboard Shortcuts
		Help
		About
		Close All
		Close
		quit

Plain Text 🕶 Tab Width: 8 💌 Ln 1, Col 1 💌 INS



5. To learn more, click Help to view the gedit help guide.

\$_	📓 💿 🔼 📴 💿 🗢 🚷			Thu Jan 16, 09:56 AM
Op		edit Text Editor	Д Q = ×	Save = ×
	🖻 gedit Text Editor			
	Welcome to the <i>gedit</i> help guide. For a quick introduc keyboard shortcuts, visit the <u>Get started with gedit</u> ar	tion into both <i>gedit</i> 's most basic features, as well ad <u>Shortcut keys</u> pages.	as some advanced	
	Other help topics are grouped together into sections I	pelow. Enjoy using gedit!		
	Get started with gedit A brief introduction to gedit.	Shortcut keys Use keyboard shortcuts to help you work	c more quickly.	
	Working With Files			
	File basics: Open, close, and save files Leam the basics of how to work with files in gedit.	Edit a file as the root user Use administrative privileges to edit a fil	e.	Ŧ
	Add and remove tabs Create or close tabs in the gedit window.	Replace text Replace portions of text in a file.		T
	Move and re-order tabs Change the position of a tab in the gedit window.	Search for text Find a portion of text within a file.		
	Organize files in grouped tabs Group similar tabs together.	Undo a recent action Revert a recent change to one of your fil	es.	
	Configure gedit			Ln 1, Col 1 👻 INS



4.7 Camera

MaaXBoard support USB Camera and MIPI-CSI Camera. System provide a Camera application based on QT Lib, could be used with desktop environment to preview, photograph and record video. Connect a displayer, camera to MaaXBoard, make sure the desktop environment is start up.

1. Open Camera application, system will detect the Camera connected or Camera interface. Choose uvcvideo when you use the USB camera, choose mx6s-csi when you use MIPI-CSI camera. Click Reload button to refresh.

Ō	Camera	_ 🗆 ×
	Seload	
	uvcvideo mx6s-csi	
	Record Time[s]: 5	



2. Click the Camera button on screen, to open Camera and preview the video.



 Click Capture button to take a photo and show the thumbnail in the right side of the window. Click Video, it will record yuv video file in yuvv format, users could copy it to PC to check with YUVplayer. The photo and video files will be saved in /root/Pictures.





- Uvcvideo
- 4. Click the thumbnail to close the camera preview and show the whole image in current window.

Camera application supports adjust the window size, click the x to close the application.



4.8 Network Manager

Network manager could be used to manage the Ethernet and Wi-Fi connection:



4.8.1 Manage Ethernet connection

The default Ethernet connection is **Wired connection 1**, choose this connection, then click setting button to edit.

In Ethernet page, users could check MAC address, Speed, Duplex mode, etc. Click "Save" button to



save the modification.

	Editing Wired connection 1	×
Connection name Wired	connection 1	
General Ethernet	802.1X Security DCB Proxy IPv4 Settings IPv6 Set	tings
Device	AE:E7:E5:2A:16:92	-
Cloned MAC address		•
MTU	automatic	+ bytes
Wake on LAN	Opfault Phy Unicast Multicast Ignore Broadcast Arp Magic	
Wake on LAN password		
Link negotiation	Ignore	•
Speed	100 Mb/s	•
Duplex	Full	•
	Cancel	Savo

In IPv4/IPv6 Settings page, users could change IP address, DNS servers, etc. Click "Save" button to save the modification.

	Editing Wired	connection 1	×	
Connection name Wired con	nection 1	connection 1	^	
General Ethernet	202 1V Security DCP	Drowy IDv4 Sottings	IDu6 Sottings	
General Ethernet	502.1X Security DCB	Proxy IPV4 Settings	iPvo Settings	
Method Automatic (DHCP)			•	
Additional static address	es			
Address	Netmask	Gateway	Add	
			Delete	
Additional DNS servers				
Additional DNS servers Additional search domains				
Additional DNS servers Additional search domains DHCP client ID				
Additional DNS servers Additional search domains DHCP client ID Require IPv4 addressing	for this connection to com	plete		None of the
Additional DNS servers Additional search domains DHCP client ID Require IPv4 addressing	for this connection to com	plete	Routes	
Additional DNS servers Additional search domains DHCP client ID Require IPv4 addressing	for this connection to com	plete	Routes	
Additional DNS servers Additional search domains DHCP client ID Require IPv4 addressing	for this connection to com	plete	Routes Cancel Save	



4.8.2 Manage Wi-Fi Connection

1. Wi-Fi connection need to be adding manually, click + button, then select Wi-Fi in the pop-up window.



2. In Wi-Fi Page, enter the SSID for the Wi-Fi network, and choose work mode, band and device to



use.

s_ 🔡 🕥 🕨 📝 🕥 🛜 🚷			Fri Jan 17, 08	8:19 AM
		Editing Wi-Fi connection 1	×	
	Connection name	-Fi connection 1		
Name	General Wi-Fi	Wi-Fi Security Proxy IPv4 Settings	IPv6 Settings	
 Ethernet Wired connection 	SSID	Embest_WiFi		
	Mode	Client	•	
	Band	Automatic	-	
	Channel	default	- +	
	BSSID	I		
	Device	wlan0 (D0:C5:D3:F9:5C:5F)	•	
	Cloned MAC address		•	
	MTU	automatic	– + bytes	
+ - 0				
and the second				1
				-
	1			11402
			Cancer Save	Fr

If we connect Wi-Fi with exist Wi-Fi connection, choose Client in Mode, Automatic in Band. If we set a new Wi-Fi Hotspot, choose Hotspot in Mode, 2.4GHz or 5GHz in Band, and modify the channel parameter if necessary.

	2		Editing Wi-F	i conne	ction 1		×	
Name	Connection name	e Wi	i-Fi connection 1					
✓ Ethernet	General V	Vi-Fi	Wi-Fi Security	Proxy	IPv4 Settings	IPv6 Set	ttings	
 ₩ied c Wi-Fi 		SSID	AP					
Wi-Fi co	1	Mode	Hotspot				•	
		Band	A (5 GHz)		k		•	
	Cha	annel	default				+	
	D	evice	wlan0 (D0:C5:D3:F9:	5C:5F)			•	
	Cloned MAC ad	dress					•	
		MTU	automatic			· - • • •	bytes	
+ - *								
A State								
A State of S								1 - M - 19
					Ca	ncel	Save	Thank 6
1252	1	1 and		191	T22 ML	-		The part of



3. In Wi-Fi Security page, choose the Wi-Fi security method and enter password.



4. In IPv4/IPv6 Settings page, change IP address, DNS servers, etc. Click "Save" button to save the modification.

			Editing W	/i-Fi connection 1	×	
Name	Connection	name Wi-F	i connection 1			
✓ Ethernet	General	Wi-Fi	Wi-Fi Security	Proxy IPv4 Settings	IPv6 Settings	
✓ Wi-Fi	Method	Automatic (I	DHCP)		•	
Wi-Fi co	Addition	al static add	Iresses			
	Addres	65	Netmask	Gateway	Add	
					Delete	
	Addi	tional DNS se	ervers			
+ - <	Addit Addition	tional DNS se al search dor	nains			
+ - *	Addit Addition	tional DNS se al search dor DHCP clie	ervers nains			
+ - *	Addi Addition	tional DNS se al search dor DHCP clie ire IPv4 addre	ervers mains ent ID essing for this cor	inection to complete		
+ - 4	Addi Addition	tional DNS se al search dor DHCP clie ire IPv4 addri	ervers mains ent ID essing for this cor	nection to complete	Routes	



4.9 Bluetooth Manager

4.9.1 Search and Connect Device

1. Click Search button to search for available Bluetooth device.



2. Select the device to connect, then click Pair button in Right click menu, Device menu or Quick menu bar to pair the device.





3. Sometimes the device will ask the system to confirm pairing request.

🗉 🗟 🧿 💽 🚟 🔕 🤝 🖇			Sun Jan 19, 07:47 AM
	Bluetooth Dev	vices ×	
الكوالية بالكراكي العرواك	Adapter Device View Help		
	🔍 Search 🛛 🕂 🖘 🔶 🗟	Setup 🚍 👻	
	44-1E-E4-54-BC-DB Unknown 44:1E:E4:54:BC:DB		
	Mi Band 3 Unknown D5:38:B8:75:50:A0		
	4B-8A-C2-92-45-70 Unknown 4B:8A:C2:92:45:70		
	Xiaomi6x Smart phone 94:87:E0:DF:90:2D		
	∲5.23 KB 1	9.00 B/s 👋 5.02 KB 30.00 B/s 💽 📴	
	Bluet	ooth	
	В	luetooth	
	Pairing request f Xiaomi6x (94:8 Confirm value fo	or: 7:E0:DF:90:2D) r authentication: 205651	
199	Confirm	Dony	
		Deny March Hard	
	The start	TOP & STOR	

4. To cancel the pair, select the device, then click Remove button in Right click menu, Device menu or Quick menu bar to pair the device.





4.9.2 Transmit and Receive Files

1. Pair with a Bluetooth device, such as smart phone, then click "Send File" button.



2. Choose the file in pop-up window.

\$_	🖹 🌀 💽 🜌			Su	n Jan 19, 07:49 A	М
ſ		Select files to send	٩	ок	Cancel ×	
	🛇 Recent	▲ moot →		4		
	û Home	Name	~	Size	Modified	
	i /	4ktest.mp4 audio sample.wav		113.2 MB 25.1 MB	Wed Wed	
	+ Other Locations	 check.sh cp.sh embest.mp4 Pictures uart_test weston-screenshooter 		326 bytes 63 bytes 21.6 MB 20.3 kB 66.8 kB	7 Mar 2019 Fri Wed Fri 7 Mar 2019 13 Dec 2019	



3. Click "Accept" to receive the file send by the smart phone.



4. Select the inform window, press "Esc" button on keyboard to close it.



4.9.3 Connect Bluetooth Audio

MaaXBoard supports connect the Bluetooth audio device, such as Bluetooth headset, to play video or audio files. Pair the device at first, then choose "Connect to: Audio Sink" in Right click menu, or Device



menu. Users could also click Setup button, follow the guide to configure the Bluetooth connection.





4.9.4 Other Configuration

1. In Adapter -> preferences, user can modify the device name of the Bluetooth adapter.

▣ 📱 🎯 🗖 🗖 🎯 🗢 🕅				Sun Jan 19, 08:08 AI
			Bluetooth Adap	oters ×
		되는 일이	MaaXBoard	1
			Visibility Setting • Hidden	
		Bluetooth Devices	Always visible	
	Adapter Device View Help		O Temporarily visible	
	🔾 Search 🔮 🤜 🔶	🗟 Setup 😑	Hidden	
	(Q 4B-8A-C2-92-45-70		Friendly Name	
	Unknown 4B:8A:C2:92:45:70		MaaXBoard	
	Mi Band 3 Unknown D5:38:B8:75:50:A0			Close
at and	6A-04-36-29-41-38 Unknown 6A:04:36:29:41:38			r and the
	小米手机 Smart phone 94:87:E0:CA:50:8C	\$2A	22 MP 0 00 P/c 2 5 90 MP 0 00	
	and the second s			

2. In View -> Local Services, user can change the incoming folder for received files, etc.





4.10 Image Viewer

In file manager, double click the image file, system will use Image Viewer to show the picture on the screen.



In Image Viewer, users could full screen to view the picture, zoom, rotate, check picture properties, etc.





To learn more, open the help content by click the thumbnail in the menu bar:





Chapter 5 Burn or update the system Image

5.1 Burn the System Image to SD Card under Windows OS

- 1. Firstly, you should prepare a SD card, which is no less than 8GB.
- 2. Then, download and install "Win32 Disk Imager" from: https://sourceforge.net/projects/win32diskimager/.

😼 Win32 Disk Imager	
Image File	Device
	[Н: \] 🔻
Copy MD5 Hash:	
Progress	
Version: 0.9.5 Cancel Read Writ	e Exit

3. Select the system images file: eg:MaaXBoard-Debian-Image-SDcard-V1.1.1r10.img

👒 Win32 Disk Imager	
-Image File	- Device -
1	[H:\] 🔻
Copy MD5 Hash:	
Progress	Select Image File
Version: 0.9.5 Cancel Read	Write Exit

4. Click "Write" button to burn the images:

攱 Win32 Disk Imager	
-Image File-	Device -
Path of your image file	[H:\] 🔻
Copy 🔲 MD5 Hash:	
- Progress	Click Write
Version: 0.9.5 Cancel	Read Write Exit



5.2 Burn the System Image to SD Card under Linux OS

In Ubuntu or Debian OS, you can use bmap-tool to burn the image to SD Card. Here we use MaaXBoard-Debian-Image-SDcard-V1.1.1r10.img as an example:

1. Install bmap-tools

\$ sudo apt install bmap-tools

2. Enter the following instructions in command line to check the SD Card ID, in this example is: sdc

\$ Is /dev/so	*									
/dev/sda	/dev/sda2	/dev/sdb	/dev/sdb2	/dev/sdc	/dev/sdc2					
/dev/sda1	/dev/sda5	/dev/sdb1	/dev/sdb5	/dev/sdc1						
3. If SD C	ard is mount	ted, umount i	it.							
\$ sudo um	sudo umount /dev/sdc1									
sudo umount /dev/sdc2										

4. Burn the SD card with following instructions:

\$ bmaptool create -o burn.map MaaXBoard-Debian-Image-SDcard-V1.1.1r10.img
\$ sudo bmaptool copy --bmap burn.map MaaXBoard-Debian-Image-SDcard-V1.1.1r10.img
/dev/sdc

5.3 Update System Image in eMMC

USB0 (The lower one in USB interface HUB1) support burning mode. Connect USB0 and PC before power on the board. The system will enter burning mode. Then users could burn the system image to the development board using uuu tools. For the detail information, refer to MaaXBoard EMMC burning Guide.



Chapter 6 Appendix

6.1 Hardware

For the detail hardware introduction, please refer to MaaXBoard Hardware user manual.