VITAM-6XXA Series

IP66/IP69K Fanless Stainless Steel Panel PC with NXP® i.MX8M+, Quad Core

User Manual

Release Date	Revision
Dec. 2023	V1.0

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Revision History

Reversion	Date	Description
1.0	2023/12/20	Official Version

Warning!_____

This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Electric Shock Hazard – Do not operate the machine with its back cover removed. There are dangerous high voltages inside.

Caution
Risk of explosion if the battery is replaced with an incorrect type.
Batteries should be recycled where possible. Disposal of used batteries must be in accordance with local environmental regulations.

Disclaimer
This information in this document is subject to change without notice. In no event shall Aplex Technology Inc. be liable for damages of any kind, whether incidental or consequential, arising from either the use or misuse of information in this document or in any related materials.

Packing List

Accessories (as ticked) included in this package are:
☐ Adaptor ☐ Driver & manual CD disc ☐ Other._____(please specify)

Safety Precautions

Follow the messages below to prevent your systems from damage:

- Avoid your system from static electricity on all occasions.
- Prevent electric shock. Don‘t touch any components of this card when the card is power-on. Always disconnect power when the system is not in use.
- Disconnect power when you change any hardware devices. For instance, when you connect a jumper or install any cards, a surge of power may damage the electronic components or the whole system.

Table of Contents

Chapter 1 Getting Started

1.1 Features

- 10”~15”, 21.5” Stainless Steel Panel PC
- True Flat Front Bezel Design and Grade 304 Stainless Steel Enclosure (Grade 316 for option)
- IP66/IP69K Rated with M12 Connectors
- Support Resistive Touch and Projected Capacitive Touch
- NXP® i.MX8M Plus Quad Core, 1.6GHz onboard processor
- Touch on/off Button on the side edge for Hygienic Cleaning
- Support Ergonomic Versatile Mounting: Yoke Mount/Space-saving VESA 75x75mm and VESA 100 x 100mm(for 21.5” only)

1.2 Specifications

	VITAM-6XXA Series
System	
CPU	NXP® i.MX8M Plus Quad, 4x Cortex-A53 up to 1.6 GHz
Memory	Onboard 4GB LPDDR4 DRAM
Storage	Onboard 16GBeMMC Flash
External IO Port	
M12 Connectors	1 x M12 8pin for USB2.0 with waterproof cover and chain 1 x M12 8pin COM1, RS-232/485, default RS-232, with waterproof cover and chain 1 x M12 8pin for LAN with waterproof cover and chain 1 x M12 3pin for DC power with waterproof cover and chain
Switch	1 x Power Switch at rear side (option)
Button	1 x Touch on/off Switch on the edge side (Touch on-default/Touch off-option_ press downward)
Power	1 x24V DC power input via 1 x 3-pin terminal block
Option	Either 2 x M12 Blank for option (Priority: COM/USB/LAN): 1 x GbE LAN 1 x COM Port
Expansion	
Expansion Slot	1 x M.2 B Key 3042/3052 (USB3.0, USB2.0) 1 x M.2 E Key 2230 (PCIe3.0x1, USB2.0) 1 x Nano SIM slot

Display (Standard)			
Model	VITAM-610A	VITAM-615A	VITAM-621A
Display Type	10.1” TFT LCD	15” TFT LCD	21.5” TFT LCD
Resolution	1280x800	1024x768	1920x1080
Max. Color	16.7M/262K	16.2M	16.7M
Luminance	350/300	300	250
Contrast Ratio	800:1/1300:1	2000:1	3000:1
Viewing Angle(H/V)	170/170	176/176	178/178
Backlight Lifetime	30,000/25,000hrs	70,000hrs	30,000hrs
Display (High Brightness)			
Model	VITAM-610A	VITAM-615A	VITAM-621A
Display Type	10.1” TFT LCD	15” TFT LCD	21.5” TFT LCD
Resolution	1280x800	1024x768	1920x1080
Max. Color	16.7M	16.7M	16.7M
Luminance	1000 nits		1500 nits
Contrast Ratio	1300:1	3000:1	3000:1
Viewing Angle(H/V)	170/170	176/176	178/178
Backlight Lifetime	50,000hrs	70,000hrs	50,000hrs
Touch Screen – Projected Capacitive Type			
Interface	USB		
Light Transmission	90% above		
Touch Screen – Resistive Type			
Interface	USB		
Light Transmission	80% above		
Power			
Power Input	DC24V		
Connector	Pitch 3.5mm 3pin Phoenix Connector		
Power Consumption	MAX: 17.04W	MAX: 19.08W	Max: 37.87W
Mechanical			
Front Bezel Metal	Stainless Steel (304 default, 316 option)		
Rear Panel Metal	Stainless Steel/VESA 75 Yoke Mount(option)	Stainless Steel/V75 Yoke Mount (opt.)	Stainless Steel/V100 Yoke Mount (opt.)
Chassis Color	Stainless Steel Color		
IP Rating	IP66/IP69K		
Dimensions(mm)	300 x 220 x 53	399 x 324 x 53	571.1 x 361.9 x 55.1
Net Weight (Kg)	3.73	6.65	10.05

Environmental	
Operating Temperature	0~50℃ (-20~60℃ option)
Storage Temperature	-30~70℃
Humidity	10 to 90% @ 40℃, non-condensing
Certification	Meet CE / FCC Class A
Operating System	Yocto Linux Kernal 4.0 ANDROID 11 (Default)

1.3 Dimensions

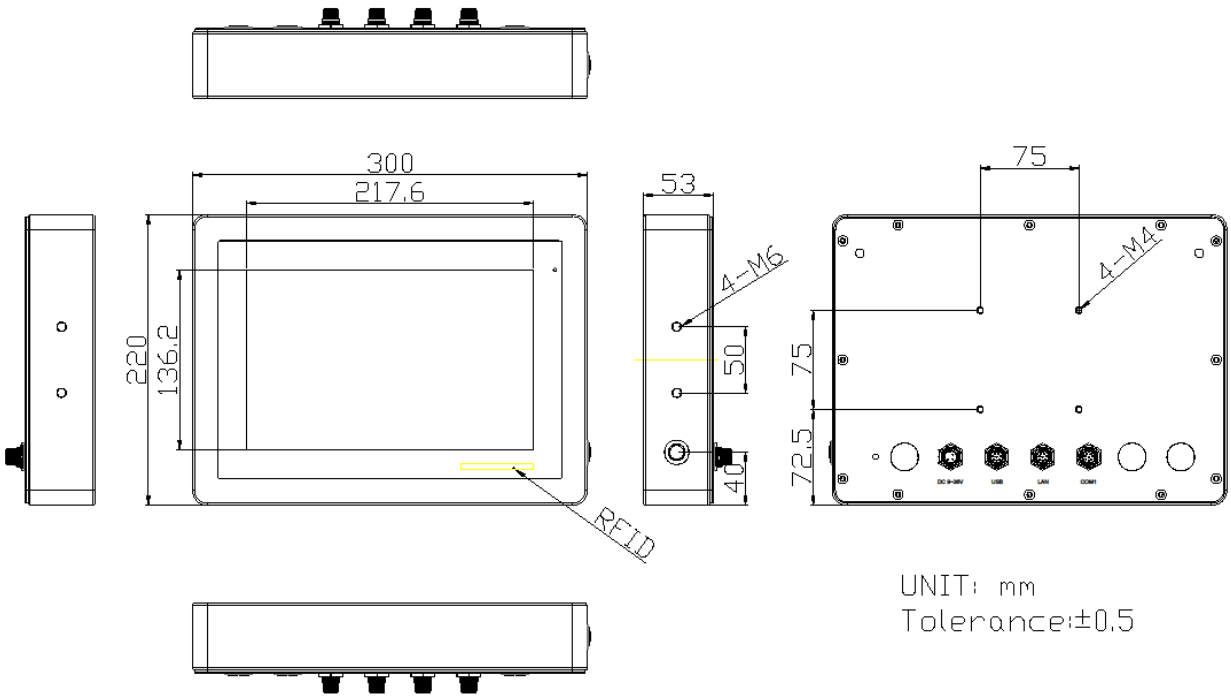


Figure 1.1: Dimensions of VITAM-610AP/AR(H)

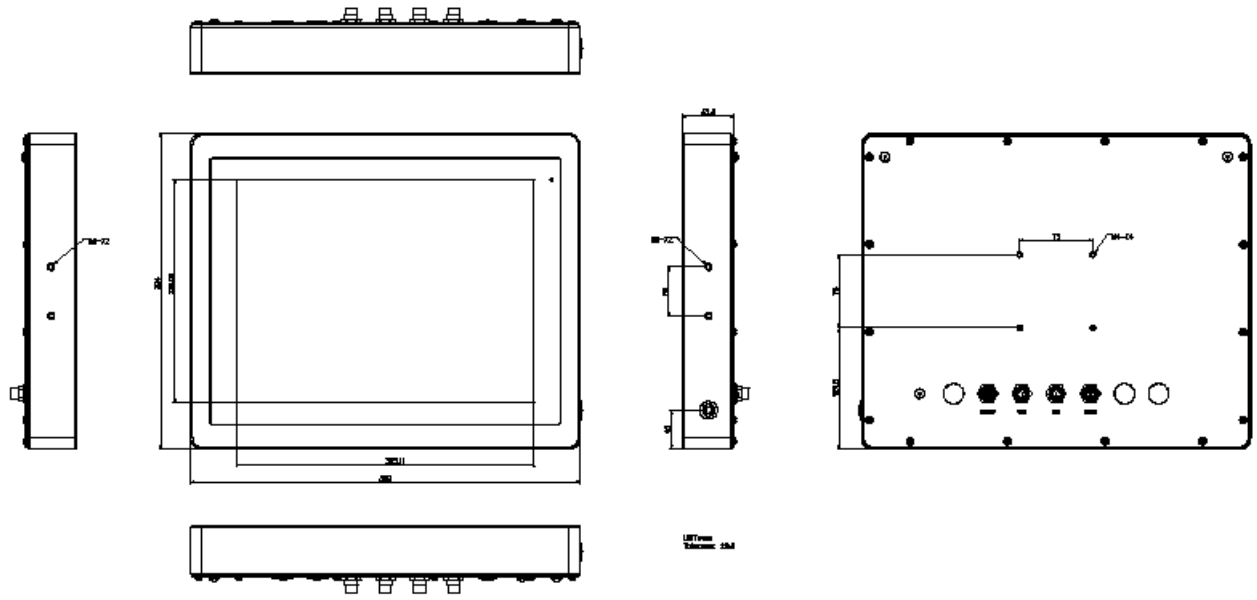


Figure 1.2: Dimensions of VITAM-615AP/AR(H)

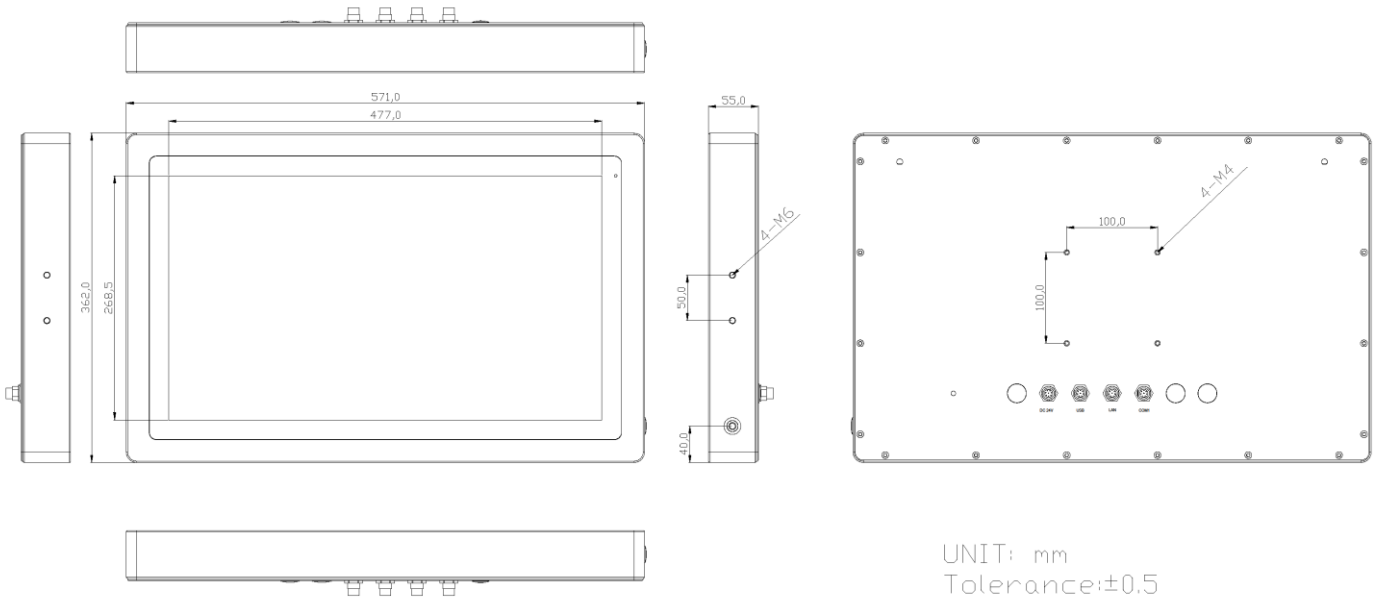


Figure 1.3: Dimensions of VITAM-621AP/AR((H)

1.4 Brief Description of VITAM-6XXA

VITAM-6A series have 10.1”, 15” and 21.5” in fanless designed ARM based Panel PC, which comes with flat front panel LED backlight touch designed. They are powered by NXP® i.MX8M Plus Quad, 4x Cortex-A53 processor, 4GB LPDDR4 onboard memory, and 16GB eMMC or 32GB eMMC NAND flash onboard. VITAM-6XXA series is DC 24V power input and IP66/69K front panel. The models can be VESA 75 x 75 and VESA 100 x 100 mounted. The chassis color is Black C for plastic design in 10.1”, 15” and 21.5”. Support 7H anti scratch surface projected capacitive touch screen is ideal for use as PC-based controller for industrial automation & factory automation.

Figure 1.4: Front View of VITAM-6XXA Series

Figure 1.5: Rear View of VITAM-6XXA Series

1.5 Yoke Mount and VESA Mount

The VITAM-6XXA series is designed to be VESA mount and Yoke Mount as shown in Picture below.

Figure 1.6: VITAM-6XXA Series Yoke Mount

Figure 1.7: VITAM-6XXA Series VESA Mount

Chapter 2 Hardware

2.1 Motherboard Introduction

SBC-7132 is an industrial motherboard developed on the basis of NXP i.MX8M plus processor, which designed for Aplex standard system the ARMPAC-6A & ViTAM-6A series.

2.2 Motherboard Specifications

<table>
<tr><th colspan="4">SBC-7132_Industrial Motherboard</th></tr>
<tr><td>Form Factor</td><td colspan="3">3.5” ECX</td></tr>
<tr><th colspan="4">System</th></tr>
<tr><td>Processor</td><td colspan="3">NXP® i.MX8M Plus Quad, 4x Cortex-A53 up to 1.6 GHz</td></tr>
<tr><td>Memory</td><td colspan="3">Onboard 4GB LPDDR4-4000 DRAM</td></tr>
<tr><td>Storage</td><td colspan="3">Onboard 16GB eMMC Flash
1 x Micro SD Slot</td></tr>
<tr><th colspan="4">Graphics</th></tr>
<tr><td>LVDS</td><td colspan="3">1 x 18/24-bits Dual Channel LVDS</td></tr>
<tr><td>LVDS & Touch Screen</td><td colspan="3">LVDS, backlight control, backlight power, USB2.0(for touch screen),
1 x System LED
<table>
<tr><th>System Status</th><th>LED Status</th></tr>
<tr><td>System On</td><td>Green Solid</td></tr>
<tr><td>Sleep Mode</td><td>Green Blinking</td></tr>
<tr><td>Power Off</td><td>LED Off</td></tr>
</table>
via DF13-40DP-1.25V</td></tr>
<tr><th colspan="4">I/O</th></tr>
<tr><td>I/O</td><td colspan="3">1 x USB 3.0/USB2.0, via vertical USB type-A port
1 x USB 2.0 download mode via Micro USB port</td></tr>
<tr><td>Ethernet</td><td colspan="3">1 x GbE Lan,RJ45 (LAN1),support optional PoE+(IEEE 802.3AT) PD module
1 x GbE Lan,RJ45 (LAN2)
LAN LED Status:
<table>
<tr><td>LED Color</td><td>Green(Left)</td><td>Orange(Right)</td></tr>
<tr><td>GbE</td><td>NA</td><td>Solid</td></tr>
<tr><td>100Mbps</td><td>Solid</td><td>Solid</td></tr>
<tr><td>10Mbps</td><td>Solid</td><td>Solid</td></tr>
</table></td></tr>
</table>

Serial Port & CAN bus	1 x Pitch 3.5mm 2x5pin Terminal Block with ➢ 1 x RS232(RX,TX,RTS,CTS)/2W RS485(D+,D-),select via jumper ➢ 1 x 2W RS485(D+,D-) ➢ 1 x CAN bus 2.0b(CAN_H,CAN_L) 1 x RS232 via 2x5pin header 1 x CAN via 1x4 wafer (CAN_H,CAN_L,GND,5V) (Optional)
Audio (Optional)	Line-in, mic-in, line-out via 2x6pin header Support 2x2W speaker (SPKL1/SPKL2)
GPIO	8-bit GPIO(4xDI,4xDO) via 2x5 pin header
I^2C	I^2C via 1x4 pin wafer
Expansion Slot	1 x M.2 B-Key (USB3.0, USB2.0) support 3042/3052, w/clamshell NANO SIM slot 1 x M.2 E-Key (PCIe3.0x1, USB2.0) support 2230 for WiFi/BT
RTC Battery	2pin wafer for CR2032
Mode Select	1x2*2pin dip switch for burning mode & boot device select (eMMC/SD)

Power Management	
Operation Voltage	DC 24V (+/-10% tolerance) power input
Connector	Pitch 3.5mm 3pin terminal blocks

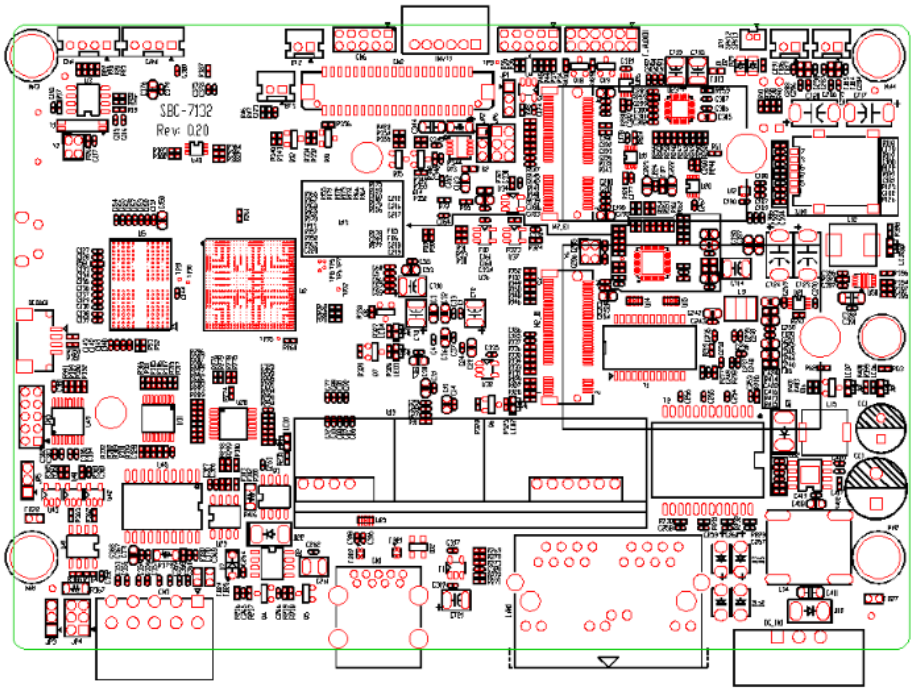
Mechanical	
Dimension	146mm x 102mm
Gross Weight	TBD

Power Management	
Operation temperature	-30~70°C
Storage temperature	-40~85°C
Storage humidity	10 to 95%, non-condensing, operating
Certifications	Design Meet CE / FCC Class A UKCA RoHS2.0/REACH

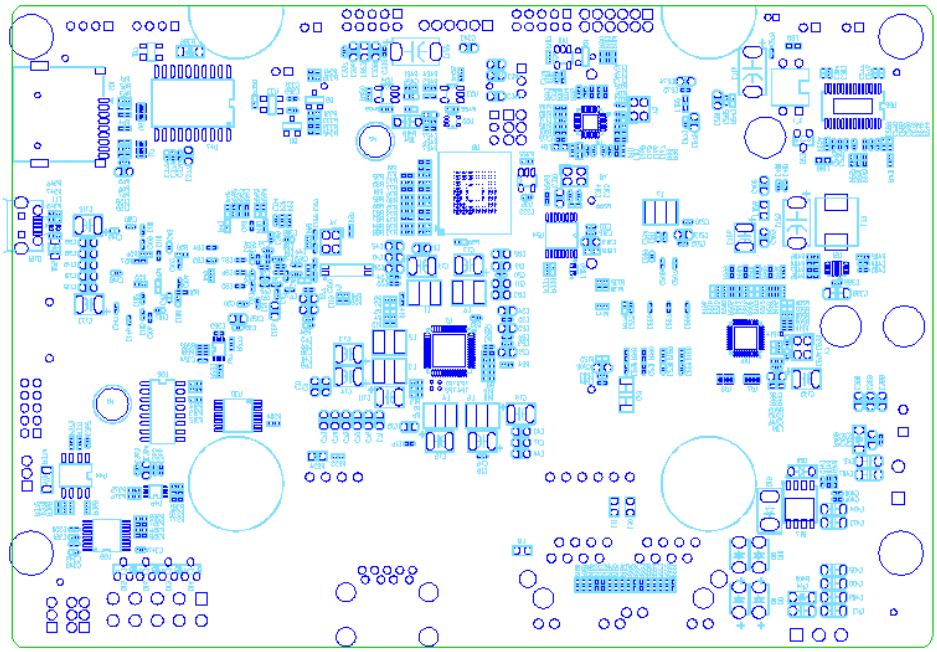
OS System	
Android	Android 11
Linux	Yocto Linux 4.0 (kirkstone)

2.3 Motherboard Dimensions

Board Top

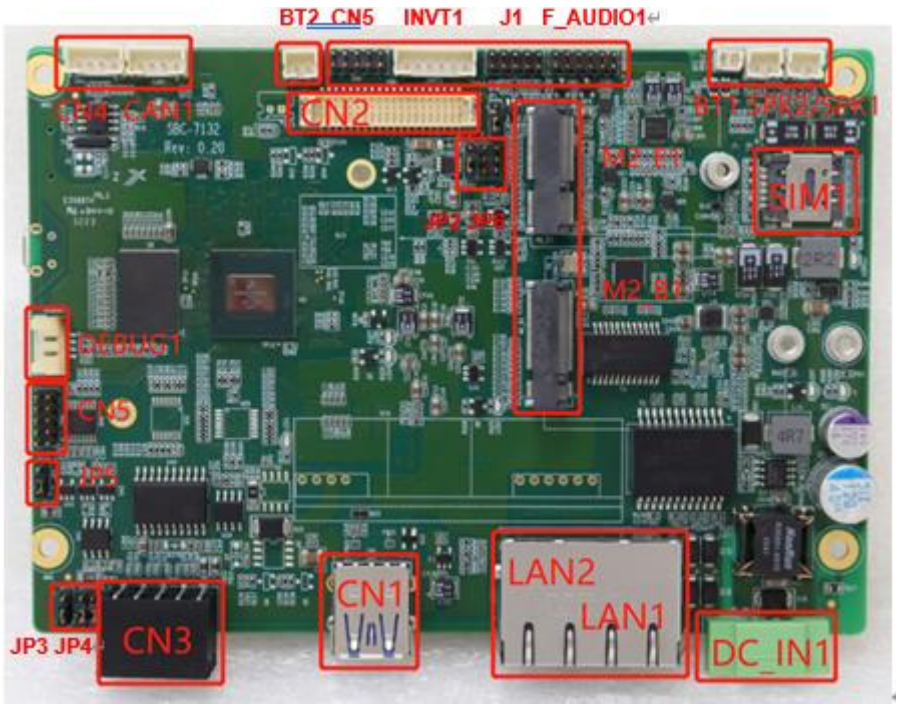


Board Bottom



2.4 Motherboard Jumpers and Connectors Location

Board Top

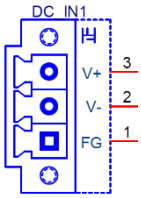


Board Bottom

2.5 Motherboard Jumpers and Connectors

1. DC_IN1:

(3.50mm Pitch Dinkle_ECH350RM-03P), For DC 24V system power input.



Pin#	Signals
1	FG
2	DC_IN-
3	DC_IN+

2. CN1:

(USB type A), USB3.0/USB2.0

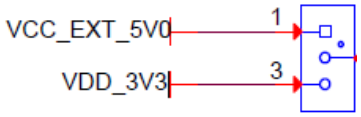
3. CN2:

(1.25mm pitch Hirose_DF13-40DP-1.25V), Provides 18/24-bits dual channel LVDS, LCD backlight power and control, system LED and USB2.0 for touch screen.

Function	Signal Name	Pin#		Signal Name	Function
DC12/24V for LCD backlight	DC 12V/24V	2	1	DC 12V/24V	DC12/24V for LCD backlight
LVDS Signals	BKLT_EN	4	3	BKLT_CTRL	LVDS Signals
	GND	6	5	GND	
	LVDS_VCC*	8	7	LVDS_VCC*	
	LVDS_VCC*	10	9	LVDS_VCC*	
	GND	12	11	GND	
	LA_D0_P	14	13	LA_D0_N	
	LA_D1_P	16	15	LA_D1_N	
	LA_D2_P	18	17	LA_D2_N	
	LA_D3_P	20	19	LA_D3_N	
	LA_CLKP	22	21	LA_CLKN	
	LB_D0_P	24	23	LB_D0_N	
	LB_D1_P	26	25	LB_D1_N	

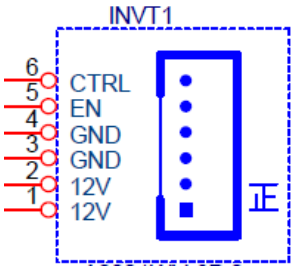
	LB_D2_P	28	27	LB_D2_N	
	LB_D3_P	30	29	LB_D3_N	
	LB_CLKP	32	31	LB_CLKN	
USB3	GND	34	33	GND	USB3
	USB3_CN1_P	36	35	USB3_CN1_N	
	5V	38	37	NC	
LED	PWR_LED+	40	39	ERRLED+	LED

***JP2**

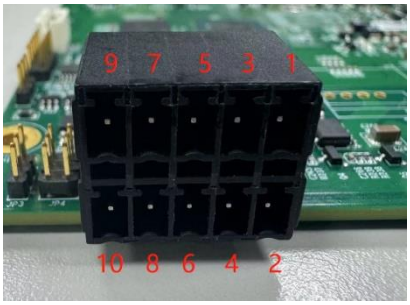


JP2 Pin#	Function
1-2 Close	LVDS_VCC=5V
2-3 Close	LVDS_VCC=3.3V

4. INVT1:



5. CN3：



(3.50mm pitch Dinkle_0221-2210THT),

Provides 2xCOM(COM1:RS232/485,COM2:RS485) and 1xCAN Bus.

Function	Signal Name	Pin#	Pin#	Signal Name	Function
COM2* (JP5) CAN Bus	GND	1	2	GND	COM1* (JP3/JP4)
	CAN0_H	3	4	COM1_CTS	
	CAN0_L	5	6	COM1_RTS	

	485-	7	8	COM1_TX	485-	
	485+	9	10	COM1_RX	485+	

***JP3**

JP3 Pin#	Function
1-2 Close	COM1 Add Terminal

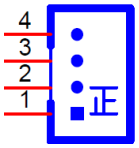
***JP4**

JP4 Pin#	Function
1-3/2-4 Close	COM1 RS232
3-5/4-6 Close	COM1 RS485

***JP5**

JP5 Pin#	Function
1-2 Close	COM2 Add Terminal

6. CN4：



(2.00mm pitch 4pin wafer), Provides I2C signal.

Pin#	Signal Name
1	GND
2	I2C_SCL
3	I2C_SDA
4	5V_S0

7. CN5：

(2.00mm pitch 2x5pin header), Provides COM3 RS232.

Signal Name	Pin#		Signal Name
NC	1	2	RX
TX	3	4	NC
GND	5	6	NC
RTS	7	8	CTS
NC	9	10	NC

8. CN6:

(2.00mm pitch 2x5pin header), Provides 8-bits GPIO.

Signal Name	Pin#		Signal Name
5V	1	2	GND
GPIO1_IO00	3	4	GPIO1_IO12
GPIO1_IO01	5	6	GPIO1_IO13
GPIO1_IO05	7	8	GPIO1_IO14
GPIO1_IO06	9	10	GPIO1_IO15

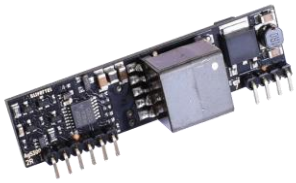
9. CN1:

(2.00mm pitch 4pin wafer), Provides 1xCAN Bus.

Pin#	Signal Name
Pin1	GND_IO_1
Pin2	CAN_L
Pin3	CAN-H
Pin4	VCC_IO_1

10. LAN (LAN1/LAN2):

(Side by side RJ45 connector UDE_RB2-ZZ-0100-A), Provides 2xGbE LAN. LAN1 supports PoE+ via optional PoE+ module*.



***LAN1 supports PoE+ module Silvertel_AG5300**

IEEE802.3at and IEEE802.3af compliant

Maximum 30W peak output power

11. F_AUDIO1 (Optional):

(2.00mm pitch 2x6 pin header), Provides line-in/line-out/mic-in.

Signal Name	Pin#	Pin#	Signal Name
NC	1	2	GND_AUD
HP_OUTL	3	4	HP_OUTR
LINE_OUT_DET	5	6	NC
LINE_IN_L	7	8	LINE_IN_R
MIC_IN_L	9	10	MIC_IN_R
GND_AUD	11	12	NC

12. SPKL1/SPKL2 (Optional):

(2.00mm pitch 2 pin header), Provides up to 2x2W speakers out.

Pin#	Signal Name
Pin1	Speaker+
Pin2	Speaker-

13. BT1:

(1.25mm pitch 2 pin header),For 3.3V RTC battery.

Pin#	Signal Name
Pin1	BAT+
Pin2	GND

14. JP6:

(2x3 pin header),Jumper for backlight control mode setting.

JP6 Pin#	Function	
	Close	Open
1-2	DC mode	PWM mode
3-4	PWM level 5V	PWM level 3.3V
5-6	Backlight enable level 5V	Backlight enable level 3.3V

15. M2_B1:

(M.2 B-Key), With USB3.0/USB2.0 signals. Support 3042/3052 M.2 B-Key expansion cards.

16. SIM1:

(Clam-shell type micro-SIM slot), Support micro SIM card for M2_B1.

17. M2_E1:

(M.2 E-Key), With PCIe3.0x1/USB2.0 signals. Support 2230 M.2 E-Key expansion cards.

18. SD1:

(Micro SD slot), Support SDXC.

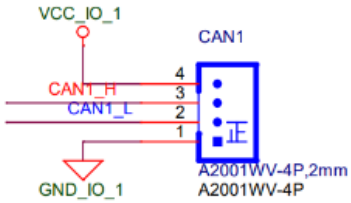
19. OTG1:

(Micro USB), Provide USB OTG function.

20. J1:

(2.00mm pitch 2x5pin header), JTAG function.

21. CAN1：



(2.00mm pitch 4pin wafer), Provides CAN bus signals.

Pin#	Signal Name
1	GND
2	CAN_L
3	CAN_H

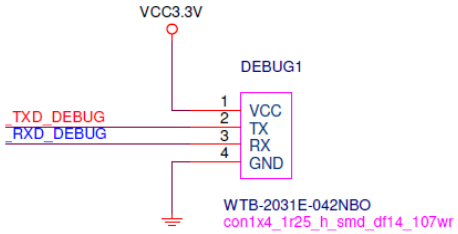
4	VCC

22. BT2(Reserved):

(1.25mm pitch 2 pin header),For external power on switch.

Pin#	Signal Name
Pin1	CPUPWRON
Pin2	GND

23. DEBUG1 :

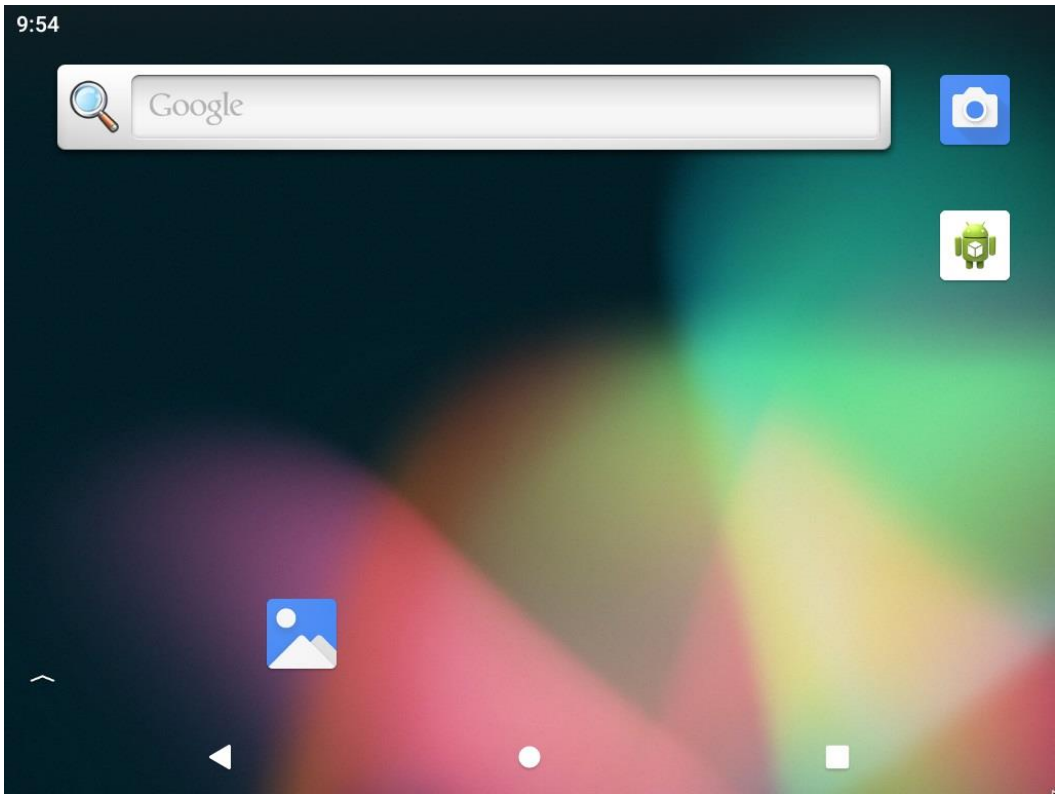


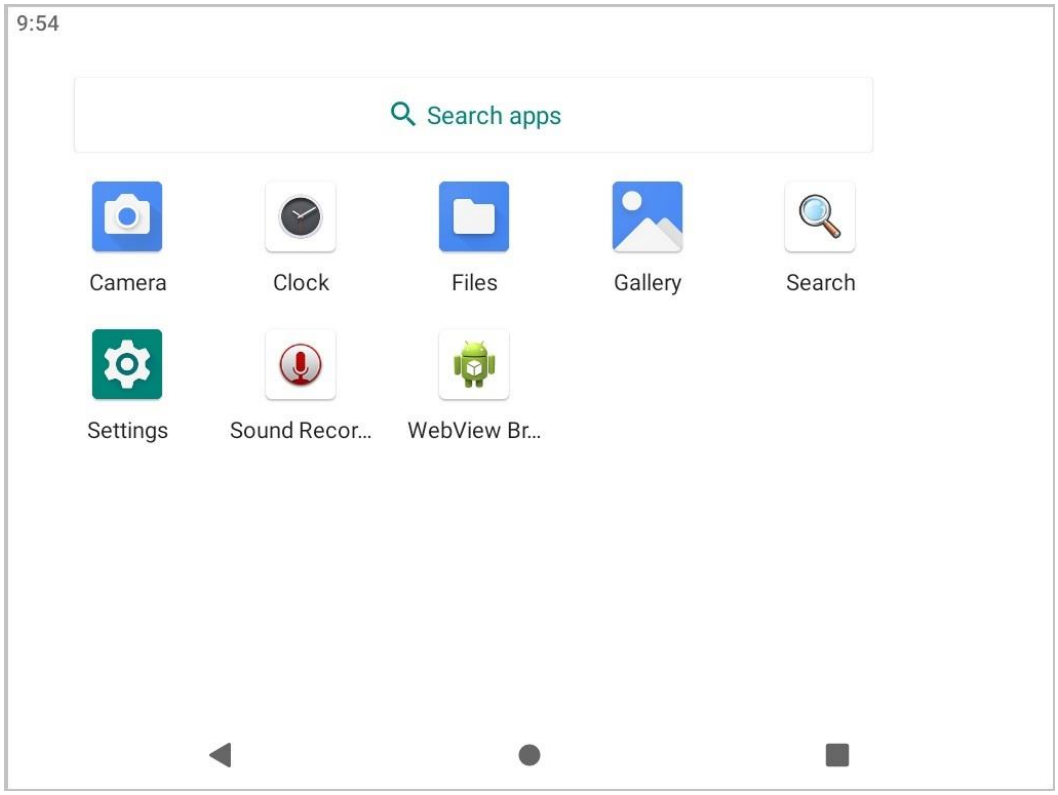
(1.25mm pitch 4pin wafer)),For console debug message only.

Pin#	Signal Name
1	3P3V_S0
2	UART0_TXD
3	UART0_RXD
4	GND

Chapter 3 Software images

3.1 ANDROID11

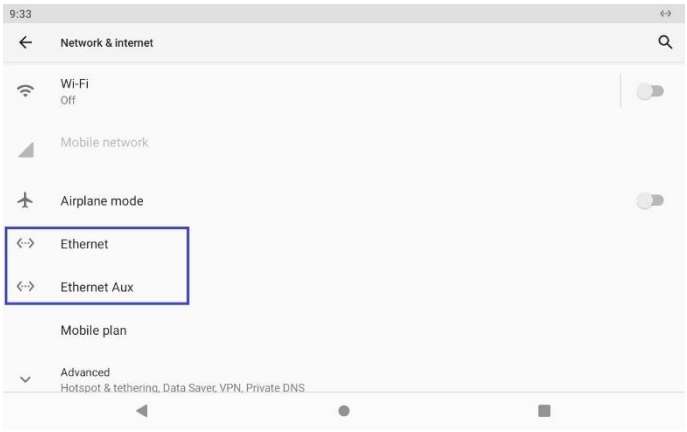




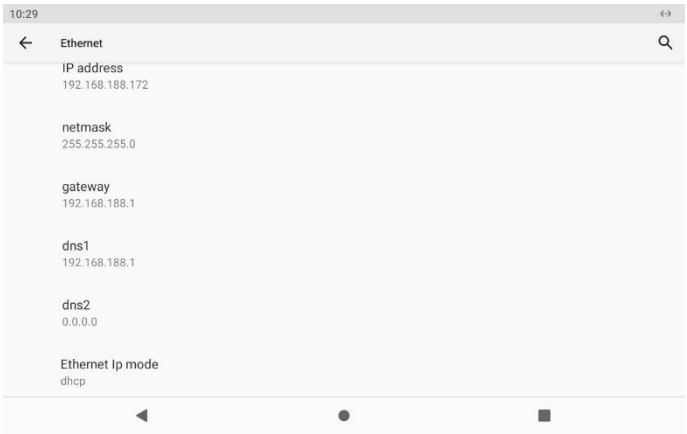
3.1.1. Android 11 Dual Ethernet Connect Check:

1. DHCP Dual Ethernet Connect Check: Settings => Network & Internet

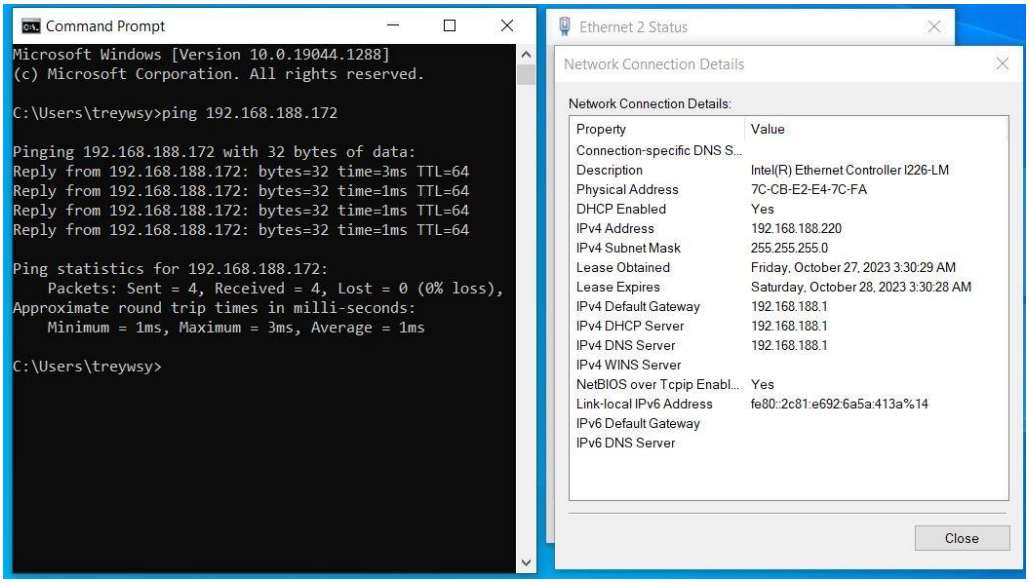
- **Note: When dual network ports are configured for DHCP connection under the Android 11 operating system, the first network port (LAN1) will be used to connect to the external Internet.**



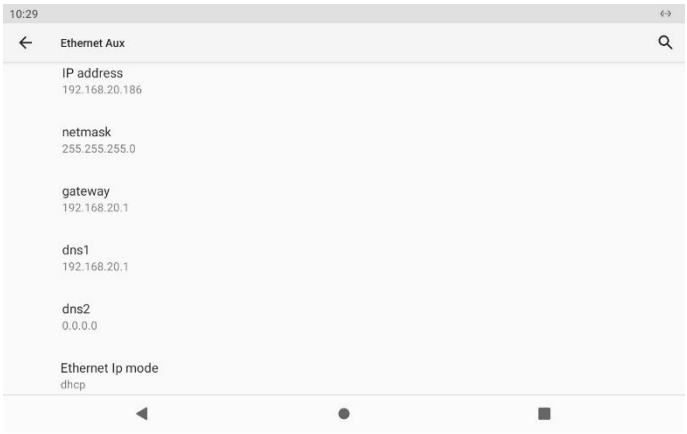
Ethernet (LAN1)



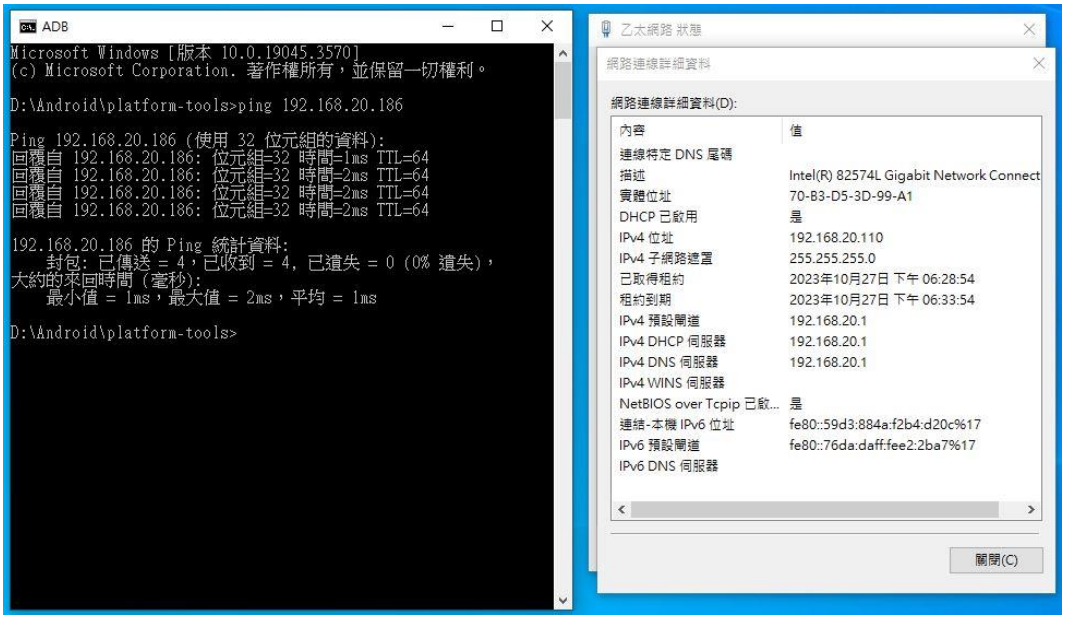
PC-1 pin Android 11 LAN1:



Ethernet AUX(LAN2)

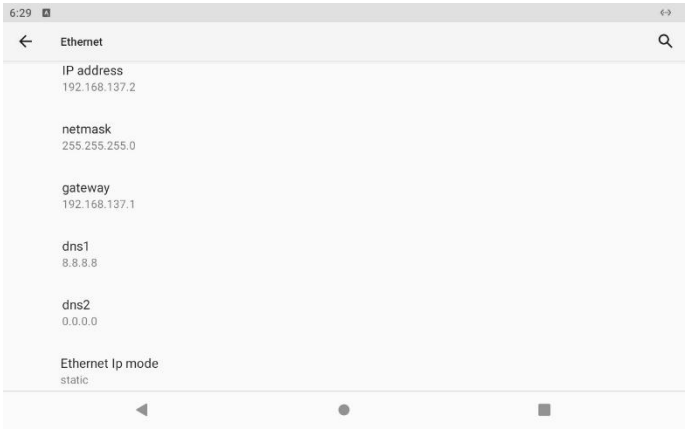


PC-2 pin Android 11 LAN2:

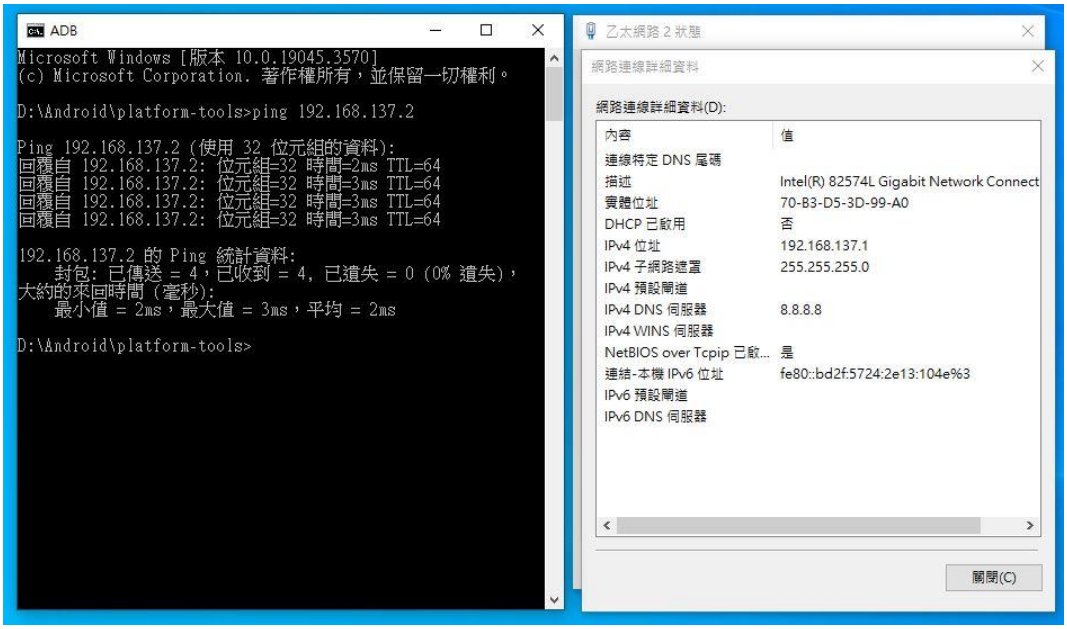


2. **Static IP Dual Ethernet Connect Check: Settings => Network & Internet**

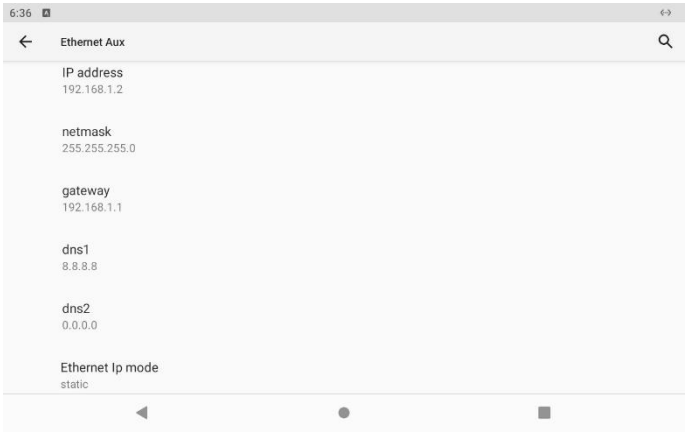
Ethernet (LAN1)



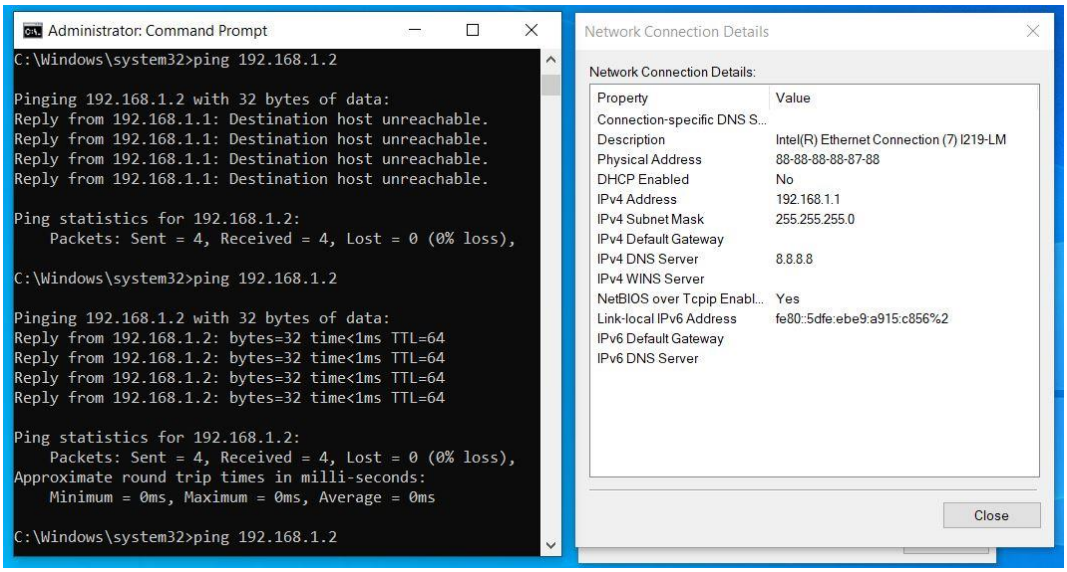
PC-1 pin Android 11 LAN1:



Ethernet AUX (LAN2)



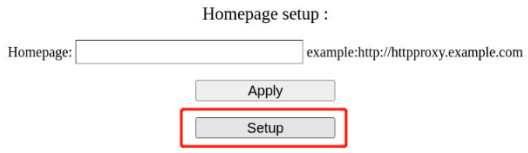
PC-2 pin Android 11 LAN2:



3.2. Yocto Linux 4.0 (kirkstone)

1. System Login & Setup

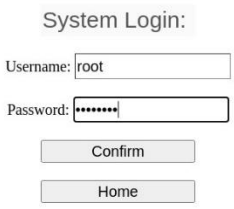
- **Press the “Setup” button to enter the setup login page.**

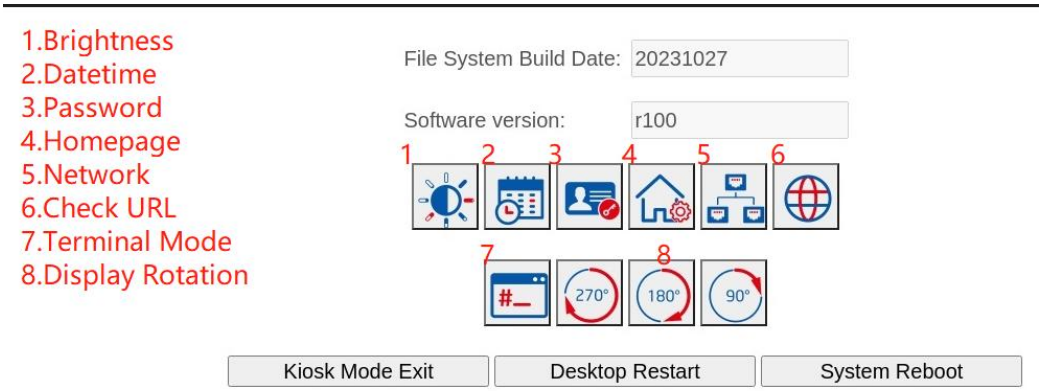


- **Default login username/password**

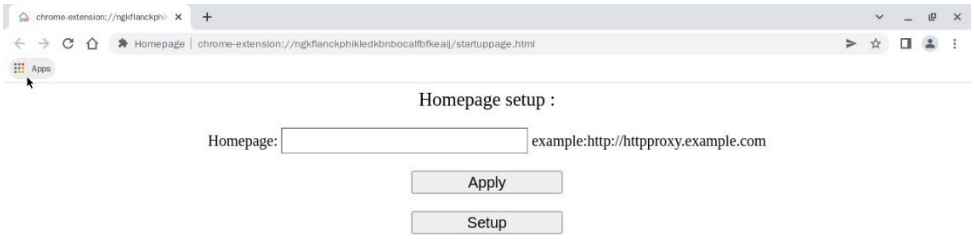
  Username: root

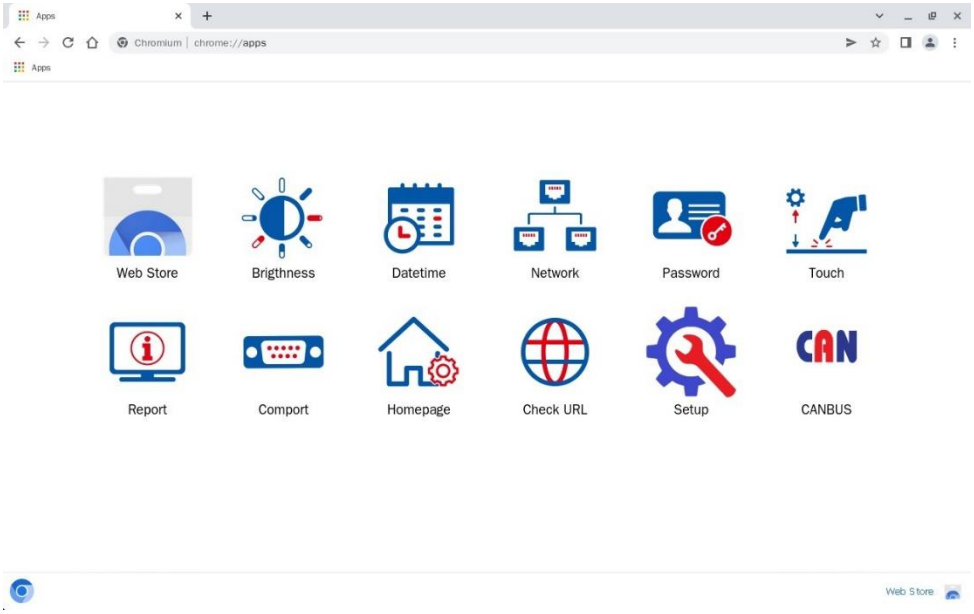
  Password: rootroot



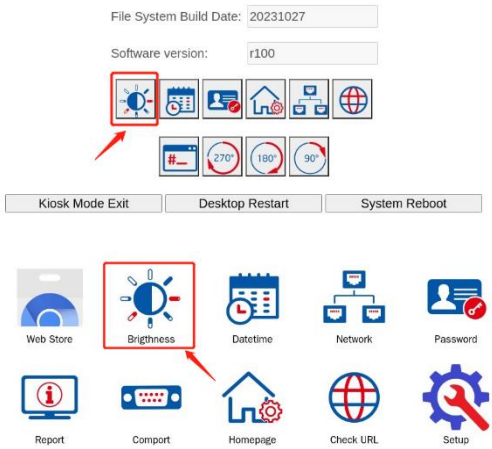


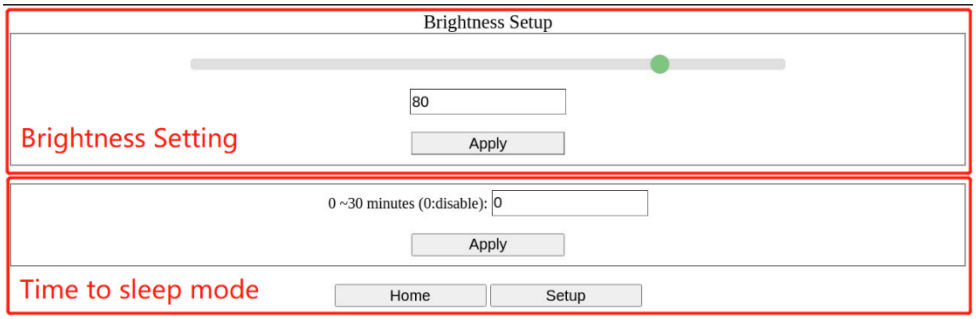
➢ **While not in the Kiosk mode, press the “Apps” button on Chromium.**





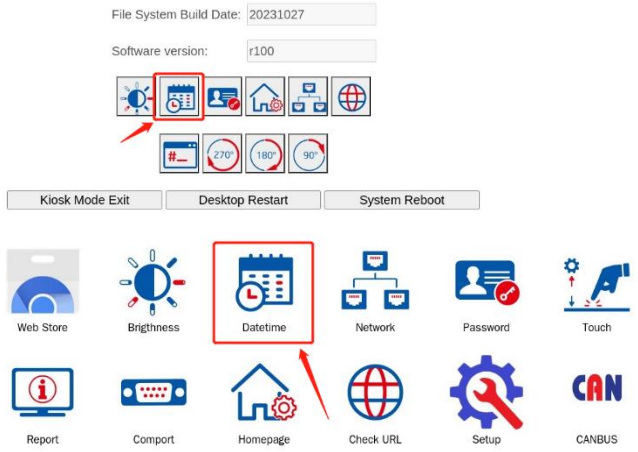
2. Brightness Setting



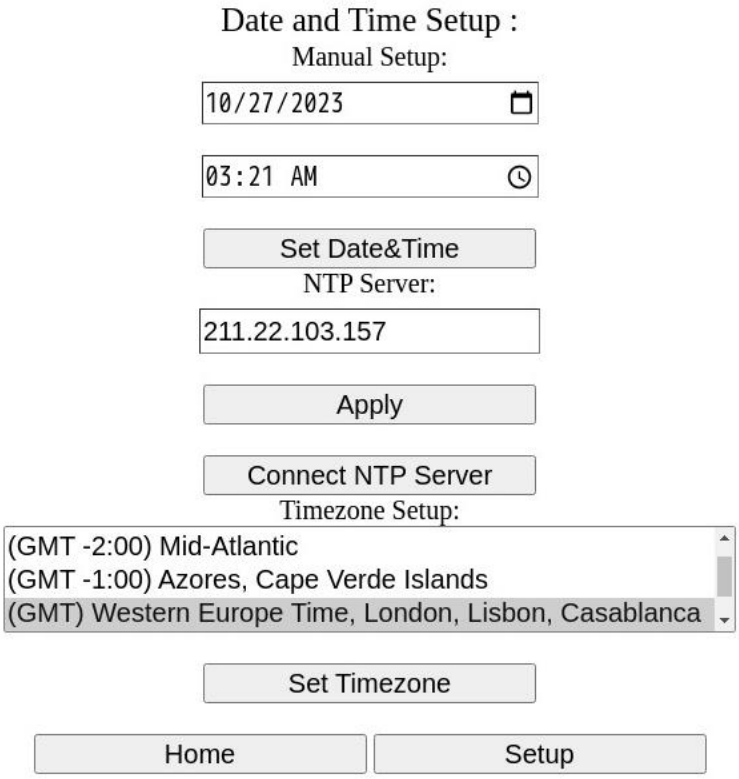


- **Brightness can be set from 1~100% via slide bar or directly fill the value.**
- **Time to sleep mode can be set from 0~30mins or fill 0 to disable.**

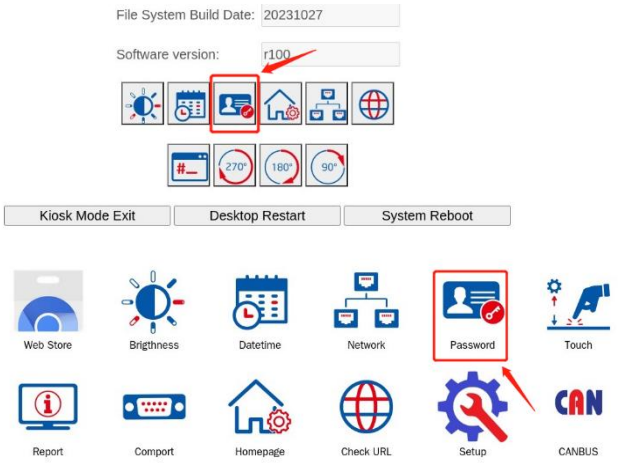
3. Date & Time Setting



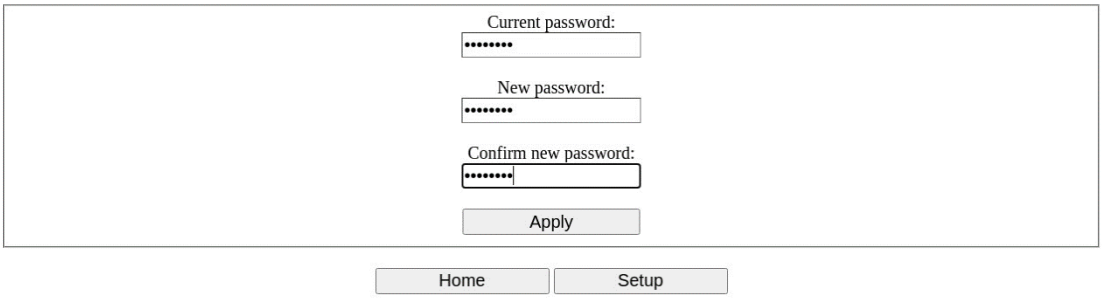
- **Date 、 time and time zone can be set manually, or can be synchronized automatically by connecting the NTP server.**



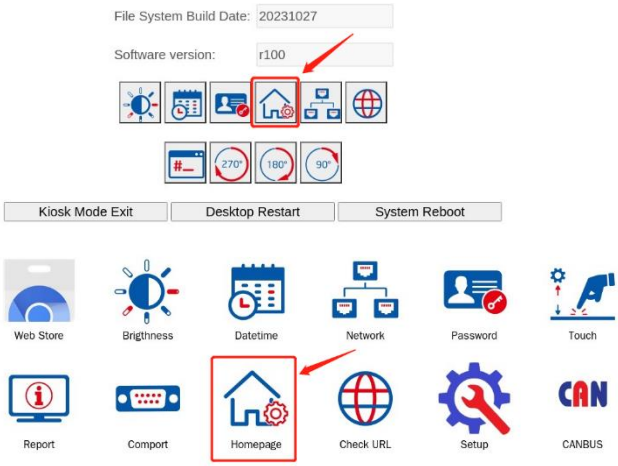
4. Login Password Setting



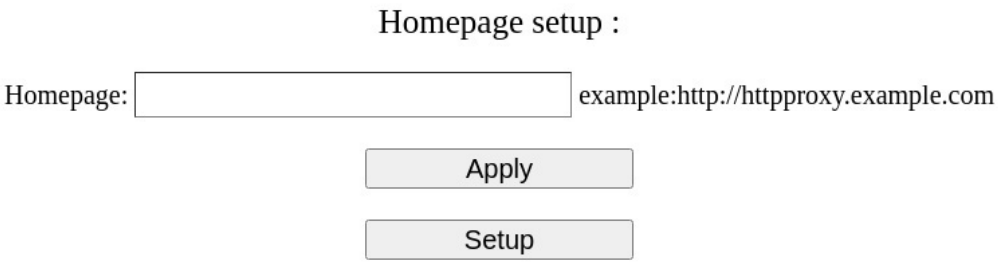
- **Please note:**
  1. **Password must contain at least eight characters**
  2. **Password must contain at least one uppercase letter A-Z**
  3. **Password must contain at least one lowercase letter a-z**
  4. **Password must contain at least one numeric character 0-9**



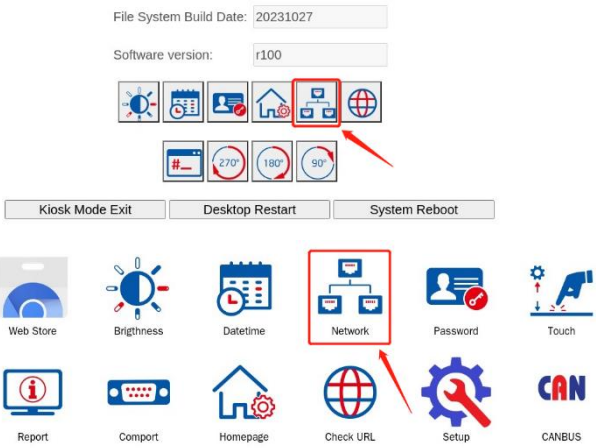
5. Homepage Setting



- **Enter the URL you want to set as the homepage and press the "Apply" button.**

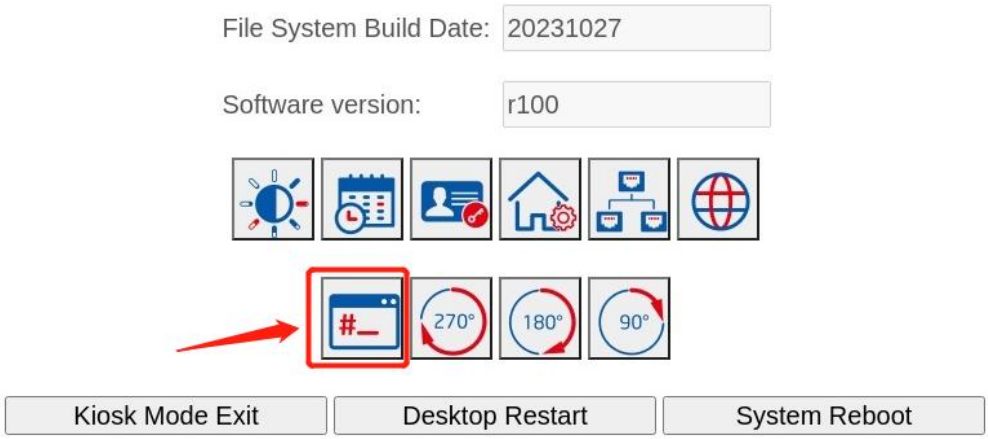


6. Network Setting



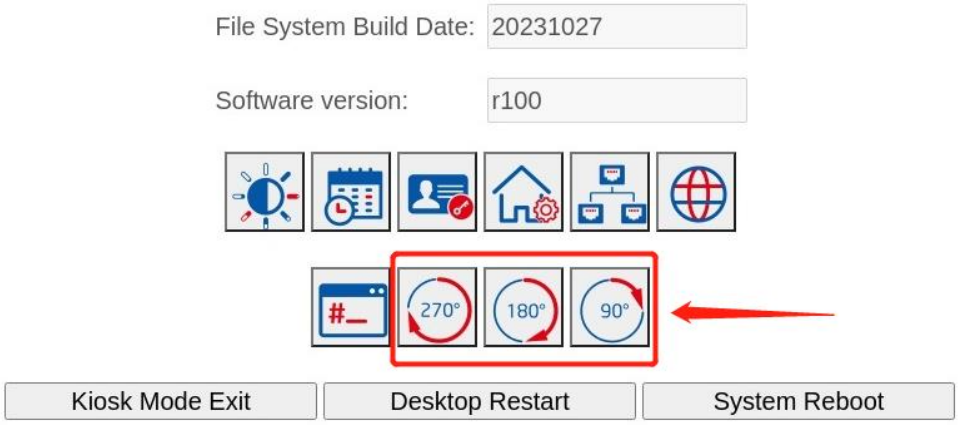
➢ **Network setting for LAN1(eth0) & LAN2(eth2).**

7. Terminal Mode



```
vm login: root
Password:
Last login: Fri Oct 27 03:18:07 UTC 2023 from 192.168.20.110 on pts/0
Software version:r100
root@vm:~#
root@vm:~# uname -a
Linux vm 5.15.71+g3313732e9984 #1 SMP PREEMPT Tue Nov 15 10:35:06 UTC 2022 aarch64 aarch64 aarch64 GNU/Linux
root@vm:~#
root@vm:~# cat /etc/os-release
ID=fsl-imx-xwayland
NAME="NXP i.MX Release Distro"
VERSION="5.15-kirkstone (kirkstone)"
VERSION_ID=5.15-kirkstone
PRETTY_NAME="NXP i.MX Release Distro 5.15-kirkstone (kirkstone)"
DISTRO_CODENAME="kirkstone"
root@vm:~#
root@vm:~# free
               total        used        free      shared  buff/cache   available
Mem:         3687572      552232     2624912       62744      510428     2969576
Swap:              0           0           0
root@vm:~#
root@vm:~# exit
```

8. Screen Rotation

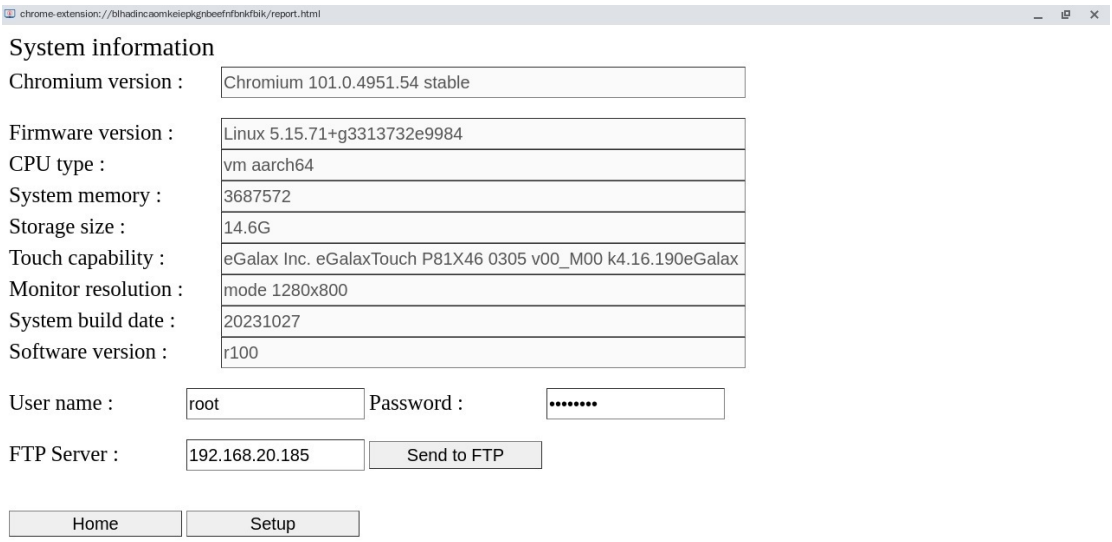


- **Screen rotation for 90°/180°/270°.**

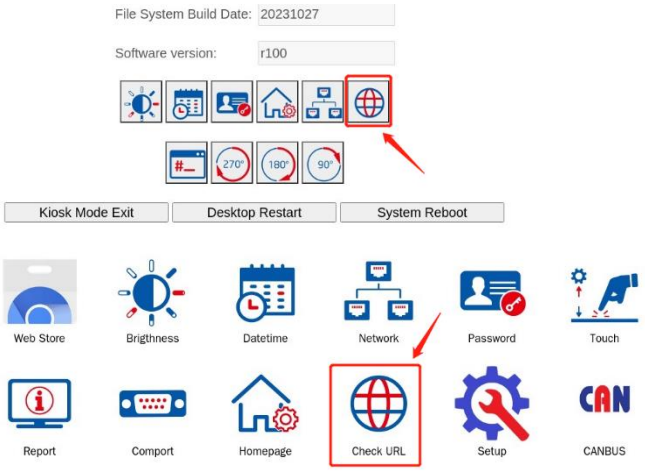
9. Gesture Key for Exit Kiosk Mode

- **While under Kiosk mode, touch the left down corner for 5 times to exit it.**

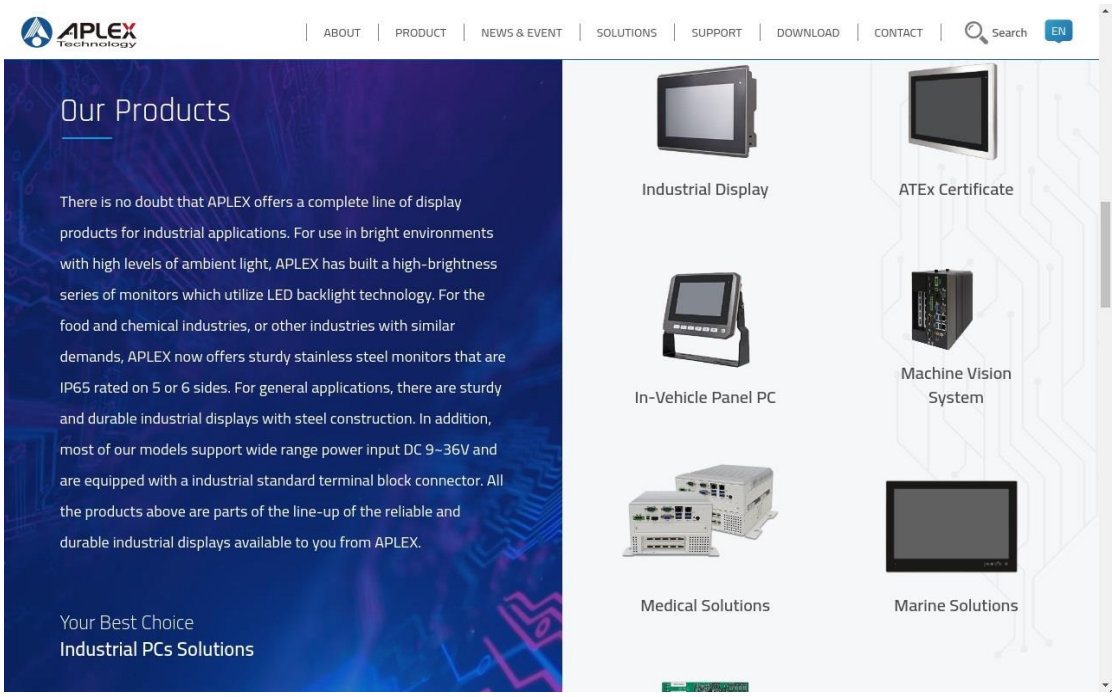
10. System Information



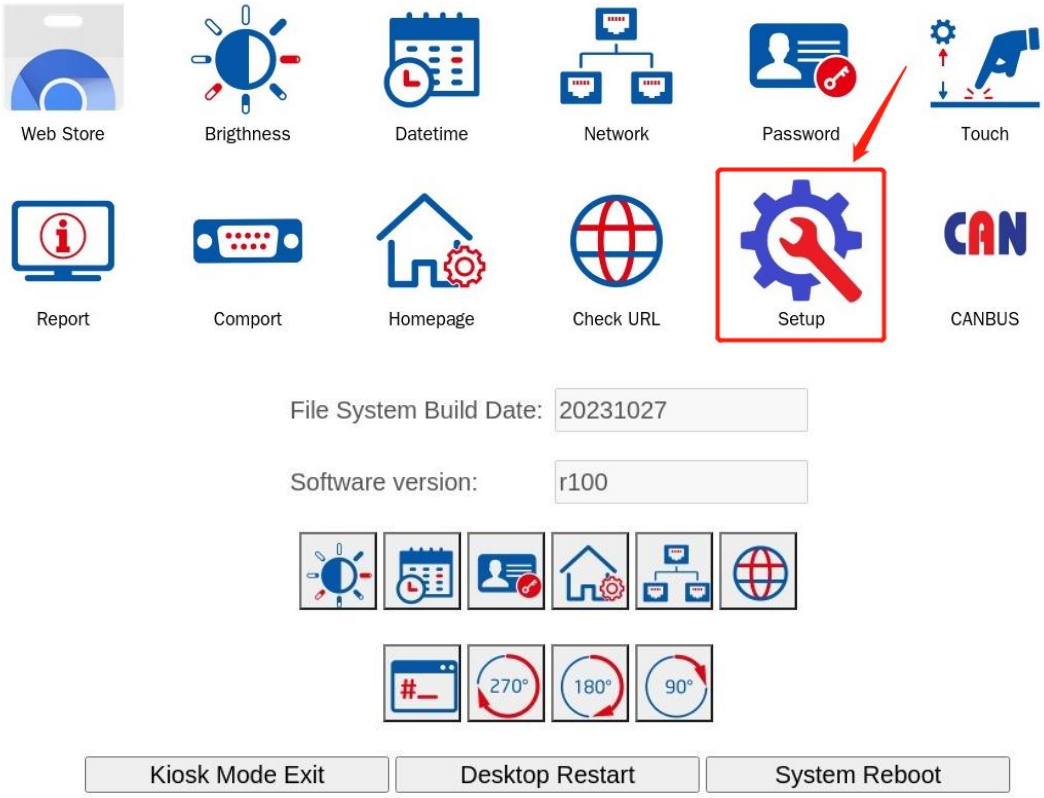
11. Return to Homepage



- **Return to the homepage of user settings.**

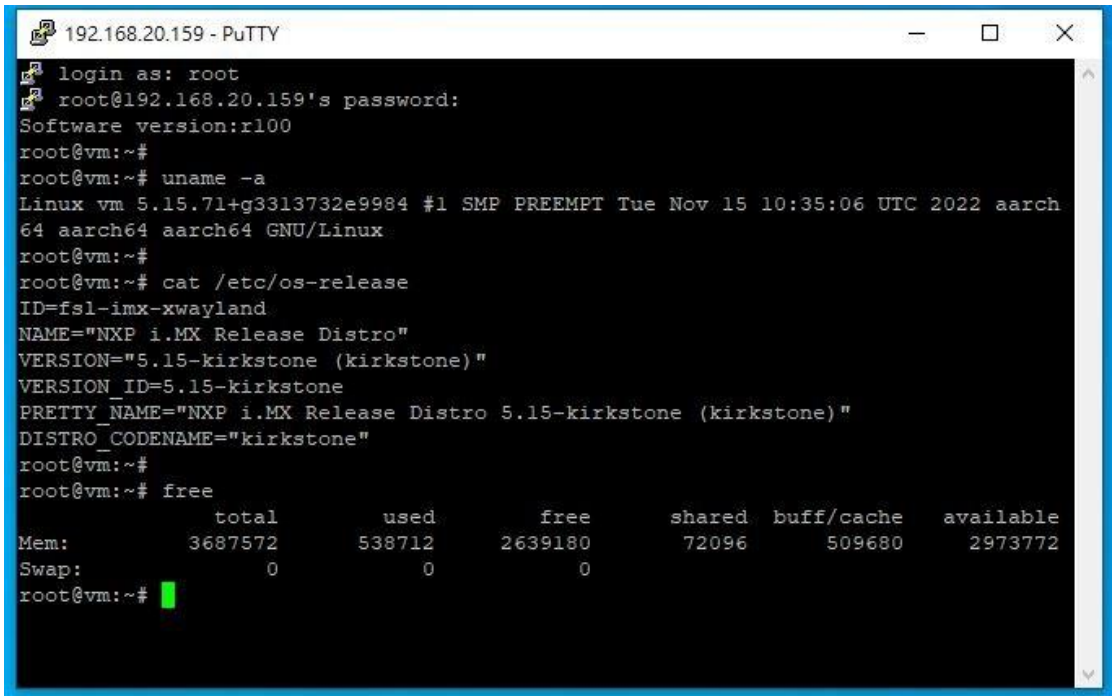


12. Return to System Login & Setup

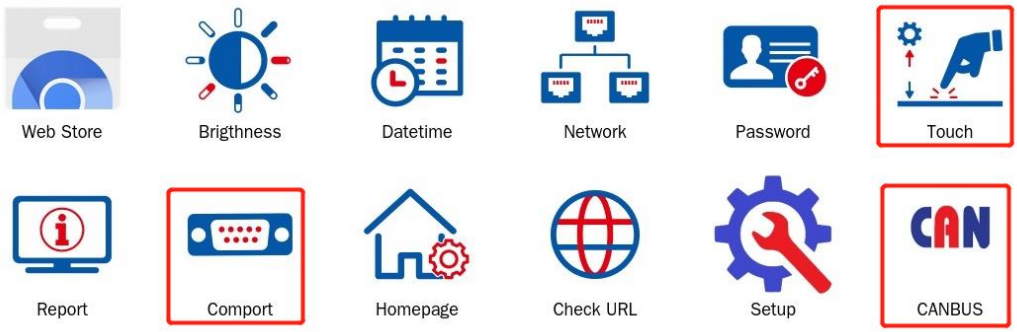


13. SSH Login

- **System also supports remote SSH login.**

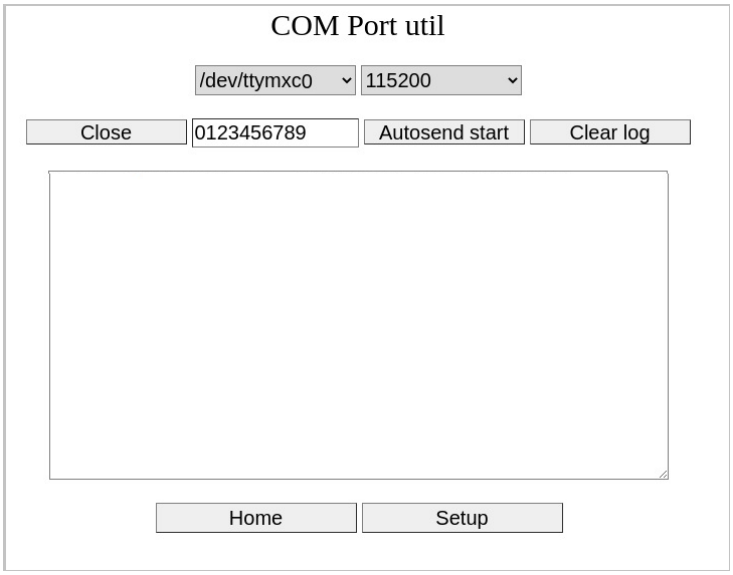


14. CAN Bus/COM Port/Touch Screen Test Tool

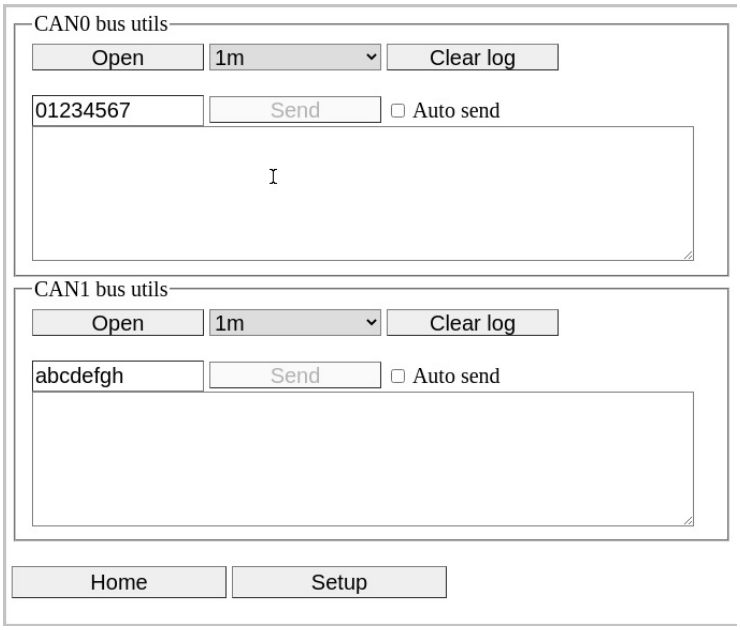


Z

- **COM port tool**



- **CANBus tool**



- **Touch screen draw test tool**


Touch tool :
Clear draw
Home
Setup