
Advantech IIoT Group

Advantech TPC-100W Software
User Manual

Version <1.09>

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Revision History

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2022/11/09	1.8	<ol style="list-style-type: none"> 1. Add the Backup page of GUI Settings tool 2. Update Gesture
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2022/07/04	1.3	Update the method of install Yocto 3.0 to emmc.
2022/06/17	1.2	Add the OPCUA page of GUI Settings tool
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1. ARM Yocto

TPC-100W platform is an embedded system with Linux Yocto 3.0/3.3. It contains system-required commands and drivers ready. The Yocto Project is an open source collaboration project that helps developers create custom Linux-based systems that are designed for embedded products regardless of the product's hardware architecture. Yocto Project provides a flexible toolset and a development environment that allows embedded device developers across the world to collaborate through shared technologies, software stacks, configurations, and best practices used to create these tailored Linux images.

2. ARM Yocto Software Support

2.1. System Default Software

ARM Yocto 3.0 support complete IIoT function as default including:

- SSH
- Wayland Terminal
- Qt5.15.0
- Gstreamer1.0
- Imx-gpu-viv 6.4.3.p1.4
- Wayland 1.18.0-r0
- Weston 9.0.0.imx-r0
- Weston-xwayland 9.0.0.imx-r0
- VNC
- TPM SLB9670
- GUI Settings Tool
- Recovery
- Security boot

ARM Yocto 3.3 support complete IIoT function as default including:

- SSH
- Wayland Terminal
- Qt5.15.2
- Gstreamer1.18.5
- Imx-gpu-viv 6.4.3.p2.6
- Wayland 1.18.0-r0
- Weston 9.0.0.imx-r0
- Weston-xwayland 9.0.0.imx-r0
- VNC
- TPM SLB9670
- GUI Settings Tool
- Recovery
- Security boot
- Watchdog
- Openssh-sftp-server 8.5p1-r0

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2.2. GPU Accelerations

Vivante GPU accelerations for Wayland; The Hantro Video Processing Unit supports the following decoders:

- video/x-h265
- video/x-vp9
- video/x-h264
- video/x-vp8
- video/x-vp6-flash
- video/mpeg
- video/x-h263
- video/x-flash-video
- video/x-divx
- video/x-xvid
- video/x-cavs
- video/x-wmv
- video/x-pn-realvideo
- video/x-raw

2.3. Install Yocto Software

Firstly, burning image to microSD card and instruction as below. If you already have the microSD card with Yocto image, you can go to the second part directly.

Note. Recommend the microSD card is more than 16GB storage interface to avoid not enough storage space.

If your PC is Linux environment:

1. Prepare the Linux environment that can use “uncompress” and “dd” command. (Below uses ubuntu 18.04 as example.)
2. Use “tar Jxvf filename” to uncompress the file to img format. If your file has already been img format, please go to next step directly.

```
$ tar Jxvf eamb9918-sdcard_1.1.0.img.tar.xz
```

3. Use “sudo dd if=imgfile of=SDpartition bs=4096” to burn the img file to your microSD card. (Note: You should check which partition is your microSD card firstly and you can format your microSD card before this step to avoid compatibility issue.)

```
$ sudo dd if=eamb9918-sdcard_1.1.0.img of=/dev/sdc bs=4096
```

If your PC is Windows:

1. Unzip the file to img format.
2. Use the Rufus or Raspberry Pi Imager provided by Raspberry Pi to burn the img file to your microSD card. You can refer to below link for the usage of the tools.

Raspberry Pi Imager:

<https://www.raspberrypi.com/news/raspberrypi-imager-imaging-utility/>

Rufus:

<https://rufus.ie/en/>

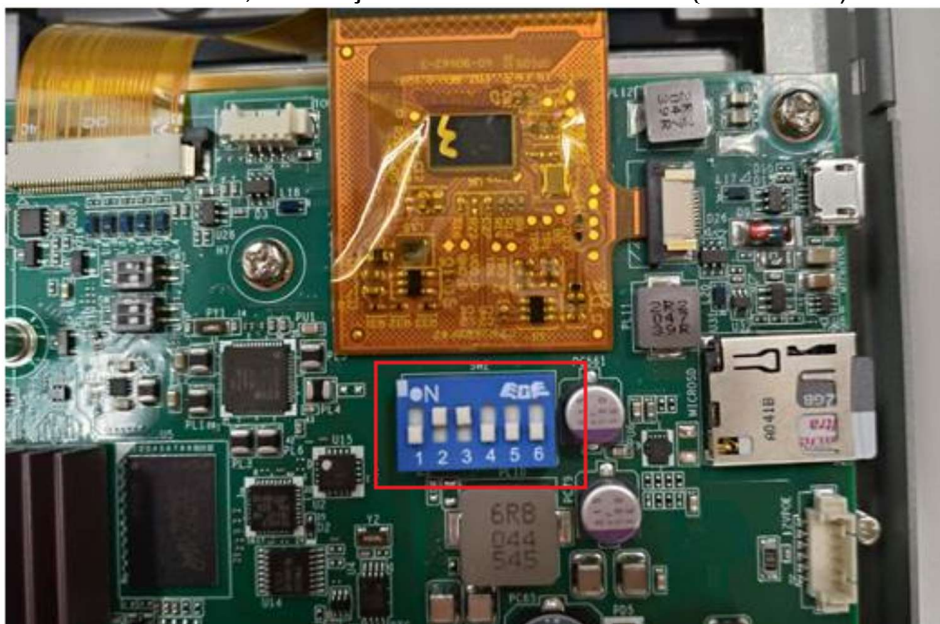
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Second, after image is put into microSD card, use microSD card to update the image.

1. Remove the screws from back cover. Due to COM port cover need to put down, then slide up.



2. Insert microSD card, then adjust switch as below order (red remark).



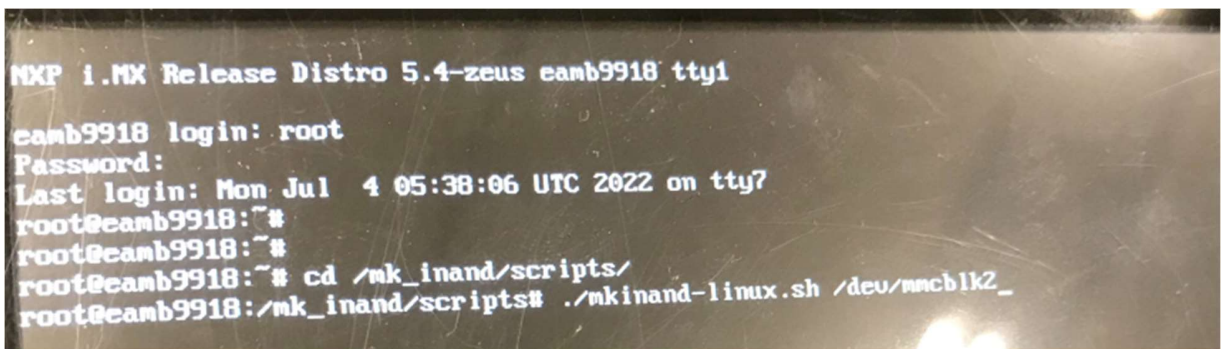
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- Power on the system and login with root account. Then it will ask you to setup the password of operator system in SD card. Please refer to chapter 2.4 First login for more information.
- (Optional for Yocto3.0)After login the system with desktop UI, open Terminal and input below commands. (This will close the desktop UI because it will cause the next process abnormally.)

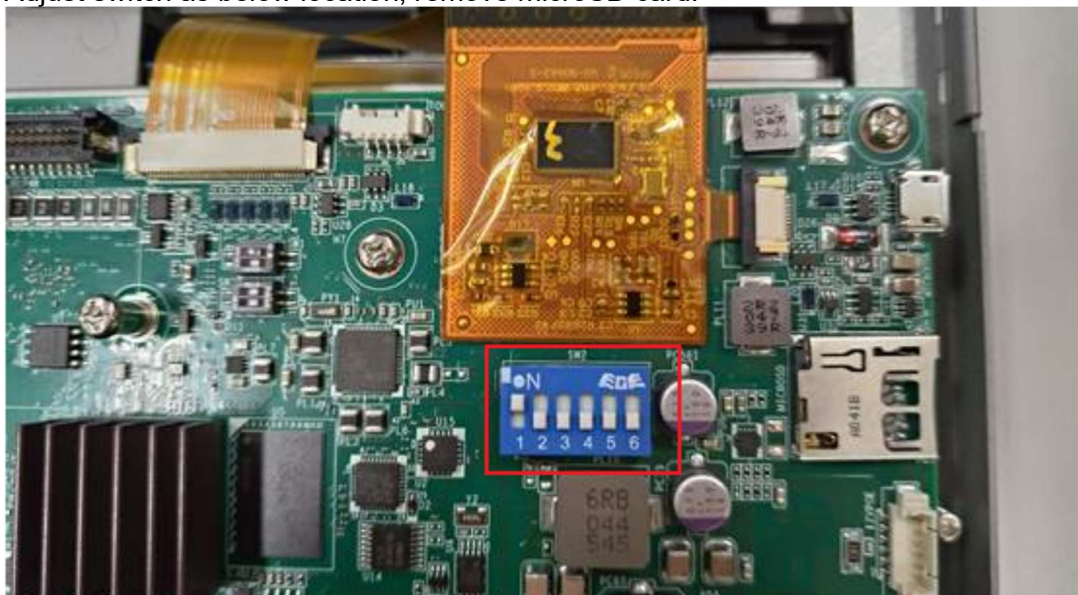
```
sh-5.0# systemctl stop weston@root.service
```

- Login the system with root account if need and enter below commands.

```
root@eamb99918:~# cd /mk_inand/scripts
root@eamb99918:/mk_inand/scripts# ./mkinand-linux.sh /dev/mmcblk2
```



- Waiting for update is finished. Then power off the system.
- Adjust switch as below location, remove microSD card.



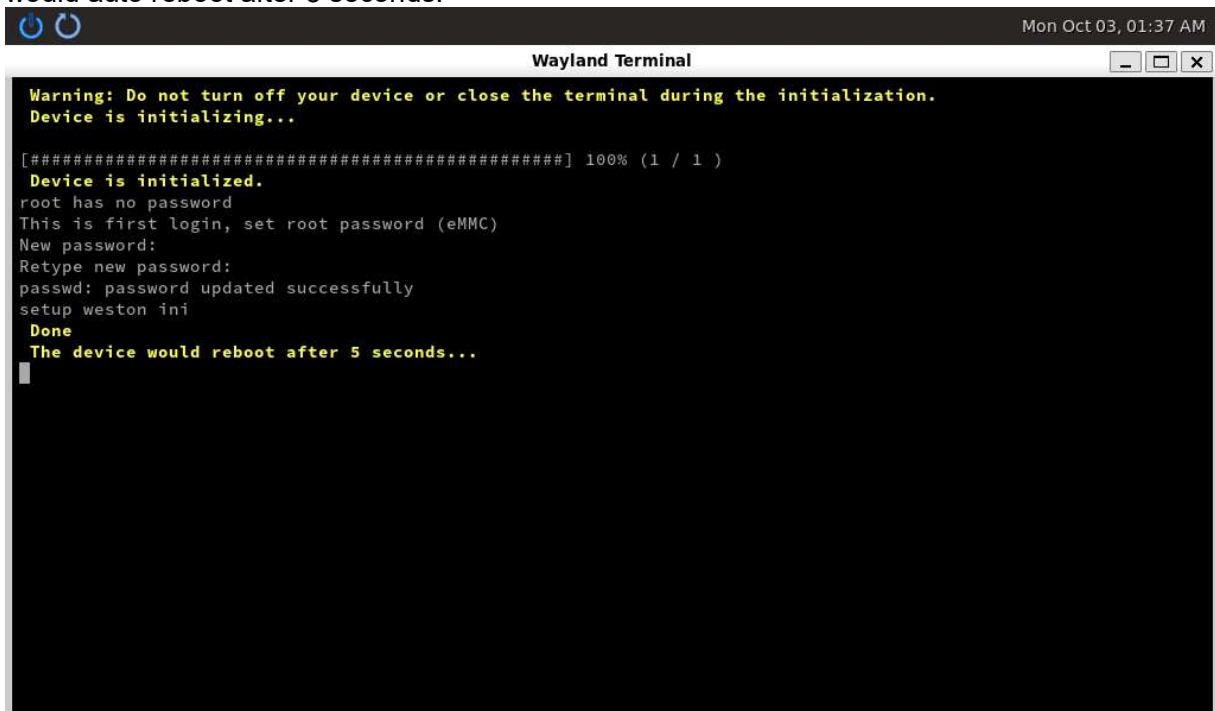
- Power on again from eMMC. Then it will ask you to setup the password of operator system in eMMC. Please refer to chapter 2.4 First login for more information.

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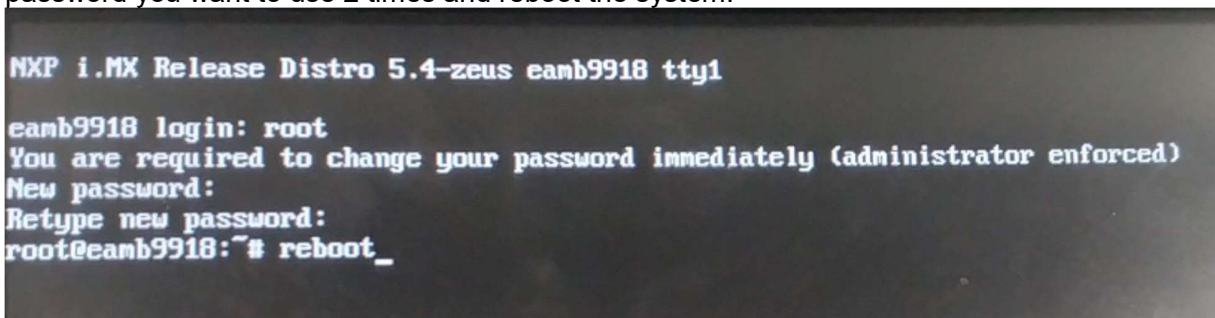
2.4 First login

If you are the first time to login the system, you would need to setup the password. Please connect the physical keyboard and use the account “root” to login.

If your screen displays this, please input the password you want to use 2 times for root. Then it would auto reboot after 5 seconds.



If your screen displays this, please use the account “root” to login, Then you have to input the password you want to use 2 times and reboot the system.



Now you can use the Yocto system with GUI.

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3. TPC-100W Module Extension

TPC-100W supports one M.2 E-Key slot which allows users to expand the functionality. There are pre-configured Wi-Fi modules ready to use. This chapter will take Wi-Fi module as an example to demonstrate how to use a module on TPC-100W.

3.1 Module Information

- P/N: 968DD00086
M.2 2230 RYWDB02 802.11a/b/g/n+BT5
Cable: 17cm~20cm
- P/N: EWM-W194M201E
M.2 2230 SDIO-UART Module IEEE 802.11ac/a/b/g/n, Bluetooth 5.0, 2T2R
Cable: 17cm~20cm

3.2 The Configuration and Connection of WIFI Module

Configure by Command mode

1. Check the WIFI device exists.

```

$ ifconfig wifi
wifi0    Link encap:Ethernet HWaddr 88:da:1a:76:38:bc
         inet6 addr: fe80::8ada:1aff:fe76:38bc/64 Scope:Link
         UP BROADCAST MULTICAST DYNAMIC MTU:1500 Metric:1
         RX packets:0 errors:0 dropped:0 overruns:0 frame:0
         TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
         collisions:0 txqueuelen:1000
         RX bytes:0 (0.0 B) TX bytes:0 (0.0 B)

or

$ ifconfig mlan0 (or wlan0)
mlan0: flags=-28669<UP,BROADCAST,MULTICAST,DYNAMIC> mtu 1500
        ether 48:e7:da:78:20:01 txqueuelen 1000 (Ethernet)
        RX packets 0 bytes 0 (0.0 KiB)
        RX errors 0 dropped 0 overruns 0 frame 0
        TX packets 0 bytes 0 (0.0 KiB)
        TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

```

Or you can use below command to check.

```

ls /sys/class/net/
can0 can1 eth0 eth1lo wifi0 (or mlan0, wlan0)

```

If the WIFI node exists, the WIFI driver works normally.

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2. Enable WIFI.

```
$ connmanctl technologies
/net/connman/technology/p2p
  Name = P2P
  Type = p2p
  Powered = False
  Connected = False
  Tethering = False
/net/connman/technology/wifi
  Name = WiFi
  Type = wifi
  Powered = True
  Connected = False
  Tethering = False
/net/connman/technology/bluetooth
  Name = Bluetooth
  Type = bluetooth
  Powered = True
  Connected = False
  Tethering = False
/net/connman/technology/ethernet
  Name = Wired
  Type = ethernet
  Powered = True
  Connected = True
  Tethering = False
```

If “Powered = True”, it means WIFI is enabled.
If WIFI is disabled, please use below command to enable it.

```
$ connmanctl enable wifi
```

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3. Scanning WIFI hotspot.

```

$ connmanctl scan wifi
$ connmanctl services
*AO Wired          ethernet_c400ad7d091c_cable
  advanxxx         wifi_88da1a7638bc_616476616e74656368_managed_psk
  TP-LINK_A990     wifi_88da1a7638bc_54502d4c494e4b5f41393930_managed_psk
  QA-Test          wifi_88da1a7638bc_51412d54657374_managed_psk
  TP-LINK_603854   wifi_88da1a7638bc_54502d4c494e4b5f363033383534_managed_none
  PCCWS_LOCAL      wifi_88da1a7638bc_50434357535f4c4f43414c_managed_psk
  QA-Test-5G      wifi_88da1a7638bc_51412d546573742d3547_managed_psk
  php              wifi_88da1a7638bc_706870_managed_psk
                  wifi_88da1a7638bc_hidden_managed_none
                  wifi_88da1a7638bc_hidden_managed_psk
  KOALXA-AP-2.4   wifi_88da1a7638bc_4b4f414c58412d41502d322e34_managed_psk
  PCCWS_GDCN      wifi_88da1a7638bc_50434357535f4744434e_managed_psk
  ChinaNet-APUU   wifi_88da1a7638bc_4368696e614e65742d41505555_managed_psk
  DIRECT-8CAXA-JIANFENGmsMZ wifi_88da1a7638bc_4449524543542d38434158412d4
                  a49414e46454e476d734d5a_managed_psk
  HP-HOTSPOT-98-LaserJet M1218 wifi_88da1a7638bc_48502d484f5453504f542d39382d4c
                  617365724a6574204d31323138_managed_none
  KoalXARd@6      wifi_88da1a7638bc_4b6f616c584152644036_managed_psk
  TP-LINK_F8FE    wifi_88da1a7638bc_54502d4c494e4b5f46384645_managed_none
  KOALXA-AP-5     wifi_88da1a7638bc_4b4f414c58412d41502d35_managed_psk

```

4. Connect to WIFI hotspot.

If the WIFI hotspot needs password, it will remind you to input.

```

connmanctl
connmanctl> agent on
Agent registered
connmanctl> connect wifi_88da1a7638bc_616476616e74656368_managed_psk
Agent RequestInput wifi_88da1a7638bc_616476616e74656368_managed_psk
  Passphrase = [ Type=psk, Requirement=mandatory ]
Passphrase? *****
Connected wifi_88da1a7638bc_616476616e74656368_managed_psk
connmanctl> quit

```

5. Now you can browse the internet by WIFI.

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6. Disable WIFI. Require disconnect WiFi before disable WiFi, otherwise connmanctl would be abnormal.

```
$ connmanctl disconnect wifi_88da1a7638bc_616476616e74656368_managed_psk  
$ connmanctl disable wifi
```

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3.3 The Configuration and Connection of Bluetooth Module

Configure by Command mode

1. Check the Bluetooth device status.

```
root@Qing:~# hciconfig
hci0: Type: BR/EDR Bus: USB
BD Address: 00:1A:7D:DA:71:13 ACL MTU: 310:10 SCO MTU: 64:8
UP RUNNING
RX bytes:574 acl:0 sco:0 events:30 errors:0
TX bytes:368 acl:0 sco:0 commands:30 errors:0
```

If there is no device showed, it means no driver or device.

2. Enable Bluetooth service.

```
systemctl status bluetooth
## 如果没有 active, 你需要执行以下指令, 否则, 无须执行
systemctl enable bluetooth.service
systemctl start bluetooth
```

```
connmanctl enable bluetooth
#or
# hciconfig hci0 up
```

3. Open Bluetooth.

```
bluetoothctl

[bluetooth]# power on
[bluetooth]# pairable on
```

4. Scanning Bluetooth device.

Start scanning

```
## 扫描设备
[bluetooth]# scan on
Discovery started
[CHG] Controller 00:19:88:5E:10:B1 Discovering: yes
[NEW] Device 98:39:8E:1B:D8:88 Galaxy A5 (2016)
[CHG] Device 98:39:8E:1B:D8:88 RSSI: -86
Now, Copy the MAC Address of your PC
```

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Stop scanning:

```
## 结束扫描  
[bluetooth]# scan off
```

Please record the MAC address you want to connect.

5. Pair and connect to the Bluetooth device.

Pair the device by MAC address. If the device is paired before, you can ignore this.

```
[bluetooth]# pair 98:39:8E:1B:D8:88  
Attempting to pair with 98:39:8E:1B:D8:88  
[CHG] Device 98:39:8E:1B:D8:88 Connected: yes  
Request confirmation  
[agent] Confirm passkey 117022 (yes/no):
```

Connect the device by MAC address.

```
[bluetooth]# connect 98:39:8E:1B:D8:88  
Attempting to connect to 98:39:8E:1B:D8:88  
[CHG] Device 98:39:8E:1B:D8:88 Connected: yes  
Connection successful  
[CHG] Device 98:39:8E:1B:D8:88 ServicesResolved: yes
```

Trust the device by MAC address.

```
[bluetooth]# trust 98:39:8E:1B:D8:88
```

Now the connection is successful. You can exit the bluetoothctl.

```
[bluetooth]# quit
```

6. Using Obex profile to test the file transmission by Bluetooth.

```
$ echo "helloworld" > /home/root/test.txt  
$ export $(dbus-launch)  
$ /usr/libexec/bluetooth/obexd -r /home/root -a -d &
```

```
obexctl  
[obex]# connect 98:39:8E:1B:D8:88  
[obex]# send <file>  
[obex]# quit
```

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4. Time and Date Setting

Set system time (2021/10/07 09:00:00):

```
sh-5.0# date -s "2021/10/07 09:00:00"
```

Synchronize time from the NTP server:

```
sh-5.0# ntpdate <NTPSERVERIP>
```

Reset RTC hardware clock time (use current system time):

```
sh-5.0# hwclock -w
```

Reset system time (use RTC hardware clock time):

```
sh-5.0# hwclock -s
```

Set system time zone (use Taipei time):

```
sh-5.0# cp /usr/share/zoneinfo/Asia/Taipei /etc/localtime  
sh-5.0# sync
```


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5. CAN Setting

TPC-100W support FINTEK CAN. The below table shows the detailed information of CAN on TPC-100W and here we list the basic command to use CAN on TPC-100W.

HW	DEVICE	MODE
Fintek CAN0	can0	socket can

Setting: Open CAN device (The following examples will configure “can0” to bit-rate 250000, sample-point 0.875 and error restart with 100ms.)

```
sh-5.0# ifconfig can0 down
sh-5.0# ip link set can0 type can restart-ms 100
sh-5.0# ip link set can0 type can bitrate 250000 sample-point 0.875
sh-5.0# ip link set can0 type can berr-reporting on
sh-5.0# ifconfig can0 txqueuelen 1000
sh-5.0# ifconfig can0 up
```

We’ll use “candump” to receive data, “cangen” & “cansend” to send data. The “cangen” will send random data & ID and “cansend” will send specific data & ID to CANBUS.

Send message (“123#R”) to can0:

```
sh-5.0# cansend can0 123#R
```

Receive message from can0:

```
sh-5.0# candump can0
```

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6. Brightness Setting

1. Get brightness value:

```
sh-5.0# cat /sys/class/backlight/lvds_backlight/@0/brightness
```

2. Set brightness value: You can set the value from 0~100. Please notice that value 0 will let the screen be black.

```
Value 1
sh-5.0# echo 1 >> /sys/class/backlight/lvds_backlight/@0/brightness
Value 100
sh-5.0# echo 100 >> /sys/class/backlight/lvds_backlight/@0/brightness
```

7. COM Setting

TPC-100W supports 2 COM port. One is RS232/422/485 and another is RS485. Below commands can be used to change the settings. Please note these settings will back to default after reboot. If you want to keep the settings after reboot, you can use “GUI Settings Tool”. (Please check chapter 9.3.5 for more information.)

Set COM1 as RS232 mode and baud rate 115200.

```
sh-5.0# echo out > /sys/class/gpio/gpio85/direction
sh-5.0# echo out > /sys/class/gpio/gpio86/direction
sh-5.0# echo 1 > /sys/class/gpio/gpio85/value
sh-5.0# echo 0 > /sys/class/gpio/gpio86/value
sh-5.0# stty -F /dev/ttymx0 -echo -onlcr 115200
```

Set COM1 as RS422 mode and baud rate 115200.

```
sh-5.0# echo out > /sys/class/gpio/gpio85/direction
sh-5.0# echo out > /sys/class/gpio/gpio86/direction
sh-5.0# echo 1 > /sys/class/gpio/gpio85/value
sh-5.0# echo 1 > /sys/class/gpio/gpio86/value
sh-5.0# stty -F /dev/ttymx0 -echo -onlcr 115200
```

Set COM1 as RS485 mode and baud rate 115200.

```
sh-5.0# echo out > /sys/class/gpio/gpio85/direction
sh-5.0# echo out > /sys/class/gpio/gpio86/direction
sh-5.0# echo 0 > /sys/class/gpio/gpio85/value
sh-5.0# echo 1 > /sys/class/gpio/gpio86/value
sh-5.0# stty -F /dev/ttymx0 -echo -onlcr 115200
```

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Set COM2 baud rate 115200.

```
sh-5.0# stty -F /dev/ttymx2 -echo -onlcr 115200
```

8. Network Setting

TPC-100W using ConnMan to manage network. Below commands can be used to change the settings.

1. Get Network services:

```
sh-5.0# connmanctl services
*AO Wired      ethernet_c400ad971b0b_cable
```

2. Set Network IP address:

```
sh-5.0# connmanctl config ethernet_{your_service} --ipv4 manual 192.168.10.2 255.255.255.0
192.168.10.1
or
sh-5.0# connmanctl config ethernet_{your_service} --ipv4 dhcp
```

3. Set Network domain name servers:

```
sh-5.0# connmanctl config ethernet_{your_service} --nameservers 8.8.8.8 4.4.4.4
```

Please reference <https://wiki.archlinux.org/title/ConnMan> for more details.

9. Firewall Setting

Linux Yocto image for TPC-100W enable 22 SSH, 80 HTTP, 443 HTTPS, 8080 SWUPDATE by default for usage. You can follow below command to change it.

1. Check the list of iptables.

```
sh-5.0# iptables -L
```

2. Modify the /etc/iptables/iptables.rules and reboot the system.

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```
# Generated by iptables-save v1.8.3 on Wed Feb 23 10:16:51 2022
*filter
:INPUT DROP [3652:224108]
:FORWARD ACCEPT [0:0]
:OUTPUT ACCEPT [8:1414]
-A INPUT -i lo -j ACCEPT
-A INPUT -m state --state RELATED,ESTABLISHED -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 22 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 80 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 443 -j ACCEPT
-A INPUT -p tcp -m state --state NEW -m tcp --dport 8080 -j ACCEPT
-A INPUT -p icmp -m icmp --icmp-type 8 -j ACCEPT
COMMIT
# Completed on Wed Feb 23 10:16:51 2022
```

10. Device Information

TPC-100W provide atcc.info to get device information. Below commands can be used to show the information.

Get Device Information :

```
sh-5.0# atcc.info
Board Information:
  BOARD_VERSION: 1.0
  SERIAL_NUMBER: 123456789
  MANUFACTURING_TIME: 2023/02/16 00:00:00
Image Information:
  NAME: "NXP i.MX Release Distro"
  VERSION: "5.10-hardknott (hardknott)"
  VERSION_ID: 5.10-hardknott
  PRETTY_NAME: "NXP i.MX Release Distro 5.10-hardknott (hardknott)"
  IMAGE_VERSION: "TPC-100W-Yocto3.3.3-v1.0"
  KERNEL_VERSION: "Linux version 5.10.72"
  UBOOT_VERSION: "U-Boot 2021.04"
```

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11. GUI Settings Tool

11.1 Introduction of Advantech TPC-100W Settings Tool

Advantech TPC-100W Settings Tool is a Linux-based utility. Settings Tool helps user to get image version, get/set network configuration, get/set time configuration, and get/set screen configuration. There is a binary in Settings Tool: **settings**.

- **settings**
A GUI program provides GUI interface for user. User can configure Screen, Network, Time of TPC-100W via this program. Execution of settings relies on Qt and OpenGL libraries, `connmanctl` and `timedatectl` command line tools.

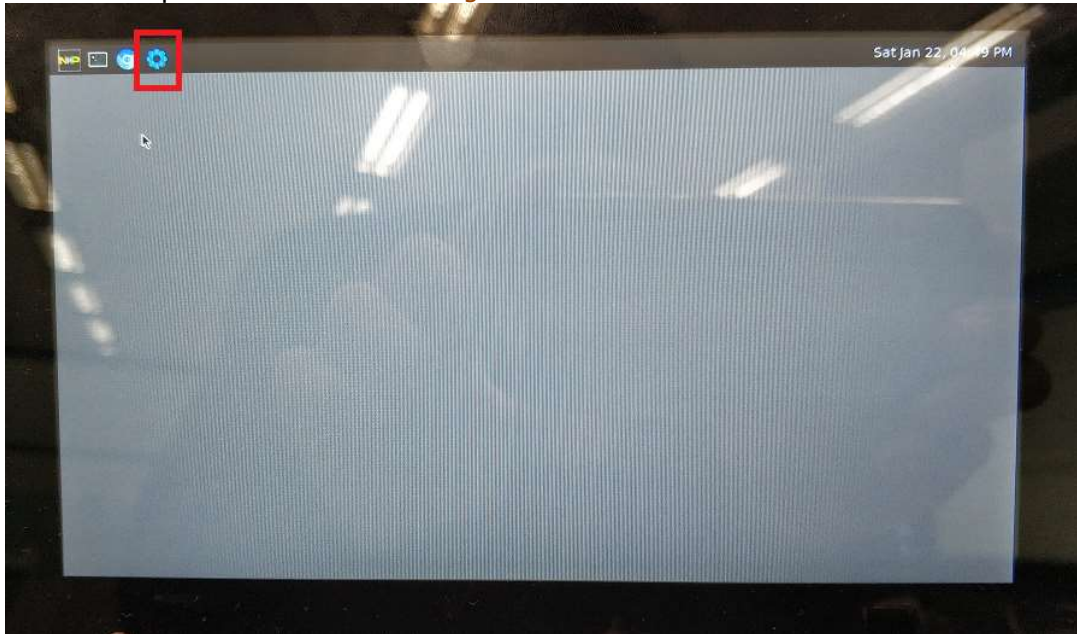
11.2 Platform Supported

Linux, arm64

11.3 How to Use TPC-100W Settings Tool

There is one binary in TPC-100W Settings Tool, "**settings**". "**settings**" is a GUI program. This section will explain how to use the GUI program, where to find logs.

- Click top bar icon to start **settings**



- To start **settings** by command line

```
sh-5.0# /usr/bin/settings
```

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11.3.1 Screen Configuration

All screen related configuration is in Screen page. After adjusted the brightness, it would be updated effective immediately. After adjusted the screensaver, hide cursor, gesture, you should click apply button to apply setting.

- To adjust brightness. You can use slider or spinbox to adjust value.

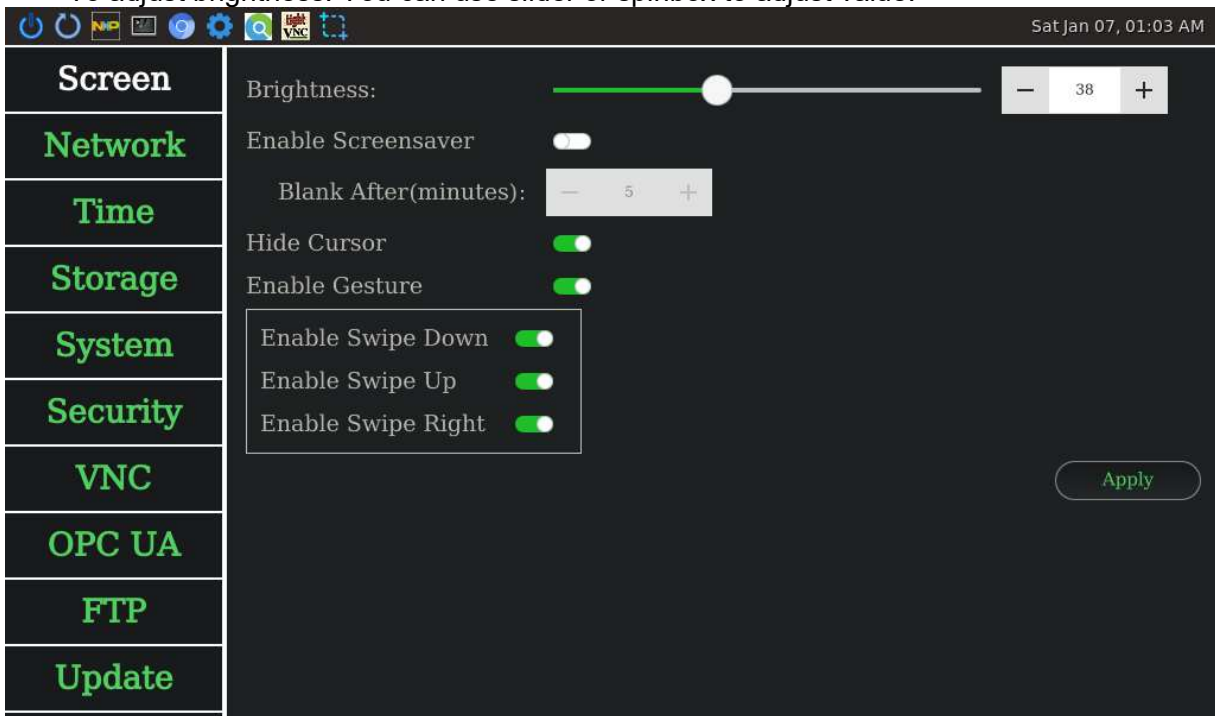


Figure Sample of Screen Page

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- To enable/disable screensaver. You can press switch button. You can use spinbox to adjust blank after minutes.

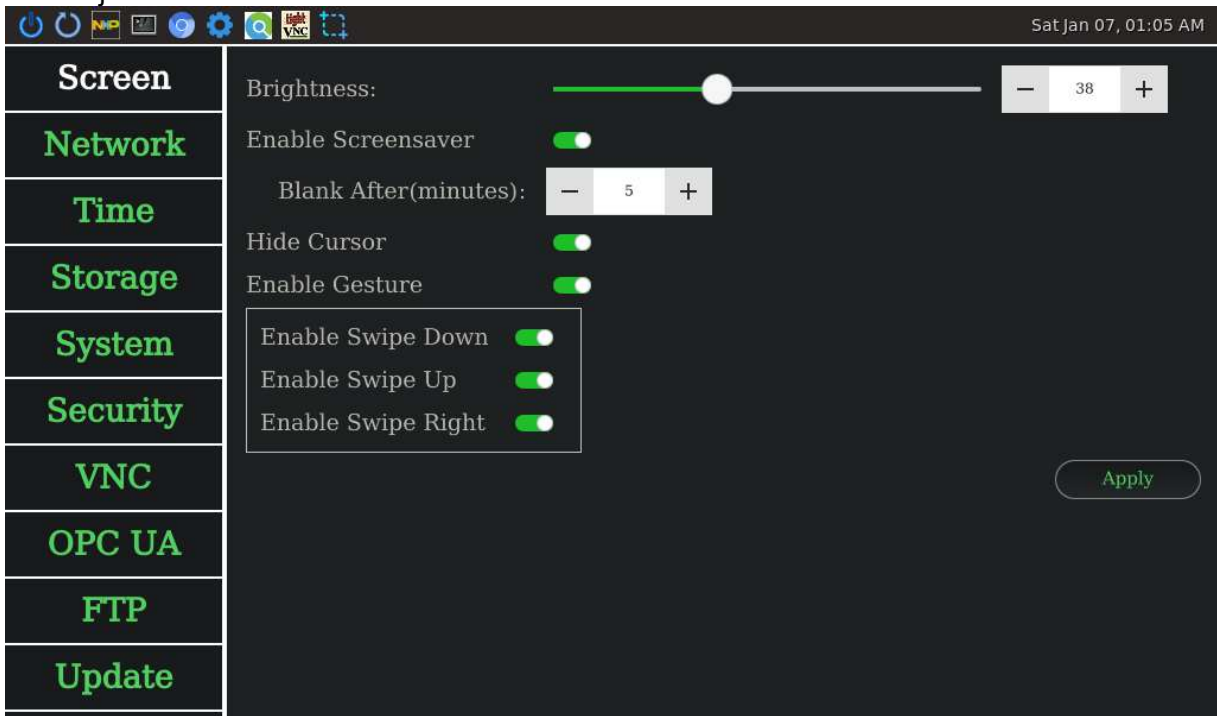


Figure Sample of Enable Screensaver Screen Page

- To enable/disable hide cursor. You can press switch button.

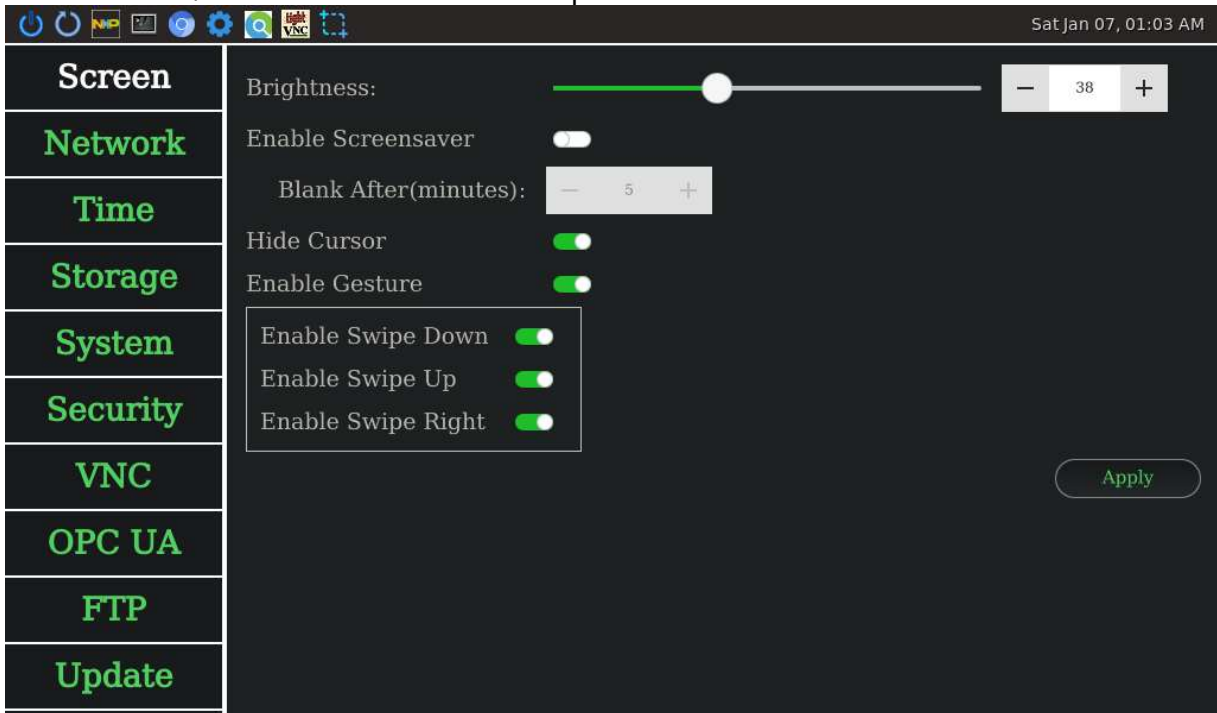


Figure Sample of Enable Hide Cursor Page

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■ To enable/disable gesture. You can press switch button.

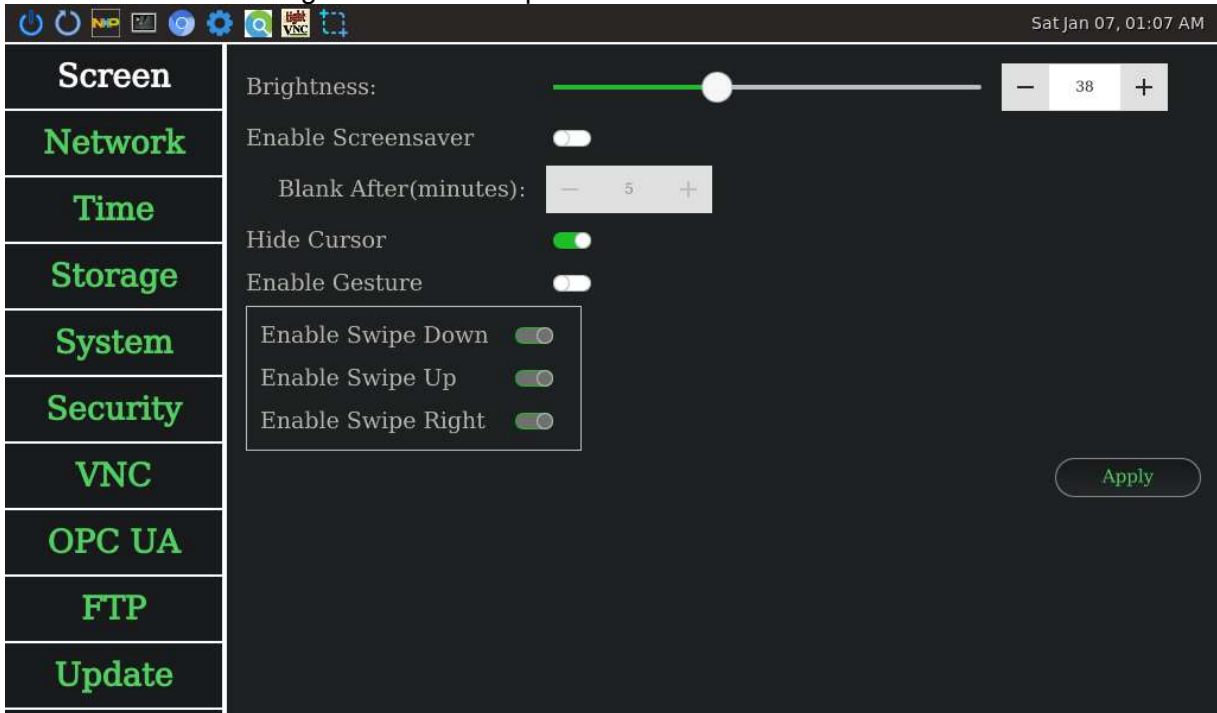


Figure Sample of Disable Gesture Page

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11.3.2 Network Configuration

All network related configuration is in Network page. The “Wired 1” tab is mapping to eth0 network interface and “Wired 2” tab is mapping to eth1 network interface. You can use the network settings whatever the network cable is connected or not. After adjusted the configuration, you should press Apply button to save configuration.

Note: The ifconfig interface of TPC-100W LAN A is eth1, and LAN B is eth0 on the image: eamb9918-sdcard_1.1.0.img.tar.xz.

■ You can view wired 1/2 information. To edit it, you can press config button.

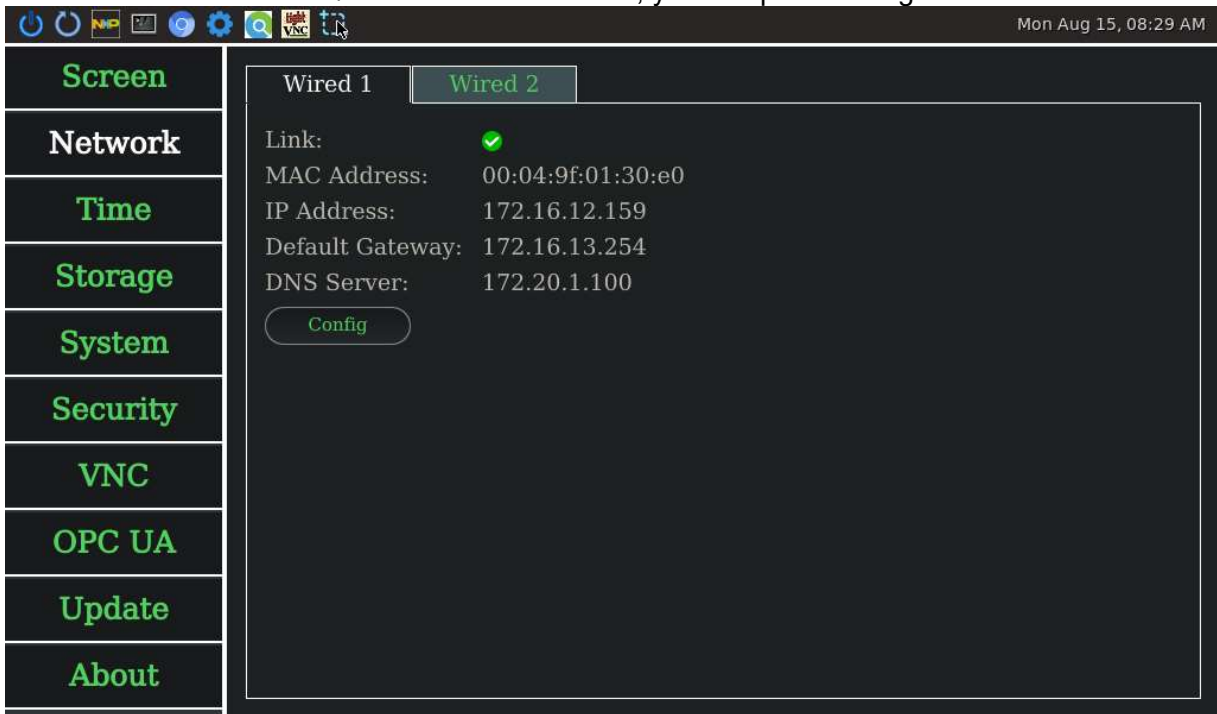


Figure Sample of View Network Page

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- To enable/disable DHCP. You can press switch button.

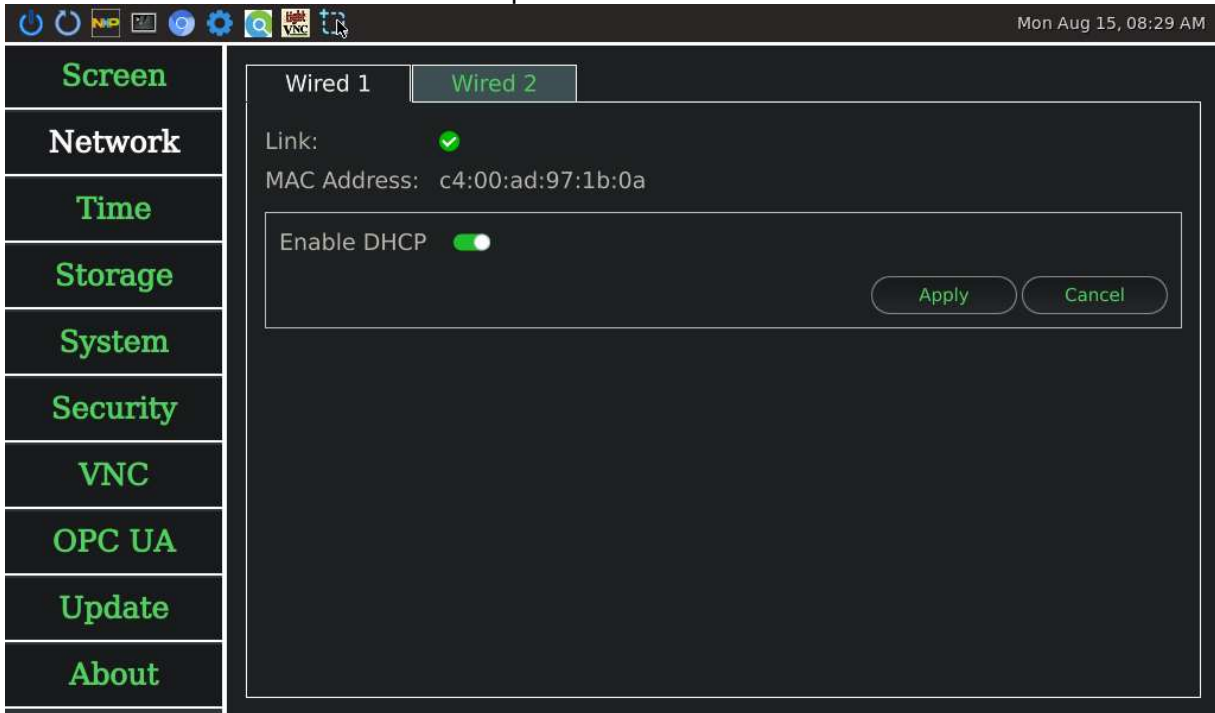


Figure Sample of Enable DHCP Network Page

- To set static IP. You should disable DHCP, then set the IP address, network mask, default gateway, and DNS server.

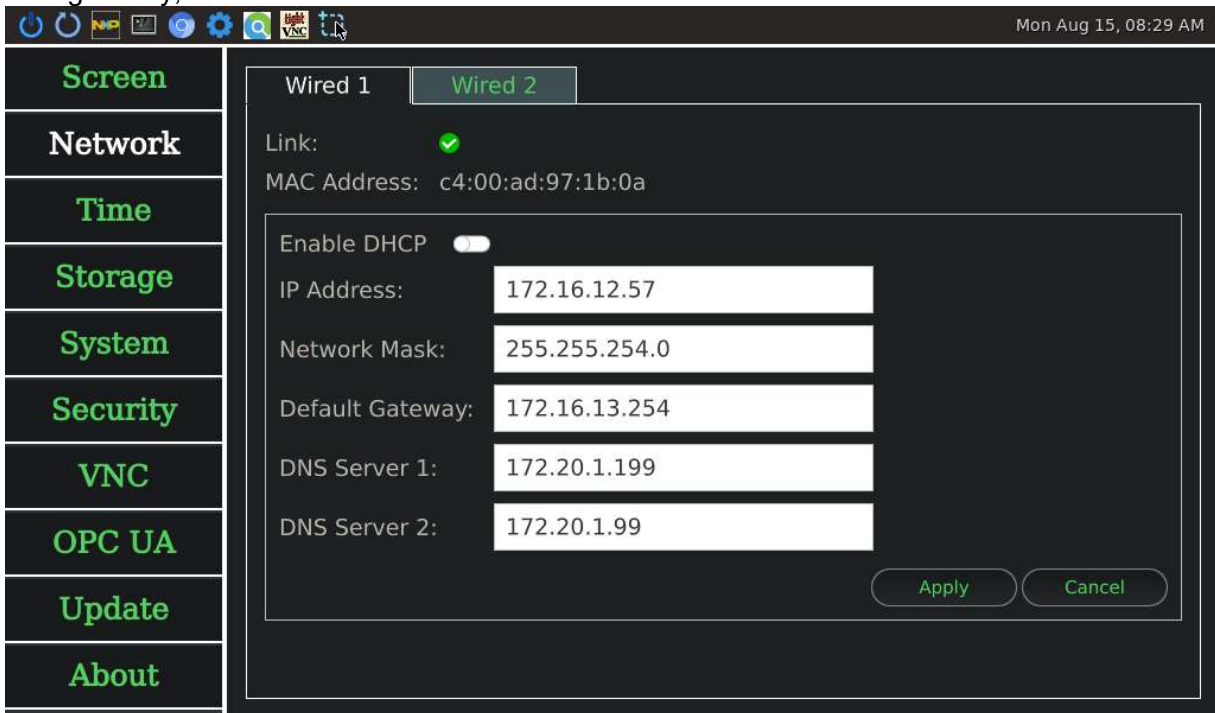


Figure Sample of Disable DHCP Network Page

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- To set Wired 2. You could press Wired 2 tab or swipe left to change the page. If there is no connection on wired 2, you still can set DHCP or static IP. If you apply settings when the status is offline, it would save to app config. When the status back to online, it would take effect only once.

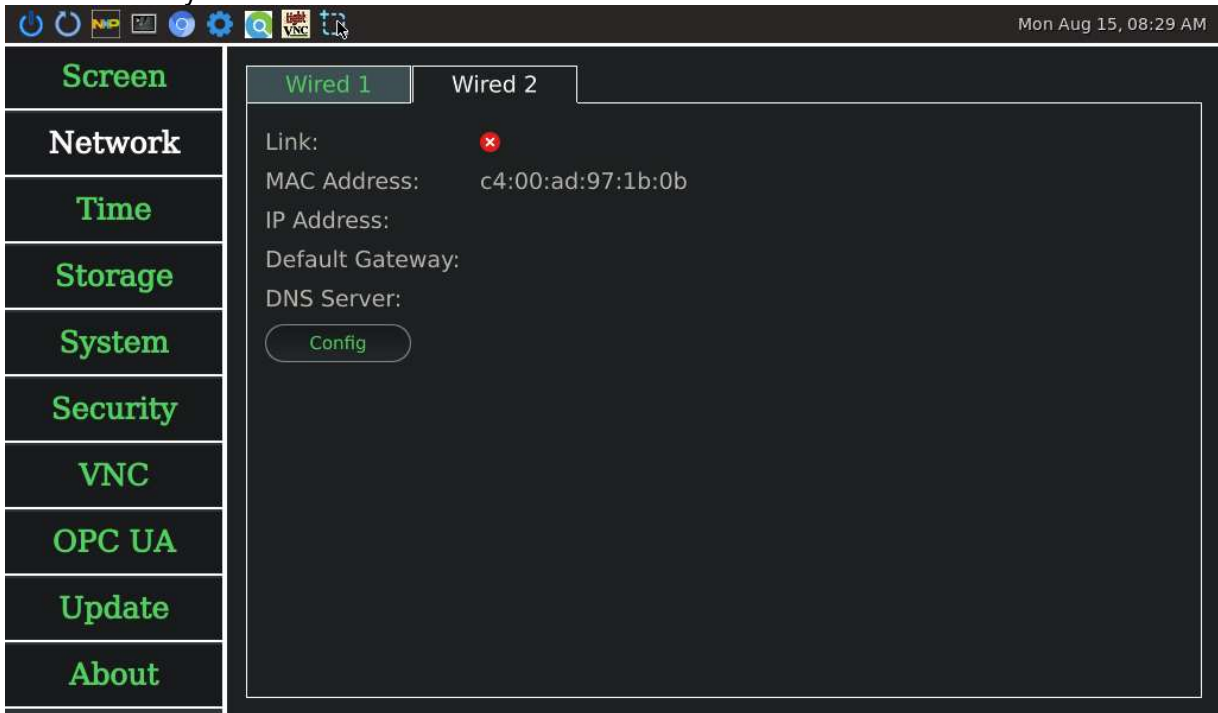


Figure Sample of View Wired 2 Network Page

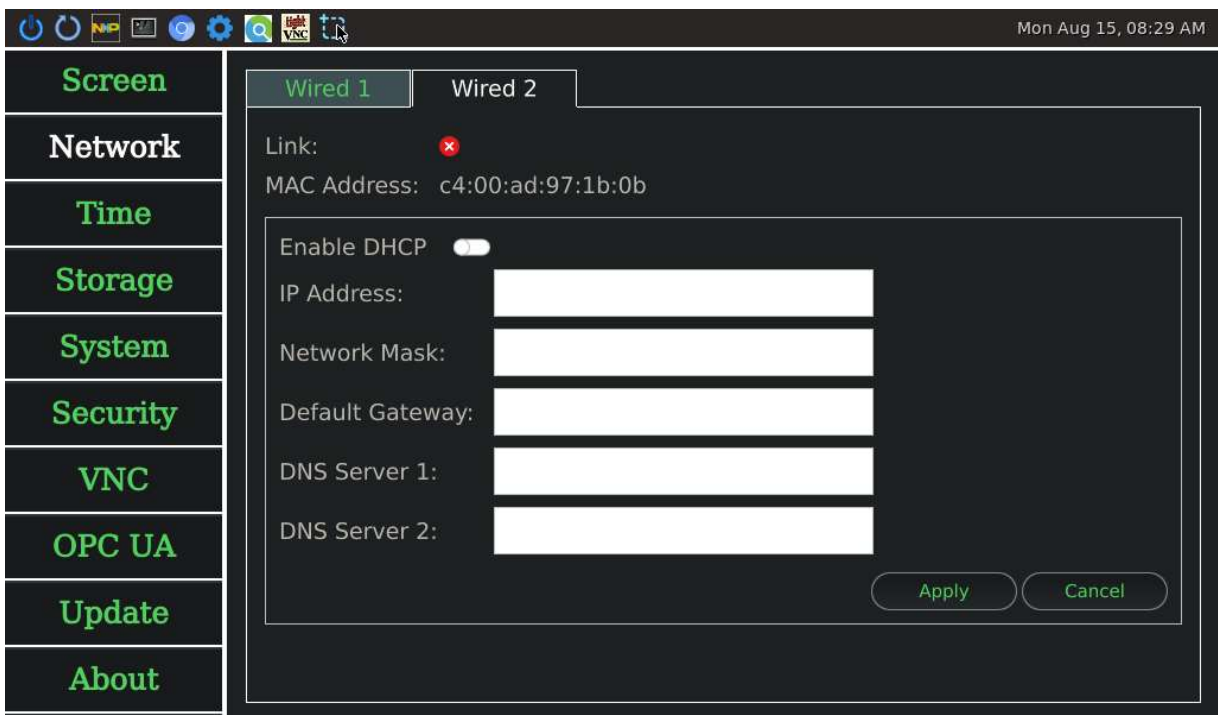


Figure Sample of Edit Wired 2 Network Page

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11.3.3 Time Configuration

All time related configuration is in time page. After adjusted the configuration, you should press Apply button to save configuration.

- To set timezone. You can press timezone combobox.

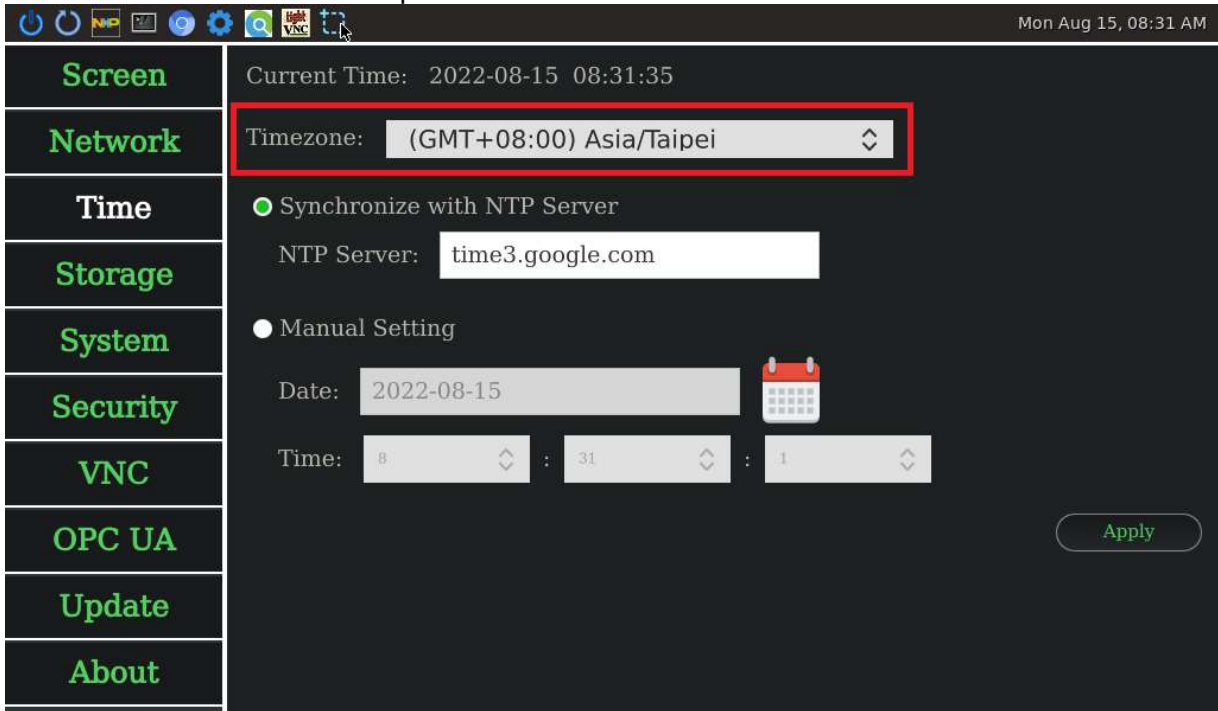


Figure Sample of Timezone Time Page

- To set synchronize with NTP server. You can press synchronize with NTP server radio button. NTP server is optional, default obtain from DHCP.

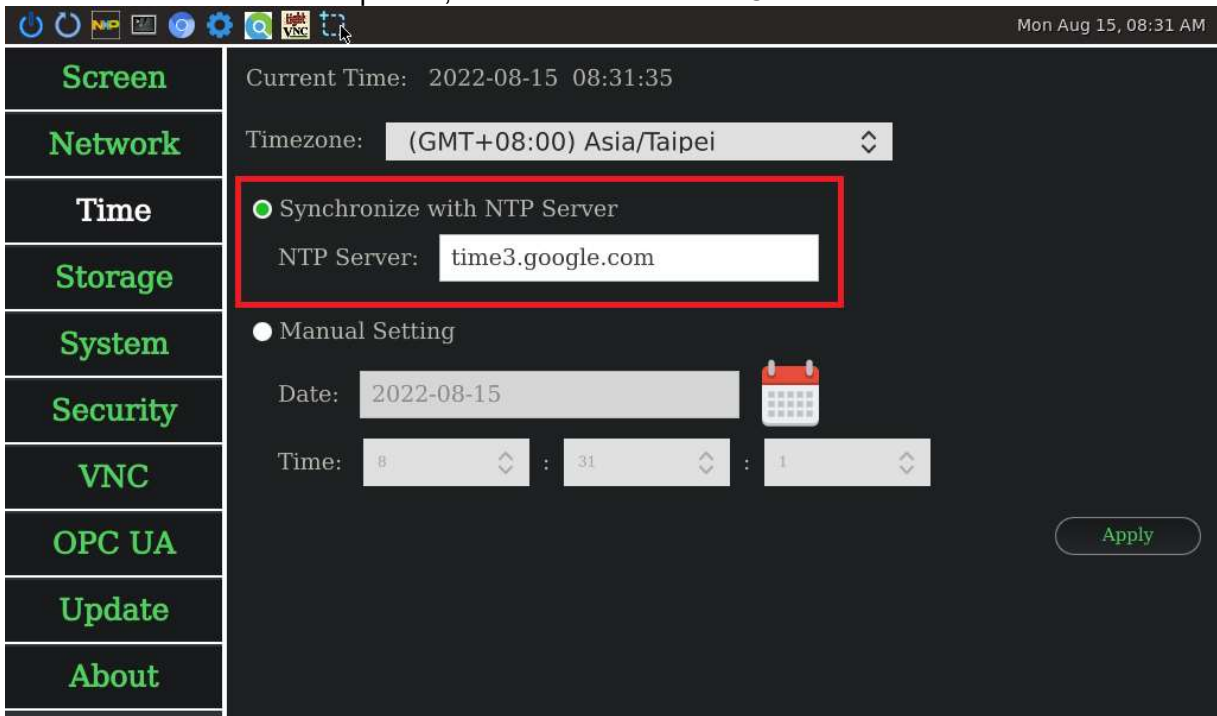


Figure Sample of Synchronize with NTP Server Time Page

- To set manual setting. You could press manual setting radio button. There is calendar button to set date. There are hour, minute, and second comboboxes to set time.

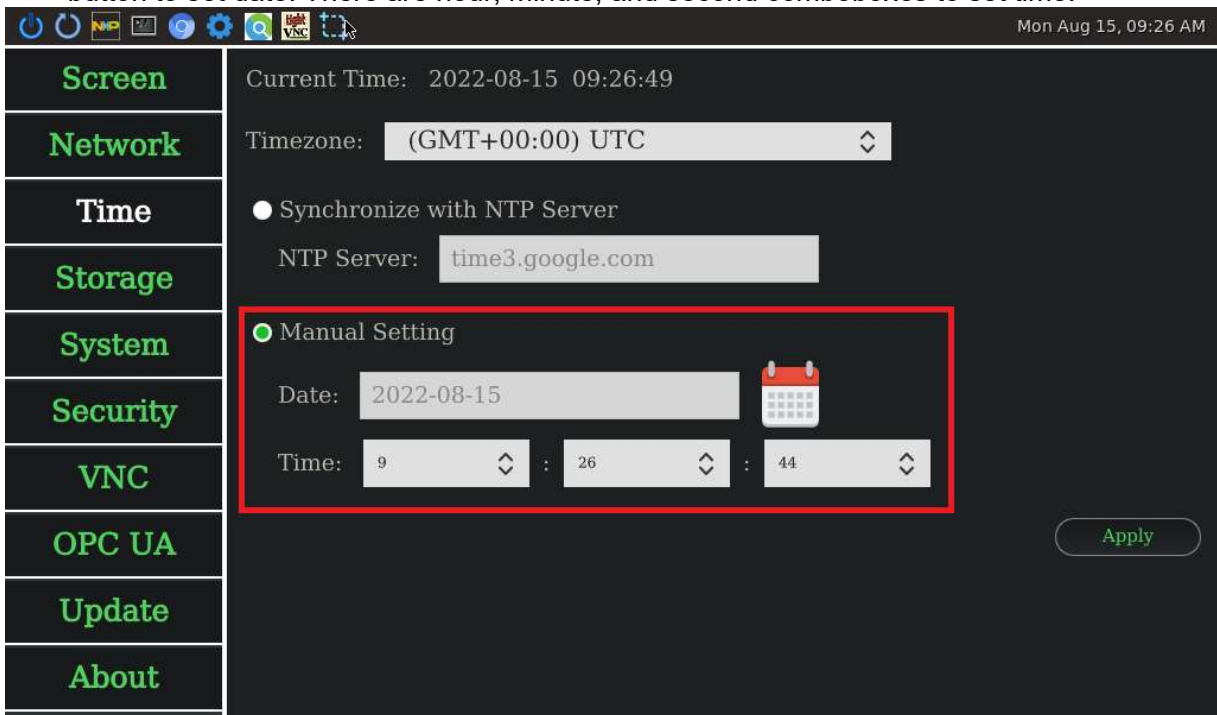


Figure Sample of Manual Setting Time Page

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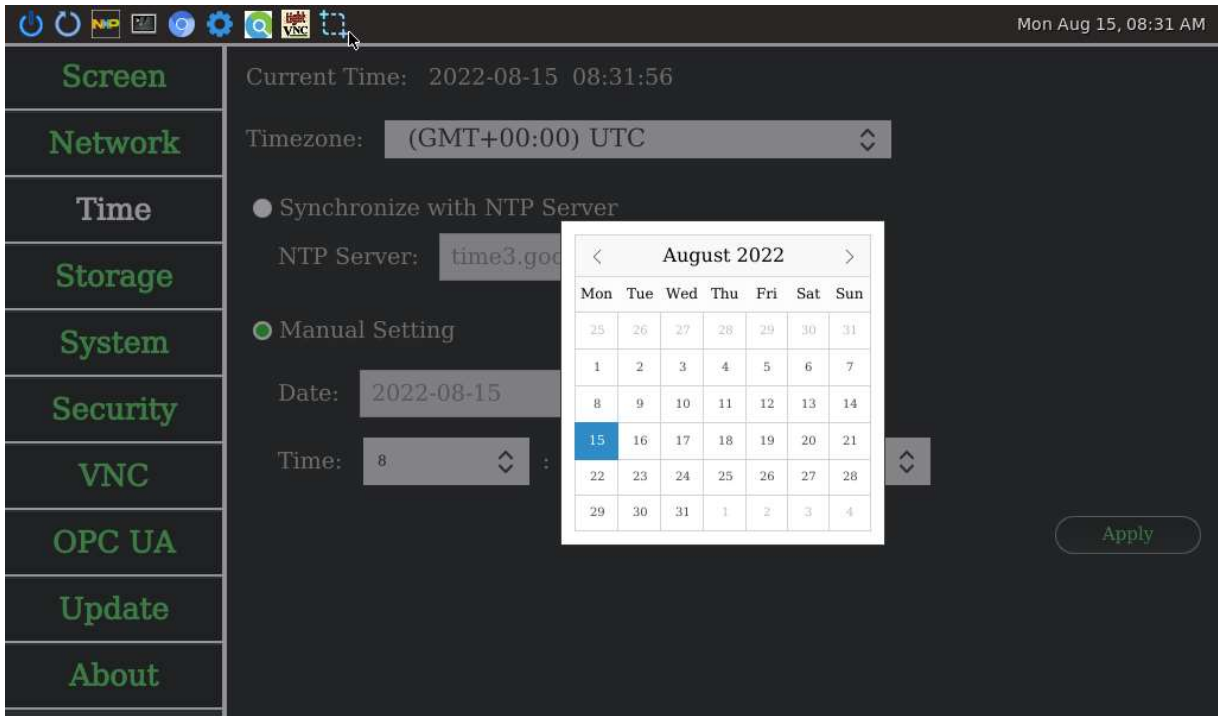


Figure Sample of Calendar Popup

11.3.4 Storage Information

All storage related information is in storage page.

- To see eMMC information.

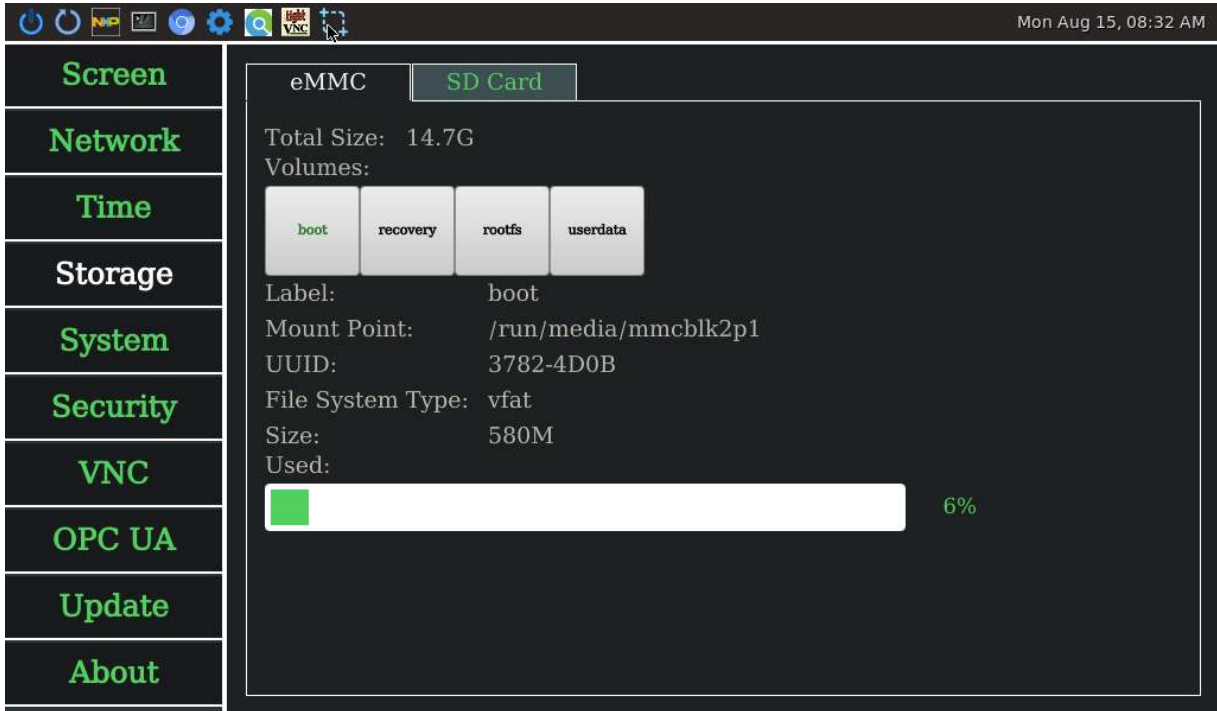


Figure Sample of eMMC Page

- To see SD card information.

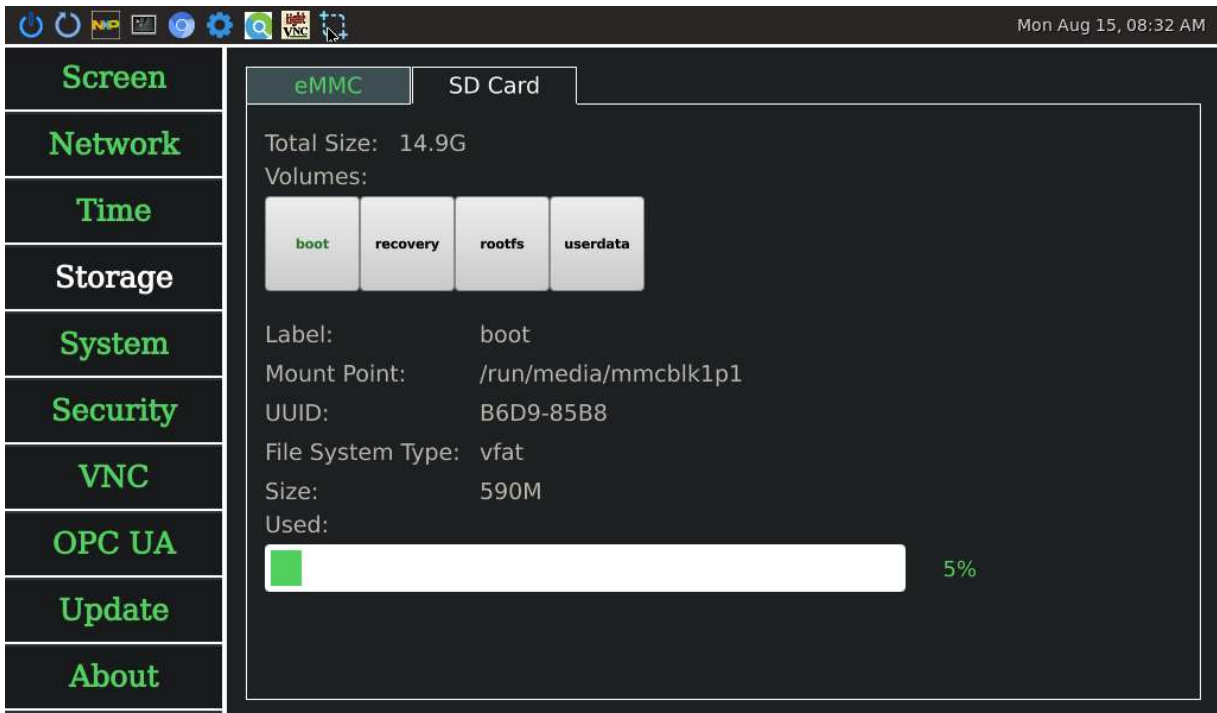


Figure Sample of SD card Page

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11.3.5 System Configuration

All system related configuration is in system page. After adjusted the configuration, you should press Apply button to save configuration. If you enable/disable read-only file system, you need to reboot device to verify the setting.

- To set startup application. You can press application dropdown list. Default is settings tool.
Note: If startup application is VNC viewer, it would start the monitor program first. The monitor program would check VNC server availability every 30 seconds. It would start VNC viewer only when VNC server is available to be connected.

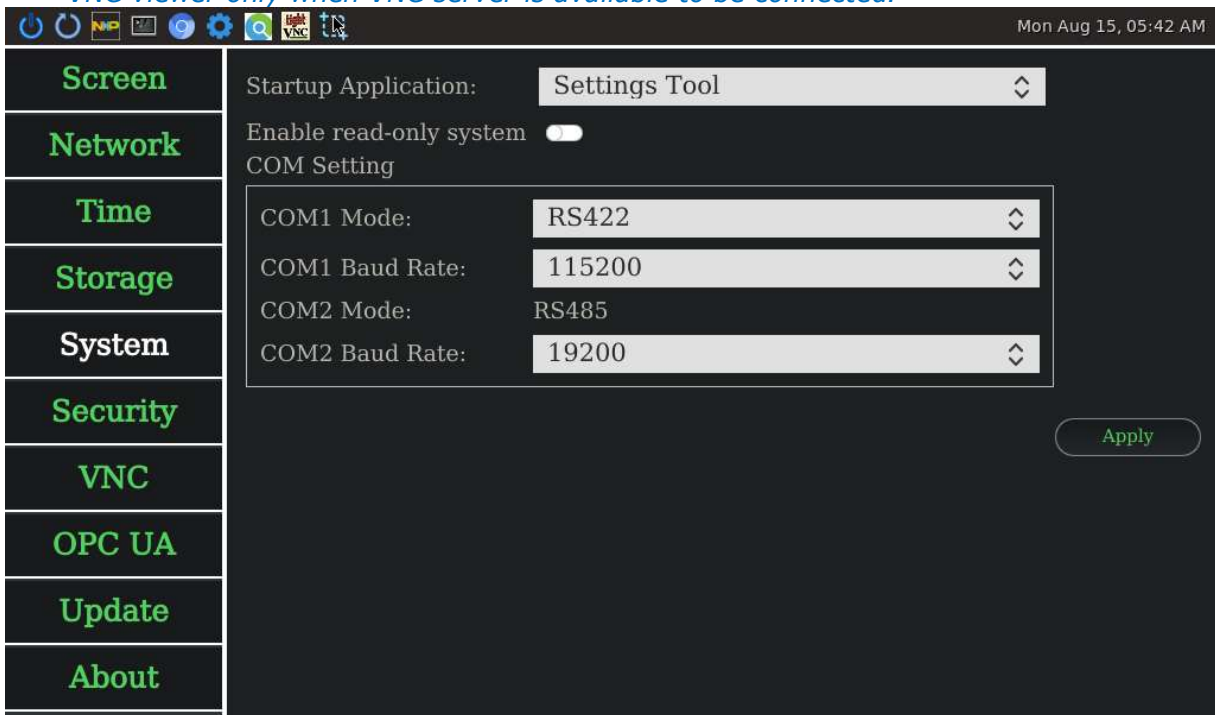


Figure Sample of System Page

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- To set static page. You can adjust timeout and URL. Or you can use custom static page.
Note: Static page would started by chromium. It would infinite retry each connection with timeout. You can use it to connect to your device.

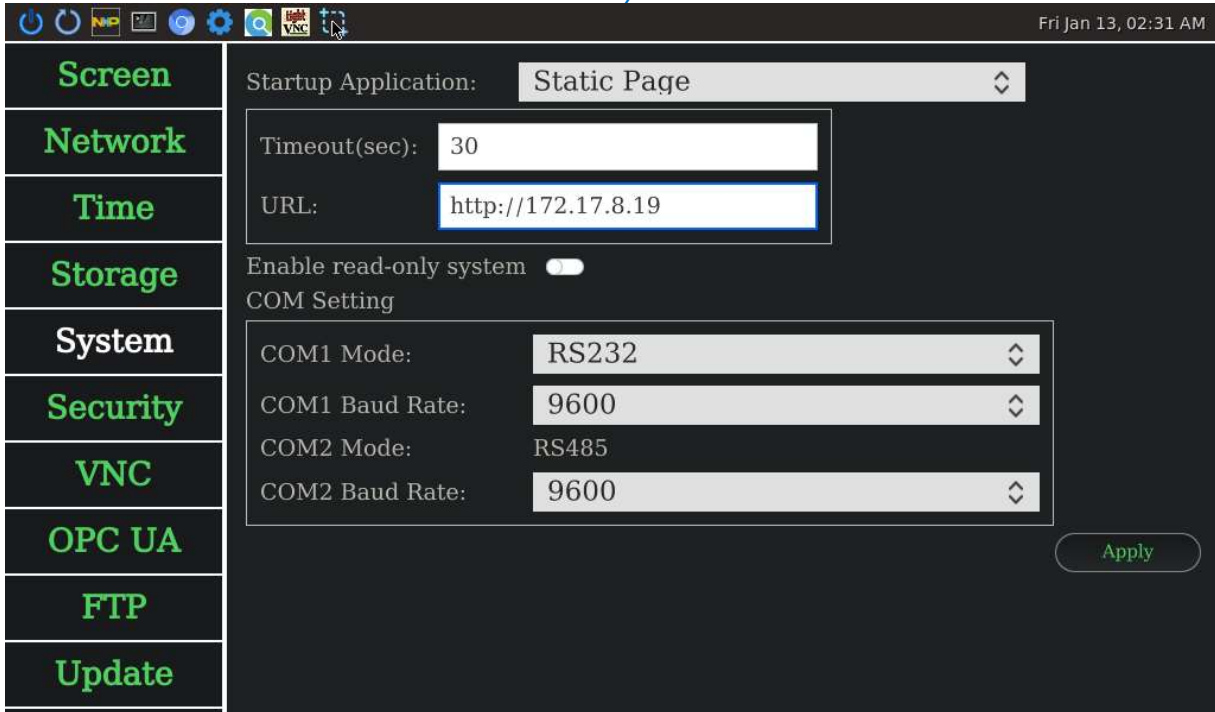


Figure Sample of Static Page System Page

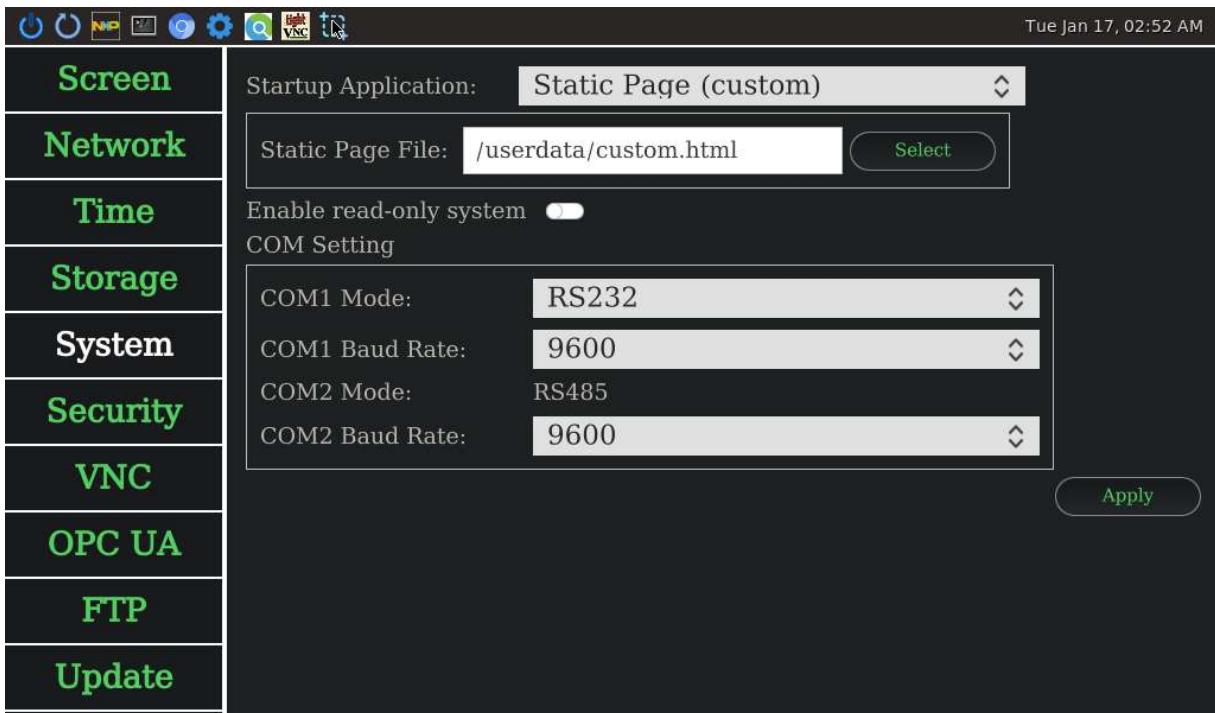


Figure Sample of Custom Static Page System Page

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- To enable/disable read-only system. You can press switch button.

Note: It only makes your root file system to be read-only.

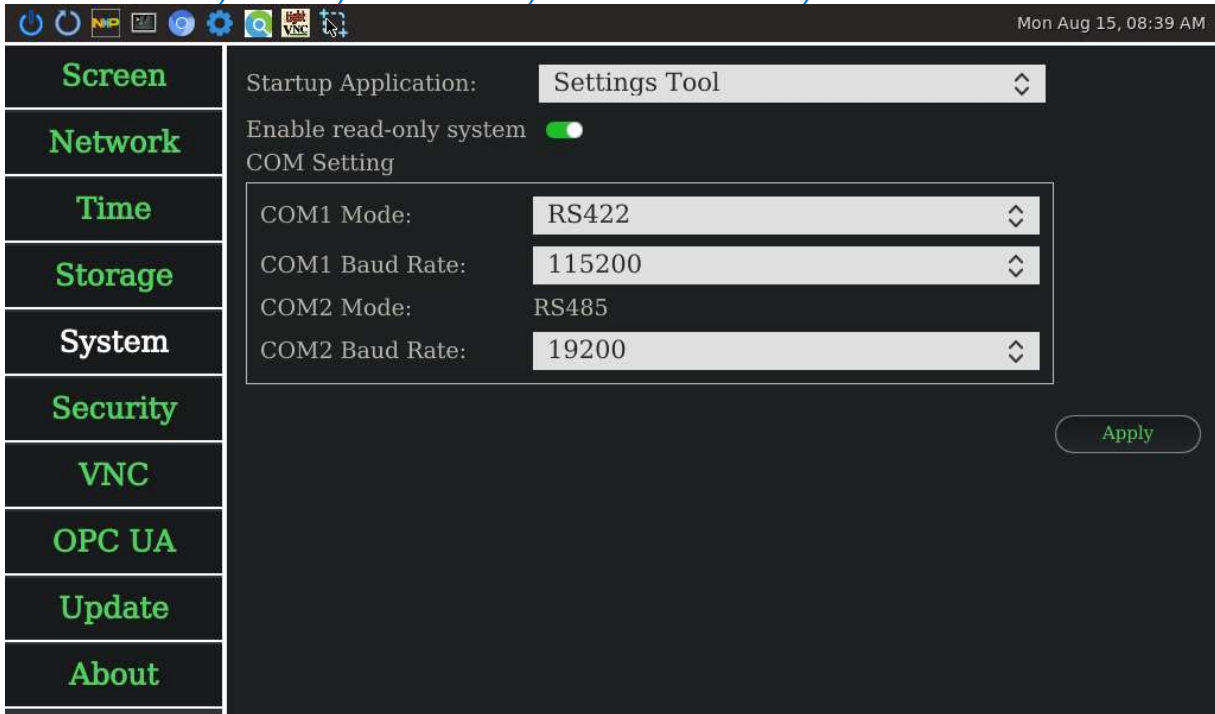


Figure Sample of Enable Read-only System Page

- To set COM port. You can set COM1 mode to RS232, RS422, RS485. And you can set COM1 and COM2 baud rate.

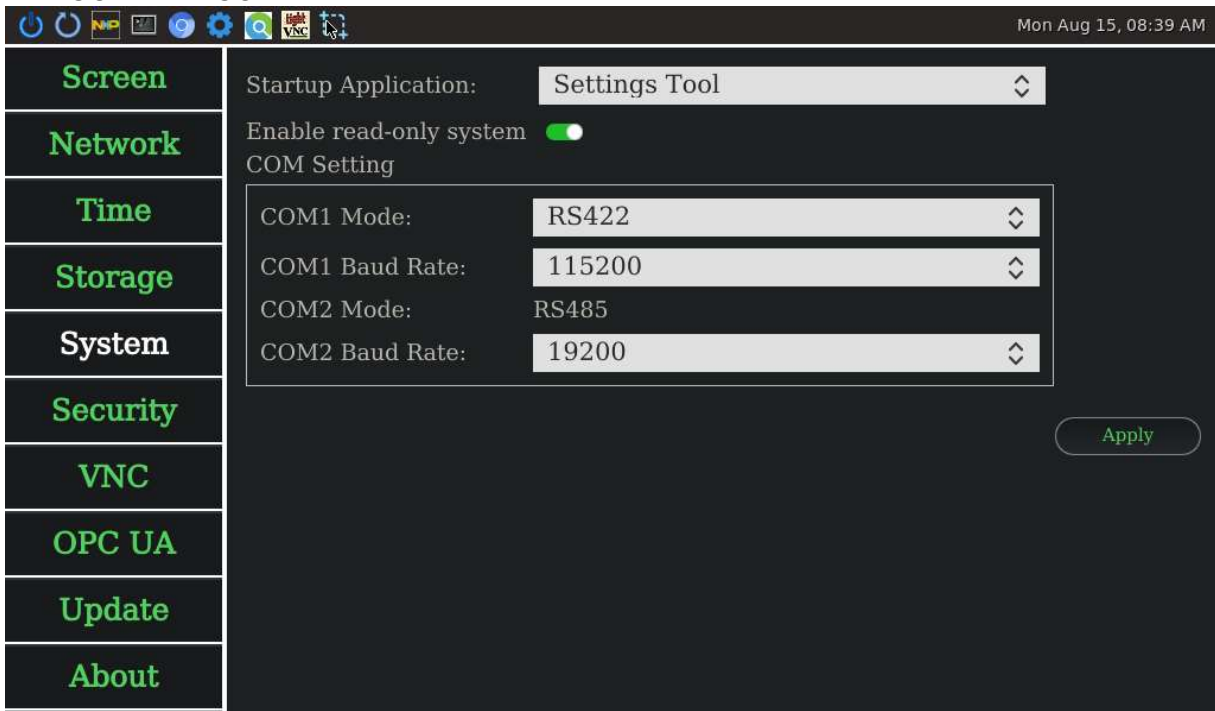


Figure Sample of COM System Page

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11.3.6 Security Configuration

All security related configuration is in security page. You can enable security function and set password. Then you would need to enter password when start the settings tool. After adjusted the configuration, you should press Apply button to save configuration

- To enable security function. You can press enable switch button and set password.

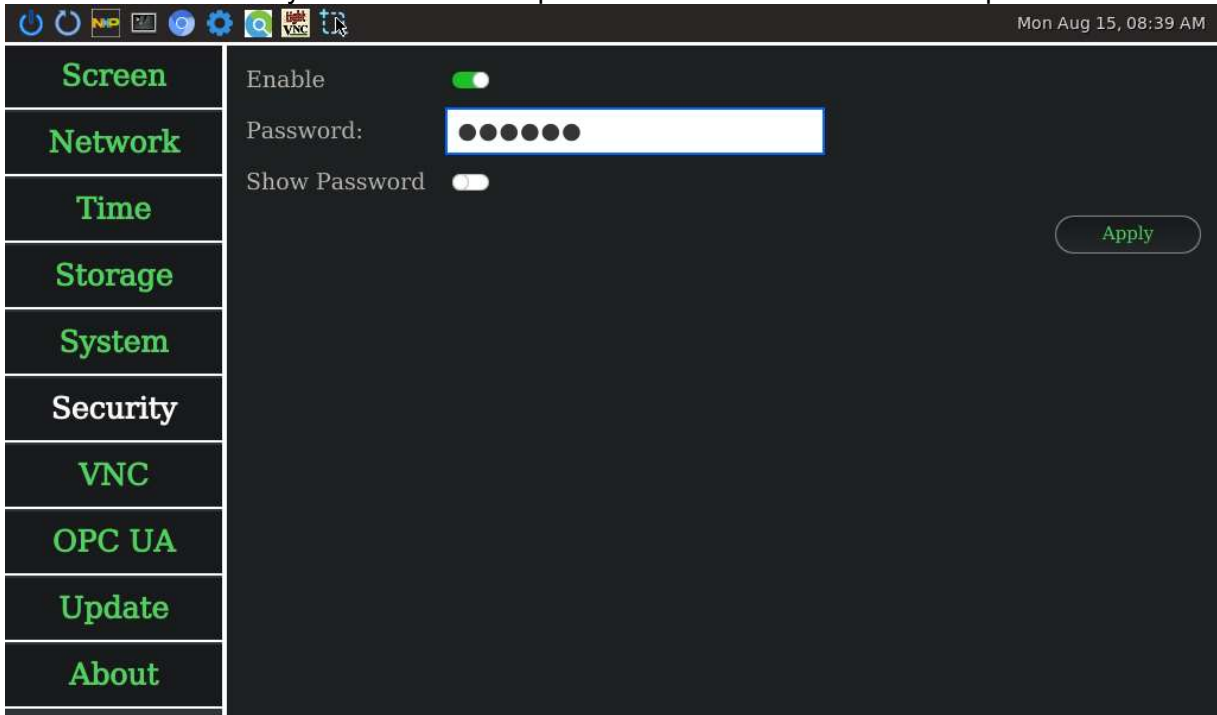


Figure Sample of Security Page

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- After you enable security. You would need to enter password when you open Settings Tool next time.

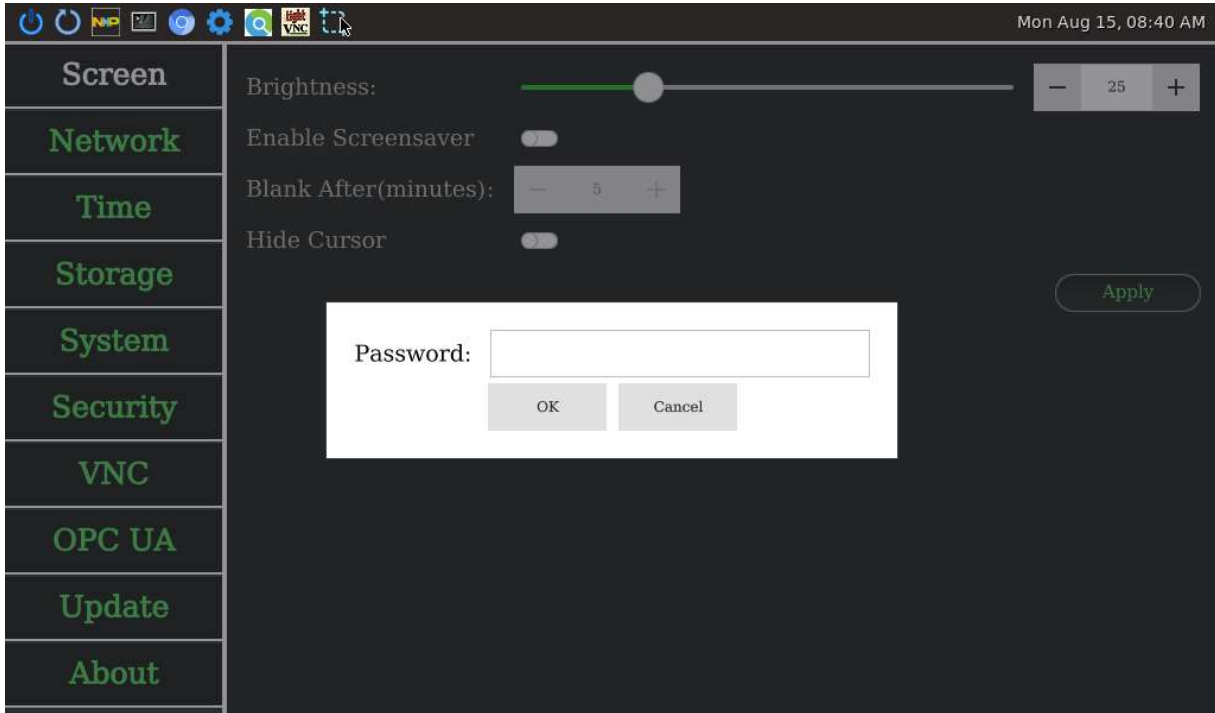


Figure Sample of Login

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11.3.7 VNC Configuration

All VNC related configuration is in VNC page. After adjusted the configuration, you should press Apply button to save configuration. This configuration is used for VNC viewer which is one of the startup applications.

- To set VNC server setting. You can set VNC server address with port and password. You can enable show password to see plain text. You can enable view only mode to ignore inputs. You can enable full screen mode of VNC viewer. You can set image quality of JPEG compression.

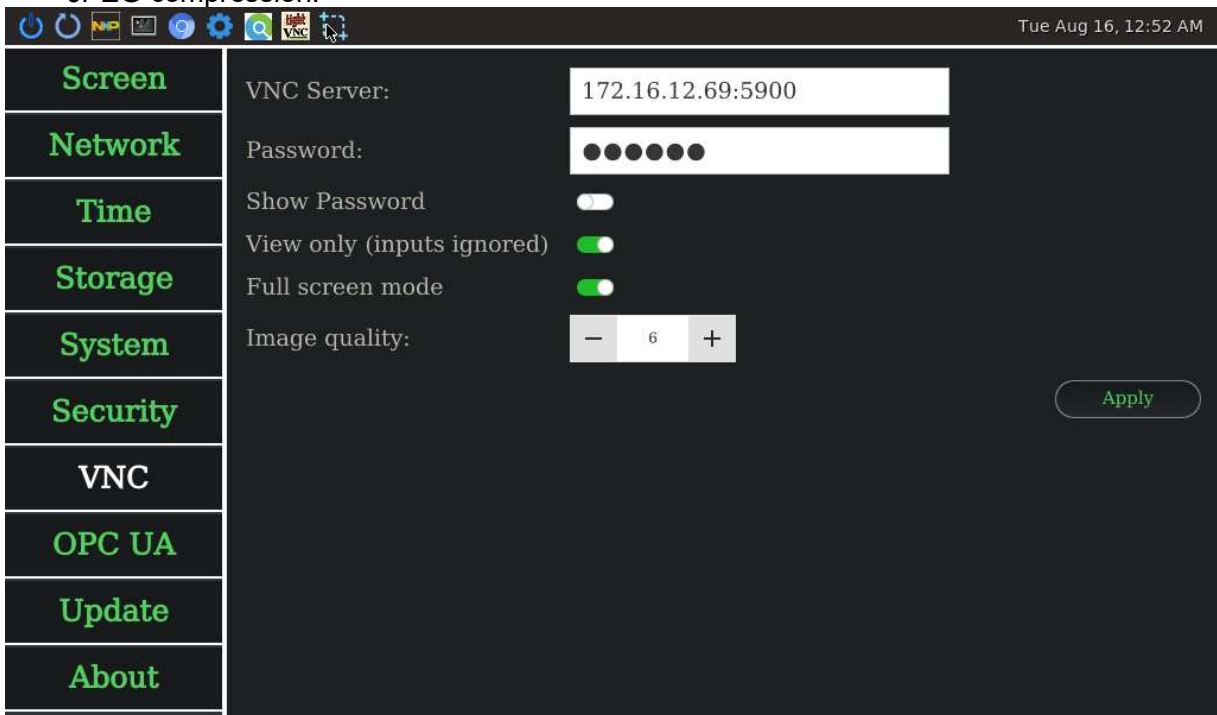


Figure Sample of VNC Page

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11.3.8 OPC UA Configuration

All OPC UA related configuration is in OPC UA page. After adjusted the configuration, you should press Apply button to save configuration. This configuration is used for OPC UA server.

- To enable OPC UA server. You can press enable switch button. You can set OPC UA server port number and identity token. When you select "Username/Password" type, you can set custom username and password.

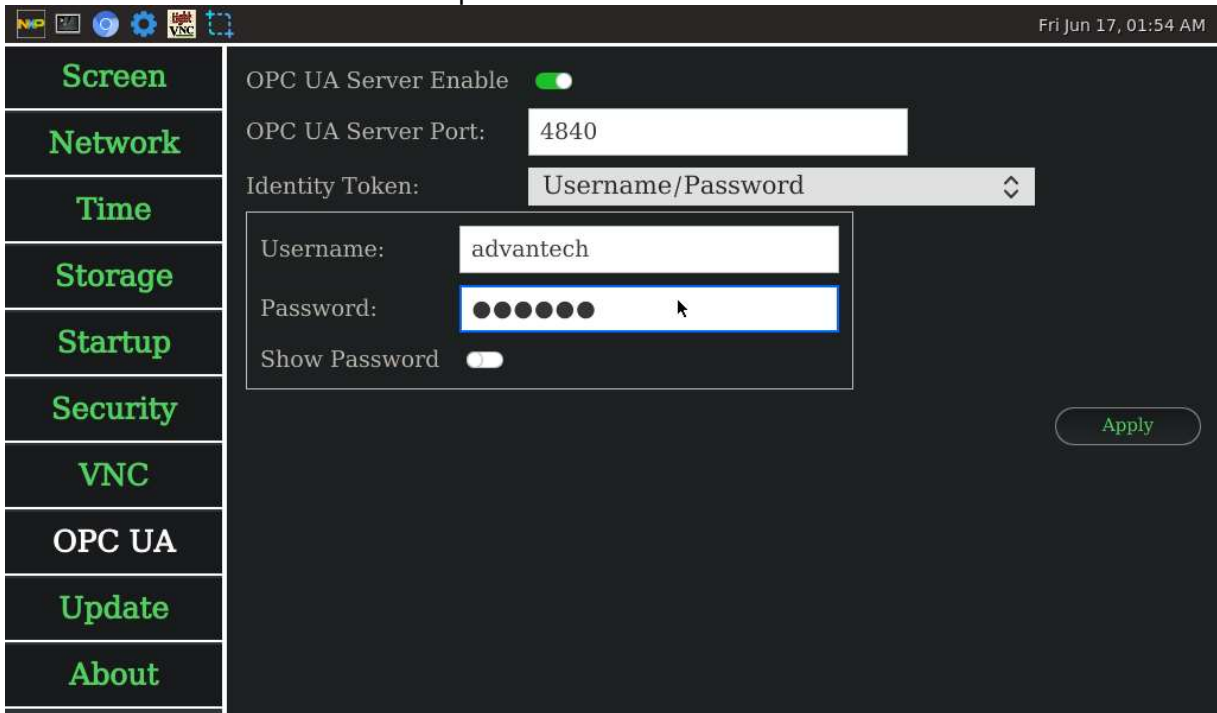


Figure Sample of OPC UA Page

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11.3.9 FTP Configuration

All FTP related configuration is in FTP page. After adjusted the configuration, you should press Get button to download file from FTP server. This configuration is used for FTP client.

- To use FTP client. You can set FTP server IP address, port number, username, password, remote file path, and local path. Remote file path must be a file on FTP server, not a folder. Local path can be a folder or a file name.

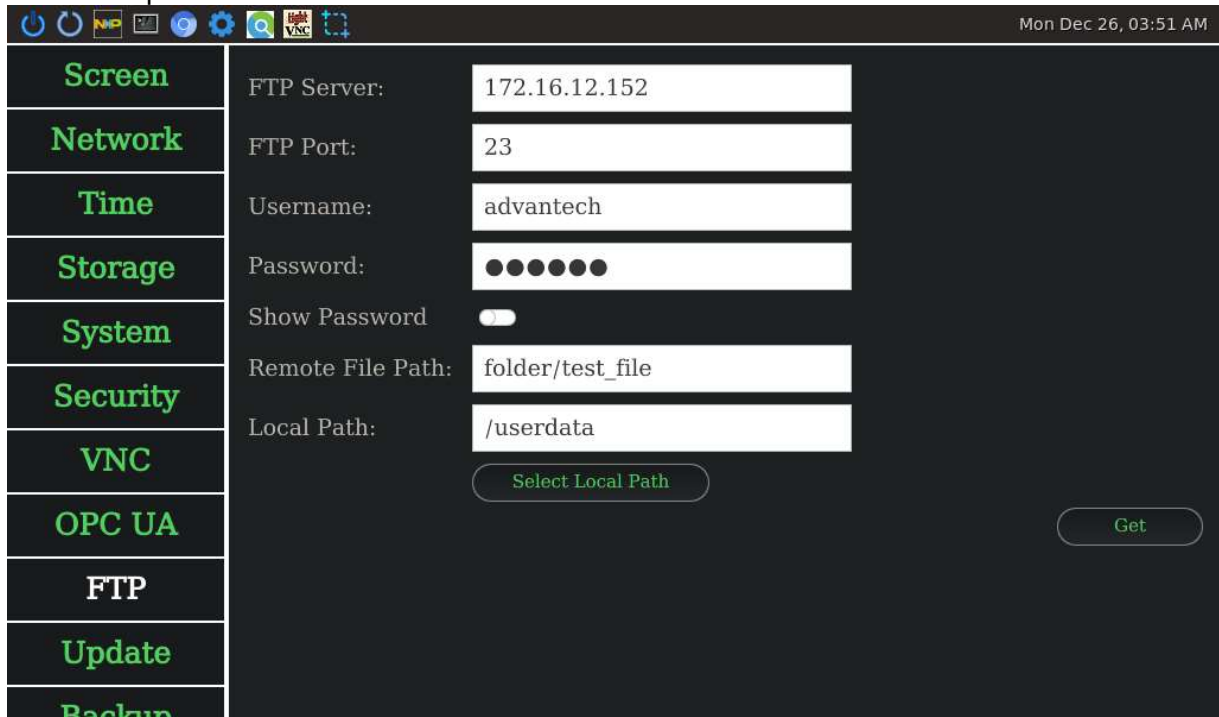


Figure Sample of FTP Page

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11.3.10 Update Configuration

All update related configuration is in update page. After selected the image and adjusted the configuration, you should press Update button to start. If you want to keep settings after update, you can enable backup settings, root user.

- To update device. You can upload image to device or plug USB. Then you should press select button to select your image file.

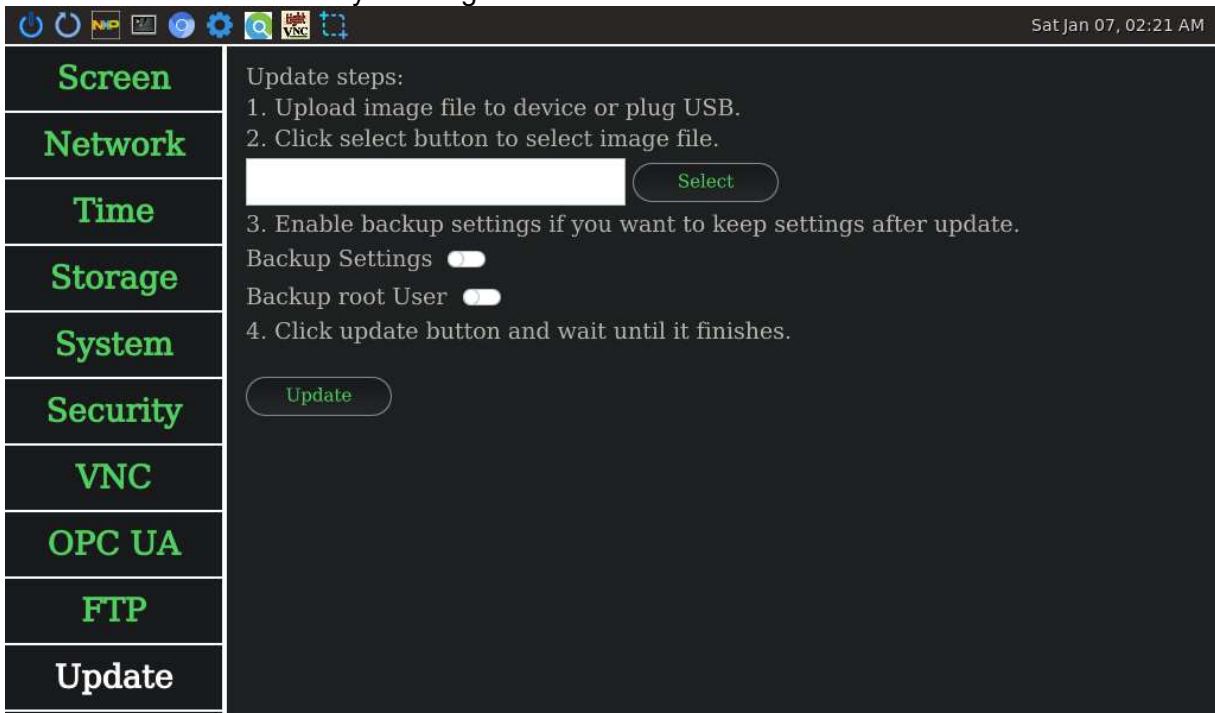


Figure Sample of Update Page

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- For example, select image file from USB.

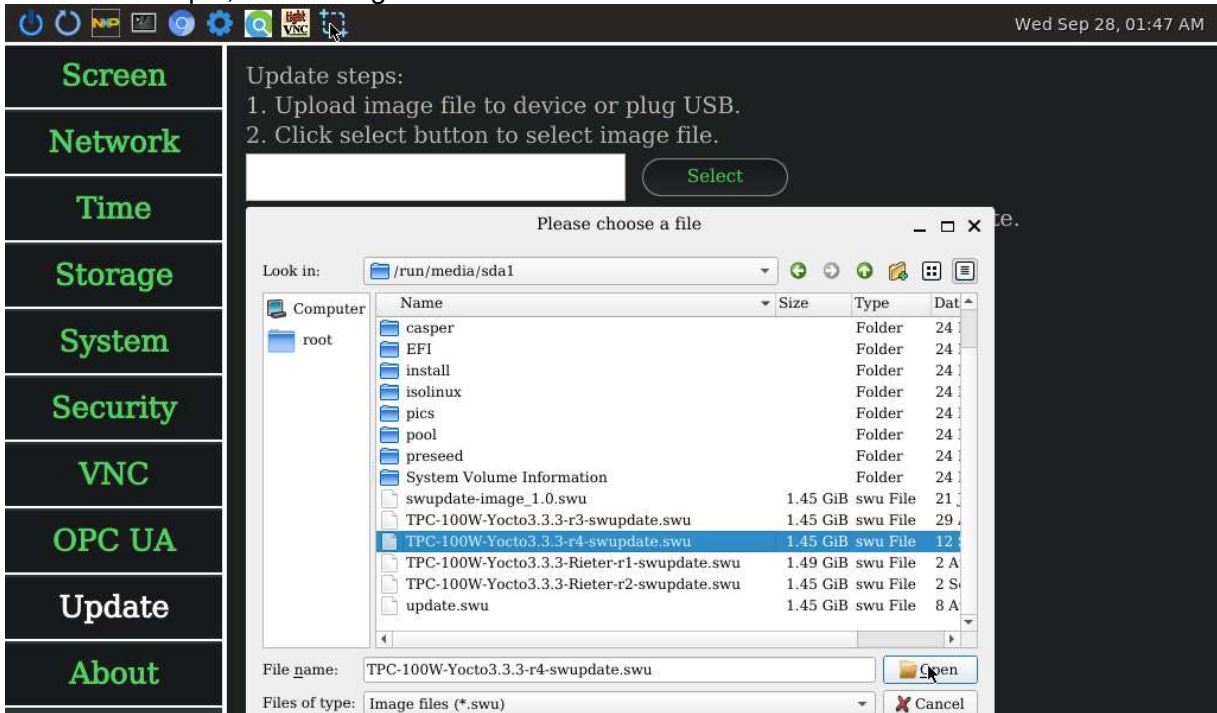


Figure Sample of Select File

- To enable/disable backup settings and user. You can press switch button.

Note: The "Settings" means the configuration in Settings Tool. The "root User" means system root user.

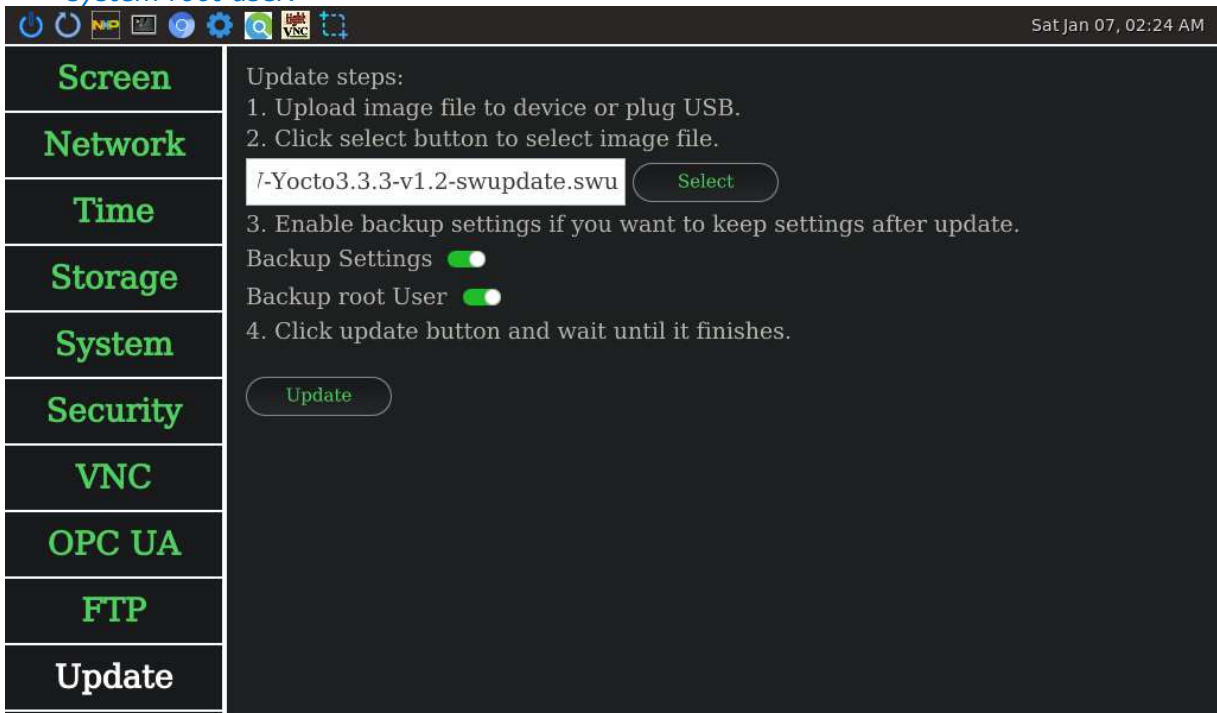


Figure Sample of Update

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- Press update button after selected image file.

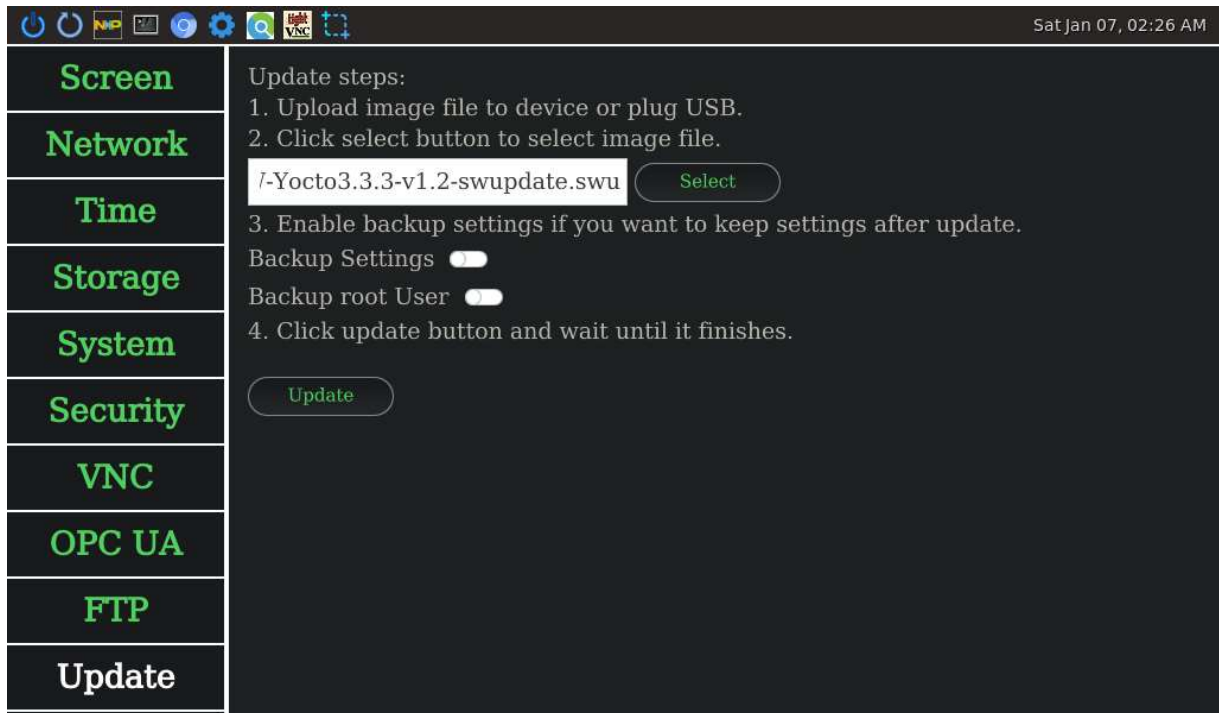


Figure Sample of Update

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11.3.11 Operate Actions

All operate related actions are in operate page. You can press Export button to export settings to a folder. And you can press Import button to import settings from exported file. You can press Reboot button to reboot system. You can press Exit button to exit application.

Note: Import actions would not affect "read-only system" in System. If you want to keep import settings after reboot, you should disable "read-only system" first.

- To export settings. You can export file to device or plug USB.



Figure Sample of Operate Page

- For example, press Export button to select export folder.

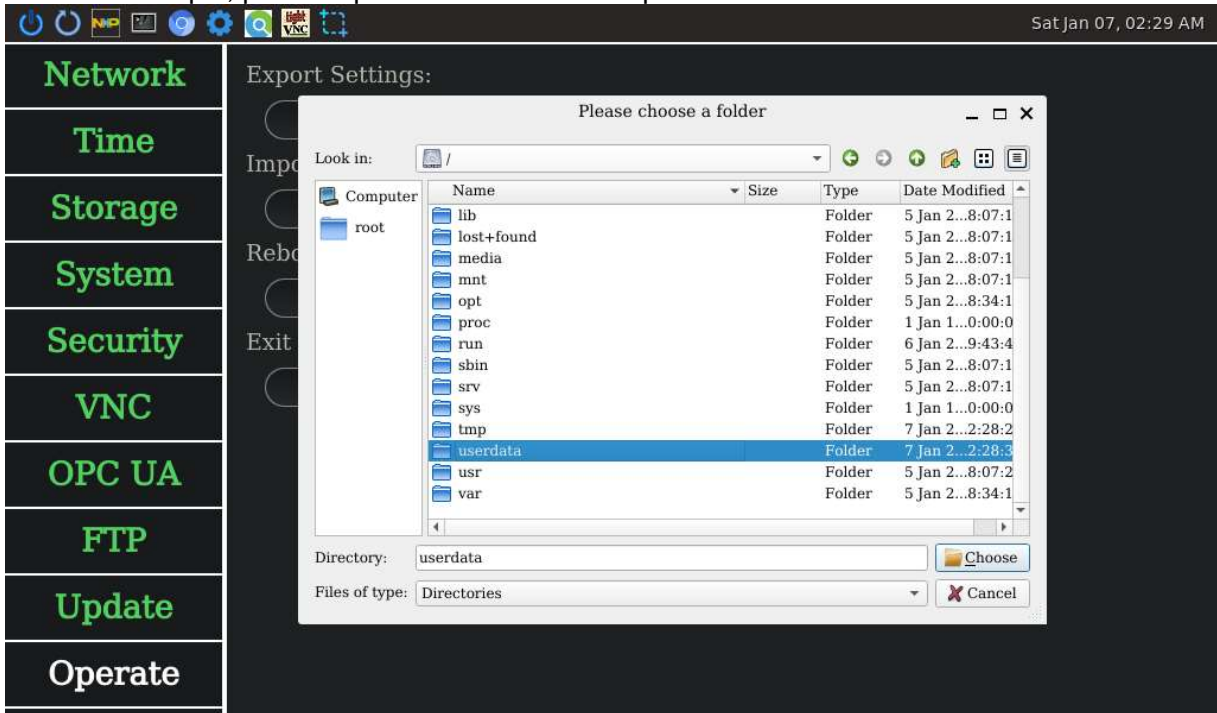


Figure Sample of Select Folder

- To import settings. You can upload file to device or plug USB. Then you should press Import button to select your exported file.

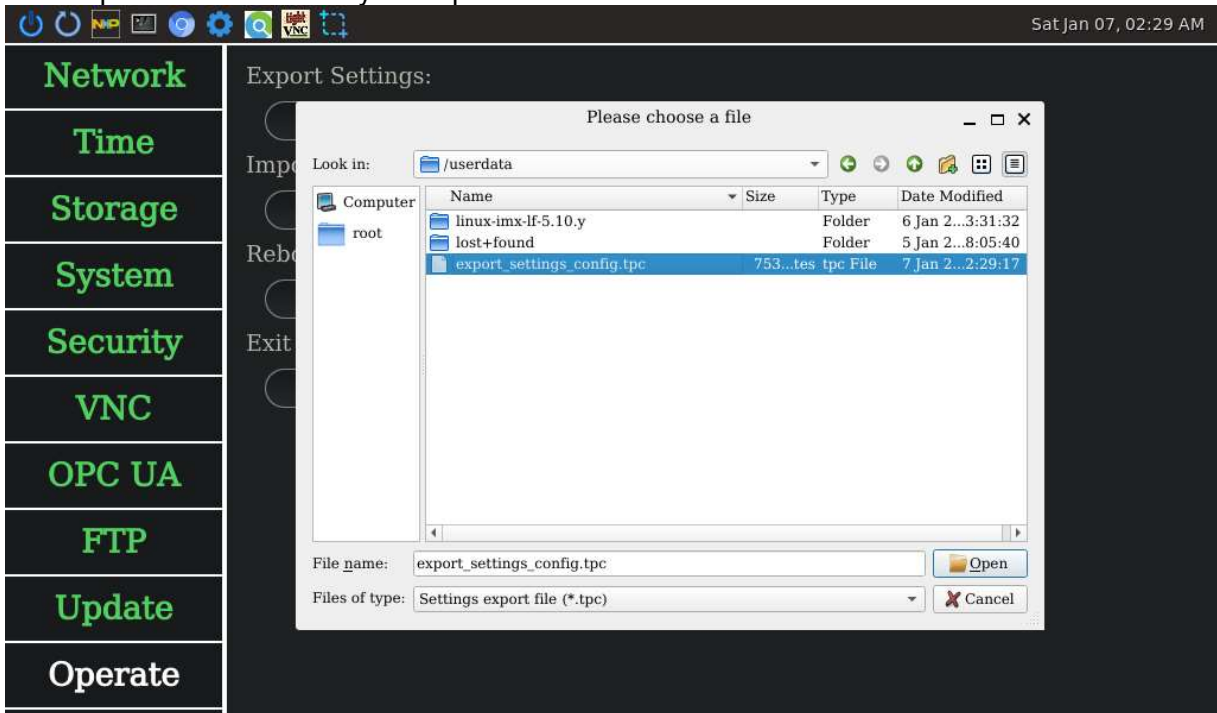


Figure Sample of Import Exported File

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11.3.12 About Information

All version and device related information is in about page.

- To see image, app, and important package version. To see CPU temperature.

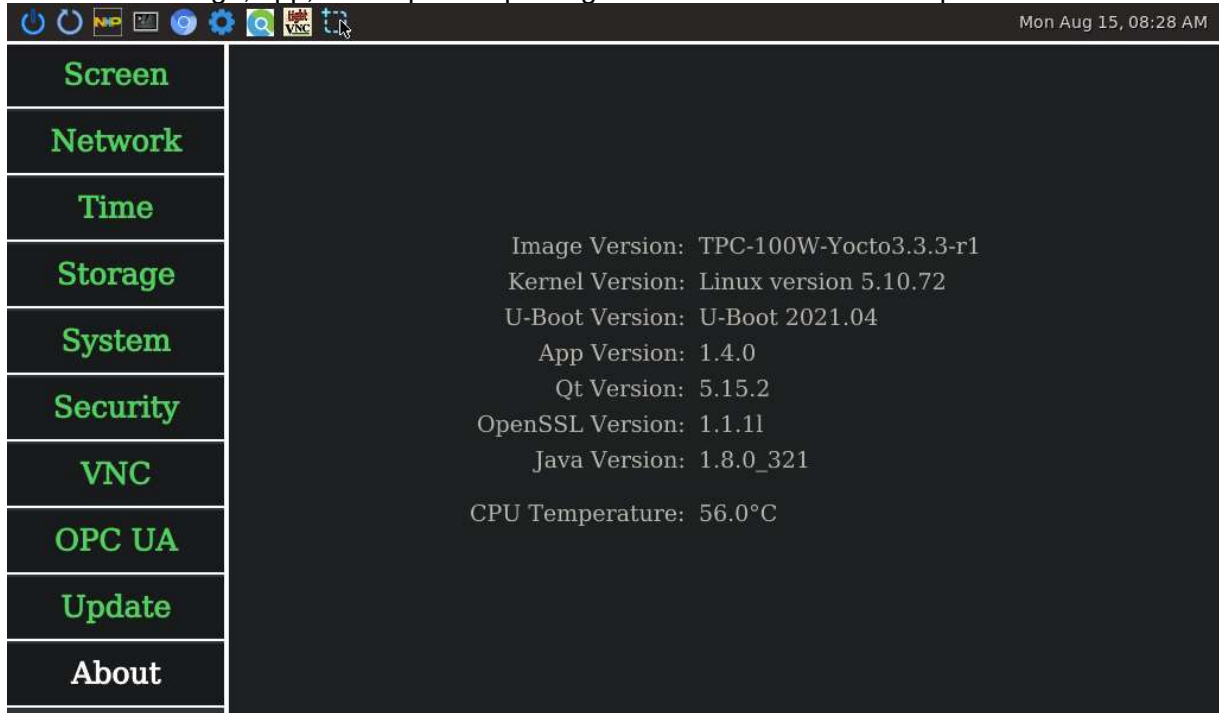


Figure Sample of About Page

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11.3.13 About Logs

■ TPC-100W Settings Tool Log

TPC-100W settings tool records debug message in log. Log path is “/tmp/settings.log”.

```
2022-01-19 09:02:53 - Debug: width:1024 height:600 File:(src/qmlwindow.cpp) Line:(37)
2022-01-19 09:02:53 - Debug: cmd:cat /sys/class/backlight/lvds_backlight0/brightness ret:0 File:(src/screen_utility.cpp) Line:(30)
2022-01-19 09:02:53 - Debug: cmd:connmanctl services ethernet_c408ad971b0a_cable | grep -i 'ipv4.Configuration' | tr -d '[]' | awk -F ',' '{print $1}' | awk -F '=' '{print $3}' | tr -d '\n' value:dhcp ret:0
size:1 ret:0 File:(src/utility.cpp) Line:(39)
2022-01-19 09:02:53 - Debug: cmd:connmanctl services ethernet_c408ad971b0a_cable | grep -i 'ipv4.Configuration' | tr -d '[]' | awk -F ',' '{print $1}' | awk -F '=' '{print $3}' | tr -d '\n' value:dhcp ret:0
File:(src/network_utility.cpp) Line:(101)
2022-01-19 09:02:53 - Debug: cmd:connmanctl services ethernet_c408ad971b0a_cable | grep -i 'ipv4.Configuration' | tr -d '[]' | awk -F ',' '{print $1}' | awk -F '=' '{print $3}' | tr -d '\n' value:dhcp ret:0
File:(src/network_utility.cpp) Line:(101)
2022-01-19 09:02:53 - Debug: cmd:connmanctl services ethernet_c408ad971b0a_cable | grep -i 'ipv4' | grep Address | tr -d '[]' | awk -F ',' '{print $2}' | awk -F '=' '{print $2}' | tr -d '\n' value:172.16.12
.83 ret:0 File:(src/network_utility.cpp) Line:(101)
2022-01-19 09:02:53 - Debug: cmd:connmanctl services ethernet_c408ad971b0a_cable | grep -i 'ipv4.Configuration' | tr -d '[]' | awk -F ',' '{print $1}' | awk -F '=' '{print $3}' | tr -d '\n' value:dhcp ret:0
File:(src/network_utility.cpp) Line:(101)
2022-01-19 09:02:53 - Debug: cmd:connmanctl services ethernet_c408ad971b0a_cable | grep -i 'ipv4' | grep Netmask | tr -d '[]' | awk -F ',' '{print $3}' | awk -F '=' '{print $2}' | tr -d '\n' value:255.255.2
54.0 ret:0 File:(src/network_utility.cpp) Line:(101)
2022-01-19 09:02:53 - Debug: cmd:connmanctl services ethernet_c408ad971b0a_cable | grep -i 'ipv4.Configuration' | tr -d '[]' | awk -F ',' '{print $1}' | awk -F '=' '{print $3}' | tr -d '\n' value:dhcp ret:0
File:(src/network_utility.cpp) Line:(101)
2022-01-19 09:02:53 - Debug: cmd:connmanctl services ethernet_c408ad971b0a_cable | grep -i 'ipv4' | grep Gateway | tr -d '[]' | awk -F ',' '{print $4}' | awk -F '=' '{print $2}' | tr -d '\n' value:172.16.13
.254 ret:0 File:(src/network_utility.cpp) Line:(101)
```

Figure Log

The monitor program of VNC server records debug message in log. Log path is “/tmp/runapp.log”.

```
root@eamb9918:~# cat /tmp/runapp.log
2022-04-18 03:22:07 - Debug: cmd:ssh -o ConnectTimeout=10 user@172.16.13.207 -v -p 5900 2>&1 output:OpenSSH_8.0p1, OpenSSL 1.1.1g 21 Apr 2020
debug: Reading configuration data /etc/ssh/ssh_config
debug: /etc/ssh/ssh_config line 20: Applying options for *
Pseudo-terminal will not be allocated because stdin is not a terminal.
debug: Connecting to 172.16.13.207 [172.16.13.207] port 5900.
debug: connect to address 172.16.13.207 port 5900: Network is unreachable
ssh: connect to host 172.16.13.207 port 5900: Network is unreachable
ret:65280 File:(C) Line:(0)
2022-04-18 03:22:07 - Debug: 172.16.13.207:5900 vnc server is not available! File:(C) Line:(0)
2022-04-18 03:22:32 - Debug: another instance is running File:(C) Line:(0)
2022-04-18 03:22:32 - Debug: another instance is running File:(C) Line:(0)
2022-04-18 03:22:33 - Debug: another instance is running File:(C) Line:(0)
2022-04-18 03:22:37 - Debug: cmd:ssh -o ConnectTimeout=10 user@172.16.13.207 -v -p 5900 2>&1 output:OpenSSH_8.0p1, OpenSSL 1.1.1g 21 Apr 2020
debug: Reading configuration data /etc/ssh/ssh_config
debug: /etc/ssh/ssh_config line 20: Applying options for *
Pseudo-terminal will not be allocated because stdin is not a terminal.
debug: Connecting to 172.16.13.207 [172.16.13.207] port 5900.
debug: fd 3 clearing O_NONBLOCK
debug: Connection established
```

Figure Log

11.3.14 Known issues

■ “ComboBox.qml:56: TypeError: Cannot read property 'width' of null”

This is a Qt bug at version 5.15.0. When UI dropdown combobox, it would show “ComboBox.qml:56: TypeError: Cannot read property 'width' of null” in log.

Reference: <https://bugreports.qt.io/browse/QTBUG-86131?attachmentOrder=asc>

```
2022-01-19 10:59:15 - Debug: cmd:connmanctl services ethernet_c408ad971b0a_cable | grep -i 'ipv4.Configuration' | tr -d '[]' | awk -F ',' '{print $1}' | awk -F '=' '{print $3}' | tr -d '\n' value:dhcp ret:0
File:(src/network_utility.cpp) Line:(101)
2022-01-19 10:59:15 - Debug: cmd:connmanctl services ethernet_c408ad971b0a_cable | grep -i 'ipv4.Configuration' | tr -d '[]' | awk -F ',' '{print $1}' | awk -F '=' '{print $3}' | tr -d '\n' value:dhcp ret:0
File:(src/network_utility.cpp) Line:(101)
2022-01-19 10:59:15 - Debug: cmd:connmanctl services ethernet_c408ad971b0a_cable | grep -i 'ipv4' | grep Address | tr -d '[]' | awk -F ',' '{print $2}' | awk -F '=' '{print $2}' | tr -d '\n' value:172.16.12
.83 ret:0 File:(src/network_utility.cpp) Line:(101)
2022-01-19 10:59:15 - Debug: cmd:connmanctl services ethernet_c408ad971b0a_cable | grep -i 'ipv4.Configuration' | tr -d '[]' | awk -F ',' '{print $1}' | awk -F '=' '{print $3}' | tr -d '\n' value:dhcp ret:0
File:(src/network_utility.cpp) Line:(101)
2022-01-19 10:59:15 - Debug: cmd:connmanctl services ethernet_c408ad971b0a_cable | grep -i 'ipv4' | grep Netmask | tr -d '[]' | awk -F ',' '{print $3}' | awk -F '=' '{print $2}' | tr -d '\n' value:255.255.2
54.0 ret:0 File:(src/network_utility.cpp) Line:(101)
2022-01-19 10:59:15 - Debug: cmd:connmanctl services ethernet_c408ad971b0a_cable | grep -i 'ipv4.Configuration' | tr -d '[]' | awk -F ',' '{print $1}' | awk -F '=' '{print $3}' | tr -d '\n' value:dhcp ret:0
File:(src/network_utility.cpp) Line:(101)
2022-01-19 10:59:15 - Debug: cmd:connmanctl services ethernet_c408ad971b0a_cable | grep -i 'ipv4' | grep Gateway | tr -d '[]' | awk -F ',' '{print $4}' | awk -F '=' '{print $2}' | tr -d '\n' value:172.16.13
.254 ret:0 File:(src/network_utility.cpp) Line:(101)
2022-01-19 11:10:31 - Warning: file:///usr/lib/qml/QtQuick/Controls.2/ComboBox.qml:56: TypeError: Cannot read property 'width' of null File:(file:///usr/lib/qml/QtQuick/Controls.2/ComboBox.qml) Line:(56)
2022-01-19 11:10:31 - Warning: file:///usr/lib/qml/QtQuick/Controls.2/ComboBox.qml:56: TypeError: Cannot read property 'width' of null File:(file:///usr/lib/qml/QtQuick/Controls.2/ComboBox.qml) Line:(56)
2022-01-19 11:10:31 - Warning: file:///usr/lib/qml/QtQuick/Controls.2/ComboBox.qml:56: TypeError: Cannot read property 'width' of null File:(file:///usr/lib/qml/QtQuick/Controls.2/ComboBox.qml) Line:(56)
2022-01-19 11:10:31 - Warning: file:///usr/lib/qml/QtQuick/Controls.2/ComboBox.qml:56: TypeError: Cannot read property 'width' of null File:(file:///usr/lib/qml/QtQuick/Controls.2/ComboBox.qml) Line:(56)
2022-01-19 11:10:31 - Warning: file:///usr/lib/qml/QtQuick/Controls.2/ComboBox.qml:56: TypeError: Cannot read property 'width' of null File:(file:///usr/lib/qml/QtQuick/Controls.2/ComboBox.qml) Line:(56)
2022-01-19 11:10:31 - Warning: file:///usr/lib/qml/QtQuick/Controls.2/ComboBox.qml:56: TypeError: Cannot read property 'width' of null File:(file:///usr/lib/qml/QtQuick/Controls.2/ComboBox.qml) Line:(56)
2022-01-19 11:10:31 - Warning: file:///usr/lib/qml/QtQuick/Controls.2/ComboBox.qml:56: TypeError: Cannot read property 'width' of null File:(file:///usr/lib/qml/QtQuick/Controls.2/ComboBox.qml) Line:(56)
2022-01-19 11:10:31 - Warning: file:///usr/lib/qml/QtQuick/Controls.2/ComboBox.qml:56: TypeError: Cannot read property 'width' of null File:(file:///usr/lib/qml/QtQuick/Controls.2/ComboBox.qml) Line:(56)
```

Figure Error Log

■ Desktop Status Bar Time is Not Synced

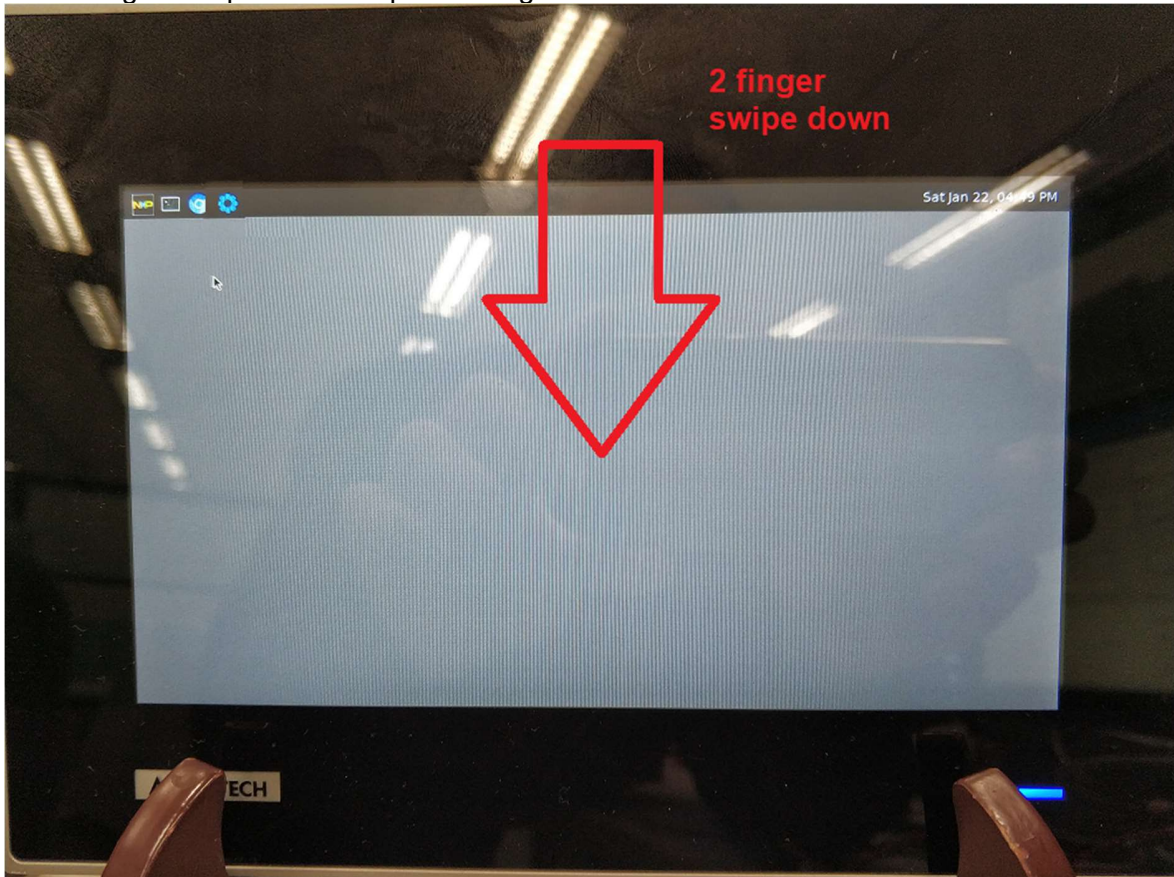
When you clicked apply button at time configuration page, it would update time immediately. But it takes about 1 minute to update on desktop status bar.

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11.4 How to Use Gesture

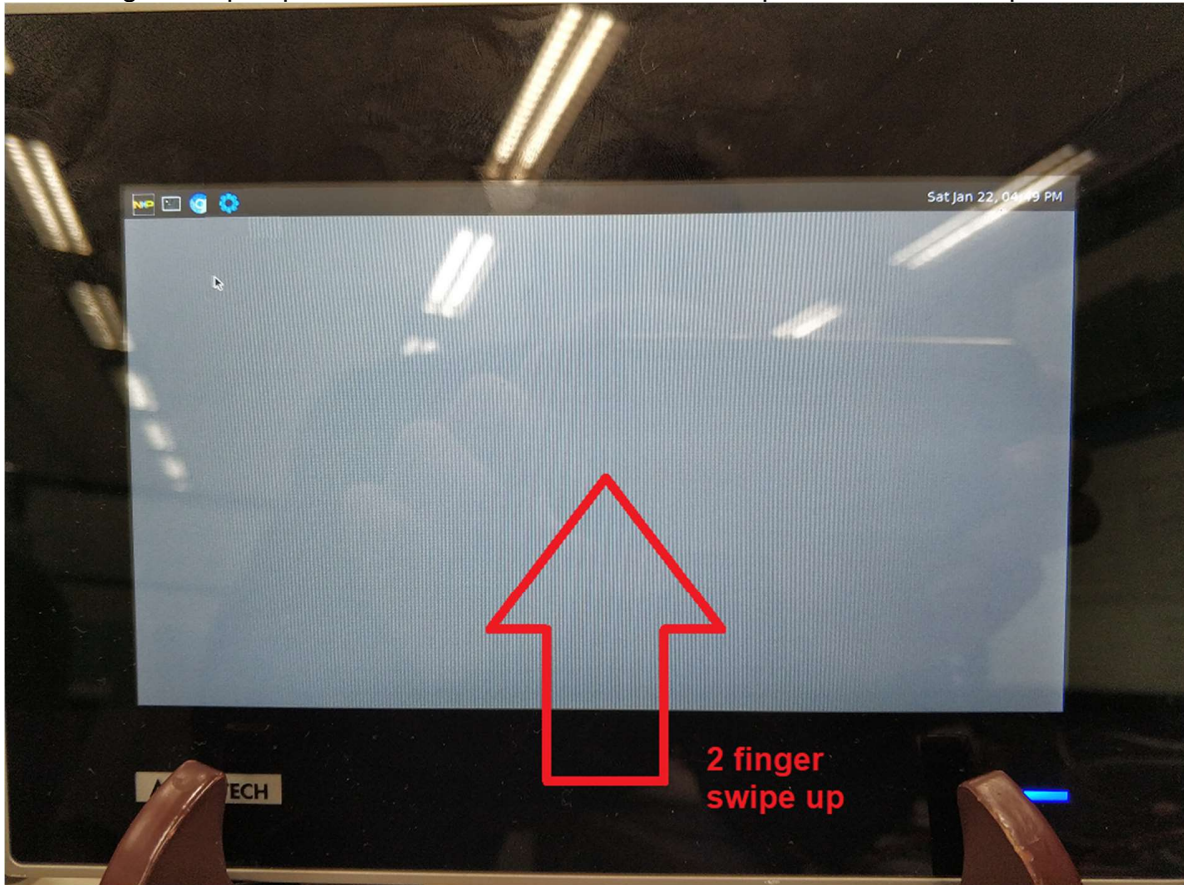
There are predefined gestures on TPC-100W. This section will explain how to use gesture to open/close Settings Tool.

- 2 fingers swipe down to open Settings Tool



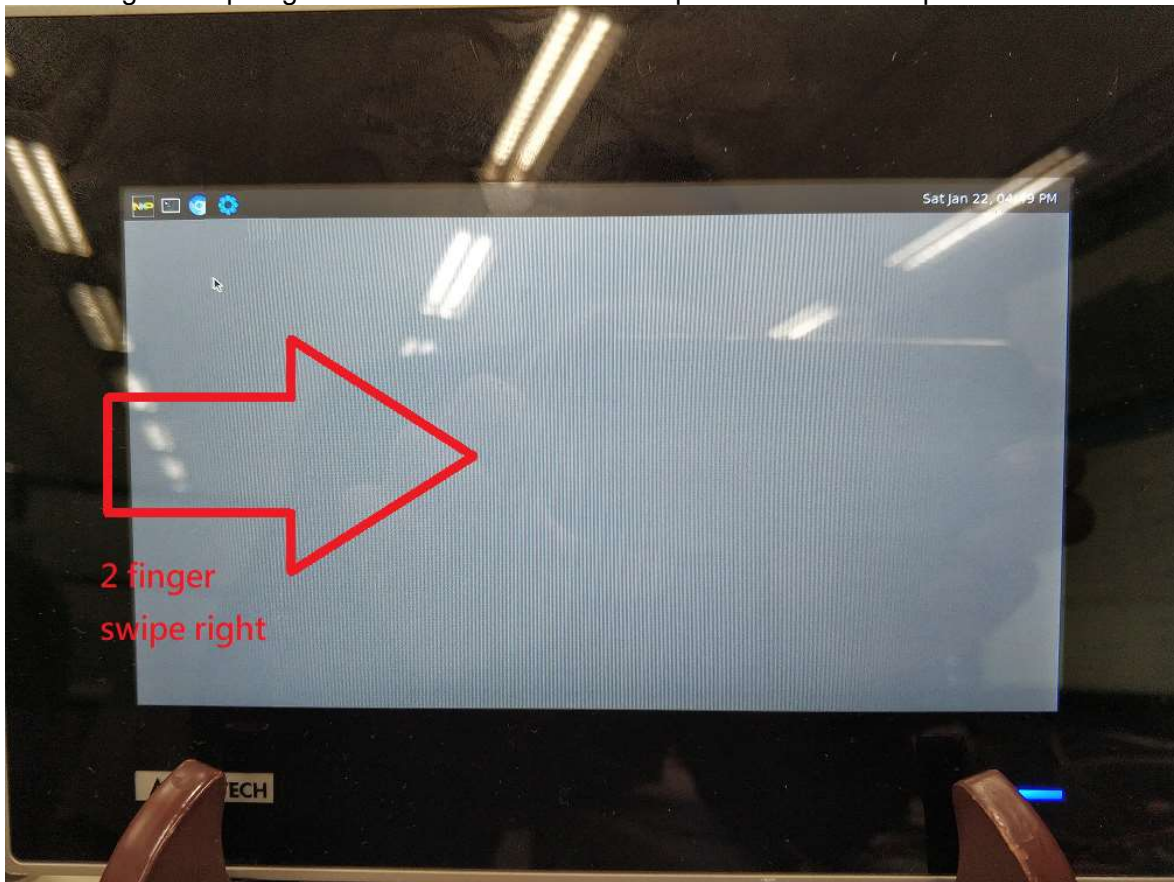
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- 2 fingers swipe up to close activated window. This is equal to shortcuts “super + k”.



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- 2 fingers swipe right to switch window. This is equal to shortcuts “super + tab”.



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11.5 How to Take Screenshots

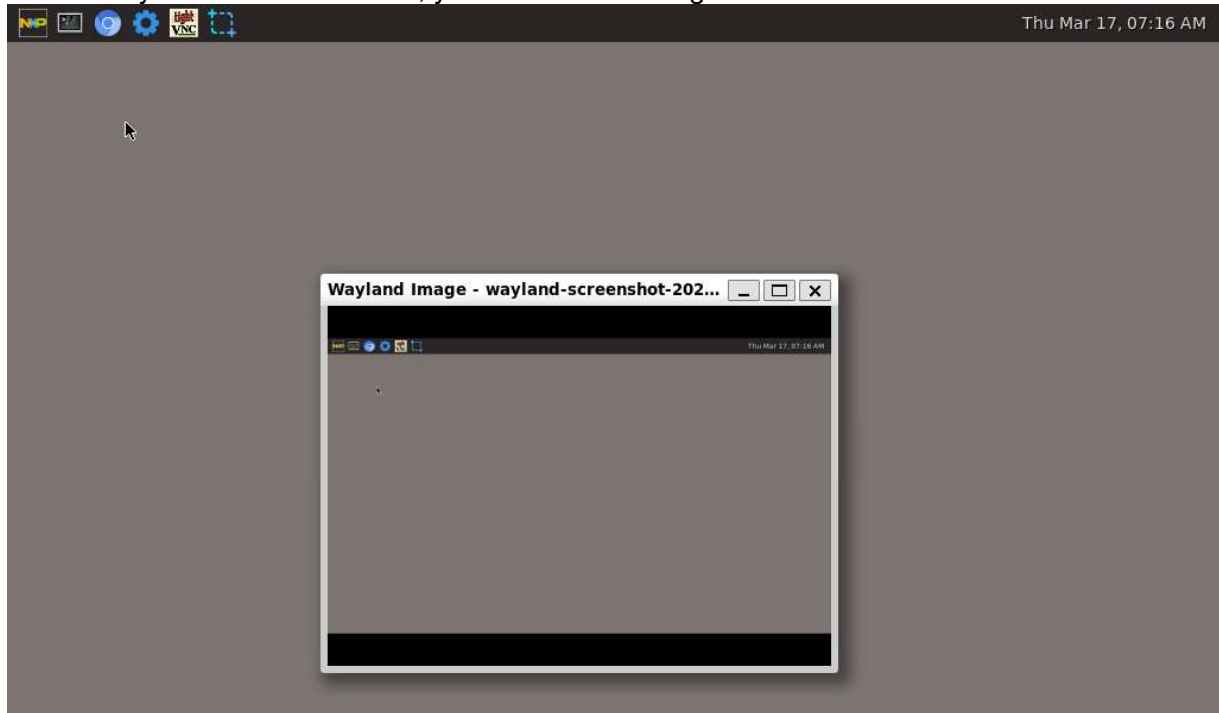
It is able to take a screenshot on TPC-100W. This section will explain how to take a screenshot, where to find screenshots.

- Click top bar icon to take a screenshot



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■ After you take a screenshot, you can see the image window.



You can find the screenshot under "/userdata ".

```

root@eamb9918:~# ls -al /userdata/
total 60
drwxr-xr-x  3 root root  4096 Mar 17 07:16 .
drwxr-xr-x 21 root root  4096 Mar 16 08:11 ..
drwx-----  2 root root 16384 Mar 16 08:10 lost+found
-rw-r--r--  1 root root 12187 Mar 17 07:16 wayland-screenshot-2022-03-17_07-16-48.png
-rw-r--r--  1 root root 21799 Mar 17 07:16 wayland-screenshot-2022-03-17_07-16-51.png
root@eamb9918:~#

```

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12. Weston Keyboard Shortcuts

The table below lists the actions that can be performed through Weston keyboard shortcuts, when the TPC-100W is connected to a keyboard. "super", i.e. Windows key between "ctrl" and "alt" (default value)

Command	Action	Condition(s)
ctrl + scroll	Zoom in / out the desktop	Keyboard + mouse
super + shift + f	Put activated window fullscreen	Keyboard
super + left mouse button	Move activated window	Keyboard + mouse
super + middle mouse button (Not support)	Rotate activated window (Not support)	Keyboard + mouse
super + right mouse button	Resize activated window	Keyboard + mouse
super + shift + left mouse button	Resize activated window	Keyboard + mouse
super + tab	Switch windows	Keyboard
super + k	Kill activated window	Keyboard
super + s	Capture a screenshot (see details below)	Keyboard

■ Capture a screenshot

Refer to the table above for the command to be used. The captured picture (PNG format) is automatically stored in /home/weston/wayland-screenshot-2022-03-08_01-48-19.png.

13. Playing video

Playing the mp4 video with below command.

```
sh-5.0# gst-launch-1.0 filesrc location=/4k.mp4 ! decodebin ! imxvideoconvert_g2d ! autovideosink
```

14. USB storage

After plugging in the USB storage to TPC-100W, it will be mounted to /run/media/sdx1, where x=a, b or c ...

You can check the USB storage contents by below command. We use sda1 as example.

```
sh-5.0# ls /run/media/sda1
```

15. Watchdog

If you want to test watchdog, you can go to /usr/src/advantech/watchdog and make. You would get watchdog-test binary to test.

Go to /usr/src/advantech/watchdog and make.

```
sh-5.0# cd /usr/src/advantech/watchdog
sh-5.0# make
```

Set watchdog timeout to 20 seconds. It would strobe every fixed period.

```
sh-5.0# ./watchdog-test -d -t 20 -e
```

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You can kill watchdog-test to check system would reboot after 20 seconds.

```
sh-5.0# killall watchdog-test
```

Please reference

<https://github.com/torvalds/linux/blob/master/tools/testing/selftests/watchdog/watchdog-test.c> for more details.

16. About LICENSE

16.1 Advantech TPC-100W Settings Tool

Please reference <https://github.com/Advantech-IIoT/settings/blob/master/LICENSE> for more details.

16.2 Qt Browser

Please reference <https://github.com/Advantech-IIoT/quicknanobrowser/blob/master/LICENSE> for more details.

16.3 ydotool

Please reference <https://github.com/Advantech-IIoT/ydotool/blob/master/LICENSE> for more details.

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17. Appendix

17.1 FAQ

Q: How to access FTP service?

Ans: The FTP service is based on SFTP (SSH File Transfer Protocol) is a secure file transfer protocol. It runs over the SSH protocol. It supports the full security and authentication functionality of SSH. You can use the ftp client with supported sftp, like FileZilla and direct access via `sftp://ip-address`.

Reference https://wiki.filezilla-project.org/FileZilla_Client_Tutorial_%28en%29%20%20

Q: How to enable NTP server?

Ans: NTP (Network Time Protocol) is a suite of applications that allows computers to coordinate their system time. You should edit configuration file `/etc/ntp.conf` for your situation. For example :

- Add reference clock peers in `ntp.conf`

```
server time1.google.com iburst
```

- To allow hosts to query the time and statistics in `ntp.conf`

```
restrict 172.16.12.0 mask 255.255.255.0 nomodify notrap
```

- To allow NTP port

```
$ iptables -A INPUT -p udp --dport 123 -j ACCEPT
$ iptables -A OUTPUT -p udp --sport 123 -j ACCEPT
```

- To enable and start the NTP server

```
$ systemctl enable ntpd
$ systemctl start ntpd
```

Reference https://docs.ntpsec.org/latest/ntp_conf.html

After setup server, you can test it with NTP client.

```
$ ntpdate -vd 172.16.12.6
```

Q: How to exit fullscreen application when gestures are disabled?

Ans: You can use the shortcut key to switch or kill application with keyboard, please refer to **12. Weston Keyboard Shortcuts**. Or you can ssh into device and enter kill command.