

FES101E6

ARM based Panel PC

User Manual

(Preliminary)

Fanless ultra-compact
Dual Core Cortex A72+Quad core Cortex A53
ARM system for
Industrial/Door-Control/Medical-care

Applicable Models:

FES101E6-R/K39xxxSS, FES101E6-R/K39xxxPS
FES101E6-R/K39xxxSA, FES101E6-R/K39xxxPA
FES101E6-R/K39xxxSB, FES101E6-R/K39xxxPB
FES101E6-R/K39xxxSC, FES101E6-R/K39xxxPC
FES101E6-R/K39xxxSD, FES101E6-R/K39xxxPD

Version: V1.0
Document No: doc-FES101E6-RK39xxxxxV10
Main Board: MBE71C-R39xxxSS



Packing List

- ☑ 1 x FES101E6-R39/K39 device.
- ☑ 1 x DC Adaptor, 12V/2A (for version FES101E6-xxxxxxSS/SA/SB/SC/SD only).
- ☑ 2 x Antenna (for version "FES101E6-xxxxxxPC", " FES101E6-xxxxxxPD",
"FES101E6-xxxxxxSC", " FES101E6-xxxxxxSD" only).

Ordering Information

Part Number: **FES101E6-R/K39mnxy-z**

- **101**: Panel Size 10.1"
- **E6**: PCAP + Plastic Bezel with Status Light Bar (RGB optics fiber)
- **R39**: Arm Processor Dual Cortex-A72 + Quad Cortex-A53. (0°C ~ 60°C).
- **K39**: Arm Processor Dual Cortex-A72 + Quad Cortex-A53. (-20°C ~ 60°C).
- **m**: On Board DDR3 Memory Size
 - 1 1GB of LPDDR3.
 - 2 2GB of LPDDR3. (default)
 - 8 8GB of LPDDR3.
- **n**: On Board eMMC Size
 - 8 8GB of eMMC.
 - F 16GB of eMMC. (default)
 - J 32GB of eMMC.
- **xy**: The Function Summary code
 - SS 1x HDMI, 1x USB3.0, 1x USB2.0, 1x GigE, 1x mSD slot, 1x Speaker,
1x Full-COM port, 6x DIO, Phoenix CONN.
 - PS 1x HDMI, 1x USB3.0, 1x USB2.0, 1x GigE(PoE+), 1x mSD slot, 1x Speaker,
1x Full-COM port, 6x DIO, Phoenix CONN.
 - PA PS + 5M Megapixels-Camera
 - PB PS + 5M Megapixels-Camera, RFID
 - PC PS + wifi
 - PD PS + wifi, 4G-LTE
- **z**: OS version
 - B Android 8
 - D Debian 9



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Warranty Description

The starting date of our warranty is recorded on the product serial number. Within one year from the date of delivery, if the customer finds a defect, we will choose to repair or replace the defective product free of charge, provided that the customer has prepaid freight. In the product serial number, the fourth and fifth digits indicate the year of manufacture, the sixth digit indicates the month (1- 9 and "A" for October, "B" for November, "C" for December), and the seventh digit for the week number of the month.

(e.g., the serial number xxx10C3xxxxxxx denotes the third week of December 2010).

RMA Service

You may need the following information ready before RMA procedure.

- Product number & serial number
- Software (OS version, application software, etc.)
- Description of complete problem
- The exact error messages that show up on screen

In addition, for the software compatible issue that we suggest to visit the website of our distributor to find the update information about the product first. Normally, the way might help solve application software problem quickly.



Precautions for use

- More frequent and larger data access on eMMC memory makes the eMMC life span shorter. Therefore, it is highly recommended to use a Micro SD card for large data access.
- When both DC-in and PoE+ are connected to the FES101E6, the connection with higher voltage will be the main power source.
- The Operating Temperature is a result of the test performed in experimental chamber. It is highly suggested to execute a solid testing under actually application environment.

Safety Statement

FCC-B Radio Frequency Interference Statement

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

- Shielded interface cables and A.C. power cord, if any, must be used in order to comply with the emission limits.
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Notice:

The product described in this document is designed for general use, Forenex Technologies assumes no responsibility for the conflicts or damages arising from incompatibility of the product. Check compatibility issue with your local sales representatives before placing an order.



1. General Information

The FES101E6 (Panel mount PC) is designed with an ABS plastic bezel, metal rear cover chassis and the PCAP touch panel covers the front of FES101E6 to able to adapt front-IP65 ingress protection. Also due to take full advantage of the lowest power, fanless system design for a wide variety of industrial automation, transportation, door-control, medical-care and HMI applications.

1-1. Product Specifications

Display:

- ✓ 10.1"(Dimension), 1280 x 800 pixels(Resolution)
- ✓ 300 cd/m² (Brightness), 800:1(Contrast Rate), 85°/85°/85°/85°(Viewing Angle)
- ✓ Touch Panel(Multi-fingers Project Capacitive)

Processor:

- ✓ Arm Dual Cortex-A72 @2.0Ghz + Quad Cortex-A53 @ 1.5Ghz Core

System Memory:

- ✓ 1GB/2GB(default)/8GB

Storage(eMMC):

- ✓ 8GB/16GB(default)/32GB

I/O Interfaces:

- ✓ 1 x Controllable surround status light bar (RGB optic fiber)
- ✓ 1 x HDMI
- ✓ 1 x Gigabit Ethernet Port with PoE+
- ✓ 1 x USB 3.0 Type A
- ✓ 1 x USB 2.0 Type A
- ✓ 1 x Micro-SD Card Slot
- ✓ 1 x Full modem RS232 port with 3-In/ 3-out DIO
- ✓ 1 x Terminal Block Power Connector

Operating System:

- ✓ Android 7.1/ 8.0
- ✓ Debian 9

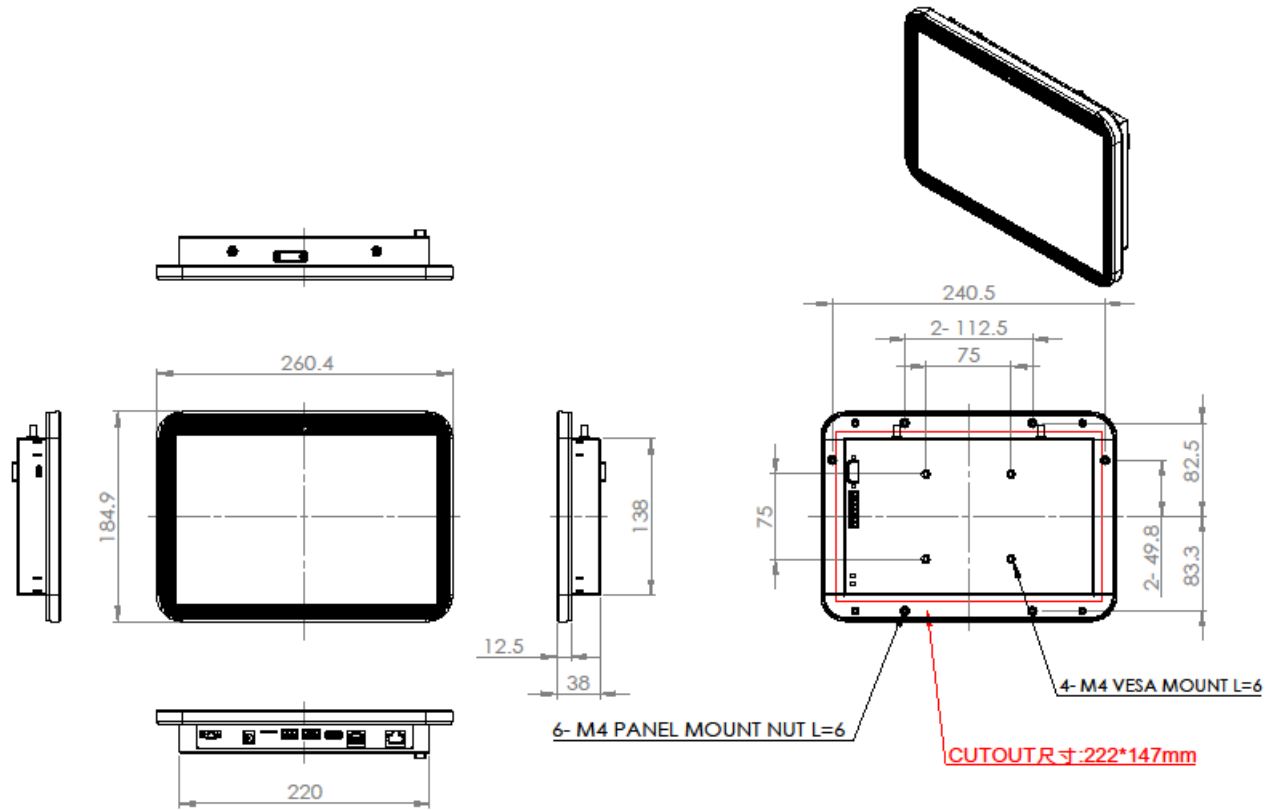
1-2. Optional Functions

- ✓ Front CMOS Camera 5-megapixel module
- ✓ 13.56 MHz RFID module
- ✓ IEEE 802.11a/b/g/n/ac, 2.4G/5Ghz Wi-Fi module, 2x2 MIMO standard + BT 4.1
- ✓ 4G LTE Cat4 module with Micro-SIM socket carrier board
- ✓ 4G LTE-A Cat6 module with Micro-SIM socket carrier board
- ✓ Secondary 10/100M Ethernet module

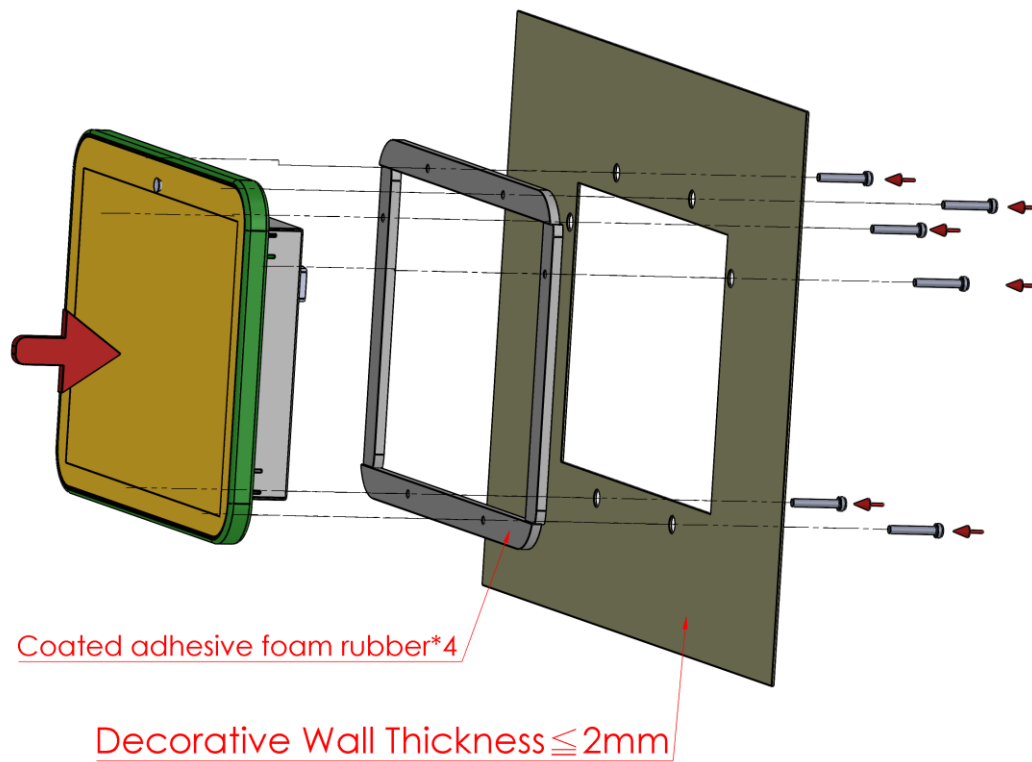


1-3. Outline Dimensions

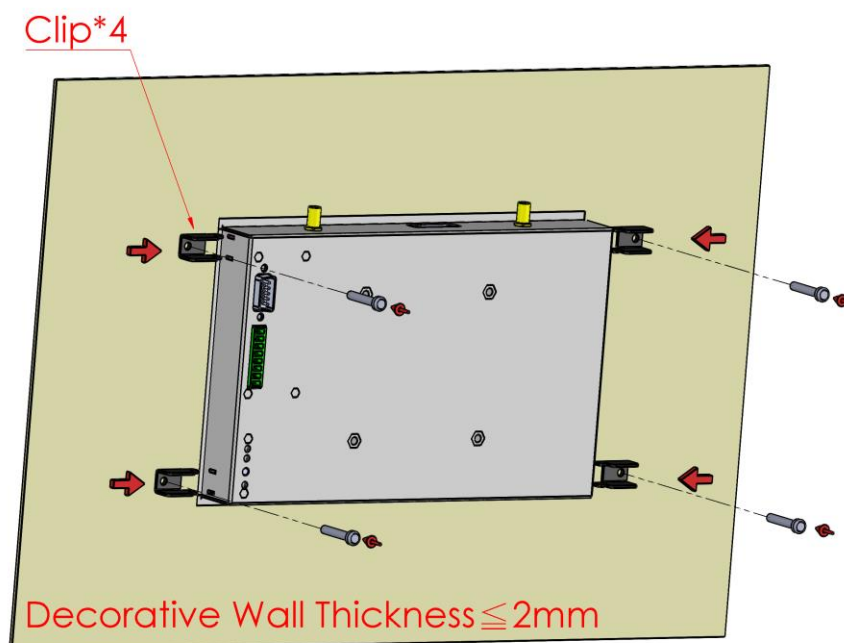
1-3-1. The Outline of 10.1" Panel PC (FES101E6-R39xxPS/PB/PC)



1-3-2. Panel Mounting Illustration



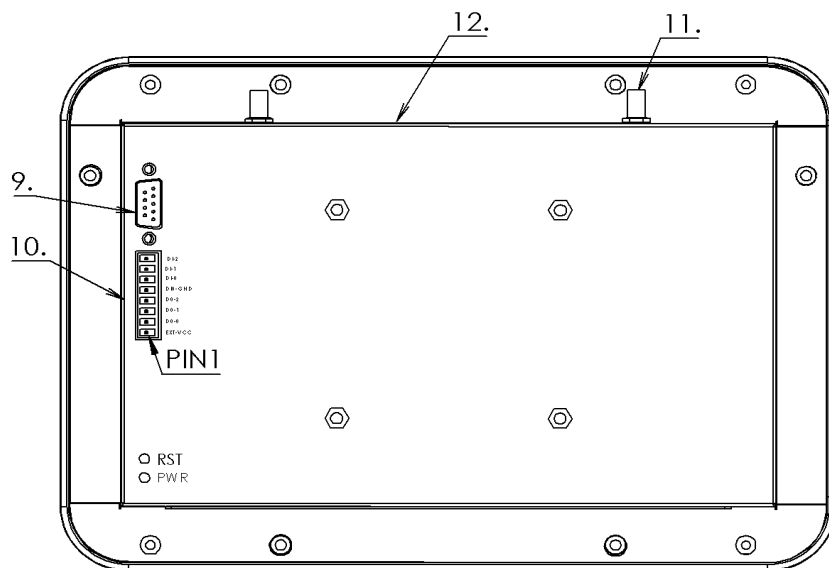
1-3-3. Clips Mounting Illustration



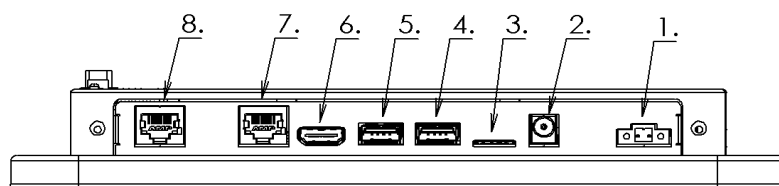
2. Peripherals Port Description

2-1. External IO port placement

1.	DC-12V Backup Power Connector
2.	DC Jack/ Φ 2.0 (Option)
3.	Micro SD/SDHC Card Slot
4.	USB 2.0 Port
5.	USB 3.0 Port
6.	HDMI 2.0 Port
7.	10/100MB-LAN (Option)
8.	Gigabit Ethernet Port with PoE+
9.	Full Modem RS232 Port
10.	DIO Port (3-IN / 3-OUT)
11.	Wi-Fi Antenna (Option)
12.	4G-LTE SIM Card Socket (Option)



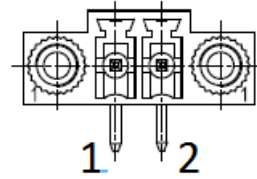
REAR SIDE



FRONT PANEL

2-2. DC Power Connector

- On front panel, external secondary power input.

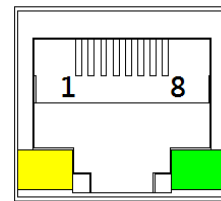


- Pin Assignment:

Connector: (Terminal Block-2P/Male)	
Pin number	Description
1	GND
2	DC12V

2-3. Gigabit Ethernet Port with PoE+

- On front panel.



- The RJ45 port that supports high-speed Gigabit Ethernet and conform to the 802.3at specification. The Inner 802.3at PoE+ board is Powered Device (PD) controller and switching regulator for high power IEEE 802.3at(25W) and 802.3af(12W) applications.
- The integrated 8-pin Gigabit Ethernet port is using an 8 Position 8 Contact (8P8C) receptacle connector (commonly referred to as RJ-45).
- The Gigabit Ethernet port (RJ-45 port) has two individual LED indicators located on the front side to show:
 - Active LED is blinking in green color means activity of data flow IN or OUT of the device.
 - Link LED is in Red color means devices is operating in speeds 10/100Mbps.
Link LED is in Green color means devices is operating in speeds 1000Mbps.

2-4. Micro SD/SDHC card Slot

- On Front panel.

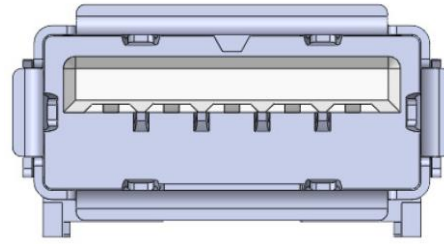


- Adapted card size(11 x 15 x 1.0 mm)
- Micro SD/SDHC card slot without spring and enable the SD storage up to 32GB size.



2-5. USB 2.0 Port

- On Front panel.

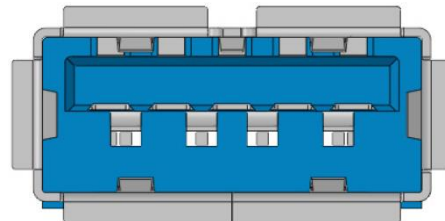


- Provides a USB 2.0 port gives complete hot plug capability and complies with USB UHCI, Rev. 2.0.
- Pin Assignment:

Connector: (USB Type A)	
Pin number	Description
1	+5V/500mA
2	USB Data -
3	USB Data +
4	GND

2-6. USB 3.0 Port

- On Front panel.



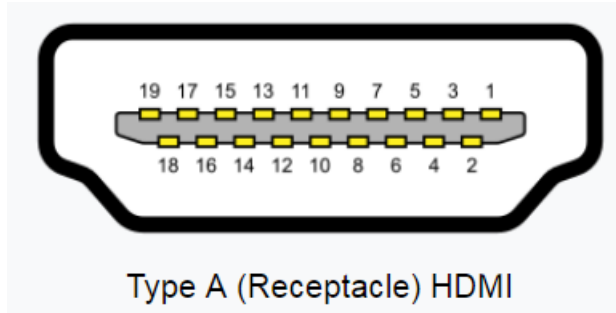
- The dedicated USB port to in charge of updating the Image File while the FES101E6 board being enter update mode.
- Under Linux OS environment, the USB3.0 default as host and gives complete hot plug capability and complies with USB xHCI, Rev. 3.x(USB 3.1 Gen 1).
- Under Android OS environment, the USB3.0 can be defined as host or device.
- Pin Assignment:

Connector: (USB 3.0 Type A)			
Pin number	Description	Pin number	Description
1	VBUS	6	SSRX+
2	D-	7	GND
3	D+	8	SSTX-
4	ID	9	SSTX+
5	GND		



2-7. HDMI®-2.0 port

- On front panel.
- The HDMI port uses an HDMI Type-A receptacle connector. It allows connecting the digital video devices which utilize a high definition video signal without a HDCP.
- Support HDMI® V2.0, Res. up to 4Kx2K @60fps, HDCP1.4 /2.2



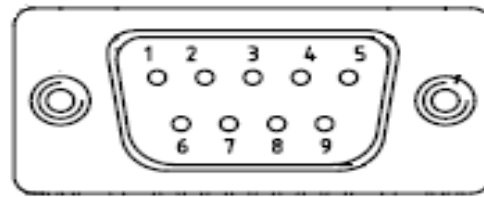
- Pin Assignment:

Connector: (19-pin HDMI Type A)			
Pin number	Signal	Pin number	Signal
1	TMDA_Data2+	2	Data2_GND
3	TMDA_Data 2-	4	TMDA_Data1+
5	Data1_GND	6	TMDA_Data1-
7	TMDA_Data0+	8	Data0_GND
9	TMDA_Data0-	10	TMDA_CLK+
11	CLK_GND	12	TMDA_CLK-
13	NC	14	NC
15	DDC-SCL	16	DDC-SDA
17	CEC GND	18	Power 5V supply
19	Hot Plug Detect		



2-8. Full modem RS232 Port

- On rear side.

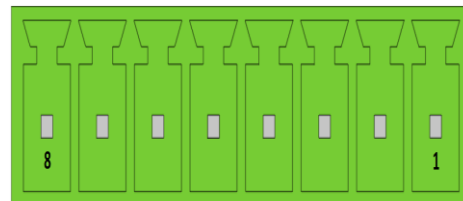


- Pin Assignment.

Connector: (DTE-DB9/Male /Black)	
Pin number	Description
1	DCD
2	RXD
3	TXD
4	DTR
5	COM-GND
6	DSR
7	RTS
8	CTS
9	RI

2-9. 3-IN/3-OUT DIO Port

- On rear side.



- Pin Assignment.

Connector: (Terminal Block-8P/Male)	
Pin	Description
1	EXT-VCC (External power provides for the pull-high level of pin DO-0,1,2 use)
2	DO-0 (Open Drain output)
3	DO-1 (Open Drain output)
4	DO-2 (Open Drain output)
5	DIO-GND
6	DI-0 (the input range of 5V-36V)
7	DI-1 (the input range of 5V-36V)
8	DI-2 (the input range of 5V-36V)



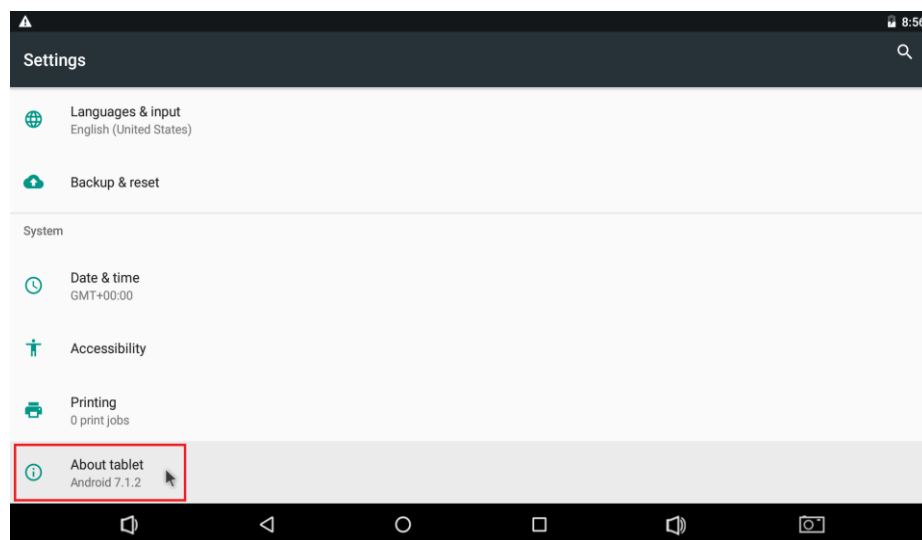
3. Software and Technical Supports

3-1. Android Programming Guide

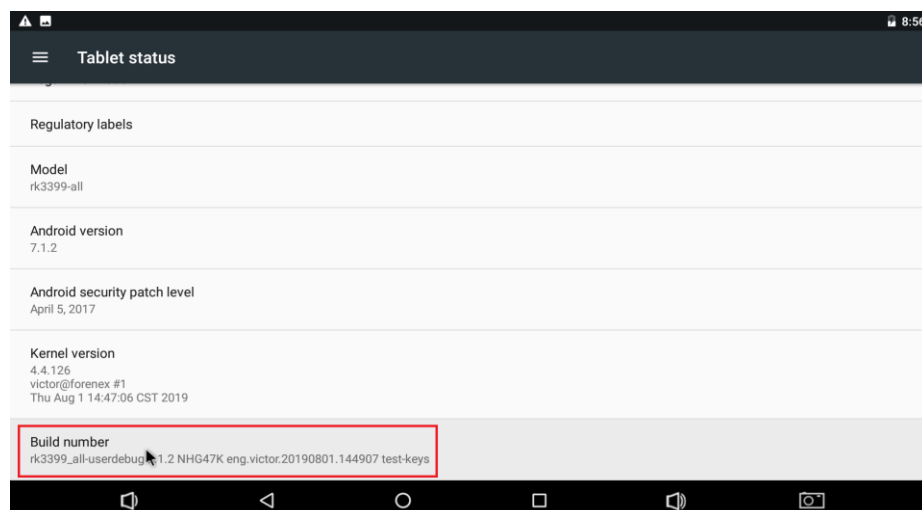
3-1-1. ADB installation

Originally, the USB3.0 was defaulted as host mode. Before use function ADB, the USB 3.0 Port have to be set to device mode by following steps.

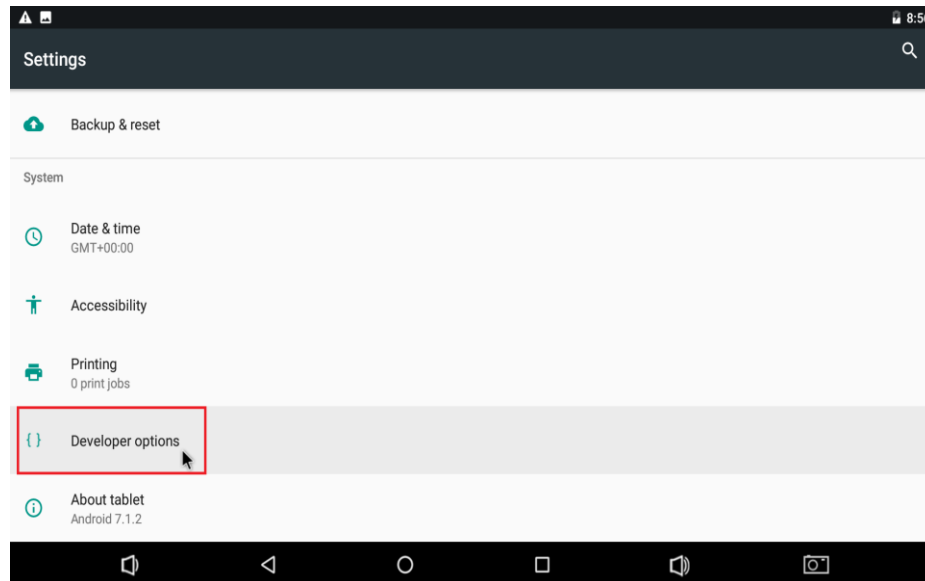
Step1. Scroll to "Settings > About Tablet"



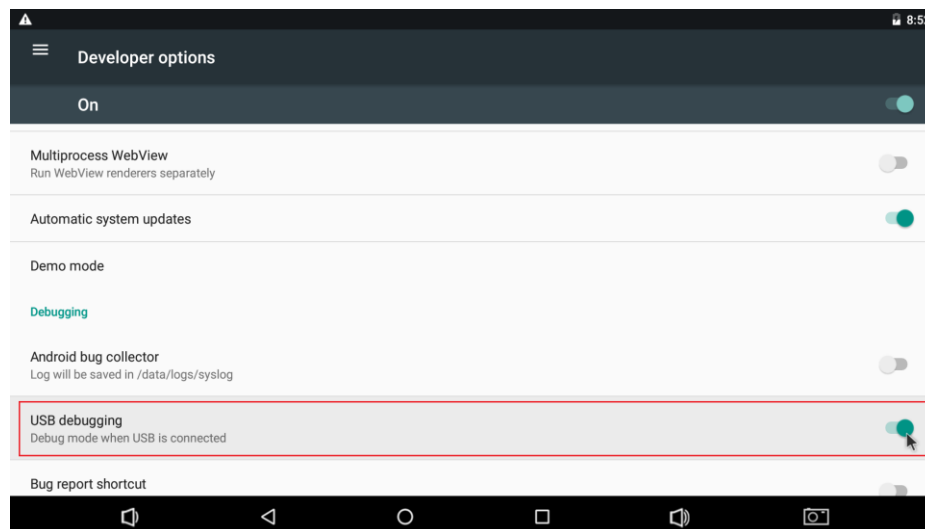
Step2. From "Settings" select "About tablet" to enter the dialog, and then click "Build number" in the dialog as shown. Android will pop up a countdown message. Keep clicking it until zero for Android to authorize the user to be a Developer.



Step3. After finished above action, a new item "Developer Options" will appear in the system block.



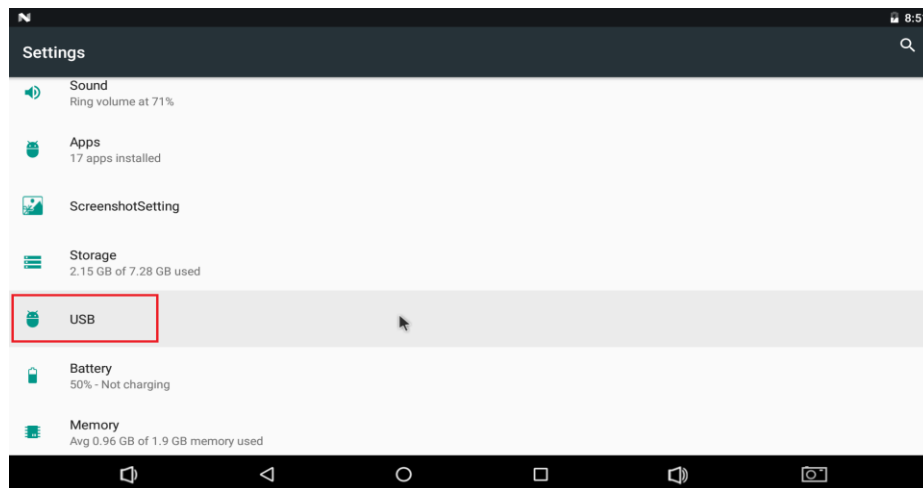
Step4. Get into the new item "Developer Options" and turn on the USB debugging function.



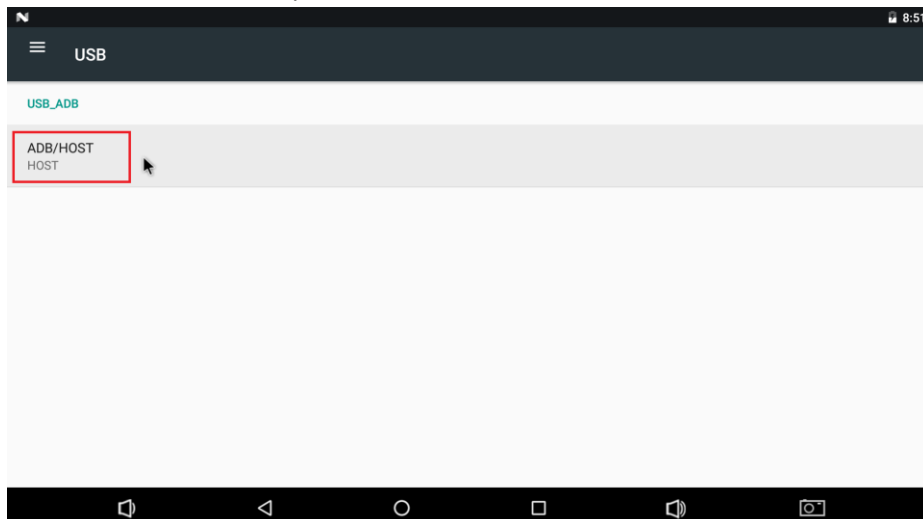
Note: Please do not change the others that you do not understand what it does.



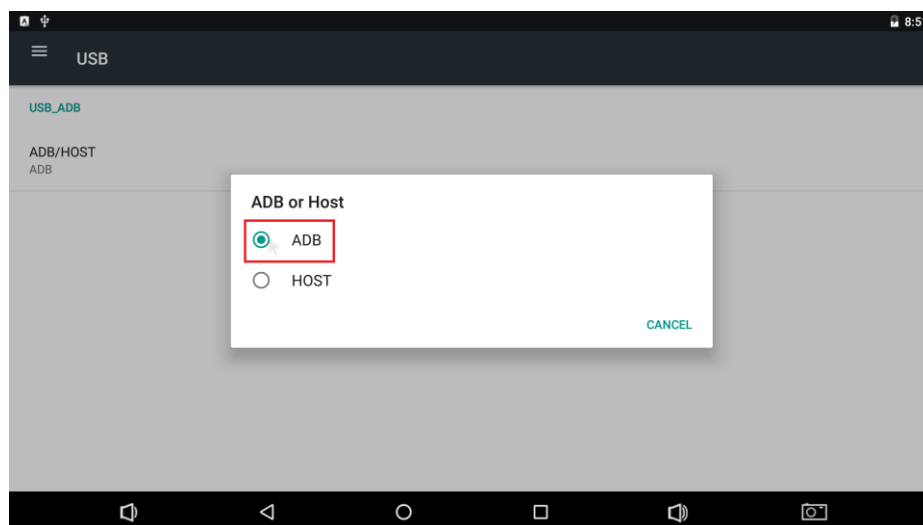
Step5. Scroll to "Settings > USB"



• Then Scroll to "USB > ADB/HOST"



• Set USB3.0 as ADB



3-1-2. To install APK software over the ADB function of PC :

1. Complete the connection between USB3.0 (Type A) port of FES101E6 and USB port of PC.
2. Enter the command string "adb install xxxxx.apk" from pc that will begin user's APK software installation.

3-1-3. To control Status Light Bar (RGBW Optic Fiber):

Refer to the API files.



FES101E6_rgb_a.cpp



FES101E6_rgb_a.h

```
//To set each RED, GREEN, BLUE, WHITE light on
void FES101E6_red_light(GPIO_ON);
void FES101E6_green_light(GPIO_ON);
void FES101E6_blue_light(GPIO_ON);
void FES101E6_white_light(GPIO_ON);
```

```
//To set each RED, GREEN, BLUE, WHITE light off
void FES101E6_red_light(GPIO_OFF);
void FES101E6_green_light(GPIO_OFF);
void FES101E6_blue_light(GPIO_OFF);
void FES101E6_white_light(GPIO_OFF);
```

3-1-4. To control DIO Ports:

Refer to the API files.



FR_u2r2_a12.cpp



FR_u2r2_a12.h

```
// First initial gpio
int FR_u2r2_gpio_init(eGPIO_value);

// To set each PINs DO-0, DO-1, DO-2
void set_FR_u2r2_gpio_out0 (eGPIO_value); // set DO-0
void set_FR_u2r2_gpio_out1 (eGPIO_value); // set DO-1
void set_FR_u2r2_gpio_out2 (eGPIO_value); //set DO-2
```



```
// Retrieve the status of PINs DO-0, DO-1 and DO-2 for confirmation
int get_FR_u2r2_gpio_out0 ();
int get_FR_u2r2_gpio_out1 ();
int get_FR_u2r2_gpio_out2 ();

// To get value of PINs DI-0, DI-1, DI-2
int get_FR_u2r2_gpio_in0 (); // read DI-0
int get_FR_u2r2_gpio_in1 (); // read DI-1
int get_FR_u2r2_gpio_in2 (); // read DI-2
```

3-1-5. To control Comport Mode:

FR_u2r2 generate two devices node, the path are “/dev/ttyUSB0” and “/dev/ttyUSB1”.

Refer to the API files.



FRu2r2_comport_a.cpp



FRu2r2_comport_a.h

```
// To set ttyUSB0 comport mode
void set_FRu2r2_ttyUSB0_mode(comport_mode);

// To set ttyUSB1 comport mode
void set_FRu2r2_ttyUSB0_mode(comport_mode);
```

MODE_2	MODE_1	MODE_0	Mode	Status
0	0	0	RS-422 Full Duplex	1T/1R RS-422
0	0	1	Pure RS-232	3T/5R RS-232.
0	1	0	RS-485 Half Duplex	1T/1R RS-485, TX ENABLE Low Active
0	1	1	RS-485 Half Duplex	1T/1R RS-485, TX ENABLE High Active
1	0	0	RS-422 Full Duplex	1T/1R RS-422 with termination resistor and bias resistor.
1	0	1	Pure RS-232	1T/1R RS-232 co-exists with RS485 application without the need for the bus switch IC (for special usage).
1	1	0	RS-485 Half Duplex	1T/1R RS-485 with termination resistor and bias resistor. TX ENABLE Low Active
1	1	1	Low Power Shutdown	All I/O pins are High Impedance

(Table 1)



3-2. Debian Programming Guide

3-2-1. To control Status Light Bar (RGBW Optic Fiber):

Refer to the API files.



FES101E6_rgb.c



FES101E6_rgb.h

```
// For instance to set each RED, GREEN, BLUE, WHITE light on
void set_FES101E6_red (GPIO_ON);
void set_FES101E6_green (GPIO_ON);
void set_FES101E6_blue (GPIO_ON);
void set_FES101E6_white (GPIO_ON);

// For instance to set each RED, GREEN, BLUE, WHITE light off
void set_FES101E6_red (GPIO_OFF);
void set_FES101E6_green (GPIO_OFF);
void set_FES101E6_blue (GPIO_OFF);
void set_FES101E6_white (GPIO_OFF);
```

3-2-2. To control DIO Ports:

Refer to the API files.



FR_u2r2_12.c



FR_u2r2_12.h



libfintek_api.a



fintek_api.h

```
// First initial gpio
int FR_u2r2_gpio_init (eGPIO_value);

// To set each PINs DO-0, DO-1, DO-2
void set_FR_u2r2_gpio_out0 (eGPIO_value); // set DO-0
void set_FR_u2r2_gpio_out1 (eGPIO_value); // set DO-1
void set_FR_u2r2_gpio_out2 (eGPIO_value); // set DO-2

// Retrieve the status of PINs DO-0, DO-1 and DO-2 for confirmation
int get_FR_u2r2_gpio_out0 ();
int get_FR_u2r2_gpio_out1 ();
int get_FR_u2r2_gpio_out2 ();
```



```
// To get value of PINs DI-0, DI-1, DI-2
int get_FR_u2r2_gpio_in0 (); // read DI-0
int get_FR_u2r2_gpio_in1 (); // read DI-1
int get_FR_u2r2_gpio_in2 (); // read DI-2
```

3-2-3. To control Comport Mode:

FR_u2r2 generate two devices node, the path are “/dev/ttyUSB0” and “/dev/ttyUSB1”.

Refer to the API files.



FR2ur2_comport.c



FR2ur2_comport.h

```
// To set ttyUSB0 comport mode
Int set_FR2ur2_ttyUSB0_mode(comport_mode);
```

```
// To set ttyUSB1 comport mode
Int set_FR2ur2_ttyUSB1_mode(comport_mode);
```

**** comport_mode setting, refer to Table 1 of section 3-1-5**

