

FES133/156/215-R39

ARM-Panel-PC User Manual (Preliminary)

Fanless ultra-compact
Dual Core Cortex A72+Quad core Cortex A53
ARM system for
Industrial/Advertising Applications

Version: V1.0

Document No: doc-FESxxxE2-R39V10

PCB Bare Board: PB7968MV11



Packing List

- ☑ 1 x FES133/156/215-R39 or K39 series Panel-PC.
- ☑ 1 x CD includes User Manual/APIs.
- ☑ 2 x ANTENNA, 2.4~2.5/4.9~5.8GHz, bendable, L=110mm.
- ☑ 1 x Adaptor, DC-12V/1A.

Ordering Information

Part Number: FES133/156/215-**xn**-R39**yz**-**MN**

• **x** : Touch Panel Type

- N: without Touch Panel.
- E: with PCAP Touch Panel.

• **n** : Optional Frame Style

- 2: Classic black metal Chassis.
- 3: Classis OAK wooden frame + black metal chassis.
- 4: Classis Pine wooden frame + black metal chassis.

• **y** : On Board DDR3 Memory Size

- 1 1GB of LPDDR3.
- 2 2GB of LPDDR3(default).

• **z** : On Board eMMC Size

- 4 4GB of eMMC.
- 8 8GB of eMMC.
- F 16GB of eMMC.

• **MN** : The Function Summary code

- SS HDMI 2.0, GigE, 5G-wifi, USB 3.0 (Type-A), USB2.0 (Type-A), USB HUB, Micro-SD Socket, Line-Out, MIC-In, IR Port, Debug Port, DC-IN12V.
- S1 SS (Without Audio, USB HUB, IR).
- S2 SS (Without USB HUB, IR).
- S3 SS (Without Audio, USB HUB, GigE, IR).
- PS SS + 802.3at (Mode A&B, PoE+).
- P1 S1 + 802.3at (Mode A&B, PoE+).



Revision histories

Rev. No.	Date	Owner	Substantial Changes
1.0	2019/09	Victor	First issue.



Table of Contents

1. General Information	5
1-1. Features	5
1-1-1. ARM based System	5
1-1-2. Panel Display	5
1-1-3. The Operating Temperature	5
1-1-4. Storage Expansion.....	6
1-1-5. Networking Option	6
1-1-6. Power over Ethernet option	6
1-1-7. Embedded OS ready.....	6
1-2. Product Specifications.....	7
1-3. Outline Dimensions.....	9
1-3-1. The Outline of 13.3" Panel PC (FES133x3-R39xxxx)	9
1-3-2. The Outline of 15.6" Panel PC (FES156x3-R39xxxx)	10
1-3-3. The Outline of 21.5" Panel PC (FES215x2-R39xxxx)	11
2. Peripherals Port Description	12
2-1. DC Power Jack	12
2-2. Gigabit Ethernet Port	12
2-3. USB 2.0 Port	13
2-4. USB 3.0 Port	13
2-5. Micro SD/SDHC card Slot	14
2-6. HDMI®-2.0 port	14
2-7. RS232 Debug Port	15
3. Software and Technical Supports	16
3-1. Android Programming Guide	16
3-1-1. ADB installation	16
3-1-2. To install APK software over the ADB function of PC :.....	19



1. General Information

The FORENEX FESxxx-RK39 Panel-PC Series is designed with an elegant OAK nature wooden frame and classical block metal chassis, ultra-Slim, compact outline to make it takes full advantage of the lowest power, fan less system design.

In the inner, embeds powerful graphic engines provide optimized performance on supporting multi-format video decoders including H.264/H.265/VP9 up to 4Kx2K, especially, H.264/H.265 decoders support 10bits coding, and also supports H.264/MVC/VP8 encoders by 1080p@30fps, high-quality JPEG encoder/decoder, and embedded 3D GPU makes FEB710 completely compatible with OpenGL ES1.1/2.0/3.0/3.1, OpenCL and DirectX 11.1. Special 2D hardware engine will maximize display performance and provide very smooth operation. On-board storage includes eMMC Flash Device and can expand through one Micro SD card.

The FESxxxE2-RK39 is very suitable for a variety of industrial transportation, selling infotainment, self-ordering machine (HMI) and TV advertisement applications.

1-1. Features

1-1-1. ARM based System

With Arm Cortex®-A72 + Cortex®-A53 platform is a powerful Android/ Linux-based solution, offering high performance processing optimized for the lowest power consumption.

1-1-2. Panel Display

Provides optional 13.3 / 15.6 / 21.5 inch panel, each one has resolution 1920x1080 with optional PCAP Touch 10-Point multi-touch.

1-1-3. The Operating Temperature

FESxxxE2-R39 Provide a wide range from 0°C up to 70°C for Commercial environment, FESxxxE2-K39 Provide a wide range from -20°C up to 80°C for Industrial environment, suitable for critical environment applications.

****Note:** 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.



1-1-4. Storage Expansion

The Micro SD/SDHC card slot enables the FESxxx-RK39 to have a flexible storage up to 32GB size.

*****Note: More frequent and larger data access on eMMC memory makes the eMMC lifespan shorter. Therefore, it is highly recommended to use a Micro SD card for large data access.***

1-1-5. Networking Option

The FESxxx-RK39 equips with RJ-45 port that supports high-speed Gigabit Ethernet. And a 2.4G/5Ghz, Wifi(WLAN): IEEE 802.11a/b/g/n/ac 2x2 MIMO standard with SDIO interface on board.

1-1-6. Power over Ethernet option

The optional 802.3at PoE+ module is Powered Device (PD) controller and switching regulator for high power IEEE 802.3at and 802.3af applications. The PoE+ module can output 25W of power. The FESxxx-RK39 can be operated using either PoE+ or external adaptors (12V).

1-1-7. Embedded OS ready

- Android 7.1
- Debian 9



1-2. Product Specifications

Processor:

- ✓ Rockchip3399 Arm Cortex®-A72 + Cortex®-A53

System Memory:

- ✓ 1GB/2GB(default) LPDDR3L-1600 SDRAM

Storage:

- ✓ 4GB/8GB(default)/16GB eMMC Flash memory

Graphics:

ARM Mali-T860MP4 (Embedded 3D GPU)

- ✓ Supports completely compatible with OpenGL ES1.1/2.0/3.0/3.1, OpenCL, DX11
- ✓ Supports AFBC (ARM Frame Buffer Compression)
- ✓ Video Decoder:
 - H.264 /H.265, 10bit, up to 4Kx2K@60fps
 - VP9, 8bit, up to 4Kx2K@60fps
 - MPEG-4 /MPEG-2 /VP8 up to 1080p@60fps
- ✓ Video Encoder:
 - H.264 /MVC /VP8 encoders by 1080p@30fps
- ✓ Supports HDMI® V2.0, Res. up to 4Kx2K @60fps, HDCP1.4 /2.2

LAN:

- ✓ Realtek RTL8211E Gigabit Ethernet transceiver with RGMII support

WLAN:

- ✓ 2.4G/5Ghz, Wi-Fi module with SDIO interface on board. The wireless module complies with IEEE 802.11a/b/g/n/ac 2x2 MIMO standard

USB:

- ✓ Original from processor, with 1 x USB3.0 and 1 X USB2.0

I/O Interfaces:

- ✓ 1 x DC Power Jack
- ✓ 1 x Gigabit Ethernet Port (supports optional IEEE 802.3at, PoE+)
- ✓ 1 x Micro-SD Card Slot
- ✓ 1 x USB 2.0 Type A
- ✓ 1 x USB 3.0 Type A(Image file update Port)
- ✓ 1 x HDMI
- ✓ 2 x Antenna holes for 5G/Wi-Fi
- ✓ 1 x Debug Port



Panel Specification:

- ✓ FES133: CR (600)/ 250nit/ Viewing angle: (L:89, R:89, T:89, B:89).
- ✓ FES156: CR (1000)/ 350nit/ Viewing angle: (L:89, R:89, T:89, B:89).
- ✓ FES156: CR (1000)/ 500nit/ Viewing angle: (L-R:175, T-B:175).

Dimension (W x H x D):

- ✓ 348.8mm (W) x 231.1mm (H) x Max.37mm (D) (13.7" x 9.1" x 1.5"),(FES133N3)
- ✓ 406mm (W) x 266.5mm (H) x Max.37mm (D) (16.0" x 10.5" x 1.5"), (FES156E3)
- ✓ 520mm (W) x 303mm (H) x Max.44mm (D) (20.5" x 11.9" x 1.7"), (FES215E2)

Weight:

- ✓ 1.4kg (FES133N3-R39)
- ✓ 2.8kg (FES156E3-R39)
- ✓ 4.5kg (FES215E2-R39)

Operating Temperature:

- ✓ 0°C ~ 70°C (FESxxx-R39)
- ✓ -20°C ~ 80°C (FESxxx-K39)

Operating Humidity:

- ✓ 0% ~ 90% @ 45°C (non-condensing)

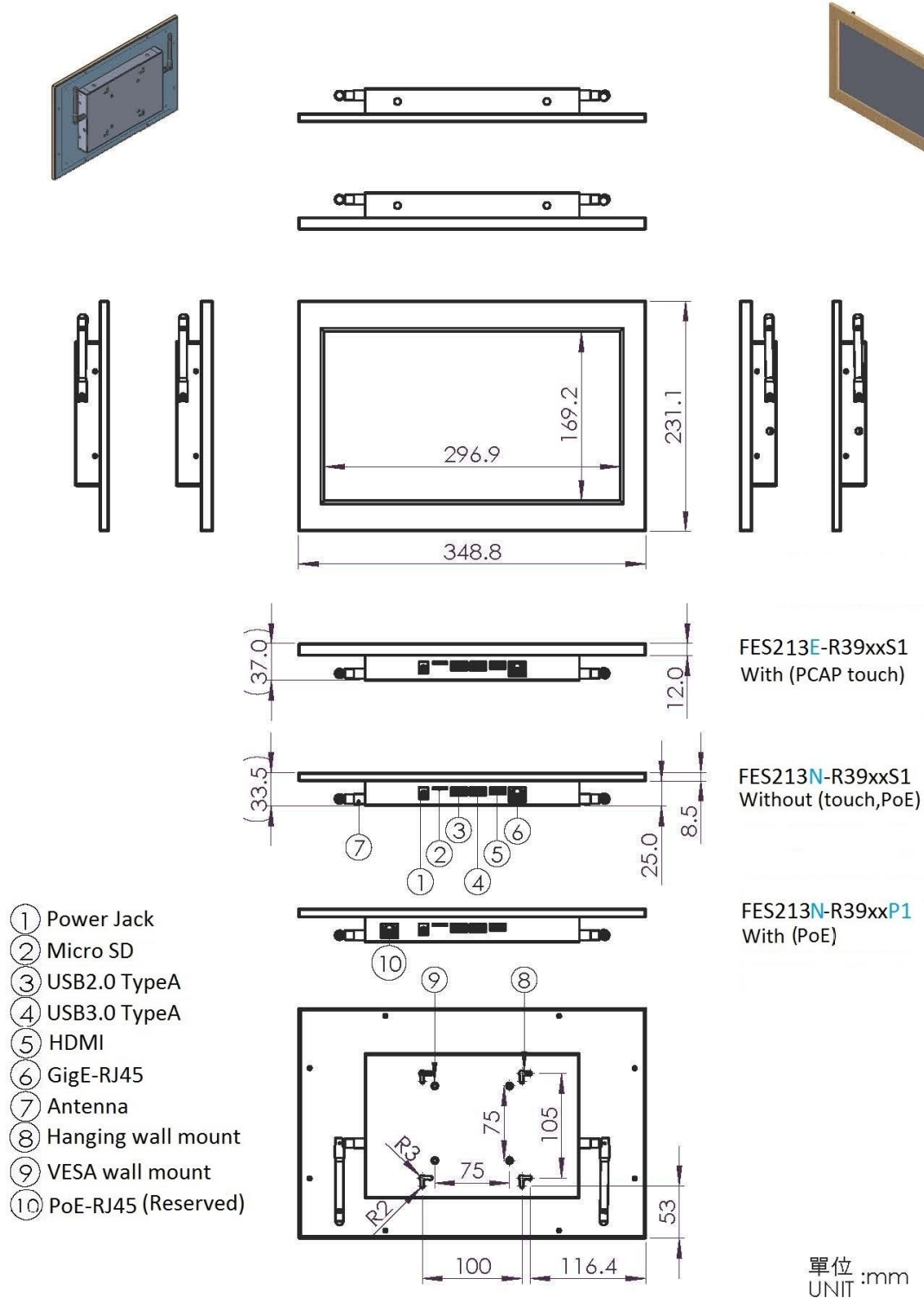
Operating System:

- ✓ Android 7.1
- ✓ Debian 9

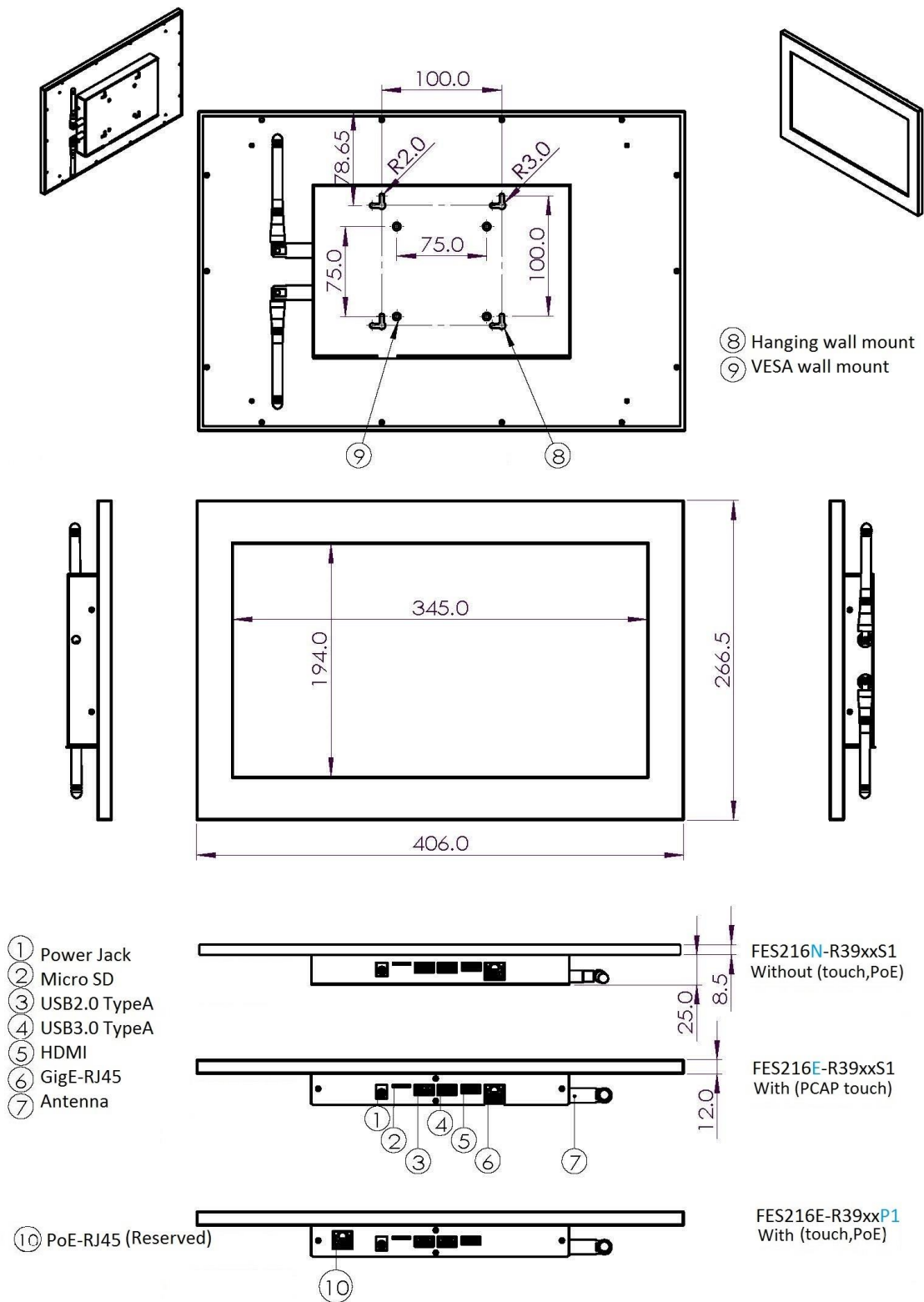


1-3. Outline Dimensions

1-3-1. The Outline of 13.3" Panel PC (FES133x3-R39xxxx)

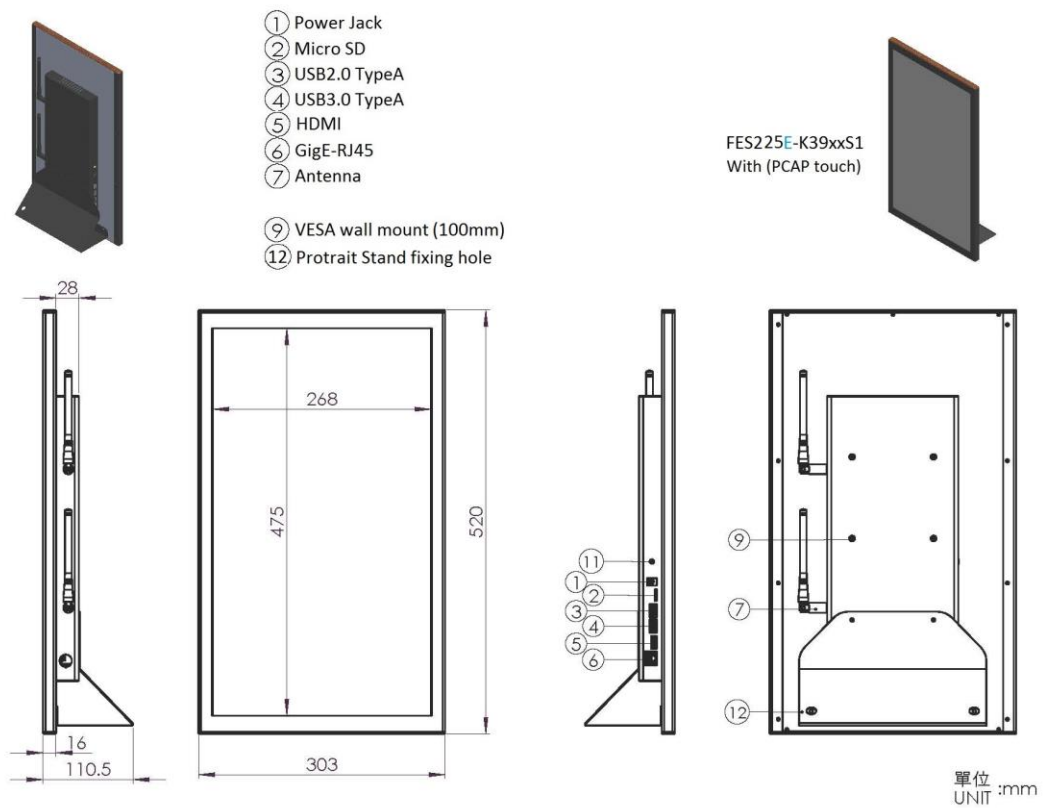


1-3-2. The Outline of 15.6" Panel PC (FES156x3-R39xxxx)



單位:mm
UNIT

1-3-3. The Outline of 21.5" Panel PC (FES215x2-R39xxxx)



2. Peripherals Port Description

2-1. DC Power Jack

- On front panel, carries external power input.

DC Plug-in $\Phi 2.0$

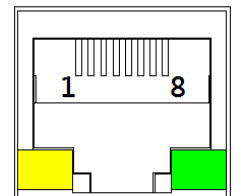


- Pin Assignment:

Connector: (DC Power Jack)	
Pin number	Description
Tip	DC12V ~ 24V
Sleeve	GND

2-2. Gigabit Ethernet Port

- On front panel.
- 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.



2-3. USB 2.0 Port

- On Front panel.
- The FESxxx-RK39 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

2-4. USB 3.0 Port

- On Front panel.
- The dedicated USB port to in charge of updating the Image File while the FESxxx-RK39 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		

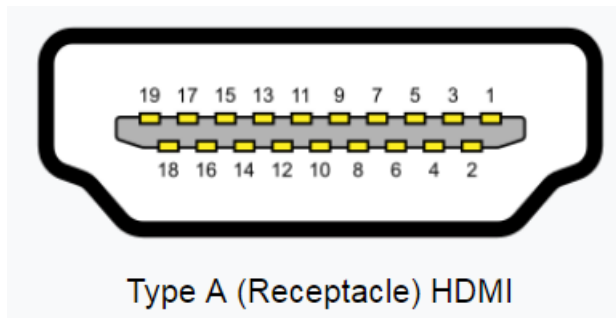


2-5. Micro SD/SDHC card Slot

- On Front panel.
- Micro SD/SDHC card slot without spring and enable the SD storage up to 32GB size.
- Providing as an extra-storage device. Prevent more frequent and larger data access on eMMC memory makes its lifespan shorter.

2-6. 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		



2-7. RS232 Debug Port

- On rear panel.
- Pin Assignment.

Connector: (DB-9/Male)	
Pin number	Description
1	COM-GND
2	Console-RX (SIN), RS232 level
3	Console-TX (SOUT), RS232 level
4	NC
5	COM-GND
6	NC
7	NC
8	NC
9	NC



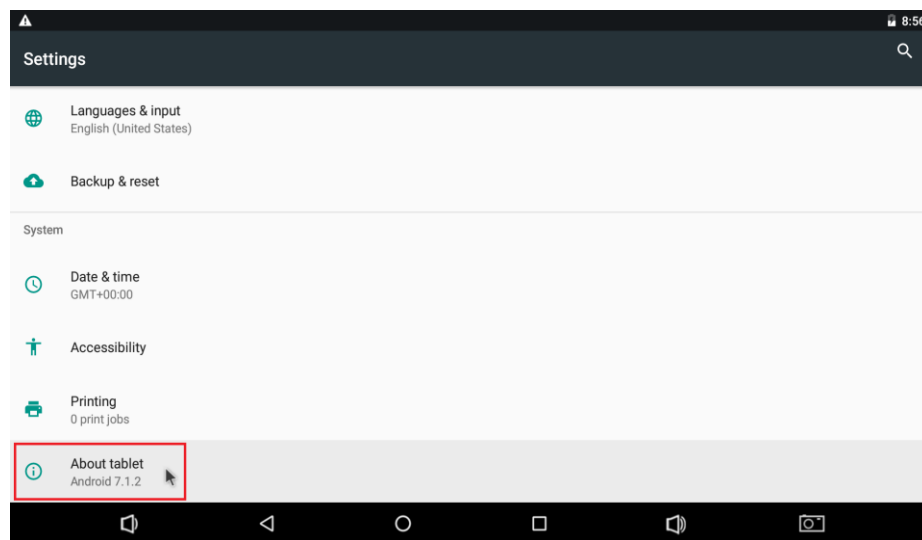
3. Software and Technical Supports

3-1. Android Programming Guide

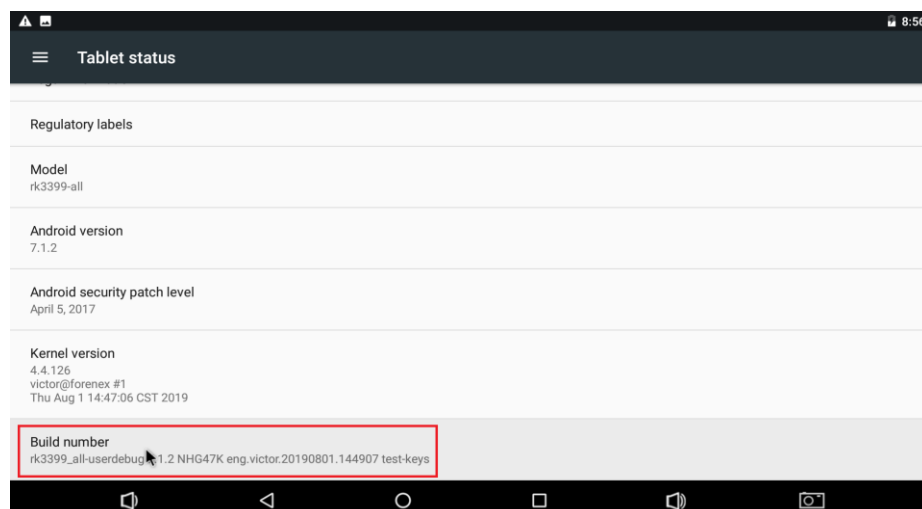
3-1-1. ADB installation

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.

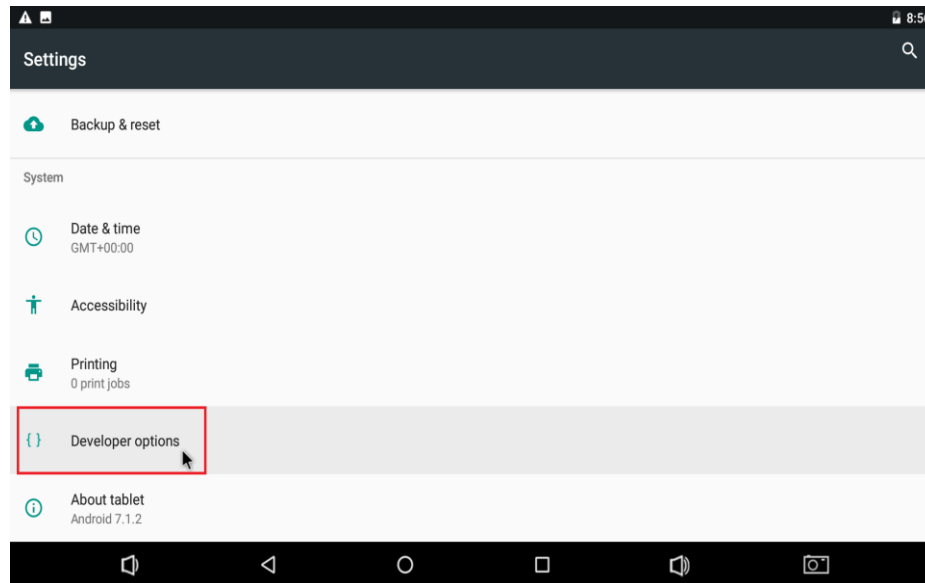
Step1. Scroll to "Settings > About Tablet"



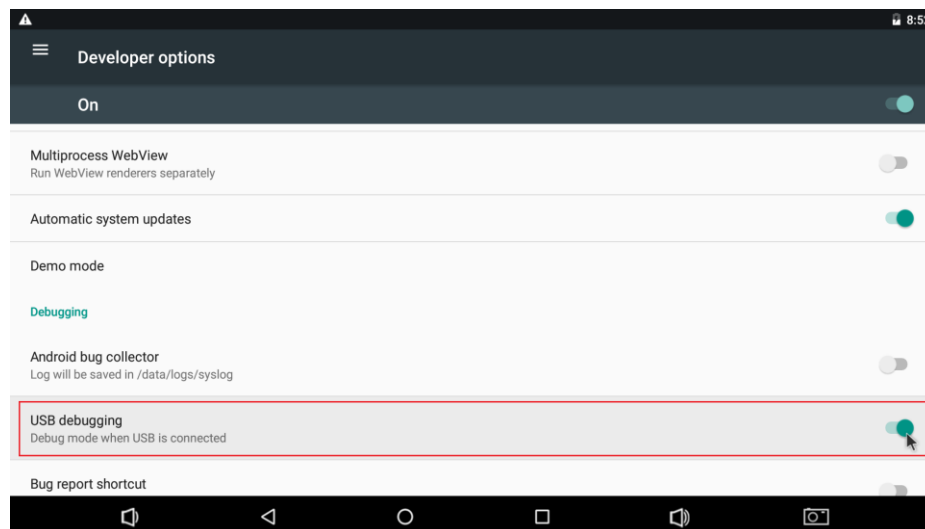
Step2. From "Settings" select "About tablet" to enter the dialog, and then click "Build number" in the dialog as shown. Android will pop up a countdown message. Keep clicking it until zero for Android to authorize the user to be a Developer.



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



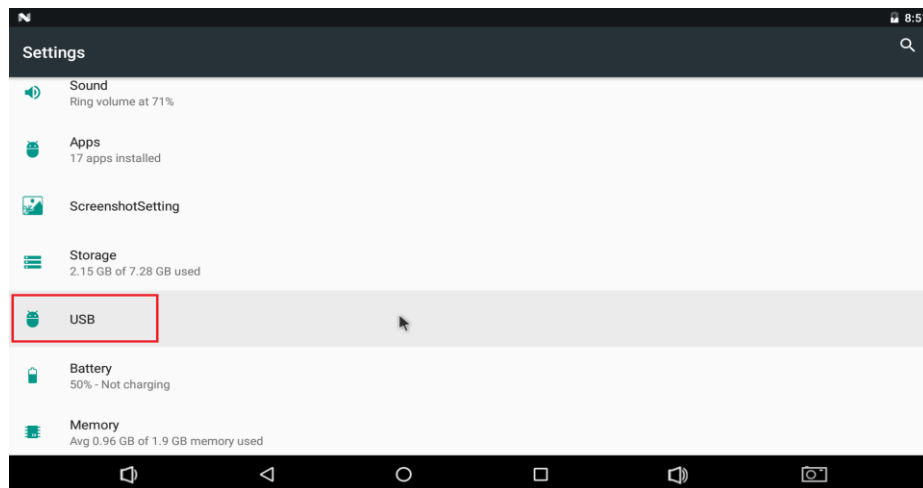
Step4. Get into the new item "Developer Options" and turn on the USB debugging function.



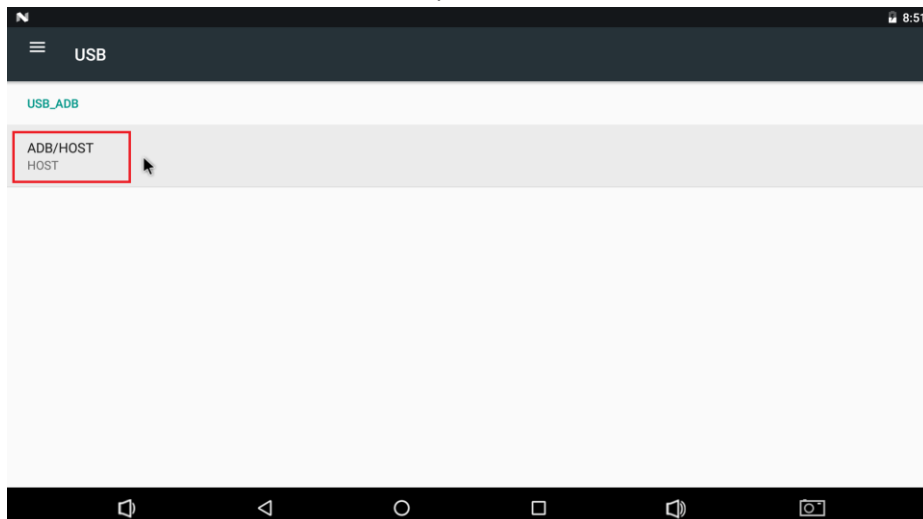
Note: Please do not change the others that you do not understand what it does.



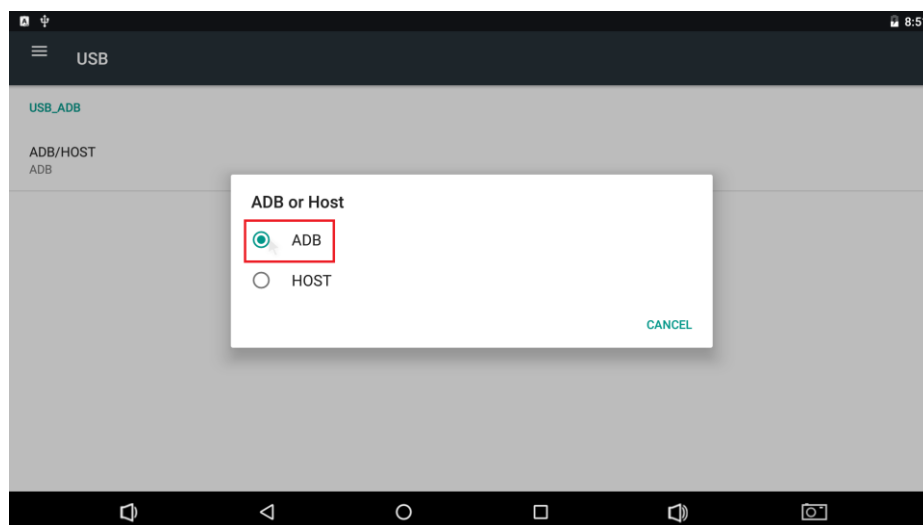
Step5. Scroll to "Settings > USB"



• 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 connectivity between USB3.0 (Type A) port of FESxxx-RK39 and USB port of PC.
2. Enter the command string "adb install xxxxx.apk" from pc that will begin user's APK software installation.

