



**User Manual**

# **EPD Control Board EPD-132 Development Kit**

**Wireless ePaper Display Solution**

**ADVANTECH**

*Enabling an Intelligent Planet*

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1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
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5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

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# Declaration of Conformity

## FCC Class B

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:

- 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.

## IMPORTANT NOTE:

### FOR MOBILE DEVICE USAGE (>20cm/low power)

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body.

### FOR COUNTRY CODE SELECTION USAGE (WLAN DEVICES)

Note: The country code selection is for non-US models only and is not available to all US models. Per FCC regulations, all Wi-Fi products marketed in the US must be fixed to US operation channels only.

### LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following "Contains TX FCC ID: M82-EPD-132-092 ".


If the labelling area is larger than the palm of the hand, then the following FCC part 15.19 statement has to also be available on the label: This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

## NCC

### 低功率電波輻射性電機管理辦法

- 第十二條 經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。
- 第十四條 低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前項合法通信，指依電信法規定作業之無線電通信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。

### 模組認證：

1. 本模組於取得認證後將依規定於模組本體標示審驗合格標籤。
2. 系統廠商應於平台上標示「本產品內含射頻模組： XXXyyyLPDzzzz-x」字樣。

## Technical Support and Assistance

1. Visit the Advantech website at <http://support.advantech.com> where you can find the latest information about the product.
2. Contact your distributor, sales representative, or an Advantech customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
  - Product name and serial number
  - Description of your peripheral attachments
  - Description of your software (operating system, version, application software, etc.)
  - A complete description of the problem
  - The exact wording of any error messages

## Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

Part No.	Description
EPD-132B1AG-NSD01	13.3 " Black/White EPD Wi-Fi(2.4G) solution
EPD-132R1AG-NSD01	13.3 " Red/Black/White EPD Wi-Fi(2.4G) solution
1750008001-01	Wi-Fi dipole antenna, 5dBi 2.4/5GHz
1750006043-01	RF SMA cable, L=150mm
1750008816-01	Antenna magnetic base, L=100mm
1700015038	FFC Cable 10P-0.5mm 7.9cm for DCU2.0
1700029192-01	60cm Micro USB with 5P(M) for power report
9696053RS00	EPD-053R A101-1 daughter board with Switch and LED

## Ordering Information

Part No.	Description
EPD-DK132R-FB01	EPD-132R Development Kit, including 2.4G antenna x1, EPD controller x1, 13.3" red, black and white EPD x1, USB cable x2 and ED22 x1
EPD-DK132B-FB01	EPD-132B Development Kit, including 2.4G antenna x1, EPD controller x1, 13.3" black and white EPD x1, USB cable x2 and ED22 x1

## Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
  - The power cord or plug is damaged.
  - Liquid has penetrated into the equipment.
  - The equipment has been exposed to moisture.
  - The equipment does not work well, or you cannot get it to work according to the user's manual.
  - The equipment has been dropped and damaged.
  - The equipment has obvious signs of breakage.

**DISCLAIMER:** This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

## Consignes de Sécurité

1. Lisez attentivement ces instructions de sécurité.
2. Conservez ce manuel de l'utilisateur pour référence ultérieure.
3. Débranchez cet appareil de toute prise secteur avant le nettoyage. Utilisez un chiffon humide. N'utilisez pas de détergents liquides ni en spray pour le nettoyage.
4. Pour les équipements enfichables, la prise de courant doit être située à proximité de l'équipement et doit être facilement accessible.
5. Gardez cet équipement à l'abri de l'humidité.
6. Placez cet équipement sur une surface fiable lors de son installation.
7. Les ouvertures de l'enceinte sont destinées à la convection de l'air. Protégez le matériel contre la surchauffe. **NE COUVREZ PAS LES OUVERTURES.**
8. Assurez-vous que la tension de la source d'alimentation est correcte avant de connecter l'équipement à la prise de courant.
9. Placez le cordon d'alimentation de sorte que personne ne puisse marcher dessus. Ne placez aucun objet sur le cordon.
10. Toutes les mises en garde et avertissements sur l'équipement doivent être notés.
11. Si l'équipement n'est pas utilisé pendant une longue période, débranchez-le de la source d'alimentation pour éviter tout dommage dû à une surtension transitoire.
12. Ne jamais verser de liquide dans une ouverture sous peine de provoquer un incendie ou un choc électrique.
13. Ne jamais ouvrir l'appareil. Pour des raisons de sécurité, cet équipement ne doit être ouvert que par du personnel qualifié.
14. Si l'une des situations suivantes se produit, faites vérifier l'équipement par le personnel de service:
  - Le cordon d'alimentation ou la fiche est endommagé.
  - Un liquide a pénétré dans l'appareil.
  - L'équipement a été exposé à l'humidité.
  - L'équipement ne fonctionne pas bien ou vous ne pouvez pas le faire fonctionner conformément au manuel d'utilisation.
  - L'équipement est tombé et a été endommagé.
  - L'équipement présente des signes évidents de rupture.

**AVERTISSEMENT:** Cet ensemble d'instructions est donné conformément à la norme CEI 704-1. Advantech décline toute responsabilité quant à l'exactitude des déclarations contenues dans le





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# Chapter 1

Introduction

## 1.1 Introduction

The EPD-132 is a development kit with development tools which support the ultra-low power 2.4GHz RF wireless protocol integrated with the 13.3" R/B/W & B/W EPD in an ARM Cortex-M4 processor. Users may use this kit to experience how wireless modules deliver images to e-Paper and how e-Paper displays images. Users control our host mcu BM22 through the Advantech ED22 development board.

The main features of EPD-132 development kit are:

- ARM Cortex-M4 Core Processor
- IEEE 802.11b/g/n + Bluetooth 4.1 standard support
- 13.3" e-Paper panel display
- Supported temperature ranges 0 ~ 40 °C in R/B/W, 0 ~ 50 °C in B/W
- Development board (ED22) supports commands to control EPD-132

## 1.2 Specifications

Computing System	MCUST 32-bit ARM Cortex-M4 Processor	
	Memory	RAM 256 KB
Display	Screen Size	285.8 x 213.65 mm
	Resolution	1600 x 1200 pixels
Storage	Internal	ITE SPI Flash: 32Mb
	External	BM22 SPI Flash: 128Mb
Wireless Network	Standard	IEEE 802.11b/g/n and BT4.1
	Frequency Band	2.4000~2.4840 GHz for Wi-Fi 2.4000~2.4835 GHz for BT
	Channels	1-11 for Wi-Fi 0~78 for BT 2.1+EDR 0~39 for BLE
	Transmit Power	Typ. 14 dBm at 802.11b CCK Mode 1M Typ. 12 dBm at 802.11g OFDM Mode 54M Typ. 12 dBm at 802.11n OFDM Mode MCS0 Typ. 5 dBm for BLE (class 1.5)
	Receiver Sensitivity	Typ. -95dBm at 1 Mbps Typ. -75 dBm at 54 Mbps Typ. -89 dBm at MCS0 Typ. -89 dBm for BLE
	Function	End node
	Antenna Connector	MHF
	Antenna	PCB Antenna
System Inter-face	Indicator Button	1 for Reset/ Page Change/Wake-up/Alert cancel

I/O (On-Board)	I2C	4-pin Pin Header	
	FFC Connector1 (Alert)	LED/button daughter board	
	FFC Connector2 (FFC_GPIO)	10 port GPIO for system expansion	
	FFC Connector3 (CN8)	UART debug port	
	Switch	Factory mode setting	
	Micro USB (CN2)	USB to TCON (Timing Controller)	Interface for data to EPD
	EPD connector	39P for 13.3" (R/B/W or B/W ) & 9.7" EPD (R/B/W)	
Power	DC 5V	Micro USB (CN2) up to 0.9A/4.5 W in USB3.0 host In Data transmission mode With Micro USB (CN3) up to 2A/ 10 W Power supply	
	Power Consumption	Standby 18mA / 90mW, application 0.25A / 1.25W	
Environment	Operational Temperature	0 ~ 40 °C (R/B/W) , 0 ~ 50 °C (B/W)	
	Non-Operational Temp.	-25 ~ 60 °C (R/B/W) , -25 ~ 70 °C (B/W)	
	Assembly Temperature	10 ~ 40 °C	
	Operating Humidity	5 ~ 85% Relative Humidity, non-condensing	
System Mechanical	Material Type	Metal (NCT)	
	Painting Type	SECC+ Painting	
	Dimension	240 x 322 x 60.5 mm/ 240 x 322 x 24 mm	
	Weight	1.3kg	
Physical Characteristics	Dimensions (W x H)	Panel: 285.8 x 213.65 mm PCBA: 108 x 122 x 3.9 mm	
	Weight	Panel: 0.12g PCBA: 0.17g	
Operating System	ThreadX v5.6		

**Note!** To prepare the image for EPD follow the instructions below.



1. Image needs to be set as 1600\*1200 pixels, do not resize it after completing the image as this will cause jaggy edges.
2. 24-bit / BMP format for EPD-132B
3. 24-bit / BMP format for EPD-132R, color range values below.  
Red: (255,0,0)  
Black: (0,0,0)  
White (255, 255, 255)

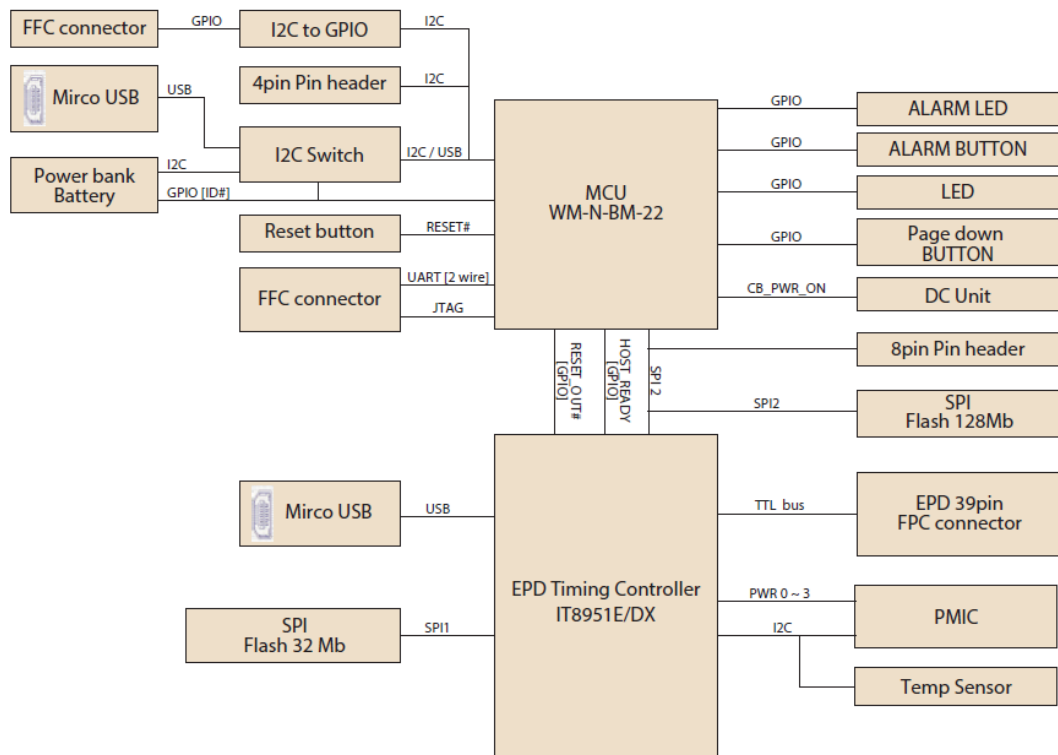


Figure 1.1 Block Diagram

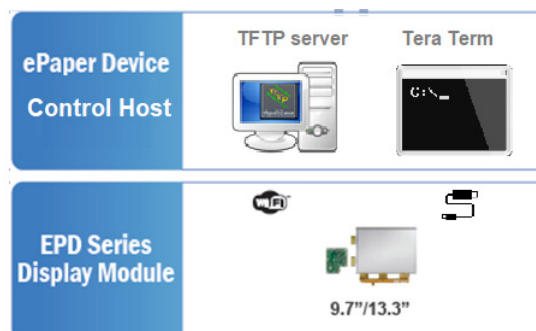
## 1.3 System Implementation

Advantech provides a total solution for system integrators to select different configurations according to end users system requirements. EPD-132 includes a Cortex M4 MCU Wi-Fi module, 13.3" ePaper, and an EPD controller solution. EPD-132 development kit with image display tool helps customers during the system planning stage to get started with e-paper quickly and easily.

Use this kit to learn how wireless modules deliver the image to ePaper and how ePaper displays the image. Users may use direct wiring to control our host mcu BM22 through Advantech's ED22 development board.

### 1.3.1 Advantech EPD-132 Development Kit

This architecture is composed of TFTP server, Tera Term, and EPD-132 (ePaper and controller). Physically, the development kit uses ED22 to connect between the control host computer and the EPD-132 module. Users control EPD-132 module through Tera Term on the host computer, so the image can be delivered wirelessly to ePaper when the user executes the command in Tera term.



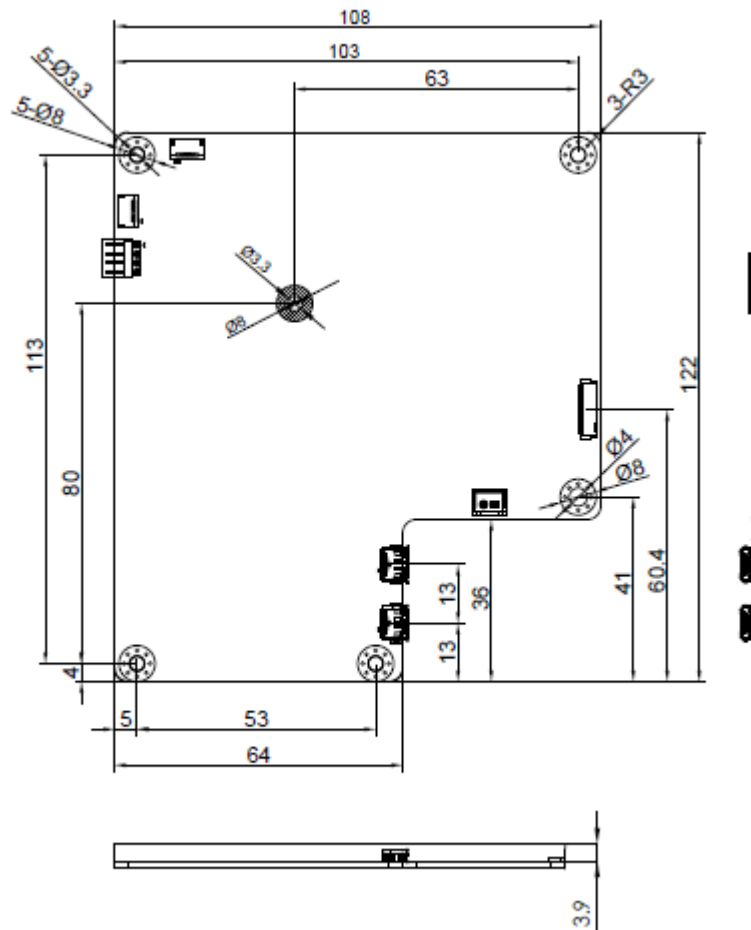
# Chapter 2

Development Kit HW  
Specification

This section provides board level PCBA design in #3.1 and the system level reference design in #3.2.

EPD-132 PCBA has the following spec.

- PCBA: 108 x 122 x 3.9 mm
- PCB thickness: 3 mm  $\pm$  10%
- Module input voltage: 5V DC-in
- Connector current rating: 0.5A / Power contact

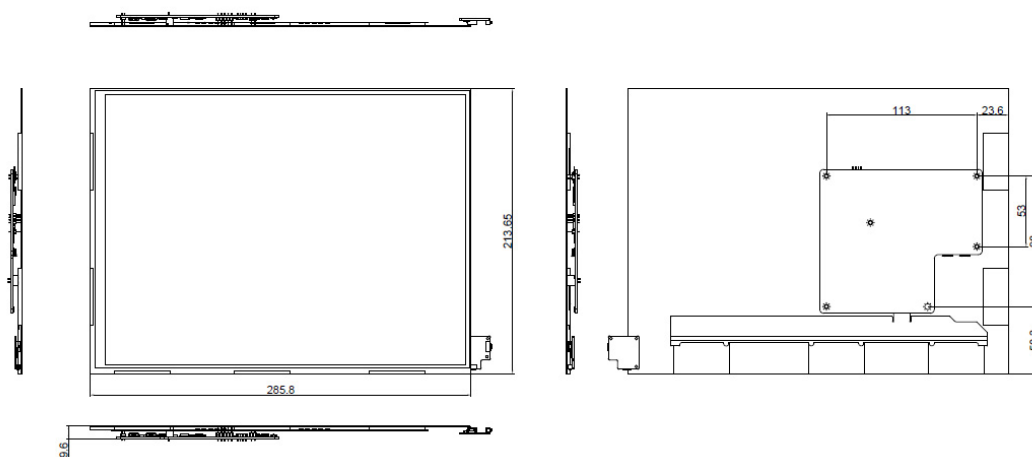


**Figure 2.1 Module Outline: 108 x 122 x 3.9 mm**

13.3" EPD (PN:968AD00147/968AD00388) spec.

- Panel Size: 285.8 x 213.65 mm
- PN: 968AD00388 Operating temperature range: 0 °C to +50 °C for Black and White,
- PN:968AD00147 Operating temperature range: 0 °C to +40 °C for Red, Black and White.
- All E ink Panel inspection criteria refers to E ink CAS & Inspection standard document.



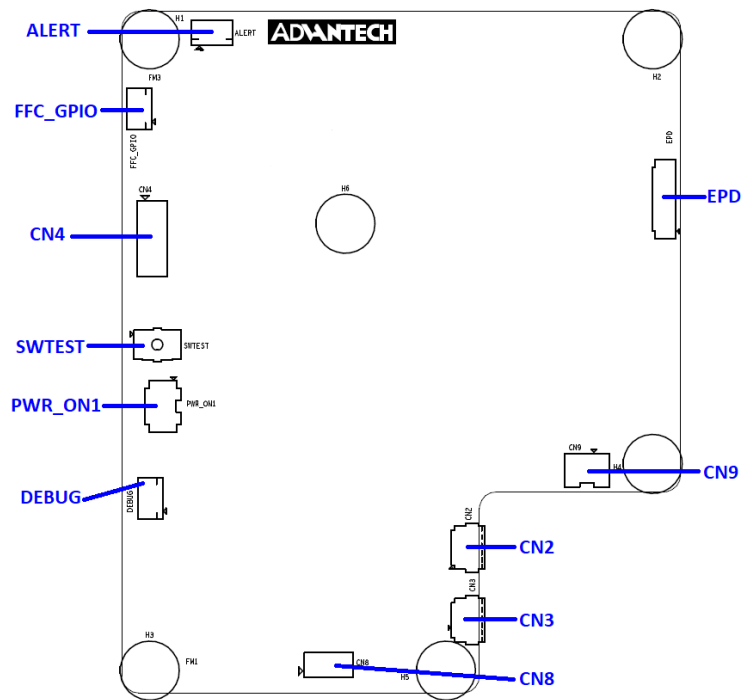


**Figure 2.2** Module connection to panel

**Note!** *E Ink recommended conditions for storage:*  
 Temperatures: 20  $\pm$  10  $^{\circ}$ C  
 Humidity: 60% RH  $\pm$  10% RH, Non-condensing

**Note!** *If the panel module has been in low temperatures between 0 $\sim$ 25  $^{\circ}$ C for a while, we recommend to leave it between 20 to 30  $^{\circ}$ C for 4 days before assembly.*

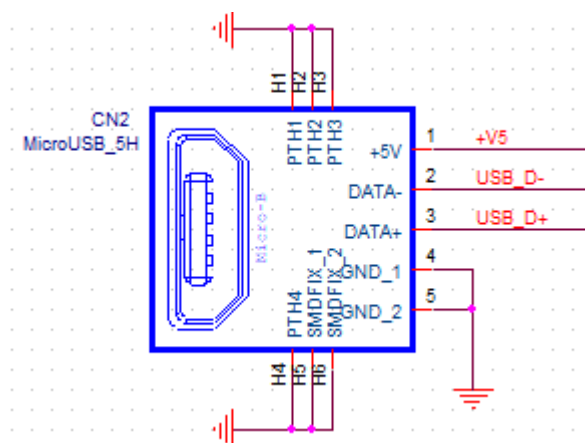
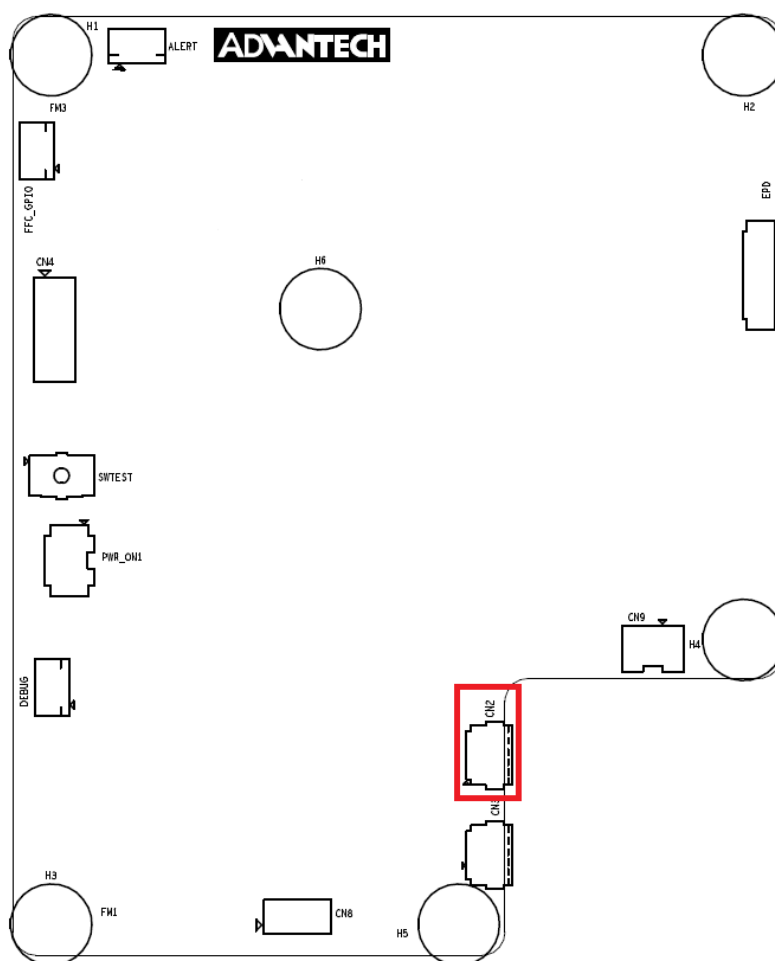
## 2.1 Board level I/O



**Table 2.1: I/O Connector**

NAME	Description	EPD-132	EPD-130
CN2	External Micro USB Port	v	v
CN3	External Micro USB Port	v	v
CN4	10 pins header for ES test		
CN8	8 pins header to connect to host		v
CN9	2 pins connector for DC-IN power		v
EPD	39 pins FPC to connect to e-paper panel	v	v
ALERT	10 pins FFC to connect to daughter board	v	
FFC_GPIO	10 pins FFC connector for external GPIO	v	
DEBUG	10 pins FFC connector	v	
SWTEST	For software test	v	v
PWR_ON1	4 pins DIP Switch	v	

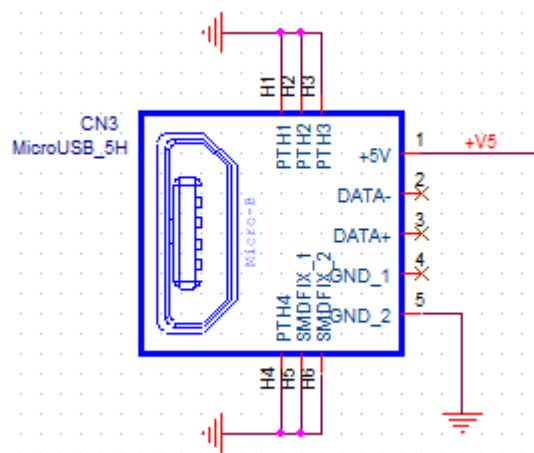
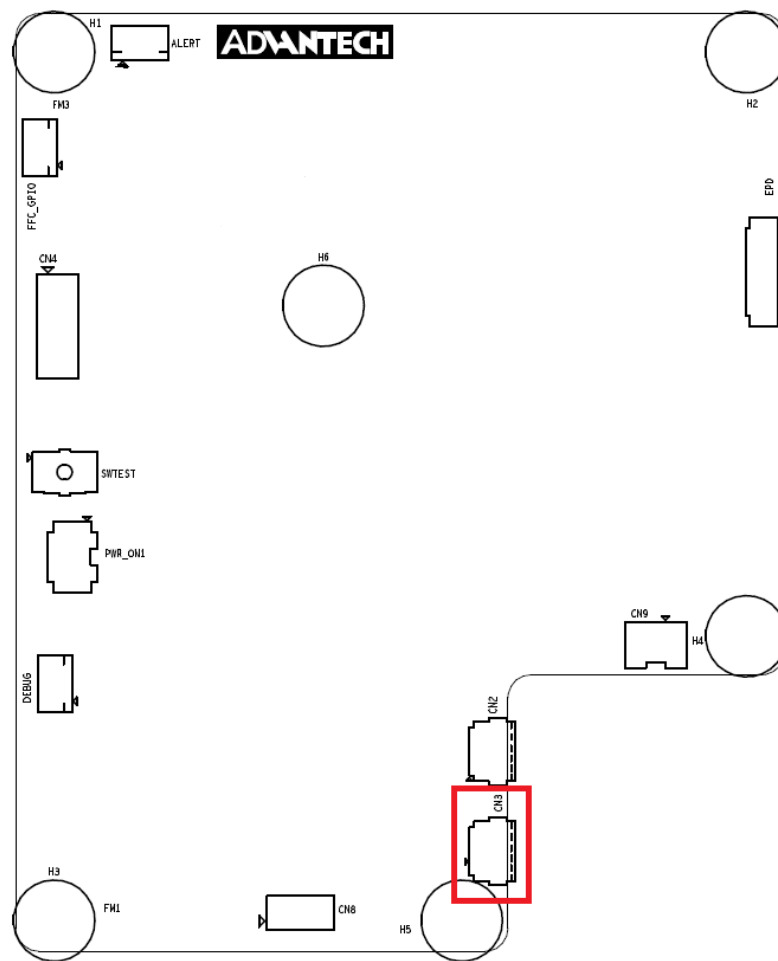
## 2.1.1 CN2



**Table 2.2: CN2**

PIN	PIN_NAME
1	+V5
2	USB_D-
3	USB_D+
4	GND
5	GND

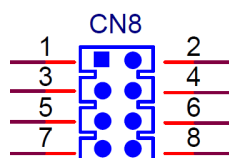
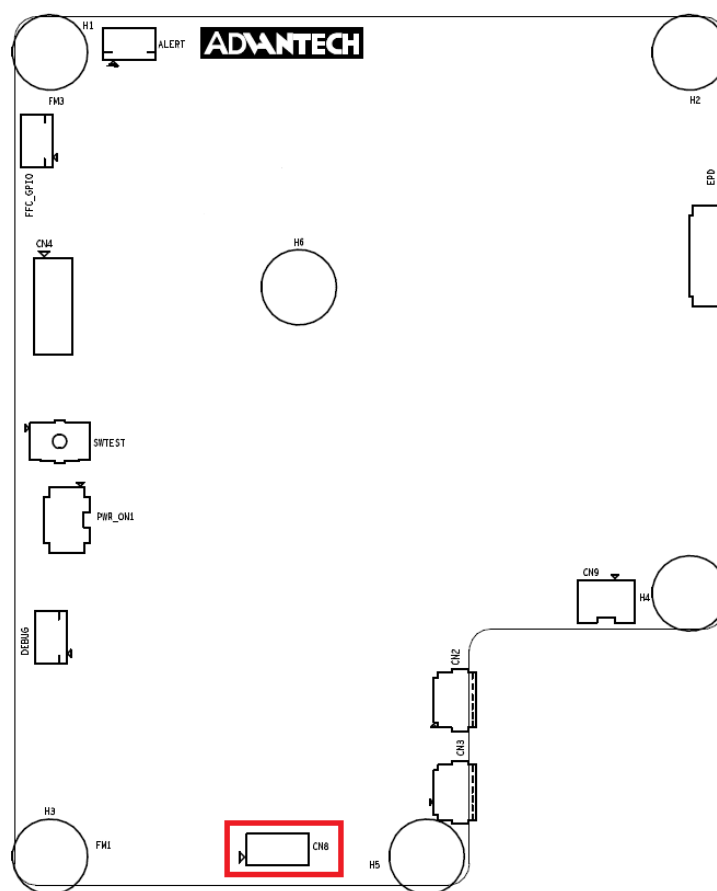
## 2.1.2 CN3



**Table 2.3: CN3**

PIN	PIN_NAME
1	+V5
2	N/A
3	N/A
4	N/A
5	GND

### 2.1.3 CN8



**Table 2.4: CN8 (SPI PIN HEADER)**

PIN	PIN_NAME	PIN	PIN_NAME
1	NC	2	SPI_CLK(Serial Clock)
3	NC	4	SPI_MOSI(Master Output,Slave Input)
5	NC	6	SPI_MISO(Master Input,Slave Output)
7	NC	8	SPI_CS0#(Slave Selected)

Serial Clock:

- SCLK: SCK

Master Output → Slave Input (MOSI):

- SIMO, MTSR - corresponds to MOSI on both master and slave devices, connects to each other.
- SDI, DI, DIN, SI - on slave devices; connects to MOSI on master, or to below connections.

- SDO, DO, DOUT, SO - on master devices; connects to MOSI on slave, or to above connections.

Master Input ← Slave Output (MISO):

- SOMI, MRST - correspond to MISO on both master and slave devices, connects to each other.
- SDO, DO, DOUT, SO - on slave devices; connects to MISO on master, or to below connections.
- SDI, DI, DIN, SI - on master devices; connects to MISO on slave, or to above connections.

Slave Select:

- SS: SS, SSEL, CS, CS, CE, nSS, /SS, SS#

In other words, MOSI (or SDO on a master) connects to MOSI (or SDI on a slave). MISO (or SDI on a master) connects to MISO (or SDO on a slave). Slave Select is the same functionality as chip select and is used instead of an addressing concept. Pin names are always capitalized as in Slave Select, Serial Clock, and Master Output Slave Input.

## 2.1.4 CN9

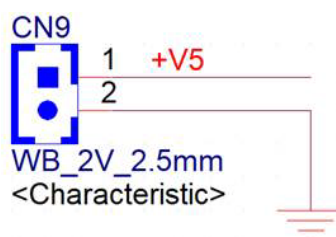
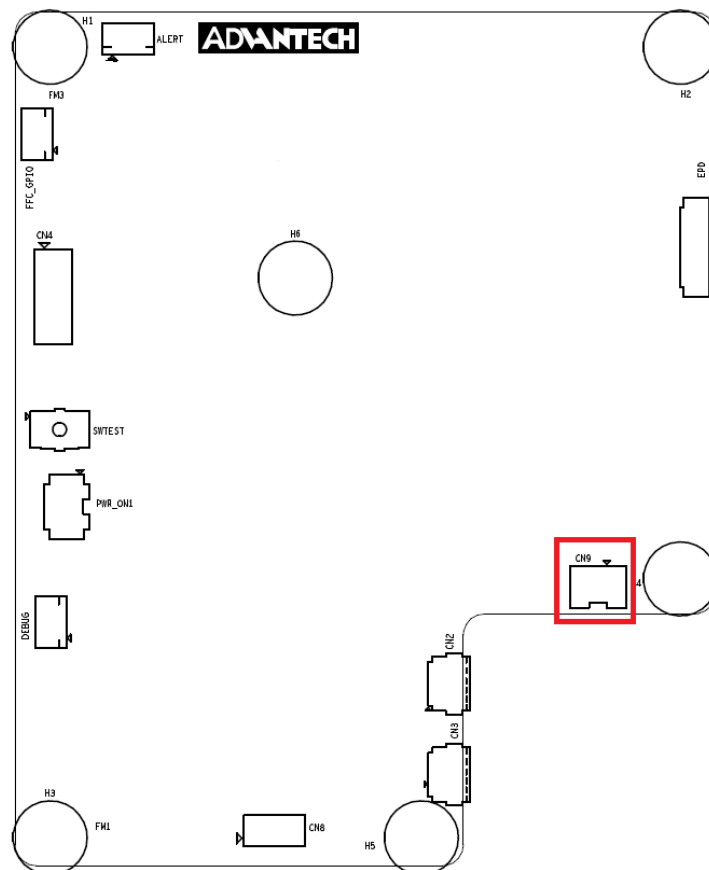
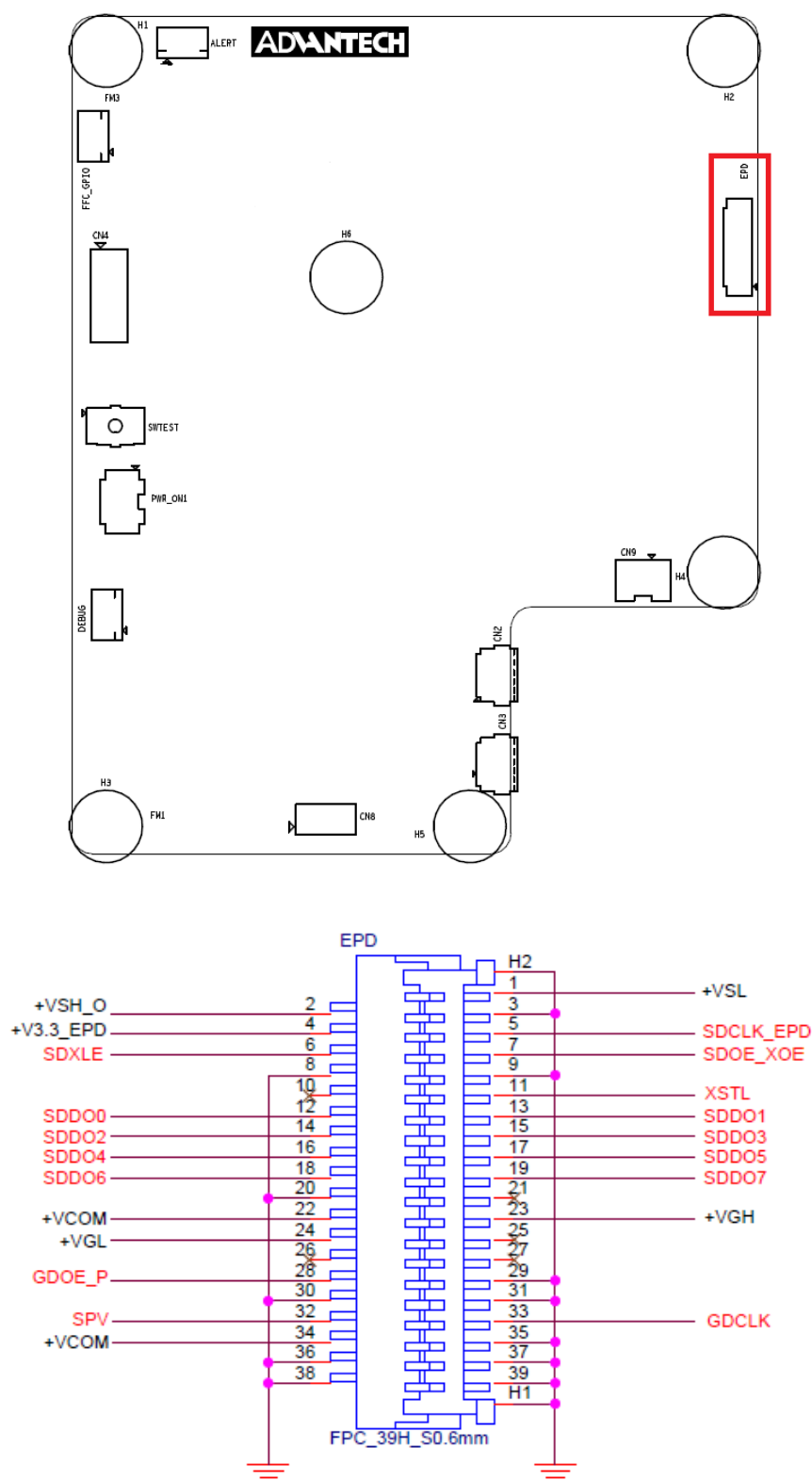


Table 2.5: CN9

PIN	PIN_NAME	PIN	PIN_NAME
1	+V5	2	GND

### 2.1.5 EPD connector

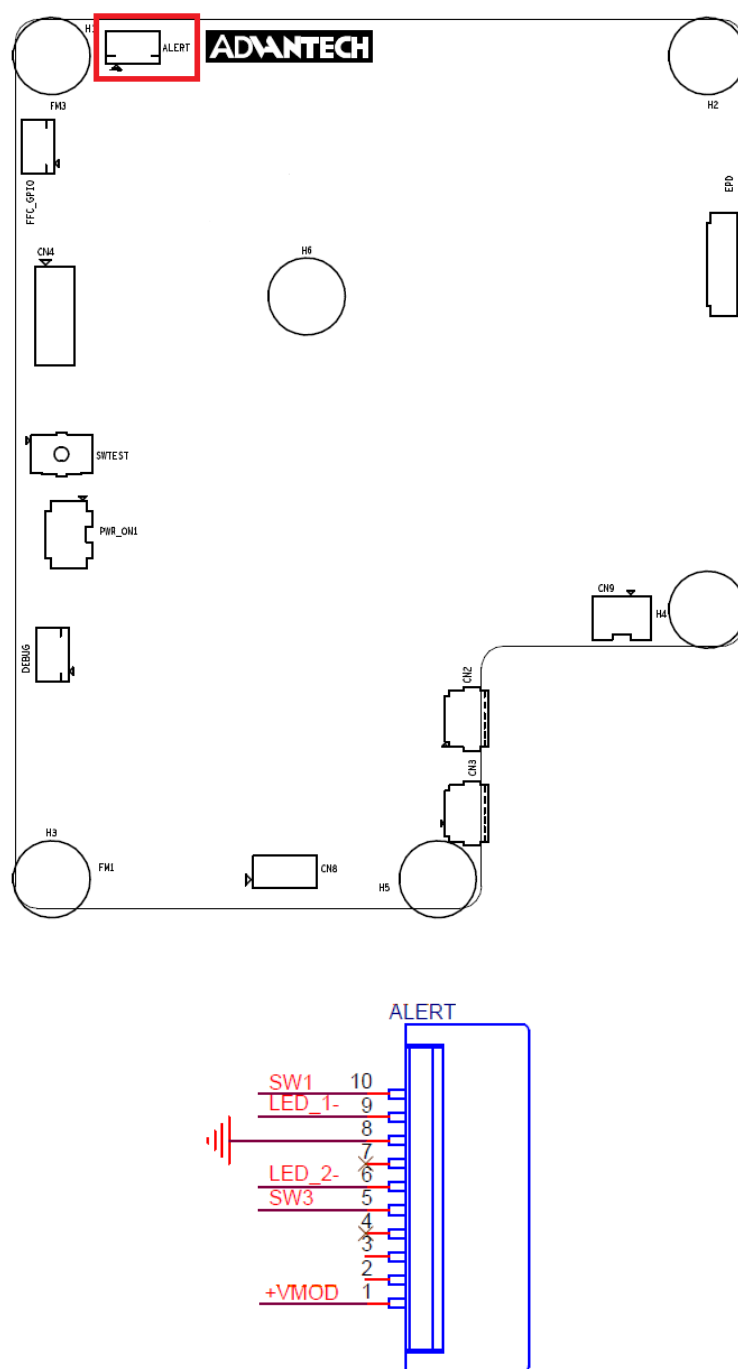


**Table 2.6: EPD connector**

<b>PIN</b>	<b>PIN_NAME</b>	<b>PIN</b>	<b>PIN_NAME</b>
1	+VSL (Negative power supply source driver)	2	+VSH_O (Positive power supply source driver)
3	GND	4	+V3.3_EPDP (3.3V)
5	SDCLK_EPDP (Clock source driver)	6	SDXLE (Latch enable source driver)
7	SDOE_XOE (Output enable source driver)	8	GND
9	GND	10	NC
11	XSTL (Start pulse source driver)	12	SDDO0 (Data)
13	SDDO1 (Data)	14	SDDO2 (Data)
15	SDDO3 (Data)	16	SDDO4 (Data)
17	SDDO5 (Data)	18	SDDO6 (Data)
19	SDDO7 (Data)	20	GND
21	NC	22	+VCOM (Common connection)
23	+VGH (Positive power supply gate driver)	24	+VGL (Negative power supply gate driver)
25	NC	26	NC
27	NC	28	GDOE_P
29	GND	30	GND
31	GND	32	SPV (Start pulse gate driver)
33	GDCLK (Clock gate driver)	34	+VCOM (Common connection)
35	GND	36	GND
37	GND	38	GND
39	GND		



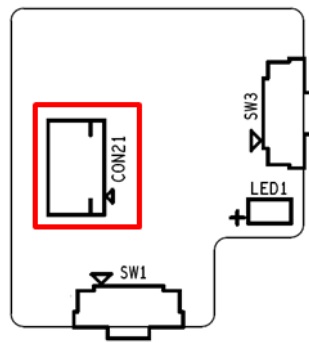
## 2.1.6 Daughter Board Connector



**Table 2.7: ALERT**

PIN	PIN_NAME	PIN	PIN_NAME
1	+VMOD	2	NC
3	NC	4	NC
5	SW3	6	LED_2-
7	NC	8	GND
9	LED_1-	10	SW1

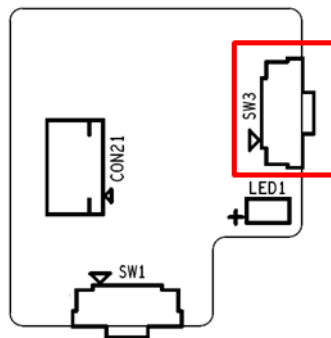
### 2.1.6.1 Daughter Board



**Table 2.8: CON21**

PIN	PIN_NAME	PIN	PIN_NAME
1	SW1	2	LED_1 : Green
3	GND	4	NC
5	LED_2: Red	6	SW3
7	NC	8	NC
9	NC	10	+VDD

SW1 Un-mount, SW3 as below.



**Table 2.9: SWTEST**

PIN	PIN_NAME	PIN	PIN_NAME
1	+VDD	2	SW3
3	GND	4	GND

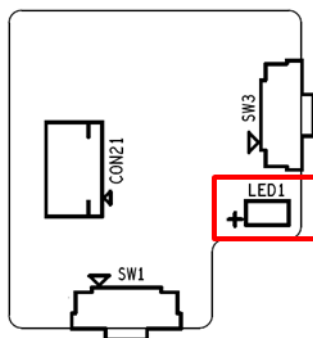
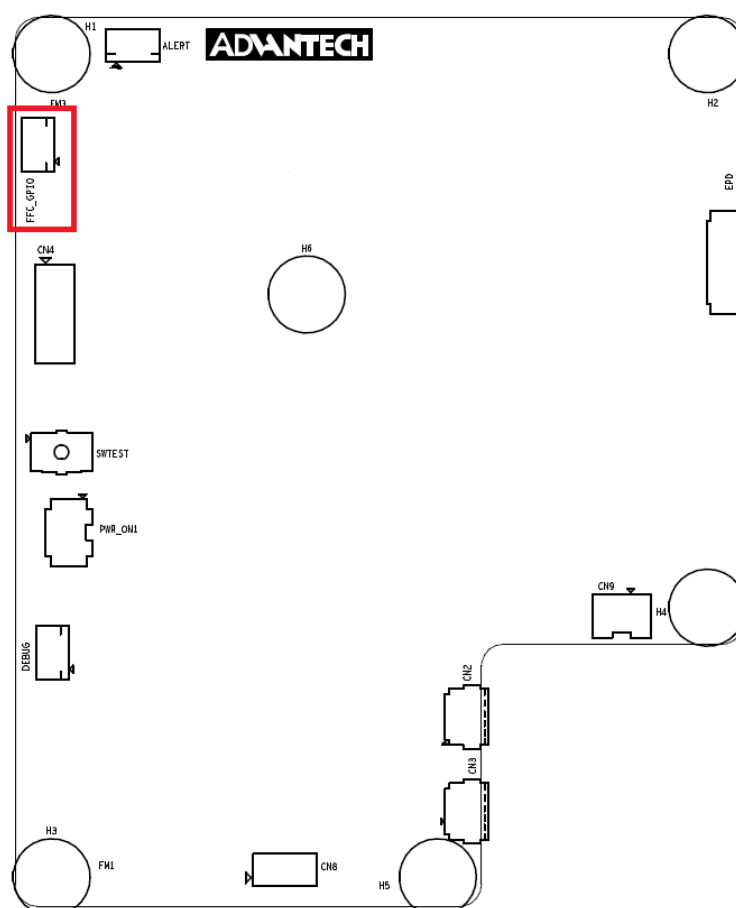
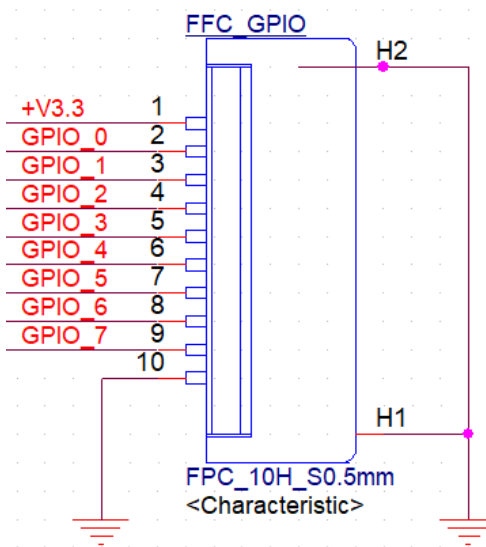


Table 2.10: LED

PIN	PIN_NAME	PIN	PIN_NAME
1	+VDD	2	+VDD
3	LED_1-	4	LED_2-

### 2.1.7 FFC\_GPIO



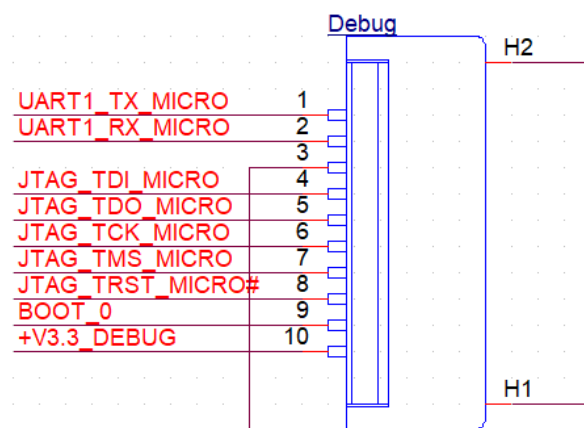
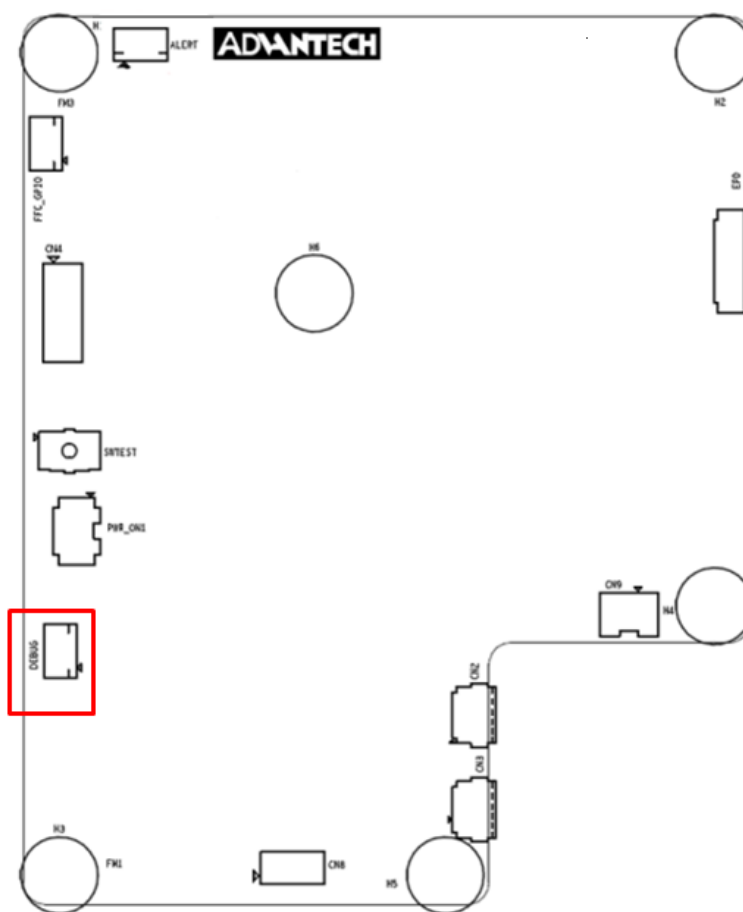


**Table 2.11: FFC\_GPIO**

PIN	PIN_NAME	PIN	PIN_NAME
1	+V3.3	2	GPIO_0 (default LOW)
3	GPIO_1 (default LOW)	4	GPIO_2 (default LOW)
5	GPIO_3 (default LOW)	6	GPIO_4 (default LOW)
7	GPIO_5 (default LOW)	8	GPIO_6 (default LOW)
9	GPIO_7 (default LOW)	10	GND

GPIO Voltage level is 3.3V

## 2.1.8 DEBUG

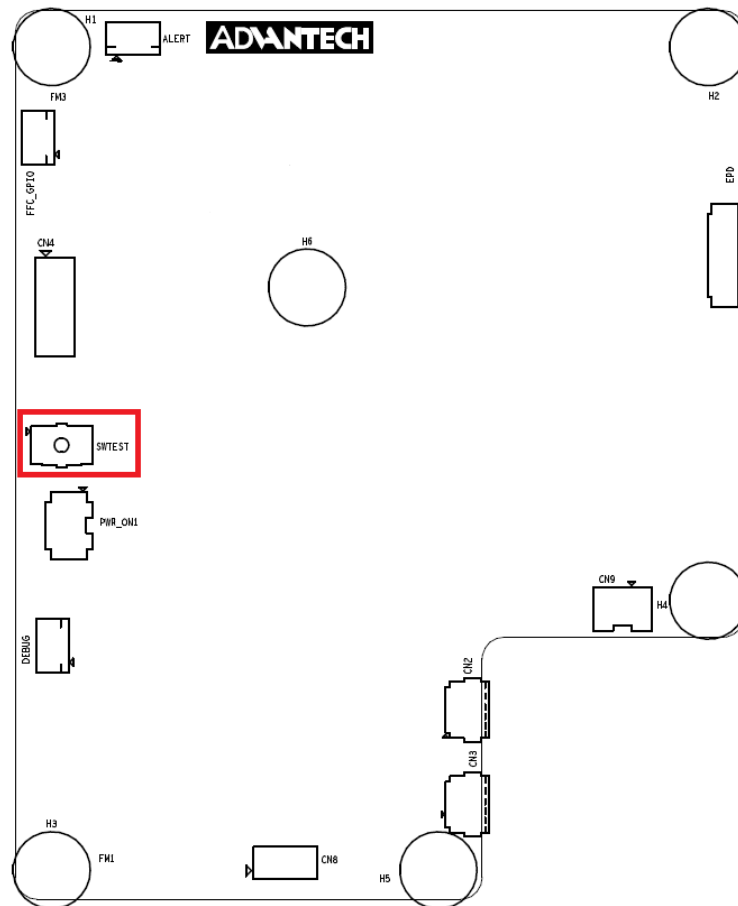


**Table 2.12: FFC\_GPIO**

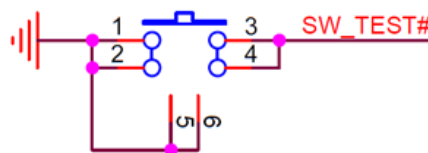
PIN	PIN_NAME	PIN	PIN_NAME
1	UART1_TX	2	UART1_RX
3	GND	4	JTAG_TDI
5	JTAG_TDO	6	JTAG_TCK
7	JTAG_TMS	8	JTAG_TRST
9	BOOT_0	10	+V3.3

1. **TDI** (Test Data In)
2. **TDO** (Test Data Out)
3. **TCK** (Test Clock)
4. **TMS** (Test Mode Select)
5. **TRST** (Test Reset) optional.

## 2.1.9 SWTEST



SWTEST



**Table 2.13: SWTEST**

PIN	PIN_NAME	PIN	PIN_NAME
1	GND	2	GND
3	SW_TEST#	4	SW_TEST#
5	GND	6	GND

### 2.1.10 PWR\_ON1

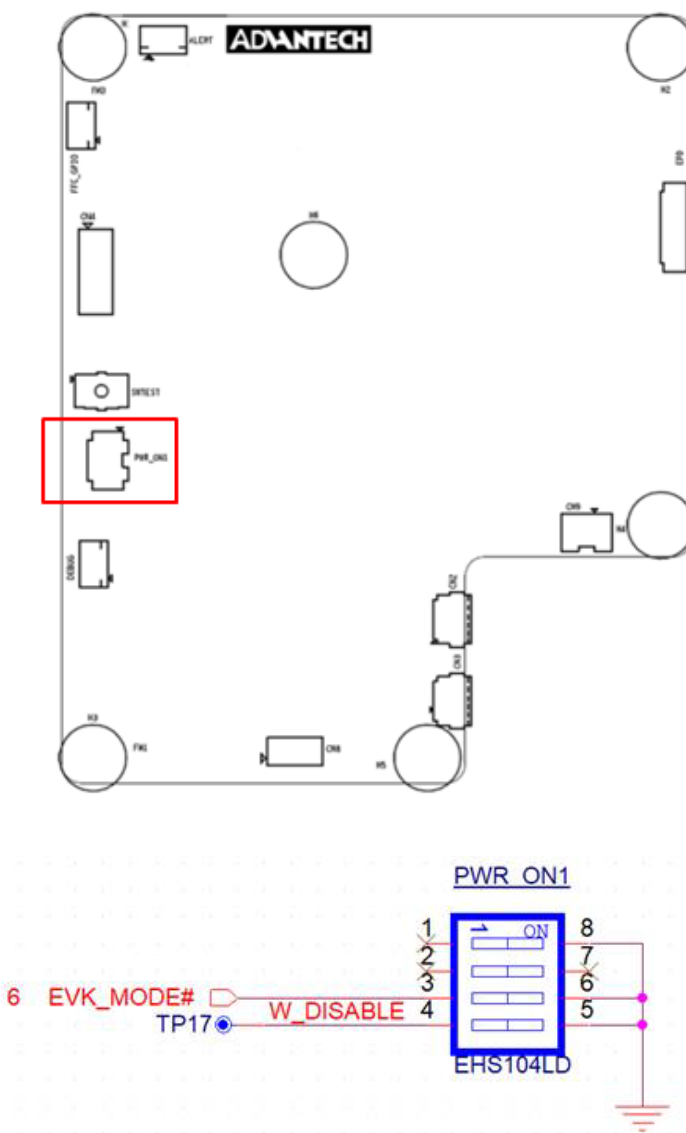


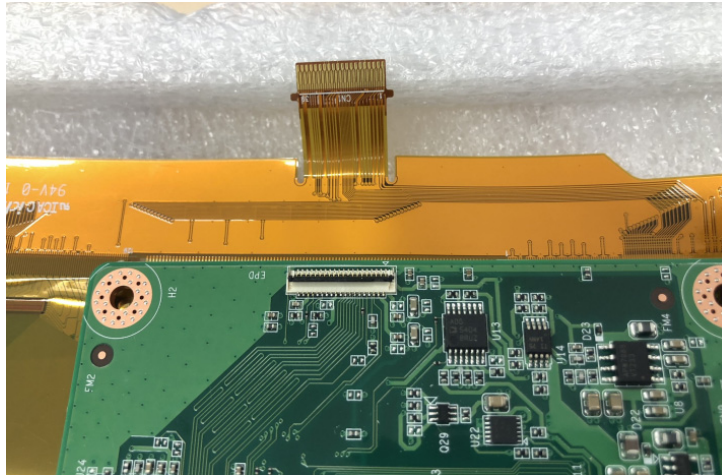
Table 2.14: SWTEST

PIN	PIN_NAME	PIN	PIN_NAME
1	NC: only for SW testing usage	2	NC: only for SW testing usage
3	EVK_MODE#	4	W_DISABLE: WiFi power on/off
	OFF		ON
1	NC		NC
2	NC		NC
3	BM22 mode		EVK mode
4	WIFI power ON		WIFI power OFF

## 2.1.11 Panel, PCBA connector and USB data transmission connector

1) Connected EPD FPC to mainboard

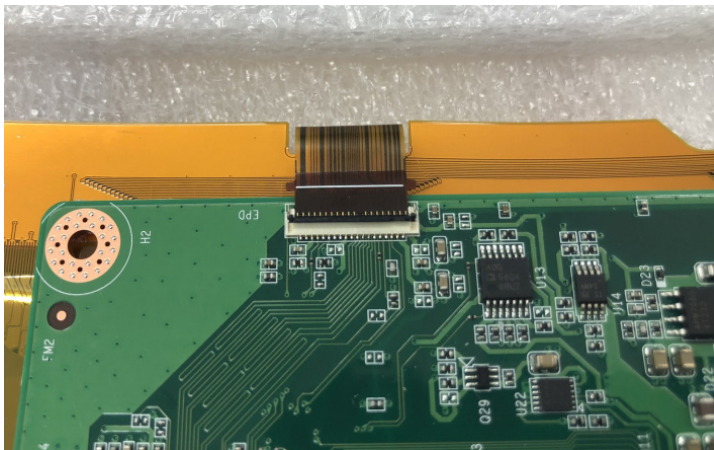
- FPC from the ePaper display



- Release the rotary latch of the connector on the control board.



- Blend the FPC carefully to the control board direction.



- Insert the FPC into the connector on the control board.

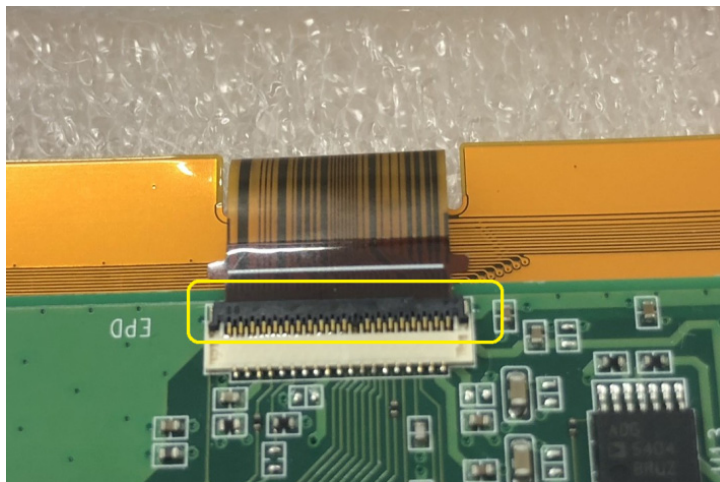




- After connecting steadily, lock the rotary latch.



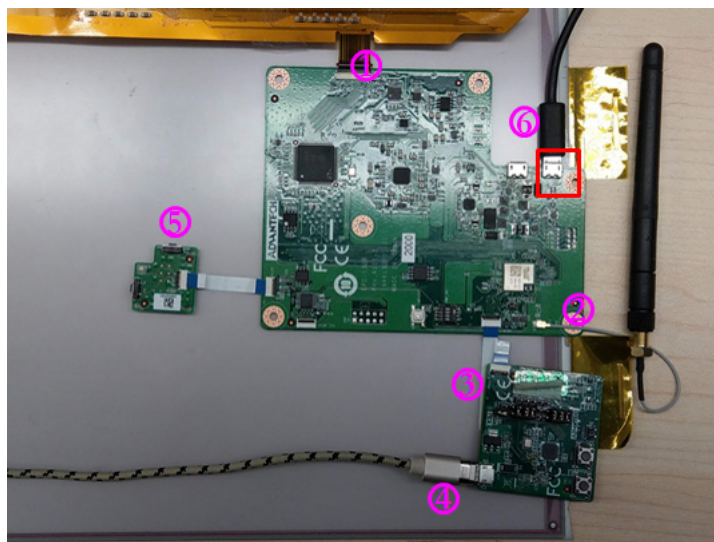
- Check if the connection is correct and tight.



Below Item 2: Connected Wi-Fi antenna to mainboard.

Below item 5: Connected IO daughter to mainboard.

Below item 6: Connected power cable to mainboard USB(CN3).



## 2.2 Daughter Board: LED & Button Behavior

The daughter board: 9696053RS00 works with EPD-132.

### 2.2.1 Button behavior

1. If the Red LED (LED2) lights up, press the button to turn off LED2.
2. If Red LED (LED2) is off, the user can press the button to change the screen image to next page.
3. Press the button again and the system will refresh the image or restore the default.

item	Status	Action	Result
1	When LED2 is on		Turns off LED2
	When LED2 is off	Press button for 0.5 sec and release button	Changes to next page image
2	When LED2 is off	Press button for 10 sec	Step 1.LED2 flashes (0.5 sec toggle LED2) after holding for 5 sec. Step 2. LED2 on, hold 10 sec Step 3. LED2 off, then release SW3 keys Final result->Resets to default and reboots

### 2.2.2 LED behavior

1. Green LED (LED1) blinks when the system sends the image to the display on the panel.
2. Use LED command Remote control from Tera Term.

item	Status	Action	Result
1	Device connected LED off	System trigger to refresh image	1. Turn on LED1 when image refresh. 2Turn off LED1 after image refresh finish
2	Step1. Device connected LED off, Step2.Remote Control Command From Gateway	Command: Led 1 1:	green led LED1 on
		Command: Led 1 0:	green led LED1 light-off
		Command: Led 2 1:	red led LED2 light-up
		Command: Led 2 0:	red led LED2light-off

# Chapter 3

EPD-132 Development  
Kit Hands-on

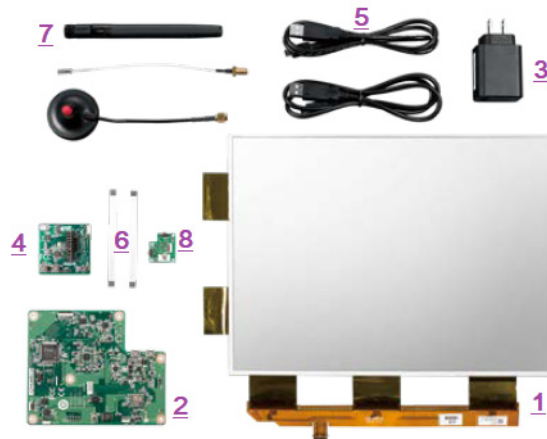
EPD-132 development kit helps users to quickly download images and display them on ePaper. Users can download multiple images into the EPD-132 kit and setup the display in carousel mode. The system will then make a slideshow of those images. This document will teach you how to use EPD-132 development kit to display images.

The EPD-132 development kit firmware is for users to download images to make slideshows. If the designer needs to change the host control to ePaper manager, EPD-DK132 needs to refresh the firmware. Please refer to chapter 3.5.5 FW update.

## 3.1 Components LIST

### 3.1.1 HW Components List

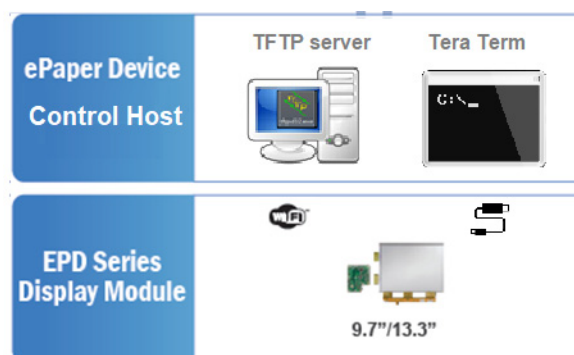
Item	Description	Quantity
1	13.3" ePaper display	1
2	EPD-132 controller (PCBA)	1
3	Power adapter and cable (A/D 100-240V 10W 5V )	1
4	ED22 board	1
5	ED22 Micro USB cable	1
6	10 Pin FFC cable	2
7	2.4G Wi-Fi antenna	1
8	I/O daughter board	1



### 3.1.2 SW Components List

Item	Description	Quantity
1	BLE App to config Wi-Fi SSID	1
2	Python tool chain for transferring image	1
3	Tera Term sends command to EPD-132 from Computer	1
4	ED22 driver to enable development board	1
5	TFTP to download images to EPD-132	1

## 3.2 System Architecture

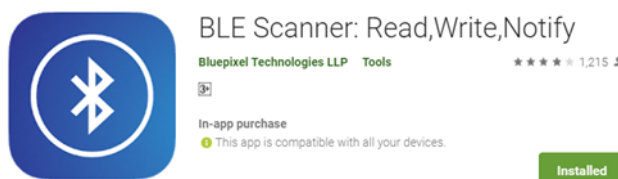


## 3.3 Tool And Development Environment Setup

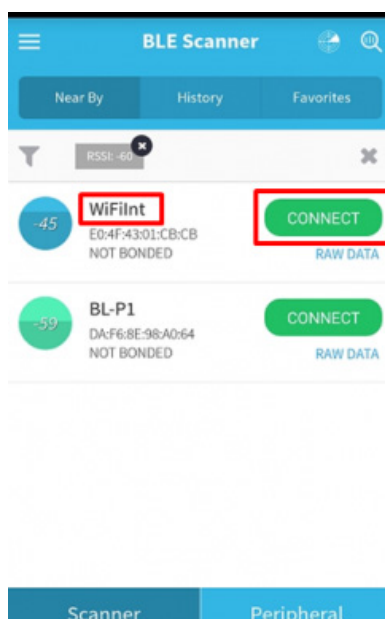
### 3.3.1 Configure Wi-fi setting through BLE

BLE-WiFi introduction service is a demo for setting up SSID and password to join the network via smart phone. EPD-132 will be paired via a BLE GATT server with the smartphone. Then you can start Wi-Fi security setting.

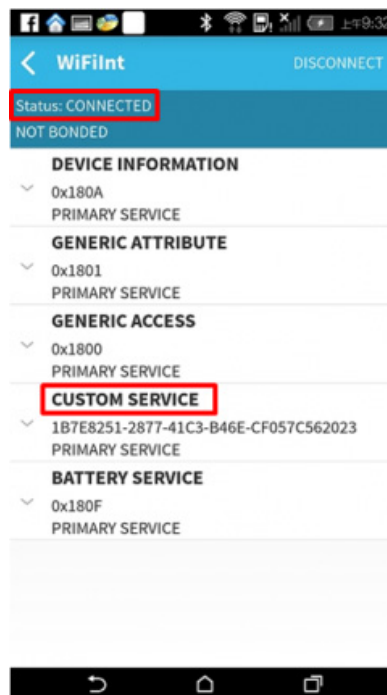
1. Install and launch the BLE Scanner app on iOS or Android.



2. Pull down the screen to rescan devices and it will list nearby BLE devices. Find the "WiFilnt" device and press the CONNECT button.



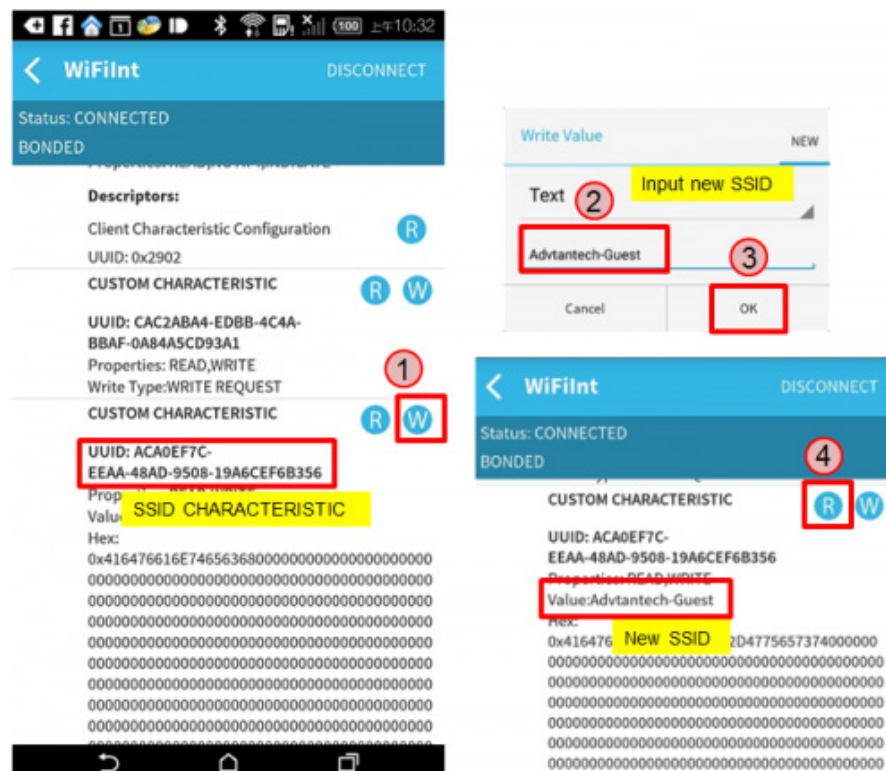
3. If the connection is successful, you can see the picture below. Press the CUSTOM SERVICE button.



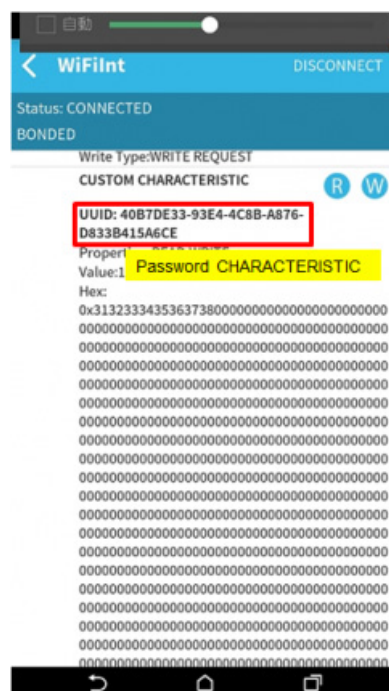
**Note!** You need to remove bluetooth pairing with "WiFilnt" from the bluetooth setting when you can not connect to the device.



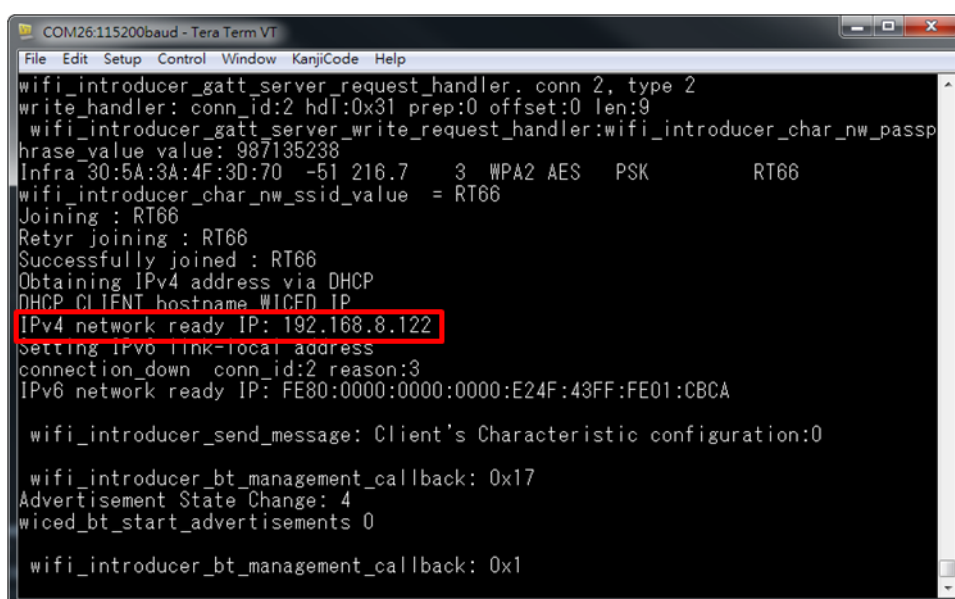
4. Find the UUID: ACA0EF7C-EEAA-48AD-9508-19A6F6B356 for SSID characteristic.



- Find the UUID: 40B7DE33-93E4-4C8B-A876-D833B415A6CE for Password characteristic then proceed as in Step 4.



- If joining is successful you can see the network IP on the console screen.

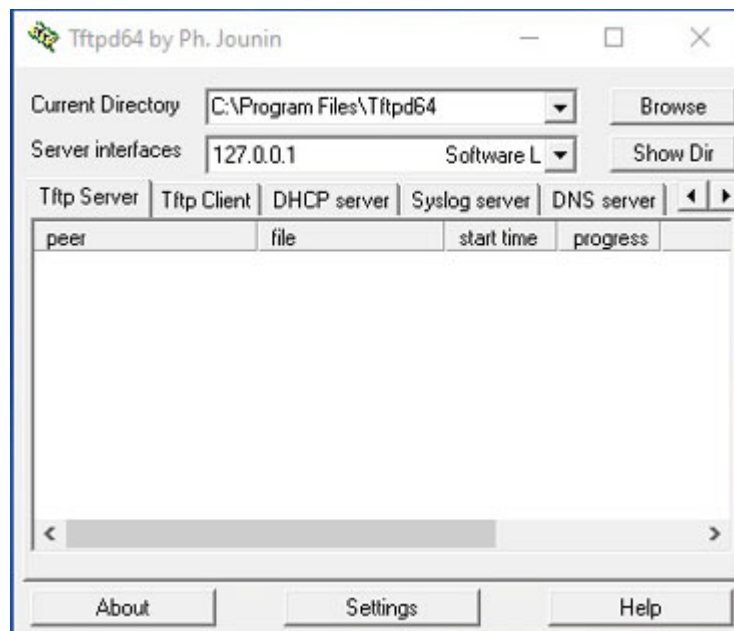


### 3.3.2 Prepare Recommended OS

1. Prepare a Win 7 PC.

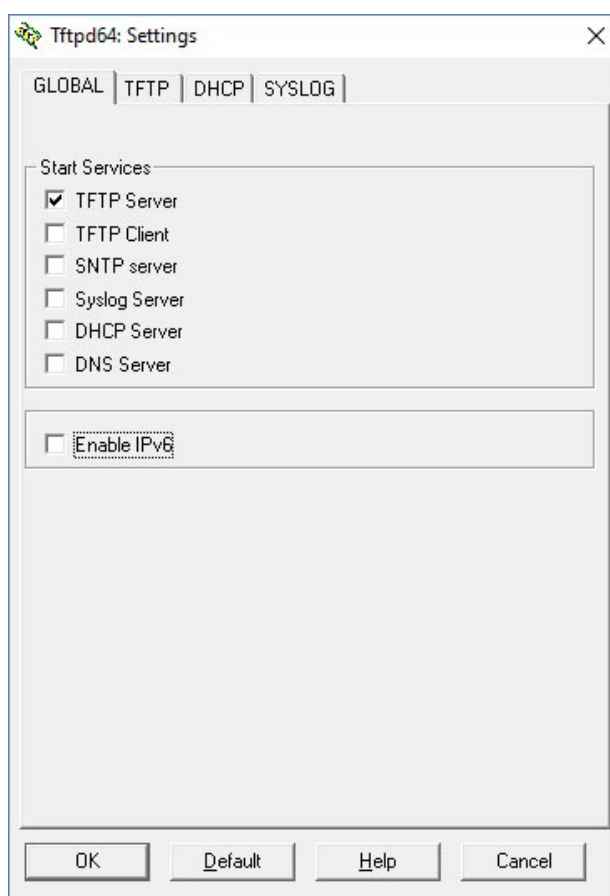
### 3.3.3 TFTP Download /Upload File

1. Make sure PC is connected to 2.4G Wi-Fi.
2. Recommend using tftpd64.
3. After the download is complete, open Tftpd64 program, click on setting button (add image figure 3-1).

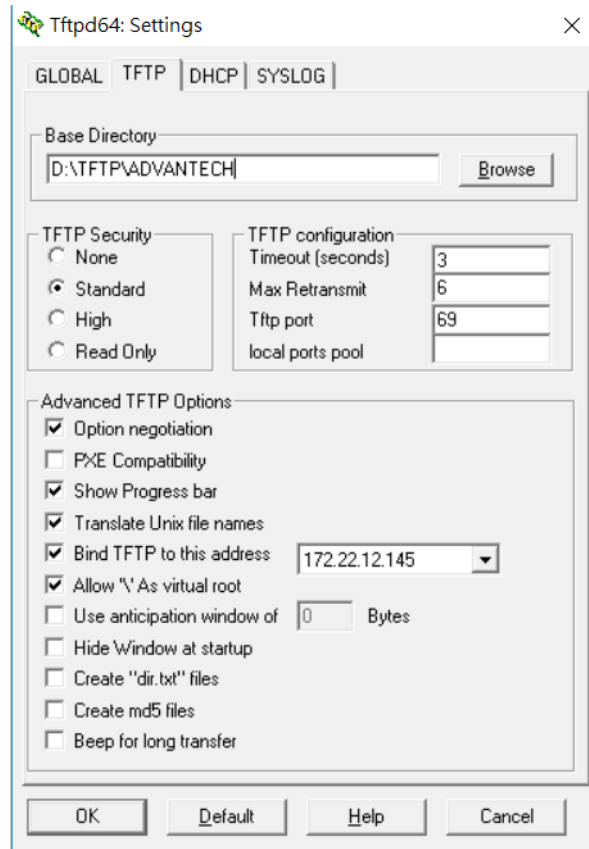




4. Settings window will open as shown below. Put a check mark only to TFTP Server option. Remove check mark from all other options.



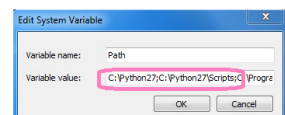
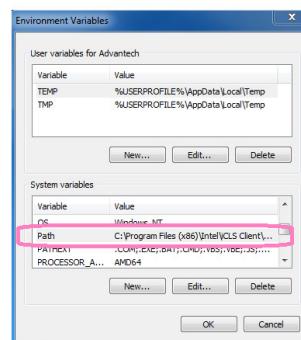
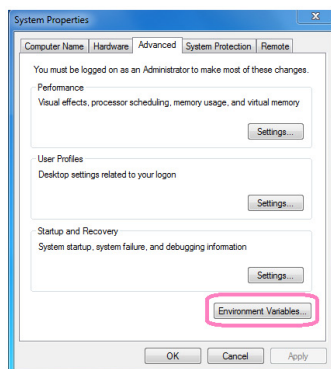
5. Then next select TFTP tab. Click on Browse button to specify Base Directory of the TFTP Server. You can select any folder in your windows laptop/PC as the Base Directory. All the files transferred using TFTP Server will be placed in this folder. (Example: D:\TFTP\ADAVANTECH is Base Directory).



6. Under Advanced TFTP Options, Select all options which are selected in above screenshot.
7. Once you have performed all the above steps, Click on OK. Now you will receive a window asking to restart Tftpd64 to apply the new settings. Click on OK.

### 3.3.4 Python Environment Setup

1. Download and install Python (must use Python 2.7.x Windows x86)
2. Set the variables of Widows environment path: add "C:\Python27;C:\Python27\Scripts" to path
3. Download and install python PIL package
4. Download and unzip picture transformation tool "BmpToPixel\_EPD-132R.py"



### 3.3.5 Transfer BMP Image To EPD Format using Python

1. Run BmpToPixel\_D73.py <source BMP image filename> <output filename> in CLI window.
  - Source BMP image filename: the image file to be converted
  - Output filename: converted file name (recommend to use ".esi" as the extension)
  - Bmp size must comply with EPD resolution 1600 x 1200
  - Bmp file: mono color/16 color/256 color/24bits bitmap format
  - Ex: BmpToPixel\_D73.py EVK\_03.bmp EVK\_03.esl

```
D:\project\EPD-132\Server\EPD-transfer\test>BmpToPixel_D73.py EVK_03.bmp EVK_03.esl
Image Convert processing
Image Convert Done
405DA20C

D:\project\EPD-132\Server\EPD-transfer\test>dir
Volume in drive D has no label.
Volume Serial Number is D052-8FEC

Directory of D:\project\EPD-132\Server\EPD-transfer\test

2019/04/29 下午 01:43 <DIR>          .
2019/04/29 下午 01:43 <DIR>          ..
2018/07/24 下午 04:37              3,411 BmpToPixel_D73.py
2018/06/26 上午 11:02          3,840,056 EVK_03.bmp
2019/04/29 下午 01:43          960,000 EVK_03.esl
2019/04/29 下午 01:43          5,773,200 logfile
               4 File(s)      10,576,667 bytes
               2 Dir(s)      337,131,433,984 bytes free
```

2. Type BmpToPixel.bat to use batch conversion in directory.

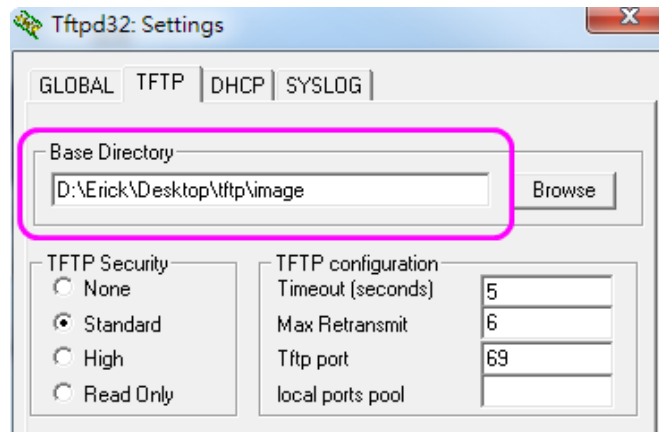
```
D:\project\EPD-132\Server\EPD-transfer\test>BmpToPixel.bat EVK_03.bmp EVK_03.esl
Image Convert processing
Image Convert Done
405DA20C
Conversion completed!
Press any key to continue . . .

D:\project\EPD-132\Server\EPD-transfer\test>dir
Volume in drive D has no label.
Volume Serial Number is D052-8FEC

Directory of D:\project\EPD-132\Server\EPD-transfer\test

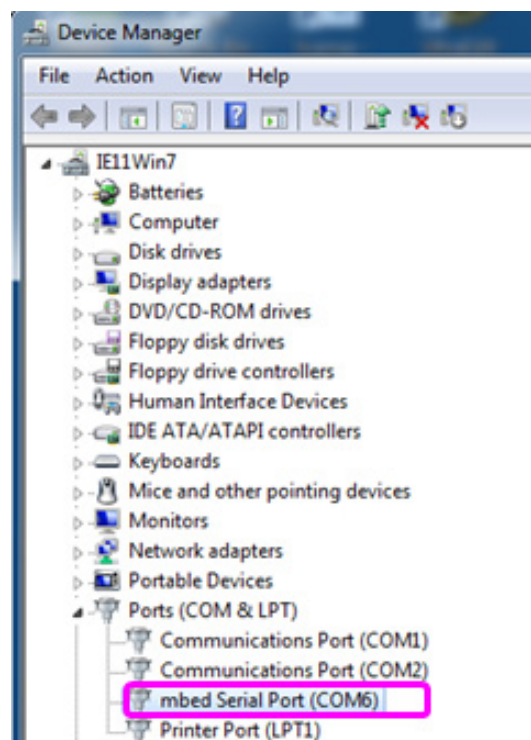
2019/04/29 下午 01:48 <DIR>          .
2019/04/29 下午 01:48 <DIR>          ..
2018/08/24 下午 01:38              111 BmpToPixel.bat
2018/07/24 下午 04:37              3,411 BmpToPixel_D73.py
2018/06/26 上午 11:02          3,840,056 EVK_03.bmp
2019/04/29 下午 01:48          960,000 EVK_03.esl
2019/04/29 下午 01:48          5,773,200 logfile
               5 File(s)      10,576,778 bytes
               2 Dir(s)      337,124,696,064 bytes free
```

3. Copy output files to tftp Base Directory.



### 3.3.6 WISE-ED22 Setup

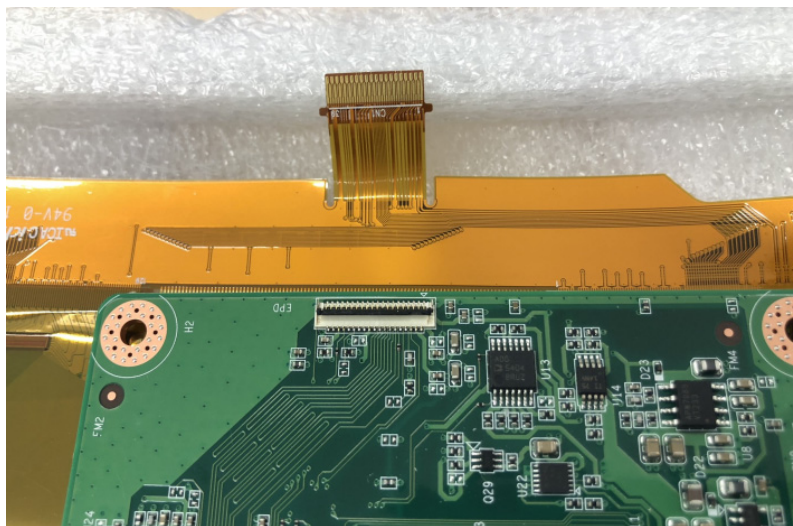
1. Download and install WISE-ED22 driver.
2. Update WISE-ED22 FW for EPD-132 project. You can reference ED22 Firm-ware Update.
3. Connected to PC via a micro USB cable, the Device Manager will appear mbed Serial Port.



## 3.4 EVALUATION Kit Hands-on

### 3.4.1 Setup the hardware

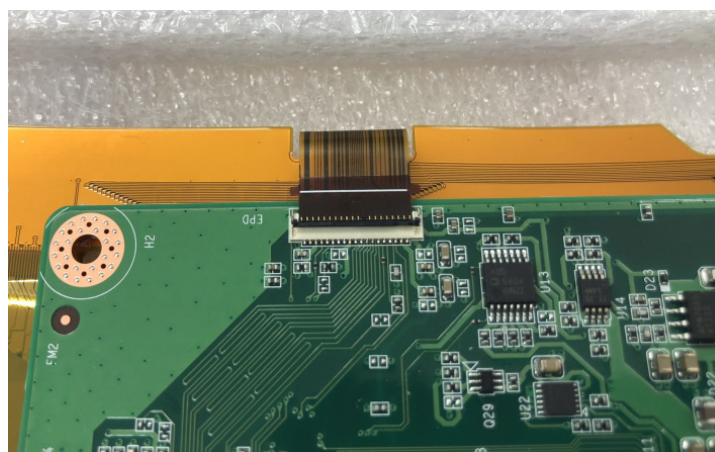
1. Connected EPD FPC to mainboard.
  - User can see the below FPC from the ePaper display.



- Release rotary latch of the connector on the control board.



- Blend the FPC carefully to the control board direction.



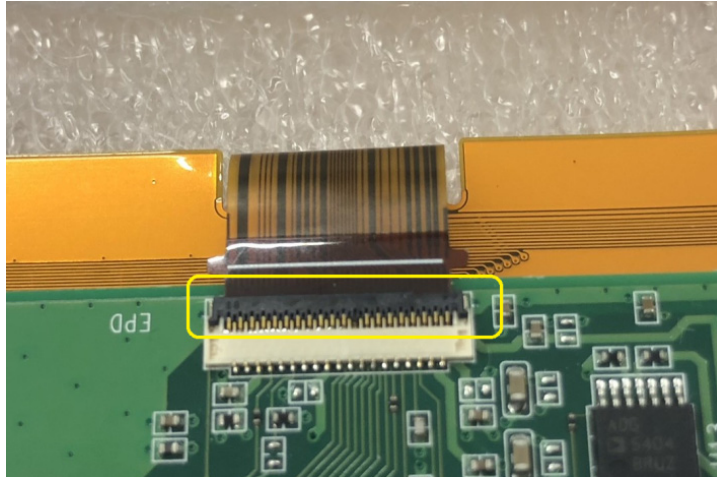
- Insert the FPC into the connector on control board.



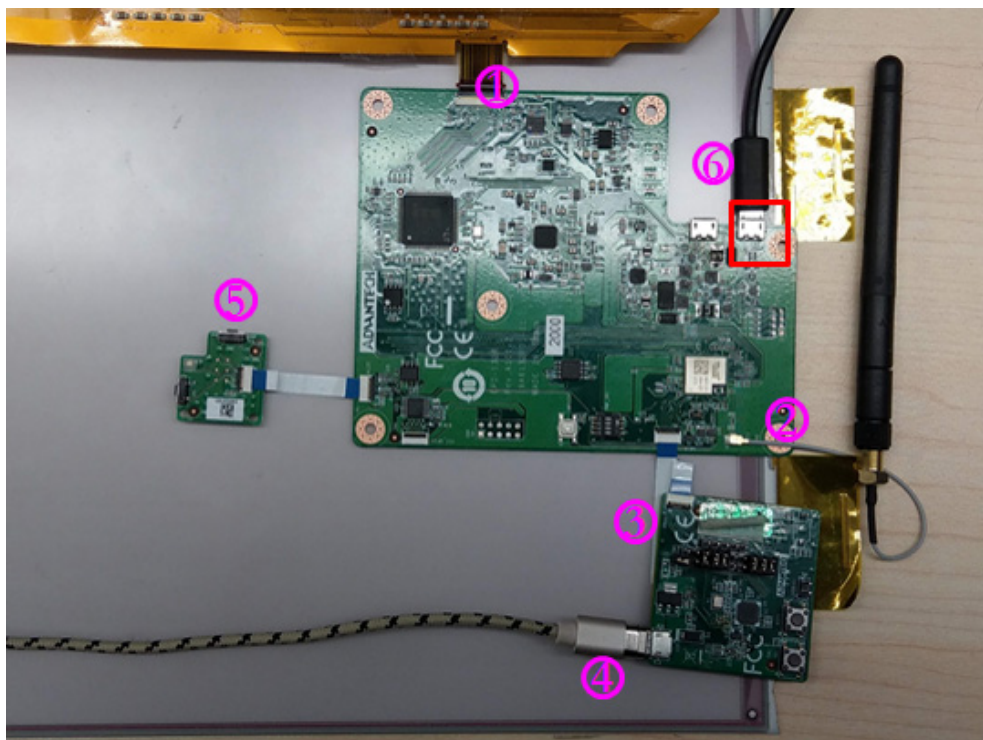
- After connecting steadily, lock the rotary latch.



- Check if the connection is correct and tight.



1. Connected Wi-Fi antenna to mainboard.
2. Connected ED22 board to mainboard via FPC cable.
3. Connected ED22 board to PC via micro USB cable.
4. Connected IO daughter to mainboard.
5. Connected power cable to mainboard USB(CN3).





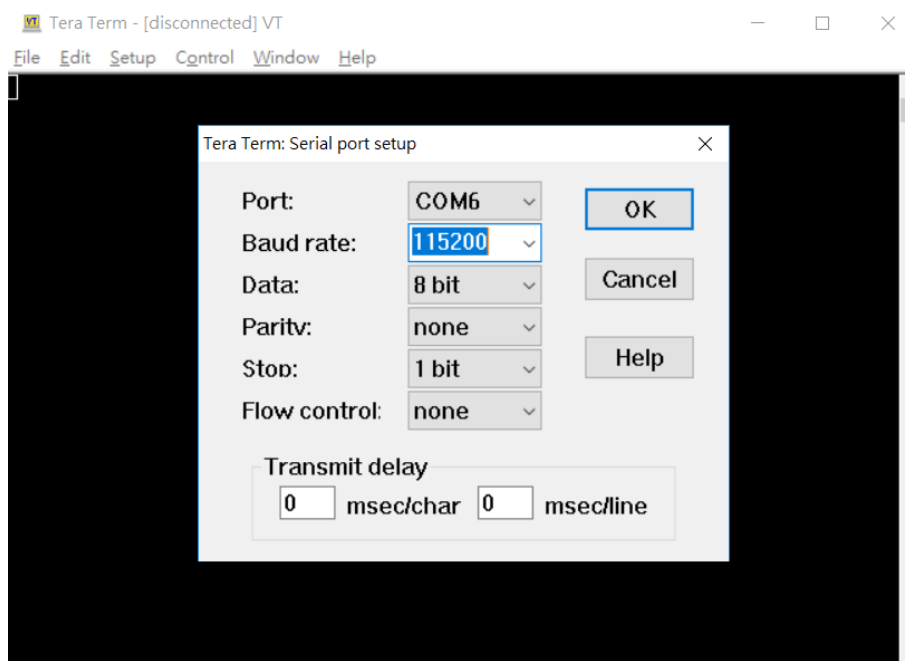
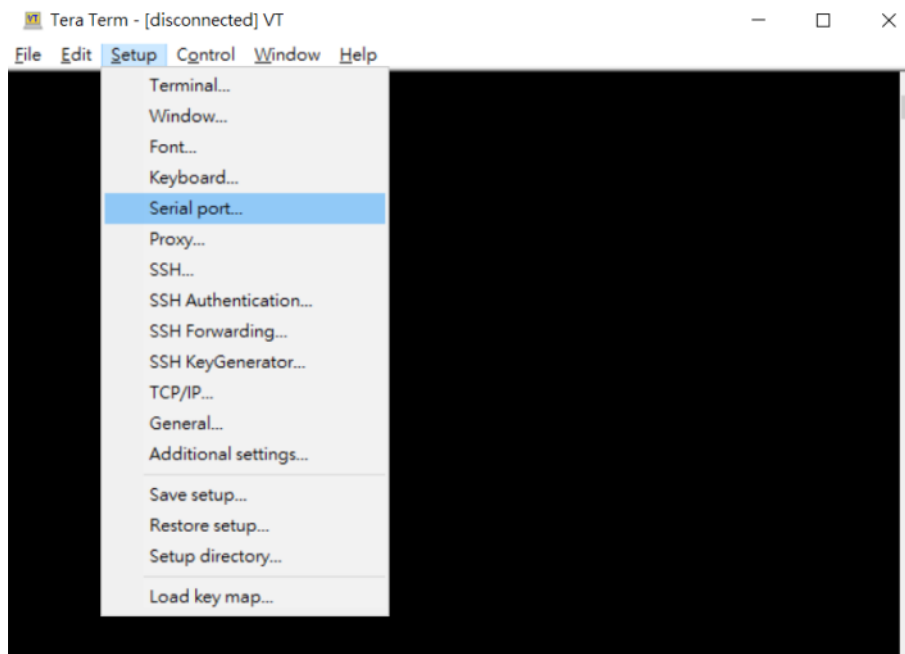
### 3.4.2 Command Console Setting

Start a serial tool (use tera term in this), and make the communication setting as shown below. You may setup below item.

#### Download Tera term:

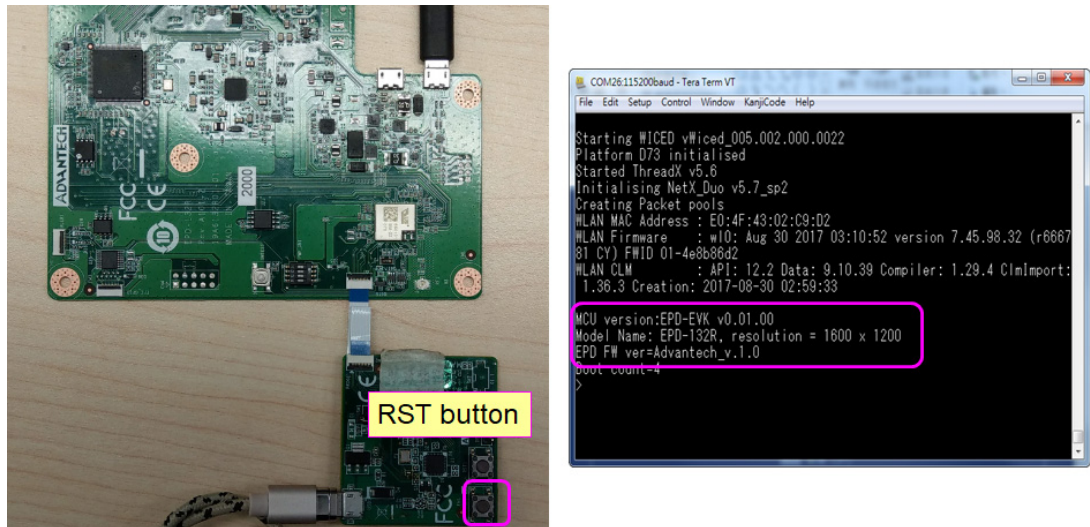
Tera version: 4.91

#### Setup your serial com port and baud rate:



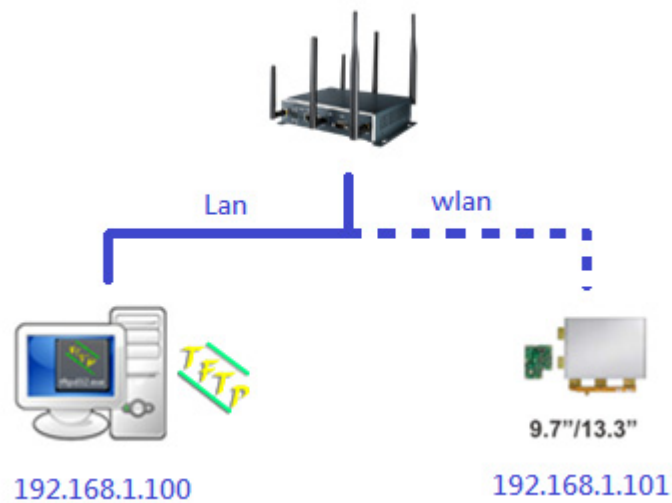
### 3.4.3 RESET EPD-132

Press "RST" button, shown below, and the system will then start the HW reset.



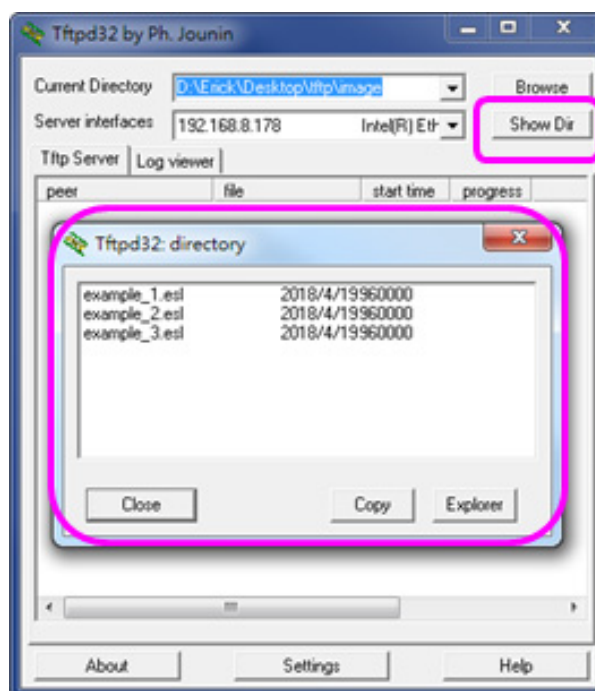
### 3.4.4 Launch TFTP Service

PC joins Wi-Fi AP, make sure the PC network is the same domain as with EPD-132.

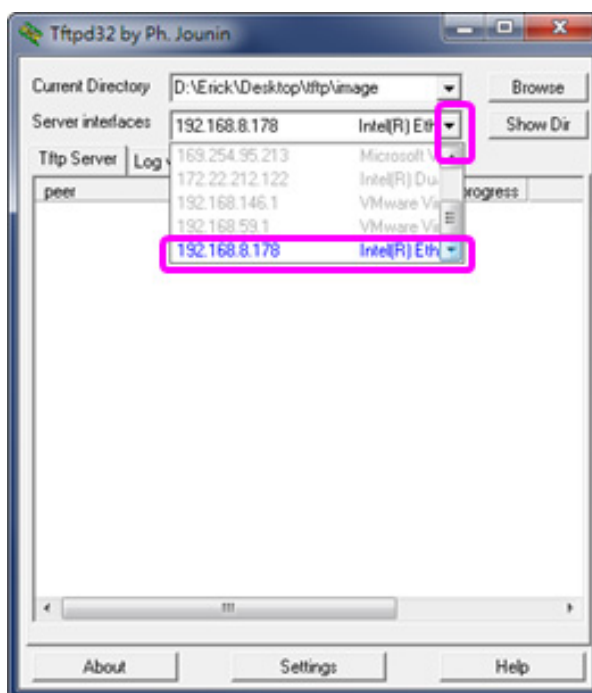




1. Launch tftpd64.exe and select "Tftp Server" tab.
2. Check image folder, image file size must be 960000 bytes.

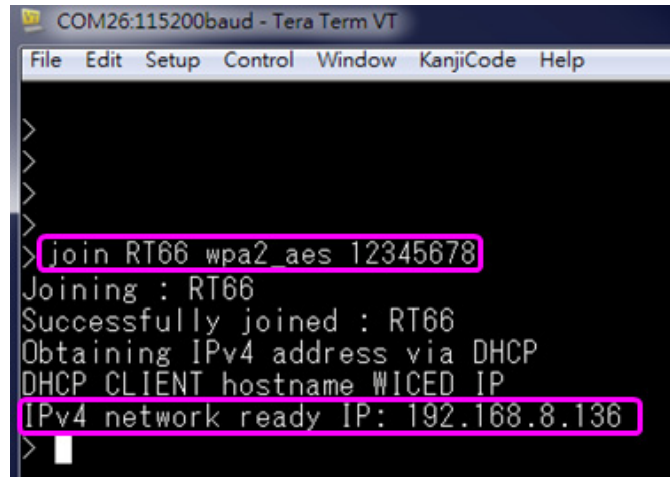


3. Select tftp server IP.



### 3.4.5 EPD-132 JOIN WIFI AP

1. EVK operates in command mode, you must start a serial tool.
2. Type **join <SSID> <encryption> [key]**.
3. SSID, encryption protocol and key consistent with Wi-Fi AP setting.
4. Ex: join RT66 wpa2\_aes 12345678.
5. Get IPv4 IP if joining is successful.



```
COM26:115200baud - Tera Term VT
File Edit Setup Control Window KanjiCode Help
>
>
>
> join RT66 wpa2_aes 12345678
Joining : RT66
Successfully joined : RT66
Obtaining IPv4 address via DHCP
DHCP CLIENT hostname WICED IP
IPv4 network ready IP: 192.168.8.136
>
```

## 3.5 Command List

EVK commands that you can use.

Command	Function	Return
evk_info	get EVK version	EVK version
epd_info	get EPD information	EPD model name, resolution, F/W version
get_mac_addr	get MAC	EVK MAC address
ping	ping command	Packet statistics
join	Wi-Fi connect	IPv4 IP if join successful
leave	leave an AP after join	No return value
tftp	download Images to Flash	Refer to chapter 3.5.2.A
epd_disp	refresh Image	Refer to chapter 3.5.2.B
iperf	Wi-Fi throughput test	Report Bandwidth between specified period
bt_wifi	start ble-wifi introducer service	Information of bt/wifi and joined AP
carousel	start epd into carousel mode	Refer to chapter 3.5.3
led	set the led light or dark	Turn-on/off led

### 3.5.1 Command Description

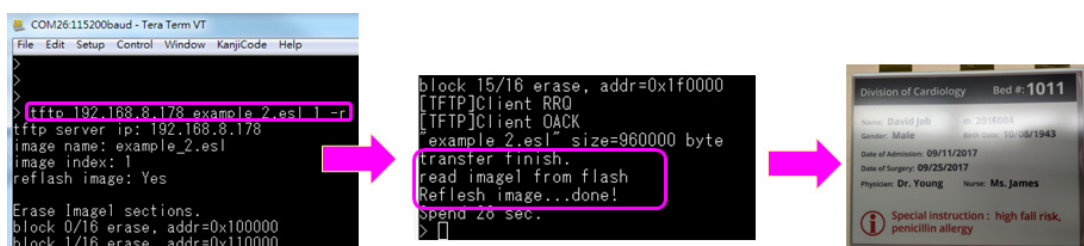
- evk\_info: Return EVK version
- epd\_info: Return EPD model name, resolution and F/W version
- get\_mac\_addr: Return EVK MAC address
- ping <dest> [-i <interval in ms>] [-n <number>] [-l <length>]
  - Return ping reply time if successful
  - ping 8.8.8.8 -i 100 -n 5 -l 50
- join <SSID> <encryption> [key]
  - Join to Wi-Fi AP and get IP address
  - Join RT66 wpa2\_aes 12345678
  - Reference “EVK Join to Wi-Fi AP”
- leave: leave an AP router
- tftp: Reference “Download Images to Flash”
- epd\_disp: Reference “Refresh Image”
- carousel: Reference “Carousel Mode”
- led: set the led light or dark
  - led 1 0; turn-off led
  - led 1 1; turn-on led

### 3.5.2 Download Images to EPD-132 & REFLASH IMAGE

#### A. DOWNLOAD THE IMAGE

**tftp <ip> <filename> <flash index> [-r]**

- ip: tftp server ip
- filename: image file name
- flash index: range 0~3, that have maximum 4 images(0~3) be saved in flash
- -r: immediate refresh after download complete
- Ex: tftp 192.168.8.178 example\_2.esl 1 -r



#### B. Download Image

**epd\_disp <-f flash index | -i internal image index>**

- -f: display image that read from flash, range 0~3
- -i: display internally generated image, range 0~4
  - 0: fully black
  - 1: full white
  - 2: full red
  - 3: black/white/red vertical stripes
  - 4: black/white/red horizontal stripes
- Ex: epd\_disp -f 1
- Ex: epd\_disp -i 4

```

> epd_disp -f 1
read image1 from flash
Refresh image...done!
Spend 27 sec.
>
> epd_disp -i 4
horizontal bwr image...
Refresh image...done!
Spend 18 sec.
>
>

```

### 3.5.3 EPD-132 Carousel Mode

**carousel**<-e | -p | -s | -t >

- -e <1 / 0 >: set carousel mode
  - 1: enable, 0: disable
  - Ex: carousel -e 1 // enable carousel mode.
- -p <P0 P1...Pn>: edit carousel page
  - P0~Pn: carousel page, n>0, n<14
  - Ex: carousel -p 1 2 5 8 10 // set carousel page 1, 2, 5, 8, 10
  - Ex: carousel -p 1 1 1 3 3 3 6 // you can use same page when use partial update
- -s <Sn start-X start-Y Image-W image-H mode>: edit carousel setting
  - Sn: carousel sequence number, associated with the -p order, n>0, n<16
  - start-X: refresh X coordinate
  - start-Y: refresh Y coordinate
  - image-W: refresh width
  - image-H: refresh height
  - mode: refresh mode, 0: GC mode (by default), 1: DU mode (only use in B/W panel), 2: Rolling mode (only use in B/W panel)
  - Ex: carousel -s 1 0 0 1600 1200 0 // S1 (x,y)=(0,0) (w,h)=(1600,1200) use GC mode
- -t <Sn time>: set the interval between the next image
  - Sn: carousel sequence number, associated with the -p order, n>0, n<16
  - time: the unit is second.
  - Ex: carousel -t 1 5 // set S1 to S2 interval 5 second
- A carousel example
  - join ssid wpa2\_aes password // join the AP router named "ssid"
  - tftp 192.168.8.178 BSD\_00.esl 0 -r // load BSD\_00.esl to page 0
  - tftp 192.168.8.178 BSD\_01.esl 1 -r // load BSD\_01.esl to page 3
  - tftp 192.168.8.178 BSD\_02.esl 2 -r // load BSD\_02.esl to page 6
  - carousel -p 0 3 3 3 6 6 6 // set carousel page P0(S0) P3(S1) P3(S2) P3(S3) P6(S4) P6(S5) P6(S6)
  - carousel -s 0 0 0 1600 1200 0 // set S0 (x, y)=(0, 0), (w, h)=(1600, 1200), full update with GC mode
  - carousel -s 1 1095 50 140 240 0 // set S1 (x, y)=(1095, 50), (w, h)=(140, 240), partial update with GC mode
  - carousel -s 2 215 740 1230 85 0 // set S2 (x, y)=(215, 740), (w, h)=(1230, 85), partial update with GC mode

- carousel -s 3 130 20 910 320 0 // set S3 (x, y)=(130, 20), (w, h)=(910, 320), partial update with GC mode
- carousel -s 4 1095 50 140 240 0 // set S4 (x, y)=(1095, 50), (w, h)=(140, 240), partial update with GC mode
- carousel -s 5 215 740 1230 85 0 // set S5 (x, y)=(215, 740), (w, h)=(1230, 85), partial update with GC mode
- carousel -s 6 130 20 910 320 0 // set S6 (x, y)=(130, 20), (w, h)=(910, 320), partial update with GC mode
- carousel -e 1 // enable carousel mode

### 3.5.4 EPD-132 Firmware Update

#### Step1. EVALUATION KIT Update FW on host MCU BM22

1. Use WISE-ED22 by simply connecting to your PC with a micro-USB cable, and to the mainboard connector (CN3) using a 10-pin FFC cable. You can drag and drop binary images onto the DAPLink disk drive, which will then be programmed into the target system. If errors are encountered, a file called "fail.txt" will appear with details.
2. Note that the WISE-ED22 has to contain the correct firmware to enable drag and drop programming

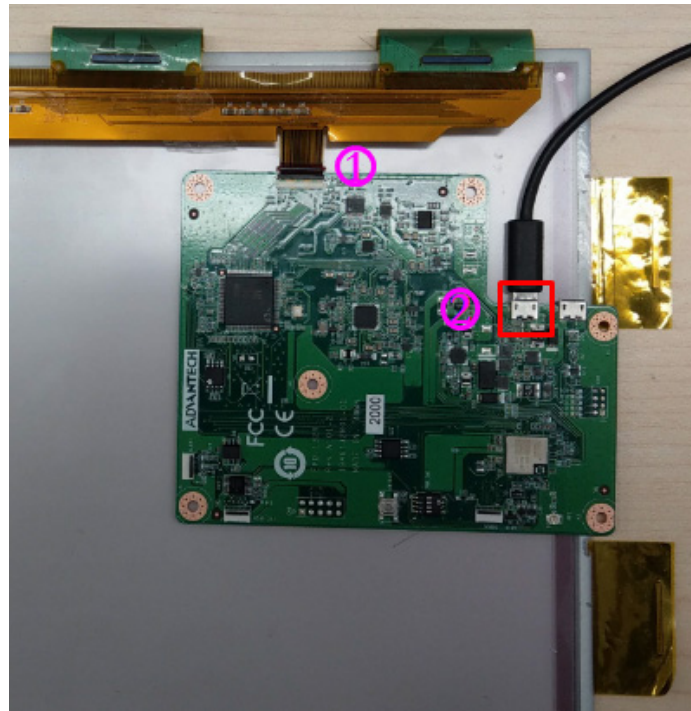


3. Refer to detailed steps in "3.3.6 WISE-ED22 Setup".

## Step2 CN2 USB DOWNLOAD IMAGE to ITE8951 to control EPD

Follow steps and pictures below to setup the hardware

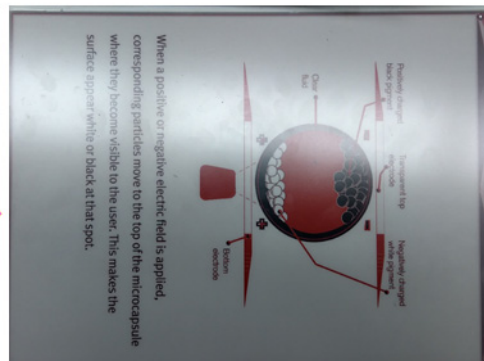
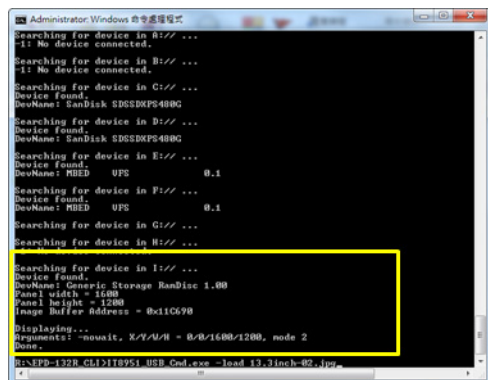
1. Connected EPD FPC to mainboard
2. Connected USB cable to mainboard USB2(CN2)



3. Download and unzip [HYPERLINK EPD-132R\\_CLI\\_tool](#)
4. Click "IT8951\_FWVersion.bat" to get EPD panel information

```
Administrator: Windows 命令提示符
Searching for device in A:// ...
-1: No device connected.
Searching for device in B:// ...
-1: No device connected.
Searching for device in C:// ...
Device found.
DevName: SanDisk SDSSDXPS480G
Searching for device in D:// ...
Device found.
DevName: SanDisk SDSSDXPS480G
Searching for device in E:// ...
Device found.
DevName: MBED UFS 0.1
Searching for device in F:// ...
Device found.
DevName: MBED UFS 0.1
Searching for device in G:// ...
Searching for device in H:// ...
-1: No device connected.
Searching for device in I:// ...
Device found.
DevName: Generic Storage RamDisc 1.00
Panel width = 1600
Panel height = 1200
Image Buffer Address = 0x11C690
Getting FW version...
FW Version : Advantech_v.1.0
Done.
R:\EPD-132R_CLI>
```

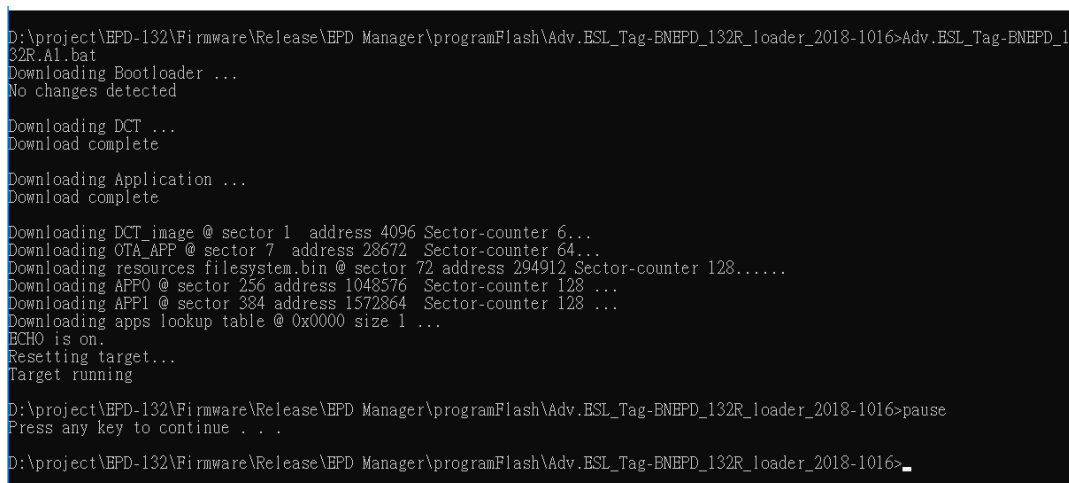
- Download and Refresh Image  
Click "IT8951\_UpdateImage1.bat" to update "13.3inch-01.bmp" to EPD.  
Click "IT8951\_UpdateImage2.bat" to update "13.3inch-02.bmp" to EPD.  
Open "IT8951\_UpdateImage1.bat" and edit "13.3inch-02.bmp" for your image name.



### 3.5.5 Upgrade Firmware to EPD-132 and connect to ePaper manager

Follow steps and refer to environment setting

- Download and unzip update tool
- Copy and replace new binary (separately available) folder to tool directory
- Setup EPD-132 to develop mode, reference link
- Execute "Adv.ESL\_Tag-BNEPD\_132R.bat" batch file
- After the firmware update is complete, the EPD-132 will reboot

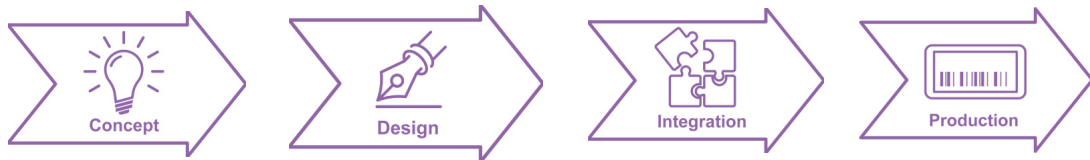






# Chapter 4

WISE-EC EPD Design-  
in Service



## 4.1 The Acquisition of Information

Since ePaper is not a plug and play device, Advantech WISE-EC Design-in Services help customers to reduce the time and work involved with designing a new ePaper device. Advantech handles the complexities of technical research and provides hardware and software integrated connectivity solutions to accelerate the implementation in a wide range of applications such as electronic shelf labelling, smart logistics, smart factory, smart hospital, digital information signage and smart transportation. Advantech not only provides the single end device but for end-to-end solutions includes our ePaper Manager server, IoT gateway, and router.

With ePaper Manager, you can manage all information on ePaper devices in real-time. Remotely control all services to provide your customers with the latest information and have proper interaction with them. We also provide APIs to integrate data with your original management system. The items below are for you to extend your service for your end customer.

### Full centralized control at a glance

- Monitoring functions for low power etc
- Immediate/scheduling information to end user
- Control stock levels in stocktaking mode

### Flexible content editor for users

- Creation of templates with simple GUI
- Content previews for system management
- Auto-generated content by system
- Easily check product expiry dates

Finally, by applying Advantech EPD series solution, system integrators and developers can focus on their own application development with Advantech's reliable battery powered wireless ePaper display solutions.

### 4.1.1 Design

#### Design Guideline Support

- Multiple I/O extension
- Customized industrial design
- Optical bonding to improving image quality

#### Wireless Conductive Measurement

- TX power / mask / RF harmonic tuning / RX sensitivity

When a product moves into the design stage, Advantech will supply a design guide of the device for reference as well as Antenna selection & schematic review. The EPD device design guide provides onboard IO definitions and recommendations so customers can have a clear guideline to follow during their EPD development. In addition, our team is able to assist customers to review the placement/layout and schematics to ensure the EPD device design meets their full requirements.

For software development, Advantech WISE-EC software team can assist customers to establish an environment for software development and evaluate the amount of time and resources needed. If customers outsource software development to a 3rd party, Advantech can also cooperate with the 3rd party and provide consulting services. With Advantech's professional support, the design process becomes much easier and product quality will be improved to meet their targets.

#### Design Assistance Service

Advantech provides check lists for engineer to check their schematics and also review their service based on customer carrier board schematics. Those services are preventative, and help to catch design errors before they happen. This saves a lot of time and cost with regard to developing carrier boards.

- Schematic Review
- Placement and Layout Review
- Debugging Assistance Services
- General/Special Reference Design Database.

---

### 4.1.2 Integration

- Performance fine tuning
- SW integration from end-to-end
- Certification pre-scan
- Wireless & safety certification

#### Integration stage

This phase comprises of HW/SW integration, application development, and ePaper implementation. Due to the lack of knowledge and experience on platforms, customers need to spend a certain amount of time analyzing integration problems. In addition, ePaper implementation has a lot to do with driver and signal communication because it is not a plug and play device. Advantech's team has a complete total standard HW/SW solution to fine tune performance, driver integration, and application-specific customization. Consequently, we can support customers with professional advice and information as well as shortening development time and enabling more effective product integration.

#### Validation stage

After the customer's sample is complete, the next step is a series of verifications. In addition to verifying a product's functionality, the related tests of the product's efficiency and stability are also an important part at this stage especially. As a supportive role, Advantech primarily helps customers solve their problems in the testing process and will give suggestions and tips as well. Through an efficient verification process backed by our technical support, customers are able to optimize their applications with less fuss. Furthermore, Advantech's team can provide professional consulting services about further testing and equipment usage, so customers can find the right tools to efficiently identify and solve problems to further enhance their products quality and performance.

### 4.1.3 Production

- Production
- Worldwide logistics management
- Global repair service & RMA

Advantech has two manufacturing center in Taiwan and Kunshan to provide customized chassis assembly, testing services, packaging and labeling to meet customer special needs.

Customers can place an order via our smart and fast on-line system. With global peripheral procurement service and global logistics service, Advantech provides vertical integration in a short lead time and competitive price for customers' one-stop shopping solutions, and then we direct shipments to end users. After sales, a completed global repair service (RMA) takes charge to provide a full repair service with efficient delivery.

## 4.2 Contact Information

Below is the contact information for Advantech customer service.

Region/Country	Contact Information
America	1-888-576-9688
Brazil	0800-770-5355
Mexico	01-800-467-2415
Europe (Toll Free)	00800-2426-8080
Singapore & SAP	65-64421000
Malaysia	1800-88-1809
Australia (Toll Free)	1300-308-531800-810-0345
China (Toll Free)	800-810-8389Sales@advantech.com.cn
India (Toll Free)	1-800-425-5071
Japan (Toll Free)	0800-500-1055
Korea (Toll Free)	080-363-9494
	080-363-9495
Taiwan (Toll Free)	0800-777-111
Russia (Toll Free)	8-800-555-01-50

You can reach our service team through the website below, our technical support engineer will provide quick response once the form is filled out:

[http://www.advantech.com.tw/contact/default.aspx?page=contact\\_form2&subject=Technical+Support](http://www.advantech.com.tw/contact/default.aspx?page=contact_form2&subject=Technical+Support)

## 4.3 Global Service Policy

### 4.3.1 Warranty Policy

Below is the warranty policy of Advantech products:

#### 4.3.1.1 Warranty Period

Advantech branded off-the-shelf products and 3rd party off-the-shelf products used to assemble Advantech Configure to Order products are entitled to a 2 years complete and prompt global warranty service. Product defect in design, materials, and workmanship, are covered from the date of shipment.

All customized products will by default carry a 15 months regional warranty service. The actual product warranty terms and conditions may vary based on sales contract.

All 3rd party products purchased separately will be covered by the original manufacturer's warranty and time period, and shall not exceed one year of coverage through Advantech.

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#### 4.3.1.2 Repairs under Warranty

It is possible to obtain a replacement (Cross-Shipment) during the first 30 days of the purchase, thru your original ADVANTECH supplier to arrange DOA replacement if the products were purchased directly from ADVANTECH and the product is DOA (Dead-on-Arrival). The DOA Cross-Shipment excludes any shipping damage, customized and/or build-to-order products.

For those products which are not DOA, the return fee to an authorized ADVANTECH repair facility will be at the customers' expense. The shipping fee for reconstructive products from ADVANTECH back to customers' sites will be at ADVANTECH's expense.

#### 4.3.1.3 Exclusions from Warranty

The product is excluded from warranty if

- The product has been found to be defective after expiry of the warranty period.
- Warranty has been voided by removal or alternation of product or part identification labels.
- The product has been misused, abused, or subjected to unauthorized disassembly/modification; placed in an unsuitable physical or operating environment; improperly maintained by the customer; or failure caused which ADVANTECH is not responsible whether by accident or other cause. Such conditions will be determined by ADVANTECH at its sole unfettered discretion.
- The product is damaged beyond repair due to a natural disaster such as a lightning strike, flood, earthquake, etc.
- Product updates/upgrades and tests upon the request of customers who are without warranty.

### 4.3.2 Repair Process

#### 4.3.2.1 Obtaining an RMA Number

All returns from customers must be authorized with an ADVANTECH RMA (Return Merchandise Authorization) number. Any returns of defective units or parts without valid RMA numbers will not be accepted; they will be returned to the customer at the customer's cost without prior notice. An RMA number is only an authorization for returning a product; it is not an approval for repair or replacement. When requesting an RMA number, please access ADVANTECH's RMA web site:

**<https://erma.advantech.com.tw/>** with an authorized user ID and password.

You must fill out basic product and customer information and describe the problems encountered in detail in "Problem Description". Vague entries such as "does not work" and "failure" are not acceptable.

If you are uncertain about the cause of the problem, please contact ADVANTECH's Application Engineers (AE). They may be able to find a solution that does not require sending the product for repair.

The serial number of the whole set is required if only a key defective part is returned for repair. Otherwise, the case will be regarded as out-of-warranty.

#### 4.3.2.2 Returning the Product for Repair

It's possible customers can save time and meet end-user requirements by returning defective products to any authorized ADVANTECH repair facility without an extra cross-region charge. It is required to contact the local repair center before offering global repair service.

It is recommended to send cards without accessories (manuals, cables, etc.). Remove any unnecessary components from the card, such as CPU, DRAM, and CF Card. If you send all these parts back (because you believe they may be part of the problem), please note clearly that they are included. Otherwise, ADVANTECH is not responsible for any items not listed. Make sure the " Problem Description " is enclosed.

European Customers that are located outside European Community are requested to use UPS as the forwarding company. We strongly recommend adding a packing list to all shipments. Please prepare a shipment invoice according to the following guidelines to decrease goods clearance time:

1. Give a low value to the product on the invoice, or additional charges will be levied by customs that will be borne by the sender.
2. Add information "Invoice for customs purposes only with no commercial value" on the shipment invoice.
3. Show RMA numbers, product serial numbers and warranty status on the shipment invoice.
4. Add information about Country of origin of goods

In addition, please attach an invoice with RMA number to the carton, then write the RMA number on the outside of the carton and attach the packing slip to save handling time. Please also address the parts directly to the Service Department and mark the package "Attn. RMA Service Department".

All products must be returned in properly packed ESD material or anti-static bags. ADVANTECH reserves the right to return unrepaired items at the customer's cost if inappropriately packed.

Besides that, "Door-to-Door" transportation such as speed post is recommended for delivery, otherwise, the sender should bear additional charges such as clearance fees if Air-Cargo is adopted.

Should DOA cases fail, ADVANTECH will take full responsibility for the product and transportation charges. If the items are not DOA, but fail within warranty, the sender will bear the freight charges. For out-of-warranty cases, customers must cover the cost and take care of both outward and inward transportation.

#### 4.3.2.3 Service Charges

The product is excluded from warranty if:

- The product is repaired after expiry of the warranty period.
- The product is tested or calibrated after expiry of the warranty period, and a No Problem Found (NPF) result is obtained.
- The product, though repaired within the warranty period, has been misused, abused, or subjected to unauthorized disassembly/modification; placed in an unsuitable physical or operating environment; improperly maintained by the customer; or failure caused which ADVANTECH is not responsible whether by accident or other cause. Such conditions will be determined by ADVANTECH at its sole unfettered discretion.
- The product is damaged beyond repair due to a natural disaster such as a lightning strike, flood, earthquake, etc.
- Product updates and tests upon the request of customers who are without warranty.

---

If a product has been repaired by ADVANTECH, and within three months after such a repair the product requires another repair for the same problem, ADVANTECH will do this repair free of charge. However, such free repairs do not apply to products which have been misused, abused, or subjected to unauthorized disassembly/modification; placed in an unsuitable physical or operating environment; improperly maintained by the customer; or failure caused which ADVANTECH is not responsible whether by accident or other cause.

Please contact your nearest regional service center for detail service quotation.

Before we start out-of-warranty repairs, we will send you a pro forma invoice (P/I) with the repair charges. When you remit the funds, please reference the P/I number listed under "Our Ref". ADVANTECH reserves the right to deny repair services to customers that do not return the DOA unit or sign the P/I. Meanwhile, ADVANTECH will scrap defective products without prior notice if customers do not return the signed P/I within 3 months.

#### **4.3.2.4 Repair Report**

ADVANTECH returns each product with a "Repair Report" which shows the result of the repair. A "Repair Analysis Report" is also provided to customers upon request. If the defect is not caused by ADVANTECH design or manufacturing, customers will be charged US\$60 or US\$120 for in-warranty or out-of-warranty repair analysis reports respectively.

#### **4.3.2.5 Custody of Products Submitted for Repair**

ADVANTECH will retain custody of a product submitted for repair for one month while it is waiting for return of a signed P/I or payment (A/R). If the customer fails to respond within such period, ADVANTECH will close the case automatically. ADVANTECH will take reasonable measures to stay in proper contact with the customer during this one month period.

#### **4.3.2.6 Shipping Back to Customer**

The forwarding company for RMA returns from ADVANTECH to customers is selected by ADVANTECH. Per customer requirement, other express services can be adopted, such as UPS, FedEx and etc. The customer must bear the extra costs of such alternative shipment. If you require any special arrangements, please indicate this when shipping the product to us.







*Enabling an Intelligent Planet*

## **[www.advantech.com](http://www.advantech.com)**

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