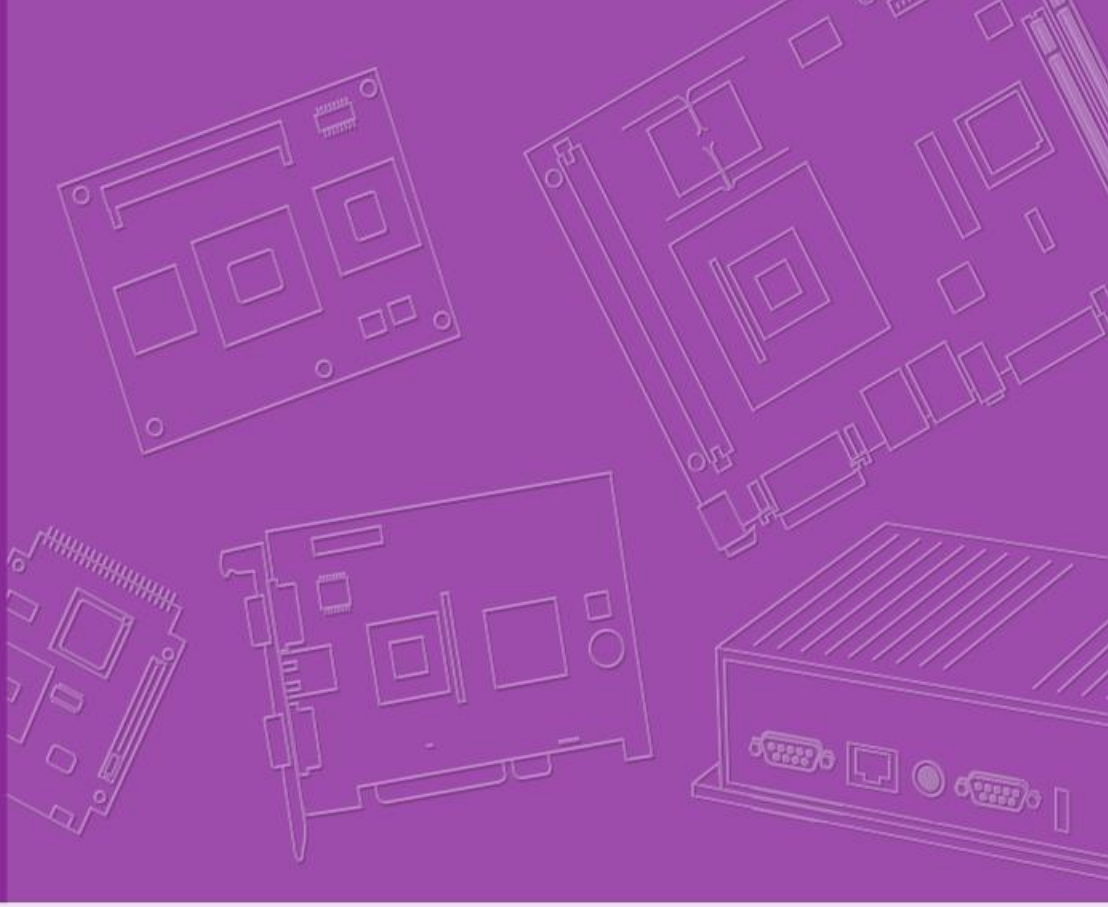

User Manual

EPD Control Board
EPD-132

Wireless ePaper Display Solution

ADVANTECH
Enabling an Intelligent Planet

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Part No.2006013210 Edition 1

August 2019

Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

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.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

FCC Class B

Note: 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 minimum distance 20cm between the radiator & your body.

FOR COUNTRY CODE SELECTION USAGE (WLAN DEVICES)

Note: The country code selection is for non-US model only and is not available to all US model. Per FCC regulation, all Wi-Fi product marketed in US must fixed to US operation channels only.

LABEL OF THE END PRODUCT: Host Model Name EPD-132R2

The final end product must be labeled in a visible area with the following " 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.

OEM Integration Instructions：

This device is intended only for OEM integrators under the following conditions：

The module can be used to installation in other host. The antenna must be installed such that 20 cm is maintained between the antenna and users, and the transmitter module may not be colocated

with any other transmit or antenna. The module shall be only used with the integral antenna(s) that has been originally tested and certified with this module.

As long as 3 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirement with this module installed (for example, digital device emission, PC peripheral requirements, etc.)

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

CCAH09LP0190T1

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 Advantech's 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.

- 1 EPD-132 EPD control board & 13.3" EPD

Part No.	Description
EPD-132B1AG-NSD01	13.3" Black/White ePaper Wi-Fi / BT display module solution in 2.4G
EPD-132R1AG-NSD01	13.3" Red/Black/White ePaper Wi-Fi / BT display module solution in 2.4G

EPD-132R1AG-NSD11	EPD-132R1AG-NSD01 for 50 pcs solution kit
EPD-132R1AG-NSD21	EPD-132R1AG-NSD01 for 100 pcs solution kit
EPD-132R1AG-NSD31	EPD-132R1AG-NSD01 for 500 pcs solution kit
EPD-132R1AG-NSD41	EPD-132R1AG-NSD01 for 1000 pcs solution kit
EPD-132B1AG-NSD11	EPD-132B1AG-NSD01 for 50 pcs solution kit
EPD-132B1AG-NSD21	EPD-132B1AG-NSD01 for 100 pcs solution kit
EPD-132B1AG-NSD31	EPD-132B1AG-NSD01 for 500 pcs solution kit
EPD-132B1AG-NSD41	EPD-132B1AG-NSD01 for 1000 pcs solution kit

Ordering Information

Part No.	Description
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	FPC 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

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 d? 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.
    - Equipment L'équipement est tombé et a été endommagé.
    - Equipment 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 module which supports 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 is:

- ARM Cortex-M4 Core Processor
- Support IEEE 802.11b/g/n + Bluetooth 4.1 standard
- 13.3" e-Paper panel display
- Rich control I/O: expansion pin header & I2C
- Supports temperature 0 ~ 40 °C In R/B/W, 0 ~ 50 °C in B/W
- Supports over-the-air upgrade (OTA)
- Optional wall mount kit for various applications

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. 20.6 dBm at 802.11b CCK Mode 1M Typ. 21.41 dBm at 802.11g OFDM Mode 54M Typ. 21.46 dBm at 802.11n OFDM Mode MCS0 Typ. 5.49 for BT
	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	Dipole or PCB Antenna
System Interface	Indicator Button	1 for Reset/ Page Change/Wake-up/Alert cancel

I/O (on-board)	I2C	4pin 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 orB/W) & 9.7" EPD (R/B/W)	
Power	DC 5V	Micro USB (CN2) up to 0.9A/4.5 W in USB3.0 host Micro USB (CN3) up to 2A/ 10 W	In Data transmission mode With 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	
Housing 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! *The image for EPD need to follow below instruction.*

1. *Image need to set as 1600*1200 pixels, do not resize it after complete the image which will cause jaggy edges.*
2. *24 bits / BMP format for EPD-132B*
3. *24 bits / BMP format for EPD-132R and the color only support below range.*
   Red: (255,0,0)
   Black: (0,0,0)
   White (255, 255, 255)

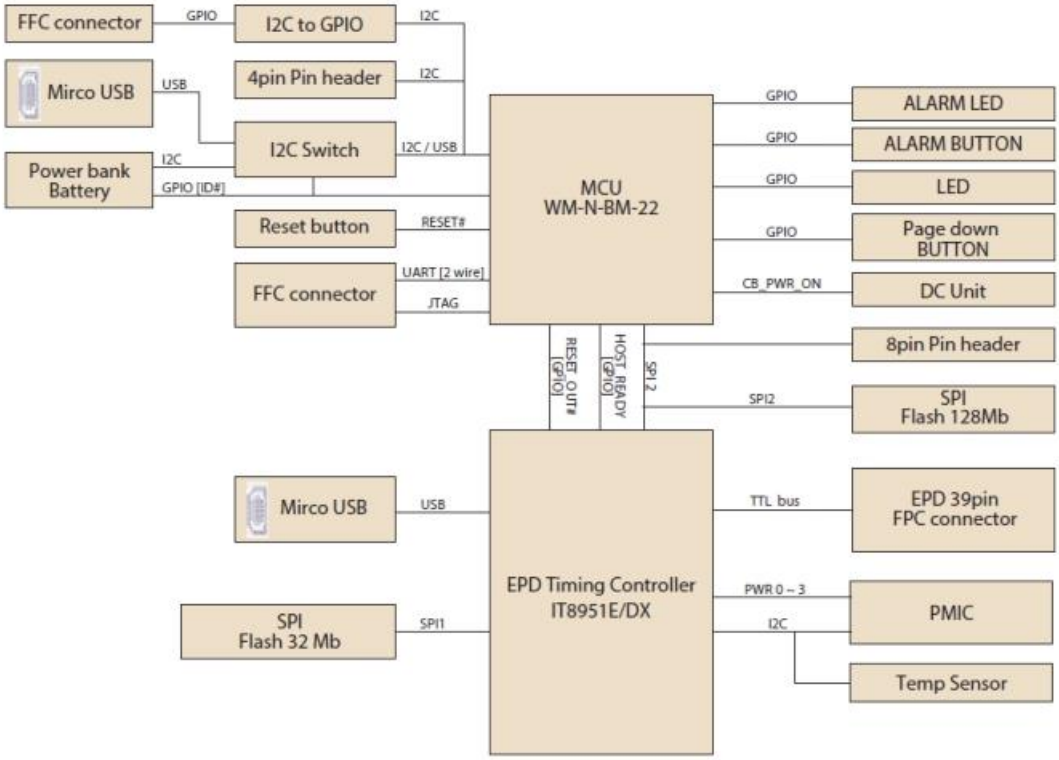


Figure 1.1 Block Diagram

1.3 System implementation

EPD device can be applied to different applications and the system integrator can control the RESTful API for different scenarios.

1.3.1 Advantech EPD-132 & ePaper Manager Solution

Wireless EPD System consists of ePaper Manager, Gateway, Router and EPD device.

- The ePaper Manager provides Web GUI to management the wireless EPD device.
- The Gateway/embedded computer are responsible for communication between ePaper Manager and EPD device.
- The EPD is a device with ePaper, EPD controller and wireless connectivity.

Advantech provides a total solution. From the system architecture, EPD-132 is at the end node of the system. Developers can apply Advantech WISE-3610W to connect to the ePaper manager which is installed in Advantech Embedded Computer / ARK2250L. There are multifunction RESTful API on ePaper Manager for developers to integrate with vertical market applications eg. retail, smart warehouse, factory, hospitals and transportation.

Chapter 2

EPD Hardware Specification

This section provides board level PCBA and Panel mechanical size.

EPD-132 PCBA with following spec.

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

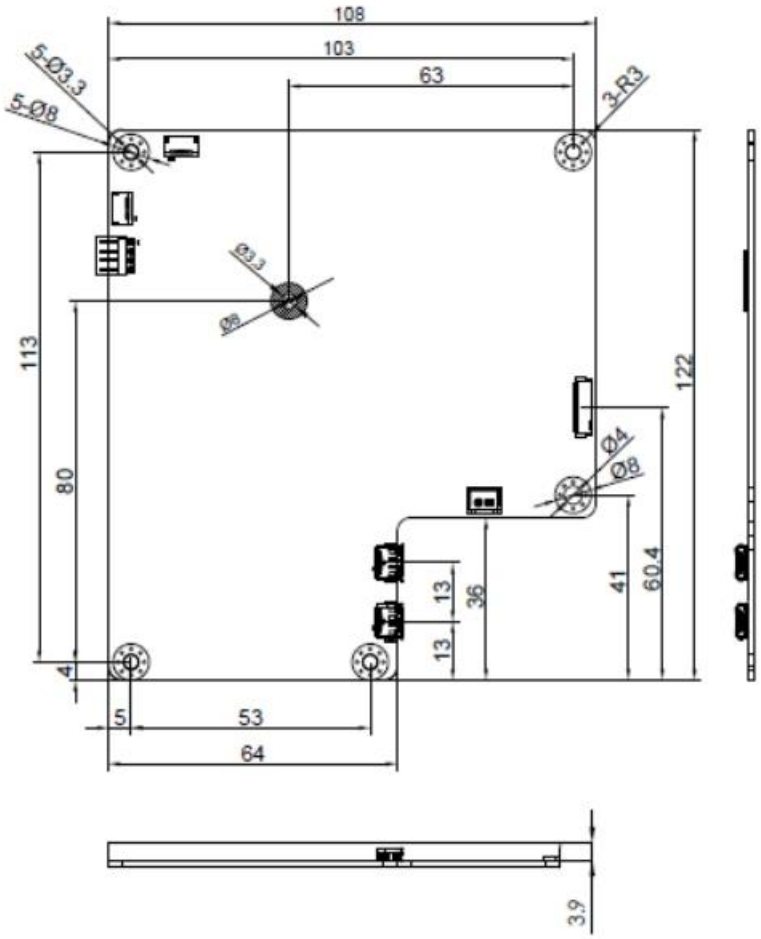


Figure 2.1 MODULE OUTLINE: 108 x 122 x 3.9 mm

13.3" EPD (PN:968AD00147/968AD00388) with following 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 Eink Panel inspection criteria refer to Eink CAS & Inspection standard document.

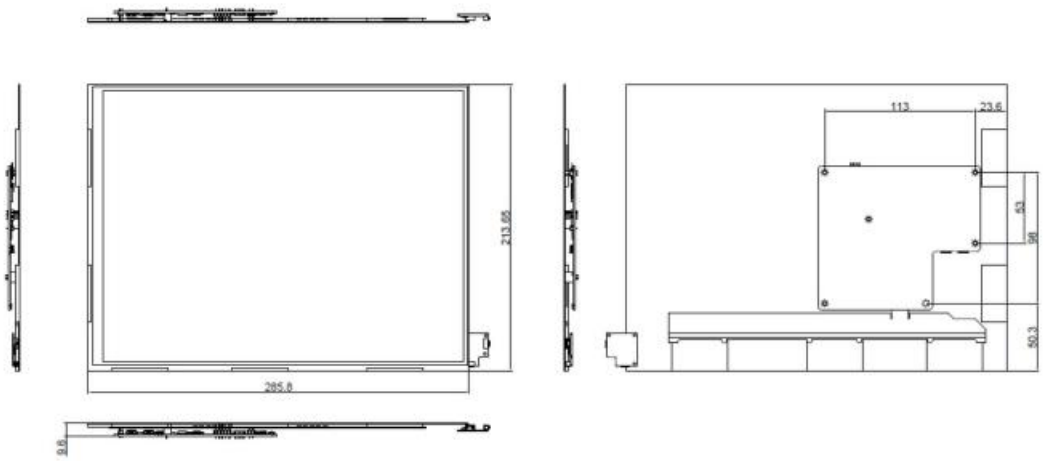


Figure 2.2 Module connect to panel Specifications

Note! *E Ink Recommend condition for storage:*
Temperature: 20 +-10 °C
Humidity: 60% RH+-10%RH, Non-condensing

Note! *If the panel module has been put in low temperatured between 0~-25 °C for a while, we recommend to leave it between 20 to 30 °C for 4 days before assembly.*

2.1 Board level I/O

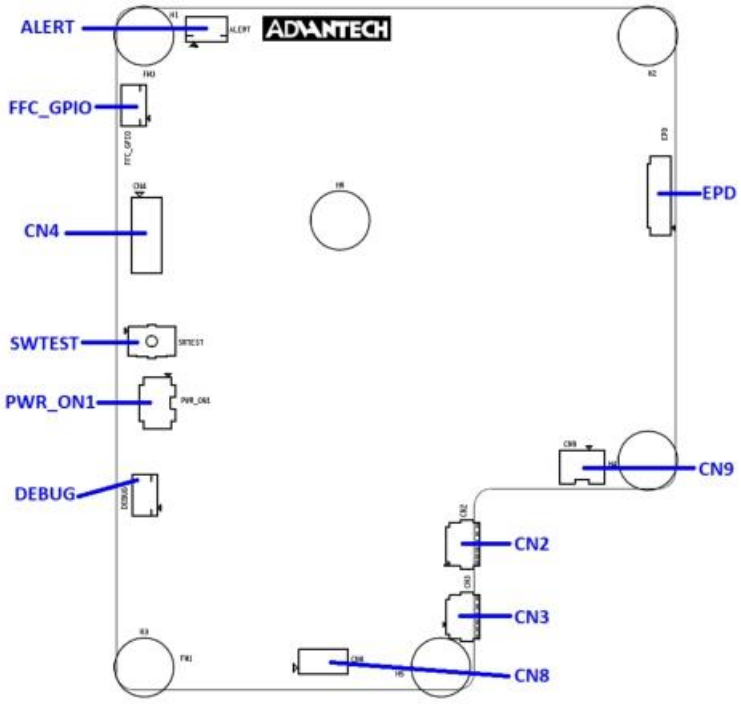
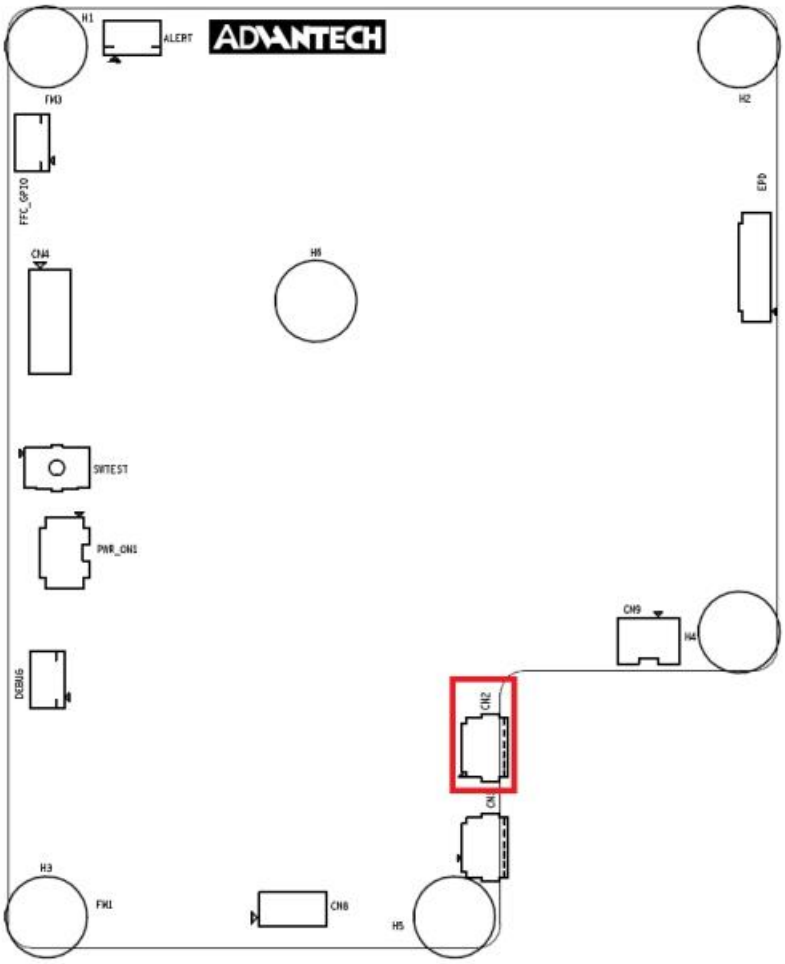


Table 2.1: I/O Connector

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

*Legend: **v** = yes, **-** = no.*

2.1.1 CN2


H1
ALERT
ADVANTECH
FM3
H2
FFC_GPIO
EPD
CN4
H6
SWTEST
PWR_ON1
CN9
H4
DEBUG
CN2
CN1
H3
FM1
CN8
H5

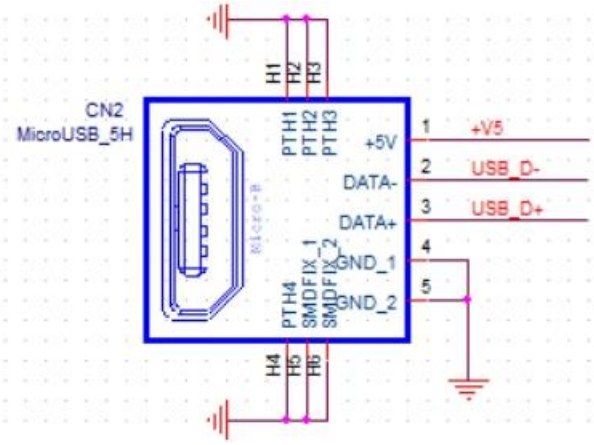
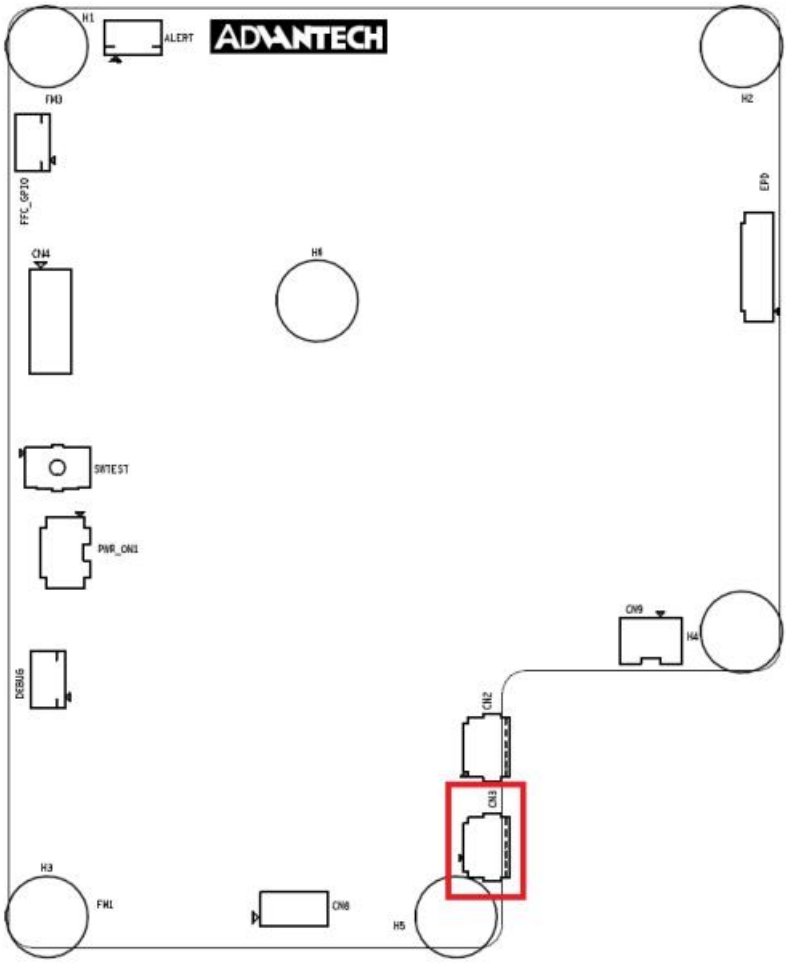

H1
H2
H3
CN2
MicroUSB_5H
PTH1
PTH2
PTH3
+5V
DATA-
DATA+
GND_1
GND_2
PTH4
SMDFIX_1
SMDFIX_2
1
+V5
2
USB_D-
3
USB_D+
4
5
H4
H5
H6

Table 2.2: CN2	
PIN	**PIN_NAME**
1	+V5
2	USB_D-
3	USB_D+
4	GND
5	GND

2.1.2 CN3



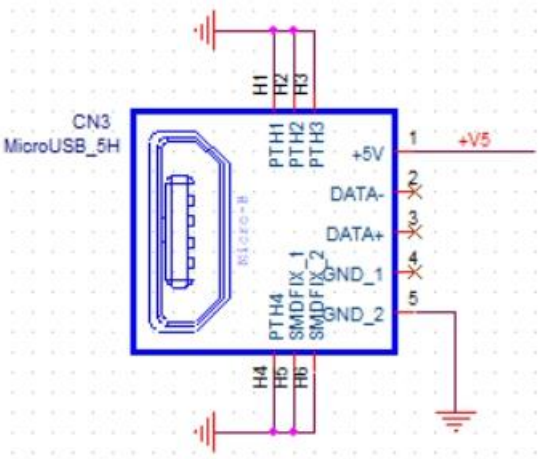
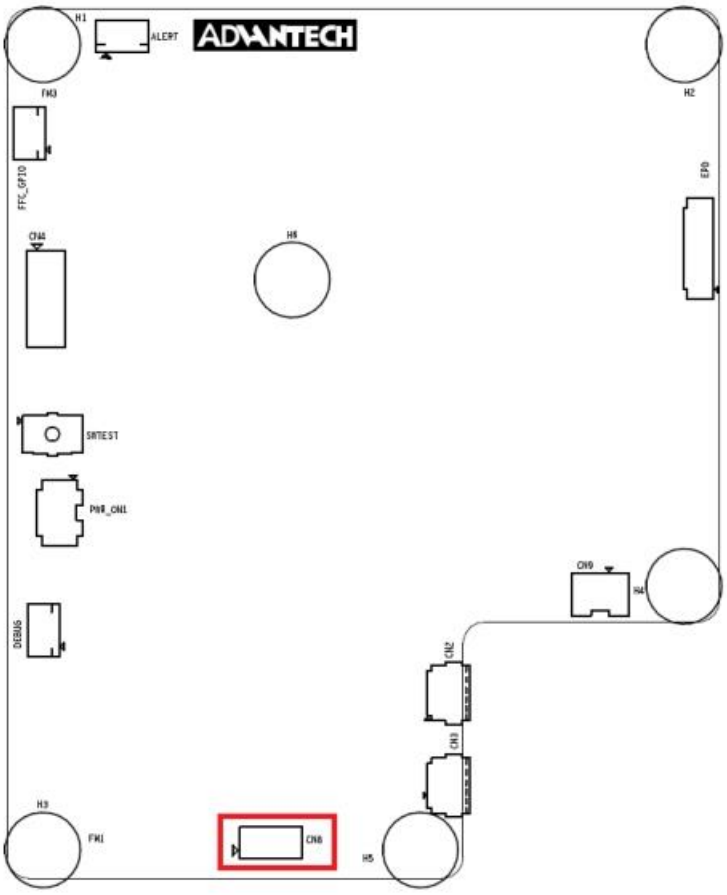


Table 2.3: CN3	
PIN	**PIN_NAME**
1	+V5
2	N/A
3	N/A
4	N/A
5	GND

2.1.3 CN8



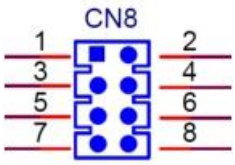


Table 2.4: CN8 (SPI PIN HEADER)			
PIN	**PIN_NAME**	**PIN**	**PIN_NAME**
1	NC	2	SPI_CLK(Serial Clock)
3	NC	4	SPI_MOSI(Master Output,Slave Input)
5	NC	6	SPI_MISO(Master Input,Slave Output)
7	NC	8	SPI_CS0#(Slave Selected)

Serial Clock:

- SCLK: SCK

Master Output → Slave Input (MOSI):

- SIMO, MTSR - correspond 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):

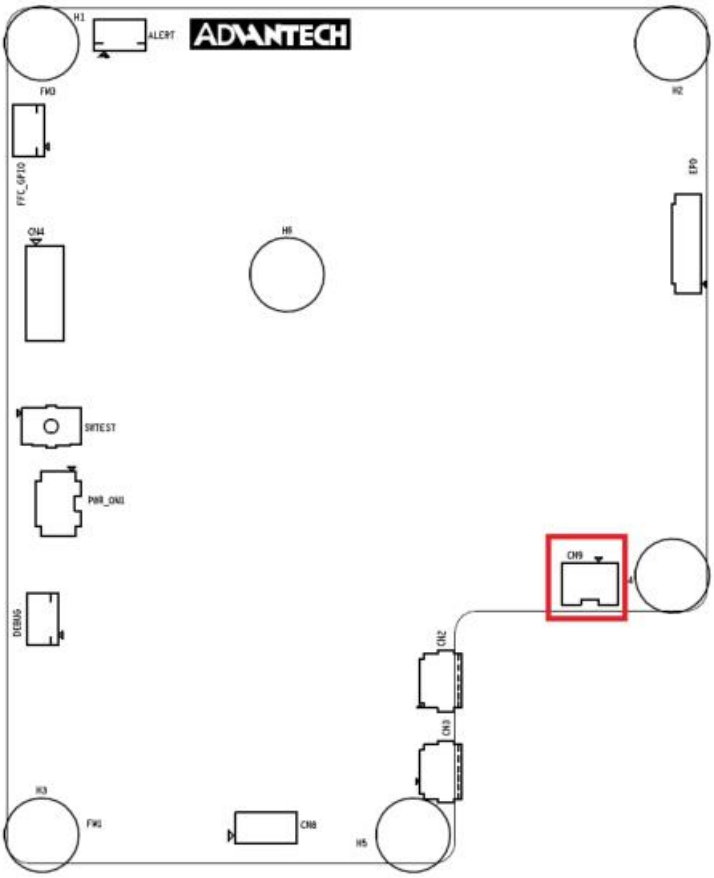
- SOMI, MRST - correspond to MISO on both master and slave devices, connects to each other
- SDO, DO, DOUT, SO - on slave devices; connects to MISO on master, or to below connections
- SDI, DI, DIN, SI - on master devices; connects to MISO on slave, or to above connections

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



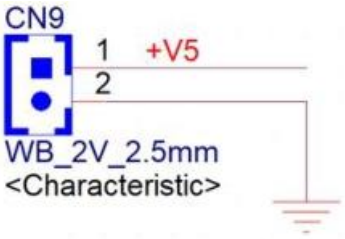
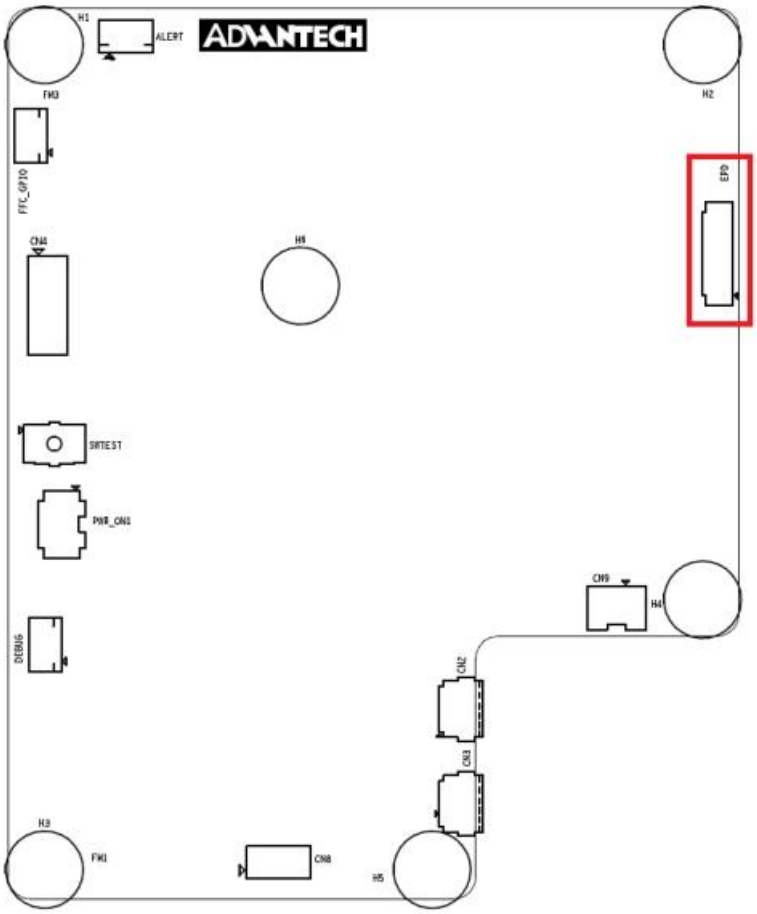


Table 2.5: CN9

PIN	PIN_NAME	PIN	PIN_NAME
1	+V5	2	GND

2.1.5 EPD connector



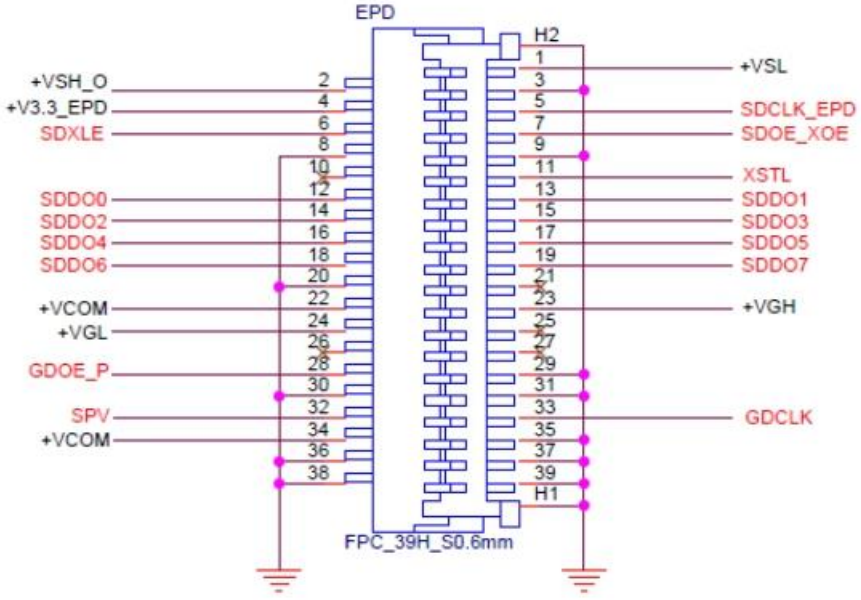
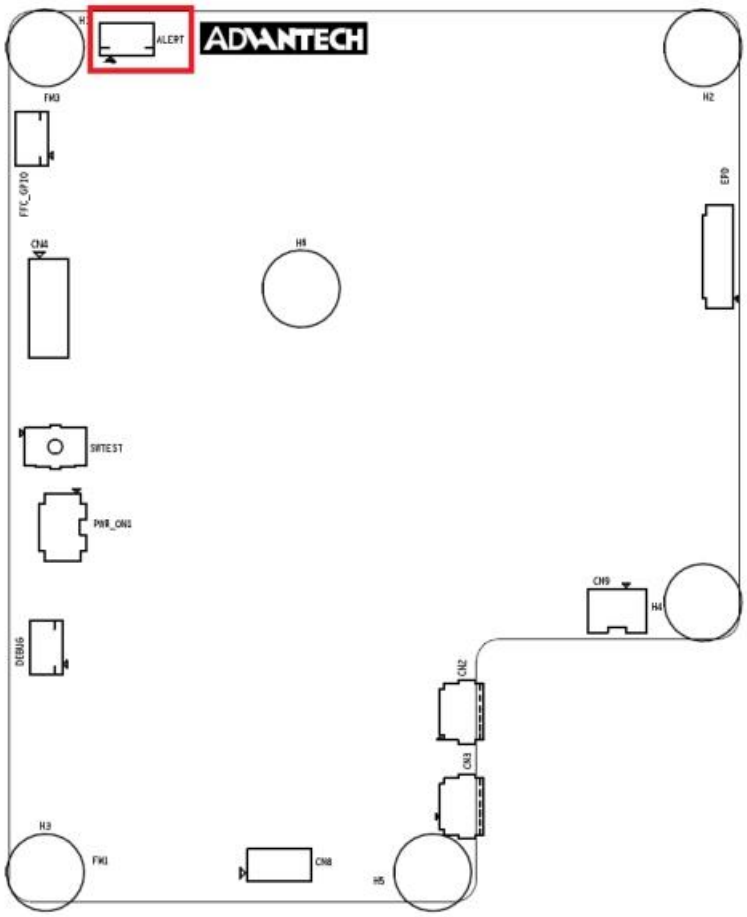


Table 2.6: EPD connector

PIN	PIN_NAME	PIN	PIN_NAME
1	+VSL (Negative power supply source driver)	2	+VSH_O (Positive power supply source driver)
3	GND	4	+V3.3_EPD (3.3V)
5	SDCLK_EPD (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



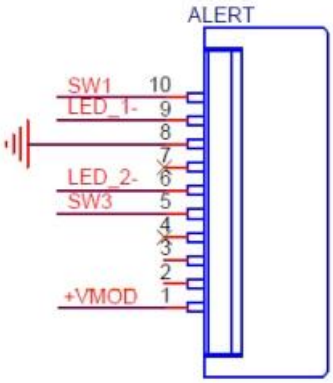


Table 2.7: ALERT

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

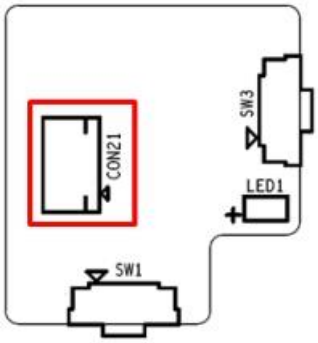


Table 2.8: CON21

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

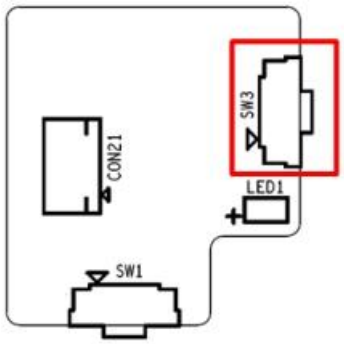


Table 2.9: SWTEST

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

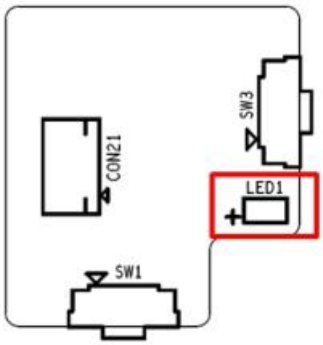
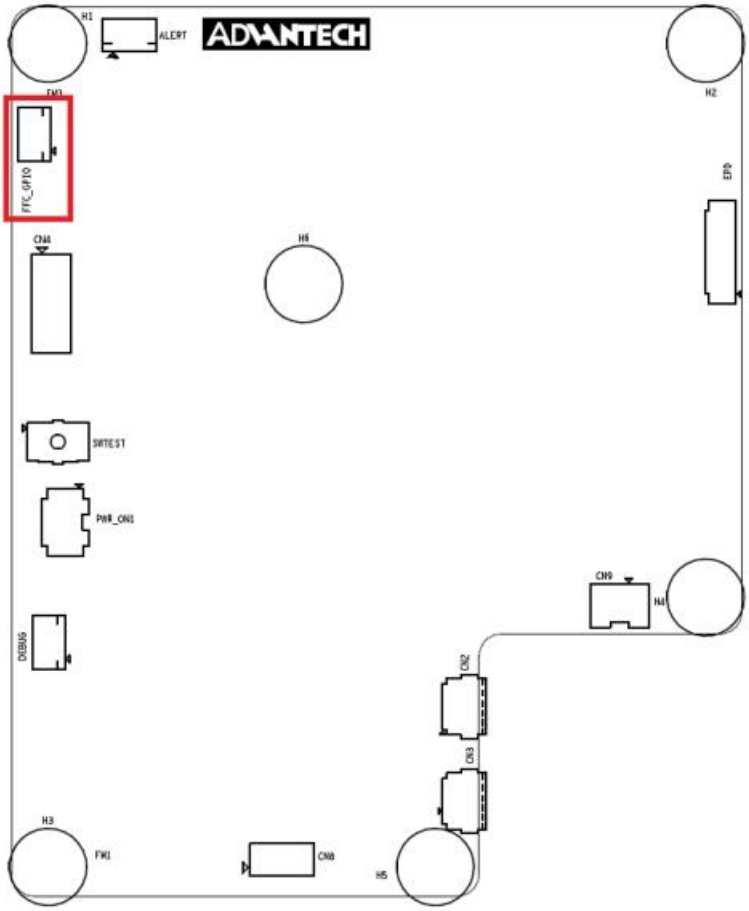


Table 2.10: LED			
PIN	**PIN_NAME**	**PIN**	**PIN_NAME**
1	+VDD	2	+VDD
3	LED_1-	4	LED_2-

2.1.7 FFC_GPIO



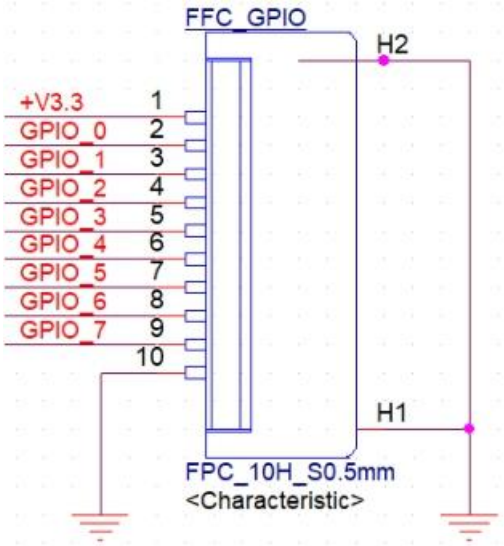
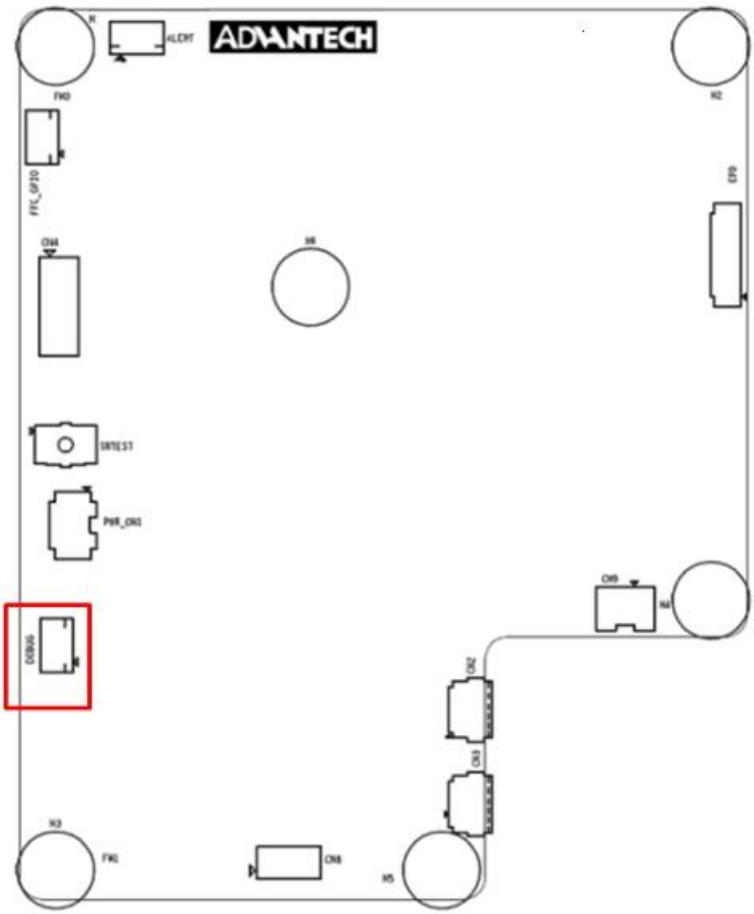


Table 2.11: FFC_GPIO

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



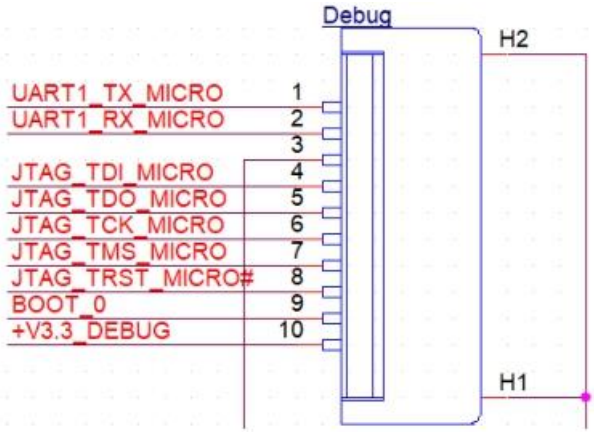
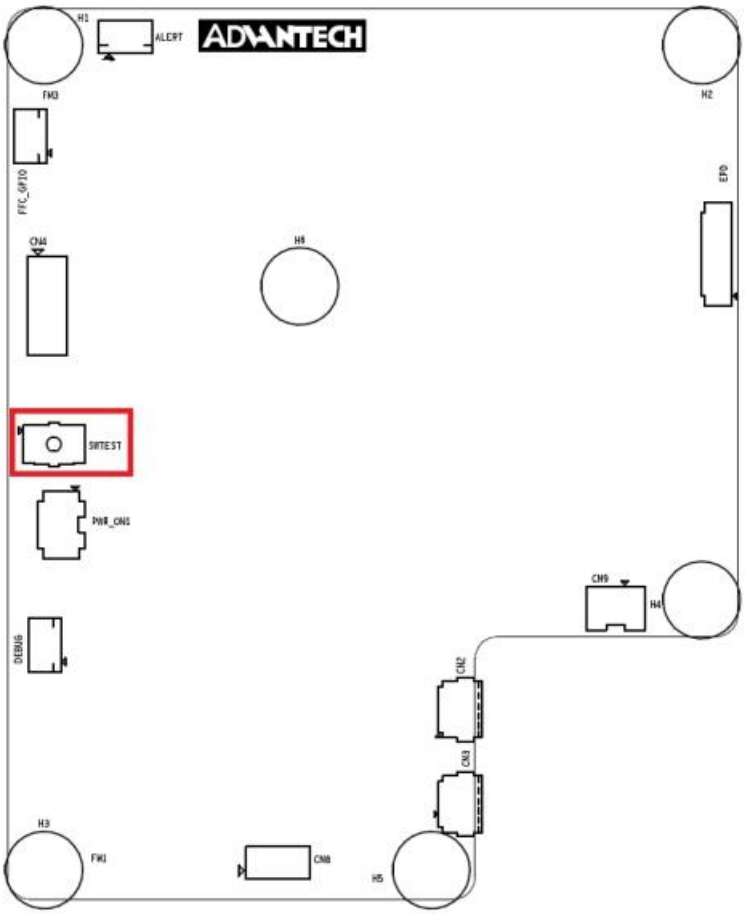


Table 2.12: FFC_GPIO

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



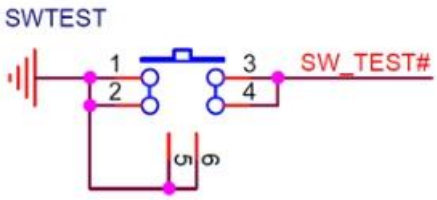
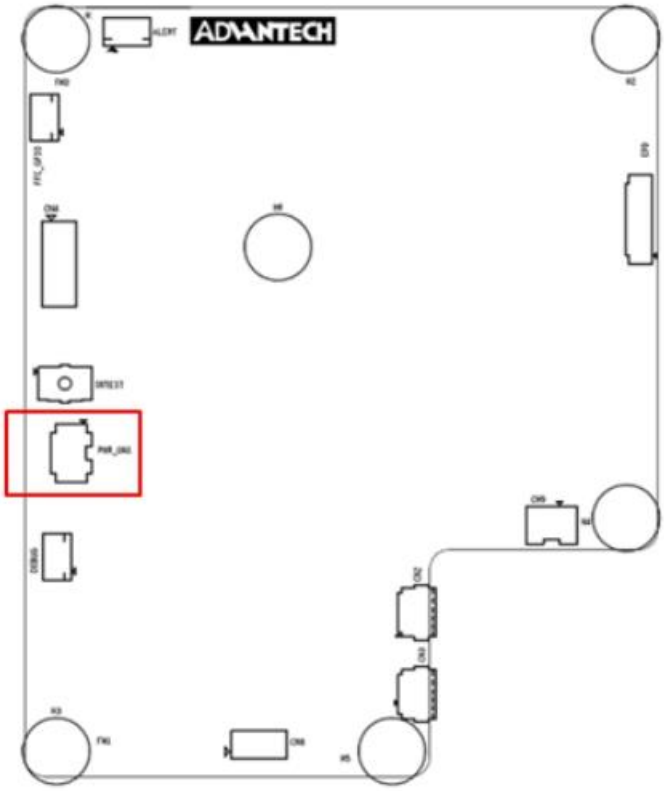


Table 2.13: SWTEST

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



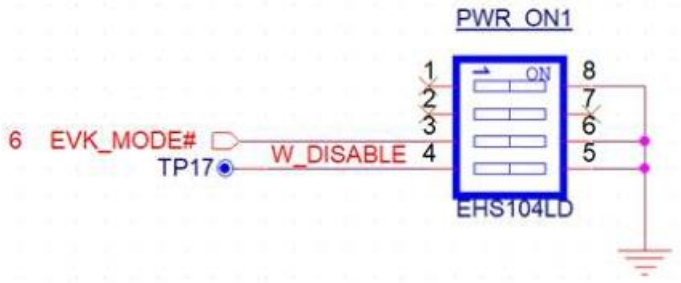


Table 2.14: SWTEST			
PIN	**PIN_NAME**	**PIN**	**PIN_NAME**
1	NC: only for SW testing usage	2	NC: only for SW testing usage
3	EVK_MODE#	4	W_DISABLE: WiFi power on/off

	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

- The FPC from the ePaper display

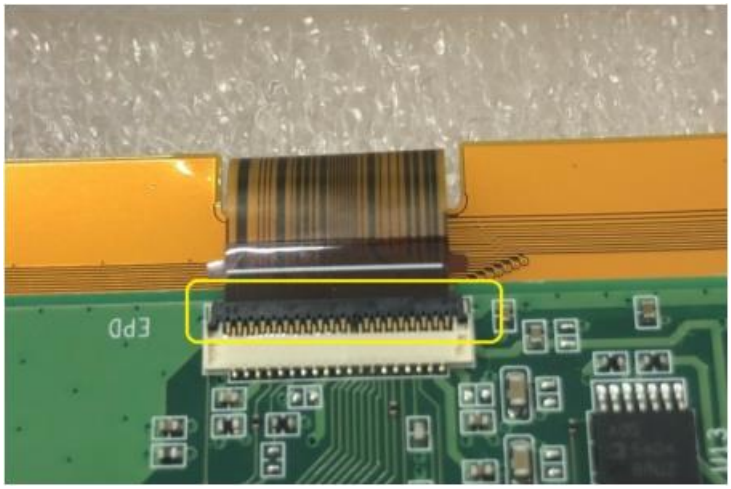
- Release the rotary latch of the connector on the control board

- Blend the FPC carefully to the control board direction

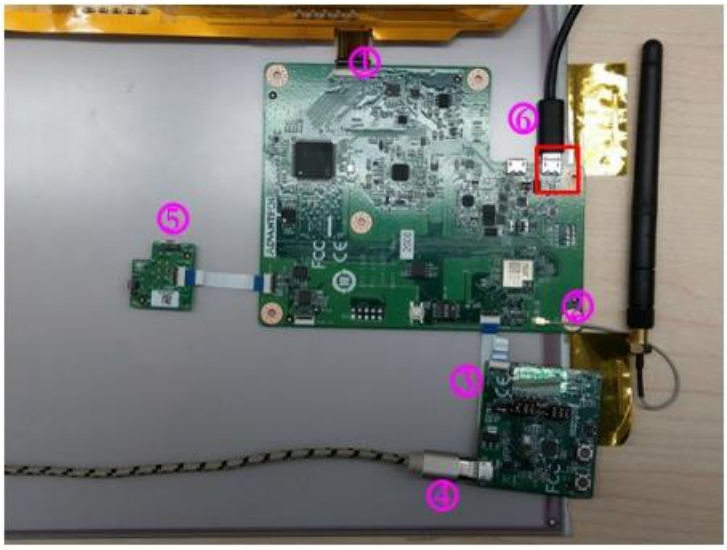
- Insert the FPC into the connector on control board

- After connecting firmly, lock the rotary latch.

- Check if the connection is correct and tight.



Below Item 2: Connected Wi-Fi antenna to the mainboard
Below item 5: Connected IO daughter to the mainboard
Below item 6: Connected power cable to the mainboard USB (CN3)



2.2 Daughter board: LED & Button Behavior

The daughter board: 9696053RS00 can work with EPD-132.

2.2.1 Button behaviors

1. If RED LED (LED2) light up and click the button, system can turn off LED light
   If no led light and click the button, the system screen can change to next page.
2. Press button then system will refresh image or restore default.

item	Status	Action	Result
1	When LED2 is on	Press button for 0.5 sec and release button	Turn off LED2
	When LED2 is off		Change to next page image
2	When LED2 is off	Press button for 10 sec	Step 1.LED2 flash (0.5 sec toggle LED2) after hold 5 sec. Step 2. LED2 on and hold 10 sec Step 3. LED2 off and then release SW3 keys Final result->Reset to default and reboot

2.2.2 LED behaviors

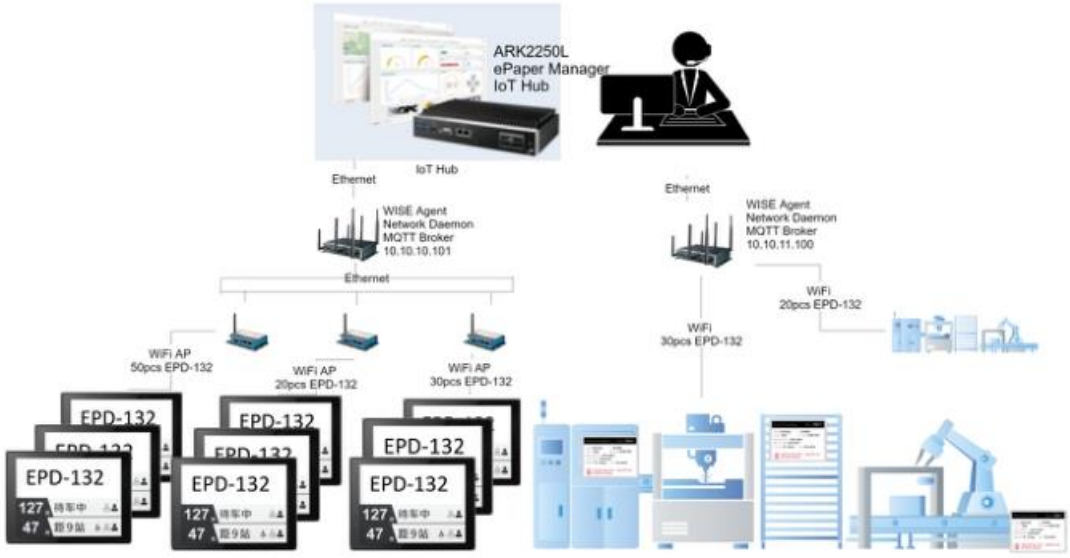
1. Green LED (LED1) blink when system sends the image to display on panel.
2. Use LED command remote control from Tera Term.

item	Status	Action	Result
1	Device connected LED off	System trigger to refresh image	1. Turn on LED1 when image refresh. 2. Turn off LED1 after image refresh finish
2	Step1. Device connected LED off, Step2.Remote control command from the 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 Network Architecture and Software features

3.1 System Topology Architecture



3.1.1 System environment

No	Device1	OS	version
1	ARK 2250L/ePaper manager	WIN7, WIN10 (2019,Q3)	64 bit, Professional
2	WISE Gateway: WISE3610W	OpenWRT R1.2.11	SW version: 3610W-OIV0101-WifiEPD
6	EPD-132: Cypress BM22	ThreadX v5.6 , SDK 4.1.8	V1.0.0

3.2 System Specification

1. Each WISE-3610W gateway can organized an isolated network and be a Wi-Fi AP as well.
2. Each WISE-3610W can support up to 100 EPD devices

3.2.1 ePaper Manager

- Support friendly user interface to operate the execute command to control EPD-132 (EPD device) and WISE-3610W(gateway).
- External vertical system can operate the whole EPD system as below list:
  1) ePaper manager GUI can perform command to control WISE-3610W (gateway).
  2) ePaper manager can perform command to control EPD-132 (EPD device).
  3) ePaper manager can deliver the image /Firmware EPD device through WISE Gateway.
  4) Device can periodical report status back to ePaper manager.

3.2.2 WISE Gateway

- Receive commands from ePaper manager and execute.
- Control EPD-132 through commands from ePaper manager.
- EPD-132 wireless can connect to WISE-3610W directly.
- EPD-132 wireless connects to Intranet AP, then WISE-3610W acts as a gateway to control EPD-132
- Supports MQTT broker Server .

3.2.3 EPD Device

1. Supports BLE re-config : if device keeps failing to join, the device will enable BLE for new SSID.
2. Supports emergency status report after join router. E.g. low power, HW malfunction and exception handling.
3. Support multi-image storage.
   a.Full size image: 14 pages
   b.Support partial updates. (ePaper Manager 2.0)
   c.Supports de-compression in tag side. (ePaper Manager 2.0)
4. Supports Device actions from WISE-3610W.

3.3 System Network Specification

- 2-way communication: Device status report and battery status report.
- Physical transmission data rate : 16Mbps Byte/Sec
- Network join performance
  1.1 pcs Tag join network in 6 secs.
  2.100 pcs Tag join network in 1 minutes
- Data transfer Performance from WISE-3610W
  1) Update 50pcs EPD-132 in 30 mins

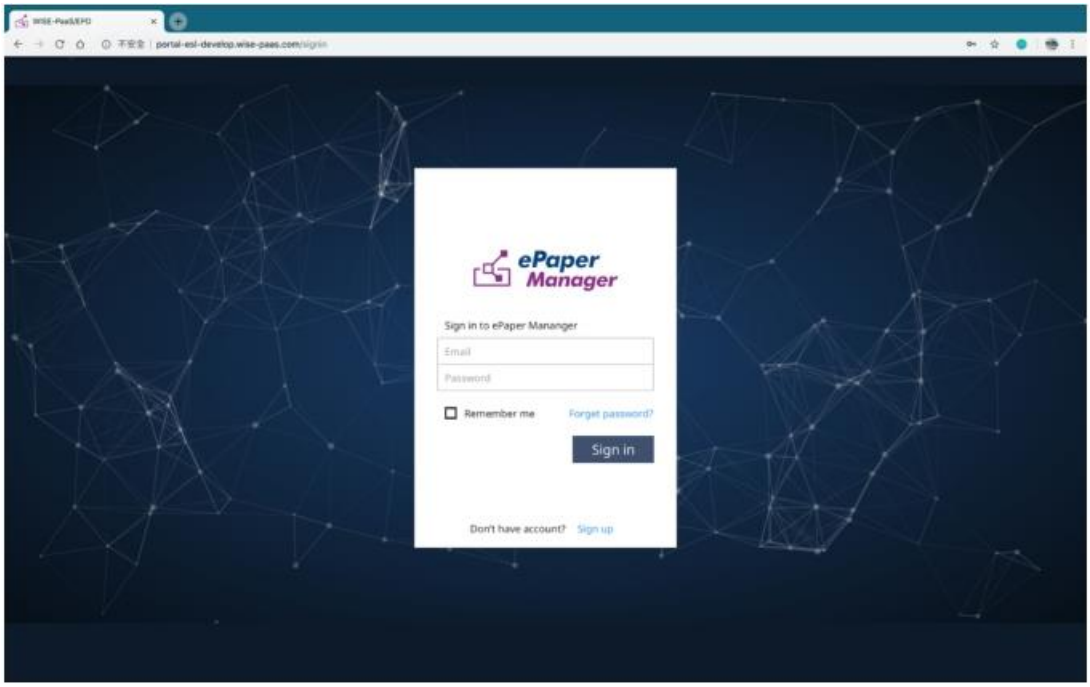
Note! *The performance will be adjusted according to environmental limitations.*

Chapter 4

EPD-132 in ePaper Manager

4.1 EPD-132 with ePaper Manager Solution

Previously, we have go through EPD-132 function as an end device. To build up a solution, we need a gateway to connect to our CMS: ePaper manager. Indeed, ePaper Manager provides complete solution to help you import tag data, design tag templates and manage tags easily. This user manual will show you how to build a total solution system.



Moreover, ePaper Manager provides a complete solution to help you easily import device data, design device templates, and manage devices. The main feature lists are as below.

Table 4.1: ePaper manager main feature list

1	Overview	System dashboard
2	EPD controller	Control & Manage EPD device and association with target
3	Item	Data Group Management
4	Device list	Target Product Data & Import
5	Template	EPD image design and generation
6	White list setting	EPD white list
7	OTA	Firmware upgrade
8	Setting	User account management
9	Document	Online document

4.2 Preparation

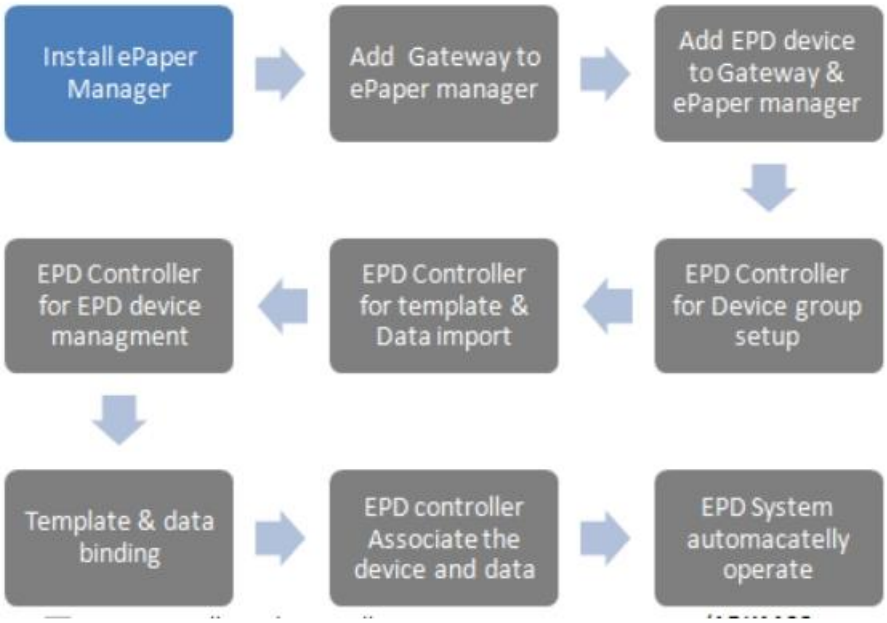
4.2.1 Hardware Component List

1. Advantech Embedded Computer: ARK-2250L
2. Advantech IoT Gateway: WISE-3610W & Advantech EPD devices.

4.2.2 Software Component List

1. Window7 Professional version for ARK2250L
2. ePaper Manager Installation & License on ARK2250L
3. 500 connection License on ARK2250L.
4. Recommend Browser: Chrome version 75.0.3770.100 (official version) (64-bit)
5. Recommend FTP Server: FileZilla Server version 0.9.60 beta

4.2.3 ePaper Manager Setup on ARK

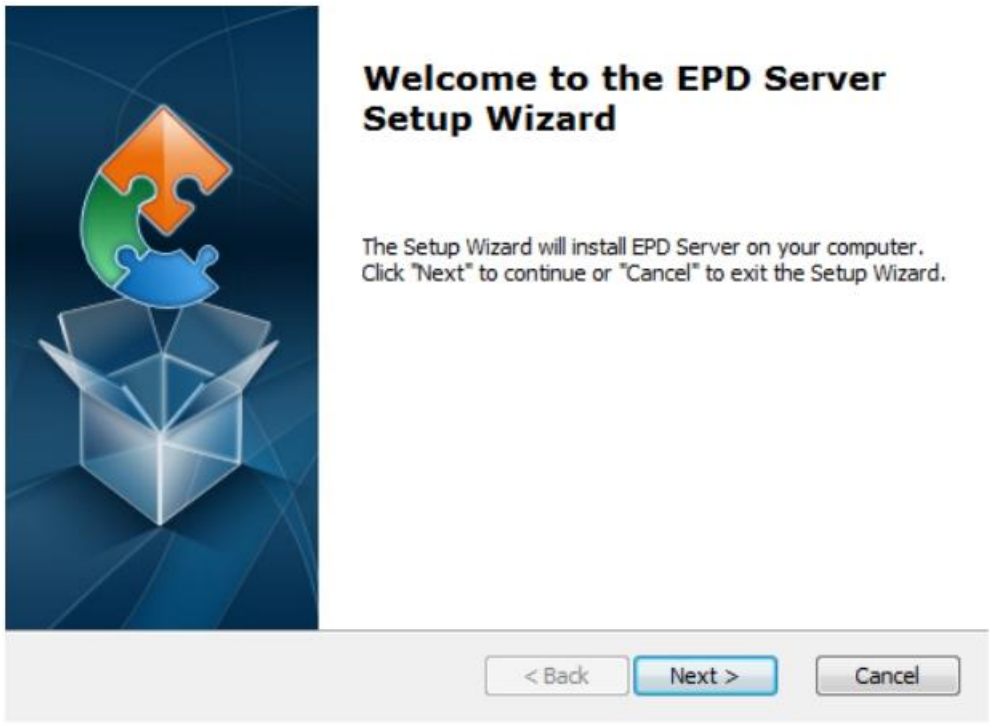


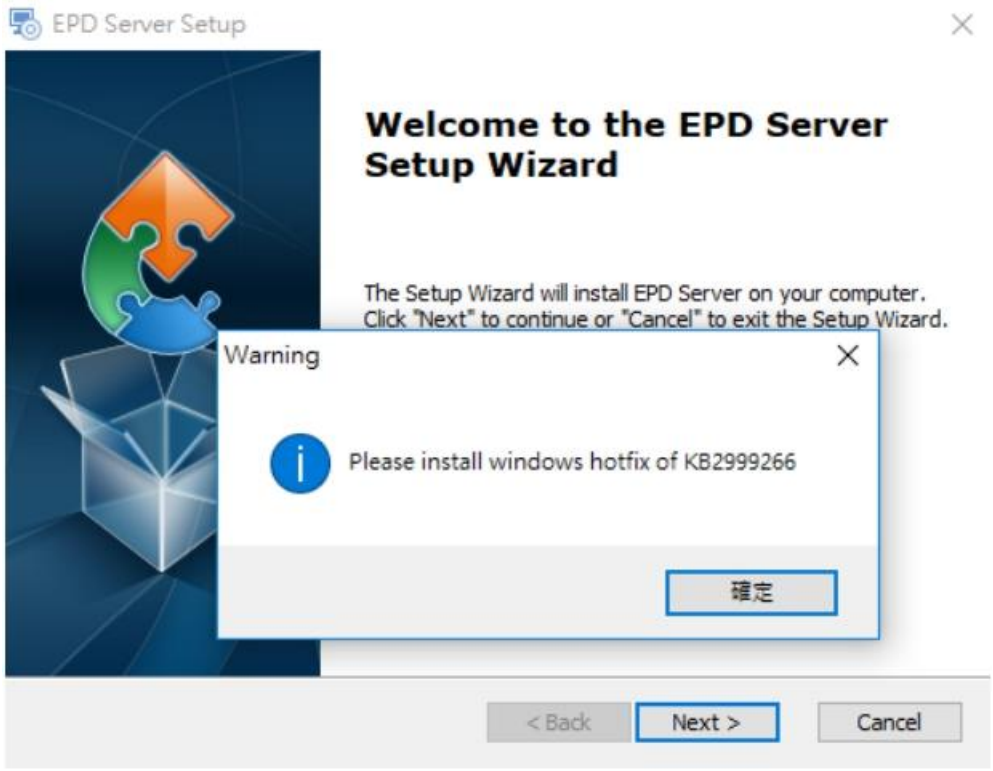
1. First, you will need to install ePaper manager on ARK-2250L.

   ePaper Manager Installation

   Double click the **EPD ServerSetup_1.0.0.exe** file to start installation process on the server-side computer.

   Follow the instructions in the setup wizard.

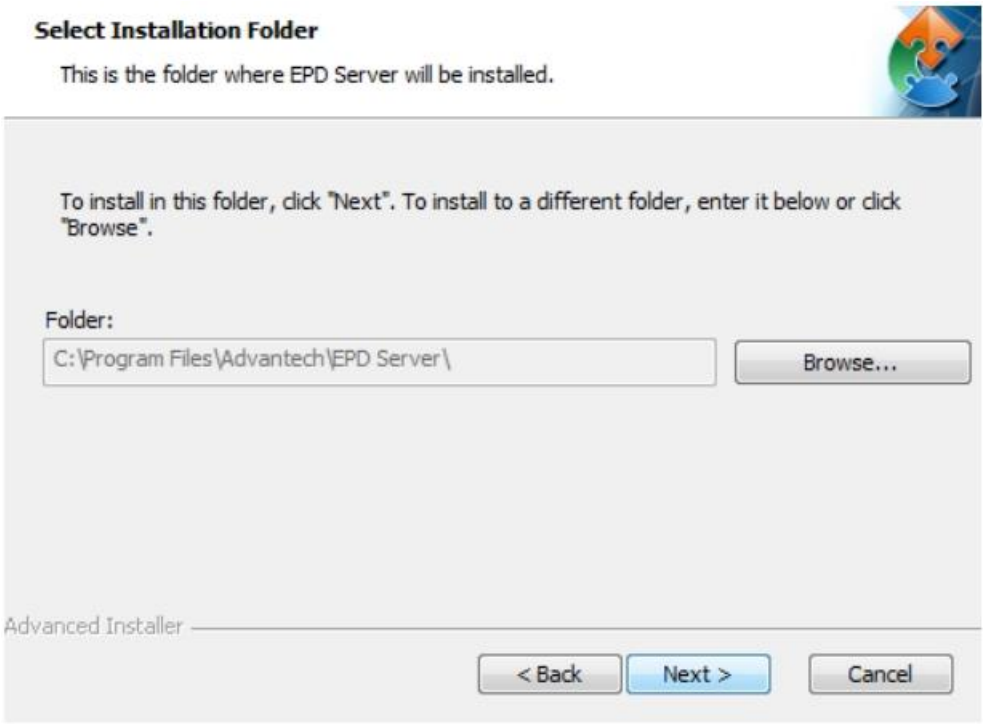




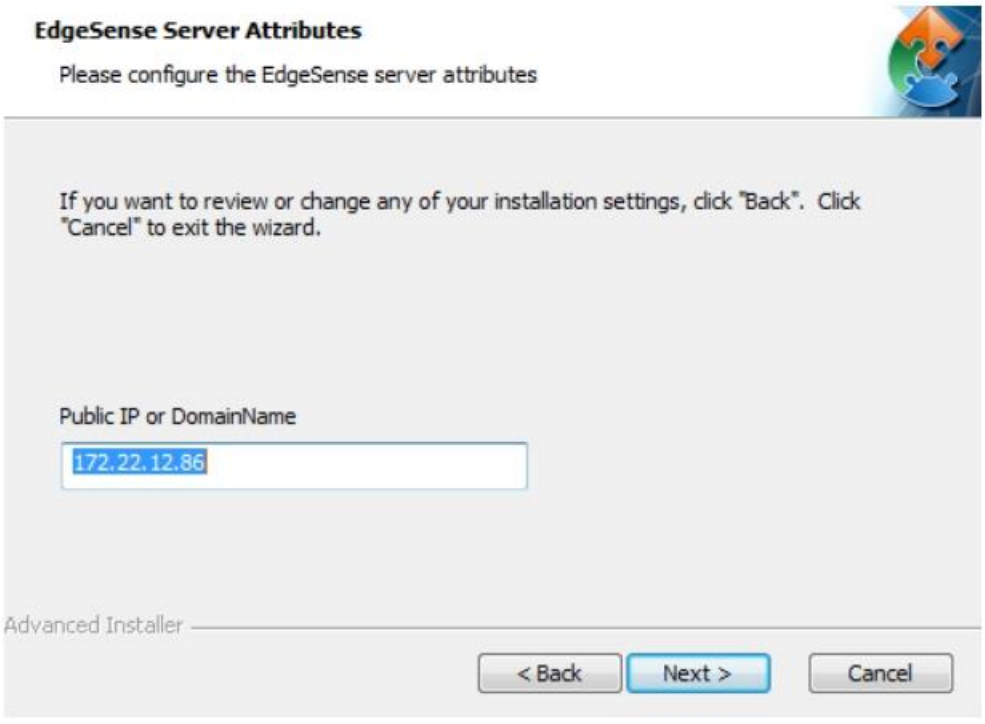
Windows hotfix of KB2999266 is required to run this software. Please download one from Microsoft website and execute it. (https://www.microsoft.com/zh-TW/download/confirmation.aspx?id=49093).

Microsoft Visual C++ 2015 Redistributable Update 3

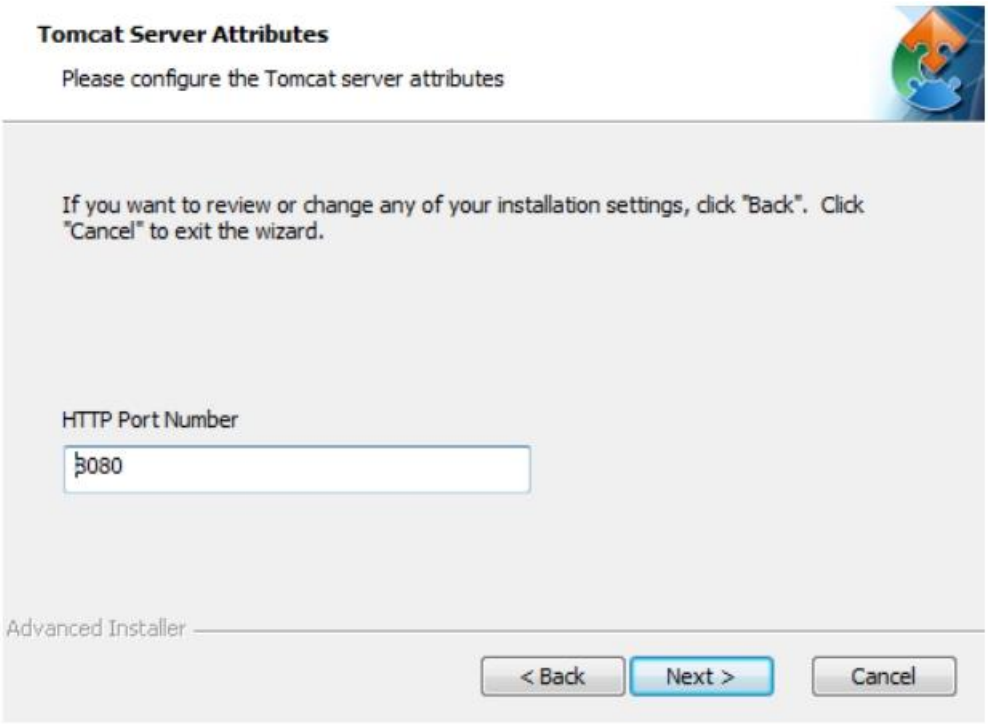
(https://www.microsoft.com/en-us/download/details.aspx?id=53840)



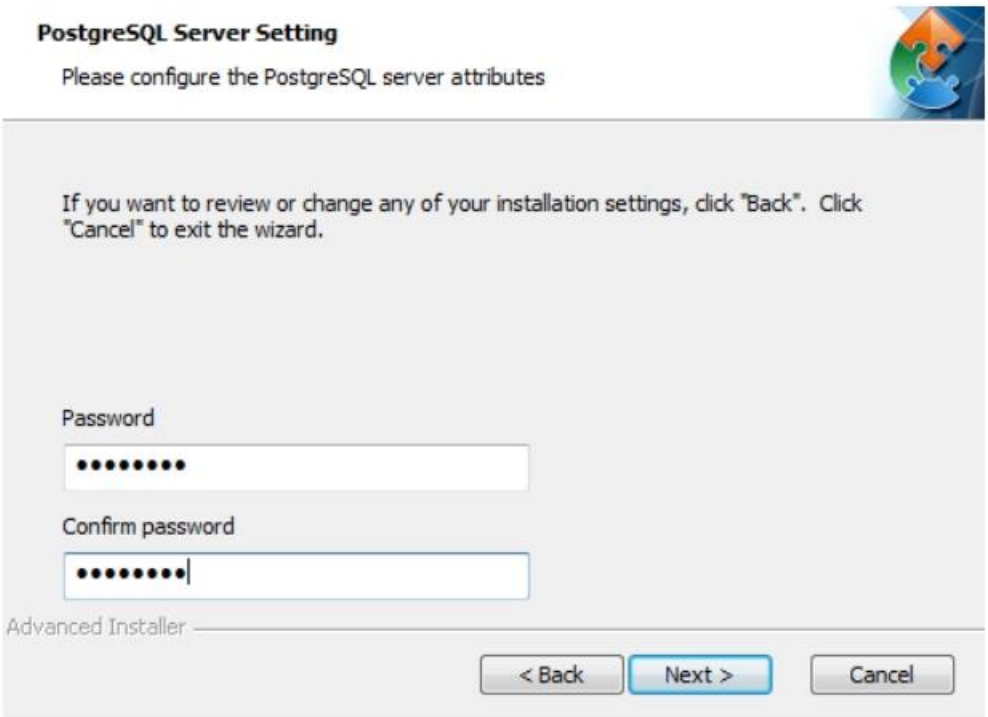
Please click the next button if you no need to change the default installation path.



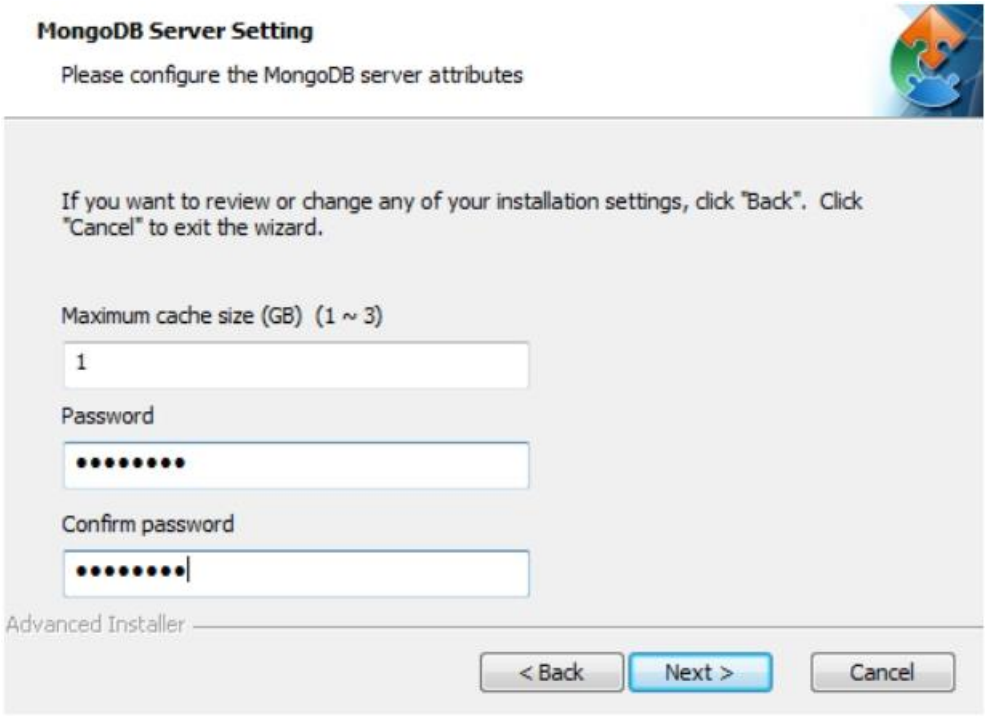
Please check your public IP or domain name and fill it in.



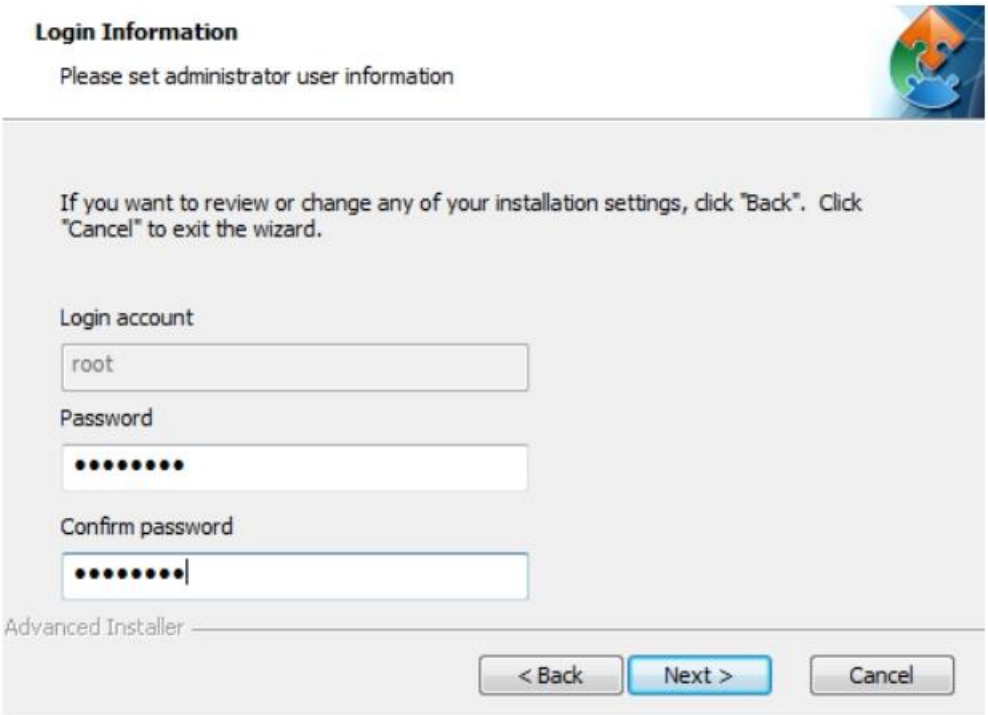
Please change the port number if need.



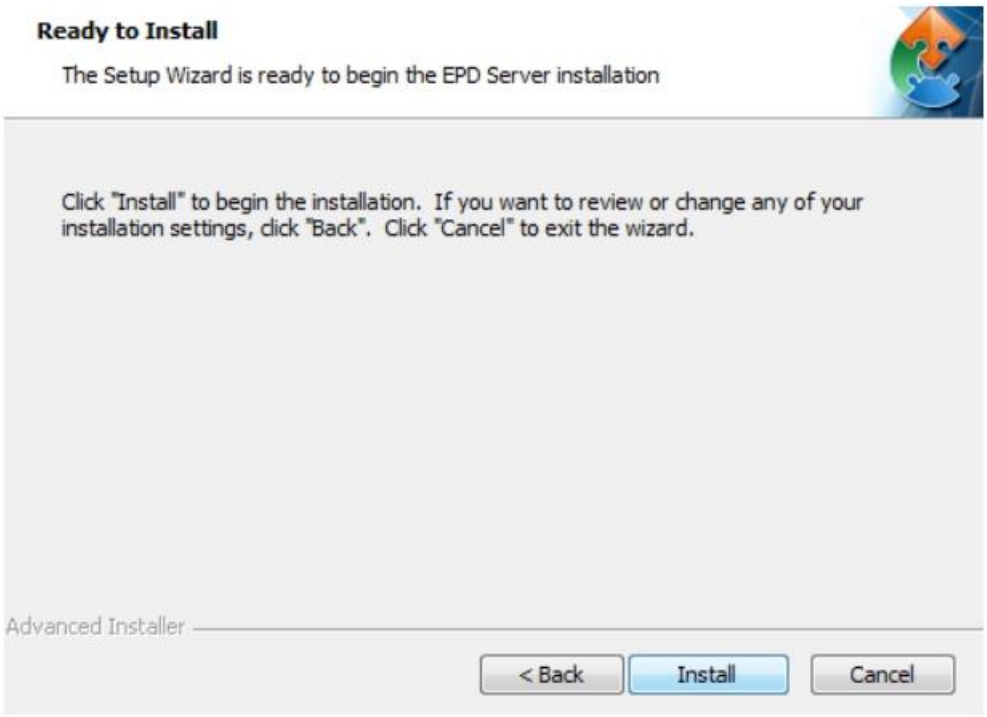
Please fill in the password and confirm password for PostgreSQL database.



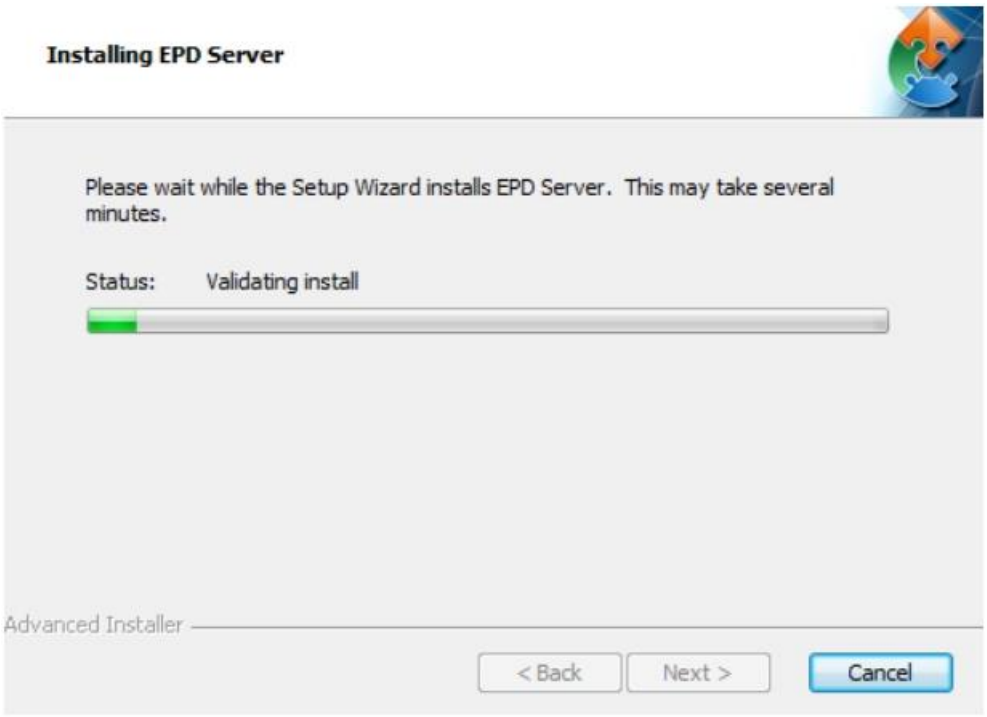
Please fill in the password and confirm password for MongoDB database.



Please fill in the password and confirm password for root administrator to login the server.



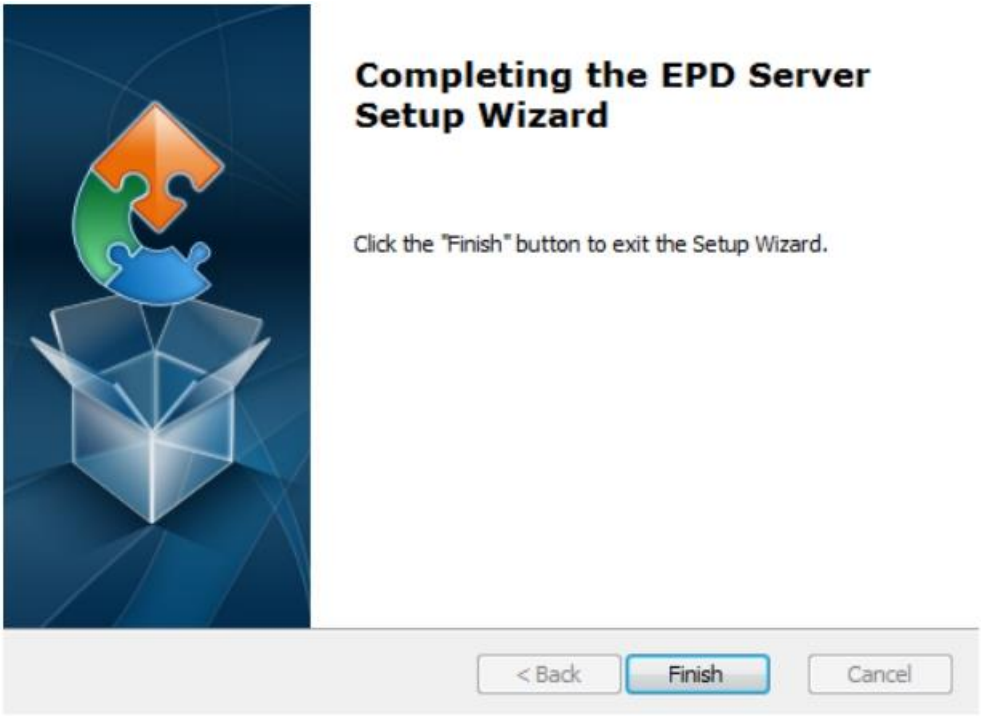
Please click the install button to start installation.



installing...

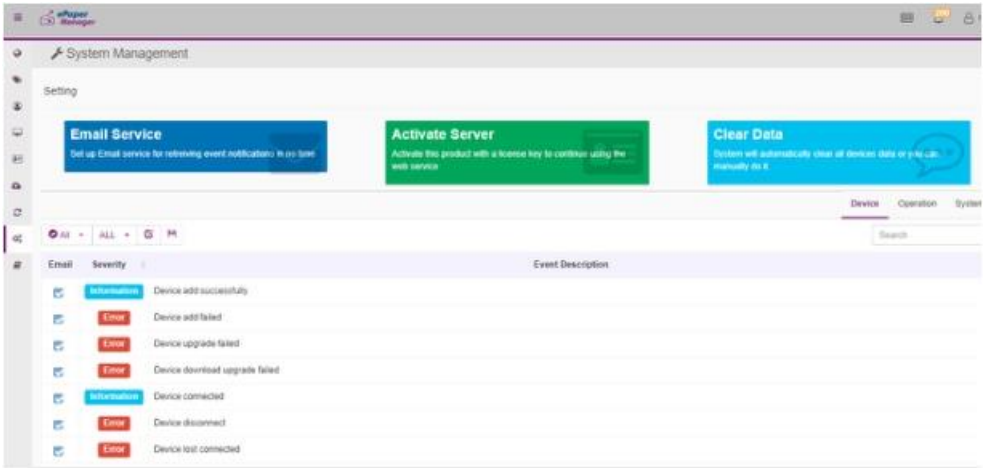
Please allow to access the installation of erl.exe.

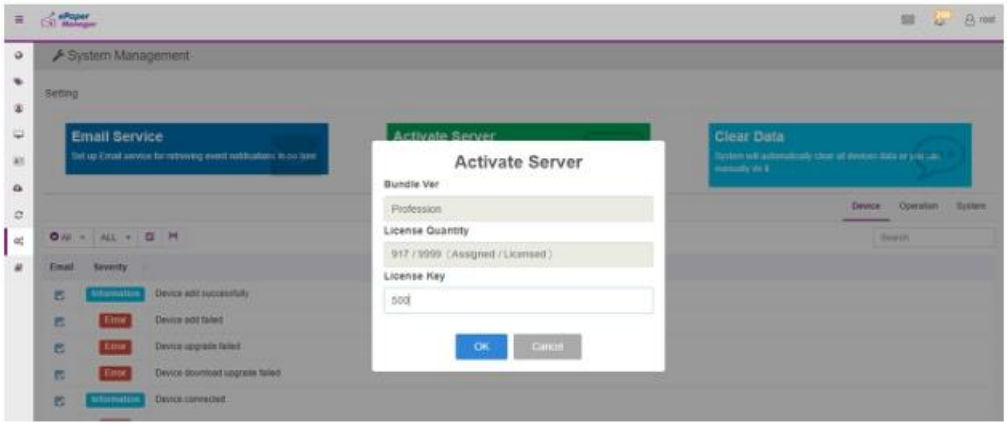
Please allow to access the installation of epmd.exe.



Click the Finish button to exit the Setup Wizard.

2. You will get a register key from our sales package. You will need to enable the key after installation of ePaper manager.




System Management
Setting
Email Service
Activate Server
Clear Data
Activate Server
Bundle Ver
Profession
License Quantity
917 / 9999 (Assigned / Licensed)
License Key
500
OK
Cancel

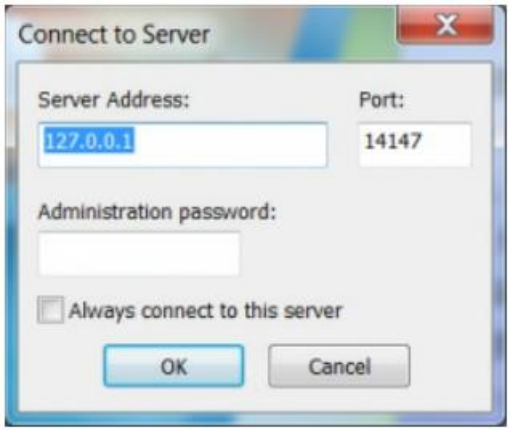
Activate Server
Bundle Ver
Profession
License Quantity
3 / 110 (Assigned / Licensed)
License Key
213243
342343
24234
OK
Cancel

Activate Successfully!
OK

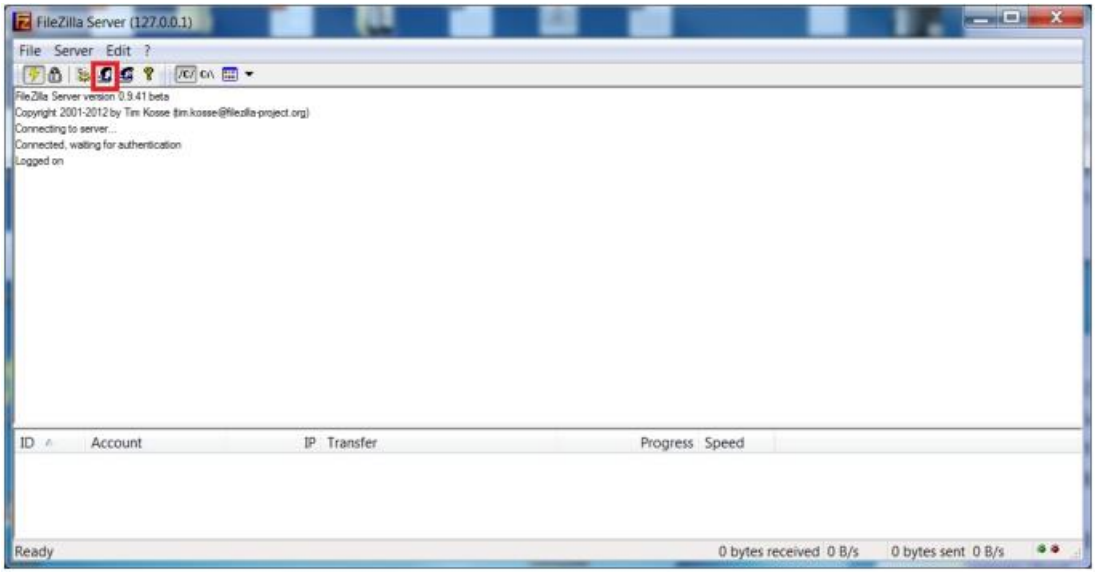
4.2.3.1 How to configure your FTP server

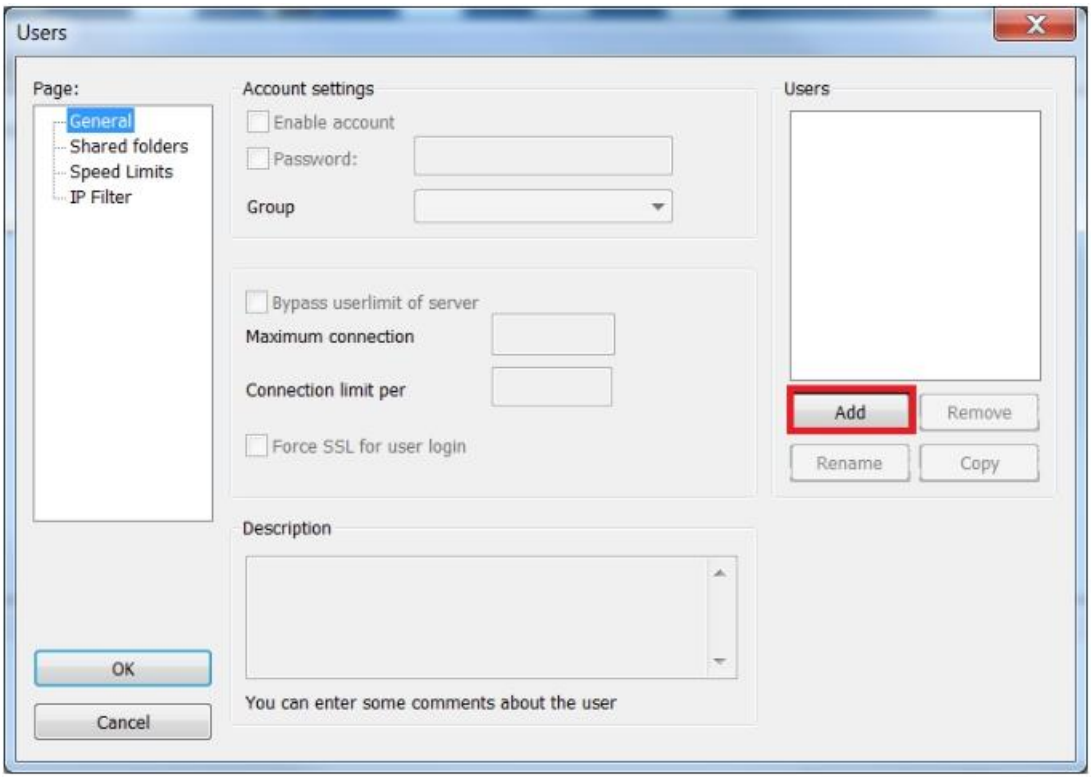
Before you start transmitting the image to the Electronic Paper Display (EPD) or offering Firmware upgrades, you need to setup ARK2250L as an FTP server. Click the startup icon to launch Filezilla.

1. Start configuring your FTP server.



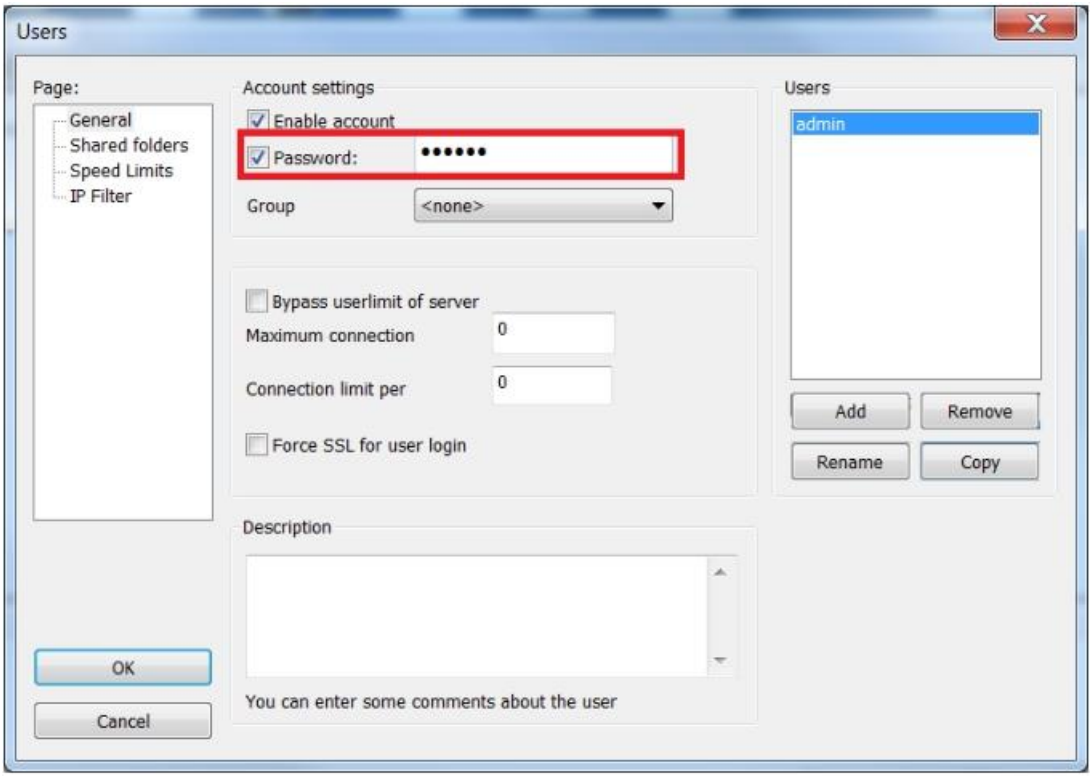
2. Add user account.



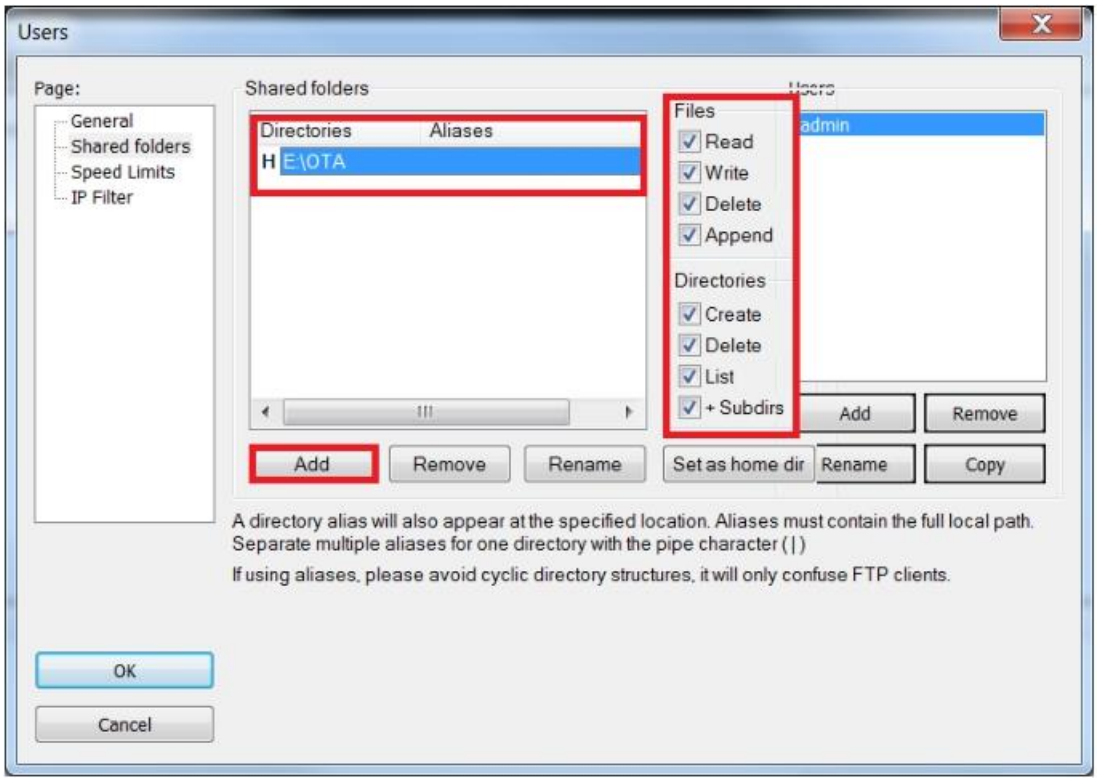

Users
Page:
General
Shared folders
Speed Limits
IP Filter
Account settings
Enable account
Password:
Group
Bypass userlimit of server
Maximum connection
Connection limit per
Force SSL for user login
Users
Add
Remove
Rename
Copy
Description
You can enter some comments about the user
OK
Cancel

Add user account
Please enter the name of the user account that should be added:
admin
User should be member of the following group:
<none>
OK
Cancel

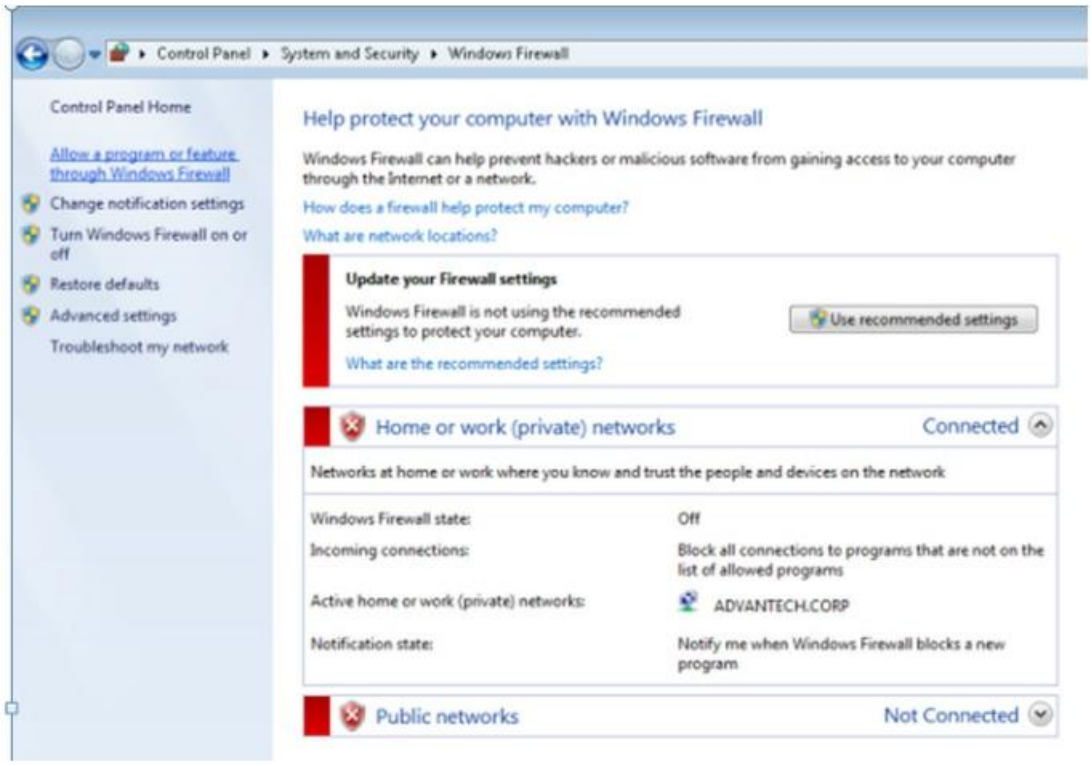
3. Add password for user.



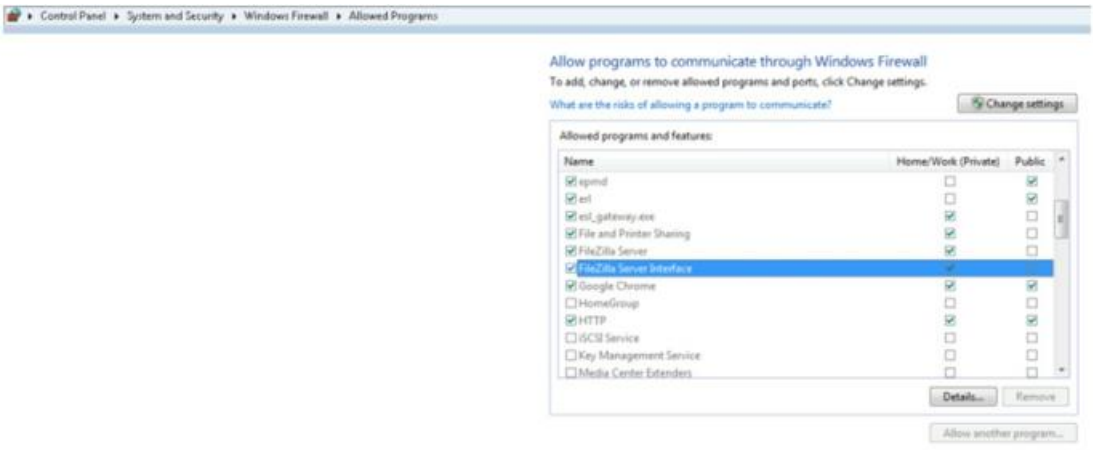
4. Add the shared folders and set the property of the directories and files. Add the FTP Server to OTA Storage. You should make shure that the shared folders are available.



5. Open Windows firewall setting and click allow a program or feature through Windows firewall.

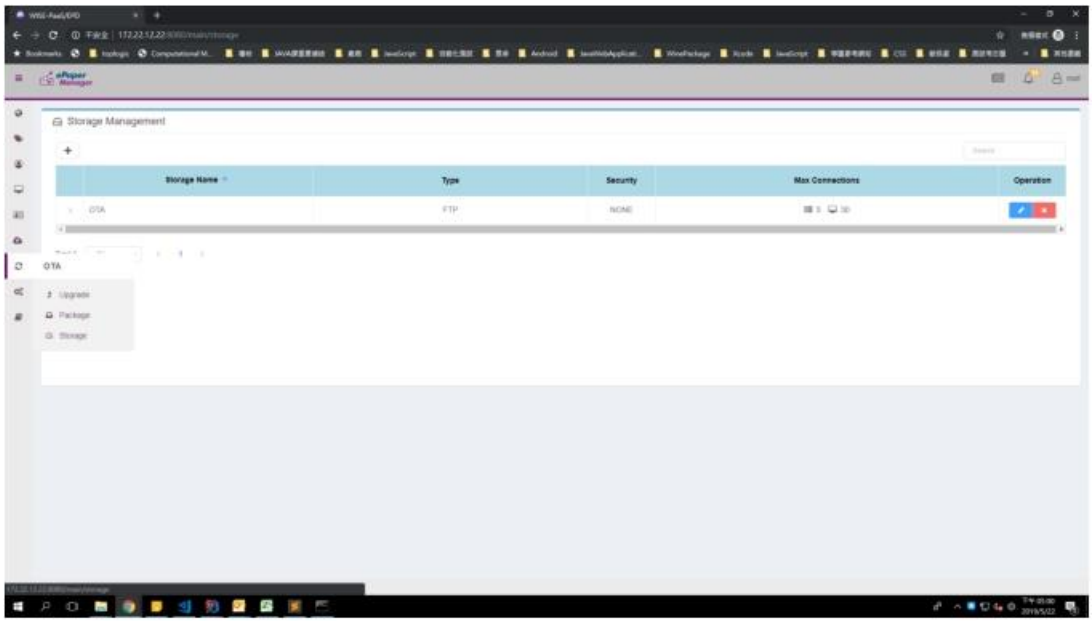


6. Make sure to allow FileZilla Server and FileZilla Server Interface to pass the Windows firewall.

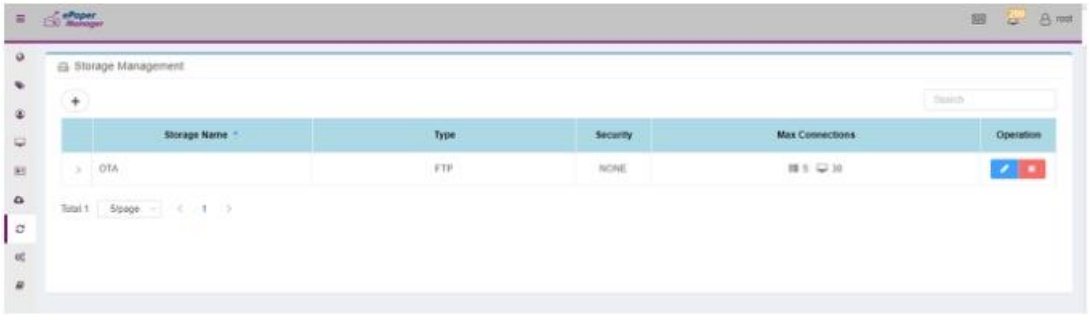


4.2.3.2 How to configure your FTP server on ePaper manager

1. Click Storage button to add a FTP storage for OTA and image delivery.



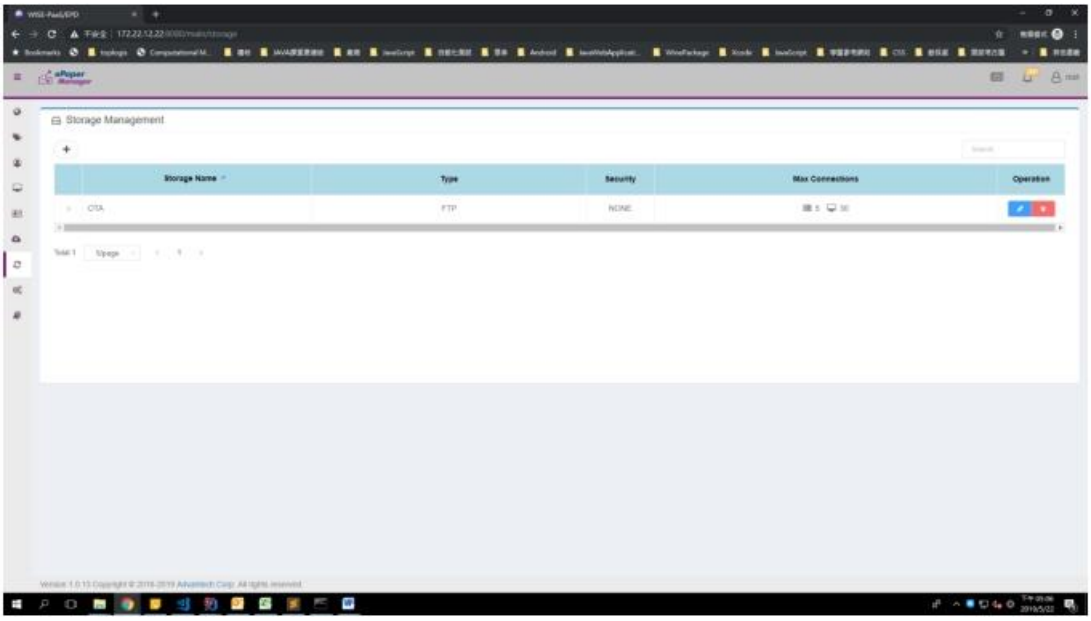
2. Click Add (+) button on the left-upper corner. Select the FTP option.



3. Finish the configuration form and click Confirm.

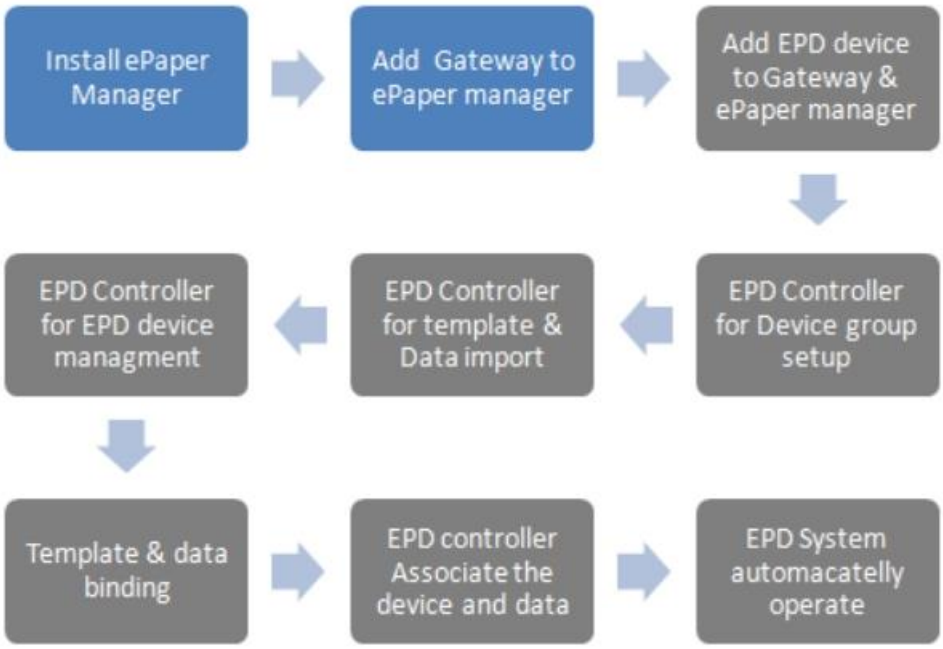
Storage Name: OTA
Security: NONE
Domain: [Your Server IP]
Port: 21
Account Name: [Your FTP account]
Password: [Your FTP password]
Root Path: [Your root path]

4. You will see an item in the Storage Management table.



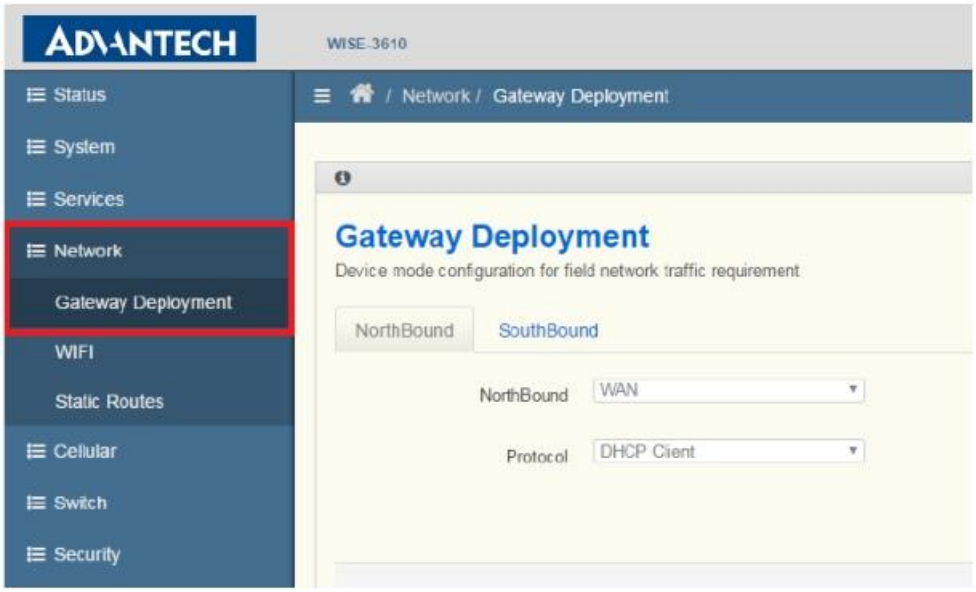
5. Open up the FTP port of the firewall in the OS.

4.2.4 WISE-3610W Setup and Connect to ARK with ePaper Manager

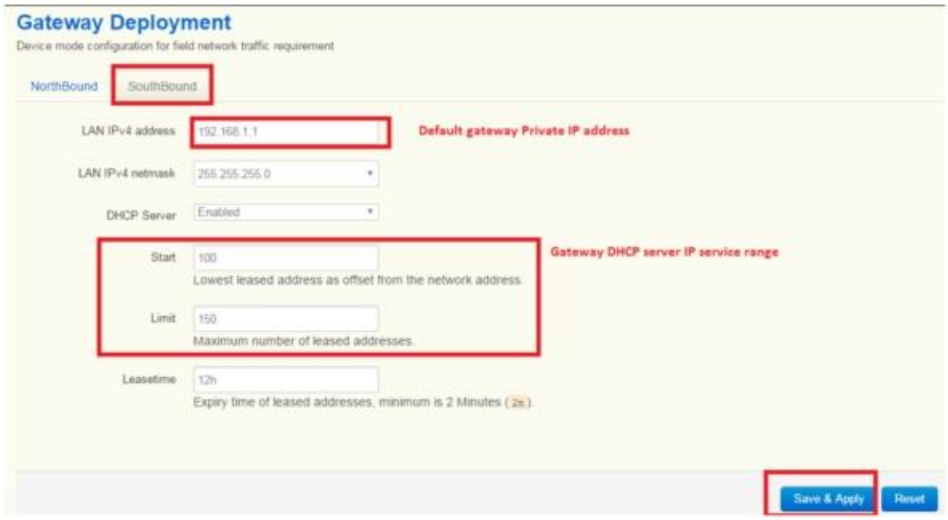


After completing the ePaper manager installation, start configuring the Gateway: WISE-3610W.

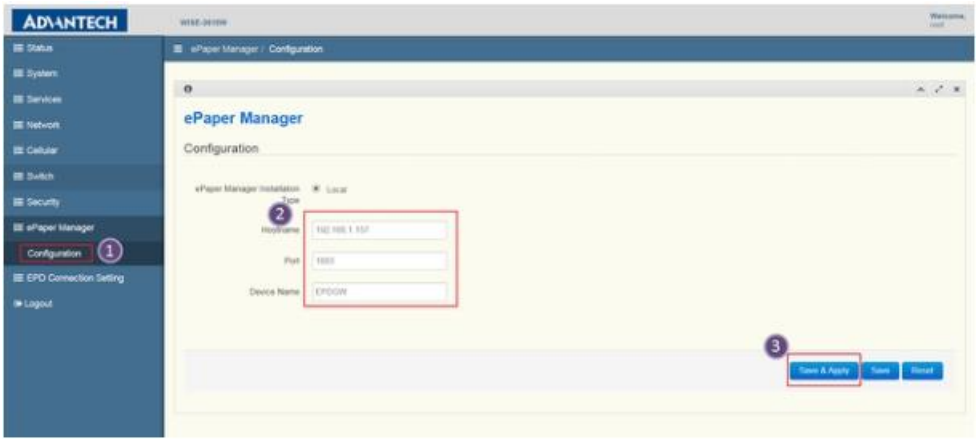
1. Power on WISE-3610W.
2. Open WISE-3610W management web page: Open a web browser (Chrome is suggested) and enter the IP Address http://192.168.1.1 or http://advan-tech.local/
3. Login: The default user name and password are **root** and **ePaper**. Click the Login button to open the web-based configuration page.
4. Build networking connection.



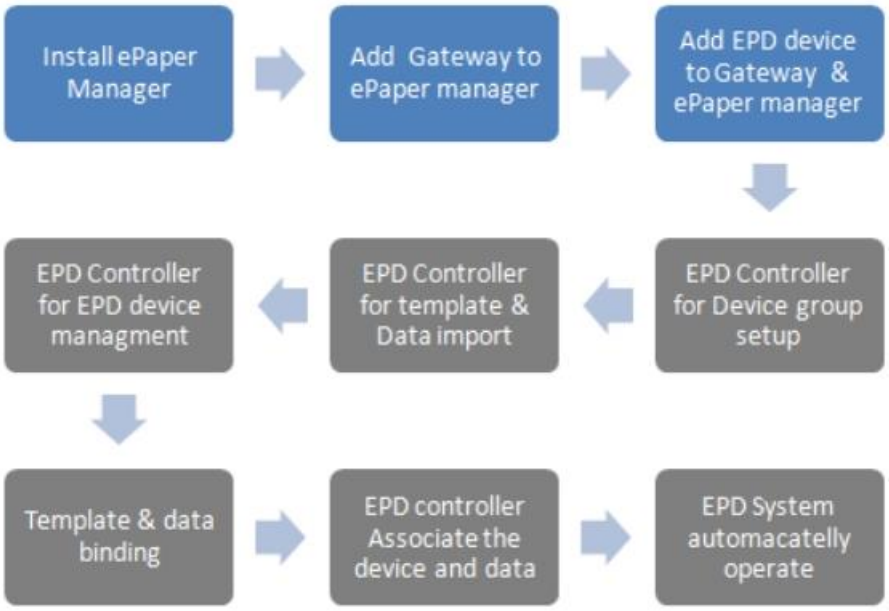
5. Ethernet WAN Backhaul Connection:
Connect an Ethernet cable to exiting backhaul router and ISP cable modem or Internet service provider xDSL / FTTx modem.
Select WAN for NorthBond backhaul connection and choose Protocol > DHCP Client



6. Setup the ePaper management server IP as shown below.

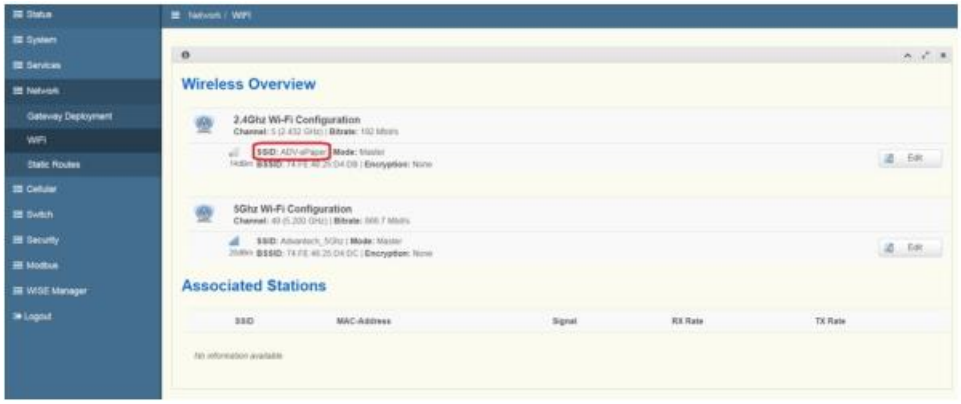


4.2.5 EPD-132 Setup and Connect to ARK with ePaper Manager



This explains how the router joins with the WISE-3610W (gateway). Users can understand what performance can be reached using our specification. The user can also change some parameters to fit their requirements.

1. Default WISE-3610W setting:
   a. SSID: **ADV-ePaper**
2. Password: **ePaperePaper**
   b. WISE-3610w login as shown below (root/ePaper)



3. Power on EPD-132
   a. Plug the Micro USB to provide the power.
4. EPD-132 join the network with SSID:
   a. Setup the SSID to join the network with APP in one device, refer to Chapter 4.3.

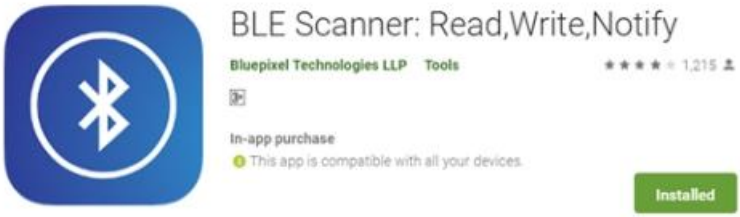
Note!

1. *The default SSID on WISE-3610W & EPD-132 will be the following: SSID: **ADV-ePaper**, Password: **ePaperePaper***
2. *Once WISE-3610W & EPD-132 powers on with the default SSID/ Password setting, EPD-132 will connect to WISE-3610W. EPD-132 will set the default Agent IP according to the Domain from gateway after connection.*
3. *EPD-132 may have changed the default SSID/Password in some cases and lost the connection with the gateway. Users need to maintain the EPD setting list in WISE-3610W before using the BLE tool to re-config the EPD-132's SSID/Password.*
4. *EPD-132 connects to ePaper manager of the ARK2250L through WISE-3610W's Agent. So we need to setup the Gateway's IP where the Agent is on EPD setting page, and EPD-132 can connect to the Agent via customer's AP router.*
5. *In summary, if EPD-132 only needs to change SSID/Password, users can use the BLE tool. If EPD-132 needs to setup the Agent IP connect to ePaper manager of ARK2250L, users need to use the tool on WISE-3610W refer to #4.2.6. with WISE-3610W/EPD-132 default setting: SSID: ADV-ePaper, Password: ePaperePaper.*

Configure Wi-fi setting through BLE

BLE-WiFi introducer service is a demonstration to setup SSID and password to join a network by smart phone. EPD-132 will be paired via a BLE GATT server with the smartphone.Then you can start your Wi-Fi security setting.

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

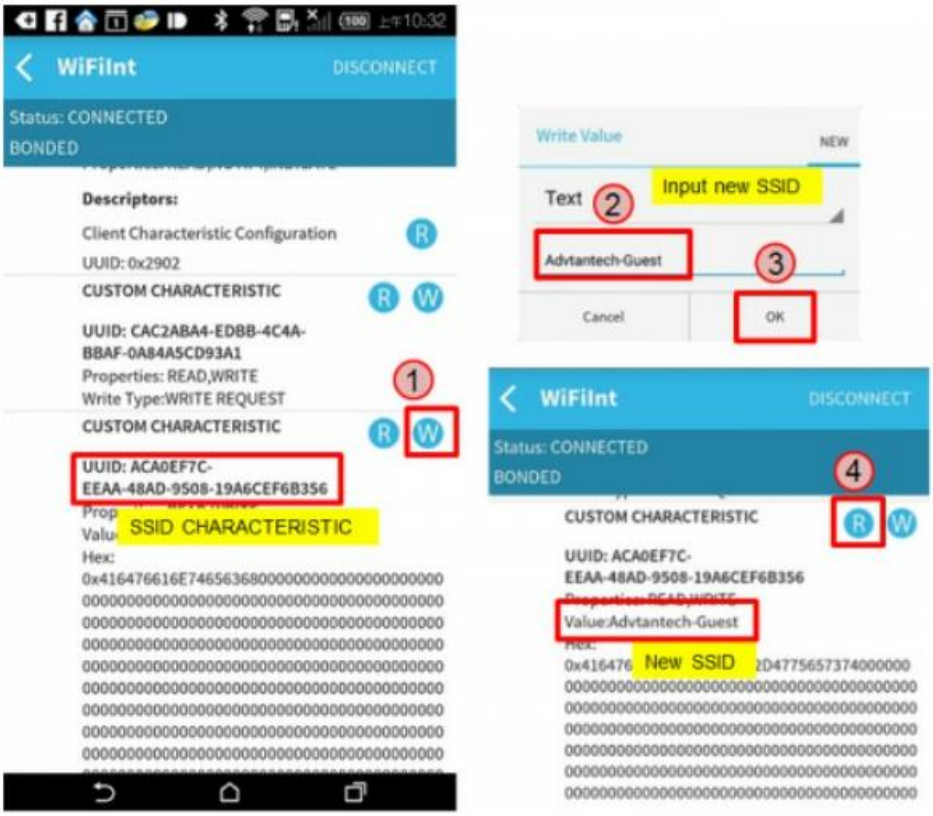


Step 2: Pull down the screen to rescan devices and it will list nearby BLE devices. Find the "WiFiInt" device and press the CONNECT button.

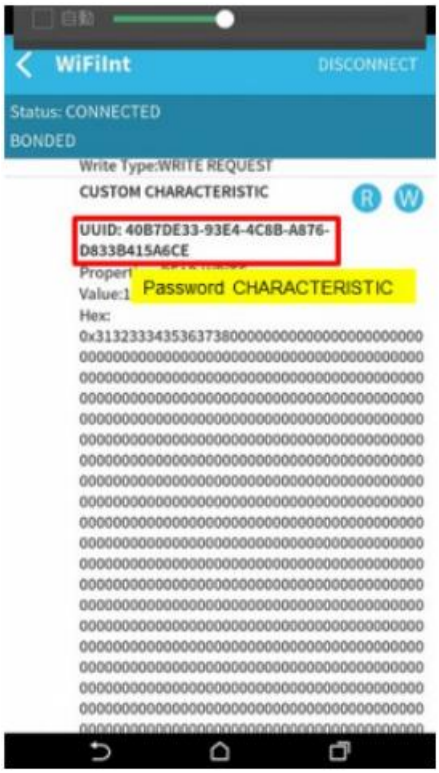
Step 3: If the connection is successful, you can see the picture below. Press the "CUSTOM SERVICE" button.

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

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



Step 5: Find the UUID: 40B7DE33-93E4-4C8B-A876-D833B415A6CE for Password characteristics then procedure as Step4.



b. Setup the batch file WISE-3610W installer
   i. See chapter 4.2.6

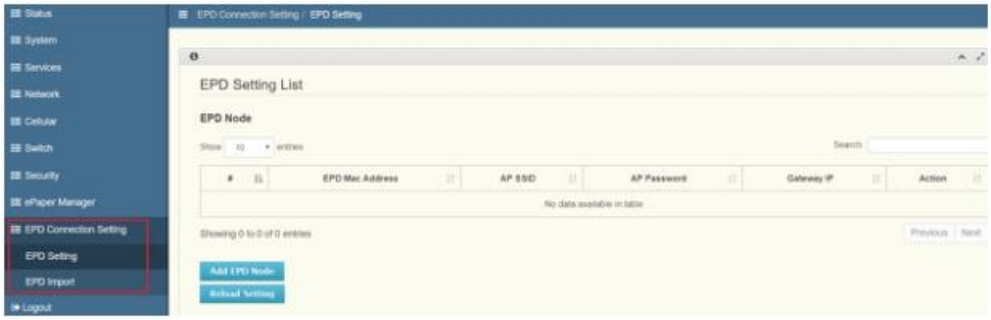
4) EPD-132 will report status every 1 mins (adjustable)

4.2.6 Setup the Batch File WISE-3610W Installer

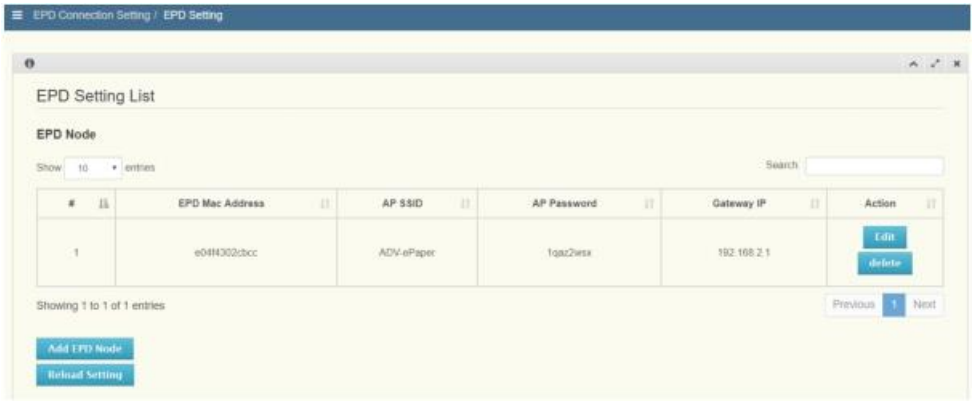
1) EPD Connection Setting

EPD Connection Setting feature is for users to wirelessly setup the group EPD SSID/ Password/IP and connect to a dedicated Router /gateway.

There are two functions: "EPD setting" and "EPD Import" in EPD Connection Setting as shown below. "EPD setting" is the setting feature for each EPD manually. "EPD Import" is the feature to import a batch file for the system to setup the EPD group automatically.



In EPD setting, users can add EPD node one by one in this page. EPD Setting as shown below.



2) EPD Setting

Below shows the EPD device information, including EPD device's Mac address, router SSID/password and Gateway IP. Though the default values are the same as below, the system offers four operations *add node/edit/delete/reload* settings as shown below.

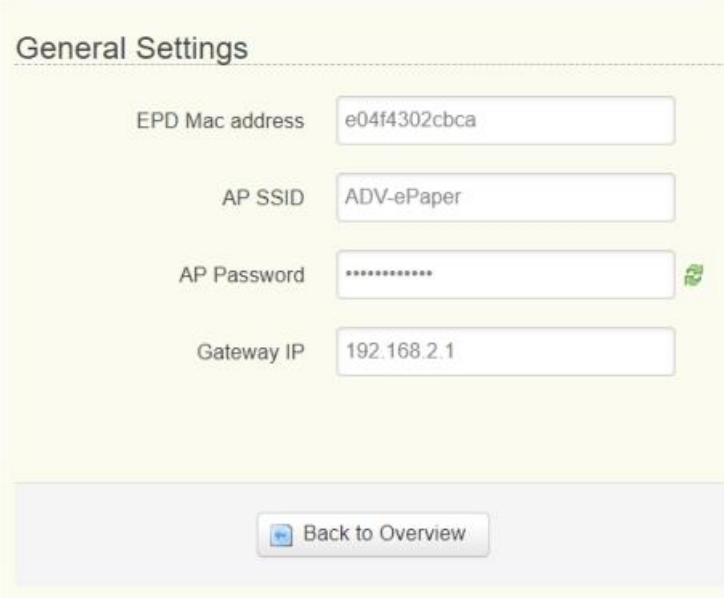
a. "Add EPD Node" button: Turns to general setting page as shown below. Users should see four written parameters.

i. EPD Mac address: Users can find Mac address on the sticker label on EPD node and Mac address is a string A to F, 0-9 and string length is 12 byte.

ii. AP SSID: SSID is the user's AP router.

iii. AP Password: Password is defined on the user's AP router and string length is more than 8 bytes.

iv. Gateway IP: This gateway IP is the 3610W WAN port IP address. Users can find this information on web page of Status->overview.



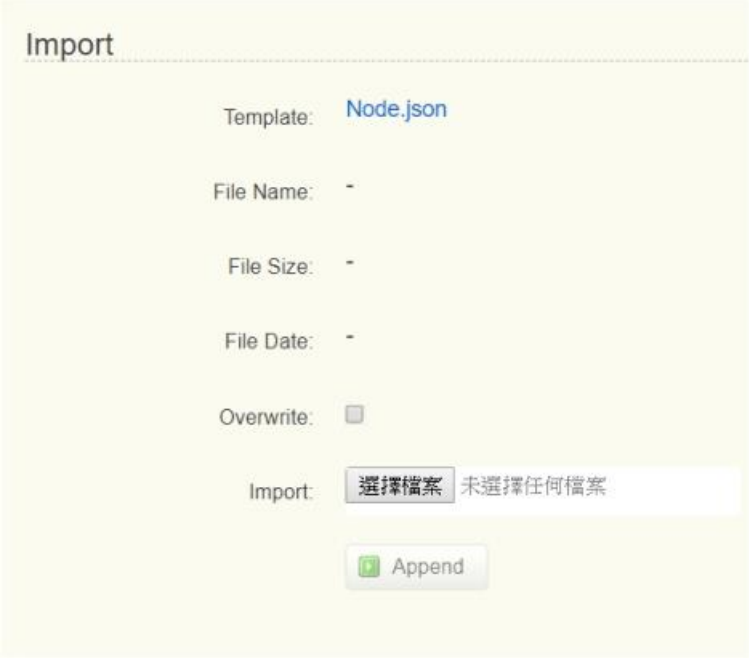
b. Button "Edit" : It return to general setting page to modify these settings.

c. Button "delete": The setting Items of the EPD are deleted directly after clicking the button.

d. Button "Reload Setting" : All EPD settings must choose the "Reload Setting" button for the system to apply it.

3) EPD import

1. When multiple EPD devices need to be added into the EPD list, users can import a batch file to set it up. The file format can reference the template Node.json on the web page as shown below.



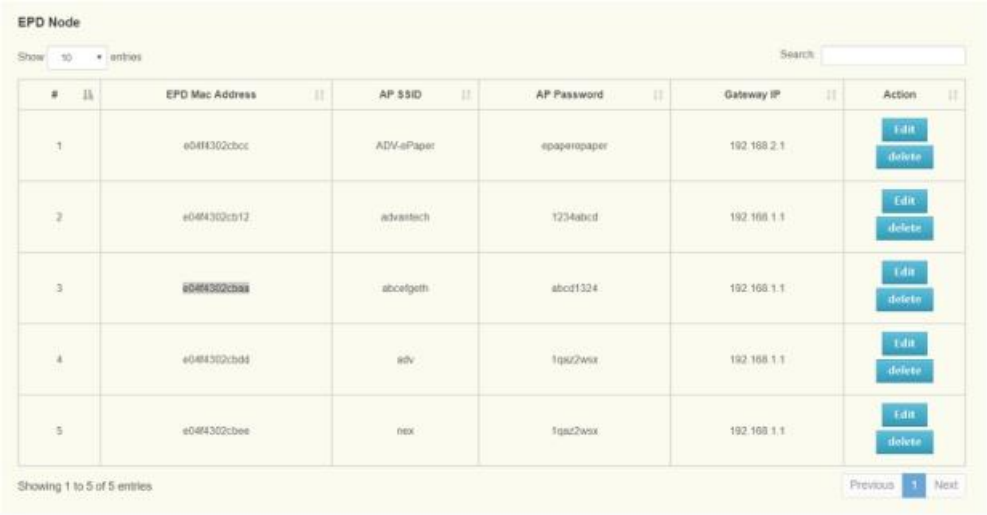
As shown in the red box below, EPD nodes have four attributes representing EPD Mac address, AP SSID, AP password and gateway IP address respectively, and users should follow the format below .

```
[
        {
        "Metadata" : ["TagMac", "Tagssid", "Tagpswd", "Taggwip"],

        "Tag"     : [
                        ["e04f4302cb12", "advantech", "1234abcd", "192.168.1.1"],
                        ["e04f4302cbaa", "abcefgeth", "abcd1324", "192.168.1.1"],
                        ["e04f4302cbdd", "adv", "1qaz2wsx", "192.168.1.1"],
                        ["e04f4302cbee", "nex", "1qaz2wsx", "192.168.1.1"]
                    ]
        }
]
```

2. If the file uploads successfully, EPD device information is shown on screen. If the information does not display on the web page , please check file content for any error symbols.

After importing files, users should click "Reload setting" to let the system apply it.



4.2.7 Hands-on Batch File WISE-3610W Installer

1) EPD Setting

Installer SOP. Follow these 3 steps

Step 01: click "EPD Connection Setting" ->" EPD Setting"-> "Add EPD Node "on web page

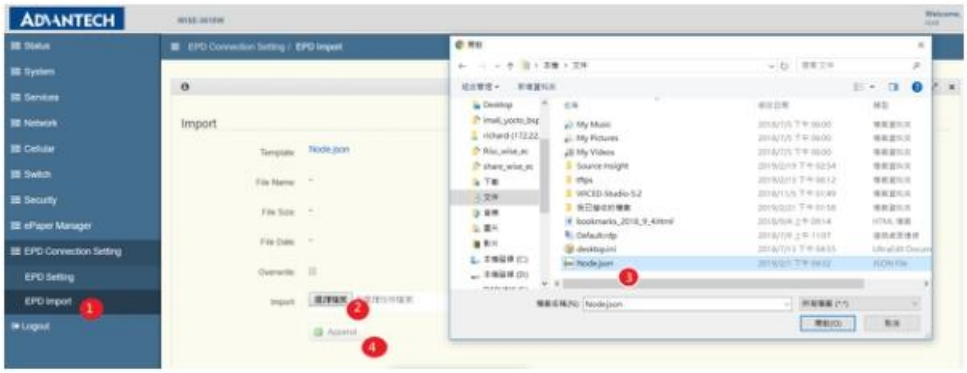
Step 02: Fill in the corresponding information of the EPD Mac address, AP SSID, AP Password, Gateway IP then save & apply.

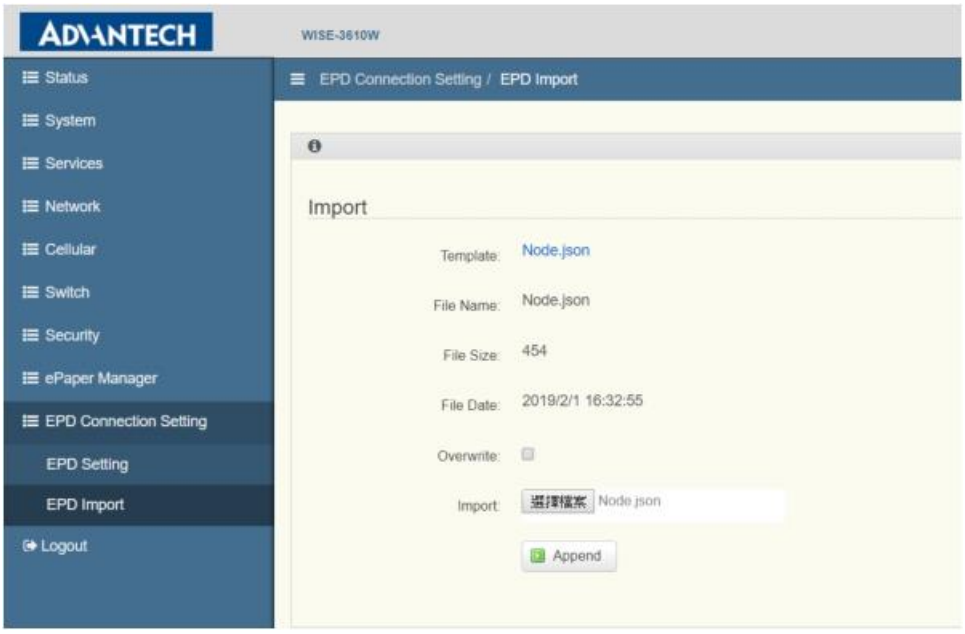
Step 03: Click Reload setting button

2) EDP import

Installer SOP. Follow these 2 steps to import the file.

Step 01: Click "EPD import"->choose file->Append



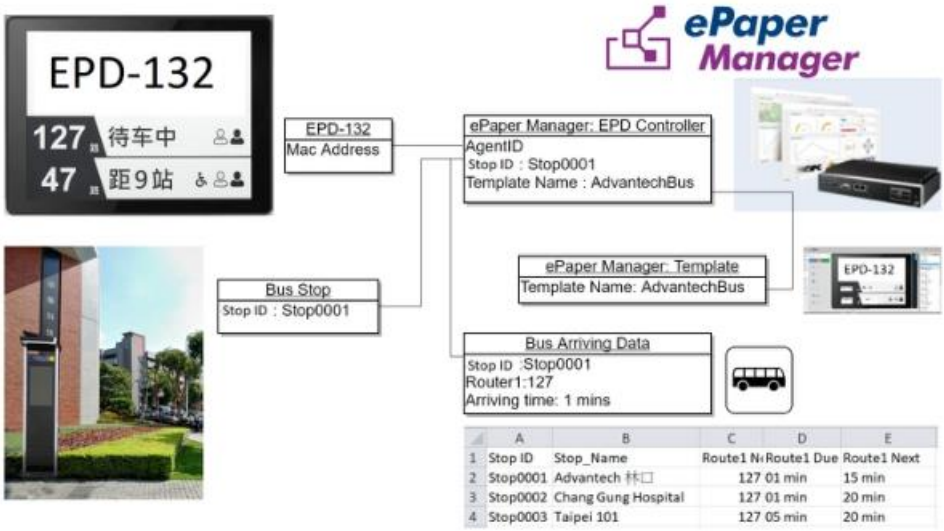


Step 02: Click Reload setting button

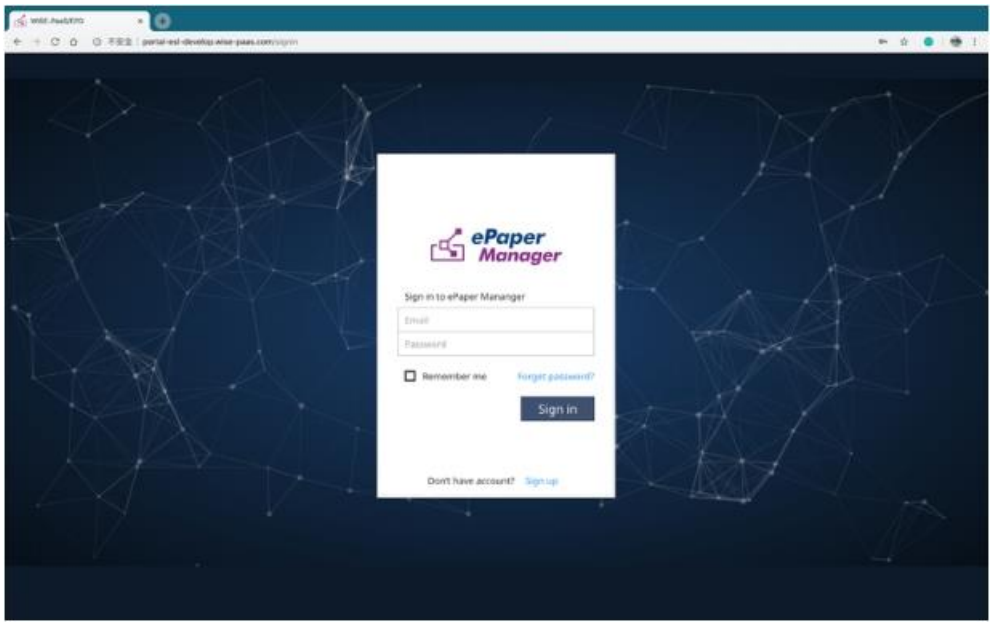
4.3 Hands-on EPD Device on ePaper Manager

The user needs to prepare before starting the ePaper manager/EPD controller as shown below.

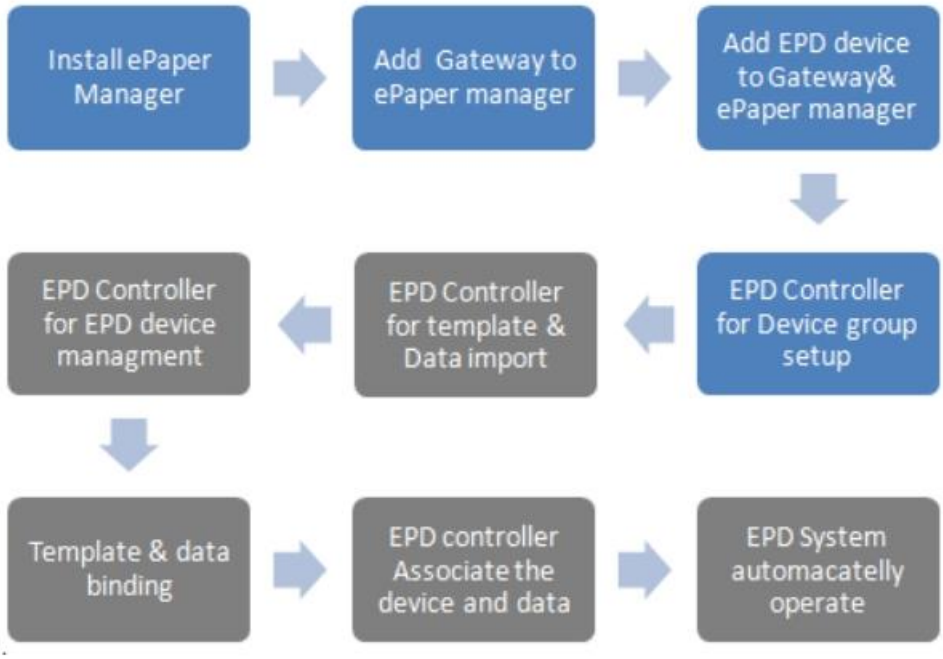
1. EPD device mac address.
2. Target Item description data which needs to contain a unique ID as the key, e.g. StopID.
3. Target Item ID as the key, e.g. StopID.
4. EPD device screen typesetting as in the EPD image template.



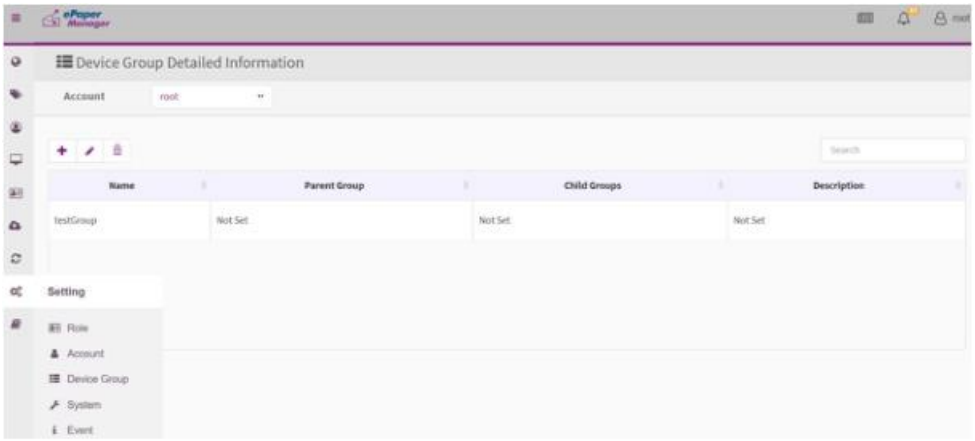
4.3.1 ePaper Manager Login



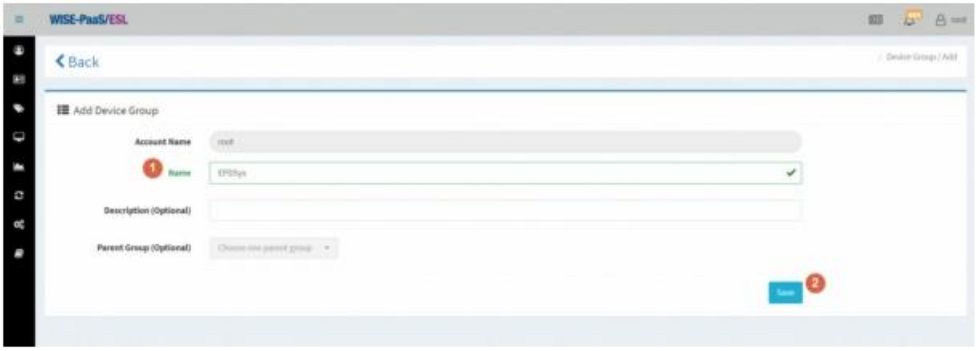
4.3.2 Add Group & Device into ePaper Manager



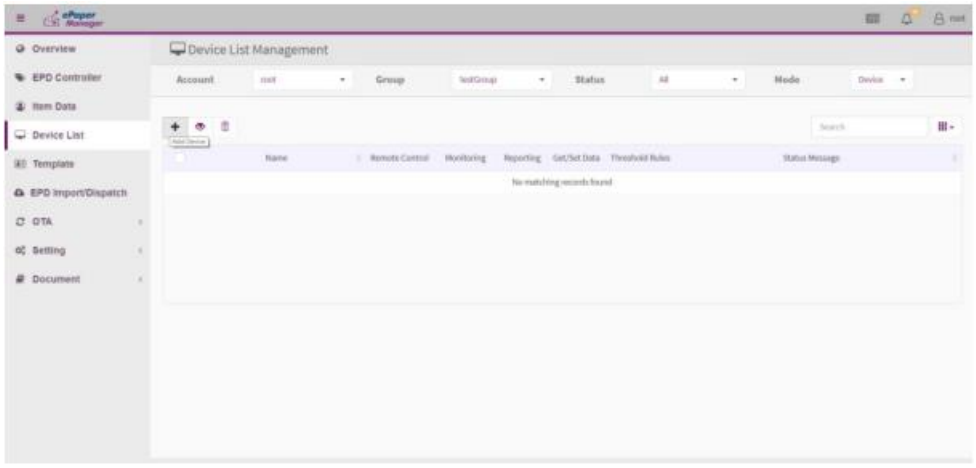
1. Legal ePaper device joins the network
2. Create group & edit group information

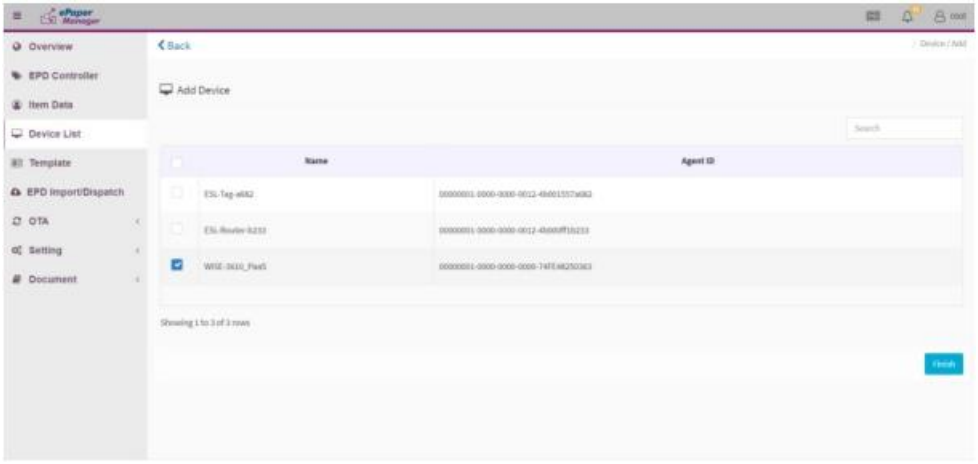


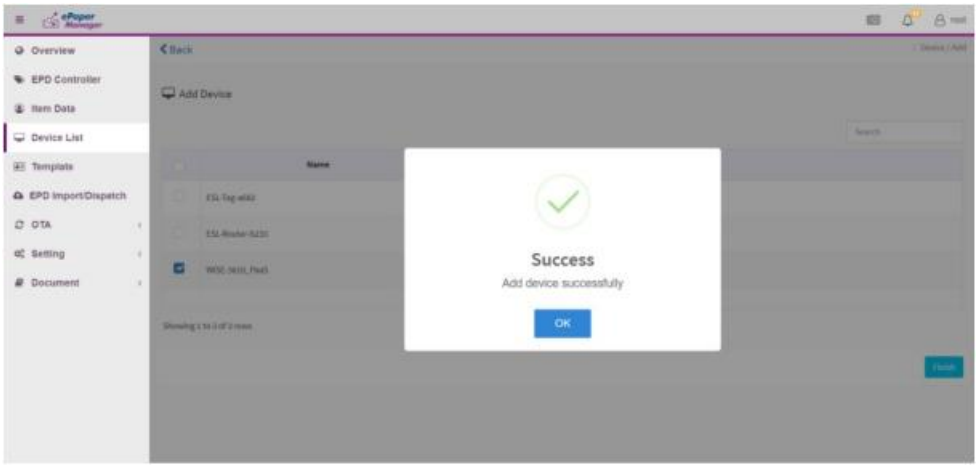
3. Add Group



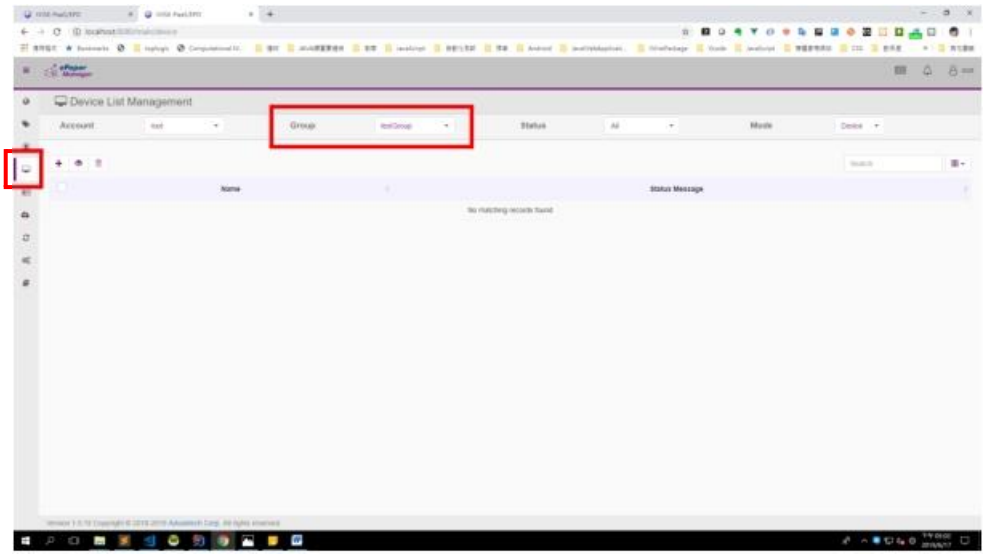
4. Add Gateway / EPD device to Group.



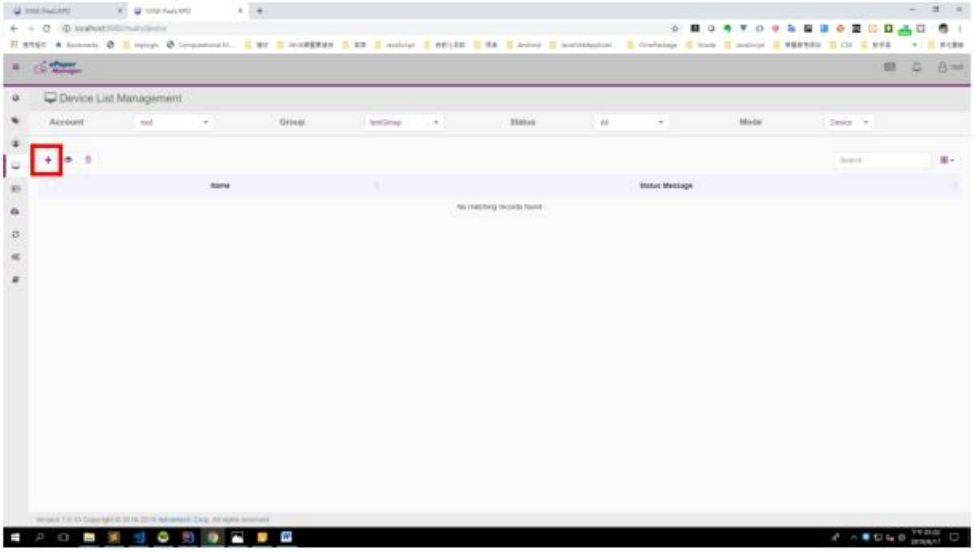




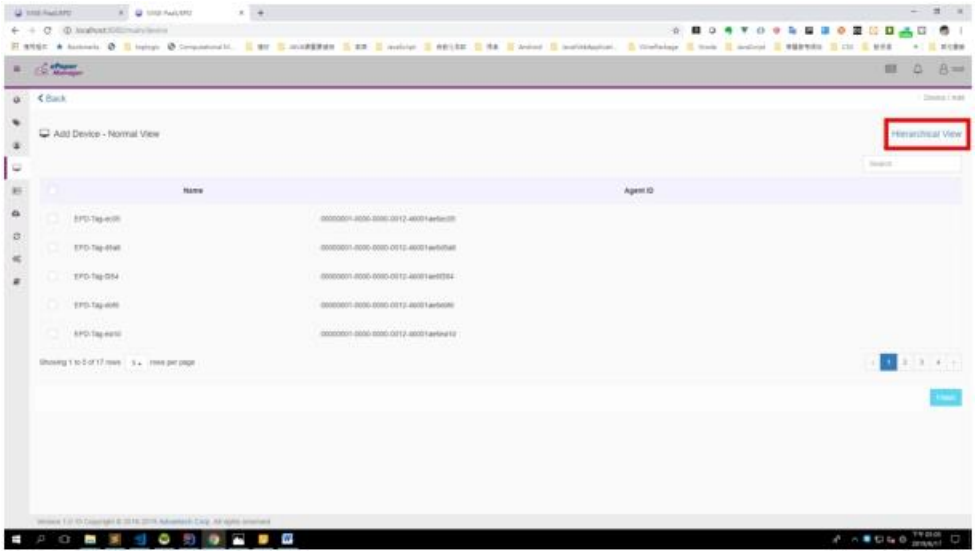
5. Add Device into a Device Group
1) Click Device List on the side bar menu, and select the device group you want to add devices.

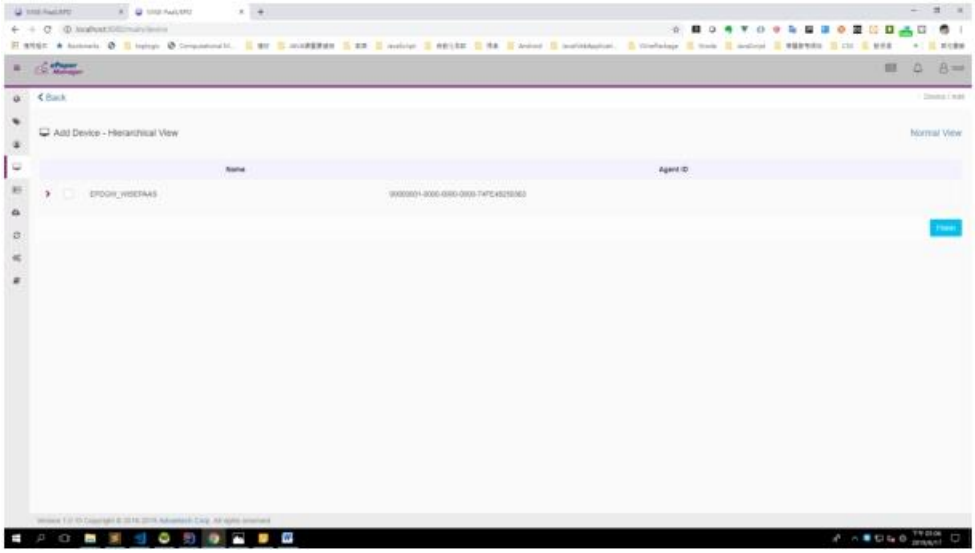


2). Click add button on the top-left corner.

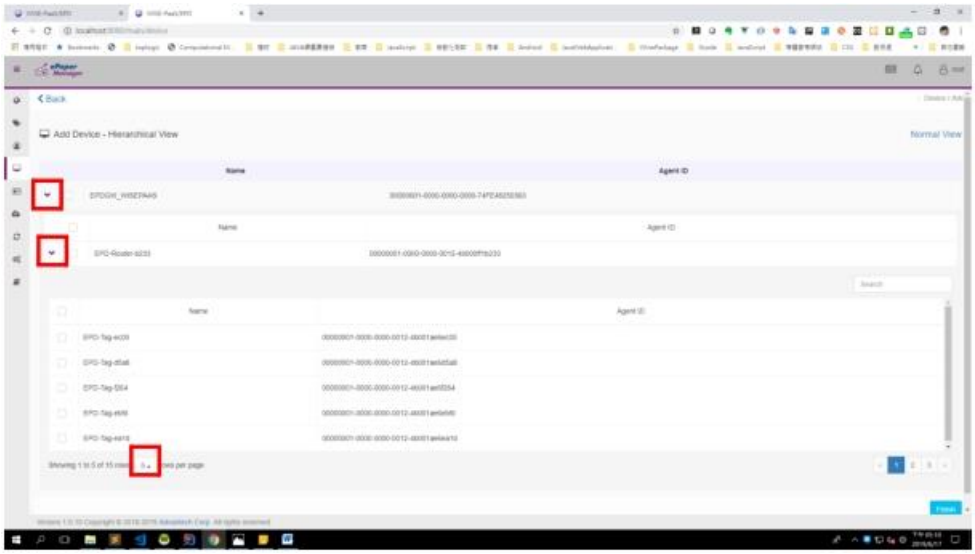


3). Choose the Hierarchical view. (If you have finished the White List Setting previously, you will see the devices grouped under a gateway.)

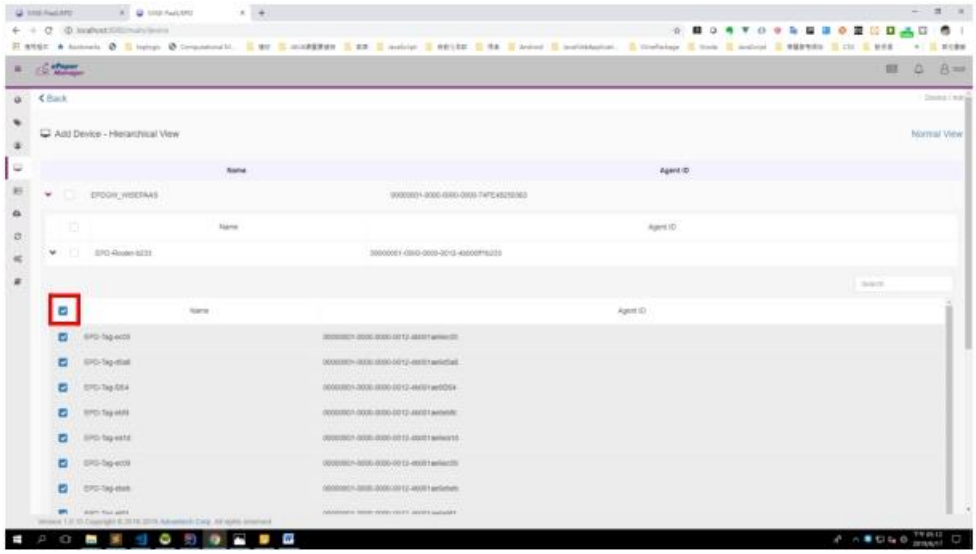




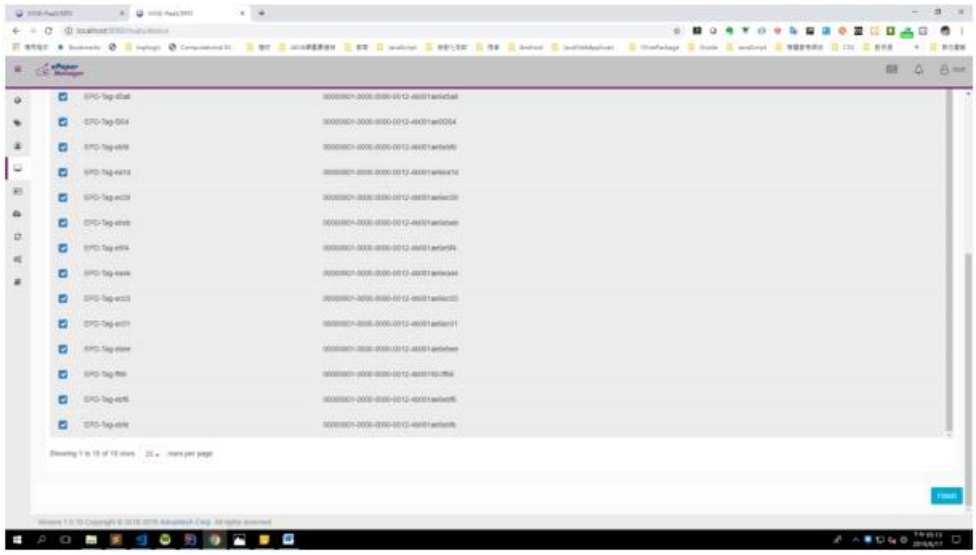
4). Open the hierarchy until you see the device. Change the show number in order to select all devices under this gateway.

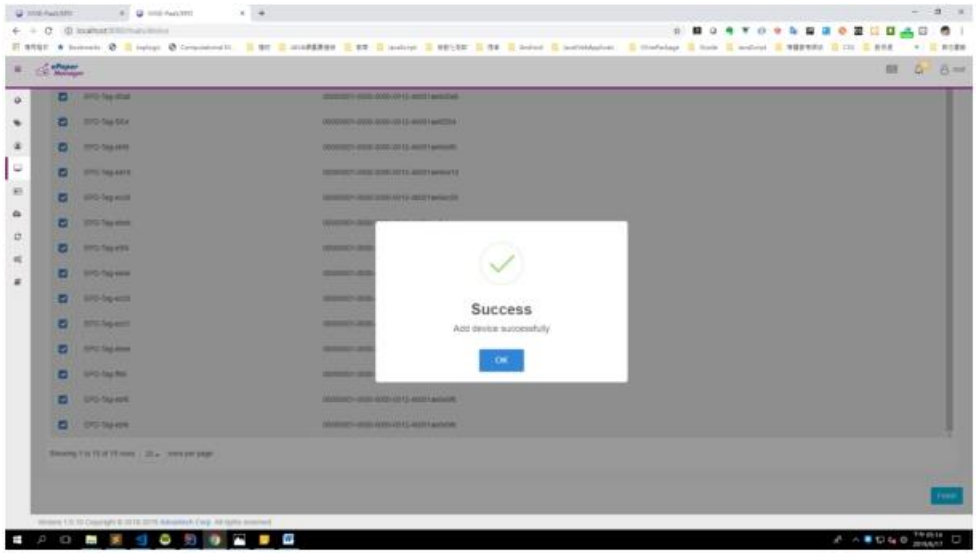


5). Select all by clicking the checkbox above.



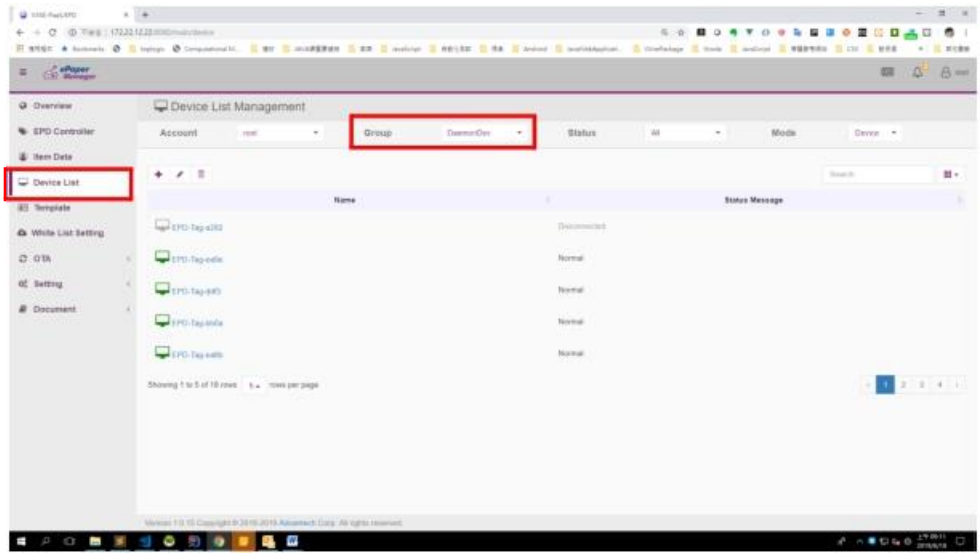
6).Click the finish button to finish the selection.



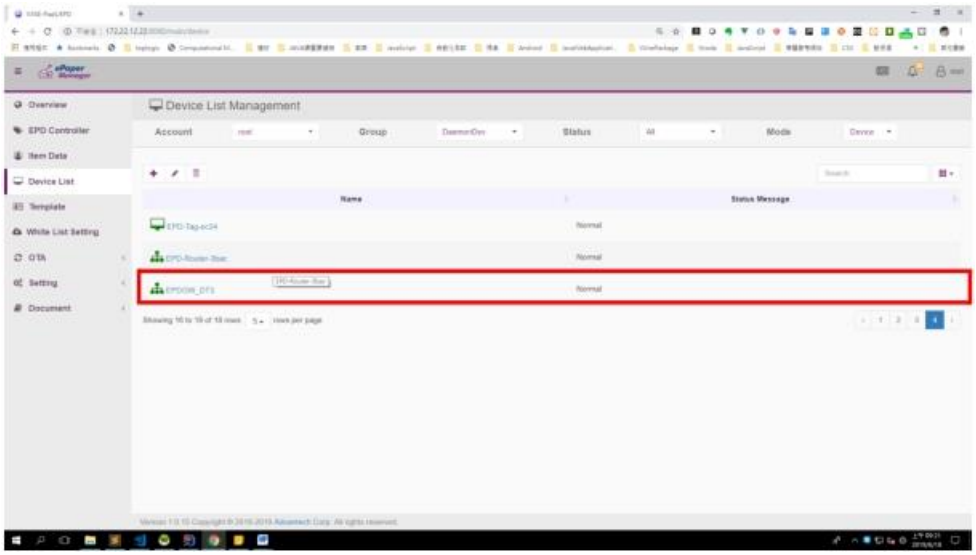


6. Set Gateway Encrypted Key

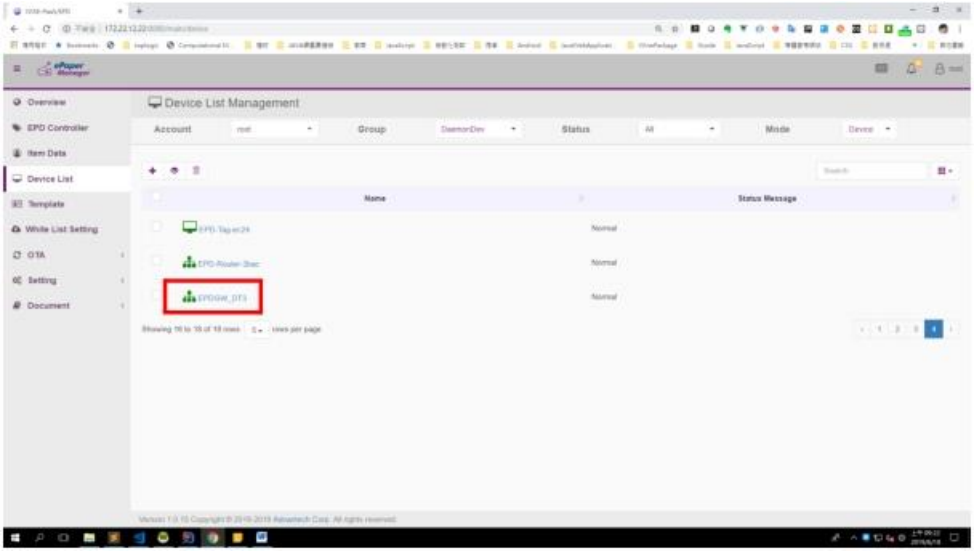
1).Click Device List on the side bar menu, and select the device group with the router.



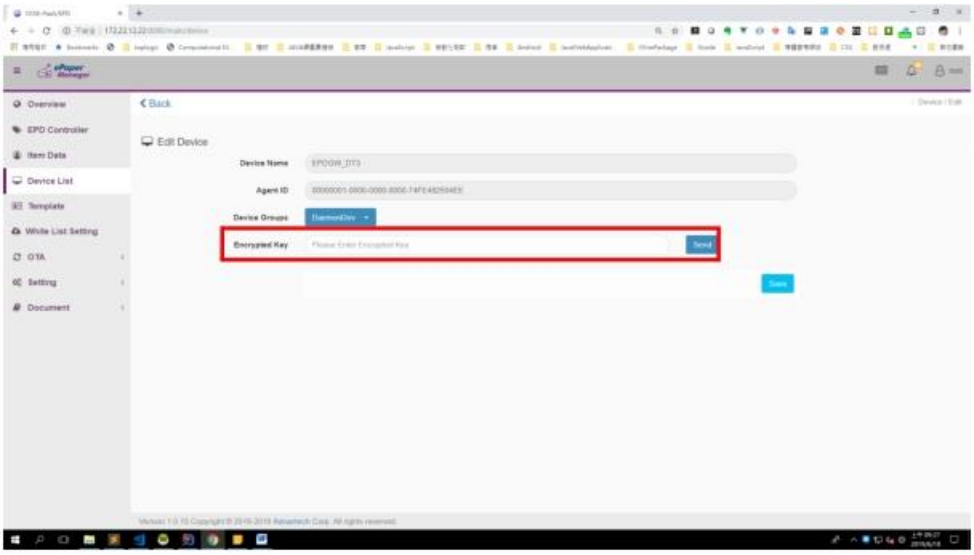
2). Find the gateway device, and change to edit mode by clicking the edit button.



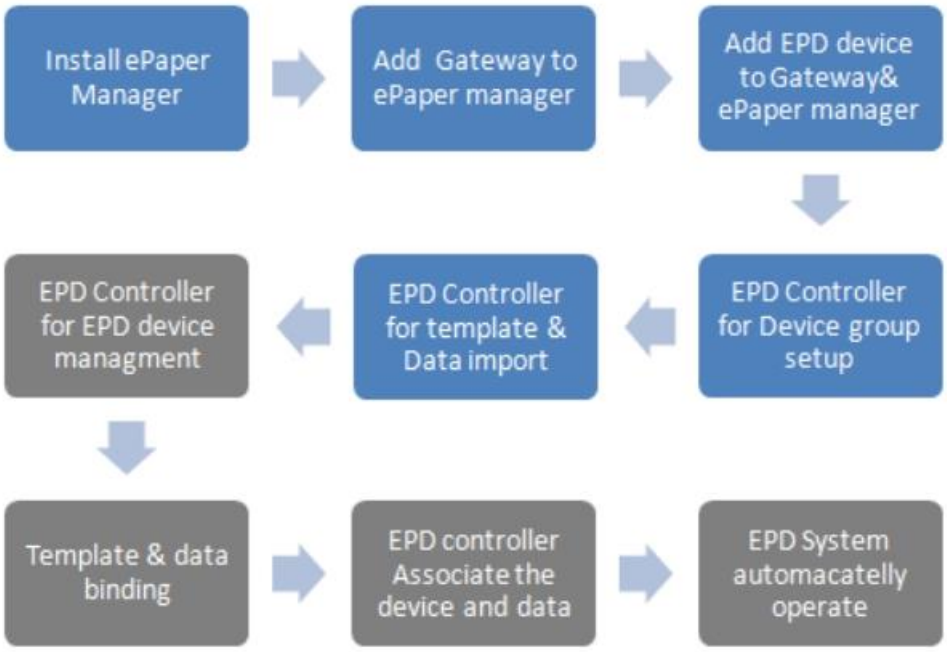
3). Click the name of gateway device to enter edit mode.



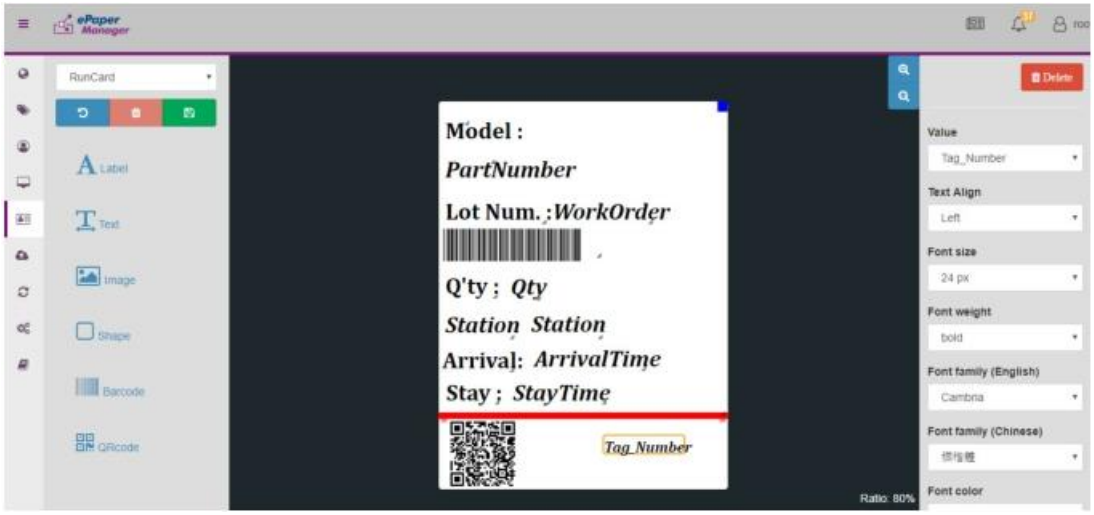
4.) Fill in the Encrypted Key (32-characters with A-Z and 0-9), and then click send to finish the configuration.



4.3.3 Design Your Own Template



Before delivering data to the EPD device, the user needs to design the template for the device to show the data on the screen. We provide a drag & drop user interface to help you design templates more easily. Click Template in the left-side navigation bar. We provide some tools to design templates, such as Label, Text, Image, Shape, Bar-code and QRcode.



- Label
  - Simply a text message
- Text
  - Its value comes from imported data, you can choose what column of data needs to be shown.
- Image
  - You can upload colorful images and it will automatically be transferred to red, black and white.
- Shape

- System supports rectangle, circles, and triangle shapes.

- Barcode
  - System supports Code 39 barcode
- QRcode

4.3.4 Import Item Data to ePaper Manager

There are 2 way to to import data from vertical market application to our ePaper manager.

1) JSON Format : User sends out the API to update the data in real time.

In order to import data to the EPD, below is the JSON format schema. You should reference below rules and prepare the data to upload your file.

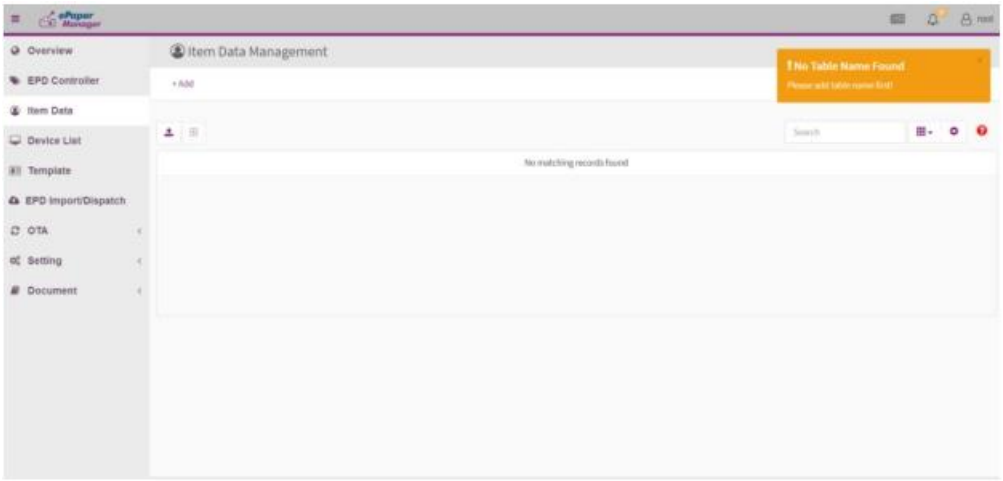
{ "items": [{ "code": "uniqueID_user_provide_1", "name": "item_name_user_provide_1", "content": { "Tag Content Title 01": "Tag Content01", "Tag Content Title 02": "Tag Content02" } }, { "code": "uniqueID_user_provide_2", "name": "item_name_user_provide_2", "content": { "Tag Content Title 11": "Tag Content11", "Tag Content Title 12": "Tag Content12" } },] }

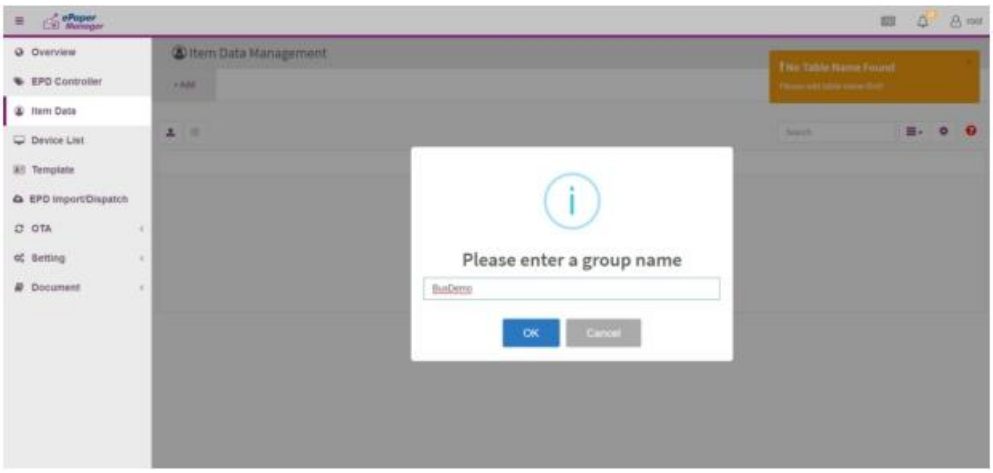
2) Batch update data into the ePaper manager database using Excel or CSV format. If you upload Excel or CSV to the system directly, the system will auto transfer the format to JSON.

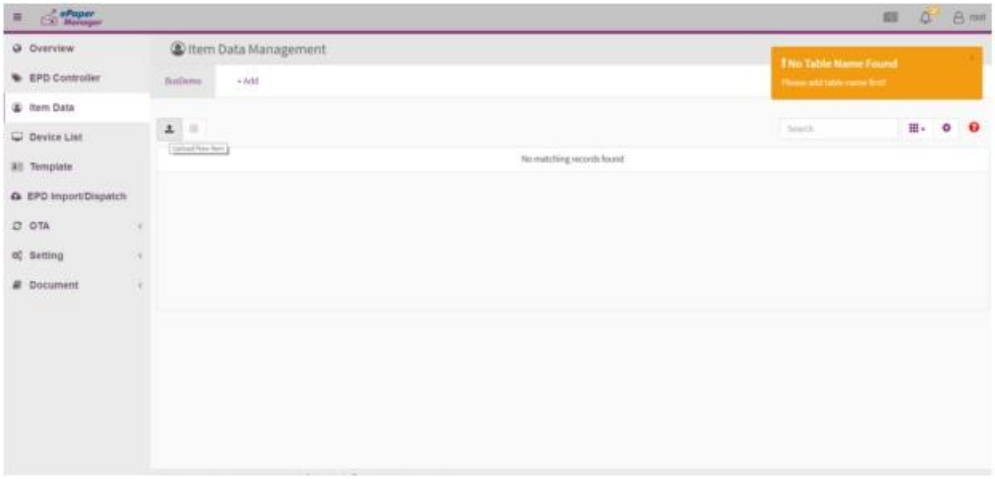
Example1:

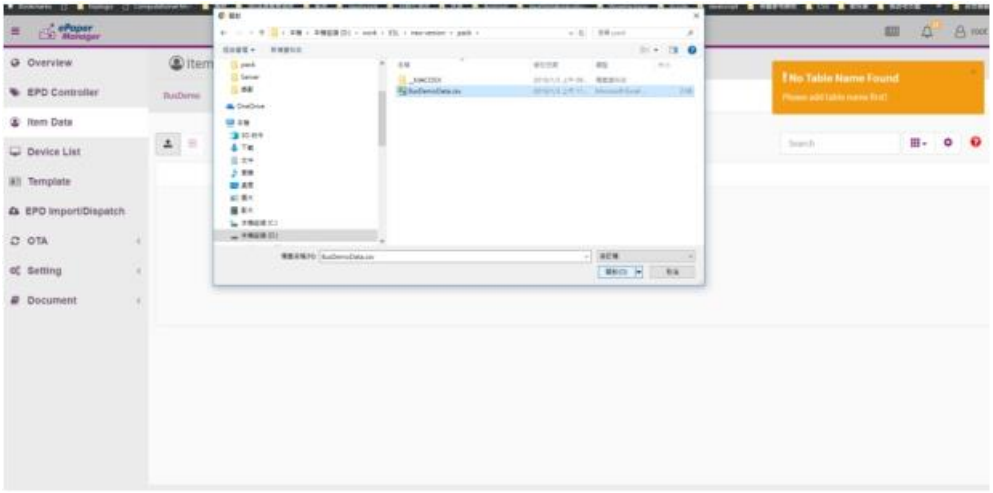
i. Vertical application scheduling sends data to ePaper manager server

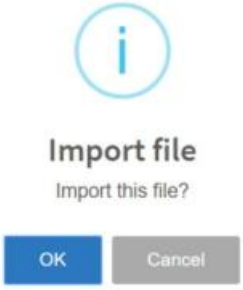
ii. Click ITEM Data in the left-side navigation bar and click the left side button in the page as shown below.

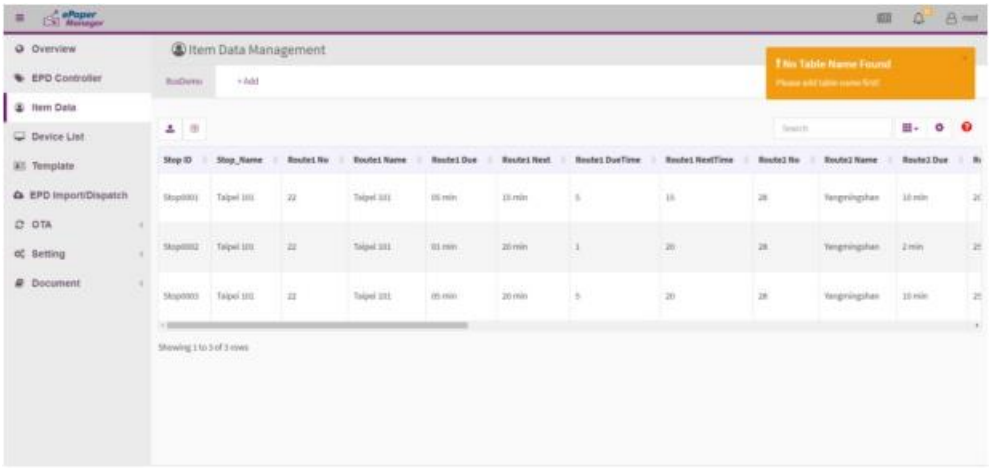





Overview
EPD Controller
Item Data
Device List
Template
EPD Import/Dispatch
OTA
Setting
Document
Item Data Management
No Table Name Found
No matching records found


Overview
EPD Controller
Item Data
Device List
Template
EPD Import/Dispatch
OTA
Setting
Document
No Table Name Found

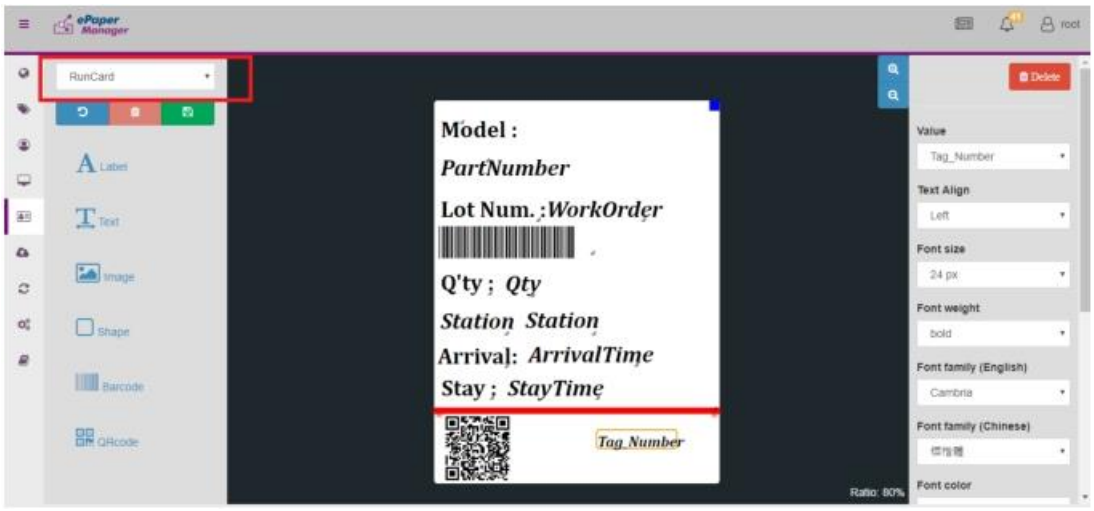

Import file
Import this file?
OK
Cancel


Overview
EPD Controller
Item Data
Device List
Template
EPD Import/Dispatch
OTA
Setting
Document
Item Data Management
No Table Name Found

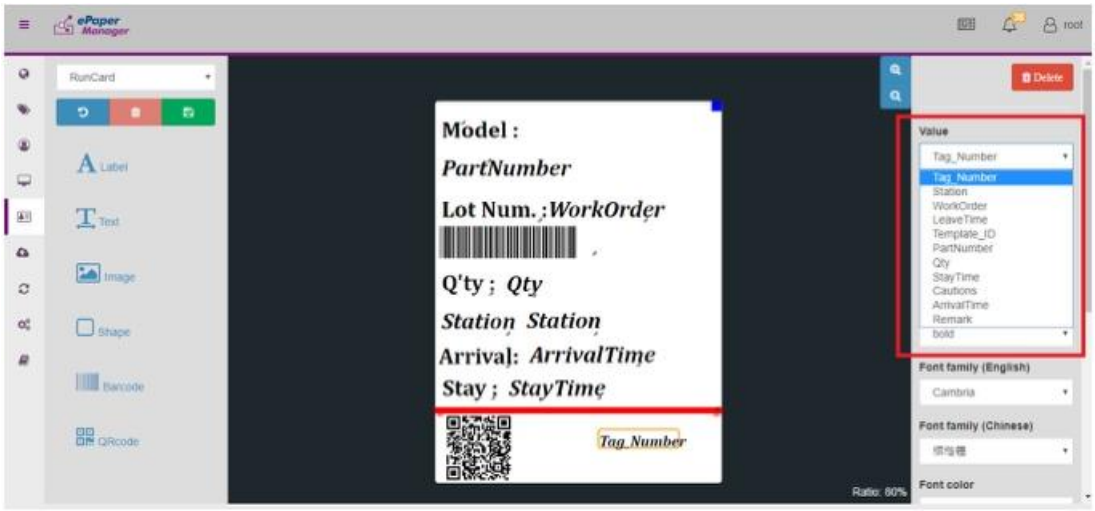
4.3.5 Combine the Template and Item Data

After importing data and making the template, we can combine them for regular data auto updates.

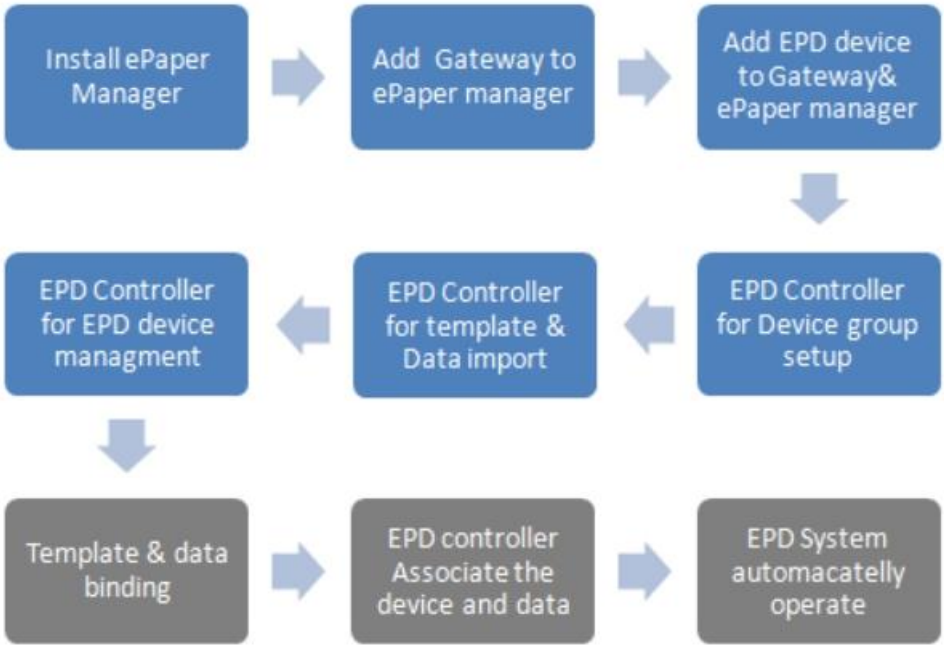
1) Select the Item Group from Item Data



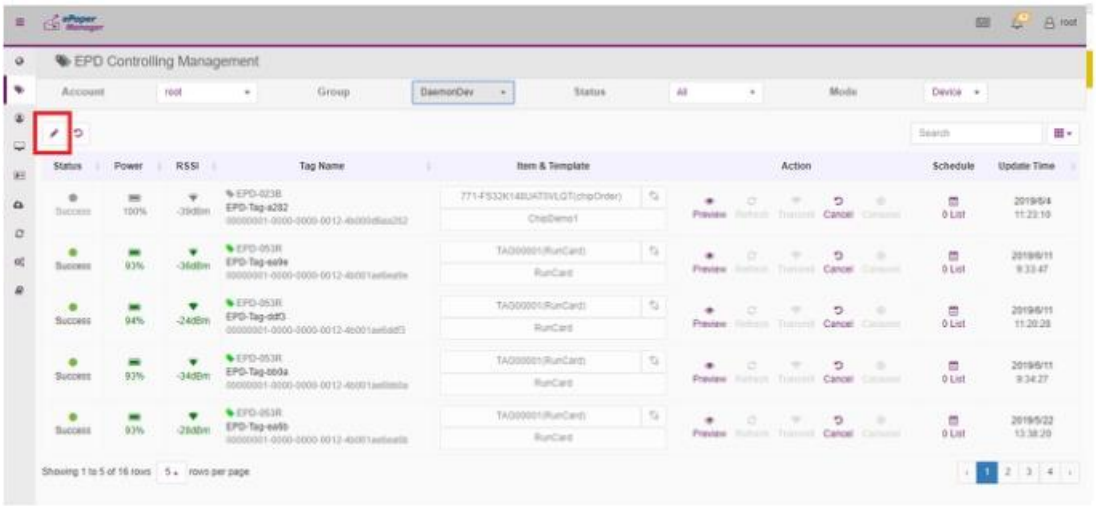
2) Click on the component, you can select values at the right Drop-down menu



4.3.6 EPD Controller for EPD Device Management



- Select correct account/group where your devices belong to.
- Select Preview / Edit mode.



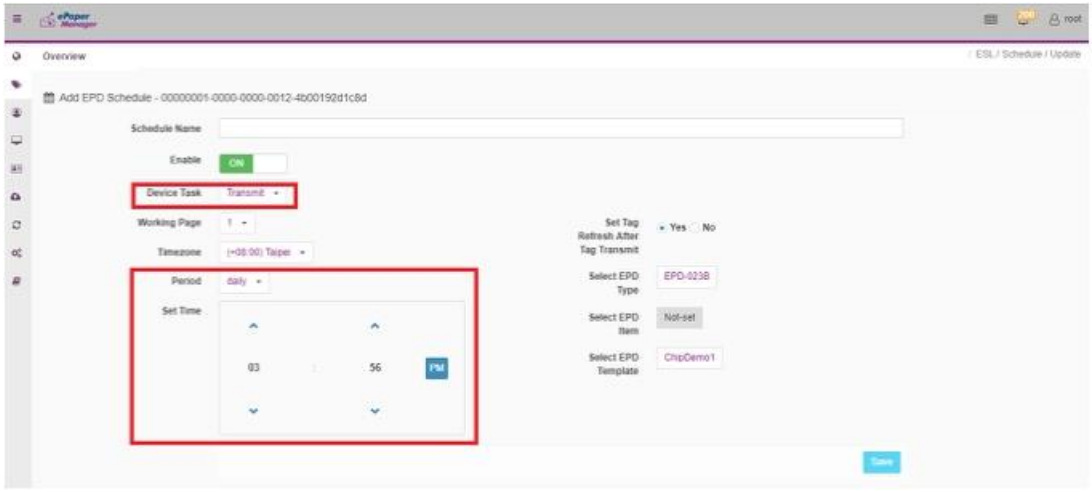
There are 2 parts in the management: Properties & Action

1) Properties: Users can read EPD device status atributes such as.
   - EPD devices name
   - Panel type
   - Data page in device
   - Electricity
   - Connecting status
   - Last update time
2) Action
   - Action: Schedule
     - User needs to setup EPD device data delivery schedule:

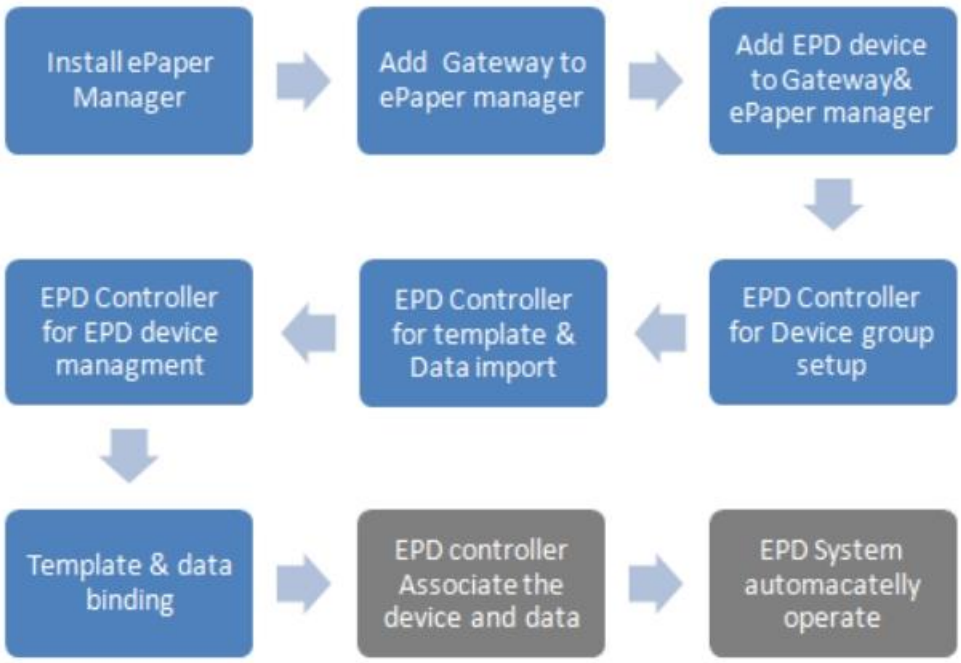
■Device Task: Select Transmit

– User needs to setup EPD device image flash schedule

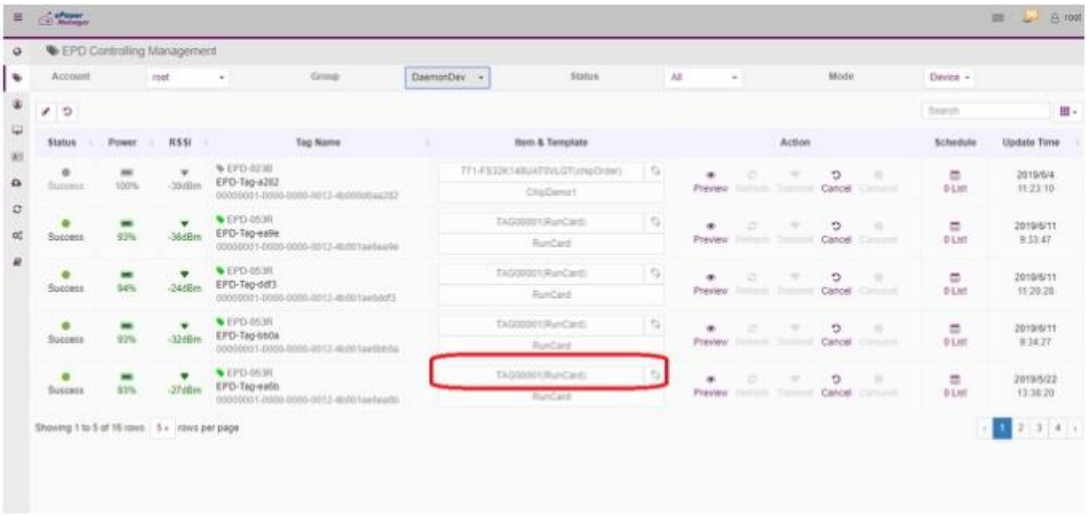
■Device Task: Select Re-fresh



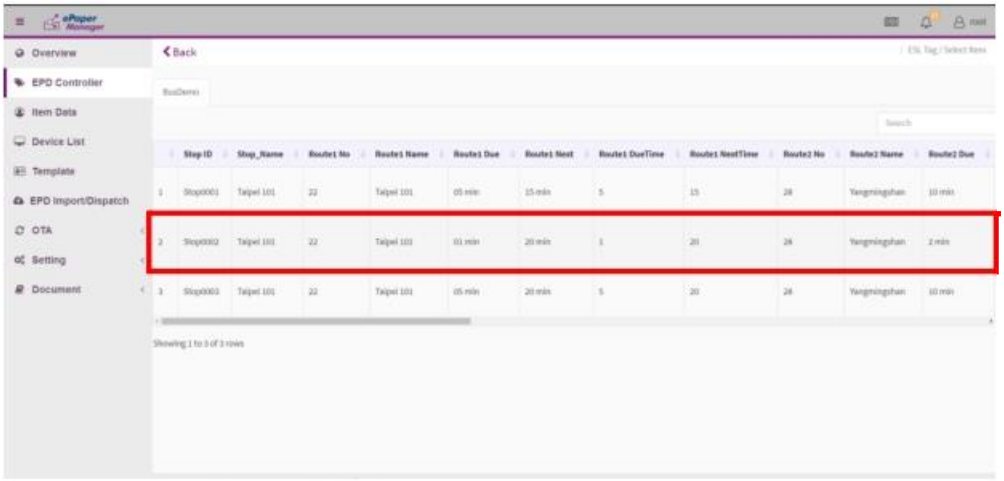
- Select EPD Device: select device to receive the schedule.
- Set Tag Template: select EPD Template from the list.
- Working Page: select which page in the EPD device.
- User may setup the schedule date and time from system.



1. Select binding data icon.



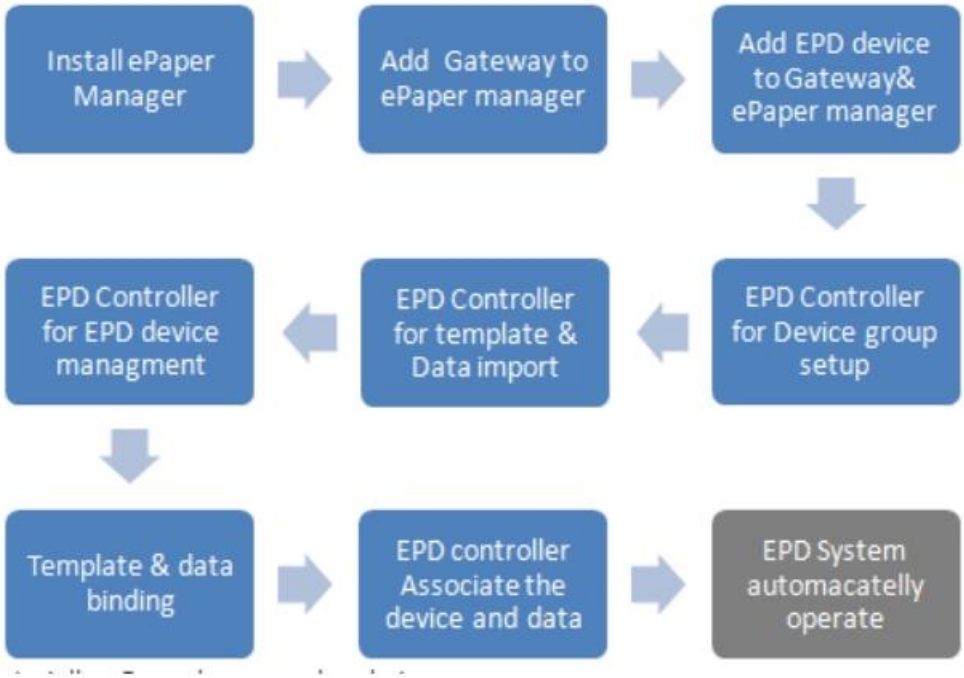
2. Select data to bind.



Note! *User can import data and binding data into the EPD device via this web page.*

We also offer a mobile APP to bind device data and EPD.

3. Binding product item data with the APP.



- Install on Barcode scanner handset
- Use a barcode scanner: PWS-472 to scan the EPD device Mac address bar-code and target product barcode.
  - Install on Barcode scanner handset
  - Use a barcode scanner : PWS-472 to scan the EPD device Mac address bar-code and target product barcode

ePaper Manager Associate App.

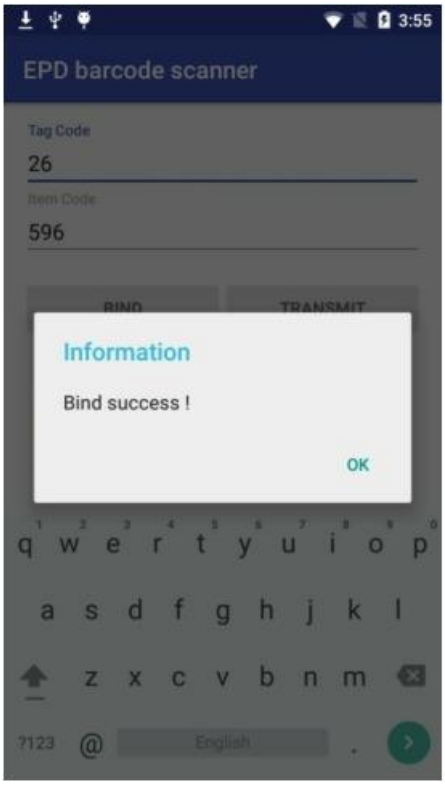
Download and install the EPM Barcode Scanner app on the PWS-472 device, a 5" Industrial-Grade Handheld Terminal with 1D barcode scanner, and you will see this icon on your desktop.

Please check your device linked with internet. Launch the app by click the icon.

Enter the server location, account, and password to sign in e-Paper Manager.

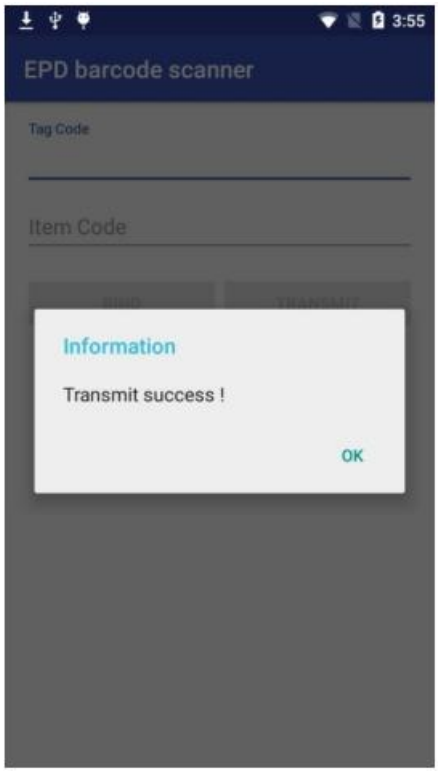
Enter your Tag Code and Item Code information to bind.

User with the PWS-472 device can scan a barcode to quickly bring the Tag Code and Item Code information into the fields. A Bind Success! information window will show up.

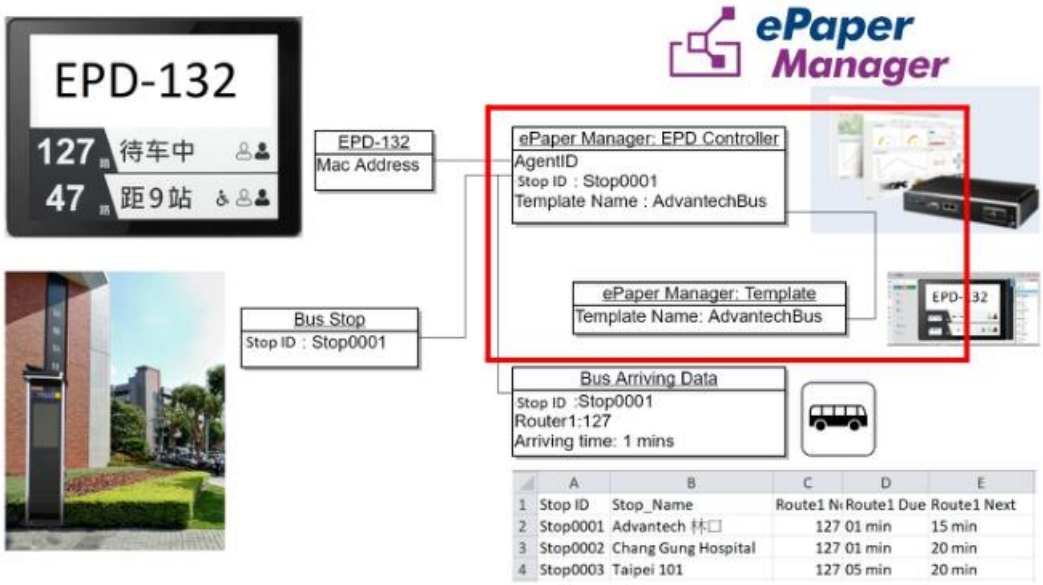


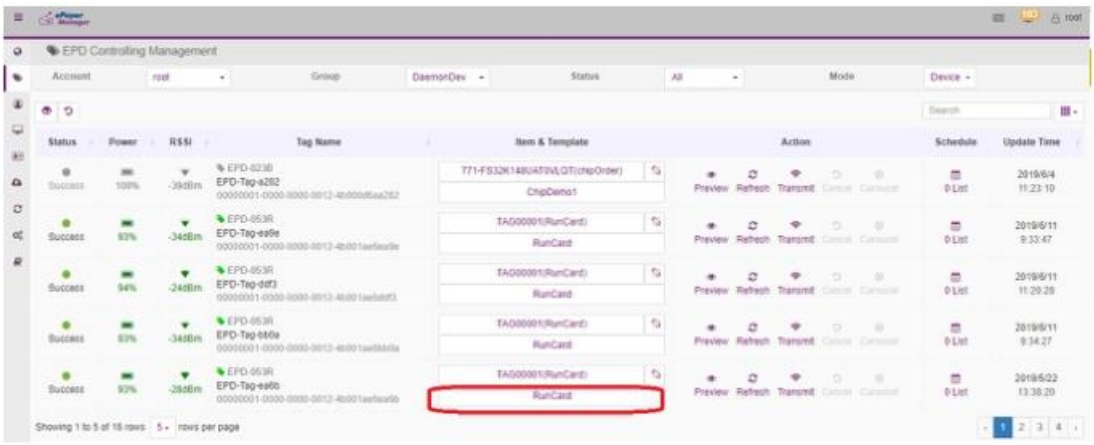
Click the transmit button to transmit the image to the tag device.

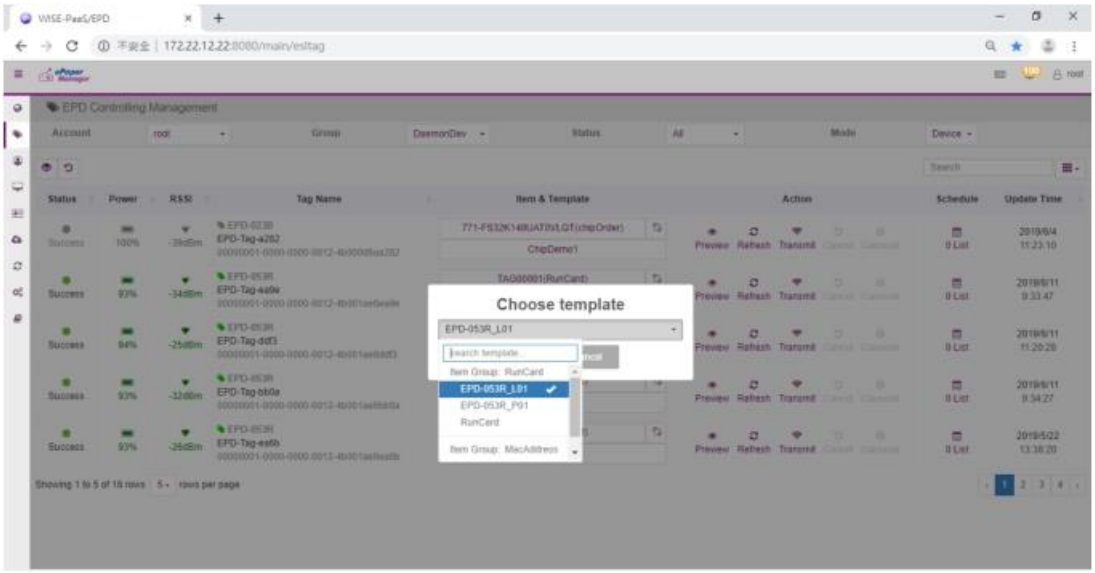
A Transmit success! information window will show up.

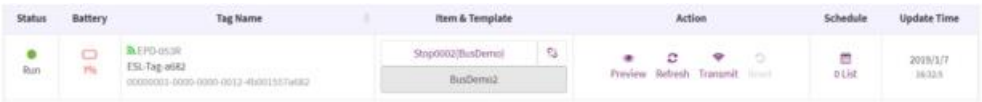


4. Binding the template:





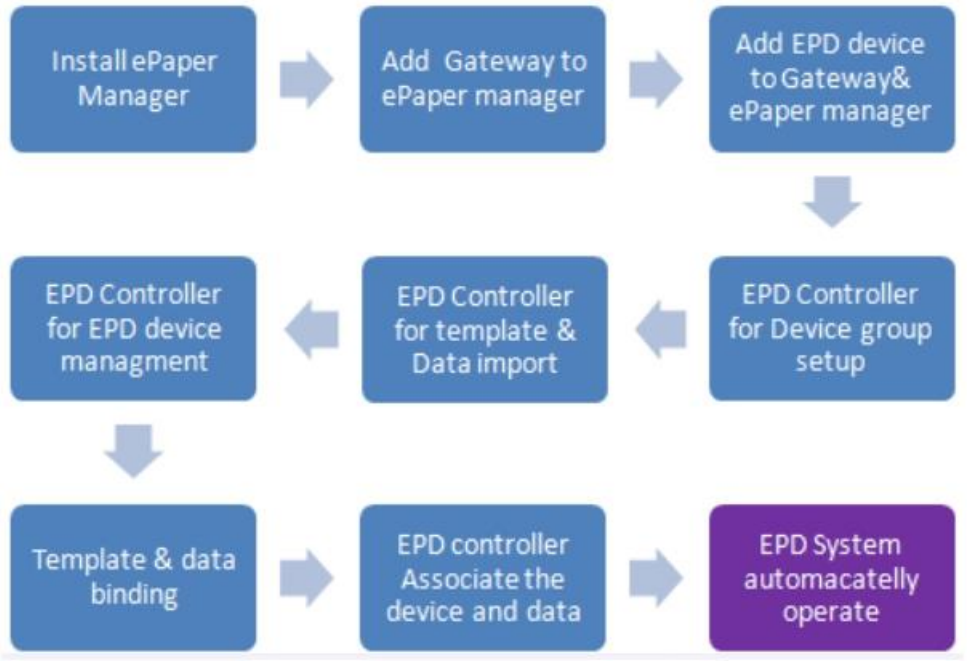




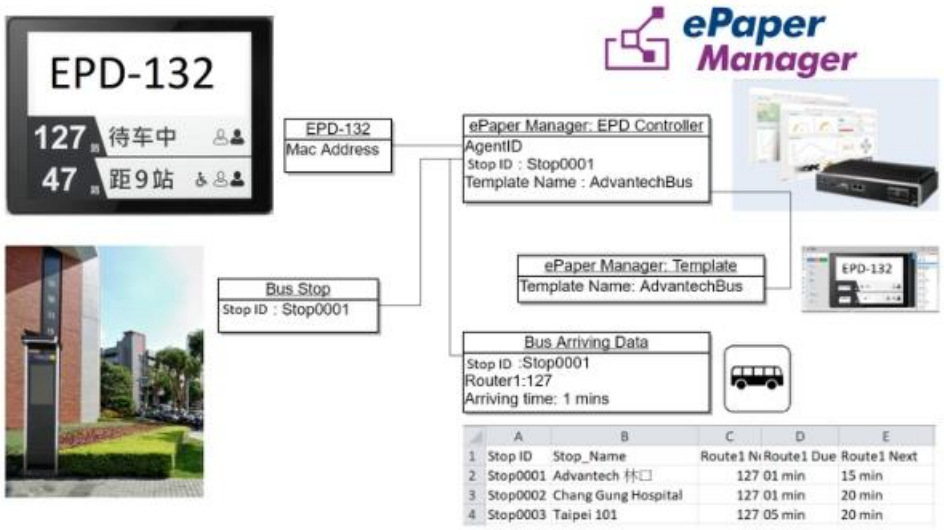
5. There are 4 actions for you to select.

- Preview: Current EPD device image preview
- Refresh: Re-flash image
- Transmit: Transmit image
- Un-bind the EPD device and Item

4.3.7 Final Association between EPD Device, Target Product and Product Data



1) EPD device: Get, MAC address, ePaper record, and agent ID number.
2) Target Item Product: Get a physical Bus StopID as associate attribute
3) User need to associate the items above, the association is outlined in 4.2.7 above.
4) Bus Arriving Data needs to be included: field name: StopID and data: Stop0001

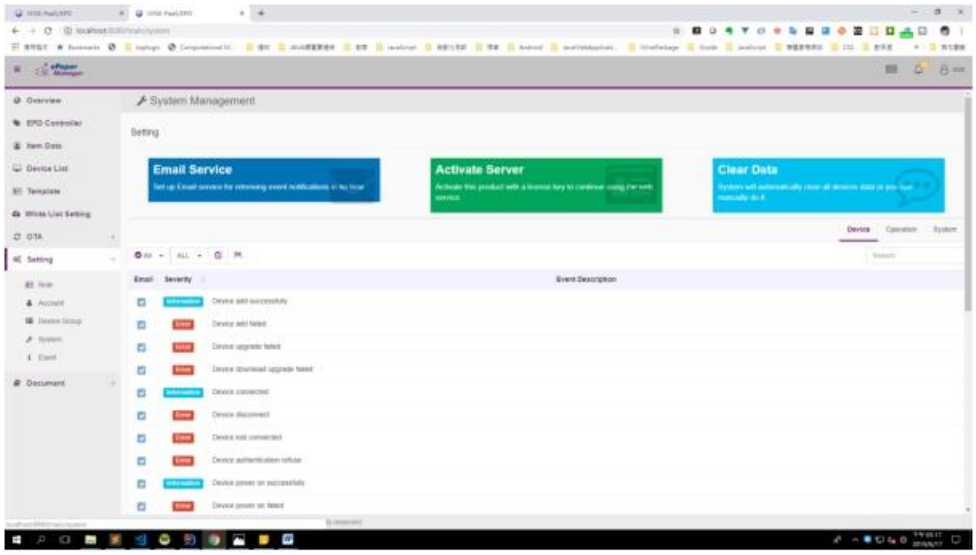


4.3.8 Smart Bus Stop Scenario

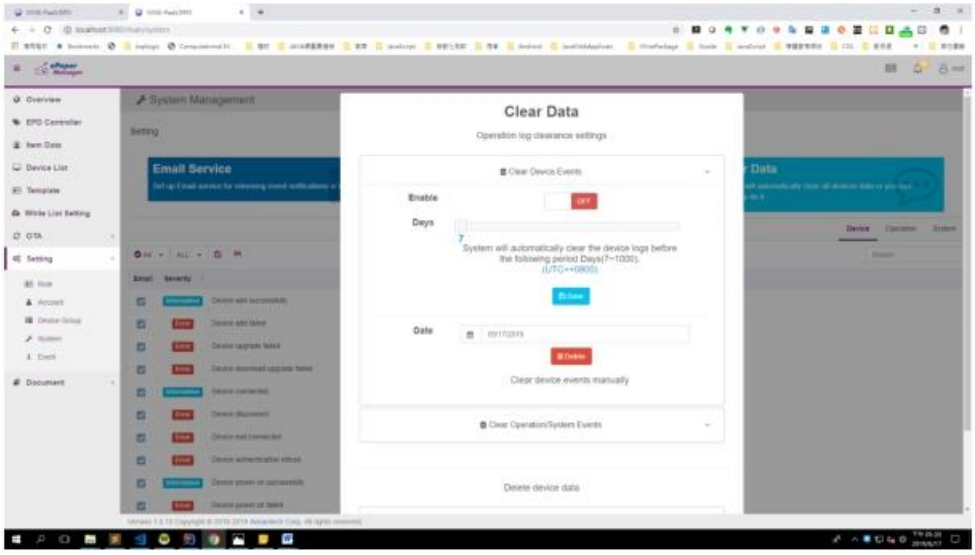
1. EPD device in standby Mode shows bus status.
2. Government bus information server communicates with ePaper manager through Restful API.
3. EPD device gets data every min to update bus info from ePaper manager.

4.3.9 Clear Events and Data of MongoDB

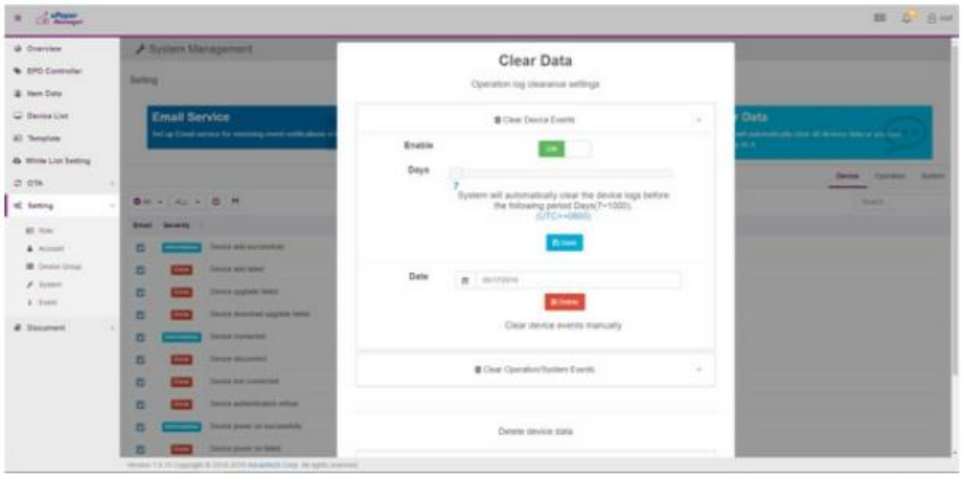
1. Click Setting – System on the side bar menu, and Click the Clear Data Button.

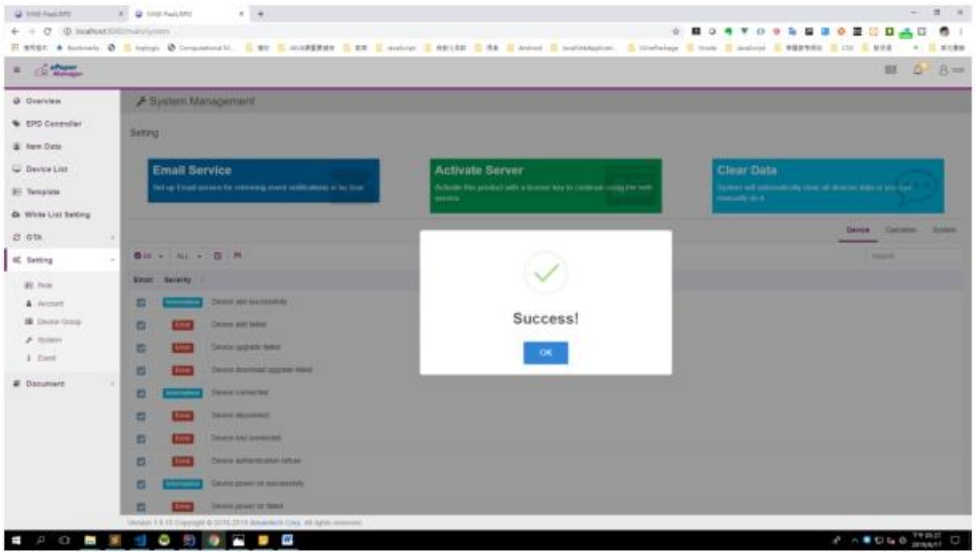


2. Clear device events:
1.) Open the Clear Device Events section.

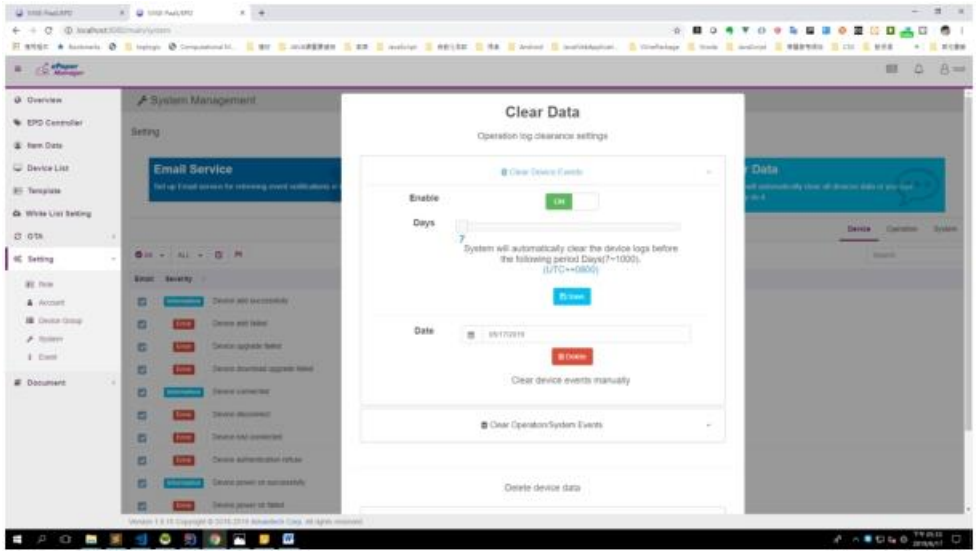


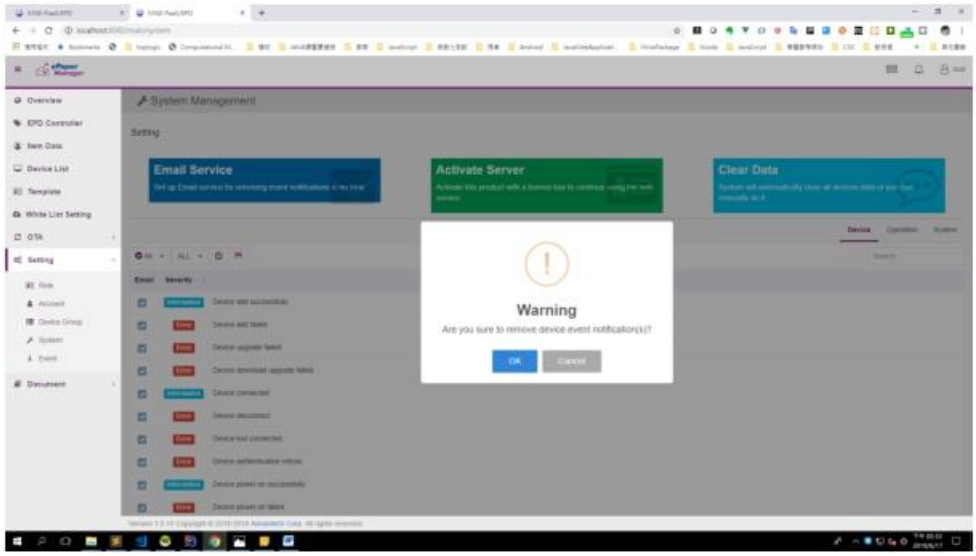
2.) System automatically clearance. Change the Enable switch to ON, and select which days and how often the system will begin the clearance, and then click save button to finish configuration.

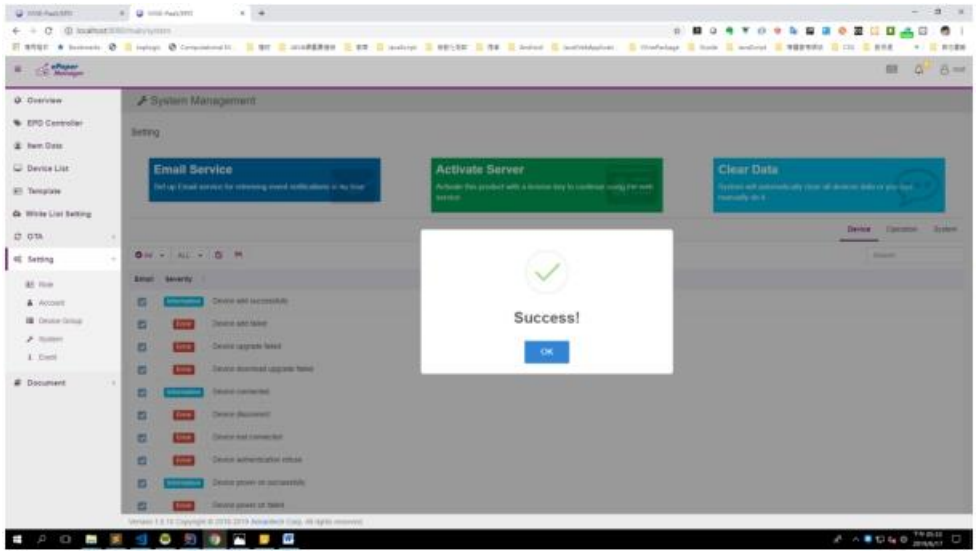




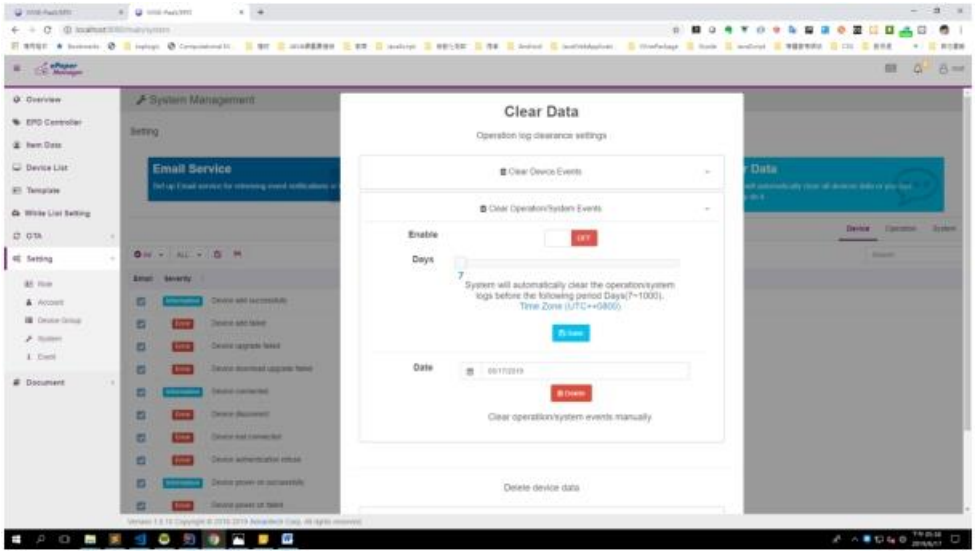
3.) Clear events manually. Select the clearance date (Reminder: the events between the date and before will be cleared), and click the Delete button to begin to clear data.



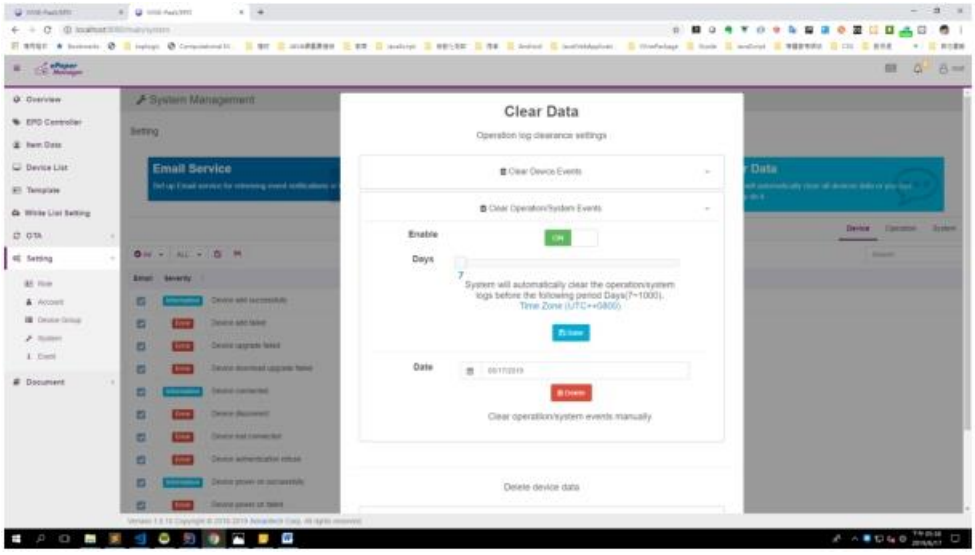


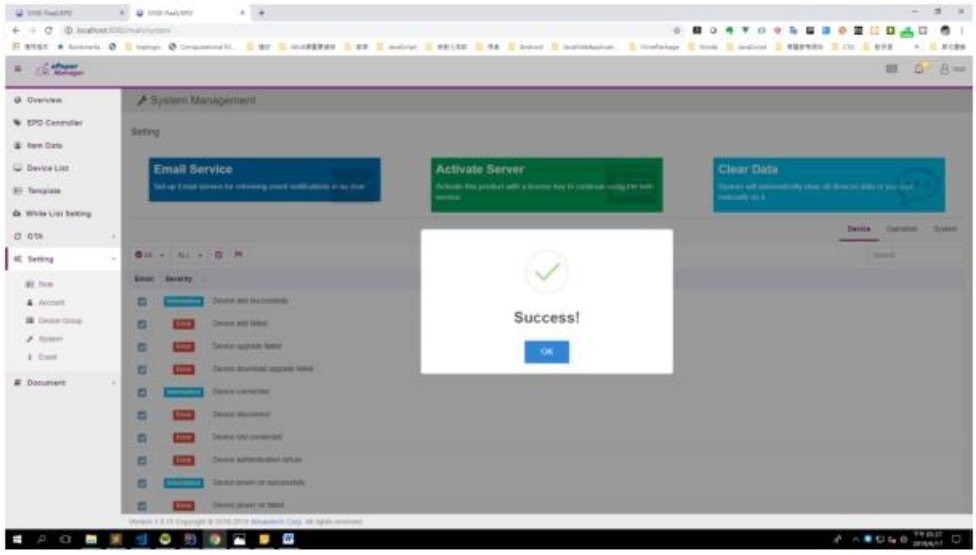


3. Clear operation/system events:
1.) Open the Clear Operation/System Events section.

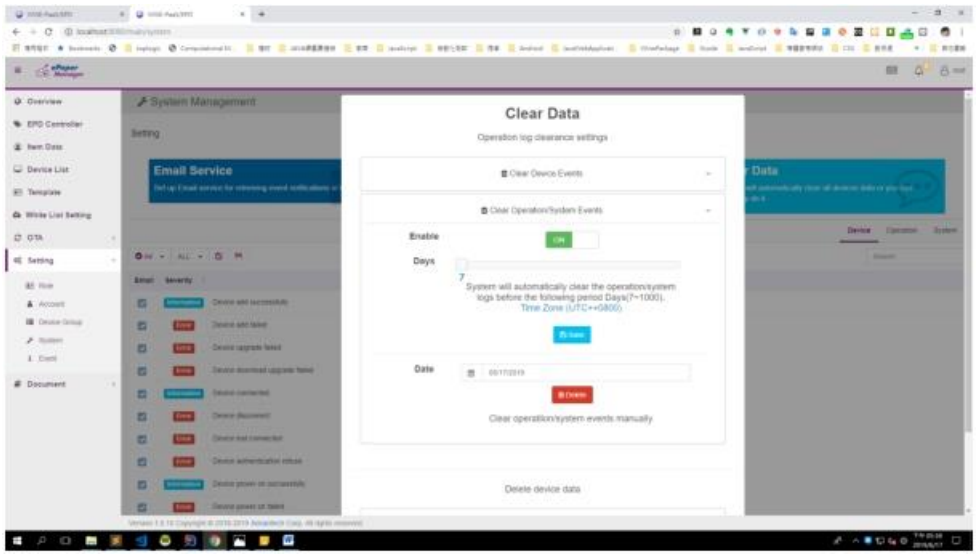


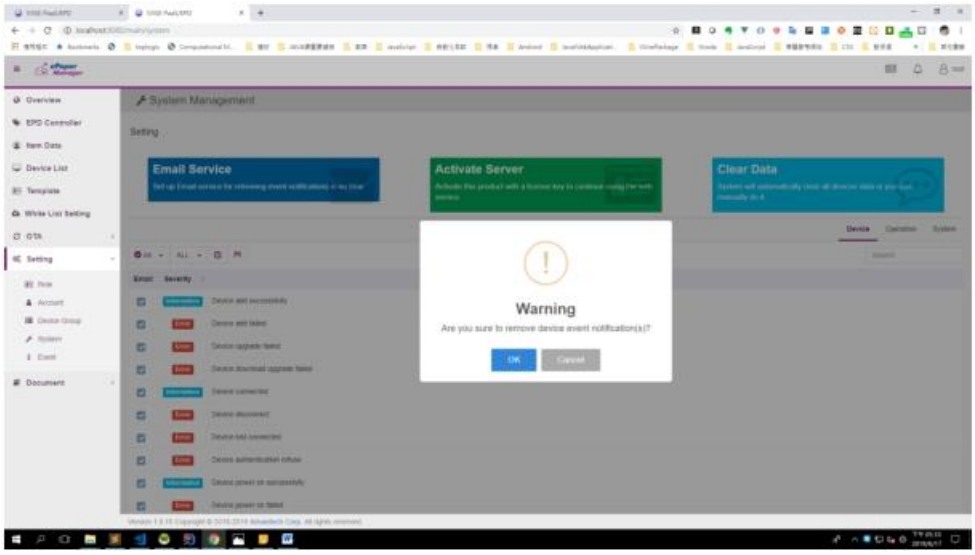
2.) System automatically clearance. Change the Enable switch to ON, and select which days and how often the ystem will begin clearance, and then click save button to finish this configuration.

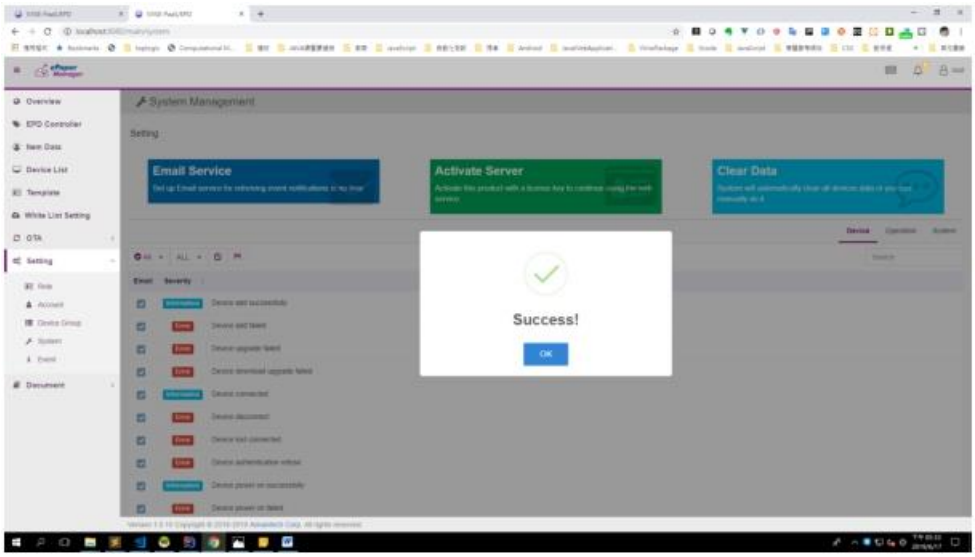




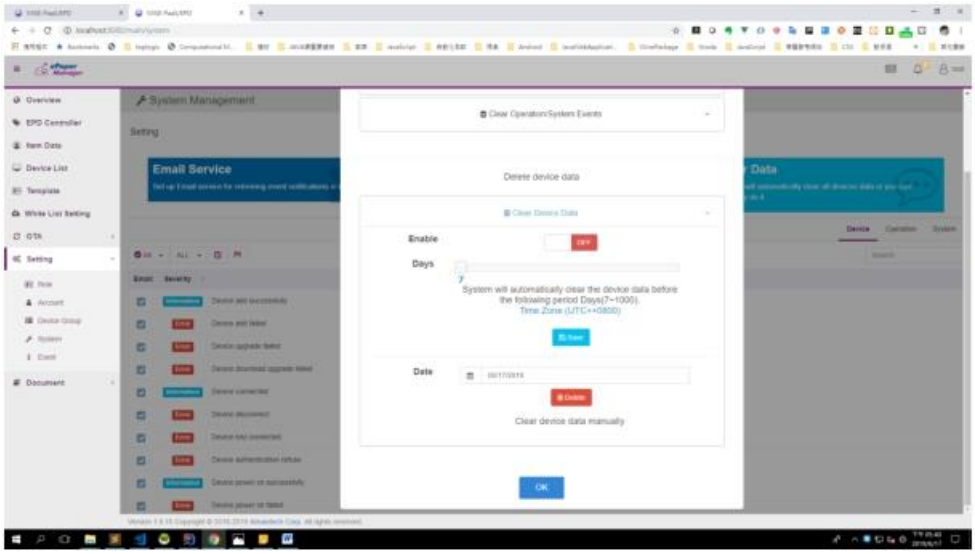
3.) Clear events manually. Select the clearance date (Reminder: the events between the date and before will be cleared), and click the Delete button to begin to clear data.



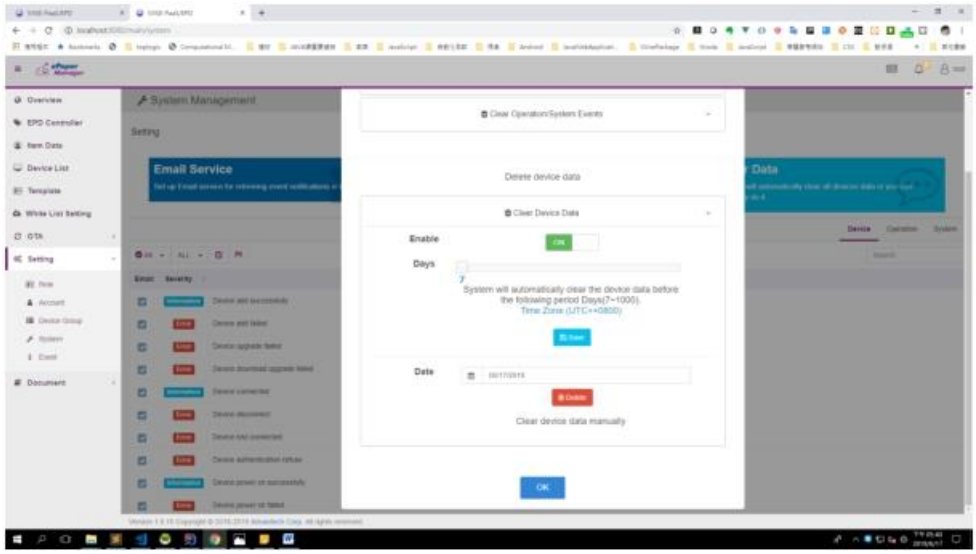


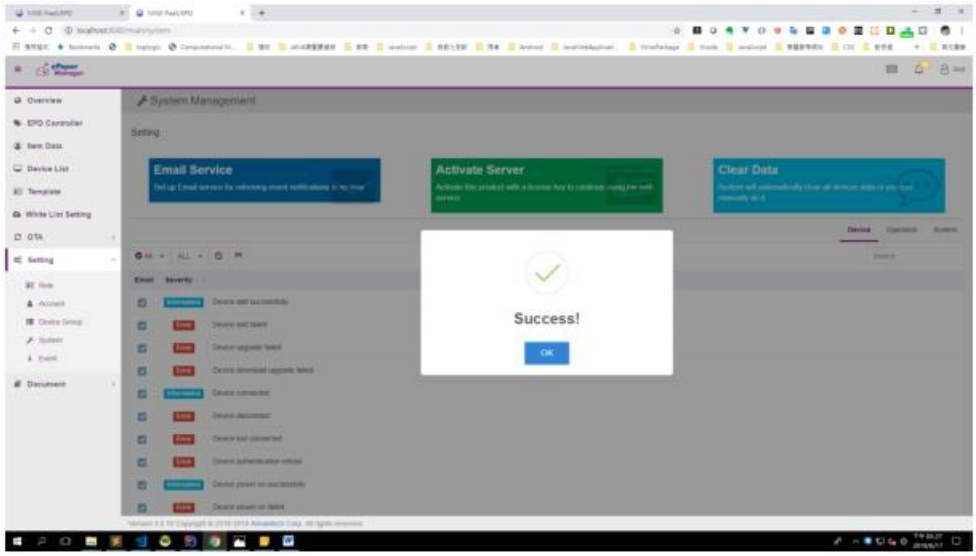


4. Clear device data:
1.) Open the Clear Device Data section.

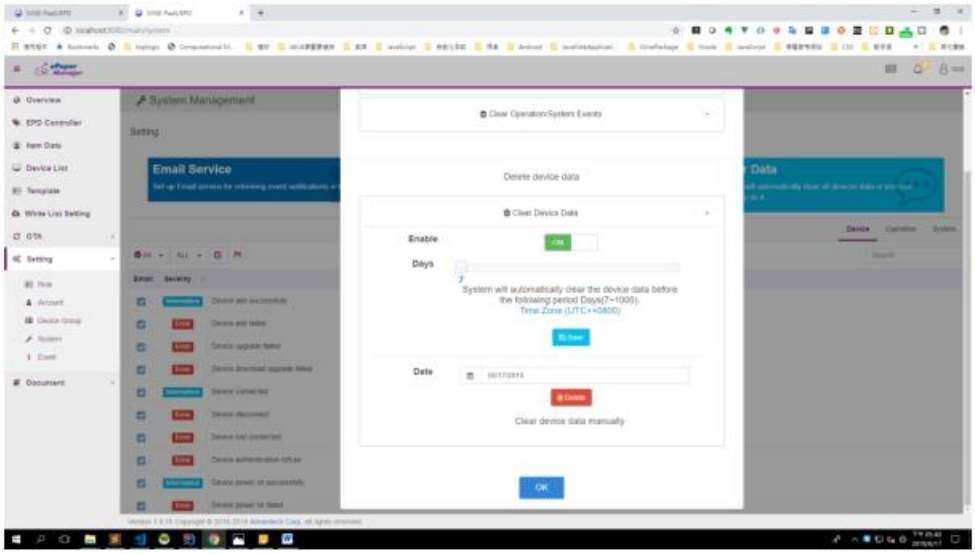


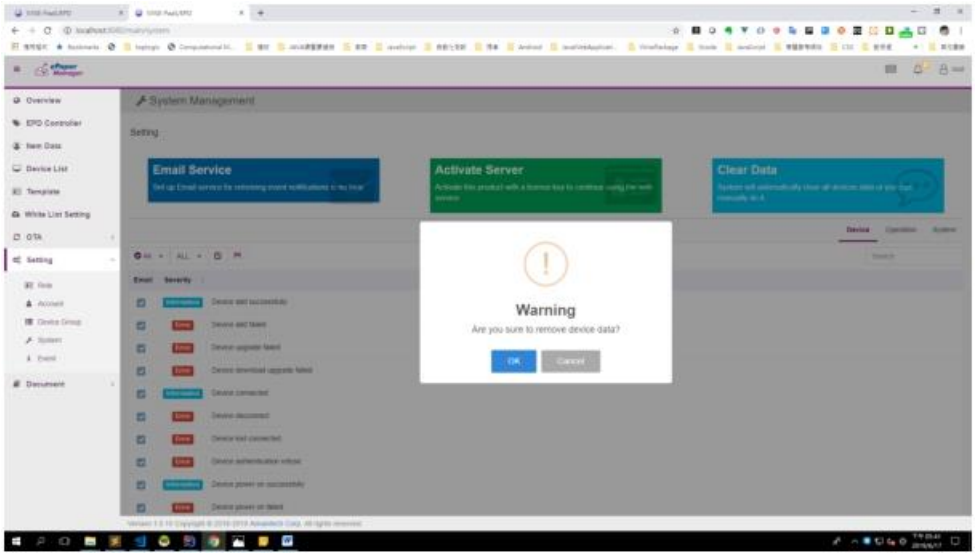
2.) Automatic System clearance. Change the Enable switch to ON, and select which days and how the often system will begin the clearance, and then click save button to finish this configuration.

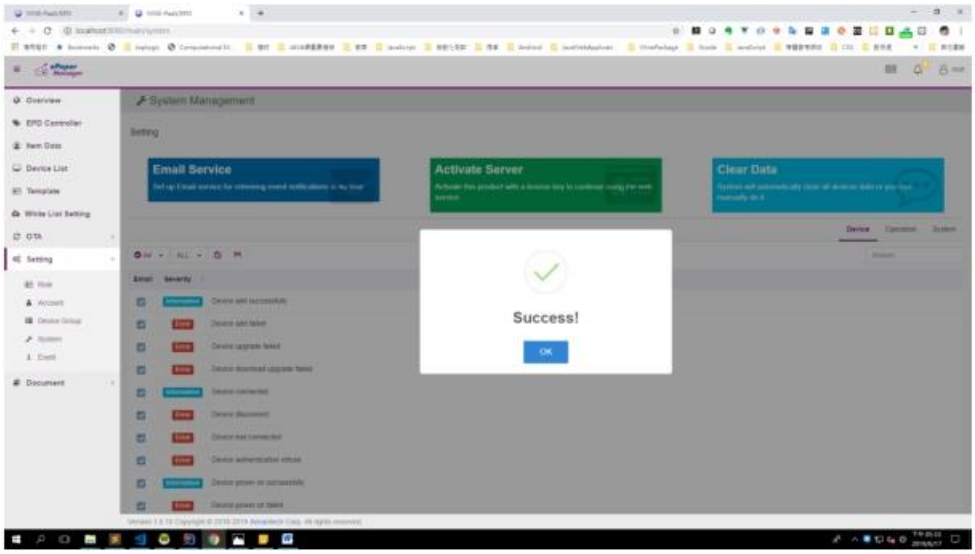




3.) Clear events manually. Select the clearance date (Reminder: the data between the date and before will be cleared), and click the Delete button to begin to clear data.

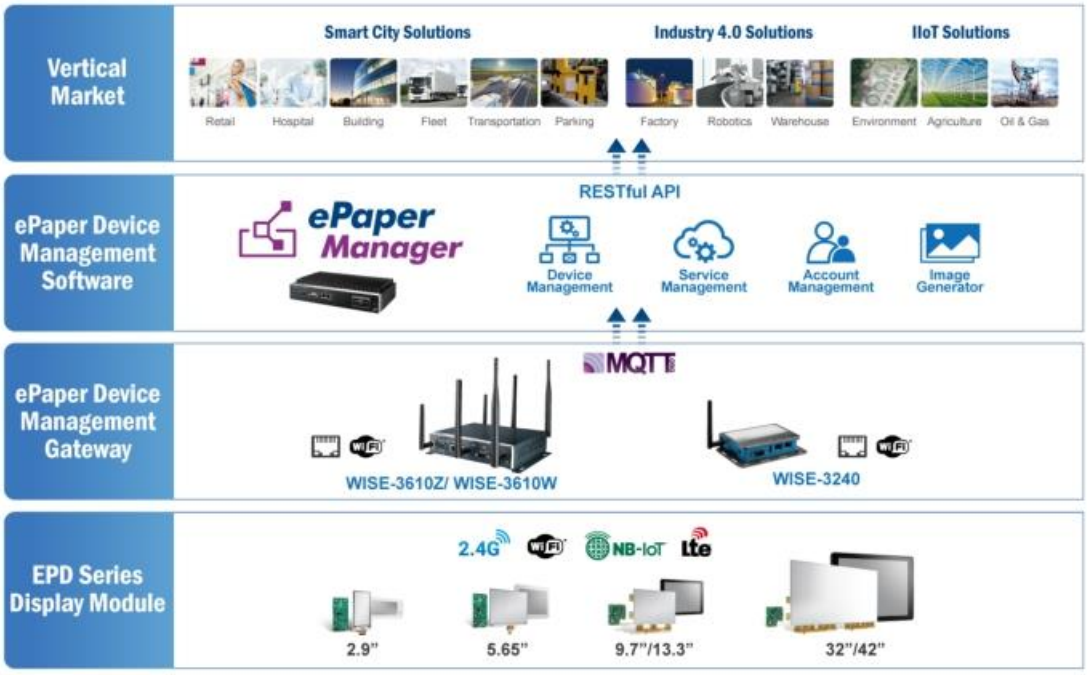






4.4 Integrate EPD APIs into Your System

We provide easy-to-use APIs to help you integrate into your own system. Below is a sample for you to understand and help integration into your system with our restful APIs.



The vertical application needs to send the API to ePaper manager, sample code shown below.

1. Our API in Javascript: setItemData to update data into ePaper manager and ePaper manager will help forward the data to EPD.

```
// update Item Data
function setItemData(){
    var url = HOST + '/esl/v1/items';
    var type = 'PUT';
    var data = {
      "items": [ JSON.parse($('#log').val()) ]
    };
    console.log(data);

    api(url, type, data, function(res){
        if(res && res.result)
        alert("Item Successfully Updated!");
      else
        alert("Ajax request error!");
    });
}
```

2. User also can use our API: setSensorData to control EPD LED

```
// set LED light
function setSensorData(){
    var agentid = $('#agentid').val();
    var plugin = $('#plugin').val();
    var sensorId = $('#sensorId').val();
    var    sensorValue    =    parseInt($('#sensor-
Value').val());

    var url = HOST + '/esl/v1/devicectrl/data';
    var type = 'POST';
    var data = {agentId: agentid, plugin: plugin,
sensorIds: [{n: sensorId, v: sensorValue}]};

    api(url, type, data, function(res){
        console.log(JSON.stringify(res));
        if(res && res.items && res.items.length > 0
&& (res.items[0].statusCode === 202 || res.items[0].statusCode
=== 200)){
        alert("Update Sensor Data Command Sended!") }
      else {
        alert("Ajax request error!");
      }
    });
}
```

For more API, user may check next chapter.

4.4.1 EPD Data Update API

1. Upload EPD Data

- path: /esl/v1/items
- method: POST
- header: Basic Authorization
- body paramters:
- code: string
- name (group name): string
- content: JSON string
- body(example)
  { "items": [{ "code": "X001", "name": "John", "content: "{"name": "John","age": "18"}" }] }
- response(example)
  { "result": true }

2. Upload EPD Data for a specific item group

- path: /esl/v1/items/name/{name}
- method: POST
- header: Basic Authorization
- body paramters:

- code: string
- name (group name): string
- content: JSON string

- body(example)
  { "items": [{ "code": "X001", "name": "John", "content: "{"name": "John","age": "18"}" }] }
- response(example)
  { "result": true }

3. Update EPD Data

- path: /esl/v1/items
- method: PUT
- header: Basic Authorization
- body parameters:
  - code: string
  - name (group name): string
  - content: JSON string
- body(example) (Notes: you have to give all content in body even if you only need to edit partial content)
  { "items": [{ "code": "X001", "name": "John", "content": "{"name": "John","age": "20"}" }] }
- response(example)
  { "result": true }

4. Delete EPD Data

- path: /esl/v1/items
- method: DELETE
- header: Basic Authorization
- body parameters:
  - code: string
- body(example)
  { "items": [{ "code": "X001" }] }
- response(example)
  { "result": true }

5. Get EPD Tag AgentID

- path: /esl/v1/tags/agentid
- method: GET
- header: Basic Authorization
- url parameter: ?itemcode=[ITEM CODE]
- response(example)
  { "agentid": "00000001-0000-0000-0012-4b001557aa72" }

6. Get EPD Tag Status

- path: /esl/v1/tags/status
- method: GET
- header: Basic Authorization
- url parameter: ?agentid=[DEVICE AGENT ID]
- response(example) (Notes: all possible status are "sending command", "command timeout", "setting image", "set image okay", "set image error", "refreshing image", "refresh image okay", "refresh image error")
  { "status": "set image okey" }

7. Set EPD Tag Binding

- path: /esl/v1/tags/setBinding

- method: POST
- header: Basic Authorization
- body parameters:
  - agentid: string
  - templatename: string
  - body(example) (Notes: you must provide "agentid" or "did" in body, and for other parameters as follows, you only need to give at least one: "tid or templatename", "iid or itemcode", "mid")
    { "agentid": "00000001-0000-0000-0012-4b001557a500", "templatename": "Abnormal-English" }
- response(example)
  { "result": true }

8. Set EPD Tags Binding

- path: /esl/v1/tags/setBindings
- method: POST
- header: Basic Authorization
- body parameters:
  - agentid: string
  - templatename: string
  - body(example) (Notes: you must provide "agentid" or "did" in body, and for other parameters as follows, you only need to give at least one: "tid or templatename", "iid or itemcode", "mid")
    { "bindings": [{ "did": 32, "itemcode": "Stop0002", "templatename": "Bus Stop Demo Init" }, { "agentid": "00000001-0000-0000-0012-4b001557a682", "itemcode": "Stop0002", }] }
- response(example)
  { "result": true }

9. Transmit Image

- path: /esl/v1/tags/setImage
- method: POST
- header: Basic Authorization
- body parameters:
  - agentid: string
  - refresh(optional, default: 1): number [available values: 1: Refresh after transmit, 0: Just store image to ESL tag memory]
  - page(optional, default: 0): number [available values: 0 ~ maxpagesize-1]
- body(example)
  { "agentid": "00000001-0000-0000-0012-4b001557aa72", "refresh": 1, "page": 0 }
- response(example)
  { "status": "setting image" }

10. Transmit Image with Item Data

- path: /esl/v1/tags/setImageWithData
- method: POST
- header: Basic Authorization
- body parameters:
  - agentid: string
  - item: JSON
  - code: string
  - name (optional): string

- content (optional): JSON string
- refresh (optional, default: 1): number [available values: 1: Refresh after transmit, 0: Just store image to ESL tag memory]
- page (optional, default: 0): number [available values: 0 ~ maxpagesize-1]

- body(example)
  { "agentid": "00000001-0000-0000-0012-4b001557aa72", "item": { "code": "Stop0001", "name": "Taipei 101", "content": "{\"Stop_Name\":\"Grand Hotel\", \"Route1 Name\":\"Test\"}" }, "refresh": 1, "page": 0 }
- response(example)
  { "itemStatus": "update item okay", "status": "set image okay" }

11. Refresh Image

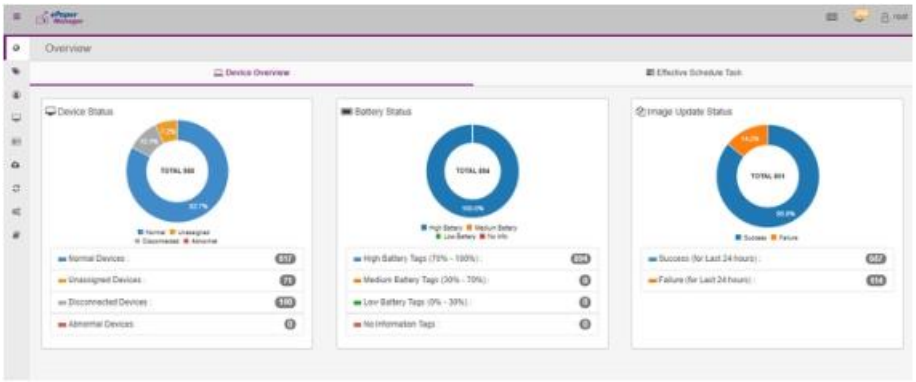
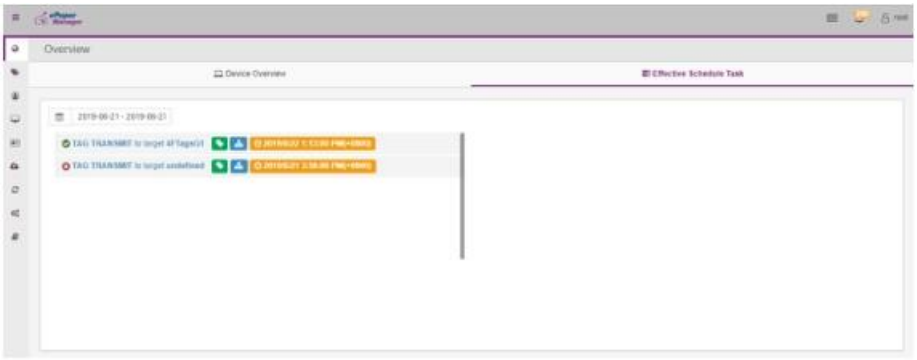
- path: /esl/v1/tags/refreshImage
- method: POST
- header: Basic Authorization
- body parameters:
  - agentid: string
  - page(optional, default: 0): number [available values: 0 ~ maxpagesize-1]
  - body(example)
    { "agentid": "00000001-0000-0000-0012-4b001557aa72", "page": 0 }
- response(example)
  "status": "refreshing image" }

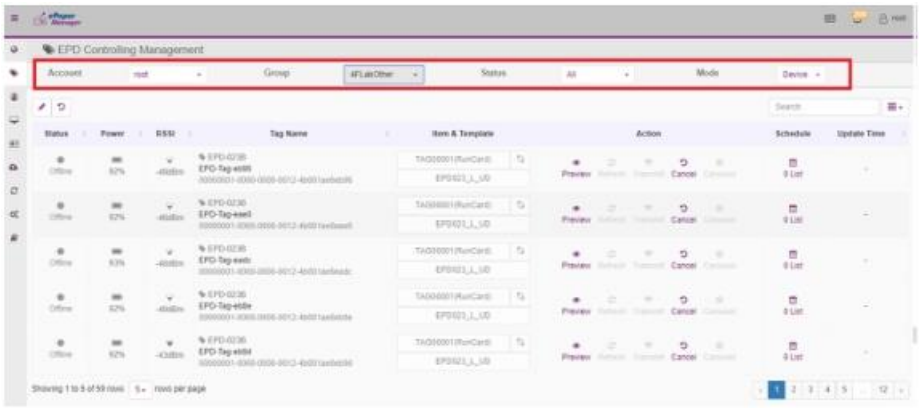
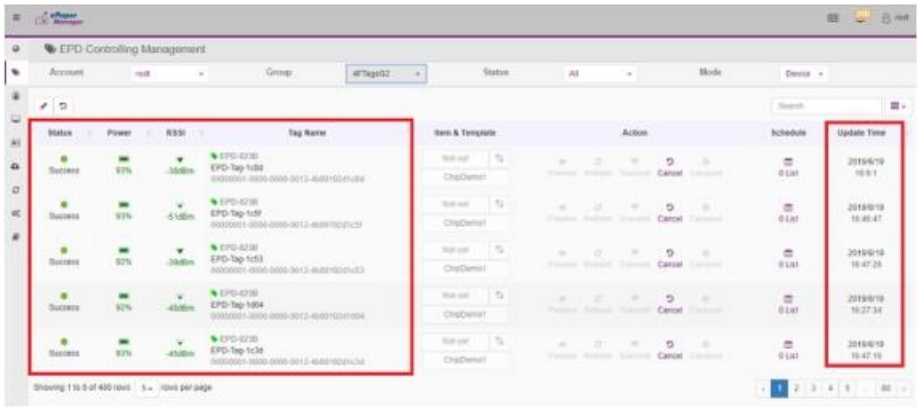
12. Get Item

- path: /esl/v1/items/itemcode/{itemcode}
- method: GET
- header: Basic Authorization
- response(example)
  { "code": "Tag_00001", "iid": 243, "name": "RunCard", "content": "{\"Tag_Number\":\"Tag_00001\",\"Template_ID\":\"RunCard\",\"WorkOrder\":\"YSI5001ZA\",\"PartNumber\":\"DLV8315-1J30000\",\"Qty\":\"20\",\"Station\":\"Assy\",\"NextStation\":\"BurnIn\",\"ArrivalTime\":\"5/22/18 9:11\",\"LeaveTime\":\"\",\"StayTime\":\"0\",\"Cautions\":\"\",\"Remark\":\"\"}" }

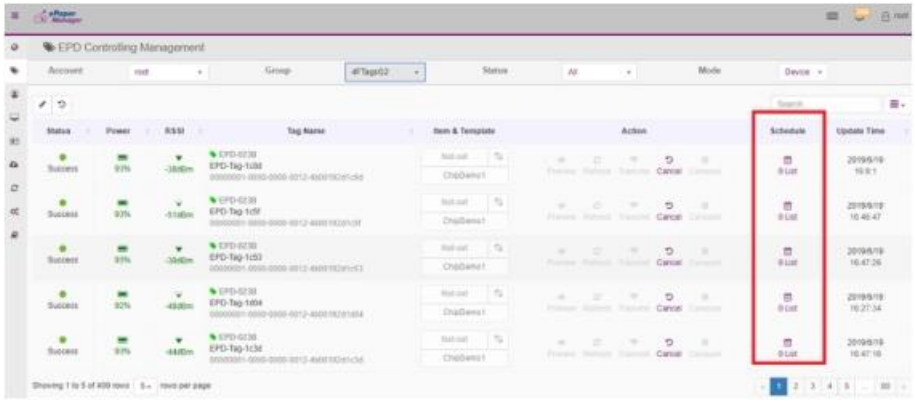
4.5 ePaper Manager Feature list

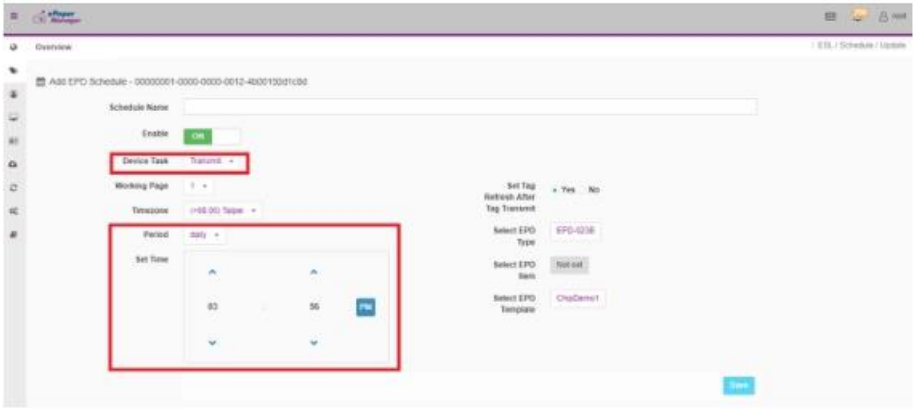
4.5.1 Component List

Dashboard	 1. Device status: Provides EPD device status in system. 2. Battery status: Shows battery status on EPD device. 3. EPD Device: Show image update status.
	 4. schedule task effective schedule task: User can select current schedule in the system

EPD Controller	EPD device search  Search criteria Account/ Group/Connecting Status/ EPD Device Mode
	Properties  Name / Panel type/ total page /Connecting status / Update Status

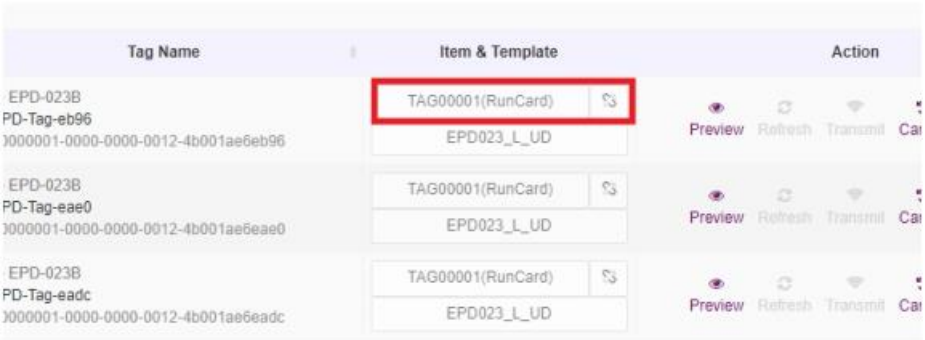
Action	Schedule



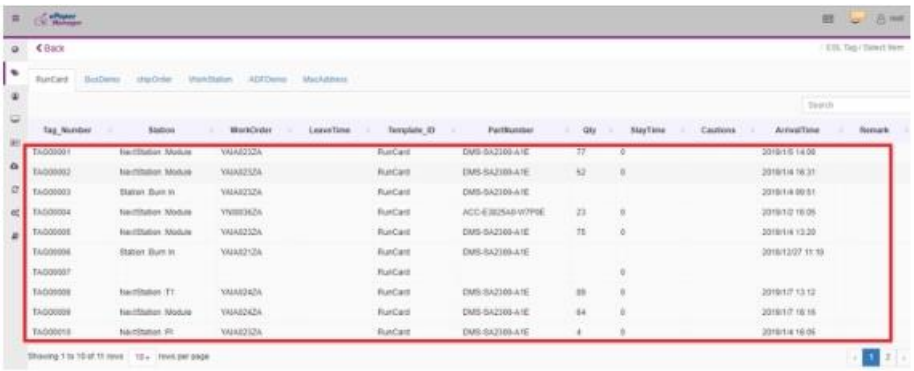


User can setup SLEEP/ TRANSMIT/REFRESH as the scheduling task daily / weekly/ monthly /yearly.

Bind Item

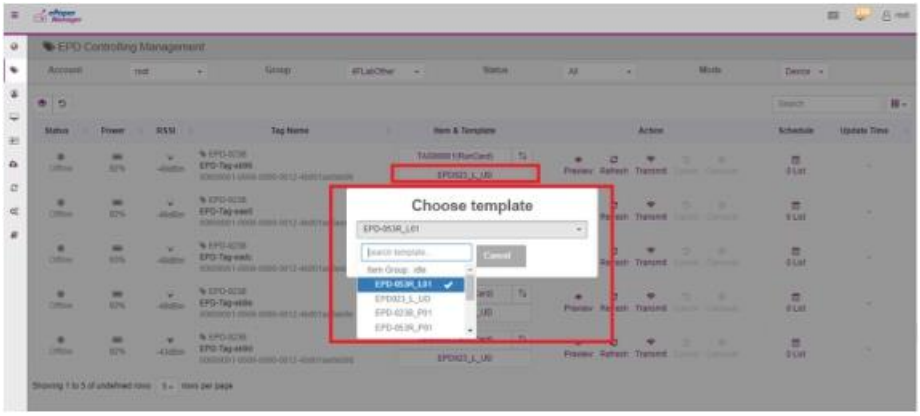


Available Target Product and Data



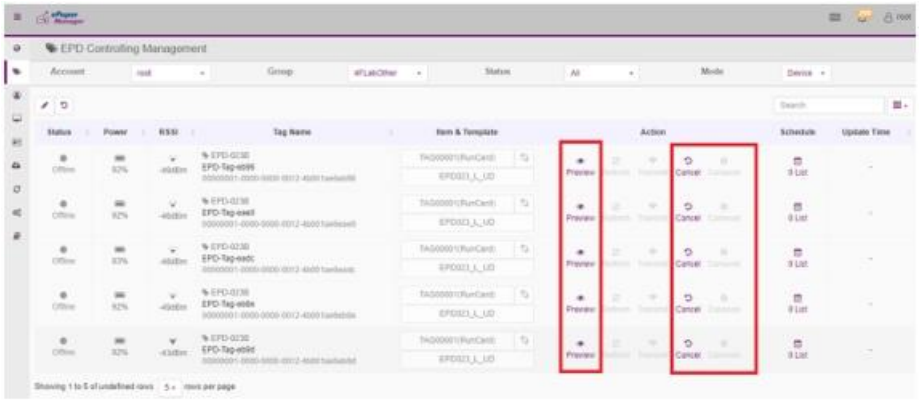
User can manually bind/unbind ITEM DATA to the EPD device
1. Click the eye image icon.
2. Select the bind icon.l
3. System will pop-up another page for Available Target Product and Data.

Action	Bind Template



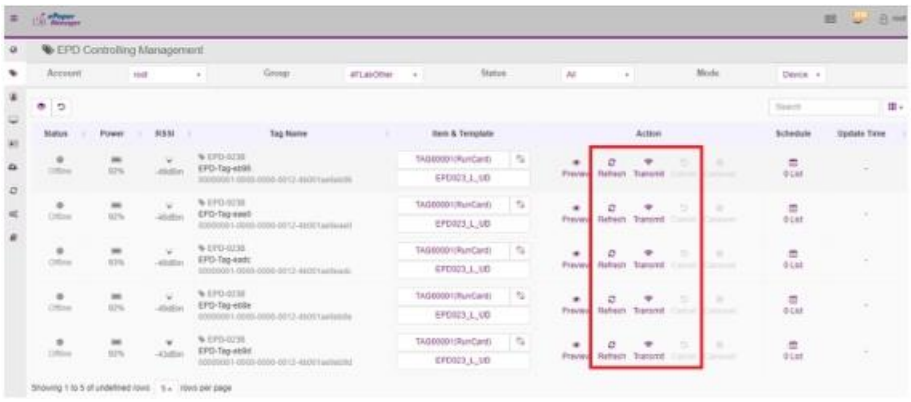
User can manually bind the Template to the EPD device

Action	Preview



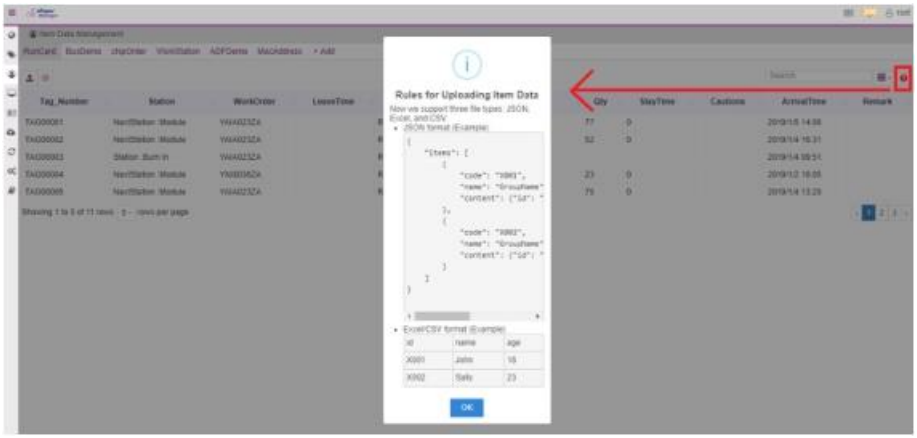
User can preview the EPD Device image.

Transmit



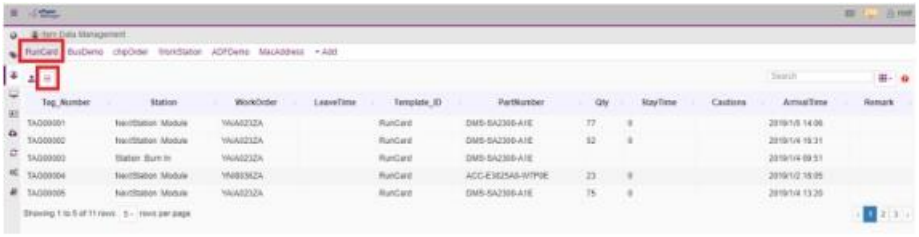
1. User can re-flash the image on EPD device
2. User can Transmit image to EPD device
3. If user have click "transmit" or "re-flash" for the device, then the system keep busy , not response from device side. User can click "reset" to cancel the execution.

Item Data	Import ITEM Data

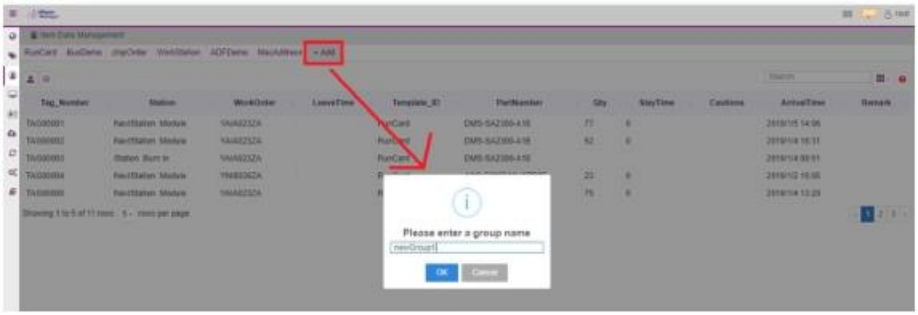


Support CSV, EXCEL , JASON Format

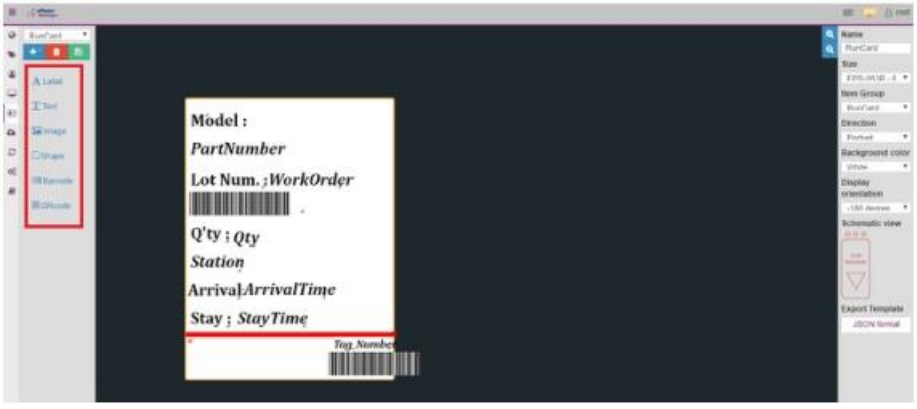
Add new data into current item



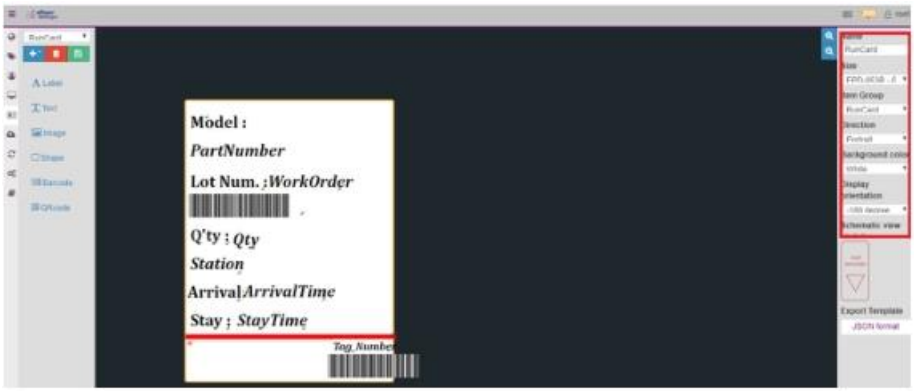
Working Group



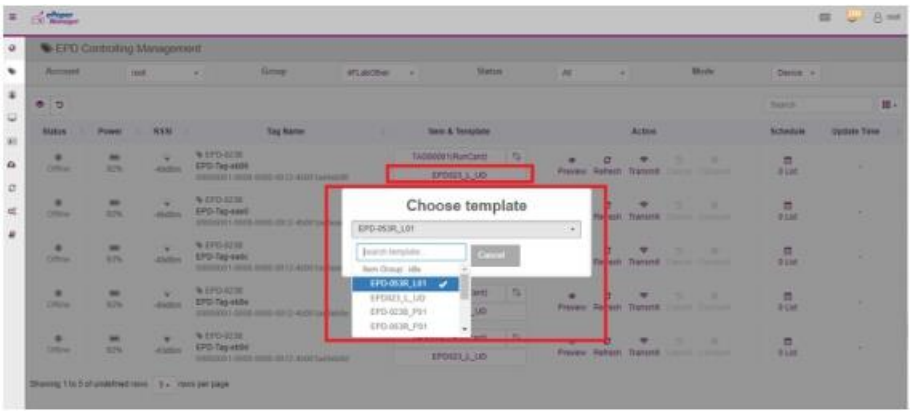
1. User can perform different working group in the same system.
2. User can add new group by click "Add" icon.

Device List	Device search including EPD device, Router and Gateway. Search criteria Account/ Group/Connecting Status/ EPD Device Mode
	Action Remote control device: 1. Default column is Name and status message. 2. User can click icon at the right to select more fields: monitoring and Get/Set Data.
Template	 User may add, save, delete Template
	 Provides image tool Label / Text / Image / Shape / Barcode / Qrcode

User may save the template and then go to EPD controller to bind the template with EPD device.

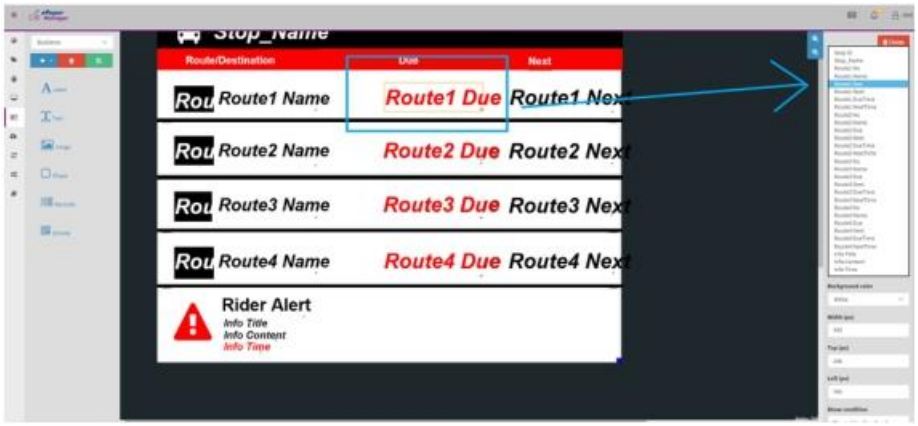


Template name:
EPD Size
ITEM DATA group
Image direction
Background color
Display orientation
Schematic view



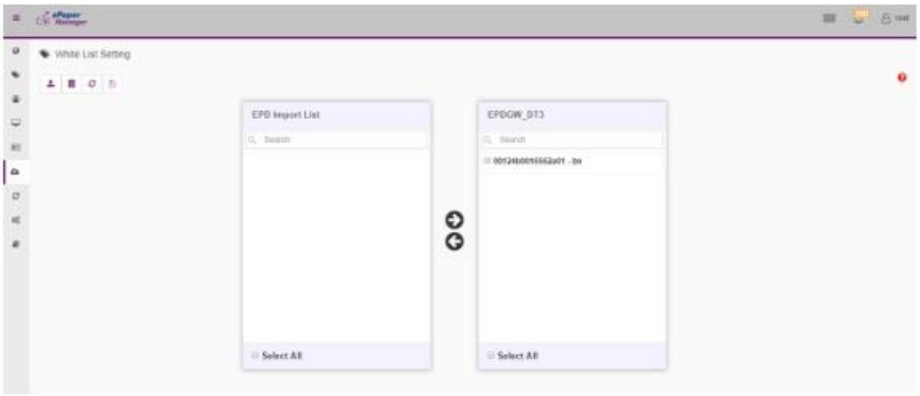
1.EPD controller should setup the binding template.

1. Select on component
2. Right side shows the component properties.



1. Select on component
2. right side shows the component properties.
3.select the field “Value” and drop down menu shows data field from item data.

White List Setting

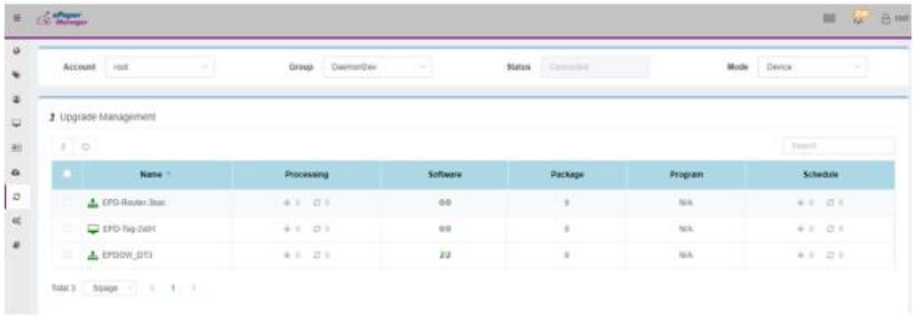


File format

Epd-023,053 white list setting.
User needs to import the device list and then the device can join the network.

OTA

Upgrade



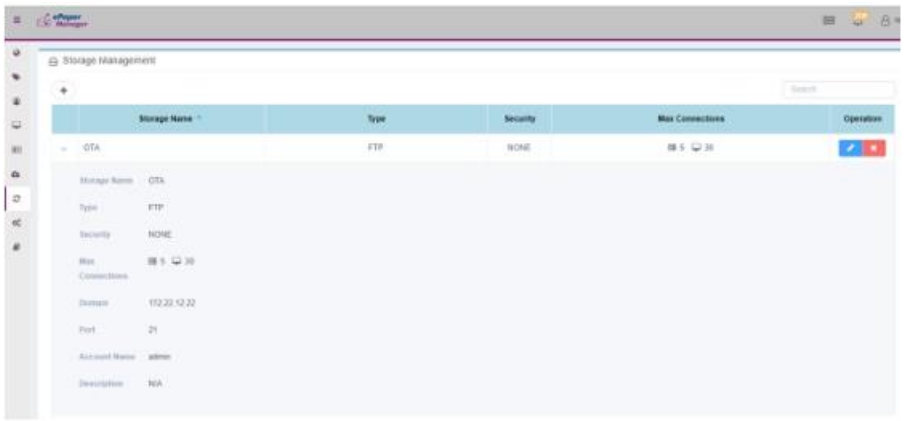
Select upgrade device

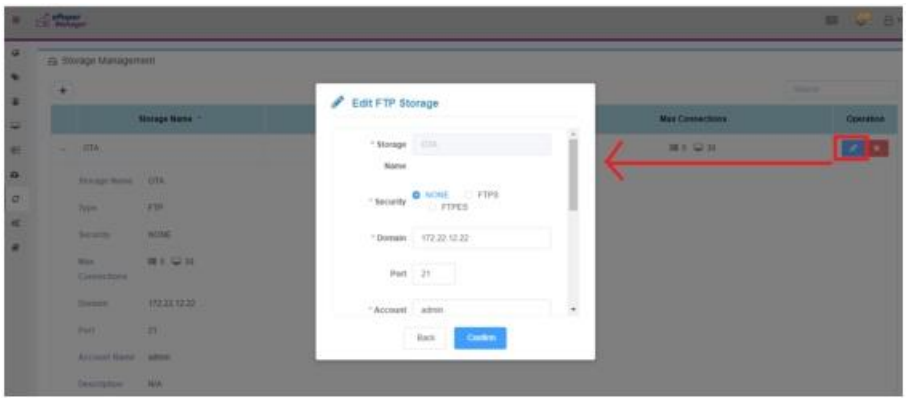
Package

File preparing for the upgrade

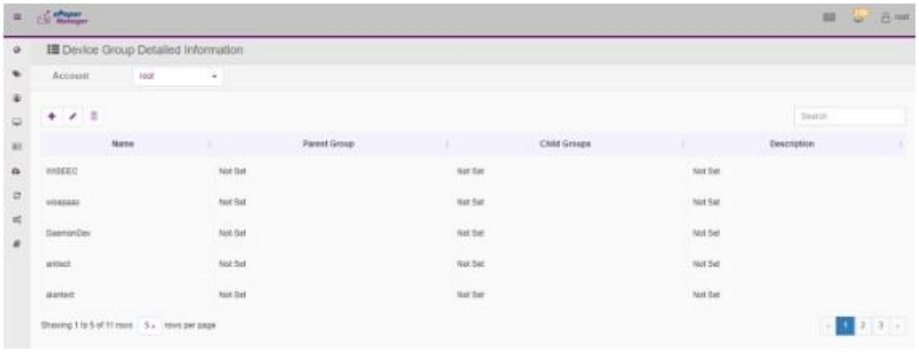
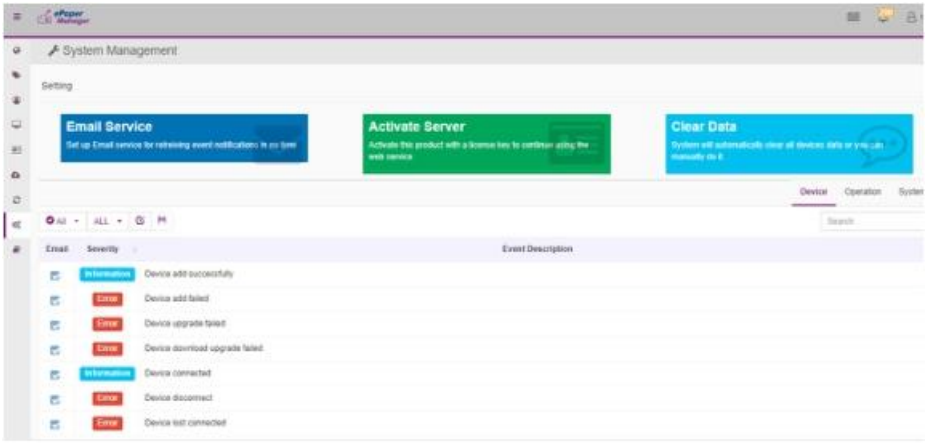
OTA

Storage

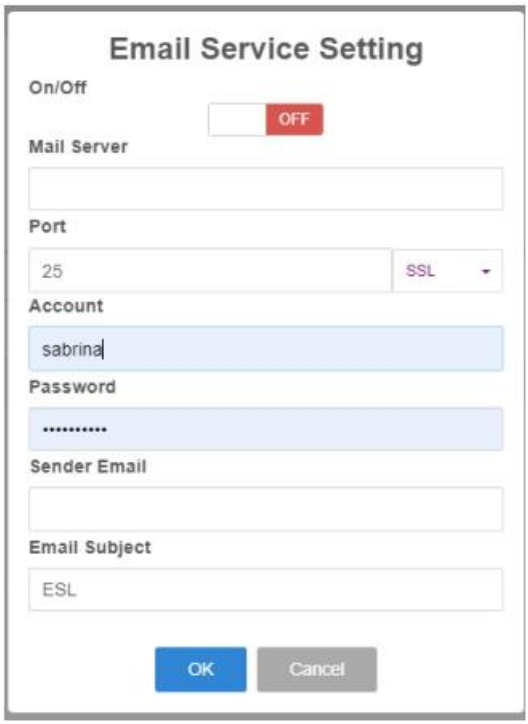




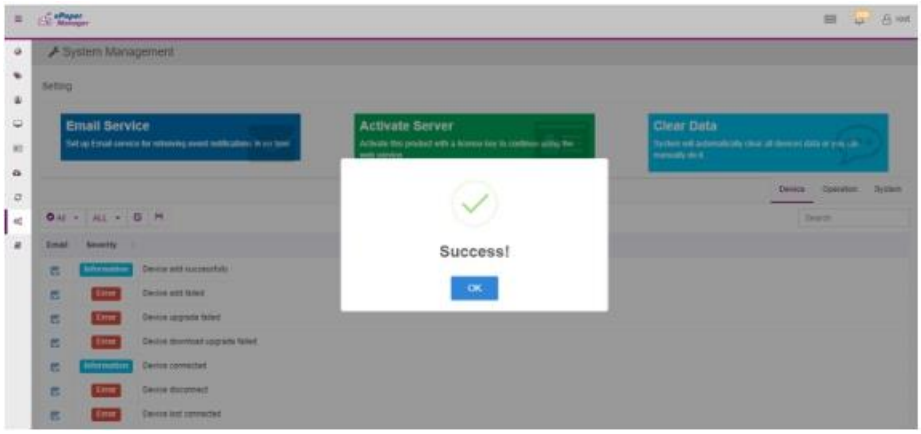
FTP & File path setting

Setting	Role
	 Definition as below Super admin: Admin: Device admin:
	Account & Group
	   Set the device into group.
	Email Service
	1.Click System button under the Setting list 

2.Click Email Service, and fill in the following form.

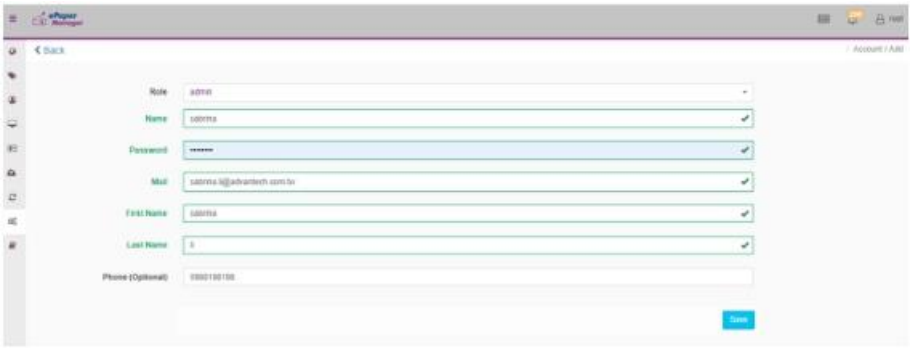


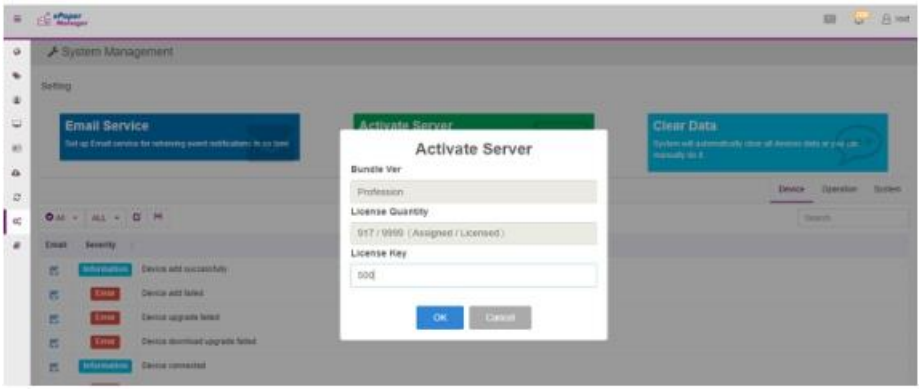
3.Setting successfully.



4.Add email account list for this service. Click Account button under the Setting List.

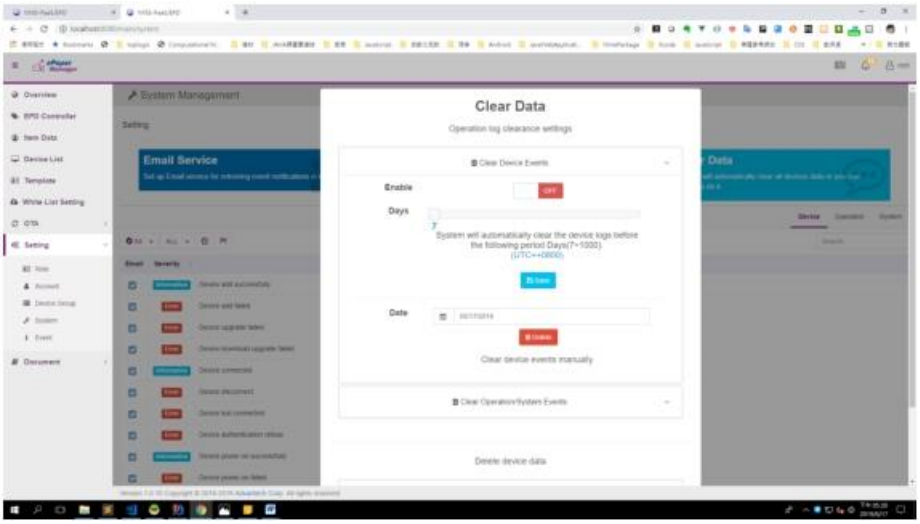
5.Add an admin account. Click Save button. Email will send to this local user when event occurs.



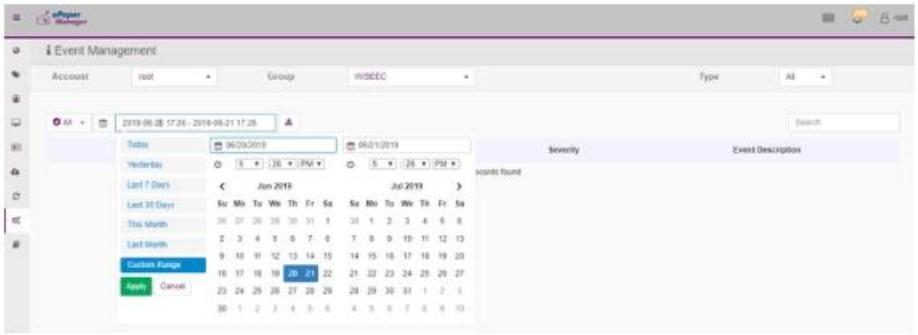
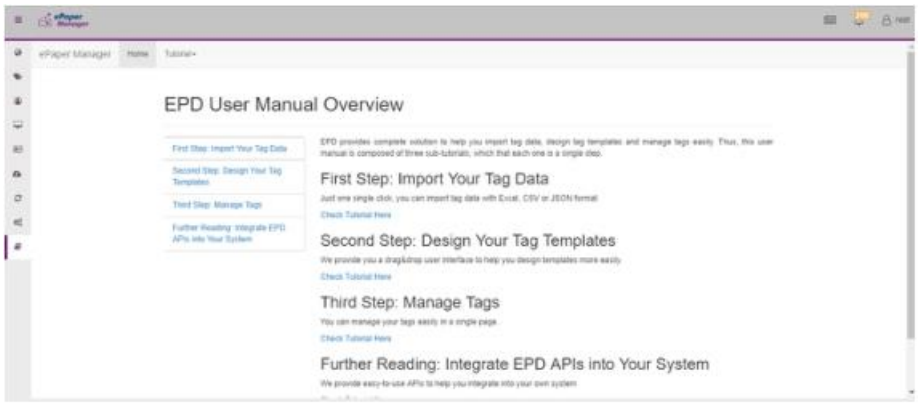


Add EPD connection number license.

Clear Data

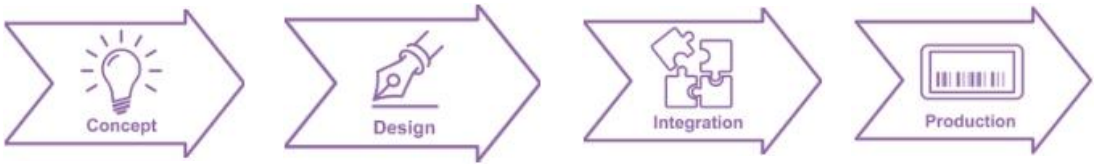


User can query the event by clicking the calendar.

	Event  User can query the event by clicking the calendar.
Document	 User manual Restful API Release Notes

Chapter 5

WISE-EC EPD Design-in Service



5.1 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 new ePaper devices. Advantech handles the complexities of technical research and provides hardware and software integrated connectivity solutions to accelerate development of a wide range of applications such as electronic shelf labelling, smart logistic, smart factory, smart hospital, digital information signage, and smart transportation. Advantech not only provides the single end device but an end-to-end solution including 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.

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

5.1.1 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 EPD device for reference as well as Antenna selection & schematic review. The EPD device design guide provides onboard IO definitions and recommendations of the industrial design, so customers can have a clear guideline to follow during their EPD device 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 proficient 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 list for engineer for easy check their schematics and also review service based on customer carrier board schematics. Those services are preventative,

and help to catch design errors before they happen. It helps to save a lot of time and costs with regard to developing carrier boards.

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

5.1.2 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 plat- forms, customers need to spend a certain amount of time on analyzing integration problems. In addition, ePaper implementation has a lot to do with driver and signal communication which is not plug and play device. Therefore the customer has to learn from trial and error and finally get the best solution with the least effort. Advantech's team has completed total standard HW/SW solution to do performance fine tune, 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 customer's ES sample is completed, the next step is a series of verification steps. In addition to verifying a product's functionality, the related test 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.

5.1.3 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.

Customer can place an order via our smart and fast on-line system. With global peripheral procurement service and global logistics service, Advantech provide vertical integration in short lead time and competitive price for customers' one-stop shopping solutions, and then direct shipment to end users. After sales, a completed global repair service (RMA) take charge to provide device fully repairing service, and then execute efficient delivery.

5.2 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

On the other hand, you can reach our service team through below website, 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

5.3 Global Service Policy

5.3.1 Warranty Policy

Below is the warranty policy of Advantech products:

5.3.1.1 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.

5.3.1.2 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.

5.3.1.3 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 lighting strike, flood, earthquake, etc.
- Product updates/upgrades and tests upon the request of customers who are without warranty.

5.3.2 Repair Process

5.3.2.1 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: http://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.

5.3.2.2 Returning the Product for Repair

It's possible customers can save time and meet end-user requirements by returning defective products to an y 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.

5.3.2.3 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 lighting 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.

5.3.2.4 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.

5.3.2.5 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.

5.3.2.6 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.

ADVANTECH

Enabling an Intelligent Planet

www.advantech.com

Please verify specifications before quoting. This guide is intended for reference purposes only.

All product specifications are subject to change without notice.

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