

EPM-1715

Super CAP Power Module

User's manual



3rd Ed – 23 February 2023

FCC Statement



THIS DEVICE COMPLIES WITH PART 15 FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

- (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE.
- (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRE OPERATION.

THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS "A" DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES.

THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS.

OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

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1. Getting Started

1.1 Safety Precautions

Warning!



Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.

Caution!



Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

Always note that improper disassembling action could cause damage to the motherboard. We suggest not removing the heatsink without correct instructions in any circumstance. If you really have to do this, please contact us for further support.

1.2 Packing List

Before you begin installing your single board, please make sure that the following materials have been shipped:

- 1 x EPM-1715 Super CAP Power Module
- 1 x USB Cable Mini B(M)-A Type(M) 100cm
- 1 x Power Cable 4P/4.2mm-4P/4.2mm 20cm



If any of the above items is damaged or missing, contact your retailer.

1.3 Document Amendment History

Revision	Date	By	Comment
1 st	April 2017	Avalue	Initial Release
2 nd	August 2019	Avalue	Version update to A1.1
3 rd	February 2023	Avalue	Add 4. Mechanical Drawing

1.4 Manual Objectives

This manual describes in details Avalue Technology EPM-1715 Single Board.

We have tried to include as much information as possible but we have not duplicated information that is provided in the standard IBM Technical References, unless it proved to be necessary to aid in the understanding of this board.

We strongly recommend that you study this manual carefully before attempting to set up EPM-1715 series or change the standard configurations. Whilst all the necessary information is available in this manual we would recommend that unless you are confident, you contact your supplier for guidance.

Please be aware that it is possible to create configurations within the CMOS RAM that make booting impossible. If this should happen, clear the CMOS settings, (see the description of the Jumper Settings for details).

If you have any suggestions or find any errors regarding this manual and want to inform us of these, please contact our Customer Service department with the relevant details.

1.5 System Specifications

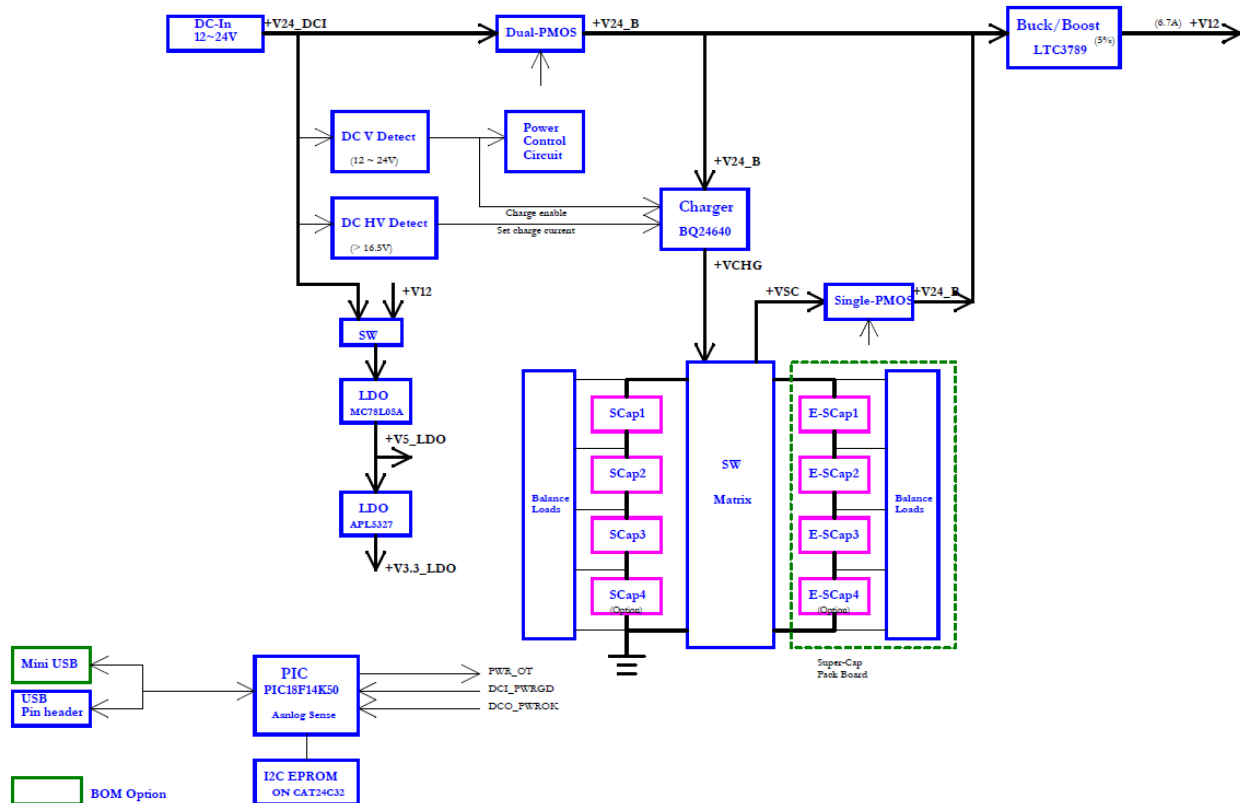
DC In/Out Characteristics	
Rated Output Power (Typ)	60W total output
Maximum Output Power	80W total output
Input Voltage Range	12V ~ 24V
Output Voltage Range	+12V $\pm 5\%$
Maximum Output Current (DC-12V)	+12V 6.7A
Output Ripple & Noise Range	+12V: 100mVpp
DC In/Out Connection	
Input Power Connector	DC Jack 3-pin 2.5mm on board.
Super-Cap Specification	
Main board Super-Cap 4-Cell or 3-Cell on board	Super-Cap Pack board: 400F 4-cell model, 6-cell model or 8-cell model for external 3-cell or 4-cell pack board combined.
Super-Cap pack board 4-Cell or 3-Cell	Super-Cap Pack board: 400F 4-cell model or 3-cell model
Charge Voltage	4-cell/8-cell 10.1V $\pm 3\%$, 6-cell 7.6V $\pm 3\%$
Charge Behavior	Super-Cap is charging or holds at charge full voltage when DC-in is powered.
Super-Cap Cells Life Time	@2.5V 65°C is about 8000 hours, @2.5V 50°C is about 14000 hours
Over Temperature Protection	65°C, PIC firmware drive power off and Super-Cap charger drive charge off.
Super-Cap Pack Connector	PCB board to board DIP connectors.
Function Behavior Specification	
DC-in Power Loss Trigger	Two-pin power on/off button signals of MB, PIC GPO drive dual NMOS turn on to GND for 0.5Sec and then off when DC-in power fail.
Additional Power on/off Behavior	I2C EPROM for PIC setting and following the additional on/off behavior (Optional).
Size	4-cell: 160mm*70mm*69mm*69mm 6-cell/8cell: 160mm*115mm*69mm
Weight	0.44lbs(0.2kg)



Note: Specifications are subject to change without notice.

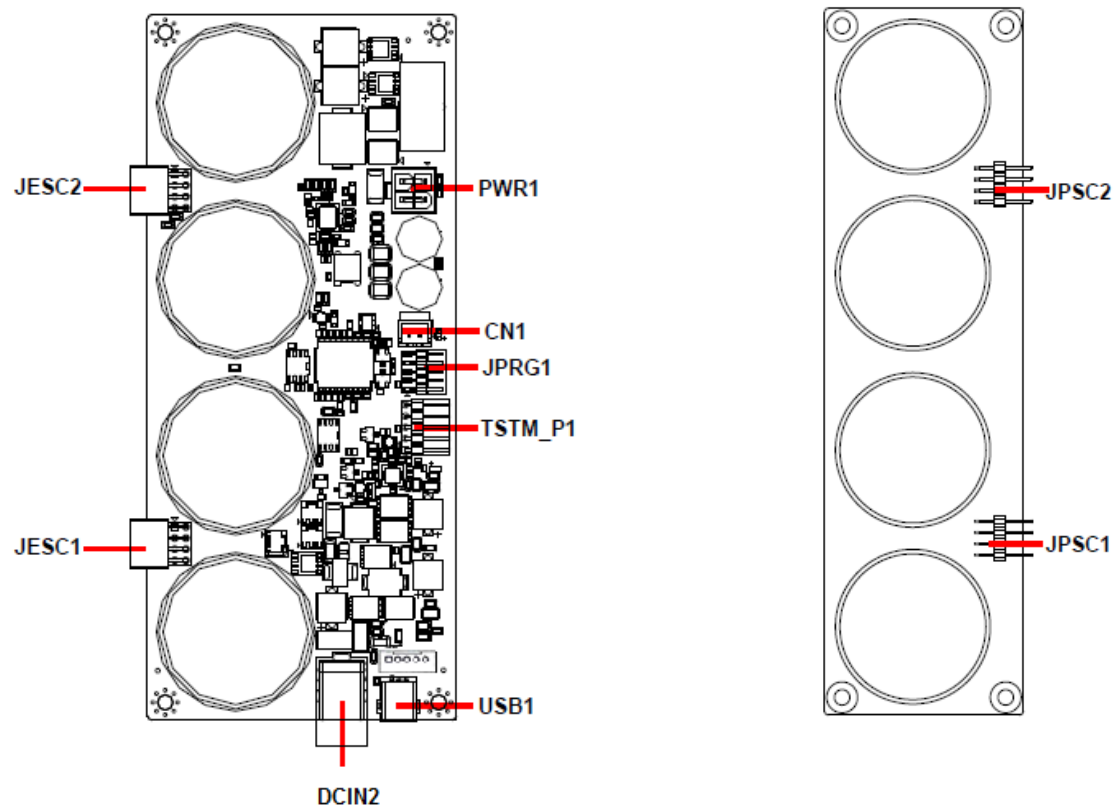
1.6 Architecture Overview—Block Diagram

The following block diagram shows the architecture and main components of EPM-1715.



2. Hardware Configuration

2.1 Product Overview



2.2 Connector List

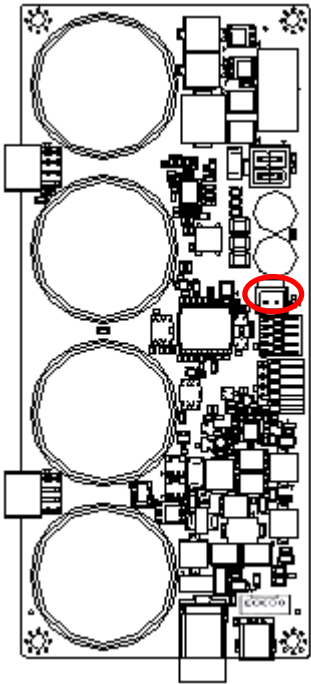
The following tables list the function of each of the board's connectors.

Connectors

Label	Function	Note
CN1	Power button connector	2 x 1 wafer, pitch 2.00mm
USB1	Mini USB 90D	
JPRG1	PIC Controller	5 x 1 header, pitch 2.00mm
DCIN2	DC power-in connector	
JESC1	Main board connector 1 (connect to JPSC1)	4 x 2 header(F), pitch 2.54mm
JESC2	Main board connector 2 (connect to JPSC2)	4 x 2 header(F), pitch 2.54mm
TSTM_P1	Test Module Port	5 x 1 header, pitch 2.54mm
PWR1	Power connector	2 x 2 wafer, pitch 4.20mm
JPSC1	Super-Cap Pack board connector 1 (connect to JESC1)	4 x 2 header, pitch 2.54mm
JPSC2	Super-Cap Pack board connector 2 (connect to JESC2)	4 x 2 header, pitch 2.54mm

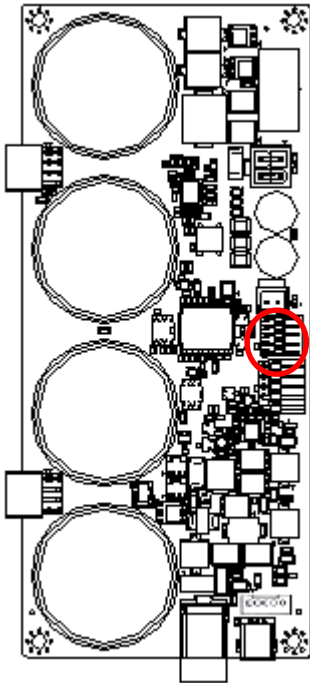
2.3 Setting Connectors

2.3.1 Power button connector (CN1)



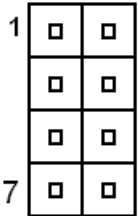
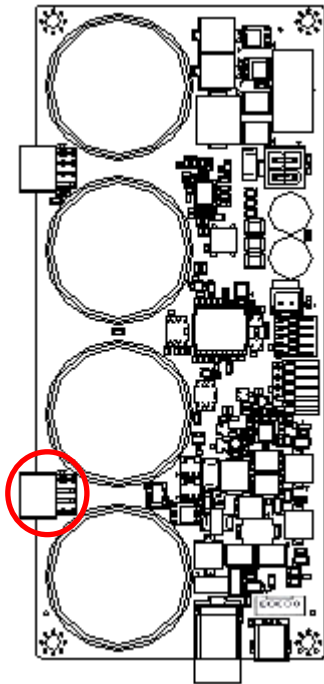
PIN	Signal
1	POFF_TRG
2	GND

2.3.2 PIC Controller (JPRG1)



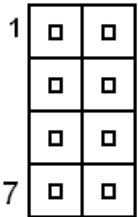
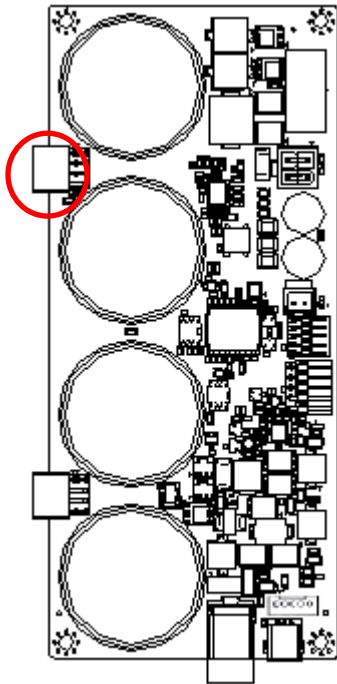
PIN	Signal
5	GND
4	PIC_ICSPDAT
3	PIC_ICSPCLK
2	PIC_MCLR
1	+3.3V

2.3.3 Main board connector 1 (JESC1)



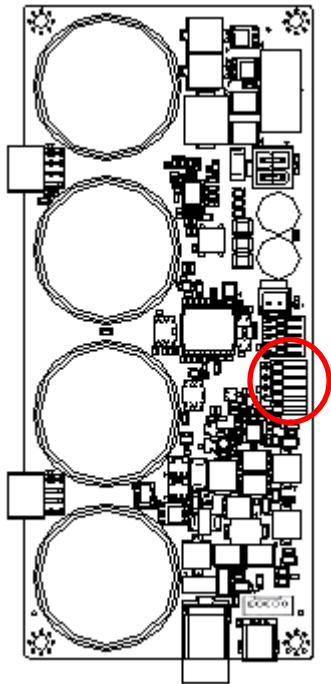
Signal	PIN	PIN	Signal
+VSCE	1	2	+VSCE
+VSCE	3	4	+VSCE
+VSCE	5	6	+VSCE
+VSCE	7	8	+VSCE

2.3.4 Main board connector 2 (JESC2)



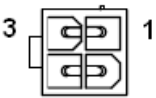
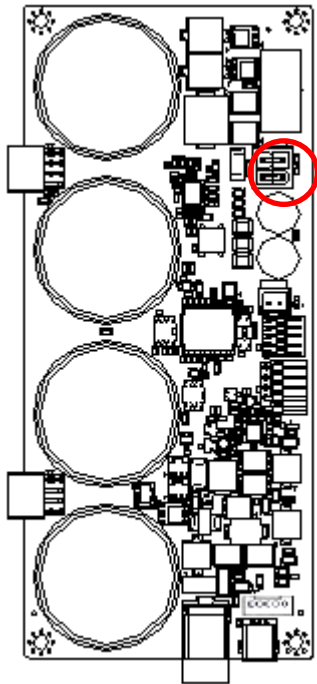
Signal	PIN	PIN	Signal
NEG_VSCE	1	2	NEG_VSCE
NEG_VSCE	3	4	NEG_VSCE
NEG_VSCE	5	6	NEG_VSCE
NEG_VSCE	7	8	NEG_VSCE

2.3.5 Test Module Port (TSTM_P1)



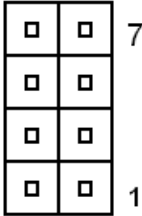
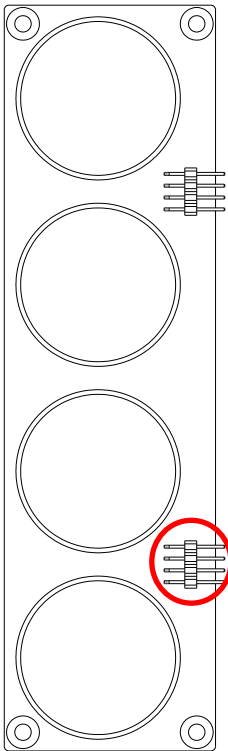
PIN	Signal
5	+VCHG
4	+VSCL
3	CHG_OPEN#
2	SC4
1	GND

2.3.6 Power connector (PWR1)



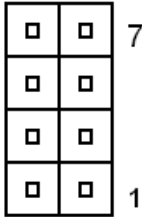
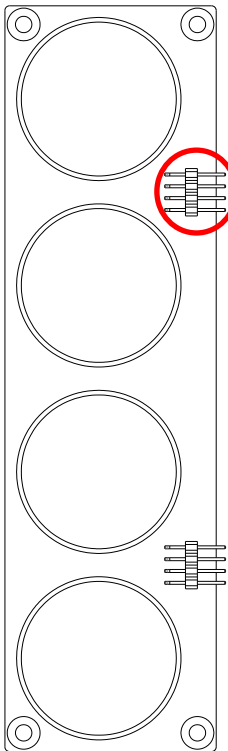
Signal	PIN	PIN	Signal
+12V	3	1	GND
+12V	4	2	GND

2.3.7 Super-Cap Pack board connector 1 (JPSC1)



Signal	PIN	PIN	Signal
+VSCE_PK	8	7	+VSCE_PK
+VSCE_PK	6	5	+VSCE_PK
+VSCE_PK	4	3	+VSCE_PK
+VSCE_PK	2	1	+VSCE_PK

2.3.8 Super-Cap Pack board connector 2 (JPSC2)

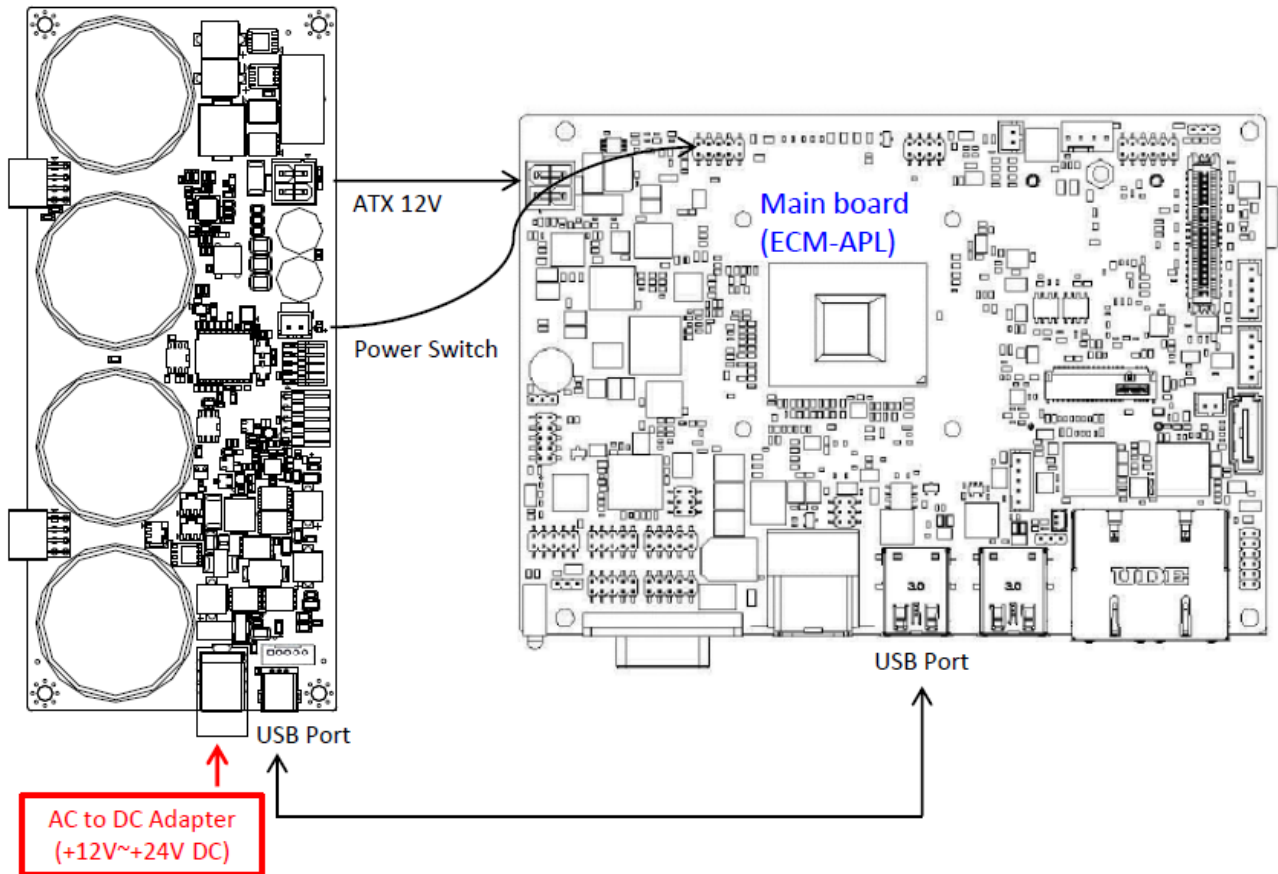


Signal	PIN	PIN	Signal
NEG_PK	8	7	NEG_PK
NEG_PK	6	5	NEG_PK
NEG_PK	4	3	NEG_PK
NEG_PK	2	1	NEG_PK

2.4 Connection and Operation explained

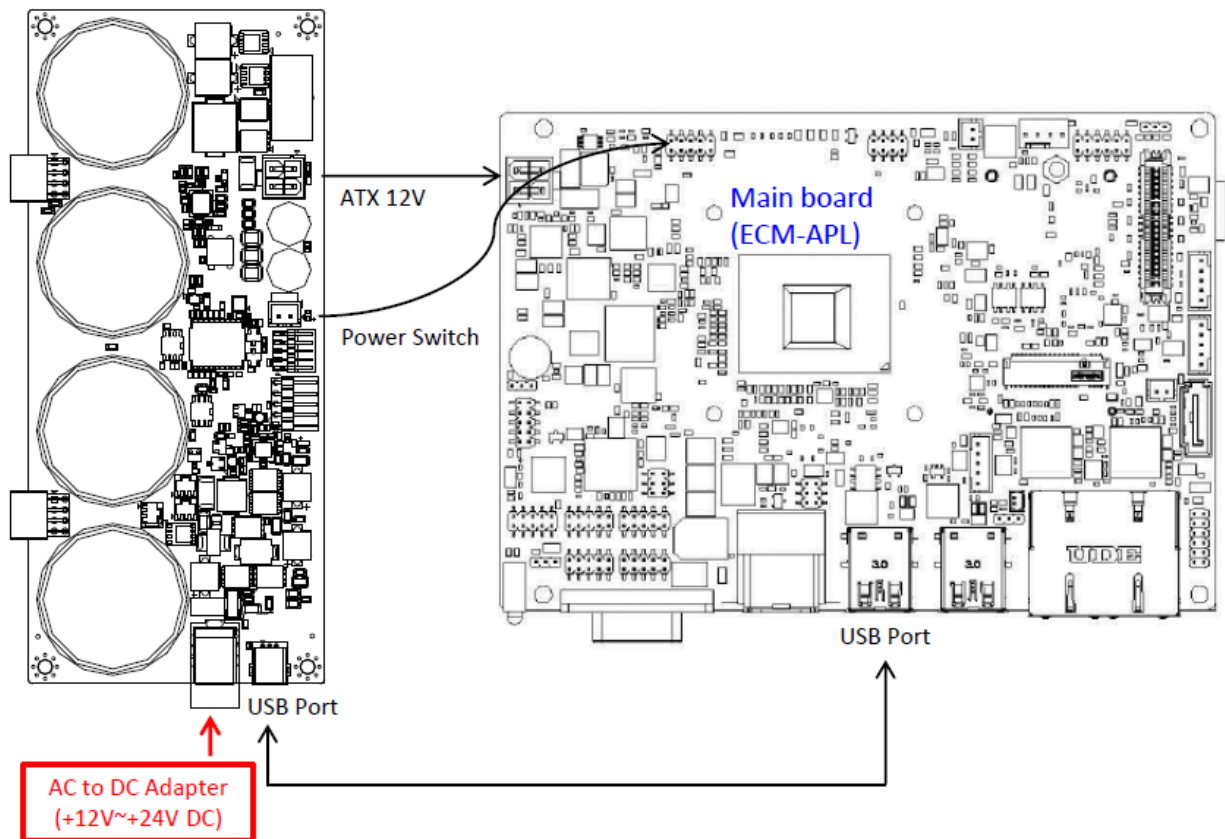
2.4.1 Power input connection:

1. Connecting ATX 12V power connector (4 pins) between the EPM-1715 and main board.
2. Input +12V ~ +24V DC power to PWR1 of EPM-1715.



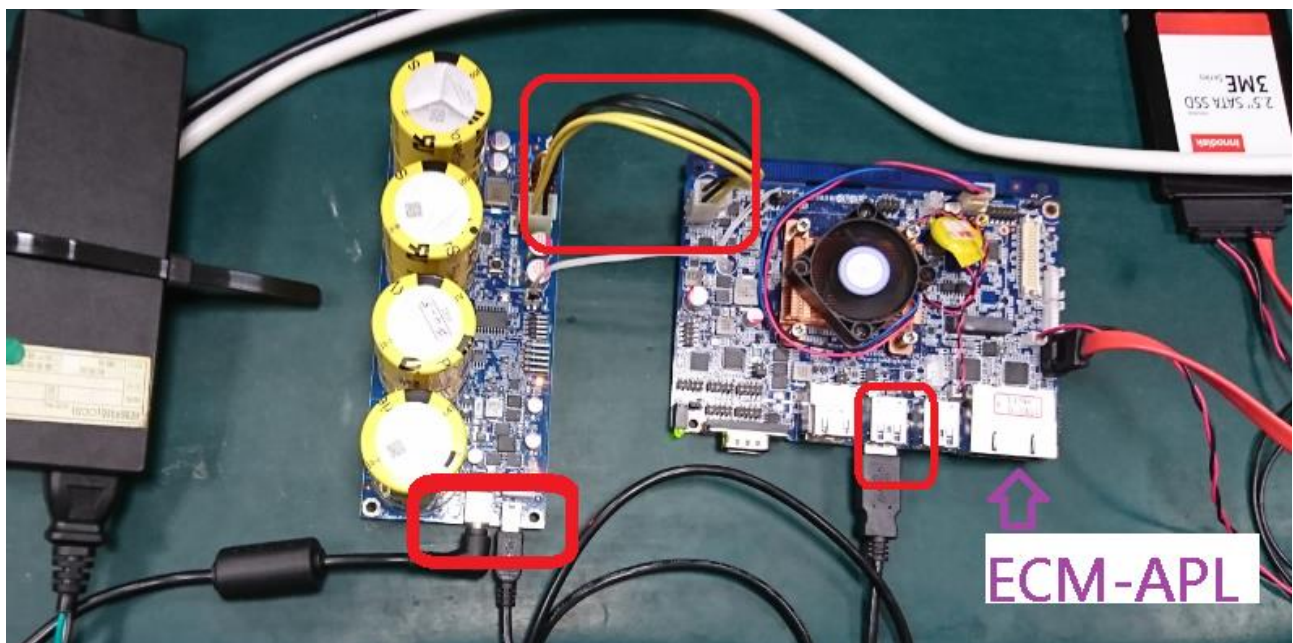
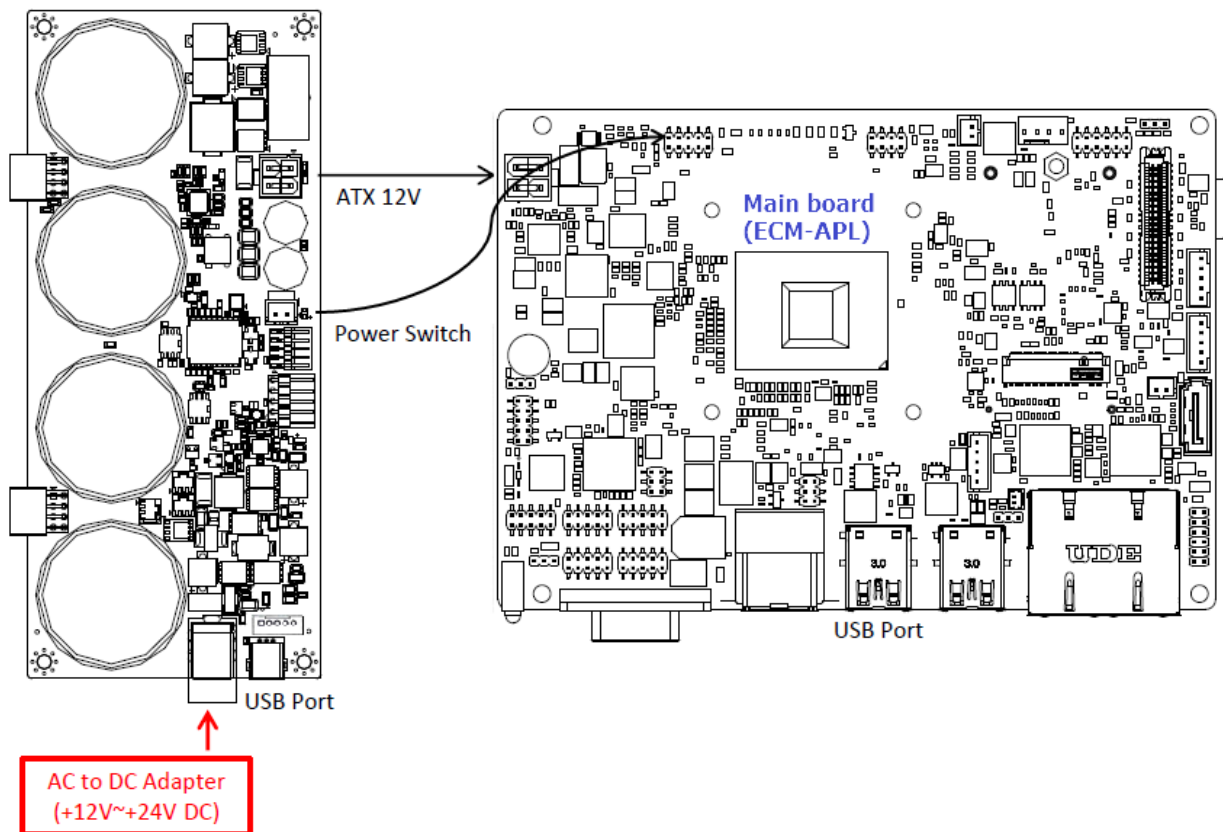
2.4.2 Connection for monitoring EPM-1715's Super Capacitor power status through USB port (when Power Reboot Setting is set "Power" type):

1. Connecting the USB ports between EPM-1715 and main board through an USB port cable.
2. To launch EPM-1715 AP to monitor the EPM-1715's Super Capacitor power status through USB Port.
3. Power Reboot Setting from EPM-1715 AP should be set as "power" when connecting USB cable

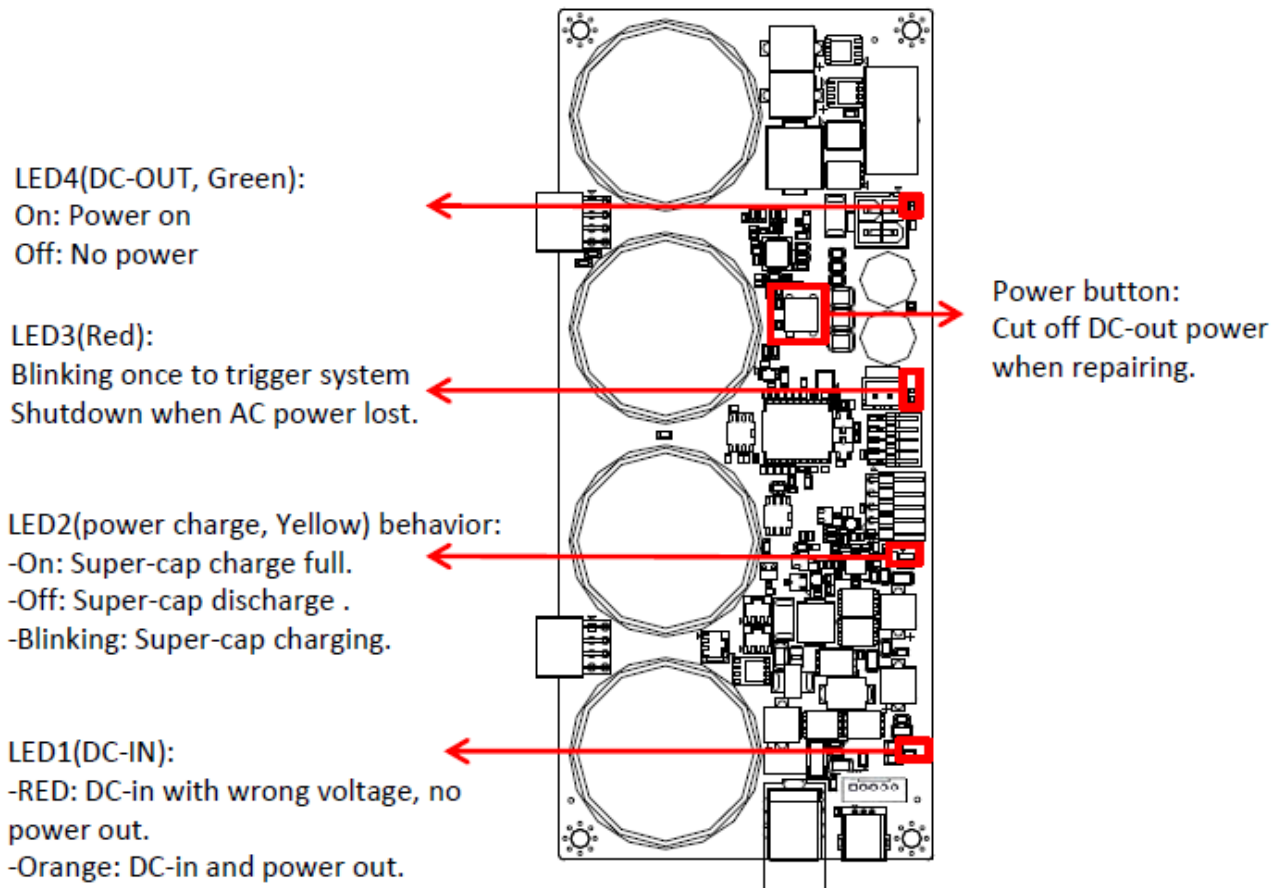


2.4.3 Connection for powering off/on the main board through EPM-1715's Power button connector (CN1) (when Power Reboot Setting is set "Button" type):

1. Connecting EPM-1715's Power button connector (CN1) to the power switch pin header of the main board.
2. Power Reboot Setting from EPM-1715 AP should be set as "Button" when connecting power switch cable.



2.4.4 EPM-1715 Status LED:



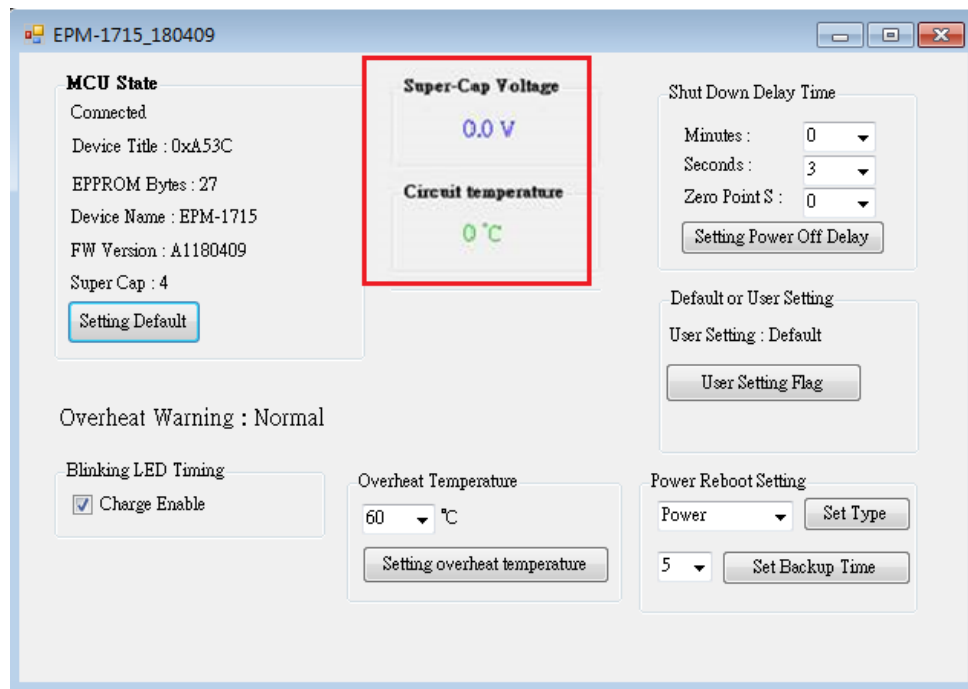
3. AP Setting

3.1 Download AP Software

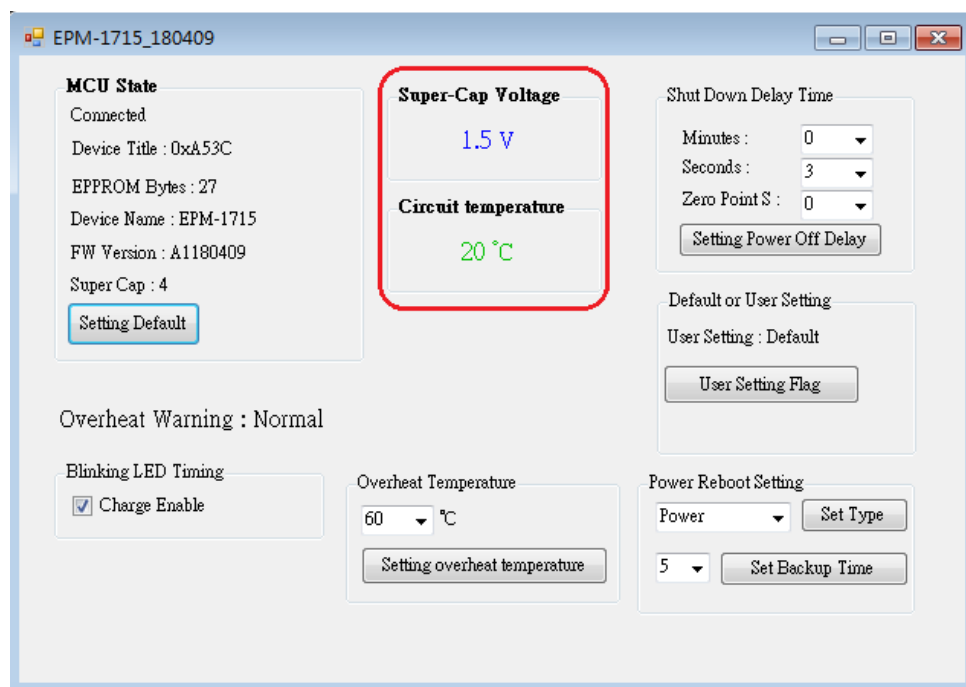
- Download AP from Avalue website and run file **EPM_1715 Checking.exe**

The AP dialog box is below,

1. **AC Power disconnected/AC Lost**



2. **AC Power Connected**

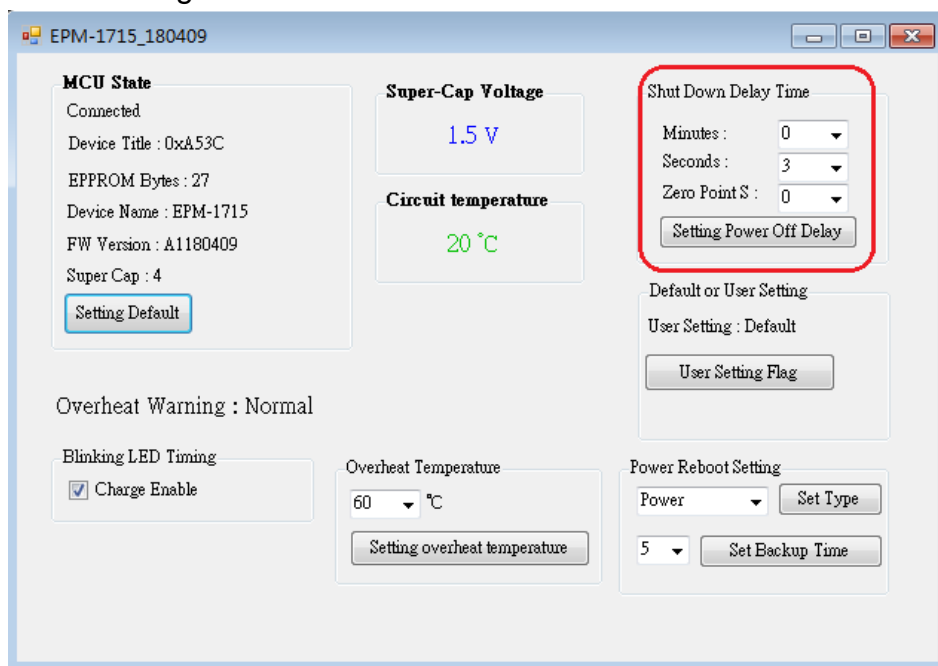


3.2 Function Setting

3.2.1 Setting “Trigger time” to shutdown system when AC loss.

- Trigger range: 0sec to 1min. (Default: 3 secs).
- Select trigger time you want and press **Setting Power Off Delay** to complete the setting.
- When the trigger time is more than 1mins, EPM-1715 will not trigger to shut down the system.

The dialog box:



3.2.2 Power Reboot Setting:

a.) [Set Type] Power Reboot Setting:

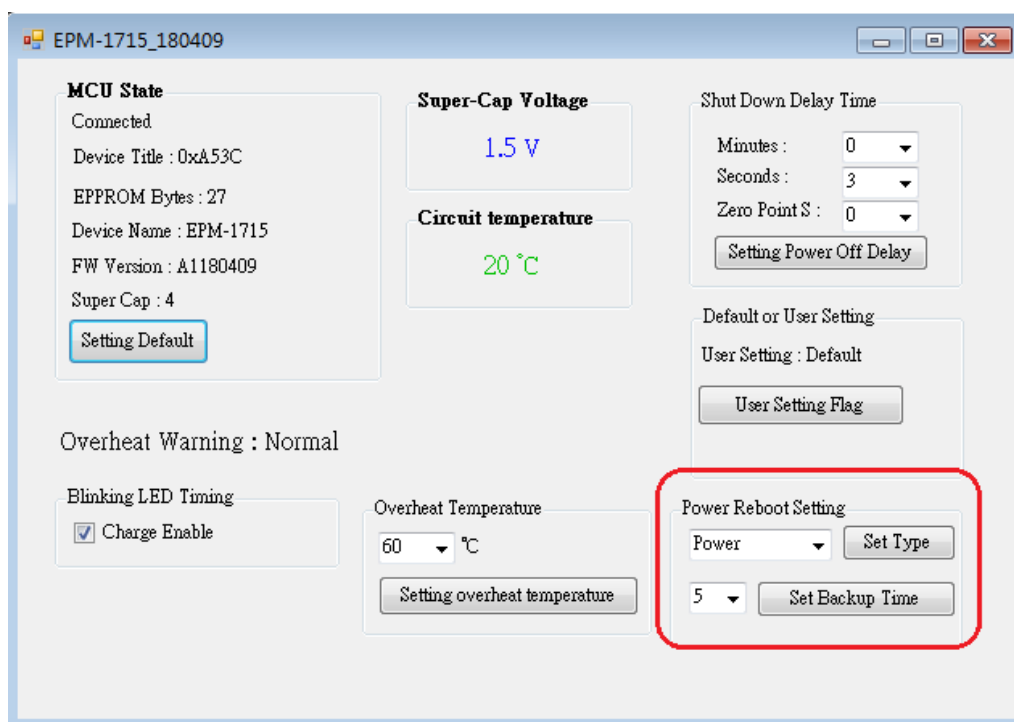
There are three type for power reboot. Please press “Set Type” after you have chosen which type you need to complete the setting (Power is the default setting).

- (1) Power: Reset power to reboot (cut off power and then turn on power)
- (2) Button: Use Power Button to reboot (automatically trigger the power button through the cable)
- (3) No Reboot: disable reboot function

b.) [Set Back up] Backup Time Setting:

This is to set the system backup time that you want to pass to start rebooting. The setting time range is 3 minutes to 20 minutes. Please press “Set Backup Time” after you have chosen the time you want to complete the Setting (5 minutes is the default setting).

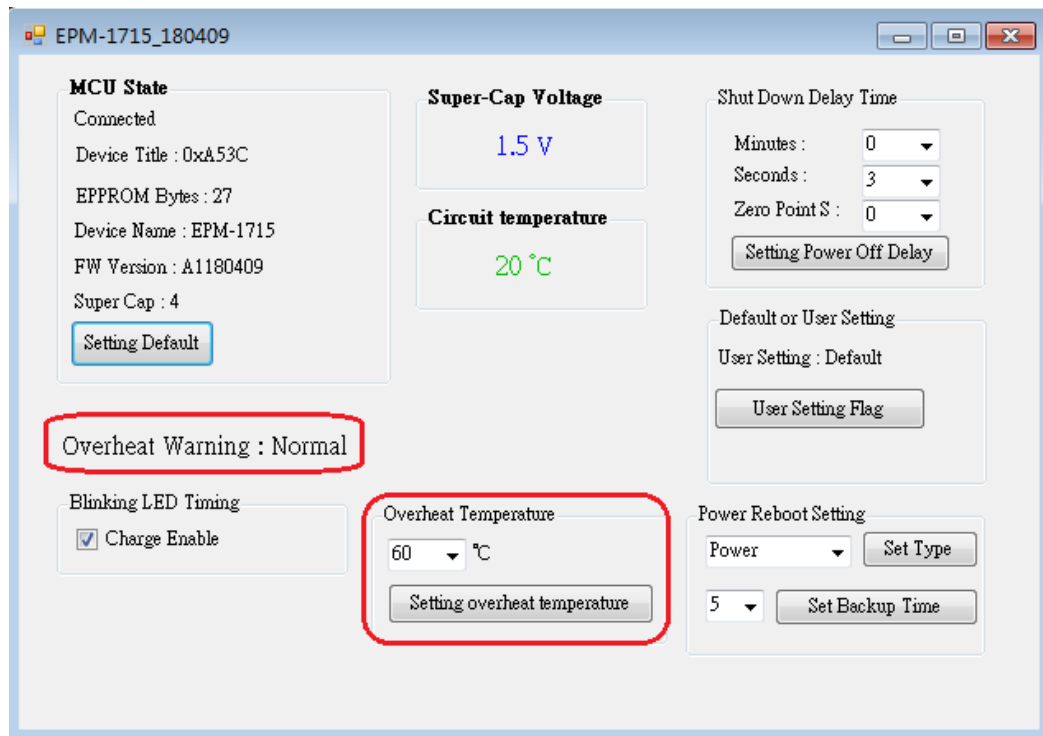
The dialog box:



3.2.3 Over Heat Shut down Setting:

- Setting temperature to trigger system discharge super capture to avoid over heat.
Select the temperature you want and press **Setting overheat temperature** to complete the setting. The default setting is 60 ° C.
- Temperature Range: 40 ° C~ 60 ° C
- The warning notice -“Over heat Warnings: The EPM-1715 is Overheat!!!”- shows up when the temperature is over than the value you set..
- The warning notice will disappear and the super capture will charge automatically when the temperature is **under 40 ° C**.

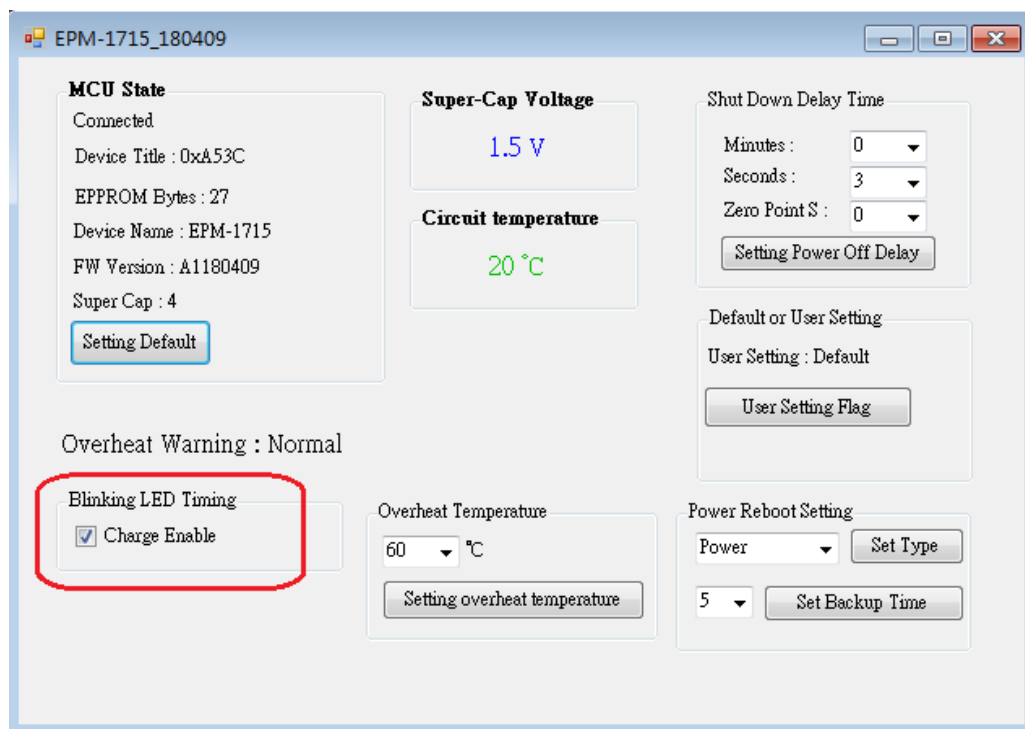
The dialog box:



3.2.4 LED2 (power charge) Blinking Time Setting:

- a.) LED2 (power charge) behavior:
- On: power full
 - Off: power discharging
 - Blinking: Power charging
- b.) **Setting blinking time:**
- Press **Charge Enable** to ensure auto charge function.
 - Uncheck **Charge Enable** will disable charge function.

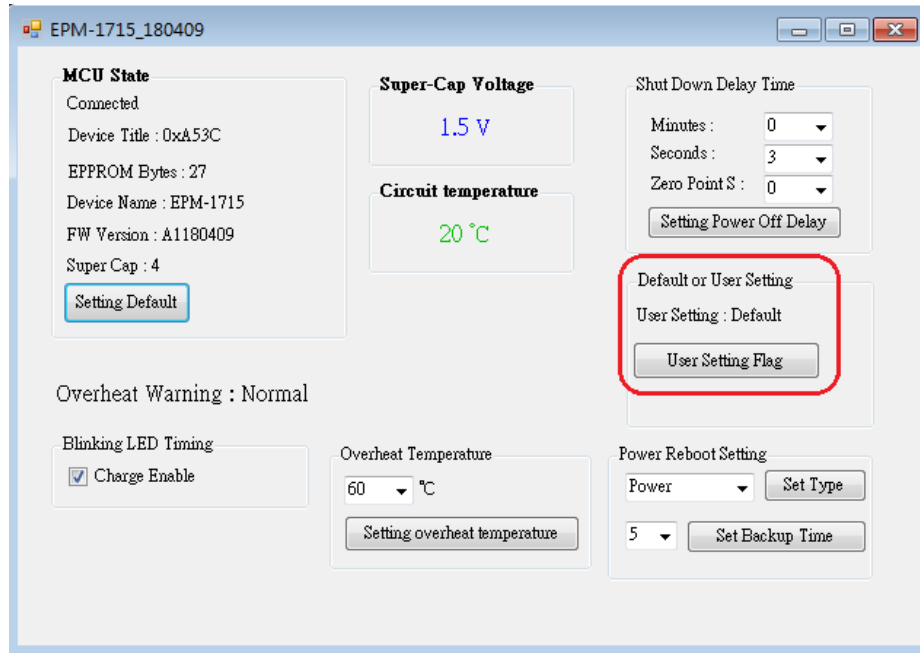
The dialog box:



3.2.5 User/Default Setting:

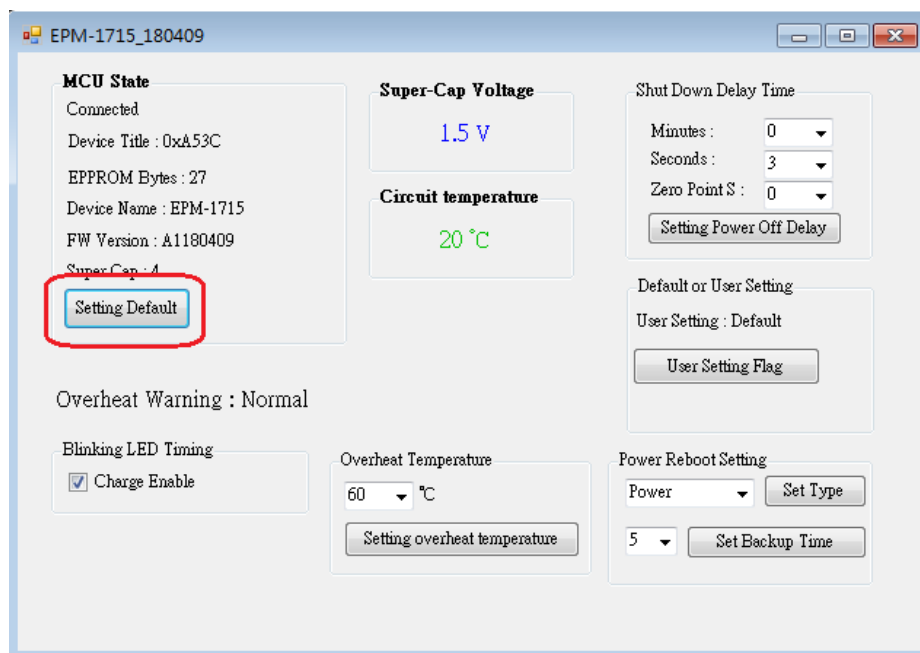
- a.) Select/key-in the value that you want and press **User's setting flag**.
User setting will be changed from "Default" to "User's changing". All setting you made will be remaining when you re-boot the system.

The dialog box:



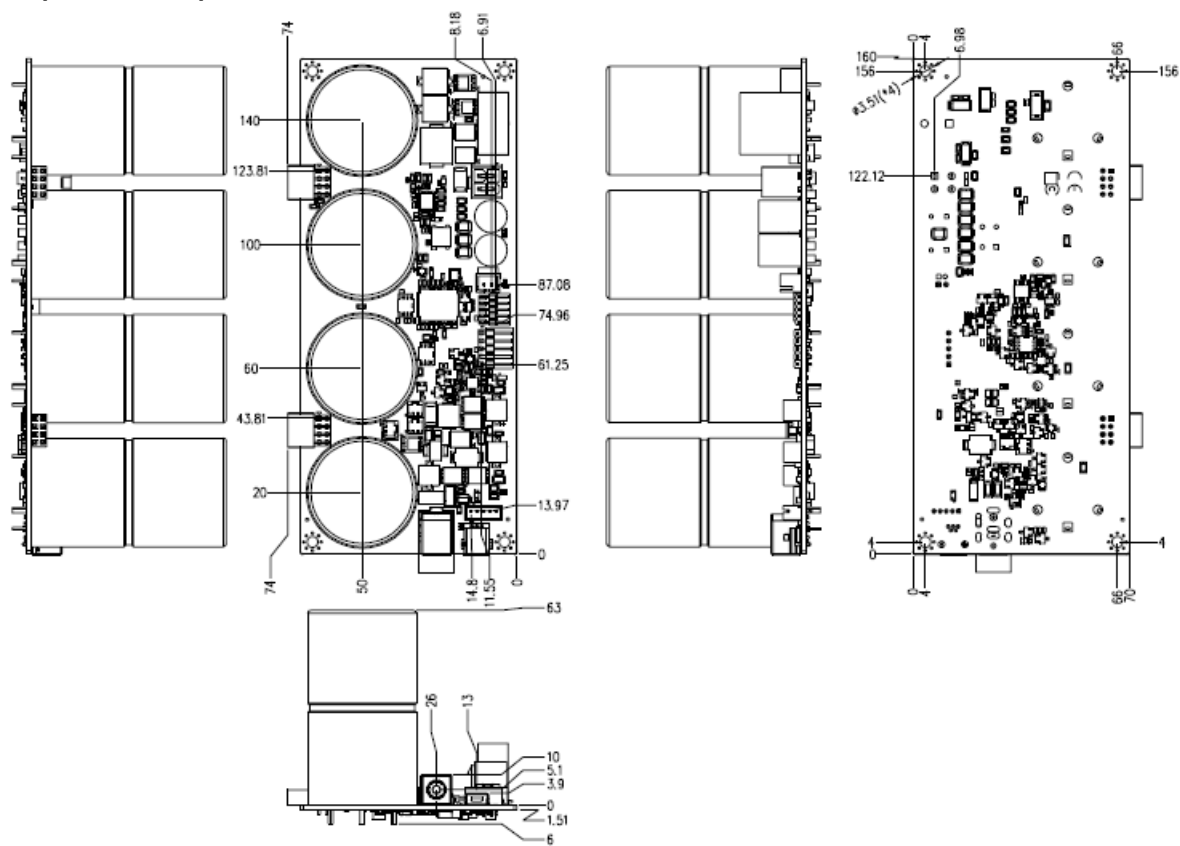
- b.) Press **Setting Default**, all setting will return to default.

The dialog box:



4. Mechanical Drawing

4-cell (EPM-1715)



Unit: mm

