EVALUATION-KIT for Epson Real Time Clock Module.

EASY INSTRUCTION MANUAL

Oct 2019

Microdevice Operations Division

Seiko Epson Corporation

OUT-19-4700

INDEX

1. Outline

Purpose

The RTC Evaluation Tool is a Windows application that allows Epson customers to evaluate Epson RTC devices.

The program allows the configuration of supported RTCs and provides a simple method to adjust the device settings and evaluate basic performance. It assumes that an Epson RTC Evaluation board with USB interface is used. Other evaluation platforms, or custom solutions, are not supported.

RTC Devices supported:

RX8804CE or RX8900CE

Please refer also to 8 Control of External RTC.

Feature

On GUI of Windows, confirmation of an operation are possible of all functions of RX8900CE andRX8804CE.

The function that user can send 10 sequences command to RTC.

This function help your software examination.

The function that an external RTC is connected to a board realize evaluation of an RTC on the customer products.

1. Outline

Features

Windows GUI provides a simple method to adjust the device settings and evaluate basic performance.

Information: Provides a brief summary of the selected RTC features.

Time and Date: Provides a simple method to update the Time and Date settings of the RTC.

Alarm: Controls the settings for the internal RTC alarm. It also provides a method to enable and visually test a specific alarm time.

Timer: Allows configuration and control of the RTC timer feature. It also provides a method to enable and visually test a specific alarm time.

Register: Designed to display the current RTC register values and provide an easy method to interactively program a single register, or a sequence of registers.

Power: Controls the Voltage provided to the RTC by the power management IC. It also displays power measurements for the RTC and optional data logging.

Frequency: The Frequency Tab allows configuration of the FOUT (frequency out) pin of the RTC.

2. Restrictions and exemption clause

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Deployment environment:

Perform handling of an Evaluation-kit by an experienced electronics-engineer.
To prevent ignition by power source short , fume, overheat and equipment damage by performing work on stable desk of non electroconductivity of a laboratory.
Be careful about handling jumpers pin or test pins on board in order to avoid injury in fingers.
As for board, do not operate in a pyrostat and other environmental testing equipment's.
Voltage and current readings and display in windows are rough values and are only for your understanding of functional characteristics.
Even if the voltage and electric current showed not exact values, that is not a problem.
When precise measurements are necessary, evaluate with a measuring instrument.

3. Warning to use it safely

1: PIN HEAD

A head of each test pin and a jumpers pin is sharp.
Be careful to these pin, it is sticking easy into a finger very much.

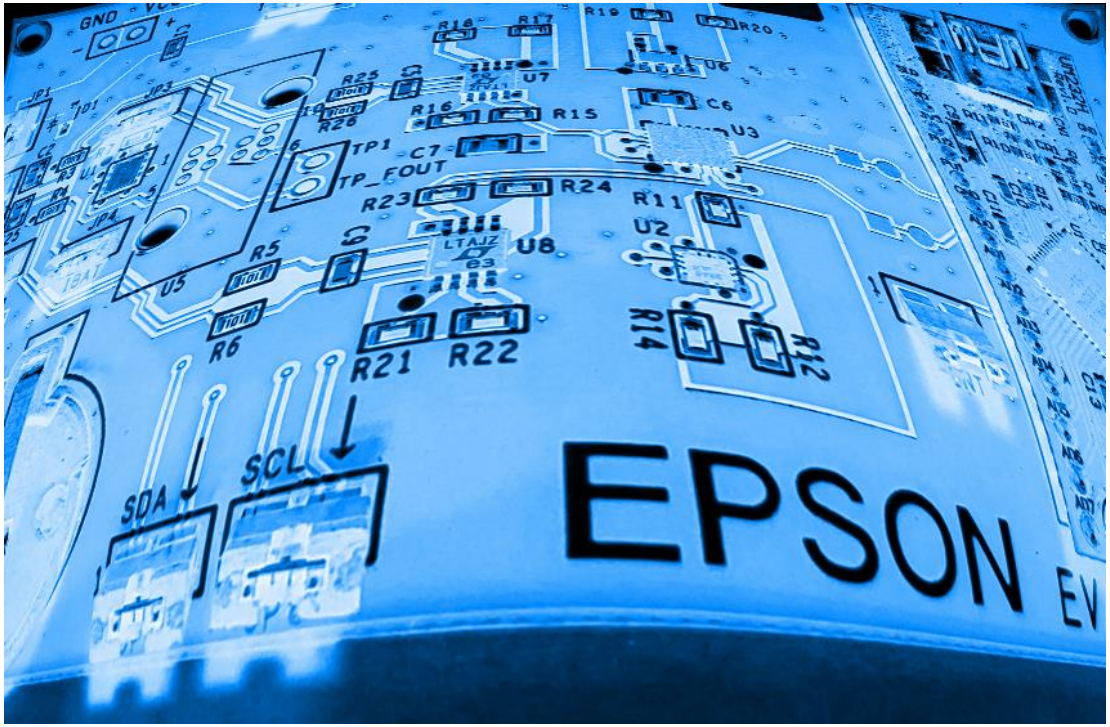
2: A SHORT CIRCUIT

A board works in a USB power source from a PC.
When a terminal of a board short-circuits, may damage of USB port of a PC occur.
Be careful to neighboring metal of Evaluation-kit.

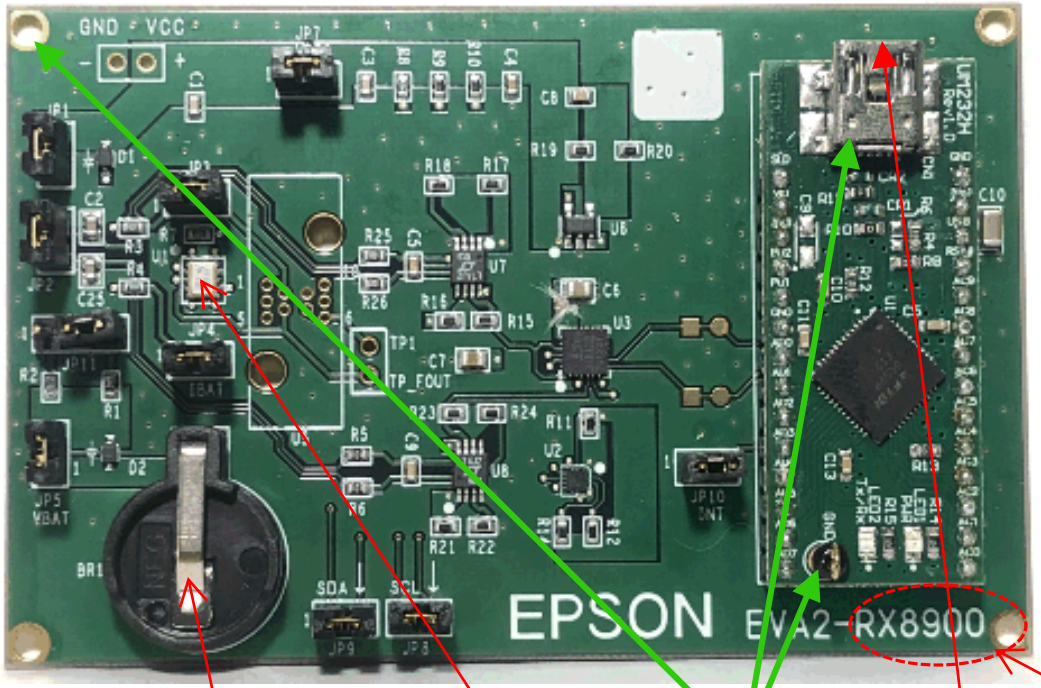
3: BATTERY

Confirm battery cell polarity.
Top is Plus(+).
Battery type is CR1220.
Epson does not take responsibility about a trouble of quality of coin battery.

Chapter 1 Board



4. Layout



Model name on the board.

Signal ground

A Battery socket.
For CR1220.
Even if Battery does not set, Evaluation-kit work.

RX8900CE
or RX8804CE

USB Mini-B port.

Cable is not attached.
Please prepare suitable length cable to PC.

5. RX8900CE Setup of Jumper

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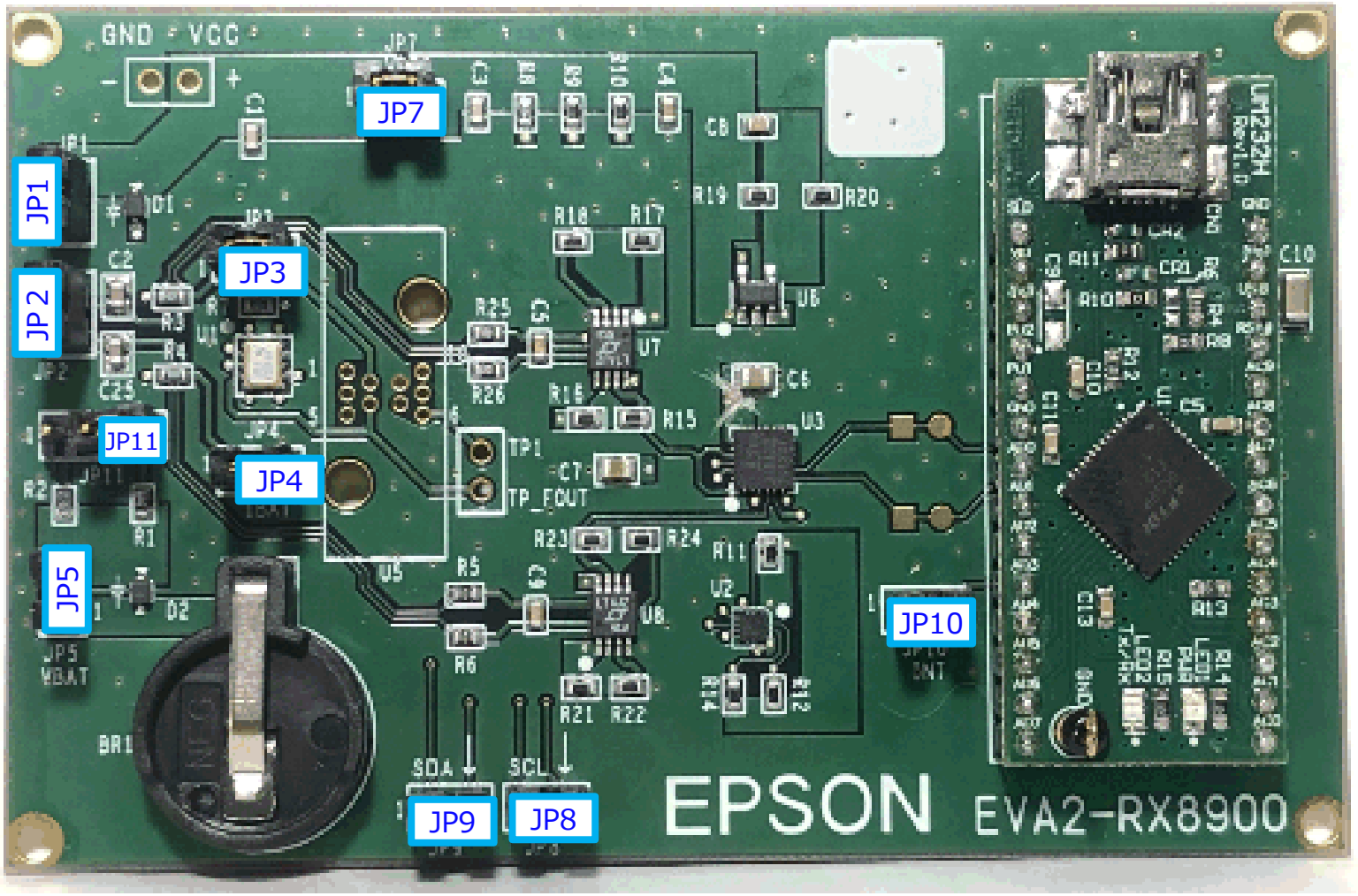
RTC-EVA2-RX8900CE

JPn ← Close by Jumper



6. RX8804CE Setup of Jumper

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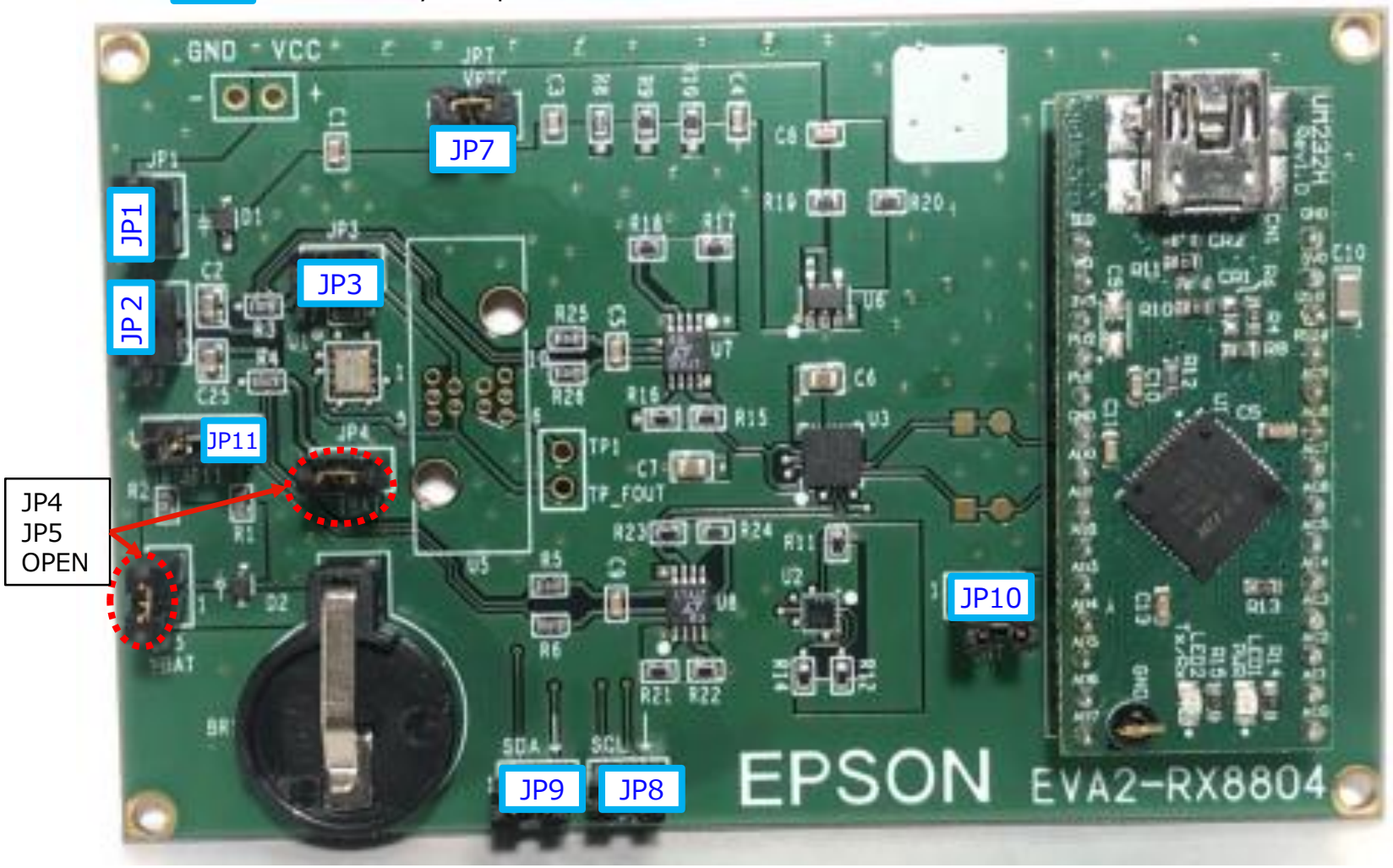
RTC-EVA2-RX8804CE

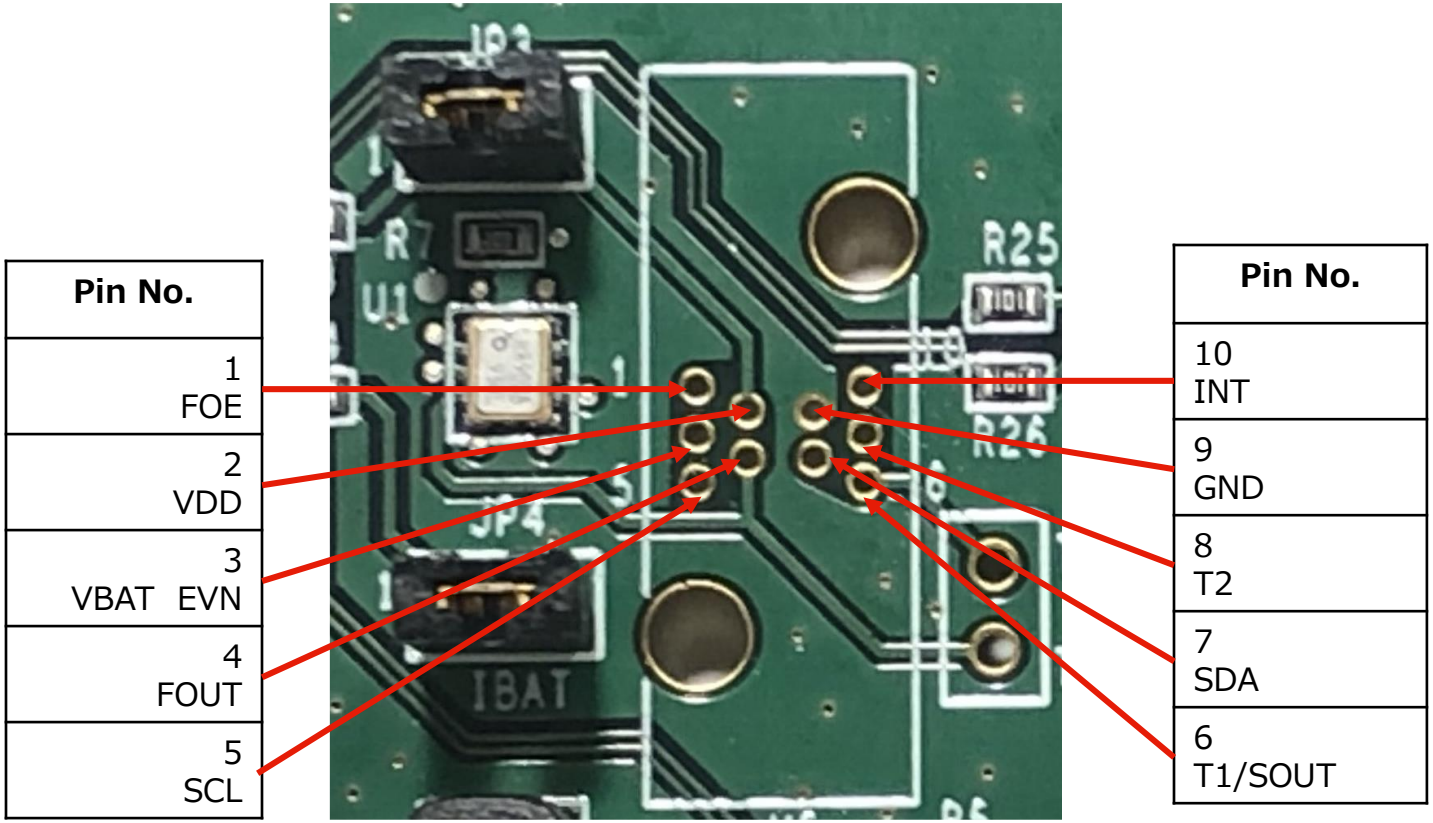
JPn ← Close by Jumper



7. Monitor of signals

Signal monitoring

Signal of each pins appears in these place.



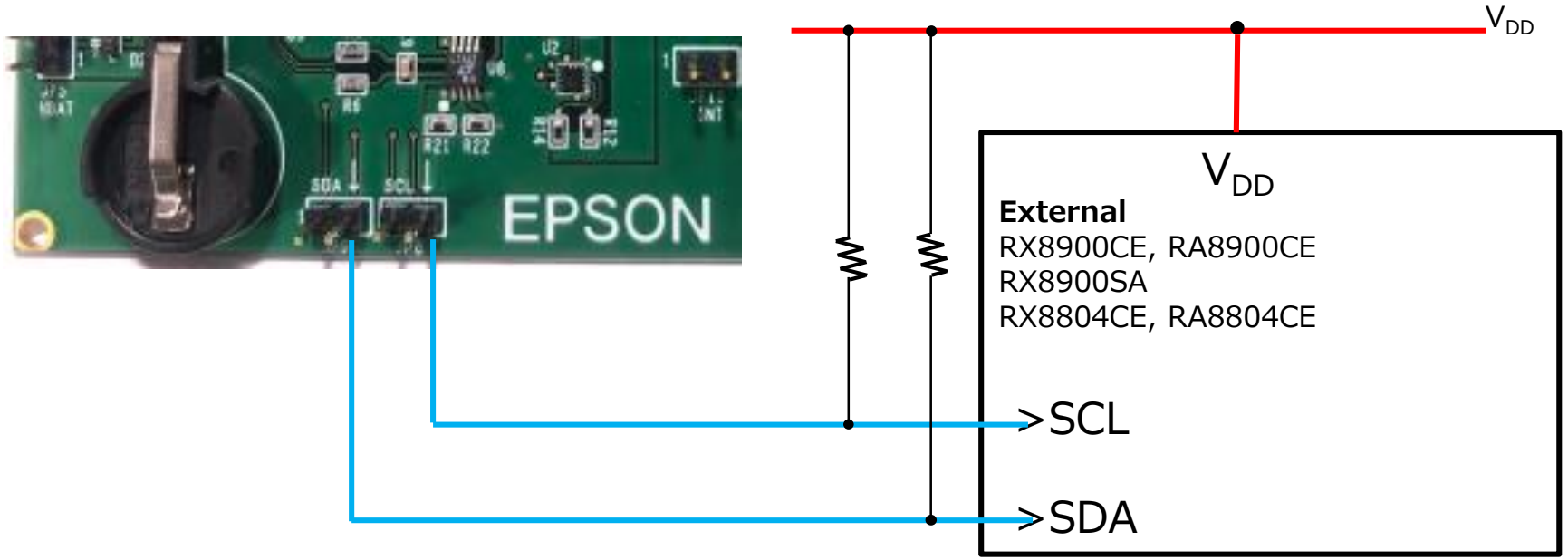
8. Control of External RTC

When both JP8 and JP9 are open, RTC on board is disconnected from I²C on board.
Thus board enables connection of external RX8804CE, RX8900CE,RX8900SA and control is possible.
It realized evaluation of RTC on your system.

1 Should be connect each of GND of external RTC and on the board RTC.

2 Connect both SDA and SCL of external RTC.

3 As for V_{DD} voltage of each RTC, reduce voltage difference by each voltage adjustment as much as possible.

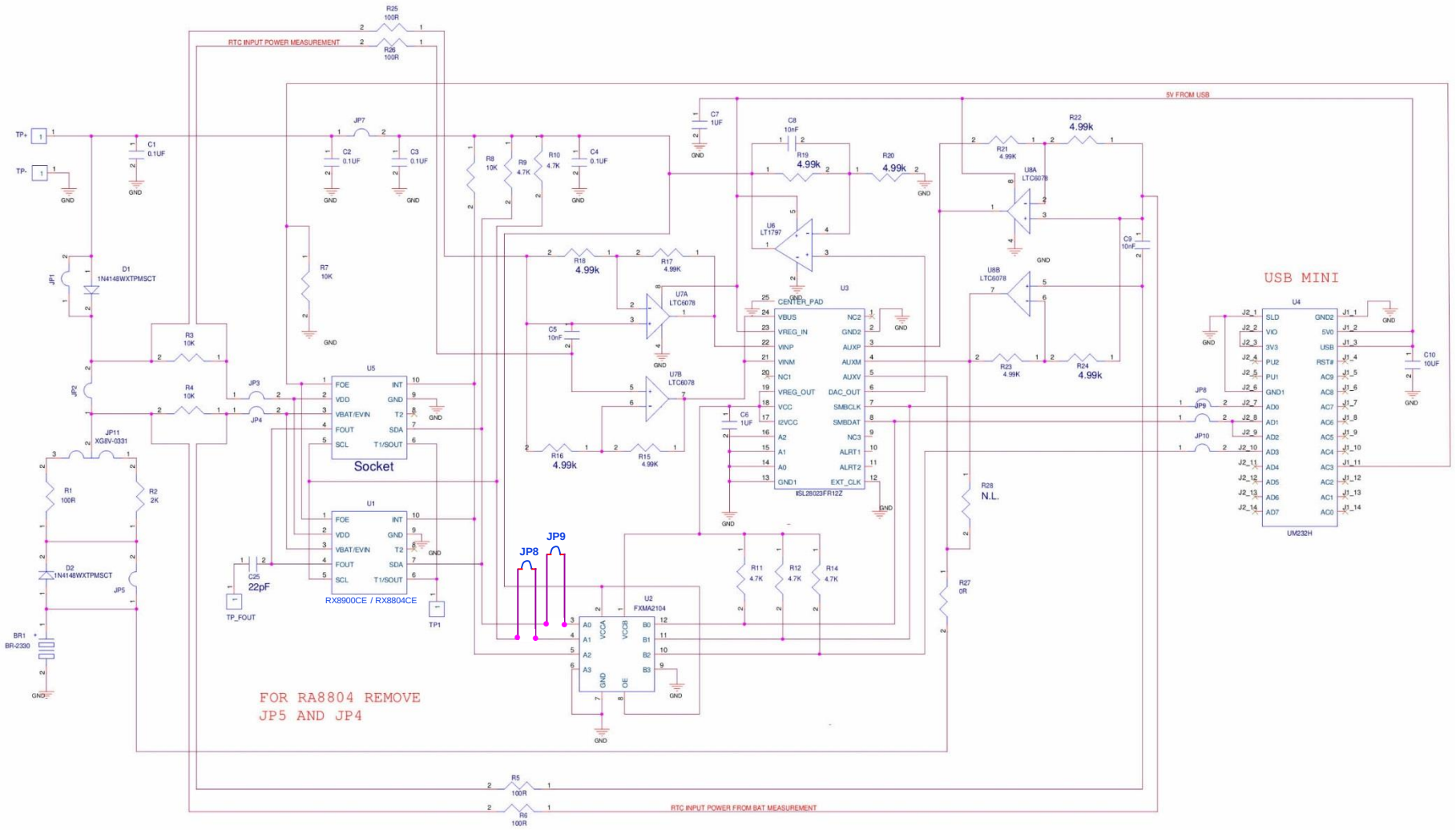


9. Jumpers

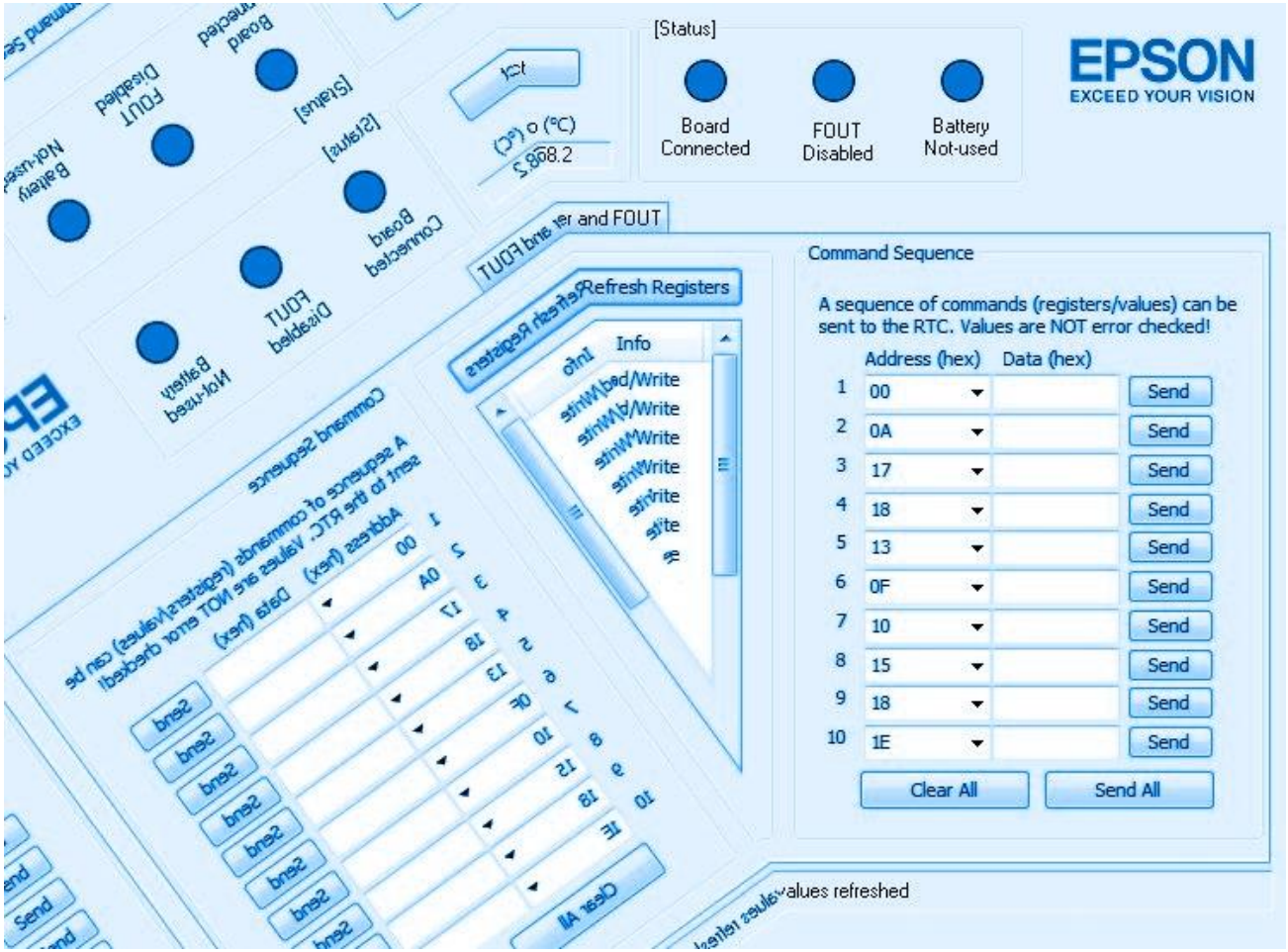
Keep the default setting of the Jumper, which are indicated by the √ in the table below.
If the jumpers are moved, it may put the RTC in an invalid mode.

	OPEN	CLOSE
JP1	Enables Diode D1	√ Bypasses Diode D1
JP2	No battery charging from V_{DD}	√ Enables battery charging from V_{DD}
JP3	V_{DD} not connected to power supply	√ VDD connected to power supply
JP4	V_{BAT} supply not connected for √ RX8804CE	Enables V_{BAT} input for √ RX8900CE
JP5	Enables Diode D2 for √ RX8804CE	Bypasses Diode D2 for √ RX8900CE
JP6		
JP7	Enables pull-up power of I^2C	√ Enables pull-up power of I^2C.
JP8	SCL of RTC on the board is not connected	√ Controller is accessed to RTC on the board.
JP9	SDA of RTC on the board is not connected	
JP1 0	Disconnects INT signal to USB controller	√ Connects INT signal to USB controller.
JP11	Battery backup is disabled.	Select battery protection resistor for battery backup. √ Close pin2 and pin3. 100Ω

10. Circuit diagram

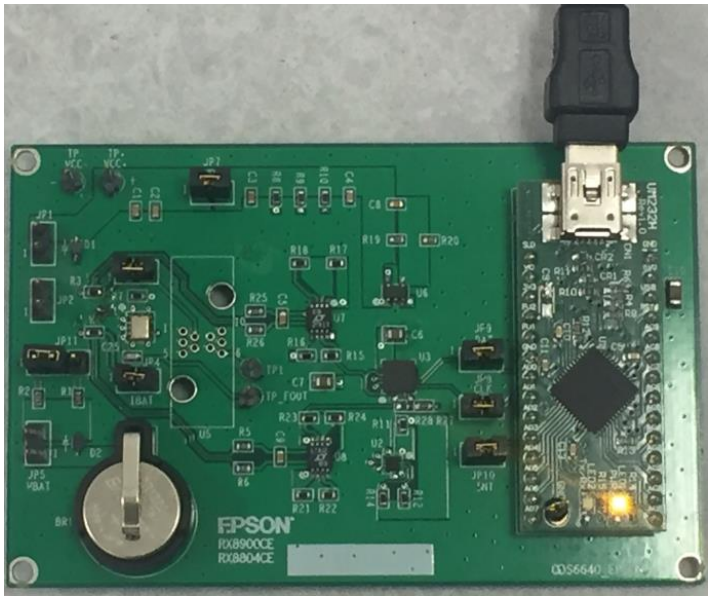


Chapter 2 software



11. Connection to PC

1. Before start software, Connect USB port and PC
2. After few seconds, orange LED is turned ON
3. When first connect evaluation board to PC, USB-serial driver is installed on Windows



12. Setup of software

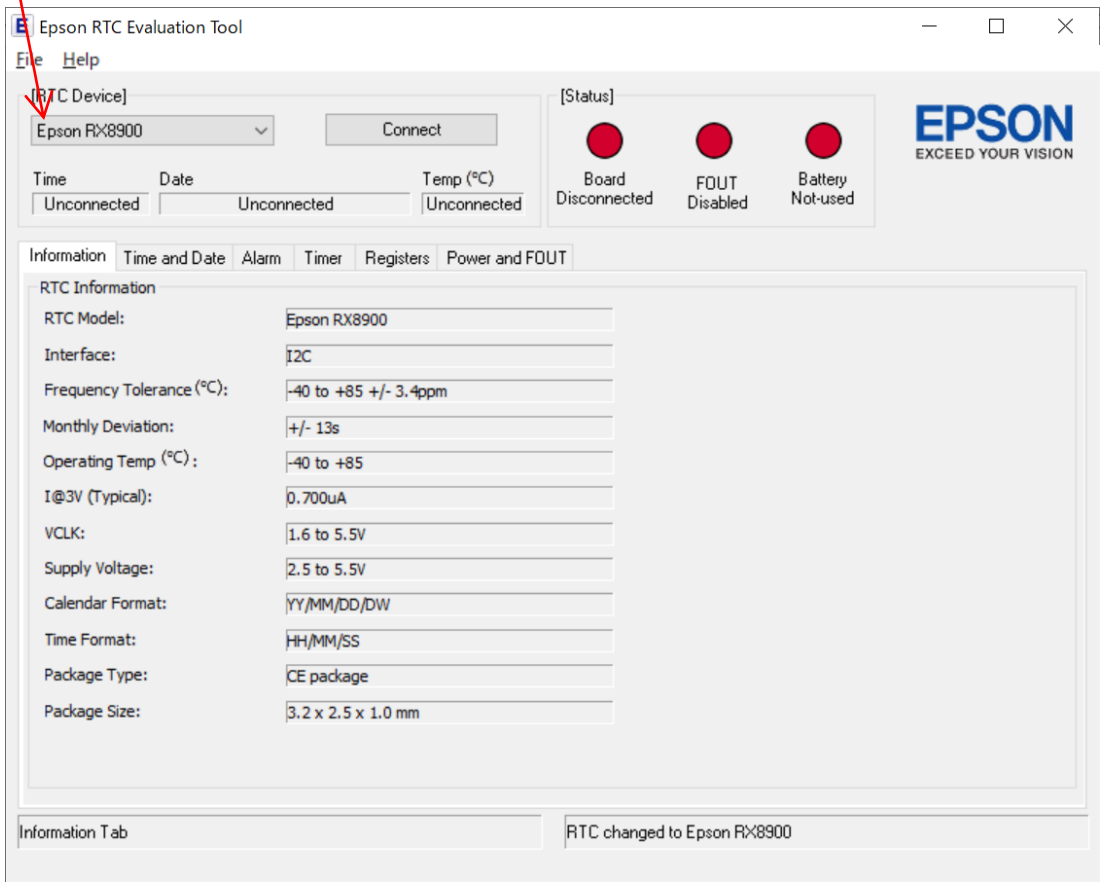
Procedure of software install.

Evaluation-kit works on Windows-PC.
Windows10 and Windows7 is available.

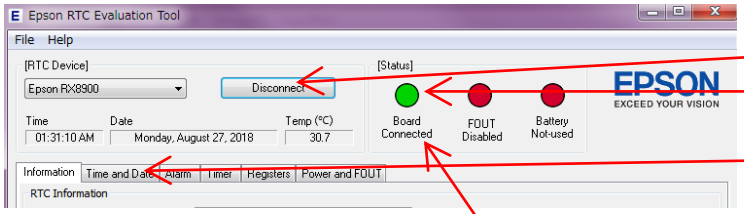
1. extract RtcEvalTool_setup-v2.00.zip to your folder
2. execute RtcEvalTool_setup-v2.00.exe
3. please install according to guide messages
4. Icon may appear on desktop, software install is finish

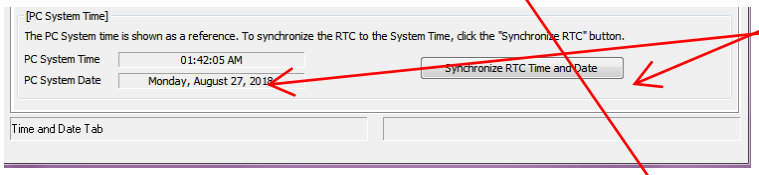
13. Connection to PC

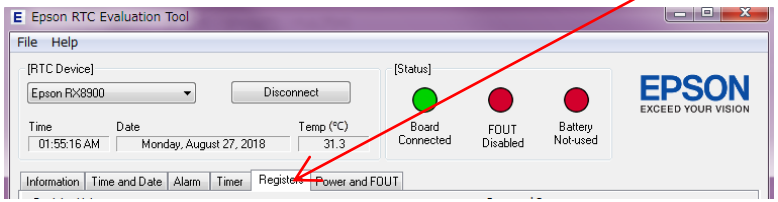
Connect a board to USB2.0 port of a PC.
With the first PC, need wait to completion of a device register of a USB controller.
After USB device register was completed normally, double click the shortcut icon.
Control window will appear on Monitor.
select a device model RX8900 or RX8804.



14. Initializing







- 1;Push Connect button
  After connection was success, this lamp is changed to Green from Red
- 2:Select Time and Date Tab
- 3:Time of PC is appeared in the lower part of the window
- 4 ;and push synchronize RTC Time and Date button for first initializing of RTC

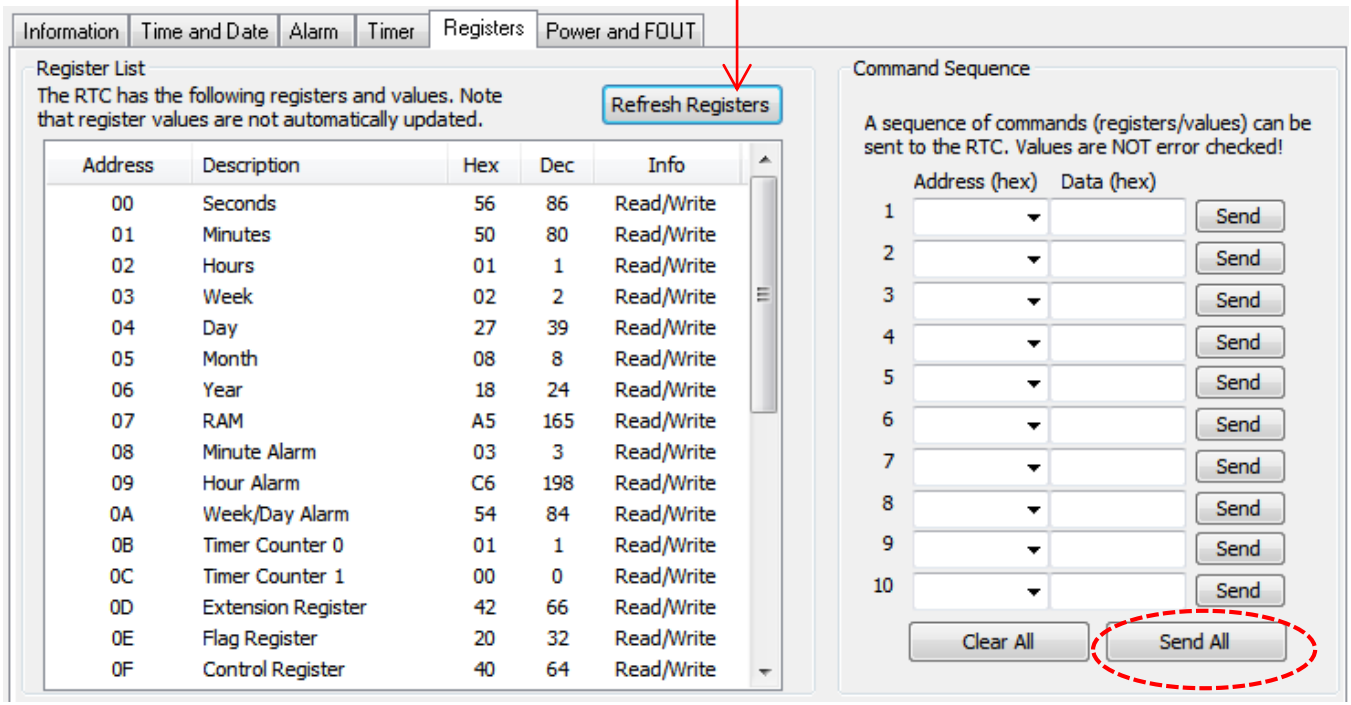
  Note; when RTC return from backup status, not need this initializing
- 5: select Registers Tab

When a board don't connect normally,
Remove a board from USB after closing software.
Confirm Jumper.
Connect a board to another Universal Serial Bus port, and it be tested again.

15. Registers Tab

This part displays value of all registers with slider.

Indication is maintained till a Refresh Register button is pushed.



When an address and data are set and push a send button, writing is performed.

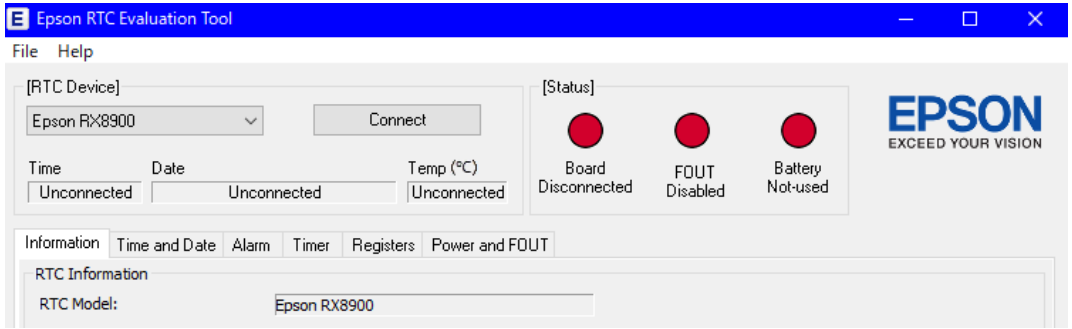
When a Send All button is pushed, writing is performed sequentially from the top.

When writing is performed, the left register value is updated.

Each command or a collective execution of 10step is possible.

Data form is Hex.

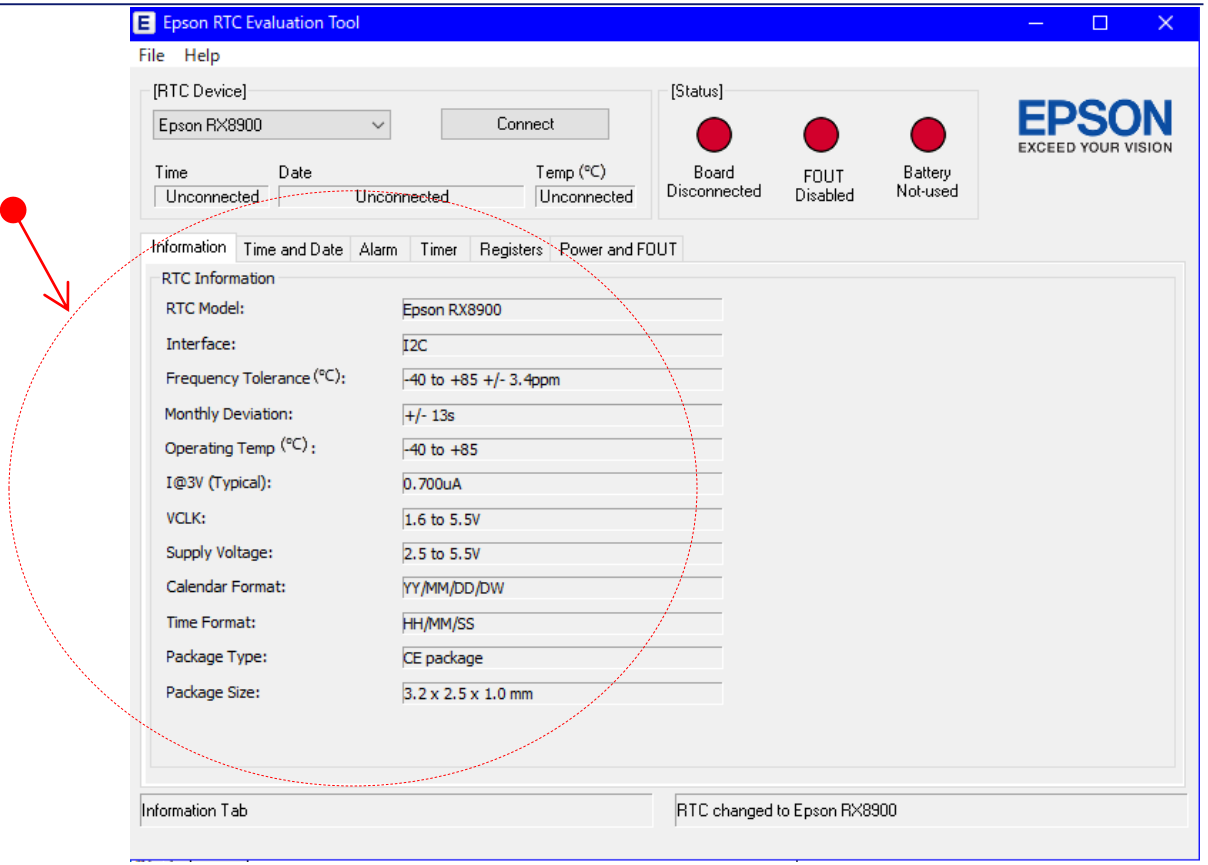
16. Status Header



- ✓ **Status Header** is always present on all tabs
- ✓ **Connect** must be Clicked to initiate communication with Evaluation-kit
- ✓ **Time/Date and Temp** of RTC IC, updates every second
- ✓ **Green status** button indicates board is connected and ready to communicate with GUI. , resets to Red when board is disconnected by user Clicking disconnect button or physically unplugging USB connector
- ✓ **FOUT** is Red by default , will turn Green if and when <Enable FOUT > is selected from the Power and FOUT Tab
- ✓ **Battery in use** Button will turn Green when 25 nA or more is being by supplied by Battery

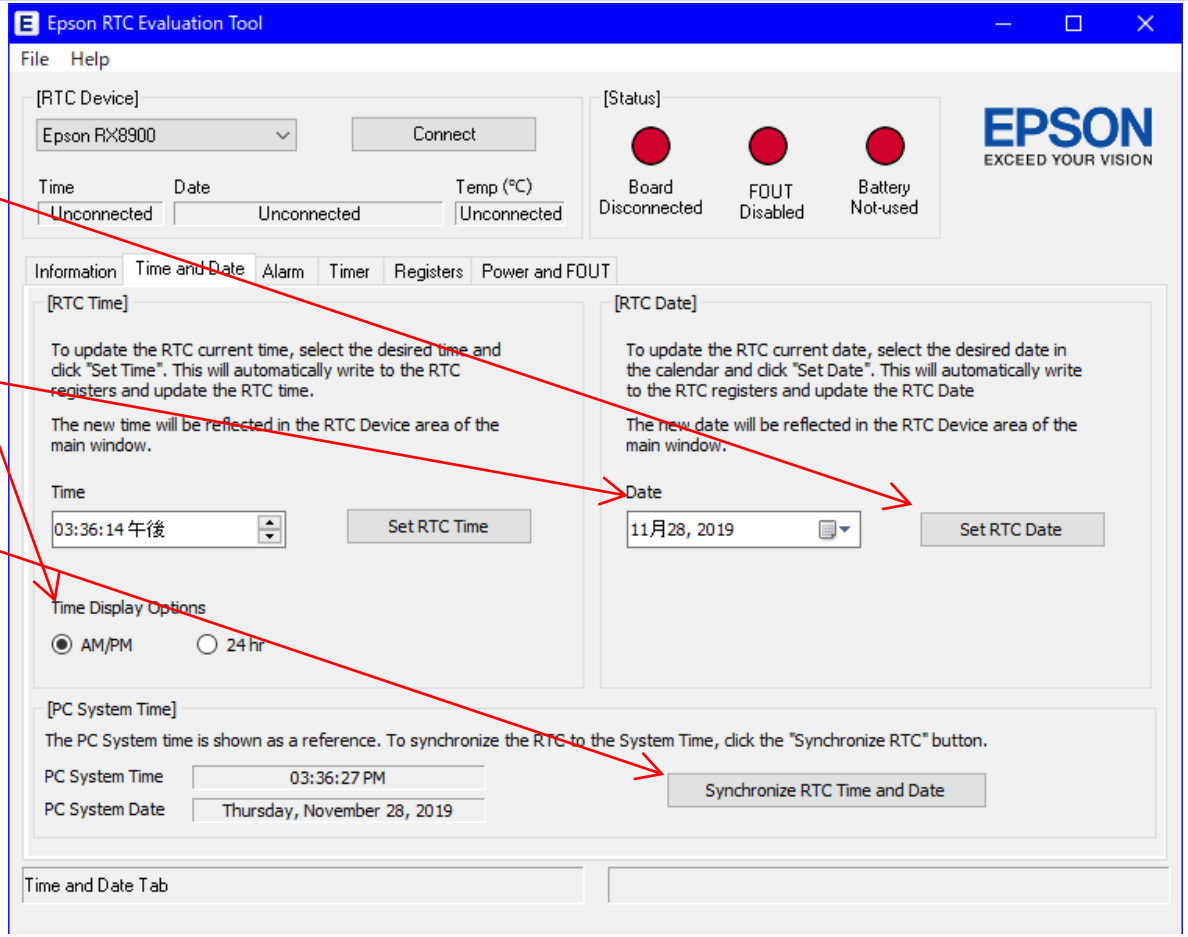
17. Information Tab

- ✓ **Displays Device information** and indicated Date and time Format.



18. Time and Date Tab

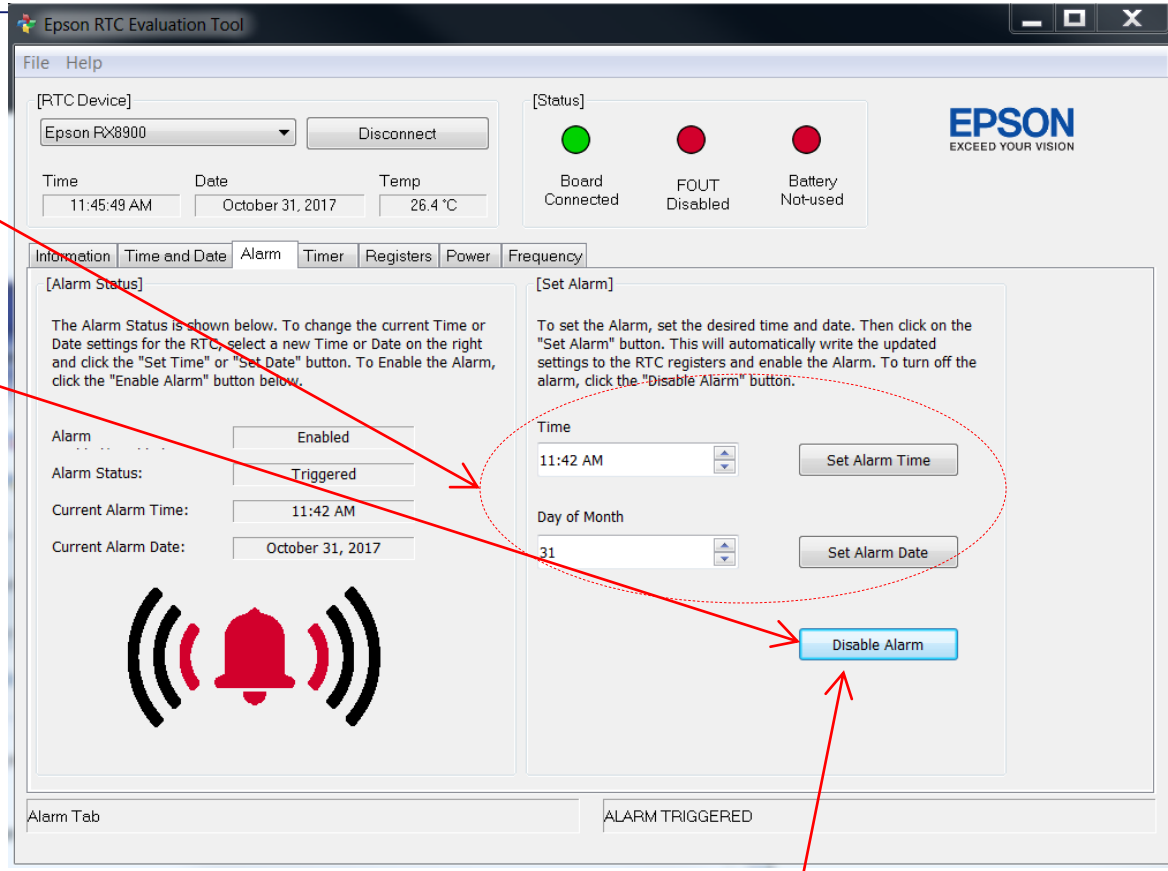
- ✓ **Set RTC Time** This button selects and updates RTC time by user.
- ✓ **Time Display option** selects AM/PM or 24 hours format.
- ✓ **Set RTC Date** user can select date from a drop down calendar
- ✓ **Synchronize RTC Time and Date** this button will sync RTC to PC time and date only once



19 Alarm Tab

- ✓ **Set Alarm Time** sets alarm Time
- ✓ **Set Alarm Date** sets Date
- ✓ **Disable Alarm**
  when alarm is triggered this button must be clicked or alarm will continue indefinitely

Alarm can be back dated , there is no error message indicator to warn user



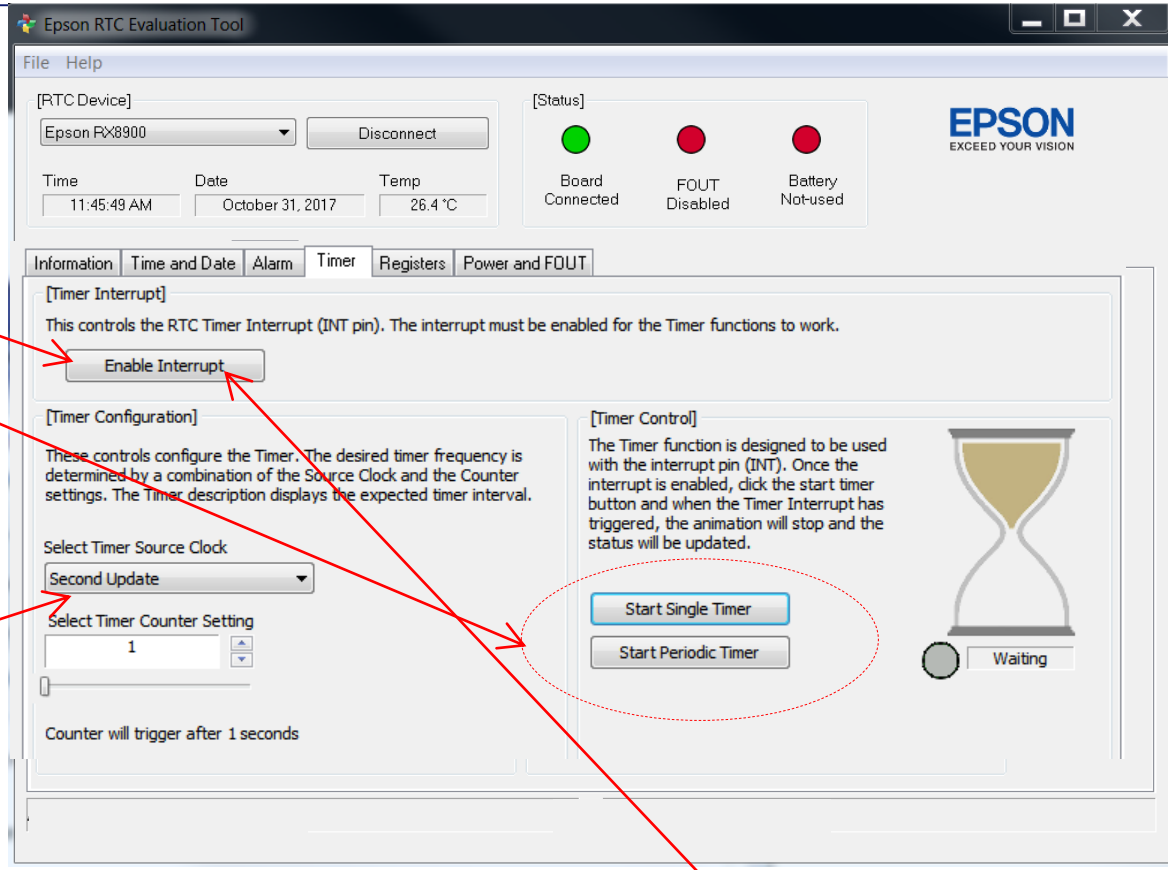
When some setting was changed, Enable does a toggle in Disable. Change it in Enable again.

20. Timer Tab

✓ **Enable Interrupt**
This button must be enabled before timer can be started

✓ **Start timer**
This button will start timer only after Interrupt has been enabled first,
It selectable in single timer, or periodic timer

✓ **Select Timer Source Clock**
four different option are available to select from, all tested



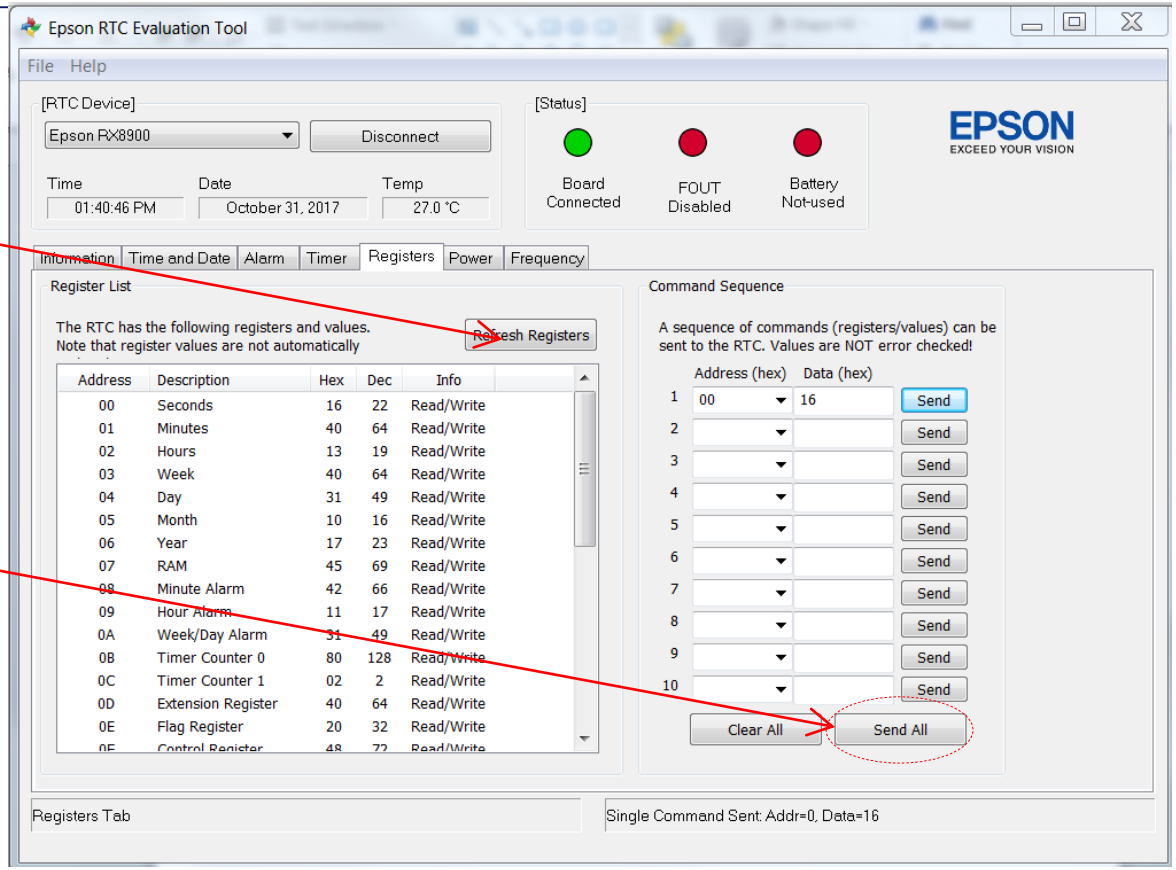
When some setting was changed,
Enable does a toggle in Disable.
Change it in Enable again.

21. Registers Tab

✓ **Refresh Registers**
This button will refresh and update current
registers when selected by user

✓ **Send**
This button will update selected registers with new commands , one or more can be selected at a time , all registers will refresh automatically , once one or new commands are entered

✓ **Registers R/W**
all registers labeled R/W will Write and Read new commands accordingly



22. Power and FOUT Tab

- ✓ **Set Supply Voltage**
  This window selects Supply voltage by user from 0V to 4V max in 0.1V increments

- ✓ **Data Averaging** 0.5,1.0, 1.5, 2 sec
  User can select the averaging time of data collected

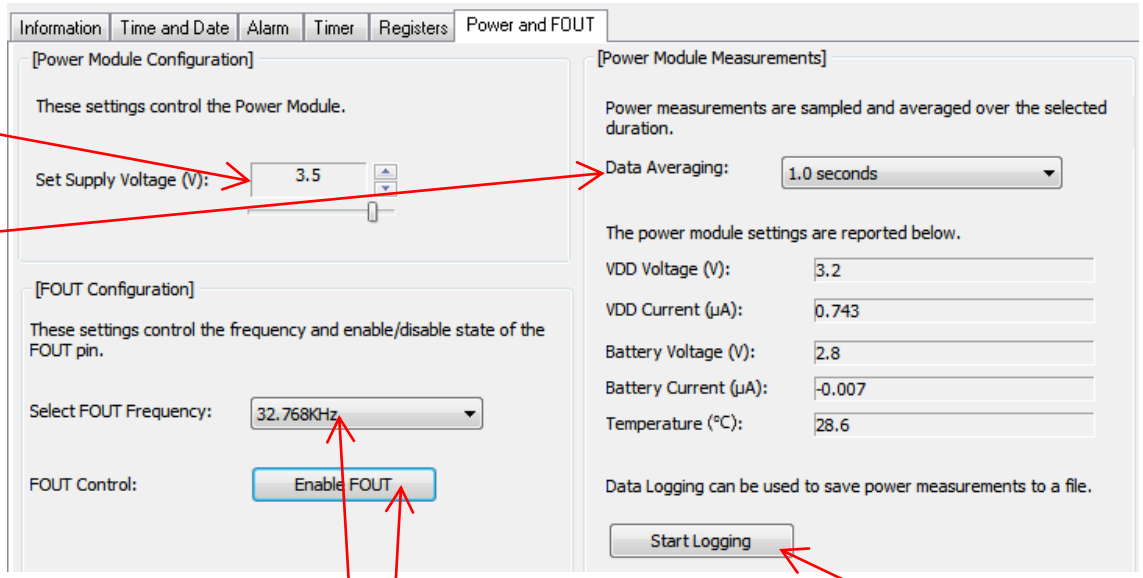
- ✓ **VDD Voltage**
  this is the voltage measured at RTC Vdd pin and includes all voltage drops , typically lower than supply voltage set

- ✓ **VDD current**
  average pulsating current being drawn by RTC from VDD , this value will fluctuate due to the fact RTC current is a pulsating current

- ✓ **Battery Voltage**
  This is the voltage measured at Battery terminal , not at RTC Vbat pin

- ✓ **Battery Current**
  average pulsating current being drawn by the RTC from Battery , this value will fluctuate due to the fact RTC current is a pulsating current

- ✓ **Temperature**
  Displays temperature of power management IC



Data logger function are invalid

- ✓ **Enable /Disable FOUT.**
  By default this function is disabled when Evaluation-kit first connected,

- ✓ **Select FOUT Freq.**
  1.0, 1024, 32.7 KHz
  User can select one of 3 output Freq.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