PQSense Passive Wireless Temperature Monitoring System

Reader Utility Operating Manual

Version: v3.2 (UT4.0)
Date: 2021-10-12
PQSense Technology Co. Ltd.

FCC Compliance Information

Part 15 Compliance Information

15.19

This device complies with Part 15 of the 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.

15.21

* Any changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate equipment.

* This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

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.

1. Table of Contents

1. Table of Contents 2
2. Hardware Installation Instructions 3
3. Software Installation Instructions 6
   1. Install: Reader USB Driver 6
   2. Install: Setup_PQS_Reader_Utility 6
   3.Connecting the Reader to Computer (See Pic.5) 6
4. Wireless Temperature Monitoring Software Instructions 7
5. Wireless Temperature Display Software Instructions (PQS Reader_Utility) 9
   1. Reader UT Interface Instructions: 9
   2. Base Setting Interface Instruction: 13
   3. SensorID P1 Interface Instructions: 14
   4.Antenna Setting Interface Instructions: 17
6. Function Bar Instructions 18
   1. RF CTRL Interface Instructions 19
   2. RF Firmware Download Interface Instructions: 20
7. Hidden Interface Instructions 22
   1.1 Adjust Temperature Interface Instructions 24
   1.2 Advanced Base Setting Interface Instruction: 26
   1.3 Auto Scan Function 29
   1.4 Advanced Sensor Status Display 30
   1.5 ALC Interface Instructions 31
   1.6. Redundant Mode Function 32
   2.1 Advanced RF CTRL Tab. 34
   2.2 Advance CTRL Settings Interface. 36
   2.3 RF Event Interface 36
   3.1 Comm Dialog 37

2.Hardware Installation Instructions

The following will guide you through the process of installing and configuring the PQSense Reader UT and show how to use the software to PQSense Wireless Temperature Reader to view and record temperature data.

Equipment list:

No.	Equipment	Description	Quantity
1	Wireless Temperature Reader	DIN-Rail mounting Support Modbus RTU procotol，RS485 transmission	1
2	Sensor	Passive RFID tags can also report sensor data transmission within 2 meters of	1 ~ 6
3	Antenna	Reader and Sensor communication	1 ~ 4
4	data transfer cable (USB To MicroUSB)	Reader UT and Reader communication	1
5	PC or Laptop	Install Reader Utility Software	1
6	Reader Utility Software	view temperature data and configuration Reader	1
7	Reader USB Driver	Wireless Temperature Reader requires that USB-Serial device drivers be installed	1

1. Antenna wiring:

Antenna is first wired to the extension cord, then the Reader itself. Either of the antenna ports would work. See Pic. 1 & Pic.2

Pic.1

Pic.2

2. Sensor install

Sensor are recommended to be installed on metal surface, favorable for wireless transmission distance. It is not necessary to fix down, but recommended when installed inside equipments. See Pic.3

Pic.3

3. Sensor / Antenna Locations and Directions:

Antenna is best pointed towards the sensors at a depression angle, slightly away from the Sensors. See Pic.4

Pic.4

4. Reader Setup:

Finally, power can be connected to the Reader, the Reader should start functioning. RS485 Port and USB Port can be connected if needed.

Pic.5

3. Software installation Instructions

1. Install: Setup_PQS_Reader_Utility

Double click on “Reader UT 4.x.x_Setup_PQSense”and follow the onscreen instructions to complete installation.

2.Connecting the Reader to Computer (See Pic.5)

Step 1: Connect the reader to a power source, see below. The Reader supports a wide voltage input range, ranges 85~265V AC/DC are all suitable.

Step 2: Turn on the electricity. Reader’s power signal light should turn on and flash in intervals.

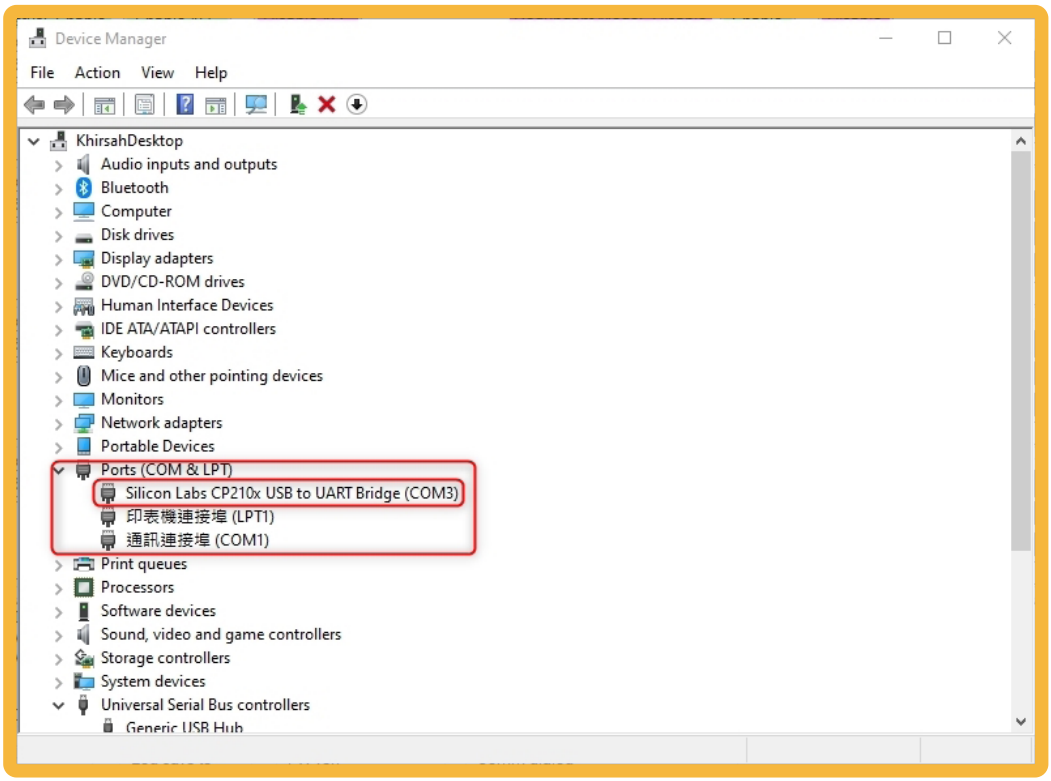
Step 3: Connect the Reader USB cord to the Computer’s USB port.

Step 4: Run PQS Reader Utility (Wireless Temperature Display Software)

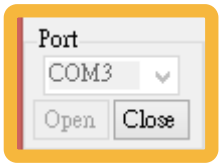
3. Wireless Temperature Monitoring Software Instructions

1. Start Temperature Display, see steps below:

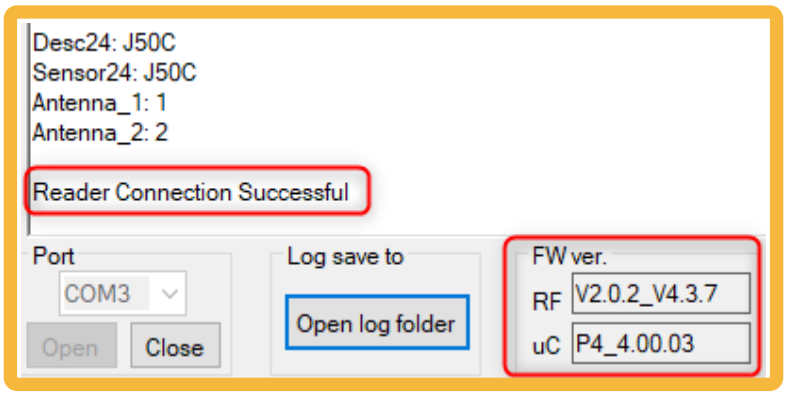
1.1 Double click on shortcut icon on Desktop to open to software;



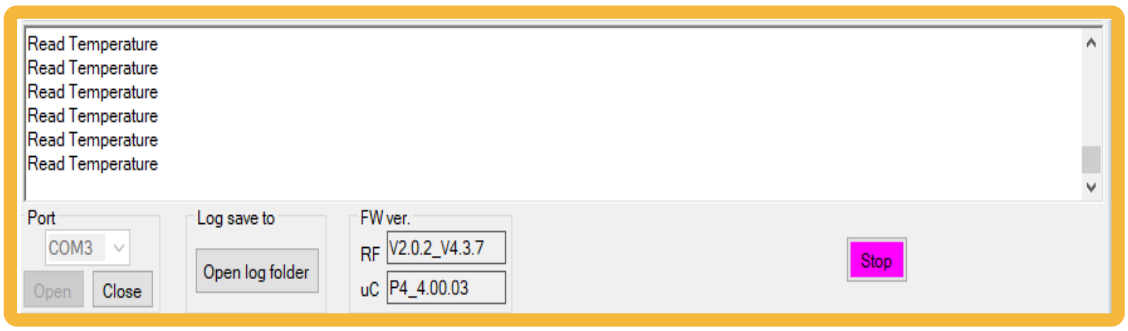
1.2 After the software has started, open Device Manager. Check under Ports to find “Silicon Labs CP210x USB to UARTBridge(COMn)”.



1.3 Choose USB Port: COMn; Click on Open.



1.4 This should show up. Make sure FW Ver. displays version number normally. The above pics shows the Reader connected correctly;

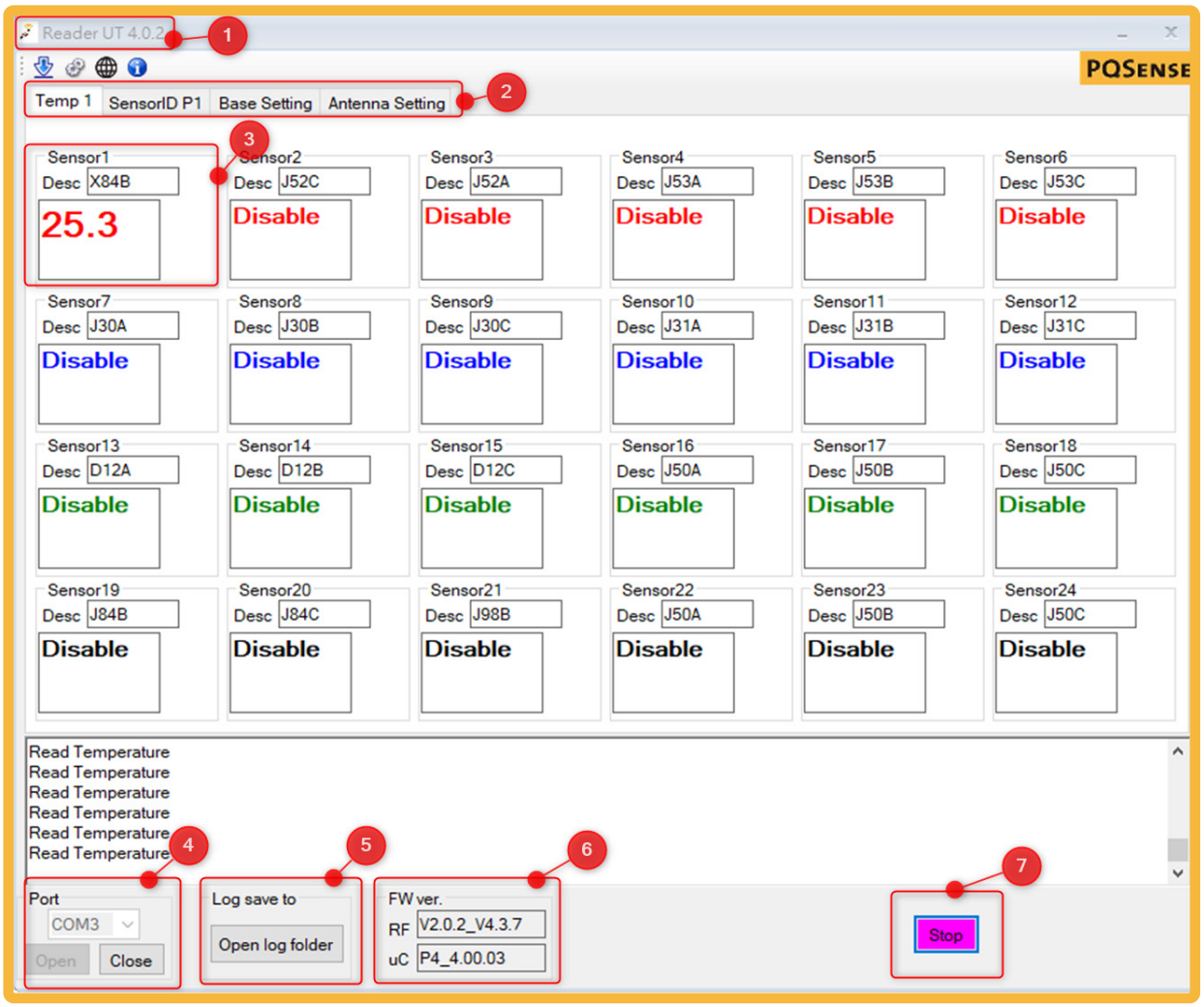


1.5 Click on the Start button, Text shows UT scanning for Reader's paired sensors.

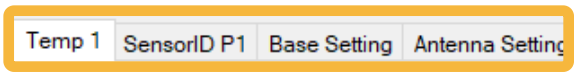
Note: When text "time out" appears, it indicates the communication between the UT Software and Reader was unsuccessful, this does not influence the Reader from working properly, but indicates the Reader is currently busy processing, and will be counted under No_Resp.

4. Wireless Temperature Display Software Instructions (PQS Reader_ Utility)

1. Reader UT Interface Instructions:

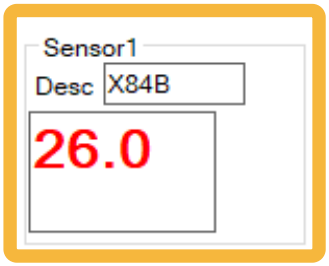


1.1 Reader UT's Software version should be "Reader UT x.x.x"



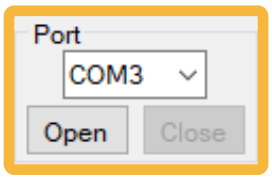
1.2 Settings Function Panels:

Temp 1: Sensor Status and Sensor Notifications Panel
SensorID P1: Enable/Disable Sensors and sensor ID settings
Base Setting: Address Settings and Test Mode Panel
Antenna Settings: Enable/Disable Antenna



1.3 Displays temperature data for Sensor X84B:

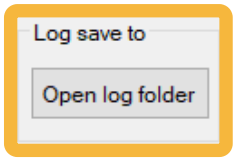
- When “Read Fail” is displayed: Failed to read the temperature.
- When “No Setting” is displayed: Sensor ID was not set.
- When “Disable” is displayed: This Sensor has been disabled.
- When “----” is displayed: Still Initializing, hasn’t received temperature read.
- When “ANT Disable” is displayed: The antenna for reading the sensor has been disabled.



1.4 Choose USB communication port accordingly

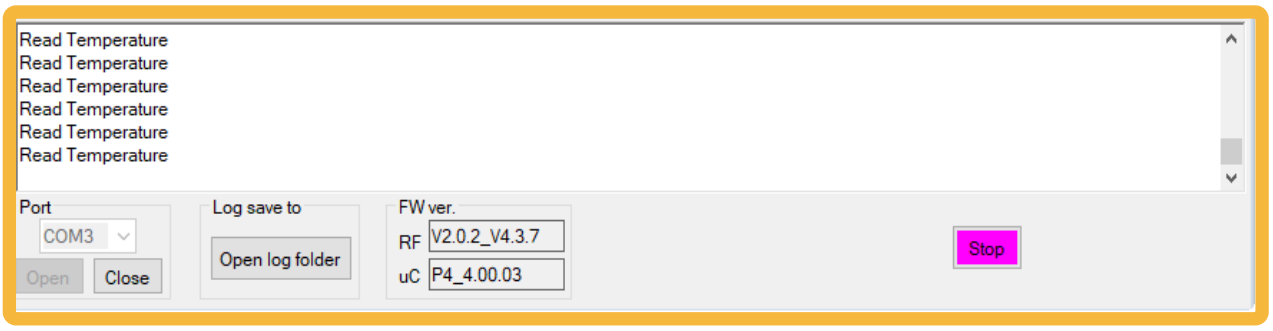
COM Port for the PC can be found under “Computer Management” -> “Device Manager” -> “Port Silicon Labs CP210x USB to UART Bridge”

Open/Close : (Open)/(Close) the connection to the Reader.



1.5 Real-time Data Logging Function:

The folder “T_Log” will be generated on the first use of this software (on read temperature).

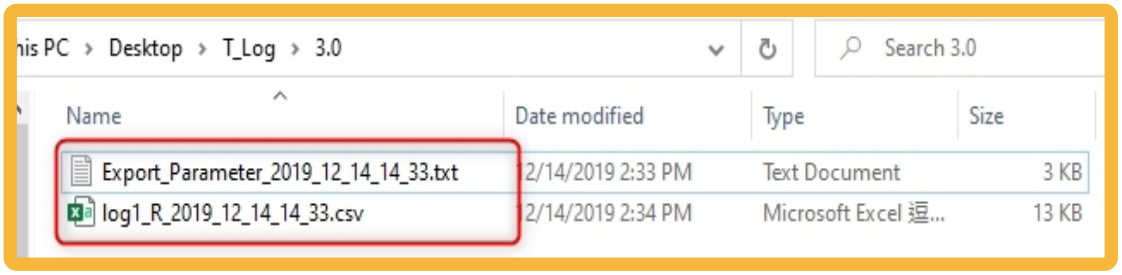


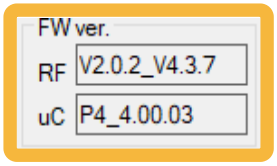
Double click “Open Log Folder” and choose the folder “3.0” inside, you will find the according log file inside.

Each read will generate a document accordingly; the file is named after the time in which the reading was stopped. File descriptions:

Text File: “Export_Parameter_(Time)” - Log file for reader parameters at the start of the read.

CSV File: “Log_(Time)” - Real-time log file for read temperatures, antenna signal... etc.



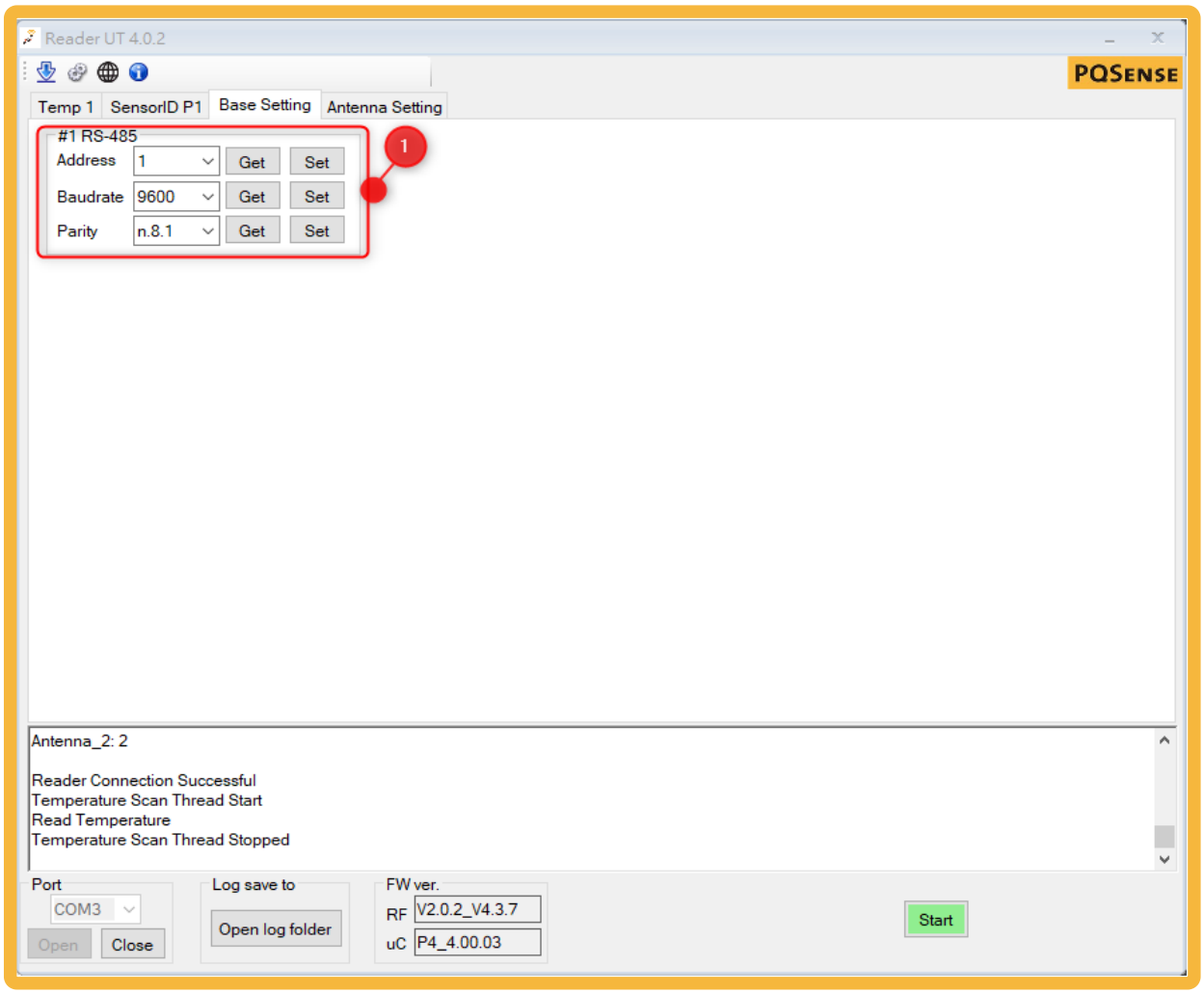


1.6 Displays Reader firmware:
RF refers to the Radio Module, uC refers to the Control Module.

Note: Every time a new uC Firmware is provided, please make sure to test the Reader_UT software paired, to avoid equipment signal errors (Testing software will normally be sent alongside the newest uC firmware update) .

1.7 Start/Stop UT inquiry for Sensor information.

2. Base Setting Interface Instruction: Set ModBus Slave (Reader to Master Device) Communication Protocol

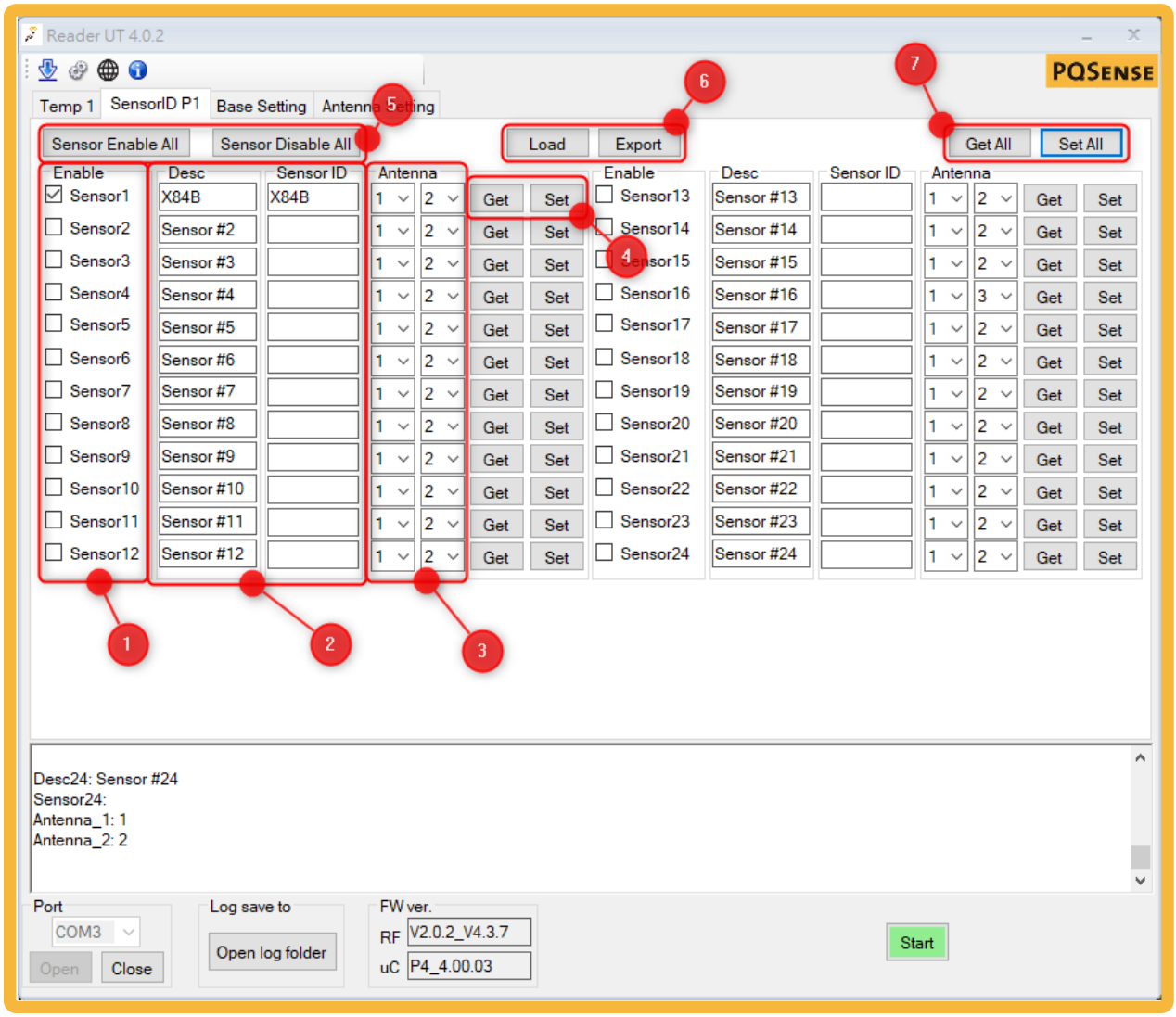


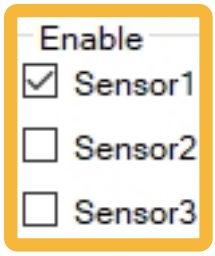
2.1 Reader RS485/Modbus Port parameter settings:

Choose your desired settings from drop-down list. “Set” to overwrite, “Get” to get current parameters.

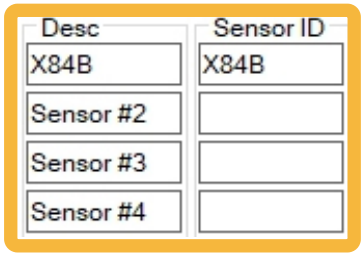
Slave Address: Set slave address
Baud rate: set baud rate
Parity: Set Odd/Even check, data length, stop bit

3. SensorID P1 Interface Instructions:
Sets the ID for the Sensor read by the Reader. Sensor settings will be dvisabled when UT is enabled to inquire Reader for signals.



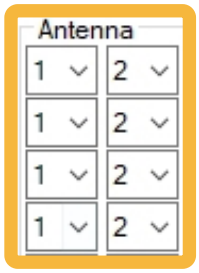


3.1 Click to check the sensors needed for the reader to scan.



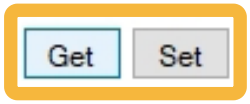
3.2 Set Sensor ID:

Edit the Sensor's ID (As shown on the surface of the Sensor) and description,
The Sensor column can be edited with only letters and number, Ex: X33A.
The Sensor ID Column should be inputted with the ID of the according Sensor (As shown on the surface of the Sensor); Sensor ID is case-sensitive.
Hidden Function: After Sensor ID is set, you may double click on the text "Sensor ID", and you will copy the Sensor ID column to the Sensor column.



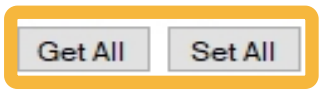
3.3 Sets the Antenna port for the Sensor: ANT 1 ~ Ant4

Set up Antenna according to on-site testing; each sensor can have at most 2 antennas simultaneously.

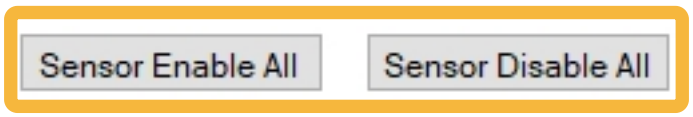


3.4 Get/Set Setting Parameters Function:

Get: Gets the current setting parameter of the Reader.
Set: Overwrites and updates the Reader's settings with the parameters set.



Small Tip: The Get/Set All button to the top right corner of this area can Get/Set all settings parameter of this area. You can also enable/disable all sensors with the Sensor Enable/Disable All button at the top left corner.

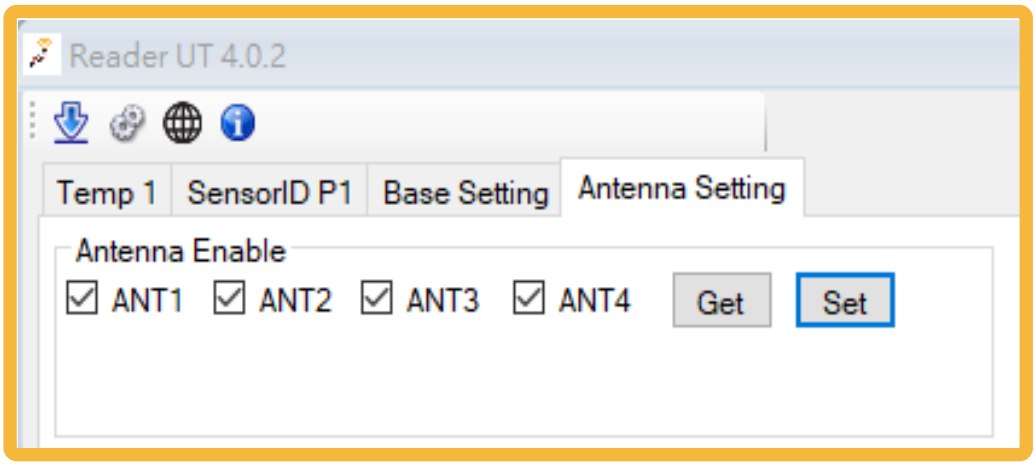


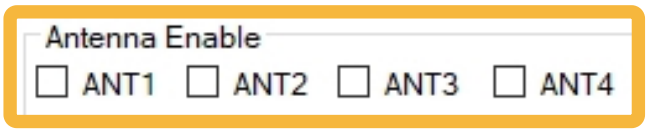
3.5 Enable/Disable All Sensors Function:
Click to Enable/Disable all Sensors at once.

3.6 Load/Export Sensor List Function:
Load/Export previously set sensor settings from csv file.
Export first for template.

3.7 Set/Get All Sensor Settings:
Set all sensor settings at once.
Get all sensor settings from Reader at once.

4.Antenna Setting Interface Instructions: Enable or Disable Reader's Antenna ports





4.1 Antenna Enable:

Enables Antennas with checkmark (ANT 1 ~ ANT 4)

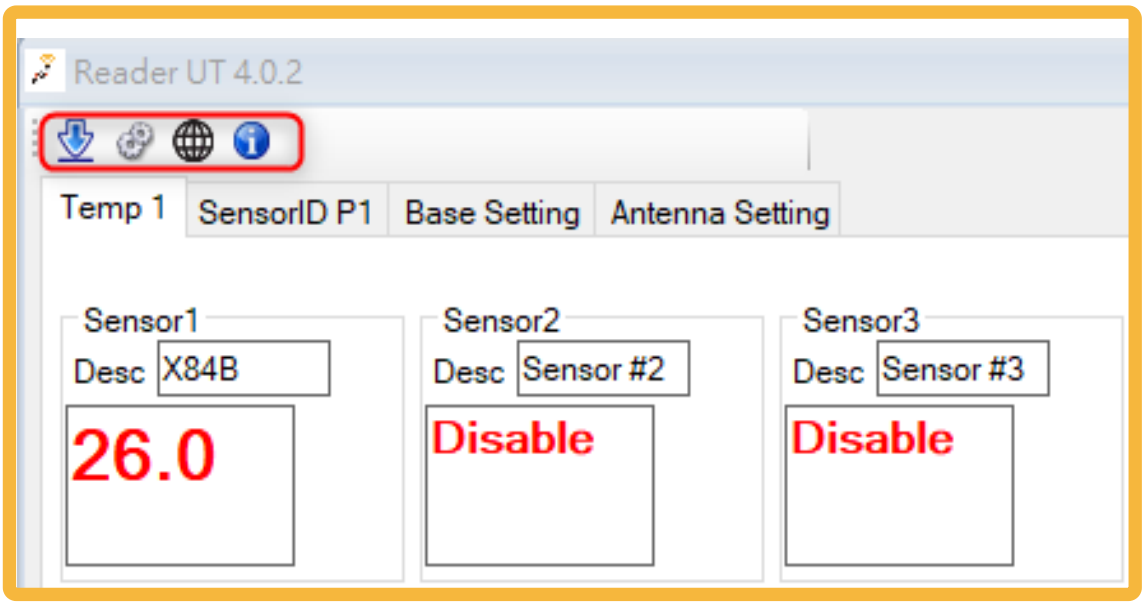
Note: ANT1~ANT4 doesnt show up until COM port is open.

4.2 Get/Set Setting Parameters Function:

Get: Gets the current setting parameter of the Reader.

Set: Overwrites and updates the Reader's settings with the parameters set.

5. Function Bar Instructions



Icons inside picture:

: RF Firmware Download
RF Firmware Version Upgrade

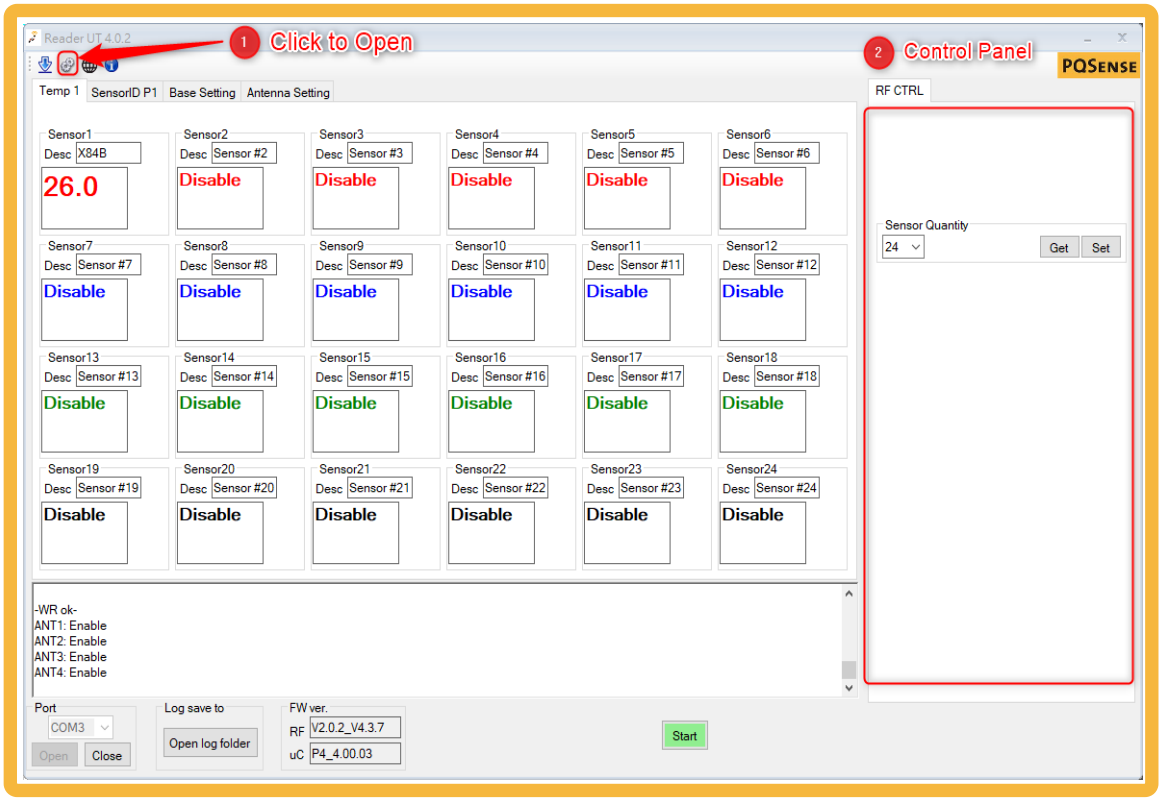
: Control Panel
Control Panel

: Language Settings
Change Languages here.

: About
UT Version Information

1. RF CTRL Interface Instructions

1.1 Click , to open RF CTRL interface.

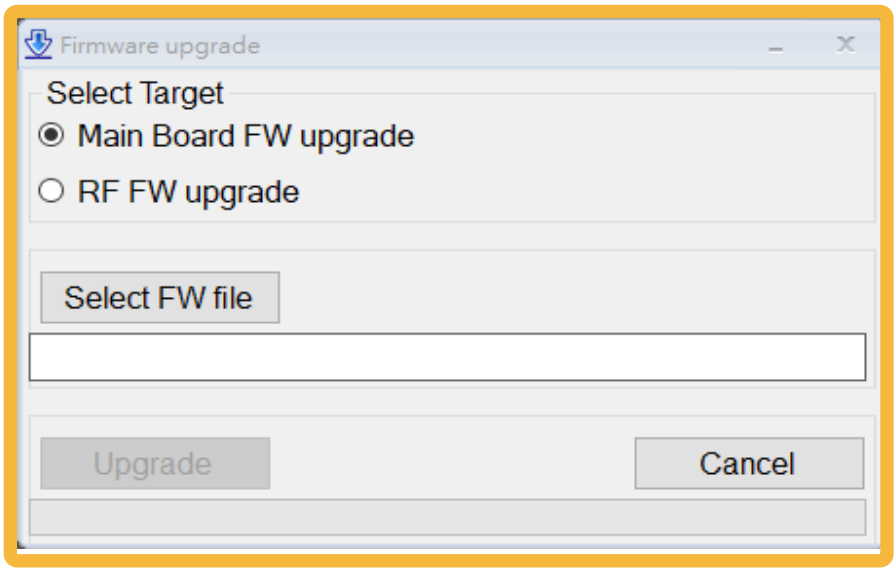


1. Sensor Quantity

Sets the quantity of sensors to be shown.

2. RF Firmware Download Interface Instructions:

2.1 Click , RF/MainBoard Firmware Download Interface window should pop up.



2.2 Choose the desired Firmware you would like to upgrade, and click Select FW File, please contact us if further clarifications are needed.

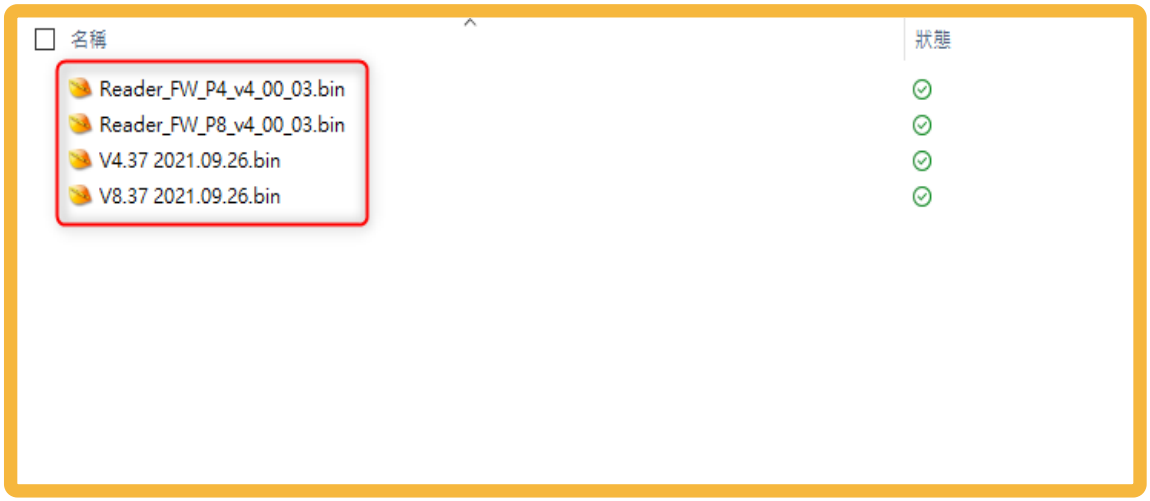
RF Firmware:

V4.XX.....bin for 4 port Readers

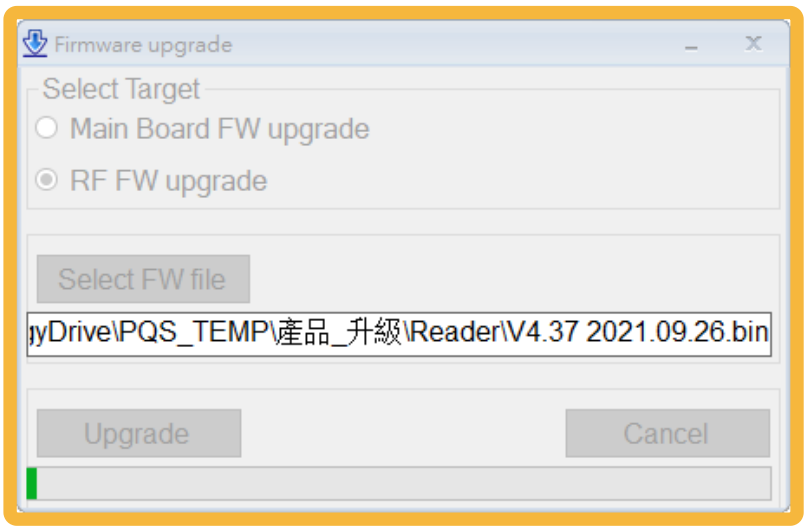
MainBoard Firmware:

Reader_FW_P4.....bin for PQS-RD-01 series

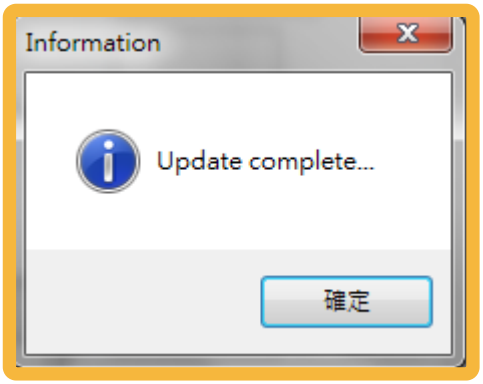
Reader_FW_P8.....bin for PQS-RD-11 series



2.3 Update should proceed after FW file is chosen. Loading bar below indicates its progress.



2.4 After update is complete, a notification window should pop up showing "Update Complete"



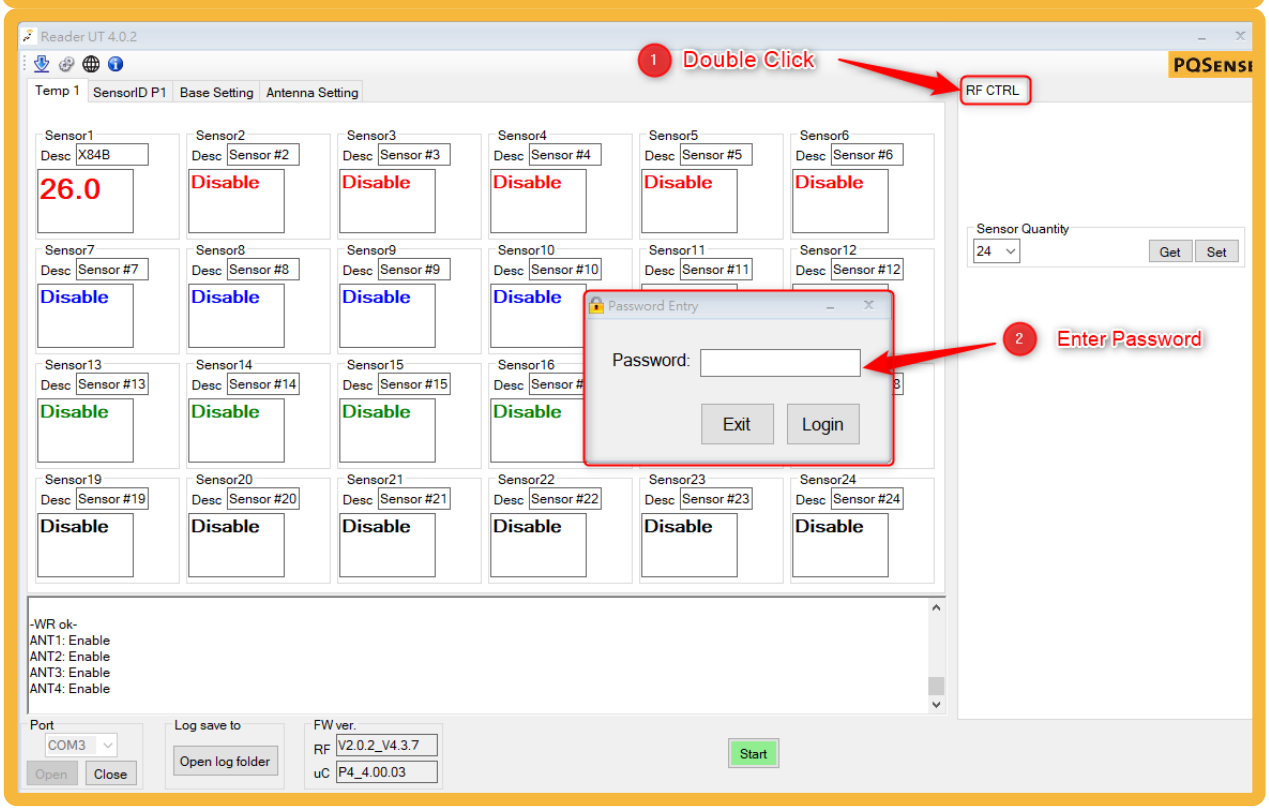
Warning:
1. Please confirm with our technicians the version and the possibility of upgrading before proceeding.
2. During the upgrade process, do not unplug the power source of the Reader or USB connecting cables...etc, this will very likely cause the Reader RF to fail to upgrade as well as cause irreversible damage, causing the reader to not operate normally at times. Please contact our technicians if it fails due to above reasons for further assistance.

6. Unlock Hidden Interface Instructions

Hidden interfaces are for more advanced user settings. Please follow the below steps to reveal the hidden interfaces.

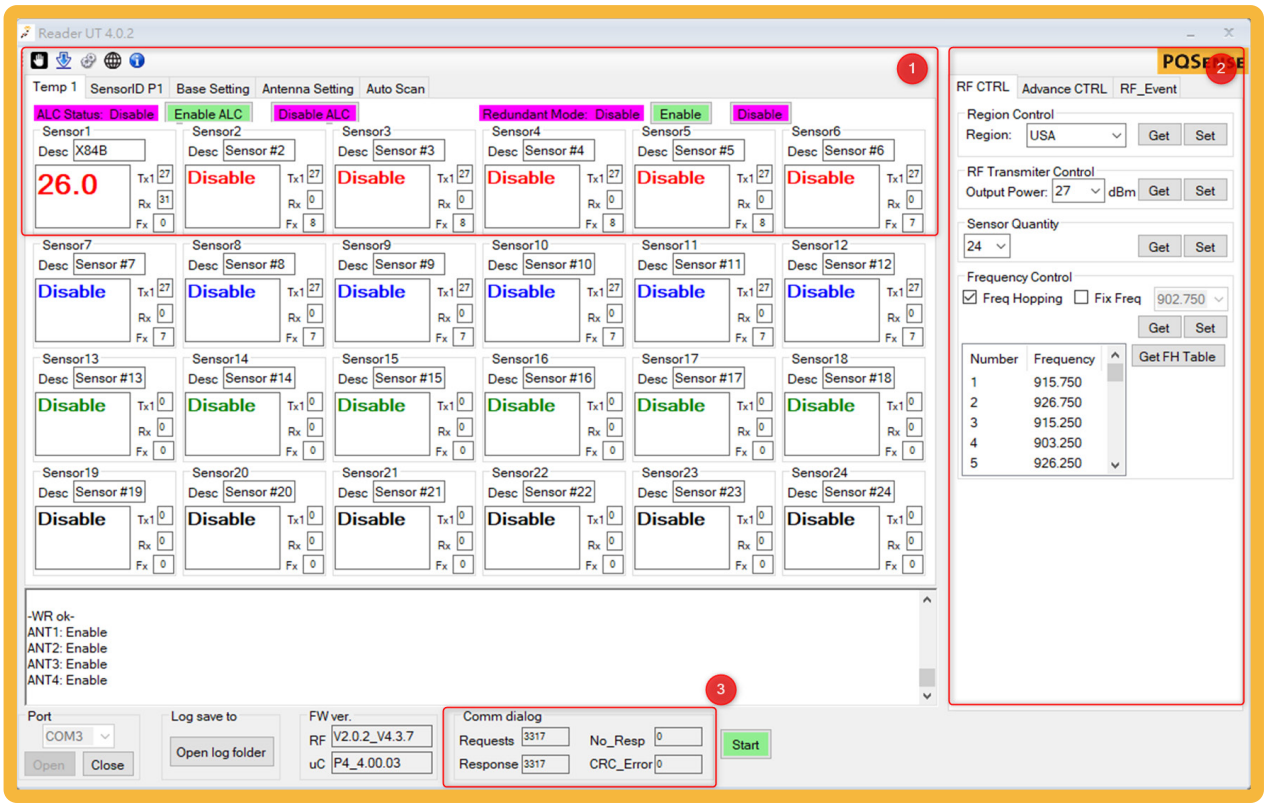
Step 1: Click on RF CTRL icon, the CTRL panel on the right should pop up.
Step 2: Double click on the RF CTRL Tab to reveal the password locked hidden interface.

Note:
Please contact your local distributor or PQSense partner for password.

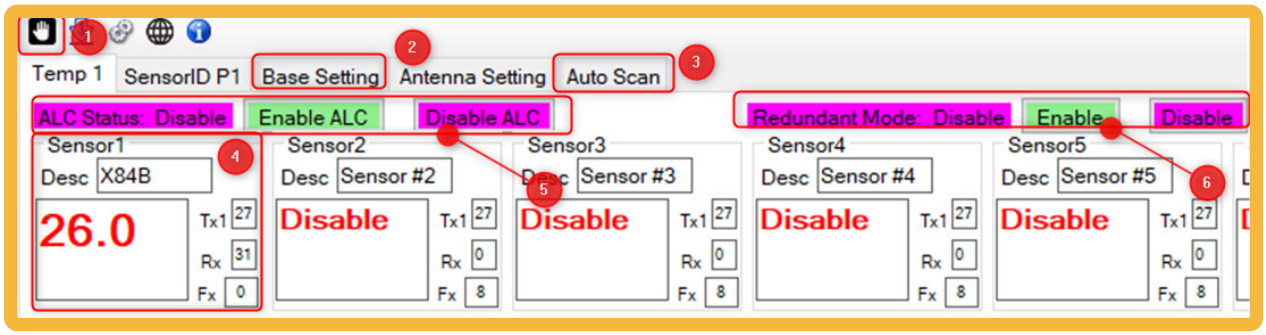


Hidden Interface: 1. Top Panel

Full Hidden Interface



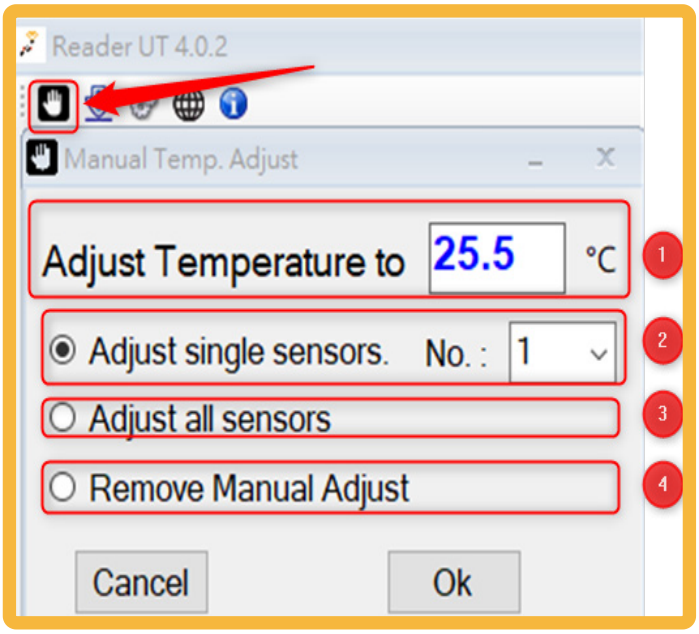
1. New Top Panel

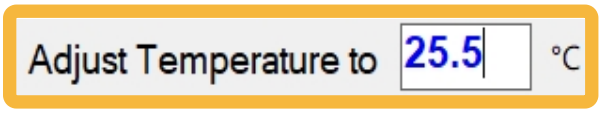


1.1 Manual Adjust Temperature Function
1.2 Base Settings Tab with advanced options
1.3 Auto Scan Function
1.4 Advanced Sensor Status Display
1.5 ALC Function
1.6 Redundant Mode Function

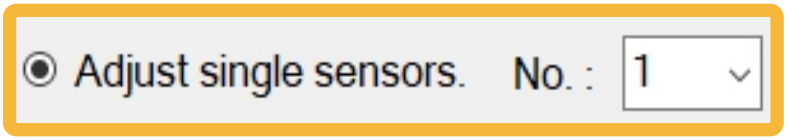
1.1 Adjust Temperature Interface Instructions

Click , Adjust Temperature Interface window should pop up.

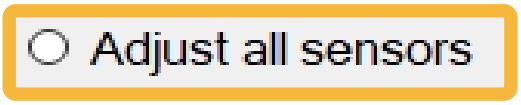


1. 

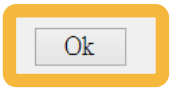
Input the temperature value you wish to adjust into.

2. 

Click the drop down menu and choose the Sensor you wish to adjust temperature values (For calibrating a single sensor)

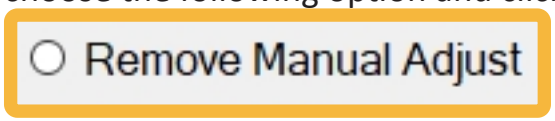
3. 

Click and choose adjust all sensor temperature values.

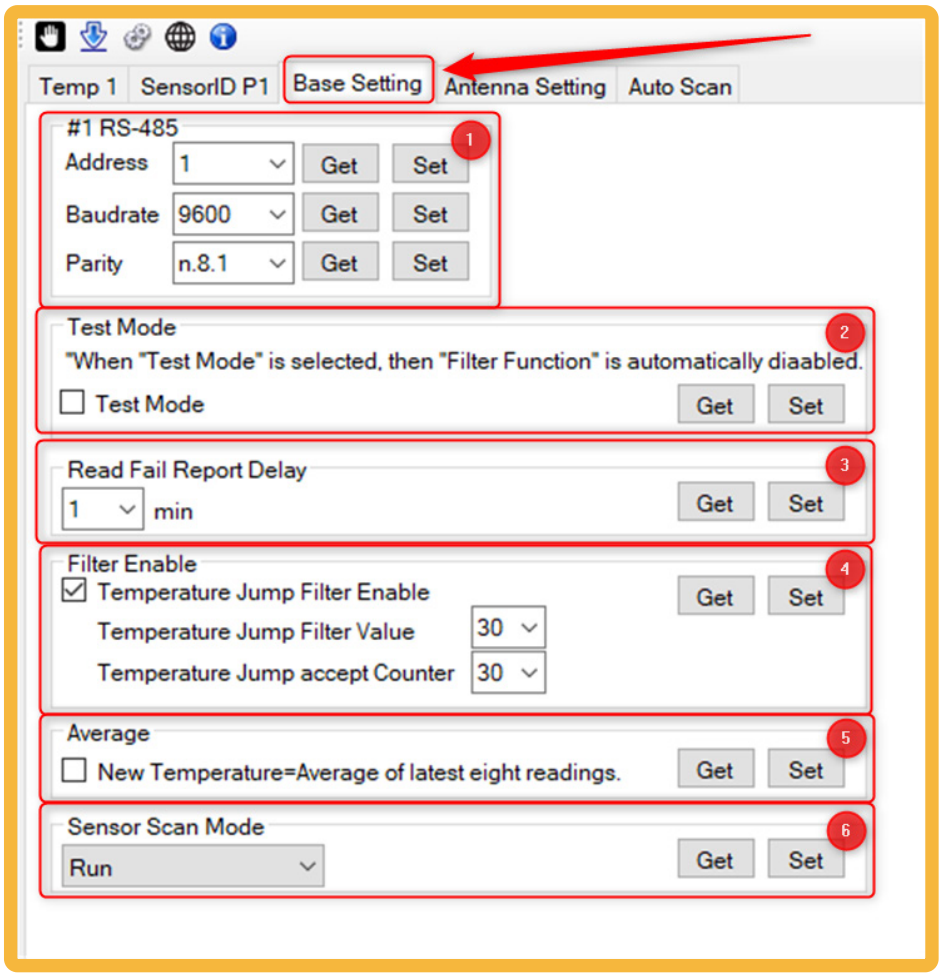
4. 

Click Ok to confirm calibration.

5. If you wish to return to unadjusted temperatures for the Sensor, choose the following option and click ok.

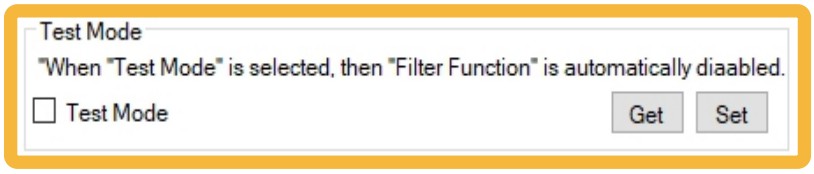


1.2 Advanced Base Setting Interface Instruction:



1. Reader RS485/Modbus Port parameter settings:
Choose your desired settings from drop-down list. “Set” to overwrite, “Get” to get current parameters.

Slave Address: Set slave address
Baud rate: set baud rate
Parity: Set Odd/Even check, data length, stop bit

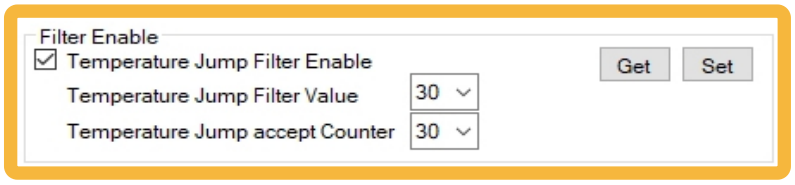


2. Test Mode Enable/Disable:

When Test mode is enabled, temperature filter function will be stopped.

3. Read Fail Report Delay

Reader reads (receiving signals) error response (report) delay settings: counted in minutes.



4. Temperature Jumps Filter Function (Enabled) Settings:

Temperature Jump Filter Value: Set filter value for temperature jumps
Temperature Jump Accept Counter: Set acceptable counts for temperature

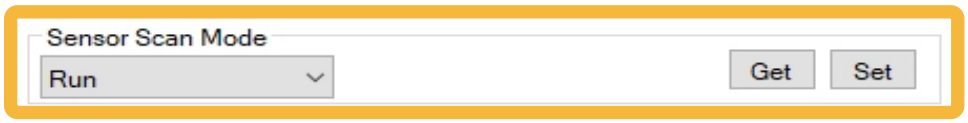
Note:

①This temperature filtering function is not for filtering the difference in temperature for two locations, but the temperature difference of a single location.

②Explanation for settings in the above picture: When the temperature difference(overheat) of a certain location reaches 30 degrees and continues for 50 times, it will identify it as a normal temperature. It will then save the data (temperature data) and send to RS485, and clear counts. If it overheats for less than 50 times continuously, then it will filter out the temperature data.

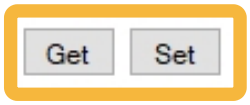
5. Temperature Average Function

Note:
①Turn on function if needed.
②Sudden changes in temperature could take longer to be noticed, due to temperatures being averaged of latest eight readings.



6. Sensor Scan Mode

Note:
①Turn on function if needed, default is “Run
②This function’s parameter can be set/controlled through register address.

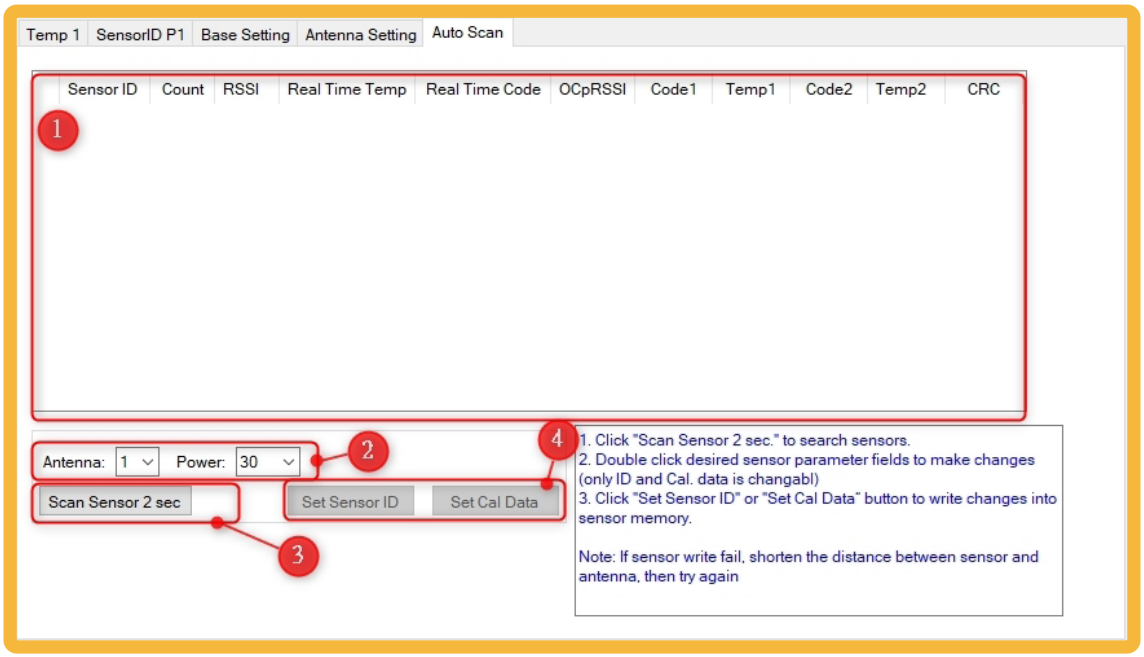


7. Get/Set Setting Parameters Function:

Get: Gets the current setting parameter of the Reader.
Set: Overwrites and updates the Reader’s settings.

1.3 Auto Scan Function

The main function of Auto Scan is to automatically scan all detectable sensors within range.



1. Sensor Details Interface:
Display interface for details of sensors scanned.

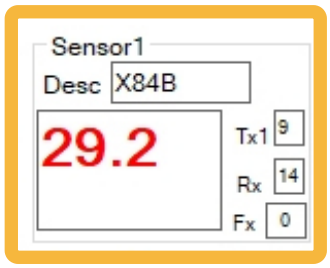
2. Antenna/Output Power Settings:
Change parameters for scanning sensors.

3. Scan Sensor Button:
Scans detectable sensors for 2 seconds.

4. Set Sensor ID / Set Cal Data Button
Click on button to write changes into sensor memory.
(Only ID and Cal Data is changeable)

Note: If sensor write fail, shorten the distance between sensor and antenna, then try again

1.4 Advanced Sensor Status Display



1.3 Displays temperature data for Sensor X84A:

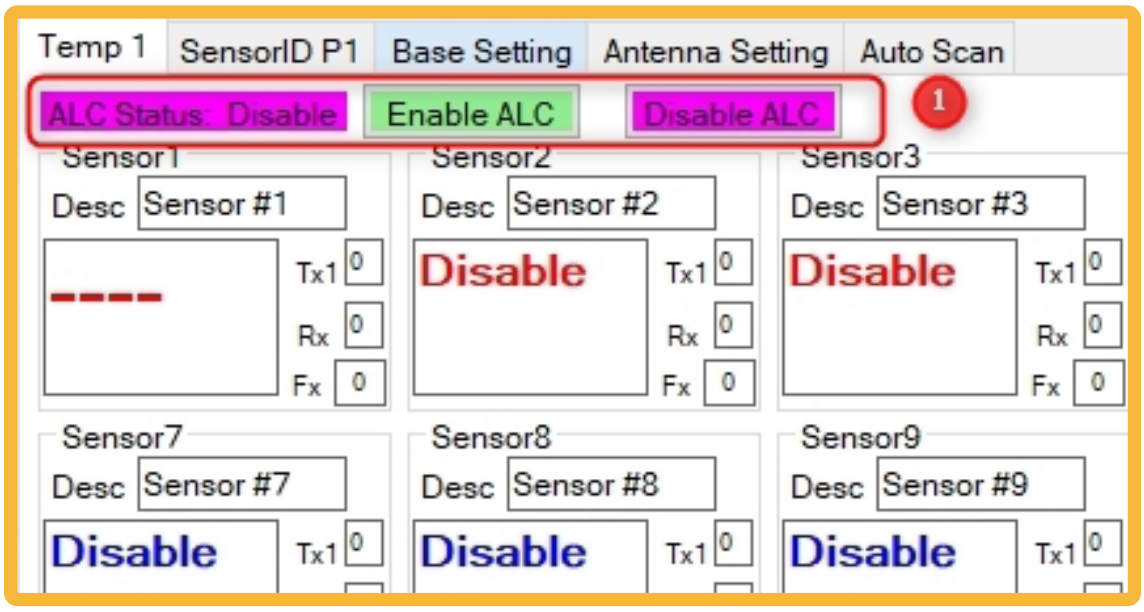
Tx* represents the send signal strength, Rx represents the receive signal strength, Fx represents the fail count. The digit "*" of TX* represents the antenna (port), representing the antenna reading the sensor signals.

- When "Read Fail" is displayed: Failed to read the temperature.
- When "No Setting" is displayed: Sensor ID was not set.
- When "Disable" is displayed: This Sensor has been disabled.
- When "----" is displayed: Still Initializing, hasn't received temperature read.
- When "ANT Disable" is displayed: The antenna for reading the sensor has been disabled.

1.5 ALC Interface Instructions

The main function of the ALC is to maintain the Sensor's receive (RX) in a certain area (Currently set as 10~19). This allows the Reader to be able to adjust the emissive power of the Sensor (TX) automatically, to prevent the Sensor from not working due of the large amounts of electromagnetic waves caused by large emissive power of the TX, as well as other possible problems.

Note: It is recommended that the ALC Function is enabled while use. This allows the Reader to read each Sensor more intelligently, please contact us for any questions regarding ALC.



1. Enable/Disable ALC Function through the place in Pic 1. You may set them altogether:

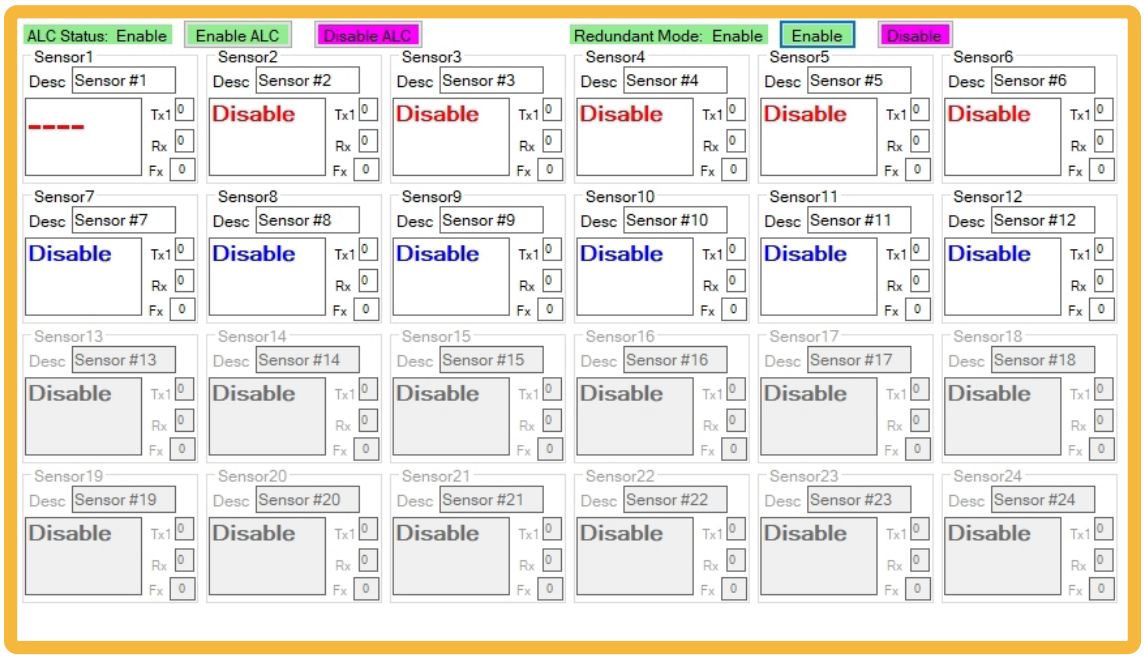
Enable all: Enables ALC for all sensors

Disable all: Disables ALC for all sensors

"all" refers to all Sensors (Sensor 1~24)

1.6. Redundant Mode Function

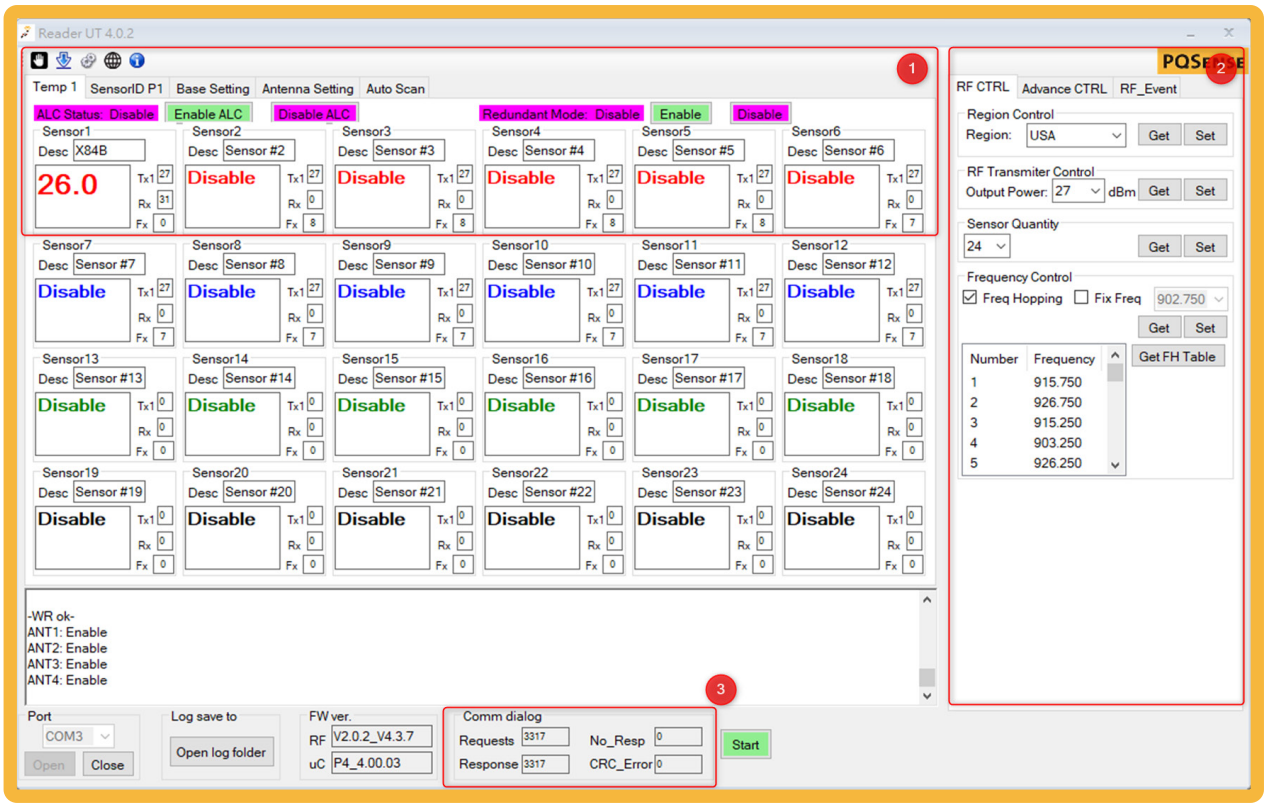
The main function of Redundant Mode is to have sensors 13~24 act as a secondary sensor of sensors 1~12. The primary and secondary sensor should be placed at the same location (sensor 13 is substitute of sensor 1...etc.). All sensors will be operating properly, but data will be gathered and shown on the primary sensor's display.



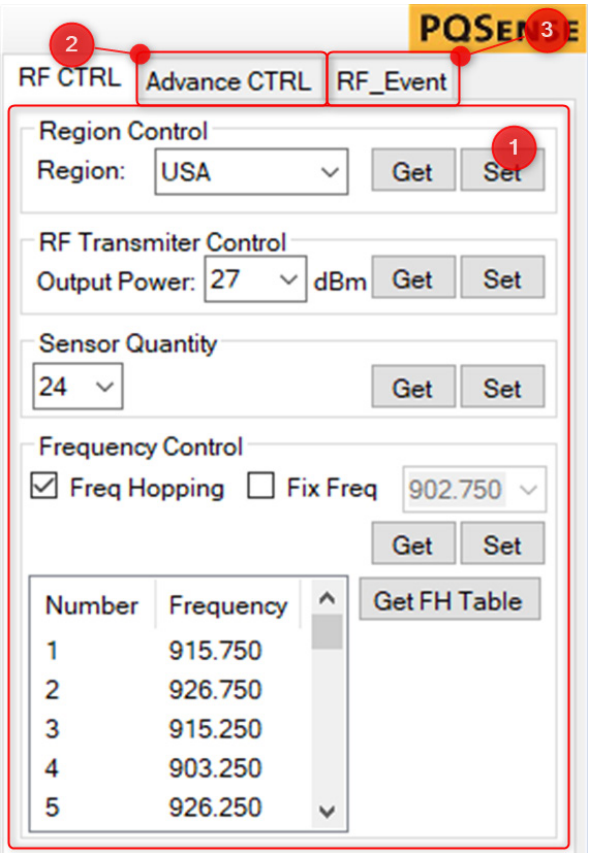
When this function is enabled, sensors 13~24 will be greyed out and the data gathered will be merged to show on the primary sensor's display.

Hidden Interface: 2. New Side Panel

Full Hidden Interface



2. New Side Panel

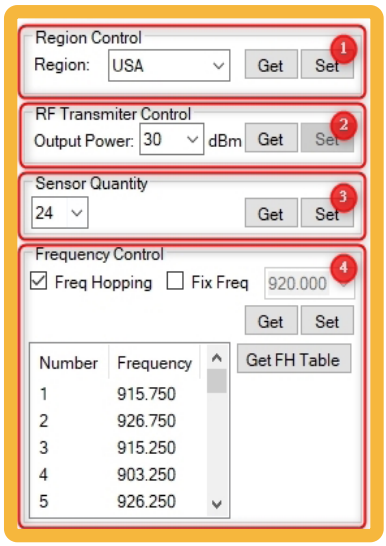


2.1 Advanced RF CTRL Tab

2.2 Advanced CTRL Tab

2.3 RF_Event Tab

2.1 Advanced RF CTRL Tab



1. Region Control

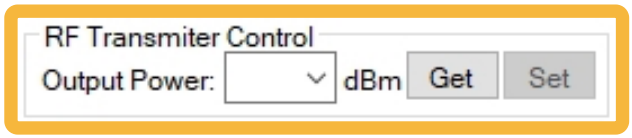
2. RF Transmitter Control

3. Sensor Quantity

4. Frequency Control

1. Region Control

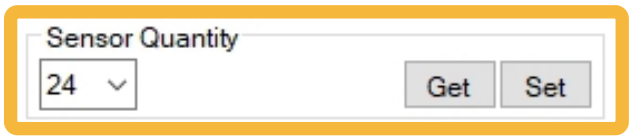
Choose settings for the region of the Reader's work frequency. It is required to set it onto "USA" Frequency (Is also preset settings)



2. RF Transmitter Control

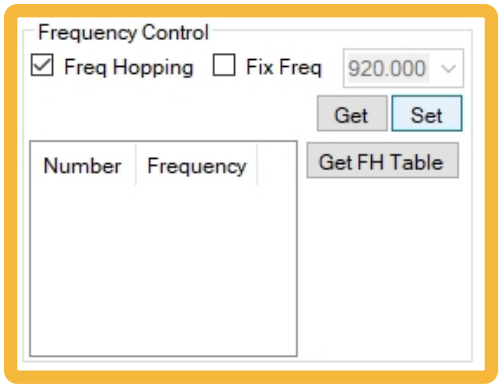
Sets RF Transmitter's output power.

Note: While ALC Status is Enabled, manually adjusting the Reader's emissive power is not possible. This is because the Reader will automatically adjust emissive power according to the ALC function.



3. Sensor Quantity

Sets the quantity of sensors to be shown.

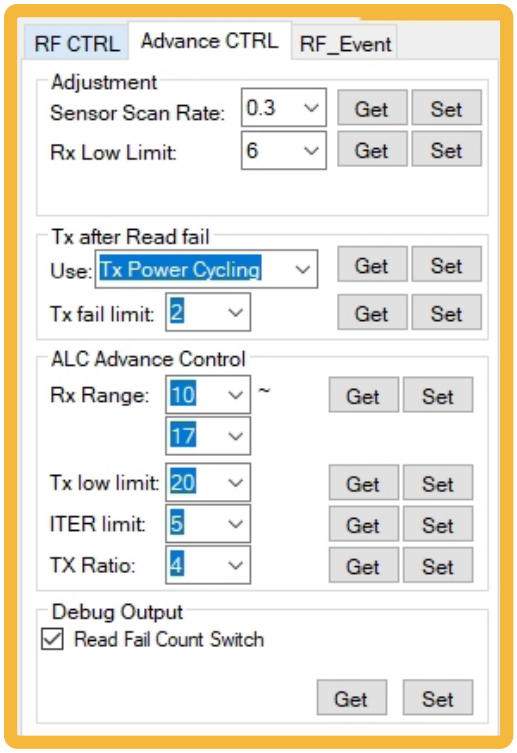


4. Frequency Control

Frequency and Frequency Hopping settings and parameters can be changed here.

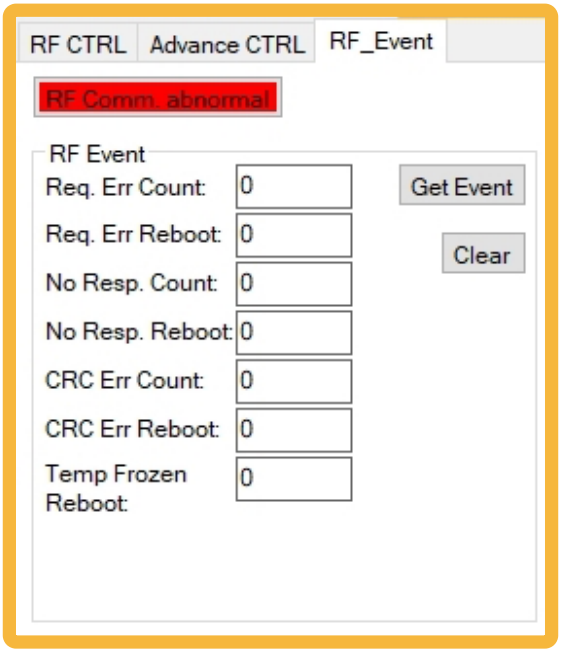
2.2 Advance CTRL Settings Interface

Advanced control settings for the reader can be found here. For more details please contact us.



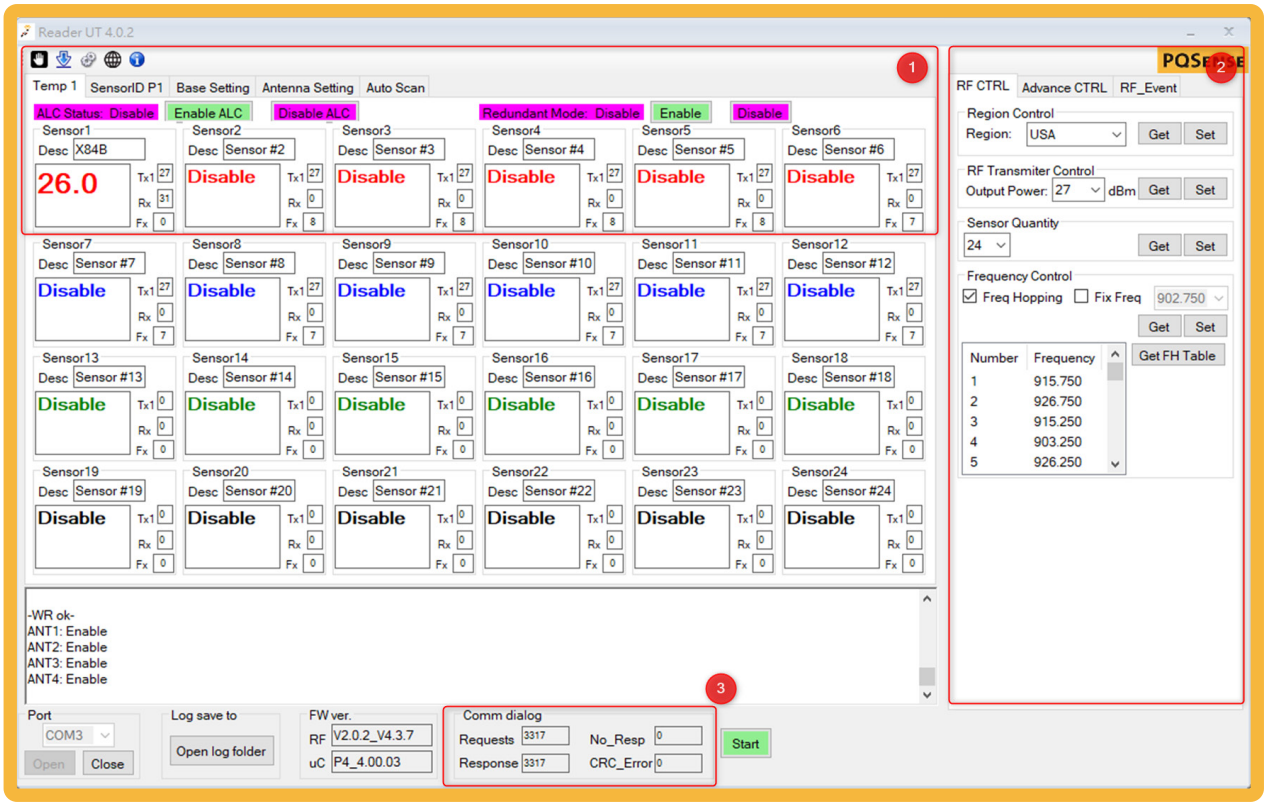
2.3 RF Event Interface

RF Event info can be found here. For more details please contact us.

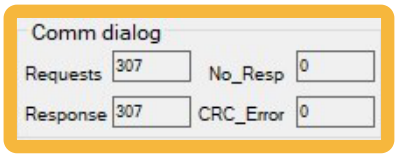


Hidden Interface: 3. Comm Dialog

Full Hidden Interface



3. Comm Dialog



Comm Dialog:
displays the amount of request and response counts

Requests: Request Counts Response: Response Counts
No_Resp: No Response Counts CRC_Error: CRC Error Counts