User Manual

Accelerometer Data Logger

Written by Ryan Lin

Edited by Julia Wang

Table of Contents

Important Information

Warranty

All products manufactured by ICP DAS are under warranty regarding defective materials for a period of one year, beginning from the date of delivery to the original purchaser.

Warning

ICP DAS assumes no liability for any damage resulting from the use of this product.ICP DAS reserves the right to change this manual at any time without notice. The information furnished by ICP DAS is believed to be accurate and reliable. However, no responsibility is assumed by ICP DAS for its use, not for any infringements of patents or other rights of third parties resulting from its use.

Copyright

Copyright @ 2017 by ICP DAS Co., Ltd. All rights are reserved.

Trademark

Names are used for identification purpose only and may be registered trademarks of their respective companies.

Contact us

If you encounter any problems while operating this device, feel free to contact us via mail at: service@icpdas.com . We guarantee to respond within 2 working days.

1. Introduction
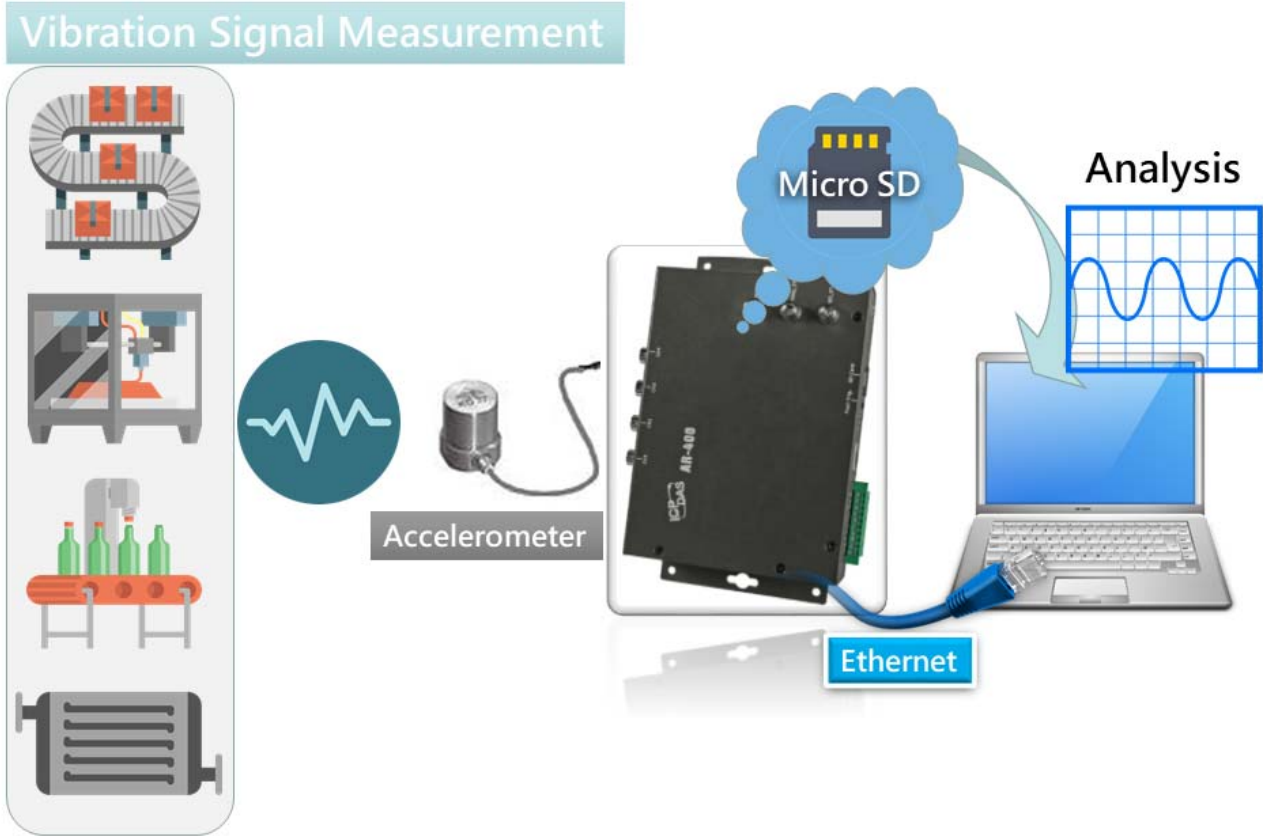
In recent years, in the trend of rapid growing in intelligent factory, automatic, unmanned, and intelligent equipment would be the main trend in the future. The vibration detection of equipment could prevent the loss caused by the damage of equipment. We should let factory manager could do maintenance and repair to prevent the equipment from being out of order more and more which leads taking repairing in large scale by maintenance and repair first and decrease the production efficiency.

IEPE acceleration sensor in current market is often used in detection of vibration signal in station bearing, and often needs to take extra driver module. In this way, cost down is made, and the uncertain results of measuring is increased much more. Besides, the sampling range of acceleration recorder often seen in market could not meet with the range of detection in vibration if station bearing. In order to make the factory to achieve the best benefits, ICP DAS

have Accelerometer Data Logger, AR-200/AR-400.

1.1 Features

◆ 2 or 4 simultaneous, 16-bit resolution ADC

◆ Support 2 or 4 IEPE input，and built-in 3 mA excitation current

◆ AR-200 support sample rate: 200kHz、100kHz、50kHz

◆ AR-400 support sample rate: 125kHz、100kHz、50kHz

◆ Max. Recording time：120 seconds

◆ Dynamic range：+/- 10V

◆ Flexible trigger modes: Push button trigger、Schedule trigger、analog threshold trigger、digital input trigger and utility remote trigger

◆ Supports 4 to 32 GB micro SDHC type flash

◆ Provide 2-ch DI and 1-ch Relay

◆ Provide LED indicators

◆ Contains LED indicator on RJ-45 for Ethernet status.

◆ 4 kV Contact ESD protection for any terminal

◆ Wide range of power input (+10 ~ +30 VDC) and operating temperature (-25 ~ +75°C).

◆ RoHS design

1.2　Specification

Module	AR-200	AR-400
Analog Input Interface		
Channels	2 (simultaneous sampling)	4 (simultaneous sampling)
ADC Resolution	16 bit	
Sample rate (kHz)	50, 100, 200	50, 100, 125
Dynamic range	+/- 10V	
IEPE	3 mA	
Trigger mode	Push button trigger、Schedule trigger、Analog threshold trigger、Digital input trigger、Utility Remote trigger	
Connector	BNC	
Digital Input Interface		
Channels	2, Dry Contact: Source x 1, Wet Contact: Sink or Source x 1	
Dry Contact Level	Off Voltage Level : Open, On Voltage Level : Close to GND	
Wet Contact Level	Off Voltage Level : +4 VDC max., On Voltage Level : +10 VDC to +50 VDC	
Digital Output Interface		
Channels	1, Power Relay, Form A x 1	
Contact Rating	AC: 125 V@0.6A DC: 30V@2A, 110V@0.6A	
Ethernet Interface		
Controller	10/100Base-TX Ethernet Controller (Auto-negotiating, Auto_MDIX)	
Connector	RJ-45 with LED indicator	
SD Card Interface		
Storage Media	Micro SDHC type flash – support 4 to 32 GB	
Recording Format	Binary	
LED Indicator		
LED indicator	PWR LED, DAQ LED, SD LED	
Power		
Power supply	Unregulated +10 ~ +30 VDC	
Protection	Power reverse polarity protection, Over-voltage brown-out protection	
Power Consumption	4.3W	
Mechanical		
Installation	Wall Mount	

Dimensions	197 mm x 139 mm x 57 mm (W x L x H)
Environment	
Operating Temp.	-25 ~ 75 ℃
Storage Temp.	-30 ~ 80 ℃
Humidity	10 ~ 90% RH, non-condensing

2. Getting Started

■ **Appearance**
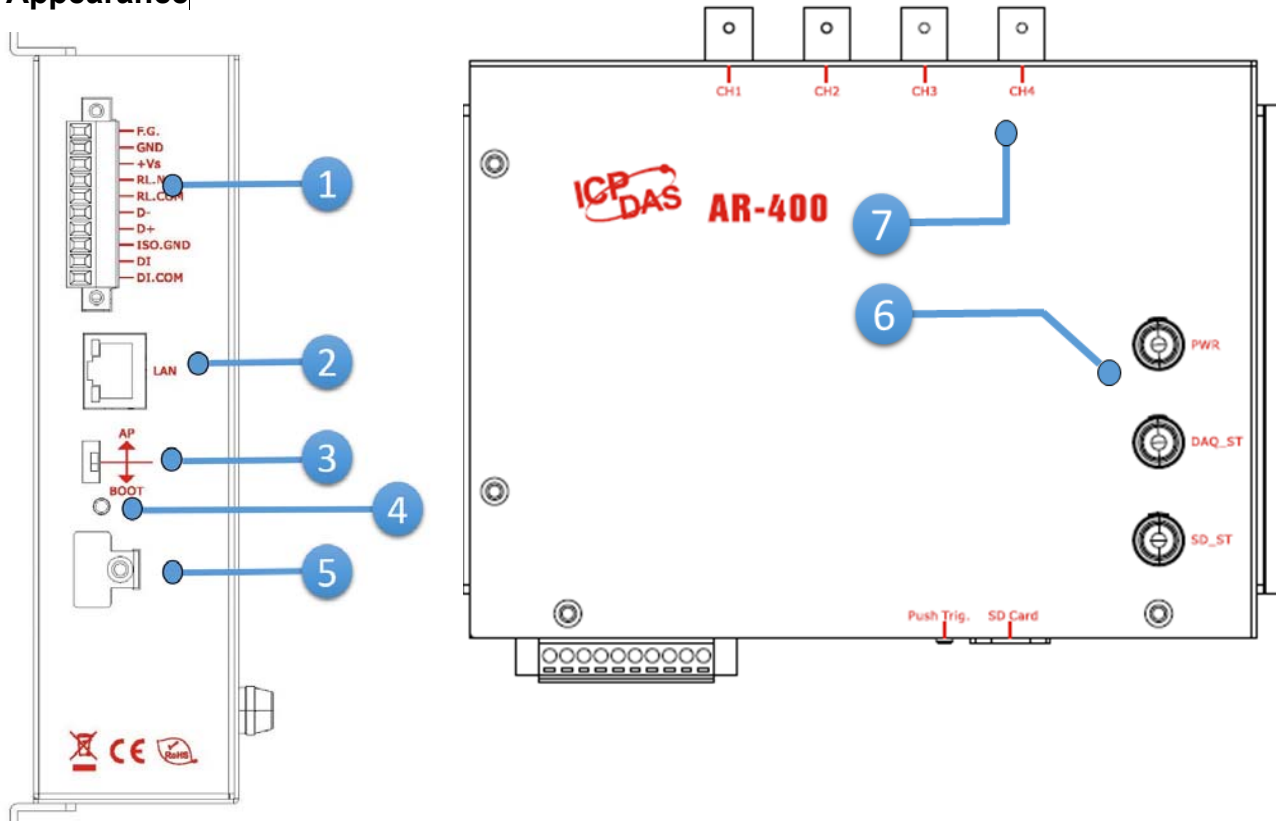
NO.	Descriptions
1	Terminal block
2	Ethernet Port with RJ-45 connector
3	Init. DIP-switches
4	Push button
5	Micro SD slot
6	LED indicators
7	BNC connector

■ Wiring and Pin Assignment
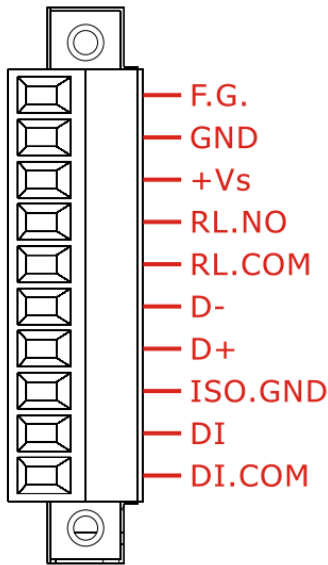
NO.	Name	Descriptions
1	F.G	Power +10 ~ +30 VDC
2	GND	
3	+Vs	
4	RL.NO	Relay
5	RL.COM	
6	D-	RS-485
7	D+	
8	ISO.GND	DI
9	DI	
10	DI.COM	

Input	ON	OFF
Relay Contact (Dry)	Relay Close — DIx / GND	Relay Open — DIx / GND
Open Collector (Dry)	ON — DIx / GND	OFF — DIx / GND
Relay Contact (Wet)	Relay Close — DI.COM / DIx	Relay Open — DI.COM / DIx
NPN Output (Wet)	ON — DI.COM / DIx	OFF — DI.COM / DIx

Output	ON	OFF
Relay	Load AC/DC — RLx NO / RLx COM	Load AC/DC × — RLx NO / RLx COM

2.1 LED Indicator

The accelerometer data logger provides three LED indicators, including indicators for power status, DAQ status and memory card status. The Following is an overview of the purpose and function of each LED indicator together with a description.

DAQ_ST	SD_ST	Description
AP mode		
Flash (Slow, 500ms)	OFF	Idle
Flash (Fast, 100ms)	OFF	Acquiring data
ON	Flash (Fast, 100ms)	● Saving data ● Formatting SD card
Flash (Slow, 500ms)	Flash (Slow, 500ms)	● Do not detect SD card ● Illegal File System
Bootloader mode		
Flash (Fast, 100ms)	Flash (Fast, 100ms)	Updating FW

2.2 Push Button

The Accelerometer Data Logger provide flexible trigger modes, one of them is Push button. The user should keep pressed button at least one second and then released button to start sampling data. Before the sampling time has elapsed, the user can keep pressed button at least one second to stop sampling data. The user can configure sampling rate and sampling time by configuration tool (AR_Tool). About the more information of trigger modes, please refer to the user's manual.

The factory default sampling rate and sampling time:
   AR-200: 200 KHZ, 30 seconds
    AR-400: 125 KHZ, 30 seconds

 ← Button

2.3 Init. DIP Switch

The Accelerometer Data Logger provide an Init. Dip switch, default in [AP]. The user can switch to [BOOT] and re-power on. The device will turn into Bootloader mode and wait for update firmware.

The Firmware Update utility, FW_Update_Tool_v3.xx.exe (where x denotes the utility version) can be obtained from companion CD or our FTP site:
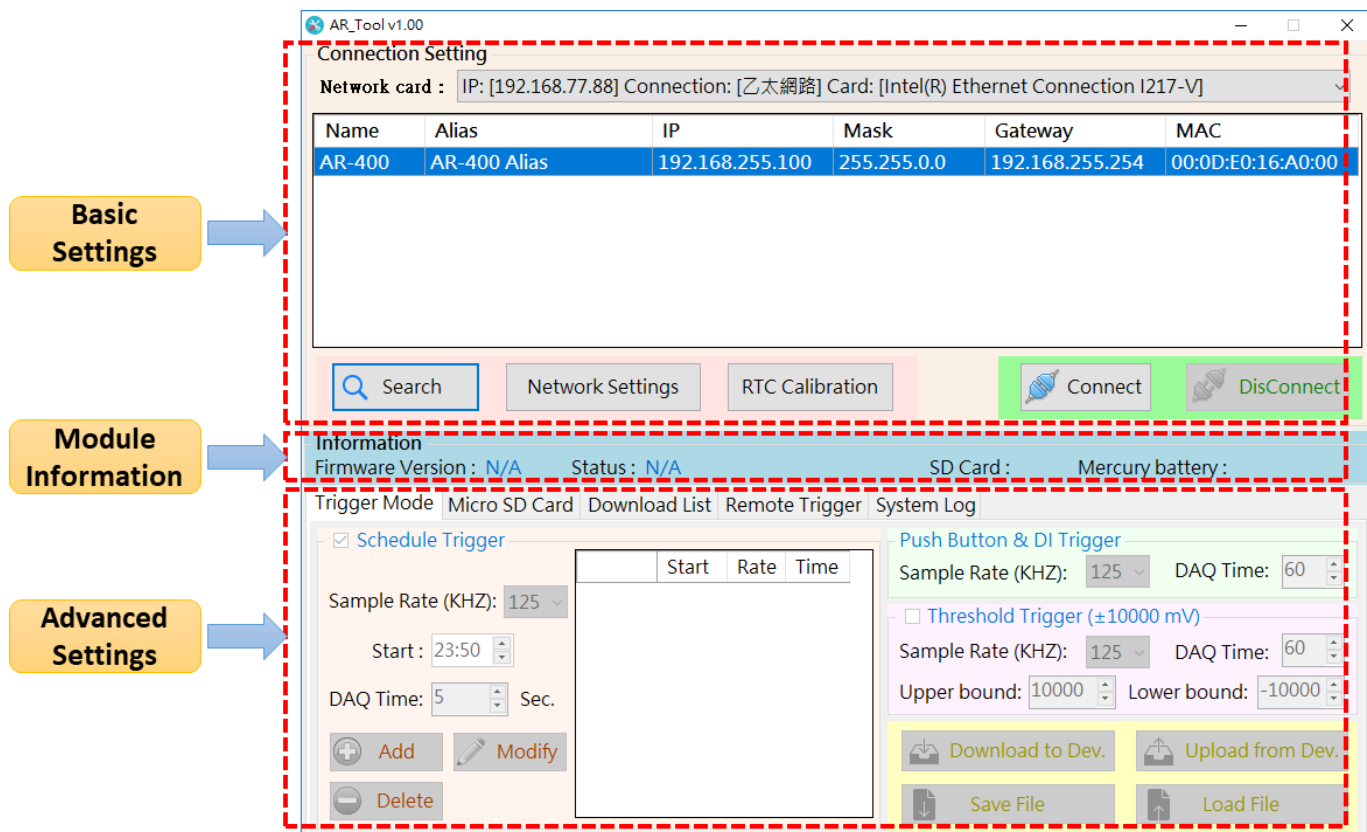
CD:\ar\utility\fw_update_tool\

ftp://ftp.icpdas.com/pub/cd/ar/utility/fw_update_tool/
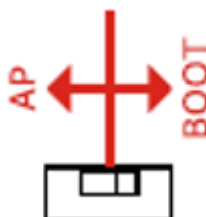
3. AR_Tool Utility

ICP DAS provides a configuration tool, AR_Tool utility, to configure the accelerometer data logger. AR_Tool is divided into three functions, Basic settings, Module information and Advanced settings. The following is an overview of AR_Tool.
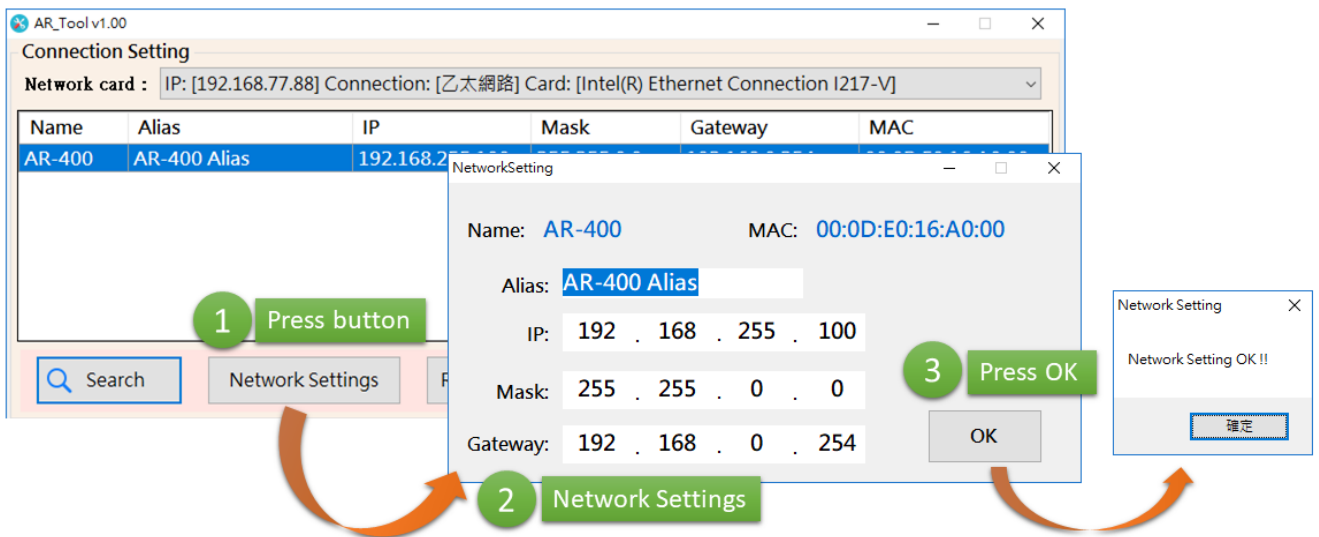
3.1 Basic Settings

The Basic Settings section provides the ability to set or adjust basic settings for the accelerometer data logger, including the network, RTC calibration, and device search, etc.
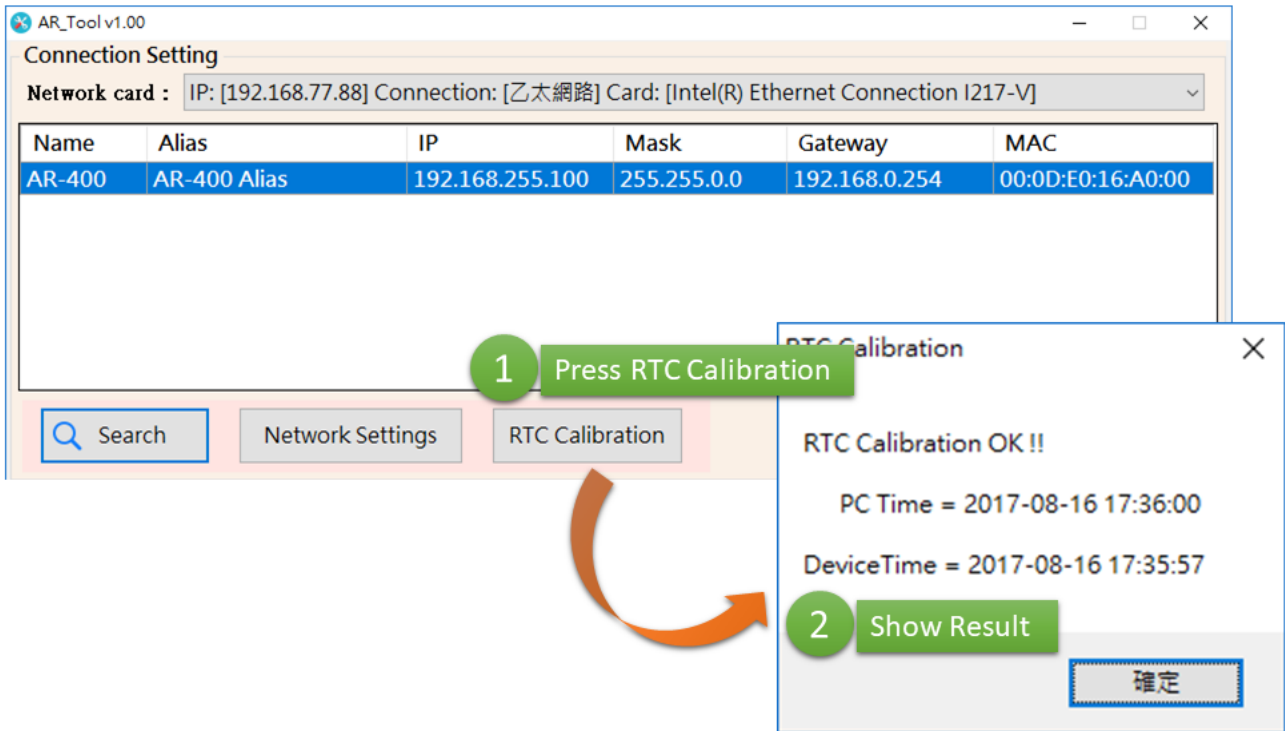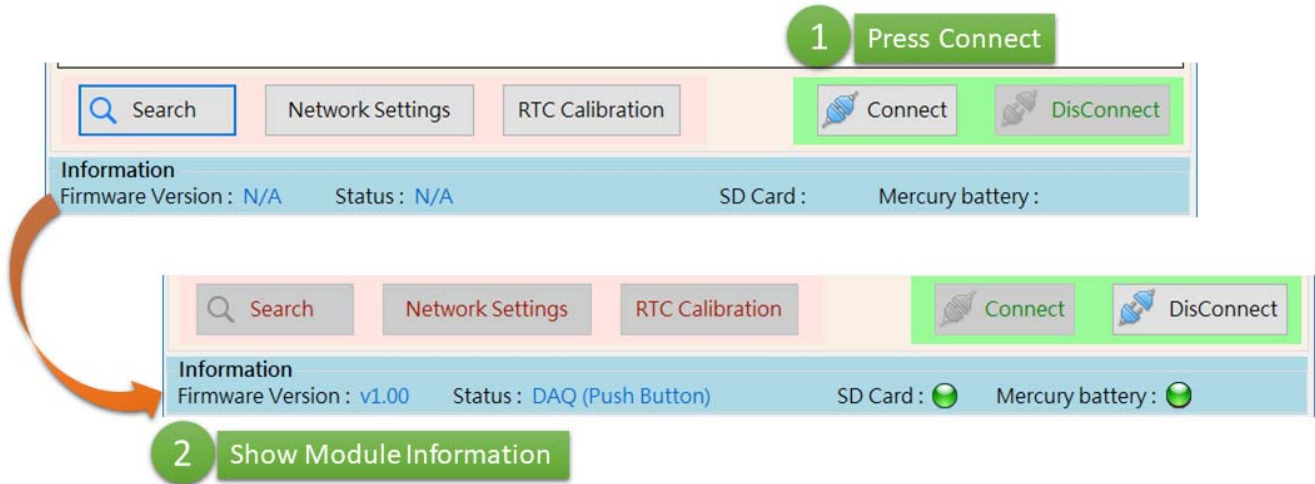
3.1.1 Device Search
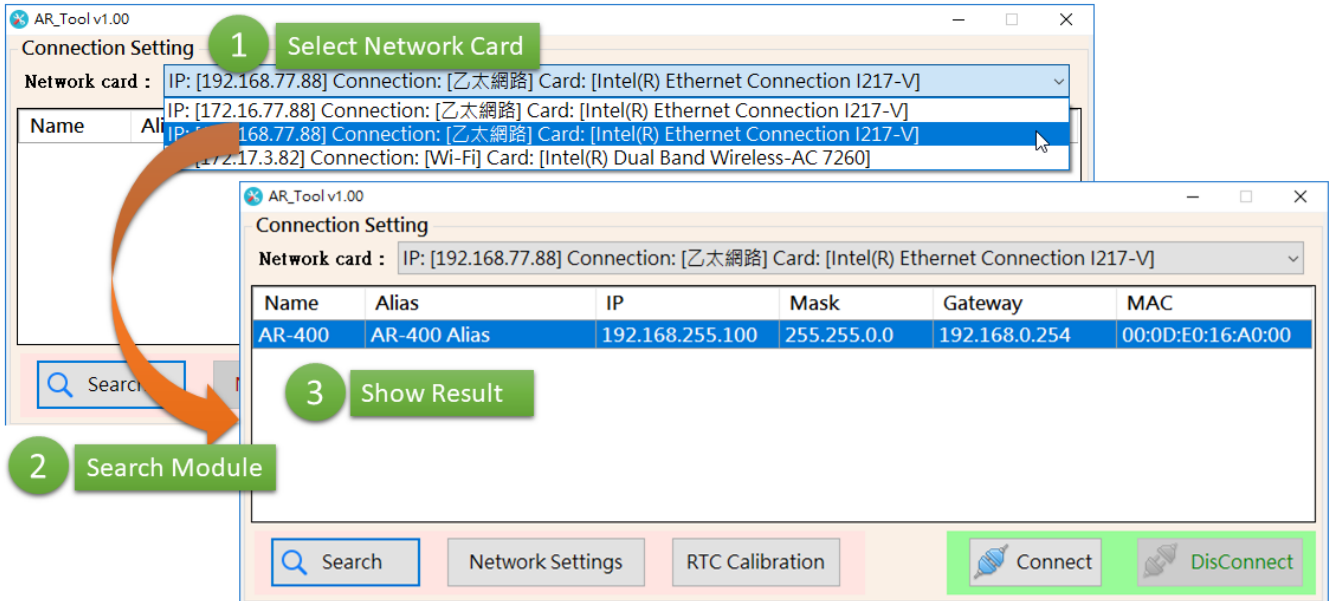
3.1.2 Network Settings

3.1.3 RTC Calibration

3.2 Module Information

Module information show several status of the accelerometer data logger, including firmware version, Micro SD card status, and battery stastus, etc.

Parameter	Description
Firmware Version	『N/A』：Disconnect with module 『vx.xx』：Show firmware version
Status	『N/A』：disconnect with module 『Idle』：connect with module and module do nothing 『Saving Data』：Writing data to Micro SD card 『DAQ (Push Button)』：Push button trigger detected 『DAQ (Schedule)』：Schedule trigger detected 『DAQ (Threshold)』：Analog threshold trigger detected 『DAQ (Remote)』：Remote trigger detected 『DAQ (DI)』：DI trigger detected
SD Card	🟢 : Detect Micro SD card 🔴 : Do not detect Micro SD card
Mercury battery	🟢 : Normal 🔴 : Low battery

3.3 Advanced Settings

3.3.1 Trigger Mode

The accelerometer data logger provide five trigger mode, including Push button trigger、Schedule trigger、Analog threshold trigger and Digital input trigger. The user can configure sampling rate, sampling time and other parameters of trigger mode.

A. Schedule Trigger Mode

The following is an overview of the parameters that can be found on the 『Schedule Trigger Mode』, together with a description of each.

NO.	Parameter	Description
1	Enable Trigger Mode	If checked, it means enable this trigger mode
2	Sample Rate(KHZ)	AR-200：200kHz, 100kHz, 50kHz AR-400：125kHz, 100kHz, 50kHz
3	Start	Set schedule's start time：00:00 ~ 23:59
4	DAQ Time	Set DAQ time：1~120 seconds
5	Add	Add a new schedule
6	Modify	Modify schedule
7	Delete	Delete schedule
8	Number of schedules	1~144，at least 10 minutes between 2 schedules

Note:
- *Just only one trigger mode between Schedule Trigger mode and Threshold Trigger mode can be enabled at the same time.*
- *Factory default enable Threshold Trigger mode.*
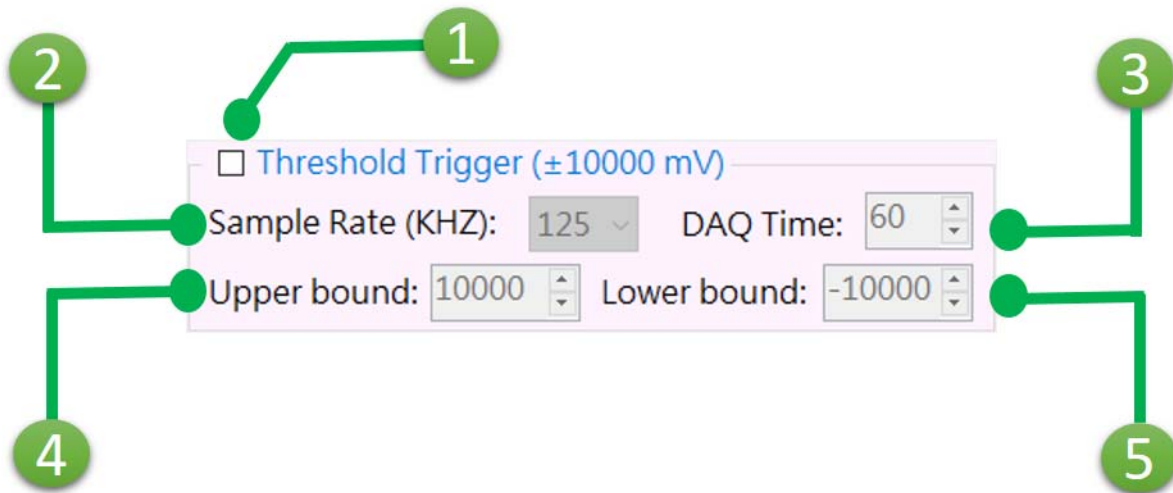
B. Push Button & DI Trigger Mode

The following is an overview of the parameters that can be found on the 』Push Button & DI Trigger Mode』, together with a description of each.

NO.	Parameter	Description
1	Sample Rate(KHZ)	AR-200：200kHz, 100kHz, 50kHz AR-400：125kHz, 100kHz, 50kHz
2	DAQ Time	Set DAQ time：1~120 seconds

Note:
- *The user should keep pressed button at least one second and then released button to start sampling data. Before the sampling time has elapsed, the user can keep pressed button at least one second to stop sampling data.*
- *Factory default:*
  AR-200: 200kHz, 30 seconds ; AR-400: 125kHz, 30 seconds
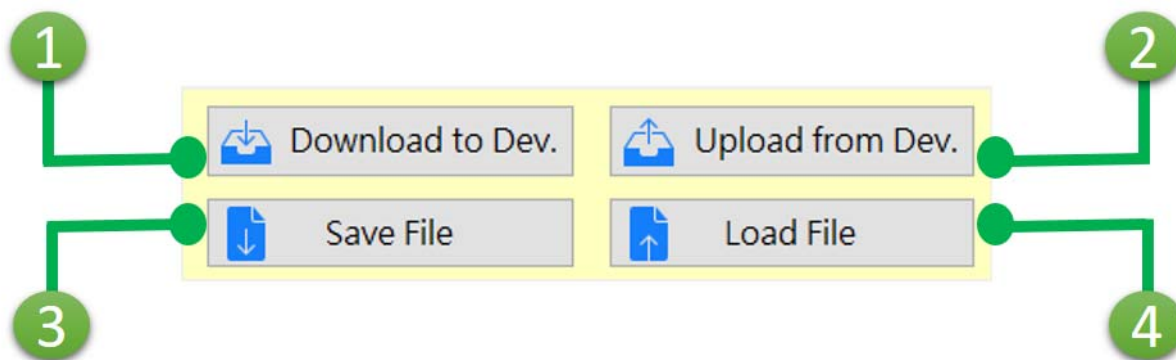
C. Threshold Trigger Mode

The following is an overview of the parameters that can be found on the 『Threshold Trigger Mode』, together with a description of each.

NO.	Parameter	Description
1	Enable Trigger Mode	If checked, it means enable this trigger mode
2	Sample Rate(KHZ)	AR-200：200kHz, 100kHz, 50kHz AR-400：125kHz, 100kHz, 50kHz
3	DAQ Time	Set DAQ time：1~120 seconds
4	Upper bound	Threshold's upper bound: +/- 10000 mV
5	Lower bound	Threshold's lower bound: +/- 10000 mV

Note:
1. *Just only one trigger mode between Schedule Trigger mode and Threshold Trigger mode can be enabled at the same time.*
2. *Factory default enable Threshold Trigger mode.*
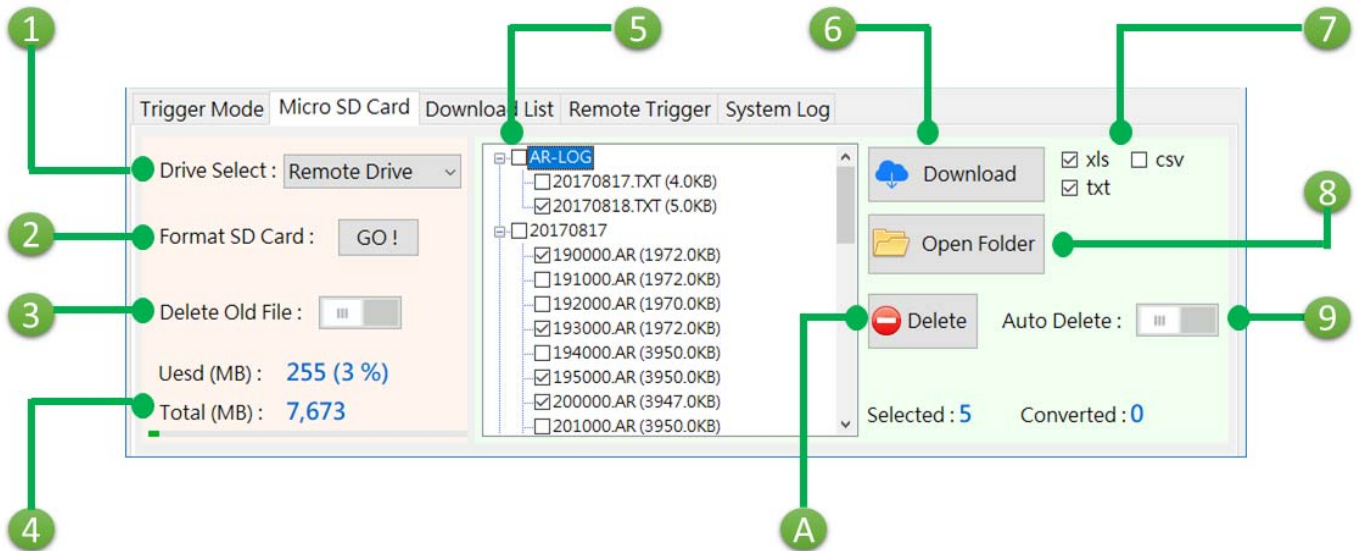
D. Download/Upload Parameters

The following is an overview of the parameters that can be found on the 『Download/Upload Parameters』, together with a description of each.

NO.	Parameter	Description
1	Download to Dev.	Write trigger mode settings to device
2	Upload From Dev.	Read trigger mode settings from device
3	Save File	User can save trigger mode settings to a file(*.ini)
4	Load File	User can load trigger mode settings from a file(*.ini)

3.3.2 Micro SD Card

All sampling files saved in Micro SD card have the ".AR" file name extension. AR_Tool will help the user to convert those files to text file or excel file.
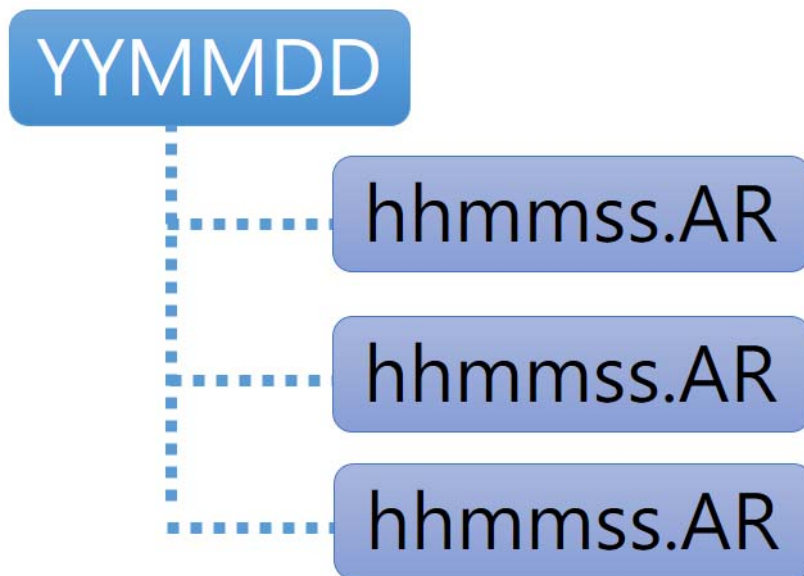

The following is an overview of the parameters that can be found on the 『Download/Upload Parameters』, together with a description of each.

NO.	Parameter	Description
1	Drive Select	It will show all removable storage devices on PC. If utility connected with module, it will have an option 『Remote Drive』.
2	Format	This function can format memory card selected by 『Drive Select』.
3	Delete Old File	If module is so low on storage that it can't save data. This function can delete old files and then save data. Factory default : Disabled this function : Disable, it will not save data. : Enable, it will auto delete old files.
4	Storage	It will show total storage of memory card and how much storage memory card used.

| 5	File List	It will show all *.AR files and log files in memory card.
6	Convert / Download	『Convert』: It will convert selected *.AR files in file list. 『Download』: It will download *.AR files and log files selected in file list.
7	File Type	Set file type that *.AR files will be converted
8	Open Folder	It will open folder that save *.AR files.
9	Auto Delete	It will delete file automatically when file download completed.
A	Delete	The user can delete selected files in file list manually.

The naming rules of sampling file is shown below:

It used sampling date as file folder, sampling tile as file name.

3.3.3 Download List

The user can download multiple files from accelerometer data logger, and can see download status at this tab.
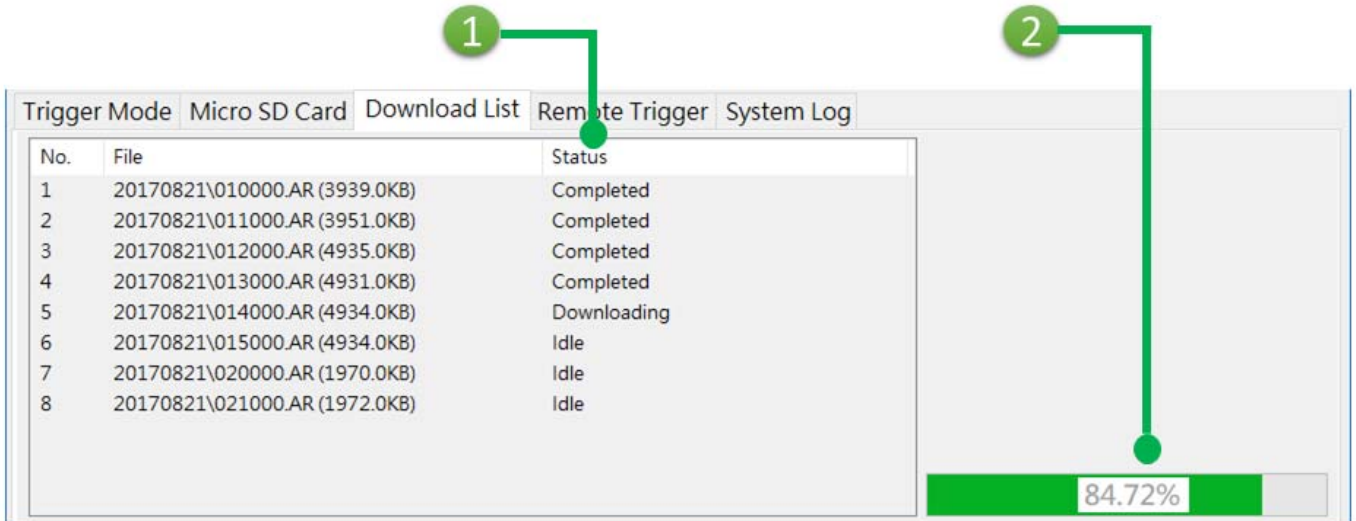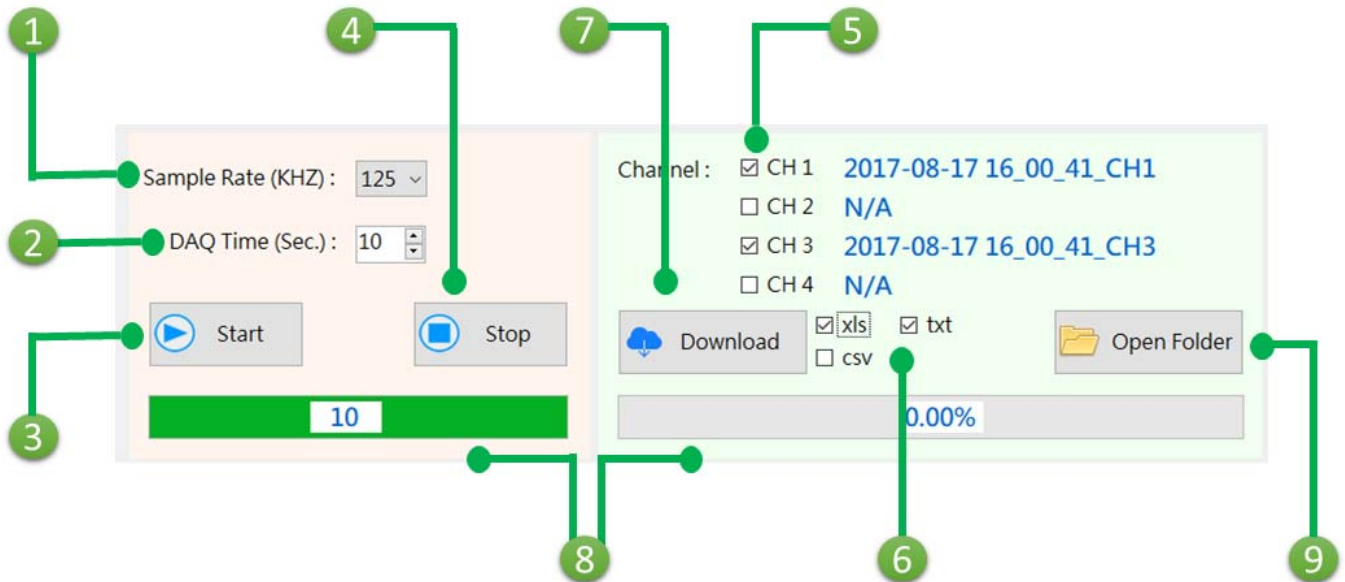

The following is an overview of the parameters that can be found on the 『Download List』, together with a description of each.

NO.	Parameter	Description
1	File List	Show download status of each files
2	Progress Bar	Show download progress

3.3.4 Remote Trigger

Accelerometer data logger provide remote trigger function. The user can sampling data and download data directly via AR_Tool.
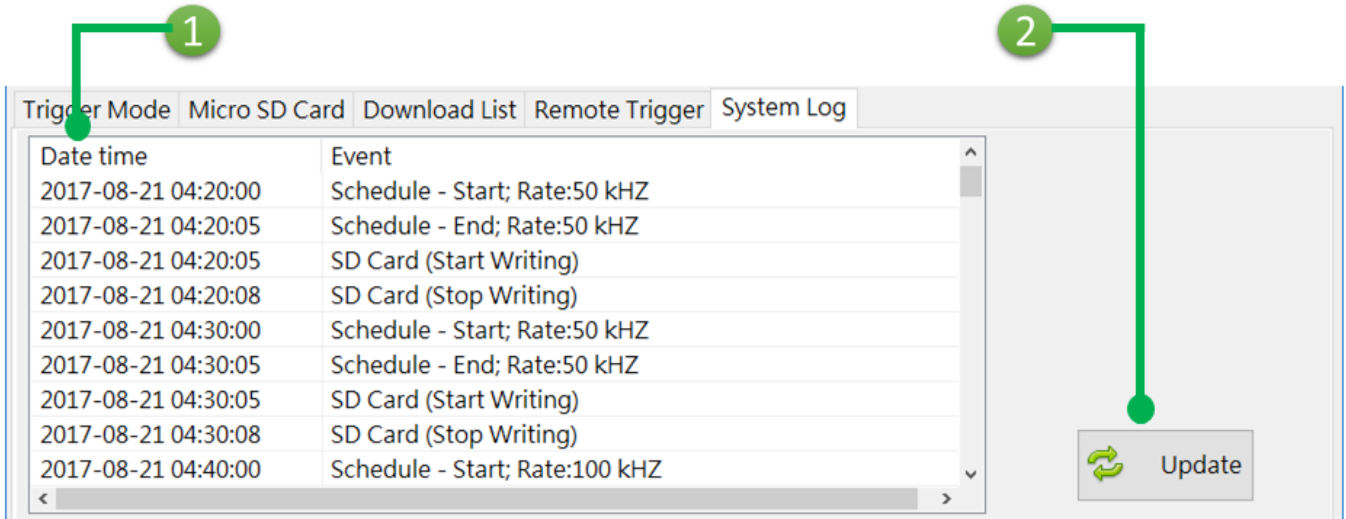

The following is an overview of the parameters that can be found on the 『System Log』, together with a description of each.

NO.	Parameter	Description
1	Sample Rate(KHZ)	AR-200：200kHz, 100kHz, 50kHz AR-400：125kHz, 100kHz, 50kHz
2	DAQ Time	Set DAQ time：1~120 seconds
3	Start	Start sampling data
4	Stop	Stop sampling data
5	Channel	Select desired channel.
6	File Type	Select file type that *.AR files will be converted.
7	Download	It will download selected channel's data.
8	Progress Bar	Show sampling progress and download progress
9	Open Folder	It will open folder that save *.AR files.

3.3.5 System Log

System Log show 200 recant system events, including boot-up time, sampling mode, sampling time, and so on.

The following is an overview of the parameters that can be found on the 『System Log』, together with a description of each.

NO.	Parameter	Description
1	Event list	Show system events.
2	Update	Update to the latest system events.

Appendix A. Revision History

This chapter provides revision history information to this document.

The table below shows the revision history.

Revision	Date	Description
1.0.0	September 2017	Initial issue

Appendix B. Firmware Update

This chapter provides a way to update the latest firmware of accelerometer data logger.

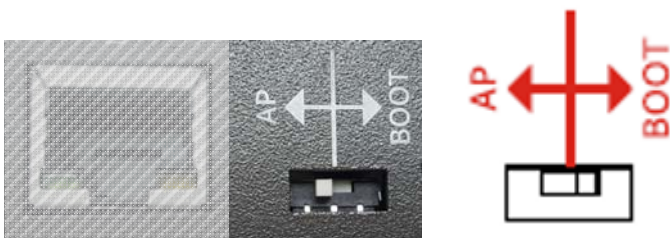| Step 1: Get Firmware_Update_Tool utility |
| --- |

The Firmware Update utility, FW_Update_Tool_v3.xx.exe (where x denotes the utility version) can be obtained from companion CD or our FTP site:

CD:\ar\utility\fw_update_tool\

ftp://ftp.icpdas.com/pub/cd/ar/utility/fw_update_tool/

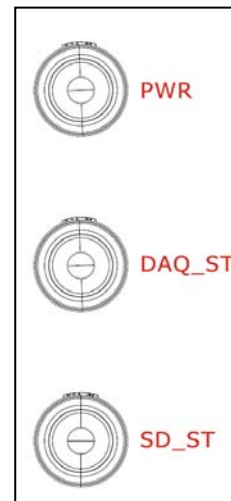| Step 2: Adjust Init. dip switch |
| --- |

Set Init. Dip switch to 『BOOT』

Step 3: Into Bootloader mode

Re-power up,

and confirm that DAQ_ST led and SD_ST led are fast flashing.

Step 4: Start Update

① Select Network Card

② Assign IP address for AR Series

③ Select *.fw file

④ Enter

⑤ Start Update

3. Firmware Update

Click "Update" button to start firmware updating!!

Update

Programming.

Update OK