

# **S-DAQ User Manual**

**v0.1**



# [ Revision History ]

Version	Date	Change History	Author	Confirmed by
V0.1	2015.09.06		SangHo Lee	SangHo Lee

## 1. Introduction

S-DAQ is a device for transferring voltage signal and equipment information to an agent PC through wired/wireless communication. Users are advised to read carefully all manuals provided with the package, to ensure safe and efficient use of S-DAQ unit. This manual explains necessary skills and information for setting up and using S-DAQ.

## 2. S-DAQ Basic Specifications

S-DAQ comprises three boards (CPU Board, DAQ<sup>i</sup> Board, RS-232 <sup>ii</sup>Board) and each board contains following components.

### 1) Board Components

- A. CPU Board : CPU, Power Module, Communication Module (WIFI, LAN)
- B. DAQ Board : ADC Module(40 Channels), FPGA
- C. RS-232 Board : RS-232 (9 Channels)

### 2) Exterior

The picture is of the S-DAQ board and case. The front panel of S-DAQ has power port (24Vdc), power on/off switch, USB memory port, LAN 2Port, Mini-USB Port, a port for an external antenna. The rear panel houses LED, FG, DAQ Port, RS-232 Port connections.



**Figure 1 S-DAQ Exterior**



Figure 2 S-DAQ Front Panel



Figure 3 S-DAQ Rear Panel

- A. Power : 24Vdc supply.
- B. WIFI : Port for connecting external antenna.
- C. LAN0, LAN1 : LAN Port for Ethernet communication with other devices using TCP/IP.
- D. Mini-USB : Developer's Debug Port.
- E. USB : used for S-DAQ FW update.
- F. Power Switch : Power On/Off switch.
- G. ADC : Receives analogue voltage inputs up to 40 channels.
- H. LED(1,2,3) : Status LED
- I. RS-232 : for serial communications with other devices (supports up to 9 channels).
- J. FG : Frame Ground for noise reductions. Connects to host equipment ground.

### 3) H/W Specifications

- A. S-DAQ internal H/W has following characteristics.
  - i. Freescale i.MX6 Quad Core(1 GHz × 4)
  - ii. Dual Band WIFI, 802.11 a/b/g, Ethernet communications support
  - iii. FPGA(SPARTAN LX4 ) support

## B. DAQ Board H/W Details

ITEM	SPECIFICATION
ADC CH	SINGLE 40CH, DIFFERENTIAL 20CH 16BIT
INPUT	MAX +/- 10V
FILTER	40CH 300KHz LOWPASS FILTER
SAMPLE RATE	40CH 1KSPS (NORMAL), 5CH 64KSPS (MAX)
REFERNCE VOLTAGE	4.096V
ADC CONTROL	SPARTAN-6 FPGA SERIES
ISOLATION POWER (1)	2W 5V to 7V DC-DC CONVERTER
ISOLATION POWER (2)	2W 24V to +/- 12V DC-DC CONVERTER
ISOLATION VOLTAGE	MAX 6500VRMS 1SEC
ADC I/F	SPI 3.3MHz 5CH
CPU I/F	SPI 20MHz 1CH
FPGA PROGRAMMING	SPI 20MHz 1CH
SUPPLY POWER (1)	3.3V
SUPPLY POWER (2)	5V
SUPPLY POWER (3)	24V
Size	100 x 100 x 16 (mm)

## C. CPU Board H/W Details

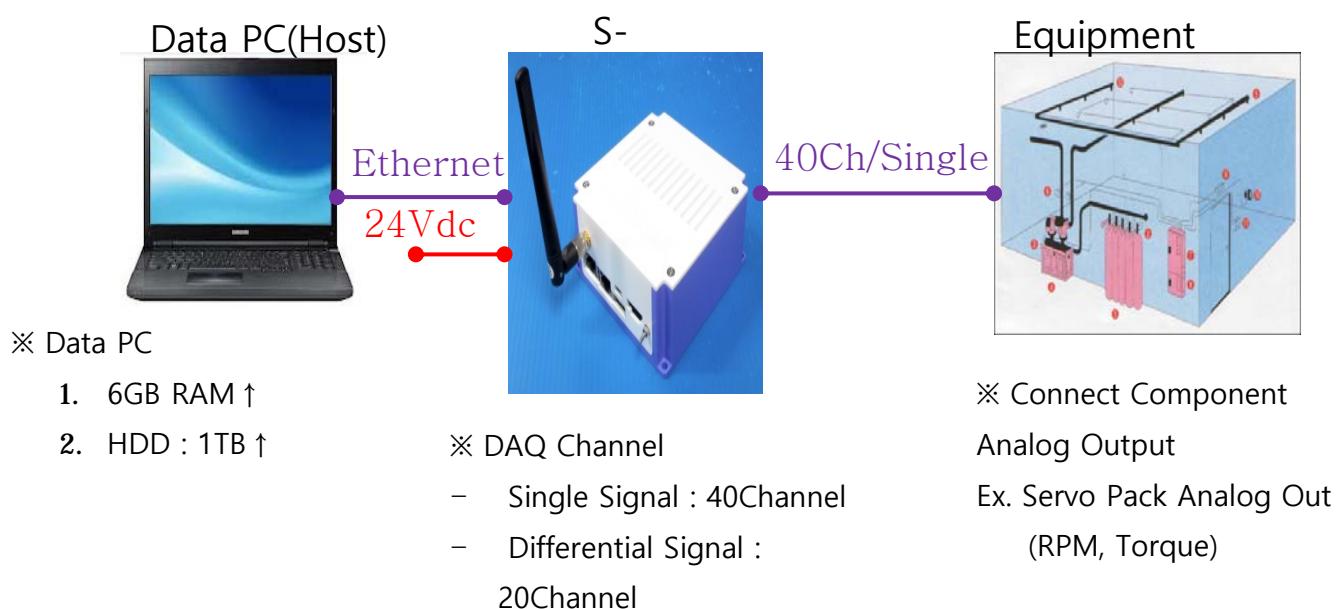
ITEM	SPECIFICATION
ADC CH	SINGLE 40CH, DIFFERENTIAL 20CH 16BIT
INPUT	MAX +/- 10V
FILTER	40CH 300KHz LOWPASS FILTER
SAMPLE RATE	40CH 1KSPS (NORMAL), 5CH 64KSPS (MAX)
REFERNCE VOLTAGE	4.096V
ADC CONTROL	SPARTAN-6 FPGA SERIES
ISOLATION POWER (1)	2W 5V to 7V DC-DC CONVERTER
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ISOLATION VOLTAGE	MAX 6500VRMS 1SEC
ADC I/F	SPI 3.3MHz 5CH
CPU I/F	SPI 20MHz 1CH
FPGA PROGRAMMING	SPI 20MHz 1CH
SUPPLY POWER (1)	3.3V
SUPPLY POWER (2)	5V
SUPPLY POWER (3)	24V
Size	100 x 100 x 16 (mm)

## D. RS-232 Board H/W Details

ITEM	SPECIFICATION
ADC CH	SINGLE 40CH, DIFFERENTIAL 20CH 16BIT
INPUT	MAX +/- 10V
FILTER	40CH 300KHz LOWPASS FILTER
SAMPLE RATE	40CH 1KSPS (NORMAL), 5CH 64KSPS (MAX)
REFERNCE VOLTAGE	4.096V
ADC CONTROL	SPARTAN-6 FPGA SERIES
ISOLATION POWER (1)	2W 5V to 7V DC-DC CONVERTER
ISOLATION POWER (2)	2W 24V to +/- 12V DC-DC CONVERTER
ISOLATION VOLTAGE	MAX 6500VRMS 1SEC
ADC I/F	SPI 3.3MHz 5CH
CPU I/F	SPI 20MHz 1CH
FPGA PROGRAMMING	SPI 20MHz 1CH
SUPPLY POWER (1)	3.3V
SUPPLY POWER (2)	5V
SUPPLY POWER (3)	24V
Size	100 x 100 x 16 (mm)

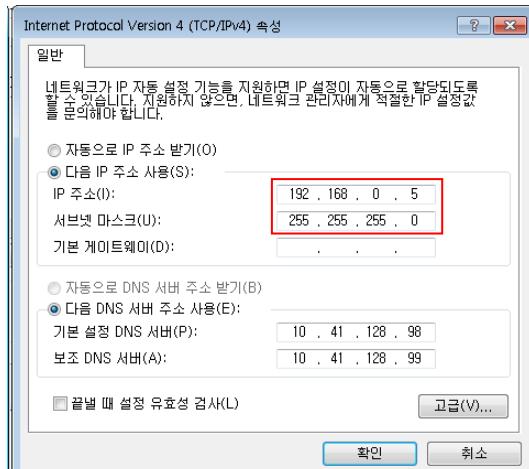
## 3. How to Install and Use

## 1) S-DAQ Installations

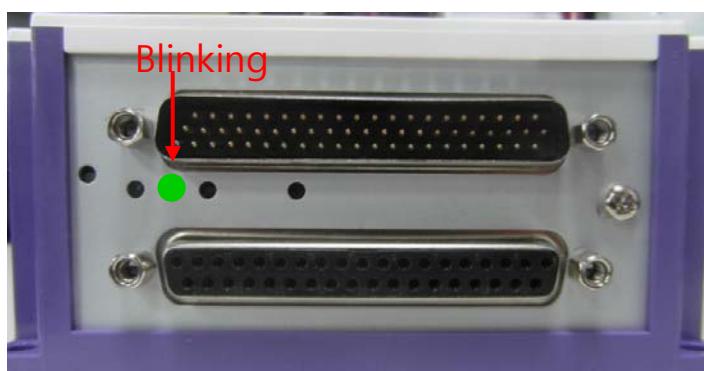


## 2) S-DAQ Connection Check

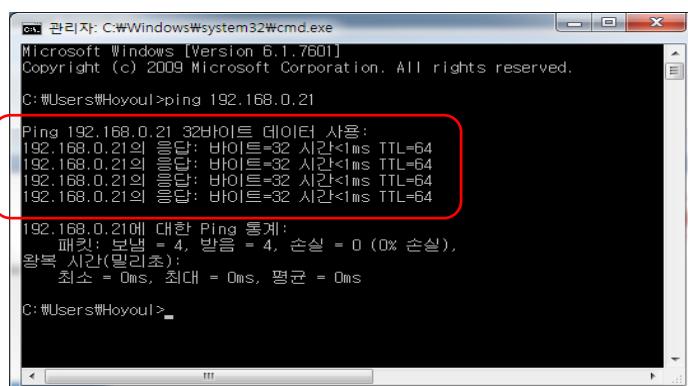
## A. Change IP Address for Data PC to 192.168.0.5.



## B. Power on and confirm LED2 is blinking green.



## C. Do a ping test to S-DAQ from Data PC to confirm connection.



## 3) S-DAQ Pin Map

PIN Num	ADC	PIN Num	ADC	PIN Num	ADC	PIN Num	ADC	PIN Num	ADC
20	ACH0	16	ACH8	12	ACH16	8	ACH24	4	ACH32
62	ACH1	58	ACH9	54	ACH17	50	ACH25	46	ACH33
39	GND1	35	GND5	31	GND9	27	GND13	43	GND17
41	ACH2	37	ACH10	33	ACH18	29	ACH26	25	ACH34
19	ACH3	15	ACH11	11	ACH19	7	ACH27	3	ACH35
39	GND2	35	GND6	31	GND10	27	GND14	43	GND18
61	ACH4	57	ACH12	53	ACH20	49	ACH28	45	ACH36
40	ACH5	36	ACH13	32	ACH21	28	ACH29	24	ACH37
39	GND3	35	GND7	31	GND11	27	GND15	43	GND19
18	ACH6	14	ACH14	10	ACH22	6	ACH30	2	ACH38
60	ACH7	56	ACH15	52	ACH23	48	ACH31	44	ACH39
39	GND4	35	GND8	31	GND12	27	GND16	43	GND20

## 4. HW Specifications

S-DAQ		Case	
Sensor Type	ADC & Serial Interface	SIZE	110 × 110 × 50 mm
Function	Voltage Measurement & RS-232	무게	
Measurement Range	±10V	Port	
DAQ SNR	89dB	WIFI	
Channel	ADC : 40Channel / RS-232 : 9Channel	LAN0	Power
Resolution	0.378uV/LSB	LAN1	Power Switch
DAQ Data Rate	1 / 2 / 4 / 8 kHz	USB	
Baud-Rate	9600 / 19200 / 38400 / 57600 / 115200		
Operation Temperature	5°C ~ 50°C		
Wireless	IEEE 802.11 a/b/g (2.4GHz / 5.2GHz 대응) - WPA2-PSK, WAP2-PEAP - AES		
LAN	LAN × 2		
전원사양	24Vdc(±2.4V), 500mA		
부가기능	- OTA F/W Upgrade - USB OTG	ADC : 40Channel	FG
		RS-232 : 9Channel	

<sup>i</sup> DAQ : Stands for Data Acquisition. General terminology for measurement of analog input/output, digital input/output and digital counter/timer.

<sup>ii</sup> RS-232 : Serial type communication interface between PC and devices such as sound coupler and modem.

## **Federal Communication Commission Interference Statement**

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 generate, 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 technical for help.
- Only shielded interface cable should be used.

Finally, any changes or modifications to the equipment by the user not expressly approved by the grantee or manufacturer could void the users authority to operate such equipment.

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

Caution : Any changes or modifications in construction of this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device is operation in 5.15 – 5.25 GHz frequency range, then restricted in indoor use only.

## **RF exposure warning**

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.