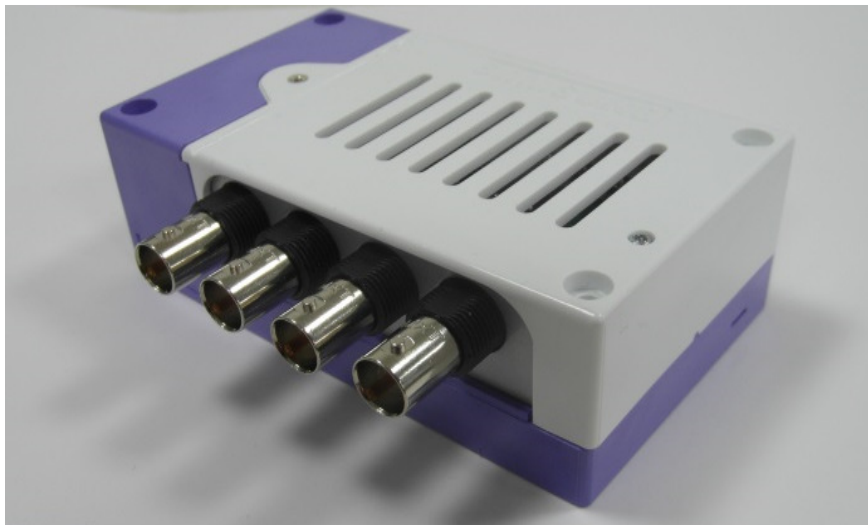


# SCOPE 2.0 Plus User Manual

V0.1



SEMES

Test&Package Team

# [ Revision History ]

Version	Date	Change History	author	Confirmed By
V0.1	20170923	draft	Yong-Seok Jang	Yong-Seok Jang

## 1. Introduction

SCOPE2.0 Plus is a device for transferring vibration 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 SCOPE2.0 Plus unit. This manual explains necessary skills and information for setting up and using SCOPE2.0 Plus

## 2. SCOPE2.0 Plus Specifications

SCOPE2.0 Plus Platform comprise two boards(Main Board, Interface Board) and Sensor Module comprise one board. Each Board Contains following components

### 1) Board Components

#### A. Platform

- i . Main Board: CPU / RAM / Flash / Power Module
- ii . Interface Board: WIFI / LAN

#### B. Sensor Module

- i . Analog Vibration sensor interface Filter

### 2) Exterior

This picture is of SCOPE2.0Plus Board and case. The front panel of SCOPE2.0 Plus has Power (24Vdc), USB OTG, LAN Port, RS-232 4Port, a Port of external antenna, LED. The rear panel of SCOPE2.0 Plus has FG. The Sid panel of SCOPE2.0 Plus has Sensor Connector (BNC)

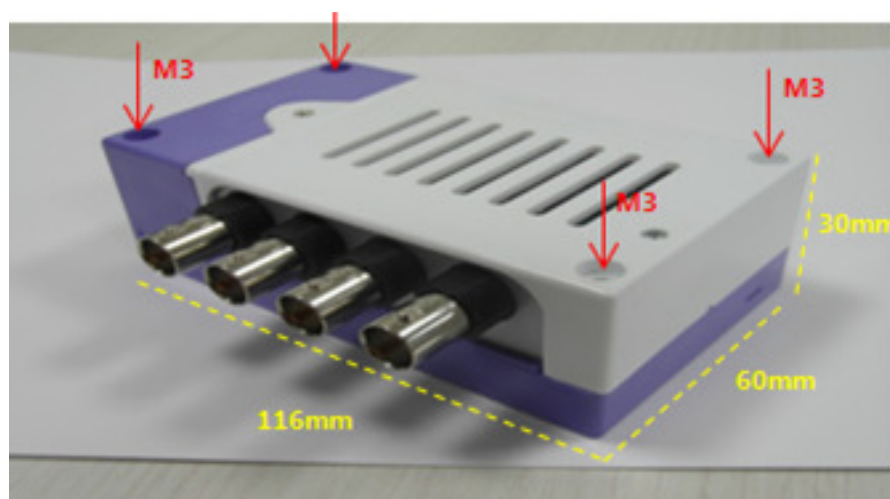


Figure1. SCOPE2.0 Plus Exterior



Figure2. SCOPE2.0 Plus Front Exterior

- A. Power: 24Vdc supply (VCC / GND / FG)
- B. Antenna: Port for connecting WI-FI module
- C. LAN: LAN Port for Ethernet communication with other devices using TCP/IP
- D. USB: USB-OTG Port ( used for FW update)
- E. LED (1,2,3): Status LED
- F. FG: Frame Ground for noise reduction. Connects to host equipment ground
- G. RS232: standard for serial communication transmission of data (used for communication between SCOPE2.0 Plus and equipment)
- H. Debug: RS232 Debugging Port

### 3) H/W Specification

- A. SCOPE2.0 Plus internal H/W has following characteristics.
  - ① Freescale i.MX6 Qual Core(1Ghz x 4)
  - ② Dual Band WIFI, 802.11 a/b/g, LAN communication support
  - ③ FPGA(SPARTAN LX4 )support

## B. Platform HW Details

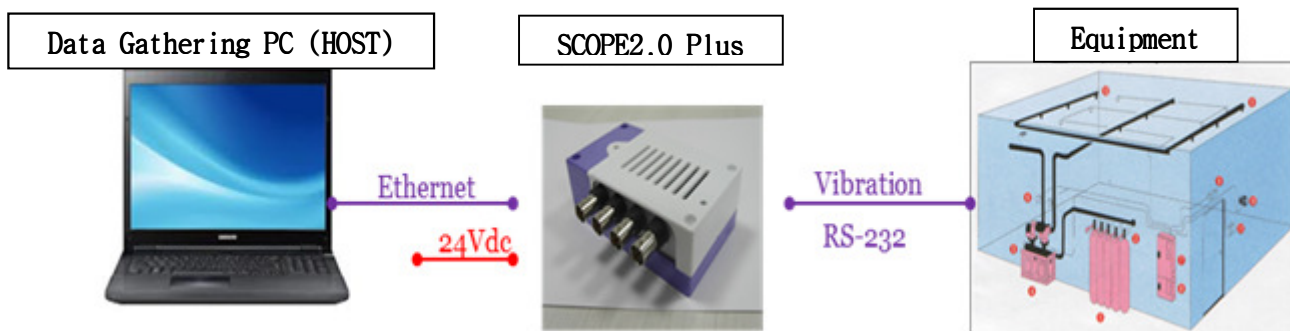
ITEM	SPECIFICATION
CPU	Freescale-i.MX6Q CPU(Quad)
ETHERNET	GIGABIT-LAN
SERIAL	USB to SERIAL Debug port
USB	USB2.0 Client Debug port
WIFI	802.11a/b/g
ADC BOARD I/F	8bit Bus, 5V, 3.3V, 24V supply
INDICATOR	3COLOR x2
Digital I/F	RS-232 x 4
CONFIG SWITCH	TACT SWITCH x 1
FPGA I/F	8bit Bus
FPGA PROGRAMMING	SPI 20MHz 1CH
SUPPLY POWER	24V (21.6V~26.4V)
Size	100 x 60 x 40 (mm)

## C. Analog Vibration Sensor module Details

ITEM	SPECIFICATION
FPGA	SPARTAN-6
ADC	AD7684 x 4
FILTER	1EPE(3MHz)
INPUT	±5V
SUPPLY POWER (1)	3.3V
SUPPLY POWER (2)	5V
SUPPLY POWER (3)	24V
Connector	BNC x 4

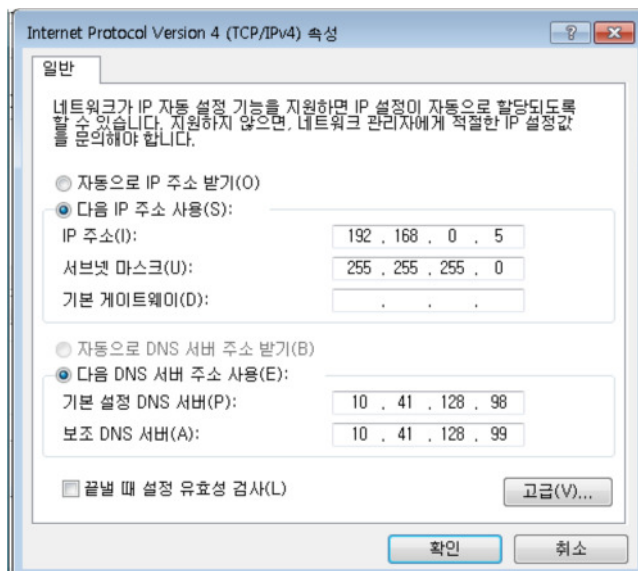
### 3. How to install and Use

#### 1) SCOPE2.0 Plus installations



#### 2) SCOPE2.0 Plus Connection Check

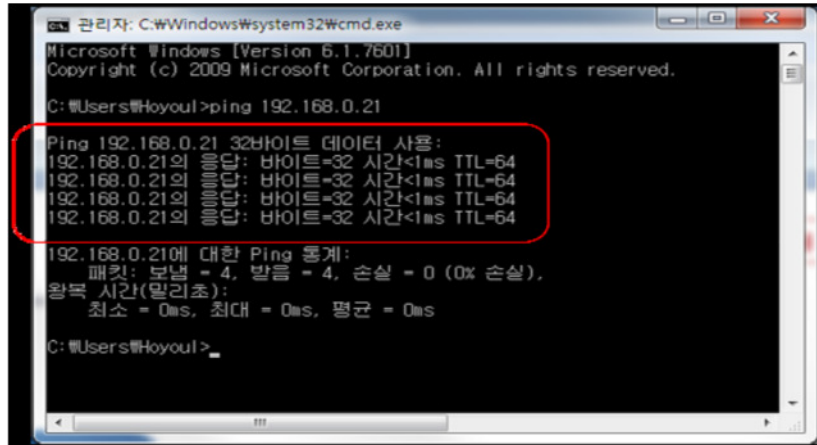
##### A. Change IP Address for Data PC to 192.168.0.5



##### B. Power On and confirm LED2 blinking green.



C. Do a ping test to SCOPE2.0 Plus from Data PC to confirm connection





## 3) SCOPE2.0 Plus Pin Map

## A. Power

Pin Number	Description
1	VCC
2	GND
3	FG

## B. LAN Port

Pin Number	Description
1	Rx-
2	Rx+
3	Tx-
4	Tx+
5	FG
6	FG

## C. RS-232 4Port

Pin Number	Description		Pin Number	Description
1	FG		2	FG
3	232_Tx1		4	GND
5	232_Rx1		6	232_Rx3
7	GND		8	232_Tx3
9	GND		10	GND
11	232_Rx2		12	232_Tx4
13	232_Tx2		14	232_Rx4

### 4. HW Specifications

	SCOPE2.0 Plus	Case	
Sensor Type	Piezo Vibration Sensor (IEPE Filter)	Size	116 X 60 X 35 mm
Function	Vibration Measurement	Weight	200g
		Installation	Bolt-up(M3)
Range	Vibration: ±50g	Case & Port	
Channel	Vibration: 4 CH		
Sampling	Vibration: 20 25kHz		
CPU & RAM	ARM Cortex-A Quad Core DDR2 2 GB		
Operation Temp	5°C ~ 50°C		
External Interface [Wireless]	IEEE 802.11 a/b/g (2.4/5.2/5.8GHz) - Certification WPA2-PSK, WAP2-PEAP - Encryption AES		
External Interface [LAN]	LAN 100Mbps		
External Interface [Serial]	RS-232 (4 Port)		
VCC	24Vdc (±2.4V)		

## 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**

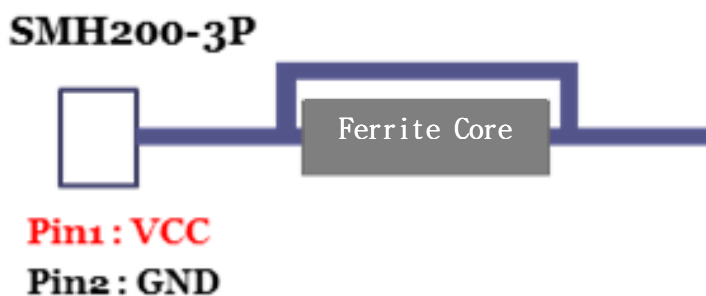
This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

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

[Cable specification]

. Power Cable

- A ferrite Core is added to the Power input terminal (Number of turns / 1 turn)  
(Using Power Source including a ferrite Core)



. LAN Cable (Using Direct Cable)

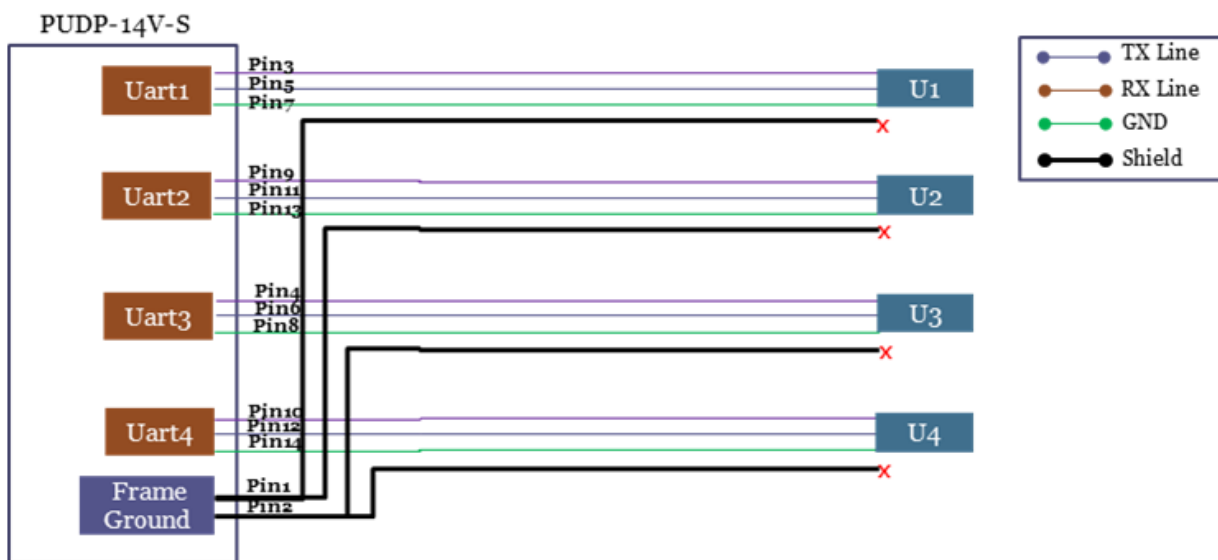
- Apply Shielded LAN Cable
- Add Ferrite Core on both end of LAN Cable (Each Number of turns / 1turn)



. RS-232 Cable (4Port)

- Apply Shielded Cable.

(Shield is connected to Frame Ground of SCOPE2.0 Plus)



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