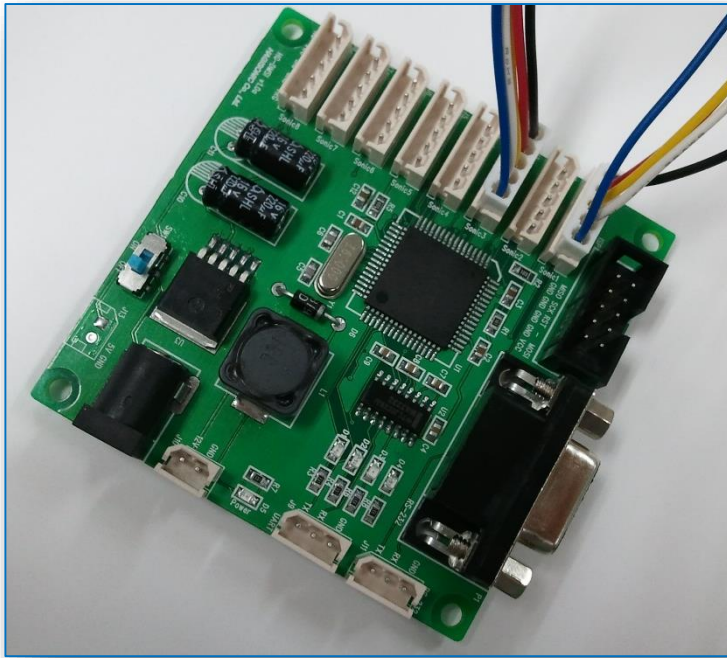


Distance Measurement Interface Board

■ Model#: HG-DMSI-03



◆ Features

- Size : 80 x 80 mm
- Channel : Connect up to 8 Ultrasonic Sensors
([HG-B40A, HG-B40C <5V and external mode> only](#))
- Power : **DC 12V**(DC Jack connector 1ea, 2pin connector 1ea),
DC 5V(2pin connector 1ea)
- Output : RS232(9-pin DSUB 1, 3-pin connector 1), UART(3-pin connector 1)

◆ Communication Setting

- Default Baudrate : 57600 bps * (LED ON is showing current Baudrate)
1: 9600 (■ ■ ■ ■), 2:19200, 3:38400, 4:57600
- Data bit : 8 bit
- Stop bit : 1 bit
- Parity bit : None
- Hardware Flow control : None

Distance Measurement Interface Board

■ Model#: HG-DMSI-03

◆ Communication PROTOCOL

Read	STX	@	Sensor ID	Command	ETX	
Write	STX	#	Sensor ID	Command	Data	ETX
Return Value	STX	\$	Sensor ID	Command	Data	ETX
ACK	STX	!	Sensor ID	Command	Data	ETX
Distance Data	STX	^	Sensor ID	Data	ETX	

* Reference : STX : 0X02 , ETX: 0x03
Ultrasonic Sensor ID : 0~7

Command	Version	Firmware version
	Mode	0: Free Run, 1: External Trigger(default : 0)
	RingBuff	Ring Buffer use(0: not use, 1: use)
	Period	Ultrasonic sensor trigger bandwidth (unit ms; Range: 20~50; default: 50)
	Trigger	External Trigger
	NumSonic	Number of ultrasonic sensors(default: 8)

* Using default value (0) for Sensor ID is recommended for Command(Mode, RingBuff, Priod, NumSonic, NumPSD)

[Protocol]

0X02 : STX(start of text) character that indicates start of the command

0X03 : ETX(end of text) character that indicates end of the command

@ : read character for reading next parameter

: write character for saving assigned value to next parameter or for executing the next commend

! : ACK(acknowledge) character that indicates the read or write command is received

\$: reply character that indicates the returning parameter value when read command is inputted

^ : character indicates the distance value from HG-DMSI-02's ultrasonic sensors

| : distinguish between command and data in front of the data value from inputted command

1) Mode

HG-DMSI-02's operation mode

-Free Run mode : Triggers ultrasonic in regular interval

-External Trigger mode : External trigger signal is needed for regular or irregular interval trigger signals

- Disply Mode.

Input : @0|Mode

Output : !0|Mode -> @0|Mode|0

- Mode setting.

Input : #0|Mode|1 (Change to External Trigger Mode)

Output : !0|Mode|1

* In External Trigger mode, external trigger signal is needed to receive data

Distance Measurement Interface Board

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◆ Communication PROTOCOL(cont.)

2) RingBuff

Use 'Ring Buffer' in Ultrasonic sensor module's internal algorithm.

※ When using External Trigger Mode and the trigger interval gets slow, using 'Ring Buffer' is not recommended because it will delay the data. In this case, the resolution will be dropped.

- Display RingBuff mode

Input : @0|RingBuff

Output : !0|RingBuff -> @0|RingBuff|1

- RingBuff Setting

Input : #0|RingBuff|0 (set 'Ring Buffer' to 'not use')

Output : !0|RingBuff|0

3) BaudRate

It indicates communication speed of HG-DMSI-02.

- Display BaudRate

Input : @0|BaudRate

Output : !0|BaudRate -> @0|BaudRate|38400

- BaudRate Setting

Input : #0|BaudRate|9600 (Change Comm. Speed to 9600)

Output : !0|BaudRate|9600

4) Period

It indicates trigger intervals of ultrasonic sensor module.

- Display Period

Input : @0|Period

Output : !0|Period -> @0|Period|50

- Period Setting

Input : #0|Period|20 (Change trigger intervals to 20ms)

Output : !0|Period|20

5) Trigger

Triggers ultrasonic sensor module

- ID3 ultrasonic sensor trigger

Input : #3|Trigger (Triggers ID3 ultrasonic sensor)

Output : ^3|365 (distance data : 365mm)

6) NumSonic

Sets number of ultrasonic sensors

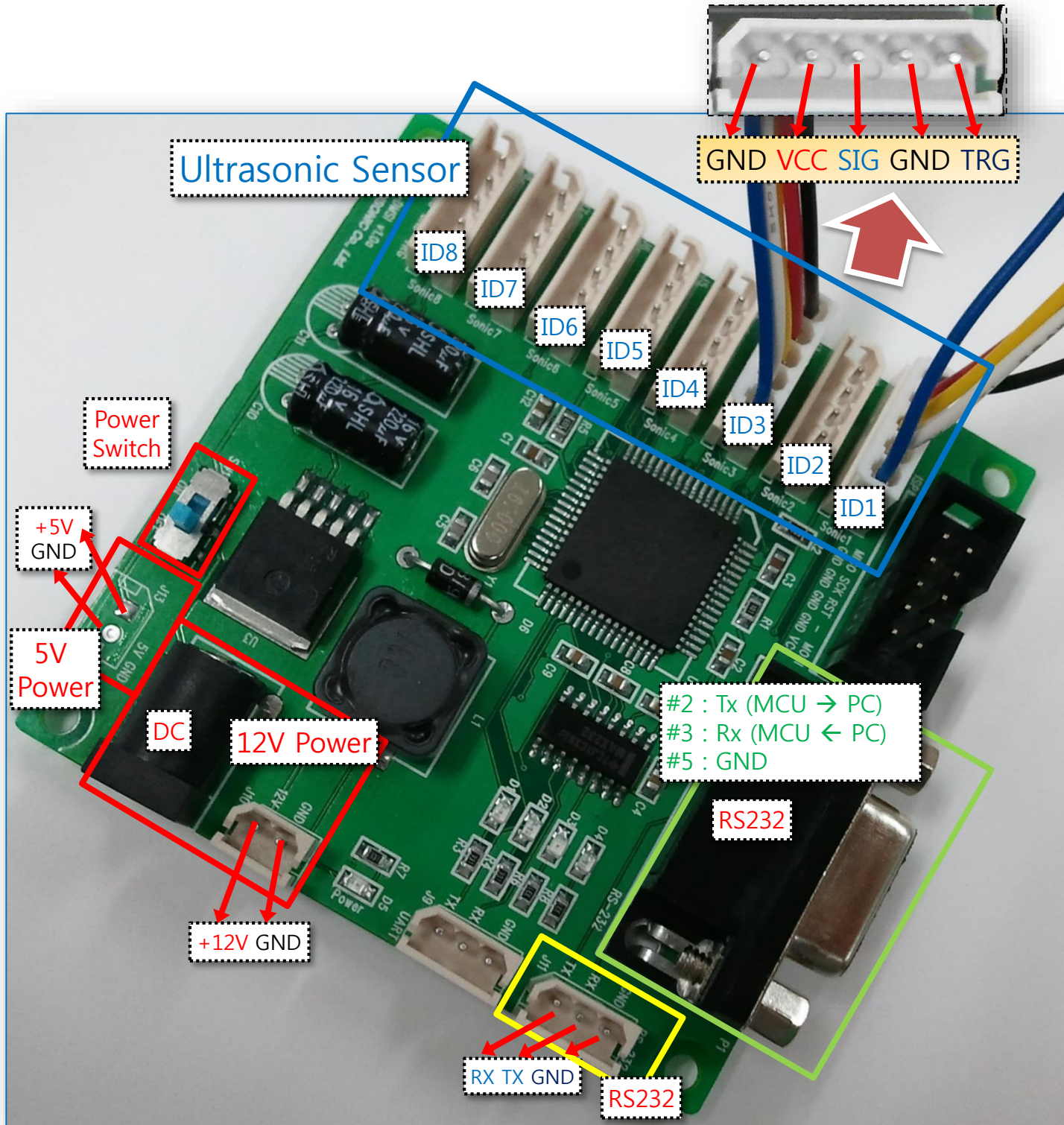
- Use 2 ultrasonic sensors

Input : #0|NumSonic|2

Output : !0|NumSonic|2

Distance Measurement Interface Board

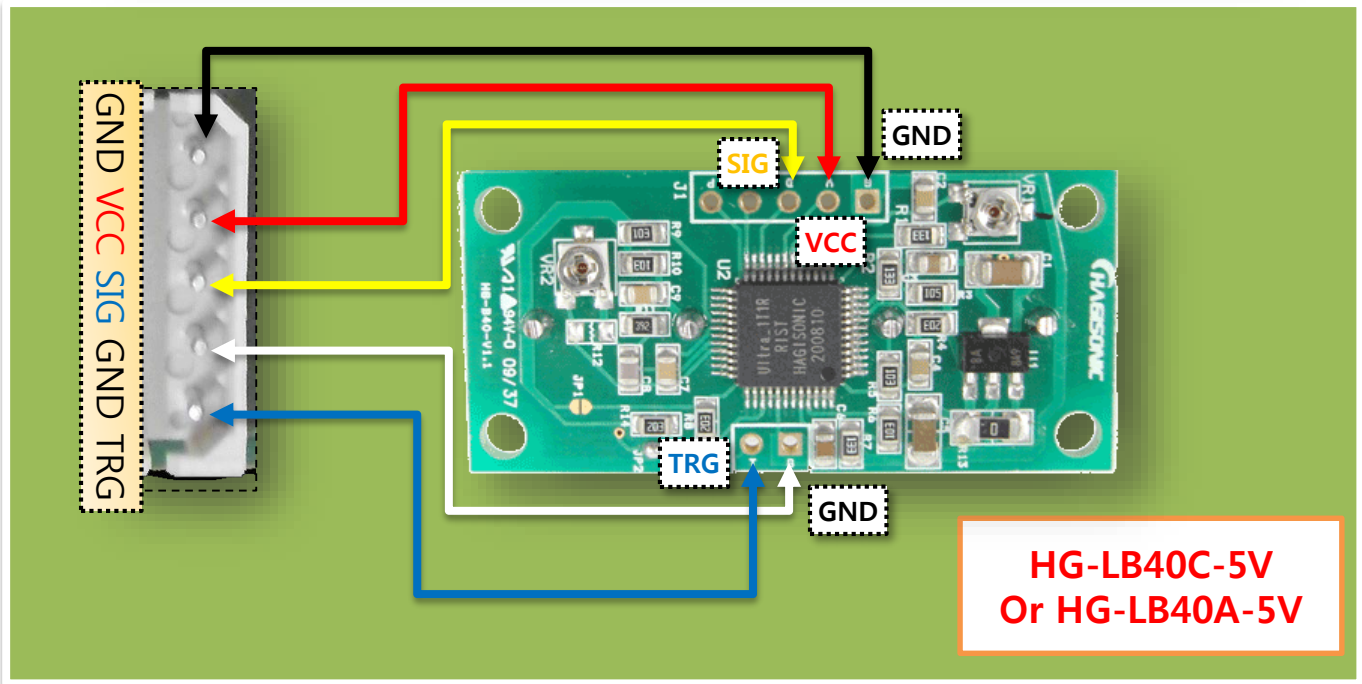
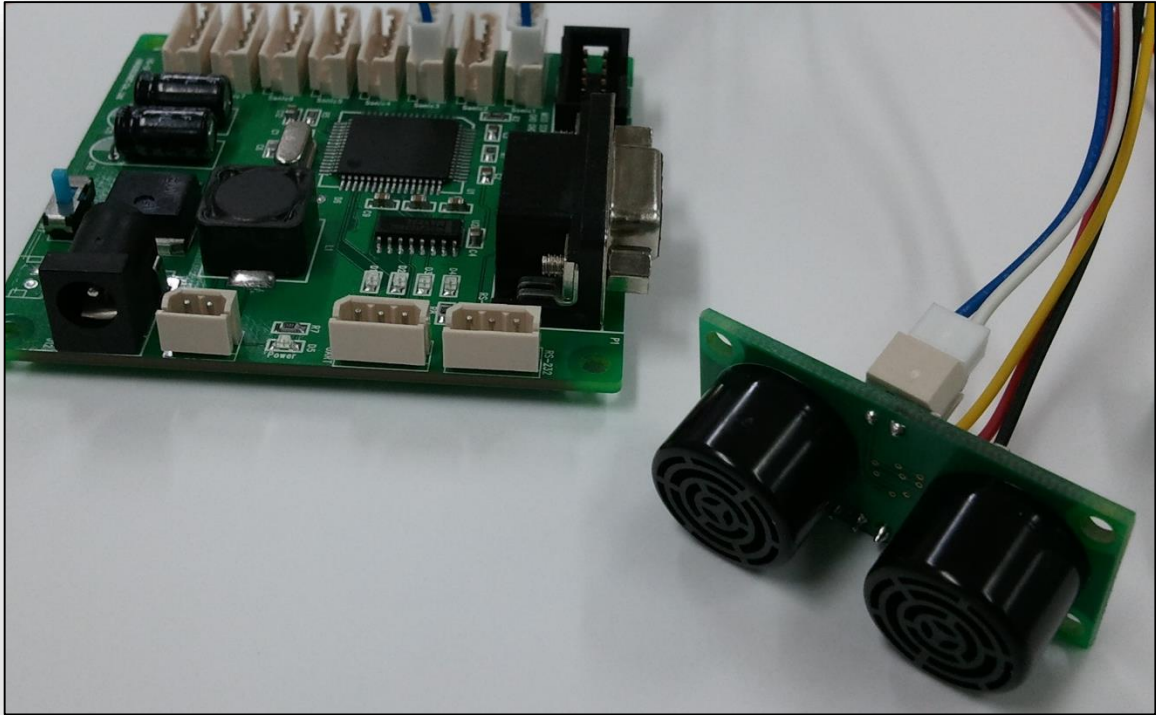
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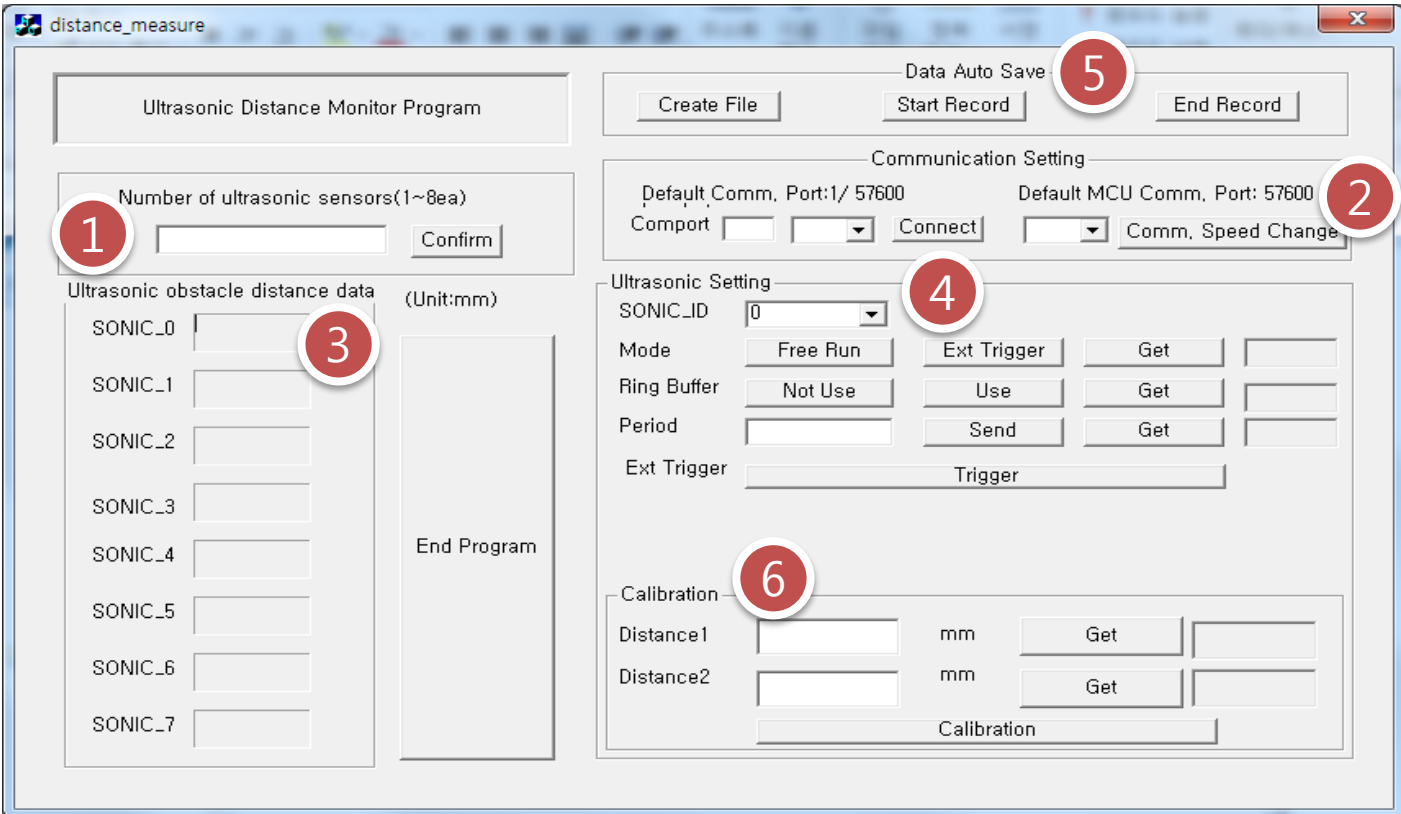
◆ Ultrasonic Sensor(HG-B40) Connection



Distance Measurement Interface Board

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◆ Monitor Program



1) Monitor Program Setting Areas

- ① The number of ultrasonic sensors setting area.
- ② Communication port and speed setting area
- ③ Ultrasonic sensor distance data display area
- ④ Ultrasonic sensor inner parameter setting area
- ⑤ Distance data file recording area
- ⑥ Ultrasonic distance parameter Calibration area

Distance Measurement Interface Board

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◆ Monitor Program(Cont.)

2) How to use

1) Set the number of ultrasonic sensors to use

- enter the number of ultrasonic sensors in the EditBox in ① area and click 'Confirm' button.

2) Set the trigger intervals of ultrasonic sensor

- Select the SONIC_ID, enter the intervals(20~50) in the EditBox in 'Period' section and Click Send button.
(20ms ~50ms)

3) Ring buffer use or not use (Moving average)

- Click 'Not Use' or 'Use' button in 'Ring Buffer' section in ④ area.

4) Set the Mode

- Free Run Mode: In this mode, HG-DMSI-02 will input regular interval trigger signal to ultrasonic sensor(s).

To use this mode, click 'Free Run' button in Mode section in ④ area.

- External Trigger Mode: In this mode, external trigger signal will be generated from HG-DMSI-02 and inputted to a certain ultrasonic sensor to measure distance once. This will measure the distance only once by clicking 'Trigger' button in 'Ext Trigger' section in ④ area. (When using 'External Trigger Mode', use of 'Ring Buffer' is not recommended when the trigger interval gets slow.)

5) Display parameter values

- In ④ area, clicking 'Get' button in Mode, Ring Buffer, Period section will display the parameter values of each.

6) Distance data recording method

- In ⑤ area, first click 'Create File' button to create a file. Next, click 'Start Record' button and 'End Record' button at the start and end.

7) Calibration

- Ultrasonic is highly affected by surrounding environment and when the sensor is produced, each sensor has delicate difference in its characteristics. Using same parameter for every ultrasonic sensors will produce inaccurate result. In order to prevent this, calibration of each sensor is necessary.

i) In empty space, place ultrasonic sensor and the obstacle in line.

ii) Measure the actual distance between the sensor and the obstacle by ruler or other measuring devices.

iii) In ⑥ area, enter the measured distance to the EditBox next to 'Distance1' and click 'Get' button.

v) Move the obstacle and repeat i)~ii) and enter the measured distance to the EditBox next to

'Distance2' and click 'Get' button.

vi) and click 'Calibration' button

※ Calibration is already done from our factory when you purchase ultrasonic sensor and HG-DMSI-02 together.

Please use 'Calibration' only when you change the ultrasonic sensor's channel or when you purchased sensor and board separately.