

Gyro Evaluation Board

CD-0026

Operation Manual

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Preface

This system filters the gyro's bare output and converts to digital signal for feeding to a Windows PC serial port, while providing a regulated 5VDC power supply to the gyro. In the PC, the digitized data is scaled, moving-average is taken, and integrated into the calculated-angle to display on screen. The calculated -angle is a simple integration of the filtered gyro output that does not go through any compensation algorithms. This document describes the operation of the said system.

For schematic, please browse: www.spp.co.jp/sss/cd0026schema.jpg

This system is not intended for employment into a product, nor for measurement of any sort; this system is designed solely for comparing performances of various gyros under different settings.

Quick Guide

This system is a support tool to try the gyro CRS03. The system can display the gyro output and the calculated angle by integrating the gyro output onto Windows PC screen. Some characters may garble on non-Japanese Windows, but the program should generally work (not guaranteed, however).

- 1) Connect a sample gyro and PC to the board: see page 6.
 - The power switch must be off while connections are being made.
 - Use either 9V drycell or external power supply, but never use them at the same time.For precaution, remove the power supply cable before mounting the drycell.
- 2) Insert the CDRom to CD drive, and run Installer¥disk¥setup.exe
- 3) Specify the folder to install, and click [Finish] to start installing.
- 4) After installing, LabVIEW runtime engine screen will appear. Follow instructions to install the runtime (required).
- 5) Run "Silicon VSG data logging system.exe" to start the system program.
- 6) Turn on the evaluation board.
- 7) Set up the parameters on the left side of the window, top to bottom (see page 8)
[null offset] means the center zeroing reset. This button must be clicked in order to integrate into the calculated angle.
- 8) For the settings, see pages 8 to 11.

Clicking [start data collection] starts data collection, and [stop data collection] stops data collection. To finish the program, click [quit].

The vertical axis of the graph is voltage. The horizontal axis of the graph is the number of data. Do not turn OFF the board while data is being collected.

The display voltage range can be changed by clicking the voltage indications (default: +2.50/-2.50) on screen.

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1. PC Environment

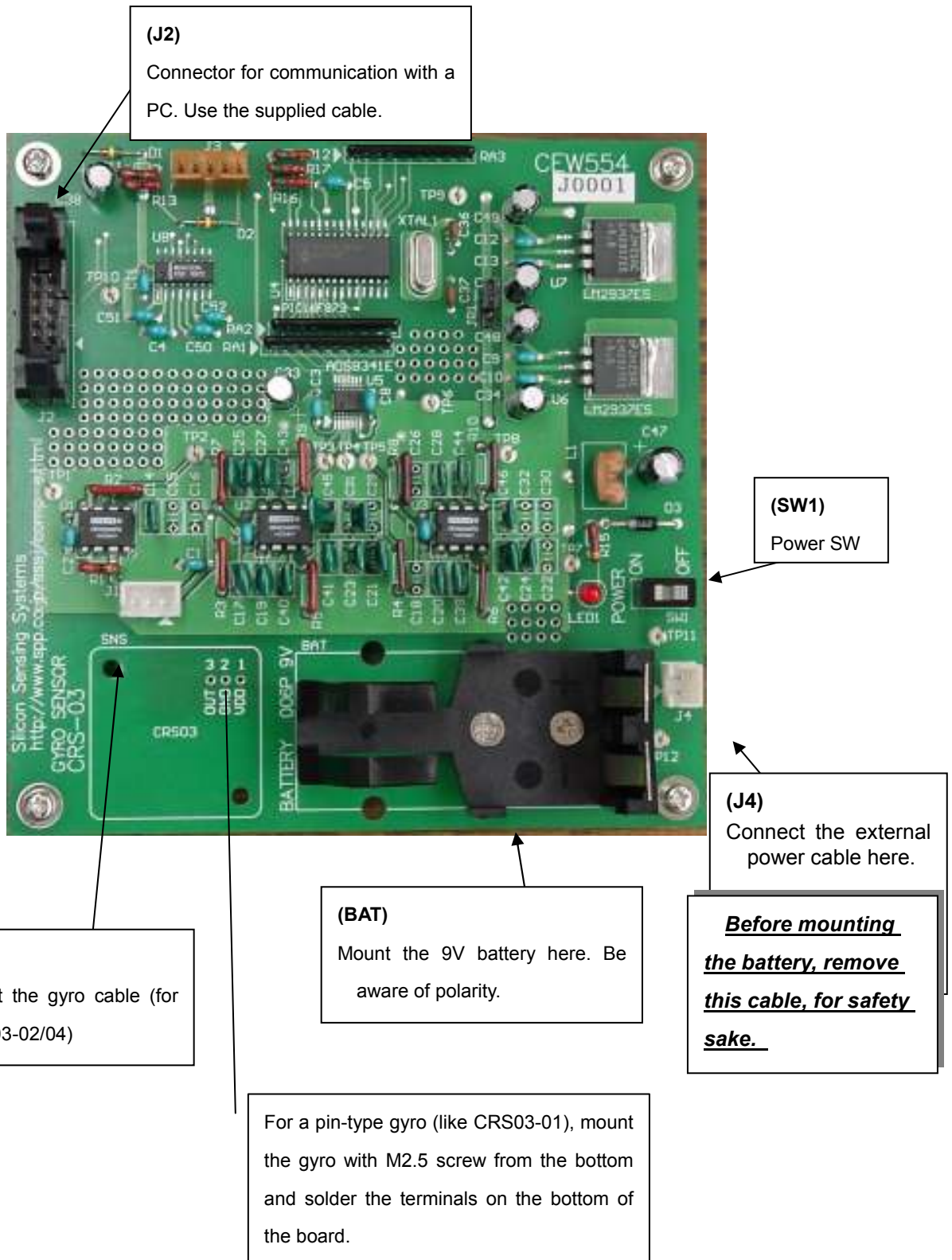
The program has been tested in the following computer system.

OS	Windows98SE/2000/Me/XP
CPU	Pentium II 300MHz
HDD space availability	11MB
Input/output	1 x RS232C Serial port
Recommended Memory	256MB

Although some characters may garble, the program has been found to work on several non-Japanese Windows (not guaranteed to). If you encounter a garble that you need to read, please browse www.spp.co.jp/sss/cd0026e.html or enquire SSSJ for translation with the screen caption. E-mail: sss@spp.co.jp

2. Hardware Description

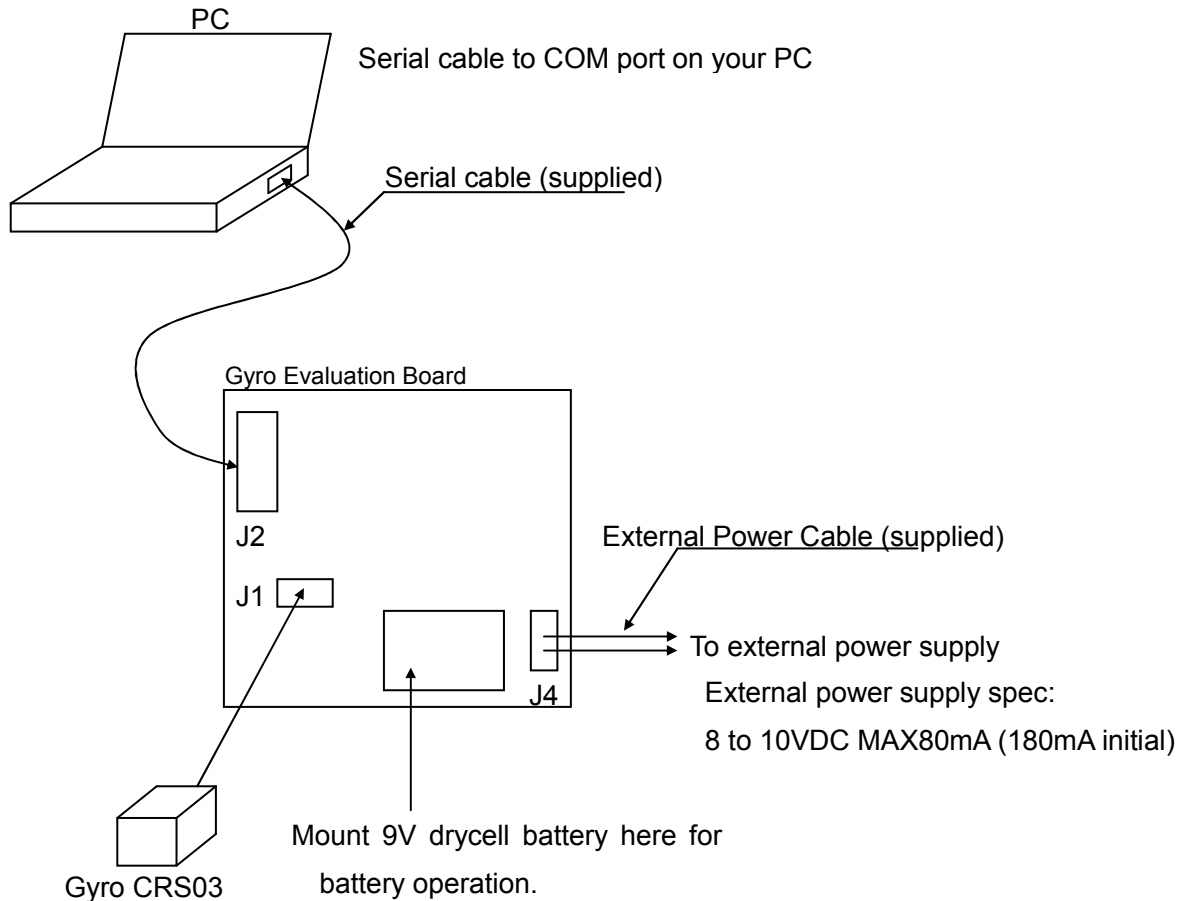
2-1 Appearance



2-2 Connection

Install the software first (see next page).

The power switch must be OFF while the connections are being made.



<Caution>

The power to the board can be either a battery or external power supply. Never connect both at the same time. For safety sake, remove the drycell battery before attaching the external power cable to the board.

<Caution>

Turn SW1 OFF when connecting the cables.

Be cautious to static electricity

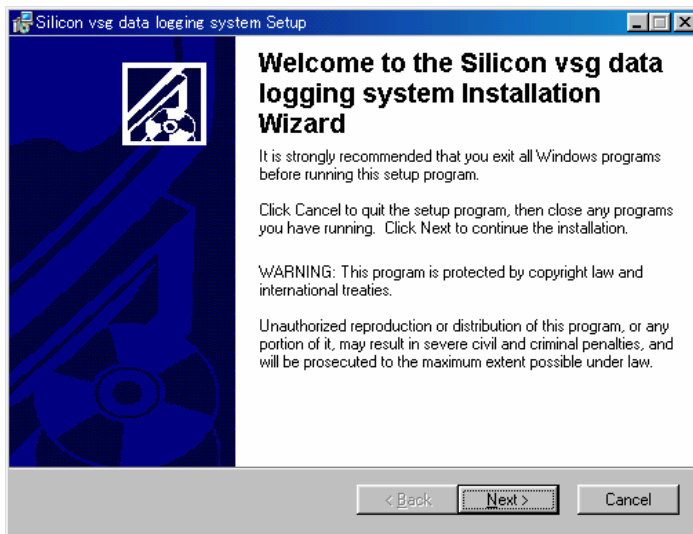
2-3 Power ON

Check again the connections and turn the power SW1 ON. The power lamp (LED) will light and data will be output to COM port.

3. Gyro Evaluation Board Program

3-1 Installing

1. Insert the enclosed CDROM into to your CD Drive.
2. Run Installer¥disks¥Setup.exe
3. With the screen beneath, select appropriate directory to install and click (finish).
Default directory will be ¥Program Files¥Silicon VSG data logging system



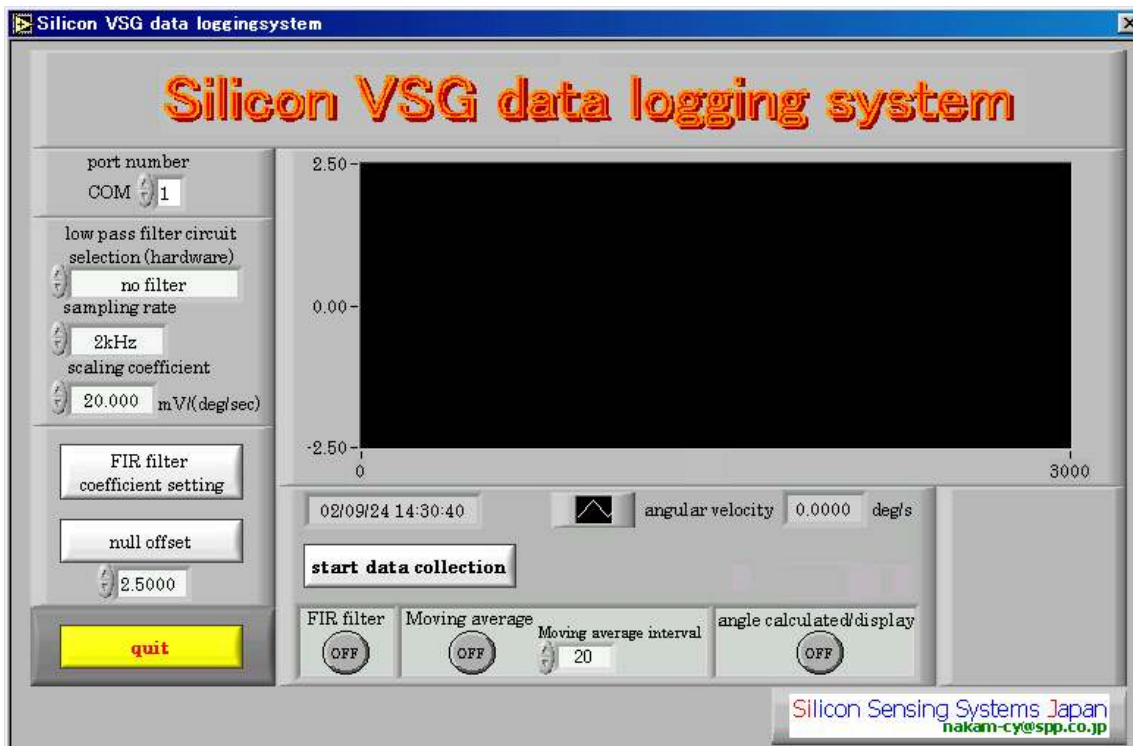
In this installation, LabView runtime will also be installed, overwriting any existing LabView runtime in your PC, if any.

4. After all necessary installations, "Silicon VSG data logging system.exe" will be created.
5. Click on "Silicon VSG data logging system.exe" to start the program.

3-2. Operation

1. Start the Program
2. Turn on the evaluation board.

Screen Shot : All basic settings and graphics shall be set on the this screen:



Label	Description
Port number	Specify COM port on your PC where the board output is connected.
low pass filter circuit selection(hardware)	Select the hardware low-pass filter on the board. This filter is for anti-aliasing. Active is Butterworth 4 th ord. Passive is RC 1 st ord.
sampling rate	Select sampling rate for AD conversion.
scaling coefficient	Input gyro scale factor (for example, 20mV for CRS03-02)
FIR filter coefficient setting	Software FIR Low Pass Filter will change the readings of angular-velocity and angle-cauculated, therefore it is a feature only for reference to see the waveform transition, and not to be should not be used normally. Clicking this button will show the setting window. TAP should be less than 1/100 of sampling
Null offset	Zeroeing reset. It will collect neutral value for 4 sec at 50Hz and average. This button MUST be clicked prior to data collection.
Start data collection	Starts data collection. Click again to stop/re-start.
FIR filter	Click to activate the software FIR LPF. ON = color red
Moving average	Click to activate the moving average noise reduction. ON= color red
Moving average interval	Sets moving average interval
angle calculated/display	Click to display the integrated angle reading. The angle is calculated as the integral of the gyro's angular velocity output, and is not compensated like usually seen on IMUs. This should be used only for comparing the performances of different gyros, but should not be used for dynamic measurement of angles.
angular velocity	Real time angular velocity
Angle	Real time integrated angle
Quit	Quits the program

3-3. Detailed Settings

1. <Moving average interval>

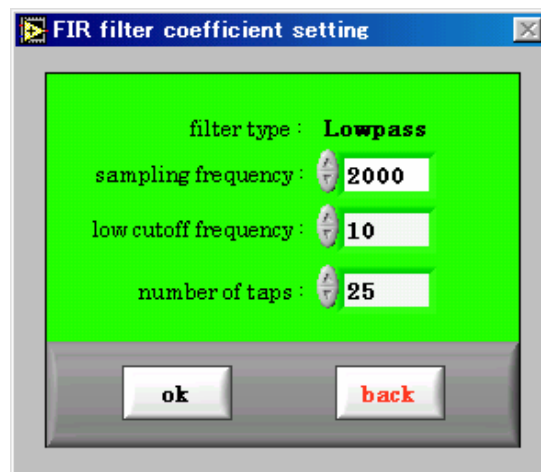
The maximum value for Moving average interval is dependent on the sampling frequency:

Sampling	Moving average interval
2KHz	200
1KHz	100
500Hz	50
200Hz	20
100Hz	10
50Hz	5

FIR Filter Setting

Software FIR Low Pass Filter will change the readings of angular-velocity and angle-cauculated, therefore it is a feature only for reference to see the waveform transition, and not to be should not be used normally.

Clicking the button “FIR filter coefficient setting” will pop-up the filter setting window. The software filter set here will be fixed lowpass.



FIR Filter Setting window

Label	Description
sampling frequency	Select the sampling frequency
low cutoff frequency	Select the LPF cutoff frequency
number of taps	Select the number of taps. The more the taps, the sharper the filter

<Reminder>

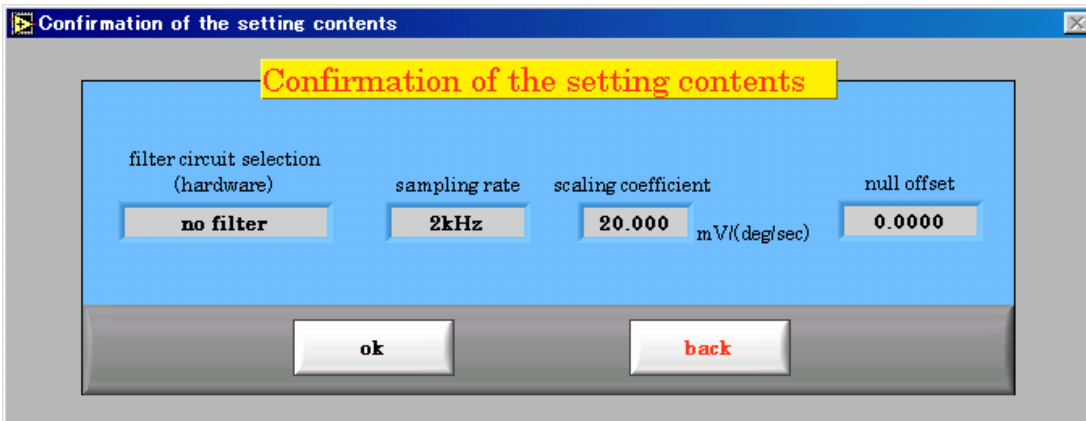
Low cutoff frequency has to be more than 0, and less than 1/2 of the sampling frequency.

Number of taps has to be less than 1/100 of sampling frequency.

Confirmation Window

Click on “start data collection” will pop-up the confirmation window prior to starting collection of data.

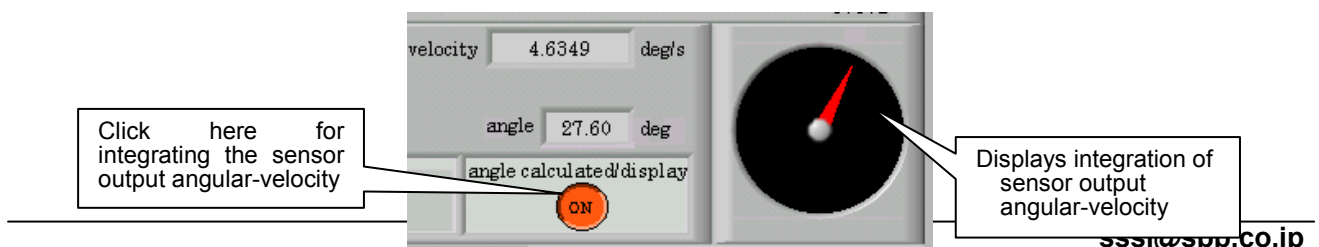
If the settings are OK, click “ok”, otherwise click “back” to go back to the settings. If you don’t see the “ok” button, check connections or power supply.



Confirmation Window

Operational buttons during Data Collection.

Label	Description
Angular Velocity Graph	Vertical axis shows output voltage. Horizontal axis shows the number of data. One screen can show upto 3000 data, then starts scrolling to show the latest 3000 data. Displayed voltage range can be changed by on the voltage numerals (default: 2.50V/-2.50V)
Stop data collection	Stops data collection. To save the logged data, follow the pop-up screen. Maximum saved data is 60000 from the start of data collection.
FIR filter	The software filter in ON when red. Software FIR Low Pass Filter will change the readings of angular-velocity and angle-cauculated, therefore it is a feature only for reference to see the waveform transition, and not to be should not be used normally.
Moving average	Moving-average is ON when red.
Moving average interval	Sets the interval for Moving-average.
angle calculated/display	Displays the integrated value, which is the calculated artificial angle reading (no compensation). See below



<NOTES>

Do not turn off the evaluation board during data collection.

During data collection, set values (filters) cannot be changed.

PC continuously checks for any omitted data from the evaluation board. If any data is omitted, the data collection will stop. If the data collection seem to stop frequently, check connections, or try lowering the sampling frequency.

Software FIR Low Pass Filter will change the readings of angular-velocity and angle-cauculated, therefore it is a feature only for reference to see the waveform transition, and not to be should not be used normally.

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