# **Vibration Logger**

# Logger Software User Guide

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# **Revision History**

Rev. No.	Date	Page	Description
20220308	2022/3/8	ALL	New release
20240226	2024/2/26	P2 P6 P24	Correction of notes Corrected compatible OS Correction of contact information

# 1. Introduction

# 1.1. Overview

Vibration Logger is a dedicated software to evaluate Seiko Epson acceleration sensor M-A352AD1/M-A552AR1 and vibration sensor M-A342VD1/M-A542VR1 for various applications. Measurements and confirmation of acceleration/vibration waveforms can easily be performed on a Windows PC. This software is provided to customers for the purpose of evaluating the acceleration/vibration sensors free of charge.

# 1.2. Key Functions

Key functions of this software are as follows.

- Display of a set of measurements on 2D Graphs
  - Raw data plot (3-axis acc/vel/disp data and temperature)
  - · Average/RMS data plot (3-axis acc/vel/disp data and temperature, moving average interval setting)
  - FFT amplitude plot (3-axis acc/vel/disp data, peak search, Real-time update and save, FFT parameter settings)
- Saving log data to file (in csv format)
- Two measurement options (one time measurement, scheduled measurement)
- Sensor configuration (FIR filter, sampling rate, output type / physical quantity)
- Up to 8 units of parallel measurement
- Status display (communication error, A342 error flag count)



# 2. Setup

# 2.1. System Requirements

The recommended system specifications for this software are as follows.

Operating System	Windows11, Windows10 (64-bit) *1
CPU Speed (recommended)	2.5 GHz or higher
Memory (recommended)	8 GB or higher
Strage Space	1 GB free storage space before installation

\*1) Operating systems other than Windows11 and Windows10 (64-bit) have not been tested.

Note) If operation abnormality such as a delay in refreshing plots arises when parallel measurements are performed or when using a computer with low specifications, please use a computer with higher specifications.

# 2.2. Driver for USB to Serial Converter

FTDI USB Serial Converter Driver is required when using the Epson evaluation tool "USB I/F board (M-G32EV041)". If installation is required, users can choose one of the following options in compliance with the terms and conditions provided by FTDI.

- 1) Update the driver from Windows Device Manager (automatic update via Internet is recommended).
- 2) Download the appropriate driver from FTDI's website (http://www.ftdichip.com/Drivers/VCP.htm) for the operating system being used.

# 2.3. Vibration Logger Software Installation

Follow the procedure below to install "Vibration Logger" on the PC to be used. Since this software requires NI-VISA by National Instruments, the NI-VISA will be installed at the same time when installing this software.

- 1) Close all other running applications.
- 2) Execute "setup.exe" in the folder "Installer\Volume".
- 3) Select the destination directory and click "Next".

🐙 Vibration Logger	– 🗆 ×
<b>Destination Directory</b> Select the installation directories.	EPSON
All software will be installed in the following locations. To install so different location, click the Browse button and select another direc	tware into a ctory.
C.¥Epson¥Vibration Logger¥	Browse
Directory for National Instruments products C#Program Files (x86)#National Instruments#	Browse
Back</td <th>Next&gt;&gt; Cancel</th>	Next>> Cancel

4) Check the contents of the license agreement for this software and National Instruments software, and select "I accept the license agreement(s)" if you agree to the Terms and Conditions, and then click "Next".

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License Agreement You must accept the licenses displayed below	to proceed.	EP	SON
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	<ul> <li>I accept the</li> <li>I do not acce</li> </ul>	License Agreement ept the License Agr	eement.
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Vibration Logger  License Agreement You must accept the licenses displayed below I  NI M NATIONAL INSTRUMENTS SOF CAREFULLY READ THIS SOFTWARE LICENSE AG DOWNLOADING THE SOFTWARE LICENSE AG DOWNLOADING THE SOFTWARE AND/OR CLICK COMPLETE THE INSTALLATION PROCESS, YOU THIS AGREEMENT. IF YOU DO NOT WISH TO BEG BE BOUND BY ITS TERMS AND CONDITIONS, DO AND RETURN THE SOFTWARE (WITH ALL ACCO) THEIR CONTAINERS) WITHIN THIRTY (30) DAYS SUBJECT TO NI'S THEN-CURRENT RETURN POI TERMS ON BEHALF OF AN ENTITY, YOU AGREE I ENTITY TO THESE TERMS. The software to which this National Instruments license app	to proceed. TWARE LICI SREEMENT ("AG ING THE APPLIC AGREE TO BE B COME A PARTY T NOT INSTALL C MPANYING WRIT OF RECEIPT. ALI LICY. IF YOU ARE THAT YOU HAVE lies is Vibration Log I do not acce	ENSE AGRE REEMENT"). BY CABLE BUTTON TO OUND BY THE TI O THIS AGREEM R USE THE SOF TEN MATERIALS L RETURNS TO I EACCEPTING TH AUTHORITY TO ger. above 2 License Agent all these License	EMENT CO EMENT CO ERMS OF ENT AND TWARE, AND WILL BE HESE BIND THE U U U U U U U U U U U U U

5) When the "Start installation" screen appears, click "Next" to start the installation.

🐙 Vibration Logger			_	
Start Installation Review the following summary be	efore continuing		EP	SON
Adding or Changing • Vibration Logger Files • NI-VISA 18.0 Runtime Support Click the Next button to begin installation. Cliv	ck the Back but	ton to change the	installation settings.	
	Save File	<< Back	Next>>	Cancel

6) When the installation completion screen appears, click "Next".

Follow the screen that prompts you to restart the PC.

When the restart is complete, the installation is finished.

🚚 Vibrati	on Logger		_	
	Installation Complete		EP	SON
The	e installer has finished updating your system.			
		<< Back	Next>>	Finish
Vibration	Logger		- 0	×
Q	You must restart your computer to comp If you need to install hardware now, shut to restart later, restart your computer be	lete this operat down the com fore running an	ion. outer. If you choo y of this softwar	ose e.
	Restart Shut Down		Restart Later	

# 2.4. Uninstalling the Software

To uninstall this software, go to "Programs and Features" in Control Panel, select "Vibration Logger", and execute the uninstallation.

Programs and Features					-		×
$\leftarrow \rightarrow$ $\checkmark$ $\uparrow$ $\square$ $\rightarrow$ Control P	Panel > Programs > Programs and Features		□ ×				
Control Panel Home View installed updates	Uninstall or change a program To uninstall a program, select it from the list and th	nen click Uninstall, Change, or Re	epair.				
Turn Windows features on or off	Organize Uninstall					•	2
Install a program from the network	Name	Publisher	Installed On	Size	Version		^
	Vibration Logger	Seiko Epson Corp.	3/1/2022	5.13 MB	1.0.1		
	📧 VISA Shared Components 5.12.0 (64-Bit)						
	VISA.NET Shared Components 5.11.0 (64-Bit)						$\checkmark$
	<						>
	Currently installed programs Total size 57 programs installed	⊭ 6.74 GB					
Programs and Features							
Are you sure you want to	uninstall Vibration Logger?						
In the future, do not show n	ne this dialog box Yes No						

# 3. Operation Procedure

# 3.1. Procedures from Launching the Software for Logging

Sequence of procedures from the software launch to the data logging is shown below.



# 3.2. Start the Software

After connecting the sensor to the PC, execute "Vibration Logger.exe"



to start the software.

# 3.3. Exit the Software

Click "Exit" in the "File" menu or click "X" button in the upper right corner of the window to exit this software.

🥏 Vibration Logger Ver. 1.				
File(F) Tool(T) Help(H)	) Ctrl+P			
Exit(Q)	Ctrl+Q			
	Sensor	Setting Save&Graph Schedule	Sensor Status	
Find	Туре	COM Port Serial No.	NG A352 %	^
Setting	A352	1%	Err Lost X_EXI Y_EXI Z_EXI X_ALM Y_ALM Z_ALM	
	A352		Acco II	_
START	A352		NG         A352         6           Err         Lost         X_EXI         Y_EXI         Z_EXI         X_ALM         Y_ALM         Z_ALM	
Meas Mode	A352			
Wait Time[sec]	A352			
0 Moos Timolsoci	A352	×		
1000	A352	1% <b>•</b>	NG A352 1/2	
Elapsed Time[sec]	A352	k v	Err Lost X_EXI Y_EXI Z_EXI X_ALM Y_ALM Z_ALM	Ļ
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# 3.4. Configuration of the Serial Communication Port

Click [SerialPort Config] in the [Tool] menu to configure the serial communication port settings.

# Precautions (Important)

The factory default communication baud rates are as follows. Set the appropriate communication baud rate according to the model used.

M-A352AD1, M-A342VD1, M-A542VR1 : BaudRate = 460800 \*1

\*1) The sensor factory default setting (= 460800) matches the software default setting (= 460800) .

M-A552AR1 : BaudRate = 230400 \*2

\*2) The sensor factory default setting (= 230400) and the Logger Software default setting (= 460800) are different, so either baud rate setting must be changed.

Note) The setting configuration is stored once the setting is changed. No further configuration is necessary at the next startup.





### Ignore SerialPort

To detect the COM ports where sensors are connected, this software sends commands to all open COM ports. If any specific COM ports are to be removed from the detection, add the COM numbers to the Ignore SerialPort list here.

Use this function when it takes a long time to detect sensors, or when there are COM ports that need to avoid sending commands.

#### Serial Port Settings

If accessing the UART\_CTRL register of the sensor to change the communication settings, please change the settings of this software accordingly.

# 3.5. Sensor Communication Connection

Click the "Find" button to connect the sensor.

The "Find" button turns green when the connection is completed successfully, and Types (model names), COM Ports, and Serial Nos. of all the connected sensors are displayed.

0.1	- 0
gger	
Sensor Setting Save&Graph Schedule	Sensor Status
Type COM Port Serial No.	NG A352 %
A342 COM4 V0000074	Err Lost X_EXI Y_EXI Z_EXI X_ALM Y_ALM Z_ALM 0 0 0 0 0 0 0 0 0
A352 %	A352 1/2
A352 1/2 🔽	Err Lost X_EXI Y_EXI Z_EXI X_ALM Y_ALM Z_ALM
A352 1/2 -	
A352	NG A352 1/2
A352 1%	Err         Lost         A_EAR         F_EAR         A_EAR         F_EAR         A_EAR         F_EAR         F_
A352	NG A352 %
A352 1%	Err Lost X_EXI Y_EXI Z_EXI X_ALM Y_ALM Z_ALM 0 0 0 0 0 0 0 0 0
	0.1 Sensor Setting Save&Graph Schedule Type COM Port Serial No. A342 COM4 W0000074 A352 COM4 W0000074 A352 COM4 A COM4 A352 COM4 COM

Note) The "Find" button turns red when a connection error occurs, and the type (sensor model), COM Port, and Serial No. of the sensor are not displayed. Please check if there is any problem in the connection between the sensor and the PC or in the serial communication settings.

# 3.6. Measurement Condition Settings

### 3.6.1. Sensor Register Settings

- ① First, click the "Setting" tab, and configure the sensor settings (output physical quantity, output mode, sampling rate, filter) for the corresponding model.
- ② Next, click the "Setting" button to start writing to a dedicated sensor register. The "Setting" button turns green when the writing is successfully completed.

A the section of the									
VIDration L	ogger								
	Sensor Setting Save&Graph Schedule	Sensor S	Status						
Find	A342	NG	A352 ½						
	Physical Quantity Output Mode	Err	Lost	X_EXI	Y_EXI	Z_EXI	X_ALM	Y_ALM	Z_ALM
Setting	Helocity Helocity	0							
	Sampling Rate RAW RMS/P-P UpdateRate[sec] n		A352 4		-				
START	3000sps / 0.1sec 0.085333sec 4	Err	Lost	X EXI	Y EXI	Z EXI	X ALM	Y ALM	Z ALM
Meas Mode	A352	0							
One Time	Sampling Bata								
Wait Time[sec]	Sampling Kate J 1000sps	NG	A352 %						
A 0	Filter 👸 FIR Kaiser TAP512 fc=460	Err	Lost	X_EXI	Y_EXI	Z_EXI	X_ALM	Y_ALM	Z_ALM
Meas Time[sec]	ľ	0							
/ 1000		NG	A352 1/2						
Elapsed Time[sec]		Err	Lost	X_EXI	Y_EXI	Z_EXI	X_ALM	Y_ALM	Z_ALM
0		0							

- Note) If you change the settings in step ① after step ②, the settings will be unset and the "Setting" button will turn OFF. Click the "Setting" button again to configure the settings.
- Note) The above settings are retained when exiting the software, and the settings are reflected at the next startup.

# 3.6.2. Log Data and Graph Display Settings

Click the "Save & Graph" tab, and set each item that belongs to the Save, Graph, and FFT categories.

🤣 Vibration Logger Ver.1.0	11	- 0	×
File(F) Tool(T) Help(H)			
Vibration Log	gger		
	Sensor Setting Save&Graph Schedule	Sensor Status	
Find	Save	NG A352 1/2	^
	Raw AvgRms FFT	Err Lost X_EXI Y_EXI Z_EXI X_ALM Y_ALM Z_ALM	
Setting			
START	Path	NG A352 1/2	
50740	🖁 C:¥EPSON¥Vibration Logger 🛛 🗁	Err Lost X_EXI Y_EXI Z_EXI X_ALM Y_ALM Z_ALM	
Meas Mode	Graph		
One Time	Raw AvgRms FFT	NG A352 1	
Wait Time[sec]		Err Lost X_EXI Y_EXI Z_EXI X_ALM Y_ALM Z_ALM	
0 Mass Time[sec]			
1000	++1	NG A352 1/2	
Elapsed Time[sec]	No. of Samples FFI Category	Err Lost X_EXI Y_EXI Z_EXI X_ALM Y_ALM Z_ALM	
0	Joise granpitudespectrum		~
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#### Save

"Raw" : Save the sensor output raw data to a csv file.

"AvgRms" : Calculate average per second and RMS data based on the raw data and save them to a csv file.

"FFT" : Calculate FFT amplitude spectrum based on the raw data and save it to a csv file. Only the latest spectrum calculated just before the end of measurement is stored.

"Path" : Specify the csv files saving folder.

### Graph

"Raw" : The sensor output raw data is displayed in a graph (Raw Graph).

"AvgRms" : Calculated average per second and RMS data based on the raw data are displayed in a graph (AvgRms Graph).

"FFT" : Calculated FFT amplitude spectrum based on the raw data is displayed in a graph (FFT Graph).

### FFT

"No. of Samples" : Select the number of samples for FFT calculation from the following options. [ 1024, 2048, 4096, 8192, 16384, 32768, 65536, 131072, 262144, 524288 ]

"FFT Category": Select the FFT category from the following options. [ Amplitude Spectrum, Power Spectrum, Amplitude Spectral Density, Power Spectral Density ]

Note) The above settings are retained when exiting the software, and the settings are reflected at the next startup.

### 3.6.3. Measurement Mode and Sequence Settings

Configure the measurement mode and sequence, and set the time for scheduled measurement.

"Meas Mode" : Select the measurement mode (One Time: One time measurement, Schedule: Scheduled measurement). "Wait Time" : Set the wait time (in seconds) from clicking the "START" button to beginning the measurement. "Meas Time" : Set the duration (in seconds) of the measurement.

Vibration Logge File(F) Tool(T) H	(er. 1.0. 1 x(H)									-		×
Vibration	ogger											
	Sensor Settin	g Save&Graph Schedule		Sensor St	atus							
Find		hh : mm			A352 %							^
	Read	00 : 00 Add		Err	Lost	X_EXI	Y_EXI	Z_EXI	X_ALM	Y_ALM	Z_ALM	-
Setting	S	itartTime ( hh : mm )	_	0								
START	1	08 : 20 delete	^		A352 %							
	그	14 : 45 delete		Err	Lost	X_EXI	Y_EXI	Z_EXI	X_ALM	Y_ALM	Z_ALM	-
Meas Mode	_	14 45 delete		0								
One Time	-	21 : 10 delete			A352 🖌							
Wait Time[sec]				Err	Lost	X_EXI	Y_EXI	Z_EXI	X_ALM	Y_ALM	Z_ALM	~
Meas Time[sec]		delete										
1000		00 : 00 delete		NG	A352 %							
Elapsed Time[se	ec]			Err	Lost	X_EXI	Y_EXI	Z_EXI	X_ALM	Y_ALM	Z_ALM	-
0		delete	¥									~
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## Schedule

.

Set the times for scheduled measurement. Settings can be made in either of the following 1) or 2).

- 1) Enter the time in 24-hour format as "hh : mm" and click the "Add" button to add it to the time list.
- 2) Prepare a csv file with the times entered in the "hh:mm" format in advance, and click the "Read" button to add the contents of the csv file to the time list at once.

See "ScheduledMeas.csv" file in the installation folder for a sample csv file.

	Α	В	С	D	E	F
1	0	0				
2	0	5				
3	0	10				
4	0	15				
5	0	20				
6	0	25				
7	0	30				

Note) For Preparing a CSV file, there is a restriction on the start time must be in 5minute increments.

- Note) Actual measurements are performed based on the PC time clock. The number of samples collected may vary from measurement to measurement and from sensor to sensor.
- Note) The above settings are retained when exiting the software, and the settings are reflected at the next startup.

# 3.7. Measurement

## 3.7.1. Start Measurement

Click the "START" button to start the measurement. During the measurement, the software works as follows.

- The "START" label changes to "STOP", and the yellow blinks repeatedly.
- The elapsed time and sensor status are displayed.
- According to the setting conditions, a graph of the measurement data are plotted, and saved to a csv file.

<ul> <li>Vibration Logger Ver.1.0.1</li> <li>File(F) Tool(T) Help(H)</li> </ul>				- 🗆 X	
Vibration Log	ger				
Find 1	Sensor Setting Save&Graph Schedule	Sensor Status	W0000074	2022/03/02 13:02:06	Sensor Status *1
Setting	A342 COMPORT Senarro.	Err Lost X_EXI 0 0 0	Y_EXI Z_EXI X_X	ALM Y_ALM Z_ALM	Updates the sensor status information every second.
STOP	A352 %	NG A352 ½ Err Lost X_EXI	Y_EXI Z_EXI X_A	alm Y_ALM Z_ALM	[ Err ] : Communication error
Meas Mode One Time Wait Time[sec]	A352 1/2 V A352 1/2 V	NG A352 %		0	[Lost]: Packet lost *2
0 Meas Time[sec]		Err Lost X_EXI	Y_EXI Z_EXI X_J	ALM Y_ALM Z_ALM	[X_EXI, Y_EXI, Z_EXI]: Structural Resonance
Elapsed Time[sec]	A352 1%	NG         A352         ½           Err         Lost         X_EXI           0         0         0	Y_EXI Z_EXI X_A	ALM Y_ALM Z_ALM	Warning (FLAG Reg.)
Copyright (c) Copyright (c) 2 National In	n Corporation. All Rights Reserved. nstruments Corporation. All Rights Reserved.	p - 7 - 9	7 7 7	~	[ X_ALM, Y_ALM, Z_ALM ] : Threshold Detection (FLAG Reg.)

The elapsed time (in seconds) from the start of measurement is displayed.

- All statuses are reset to zero at the start of measurement, and then the number of flag-raising is counted (one exception: Err status is not reset to zero during scheduled measurement).
- \*2) Increment values in each packet are monitored.

# 3.7.2. End Measurement

Click the "STOP" button to end the measurement. The button label changes to "START" and the indicator turns green. All plot windows are closed, and the measurement data saving is terminated.

ibration I c	ader										
	Sensor	Setting	Save&Graph Schedul	Sensor	Status						
Find	Type	СОМІ	Port Serial No.	ОК	A342 <sup>1</sup> / <sub>6</sub>	COM4	Woo	00074	2022	/03/02 13:	03:38
Satting	A342	K COM4	W0000074	Err	Lost	X_EXI	Y_EXI	Z_EXI	X_ALM	Y_ALM	Z_ALM
Setting	A352	ľ2	V		Jora L			10		10	
START	A352	1%		Err	Lost	X_EXI	Y_EXI	Z_EXI	X_ALM	Y_ALM	Z_ALM
Meas Mode	A352	I.	v	0							
One Time	A352	1%	v	NG	A352 %						
0	A352	1/2		Err	Lost 0	X_EXI	Y_EXI	Z_EXI	X_ALM	Y_ALM	Z_ALM
Meas Time[sec]	A352	12			A352 4		-				
Elapsed Time[sec]	A352	L		Err	Lost	X_EXI	Y_EXI	Z_EXI	X_ALM	Y_ALM	Z_ALM
175		1:0		0							

# 3.7.3. Graph Windows

Functions of each graph window are described below.

# 1) RawGraph

### XYZ / X / Y / Z / Temperature



Note) If the sampling interval is longer than the time range of the horizontal axis, measured values are not plotted in the graph.

# 2) AvgRmsGraph



Select the sensor No. and measurement axis to be displayed.

Select the calculation format (Average/RMS) to be displayed.

# 3) FFT Graph



\*1) For a half-width of M, the full width of the moving-average filter is N = 1 + 2M samples. Therefore, the full width N is always an odd number of samples.

# 3.8. CSV File Data Format

## 3.8.1. Data Delimiter and Decimal Separator

Click "CSV Config" in the "Tool" menu, and select the data Delimiter and decimal separator.

🥏 Vibration Logger Ver.1.0.1								-		×
File(F) Tool(T) Help(H)										
Vib Status(O)	Ctrl+O									
SerialPort Config(S)	. Ctrl+S									
CSV Config(C)	Ctrl+C ng Save&Graph Schedule	Sensor S	tatus							
Find	Type COM Port Serial No.	NG	A352 %							^
Sotting	A352 1/2 -	Err	Lost	X_EXI	Y_EXI	Z_EXI	X_ALM	Y_ALM	Z_ALM	
Setting	A352 I		Lance L							-
START	A352 4	NG	Lost	X_EXI	Y_EXI	Z_EXI	X_ALM	Y_ALM	Z_ALM	
Meas Mode	A352 4	0								
One Time Wait Time[sec]	A352 🔓 💌	NG	A352 <sup>1</sup> / <sub>0</sub>							
0	A352 %	Err	Lost	O X_EXI	Y_EXI	Z_EXI	X_ALM	V_ALM	Z_ALM	
1000	A352 4	NG	A352 <sup>1</sup> / <sub>8</sub>							-
Elapsed Time[sec]	A252 I/	Err	Lost	X_EXI	Y_EXI	Z_EXI	X_ALM	Y_ALM	Z_ALM	
0		0								~
Copyright (c) 2022 Seiko Epson ( Copyright (c) 2022 National Inst	Corporation. All Rights Reserved. truments Corporation. All Rights Reserved.									
CSV Config										
Delimiter	- Delimiter									
Semicolon(;)	Select the data da	limitor								
φ					ام ما م	/ \1				
Decimal Separator Comma(,)	[Comma (, ), Tar	5 ( \t ), Se	emicolor	1(;), Р	erioa	(.)]				
	Decimal Separato	or								
		noroto-								
	Select the data se	eparator.								
OK Cancel	[ Period ( . ), Com	ıma ( , ) ]								

# 3.8.2. Header Specifications for Generated csv Files

Header specifications for each csv file (Raw, AvgRms, FFT) generated upon one-time and scheduled measurements are described below.

The header specifications are also described in the "Header.xlsx" file in the installation folder.

### 1) One Time Measurement

#### 1-1) Raw Data

Below describes the csv file data format that is generated when the "Raw" button in the "Save & Graph" tab is enabled.

File name: A342\_xxxxxxx(S/N)\_COMxx\_yymmdd\_hhmm.csv

1st column: Sampling index number 2nd column: Increment value for each sampling. 3rd column: Temperature value of the built-in temperature sensor. 4th column: X-axis sensor output. <sup>\*1</sup> 5th column: Y-axis sensor output. <sup>\*1</sup> 6th column: Z-axis sensor output. <sup>\*1</sup> 7th column: Flag register value of the sensor.

\*1) The unit corresponds to the output physical quantity (G, m/s, m) configured.

index	counter	temp. [℃]	X [G   m/s   m]	Y [G   m/s   m]	Z [G   m/s   m]	flag
0	1	27.2213936	4.76837E-07	5.05447E-05	-6.46114E-05	0
1	2	27.2213936	2.6226E-06	5.19753E-05	-5.81741E-05	0
2	3	27.2213936	1.3113E-05	5.10216E-05	-5.55515E-05	0
3	0	27.2213936	3.93391E-05	5.17368E-05	-5.57899E-05	0
4	1	27.2213936	3.5286E-05	5.79357E-05	-6.24657E-05	0
5	2	27.2213936	1.71661E-05	4.72069E-05	-7.39098E-05	0

### 1-2) AvgRms Data per Second

Below describes the csv file data format that is generated when the "AvgRms" button in the "Save & Graph" tab is enabled.

#### File name: A342\_xxxxxx(S/N)\_COMxx\_AvgRms1s\_yymmdd\_hhmm.csv

1st column: Elapsed time (in seconds) from the start of measurement.

2nd column: Temperature value of the built-in temperature sensor.

3rd column: Average value of the X-axis sensor output. \*1

4th column: RMS value of the X-axis sensor output. \*1

5th column: Maximum absolute value of the X-axis sensor output. \*1

6th column: Crest factor (CF = | Max | / RMS) of the X-axis sensor output. \*1

7th column: Average value of the Y-axis sensor output. \*1

8th column: RMS value of the Y-axis sensor output.  $^{^{\star\!1}}$ 

9th column: Maximum absolute value of the Y-axis sensor output. \*1

10th column: Crest factor (CF = | Max | / RMS) of the Y-axis sensor output. \*1

11th column: Average value of the Z-axis sensor output. \*1

12th column: RMS value of the Z-axis sensor output. \*1

13th column: Maximum absolute value of the Z-axis sensor output. \*1

14th column: Crest factor (CF = | Max | / RMS) of the Z-axis sensor output. <sup>\*1</sup>

\*1) The unit corresponds to the output physical quantity (G, m/s, m) configured.

time	temp.	X Avg	X Rms	X  Max	X CF	Y Avg	Y Rms	Y Max	Y CF	Z Avg	Z Rms	Z Max	Z CF
[sec]	[℃]	[*]	[*]	[*]	[*]	[*]	[*]	[*]	[*]	[*]	[*]	[*]	[*]
1	27.22139	-2.9E-06	7.14E-05	0.000189	2.652	1.68E-06	4.45E-05	0.000112	2.505349	2.73E-06	8.27E-05	0.000331	4.005779
2	27.22139	8.12E-07	3.92E-05	0.000122	3.112849	-9.8E-07	6.55E-05	0.00017	2.597251	-4.3E-06	8.69E-05	0.000216	2.486008
3	27.22139	2.1E-06	3.41E-05	0.000111	3.266582	-1.2E-06	5.27E-05	0.000179	3.393906	1.65E-06	6.76E-05	0.000167	2.475046
4	27.22139	-1.5E-06	3.39E-05	0.000104	3.071316	1.18E-06	4.32E-05	0.000134	3.102103	-1.1E-06	8.86E-05	0.000277	3.121088
5	27.22139	1.28E-06	3.39E-05	0.000142	4.20167	-1.3E-06	5.45E-05	0.000148	2.707514	2.61E-06	0.000146	0.00037	2.532496

### 1-3) FFT Data

Below describes the csv file data format that is generated when the "FFT" button in the "Save & Graph" tab is enabled.

#### File name: A342\_xxxxxxx(S/N)\_COMxx\_AS/PS/ASD/PSD<sup>\*1</sup>\_yymmdd\_hhmm.csv

1st column: Frequency index. 2nd column: FFT amplitude of the X-axis sensor output. <sup>\*2</sup> 3rd column: FFT amplitude of the Y-axis sensor output. <sup>\*2</sup> 4th column: FFT amplitude of the Z-axis sensor output. <sup>\*2</sup>

\*1) AS: Amplitude Spectrum, PS: Power Spectrum, ASD: Amplitude Spectral Density, PSD: Power Spectral Density.
\*2) Corresponding Units; AS: (G, ms, m/s), PS: (G, ms, m/s)<sup>2</sup>, ASD: (G, ms, m/s)/√Hz, PSD: (G, ms, m/s)<sup>2</sup>/Hz.

Freq	Х	Y	Z
[Hz]	[*]	[*]	[*]
0.732422	9.16E-07	1E-06	7.36E-07
1.464844	1.19E-06	9.58E-07	9.34E-07
2.197266	1.15E-06	6.49E-07	7.73E-07
2.929688	2.01E-06	7.7E-07	9.78E-07

# 2) Scheduled Measurement

### 2-1) Raw Data

Same as the RAW data format for the one time measurement.

#### 2-2) AvgRms Data per Second

Same as the AvgRms data format for the one time measurement.

#### 2-3) AvgRms Data for Each Scheduled Measurement

Below describes the csv file data format that is generated when the "AvgRms" button in the "Save & Graph" tab is enabled.

For the outputs of all sensor X/Y/Z axes, the respective average values and RMS data over the measurement time for each scheduled measurement are saved. A new csv file is created when scheduled measurements are performed across the month.

#### File name: AllSensors\_AvgRms\_yymm.csv

1st column: Start time of each scheduled measurement. 2nd column: Temperature value of the built-in temperature sensor. 3rd column: Average value of the X-axis sensor output over the measurement time. \*1 4th column: RMS value of the X-axis sensor output over the measurement time. \*1 5th column: Maximum absolute value of the X-axis sensor output over the measurement time. \*1 6th column: Crest factor (CF = | Max | / RMS) of the X-axis sensor output. \*1 7th column: Average value of the Y-axis sensor output over the measurement time. \*1 8th column: RMS value of the Y-axis sensor output over the measurement time. \*1 9th column: Maximum absolute value of the Y-axis sensor output over the measurement time. \*1 10th column: Crest factor (CF = | Max | / RMS) of the Y-axis sensor output. \*1 11th column: Average value of the Z-axis sensor output over the measurement time. \*1 12th column: RMS value of the Z-axis sensor output over the measurement time. \*1 13th column: Maximum absolute value of the Z-axis sensor output over the measurement time. \*1 13th column: Crest factor (CF = | Max | / RMS) of the Z-axis sensor output over the measurement time. \*1 13th column: RMS value of the Z-axis sensor output over the measurement time. \*1 13th column: Crest factor (CF = | Max | / RMS) of the Z-axis sensor output over the measurement time. \*1 13th column: Maximum absolute value of the Z-axis sensor output over the measurement time. \*1 15th column: Crest factor (CF = | Max | / RMS) of the Z-axis sensor output. \*1

\*1) The unit corresponds to the output physical quantity (G, m/s, m) configured.

Data	temp.	X Avg	X Rms	X  Max	X CF	Y Avg	Y Rms	Y  Max	Y CF	Z Avg	Z Rms	Z  Max	Z CF
Date	[℃]	[*]	[*]	[*]	[*]	[*]	[*]	[*]	[*]	[*]	[*]	[*]	[*]
2021/12/21 15:35	28.19209	-8.7E-08	3.36E-05	0.000123	3.658382	2.02E-07	4.67E-05	0.000191	4.09287	6.31E-09	8.2E-05	0.000296	3.608631
2021/12/21 15:40	27.36624	-1.5E-07	3.47E-05	0.000121	3.489971	-7.7E-08	4.62E-05	0.000158	3.42023	3.89E-07	6.66E-05	0.000214	3.219931
2021/12/21 15:45	27.22139	-7.3E-08	3.37E-05	0.000127	3.778102	-1.1E-07	4.34E-05	0.000155	3.572203	5.62E-08	7.2E-05	0.000303	4.207293
2021/12/21 15:50	27.22139	-1.2E-07	3.58E-05	0.000133	3.703765	-4.3E-08	4.55E-05	0.000159	3.496568	3.48E-07	7.8E-05	0.000266	3.406786

### 2-4) FFT Data

Below describes the csv file data format that is generated when the "FFT" button in the "Save & Graph" tab is enabled.

CSV files are generated for each axis. A new csv file is created when scheduled measurements are performed across the month.

File names: A342\_xxxxxxx(S/N)\_COMxx\_AS/PS/ASD/PSD<sup>\*1</sup>\_X\_yymm.csv

### A342\_xxxxxxx(S/N)\_COMxx\_AS/PS/ASD/PSD<sup>\*1</sup>\_Y\_yymm.csv

## A342\_xxxxxxx(S/N)\_COMxx\_AS/PS/ASD/PSD\*1\_Z\_yymm.csv

1st column: Frequency index.

2nd column: FFT amplitude of the sensor X- (Y-, Z-) axis output for the 1st scheduled measurement. <sup>\*2</sup> 3rd column: FFT amplitude of the sensor X- (Y-, Z-) axis output for the 2nd scheduled measurement. <sup>\*2</sup> 4th column: FFT amplitude of the sensor X- (Y-, Z-) axis output for the 3rd scheduled measurement. <sup>\*2</sup> 5th column: FFT amplitude of the sensor X- (Y-, Z-) axis output for the 4th scheduled measurement. <sup>\*2</sup> 6th column onwards: A column is appended each time a scheduled measurement is performed.

\*1) AS: Amplitude Spectrum, PS: Power Spectrum, ASD: Amplitude Spectral Density, PSD: Power Spectral Density.
\*2) Corresponding units; AS: (G, ms, m/s), PS: (G, ms, m/s)<sup>2</sup>, ASD: (G, ms, m/s)/√Hz, PSD: (G, ms, m/s)<sup>2</sup>/Hz.

Freq	1st scheduled	2nd scheduled	3rd scheduled	4th scheduled
	measurement	measurement	measurement	measurement
[HZ]	[*]	[*]	[*]	[*]
Freq(Hz)	2022/3/1 17:25	2022/3/1 17:30	2022/3/1 17:35	2022/3/1 17:40
0.018310547	0.000166625	0.000126593	9.15051E-05	0.000177917
0.036621094	9.01086E-05	7.57014E-05	6.92058E-05	0.000102031
0.054931641	4.46601E-05	5.20665E-05	5.62734E-05	4.66004E-05
0.073242188	3.43613E-05	3.5862E-05	3.88898E-05	3.32815E-05
0.091552734	2.31789E-05	2.0644E-05	2.242E-05	2.03556E-05
0.109863281	1.31738E-05	1.022E-05	1.11681E-05	1.08793E-05
0.128173828	6.20142E-06	6.01953E-06	7.09303E-06	6.2684E-06

# 4. Evaluation System Configuration Examples

The followings are system configuration examples when connecting the sensors to a PC. Please contact us for EPSON accessories or prepare other manufacturer's accessories by customers.

Accessories marked "Required" in the tables are required to be used. Accessories listed as "Optional" are to be prepared when necessary.

Although the accessories listed have been tested by Epson, they are not guaranteed to work since they are affected by the actual PC specifications.

# 4.1. A352AD1 / A342VD1

# 4.1.1. Evaluation System Configuration Example



# 4.1.2. Table of Accessories

Accessories Tested (model number / manufacturer)	Use Case / Remarks
Relay Board for EPSON Accelerometer / IMU Product No.: M-G32EV051 Manufacturer: EPSON	<ul> <li>Optional</li> <li>Recommended when the vibration of the USB cable affects measurements.</li> <li>Recommended when measuring small vibration.</li> </ul>
USB Evaluation Cable Interface Board for EPSON IMU / Accelerometer Product No.: M-G32EV041 Manufacturer: EPSON	<ul> <li>Required</li> <li>Convert the sensor output interface (UART) to USB.</li> <li>A dedicated driver may be required to connect to a PC. Please install it in accordance with the enclosed manual.</li> </ul>
USB Cable Type C to A (USB 2.0)	<ul> <li>Required</li> <li>Standard USB cables can be used.</li> <li>The maximum cable length for USB 2.0 is 5 m.</li> <li>A repeater cable may be used to extend the cable length. However, this is not recommended as it may degrade the communication quality.</li> <li>If more than 5m cable length is required, the configuration using the A552AR1 and A542VR1 (Section 4.1.3) is recommended.</li> </ul>
USB Hub (USB 2.0)	<ul> <li>Optional</li> <li>Prepare a USB hub when connecting multiple sensors.</li> <li>A general USB Hub can be used.</li> </ul>
Metal Base Plate	<ul> <li>Optional</li> <li>Co-tightening the sensor with M-G32EV051 or M-G32EV041 can reduce the influence of electrical noise.</li> <li>The sensor is designed to be mounted on a cabinet; however, evaluation can be simplified by preparing a metal base plate.</li> <li>Please prepare the metal plate by customers considering the shape of the sensor and the cabinet.</li> <li>Use the M2 screws supplied with M-G32EV051 or M-G32EV041.</li> </ul>

# 4.2. A552AR1 / A542VR1

# 4.2.1. Evaluation System Configuration Example



# 4.2.2. Cable Connection Configuration Example



# 4.2.3. Table of Accessories

Accessories Tested (model number / manufacturer)	Use Cases / Remarks
USB to RS422 Adapter Product No.: ICUSB234854I Manufacturer: StarTech	<ul> <li>Required</li> <li>Convert the sensor output interface (RS422) to USB.</li> <li>Up to four sensors can be connected with this product.</li> <li>A dedicated driver may be required to connect to a PC. Please install it in accordance with the enclosed manual.</li> <li>Settings for communication mode, power supply, and termination are required. Please follow the product manual before connecting sensors.</li> </ul>
<b>AC Adapter</b> Product No.: ATS036-A120 Manufacturer: Adapter Technology	<ul> <li>Required</li> <li>For power supply to the sensor.</li> <li>The output voltage of this product is 12V.</li> </ul>
M12 A-Code Double Ended Product No.: M12A08FL-12AFL-SBxxx (xxx: Cable length) Manufacturer: Amphenol LTW	<ul> <li>Required</li> <li>This cable is used to convert an M12 male connector to an M12 female connector.</li> <li>Please refer to the manufacturer's website for the cable length.</li> </ul>

M12 to RJ45 Cable Product No.: 0985 656 103 / xxM (xx: Cable length) Manufacturer: Lumberg automation	<ul> <li>Required</li> <li>For connecting the sensor via RS422.</li> <li>Please refer to the manufacturer's website for the cable length</li> </ul>
DB9 to RJ45 Modular Adapter - F/F Product No.: GC98FF Manufacturer: StarTech	<ul> <li>Required</li> <li>Convert a DB9 male connector into an RJ45 female connector.</li> </ul>
Magnet Base Product No.: M-A52EV161 Manufacturer: EPSON	<ul> <li>Optional</li> <li>If the target cabinet is made of a magnetic material such as iron, this magnet base can be used to mount the sensor.</li> </ul>

# 5. Contact

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# JAPAN

SEIKO EPSON CORPORATION. MD SALES & MARKETING DEPT. https://global.epson.com/products\_and\_drivers/sensing\_system/contact/

# Product Information on www server

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