ONO SOKKI

Portable 2 ch / 4 ch FFT Analyzer

CF-9200 CF-9400

CF-9200

CF-9400

Table of Contents

CF-9000 series developed to aim for…

Fusion of Steadfast evolution & technology

Simpler, easier and high function Analyzer for On-site operation

Since 2006～

Since 2014～

New product

CF-7200

CF-9200/9400

【 Feature & usability by type 】

All in one type portable FFT Analyzer

Minimum channels・exclusive use

Portable・hand-carried

Shared-use

Single・Simple・Automatic ・Small-scale measurement (1ch～4ch)

AC power source & battery (5 hours or more)

CF-9200/9400

PC type FFT Analyzer

Multi-channel・scalable use

Stationary

Exclusive-use

Compounding ・Multiple From small to large scale measurement (1ch～64ch)

DS-3000

CF-9200 / 9400 System Configuration

2014/11/01

Optional Software
Software：4 kinds

- CF-0922 Tracking Analysis
- CF-0923 RTA Analysis
- CF-0942 Log sweep excitation control
- CF-0947 LAN external control function

Portable 2ch FFT Analyzer

CF-9200E

Portable 4ch FFT Analyzer

CF-9400E

Accessories

- SD card memory (4GB)
- CF-0703 USB cable
- AC Adapter
- Manual
- DR-202 ×2 Battery pack
- CD
  - Reference guide (J/E)
  - User's guide (J/E)
  - Manual for CF-0947 (J/E) Setup software

Optional Carrying case

- CC-0025 Soft carrying case
- CC-0091 Hard carrying case

Optional documentation

- Reference guide (Japanese)
- Reference guide (English)

Optional Hardware

- CF-0971 Signal output option
- DR-202 Battery pack
- PS-P20018A AC Adapter
- CF-0703 USB cable

Recommended products

- Wireless LAN adapter TP-LINK TL-WN725N
- Bluetooth adapter ORICO BTA-402
- PMC02A Battery charger
- SD memory card PHISON ～32GB

[Product outline 1]

Dynamic range (CF-7200A) **90 dB min** → **120 dB min**
A/D converter (CF-7200A) **16 bit** → **24 bit**

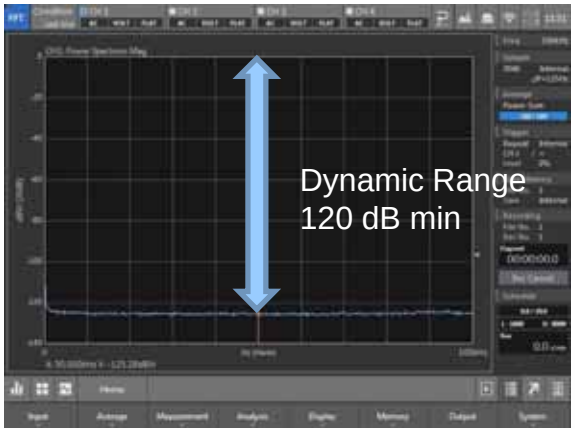
Simplification of voltage ranges (8 ranges → 2 ranges)

- Elimination of FFT analysis failure caused by volume overload in A/D conversion
- Elimination of recording failure caused by volume overload in A/D conversion

Disuse of analog filter (HPF/LPF) at the front end of the A/D converter

- Reduced power consumption → **4 ch analysis, 5-hour drive**
- Eliminates differences in phase and gain between channels which occur during the use of an analog filter, and also solves the problem of irreversibility of record data (ORF).

Dynamic range



CF-7200A

CF-9200

[Product outline 2]

**The operation buttons of the previous model have been retained, and new ones added.
Improved operation feel!**

CF-9400

CF-7200A

Schedule button has been added.

This button has been changed to an **Auto Sequence** button.

Large buttons have been adopted for improved "**pressing feel**."

- A hard button has been adopted for **[SCHED]** (Schedule).
- The [MEMO] (Voice memo) button has been disused.
  The **[AUTO_SEQ] (Auto Sequence)** button is now installed in this position.

MEMO (Voice Memo)
(The voice memo function has been disused.)

- The **[ESC]** (ESCAPE) key has been able to be used for the marker imprinting during recording.
- Assigns [HOLD] (key lock function) to the **[SELECT]** key.

Disused

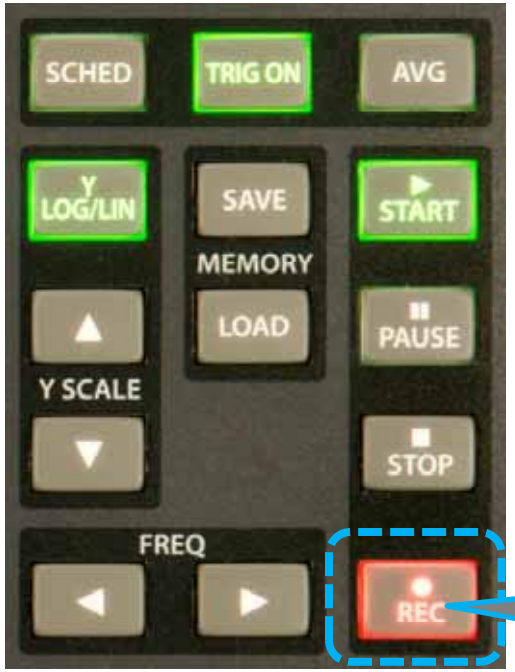
[Product outline 3]

Realizes FFT real-time rate of 100 kHz during 4 ch analysis (*1) and simultaneous recording during FFT analysis.

*1:During internal sampling, the FFT frame length is no greater than 4096.

Time series data for 4ch (*2) (24-bit, 256 kHz sampling) can be recorded.

*2:During analysis frequency of 100 kHz with CF-9400.



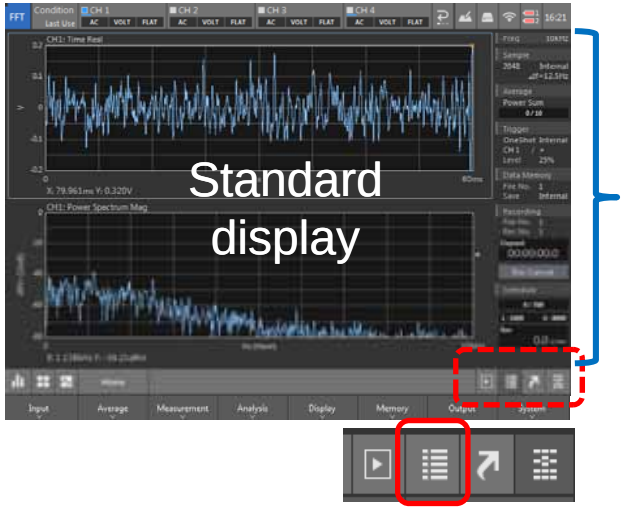
The recording method can be set to either SSD (internal)/SD or SDHC memory card/USB memory.

[Maximum recording time]
Approx. 16 minutes (For 4 ch analysis at 100 kHz when rotation data is OFF)
※File size: 4 GB

In the case of a 4 ch input, ORF recording will start as soon as the [REC] button is pressed, even if FFT_100 kHz analysis is taking place.

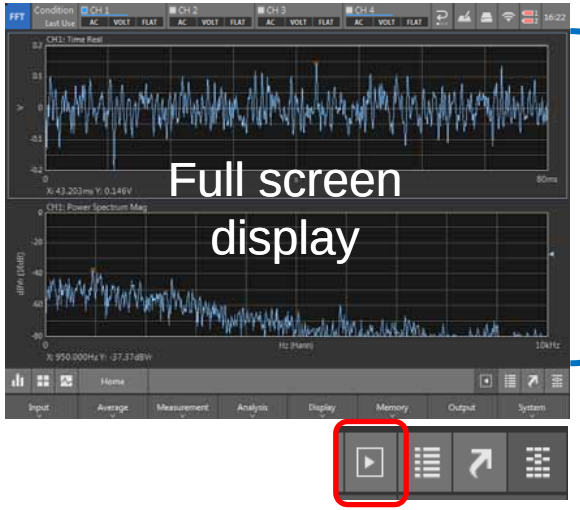
[Product outline 4]

Screen mode switching function
The CF-9200/9400 enables one of four screen modes to be selected for each analysis mode.



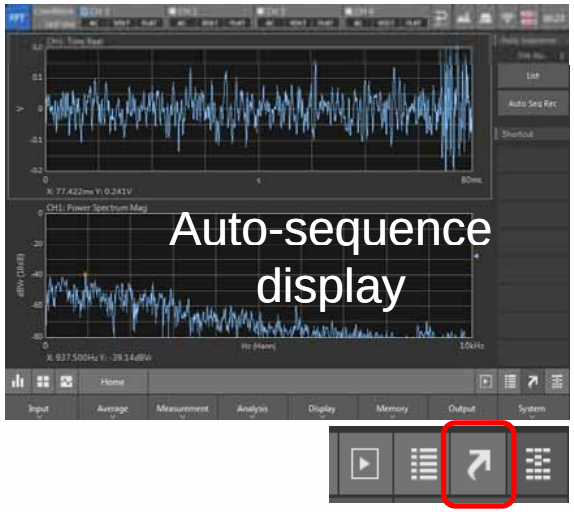
Basic

Displays annotations (default display)



Large

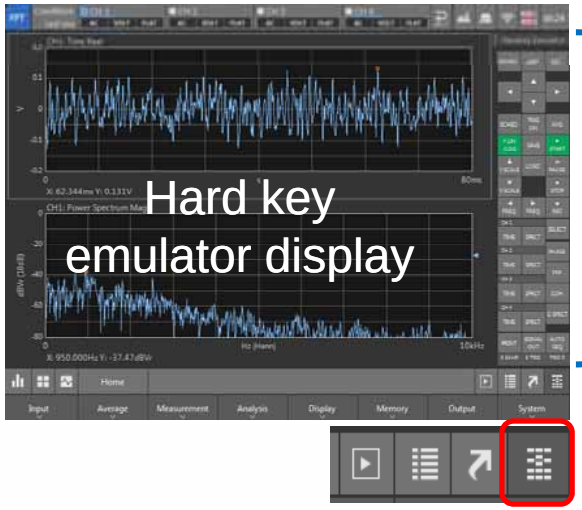
Full-screen display of graphs



Convenience

Execution commands stored in the auto-sequence function

Displays software shortcut



Silent & Remote

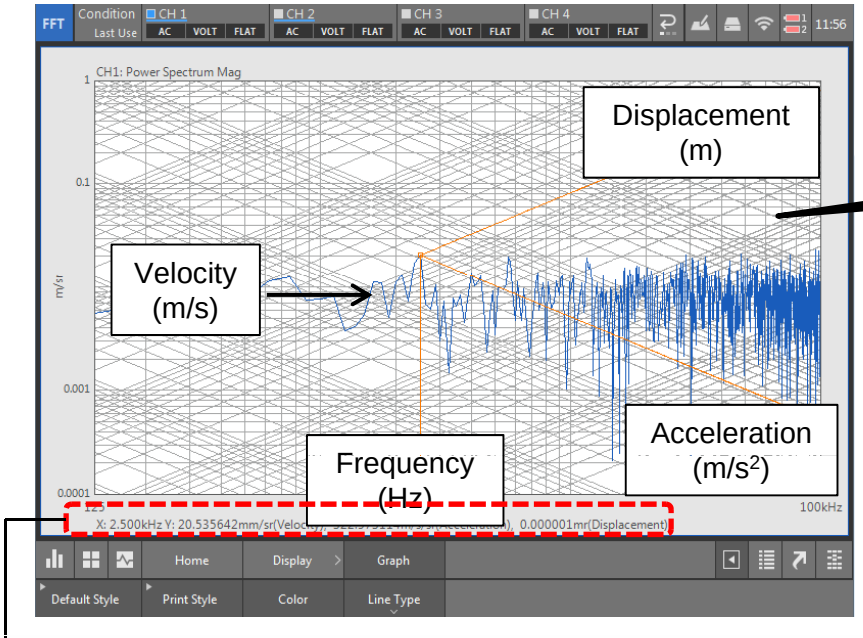
Software keyboard display

[Product outline 5]

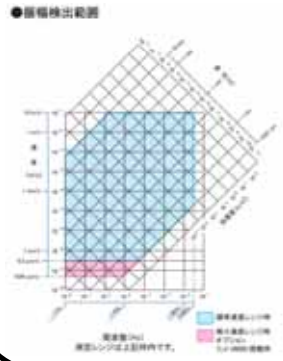
Real-time tripartite graph display function
Simultaneous readout of three amplitudes (acceleration/velocity/displacement) in vibration analysis

The CF-9200/9400 comes with a new **real-time tripartite graph display function.**

During FFT analysis, **three amplitude values (acceleration (m/s^2)/velocity (m/s)/displacement (m))** for an arbitrary frequency can be read out in real time. This product will eliminate the need to convert the amplitude by carrying out differentiation and integration individually by the frequency analysis function as with the previous models, thus enabling data at that amplitude to be read speedily.



Tripartite display ON.
Amplitude is read using Search Cursor (3 lines appear).



What is a tripartite graph?
This graph is shown on the last page of our LV-1800 laser Doppler vibrometer brochure.

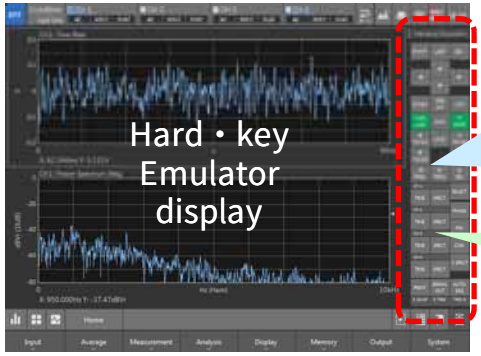
A tripartite graph (diagram) is a single graph which indicates the relationship between displacement, velocity and acceleration by utilizing the fact that when a sinusoidal wave sin (wt) is differentiated and integrated, a multiple of each frequency (w) or 1 / Angular frequency (w) is obtained.

Cursor value: Indicates frequency (Hz) / velocity (m/s) / acceleration (m/s^2) / displacement (m) simultaneously.

[Product outline 6]

Realization of noise-less and vibration-less operation (fan-less, spindle-less)

- Silent operating sound
- Vibration-less during operation
- Operating sound can be turned off

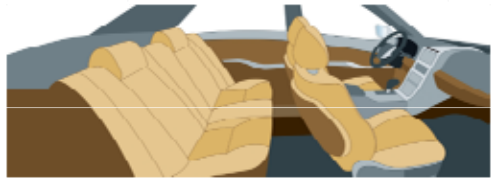


-No-operating sound on the hard key emulator display

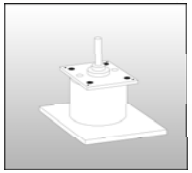
Sound-less screen switching

Provides Superior performance in measurement of…

Vehicle interior measurement



Operating sound of compact motor

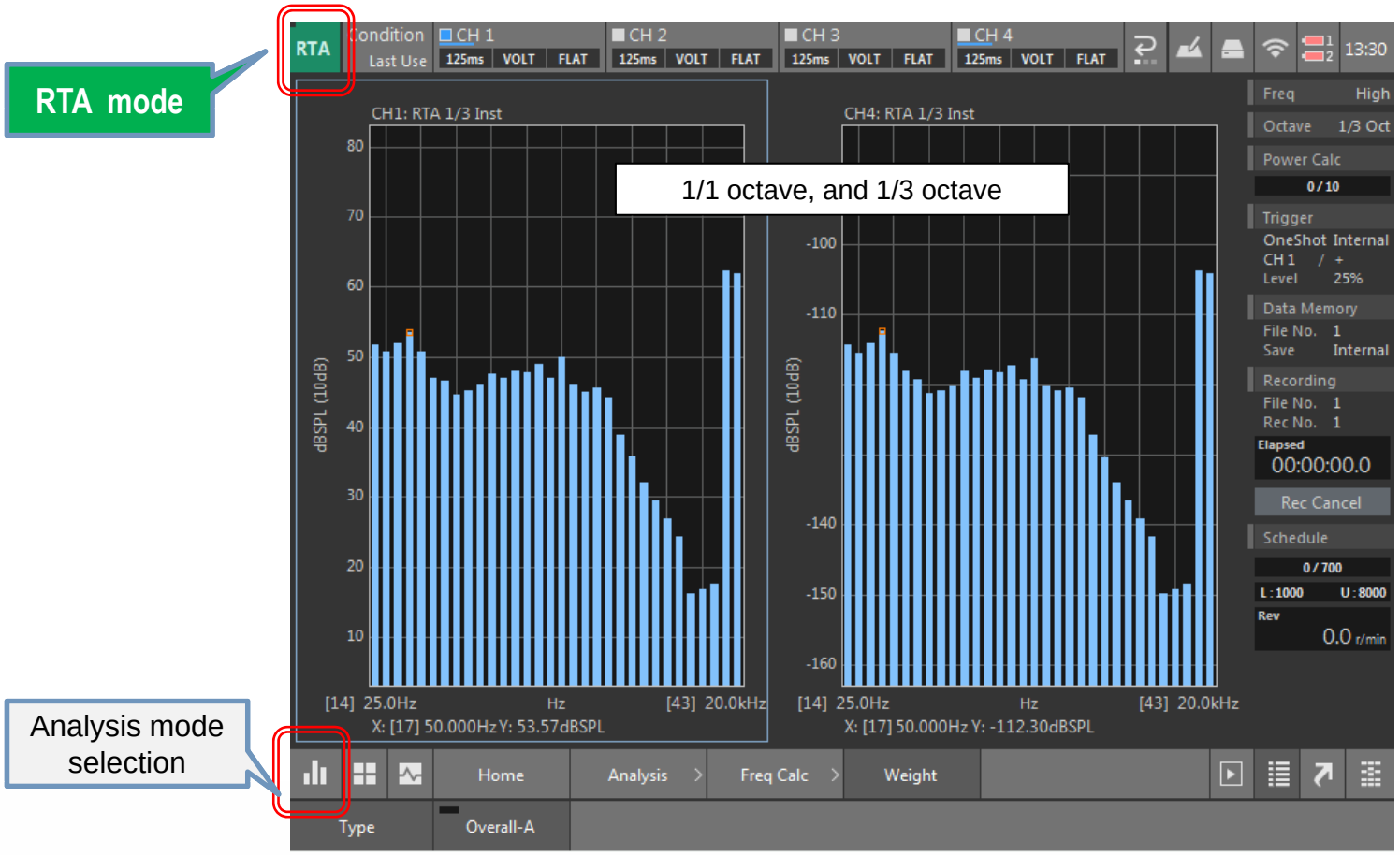


Operating sound of power switch components

[Product outline 7]

Provision of RTA analysis function.

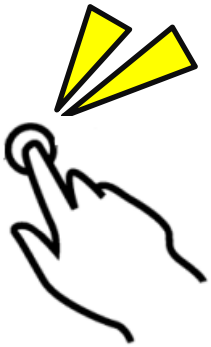
RTA analysis function can be provided. (OP: CF-0923)



[Product outline 8]

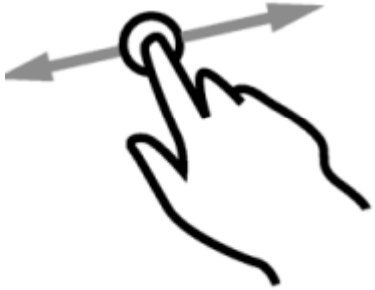
The LCD panel has been changed from a resistive film type to a capacitive type.
Gesture operation provides speedy movement.

There are two new touch operations currently assigned.



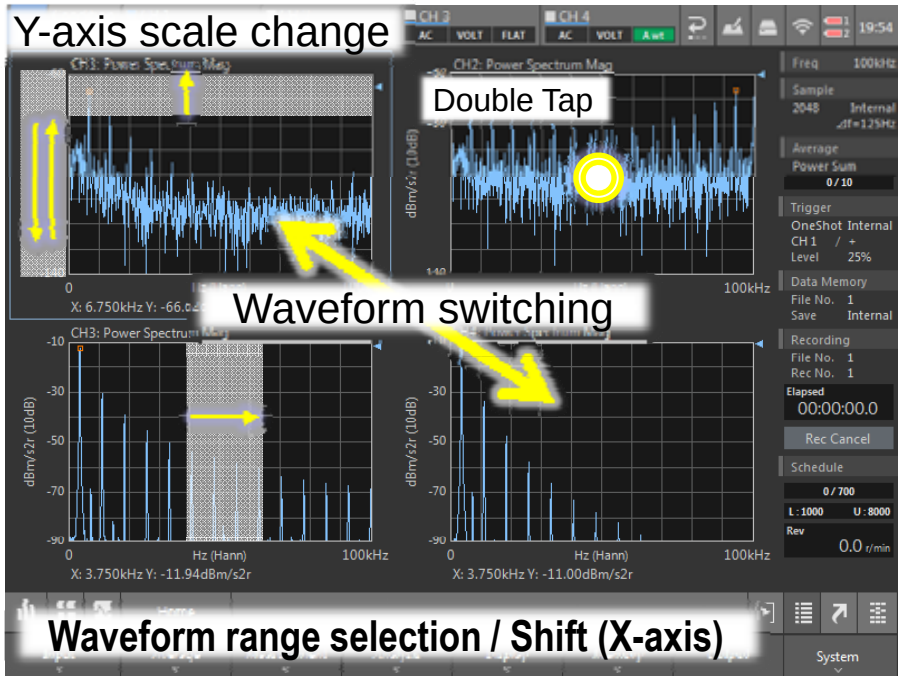
DoubleTap

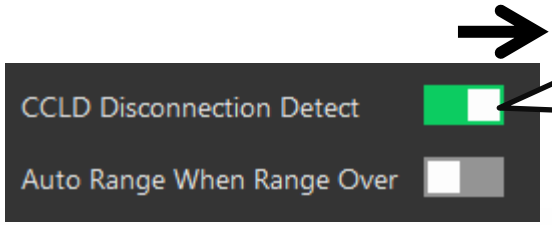
・Auto adjustment of Y-axis scale



Swipe

- Switching of displayed screen
- Selection (expansion) of the waveform range (Y-axis, X-axis)
- Change of Y-axis offset
- Change to Y-axis span





Turn ON / OFF by means of a swipe operation.

Operation of function ON/OFF switch

[Product outline 9]

Multi-touch operations can be performed on the LCD screen.
Y-axis scale automatically fits the by double-tapping.

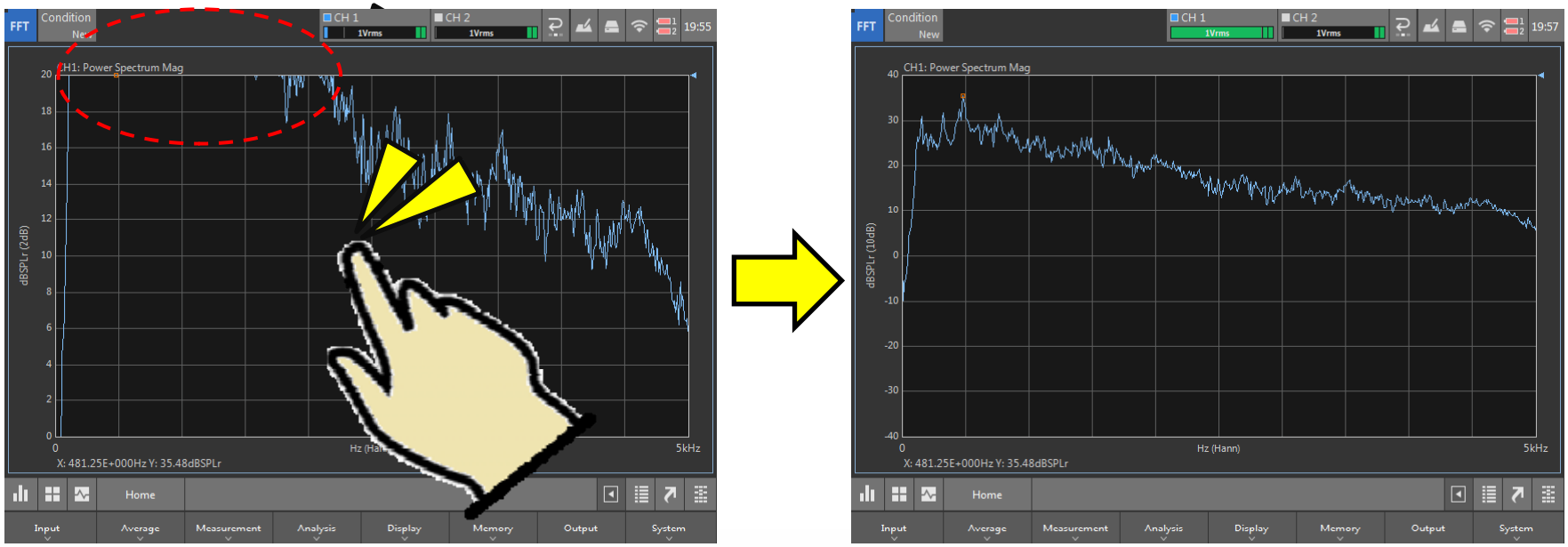
This operation method is common to **FFT/RTA/FRA.**

When you double-tap the screen, the Y-axis scale automatically fits the waveform on the screen at that instant.

***Double tapping** (rapidly and lightly tapping the screen twice)

When waveform is not settled within the screen, tap the screen twice rapidly and lightly.

Make fit Y-axis scale on the waveform.

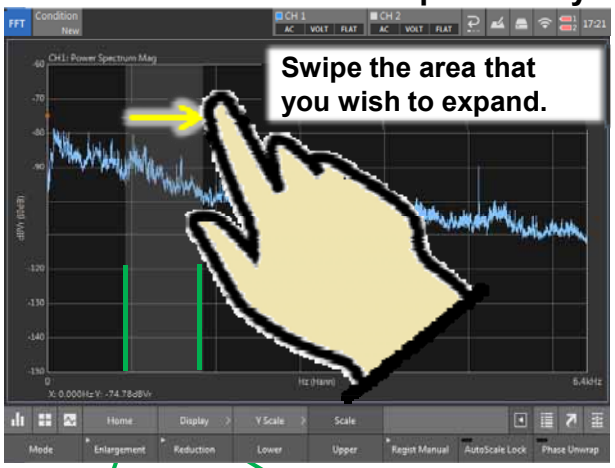


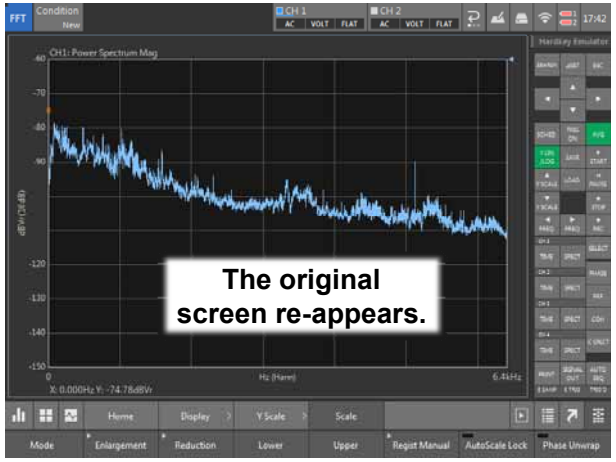
[Product outline 9]

Multi-touch operations can be performed on the LCD screen.
Y-axis scale automatically fits the by double-tapping.

This operation method is common to **FFT/RTA/FRA.**

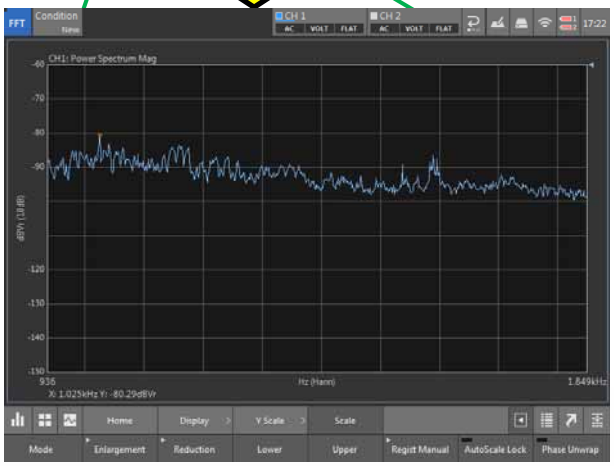
X-axis expansion by swiping

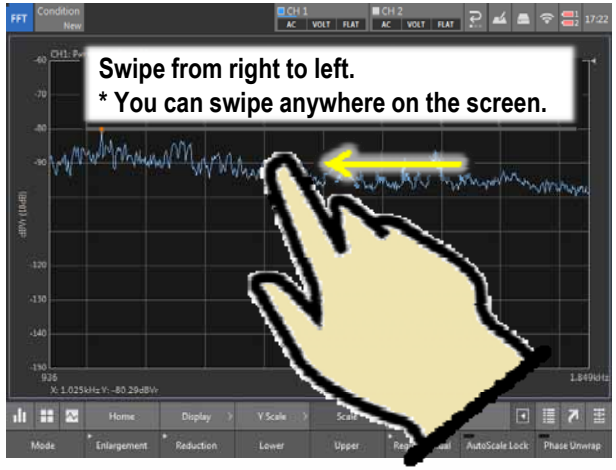




By double-tapping the screen, the size of the scale will change to fit the waveform, even when the X-axis has been expanded.

Return to the original scale.





When the amplitude acceleration is double-integrated, and a peak is found in the low frequency component of the background vibration,
this operation is effective for avoiding unwanted peaks, selecting only the zone in which measurement is to be performed, and adjusting the size of the scale to fit the waveform.

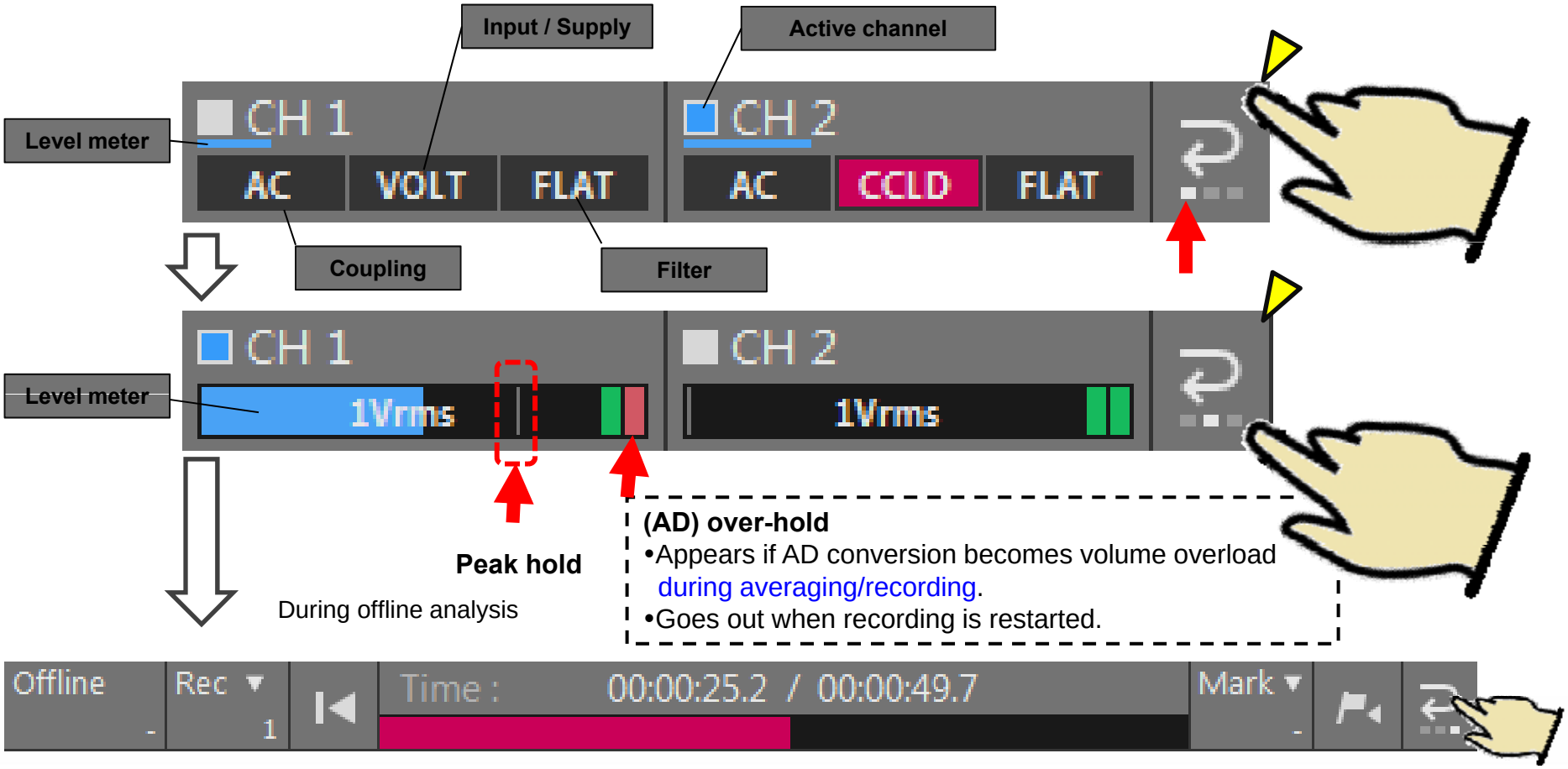
Use two cursors when you want to set the expansion range accurately.

[Product outline 10]

You can select one of three types of level meter.
You can select either a centralized information display or a major information display according to the desired visibility.

This operation method is common to **FFT/RTA/FRA.**

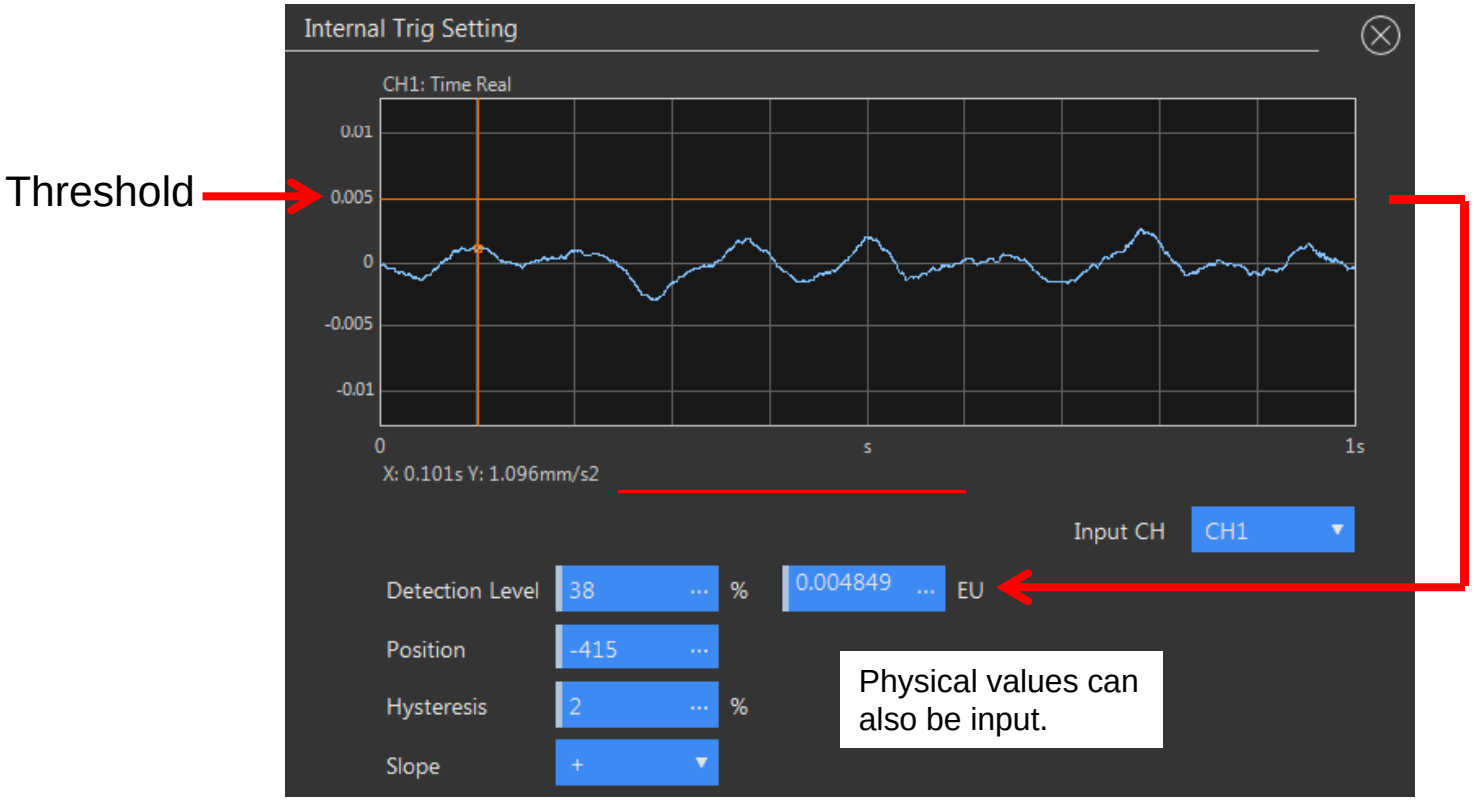
Major information is continuously displayed, or the input level is displayed in enlarged form.



[Product outline 11]

Comes to be able to set the trigger level by EU values.

The threshold value of the trigger level can be displayed by % indication and calibration (physical value).

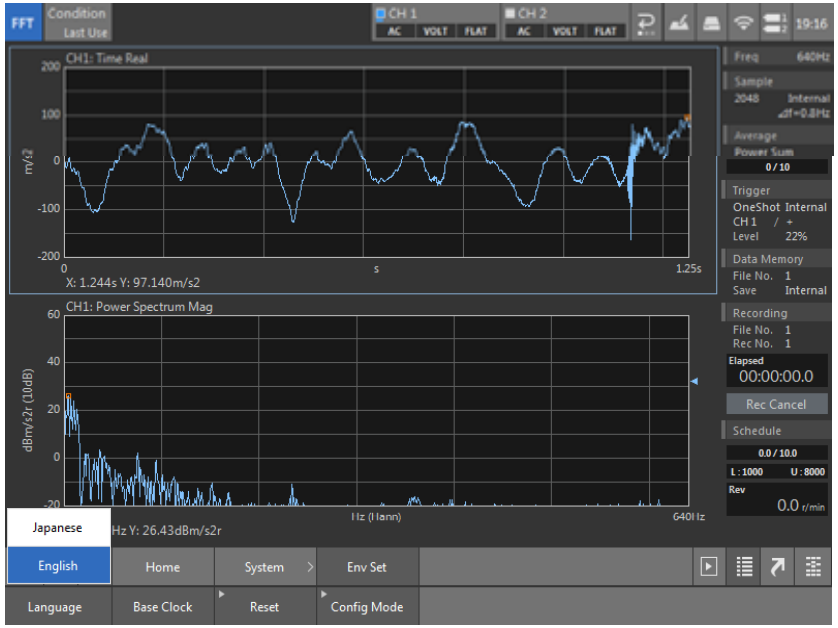


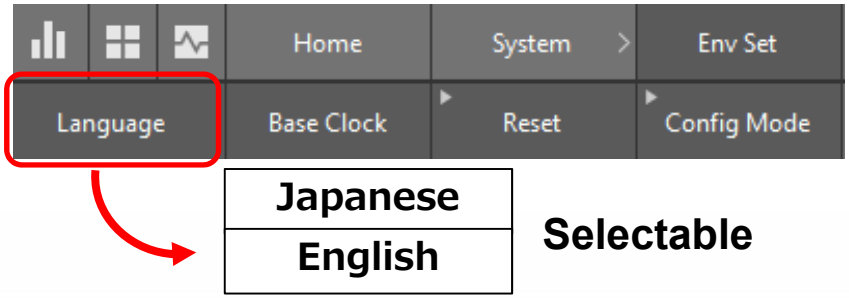
- It is possible to make it a condition that the signal level attain the target physical value.
  e.g. The recorder starts when 9.8 m/s^2 is attained.

[Product outline 12]

English/Japanese Message Language Selection

Message language can be selected from English or Japanese.





Selectable

Japanese

English

Language selection: available only for message

[Product outline 13]

- **Secondary battery drive permits 5 hours of continuous operation.**
- **The batteries can be hot-swapped (battery replacement while the power is ON).**
- **Two batteries can be charged during FFT operation.**

Both batteries are used simultaneously, so both should be replaced at the same time.

The instrument can be run cordlessly for up to 5 hours by using two internal secondary batteries.
When two batteries are used, **both run down simultaneously**. (→This method of use makes for long battery life.)

The internal batteries can now be removed one at a time without any need to switch OFF the power to the instrument (hot swap function).
* Replacement of both batteries simultaneously is the standard replacement method.
It is now possible to charge the internal batteries of the CF-9200/9400 while using the instrument. **The charging time is between about 8 and 9 hours.** (This time varies according to the conditions of use.)

[Product outline 13]

- Secondary battery drive permits 5 hours of continuous operation.
- The batteries can be hot-swapped (while the power is ON).
- Two batteries can be charged during FFT operation.

Concerning the standard accessory lithium-ion secondary batteries and external battery charger

OP: Lithium secondary battery

Made by STL

DR202

Recommended: External charger

Made by RRC power solutions

PMC02A

*Enables 2 batteries to be charged simultaneously

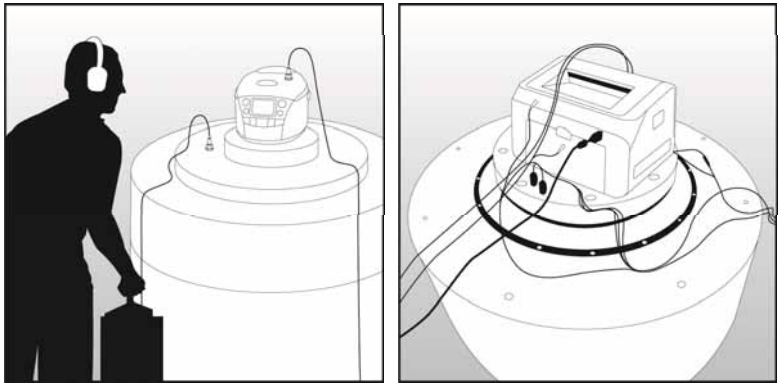
*Charging time is about 4 hours.

[Product outline 14]

Log sweep / Excitation control function (Option: CF-0942).
Enables more accurate vibration analysis using a VCM or an electromagnetic exciter .

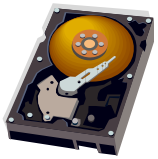
[Note] The CF-0971 1-signal output module (OP) is required for this software option.

①LOG sweep



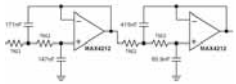
Excitation-response measurement using an electromagnetic exciter, voice coil (VCM: voice coil motor) ※Effective for evaluating application products.

HDD VCM



VCM actuators

Speakers



F characteristics of analog circuit

Resolution **160** 10 ～100Hz

Resolution **160** 100～1000Hz

Resolution **160** 1kHz～10kHz

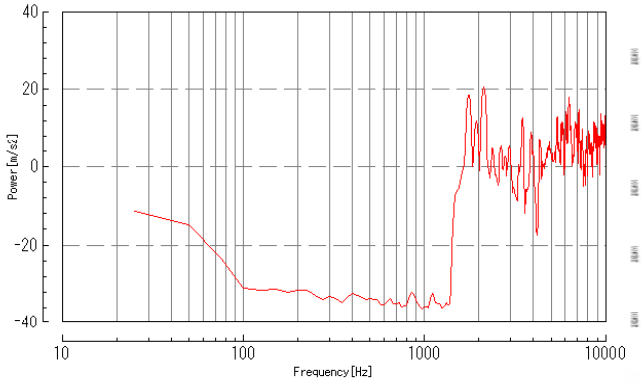
Sinusoidal waves are swept at the specified resolution. They are applied to signals.

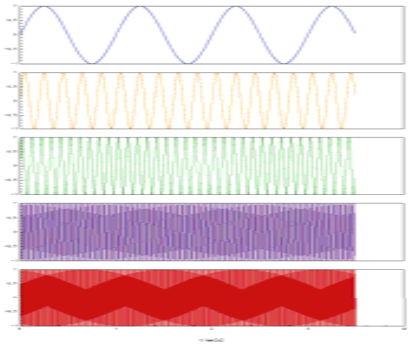
Merits of analysis (FRA) using a Log sweep

①Conditions can be set for each decade.
→ The frequency resolution per decade can be specified.

②Analysis can be performed at a high SN ratio.
→ The energy of the sinusoidal wave is large.
→ The auto-range function enables the dynamic range of FFT to be used fully.

③The target amplitude of HigthQ can be measured accurately.
→ There is adequate time to perform vibrational excitation of the measurement target.



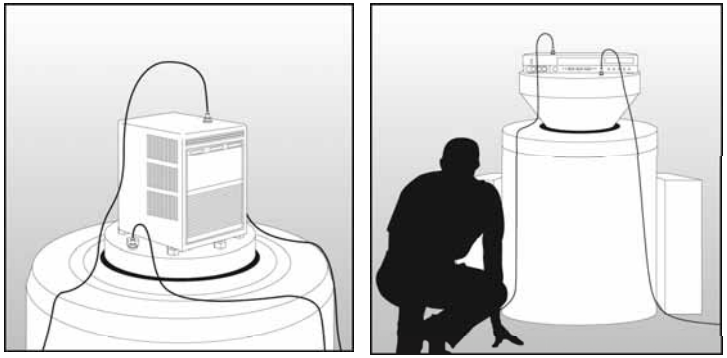


[Product outline 14]

Log sweep / Excitation control function (Option: CF-0942).
Enables more accurate vibration analysis using a VCM or an electromagnetic exciter .

[Note] The CF-0971 1-signal output module (OP) is required for this software option.

② Excitation control

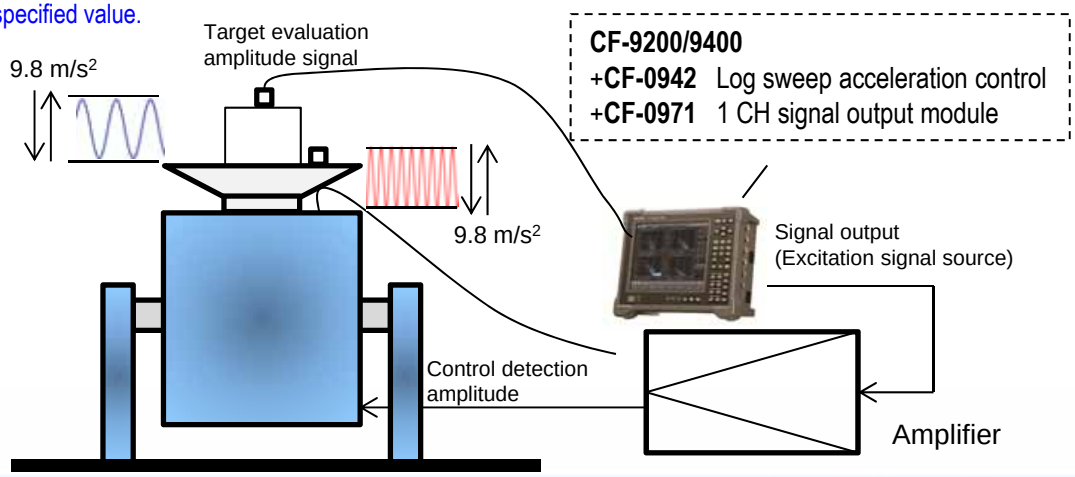


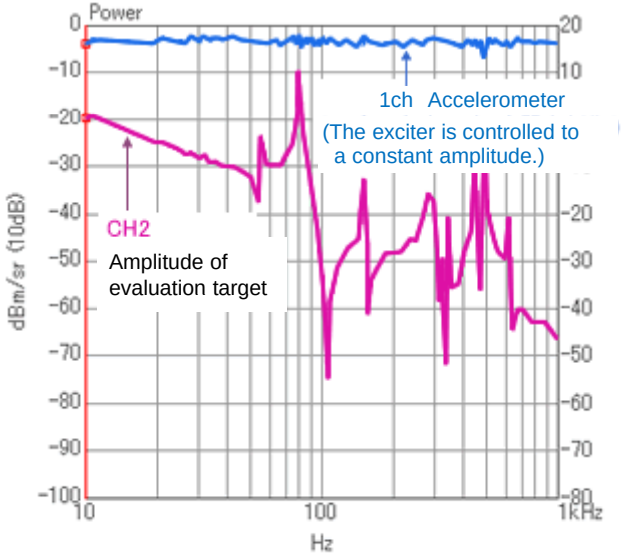
This is a function which controls the electromagnetic exciter to the specified amplitude (acceleration/velocity/displacement).
It also enables the sound pressure from a speaker to be controlled.

When the measurement target is to be excited by the electromagnetic exciter, if this function is combined with a sensor that detects amplitude, such as an accelerometer, the electromagnetic exciter will be controlled to the specified amplitude (acceleration/velocity/displacement).
There is no need to take into consideration the frequency characteristics of the electromagnetic exciter or the effect of the load.

The behavior of the component parts under the specified acceleration, for example, can be easily evaluated.

Even if the excitation frequency changes, the amplitude (acceleration/velocity/displacement) is controlled to the specified value.





[Product outline 15]

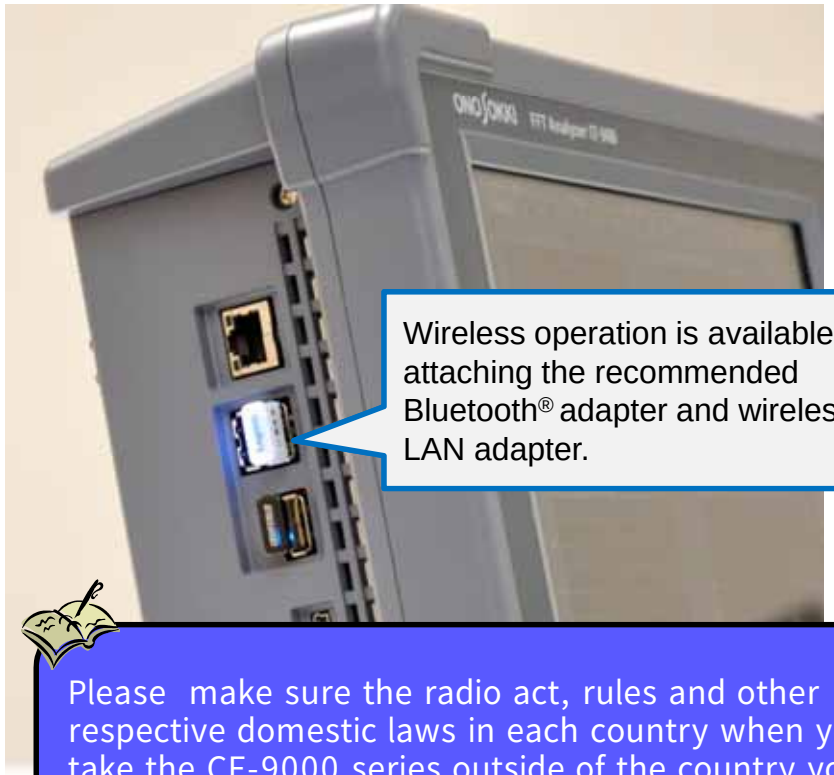
Adopted wireless control（Bluetooth®/Wireless LAN）
- Keyboard, remote control, printer and mouse operations by Bluetooth®
- Remote monitoring and control by Wireless LAN

※ Bluetooth® supported

CF-9200/9400 has three USB terminals (TypeA)

USB terminal (MiniB)
USB mass storage class (for PC connection)

Drivers for recommended Bluetooth® adapter and wireless LAN adapter have already installed at the time of shipment.



Wireless operation is available by attaching the recommended Bluetooth® adapter and wireless LAN adapter.

Please make sure the radio act, rules and other respective domestic laws in each country when you take the CF-9000 series outside of the country you are using.

[Product outline 15]

Adopted wireless control（Bluetooth®/Wireless LAN）
- Keyboard, remote control, printer and mouse operations by Bluetooth®
- Remote monitoring and control by Wireless LAN

※ Bluetooth® supported

Information about recommended wireless LAN adapter and Bluetooth® adapter

Requires wireless LAN adapter.
（※Use recommended products.）

The drivers of recommended adapters are pre-installed to the CF-9200/9400.

TP-LINK
TL-WN725N

ORICO
BTA-402

Adapters other than recommended products and those drivers cannot be used.

[Product outline 15]

Adopted wireless control（Bluetooth®/Wireless LAN）
- Keyboard, remote control, printer and mouse operations by Bluetooth®
- Remote monitoring and control by Wireless LAN

※ Bluetooth® supported

Bluetooth Approx.25 m (max)

Bluetooth® keyboard allows..
- Remote control
- Key entry of Label

※Refer to page for key assignment.

Screenshot by cordless & USB connection

Mobile printer made by Seiko Instruments Inc.,

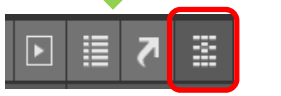
Bluetooth® supported DPU-S445-01A-E （recommended product）

Thermal transfer type
Paper width:112mm*
Power: AC adapter
OP: lithium ion secondary battery

◆Cable-wired available (USB connection)
◆Paper width: Compatible with the CX-0510

Requires Bluetooth® adapter （※Use recommended product.）

All functions of the main unit can be operated by connecting a Bluetooth® supported mouse.



Display of Hard keyboard

Wireless control is the bet recommended here, but USB keyboard /mouse is also available.

Bluetooth Approx.25 m (max)

Connecting a mouse appears on the screen

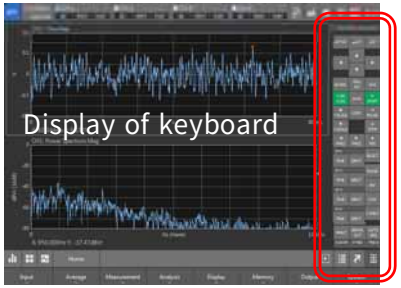
[Product outline 15]

Adopted wireless control（Bluetooth®/Wireless LAN）
- Keyboard, remote control, printer and mouse operations by Bluetooth®
- Remote monitoring and control by Wireless LAN

※ Bluetooth® supported

Wireless remote control by using Remote Desktop function and wireless LAN adapter

Requires wireless LAN adapter
(※recommended product)



Wireless access distance: over 100m under good condition

Wireless LAN

Operation by using Tablet terminal (Android/iOS/Windows)

Microsoft Remote Desktop for iOS/Android (Available by download of free application program)

Operation by using Windows® PC

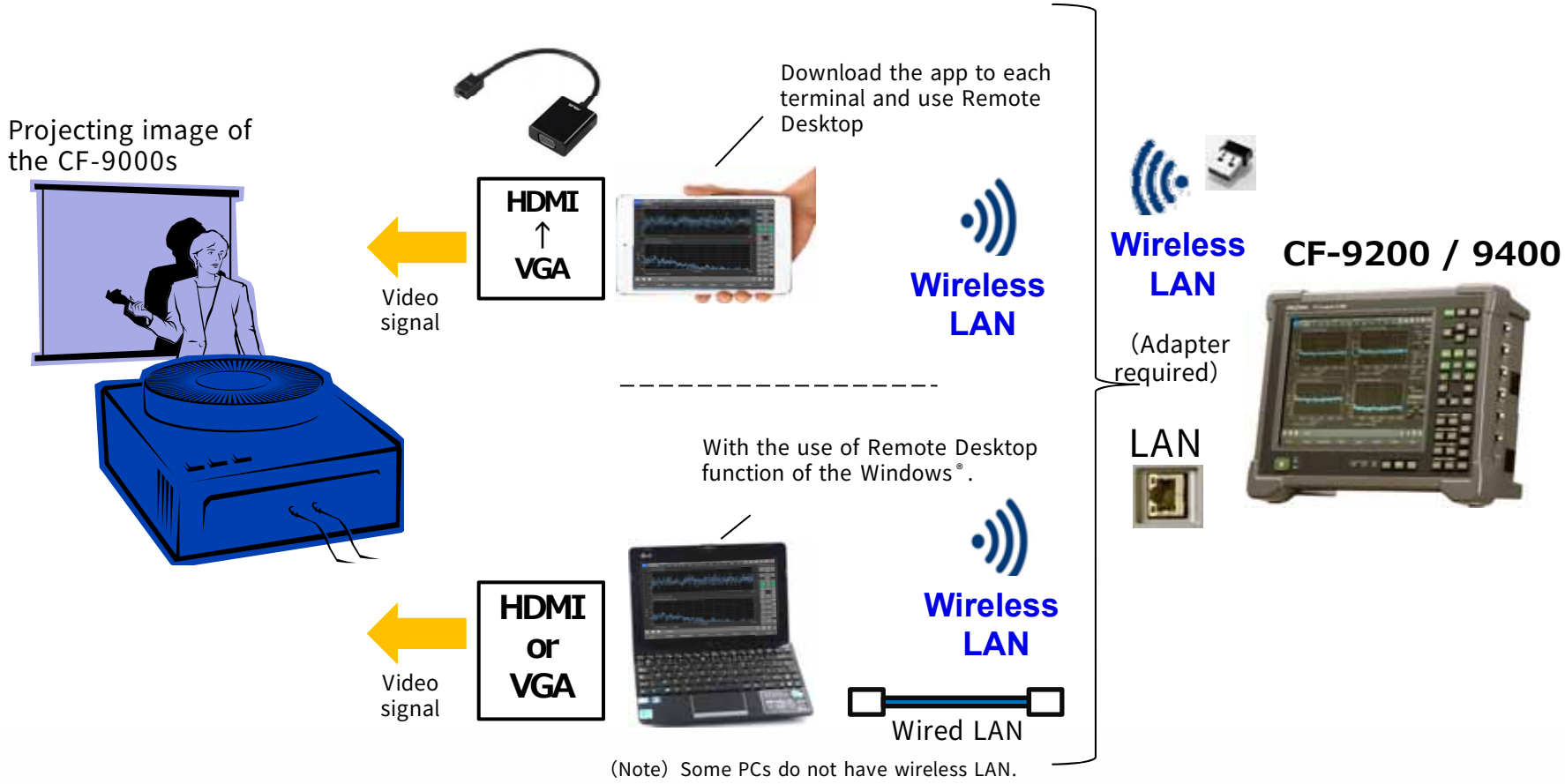
With the use of Remote Desktop function of the Windows®.

CF-9200/9400 can be operated by software key & hardware key (except for power ON/OFF)

[Product outline 16]

Screen and button on the CF-9200/9400 can be shared via projector using Remote Desktop function.

Displaying screen on the CF-9200/9400 can be shared via PC or tablet terminal using Remote Desktop function（wired LAN or wireless LAN adapter).



[Product outline 17]

Data can be transferred by using USB mass storage class/ an Ethernet (LAN) cable (Note).
As a result, both DAT and TRC are immediately rendered visible, thus facilitating data management.

Note: USB mass storage device class

Measurement data from the SSD in CF-9200/9400 unit can be acquired ①.

Note: Owing to security protection, the kinds of environments in which a removable memory (SD or USB) cannot be used in-house are increasing.

Only public folders in the storage media (SSD) inside the CF-9200/9400 can be accessed by the USB mass storage function.
SD memory cards and USB memories cannot be accessed.

•DataMem : dat/txt/bmp data
•offline : ORF data

PC OS
Basic recommendation : Windows 7 (32-bit, 64-bit)
Operation checked : Windows 8.1 (64 bit version)

SSD

AutoSeq
DataMem
Offline
Panel

CF-9200 / 9400

USB MiniB

USB mass storage device class

PC

Note: USB Mass Storage (device) Class
A general purpose drive program and standard that recognize and control the connected USB device (= CF-9200/9400)
Also called “USB storage class.”

[Product outline 17]

Data can be transferred by using USB mass storage class/ an Ethernet (LAN) cable
As a result, both DAT and TRC are immediately rendered visible, thus facilitating data management.

Measurement data from the SSD in CF-9200/9400 unit can be acquired ②.

Note: Owing to security protection, the kinds of environments in which a removable memory (SD or USB) cannot be used in-house are increasing.

Only public folders in the storage media (SSD) inside the CF-9200/9400 can be accessed by means of a PtoP connection.
SD memory cards and USB memories cannot be accessed.

•DataMem : dat/txt/bmp data
•offline : ORF data

PC OS
Basic recommendation : Windows 7 (32 bit, 64 bit)
Operation checked : Windows 8.1 (64 bit version)

LAN:
Port ×1 (RJ45)
10BASE/100BASE/1000BASE-T

SSD

AutoSeq
DataMem
Offline
Panel

PC

CF-9200 / 9400

LAN connector

PtoP

* A simple LAN in which PCs are directly connected to each other

LAN cable
Category 5E cross * Use a cross cable Within 100 m

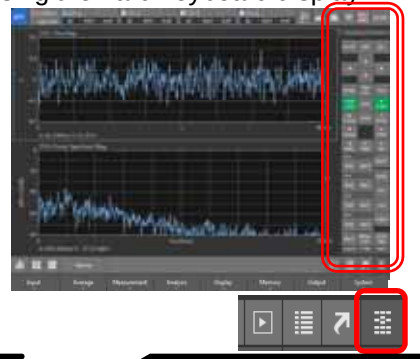
[Product outline 18]

The use of LAN external control (OP: CF-0947) permits external control using an Ethernet cable, or Remote Desktop (wired)

[Remote Desktop]

Remote Desktop is a method of connecting two PCs to each other via a network (or the Internet). **This function displays the desktop of the computer at the connection destination on the desktop of your own PC, making it appear as though the computer at the connection destination is at your fingertips.** It enables you to carry out remote operations from a location that is separate from the CF-9200/9400, by using a single LAN cable.

All functions can be operated using the hard keyboard display.



The screen of the CF-9200/9400 is displayed using the Remote Desktop function in Windows.

OS:
Windows 7 SP1
(64 bit/32 bit)

PtoP
* A simple LAN in which PCs are directly connected to each other

LAN cable
Category 5E cross
* Use a cross cable
Within 100 m

CF-9200 / 9400

[Product outline 18]

The use of LAN external control (OP: CF-0947) permits external control using an Ethernet cable, or Remote Desktop (wired)

[External control]

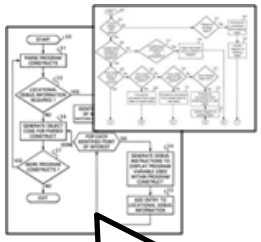
Used to create a program for controlling the CF-9200/9400 from a LAN.
The CF is automatically run by a program from the PC side, permitting acquisition and evaluation of data.

LAN:
Port ×1 (RJ45)
10BASE/100BASE/1000BASE-T

OS:
Windows 7 SP1
(64 bit/32 bit)

PC

Program



Program development
1) Visual Studio 2012 (VB/C#) (Note)
2) Excel 2007

PtoP
*A simple LAN in which PCs are directly connected to each other

LAN cable
Category 5E cross
* Use a cross cable.
Within 100 m

CF-9200 / 9400

Note:
VB：Microsoft Visual Basic
C#： Object-oriented programming language intended for developing software for Microsoft .NET environment which Microsoft announced in 2000.

[Product outline 19]

The CF-9200/9400 enables one of three storage locations to be selected as the storage medium for the acquired data (*.dat/*.txt/*.bmp/*.orf)

USB memory

～32 GB (MAX)

*Use the USB memory recommended by Ono Sokki.

*.dat
*.txt
*.bmp
*.orf

1 file：4 GB（MAX）

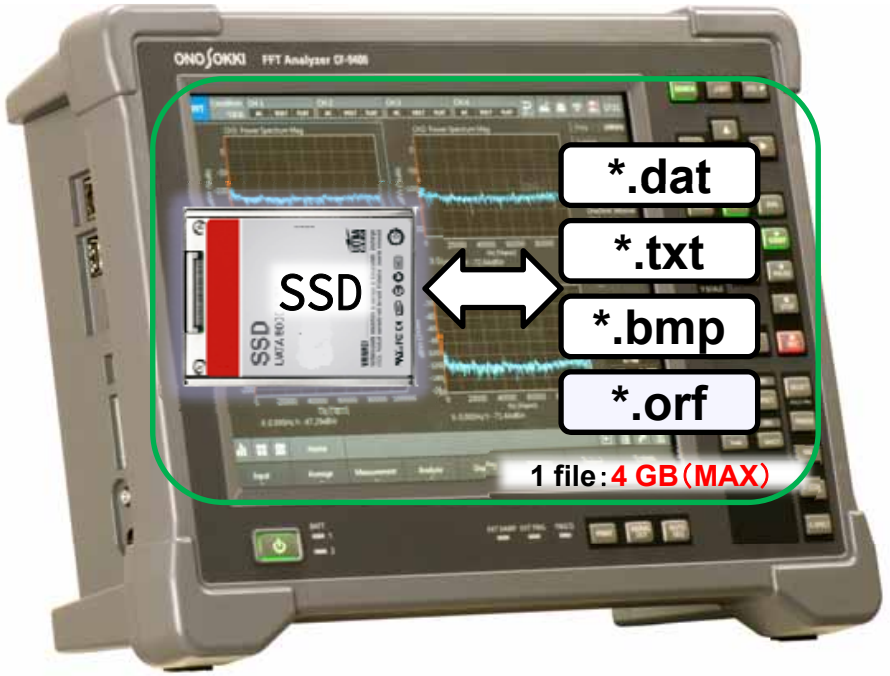
SD/SDHC memory card

～32 GB (MAX)

*Use the memory card recommended by Ono Sokki.

*.dat
*.txt
*.bmp
*.orf

1 file：4 GB（MAX）



[Product outline 19]

The CF-9200/9400 enables one of three storage locations to be selected as the storage medium for the acquired data (*.dat/*.txt/*.bmp/*.orf)

Data compatibility with other FFT of Ono Sokki

Q1: What is Ono Sokki's FFT and Windows software where ORF made by the CF-9200/9400 can be played back?

Ans1: Can be read by DS-3000, DS2000A and OS-2000 series.

Q2: Can ORF made by the FFT and software of other models be played back in the CF-9200/9400?

Ans2: Can be read if the filename is made to conform to the naming rules of the CF.
However, the maximum number of channels for the readable ORF files is 4 CH. If the number of channels are exceeded 4 CH, the filenames cannot be displayed for reasons concerning UI.

Q3: Can an ORF or TRC file in which Japanese language is used be read to the CF-9200/9400?

Ans3: The file can be read provided that the filename conforms to the naming rules.

001_RecordNum1_RecFile.orf

In this way, the line No. on the memory screen of the CF and also the number of records are held in the file. In this way, the file is renamed.

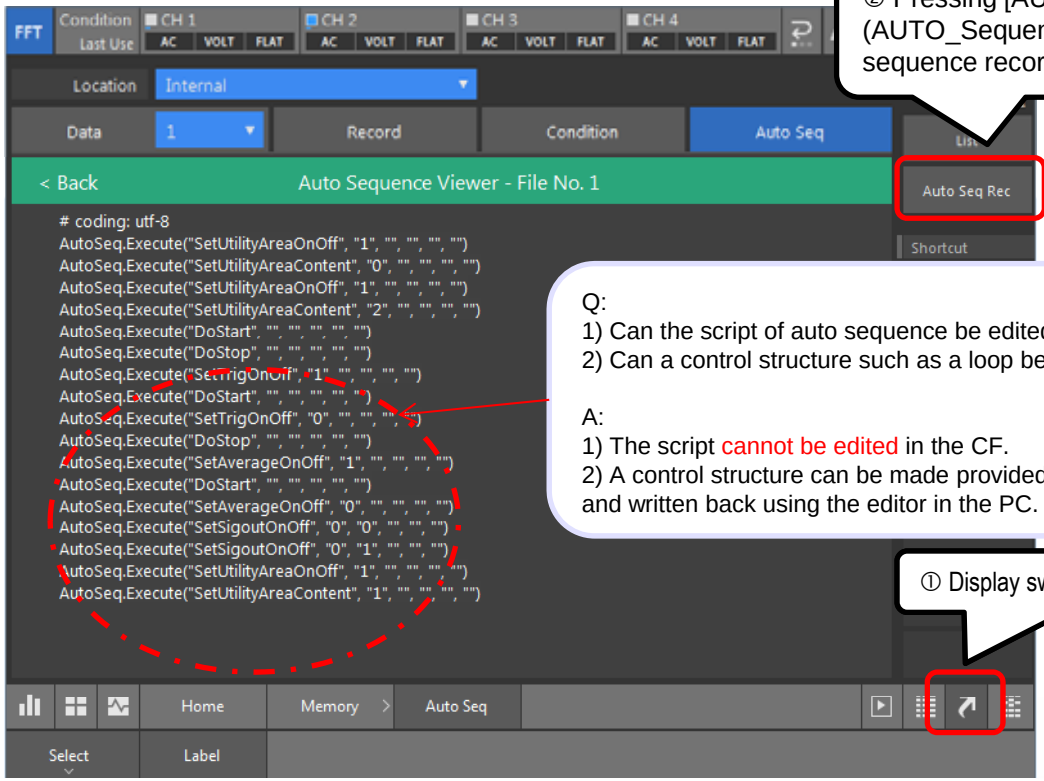
[Product outline 20]

FFT operations performed by auto sequence can be recorded, and also automatic operations can be performed.
Operation sequences performed by specialists and experts can be automatically reproduced.
Mistakes at the site are reduced, regardless of the skill of the operators.

[AUTO_Seq (Sequence)] is a function that is used to record and automatically play back operations performed on the CF9200/9400.
The difference between it and Panel Condition is that **it can automatically reproduce the motion that follows the flow of operations**.

CF-9200/9400

③ Playing back and executing the recorded sequence using the [AUTOSEQ] hard button



② Pressing [AUTO_Seq_Rec] (AUTO_Sequence_Record) starts sequence recording.

Q:
1) Can the script of auto sequence be edited in the CF?
2) Can a control structure such as a loop be constructed?

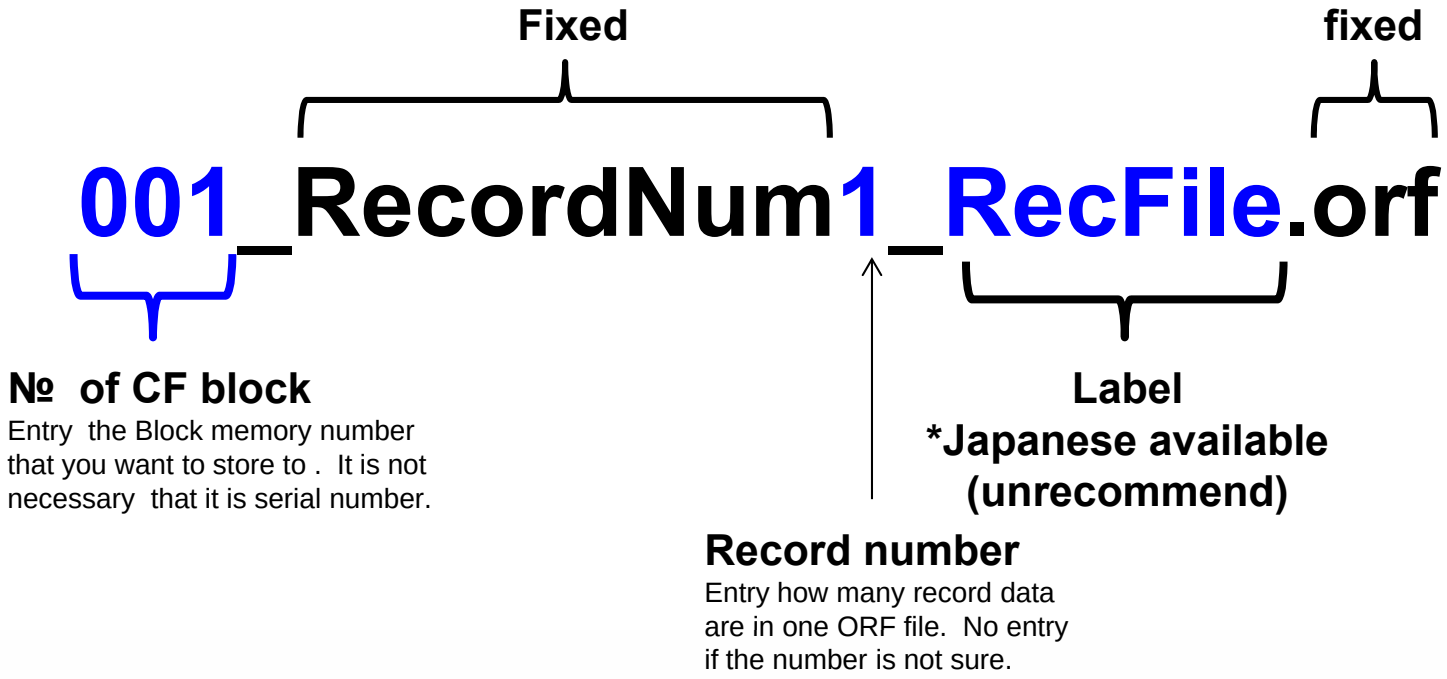
A:
1) The script cannot be edited in the CF.
2) A control structure can be made provided that the file is edited and written back using the editor in the PC.

① Display switches to [AUTO_Seq].

[Product outline 21]

File naming rules to read the ORF file made by Ono Sokki's other FFTs

Rename the file on a PC according to the file naming rule to read ORF file on the CF-9200/9400.



CF-9200
（100 kHz　2ch）

CF-9400
（100 kHz　4ch）