

## FIELD RECORDING UNIT



# es8

### User's Manual

Thank you for purchasing the Field Recording Unit es8.

Please read this manual before using the product.

Then, keep the manual handy.

#### Notes:

The company name or product name described on this manual is a trade mark or a registered trade mark.

Further, the contents of this manual may be changed without notice.

# TEAC

TEAC Corporation

July, 2006, Revision 1.1.1

Manual Part Number D00841900X




**Revision History**






Revision	Date	Description
1.0.0	Dec. 2004	First edition
1.0.1	Jan. 2005	Contents of PC recording added.
1.0.2	Jan. 2005	Optional function added.
1.0.3	Jan. 2005	Standard accessory added. Count number to fulfill the trigger condition revised. Cautions when using it outside the guaranteed operating conditions added. Explanation of the trigger function added.
1.0.4	Mar. 2005	Specifications and Table of setting range added, header information added.
1.1.0	July 2005	GPS information format changed.
1.1.1	July. 2006	Company name is changed to TEAC Corporation




**CAUTIONS**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Voluntary Control Council for Information Technology Equipment (VCCI). Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## For Safe Use

	This symbol designates the cautions (including warnings), to which you must pay attention.
	This symbol designates activity that is prohibited. This symbol illustrates the contents of the prohibition (The left figure means "Disassembly is prohibited").
	This symbol designates mandatory action or content to be performed. This symbol illustrates the nature of the action. (The left figure means, "Unplug the power cord from the power outlet")

	A failure to observe the precautions indicated by this symbol may result in serious injury or death.
<b>WARNING</b>	
	<p>■ If an abnormality occurs, continuing to work during the abnormal condition (e.g., smoke emission or a bad odor) could result in fire or electric shock. Turn the power supply off immediately and unplug the power cord from the power outlet. After you confirm that there is no further smoke emission, contact the TEAC customer service division for repair.</p>
	<p>■ Do not open the cover Do not remove the cover of this equipment. This could result in electrical shock. You may contact the TEAC customer service division for internal check or repair. Do not modify this equipment. This could result in a fire or electrical shock.</p>
	<p>■ Do not damage the cable Do not place heavy objects on the cable. Any kind of damage or work to, or unnatural bending, twisting, stretching, or heating of, the cable should be avoided. Those actions could result in a fire or electrical shock.</p>
	<p>■ Prevent dampness or moisture Do not let this equipment get wet. Operation while its interior is wet or damp could result in fire or electrical shock. If moisture gets inside, turn the power supply off immediately and unplug the power cord from the power outlet. Then contact the TEAC customer service division.</p>

	A failure to observe the precautions indicated by this symbol may result in injury or property damage.
<b>CAUTIONS</b>	
	<p>■ Unsuitable location Do not place the equipment at the following sites. It may result in fire or electrical shock.</p> <ul style="list-style-type: none"> <li>- in a place where the equipment may be exposed to oily smoke (e.g., smoke from cooking oil) or steam or where there is a moisture nearby. <ul style="list-style-type: none"> <li>– in a humid or dusty places.</li> </ul> </li> <li>- on an unstable surface, such as a tilted or unsteady table. <ul style="list-style-type: none"> <li>– in a place where the equipment may be exposed to direct sun light</li> </ul> </li> </ul> <p>■ Do not touch with wet hand It may result in an electrical shock.</p>
	<p>■ When not in use for a long period When not using this equipment for a long period of time, unplug the power cord.</p>

## CAUTIONS REGARDING USE

**Make sure to check whether or not the product is the same as what you ordered.**

We have been doing comprehensive quality control. However, we recommend you ensure the delivered product is the same as what you ordered. If you find any deficiencies, please contact TEAC immediately.

### Standard Accessory

AC adaptor x 1 (A05C1-12MI)

Cable side D-SUB connector x 1 (connector: HIROSE HDBB-25PF(05), cover: HIROSE HDB-CTH1)

es8 Application Software CD-ROM (T001107-00□)

CD-ROM includes files as follows.

Control Program esNavi PL-U4400

es8 User's Manual D00841900

esNavi User's Manual D00860600

AA cell battery x 4 (Oxiride cell battery)

**Use the cell battery or the external power supply described on the specifications of this manual**

Only the power supply of the main unit described on the specifications is available. Other kinds of power supply may result in damage to main unit.

### Cautions for long period of storage

Make sure to remove the cell battery from the inside of the main unit for long period of storage.

## WARRANTY

### Hardware Warranty

- The product's hardware warranty is good for a period of one year following purchase.

In the case of hardware failure when normal operating procedures have been followed and the warnings have been observed, the nearest sales office or service division of TEAC Instruments Corporation ("TEAC") will repair the product hardware free of charge.

- When seeking complimentary repair due to hardware failure within the warranty period, please contact an exclusive dealer of this product, the nearest TEAC's sales office or the service division. However, if you are located far from TEAC's service offices (i.e.: remote island or similar isolated location), we will request an additional fee for on-site service. Prior to performance of warranty services by TEAC, remove data and recoding media, or equipment, parts, mechanism unit, accessories, attachments, modification other than TEAC's products.

- Complimentary repairs will not be available during the warranty period under certain circumstances, such as the following.

- 1) Hardware failure or damage caused by improper operation or repair or modification without TEAC's approval.
- 2) Hardware failure or damage caused by transport, moving, dropping after purchase.
- 3) Hardware failure or damage caused by fires, earthquakes, water hazards, lightning, or other natural hazards, public hazards, or abnormal voltage.
- 4) Hardware failure or damage caused by other equipment.
- 5) Except for abnormal wear or damage, hardware failure or damage caused by worn and torn parts that are considered to be natural wear and tear.
- 6) Hardware failure or damage caused by special usage, or severe environmental conditions in particular.
- 7) Maintenance service for inspection.

- The description above provides for all hardware guarantees for TEAC's product in use for all explicit or implicit guarantee liability, including defect liability in law.

TEAC's guarantee liability covers repair or exchange of this product only. To the maximum extent permitted by applicable law, in no event will TEAC be liable for any of the customers' loss of profit or any damages based on a claim for damages by third parties.

- The guarantee described above is available only in Japan.

- Repair after the warranty expires:

Please contact an exclusive dealer of this product, the nearest TEAC's sales office or the customer service division.

### Software Warranty

The software product warranty period is 90 days following the purchase of the product.

TEAC warrants that the SOFTWARE will be usable for the purpose indicated in TEAC's document if properly installed on a computer. If the SOFTWARE is not usable for the purpose indicated in TEAC's document during the warranty period, the customer may request modifications of the product through a dealer. If TEAC considers it impossible to modify the SOFTWARE, the customer may return the product for a refund. TEAC does not warrant that the operation of the SOFTWARE will be uninterrupted or error-free.

No liability for consequential damages: In no event shall TEAC be liable for any consequential damages whatsoever (including damages for loss of business profits, business interruption, loss of business information, or any other pecuniary loss) arising out of the use of, or inability to use, the SOFTWARE, even if TEAC has been advised of the possibility of such damages.

The guarantee described above is available in Japan only

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- If you have any questions concerning this Agreement, please submit them to the address below:

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## About This Manual

This manual consists of the following Sections.

Section	Contents
Section 1: Overview	Describes the system's overview, features, and options.
Section 2: Name & Functions of each part	Describes the names and functions of each part. Also describes the connector's pin configuration for the external device.
Section 3: Before recording	Describes information required to operate such as power supply or other cautions. Also describes various types of system settings before recording operations.
Section 4: General operation	Explains key operations and each operation menu's contents.
Section 5: Basic recording	Records data on minimal settings by key operations.
Section 6: Detail record settings	Describes operations for more utilized recording such as channel name settings or file information input.
Section 7: Data format for es8	Describes the recording data format.
Section 8: Trigger & Interval recording	The recording can be automatically started and stopped by using the pre-settings.
Section 9: Comparator function	Describes how to perform the external contact output.
Section 10: Saving & loading of settings	Describes how to save settings and load them as required.
Section 11: Manual calibration	Manual calibration can be done for keeping better accuracy on.
Section 12: MISC MENU	Describes system settings such as backlighting, LCD, and key-beeping.
Section 13: Specifications	Describes specifications of es8.

As for connection with PC, or operating procedure of attached esNavi program, refer to "esNavi User's Manual"

### Rules for expressions in this manual

The "**key**" is used to express the push button on the front panel of the es8.

The "**cursor**" is used to express  which appears on LCD display when choosing setting value in operation of the main unit.

Items or messages shown in the display or the PC program are indicated by such descriptions as **<MENU>** or **<Are you sure?>**.

The control button or selection items in the display of the es8 or PC program are expressed by such descriptions as **[REC]**.

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## Section 1 Preface

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### 1.1. Overview

The es8 is a handy type field recorder which allows you to record signals of a maximum of 5 kHz on to a CompactFlashR (CF) memory card. In addition to standalone operations by keys on the main unit, es8 performs monitoring on the PC display and data recording on the PC hard drive by connecting a Windows PC thru a USB cable to run a navigation program.

The data file format of a CF memory card is compatible to TEAC's proprietary TAffmat or CSV (upper sampling frequency of recording is limited), making it possible to read data using popular analysis software or spreadsheet calculation software such as a TEAC Data Viewer Program.

### 1.2. Features

- Samples all the channel data simultaneously via 16bit AD converter on each channel.

- Sampling frequency ranges from 5kHz to 1/60Hz.

- Operation from a PC via USB I/F is possible. TEAC's proprietary TAffmat, which consists of a text header file and binary data file, or CSV format is available in data recording format. (In the case of CSV format, the sampling frequency is a maximum of 50Hz.)

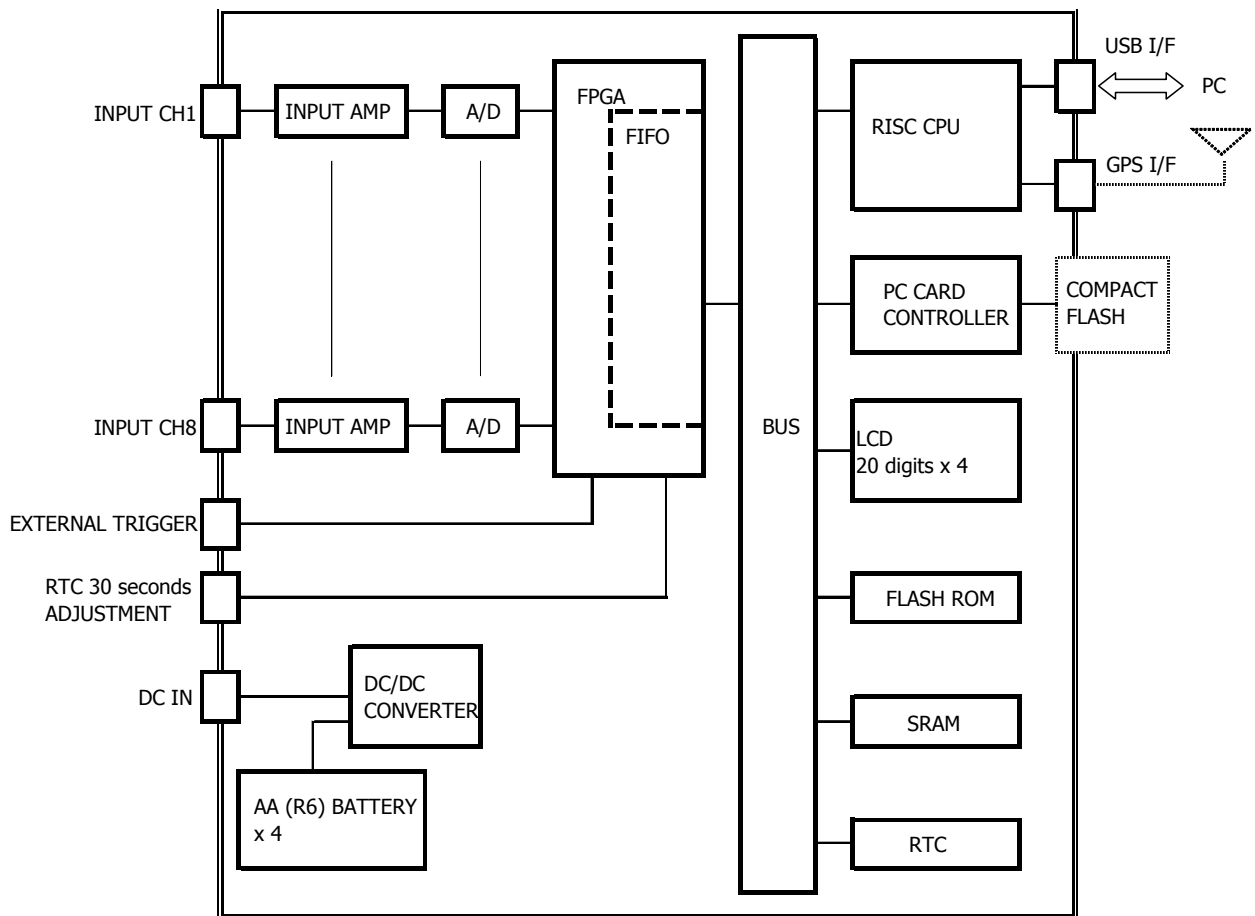
- In addition to the manual operation of start/stop functions, level (edge detect) trigger, window trigger, and pre/post triggers are available for recording.

- For supporting comparator output, es8 can generate an alarm output signal to be used for monitoring.

- es8 can be used under much more operating temperature range of  $-10^{\circ}\text{C} \sim 50^{\circ}\text{C}$ .


- Sequential recording can be done by a cell battery for about 4 hours (depends on the cell battery product). An external power supply or battery is also available.

### 1.3. Block Diagram

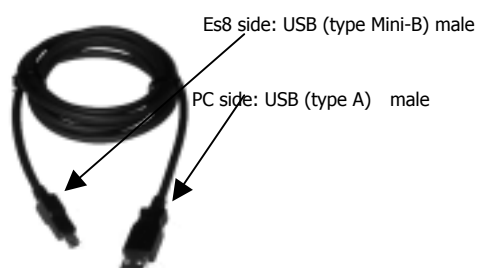


## 1.4. About Options

The following options are available in es8.

Product Name · Part No.	Overview
GPS Unit es8 GPS UNIT (19192950-00)	<p>Records time calibration or location data (latitude, longitude) by GPS.</p> <p>The power supply for the GPS unit is supplied not only by the standard accessory of an AC adapter but also by the main unit of es8.</p> <p>However, operation time will be shortened remarkably in the case when the main unit is powered by a cell battery.</p> <p>Receiver: GSU-36AM made by Position CO., LTD      Antenna: GA-31 made by Cirotech Technology Corp.</p> <p>AC adaptor only for GPS unit as a standard accessory</p>
BNC convert cable CL-es8BNC (19192970-00)	<p>1.5m long cable:D-SUB connector connected with BNC cables for 8 channels</p> 

General USB cable is required when connected a PC to control es8.



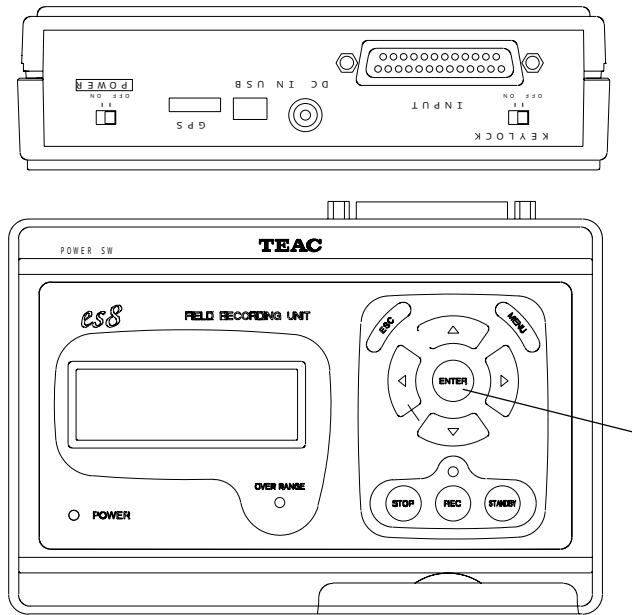
### CAUTIONS

Operations via USB HUB are not guaranteed. Please connect the USB cable directly to the USB port of the main PC unit.

Note:

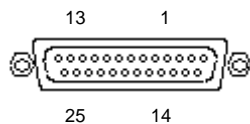
## Section 2 Name & Functions of Each Part

This section explains about names and functions such as keys on each part of the main unit, display parts, and connectors.



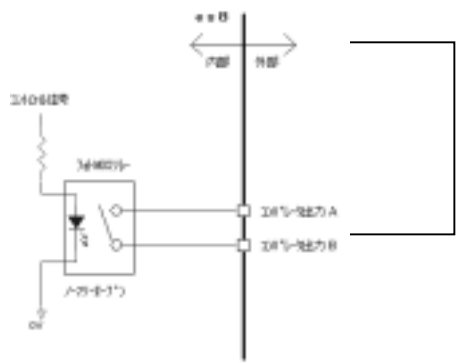
Name	Explanations
① POWER SW	Power switch
② GPS connector	For connecting the optional GPS unit. Power for the GPS unit can be supplied via the main unit of es8. In this case, an AC adaptor or external DC supply is recommended.
③ USB interface	For connecting to a PC, compatible with USB2.0 Not available for bus power operation via PC
④ DC IN connector	For connecting the attached AC adaptor or external DC power supply(8 VDC ~ 15 VDC). EIAJ RC-5320A compatible, Voltage category 4
⑤ INPUT CONNECTER	For connecting input signal. D-SUB 25pin Hirose RDBD-25S-LNA(05)
⑥ KEYLOCK	Keylock switch for locking key operation on main unit.
⑦ LCD	LCD display of character type (20char×4lines) with back light. Shows the instruction menu or operational status and monitors recording status.
⑧ POWER LED	Glows green when turning on. Blinks red when voltage is low.
⑨ OVER RANGE LED	Blinks red when the input signal for some channel exceeds $\pm 120\%$ of the range.
⑩ ESC Key	Returns the system to the Main menu. In the details menu, you can cancel the change to move back to the menu above.
⑪ MENU Key	Moves to each menu.
⑫ Up/Down Key	Selects setting items.
⑬ Right/Left Key	Changes setting values.
⑭ ENTER Key	Establish settings and moves to the details menu. In the details menu, you can establish the settings and move to the next menu.
⑮ REC LED	Blinks red when the system is in recording stand-by mode. Glows red when starting to record.
⑯ STOP Key	Stops recording.
⑰ REC Key	Starts recording.
⑱ STANDBY Key	Starts recording stand-by status.
⑲ CF Memory Card Slot	For inserting the CompactFlash® card

## INPUT Connector



PIN No.	Name	Explanations
1	External Trigger	Records at Low, stops at High, Interval before next recording requires over 5 seconds. Open status available in TTL level (active Low) or High level.
2	RTC 30 sec. calibration	Internal clock calibration. Falling to Low level initiates the calibration process. If the seconds digit in the internal clock is within 30sec, the seconds is omitted to set the time. If the seconds digit is over 30sec, the time is set to 1 minute later automatically.(available only for the Time Set display) Open status available in TTL level (active Low) or High level.
3	Comparator Output B	When recording, if the predefined condition is fulfilled, the relayed contact output is output.
4	Comparator Output A	Rating:40V 0.25A, Delay:max.300us from sampling point
5	GND	Ground
6	CH8 DC IN +	For connecting an input signal of 8channel + polarity.
7	CH7 DC IN +	For connecting an input signal of 7channel + polarity.
8	CH6 DC IN +	For connecting an input signal of 6channel + polarity.
9	CH5 DC IN +	For connecting an input signal of 5channel + polarity.
10	CH4 DC IN +	For connecting an input signal of 4channel + polarity.
11	CH3 DC IN +	For connecting an input signal of 3channel + polarity.
12	CH2 DC IN +	For connecting an input signal of 2channel + polarity.
13	CH1 DC IN +	For connecting an input signal of 1channel + polarity.
14	GND	Ground
15	Reserved	Reserved(not available)
16	Reserved	Reserved(not available)
17	GND	Ground
18	CH8 DC IN -	For connecting an input signal of 8channel - polarity.
19	CH7 DC IN	For connecting an input signal of 7channel - polarity.
20	CH6 DC IN	For connecting an input signal of 6channel - polarity.
21	CH5 DC IN	For connecting an input signal of 5channel - polarity.
22	CH4 DC IN	For connecting an input signal of 4channel - polarity.
23	CH3 DC IN	For connecting an input signal of 3channel - polarity.
24	CH2 DC IN	For connecting an input signal of 2channel - polarity.
25	CH1 DC IN	For connecting an input signal of 1channel - polarity.

Comparator Output Diagram



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## Section 3 Before Recording

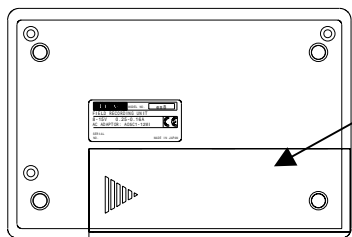
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Starting and terminating the main unit of es8.

### 3.1. Cautions as to Power Supply. Power Supply

The main unit operates by an AA cell battery×4. Recording can last continuously for more than 3 hours by an Oxiride battery of standard accessory.

In the case of long periods of operation by an internal battery, we recommend you use a NiMH type battery (i.e.: NiMH battery: Panasonic HHR-3SPS Meta-high 2400 series). This battery makes it possible to record for about 4 hours. We also recommend you use an NiMH type battery under the temperature of 0°C ~ 40°C( However, it should be within the range of spec).



Battery Setting

Slide the cover on the bottom panel toward the direction of the arrows.

To confirm the voltage of the back up internal battery, please refer to "3.6. Confirming the supply voltage and operational settings when the battery voltage is low". And when the total voltage of the cell battery comes down to lower than 4.2V in the case of using an internal cell battery alone, the system comes into the state of low battery voltage.

Use attached AC adaptor (A05C1-12MI) whenever using the AC supply.

An external power supply is available, in that case, the power supply voltage range is defined as 8VDC ~ 15VDC. External power supply operation should precede internal battery one when both are simultaneously available. Rating of 0.2A or more should be used in the case of 12VDC.

The specification of DC IN connectors of the main unit is compatible to EIAJ RC-5320A and Voltage category 4. Polarity is as follows.



#### CAUTIONS

Be careful of the polarity when connecting the external DC power supply to the DC IN connector.

Please use the attached adaptor without fail when using the AC supply.

#### Action of es8 when the external supply has a low battery or when instaneous power failure occurs

When es8 has an internal battery, you can choose the action from the following two items when the external battery supply is low or instantaneous power failure occurs.

Stops recording and starts file closing. If the external supply recovers, es8 restarts to record it as new file.

Keeps on recording with the internal battery. If the external supply recovers, es8 switches to the external one and keeps on recording. If the external supply does not recover, it stops recording and starts the file closing when the internal battery comes into a low state.

Refer to "3.6. Confirming the supply voltage and operational settings when the battery voltage is low" for settings.

#### Internal Back-up Battery

Setting the parameters for power-on status or record recovering action after power failure is saved on SRAM. This SRAM is backed up by an internal back-up battery. Refer to "3.6. Confirming the supply voltage and operational settings when the battery voltage is low" for confirming the voltage of the internal back-up battery. Any problems will not occur in back-up action so long as the voltage shows 2.8V or more under normal use.

### 3.2. Connecting Input Signal

Connect the input signal to the INPUT connector (D-SUB 25pin female) on the rear panel.

Refer to "Section 2 Name & functions of each part" for input channel and polarity and pin configurations of the input signal on each channel. The connector for the signal input is a standard accessory, and a BNC conversion cable CL-es8BNC (D-SUB-BNC(x8) connector cable) is also available as an optional accessory.



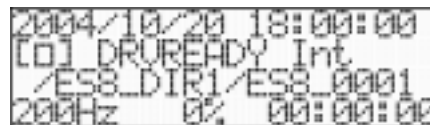
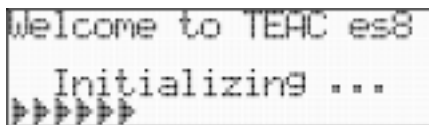
#### CAUTIONS

The maximum input voltage rating is  $\pm 50$  V. The Input part shall be damaged if the input voltage exceeds this amount.

### 3.3. ON/OFF Power Switch

Turn the power switch ON.

1. Connect the attached AC adaptor to the main unit or set the cell battery into the the main unit so that you don't make a mistake about its direction of polarity.
2. Turn the power switch on the rear panel. The LED of POWER SW glows green.
3. Each LED on the top panel blinks. And the LCD shows <Welcome to TEAC es8> <Initializing ...> and initial display (<MAIN> display) sequentially.



Turn the power switch OFF.

1. Make sure the system is in stop mode.
2. Set the POWER SW on rear panel to OFF.
3. Green LED of POWER SW turns off and LCD display shows off.

### 3.4. Calibration while the Power is ON

#### Stability of the System

When cold booting, it takes about 10 minutes from the time of power-on to an operating state precise enough to guarantee a stable analog circuit.

Turning the power on main unit reads calibration values automatically. This action makes settings on each amplifier after reading the calibration value pre-saved on the back-up SRAM.

This value can be rewritten and updated by doing manual calibration in <Calibration> of <SYSTEM MENU>.

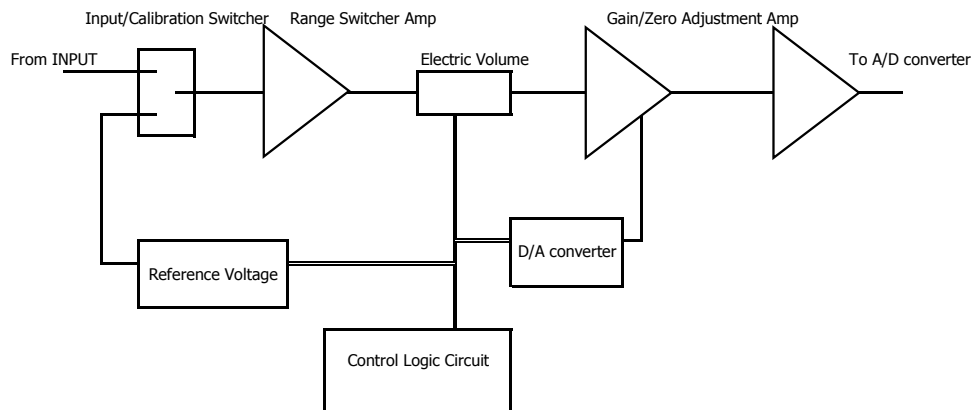
In this calibration process, using internal reference voltage, es8 records internal information as to each input range and sampling frequency, then calibrates the offset values and gains to update and write the calibration value on the backed up SRAM.

Refer to "Section 11 Manual calibration" for how to update the calibration value by this calibration process.

Rewriting the calibration value by manual calibration

When much more precision is required in particular or the surrounding temperature is far from the normal one (ie:-10°C, +50°C), manual calibration must be done before measuring. Even in other cases, we also recommend you to do periodical manual calibration about once every 6 months to maintain higher measurement precision.

#### Block Diagram of Calibration Circuit



#### Overview of Calibration Action

Offset value adjustment: Output 0V from the reference voltage supply, and adjust zero calibration amplifiers by D/A comparator to make A/D value zero on each input range.

Gain adjustment: Output +2V from reference voltage supply, and adjust electrical volume to make A/D value +2V on each input range.

Save the results of these settings on backed-up SRAM.

### 3.5. Setting the Date and Time

Adjust internal clock (RTC) in main unit.



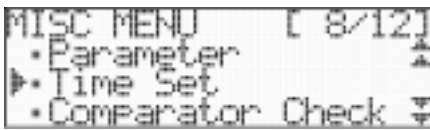
1. Turn the power switch ON to show <MAIN> display.



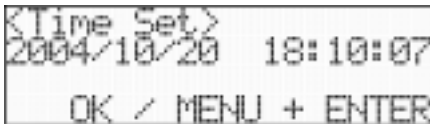
2. Press [MENU] five times to show <MISC MENU>.

<MAIN> → <SYSTEM MENU> → <FILE MENU> → <RECCOND MENU> → <COMPARATOR MENU>  
→ <MISC MENU>

The item shown in <MISC MENU> depends on the status when the system escaped from this menu through previous operation.



3. Press Down the key to move the cursor to <Time Set>.



4. Press [ENTER] to show the time setting display.

The present system time is shown.

#### RTC 30 seconds calibration

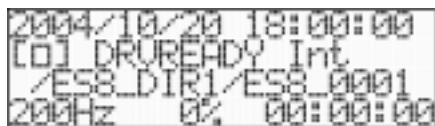
Time calibration is done automatically when RTC 30 sec calibration signal, described in "Section 2 Name & functions of each part Input connector", is inputted under this status (Under bar is located on the seconds digit, and the time is counted up). => Returns to <MISC MENU>. (RTC 30 sec calibration: Falling to Low level initiates the calibration process. If the seconds digit in the internal clock is within 30sec, the seconds is omitted to set the time. If the seconds digit is over 30sec, the time is set to 1 minute later automatically.)

5. The value at the underscore bar can be modified. The underscore bar can be moved by the Right/Left key. The value can be changed by the Up/Down key. You can modify the date and times when you want to make settings. If the underscore bar is moved, time is not counted up.

6. While continuing to hold [MENU] key, press [ENTER] key.

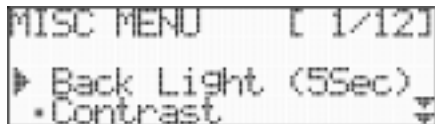
The display changes to <MAIN> menu. And, new date and time will be set.

### 3.6. Confirming Supply Voltage & Operational Settings for Low Battery



2004/10/20 18:00:00  
[0] DRUREADY Int  
/ES8\_DIR1/ES8\_0001  
200Hz 0% 00:00:00

1. Turn the power switch ON to show <MAIN> display.



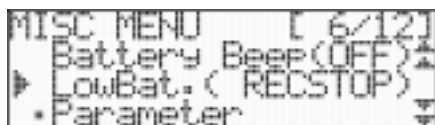
MISC MENU [ 1/12]  
▶ Back Light (5Sec)  
• Contrast

2. [MENU] を 5 回押し、<MISC MENU> を表示します。

Press [MENU] 5 times to show <MISC MENU>.

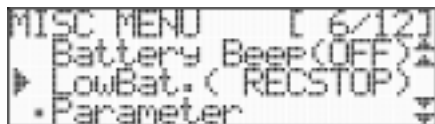
<MAIN> -> <SYSTEM MENU> -> <FILE MENU> -> <RECCOND MENU> ->  
<COMPARATOR MENU> -> <MISC MENU>

The item shown in <MISC MENU> depends on the status when the system escaped from this menu through previous operation.



MISC MENU [ 6/12]  
Battery Beep (OFF)  
▶ LowBat. ( RECSTOP)  
• Parameter

3. Press the Down key to move the cursor to <LowBat>.



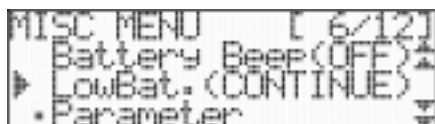
MISC MENU [ 6/12]  
Battery Beep (OFF)  
▶ LowBat. ( RECSTOP)  
• Parameter

4. Press the Right/Left key to set the action when the external power supply has a low battery level.

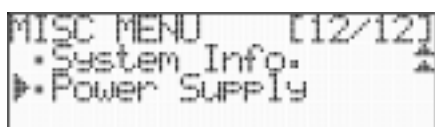
When es8 has an internal battery, you can choose the action from following 2 items when the external supply has a low battery or instantaneous power failure occurs.

I . Stops recording and starts the file closing. If the external supply recovers, es8 restarts automatically to record as a new file. => Right/Left key to set

II . Continues recording by internal battery. If external supply recovers, The system switches to the set external one and keeps on recording. If the external supply does not recover, it stops recording and starts closing the file when the internal battery comes into a low state. => Right/Left key to set [CONTINUE]

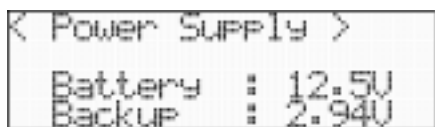


MISC MENU [ 6/12]  
Battery Beep (OFF)  
▶ LowBat. (CONTINUE)  
• Parameter



MISC MENU [12/12]  
• System Info.  
▶ Power Supply

5. Press the Down key to move cursor to <Power Supply>.



< Power Supply >  
Battery : 12.5V  
Backup : 2.94V

6. Press [ENTER] to show the voltage status of the internal battery or external power supply (<Battery>) and back-up battery (<Backup>).

7. Press [ESC] to return to previous menu.

### 3.7. Preparation of the Recording Media

The Available media is the memory card of the CompactFlashR(CF) type. You can use a maximum of 2GB in FAT16 format. Use the following PC cards that we have verified. The media other than these items may not be operating properly for recording or replaying. (As of July 2005)

Bender	Series	Part No.	Memory Size	Notes
I.O.DATA	CF40	CF40-128M	128MB	
I.O.DATA	CF40	CF40-1G	1GB	
I.O.DATA	CFS-IV	CFS-IV128	128MB	Industrial model
I.O.DATA	CFX	CFX-256M	256MB	
I.O.DATA	CFS	CFS-32M	32MB	
I.O.DATA	CF85	CF85-2G	2GB	
BAFFALO	RCF-X	RCF-X64MY	64MB	
BAFFALO	RCF-G	RCF-G256M	256MB	
BAFFALO	RCF-G	RCF-G2G	2GB	
SUN DISK	Ultra II	SDCFH-256-903	256MB	
SUN DISK	Ultra II	SDCFH-1024-903	1GB	
SUN DISK	---	SDCFB-1024-J60	1GB	※1
SUN DISK	---	SDCFB-1024-901	1GB	
SUN DISK	---	SDCFB-2048-901	2GB	※1
SUN DISK	---	SDCFB-2048-J60	2GB	※1
SUN DISK	Ultra	SDCFH-512-801	512MB	
SUN DISK	---	SDCFB-512-801	512MB	
HAGIWARA SYSCOM	Z-Pro	HFC-CF-1GZP	1GB	
LEXER MEDIA	Professional	CF1GB-80-380	1GB	
LEXER MEDIA	Professional	CF2GB-40-380	2GB	

There is no plan to develop the product available to Micro Drive.

- Interval period requires 6 sec or more in the case of interval recording.



#### CAUTIONS

##### To turn the power supply off after taking the media out

Make sure to take the CF memory card out before turning the power of the main unit off. If you turn it off while saving, data saved on the media may not be read.

##### To take the memory out

Make sure to insert or take out the CF memory card under STOP status.

Use <FILE MENU> -> <Eject Media> to take CF memory card out.

##### To avoid partially deleting files or renaming saved files by file operation on the Windows environment

Make sure not to delete files partially or not to rename saved files by file operation on the Windows environment. The file operations such as deleting, moving, or renaming of a file/folder may cause the data file and header file to become unlinked and result in being unable to read the saved data, or may cause the recording rate of the specified CF memory card to become unreliable. Thus, the data cannot be read when the modified media is inserted again.

##### To handle the CF memory card

Make sure to touch the metallic material and remove the static electricity on your body before touching the main unit to prevent static electricity from damaging the saved data on the CF memory card. Also, do not touch the media in the PC card slot while recording.

##### To use FAT16 for formatting of a CF memory card by Windows file operations

The es8 does not support a CF memory card formatted using FAT32. Make sure to format it using FAT16. The CF memory card with file format other than FAT16 is not available. And also, the CF memory card with FAT16 formatted on Linux PC is not available.

##### Do not touch the dip switch

Do not touch the dip switch located on the left side of the CF memory card slot.

## Formatting CF memory card

Make sure that the CF memory card was formatted with FAT16 before recording. You can choose one of among two ways of formatting as follows.

### To format on Windows PC



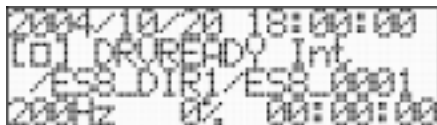
Choose [FAT] in <File System> of <Format> menu.

### To format on main unit



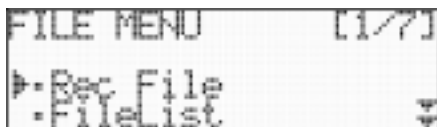
#### CAUTIONS

The CF memory card with a file format other than FAT16 cannot be formatted.



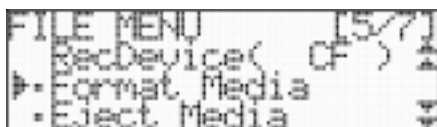
1. Turn the power switch ON to show <MAIN> display.

Insert the CF memory card to be formatted.

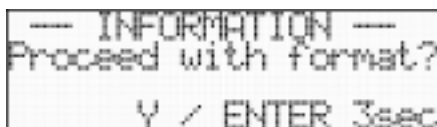


2. Press [MENU] two times to show <FILE MENU>.

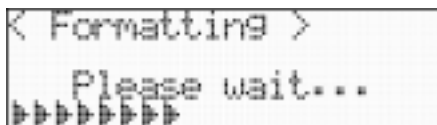
The item shown in <FILE MENU> depends on the status when the system escaped from this menu through previous operation.



3. Press Up/Down key to move the cursor to <Format Media>.



4. Press [ENTER] to show the format menu. The message will appear to confirm whether or not you proceed with formatting.



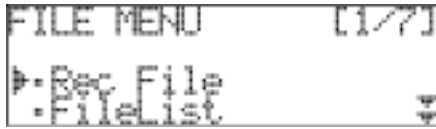
5. Press and hold [ENTER] for three second to start formatting.

The LCD displays like the left figure while formatting.  
Press [ESC] if you don't format.

6. The system will return to <FILE MENU> when formatting is finished.

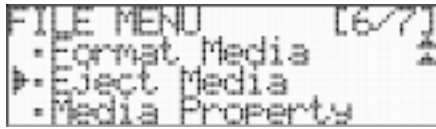
**To remove the CF memory card**

Remove the CF memory card when the main unit is in STOP status.

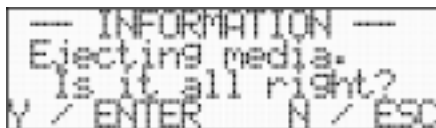


1. To show <FILE MENU>.

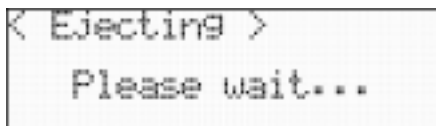
The item shown in <FILE MENU> depends on the status when the system escaped from this menu through previous operation.



2. Press Up/Down key to move cursor to <Eject Media>



3. Press [Enter] key to show eject menu. Message will appear to confirm to eject CF memory card.



4. Press [Enter] key to eject the memory card.

When in the ejecting process, the LCD shows like the left figure.

If you don't eject memory card, press [ESC].

5. After finishing ejecting CF memory card, the system returns to <MAIN> menu and shows <NO MEDIA>.

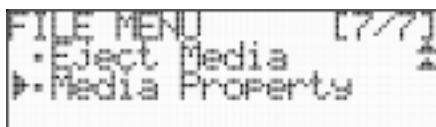
6. Open the card slot and push the lever to remove the CF memory card.


**CAUTIONS**

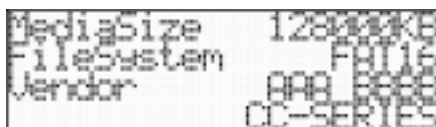
Once this action has been taken, you have to remove the CF memory card from the main unit and insert it again to let the main unit recognize the CF memory card.

**To confirm the content of the CF memory card**

The content of the CF memory card can be confirmed on <Media Property> of <FILE MENU>.



1. In <FILE MENU> move the cursor to <Media Property>.



2. Press [ENTER] to show the contents of the CF memory card loaded at present as shown in the left example. (Media Size, File System, Vendor and Model name)

3. Press [ENTER] to return to <FILE MENU>.

### 3.8. Setting the Recording Destination

In addition to the CF memory card, the hard drive of the PC is available as the storage destination when connected with to a PC via a USB cable. You can choose the media in <RecDevice> of <FILE MENU>.

For data recording on the hard drive of a PC using the esNavi program, refer to the separate volume entitled "esNavi Users' Manual".



1. In <FILE MENU> move the cursor to <Rec Device>.

2. Press Right/Left key to choose a storage destination media.

[CF]:Records on CF memory card.

[PC+CF]:Records on PC as well as CF memory card.

[PC]:Records on PC only.



#### CAUTIONS

It is impossible to start recording by choosing [PC] unless PC is connected to the main unit. In case PC is not connected to the main unit, make sure to use a CF memory card and choose [CF] or [PC+CF] before recording.

Note:

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## Section 4 General Operations

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The general operation of the main unit can be performed by choosing the required item according to the menu shown on the LCD to make settings of the recording. After the record settings have been made, the start and stop of recording can be performed by the key operations.

### 4.1. Key Operations

The keys for the setting operations and their actions are as follows.

Key Name	Action
Up/Down Key	Moves the cursor to choose the setting items.
Right/Left Key	Moves the cursor to change the setting value.
ESC Key	Cancels chosen items to return to MAIN menu. Clears peak hold while monitoring.
MENU Key	Switches MAIN display.
ENTER Key	Establishes chosen item.

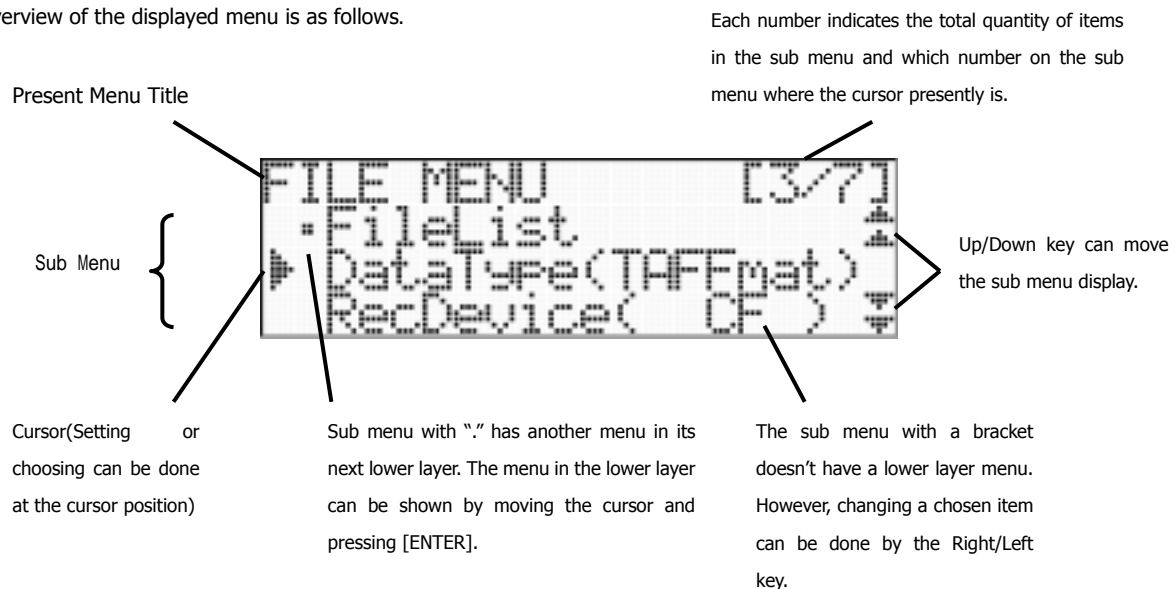
---

The keys for the recording operation and the overview of their actions are as follows.

Key Name	Action
STOP Key	Stops recording (A/D stop).
REC Key	Starts recording.
STANDBY Key	Makes the system record by stand-by (A/D start).

---

An overview of the displayed menu is as follows.



## 4.2. Operations of Each Menu

Pressing [MENU] can move the menu like "<MAIN> -> <SYSTEM MENU> -> <FILE MENU> -> <RECCOND MENU> -> <COMPARATOR MENU> -> <MISC MENU> -> <MAIN> -----". Pressing [ESC] can return to <MAIN> from any menu.

Each key of [STOP], [STOP], and [REC] is not available when the lower menu is prepared to be shown on each menu.

Upper Menu	Sub Menu
MAIN	Shows the setting parameter of recording, status of main unit, and digital value.
SYSTEM MENU	<p>Makes settings such as sampling frequency, input range, and ON/OFF of the channel.</p> <p><b>Sampling:</b> setting of sampling frequency</p> <p><b>Range:</b> setting of input range on each channel</p> <p><b>CH Use:</b> setting of ON/OFF on each channel</p> <p><b>CH Name:</b> setting of channel name</p> <p><b>CH Unit:</b> setting unit of physical quantity of the channel</p> <p><b>CH UnitChange:</b> setting of offset value and transforms coefficient for physical quantity transform on each channel</p> <p><b>Calibration:</b> performing manual calibration</p>
FILE MENU	<p>Makes settings of the recording file or recording format and formats media.</p> <p><b>Rec File:</b> setting a recording file directory name, a file name, and its comments on CF memory card</p> <p><b>FileList:</b> shows a table of recording files.</p> <p><b>Data Type:</b> selects a format of recording file. TAFFmat or text (CSV) format is available.</p> <p><b>Rec Device:</b> selects a storage destination.</p> <p>CF memory card, PC, or simultaneous recording on both of them is available.</p> <p><b>Format Media:</b> formats CF memory card.</p> <p><b>Eject Media:</b> performs the ejection process of the CF memory card.</p> <p><b>Media Property:</b> shows the information of the CF memory card inserted.</p>
RECCOND MENU	<p>Makes setting of the recording mode.</p> <p><b>Mode:</b> selects recording mode. The shown menu depends on selecting from among <b>[OFF]</b>(recording by normal key operation without trigger recording), <b>[Trigger]</b>(trigger recording), and <b>[Interval]</b>(interval recording).</p>
COMPARATOR MENU	<p>Makes settings of the comparator output.</p> <p><b>Mode:</b> selects whether or not to use the comparator function.</p> <p><b>Setting:</b> setting of the comparator output condition on each channel.</p> <p><b>Logic:</b> setting the comparator output logic to And or Or of the output conditions designated on each channel.</p>
MISC MENU	<p>In this menu, you can control the contrast of the main unit's LCD, or confirm the battery power or perform the loading/saving functions of the parameter files.</p> <p><b>Back Light:</b> setting of the glowing time length of LCD</p> <p><b>Contrast:</b> setting of the contrast of LCD</p> <p><b>Panel Beep:</b> setting the key operations beep sound to ON/OFF</p> <p><b>Range Beep:</b> setting the beep sound when over the range to ON/OFF</p> <p><b>Battery Beep:</b> <input type="checkbox"/> setting the beep sound when the battery is low to ON/OFF</p> <p><b>LowBat.:</b> setting the functions when the external power supply has a low battery</p> <p><b>Parameter:</b> saves or loads the setting parameter and initializes the parameter</p> <p><b>Time Set:</b> settings of the time</p> <p><b>Comparator Check:</b> tests comparator output,</p> <p><b>GPS Information:</b> indicates GPS satellite information</p> <p><b>System Info.:</b> shows the firmware version, FPGA version, and temperature of the inside of the main unit</p> <p><b>Power Supply:</b> indicates the power supply voltage(external supply voltage in case of the external supply, cell battery voltage in case of internal cell battery) and cell battery voltage for SRAM back-up</p>
MAIN	

Menu Moving by  
[MENU], To  
<MAIN> by IESC1

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## Section 5 Basic Recording

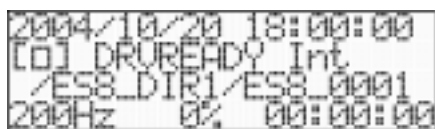
---

You can make basic settings and recordings using key operations.

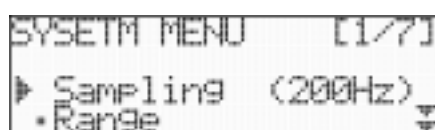
### 5.1. Setting the Recording Parameter

Before basic recording by key operation, some settings of the recording parameter, such as sampling frequency, input range of each channel, choosing the available channel(ON/OFF of channel), choosing the recording data format, and recording mode, are required to be made.

#### Setting the Sampling frequency



1. Turn the power switch ON to show <MAIN> display.

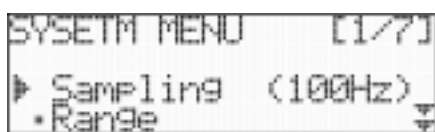


2. Press [MENU] to show <SYSTEM MENU>.

The item shown depends on the status when the system escaped from this menu through previous operation.

3. Make settings of sampling frequency.

Make sure that the cursor is located on <Sampling>. If not on <Sampling>, press the Up key to move the cursor to <Sampling>.



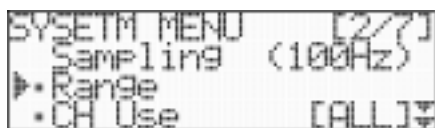
4. Use Right/Left key to show desired sampling frequency in a bracket.

You can choose the value such as 5 kHz, 2 kHz, 1 kHz, 500 Hz, 200 Hz, 100 Hz, 50 Hz, 20 Hz, 10 Hz, 5 Hz, 2 Hz, 1 Hz, 2 Sec, 5 Sec, 10 Sec, 30 Sec, 60 Sec.

The left figure shows a sampling frequency set at 100Hz.

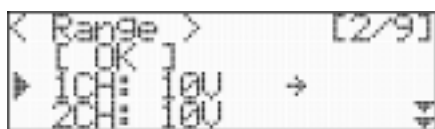
In case [CSV] (ASCII data file) is chosen as a recording data format described later, set the sampling frequency to 50 Hz or less.

#### Setting the input range



1. Set the input range of each channel.

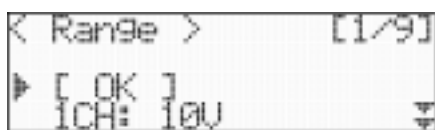
Press the Down key to move cursor to <Range>.



2. Press [ENTER] to show the range setting menu of each channel.

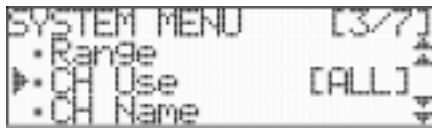
Press Right/Left key to make settings of the input range of the channel where the cursor is located. Press Up/Down key to move the cursor to another channel.

While continuing to hold the [MENU] key, press the Right/Left key. The same settings can be made on other channel simultaneously.

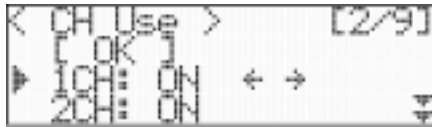


3. Press Up key to move the cursor to [OK] after the setting is finished.

4. Press [ENTER] to establish the range of setting. (Display returns to <SYSTEM MENU>)

**Choosing a recording channel**

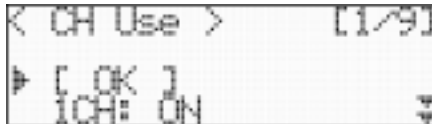
1. Press the Down key to move to <CH Use> to choose channel to be used for next recording.



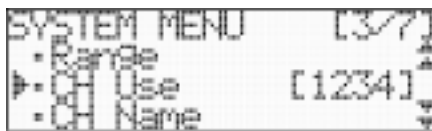
2. Press [ENTER] to show ON/OFF menu on each channel.

Press the Right/Left key to change the settings to ON/OFF on the channel where the cursor is located.

Press the Up/Down key to move the cursor to the other channel.

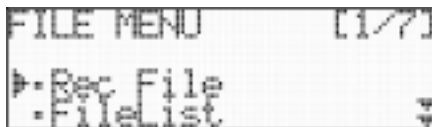


3. Press the Up key to move the cursor to [OK] after the settings on each channel are finished.

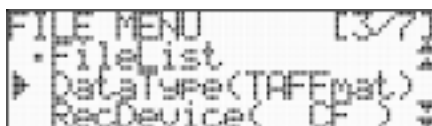


4. Press [ENTER] to establish the channel to be used. The system returns to <SYSTEM MENU>. The channel to be used is shown at <CH Use>.

The left figure shows CH1, 2, 3, 4 which set the recording of the target channel. <ALL> means that all the channel is set for recording the target channel.

**Choosing a recording data format**

1. Press [MENU] to move from <SYSTEM MENU> to <FILE MENU>. The item shown depends on the status when the system escaped from this menu through previous operation.



2. Press the Down key (or Up key in case of another item shown) to move the cursor to <Data Type>.

3. Press the Right/Left key to choose the recording data format shown in the bracket.

[TAFFmat]: creates header file of the text format and binary data file. It is TEAC's proprietary file format for the digital data recorder. However, the available format may be changed for some products.

[CSV]: creates a header file in text format and data file in CSV format.

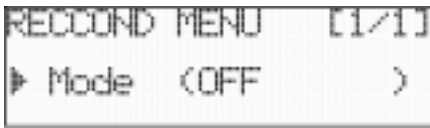
Details related to the data format are described in "Section 7"

**CAUTIONS**

Set the sampling frequency to 50 kHz or less before choosing the CSV as the recording data format.

In case CSV is chosen as the recording data format and pre-trigger is used, recording finish time will be delayed by seconds of the pre-trigger.

## Setting the recording mode



**1.** To set the recording mode.

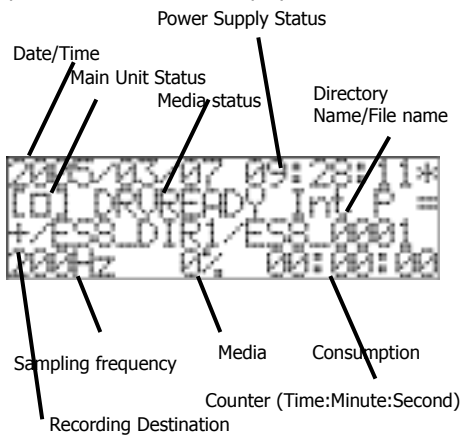
Turn the trigger mode off to record by key operations. Press [MENU] to move from <FILE MENU> to <RECCOND MENU>. The item displayed depends on the status when the system escaped from this menu through previous operation.

**2.** Make sure that the item shown in a bracket is [OFF]. If it's not [OFF], press the Right/Left key to change it.

That is all for the Basic settings to record using the key operation.

## 5.2. Recording by the Key Operation

You can start or stop the recording through the key operations after setting the required recording conditions. And monitoring data can be performed on the LCD display of the main unit.



### 1. To show <MAIN> menu

Press [ESC] to show <MAIN> while <MENU> is being shown.

The left figure of the LCD shows the main unit status as follows.

[ ] shown in the main unit status display indicated the system is in STOP status.

#### Main Unit Status

Display	Status
[ ]	<b>STOP</b> (Stop, Idle)
[ ]	<b>REC</b> (Recording)
[ ]	<b>RECSTANDBY</b> (REC Stand-by)
[*]	<b>STORE</b> (File copying)

#### Media Status

Display	Status
DRVREADY	Ready for recording
NOMEDIA	Media not loaded, or ejected
BADMEDIA	Another format media other than the FAT16 has been loaded or unavailable media has been loaded (It is not recognized as a CF memory card since the CIS information cannot be read.)
UNFORMAT	Unformatted media or media with unavailable format has been loaded.
LOADING	The data is being loaded from the media.
WRITING	The data is being written on the media.
FORMAT	The media is being Formatted.
EJECTING	The media is being ejected.
LOWBATT	The battery is detected low.
MEDFULL	The media is full.
CAL	The calibration is being performed on the system.

#### Operated Power Supply Status

Display	Status
Ext	Being operated by the external power supply.
Int	Being operated by the internal battery.

#### Display of Storage Destination, etc

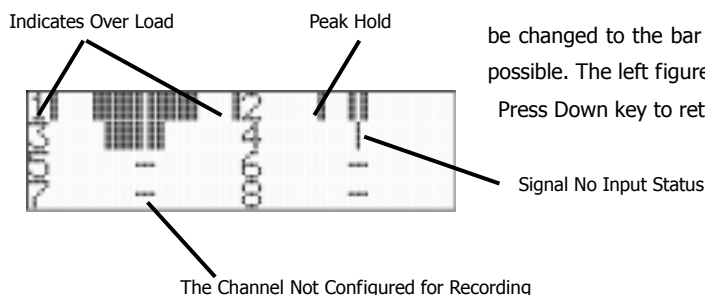
Display	Status
(blank)	Record on the CF memory card only
+	Record on the CF memory card and PC simultaneously
-	Record on the PC only
P	The key lock is on
=	Connecting the EsNavi program
*	Catching satellite signal(es8 is connected with optional GPS unit)

2004/10/25 20:01:00  
 [III] DRUREADY Int  
 /ES8\_DIR1/ES8\_0001  
 100Hz 0% 00:00:00

## 2. Press [STANDBY].

REC LED blinks red and the main unit comes into the REC stand-by status.  
 The main unit status displayed in the LCD indicates [II].

## 3. Press the Up key on <MAIN> display when REC is in stand-by status. The display will be changed to the bar meter display and monitoring of the input signal level becomes possible. The left figure shows that CH1 ~ CH4 is chosen as a recording channel. Press Down key to return the system to <MAIN>.



1: -1.0203 2: 2.5069  
 3: 3.0075 4: -2.0868  
 5: - 6: -  
 7: - 8: -

## 4. Press the Down key on <MAIN> display when REC stand-by status. The display will be changed to the numeral monitor display and monitoring of the input signal in numeric form becomes possible. The left figure shows that CH1 ~ CH4 is chosen as a recording channel.

Press the Up key to return the system to <MAIN>.

2004/10/25 20:02:30  
 [●] DRUREADY Int  
 /ES8\_DIR1/ES8\_0001  
 100Hz 0% 00:00:50

## 5. Press [REC].

REC LED blinks red, and the main unit starts recording.  
 The main unit status display of the LCD shows [●].

Data monitoring of recording can be performed using the same operation as REC stand-by

## 6. Press [STOP]

REC LED turns off, and the main unit stops recording.  
 The main unit status displayed in the LCD shows [□].

## 7. After you start recording again, a sequential number next to the file name is increased by an increment of one and a new data file will be created. (In this example, from 001 to 002)

## 8. Press [REC] when in STOP status. The main unit will come into recording status directly without passing through the REC stand-by status.

## 9. Press [STANDBY] while recording. The main unit will close the present recording file and come into the REC stand-by status. Press [REC] to start another recording and create the data file.

### 5.3. To Display the Recorded File List

The recorded file list can be shown as follows.

```
FILE MENU [2/7]
-Rec File
▶FileList
  DataType(TAFFmat)▼
```

1. In <FILE MENU>, move the cursor to <FileList>.

```
/ESDAT [1/1]
▶ES8_DIR1 04/11/04
```

2. Press [ENTER] to show <Dir List>.

A directory of the saved recording files will appear.

If there is more than one directory, they are shown in some pages. Press the Up/Down key to move from page to page. The number shown in the upper right portion means the order number of the file at the cursor in the total files. The maximum number shown in the display is <9999>. <9999> is shown, even if the total number exceeds it.

```
/ES8_DIR1 [1/2]
▶ES8_T001 04/11/04
-ES8_T002 04/11/04
```

3. Move the cursor to the directory which you want to display and press [ENTER]. The recorded file list in the directory will appear on the display.

If there is more than one directory, they are shown over several pages. Press the Up/Down key to move from page to page. The number shown in the upper right portion means the order number of the file at the cursor in the total files. The maximum number shown on display is <9999>. <9999> is shown, even if the total number exceeds it. The examples in the left hand figure show that there are two files in total, and the cursor is located in the first file.

```
<ES8_T001.DAT>
STA 11/04 12:33:50
END 11/01 12:33:52
RecScan 20004
```

4. Press [ENTER] to show the details of recording information of the file where the cursor is located. Press the Up/Down key to move the display item.

5. Press [ENTER] to show the file list. Press [ESC] two times to return to <FILE MENU>.

### 5.4. Keylock

Set the KEYLOCK on the rear panel to ON to disable the key operations. Set it to OFF to enable the key operations.

---

## Section 6 Detailed Record Setting

---

You can configure the parameters of each channel name and physical quantity conversion and also assign folder names or file names to recording files you have saved.

### 6.1. Channel Settings

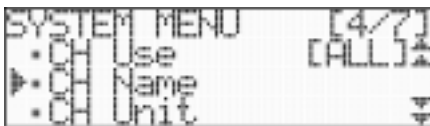
The channel name, physical quantity unit, and coefficient of the physical quantity conversion (coefficient A and B in formula of  $AX+B$ ) can be configured on each recording channel. They are saved as each channel's information in the header file which is created as a pair in conjunction with the recording data file.

#### Setting the Channel Name

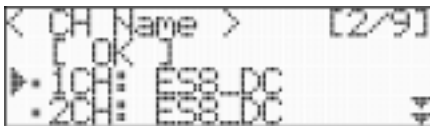
Assigning an individual name to each channel makes it possible to distinguish signal attributes of input channel and it is available for post analysis of test data.

A maximum of 15 characters is available for a channel name when they are inputted from main unit.

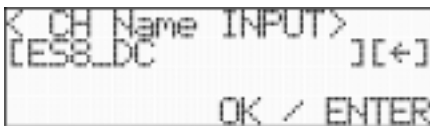
1. Press [MENU] to show <SYSTEM MENU> when the main unit is in STOP status.



2. Press the Down key (or Up key in case of another item shown) to move the cursor to <CH Name>.



3. Press [ENTER] to display the channels that have been named.



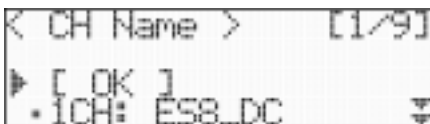
4. Press the Up/Down key to move the cursor to the channel you want to set and press [ENTER].

The input menu for the channel name will appear.

You can modify a character at the underscore bar. Press the Right/Left key to move underscore bar and press Up/Down key to modify a character. Move the underscore bar to [←] to change the item in the lower portion of the menu to <BackSpace/ENTER>. And press [ENTER] to delete the input characters one by one (Back Space).

5. Make sure that the display shows <OK / ENTER> after finishing the input and press [ENTER] to return to the channel name input menu.

While continuing to hold [MENU] key, press [ENTER] key. The same settings can be made on the other channel simultaneously.



6. Press the Up key to move the cursor to <OK>. And press [ENTER] to establish the input and return to <SYSTEM MENU>.

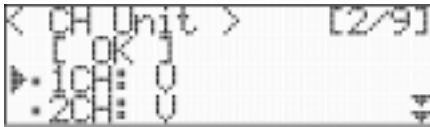
### Setting of Physical Quantity Conversion Unit

The default setting of the physical quantity conversion unit on each channel is V.

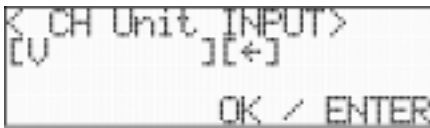
A maximum of 8 characters is available for the physical quantity conversions unit when they are inputted from main unit.



1. Press the Down key to move the cursor to <CH Unit>.



2. Press [ENTER] to show the physical quantity unit configurations on each channel at present.

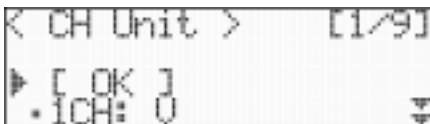


3. Press the Up/Down key to move the cursor to the channel you want to set and press [ENTER].

The physical quantity conversions unit input menu will appear.

You can modify a character at the underscore bar. Press the Right/Left key to move underscore bar and press Up/Down key to modify a character. Move the underscore bar to [←] to change the item in the lower portion of the menu to <BackSpace/ENTER>. And press [ENTER] to delete the input characters one by one (Back Space).

4. Make sure that the display shows <OK / ENTER> after finishing the input and press [ENTER] to return to the physical quantity conversions unit input menu. While continuing to hold [MENU] key, press [ENTER] key. The same settings can be made on other channel simultaneously.



5. Press the Up key to move the cursor to <OK>. And press [ENTER] to establish the input and return to <SYSTEM MENU>.

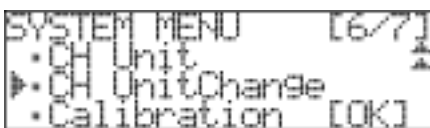
### Setting of the physical quantity conversion coefficient

The default physical quantity conversion coefficient (formula of  $AX+B$ ) configured on each channel are as follows: coefficient A is 1 and coefficient B is 0. A maximum of 10 digits (including symbols or decimal point) is available as input when they are inputted from main unit.

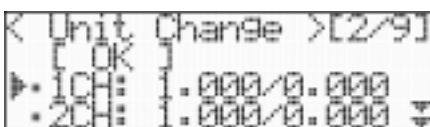
**To convert recording numeral data to actual input voltage:** The AD conversion value is an integer ranging from -32768 to +32767 and the value would be  $\pm 25000$  when the input is  $\pm 100\%$  in the input range settings.

The actual input voltage = AD conversion value of the data file  $\times$  SLOPE of the header file

1. Press the Down key to move to <CH UnitChange>.



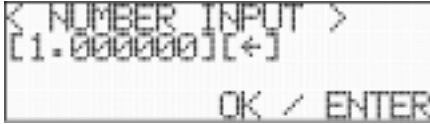
2. Press [ENTER] to show the physical quantity conversion coefficient configured on each channel at present.





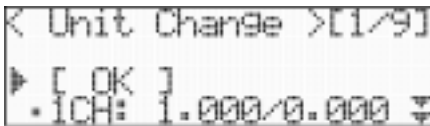


3. Press the Up/Down key to move the cursor to the channel you want to configure and press [ENTER]. The physical quantity conversion coefficient input menu will appear on the LCD. Move the cursor to <Coeff> to input coefficient A, or move the cursor to <Offset> to input coefficient B by pressing the Down key and press [ENTER].



4. <NUMBER INPUT> is shown on the LCD. You can modify a number with the underscore bar. Press the Right/Left key to move the underscore bar. Press the Up/Down key to modify a number. Move the underscore bar to [←] o change the item in the lower portion of the menu to <BackSpace/ENTER>. And press [ENTER] to delete the input characters to the left one by one (Back Space).

5. Make sure that the display shows <OK / ENTER> after finishing the input and press [ENTER] to return to the Physical quantity conversion coefficient input menu.



6. Press the Up key to move the cursor to <OK>. And press [ENTER] to establish the input and return to <SYSTEM MENU>.

## 6.2. Settings of the recording file

You can make settings of the recording file and folder name on which you might want to save something. And you can input comments to each file. The default for the recording file name is ES8\_0. The sequential number, incremented (ranging from 001 to 999) whenever recording starts, is added to the end of the file name. The default of the directory name is ES8\_DIR1.

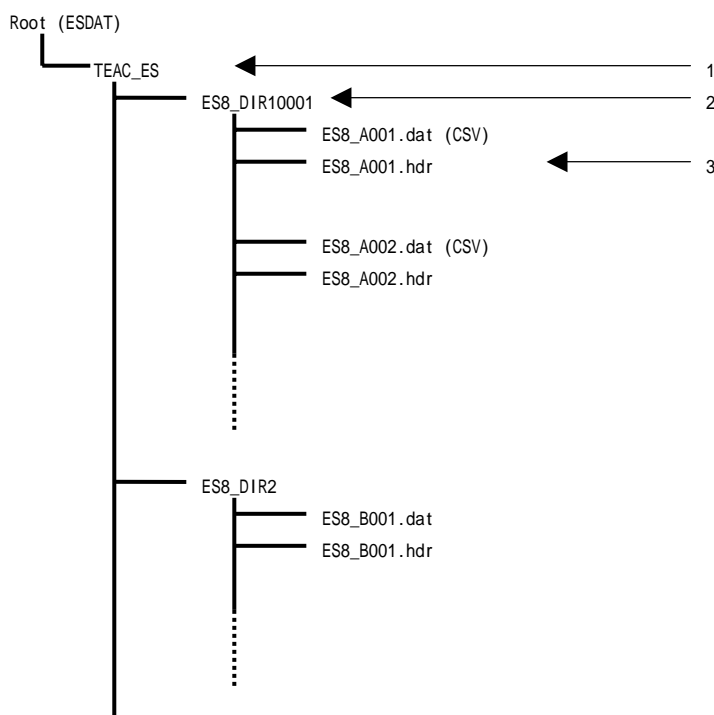
### File name

In case of recording on a CF memory card: A maximum of 5 alpha-numeric characters are available to be designated. (except for ¥ / \* ? < > | " ; :) Sequential numbers with 3 digits starting from 001 is added to these 5 characters to become 8 characters in total. If the designated character is 4 or less, the portion between the characters and the 3 digits will be filled with "0", and the number of characters in the file name will become 8 in total.

In the case of recording on a PC: In case of recording on a PC or recording on media and a PC simultaneously, there is no limitation of the length for the file name. (However, the character such as ¥ / \* ? < > | " ; : is not available.) A maximum of 8 digit sequential numbers can be added to the file name.

### The directory name and directory structure on CF memory card

The directory structure is as follows:



#### 1. TEAC\_ES

This directory is created automatically when the CF memory card is formatted. When the CF memory card is inserted to the main unit with no directory, this is created automatically.

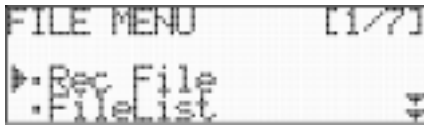
#### 2. ES8\_DIR1

This directory name is assigned in <REC File> -> <DirName>.

#### 3. ES8\_A001.dat, ES8\_A001.hdr

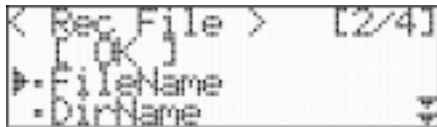
This data file and header file are created in one recording. These are file names, assigned in <REC File> -> <FileName>, to which sequential names in recording are added.

## Setting the Recording File Name and Directory Name

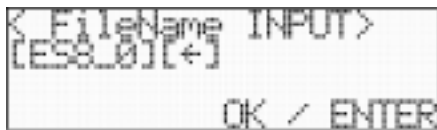


1. Press [MENU] to show <FILE MENU>. The item shown in <FILE MENU> depends on the status when the system escaped from this menu through a previous operation.

2. Make sure that cursor is located in <Rec File> (press Up key if required), and press [ENTER].



3. In <Rec File> menu, the cursor is located in <FileName>. Press [ENTER] to assign the file name.



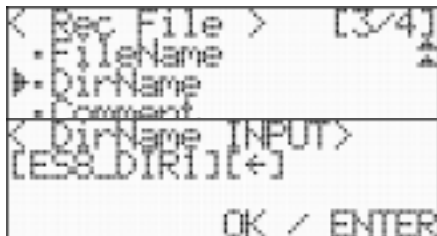
4. The file name can receive input at <NUMBER INPUT> menu.

You can modify a character at the underscore bar. Press Right/Left key to move the underscore bar. Press the Up/Down key to modify a character.

Move the underscore bar to [←] to change the items in the lower portion of the menu to <BackSpace/ENTER>. And press [ENTER] to delete the input character to the left one by one.(Back Space)

A maximum of 5 characters can be inputted. Each recording file will be named with the input character to which 3 digit sequential numbers are added. (8 characters + extension)

5. Make sure that the display shows <OK / ENTER> after finishing the input, and press [ENTER] to return to <Rec File>.



6. Input directory name. Move cursor to <DirName>, and press [ENTER].

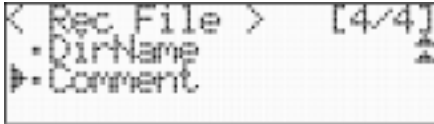
7. Directory name can be inputted at <DirName INPUT> menu.

You can modify a character with the underscore bar. Press the Right/Left key to move the underscore bar. Press the Up/Down key to modify a character.

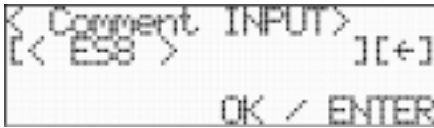
Move the underscore bar to [←] to change the item in the lower portion of the menu to <BackSpace/ENTER>. And press [ENTER] to delete input characters to the left one by one. (Back Space)

A maximum of 8 characters can be inputted.

8. Make sure that the display shows <OK / ENTER> after finishing the input, and press [ENTER] to return to <Rec File>.



9. Input the comments. Move the cursor to <Comment>, and press [ENTER].



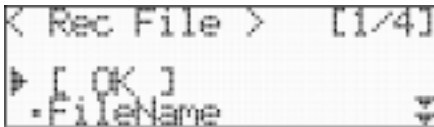
10. The file name can be inputted at <Comment INPUT>.

You can modify a character with the underscore bar. The Press Right/Left key to move the underscore bar. Press the Up/Down key to modify a character.

Move the underscore bar to [←] to change the items in the lower portion of the menu to <BackSpace/ENTER>. And press [ENTER] to delete the input characters to the left one by one .(Back Space)

A maximum of 15 characters can be inputted.

11. Make sure that the display shows <OK / ENTER> after finishing the input, and press [ENTER] to return to <Rec File>.



12. Press the Up key to move the cursor to <OK>, and press [ENTER] to establish the input and to return to <FILE MENU>.

Note:

Note:

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## Section 7 es8 data format

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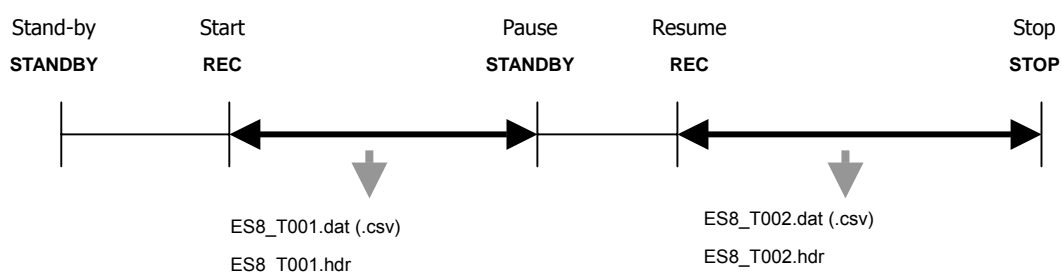
In the es8, you can choose the recording data format of the CF memory card from either of the following 2 items. To choose recording data for the recording data format, please refer to "Choosing the recording channel" found in "5.1. Settings of the recording conditions".

[**TAFFmat**]: creates a header file in text format and a binary data file. This is a proprietary (\*)file format of the TEAC digital data recorder. TAFFmat(an acronym for Teac data Acquisition File Format) is a file format that consists of a data file(binary format, extension is "dat") containing A/D conversion data and a header file(text format, extension is "hdr") containing recording conditions. (\*: a part of the header file varies depending on product)

[**CSV**]: creates a header file in text format and data file in CSV format.

### 7.1. Data file

During the time from Start to Pause or STOP, a collection of data is being saved on a CF memory card. Each time a new recording starts, a sequential number of 3 digits, added to predefined file names, is incremented by 1. Both of the data file and the header file are saved one by one on every recording.



#### In the case of TAFFmat

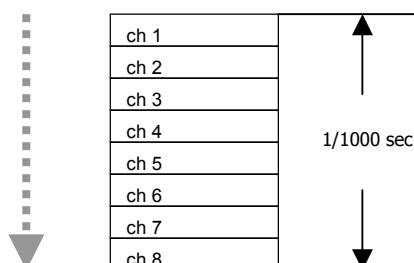
When the TAFFmat is chosen, A/D-converted data is recorded as 2-byte integers from -32768 to +32767. Negative numbers are expressed as complements of 2. The byte order is from the lower bytes to the higher bytes. The data order is as follows; first sampling channel order -> second sampling channel order -> ... -> last sampling channel order.

ADC value  $\pm 25000$  represents  $\pm 100\%$  of the input range. The file extension is .dat .

This document uses the term "scan" to refer to a collection of data resulting from one sampling. A data file is a collection of scan repetitions.

#### Example: Data of 1 scan when the sampling frequency is 1 kHz

Order of recorded data



## In the case of CSV

The data file recorded as CSV format has a structure like the following example:

FILE	898_0003																
COMMENT	= 030 =																
TIME	2005/7/30 9:53:44																
SAMPLE	25Hz																
START_TRIGGER	LEVEL PRE 30																
CH	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8									
RANGE	2V	2V	2V	2V	2V	2V	2V	2V									
NAME	898_DC	898_DC	898_DC	898_DC	898_DC	898_DC	898_DC	898_DC	LATITUDE	LONGITUDE	ALTITUDE	SPEED	COURSE				
UNIT	V	V	V	V	V	V	V	V			meter	km/h	degree				
0	-1.264	-0.00023	-1.264	0.00015	-1.26415	-0.00023	-1.26543	0.00047	N	25	34.6694	E	139	30.9093	30	0.105	171.7
1	1.3049	-0.00013	1.30464	-0.00013	1.30447	0.00007	1.30535	-0.00033	N	25	34.6694	E	139	30.9093	30	0.105	171.7
2	-1.27183	-0.00007	-1.27007	-0.00007	-1.27095	-0.00015	-1.27183	0.00047	N	25	34.6693	E	139	30.9093	30	0.105	169.4
3	1.26979	0.00009	1.26856	0.00029	1.26919	0.00029	1.26984	-0.00007	N	25	34.6693	E	139	30.9093	30	0.105	169.4
4	-1.23275	-0.00015	-1.23223	0.00007	-1.23311	-0.00015	-1.23327	0.00047	N	25	34.6693	E	139	30.9093	30	0.105	169.4
5	1.23947	-0.00007	1.23906	-0.00023	1.23968	0.00007	1.23906	-0.00023	N	25	34.6693	E	139	30.9093	30	0.105	169.4
6	-1.19008	0.00013	-1.18951	-0.00007	-1.19008	-0.00023	-1.19057	-0.00015	N	25	34.6693	E	139	30.9093	30	0.105	169.4
7	1.18401	0.00015	1.18401	0.00007	1.18525	0.00021	1.18568	0.00063	N	25	34.6693	E	139	30.9093	30	0.105	169.4
8	-1.14309	0.00007	-1.14262	-0.00007	-1.14387	-0.00038	-1.14393	-0.00007	N	25	34.6693	E	139	30.9093	30	0.105	169.4
9	1.13584	0.00015	1.13559	-0.00007	1.13584	0.00047	1.13624	0.00039	N	25	34.6693	E	139	30.9093	30	0.105	169.4
10	-1.09151	-0.00007	-1.09159	0.00072	-1.090	-0.00007	-1.09047	0.00021	N	25	34.6693	E	139	30.9093	30	0.105	169.4
11	1.08399	0.00009	1.08373	-0.00007	1.08373	-0.00007	1.08368	-0.00015	N	25	34.6693	E	139	30.9093	30	0.105	169.4
12	-1.03703	0.00009	-1.03626	-0.00007	-1.03606	-0.00007	-1.03752	-0.00007	N	25	34.6693	E	139	30.9093	30	0.105	169.4
13	1.03068	-0.00007	1.03068	-0.00007	1.03072	0.00019	1.03219	0.00033	N	25	34.6693	E	139	30.9093	30	0.105	169.4
14	-0.97929	-0.00015	-0.97929	-0.00007	-0.97947	-0.00007	-0.97987	-0.00033	N	25	34.6693	E	139	30.9093	30	0.105	169.4
15	0.96625	-0.00007	0.96591	0.00015	0.96623	-0.00023	0.96671	0.00007	N	25	34.6693	E	139	30.9093	30	0.105	169.4

Item	Detail
FILE	Name of the file recorded
COMMENT	Comment inputted in <FILE MENU> <COMMENT>
TIME	Recording start time
SAMPLE	Shows sampling frequency setting
START_TRIGGER	Same to START__TRIGGER of header file. Number of scan is shown after it only when pre-trigger exits.
CH	Only the available channel is shown in CH*.
RANGE	Range (2V,5V,10V) specified in <SYSTEM MENU> <Range>
NAME	The channel name specified in <SYSTEM MENU> <CH Name>
UNIT	The physical quantity unit specified in <SYSTEM MENU> <CH Unit>
0,1,2, . . . ,n	The number of scan is incremented from 0.
LATITUDE	Shows the latitude per scan only when the optional GPS unit is connected. Shows < ---- > when not finished measuring it.
LONGITUDE	Shows the longitude per scan only when the optional GPS unit is connected. Shows < ---- > when not finished measuring it.
ALTITUDE	Shows the altitude of the antenna per scan only when the optional GPS unit is connected. Shows < ---- > when not finished measuring it.
SPEED	Shows the speed of the antenna per scan only when the optional GPS unit is connected. Shows < ---- > when not finished measuring it.
COURSE	Shows the course of the antenna per scan only when the optional GPS unit is connected. Shows < ---- > when not finished measuring it.



## CAUTIONS

Please set the sampling frequency to 50 kHz or less before choosing CSV as recording data format.

When a PC is chosen as a storage destination, neither LATITUDE, LONGITUDE, ALTITUDE, SPEED nor COURSE is recorded.

## 7.2. Header File

No matter how you choose the format such as TAFFmat or CSV, header file (\*.hdr) compatible with TAFFmat format is created according to a recoding data file. The header file is a text file on which the recording conditions are saved.

It can be opened by Window's application software such as MemoPad or Notepad since it is a text format.

Each item of the recording condition is described line by line on the header file, and each parameter is divided by ",". An example of a header file is shown as follows.

### Example of a header file

```
DATASET ES8_0003
VERSION 1
SERIES CH1_ES8_DC,CH2_ES8_DC,CH3_ES8_DC,CH4_ES8_DC,CH5_ES8_DC,CH6_ES8_DC,CH7_ES8_DC,CH8_ES8_DC
DATE 07-20-2005
TIME 09:53:44.00
RATE 20
VERT_UNITS V,V,V,V,V,V,V,V
HORZ_UNITS Sec
COMMENT < ES8 >
NUM_SERIES 8
STORAGE_MODE INTERLACED
FILE_TYPE INTEGER
SLOPE 0.00008000,0.00008000,0.00008000,0.00008000,0.00008000,0.00008000,0.00008000,0.00008000
X_OFFSET -0.5000000
Y_OFFSET 0.000000,0.000000,0.000000,0.000000,0.000000,0.000000,0.000000,0.000000
NUM_SAMPS 62
DATA
DEVICE ES8
SLOT1_AMP AD_AMP,8
CH1_1 ES8_DC,RANGE=2V
CH2_2 ES8_DC,RANGE=2V
CH3_3 ES8_DC,RANGE=2V
CH4_4 ES8_DC,RANGE=2V
CH5_5 ES8_DC,RANGE=2V
CH6_6 ES8_DC,RANGE=2V
CH7_7 ES8_DC,RANGE=2V
CH8_8 ES8_DC,RANGE=2V
ID_NO 1
TIME 20050720095344,20050720095346
REC_MODE CF
START_TRIGGER LEVEL,PRE,10
STOP_CONDITION COMMAND
DATA_TYPE CSV
ID_END
MEMO1 < ES8 >
MEMO2 Comment2
MEMO3 Comment3
MEMO4 Comment4
LATITUDE N,35,34.6684
LONGITUDE E,139,38.9093
ALTITUDE 00030
SPEED 0.185
COURSE 171.7
ES8_VERSION V1.10,V0.36,452010
END
```

## Explanations of header file keyword

Item	Detail
<b>DATASET</b>	Recorded file name
<b>VERSION</b>	1(fixed)
<b>SERIES</b>	Channel number used for recording. Characters after underscore bar refer to the Channel name
<b>DATE</b>	Starting date of recording(month-date-year)
<b>TIME</b>	Starting time of recording(time:minute:second)
<b>RATE</b>	Sampling frequency(unit:Hz)
<b>VERT_UNITS</b>	Physical/engineering unit of each channel
<b>HORZ_UNITS</b>	Unit of time axis. Sec(fixed)
<b>COMMENT</b>	Comment inputted in <FILE MENU> <Rec File> <Comment>
<b>NUM_SERIES</b>	Number of recording channel
<b>STORAGE_MODE</b>	Data order. It's fixed to be set as INTERLACED because of the scan order.
<b>FILE_TYPE</b>	1data (2-byte). It's fixed to be set as INTEGER because of the integer.
<b>SLOPE</b>	The coefficient to convert data to physical/engineering unit.
<b>X_OFFSET</b>	The location of the leading data on the time axis. 0 in normal. Setting value (sec) is written as a negative value in the case of pre-trigger. The seconds will be used as units even when the pre-trigger is set by a scan number.
<b>Y_OFFSET</b>	An addition constant to convert data to physical/engineering unit
<b>NUM_SAMPS</b>	The number of recording data per channel
<b>DATA</b>	Information following this item is specific to this equipment. Items below this text are not recorded when recorded on a PC. And, items below this text are not recorded as the header file on a PC when recorded on a PC and other device simultaneously.
<b>DEVICE</b>	The recording system name. In the above case, the ES8 is assigned.
<b>SLOT</b>	Identification name, channel number, and version of mounted amplifier.
<b>CH1_1</b>	Following the underscore bar, it shows the channel number, amplifier's kind, and setting of range.
<b>ID_NO</b>	1(fixed)
<b>TIME</b>	Recording start time and finish time (YYYYMMDDhhmmss)
<b>REC_MODE</b>	Shows the recorded device.
<b>START_TRIGGER</b>	The condition of recording start.  LEVEL: Starts recording by level trigger, TIMER: Starts after the setting time of the interval recording lapse, EXT: Starts recording by external trigger  RESUME: Starts recording as power supply resumes after the recording stop because of a low battery.  COMMAND: Starts recording the main unit's key operation or PC's command.
<b>STOP_CONDITION</b>	The condition stopping a recording.  TIMER: Stops recording by the designated recording time, EXT: Stops recording by an external trigger, MEDIA FULL: Stops recording on media full status, LOWBATT: Stops recording on low battery, COMMAND: Stops recording by the main unit's key operation or PC's command.
<b>DATA_TYPE</b>	Data format type, TAFFmat or CSV.
<b>ID_END</b>	The description below this item is hardware information.
<b>MEMO1/2/3/4</b>	Shows comment, inputted in <Setup> -> <System> -> <Comment>, from the first line to the 4th line.
<b>LATITUDE</b>	Latitude when es8 starts recording. Available only when GPS unit connected. Shows it even if GPS is not measuring it.
<b>LONGITUDE</b>	Longitude when es8 starts recording. Available only when GPS unit connected. Shows it even if GPS is not measuring it.
<b>ALTITUDE</b>	Altitude of antenna when es8 starts recording. Available only when GPS unit connected. Shows it even if GPS is not measuring it.
<b>SPEED</b>	Speed when es8 starts recording. Available only when GPS unit connected. Shows it even if GPS is not measuring it.
<b>COURSE</b>	Course when es8 starts recording. Available only when GPS unit connected. Shows it even if GPS is not measuring it.
<b>ES8_VERSION</b>	FPGA of the main unit and version, serial number of the firmware
<b>END</b>	Means the end of the header file.



## Section 8 Trigger Recording & Interval Recording

In es8, you can choose trigger recording or interval recording as well as manual recording by key operation.

Choosing the recording mode can be done in <Mode> of <RECCOND MENU>.

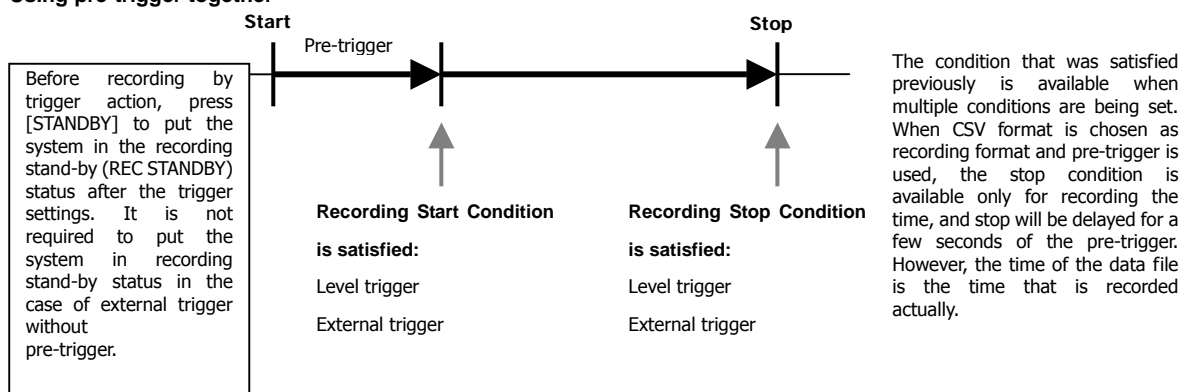
### 8.1. Trigger Recording

In the trigger recording mode, recording can be performed by a pre-trigger only or by a post-trigger.

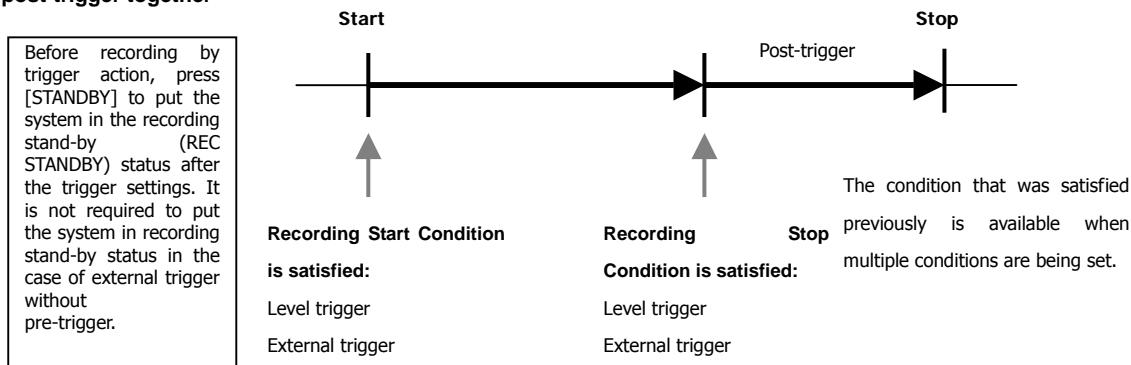
Repetition recording is also available.

The recording action as shown in the figure below is a repeated designated count (Repeat Count). A recording of 1 count only is also available

#### Using pre-trigger together



#### Using post-trigger together



#### <Start condition>

Level trigger: The trigger is a change in level in a specified channel.

External trigger: If the signal input to the external trigger pin of the Input connector is low, recording will start. The interval until the next recording starts should be 5 sec or more. The signal is TTL level (active low).

It is not required to put the system in recording-standby status in case of the external trigger without the pre-trigger. Recording starts immediately when the Low level signal is inputted.

#### <Stop condition>

External trigger: If the signal input to the external trigger pin of the Input connector is low, recording will stop. The signal is TTL level (active low), and Open is possible for High level.

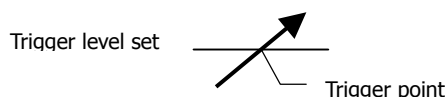
Recording time: The system records data during the specified time after starting.

## Section 8 Trigger Recording & Interval Recording

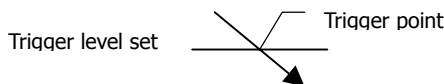
### Settings of the trigger level

The trigger level is independent of each channel, and can be set by "Edge" or "Window".

Edge Up

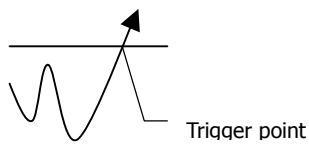


Edge Down



Window Out

Trigger level set Hi

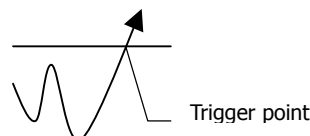


Trigger level set Lo

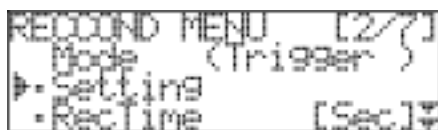
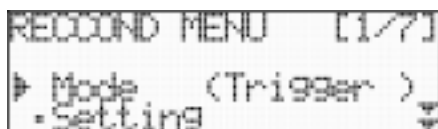
Window In

Trigger level set Hi

Trigger level set Lo



トリガ収録の設定



1. Press [MENU] to show <RECCOND MENU>, and choose [Trigger] by the Right/Left key in <Mode> menu.

2. Move cursor to <Setting>, and press [ENTER].

Make settings of the trigger condition for each channel.

"OR" or "AND" of channels for which the trigger monitor available can be specified as the logic in order to detect the trigger. (Refer to <Logic & Count> as described later.)

3. The trigger condition of each channel is shown as follows:

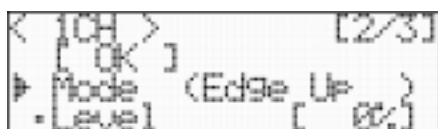
<IGNORE>: Not channel for the trigger

<Edge Up>: Trigger occurs when crossing the trigger level upward.

<Edge Down>: Trigger occurs when crossing the trigger level downward.

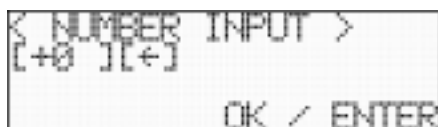
<WindowIN>: Trigger occurs when going in the High Low area.

<WindowOUT>: Trigger occurs when going out of the High Low area.



4. Move cursor to the channel to make or change the setting, press [ENTER]. The details of the setting menu of each channel will appear.

The trigger conditions can be changed by the Right/Left key when the cursor is located in <Mode>. The menu, which is shown under <Menu>, changes according to the trigger conditions.



5. When [Edge Up/Down] is chosen, make the setting of <Level>. Move <Level>, and press [ENTER].

In <NUMBER INPUT> menu, input threshold level as a form of % of input range. After inputting, press [ENTER]. The display will return to the detailed setting menu. When [Window] is chosen, make the settings of <Level Hi> and <Level Lo> as well.

```

< ICH > [1/3]
▶ [ OK ]
  • Mode (Edge Up )

```

```

< Setting > [1/9]
▶ [ OK ]
  • ICH: Edge Up

```

```

RECCOND MENU [3/7]
  • Setting
▶ • RecTime [Sec]
  • Pre / Post [PRE]

```

```

RECCOND MENU [4/7]
  • RecTime [Sec]
▶ • Pre / Post [PRE]
  • Logic&Count [OR]

```

```

RECCOND MENU [5/7]
  • Pre / Post [PRE]
▶ • Logic&Count [OR]
  • RepeatCount

```

```

RECCOND MENU [6/7]
  • Logic&Count [OR]
▶ • RepeatCount
  External (OFF)

```

```

RECCOND MENU [7/7]
  • RepeatCount
▶ External (ON )

```

6. In detailed setting menu, move the cursor to [OK] without fail, and press [ENTER] to establish the channel setting.

7. In the case of multi-channels, make settings of the same operation on the other channels. And in <Setting> menu, move the cursor to [OK] to establish the setting.

8. Move the cursor to <Rec Time> and press [ENTER] to set the recording time after triggering. Input the number of seconds according to the menu which will be shown.

9. Make settings of the pre-trigger or post-trigger. Move the cursor to <Pre/Post> and press [ENTER]. According to the menu which will be shown, make the setting of <Mode> and <Scan> (Specify the range of pre or post-trigger in the scan numbers. The setting range is the value resulting from 460000/recording channel number).

In ASCII recording, if the GPS information (latitude, longitude, altitude, speed, and course) is ON, the value will be a maximum of 15000. Even if the setting value exceeds it, 15000 will be set automatically.

10. Move the cursor to <Logic&Count> and press [ENTER]. Make the settings of the trigger logic and trigger count between the multiple trigger monitor channels. According to the menu which will be shown, make the setting of <Mode> (OR or AND logic) and input value into <Count>. (Triggering occurs when the trigger condition comes equal to the number of count set in here. A maximum of 65535 counts)

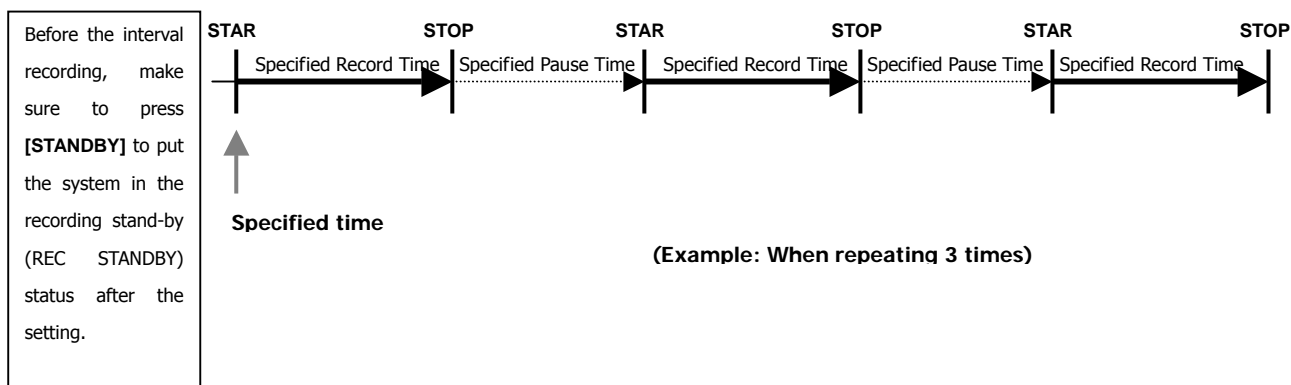
11. Move the cursor to <RepeatCount> and press [ENTER]. Set the repetition count of the trigger for recording. According to the menu which will be shown, input the count value.

In the case of using the CF memory card, it will be a maximum of 999.

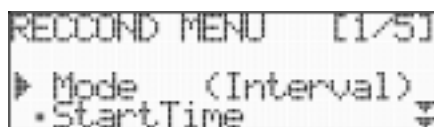
12. When triggering by an external trigger, move [cursor] to <External> and choose [ON] by Right/Left key

## 8.2. Interval Recording

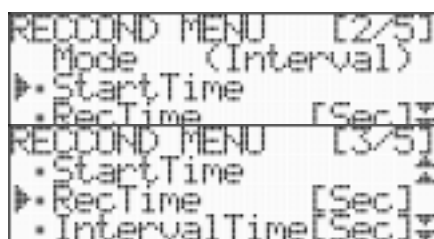
At the specified time, recording will START and STOP repeatedly for a specified number of times. You can also specify 1 time only.



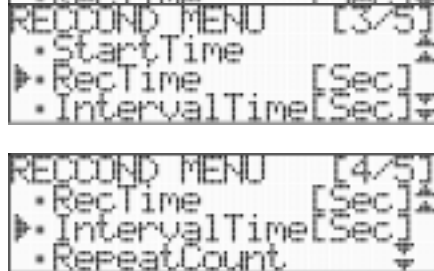
### Setting of the interval recording



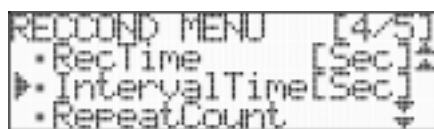
1. Press [MENU] to show <RECCOND MENU>, and choose [Interval] by Right/Left key.



2. Move cursor to <StartTime> and press [ENTER]. Set the starting time by [Time Set].



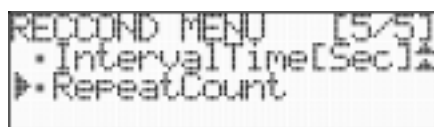
3. Move cursor to <Rec Time> and press [ENTER]. Set the recording time. Input value in seconds according to the menu which will be shown.



4. Move the cursor to <IntervalTime> and press [ENTER]. Set the interval time.

Specify the value in seconds according to the menu which will be shown.

The value must be 5 sec or more. The maximum value is 86400 seconds (24 hours).



5. Move the cursor to <RepeatCount> and press [ENTER]. Set the repetition count to interval recording. Specify the repetition count according to the menu which will be shown.

The maximum value is 999 when recording on the CF memory card

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## Section 9 Comparator Function

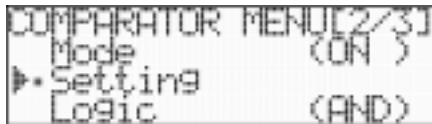
---

Being independent of the trigger function, monitor level for the input signal of each channel can be set, and external output can be performed when the condition is satisfied. Please refer to "Section 2 Name & functions of each part Input connector" for hardware specifications.

### Setting of comparator functions



1. Press [MENU] to show <COMPARTOR MENU>, and choose [ON] by Right/Left key in <Mode> menu.



2. Move cursor to <Setting>, and press [ENTER].

Make settings of the comparator output condition for each channel.

"OR" or "AND" of the channels for which the trigger monitor available can be specified as the logic in order to detect the trigger. (Refer to <Logic> as described later.)

3. The trigger condition of each channel is shown as follows:

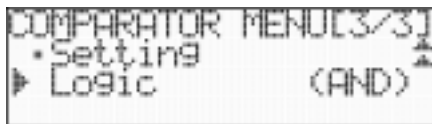
<IGNORE>: Channel not available for the trigger

<Level Up>: The trigger occurs when the input signal is higher than the trigger level.

<Level Down>: The trigger occurs when the input signal is lower than the trigger level.

<WindowIN>: The trigger occurs when the signal is going in the High Low area.

<WindowOUT>: The trigger occurs when the signal is going out of the High Low area.



4. Move the cursor to <Logic> and press [ENTER]. Make the settings of the trigger logic between the multiple monitor channels. And set [AND] or [OR] by the Right/Left key.

Note:

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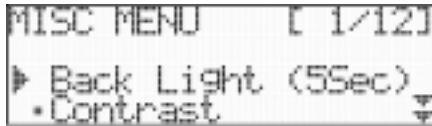
## Section 10 Saving & Settings

---

5 kinds of setting information can be saved on es8 and loaded if necessary. Saving and loading setting information can be performed in <MISC MENU> of <Parameter>. And the main unit setting information can be initialized. (The default value of the setting information parameter)

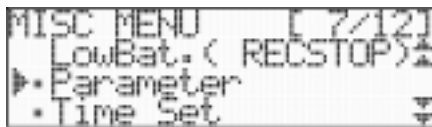
### 10.1 Saving the Setting Information

Save the present setting information.

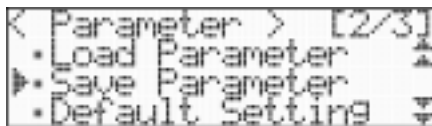


1. Press [MENU] to show [MISC MENU].

The item which will be shown in <MISC MENU> depends on the status when the system escaped from this menu by a previous operation.

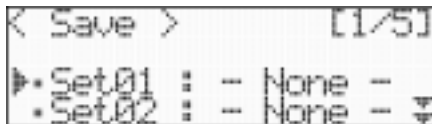


2. Press the Up/Down key to move <Parameter>.



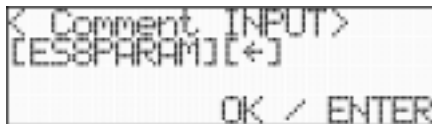
3. Press [ENTER] to show <Parameter>.

Press Down key to move the cursor to <Save Parameter>.



4. Press [ENTER] to show <Save>.

The present status of the registered setting will be shown in <SET01> ~ <SET05>. The item with <None> indicates that it has no setting parameter registered.

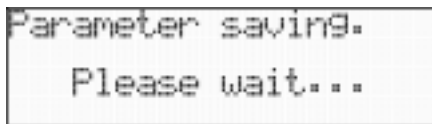


5. Move the cursor to the item to save the parameter setting and press [ENTER] to show <Comment INPUT>. A maximum of 8 characters can be inputted.

<ES8PARAM> is shown as the default comment.

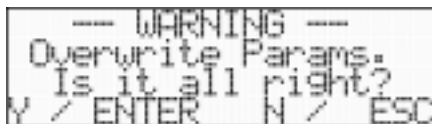
A character at the underscore bar can be modified. The underscore bar can be moved by the Right/Left key. The character can be modified by the up/Down key.

Move the underscore bar to [ ] to change the item in the lower portion of the menu to <BackSpace/ENTER>. And press [ENTER] to delete the inputted characters to the left one by one (Back Space).



6. After finishing the input, confirm that <OK / ENTER> is shown and press [ENTER].

The message (see figure on the left) will be shown and setting information will be saved, and the system returns to <MISC MENU>.

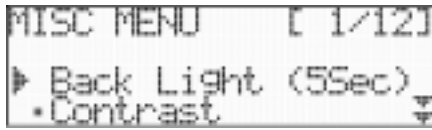


7. To change the setting information saved before, choose the item to change in <Save>, and press [ENTER]. The message (see figure on the left) will be shown. Press [ENTER] to show <Comment INPUT>.

8. To delete saved information, while holding [MENU] in <Save> (<Save> will be change to <Clear>), press [ENTER]. The item at cursor can be deleted.

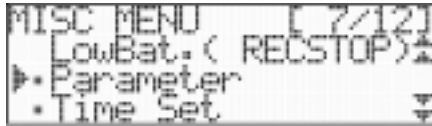
## 10.2. Loading the Settings Information

Load the setting information saved before and change the settings of the main unit of es8.

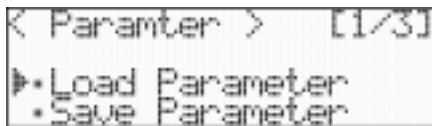


1. Press [MENU] to show <MISC MENU>.

The item shown in <MISC MENU> depends on the status when the system escaped by a previous operation.

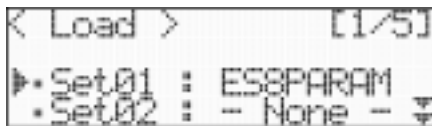


2. Press the Up/Down key to move cursor to <Parameter>.



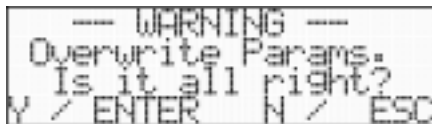
3. Press [ENTER] to show <Parameter>.

Confirm the cursor is located in <Load Parameter>.



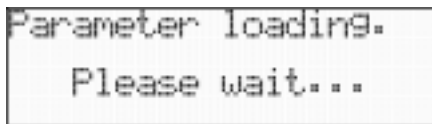
4. Press [ENTER] to show <Load>.

The present status of the registered setting will be shown in <SET01> ~ <SET05>. The item with <None> indicates that it has no setting parameter registered.



5. Move the cursor to the item to load and press [ENTER]. <Warning> will be shown, and a message will be shown to confirm whether or not the present setting information of the main unit is replaced by loaded setting information.

Press [ENTER] to load the setting information. Press [ESC] to cancel it.



6. Press [ENTER]. The message (see figure on the left) will be shown and setting information will be saved, and the system returns to <MISC MENU>.

## 10.3. Initializing the Setting Information

Initialize the setting information. The initialized setting information and values are as follows.

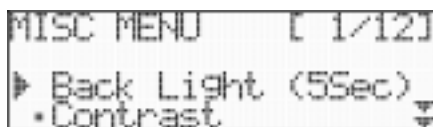
Item	Default value	Item	Default value
Sampling	100 Hz	Trigger	
Range	10 V	Level Setting	IGNORE
CH Use	8	RecTime	0Sec
CH Name	ES8_DC	Pre/Post	PRE
CH Unit	V	Logic&Count	OR/0
Unit Change A	1.000000	RepeatCount	1
Unit Change B	0.000000	External	OFF
FileName	ES8_0	Interval	
DirName	ES8_DIR1	RecTime	0Sec
Comment	<ES8>	IntervalTime	5Sec
DataType	TAFFmat	RepeatCount	1
		COMPARATOR	
		Level Setting	IGNORE
		Logic	AND
		GPS Information	
		TimeZone	JAPAN(UTC + 09:00)
		Lat./Lon.	ON
		Altitude	OFF
		Speed	OFF
		Course	OFF



### CAUTIONS

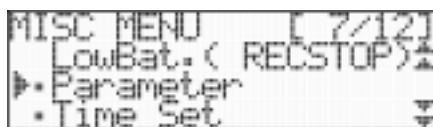
Setting of the MISC MENU, except for setting of <GPS Information> is not initialized.

Resulting from calibration is not initialized.

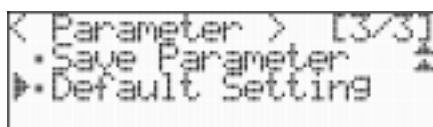


1. Press [MENU] to show <MISC MENU>.

The item shown in <MISC MENU> depends on the status when the system escaped from the menu by a previous operation.

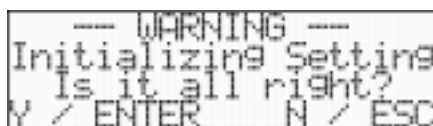


2. Press the Up/Down key to move <Parameter>.



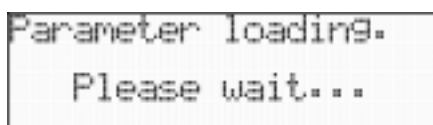
3. Press [ENTER] to show <Parameter>.

Press Down key to move the cursor to <Default Setting>.



4. Press [ENTER] to show the conformation message in order to initialize the setting.

Press [ENTER] to initialize the setting. Press [ESC] to cancel initializing.



5. Press [ENTER]. The message (see figure on the left) will be shown and setting information will be saved, and the system returns to <MISC MENU>.

Note:

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## Section 11 Manual Calibration

---

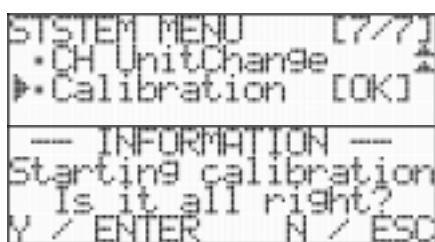
After the power is turned on, the main unit will read the calibration value automatically. This action makes the setting of each amplifier by reading calibration values that were recorded on a back-up SRAM.

These values can be rewritten and updated by performing manual calibration in <Calibration> of <SYSTEM MENU>. In this case of calibration, internal recording of each input range and sampling frequency is performed, and then the offset value and gain value are calibrated by internal reference voltage to update the calibration value to be recorded on a back-up SRAM.

### Rewriting the Calibration Value by Manual Calibration

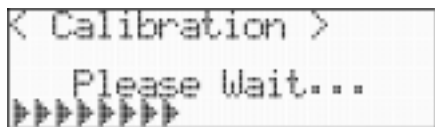
When precision is required in particular or the temperature is entirely different from the normal temperature (ie: -10°C, +50°C), manual calibration must be performed before measuring. In any case, we also recommend you to perform periodical manual calibration about once every 6 months to maintain a higher level of measurement precision.

### Executing manual calibration



1. Press [MENU] to show <SYSTEM MENU>, and move cursor to <Calibration>.

2. Press [MENU] to show the confirmation menu. If you press [ENTER], the system will start calibration. If you press [ESC], the system will return to <SYSTEM MENU> without performing calibration.



3. Press [ENTER] to perform calibration.

The message (see figure on the left) will appear during calibration.  
And the REC LED blinks red.

4. When the calibration is finished, the system returns to <SYSTEM MENU>.

Note:

## Section 12 MISC MENU

In <MISC MENU>, the following operations related to the system setting of the main unit can be performed.

Item	Detail
<b>Back Light</b>	Using the Right/Left key, set the time length of the backlight glowing when the key operation is done.
<b>Contrast</b>	Press <b>ENTER</b> to enter the next lower menu. And, control the contrast of the LCD.
<b>Panel Beep</b>	Using the Right/Left key, set the ON/OFF. In REC stand-by status, you can set whether or not to make the beep sound caused by key operation.
<b>Range Beep</b>	Using the Right/Left key, set the ON/OFF. In REC stand-by status, you can set whether or not to make the beep sound when the overrange condition occurs on recording.
<b>Battery Beep</b>	Using the Right/Left key, set the ON/OFF. You can set whether or not to make the beep sound when the battery is low.
<b>LowBat.</b>	Set the recording operations when the battery is low. Refer to "3.6. Confirming Supply Voltage and Operational Settings for Low Battery".
<b>Parameter</b>	Press <b>ENTER</b> to enter the lower menu. You can save 5 patterns of settings information on the main unit. In this menu, this setting information can be saved or loaded. And setting the parameter can be initialized.
<b>Time Set</b>	Sets the time setting. Refer to "3.5. Setting Date and Time".
<b>Comparator Check</b>	Press <b>ENTER</b> to enter the lower menu. You can examine the comparator output.
<b>GPS Information</b>	<p>Press <b>ENTER</b> to enter the lower menu.</p> <p><b>GPS Data:</b> Shows the data such as time and location sent from the GPS unit.</p> <p><b>TimeZone Set:</b> Sets the Local Time by inputting the difference in time from the World Standard Time.</p> <p>Using the Right/Left key, choose <b>[JAPAN]</b> after &lt;TimeZone&gt; to set it to Japan standard time.</p> <p><b>Lat./Lon:</b> decides whether or not to save the information of the latitude/longitude on the header file or on the CSV file in the case of CSV recording.</p> <p><b>Altitude:</b> decides whether or not to save information of the antenna altitude on the header file or on the CSV file in the case of CSV recording.</p> <p><b>Speed:</b> decides whether or not to save information of the speed on the header file or on the CSV file in case of CSV recording.</p> <p><b>Course:</b> decides whether or not to save information of the course on the header file or on the CSV file in the case of CSV recording.</p>
<b>System Info.</b>	Press <b>ENTER</b> to show the system information.
<b>Power Supply</b>	<p>Press <b>ENTER</b> to show the voltage of the internal battery.</p> <p>Refer to "3.6. Confirming Supply Voltage and Operational Settings for Low Battery".</p>



### CAUTIONS

When a PC is chosen as the storage destination, neither LATITUDE, LONGITUDE, ALTITUDE, SPEED nor COURSE is recorded.

Note:

## Section 13 Specifications

### INPUT

項目	内容
Number of input channel	8 (ON/OFF setting per channel)
Input format	Unbalanced input
Input connector	D-sub 25 pin Hirose RDBD-25S-LNA(05) Including the comparator output, signal input for time calibration, and external trigger
Input range	+/-2V +/-5V +/-10V
Absolute max. input volt.	+/- 50V
Input impedance	1 MΩ
AD converter	16 bit simultaneous sampling for all the channels
Quantization bit rate	
Conversion method	Sequential conversion
Input filter	Not available
Sampling frequency	5 kHz, 2 kHz, 1 kHz, 500 Hz, 200 Hz, 100 Hz, 50 Hz, 20 Hz, 10 Hz, 5 Hz, 2 Hz, 1 Hz, 1/2 Hz, 1/5 Hz, 1/10 Hz, 1/30 Hz, 1/60 Hz
Gain precision	within +/- 0.5%
Linearity	within +/- 0.1%
Drift	within +/- 0.1%
S/N	70 dB (within bandwidth)
Crosstalk	-70 dB (within bandwidth)
Topology difference between channels	within +/- 1 (in case of same range)

### Comparator Output

Item	Content
Number of Channel	1
Trigger Condition	Manual, Level, Window(In/Out)
Output Format	Relay contact, Rating: 40V 0.25A, Output delay from the sampling point is a maximum of 300μs.
Monitor Channel	AND or OR for all the channels

### Recording

Item	Content
Recording Mode	Manual recording, Trigger recording, Interval recording  <b>Trigger recording</b> Recording start condition: Level(Edge) window, or External trigger signal(starts in Low, stops in High or Open) AND or OR of all channels Recording time: Specified time( Unit is second, maximum value depends on media capacity) Pre/Post-trigger: Specify either of them by the number of scan, setting range: 460000/input channel number In ASCII recording, if either of GPS information (latitude, longitude, altitude, speed, and course) is ON, the value will be a maximum of 15000. Even if the setting value exceeds it, 15000 will be set automatically. Repetition counts: Max. 999 counts  <b>Interval recording</b> Recording start condition: Specified Date&Time or REC key Recording time: Specified time( Unit is second, maximum value depends on media capacity) Recording interval: 5 ~ 86400sec(24 hours), Must be within possible continuous operating time in case of cell battery operation
収録メディア	CompactFlash, FAT16, Max.2GB
収録形式	Binary (TAFFmat) or ASCII (CSV) data, In case of ASCII, sampling frequency must be 50Hz or less.



## Others

Item	Content
Interface	USB2.0 (Full speed, available only for 12Mbps) when the PC connected, real time monitoring on the PC.
Power Supply	Internal: AA NiMH battery, or AA Alkaline battery × 4
Operating temperature	-10°C ~ 50°C (In the case of using it under low temperature, you may find it hard to see the LCD display clearly. If the operating temperature is out of 0°C ~ 40°C, use a NiMH battery.)
Guaranteed Operating Temperature	0°C ~ 40°C
Operating Humidity	10% ~ 85%RH (non-condensed)
Continuous Operating Time	Approximately 4 hours when using the NiMH Panasonic HHR-3SPS Meta-high 2400 series (or equivalent)
Safety Standard	VCCI Class A
Operation in case of power Failure	You can choose the following items from the setting menu. <ul style="list-style-type: none"> <li>■ Stops recording and starts the file closing. If the external supply recovers, es8 restarts to record as new file.</li> <li>■ Keeps on recording by internal battery. If the external supply recovers, es8 switches to the external one and keeps on recording. If the external supply does not recover, it stops recording and starts the file closing when the internal battery comes into a low state.</li> </ul>
Internal time calibration	±30sec calibration by external signal Calibration by GPS (optional, the internal clock is calibrated within ±35msec) Caution: The starting time, which is written on the header when recording starts by manual operation or level of the trigger, is precise to one second since it is the data of the second unit.
Location data recording	When connected with the optional GPS, latitude/longitude of the recording start point is recorded on the header file or Latitude/longitude is recorded on the sampling data (updating period of latitude/longitude is 1Hz) in the case of recording in ASCII (CSV) format. Location precision: Horizontal 20m or less, Vertical 25m or less, Conditions: Not moving, SA (Selective Availability) = OFF
Power supply low volt. alarm	LED blinks red when the voltage is low.
Range over alarm	LED blinks red when either of the channels comes into over range status.
Dimension	150(W)×40(H)×100(D)mm (Not including extruded part)
Weight	Approximately 400g (Not including cell battery and card)

外形図

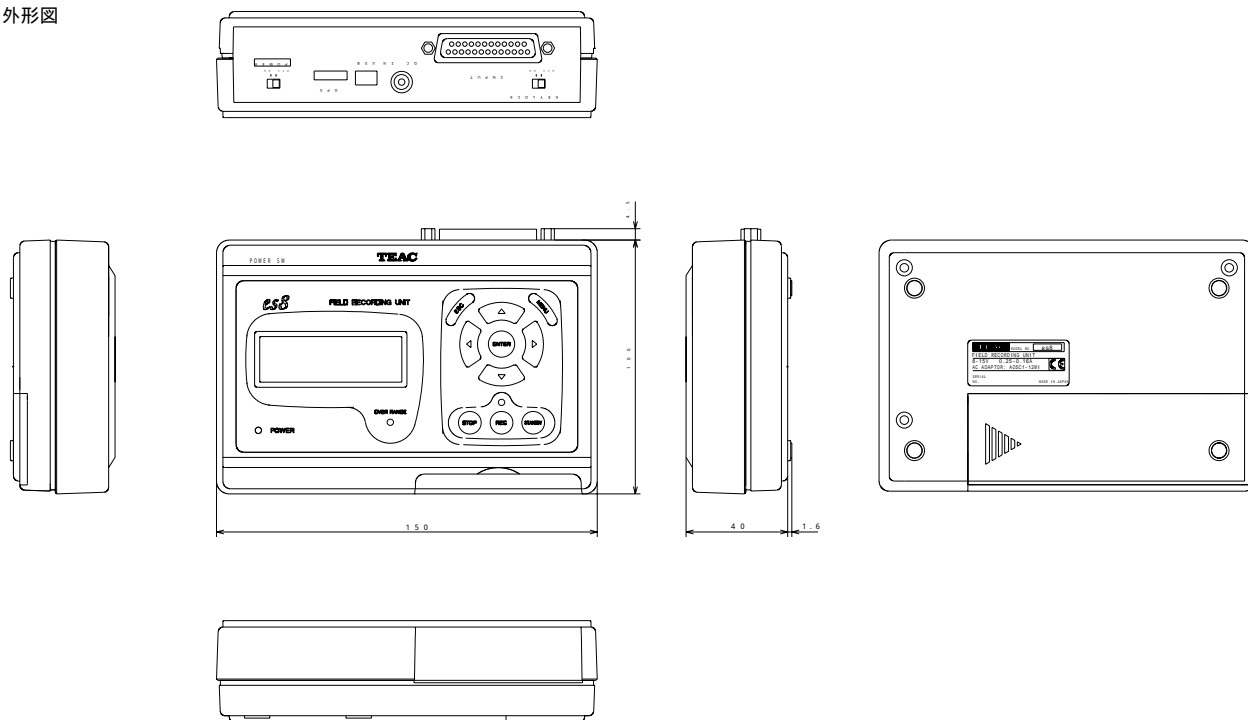




Table of each item's setting range

Setting Items	Unit	esNavi	es8
Sampling Frequency	Hz	5k,2k,1k,500,200,100,50,20,10,5,2,1,1/2,1/5,1/10,1/30,1/60	
Range	V	10, 5, 2	
Channel Name	Character	20	15
Channel Unit	Character	8	
Channel Unit Conversion A Coefficient	Character	10	
		Including decimal point	
Channel Unit Conversion B Coefficient	Character	10	
		Including decimal point	
Recording File Name	Character	5	
Recording Directory Name	Character	8	
Comments during Recording	Character	512(128x4 lines)	15
Maximum file number in 1 directory	File	65532(When only TEAC__ES directory and directory specified in <RecFile>-<DirName> exist in the card.)	
Maximum Recording Count	Count	In the case of the above condition, 32766 (Data file and header files are created as a pair in one recording.)	
Maximum Directory Number	Directory	65533(When either of the files or directories other than the TEAC__ES directory does not exit in the card.)	
Level Trigger Settings	%	-99 ~ +99	
Window Trigger Settings	%	-99 ~ +99	
Recording Time	Sec	0 ~ media capacity (0: Records until the system is stopped because of other reasons.)	
Pre/Post	Scan	0 ~ (460000/iuput channel number) In ASCII recording, if either of GPS information (latitude, longitude, altitude, speed, and course) is ON, the value will be a maximum of 15000. Even if the setting value exceeds it, 15000 will be set automatically.	
Counts to fulfill trigger condition	Counts	1 ~ 65535	
Repetition Counts	Counts	CF or CF+PC as recording media: 0 ~ 999(0: infinite times) PC only as recording media: 0 ~ 65534(0: infinite times)	
Interval Time	Sec	5 ~ 86400(24 hours)	
Comparator Output Setting (Level)	%	-120 ~ +120	
Comparator Output Setting (Window)	%	-120 ~ +120	
Glowing Time Length of Back Light	Sec	Always OFF, 1, 3, 5, Always ON	
Difference of Time setting	Min	+/- 14:45	

Note:

Note:

## Recommendation of User Registration

Once you have completed the User Registration, we will send you information concerning product support and new products.

In addition, we will create a specific updated version on this product, if we believe it to be necessary. Choose one of the three following methods of registration:

### On line registration

Please login to the following web site to register.

URL:<http://www.tic.teac.co.jp>

### Registration by FAX

Please complete the required items in the following <User Registration Form>, and send it by fax to:

(FAX: +81-422-52-1990)

### Registration by Mail

Please complete the required items in the following <User Registration Form>, and copy and send it to the following address.

#### Address:

Overseas Sales Group, Business Solutions Company

TEAC CORPORATION

3-7-3 Naka-cho, Musashino-shi, Tokyo

180-8550 Japan

### User Registration Form

Product Name	es8
Serial Number	No.
Purchase Date	
Company Name	
Division Name	
Person in charge	
Address	
TEL	
FAX	
E-mail	
Information via E-mail	Do not send.
Notes	