Instruction Manual

Contents Recorder & Player VT3000

IM 706530-01E

YOKOGAWA
Yokogawa Electric Corporation

IM 706530-01E
1st Edition

Thank you for purchasing the Contents Recorder & Player VT3000. This User's Manual contains useful information about the precautions, functions, and operating procedures of the instrument. To ensure correct use, please read this manual thoroughly before operation. Keep this manual in a safe place for quick reference in the event a question arises.

Notes

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functions. Illustrated screen contents in this manual may differ slighty from what actually appears on your screen.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA dealer as listed on the back cover of this manual.
- Copying or reproducing all or any part of the contents of this manual without YOKOGAWA's permission is strictly prohibited.
- The warranty card is included in the packing box, and replacement cards will not be provided. Please read the warranty carefully, and keep the card in a safe place.

Trademarks

- MS-DOS is a registered trademark of Microsoft Corporation.
- Other company and product names are trademarks or registered trademarks of their respective holders.

Revisions

- 1st Edition August 2000

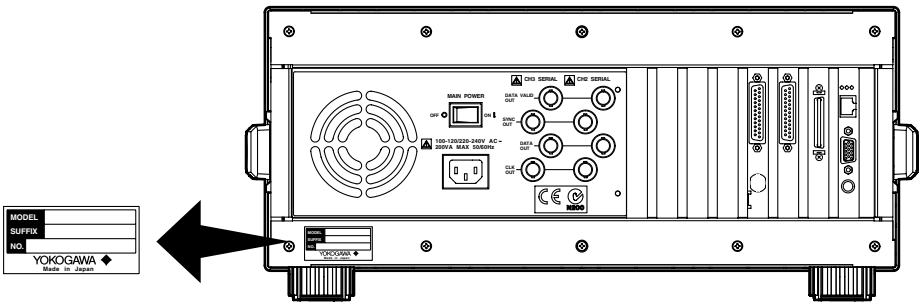
Disk No. CM05
1st Edition: August 2000 (YK)

Checking the Contents of the Package

Unpack the box and check the contents before operating the instrument. If some of the contents are not correct, are missing, or are physically damaged, contact the dealer from which you purchased them.

VT3000

Check that the model name and suffix code given on the name plate on the rear panel match those on the order.



MODEL

706530	1 channel output model, 256 MB memory
706531	2 channel output model, 256 MB memory per channel
706532	3 channel output model, 256 MB memory per channel

SUFFIX

Specifications	Code	Notes
Power cord	-M	UL/CSA Standard power cord (Part No.: A1006WD and A1253JZ) [Maximum rated voltage: 125 V; Maximum rated current: 7 A]
	-D	UL/CSA Standard power cord (Part No.: A1006WD)
Options	/HD1	30 GB HDD option
	/BS	BS digital multiplexing plug-in software
	/M11	Additional 256 MB of memory to ch1 (512 MB total)
	/M12	Additional 512 MB of memory to ch1 (768 MB total)
	/M13	Additional 768 MB of memory to ch1 (1024 MB total)
	/M21	Additional 256 MB of memory to ch2 (512 MB total)
	/M22	Additional 512 MB of memory to ch2 (768 MB total)
	/M23	Additional 768 MB of memory to ch2 (1024 MB total)
	/M31	Additional 256 MB of memory to ch3 (512 MB total)
	/M32	Additional 512 MB of memory to ch3 (768 MB total)
	/M33	Additional 768 MB of memory to ch3 (1024 MB total)

NO. (Instrument Number)

When contacting the dealer from which you purchased the instrument, please quote the instrument number.

Note

We recommend you keep the packing box. The box is useful when you need to transport the instrument.

Standard Accessories

The following standard accessories are supplied with the instrument:

Part Name	Part Number	Quantity	Notes
1. Power cord	A1006WD	1	
2. Rubber feet for the hind feet	A9088ZM	1	Two rubber feet in one set
3. User's Manual	IM706530-01E	1	User's Manual (this manual)

Optional Accessories (Sold Separately)

The accessories in the chart below are sold separately. For information and ordering, contact your dealer.

Part Name	Part Number	Quantity	Notes
BNC cable	366924	1	BNC-BNC, length: 1 m
BNC cable	366925	1	BNC-BNC, length: 2 m
Rack mount kit	751535-E4	1	For EIA single mount
Rack mount kit	751535-J4	1	For JIS single mount

Safety Precautions

This instrument is an IEC safety class 1 instrument (provided with terminal for protective earth grounding).
The following general safety precautions must be observed during all phases of operation. If the instrument is used in a manner not specified in this manual, the protection provided by the instrument may be impaired. YOKOGAWA Electric Corporation assumes no liability for the customer's failure to comply with these requirements.

The following symbols are used on this instrument.


"Handle with care." To avoid injury, death, or damage to the instrument, the operator must refer to the explanation in the User's Manual or Service Manual.


Alternating current

ON (power)


OFF (power)


ON (power) state


OFF (power) state

Make sure to comply with the safety precautions listed below. Failure to comply might result in injury or death.

WARNING

Power Supply

Ensure that the source voltage matches the voltage of the power supply before turning ON the power.

Power Cord and Plug

To prevent the possibility of electric shock or fire, be sure to use the power cord supplied by YOKOGAWA. The main power plug must be plugged into an outlet with a protective earth terminal. Do not invalidate this protection by using an extension cord without protective earth grounding.

Protective Grounding

Make sure to connect the protective grounding to prevent electric shock before turning ON the power. The power cord that comes with the instrument is a three-pin type power cord. Connect the power cord to a properly grounded three-pin outlet.

Necessity of Protective Grounding

Never cut off the internal or external protective earth wire or disconnect the wiring of the protective earth terminal. Doing so poses a potential shock hazard.

Defect of Protective Grounding

Do not operate the instrument when the protective earth or the fuse might be defective. Also, make sure to check them before operation.

Do Not Operate in Explosive Atmosphere

Do not operate the instrument in the presence of flammable liquids or vapors. Operation in such environments is very dangerous.

Do Not Remove Covers

Some areas inside the instrument have high voltages. The cover should be removed by YOKOGAWA's qualified personnel only.

External Connection

Connect the protective grounding before connecting to the item under measurement or to an external control unit.

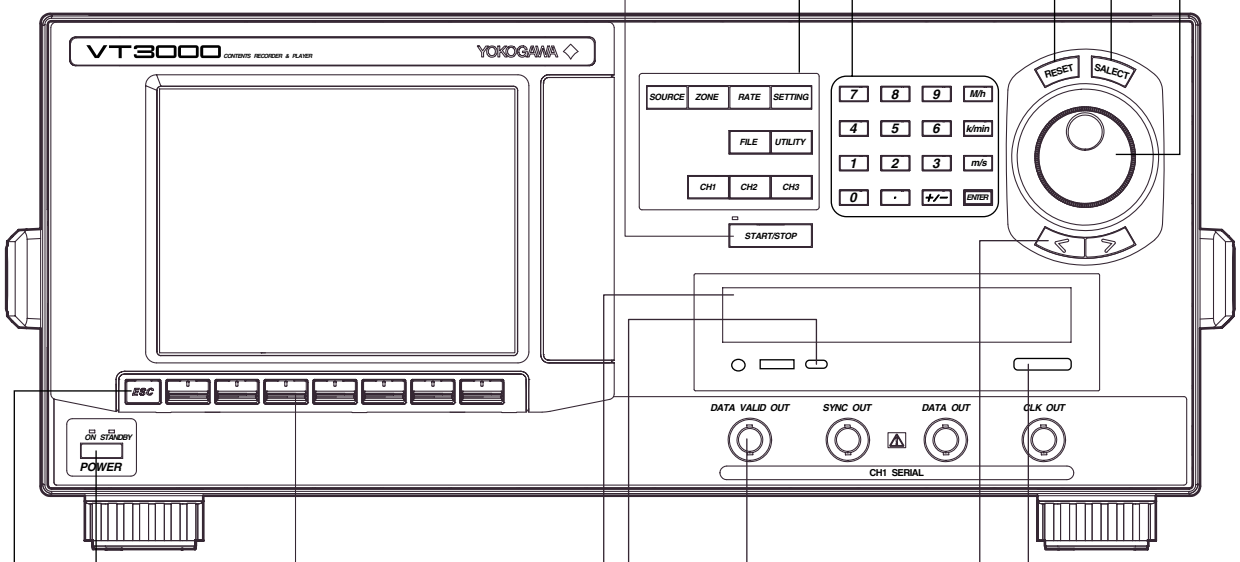
Fuses

The fuses inside the case can not be replaced by the user. If you believe the fuse is blown, please contact your nearest YOKOGAWA representative listed on the back cover of this manual. The ratings of the fuses used inside the case are indicated below.

Location	Max. rated voltage	Max. rated current	Type	Approved standard
Power Supply	250 V	6.3 A	Time lag	UL/CSA/VDE/SEMKO

Contents

1.1 Front Panel



SOURCE key
Select the files to be output
ZONE key
Select the zone to be output
RATE key
Set the clock
SETTING key
Set the output port, level, etc.
FILE key
Delete or copy files on the built-in hard disk or create or delete directories
UTILITY key
Mount CD-ROM and SCSI devices, display setup information, and set other items

Rotary knob
Set values, select files, etc.

SELECT key
RESET key

Numerical keys

START/STOP key

Power switch (Auxiliary)

Soft keys

ESC key
Clear soft key menus

Serial output terminal

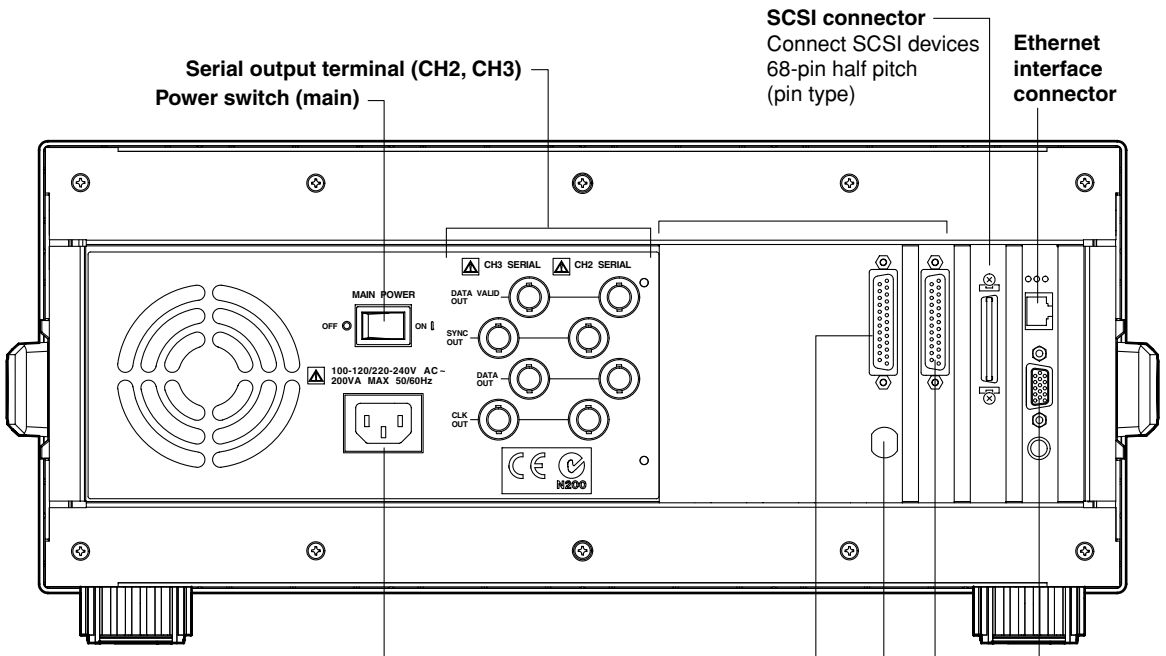
Access indicator

CD-ROM drive

Eject button
Eject CD-ROM

Arrow keys
Move between digits when setting values and backspace (< key)

1.2 Rear Panel



1.3 Functions

Overview

The VT3000 is a signal generator and recorder for testing transport stream (TS) complying with the MPEG2-System Standard. It can be used to evaluate or test set-top boxes (STB) for digital satellite broadcast, digital CATV, and digital ground-based broadcast and bit stream recording devices such as D-VHS and DVD.

MPEG2 Transport Stream (TS) Output Function

This function continuously outputs a TS complying with the ISO/IEC13818-1 MPEG-System from an arbitrary start address to an arbitrary end address at up to 56.61 Mbps. The three available output modes are listed below. The content that is output is created by the user.

Memory output

Transfers the TS from the built-in hard disk to the memory (DIMM) and then outputs the stream from the memory. Stable output is obtained, because it does not directly depend on the I/O throughput of the hard disk. Because this output mode does not depend on the size of the hard disk, you can output the stream for a long period of time. However, because the stream is transferred from the hard disk to the memory, delay occurs from the time the operation is initiated to the time the stream is actually output.

HDD output

Outputs the TS directly from the hard disk. You can output contents as large as the size of the hard disk without any delay. This places a heavy burden on the hard disk.

Quick output

The initial output comes from the hard disk. The TS is simultaneously transferred to the memory. Because the stream is output from the memory after the first time or when it is restarted, no delay is present and the output stream is relatively stable.

Seamless Process

Use this function when you need to output an unbroken stream such as when repetitively outputting the TS.

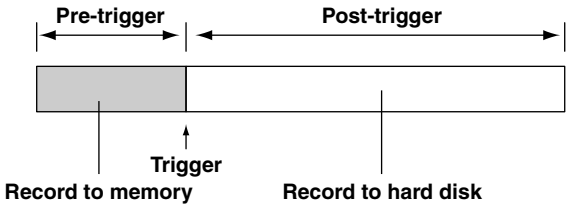
This function carries out time stamping and seamless processing of VIDEO and AUDIO data.

Recording Function

This function enables you to capture contents from the DVB parallel terminal. The captured contents are stored on the built-in hard disk, and can be output. They can also be saved to a SCSI device or to a PC via SCSI or Ethernet.
In addition, you can start the recording operation by applying an external trigger signal.
The following two recording modes are available:

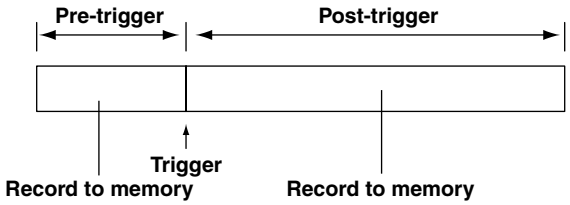
Hard disk recording mode

Stores the pre-trigger section of data to the memory. Stores the post-trigger section of data to the hard disk.
You can record a large amount of contents in this mode.



Memory recording mode

Records all contents to the memory.
Stable recording is achieved, because the hard disk is not used.



Multi-channel function

With the 2CH and 3CH models (706531 and 706532), it is possible to perform setting, recording and reproduction for each channel independently.

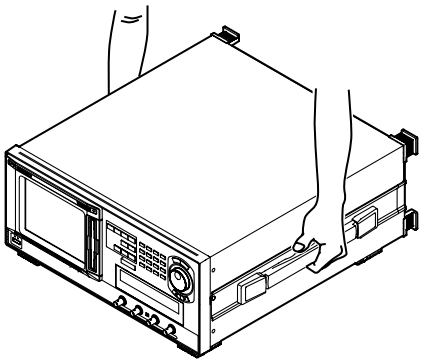
2.1 Usage Precautions on the Use of the Instrument

Safety Precautions

- If you are using this instrument for the first time, make sure to thoroughly read the “Safety Precautions” given on page 3.
- Do not remove the cover from the instrument. Some sections inside the instrument have high voltages that are extremely dangerous. For internal inspection or adjustment, contact your nearest YOKOGAWA dealer as listed on the back cover of this manual.
- Never continue to use the instrument if there are any symptoms of trouble such as strange odors or smoke coming from the instrument. In such cases, immediately turn OFF the power and unplug the power cord. Then, contact your nearest YOKOGAWA dealer as listed on the back cover of this manual.
- Nothing should be placed on top of the power cord. The power cord should also be kept away from any heat sources. When unplugging the power cord from the outlet, never pull by the cord itself. Always hold and pull by the plug. If the power cord is damaged, contact your dealer for replacement.

General Handling Precautions

- Never place any objects containing water on top of the instrument. A water spill can lead to malfunction of the instrument.
- Do not apply shock or vibration to the instrument. This can lead to malfunction. Take extra caution because the built-in hard disk is sensitive to vibration and shock. In addition, applying shock to the input terminal or the connected cable can cause electrical noise to enter the instrument.
- Do not bring charged objects near the input/output terminals. This can lead to malfunction.
- If you are not going to use the instrument for a long period of time, unplug the power cord from the outlet.
- When the instrument is not being used for an extended period of time, unplug the power cord from the outlet. The instrument weighs approximately 8 kg. To carry the instrument, use the handle as shown in the figure below, and move it with care.

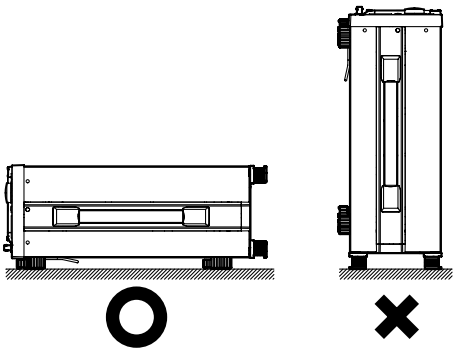


- Be careful not to scratch the surface of the LCD with sharp objects. This can lead to malfunction.
- When cleaning the case or the operation panel, first remove the power cord from the outlet. Then, wipe with a dry, soft cloth. Do not use volatile chemicals as this may cause discoloring and deformation.

2.2 Installing the Instrument

WARNING

To avoid the possibility of fire, never use the instrument with the rear side facing down, as the cooling vents will be obstructed. Placing the instrument with the rear side down can cause a fire when the instrument malfunctions. If you must use the instrument with the rear side down, place a metal plate or a flame-resistive barrier (grade UL94V-1 or higher) beneath the instrument.



Installation Condition

Install the instrument in a place that meets the following conditions:

Ambient temperature and humidity

Use the instrument in the following environment:

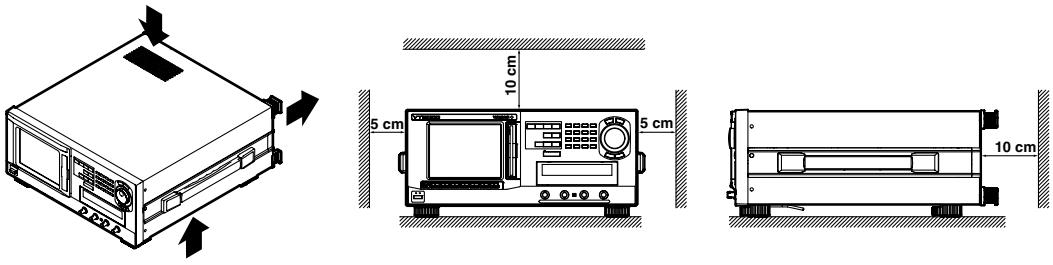
- Ambient temperature: 5 to 40°C
  However, in order to obtain highly accurate measurements, operate the instrument in the 23 ± 5°C temperature range.
- Ambient humidity: 20 to 80% RH
  No condensation should be present. However, in order to obtain highly accurate measurements, operate the instrument in the 55 ± 10% RH range.

Note

Condensation may occur if the instrument is moved to another place where the ambient temperature is higher, or if the temperature changes rapidly. In this case, let the instrument adjust to the new environment for at least an hour before using the instrument.

Well-ventilated location

Vent holes are located on the top and bottom of the instrument. In addition, vent holes for the cooling fan are located on the rear. To prevent internal overheating, allow for enough space around the instrument (see the figure below) and do not block the vent holes.

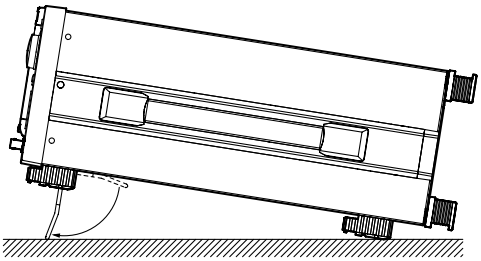


Do not install the instrument in the following places:

- In direct sunlight or near heat sources.
- Where an excessive amount of soot, steam, dust, or corrosive gases are present.
- Near strong magnetic field sources.
- Near high voltage equipment or power lines.
- Where the level of mechanical vibration is high.
- In an unstable location.

Installation Position

Place the instrument in a horizontal position or inclined position using the stand as shown in the figure below.
When using the stand, pull it forward until it locks (perpendicular to the bottom surface of the instrument). If you are installing the instrument on a slippery surface, attach the rubber feet (two pieces, included in the package) to the hind feet.
If you are not using the stand, return it to the original position while pressing the leg section of the stand inward.



2.3 Connecting the Power Supply

Before Connecting the Power Supply

Follow the warnings below when connecting the power supply. To prevent the possibility of electric shock and damaging the instrument, follow the warnings below.

WARNING

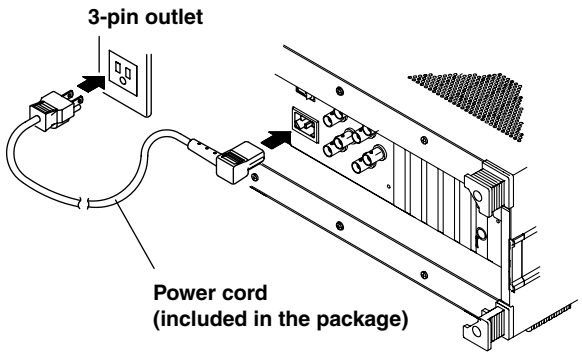
- Ensure that the supply voltage matches the rated supply voltage of the instrument before connecting the power cable.
- Check that the power switch is turned OFF before connecting the power cord.
- To prevent the possibility of electric shock or fire, be sure to use the power cord supplied by YOKOGAWA.
- Make sure to perform protective earth grounding to prevent the possibility of electric shock. Connect the power cord to a properly grounded three-pin outlet.
- To minimize the possibility of electric shock, do not use an extension card without a protective earth ground.

Connection Procedure

1. Check that the power switch on the rear panel is OFF.
2. Connect the power cord plug to the power connector on the rear panel. (Use the power cord that came with the package.)
3. Connect the plug on the other end of the power cord to the socket that meets the conditions below. The AC outlet must be of a three-pin type with a protective earth terminal.

Rated supply voltage:	100 to 120 VAC
Permitted supply voltage range:	90 to 132 VAC
Rated supply voltage frequency:	50/60 Hz
Permitted supply voltage frequency range:	48 to 63 Hz
Maximum power consumption:	200 VA

Power cord (included in the package)



2.4 Turning ON/OFF the Power Switch

Things to Check before Turning ON the Power Switch

- The instrument is properly installed.
- The power cord is properly connected.

Location of the Power Switch and ON/OFF Operation

There are two power switches on the instrument.

- The main switch on the rear panel
- The sub switch at the lower left corner on the front panel

Turning ON the power

Turn ON the main switch on the rear panel and then the sub switch on the front panel to start up the VT3000. The instrument will be ready approximately 90 s after you turn ON the sub switch.

CAUTION

Do not turn OFF the power until the instrument has finished the start-up cycle. Otherwise, the hard disk or the files on it may be damaged.

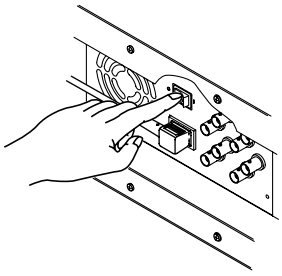
Turning OFF the power

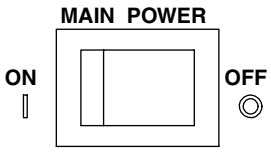
To turn OFF the power, press the sub switch on the front panel. After the instrument is in the standby condition (approximately 20 s later), turn OFF the main switch on the rear panel.

CAUTION

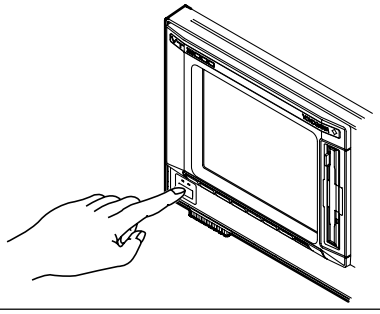
Do not turn OFF the main power switch until the instrument is in the standby condition after pressing the sub switch. Otherwise, the hard disk or the files on it may be damaged.

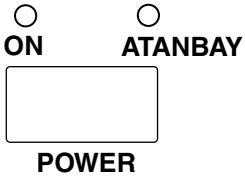
Main power switch





Sub power switch





Power Up Operation

When the power switch is turned ON, BIOS and LINUX startup messages are displayed. Front panel key operations are disabled during this period.

Note

- If the VT3000 does not start up even if you turn ON the main switch, turn OFF the main switch and check the following points:
  - Is the power cord securely connected?
  - Is the correct voltage coming from the power outlet?

  If the instrument still fails to power up after checking these points, it is probably a malfunction. Please contact your nearest YOKOGAWA dealer as listed on the back cover of this manual for repairs.
- If the voltage level of the lithium battery used to store information falls below a minimum level, the VT3000 will fail to operate properly such as inaccurate display of date and time and inability to save or recall setup data. If these symptoms appear, you must quickly replace the lithium battery. The user cannot replace the battery. For battery replacement, contact your nearest YOKOGAWA dealer as listed on the back cover of this manual.

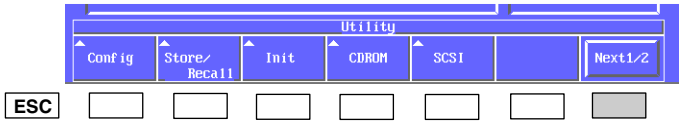
Warm Up

In the installation condition indicated in section 2.2, allow the instrument to warm up for at least 30 minutes after the power switch is turned ON

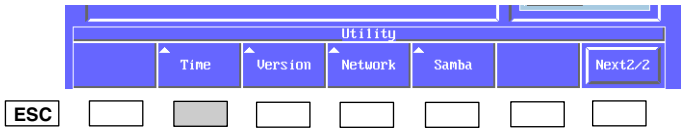
2.5 Setting the Date and Time

Procedure

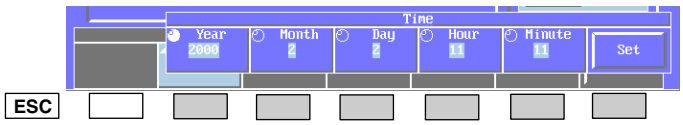
1. Press the UTILITY key to display the Utility menu.
2. Press the [Next1/2] soft key to display the next menu.



3. Press the [Time] soft key to display the Time menu.



4. Press the [Year], [Month], [Day], [Hour], and [Minute] soft keys and set the date and time using the rotary knob.
5. Press the [Set] soft key to confirm the changes.



Explanation

Setting the date

Set the Year/Month/Day.

- Year
  Range: 1999 to 20037
- Month
  Range: 1 to 12
- Day
  Range: 1 to 31

Setting the time

Set the Hour/Minute.

- Hour
  Range: 0 to 23
- Minute
  Range: 0 to 59
  Seconds will be set to 00 when you press the [Set] soft key.

Display position of date and time

The date and time are displayed in the upper right corner of the screen.

3.1 Connecting the Cable to the Parallel Output Connector

Position of the Output Terminal

The output terminal is located on the rear panel. Connect a Dsub25-pin cable to the connector of the channel to be output.

Parallel Output Specifications

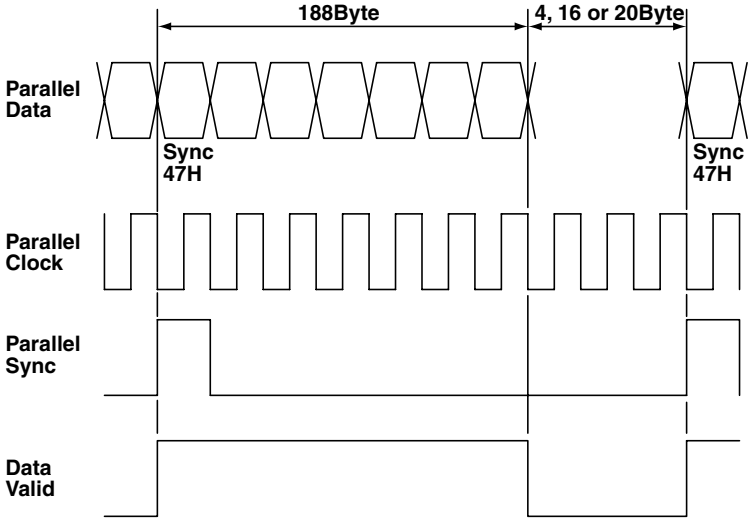
Output level : LVDS (DVB-A010), RS422
Connector : Dsub25

Connection

Pin No.	Signal Name	Pin No.	Signal Name
1	CLKA	14	CLKB
2	SYS GND	15	SYS GND
3	DATA7 A	16	DATA7 B
4	DATA6 A	17	DATA6 B
5	DATA5 A	18	DATA5 B
6	DATA4 A	19	DATA4 B
7	DATA3 A	20	DATA3 B
8	DATA2 A	21	DATA2 B
9	DATA1 A	22	DATA1 B
10	DATA0 A	23	DATA0 B
11	DATA VALID A	24	DATA VALID B
12	SYNC A	25	SYNC B
13	NC		

Parallel Output Timing

The figure below indicates the parallel output timing. You can specify Dummy Out only on packets that are 1188 bytes in length. You can select Dummy Out from 4, 16, and 20. Dummy Out data will be all 0s.
If DataValid is set to A, Valid during Dummy Out of a 188-byte packet or 4, 16, or 20 bytes after the 188th byte of a 192-, 204-, or 208-byte packet will be Low.
If DataValid is set to B, Valid will be High during the above period.
If Slope is switched using Setting Output, the phases of Parallel Data and Parallel Clock change. (The slope of the example below is ↓.)
If Out Type is set to Inverse ON, Parallel Sync and Data Valid are inverted. (OFF in the example below)



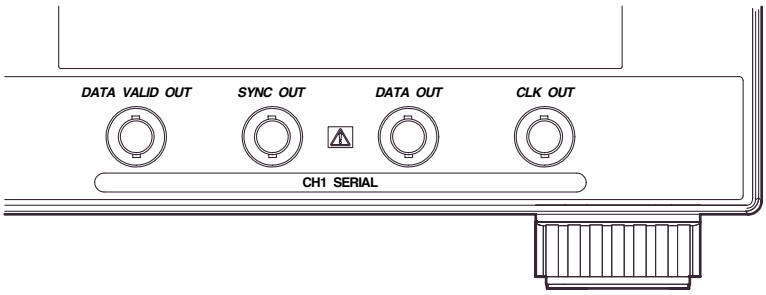
Note

If you select “Super Frame Synchronizing Output” as the synchronizing signal output, the Super Frame synchronizing signal is output from pins 12 (Sync A) and 25 (Sync B) of the parallel output connector.

3.2 Connecting the Cable to the Serial Output Connector

Position of the Output Terminal

The 1CH serial output connector is located on the front panel. The 2CH and 3CH serial output connectors are provided on the rear panel. Connect a cable with a BNC connector.



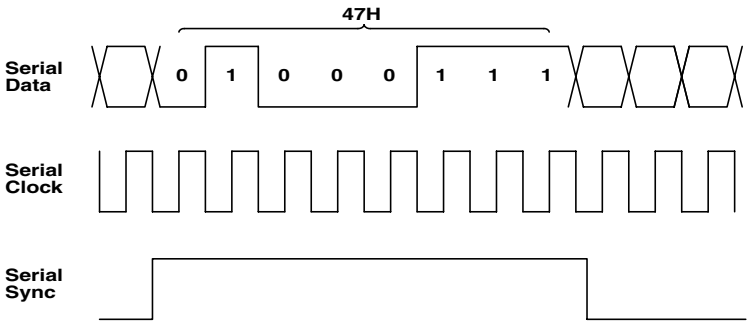
Serial Output Specifications

Item	Specifications	
Serial data output	Output level	: TTL (50 Ω) ECL (50 Ω Unbalanced) can be switched
	Output connector	: BNC
Serial clock input/output	Output level	: TTL (50 Ω) ECL (50 Ω Unbalanced) can be switched
	Output timing	: Rising and falling can be switched
	Output connector	: BNC
SYNC output	Output level	: TTL (50 Ω) ECL (50 Ω Unbalanced) can be switched
	Output connector	: BNC

Serial Output Timing

The figure below shows the timing between the serial data, clock, and SYNC. SYNC output is HIGH only for the synchronizing signal section 47H at the beginning of the packet. For a 188-byte packet, the data of length equal to the number of Dummy bytes that come after the 188th byte (from the beginning of the packet) are all 0s. If Slope is switched using Rate Setting, the phases of Serial Data and Serial Clock change. (The slope of the example below is ↓.)

If Out Type is set to Inverse ON, Serial Sync and Serial Valid are inverted. (OFF in the example below)



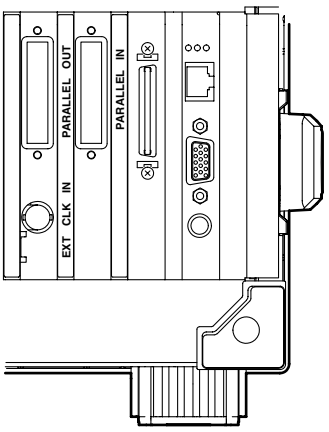
Note

If Super Frame synchronizing output is turned ON in section 3.13, “Selecting the Super Frame Synchronizing Output,” the SYNC output terminal outputs a signal that is synchronized to slot, Frame, or Super Frame.

3.3 Connecting the Cable to the External Clock Input Connector

Position of the Input Terminal

An external clock input connector is provided on the rear panel for each channel. Connect a cable with a BNC connector.



External Clock Specifications

Item	Specifications	
External clock	Input level	: TTL (50 Ω) input ECL (50 Ω Unbalanced) can be switched
	Input timing	: Rising and falling can be switched
	Connector	: BNC
	Format	: Serial/Parallel (Inputs a clock obtained by frequency dividing the serial clock by eight)

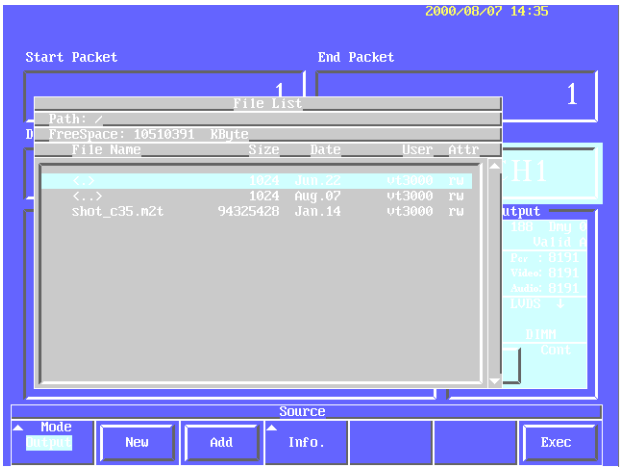
Note

The external clock input connector is common to serial and parallel. Normally, you will set Ext Clock under the Rate menu to Serial if you set Output Type to Serial, and Ext Clock under the Rate menu to Parallel if you set Output Type to Parallel. This will cause data that are synchronized to the clock to be output. If you set Output Type to Parallel, and Ext Clock under Rate to Serial, data will be output every eight cycles of the clock. (This function is useful depending on the modulator.)

3.4 Selecting the Contents to Be Output

Procedure

1. In the case of the 2CH and 3CH models, a channel to be set is selected using the CH1 to CH3 keys.
2. Press the SOURCE key to display the Source menu.
3. Press the [Mode] soft key and select Output.



Selecting the Directory

4. Highlight the directory with the rotary knob and press the SELECT key. Select <..> to move up a directory.

Selecting the contents

5. Highlight the content that you wish to output first with the rotary knob and press the [New] soft key. A [0*] mark is placed by the content indicating that it is selected. You can place up to eight [0*] marks. To add a new content, select the desired content with the rotary knob and press the [Add] soft key. A [1*] mark is placed by the content. Every time you press the [Add] soft key the number indicating the output order is displayed in a similar fashion.
6. Press the [Exec] soft key to confirm the contents to be output. At this point, the menus and file list disappear and the selected contents are displayed under File Name.

Viewing the contents information

7. Press the [Info] soft key to view the information about the file that is highlighted in the file list.

Note

- You cannot operate the Source menu by pressing the SOURCE key while contents are being output.
- If the selected file is not a TS file, a warning is displayed.
- Can be set for each channel.

Explanation

Selecting the Contents

You can continuously output contents by selecting multiple contents. If you saved a large content by dividing it into multiple contents, you can select the divided contents and output them as though they were a single continuous content.

Contents information

Contents information includes the following items:

TS file

File Name : File name of the content
File Size : Size
Packet Type : TS packet type
Total Packet : Total number of packets
Total Frame : Total number of frames
Total Time : Playback time
Total Address : Total number of addresses

----- ---------PID Information----------
PAT PID : PID of the PAT included in the TS
NET PID : PID of the NET included in the TS
PMT PID : PID of the PMT packet included in the TS
PCR PID : PID of the PCR packet included in the TS
Elementary PID : PID of the Elementary packet included in the TS
Stream Type : Stream type
Elementary PID : PID of the Elementary packet included in the TS
Stream Type : Stream type

----- ---------Video Information----------

Video PID : PID of the Video packet included in the TS
Frame Size : Frame size of this video
Picture Rate : Frame rate
Video Bit Rate : Data rate
Aspect Ratio : Aspect ratio
Buffer Size : Buffer size

----- ---------Audio Information----------

Audio PID : PID of the Audio packet included in the TS
Layer : Layer
Sampling Rate : Sampling rate
Audio Bit Rate : Data rate
Audio Mode : Mode

BS file

File Name	: File name of the content
File Size	: Size
Packet Type	: TS packet type
Total SuperFrame	: Total number of super frames

Note

- If you select multiple contents in the DIMM or the DIMM/HDD mode and the total size of the selected contents exceeds the DIMM size, an error occurs.
- If you select multiple contents and the packet types of the selected contents are different, the contents will be identified as NOTS even if the individual content is a TS file.

3.5 Setting the Zone

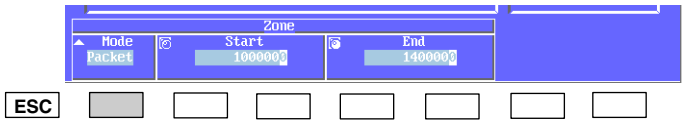
In addition to playing the entire content, the VT3000 can also output a section of the content that is specified by the user. This range is called a zone and is specified by Start and End points.

Procedure

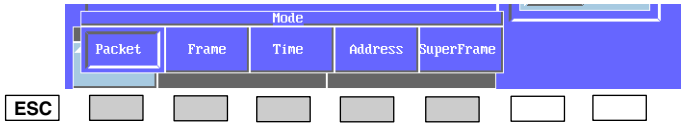
1. In the case of the 2CH and 3CH models, a channel to be set is selected using the CH1 to CH3 keys.
2. Press the ZONE key to display the Zone menu.

Setting the Mode

3. Press the [Mode] soft key to display the Mode menu.

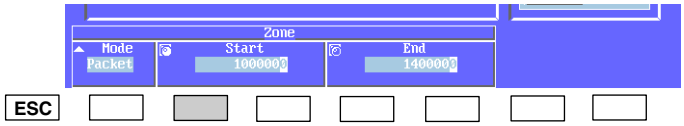


4. Using the soft key, select the unit of the output range (zone) from Packet, Frame, Time, Address, and SuperFrame.



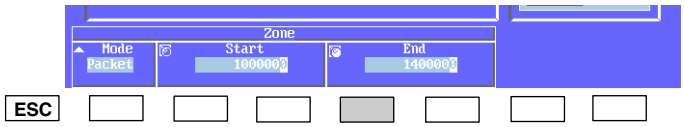
Setting the Start position of the content to be output

5. Press the [Start] soft key and set the start position of the content to be output using numerical keys or rotary knob.



Setting the End position of the content to be output

6. Press the [End] soft key and set the end position of the content to be output using numerical keys or rotary knob.



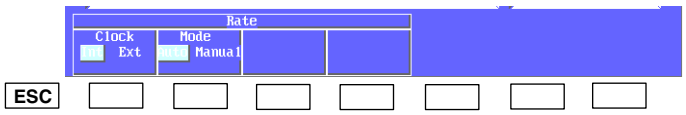
Note

- You cannot change the Start and End positions if the file to be output is not selected.
- The range of Start and End positions is automatically determined from the TS information of the selected file.
- If the mode is set to Frame or Time, the Start and End positions are computed based on the output rate. If you manually change the output rate, the Start and End positions are recomputed. If the output rate is Auto or Ext, the Start and End positions are computed with the Auto value of the output rate.
- If the mode is set to Packet, the Start and End positions are set to 188, 192, 204, or 208 bytes (the unit of packets) according to the Packet setting in section 3.8, “Setting Packet Parameters.”
- If the mode is set to SuperFrame, the Start and End positions are set to values in unit of super frames.
- To output a file that has been identified as a non-TS file, set the Mode to Address.
- You cannot operate the Zone menu while contents are being output.
- Can be set for each channel.

3.6 Setting the Output Rate

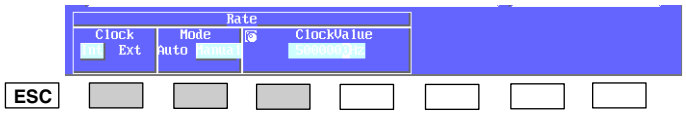
Procedure

1. In the case of the 2CH and 3CH models, a channel to be set is selected using the CH1 to CH3 keys.
2. Press the RATE key to display the Rate menu.



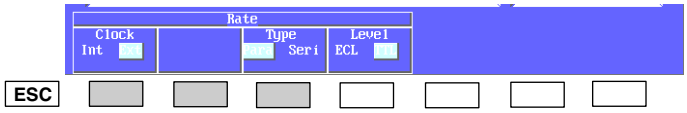
Selecting the internal clock

3. Press the [Clock] soft key to select [Int].
4. Press the [Mode] soft key to select [Auto] or [Manual].
5. If "manual" is selected, set the clock frequency using numerical keys or rotary knob. The range is from 1000 Hz to 57000000 Hz.



Selecting the external clock

6. Press the [Clock] soft key to select [Ext].
7. Press the [Type] soft key to select [Para] or [Seri].
8. Press the [Level] soft key to select [ECL] or [TTL].



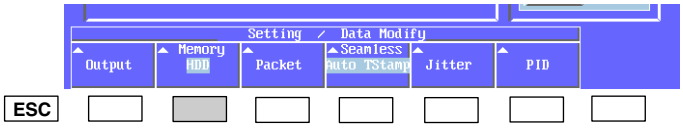
Note

- If Zone mode is set to Frame or Time and you operate the Rate menu, an error occurs.
- If Clock is set to Auto and the selected file is a TS file, the Clock value (data rate) that is computed from the TS file is displayed. However, the Clock value may not be correct if multiple files are selected. We recommend you set the Clock to Manual and output the contents, if you select multiple files.
  If the selected file is not a TS file, 0.001000 Mbit/s (1000 Hz) is displayed.
- If the output rate is set to external clock, input a continuous clock for the external clock. Burst signals cannot be used as clock signals. In addition, if you stop the external clock while outputting the contents, the VT3000 may not operate properly.
- Can be set for each channel.

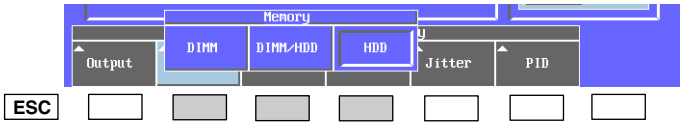
3.7 Setting the Output Mode

Procedure

1. In the case of the 2CH and 3CH models, a channel to be set is selected using the CH1 to CH3 keys.
2. Press the SETTING key to display the Setting menu.



3. Press the [Memory] soft key.
4. Select [DIMM] (memory output mode), [HDD&DIMM] (quick output mode), or [HDD] (HDD output mode).



Explanation

Select from the following output modes:

Memory output mode:	Transfers the contents from the built-in hard disk to the memory and then outputs the contents. The contents in the hard disk can be accurately output.
Quick output mode:	Outputs the contents directly from the hard disk the first time. Outputs from the memory subsequently.
HDD output mode:	Outputs the contents directly from the hard disk. Large contents that exceed the available memory can be output.

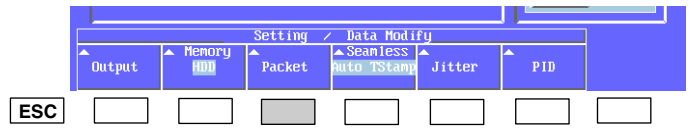
Note

- In the quick output mode, the initial output may not be accurate depending on the internal state of the hard disk. The output will be accurate after the first time.
- In the HDD output mode, the possibility of a hard disk crash is higher because the contents are directly output from the built-in hard disk. Avoid using this mode for an extended period of time.
- The status while the contents are being output from the built-in hard disk is displayed on the FIFO OVERFLOW indicator.
- The OutData indicator is red while contents are being output from the built-in hard disk or while contents are being transferred from the built-in hard disk to the memory. The OutData indicator is green while contents are being output from the memory.
- If the same content (same zone) is already transferred to the memory, the content is not transferred again.
- Can be set for each channel.

3.8 Setting Packet Parameters

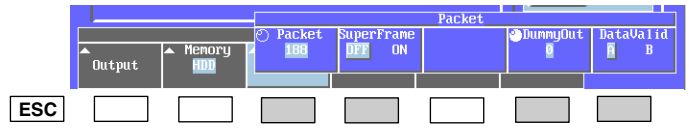
Procedure

1. In the case of the 2CH and 3CH models, a channel to be set is selected using the CH1 to CH3 keys.
2. Press the SETTING key to display the Setting menu.
3. Press the [Packet] soft key.



Setting the packet length

4. Press the [Packet] soft key.
5. Set the packet length using the rotary knob. Select the packet length from [188], [192], [204], or [208].



Selecting the Super Frame Synchronizing Output

6. Press the [SuperFrame] soft key to select [OFF] or [ON].
7. If you turned ON the SuperFrame, press the [Sync] soft key and select [SuperFrame], [Frame], or [Slot] using the rotary knob.

Setting a dummy packet (when the packet length is set to 188)

8. Press the [DummyOut] soft key.
9. Set the number of bytes of the dummy packet to be attached to the TS using the rotary knob. Select the number of bytes of the dummy packet from [0], [4], [16], or [20].

Selecting Data Valid

10. Press the [DataValid] soft key to select [A] or [B].

Note

- You cannot operate the Packet menu while contents are being output.
- If a dummy packet is attached and the output rate is AUTO, the output rate is recomputed.
- Can be set for each channel.

Explanation

Packet length

Set the packet length of the TS to be output.

Super Frame

Super Frame	Specifications
OFF	Turn this OFF when outputting normal TS complying with ISO/IEC13818-1.
ON	Turn this ON to attach a TMCC signal complying with ARIB STD-20 and output the Super Frame synchronizing signal from multiple TS synthesis signals that have been aligned into frames.

Note

- During parallel output, the Super Frame synchronizing signal is output from pins 12 (Sync A) and 25 (Sync B) of the 25-pin Dsub connector.
- When Super Frame is ON, specify the Zone in bytes in the “Address” mode. Set the difference between Start and End to units of Super Frames (204*48*8 bytes or 188*48*8 bytes). Otherwise, the TMCC signal will not be output correctly when repeatedly outputting the TS.
- If you specify Packet, Time, or Frame for the Zone setting, the display may show incorrect values.

If Super Frame is turned ON, you can select the synchronizing signal from Super Frame, Frame, and Slot.

Selecting the attachment of dummy packets

You can attach dummy packets when the packet length of the TS of the content is 188 bytes. You can select 4, 16, or 20 for the dummy packet. After 188 bytes are output, 4, 16, or 20 bytes of all-zero data are output as dummies.

Data Valid

Data Valid	Specifications
A	If the packet length of the TS is 188 bytes, Data Valid will be Low during the attached dummy packet. If the packet length of the TS is 192, 204, or 208 bytes, Data Valid will be Low for 4, 16, or 20 bytes, respectively, from the end of the TS.
B	Data Valid will be High over the entire duration.

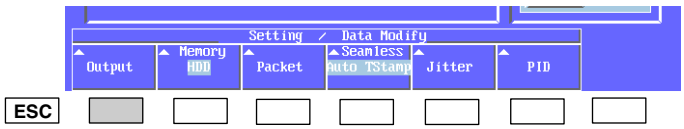
Note

- If the selected file is identified as a TS file, the menu will change according to the packet length that is automatically detected. If the selected file is not identified as a TS file, the packet length will be 188 bytes.
- If you attempt to change the packet length that is automatically detected from the TS file, a warning is displayed.

3.9 Setting Other Parameters Related to the Output

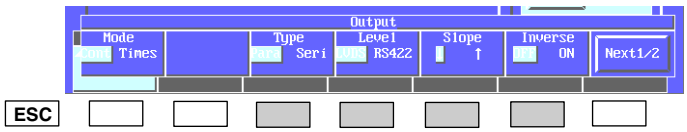
Procedure

1. In the case of the 2CH and 3CH models, a channel to be set is selected using the CH1 to CH3 keys.
2. Press the SETTING key to display the Setting menu.
3. Press the [Output] soft key.



Setting the repetition count of the output

4. Press the [Mode] soft key to select [Cont] or [Times].
5. If you select [Times], set the repetition count using numerical keys or the rotary knob. The range is from 1 to 256.



Selecting the Type

6. Press the [Type] soft key to select [Para] or [Seri].

Selecting the Level

7. Press the [Level] soft key to select [LVDS] or [RS422] during Parallel output or [TTL] or [ECL] during Serial output.

Selecting the Slope

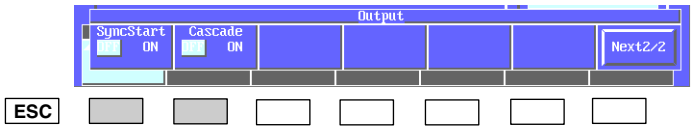
8. Press the [Slope] soft key to select [↓] or [↑].

Selecting the output logic

9. Press the [Inverse] soft key to select [OFF] or [ON].

Select sync output mode (2CH, 3CH model)

10. Press the [Next1/2] soft key.



11. Press the [Sync Start] soft key and select [ON].

Select cascading mode (2CH, 3CH model).

12. Press the [Cascade] soft key and select [ON].

Note

- You cannot operate [Output]-[Mode] and [Output]-[Loop] while contents are being output.
- Can be set for each channel.

Explanation

Setting the repetition count of the output

If you select Cont, output will repeat indefinitely from the Start position to the End position specified for Zone. If you select Times, output will repeat the specified number of counts and stop at the End position. If you select one for the count, the content will be output once. If the content is extremely short, the output count may not be correct.

Selecting the Level

If you select LVDS, the content is output using the voltage levels standardized by TIA/EIA-644 and IEEE1596.3 SCI LVDS.

If you select RS422, the content is output using the voltage levels standardized by TIA/EIA-422.

Selecting the output logic

If turned ON, the DATA VALID and SYNC signals are inverted (negative logic).

Sync output mode (2CH, 3CH model)

This is the mode in which channel outputs are started simultaneously. Output methods and output settings of clock, etc. of the channels can vary from one channel to another.

Cascading mode (2CH, 3CH model)

Two or more channels can be operated at the same clock.

A clock supplied from a modulator, etc. can be shared by the channels.

When using cascade output mode, connect the channel clock inputs and clock output connectors as shown below. Use a 50@ coaxial cables with a BNC connector as the cables for connection.

When using internal clock

Connect the CH3 serial clock output and CH2 serial clock input.

Connect the CH2 serial clock output and CH1 serial clock input.

Set the CH3 clock.

When using external clock

Input an external clock to the CH3 serial clock input.

Connect the CH3 serial clock output and CH2 serial clock input.

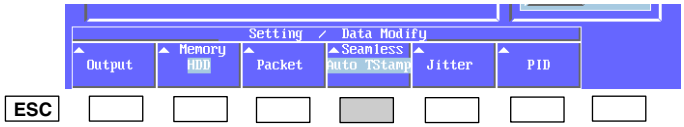
Connect the CH2 serial clock output and CH1 serial clock input.

Set an external clock for the CH3.

3.10 Making Seamless TS Packets

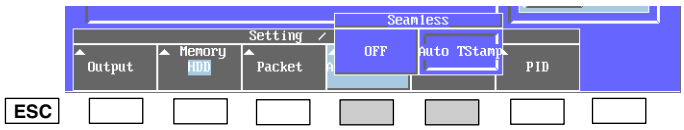
Procedure

1. In the case of the 2CH and 3CH models, a channel to be set is selected using the CH1 to CH3 keys.
2. Press the SETTING key to display the Setting menu.
3. Press the [Seamless] soft key.



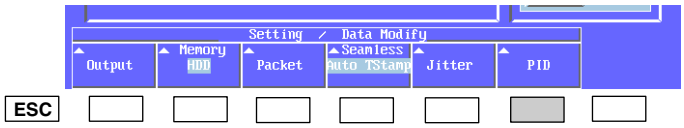
Setting Seamless

4. Select [AUTO Tstamp] or [OFF].

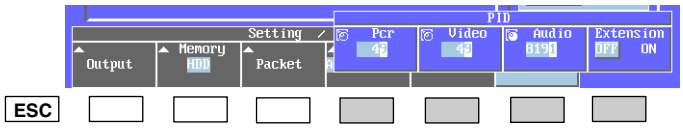


Set the PCR (PID)

5. Press the [PID] soft key to display the PID menu.



6. Press the [PCR] soft key and select the PCR (PID) using numerical keys or the rotary knob. The range is from 0 to 8191.



Setting the Video (PID)

7. Press the [Video] soft key and select the Video (PID) using numerical keys or the rotary knob. The range is from 0 to 8191.

Setting the Audio (PID)

8. Press the [Audio] soft key and select the Audio (PID) using numerical keys or the rotary knob. The range is from 0 to 8191.

Setting the Extension

9. Press the [Extension] soft key to select [OFF] or [ON].

Note

- Set PCR (PID), Video (PID), and Audio (PID) in decimals.
- The seamless function cannot be used on the playback of contents that have been placed in frames that are compatible with the BS digital broadcast (ARIB STD-B20).
- If the selected file is identified as a TS file, the detected PID is used for each PID. If the selected file is not identified as a TS file, PCR (PID), Video (PID), and Audio (PID) will be 8191. In addition, the Audio (PID) is 8191 if there are no Audio data.
- You cannot operate the Seamless and PID menus while contents are being output.
- Can be set for each channel.

Explanation

Making seamless packets

The following two types of seamless processes are available:

- Auto Time Stamp
- Splicing

Auto Time Stamp

Automatically updates time stamps to maintain continuity of the Video, Audio, PTS, DTS, and PCR when repetitively outputting contents according to the ISO/IEC-13818 standard.

When Extension is turned ON, time stamps of all PTS, DTS, and PCR are updated.

Time stamping method (method to compute the summed value)

The cycle period derived from the bit rate and data length are added to the PTS, DTS, and PCR.

Splicing

To maintain the continuity of video, you must process the start point and end point (repeat point) of the TS file in addition to updating the time stamp. The function that carries out this process is called Splicing.

Splicing is based on the method described below. In some cases, depending on the decoder, the continuity of video cannot be maintained even if Splicing is used.

Method used to detect the position of the seamless process

Detecting the start position

Start position is the beginning of the sequence header, GOP, or I frame. The start position of the seamless process is searched in the area that comes after the specified address (time axis direction in which the values get larger, where address indicates PACKET, FRAME, and TIME).

The search is performed in the following order: sequence header, GOP, and I frame.

The search range is 6 Mbytes from the specified address.

Searching the end position

The end position is before the sequence header, the end of GOP, or the I or P picture. The end position is searched sequentially in the area before the specified address (time axis direction in which the values get smaller). The search range is 6 Mbytes from the specified address.

Seamless process of VIDEO data

Processing the start point of the packet that is to be made seamless

- The TS packet before the GOP header data is deleted.
- PES header that includes DTS or PTS of an I frame is placed at the beginning of the TS packet.
- If there is space left after inserting the GOP header, it is filled with stuffing bytes using the adaptation field of the TS.
- If there is no space for the PES header before the GOP header, another TS packet is inserted before it.

Processing the end point of the packet that is to be made seamless

- If DTP and PTS are included in the PES header immediately after the end point, the time stamp inside the PES header goes through a stuffing process. (This is because the time stamp inside the PES header is indicating the playback time of the P picture that was deleted.)
- The remainder of the last TS packet is filled with stuffing bytes.

Broken link flag

The broken link flag of the first GOP that has gone through seamless processing is set to ON.

Seamless process of AUDIO data

- The extraction of both the start and end points are based on the SYNC signal that contains PTS.
- Based on the PTS of the VIDEO data, the AUDIO data are made into NULL packets so that
  Start VIDEO PTS < AUDIO PTS
  Stop VIDEO PTS > AUDIO PTS
  are satisfied.

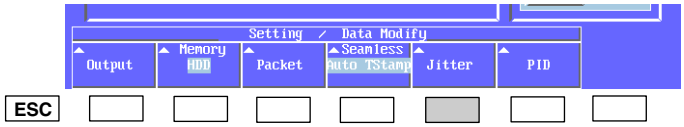
Time stamping method (method to compute the summed value)

The time stamp of PCR is processed in the same fashion as the Auto Time Stamp.
If the content includes Video, the cycle period derived from the DTS of the Video is added.
If the content only includes Audio, the cycle period derived from the PTS of the Audio is added.

3.11 Using the Jitter Addition Function

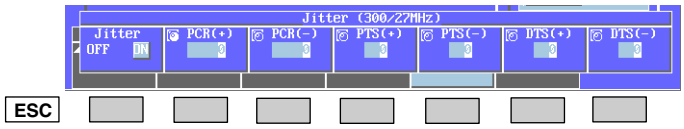
Procedure

1. In the case of the 2CH and 3CH models, a channel to be set is selected using the CH1 to CH3 keys.
2. Press the SETTING key to display the Setting menu.
3. Press the [Jitter] soft key.



Turn ON/OFF the Jitter

4. Press the [Jitter] soft key to select [OFF] or [ON].



Setting PCR(+)

5. Press the [PCR(+)] soft key and set PCR(+) using numerical keys or the rotary knob. The range is from 0 to 65535.

Setting PCR(–)

6. Press the [PCR(–)] soft key and set PCR(–) using numerical keys or the rotary knob. The range is from 0 to 65535.

Setting PTS(+)

7. Press the [PTS(+)] soft key and set PTS(+) using numerical keys or the rotary knob. The range is from 0 to 255.

Setting PTS(–)

8. Press the [PTS(–)] soft key and set PTS(–) using numerical keys or the rotary knob. The range is from 0 to 255.

Setting DTS(+)

9. Press the [DTS(+)] soft key and set DTS(+) using numerical keys or the rotary knob. The range is from 0 to 255.

Setting DTS(–)

10. Press the [DTS(–)] soft key and set DTS(–) using numerical keys or the rotary knob. The range is from 0 to 255.

Note

- The jitter addition function cannot be used on the playback of contents that have been placed in frames that are compatible with the BS digital broadcast (ARIB STD-B20).
- Can be set for each channel.

Explanation

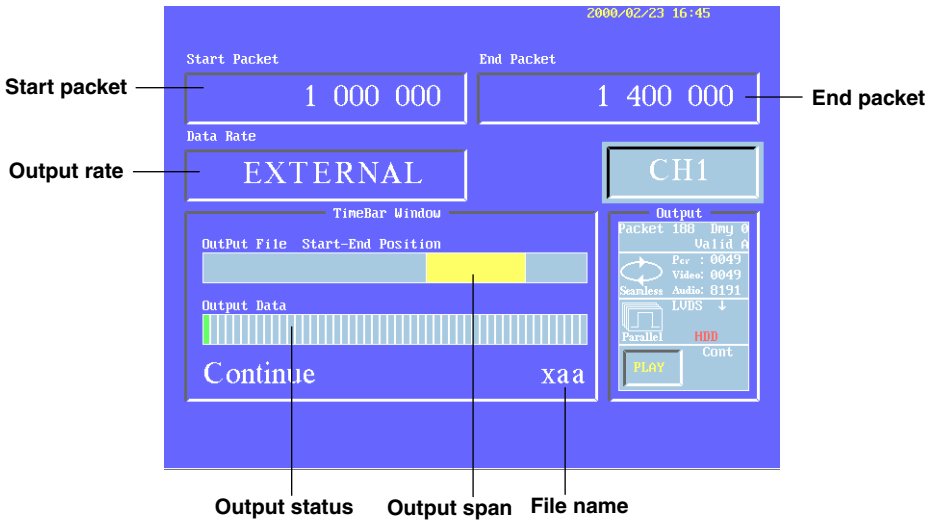
The jitter addition function adds jitter to the TS packet in the following manner:

- For the TS packet, when the first PCR is detected, the time specified for PCR(+) is added to the original PCR. When the next PCR is detected, the time specified for PCR(–) is added to the original PCR. This process is alternated.
- For the TS packet, when the first PTS is detected, the time specified for PTS(+) is added to the original PTS. When the next PTS is detected, the time specified for PTS(–) is added to the original PTS. This process is alternated.
- For the TS packet, when the first DTS is detected, the time specified for DTS(+) is added to the original DTS. When the next DTS is detected, the time specified for DTS(–) is added to the original DTS. This process is alternated.
- The jitter is added to the PCR, PTS, and DTS that have PIDs specified during the seamless process.

3.12 Outputting the Contents

Procedure

1. Press the START/STOP key to output the contents over the range specified by zone. The menu that was displayed is cleared. Press the START/STOP key to stop the output.



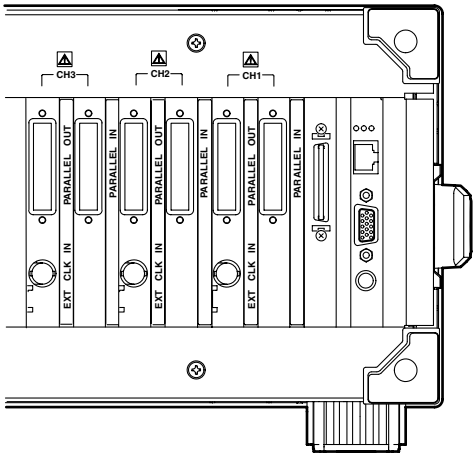
Explanation

- If you specified the output count, the output automatically stops after outputting the contents the specified number of times.
- The screen displays the Start and End Positions of the output buffer and the contents to be output. (Output File Start-End Position)
- The screen displays the current output position within the output span (from the Start position to the End position). (Output Data)

4.1 Connecting the Cable to the Parallel Input Terminal

Position of the Input Terminal

The parallel input terminal is located for each channel on the rear panel. Connect a 25-pin Dsub cable.



Parallel Input Specifications

Output level : Switch between LVDS (DVB-A010) and RS422
Connector : Dsub25

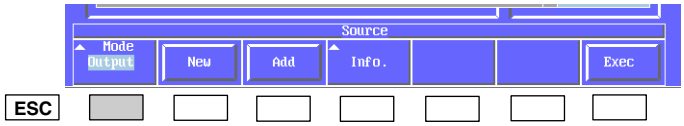
Connection

Pin No.	Signal Name	Pin No.	Signal Name
1	CLKA	14	CLKB
2	SYS GND	15	SYS GND
3	DATA7 A	16	DATA7 B
4	DATA6 A	17	DATA6 B
5	DATA5 A	18	DATA5 B
6	DATA4 A	19	DATA4 B
7	DATA3 A	20	DATA3 B
8	DATA2 A	21	DATA2 B
9	DATA1 A	22	DATA1 B
10	DATA0 A	23	DATA0 B
11	DATA VALID A	24	DATA VALID B
12	TRIGER A	25	TRIGER B
13	NC		

4.2 Setting the VT3000 in the Record Mode and Setting the File Name

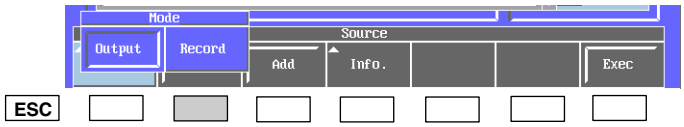
Procedure

1. In the case of the 2CH and 3CH models, a channel to be set is selected using the CH1 to CH3 keys.
2. Press the SOURCE key to display the Source menu.



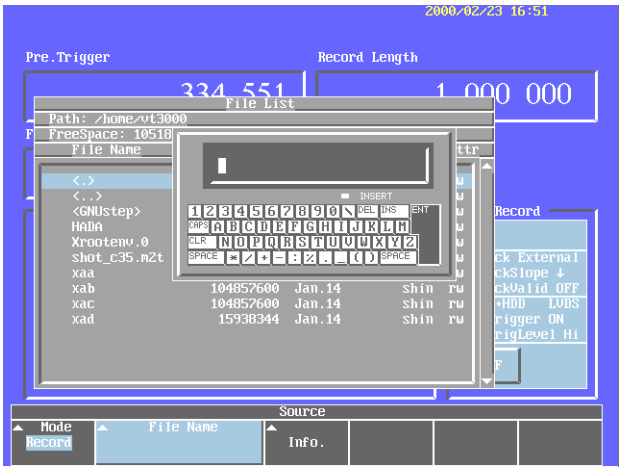
Setting the mode

3. Press the [Mode] soft key and select Record.



Setting the save destination

4. Highlight the destination directory with the rotary knob and press the SELECT key. Select <..> to move up a directory.
   When you change the directory, the file name that is entered is cleared.



Setting the file name

5. Press the [File Name] soft key to display a keyboard screen.
6. Enter the file name using up to 24 characters on the keyboard.

Viewing the file information

7. Press the [Info] soft key to view the information about the file that is highlighted.

Explanation

Save destination

The file is saved to the Path of the file list that is currently displayed.

File name

You can enter up to 24 characters for the file name, but the VT3000 can only display 15 characters in the file list.

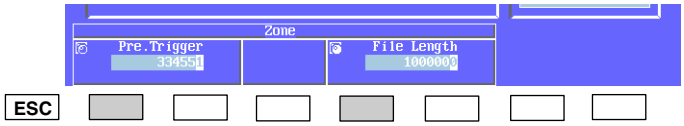
Note

- You cannot operate the Source menu while recording is in progress.
- Can be set for each channel.

4.3 Setting the Pre-trigger and Data Length

Procedure

1. In the case of the 2CH and 3CH models, a channel to be set is selected using the CH1 to CH3 keys.
2. Press the [ZONE] key to display the Zone menu.
3. Press the [Pre. Trigger] soft key and select the pre-trigger using numerical keys or rotary knob. If you set the pre-trigger to 0, data before the trigger point will not be recorded.



4. Press the [File Length] soft key and select the length of the data to be recorded using numerical keys or rotary knob.

Explanation

Pre-trigger range

The pre-trigger range is 0 MB to the DIMM size × 3/4 MB.

Data length range

The data length range varies depending on the [Memory] setting in section 4.6, “Setting the Record Mode” as follows:

When the Memory setting is DIMM

0 MB to the DIMM size

When the Memory setting is DIMM/HDD

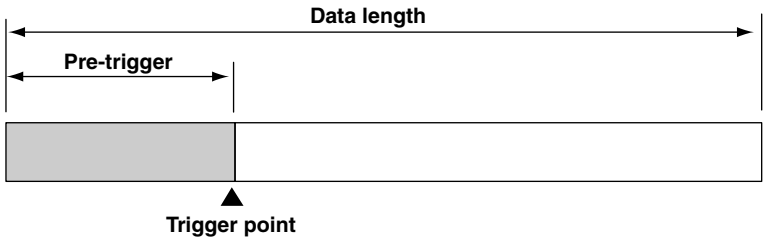
0 MB to the free space on the built-in hard disk (100 GB maximum = 102400 MB)

Note

- If you abort the recording before reaching the data length, data up to that point are recorded.
- If the free space on the hard disk is insufficient, data are recorded until the hard disk is full.
- Can be set for each channel.

Relationship between the pre-trigger and data length

The relationship between the pre-trigger and data length is as follows:



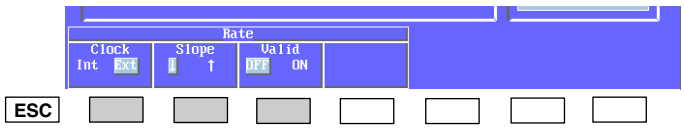
Note

- If you set the pre-trigger larger than the data length, an error occurs.
- You cannot operate the Zone menu while recording is in progress.

4.4 Setting the Clock

Procedure

1. In the case of the 2CH and 3CH models, a channel to be set is selected using the CH1 to CH3 keys.
2. Press the RATE key to display the Rate menu.
3. Press the [Clock] soft key to select [INT] or [EXT].



4. Press the [Slope] soft key to select rising [↑] or falling [↓].
5. If you select external clock, press the [Valid] soft key to select [ON] or [OFF].

Explanation

Clock

You can set the sampling to the internal clock or the external clock.

Internal clock

0 Hz to 57000000 Hz

External clock

Clock signal applied to the external clock terminal

Up to 7.5 MHz

Slope

Sampling is carried out on the rising or falling edge of the clock signal.

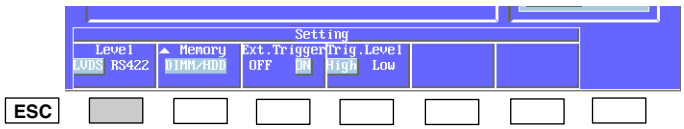
Note

- If the rate is set to external clock, input a continuous clock for the external clock. Burst signals cannot be used as clock signals. In addition, if you stop the external clock while recording, the VT3000 may not operate properly.
- You cannot operate the Rate menu while recording is in progress.
- If Valid is ON, the external clock is masked when Valid is at the “L” level.
- Can be set for each channel.

4.5 Setting the Input Level

Procedure

1. In the case of the 2CH and 3CH models, a channel to be set is selected using the CH1 to CH3 keys.
2. Press the SETTING key to display the Setting menu.
3. Press the [Level] soft key to select [LVDS] or [RS422].



Explanation

If you select LVDS, recording is carried out using the voltage levels standardized by TIA/EIA-644 and IEEE1596.3 SCI LVDS.
If you select RS422, recording is carried out using the voltage levels standardized by TIA/EIA-422 (positive voltage levels only).

Note

- You cannot operate the Setting menu while recording is in progress.
- If you set the input level to RS422, do not apply a negative voltage.
- Can be set for each channel.

4.6 Setting the Recording Mode

Procedure

1. In the case of the 2CH and 3CH models, a channel to be set is selected using the CH1 to CH3 keys.
2. Press the SETTING key to display the Setting menu.
3. Press the [Memory] soft key to display the Memory menu.

4. Select [DIMM] or [DIMM/HDD].

Explanation

Recording mode

The following two recording modes are availables:

DIMM

The entire data are recorded to memory. After recording is finished, the data residing in the memory is saved to the hard disk.

DIMM/HDD

Stores the pre-trigger section of data to the memory. Stores the post-trigger section of data (after the trigger point) to the built-in hard disk. After recording is finished, the data residing in the memory is saved to the hard disk.

This is useful when recording large quantities of data.

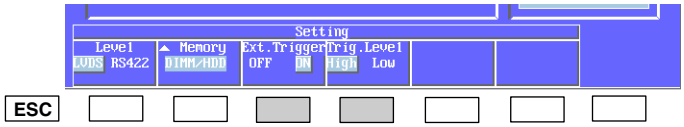
Note

- In the DIMM/HDD mode, you can record data that exceed the size of the memory. However, the disk write speed may be insufficient to keep up with the input data stream, if, for example, the VT3000's HD is busy due to external access via Ethernet using Samba or FTP. In such case, recording is aborted. We recommend that you turn OFF the network function when recording using the DIMM/HDD mode.
- If you abort the recording while recording in the DIMM mode, a file with 0 size is created.
- Can be set for each channel.

4.7 Setting the External Trigger

Procedure

1. In the case of the 2CH and 3CH models, a channel to be set is selected using the CH1 to CH3 keys.
2. Press the SETTING key to display the Setting menu.
3. Press the [Ext. Trigger] soft key to select [ON] or [OFF].



4. If the external trigger is turned ON, press the [Trig. Level] soft key to select [High] or [Low].

Explanation

With the external trigger ON and the VT3000 in the trigger-wait state, recording will start when you press the START/STOP key, even before the external trigger is input. Subsequently, when a trigger signal is input, the VT3000 will start recording.
If the external trigger is turned OFF, the VT3000 will enter the trigger-wait state when you press the START/STOP key. When you press the START/STOP key again, the VT3000 will start recording.
The external trigger signal is input through the parallel input connector.
The High or Low period of the external trigger signal must be at least 100 ns long.

Note

Can be set for each channel.

4.8 Starting the Recording Operation

Procedure

1. In the case of the 2CH and 3CH models, a channel to be set is selected using the CH1 to CH3 keys.
2. When you press the START/STOP key, the VT3000 enters the trigger-wait state. If the external trigger is OFF, recording starts when you press the START/STOP key again. If the external trigger is ON, recording starts when a trigger signal is input.
   If you press the START/STOP key while recording is in progress, recording stops.

Explanation

After you press the START/STOP key, recording stops when the specified length of data is recorded.

Note

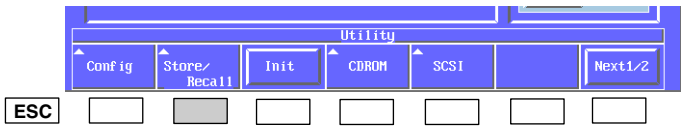
- Even if the external trigger is ON and the VT3000 is in the trigger-wait state, recording will start when you press the START/STOP key.
- If the recording mode is DIMM and you abort the recording, a file with 0 size is created.
- If the recording mode is DIMM/HDD and you abort the recording, data up to that point are recorded.
- In the trigger-wait state, if the specified pre-trigger length of data are not recorded, the Pre.Trig indicator appears at the upper left corner of the screen. If you start recording while this indicator is displayed (pre-trigger length of data are not recorded), a file is created which has no content recorded at the beg of the record file.
- If the record file exceeds 2 GB, recording is carried out by segmenting the file every 2 GB. For the segment file name, an index number is attached to the end of the specified file name. For example, if you record a 6-GB file to the file name “TEST,” the file is divided into three files, “TEST.1,” “TEST.2,” and “TEST.3.”
- Sync recording cannot be used in record mode. Moreover, cascading mode cannot be used.

5.1 Storing Setup Data in the Setup Data File

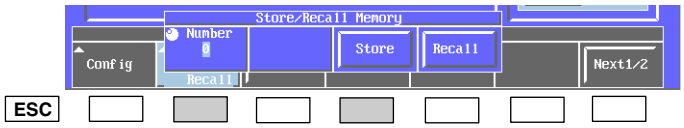
You can save and recall up to 32 sets of panel setup data and content name (file name) to the setup data file

Procedure

1. Press the UTILITY key to display the Utility menu.



2. Press the [Store/Recall] soft key to display the Store/Recall Memory menu.



Selecting the setup data number

3. Turn the rotary knob to set the setup data number.

Storing the data

4. Press the [Store] soft key.
5. A confirmation message appears. Select [OK] by turning the rotary knob and press the SELECT key to store the setup data.

Explanation

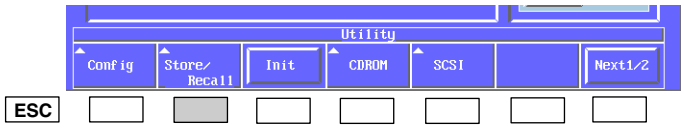
Setup data number

Select a value between 0 and 31. If setup data are already stored to the selected number, the previous data are overwritten.

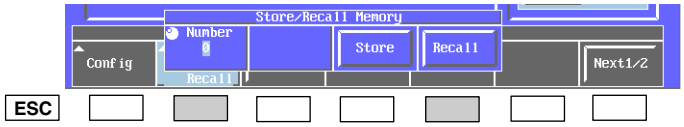
5.2 Recalling Setup Data from the Setup Data File

Procedure

1. Press the UTILITY key to display the Utility menu.



2. Press the [Store/Recall] soft key to display the Store/Recall Memory menu.



Selecting the setup data number

3. Turn the rotary knob to set the setup data number.

Recalling the data

4. Press the [Recall] soft key to recall the setup data.

Explanation

Setup data number

Select the setup data from a value between 0 and 31.

5.3 Connecting a SCSI Device

You can connect an external hard disk to the VT3000 and copy or move contents from the external hard disk to the built-in hard disk of the VT3000.

SCSI Specifications

Item	Specifications
Interface standard	SCSI (Small Computer System Interface), ANSI X3.131-1986
Connector type	68-pin Ultra Wide SCSI (pin type)

Items Necessary for Connection

Cable

Use a commercially sold cable that is 3 m or less in length, that has a ferrite core on each end of the cable, and that has a characteristic impedance between 90 and 132 Ω.

Terminator

Be sure to attach a terminator to the last external SCSI device.

Connection Procedure

1. Connect the SCSI cable to the SCSI connector on the rear panel of the instrument.
2. After turning on the SCSI device, turn ON the VT3000. To format the hard disk, follow the procedure described in the next section, “Formatting the Disk.”

Hard Disks that Can Be Connected

You can connect a single-partition hard disk that has been formatted in the expanded region of the FAT system using fdisk. You cannot connect a hard disk that has been formatted in the primary region using fdisk.
For general handling precautions for the connected hard disk, see the instruction manual that is provided with the hard disk.

Note

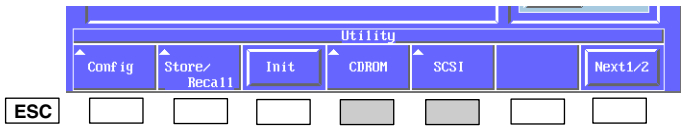
- A maximum of 7 SCSI devices can be connected to this equipment.
- Make sure all SCSI devices connected have unique ID numbers.

5.4 Mounting a Internal CD-ROM Drive or External SCSI Device

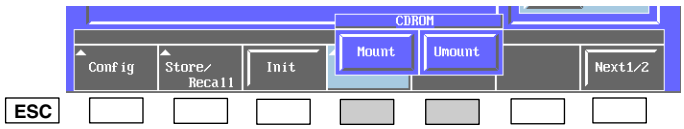
Procedure

Mount/Unmount the Internal CD-ROM drive

1. Press the UTILITY key to display the Utility menu.
2. Press the [CDROM] soft key.

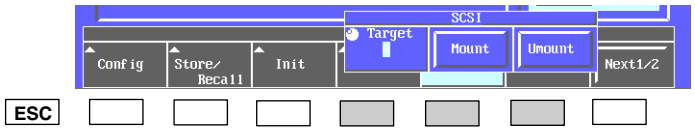


3. Press the [Mount] or [Unmount] soft key.



Mount/Unmount the External SCSI Device

1. Press the UTILITY key to display the Utility menu.
2. Press the [SCSI] soft key.



3. Press the [Target] soft key and select the target using rotary knob.
4. Press the [Mount] or [Unmount] soft key.

Explanation

You must mount the CD-ROM or SCSI device in order for the VT3000 to recognize it. To unload the CD-ROM, unmount it.

CAUTION

Do not turn OFF the SCSI device or remove the SCSI cable while mounting the device. This can damage the SCSI device or files on the SCSI device.

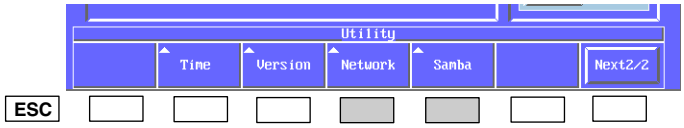
Note

- SCSI deviced which can be connected to the instrument are hard disks, PD, JAS, and Zip disk with FAT32 formatting.
- The <SCSI> and <cdrom> directories in the home directory are mount points for the SCSI and CD-ROM. Do not remove these directories.
- Do not place files or create directories under the <SCSI> and <cdrom> directories if they are not mounted.
- If the current directory is below the <cdrom> directory, you cannot unmount the CD-ROM. Move to the current directory above the <cdrom> directory.
- If you turn OFF the VT3000 with the SCSI device or CD-ROM mounted, it will be mounted the next time the VT3000 is turned ON.
- If you try to mount a device that is already mounted, an error occurs.
- When directly outputting the contents from the CD-ROM in the HDD mode and the output rate is slower than the transfer rate from the CD-ROM (varies depending on the writing format of the CD-ROM), the contents may not be output correctly. If the output mode is DIMM/HDD, the contents may not be output correctly until the contents are transferred to the DIMM.
- While the CD-ROM drive or SCSI device directory (<cdrom>, <scsiA to scsiG>) are selected in the SOURCE menu or FILE menu, unmounting the CD-ROM causes a message “Device is busy” to appear and it is impossible to unmount the CD-ROM. In this case, select any drive other than the CD-ROM drive or any directory other than the directories of the SCSI devices and then unmount the CD-ROM.
- Target numbers are assigned to SCSI devices in ascending order of ID numbers. For example, if SCSI devices with ID numbers 2, 5, and 6 are connected, target numbers A, B, and C are assigned in that order.

5.5 Configuring the Network and SAMBA

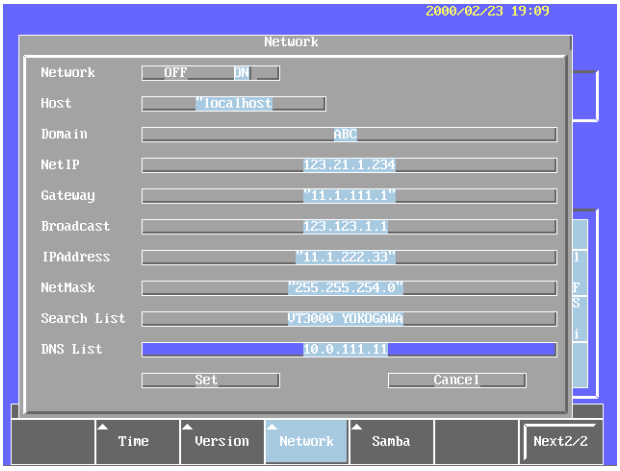
Procedure

1. Press the UTILITY key to display the Utility menu.
2. Press the [Next1/2] soft key.



Configuring the network

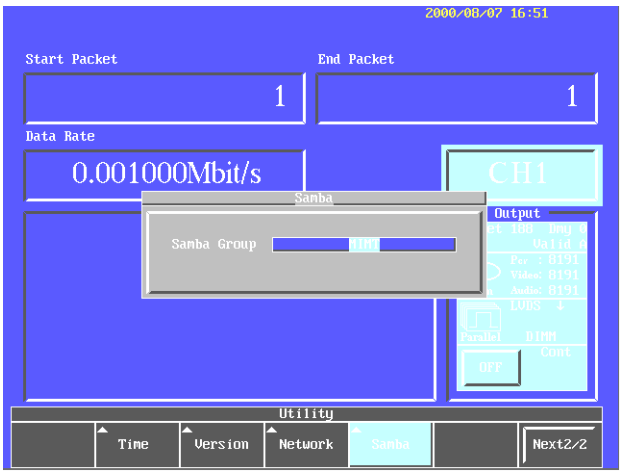
3. Press the [Network] soft key to display the Network configuration screen.



4. Highlight Network using the rotary knob.
5. Select [ON] or [OFF] using the SELECT key.
6. If you select ON, set the Host, Domain, Net IP, Gateway, Broadcast, IPAddress, NetMask, Search List, and DNS List. To set the Host, Domain, Net IP, Gateway, Broadcast, IPAddress, NetMask, Search List, and DNS List, press the SELECT key to display the keyboard. Enter up to 20 characters for the Host, up to 15 characters for the NetIP, Gateway, Broadcast, IPAddress, and NetMask, and up to 50 characters for the others.
7. Highlight [Set] or [Cancel] using the rotary knob and press the SELECT key.

Configuring SAMBA

8. After step 1, press the [Samba] soft key to display the Samba configuration screen.



9. Press the SELECT key to display the keyboard. Enter the work group name of Samba using up to 20 characters. It takes some time for the samba configuration to take effect.

Explanation

Network

You can connect to the network via Ethernet. Using ftp, you can exchange contents with a PC on the network.

If you put a file to the VT3000 using ftp, it is placed in the VT3000 directory. The file that has been put appears in the list when the file list is closed and opened once again.

Host

Enter the host name of the VT3000.

Domain

Set the network domain name that the VT3000 belongs to.

Net IP

Set the network address used to exchange data over the network.

Gateway

Set the IP address of the gateway (router, switch, etc.) used to communicate with other networks. Set the gateway according to the system or network to which the VT3000 belongs. You may not need to set the gateway.

Broadcast

The IP address with the host section set to all 1s in binary notation is called a broadcast address. This address is used to transmit the same packet to all hosts on the network to which the VT3000 is connected.

IP Address

Set the IP address to assign to the VT3000. The IP address is used to uniquely identify a device on the network when using TCP/IP.

NetMask

Set the mask value used when determining the subnet network address from the IP address. Set the netmask according to the system or network to which the VT3000 belongs. You may not need to set the netmask.

Search List

Set the domain name of the network to be searched. To set multiple domains, enter a space as a delimiter between the domain names.

DNS List

Set the DNS server address. To set multiple addresses, enter a space as a delimiter between the addresses.

Anonymous ftp

The VT3000 supports anonymous ftp. The user name of the file that is put to the VT3000 using anonymous ftp is automatically set to “VT3000.”

Note

- Set the NetIP, Gateway, Broadcast, IPAddress, and NetMask by specifying four values between 0 and 255 delimited by a period (“xxx.xxx.xxx.xxx”). An error occurs if the values are specified using any other format.
- Because the VT3000 does not support DHCP, obtain a fixed IP address for the Host and IP Address.
  For details, consult your network administrator.
- You cannot create directories below the VT3000 directory using ftp.
- You can only put files to the VT3000 directory using ftp.

SAMBA

Because the VT3000 uses Linux as its OS, SAMBA is used to connect to a PC running Windows on the network. Here, you will set the SAMBA work group. By setting the work group, the VT3000 is recognized as a SAMBA server from a PC running Windows. Then, you can exchange contents with the PC.

Note

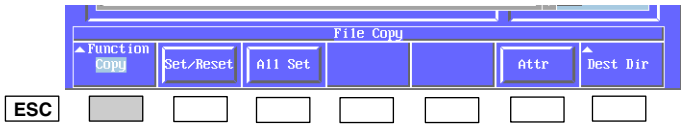
When copying directories or files to the VT3000 (Samba server) from a PC running windows, use only alphanumeric characters for the directory and file names. Copying directories or files that use double-byte characters in their names will appear as garbled characters on the VT3000 file list.

5.6 Deleting Files

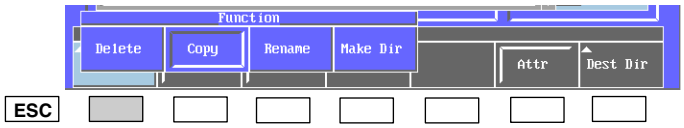
Procedure

Displaying the delete menu

1. Press the FILE key to display the File menu.
2. Press the [Function] soft key to display the Function menu.

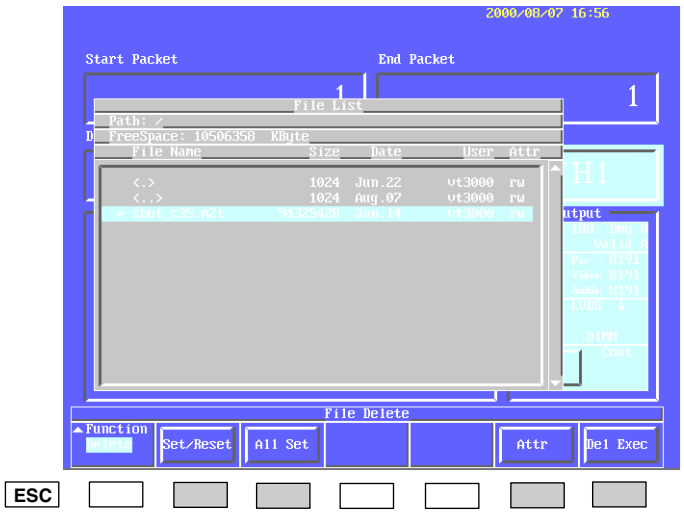


3. Press the [Delete] soft key to display the File List and Delete menus.



Changing the directory

4. Highlight the directory (displayed with <>) with the rotary knob and press the SELECT key. The file list of the selected directory is displayed.
   Select <..> and press the SELECT key to move up a directory.



Selecting the file to be deleted

5. Select the file to be deleted using the rotary knob and press the [Set/Reset] soft key. A [*] mark is placed by the file indicating that it is selected. Press the same soft key again to remove the [*] mark.

Selecting all files to be deleted

6. Press the [All Set] soft key (the name of the soft key changes to [All Reset]) to place [*] marks. Press the [All Reset] soft key (the name of the soft key changes to [All Set]) to remove [*] marks.

Executing the delete operation

7. Press the [Del Exec] soft key to delete all files that have [*] marks.

Setting the File Attributes

8. Select the file using the rotary knob and press the [Attr] soft key to select [R] or [R/W].

Explanation

Deletes files that have been saved to the built-in hard disk or external SCSI device.

Setting the file attribute (Attr)

You can set file attributes for each file. The two attributes you can select are as follows:

- R/W: Reading and writing of the file are possible
- R: Only reading of the file is possible

If you set the attribute to [R], the file cannot be deleted. Set the attribute to [R] for those files you do not wish to delete.

Selecting the files to be deleted

Deletes all files that have [*] marks.

If files exist in the directory you wish to delete, delete the files in the directory first. Then, delete the directory.

Note

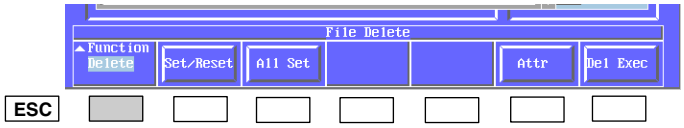
- You cannot delete files while stream output or recording is in progress. Press the START/STOP key to stop the output.
- Data that are deleted cannot be recovered. Make sure you do not erase important files. You can delete directories if there are no files in them.
- If an error occurs while deleting multiple files, the files after the error occurrence are not deleted.
- You cannot delete files that have [R] attributes (read-only).

5.7 Copying Files

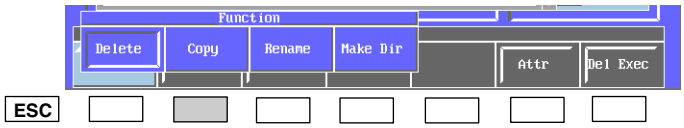
Procedure

Displaying the copy menu

1. Press the FILE key to display the File menu.
2. Press the [Function] soft key to display the Function menu.



3. Press the [Copy] soft key to display the File List and Copy menus.

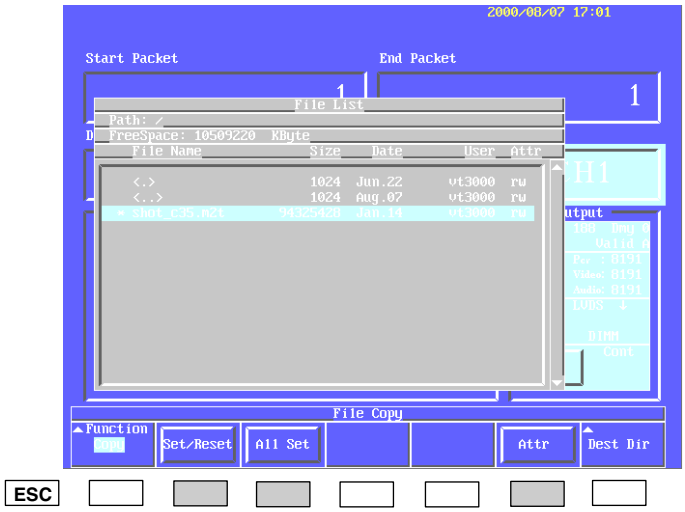


Changing the directory

4. Highlight the directory (displayed with <>) with the rotary knob and press the SELECT key. The file list of the selected directory is displayed.
   Select <..> and press the SELECT key to move up a directory.

Selecting the file to be copied

5. Highlight the file you wish to copy using the rotary knob and press the [Set/Reset] soft key. A [*] mark is placed by the file indicating that it is selected.
   Press the same soft key again to remove the [*] mark.



Selecting all files to be copied

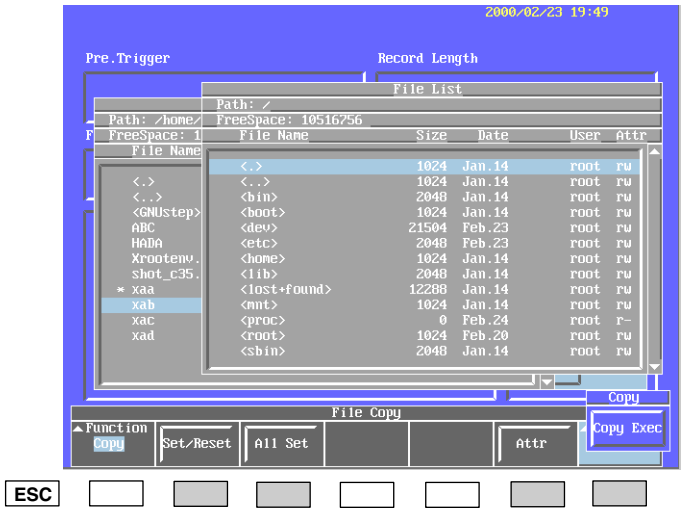
6. Press the [All Set] soft key (the name of the soft key changes to [All Reset]) to place [*] marks. Press the [All Reset] soft key (the name of the soft key changes to [All Set]) to remove [*] marks.

Selecting the copy destination medium or directory

7. Press the [Dest Dir] soft key to display the File List and Copy menus.
8. Select the copy destination medium or directory.

Executing the copy operation

9. Press the [Copy Exec] soft key to execute the copy operation.



Setting the File Attributes

10. Highlight the file using the rotary knob and press the [Attr] soft key to select [R] or [R/W].

Explanation

Copies the files that are saved on the built-in hard disk or external SCSI device to the specified directory.

Setting the file attribute (Attr)

You can set file attributes for each file. The two attributes you can select are as follows:

- R/W: Reading and writing of the file are possible
- R: Only reading of the file is possible

Note

- You cannot copy files while stream output or recording is in progress. Press the START/STOP key to stop the output.
- If an error occurs while copying multiple files, the files after the error occurrence are not copied.
- If files with the same file name exist at the copy destination, they are overwritten.
- You cannot copy the same files to another directory after copying the files. Select the files to be copied again and copy them.
- An error occurs if the copy source and copy destination directories are the same.

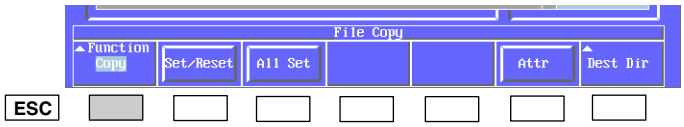
5.8 Renaming Files and Creating Directories

Procedure

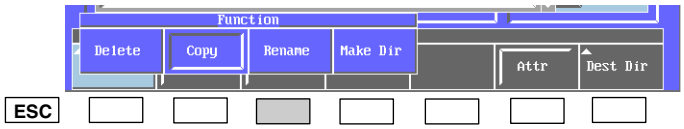
Renaming a file

Displaying the Rename menu

1. Press the FILE key to display the File menu.
2. Press the [Function] soft key to display the Function menu.



3. Press the [Rename] soft key to display the File List and Rename menus.



Changing the directory

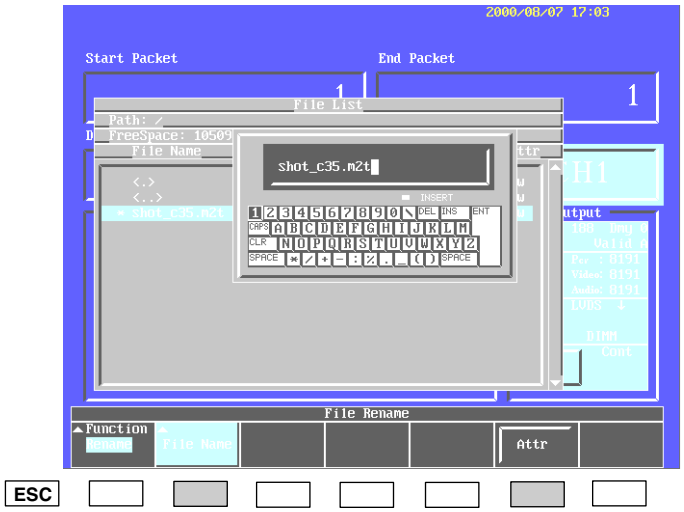
4. Highlight the directory (displayed with <>) with the rotary knob and press the SELECT key. The file list of the selected directory is displayed.
   Select <..> and press the SELECT key to move up a directory.

Selecting the files to be renamed

5. Highlight the files you wish to rename using the rotary knob.

Setting a new file name

6. Press the [File Name] soft key to display a keyboard screen. Enter the file name using up to 24 characters.



Creating a directory

Displaying the Make Dir menu

7. After step 2, press the [Make Dir] soft key to display the File List and Make Dir menus.

Selecting the directory

8. Highlight the directory (displayed with <>) with the rotary knob and press the SELECT key. The file list of the selected directory is displayed.
   Select <..> and press the SELECT key to move up a directory.

Setting the directory name

9. Press the [Dir Name] soft key to display a keyboard screen. Enter the directory name using up to 24 characters. Press the [ENTER] key to create the directory.

Explanation

Renaming files

You can rename files.

Creating directories

You can create directories on the floppy disk, built-in hard disk, or external SCSI device.

Note

- You cannot create directories while stream output or recording is in progress. Press the START/STOP key to stop the output.
- If a file with the same name exists in the same directory, it is overwritten.
- If a directory with the same name already exists in the same directory, the directory cannot be created.
- You can enter up to 24 characters for the file name and directory name. However, the VT3000 only displays the first 15 characters on the file list.

5.9 Creation of BS digital broadcasting compatible streams (/BS option)

Procedure

1. Press the FILE key to display the File menu.
2. Press the [Function] soft key.
3. Press the [Convert] soft key.

For the subsequent operations, see the instruction manual of the “BS Digital Multiplexing Software”.

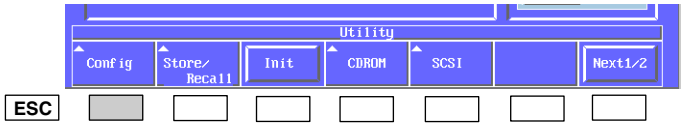
Explanation

If you purchased the BS digital multiplexing software with a /BS option, this equipment makes it possible to create multiplexing streams with TMCC compatible with the BS digital broadcasting (ARIB STD-B20).

6.1 Turning ON/OFF the Alarm Sound and Screen Saver

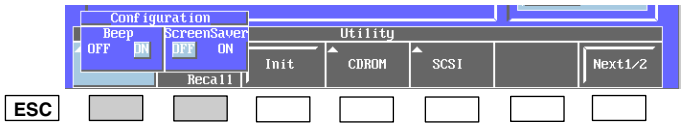
Procedure

1. Press the UTILITY key to display the Utility menu.
2. Press the [Config] soft key to display the Config menu.



Turning ON/OFF the alarm sound

3. Press the [Beep] soft key to select [ON] or [OFF].



Turning ON/OFF the screen saver

4. Press the [ScreenSaver] soft key to select [ON] or [OFF].

Explanation

Alarm sound

Selects whether or not to sound an alarm when you make a mistake in an operation and when errors and warnings are displayed. The initial value is ON.

Screen saver

If there is no key operation for approximately five minutes, the backlight of the display turns OFF. To exit the screen saver, press a key. The initial setting is OFF.

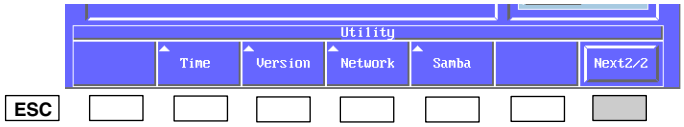
Note

The alarm sound and screen saver settings are reset to the initial values every time the power is turned OFF.

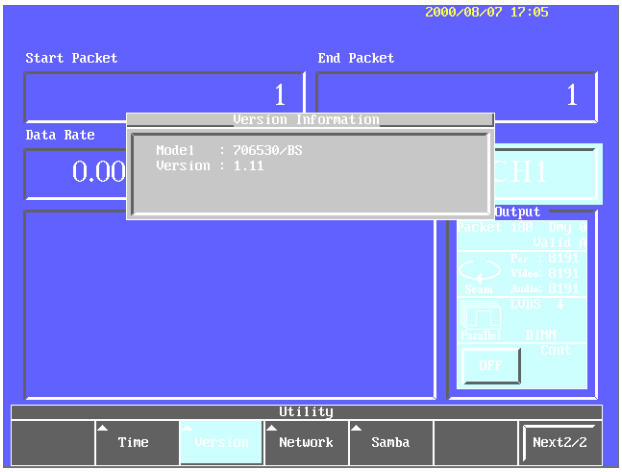
6.2 Displaying the Overview

Procedure

1. Press the UTILITY key to display the Utility menu.
2. Press the [Next1/2] soft key to display the next menu.



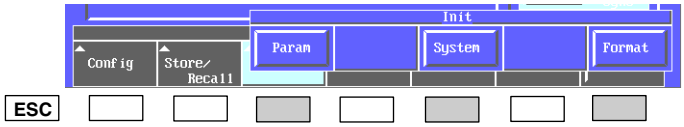
3. Press the [Version] soft key to display the version and model name.



6.3 Initializing the Settings

Procedure

1. Press the UTILITY key to display the Utility menu.
2. Press the [Init] soft key.



Initialization of setting information

3. Press the [Param] soft key. A comfirmation message appears.
4. Select [OK] using the rotary knob and press the SELECT key.

Initialization of system information

3. Press the [System] soft key. A comfirmation message appears.
4. Select [OK] using the rotary knob and press the SELECT key.

Initialization of built-in hard disk

3. Press the [Format] soft key. A comfirmation message appears.
4. Select [OK] using the rotary knob and press the SELECT key.

Explanation

Initialization of setting information

The channel setting information is initialized to the factory setting. However, the network setting cannot be initialized.

Initialization of system information

The channel setting and VT3000 setting are initialized to the factory setting.

Initialization of built-in hard disk

Formats the hard disk and reconstructs the file system. When initialization is completed, power to the VT3000 is automatically turned off.

CAUTION

Initializing the built-in hard disk erases all data contents in the hard disk.

7.1 Error Messages

Error Messages

A message may appear while you are using the VT3000. This section describes the meanings of the messages and the corrective actions. If the corrective action indicates servicing, please contact your nearest YOKOGAWA dealer as listed on the back cover of this manual.

Error Messages

Code	Message	Cause Reference	Page
001	Status is local, then you cannot operate by remote.	Tried to display the remote menu while operating the local menu in the remote mode.	—
002	Status is remote, then you cannot operate by local.	Tried to display the local menu while operating the remote menu in the remote mode.	
003	VT3000 is now playing.	Tried to carry out an operation that cannot be carried out while outputting contents.	3-5, 3-8, 5-9
004	VT3000 is now recording.	Tried to carry out an operation that cannot be carried out while recording is in progress.	4-2, 4-3, Ch. 5, 5-9
005	FileName is too long.	The length of the file name exceeds the limit.	4-2, 5-13
007	Permission denied.	Tried to delete a read-only file.	5-9
008	Same File is exist.	A file with the same file name exists.	4-2
009	Netwrok setting is wrong. Please input ***.***.***.*** 0<=***<=255	Network configuration is not correct.	5-6
1300	Not selected file	Tried to output without any file being selected.	3-5, 3-20
1302	Can't operate while running.	Operated the Mode or Loop in the SETTING-Output menu while outputting contents.	3-13
1304	Over DIMM size.	The total size of the multiple contents you selected exceeded the DIMM size.	3-5
2303	VT3000 is now playing or recording.	Tried to carry out an operation that cannot be carried out while outputting contents or while recording is in progress.	3-10, 3-11, 3-15
2304	You cannot change Rate in Running when zone mode is Frame or Time.	Tried to operate the RATE menu while outputting contents with zone set to Time or Frame.	3-9, 4-4
2305	Zone is Out of range.	The Time value when zone is set to Time exceeds the range.	3-5
2306	Start position is greater than stop position.	The Start time value is greater than the End time value when zone is set to Time.	3-5
2307	Pretrigger size is greater than file length.	Recorded while PreTrigger is greater than FileLength.	4-3
2308	Zone size is less than 4096 byte in HDD mode.	With the output mode set to HDD, you specified an output zone that is less than or equal to 4096 bytes and output the data.	3-8
2309	Cannot output when output type is Serial and external clock is Parallel.	Tried to output with Output set to Serial and external clock set to Para.	3-9, 3-13
2312	You cannot delete this directory.	Tried to delete the SCSI and CD-ROM directory which are mount points for SCSI and CD-ROM.	5-5, 5-9
2313	No SMB group name are filled.	The Samba group is not specified.	5-6
2314	No data are stored in this number.	Recalled a setup data number that has not been stored.	5-3
2318	You cannot delete or rename selected file on output mode.	Tried to delete or rename the file that you have selected as an output file.	5-13
2319	Device is busy.	Mounted SCSI (CD-ROM) while the file list is in the scsi (cdrom) directory.	5-5

Error Messages Related to LINUX

Code	Message	Cause Reference	Page
3101	No space left on device.	No space left on the built-in hard disk.	
3101	*** and *** are the same file name.	Tried to copy to the same directory.	5-11
3105	*** exists but is not a directory.	The same file name existed, when Mkdir was executed.	5-13
3106	The kernel deos not recognize /dev/sda* as a block device.	Mounted the SCSI device without connecting the SCSI device.	5-5
3106	Wrong fs type, bad option, bad superblock on/dev/cdrom.	Mounted the CD-ROM without inserting a CD-ROM.	5-5
3106	According to mtab, /dev/*** is already mounted on ***.	Tried to mount a device that is already mounted.	5-5
3109	Directory not empty.	The directory you tried to delete contains files.	5-9
3111	Device is busy.	Unmounted the SCSI (CD-ROM) when the current directory is the scsi (cdrom) directory.	5-5

7.2 Recommended Replacement Parts

The one-year warranty applies only to the main unit of the instrument (starting from the day of delivery) and does not cover any other items or expendable items (items which wear out). The replacement period for expendable items may vary depending on the conditions of use. Refer to the table below as a general guideline. Contact your nearest YOKOGAWA dealer for replacement parts.

Parts Name	Replacement Period
LCD backlight	3 years
Built-in hard disk	One year after purchase (data are excluded)
Cooling fan	3 years
Backup battery (lithium battery)	3 years

Specifications

Output Signal

Item	Specifications
Output signal specifications	Complies with ISO/IEC-13818
Data rate	0.1 M to 56.61 Mbps (1 Hz resolution) Auto clock function included (used to synchronize the clock to the data rate computed from the data in the internal clock mode)
Record length	Normal 256 MB Option 256 MB to 768 MB
Packet length	188, 192, 204, or 208 bytes
Data setting	Specify the start and stop position of playback with packet number, frame, or time.
Writing to the memory	Able to write one or multiple data sets
Loop playback	Specify the number of playback repetitions from 1 to 256 times and infinity. Able to repetitively playback one channel of video and one channel of audio seamlessly.*1

*1: Seamless processing is possible only on streams complying with the MPEG2-System standard.

Input/Output Format of Signal*2

Item	Specifications	
Serial output	Level	TTL (50 Ω) or ECL (50 Ω unbalanced)
	Connector	BNC
Serial clock input/output	Level	TTL (50 Ω) or ECL (50 Ω unbalanced)
	Timing	Rise or Fall
	Connector	BNC
SYNC output*3	Level	TTL (50 Ω) or ECL (50 Ω unbalanced)
	Connector	BNC
Data Valid*3	Level	TTL (50 Ω) or ECL (50 Ω unbalanced)
	Connector	BNC
Parallel output*3, *4	Level	LVDS (DVB-A010) or RS422
	Connector	25-pin Dsub
External CLK input	Level	TTL (50 Ω) or ECL (50 Ω unbalanced)
	Timing	Rise or Fall
	Connector	BNC
	Format	Serial/Parallel (input a clock obtained by frequency dividing the signal by eight) During parallel output, select serial or parallel for the external clock

*2: Select the signal level from the menu.
*3: Select SF-Sync or Pkt-Sync from the menu.
*4: Switch Data Valid signal between Low and High for the latter 4, 16, 20 bytes of the 192-, 204-, and 208-byte packet.

Jitter Addition Function*5

Item	Specifications	
PCR	+ side	0 to 728.16 ms (11.11 us steps)
	– side	0 to 728.16 ms (11.11 us steps)
PTS, DTS	+ side	0 to 2.83 ms (11.11 us steps)
	– side	0 to 2.83 ms (11.11 us steps)

*5: Select + side and – side for each PCR, PTS, and DTS. The value on the + side and – side are alternately added to each time stamp.

TS Record Function

Item	Specifications	
Input	Level	LVDS (DVB-A010) or RS422
	Connector	25-pin Dsub
Sampling rate	Internal clock	0.1 Mbit/s to 57 Mbit/s
	External clock	0.1 Mbit/s to 57 Mbit/s
Record length	Pre-trigger	Up to the maximum memory length
	Post-trigger	Up to the HDD size.

Storage Media and Communications

Item	Specifications	
Built-in HDD	Size	6.4 Gbytes or 30 Gbytes (IBM format)*6
	Others	Can be mounted with Linux
Built-in CD-ROM	x32 speed, SCSI interface	
SCSI	Standard Ultra Wide SCSI	
Communication	10/100Base-T Ethernet (TCP/IP)	

General Specifications

Item	Specifications	
Standard operating condition	Ambient temperature	23 ± 5°
	Ambient humidity	55 ± 10% RH
	Supply voltage and frequency	1% of rating
	Warm-up	At least 30 minutes
Storage conditions	Temperature	–20 to 60°C
	Humidity	20 to 85% RH * no condensation
Operating conditions	Temperature	5 to 40°C
	Humidity	20 to 85% RH * no condensation
Rated supply voltage	100 to 1240 VAC	
Permitted supply voltage range	90 to 264 VAC	
Rated supply voltage frequency	50 Hz or 60 Hz	
Permitted supply voltage frequency range	48 to 63 Hz	
Maximum power consumption	200 VA	
Withstanding voltage	1.5 kVAC for one minute	
Insulation Resistance	10 MΩ or more (500 VDC)	
External dimensions	Approx. 426(W) X 176(H) X 450(D) mm	
Weight	Approx. 15 kg	
Safety standard	Complying standard	EN61010-1
	Overvoltage category (Installation category) II*1	
	Pollution degree 2*2	
Emission	Complying standard	• EN61326 Class A This product is a Class A (for industrial envionment) product. Operation of this product in a residential area may cause radio interference in which case the user is required to correct the interference.
	Cable requirement	• Serial output terminal Use a BNC cable*3 • DVB output connector Use a D-sub 25-pin shielded cable*3 • Video output connector Use a D-sub 15-pin VGA shielded cable*3 • SCSI connector Use a Wide SCSI shielded cable*3 • Ethernet connector Use a Ethernet cable and attach a ferrite core (seiwa: E04SR170730A, YOKOGAWA: B9994SP)
	Tests	1. Main terminal disturbance voltage (EN61326) Class A 2. Electromagnetic radiation disturbance (EN61326) Class A 3. Harmonic current emission (EN61000-3-2) 4. Voltage fluctuation and flicker (EN61000-3-3)

Item	Specifications	
Immunity*1	Complying standard	EN61326
	Test condition	• Mode: Parallel output mode • Data Rate: 56.6 M bps • Level: RS422
	Tests	1. Electrostatic discharge (IEC61000-4-2): 8 kV (air dischage), 4 kV (contact discharge), Criterion B 2. EM-field immunity (IEC61000-4-3): 80 MHz to 1 GHz, 10 V/m, Criterion A 3. Electrical fast transient/burst (IEC61000-4-4): 2 kV (AC line), 1 kV (other signal lines), Criterion B 4. HF conducted immunity (IEC61000-4-6): 0.15 to 80 MHz, 10 Vrms, Criterion A 5. Power frequency magnetic field (IEC61000-4-8): 50 Hz, 30 A/m, Criterion A 6. Surge immunity (EN61000-4-5): AC Power 0.5 kV (line to line), 1 kV (line to earth), Criteria B 7. Voltage dips, short interruptions (EN61000-4-11): dips (0.5 cycle each polarity), Criteria B
	Definition of performance criteria A and B	
		criterion A: During experiments make sure the above "Influence in the immunity environment" values are being satisfied.
		criterion B: This apparatus continues to operate without hang-up or falling into uncontrollable conditions during the test. No change of actual operating state or stored data is allowed.

*1: "Overvoltage category (Installation category)" describes a number which defines a transient overvoltage condition. It implies the regulation for impulse withstand withstand voltage. "II" applies to electrical equipment which is supplied from the fixed installation like distribution board.

*2: "Pollution degree" describes the degree to which a solid, liquid, or gas which deteriorates dielectric strength or surface resisstivity is adheting. "2" applies to normal indoor atmosphere. Normally, only non-conductive pollution occurs.

*3: The cable length is less than 3 m.

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