

LT 7030A

3D ASSIST BOX

INSTRUCTION MANUAL

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GENERAL SAFETY SUMMARY

■ Read This before Using the Instrument

This instrument should only be used by persons with sufficient knowledge of electronics who thoroughly understand the contents of this manual.

This instrument is not designed or manufactured for households or ordinary consumers.




If unqualified personnel are to use the instrument, be sure the instrument is handled under the supervision of qualified personnel (those who have electrical knowledge). This is to prevent the possibility of personal injury or damage to the instrument.

■ Note about Reading This Manual

The contents of this manual contain specialized terminology and may be difficult to understand. If you have any questions about the contents of this manual, please contact your local LEADER agent.

■ Symbols and Terms

The following symbols and terms are used in this instruction manual and on the instrument to indicate important warnings and notes.

<p><Symbol></p> 	<p>This symbol appears in this instruction manual and on the instrument to indicate an area where improper handling could result in personal injury, damage to the instrument, or malfunction of the instrument or devices connected to it.</p> <p>When you encounter this symbol on the instrument, be sure to refer to the information in this instruction manual that corresponds to the area that the symbol marks.</p>
<p><Term></p>  WARNING	<p>Ignoring the precautions that this term indicates could lead to death or serious injury.</p>
<p><Term></p>  CAUTION	<p>Ignoring the precautions that this term indicates could lead to personal injury or damage to the instrument.</p>

GENERAL SAFETY SUMMARY

Read the warnings and cautions below thoroughly to avoid death, personal injury, and damage and deterioration of the instrument.



■ Warnings Concerning the Case and Panels

Do not remove the instrument's case or panels for any reason. Touching the internal components of the instrument could lead to fire or electric shock.

Also, do not allow foreign materials, such as liquids, combustible matter, and metal, to enter the instrument. Turning the instrument on when such materials are inside it could lead to fire, electric shock, damage to the instrument, or some other accident.

■ Installation Environment

• Operating Temperature Range

Use this instrument in a 0 to 40 °C environment. Using the instrument with its vents blocked or in a high temperature environment could lead to fire.

Drastic changes in temperature, such as might be caused by moving the instrument between two rooms with different temperatures, can damage the instrument by causing condensation to form within it. If there is a possibility that the instrument has condensation within it, wait for approximately 30 minutes before turning on the power.

• Operating Humidity Range

Use this instrument in an environment whose relative humidity is 85 % or less where there is no threat of condensation forming.

Also, do not operate this instrument with wet hands. Doing so could lead to electric shock or fire.

• Do Not Operate in an Explosive Atmosphere

Using this instrument in an environment where flammable gasses, explosive gasses, or steam is emitted or stored could lead to an explosion or fire. Do not use the instrument in such an environment.

• Do Not Insert Foreign Materials

If foreign materials, such as metal, flammable objects, or liquid are allowed into the instrument (through the vents for example), fire, electric shock, damage to the instrument, or some other accident may result.

■ If You Notice Something Wrong during Operation

If you notice smoke, fire, a strange smell, or something else that is wrong with the instrument while you are operating it, stop operation immediately, and remove the power cord plug from the outlet. Failing to do so could lead to fire. After making sure that fire has not spread anywhere, contact your local LEADER agent.

GENERAL SAFETY SUMMARY



■ Warnings Concerning the Power Source

Do not use a power source with a voltage other than the rated power source voltage for the instrument. Doing so could lead to fire.

Confirm the voltage of the power source before you connect the power cord to it.

Only use a power source whose frequency is 50/60 Hz.

Use a power cord that is appropriate for the voltage of the power source. Also, use a power cord that meets the safety standards of the country that you are using it in.

Using a power cord that does not meet the standards could lead to fire. If the power cord is damaged, stop using it, and contact your local LEADER agent. Using a damaged power cord could lead to electrical shock or fire.

When removing the plug from the power outlet, do not pull on the cord. Pull from the plug.



■ Cautions Concerning the Input and Output Connectors

To avoid damaging the instrument, only apply signals to the input connectors that conform to the specifications in this instruction manual. Do not short or apply external voltage to the output connectors.

Doing so could damage the instrument.

■ If You Will Not Use the Instrument for an Extended Period of Time

If you will not use the instrument for an extended period of time, remove the power plug from the outlet.

GENERAL SAFETY SUMMARY

■ Calibration and Repairs

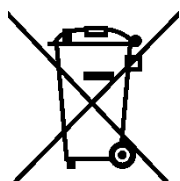
This instrument has been carefully examined at the factory to ensure that its performance is in accordance with the standards. However, because of factors such as parts wearing out over time, the performance of the instrument may degrade. To ensure stable performance, we recommend that you have the instrument calibrated regularly. Also, if the instrument malfunctions, repairs are necessary. For repairs and calibration, contact your local LEADER agent.

■ Routine Maintenance

Before you clean the instrument, remove the power plug from the outlet.

Do not use thinner, benzene, or other solvents when you clean the instrument's case, panels, and knobs. Doing so could lead to paint chipping and the corrosion of plastic components. To clean the case, panels, and knobs, use a soft cloth with mild detergent, and wipe gently. While cleaning, make sure that foreign materials, such as water and detergent, do not enter the instrument. If liquid or a metal object enters into the instrument, fire or electric shock may result.

■ About the European WEEE Directive



This instrument and its accessories are subject to the European WEEE Directive.

Follow the applicable regulations of your country or region when discarding this instrument or its accessories. Follow the EU Battery Directive when discarding the batteries that you removed from this instrument.

(WEEE stands for Waste Electrical and Electronic Equipment.)

Follow the warnings and precautions that have been listed in this section to use the instrument correctly and safely. Precautions are also contained in various other sections of this instruction manual. To use the instrument correctly, be sure to follow those precautions as well.

If you have any questions or comments about this instruction manual, please contact your local LEADER agent.

1. INTRODUCTION

Thank you for purchasing this LEADER instrument. To use this instrument safely, read this instruction manual thoroughly, and make sure that you know how to use the instrument properly.

If some point about the operation of this instrument is still unclear after you have read this instruction manual, refer to the contact information on the back cover of the manual to contact LEADER, or contact your local LEADER agent.

After you have finished reading this manual, keep it in a convenient place so that you can refer to it when necessary.

1.1 Scope of Warranty

This LEADER instrument has been manufactured under the strictest quality control guidelines.

LEADER shall not be obligated to furnish the following free services during the warranty period.

1. Repair of malfunction or damages resulting from fire, natural calamity, or improper voltage applied by the user.
2. Repair of an instrument that has been improperly repaired, adjusted, or modified by personnel other than a factory-trained LEADER representative.
3. Repair of malfunctions or damages resulting from improper use.
4. Repair of malfunctions caused by devices other than this instrument.
5. Repair of malfunctions or damages without the presentation of a proof of purchase or receipt bill for the instrument.

1.2 Operating Precautions

1.2.1 Mechanical Shock

This instrument contains sensitive components, so it may be damaged if it is dropped or otherwise exposed to a strong shock.

1.2.2 Electrostatic Damage

Electronic components can be damaged by static discharge. Static electricity can build up in the core wire of a coaxial cable. Before connecting a coaxial cable to the instrument, short the core wire of the cable with the external conductor.

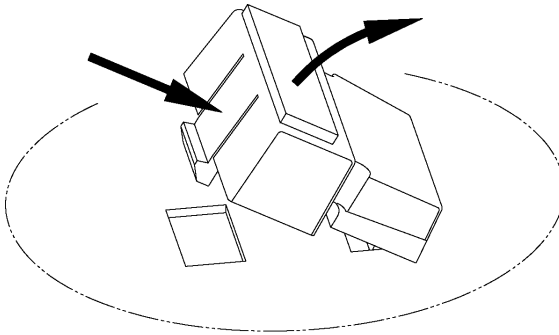
1.2.3 Rack Mounting

This instrument can be mounted on an EIA 19-inch rack.

If you are mounting this instrument on a rack, be sure to provide additional support for the instrument. If you only use the flanges on the front panel to mount the instrument, the instrument case may be deformed, or the instrument may fall.

Before mounting, remove the four feet from the bottom of the instrument.

You can remove the feet by pressing the tab and pulling the feet out.



1.3 Trademark Acknowledgments

The company and product names in this document are trademarks or registered trademarks of their respective holders.

2. SPECIFICATIONS

2.1 General

This instrument is designed for use in evaluating the stereopsis effect at locations where 3D works are created or where products that use 3D are manufactured. This instrument can be used to evaluate items such as whether a video is easy to watch and whether the video is safe to be viewed by humans.

2.2 Features

- **EIA 2U rack size**

A high-performance industrial PC with Windows 7 has been housed in a case that can be mounted in 2U rack space of an EIA 19-inch rack.

- **Support for various input formats**

The LT 7030A supports HD-SDI dual link and single link (Side by Side(Half) as well as Top and Bottom) as well as HDMI (Side by Side(Half), Top and Bottom, Line by Line, and Frame Packing) input signals, which enables it to measure a variety of 3D signals.

- **Automatic 3D disparity measurement (*1)**

- The video for the left eye and the video for the right eye that are applied to the SDI input connectors or the HDMI input connector are displayed in the upper left and upper right of the measurement screen. A depth image, which is a combination of the left and right video and which uses shading to indicate the depth of the disparity, is displayed in the middle of the screen. In place of the depth image, a convergence image, which indicates the difference between the left and right videos, or an overlay image can be displayed.
- The LT 7030A performs a disparity analysis on the left and right video, and then displays a disparity histogram with the frequency of disparity occurrence on the vertical axis and the number of near points and the number of far points on the horizontal axis. The histogram is displayed in the bottom part of the measurement screen.
- If the measured number of near points or the measured number of far points exceeds its set limit, the LT 7030A changes the color of the histogram bar to indicate this. At the same time, the display color of the depth image and the overlay image is changed to make it easy to see the locations where the limit has been exceeded.
- The LT 7030A can display a disparity error log with time codes as references.
- The LT 7030A can display a graph for observing how the maximum disparity changes over time.
- The LT 7030A has two selectable log types: the error log, in which logs are recorded when errors occur, and the data log, in which all the measured frames are recorded. The maximum disparity with time codes as a reference, the histogram, a thumbnail, and other similar data is recorded to an XML file and can be displayed in a dedicated viewer.
- The print feature of the error log viewer can be used to print data per frame or to print all the measured results. A disparity analysis report can also be printed.
- The report feature of the analyzer can be applied to the data log to produce a report of how the maximum disparity changes.
- The logs are recorded and stored in an internal SSD. The data can be transferred to USB memory devices.

- **Disparity evaluation in hypothetical viewing environments**

Interpupillary distance, viewing distance, and screen width can be entered as instrument parameters, which makes it possible to evaluate the stereopsis effect that occurs in hypothetical viewing environments.

- **Monitoring of 3D video**

Connecting the HDMI output connector to a 3D TV makes it possible to monitor 3D video.

- **Running the OS in ROM Mode (*2)**

The system OS runs in ROM mode. Even if the power supply is suddenly cut off, it will not affect the system.

- *1 The automatic measurement display is shown with a time lag compared to the signal input. Also, if there are many flat parts in the video, if there are repetitions of similar patterns, if there are scenes that are extremely bright or dark, or in similar situations, incorrect depth information may be displayed.
- *2 The D drive is not handled as ROM. Data stored on this drive may be lost.

2.3 Specifications

2.3.1 I/O

SDI Input (Rear Panel)

Function	Video signal input
Input Connectors	2 BNC connectors
Input Impedance	75 Ω

HDMI Input (Rear Panel)(*1)

Function	Video signal input
Input Connector	One type A connector

HDMI Output (Front Panel)

Function	Direct output of the input video signal
Output Connector	One type A connector

USB Ports (Front and Rear Panels)

Function	For connecting a keyboard, mouse, and other USB devices
Output Connectors	5 ports

Monitor Connectors (Rear Panel)

Function	Measurement screen output
Display Format	XGA or higher (1920 × 1080 recommended)
Output Connectors	DVI-D, VGA (D-sub), and HDMI (one connector each)
VGA Locking screws	Inch screws (No.4-40UNC)

- *1 You cannot apply content protected signals to the HDMI input connector.

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2.3.2 Automatic 3D Disparity Measurement

Function	Automatic measurement of the disparity of the video in the applied SDI or HDMI signal
Signal Input	
Connector	SDI or HDMI
SDI	
Single Link	BNC input connector, SDI input connector
3D Format	Side by Side(Half), Top and Bottom
Dual Link	
Left Video	BNC input connector, SDI input connector
Right Video	BNC input connector, SDI input connector
HDMI	HDMI input connector
3D Format	Side by Side(Half), Top and Bottom, Line by Line, Frame Packing
Video Format	
SDI	1080p/23.98, 1080p/24, 1080p/25, 1080p/29.97, 1080p/30, 1080PsF/23.98, 1080PsF/24, 1080PsF/25, 1080PsF/29.97, 1080PsF/30, 1080i/50, 1080i/59.94, 1080i/60
HDMI	1080p/23.98, 1080p/24, 1080p/25, 1080p/29.97, 1080p/30, 1080i/50, 1080i/59.94, 1080i/60
Signal Output (Monitor)	
Connector	HDMI output connector (InfoFrame is supported)
3D Format	
With SDI Input	Side by Side(Half)
With HDMI Input	The input 3D format
Video Format	
SDI Input	
With 1080p, 1080i Input	The input video format
With 1080PsF/23.98 Input	1080p/23.98
With 1080PsF/24 Input	1080p/24
With 1080PsF/25 Input	1080i/50
With 1080PsF/29.97 Input	1080i/59.94
With 1080PsF/30 Input	1080i/60
With HDMI Input	The input video format
Display	
Preview Display	Left and right input video Displayed in the upper left and upper right of the measurement screen, respectively.
Combined Video Display	Depth, convergence, overlay Displayed in the top center of the measurement screen

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Histogram Display	Disparity distribution display Displayed in the bottom of the measurement screen
Polarity	
+	Far
-	Near
Display Scale	
Vertical Axis Scale	Auto range, manual range
Number of Occurrences (Manual Range)	2,000, 6,000, 15,000, 30,000, 60,000, FULL (129,600)
Threshold Line	0 to 100 %
Horizontal Axis Scale	
Measurement of All Areas	20 %, 10 %, 3.3 %
Measurement of Selected Area	5 %, 2.5 %
Display Unit	
Screen Disparity	%, cm, dot
Perceived Depth	cm
Angle of Vergence	°
Angular Disparity	°
Time Code Format	RP188, VITC, Serial, PC Local Time
Error Log	
Display Position	Displayed transparently on the left side of the histogram
Items	Time code, frame count, near OK/NG, maximum near value, far OK/NG, maximum far value
Time Graph	
Display Position	Below the histogram
Item	Maximum disparity changes
Graph Direction	Left to right, right to left
Parameters (Viewing Conditions)	
Interpupillary Distance	2.00 to 20.00 cm
Viewing Distance	1.00 cm or more
Screen Width	6.00 to 25,000.00 cm
Measurement Cycles (*1)	2 cycles per second or more
Measurement Delay	1 second or less
Measurement Range (*2)	
Far	
Measurement of All Areas	
With 20 % Scale	0 to 20 % (0 to 384 dots)
With 10 % Scale	0 to 10 % (0 to 192 dots)
With 3.3 % Scale	0 to 3.33 % (0 to 64 dots)
Measurement of Selected Area	
With 5 % Scale	0 to 5 % (0 to 96 dots)
With 2.5 % Scale	0 to 2.5 % (0 to 48 dots)

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Near

Measurement of All Areas

With 20 % Scale	-20 to 0 % (-384 to 0 dots)
With 10 % Scale	-10 to 0 % (-192 to 0 dots)
With 3.3 % Scale	-3.33 to 0 % (-64 to 0 dots)

Measurement of Selected Area

With 5 % Scale	-5 to 0 % (-96 to 0 dots)
With 2.5 % Scale	-2.5 to 0 % (-48 to 0 dots)

Resolution of Measured Disparity (*2)

Measurement of All Areas	0.21 % (4 dots)
Measurement of Selected Area	0.05 % (1 dot)

Settable Range of the Disparity Upper Limit

Same as the measurement range

*1 If thumbnails are being acquired to the error log, this may be smaller than the specified value.

*2 The screen disparity (cm), perceived depth, angle of vergence, and angular disparity vary depending on how the parameters are configured. The LT 7030A does not measure disparities that exceed the scale.

2.3.3 Log Viewer

Logs	Error log, data log
File Format	XML
Display	
Items	Time code, frame count, near OK/NG, maximum near value, far OK/NG, maximum far value
Histogram Display	Disparity distribution display
Threshold Line for the Number of Occurrences	0 to 100 % (manual)
Display Unit	
Screen Disparity	%, cm, dot
Perceived Depth	cm
Angle of Vergence	°
Angular Disparity	°
Printing	
Items	Version information, parameters, upper limit, time code, disparity, vertical range, horizontal range, threshold, histogram, thumbnail, signal input connector, video format
Format	Disparity analysis report per frame, disparity analysis report per 1800 frames, all disparity analysis reports (contains aggregate results)

2. SPECIFICATIONS

Export	
Format	CSV
Items	Parameters, upper limit, time code, disparity, vertical range, horizontal range, threshold, histogram data, signal input connector, video format
Analyze Feature	Only for the data log
Time Graph	Maximum disparity changes, magnified display
Data Analysis	Statistical processing of all acquired data
Report	Printing of analysis reports for maximum disparity changes (contains aggregate results)

2.3.4 System

Operating System	Windows 7 Professional 32 bit English Version
CPU	Intel Core 2 Duo processor 2.26 GHz
System Memory	8 GB
Storage Device (*1)	
CF, OS Areas	4 GB
SSD, Data Areas	40 GB
Keyboard	English USB keyboard (included)
Mouse	USB wheel mouse (included)

*1 Specifications subject to change without prior notice due to product improvements.

2.3.5 General Specifications

Environmental Conditions	
Operating Temperature Range	0 to 40 °C
Operating Humidity Range	85 %RH or less (no condensation)
Operating Environment	Indoors
Elevation	Up to 2,000 m
Overvoltage Category	II
Pollution Degree	2
Power Requirements	
Voltage	90 to 250 VAC
Frequency	50/60 Hz
Power Consumption	85 W max.
Dimensions	482 (W) × 88 (H) × 250 (D) mm (excluding protrusions)
Weight	5.8 kg (excluding accessories)
Accessories	CD-ROM (Software, instruction manual) 1 Power cord 1 Keyboard 1 Mouse 1

2.4 Principles of Automatic 3D Disparity Measurement

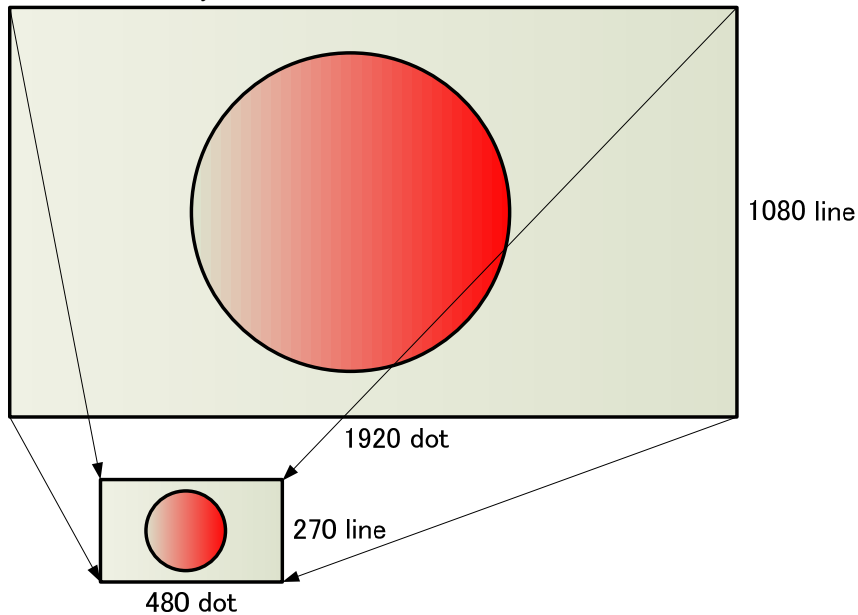
This section explains the automatic 3D disparity measurement principles.

2.4.1 Measurement Method

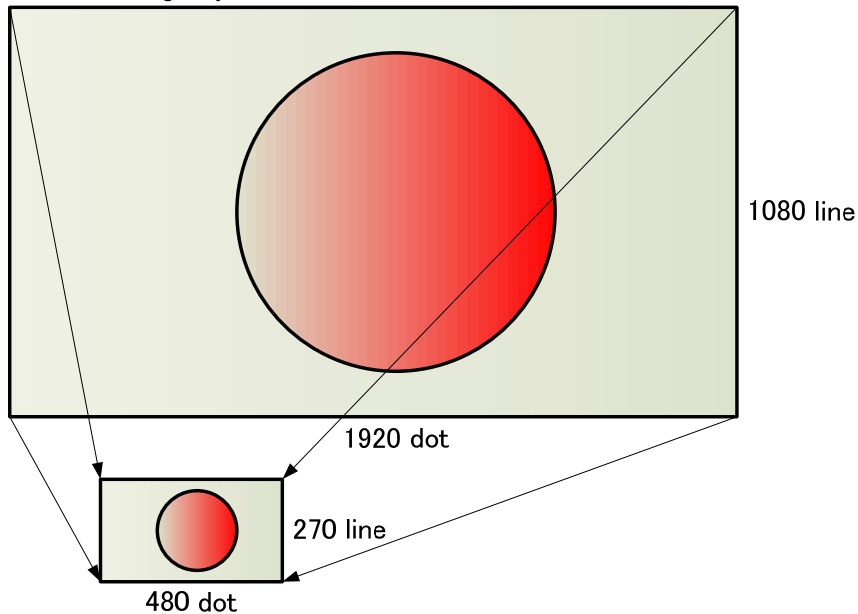
During automatic 3D disparity measurement, the LT 7030A automatically measures the horizontal disparity within the video. The measurement method is explained below. Note that in the following explanation, the Area Mode menu item has been set to Normal.

1. The video for the left eye and the video for the right eye are both reduced to 480 dots × 270 lines.

Video for the left eye



Video for the right eye

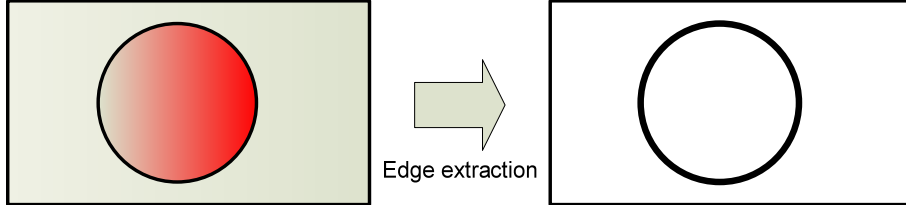


2. SPECIFICATIONS

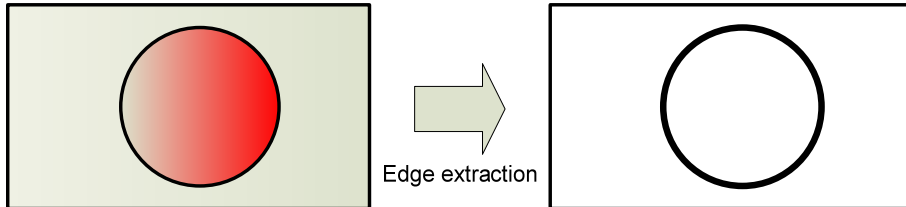
- * When the 3D format is set to Side by Side(Half), the video for the left eye and the video for the right eye are both expanded from 960 dots × 1080 lines to 1920 dots × 1080 lines before being reduced to 480 dots × 270 lines.
- * When the 3D format is set to Top and Bottom, the video for the left eye and the video for the right eye are both expanded from 1920 dots × 540 lines to 1920 dots × 1080 lines before being reduced to 480 dots × 270 lines.

2. The edges are extracted from the reduced video.

Video for the left eye (480 dots × 270 lines)



Video for the right eye (480 dots × 270 lines)

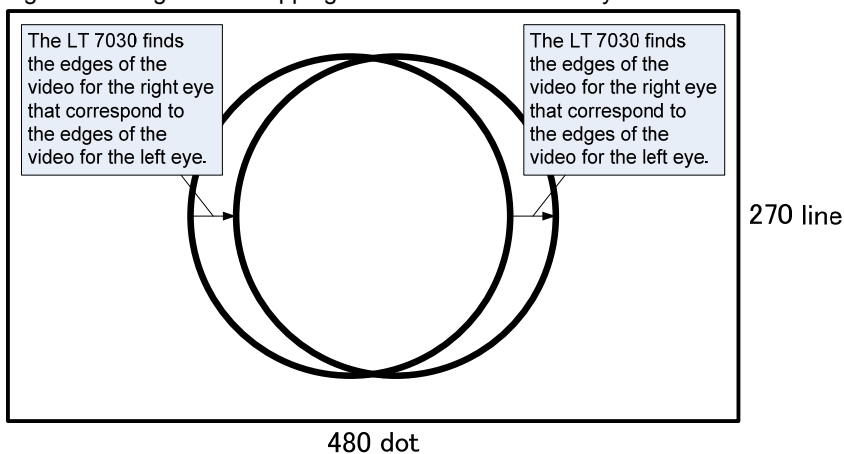


3. On the same line, the LT 7030A finds the edge of the video for the right eye that corresponds to the edge of the video for the left eye and measures the horizontal disparity between the edges.

This process is carried out for all 270 lines. The LT 7030A counts the number of occurrences of horizontal disparity and shows them on a histogram.

The horizontal disparity measurement resolution is $1920 \text{ dots} / 480 \text{ dots} = 4 \text{ dots}$ (approximately 0.21 %).

Figure showing the overlapping of the video for the left eye and the video for the right eye

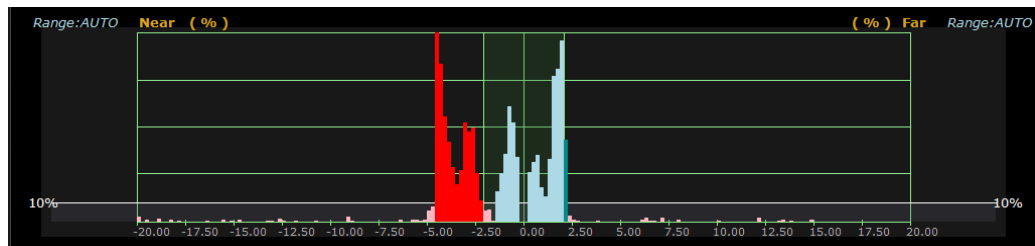


2.4.2 Measurement Range

You can set the horizontal disparity measurement range by setting Horizontal Range on the Range menu to 20% Histogram, 10% Histogram, or 3.3% Histogram. (When the Area Mode menu item is set to Select, the options you can select are 5% Histogram and 2.5% Histogram.)

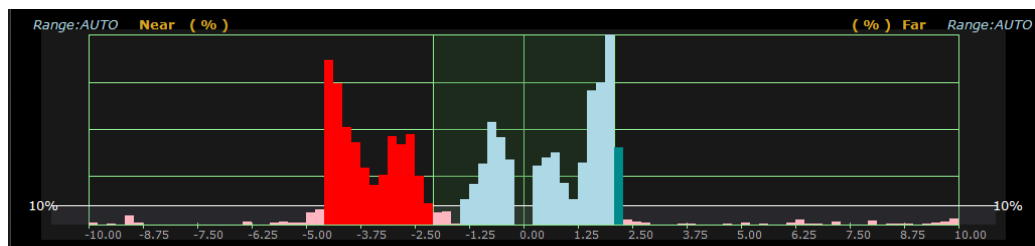
- **20% Histogram**

The LT 7030A searches within the range of $\pm 20\%$ (± 96 dots: ± 384 dots when converted to the video prior to reduction) of the edges of the reduced video for the left eye to find the corresponding edges of the reduced video for the right eye.



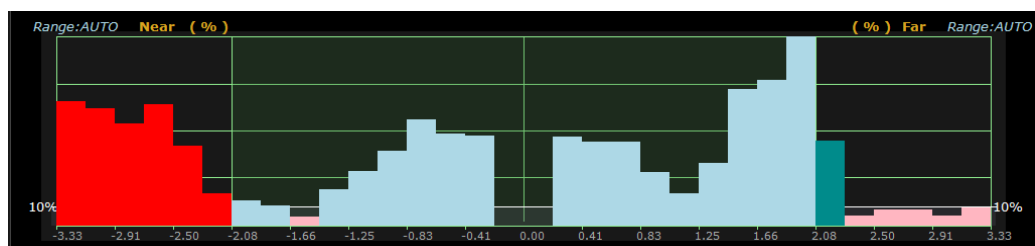
- **10% Histogram**

The LT 7030A searches within the range of $\pm 10\%$ (± 48 dots: ± 192 dots when converted to the video prior to reduction) of the edges of the reduced video for the left eye to find the corresponding edges of the reduced video for the right eye.



- **3.3% Histogram**

The LT 7030A searches within the range of $\pm 3.33\%$ (± 16 dots: ± 64 dots when converted to the video prior to reduction) of the edges of the reduced video for the left eye to find the corresponding edges of the reduced video for the right eye.

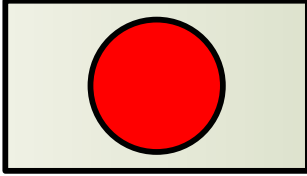
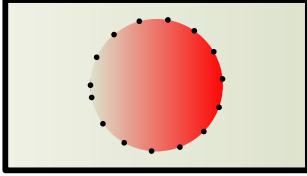
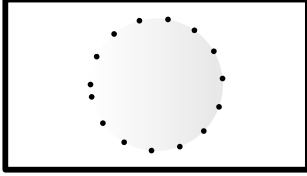
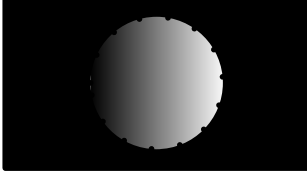
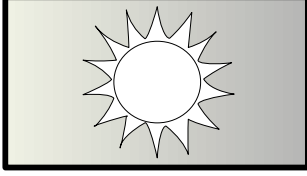
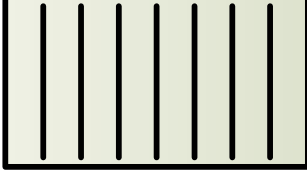


The default measurement range setting is 20% Histogram. However, by switching the setting to 10% Histogram when you have confirmed that the disparity will not exceed $\pm 10\%$ in the video being measured or 3.3% Histogram when you have confirmed that the disparity will not exceed $\pm 3.33\%$, you can perform highly precise measurements.

2. SPECIFICATIONS

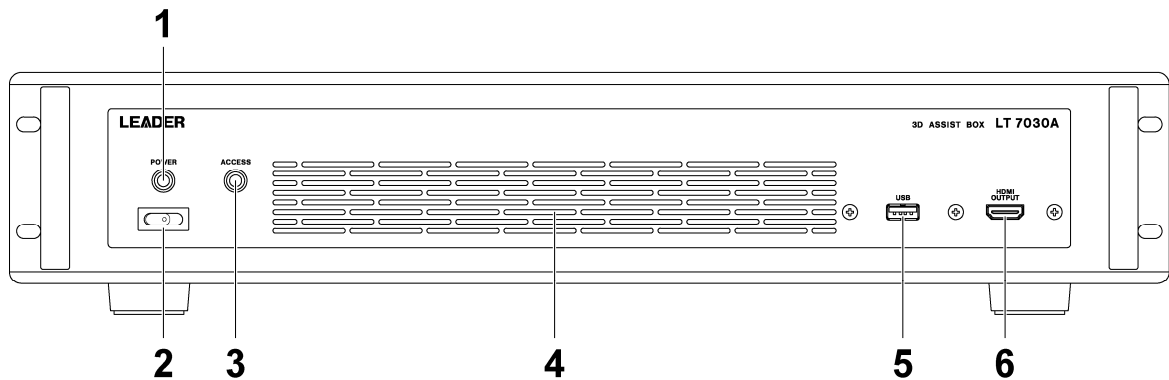
2.4.3 Video That Can Easily Produce Measurement Errors

Because of the limitations of the horizontal disparity measurement principles, the following types of video can easily produce measurement errors.

Video That Can Easily Produce Measurement Errors	Video Example	Notes
Flat video		The LT 7030A cannot measure the disparity of flat parts (it can measure outlines).
Video in which the outline is not clear (video that is out of focus).		It is easy for measurement errors to occur because it is difficult for the LT 7030A to extract the edges.
Video that is too bright overall so the outline is not clear (video in which the iris setting is incorrect).		
Video that is too dark overall so the outline is not clear (video in which the iris setting is incorrect).		
Video that is too bright and in which lens flare has occurred.		
Video that has repeating vertical lines.		It is easy for measurement errors to occur because it is difficult for the LT 7030A to find the edges of the video for the right eye that correspond to the edges of the video for the left eye.

3. PANEL DESCRIPTION

3.1 Front Panel



1 Power LED (green)

Lights when the power is on.

2 Power switch

The LT 7030A turns on automatically when an AC power source is supplied. Press this switch when you need to turn the power on after turning it off.

3 Access LED (red)

This LED lights when the internal CF or SSD is being accessed. When this LED is lit, do not remove the power plug.

4 Vent

This is a vent for cooling the LT 7030A. If AC power is being fed to the LT 7030A but the power is turned off, you will see a red light inside the case. This is not a malfunction.

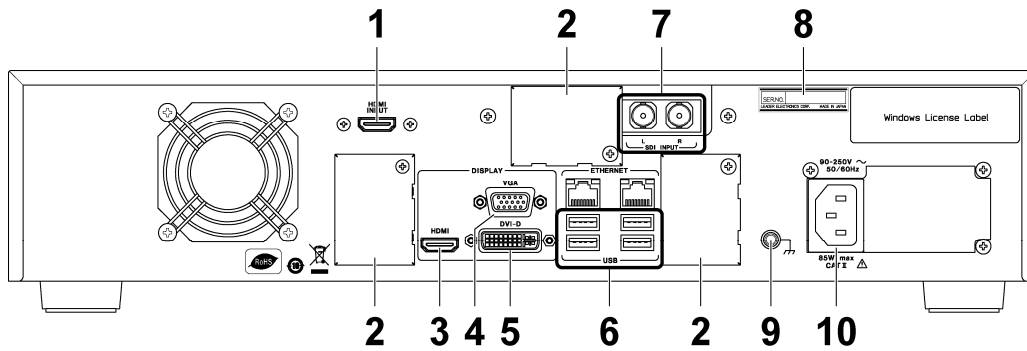
5 USB port

Connect the accessory keyboard or mouse to this port. You can also connect USB devices such as USB memory devices.

6 HDMI OUTPUT

This is the 3D video monitor output connector. By connecting this to a 3D TV, you can view the input 3D video.

3.2 Rear Panel



1 HDMI INPUT

This is the HDMI signal input connector.

2 Connector Cover

This is not used on the LT 7030A. Do not remove the connector cover.

3 Display connector (HDMI)

4 Display connector (VGA)

5 Display connector (DVI-D)

These are the measurement screen output connectors. Connect a display (XGA or higher, FHD is recommended) to one of these connectors.

6 USB ports

Connect the included keyboard and mouse to these ports. You can also connect USB devices such as USB memory devices.

7 SDI INPUT

These are the SDI signal input connectors. Connect the video for the left eye to the L connector and the video for the right eye to the R connector. In single link mode, connect the video to the L connector.

8 Serial number name plate

The instrument's serial number is written on this name plate.

9 Protective ground connector

Connector for connecting to external ground.

10 AC inlet

4. BEFORE YOU BEGIN MEASURING

4.1 ROM Mode

The hardware configuration of this instrument is based on an industrial computer. The instrument is composed of an Intel chipset Mini-ITX motherboard with a dual-core CPU (Core 2 Duo) and Microsoft Windows 7 Professional as its operating system. During normal operation, this system is no different than an ordinary consumer PC, but there are some differences because the system has been designed specifically for measurement applications.

This instrument employs a solid-state drive called CF as its main storage device. The CF is superior to typical hard disk drives in service life and stability. However, the CF has limitations in the number of times data can be written to it and is also vulnerable to data corruption when power is interrupted unexpectedly. Therefore, the system area containing the OS and applications must be handled as a ROM.

This instrument uses a software tool called Stick Lite 7 by ROM-Win to make the system area read-only. This tool reserves a section of memory as an emulation area. When there is a request to write data to the CF, the data is written in the emulation area in order to keep the Windows system and application area read-only. This prolongs the service life of the CF and prevents data corruption caused by a sudden power interruption.

4.1.1 Notes

Below are notes about this instrument running in ROM mode.

- Even if you install a software application, when you restart the system, the system will return to the condition it was in before the application was installed.
- Even if you change the Windows configuration, when you restart the system, the system will return to the original configuration.
- Drivers that are not installed by factory default will be installed through Plug and Play every time you start the system.
- Even if system files are corrupted due to operation errors or unexpected accidents, you can restore the system by restarting it.
- The D drive is not handled as ROM. The data stored on this drive will not be deleted when you restart the system.

4.1.2 Releasing the ROM Mode

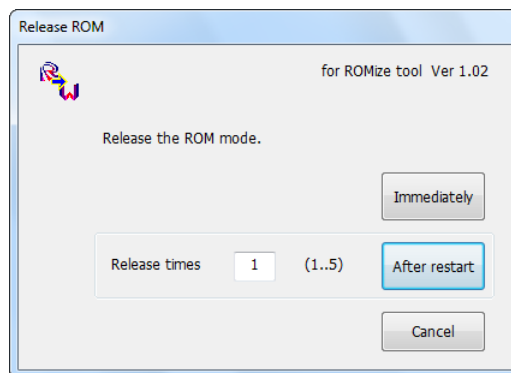
You can release the ROM mode so that the system retains the changes that you make to the Windows configuration, such as the configuration for connecting to the in-company network, user account settings, and desktop configuration, and external device drivers that needs to be used regularly.

To release the ROM mode, follow the procedure below.

1. Double-click "C:\Program Files\RWFLASH\rwflash."
2. When the following window appears, click **Immediately** or **After restart**.

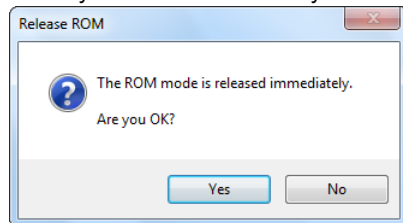
If you select **Immediately**, the ROM mode is released immediately.

If you select **After restart**, the ROM mode is released when you restart the system. In the "Release times" box, enter the number of times the system will need to be restarted before the ROM mode is enabled again.

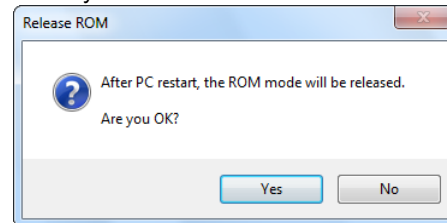


3. When the following window appears, click **Yes**.

When you select **Immediately**



When you select **After restart**



4. Make the necessary configuration changes while the ROM mode is disabled.

When you select Immediately

The ROM mode is released immediately after you click **Yes** in step 3. Make the necessary changes, and restart the system. The system will restart in ROM mode.

When you select After restart

Restart the system. The ROM mode is released immediately after you restart. Make the necessary changes, and restart the system again. When you restart the system the number of times specified by Release times, the ROM mode will be enabled.

For example, if you set Release times to 2, the ROM mode will be enabled the second time you restart the system after the ROM mode is disabled.

ROM mode (current)	Restart	ROM mode released	Restart	ROM mode released	Restart	ROM mode
-----------------------	---------	----------------------	---------	----------------------	---------	----------

4. BEFORE YOU BEGIN MEASURING

Notes

Installing third party software applications (including antivirus software) not specified by LEADER will void the guarantee.

The following settings affect the operation of this instrument. Do not change them.

Setting		Value
Power Options	Turn off the display	Never
	Put the computer to sleep	Never

4.2 User Account

The Windows user account that is configured in the factory default settings is shown below. When you log on to the LT 7030A or recover it from sleep mode, enter the user name and password shown here.

User name: lt7030a

Password: lt7030a

4.3 Connection

• Input Signal

Apply the video for the left eye (L) and the video for the right eye (R) to the SDI input connectors or to the HDMI input connector. BNC and HDMI cables are not included with the LT 7030A.

• Display

Connect a display (XGA or higher, FHD is recommended) to the HDMI output connector, VGA output connector, or DVI-D output connector. The display and the connecting cables are not included with the LT 7030A.

This instrument was verified to work properly when an FHD display was connected to the DVI-D output connector.

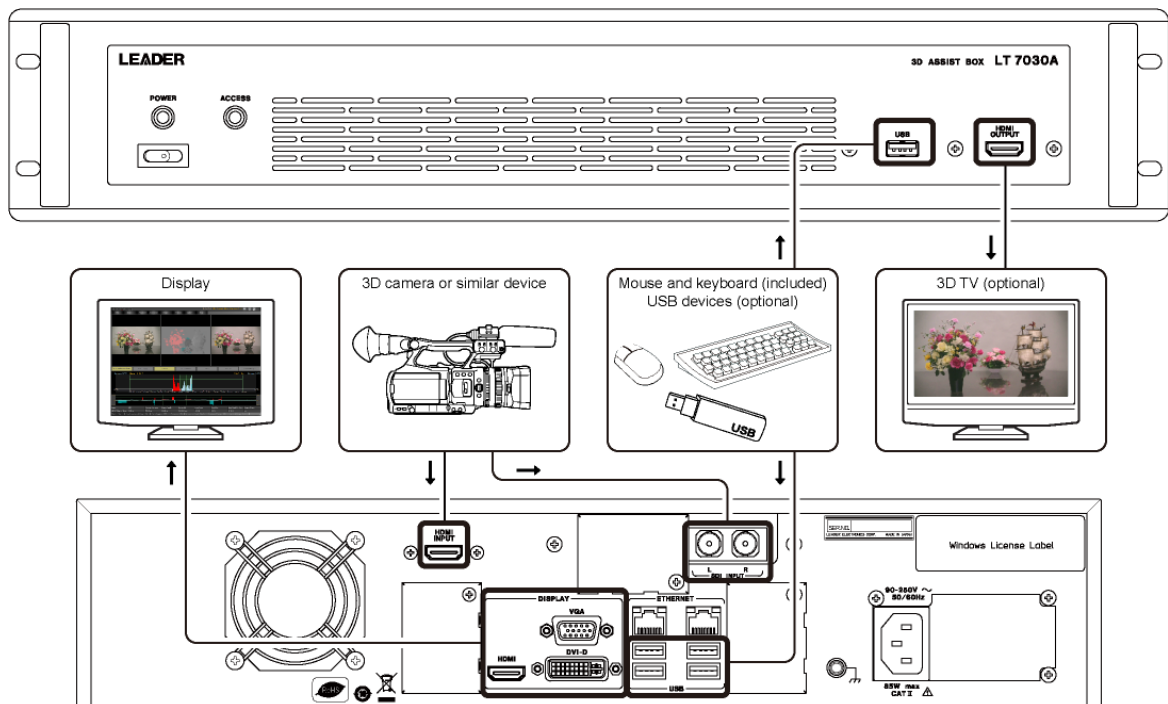
• Mouse, Keyboard, and Optional USB Devices

Connect the included mouse and keyboard to the USB ports (you can also connect a mouse and keyboard that you have purchased separately).

You can also use USB devices (USB 2.0 devices are recommended) such as USB memory devices. Connect these other devices as necessary.

• 3D TV (Optional)

By connecting a 3D TV to the HDMI output connector, you can view the 3D video on a TV.



* The mouse and keyboard shown here are just examples. They are different from the actual accessories that are included.

4.4 Turning the Instrument On and Off

• Turning the Instrument On

The LT 7030A turns on automatically when an AC power source is supplied. The automatic 3D measurement software starts when the LT 7030A turns on. (If the LT 7030A does not turn on when an AC power source is supplied, you can use the front panel power switch to turn the LT 7030A on.)

The LT 7030A starts with the settings that were last exported through the use of the Export command on the File menu. If there is no exported file, an error message will be displayed, so click OK. In this situation, the LT 7030A will start with the default settings.

See section 5.4.1, “File.”

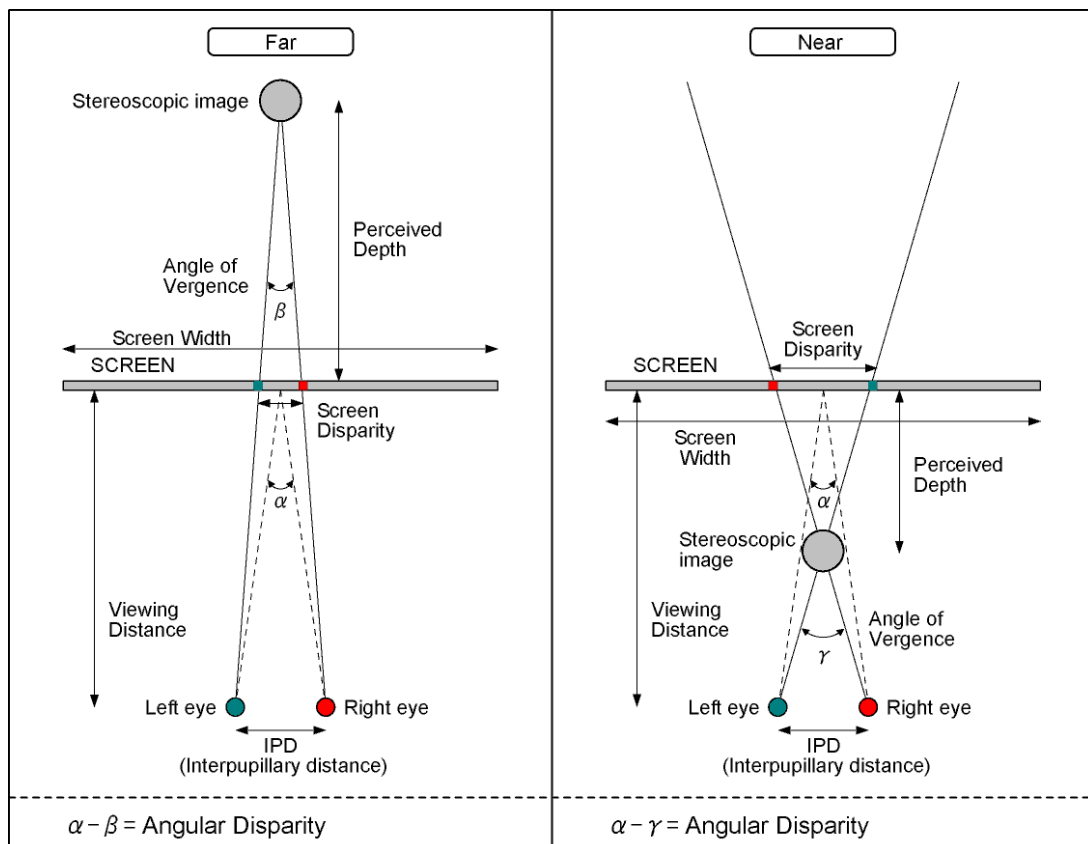
• Turning the Instrument Off

To turn off the instrument, stop disparity measurement, turn off Data Logging and Graph and Error Logging, and then shut down Windows. To shut down windows, on the task bar, click Start and then Shut down.

4.5 About the Names of Settings and Measurement Items

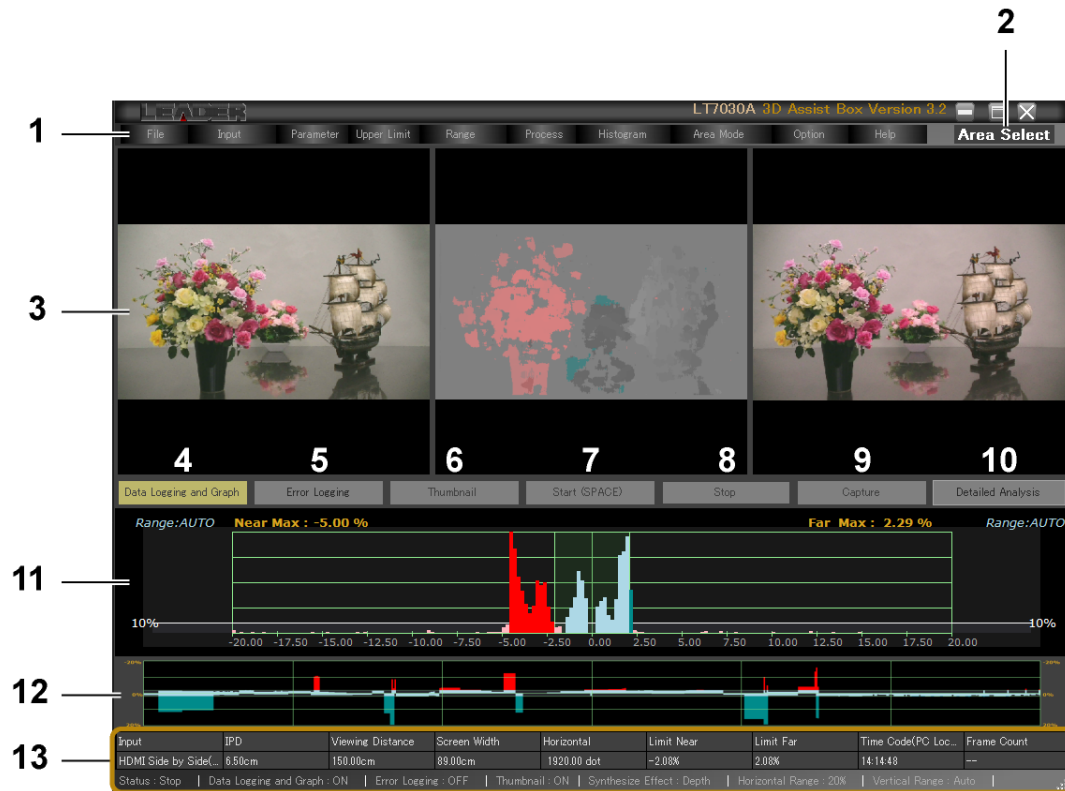
The names of the settings and measurement items that are used with the LT 7030A are shown below.

When a 3D image appears recessed on the screen, it is said to be “Far.” When a 3D image appears to jump out of the screen, it is said to be “Near.”



5. AUTOMATIC 3D DISPARITY MEASUREMENT

5.1 Window Explanation



1 Menu

Performs file operations and configures various settings.

See section 5.4.1, “File.”

2 Area Select

Appears when the Area Mode menu item is set to Select. You can measure the disparity of the selected 480 dots × 270 lines area of the 1920 dots × 1080 lines video.

See section 5.4.8, “Area Mode.”

3 3D Video

From the left, the video for the left eye, the combined video, and the video for the right eye are displayed.

For the combined video, you can select from the following display modes: depth, convergence, and overlay.

See section 5.4.7, “Option.”

4 Data Logging and Graph

Select whether to record the data log. If you turn this on, you can also view a time graph with time on the horizontal axis and the maximum disparity on the vertical axis.

You can use the F1 key or Data Logging and Graph on the Option menu to perform the same function. However, after you click the Data Logging and Graph button, you will not be able to use the F1 key until you restart the automatic 3D disparity measurement software.

5. AUTOMATIC 3D DISPARITY MEASUREMENT

You cannot turn both the Data Logging and Graph button and the Error Logging button on at the same time.

See section 5.4.7, “Option.”

Data Logging and Graph (F1)	(Gray):	The data log will not be recorded. This is the default setting.
Data Logging and Graph (F1)	(Yellow):	The data log will be recorded.
Pre-set Start	(Green):	The LT 7030A will start recording the data log at the specified time.
Pre-set Stop	(Green):	The LT 7030A will stop recording the data log at the specified time.

5 Error Logging

Select whether to log disparity errors.

You can use Error Logging on the Option menu to perform the same function.

You cannot turn both the Error Logging button and the Data Logging and Graph button on at the same time.

See section 5.4.7, “Option.”

Error Logging	(Gray):	Error will not be logged. This is the default setting.
Error Logging	(Yellow):	Errors will be logged.
Pre-set Start	(Green):	The LT 7030A will start logging errors at the specified time.
Pre-set Stop	(Green):	The LT 7030A will stop logging errors at the specified time.

6 Thumbnail

Select whether to record the combined video when logs are recorded.

You can use Thumbnail on the Option menu to perform the same function.

See section 5.4.7, “Option.”

Thumbnail	(Gray):	The combined video will not be recorded. This is the default setting.
Thumbnail	(Yellow):	The combined video will be recorded.

7 Start or Running

Starts acquiring the 3D video and starts the disparity measurement. The 3D video is also generated from the front panel HDMI OUTPUT connector.

You can use the SPACE key or Start on the Process menu to perform the same function.

However, after you click the Start button, you will not be able to use the SPACE key until you restart the automatic 3D disparity measurement software.

See section 5.4.6, “Process.”

Start (SPACE)	(Gray):	Disparity is not being measured. This is the default setting.
Running...	(Yellow):	Disparity is being measured.

8 Stop

Stops the disparity measurement.

You can use the SPACE key or Stop on the Process menu to perform the same function. However, after you click the Stop button, you will not be able to use the SPACE key until you restart the automatic 3D disparity measurement software.

See section 5.4.6, “Process.”

Stop	(Gray):	Disparity is not being measured.
Stop (SPACE)	(Gray):	Disparity is being measured.

9 Capture

Takes a screen capture of the 3D video.

You can use Capture on the Process menu to perform the same function.

See section 5.4.6, “Process.”

10 Detailed Analysis

After you take a screen capture, click this to analyze the screen capture data.

See section 5.4.6, “Process.”

11 Histogram Display

A histogram is displayed with the near and far distances from the screen on the horizontal axis and the number of occurrences on the vertical axis. The maximum disparities are displayed as values above the histogram.

See section 5.2, “Histogram Explanation.”

12 Time Graph Display

When Data Logging and Graph is on, a time graph is displayed with time on its horizontal axis and maximum disparity on its vertical axis.

See section 5.4.7, “Option.”

13 Status Display

Displays the settings and the input signal information.

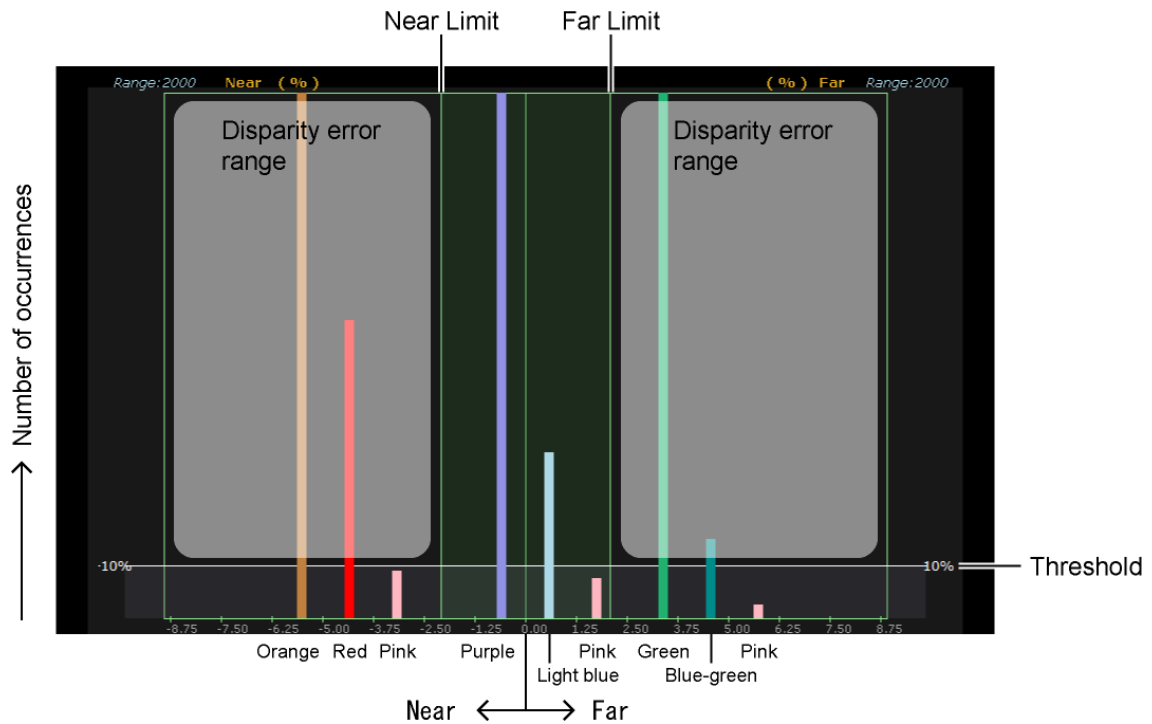
Item	Explanation
INPUT	Displays the input connector and format that have been selected on the Input menu. See section 5.4.2, “Input.”
IPD Viewing Distance Screen Width	Displays the viewing environment that has been configured on the Parameter screen. See section 5.4.3, “Parameter.”
Horizontal	Displays the number of horizontal dots. This is fixed to 1920.00 dots.
Limit Near Limit Far	Displays the upper disparity limits that have been set on the Upper Limit menu. See section 5.4.4, “Upper Limit.”
Time Code	Displays the time code embedded in the input signal. Set Time Code Source on the Option menu to select the time code format. See section 5.4.7, “Option.”
Frame Count	Displays the frame count embedded in the input signal.
Status	Displays the current measurement status. Stop: Disparity is not being measured. Running: Disparity is being measured.

5. AUTOMATIC 3D DISPARITY MEASUREMENT

Item	Explanation
	See section 5.4.6, "Process."
Data Logging and Graph	Displays whether to log data. OFF: Data will not be logged. ON: Data will be logged. See section 5.4.7, "Option."
Error Logging	Displays whether to log errors. OFF: Errors will not be logged. ON: Errors will be logged. See section 5.4.7, "Option."
Thumbnail	Displays whether the combined video will be recorded when logs are recorded. OFF: The combined video will not be recorded. ON: The combined video will be recorded. See section 5.4.7, "Option."
Synthesize Effect	Displays the display mode of the combined video that you selected by setting Synthesize Effect on the Option menu. See section 5.4.7, "Option."
Horizontal Range Vertical Range	Displays the range that has been selected on the Range menu. See section 5.4.5, "Range."
Limit Expression	Displays the upper limit display format that you selected by setting Limit Expression on the Option menu. See section 5.4.7, "Option."
Including 0% Bar Excluding 0% Bar	Displays whether the LT 7030A will measure 0 % disparity (no disparity), which you have selected on the Option menu. Including 0% Bar: 0 % disparity will be measured. Excluding 0% Bar: 0 % disparity will not be measured. See section 5.4.7, "Option."
Histogram	Displays the histogram color that you selected on the Histogram menu. Normal: Normal display. Color Map: Gradation display. See section 5.4.7, "Histogram."
Area Mode	Displays the measurement area that you have selected on the Area Mode menu. Normal: Measurement of all areas. Select: Measurement of selected area. See section 5.4.8, "Area Mode."
TimeCode	Displays the time code mode that is used when logs are recorded, which you have selected by setting Time Code Mode on the Option menu. Normal: Normal time codes. Zero Start: The recording start time is 00:00:00. See section 5.4.9, "Option."

5.2 Histogram Explanation

The LT 7030A considers disparities that are less than Near Limit or greater than Far Limit as errors. However, even in these situations, as long as the number of disparity occurrences is less than or equal to Threshold, the LT 7030A does not consider the disparities as errors.



* For the sake of the explanation, we have simplified the figure.

You can set Near Limit, Far Limit, and Threshold to any values that you want on the Upper Limit menu. Threshold is a percentage with Vertical Range set on the Range menu assumed to be 100 %.

See sections 5.4.4, “Upper Limit,” and 5.4.5, “Range.”

An explanation of the colors used in the histogram is given below.

The cells in the table that are shaded in indicate the ranges that the LT 7030A considers as disparity errors.

		Near and Far Distances from the Screen		
		Less than Near Limit	Between Near Limit and Far Limit	Greater than Far Limit
Number of Occurrences	Range Over(*1)	Orange (*2)	Purple	Green (*2)
	Greater than Threshold	Red (*2)	Light blue	Blue-green (*2)
	Less than or Equal to Threshold	Pink	Pink	Pink

*1 This does not occur when Vertical Range is set to Auto. The disparity that occurs the most is set to 100 %.

*2 When the Histogram menu item is set to Color Map, +7.5 % is displayed in blue, -7.5 % is displayed in red, and the values between these end points are displayed with a gradation. (When the Area Mode menu item is set to Select, the values between +1.87 % and -1.87 % are displayed with a gradation.)

5.3 How to Use

This section explains the basic operating procedures of the LT 7030A.

1. Connect the necessary devices to the LT 7030A, and then turn on the LT 7030A.

See sections 4.1, “Connection,” and section 4.4, “Turning the Instrument On and Off.”

2. On the Input menu, select the input connector, link format, 3D format, and video format from the values shown below.

See section 5.4.2, “Input.”

Input Connector	Link Format	3D Format	Video Format
SDI	Dual Link	-	1080i 59.94, 1080i 60, 1080p 23.98,
	Single Link	Side by Side(Half)	1080psf 23.98, 1080p 24, 1080psf 24,
		Top and Bottom	1080p 29.97, 1080psf 29.97,
HDMI	-	Side by Side(Half)	1080i 59.94, 1080i 60, 1080p 23.98,
		Top and Bottom	1080p 24, 1080p 29.97, 1080p 30,
		Line by Line	1080i 50, 1080p 25
		Frame Packing	

3. On the Parameter menu, configure the viewing environment.

After you have finished configuring the settings, click OK.

See section 5.4.3, “Parameter.”

The screenshot shows the 'Parameter' menu with the following settings:

- IPD: 6.50 cm
- Viewing Distance: 150.00 cm
- Screen Width: 89.00 cm

Buttons for 'Cancel' and 'OK' are at the bottom.

4. Use Near Limit and Far Limit on the Upper Limit menu to set the upper disparity limits.

If the measured disparity exceeds one of these upper limits, an error will occur.

After you have finished configuring the settings, click OK.

See section 5.4.4, “Upper Limit.”

Near Limit

The screenshot shows the 'Upper Limit' menu for 'Near Limit' with the following settings:

- Screen Disparity: -2.08 %, -1.85 cm, -40.00 dot
- Perceived Depth: -33.29 cm
- Angle of Vergence: 3.19 °
- Angular Disparity: -0.71 °

Buttons for 'Cancel' and 'OK' are at the bottom.

Far Limit

The screenshot shows the 'Upper Limit' menu for 'Far Limit' with the following settings:

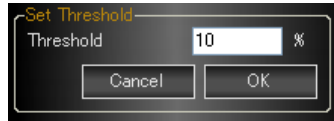
- Screen Disparity: 2.08 %, 1.85 cm, 40.00 dot
- Perceived Depth: 59.86 cm
- Angle of Vergence: 1.77 °
- Angular Disparity: 0.71 °

Buttons for 'Cancel' and 'OK' are at the bottom.

5. Use Error Threshold on the Upper Limit menu to set the disparity occurrence threshold.

Even if disparity errors occur, if the number of occurrences is less than or equal to the threshold that you set here, the LT 7030A will not consider the disparities as errors. After you have finished configuring the settings, click OK.

See section 5.4.4, “Upper Limit.”



6. If you want to record logs during measurement, configure the corresponding setting on the Option menu.

Turning Logging On and Off

The LT 7030A has two log types: the data log, in which all the measured frames are recorded, and the error log, in which logs are recorded only when disparity errors occur.

To turn on data logging, click Data Logging and Graph on the Option menu. Data Logging and Graph will be displayed in orange. Alternatively, click the Data Logging and Graph button in the middle of the screen, or press F1. In both cases, Data Logging and Graph will be displayed in yellow. In this situation, you can view a time graph with time on the horizontal axis and the maximum disparity on the vertical axis.

To turn on error logging, click Error Logging on the Option menu. Error Logging will be displayed in orange. Alternatively, click the Error Logging button in the middle of the screen. Error Logging will be displayed in yellow.

You can also turn logging on and off during measurements.

Turning Thumbnails On and Off

You can record the combined video together with logs.

To turn on combined video recording, click Thumbnail on the Option menu. Thumbnail will be displayed in orange. Alternatively, click the Thumbnail button in the middle of the screen. Thumbnail will be displayed in yellow.

You can also turn combined video recording on and off during measurements.

Selecting the Time Code Format

In the logs, data is recorded with time codes as references. Use Time Code Source on the Option menu to select the time code format from the values shown below.

RP188, VITC, Serial, PC LocalTime

By setting Time Code Mode to Zero Start on the Option menu, you can set the logging start time to 00:00:00.

See section 5.4.7, “Option.”

5. AUTOMATIC 3D DISPARITY MEASUREMENT

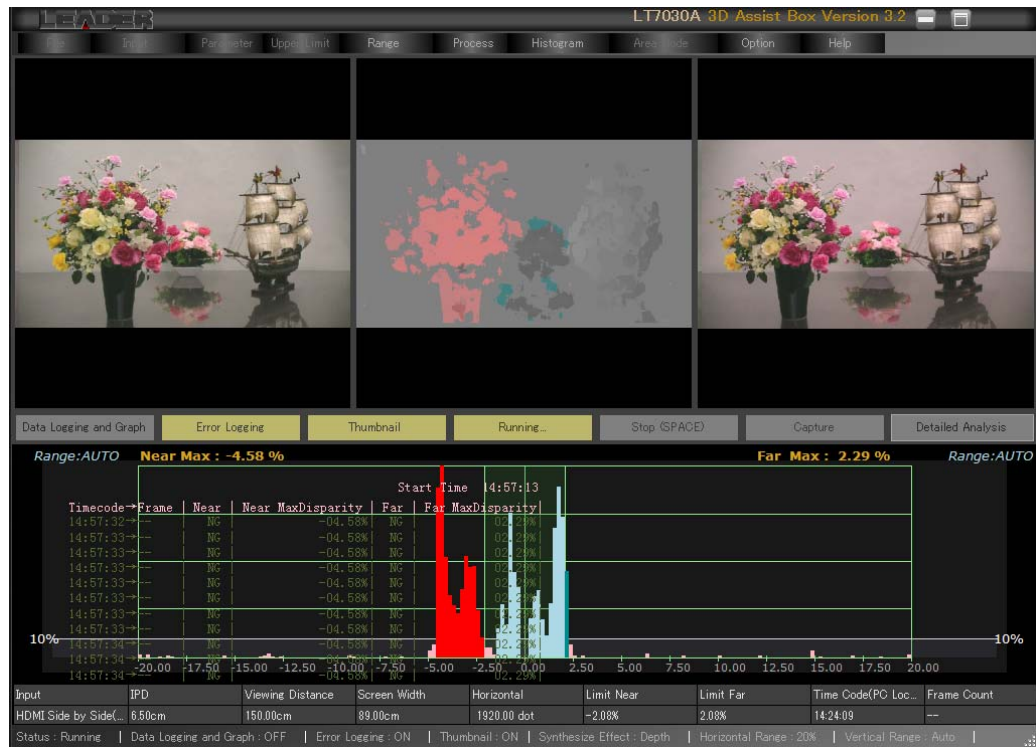
7. Click the Start button in the center of the screen or press SPACE.

The LT 7030A starts acquiring the 3D video and starts the disparity measurement. The 3D video is also generated from the front panel HDMI OUTPUT connector. To stop the measurement, click the Stop button in the center of the screen, or press SPACE.

See section 5.4.6, "Process."

If you turned logging on in step 6, the LT 7030A automatically saves log data. To view the saved log data, use the log viewer.

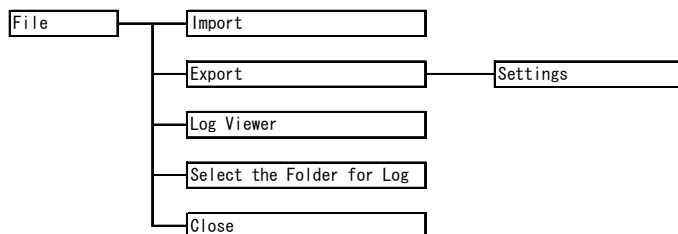
See chapter 6, "LOG VIEWER."



5.4 Menu Explanation

5.4.1 File

The structure of the File menu is shown below. During disparity measurements, you cannot select the File menu.

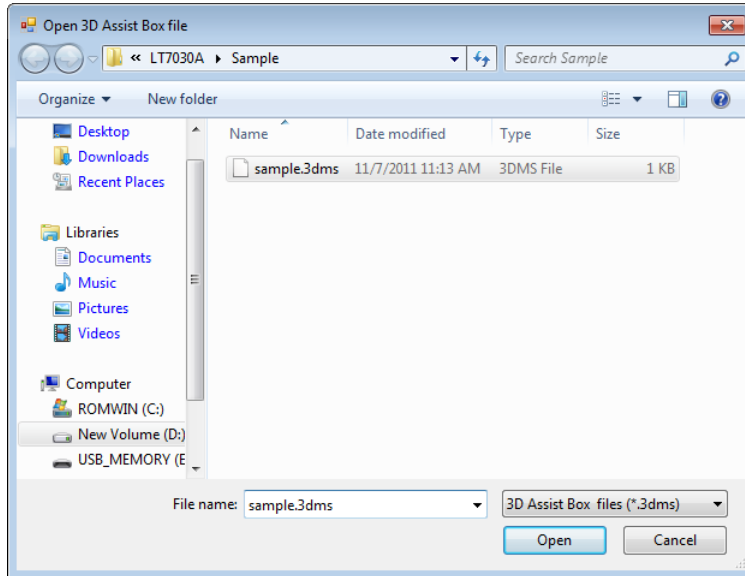


• Import

Imports the 3dms-format (a proprietary LEADER format) setup data that you exported with the Export menu item.

When Error Logging or Data Logging and Graph is on, you cannot import data.

Sample data is saved in the following file: “D:\LT7030A\Sample\sample.3dms.” This data has the settings that are necessary to perform measurements, so you can use this data to immediately perform basic operations.

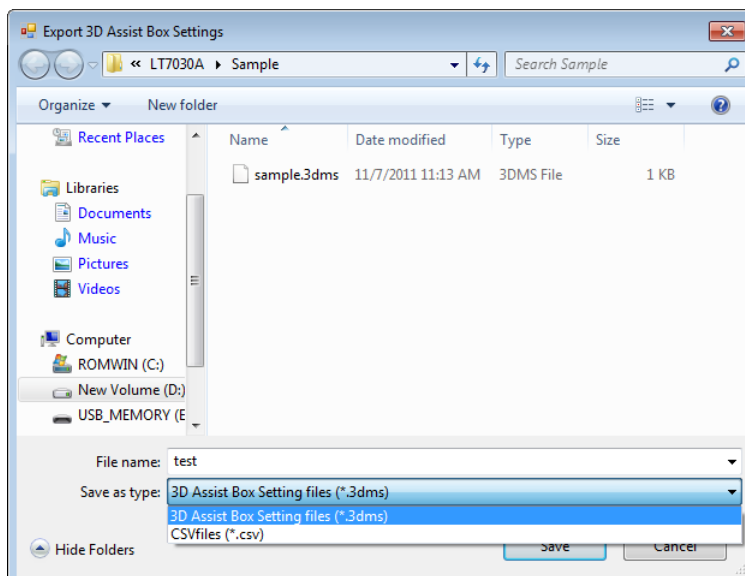


• Export - Settings

Exports settings in 3dms format (a proprietary LEADER format) or csv format. Use the “Save as type” list to select the file format.

You can use the Import menu item to import data that you export in 3dms format.

You can use Microsoft Excel or a similar program to view data that you export in csv format.



- Log Viewer

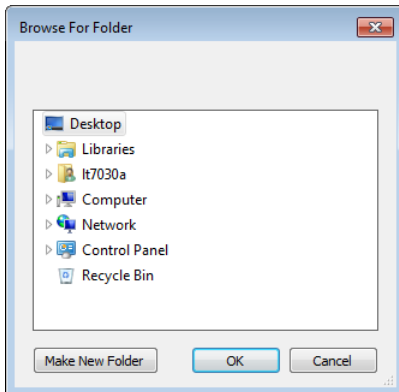
Displays the logs that have been recorded during disparity measurement. When Error Logging or Data Logging and Graph is on, you cannot view the logs.

See chapter 6, “LOG VIEWER.”

- Select the Folder for Log

Select the save location for the recorded logs.

In the factory default settings, this is set to “D:\LT7030A.”



- Close

Stops the automatic 3D disparity measurement. You can also use the close button in the upper right of the screen to stop the measurement.

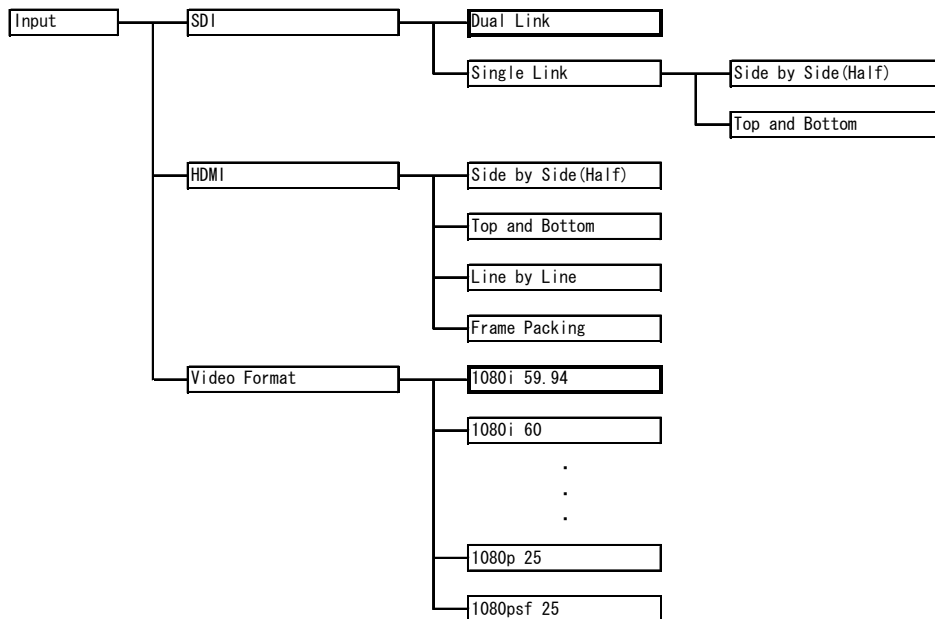
To restart the software, double-click the “3D Assist Box” icon on the desktop.



3D Assist Box

5.4.2 Input

The structure of the Input menu is shown below. During disparity measurements, you cannot select the Input menu.



- SDI and HDMI

Use these menu items to select the input connector, link format, and 3D format from the values shown below.

Input Connector	Link Format	3D Format
SDI	Dual Link	-
	Single Link	Side by Side(Half) Top and Bottom
HDMI	-	Side by Side(Half) Top and Bottom Line by Line Frame Packing

- Video Format

Select the input format. The formats that you can select vary depending on the input connector as shown in the following table.

Input Connector	Input Format
SDI	1080i 59.94, 1080i 60, 1080p 23.98, 1080psf 23.98, 1080p 24, 1080psf 24, 1080p 29.97, 1080psf 29.97, 1080p 30, 1080psf 30, 1080i 50, 1080p 25, 1080psf 25
HDMI	1080i 59.94, 1080i 60, 1080p 23.98, 1080p 24, 1080p 29.97, 1080p 30, 1080i 50, 1080p 25

5.4.3 Parameter

Click Parameter to display the Parameter screen. Use this screen to configure the viewing environment.

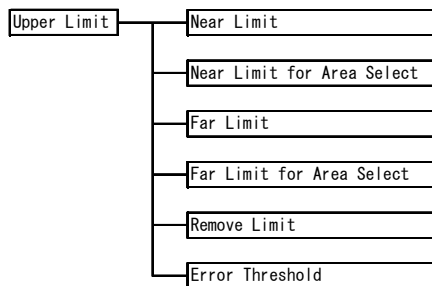
During disparity measurements, you cannot configure the Parameter settings.

Item	Explanation
IPD	Enter the interpupillary distance (2.00 to 20.00 cm). For adults, this is 6.50 cm. For children, this is approximately 5.00 cm.
Viewing Distance	Enter the distance from the screen to the viewer (1.00 cm or more).
Screen Width	Enter the screen width (6.00 to 25000.00 cm).

5.4.4 Upper Limit

The structure of the Upper Limit menu is shown below.

During disparity measurements, you cannot select the Upper Limit menu.



• Near Limit, Near Limit for Area Select, Far Limit, and Far Limit for Area Select

Use these menu items to enter the upper disparity limits. If the measured disparity exceeds one of these upper limits, an error will occur.

You can set the values separately when the Area Mode menu item is set to Normal and when it is set to Select.

When Error Logging or Data Logging and Graph is on, you cannot set the upper limits.

When you enter one of the Screen Disparity settings, the other settings are set automatically. However, when the Parameter items are not set, you cannot enter any settings other than Screen Disparity (% or dot).

5. AUTOMATIC 3D DISPARITY MEASUREMENT

Near Limit (for Area Select)

Far Limit (for Area Select)

Item	Explanation
Screen Disparity	Enter the upper limit for the screen disparity. Enter negative values for the Near disparity (-100.00 to 100.00 %).
Perceived Depth	Enter the near and far limits as distances from the screen. Enter negative values for the Near disparity.
Angle of Vergence	Enter the upper limit for the angle of vergence.
Angular Disparity	Enter the upper limit for the angular disparity.

• Remove Limit

Clears the Near Limit and Far Limit settings.

• Error Threshold

Enter the disparity error occurrence threshold. Even if disparity errors occur, if the number of occurrences is less than or equal to the threshold that you set here, the LT 7030A will not consider the disparities as errors (0 to 100 %).

Set the threshold as a percentage with Vertical Range set on the Range menu assumed to be 100 %. When Vertical Range is set to Auto, 100 % represents the disparity that occurs the most.

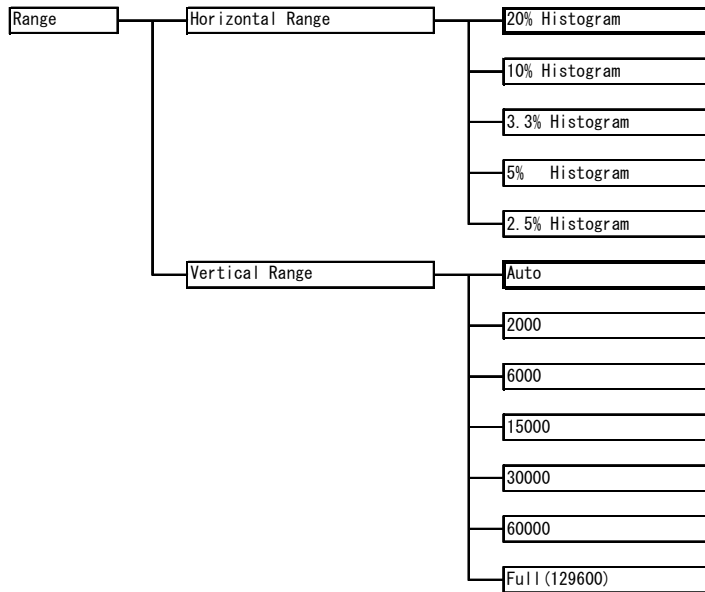
See section 5.4.5, “Range.”

Threshold Setting Method (Recommended)

- On the Range menu, set Vertical Range to Full(129600). On the Option menu, set Synthesize Effect to Depth.
- Apply the 3D video signal.
- Set the threshold so that there is a clear definition between the light and dark parts of the combined video and so that there is little noise in the combined video. As a guideline, the threshold should be set to a value between 1 and 4 % at this step.
- Adjust the threshold while you reduce the Vertical Range setting on the Range menu. As a guideline, the final Vertical Range setting should be around 15000.

5.4.5 Range

The structure of the Range menu is shown below.



- Horizontal Range

Select the disparity measurement range (the histogram's horizontal axis) from the values shown below.

During disparity measurements, you cannot select this menu item.

See section 2.4.2, "Measurement Range."

When the Area Mode Menu Item Is Set to Normal

20% Histogram, 10% Histogram, 3.3% Histogram

When the Area Mode Menu Item Is Set to Select

5% Histogram, 2.5% Histogram

- Vertical Range

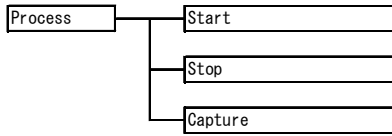
Select the measurement range of the number of occurrences (the histogram's vertical axis) from the values shown below.

When you select Auto, 100 % represents the disparity that occurs the most.

Auto, 2000, 6000, 15000, 30000, 60000, Full(129600)

5.4.6 Process

The structure of the Process menu is shown below.



● Start

The LT 7030A starts acquiring the 3D video and starts the disparity measurement. You can also use the Start button in the center of the screen or the SPACE key to start the acquisition and measurement.

During disparity measurements, you cannot select this menu item.

The 3D video is also generated from the front panel HDMI OUTPUT connector. The format of the output signal varies depending on the input signal as shown in the following table.

Input Signal			Output Signal	
Input Connector	Format	Video Format	Format	Video Format
SDI	Single Link or Dual Link	1080i, 1080p (*1)	Side by Side(Half)	The same as the input signal
		1080psf 23.98	Side by Side(Half)	1080p 23.98
		1080psf 24	Side by Side(Half)	1080p 24
		1080psf 29.97	Side by Side(Half)	1080i 59.94
		1080psf 30	Side by Side(Half)	1080i 60
		1080psf 25	Side by Side(Half)	1080i 50
HDMI	Side by Side(Half)	1080i, 1080p (*1)	Side by Side(Half)	The same as the input signal
	Top and Bottom	1080i, 1080p (*1)	Top and Bottom	The same as the input signal
	Line by Line	1080i, 1080p (*1)	Line by Line	The same as the input signal
	Frame Packing	1080i, 1080p (*1)	Frame Packing	The same as the input signal

*1 Specify 1080i 59.94, 1080i 60, 1080p 23.98, 1080p 24, 1080p 29.97, 1080p 30, 1080i 50, or 1080p 25.

● Stop

Stops the disparity measurement. You can also use the Stop button in the center of the screen or the SPACE key to stop the measurement.

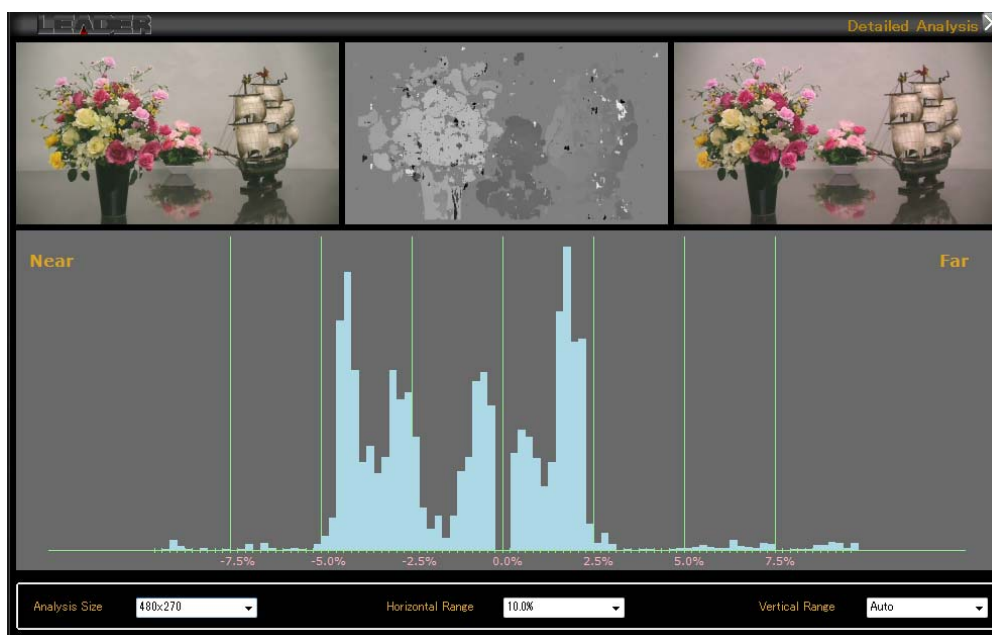
● Capture

Select the Capture menu item to capture the 3D video. You can also use the Capture button in the center of the screen to capture the video. When the Area Mode menu item is set to Select, you cannot select this menu item.

After the LT 7030A captures the video, the disparity measurement is stopped, and the Detailed Analysis button in the center of the screen lights in orange.

You can then click the Detailed Analysis button to analyze the captured data. On the Detailed Analysis screen, the captured data (1920 × 1080) is reduced to the measurement size that you have specified (the Analysis Size), and the disparity is then measured.

In the top of the screen, the video for the left eye, the combined video (the depth display with no errors displayed), and the video for the right eye are displayed. If you double-click the video for the left eye or the video for the right eye, the video prior to reduction (1920 × 1080) is displayed. If you double-click the combined video, a zoomed display of the combined video after reduction is displayed. To return to the normal display, double-click the screen.



Analysis Size (Measurement size)(*1)	Horizontal Range	Vertical Range (*2)
480x270	3.3%, 6.7%, 10.0%, 13.3%, 16.7%, 20.0%, . . . 46.7%	Auto, 1.0%, 2.0%,
640x360	2.5%, 5.0%, 7.5%, 10.0%, 12.5%, 15.0%, . . . 35.0%	3.0%, 4.0%, 5.0%,
960x540	1.7%, 3.3%, 5.0%, 6.7%, 8.3%, 10.0%, . . . 23.3%	10.0%, 15.0%,
1280x720	1.3%, 2.5%, 3.8%, 5.0%, 6.3%, 7.5%, . . . 17.5%	30.0%, 50.0%,
1920x1080	0.8%, 1.7%, 2.5%, 3.3%, 4.2%, 5.0%, . . . 11.7%	100.0%

*1 When the input connector is HDMI and the 3D format is Side by Side(Half), you cannot select 1920x1080.

*2 100.0% indicates the total number of pixels. When you select Auto, 100.0% represents the disparity that occurs the most.

5.4.7 Histogram

The structure of the Histogram menu is shown below.

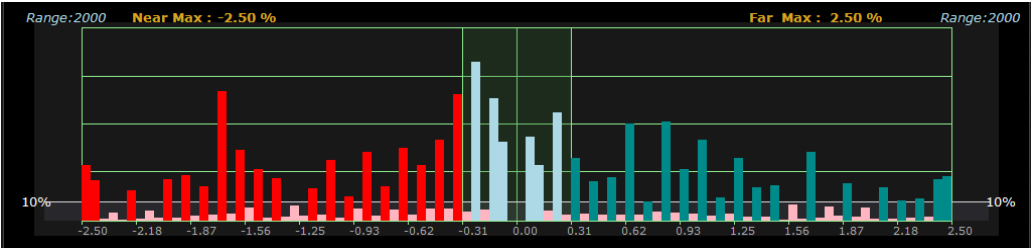


• Normal and Color Map

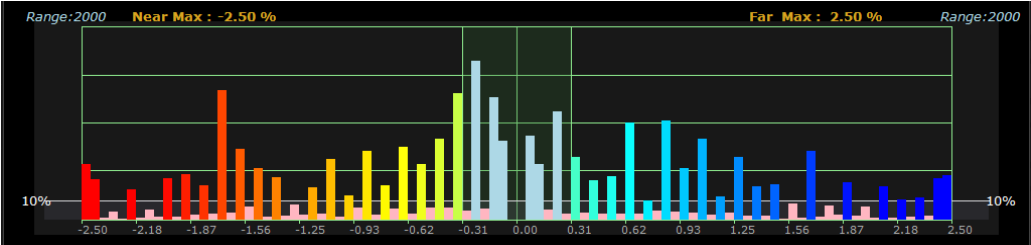
You can select the histogram colors from the options shown below.

Histogram Colors	Explanation
Normal	The histogram is displayed with the colors that were shown in section 5.2, “Histogram Explanation.”
Color Map	Blue is used at +7.50 %, red is used at -7.50 %, and the values between these end points are displayed with a gradation. (When the Area Mode menu item is set to Select, the values between +1.87 % and -1.87 % are displayed with a gradation.)

Normal

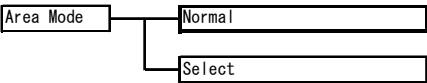


Color Map



5.4.8 Area Mode

The structure of the Area Mode menu is shown below.
During disparity measurements, you cannot select the Area Mode menu.

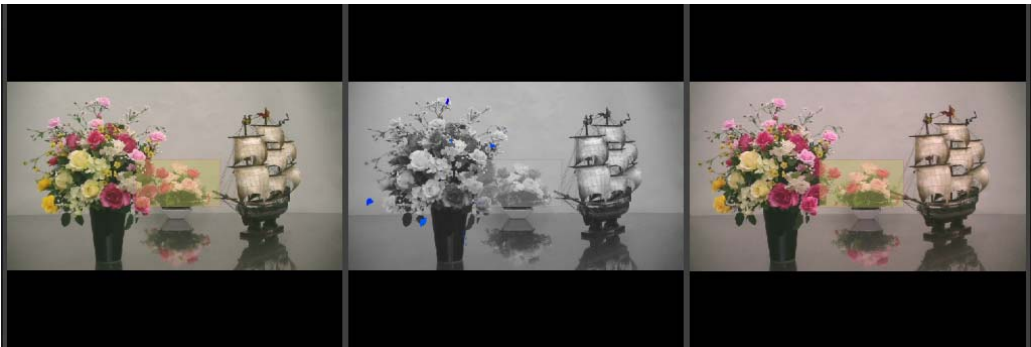


● Normal and Select

Select the disparity measurement range from the values shown below.

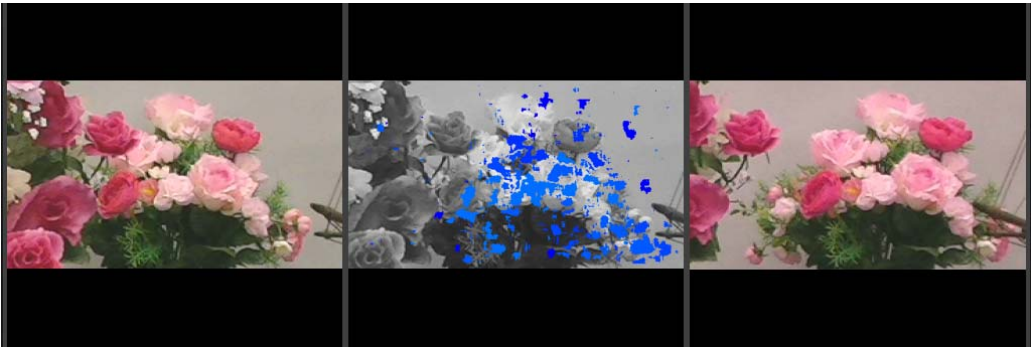
Measurement Range	Explanation
Normal	The disparity of all areas (1920 dots × 1080 lines) will be measured. The measurement resolution is 4 dots (approximately 0.21 %).
Select	The disparity of the selected area (480 dots × 270 lines) will be measured. The measurement resolution is 1 dot (approximately 0.05%).

If you select the Select menu item and then begin the disparity measurement, a yellow frame will be displayed in the top of the screen. To move this frame, move the cursor over the video for the left eye. After you have selected the measurement area, double-click. Note that the disparity measurement is not performed while you are selecting the measurement area.



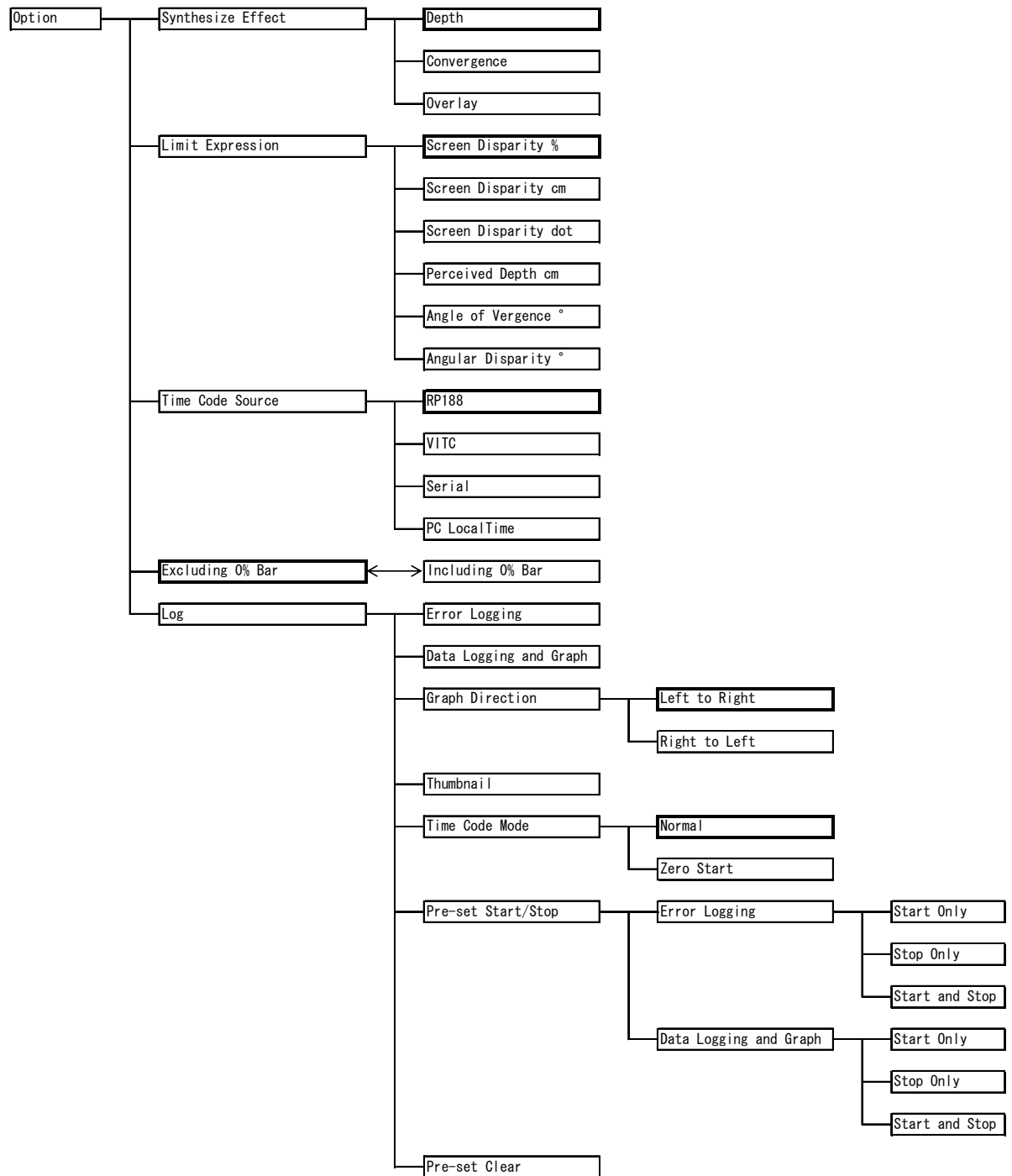
The disparity of the selected area is displayed. “Area Select” is displayed in the upper right of the screen.

If you want to change the selected area, during the disparity measurement, double-click the video for the left eye again to display the yellow frame.



5.4.9 Option

The structure of the Option menu is shown below.



● Synthesize Effect

Select the display mode of the combined video, which is shown in the center of the screen, from the values shown below.

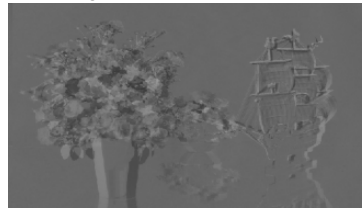
Display Mode	Explanation
Depth(*1)	In relation to the screen, the near parts of the video are displayed in white and the far parts of the video are displayed in black. When the upper disparity limits have been set, locations in which errors occur are displayed in red (for near parts) and blue (for far parts).
Convergence	The difference between the video for the left eye and the video for the right eye are displayed in monochrome.
Overlay(*1)	In relation to the screen, the near parts of the video are displayed in red and the far parts of the video are displayed in blue. The red and blue parts are overlaid on top of a monochrome version of the video for the left eye. If the upper disparity limits have not been set, only a monochrome version of the video for the left eye is displayed.

*1 When the Histogram menu item is set to Color Map, the disparity portions are displayed with a gradation.

Depth



Convergence



Overlay



● Limit Expression

Select from the following values the display format of Limit Near and Limit Far that are displayed at the bottom of the screen and of Near MaxDisparity and Far MaxDisparity that appear on the log display.

Display Format	Explanation
Screen Disparity %	The screen disparity is displayed as a percentage. This is the default setting.
Screen Disparity cm	The screen disparity is displayed in centimeters. This cannot be selected if the Parameter items have not been set.
Screen Disparity dot	The screen disparity is displayed in dots.
Perceived Depth cm	The near and far distances from the screen are displayed in centimeters. This cannot be selected if the Parameter items have not been set.
Angle of Vergence °	The angle of vergence is displayed in degrees. This cannot be selected if the Parameter items have not been set.
Angular Disparity °	The angular disparity is displayed in degrees. This cannot be selected if the Parameter items have not been set.

• Time Code Source

Select the format of the time codes that are used in logging from the values shown below. During disparity measurements, you cannot select this menu item.

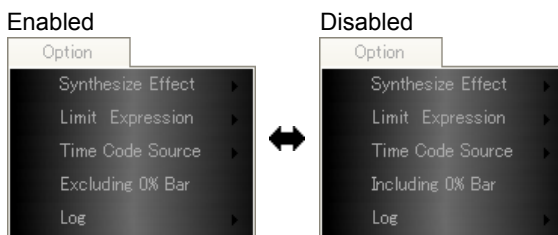
When Time Code Mode is set to Zero Start, the disparity measurement start time is set to 00:00:00 regardless of the time code that you select here.

Format	Explanation
RP188	The PR188 time code embedded in the input signal is displayed. This is the default setting.
VITC	The VITC time code embedded in the input signal is displayed.
Serial	The time code embedded in the input signal is displayed.
PC LocalTime	The LT 7030A clock is displayed here. If you have set INPUT to HDMI on the File menu, PC LocalTime is selected automatically.

• Excluding 0% Bar and Including 0% Bar

With the default settings, the LT 7030A will measure 0 % disparities (no disparity). However, you can configure the LT 7030A so that it does not perform these measurements.

To disable these measurements, click the Excluding 0% Bar menu item. The menu item will switch to Including 0% Bar, and 0 % disparities will no longer be measured. If you click the Including 0 % Bar menu item, the LT 7030A will measure 0 % disparities again.



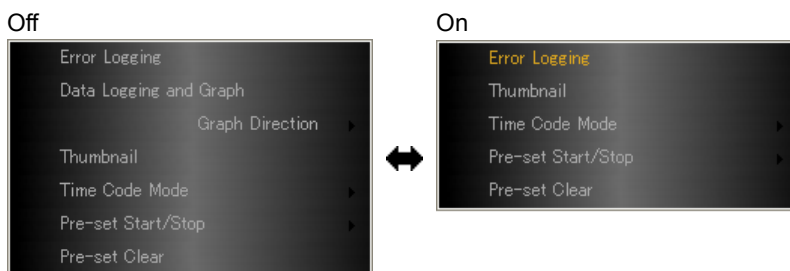
• Log - Error Logging

You can configure the LT 7030A so that it logs the errors that occur during disparity measurements.

To log errors, click the Error Logging menu item. When the text on this menu item is displayed in orange, the LT 7030A is configured to log errors. You can also click the Error Logging button in the center of the screen to log errors.

If Near Limit and Far Limit have not been set on the Upper Limit menu or if Data Logging and Graph has been turned on, you cannot select this menu item.

See section 5.4.4, “Upper Limit.”



When you turn Error Logging on and press Start, the error log and the recording start time are displayed on the screen as shown below.

Range:FULL		Near Max : -0.41 %			
					Start Time 14:51:01
Timecode→	Frame	Near	Near MaxDisparity	Far	Far MaxDisparity
14:51:29→	--	OK	--,--%	NG	01.23%
14:51:31→	--	OK	--,--%	NG	01.45%
14:51:31→	--	OK	--,--%	NG	01.45%
14:51:31→	--	OK	--,--%	NG	02.03%
14:51:31→	--	OK	--,--%	NG	02.03%

Until you turn Error Logging off, the recorded error log is saved in the following log folder as a single piece of data. To view the saved error log, use the log viewer.

See chapter 6, “LOG VIEWER.”

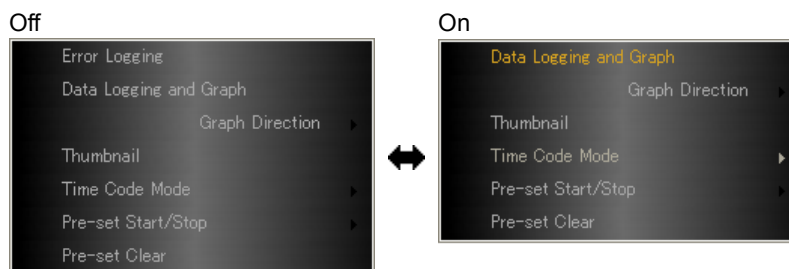
D
└─ LT7030A
└─ Log
└─ yyyy-mm-dd-hh-mm-ss-log.....Log folder (when Area Mode is set to Normal)
└─ yyyy-mm-dd-hh-mm-ss-log-Area.....Log folder (when Area Mode is set to Select)

● Log - Data Logging and Graph

You can configure the LT 7030A so that it logs all the frames that it measures during disparity measurements. You can also view a graph of the log with time on the horizontal axis and the maximum disparity on the vertical axis.

To record the data log, click the Data Logging and Graph menu item. When the text on this menu item is displayed in orange, the LT 7030A is configured to record the data log. You can also click the Data Logging and Graph button in the center of the screen or press F1 to record the data log.

If Error Logging is on, you cannot select this menu item.



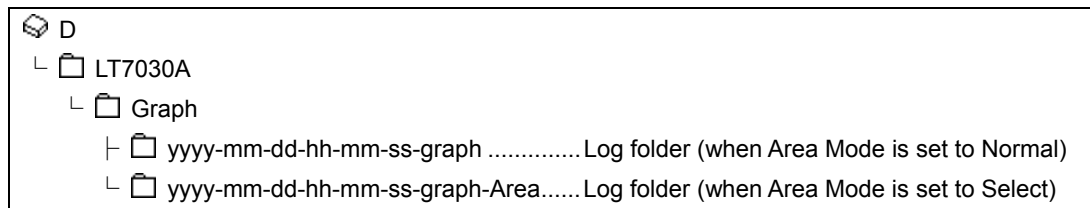
When you turn Data Logging and Graph on and press Start, the time graph is displayed on the screen as shown below.

Up to 600 frames are displayed on the time graph. Older graph data is deleted from the display, but after the measurement is complete, you can use the log viewer to view the entire graph.

See chapter 6, “LOG VIEWER.”



Until you turn Data Logging and Graph off, the recorded data log is saved in the following log folder as a single piece of data. To view the saved data log, use the log viewer.



• Log - Graph Direction

Select from the values shown below the direction of the horizontal axis (time) of the time graph that is displayed when you turn Data Logging and Graph on.

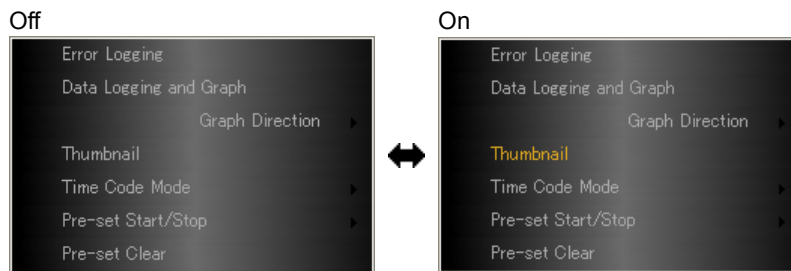
If Error Logging is on, you cannot select this menu item.

Left to Right, Right to Left

• Log - Thumbnail

You can record the combined video together with the logs when they are recorded.

To record the combined video, click the Thumbnail menu item. When the text on this menu item is displayed in orange, the LT 7030A is configured to record the combined video. You can also use the Thumbnail button in the center of the screen to turn on the recording of combined video.



Until you turn Error Logging or Data Logging and Graph off, the recorded combined video is saved in the following log folder as a single piece of data. To view the saved combined video, use the log viewer.

See chapter 6, “LOG VIEWER.”

• Log - Time Code Mode

Select the logging time code mode.

During disparity measurements, you cannot select this menu item.

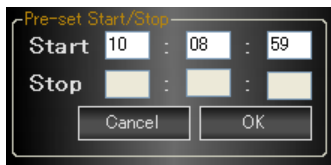
Format	Explanation
Normal	Logs are recorded with the time code that you used Time Code Source to select.
Zero Start	The time code of the disparity measurement start time is set to 00:00:00.

- Log - Pre-set Start/Stop

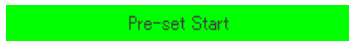
You can configure the LT 7030A so that logging starts and stops at the specified times. During disparity measurements, you cannot select these menu items.

To Start Logging at a Specified Time

- Set Time Code Mode to Normal. When Time Code Mode has been set to Zero Start, you cannot use this feature. Turn the Error Logging button and the Data Logging and Graph button off.
- Click Error Logging or Data Logging and Graph, and then click the Start Only menu item to enter the start time. Enter two digits for the time.



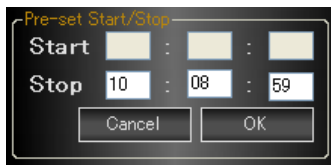
When you click OK, the text on the Error Logging button or the Data Logging and Graph button changes to Pre-set Start.



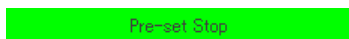
- Click Start. The LT 7030A will start logging at the specified time.

To Stop Logging at a Specified Time

- Click Error Logging or Data Logging and Graph, and then click the Stop Only menu item to enter the stop time. Enter two digits for the time.
When Time Code Mode has been set to Zero Start, enter the time from the start of logging to the point where logging will stop.

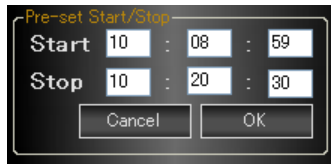


- Click Start.
- Turn the Error Logging button or the Data Logging and Graph button on. (You can also turn these buttons on before pressing Start.)
The text on the Error Logging button or the Data Logging and Graph button changes to Pre-set Stop. The LT 7030A will stop logging at the specified time.

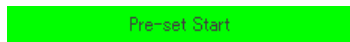


To Start and Stop Logging at the Specified Times

- a) Set Time Code Mode to Normal. When Time Code Mode has been set to Zero Start, you cannot use this feature. Turn the Error Logging button and the Data Logging and Graph button off.
- b) Click Error Logging or Data Logging and Graph, and then click the Start and Stop menu item to enter the start and stop times. Enter two digits for the times.



When you click OK, the text on the Error Logging button or the Data Logging and Graph button changes to Pre-set Start.



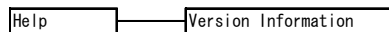
- c) Click Start. The LT 7030A will start and stop logging at the specified times.

- Log - Pre-set Clear

Clears the preset feature (starting and stopping logging at the specified times).

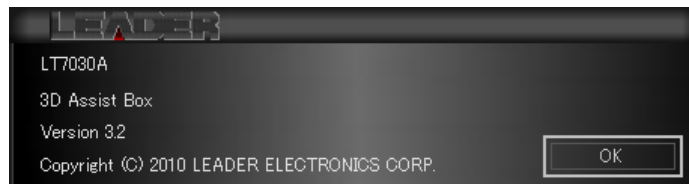
5.4.10 Help

The structure of the Help menu is shown below.



- Version Information

Displays the software version.



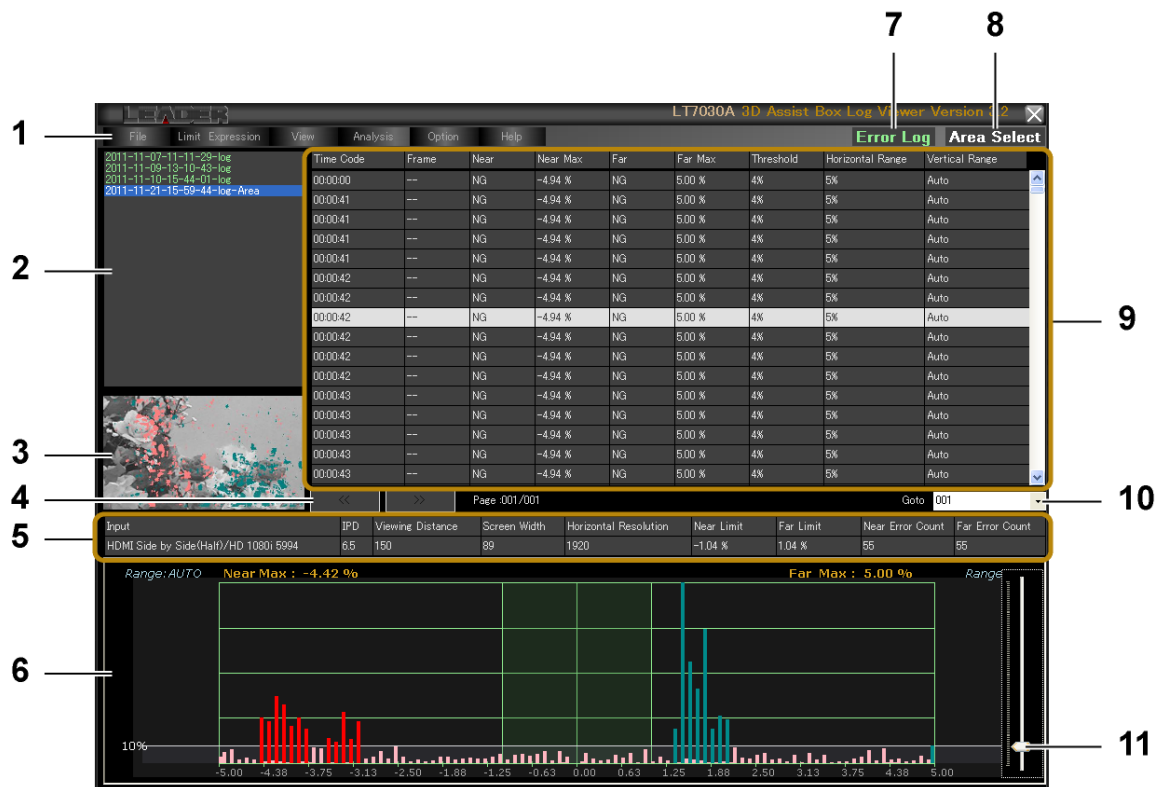
6. LOG VIEWER

This chapter explains the log viewer feature, which is a part of the automatic 3D disparity measurement software.

During disparity measurements, recorded logs are saved to the LT 7030A. You can use the log viewer to view these logs. In addition, by installing the log viewer on another PC, you can also view the log data on the other PC.

To start the log viewer, on the File Menu, click Log Viewer. To run the log viewer on another PC, see section 6.2, “Installation.”

6.1 Window Explanation



1 Menu

Performs file operations and configures various settings.

See section 6.4, “Menu Explanation.”

2 Log Folder Display

Displays a list of the log folders that are saved in D:\LT7030A\Log or D:\LT7030A\Graph. You can use the File menu to change the folder location.

When you have set the Area Mode menu item to Select in the automatic 3D disparity measurement, “-Area” is appended to the end of the folder name.

See section 6.4.1, “File.”

3 Thumbnail Display



Displays the combined video of the log that you select using “9 Log Data Display.”

Use Synthesize Effect on the Option menu to select the display mode.

To display the combined video, Thumbnail on the Option menu must be turned on so that thumbnails are recorded when logs are recorded. When thumbnails are turned off, “NO Thumbnail” is displayed, and the combined video is not displayed.

See section 5.4.7, “Option.”

4 Page Navigation Buttons

Up to 1800 log data entries can be displayed per page. If there are 1801 data entries or more in a single file, click  to move to the next page and  to move to the previous page.

5 Status Display

Displays the settings that were in use when the log was recorded. For information on the items not shown below, see section 5.1, “Window Explanation.”

View	Item	Explanation
Error Log	Near Error Count	Displays the number of near error occurrences in the selected log data entry.
	Far Error Count	Displays the number of far error occurrences in the selected log data entry.
All Data Log	Frame Count	Displays the number of frames that are recorded in the selected log folder.

6 Histogram Display

Displays the histogram of the log that you select using “9 Log Data Display.”

7 Log Type Display

Displays the type of log that has been selected on the View menu.

See section 6.4.3, “View.”

8 Area Select Display

This is displayed when you use “2 Log Folder Display” to select a log folder that has “-Area” appended to it.

9 Log Data Display

Displays the contents of the log folder that you used “2 Log Folder Display” to select.

10 Goto

Up to 1800 log data entries can be displayed per page. If there are 1801 data entries or more in a single file, you can use the Goto box to go to the specified page.

11 Slider

Changes the threshold that has been set with Error Threshold on the Upper Limit menu.

See sections 5.4.4, “Upper Limit,” and 6.4.5, “Option.”

6.2 Installation

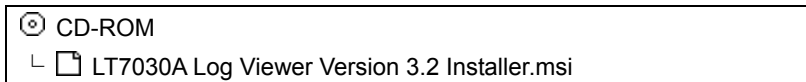
You can install the log viewer as standalone software on another PC. By doing so, you can view the log data that has been recorded on the LT 7030A on another PC.

This section will show the procedure for viewing log data that has been recorded on the LT 7030A on another PC.

The other PC must meet the following system requirements.

Item	Requirement
OS	Windows 7, Windows XP SP3
Memory	1 GB or more
Hard disk	1 MB or more of free space (this does not include the space that is required to install Microsoft .Net Framework 3.5)
Display	1024 × 768 or higher, high color, 32 bit

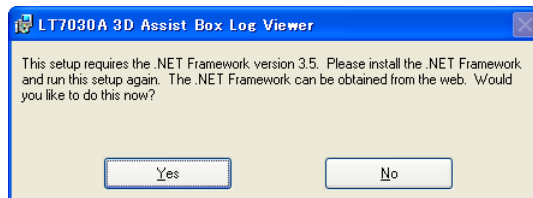
1. Insert the included CD-ROM in the PC.
2. Double-click “LT7030A Log Viewer Version 3.2 Installer.msi” on the CD-ROM.



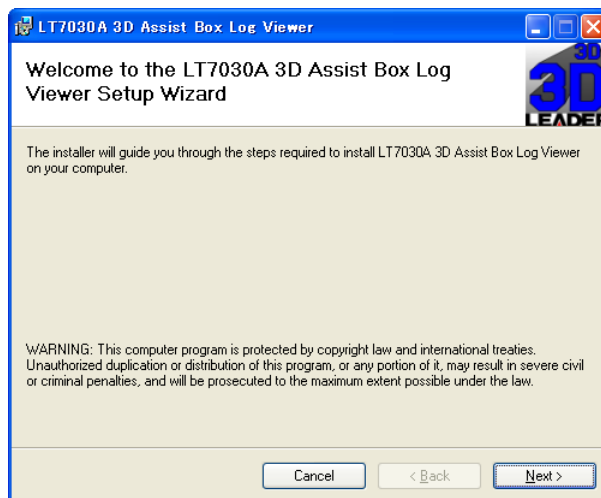
3. Install Microsoft .NET Framework 3.5.

If Microsoft .NET Framework 3.5 is not installed on the PC, the following window will be displayed. Click Yes to install the software.

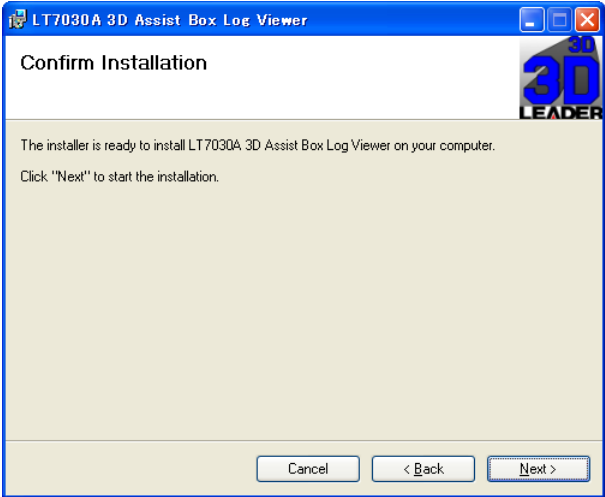
Follow the procedure provided by Microsoft to install the software.



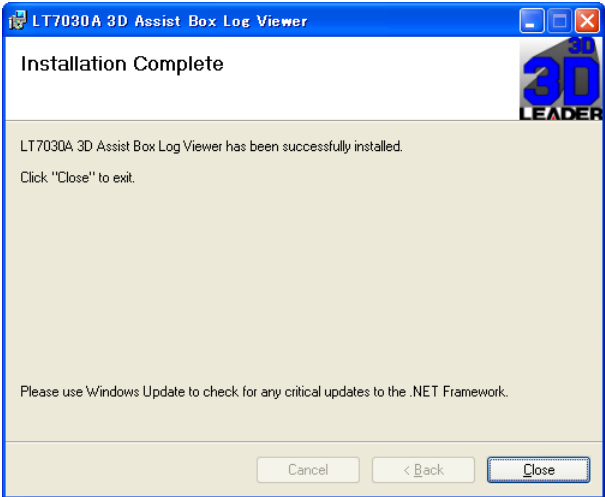
4. When the following window appears, click Next.



5. When the following window appears, click Next.



6. When the following window appears, the installation is complete. Click Close.



7. On the PC's D drive, create a "LT7030A" folder. In that folder, create a "Log" folder and a "Graph" folder. Copy the log folders from the LT 7030A to these folders.
Copy the folders as a whole (do not copy individual files).

PC	
D	
└─ LT7030A	Create this folder.
└─ Log	Create this folder.
└─ yyyy-mm-dd-hh-mm-ss-log(-Area)	Copy the folders into this folder from the LT 7030A.
└─ Graph	Create this folder.
└─ yyyy-mm-dd-hh-mm-ss-graph(-Area)	Copy the folders into this folder from the LT 7030A.

6. LOG VIEWER

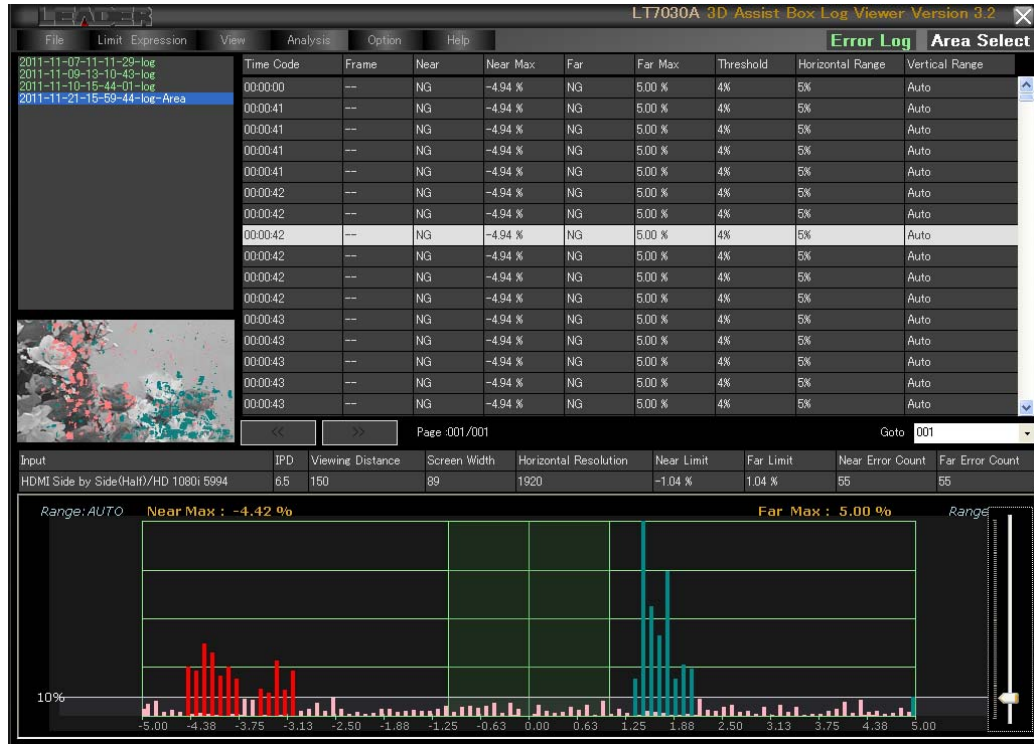
8. Double-click “3D Assist Box Log Viewer” on the desktop.



3D Assist Box Log Viewer

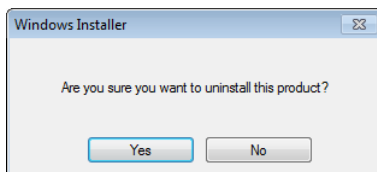
The Log Viewer window is displayed.

Select a log folder in the upper left of the window to display the contents of the folder in the right side of the window.



6.3 Uninstallation

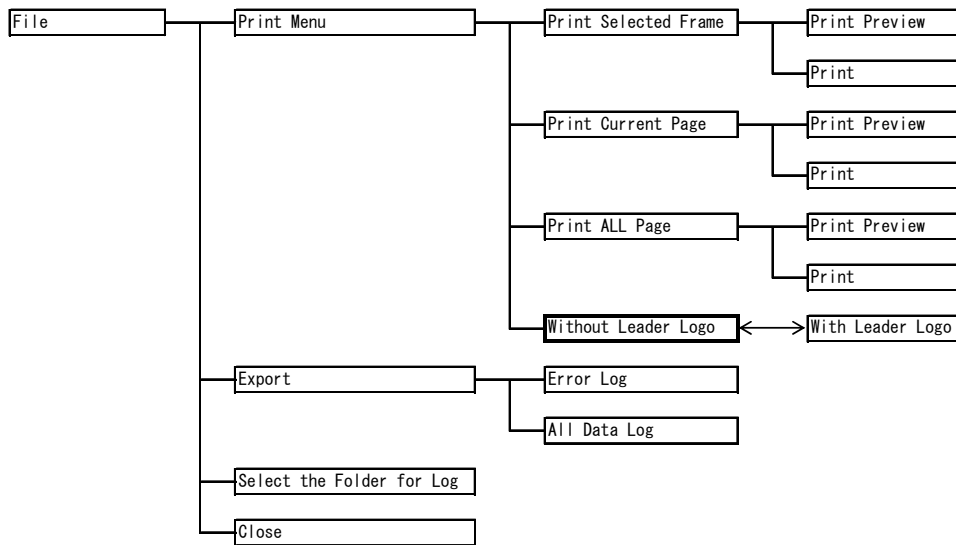
To uninstall the log viewer, on the taskbar, click Start, All Programs, LT7030A 3D Assist Box, and then Uninstall. Click Yes when the following dialog box appears.



6.4 Menu Explanation

6.4.1 File

The structure of the File menu is shown below.



● Print Menu

By connecting a printer to the LT 7030A, you can print log data as reports. Select the print format from the values shown below. Click Print Preview to see how it will be printed. Click Print to print the data.

Print Format	Explanation
Print Selected Frame	Only the log data that you selected in the log data display in the upper right of the screen will be printed.
Print Current Page	The currently displayed page of the log data that is contained in the log folder that you selected in the upper left of the screen will be printed.
Print ALL Page	All the log data that is contained in the log folder that you selected in the upper left of the screen will be printed.

With “Print ALL Page,” a title page is printed before the log data. The values that you enter on the Contents Information screen will be printed on this title page.

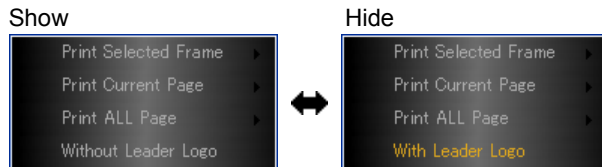
- Without Leader Logo and With Leader Logo

With the default settings, the “LEADER” logo is included in reports, but you can hide this logo.

To hide the logo, click the Without Leader Logo menu item. The text on the menu item switches to “With Leader Logo,” and the logo is hidden. You can display the logo by clicking the With Leader Logo menu item.

The setting that you specify here also affects the time graph analyzer reports.

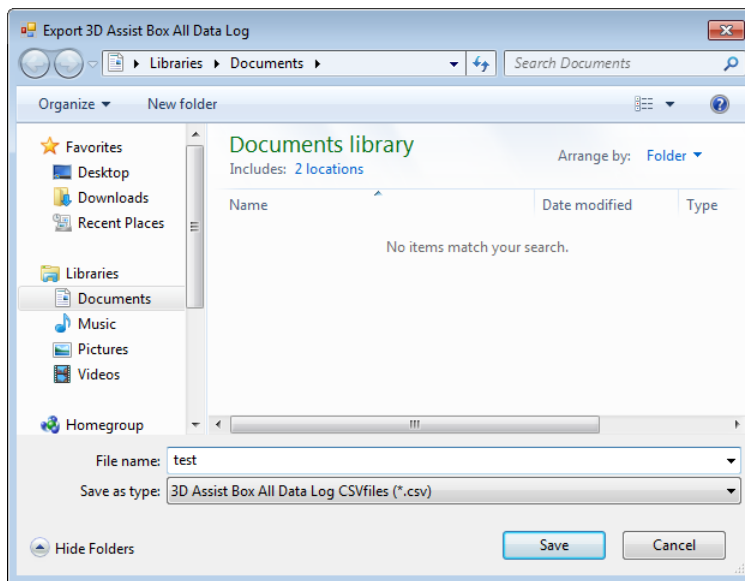
See section 6.5.3, “Report Screen Explanation.”



- Export - Error Log and Export - All Data Log

Exports the data that is contained in the log folder that you selected in the upper left of the screen. The data is saved in csv format.

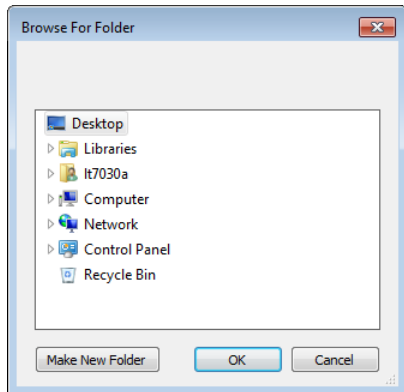
You can use Microsoft Excel or a similar program to view the exported data.



- Select the Folder for Log

Select the log folders that are displayed in the log viewer.

In the factory default settings, the log folders in “D:\LT7030A” are displayed.

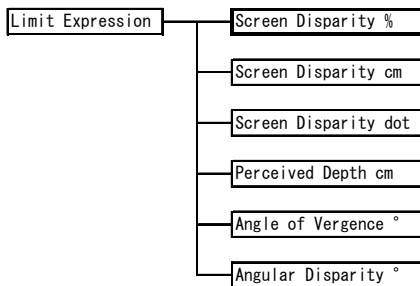


- Close

Closes the log viewer. You can also use the close button in the upper right of the screen to close the log viewer.

6.4.2 Limit Expression

The structure of the Limit Expression menu is shown below.



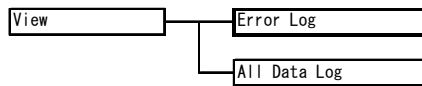
- Limit Expression

Select the display format of Near Max and Far Max from the values shown below.

Display Format	Explanation
Screen Disparity %	The screen disparity is displayed as a percentage. This is the default setting.
Screen Disparity cm	The screen disparity is displayed in centimeters.
Screen Disparity dot	The screen disparity is displayed in dots.
Perceived Depth cm	The near and far distances from the screen are displayed in centimeters.
Angle of Vergence °	The angle of vergence is displayed in degrees.
Angular Disparity °	The angular disparity is displayed in degrees.

6.4.3 View

The structure of the View menu is shown below.



• Error Log and All Data Log

Switches the log type.

Click Error Log to view the error logs that have been recorded during automatic 3D disparity measurement through the use of the Error Logging menu item. Click All Data Log to view the data logs that have been recorded during automatic 3D disparity measurement through the use of the Data Logging and Graph menu item.

6.4.4 Analysis

The structure of the Analysis menu is shown below.



• All Data Log

When the View menu item is set to All Data Log, click this to display an analysis of the data in the log folder that you selected in the upper left of the screen.

See section 6.5, “Time Graph Analyzer.”

6.4.5 Option

The structure of the Option menu is shown below.



• Manual Threshold

Changes the threshold that has been set with Error Threshold on the Upper Limit menu.

Changes to the threshold can be viewed temporarily on the histogram. These changes are not applied to the thumbnails and error counts. If you switch to a different log, you will lose the changes that you have made to the threshold.

See section 5.4.4, “Upper Limit.”

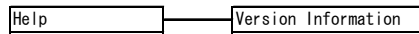
To change the threshold, select a log, and then click the Manual Threshold menu item.

When the menu item text is displayed in orange, you can use the slider in the lower right of the screen to change the threshold.



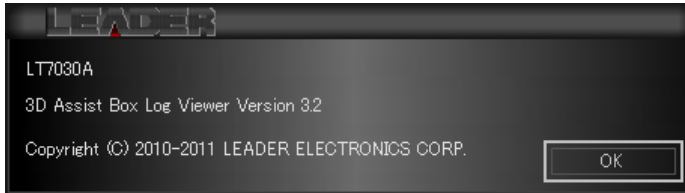
6.4.6 Help

The structure of the Help menu is shown below.



- Version Information

Displays the software version.

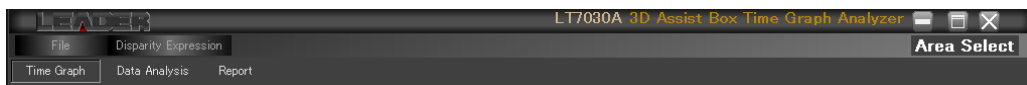


6.5 Time Graph Analyzer

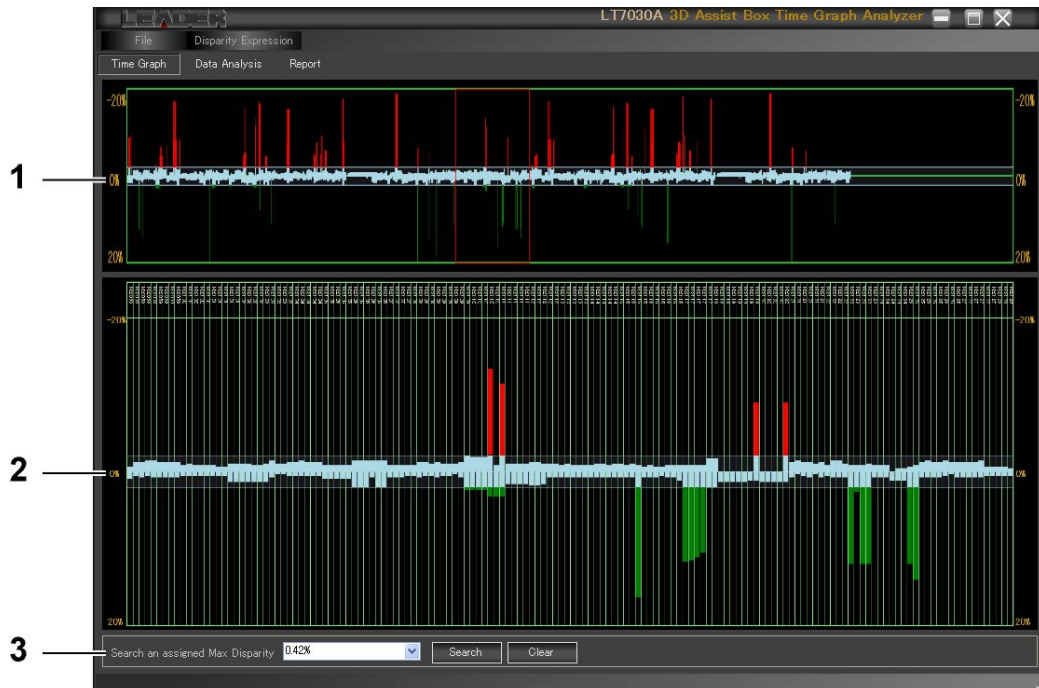
When the View menu item is set to All Data Log, you can analyze the selected log folder by setting the Analysis menu item to All Data Log.

There are the following three analysis screens: the time graph screen, the data screen, and the report screen. To switch between the screens, click Time Graph, Data Analysis, or Report in the upper left of the screen.

“Area Select” is displayed in the upper right of the screen to indicate the times when a selected area was measured.



6.5.1 Time Graph Screen Explanation



6. LOG VIEWER

1 Complete Time Graph Display

All the data is displayed on a graph with time as its horizontal axis (left to right) and maximum disparity as its vertical axis.

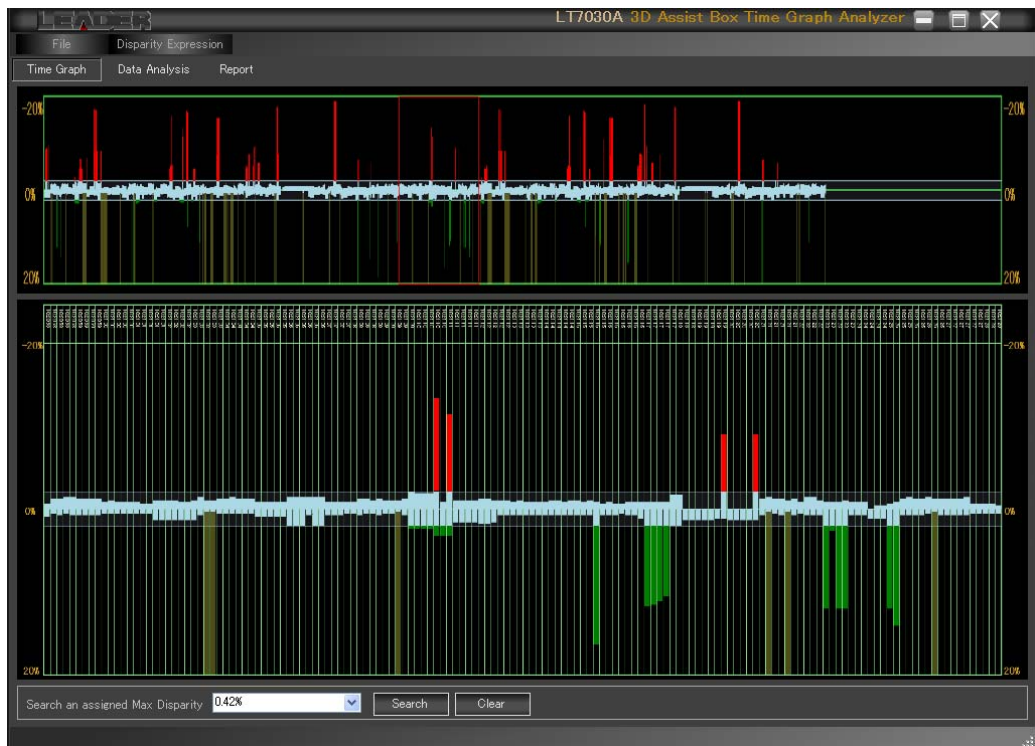
Use the mouse to move the red box (which covers 150 frames). A magnified version of the indicated area is displayed below the complete time graph. Double-click the red box to fix its position. To make the box movable, double-click it again.

2 Magnified Time Graph Display

Displays a magnified version of the area that you selected with the red box as shown in “1 Complete Time Graph Display.” Time codes are displayed at the top of the graph.

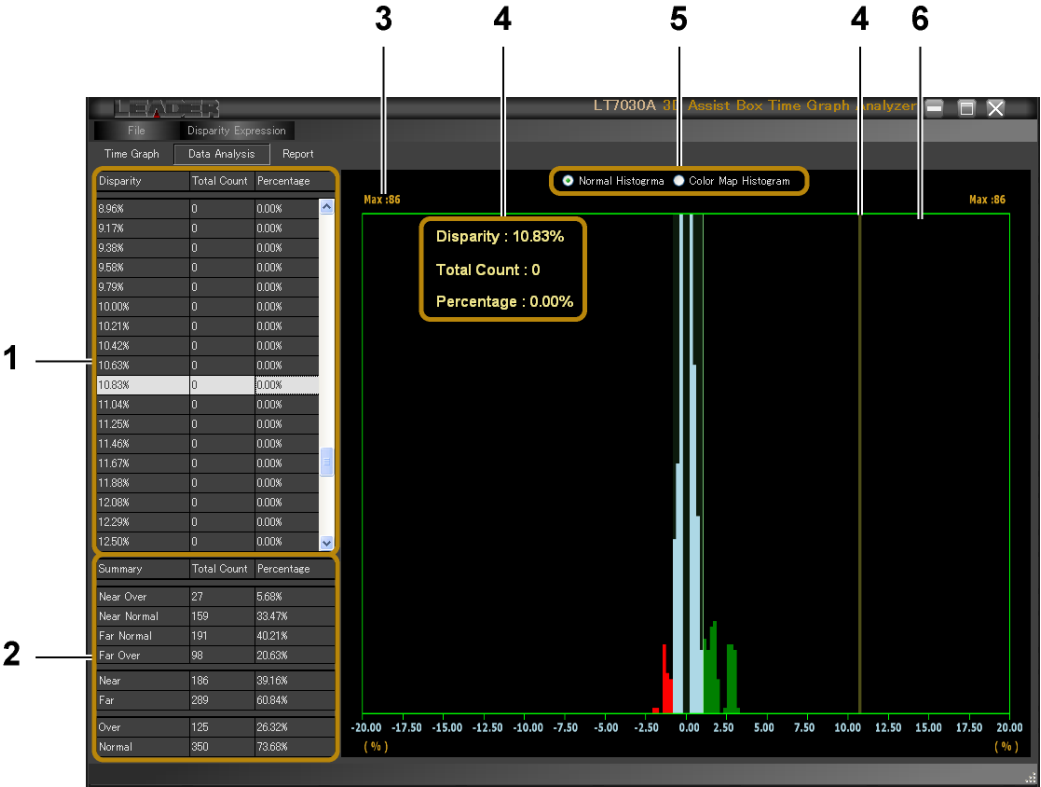
3 Disparity Search

Select a disparity from the list, and then click Search to display the selected disparity in olive. Click Clear to clear this display.



6. LOG VIEWER

6.5.2 Data Screen Explanation



1 Analysis Display (Per Disparity)

Displays the total number of occurrences of each disparity as a count and as a percentage of the total number of disparities.

2 Analysis Display (Overall)

Displays the total number of occurrences of the following items as a count and as a percentage of the total number of occurrences of all items shown below.

Item	Explanation
Near Over	A near disparity, in relation to the screen, that exceeds the upper limit
Near Normal	A near disparity, in relation to the screen, that does not exceed the upper limit
Far Normal	A far disparity, in relation to the screen, that does not exceed the upper limit
Far Over	A far disparity, in relation to the screen, that exceeds the upper limit
Near	A near point in relation to the screen
Far	A far point in relation to the screen
Over	A disparity that exceeds the upper limit
Normal	A disparity that does not exceed the upper limit

3 Maximum Occurrence Display

Displays the maximum number of occurrences. The vertical axis uses the maximum number of occurrences as the upper limit of its full scale.

4 Display of Selected Data

Displays in olive on the graph the data that you selected using “1 Analysis Display.” The data is also displayed as values in the upper left of the graph.

5 Histogram Color Selection

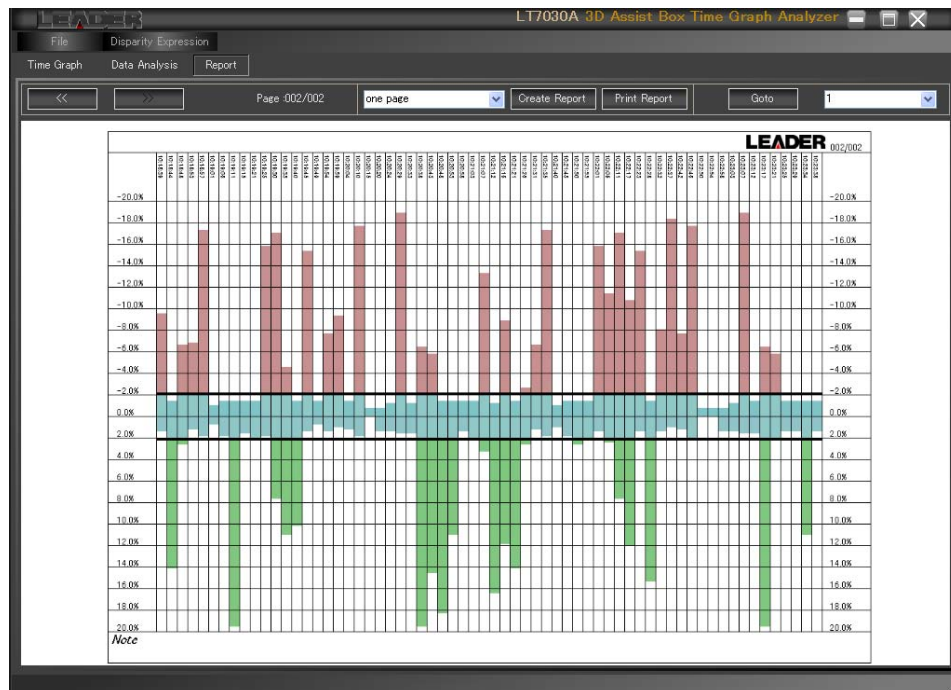
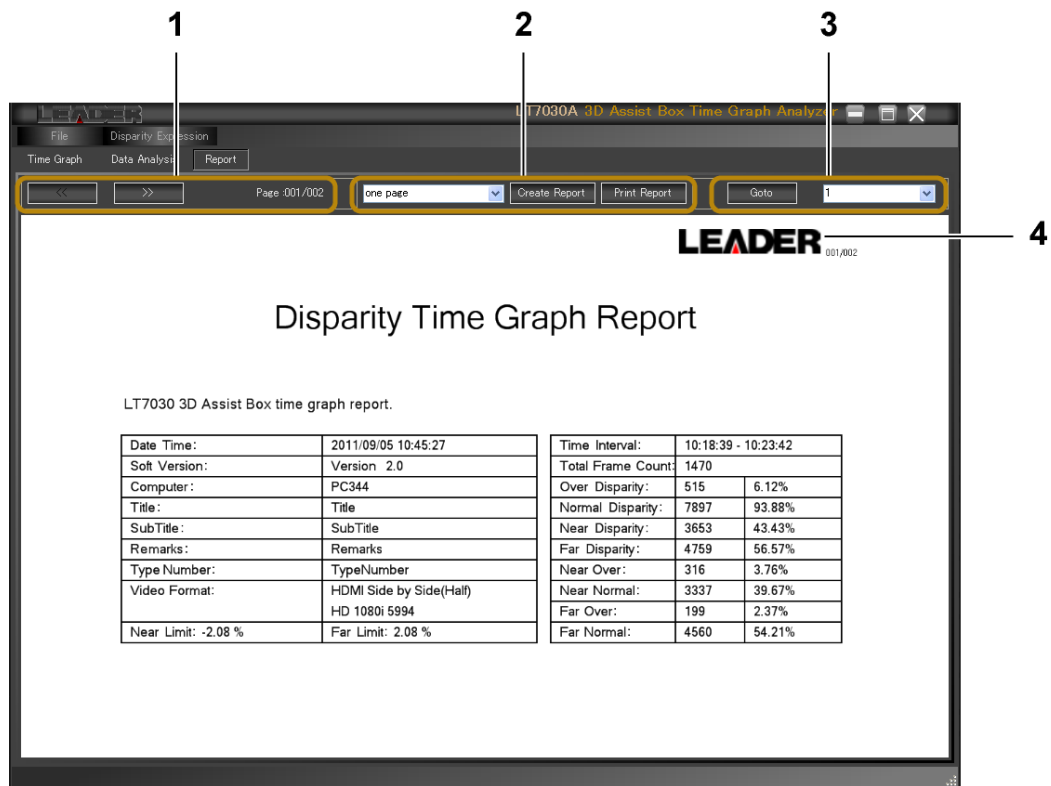
Select the histogram colors. If you select “Color Map Histogram,” a gradation is used to display the histogram.

6 Graph Display



Displays a graph with disparity as its horizontal axis and total number of occurrences as its vertical axis.

6.5.3 Report Screen Explanation

On the report screen, you can view and print the time graph as a report.
If the LT 7030A cannot recognize the time codes, the time graph may not be displayed correctly.

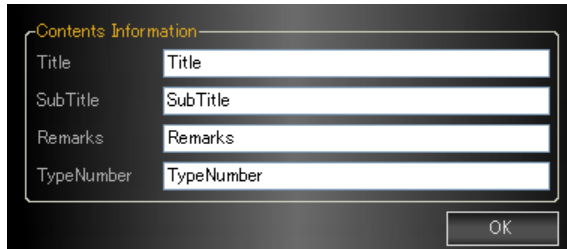


1 Page Navigation Buttons

Click  to move to the next page and  to move to the previous page.

2 Display and Print Reports

Click Create Report to display a report. Click Print Report to print a report. A cover page is included as the first page of the report. The items that you entered on the Contents Information screen are printed on the cover page.

A screenshot of a 'Contents Information' dialog box. It has a title bar with the text 'Contents Information'. Inside the dialog, there are four text input fields: 'Title', 'SubTitle', 'Remarks', and 'TypeNumber'. Each field has its label to the left and the field name to the right of the input area. At the bottom right of the dialog is an 'OK' button.

Use the list to select the interval of the time graph's horizontal axis from the values shown below. If you select “one page,” the horizontal axis interval will be automatically adjusted so that the time graph fits on one page.

After you select a value, click Create Report or Print Report to apply the change.

1 sec, 2 sec, 5 sec, 10 sec, 30 sec, 1 min, 2 min, 3 min, one page

3 Goto

Click Goto to go to the selected page.

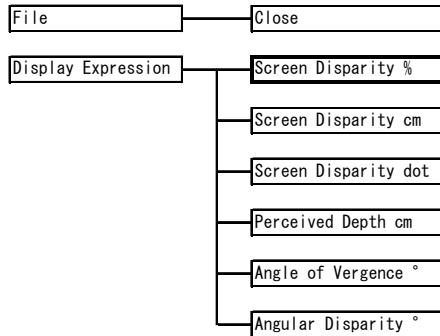
4 LEADER Logo

You can use the File menu in the log viewer to hide this logo.

See section 6.4.1, “File.”

6.5.4 Menu Explanation

The structure of the time graph analyzer screen's menu is shown below.



• File - Close

Closes the time graph analyzer. You can also use the close button in the upper right of the screen to close the time graph analyzer.

• Disparity Expression

Select the disparity display format from the values shown below.

On the report screen, this value is applied when you click Create Report or Print Report.

Display Format	Explanation
Screen Disparity %	The screen disparity is displayed as a percentage. This is the default setting.
Screen Disparity cm	The screen disparity is displayed in centimeters.
Screen Disparity dot	The screen disparity is displayed in dots.
Perceived Depth cm	The near and far distances from the screen are displayed in centimeters.
Angle of Vergence °	The angle of vergence is displayed in degrees.
Angular Disparity °	The angular disparity is displayed in degrees.

Following information is for Chinese RoHS only

所含有毒有害物质信息

部件号码: LT 7030A



此标志适用于在中国销售的电子信息产品, 依据2006年2月28日公布的

《电子信息产品污染控制管理办法》以及SJ/T11364-2006《电子信息产品污染控制标识要求》, 表示该产品在使用完结后可再利用。数字表示的是环境保护使用期限, 只要遵守与本产品有关的安全和使用上的注意事项, 从制造日算起在数字所表示的年限内, 产品不会产生环境污染和对人体、财产的影响。

产品适当使用后报废的方法请遵从电子信息产品的回收、再利用相关法令。

详细请咨询各级政府主管部门。

产品中有毒有害物质或元素的名称及含量

部件名称 Parts	有毒有害物质或元素 Hazardous Substances in each Part					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
主体部	×	○	○	○	○	○
开关电源	×	○	○	○	○	○
风扇	×	○	○	○	○	○
外筐	○	○	○	○	○	○
附件	×	○	○	○	○	○
包装材	○	○	○	○	○	○
备注) ○: 表示该有毒有害物质在该部件所有均质材料中的含量均在SJ/T11363-2006 规定的限量要求以下。 ×: 表示该有毒有害物质或元素至少在该部件的某一均质材料中的含量超出SJ/T11363-2006 标准规定的限量要求。						

Ver. 1

LEADER

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