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# LE 8682 VIDEO MEASURING BOX

INSTRUCTION MANUAL



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## 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.

<symbol></symbol>	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. 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.
<term></term>	Ignoring the precautions that this term indicates could lead to death or serious injury.
<term></term>	Ignoring the precautions that this term indicates could lead to personal injury or damage to the instrument.

Read the warnings and information 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 %RH 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

Do not insert foreign materials, such as metal and flammable objects, through the vents or allow liquid to enter the instrument. Such acts can lead to fire, electric shock, damage to the instrument, or some other accident.

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. Failing to do so could lead to fire. Turn OFF the power switch, and remove the power cord from the outlet. After making sure that fire has not spread anywhere, contact your local LEADER agent.



# 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. Warnings Concerning Grounding The instrument has a ground terminal to protect the user and the instrument from electric shock.



Cautions Concerning the Input and Output Connectors

Ensure that the product is properly grounded for safe operation.

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.

• Cautions Concerning the AC Adapter

Only use the specified type of AC adapter. Using a non-specified type of adapter could damage the instrument and lead to fire.

We recommend you replace the AC adapter at least once every five years.

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.

## 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

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

Do not use thinner or benzene when you clean the instrument's case, panels, or 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 product. 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 a product 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 Maximum Allowable Input Voltage

# 

The maximum signal voltage that can be applied to the input connectors is indicated below. Do not apply excessive voltage to the connectors. Doing so may damage the device or lead to injury.

Input Connector	Maximum Allowable Input Voltage
INPUT	±5 V (DC + peak AC)

#### 1.2.2 Mechanical Shock

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

#### 1.2.3 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.

#### 1.2.4 Warming Up

To ensure more accurate measurements, turn ON the instrument approximately 30 minutes before you intend to use it to allow its internal temperature to stabilize.

#### 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

The LE 8682 can take waveform measurements of NTSC/PAL composite video signals. The measured values can be retrieved using an application installed on a PC or using remote commands.

## 2.2 Features

#### • Measurement of NTSC or PAL composite video signals

The LE 8682 can measure the burst level, burst frequency, and so on of NTSC or PAL composite video signals.

#### • Automatic self check

The LE 8682 has a feature for calibrating its own measurement levels in the waveform measurement section.

## 2.3 Specifications

#### 2.3.1 Waveform Input

Input Signal	NTSC or PAL composite video signal
Input Connector	1 BNC connector
Input Impedance	75 Ω
Maximum Input Voltage	±5 V (DC + peak AC)
Maximum Measurement Input V	oltage
	±3 V (DC + peak AC)
Number of Ranges	3
Measurement Range	
Range 1	±3 V (DC + peak AC)
Range 2	±1.5 V (DC + peak AC)
Range 3	±0.75 V (DC + peak AC)
Voltage Measurement Accuracy	
Range 1	
340 mV to 3 V or 340 mVp-	p to 6 Vp-p
	±3 %
≤340 mV or ≤340 mVp-p	±10 mV
Ranges 2 and 3	
170 mV to 1.5 V or 170 mV	p-p to 3 Vp-p
	±3 %
≤170 mV or ≤170 mVp-p	±5 mV
Frequency Measurement Accura	асу
	±0.1 % (25±5 °C)
A/D Converter	12 bit, 60 MHz sampling

2.3.2	Waveform Output	
	Output Format Range 1 Range 2 Range 3 Output Connectors Output Impedance Maximum Output Voltage Output Voltage Accuracy Frequency Response	Outputs half the input signal Active through output Active through output 2 BNC connectors 75 $\Omega$ ±1.5 V (DC + peak AC, at 75 $\Omega$ termination) ±2 % (DC) ±5 % (DC to 5 MHz)
2.3.3	Control Connectors	
	PC Interface Specifications Port Function Camera Control	USB 1.1 Type B Transmits settings and measured data Custom order feature
2.3.4	Automatic Self Check	
	Offset Calibration Calibration Voltage Criterion Range 1 Range 2 Range 3	0 mV ±10 mV ±5 mV ±2.5 mV
	DC Voltage Calibration	
	Calibration Voltage Range 1 Range 2 Range 3 Criterion Range 1 Range 2 Range 3	±2 V ±1 V ±0.5 V ±60 mV ±30 mV ±15 mV
	AC Voltage Calibration (Level C	Calibration Only)
	Calibration Voltage Range 1 Range 2 Range 3 Frequency Criterion	2 Vp-p 2 Vp-p 1 Vp-p 3.6 MHz ± 0.5 %
	Range 1 Range 2	±60 mV +60 mV
	Range 3	±30 mV

2.3.5	Measurable Items	
	Measurement Signal	NTSC or PAL composite video signal
	V-Sync Frequency Description Measurement Range Measurement Accuracy	Measures the frequency of the vertical sync signal 10 to 100 Hz ±0.1 %
	H-Sync Frequency Description Measurement Range Measurement Accuracy	Measures the frequency of the horizontal sync signal 10 to 20 kHz ±0.1 %
	Sync Level Description Measurement Range Measurement Accuracy	Measures the amplitude of the horizontal sync signal 100 to 500 mV See "Voltage Measurement Accuracy" in section 2.3.1, "Waveform Input."
	Burst Frequency Description Measurement Range Measurement Accuracy	Measures the frequency of the color burst signal 3 to 4 MHz ±0.1 % (25±5 °C)
	Burst Level Description Measurement Range	Measures the maximum amplitude of the color burst signal 100 to 500 mV
	Measurement Accuracy	See "Voltage Measurement Accuracy" in section 2.3.1, "Waveform Input."
	Luminance level	
	Description	Measures over the specified range the amplitude of the luminance signal (Y signal) after separating Y and C components in reference to the pedestal level
	Measurement Range	
	Range 1	±3 V
	Range 2	±1.5 V
	Range 3	±0.75 V
	Measurement Accuracy	See "Voltage Measurement Accuracy" in section 2.3.1, "Waveform Input."

#### 2. SPECIFICATIONS

Color Level	
Description	Measures over the specified range the amplitude of the color signal (Y signal) after separating Y and C components in reference to the pedestal level
Measurement Range	
Range 1	±3 V
Range 2	±1.5 V
Range 3	±0.75 V
Measurement Accuracy	See "Voltage Measurement Accuracy" in section 2.3.1, "Waveform Input."
Peak Level	
Description	Measures over the specified range the maximum value of the video signal
Measurement Range	
Range 1	±3 V
Range 2	±1.5 V
Range 3	±0.75 V
Measurement Accuracy	See "Voltage Measurement Accuracy" in section 2.3.1, "Waveform Input."
General Specifications	
Environmental Conditions	
Operating Temperature	0 to 40 °C
Operating Humidity Range	85 %RH or less (no condensation)
Optimal Temperature	10 to 35 °C
Operating Environment	Indoors
Elevation	Up to 2,000 m
Overvoltage Category	II
Pollution Degree	2
Power Requirements	
Voltage	24 VDC
Power Consumption	60 W max.
Dimensions	205 (W) × 35 (H) × 125 (D) mm (excluding protrusions)
Weight	0.9 kg
Accessories	CD-ROM (PC application, instruction manual) 1
Sold Separately	AC adapter

2.3.6

# 3. PANEL DESCRIPTION

#### • Front Panel



#### • Rear Panel



#### • Panel Description

No.	Name	Description
1	INPUT	Receives NTSC or PAL composite video signals.
2	OUTPUT 1	Transmits the signal that is received through INPUT (active
	OUTPUT 2	through).
3	CONTROL	Controls a camera and supplies power.
	(custom order feature)	For details, contact your nearest LEADER agent.
4	USB	Connects to a PC and receives LE 8682 settings and measured
		values from the PC.
5	Power LED	Lights in green when the power is on.
6	DC INPUT	Connect the AC adapter sold separately.
7	Ground terminal	Used to connect the instrument to an external ground.
8	Serial number label	The serial number is printed on this label.

# 4. BEFORE YOU BEGIN MEASURING

#### 4.1 System Overview

The LE 8682 measures the NTSC/PAL composite video signal received through INPUT. You can retrieve the measured values from a PC that is connected to the LE 8682 through USB. OUTPUT 1 and 2 provide active through output of the signal received through INPUT. Connect image processing boards and the like to these connectors.



#### • PC System Requirements

OS: Windows XP (SP2 and later), Windows 7, Windows 8 Required software: .NET Framework Client Profile 4.2 Installing the USB Driver

Follow the procedure below to install the USB driver in your PC.

For the USB driver, use LE9280\_04B\_CommClass\_32.inf or LE9280\_04B\_CommClass\_64.inf in the supplied CD-ROM.

⊙ CD-ROM
L D USB_CommClass_INF
│
LE9280_04B_CommClass_64.infUSB driver (64 bit version)
├ D Instruction_Manual_for_LE_8682

- 1. Load the supplied CD-ROM in your PC.
- 2. Connect the AC adapter to the LE 8682 to turn it on.

The LE 8682 does not have a power switch. The power turns on when you connect the AC adapter.

3. Using a USB cable, connect the LE 8682 USB port to the PC's USB port.

Found New Hardware Wizard appears.

4. Select "No,..." and click Next.

Found New Hardware Wizard	
	Welcome to the Found New Hardware Wizard
	Windows will search for current and updated software by looking on your computer, on the hardware installation CD, or on the Windows Update Web site (with your permission). <u>Read our privacy policy</u>
	Can Windows connect to Windows Update to search for software?
	$\bigcirc$ Yes, this time only
	<ul> <li>Yes, now and every time I connect a device</li> <li>No, not this time</li> </ul>
	Click Next to continue.
	< Back Next > Cancel

5. Select "Install from a list..." and click Next.

Found New Hardware Wizard	
This wizard helps you install software for:         USB Device         If your hardware came with an installation CD or floppy disk, insert it now.         What do you want the wizard to do?         Install from a list or specific location (Advanced)         Click Next to continue.	
<pre>&lt; Back Next &gt; Cancel</pre>	

6. Select "Search removable media..." and click Next.

Found New Hardware Wizard
Please choose your search and installation options.
⊙ Search for the best driver in these locations.
Use the check boxes below to limit or expand the default search, which includes local paths and removable media. The best driver found will be installed.
Search removable media (floppy, CD-ROM)
Include this location in the search:
H:\ Browse
O Don't search. I will choose the driver to install.
Choose this option to select the device driver from a list. Windows does not guarantee that the driver you choose will be the best match for your hardware.
< <u>B</u> ack <u>Next</u> Cancel

7. Select the appropriate version (32 bit or 64 bit), and click Next.

Found New Hardware Wizard
Please select the best match for your hardware from the list below.
USB Serial Ports Driver
urer Location
[lectronics Corp h:\8682\driver\usb_commclass_inf\le9280_04b_commclass_32.inf
liectronics Corp h:\8682\driver\usb_commclass_inf\le928U_U4b_commclass_64.inf
This driver is not digitally signed! <u>Tell me why driver signing is important</u>
< <u>B</u> ack <u>N</u> ext > Cancel

8. When the following window appears, click Next.

Hardwar	re Installation
1	The software you are installing for this hardware: USB Serial Ports Driver has not passed Windows Logo testing to verify its compatibility with Windows XP. [Tell me why this testing is important.] Continuing your installation of this software may impair or destabilize the correct operation of your system either immediately or in the future. Microsoft strongly recommends that you stop this installation now and contact the hardware vendor for software that has passed Windows Logo testing.
	<b>Continue Anyway</b>

9. When the following window appears, the installation is complete. Click Finish.

Found New Hardware Wiz	ard				
	Completing the Found New Hardware Wizard				
	The wizard has finished installing the software for:				
	USB Serial Ports Driver				
	Click Finish to close the wizard.				
	< <u>B</u> ack <b>Finish</b> Cancel				

You can check the installed USB driver under Ports in Device Manager.



4.3 Starting the PC Application

Copy the entire Release\_\*\*\* folder on the supplied CD-ROM to your PC in the location of your choice.

To start the PC application, click LE8682Soft.exe.

⊙ CD-ROM
├ D Instruction_Manual_for_LE_8682
L D PC_SOFT
L 🗇 Release_***Copy to the PC.
├ 🗋 LE8682Soft.exePC application
├ 🗋 LE8682Soft.exe.config
LE8682Soft.pdb

\* To start the PC application, .NET Framework Client Profile must be installed in your PC. Install it from Microsoft Website.

# 5. HOW TO USE

#### 5.1 Measurement Procedure

1. Connect the AC adapter to the LE 8682 to turn it on.

The LE 8682 does not have a power switch. The power turns on when you connect the AC adapter.

- 2. Using a USB cable, connect the LE 8682 USB port to the PC's USB port.
- 3. Start the PC application.
- 4. Select the COM port, and click Open.

"COM\* OPEN" appears at the lower left of the window.

If you cannot select the COM port, close the PC application, and remove the USB cable. Reconnect the cable, and restart the PC application.

명문 VIDEO MEASUREING BOX Ver.1.00	
Setting Help	
V-Sync Frequency [Hz] Burst Frequency [MHz] EN H-Sync Frequency [Hz] Burst Level [mV]	COM Port

5. On the Setting menu, click Window Setting. Set the measurement ranges, and close the window.

The settings specified here will be cleared when the LE 8682 is turned off. You must set them every time you turn the LE 8682 on.

You can set up to 32 measurement ranges. On the measurement window, eight ranges that you select are displayed.

Reference 5.2.2, "Window Setting"

🖳 Window Setting						
File						
Window No.1 ────────────────────────────────────	v No.2	Window No.4	Window No.5	Window No.6	Window No.7	Window No.8
End Line 31 🔄 End Lin Start Time[us] 6.0 🖨 Start Ti End Time[us] 10.0 🚑 End Tim	e 81 🚓 End Line 31 🚔 ime[us] 12.0 🚓 Start Time[us] 19.0 🚓 ne[us] 16.0 🚓 End Time[us] 29.0 🐳	End Line 81 🛃 Start Time[us] 26.0 🜩 End Time[us] 30.0 🚔	End Line 31 🚑 Start Time[us] 32.0 🚑 End Time[us] 36.0 🚔	End Line 31 👉 Start Time[us] 89,0 🜩 End Time[us] 43,0 🜩	End Line 31 👉 Start Time[us] 45.0 🜩 End Time[us] 49.0 🜩	End Line 31 💣 Start Time[us] 52.0 🜩 End Time[us] 58.0 🚔
SET This Window	his Window	SET This Window	SET This Window	SET This Window	SET This Window	SET This Window
Start Line <u>0 </u> Start Li End Line <u>0 </u> End Line	ne 0 🚑 Start Line 0 🚑 e 0 🚭 End Line 0 🖨	Start Line 0 🖨 End Line 0 🌩	Start Line 0 🚔 End Line 0 🔿	Start Line 0 🚖 End Line 0 😓	Start Line 0 🚖 End Line 0 🔄	Start Line 🛛 🚔 End Line 🗘 🌩
Start Time[us] 0,0 🚔 Start Time[us] 0,0 🚔 End Time	ime[us] 0.0 🚖 Start Time[us] 0.0 🔄 ne[us] 0.0 🚔 End Time[us] 0.0 🚔	Start Time[us] 0.0 🚔 End Time[us] 0.0 🚔	Start Time[us] <mark>0,0                                   </mark>	Start Time[us] <u>0.0</u> End Time[us] <u>0.0</u>	Start Time[us] <u>0.0 🚖</u> End Time[us] <u>0.0 🚔</u>	Start Time[us] <u>0,0</u> End Time[us] <u>0,0</u>
Window No.17	v No.18 Window No.19	Window No.20	Window No.21	Window No.22	Window No.23	Window No 24

#### 6. Select the window number.

On the PC application, up to eight ranges can be measured simultaneously. The available window numbers are those whose EN check boxes have been selected in the Window Setting window.

P VIDEO MEASUREING BOX Ver.1.00			
Setting Help			
Technology Innovator			
	Puret Frequency [MU]		Measure Start
	Durst Level [w] (	Close	
H-Sync Frequency [Hz]	Burst Level [mv]		
Sync Level [mv]			
Video Level A	CVideo Level B	Video Level C	Video Level D
Window No. Window 1 👻	Window No. Window 2 🔫	Window No. Window 3 🗸	Window No. Window 4 🗸
Luminance Level [mV]	Luminance Level [mV]	Luminance Level [mV]	Luminance Level [mV]
Chrominance Level [mV]	Chrominance Level [mV]	Chrominance Level [mV]	Chrominance Level [mV]
Peak Level [mV]	Peak Level [mV]	Peak Level [mV]	Peak Level [mV]
) City Level 5			) Gline Level III
Window No Window 5	Window 8	Window 7	
	Window No.	Window No.	Window No.
Luminance Level [mV]	Luminance Level [mV]	Luminance Level [mV]	Luminance Level [mV]
Chrominance Level [mV]	Chrominance Level [mV]	Chrominance Level [mV]	Chrominance Level [mV]
Peak Level [mV]	Peak Level [mV]	Peak Level [mV]	Peak Level [mV]
COM4 OPEN			.ii

- 7. Apply an NTSC/PAL composite video signal to the INPUT connector of the LE 8682.
- 8. Click Measure Start.

The measurement is repeated at approximately 600 ms intervals. To stop measurement, click Measure End.

P VIDEO MEASUREING BOX Ver.1.00		
Setting Help		
	COM4 -	Macaura End
V-Sync Frequency [Hz] 59,94 Burst Frequency [MHz]	3.57971 🔽 EN Close	IVEASURE LIN
H-Sync Frequency [Hz] 15.73 Burst Level [mV]	289.7	
Sync Level [mV] 293.4		
CVideo Level A		
Window No. Window 1 - Window No.	Window 2 👻 Window No. Window	3 👻 Window No. Window 4 👻
Luminance Level [mV] 546.1 Luminance Level [mV]	488.0 Luminance Level [mV] 404.6	Luminance Level [mV] 342.7
Chrominance Level [mV] 4.4 Chrominance Level [mV]	477.7 Chrominance Level [mV] 676.4	Chrominance Level [mV] 676.4
Peak Level [mV] 549.9 Peak Level [mV]	723.9 Peak Level [mV] 724.9	Peak Level [mV] 724.7
) Give Level E	) Educ Louis C	) Gira Lavel II
Window No. Window 5	Window 6	7 Window No Window 8
Wildow No.		Wildow No.
Chrominance Level (mv) 235.9 Luminance Level (mv)	217.4 Luminance Level [mV] 103.1	Chrominance Level [mV] 57.5
Peak Level [mV] 030.0 Peak Level [mV]	544.7 Peak level [mV] 508.7	Peak Level [m\] 306.6
>>>>>>		

# 5.2 PC Application Description

# 5.2.1 Measurement Window

The measurement window appears when the PC application starts.

		2	3
VIDEO MEASUREING BOX Ver.1.00			
Setting Help			
V-Sync Frequency [Hz] 59.94	Burst Frequency [MHz] 3.57971	Close	Measure End
H-Sync Frequency [H2] 15.73 Sync Level [mV] 293.4	Burst Level [mV] 289.7		
Video Level A-	Video Level B	Video Level C Window No. Window 3	Video Level D Window No. Window 4
Luminance Level [mV] 546.1	Luminance Level [mV] 488.0	Luminance Level [mV] 404.6	Luminance Level [mV] 342.7
Chrominance Level [mV] 4.4 Peak Level [mV] 549.9	Chrominance Level [mV] 477.7 Peak Level [mV] 723.9	Chrominance Level [mV] 676.4 Peak Level [mV] 724.9	Chrominance Level [mV] 676.4 Peak Level [mV] 724.7
5 Video Level E	Video Level F	C <sup>Video Level G</sup>	Video Level H
Window No. Window 5	Window No. Window 6 -	Window No. Window 7 ▼	Window No. Window 8
Chrominance Level [mV] 635.3	Chrominance Level [mV] 668.0	Chrominance Level [mV] 679.0	Chrominance Level [mV] 482.8
Peak Level [mV] 639.9	Peak Level [mV] 544.7	Peak Lever [mV] 508.7	Peak Level [mV] 306.6
0			

#### 1. Menu

	Menu	Description			
Setting	Window Setting	Set the measurement range.			
		Reference 5.2.2, "Window Setting"			
	Level unit	Set the level display unit to mV or IRE.			
Help	Version Inf.	Displays the following information in order.			
		PC application version			
		LE 8682 serial number			
		LE 8682 CPU version			
		LE 8682 FPGA version			
		PC SOFT Version:1.00 SerialNo :0000000 CPU Version :1.00 FPGA Version:1.00			

#### 2. COM Port

Selecting a port and clicking Open connects the PC to the LE 8682. To disconnect, click Close.

#### 3. Measure Start / Measure End

Starts or stops measurement.

#### 4. Measured values

Displays the input signal frequency, level, etc.

The burst frequency is measured only when the EN check box is selected. The value is obtained by averaging the previous 10 measurements. Therefore, no value will appear until 10 measurements have been made.

#### 5. Signal Level A to H

Displays the input signal levels for the measurement range corresponding to the selected Window No.

The available window numbers are those whose EN check boxes have been selected in Window Setting.

#### 6. Information display

#### COM\* CLOSE

Appears when the PC and LE 8682 are not connected.

#### COM\* OPEN

Appears when the PC and LE 8682 are connected when measurement is stopped.

#### >>>>>

Appears when measurement is in progress. The ">" character is added each time a measurement is made.

#### 5.2.2 Window Setting

The Window Setting window appears when you click Window Setting on the Setting menu of the measurement window. This window is used to set measurement ranges. Window Setting is not available when the PC and LE 8682 are not connected.

You can set up to 32 measurement ranges. On the measurement window, eight ranges that you select are displayed.

The settings specified here will be cleared when the LE 8682 is turned off. You must set them every time you turn the LE 8682 on.

1 2						
🖳 Vindow 🛿 atting						
File     Window No.1       W Rdow No.1     Window       Start Line     00       End Line     01       Start Line     00       Start Time [us]     00       End Time [us]     0.0       Start Time [us]     0.0       SET This Window     SET Time	W No 2 Window No 3 · Window No 3 ·	80 ↔ 81 ↔ 150 ↔ 230 ↔ Start Line 30 ↔ Start Line 31 ↔ Start Time[us] 260 ↔ SET This Window	Window No.5 VI EN Start Line 80 🔄 End Line 81 🔄 Start Time(us) 86.0 🔄 SET This Window	Window No 6 D EN Start Line 30 @ End Line 31 @ Start Time[us] 330 @ End Time[us] 430 @ SET This Window	Vindow No.7 VIndow No.7 Start Line 30 😭 End Line 31 👼 Start Time(us) 45.0 🔅 End Time(us) 49.0 💿 SET This Window	Window No 8 Start Line 80 @ End Line 81 @ Start Time[us] 520 @ End Time[us] 580 @ SET This Window
Window No.9 EN Start Line 0 12 End Line 0 12 Start Time[us] 0.0 12 End Time[us] 0.0 12 SET This Window	W No.10 Window No.11 Window No.	Window No.12       0     Image: Start Line     0       0     Image: Start Line     0       0     Image: Start Time[us]     0.0       0.0     Image: Start Time[us]     0.0       Start Time[us]     0.0     Image: Start Time[us]       Start Time[us]     0.0     Image: Start Time[us]	Window No.13 Start Line 0 🔄 End Line 0 🔄 Start Time[us] 00 🔄 End Time[us] 00 🔄 SET This Window	Window No.14       EN       Start Line     0       End Line     0       Start Time[us]     00       End Time[us]     00       SET This Window	Window No.15 EN Start Line 0 2 End Line 0 2 Start Time[us] 0.0 2 End Time[us] 0.0 2 SET This Window	Window No.16 EN Start Line 0 55 End Line 0 55 Start Time[us] 00 55 End Time[us] 00 55 SET This Window
Window No.17 EN Start Line D E Start Line D E Start Line D E Start Time[us] 00 E Start	w No 18	Window No 20       Image: End Line       Image: E	Window No 21 EN Start Line 0 🔅 End Line 0 🔅 Start Time(us) 00 🔄 End Time(us) 00 🔄 SET This Window	Vindow No 22 EN Start Line 0 🔄 End Line 0 🔄 Start Time[us] 00 🚭 SET This Window	Vindow No 23 E N Start Line 0 ÷ End Line 0 ÷ Start Time[us] 00 ÷ SET This Window	Window No.24       EN       Start Line     0       End Line     0       Start Time(us)     0.0       End Time(us)     0.0       SET This Window
Window No 25 EN Start Line D E Start Line D E Start Line D E Start Line D E Start Time[us] 0.0 E SET This Window SET This Window	W No 26	Window No 28 E EN Start Line 0 20 End Line 0 20 Start Time[us] 0.0 20 End Time[us] 0.0 20 SET This Window	Window No 23 E N Start Line 0 2 End Line 0 2 Start Time(us) 00 2 End Time(us) 00 2 ET This Window	Window No.30 E EN Start Line 0 🔄 End Line 0 🔄 Start Time[us] 0.0 🔄 End Time[us] 0.0 🚭 SET This Window	Window No.31 EN Start Line 0 2 End Line 0 2 Start Time[us] 0.0 2 End Time[us] 0.0 2 SET This Window	Window No.32 EN Start Line 0 57 End Line 0 57 Start Time[us] 0.6 57 End Time[us] 0.8 57 SET This Window
				INIT C	3	SET ALL

#### 1. File

Open

Opens a setup file that has been saved.

Save

Saves the settings with a name.

#### 2. Window No.1 to 32

#### ΕN

Select the check box to enable the measurement range and allow it to be selected with Window No. in the measurement window.

#### Start Line / End Line

Enter the measurement start and end lines in the range of 21 to 263 and 283 to 525, respectively.

Enter a larger number for End Line than Start Line. Also, set the difference between the start and end lines to 20 or less.

#### Start Time / End Time [us]

Enter the measurement start and end times in the range of 5.0 to 63.5 assuming the rising edge of the horizontal sync signal to be 0 [us]. Enter a larger number for End Time than Start Time.

#### SET This Window

Apply the settings for each window.

#### 3. INIT COLOR BAR

Sets Window No. 1 to 8 to the measurement ranges appropriate for the color bar. To apply the settings, click SET ALL.

#### 4. SET ALL

Applies the settings of all windows.

# 6. REMOTE CONTROL

By using remote control commands, you can configure the LE 8682 and retrieve measured values from a PC.

#### 6.1 Command Structure

• Send

Tx commands are constructed from a command, parameters, and delimiters.

[Command] + [space]	+ [parameter 1] +	[space] + [parameter	<sup>2</sup> ] + [space] +	+ [delimiter]

• Command

ASCII code. Enter a space code between the command and the parameters.

• Parameters

ASCII code. To specify multiple parameters, enter a space between them.

• Delimiter

LF (0x0A).

Response

When the LE 8682 appropriately receives a Tx command, it returns "A" (ACK). Depending on the command, the LE 8682 returns a setting when a question mark is specified for a parameter.

If an error occurs, the LE 8682 returns an error message.

The corresponding response messages are constructed in the same manner as the Tx commands.

The error message format is "ERR[error code]".

Error Code	Description
01	Invalid command.
11	Invalid parameter (value, range, etc.).
31	Not configured to make measurements.
51	Unable to retrieve measured values (timeout).
52	Measurement out of range (upper limit).
53	Measurement out of range (lower limit).
99	Other errors.

# 6.2 Commands

No.	Command	Tx Parameter		Description
1	RANGE	р1	1 to 3 / ?	Sets the input range
2	VFRQ	р1	?	Queries the V-sync frequency
3	HFRQ	р1	?	Queries the H-sync frequency
4	SNCLEV	р1	?	Queries the sync level
5	BSTFRQ	р1	?	Queries the burst frequency
6	BSTLEV	р1	?	Queries the burst level
7	VIDEOWIN			Sets the measurement range
		р1	1 to 32	Selects a window
		p2	300 to 3411 / ?	Sets or queries the start time
		р3	21 to 263 / 283 to 525	Sets the start line
		p4	300 to 3411	Sets the end time
		р5	21 to 263 / 283 to 525	Sets the end line
8	VIDEOSIG			Queries the video signal level
		р1	1 to 32	Selects a window
		p2	?	Query
9	CHECK	p1	?	Executes self check
10	VER	p1	?	Queries the version

#### 6.3 Command Details

#### **1**. Sets the input range

#### • Tx Command

Command		Tx Parameter	Description
RANGE	p1	1	Range 1 (±3 V input)
		2	Range 2 (±1.5 V input)
		3	Range 3 (±0.75 V input)
		?	Query

#### Response Message

When p1 is 1 to	o 3A	A (ACK)
When p1 is ?	1	to 3 (range 1 to 3)

#### • Example

[Tx] RANGE 1	. Sets range 1
[Response] A	.ACK
[Tx] RANGE ?	. Queries the range
[Response] RANGE 1	.Range 1

#### 2. Queries the V-sync frequency

#### • Tx Command

VFRQ ?

#### Response Message

1 digit integer + 3 digit decimal + 2 digit exponent [Hz]

• Example

[Tx] VFRQ ?..... Queries the V-sync frequency [Response] VFRQ 5.994E+01 ...... 59.94 Hz

#### 3. Queries the H-sync frequency

• Tx Command

HFRQ ?

Response Message

1 digit integer + 3 digit decimal + 2 digit exponent [Hz]

• Example

[Tx] HFRQ ?..... Queries the H-sync frequency [Response] HFRQ 1.573E+04 ...... 15.73 kHz

#### 4. Queries the sync level

- Tx Command
  - SNCLEV ?
- Response Message

1 digit integer + 3 digit decimal + 2 digit exponent [mV]

• Example

[Tx] SNCLEV ?.....Queries the sync level [Response] 2.940E+02 ......294.0 mV

\* Even if "IRE" is specified on the PC, the value is returned in millivolts.

#### 5. Queries the burst frequency

• Tx Command

BSTFRQ ?

#### Response Message

1 digit integer + 6 digit decimal + 2 digit exponent [Hz]

• Example

[Tx] BSTFRQ ? .....Queries the burst frequency [Response] BSTFRQ 3.579919E+06..3.5799 MHz

#### 6. Queries the burst level

• Tx Command

**BSTLEV** ?

Response Message

1 digit integer + 3 digit decimal + 2 digit exponent [mV]

• Example

[Tx] BSTLEV ? ...... Queries the burst level [Response] BSTLEV 2.921E+02....... 292.1 mV

\* Even if "IRE" is specified on the PC, the value is returned in millivolts.

#### 7. Sets the measurement range

#### • Tx Command

Command		Tx Parameter	Description
VIDEOWIN	p1	1 to 32	Window number
	p2	300 to 3411	Measurement start time [ns] (1 = 16.67 ns)
		?	Query (parameters p3 to p5 are unnecessary)
	р3	21 to 263, 283 to 525	Measurement start line
	p4	300 to 3411	Measurement end time [ns] (1 = 16.67 ns)
	p5	21 to 263, 283 to 525	Measurement end line

#### Response Message

When p1 to p5 are sent	A (ACK)
When p2 is ?	p1 to p5

#### • Example

[Tx] VIDEOWIN 1 300 21 500 30...... Sets the measurement range of window 1
[Response] A.....ACK
[Tx] VIDEOWIN 1 ?....Queries the measurement range of window 1
[Response] VIDEOWIN 1 300 21 500 30

Returns the measurement range of window 1

#### 8. Queries the video signal level

#### • Tx Command

Command	Tx Parameter		Description	
VIDEOSIG	p1	1 to 32	Window number	
	p2	?	Query	

#### Response Message

Command	Response Parameter		Description
VIDEOSIG	р1	1 to 32	Window number
	p2	Luminance level	1 digit integer + 3 digit decimal + 2 digit exponent [mV]
	р3	Color level	
	p4	Peak level	

#### • Example

[Tx] VIDEOSIG 1 ?.....Queries the video signal level of window 1 [Response] VIDEOSIG 1 3.660E+02 4.875E+00 3.688E+02

> Luminance level: 366.0 mV Color level: 4.875 mV Peak level: 368.8 mV

\* Even if "IRE" is specified on the PC, the value is returned in millivolts.

#### 9. Executes self check

• Tx Command

CHECK ?

#### Response Message

The response takes approximately 2 seconds.

Command	F	Response Parameter	Description
CHECK	HECK p1 OK		Self check successful (no p2)
		NG	Self check failure
	p2	001 to 333	Range 1 result + Range 2 result + Range 3
			0: Both DC calibration and AC calibration are within
			the specifications.
			1: DC calibration is outside the specifications. AC
			calibration is within the specifications.
			2: DC calibration is within the specifications. AC
			calibration is outside the specifications.
			3: Both DC calibration and AC calibration are outside
			the specifications.

#### • Example

[Tx] CHECK ?	. Executes s	self check
[Response] CHECK NG 123	. Self check	failure
	Range 1:	DC calibration is outside the range.
	Range 2:	AC calibration is outside the range.
	Range 3:	Both DC calibration and AC
	calibration	are outside the specifications.

#### 10. Queries the version

• Tx Command

VER ?

#### Response Message

Command	Response Parameter		Description
IMES	p1 Serial number		7 digit integer
	p2 CPU Version		Integer + 2 digit decimal
	p3 FPGA version		Integer + 2 digit decimal
	p4	Hardware version	4 digit integer

#### • Example

[Tx] VER ?	. Queries the version			
[Tx] VER 1234567 1.00 1.02 0000	Serial number: 1234567			
	CPU version: 1.00			
	FPGA version: 1.02			
	Hardware version: 0000			

#### Following information is for Chinese RoHS only

# 所含有毒有害物质信息

# 部件号码: LE 8682



标准规定的限量要求。

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。

部件名称	有毒有害物质或元素 Hazardous Substances in each Part						
Parts	铅	汞	镉	六价铬	多溴联苯	多溴二苯醚	
	(Pb)	(Hg)	(Cd)	(Cr(VI))	(PBB)	(PBDE)	
实 <b>装基板</b>	×	0	×	0	0	0	
主体部	×	0	0	0	0	0	
外筐	×	0	0	0	0	0	
线材料一套	×	0	0	0	0	0	
包装材	0	0	0	0	0	0	
<b>备注)</b> 〇: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							

产品中有毒有害物质或元素的名称及含量

Ver.1

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