

# TE460-137 2K/4K HDMI SIGNAL GENERATOR & ANALYZER User's Guide

## Welcome!

Everyone at Altinex greatly appreciates your purchase of the TE460-137. We are confident that you will find it to be reliable and easy to use. If you need support, please do not hesitate to call us at 714-990-2300.

At Altinex, we are committed to developing unique and state of the art Signal Management Solutions® for demanding audiovisual installations. Welcome to the Altinex family of satisfied customers around the world!

## 1. Precautions and Safety Warnings

- These instructions are to ensure the reliable operation of your TE460-137 and to prevent fire and shock hazards. Please read them carefully and heed all warnings.

### 1.1 General

- Qualified Altinex service personnel or their authorized representatives must perform all service.

### 1.2 Installation Precautions

- To prevent fire or shock, do not expose this unit to water or moisture. Do not place in direct sunlight, near heaters or heat-radiating appliances, or near liquid. Exposure to direct sunlight, smoke, or steam can harm internal components.
- Handle carefully; dropping or jarring can cause damage.

### 1.3 Cleaning

- Clean with a dry cloth only. Never use strong detergents or solvents such as alcohol or thinner.

### 1.4 FCC Notice

- This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
- This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 2 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions found herein, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.
- Any changes or modifications to the unit not expressly approved by Altinex, Inc. could void the user's authority to operate the equipment.

## 2. Installation Procedures

Note: Download and read the entire online manual to become familiar with the TE460-137 and for detailed information. See the top label of the TE460-137 for control details or refer to the complete online manual.

Step 1: Insert a small paperclip into the battery compartment slot and press firmly.

Step 2: Install the battery provided with the tester. Make sure the mylar tab is underneath the battery as shown in the image to the right.

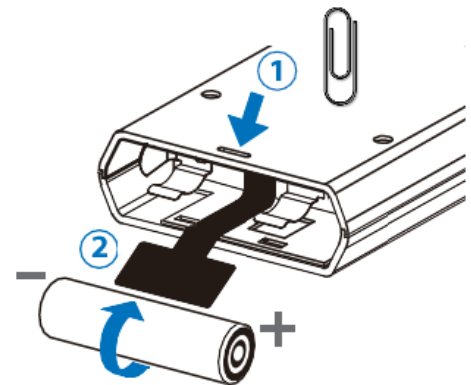
Caution: Make sure the polarity of the battery matches the tester.

Step 3. The tester is now ready.

Step 4. Select the desired mode of operation using the TASK button on the front of the tester. Press ENTER to confirm the selection.

Step 5. Use the MENU and UP/DN arrows to navigate the menus.

Step 6. The ENTER button selects the menu, the UP/DN buttons cycle through the available options, and the ENTER button confirms the selection.



## 3. Warranty and Return Policies

Please visit the Altinex website at [www.altinex.com](http://www.altinex.com) for details on warranty and return policies. In the case of a unit needing repair, please complete a RMA (return material authorization) form located on the bottom left hand corner of the Altinex homepage. Once completed, please email the form to [support@altinex.com](mailto:support@altinex.com).

## 4. Technical Specifications

Specifications are subject to change due to design improvements. Please see [www.altinex.com](http://www.altinex.com) for up to date information.

Features/Description	TE460-137
Input Connectors	
Digital Video + Audio	HDMI F, Type A
Power	Micro USB F (1)
Output Connectors	
Digital Video + Audio	HDMI F, Type A
Compatibility	
Digital Signal types	HDMI 1.4,3D
Signal resolution	Up to 4k x 2k
Accessories Included	
Power supply	2.4A USB Wall charger (1)
2.0 USB cable	6ft, A- M /B- M cable (1)
HDMI Cable	1 ft, HDMI M/M cable (1)
Lithium battery	3.6V 3350MAB (1)
Optional Accessories	

Table 1. TE460-137 General

Mechanical	TE460-137
Material	Steel
Color	Silver
Height	1.06 in. (27 mm)
Width	3.15 in. (80 mm)
Length	4.88 in. (124 mm)
Weight	0.6 lb. (0.26 kg)
T° Operating	10°C-40°C
Humidity	60% RH non-condensing
MTBF (calc.)	38,000 hrs.

Table 2. TE460-137 Mechanical

Electrical	TE460-137
Video Input Signals	
Digital Video + Audio	HDMI Standard
Output Signals	
Digital Video + Audio	HDMI Standard
Power	
5V	5W

Table 3. TE460-137 Electrical

HDMI, the HDMI Logo, and High Definition Multimedia Interfaces are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries.

## 5. About Your TE460-137

- HDMI input and output with 18Gbps (600MHz) 4K UHD support
- DVI 1.0 compliant with the use of an HDMI-DVI adaptor
- HDCP 1.4 and 2.2 compliant
- Supports HD resolutions up to 4096x2160@60Hz (4:4:4, 8-bit)
- Source bypass support in Analyzer mode
- 4K sources can be scaled down to 1080p in Analyzer mode to support a wider range of displays when analyzing a high-bandwidth source
- HDR bypass and analysis support
- Source video, audio and timing analysis
- Analysis and emulation of EDID data
- HDCP and SCDC monitoring functions
- HDMI packet analysis
- Analyzer mode complies with the CEA standard HDR static metadata extensions CEA-861-F and CEA-861.3
- 23 selectable output resolutions available in Test Pattern mode
- 11 selectable static test patterns in Test Pattern mode
- HDMI 2.0 cable test function including tests for 5V, CEC and hot- plug detection support
- Supports LPCM 2.0, 5.1, and 7.1 audio output with adjustable sinewave frequencies for each channel
- Comprehensive EDID management support with 10 built-in default EDIDs and 10 user EDIDs copied from sink devices
- Powered by a single Lithium-ion battery (included). Use of an external USB power bank can provide extended operation time
- OLED display with rapid updates of current status information
- Supports optional Windows control software

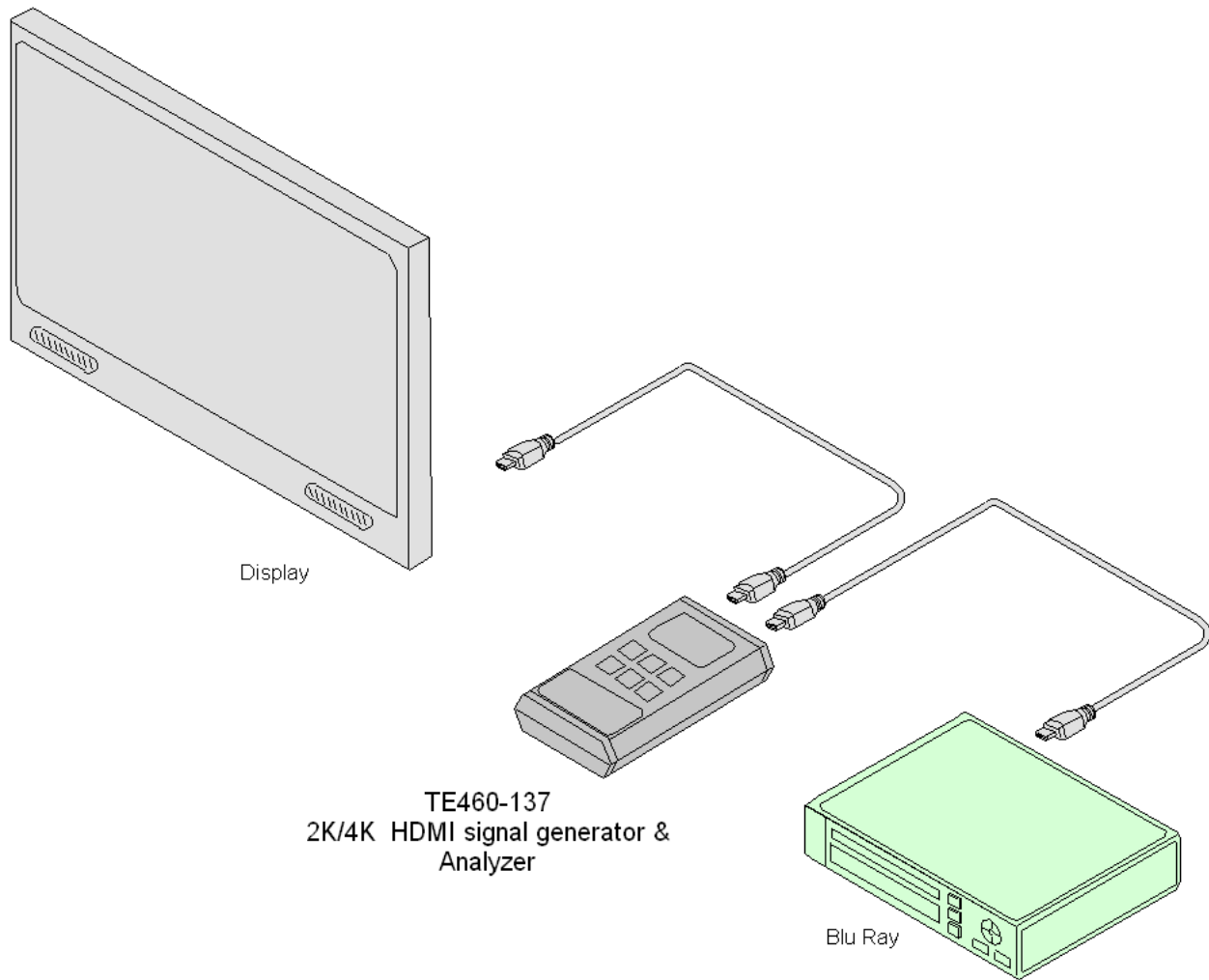


TE460-137 HDMI Signal Generation and Analysis tool provides a convenient way to test and verify all aspects of an HDMI signal path, including source and sink. TE460-137 complies with the HDMI 2.0a and HDCP 1.4/2.2 standards. The TE460-137 Analyzer mode complies with the CEA standard HDR static metadata extensions CEA-861-F and CEA-861.3 for EDID analysis.

TE460-137 is powered by a single rechargeable Lithium-ion battery. Beyond the Lithium-ion battery, the unit may also be powered (and the battery recharged) via the micro USB port using included with unit USB wall charger and USB cable. An external power bank can also be used to extend the portable service time. 4K sources can be scaled down to 1080p output in Analyzer mode to support a wider range of displays when analyzing high- bandwidth sources.

TE460-137 has an integrated OLED display which provides a way to quickly and clearly view the current signal state or the results of signal analysis. This portable handheld design is ideal for both the professional end user and installation engineer alike. TE460-137 unit can be used in following applications Installer/Integrator multi-function test tool, HDMI source and sink testing, HDCP compliance verification, production testing, etc.

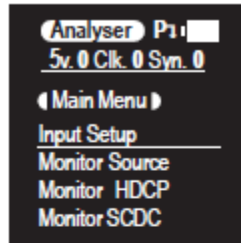
## 6. Application Diagrams



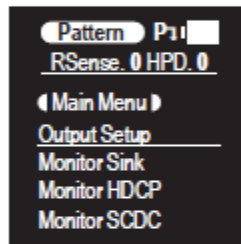
## 7. Operation

## 7.1 Modes of Operation

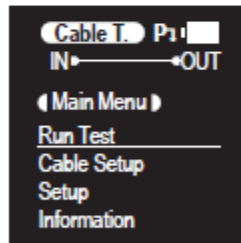
- A Analyzer Mode:** The status line will display the 5v, TMDS clock, and sync detection state of the connected source. (1 = detected, 0 = not detected.)



- B Pattern Mode:** The status line will display the RxSense and Hot-plug detection state of the connected display. (1 = detected, 0 = not detected.)



- C Cable Test Mode:** The status line will display a cable connection graphic.



- 2 BATTERY CHARGING LED:** The battery charging LED will illuminate red when a USB power source is connected and actively charging the battery.
- 3 MENU:** Press to back out from menu items and return to the main OLED menu screen.
- 4 -/+ & ▼/▲:** Press to move up and down or adjust selections within menus.

- 5 ENTER:** Press to confirm a selection or to go deeper into a menu item.

*Note: In Analyzer and Pattern modes, press and hold this button for 2 seconds to turn audio On or Off.*

- 6 TASK MODE:** Press to switch the unit between Analyzer Mode, Pattern Mode, and Cable Test Mode.

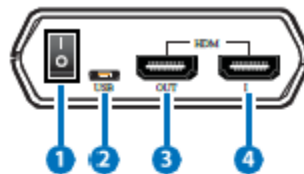
*Note: In Analyzer mode, press and hold this button for 2 seconds to toggle the input's hot plug trigger. In Pattern mode, press and hold this button for 2 seconds to enable or disable the output's AV Mute function.*

- 7 HDCP:** Press to switch between supported HDCP versions (1.4, 2.2) or to disable HDCP. In Analyzer mode, this changes the HDCP versions supported by the input port. In Pattern mode, this changes the HDCP required by the output port.

*Note: The button's outline will light up according to the HDCP state and current version supported. Red = HDCP 1.4, blue = HDCP 2.2, off = HDCP disabled, flashing = HDCP authentication failure.*

**FACTORY RESET:** Pressing and holding the HDCP button during power on will reset the unit to its factory default settings.

## 7.2 Rear Panel

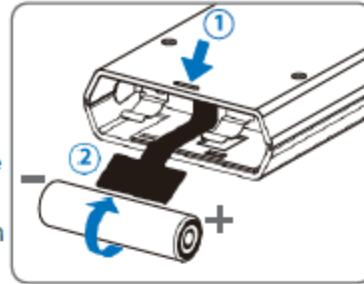


- 1 POWER:** Flip this switch to turn the unit ON or OFF
- 2 USB:** Multi-function port for power/battery charging, firmware update or RS-232 command control.
- Note: USB operation modes are changed within the OLED Setup menu.*
- 3 HDMI OUT:** Connect to an HDMI TV, monitor or amplifier for digital video and audio output.
- 4 HDMI IN:** Connect to HDMI source equipment such as a media player, game console or set-top box.

## 7.3 Battery Compartment

## 6.3 Battery Compartment




While this unit may be powered directly via the USB port, it is more typically powered by a rechargeable Lithium-ion battery (not included) which is concealed within the bottom of the unit.











- A Opening the Compartment:** Use a small flathead screwdriver to gently, but firmly, press down into the slot ① behind the base panel and the bottom cover will pop out.
- B Removing the Battery:** If a battery is already installed, a Mylartab ② will be visible beneath the battery. Pull on the Mylar tab to pop the battery out of its holding brackets.
- C Inserting the Battery:** Turn the unit so that it is face down and align the battery so that the positive terminal of the battery (marked with a +) is aligned with the positive (+) marking on the right-hand side on the back of the battery compartment. Extend the Mylar tab out of the battery compartment, then place the battery on top of the extended tab and slide the battery into the unit until it snaps into the holding brackets as shown in the illustration.
- D Closing the Compartment:** After the battery has been properly inserted, place the battery compartment cover back into the bottom of the unit by first fitting the 2 small tabs on the cover into the 2 slots in the case and then gently snapping the cover into place.
- E Charging the Battery:** Connect a USB charger (5V/2.1A minimum) to the USB port to charge the unit's battery until it is full. The typical charging time, from empty to full, is approximately 3 hours while the unit's power is off. Average operation time from a fully charged battery is roughly 4 hours, but might be less depending on specific usage and battery quality.

*Note: A battery is not included in the standard package, however the Panasonic NCR18650B (3.6V/3350mAh) Lithium-ion rechargeable battery is recommended.*

## 7.4 OLED Display

USB Port Function	
	Battery charge mode.
	RS-232 control mode.
	Firmware update mode.

Power Status	
	External power only. No battery present.
	External power. Battery at max charge.
	External power. Battery charging.
	Battery power with ~100% charge.
	Battery power with ~75% charge.
	Battery power with ~50% charge.
	Battery power with under 25% charge. Icon flashes to indicate recharge needed.
	Battery power is critically low. Auto shutdown.



## 7.5 OSD Menus

### 7.5.1 OSD Menu – Analyzer

LEVEL 1	LEVEL 2	LEVEL 3	
Input Setup	Hotplug Time	50ms~500ms (150ms)	
	Hotplug Toggle		
	RxSense		On (POR)
			Off
	DDC Bus		On (POR)
			Off
	HDCP Port		v1.4
			v1.4+v2.2 (POR)
			Off
	HDCP REAUTH-REQ		
	4K to 1080p		On YCbCr Out
			On RGB Out
		Off	
SCDC Port		On (POR)	
		Off	
PC Tolerance		1~10 (6) (Each step is $\pm 1/1000$ )	
Monitor Source	Timing	[Analytic Data]	
	HDCP		
	Format		
	Colorspace		
	Audio		
	Deep Color		
	AVI, AIF, HDR, VSI, AVMute, SPD, 3D		
Monitor HDCP (HDCP v1.4)	Source HDCP	[Analytic Data]	
	Rx HDCP Port		
	Aksv		

LEVEL 1	LEVEL 2	LEVEL 3
Monitor HDCP (HDCP v1.4)	Bksv	[Analytic Data]
	Ri Source	
	Ri' Rx	
	Count	
	Day 0 00 : 00 : 00	
Monitor HDCP (HDCP v2.2)	Source HDCP	[Analytic Data]
	Rx HDCP Port	
	TxCaps	
	RxCaps	
	Receiver ID	
	m	
	riv	
Monitor SCDC	Rx SCDC Port	[Analytic Data]
	Sink Version	
	Source Version	
	Scramble Enabled	
	Scramble Status	
	Clock Detect	
	Ch2/1/0 Locked	
	CED Ch0	
	CED Ch1	
	CED Ch2	
	ENTER Reset/Start	
	HF VSDB	
	SCDC Exist	
Video Timing	Timing	[Analytic Data]
	TMDs Clock	
	Pixel Clock	
	Data Rate	
	Bit Depth, 3D, Y4:2:0, Scramble	

LEVEL 1	LEVEL 2	LEVEL 3
Video Timing	Total (H/V Total Pixel/Line)	[Analytic Data]
	Act (H/V Active Pixel/Line)	
	Polarity (H/V Sync. Polarity)	
	Scan	
	HFreq (H Sync. Frequency)	
	VFreq (V Sync. Frequency)	
	Offset1 (H/V Sync. Offset1)	
	Offset2 (H/V Sync. Offset2)	
Audio Timing	ACR, AIF, ASP, HBR	[Analytic Data]
	N	
	CTS	
	ASP PLL Lock	
	ASP audio FIFO	
	ASP Layout	
	ASP Ch No.	
	CHS App. Type	
	CHS Audio Coding	
	CHS Ch No.	
	CHS Source No.	
	CHS Sampling Rate	
	CHS Sampling Size	
Packet	GCP 0x03	[Analytic Data]
	AVI 0x82	
	AIF 0x84	
	SPD 0x83	

LEVEL 1	LEVEL 2	LEVEL 3
Packet	VSIF H14b 0x81	[Analytic Data]
	DRMI (HDR) 0x87	
EDID Analyzer	Sink	[Analytic Data]
	Rx EDID	[Analytic Data]
	[D1] [DVI	[Default EDID Details]
	[D2] VGA	
	[D3] 8B LPCM PC	
	[D4] 8B LPCM H[D	
	[D5] 12 BS 720p	
	[D6] 12 BS H[D 3[D	
	[D7] 12 BS 4K6G	
	[D8] 12 HBR 4K3G	
	[D9] 12 HBR 4K420	
	[D10] 12 HBR 4K6G	
	[C1~10] Copy 01~10	[Copied EDID Details]
EDID Emulator	Copy Sink	
	[D1] [DVI	
	[D2] VGA	
	[D3] 8B LPCM PC	
	[D4] 8B LPCM H[D	
	[D5] 12 BS 720p	
	[D6] 12 BS H[D 3[D	
	[D7] 12 BS 4K6G	
	[D8] 12 HBR 4K3G	
	[D9] 12 HBR 4K420	
	[D10] 12 HBR 4K6G	
	[C1~10] Copy 01~10	
EDID Copy Sink	[C1~10] Copy 01~10	
EDID Burn Sink	[D1] [DVI	
	[D2] VGA	

LEVEL 1	LEVEL 2	LEVEL 3
EDID Burn Sink	[D3] 8B LPCM PC	
	[D4] 8B LPCM H[D	
	[D5] 12 BS 720p	
	[D6] 12 BS H[D 3[D	
	[D7] 12 BS 4K6G	
	[D8] 12 HBR 4K3G	
	[D9] 12 HBR 4K420	
	[D10] 12 HBR 4K6G	
	[C1~10] Copy01~10	
Setup	USB Port	<b>Power</b>
		RS-232
	OLED Contrast	0~8 ( <b>6</b> )
	Firmware Update	Yes/No
	Power Saving	2min~10min
		Off
	EDID Reset	Yes/No
Factory Restore	Yes/No	
Information	[Unit Version Details]	

## Notes:

- Items in **Bold** are the factory default settings.
- Items marked with **POR (Power-On Reset)** will return to their factory default settings when the power is turned off.
- **Power Saving Mode:** The OLED display will automatically switch off after the set number of minutes. All other functions of the unit will continue normally while the display is turned off and the HDCP button will slowly flash red to indicate it is in power saving mode. To turn the OLED display back on, press any key. This powersaving feature is only available while the unit is not receiving power via USB.

## 7.5.2 OSD Menu – Pattern Generator

LEVEL 1	LEVEL 2	LEVEL 3
Output Setup	Timing	[T1] 720×480p59
		[T2] 720×576p50
		[T3] 1280×720p25
		[T4] 1280×720p30
		[T5] 1280×720p50
		[T6] 1280×720p60
		[T7] 1920×1080i50
		[T8] 1920×1080i60
		[T9] 1920×1080p24
		[T10] 1920×1080p25
		[T11] 1920×1080p30
		[T12] 1920×1080p50
		<b>[T13] 1920×1080p60</b>
		[T14] 3840×2160p24
		[T15] 3840×2160p25
		[T16] 3840×2160p30
		[T17] 3840×2160p50
		[T18] 3840×2160p60
		[T19] 4096×2160p24
		[T20] 4096×2160p25
		[T21] 4096×2160p30
		[T22] 4096×2160p50
		[T23] 4096×2160p60
		Pattern
		[P2] Blue
		[P3] Cyan
		[P4] Green
		[P5] Magenta
		[P6] Red

LEVEL 1	LEVEL 2	LEVEL 3
Output Setup	Pattern	[P7] White
		[P8] Yellow
		[P9] Color Bar
		[P10] Grayscale 256
		[P11] V Line OnOff
	Format	HDMI
		DVI
	Colorspace	RGB
		YUV444
	ColorRange	Full
		Limited
	Audio LPCM	2CH
		5.1CH
		7.1CH (POR)
	HDCP Out	v1.4
		v2.2
		Off
HDCP V2.2 (AKE-Stored-KMC)	On	
	Off	
AVMute	On	
	Off (POR)	
Output	On (POR)	
	Off	
+5V Out	Follow	
	On	
Monitor Sink	HDCP Port/Auth	[Analytic Data]
	EDID	
	SCDC Port	
Monitor HDCP (Output HDCP 1.4)	Tx HDCP	[Analytic Data]
	Sink HDCP Port	

LEVEL 1	LEVEL 2	LEVEL 3
Monitor HDCP (Output HDCP 1.4)	Aksv	[Analytic Data]
	Bksv	
	Ri Tx	
	Ri' Sink	
	Count	
	Day 0 00:00:00	
Monitor HDCP (Output HDCP 2.2)	Tx HDCP	[Analytic Data]
	Sink HDCP Port	
	TxCaps	
	RxCaps	
	Receiver ID	
	m	
	riv	
	Stored km	
	Sink REAUTH	
	Count	
	Day 0 00:00:00	
	Monitor SCDC	
Sink Version		
Source Version		
Scramble Enable		
Scramble Status		
Clock Detect		
Ch2/1/0 Locked		
CED Ch0		
CED Ch1		
CED Ch2		
ENTER Reset/Start		
HF VSDB		
SCDC Exist		



LEVEL 1	LEVEL 2	LEVEL 3
Audio Output	Volume	0~80 (70)
	Sample Rate	48KHz
		96KHz
		192KHz
	Word Length	16 Bits
		20 Bits
		24 Bits
	Channels	2
		5.1
		7.1 (POR)
SD0-L~SD03-L Freq.	Mute	
	200Hz~1600Hz (1000Hz)	
SD0-R~SD3-R Freq.	Mute	
	200Hz~1600Hz (1000Hz)	
EDID Analyzer	Same as Analyzer Mode	[Analytic Data]
EDID Emulator	Same as Analyzer Mode	[Analytic Data]
EDID Copy Sink	Same as Analyzer Mode	[Analytic Data]
EDID Burn Sink	Same as Analyzer Mode	[Analytic Data]
HDR Emulator	HDR Out	On
		Off
	AVI Colorimetry	BT.2020(1)
		BT.2020(2)
		No Data
		ITU601
		ITU709
		xvYCC601
		xvYCC709
		sYCC601
		AdobeY601
		Adobe RGB

LEVEL 1	LEVEL 2	LEVEL 3
HDR Emulator	EOTF	<b>0:SDR Lumi Range</b>
		1:HDR Lumi Range
		2:SMPTE ST2084.2
		3:Future EOTF
	Metadata Descr.	<b>S. Metadata Type 1</b>
		Reserved
	Max. Content L-L	0~65500 ( <b>0</b> )
	Max. FrameAve L-L	0~65500 ( <b>0</b> )
AVI Color Space	[Analytic Data]	
Sink EDID HDR	[Analytic Data]	
Setup	USB Port	<b>Power</b>
		RS-232
	OLED Contrast	0~8 ( <b>6</b> )
	Firmware Update	Yes/No
	Power Saving	2min~10min
		<b>Off</b>
	EDID Reset	Yes/No
Factory Restore	Yes/No	
Information	[Unit Version Details]	

Notes:

- Items in **Bold** are the factory default settings.
- Items marked with **POR (Power-On Reset)** will return to their factory default settings when the power is turned off.
- **Power Saving Mode:** The OLED display will automatically switch off after the set number of minutes. All other functions of the unit will continue normally while the display is turned off and the HDCP button will slowly flash red to indicate it is in power saving mode. To turn the OLED display back on, press any key. This powersaving feature is only available while the unit is not receiving power via USB.

## 7.5.3 OSD Menu - Cable Test

LEVEL 1	LEVEL 2	LEVEL 3
Run Test (Enter-Start/Stop)	Normal/Strict	[Analytic Data] (PASS or FAIL result)
	Elapsed Time (Min:Sec)	
	+5V	
	Hotplug	
	DDC Bus	
	CEC	
	4K6G A/V	
Cable Setup	Level	Normal
		Strict
	Time	2 minute
		5 minute
		10 minute
		15 minute
		30 minute
		1 hour
	Infinite	
	Calibration Value	Default
Loose		
Strict		
Setup	USB Port	Power
		RS-232
	OLED Contrast	0~8 (6)
	Firmware Update	Yes/No
	Power Saving	2min~10min
		Off
	EDID Reset	Yes/No
Factory Restore	Yes/No	
Information	[Unit Version Details]	

## 7.5.4 Test Timings

Test Timing List	Hz	ID	Test Timing List	Hz	ID
720×480p	59	T01	3840×2160p	24	T14
720×576p	50	T02		25	T15
1280×720p	25	T03		30	T16
	30	T04		50	T17
	50	T05	60	T18	
1920×1080i	60	T06	4096×2160p	24	T19
	50	T07		25	T20
1920×1080p	60	T08		30	T21
	24	T09		50	T22
	25	T10		60	T23
	30	T11			
	50	T12			
	60	T13			

## 7.5.4.1 Input/Output PC Resolutions

PC Resolution	Vertical Frequency (Hz)	HDMI Input	HDMI Output
640×350p	85	✓	
640×480p	59, 72, 75, 85	✓	
720×400p	70, 85	✓	
800×600p	56, 60, 72, 75, 85	✓	
848×480p	60	✓	
1024×768p	60, 70, 75, 85	✓	
1152×864p	70, 75, 85	✓	
1280×768p	60 (RB), 60, 75, 85	✓	
1280×800p	60 (RB), 60, 75, 85	✓	
1280×960p	60, 85	✓	
1280×1024p	60, 75, 85	✓	
1360×768p	60	✓	
1366×768p	60 (RB), 60	✓	
1400×1050p	60 (RB), 60	✓	
1440×900p	60 (RB), 60	✓	
1600×900p	60 (RB)	✓	
1600×1200p	60	✓	
1680×1050p	60 (RB), 60	✓	
1920×1200p	60 (RB)	✓	

## 7.5.4.2 Input/Output TV Resolutions

TV Resolution	Vertical Frequency (Hz)	HDMI Input	HDMI Output
480i	59, 60	✓	59
480p	59, 60	✓	
576i	50	✓	
576p	50	✓	50
720p	25, 29, 30, 50, 59, 60	✓	25, 30, 50, 60
1080i	50, 59, 60	✓	50, 60
1080p	23, 24, 25, 29, 30, 50, 59, 60	✓	24, 25, 30, 50, 60
2048×1080p	23, 24, 25, 29, 30, 50, 59, 60	✓	
3840×2160p	23, 24, 25, 29, 30, 50, 59, 60	✓	24, 25, 30, 50, 60
4096×2160p	23, 24, 25, 29, 30, 50, 59, 60	✓	24, 25, 30, 50, 60

## Notes:

- RB = Reduced Blanking.
- If a source resolution or timing is not natively supported, the resolution will be displayed on the unit as "Timing?"

**!** **Output Resolutions (Analyzer Mode)**

- This unit provides 3 options for how to handle the output of 4K video input sources when in Analyzer mode. These choices are selectable from the "Input Setup" menu using the "4K to 1080p" item.
- To pass the 4K source without modification set "4K to 1080p" to "Off".
- To scale the 4K source down to 1080p and output as YCbCr, set it to "On YCbCr Out".
- To scale the 4K source down to 1080p and output as RGB, set it to "On RGB Out".
- All other (non-4K) resolutions will be passed without modification regardless of this setting.

*Note: When 4K sources are scaled down to 1080p they will maintain the same refresh rate. For example, if the source is 4K@24Hz, the scaled timing will be 1080p@24Hz.*

## 7.5.5 Test Patterns

There are a total of 11 test patterns available for output when in Pattern Mode.

Test Pattern Name	Variations	ID
Black		P01
Blue		P02
Cyan		P03
Green		P04
Magenta		P05
Red		P06
White		P07
Yellow		P08
Color Bar		P09
Grayscale 256		P10
Line On/Off-V		P11



These patterns are full screen purity tests offering eight different full field patterns: **Black, Blue, Cyan, Green, Magenta, Red, White, Yellow.** The color patterns should display an even distribution of brightness and consistent color tone across the screen. The 100% white pattern should display evenly across the screen and not cause the display's overall brightness to lower, or for the image to become instable. The black pattern will give a good idea of the display's true minimum brightness capability and is helpful for setting the viewing room lighting levels.

### 9. Color Bar



The **Color Bar** pattern is a series of repeating vertical colored bars (white, yellow, cyan, green, magenta, red, blue, black).

### 10. Grayscale 256



Gray

The **Grayscale 256** pattern provides a way to fine tune the contrast, brightness and grayscale tracking of your display with a full 265 step gradient progressing from 0% to 100% brightness. When testing a display, no color should be visible at any point across the gradient, and the transition from black to white should appear even and consistent.

### 11. Line On/Off-V



White & Black Lines

The **Line On/Off-V** pattern generates an alternating pattern of single-pixel vertical lines. This pattern can be used to analyze the horizontal pixel resolution of your display. If the output appears to have mosaic patterns, or appears to be a solid field (grey, white or black), then it is possible that your display does not fully support the resolution you are currently sending to it.

*Note: When outputting 4K@50/60Hz the pattern will consist of double, rather than single, pixel lines.*



## 7.6 RS232 Control

When the unit is set to RS-232 mode in the System menu and connected to a PC via a USB cable, the following COM port settings should be used for direct control.

Baud Rate	115200bps
Data Bits	8
Parity Bits	None
Stop Bits	1
Flow Control	None

## 6.7 RS-232 Commands

Before using the commands, please read the following:

### **i** Syntax

All commands MUST start with the "\$" character or the command will not be recognized by the unit. Commands must end with a carriage return (0x0D). Use of a line feed (0x0A) is optional. Commands are not case-sensitive.

### **i** Responses

The unit will respond to most commands with a repeat of the original command followed by the specified parameters or requested information except where otherwise noted. If an invalid command is entered, the unit will respond with "\$err". All unit responses end with a carriage return (0x0D) + line feed (0x0A).

### **i** Cautions

Only one command may be processed at a time. Additional commands should not be sent until the response from the previous command has been received.

COMMAND	DESCRIPTION AND PARAMETERS
\$?	Show full command list.
\$HELP	Show full command list.
\$4K_TO_1080P N1	Set the 4K downscaling mode.  Available values for N1: OFF [No downscaling] ON_RGB [1080p, RGB color] ON_YUV [1080p, YUV color]
\$4K_TO_1080P?	Display the current 4K downscaling mode.
\$AUDIO_CH N1	Set the number of internally sourced audio output channels.  Available values for N1: 2 [2 Channels (2.0)] 6 [6 Channels (5.1)] 8 [8 Channels (7.1)]
\$AUDIO_CH?	Display the current number of audio output channels.
\$AUDIO_FREQ N1,N2	Set the internal audio output frequency of the selected channel (in Hz).  Available Values for N1: SD0_L [SD0 Left Channel] SD0_R [SD0 Right Channel] SD1_L [SD1 Left Channel] SD1_R [SD1 Right Channel] SD2_L [SD2 Left Channel] SD2_R [SD2 Right Channel] SD3_L [SD3 Left Channel] SD3_R [SD3 Right Channel]  N2 = MUTE, 200, 400, 600, 800, 1000, 1200, 1400, 1600

COMMAND	DESCRIPTION AND PARAMETERS
\$AUDIO_FREQ? N1	Display the internal audio output frequency of the selected channel (in Hz). Available Values for N1: SD0_L [SD0 Left Channel] SD0_R [SD0 Right Channel] SD1_L [SD1 Left Channel] SD1_R [SD1 Right Channel] SD2_L [SD2 Left Channel] SD2_R [SD2 Right Channel] SD3_L [SD3 Left Channel] SD3_R [SD3 Right Channel]
\$AUDIO_MUTE N1	Turn the audio output mute on or off. N1 = ON, OFF
\$AUDIO_MUTE?	Display the audio output mute state.
\$AUDIO_SR N1	Set the internal audio output sampling rate (in kHz). N1 = 48, 96, 192
\$AUDIO_SR?	Display internal audio output sampling rate.
\$AUDIO_VOL N1	Set the audio output volume. N1 = 0 ~ 80
\$AUDIO_VOL?	Display the current audio output volume.
\$BOOT GO	Reboot the unit. <i>Note: The unit won't respond to any commands during the boot process.</i>
\$BOOT?	Display the current boot state.
\$CABLE_LEVEL N1	Set the cable test level. N1 = NORMAL, STRICT
\$CABLE_LEVEL?	Display the cable test level.
\$CABLE_RESULT?	Display the cable test result.
\$CABLE_RUN N1	Start or stop the cable testing process. N1 = START, STOP
\$CABLE_RUN?	Display the cable test status.

COMMAND	DESCRIPTION AND PARAMETERS
\$CABLE_TIME N1	Set the testing time for the cable test. Available values for N1: 1 [2 Minutes] 2 [5 Minutes] 3 [10 Minutes] 4 [15 Minutes] 5 [30 Minutes] 6 [1 Hour] 7 [Infinite]
\$CABLE_TIME?	Display the currently set testing time.
\$COLOR_SPACE N1	Set the output color space. Available values for N1: RGB [RGB 4:4:4] Y444 [YCbCr 4:4:4]
\$COLOR_SPACE?	Display the current output colorspace.
\$EDID_COPY_SINK N1	Copy the current HDMI sink's EDID to the designated copy slot. N1 = C1 ~ C10 <i>Note: If the copy fails "\$err" will be displayed.</i>
\$EDID_MANUF? N1	Display the manufacturer name stored in the EDID of the selected location. Available values for N1: RX [HDMI Input (Rx) Port] SINK_H [HDMI Sink] Notes: <ul style="list-style-type: none"> <li>• If the EDID fails to be read, "\$err_ddc" will be displayed.</li> <li>• If the EDID has invalid content, "\$err_bad" will be displayed.</li> </ul>

COMMAND	DESCRIPTION AND PARAMETERS
\$EDID_MODEL? N1	<p>Display the model/monitor name stored in the EDID of the selected location.</p> <p>Available values for <b>N1</b>:</p> <p>RX                           [HDMI Input (Rx) Port]  SINK_H                       [HDMI Sink]</p> <p>Notes:</p> <ul style="list-style-type: none"> <li>• If the EDID fails to be read, "\$err_ddc" will be displayed.</li> <li>• If the EDID has invalid content, "\$err_bad" will be displayed.</li> </ul>
\$EDID_NAME N1,N2	<p>Set the EDID name of the selected copy slot.</p> <p><b>N1</b> = C1 ~ C10  <b>N2</b> = {Name}               [20 characters max]</p>
\$EDID_NAME? N1	<p>Display the name of the selected EDID slot.</p> <p><b>N1</b> = D1 ~ D10, C1 ~ C10</p>
\$EDID_NATIVE? N1	<p>Display the native resolution value stored in the EDID of the selected location.</p> <p>Available values for <b>N1</b>:</p> <p>RX                           [HDMI Input (Rx) Port]  SINK_H                       [HDMI Sink]</p> <p>Notes:</p> <ul style="list-style-type: none"> <li>• First detailed timing from Block 0.</li> <li>• If the EDID fails to be read, "\$err_ddc" will be displayed.</li> <li>• If the EDID has invalid content, "\$err_bad" will be displayed.</li> </ul>

COMMAND	DESCRIPTION AND PARAMETERS
\$EDID_READ N1,N2	<p>Displays the selected data block stored in the EDID of the selected location.</p> <p>Available values for <b>N1</b>:</p> <p>D1~D10 [Default EDID 1~10]            C1~C10 [Copy EDID 1~10]            SINK_H [HDMI Sink]</p> <p>Available values for <b>N2</b>:</p> <p>BLOCK0 [EDID Block 0]            BLOCK1 [EDID Block 1]            BLOCK2 [EDID Block 2]            BLOCK3 [EDID Block 3]</p> <p>Notes:</p> <ul style="list-style-type: none"> <li>• This data is output as a bit stream of 128 bytes following the &lt;CR&gt;&lt;LF&gt; of the command acknowledgement.</li> <li>• Each hex data unit is composed of 3 digits. The first 2 digits are the hex value. The 3rd digit is a space (0x20).</li> <li>• Blocks 2 &amp; 3 are only supported from the HDMI sink.</li> <li>• If the EDID fails to be read, "\$err_ddc" will be displayed.</li> <li>• If block 2 or block 3 doesn't exist, "\$err_block" will be displayed.</li> </ul>
\$EDID_RX N1	<p>Select the EDID to use with the unit's HDMI input (Rx).</p> <p>Available values for <b>N1</b>:</p> <p>D1~D10 [Default EDID 1~10]            C1~C10 [Copy EDID 1~10]            SINK [Current HDMI sink]</p>
\$EDID_RX?	<p>Display the current EDID selection for the unit's HDMI input (Rx).</p>

## 8. Troubleshooting Guide

We have carefully tested and have found no problems in the supplied TE460-137. However, we would like to offer suggestions for the following:

<b>Switcher</b>	
Symptom	Resolution
Poor Output Image	<ol style="list-style-type: none"> <li>1. Verify the cable between the transmitter input and the source is a genuine HDMI cable.</li> <li>2. Troubleshoot with a lower gauge, shorter distance HDMI cable.</li> </ol>
RS232 Commands Not Recognized	<ol style="list-style-type: none"> <li>1. Verify you are using the correct baud rate. Remember, the transmitter and receiver use the same baud rate.</li> <li>2. Make sure the receiving devices matches the baud rate from the transmitting device; typically a PC or laptop.</li> </ol>

