DIGITALINX

VALUE-ENGINEERED DIGITAL SOLUTIONS

DL-44E-KIT Owners Manual

LIBERTY AV SOLUTIONS
A SUBSIDIARY OF WESCO DISTRIBUTION, INC.

Rev 190528

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Important Safety Instructions

» Please completely read and verify you understand all instructions in this manual before operating this equipment.

» Keep these instructions in a safe, accessible place for future reference.

» Heed all warnings.

» Follow all instructions.

» Do not use this apparatus near water.

» Clean only with a dry cloth.

» Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

» Use only accessories specified or recommended by Intelix.

» Explanation of graphical symbols:

◊ Lightning bolt/flash symbol: the lightning bolt/flash and arrowhead within an equilateral triangle symbol is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product enclosure which may be of sufficient magnitude to constitute a risk of shock to a person or persons.

◊ Exclamation point symbol: the exclamation point within an equilateral triangle symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

» **WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE AND OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES, SHOULD NOT BE PLACED ON THIS APPARATUS.**

» Use the mains plug to disconnect the apparatus from the mains.

» **THE MAINS PLUG OF THE POWER CORD MUST REMAIN READILY ACCESSIBLE.**

» Do not defeat the safety purpose polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of your obsolete outlet. **Caution! To reduce the risk of electrical shock, grounding of the center pin of this plug must be maintained.**

» Protect the power cord from being walked on or pinched particularly at the plugs, convenience receptacles, and the point where they exit from the apparatus.

» Do not block the air ventilation openings. Only mount the equipment per Intelix’s instructions.

» Use only with the cart, stand, table, or rack specified by Intelix or sold with the equipment. When/if a cart is used, use caution when moving the cart/equipment combination to avoid injury from tip-over.

» Unplug this apparatus during lightning storms or when unused for long periods of time.

» **Caution!** Shock Hazard. Do not open the unit.

» Refer to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Table of Contents

Product Overview

The DL-44E-KIT is an HDMI 1.4 compatible 4x4 matrix switcher kit which consists of an HDMI and HDBaseT matrix switcher, 3 compatible HDBaseT receivers and accessories. The HDMI and HDBaseT matrix switcher features 4 HDMI inputs, 3 HDBaseT outputs + 1 HDMI output. Digital and/or analog audio can be de-embedded from the 4th output (HDMI). The matrix switcher supports EDID management, is HDCP 2.2 and HDMI 1.4 compliant. The 3 HDBaseT transmitter outputs are compatible only with the 3 HDBaseT receivers that are included with the kit. The HDBaseT extender circuits are capable of extending 4K/60Hz 4:2:0 signals up to 40m, 1080p up to 70m all while powering the remote receivers using CAT6 F/UTP rated cable for each extension circuit. The HDBaseT receivers can also extend bi-directional IR that can be free-routed from the HDBaseT receiver locations to the local switcher to allow flexible control of sources or devices living in the A/V headend.

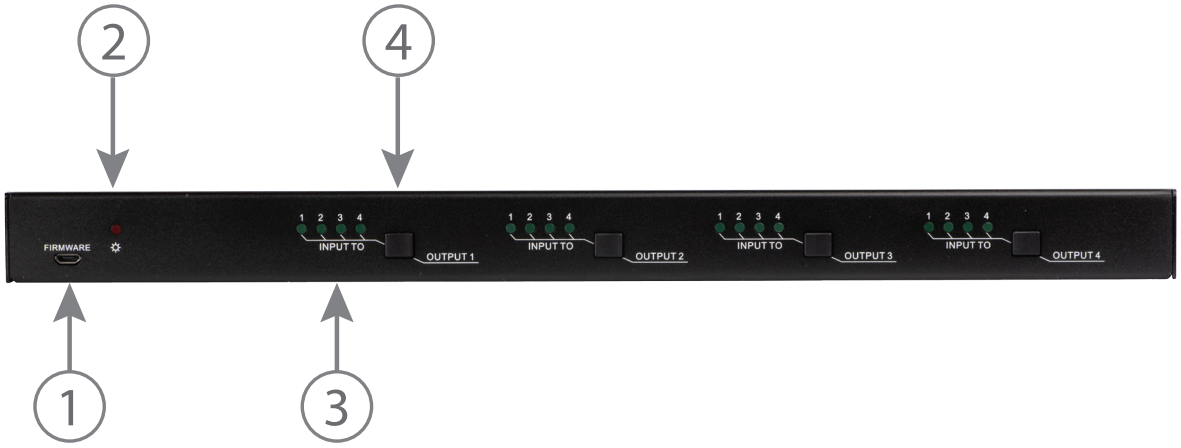
The switcher kit can be controlled either by front panel buttons, IR remote, TCP/IP, RS232 or by the internal built in web GUI/server.

Product Overview

- 4x4 HDMI 1.4 and HDBaseT Matrix Switcher
- (3) 70m HDBaseT Receivers
- Quick Install Guide
- (1) IR Remote
- (4) IR Emitters
- (4) IR Receivers
- (1) 5-pin Phoenix connector
- (1) 3-pin Phoenix connector
- (1) DB9 to 3 pin Phoenix Adapter Cable for RS232
- (1) DC24V 2.71A power supply with US, UK, EU and UA power plugs
- (8) Rack mount ears with 8 mounting screws
- (4) Plastic Cushions

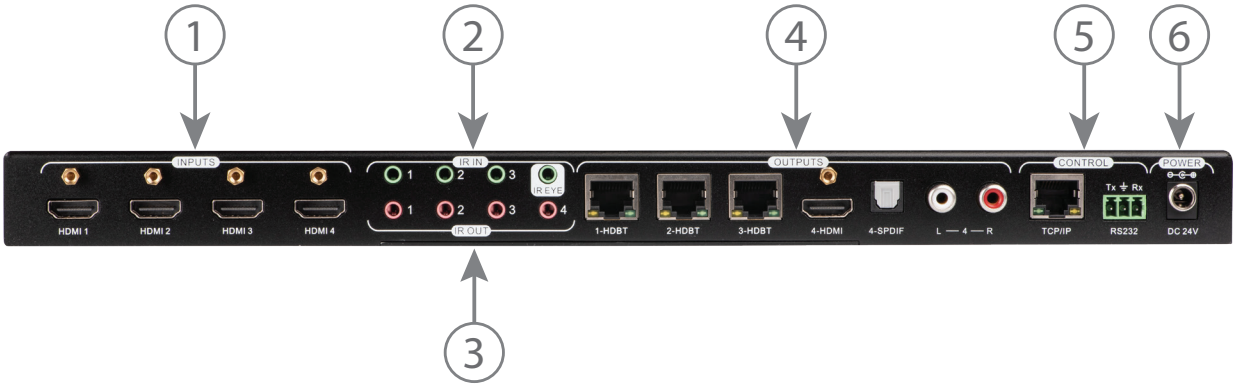
Product View- Switcher

Switcher - Front Panel



1. **FIRMWARE** - Micro USB port for firmware upgrades
2. **POWER LED** - Illuminates red when power is applied
3. **INPUT SELECTOR INDICATORS**
   - There are four LEDs that corresponds to every source input and labeled accordingly 1-4. Illuminates blue to indicate which source is selected for each output
4. **OUTPUT SELECTOR BUTTON**
   - Press the output button repeatedly to through inputs

Switcher - Rear Panel



1. **INPUTS**

   - *HDMI 1-4* - HDMI inputs 1-4

2. **IR IN**

   - *1-3* - 3.5mm ports for IR receivers for IR pass through control
   - *IR EYE* - 3.5mm ports for IR receiver for switchers IR remote control

3. **IR OUT**

   - *1-4* - 3.5mm ports for IR emitters for IR pass through control

4. **OUTPUTS**

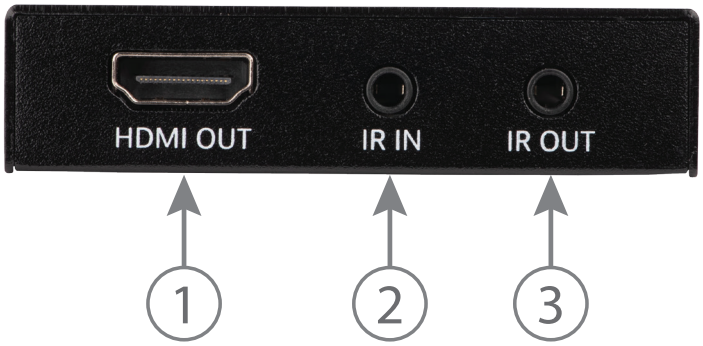
   - *1-3 HDBT* - HDBaseT outputs 1-3
   - *4 HDMI* - HDMI output
   - *SPDIF* - Digital S/PDIF audio output
   - *L/R* - Analog RCA stereo audio output

5. **CONTROL**

   - *TCP/IP* - RJ45 to control device via network / web GUI
   - *RS232* - 3 pin phoenix connector for RS232 control

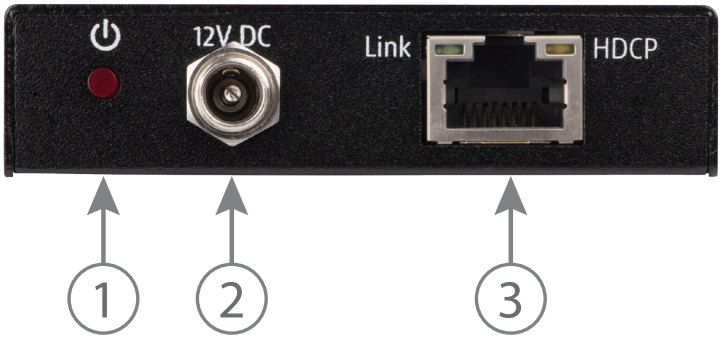
6. **DC24V**- Locking power supply port

HDBaseT Receiver - Front Panel



1. **HDMI OUT**- HDMI output port for connection to TV display
2. **IR IN -** 3.5mm IR input port for connection to IR receiver or IR system
3. **IR OUT** - 3.5mm IR output port for connection to IR emitter

HDBaseT Receiver - Rear Panel



1. **POWER LED** - Illuminates red when power is applied
2. **DC24V**- Locking power supply port
3. **HDBT IN** - RJ45 HDBaseT connection. Connect Cat6 cable to HDBT output transmitter of the DL-44E-KIT
   - *LINK LED* - Illuminates yellow when there is a valid HDBaseT link between switcher and receiver
   - *HDCP LED* - Illuminates green when video content is encrypted

Installation Instructions

Mounting the Switcher

Remove the screws on both sides of the switcher, then attach the supplied mounting clips for surface or rack mounting.

Mounting the HDBaseT Receivers

Remove the screws on both sides of the receiver, then attach the supplied mounting clips for surface or rack mounting.

At least 2 inches of free air space is required on both sides of the DL-44E-KIT receivers for proper side ventilation. Avoid mounting the receiver near a power amplifier or any other source of significant heat.

Connecting Video Sources

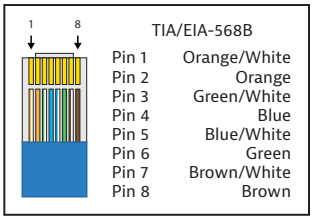
Connect source devices to the inputs on the transmitter. When using HDMI cables for source inputs, use a High Speed HDMI cable that is less than or equal to 5 meters in length for 4k60 signals and 8 meters for 1080p signals.

Connecting Displays

Connect the display devices to the HDMI output of the HDBaseT receiver using a High Speed HDMI cable that is less than or equal to 5 meters in length for 4k60 signals and 8 meters for 1080p signals.

Connecting HDBaseT

Connect one end of a Category cable to the DL-44E-KIT HDBaseT receiver labeled *HDBT IN*, then connect the other end of the Category cable to the switcher transmitter output labeled *HDBT 1-3.*



Twisted Pair Wiring
Use TIA/EIA-568B wiring for Category 6 connection between send and receive units.

To ensure proper performance of the DL-44E-KIT system, it is recommended that you use solid core, shielded Category 6 F/UTP cabling at a minimum. Category 5e F/UTP may perform well up to a certain length but may not support power over HDBaseT reliably longer distances.

When using shielded category cabling *ALWAYS*...

....use shielded connectors
....properly ground the category cable

For optimized performance use the following Liberty Wire and Cable branded cabling;

Category 6 plenum; 24-4P-P-L6SH
Category 6A plenum; 24-4P-P-L6ASH

Category 6 NON-plenum; 24-4P-L6SH
Category 6A NON-plenum; 24-4P-L6ASH

Connecting Audio Output

The DL-44E-KIT features two audio outputs, digital Toslink and unbalanced stereo analog via left and right RCA, that mirrors the embedded HDMI audio of HDMI output 4 on the switcher.

Note: When using multi channel audio only the digital audio output will pass multi channel audio. The analog output will only pass 2 channel stereo.

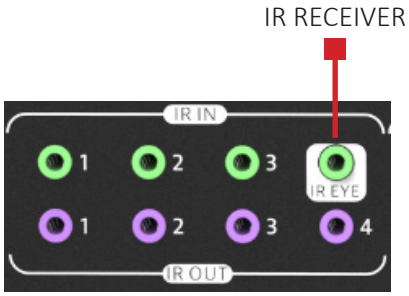
Connecting IR Control

The DL-44E-KIT is capable of transmitting a bi-directional IR signals through the HDBaseT circuits. There is also an IR remote for the switcher that can be used to control the switchers functions such as AV switching.

Passing IR Signals:
TheDL-44E-KIT is capable of passing IR signals between 33 and 55 KHz. To prevent damage to any of the electronics, the extenders should be powered off while inserting or removing any IR components.

Switcher Remote Control

To use the DL-44E-KITs IR remote to control switching functions, connect one of the IR receivers that was included into the kit into the IR EYE input on the switcher. To control the switch point to switchers remote at the IR receiver.



NOTE: The IR EYE input is only for the switchers IR remote and will only control the switchers functions. Using this port with a 3rd party remote will not tunnel IR through the IR OUTS on the local switcher or HDBT receivers

Bi-directional IR through HDBaseT

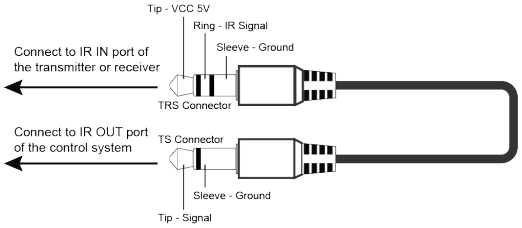
To control a display connected to an HDBaseT receiver via IR, connect IR receiver(s) to the IR IN (1-3) ports of the switcher, then connect IR emitter(s) to the IR OUT port of the HDBaseT receiver on the corresponding output.

To control local video sources via IR connected to the local switcher from an IR remote at the HDBaseT receiver location, connect an IR receiver to the IR IN port of the HDBaseT receiver, then connect an IR emitter to the IR OUT port of the switcher on the corresponding output to the local source to be controlled.

NOTE: The IR IN > IR OUT pathways follows the AV route when AV signals is routed from input to output by default. For example, when input 1 is routed to output 3, the IR receiver connected to the HDBaseT receiver on output 3 can only communicate through the IR OUT 1 port of the switcher and vice versa. This can be changed via API where it does NOT follow AV so IR routes can be set independently of the AV route from any IR input to any IR output via API. The control commands for this operation are referenced on page 29.

Device Control from Control System

To pass 3rd party IR system signals through the DL-44E-KIT, such as a control system, connect the TS connector of the Digitalinx IR-AC coupling cable (purchased separately) to the IR output port of the control system and connect the TRS connector of the IR-AC cable to the IR IN port of the switcher / receiver.

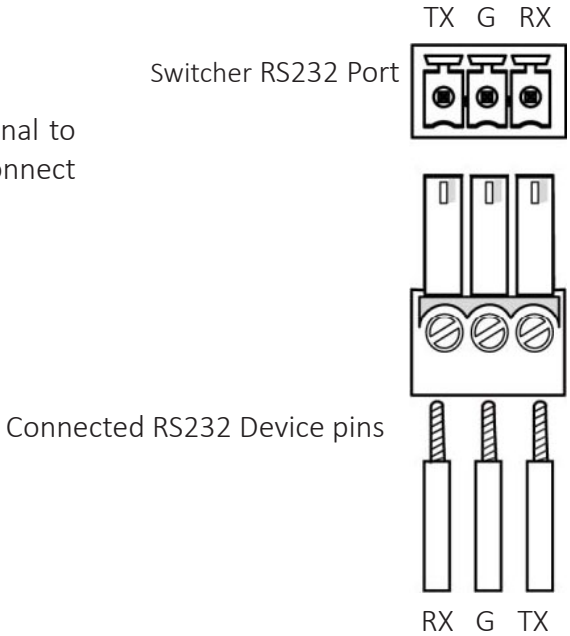


Connecting RS232 Control

Connect a control system to the DL-44E-KIT switcher via RS232 so the switcher can be controlled by a 3rd party control system.

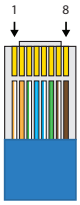
RS232 Wiring
Connect the system controller RX signal to TX on the DL-44E-KIT switcher, then connect the controllers TX signal to RX.

RS232 Settings:
- 9600 baud
- 8 Data Bits
- 1 Stop Bit
- Parity = none



Connecting Ethernet

The DL-44E-KIT may be controlled via Ethernet using the internal web GUI or via Telnet server.



TIA/EIA-568B

Pin 1	Orange/White
Pin 2	Orange
Pin 3	Green/White
Pin 4	Blue
Pin 5	Blue/White
Pin 6	Green
Pin 7	Brown/White
Pin 8	Brown

The TCP/IP port requires a standard straight-through Category 5 or greater cable with the TIA/EIA-568B crimp pattern for optimal operation.

The default settings for the TCP/IP port are:
IP address: 192.168.0.178, Telnet port 4001

Web Browser Control / GUI

To connect to the DL-44E-KIT web GUI, connect a computer to the same LAN as the DL-44E-KIT, be sure your computer is in the same network ID range as the switcher, enter in the default IP of the switcher into a web browser. See page 14 for web GUI settings and configuration.

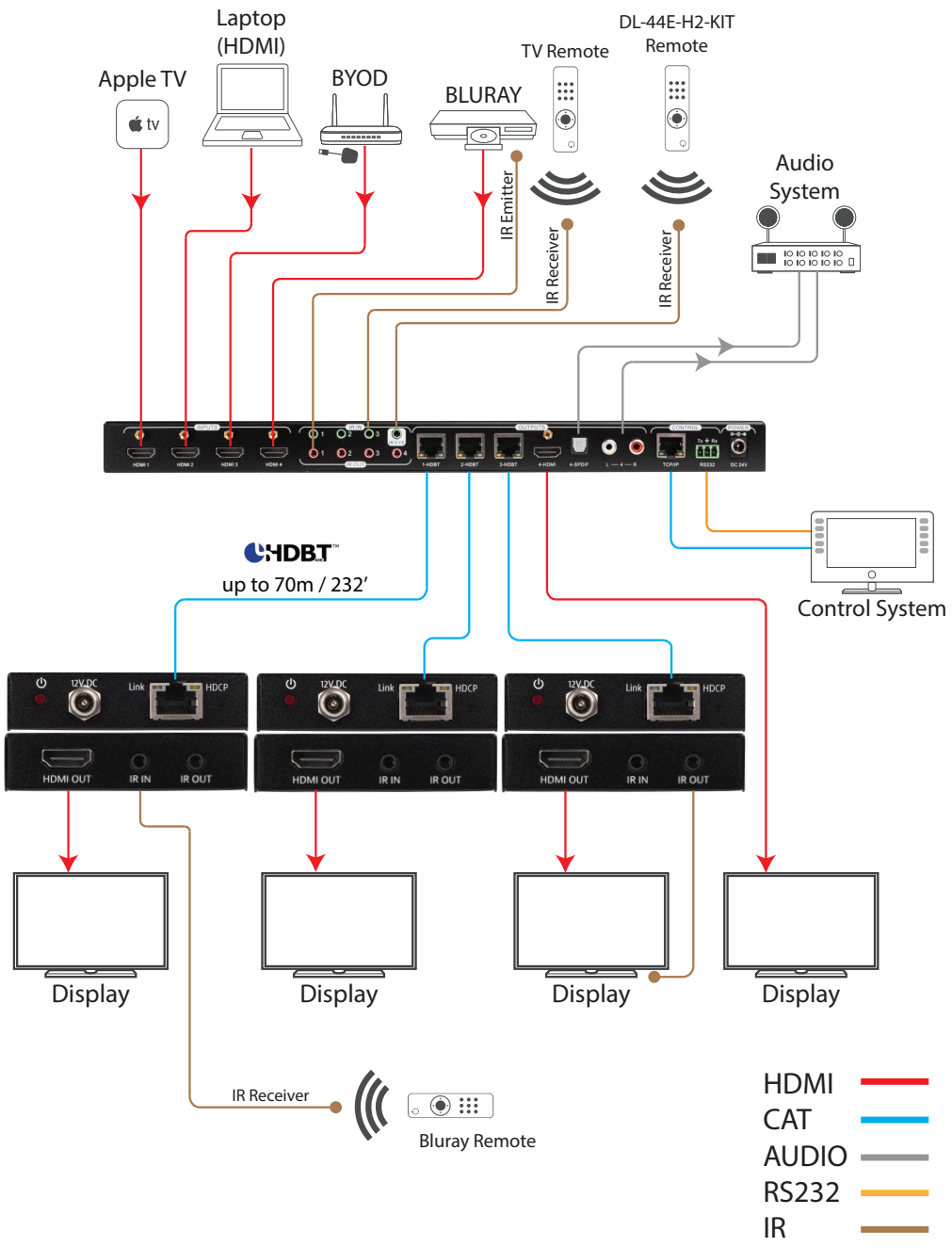
Telnet Control

To connect to the DL-44E-KIT and control it as a Telnet client, connect a computer to the same LAN as the DL-44E-KIT, be sure your computer is in the same network ID range as the switcher, enter in the default IP of the switcher into a telnet server and use Port 4001 to connect. See page 21 for all the available control commands for this switcher kit.

Applying Power

Connect the included power supply to the DL-44E-KIT and lock the power supply to the power connector by twisting the locking collar clockwise. The switcher powers all the receivers in the kit via PoC so power supplies for the receivers are not required.

A/V Diagram


Apple TV
Laptop (HDMI)
BYOD
BLURAY
TV Remote
DL-44E-H2-KIT Remote
Audio System
IR Emitter
IR Receiver
IR Receiver
HDBT
up to 70m / 232'
Control System
HDMI OUT
IR IN
IR OUT
Display
Display
Display
Display
IR Receiver
Bluray Remote
HDMI
CAT
AUDIO
RS232
IR

Web Browser Control / System Settings

GUI System Controller

Open a web browser on a PC that is connected to the same LAN as the DL-44E-KIT and type in the default IP address of the kit and press enter.

NOTE: The IP address of the DL-44E-KIT is 192.168.0.178, the PC connected to this LAN must be in the 192.168.0/24 Network ID range in order to access the GUI.

The login screen will appear. The default user name and password to access the web GUI controller is *user*

After logging in, the following screen will appear

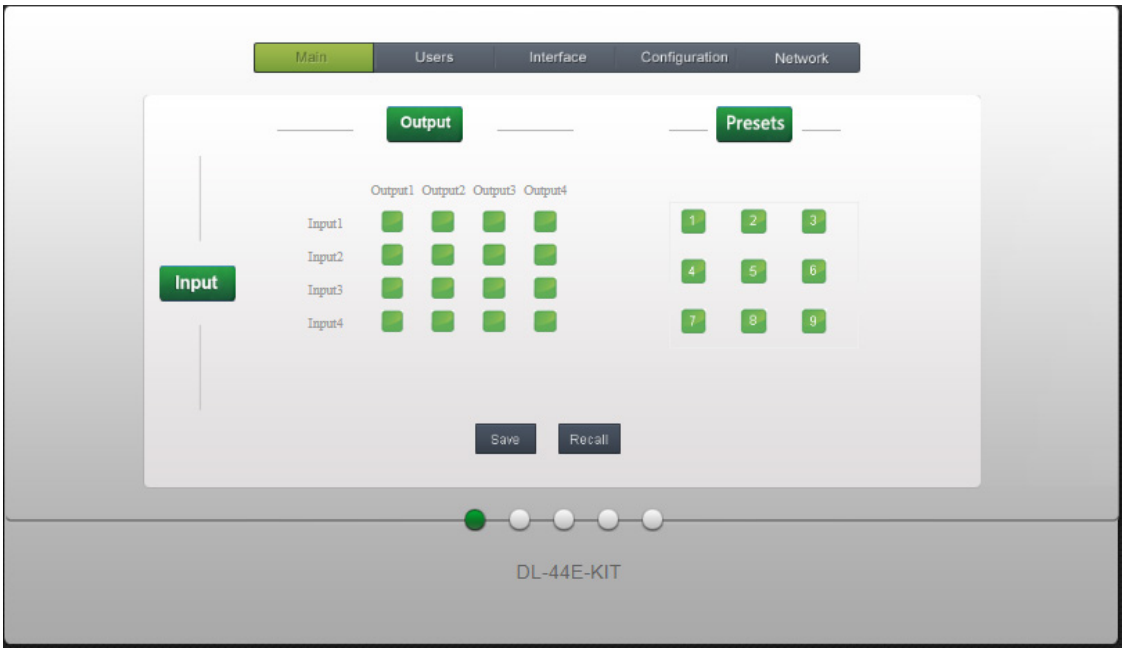
To route inputs to outputs simply press the desired INPUT corresponding to the desired OUTPUT, the AV route will then initiate.

To save the current AV routes as a PRESET to be recalled later, select the desired preset number and click *SAVE*. To recall a PRESET, select the desired preset and click *RECALL*.

Advanced Settings

Open a web browser and type in the IP address of the DL-44E-KIT. The default IP address is 192.168.0.178. Be sure the computer you are using to connect to the DL-44E-KIT web GUI is in the same IP / Network ID range.

The default user name and password is *admin.* After logging in, the control GUI screen will appear with additional submenus for configuring advanced settings. See previous section for switching and presets.

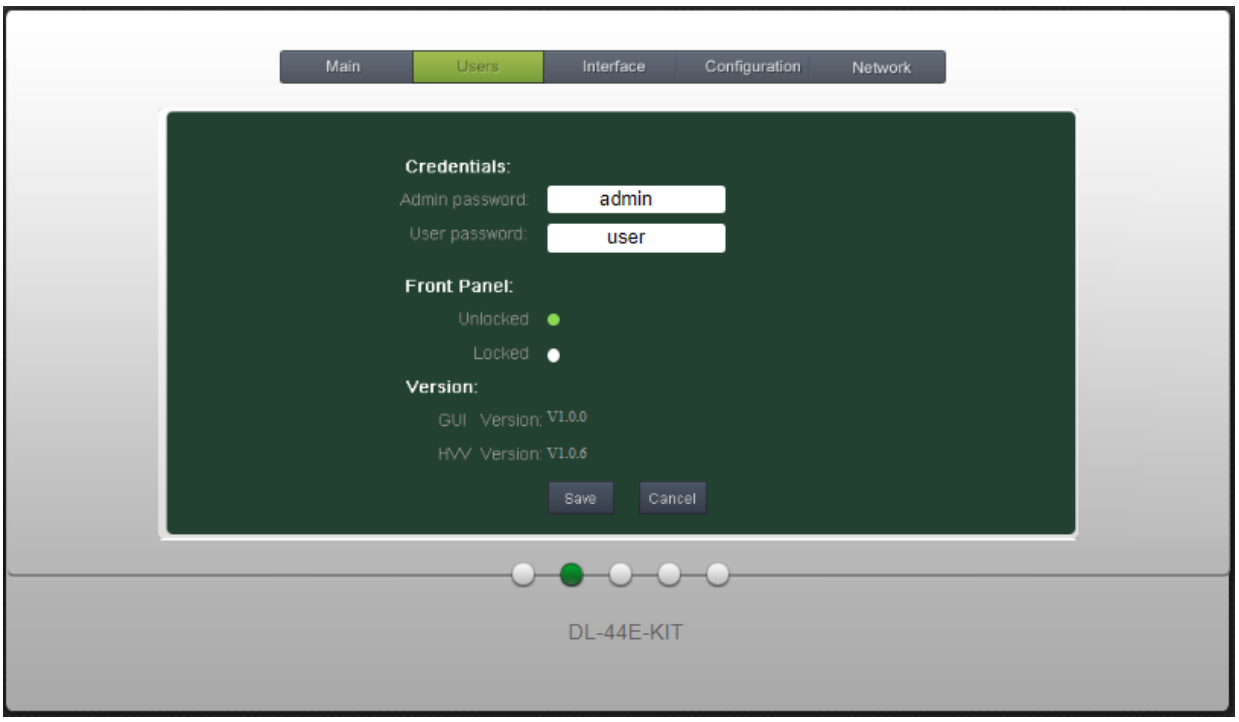


Access Settings

The *USERS* submenu allows you to change the password credentials for the *admin* and *user* login as well as lock / unlock the front panel buttons of the DL-44E-KIT.

To change the password for the admin login, enter in the desired password then click *SAVE*

To enable / disable front panel lock control, check on either the *Unlocked* or *Locked* settings under *Front Panel* option and click *SAVE*.

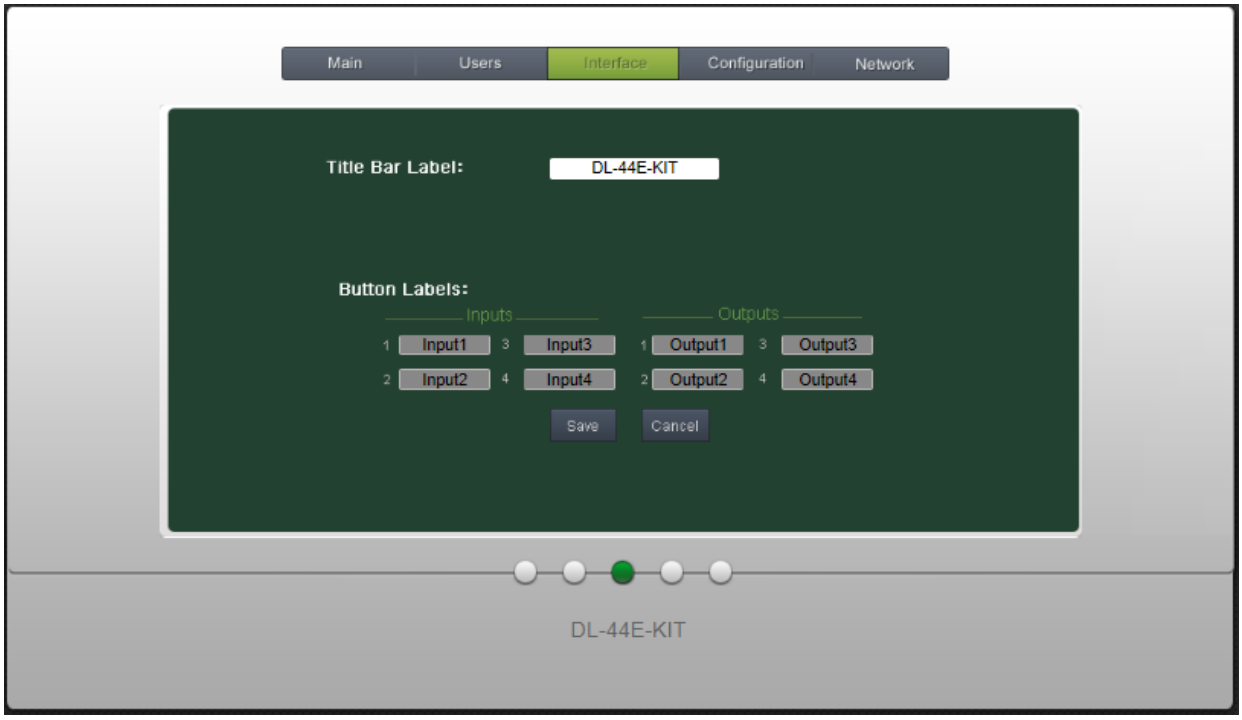


Interface (Input Names)

The *Interface* menu allows you to define the AV input and output names as well as assign a title to GUI control

To add a title to the GUI control, enter in the desired name under *Title Bar Label:* then click *SAVE*

To add user defined names to the video inputs or outputs, enter in the name for each input*:* then click *SAVE*

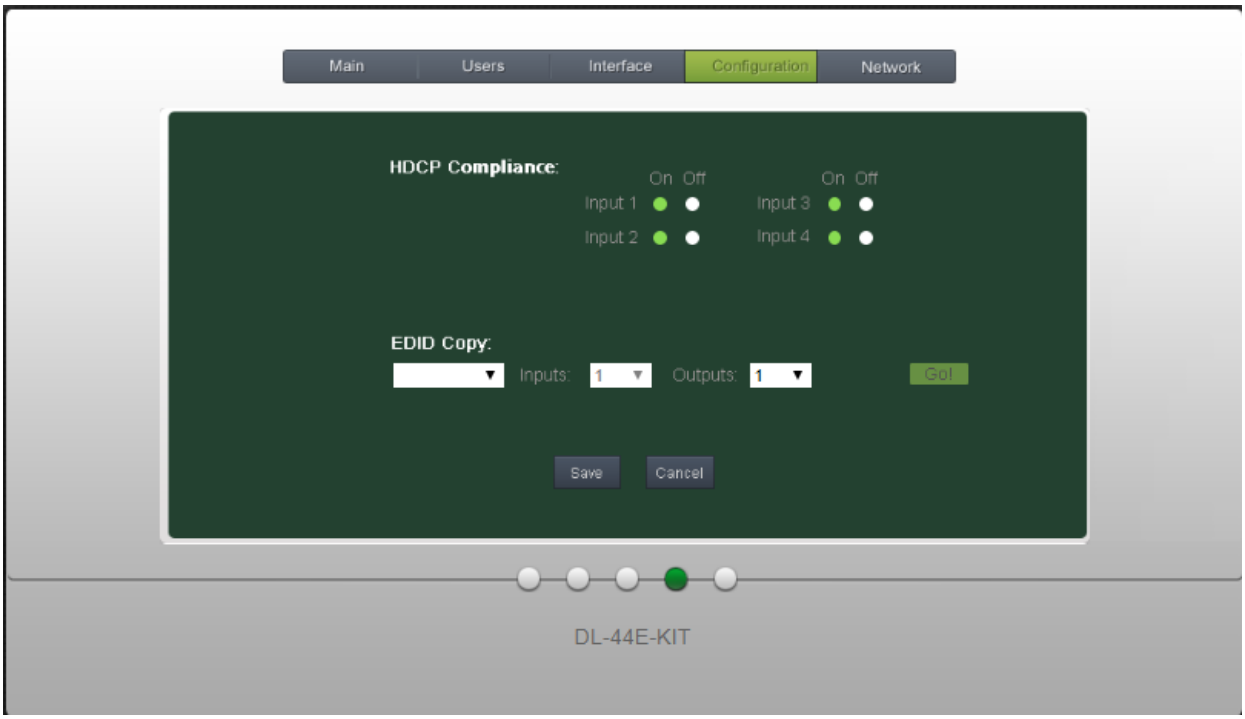


EDID / HDCP Configuration

The *CONFIGURATION* menu allows you to either copy EDID from a display and assign to an input and turn HDCP compliance ON or OFF on the AV inputs.

To copy EDID from a connected display on an output of an HDBaseT receiver to an input, select which output to which you would copy EDID from and assign to one or all inputs then click *SAVE*.

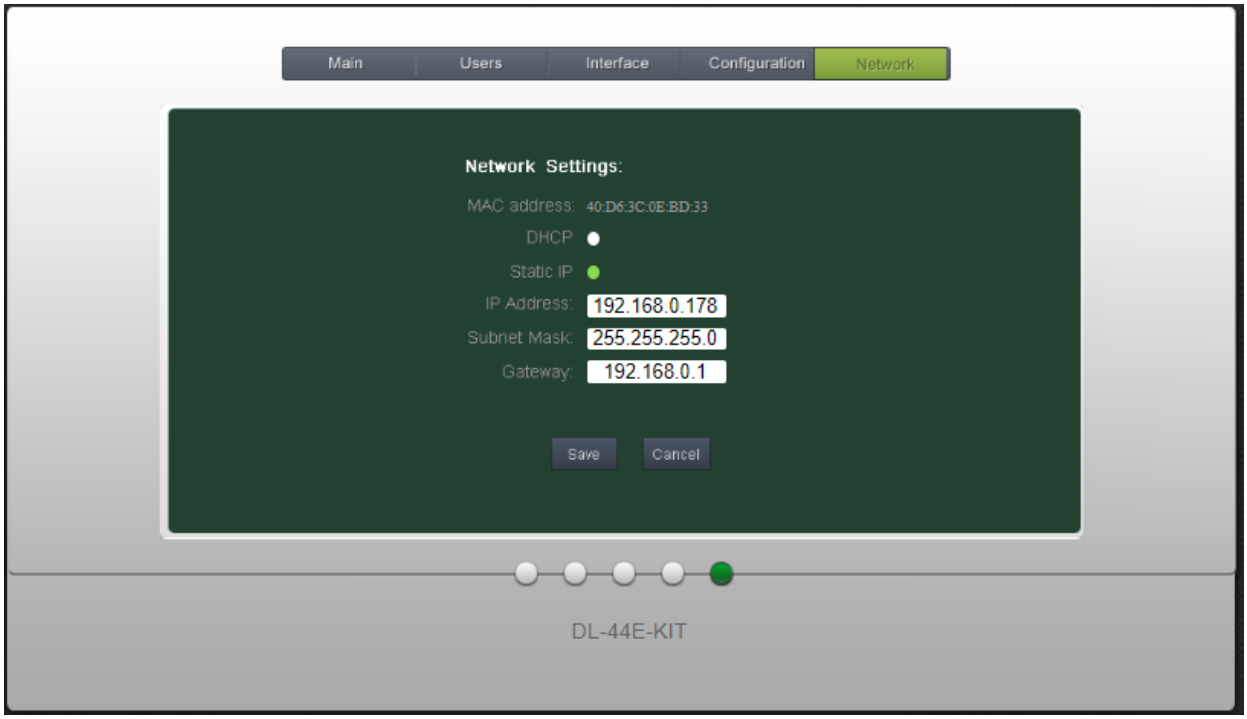
To turn HDCP compliance either ON or OFF, check the ON or OFF button to the desired input. NOTE: when turning HDCP OFF, the switcher will not transmit HDCP encrypted content.



Network Settings

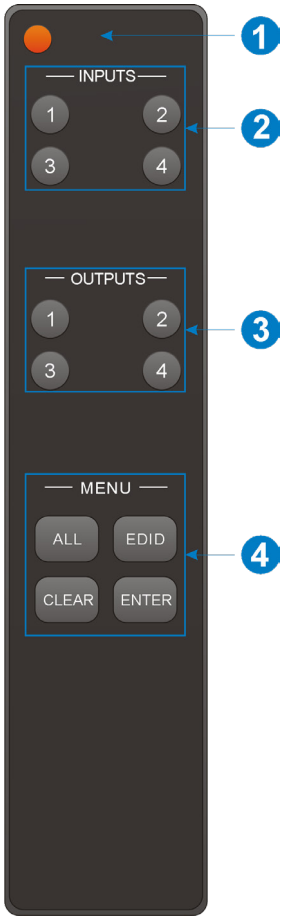
The *Network* menu allows you to set the IP address mode to either Static or DHCP, by default the DL-44E-KIT is set to Static mode with a pre-defined IP address of 192.168.0.178 / subnet 255.255.255.0 and gateway set to 192.168.0.1

Check either the *DHCP* or *Static* mode to change IP modes. If using a Static IP address enter in the IP address, subnet and gateway, then click *SAVE*. You will need to reboot the switch for the new network settings to take place.



IR Remote Control

The DL-44E-KIT includes an IR remote which performs routing functions available on the front panel of the switcher. When using the remote control locally, i.e., pointed directly at the switcher.



1. Enter or exit standby power button
2. Video input selection buttons
3. Switcher output selection buttons
4. Operation buttons
    - *ALL* - Use this button to confirm input routing from a selected input to ALL outputs or to confirm EDID copy from a selected output to ALL inputs
    - *CLEAR* - Use this button to clear current selection
    - *ENTER* - Use this button to confirm AV switching operation from a selected input to selected output or to copy EDID from a selected output to an selected input
    - *EDID* - Use this to copy EDID from a selected output to a selected input

RS232 and TCP/IP Control

RS232 Settings: 9600 baud, 8 Data bits, 1 Stop bit, Parity = None
TCP/IP Settings: User defined IP address (default IP address:192.168.0.178), Telnet port 4001

There are no spaces between any of the characters in the command string. The commands are case sensitive.

A/V Routing and Switching

Description	Command	Examples
Route AV input *[I]* to output *[O]*	OUT*[I]*:*[O]*. *[I] = [1-4]* *[O] = [1-4]*	*Command:* *OUT1:2.* *Response:* *AV:01->02<CR><LF>*
Route AV input *[I]* to all outputs	*[I]*ALL: *[I] = [1-4]*	*Command:* *1ALL.* *Response:* *01 To All.<CR><LF>*
Query current routing status	STA_VIDEO.	*Command:* *STA_VIDEO.* *Response:* *AV:03->01<CR><LF>* *AV:02->02<CR><LF>* *AV:03->03<CR><LF>* *AV:04->04<CR><LF>* *IR:03->01<CR><LF>* *IR:04->02<CR><LF>* *IR:04->03<CR><LF>* *IR:01->04<CR><LF>*
Query current input link status.	STA_IN.	*Command:* *STA_IN.* *Response:* *IN 01 02 03 04* *Connect Y Y N N*
Query current output link status	STA_OUT.	*Command:* *STA_OUT.* *Response:* *OUT 01 02 03 04* *Connect Y Y N N*

Saving / Recalling Switch Scenes or Presets

Description	Command	Examples
Store current switching status to preset *[P]*	PresetSave*[P]*. *[P] = [1-6]*	*Command:* *PresetSave1.* *Response:* *Save To F1<CR><LF>*
Recall switching preset *[P]*	PresetRecall*[P]*. *[P] = [1-6]*	*Command:* *PresetRecall1.* *Response:* *Recall From F1<CR><LF>*

Audio Control

Description	Command	Examples
Turns the TOSLINK digital audio output ON	SPDIFON.	*Command:* *SPDIFON.* *Response:* *DigitalAudio ON with ALL Outputs<CR><LF>*
Turns the TOSLINK dgitial audio output OFF	SPDIFOFF.	*Command:* *SPDIFOFF.* *Response:* *DigitalAudio OFF with ALL Outputs<CR><LF>*

System Commands

Description	Command	Examples
Turns switcher ON	`PowerON.`	*Command:* *PowerON.* *Response:* *PWON<CR><LF>*
Turns switcher OFF	`PowerOFF.`	*Command:* *PowerOFF.* *Response:* *PWOFF<CR><LF>*
Restores the matrix to factory defaults	`RST.`	*Command:* *RST.* *Response:* *Factory Default!<CR><LF>*
Front panel button LOCK	`Lock.`	*Command:* *Lock.* *Response:* *System Locked!<CR><LF>*
Front panel button UNLOCK	`Unlock.`	*Command:* *UNLOCK.* *Response:* *System Unlocked<CR><LF>*
Query firmware version	`/^Version.`	*Command:* */^Version.* *Response:* *v1.0.6<CR><LF>*

Technical Specifications- Switcher

Video	
Video Inputs	(4) HDMI
Video Input Connectors	(4) HDMI Type A Female
Input video Signal	HDMI 2.0 compliant
HDMI Input Resolution Support	Up to 4K@60Hz 4:2:0 / 8 bit deep color
Video Output	(3) HDBaseT, (1) HDMI
Video Output Connector	(1) Type-A Female HDMI, (3) RJ45
Output Resolution Support	Up to 3840 x 2160 @60Hz / 4:2:0 / 8 bit deep color
Standards	HDMI 1.4, HDCP 2.2
Bandwidth	*All HDMI inputs / outputs:* 10.2Gbps
Audio Output	
Audio Output	(1) Unbalanced stereo audio (1) Digital SPDIF stereo audio
Audio Output Connector	(2) RCA (Left and Right) (1) Toslink connector
Frequency Response	20Hz – 20KHz, ±3dB
Max Input Level	2.0Vrms ± 0.5dB. 2V = 16dB headroom above-10dBV (316mV) nominal consumer line level signal
Output Impedance	70Ω
Control	
Control Ports	(1) RS232, (1) IR Eye, (3) IR IN, (4) IR OUT, (1) TCP/IP, (1) Firmware
Control Connectors	(1) 3-pin terminal block- RS232, (8) 3.5mm jacks- IR, (1) RJ45- TCP/IP, (1) Micro USB-Firmware
IR Carrier Frequency Range	33-55kHz at 5 volts
HDBaseT Signal Characteristics	
Maximum Distance	*HDBaseT Output (Transmitter):* 70 m (up to 1080p) , 40 m (up to 4K@60Hz / 4:2:0 / 8 bit deep color
Cable Requirements	Solid core shielded Category 6 F/UTP cable or greater with TIA/EIA-568B crimp pattern
Bandwidth	*HDBaseT Output (Transmitter):* 10.2Gbps
Chassis and Environmental	
Dimensions (WxHxD)	360mm x 28mm x 150 mm (13.8 in x 1.1 in x 5.9 in) – 1RU
Shipping Weight	9.11kg (2 lbs.)
Operating Temperature	0° to +55° C (+32° to +131° F)
Operating Humidity	10% to 90%, Non-condensing
Storage Temperature	-20° to +70° C (+14° to +158° F)
Storage Humidity	10% to 90%, Non-condensing
Power, ESD, and Regulatory	
Power Supply Input	100V-240VAC / 50-60 Hz
Power Supply Output	24VDC / 2.71A
Power Consumption	35 watts (max)
ESD Protection	15kV
Product Regulatory	FCC, CE, RoHS
Power Supply Regulatory	CE, RoHS
Other	
Standard Warranty	5 years
Included Accessories	Quick Install Guide, (1) 3-pin Phoenix connectors, (1) 5-pin Phoenix connectors, IR Remote, (4) IR Emitters, (4) IR Receivers, (1) DB9 to 3 pin Phoenix adapter cable for RS232, (1) DC24V power supply with US, UK, EU and AU power plug, (8) Rack mount ears with 8 mounting screws, (4) Plastic Cushions

Distances and picture quality may be affected by cable grade, cable quality, source and destination equipment, RF and electrical interference, and cable patches.

Technical Specifications- HDBaseT Receiver

Supported Audio and Video	
Video Input	(1) HDBaseT
Video Input Connector	(1) RJ45
Video Output	(1) HDMI
Video Output Connector	(1) HDMI Type A Female
Video Compliance	HDMI 1.4, HDCP 2.2
Output Resolution Support	Up to 4K@60Hz (4:2:0 chroma sub-sampling / 8 bit deep color)
Embedded Audio	Supports up to 8Ch LPCM, Dolby TrueHD, DTS-HD, Dolby Digital5.1, DTS 5.1, Dolby Digital Plus
HDBaseT Signal Characteristics	
Maximum Distance	70 m (up to 1080p) , 40 m (up to 4K@60Hz / 4:2:0 / 8 bit deep color)
Cable Requirements	Solid core shielded Category 6 F/UTP cable or greater with TIA/EIA-568B crimp pattern
Bandwidth	10.2Gbps
Control	
Control Ports	(1) IR IN, (1) IR OUT
Control Connectors	(2) 3.5mm jacks
IR Carrier Frequency Range	33-55kHz at 5 volts
Chassis and Environmental	
Dimensions (WxHxD)	18 mm x 120 mm x 74 mm (0.71 in x 4.72 in x 2.91 in)
Shipping Weight	235g (.5 lbs.)
Operating Temperature	0° to +40° C (+32° to +104° F)
Operating Humidity	10% to 90%, Non-condensing
Storage Temperature	-10° to +50° C (+14° to +122° F)
Storage Humidity	10% to 90%, Non-condensing
Power, ESD, and Regulatory	
Power Supply Input Power	24V DC 1.25A or PoC (Power Over Cable), 100-240VAC, 50/60Hz
Power Consumption	12 watts (max)
ESD Protection	15kV
Product Regulatory	FCC, CE, RoHS
Power Supply Regulatory	CE, RoHS
Other	
Standard Warranty	5 years

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Thank you for your purchase.

For Technical Support please call our toll free number at 800-530-8998 or email us at supportlibav@libav.com

www.libav.com

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