

DS16EV51-AEVKD DVI Extender Demo Kit for Dual or Single Link DVI Cables

General Description

The DS16EV51-AEVKD Dual/Single link DVI Cable Extender Demo Kit provides a complete DVI system extension solution using two National's DS16EV5110A's - Video Equalizers.

Two Molex DVI connectors are used as the input and the output connections for a dual or single link DVI system. This version of the kit demonstrates both a single link and a dual link DVI system.

The Analog Pins of a typical DVI link (R, G, B, Hsync, and Vsync) are not connected. The DDC signals, Hot Plug, 5V Power and 5V Ground are directly connected between the DVI connectors, making this demo kit HDCP compliant.

A 3.3V VCC 1-pin header (J4) and a GND 1-pin header (J5) are used for the power supply.

Alternately, an AC/DC power adapter (>800mA) is required for the evaluation kit to provide 5V DC voltage for easy portability. A 1.8 mm DC Power Jack is used to connect the AC/DC Power Adapter. National's LP3965, a 3.3V, 1500mA, Fast, Ultra Low Dropout Linear Regulator, converts the 5V power supply voltage to a 3.3V power supply voltage that powers the DS16EV5110A's.

Features

- **Compatible with DTV Resolutions 480i, 480p, 720i, 720p, 1080i, 1080p (8 bit, 10 bit, 12 bit color depth)**
- **Compatible with the Single Link Computer Resolutions of VGA, SVGA, XGA, SXGA, UXGA**
- **Compatible with the Dual Link Computer Resolutions of QXGA, WQXGA**
- **Supports TMDS DVI or HDMI Dual/Single Link**
- **Adjustable rotary switch for easy custom EQ boost level setting to reach maximum length of TMDS Interface with HDMI, or DVI Cables**
- **Single 3.3V Supply**
- **Ultra Portable with AC/DC Power Adapter (not included in the kit)**
- **500 mW Typical Power Consumption of each DS16EV5110A device**
- **>6kV ESD Rating**
- **-40 to 85C Industrial Temperature Range**
- **The DS16EV5110A demo kit extends TMDS with the 28 AWG STP DVI cable as follows:**

Format	Link	Resolution	Pixel bandwidth (MPixel/s) 60Hz LCD with 20% blanking	Per channel bandwidth (Gb/s) 60Hz LCD with 20% blanking	DVI Cable Length
VGA	Single	640 x 480	22.1	0.221	> 45m
SVGA	Single	800 x 600	34.6	0.346	> 40m
XGA	Single	1024 x 768	56.5	0.565	> 35m
SXGA	Single	1280 x 1024	94.4	0.944	> 30m
UXGA	Single	1600 x 1200	138.0	1.380	> 25m
HDTV	Single	1920 x 1080	149.3	1.493	> 25m
QXGA	Dual	2048 x 1536	113.2	1.132	> 30m
WQXGA	Dual	2560 x 1600	147.5	1.475	> 25m

Applications

High Definition Displays and Televisions
High Definition Front- Projectors
LCD Computer Monitors
DVI-D/HDMI Cable Extender

Ordering Information

PART: DS16EV5110ASQ

DVI Demo Board for DVI Dual/Single Link Cables: DS16EV51-AEVKD

HDMI Demo Board for HDMI Cables: DS16EV51-AEVKH

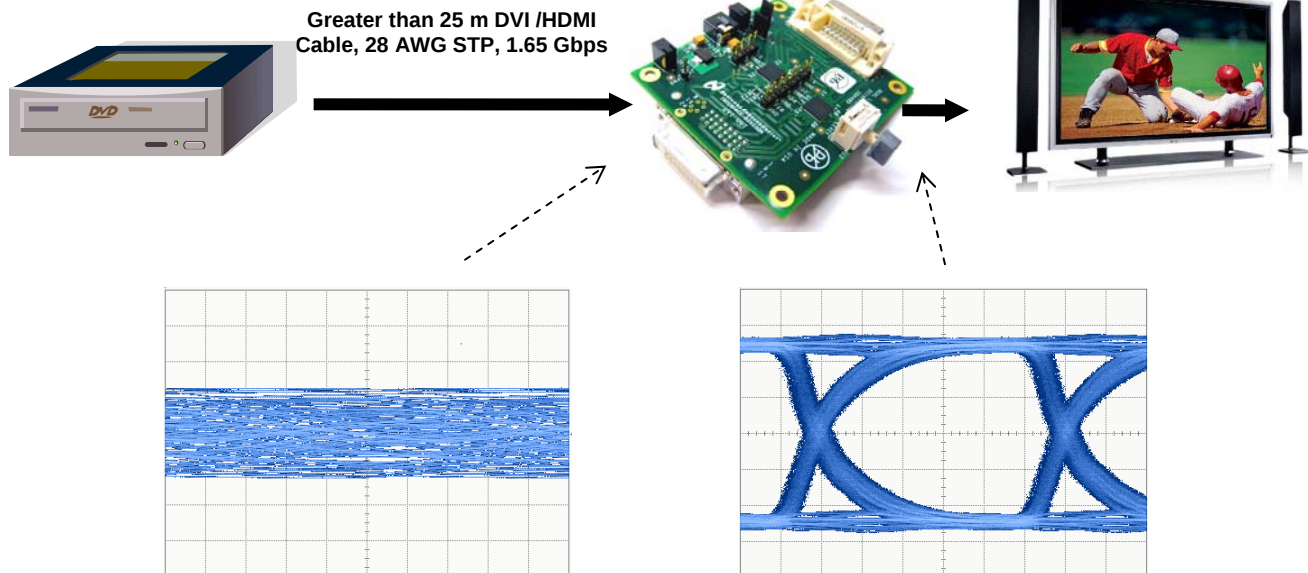
CAT5 Demo Board for CAT5 Cables: DS16EV51-AEVKC

Typical Applications

DVI Video Source

DS16EV51-AEVKD

High Definition Display



Bill of Materials

DESIGNATION	QTY	DESCRIPTION
C2, C4, C6, C8, C10, C12, C15, C17	8	0.01uF $\pm 10\%$ Ceramic Capacitor 0402
C1, C3, C5, C7, C9, C11, C13, C14, C16	9	0.1uF $\pm 10\%$ Ceramic Capacitor 0402
C59	1	33uF $\pm 10\%$ Tantalum Capacitor 3528
C60	1	68uF $\pm 10\%$ Tantalum Capacitor 3528
D4	1	LED Green
D5	1	LED Red
R19, R23	2	453 ohm $\pm 5\%$ Resistor 0402
R20	1	1K ohm $\pm 5\%$ Resistor 0402
R24	1	10K ohm $\pm 5\%$ Resistor 0402
R21, R22	2	50 ohm $\pm 5\%$ Resistor 0402
J45, J46	2	DVI-I Receptacle Female
J47	1	DC Power Jack 1.8 mm
J4, J5	2	1 pin header (J4: VDD=3.3V, J5:GND)
J7, J8, J9, J10, J11, J12	5	1X2 pin header
J15	1	1X3 pin header
U13, U14	2	National DS16EV5110A
U15	1	National LP3965 – 3.3V -1500mA
U3	1	94HBB08RAT Rotary Dip Switch

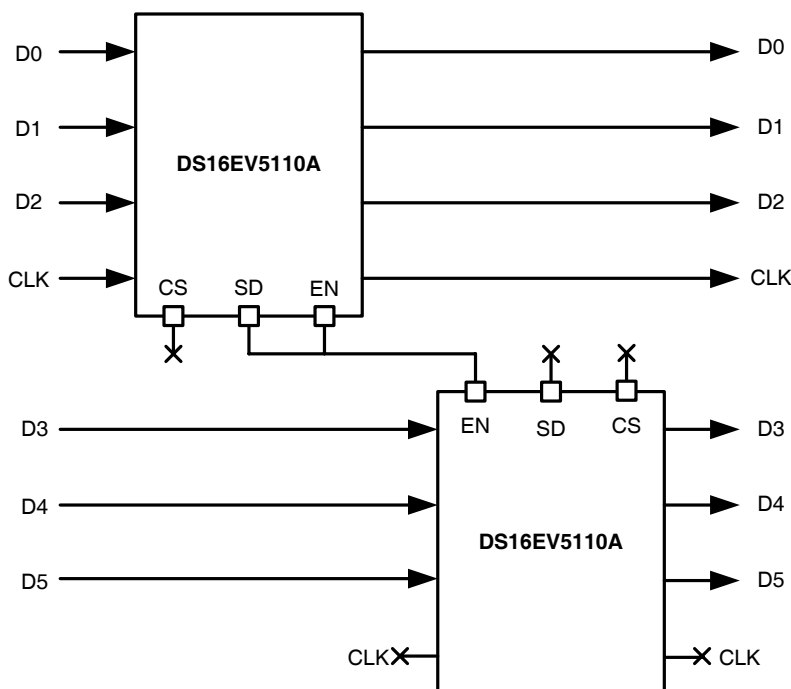
Quick Start Guide:

1. Connect 3.3V DC power to J4 and ground to J5 from the power supply.
Or, plug the AC/DC power adapter to the DC power Jack
AC/DC power adapter requirement: Output DC 4V~6V, Output current > 800mA
2. Attach two DVI cables to the DVI Input and Output Connectors
3. Turn on the DVD/Computer and the Monitor/HDTV.

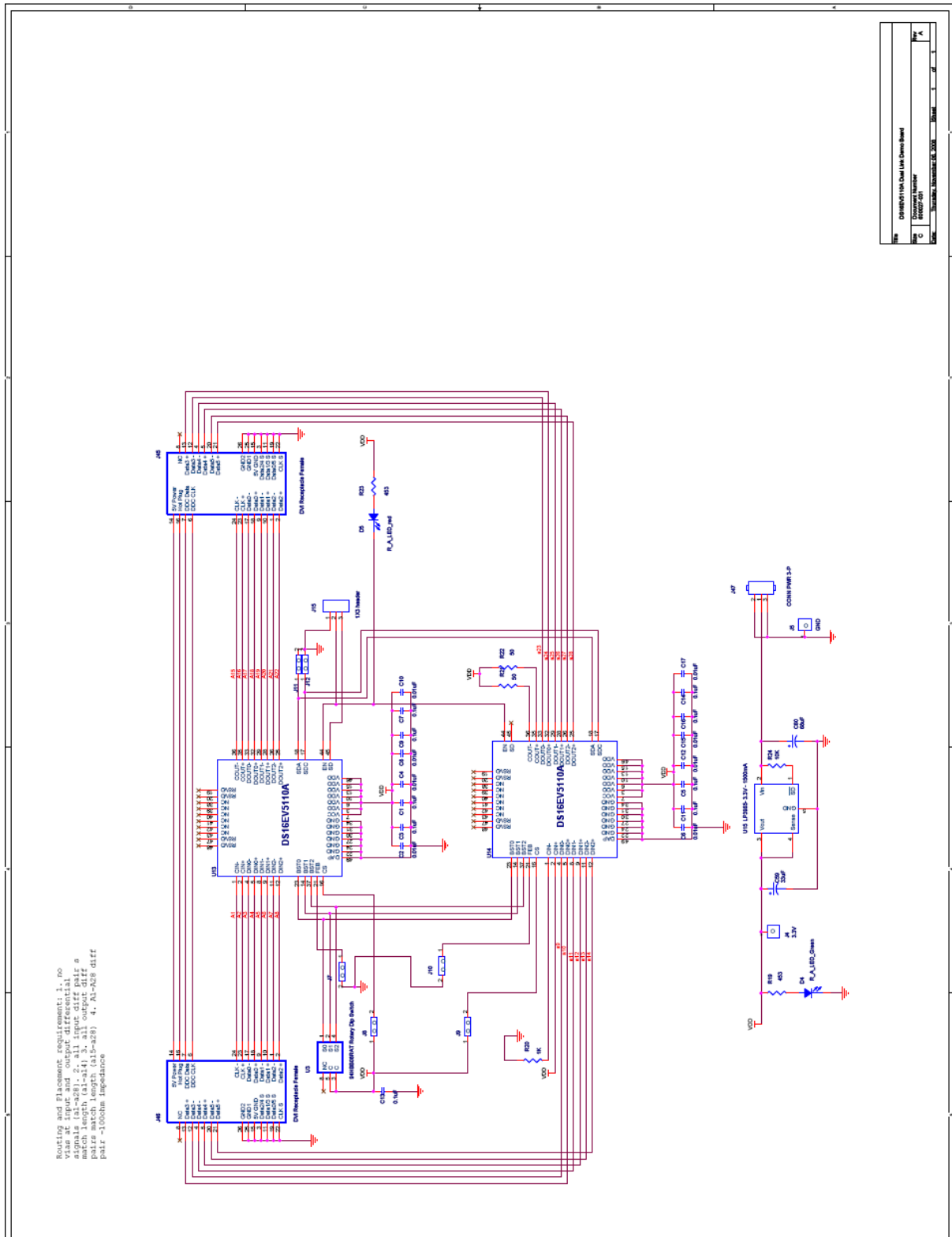
Adjustment and Control Description

Component	Name	Function
D4	PWR	The LED turns on when 5V DC applied
D5	SD	The LED turns on when the DS16EV5110 does not detect clock signal
J47	5V DC	Optional DC Power Jack for 1.8 mm Adaptor Plug
J4	3.3V	3.3V VCC power supply
J5	GND	GND
J10	FEB and GND	Optional SMBus control of U14 (See Datasheet)
J9	CS and VDD	Optional SMBus control of U14 (See Datasheet)
J7	FEB and GND	Optional SMBus control of U13 (See Datasheet)
J8	CS and VDD	Optional SMBus control of U13 (See Datasheet)
J11, J12	SDA, SDC and GND	Optional SMBus access (See Datasheet)
J15	Loop Back Control	Connect "LED" and "SD" to enable D5 function. Connect "SD" and "EN" to enable look back control function. When the clock signal is not detected, the DS16EV5110A enters power down mode.
U3	Rotary Switch	Turn the switch to control the EQ boost setting. "0" on the switch refers to the boost setting of "0X00", "7" on the switch refers to the boost setting of "0X07". See datasheet for detail Boost setting information.

Connection in Dual Link Application

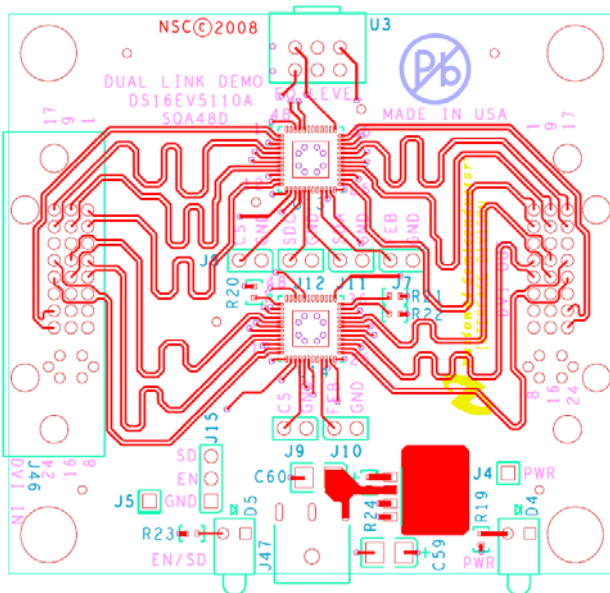


Schematics

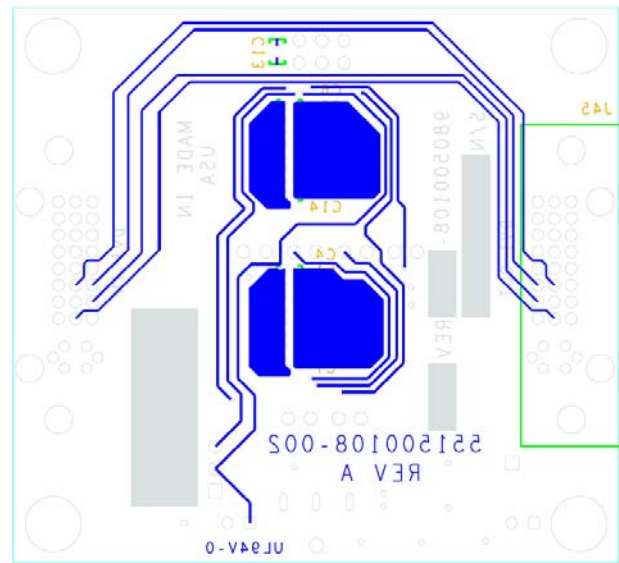


Layout Considerations

- Keep the clock and data transmission lines as short as possible with controlled 50 ohm single-ended impedance. Or, use differentially coupled traces with 100 ohm impedance.
- Avoid using vias on the clock and data transmission lines on the input side of the DS16EV5110A.
- Place power supply decoupling capacitors close to the VCC pins.



Top View Layout



Bottom View Layout

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products

Audio	www.ti.com/audio
Amplifiers	amplifier.ti.com
Data Converters	dataconverter.ti.com
DLP® Products	www.dlp.com
DSP	dsp.ti.com
Clocks and Timers	www.ti.com/clocks
Interface	interface.ti.com
Logic	logic.ti.com
Power Mgmt	power.ti.com
Microcontrollers	microcontroller.ti.com
RFID	www.ti-rfid.com
OMAP Mobile Processors	www.ti.com/omap
Wireless Connectivity	www.ti.com/wirelessconnectivity

Applications

Automotive and Transportation	www.ti.com/automotive
Communications and Telecom	www.ti.com/communications
Computers and Peripherals	www.ti.com/computers
Consumer Electronics	www.ti.com/consumer-apps
Energy and Lighting	www.ti.com/energy
Industrial	www.ti.com/industrial
Medical	www.ti.com/medical
Security	www.ti.com/security
Space, Avionics and Defense	www.ti.com/space-avionics-defense
Video and Imaging	www.ti.com/video

TI E2E Community Home Page

e2e.ti.com

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2012, Texas Instruments Incorporated