DS22EV5110-EVKH
HDMI Extender Demo Kit for HDMI Cables

General Description

The DS22EV5110-EVKH HDMI Cable Extender Demo Kit provides a complete HDMI system extension solution using National's DS22EV5110 - a DVI, HDMI Extended Reach Equalizer with Retimer and Output De-Emphasis.

Two HDMI female connectors are used as the input and the output connections for a HDMI system.

The DDC signals are connected through an I2C buffer.

The Hot Plug, 5V Power and 5V Ground are directly connected between the HDMI connectors, making this demo kit HDCP compliant.

A 3.3V VCC 1-pin header (J22) and a GND 1-pin header (J23) 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 1.8mm 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 DS22EV5110.

Features

- Compatible with DTV Resolutions 480i, 480p, 720i, 720p, 1080i, and 1080p with 8 bit and 12 bit deep color depths.
- Compatible with Computer Resolutions of VGA, SVGA, XGA, SXGA, UXGA
- Supports TMDS HDMI Single Link
- Adjustable rotary switches for easy custom EQ boost level setting and De-Emphasis setting to reach maximum length of TMDS Interface with Twisted Pair, HDMI, or DVI Cables
- Single 3.3V Supply
- Ultra Portable with AC/DC Power Adapter (Not included in the kit)
- >8kV ESD Rating
- 0 to 70C Temperature Range

Applications

- Repeater Applications:
  - HDMI / DVI Extender
- Source Applications:
  - Video Cards
  - Blu-ray DVD Players
  - Game Consoles
- Sink Applications:
  - High Definition Displays
  - Projectors

Ordering Information

PART: DS22EV5110SQ
HDMI Demo board: DS22EV5110-EVKH

DS22EV5110-EVKH Demo Board ID: 551600199-042

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Repeater Applications



The DS22EV5110-EVKH demo kit extends TMDS with the 28 AWG STP HDMI cables as follows:

	Resolution	Pixel bandwidth (MPixel/s) 60Hz LCD with 20% blanking	Per channel bandwidth (Gb/s) 60Hz LCD with 20% blanking	HDMI Cable A (28 AWG)	HDMI Cable B (28 AWG)
HDTV (1080i)	1920 x1080	75	0.75	> 50m	> 20m
HDTV (1080p) 8 bit Color Depth	1920 x1080	150	1.5	> 35m	> 10m
HDTV (1080p) 12 bit Color Depth	1920 x1080	225	2.25	> 25m	> 7.5m

Quick Start Guide:

1. Connect 3.3V DC power to J22 and ground to J23 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 HDMI cables to the HDMI Input and Output Connectors
3. Turn on the DVD/Computer and the Monitor/HDTV.

Adjustment and Control Description

Component	Name	Function
D2	PWR	The LED turns on when 5V DC applies
D3	SD / LOCK	The “GREEN” LED turns on when the incoming signal is detected by DS22EV5110 The “ORANGE” LED turns on when the PLL of the DS22EV5110 is locked
J24	5V DC	Optional DC Power Jack for 1.5 mm Adaptor Plug
J22	3.3V	3.3V VCC power supply
J23	GND	GND
J44	CS	SMBus Control, Assert HIGH to access SMBus (Optional)
J42, J43	SDA, SDC	SDA=SMBus data I/O, SDC=SMBus clock I/O (Optional)
JP18, JP19	VOD_CRL	Connect JP18, Sets external resistor = 24K ohm for VO = 1000mVpp Connect JP19, Sets external resistor = 12K ohm for VO = 2000mVpp
JP24, JP25, JP26	SD / LOCK /EN	Connect JP24 and JP26 to enable D3 Connect JP25 to disable the device outputs Or, use as SD-EN, LOCK-EN auto control. See datasheet
JP21	BYPASS	Connect JP21 to VDD to bypass Reclock function
U6	Rotary Switch (EQ)	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.
U11	Rotary Switch (DE)	Turn the switch to control the DE setting. “0” = 0 dB, “1” = -3 dB, “2” = -6 dB, “3” = -9 dB, “4”, “5”, “6”, “7” = N/A Leave it as “0” in most of the cases.

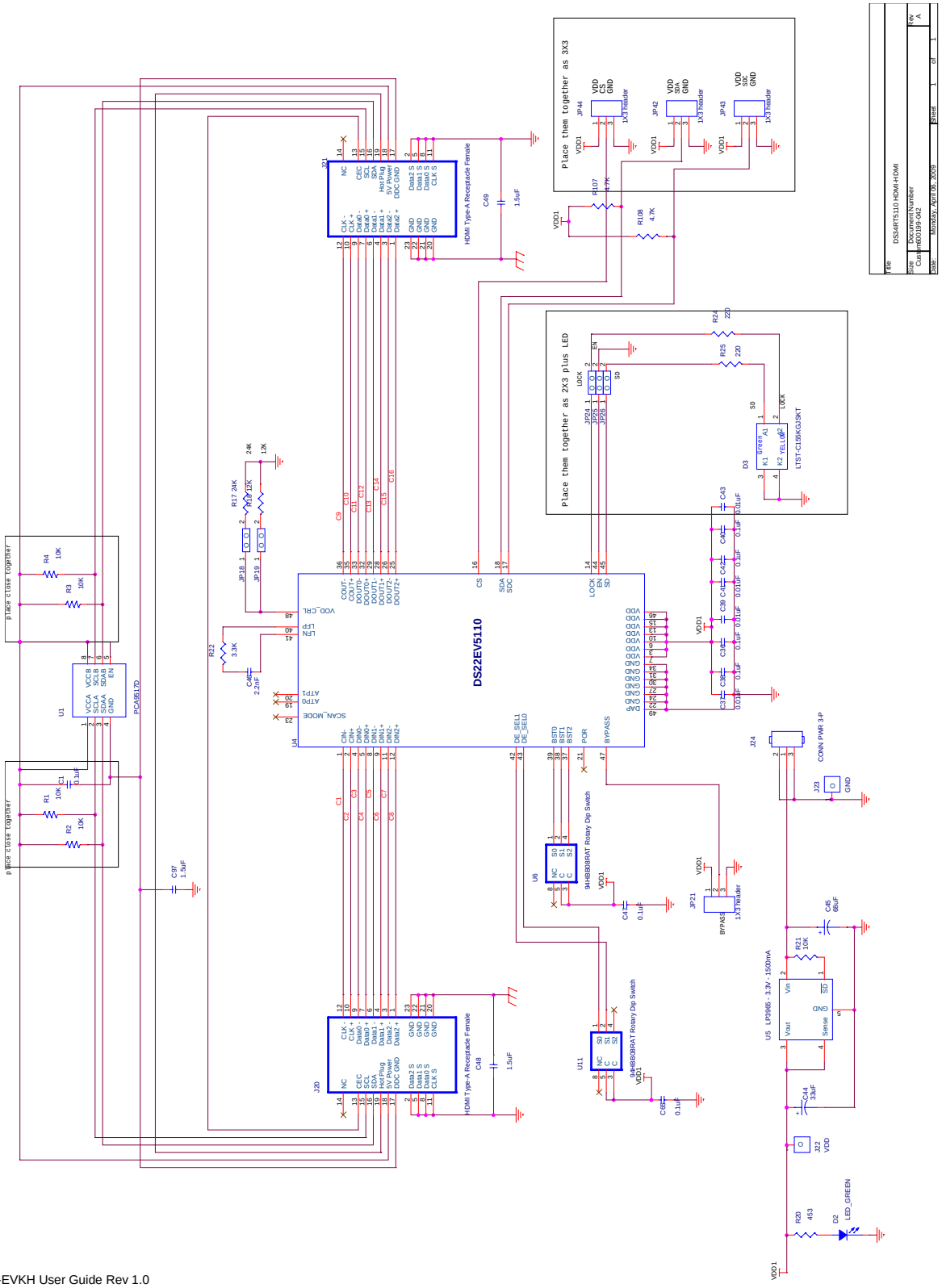
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Bill of Materials

DESIGNATION	QTY	DESCRIPTION
C36, C38, C40, C42, C47, C65	6	0.1uF ±5% Ceramic Capacitor 0402
C37, C39, C41, C43	4	0.01uF ±5% Ceramic Capacitor 0402
C1	1	0.1uF ±5% Ceramic Capacitor 0603
C46	1	2.2nF ±5% Ceramic Capacitor 0603
C48, C49, C97	3	1.5uF ±5% Ceramic Capacitor 1206
C44	1	33uF ±5% Tantalum Capacitor 3528
C45	1	68uF ±5% Tantalum Capacitor 3528
D2	1	LED Green Right Angel
D3	1	LTST-C155KGJSKT (Orange/Yellow) Dual LED
R20	1	453 ohm ±5% Resistor 0402
R21	1	10K ohm ±5% Resistor 0402
R24, R25	2	220 ohm ±5% Resistor 0402
R107,R108	2	4.7K ohm ±5% Resistor 0603
R1,R2,R3,R4	4	10K ohm ±5% Resistor 0603
R17	1	24K ohm ±5% Resistor 0603
R18	1	12K ohm ±5% Resistor 0603
R22	1	3.3K ohm ±5% Resistor 0603
J20,J21	2	HDMI Receptacle Female 210008715-040
J24	1	DC Power Jack 1.8 mm
J22, J23	2	1 pin header
JP18, JP19, JP24, JP25, JP26	5	1X2 pin header
JP21,JP42,JP43,JP44	4	1X3 pin header
U1	1	PCA9517D Philips Semiconductor I2C Buffer
U4	1	National DS22EV5110
U5	1	National LP3965 – 3.3V -1500mA
U6, U11	2	94HBB08RAT Rotary Dip Switch

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Schematics

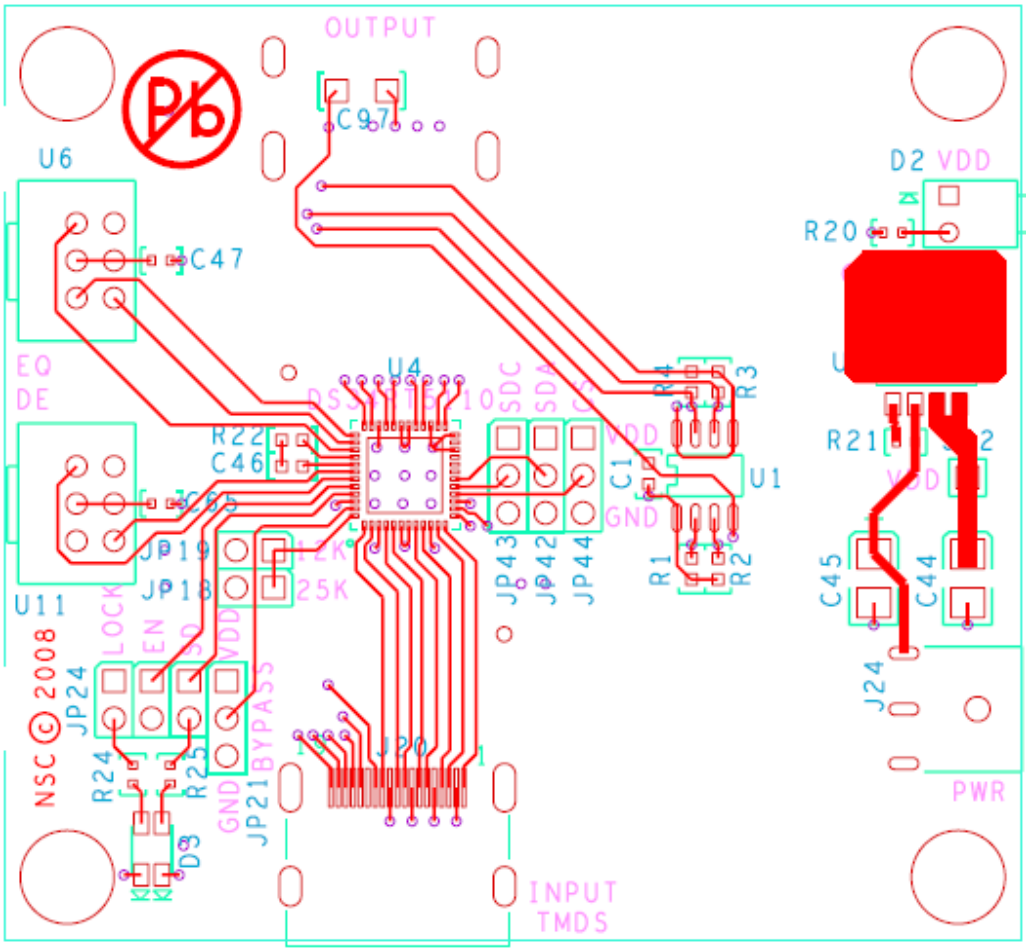


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Layout Considerations

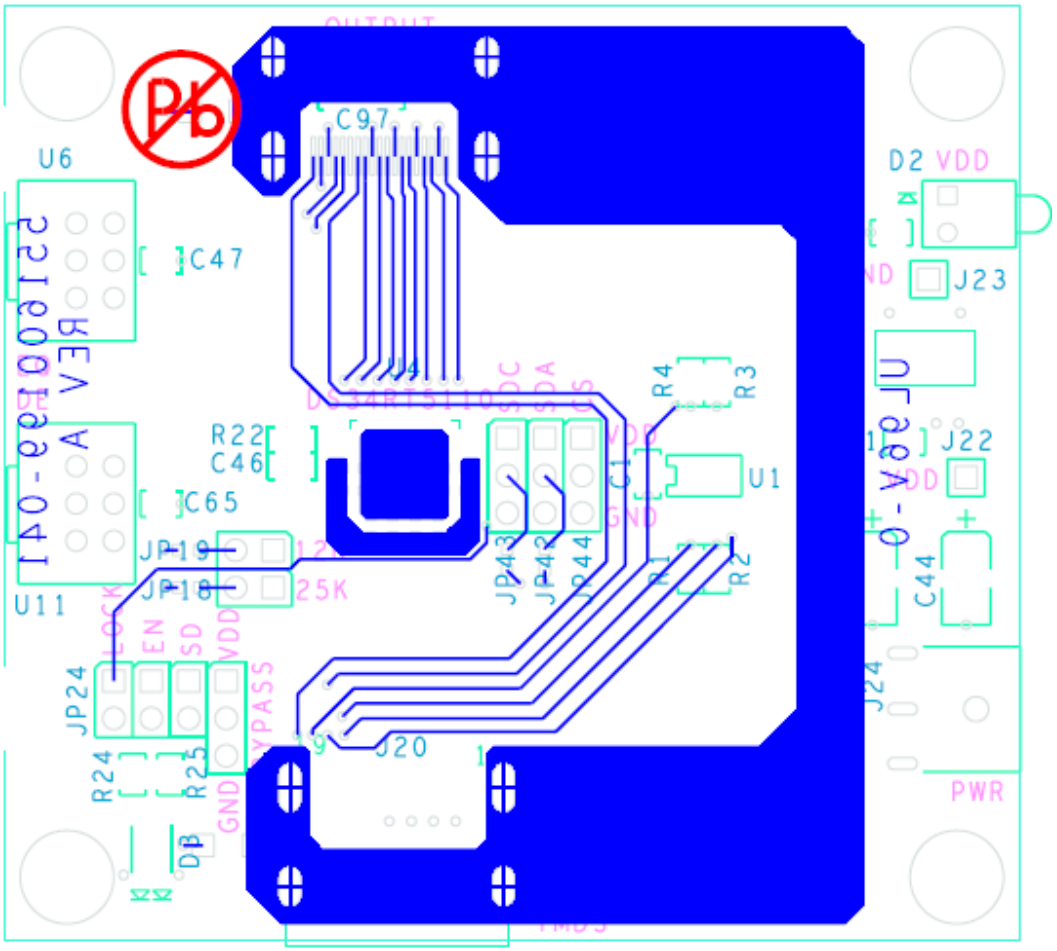
- Keep the clock and data transmission lines as short as possible with controlled 50 ohm single-ended impedance. Or, use differentially coupled traces with 100 ohm impedance.
- Avoid using vias on the clock and data transmission lines on the input side of the DS22EV5110.
- Place power supply decoupling capacitors close to the VCC pins.

Layout (Top Layer)



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Layout (Bottom Layer)



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