DS34RT5110 HDMI Cable Equalizer for 4k Resolution

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The DS34RT5110 can be used as a TMDS equalizer, capable to support 3 data and 1 clock lines up to 3.4 Gbps per data line (or up to 340 MHz pixel clock). It is capable to support common display resolutions at 1080P/8-bit color at 1.485 Gbps per data line, or 1080P/12-bit at 2.25 Gbps, or 4k/8-bit resolution at 2.97 Gbps. The DS34RT5110 has on-chip 50Ω input terminations to 3.3V compatible to DC coupled TMDS video source. Its output drivers are open-collector outputs compatible to DC coupled HDMI receiver downstream. The output drive amplitude is adjustable through an external resistor to GND.

Each one of the three data lines is equipped with a high gain equalizer, providing signal boost of up to about 27 dB at 3.4 Gbps. This high gain input stage enables the DS34RT5110 as a long reach user-settable HDMI cable equalizer, supporting 4k resolution. It is capable to extend the cable length, depending on the quality and wire gauge of the cable.

Figure 1 shows a simplified schematic diagram for using the DS34RT5110 as a HDMI repeater or a cable equalizer at the sink side.
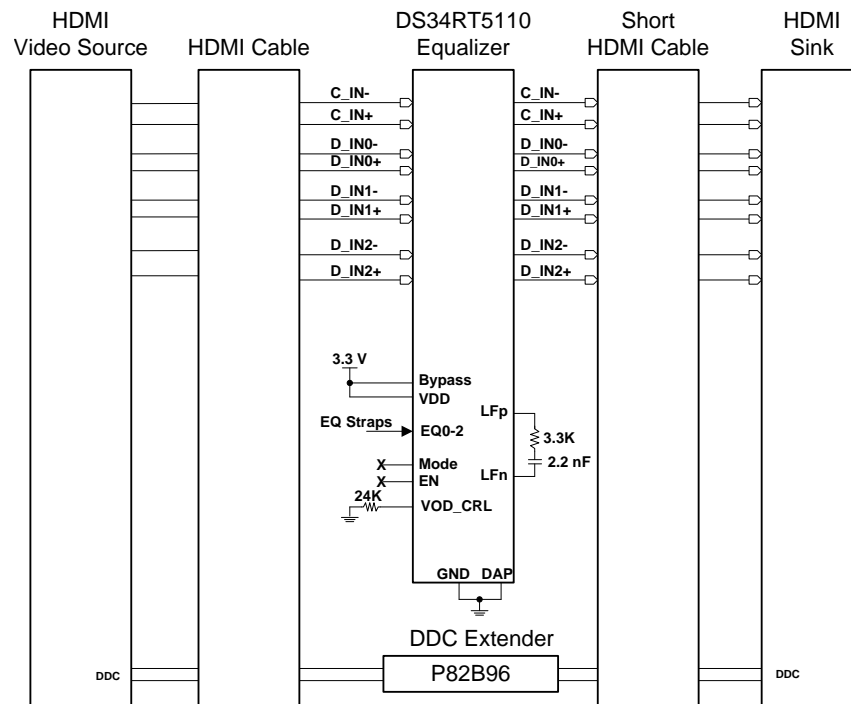

Figure 1. DS34RT5110 as a Cable Equalizer

Table 1 illustrates the equalizer settings (EQ0-2) to set the level of equalization dependent on the insertion loss of the HDMI cable, which is determined by the length and wire gauge of the cable.

Table 1. Equalizer Boost Configuration

EQ Setting			EQ Boost
EQ2	EQ1	EQ0	Equalization in dB
			at 3.4 Gbps
0	0	0	0(default)
0	0	1	10
0	1	0	16
0	1	1	19
1	0	0	23
1	0	1	25
1	1	0	26
1	1	1	27

In a closed system where the video source is well defined, and does not have large amount of low frequency jitter (<4 MHz)), using DS34RT5110 as a retimer can produce satisfactory result as a HDMI extender and retimer, allow longer distance and cascading operation. Connects pin 47 (BYPASS pin) to GND will set the DS34RT5110 as a HDMI retimer.

In open systems where the video source may have large amount of low frequency jitter (< 4 MHz), the DS34RT5110 as a retimer may not be able to handle this large amount of low frequency jitter, and may have difficulty to maintain the output data and clock lines as a synchronous bus, in which the data and clock lines maintain very similar jitter profiles in both the jitter amplitude and jitter frequency. Under this situation, setting pin 21 (MODE pin) to logic high will help to relief the jitter problem. In cases where the video source has excessive amount of low frequency jitter, the output of the DS34RT5110 may exceed the HDMI output eye template due to the low frequency jitter transferred to the output. In severe cases, there is a possibility of data integrity problem. In an open system where the video source is unknown and has high possibility it can be a video source with high level of low frequency jitter, it is recommended to use the DS34RT5110 as an equalizer as shown in Figure 1.

For detail product information, please refer to the *DS34RT5110* datasheet at www.ti.com

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