

July 2010

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## General Description

The SiI9134 HDMI Deep Color Transmitter is a third-generation High Definition Multimedia Interface (HDMI®) transmitter that provides a simple method of sending protected digital audio and video that provides end users with a truly all-digital experience. A/V receivers, along with Blu-ray Disc™ and HD DVD players and recorders, can provide high quality digital audio and video over a simple, low cost cable.

The SiI9134 transmitter extends the Silicon Image family of HDMI transmitters by supporting 30-bit and 36-bit Deep Color video, and incorporates a flexible audio and video interface. It is software and pin-compatible with the SiI9034 transmitter.

The transmitter performs the 10- or 12-bit to 8-bit conversion of the 10/12-bit Deep Color video input data by increasing the TMDS™ clock frequency and packing the extra bits into the next byte. An integrated color-space converter allows direct connection to all major MPEG decoders, including those that provide only an ITU.656 output.

Pre-programmed High Bandwidth Content Protection (HDCP) keys provide the highest level of key security; which simplifies manufacturing and lowers cost.

## HDMI Output

- Supports Deep Color and High-Bitrate Audio
- Supports all the mandatory and several optional 3D formats described in the HDMI 1.4 Specification
- uses the latest generation of TMDS core technology, which operates from 25 MHz to 225 MHz to support Deep Color and 1080p resolution
- Backward compatibility with the DVI Specification allows HDMI systems to connect to DVI displays.
- HDCP encryption engine for transmitting protected audio and video content

## Digital Video Interface

- Supports DVD and HD MPEG decoders
- 24-bit, 30-bit, and 36-bit RGB/YCbCr 4:4:4 (Deep Color)
- 16-bit, 20-bit, and 24-bit YCbCr 4:2:2
- 8-bit, 10-bit, and 12-bit YCbCr 4:2:2 (ITU.601 and ITU.656)
- 12-bit, 15-bit and 18-bit dual-edge clocking input modes
- YCbCr-to-RGB color space conversion
- BTA-T1004 video input format
- Input clock divider or multiplier (input clock frequencies of 0.5x, 2x, 4x).
- Programmable Data Enable generator and sync extraction.

## Digital Audio Interface

- DTS HD and Dolby True HD high bit rate audio support
- A dedicated 4-pin Direct Stream Digital (DSD) 8-channel input provides for Super Audio CD (SACD) and decoded Dolby Digital applications
- Four I<sup>2</sup>S inputs with flexible channel mapping support High Bit-Rate audio and accept Dolby Digital and DVD-Audio input (2-channel 192 kHz, 8-channel 192 kHz)
- S/PDIF input supports PCM, Dolby Digital, and DTS digital audio transmission (32–192 kHz sample rate)
- IEC60958 or IEC61937 compatible
- 2:1 and 4:1 down-sampling handles 96 kHz and 192 kHz audio streams

## Control Capability

- Monitor Detection supported through Hot Plug and Receiver Detection
- Master I<sup>2</sup>C interface for DDC connection simplifies board layout and lowers cost.
- Flexible power management.

## Package

- 100-pin 14 mm by 14 mm TQFP package

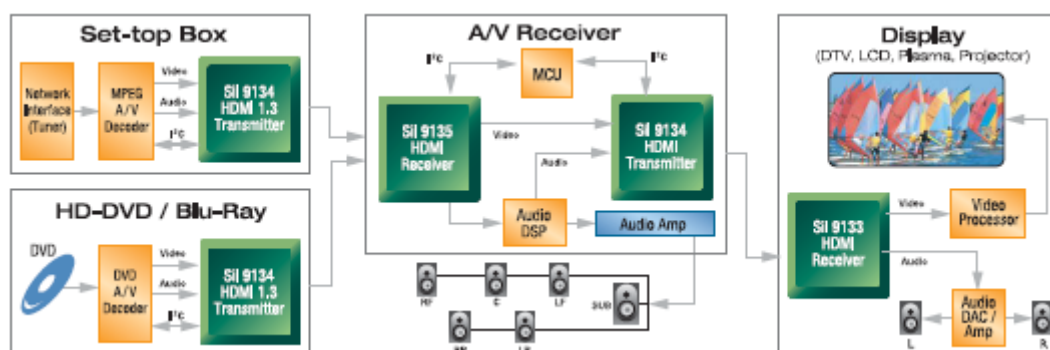


Figure 1. SiI9134 System Diagram

# SiI9134 Transmitter Compared with SiI9030 and SiI9034 Devices

Table 1 summarizes the differences among the SiI9030, the SiI9034, and the SiI9134 HDMI transmitters.

Table 1. Summary of New Features

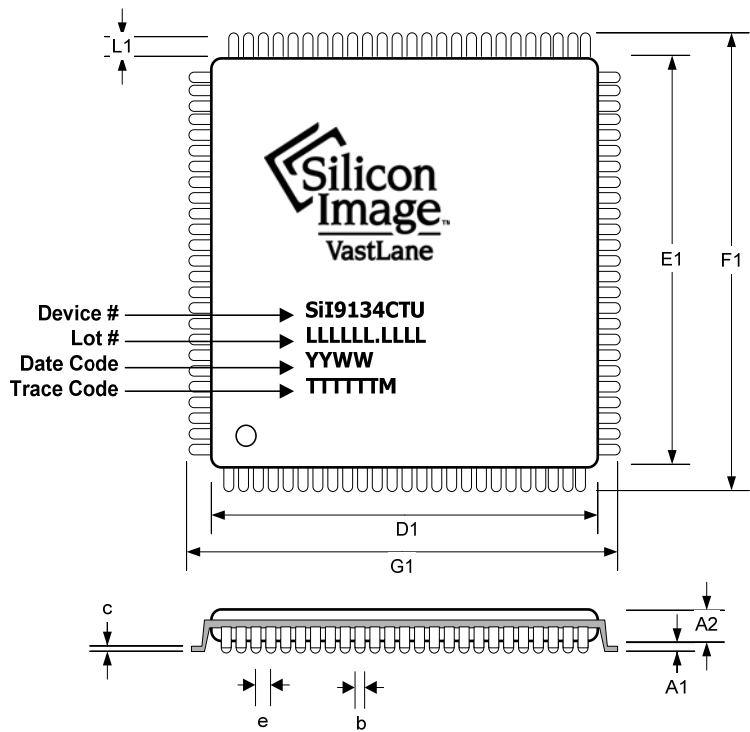
Transmitter	SiI9030	SiI9034	SiI9134
<b>Video Input</b>			
Digital Video Input Ports	1	1	1
I/O Voltage	3.3 V	3.3 V	3.3 V
Input Pixel Clock Multiply/Divide	0.5x, 2x, 4x	0.5x, 2x, 4x	0.5x, 2x, 4x
Maximum Pixel Input Clock Rate	150 MHz	165 MHz	165 MHz
Maximum TMDS Output Clock	150 MHz	165 MHz	225 MHz
BTA-T1004 Format Support	Yes	Yes	Yes
<b>Video Format Conversion</b>			
36-Bit and 30-Bit Deep Color	No	No	Yes
YCbCr → RGB CSC	Yes	Yes	Yes
RGB → YCbCr CSC	No	Yes	Yes
4:2:2 → 4:4:4 Upsampling	Yes	Yes	Yes
4:4:4 → 4:2:2 Decimation	No	Yes	Yes
16-235 → 0-255 Expansion	Yes	Yes	Yes
0-255 → 16-235 Compression	No	Yes	Yes
16-235/240 Clipping	No	Yes	Yes
<b>Audio Input</b>			
S/PDIF Input Ports	1	1	1
I <sup>2</sup> S Input Bits	4 (8-channel)	4 (8-channel)	4 (8-channel)
High Bit Rate Audio Support	No	No	Yes
Compressed DTS-HD and Dolby True-HD	No	Yes	Yes
One-bit Audio (DSD/SACD)	No	Yes	Yes
2-Channel Maximum Sample Rate	192 kHz on I <sup>2</sup> S 96 kHz on S/PDIF	192 kHz on I <sup>2</sup> S 192 kHz on S/PDIF	192 kHz on I <sup>2</sup> S 192 kHz on S/PDIF
8-Channel Maximum Sample Rate	96 kHz	192 kHz	192 kHz
Down Sampling	96 kHz to 48 kHz 192 kHz to 48 kHz	96 kHz to 48 kHz 192 kHz to 48 kHz	96 kHz to 48 kHz 192 kHz to 48 kHz
<b>I<sup>2</sup>C Address Bus</b>			
Device Address Select	CI2CA Pin	CI2CA Pin	CI2CA Pin
Master DDC Bus	Yes	Yes	Yes
<b>Other</b>			
3D Support	No	No	Yes
HDCP Reset	Software Register	Software Register	Software Register
Package	80-pin TQFP ePad	100-pin TQFP	100-pin TQFP

Figure 2 shows the pin assignments of the Si9134 receiver. Pin names are generalized by type for this document. The list below the diagram describes the purpose of each type. The package is 100-pin 14 mm by 14 mm TQFP.



Packaging

100-pin TQFP Package Dimensions and Marking Specification



JEDEC Package Code MS-026-AED

Item	Description	typ	max
A	Thickness	—	1.20
A1	Stand-off	—	0.15
A2	Body thickness	1.00	1.05
D1	Body size	14.00	—
E1	Body size	14.00	—
F1	Footprint	16.00	—
G1	Footprint	16.00	—
L1	Lead length	1.00	—
L	Foot length	0.60	0.75
b	Lead width	0.22	0.27
c	Lead thickness	—	0.20
e	Lead pitch	0.50	—

Dimensions in millimeters.

Overall thickness A = A1 + A2.

Package: SiI9134CTU	
Legend	Description
LLLLLL.LLLL	Lot number
YY	Year of manufacture
WW	Week of manufacture
TTTTTT	Trace code
M	Maturity code = 0: engineering samples = 1: pre-production > 1: production

Figure 42. Package Diagram

Ordering Information

Production Part Numbers:

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Device	Part Number
Standard	SiI9134CTU

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