NXP HDMI receivers TDA997xx and transmitters TDA998x

Superior performance in high-end multimedia systems

Fully compliant with the High-Definition Multimedia Interface (HDMI) 1.2 standard and supporting TV resolution up to HDTV, these advanced receivers and transmitters deliver superior performance in high-end multimedia systems. They come equipped with a range of integrated features and programmable options, and are available in small packages that save space. NXP supports the HDMI standard with a complete range of receivers and transmitters.

Features HDMI receivers

- Embedded OTP memory for HDCP keys
- Embedded A/D converters with up to 10-bit resolution
- Sampling rate up to 81 or 110 Msps (Up to 165 Msps by Q1, 2007)
- PC resolution from VGA to SXGA (UXGA by Q2, 2006)
- Frame and field detection for interlaced video signals
- Sync timing measurements for format recognition
- Color-space conversion block
- 1.8- and 3.3-V power supplies
- Accept TTL inputs (tolerant to 5 V)
- LV/TTL-compatible outputs

Features HDMI 1.2 transmitters

- Integrated upscaler with de-interlacer (TDA9983A only)
- Internal memory for HDCP support
- OBA stream (SACD capable)
- Embedded SHA-1 calculator for repeater functionality
- 720p/1080i/1080p output formats
- 3x8-bit RGB or YCbCr video streams
- Up to four I^2S audio streams sampling at up to 192 kHz
- Advanced I^2C DDC interface for EDID reading access

Applications

- Digital TVs, high-definition monitors and displays
- Projectors, plasma and LCD TVs, rear-projection TVs
- Home-entertainment systems and set-top boxes
- Video distribution
- DVD/DVR

HDMI receivers TDA997xx (see diagrams on page 4)

The TDA997xx family of receivers includes single- and dual-input devices with sampling rates up to 81/110 Msps, integrated analog-to-digital converters (ADCs), embedded One Time Programmable (OTP) memory to support High-bandwidth Digital Content Protection (HDCP) keys, and integrated digital processing.

NXP founded by Philips

Optimized for use with NXP Nexperia and other media processors, the receivers convert digital data streams from an HDMI source (with or without HDCP cap) into an RGB or YUV (YCbCr) parallel digital signal.

The TDA997xA versions have a sampling rate of up to 81 or 110 Msps and support TV resolutions from 480i and 576i to HDTV (up to 1920x1080i at 50/60 Hz), and PC resolutions from VGA (640x480p at 60 Hz) to SXGA (1280x1024p at 60 Hz). The TDA997xC versions, to be released in Q1, 2007, have sampling rates up to 165 Msps and support higher HDTV (1080p) resolutions and PC resolution up to UXGA.

In all the receivers, selection of the HDMI input can be done automatically, via activity detection, or via the I²C-bus. Each input contains a termination resistance control set by an external resistor connecting the RRX x pin and ground.

All the receivers support frame and field detection for interlaced video signals and offer sync timing measurements for format recognition. Each has an integrated color-space conversion block, down-sampling filters, embedded functions for timing codes, and an internal pattern generator for video and audio.

HDMI transmitters TDA998x

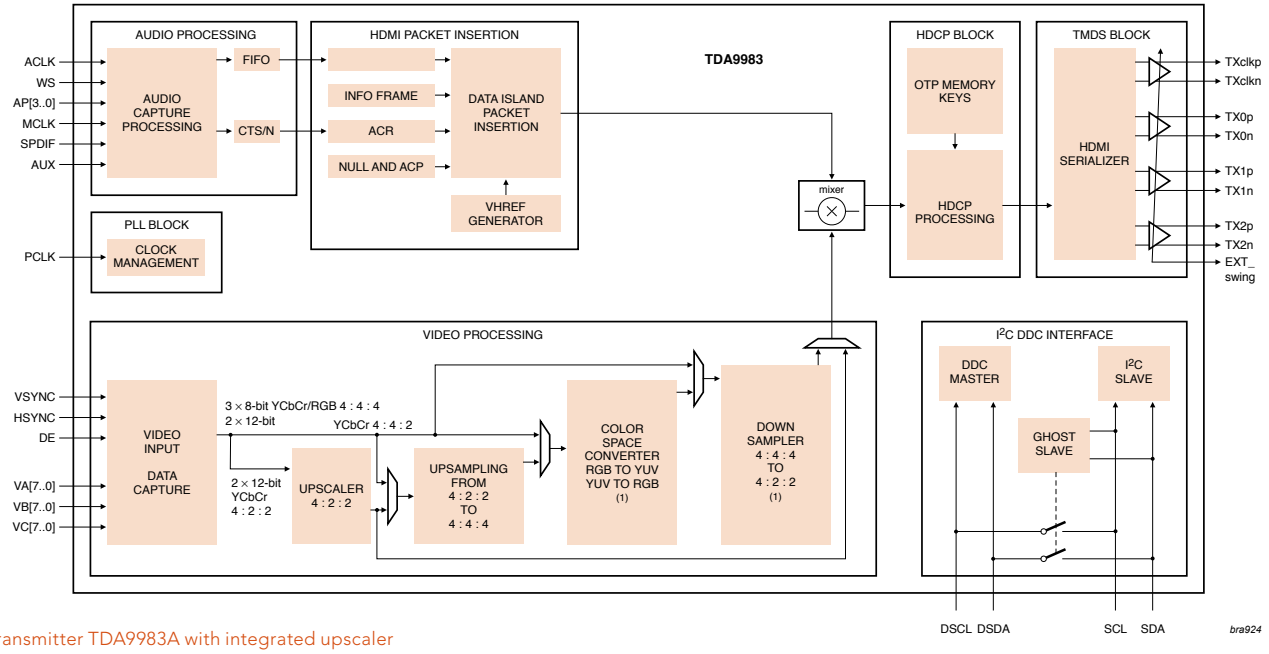
The TDA9982A and the TDA9983A are HDMI transmitters that accept 3x8-bit RGB or YCbCr video and One Bit Audio (SACD) audio inputs, include I²S and S/PDIF interfaces, and support HDCP. The TDA9983A is the same as the TDA9982A, but adds an intra-field de-interlacer that uses intelligent interpolation to create a 720p/1080i output from a standard-definition input. Both transmitters have been certified HDMI 1.2 compliant at NXP's Authorized Test Centers (ATCs) in France and the US. Each has an HDCP 1.2-compliant cipher block and can carry additional information, such as info frames, called for in the HDMI 1.2 standard. For maximum security, the HDCP key sets can be stored internally in non-volatile OTP memory.

There are up to four I²S audio streams with audio sampling rates up to 192 kHz, an S/PDIF channel, and eight OBA channels allowing SACD support.

Each transmitter integrates a fully programmable input formatter and a color-space conversion block. For video input, the transmitters support the following formats: YCbCr / RGB 4:4:4 (up to 3x8 bits), YCbCr 4:2:2 semi-planar (up to 2x12 bits), and YCbCr 4:2:2 compliant with ITU656 (up to 1x12 bits). For output, they support YcBcr / RGB 4:4:4: and YCbCr 4:2:2.

The Data Enable inputs, like the V_{ref}, H_{ref}, and F_{ref} signals, can be used for horizontal and vertical synchronization. Also, the pixel-rate clock inputs can be made active on one or both edges.

Both transmitters are backward compatible with the DVI standard and support TMDS. An I2C-bus master interface provides device control and support DDC communications, and the CMOS data-input bus is compatible with LV/TTL. Both transmitters offer low power consumption and a power-down mode, and are available in a space-saving HTQFP80 package.



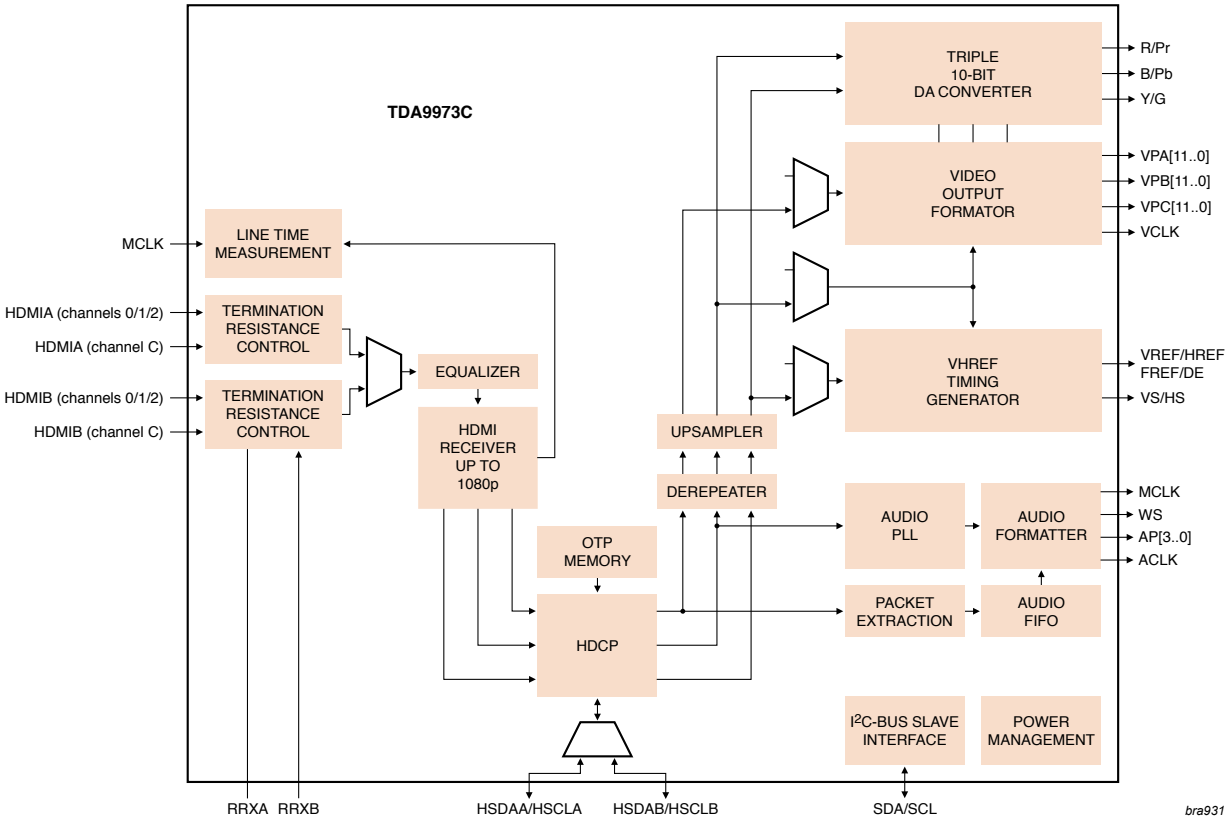
HDMI transmitter TDA9983A with integrated upscaler
Note: The TDA9982A is the same as the TDA9983A, but without the upscaler

HDMI receivers TDA997xx											
			Inputs			Outputs			Conversion rate		
Part number	Description	HDMI	Analog	HDMI	ADC	Digital video	Digital audio	Analog video	Analog (msps)	HDMI (msps)	Package
TDA9970A	3x8-bit ADCs, dual-input HDMI	1.2	3	2	8	RGB / YUV	I²S or SPDIF	0	110	110	SQFP208** or LBGA256
TDA9970C*	3x8-bit ADCs, dual-input HDMI, rated 1080p	1.2	3	2	8	RGB / YUV	I²S or SPDIF	0	110	165	LBGA256
TDA9973A	Dual-input HDMI	1.2	0	2	-	RGB / YUV	I²Sor SPDIF	3	-	110	LQFP144
TDA9973C*	Dual-input HDMI, rated 1080p	1.2	0	2	-	RGB / YUV	I²S or SPDIF	3	-	165	LQFP144
TDA9975A	3x10-bit ADCs, dual-input HDMI	1.2	3	2	10	RGB / YUV	I²S or SPDIF	0	110	110	SQFP208** or BGA256
TDA9975C*	3x10-bit ADCs, dual-input HDMI, rated 1080p	1.2	3	2	10	RGB / YUV	I²S or SPDIF	0	110	165	LBGA256
TDA9977A	Single-input HDMI	1.2	0	1	-	RGB / YUV	I²S or SPDIF	3	-	110	LQFP144
TDA9977C*	Single-input HDMI, rated 1080p	1.2	0	1	-	RGB / YUV	I²S or SPDIF	3	-	165	LQFP144
TDA9979A	Dual-input HDMI with repeater function	1.2	0	2	-	RGB / YUV	I²S, SPDIF or 1-bit audio	3	-	110	LQFP144
TDA9979C*	Dual-input HDMI with repeater function, rated 1080p	1.2	0	2	-	RGB / YUV	I²S, SPDIF or 1-bit audio	3	-	165	LQFP144

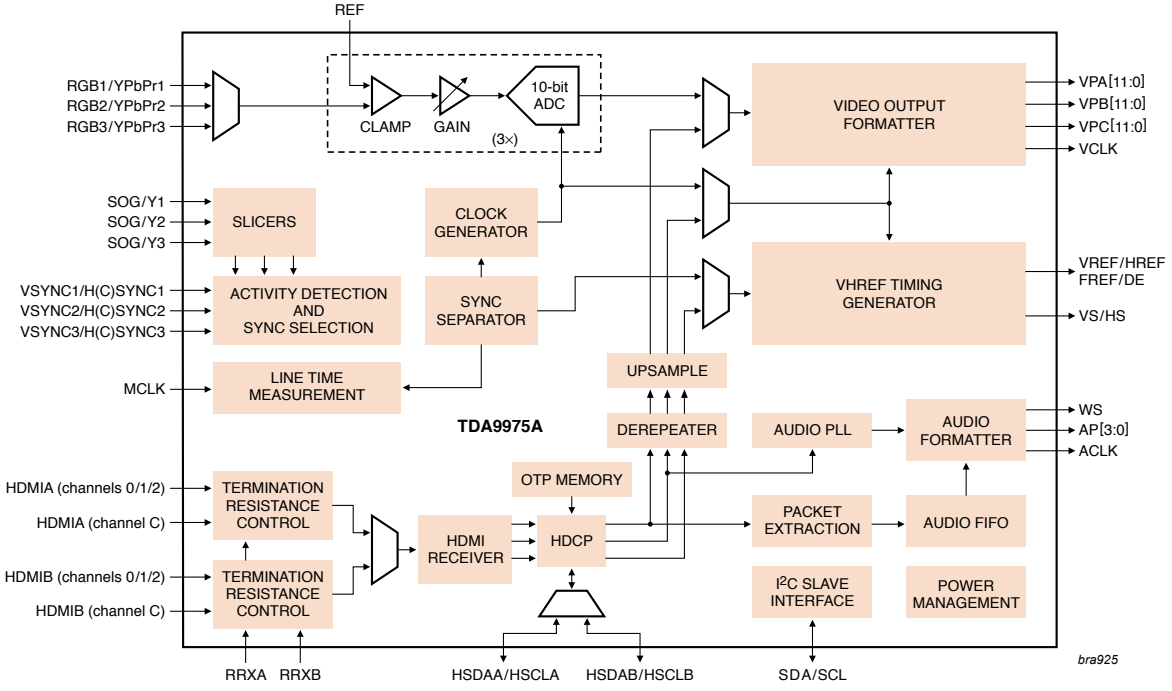
* Available Q1, 2007
** Two analog inputs only

HDMI transmitters TDA998x										
Designation	Features									Package
	Scaler	HDCP	Max resolution	HDMI version	Resolution (bits)	Voltage supply	I²S audio channels	Audio sample rate	SPDIF	
TDA9982A/8	External	Internal	720p/1080i	1.1 and 1.2	8	3.3 and 1.8V	4	192 kHz	Yes	HTQFP80
TDA9982A/15			1080p							
TDA9982B/8		No	720p/1080i							
TDA9982B/15			1080p							
TDA9983A/8	Internal	Internal	720p/1080i	1.1 and 1.2	8	3.3 and 1.8V	4	192 kHz	Yes	HTQFP80
TDA9983A/15			1080p							
TDA9983B/8		No	720p/1080i							
TDA9983B/15			1080p							

Video ADC and DAC converters range		
Conversion	Function	Description
ADC	TDA8754	Triple 8-bit analog-to-digital video converter with sampling frequency up to 270 Msps (QXGA 85 Hz) for PC inputs
	TDA8759A	Triple 10-bit analog-to-digital video converter with sampling rate up to 81 Msps (1080i) for HDTV inputs
	TDA9955	Triple 8-bit analog-to-digital video converter with sampling rate up to 170 Msps (1080p) for HDTV inputs
DAC	TDA8771	Triple 8-bit video digital-to-analog converter with sampling frequency up to 35 Msps
	TDA8777	Triple 10-bit video digital-to-analog converter with sampling frequency up to 330 Msps



HDMI receiver TDA9973C



HDMI receiver TDA9975A

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