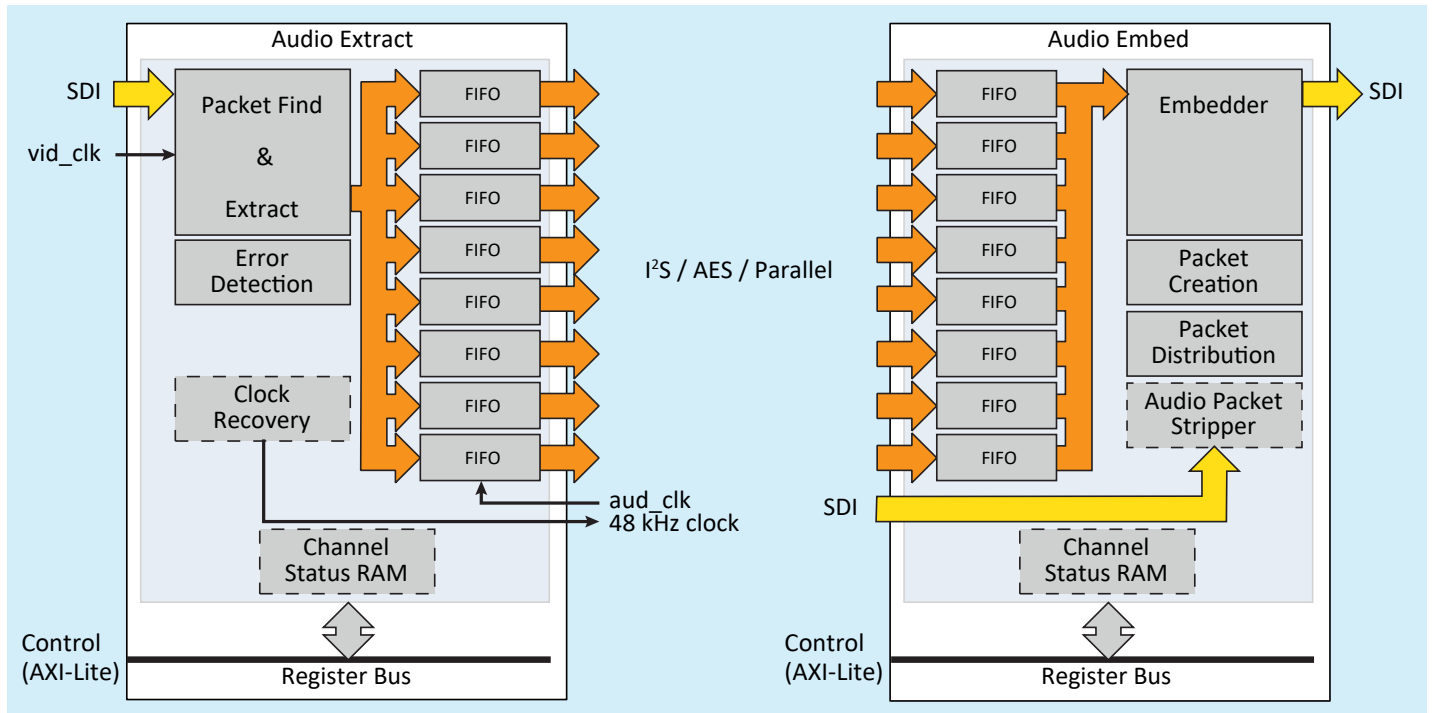


# Audio Embed/Extract Xilinx FPGA IP



## Summary

Omnitek provide a SDI Audio Extractor IP Core and a SDI Audio Embedder IP Core.

The SDI Audio Extractor block is designed to extract audio delivered as SMPTE 272M packed data from SD-SDI and audio delivered as SMPTE 299M packed data from HD-SDI. The extracted audio may be output in either I<sup>2</sup>S Audio, AES Audio, or Parallel Audio format.

The Embed block allows audio to be embedded in up to 16 channels (8 channel pairs). The Extract block is designed to extract audio from a single channel pair but multiple blocks may be used together to extract the audio from multiple channel pairs.

The audio embedded by the SDI Audio Embedder IP Core is formatted either in accordance with the SMPTE 272M standard (for SD video) or in accordance with the SMPTE 299M standard (for HD and for 3G video).

The input audio may be at any of the sample rates permitted by the above SMPTE standards and can be provided in either I<sup>2</sup>S Audio, AES Audio or Parallel Audio format. It can also be either synchronous or asynchronous to the video.

Operations in both IP Cores are setup with using registered accessed via the Register Bus.

## Applications

The Omnitek SDI Audio Extractor and SDI Audio Embedder IP Cores can be used in a range of applications including:

- SDI audio embedding and extraction
- SDI audio editing
- SDI audio monitoring & analysis

## Key Features

- Audio Embed/Extract firmware for Xilinx Virtex 5, Virtex 6, and 7-Series FPGAs or alternative technologies (if required)
- Handle audio conforming to SMPTE 272M (SD) or SMPTE 299M (HD/3G), presented as I<sup>2</sup>S Audio, AES Audio or Parallel Audio
- Support all sample rates permitted by the SMPTE standards
- SDI Audio Embedder IP Core handles up to 16 channels (8 channel pairs); Extract block handles one channel pair but multiple blocks can be used together to handle the required number of channels
- SDI Audio Embedder IP Core includes sine generator for test purposes
- Embed Block able to strip out existing audio
- Information reported by Extract Block includes which audio groups and control packets have been detected, a decode of the Audio Control Packet; and ancillary packet checksum, parity field and CRC error counts
- Both blocks controlled through set of slave registers accessed either through exposed ports or via optional register interface block
- Both blocks optionally available as source code in either Verilog or VHDL.

## Connectivity

Omnitek provides a large range of complementary IP Cores for video processing and connection. These IP cores can be used individually or in combination to provide FPGA solutions for applications in broadcast, AV, aerospace/defence, medical, scientific and automotive industries.

Omnitek IP Cores are supplied with design integration services tailored to your specific needs, but can be supplied as discrete blocks for inclusion in your own designs by special arrangement or as single chip solutions.



## Supported Devices

The Omnitek Multi-Channel Streaming DMA Controller IP can be implemented on the following Xilinx devices:

- Artix-7, Kintex-7 and Virtex-7
- Kintex UltraScale and Virtex UltraScale
- Kintex UltraScale+ and Virtex UltraScale+
- Zynq-7000 APSoC and Zynq UltraScale+ MPSoC

## Example Resource Usage

SDI Audio Embedder Core	LUTs	Registers	Block RAM
Embedder	385 + 465 per Audio Group (2 channel pairs)	390 + 345 per Audio Group	3 per Audio Group
Register Interface (optional)	55	100	0
Channel Status Memory (optional)	41 + 10 per Audio Group	25 + 10 per Audio Group	1 per Audio Group
Audio Clock generator (optional)	75	65	0
Sine Wave Generator (optional)	85	110	2
Audio Stripper (optional)	220 or 340	290 or 520	2 or 4

SDI Audio Extractor Core	LUTs	Registers	Block RAM
Extractor	220	220	1
Register Interface (optional)	15	35	0
Channel Status Memory (optional)	32	25	1
Error Checking (optional)	176	125	0
FIFO Status (optional)	24	48	0
Clock Recovery (optional)	253	290 or 520	1

## Licensing Options

- Evaluation licence - fixed configuration version, available for free for 30 days through Omnitek website. Includes pre-compiled driver, Reference design and access to documentation (unencrypted).
- Encrypted Source licence - NRE - allowing IP to be compiled into designs.
- Full Source Code licence - allowing customisation of IP.

## Product Options

- Audio Embed Block
- Audio Extract Block
- Annual Licence or Source Code
- FPGA family
- Extended evaluation period (over 30 days)
- Extended support period (over 1 year)

## Deliverables

- Encrypted RTL or Source code for Audio Embed and Extract blocks
- Optional register interface
- Project file/wrapper supporting integration with compatible FPGA components
- Testbench
- Comprehensive documentation



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### About Omnitek

Omnitek is a leading independent consultancy company specializing in the design of video products and IP for the broadcast, post-production, digital film, AV, medical, aerospace/defence, automotive and consumer industries. Since its foundation, Omnitek has completed many successful design projects for major equipment manufacturers throughout Europe, Asia, and the United States.

Omnitek reserves the right to change specifications without notice. Refer to the Omnitek web site for the latest specifications and further information:

[www.omnitek.tv](http://www.omnitek.tv)



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