

ICS-8580

2-Channel High-Definition or 4-Channel Standard Definition H.264 Video encoder/decoder

The ICS-8580 is a rugged XMC module designed to process and route video as well as perform multichannel H.264 compression/decompression. Flexible video connectivity allows interfacing to a variety of video inputs and outputs. These video connections support standard definition, high definition, and computer resolutions up to 1600X1200. The combination of a versatile FPGA device coupled with powerful dual DSP signal processors provides unparalleled compute power for video applications. The FPGA enables video switching, format conversions, scaling, blending and a variety of other processing functions while the Dual DSP processors enable multichannel video compression and decompression for over 100x reduction in bandwidth without sacrificing video quality. An Ethernet interface is used to access the encoded UDP bitstream and can also be used for issuing control and status commands. A higher bandwidth PCIe interface also enables transmission of multiple uncompressed video streams for processing or storage in addition to control and command functionality.

In a typical application, uncompressed video is streamed to the ICS-8580 from standard and/or high definition sensors. The FPGA ingests these data streams and performs video processing and switching operations to route the video. Two high definition or up to four standard definition streams can be routed to the Dual DSP processors for MISB compliant H.264 encoding. The compressed video stream is encapsulated into a MPEG-2 Transport stream and can be combined with synchronized audio or external metadata. The generated bitstream is then transmitted using UDP packets for

storage or ethernet data link. Each DSP processor is independently capable of encode or decode configurations.

The ICS-8580 is suited for a wide range of system topologies due to its ability to process multiple channels, configure for encode or decode, and incorporate audio and metadata sources.

One key advantage of the ICS-8580 is the ability to interface to a variety of video inputs and outputs. The H/W can connect to most industry standard analog and digital formats including: DVI, HDMI, HD/SD SDI, NTSC, PAL as well as RGB including sync-on-green standards. Furthermore, the H/W can support a variety of resolutions from standard definition up to high definition. This flexibility allows the ICS-8580 to fit a variety of system architectures and can adapt to changing system requirements. The capability to incorporate video switching and video processing features also adds to the card's flexibility.

The ICS-8580 provides several options for configuration and control. Out-of-the-box an embedded web server enables board configuration via standard web browser. This control GUI interface demonstrates the configurable options available on the board and allows for evaluation of the various modes. When integrating into a rugged system, an advanced API is provided that is used to send command and status information to the board over an Ethernet socket connection or PCIe link. This API is available across a variety of operating systems and allows very rapid system integration.

By combining the highest level of processing, flexible connectivity, S/W support, standard compliance in a ruggedized XMC form factor, the ICS-8580 is an ideal solution for enhancing and augmenting a platform's video capabilities.

FEATURES:

- Real-time multi-channel encoding and decoding for transmission of video over IP data link
- ITU-T H.264 AVC Codec (MPEG-4 Part 10) Main Profile with configurable codec parameters
- MPEG2 TS multiplexing with audio and metadata encapsulation
- Data rates from 512kbps to 20Mbps <60ms Latency
- 1 to 2 channels of HD encoded video up to 1600 X 1200@30fps
- 1 to 4 channels of Standard Definition video
- Input sources supported: HD/SD SDI (SMPTE259M/292M), NTSC/PAL, HDTV (1080p/720p), CVBS, S-Video, Component
- Support for Base Cameraink input devices
- Stereo Audio I/O with synchronization to video
- Metadata Ingest through Ethernet and PCIe
- Output video formats supported: HD/SD SDI, SDTV, HDTV, CVBS, S-Video, Component
- PCIe Gen1 x4 Data link for Raw/Compressed Video Transport, Metadata and H/W configuration
- Configuration control through Ethernet/PCIe Webserver or programmable API
- Support for direct record/playback from NAS data storage
- Video compression SDK/API for fast integration into enterprise applications
- Multiple OS support for API and device drivers

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Specifications

Video Input

- Digital Video
 - HD/SD SDI (2)
 - DVI/HDMI up to 1600x1200@60
 - Base Cameralink input
- Analog Video
 - HD Component (1080p/720p) (2)
 - RS-170 composite (PAL/NTSC) (4)
 - Computer display support (VGA up to UXGA resolutions)
 - Sync-on-green format support

Outputs

Outputs can be sourced from inputs, PCIe or decode of compressed stream

- Digital Video
 - HD/SD SDI
 - DVI/HDMI
- Analog Video
 - NTSC, PAL, CCIR and RS-170
 - RGB with Sync-on-green capability
 - HD Component (1080p/720p)

Video Compression/Decompression

- H.264 main profile
 - 1 to 2 simultaneous HD channels
 - 1 to 4 simultaneous SD channels
 - CBR/VBR mode support
 - Multiple configurable parameters including bit rate, I frame interval and quality level
 - Standard MPEG2-TS transport stream (ISO/IEC 13818, STANAG 4609) over UDP/IP Unicast/Multicast
 - AAC-LC Audio compression

Audio

- Input:
 - 2 channels stereo input or 4 channels Mono
 - 48.1 or 44 KHz sampling
- Output:
 - 1 channel Stereo or 2 channels Mono output

Metadata

- Supported over Ethernet and PCIe interfaces (MISB 605.2)
- Allows generic data encapsulation as well as MISB KLV format support
- Complies with MISB standard 604.1 synchronization MPEG2 streams

Control and Configuration

- Web-based GUI available for board configuration
- Settings can be saved for automatic power up mode
- Remote S/W API for controlling the board over Ethernet or PCIe.
- Supports up to 4 SMB/CIFS Network Area Storage devices
- OS support: Windows, Linux and VXWorks
- Board Firmware can be remotely updated for in-field upgrades

I/O specification

- XMC P16 connector allocated for Video I/O, Ethernet and Serial I/O
- Unicast, Multicast and Broadcast UDP support
- PCIe x4 Gen 1 connection allows simultaneous upload/download of up to 4 channels of raw/compressed video, metadata or audio. PCIe link can be leveraged for framegrabber type applications or data storage to disk.

Customization

- Contact factory for any specific video or processing requirements. Configurability of FPGA allows for various modifications and enhancements to processing pipelines.
- MISB EG 904 capable

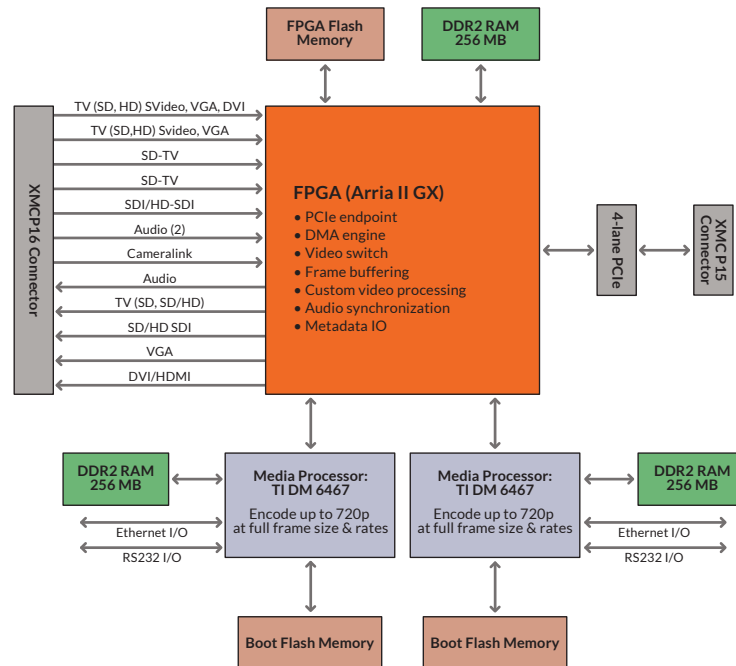
Integration

- Supporting documentation, qualification reports and CAD models available for ease of system integration
- PCIe and 3U VPX carrier boards available for evaluation and I/O breakout

Environmental

- Operating temperature, -40°C to +85°C
- Storage Temperature, -50°C to +100°C
- 95% non-condensing humidity
- Air-cooled or conduction cooled options
- 16 – 26 Watt depending on configuration

Block diagram



Ordering information

ICS-8580A-x00	Level X, 2 streams of H.264 compression up to 1080p30
ICS-7006A-100	Compatible 3U VPX XMC carrier card
ICS-8580A-RTM-100	Rear-transition module to support ICS-8580 I/O to 3u VPX
ICS-7005A-100	PCIe slot card XMC carrier with integrated DVI/RGB/TV/SDI connectors routed for ICS-8580
ICS-8580-SDK-LX	Linux SDK w/source and license (per chassis)
ICS-8580-SDK-WIN	Windows SDK w/source and license (per chassis)
ICS-8580-EDK-000	FPGA and embedded TI media processor software binaries (one-time purchase)

NOTE: An SDK is not required to use http access for configuration and control

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