GE
Intelligent Platforms

daq8580

Rugged Multichannel FMV Compression Appliance for SWaP Constrained Processing, Server, and Storage Applications

Features

- Real-time multi-channel encoding and decoding for transmission of video over IP data link
- Rugged conduction cooled form factor
- ITU-T H.264 AVC Codec (MPEG-4 Part 10) Main profile with configurable parameters
- 1 to 2 channels of encoded HD video up to 1600x1200@30fps
- 1 to 4 channels of encoded Standard definition video supporting NTSC/PAL
- MPEG2-TS multiplexing with audio and metadata encapsulation
- Support for RS232(2) or RS422(2) serial I/O
- Data rates from 128Kbps to 20Mbps
- Low Latency <70ms
- Input sources supported:
  - HD/SD SDI (SMPTE259M/292M), HDMI, DVI, RS170(NTSC/PAL), HDTV(720p60/1080p30), CVBS, S-Video, Component, RGB, STANAG, Cameralink
- Metadata insertion via Ethernet, RS-232/422 or SDI MISB 605.2
- KLV metadata insertion
- Stereo audio inputs and outputs with synchronization to video
- Output video formats supported:
  - HD/SD SDI (SMPTE 259M/292M), SDTV and HDTV CVBS/S-Video/Component, RGB, DVI, HDMI
- Configuration and control through Ethernet Webserver or programmable API
- Support for direct record/playback from NAS data storage
- Video compression SDK/API for fast integration into enterprise applications
- Fully rugged and deployable enclosure

The daq8580 provides a rugged standalone solution designed to address the challenges of processing, transporting and storing full motion video through video encoding. The rugged appliance can interface with a wide variety of analog and digital I/O and can process standard video formats up to 1080p30 as well as computer resolutions up to 1600x1200. A versatile FPGA device combined with dual DSP signal processors provides unparalled compute power for video compression/decompression, video switching and video processing capabilities. The FPGA enables video switching, format conversions, scaling, blending and many 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 stream the encoded UDP bitstream and is also used for issuing control and status commands. Running embedded Linux on dual Arm processors, the device can be configured for various applications and is contained in a small rugged form factor targeted at SWaP (size, weight and power) constrained deployments such as UAVs.

In a typical application, uncompressed video is streamed to the daq8580 from standard and/or high definition sensors. The configurable hardware interfaces with the various video sources and performs video processing and switching operations to route video to the outputs and DSP engines. The dual DSPs can encode two streams of high definition or up to four standard definition video streams using a MISB compliant H.264 AVC Main profile codec. 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 over UDP packets for storage or ethernet data link. Each DSP processor is independantly capable of encode or decode configurations. In a decode mode, the compressed bitstream is received by the daq8580, uncompressed and routed to an output. The daq8580 platform can be adapted to fit various system requirements due to the configurability of the FPGA and DSP processing subsystem.

The daq8580 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 operating modes. When integrating into a rugged system, an advanced API is provided that is used to send command and status information to and from the board over an Ethernet socket connection. The socket based API is compatible across a variety of operating systems.

Designed to support a wide range of challenging environments, the daq8580 can endure the stresses of high altitudes, wide temperature ranges, vibration, shock, humidity and salt fog. The 28V power supply is designed to meet MIL-STD-704E and MIL-STD-1275B making it suitable for aircraft as well as ground vehicle operations.

Specifications

Inputs
- Digital Video
  - HD/SD SDI (2)
  - DVI/HDMI/VGA up to 1600x1200@30
- Analog Video
  - HD component (1080p/720p)(2)
  - RS-170 composite (PAL/NTSC)(4)
  - Computer display support (VGA up to WUXGA resolutions)
  - Sync-on-green format support

Outputs
- Video Outputs can be sourced from inputs or from 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 (1080/720)

Video Compression
- 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
  - Metadata insertion (MISB 604.2) (ISO/IEC14496-10)

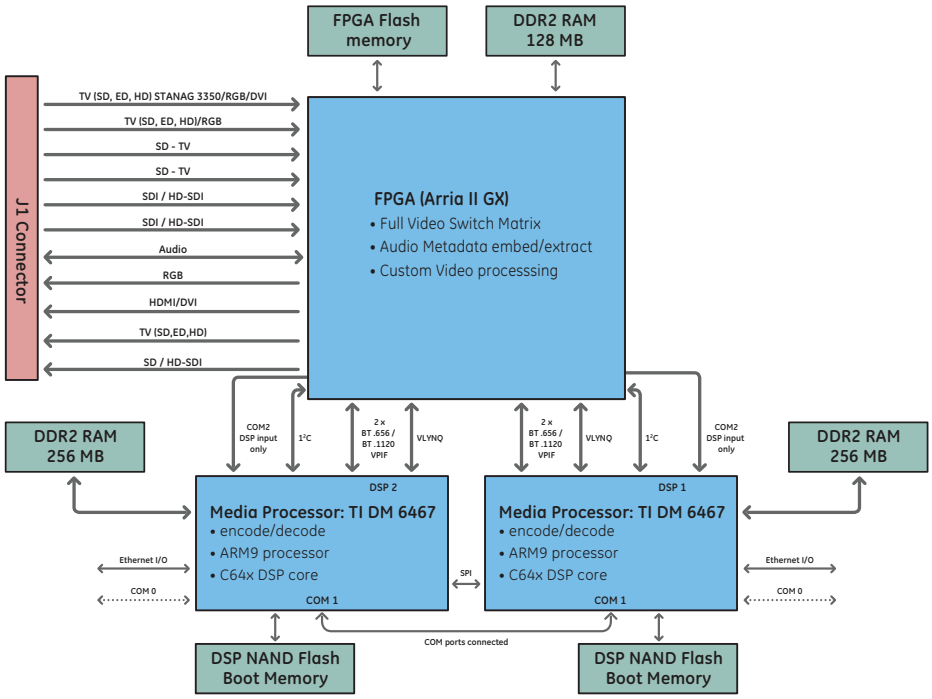
Audio
- Input:
  - 2 channels stereo input or 4 channels Mono
  - 48.1 or 44 KHz sampling
- Output:
  - 1 channel Stereo output or 2 channels mono

Metadata
- Supported over Ethernet and SDI interfaces (MISB 605.2)
- Allows generic data encapsulation as well as MISB KLV format support
- Complies with MISB standard 604.1 synchronization
- Compliant with SMPTE RP217 – Mapping KLV into 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
- 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
- 2 – 10/100 Ethernet connections for Unicast, Multi-cast or Broadcast UDP support.

Block Diagram



- 2 – RS-232 or 2 – RS-422 serial connections for control or data
- All video I/O and Ethernet ports routed to MIL-STL-38999 connectors

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
- Cameralink (base) capable

Dimensions
- Height: 10.1 in. (256.7mm)
- Depth: 7.1 in. (185mm)
- Thickness: 2.5 in. (63.5 mm)

Weight
- 2.25 kg

Power Requirements
- 25 watts max of 28V

Environmental
- Operating Temperature: -40degC + 85deg C
- Vibration: 5Hz to 100Hz PSD increasing at 3dB/octave; 100Hz to 1000Hz PSD = 0.1g2/Hz; 1000Hz to 2000Hz PSD
- Shock: 40g, 11 msec, half-sine
- Humidity (all versions): 5% to 95% non-condensing
- Storage Temperature (all versions): -40 degC+125DegC

Ordering Information

daq8580-500	Rugged video compression and transmission appliance
daq8580-PSU	Standalone power supply (brick style, 100-240VAC)
CN-daq8580	Kit of mating connectors for daq8580

GE Intelligent Platforms Contact Information

Americas: **1 800 433 2682** or **1 434 978 5100**
Global regional phone numbers are listed by location on our web site at **www.ge-ip.com/contact**

www.ge-ip.com/sensorprocessing