Codec2X29

Video Compression/Sensor Multiplexing System

The Codec2X29 Video Compression and Multiplexing System provides video capture, Motion JPEG compression, and sensor data multiplexing for applications such as UAVs or surveillance. It provides superb flexibility in aggregation of sensor data into a single-bit stream in a package occupying only 29 cubic inches.

The Codec2X29 is the next generation design of the ViaSat ENC1000A29 encoder, adding a wide range of multiplexing features to allow attachment of telemetry and sensor metadata to the compressed video stream with no requirements for synchronization of bit rates among different sensor data sources. The highly integrated design requires only a fraction of the power, volume and weight of previous video codec and multiplexing solutions.

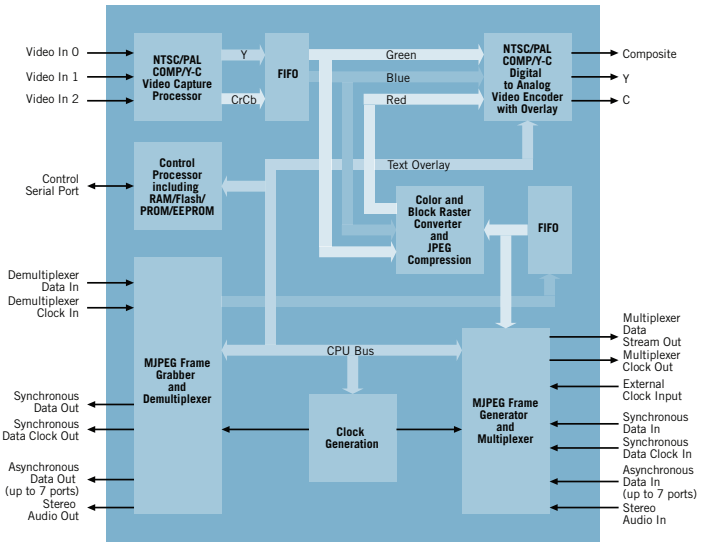
The same unit can be used as either the video encoder/multiplexer or the video decoder/demultiplexer. Encoder or decoder configuration is achieved by appropriate setting of a single pin on the control connector.

ABOUT MOTION JPEG

Motion JPEG (MJPEG) refers to motion imagery compression by treating video as a series of still images and compressing each with the industry standard JPEG still image compression algorithm. This approach has the following differences compared to commercial standards such as MPEG-2:

- Because video frames are processed independently, MJPEG latency is typically no more than 3 frames end to end. MPEG-2 takes advantage of frame-to-frame correlation and the resulting processing can introduce many frames of latency.
- Image quality is a user configurable parameter in the Codec2X29. When link bandwidth is reduced, the frame rate drops, but the frame quality is unaffected. This makes MJPEG well suited to carrying ISR video in limited bandwidth applications.
- MJPEG is very resilient to bit errors – useful video can be obtained at BER = 1e-4.
- MJPEG has low computational complexity, resulting in small, power-efficient implementations.

SYSTEM BLOCK DIAGRAM



Codec2X29 At-A-Glance

- » High-quality, low-latency video compression
- » Allows tradeoff of frame rate, image quality, and output bit rate from 20 kbps to 20 Mbps
- » NTSC or PAL, Composite, Y/C, or monochrome formats
- » Multiplexing of multiple channels of synchronous data, asynchronous data, and toll-quality digitized audio
- » Usable video at 1e-4 BER
- » Meta-data including GPS attached to each video frame
- » Supports multiple simultaneous video streams by daisy-chaining units
- » Designed for use in military aircraft environments

Applications

- » Intelligence/Surveillance/Reconnaissance (ISR)
- » Manned and unmanned aircraft sensor multiplexing
- » Digital video data links

Codec2X29 Specifications

VIDEO

- Motion JPEG video compression and decompression. Includes restart markers for fast error recovery. Compression quantization can be set in 240 steps.
- PAL, NTSC, CCIR and RS-170 monochrome
- Up to 30 FPS (NTSC) or 25 FPS (PAL) automatically adjusted to fill available bandwidth in the multiplexer bit stream based on the quantization level chosen by the user.
- Supports two user-selectable methods of handling interlace—stacked fields (useful when significant motion makes it preferable to compress fields independently) or interlaced fields (more efficient when motion is limited)
- **Resolution options** 560 or 280 per line. 480 or 240 lines per frame (NTSC) or 576 or 288 lines per frame (PAL)
- **Crop modes** 100%, 85%, 65%
- User configurable on-screen display of meta-data and locally defined text
- **Video adjustments** brightness, tint, saturation
- **Input camera feeds** 3 composite video feeds or 1 Y/C, selectable by command line. SMA type connectors
- **Output monitor feeds** 1 Y/C, 1 composite. SMA type connectors
- Encoder configuration is embedded in multiplexed bit stream—allows decoder to autoconfigure to match
- Built in color bars for testing

CONTROL

Command line interface via RS-232 serial port. Commands are text strings in the format “cmd <argument list>”.

INPUT POWER

28 VDC per MIL-STD-704 normal operation. Max current draw is 350 mA at 28 VDC

MULTIPLEXING

Synchronous data One port (clock and data) at any rate up to 10 Mbps (must be less than multiplexer bit stream rate). Automatic clock reconstruction at the decoder for any clock rate. Signal format is RS-422.

Asynchronous data 6 serial ports at up to 115.2 kbaud with RS-232 signal levels or up to 999.6 kbaud with RS-422.

GPS port Accepts industry standard NMEA 0183 format GPS information on one of the asynchronous ports. Tags individual video frames with GPS, time of day, and other user-defined meta-data.

Audio 2 audio ports at mic levels (encoder) and line levels (decoder). Digitized at 64 kbps ulaw (toll quality).

Real-time clock Integral battery backed real-time clock can be used to tag video frames with time of day.

Multiplexed bit stream Synchronous clock and data using RS-422 signaling format. Clock can be externally or internally sourced at any bit rate from 20.0 kbps to 20.0 Mbps. Internally generated clock can be set in 1 kHz steps.

ENVIRONMENTAL

Cooling by conduction to the mounting baseplate—fanless chassis

Operating temp -20 to +70C baseplate temperature

Non-operating -40 to +85C

Altitude to 70,000 feet

Humidity to 95% non condensing

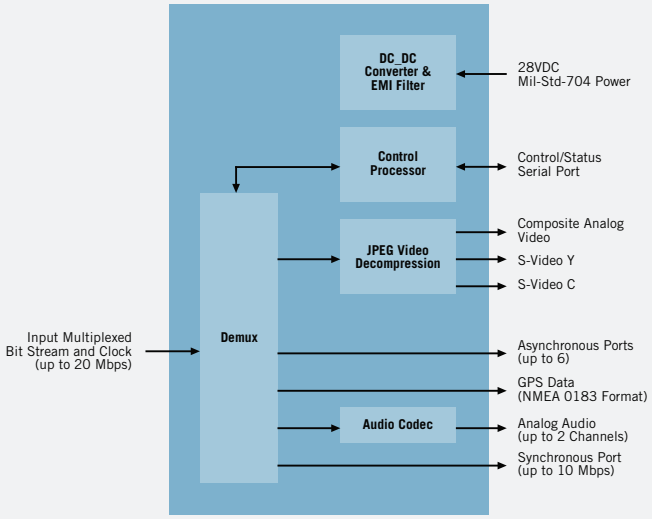
- Shock and Vibration: consistent with fixed wing and helicopter environments in MIL-STD-810F

SIZE

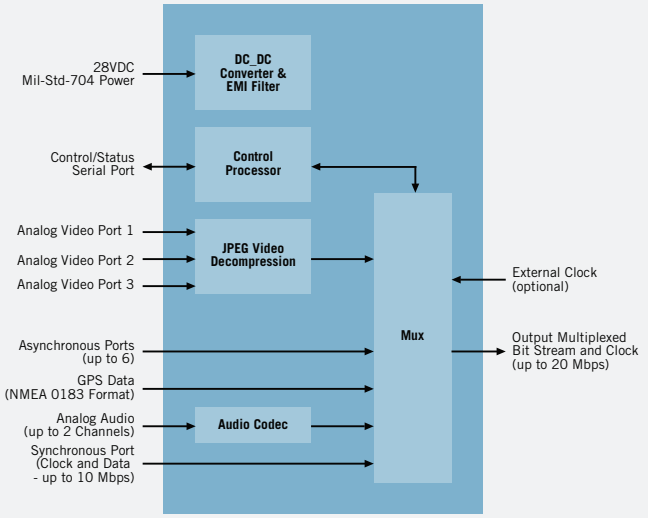
Dimensions 29 cubic inches (5” x 4” x 1.45”)

Weight 25 ounces

DECODE MODE



ENCODE MODE



CONTACT

1935 CORDELL COURT
EL CAJON, CA 92020-0911

WEB WWW.VIASAT.COM/ISR-DATA-LINKS
TEL 619.438.6000
EMAIL ENERLINKS@VIASAT.COM