

# CWICOM

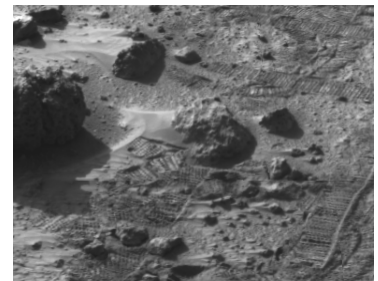
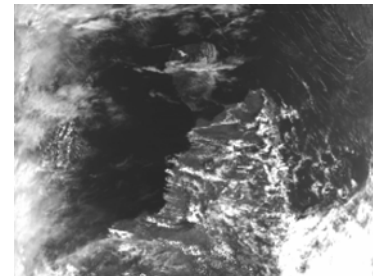
## Your Image Compression Core on a Single Chip

CWICOM is a **very high-performance image compression ASIC** that implements the CCSDS 122.0 wavelet-based image compression standard and that outputs compressed data according to the CCSDS output source packet protocol standard. CWICOM stands for CCSDS Wavelet Image COMpression ASIC, and is developed by EADS ASTRIUM in the frame of an ESA contract.

CWICOM is large dynamic, large images, large compressed rate range, and high speed image compression unit that is potentially relevant for compression of any 2D image with bi-dimensional data correlation.

Its highly optimized internal architecture allows performing lossless and lossy image compression at very high data rate (up to **60 Mpixels/s**) without any external memory by taking advantage of the on-chip memory (almost 5 Mbits of embedded internal memory).

CWICOM is implemented using the largest matrix of the ATMEL ATC18RHA technology, and will be provided into a standard surface mount package CQFP256.



### Key features

- High performance CCSDS Wavelet Image Compression Module
- Processing capability at full speed of unlimited number of multiplexed image data flows
- Compression:
  - Lossless or lossy mode
  - Easy to use (no compression parameters to adjust)
  - Exact Fixed bit-rate, efficient on very large compressed data rate
- Equalization capability for a Line CCD in order to compensate for sensor non-uniformity
- CCSDS Source Packet formatting
- Highly integrated module in a single ASIC component:
  - No External Memory required
  - Standard surface mount packaging CQFP 256
- Availability of a C executable bit accurate reference software model

### Main Application Fields

- Earth observation: Monospectral, Multispectral, Superspectral, Hyperspectral, ...
- Scientific data compression
- LEO, MEO and GEO satellite

### Budgets

- High data rate 60 Mpixels/s
- Pixels dynamic up to 16 bits
- Image width up to 3496 columns
- Image height unlimited in push-broom
- Op frequency 60 MHz
- Compression 0.5 bpp to 10 bpp
- Memory gates 4.6 Mbits
- Logical gates 1 M gates
- Packaging CQFP 256
- Size 50 x 50 x 3 mm<sup>3</sup>
- Mass 12 g
- Power ~100 mW/Mpix/s max (5W-6W for 60 Mpix/s)

### Interfaces

- Voltage in 1.8V and 3.3V
- Input 16 bits Parallel Port
- Output 16 bits Parallel Port
- Control RMAP SpaceWire or SPI

### Environments

- Temperature -55°C to +125°C
- Radiation 100 krad total dose  
SEU tolerant technology (internal EDAC)  
Latch up Free  
(LET level > 80 MeV)

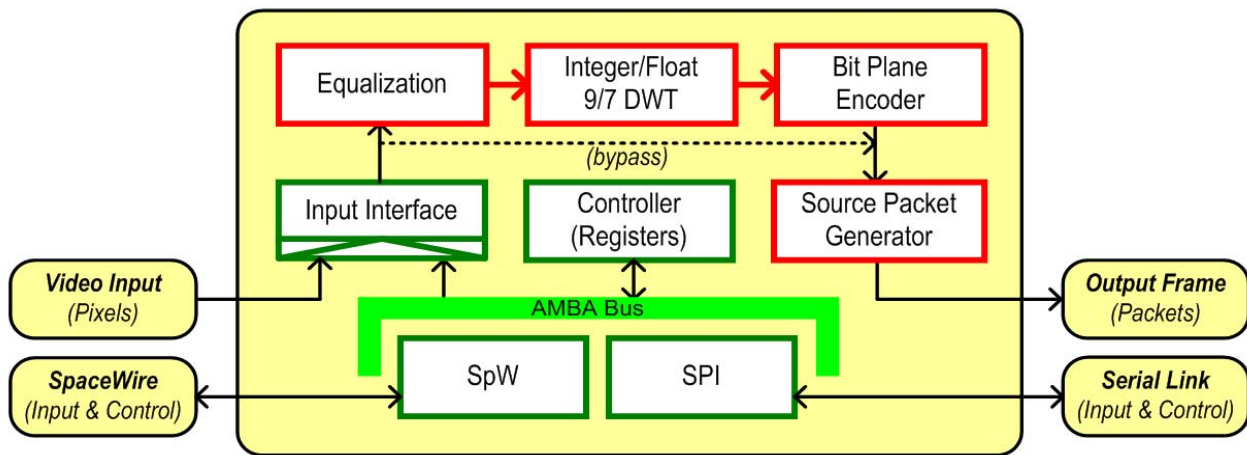


# Wicom

## CCSDS WAVELET IMAGE COMPRESSION MODULE

The CCSDS Image Data Compression Standard defines a payload image data compression algorithm that has widespread applicability to many types of instruments and images. EADS ASTRIUM, which has contributed to the definition and the development of this CCSDS 122.0 algorithm, is able to propose with the CWICOM ASIC a highly integrated solution that respects the multi-mission support capabilities offered by this Standard.

In addition to the CCSDS 122.0 wavelet-based image compression standard, CWICOM implements also the CCSDS output source packet protocol standard.



CWICOM benefits from the strong expertise of EADS ASTRIUM in most of the image compression techniques (transform coding, entropy coding, rate regulation) and image compression standards (H261, JPEG DCT, JPEG-LS, JPEG2000 Wavelet) to integrate all the required **high level performances** with a really **easy-to-use** interface.

CWICOM brings a very powerful, cost-effective and highly integrated solution for any image compression application as it performs CCSDS image compression treatments **without requiring any external memory**.

The simplicity of such a stand-alone implementation is achieved thanks to a very efficient internal embedded memory organization which gets rid of extra memory chip procurement and so of the potential obsolescence created by any bound to be specific external memory interface.

Beyond the surface saving, it offers the simplest possible implementation for any upcoming compression equipment in a standard CQFP256 surface mount package.

