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PRODUCT BRIEF*

AHA3430 StarLite

40 MBYTES/SEC SIMULTANEOUS COMPRESSOR/DECOMPRESSOR IC, 3.3V

The high speed compression coprocessor is a single-chip CMOS VLSI device that implements a lossless compression and decompression algorithm. The algorithm exhibits an average compression ratio over 13 to 1 for bitmap image data. The device supports simultaneous compression and decompression operations at 40 MBytes/sec each.

A Non-muxed microprocessor interface connects directly to various embedded processors. An additional synchronous 32-bit port transfers data at up to 160 MBytes/sec. Scanners and print engine interfaces may optionally be connected to two 8-bit synchronous video ports for emerging multifunction laser printer and copier applications.

AHA3430A-040 PTC

YYWW - COUNTRY OF ORIGIN

LLLLL

NOTES: YYWW = DATE CODE; LLLLL= LOT NUMBER

APPLICATIONS

• Multifunction printers and copiers
• High performance laser printers and digital copiers

FEATURES

PERFORMANCE:
• 40 MBytes/sec compression/decompression rates
• 160 MBytes/sec burst data rate over a 32-bit data bus
• 40 MBytes/sec synchronous 8-bit video in and video out ports
• Simultaneous compression/decompression operation at full bandwidth
• Average 13 to 1 compression ratio for bitmap image data

FLEXIBILITY:
• Configurable I/O interface for DMA mode, Big Endian or Little Endian, and 32-bit or 16-bit bus widths
• Interfaces directly with various i960 or Motorola 68xxx family of processors
• Optional 8-bit video input and output ports
• Pass-through mode passes raw data through compression and decompression engines
• Programmable scan line length up to 2K bytes

SYSTEM INTERFACE:
• Single chip compression/decompression solution
• No external SRAM required
• Four 16 x 32-bit FIFOs
• Programmable interrupts
• Output signals may be tristated to facilitate board level testing

OTHERS:
• Low power modes
• Optional counter checks errors in decompression
• Ambient temperature spec is 70°C, still air
• Software emulation program available
• 120 pin thin quad flat package
• 3.3V operation
• Firmware and pin compatible with AHA3410C
• RoHS compliant

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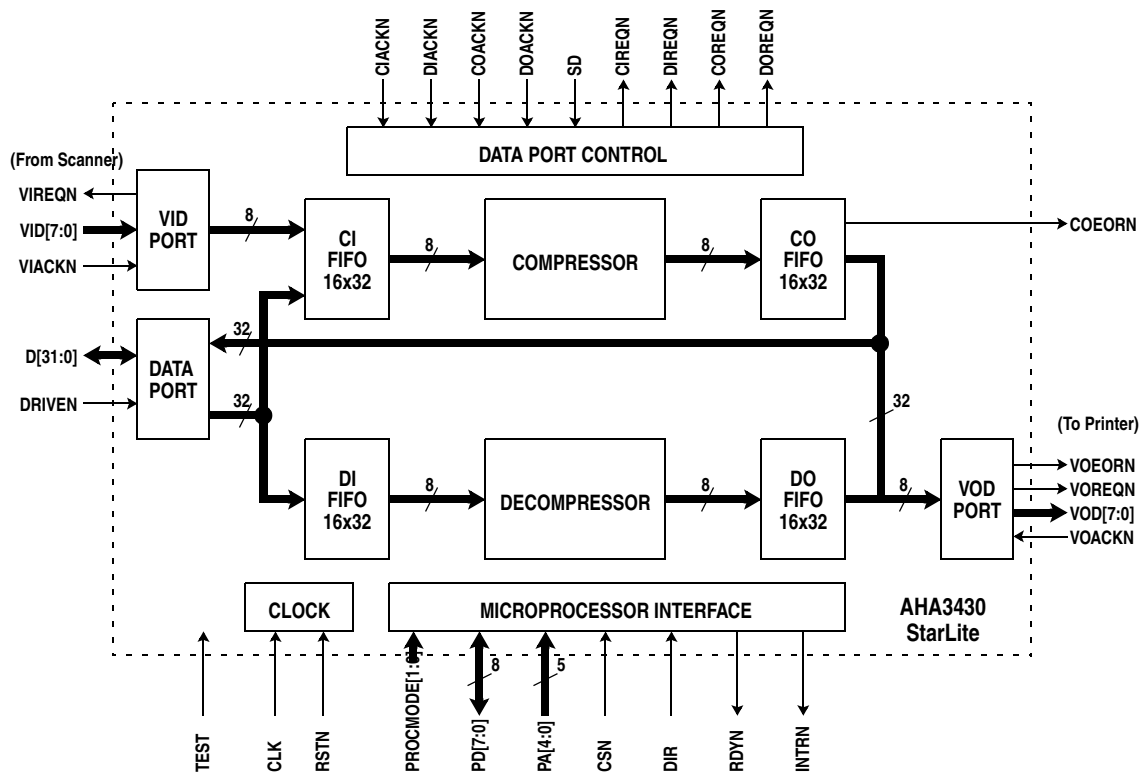*Request the AHA3430 Product Specification for complete details.

Figure 1:   AHA3430 Block Diagram

FUNCTIONAL DESCRIPTION

The coprocessor device has three external high speed synchronous data ports each capable of transferring once every 40 MHz clock. These are a 32-bit bidirectional data port, an 8-bit Video Input Data (VID) port and a Video Output Data (VOD) port. The 32-bit port is capable of transferring up to 160 MBytes/sec. The VID and VOD are capable of up to 40 MBytes/sec each.

The device accepts uncompressed data through the 32-bit data or optionally through the 8-bit VID port into its Compression In FIFO (CI FIFO). The 32-bit data port may be configured for 16-bit transfers. Compressed data is available through the 32-bit data port via the Compressed Output FIFO (CO FIFO). The sustained data rate through the compression engine is 40 MBytes/sec.

Decompression data may be simultaneously processed by the device. Decompression data is accepted through the 32-bit data port, buffered in the Decompression Input FIFO (DI FIFO), and decompressed. The output data is made available on the 32-bit data port via the Decompression Output FIFO (DO FIFO) or optionally on the 8-bit Video Output port. The decompression engine runs on the 40 MHz clock and is capable of processing an uncompressed byte every clock, i.e. 40 MBytes/sec.

The four FIFOs are organized as 16x32 each. For data transfers through the three ports, the "effective" FIFO widths differ according to their data bus widths.

Data transfer for compression or decompression is synchronous over the three data ports functioning as DMA masters. To initiate a transfer into or out of the Video ports, the device asserts VxREQN, the external device responds with VxACKN and begins to transfer data over the VID or VOD busses on each succeeding rising edge of the clock until VxREQN is deasserted. The 32-bit port relies on the FIFO Threshold settings to determine the transfer.

SYSTEM APPLICATION

The device is intended for memory intensive applications, such as high resolution copiers or printers. These applications require the simultaneous compression and decompression capability of the device. Copiers use this feature to feed the compressed bit maps through the decompressor to the printer engine while another process uses the compressor to input and compress scanned images. Movement for both processes is typically controlled by a DMA controller that is programmed by the local microprocessor or by programmed I/O.
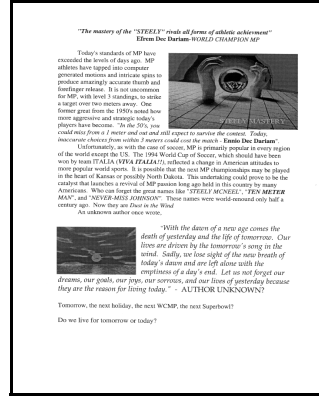
STARLITE IMAGE COMPRESSION RESULTS - 1200 x 1200 DPI

Uncompressed file size = 16 MBytes; Image dimensions = 10200 × 13200 pels
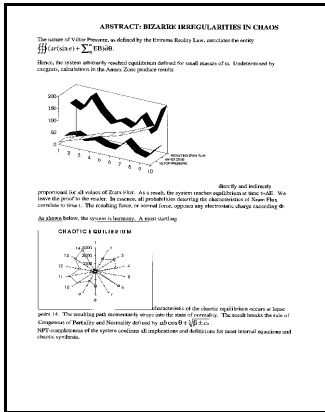
FONTS - Simple Text
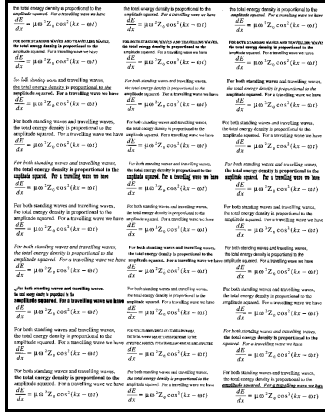
Output File Size   = 783,848
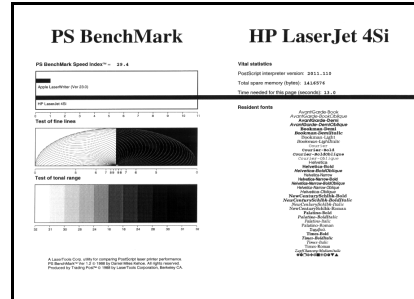
Compression Ratio = 21.5

MATH - Simple Text and Lineart

Output File Size   = 79,245

Compression Ratio = 212.4

MP - Text and Simple Graphics

Output File Size   = 86,525
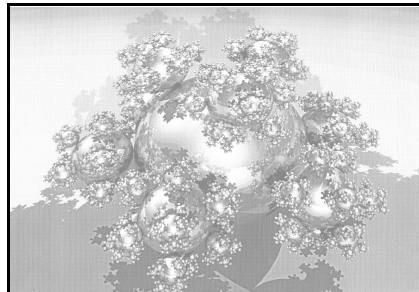
Compression Ratio = 194.5

BENCH2 - Text and Graphics with Pictorials
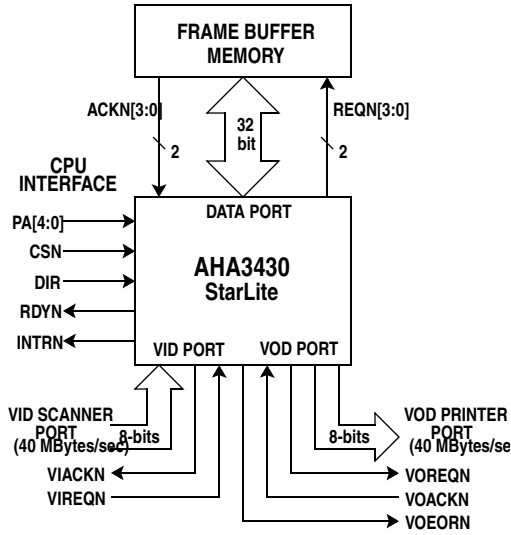

Output File Size   = 424,995

Compression Ratio = 39.6

BALLS - Complex Graphics with Pictorials

Output File Size   = 3,665,167

Compression Ratio = 4.6

COMPRESSOR/DECOMPRESSOR FOR MID-RANGE MULTIFUNCTION COPIER/PRINTER APPLICATIONS - AN EXAMPLE

FRAME BUFFER MEMORY

ACKN[3:0]   32 bit   REQN[3:0]

2   2

CPU INTERFACE

DATA PORT

PA[4:0]

CSN   **AHA3430 StarLite**

DIR

RDYN

INTRN   VID PORT   VOD PORT

VID SCANNER PORT (40 MBytes/sec)   8-bits   8-bits   VOD PRINTER PORT (40 MBytes/se

VIACKN   VOREQN

VIREQN   VOACKN

VOEORN

ORDERING INFORMATION

PART NUMBER	DESCRIPTION
AHA3430A-040 PTC	40 MBytes/sec Simultaneous Lossless Data Compression/Decompression Coprocessor IC

ABOUT AHA

Comtech AHA Corporation (AHA) develops and markets superior integrated circuits, boards, and intellectual property core technology for communications systems architects worldwide. AHA has been setting the standard in Forward Error Correction and Lossless Data Compression technology for many years and provides flexible, cost-effective solutions for today's growing bandwidth and reliability challenges. Comtech AHA Corporation is a wholly owned subsidiary of Comtech Telecommuncations Corp. (NASDAQ: CMTL). For more information, visit www.aha.com.