PM-2m

Multi-Function Image Processor Family

High-performance bitonal image compression solutions

- Flexibility — Family of codecs enables designers to choose desired functionality

- Maximized system performance — advanced multi-tasking capabilities

- High throughput — processes 600 dpi documents in less than 250 milliseconds

- Multi-standard support — ITU G3, G4 and JBIG

The Pixel Magic PM-2m™ family of imaging codecs delivers high-performance bitonal image compression/decompression capabilities in a range of configurations to meet specific needs. The PM-2m codecs offer the advantages of multi-tasking and high clock speeds at a low cost. This makes the PM-2m family ideal for today's competitive multi-function peripherals (MFPs).

ADVANCED MULTI-TASKING

A single PM-2m can maximize system performance by handling interrupt-driven image processing functions for printing, faxing, copying, and other tasks. Full support for multi-threaded operation enables the PM-2m to switch among several active tasks, suspending any operation at the end of any line and restarting a different operation from its previous stopping point. All PM-2m operational modes and compression standards are supported by this feature.

HIGH THROUGHPUT

All PM-2m codecs deliver exceptional throughput. The high-performance PM-2m can handle letter-sized 300 dpi documents in less than 75 milliseconds and 600 dpi documents in less than 250 milliseconds. Its clock speed of 40 MHz enables a typical throughput of 140 Mpixels/second for ITU G3 and G4 data. The worst-case throughput for any compression/decompression standard is 40 Mpixels/second.

SCALING AND ROTATION

The PM-2m offers all of the important features of its predecessors, including rotation and Pixlet Interpolation™ for high-performance scaling. Unlike other compression chips, the multi-tasking capabilities of the PM-2m support multiple simultaneous operations for both compression and decompression modes, in real time.

JBIG COMPRESSION

Most PM-2m family members support JBIG, for compression ratios up to four times higher than two-dimensional ITU Group 4 encoding methods. This improvement significantly increases system performance and reduces image storage and transmission costs.

PM-2m Key Features*

- Advanced multi-tasking for interrupt-driven image processing

- High speed bitonal image compression/decompression

- Support of ITU G3, G4 and JBIG bitonal image data formats

- High performance scaling and rotation capabilities

- Programmable outlet palette

- High-speed rotation assist function, concurrent with decompression

- Flexible I/O modes include Burst, FIFO and Full Duplex DMA operation

- Large image size capacity — handles up to 64K pixels per line, up to 64K lines

- Programmable bit and byte ordering on input and output

* see family chart for feature set

iCODEC

THE PIXEL MAGIC™ iCODEC™ FAMILY The PM-2m codecs are part of the Pixel Magic family of high-speed imaging codecs. Our industry-leading iCODEC products — PM-2m, PM-2mc,™ PM-22™ and PM-36™—offer a complete spectrum of off-the-shelf solutions to meet a variety of application, design and budget requirements. Pixel Magic iCODECs are designed for maximum reliability and ease of use, leveraging today's most advanced technologies to increase throughput and functionality, while driving down costs. Typical applications include: high-speed digital copiers; fax machines; laser and inkjet printers; and multi-function peripherals.

Pixel Magic **Complete Solutions**

System Solutions

iDSP

iRET

iCODEC
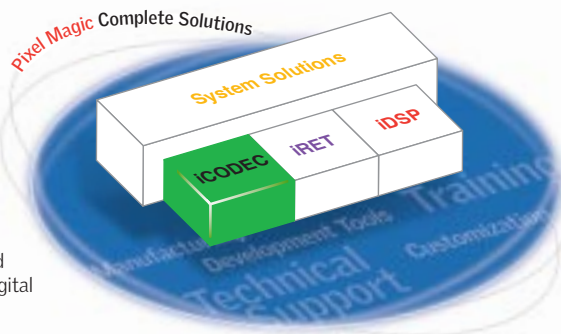
PM-2m CAPABILITIES

The PM-2m enables the following combinations of operations to be performed on the data stream during one pass through the device:

- Decompress, scale, and clip the resulting bitonal data

- Decompress, scale to gray, and clip the resulting data

- Decompress, clip and rotate to any multiple of 90 degrees

- Clip and compress bitonal input

Scale factors for pass-through or decompression operations range from 1:256 to 255:1 in increments of 1/256. The PM-2m supports any combination of bit and byte ordering on both input and output ports.

THE ROLE OF MULTI-TASKING

Effective multi-tasking will increase processor efficiency by reducing the overhead involved in multiple simultaneous compression/decompression processes. The PM-2m is capable of halting a process at the end of any line and cleanly restarting. When the processor is halted, the internal state can be read and stored. The PM-2m can then be reconfigured and restarted, either with a process that has been suspended, or with an entirely new process.

The external SRAM-based memory can be configured into multiple segments, with each segment used by one of the processes sharing the PM-2m at any time. This function eliminates the need to read and restore data from previous lines when one process is suspended for another. Another special function transfers the complete JBIG context memory to and from the PM-2m local SRAM without external intervention. This relieves the system of the task of storing the context externally.

A RANGE OF CONFIGURATIONS

The PM-2m comes in a range of configurations to meet a variety of design, performance and cost requirements. The PM-2m family includes the following:

	PM-2m	PM-2mc	PM-2mj	PM-2mh
JBIG	●	●	●	
MH/MMR (G3/G4)	●	●		●
Rotation/Scaling	●			
40 MHz	●	●	●	
33 MHz	●	●	●	
25 MHz				●

DESIGN CONSIDERATIONS

The PM-2m family requires little in the way of external support chips. A minimal system requires only a frequency source and an external SRAM (8KB minimum, up to 64KB), which serves as a local buffer during processing operations. Input and output buffers can be added to isolate the PM-2m data requirements from the host data bus, for higher performance systems.

For ease of design, the PM-2m family supports 8- or 16-bit input and output data ports. A 16-bit-wide control port with standard microprocessor controls signals is used to program and monitor the device.
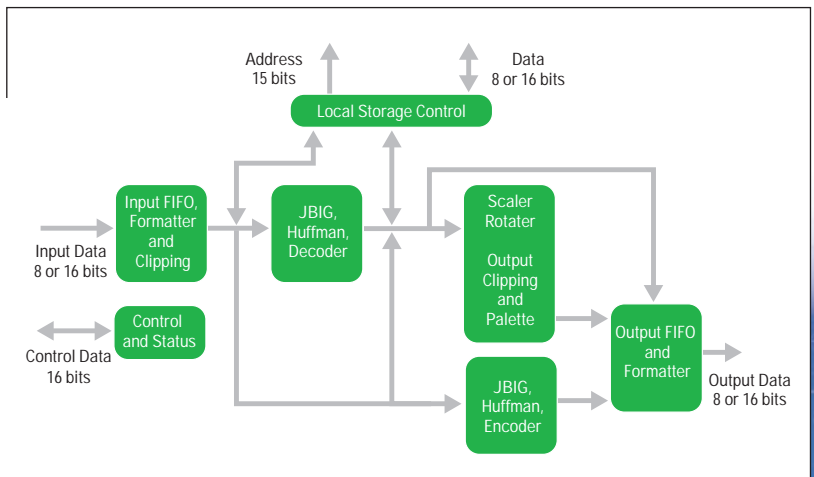
PM-2m FAMILY SPECIFICATIONS

Storage Formats Supported

- TU Group 3 1D (Modified Huffman coding)

- ITU Group 3 2D (Modified READ coding, programmable K-factor)

- ITU Group 4 2 D (Modified Modified READ coding)

- IBM Modified Modified READ coding

- TIFF Type 2

- JBIG (ISO IS 11544 compliant) Single progression sequential, Adaptive pixel, Typical prediction, 2 or 3 Line template, Variable stripe size

Electrical Specifications

- 5.0 Volt power supply

- TTL-compatible I/O

- Designed and fabricated in 0.6 micron standard cell technology

- Available in industry-standard 160 PQFP package with 0.65 mm lead spacing

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