

# M-506

## M-Series Module

### OVERVIEW



Pico Computing's modules are the foundational building blocks that comprise a truly scalable HPC system based on the PCI Express bus standard. The business card-sized M-506 is a powerful computing element composed of FPGA logic (with loading system), a local memory sub-system, and a fully-switched PCIe x8 communication structure. The module is designed for maximum memory and logic bandwidth.

Up to six M-506 modules can be snapped onto a Pico Computing EX-500 backplane, filling a single PCIe slot with a groundbreaking level of parallel processing density for compute-intensive applications.

The M-506, a variant of the M-505, includes the Altera Stratix V 5SGXMA3 FPGA. The module features a x8 PCI Express Gen 3 connection to the host and multiple high-performance/high-density SODIMM memory banks with independent memory controller, local to the FPGA.

### Applications

Choose the M-506 to dramatically accelerate radio astronomy, design simulations/emulations, SDR applications, beam forming, digital signal processing, and other algorithms.

### SPECIFICATION SUMMARY

- *Altera Stratix V 5SGXMA3E3H29 FPGA*
- *x8 PCI Express Gen 3 Interface*
- *Up to Six M-506 Modules per EX-500 Backplane*
- *2, 4, and 8 GB DDR3 SODIMM Banks*
- *256 MB Quad-Serial Flash*
- *46 LVDS*
- *8 GTX Transceivers*

## Specifications

### FORM FACTOR

- M-Series Module
- 1.75 x 3.88 (inches)
- 44.49 x 98.57 (mm)
- Double-slot width with heat sink
- Use with EX-Series backplane in standalone/embedded application

### HOST INTERFACE

- x8 PCIe Gen 3

### FPGA

- Altera Stratix V 5SGXMA3E3H29

### DDR3 COMPONENT MEMORY

- 2 GB @ 800 MHz, 64-bit, 12.8 GB/s
- 4 GB @ 400 MHz, 64-bit, 6.4 GB/s
- 8 GB @ 677 MHz, 64-bit, 10.0 GB/s

## Ordering & Deliverables

### ORDERING

For more information, to request a quote or place an order, please contact Pico Computing.

### CLOCK

- 100 MHz PCIe reference clock
- 200 MHz system clock
- 200 MHz GPIO clock
- 125 MHz GX clock
- 400 MHz DDR3 clock

### ELECTRICAL

- Card power derived from 12.0V via EX-Series Backplane
- FPGA power dissipation dependent upon user application

### ENVIRONMENTAL

- Storage Temperature: -20°C — 100°C
- Operating Temperature: 0°C — 85°C for commercial grade -40°C — 100°C for industrial grade

### DEBUGGING TOOL

- System Monitor Utility Program provides ability to read FPGA die temperature, FPGA core voltage, and core current
- Accessible JTAG header, JTAG cable included for iMPACT and Chipscope

### QUALITY

- Manufactured to IPC610-Class 2 standard
- Designed and supplied to ISO9001:2000 certification
- RoHS compliant

### CONFIGURATION FLASH

- 256 MB Quad-Serial

### COOLING

- Delivered with custom heat sink
- Forced air cooling required

### RUGGEDIZATION

- BGA underfill and conformal coating upon request

### STATUS LEDs

- Stratix V nSTATUS - Orange
- Stratix V CONF\_DONE - Green

### EXPANSION HEADER

- 46 Differential Pairs (1.5V Operation)
- 2 GX Transceivers

### DELIVERABLES

- M-506 FPGA Module
- Interface to host
- Interface to memory
- API (C++)
- Host side drivers
- Samples/examples

### CONTACT

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