## DDR3 MIP - Module in a Package

SMART's new MIP (module in a package) is a tiny form factor (TFF) memory module that combines the benefits of industry standard SO-DIMMs with SMART's proprietary stacking technology.

About the size of a nickel, SMART's MIP occupies 1/5th the area of a SO-DIMM while offering higher performance and lower power. Key advantages of MIPs over SO-DIMMs include 42% power savings, 42% jitter reduction, and 39% PK/PK savings. These benefits are critical for applications such and broadcast video, mobile routing, high-end video/ graphics cards and embedded computing applications where memory density in a small space (without the need for ECC) is essential. MIPs contain on-package address and control signal termination, eliminating the need in DRAM-down board usage scenarios.

The MIP leverages SMART's extensive stacking technology into new markets and new applications. It addresses OEMs' need for more, and faster memory in space-saving cube-computing applications for networking, telecom and embedded markets. The MIP is offered in densities from 2GB to 4GB, with speeds up to DDR3-1866.

"SMART has been stacking off-the-shelf DRAMs for many years, providing key space-saving benefits to OEMs. The MIP is a natural extension of this expertise and combines with SMART's values to deliver high quality, highly reliable unique memory solutions."

Mike Rubino, SMART's VP of Engineering
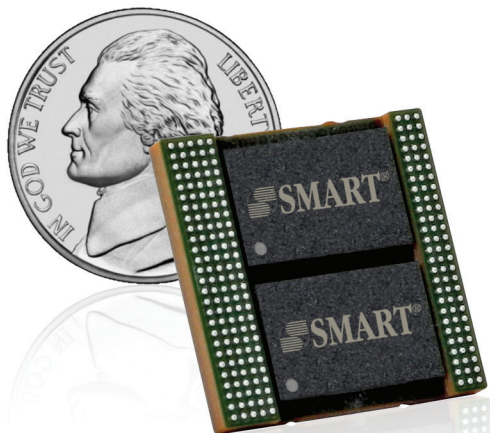
Features

- Tested at speeds up to DDR3-1866
- MIP Densities; 2GB and 4GB, see layout options
- Proven SMART technology; Multiple DRAM sources
- Multiple configurations supported with same ballout
- Pin-out supports ideal return path. Minimum noise during all transition points
- On package address and control signal termination
- ECC chip can be added on motherboard and still utilize MIP address termination (See Layout 5)
- Leverages SMART's 5+ years of production experience and reli ability data for proprietary memory stacking technology (RC stacks)
- SMART has shipped hundreds of thousands of RC stacks in loose as well module form to several major OEM customers
- One less level of solder joints and reflow cycle compared to RC stacks

Advantages

- Occupies only 1/5 the space of a SO-DIMM
- Up to 42% power savings vs SO-DIMMs
- Supports DDR3 speeds up to 1866, with 42% less jitter
- Leverages SMART's proven stacking technology
- Superior ruggedness – soldered down; no socket or clips
- Includes on-package Address and control signal termination, eliminating the need for these in DRAM-down board usage scenarios
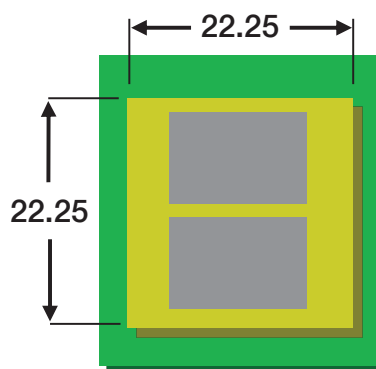- Offered in industrial grade -40°C to +85°C

Application Examples

- Video broadcast
- Video/graphics cards
- Embedded computing
- Telecom
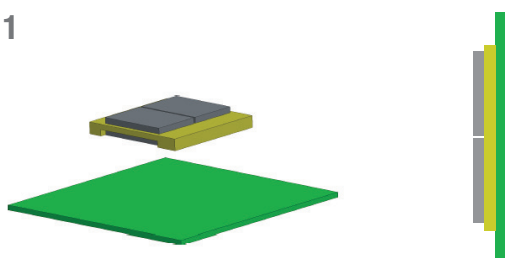- Defense/Aerospace
- Automotive

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Ordering Information

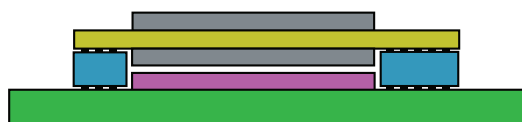| SMART Part Number	Density	Dimensions (mm)	Voltage	MIP Configuration	Speed	Temperature
SH2566MP321638HA	2GB	22.5 x 22.5	1.35V	256Mx64, 1R x16	DDR3-1866	0°C to +70°C
SH2566MP321638SD	2GB	22.5 x 22.5	1.35V	256Mx64, 1R x16	DDR3-1866	0°C to +70°C
SH2566MP321638ME	2GB	22.5 x 22.5	1.35V	256Mx64, 1R x16	DDR3-1866	0°C to +70°C
SH2566MM321616ME	2GB	22.5 x 22.5	1.35V	256Mx64, 1R x16	DDR3-1600	0°C to +70°C
SH2566MP321616ME	2GB	22.5 x 22.5	1.35V	256Mx64, 1R x16	DDR3-1600	0°C to +70°C
SH5123MP351816HA	2GB	22.5 x 22.5	1.35V	512Mbx32, 1R x8	DDR3-1600	0°C to +70°C
SH5123MP351816SQ	2GB	22.5 x 22.5	1.35V	512Mbx32, 1R x8	DDR3-1600	0°C to +70°C
SH5126MP321616ME	4GB	22.5 x 22.5	1.35V	512Mx64, 2R x16	DDR3-1600	0°C to +70°C

DDR3 MIP

Layout 1

Layout 2

Layout 3: with ECC

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