

# EMAC SoM Presentation



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# System on Module

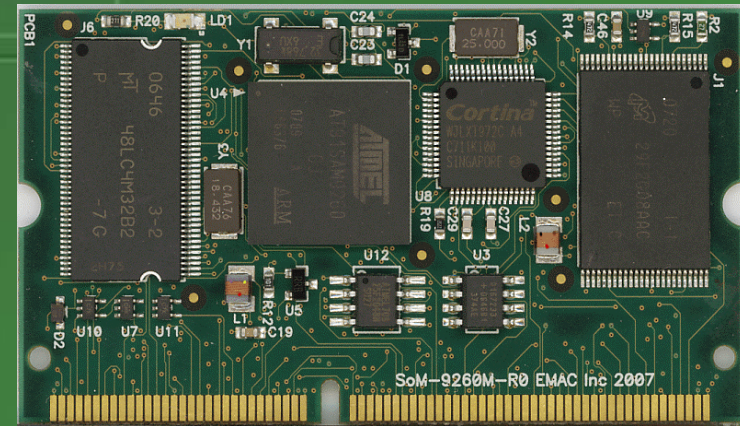
- System on Module (SoM) is an alternative to Single Board Computers for Embedded Systems offering a more flexible & contoured solution.
- An SoM approach is also an alternative to Full Custom engineering offering a much faster time to market at reduced cost and risk.
- With an SoM approach you get the best aspects of both buying Off-the-Shelf & of a Custom Engineered solution.

# System on Module

- An SoM approach is comprised of a Processor Module that is designed to plug into a Carrier Board.
- An SoM Module contains the processor, memory, and standard I/O & is usually an Off-the-Shelf component.
- The SoM Carrier contains all the connectors, power supplies as well as any additional I/O requirements. The Carrier is usually a custom component, but can be purchased Off-the-Shelf as well.

# The Module

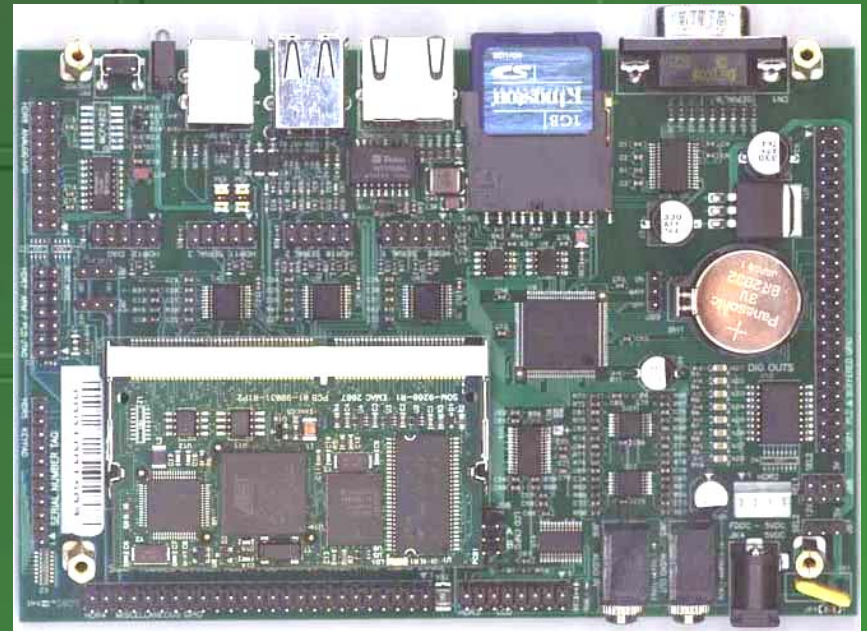
- Contains the Processor Core
- Contains Flash & RAM
- Contains Standard I/O
  - Serial Ports
  - Ethernet
  - Real Time Clock
- Additional I/O (depending on module type)
  - GPIO & A/D
  - USB Host & Device
  - Video & Touchscreen Controller
  - Audio



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# The Carrier

- Can be any size or shape required by the application
- Contains all connectors
  - Complete control over connector location
  - Complete control over connector type
- Contains any additional I/O required by the application
- Off-the-shelf Carriers are available as a reference & to ease early development



# SoM Benefits

- Faster time to market
- Cost savings
- Reduced risk
- Scalable Features & CPU choices
- Increased Longevity
- Decreased customer design requirements
- Small footprint

# Faster Time to Market

- Since the Module is purchased Off-the-Shelf and most of the complexity is on the module, design time is reduced.
- Software Board Support Packages (BSPs) and Integrated Development Environments (IDEs) are provided with the Module and do not have to be developed.
- Reference Carrier boards with Schematics are available to allow early software development before customer Carrier board is complete.

# Cost Savings

- Since the Module is purchased Off-the-Shelf design cost is reduced.
- The Module BSP and IDE are provided and do not have to be developed.
- Multiple Modules with various processing power and I/O features allow for best-fit at lowest cost Module selection.

# Reduced Risk

- Since the Module is purchased Off-the-Shelf and most of the complexity is on the Module, design risk is reduced.
- Micro Pitch BGAs and other very fine pitch components reside on Module simplifying Carrier Board PCB layout.
- Reference Carrier boards with Schematics are available simplifying Carrier design.
- The Module BSP and IDE are provided and do not have to be developed.

# Scalable Feature & CPU Choices

- 8, 16, & 32 bit Modules
- 8051, 68HC12, Blackfin, Coldfire, & ARM
- 30, 66, 200, 400, 600 MHz.
- Serial ports, SPI, I2C
- Ethernet, CAN & I2S Audio
- Video & Touchscreen
- USB Host & Device
- SD/MMC Flash Card
- GPIO, Timer/Counters, PWM, A/D

# Increased Longevity

- Module contains most components (CPU, RAM, Flash) with accelerated End-Of-Life risk
- Modules are pin compatible providing an alternate replacement if a module is no longer available
- Modules are designed to be interchangeable with minimal hardware & software changes
- Module BSPs are kept up to date

# Decreased Customer Design Requirements

- Since the Module is purchased Off-the-Shelf and most of the complexity is on the Module, design requirements are reduced.
- Micro Pitch BGAs and other very fine pitch components reside on Module simplifying Carrier Board PCB layout.
- Reference Carrier boards with Schematics are available simplifying Carrier design.
- The Module BSP & IDE are provided and do not have to be developed.

# Small Footprint

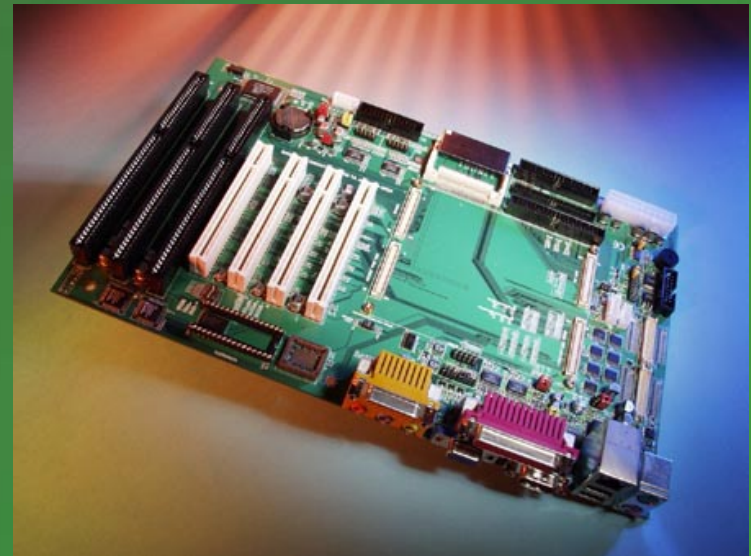
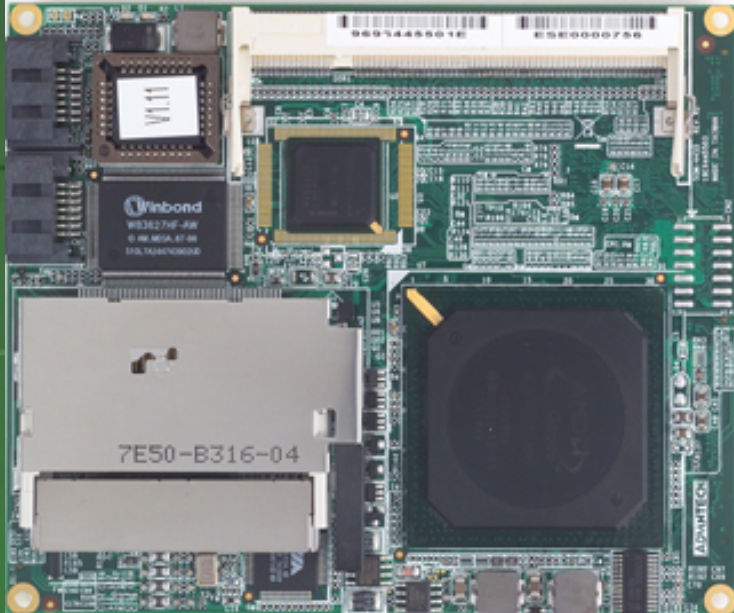
- Different size Modules available depending on Features & Processing Power required
- Different Module Mounting options (depending on module type) allowing Module to stand off the Carrier board
- Components can be placed under module to reduce Carrier board space
- Carrier PCB routing is reduced allowing tighter component placement

# SoM Types

- ETX – x86 popular standard provides PCI & ISA buses
- XTX – x86 standard provides PCI & PCI Express buses with ETX migration path
- COM Express – x86 popular standard provides PCI & PCI Express buses
- EMAC SODIMM – Non x86 RISC provides processor local bus
- For product listings & information on the above SoMs go to: [www.emacinc.com/som](http://www.emacinc.com/som)

# x86 SoM Advantages

- x86 PC Compatible Modules
- Modules are Standardized
- High-End, Fast Processing Power
- Large Memory Capacity



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# EMAC SODIMM SoM Advantages

- Smaller Size
- Lower Power
- Less Expensive
- Highly Integrated
- Uses Well Proven SODIMM Connector

# EMAC SODIMM SoMs

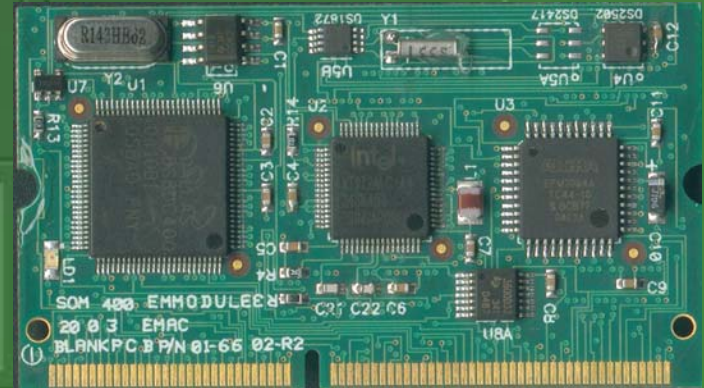
## 144-Pin SoMs (Headless)

- SoM-400E – 8-bit, Dallas TINI DS90C400 (8051) based module
- SoM-NE64 – 16-bit, Freescale MC9S12NE64 based module
- SoM-536E – 16-bit, Blackfin DSP ADSP-BF536 based module
- SoM-5282 – 32-bit, Freescale Coldfire MCF5282 based module
- SoM-9260 – 32-bit, Atmel ARM9 AT91SAM9260 based module

## 200-Pin SoMs (with Video & Touch)

- SoM-9307 – 32-bit, Cirrus ARM9 EP9307 based module

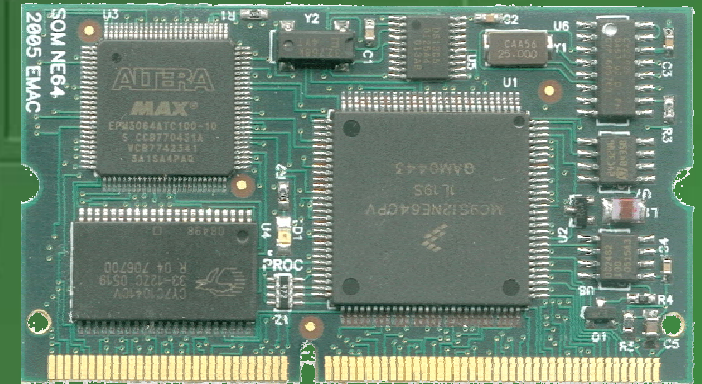
# SoM-400EM



- Dallas DS80C400 TINI 30MHz Processor
- Up to 2MB of Flash & battery backed RAM
- 1 Ethernet Port, 1 CAN Port & MMC/SD Card
- 3 Serial Ports, 1-Wire Port & SPI
- Typical Power Requirements 3.3V @ 200ma.
- Timer/Counters & GPIO
- Programs in Java or C with File System in RAM

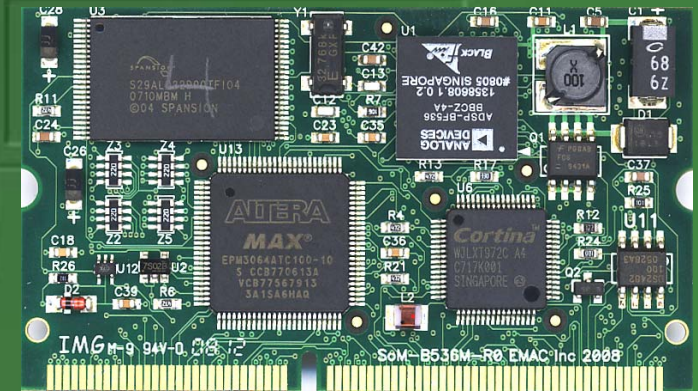
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# SoM-NE64



- Freescale MC9S12NE64 50MHz Processor
- Up to 64KB of Flash & 512KB of RAM
- 1 Ethernet Port & MMC/SD Card
- 2 Serial Ports, 1-Wire Port, I2C & SPI
- Typical Power Requirements 3.3V @ 200ma.
- Timer/Counters, PWM, A/D & GPIO
- Runs FreeRTOS & Programs in C

# SoM-536EM



- AD Blackfin ADSP-BF536 400/600 MHz CPU
- Up to 4MB of Flash & 64MB of SDRAM
- 1 Ethernet Port, 1 CAN Port & MMC/SD Card
- 2 Serial Ports, 1-Wire Port, I2C, I2S & SPI
- Typical Power Requirements 3.3V @ 300ma.
- Timer/Counters, PWM & GPIO
- Runs uClinux with Real Time Extensions & Programs in C

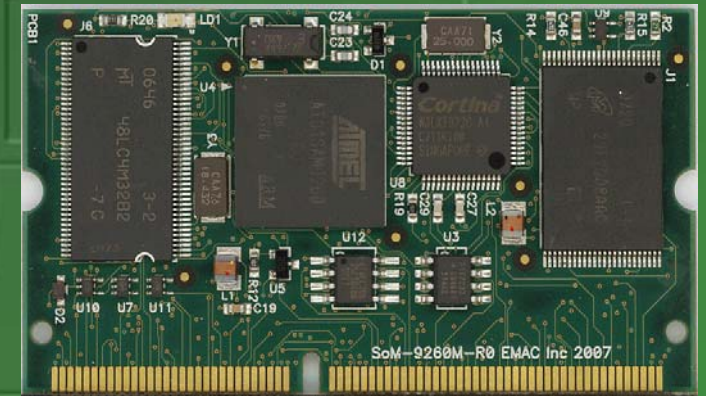
# SoM-5282M



- Freescale Coldfire MCF5282 66MHz CPU
- Up to 4MB of Flash & 16MB of SDRAM
- 1 Ethernet Port, 1 CAN Port & MMC/SD Card
- 3 Serial Ports, I2C & SPI
- Typical Power Requirements 3.3V @ 300ma.
- Timer/Counters, PWM, A/D & GPIO
- Runs uClinux & Programs in C

# SoM-9260M

- Atmel ARM9 AT91SAM9260  
200MHz CPU
- Up to 64MB of Flash & 64MB of SDRAM
- 1 Ethernet Port, 2 SPIs, Audio & MMC/SD Card
- 6 Serial Ports, 2 USB Hosts & 1 USB Device
- Typical Power Requirements 3.3V @ 300ma.
- Timer/Counters, PWM, A/D & GPIO
- Runs Linux with Real Time Extensions or WinCE 6.0 & Programs in C, C# or Java



# SoM-9307M

- Cirrus ARM9 200MHz CPU
- Up to 64MB of Flash & 64MB of SDRAM
- 3 Serial Ports & 3 USB Hosts
- 1 Ethernet Port, SPI, Audio & MMC/SD Card
- Video/Graphic LCD with Touchscreen interface
- Typical Power Requirements 3.3V @ 300ma.
- Timers, PWM, A/D & GPIO
- Runs Linux or WinCE 6.0 & Programs in C, C# or Java



# EMAC SoM Carriers

## 144-Pin SoM SODIMM Carriers

- SoM-100E – Recommended for the following SoMs
  - SoM-400EM
  - SoM-NE64M
  - SoM-5282M
- SoM-150E – Recommended for the following SoMs
  - SoM-536EM
  - SoM-9260M

## 200-Pin SoM SODIMM Carriers

- SoM-200E – Recommended for the following SoMs
  - SoM-9307M

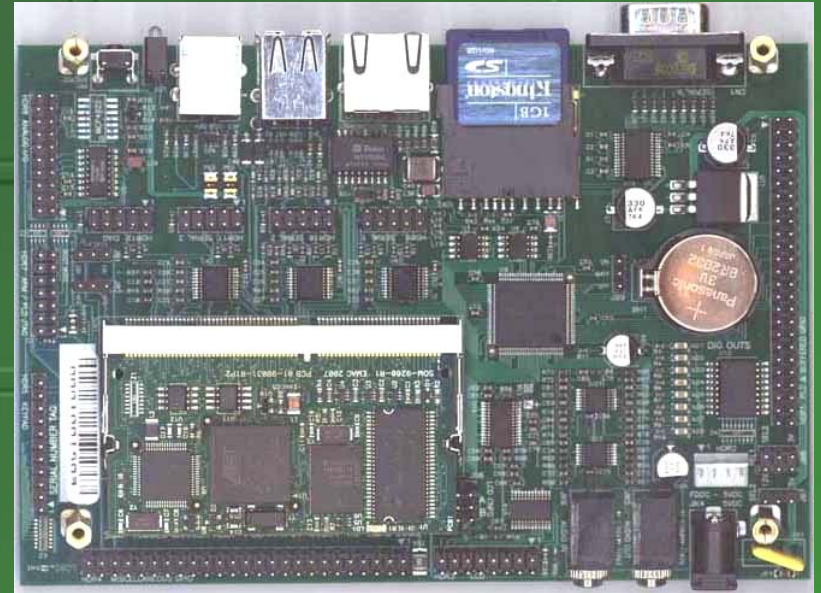
# SoM-100ES

- CAN & 1-Wire Ports
- 25 SoM Specific I/O Lines
- 24 Key, Keypad Interface
- Character LCD Interface
- MMC/SD Flash Card Socket & RJ45 Ethernet
- 2 Serial RS232 Ports & 1 RS485/422/232 Port
- Dial-up or Wireless Modem Socket
- 32 General Purpose (PLD) I/O Lines including 8 High-Drive (500ma sink) lines
- Optional 12-bit A/D & D/A



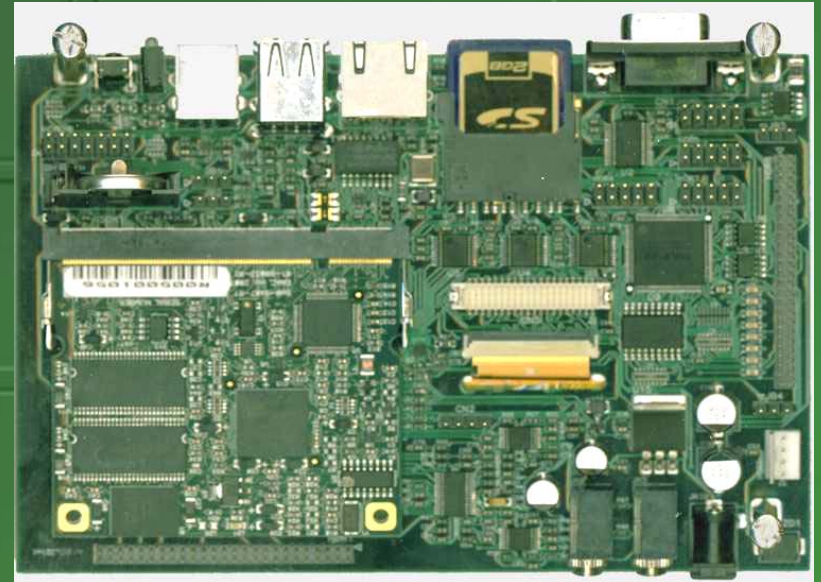
# SoM-150ES

- CAN & 1-Wire Ports
- 24 SoM Specific I/O Lines
- 24 Key, Keypad Interface
- Character LCD Interface
- MMC/SD Flash Card Socket & RJ45 Ethernet
- 4 Serial RS232 Ports & 1 RS485/422/232 Port
- Dual USB Host & USB Device Jacks
- 24 General Purpose (PLD) I/O Lines including 8 High-Drive (500ma sink) lines
- Optional 12-bit A/D, D/A & I2S Audio In/Out



# SoM-200ES

Back  
Side

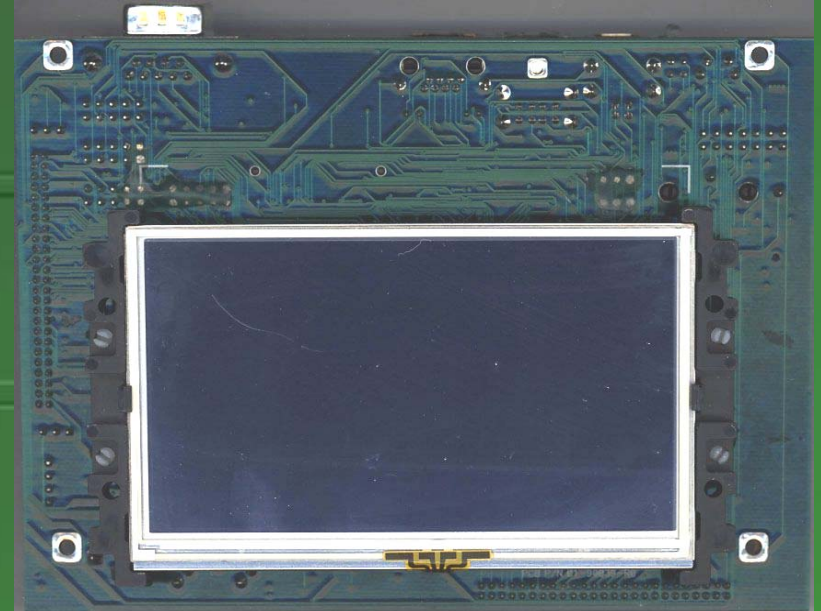


- 32 SoM Specific I/O Lines
- 24 Key, Keypad Interface
- Graphic WQVGA LCD with Touchscreen
- MMC/SD Flash Card Socket RJ45 Ethernet
- 3 Serial RS232 Ports & 1 RS485/422/232 Port
- Dual USB Host & USB Device Jacks
- 24 General Purpose (PLD) I/O Lines including 8 High-Drive (500ma sink) lines
- Optional I2S Audio In/Out & CAN

# SoM-200ES

- 32 SoM Specific I/O Lines
- 24 Key, Keypad Interface
- Graphic WQVGA LCD with Touchscreen
- MMC/SD Flash Card Socket RJ45 Ethernet
- 3 Serial RS232 Ports & 1 RS485/422/232 Port
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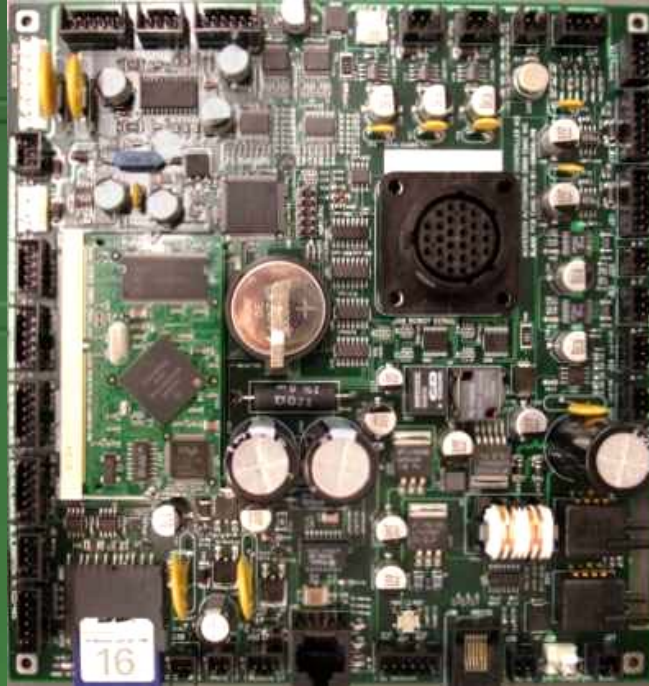
Front  
Side



# Custom Carriers by EMAC

- EMAC has designed & manufactured a variety of Custom SoM Carriers for a number of different Industries. These Industries include:
  - Medical
  - Gaming
  - Environmental Control
  - Metering
  - Homeland Security
  - Military
  - Real Time Data Acquisition & Control
  - Robotics

# Custom Carriers by EMAC



# EMAC SODIMM SoM Roadmap

4Q08

## 144-Pin SoMs (Headless)

- SoM-9G20 – 32-bit, Atmel ARM9 AT91SAM9G20 based module
  - Similar feature set as the SoM-9260
  - Runs at 400Mhz and uses less power than the SoM-9260
  - Provides NAND Flash & I2C

2Q09

## 200-Pin SoMs (with Video & Touch)

- SoM-3517 – 32-bit, TI ARM Cortex A8 OMAP3517 based module
  - 500MHz ARM Cortex-A8 core with NEON SIMD Coprocessor
  - 3D Graphic engine with hardware video scaling & Touchscreen
  - 4 serial ports, 10/100 Ethernet, CAN, SPI, I2S Audio, & I2C
  - High Speed USB Host & Device
  - SD/MMC Flash Card Interface
  - Video Input Port