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Procelerant CEGM45

Core™ 2 Duo Processor COM Express Module

FEATURE SUMMARY

- Core™ 2 Duo and Celeron® M processor options
 - 2.53GHz and 2.26GHz Core™ 2 Duo
 - 1.2 GHz and 1.86GHz Core™ 2 Duo LV
 - 1.2GHz and 1.9GHz Celeron® M ULV
- GM45 Express chipset and ICH9-M
- Dual-channel DDR3, up to 8GB
- Type 2 and Type 3 pinout options
- Standard microSD socket

The Procelerant® CEGM45 combines the next generation performance Intel® Core™ 2 Duo processors and the GM45/GS45 chipsets with RadiSys designed dual channel memory to provide breakthrough processing performance on a basic size COM Express module. The compact 95mm x 125mm module is ideal for processing intensive applications such as medical or machine imaging and high end test and measurement or gaming. Featuring DDR3 memory, enhanced 3D graphics, and a microSD® socket, the CEGM45 is available in both Type 2 and Type 3 COM Express pin-out options. The CEGM45 supports existing and new carrier designs while maximizing feature content.

The RadiSys Procelerant® CE family of COM Express products enable customers to start designing at the same time as processor release, saving months of development time and resources. OEM focus can remain on core competencies such as software and application development rather than high speed circuit design. Planned feature changes, demand fluctuations and performance upgrades can be handled without product re-designs using the Procelerant CE family. Procelerant CE modules can reduce service repair inventories, and simplify upgrades, contributing to the success of the product over its lifetime.

COM EXPERT DESIGN SERVICES

OEMs can depend on the RadiSys COM Expert team to support their design at every stage, from schematic checks to the handling of entire custom carrier and system designs. RadiSys COM Expert services include options for software utilities, custom BIOS, mechanical models, debug assistance and more to customers using RadiSys Procelerant® CE processor modules. Design consulting and debug services are also available to support OEM product development at any stage. Ask your RadiSys Sales Manager for more information.

KICKSTART YOUR APPLICATION DEVELOPMENT WITH COM EXPRESS STARTER KITS

Accelerate a product's development, improve its time to market and reduce overall cost by minimizing the design team's installation requirements and maximizing their efficiency. Procelerant® COM Express Starter Kits arrive integrated onto a CR202 or CR203 development carrier board with heatsink, memory modules, hard drive, DVD drive, and power supply--all using only a single order code.

COM EXPRESS AND REAL-TIME HYPERVISOR

The greatest challenge companies face in adopting new technology is the difficulty they experience

adapting it into their current products and also in utilizing it to its fullest advantage. Multi-core processing, one of the newest technological advances in COM Express modules, operates with the greatest efficiency when utilized with RadiSys Microware® Hypervisor middleware. One of the main benefits of Hypervisor's innovation is the ability to run legacy software on the latest-generation platforms without going through complex porting development. This saves time, and resources and total cost of ownership while advancing product features and functionality.

Procelerant CEGM45 Specifications

FEATURE	FUNCTION	DESCRIPTION
PROCESSOR	T9400 Type 2	2.53 GHz Core™ 2 Duo processor / 6MB Cache / 1067MHz FSB/ 35W
	P8400 Type 2	2.26 GHz Core™ 2 Duo processor / 3MB Cache / 1067MHz FSB/ 35W
	SP9300 Type 2	2.26 GHz Core™ 2 Duo processor / 6MB Cache / 1067MHz FSB/ 25W
	SP9300 Type 3	2.26 GHz Core™ 2 Duo processor / 6MB Cache / 1067MHz FSB/ 25W
	SL9400 Type 2	1.86 GHz Core™ 2 Duo SV processor / 6MB Cache / 1067MHz FSB /17W
	SU9300 Type 2	1.2 GHz Core™ 2 Duo processor / 3MB Cache /800MHz FSB/10W
	T3100 Type 2	1.9 GHz Celeron® M processor / 1MB Cache / 800MHz FSB/35W
	ICP722 Type 2	1.2 GHz Celeron® M processor / 1MB Cache / 800MHz FSB/5.5W
CHIPSET	Intel® GM45/GS45 Express Chipsets and ICH9M I/O Hub	
MEMORY	Type	Two 204-pin right-angle SO-DIMM sockets for DDR3-1067 and DDR3-800
	Capacity	Up to 4GB per channel, for a maximum of 8GB memory
FLASH	4MB system flash for BIOS storage	
VIDEO	Intel® Gen 5.0 integrated graphics engine	Dual LVDS supports 2 x 18 bpp OR 2 x 24 bpp panel support
		VGA
		Default Output: SDTV/Standard Definition TV Also Supported: Composite, S-Video, Component Video, HDTV
		Dual-channel SDVO, multiplexed on the PCI Express Graphic port display interface
		Three DisplayPort, multiplexed on

		the PCI Express Graphic port display interface
	External	One PCI Express x16 Graphics expansion port
NETWORKING	Type 2	One 10/100/1000BaseT
	Type 3	Two 10/100/1000BaseT
AUDIO	High Definition Audio	
	Speaker Out	
STORAGE	SATA	Four SATA interfaces, each capable of supporting one SATA device Supports both 1.5 and 3.0 Gbps operation
	IDE (type 2 only)	One IDE interface (build option) capable of supporting two UltraATA/100 devices
	USB	microSD socket (not available on T9400)
PCI EXPRESS	Type 2 and 3	One x16 PCI Express Graphics expansion port
	Type 2	One PCI Express x1 interface and Four x1 PCI Express link expansion ports, configurable as: <ul style="list-style-type: none"> • Four x1 • One x4 • One x2 and two x1 • One x3 and one x1
	Type 3	Four x1 PCI Express link expansion ports, configurable as: <ul style="list-style-type: none"> • Four x1 • One x4 • One x2 and two x1 • One x3 and one x1
PCI	One PCI 2.3 compliant 32-bit, 33MHz bus	
USB	Eight USB 2.0 expansion ports USB 2.0 Debug Port on port 0	
LPC	One LPC interface	
POWER	+12 power rail, primary input Supports 6.0V-16.8V (SL9400, SP9300, SU9300, ICP722)	

Supports 6.0V-15.5V (T9400 only)

POWER MANAGEMENT ACPI 3.0 supporting states S0, S3, S4, S5, G3, and C0, C1, C2, C3, C4/C4E

MISCELLANEOUS One SMBus
One I2C
Eight GPIO (four GPI and four GPO)

BIOS Phoenix® EmbeddedBIOS® with StrongFrame® Technology

OS Windows XP® Embedded
Windows XP® Professional
Windows Vista® Ultimate Edition
Red Hat® Embedded Linux
RadiSys Microware® OS-9
Microware® Hypervisor

PHYSICAL SPECIFICATIONS

PHYSICAL Dimensions 95mm x 125mm
Compliance PICMG COM Express R1.0 Basic Form Factor

ENVIRONMENT

Cooling	Forced air	Class EAC1 as defined in the ANSI/VITA 47-2005
	Conduction	Class ECC1 as defined in the ANSI/VITA 47-2005
Temperature	Operating	Up to 2300m (7500 ft), 0 to 60C Derated -1.1 C per 305 m (1000 ft) above 2300 m (7500 ft) Note: This Spec is based on the SKU of CEGM45T2-T94 with CEGM45-AHS.
	Non-operating	-40°C to +85°C
Shock	Operating	30G, half sine shock pulse, 11ms duration, 3 times per face
	Non-Operating/Unpacked	40G, half sine shock pulse, 11ms duration, 3 times per face (unpackaged)
	Transportation/Packaged	Fixtured assembly: 50G, 17.4 ms trapezoidal pulse Drop test, 10-up bulk packaging, 30in free-fall, one drop on each of six faces
Vibration (random)	Operating	Random 5Hz to 2KHz, 7.7 grms, 10min in each of 3 axes

		5Hz - 20Hz: 0.004g ² /Hz ramping up to 0.04g ² /Hz 20Hz to 1000Hz: 0.04g ² /Hz 1000Hz to 2000Hz: 0.04g ² /Hz ramping down to 0.01g ² /Hz
	Non-Operating/Storage	Random 5Hz to 2KHz, 9.7 grms, 10min in each of 3 axes 5Hz - 20Hz: 0.006g ² /Hz ramping up to 0.06g ² /Hz 20Hz to 1000Hz: 0.06g ² /Hz 1000Hz to 2000Hz: 0.06g ² /Hz ramping down to 0.02g ² /Hz
	Humidity	
	Operating	5% to 95% non-condensing. 95% RH@30C, linear derating to 25% RH@60C
	Non-Operating/Storage	5% to 95% non-condensing
	Altitude	
	Operating	To 15,000ft (4570m)
	Non-Operating/Storage	To 40,000ft (12000m)
REGULATORY	Safety	UL60950-1, EN60950-1, IEC60950-1 Shall meet RoHS at time of production
	EMC	EN55024, EN55022, and FCC Part 15, Subpart B, Class B
WARRANTY	Standard	Two years, parts only

Ordering Information

Module Order Codes:

CEGM45T2-T94-0: Type 2, 2.53GHz Core™ 2 Duo T9400
CEGM45T2-P84-0: Type 2, 2.26GHz Core™ 2 Duo P8400
CEGM45T2-SL9-0: Type 2, 1.86GHz Core™ 2 Duo SL9400
CEGM45T2-SU9-0: Type 2, 1.2GHz Core™ 2 Duo SU9300
CEGM45T2-SP9-0: Type 2, 2.26GHz Core™ 2 Duo SP9300
CEGM45T3-SP9-0: Type 3, 2.26GHz Core™ 2 Duo SP9300
CEGM45T2-T31-0: Type 2, 1.9GHz T3100 Celeron® M SV
CEGM45T2-722-0: Type 2, 1.2GHz ICP722 Celeron® M ULV

Supporting Products:

CR202-PCIE16: Type 2, ATX development carrier, PCI Express x16
CR203-VGA: Type 3, ATX development carrier, VGA
CEGM45-AHS: CEGM45 active heatsink assembly
CEGM45R2-HSP: CEGM45 heatspreader assembly

Starter Kits

All starter kits include the following:

- 100-220V input voltage, 350W, ATX-compliant power supply
- 4 GB DD3 SDRAM
- 3.5" 80GB SATA hard disk drive
- 5.25" 9GB 20X SATA DVD+RW combination drive
- 2 SATA cables
- Two power cords for use in North America and Europe
- CEGM45 active heatsink assembly
- Microware Hypervisor Product CD for Intel x86 multicore processors. Please contact RadiSys for a 30-day trial license key and passwords for your preferred operating systems.

S-CEGM45T2-T94-KIT

- CEGM45T2-T94: Type 2, 2.53GHz Core™ 2 Duo
- CR202-PCIE16: Type 2 carrier board with x16 PCI Express

S-CEGM45T2-SP9-KIT

- CEGM45T2-SP9: Type 2, 2.2.6GHz Core™ 2 Duo
- CR202-PCIE16: Type 2 carrier board with x16 PCI Express

S-CEGM45T3-SP9-KIT

- CEGM45T3-SP9: Type 3, 2.26GHz Core™ 2 Duo
- CR203-VGA: Type 3 carrier board with VGA

S-CEGM45T2-SL9-KIT

- CEGM45T2-SL9: Type 2, 1.86GHz Core™ 2 Duo
- CR202-PCIE16: Type 2 carrier with x16 PCI Express

S-CEGM45T2-SU9-KIT

- CEGM45T2-SU9: Type 2, 1.2GHz Core™ 2 Duo
- CR202-PCIE16: Type 2 carrier with x16 PCI Express

S-CEGM45T2-722-KIT:

- CEGM45T2-722: Type 2, 1.2GHz Celeron® M ULV
- CR202-PCIE16: Type 2 carrier with x16 PCI Express