EPSON
EPSON EUROPE ELECTRONICS

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EPSON opens Design Center in Barcelona

EPSON is following the race of Embedded solutions and realises the integration of systems in a single chip. For that purpose EPSON focuses its strategy of supporting the development of complex "System-On-Chip" (SoC) solutions by means of the set-up of local Design Centers. This strategy began in December 1999 with the establishment of a Design Center in Scotland devoted to provide system level and firmware support.

The next step will be the establishment of a hardware design center in Barcelona/ Spain focused on microelectronics design from ASICs to SoC. Thus, providing the needed hardware development task-force for standard ASIC projects and the necessary complement to the Scotland design center for SoC.

EPSON has already a worldwide network of Design Centers and the new center will collect this diversified experience providing local system integration, IP adaptation and a high degree of flexibility. It offers all the standard ASIC services (synthesis, Place&Route, netlist validation, design support, etc.) focusing the European market requirements.

These activities will be improved by working closely with the Scotland Design Center focused on firmware design for "System-on-Chip" projects. Therefore EPSON is able to provide complete and local support in hardware and firmware design for mobile applications.

EPSON will sign a cooperation agreement with the CSIC (Consejo Superio de Investigaciones Científicas), the highest institution for R & D in Spain. The CSIC will offer EPSON the support of CNM (Centro Nacional de Microelectrónica), an Institute for Microelectronics with locations in Barcelona, Madrid and Seville. The support consists in the assignment of infrastructure, design resources and experience for the development of ASICs in the main facilities of CNM located in Barcelona.

The cooperation activities start by April 2000.

New Factory Building for Quartz Devices Completed

Last year EPSON opened a new factory building for Quartz Devices, located at the EPSON Ina Plant in Japan.

In this factory a new product line has been installed for the production of high-stability AT cut crystal units, SAW resonators and all new products with ceramic packages. The first operations started in November 1999.

In the building and construction of the new factory as much attention as possible was paid to the fulfillment of the energy saving concept of EPSON:

the so-called turbulent flow method is used as cleaning system. This method controls the air current while it creates an atmosphere close to that of a laminar flow method. But this method saves energy and provides a two digit level increase in performance.

The building itself was created to use new forms of energy such as the technology of fuel cells, solar power and ice heat accumulation system. Using as much natural light as possible shows another significant contribution to the "energy saving" demands.

Low-Cost, Low-Power Single Chip Embedded Memory LCD Controller

SED1376

SED1376 First to Feature Direct Sharp HR-TFT Support; Ideal for Embedded and Handheld Markets

EPSON announces SED1376, a color/monochrome LCD graphics controller with an embedded 80 KB SRAM display buffer. The only LCD controller to directly interface to the Sharp HR-TFT and Epson D-TFD families of LCD panels, SED1376 does not require an additional timing control ASIC, providing a low cost, low power, single chip solution for the embedded and handheld markets.

With its embedded memory, SED1376 is one of the most comprehensive display solutions for the portable device market. The SED1376 is not limited to a single CPU type or operating system, thus giving embedded systems designers a flexible, simple, and therefore cost-effective means to integrate LCD displays into their products.

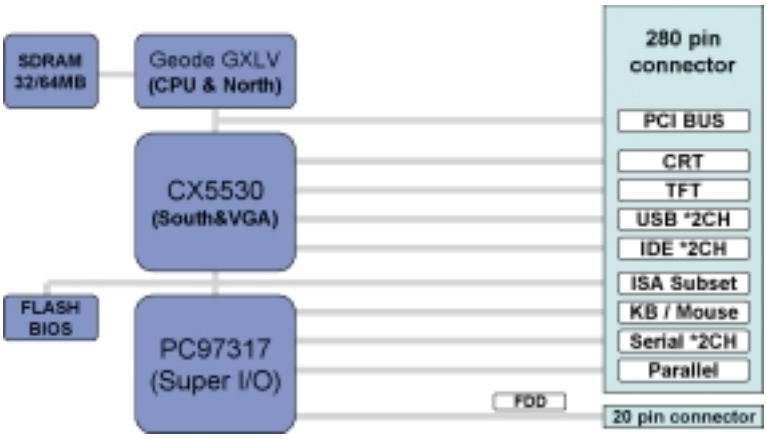
Using a guaranteed low-latency CPU architecture, SED1376 provides support for microprocessors without READY/WAIT# handshaking signals. The 32-bit internal data path provides high performance bandwidth into display memory, allowing for fast screen updates.

The SwivelView™ feature allows 90°, 180° or 270° hardware rotation of the display memory for products requiring a rotated display image, greatly increasing overall system performance. SED1376 also supports Picture in Picture Plus, an overlay window feature allowing multiple images to be displayed simultaneously with complete software control of the window's size and position.

EPSON's SED1376 embedded memory LCD controller is scheduled to be available in sample quantities in March 2000.

EPSON CARD-PCI/GX

A system solution with high performance and low power consumption

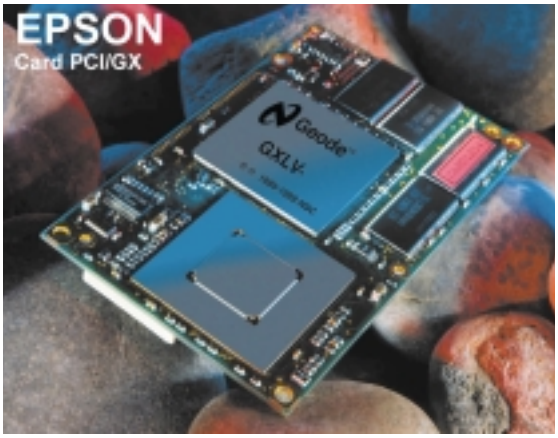


EPSON announces the CARD-PCI/GX based on the Geode™ processor from National Semiconductor®. The compact Card-PCI/GX sets a new standard for low cost applications and various Windows®CE, NT, 98, 2000, Linux, QNX or VxWorks-based applications.

Using a 280-pin connector, the CARD-PCI/GX is working on very low power consumption rates (less than 3W typical) and does not require any fan for cooling. The EPSON CARD-PCI/GX as a complete PC module is targeting a broad market where high performance and low power consumption are valued. Factory automation, mobile test, measurement system, panel PC, networks attached workstations, visual devices (like mobile projectors), more general compact PCI boards and other embedded systems are typical applications.

Specifications

Processor	Geode™ GXLV at 200 MHz
Chipset	CX5530 (Companion chip) PC97317 (Super I/O controller)
Interfaces	PCI Bus (3 slots supported) – USB 2ch ISA Bus (subset) – IDE 2ch 2 serials – Parallel - PS/2 KB&MS Audio interface AC97
Memory	32 or 64 MB SDRAM 4 MB VRAM 256 KB Flash
Video Performance	CRT & TFT LCD supported Up to 1280&1024 (SXGA resolution)
Power Consumption	Less than 3 W typical



EPSON provides ARM7TDMI 32-bit RISC as a Macro Cell for Embedded Arrays

In order to provide full System-on-Chip design support, EPSON now offers the ARM7TDMI™ 32-bit RISC core licensed from ARM Corp./ England which is a standard in mobile computing and many other applications including automotive, networking and multimedia. The ARM core fits perfectly into EPSON's energy saving policy while combining the advantages of high speed computing, low power consumption and small area on silicon.

The core is available as a macro cell in 0,35 µm technology with behavioral models in Verilog and VHDL. For system integration EPSON provides extensive Hardware and Software development tools with enhanced debugging features.

Supported ASIC

- 0.35 µm Embedded Array SSL50000 series
- 0.35 µm Standard Cell SCB50000 series
- 0.25 µm Embedded Array SSL60000 series*

Peripheral Support

- Memory interface, bus bridge, interrupt controller, timer, power management unit, cache, etc.

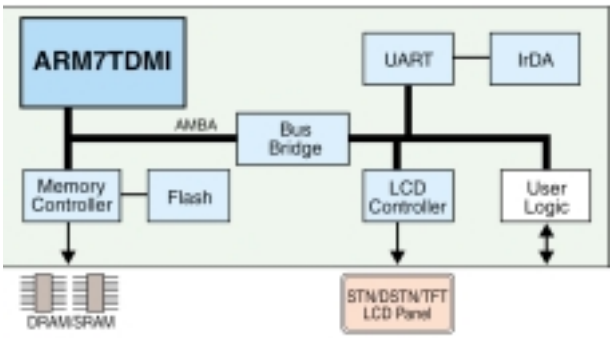
Hardware Development Tools

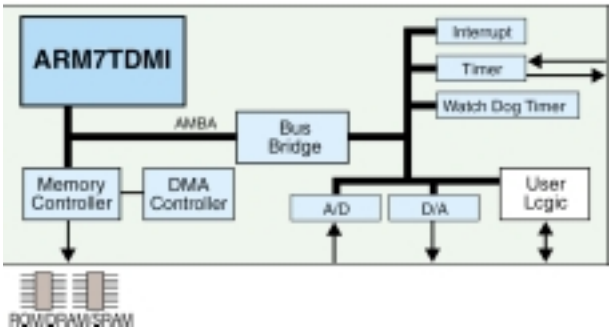
- Design Compiler
- Auklet/UX*, Verilog-XL, Model Sim. VSS

Software Development Tools

- ICE, evaluation samples

*=under development





EPSON Introduces First High-Performance 32-bit RISC Microcontroller with LCD Panel Interface

E0C332L01

EPSON introduces the latest member of its E0C33 family of RISC microcontrollers: the E0C332L01 is a high-performance, low-power 32-bit RISC MCU combined with an LCD panel interface for a complete system-on-a-chip solution. With high-speed operation, minimal power consumption and low cost, E0C332L01 is especially suitable for portable applications such as point-of-sales terminals, digital cameras, personal digital assistants and other handheld devices. It has built-in peripheral functions including LCD controller (embedded EPSON SED1375/VRAM) and A/D conversion, and it provides a DSP functionality realized with a MAC (multiplication accumulation instruction: 16 bit x 16 bit + 64 bit). This structure allows to minimize the overall system costs and to reduce time-to-market.

Development Tool Set

- optimized C compiler (based on GNU GCC 2.7.2)
- real-time operation system (ROS33)
- "In Circuit Debugging" (ICD33)
- wide range of emulation probe of devices

Optional High Level Firmware

- voice compression/decompression (VOX33)
- voice recognition in real-time (VRE33)
- Jpeg compression/decompression (JPEG33)
- melody library (MELODY33)
- Graphic, Sound and Text to Speech libraries are under development

Availability of Tools/Samples

- Production quantities and samples of E0C332L01 are available from now on (Package QFP8-176). Please contact our sales offices or visit our homepage for further information.

New package option for EPSON´s group of programmable oscillators

SG-8002JF

The newest member of the EPSON SG-8002 series of programmable oscillators is the SG-8002JF for standard clocking applications and all areas where short lead times and a small, cost effective frequency generation solution is needed.

The SG-8002JF completes the series with a 7.1 x 5.1 x 1.5 mm³ plastic package, which is fully footprint and function compatible with the well known CA package, while offering a cost effective plastic solution.

The one-time programmable SG-8002JF is the first oscillator available in this kind of package. It can be ordered in frequencies from 1 MHz to 125 MHz and in three different combinations of stability and operating temperature range. The oscillator is programmed in a batch process in mass production quantities. Samples are programmed by distributors or even by customers themselves and are available at a few days notice. Programmers can be ordered.

Like the other oscillators of the SG-8002 series, the SG-8002JF uses an internal PLL frequency generation circuit and combines extremely low delivery time with versatility at reasonable prices.

Specifications

Frequencies	1 MHz to 125 MHz
Operating voltage	5 V or 3.3 V
Output Level	TTL (5 V) or CMOS
Stabilities	+/- 50 ppm (-20°C to 70°C) +/- 100 ppm (-20°C to 70°C) +/- 100 ppm (-40°C to 85°C)
Aging	+/- 5 ppm / 1st year
Options	output enable or standby option
Package Size	7.1 x 5.1 x 1.5 mm³

New Real Time Clock Module

RTC-8564JE

EPSON´s new RTC-Module RTC-8564JE is a I²C-BUS interface RTC which is fully compatible with the PHILIPS PCF-8564 type. Like all EPSON RTCs it integrates the crystal in the package.

The component is available in the space saving JE (VSOJ-20) package. This very low profile type of package (7.0 x 5.4 x 1.3 mm³) makes it suitable for any kind of portable application where time and date information is needed.

At a wide operating voltage range between 1.8 V and 5.5 V the RTC-8564JE has a very low current consumption of 0.3 µA at 3 V. The data hold voltage ranges from 1.2 V to 5.5 V and the operating temperature range is from -10°C to +70°C at a tolerance of only 5 +/- 23 ppm at 25°C.

Beside alarm and timer registers the RTC-8564JE provides a selectable frequency output of 1 Hz, 32 Hz, 1024 Hz or 32.768 kHz.

The RTC-8564JE is completely function compatible with the successful EPSON RTC-8563, only the frequency output has been changed to CMOS levels.

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