

Q What is NEC's approach to its SOC (system on a chip) business?

A SOC refers to integrating multiple functions onto a single chip. NEC's strengths in the SOC business are its extensive library of cores to realize multimedia functions and its cutting-edge semiconductor technologies both in memories and logic ICs. To work closely with its customers, NEC has established design centers in its major markets of Japan, the United States, Europe, and elsewhere in Asia. Through the provision of comprehensive solutions, NEC has built long-standing partnerships with leading equipment manufacturers in various industries worldwide. By leveraging its unique strengths, NEC aims to aggressively expand its SOC business and thus increase both sales and profits in its semiconductor business.

In fiscal 1998, sales of electron devices increased 3 percent, to ¥988.8 billion (\$7,434 million), accounting for 20 percent of net sales. Although oversupply caused a weak performance in the DRAM market, NEC's semiconductor sales rose on the strength of sustained growth in the system LSI market associated with the further digitization of electronic equipment. Driven by demand for color LCDs, sales of electronic components also grew.

>> In **memories**, NEC accelerated its production shift from 16Mbit DRAMs to high-value-added 64Mbit DRAMs. Furthermore, NEC developed a 128Mbit synchronous DRAM mainly for use in notebook PCs and PC servers. NEC's total memory sales decreased owing to plunging prices for DRAMs; however, NEC enjoyed increased sales of high-speed static random access memories (SRAMs).

>> The **system LSI** market sustained its pattern of growth, reflecting the increasing digitization and multimedia integration of electronic equipment. Microcomputer sales advanced, thanks to demand from manufacturers of consumer electronics products and video game units. Supported by solid world demand for PCs and video game units, sales of application-specific integrated circuits (ASICs) increased. Sales of digital signal processors (DSPs) for cellular phones and charge-coupled devices (CCDs) were also higher.

>> During fiscal 1998, NEC signed an agreement with Philips Semiconductors B.V., of the Netherlands, to jointly develop SOC's. Under the agreement, NEC will provide its MIPS-based microprocessor core and both companies will combine their circuit libraries to jointly develop advanced SOC's for the rapidly growing field of digital consumer products.

>> Shipments of NEC's **discrete devices** rose with the launch of new products for cellular phones.

>> In response to rising demand for advanced semiconductors, NEC increased its production capacity of 0.25-micron diffusion lines in Japan, the United Kingdom, and the United States. In addition, participating in a Chinese government national project, NEC established a joint venture for semiconductor production with a local partner company.

>> Despite a sluggish market for color LCDs for use in notebook PCs, sales of **thin-film transistor (TFT) color LCDs** increased due mainly to growing demand for panels for use in PC display monitors. Furthermore, NEC developed large 18.1-inch and 20.3-inch panels during the year under review. To capitalize on opportunities in the high-growth-potential area of **color PDPs**, NEC continued the construction of a mass-production plant in Japan and developed 42-inch and 50-inch modules.

Highlights of the Year

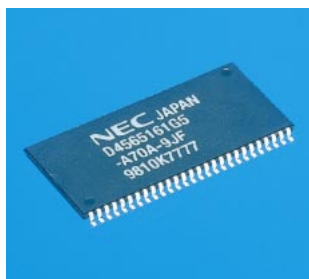
<input type="checkbox"/> Joint venture semiconductor company established in China
■ Development of cylindrical lithium-ion rechargeable battery
■ V _R 4111, a microprocessor for hand-held PCs, developed
<input type="checkbox"/> Codevelopment agreement concluded with Philips Semiconductors for SOC's
■ VCM, a new memory technology, developed
■ 1/2-inch, 1.3-million-pixel CCD sensor developed
■ Strategic partnership with THOMSON multimedia for color PDPs formed
<input type="checkbox"/> 128Mbit synchronous DRAM developed

NEC Develops V_R4111 Microprocessor

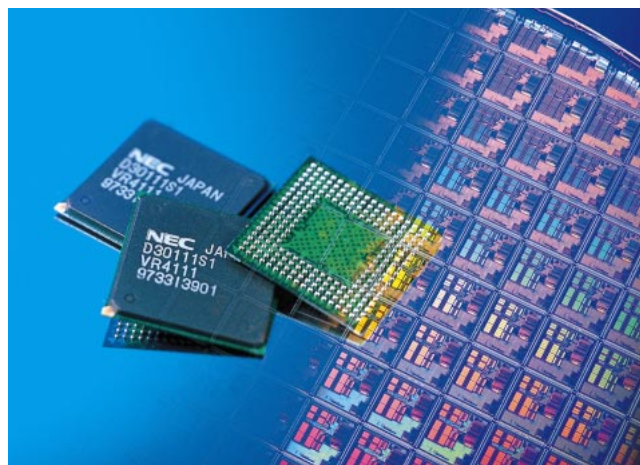
NEC developed the V_R4111, a high-speed, 64-bit RISC microprocessor for hand-held PCs running Microsoft Corporation's Windows® CE 2.0

NEC Develops VCM Technology

In November 1997, NEC unveiled virtual channel memory (VCM), a memory core technology that helps significantly enhance the system and graphic performances of PCs and workstations. VCM produces accelerated data input and output by introducing multiple channels for temporary memory storage between the memory cell and input/output interfaces.



NEC aims to establish VCM as the de facto standard for memory design. This new technology was adopted in a 64Mbit synchronous DRAM developed by NEC.



platform. Based on architecture developed by MIPS Technologies, of the United States, the V_R4111 was built using a leading-edge 0.25-micron process technology to offer high-speed processing with higher energy efficiency. The result is a twofold improvement in processing speed per unit of power consumption compared with its predecessor.

1/2-Inch, 1.3-Million-Pixel CCD Sensor Developed
CCD sensors are indispensable for image recognition in digital cameras. During fiscal 1998, NEC released a CCD sensor that integrates 1.3 million pixels in a 1/2-inch image size. This CCD sensor will help reduce power consumption and costs in high-resolution digital still cameras.

Strategic Partnership with THOMSON multimedia for Color PDPs

NEC has agreed with THOMSON multimedia S.A., of France, to develop next-generation technologies for



color PDPs. By developing next-generation circuitry and process technologies, the companies seek to create color PDPs that are brighter, more power-efficient, and have higher picture quality at a lower cost.

In addition, NEC will expand its global sales channels in this area by supplying 42-inch PDPs to THOMSON multimedia.

Development of Cylindrical Lithium-Ion Rechargeable Battery

NEC's affiliate Moli Energy (1990) Limited, of Canada, developed a cylindrical lithium-ion rechargeable battery using manganese materials in the electrode. Manganese-based materials cost less and are safer than the cobalt-based materials most commonly used in today's lithium-ion batteries. The newly developed battery is suitable for use in portable information terminals and will be sold through NEC's potent global channels.