World News

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Philips puts its weight behind Pb-free

Much of Philips' product and package portfolios has been lead-free (Pb-free) for years. Through continuous upgrading – replacing SnPb plating with pure tin – and innovative design, *full conversion* is expected well before new legislation comes into effect in 2006. Already, Philips' entire range of small-signal discrete, plastic, surface mount devices (SMDs) is now in 100% lead-free packaging. This will be followed quickly by the complete portfolio of glass and ceramic products.

Philips' drive to eliminate lead from electronic products supports formal guidelines introduced by various bodies. Of particular relevance, the RoHS (Restrictions on Hazardous Substances) establishes phase-out dates for Pb in electronic products, so that lead content must be below certain limits by July 2006. Philips' lead-free program aims to achieve complete conversion ahead of new legislation and **without** adversely affecting technical specifications or customers' manufacturing processes.

In 2001, Philips teamed up with STMicroelectronics and Infineon Technologies to form the E3 collaboration with the aim of developing standards relating to lead-free products. These standards are based on factors such as solderability, material reliability and characterization of the moisture sensitivity level (MSL). E3 shares two main goals: compatibility with both SnPb and Pb-free soldering, and elimination of lead in terminals (leads, balls, bumps) – the main source of Pb in packages. E3 defines lead-free as less than 1000 ppm lead content by weight. Increased uniformity is aided by their 'Green package' definition, ensuring lead and certain other elements are not intentionally added during manufacture.

Losing lead without compromise
Replacing lead-based package terminals with pure tin (100% Sn) plating creates a fully compatible Pb-free alternative, equal in size and electrical / mechanical characteristics. Also, Sn plating means lead-free Philips devices can still be used in conventional SnPb soldering. Philips applies solder tests to ensure forward / backward compatibility, and results also show that solder joint reliability of Pb-free packages is equal to or better than that for SnPb. In addition, all current Philips products have been re-qualified to deliver lead-free solutions that meet industrial standards.

Several preventative measures ensure that whisker growth – the term for metallic protrusion on electroplated layers – is not a problem with Pb-free: this has been confirmed by more than two years of extensive testing. Furthermore, MSL remains the same for Pb and Pb-free packages, although it may be affected by higher Pb-free soldering temperatures used in some processes.

Leading the way to lead-free!
With the path firmly laid for qualified Pb-free standards and products, Philips now leads the industry's drive towards 100% lead-free packaging with the introduction of the lead-free plastic SMD portfolio.

"We have accelerated our drive to deliver 100% lead-free products with the introduction of our portfolio of small-signal plastic SMDs," said Frans Scheper, Senior Vice President of Philips Semiconductors. "We wanted to enable a smooth transition for our customers by providing forward and backward compatibility of the devices with the reliability they need, and in plenty of time to test and prepare before forthcoming legislation."

Philips' active program of rapid Pb-free conversion proves the company's commitment to delivering quality products that meet customer requirements and contribute to a cleaner, greener environment.
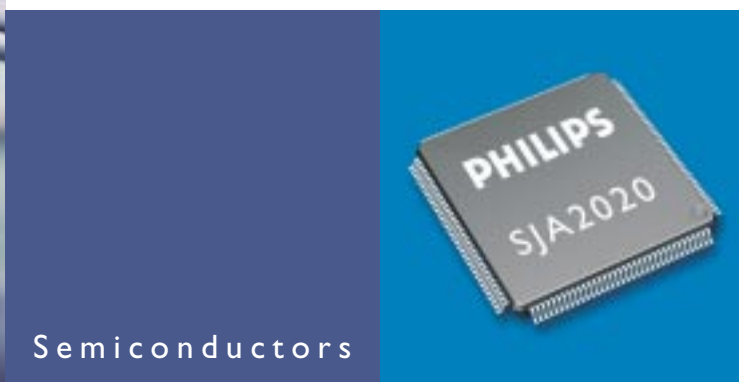
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Industry's first 32-bit IVN gateway controller

Today's in-vehicle networks (IVNs) require more memory and greater computing power in their control modules. Intricate networks are becoming even more complex as the number of applications increases. So Philips' new dedicated automotive microcontroller, the SJA2020, is the ideal choice for manufacturers looking for a solution that satisfies today's needs *and* anticipates tomorrow's. It's an industry first – a 32-bit ARM7-based microcontroller with embedded Control Area Network (CAN) and Local Interconnect Network (LIN) gateway functionality.

Leveraging its expertise in automotive electronics and 32-bit microcontrollers, Philips is entering the growing market for 32-bit microcontrollers in automotive applications. It is working closely with key players in the automotive industry (including Green Hills Software) to develop a family of ARM-based devices targeting specific in-vehicle applications. The first such device is the SJA2020, designed to support the increasing number and complexity of IVN systems.

Fully compliant with the AEC Q100 standard, the device features an industry-standard ARM7 core operating at up to 60 MHz. In addition, 256 Kbytes of robust embedded Flash memory and support for up to 6 CAN channels and 4 LIN masters provide designers with great flexibility in terms of implementation and customization of the gateway. The high-performance IVN functionality is backed up with a comprehensive list of auxiliary features,

allowing the same device to be used for many different applications. Among these additional features are five UARTs, four 32-bit timers, a 4-channel 10-bit ADC and up to 94 general-purpose I/Os.

"The market for 32-bit microcontrollers for automotive applications is expected to grow by a compound annual growth rate of 19% through 2007. Being the first 32-bit micro-controller designed specifically to support multiple CAN and LIN channels, the SJA2020 device is extremely well positioned to meet these industry demands and reflects Philips' focus and leadership in automotive IVN applications," said Chris Webber, Vice President of the Automotive Electronics & Telematics Practice with analyst firm Strategy Analytics.

The device – supplied in a 144-pin LQFP package – provides centralized processing power and intelligence for multiple IVN nodes. It supports the trend towards centralized body control applications, from central locking to power windows. By offering both CAN and LIN nodes on a single chip, it also lets applications communicate across different in-vehicle serial bus systems. For car manufacturers, it's a cost-effective and flexible way to implement an in-vehicle networking gateway for applications that require a 32-bit microcontroller. And replacing several 8-bit microcontrollers, the SJA2020 also cuts back on component count and helps centralize communications in IVN systems.

➡️ **Automotive continue**

LIN I/O slave expander cuts costs and complexity

As the number of applications in cars increases, manufacturers need to keep costs down without compromising on safety, which is why Philips has produced the UJA1023. It's a fully integrated Local Interconnect Network (LIN) I/O slave expander – a versatile, single-chip solution that supports up to eight identical LIN I/O slave nodes on a single LIN bus.

LIN is a low-cost in-vehicle network (IVN) solution for body control applications such as power windows, heated seats, backlighting LEDs, buttons, switches, sensors and power FETs for driving lamps or motors. Simplifying the design process and reducing the component count, the UJA1023 can be used to control up to eight LIN applications without requiring a microcontroller or any external components. By minimizing application-specific overheads and reducing interconnection costs by at least 10%, the UJA1023 provides a cost-effective way of handling rising complexity.

"As market leader in IVN semiconductors, Philips has developed the UJA1023 in response to customer demand for increasingly cost-effective, fail-safe and compact IVN solutions," said Jacob van der Pol, CAN/LIN segment manager at Philips Semiconductors. "In addition, the UJA1023 is in line with the increasing use of LIN in the car, as it offers a versatile single-chip solution enabling the control of multiple LIN applications with just a single device."

The device features an integrated LIN transceiver, an on-chip oscillator, eight configurable I/Os and automatic bit-rate synchronization to any bit rate between 1 and 20 Kbit/s. The outputs of the device can be configured as high- and/or low-side, cyclic or PWM driver. The inputs feature an eight-channel multiplexed 8-bit ADC, a configurable edge capture function and wake-up capability.

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Siemens VDO rewards high quality

At its recent 'supplier day', Siemens VDO Korea awarded prizes to Philips Semiconductors and four other companies in recognition of their high product quality.

In January of this year, Siemens VDO Korea held its second supplier day at the Sheraton Grande Walkerhill Hotel in Seoul, the Republic of Korea. Scheduled to be held every two years, the event saw 33 companies come together under the motto 'zero tolerance for defects'.

Four companies including Philips received 'Best Quality Performance Awards'; a further award was given in the 'Best Quality Improvement' category. As the names suggest, the winners were selected on the level of effort devoted to solving quality issues, as well as the actual product quality. Along with the award itself, each winner earned another valuable prize – first consideration for all new Siemens VDO projects worldwide.

➡️ **Automotive continue**

ULPI increases interoperability of USB components

Leading names in Universal Serial Bus (USB) connectivity have joined forces to develop a new transceiver interface standard for Hi-Speed USB 2.0 that reduces development time, increases design flexibility and ensures interoperability. The UTMI+ Low Pin Interface (ULPI) provides a standard interface for host, peripheral and On-The-Go (OTG) functionality. This cuts the transceiver pin-count from over 100 to as low as 24 and enables the use of much smaller packages. A key player in creating the ULPI specification, Philips offers the first ULPI-compliant USB transceivers – the ISP150x family.

USB is the most widely deployed wired connection interface in the PC domain. The recent USB 2.0 and OTG developments are expanding the applicability of USB by significantly increasing transfer rates and adding point-to-point communications. The ULPI specification is a physical implementation of the USB 2.0 Transceiver Macrocell Interface Plus (UTMI+), which Philips was heavily involved in promoting, and covers host, device and OTG applications. It allows designers to easily connect a Hi-Speed USB transceiver to USB core logic embedded in application-specific integrated circuits (ASICs) and System-on-Chip (SoC) solutions.

The ULPI specification provides a standard 12-pin interface between embedded host, peripheral or OTG circuitry and an external transceiver. As a result, more USB functionality can be designed in, pin-count can be dramatically cut and packages as small as 4 mm x 4 mm can be used. By employing the ULPI standard instead of the proprietary interfaces used today, ASIC and SoC designers can reduce design time, simplify testing and ensure interoperability with USB transceivers.

The specification was developed by the ULPI working group, a consortium of leading semiconductor and IP providers. Chaired by Philips, the working group also comprises ARC International, Conexant, Mentor Graphics, TransDimension Inc. and Standard Microsystems Corporation (SMSC). In addition, Cypress, Synopsys, Innovative Semiconductors and Motorola have recently verified the specification and joined the working group.

"We are delighted to continue our close working relationship with Philips Semiconductors," said Michael Kaskowitz, General Manager of the Mentor Graphics Intellectual Property division. "Proving the interoperability of our intellectual property with the ISP150x family will be a major factor in easing the adoption of Hi-Speed USB in today's sophisticated embedded devices."

Intimately involved in creating the specification, Philips had first-hand knowledge of any modifications. Consequently it could develop transceivers in parallel with the standard, and so was the first company to bring ULPI-compliant products to market. The 32-pin ISP1504 provides full host, peripheral and OTG functionality, while the 24-pin ISP1505 is designed for stand-alone hosts and peripheral applications. Finally, the 24-pin ISP1506 is a fully featured host, peripheral and OTG transceiver that brings double-data-rate operation to mobile applications.

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→ **Networking continue**

Industry's first Hi-Speed USB host controllers

Philips has delivered the industry's first Hi-Speed Universal Serial Bus (USB) host controllers for embedded systems. The two new devices are the ISP1760 host controller and the ISP1761 single-chip host and peripheral controller with USB On-the-Go (OTG) support. They both feature high throughput and low power consumption, enabling bandwidths up to 480 Mbit/s – the maximum offered by the USB 2.0 specification.

These new Hi-Speed USB controllers allow people to connect to information, entertainment and services more quickly and conveniently. The ISP1760 is designed for set-top boxes, digital televisions, DVD recorders and other consumer products. It offers high-speed USB connection to PC peripherals such as printers, hard disk drives, memory cards and scanners. The single-chip ISP1761 includes Hi-Speed capability for both the device and host function. It is OTG-capable, providing point-to-point communication between portable devices such as mobile handsets, PDAs, digital still cameras, digital video cameras and MP3 players.

"Philips is the first to deliver high-performance, Hi-Speed USB and Hi-Speed USB OTG solutions that will change the way people transfer information and digital content," said Dave Sroka, director of marketing at Philips Semiconductors. "Given the boom of connected consumer devices, the ISP176x family of USB solutions can transform PDAs, digital cameras or smart phones into centers of connectivity."

Power consumption is especially important for portable devices. The ISP176x family features a power-optimized architecture for low power consumption in both operating and suspend modes. A hybrid power-down mode also allows the USB devices to be powered from both the USB cable and the system power supply. When this power reallocation is utilized, the power consumption of the ISP1761 or ISP1760 from the board supply is reduced by over 40%.

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- /buses/usb/products/host/isp1760
- /buses/usb/products/otg/isp1761

→ **Networking continue**

Direct-conversion silicon tuner

A leading provider of silicon solutions for broadband communications, Broadcom is joining forces with Philips to create next-generation direct-conversion silicon tuners. Direct conversion has numerous advantages over existing technologies, allowing cable modem manufacturers to implement cost-effective, very-low-power tuner designs. Under this joint development program, Philips will exclusively supply Broadcom with a new direct-conversion silicon tuner solution for cable modem applications. Broadcom will implement this technology in a single-chip product – the BCM3419.

Direct-conversion silicon tuner technology offers significant advantages over the dual- and single-conversion tuners used in existing cable modems. By eliminating expensive SAW filters, this advanced technology reduces the design complexity and the cost of implementing tuner designs. And direct-conversion tuner technology is opening the door to emerging cable modem applications. For example, the lower power and cost demands deliver the precise design benefits required by outdoor wireless access points and Voice-over-IP (VoIP) via cable.

"The technology demands for cable modems are changing to reflect the growing number of uses seen by cable operators, including line-powered or battery-backed voice modems," said Dan Marotta, Vice President of Broadcom's Broadband Communications Group. "Working with Philips on this next-generation tuner technology will allow our customers to support a growing number of cable modem applications that are not possible today with dual-conversion tuners. An immediate benefit of using direct-conversion technology in the BCM3419 chip is the improved market competitiveness the product can offer our customers. This advanced silicon solution cuts the number of tuner support components in half and reduces the time and complexity of manufacturing."

The BCM3419 is the cable modem industry's first single-chip, direct-conversion tuner solution. It supports both current requirements for Quadrature Amplitude Modulation (QAM), as well as advanced orders of QAM used by many of Broadcom's chips. The advanced capabilities in the BCM3419 result in improved product performance and reliability and fewer system support components. The BCM3419 also allows customers to reduce the bill of materials (BOM) for existing cable modems.

→ **Networking continue**

Easier software development for attractive consumer products

Software is a vital element of today's consumer devices, providing more and more exciting new features and broad product differentiation. However, creating robust and reliable software is a long and expensive process. Philips is driving two far-reaching cooperative initiatives that will simplify the creation of middleware and application software for the consumer market. This in turn will cut time-to-market for exciting new home entertainment products.

To speed the development of new products, consumer electronics (CE) manufacturers often turn to independent software vendors (ISVs) for middleware and application software. However, having to adapt code to suit the numerous silicon platforms that exist is a major hindrance for ISVs when bringing new modules to market. In response, Philips and Samsung have joined forces to develop the Universal Home Application Programming Interface

(UHAPI). The UHAPI is a common framework for software creation and aims to make the development process more efficient while offering CE companies the flexibility to differentiate their products. Once finalized, it will act as a bridge between hardware and higher-level software, allowing ISVs to develop hardware-independent modules and cutting time-to-market for complete hardware / software solutions.

The UHAPI consists of a set of software interfaces for configuring and controlling audio- and video-related components of a semiconductor platform. It targets a wide range of consumer applications including analog and digital televisions, DVD players and recorders, set-top boxes, personal video recorders and home servers. Together, the semiconductor divisions of Philips and Samsung will establish, maintain and promote the UHAPI specification. They plan to invite other companies to participate in enhancing the UHAPI and deploying it throughout the CE market. The first UHAPI-compliant semiconductor products are expected to be released during 2004.

Philips' involvement in the UHAPI is complemented by its Nexperia Home Partnership Program (NHPP). This initiative is aimed at ISVs and system integrators who wish to create middleware and application software for 'Connected Consumer' devices. It offers a complete set of technical tools, information and joint marketing programs. In addition, complete software development kits are planned and will include development hardware, software applications, a documented API and an operating system. The first of these kits is aimed at digital TV and is based on the Nexperia PNX8550 Home Entertainment Engine. A similar kit for DVD+RW will be available in the second half of this year.

Fourteen leading ISVs have already joined the NHPP. They are Allegro Software, ANT Limited, Blunk Microsystems, BORES Signal Processing, Cabot Communications, DivXNetworks, ICT Embedded, Mediabolic, Momentum Data Systems, Ordina, Planetweb, S3, Streaming Networks and Wind River Systems. These companies are developing software-based products complementing the Nexperia Home Family semiconductor system solutions. Combining software and hardware in this way enables a wide range of new opportunities for manufacturers of innovative consumer electronics products.

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/products/nexperia/home/partner
www.uhapi.org/

➜ **Technology continue**

Breakthrough in embedded EEPROM technology

Philips Semiconductors' new low-voltage embedded EEPROM option for its 0.18 µm CMOS18 process delivers outstanding memory density and power consumption levels. Targeting the need for increased storage and flexibility in smart card, consumer, communications and automotive applications, the new technology complements and extends Philips' portfolio of non-volatile memory options.

Many new applications demand larger information storage from strictly limited power budgets. For example, proposed security measures have heralded the arrival of electronic passports. The chips in these passports must be contactless – so must draw energy from a weak RF field – yet they also have to be able to store large amounts of biometric data for identification purposes. The new byte-alterable CMOS18 EEPROM technology fulfils both these requirements, providing high density and low power consumption. It is also fully compatible with Philips' existing embedded Flash memory option, enabling the creation of highly flexible mixed Flash / EEPROM systems.

"With embedded ROM, EEPROM and Flash memory available in the same low-cost CMOS process for all our 8-, 16- and 32-bit product families, we can implement a wide range of non-volatile memory configurations," said Bettina Kuhrt, Marketing Manager for Mobile Communications Products, Security Solutions at Philips Semiconductors. "Whether customers are looking for fast prototyping, production-line programming or the ability to download Java applets onto a card, we can now provide the optimum mix of non-volatile memory at voltage and power levels that suit high-performance applications as well as contactless smart card solutions."

The EEPROM process is based on a similar cell design to Philips' proven 2-transistor NOR Flash technology. Both use Fowler-Nordheim (FN) electron tunneling for programming **and** erasure, resulting in very low power consumption. However, the EEPROM process features a small increase in programming voltage, tighter control of the erase-distribution and read-threshold voltages, and an increased gate area on the memory transistor for greater charge injection. Together, these modifications have enabled a breakthrough in byte-erase time for FN-based devices, lowering it to below 1 ms. Crucially, none of these techniques compromises the performance of the baseline CMOS18 process, enabling a true embedded memory technology that is highly reliable – an important factor in many markets.

Furthermore, the new option dramatically reduces cell size – from 5 µm^2 for conventional 0.18 µm embedded EEPROM technologies down to just 1.2 µm^2. This enables the creation of 2 Mbit (256 Kbyte) memories in a silicon area compatible with cost constraints of smart card applications. Philips has also shown that the technology can be successfully shrunk to 0.15 µm, with early indications that further migration to 0.13 µm and sub-100 nm

processes is possible. The ability to migrate a process option encourages IP re-use, offering manufacturers a cost-effective way to increase functionality and memory capacity as future applications demand.

The new EEPROM option is available for design-in now and is supported by all the company's CMOS18 design tools, including the provision of memory test facilities through a standard JTAG interface.

➜ **Technology continue**

Philips Semiconductors joins the MIPI Alliance

Further strengthening its commitment to open standards, Philips Semiconductors has joined other leading mobile communications companies in the Mobile Industry Processor Interface (MIPI) Alliance. The MIPI Alliance aims to develop and promote industry standards for interfaces to mobile application processors.

The MIPI Alliance comprises around forty leading companies, drawn from virtually every segment of the mobile communications industry. It is intended to complement existing standards bodies and focuses on microprocessors, peripherals and software interfaces. By establishing specifications for standard hardware and software interfaces to mobile application processors and encouraging their adoption throughout the industry value chain, the MIPI Alliance will allow handset manufacturers to source peripherals from numerous suppliers. These standards will simplify development and encourage IP re-use, providing a cost-effective way to speed the advent of future-generation handsets and the deployment of new services.

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➜ **Technology continue**

Maximize RF performance, minimize system size

Increased integration, smaller devices and higher frequencies are major trends in RF design. Philips helps designers respond to these challenges while improving overall RF performance with RF System-in-a-Package (RF SiP) and passive integration technologies. The benefits of these technologies can be clearly seen in the new UAA3587 RF transceiver for GPRS and EDGE mobile phones, enabling the rapid development of highly featured next-generation handsets.

In today's markets, manufacturers are increasingly looking for more-integrated RF solutions to cut size, cost and time-to-market. However, no single silicon manufacturing process is capable of providing maximum performance in all areas of an RF system. Philips' RF SiP technology provides an answer to this apparent paradox. Combining multiple dies into a single package, RF SiPs are 'one-chip' solutions that allow each sub-system to be manufactured in its optimal process – such as Philips BiCMOS QUBiC for RF components and 0.12 μm CMOS for digital logic.

The RF SiP approach is perfectly complemented by Philips' silicon integrated passive technology. In this technology, high-quality passive components such as accurate resistors, high-Q inductors and high-density MIM capacitors are integrated into a low-cost silicon substrate. As well as reducing parasitic losses and improving RF performance, this helps cut assembly costs and time-to-market. Within the silicon-based RF SiP, the low-cost passive die acts as a carrier for the active components. The active dies are flip-chip bonded to the passive silicon, and the whole assembly is housed in a standard plastic package.

"In a fiercely competitive market, RF SiP solutions and passive integration technology on the RF front-end provide a critical advantage," said Gert-Jan Kaat, Senior Vice-President for mobile communications in Philips Semiconductors. "Handset manufacturers can save board space, maximize performance, drastically reduce engineering hours and get their products to market quickly."

The first cellular IC to make use of these technologies is the UAA3587 RF transceiver, which will become the heart of the RF front-end for Nexperia Cellular System Solutions. It uses 35 fewer RF components than the previous generation and enables a design area of less than 2.5 cm^2 for the complete radio sub-system. Combined with the miniaturization of other components, this gives a space saving of 30% over the previous 'best in class' – and 50% over the industry average while offering increased RF functionality.

Pushing on-state resistance below the milliohm

Combining its excellence in silicon and packaging technologies, Philips has demonstrated the world's first sub-milliohm MOSFET. The device displays a number of technology developments that will increase efficiency, reduce device footprints and improve performance in power management applications across all markets.

Energy efficiency and device size are key considerations in many market segments, particularly for battery-powered and handheld equipment. Philips Semiconductors is leading the way in improving these properties with the demonstration of the world's first MOSFET to exhibit an on-state resistance ($R_{DS(on)}$) of less than 1 mΩ – a reduction of around 40%.

This important step in MOSFET development was achieved primarily through copper clip technology; an area where Philips leads the industry. Typically MOSFETs are connected to the top of the package using a weld and wire bond. However, copper clips allow the entire surface of the chip to be connected – rather than just a single point. This improves current distribution and thermal performance, significantly lowering on-state resistance. Careful design of the copper clip and package leadframe was needed to ensure accurate control of the clip position and a workable assembly process.
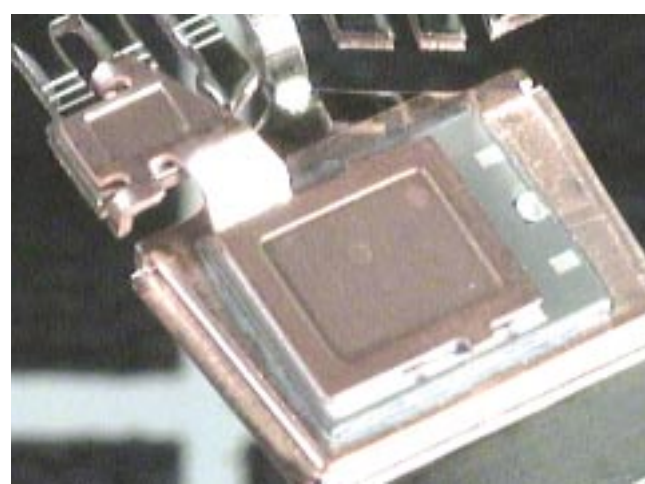
The device uses many other technology breakthroughs – such as Philips' patented self-aligned process, which enables the manufacture of silicon with low enough resistance. In addition, accommodating the copper clip arrangement required solderable top metallization. In this way, Philips took the best available silicon technology and packaging technology, then combined and optimized them to reach the required sub-milliohm target.

"As the number of portable electronics products continues to grow, power management devices with greater functionality, performance and reliability are required," said Manuel Frade, Vice President and General Manager of Philips Semiconductors' Power Management Business Line. "Philips continues to find new methods to improve chips and ensure the industry can meet customer requirements."

MOSFETs with such low $R_{DS(on)}$ values will be real advantage in applications where power loss and heat dissipation are critical, such as computer motherboards. They will also be important in automotive applications where ever-higher currents need to be switched with minimum power loss. Many of the technology developments made during the sub-milliohm MOSFET program have already been implemented in Philips' recently announced LFPAK MOSFETs and P-channel μTrenchMOS devices.

The world's first MOSFET with an on-state resistance below 1 mΩ

*In*sight

When you hear about major developments in the semiconductor industry, it's usually about leading-edge semiconductor process technologies. After all, breaking the so-called 1 micron and 0.1 micron barriers is what made headline news. It is true that achieving progressively smaller geometries is important, for without them the consumer electronics industry won't have the chips it will need in three years time to meet the exponential performance demands of the information society. In practical terms though, these announcements are not about the here and now, they are more about the yet to come.

What is practical in terms of today's applications is how current technologies are being brought together to solve here and now problems. Real applications, especially those in consumer electronics, typically require the use of several different process technologies to achieve the required price/performance points. Mobile phones, for example, rely on the latest high-volume CMOS process technologies to implement their digital baseband functionality. Yet when it comes to their RF functions, process technologies such as silicon or silicon germanium BiCMOS are required to achieve the necessary high-frequency performance and dynamic range; III-V technologies such as GaAs are required to up the efficiency and linearity of RF power amplifiers; and a whole range of passive components such as inductors and capacitors are needed for resonant circuits, filters and impedance matching networks.

Up until a few years ago it would have been the responsibility of the handset manufacturer to integrate all these technologies into a phone, using a mixture of ICs and discrete components. Today that has all changed. Now it is semiconductor companies that integrate all these technologies into IC-sized packages so that handset manufacturers can enjoy the luxury of ultra-miniature, fully tested, plug-and-play solutions. This new breed of System-in-a-Package (SiP) solutions is not just appearing in the mobile communications industry. It is appearing in a whole range of consumer electronics products.

The hybrid-circuit industry would argue that they have been doing this for years, and in a sense they have. But there are important differences between conventional hybrid circuits and SiPs. The latest SiP technologies, such as those being used in Philips RF SiPs, move as many components as possible onto silicon, thereby leveraging the miniaturization, precision and volume manufacturing advantages of wafer-scale processing. Inductors, capacitors and resistors, once the realm of conventional discrete component manufacturers, are now manufactured on silicon using low-cost 'back-end' wafer processes.

There is another important difference. Hybrid circuit manufacturers tend to outsource their components. Philips, on the other hand, with its comprehensive range of semiconductor processes and passive component integration technologies can produce entire SiP solutions in-house, giving it complete control over system partitioning. As a result, components can be shifted to whatever type of silicon produces the best price/performance ratio.

Assembly and test may not have been the most glamorous end of the semiconductor business, but when it comes to stacking chips on chips, placing them to micron accuracies, bonding them electrically and mechanically together, and testing them as a complete system solution, SiP technology is one of the most exciting new developments in the industry.

Peter Harold
former European Editor, EDN Magazine

Collaboration drives advanced process development

For leading consumer electronics companies, access to state-of-the-art semiconductor technology is the key to delivering ever-richer consumer experiences in areas such as multimedia entertainment and communications. Philips is heavily involved in many cooperative projects to ensure that new processes are available in plenty of time to meet the demands of future applications.

Semiconductor manufacturers require advanced baseline CMOS technologies for the powerful digital ICs at the heart of these applications. With 0.18 µm CMOS processes widely used in today's products, the drive towards future nodes on the CMOS roadmap

is well under way. The Crolles2 Alliance is commercializing 120 and 90 nm processes, and is already developing tomorrow's 65 nm technology. Meanwhile, long-term research collaborations are investigating the 45 nm node and beyond.

To complement CMOS technology, manufacturers also need special semiconductor processes to produce chips that can handle associated tasks such as wireless communication, power amplification and display driving. Again, Philips is active in joint research projects to drive these advances. Its commitment to providing total system solutions rather than component parts means that development of these specialized processes is as important to the company as having cutting-edge CMOS.

Unique collaboration speeds industrialization

In conjunction with its Crolles2 Alliance partners – Motorola and STMicroelectronics – Philips is advancing the next three CMOS baselines towards industrialization. The joint development of these processes will keep the Alliance members ahead of the industry's roadmap, and allow their customers to exploit the performance, power, size and cost benefits earlier.

The most mature of these technologies is the 0.12 µm CMOS12, in which several devices have already been produced, with many more in the pipeline. CMOS12 is a 1.2 V technology with options optimized for high speed or low power. Embedded ROM, SRAM and DRAM modules have been developed for CMOS12, and numerous IP blocks are available. These include MIPS, ARM7 and ARM9 cores, TriMedia processors and USB functions as well as general-purpose and I/O cells. A complete CMOS12 design environment has already been released and support services are available.

Product development is also under way for CMOS090. The first tape-outs of this 90 nm process were achieved in December 2003, and the first product was successfully processed

earlier this year. A 1.0 / 1.2 V technology, CMOS090 will be available in general-purpose and low-power versions. As well as ROM, SRAM and DRAM, a number of embedded non-volatile memory options will be available. These include the familiar Flash memory and EEPROM, but also new magnetoresistive RAM (MRAM) that combines the benefits of SRAM, DRAM and Flash into a single memory type. A high-performance RF version of CMOS090 is due to begin prototyping later this year.

Looking further into the future, development of the 65 nm CMOS065 process is progressing rapidly at the Crolles2 facility. CMOS065 will be an evolution of CMOS090 and will be based on known technology modules. Due to be released during 2005, CMOS065 will be available in general-purpose and low-power versions operating at 0.9 V and 1.2 V respectively. It will deliver logic densities twice as high as CMOS090 (four times those of CMOS12) and offer performance increases without additional leakage. Many of the same options as for CMOS090 will eventually be available including Flash, MRAM and RF.

Philips and IMEC strengthen link

Royal Philips Electronics has signed a new agreement with the Inter-university MicroElectronics Center (IMEC), one of the world's leading independent research centers in nanoelectronics.

Following last year's announcement of Philips' participation as a Core Partner in IMEC's sub-45 nm research programs, the new deal extends Philips' access to the advanced facilities and expertise available within IMEC until the end of 2008. It will enable joint research activities into advanced CMOS technologies in preparation of continued development and commercialization within the Crolles2 Alliance, as well as joint development of more-specialized semiconductor processes.

"Our previous collaboration with IMEC made possible important differentiators such as our world-beating RF BiCMOS processes, highly effective non-volatile embedded memory

solutions and best-in-class TrenchMOS devices," said Theo Claasen, Executive Vice President Technology and Strategy, Philips Semiconductors. "This new agreement with IMEC therefore represents an important part of our strategy to keep Philips at the forefront of the semiconductor industry."

The agreement will run for five years and replaces an existing contract that was scheduled to finish by mid 2005. It guarantees Philips a unique level of interaction with the expertise of IMEC's research scientists. Philips will also have access to the state-of-the-art equipment within IMEC's existing and newly built clean-room facilities. This will enable the development of process steps for both 200 mm and 300 mm wafers, providing high-quality input to Philips' advanced production fabs.

New European project pushes the limits of CMOS technology

Seed-funded by the European Commission, the NanoCMOS project brings together some of Europe's leading research institutes and semiconductor companies. The project aims to carry out the pioneering research into materials, processes, device architectures and interconnections that is required to continue the drive towards increased semiconductor performance and density.

The project's first goal is to demonstrate the feasibility of 45 nm CMOS technology, which it aims to do by 2005. At the same time, research into the next nodes on the international technology roadmap (32 and 22 nm CMOS) will begin. This first phase is expected to last 27 months and mobilizes a large research potential. In addition to the € 24 million support from the European Commission, the partners will invest advanced research resources to achieve the project's objectives.

Beginning in 2006, a proposed second phase will demonstrate the feasibility of the 32 and 22 nm nodes. Additionally, the consortium will make a proposal to the MEDEA+ organization to start in 2006. The proposal will cover the integration and validation of

the 45 nm node in an industrial 300 mm wafer manufacturing facility, currently expected to be the Crolles2 facility. These two upcoming project proposals have been integrated into the NanoCMOS strategy and discussed with European Commission and MEDEA+ officials.

"NanoCMOS has ambitious objectives and impressive resources mobilized towards a common goal," said Guillermo Bomchil, leader of the NanoCMOS project. "It represents a unique opportunity for Europe to become the leading center for nanoelectronics, while supporting academic research and helping its indigenous industrial players to hone their competitive edge."

The project involves Europe's three largest semiconductor companies – Philips, Infineon and STMicroelectronics – as well as the two biggest technical research institutes – CEA Leti in France and IMEC in Belgium. Other partners include the Technical University of Chemnitz (Germany), Ion Beam Services (France), ISILTEC (Germany), Magwel (Belgium), ACIES Europe (France), the Fraunhofer-Gesellschaft (FhG) in Germany and the Centre National de la Recherche Scientifique (CNRS) in France.

First-ever DVD+RW/HDD combination recorder reference design

Philips offers the world's first semiconductor reference design for DVD+RW and hard disk drive (HDD) combination recorders. Combination devices are the next step towards the vision of the Connected Consumer and are expected to become a lucrative market. This reference design will allow DVD recorder manufacturers to create DVD+RW / HDD combination devices from scratch and in time for the next holiday buying-season.

"Adding a hard disk drive to a DVD recorder to combine time-shifting and archiving gives a great product. In addition to recording TV programming, the hard drive can be used as an audio jukebox and a place to store the family photo album," said Michelle Abraham, senior analyst with leading research firm In-Stat/MDR. "We forecast sales of combination DVD / HDD recorders will expand worldwide from 1.3 million units in 2003 to 18 million by 2007."

The Nexperia DVD+RW / HDD combination recorder reference design is based on Philips' DVD recorder engine and the Nexperia PNX7100 single-chip MPEG-2 codec. The reference design is industry-proven and fully compliant with the DVD+R/+RW standard. It comes complete with hardware schematics, industry-standard software stack, comprehensive Nexperia Home development kit, documentation and a new tool allowing customization of the recorder's graphical user interface. As a result, the reference design provides OEMs with a low bill of materials, rapid time-to-market and easy product differentiation – critical factors in this competitive market.

"Philips was the first company to offer a complete semiconductor reference design for DVD+R/+RW digital video recorders and continues to meet the demands of our customers with advanced solutions addressing the fast-moving trends of the DVD recording market," said Jeroen Keunen, General Manager, Consumer and Multimedia at Philips Semiconductors. "By leveraging our expertise in Connected Consumer appliances, Philips is committed to providing our customers with turnkey semiconductor solutions to bring the benefits of digital video recording, archiving and time-shifting to the end consumer."

Connected combination devices are predicted to become extremely popular. Serving as media entertainment hubs, they offer storage of and access to digital content from video, audio, gaming and PC applications throughout the home.

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/products/nexperia/home/products/reference/dvd_rw_pvr_combi/
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Bringing DVD recorders to the high-volume market

The new Nexperia PNX7200 single-chip MPEG-2 codec enables the creation of attractive DVD recorders at mainstream price points. This highly integrated product cuts the bill of materials (BoM) by up to 30%, leading to the lowest system costs on the market. The PNX7200 is an integral part of the fourth-generation Nexperia DVD+RW reference design as well as a DVD recorder monoboard produced by BenQ. Such integrated design solutions accelerate the creation of high-volume consumer products.

"DVD recorders will be big in 2004 and will essentially replace the market for video cassette recorders," said research analyst Adrienne Downey of Semico Research. "Companies such as Philips are providing robust semiconductor technologies that make it easy for manufacturers to build DVD recorders quickly and cost-effectively to meet consumers' needs." Semico Research predicts sales of 13.3 million DVD recorders in 2004, compared with just 3.5 million in 2003.

The Philips Nexperia PNX7200 is the most integrated MPEG-2 codec available today. Delivering high-quality multimedia encoding, decoding and transcoding on a single chip, it significantly lowers the BoM and development times for home entertainment systems. Manufactured in Philips' advanced 0.12 µm process technology, it has the smallest memory footprint – just one SDRAM. The PNX7200 enhances consumers' audio / video experience via improved features such as integrated progressive scan, adaptive picture sharpness, de-blocking artifact removal and simultaneous progressive and interlaced output.

Providing a further reduction in system cost, the fourth-generation Nexperia DVD+RW reference design is a ready-to-manufacture solution for high-volume DVD recorders based on the PNX7200. It incorporates all required hardware, a complete software stack and user interface generation tools. Building on the success of previous versions, this new reference design offers reliability, compatibility and full compliance with the DVD+RW standard.

New monoboard solution cuts size and price
The DVD recorder monoboard from BenQ is targeted at consumer electronics OEMs looking for reliable, low-cost DVD+RW solutions. It integrates a digital board featuring the PNX7200 with the BenQ optical engine based on the Nexperia PNX7850 chipset. Integrating these two high-quality components into a single board markedly reduces inventory costs and form factor, as well as simplifying sourcing arrangements. The proven combination of optimal front-end and MPEG-2 back-end also improves the reliability and playability of the end product.

"Together, BenQ and Philips share the same goal; to drive the rapid adoption of DVD recorders into the mainstream market by supplying our customers with a complete DVD-recorder monoboard," said William Wang, Vice President, BenQ Corp. "We are excited to join forces with Philips again since Philips' system solutions have been supporting BenQ in its efforts to lead the performance, recording speed, and price point battles in the audio/video and PC optical engine markets."

Philips sees the booming DVD recorder market as a cornerstone of its Connected Consumer vision. The company offers a unique portfolio of feature-rich and industry-proven solutions to drive down costs and development times. Around seven out of ten DVD+RW recorders sold in 2003 were based on Philips Nexperia products.

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• /products/nexperia/home/products/dvd_recording
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Semiconductors

Latest LCD TV solutions are world firsts

The booming flat panel display and LCD TV market is likely to reach 32 million units by 2008, according to Strategy Analytics. Though currently dominated by small and medium-sized displays, the 30"+ segment is set to grow rapidly from 2005. Helping drive adoption of LCD TV in all price bands, Philips leads the industry with integrated devices such as the TDA15500 single-chip solution and PNX5000 scaler.

Philips continues to take the global TV market by storm, replicating its reputation for CRT technology in the realm of LCD. "Playing a leading role in the growing LCD market and providing manufacturers with state-of-the-art multi-functional and cost-effective chip solutions are key to our business," said Martin Maloney, International Product Marketing Manager, Philips Semiconductors. Two of the company's latest solutions say something about the range and power of its LCD TV portfolio.

The highs and the lows of the LCD TV market

Aimed primarily at low-end LCD TV, the TDA15500 is the market's first single-chip solution to include video decoding, picture improvement, de-interlacing and scaling, sound entertainment, and a microcontroller with teletext. "This latest system solution revolutionizes the LCD TV industry," said Jos Klippert, Marketing Director for LCD TV solutions at Philips Semiconductors. "The TDA15500 is a low-cost, single-chip implementation in an easy-to-use reference design that helps our customers build competitive LCD TVs with short times-to-market. It also provides the flexibility they need to differentiate themselves from other players."

The technology behind the TDA15500 is derived from Philips' third-generation Ultimate-One-Chip (UOC) solution and scaler expertise. David Mercer, VP of Strategy Analytics,

commented, "Single-chip solutions such as the TDA15500 will help drive growth in the low-end LCD market as the technology will allow more manufacturers to bring affordable LCD TV sets to market."

Part of the Nexperia Home Family, the PNX5000 scaler device also benefits from UOC compatibility. Targeting mid-range and high-end LCD TV, it delivers world-class picture quality at a competitive price. "The PNX5000 scaler is the first on the market to integrate motion-compensated de-interlacing," said Jos Klippert. "Its unique compatibility with the industry-standard UOC video processor and software stack enables a highly integrated LCD TV solution. We are the only company which can currently offer this total system solution." By re-using existing development investments in UOC- and GTV- (Global TV) based CRT chip technology, manufacturers can improve time-to-market and reduce overall expenditure.

Philips' LCD TV solutions aim to meet manufacturer and consumer expectations in picture quality, features and price. David Mercer said, "With Philips' proven and extensive knowledge in the television arena, its semiconductor division is a leader in developing single-chip technology." These latest LCD TV products are prime examples of the company's ability to convert innovative technology into real solutions.

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- /news/content/file_1025.html

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Low-cost, high-performance audio amplifier

Delivering an outstanding price / performance ratio, the new TDA8947J is an ideal low-cost solution for demanding audio applications. Its wide supply voltage range and extensive feature list, which includes Philips' patented overload protection, make it ideal for numerous products such as home theater systems, PC speakers and LCD, plasma and CRT televisions.

At the heart of the new device is a unique overload protection system based solely on multiple temperature measurements within the chip. This gives maximum output power for all supply voltages and enables sufficient headroom to prevent audio holes. Previously, audio holes could result from extreme conditions such as the low load impedances that can occur when overdriving an amplifier or using external speakers.

"Philips has developed its patented overload protection technology to bring to market a robust solution for high-performance audio amplification," said Jan-Paul Huyser, international product marketing, audio amplifiers at Philips Semiconductors. "In addition, we have created a family of these devices to support the various power requirements of today's consumer electronics devices – ensuring our customers a flexible amplification solution to enhance their audio and video products."

A single-chip solution supplied in a 12-pin DBS power package, the TDA8947J includes a four-channel amplifier that offers a choice of channel configurations: four single-ended (SE); two bridge-tied load (BTL); or two SE and one BTL. It can be used to enhance the sound of a simple 2.1 system, or to create a 5.1 system with just two chips – reducing the bill of materials for such systems by up to a factor of three. The device offers easy

interfacing to the system's on / off control circuit, draws a low standby current and is capable of delivering 4 x 25 W or a mix of 2 x 15 W + 1 x 50 W. Its flexibility is further extended by a wide supply voltage range of 9 to 28 V, allowing it to be designed into a wide range of applications, including those with a simple power supply structure.

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/pip/TDA8947J_N3.html

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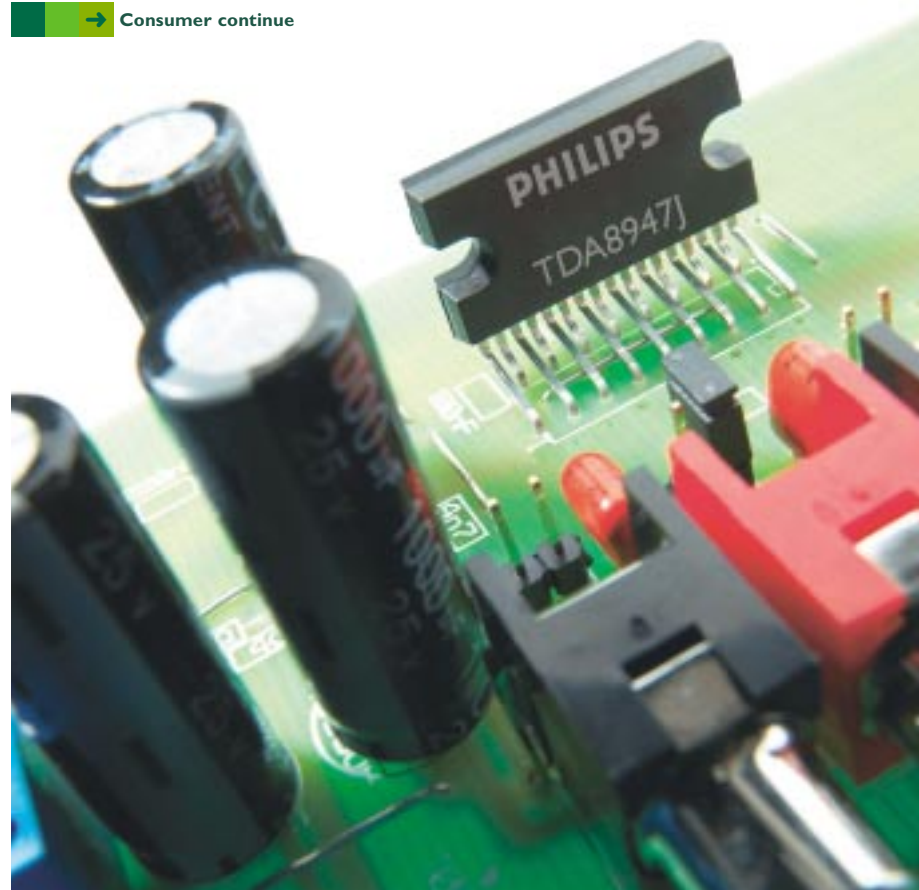
The TDA8947J enables high-quality audio at low prices

New arrivals in the LPC2100 family

Philips has expanded its LPC2100 32-bit microcontroller range with nine new devices featuring CAN, SPI, UART and I²C. Offering high performance and low power consumption, these compact devices provide cost-effective solutions for a host of real-time embedded applications including industrial control, automotive and consumer systems.

The market for 32-bit microcontrollers is predicted to rise from its 2003 value of around US$ 3 billion to US$ 7.6 billion by 2008 (Source: WSTS, IC Insights). That is a Compound Annual Growth Rate of 23%, making it one of the fastest-growing segments in the semiconductor market. To meet customer demands in 16- and 32-bit markets, Philips developed the 32-bit LPC2100 family, whose common platform architecture maximizes software and driver re-use.

LPC2100 devices are based on the ARM7TDMI-S core, implemented in an advanced 0.18 μm CMOS process and operating at up to 60 MHz (54 Dhrystone MIPS). They boast up to 256 Kbytes of the industry's highest-performance embedded Flash memory, supporting In-System and In-Application Programming. An innovative memory acceleration module boosts Flash execution to SRAM speeds, simplifying code development and eliminating the need to load performance-intensive parts into SRAM – which can be difficult and time consuming.

The latest members of the family – the LPC2119/2129, LPC2210, LPC2290, LPC2212/2214, LPC2194 and LPC2292/2294 – are optimized for high performance and low power. They incorporate enhanced communications features including SPI, UART, I²C and up to four interconnected CAN interfaces. Embedded CAN products are an important part of Philips' 32-bit offering as they provide the on-chip serial communication increasingly required in automotive and industrial applications. The CAN controller in the LPC2100 family exhibits

a number of innovative features unique to Philips products such as automatic message filtering. In addition the Full CAN standard is supported for legacy, compatibility and software portability reasons – however, the number of receive and transmit identifiers is limited only by the available memory. The on-chip CAN channels can be used as a low-cost, high-performance CAN bridge, or as a repeater for high-baud transmission over long distances.

"Philips' 32-bit microcontrollers provide the performance that makes our SPEED7 automation system the fastest of its kind worldwide, running applications up to 16 times faster than comparable devices," said Wolfgang Seel, Managing Director of VIPA. "As a result, our customers – primarily in the automotive, logistics and food industries – can increase their productivity by up to 25% in some instances."

The LPC2000 family offers users comprehensive support to enable fast, low-cost, low-risk development. Efficient tools and development environments are provided by a range of traditional 8-bit and 32-bit tool partners. In addition, the Embedded Systems Academy has adapted its free, minimal CANopen implementation (MicroCANopen) to work with the latest LPC2000 devices. This adaptation supports up to four CAN interfaces used in Full CAN operating mode, allowing engineers to quickly develop minimal CANopen network nodes, such as sensors or actuators.

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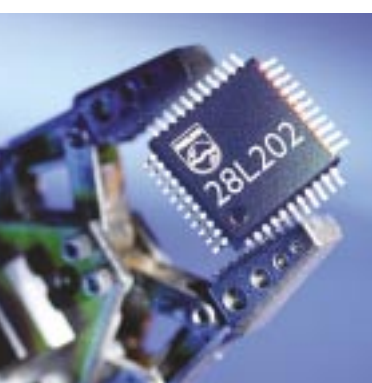
High-speed, low-power UART

The SC28L202 is the world's first Universal Asynchronous Receiver / Transmitter (UART) to feature a 256-byte FIFO and real-time error detection. This newest member of Philips' IMPACT family is a 2-channel device operating at high speed and low power, making it perfect for portable and handheld applications.

Philips' IMPACT family comprises the company's most advanced UARTs. Operating at both 3.3 V and 5 V, and over the industrial temperature range (-40 to 85 °C), these devices support multiple bus architectures. The SC28L202 features a unique real-time error detection mode that ensures data integrity by off-loading tasks such as parity checking, cyclic redundancy checking (CRC) and longitudinal redundancy check (LRC) from the CPU. 256-byte FIFOs further reduce CPU overhead by allowing interrupt at any level for each FIFO. This reduces error interrupts by up to a factor of 16. Additionally, the FIFOs meet all the requirements for processing larger data packets.

"We are extremely happy the new SC28L202 UART has reached production," said Jeff Brower, President and Engineering Director at Signalogic, Inc. "This validates our original design choice and confidence in Philips. The FIFO depth is very important for our real-time system customers in areas such as telephony, VoIP, speech and acoustic audio. In some situations we can only deal with asynchronous I/O at packet boundaries, making temporary data storage at the chip level critical."

The new device is supplied in a 56-pin TSSOP package, offering 16 general-purpose I/Os (8 per UART) for modem and DMA interface. With its low power consumption, the SC28L202 is ideal for power-constrained systems such as portable and handheld devices. However, with an extensive feature list it is also well-suited to telecom, networking, mobile communications, computing, consumer, industrial control, medical and security applications.

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/pip/SC28L202A1D56.html

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New I²C bus buffers deliver greater system control

Allowing designers to build larger I²C systems for maintenance and control applications, the PCA951x family is the first in a range of hot-swappable I²C buffers. These new devices are suitable for use in CompactPCI and AdvancedTCA architectures, as well as normal I²C or SMBus applications, where they allow more devices to be added to a single bus than ever before.

Designed for backplane multi-point and hot-swappable applications, PCA951x devices communicate between system boards, allowing the insertion and removal of boards while the system is active and without corrupting data on the I²C bus. They simplify the use of a bus to manage a large number of boards in network server, desktop PC or telecom environments. For multiple system-management buses, the devices can act as a bus buffer with different voltages on each segment.

The buffers are compatible with the new CompactPCI (PICMG2.9) and AdvancedTCA (PICMG3.x) architectures, which allow more-extensive remote system management and configuration control of communication boards, power supplies and controllers. This in turn significantly increases system reliability. PCA951x devices can also be used in standard I²C or SMBus applications. And because I²C technology is well suited to system health maintenance and control buses, the buffers are ideal for use in all of today's advanced computing, communication and networking architectures.

"With this new family of hot-swappable I²C bus buffers, we are providing more innovative I²C solutions to system manufacturers," said Pierre-Yves Lesaicherre, General Manager for Philips Semiconductors' Interface Products Business Line. "We are continuing to introduce

significant innovations in I²C technology, improving the maintenance and control bus capability for our customers in the computing, communication and networking industries."

Each member of the PCA951x family provides similar operation with specific features tailored towards particular applications. The most popular model is the PCA9511. It includes accelerators to cut rise times on heavily loaded buses, 1 V pre-charge to reduce bus glitches, and idle detect which prevents system damage by ensuring new devices are connected to the active I²C bus only when it is idle. The PCA9510 does not include the rise-time accelerators and is aimed at systems with light loads or multiple devices on a common bus.

The PCA9512 has two V_{CC} supplies for a better noise margin in voltage translation applications, and a hardware pin to disable the rise-time accelerators. Meanwhile, the PCA9513 and PCA9514 do not include the pre-charge feature and have a higher rise-time accelerator threshold to improve the noise margin in noisy applications. In addition, the PCA9513 boasts a 100 μA current source, replacing the conventional pull-up transistors required for the I²C bus. It also evens out the bus RC time constant as boards are added to or removed from the system.

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• /pip/PCA9510D.html
• /pip/PCA9513D.html
• /acrobat/literature/9397/75012798.pdf

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New industry forum to promote NFC technology

Philips and Sony have been driving the development of Near Field Communication (NFC) technology over the last eighteen months. Now, together with Nokia – the world's largest mobile handset vendor – they are creating the NFC Forum. This global forum is dedicated to promoting the use of NFC and the development of existing standards. Aiming to support the broad adoption of NFC within the communications industry, the NFC Forum will help interested companies ensure their products are interoperable.

As a founding member of the Forum, Nokia will assist in the future development of NFC by contributing to technical specifications for NFC data structures, protocols, etc. The Forum will also help to provide the technical recommendations and reference designs that will form the basis for interoperability between devices and services in the emerging world of NFC-enabled e-commerce.

"Nokia sees touch-based interactions enabled by Near Field Communication technology as an elegant way of bringing Nokia's 'Life goes Mobile' vision into reality," said Pertti Korhonen, Chief Technology Officer and Senior Vice President, Nokia. "Touch is an intuitive and easy way to connect, collect and share with mobile devices. It not only enhances the experience of using current services but also creates entirely new applications and value. Nokia is also looking forward to working with the other members of the NFC Forum and to bringing into the mobile world the exciting new user experiences that NFC offers."

A non-profit organization, the NFC Forum is perfectly positioned to provide a safe environment for its members to discuss interoperability issues regarding their NFC devices and services. Further prospective members include leading handset makers, consumer electronics companies, PC vendors, service / content providers and IC manufacturers. This collaboration between key players in the consumer electronics, mobile communications and broadcast entertainment industries marks a convergence of technologies that will create a wealth of new and exciting user experiences – enabled by NFC and delivered via laptops, web-pads and TV sets.

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/markets/identification/products/nfc/
www.nfcforum.org

→ **Identification continue**

Industry leaders showcase contactless technology at CES 2004

Philips and Visa International have joined forces to demonstrate how contactless technology can change the way digital content and services are distributed, paid for and accessed by today's universally connected consumer.

At the January 2004 Consumer Electronics Show (CES) in Las Vegas, the two companies presented proofs-of-concept showing how contactless technology can deliver rich and varied content in applications such as in-store kiosks selling the digital rights to download songs. In this demonstration, the user captures the rights onto his / her payment card and then transfers them to a Philips Streamium Internet radio using Near Field Communication (NFC) technology. The song is then streamed directly over the Internet for the user to enjoy. Demonstrations like this highlight the unique value derived from combining the latest consumer electronics, wireless connectivity and secure universal payment technologies.

Other demonstrations included applications leveraging the power of Philips' NFC and Visa's 'Verified by Visa' technologies, such as:
- Ticketing: mobile phone users pay for concert or movie tickets at the box office simply by holding their phone next to the payment terminal
- Travel: travelers both book and pay for airline tickets and hotel rooms using their home PC, made possible by an NFC-enabled mouse and a contactless Visa payment card

Philips and Visa have been exploring the market by showing their innovative proof-of-concept demonstrations to many industry leaders in communications, consumer electronics, computing and digital content provision. NFC technology is already being adopted in 'Connected Planet' products from Philips' consumer electronics division. In addition, Philips has confirmed an agreement with Nokia, Vodaphone and Universal that will allow consumers to experience rich digital television content via their mobile phones and portable handsets.

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→ **Identification continue**

Philips and IBM alliance drives RFID and smart card markets

Philips and IBM are combining their industry expertise to address the growing need for advanced high-security smart cards and Radio Frequency IDentification (RFID) technology in day-to-day business processes, operations and consumer lifestyles.

The key end-application areas Philips and IBM plan to address are RFID solutions for supply chain management, retail and asset management, as well as smart card solutions for finance, e-government, transportation and event ticketing. By teaming up with IBM, Philips will move beyond just delivering its expertise and RFID chip offering, towards integrated end-to-end solutions for major retailers, consumer goods manufacturers and couriers. Together the two companies will enable a phased and easy-to-integrate approach to creating smart card and RFID implementations for business.

Philips is committed to helping companies boost levels of advanced product-tracking and inventory control, as well as developing an end-to-end assessment of the specific costs and benefits in adopting RFID and smart card technology within their business processes. "It is our mission to continue bringing greater benefits both to companies and to today's 'Connected Consumers' – enabling better access to information, entertainment and services," said Scott McGregor, President and Chief Executive Officer of Philips Semiconductors.

Underlining its confidence in its own creations, Philips is adopting the very technology it drives into the marketplace. The first joint project between Philips and IBM is the development and implementation of an RFID solution within Philips Semiconductors. The RFID system will improve the business processes within its East Asian manu-facturing and distribution supply chain, and simplify inventory management and control. The project started in November 2003 and the system will become operational during the course of 2004.

→ **Identification continue**

New products in brief

Because of the breadth of the Philips Semiconductors product range, not all new products can be described in detail. The list below shows new products not dealt with elsewhere in this issue. For full information on any product, please go to the WN website at *www.semiconductors.philips.com/publications/worldnews/13.2.pdf* and click on the product name.

MultiMarket Semiconductors

74AHC2G00, 74AHCT2G00; 74AHC2G08, 74AHCT2G08; 74AHC2G125, 74AHCT2G125; 74AHC3G04, 74AHCT3G04; 74AHC3G14, 74AHCT3G14: Advanced High-speed CMOS logic devices. Low-power, low-noise, 5 V-tolerant I/Os. AHCT versions are TTL compatible. 00 = 2-input NAND gate, 04 = single inverter, 08 = dual 2-input AND gate, 14 = inverting Schmitt trigger, 125 = 3-state buffer / line driver.

74LVC1G74, 74LVC1G386, 74LVC2G00: Low-Voltage CMOS logic devices. High-speed, low-power, 5 V-tolerant I/Os. 00 = 2-input NAND gate, 74 = D-type flip-flop with set and reset. 386 = 3-input XOR gate.

BB184 / BB207: Single / dual variable-capacitance RF diodes in small SMD packages. For VCO and TV / FM tuning applications.

BF1211, BF1212: N-channel dual-gate MOSFETs for gain-controlled, low-noise VHF and UHF amplification in analog and digital TV tuners.

BGA2715, BGA2716, BGA2717: Silicon MMIC wideband amplifier in 6-pin SOT363. Low noise, good linearity and internal matching to 50 Ω. For LNB IF amplifiers, cable systems, ISM and general-purpose applications.

GTL2006: 13-bit GTL / GTL+ to LVTTL translator. 3.0 to 3.6 V operation. Supplied in TSSOP28.

PBLS1502V, PBLS1503V, PBLS 1504V: 15 V BISS Load switches. Low-V_{CEsat} PNP transistor and NPN RET in a single SOT666 package.

PBSS4330X, PBSS8110AS, PBSS8110S / PBSS5130T, PBSS5220T, PBSS5230T, PBSS5330X, PBSS5540X, PBSS9110T: 20 – 100 V NPN / PNP low-V_{CEsat} (BISS) transistors with high collector current capabilities (1 – 5 A). SOT54 (S), SOT23 (T) or SOT89 (X) packages. For power management and peripheral driver applications.

PCF50603: Single-chip PMU for world-wide use in low-end and mid-range mobile phones.

PEMF21: 12 V load switch. Low-V_{CEsat} PNP transistor and NPN RET in a single SOT666 package.

PESD5V0L6US: Low-capacitance 6-fold ESD protection diode array in SO8 package. Uni-directional protection of up to 6 lines or bi-directional protection of up to 5 lines in computers and peripherals, communications systems and audio / video equipment.

PESDxS2UAT / PESDxS2UQ series: Double ESD protection diodes in SOT23 / SOT663. Uni-directional protection of two lines or bi-directional protection of a single line in computers and peripherals, communications systems and audio / video equipment.

PHB160NQ08T, PHP180NQ08T, PHX18NQ11T, PHX20N06T: N-channel Q-Trench MOSFETs. Very-low gate charge, high speed, low loss. Uses include DC/DC converters, power supplies and general-purpose switching and industrial applications.

PMEG2005EL / PMEG4002EL: 20 V, 0.5 A / 40 V, 0.2 A ultra-low-V_F (MEGA) Schottky rectifiers in ultra-small, leadless SOD882. For low-voltage rectification, high-efficiency DC/DC conversion, low-power applications and high-frequency switching.

PMEG2010AEB: 20 V, 1 A ultra-low-V_F (MEGA) Schottky rectifiers in ultra-small SOD523. For low-voltage rectification, high-efficiency DC/DC conversion and low-power applications.

PMEM4020ND / PMEM4020PD: NPN / PNP low-V_{CEsat} (BISS) transistor and planar Schottky barrier diode in a single SOT457 package. For DC/DC converters, and inductive load and MOSFET drivers.

PMF370XN, PMF400UN, PMF780SN / PMG370XN: N-channel μTrenchMOS FETs in compact SOT322 / SOT363 surface-mount packages. Very-low $R_{DS(on)}$. Standard (SN), extremely low (XN) or ultra-low (UN) level. For driver circuits and switching in portable devices.

PMGD280UN / PMGD780SN: Dual N-channel μTrenchMOS FETs in compact SOT363 package. Very-low $R_{DS(on)}$. Standard / ultra-low level. For driver circuits and switching applications in portable equipment.

PMK27XP: Extremely low level, 20 V P-channel FET using TrenchDMOS technology. Low $R_{DS(on)}$. Used in battery packs, load switching applications and portable equipment.

PMWD20XN: Dual common-drain N-channel μTrenchMOS FET in TSSOP8. Fast switching and very-low $R_{DS(on)}$. Extremely low level. For battery management in portable devices.

PSMN015-110P: 110 V N-channel SiliconMAX FET using the latest TrenchMOS technology. Very-low $R_{DS(on)}$ and gate charge. Applications include DC/DC converters and switched-mode power supplies.

PTN3332, PTN3342: High-speed differential line receivers for point-to-point baseband transmission rates over controlled impedance media of approximately 100 Ω. Meet or exceed requirements of AINSI IIA / EIA-644 Standard. PTN3342 includes on-chip termination resistors.

PUMB15, PUMB16, PUMB17: Dual PNP resistor-equipped transistors (RETs) in SOT363.

→ **MultiMarket Semiconductors continue**

Automotive

BUK7212-55B, BUK7214-75B, BUK7227-100B, BUK9217-75B, BUK9230-100B, BUK9E04-30B: 30 – 100 V N-channel enhancement mode FETs using Philips' High Performance Auto-motive (HPA) TrenchMOS technology. Very-low $R_{DS(on)}$, Q101 compliant. For motors, lamps, solenoids, general-purpose power switching and automotive applications.

BUK7213-40A: 30 V N-channel enhancement mode FET using Philips' General Performance Automotive (GPA) TrenchMOS technology. Very-low $R_{DS(on)}$, Q101 compliant. For motors, lamps, solenoids, general-purpose power switching and automotive applications.

BUK7905-40AI: 40 V N-channel TrenchPLUS MOSFET featuring very-low $R_{DS(on)}$ and integrated current sensor. Ideal for variable valve timing and EPAS systems.

SAA7724H: Car radio DSP. Generates 4 audio channels plus RDS / RBDS data output.

TEA6842H, TEA6843HL, TEA6849H: New In Car Entertainment (NICE) single-chip car radio tuners for AM, FM and Weather Band. TEA6849H features Precision Adjacent Channel Suppression (PACS).

→ **Automotive continue**

Communications

BGF1801-10, BGF1901-10: 10 W LDMOS power amplifier modules GSM and GSM EDGE base station applications in the 1805 to 1880 MHz / 1930 to 1990 MHz band.

BLA0912-250: Avionics N-channel LDMOS transistor. For avionics transmitter applications from 960 to 1215 MHz.

→ **Communications continue**

Consumer

PNX3000: Digital One Chip (DOC). Analog front-end for digital video processors.

PNX8526: Programmable source decoder with integrated peripherals for advanced set-top box and digital TV applications.

TDA8925, TDA8928J: Switching power stage for a high-efficiency Class D audio amplifier. For televisions, multimedia systems and all mains-powered audio applications.

TFA9841J: Single audio power amplifier. Can be used as one Single-Ended (SE) channel with fixed gain of 26 dB. Features unique protection circuit.

TDA9884TS: I²C-bus controlled multi-standard alignment-free IF-PLL for mobile reception.

→ **Consumer continue**

Identification

TDA8029: Low-power smart card reader IC. Complete, low-cost, robust, single-chip solution.

→ **Identification continue**

Networking

TZA3057HW: Fully integrated, multi-rate fiber optic transmitter for SDH/SONET, Fibre Channel and Gigabit Ethernet optical transmission systems.

→ **Networking continue**

An interactive World News

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The pdf version of this issue of World News is available via url: *www.semiconductors.philips.com/publications/ worldnews/13.2.pdf*

→ **Leadership continue**

Integrated display module for camera phones

As the camera phone market matures, more and more applications are being developed, creating and exploiting business opportunities that didn't exist just a few years ago. Many of these applications require higher-resolution displays, but manufacturers need the displays at a price that won't limit them to high-end phones. A compact, low-cost, plug-and-play device, Philips' low-power Nexperia Display Module provides the answer.

By 2005, over 130 million camera phones will be shipped worldwide, according to the ARC (Analyses Research Consultancy) Group. This figure is expected to grow to 210 million by 2008, so manufacturers everywhere are looking for a low-cost display solution that they can simply slot into their overall phone system. Philips' new Nexperia Display Module supplies this, providing the imaging functions and high-performance display required to enable features such as MMS (Multimedia Message Service) on a wide range of cellular phones.

The first complete Philips solution for consumer camera phones, this module is easily integrated into a wide range of handsets. It processes all camera data internally, and has a single interface to the baseband processor. The module features optimized camera/display settings, real-time JPEG encoding, digital zoom and the industry's best front-of-screen performance. In addition, it offers the advantage of low power consumption, reducing overall power consumption in standby mode by 20 to 30% and extending the lifetime of a phone's battery by 2 to 4%.

Senior Vice President and General Manager of the Mobile Display Systems business unit at Philips, Harold Hoskens said, "The Nexperia Mobile Display Module extends our advanced module roadmap with a solution that addresses the camera phone industry's need for higher-resolution displays. By integrating all-Philips technology into a high-performance, low-cost and low-power module, we are delivering on our Nexperia brand promise to bring rich multimedia experiences and superior functionality to users. It's an important addition to our Nexperia product range."

The module comes in a compact 36 mm x 41 mm x 5.4 mm package, which includes a Nexperia RAM-less Mobile Image Processor (PNX4000) and a single-chip thin-film transistor (TFT) color display driver (PCF8881). The driving scheme includes various innovations, including dot-inversion, common voltage modulation and interlacing.

www.semiconductors.philips.com
/acrobat/literature//9397/75012205.pdf

→ Communications continue

Forthcoming attractions

Philips takes part in many tradeshows throughout the year and across the globe. The table below lists shows that will take place in the next few months.

Event: SCC (Cards Beijing) 2004
Date: 1 - 3 June 2004
Location: Beijing, China
Further information: www.smartcards-china.com

Event: Computex
Date: 1 - 5 June 2004
Location: Taipei, Taiwan
Further information: www.computex.com.tw

Event: WiCon World
Date: 8 - 10 June 2004
Location: Amsterdam, the Netherlands
Further information: www.wiconworld.com

→ Leadership continue

SIMD processor offers future-proof path for mobile basestation development

Philips' Single Instruction Multiple Data (SIMD) ultra-high-performance processor offers manufacturers an easy, low-cost, future-proof path for Base Transceiver Station (BTS) development. The SIMD processor supports all cellular standards from 2G to W-CDMA, CDMA2000, TD-SCDMA and OFDM and consolidates Philips' position as a leading supplier to the mobile infrastructure market. Its massively parallel and reconfigurable processor array is 100% software programmable. This makes the SIMD uniquely flexible, scalable and easy to upgrade as wireless standards and signal processing techniques continue to evolve.

In contrast to today's expensive DSP, FPGA and ASIC / SoC solutions, Philips' SIMD processors use an architecture called Associative String Processing (ASP) to deliver greater peak and sustained processing power. It also makes new software-defined applications and custom functions simple to implement in high-level languages and enables re-use across successive hardware generations. In addition, several SIMD processors can be combined (or embedded) in various parallel processing models to create MIMD (Multiple Instruction Multiple Data) processors.

"The architecture of our SIMD processor and its high level of integration combine to provide tremendous performance and flexibility advantages that simplify the hardware design process. This in turn lowers the overall cost of a new BTS," said Malcolm Spencer, General Manager ASIC, CDMA & Base Station Sector Team at Philips Semiconductors. "We expect a cost reduction of up to 70% per channel compared with today's bill of materials. And we offer both standard and application-specific software libraries, development tools and worldwide support to give our customers a huge time-to-market and validation advantage over competing solutions."

A key advantage of Philips' SIMD processor is that it migrates applications to the software domain. Consequently, new services and functions can be introduced at any time, even long after the product has been installed. This software methodology is certain to become very popular with mobile basestation developers. In fact, Gartner Research predicts that by 2008, 50% of mobile basestations will incorporate reconfigurable processor technology – such as the SIMD solution – for baseband processing.

The SIMD processor is built around a parallel-processing ASProCore, and integrates a Low-level ASP Controller (LAC), a Secondary Data Movement Controller (SDMC), a 32-bit RISC CPU, storage and interface logic. Supporting multiple standards for baseband modems, it delivers an unrivalled price-performance ratio. The processor is manufactured in cutting-edge 0.12 µm CMOS technology, with a fully compatible 90 nm version already in development. A complete set of hardware and software tools is available.

→ Communications continue

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