Bluetooth™

No cables, no limits, Philips Semiconductors

Let's make things better.

PHILIPS

Advanced Bluetooth connectivity — your Personal Area Network without limits*

By 2002, about 150 million mobile phones, other portable devices and office equipment will incorporate *Bluetooth* wireless technology. And it won't just be our mobile phones, laptops, palmtops, and computer peripherals that are *Bluetooth* enabled. New applications for *Bluetooth* are already being proposed in areas such as in-vehicle networking, medical diagnostics and domestic appliance control.

Philips Semiconductors — the world's third largest supplier of semiconductors to the mobile communications industry — is in a unique position to meet the *Bluetooth* requirements.

Last year, Philips Semiconductors was the first company to deliver a commercially available *Bluetooth* compliant silicon system solution. Of this solution, more than one million ICs were sold. Today, our *Bluetooth* competency covers key technologies, components, systems, software and development tools — everything you need to design today's and tomorrow's *Bluetooth* products.

This complete offering also includes reference designs, development and software support, supplied via our unique range of design and software partners. Irrespective of whether you're already an experienced *Bluetooth* developer with extensive RF design expertise, or a newcomer to *Bluetooth* wireless technology, we can provide you with a total *Bluetooth* solution.

"The height of cleverness is to be able to conceal it"
— Duc de la Rochefoucauld

Though *Bluetooth* wireless technology has arrived in a big way with early products like PC cards, dongles and headsets, the best is yet to come. As an ASIC manufacturer also offering WLAN, cellular and multimedia technologies, we see the most exciting developments as new System-on-Chip (SoC) solutions containing embedded *Bluetooth* cores. Providing this integrated wireless functionality is a designer's dream come true, and it's the future for advanced products with the shortest time to market.

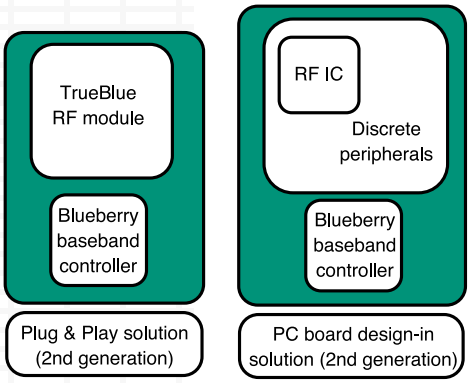
So whether you require an embedded *Bluetooth* core for SoC design, a *Bluetooth* chipset for conventional PC board design-in, or a miniature plug-and-play *Bluetooth* radio module, the choice is easy. Choose Philips Semiconductors.

* *Bluetooth is a trademark owned by its proprietor and used by Philips Semiconductors under license*

Philips Semiconductors — one company, total Bluetooth solutions

- *Bluetooth* system solutions
- Low-power, low-cost chipsets, modules and embedded cores
- Plug-and-play *Bluetooth* RF modules
- Software for wide-ranging *Bluetooth* profiles
- *Bluetooth* qualified products
- *Bluetooth* ASIC capability using Philips' revolutionary Sea-of-IP™ system-on-chip design methodology and rapid silicon prototyping
- Fast time-to-market hardware/software development system environments
- Proven high-volume *Bluetooth* manufacturing capabilities
- Partnered with SIG founder.

Solutions for all design styles



Philips Semiconductors offers a broad range of *Bluetooth* solutions, from turnkey systems to all the ICs required for your own design-ins. First generation solutions do not include integrated Flash memory or CODECs for voice transmission.

TrueBlue RF modules — the fast track with Plug & Play designs

BGB100 compact radio module

- Plug & Play cost/size optimized radio module
- No external RF components needed
- 0 dBm output at antenna
- 120 mm² small-footprint surface-mount package
- Sensitivity –80 dBm at antenna
- Seamless interface to 2nd generation baseband controllers
- On-board antenna switch, filtering and matching networks
- Handled by standard pick-and-place equipment

BGB120 long-range radio module

- Plug & Play cost/size optimized radio module
- No external RF components needed
- 20 dBm output at antenna
- 140 mm² small-footprint surface-mount package
- Target sensitivity: –85 dBm at antenna
- Seamless interface to 2nd generation baseband controllers.
- On-board antenna switch, filtering and matching networks
- Handled by standard pick-and-place equipment

BGB101 low-power radio module optimized for cellular applications

- Plug & Play cost/size optimized radio module
- No external RF components needed
- 0 dBm output at antenna
- 90 mm² small-footprint surface-mount package
- Sensitivity: -80 dBm at antenna
- Low power consumption: 40 mA @ 3 V in full Rx active mode
- Seamless interface to 2nd generation baseband controllers
- On-board antenna switch, filtering and matching networks
- Increase temperature range -30 to + 80 °C
- Handled by standard pick-and-place equipment

RF ICs for integrated board designs

UAA3558 Bluetooth radio IC

- Single-chip, fully integrated low-IF transceiver
- Low phase noise VCO
- Typical sensitivity: -85 dBm
- 4 dBm output preamplifier
- No SAW filter or crystal filters required
- Very low cost radio
- Interface chip (PCF26100) only required when used with 1st generation PCF2600x baseband controllers
- 5 x 5 mm HVQFN32 package

UAA3559 lowest power Bluetooth radio IC

- Low cost transceiver
- Fully integrated receiver and demodulator, no external filters required
- 4 dBm transmit pre-amplifier
- Fully integrated low phase noise VCO with on-chip inductors, operates at twice the *Bluetooth* frequency (simplifies application: no external inductances with associated problems of pulling and other coupling effects)
- Low current consumption (lower than the UAA3558)
- Target 2.7 V minimum operating voltage, 3.4 V maximum operating voltage (for compatibility with mobile phones and 2nd generation baseband ICs)
- Wide temperature range, target –30 to +85 °C (covers full mobile phone temperature range)
- 5 x 5 mm HVQFN32

UAA3591 single-chip, Class 1 compliant power amplifier

- 24 dBm (250 mW) output power
- 45% typical power-added efficiency
- Suitable for 100% duty cycle
- Silicon process for optimum price/performance
- Analog power control pin
- 4 x 4 mm HVQFN16 package

A wide choice of baseband controllers for Plug & Play or integrated board designs

PCF2600x 1st generation baseband controllers

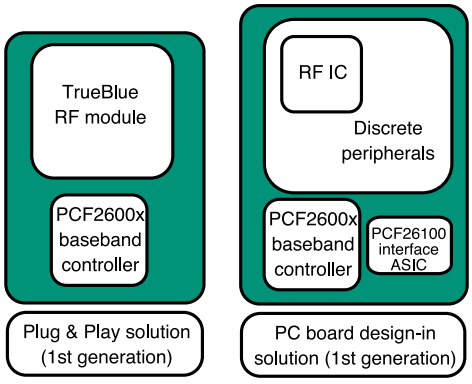
- Embedded ARM7TDMI core
- Embedded Ericsson *Bluetooth* Core (EBC) operating as Link Controller
- On-chip execution of Ericsson Protocol Stack
- Point-to-point and point-to-multipoint versions
- On-chip voice coding
- USB, UART, IrDa, PCM and I²C-bus interfaces
- 8 x 8 mm FPBGA96/100 and TQFP100 package options

PCF87750 2nd generation highly-integrated general-purpose baseband controller ('Blueberry')

- Embedded ARM7TDMI RISC core, plus enhanced Ericsson *Bluetooth* Core operating as Link Controller
- *Bluetooth* 1.1 compliant
- Embedded 384 kB Flash and 64 kB SRAM
- Clock crystals to 26 MHz
- Voice and data support
- Antenna diversity support
- Numerous interfaces including USB, SPI, UART, PCM/IOM, I^2S, I^2C-bus and general-purpose I/Os
- Supports variety of RF interfaces
- 9 x 9 mm small footprint LFBGA81 package

PCF87751 2nd generation baseband optimized for voice applications

- Derivative of the PCF87750 GP baseband
- *Bluetooth* 1.1 compliant
- Dedicated for voice communications (headsets, digital cordless phones, etc.)
- Numerous interfaces including UART, I^2C-bus and general-purpose I/Os
- Supply voltage: 1.8V
- Embedded Flash in CMOS 0.18 µm process
- Enhanced power management for 1 battery cell (NiMH, Ni-Cad)
- On chip voice AD/DA CODEC
- Adapted for multichip package
- Supports variety of RF interfaces
- 6 x 6 mm very small footprint LFBGA64 package



PCF87752 2nd generation baseband optimized for data applications

- Derivative of the PCF87750 baseband
- *Bluetooth* 1.1 compliant
- Dedicated for data communications (mobile phones, PDAs, PC peripherals, etc.)
- Voice link support through PCM/IOM interface
- Numerous interfaces including UART, I^2C-bus and general-purpose I/Os
- Adapted for multichip package
- Embedded Flash in CMOS 0.18 µm process
- Supply voltage: 1.8 V
- Supports variety of RF interfaces
- 6 x 6 mm very small footprint LFBGA64 package

Single package solutions with integrated RF and baseband

PCF87753 multichip package for data applications

- Consists of PCF87752 data baseband plus RF IC
- 5.5 x 13.5 mm LFBGA96 package

PCF87754 multichip package for voice applications

- Consists of PCF87751 voice baseband plus RF IC
- 5.5 x 13.5 mm LFBGA96 package

Developer's kits — shortening the time-to-market for advanced Bluetooth products

Philips Semiconductors supports its system-level *Bluetooth* solutions with a variety of development tools, ranging from PC controlled demonstration boards through to sophisticated prototyping platforms for system-on-chip *Bluetooth* design. All of these development tools are specifically designed to reduce the time-to-market for new *Bluetooth* products by allowing you to perform rapid hardware prototyping, efficient software design and straightforward device validation. In particular, Philips Semiconductors' support software provides you with all the necessary *Bluetooth* communications layers beneath an easy-to-use API on which you can build your applications.

BTDK v2.0 first generation developer's kit

- Two *Bluetooth* daughter cards and plug-in RF boards
- Virtual Radio (RF link simulation) for system tests
- Embedded *Bluetooth* protocol stack software, v.1.0 compliant
- FPGA socket for simulation of additional peripheral blocks
- JTAG port and logic analyzer connectors for debugging
- For PCF2600x design-ins

BByK second generation developer's kit (full version)

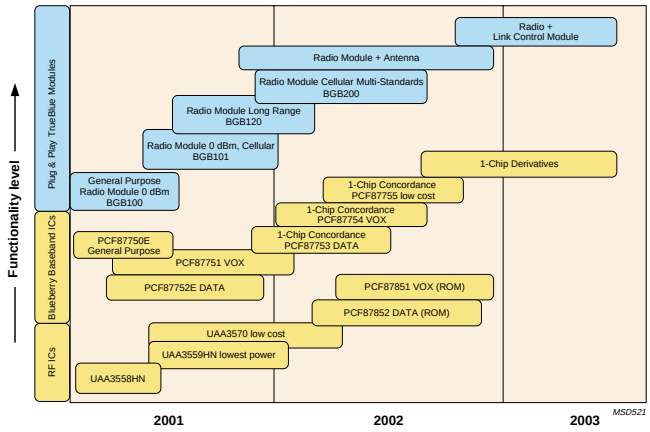
- 2 motherboards with on board Flash and RAM memory
- 3 daughter boards: TB208, TB208E and TB81
- 2 RF boards
- Connectors for UART, USB, I^2C-bus, SPI, IOM/PCM, CODEC, and JTAG interfaces
- Lauterbach Trace32-FIRE and Hewlett-Packard Real-Time Trace emulator interface
- Based on 2nd generation PCF87750 baseband controller
- *Bluetooth* RF link based on UAA3558 radio IC and BGB100 radio module
- Two wired headsets, AC/DC power supply adapters, cables, CD-ROM
- Embedded *Bluetooth* protocol stack software, V 1.1 compliant

Baby board full second generation demonstration kit

- 3 smallest form-factor *Bluetooth* demonstration boards, consisting of PCF87750 baseband plus UAA3558 RF IC or BGB100 RF module
- UART connection
- Possibility to demonstrate *Bluetooth* capability including CDROM with setup software and Tetris game
- Embedded *Bluetooth* protocol stack software, v 1.1 compliant
- Possibility to setup small piconet, point-to-point or point-to-multipoint
- Size: 53 x 40 mm

Philips Semiconductors — the fastest way to complete integrated solutions

Philips Semiconductors Bluetooth Mid Term Roadmap



Need to know more about *Bluetooth* wireless technology and its possibilities?
Visit, www.semiconductors.philips.com/bluetooth or the official website of the *Bluetooth* Special Interest Group, www.bluetooth.com

For further reading, please contact your local sales office (address overleaf):

- PCF87750 baseband controller, ordering code: 9397 750 07688
- BGB100 RF module, ordering code: 9397 750 07687
- BByK developers kit, ordering code: 9397 750 07686
- Philips *Bluetooth* Core, ordering code: 9397 750 08121.

Philips Semiconductors' philosophy is to offer optimized solutions for *Bluetooth* applications. To achieve this, we keep on investigating new processes, integration and system-on-module possibilities, leading the way to the ultimate complete integrated *Bluetooth* solution.

Our current single package (multichip) solutions combine proven baseband technology with Philips' world class RF technology. We offer single package solutions specifically for data applications (the PCF87753) and for voice applications (the PCF87754). Both solutions will be available in early 2002.

Our systems-on-modules competency — embedding more RF functionalities into a single substrate — brings miniaturization and integration possibilities to new levels. Moreover, we are already working on incorporating the antenna, maximizing the advantages of cost, size and time to market of plug-and-play modules.

But that's not all. Philips Semiconductors is developing complete integrated solutions in RFCMOS technology. And as a leading ASIC manufacturer, Philips Semiconductors also offers *Bluetooth* cores (see separate brochure mentioned below) that can be embedded in advanced
system-on-chip ASICs using the company's advanced Sea-of-IP™ design methodology.

Philips Semiconductors – a worldwide company

Argentina: see South America

Australia: 3 Figtree Drive, HOMEBUSH, NSW 2140,
Tel. +61 2 9704 8141, Fax. +61 2 9704 8139

Austria: Computerstr. 6, A-1101 WIEN, P.O. Box 213,
Tel. +43 1 60 101 1248, Fax. +43 1 60 101 1210

Belarus: Hotel Minsk Business Center, Bld. 3, r. 1211, Volodarski Str. 6,
220050 MINSK, Tel. +375 172 20 0733, Fax. +375 172 20 0773

Belgium: see The Netherlands

Brazil: see South America

Bulgaria: Philips Bulgaria Ltd., Energoproject, 15th floor,
51 James Bourchier Blvd., 1407 SOFIA,
Tel. +359 2 68 9211, Fax. +359 2 68 9102

Canada: PHILIPS SEMICONDUCTORS/COMPONENTS,
Tel. +1 800 234 7381, Fax. +1 800 943 0087

China/Hong Kong: 501 Hong Kong Industrial Technology Centre,
72 Tat Chee Avenue, Kowloon Tong, HONG KONG,
Tel. +852 2319 7888, Fax. +852 2319 7700

Colombia: see South America

Czech Republic: see Austria

Denmark: Sydhavnsgade 23, 1780 COPENHAGEN V,
Tel. +45 33 29 3333, Fax. +45 33 29 3905

Finland: Sinikalliontie 3, FIN-02630 ESPOO,
Tel. +358 9 615 800, Fax. +358 9 6158 0920

France: 7 - 9 Rue du Mont Valérien, BP317, 92156 SURESNES Cedex,
Tel. +33 1 4728 6600, Fax. +33 1 4728 6638

Germany: Hammerbrookstraße 69, D-20097 HAMBURG,
Tel. +49 40 2353 60, Fax. +49 40 2353 6300

Hungary: Philips Hungary Ltd., H-1119 Budapest, Fehervari ut 84/A,
Tel: +36 1 382 1700, Fax: +36 1 382 1800

India: Philips INDIA Ltd, Band Box Building, 2nd floor,
254-D, Dr. Annie Besant Road, Worli, MUMBAI 400 025,
Tel. +91 22 493 8541, Fax. +91 22 493 0966

Indonesia: PT Philips Development Corporation, Semiconductors Division,
Gedung Philips, Jl. Buncit Raya Kav.99-100, JAKARTA 12510,
Tel. +62 21 794 0040 ext. 2501, Fax. +62 21 794 0080

Ireland: Newstead, Clonskeagh, DUBLIN 14,
Tel. +353 1 7640 000, Fax. +353 1 7640 200

Israel: RAPAC Electronics, 7 Kehilat Saloniki St, PO Box 18053,
TEL AVIV 61180, Tel. +972 3 645 0444, Fax. +972 3 649 1007

Italy: PHILIPS SEMICONDUCTORS, Via Casati, 23 - 20052 MONZA (MI),
Tel. +39 039 203 6838, Fax +39 039 203 6800

Japan: Philips Bldg 13-37, Kohnan 2-chome, Minato-ku,
TOKYO 108-8507, Tel. +81 3 3740 5130, Fax. +81 3 3740 5057

Korea: Philips House, 260-199 Itaewon-dong, Yongsan-ku, SEOUL,
Tel. +82 2 709 1412, Fax. +82 2 709 1415

Malaysia: No. 76 Jalan Universiti, 46200 PETALING JAYA, SELANGOR,
Tel. +60 3 750 5214, Fax. +60 3 757 4880

Mexico: 5900 Gateway East, Suite 200, EL PASO, TEXAS 79905,
Tel. +9-5 800 234 7381, Fax +9-5 800 943 0087

Middle East: see Italy

Netherlands: Postbus 90050, 5600 PB EINDHOVEN, Bldg. VB,
Tel. +31 40 27 82785, Fax. +31 40 27 88399

New Zealand: 2 Wagener Place, C.P.O. Box 1041, AUCKLAND,
Tel. +64 9 849 4160, Fax. +64 9 849 7811

Norway: Box 1, Manglerud 0612, OSLO,
Tel. +47 22 74 8000, Fax. +47 22 74 8341

Pakistan: see Singapore

Philippines: Philips Semiconductors Philippines Inc.,
106 Valero St. Salcedo Village, P.O. Box 2108 MCC, MAKATI,
Metro MANILA, Tel. +63 2 816 6380, Fax. +63 2 817 3474

Poland: Al.Jerozolimskie 195 B, 02-222 WARSAW,
Tel. +48 22 5710 000, Fax. +48 22 5710 001

Portugal: see Spain

Romania: see Italy

Russia: Philips Russia, Ul. Usatcheva 35A, 119048 MOSCOW,
Tel. +7 095 755 6918, Fax. +7 095 755 6919

Singapore: Lorong 1, Toa Payoh, SINGAPORE 319762,
Tel. +65 350 2538, Fax. +65 251 6500

Slovakia: see Austria

Slovenia: see Italy

South Africa: S.A. PHILIPS Pty Ltd., 195-215 Main Road Martindale,
2092 JOHANNESBURG, P.O. Box 58088 Newville 2114,
Tel. +27 11 471 5401, Fax. +27 11 471 5398

South America: Al. Vicente Pinzon, 173, 6th floor,
04547-130 SÃO PAULO, SP, Brazil,
Tel. +55 11 821 2333, Fax. +55 11 821 2382

Spain: Balmes 22, 08007 BARCELONA,
Tel. +34 93 301 6312, Fax. +34 93 301 4107

Sweden: Kottbygatan 7, Akalla, S-16485 STOCKHOLM,
Tel. +46 8 5985 2000, Fax. +46 8 5985 2745

Switzerland: Allmendstrasse 140, CH-8027 ZÜRICH,
Tel. +41 1 488 2741 Fax. +41 1 488 3263

Taiwan: Philips Semiconductors, 5F, No. 96, Chien Kuo N. Rd., Sec. 1,
TAIPEI, Taiwan Tel. +886 2 2134 2451, Fax. +886 2 2134 2874

Thailand: PHILIPS ELECTRONICS (THAILAND) Ltd.,
60/14 MOO 11, Bangna Trad Road KM. 3, Bagna, BANGKOK 10260,
Tel. +66 2 361 7910, Fax. +66 2 398 3447

Turkey: Yukari Dudullu, Org. San. Blg., 2.Cad. Nr. 28 81260 Umraniye,
ISTANBUL, Tel. +90 216 522 1500, Fax. +90 216 522 1813

Ukraine: PHILIPS UKRAINE, 4 Patrice Lumumba str., Building B, Floor 7,
252042 KIEV, Tel. +380 44 264 2776, Fax. +380 44 268 0461

United Kingdom: Philips Semiconductors Ltd., 276 Bath Road, Hayes,
MIDDLESEX UB3 5BX, Tel. +44 208 730 5000, Fax. +44 208 754 8421

United States: 811 East Arques Avenue, SUNNYVALE, CA 94088-3409,
Tel. +1 800 234 7381, Fax. +1 800 943 0087

Uruguay: see South America

Vietnam: see Singapore

Yugoslavia: PHILIPS, Trg N. Pasica 5/v, 11000 BEOGRAD,
Tel. +381 11 3341 299, Fax.+381 11 3342 553

For all other countries apply to: Philips Semiconductors,
Marketing Communications, Building HVG, P.O. Box 218, 5600 MD EINDHOVEN,
The Netherlands, Fax. +31 40 27 24825

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