

# DATA SHEET

## **UAA3558** **Bluetooth RF Transceiver**

Objective specification  
File under Integrated Circuits, IC17

2000 Dec 21

## Bluetooth RF Transceiver

## UAA3558

### FEATURES

- Low cost solution for a Bluetooth radio
- Fully integrated receiver with high sensitivity
- Integrated low phase noise VCO
- Dedicated Bluetooth Phase-Locked Loop (PLL) synthesizer
- 4 dBm programmable transmitter preamplifier with an integrated switch
- 3-line serial interface bus
- Low current consumption from 3.0 V supply.

### APPLICATIONS

2400 to 2497 MHz Bluetooth radio transmission and reception in the Industrial Scientific and Medical (ISM) band.

### GENERAL DESCRIPTION

The UAA3558 BiCMOS device is a low power, highly integrated circuit. It features a fully integrated receiver, from antenna filter output to the demodulated data output,

an integrated VCO, a synthesizer to implement Bluetooth channel frequencies, and a transmitter preamplifier to drive either the switch diode to antenna or a power amplifier.

The synthesizer's main divider is driven by the prescaler output in the range of 2400 to 2497 MHz and programmed via a 3-wire serial bus. The reference divider ratio can be programmed to 12, 13, 16 or 26. Outputs of the main and reference dividers drive a phase comparator, where a charge pump produces phase error current pulses for integration in an external loop filter. The charge-pump current (phase comparator gain) is set to 3.5 mA.

The synthesizer is programmed and switches on 200  $\mu$ s before the desired slot to lock the VCO to the required channel frequency. Just before the desired slot, the synthesizer is switched off, allowing open loop modulation of the VCO during transmission.

The device is designed to operate from 3.0 V nominal supplies. Separate power and ground pins are provided to the different parts of the circuit. The ground leads should be connected together externally to prevent large currents flowing across the IC, which would cause damage. All  $V_{CC}$  pins must also be at the same potential ( $V_{CC}$ ).

### QUICK REFERENCE DATA

$V_{CC} = 3.0$  V;  $T_{amb} = 25$  °C; characteristics for which only a typical value is given are not tested; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{CC}$	supply voltage		2.8	3.0	3.6	V
$I_{CC}(\text{GUARD-RX})$	receiver supply current	during RX guard space	–	25	tbf	mA
$I_{CC}(\text{RX})$	receiver supply current	during RX (open loop PLL)	–	60	tbf	mA
$I_{CC}(\text{GUARD-TX})$	transmitter supply current	during TX guard space	–	36	tbf	mA
$I_{CC}(\text{TX})$	transmitter supply current	during TX	–	30	tbf	mA
$I_{CC}(\text{pd})$	total supply current in Power-down mode		–	10	60	$\mu$ A
$f_{o(\text{RF})}$	RF output frequency		2400	–	2497	MHz
$f_{\text{xtal}}$	crystal reference input frequency		12	–	26	MHz
$f_{\text{PC}}$	phase comparator frequency		–	1	–	MHz
$T_{\text{amb}}$	ambient temperature		–10	–	+50	°C

### ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
UAA3558HL	LQFP32	plastic low profile quad flat package; 32 leads; body 5 × 5 × 1.4 mm	SOT401-1
UAA3558HN	HVQFN32	plastic, heatsink very thin quad flat package; no leads; 32 terminals; body 5 × 5 × 0.85 mm	SOT617-1

Bluetooth RF Transceiver

UAA3558

BLOCK DIAGRAM

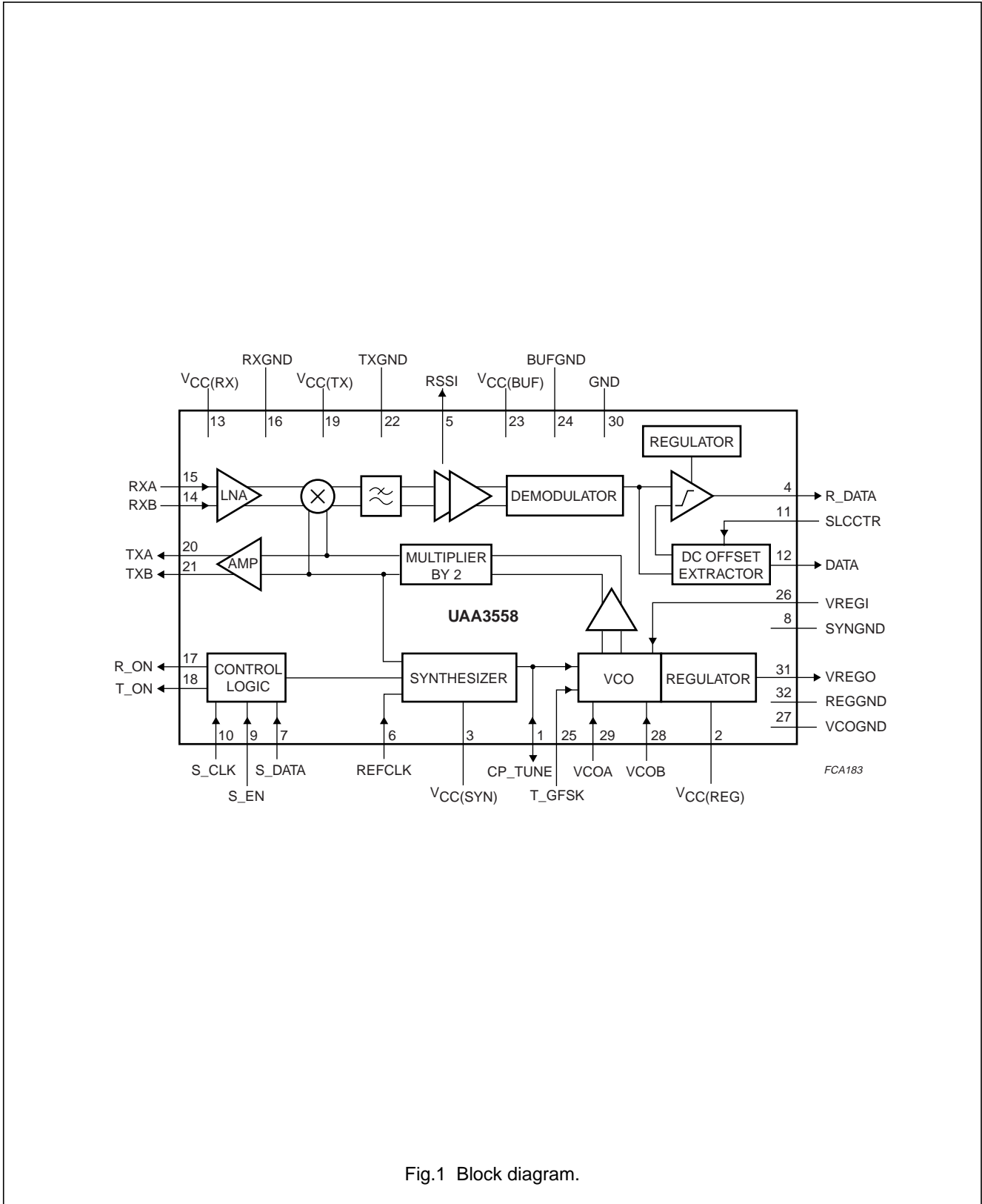


Fig.1 Block diagram.

## Bluetooth RF Transceiver

UAA3558

## DATA SHEET STATUS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS <sup>(1)</sup>
Objective specification	Development	This data sheet contains the design target or goal specifications for product development. Specification may change in any manner without notice.
Preliminary specification	Qualification	This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
Product specification	Production	This data sheet contains final specifications. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

## Note

1. Please consult the most recently issued data sheet before initiating or completing a design.

## DEFINITIONS

**Short-form specification** — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

**Limiting values definition** — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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# 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

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**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:** 51 Rue Carnot, BP317, 92156 SURESNES Cedex,  
Tel. +33 1 4099 6161, Fax. +33 1 4099 6427

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

**Hungary:** see Austria

**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,  
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**Korea:** Philips House, 260-199 Itaewon-dong, Yongsan-ku, SEOUL,  
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**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

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**Slovakia:** see Austria

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**South Africa:** S.A. PHILIPS Pty Ltd., 195-215 Main Road Martindale,  
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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

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**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 BE-p, P.O. Box 218, 5600 MD EINDHOVEN,  
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