Manual AMB2300

Version 1.7

BlueNiceCom 4

AMBER wireless GmbH
Albin-Köbis-Straße 18
51147 Köln
Tel. 02203-6991950
Fax 02203-459883
eMail info@amber-wireless.de
Internet http://www.amber-wireless.de

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1 General

BlueNiceCom 4
Bluetooth-Modul with UART-interface and integrated Chip-antenna

- Bluetooth Class 2 module
- Bluetooth Specification 2.0 compatible
- Support of Bluetooth Audio
- Integrated profiles: SPP, GAP, SDAP
- Supported profiles: DUN, OBEX, HSP etc.
- UART interface
- Integrated chip antenna

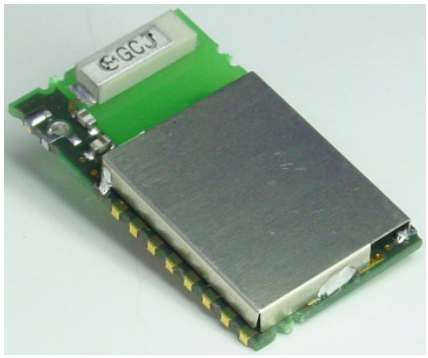


Abb. 1

AMBER wireless provides with the BlueNiceCom 4 a certified, qualified listed Bluetooth-module, based on LMX9830 from National Semiconductor. This compact and inexpensive Bluetooth-module is qualified for a serial data or audio transmission.
The module has an integrated chip-antenna and can be placed into a circuit like a SMD-part.

BlueNiceCom IV comes with an integrated firmware with the complete Bluetooth Stack (Bluetooth 2.0).
A Point-to-Point connection and a Point-to-Multipoint (Piconet) connection are supported by the firmware. Up to seven active links (Piconet) and one SCO-link (Audio) is possible.

The module can be integrated easily in a system. According to the application and the settings the BlueNiceCom 4 can work as a stand-alone-slave-module e.g. as a virtual cable replacement in combination with another commercial Bluetooth system.
A development environment AMB2300-EV is available.

2 Technical data

Voltage supply	2.9 to 3.3V
Current consumption	typ. 65mA
RF output	typ. 0dBm (Class 2)
Rx sensitivity	typ. –80dBm
Data rate UART	2,4 to 921,6 kbits/s
Operating temperature	-20°C to 70°C
Antenna	Integrated chip antenna Connection of an external antenna is possible
Dimension	27,5 x 16 x3,5mm
Miscellaneous	All further technical datas according to the LMX9830 module of National Semiconductor
Order number	AMB2300
Part code:	BlueNiceCom 4

2.1 Default settings

All parameter are stored at the internal EEPROM.
See datasheet LMX9830

Parameter	EEPROM Address	Default set ups	Notice
DeviceName length	0018	18	Device Name + NULL-Terminierung
DeviceName	0019 – 0040	<Variabel>	Device Name Consist of „ BNC4- “ and BD_ADDR

2.2 Pin assignment and functions

2.2.1 Pinning

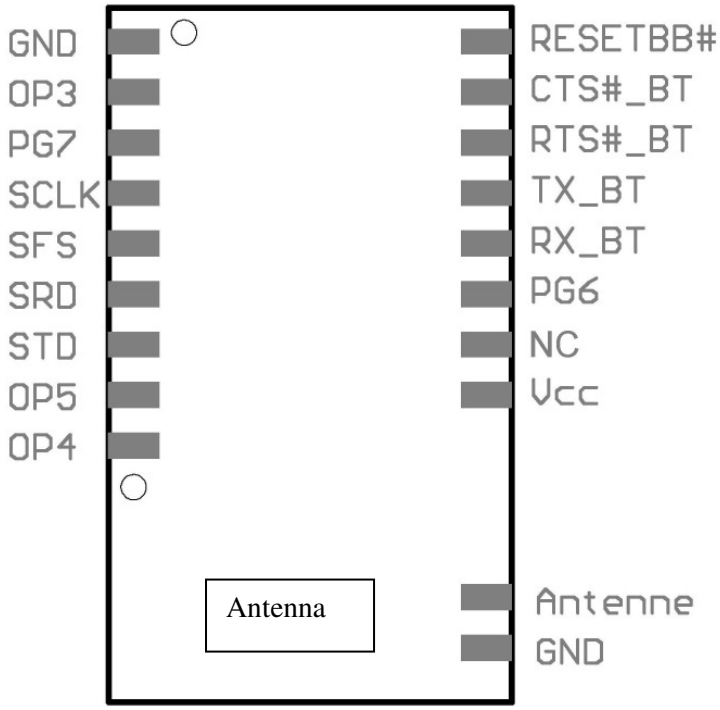


Figure. 2

2.2.2 Pinning table

Pin name	Typ[1]	Notice
GND	I	Ground
OP3	I	At start up configuration of the UART-data rate, otherwise internal use
PG7	I/O	GPIO (default setting as output, display a data exchange)
SCLK	I/O	Audio PCM Interface Clock
SFS	I/O	Audio PCM Interface Frame Synchronization
SRD	I	Audio PCM Interface Receive Data Input
STD	O	Audio PCM Interface Transmit Data Output
OP5	I	Configuration UART-data rate at Start up
OP4	I I/O	Configuration UART-data rate at Start up, otherwise GPIO
RESETBB#	I	Reset, internal Pull up, active low
CTS#_BT	I	Host Serial Port Clear To Send, active low [2] - see footnote 2
RTS#_BT	O	Host Serial Port Request To Send, active low [3] - see footnote 3
TX_BT	O	Host Serial Port Transmit Data
RX_BT	I	Host Serial Port Receive Data
PG6	I/O	GPIO (default setting as output, display a link connection)
NC	I	Not connected, no ground
Vcc	I	Power consumption, 2,9V to 3,6V
Antenna	O	Connection for external antenna[4] - see footnote 4
GND	O	

The signal level is equivalent to the power consumption (2,9V to 3,6V) of the BlueNiceCom 4 and has to be matched, if the Host system is working with a different signal level.

[1] I = Input, O = Output
[2] Connect with ground if not used
[3] Not connected if not used
[4] In as-delivered condition the antenna connection is internally not connected

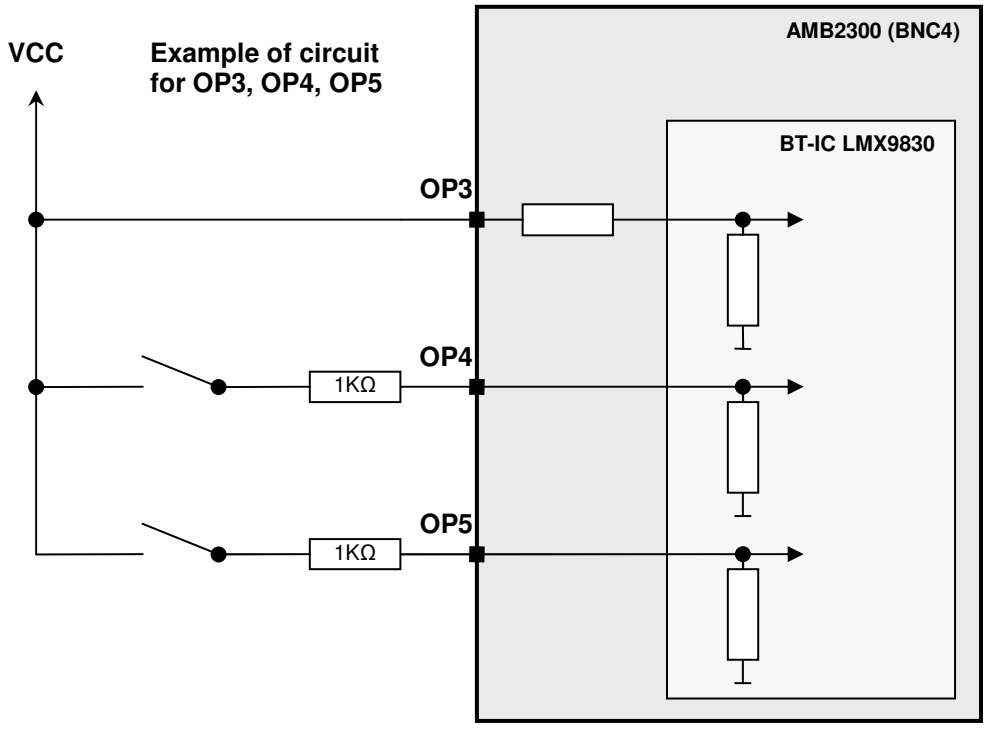
2.2.3 UART configuration with OP3, OP4, OP5

The serial interface of the AMB2300 must be configured as follows:

OP3*	OP4	OP5	Function
0	0	0	Not supported
0	1	0	Not supported
1*	0	0	UART speed read from NVS (EEPROM)
1*	0	1	UART speed 9.6 kbps
1*	1	0	UART speed 115.2 kbps
1*	1	1	UART speed 921.6 kbps

Level **note**
0 = low open pin
1 = high VCC with 1KΩ pull up
*exception OP3: VCC without pull up!

OP3, OP4 and OP5 are pulled down in AMB2300, therefore these pins for the low level are not to be switched at GND. Here an example of circuit:



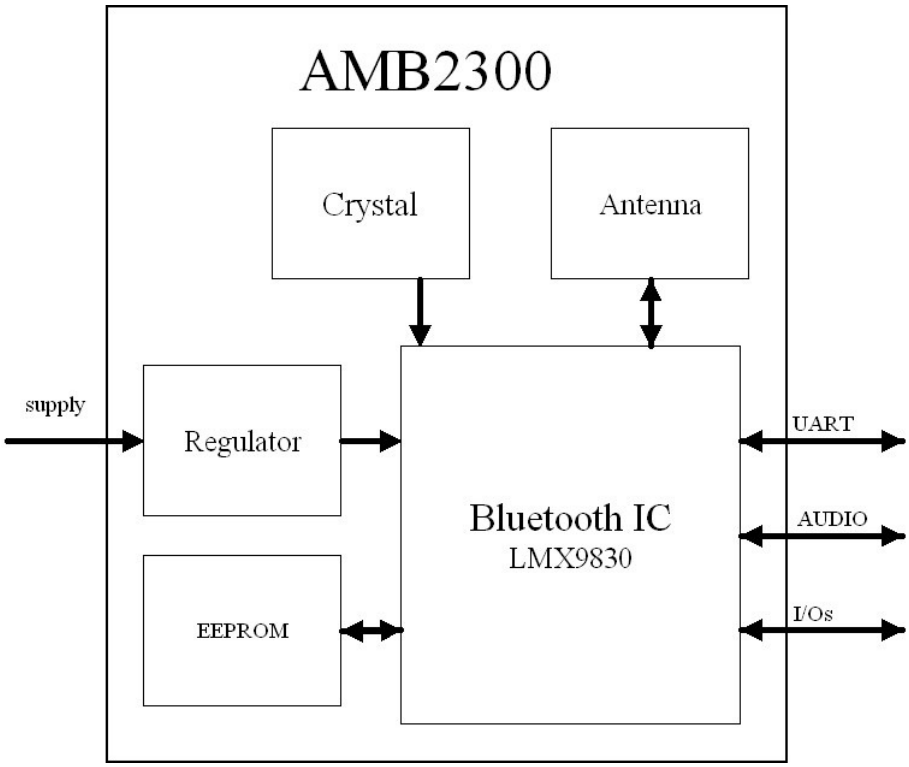
2.2.4 UART interface RX_BT, TX_BT, RTS#_BT and CTS#_BT

The interface serves for communication with the BlueNiceCom4. The hardware handshake is used (RTS/CTS). If this should not be supported by the host system, RTS#_BT and CTS#_BT must be short circuit and/or CTS#_BT put on Low levels. This can lead however to overrun! We recommended therefore urgently to use handshake.

2.2.5 Details to the remaining connections of the AMB2300

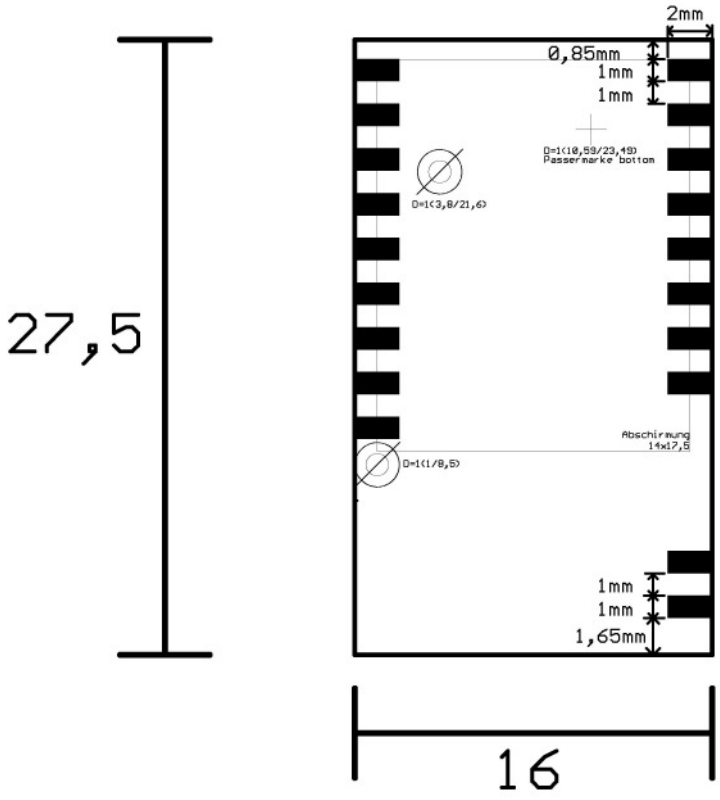
ResetBB#	Internal Pull up, low active, no external circuit is necessary
SCLK, SFS, SRD, STD	Audio interface, if not used, pins does not attached
PG6, PG7	I/O ports, if not used, pins does not attached
Vcc, Gnd	Power supply

2.2.6 Block diagram



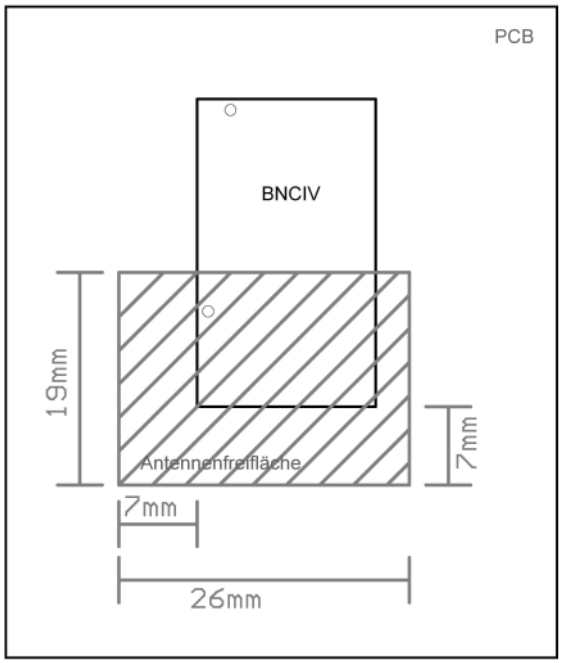
2.3 Dimension

BlueNiceCom 4 has 1mm x 2mm soldering pads with a raster of 2mm to be solder direct on a motherboard



3 Details for Layout

To achieve the maximum of range no metal (ground, strip line, components, etc..) has to be near the antenna, as shown hatched in the following figure. The antenna should have a distance of 8mm to any ground, strip line or component. Most suitable is to place the antenna at the margin of the motherboard.



The BNC4 is not isolated, so even if there are normally no short circuit problems, because of the solder resist, an isolation should be placed between BNC4 and motherboard in case of any copper on the top side of the motherboard underneath the BNC4.

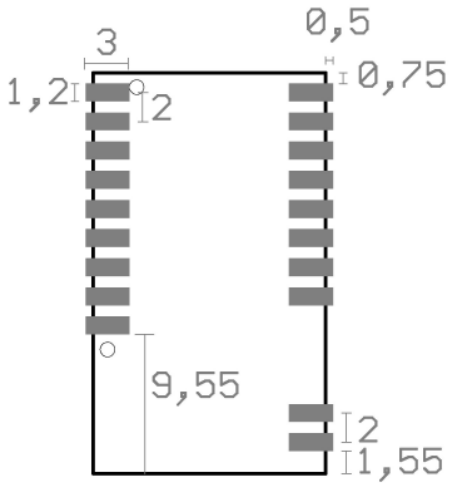
4 Soldering & Reflow

4.1 Description

- Reflow appropriate
- The temperature curve depends on the motherboard it´s character, like the number and conditioning of parts, etc. Please ask your manufactor.
- Depending on the limit values of the components following limits are not allowed to excess

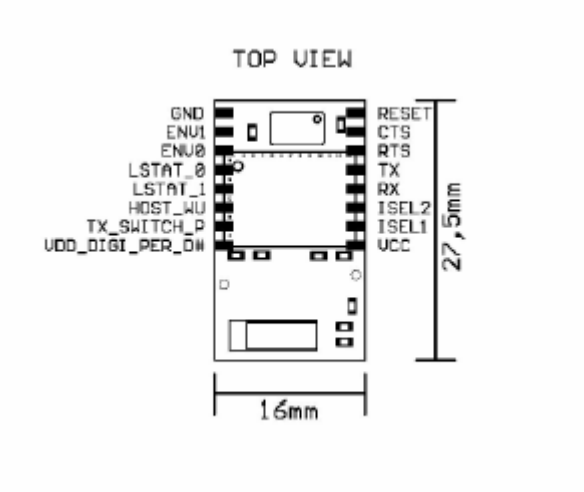
  260°C max. 40s (LMX)
  250°C max. 20s (Chip-antenna)
  200°C max. 120s (Chip-antenna)

4.2 Recommendation for Footprints

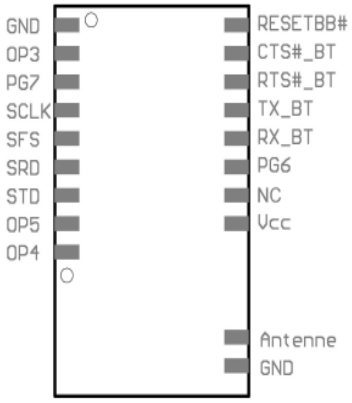


All dimensions in mm

5 Replace of BNC3 to BNC4



BNC3



BNC4

CTS, RTS, TX, RX	no change (UART)
Vcc, GND	no change
Reset	at BNC4 no external connection necessary
ISEL2	PG6 (I/O) no connection necessary
ISEL1	NC Pin not connected!
ENV1	OP3 (Input) must be connected with VCC-level (UART configuration)
ENV0	PG7 (I/O) no connection necessary
LSTAT_0, LSTAT1	Audio interface, no connection necessary (PG6 fulfils function of LSTAT_1)
Host_WU	Audio interface, no connection necessary
TX_Switch_p	Audio interface, no connection necessary (PG7 fulfis these function now)
VDD_DIGI_PER_D	OP5 (Input) must be configured (UART configuration)
---	OP4 (Input) must be configured (UART configuration)

6 Minimum connection to run the BNC4

In order to realize the simplest radio transmission are the following connections of the AMB2300 to be wired:

VCC, GND	Power supply
RX, TX	UART data
RTS, CTS	UART handshake; if does not need: short RTS and CTS or contact CTS at GND (without flow control it can come to overrun and lost data)
OP3	High (connect to VCC)
OP4, OP5	Configuration UART, see chapter 2.2.3 (open or 1KΩ pull-up)

All other PIN´s doesn´t need to be connected.

7 Further documents

Data sheet LMX9830
Software User Guide
Simply Blue Commander (Windows Software)

8 External antenna

The AMB2300 can be operated also with an external antenna. In addition the red marked condenser (100pF 0603) must, as are changed above shown in its position. The lateral antenna connection is available then for a coaxial cable or a wire antenna.

These steps should accomplish attention, only persons with good HF knowledge, since this kind of connection can involve high error potential!
By these measures the warranty and the permission expire.

9 Declaration of Conformity

CE

DECLARATION OF CONFORMITY
Directive 1999/5/EG (R&TTE)

The manufacturer: AMBER wireless GmbH
Albin-Köbis-Straße 18
51147 Köln
Tel. ++49-2203-699-1950

declares on our sole responsibility, that the following product:

Type-designation: **BlueNiceCom 4 (AMB2300)**

Intended purpose: 2,4GHz-Bluetooth™ wireless data modem
Transfer of digital messages

complies with the appropriate essential requirements of article 3 of the R&TTE 1999/5/EG directive, if used for its intended purpose and that the following norms, standards or documents has been applied:

EN 300 328-1, -2 (2001-12)
EN 301 489-1, -17 (2002-04)
EN 50371 (2002)
EN 60950 (2001-12)
FCC 47 CFR Part 15C - Intentional Radiators ANSI C63.4-1992
FCC-ID R7TAMB2300
RSS210 Issue 6 (09-2005), RSS-GEN Issue 1 (09-2005)

Köln, 10.2.2007
place and date of issue

Manufacturer/Authorized representative
Ulf Knoblich

10 Important notes

10.1 Compliance statement

USA
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.
Usually this is followed by the following FCC caution:
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Canada
Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
Usually this is followed by the following RSS caution:
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

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AMBER wireless GmbH

Albin-Köbis-Straße 18
51147 Köln
Tel. 02203-6991950
Fax 02203-459883
eMail info@amber-wireless.de
Internet http://www.amber-wireless.de