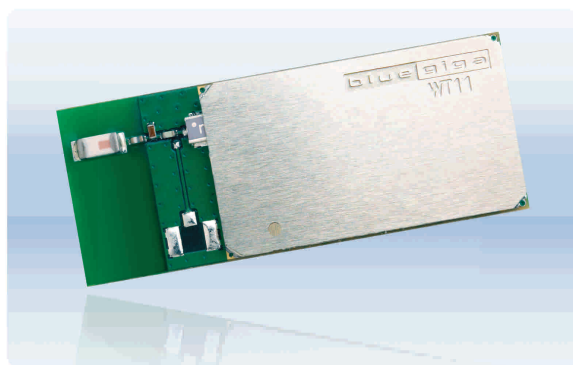**bluegiga**
TECHNOLOGIES

Bluetooth®

WRAP THOR
WT11 Bluetooth ® Module

Key Features

▷ Bluetooth® Class 1

▷ Two antenna options: integrated chip antenna or U.FL connector

▷ Enhanced Data Rates (EDR) with data throughput up to 2-3Mbps

▷ Support for Adaptive Frequency Hopping (AFH) and 802.11 co-existence

▷ USB version 2.0

▷ UART with bypass mode

▷ 8Mbits of external flash

▷ Supported profiles: SPP, DUN, OBEX and HCI

▷ Support for custom applications

▷ Industrial temperature range from -40C to +85C

▷ RoHS compliant

▷ Simple iWRAP™ firmware for controlling Bluetooth® wireless technology

▷ Fully qualified end product with Bluetooth® 2.0+EDR, CE and FCC

Description

WT11 is a next-generation, class 1, Bluetooth® 2.0+EDR (Enhanced Data Rates) module. It introduces three times faster data rates compared to existing Bluetooth® 1.2 modules even with lower power consumption! WT11 is a highly integrated and sophisticated Bluetooth® module, containing all the necessary elements from Bluetooth® radio to antenna and a fully implemented protocol stack. Therefore WT11 provides an ideal solution for developers who want to integrate Bluetooth® wireless technology into their design with limited knowledge of Bluetooth® and RF technologies.

WT11 module combined with Bluegiga's complete development, testing and verification service offering and excellent developer support, OEMs and designers ensure that their products reach the market rapidly and cost-effectively in relation to time and resources. Bluegiga has extensive in-house knowledge of both software and hardware offering customers a single point of contact to all Bluetooth® related issues.

By default WT11 module is equipped with powerful and easy-to-use iWRAP firmware. iWRAP enables users to access Bluetooth® functionality with simple ASCII commands delivered to the module over serial interface - it's just like a Bluetooth® modem. Entering the world of wireless Bluetooth® technology could not be easier!

With iWRAP software you have several implementation options:

⊙ iWRAP can be configured to operate autonomously - just like a Bluetooth® cable replacer

⊙ To create sophisticated applications - a host system can be used to control iWRAP with ASCII commands

⊙ The GPIO interface in WT11 module can be used to connect host and iWRAP

Besides the iWRAP firmware Bluegiga also offers several other firmware options for WT11 module. Standard Host Command Interface (HCI) firmware is supported and an ideal solution for systems where the host system is capable running the entire Bluetooth® stack and profiles and WT11 is utilized as the physical radio over UART or USB interface.

Technical details
Firmware:

- iWRAP™ command interface for accessing the Bluetooth® functionality and for configuring the parameters with simple ASCII commands
- HCI firmware available for UART and USB interfaces
- Possibility to use / develop custom firmware
- 128-bit Bluetooth® encryption available for all firmware options

Hardware:

- Bluetooth® Class 1 radio (range up to 200 meters)
  -Nominal output power +19 dBm
  -Nominal sensitivity -84 dBm
  -Uses 2.4 GHz ISM band
  -Based on CSR's BC04 chipset
- Integrated antenna or U.FL connector
- Host processor interface with UART or USB
- SPI interface for firmware and parameter upgrades
- 6xGPIO
- PCM interface for Audio applications
- Supply voltage: regulated 3.2 – 3.4 VDC
- PCB form factor: 35.3 x 14 x 2.3 mm
- Operating temperature: -40 ºC to +85 ºC
- Metal shielding to prevent RF interference
- Reference designs available for HCI, cable replacement and audio applications

Product codes:

- iWRAP Firmware, chip antenna   WT11-A-AI
- HCI Firmware (USB), chip antenna   WT11-A-HCI
- Custom Firmware, chip antenna   WT11-A-C
- iWRAP Firmware, U.FL   WT11-E-AI
- HCI Firmware (USB), U.FL   WT11-E-HCI
- Custom Firmware, U.FL   WT11-E-C

Development and evaluation:

- WT11-A Evaluation Kit EKWT11-A
- WT11-E Evaluation Kit EKWT11-E
- CSR's BlueLab Professional SDK
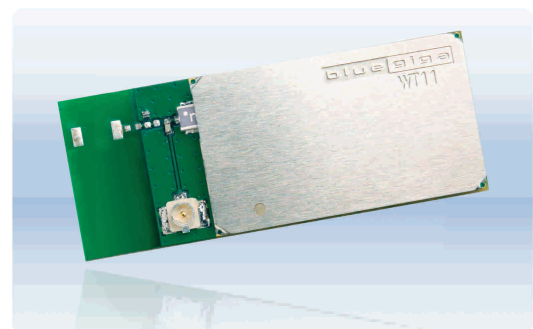
Other Bluegiga's products:

- WT12 Class 2 Bluetooth® module
- WRAP THOR® SMD module 2022-1
- WRAP THOR® Board-to-Board module 2022-1-B2B
  WRAP Access Server™ 2291, 2293

Certifications:

- Bluetooth® 2.0 + EDR
- CE, FCC

Applications:

- Cable replacement
- Point-of-sales systems
- Barcode readers and pay terminals
- Telemetry and machine-to-machine devices
- Logistics and transportation systems
- Automotive inspection and measurement systems
- Medical systems
- Fitness and sports telemetry devices
- PDAs and other portable terminals
- PCs and laptops

Preliminary information – details subject to change

WRAP THOR
EVALUATION KIT

KEY FEATURES

► *Turn-key solution for evaluating WRAP THOR based Bluetooth wireless applications*

► *Includes simple WRAP THOR ASCII Interface for commanding module from host system*

► *Can be easily attached to your existing systems or PC*

► *Directly connectable to D9 serial interface*

► *Chip or external antenna*

DESCRIPTION

WRAP THOR™ Evaluation Kit provides the interface board for evaluating your WRAP THOR based *Bluetooth* applications quickly and easily.

With WRAP THOR Evaluation Kit you can instantly access *Bluetooth* functionality using simple ASCII based command interface. This unique approach makes *Bluetooth* totally transparent. The solution does not need any *Bluetooth* support from the host side, everything is self-contained and autonomous.

You can easily perform inquiries, connect to other devices, receive connections and transmit data. No device restrictions are in place; you can, for example, use your *Bluetooth* enabled mobile phone to connect to WRAP THOR.

TECHNICAL DETAILS
– Pre-installed WRAP THOR ASCII Interface
– Serial interface for host (D9/RS-232)
– Connectors for all the signals of the WRAP THOR 2022-1 module: SPI, USB, GPIO
– Integrated antenna

Bluetooth®

TECHNICAL DATA

Available Software
- WRAP THOR ASCII Interface installed by default
- Other firmwares: (SPP, HCI)

Characteristics of WRAP THOR ASCII Interface
- Offers an intuitive access for commanding the RFCOMM from a host system. An example of some commands that are supported:
  - "INQUIRY" –find other *Bluetooth* devices in the vicinity
  - "CALL" –establish a connection to a Bluetooth device (serial port profile)
  - "LIST" –List the connection stats
  - "SET" –Set parameters
  - "HELP" –Show supported commands
- The Host system does not need any *Bluetooth* specific functionality, only an access to RS-232 (UART) for creating wireless applications
- Two different modes:
  - Data mode: it sends and/or receives data from other *Bluetooth* devices transparently.
  - Command mode: the Evaluation Kit can be commanded to perform all the described functions.

Hardware
- WRAP THOR 2022-1 *Bluetooth* Module
- HW Interfaces: D9/RS-232, SPI and GPIO pins at connectors
- PCB form factor: 87 x 89 x12mm
- Integrated antenna
- Power input 5VDC/5-9 VDC

Deliverables
- WRAP THOR Evaluation Board
- Power adaptor
- Serial Cable

Other Bluegiga Products
- WRAP THOR module
- WRAP THOR Board-to-Board Module
- WRAP Access Server
- WRAP Cable Replacer
- WRAP THOR Onboard Installation Kit

RS-232

Host System

WRAP THOR Evaluation Kit
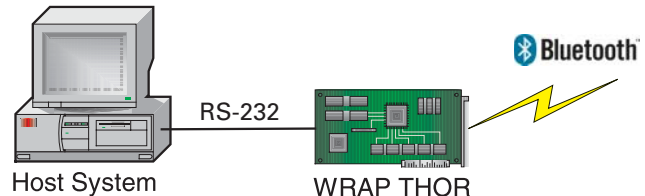
Example 1:
Commanding *Bluetooth* from PC

RS-232

Handheld terminal

WRAP THOR Evaluation Kit
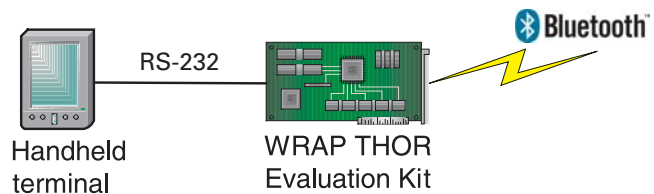
Example 2:
Commanding *Bluetooth* from a handheld terminal

RS-232

WRAP THOR Evaluation Kit
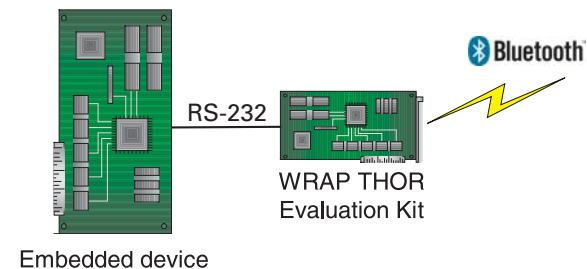
Embedded device

Example 3:
Commanding *Bluetooth* from an embedded device

Target applications for WRAP THOR modules:
- Embedded cable replacement
- Embedded systems
- Telemetry, telematics and M2M applications
- Industrial instruments, sensors and devices
- Handheld devices

WT12 Evaluation Kit

D a t a   S h e e t

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bluegiga

T E C H N O L O G I E S

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VERSION HISTORY

Version:	Author:	Comments:
1.0	MS	First version
1.1	NM	Revised
1.2	PR	Revised
1.3	MS	First public version

TERMS & ABBREVIATIONS

Term or Abbreviation:	Explanation:
ASCII	American Standard Code for Information Interchange
Bluetooth	Set of technologies providing audio and data transfer over short-range radio connections
DTE	Data Terminal Equipment
DTR	Data Terminal Ready
GPIO	General Purpose Input Output
iWRAP	Interface for WRAP
PCM	Pulse Code Modulation
SPI	Serial Peripheral Interface
UART	Universal Asynchronous Receiver / Transmitter
USB	Universal Serial Bus
WRAP	Wireless Remote Access Platform

1. INTRODUCTION

FEATURES

- Evaluation Kit for WT12 *Bluetooth* wireless communication modules
- Unregulated power supply input (5-9V)
- RS-232 serial interface (D9, DTE)
- USB interface
- SPI for upgrading the firmware and parameters
- Reset and DSR buttons
- Switches for I/O or UART and I/O or LED/USB/UART selection
- 2,5mm audio jacks for speaker and microphone connection
- 16 pin I/O interface (6xGPIO, 4xPCM, RESET, GND, POWER, TxD, RxD and +V)
- iWRAP™ command interface software as a default firmware

TARGET APPLICATIONS

WT12 Evaluation Kit is meant for evaluation and development of WRAP THOR WT12 *Bluetooth* modules or prototyping and piloting *Bluetooth* systems utilized with WRAP THOR WT12 module.

ELECTRICAL FUNCTIONALITY

Please, refer the details of WT12 *Bluetooth* module from the latest respective data sheet (WT12 Data Sheet). The physical outlook, schematics, assembly and the PIN configurations of the interfaces of WT12 Evaluation Kit are described in this document.

SOFTWARE FUNCTIONALITY

WT12 Evaluation Kit is delivered with iWRAP software as default firmware. iWRAP is a simple ASCII command based interface, which enables access to various *Bluetooth* functions. A detailed description of iWRAP can be found from *iWRAP User Guide,* which can be found from the CD delivered with the evaluation kit or alternatively downloaded from the Tech-forum.

2. PHYSICAL OUTLOOK

Figure 1: WT12 Evaluation Kit, Onboard Installation Kit and CD

3. SCHEMATICS

Schematics of WT12 Evaluation Kit can be found from the CD delivered with the package or alternatively downloaded form www.bluegiga.com/techforum/.

4. ASSEMBLY
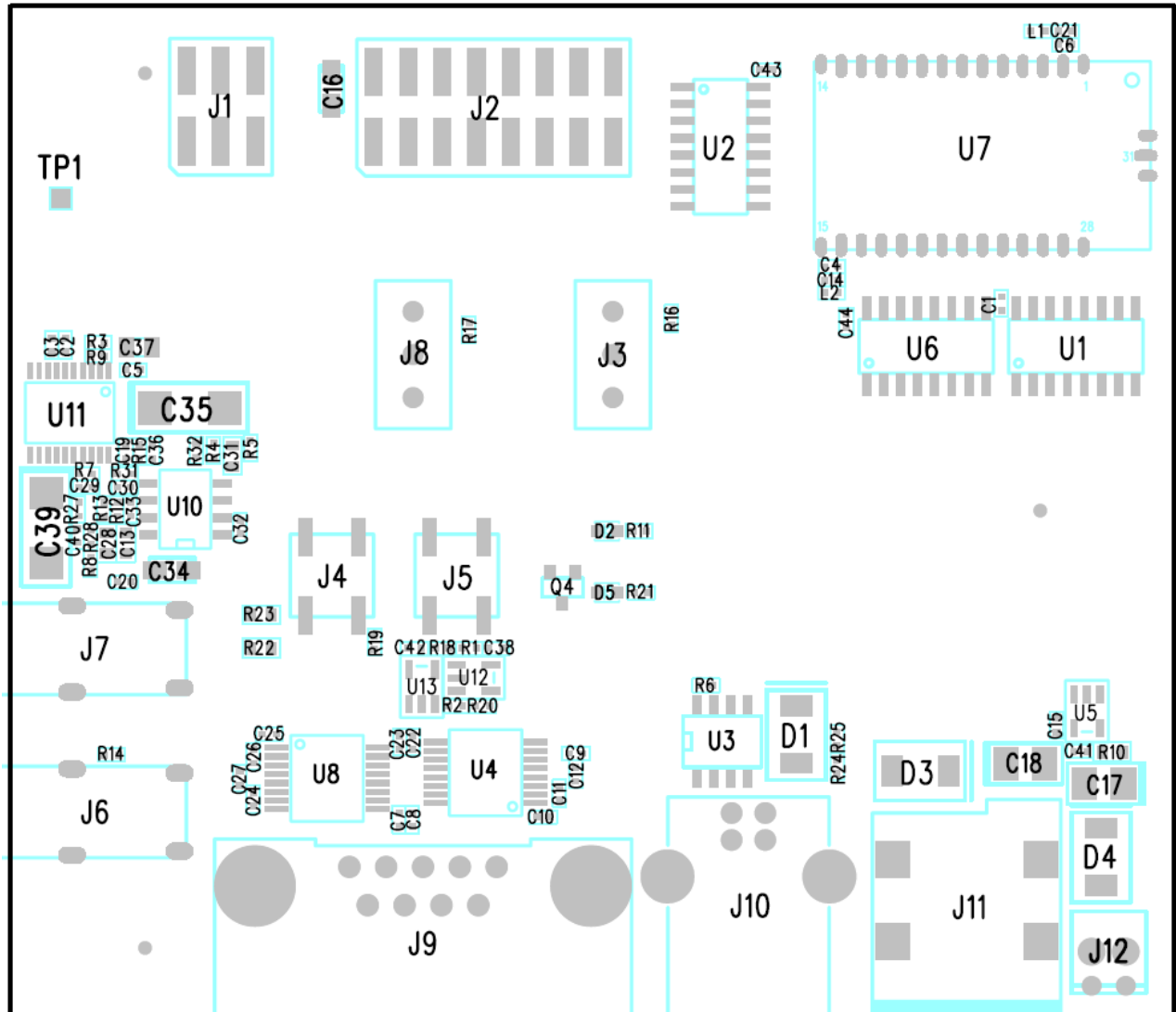
Figure 2: WT12 Evaluation Kit assembly

5. GERBER

Gerber of WT12 Evaluation Kit can be found from the CD delivered with the package or alternatively downloaded form www.bluegiga.com/techforum/.

6. SPI (J1) INTERFACE

SPI interface pin configuration is show in Table 2. The physical interface is 2X3 pin header (*AMP146134-2*).

PIN Name:	No.:	I/O:	Description:
MISO	1	O	MISO
3.3 V	2	POWER	3.3 V power supply input
CLK	3	I	CLK
MOSI	4	I	MOSI
CSB	5	I	CSB
GND	6	GND	GND

Table 1: SPI Interface PIN description

7. GPIO (J2) INTERFACE

General purpose interface pin configuration is show in **Error! Reference source not found.**. The physical interface is 2X8 pin header (*AMP146134-7*).

PIN Name:	No.:	I/O:	Description:
RESET	1	I	Reset
3.3 V	2	POWER	Regulated power supply output (3.3 V)
PIO2	3	I/O	Programmable IO number 2
PIO3	4	I/O	Programmable IO number 3
PIO4	5	I/O	Programmable IO number 4
PIO5	6	I/O	Programmable IO number 5
PIO6	7	I/O	Programmable IO number 6
PIO7	8	I/O	Programmable IO number 7
PCM_CLK	9	I/O	PCM clock
PCM_OUT	10	O	PCM out
PCM_SYNC	11	I/O	PCM synchronization
PCM_IN	12	I	PCM input
TxD	13	O	UART TX
RxD	14	I	UART RX
GND	15	GND	GND
+V	16	POWER	Unregulated power supply output (5-9 V)

Table 2: GPIO interface PIN description

8. PIO SELECT (J3)

This switch toggles PIO2 to PIO7 signal connections between J2 connector and LED/USB/UART interfaces.

Note: '*Top*' and '*bottom*' positions refer to viewing WT12 Evaluation Kit from top side as seen in Figure 2.

- Top position must be used when WT12 module is interfaced trough J2 connector.

- Bottom position is used when WT12 module is interfaced trough the DB9 RS232 connector or if USB port or if link state LED is used.

J3 Switch top position:

- PIO2 connects to pin 3 on the J2 interface

- PIO3 connects to pin 4 on the J2 interface

- PIO4 connects to pin 5 on the J2 interface

- PIO5 connects to pin 6 on the J2 interface

- PIO6 connects to pin 7 on the J2 interface

- PIO7 connects to pin 8 on the J2 interface

J3 Switch bottom position:

- PIO2 connects to USB_IO1

- PIO3 connects to nDTR-UART

- PIO4 connects to nCD-UART

- PIO5 connects to nDSR-MUX

- PIO6 connects to VBUS

- PIO7 connects to blue LED on the board marked with PIO7

9. RESET (J4)

The RESET button resets the module using the reset pin on the WT12.

10. DSR (J5)

The DSR button is connected to PIO5 pin on the WT12. Thus, when you want to use the DSR signal, please refer to the iWRAP 2.1.0 manual. The use of DSR signal is described under SET CONTROL ESCAPE chapter.

11. SPEAKER JACK (J6)

Connect your generic PC headset's 3,5mm speaker plug here.

12. MICROPHONE JACK (J7)

Connect your generic PC headset's 3,5mm headphone plug here.

13. SIG SELECT (J8)

This switch toggles nCTS and RxD signals connection between J2 connector and DB9 RS232 connector.

Note: '*Top*' and '*bottom*' positions refer to viewing WT12 Evaluation Kit from top side as seen in Figure 2.

- Top position must be used when external WT12 module's nCTS and RxD pins are interfaced trough J2 connector.

- Bottom position must be used when WT12 is interfaced trough the DB9 RS232 connector.

J8 Switch top position:

- nCTS connects to pin 10 on the GPIO (J2) interface

- RxD connects to pin 14 on the GPIO (J2) interface

J8 Switch bottom position:

- nCTS connects to nCTS-UART

- RxD connects to RXD-UART

14. RS-232 (J9) DTE INTERFACE

RS-232 interface PIN configuration is shown in Table 1. The physical interface is D9-male connector (*AMP747840-4*).

PIN Name:	No.:	I/O:	Description:
NC	1	NC	Not connected
RxD	2	I	RxD
TxD	3	O	TxD
DTR	4	O	DTR on
GND	5	GND	Ground
NC	6	NC	Not connected
RTS	7	O	RTS
CTS	8	I	CTS
NC	9	NC	Not connected

Table 3: RS232 PIN configuration

15. USB (J10) INTERFACE

J10 connector is a standard USB B receptacle connector.

16. POWER SUPPLY (J11)

This connector is used with the 5V power supply delivered with the evaluation kit. Diameter 6.0mm, inner pin diameter 2.0mm.

17. POWER SUPPLY (J12)

This connector can be used for external power supply. Power supply must be 5-9V unregulated.