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Bluegiga eHealth Bluetooth Gateways

Bluegiga’s eHealth Bluetooth Gateway product family offers simple and efficient network connectivity for Bluetooth-enabled medical, health and fitness devices. Built on a Linux™ operating system platform, our gateway devices offer flexible operating modes for data routing, application hosting, and protocol conversation.

Our eHealth gateway devices incorporate Bluegiga’s latest generation long range Bluetooth module increasing range three or four times when compared to other competing Bluetooth gateways. This makes the Bluegiga Bluetooth eHealth Gateway an ideal solution for in-home, clinic, or hospital environments.

For maximum flexibility and application customization, Bluegiga offers an eHealth Gateway SDK. The eHealth Gateway SDK provides example applications source code and other development tools for software developers to extend gateway functionality to fit their unique application and back end system requirements.

The eHealth Bluetooth Gateways are available in several product variants that combine multiple Bluetooth radios with 2G/3G, Wi-Fi and ethernet connectivity in a single, integrated platform. They are capable of supporting from 7 to 21 simultaneous Bluetooth connections making them an ideal solution for networking multiple medical or health and fitness devices to back end systems. To learn more about our eHealth Bluetooth Gateways please go to page 10.

Bluegiga eHealth Bluetooth Modules

Bluegiga’s eHealth Bluetooth Modules™ are engineered to support virtually any health, medical or fitness application requirement where Bluetooth wireless technology is needed for data or audio communications. Bluegiga’s OEM modules family incorporates our eHealth Bluetooth protocol stack and carefully designed hardware and antenna solution, simplifying customer integration project while providing the maximum connection distance. Bluegiga eHealth Bluetooth module integrates the Bluetooth Health Device Profile and IEEE agents/managers into a simple-to-use and Continua and Petri Salonen, CEO, Bluegiga Technologies Inc.

"Equipment manufacturers and system integrators are often faced with the non-trivial challenge of integrating radio frequency technologies into their own products. These integration projects always need to be completed within the budget and under tight schedules to beat the market competition while still maintaining high product quality, excellent performance, and unmatched user experience. Bluegiga provides the best type of radio technology and world-class integration support to ensure customer needs and exceed project targets."

Global Technology Leader in Bluetooth Connectivity Platforms

Founded in 2000, Bluegiga Technologies Inc. provides Bluetooth based wireless modules and access device solutions to OEMs, systems integrators and network operators. Bluegiga has built its reputation on providing innovative products and outstanding customer service at competitive prices to our customers in health and medical, automotive, audio, industrial, and consumer markets. Headquartered in Espoo, Finland, Bluegiga has offices in the US and Hong Kong and serves customers in more than 65 countries.

Contact us sales@bluegiga.com and learn more about how we can help you solve your Bluetooth application needs.

Complete Solution Approach

Bluegiga’s flexible, highly integrated products meet the most demanding requirements and can be used in a limitless number of applications. Our products are engineered to last and have the best in class RF sensitivity and power consumption profiles. Bluegiga’s simple, but powerful software interface makes application development and integration straightforward for the seasoned developer or the novice engineer. To ensure a successful customer project Bluegiga provides its customers robust technical information and a highly skilled customer service team to assist with any application scenario.

Our complete solution approach is designed to help our customers shorten development cycles, reduce design uncertainty, and improve time to market when creating Bluetooth enabled solutions.

Bluegiga’s eHealth Wireless Gateway products meet the most demanding wireless applications. Bluegiga’s experience in engineering wireless technology devices exceeds 200 man-years resulting in high quality, robust and exceptionally reliable Bluetooth devices.

To read more about our industry leading Bluetooth modules go to page 18.

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Hundreds of medical OEMs worldwide rely on Bluegiga’s Bluetooth OEM modules for the most demanding wireless applications. Bluegiga’s experience in engineering Bluetooth wireless technology devices exceeds 200 man-years resulting in high quality, robust and exceptionally reliable Bluetooth devices.

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Bluegiga Customer Service Offering

Online Self-service – techforum.bluegiga.com

Techforum.bluegiga.com is an online self-service resource that offers the latest product information: datasheets, software/firmware updates, design references, manuals, and application notes. Please visit techforum.bluegiga.com and register your personal support account today.

Support@bluegiga.com - Answer in 1 Business Day

Support@bluegiga.com is a structured ticket tracking system where all inbound questions are logged, monitored, and replied to by our customer service team. When you email support@bluegiga.com your question will be issued a ticket number for future tracking and communications. Our support staff will then analyze your question and provide recommended steps to solve your specific application needs. If you would like to talk with our support experts over the phone please call your local support contacts or request a call by emailing to support@bluegiga.com.

Design Review

Once you have selected Bluegiga for your application we want to ensure your project’s success. We offer design review services through support@bluegiga.com. Our customer service team will evaluate your design and suggest changes that are needed to ensure the highest quality end product with minimal fine-tuning and effort.

System Testing Services

Sometimes even with the most careful design you may find that you still need to improve your product’s Bluetooth functionality to meet your customer’s expectations. Bluegiga can assist you by measuring your product’s operating characteristics, identify potential issues, and suggest improvements to create the best possible solution for your customer. Please contact your sales representative to learn more about our testing services.

Bluegiga Customer Service Team

Even though Bluetooth technology is widely used, it can be challenging for even the most seasoned engineer to implement a consistent, secure, and reliable connection. Bluegiga’s customer service team is well trained, experienced and willing to help our customers solve their application challenges. By partnering with Bluegiga on your application you will have full access to our support specialists who are eager to help you create a winning wireless solution.

Bluegiga customer service team is an experienced global team knowledgeable in all facets of Bluegiga’s products and Bluetooth technology having supported thousands of customers throughout the world. With this kind of product knowledge and experience you can be assured that we will be able to help you get to market with a working Bluetooth solution.
Imagine millions of people with tiny wireless sensors attached to their bodies, monitoring heart rate, blood pressure or location while being connected to Internet. This has never been closer in becoming a reality than today. Bluetooth low energy technology is the hallmark feature of Bluetooth specification v.4.0 and it holds the promise of low energy connectivity – everywhere, into anything. Bluetooth low energy is a new, open standard developed by the Bluetooth SIG. It’s targeted to address the needs of new modern wireless applications, such as ultra low power consumption, fast connection times, reliability and security. Bluetooth low energy consumes 10-20 less power and is able to transmit data 50 times quicker than classical Bluetooth solutions. Bluetooth low energy is designed for new emerging applications and markets, such as: health and fitness, consumer medical, smart energy, industrial automation and security, but it still embraces the very same features we already know from the classical, well established Bluetooth technology.

Robustness and Reliability
The adaptive frequency hopping technology used by Bluetooth low energy allows the device to quickly hop into a wide frequency band. It not only reduces interference, but also identifies crowded frequencies and avoids them. In addition to broadcasting, Bluetooth low energy provides a reliable and connection oriented way of transmitting data.

Security
Data privacy and integrity are always a concern in wireless, mission critical applications. Therefore, Bluetooth low energy technology is designed to incorporate high level security including authentication, authorization, encryption and man-in-the-middle protection.

Interoperability
Bluetooth low energy technology is an open standard maintained and developed by the Bluetooth SIG. Strong qualification and interoperability testing processes are included in the development of technology so that wireless device manufacturers can enjoy the benefits of many solution providers and consumers can feel confident that their equipment can communicate with other devices regardless of the manufacturer.

Global Availability
Based on the open, license free 2.4GHz frequency band, Bluetooth low energy technology can be used in worldwide applications. Bluetooth low energy devices come in two types:

- Single-mode devices that only support Bluetooth low energy, and are optimized for low-power, low-cost and small-size solutions.
- Dual-mode devices that support Bluetooth low energy and classical Bluetooth technologies, and are interoperable with all previous Bluetooth specification versions.

Bluegiga is committed to being one of the first companies to introduce Bluetooth low energy solutions by releasing single mode products in 2010 and dual-mode products in 2011.
Bluegiga eHealth Bluetooth® Gateways

Access Point 3201™

Description
Bluegiga’s Access Point 3201 is a small and cost optimized access device targeted at business applications. The product is designed to fit into wireless Bluetooth applications where the network performance, reliability, scalability and easy management are important design drivers.

The Access Point is equipped with Bluegiga’s industry leading 2.1 + EDR compliant WT11 Bluetooth module providing users with the features and benefits of the very latest Bluetooth standard. The product also has an external USB connector for extending the product capabilities with GPRS/3G USB modems, Wi-Fi or extra memory.

The Access Point is an evolution from Bluegiga’s extremely reliable and successful Access Server product family. The product’s software and user interface makes it compatible with Bluegiga Access Servers. Access Point 3201 can be remotely managed with Bluegiga Solution Manager (BSM) - enabling remote management of a number of Access Points from a centralized location.

The heart of Access Point 3201 is Bluegiga’s customized Linux operating system with a number of built-in applications, such as SPP-over-IP and ObexSender. For Bluetooth wireless technology, The product has extremely advanced, reliable and easy-to-use software interface called iWRAP, which enables you to connect your Bluetooth equipped devices into TCP/IP networks with built-in security and reliability. Access Point 3201 is also available for OEM’s without the housing providing total freedom of re-branding.

Key Features
- The smallest Bluetooth Access Point in the industry
- Embedded Linux™ Operating System
- Turn-key applications for Bluetooth networking and Bluetooth proximity marketing
- Bluetooth class 1, 2.0/2.1 + EDR compliant
- Supported Bluetooth profiles: SPP, OBEX OPP, OBEX, FTP, PAN, LAN Access, DUN-GW, DI, HDP
- Bluetooth, CE, Fec and Industry Canada qualified
- External and internal antenna options
- Adjustable connection range between 1-200 meters

Applications
- Connectivity
- eHealth
- Point of sales
- Proximity marketing
- Digital Pen
Long Range Bluetooth Access Point 3241™

Key Features
- Significant Bluetooth radio performance
  - +20 dBm transmit power
  - –90dBm receiver sensitivity
- Maximum line-of-sight range 1000m
- Bluetooth 2.1 + EDR compliant
- 10/100Mbps Ethernet interface
- USB host port for optional accessories
- Built-in application interfaces for medical, Bluetooth marketing and TCP/IP networking
- Centralized remote management system with Bluegiga Solution Manager™
- Supported Bluetooth profiles: SPP, OBEX OPP, OBEX FTP, PAN, LAN Access, DI and HDP
- Embedded Linux™ operating system
- Software development kit

Applications
- Connectivity
- eHealth
- Point of sales
- Proximity marketing
- Digital Pen
- M2M

Description
The Long Range Bluetooth Access Point 3241 (AP3241) is the ideal solution for demanding connectivity applications, where extreme performance and robustness is needed. AP3241 is ideal for applications where different Bluetooth devices need to be wirelessly connected to the Internet. These applications include medical, point-of-sale, proximity marketing, location tracking, digital pen and generic Bluetooth networking.

The Bluetooth radio performance is taken to the extreme and AP3241 can reach line-of-sight range up to 1000 meters. With typical class 2 Bluetooth devices, the improved sensitivity increases the range up to 80 meters – meaning 3-4 times more range than normally. The built-in USB port allows the use of optional accessories, such as Wi-Fi, 3G modems or extra memory.

The AP3241 has built-in applications for use in e.g. eHealth and it offers the standardized Bluetooth Health Device Profile and Continua based IEEE 11073-20601 manager. The data can be relayed to various back-end services such as Google Health. AP3241 is also ideal for Bluetooth proximity marketing applications, because the improved range offers extended coverage and more reliable file delivery. The built-in proximity marketing software enables almost all turn-key solutions.

Bluegiga Solution Manager™

Description
Bluegiga Solution Manager (BSM) is a web-based remote management and monitoring platform for Bluegiga Access Servers. By using BSM, you can simultaneously upgrade, monitor and configure a large number of Bluegiga Access Servers, instead of configuring each device one-by-one.

Key Features
- Provides remote management of Bluegiga Bluetooth Access Server groups
- Enables managing the Bluetooth marketing applications (ObexSender)
- Simple graphical user interface
- Can be used over LAN, GPRS, or any other Internet connection type
- Communicates by using secure, encrypted network protocols
- Enables remote upgrades of Bluegiga Bluetooth Access Server software and content
- Available APIs enable complete look and feel customization
- User permissions can be tailored to provide different levels of user accounts

BSM Server
User Interface
Access Server
Internet

BSM Server
User Interface
Access Server
Internet
eHealth Gateway SDK™

eHealth Gateway SDK™ is a powerful software development environment that enables the development of complete health applications for Bluegiga eHealth Bluetooth Gateway platform. The eHealth Gateway SDK is bundled with Code::Blocks Integrated Application Development environment for C and C++ programming languages, standard Linux APIs and Bluegiga’s APIs for Bluetooth wireless technology and IEEE 11073-20601. In addition, the SDK comes with sample projects and applications for interfacing back end servers such as, Google Health.

The eHealth Gateway SDK enables software developers to write user programs for specific applications on top of proven and qualified Bluetooth software and Continua compliant IEEE manager stacks and run them on any available Bluegiga’s Bluetooth eHealth gateways. With the SDK the developer’s only need to write the user program and do not need to do complex and time consuming Bluetooth wireless technology or IEEE 11073-20601 development since they have already implemented and have flexible Application Programming Interfaces. This is designed to allow development, testing and certification times to be shorter and enable very quick time to market.

Bluegiga Bluetooth eHealth Gateway platform and eHealth Gateway SDK is the only combined solution in the market allowing fast development of Bluetooth wireless technology and Continua compliant health and medical applications.

Key Features

- A fully functional C and C++ Integrated Development Environment based on the Code::Blocks platform
- Supports standard IDE features such as:
  - Project creation and managed build for various tool chains
  - Standard make build
  - Source navigation
  - Debugging tools
- Standard C/C++ Linux APIs:
  - File access
  - TCP/IP
  - HTTP/HTTPS
  - XML
  - D-BUS etc.
- Bluegiga's proprietary APIs:
  - Bluetooth D-BUS API
  - IEEE 11073-20601 D-BUS API
  - Google Health CCR
- Example applications and Code::Blocks- projects
### Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>AP3201</th>
<th>AP3241</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bluetooth specification</strong></td>
<td>2.0/2.1 + EDR</td>
<td>2.1 + EDR</td>
</tr>
<tr>
<td><strong>Bluetooth class</strong></td>
<td>1 (Configurable for Class 2)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Range, line of sight</strong></td>
<td>200m</td>
<td>1000m</td>
</tr>
<tr>
<td><strong>Number of connections</strong></td>
<td>Up to 7</td>
<td>Up to 7</td>
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<tr>
<td><strong>Antenna</strong></td>
<td>Internal or external</td>
<td>Internal</td>
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<tr>
<td><strong>Temperature range</strong></td>
<td>0° to +60°</td>
<td>0° to +60°</td>
</tr>
<tr>
<td><strong>Maximum throughput</strong></td>
<td>2,1Mbps</td>
<td>2,1Mbps</td>
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<tr>
<td><strong>Integration</strong></td>
<td>Housed or OEM in PCB form</td>
<td>Housed or OEM in PCB form</td>
</tr>
<tr>
<td><strong>Interfaces</strong></td>
<td>ETH, USB</td>
<td>Ethernet, USB host</td>
</tr>
<tr>
<td><strong>DC input</strong></td>
<td>9-24 VDC</td>
<td>9-24 VDC</td>
</tr>
<tr>
<td><strong>AFH supported</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Network management</strong></td>
<td>BSM, web interface, SSH</td>
<td>BSM, web interface, SSH</td>
</tr>
<tr>
<td><strong>Memory</strong>*)</td>
<td>32MB RAM, 16MB Flash</td>
<td>32MB RAM, 16MB Flash</td>
</tr>
<tr>
<td><strong>Bluetooth module</strong></td>
<td>Bluegiga WT11-A/E</td>
<td>Bluegiga WT41</td>
</tr>
<tr>
<td><strong>Certifications</strong></td>
<td>Bluetooth, CE, FCC and IC</td>
<td>Bluetooth, CE, FCC, IC and Telec</td>
</tr>
<tr>
<td><strong>Ability to host applications</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Operating system</strong></td>
<td>Linux</td>
<td>Linux</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>74 g</td>
<td>74 g</td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td>90x59x30mm</td>
<td>90x59x30mm</td>
</tr>
<tr>
<td><strong>Profiles</strong></td>
<td>SPP, OBEX OPP, OBEX FTP, PAN, LAN Access, DI, HDP</td>
<td>SPP, OBEX OPP and FTP, PAN, LAN Access, DI and HDP</td>
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*) Extendable to GBs

### Bluegiga Solution Manager (BSM)

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- Enables managing the Bluetooth marketing applications (ObexSender)
- Simple graphical user interface
- Can be used over LAN, GPRS, or any other Internet connection type
- Communicates by using secure, encrypted network protocols
- Works seamlessly through firewalls
- Enables remote upgrades of Bluegiga Access Server software and content
- Available APIs enable complete look and feel customization
- User permissions can be tailored to provide different levels of user accounts
Bluegiga Bluetooth® Modules

iWRAP™ Bluetooth Stack

iWRAP™ is an embedded Bluetooth stack firmware for Bluegiga's Bluetooth modules. It exposes a powerful yet easy-to-use command interface to manage Bluetooth operations. iWRAP hides the complexity of Bluetooth protocol stack and profiles from the end user. A multitude of different Bluetooth profiles are supported that are suitable for a wide variety of applications. iWRAP can be used for almost anything from simple data or audio applications to more complex use cases.

Key Features

The latest iWRAP™ firmware version offers the following Bluetooth profiles and features embedded into the module:

- HDP with IEEE Agents
- HDP with IEEE Manager
- Advanced Audio Distribution Profile (A2DP) : Sink and source modes
- A/V Remote Control Profile (AVRCP) : AVRCP controller and target
- Device Identification Profile (DI)
- Serial Port Profile (SPP) : DevA/DevB
- Hands-Free Profile (HFP) v.1.5 : HPF and HFP-AG modes
- Headset profile v.1.2 (HSP) : HSP and HSP-AG modes
- Dial-up Networking Profile (DUN) : Terminal emulation
- Object Push Profile (OPP) : OPP server and client
- Human Interface Device (HID) : HID device
- Bluegiga proprietary IO Profile (BGIO)
- Bluegiga proprietary OTA (Over-the-Air configuration profile)
- Phone Book Access Profile (PBAP) : PBAP client
- File Transfer Profile (FTP) : FTP client
- Bluetooth Health Device Profile (HDP) : Sink and source modes
- Secure Simple Pairing (SSP)

Benefits

- A simple interface to exploit the power of Bluetooth wireless technology
- UART interface for iWRAP enables integration to almost any product
- iWRAP runs inside the module, no need to run Bluetooth stack on the host system
- Easy to understand commands and responses
- A wide variety of Bluetooth profiles to make complex use cases possible
- All profiles are Bluetooth qualified
- Easy to customise by Bluegiga Technologies
**WT41 Long Range Bluetooth Module™**

**Description**
WT41 is truly a long range Bluetooth module that offers an impressive 1000 meters range between two WT41 Bluetooth modules. The module utilizes Bluegiga’s sophisticated radio frequency design methodologies and offers OEM’s a trouble free product even with tight integration with surrounding electronics.

WT41 comes with Bluegiga’s iWRAP firmware offering the users a simple software integration without the need of Bluetooth protocol or profile development. iWRAP is an embedded Bluetooth stack firmware for Bluegiga’s Bluetooth. It exposes a powerful but easy-to-use command interface to manage Bluetooth operations. iWRAP hides the complexity of Bluetooth protocol stack and profiles from the end user.

**Key Features**
- Bluetooth 2.1+ EDR
- Integrates a Bluetooth radio, Bluetooth stack and profiles
- Exceptional radio performance
  - Transmit power: +20dBm
  - Receiver sensitivity: -90dBm
- Available with high efficiency chip antenna
- Industrial temperature range -40°C to +85°C
- Supported Bluetooth profiles: SPP, DUN, HFP, HSP, HID, AVRCP, DI, PBAP, OPP, FTP and HDP
- Standard HCI over UART or USB
- Bluetooth end product, CE, FCC, IC, TELEC, MK qualified

**WT21 Bluetooth Module™**

**Description**
WT21 is intended for Bluetooth applications where a host processor is capable of running the Bluetooth software stack. WT21 only implements the low level Bluetooth Host Controller Interface (HCI) but still offers advantages of a module - easy implementation and certifications. As based on CSR’s BlueCore-6 chip, WT21 offers the lowest current consumption and the highest integration level in its class. WT21 is also fully ready to support the latest Bluetooth 2.1 standard.

WT21 also has CSR’s AuriStream technology built in, which significantly improves the quality of voice in audio applications.

WT21 supports any Bluetooth software stack that implements the standard Bluetooth HCI interface. The software stack can interface to the module either via UART, SDIO or SPI interface.

WT21 offers Bluetooth in integrated form factor that is easy to understand, manage and source. It is an ideal product for an OEM who does not want to spend significant amount of time and money to RF regulatory approvals and designing a complex 2.4 GHz radio product.

By utilizing Bluegiga’s world-class integration services and technical support, OEMs can be assured that their products reach the market quickly and cost efficiently.

**Key Features**
- Highly integrated and cost efficient Bluetooth HCI module
- Bluetooth Class 1 radio based on CSR’s BlueCore-6
- Embedded antenna
- Bluetooth 2.1 + EDR compliant
- Bluetooth Controller subsystem CE, FCC and IC qualified
- Extended temperature range from -40°C to +85°C
- 801.11 co-existence interface
- AuriStream baseband codec, which provides better audio quality
- Supports any Bluetooth stack with HCI interface
**WT12 Bluetooth Module™**

**Key Features**
- Bluetooth Class 2
- Integrated chip antenna
- 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 flash memory
- Supported Bluetooth profiles: HDP, SPP, DUN, OBEX OPP, HFP v.1.5, DID, HID + HCI
- Industrial temperature range from -40°C to +85°C
- RoHS compliant
- Pin-to-pin compatible with WT11 module
- Simple iWRAP™ firmware for controlling Bluetooth wireless technology
- Fully qualified end product with Bluetooth 2.1 + EDR, CE and FCC

**Description**
WT12 is a next-generation, class 2, Bluetooth 2.1 + EDR module. It introduces three times faster data rates compared to the existing Bluetooth 1.2 modules even with a lower power consumption. WT12 is a highly integrated and sophisticated Bluetooth module, containing all the necessary elements from Bluetooth radio antenna to a fully implemented protocol stack. Therefore WT12 provides an ideal solution for developers who want to integrate Bluetooth wireless technology into their designs with limited knowledge of Bluetooth and RF technologies.

WT12 module combined with Bluegiga’s complete development, testing and verification services and excellent developer support, OEMs and designers ensure that their products reach the market rapidly and cost-efficiently 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 WT12 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. Entering the world of Bluetooth wireless technology could not be easier!

---

**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 flash memory
- Supported Bluetooth profiles: HDP, SPP, DUN, OBEX OPP, HFP v.1.5, DID, HID + HCI
- Industrial temperature range from -40°C to +85°C
- RoHS compliant
- Simple iWRAP™ firmware for controlling Bluetooth wireless technology
- Fully qualified end product with Bluetooth 2.1 + EDR, CE, FCC and IC

**Description**
WT11 is a next-generation, class 1, Bluetooth 2.1 + EDR module. It introduces three times faster data rates compared to the existing Bluetooth 1.2 modules even with a lower power consumption. WT11 is a highly integrated and sophisticated Bluetooth module, containing all the necessary elements from Bluetooth radio antenna to a fully implemented protocol stack. Therefore WT11 provides an ideal solution for developers who want to integrate Bluetooth wireless technology into their designs with limited knowledge of Bluetooth and RF technologies.

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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.
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<tr>
<th>Features</th>
<th>WT11</th>
<th>WT12</th>
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<tr>
<td><strong>Bluetooth specification</strong></td>
<td>2.0 + EDR, 2.1 + EDR</td>
<td>2.0 + EDR, 2.1 + EDR</td>
</tr>
<tr>
<td><strong>Bluetooth class</strong></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Range, line of sight</strong></td>
<td>250m</td>
<td>40m</td>
</tr>
<tr>
<td><strong>Antenna</strong></td>
<td>Internal or U.FL</td>
<td>Internal, PIN</td>
</tr>
<tr>
<td><strong>Temperature range</strong></td>
<td>-40° to +85°</td>
<td>-40° to +85°</td>
</tr>
<tr>
<td><strong>Maximum throughput</strong></td>
<td>2,1Mbp</td>
<td>2,1Mbp</td>
</tr>
<tr>
<td><strong>Integration</strong></td>
<td>Surface mount</td>
<td>Surface mount</td>
</tr>
<tr>
<td><strong>Host interfaces</strong></td>
<td>UART, USB, 6xGPIO, 1xAIO</td>
<td>UART, USB, 6xGPIO</td>
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<tr>
<td><strong>Audio interfaces</strong></td>
<td>PCM</td>
<td>PCM</td>
</tr>
<tr>
<td><strong>Operating voltage</strong></td>
<td>3.0V-3.6V</td>
<td>2.7V-3.6V</td>
</tr>
<tr>
<td><strong>AFH supported</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>802.11 co-existence</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>48KB RAM, 8MB Flash</td>
<td>48KB RAM, 8MB Flash</td>
</tr>
<tr>
<td><strong>Chip</strong></td>
<td>BlueCore-04</td>
<td>BlueCore-04</td>
</tr>
<tr>
<td><strong>Supports Bluelab SDK</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Firmwatre options</strong></td>
<td>iWRAP, HCI, Custom</td>
<td>iWRAP, HCI, Custom</td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td>35 x 14 x 2.3mm</td>
<td>26 x 14 x 2.4mm</td>
</tr>
<tr>
<td><strong>Profiles</strong></td>
<td>SPP, DUN, HFP, HSP, HID,</td>
<td>SPP, DUN, HFP, HSP, HID,</td>
</tr>
<tr>
<td></td>
<td>AVRCP, DI, PBAP, OPP, FTP,</td>
<td>OPP, FTP, HDP</td>
</tr>
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<table>
<thead>
<tr>
<th>Features</th>
<th>WT21</th>
<th>WT41</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bluetooth specification</strong></td>
<td>2.1 + EDR</td>
<td>2.1 + EDR</td>
</tr>
<tr>
<td><strong>Bluetooth class</strong></td>
<td>1</td>
<td>1</td>
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<tr>
<td><strong>Range, line of sight</strong></td>
<td>120m</td>
<td>1000m</td>
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<tr>
<td><strong>Antenna</strong></td>
<td>Internal, PIN</td>
<td>Internal, PIN</td>
</tr>
<tr>
<td><strong>Temperature range</strong></td>
<td>-40° to +85°</td>
<td>-40° to +85°</td>
</tr>
<tr>
<td><strong>Maximum throughput</strong></td>
<td>2,1Mbp</td>
<td>2,1Mbp</td>
</tr>
<tr>
<td><strong>Integration</strong></td>
<td>Surface mount</td>
<td>Surface mount</td>
</tr>
<tr>
<td><strong>Host interfaces</strong></td>
<td>UART, CSPI, SDIO, 7xGPIO</td>
<td>UART, USB, 6xGPIO, 1xAIO</td>
</tr>
<tr>
<td><strong>Audio interfaces</strong></td>
<td>I²S + PCM</td>
<td>PCM</td>
</tr>
<tr>
<td><strong>Operating voltage</strong></td>
<td>1.8V or 2.7V-4.9V</td>
<td>3.0V-3.6V</td>
</tr>
<tr>
<td><strong>AFH supported</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Chip</strong></td>
<td>BlueCore-06</td>
<td>BlueCore-04</td>
</tr>
<tr>
<td><strong>Supports Bluelab SDK</strong></td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Certifications</strong></td>
<td>Bluetooth, CE, FCC, IC,</td>
<td>Bluetooth, CE, FCC, IC,</td>
</tr>
<tr>
<td></td>
<td>TELEC and MK</td>
<td>TELEC and MK</td>
</tr>
<tr>
<td><strong>Firmwatre options</strong></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td>17.1 x 11.6 x 2.6mm</td>
<td>35 x 14 x 3.5mm</td>
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<tr>
<td><strong>Profiles</strong></td>
<td>SPP, DUN, HFP, HSP, HID,</td>
<td>SPP, DUN, HFP, HSP, HID,</td>
</tr>
<tr>
<td></td>
<td>AVRCP, DI, PBAP, OPP, FTP,</td>
<td>OPP, FTP, HDP</td>
</tr>
</tbody>
</table>
How to Integrate a Bluegiga eHealth Module into a Device?

1. Implementation of Bluetooth wireless technology
   By using Bluegiga’s embedded Bluetooth wireless technology, enabling your products with Bluetooth communications is simple, quick, and cost effective. Our Bluetooth modules have been designed for optimal RF performance; incorporate a fully embedded Bluetooth 2.1 + EDR stack; and include support for the Health Device Profile (HDP) as well as other commonly used profiles. The benefit to you and your company is shortened development cycles, lower costs, and faster time to market.

   Before you begin your medical or health and fitness design, you should first consider what type of Bluetooth module to be implemented. There are typically two configurations:
   a) Turnkey modules that incorporate a fully embedded Bluetooth stack and HDP profile
   b) HCI based modules where the upper layers of the Bluetooth stack and HDP profile run in a host-processor and the lower layers are resident within the module

   Once your have determined which type (turnkey or HCI) of module best suits your application, you can choose the most suitable module product from Bluegiga’s family of embedded Bluetooth module solutions. The WT41, WT11, and WT12 Bluetooth modules are complete turnkey modules that incorporate our iWRAP Bluetooth stack and Bluetooth profiles including HDP. The WT41, WT11, WT12 are also available as HCI modules while our WT21 module is only available as an HCI module.

2. Implementing the HDP profile and IEEE agent or manager with embedded iWRAP Bluetooth stack
   If you decide to incorporate Bluegiga’s turnkey module solution that incorporates the iWRAP Bluetooth Stack and HDP profile, you will need to consider how to implement the Continua compliant IEEE agent or manager functionality. This can be either included in Bluegiga’s Bluetooth module or through the externally connected system. This choice determines which of our three iWRAP Bluetooth firmware options your application would require:
   a) HDP gateway firmware: including HDP only, no IEEE implementation
   b) IEEE agent firmware: including HDP as well as IEEE agent(s)
   c) IEEE manager firmware: including HDP as well as IEEE manager

   The three standard firmware configurations also include the Serial Port Profile (SPP) and a custom firmware load can be created if additional Bluetooth profiles are required. We recommend contacting our support team at support@bluegiga.com to discuss the most suitable and efficient implementation for your specific requirements.

3. What is required for development – tools, documentation and examples?
   Bluegiga offers a variety of tools to assist in the integration of our Bluetooth modules in your design. First, Bluegiga’s technical documentation provides necessary technical guidance as you integrate our modules into your design. Second, our evaluation kits provide a convenient, easy to use platform for testing Bluetooth connectivity with your hardware. Finally, numerous design guides and application notes are available to help with common Bluetooth implementation scenarios.

   All technical materials are available from http://techforum.bluegiga.com while our evaluation kits are readily available through Bluegiga’s global distribution network.

4. What if you need help during development – technical support and design validation?
   At any point in the development process and you reach a stumbling block or have questions about software or hardware please don’t hesitate to contact our technical support team at support@bluegiga.com. We have a highly trained team of engineers that can answer all your questions regarding your products.

   Even if you are not having any problems during the development process, we encourage you to use our no-cost validation service to check your design’s RF, data communications, and/or audio performance. Our goal is to ensure your design provides the best possible Bluetooth connectivity and is a success for you and meets your customers expectations for Bluetooth communication.

5. Join the Bluetooth Special Interest Group
   As a member of The Bluetooth Special Interest Group you will have access to all relevant information to follow Bluetooth brand guidelines as well as official authorization to use Bluetooth logos in your general marketing materials. Becoming a member of the Bluetooth SIG is free and takes just a few minutes to sign up.

6. List your product to Bluetooth.com - Have your product in the qualified Bluetooth list
   With Bluegiga’s Bluetooth end product qualified modules you can quickly register for the mandatory end-product listing of your devices. Unlike with Bluetooth chipsets and partially certified modules, Bluegiga’s modules make your end-product listing free allowing you to register your devices as a qualified product within minutes.

7. Continua certification of your device
   All Bluegiga products are designed and tested to satisfy the technical needs of Continua Health Alliance certification. The Continua Health Alliance does require though, that all Continua compliant devices be certified and listed on the Continua website. The Continua certification program is available for Continua members only and process details can be found at the following link: www.continuaalliance.org/products/cert-process.html.

8. Gather the needed country approvals - get your product FCC, CE compliant
   You can use Bluegiga product’s FCC and CE (and several other country approvals) in your own product qualification stickers and documents. You can access Bluegiga’s product qualification numbers from techforum.bluegiga.com or by contacting Bluegiga’s support at support@bluegiga.com.

9. Prepare your product marketing material and manuals
   After you have completed steps 5-7, you should have a clear understanding of how to emphasize Bluetooth functionality in your product literature. There is also a lot of free marketing materials available from The Bluetooth SIG and Bluegiga for increasing your brand image with Bluetooth wireless technology.

And then…

After your product has been launched, Bluegiga is available to assist you with any compatibility issues that can arise from time to time and we stand ready to deliver our module product needs through our global network of distribution partners.

For more information please contact sales@bluegiga.com.
Bluegiga Customer Solutions and Case Studies

Polar Electro
Polar’s Team2 system uses Bluetooth wireless technology for easy group heart rate monitoring

Polar is a Finnish company that has emerged as the market leading brand of technology innovating in heart rate monitors since 1977. It helps customers understand their body with a combination of expertise in sports, physiology and electronics, coupled with a deep understanding of customer needs.

Polar’s latest addition to their world-class training programs is the Team2 system that allows simultaneous heart rate monitoring for 28 players in real time. The base station is equipped with Bluegiga’s class 1, WT11-A-AI Bluetooth Module. The module allows +100 meter range and Bluetooth communication with Team2 heart rate transmitters during online training sessions.

Team2 group heart monitoring system’s flexibility allows teams to monitor each player on your laptop, PDA and the system’s wrist units from different locations. The technology used allows creating an ongoing training program to achieve group and individual performance targets.

Target customers for Team2 group heart rate monitoring system are: athletes, supervised group exercises e.g. spinning, schools and universities, sports institutes and research centers, health care, events, media, military, police and sponsorships.

www.polarelectro.com

Fairbanks Scales
Fairbanks Scales develops a wireless health scale device to take the weighing industry into a new direction

Fairbanks Scales has been a leading manufacturer of weighing equipment for more than 175 years and continues to be on the leading edge of scale technology. Fairbanks developed the TeleWeigh health scale to take the health scale into a new direction and to create a wireless scale that could connect to a variety of devices via Bluetooth. The TeleWeigh health scale is used in numerous health care environments from wellness initiatives to remote telehealth monitoring.

In order to provide the best possible scale for the demanding telehealth industry, it was essential to have the longest battery life possible, the most robust wireless communications and the ability to communicate with many different platforms. Fairbanks tested and evaluated several different solutions. However, none of the tested solutions fit the needs of the product as well as the WT11 Bluetooth module from Bluegiga Technologies Oy.

Health care providers worldwide are using Fairbanks’ TeleWeigh scale, which utilizes Bluetooth wireless technology to provide state of the art health care to patients. Lives are saved, and chronic conditions are treated, while cutting the providers’ costs by utilizing Bluegiga’s WT11 Bluetooth module.

www.fairbanks.com

BodyTel
GlucoTel, a Bluetooth enabled blood glucose meter

BodyTel is a German-American company that specializes in telemedical monitoring and management systems for chronic diseases, particularly diabetes.

BodyTel’s flagship product, GlucoTel, is a Bluetooth enabled blood glucose meter (built-in Bluegiga WT12 module) that uses a Java, Bluetooth and Internet enabled cell phone to automatically and wirelessly transmit measured blood glucose values to a secure internet database.

With GlucoTel patients can continue to perform their daily monitoring as usual and still their results will be automatically transmitted to the secure internet database. BodyTel Mobile (Java application) provides patients with the ability to easily add additional values (e.g. meals, medication, sports) into the cell phone and from there into the online database as well. Patients have the ability to grant database access to other people such as healthcare professionals and caregivers. Authorized healthcare professionals and caregivers will then have accurate information, so that they can quickly adjust their treatment as needed to help improve their patient’s quality of life.

www.bodytel.com

Mindray
Patient monitoring wirelessly and safely from your home

Mindray was founded in 1991 in China with the goal of delivering high-quality, competitively priced medical devices to make healthcare more accessible and affordable around the world. Today, it is a leading developer, manufacturer and marketer of medical devices worldwide.

The company has three well-established business segments: Patient Monitoring and Life Support Products, In-Vitro Diagnostic Products and Medical Imaging Systems.

Mindray’s new wireless patient monitoring device measures patient’s condition safely in his own home. It shows the results on the display to the patient and then forwards the information through a mobile network services platform to a nurse or other medical staff in a nearby hospital. The medical staff then analyzes the results and determines if the patient should visit the hospital. The solution is ideal for elderly patients with long term illnesses that cannot move well on their own. It saves the time and energy to go to the hospital for minor checkups.

The wireless connection comes from Bluegiga’s Bluetooth WT12-A-AI4 module which is built inside the monitoring unit.

www.mindray.com
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