Bluetooth Low Energy (BLE) is a wireless personal area network technology designed and marketed by the Bluetooth Special Interest Group aimed at novel applications in the healthcare, fitness, beacons, security, and home entertainment industries.

Solution
BLE plays a key role in smart homes. BLE is fast gaining popularity as the preferred solution for smart homes due to its lower cost, low power consumption, easy development, and good interoperability.

A lighting solution for smart homes
Gain full control of your home with BLE HomeKit.

Able to control lights, dimmers, smart switches, and more.

Quick Links
products.avnet.com/asia
BLE plays key role in smart homes

Wireless protocol connection technology commonly found in smart homes include Z-Wave, WIFI and Zigbee/Thread. Yet, Bluetooth Low Energy (BLE) is fast gaining popularity as the preferred solution for smart homes due to its lower cost, low power consumption, easy development and good interoperability.

Z-Wave is highly reliable, easy-to-network with a low power consumption and a closed wireless connection protocol but is only available through Sigma Designs. WIFI is good for high data transfer rates due to its single gateway but its high power consumption and low reliability with no support for Bluetooth Mesh makes it unsuitable for multiple applications in smart homes. Zigbee/Thread's low power consumption, ease-of-use, reliability and compatibility with Mesh may make it a good solution but it lacks support for interoperability and requires mobile phones to connect through gateways.

In comparison, with the recent release of Bluetooth 5.0 and Bluetooth Mesh standards, BLE is fast overcoming shortfalls like low transmission rate and short transmission distance to become the industry leader amongst wireless internet protocols used in smart home innovations.

Through Bluetooth 5.0, you can now broadcast 8 times the volume of data at 4 times the effectiveness of current versions. As Bluetooth technology matures, Bluetooth Mesh also facilitates the setup of a Bluetooth Ecosystem that supports smartphones, sensor technologies and cloud service platforms. This means that Bluetooth Mesh standards installed in a smart home enables you to control up to 40 lights with a single mobile device, without any Gateway for relay.

BLE chips Avnet provide

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</table>

These advancements pave the way for the third wave of the internet— the Internet of Things (IoT). IoT refers to the widespread application of the internet in everyday lives. This ranges from smart homes, logistics, smart cities and lifestyle wearables like the BLE wristbands.

The BLE wristband features Step counting and Activity tracking (AAR), crisp OLED smart display with time and steps data, auto syncing of activities on Android Apps, auto firmware update that occurs Over-the-Air, 5 months of data storage records and a battery life that lasts more than a week.

Wristband features

- Step counting and Activity tracking (AAR)
- Display clock and step count / activity tracking on the device.
- Sync and show activity statistic on Android APPs
- Over-the-Air Firmware Upgrade
- Storage for 5 months record
- Crisp OLED display
- Display battery level status
- Battery lifetime: >1 week

Key components

- nRF51822 - BLE SoC
- ICM30630 – 6-axis Motion Tracking Sensor with Integrated Sensor Hub
- MAX14676/MAX14674A - PMIC
- M95M02 - 2 Mb SPI EEPROM
- DS1342T - RTC
- AHB36132U1 - 70 mAh 4.2V Li Poly Battery

Target applications

- Wristband
- Smartwatch

Block Diagram
A lighting solution for smart homes

Breaking the boundaries of traditional design, Avnet's Bluetooth Low Energy (BLE) Light Bulb solution charts new territories with the benefits of smart lighting. It includes all components required for you to implement smart lighting in your home— hardware, software and even a standard mobile application.

The features of the BLE Light Bulb include hardware components like mass production-ready color light bulb solutions that support color temperature control, R/G/B/W coloring, a wide input voltage range of AC100V-240V and ultra low power BLE module.

The software solution comes complementary to standard iOS systems with alarm and timer alerts. The three systems offered are Osram Pf/S5 LED series, DC/DC in neon BCR421 and the BLE module system with Dialog DA14580.

Features
• Mass production-ready light bulb solutions that support R/G/B/W coloring light bulb or color temperature control
• Standard iOS App available
• Wide input voltage range: AC100V - 240V
• Color light bulb: R:G:B:W=1:1:1:5 • CCT light bulb: CW:WW=4:4
• Ultra low power BLE module
• Alarm / timer alert

Systems
• LEDs: Osram P5/S5 series
• DC/DC: Infineon BCR421
• BLE: Dialog DA14580 (BLE module)
Gain full control of your home with BLE HomeKit

Apple’s HomeKit accessory protocol supports a wide range of well-defined services and characteristics, designed to give you better control over your home appliances.

The Homekit applications supported by Avnet demo kit include fans, garage door openers, light bulbs, power outlets, temperature control and humidity controls. This is made possible with an Avnet sensor board integrated with the necessary sensing and control components.

The key components used in the kit are the nRF52832 development kit from Nordic (nRF52 DK); temperature and humidity sensor (HDC1000), proximity and ambient sensor (APDS9960), 6axis Gyro and G-sensor (KXG03); and Relay (ALQ305).

Key components
- nRF52 DK – BLE SoC nRF52832 development kit from Nordic
- HDC1000 – temperature and humidity sensor
- APDS9960 – proximity and ambient sensor
- KXG03 – 6axis Gyro and G-sensor
- ALQ305 - relay

Target applications
- Fan
- Garage door opener
- Light bulb
- Outlet
- Current temperature
- Current relative humidity

The nRF52832 BLE SoC provides the essential capabilities required to enable and control your Homekit-enabled devices. The device is compact, fast, and low power, with an advanced 32-bit ARM® Cortex®-M4 processor with floating point unit and integrated prescaler support.
Welcome your new wireless browsing experience

Computer systems with built-in Bluetooth Low Energy (BLE) support now have two new appliances to complete the wireless browsing experience. Designed to complement most desktop computers, laptops, tablets and set top boxes, the nRF51 wireless keyboard and nRF51 wireless mouse come with Bluetooth HID over GATT compliance.

The nRF51 wireless keyboard set includes the RF mode switch and an accompanying USB receiver dongle running 2.4GHz Gazell protocol that will make it compatible with computer systems without BLE support. It is also rechargeable and features an easily modifiable key matrix and Microsoft media center keys.

The nRF51 wireless mouse set can be switched to Nordic 2.4GHz Gazell mode and connected to systems without BLE capabilities through the USB receiver dongle. Other features include the device information function that feeds specific information such as VID/PID and battery service that provides instant battery levels. The wireless mouse comes equipped with an optical mouse sensor, scroll wheel and six mouse buttons — left, middle, right, forward, back and DPI.

Wireless keyboard features
- Mini keyboard
- Key matrix easily modifiable to have consumer and/or Microsoft media center keys.
- RF mode switch (Proprietary / BLE)
- Rechargeable

Key components
- Nordic BLE – nRF51822QFAA
- TI LDO - TPS78225DDC
- Maxim charger – MAX1555EZK
- Epson crystal

Target applications
- Human interface device
- Battery service
- Device information

Wireless mouse features
- 6 mouse buttons (left, middle, right, forward, back, DPI)
- Scroll wheel
- Optical mouse sensor
- RF mode switch (Proprietary / BLE)

Key components
- Nordic BLE – nRF51822QFAA
- Epson crystal

Target applications
- Human interface device
- Battery service
- Device information
Solving the Elusive Baseband to Antenna Problem using RFDAC Technology

Overview - Wireless Infrastructure

Using a unique combination of design skills, systems understanding, and process technologies, Analog Devices offers the broadest portfolio of solutions for the wireless infrastructure market. Including RF ICs for the entire signal chain, world-leading converters, amplifiers and more, these high-performance devices are supported by a full range of design resources to ease the design of wireless infrastructure equipment.


Product Description: Solving the Elusive Baseband to Antenna Problem using RFDAC Technology

We'll start by exploring RF transmitter architectures, then we'll concentrate on the Direct to RF Transmitter architecture enabled by RFDAC technology. Aspects of direct to RF transmitter system design will be explored including gain, signal bandwidth, digital signal processing requirements, frequency planning, thermal noise, clock synthesis + phase noise, harmonics, sampling images, pre-distortion techniques and deterministic latency.

Webcast
(Presenter: Larry Welch - Sr. Applications Engineer, High Speed Converter Group)
Cypress now offers state-of-the-art Wi-Fi, Bluetooth and ZigBee IoT product lines

Features
- Chip level, PCB and SIP module and development software

Application
- The IoT

Product Benefits
- Along with supporting intellectual property and the WICED® Software Development Kit (SDK), developer ecosystem and community

Specifications
- Wi-Fi solutions, Wi-Fi + BT combos with 802.11ac

Cypress is the only company with wireless, MCUs, memory and PMICs optimized for IoT

Relevant Information
- Wi-Fi 802.11n: www.cypress.com/products/ieee-80211-abgn-wlan-sdio-usb-and-mimo
- Wi-Fi 802.11n With MCU: www.cypress.com/products/ieee-80211-bgn-wlan-integrated-mcu
- Automotive Wi-Fi + Bluetooth Combos: www.cypress.com/products/automotive-wifi-bluetooth-combos
- Automotive Bluetooth: www.cypress.com/products/automotive-bluetooth
Crystal MHz Range FA-118T/ FA-128/ FA-20H/ TSX-3225

FA-118T
(MHz Range Crystal Unit Ultra Miniature Size Low Profile SMD)
• Frequency range: 24MHz to 54MHz
• External dimensions: 1.6 × 1.2 × 0.35mm (t: Max.)
• Overtone order: Fundamental
• Applications: Mobile phone, Bluetooth, W-LAN, ISM band radio, Clock for MPU

FA-128
(MHz Range Crystal Unit Ultra Miniature Size Low Profile SMD)
• Frequency range: 16MHz to 54MHz
• External dimensions: 2.0 × 1.6 × 0.5mm
• Overtone order: Fundamental
• Applications: Mobile phone, Bluetooth, W-LAN, ISM band radio, Clock for MPU

FA-20H
(MHz Range Crystal Unit Ultra Miniature Size Low Profile SMD)
• Frequency range: 12MHz to 54MHz
• External dimensions: 2.5 × 2.0 × 0.55mm
• Overtone order: Fundamental
• Applications: Mobile phone, Bluetooth, W-LAN, ISM band radio, Clock for MPU

TSX-3225
(MHz Range Crystal Unit Miniature Size Low Profile SMD)
• Frequency range: 16MHz to 48MHz
• External dimensions: 3.2 × 2.5 × 0.6mm
• Overtone order: Fundamental
• Applications: Mobile phone, Bluetooth, W-LAN, ISM band radio, Clock for MPU

Learn More
The BM71 is a small form factor, Bluetooth 4.2 Low-Energy module measuring only 9 x 11.5 x 2.1 mm. The BM71 module is designed for easy implementation into a broad range of applications. Supporting the latest Bluetooth standard, it delivers up to 2.5x throughput improvement and more secure connections vs. Bluetooth 4.1 based products. Developers can easily interface to the device via a standard UART interface, available on most Microcontrollers and Processors. The BM71 has a completely integrated Bluetooth software stack, and offers a shielded regulatory certified version with built-in antenna. Developers are freed from the complexities of Bluetooth Software and RF development and can simply utilize the BM71 as a wireline replacement. Perfect for IoT (Internet of Things) applications, when interfaced to a BLE enabled smartphone or Bluetooth Internet Gateway, applications can be monitored, controlled and updated from anywhere in the world.

Features
- Bluetooth 4.2 / Mesh / SDK / Industrial temp

Applications
- BLE IOT

Specifications
- Bluetooth 4.2

Learn More

The BM70 Bluetooth 4.2 Low-Energy module is designed for easy implementation into a broad range of applications. Supporting the latest Bluetooth standard, it delivers up to 2.5x throughput improvement and more secure connections vs. Bluetooth 4.1 based products. Developers can easily interface to the device via a standard UART interface, available on most Microcontrollers and Processors. The BM70 has a completely integrated Bluetooth software stack, and offers a shielded regulatory certified version with built-in antenna. Developers are freed from the complexities of Bluetooth Software and RF development and can simply utilize the BM70 as a wireline replacement. Perfect for IoT (Internet of Things) applications, when interfaced to a BLE enabled smartphone or Bluetooth Internet Gateway, applications can be monitored, controlled and updated from anywhere in the world.

Features
- Bluetooth 4.2 / Mesh / SDK / Industrial temp

Applications
- BLE IOT

Specifications
- Bluetooth 4.2

Learn More

The Atmel® SAMB11-MR210CA is an ultra-low power Bluetooth® SMART (BLE 4.1) module with Integrated MCU, Transceiver, Modem, MAC, PA, TR Switch, and Power Management Unit (PMU). It is a standalone Cortex®-M0 applications processor with embedded Flash memory and BLE connectivity.

Features
- Ultra low power / Small size / Standalone (No MCU Need) / SDK

Applications
- IOT

Specifications
- Bluetooth 4.1

Learn More

The Atmel® BTLC1000 is an ultra-low power Bluetooth® SMART (BLE 4.1) System on a Chip with Integrated ARM Cortex-M0 MCU, Transceiver, Modem, MAC, PA, TR Switch, and Power Management Unit (PMU). It can be used as a Bluetooth Low Energy link controller or data pump with external host MCU.

Features
- Ultra low power / Small size / Standalone (No MCU Need) / SDK / Cost focus

Applications
- IOT

Specifications
- Bluetooth 4.1

Learn More
The nRF52832 SoC is a powerful, highly flexible ultra-low power multiprotocol SoC ideally suited for Bluetooth® low energy (previously called Bluetooth Smart), ANT and 2.4GHz ultra low-power wireless applications.

Features:
- Single chip, highly flexible, 2.4 GHz multi-protocol SoC
- 32-bit ARM Cortex-M4F Processor
- 1.7v to 3.6v operation
- 512kB flash + 64kB RAM
- Supports concurrent Bluetooth low energy/ANT protocol operation
- On-chip NFC tag for Out-of-Band (OOB) pairing
- Up to +4dBm output power
- -96dBm sensitivity, Bluetooth low energy
- Thread safe and run-time protected
- Event driven API
- On air compatible with nRF24L and nRF24AP series
- 2 data rates (2Mbps/1Mbps)
- PPI - maximum flexibility for power-efficient applications and code simplification
- Automated power management system with automatic power management of each peripheral
- Configurable I/O mapping for analog and digital I/O
- 3 x Master/Slave SPI
- 2 x Two-wire interface (I²C)
- UART (RTS/CTS)
- 3 x PWM
- AES HW encryption
- Real Time Counter (RTC)
- Digital microphone interface (PDM)
- On-chip balun

Application:
- Internet of Things (IoT)
- Wearables
- SmartHome sensors
- Connected white goods
- Computer peripherals
- Voice-command smart remotes
- A4WP 'Rezence' wireless charging
- Beacons
- Sports and fitness sensors and hubs
- Connected health products
- Smart watches
- RC Toys
- Interactive games
- Building automation and sensor networks

Specifications - please download http://infocenter.nordicsemi.com/pdf/nRF52832_PS_v1.2.pdf

Block Diagram

SAP Part Number / Web Buyable
- NORNRF52832-QFAA-R / NORNRF52832-QFAA
- NORNRF52832-CIAA-R

Relevant Information - Click to learn more about the nRF52 Series SoC

New Product
- Part #   Brief Description
  - nRF52832  Multiprotocol Bluetooth low energy/ANT/2.4GHz SoC

nRF52 Development Tools
- Part #  Brief Description
  - nRF52 DK  Development kit for nRF52832 SoC
  - nRF5 SDK  Software Development Kit for nRF51 and nRF52 Series
  - nRF5 SDK for IoT  IoT Software Development Kit (SDK) for applications using IPv6 over Bluetooth low energy
  - nRF5 SDK for HomeKit  Software Development Kit for HomeKit solutions
  - nRF5 SDK for AirFuel  Software Development Kit for Airfuel-compliant wireless charging applications
  - nRF Sniffer  Low cost Bluetooth low energy packet sniffer
  - nRF Connect for desktop  Cross platform Bluetooth low energy development software
ULTRA LOW POWER BLUETOOTH LE SYSTEM-ON-CHIP SOLUTION QN902x

QN902x integrates a Bluetooth LE radio, controller, protocol stack and profile software on a single chip, providing a flexible and easy-to-use Bluetooth LE SoC solution.

- **USB Type-C CC logic controller**
- **USB PD 2.0 Physical Layer controller (PD3.0 is under development)**
- **USB Type-C Microcontrollers**
- **USB Type-C High Bandwidth Switch Family**
- **USB Type-C Signal Conditioner Family**
- **USB Type-C Load Switch Family**
- **USB Type-C AC/DC Family**
- **USB Type-C Protection Family**

**Features**
- True single-chip Bluetooth LE SoC solution (32-bit ARM Cortex-M0)
- Complete Bluetooth LE protocol stack and application profiles
- Frequency bands: 2400 MHz to 2483.5 MHz
- -95 dBm RX sensitivity (non-DC-to-DC mode)
- -93 dBm RX sensitivity (DC-to-DC mode)
- TX output power from -20 dBm to +4 dBm
- Single power supply of 2.4 V to 3.6 V for QN9020/1
- Single power supply of 1.8 V to 3.6 V for QN9022
- 2 μA deep sleep mode
- 3 μA sleep mode (32 kHz RC oscillator on)
- 9.25 mA RX current with DC-to-DC converter
- 8.8 mA TX current @0 dBm TX power with DC-to-DC converter

**Applications**
- Wearable
- Healthcare and medical
- Remote control
- Smartphone accessories
- PC peripherals (mouse and keyboard)
- Wireless Sensor networks

**Product Benefits**
- Ultra low power, easy to use Bluetooth LE SoC solution.

**Specifications**

**Ultra Low Power BLE System-on-Chip Solution**

**QN902x Block Diagram**

**QN9020QBlue version 1.3.9 setup**
AX5043: Ultra-low Power RF Transceiver, 27-1050 MHz

The AX5043 is a true single chip, narrow-band, ultra-low-power ASK and FSK RF transceiver for the 27 MHz to 1050 MHz frequency bands. It offers the unique combination of ultra-low power consumption for transmit and receive operation combined with highest sensitivity and selectivity.

A link budget of 143 dB at 1 kbps is achieved, if the built-in forward error correction (FEC) is used this can be extended to 146 dB without extra external components. The AX5043 works perfectly down to 1 kbps in a 6.25 kHz channel.

**Features**
- Carrier frequency range 27 - 1050 MHz
- Ultra-low power
- Constant TX output power over the full VDD range of 1.8 - 3.6 V
- Fully autonomous lowest power wake-on-radio mode (500 nA)
- Packet RX/TX without microcontroller intervention

**Product Benefits**
- Wide frequency range to work with
- Achieves low power capability without sacrificing link budget or selectivity
- Transmit power and receive characteristics do not change over the supply voltage range
- Autonomously handles wake-on-radio cycling
- Supports a wide range of packet formats that are handled without microcontroller intervention.

**Block Diagram**

Functional block diagram of the AX5043

Learn More
The PAN1761 is a short-range, Class 2, BLE single mode module for implementing Bluetooth functionality into various electronic devices. It is a cost-effective, low-power, true system-on-chip (SoC) for Bluetooth low energy applications. It enables robust BLE devices where Power Consumption is critical. Very low-power sleep modes are available. Short transition times between operating modes further enable low power consumption. The PAN1761 combines an excellent RF transceiver programmable EEPROM memory, 32-KB RAM, and many other powerful supporting features and peripherals. The PAN1761 is suitable for systems where very low power consumption is required. Very low-power sleep modes are available. Short transition times between operating modes further enable low power consumption.

**Features**
- Seamless Integration
- Low Power Consumption

**Product Benefits**
- Devices where Power Consumption is critical
- Industrial Measurement and Diagnostics
- Mobile Phone Accessories
- Health Care, Medical Diagnostic Systems
- All Embedded Wireless Applications

**Application**
- GAP central and peripheral support for LE
- Bluetooth 4.1
- Interfaces
- NFC Forum Tag Type 3 wired interface - 1520kB built-in EEPROM NFC memory
- Temperature Range from -40°C to +85°C
- Plug-in for Bluetooth Developer Studio available
- Standard SIG BLE and “SPP over BLE” profiles available
- Bluetooth 4.1 (LE) embedded GATT profile with high level API commands, compatible to Toshiba reference BLE profiles
- Compliant with NFC Forum Tage Type 3 for easy pairing initialization and transfer of small amounts of data (ISO/IEC18092)
- Integrated 2.4GHz Antenna, NFC Antenna external (Antenna Pin)
- Same form factor and footprint as PAN1026 & PAN1760 (15.6 x 8.7 x 1.8mm³ SMD Package)

**Energy Support**
- Energy solution. Standard BLE or proprietary profiles are available for seamless integration into the application code.
- Panasonic PAN1761 offers an embedded and certified Bluetooth low energy protocol stack and BLE GATT profile inside the silicon.
- The PAN1761 supports both Bluetooth Low Energy (LE) 4.1 and NFC - NFC Forum Type 3 compliant tag - based on leading edge Toshiba SOC. The unique configuration of the PAN1761 allows NFC to wake up BLE from standby using an NFC field and automatically initiate a Bluetooth connection. Highly secure Bluetooth connections are created using NFC to exchange link keys. Toshiba BT 4.0 (extension to 4.1 under development) can be supported. BLE energy support. Central and Peripheral Mode are supported.

**Technology**
- Simple and cost-effective single-mode BLE. It may independently create a wake up signal with neither host control nor local battery consumption. The embedded microcontroller BLE device may independently create a wake up signal with neither host control nor local battery consumption. It significantly reduces external component count and power consumption in applications requiring Bluetooth Low Energy.

**Overview**
- The PAN1761 is a cost-effective, low-power, true system-on-chip (SoC) for Bluetooth low energy applications. It enables robust BLE devices. The PAN1761 is based on Toshiba’s single chip TC35667 Bluetooth semiconductor device with embedded Toshiba Bluetooth SIG compliant BLE firmware. The device is designed for use in industrial measurement and diagnostic applications as well as mobile accessories.

**Application**
- Bluetooth LE applications with extended battery life are possible as a result of zero power consumption in standby mode. A remote device may independently create a wake up signal with neither host control nor local battery consumption. Embedded microcontroller BLE device may independently create a wake up signal with neither host control nor local battery consumption. It significantly reduces external component count and power consumption in applications requiring Bluetooth Low Energy.

**Index**
- Class 2, BLE Single mode module for implementing Bluetooth functionality into various electronic devices.
- Low Power Consumption
- Devices where Power Consumption is critical
- Industrial Measurement and Diagnostics
- Mobile Phone Accessories
- Health Care, Medical Diagnostic Systems
- All Embedded Wireless Applications

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TE is a leading developer and manufacturer of high-performance antennas. We offer a wide range of standard and custom antennas for your consumer devices. Our aerospace and defense capabilities include customized antennas for communication, navigation, and other applications.

Push Limits and Set Trends with Our Antenna Support

• Fast to market: design and manufacturing locations around the world
• Experienced manufacturer: offering a wide range of antenna technologies
• Proven leader: MID technology leader; years of proven 2-Shot and LDS solutions
• Focused on quality: testing capabilities include near and far field patterns, scattering parameters, SAR, vibration, humidity, temperature shock, salt fog, throughput, and acoustic
• Value-added production processes: experienced RF and mechanical design engineering teams onsite
• Advanced aerospace, defense, and marine applications: optimizing size, weight, and power

Applications

Our innovative antenna designs have been applied to a wide range of wireless products including some of the thinnest laptops, leading touch-screen smartphones, revolutionary gaming consoles, and numerous aerospace and defense applications, like embedded and conformal communications antennas, GPS/GNSS navigation, and phased arrays for signals intelligence and radar.

Downloads

- Brochure - Antenna Products: Standard and Custom Solutions (English)
- Brochure - Antennas for Aerospace and Defense (English)
- Catalog - Standard Antenna Solutions (English)

Learn More
SimpleLink Ultra-low Power Wireless MCU for Bluetooth Low Energy - CC2640

The CC2640 device is a wireless MCU targeting Bluetooth applications. The device is a member of the CC26xx family of cost-effective, ultra-low power, 2.4-GHz RF devices. Very low active RF and MCU current and low-power mode current consumption provide excellent battery lifetime and allow for operation on small coin cell batteries and in energy-harvesting applications.

The CC2640 device contains a 32-bit ARM Cortex-M3 processor that runs at 48 MHz as the main processor and a rich peripheral feature set that includes a unique ultralow power sensor controller. This sensor controller is ideal for interfacing external sensors and for collecting analog and digital data autonomously while the rest of the system is in sleep mode. Thus, the CC2640 device is ideal for a wide range of applications where long battery lifetime, small form factor, and ease of use is important.

The Bluetooth Low Energy controller is embedded into ROM and runs partly on an ARM Cortex-M0 processor. This architecture improves overall system performance and power consumption and frees up flash memory for the application.

The Bluetooth stack is available free of charge from www.ti.com.

Applications

- Home and Building Automation
  - Connected Appliances
  - Lighting
  - Locks
  - Gateways
  - Security Systems
- Industrial
  - Logistics
  - Production and Manufacturing
  - Automation
  - Asset Tracking and Management
  - Remote Display
  - Cable Replacement
  - HMI
  - Access Control
- Retail
  - Beacons
  - Advertising
  - ESL and Price Tags
  - Point of Sales and Payment Systems
- Health and Medical
  - Thermometers
  - SpO2
  - Blood Glucose and Pressure Meters
  - Weight Scales
  - Vitals Monitoring
  - Hearing Aids
- Sports and Fitness
  - Activity Monitors and Fitness Trackers
  - Heart Rate Monitors
  - Running Sensors
  - Biking Sensors
  - Sports Watches
  - Gym Equipment
  - Team Sports Equipment
- HID
  - Remote Controls
  - Keyboards and Mice
- Gaming
- Accessories
  - Toys
  - Trackers
  - Luggage Tags
  - Wearables

Block Diagram

Learn More
Reflective optical sensor saves space and lowers costs for smart home, industrial, and office applications

The Optoelectronics group of Vishay Intertechnology has introduced a new reflective optical sensor for smart home, industrial, and office applications. Saving space compared to previous-generation solutions, the Vishay Semiconductors VCNT2020 combines an infrared emitter, silicon phototransistor detector, and daylight blocking filter in a miniature 2.5 mm by 2.0 mm by 0.8 mm surface-mount package.

The VCNT2020 device features a compact construction where the emitting light source and detector are arranged in the same plane, with excellent internal crosstalk suppression. The VCNT2020's analog output signal is triggered by the detection of reflected infrared light from a nearby object. The sensor's built-in daylight blocking filter greatly suppresses disturbing ambient light, thereby increasing the signal-to-noise ratio. The device's compact QFN package features wettable flanks to enable optical inspection of the solder joints. This lowers costs by eliminating the need for expensive x-ray inspections.

The VCNT2020 will be used for optical switching in office equipment and home appliances; optical encoding in disc and tape drives for DVD and/or camera applications; and paper presence detection in printers and copy machines.

The sensor offers a detection range of 0.2 mm to 2.5 mm, an emitter wavelength of 940 nm, and a typical output current of 1.6 mA, which represents a typical current transfer ratio (CTR) of 8% under test conditions and is up to four times higher than similar devices available on the market. The device features a Moisture Sensitivity Level (MSL) of 4 for reflow soldering according to J-STD-020; it is RoHS-compliant, halogen-free, and Vishay Green.

Samples and production quantities of the new VCNT2020 are available now, with lead times of eight to 12 weeks for large orders.