FUJITSU Wireless Solutions

FUJITSU

shaping tomorrow with you

Introduction

>> FUJITSU Components' Wireless Solutions

Introduction

FUJITSU Components wireless product portfolio consists of a wide and constantly growing range of modules, devices and solutions, developed to make IoT in many markets an easy technology to integrate.

The module product line contains a wide range of Bluetooth ® modules. The well-known family of Bluetooth version 2.1 + EDR modules which includes iOS compatible modules. The growing family of Bluetooth low energy modules - Version 4.1, 4.2 and 5 compliant - are amongst the smallest and best performing modules in the market.

The range of FUJITSU Beacons is expanded with the implementation of sensors, powered by alternative energy sources and adding solution software.

The introduction of 'FUJITSU IoT Connectivity solutions' is setting the standard by the ideal combination of our hardware products and the best software solutions in the market: A wide area MESH network with a de-centralized radio protocol that allows connected devices to make all decisions locally and co-operatively. A software stack that makes the interface from almost any sensor to our radio technologies. And the easiest connection from IoT devices to the cloud.

Imagine all the possibilities...

More information

For questions or information, please refer to your supplier or contact your local FUJITSU Office. For contact information, see the last page of this document, or visit:
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Wireless Modules

>> Bluetooth version 2.1+EDR modules

Easy control and communication

The FUJITSU Components' Bluetooth modules contain the complete upper layer protocol stack (L2CAP, RFCOMM, SDP) and the GAP and SPP profiles. Communication and control can be easily established by using as many as 200 simple text base commands and events covered by the firmware. The crystal and 8Mbit Flash memory are integrated into the module, but offer nevertheless a small and compact design. The FUJITSU Components' Bluetooth modules are available in four versions, offering antenna options, a 40-pin PCB connectors and a 10-pin FPC/ FCC connector.

In response to the rapid development of iOS devices and software applications, FUJITSU Components has developed Bluetooth modules that are compliant with the iAP and iAP2 profiles, necessary for communication with the iPhone®, iPod® and iPad®. The modules with and without antenna make the FUJITSU Bluetooth iOS modules easy to integrate.

* To purchase these Bluetooth iOS modules it is required to join the MFi license program provided by Apple®.
The CP-chip (Authentication Coprocessor chip) is required for iOS communication and needs to be purchased from Apple®.




Partnumber	MBH7BTZ39(A)	MBH7BTZ40	MBH7BTZ42(A)	MBH7BTZ43
Used IC	CSR BC4-Ext.	CSR BC4-Ext.	CSR BC4-Ext.	CSR BC4-Ext.
Type	Bluetooth Ver.2.1+EDR Class 2	Bluetooth Ver.2.1+EDR Class 2	Bluetooth Ver.2.1+EDR Class 2	Bluetooth Ver.2.1+EDR Class 2
Profile	SPP, GAP embedded (A: iAP and iAP2)	SPP, GAP embedded	SPP, GAP embedded (A: iAP and iAP2)	SPP, GAP embedded
Size	12.4x9.4x1.5mm	31x15x2.5mm	17.6x10.6x1.9mm	22.5x10.6x2.3mm
Operating Temperature	-40 to +85 °C	-25 to 85 °C	-40 to +85 °C	-40 to 85 °C
Attachment	SMD	Connector	SMD	Connector
Antenna	No	Yes	Yes	Yes
Host I/F	UART	UART	UART	UART
Qualification/ Certification	QDID, Radio Act Japan	QDID, FCC/IC/RED/Radio Act Japan	QDID, FCC/IC/RED/Radio Act Japan	QDID, FCC/IC/RED/Radio Act Japan

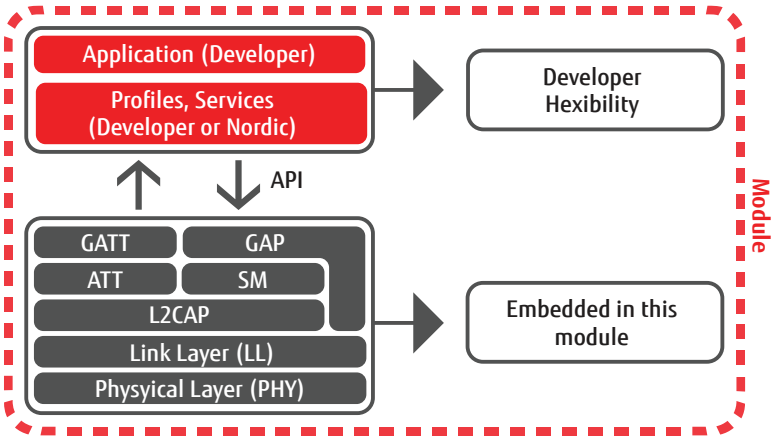
Wireless Modules

>> Bluetooth version 4.1 low energy modules

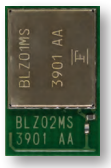
Easy-to-integrate modules

The FUJITSU wireless modules conform with the Bluetooth Core Specification version 4.1. This Bluetooth technology contains a low energy feature enabling a substantial reduction of power consumption. The modules are available with 256kB Flash memory and up to 32kB RAM for profile and application development.

FUJITSU Bluetooth version 4.1 low energy modules provide robust wireless communication with any Bluetooth compliant device.



The modules have a compact size and are among the smallest on the market with a maximum number of GPIO pins.



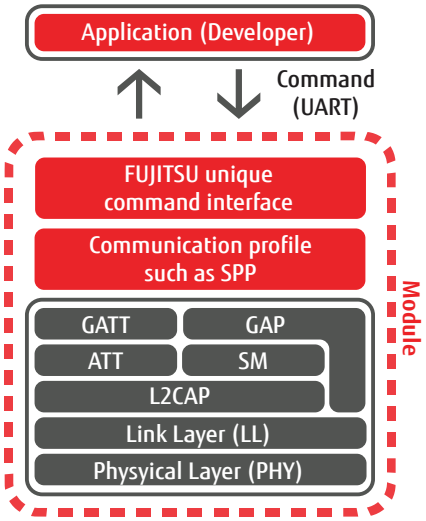
Partnumber	MBH7BLZ01-109029	MBH7BLZ02-109031	MBH7BLZ01A-109008	MBH7BLZ02A-109009	MBH7BLZ07-109033
Used IC	Nordic Semiconductor nRF51822 rev.3 16kB RAM, 256kB Flash	Nordic Semiconductor nRF51822 rev.3 16kB RAM, 256kB Flash	Nordic Semiconductor nRF51822 rev.3 32kB RAM, 256kB Flash	Nordic Semiconductor nRF51822 rev.3 32kB RAM, 256kB Flash	Nordic Semiconductor nRF51822 16kB RAM, 256kB Flash
Type	Bluetooth Ver.4.1 low energy (single mode)	Bluetooth Ver.4.1 low energy (single mode)	Bluetooth Ver.4.1 low energy (single mode)	Bluetooth Ver.4.1 low energy (single mode)	Bluetooth Ver.4.1 low energy (single mode)
SoftDevice	S110 v 8.0.0 embedded	S110 v 8.0.0 embedded	S120 v 2.0.0 embedded	S120 v 2.0.0 embedded	S110 v 8.0.0 embedded
Size	10.5x9.2x1.6mm	15.7x9.8x2.0mm	10.5x9.2x1.6mm	15.7x9.8x2.0mm	11.5x7.9x1.7mm
Operating Temperature	-40 to +85 °C	-40 to +85 °C	-25 to +85 °C	-25 to +85 °C	-40 to +85 °C
Attachment	SMD	SMD	SMD	SMD	SMD
Antenna	No	Yes	No	Yes	Yes
Host I/F	UART,SPI, I2C, GPIO	UART,SPI, I2C, GPIO	UART,SPI, I2C, GPIO	UART,SPI, I2C, GPIO	UART,SPI, I2C, GPIO
Number of GPIO's	31	31	31	31	22
Qualification/ Certification	QDID, Radio Act Japan	QDID, FCC/IC/RED/Radio Act Japan	QDID, Radio Act Japan	QDID, FCC/IC/RED/Radio Act Japan	QDID, FCC/IC/RED/Radio Act Japan

Wireless Modules

>> Bluetooth version 4.1 low energy modules

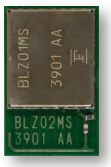
FUJITSU also offers embedded profile modules

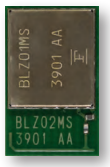
The embedded FUJITSU components Data Communication is a unique data transmission profile developed by Fujitsu Components. The FDC profile is an SPP (serial port profile) like interface which allows data to transmit with host system and can be controlled by simple text based commands (via UART). Modules are available as peripheral version or a switchable version which can be Peripheral and Central.



With more than 100 commands and continuous additions, FDC allows for quick product to market and reduction of development resources.
FDC is ideally suited for sensing, monitoring, and wearable applications.

FUJITSU FDC embedded Bluetooth version 4.1 low energy modules provide robust wireless communication with any Bluetooth compliant device. The modules are easy to integrate because of the UART communication and are compact in size.





Partnumber	MBH7BLZ01	MBH7BLZ02-109058	MBH7BLZ01A	MBH7BLZ02A-109059	MBH7BLZ07-109060
Used IC	Nordic Semiconductor nRF51822 rev.3	Nordic Semiconductor nRF51822 rev.3	Nordic Semiconductor nRF51822 rev.3	Nordic Semiconductor nRF51822 rev.3	Nordic Semiconductor nRF51822
Type	Bluetooth Ver.4.1 low energy (single mode)	Bluetooth Ver.4.1 low energy (single mode)	Bluetooth Ver.4.1 low energy (single mode)	Bluetooth Ver.4.1 low energy (single mode)	Bluetooth Ver.4.1 low energy (single mode)
Fujitsu unque data transmission profile	Peripheral type embedded	Peripheral type embedded	Central / peripheral type embedded	Central / peripheral type embedded	Peripheral type embedded
Size	10.5x9.2x1.6mm	15.7x9.8x2.0mm	10.5x9.2x1.6mm	15.7x9.8x2.0mm	11.5x7.9x1.7mm
Operating Temperature	-40 to +85 °C	-40 to +85 °C	-25 to +85 °C	-25 to +85 °C	-40 to +85 °C
Attachment	SMD	SMD	SMD	SMD	SMD
Antenna	No	Yes	No	Yes	Yes
Host I/F	UART	UART	UART	UART	UART
Qualification/ Certification	QDID, Radio Act Japan	QDID, FCC/IC/RED/Radio Act Japan	QDID, Radio Act Japan	QDID, FCC/IC/RED/Radio Act Japan	QDID, FCC/IC/RED/Radio Act Japan

Wireless Modules

>> Bluetooth version 4.2 low energy modules

FUJITSU Bluetooth 5.0 compliant low energy module.

This is the start of a new range of Bluetooth modules which conform to the Bluetooth Core Specification Version 4.2 and already have Bluetooth 5 features like the High Througput and Advertising extensions. Nordic semiconductors SoC is the base of this very powerful module that is unique in power consumption and antenna characteristics.

The Bluetooth version 4.2 low energy module has 512kB Flash memory and 64kB RAM available next to the 32- bit ARM® Cortex™-M4F CPU for profile and application development. Built-in 32.768kHz and 32MHz crystals.
The embedded FUJITSU Component Data profile can be controlled by text based commands for an easy integration in any application.

Supports Bluetooth

5

High throughput

Advertising extensions

Partnumber	FWM7BLZ20-109062	FWM7BLZ20-109068
Used IC	Nordic Semiconductor nRF52832-QFAA, 64kB RAM, 512kB Flash	Nordic Semiconductor nRF52832-QFAA
Type	Bluetooth Ver.4.2 low energy (single mode)	Bluetooth Ver.4.2 low energy (single mode)
SoftDevice	S1132 embedded	
Fujitsu unque data transmission profile		Central / peripheral type embedded
Size	15.7x9.8x1.7mm	15.7x9.8x1.7mm
Operating Temperature	-40 to +85 °C	-40 to +85 °C
Attachment	SMD	SMD
Antenna	Yes	Yes
Host I/F	UART,SPI, I2C, GPIO	UART
Number of GPIO's	30	
Qualification/ Certification	QDID, FCC/IC/RED/Radio Act Japan	QDID, FCC/IC/RED/Radio Act Japan

Wireless Modules

>> LPWAN module

FUJITSU announced the LPWAN module.

This is the start of a new range of wireless modules for the long range communication. The Low-Power Wide-Area Network module is designed for Long Range communication with a relatively low bit rate (up to 50kbps) and a low power consumption for battery powered applications.

With a LPWAN it is possible to build a private wireless network, but it can also be connected to a service or infrastructure offered by a third party. The Fujitsu modules conform to the LoRaWAN specification and are the first AS923 specification compliant modules in the Japanese market, but can also be set to a FSK type of communication which gives a High Rate mode of 300kbps for configuration purposes. And, as part of the Fujitsu IoT connectivity solutions, can be a communication device inside a scalable MESH network.

The Fujitsu LPWan module allows for quick product to market and reduction of development resources.
It is ideally suited for sensing, monitoring, and long life battery powered applications.

Partnumber	FWM7SLZ02A
Used IC	Semtech SX1272 and additional MCU
Type	LoRa / FSK
Size	22x50x4mm
Operating Temperature	-30 to +85 °C
Attachment	Stacking connector
Antenna	Built-in and RF-connector
Host I/F	2-wire UART
Data rate	Up to 11kbps (LoRa) Up to 50kbps (FSK) High rate FSK mode (300kbps) for configu-ration
Qualification/ Certification	QDID, RED, FCC/IC/, Radio Act Japan

Wireless Devices

>> Beacons introduction

FUJITSU Components' Bluetooth beacons, let the app do the talking...

FUJITSU Components' Bluetooth beacons are based upon FUJITSU Components experience in the field of Wireless Modules. The Beacons are Bluetooth powered devices capable of providing location based information to mobile devices. Beacons are low energy transmitters that broadcast specific data which triggers an action on the installed application of a mobile device.

Our beacons have unique features, for example: multiple broadcast options, secure by the use of 2 switches. The Eddystone™ (UID, TLM, EID or URL), iBeacon™ or proprietary compliant. Beacons enable pro-active communication with the audience and are used in a wide field of applications such as: in-shop promotion, musea, festivals, exhibitions and many more...

How does it work?

A beacon transmits a package of data without having the need to be connected (unlike classic Bluetooth). This data package can contain information like the identification of a group the beacons relate to. With additional the sub group, individual ID, transmitting power and for example a URL.

A standard application example is the use of beacons in shop environments. By transmitting a data package like the iBeacon™ standard (UUID, Major, Minor, Tx power) or using the Google Eddystone™ standards of transmitting an ID or URL.

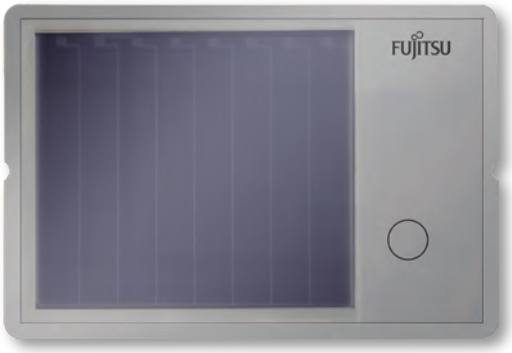
By using these standards the beacon transmits a data package at a certain interval, for example: every 100ms. This package is received by a mobile device and can trigger an installed app, open a webbrowser or visit a weblink. The data package contains information which can be converted / translated in a specific action from the installed app. This could display a discount coupon, sale items, new items etc.

Wireless Devices

>> Beacons

Solar Beacon

Partnumber	FWM8BLZ04-109072
Description	FUJITSU Data Communication for Beacon profile embedded
Type	Bluetooth v5.0 low energy compliant iBeacon, Eddystone and proprietary beacon standards supported
Size / weight	90x60x5.6mm casing
Features	IP65 (water and dust proof, outside use) NFC for direct connection
Power supply	Photovoltaic cell
Qualification	FCC/IC/RED/Radio ACT Japan, QDID



Beacon

Partnumber	FWM8BLZ02-109042
Description	FUJITSU Data Communication for Beacon profile embedded
Type	Bluetooth v4.1 low energy iBeacon, Eddystone and proprietary beacon standards supported
Size / weight	40x31x12mm casing, 10 gram excl. cell battery
Operating conditions	-30 to +60 °C @ +20 to +80%RH (No condensation)
Power supply	CR2450 coin cell
Qualification	FCC/IC/RED/Radio ACT Japan, QDID

Sensor Beacon

Partnumber	FWM8BLZ02A-109047
Description	FUJITSU Data Communication for Beacon profile embedded
Type	Bluetooth v4.1 low energy iBeacon, Eddystone and proprietary beacon standards supported
Size / weight	40x31x12mm casing, 10 gram excl. cell battery
Operating conditions	-30 to +60 °C @ +20 to +80%RH (No condensation)
Features	Acceleration sensor: Detectable range:±16G, Accuracy ±3% Temperature sensor: Detectable range:-30 to +60 degree C, Accuracy ±0.3 °C
Power supply	CR2450 coin cell
Qualification	FCC/IC/RED/Radio ACT Japan, QDID

Wireless Devices

>> Beacons

Sensor Beacon with data log

Partnumber	FWM8BLZ02A-109069
Description	FUJITSU Data Communication for Beacon profile embedded
Type	Bluetooth v4.1 low energy iBeacon, Eddystone and proprietary beacon standards supported
Size / weight	40x31x12mm casing, 10 gram excl. cell battery
Operating conditions	-30 to +60 °C @ +20 to +80%RH (No condensation)
Features	Acceleration sensor: Detectable range:±16G, Accuracy ±3% Temperature sensor: Detectable range:-30 to +60 degree C, Accuracy ±0.3 °C 32kB Non volatile Memory; 4000 x 8-byte data, about 68 hrs. at 1 min. interval, about 42 days at 15 min. interval
Power supply	CR2450 coin cell
Qualification	FCC/IC/RED/Radio ACT Japan, QDID

Sensor Beacon with enmo IoT enabled

Partnumber	FWM8BLZ02A-ENMO
Description	FUJITSU Data Communication for Beacon profile embedded with enmo IoT.over.Beacon platform support
Type	Bluetooth v4.1 low energy iBeacon, Eddystone and proprietary beacon standards supported
Size / weight	40x31x12mm casing, 10 gram excl. cell battery
Operating conditions	-30 to +60 °C @ +20 to +80%RH (No condensation)
Features	Acceleration sensor: Detectable range:±16G, Accuracy ±3% Temperature sensor: Detectable range:-30 to +60 degree C, Accuracy ±0.3 °C
Power supply	CR2450 coin cell
Qualification	FCC/IC/RED/Radio ACT Japan, QDID

Solutions

>> FUJITSU IoT Connectivity Solutions

How to establish a future proof IoT Solution

Integration of IoT requires a ready-to-go and easy-toimplement solution capable of covering the present as well as the future situation. Fujitsu IoT Connectivity Solutions offer a range of technologies ready to match nearly any application. The unique combination of hardware combined with-technologies like a MESH network that offers the ability to connect hundreds of sensor combination or beacon to cloud connectivity, enables Fujitsu to offer a customized solution that covers nearly any requirement.

Fujitsu co-creates with various partners to enable secure, scalable and flexible IoT solutions.

The high-quality Fujitsu hardware exists of modules, sensor and solar beacons. With Fujitsu IoT Connectivity we offer easy- to-use, customizable and safe solutions for various IoT application areas, such as Lighting, Smart metering, Asset management and Sensors for industrial automation and smart buildings.

The Fujitsu IoT Connectivity Solutions

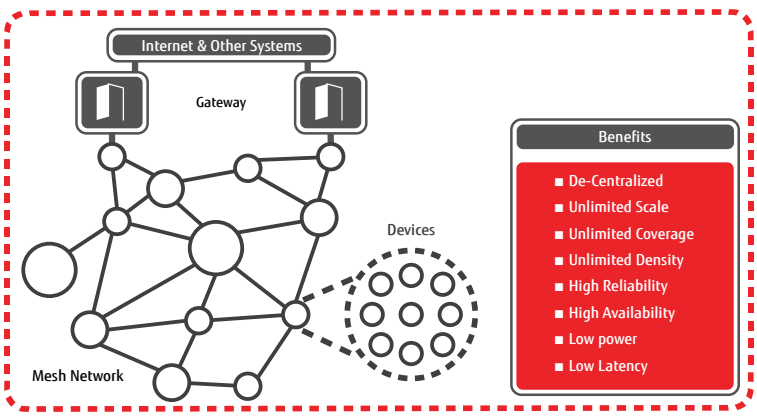
With the wireless modules, the (sensor) beacons and various partners, Fujitsu offers a one-stop shop for a variety of solutions and markets. Whether for indoor naviga-tion, asset tracking or even asset manage-ment. Utilizing MESH networks for lighting, sensors, smart city and more. Fujitsu IoT connectivity brings everything together and can customize the best solutions for individual markets.

De-centralized MESH network

Together with partner Wirepas, Fujitsu offers a tailored MESH network based solution. MESH networks have the advantage of self-healing and expandability, important factors to consider if the future might involve architectural changes.

The commonly used architecture requires gateways, routers and nodes to be software controlled which is a limiting factor. The Fujitsu IoT connectivity solution solves this and requires very limited time to market. The MESH network solution offered in the IoT Connectivity Solution provides optimum control and data information for lighting, sensors, smart city, indoor navigation, smart metering and more...

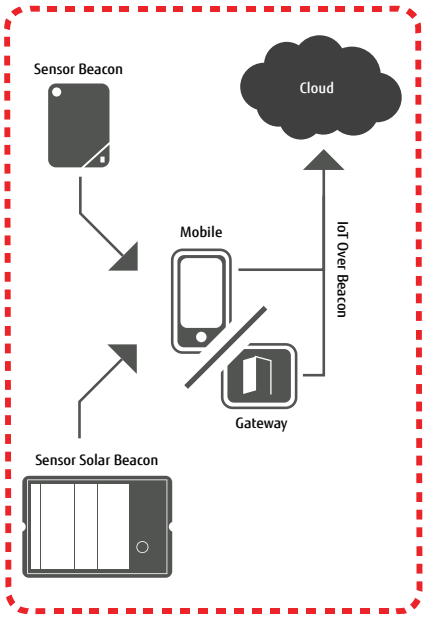
Fujitsu Mesh Network Solution



Solutions

>> FUJITSU IoT Connectivity Solutions

Fujitsu IoT Connectivity Beacon To The Cloud



Easy IoT to Cloud connectivity

Software partner Enmo Technologies has solved a major limitation of Bluetooth IoT.

Enmo has extended the Advertising mode eliminating the need for Discover and Pairing, additionally allowing the passing of large payloads (tens of thousands of Bytes). We call this technology IoT.Over.Beacon™. Fujitsu has applied enmo's IoT.Over.Beacon™ technology to the Sensor Beacon and modules. Together with the ready-to go Smartphone Apps, IoT deployments can be developed and launched in minutes through the enmo Platform.

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Sensors to IoT connectivity

Cratus Technology inc. has developed a strong solution to connect hundreds of combinations of sensors to store and transmit their data.

Fujitsu uses this intelligence to visualize data on mobile devices and augmented reality headsets and brings it to modules and beacons to integrate it in a customized combination of solutions.

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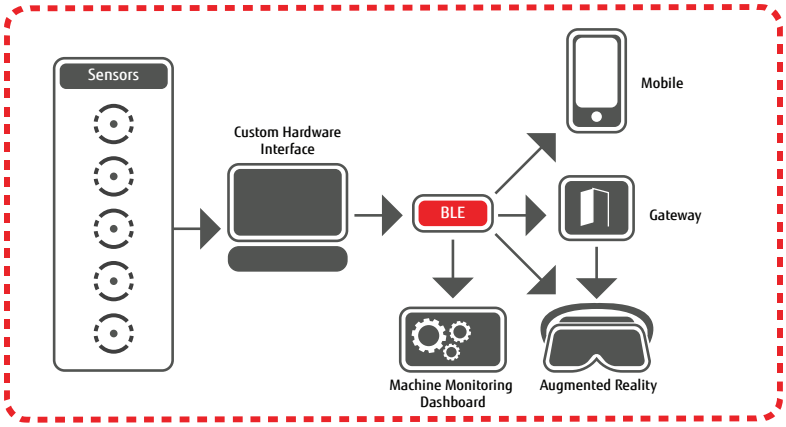
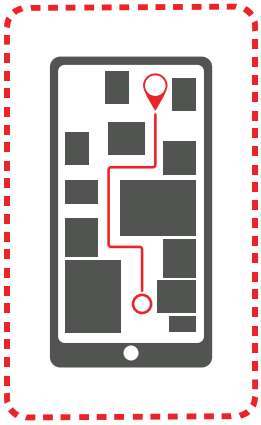
Fujitsu IoT Connectivity Sensor Interface: Cratus



Fujitsu IoT Connectivity Indoor Navigation: Indoo.rs



Indoor navigation

Beacon-based indoor navigation can be used in a wide variety of venues to provide not only location but also smart customer interaction with information and guidance.

In an airport to guide passengers through the airport, right to the correct gate at the right time. Similarly at a train station or underground to find the right platform with the latest train times and updates on any delays or changes. In hospitals to guide patients to the right department. Museums or art galleries for guided tours with beacons triggering the information on the exhibits. Shows or exhibitions to guide people round and alert them to the speaker program. Supermarkets to help people find everything on their shopping lists plus provide them with special offers.

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Solutions

>> FUJITSU IoT Connectivity Solutions

Applications

Fujitsu IoT Connectivity Solutions are developed for professional IoT applications, no matter the scale. Applications include Industry 4.0, Asset Management, Smart Metering and Smart Building / Smart City, all of which have very diverse requirements on range, throughput, latency and energy consumption. The solution provides flexibility, fit-for-purpose and, if needed, customization on all these parameters and the hardware too.

Industry 4.0

A reliable connection with real-time visibility in a highly scalable network. Control and optimize environmental conditions intelligently.

Asset Management

Track the locations of various assets. Roll cages, boxes and crates in distributions centers, beds and instruments in hospitals and other valuable corporate assets.

Smart Metering

Connect an unlimited number of metering points together in a highly scalable network.

Smart City - Smart Building

Intelligent lighting for Smart Cities and Smart Buildings enabled with Fujitsu's IoT Connectivity Solutions.

"Connecting thousands or even millions of devices in the· cloud is the projection of IoT. Connecting these devices together and keeping the dataflow manageable is the challenge. Fujitsu IoT connectivity solutions is solving some major hurdles and is prepared for the future with leading technologies form various co-creation partners."

Dennis van Doorn
Marketing Manager Wireless Solutions

Notes

Thank you for making notes!

For questions or information, please refer to your supplier or contact your local Fujitsu Office.
For contact information, see the last page of this document, or **http://www.fujitsu.com/components/**

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