1. INTRODUCTION

Overview

FSC-BT616 is a wireless microcontroller (MCU) targeting Bluetooth 5 low energy applications.

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.

FSC-BT616 contains a 32-bit ARM® Cortex®-M3 core that runs at 48 MHz as the main processor and a rich peripheral feature set that includes a unique ultra-low 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, FSC-BT616 is great for a wide range of applications where long battery lifetime, small form factor, and ease of use is important.

It supports GAP, ATT/GATT, SMP, L2CAP profiles. It integrates Baseband controller in a small package (Integrated chip antenna), so the designers can have better flexibilities for the product shapes.

Features

- 2.4-GHz RF Transceiver Compatible With Bluetooth low energy (BLE) 4.2 and 5 Specifications
- Link Budget of 102 dB for BLE
- Integrate MCU to execute Bluetooth protocol stack.
- Postage stamp sized form factor,
- Low power
- Class 1.5 support(up to +5 dBm)
- The default UART Baud rate is 115.2Kbps and can support from 1200bps up to 921Kbps,.
- UART, I2C,SPI,12-bit ADC(200ks/S)data connection interfaces.
- Support the OTA upgrade.
- Bluetooth stack profiles support: LE HID, and all BLE protocols.
- PWM
- Support eight capacitance sensor button
- Integrated temperature sensor
- Bluetooth stack profiles support: SPP, HID, MAP, and all BLE protocols.

Application

- Home and Building Automation
  - Connected Appliances
  - Lighting
  - Locks
  - Gateways
  - Security Systems
- Industrial
  - Logistics
  - Production and Manufacturing Automation
  - Asset Tracking and Management
  - HMI and Remote Display
  - 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

FEASYCOM Shenzhen Feasycom Technology Co.,Ltd

HYPER-TECH Systems
14 Odem ST. P.O.B. 7042 Petach Tikva 4917001, ISRAEL | Office: +972-3-924-3352
Fax: +972-3-9243385 | sales@hypertech.co.il | www.hypertech.co.il

– Hearing Aids

- Sports and Fitness
  – Activity Monitors and Fitness Trackers
  – Heart Rate Monitors
  – Running and Biking Sensors
  – Sports Watches
  – Gym Equipment
  – Team Sports Equipment
- HID
  – Voice Remote Controls
  – Gaming
  – Keyboards and Mice

Module picture as below showing

Figure 1: FSC-BT616 Picture

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2. General Specification

Table 1: General Specifications

Categories	Features	Implementation
Wireless Specification	Chip	TI CC2640R2F
	Bluetooth Version	Bluetooth low energy (BLE) 4.2 and 5 Specifications
	Frequency	2.402 - 2.480 GHz
	Transmit Power	+5 dBm (Maximum)
	Receive Sensitivity	-95 dBm (Typical)
	Raw Data Rates (Air)	2 Mbps(Bluetooth 5)
	Modulation	GFSK
Host Interface and Peripherals	UART Interface	TX, RX, CTS, RTS
		General Purpose I/O
		Default 115200,N,8,1
		Baudrate support from 1200 to 921600
		5, 6, 7, 8 data bit character
	GPIO	15(maximum – configurable) lines
		O/P drive strength (4 mA)
		Pull-up resistor (33 KΩ) control
		Read pin-level
	I2C Interface	1 (configurable from GPIO total). Up to 400 kbps
	SSI Interface	Up to 2 SSI interfaces with a frequency of up to 4 MHz
		Support both master and slave mode
		SPI, MICROWIRE, TI
	ADC Interface	Analog input voltage range: 1.8V ~ 3.8V
		Supports single 12-bit SAR ADC conversion
		8 channels (configured from GPIO total)
		Up to 200MSPS conversion
	PWM	4 General-Purpose Timer Modules
		Four General-Purpose Timer Modules (Eight 16-Bit or Four 32-Bit Timers, PWM Each)
Profiles	Class Bluetooth	No Support
	Bluetooth Low Energy	GATT Client & Peripheral - Any Custom Services
		BT5 Specifications
		MFI Support
Maximum Connections	Classic Bluetooth	No Support
	Bluetooth Low Energy	1Clients(TBD)
FW upgrade		Over the Air
		Xds
Supply Voltage	Supply	1.8V ~ 3.8V
Power Consumption		Max Peak Current(TX Power @ +5dBm TX): 20mA
		Standby Doze (Wait event) - ~1mA (TBD)
		Deep Sleep - 2uA(RTC Running and RAM/CPU Retention) (TBD)

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Physical	Dimensions	13mm X 26.9mm X 2.0mm; Pad Pitch 1.5mm
Environmental	Operating	-40°C to +85°C
	Storage	-40°C to +150°C
Miscellaneous	Lead Free	Lead-free and RoHS compliant
	Warranty	One Year
Humidity		10% ~ 90% non-condensing
MSL grade:		MSL 3
ESD grade:	Human Body Model	All pins: ±2500V
	Charged device model	RF pins/ Non-RF pins: ±750V

3. HARDWARE SPECIFICATION

3.1 Block Diagram and PIN Diagram

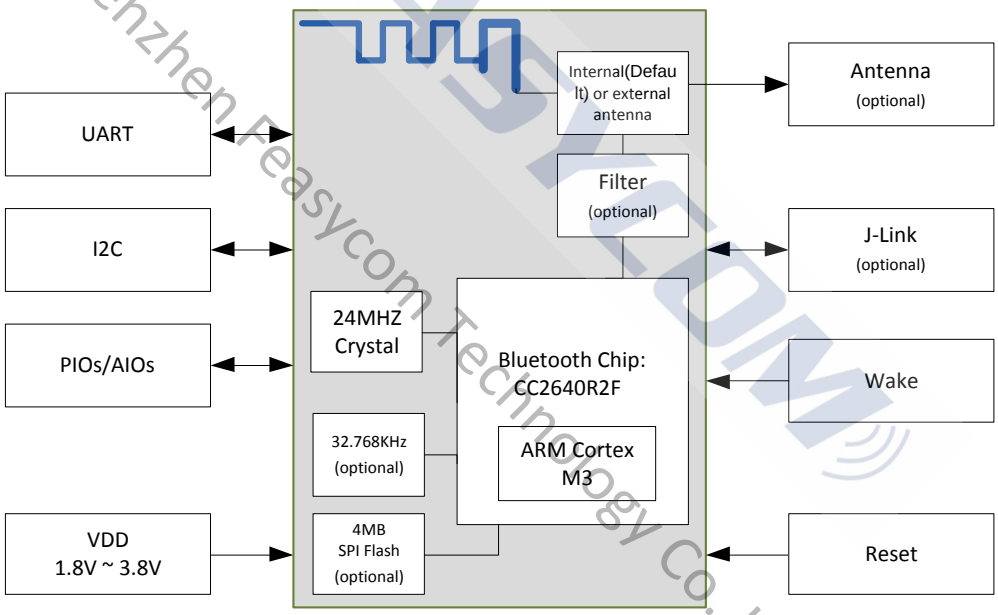

Figure 2: Block Diagram

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