MURADG

PicoIoTSOM

BG77 LTE-ESP32 System-on-Module

PicoIoTSOM is all you need to develop a cellular connectivity, GNSS, WiFi, and Bluetooth application. It is based on the ultra-compact LTE cat M1/cat NB2 BG77 module and the generic WiFi+BLE ESP32-WROOM-32D 32-bit Microcontroller. This 2.5"x3" board comes with all needed antennas on-board including GNSS low-noise amplifier front-end with integrated pre and post SAW filters and a GNSS ceramic antenna, LTE PIFA, WiFi, and BLE antennas. External active and passive GNSS antennas can be used via the u.FL connector. Also, an external LTE antenna can be used via a u.FL connector. The BG77 is an ultra-compact LPWA module supporting LTE Cat M1, LTE Cat NB1/NB2 and integrated GNSS. It is fully compliant with 3GPP Rel-14 specification and provides maximum data rates of 588 kbps downlink and 1119 kbps uplink. It features ultra-low power consumption by leveraging the integrated RAM/flash as well as the ARM Cortex A7 processor supporting ThreadX, achieving up to 70% reduction in PSM leakage and 85% reduction in eDRX current consumption compared to its predecessor. The ESP32 is a low power and a peripheral rich Xtensa dual-core 32-bit LX6 microcontroller with WiFi and dual-mode Bluetooth. PicoIoTSOM also comes with an on-board Accelerometer and a vibrator.
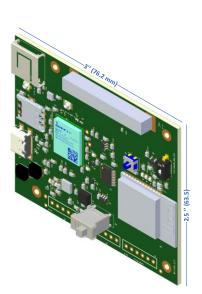
Key Benefits

- ✓ SWAP (Size, Weight, and Power) IoT solution
- ✓ 2 LTE antenna options
- ✓ 3 GNSS antenna options
- ✓ On-Board WiFi and BLE antennas
- ✓ On-Board Accelerometer and vibrator
- ✓ DC-jack, USB-C, and Li-Ion battery powered
- ✓ Module and Network status LEDs
- ✓ 3 headers supporting I2C, SPI, ADC, GPIO, etc.

Applications

- ✓ Asset Management
- ✓ Logistics
- ✓ Tracking
- ✓ Geo-Fence
- ✓ Wearables
- ✓ Smart Energy
- ✓ Medical Devices
- ✓ PPP/Hotspot

PicoIoTSOM Key

Features

Interface	USB-C UART GPIO SPI I²C ADC PWM Switches buttons u.FL Antenna connectors
Power Supply	1- USB-C Receptacle (4.2 V – 6 V) 2- DC jack (4.2 V – 10 V), 1 A 3- Lithium-Ion Battery
I/O Voltage	3.3 V
Operating Temperature	-35 °C to +75 °C
Dimensions	2.5-inch x 3-inch (63.5 mm x 76.2 mm)

BG77 Key

Features

Cellular Technology	Cat M1: LTE-FDD: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B26/B27/B28/B66/B85* Cat NB2: LTE-FDD: B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B28/B66/B71/B85*
Data	Cat M1: Max. 588 kbps (DL)/1119 kbps (UL) Cat NB2: Max. 127 kbps (DL)/158.5 kbps (UL)
Voice	VoLTE (Cat M1 Only)
SMS	Point-to-point MO and MT SMS Cell Broadcast

	Text and PDU Mode
GNSS	GPS/GLONASS/BeiDou/Galileo/QZSS QuecLocator (Cell ID Positioning)
GNSS SAW/LNA/SAW	LNA gain: 17 dB Out-of-band rejection: +80 dBc, 1627 to 1660 MHz Low current consumption: 3.1 mA
Firmware Upgrade	Via USB-C interface DFOTA (Delta Firmware Upgrade Over-the-Air)

Electrical Characteristics	Output Power: 21 dBm (Max.)
	
	Consumption @ LTE CAT M1 (typical):
	    Power Saving Mode: 3.2 µA
	    Idle State: TBD
	    Sleep State:
	    1.63 mA @ DRX = 1.28 s
	    0.76 mA @ e-I-DRX = 81.92 s, PTW = 20.48 s
	    LTE Connected Mode:
	    228 mA @ 21dBm, GNSS off
	
	Consumption @ LTE CAT NB2 (typical):
	    Power Saving Mode: 3.2 µA
	    Idle State: TBD
	    Sleep State:
	    1.5 mA @ DRX = 1.28 s
	    0.79 mA @ e-I-DRX = 81.92 s, PTW = 20.48 s
	
	LTE Connected Mode:
	        165 mA @ 21dBm, GNSS off
	
	GNSS: TBD

Protocols	PPP/TCP/UDP/SSL/TLS/FTP(S)/HTTP(S)/NITZ/PING/MQTT/LwM2M/CoAP/IPv6*

Approvals	Carrier:
	    Vodafone* (Global)
	    Deutsche Telekom* (Europe)
	    Sprint/Verizon*/AT&T*/T-Mobile* (North America)
	    Telus* (Canada)
	    China Telecom*/China Mobile*/China Unicom* (China)
	    SKT* (South Korea)
	    NTT DOCOMO*/SoftBank*/KDDI* (Japan)
	    Telstra* (Australia)
	Regulatory:
	    GCF* (Global)

	CE (Europe) FCC/PTCRB* (North America) IC* (Canada) SRRC*/NAL*/CCC* (China) KC* (South Korea) NCC* (Taiwan, China) JATE/TELEC (Japan) RCM (Australia/New Zealand) NBTC* (Thailand)

* Means development/on-going/plannin

ESP32 Key

Features

WiFi	Protocols: - Bluetooth v4.2 BR/EDR and BLE specification - A-MPDU and A-MSDU aggregation and 0.4 _s guard interval support Frequency Range: - 2.4 GHz ~ 2.5 GHz
Bluetooth	Protocols: - Bluetooth v4.2 BR/EDR and BLE specification Radio: - NZIF receiver with –97 dBm sensitivity - Class-1, class-2 and class-3 transmitter - AFH Audio: - CVSD and SBC
Hardware	Integrated crystal: 40 MHz crystal Integrated Flash: 16 MB Operating current: 80 mA (average)