BAKELOR
Mobile IOT

Mobil Gateway V1
(Indoor)

GATEWAY PURPOSE

Remotely via IOT technology
Module for the systems you want to control by providing access, remote control has been developed It can be controlled through all software technologies for your desired systems.
For example, bluetooth broadcasting transfers the data received through the devices to the system.
Then, in line with the data it receives, it transfers the data limited in the system It triggers the regions and can access instant location and movement information from the received signals.
It is the main product of systems with high security, low cost, the use of technological products, low maintenance costs, and the operations are carried out in seconds and online.

AREAS OF USE

Building Automation
- Remote power tool control
- Light control
- Barrier and gate opening systems

Smart Factory Automation
- Remote machine management
- Remote door control
- Security infrastructure

Industrial Automation
- Control via industrial wireless internet
- Industrial robot

Smart Agriculture
- Smart Greenhouse
- Smart reconstitutio
- Agricultural robots

2.2. EXAMPLES OF SECTORAL USE

2.2.1. Security. It can access instant location and movement information with signals received from children, patients or animals, that is, objects that are desired to be tracked for their safety. Thus, in case of any danger, control is provided quickly.
2.2.2. School/Education: In the attendance system for student tracking in schools, it realizes fast and reliable attendance with the signal received from the student.
2.2.3. Personal It can automate responses and trigger events. For example; "When you enter the room, the projector starts working."
2.2.4. Production/Tracking/Automation: They provide information on exactly where the products are in the factory and when and where they are delivered. Those who use this technology can access instant location and movement information as well as archive this information and perform comprehensive data analysis.

3. BENEFITS

3.1. More effective, space-saving devices instead of antennas or large devices.
3.2. No cable required for communication
3.3. Separate antennas are used for Bluetooth and wifi operations. Thus, there is no loss in power and distances.
3.4. It provides instant information.
3.5. It is basic security equipment.
3.6. It is usually modular and its features can be increased with add-ons.
3.7. Separation of server and user networks
3.8. Protects from malicious programs that can damage systems and data.
3.9. Prevents sensitive information from leaving the company.

4. GAINS

4.1. Time: Time is saved by speeding up signal acquisition.
4.2. Labor: Bluetooth system eliminates the human factor and enables data transfer without establishing a connection. Provided.
4.3. Speed: Data transfer is accelerated by instant communication of devices.
4.4. Efficiency. Under the control of a powerful system, each step will be more functional and efficient. It supports external sensor connections with multiple input, output and communication pins. Owner two different processors, which can be used together or separately if desired. Giant kit
It can be activated or deactivated by means of the switches on it.

5. PERFORMANCE CRITERIA

5.1. Signal Distance. bluetooth signal strength and distance tested with 2.4GHz wireless SMA antenna, 23dBm for 20cm and 71dBm for 50m

6. TECHNICAL SPECIFICATIONS

6.1 PROCESSORS
6.1.1. PROCESSOR (WI-FI)
6.1.1.1.1. CPU AND MEMORY
• Xtensa single/dual core 32-bit LX6 microprocessor(s), up to 600 MIPS
448kB ROM
• 520KB SRAM
16kB SRAM in RTC

6.1.1.2. CLOCK AND TIMERS

Built-in 8MHz calibrated oscillator
• Built-in RC calibrated oscillator
12-bit SAR ADC up to 18 channels
28-bit DAC

· 2 × 8-bit DAC
· Secure boot
· Flash encryption
· Cryptographic hardware acceleration

6.1.1.3. WI- FI

· 802.11 b/g/n
· 802.11 n (2.4GHz), up to 150 Mbps
· WMM
· Immediate Block ACK
· Defragmentation

6.1.1.4. WI-FI RADIO CHARACTERISTICS

DESCRIPTION	2412	-	2484	MHz
Input frequency	-	-	-	Ω
Output impedance*				
TX POWER				
Output power of PA for 72.2 Mbps	19	20	20.5	dBm
Output power of PA for 11b mode	19.5	20	20.5	dBm
DSSS, 1 Mbps	-	-98	-	dBm
CCK, 11 Mbps	-	-93	-	dBm
OFDM, 6 Mbps	-	-75	-	dBm
OFDM, 54 Mbps	-	-93	-	dBm
HT20, MCS0	-	-73	-	dBm
HT20, MCS7	-	-90	-	dBm
HT40, MCS0	-	-70	-	dBm
HT40, MCS7	-	-89	-	dBm
MCS32				
ADJACENT CHANNEL REJECTION		37	-	dB
OFDM, 6 Mbps	-	21	-	dB
OFDM, 54 Mbps	-	37	-	dB
HT20, MCS0	-	20	-	dB
HT20, MCS7				

· The device must operate in the frequency range that conforms to the standards. The target operating frequency range is software configurable.
· The output impedance for modules using IPEX antennas is 50 Q.
· The target TX power can be configured according to device requirements.

6.1.1.1.5. PREDEFINED POWER MODES

6.1.1.5.1. ACTIVE MODE

· CPU is clocked at XTAL_DIV_N (40 MHz/26 MHz) or PLL (80 MHz/160 MHz/240 MHz).
· Chip can listen, transmit.

6.1.1.5.2. MODEM-SLEEP MODE

· CPU runs and clock can be configured
· Wi-Fi/Bluetooth off. Radio off
· Current consumption: 30 mA, 80 MHz PLL
· Current consumption: 3 mA 2 MHz XTAL
· Don't wake up too soon

6.1.1.5.3. LIGHT-SLEEP MODE

· Built-in 8MHz oscillator. 40 MHz high speed crystal. PLL and radio disabled.
· Digital core clock off. CPUs are not working.
· The portable processor and touch controller can be periodically triggered by the monitor sensors.
· Current consumption: 800 μA.
· Wake-up delay time: Less than 1 ms

6.1.1.5.4. DEEP-SLEEP MODE

· Internal 8 MHz oscillator, 40 MHz high-speed crystal, PLL and radio disabled.
· The digital core is switched off. CPU content is lost.
· The voltage supplied to the RTC core drops to 0.7V.
· General purpose storage registers hold 8 x 32 bit data.
· RTC memory and fast RTC memory can be retained.
· Current consumption: 6.5 μA.
· Wake-up delay time: Less than 1 ms.
· Recommended for infrequently connected Wi-Fi/Bluetooth applications at very low power.

6.1.1.5.5. HIBERNATION MODE

· Built-in 8 MHz oscillator, 40 MHz high-speed crystal, PLL and radio disabled
· The digital core is turned off. CPU contents are lost.
· The peripherals of the RTC are turned off.
· The voltage supplied to the RTC core drops to 0.7V.
· The general purpose storage registers hold 8 x 32 bit data.
· RTC memory and fast RTC memory are switched off.
· Current consumption: 4.5 μA.
· Wake-up source: RTC timer only - Wake-up delay time: Less than 1 ms.
· Recommended for Wi-Fi/Bluetooth applications that are rarely connected at very low power.

6.1.2. PROCESSOR (BLUETOOTH)

6.1.2.1. CPU AND MEMORY:

· ARM Cortex®-M4 32-bit processor and FPU, 64 MHz
· 212 EEMBC CoreMark score running from flash memory
· 52 μA/MHz running CoreMark from flash memory
· Watchpoint and trace debug modules (DWT, ETM, and ITM)
Serial wire debug (SWD)

6.1.2.2.FLEXIBLE POWER MANAGEMENT

· 1.7 V to 5.5 V Supply voltage range
· On-chip DC/DC and LDO regulators with automated low current modes
· 1.8 V/3.3 V for external elements
· Automatic peripheral power management
· 64 MHz internal oscillator used for fast wake-up
· 0.4 μA at 3 V in System OFF mode, no RAM retention
· 1.5 μA at 3 V in System ON mode, no RAM retention, wake on RTC

6.1.2.3.ADVANCED ON-CHIP INTERFACES

- USB 2.0 full speed (12 Mbps) controller
- QSPI 32 MHz interface
- High-speed 32 MHz SPI
- Type 2 near field communication (NFC-A) tag with wake-on field
- Touch-to-pair support
- Programmable peripheral interconnect (PPI)
- 48 general purpose I/O pins
- EasyDMA automated data transfer between memory and peripherals
- 12-bit, 200 ksps ADC - 8 configurable channels with programmable gain
- 64 level comparator
- 15 level low-power comparator with wake-up from System OFF mode
- Temperature sensor
- 4x 4-channel pulse width modulator (PWM) unit with EasyDMA
- Audio peripherals: I2S, digital microphone interface (PDM)
- 5x 32-bit timer with counter mode
- Up to 4x SPI master/3x SPI slave with EasyDMA
- Up to 2x I2C compatible 2-wire master/slave
- 2x UART (CTS/RTS) with EasyDMA
- Quadrature decoder (QDEC)
- 3x real-time counter (RTC)
- Single crystal operation

6.1.2.4. Bluetooth®5, IEEE 802.15.4-2006, 2.4 GHz transceiver

- 95 dBm sensitivity in 1 Mbps Bluetooth® low energy mode
- 103 dBm sensitivity in 125 kbps Bluetooth® low energy mode (long range)
- 20 to +8 dBm TX power, configurable in 4 dB steps
- Bluetooth®5: 2 Mbps, 1 Mbps, 500 kbps, and 125 kbps
- IEEE 802.15.4-2006: 250 kbps
- Proprietary 2.4 GHz: 2 Mbps, 1 Mbps
- Single-ended antenna output (on-chip balun)
- 128-bit AES/ECB/CCM/AAR co-processor (on-the-fly packet encryption)
- 4.8 mA peak current in TX (0 dBm)
- 4.6 mA peak current in RX
- RSSI (1 dB resolution)
- Dev kit is fed from usb. It needs 5V voltage.
- The max current value supported is 1 ampere.

6.2. ACCESSIBLE BATTERY FEATURES

- 42 input and output pins (with different operating characteristics)
- One adjustable (reset pin for bluetooth processor)
- 1 reset button (for wifi processor)
- Programming pins (SWDIO/SWDCLK)
- NFC connection pins
- UART communication pins (RX-TX)
- 4 Ground (GND) pins
- One 5v and one 3v output
- LED indicator connected to 102 pin.
- 1 power LED indicator.