



ROBO SMART

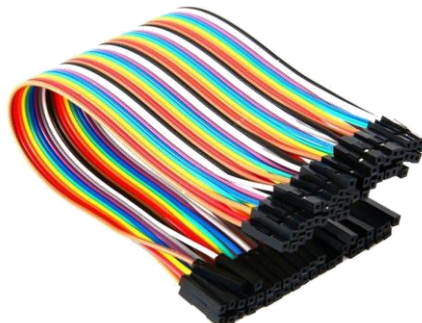


About ROBO SMART

We have designed a new Variant of Multi-controller IoT Kit, which is ready to use with a various Wireless protocol's like Wi-Fi, BLE, LoRa and Embedded AI/ ML with onboard sensors and its help Engineers to Learn, Develop and Implement from Concept Level to Industrial Grade Applications. ROBO SMART is a compact tabletop IoT Board of dimensions: 260 x 180 mm. Our engineers have taken care of the durability of the board by designing it in a fully powdered coated metal case that gives a easy access for connecting controllers.

ROBO SMART Accessories:

- Various cables for microcontrollers like Micro USB and Type B
- Power adaptor of 5V 3A
- Sets of Jumper Wire



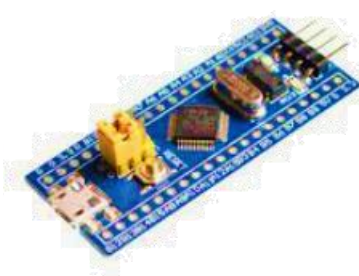
SPECIFICATIONS

ROBO SMART MICROCONTROLLERS

Parameters	Arduino UNO ATmega328P	ESP32	PI PICO	STM32 - BLUPILL
Architecture	RISC	RISC	RISC	RISC
Pin Count	20	36	40	47
SRAM	2 KiloBytes	512 KiloBytes	264 KiloBytes	20 KiloBytes
Serial wire Debug	1	1	1	1
Flash Memory	32 KiloBytes	4MB	2MB	64/128 KiloBytes
CPU speed	16 MHz	80 MHz	133 MHz	72 MHz (max)
USB Connector	USB-B	Micro	Micro	Micro
ADC	6	18	3	2
On-Board Wireless Interface	Nil	WiFi & BLE	Nil	Nil
USB module	Yes	Yes	Yes	Yes
I2C	1	2	2	2
SPI	1	3	2	2
UART	2	2	2	2
I2C	2	2	2	2
Operational Temperature	-40°C to +125°C	-40°C to +125°C	-20°C to +85°C	-40°C - +105°C
Source/Sink Current	20mA	8mA	6 mA	6 mA
Operational Voltage	5v	3.3v	3.3v	2.0V – 3.6V
USART module	Yes	Yes	Yes	Yes
Internal Oscillator	16 MHz	4-16 MHz	4-16 MHz	4-16 MHz
Ext. Wireless Protocol	LoRa	LoRa	Lora	LoRa
AI / ML	Yes	Nil	Yes	Nil
Power Distribution	Yes	Yes	Yes	Yes
Male Header Pinout for interfacing sensors & Actuators	Yes	Yes	Yes	Yes

ROBO SMART MICROCONTROLLERS

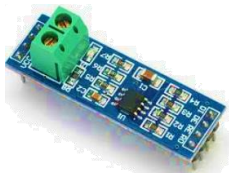
WIFI & BLE SoC Module	STM32/ RP2040 Cortex-M0+ Board	STM32/ Cortex-M3 LQFP Board
This module has a inbuilt Power Distribution with Male Header Pinout for Interfacing Sensors & Actuators	The Dual core ARM Cortex M0+ processor has inbuilt power distribution with male header pinout for interfacing sensors & actuators	The board has has inbuilt power distribution with male header pinout for interfacing sensors & actuators

Memory: Embedded flash: flash connected internally via IO16, IO17, SD_CMD, SD_CLK, SD_DATA_0 and SD_DATA_1, ROM: 448 KB, SRAM: 520 KB, RTC fast SRAM: 8 KB, RTC slow SRAM: 8KB, eFuse: 1 KB Peripheral Input/Output: • peripheral interface with DMA that includes capacitive touch • ADCs (Analog-to-Digital Converter) • DACs (Digital-to-Analog Converter) • I²C (Inter-Integrated Circuit) • UART (Universal Asynchronous Receiver/Transmitter) • SPI (Serial Peripheral Interface) • I²S (Integrated Interchip Sound) • RMI (Reduced Media-Independent Interface) • PWM (Pulse-Width Modulation) Security: hardware accelerators for AES and SSL/TLS Wireless connectivity • WiFi: 150.0 Mbps data rate with HT40 • Processor: Dual-Core 32-bit LX6 microprocessor, running at 160 or 240 MHz • Bluetooth: BLE (Bluetooth Low Energy) and Bluetooth Classic	with frequency up to 133MHz with variable core frequency. It has a onboard flash memory of 264kB SRAM & 2MB. It has a accurate clock and timer on its chip, a temperature sensor and micro USB port for power & data. It has 26 Multifunction GPIO pins (23x digital only, 3x ADC capable) and 2x SPI, 2x I2C, 2x UART, 3x 12-bit ADC and 16x controllable PWM channels and accelerated floating point libraries Its SMD module is Soldered with our IoT Experience Kit, its Male Header Pin outs 3-pin ARM Serial Wire Debug (SWD) port 	Internal memories FLASH 64KiB, SRAM 20KiB Oscillators 8MHz HIS, 40kHz LSI, 8MHz HSE, 32.768kHz LSE, 72MHz Max. Clock Speed Power Sources: Any +3.3V pin (+3.3V) Any +5V pin (+5V), USB connector (+5V) Regulator Input: +3.6V to +5.5V Output: +3.3V @ 300mA 2 x 12-bit, 1 μs A/D converters (up to 16 channels) Conversion range: 0 to 3.6 V Dual-sample and hold capability Temperature sensor Up to 9 communication interfaces Up to 2 x I2C interfaces (SMBus/PMBus) Up to 3 USARTs (ISO 7816 interface, LIN, IrDA capability, modem control) Up to 2 SPIs (18 Mbit/s) CAN interface (2.0B Active) USB 2.0 full-speed interface Debug mode Serial wire debug (SWD) & JTAG interfaces
---	--	---

ROBO SMART INBUILT SENSORS

Description	Specifications
Gyro and Accelerometer Sensor	Operating Voltage (VDC): 3 to 5V DC Communication: I2C Protocol, Chip: MPU6050 Gyro range: $\pm 250, 500, 1000, 2000$ °/s, Acceleration range: $\pm 2 \pm 4 \pm 8 \pm 16$, Max. Load Starting Frequency: ≥ 1500 pps, Max. Load Starting Frequency: ≥ 1800 pps
Barometric Pressure & Altitude Sensor	Operating voltage: 1.71V to 3.6V, Peak current: 1.12mA, Operating Pressure: 300 hPa to 1100 hPa. Operating Temperature: $-40^{\circ}\text{C} \sim +85^{\circ}\text{C}$, Accuracy between 700 to 900hPa and 25 to 40 deg. C : ± 0.12 hPa and ± 1.0 m
Temp & Humidity Sensor DHT 11	Power Supply 3.3~5.5V DC, Measurement Range: Humidity 20-90%RH. Temperature $0^{\circ}\text{C} \sim 50^{\circ}\text{C}$. Accuracy: Humidity $\pm 5\%$ RH, Temperature: $\pm 2^{\circ}\text{C}$, Resolution: Humidity 1%RH, Temp: 1°C . 4Pin Single row output and fully interchangeable, stability: $< \pm 1\%$ RH/year
1.8" TFT Display	Display Size (inch): 1.8, Input Voltage (V): 3.3 to 5, Pixel Resolution : 128 x 160 Interface Type : SPI
Relay	Relay Contact Current Capacity at AC250V and DC5V: 10A, SPDT PCB Mount Relay
Potentiometer	Through-hole, Track Resistance: 10Kohm, Operating Temp: -55°C to $+125^{\circ}\text{C}$, Temp Coefficient: ± 50 ppm/ $^{\circ}\text{C}$, Resistor Element Material: Variable Rotary Trimmer, Tolerance: 10%
Pushbutton	SPST, Round shaped, Through-hole
Buzzer	Voltage: 5V, Resistance: 42 Ω , Resonance Frequency: 2048 Hz
RGB LED	5V RGB LED, Mounting Style SMD/SMT, Current: 20mA, Voltage: 2.05 V, 2.6 V, 2.85 V

ROBO SMART WIRED AND WIRELESS CHIPSET MODULE

Description	Specifications
MAX3232	A compact size board with inbuilt Power distribution and Male header pinout for interfacing which can be used to program STC MCU, NXP MCU, Renesas MCU, STM32 MCU, N-2EC MCU with Operating Voltage of 3.3 to 5.5V, operates upto 250Kb. It can be used with most of the microcontrollers
MAX485 	A compact size board with inbuilt Power distribution and Male header pinout for interfacing which can be used for low power consumption for the RS-485 Communication. It can be used with most of the microcontrollers as a slew rate limited transceiver
MCP2515 CAN BUS 	A compact size board with inbuilt Power distribution, 5V DC power supply, SPI interface protocol control and Male header pinout for interfacing. It supports CAN V2.0B technical standard, communication rate 1Mb/S and a long data field of 0-8 bytes. The board has 120 Ω terminal resistance and 8MHZ crystal oscillator. It can be used with most of the microcontrollers

LoRa	LoRa Modem is a compact module size of 16*16mm that has Inbuilt Power Distribution and Male Header Pinout for Interfacing. It has Automatic RF Sense and CAD with ultra-fast AFC and various modulations like FSK, GFSK, MSK, GMSK, LoRaTM and OOK. It has a Programmable bit rate up to 300 kbps, High sensitivity rate down to -148 dBm, 127 dB Dynamic Range RSSI. Its Packet engine is up to 256 bytes with CRC, high efficiency PA of +14 dBm, Max. Link budget 168dB, +20 dBm - 100 mW constant RF output vs. V supply. Communication: SPI
Relay	Relay Contact Current Capacity at AC250V and DC5V: 10A, SPDT PCB Mount Relay
GSM	It is a compact module size of 25*23mm with inbuilt power distribution and male header pinout for interfacing. Its Supply voltage: 3.8V - 4.2V and Recommended supply voltage: 4V. Various Frequencies: Quad Band (850 / 950 / 1800 /1900 MHz) Its Power consumption: Sleep mode < 2.0ma, Idle mode < 7.0mA and GSM transmission (avg): 350 mA, GSM transmission (peek): 2000mAInterface: UART (max. 2.8V) and AT commands SIM card socket: microSIM, Antenna connector: IPX, Status signaling: LED, Working temperature range: -40 to + 85° C



ROBO SMART COMMUNICATION PROTOCOLS MODULE

Description	Specifications
LoRa	Frequency : 865 -867MHz Power Output Capability : +20 dBm 100 mW Voltage range: 1.8V to 3.6V
RS232	IC Chip: MAX3232 Operating Voltage: 3.3-5.5V
RS485	IC Chip : MAX485 Operating Voltage (VDC) : 5 V
CAN	CAN transceiver TJA1050 Supports CAN V2.0B
Zigbee / NB-IoT	Zigbee - 2.4GHz for worldwide deployment NB-IoT - BC95-B5
GSM	SIM 800L 850/900/1800/1900MHz GPRS data (TCP/IP, HTTP, etc.).

Experiments List:

1. Write a Program to Interface DHT11 Sensor using Arduino/R-Pi/ARM.
2. Write a Program to control Relay using Arduino/R-Pi/ARM.
3. Write a Program to Blink RGB LED using Arduino/R-Pi/ARM.
4. Write a Program to control LED using Push Button using Arduino/R-Pi/ARM.
5. Write a Program to Interface Potentiometer for Analog to Digital Conversion using Arduino/R-Pi/ARM.
6. Write a Program to Interface BMP180 Sensor and display values in TFT.
7. Write a Program to Interface MPU6050 Sensor and display values in TFT
8. Write a Program to Interface MPU6050 Sensor and display values in TFT and send data to bylnk App
9. Write a Program to Control Buzzer using Bluetooth Mobile Application.
10. Write a Program to Control Relay using GSM – Sim800L.
11. Write a Program to Control RGB LED using Blynk.
12. Write a program to send “HELLO WORLD” via Bluetooth communication.
13. Write a program to send the DHT11 data via MQTT protocol and control the Appliance via MQTT protocol.
14. Interfacing DHT11 with ARDUNO Uno and Send the data using ESP32 WiFi Coprocessor to Blynk Cloud.
15. Interfacing DHT11 with STM32 Bluepill and Send the data using ESP32 WiFi Coprocessor to Blynk Cloud.
16. Write a Program to uplink the DHT11 Data using LoRaWAN Communication.
17. Write a Program to Control LED via Downlink using LoRaWAN Communication.

Wireless LoRaWAN Outdoor Gateway

Product overview:

An LoRaWAN Outdoor Gateway based on Cortex-A7 and SX1302 RF front-end, which support long-distance low power LoRa communication. They use POE for power supply and data communication to simplify wiring.

The SX1302 chip used in this gateway is a new generation of LoRa multi-channel gateway chip. Compared with the previous generation SX1301, it not only increases the support of SF5 and SF6, improves the transmission rate, but also greatly reduces the transceiver power consumption of radio frequency. In addition, a unique identification number supporting 64 bits can be used to mark the gateway number or address.



Based on the characteristics of LoRa wireless, it can be widely used in smart meters, logistics and supply chains, smart buildings and homes, smart cities, asset tracking, urban street lights, healthcare products, agriculture, parking sensors and other fields.

Product Features:

This series is a new type of LoRa gateway launched for the application requirements in the LPWAN field. It uses an embedded Linux system for a new architecture and design, which is convenient for maintenance and update and application customization development, and can support secondary development its Software and UI is on top of openWRT. It has a inbuilt network server & GPS module, open VPN, MQTT v3.1 Bridging with TLS encryption, Buffering of LoRa frames in Packet Forwarder mode in case of NS outage. It comes with IP67/NEMA-6 industrial-grade enclosure with cable glands and PoE, Surge Protection.

Wireless performance: For example, 8 channels of 125KHz receiving channels can receive signals from SX127x or SX126x series chips at the same time; each receiving channel can resolve SF5~SF12 signals, etc., so I won't repeat them here.

Application features:

- Support Ethernet communication to meet special application requirements;
- Supports node whitelisting Lora frame filtering
- Up to 5 hours of autonomous work on battery provision
- Built-in external independent watchdog to ensure reliability;
- Supports Dual LoRa® Concentrators for up to 16 channels and MQTT v3.1 Bridging with TLS encryption
- Supports 863-870MHz, 5dBi Fiberglass Antenna

- Built-in GPS, RTC and automatic clock synchronisation, convenient for application development;
- Built-in WEB service, you can view and configure gateway information through a browser;
- Onboard 4G full Netcom module to adapt to complex construction environments;
- Support TCP, UDP, MQTT multiple data communication methods;
- Support JSON transparent transmission and other data formats;
- Support connectivity through Wi-Fi, LTE and Ethernet
- Support OpenVPN / SSH login, and secondary development at the application layer
- Support multiple working modes such as LoRaWAN Network server, TTN etc.

Product Specifications

Parameter	LoRaWAN Outdoor Gateway
CPU	Based on Cortex-A7
Main frequency	528MHz
Memory Capacity	512MB
Storage	8GB
Ethernet	10/100M adaptive single network port
4G	Optional CAT1 full Netcom
Wireless system	LoRa half duplex
Working frequency	IN 865 -867
Receive channel	8 125KHz SF adaptive (5~12) channels 1 125/250/500 bandwidth standard LoRa channel
Receiver sensitivity	-141dBm (SF12 & BW125KHz)
Transmit power	22dBm
Power supply	External power supply, waterproof connector or POE
Supply voltage	DC 9~36V
Operating Temperature	-30°C to +55°C
Way of communication	TCP/UDP/MQTT (software configurable)
Protocol support	LoRaWAN or non-LoRaWAN (software configurable)
Data Format	Transparent transmission/TLV/JSON (software configurable)

IoT Cloud Application for Cloud Space and storage

It has a perpetual license that enables device connectivity via industry standard IoT protocols - MQTT, CoAP and HTTP and supports both cloud and on-premises deployments. It combines scalability, fault-tolerance and performance so you will never lose your data. It has various provisions like manage devices and assets, monitor and control your IoT entities in secure way using rich server-side APIs. Define relations between your devices, assets, customers or any other entities. You may create widgets Graphs & Custom Requirement in Application, customize themes, generate report in the PDF, CSV, Excel formats. It facilitates with self learning blogs, user management access and snap & share of the widgets option