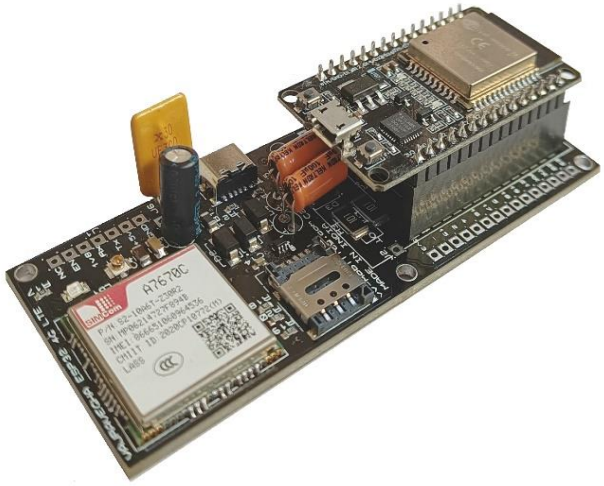
VVM ESP32 4G LTE A7670 MODULE

Product ID: VVM501
Version: v1.1



Features:

- VVM ESP32 4G LTE Module is an ultra-low power embedded SoC designed for high-speed wireless communication. It integrates the latest LTE module standards and provides a host of features such as advanced modulation and coding technologies, flexible antenna configurations, and high-speed radio transmission
- Easy migration from 2G/3G network to 4G network now made possible using this module. Network providers are in the process of shutting down support for 2G /3G and businesses relying on wireless communication are hurrying to transition to 4G LTE connectivity. Legacy devices still relying on 2G/3G can be upgraded to 4G networks and made IoT/ Industry 4.0 ready.
- ESP-WROOM-32 30 PIN Development Board which has a dual 32-bit CPU is coupled with 4G LTE wireless communication module SIM7670C
- The module uses one of the popular 4G LTE chipset A7670C by SIMCOM. The SIM7670C is Multi-Band LTE-TDD/LTE-FDD/HSPA+ and GSM/GPRS/EDGE module solution in an SMT type which supports LTE CAT1 up to 10Mbps for download data transfer
- The preconfigured AT commands of A7670C makes it easier for the user to communicate via MQTT, SMS, Calls etc.
- ESP32-WROOM-32 is a powerful, generic Wi-Fi + Bluetooth + Bluetooth LE MCU module that targets a wide variety of applications, ranging from low-power sensor networks to the most demanding tasks, such as IoT applications, voice encoding, music streaming and MP3 decoding
- Indian 4G bands can be used with this module. This means it can be used with Jio, Airtel, Vodafone networks, etc.
- The board supports multiple built-in network protocols like HTTP, HTTPS, FTP, FTPS, MQTT along with SMS and calls
- The board is powered using a Type- C connector and requires a regulated 5V/2A power source
- On-board fuse protection, transient voltage protection and EMI suppression
- VVM LTE 4G module come with antennas that allow for better reception and faster data speeds.
- Automatic switchover to 2G/EDGE in absence of LTE.
- On-board USB connector, SIM card connector, antenna connector and additional PCB connector for User Interface

Applications: Supports multiple network bands and can be used in a variety of applications including IoT applications, Telematics, Surveillance Devices, PoS, Industrial Routers, Remote Diagnostics, MQTT gateways, etc. Legacy devices still relying on 2G/3G can be upgraded to 4G networks and made IoT/ Industry 4.0 ready.

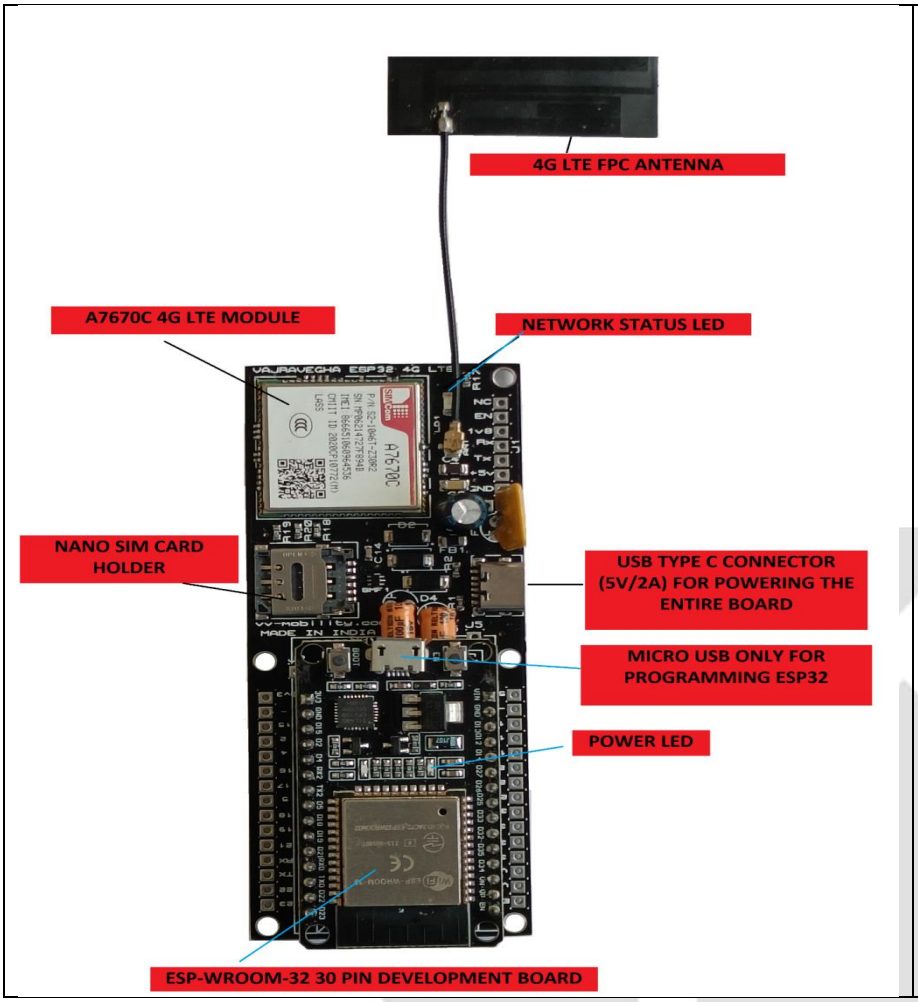
Description: VVM501 module combines features of A7670C 4G LTE module by SIMCOM with an ESP32 30 Pin WROOM 32 development board. A7670C 4G LTE modules allows for faster data speeds than traditional 3G and 2G networks. The 4G LTE module also helps to improve the reliability of the network. This module is a perfect choice for achieving high speed wireless communication. Another main feature of A7670C module is its preconfigured MQTT AT commands. One of the ways that 4G LTE networks are able to offer such high speeds for Embedded/IoT devices is through the use of MQTT. MQTT is a communication protocol that allows devices to send and receive data packets over a network without having to use a dedicated connection. The board also supports multiple built-in network protocols like HTTP, HTTPS, FTP, FTPS along with SMS and calls

Features of ESP32:
ESP32 supports a wide range of communication protocols, including LTE, WLAN, GSM/GPRS/EDGE, and 3GPP2. It is also equipped with a powerful memory subsystem and a versatile processor that makes it a perfect candidate for a wide range of applications, including mobile broadband, remote sensing, sensor networks, and industrial control. It is also well-suited for low-power applications, such as wearables and IoT devices.

Features of A7670 4G chipset:
The A7670 series is the LTE Cat 1 module which supports wireless communication modes of LTE-TDD/LTE-FDD/GSM/GPRS/EDGE. It supports maximum 10Mbps downlink rate and 5Mbps uplink rate. Supports TCP/IP/MQTT/IPV4/IPV6/Multi-PDP/FTP/ FTPS /HTTP/HTTPS/DNS

Specifications of VVM501:

Controller	ESP-WROOM-32 30 PIN Development Board (LX6 32-bit, dual-core microprocessor running at 240MHz)
Controller Features	• 15 12-bit Analog-to-Digital Converter (ADC) channels • 25 Programmable GPIOs • 3 SPI interfaces • 2 UART interfaces • 1 I2C interfaces • 25 PWM output channels • 2 Digital-to-Analog Converters (DAC) • 9 Capacitive sensing GPIO's
Memory	4 MB flash/ 520 KB SRAM
4G LTE Module	SIMCOM A7670C
SIM Card	Nano SIM Cards Only
Power Supply	5V/ 2A supply
WiFi	YES
Bluetooth	YES
4G Antenna	FPC or Foldable Rubber Duck Antenna as per customer request. Gain up to 3.5dBi, VSWR < 2.0
Dimensions	100mm X 40mm



Scan this QR code for YouTube Demo

Scan this QR code for github link
https://github.com/vajravegha

Module Board

Operation:

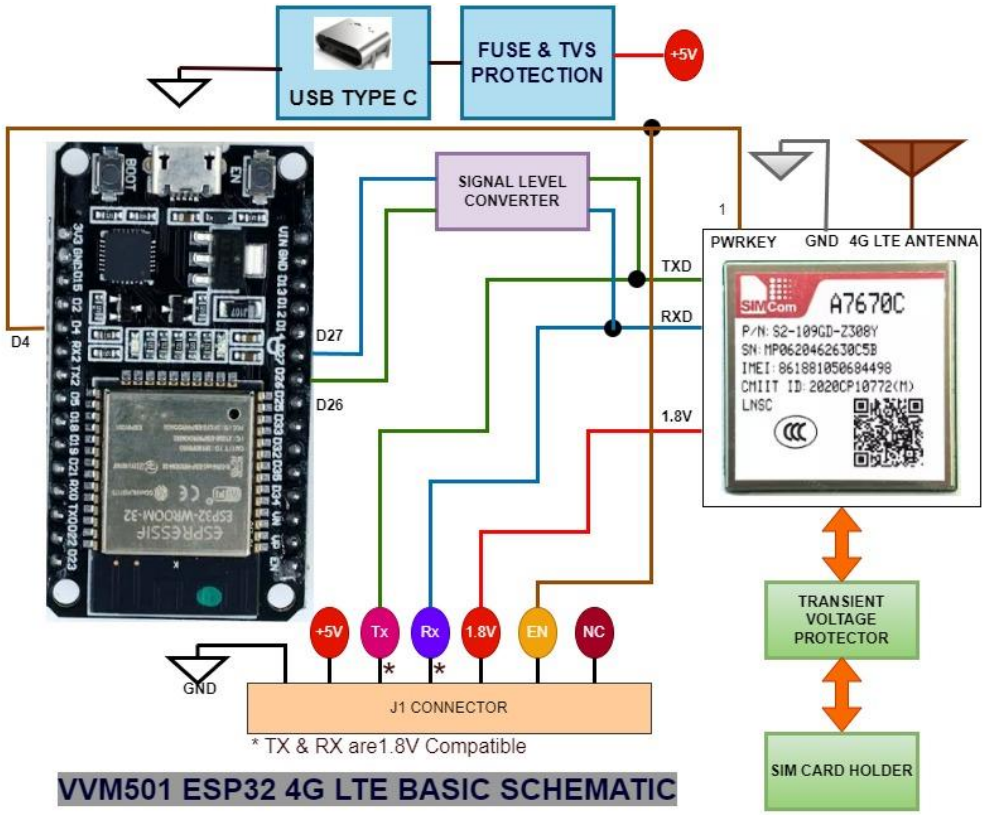
Gently insert a Nano SIM card having valid 4G subscription service in the SIM Card holder and securely lock it in place. Connect a regulated 5V 2A power supply to the USB type-C connector from a laptop or phone charger. This powers the entire board including the ESP32. Within 5-10 seconds the Network Status LED turns on and either remains on or starts blinking. Following is the status of Network Status LED

LED OFF: Module not powered/Sleep Mode ;LED ON: Searching for networks

LED BLINKING: Network Registered/ Data transmit

If the chipset is registered with the network, the device can start transmission and reception of data via 4G. Default program stored in ESP32 allows to publish MQTT messages on '**Public HiveMQ MQTT broke**r via 4G. Published messages are displayed on the HiveMQ broker webpage. Refer our GitHub link (refer QR code below) for explanation of default program and other sample codes. If messages are not being published on the broker/server, kindly check 4G signal strength in your location or adjust antenna orientation.

The ESP32 can also be connected to a PC via separate micro USB data cable to check for incoming messages on the Serial Port. Use Arduino IDE or PuTTY or any suitable serial port monitor for viewing data. Select the correct COM Port Number and set Baud Rate to 115200. Kindly note that this data cable is used only for viewing data or programming/flashing the ESP32 via laptop/PC, and not for powering the 4G chipset or other components. To power the entire board, use the USB Type C cable only. Both the type C and micro-USB connectors can be powered together, provided they both provide stable 5v supply. Ground (negative) of both the supplies will be then be common (internally shorted on the PCB) in this case



Working:

Digital pin D4 on ESP32 is connected to power key of 4G LTE module, which is used to switch on the 4G module. Pins D26 and D27 are configured as transmitter and receiver using hardware serial which is connected to receiver and transmitter of A7670C 4G LTE module respectively through a signal level converter. The board also provides an additional 6 pin SIL connector (J1) for user interface. Tx, Rx pins (1.8v level) and PWRKEY(3.3v level) pins of the 4G chipset are directly accessible through J1 connector, and the board can be powered by regulated 5v from the connector itself instead of Type C USB connector. Kindly refer datasheets, AT command list and various supporting codes on our GitHub page.

NOTES AND PRECAUTIONS:

- Use only a well regulated and stable 5v 2A supply for the Type C connector. Exceeding voltage above 5.5v either on the Type C connector or ESP32 data cable can damage the 4G module/ESP32
- Tx and Rx pins on J1 connector (connected to 4G chipset pins) are 1.8v level only. EN pin on J1 connector (connected to 4G chipset PowerKey pin) is 3.3v level only. If your host microcontroller or system exceeds these voltage levels, then use a suitable voltage level converter else the 4G module can get damaged
- Before reprogramming the ESP32, understand the AT Commands properly. Incorrect AT commands sent to the module can corrupt the 4G module memory or change the default configuration settings.
- THIS MODULE IS NOT USED TO MAKE DIRECT CALLS AS SPEAKER AND MICROPHONE IS NOT PRESENT ON THE BOARD. CONTACT US DIRECTLY INCASE OF CUSTOMISED SOLUTIONS
- While reprogramming ESP32, if the code fails to upload, kindly power off Type C USB to turn off the 4G Modem, try reprogramming and power on Type C again. After new code is uploaded into ESP32, reset the ESP32 once to resume normal operation
- **WITH THE ADVENT OF 5G NETWORKS IN INDIA, FREQUENCY BANDS ALLOTED TO 4G MODULES HAVE CHANGED FOR SOME NETWORKS. KINDLY TEST THE MODULE WITH SIM CARD OF MULTIPLE TELECOM OPERATORS AND HIGH SIGNAL STRENGTH AREAS. AT COMMAND "AT+CREG?" IS USED TO CHECK NETWORK REGISTRATION STATUS**