Datasheet – PTG4GARS-SC103V1 Series - 4G LTE, GNSS, BLE5.0 Arduino Shield with A7672S

1 Features

- USB data interface to connect with Windows/Linux/Android PCs, or embedded host. UART interface with Arduino.
- Optional six axis sensor and Pressure Sensor on board-not populated
- Optional Crypto authentication device for secured connectivity. not populated
- BLE5.0 support with onboard PCB antenna.
- Worldwide 4G/3G/2G communication coverage. Supports VoLTE.
- GNSS supporting GPS, BeiDou, GLONASS, LBS positioning.
- Supports mail, TCP/ IP/ IPV4/ V6 Multi-PDP, MT PDP, and FTP/ FTPS/ HTTP /HTTPS /MQTT/ DNS.
- Firmware update via USB/FOTA.
- Can be powered through USB +5V ± 5%
- Control of module power supply on/off by Arduino.
- Provision for antenna matching circuit components.
- RF layout design on a four-layer PCB with tuned antennas for optimal RF performance and low current consumption.

4 Applications

- Vehicle Telematics
- Industrial PCs
- IOT Gateways
- Health care
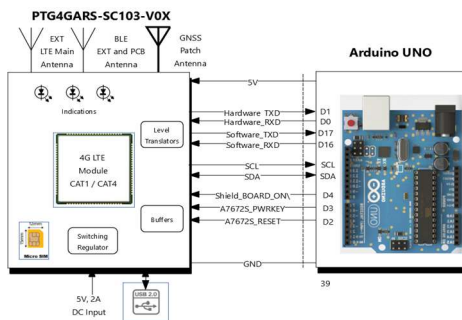
5 Simplified Block Diagram

Figure 1 Block Diagram

2 Description

ParryTech "4G LTE, GNSS, BLE5.0 Arduino Shield with A7672S" is a multi-Band 4G/3G/2G communication and GNSS positioning module, orderable in LTE-CAT1 speed option. This product is designed to be directly compatible with Arduino UNO to enable 4G LTE data connectivity for applications such as Internet of Things (IoT), Tracking, using USB or UART interfaces. The USB interface enables the 4G LTE, GNSS, BLE5.0 Arduino Shield with A7672S Board to be connected to Windows/Linux/Android PCs or Industrial PCs as a standalone unit without Arduino if needed. UART interface enables easy interface of the shield PCB with any other Microcontroller platform other than Arduino as well.

3 Part numbering

Example ordering part number: PTG4GARS-SC103V1

☗ Ordering Notes:

- ParryTech 4G LTE, GNSS, BLE5.0 Arduino Shield with A7672S is tested with Arduino Uno board; tested with Windows PC as standalone unit.
- Optional parts for the complete system are 1) Arduino Uno with USB cable 2) Suitable LTE Antenna
- Simcard is not a part of the product (Tested with SIM cards from Airtel, Vodafone and Jio).
- Separate module part number for deployment in any regions other than India can be supported. *
- For applications where internal LTE antenna is used (Flexi antenna), antenna tuning services along with casing can be availed at additional charges. *
- * For details, reach out to us through our support email ID estore-enquiry@parrytech.net.

An IMPORTANT NOTICE AND DISCLAIMER at the end of this data sheet.

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6 Specifications

GSM Frequency Band Specifications

- LTE-TDD B34/B38/B39/B40/B41
- LTE-FDD B1/B3/B5/B8
- UMTS/HSPA+ B1/B8
- GSM/GPRS/EDGE B3/B8

Software/Protocol Specifications

- USB Driver for Microsoft Windows 2000/ XP/ Vista/ Win7/ Win8/ Win10
- USB Driver for Linux /Android
- RIL supporting for Android 2.4/4.0/5.0/6.0/7.0
- MBIM to Win8
- Firmware update via USB
- TCP/IP/IPV4/IPV6/Multi-PDP/FTP/FTPS/HTTP/HTTPS/MQTT/DNS
- SSL3.0/TLS1.0/TLS1.2
- DTMF (Sending and Receiving)

General Specifications

- Control Via AT Commands
- Supply voltage: 5V±5%., 5V Typical
- Operating temperature: -40℃ to 85℃
- Board Dimension: 101.52*53.3mm
- Bandwidth: 1.4/3/5/10/15/20MHz
- 3GPP E-UTRA Release 11

Data Transfer Specifications

- LTE CAT1
  - Uplink up to 5Mbps
  - Downlink up to 10Mbps
- HSPA+
  - Uplink up to 5.76 Mbps
  - Downlink up to 42 Mbps
- UMTS
  - Uplink/Downlink up to 384Kbps
- EDGE
  - Uplink/Downlink up to 236.8Kbps
- GPRS
  - Uplink/Downlink up to 85.6Kbps

Interface Specifications

- Arduino Uno interface
- UART lines in Arduino Uno interface
- 4G module control lines in Arduino Uno interface.
- U.FL connector for LTE Main antenna, on board PCB antenna for BLE along with optional BLE external U.FL antenna interface.
- micro USB2.0 interface of LTE module to directly interface with PC, if needed.
- I2C bus interface for Arduino with 4G LTE module, Crypto authentication device, Pressure sensor, and 6 Axis sensor.
- 6 Pin Push-Push Micro Sim Card Holder with SIM card detect switch (1.8V/3.0V)

7 Detailed overview

ParryTech "4G LTE, GNSS, BLE5.0 Arduino Shield with A7672S" comes with a multi-Band 4G/3G/2G communication and GNSS positioning module, orderable in LTE-CAT1 speed option. This product is designed to be directly compatible with Arduino Uno board to enable 4G LTE data connectivity applications such as Internet of Things (IoT), using UART interface. The USB interface enables the module to be connected to Windows/Linux/Android PCs or Industrial PCs if needed. UART interface also enables easy interface with any other Microcontroller platform.

The 4G LTE, GNSS, BLE5.0 Arduino Shield with A7672S module supporting 4G/GSM/GPRS/GPS, USB/UART is designed based on quality circuit design and components on a four-layer impedance-controlled PCB ensuring best RF layout and RF performance with good thermal and system level ESD design. The onboard antennas are well tuned for best RF performance. The A7672S has strong extension capability with rich interfaces including UART, USB2.0, GPIOs etc. With abundant application capability like TCP/IP/IPV4/IPV6/Multi-PDP/FTP/FTPS/HTTP/HTTPS/MQTT/DNS. The module provides much flexibility and ease of integration for customer's end applications. The A7672S module is having internal TCP/IP stack to enable you to connect with internet via 4G/EDGE/GPRS. The SHIELD board is suitable for GNSS Tracking, as well as DATA transfer application in IoT/Machine to machine applications and vehicle tracking applications.

This 4G LTE, GNSS, BLE5.0 Arduino Shield with A7672S board has on-board buck converter, which allows 4G LTE module to function from 4.5V to 5.5V DC, which can be fed through USB connector. A7672S module can be turned ON manually through the PWRKEY button on the Shield board or alternatively by generating the power ON signal through the GPIO D3/PD3 of Arduino Uno. Similarly, for RESET also both Push button and interface signal provisions are available. The Arduino UNO can turn ON/OFF the buck converter on the shield board using a dedicated I/O line.

Push-push type Micro SIM Socket is provided on bottom side of the board and the SIM Pins are protected from electrostatic discharge (ESD) that may occur during insertion and removal of SIM card, using onboard ESD protection diode. The 4G LTE, GNSS, BLE5.0 Arduino Shield with A7672S board is designed with U.FL connector for 4G LTE Main, BT RF ports. Three on board LEDs are provided to indicate the power supply status, network status and module status. The baud rate for UART communication is configurable from 9600-921600bps through AT command and the default baud rate will be 115200bps. Functions such as send/receive SMS, access internet etc are through simple AT commands.

8 Absolute Maximum Ratings

Parameter	Max	Unit
Supply Voltage (V$_{cc}$)	5.5	V
Supply Current drawn (I$_{cc}$)	3	A
USB_VBUS	5.5	V
*Voltage at I/O pins	+5	V

Table 1: Absolute Maximum Ratings

*These parameters are for digital interface pins, GPIO, and UART and negative voltage less than -0.3V is not allowed.

Note: Stresses beyond those listed under *Absolute Maximum Ratings* may cause permanent damage to the module. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Conditions*. Exposure to absolute-maximum-rated conditions for extended periods may affect module reliability.

9 Recommended Operating Conditions

Parameter	Min	Typ.	Max	Unit
Supply Voltage to the SHIELD through USB or external power connector (Vin)	4.5	5	5.5	V
A7672S Module I/O level	2	1.8	2.4	V
Board I/O Level	4.1	5	5.5	V
RF port Impedance for LTE Main, BT, GNSS		50		ohms

Table 2: Operating conditions
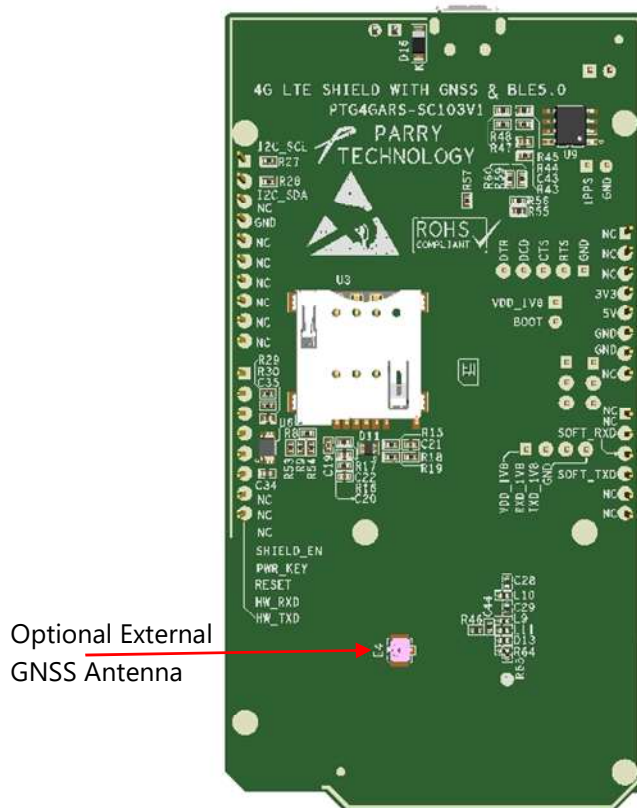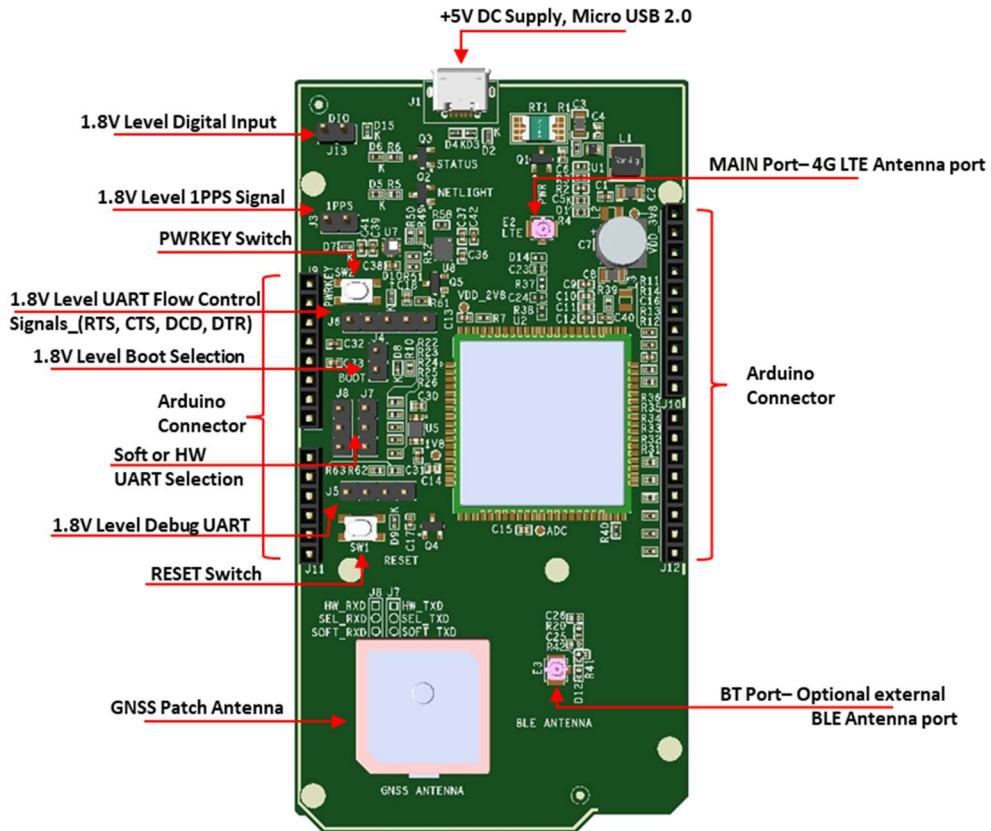
10 SHIELD board details

Figure 2 Board View

This module has interfaces for DC, digital and RF signals, as shown in Figure 2.

Connector Name	Reference Designator	Purpose
Arduino UNO connector (for Arduino Uno interface)	J9, J10, J11, J12	To interface with Arduino Uno board
4G LTE antenna port	E2	To connect external LTE antenna
Optional external BLE antenna port	E3	To connect optional external BLE antenna
Optional external GPS antenna port	E4	To connect optional external GPS antenna
Micro USB 2.0 (for DC and Digital interface)	J1	To supply DC voltage to power the PCB and provide data communication

Table 3: Details of 4G LTE, GNSS, BLE5.0 Arduino Shield with A7672S connectors

10.1 Arduino Uno connector details

The 4G LTE, GNSS, BLE5.0 Arduino Shield with A7672S has Arduino Uno interface connector as shown in **Figure 2** with reference location "J9, J10, J11, J12". **Figure 3** shows the pin details of the connector provided in the 4G LTE, GNSS, BLE5.0 Arduino Shield with A7672S board and **Figure 4** provides the Arduino Uno connector details for quick reference.
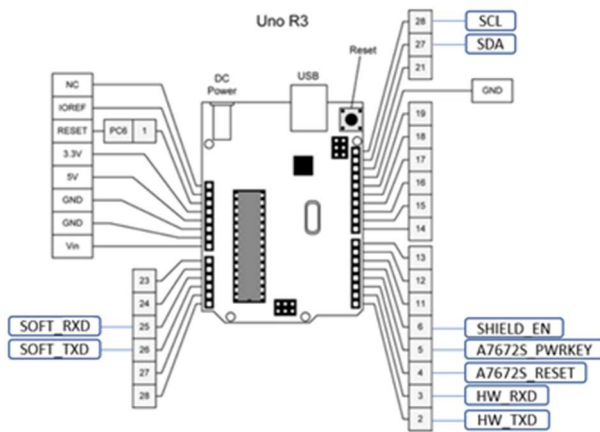
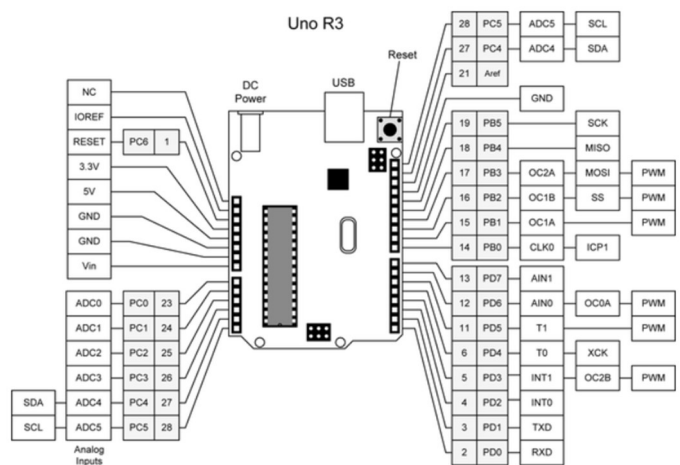Figure 3 Arduino Uno connector on 4G LTE, GNSS, BLE5.0 Arduino Shield with A7672S Board

Figure 4 Arduino Uno connector on Arduino Uno Board

Arduino Uno 4G LTE, GNSS, BLE5.0 Arduino Shield with A7672S interface signals	Arduino Uno board interface signals
SHIELD_BOARD_ON\ (Power on/off for SHIELD board)	GPIO 4
A7672S_RESET (Reset A7672S module)	GPIO 2
A7672S_PWRKEY (Turn ON A7672S module)	GPIO 3
A7672S_HW_TXD (UART of A7672S module)	GPIO 0 (RXD)
A7672S_HW_RXD (UART of A7672S module)	GPIO 1 (TXD)
A7672S_SOFT_TXD (UART of A7672S module)	GPIO 17
A7672S_SOFT_RXD (UART of A7672S module)	GPIO 16
SCL	SCL
SDA	SDA

Table 4*:* Interface signals between 4G LTE, GNSS, BLE5.0 Arduino Shield with A7672S and Arduino Uno board

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