Description

π.Lynx.LTE is a 3G/4G/NB-IoT/LTE HAT board which turns your Raspberry Pi or 40-pin Pi compatible single-board-computer into a router or gateway. The board is basically an interface bridge between mini PCIe cellular modems. With the standard mini PCIe modems you insert into HAT, your Raspberry Pi based projects can access data networks all around the world. This board enables high-bandwidth cellular connectivity on your remote devices. From low-power consumption NB-IoT LTE-Cat.M to ultra-high-speed LTE-Advanced mini PCIe cards supported by the board. Both UART and USB communication exist on the board. USB is highly recommended for achieving high-speed download/upload rates.

Remote management of M2M devices in the field, secure connection (e.g SSH/SSL) over the mobile network, reliable coverage across the globe with lots of carrier option is available with this HAT stacked on the Raspberry Pi. It can be also used as a standalone LTE modem or dongle with other embedded computer platforms. If you're looking for a Raspberry Pi LTE HAT for applications like Raspberry Pi video streaming or high-speed data transferring, you are at right place. Making a remote controllable LTE Wi-Fi Hotspot, high-speed GPS tracking, more and more use cases are possible with this add-on board.

Features

- Compatible with Raspberry Pi models and Pi-compatible boards that have the 40-pin GPIO header (4, 3, 2, B+, A+, Zero)
- Easy-to-use, simple setup, plug-and-play
- QMI, PPP and UART support
- Industry standard mini PCIe socket with worldwide LTE, UMTS/HSPA+ and GSM/GPRS/EDGE coverage with regional or global modules which work with different frequencies & carriers.
- 150Mbps downlink and 50Mbps uplink data rates with Quectel EC25.
- 14.4Mbps downlink and 5.76Mbps uplink with Quectel UC20.
- SIM socket is easily reachable on top of the board.
- Standalone use with PC/Laptop over micro USB, without mounting to RPi header.
- LTE HAT can be powered from an external 5V source by a JST connector or directly from Raspberry Pi 5V GPIO headers or also micro USB on the top of the board.
- Efficient power regulator circuit can hold up to 3 A.
- Optional Send/Receive AT commands over RPi UART port is available.
- Taking the module into the Airplane Mode, resetting module or RI and DTR functions can be accessible over GPIO pins.
- The power of the whole board can be turned off using RPi GPIO pin when low-power consumption is required.
- Some modules (e.g EC21 & EC25 & UC20) have built-in GNSS (GPS/GLONASS) receiver for your location-based applications
- -40°C ~ 80°C working environment.
- Compatible mechanical sizes with official "Raspberry Pi HAT Board Specification"
- Cutout for RPi display flex cable.
- *EVE expansion connector to connect Lynx.EVE boards for HMI applications (see our Lynx.EVE board for details)
- *Lockable SIM Card connector (in vibrating conditions) for mobile applications
- Supports QMI with Qualcomm chipset PCIe modules

Key Applications

- Telematics & Telemetry
- MQTT Server & Client
- Remote Data Monitoring
- Video/Music Streaming

- Large Data Downloads and Uploads
- Standalone LTE USB Dongle/Router
- Mobile Internet Hotspot
- Ethernet/WiFi to Cellular Router/Gateway
- GPS Tracking
- Real-time Environmental Monitoring
- Smart Energy & City & Agriculture Applications
- Smart Parking
- Security & Asset Tracking
- Projects using an HMI Display (*Requires Optional Units) & GSM/LTE Connection

Box Content

- Standard Header or Long Header (selected with order)
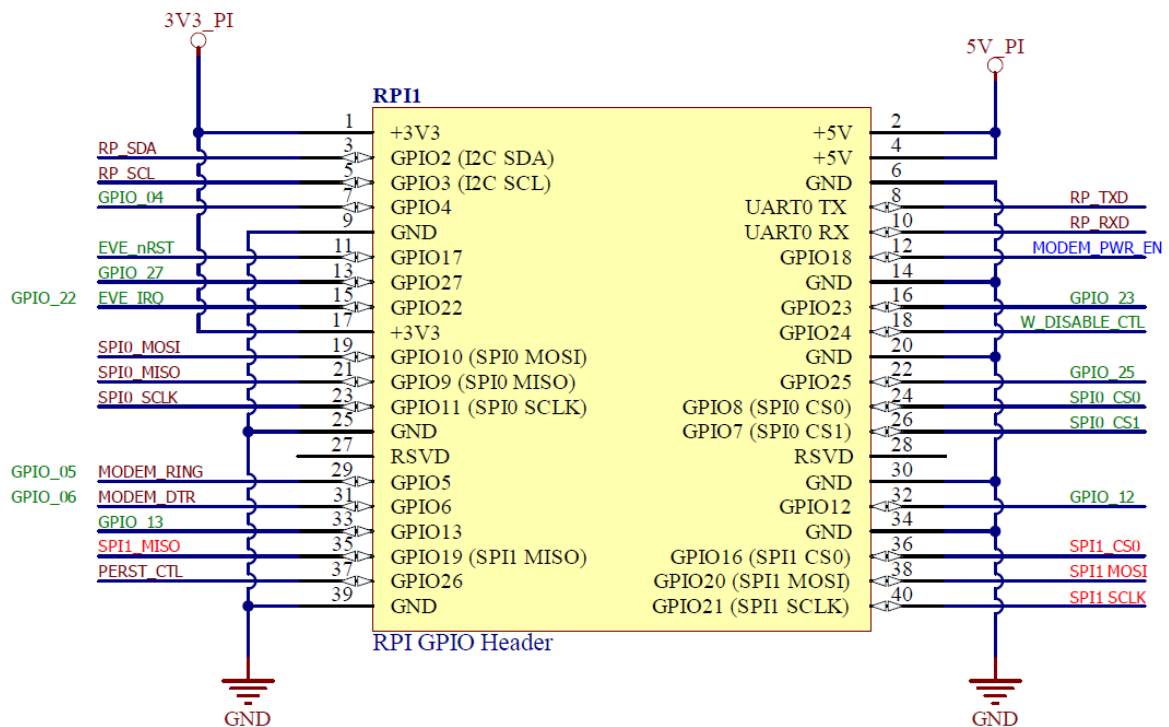- Micro USB Cable
- Power Cable for JST (10 cm)

Technical Details

Compatible mini-PCIe Modules	- Quectel - EC25 Mini PCIe 4G Module - EC21 Mini PCIe 4G Module - EC20 Mini PCIe 4G Module - UC20 Mini PCIe 3G Module - BG96 Mini PCIe NB-IoT Module - LTE-EP06 - Sierra - AirPrime MC Series - Telit - LM960, LE910V2, HE910, LE910Cx - Huawei - ME909s-120, ME909s-821, and more - Simcom - SIM7100, SIM7230, and more - ZTE - ZM8620, and more - U-Blox - MPCI-L2 Series
Compatible Embedded Boards & Systems	- Raspberry Pi 4, 3, 2, B+, A+, Zero - Asus Tinker Board - Rock 64 - Orange Pi - Samsung Eagleye board - Latte Panda - USB LTE Dongle for Windows / Linux / Embedded PC based systems

Notes: The modules' USB drivers provided by their vendors may not support with all above listed embedded computers. Kernels & Module drivers may need to be compiled in order to work with them.

Electrical Pinout

Peripherals	GPIO	Particle	Pin #			Pin #	Particle	GPIO	Peripherals
	3.3V		1	X	X	2		5V	
I2C	GPIO2	SDA	3	X	X	4		5V	
	GPIO3	SCL	5	X	X	6		GND	
Digital I/O	GPIO4	D0	7	X	X	8	TX	GPIO14	UART
	GND		9	X	X	10	RX	GPIO15	Serial 1
Digital I/O	GPIO17	D1	11	X	X	12	D9/A0	GPIO18	PWM 1
Digital I/O	GPIO27	D2	13	X	X	14		GND	
Digital I/O	GPIO22	D3	15	X	X	16	D10/A1	GPIO23	Digital I/O
	3.3V		17	X	X	18	D11/A2	GPIO24	Digital I/O
SPI	GPIO10	MOSI	19	X	X	20		GND	
	GPIO9	MISO	21	X	X	22	D12/A3	GPIO25	Digital I/O
	GPIO11	SCK	23	X	X	24	CE0	GPIO8	SPI
	GND		25	X	X	26	CE1	GPIO7	(chip enable)
DO NOT USE	ID_SD	DO NOT USE	27	X	X	28	DO NOT USE	ID_SC	DO NOT USE
Digital I/O	GPIO5	D4	29	X	X	30		GND	
Digital I/O	GPIO6	D5	31	X	X	32	D13/A4	GPIO12	Digital I/O
PWM 2	GPIO13	D6	33	X	X	34		GND	
PWM 2	GPIO19	D7	35	X	X	36	D14/A5	GPIO16	PWM 1
Digital I/O	GPIO26	D8	37	X	X	38	D15/A6	GPIO20	Digital I/O
	GND		39	X	X	40	D16/A7	GPIO21	Digital I/O

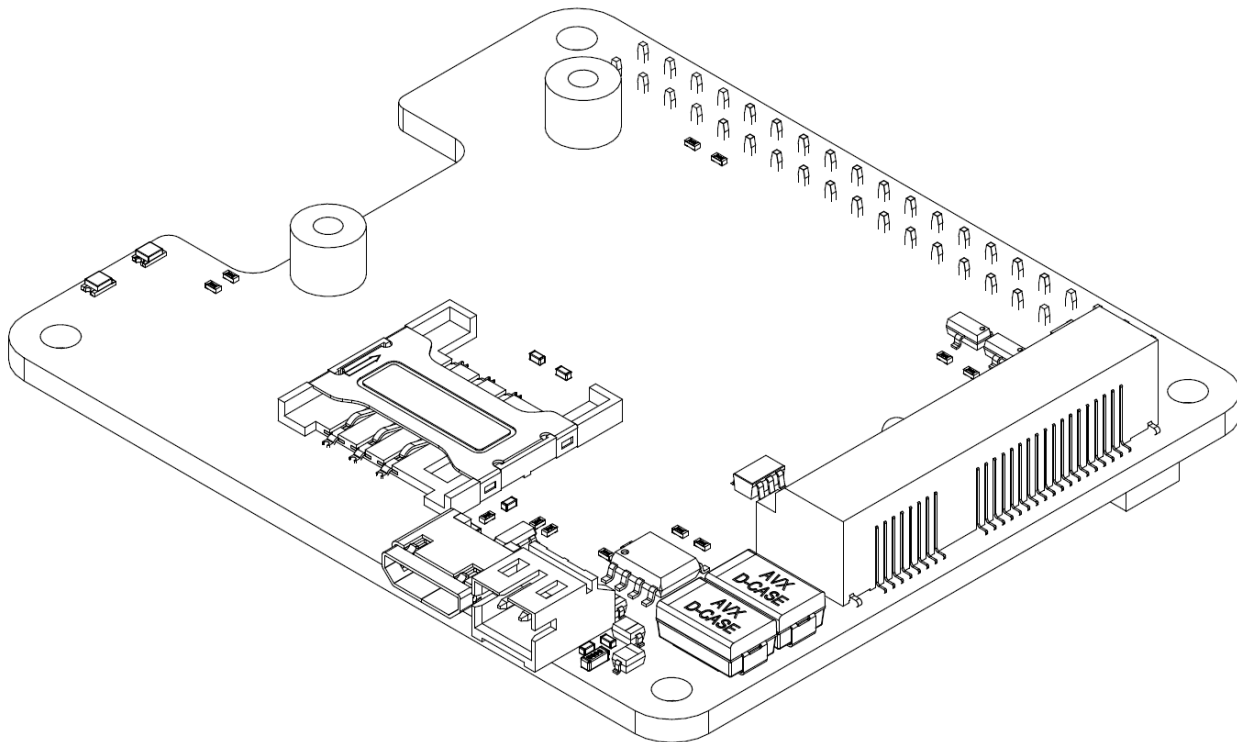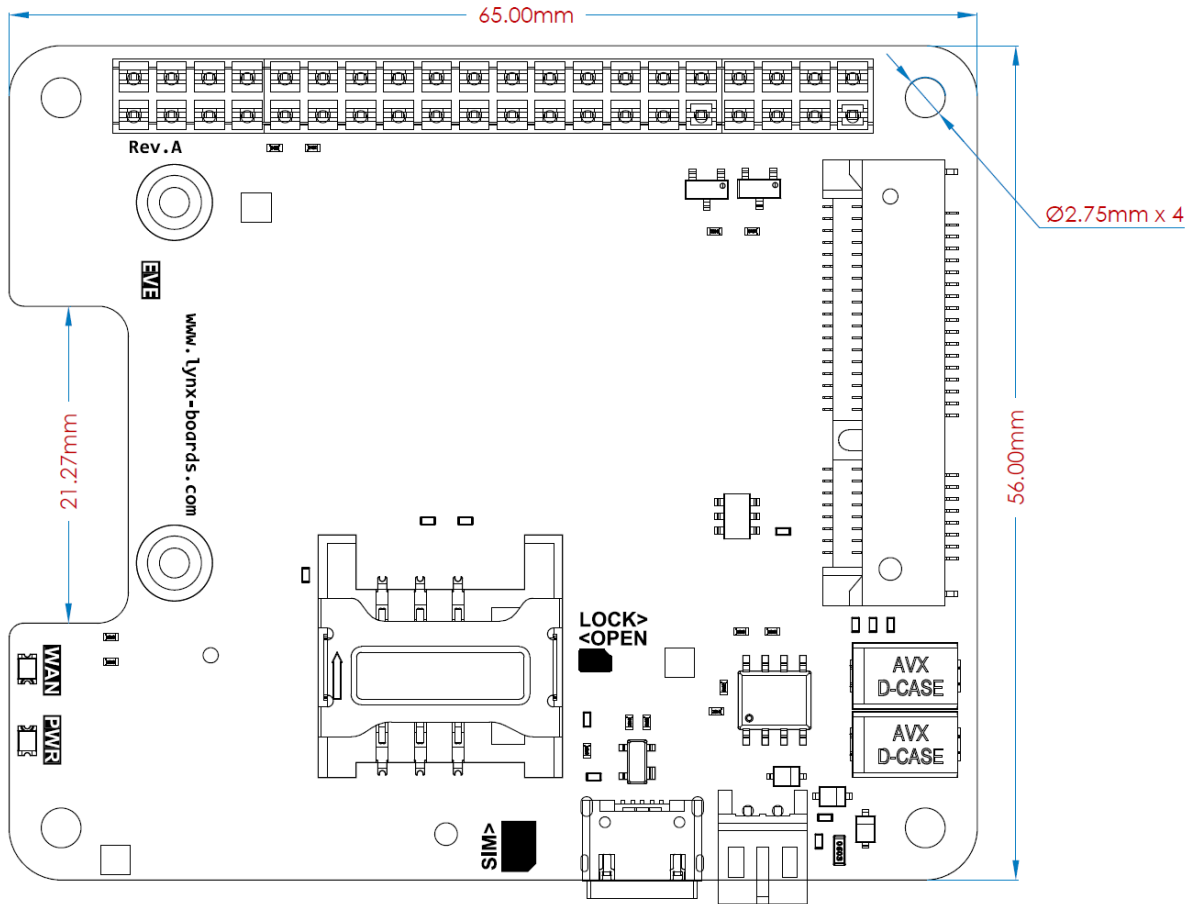*Pinout Schematic (see also entire schematic)*

Pins & Functions used by π.Lynx.LTE

RPi Pin	Function	RPi Pin	Function
UART0_TX	RPi Transmit / PCI Modem Receive	GPIO5	RING (Modem)
UART0_RX	RPi Receive / PCI Modem Transmit	GPIO6	DTR (Modem)
GPIO18	Board Power On / Off	GPIO24	Mini PCIe W_DISABLE Control
		GPIO26	Mini PCIe PERST Control

Board View & Dimensions

Annex-1: Rpi GPIO Pinout

3v3 Power	1	2	5v Power
GPIO 2 · 4 SPI3 MOSI / SDA1 · 4 SDA3	3	4	5v Power
GPIO 3 · 4 SPI3 SCLK / SCL1 · 4 SCL3	5	6	Ground
GPIO 4 · 4 SPI4 CE0 N / 4 TXD3 · 4 SDA3	7	8	TXD0 · 4 TXD1 GPIO 14 / 4 SPI5 MOSI
Ground	9	10	RXD0 · 4 RXD1 GPIO 15 / 4 SPI5 SCLK
GPIO 17 / SPI1 CE1 N	11	12	GPIO 18 / SPI1 CE0 N · 4 SPI6 CE0 N
GPIO 27 / 4 SPI6 CE1 N	13	14	Ground
GPIO 22 / 4 SDA 6	15	16	GPIO 23 / 4 SCL6
3v3 Power	17	18	GPIO 24 / 4 SPI3 CE1 N
GPIO 10 SPI0 MOSI / 4 SDA5	19	20	Ground
GPIO 9 SPI0 MISO / 4 RXD4 · 4 SCL4	21	22	GPIO 25 / 4 SPI4 CE1 N
GPIO 11 SPI0 SCLK / 4 SCL5	23	24	4 SDA4 GPIO 8 / SPI0 CE0 N · 4 TXD4
Ground	25	26	4 SCL4 GPIO 7 / SPI0 CE1 · 4 SPI4 SCLK
GPIO 0 · 4 SPI3 CE0 N / 4 TXD2 SDA0 · 4 SDA6	27	28	4 SPI3 MISO GPIO 1 / SCL0 · 4 SCL6 · 4 RXD2
GPIO 5 · 4 SPI4 MISO / 4 RXD3 · 4 SCL3	29	30	Ground
GPIO 6 · 4 SPI4 MISO / 4 SDA4	31	32	4 SDA5 GPIO 12 / 4 SPI5 CE0 N · 4 TXD5
GPIO 13 · 4 SPI5 MISO / 4 RXD5 · 4 SCL5	33	34	Ground
GPIO 19 SPI1 MISO · 4 SPI6 MISO	35	36	GPIO 16 / 4 SPI1 CE2 N
GPIO 26 / 4 SPI5 CE1 N	37	38	GPIO 20 / SPI1 MOSI · 4 SPI6 MOSI
Ground	39	40	GPIO 21 / SPI1 SCLK · 4 SPI6 SCLK

Legend:

- General Purpose Input Output
- SPI (Serial Peripheral Interface)
- I2C (Inter-Integrated Circuit)
- UART (Universal Asynchronous Receiver / Transmitter)
- Ground (GND)
- 5v Power
- 3v Power
- 2 Physical Pin Number
- 4 Pi 4 Only

Annex-2: Board Legend