

# NB-IoT Sensor Shield

AVNET<sup>®</sup> SILICA

## ARDUINO COMPATIBILITY PROVIDES ULTIMATE FLEXIBILITY

The Avnet Silica NB-IoT Sensor Shield is a Cat M1 and NB-IoT board providing Arduino pinout connectors. The Arduino compatibility provides ultimate flexibility, leveraging on a huge ecosystem of compatible boards. It enables you to choose the microcontroller board that best fits your application, like STM32 Nucleo Boards, and combine them with sensors and other peripheral boards as needed.

The NB-IoT Sensor Shield is equipped with Pmod connectors for an extended compatibility with additional boards. The shield is based on Quectel BG96, a low power module supporting Cat M1, Cat NB1 and EGPRS fallback. GNSS is also supported.

With AT commands Avnet Silica's NB-IoT Sensor Shield is easy to program and supports mbed OS for quick development and leveraging on free stacks like SSL, MQTT, COAP etc.

## FEATURES

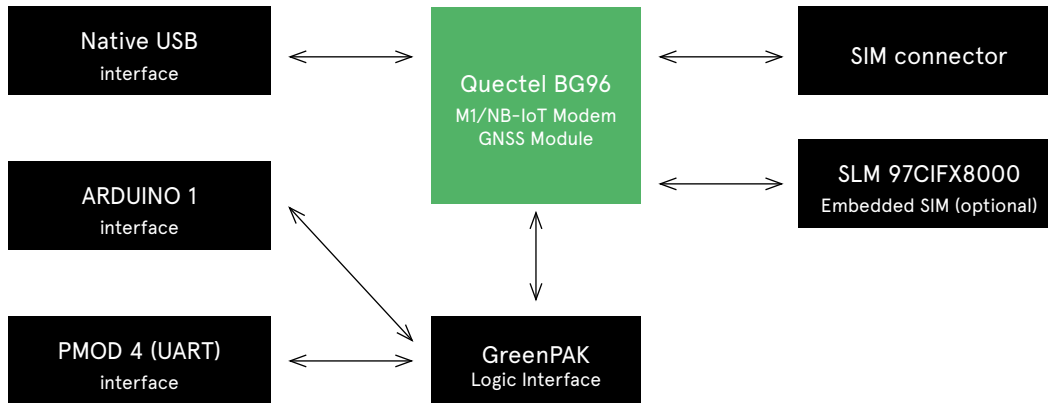
- Based on Quectel LPWA Module BG96
- Multi Modes: Cat.M1, Cat.NB1, EGPRS
- Global bands
  - Cat M1/NB1: B1 B2 B3 B4 B5 B8 B12 B13 B18 B19 B20 B26 B28 B39 (B39 for Cat M1 only)
  - EGPRS: 850/900/1800/1900 MHz
- Low Power Consumption
  - Approx. 10 uA in PSM mode
- GNSS
  - GPS, GLONASS, BeiDou/Compass, Galileo, QZSS
- Voice Over LTE support (M1 only)
  - PCM digital audio interface
- Connectors
  - Sim holder
  - Arduino pinout
  - Pmod
- Software
  - AT Commands support
  - Built in support for PPP/TCP/UDP/SSL/TLS/FTP(S)/HTTP(S)
  - Support for major operating system Android, Linux, Windows
  - Support for mbed OS for integrated embedded development
- Interface logic based on GreenPAK ( Dialog logic ) device SLG46824V



Order Code: AVSNBIOT-BG96-SHIELD-B

# NB-IoT Sensor Shield

## BLOCK DIAGRAM



## LTE COMPARISON

	Rel-8 Cat.4	Rel-11 Cat.1	Rel-13 Cat.M1	Rel-13 NB-IoT
<b>Downlink Peak Rate</b>	150Mbps	10Mbps	1Mbps	<100Kbps
<b>Uplink Peak Rate</b>	50Mbps	5Mbps	1Mbps (Full Dup.)	<100Kbps
<b>Coverage MCL (Minimum Coupling Loss)</b>	140.7dB	140.7dB	155.7dB	164dB
<b>Battery Life (200 bytes/day)</b>	<1 year	<1 year	~10 years	~10 years
<b>Number of Antennas</b>	2	2	1	1
<b>UE Receive Bandwidth</b>	20MHz	20MHz	1.4MHz	200KHz
<b>UE Transmit Power</b>	23dBm	23dBm	23dBm	23dBm
<b>Standard Readiness</b>	Now	Now	Now	Now
<b>Network Readiness</b>	Now	Now	Now *	Now *

\* Network availability depends on geographic area

## COMPARISON WITHIN LPWAN TECHNOLOGIES

	NB-IoT	CAT M1	LoRa (Semtech)	UNB (Sigfox)
<b>Spectrum</b>	LTE & 2G Bands	LTE & 2G Bands	Unlicensed 433/868MHz	Unlicensed 902MHz
<b>Modulation &amp; Demodulation</b>	pi/4 QPSK pi/2 BPSK	QPSK QAM	Chirp Spread Spectrum	FSK
<b>Uplink Data Rate</b>	< 100kbps	1Mbps	< 10kbps	< 0.1kbps
<b>Bandwidth</b>	200kHz	1.4MHz	125-500kHz	100kHz
<b>Transmit Power</b>	23dBm	23dBm	14dBm	14dBm
<b>Network</b>	Mostly S/W Upgrad	S/W Upgrad	Green Field	Green Field
<b>Terminal Price</b>	~2G Price	~2G Price	~2G Price	~2G Price
<b>Battery Life (200Byte/day)</b>	>10 years	>10 years	>10 years	>10 years
<b>MCL Coverage</b>	164dB ~15km	155.7dB ~15km	157dB ~15km	16dB EU ~12km
<b>Standard</b>	Open 3GPP	Open 3GPP	Proprietary	Proprietary

## APPLICATION MARKETS

### Industry & Agriculture

- Gas Detector
- Soil PH Tester
- Optical Sensor
- Machinery Alarm System
- Irrigation Controller
- Elevator

### Public Utilities

- Water/ Gas Metering
- Smart Parking System
- Fire Hydrant
- Smoke Alarm
- Trash Bin
- Street Lighting

### Daily Life

- Asset Tracking
- Electronics
- Person/Pet Tracking

## READY FOR mbed OS 5 - A PLATFORM OS FOR IoT DEVICES

- ARM® mbed™ is a free, open-source embedded operating system designed specifically for the “things” in the Internet of Things.
  - Enables application and component libraries to work unchanged across MCUs, hence provides portability for developers and helps to deliver network effects for contributors
- Consistent boot and C/C++ runtime across MCUs, including support across different toolchains, std library integrations
- RTOS kernel
  - Built on the established, widely used, open source CMSIS-RTOS RTX
  - Very small kernel optimised for constrained memory devices
- Common Driver APIs for all common peripherals, supported across all MCUs
- Enhanced connectivity and security stack



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