# IM51B

## 4G LTE IOT Modem for RTU32 Series

Data Sheet

40425 v1.06


BRODERSEN

simplifying systems

## INTRODUCTION

Before use of LB2 Modules, read LB2 User manual.

The Brodersen LB2 modules can be used with RTU32N & RTU32M series. The I/O modules are in two parts, bottom part containing the backplane bus, and top part containing the I/O board and logic. All LB2 I/O modules are hot plug.

The IM51B is an industrial LTE Cat M1 & Cat NB1 & EGPRS Module designed for use with the Brodersen RTU32 Series. The IM51B has a maximum data rate of 375Kbps downlink and 375Kbps uplink.

The IM51B is optimized specifically for Utility and IoT applications, with low power consumption.

Connection management and maintenance is controlled by the RTU logic to provide a wireless network connection for SCADA communications protocols like Modbus TCP, MQTT, IEC60870 or DNP3.

The communication and power interface are via the backplane connectors for the RTU32M and via the front panel USB 2.0 connectors for the RTU32N. The IM51B has a built-in SIM card slot and two external SMA antenna connectors ensure reliable communication links for both data and GPS antennas.

The IM51B has a watchdog interface for hard resetting the modem - allowing a reset to be external or issued from Logic.

## BACKPLANE PARTS

| Description | Part Nr. |
|---|---|
| BUS module for SYS-I/O, Start | BB81A |
| BUS module for SYS-I/O, Middle | BB81B |

## VERSIONS / ORDERING CODES

**Hardware basic version**

**Order code: IM51B**

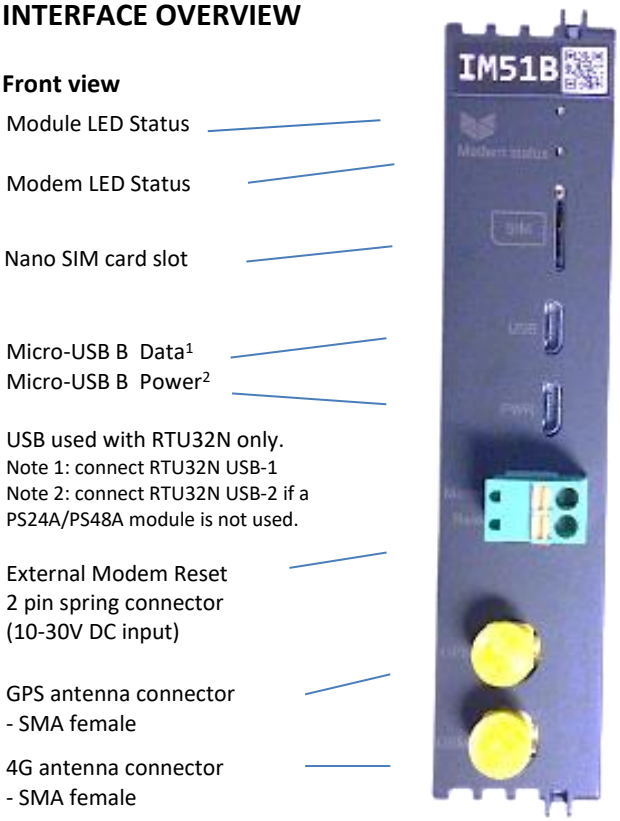
## FEATURE LIST

Benefits and features:
- Industrial terminal
- Cat M1/Cat NB1
- GPRS/EDGE
- USB 2.0 Interface for RTU32N (also power interface)
- Backplane bus for easy connection to RTU32M
- SIM card (Nano) with front access
- Watchdog control interface
- DIN rail mounting

1x 2 way 3.5mm Anytek (Phoenix MC) pluggable spring clamp connector for COM1. The conductor cross sectional area is AWG 16 (1.3mm²). The wire conductor type should be Copper and it must meet the minimum temperature criteria of 105°C.

## INTERFACE OVERVIEW

**Front view**




## TECHNICAL DESCRIPTION

**General:**
The IM51B modem is designed for working with the Brodersen RTU32 Series. Modem drivers in the RTU manage and establish connections over LTE or EDGE/GPRS to remote host/Servers. Once a connection is established, a new network connection is available for use by any of the RTU network drivers.

The modem drivers control the connection process and maintain and monitor the connection. The connection process can be configured to be automatic at power up, or it can be controlled from the RTU logic application.

The IM51B has a DC input for triggering the reset watchdog. It is provided to handle problems with



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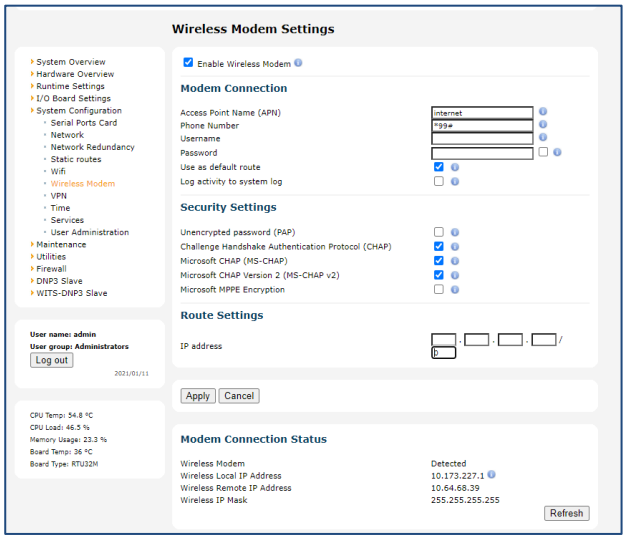
network provider systems that occasionally can lockup – where the only way out is a hardware reset (power cycle) of the modem.
The RTU32 supports a wide range of network protocols that include;
TCP/UDP/PPP/FTP/HTTP/NTP/PING/QMI/NITZ/SMTP
MQTT/CMUX/HTTPS/FTPS/SMTPS/SSL

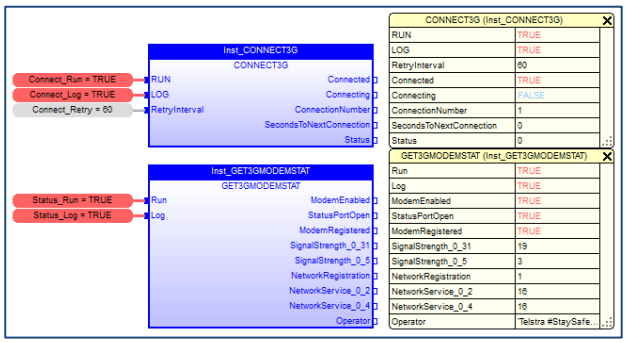
**Basic setup and configuration:**

The modem is enabled from the website configuration page under the Wireless Modem Settings menu. If enabled, the modem will establish a 4G connection automatically - with additional connection control managed by the logic application.




*Configuration Web Page - with an active connection*

The logic application has Function Blocks to manage the starting and stopping of the modem connection and to access modem diagnostic information, including registration status and signal strength.




*Logic Blocks - with an active connection*

## COMMUNICATION STANDARDS

**Frequency Bands**

| | |
|---|---|
| LTE-FDD: | B1/B2/B3/B4/B5/B7/B8/B12/B13/B18/ B19/B20/B25/B26/B28 |
| LTE-TDD: | B38/B39/B40/B41 |
| WCDMA: | B1/B2/B4/B5/B6/B8/B19 |
| GSM: | B2/B3/B5/B8 |

**Data speeds:**

**LTE:**

| | |
|---|---|
| LTE-FDD: | Max 150Mbps (DL)/Max 50Mbps (UL) |
| LTE-TDD: | Max 130Mbps (DL)/Max 30Mbps (UL) |

**UMTS:**

| | |
|---|---|
| DC-HSDPA: | Max 42Mbps (DL) |
| HSUPA: | Max 5.76Mbps (UL) |
| WCDMA: | Max 384Kbps (DL)/Max 384Kbps (UL) |

**GSM:**

| | |
|---|---|
| EDGE: | Max 296Kbps (DL)/Max 236.8Kbps (UL) |
| GPRS: | Max 107Kbps (DL)/Max 85.6Kbps (UL) |

**GPS:**

| | |
|---|---|
| GNSS: | GPS/GLONASS/BeiDou/Gallileo |

**Antenna Conn. (Data & GPS):** SMA Female.
**SIM Card:** Nano SIM card

## ELECTRICAL

**Module power supply:**

| | |
|---|---|
| Internal: | From backplane bus |
| External: | 5VDC ± 5 % |

**Module current consumption (from backplane bus)**

| | |
|---|---|
| Idle state: | 35mA @ 12V |
| Maximum: | 500mA @ 12V |

**Power Consumption @LTE Cat 4 (Typical):**

| | |
|---|---|
| Idle State: | 420mW |
| Maximum: | 6W |

**Output transmission Power:** Max. 23dBm

**Watchdog interface:**
Apply 10-60VDC to activate the watchdog.

**Separated/Safe Extra Low Voltage (SELV) limits:**

| | |
|---|---|
| VAC (RMS) | 30V |
| VAC (Peak) | 42.4V |
| VDC | 60V |

**Note:** The SELV limits relies on input supply and all connected voltages

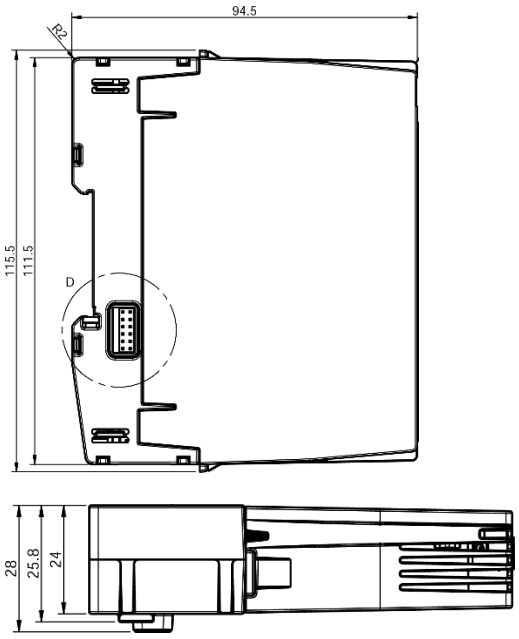
**Output power:**
Class 4 (33dBm±2dB) for GSM850

Class 4 (33dBm±2dB) for EGSM900
Class 1 (30dBm±2dB) for DCS1800
Class 1 (30dBm±2dB) for PCS1900
Class E2 (27dBm±3dB) for GSM850 8-PSK
Class E2 (27dBm±3dB) for EGSM900 8-PSK
Class E2 (26dBm±3dB) for DCS1800 8-PSK
Class E2 (26dBm±3dB) for PCS1900 8-PSK
Class 3 (24dBm+1/-3dB) for WCDMA bands
Class 3 (23dBm±2dB) for LTE-FDD bands
Class 3 (23dBm±2dB) for LTE-TDD bands

**Sensitivity:**

| | |
|---|---|
| LTE B1: | -99.5dBm (10MHz) |
| LTE B2: | -99.9dBm (10MHz) |
| LTE B3: | -99.7dBm (10MHz) |
| LTE B4: | -99.7dBm (10MHz) |
| LTE B5: | -99.9dBm (10MHz) |
| LTE B7: | -99.2dBm (10MHz) |
| LTE B8: | -99.8dBm (10MHz) |
| LTE B12: | -99.8dBm (10MHz) |
| LTE B13: | -99.5dBm (10MHz) |
| LTE B18: | -100dBm (10MHz) |
| LTE B19: | -99.9dBm (10MHz) |
| LTE B20: | -99.8dBm (10MHz) |
| LTE B25: | -100dBm(10MHz) |
| LTE B26: | -99.5dBm (10MHz) |
| LTE B28: | -99.6dBm (10MHz) |
| LTE B38: | -99dBm (10MHz) |
| LTE B39: | -99.5dBm (10MHz) |
| LTE B40: | -99.2dBm (10MHz) |
| LTE B41: | -99dBm (10MHz) |
| WCDMA B1: | -109.2dBm |
| WCDMA B2: | -110dBm |
| WCDMA B4: | -109.7dBm |
| WCDMA B5: | -110.4dBm |
| WCDMA B6: | -110.5dBm |
| WCDMA B8: | -110.5dBm |
| WCDMA B19: | -110.1dBm |
| GSM850: | -108dBmE |
| GSM900: | -108dBm |
| DCS1800: | -107.5dBm |
| PCS1900: | -107.5dBm |

## Mechanical




| | |
|---|---|
| Mounting | DIN 35 |
| Width | 24 mm |
| Height | 111.5 mm |
| Depth | 94.5 mm |
| Weight | 102 grams |

## ENVIRONMENTAL CONDITIONS

| | |
|---|---|
| Ambient operating temperature range | -25°C to +75°C |
| Ambient operating temperature range | -40°C to +85°C |
| Marked degree of protection | IP20 |
| Humidity | 0...99.8% |
| Ventilation Restrictions | No |
| Pollution degree | 2 |



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## STANDARDS

### EMC:

- **IEC 61000-6-2**: EMC - Immunity standard for industrial environments
- **IEC 61000-6-4**: EMC - Emission standard for industrial environments
- **IEC 50121-4**: Railway applications - EMC - Emission and immunity of the signalling and telecommunications apparatus

### Safety:

- **IEC 60950-1**: Safety requirements for Information technology equipment
- **IEC 61010-1**: Safety requirements for electrical equipment for measurement, control, and laboratory use

### Environmental:

- **IEC 60068-2-1**: Environmental testing - Cold
- **IEC 60068-2-2**: Environmental testing - Dry heat
- **IEC 60068-2-30**: Environmental testing - Damp heat, cyclic (12 h + 12 h cycle)
- **IEC 60068-2-78**: Environmental testing - Damp heat, steady state
- **IEC 60068-2-6**: Environmental testing - Vibration (sinusoidal)
- **IEC 60068-2-27**: Environmental testing - Shock

## MODULE LED STATUS:

A dual color (red/yellow) LED is provided on the module which indicates the module status (according to the table below):

| Status | Yellow | Red |
|---|---|---|
| Normal operating | ON | OFF |
| Module is not configured / communication error | OFF | ON |
| No module power | OFF | OFF |

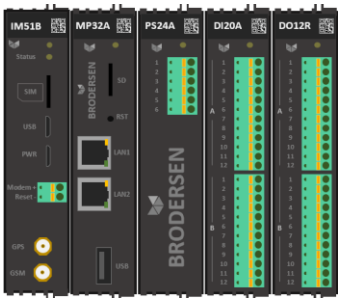
## MODEM LED STATUS:

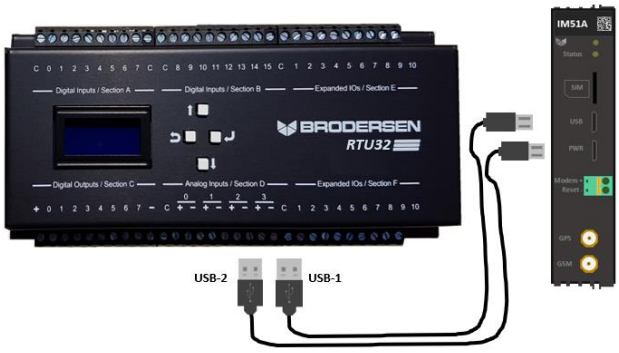
| Status | Yellow | |
|---|---|---|
| | ON | OFF |
| Steady Flash: No Telcom Connection | 2 sec | 2 sec |
| Slow Flash Off: Telcom Connected | 1.8 sec | 200 msec |
| Fast Flash Off: IP Connected | 0.8 sec | 200 msec |

## IM51B CONNECTION

The IM51B connects to the left of the RTU32M CPU module.

The IM51B can also 'stand-alone' with the RTU32N, via 2x USB connections as shown below.



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## SAFETY PRECAUTIONS

- Follow the national safety regulation (IEC 61010-1).⚠
- Only skilled person is allowed to install and operate the modules.
- Modules can only be mounted in an end-use enclosure which provides protection against fire, electrical and mechanical hazards.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.



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