IM51A

4G LTE IOT Modem for RTU32 Series

Data Sheet

40423 v1.05

BRODERSEN

simplifying systems

INTRODUCTION

Before use of LB2 Modules see 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 IM51A is an industrial LTE Cat M1 & Cat NB1 & EGPRS Module designed for use with the Brodersen RTU32 Series. The IM51A has a maximum data rate of 375Kbps downlink and 375Kbps uplink.

The IM51A 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 IM51A has a built-in SIM card slot and two external SMA antenna connectors ensure reliable communication links for both data and GPS antennas.

The IM51A 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: IM51A

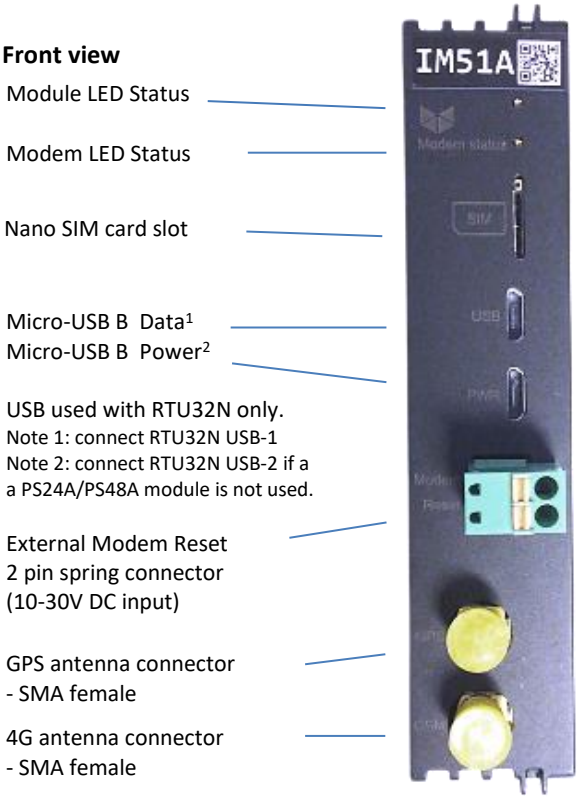
FEATURE LIST

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 IM51A 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.

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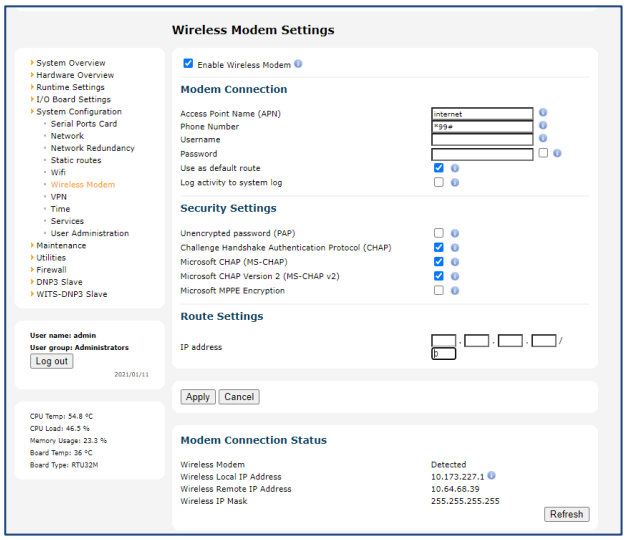
The IM51A has a DC input for triggering the reset watchdog. It is provided to handle problems with network provider systems that occasionally can lockup – where the only way out is a hardware reset (power cycle) of the modem.

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

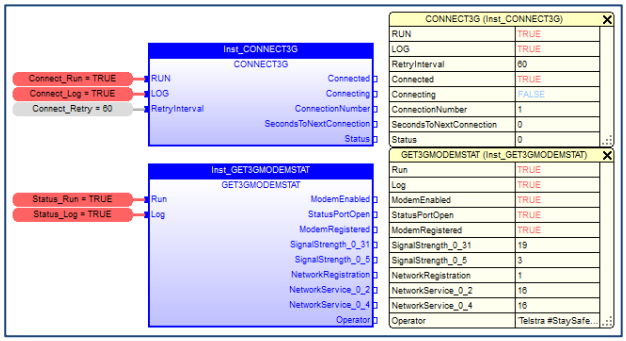
Basic Setup and Configuration:

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

Cat M1/Cat NB1:
LTE FDD: B1/B2/B3/B4/B5/B8/B12/B13/B18/ B19/B20/B26/B28
LTE TDD: B39 (For Cat M1 Only)

EGPRS:
850/900/1800/1900MHz

Data Speeds:
Cat M1: Max. 375Kbps (DL), Max. 375Kbps (UL)
Cat NB1: Max. 32Kbps (DL), Max. 70Kbps (UL)
EDGE: Max. 296Kbps (DL), Max. 236.8Kbps (UL)
GPRS: Max. 107Kbps (DL), Max. 85.6Kbps (UL)

SMS:
Point-to-point MO and MT
SMS Cell Broadcast
Text and PDU Mode

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 - Cat M1: 16mA @ 12V
- Idle state - Cat NB1: 19mA @ 12V
- Maximum - Cat M1: 330mA @ 12V
- Maximum - Cat NB1: 450mA @ 12V

Power consumption @LTE Cat M1 (Typical):
Idle State: 230mW
Maximum: 4W

Power consumption @LTE Cat NB1 (Typical):
Idle State: 190mW
Maximum: 5.4W

Output transmission Power: Max. 23dBm

Sensitivity:
-107dBm @Cat M1, 1.4MHz Bandwidth CE Mode A
-113dBm @Cat NB1, CE Level 0

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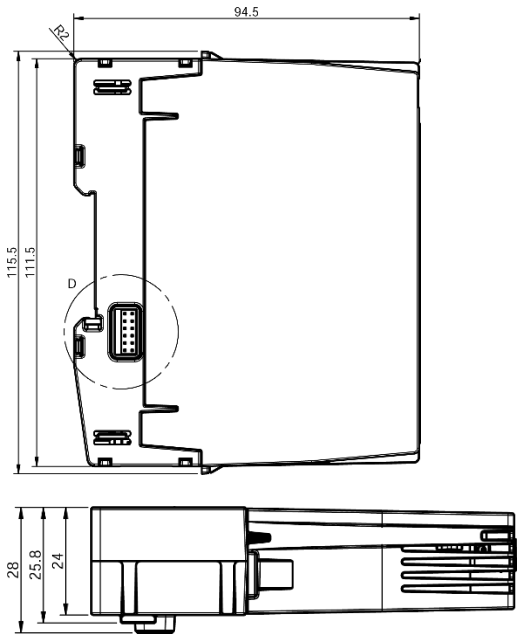
Watchdog interface:
Apply 10-60VDC to activate the watchdog.

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

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

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

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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

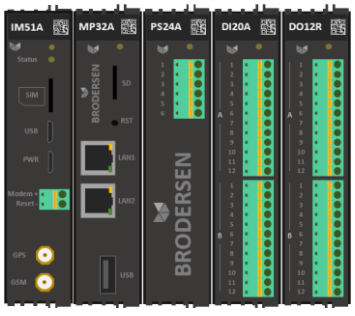
MODEM LED STATUS:

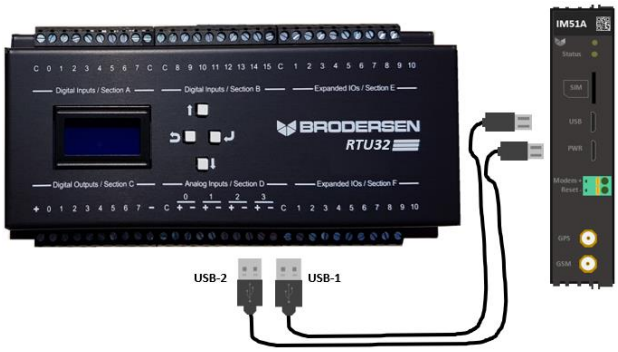
Status	Yellow	
	ON	OFF
Steady Flash: No Telcom Connection	2 sec	2 sec
Slow Flash Off: Telcom Connected	1.8 sec	200 msec
Fast Flash Off: IP Connected	0.8 sec	200 msec

IM51A CONNECTION

The IM51A connects to the left of the RTU32M CPU module.

The IM51A can also 'stand-alone' with the RTU32N, via 2x USB connections as shown below.





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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