+ ROUTERS & GATEWAYS

SmartFlex IEC 101/104 GATEWAY

LTE ROUTER WITH IEC 60870-5 PROTOCOL CONVERSION

PRODUCT FEATURES

- One-Box, cost effective solution for Energy Applications
- IEC 60870 - 101/104 protocol conversion
- Up to 3x IEC 101 devices can be connected to one gateway
- Ethernet, Serial RS232, RS485, USB connectivity
- Exceptionally resilient wireless and wired connection for 24/7 operating energy applications
- Enhanced memory
- Loaded with advanced features to secure your data
- VPN Tunnels and advanced routing features
- Sleep mode
- DIN rail mounting

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+ SmartFlex IEC 101/104 GATEWAY

4G LTE ROUTER WITH IMPLEMENTED BIDIRECTIONAL IEC 101/104 PROTOCOL CONVERSION

Industry: Power and Energy Automation Applications
Product: SmartFlex LTE Router

+ THE CHALLENGE

To connect any number of substations using IEC 60870-5 communication protocol, with one or more master control rooms, in the most effective way. This is a significant challenge for many energy companies, and one that we can solve easily, with the SmartFlex Gateway IEC 101/104.
The most effective solution, from the perspectives of communication, safety and cost, is to connect substations with control rooms via TCP/IP and Ethernet with IEC 870-5-104 protocol, which allows the service of several devices and operations at the same time, delivering a large reduction in cost compared to the use of costly leased serial lines on the LAN side of a substation to connect RTU's using IEC 870-5-101 protocol.

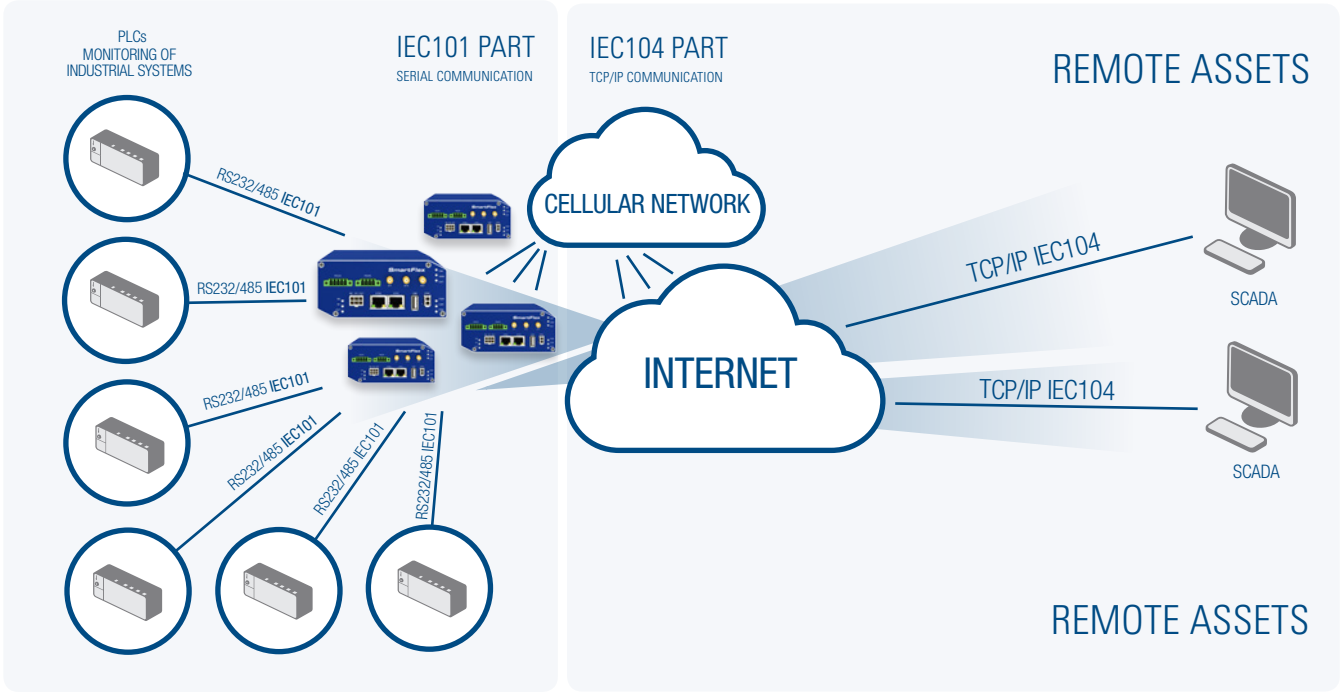
The SmartFlex IEC101/104 gateway offers 24/7 operational remote management and diagnostic features for substations with the possibility to secure data with VPN Tunnels, and advanced networking features including IP tables and Firewalls. Wireless fallback, allowing the use of two independent mobile carriers reduces the number of required service journeys to the substations.

+ THE SOLUTION

The SmartFlex IEC101/104 gateway enables fast and cost efficient coupling between control stations and SCADA system using the IEC 60870-5-101 and IEC 60870-5-104 communication standards, while profiting from the extensive compatibility of the protocols at the application level. See schematic diagram below.

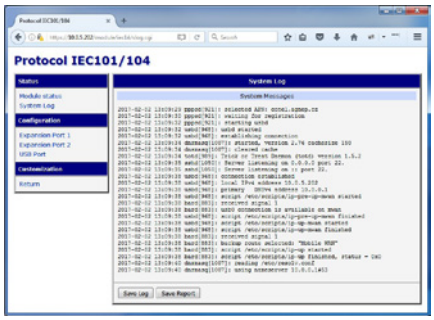
The SmartFlex IEC101/104 gateway provides a bidirectional conversion between IEC101 and IEC104 protocols, as specified by the IEC 60870-5 standard. IEC101 serial communication is converted to the IEC104 TCP/IP communication and vice versa. It is possible to configure some parameters of IEC101 and IEC104 via the web interface of the router.

The parameters of serial communication and the parameters of the IEC101 protocol can be set separately for each serial port of the router. If a network is using both serial ports of the router, there will be two instances of the user module running and two independent IEC101/104 conversions can be done. Only the TCP Port parameter can be configured in the case of IEC104. This is the port the TCP server listens for when conversion is activated. The remote IEC104 application has to communicate through this port. In the case of IEC101, the data is sent as soon as it arrives. When no data arrives, the IEC101 side asks periodically for the data according to how the Data polling time parameter is configured.



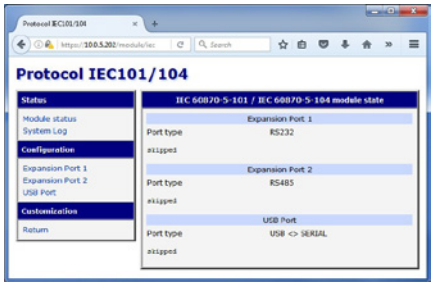
+ IEC ASDU

The IEC101 protocol (IEC 60870-5-101) defines an Application Service Data Unit (ASDU). In the ASDU there is an ASDU identifier (with the type of ASDU in it) and information objects. When converting from IEC104 to IEC101 all ASDU types defined in the IEC101 standard, in the compatible 1–127 range of ASDU types are converted accordingly. Proprietary types of ASDU, in the private range of 127–255 are not converted. In addition to standard IEC101 ASDUs some ASDUs defined in IEC104 only are converted. These are ASDUs with a time tag. The numbers of unknown ASDUs are logged and displayed on the status page.



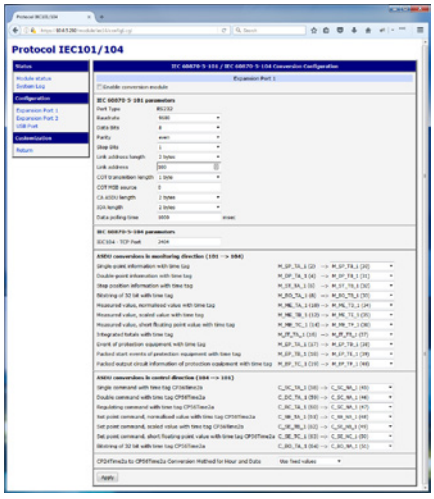
+ IEC CONFIGURATION

The configuration settings of the IEC protocol are accessible through the gateway's web interface. The Status section displays the Module status page with continuously running communication information, and the System Log page with the messages logged. The Configuration of both serial ports of the router and IEC101/104 parameters are accessible in the Configuration section - Expansion Port1, Expansion Port 2 and USB port. Each port has it's own conversion configuration.



+ IEC CONVERSION CONFIGURATION

The configuration settings of the IEC101 and IEC104 parameters are accessible in the Expansion Port 1, Expansion Port 2 and USB port items. Two separate IEC101/104 conversions are possible, individual for each serial port of the router. The parameters for each expansion port are the same. Enable the conversion for the proper expansion port by ticking the Enable conversion module checkbox up on the page. There are two parts of the configuration form – for both the IEC101 parameters and the IEC104 parameters.

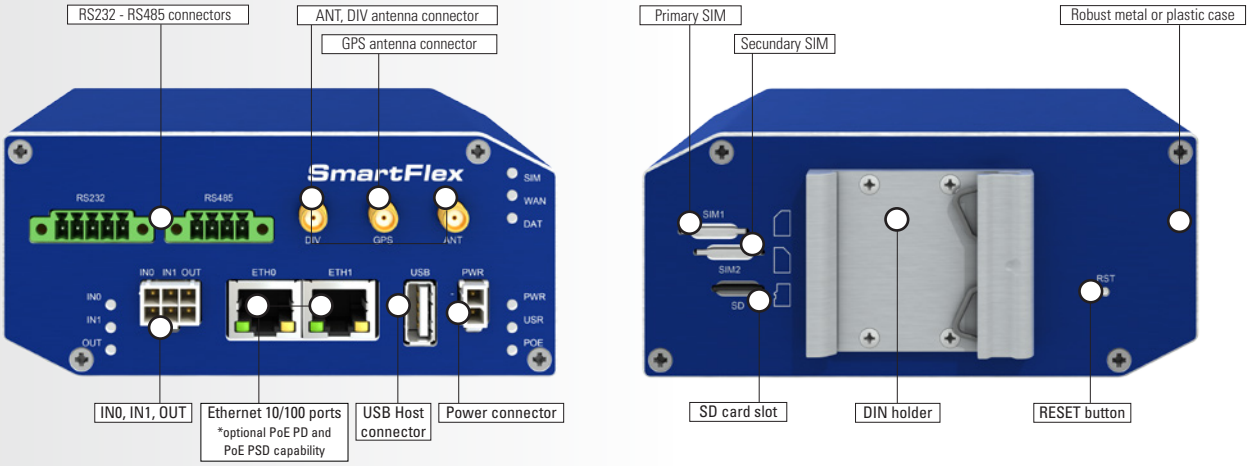


+ IEC101 PARAMETERS

In the Port Type section, the type of Expansion Ports detected in the router are displayed. The parameters on top are for the serial line communication. These parameters have to be configured according to the IEC101 telemetry used in the system. The other IEC101 parameters are static.

+ IEC104 PARAMETERS

The IEC104 TCP Port is the port that the TCP server is listening to. The TCP server is running in the router when IEC101/104 conversion is enabled. The 2404 prepared value is the official IEC104 TCP port reserved for this service. In the Expansion Port 2 configuration there is the 2405 value prepared (not reserved by the standard). The other IEC104 parameters are static and cannot be changed.



+ THE HARDWARE:

Power, Consumption, Environmental, IP cover	
Power supply	10 – 60 VDC (2–Way Molex connector)
Power consumption – Idle / Average / Peak / Sleep Mode	2.5 W / 4W / 11 W / 10 mW
Temperature range – Operating / Storage	-40 to +75 °C / -40 to +85 °C
Temperature range LTE450 – Operating / Storage	-20 to +60 °C / -40 to +85 °C
Humidity – Operating / Storage (non condensing)	0 to 95 % / 0 to 95 %
Cold Start	-35 °C
Operating Altitude	2000 m / 70 kPa
Ingress Protection Rating	IP30

Industry Certifications & Approvals	
Radio for general LTE	ETSI EN 301 511 v9.0.2, ETSI EN 301 908–1 v5.2.1, ETSI EN 301 908-2 v5.2.1, ETSI EN 301 908-13 v5.2.1
Radio for LTE450	ETSI EN 301 908-1 v6.2.1, ETSI EN 301 908-13 v6.2.1, ETSI EN 301 489-24 v1.5.1
Emissions/ Immunity	IEC 61000-6-2:2005, ETSI EN 301 489-1 v1.9.2, EN 55022:2010
Safety	EN 60950-1:06 ed.2 (non Hazardous Locations), EN 62311:2008
Vehicle	E8
Environmental	RoHS, RoHS2, REACH, WEEE
Approvals	PTCRB, R&TTE, CE, FCC, IC, UL, C1D2 / ATEX Carrier Approval: AT&T, Verizon

Ports, LED, Antennas	
2x ETH ports	RJ45, 10/100 Mbps
1x RS232, 1x RS485, USB	5pin terminal block, 4pin terminal block connectors, USB 2.0 Host connector
SIM	2 Mini SIMs (2FF) (rear panel)
LED Indicators	PWR, DAT, WAN, ETH, SIM, USR, POE, IN0, IN1, OUT
3x ANT - ANT, DIV, GPS	SMA connectors
WiFi antenna - *optional	R-SMA connector
USB	USB Host connector 2.0
I/O	6-Way Molex connector – 2x binary input, 1x binary output
SD Card	1x Micro SD Card slot (rear panel)
RST	RESET button (rear panel)

+ ORDER CODES

Region	Order code
EMEA	SR30300320 with uploaded IEC 101-104 plugin (User module) from www.bb-smartcellular.eu/ Support & Downloads
NAM	SR30500320 with uploaded IEC 101-104 plugin (User module) from www.bb-smartcellular.eu/ Support & Downloads
LATAM / APAC	SR30600320 with uploaded IEC 101-104 plugin (User module) from www.bb-smartcellular.eu/ Support & Downloads
LTE450	SR30700320 with uploaded IEC 101-104 plugin (User module) from www.bb-smartcellular.eu/ Support & Downloads

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