

SG101C Smart Modem

The most innovative industrial GPRS/3G modem with cutting-edge data routing, acquisition, logging, alarm monitoring and a wide range of external interfaces.

System Overview:

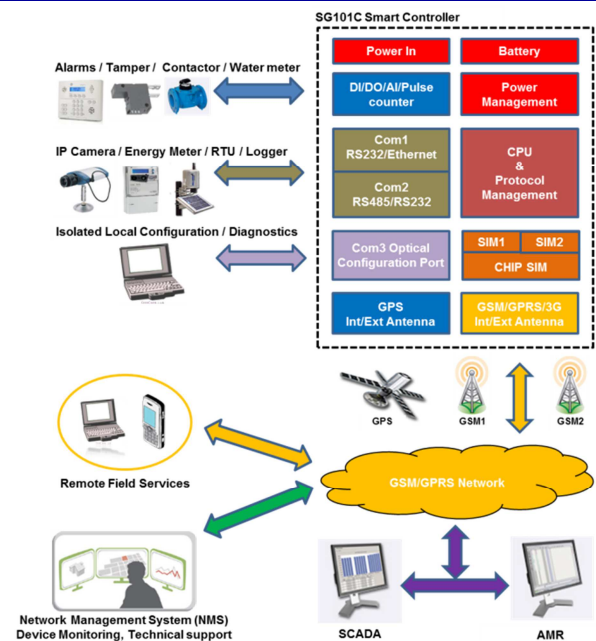
The SG101C is a rugged industrial modem and micro RTU, built on a flexible hardware and software platform. Selectable build options make the SG101C a cost effective solution compared to other modems with the benefit of advanced features when the requirement justifies the expense.

The enterprise Network Management System (NMS) provides the user with the tools and data to manage a large install base of modems. It reduces unnecessary site visits, resulting in major cost savings, higher-performance and increased efficiency.

This turnkey solution is designed for African conditions and network topology with local technical support up to design level. It complies with international IEC specifications and is approved by the local regulatory authority.



- ✓ GPRS/3G dual SIM network redundancy and internal and/or external antennas
- ✓ CHIP SIM preventing SIM theft & fraud
- ✓ GPS with accurate location and time stamped data logging
- ✓ RS232 or Ethernet on port 1
RS232 or RS485 on port 2
- ✓ Digital inputs/outputs and pulse counter with Micro RTU reporting via DNP3.0
- ✓ Ultra low power consumption. Can be powered directly from the meter/RTU
- ✓ Battery backup and power failure alert. Wide supply voltage range of 6Vdc-32Vdc
- ✓ Miniature size to fit inside meter/RTU
- ✓ Remote configuration and over the air application update



- ✓ Management Software for device monitoring with local support
- ✓ Remote application and settings update
- ✓ Scheduled upload of modem status information
- ✓ Powerful reporting and analysis capability for asset optimisation
- ✓ Network and communication management tools for reliable operation and reporting
- ✓ Turnkey solution designed for African conditions and network topology
- ✓ Local technical support up to design level and customisation of software
- ✓ Lowest total cost of ownership with GPRS data package and support software
- ✓ ICASA and Mobile Network approved

Design Features:

The SG101C was developed on a flexible hardware and software platform. There is a wide range of functional requirements in diverse remote communication applications. The SG101C flexible platform ensures that these requirements can be achieved without sacrificing cost, size or power consumption. Hardware selections are made during the project or order process stage when the user knows which functional blocks are required. Features like the number of serial ports, Ethernet, GPS, RF(future), GPRS or 3G are built options but can also be changed at a later stage, when the modem is re-deployed at another application. The functions such as RTU protocols, RS232/RS485 port selection, DIO points, actions based on events and security settings, are software configurable. These settings can be changed remotely through the Device Management System so that you never have to visit the site. The Device Management System keeps historical configuration records of individual modems and allows you to group and tag multiple modems for bulk updates. You always know the configuration settings and software versions that are deployed on your devices.

Due to its small form factor, the SG101C can be integrated directly into the end application enclosure. After the meter/enclosure is sealed the tamper switch can be activated to provide an alarm should the meter/enclosure be tampered with. The SG101C is a SIM-Less modem where a chip is soldered onto the PCB and cannot be used in mobile phones, preventing the problems associated with the theft and abuse of traditional plastic SIM cards. Dual network connectivity with advanced network failover algorithms ensures exceptional communication reliability.

External interfaces to most equipment are supported with one standard RS232 port and a second RS232/RS485 port that is software selectable. The Ethernet port is a hardware option in place of the one RS232 port. In this configuration there are will be one Ethernet port and a one RS232/RS485 port. Discreet inputs and outputs are provided and software selectable to be DI or DO.

All Configuration parameters, status indications and diagnostic information can be accessed via TCP, SMS or the local optical serial port. Installation is further simplified with a LED display panel to indicate GSM/GPRS connectivity, RX and TX data transfer, I/O status and power supply.

The remote over the air (OTA) application update function, combined with powerful processing capability, makes the SG101C Smart Modem future proof ensuring that the product functionality can grow with the customer's infrastructure requirements.

To reduce costs and complexity for the utility, a 5 year cellular plan and GPRS/3G private network bundle is available. All functions from network design, operation, monitoring and management to SIM activation, administration, fraud prevention and data costs are included as a service.

The screenshot displays the 'Device Show' interface. The left sidebar shows a 'General' tab with the following details:

- Operational: !
- Serial Number: 12121294
- Serial Number: 002E00203331470039303633
- Device Description: 12121294
- IMEI: 359193032488140
- Primary Tg: ESKNR Rollout Phase1
- Device Tg: IO4_temp
- Active MSISDN: 27828570089
- Device Type: SG001
- HW Version: unknown
- FW Version: 000074
- OS Version: 000
- Config CRC: 772f
- Active IP: 10.254.133.75
- Booster:

The main content area shows a 'Device Show' page with a map, a table of configuration parameters, and a 'GPS' section with a bar chart showing signal strength for GSM, GPRS, and 3G networks.

Below this is the 'Support Studio' interface, which includes:

- 1. A navigation menu on the left.
- 2. A table of device status with columns for Device Number, Description, MSISDN, IP, Activation, Status, Signal %, Last Signal, and Link Status.
- 3. A line graph showing signal strength over time, with a date range from Wed 30 Oct 2013 00:00 to Wed 30 Oct 2013 23:59.

Web based Device Management Software and Monitoring

SG101C Smart Modem Technical Specifications

Item	Description
Communication	
Communication network	GSM/GPRS/3G/HSPA penta band Dual SIM's for network redundancy High sensitivity GPS 1.575 GHz with internal and external antenna (built-option)
Security	CHIP SIM for theft prevention. Individual SIM PIN algorithm per modem Multiple security levels and firewall preventing unauthorized access.
Protocol	Transparent serial port for pass through XML and SMS to Device Management Software Application DNP3.0 Level 2 to SCADA Additional protocols can be implemented on request.
Visual indications	
Communication network	Tri-color (Red/Yellow/Green) GSM signal strength, network activity, TCP link status, TX/RX of IP connection, GPS activity and lock
External communication	RS232 TX/RX per port indication Ethernet activity / link indication
Device health	Power supply health, battery status, inputs/outputs status
External interfaces	
Communication network	GSM/GPRS/3G antenna connector SMA GPS antenna connector MMCX
External communication	1 x RS232 full port TX, RX, CTS, RTS, DCD, GND 1 x RS232 TX, RX, GND 1 x RS485 2-wire A/B Ethernet 10/100 Base-T, (built-option in place of the full RS232 port) Industry standard IEC 62056-21 optical serial port for local configuration
Discreet inputs/outputs	Max of 4 I/O ports software selectable to: Digital Inputs Digital Outputs Analog Inputs
Power and Mechanical	
Power source	Powered from the application e.g meter auxiliary supply of 10Vdc, 100mA External DC voltage supply of 6Vdc to 32Vdc
Power backup capacity	Rechargeable battery with 3-4 hours full communication capacity 30 days in low power mode, monitoring inputs with periodic health check 10 years in low power mode with external battery pack and support for DNP3 to SCADA
Wiring interface	Screw terminals for DIO and power, RJ45 for Serial/Ethernet
Dimensions	Height: 90mm, Depth: 19mm, Width: 64mm
Housing	Polycarbonate certified for the specified operating environment. IP51 against water and dust up to IP54 with optional terminal cover.
Mounting	DIN rail, back or side mount 2 x screw holes for panel mount
Environmental	
Temperature ranges	Operating: - 25°C to +65°C ambient, Storage: - 40°C to +85°C
Humidity range	0 % to 95 % non-condensing
Certification	
Protocol	DNP3.0 certified stack tested to Subset Level 2
EMC	ETSI EN 301 489-1 : EMC and Radio spectrum Matters (ERM) EN 55022/SANS 222/CISPR22 : Radiated Emission SANS/IEC 61000-4-2 : Electrostatic discharge immunity SANS/IEC 61000-4-3 : Radiated immunity SANS/IEC 61000-4-6 : Immunity to conducted disturbances
Regulatory	ICASA, MTN, Vodacom
Quality System	ISO9001:2008 Design and production facility