Connect Effortlessly to Serial Devices over Cellular Networks

Quad-band GSM/GPRS/EDGE 850/900/1800/1900 MHz

Versatile operation modes, including TCP Server/Client, UDP, Real COM and RFC2217

Choice of configuration methods, including web console, serial console, and Telnet

2 digital inputs and 1 relay output

Redundant DC power input

DIN-Rail

OnCell G3100 Series industrial cellular IP modems

For over twenty years, industrial systems integrators have relied on Moxa products in major device networking installations all over the world. Moxa offers industrial-grade solutions backed by an excellent warranty and highly-specialized technical support for a diverse range of applications, including connecting PLCs to a wireless control network, transmitting temperature signals over long distances, and automating device control and monitoring at remote locations.
Evolution of Cellular Technologies

CDMA, GSM and GPRS are the cellular communication standards that have been adopted by different carriers around the world. Although there are many proprietary and regional differences, two competing sets of standards dominate the worldwide market: GSM/GPRS and CDMA.

GSM standards are based on GSM (Global System for Mobile Communication), the most widely used 2G cellular technology worldwide. With GSM, all subscriber and wireless provider information is stored on an interchangeable module known as SIM (Subscriber Identification Module) cards. By swapping out the SIM card, users can effortlessly interchange phones or providers.

CDMA standards are based on CDMA (Code Division Multiple Access), a cellular standard popular in North America. The term "CDMA" (Code Division Multiple Access) refers to both a spread spectrum technique and a cellular standard popular in North America (The standard is more clearly referred to as cdmaOne or IS-95) CDMA networks boast greater range and clarity than GSM, and the subscriber information is programmed directly into the phone rather than on a SIM card.

GPRS (General Packet Radio Service) is the 2.5G extension for GSM networks. GPRS was further developed for even better performance, with Enhanced Data rates for GSM Evolution (EDGE). Although this technology is not directly compatible with GSM, the standard is implemented so that devices switch seamlessly between UMTS and GSM as needed.

Benefits of Industrial Cellular Wireless Technology

In the consumer and commercial industries, cellular technologies have enjoyed unprecedented success. The key component of the success is that cellular technologies offer a convenient communication method and connectivity by carrier. The success of cellular technologies has led to them being adopted in the industrial environmental fields. Cellular technology provides today’s machine-to-machine communications with quick, easy, secure and seamless connectivity to cellular networks.

The use of cellular technology for industrial applications is on the rise. Cellular technology business offers a number of key benefits to business.

- **Mobility and Increased Efficiency**
  Adding mobility to your operation, and improving your ability to connect to remote access devices can lead to increased efficiency.

- **Wide Transmission Range**
  Cellular technology allows you to connect to devices from a wider range of locations. You can send and receive information at any time without any limitation.

- **Better Security**
  Since cellular providers use heavily restricted and well-defined bands for their networks, cellular signals are considered very secure and not vulnerable to eavesdropping or signal interception.

- **Cost Effective**
  In a factory setting, for example, using a cellular modem for monitoring and not vulnerable to eavesdropping or signal interception.

- **Cellular Solutions from Moxa**
  Moxa offers advanced cellular solutions to connect intelligent or non-intelligent devices to GSM/GPRS networks.

- **OnCell G2150I, G2110, and G2110-T cellular modems**
  The OnCell G2150I series of cellular IP modems are designed to transmit data and short messages (SMS) over GSM/GPRS mobile networks. The modems can help increase the efficiency of maintenance and communication of remote devices, independent of operating skill.

- **OnCell G3110 and G3150 cellular IP modems**
  The OnCell G3100 series of cellular IP modems are designed to connect intelligent or non-intelligent devices to GSM/GPRS/EDGE cellular networks. Each modem comes pre-installed with the TCP/IP protocol suite to exchange data between the serial device and cellular TCP/IP network. They also feature a number of operation modes for easy integration into your applications without significant change to your software. Supported operation modes include TCP server, TCP client, Real COM, and Reverse Real COM.

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**Wireless Interface**

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- Wide Transmission Range
- Better Security
- Cost Effective

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Intelligence, Reliability, Ruggedness
OnCell G3100 Series IP Modems

Ethernet Modem Mode
Connecting a properly configured OnCell G3100 port to the MS-DOS computer’s serial port allows you to use legacy software to transmit data over the cellular network, even though the software was originally designed to transmit data over a modem. This is accomplished by converting dialed AT commands into IP format.

Reverse Real COM Mode
When the connection between the host and your serial device is disconnected because of a frequently changing private IP address “Reverse Real COM mode,” can be used to establish a transparent connection from the serial device to the host side. This is achieved by mapping the serial port to a local COM port on the host computer.

Flexible Connection Modes
The OnCell G3100 IP modem provides three types of connection modes for GSM/GPRS/EDGE: Always ON, Inactivity Timeout and Remote Host Recovered. This provides users with greater versatility, and helps to reduce the total operational cost.

Standard TCP/IP Architecture
There are three modes that are supported: TCP Server, TCP Client, and UDP Whichever mode is used, once a connection is established, the two sides of the connection can both send and receive data.

I/O Function
The OnCell G3100 IP modem has 2 digital inputs and 1 relay output built in. When the Ethernet network or power source gets disconnected, the OnCell G3100 IP modems can send out warnings by e-mail, SNMP trap, or SMS to system administrators to allow prompt reaction to emergency situations.

Typical Applications
Cellular Technology for Monitoring Remote Utilities
Productivity and profitability are key challenges for utilities. At many locations, the wiring for remote managing equipment can be expensive and difficult to install. Deployment time and overall cost are often important considerations.

Moxa offers a solution using cellular technology: an industrial-grade IP modem with dual power inputs and relay outputs. It can establish secure TCP/IP connection to your remote sites and devices, and can alert you if either one of the power inputs fail. This kind of approach has low recurring costs, because you only need to pay for data actually sent over the wireless connection. In fact, using a cellular IP modem may be less expensive than using traditional landlines.

The OnCell G3100 IP modem transfers data using high-speed GSM/GPRS/EDGE technologies. With cellular IP modems, utility companies can connect remote assets in a Wireless WAN (WWAN), for real-time two-way communication with RTUs, meters, FTUs, and other types of equipment. This is important for utilities with remote assets scattered over a broad area. GSM/GPRS/EDGE is an effective technology for providing excellent coverage in both metropolitan and rural areas.

Benefits
Cost
Moxa’s IP modem supports high-speed GPRS, which can be used to establish a reliable, always-on connection. Since users are charged by the amount of data that is transmitted, this solution can result in lower monthly charges for remote applications that are not data-intensive.

Security
Moxa’s IP modem builds a secure TCP/IP connection using advanced data encryption and authentication technologies. Users can easily set up the connection without modifying the existing software applications on the control side.

Industrial Grade
Moxa’s IP modem has special design features such as dual power inputs and relay outputs, for industrial applications that require high reliability.

Coverage
Quad band GSM/GPRS/EDGE is the standard and allows for excellent coverage in metro areas and rural areas. This is easy for remote utilities to deploy in any locations, as long as they receive cellular service.
Building Automation - Alarm System

Companies around the world utilize alarm systems to do building security management. Many of these systems were implemented before cellular networks were commonplace. They relied on a serial connection to a dial-up telephone line to send data to a control center. Now, companies rely more and more on cellular networks to manage real-time security data. Because many analog phone lines are too cumbersome for many customers to install, cellular technology is an appealing solution.

An alarm system manufacturer wanted to find an easy way to add network connectivity to its products, without going through a complete re-design. They found that a serial-to-cellular product can provide a better location. Moxa’s IP modem is a fully customizable cellular IP modem that features high speed wireless GSM/GPRS/EDGE technologies for easy implementation in any location. The IP modem is easily installed in minutes, through its web configuration feature or its included search utility. Since encryption is an important consideration when using cellular technology, the IP modem also has a secure operation mode for use with any application.

Benefits
Location
IP modems provide an excellent level of coverage, and can be conveniently implemented at almost any site.

Installation
Moxa is an expert at value-added software for industrial communication devices. The IP modem can be installed in minutes using versatile configuration options, including a web interface, serial connection, or Telnet console.

Encryption
Encryption is the most important security consideration when adopting cellular technology for industrial applications. The IP modem not only provides a secure operation mode, but also an authentication function.

Specifications & Ordering Information

Product Specifications

LAN Interface
- Ethernet: 10/100 Mbps, RJ45 connector
- Protection: Built-in 1.5 KV magnetic isolation

Cellular Interface
- Standard Compliance: GSM/GPRS/EDGE
- Band Selection: Quad-band 850/900 MHz, and 1800/1900 MHz
- Tx Power: 1 watt GSM 1800/1900, 2 watt EGSM 850/900
- GPRS Multi-slot class: Class 12
- GPRS Terminal Device Class: Class B
- GPRS Coding Schemes: CS1 to CS4
- SIM Control: 3V

Serial Interface
- No.of Ports: 1
- ESD Protection: 15 KV
- Power EFT/Surge Protection: 2 KV
- Serial Standards:
  - G3100: RS-232 (DB9 male connector)
  - G3150: RS-232 (DB9 male connector), RS-422/485 (5-pin terminal block connector)

Serial Communication Parameters
- Parity: None, Even, Odd, Space, Mark
- Data Bits: 5, 6, 7, 8
- Stop Bit(s): 1, 1.5, 2 (when parity = None)
- Flow Control: RTS/CTS, XON/XOFF
- Speed: 50 bps to 921.6 Kbps

Serial Signals
- RS-232: TX, RX, RTS, CTS, DTR, DSR, DCD, GND
- RS-422: Tx+, Tx-, Rx+, Rx-, GND
- RS-485-4w: Tx+, Tx-, Rx+, Rx-, GND
- RS-485-2w: Data+, Data-, GND

I/O Interface
- Alarm Contact:
  - 1 relay output with current carrying capacity of 1A@24 VDC
- Digital Input:
  - 2 inputs electrically isolated from the electronics

Power Requirements
- Input Voltage: 12 to 48 VDC
- Data Link: 585 to 1185 mA (peak) @ 12 V

Environment Limits
- Operating temperature: -30 to 55°C (-22 to 131°F), 5 to 95% RH
- Storage temperature: -40 to 75°C (-40 to 167°F)

Regulatory Approvals
- EMC: CEE Class A, FCC Class A, UL

Warranty Period
- 5 years

Ordering Information

Available Models
- OnCell G3110:
  - 1-port RS-232 to GSM/GPRS/EDGE IP Modem
- OnCell G3150:
  - 1 port RS-232/422/485 to GSM/GPRS/EDGE IP Modem

Quad-band Antennas (impedance= 50 ohms):
- ANT-CGB-D-0-3m:
  - Omnn 0dB/10cm, magnetic SMA antenna, 3m
- ANT-CGB-D-3-3m:
  - Omnn 3dBi/25cm, magnetic SMA antenna, 3m
- ANT-CGB-D-6-3m:
  - Omnn 5dBi/37cm, magnetic SMA antenna, 3m

Package Checklist
- OnCell G3100 IP Modem
- Rubber SMA antenna
- DIN-Rail kit
- 5-Pin Terminal Block (screw type)
- 10-Pin Terminal Block (screw type)
- Document and Software CD
- Quick Installation Guide (printed)
- Warranty Card