645M-1 4G/LTE multi-service broadband cellular modem and router

Wide-area Ethernet/serial connectivity with internal I/O

Description

The ELPRO 645M-1 cellular modem is a fast, secure remote monitoring and control solution. Using the latest 4G/LTE broadband cellular technology, the 645M-1 ensures fast, reliable, and consistent connectivity with mission-critical field devices and assets. With versatile Ethernet, serial, and I/O connectivity, customers owning several types of devices (PLCs, RTUs, sensors, pump panels, HMIs) are able to connect to the cellular network and monitor and control their systems.

The ELPRO 645M-1 cellular modem also carries the robust ratings required for heavy industrial applications, with wide temperature range and Class I, Division 2 certification. The 645M-1 is a perfect complement to ELPRO wireless solutions, allowing customers to remotely access their networks and is a perfect tool for troubleshooting and diagnosing network issues.

The ELPRO 645M-1 is today's leading solution for enabling your devices to the Internet of Things (IoT) and Industrie 4.0. Connectivity of your devices has never been so important in today's industrial world. With the 645M-1 cellular modem, there is a fast, reliable, and simple way to connect your devices to remotely monitor and control them from anywhere in the world.

Applications

- Water and waste water sensor monitoring and pump control
- Oil and gas remote sensor monitoring and pump control
- Irrigation system monitoring and control
- Utility metering backhaul

Features

- 4G/LTE broadband speeds and connectivity
- Up to 100 Mbps download and 50 Mbps upload speeds compatible with multiple carriers across the globe
- Automatic fallback to 3G and legacy EDGE/GPRS networks
- Multiple carrier compatibility with frequency bands compatible with networks in Americas, Europe, Middle-East, Africa, and Asia Pacific
- Multiple connectivity options with Ethernet, serial, and built-in I/O points for both digital and analog interfaces
- Latest security protocols: IPsec, GRE tunneling, PPTP, RADIUS clients
- Built-in secure HTPPS Web server for easy configuration and monitoring
- Multiple service provider compatible with fast, secure 4G/LTE connectivity and 3G/EDGE/GPRS fallback for reliability
- Client and router configuration modes
- Multiple I/O, Ethernet, and serial ports for wide industry applications
- Includes seven digital inputs, five digital outputs, four analog inputs accessible with SMS messaging or SNMP
- Built-in DHCP server and port forwarding
- Expandable I/O for local alarms and inputs/outputs with 115E-2 Ethernet I/O

Specifications

Specifications subject to change.

Table 1. 645M-1 4G/LTE specifications

Specification	Description
Radio (transmitter and receiver)	
Frequency—North America (LTE/CDMA/HSPA model)	Dual-band 700/1700 MHz (LTE Cat 3)
	EVDO/CDMA 800 MHz Cellular/1900 MHz PCS
	LTE Quad-band 700/850/AWS (1700/2100)/1900 MHz
	UMTS/HSPA WCDMA 850/AWS (1700/2100)/1900 MHz
	EDGE/GPRS Quad-band 850/900/1800/1900 MHz
Frequency—International (LTE/HSPA model)	Five-band 800/900/1800/2100/2600 MHz (LTE Cat 3)
	UMTS/HSPA triple-band 900/1800/2100 MHz
	EDGE/GPRS dual-band 900/1800 MHz
Data rate	LTE Cat 3—100 Mbps down, 50 Mbps up
	EVDO/CDMA—3.1 Mbps down,1.8 Mbps up
	UMTS/HSPA—7.2 Mbps down, 2.0 Mbps up
	EDGE/GPRS—236 kbps down, 236 kbps up
Transmit power (max.)	LTE Class 3, 200 mW UMTS/HSPA WCDMA Class 3, 250 mW EGSM Class 4, 2 W GSM Class 1, 1 W
Channel spacing	5 MHz, 10 MHz, 1.25 MHz
Antenna connector	2 x female SMA standard polarity (main and diversity)
Input and output	
Discrete input	(7) (ON/OFF)—max. 30 Vdc, ON 3.4 Vdc, OFF 2.8 Vdc
Discrete output	(5) (ON/OFF)—max. 30 Vdc, 200 mA
Analog input	(4) analog—input voltage range 0–30 Vdc, accuracy ±2%
Ethernet port	
Ethernet port	10/100Base-T, RJ-45 connector, 2 x IEEE® 802.3, auto MDIX, auto negotiate
Link activity	Activity LED
Serial port	
Serial port	EIA-232F DE9 female DCE
Data rate (bps)	Up to 115 kbps
Protocols and configuration	
Protocols supported	TCP/IP, UDP, ARP, ICMP, FTP, TFTP, TELNET, PING, GPS-NMEA (optional), DHCP, MAC filtering (whitelist)
	IP filtering (blacklist), DMZ, dynamic DNS, port forwarding, SNMP, HTTP embedded Web server, IPsec, GRE tunneling, PPTP, VPN, RADIUS/802.1x
User configuration	Configuration and firmware upgrades via HTTP/OTA (over the air) Web server
Configurable parameters	Client/router, serial client server, simultaneous RS-232 connection
Security	IPsec, GRE tunneling, PPTP VPN, RADIUS client, HTTPS Web server
Bandwidth protection	MAC address, whitelist/blacklist, IP filtering, whitelist/blacklist
Network management	SNMP, HTTP embedded Web server
Power supply	
Nominal supply	9–32 Vdc, under/overvoltage protection and reverse polarity
Receive current draw	130 mA at 13.8 Vdc (idle)
Transmit current draw	350 mA at 13.8 Vdc

Table 1. 645M-1 4G/LTE specifications, continued

Specification	Description
Compliance	
EMC	FCC Part 15; Industry Canada; CE; RCM; RoHS 2
RF (radio)	EN 301 511; EN 301 489-1, -7, -24; EN 301 908-1, -2; EN 62311; FCC Part 15
Safety	EN 60950-1
Hazardous area	UL Class I, Division 2
UL®	UL Listed
Environmental	MIL810 Thermal/Shock/Vibe/Humidity
Approvals	PTCRB, carrier-specific approvals
General	
Size	4.3 in x 6 in x 1.8 in (109 mm x 153 mm x 45 mm)
Housing	Powder-coated aluminum
Terminal blocks	I/O: removable terminal block, screwless push in wire, 18–28 AWG
Mounting	DIN rail, panel mount (optional)
Temperature rating	−40 to +185 °F (−40 to +85 °C),
Humidity rating	5 to 95% noncondensing
Weight	2.5 lb (1.13 kg)

Accessories

Table 2. 645M-1 4G/LTE accessories

Description	Product code
Antenna	
Cellular antenna, N-type female, 3/6.2 dBi gain	**ANTSGNEXTG-GSM-6**
Cables	
Coaxial cable kit, 9.8 ft (3 m), N-type to SMA	**CC3-SMA**
Coaxial cable kit, 32 ft (10 m), N-type to SMA	**CC10-SMA**
Coaxial cable tail, 24 in (600 mm), SMA to N-type female or male	**CCTAIL-SMA-F/M**
Configuration cable, RS-232 serial, DB-9 female to RJ-45	**CBLSER-RJ45**
RS-232 serial, null modem	**CBLSER-DB9**
Ethernet cable, 6 ft (1.8 m), crossover, RJ-45 to RJ-45	**CBLETH-C5X**
Ethernet cable, 6 ft (1.8 m), straight through, RJ-45 to RJ-45	**CBLETH-C5A**
Surge diverters	
SMA surge diverter for use with CC10, CC20-SMA	**SURCSD-SMA-2500**
Coaxial surge diverter, bulkhead N female to N female	**SURCSD-N-6000**
Signal surge diverter, 2 x 2-wire/ 1 x 4-wire	**SURIOP32D**
Mounting brackets	
Panel mounting plate kit for 615M-xx series	**BR-615-PLATE**
Power supplies	
DIN rail power supply, 85–264 Vac, 24 Vdc/2.5 A	**PSG60E**

Ordering

Table 3. 645M-1 4G/LTE ordering

Description	Frequencies (MHz)	Product code
Americas-specific bands with AT&T and Verizon compatibility	700/850/1700/1800/1900	**EL-645M-1-US**
European and rest of world specific	800/1700/1800/2100	**EL-645M-1-EU**

Note: Available RF power and frequency may vary depending on country of application. Please check user manual for your application.