Product Description

The TLE3-21100, part of the Connect Series, is a gateway with several interfaces available for telemetry and secure remote access applications. With Ethernet port and serial channel, it can connect to IP-based network equipment and serial devices at the same time. With cellular WAN, it has no geographic boundary and can be installed quickly. In contains advanced functions capable of performing intelligent protocol conversion and secure data transfer. The data logging function can store data from field devices for future transfer. Intelligent event management allows the administrator to manage the system or initiate events to trigger actions remotely. It can also notify the team when the system status changes.

Industrial applications are known for harsh environments and demand high availability. The IoT Gateway from Altus is designed for harsh conditions such as high or low temperatures, impacts or vibration. To handle the demands of industrial environments, the alloy metal housing is rigid and complies with the IP30 level of protection.

Main features:

- LTE module with 2 Micro SIM
- WiFi compliance IEEE802.11n 1T1R
- Digital Input and Output
- Integrated firewall SPI
- IPS function for cyber security
- VPN technology (IPSec / OpenVPN)
- SNMP, CLI and TR-069 support (remote management)
- RS-232/RS-485 interface
- PPPoE

Ordering Information

Included Items

The product package has the following items:

- A Gateway TLE3-21100
- Two cellular antennas (3dBi)
- A WiFi antenna (5dBi)
- Wall mount support
- Plastic supports for DIN rail mounting
- Ethernet cable RJ45 CAT5 1,5m

Product Code

The following code should be used to purchase the product:

Code	Description
TLE3-21100	Industrial IoT Gateway

Related Products

The following products must be purchased separately when necessary:

Code	Description
AMJG0808	Simple Cable RJ45-RJ45 2 m
NX9202	RJ45-RJ45 2 m Cable
NX9205	RJ45-RJ45 5 m Cable
NX9210	RJ45-RJ45 10 m Cable
AL-2600	RS-485 network branch and terminator
AL-2306	RS-485 cable for MODBUS or CAN network

Notes:

AMJG0808: Single CAT5 Ethernet network cable with an RJ45 male connector on each end (2 meters).

NX92xx: Cable for programming the CPUs of the Nexto Series and Ethernet point-to-point with another device with Ethernet interface communication.

AL-2600: This module is used for branch and termination of RS-485 networks. For each network node, an AL-2600 is required. The AL-2600 that are at the ends of network must be configured with termination, except when there is a device with active internal termination, the rest must be configured without termination.

AL-2306: Two shielded twisted pairs cable without connectors, used for networks based on RS-485 or CAN.

General Features

|		TLE3-21100
Interfaces	**SIM cards (chip)**	1 LTE module cat 4 (double)
	Ethernet	1x10/100Mbps
	LAN-WiFi	802.11n 1T1R (2.4GHz)
	Serial	1 RS232/RS485
	Digital Inputs/Outputs	1 DI ("Logic 0": 0~2Vdc, "Logic 1": 5~30Vdc) 1 DO (Relay 24Vdc / 300mA)
	Antennas	2 SMA Jack (Female) for LTE Antenna 1 SMA Jack (Male) for WiFi Antenna
	Memory card	MicroSD
	Power supply	9~36 Vdc
WAN functions	**WAN**	Cellular
	Cell phone	3GPP 3G/4G/LTE IP Pass-through
	Network monitor	ICMP DNS Query
Basic Functions	**LAN & VLAN**	DHCP Server/Relay
	Operation WiFi	AP Router
	WiFi security	WEP WPA WPA2 WPA-PSK WPA2-PSK 802.1x
	Port forwarding	NAT 1-1 1-many Transverse DMZ Virtual server & Computer VPN Pass-through
	Routing	Static and Dynamic: RIPv1/v2 OSPF BGP

Field communication	**Virtual COM**	RFC2217 TCP Client TCP Server UDP
	MODBUS	Gateway to MODBUS TCP/RTU/ASCII Client/Server
	MQTT	Subscriber & Publisher
	Data Logging	Sniffer Offline Proxy Full-time Proxy Sniffer & Proxy mixed mode
Safety	**VPN Tunnel**	IPSec OpenVPN comply with LZO compression PPTP L2TP GRE
	VPN capacity	IPSec: Up to 3 tunnels
	Scenario	Site to Site Site to Host Host to Site Host to Host Hub and Spoke Dynamic VPN
	Firewall	SPI firewall with Stealth mode IPS
	Access control	Packet filter MAC Filter
Service	**Cellular tools**	SMS Data usage SIM PIN USSD Network Scan
	Event management	Manage/notify user-configured event SMS shooting and action Email Syslog SNMP Trap MODBUS Digital inputs and outputs
Administration	**Configuration & management**	Web CLI Command script TR-069 SNMP V3 MIB private
	System Operation	Syslog Upgrade Backup & Restore Reboot and Reset
	FTP	FTP Server User account
	Diagnosis	Web diagnostic tool
Mechanical Characteristics	**Dimensions**	93x90x27 mm (with wall mount accessories)
	Weight	276 g
	Degree of protection	IP30
	Mounting	Wall mount support Plastic supports for din rail mounting
Environmental Limits	**Operating Temperature**	-30°C~70°C
	Temp. Storage System	-40°C~85°C
	Relative Humidity	10% ~ 95% (not condensed)
Standards and Regulations	**EMI**	EN 55032: 2015 +AC: 2016 Class B
	EMS	55024 EN EN 61000
	Radio	EN 301 489 EN 300 328 EN 301 893 EN 50385

Safety	EN 60950-1
Green	CE, RoHS Compliant
Anatel	**ANATEL** 17504-21-14445

Hardware Description

Physical Dimensions

See below the physical dimensions of the TLE3-21100:
(L x H x D) is 93mm x 90mm x 27mm
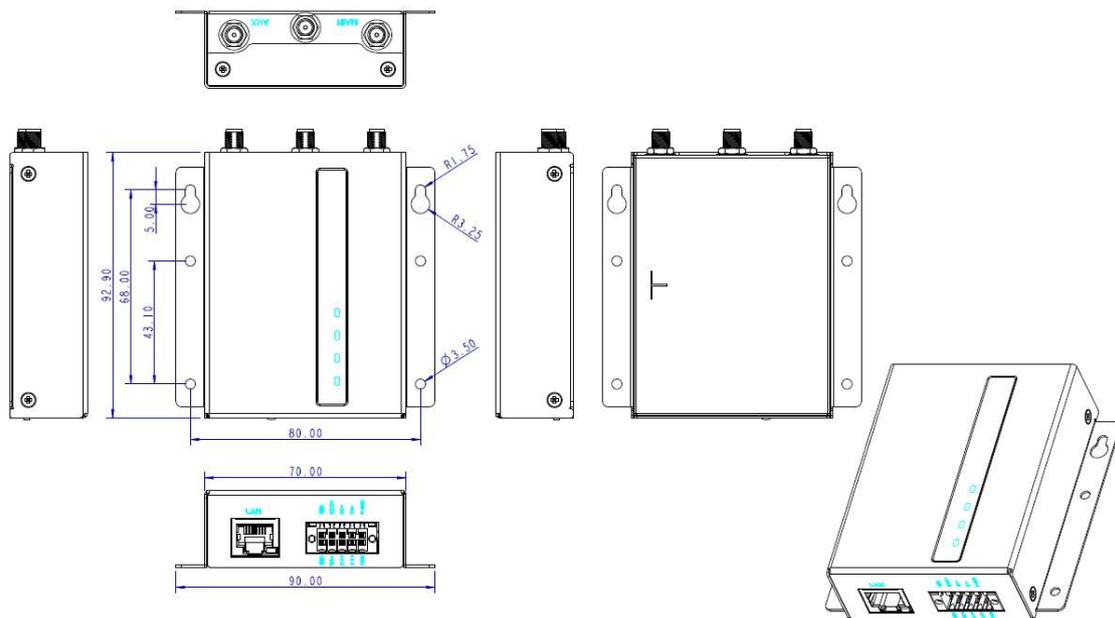
Front View

The front panel of the TLE3-21100 is shown in the image below:

Left Side View

The image below demonstrates the left side view of the TLE3-21100, which is equipped with a RJ45 connector and a removable 10-pin block connector, for 9-36 Vdc power input, RS232/RS485 serial port, digital input and digital output:
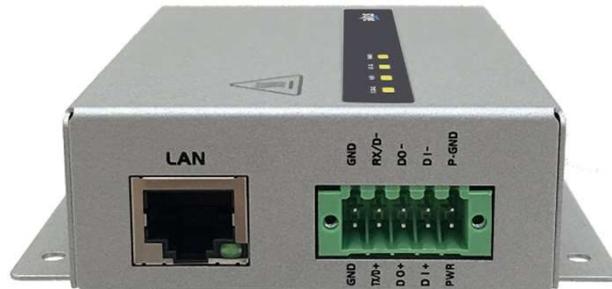
Right Side View

The image below demonstrates the right side view of the TLE3-21100, which is equipped with a memory card port, two SIM card ports (chip) and three connectors for external antennas. The product also comes with a metal sheet, which is fastened by screws and covers the card interfaces and the factory Reset button.

LED indicators

There are LED indicators located on the front panel of the product that show the diagnosis of LTE signal, WiFi, serial communication and general status:

Each LED indicator has a different color and has its own meaning, as shown in the table below:

| Indicator	LED color	Description	
SIGNAL	Blue Purple Red	When the LED color is:	
		Blue	Cellular mode is in LTE
		Purple	Cellular mode is in HSPA/3G
		Red	Cellular mode is in GSM/2G
		When the LED behavior is:	
		Blinking Fast	Signal strength between 0% - 30 %
		Blinking Slow	Signal strength between 31% - 60 %
		Stable	Signal strength between 61% - 100 %
WIFI	Blue	Stable	WiFi is enabled
		Flashing	Data being transferred via WiFi
SERIAL	Blue	Flashing	Data being transferred serially
STATUS	Blue	Blinking Slow	The gateway works normally
		Blinking Fast	The gateway is in recovery mode

Interfaces

Ethernet port

The RJ45 port automatically identifies connections from 10Base-T devices. Automatic MDI/MDIX means that you can connect to another switch or workstation without changing direct or crossover cabling. See in the table the representation of the Ethernet port:

	LED	Colour	Description	
	LAN Port LINK/ACT/SPEED	Green	Stable	Connected to the network, 10Mbps
			Flashing	Network is active
			Off	Not connected to the network

Serial Port, Power, Input and Digital Output

The device has 10 connection pins, where are the serial port (RS-232/RS-485), power (PWR), digital input (DI+ and DI-) and digital output (DO+ and DO-).
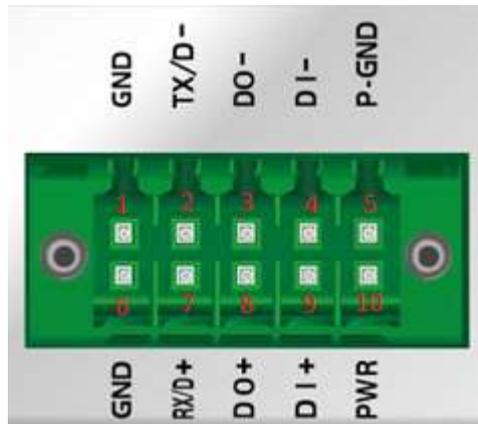
See the table for the full description of the pinout:

Pin 1	Pin 2	Pin 3	Pin 4	Pin 5
GND	RS-232 TX RS-485 D-	SD-	ED-	P-GND

Pin 6	Pin 7	Pin 8	Pin 9	Pin 10
GND	RS-232 RX RS-485 D+	SD+	ED+	PWR

See the table below for serial port specifications:

Item	Default	
Mode	Disabled	Select the operation mode for serial interface. Available modes: Virtual COM and MODBUS.
Interface	RS-232	Select the type of physical interface to connect to the access device. The compatible interface type can be RS-232 or RS-485.
Transmission Rate	9600	Select the appropriate transmission rate for serial device communication. RS-232: 1200 / 2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 155200 bps RS-485 can use a higher transmission rate of 230400 and 460800 bps.
Bit Data	8	Select 8 or 7 bits for data.
Bit Stop	1	Select 1 or 2 bits for stop bits.

See in the table below the specifications of the MODBUS mode serial port:

Mode	Specification	
Gateway Mode	Disabled by default	Select this mode to disable the MODBUS gateway function for the serial port.
	Serial Client	Select this mode when the connected serial devices are all MODBUS client.
	Serial Master	Select this mode when the connected serial device is a master MODBUS device.
Client Device	Disabled by default	The Gateway can function as a client MODBUS device and can be accessed with a SCADA management system.
Listening Port	Default: 502	Specify the Listening Port number if the client device is connected to the selected serial port. Range values: 1 to 65535
Serial Protocol	RTU by default	Select the serial protocol that is adopted by the connected MODBUS device. It can be RTU or ASCII.

See the table below for digital input and output specifications:

Mode	Specification	
Digital Input	Trigger Voltage (high)	Logic level 1: 5~30Vdc
	Normal Voltage (low)	Logic level 0: 0~2Vdc
Digital Output	Relay mode	24Vdc / 300mA

Cabling

Use a twisted-pair CAT5 cable or better cabling for RJ45 port connections. The cable between the switch and the device (switch, hub, workstation, etc.) must be less than 100m long. See in the table below the squematic of crossover and direct cables:

Crossover Cable		Direct Cable	
Nº / Pin signal	Nº / Pin signal	Nº / Pin signal	Nº / Pin signal
1 / RX+	3 / TX+	1 / RX+	1 / TX+
2 / RX-	6 / TX-	2 / RX-	2 / TX-
3 / TX+	1 / RX+	3 / TX+	3 / RX+
6 / TX-	2 / RX-	6 / TX-	6 / RX-

Observation: "+" and "-" signals represent the polarity of the wires that make up each pair.

Power

The TLE3-21100 device accepts input power (pins 10 and 5) of 9~36 Vdc. That is, it can be energized by 12 Vdc or 24 Vdc power supplies. Make sure that the electrodes have been connected to the correct pins according to their assignments.

Recommendations

Insert / Removing SIM Card

Make sure that the Gateway is switched off during insertion, removal or replacement of the SIM card (LTE chip).
To make the exchange, follow the following steps:
1. Turn off the device
2. Remove the metal sheet
3. Insert the chip by pressing it
4. To remove the chip just press it against the bottom and it will be expelled
5. Chip contacts should be oriented down (facing antenna connectors)

Using a SIM card

If the TLE's network configuration uses internet via a 4G SIM card, pay attention to a few details:
- Ask the operator to provide an IP that supports remote access.
- If it is an IoT (M2M) SIM card, check with the operator that 4G is enabled.
- The prepaid SIM card is not enabled for use in the gateway.

Topology Examples