TG451 Series

Industrial Cellular Gateways

Bivocom®

Programmable IoT Gateway with Rich I/O

TG451 is an OpenWrt based Linux OS industrial IoT gateway, which provides C/C++, Python programmable embedded environment for IoT developers and programmers to implement their industrial applications in a flexible and easy way.

TG451 has rich I/O like RJ45, RS232/RS485, DI/DO, USB, WIFI, GNSS, and protocols such as MQTT, Modbus RTU/TCP, Modbus to Json, TCP/UDP, to collect and transfer the data from diverse sensors and controllers to the cloud, and remotely control the industrial equipment. Besides, its captive portal feature is ideal for WIFI advertisement applications of transportation.

TG451 has option of dual sim or dual module for failover or load balance, provides secure, robust and reliable wireless and wired connectivity for your mission-critical industrial applications, and it has been widely used for air compressor monitor and control, bus WIFI advertisement, water pump control, electricity substation monitor, etc.

Key Features

1. Global 4G LTE/3G/2G cellular network supported
2. Dual SIM or dual module supports failover or load balance mode[1], auto switchover between wireless and wired WAN
3. Rich interfaces: 4-LAN, 1-WAN, 1-USB, 2-DI, 2-DO(Relay), 1-RS232, 1-RS485, WIFI(802.11b/g/n), GNSS/GPS(Option)
4. LTE/3G/PPPoE DHCP and static address connection
5. Captive portal for WIFI advertisement solution of transportation[2]
6. APN/VPDN, and multiple VPN protocols, IPsec, L2TP, PPTP, GRE and OpenVPN, to ensure secure data transmission
7. DHCP server, DHCP binding MAC address, DDNS, firewall, NAT, DMZ host, QoS, traffic analysis
8. MQTT, Modbus RTU/TCP, TCP/UDP, HTTP, SNMP protocols
9. SPI Firewall, Access Control, Port Mapping, DMZ Mapping, Access Control List (ACL), IP-MAC binding and Clone function
10. Web UI, telnet & SSH CLI, AT Command configuration
11. Web upgrade, local and remote syslog, serial port output log
12. SMS commands and DMP(Device Management Platform)[3] for remote configuration and management
13. OpenWrt based Linux OS, provides programmable environment via C/C++, Python, LUA, SDK[4]

Applications

Success Cases

Specifications

Cellular Interfaces

- **Antenna Connector**: 2 × 50 Ω SMA Female
- **SIM Slot**: 1, or 2(DSSM, or DSDM)
- **ESD Protection**: 15KV

Ethernet Interface

- **Ports**: 5-RJ45 (1-WAN, 4-LAN or 5-LAN configurable)
- **Data Rates**: 10/100 Mbps (Auto-Sensing), Auto MDI/MDIX
- **ESD Protection**: 1.5KV

Serial Interfaces

- **Connector**: Terminal block, 3.5 mm female socket with lock
- **Ports**: 1-RS232, 1-RS485
- **Baud Rate**: 300bps to 230400bps
- **ESD protection**: 8KV for RS232, 15KV for RS485

Wi-Fi

- **Antenna Connector**: 1 × 50 Ω RP-SMA Female
- **Standard**: IEEE 802.11b/g/n, AP and Client modes
- **Transmission Rate**: IEEE802.11b/g: Up to 54Mbps
IEEE802.11n: Up to 300Mbps
- **Security**: Open, WPA, WPA2, WPA/WPA2 Enterprise, Radius
- **Tx Power**: 18dBm (11g), 21dBm (11b)
- **Rx Sensitivity**: <-72dBm@54Mpbs

I/O

- **Connector**: Terminal block, 3.5 mm female socket with lock
- **DI**: 2-DI (0-30V Input)
Status “0”: 0-3V, status “1”: 5-30V
- **DO**: 2-Relay (Up to 5A and 30VDC/250VAC output)

External Storage

- **USB Port**: 1 x USB 2.0
- **SD (Optional)**: 1 x Micro SD interface, Up to 32G
- **Usage**: User Program, Data Storage and Firmware Upgrade

GNSS/GPS (Optional)

- **Module**: Built-in independent GPS Module, or GNSS from cellular module
- **Antenna Connector**: 1 × 50 Ω SMA Female

Power Supply and Consumption

- **Connector**: 2-pin with 3.5 mm terminal block
- **Standard Power**: DC 12V/1.5A
- **Input Voltage**: 5-35 VDC
- **Working Mode**: 280 ~ 330mA@12VDC
- **Idle Mode**: 190 ~ 240mA@12VDC

Software

- **Network Protocols**: PPP, PPPoE, SNMP v1/v2c/v3, TCP, UDP, DHCP, RIPv1/v2, OSPF, BGP, DNS, DDNS, HTTP, ARP, QoS, SNTP, Telnet, SSH
- **Serial Port**: MQTT, Transparent (TCP Client/Server, UDP Client/Server), Modbus Gateway (Modbus RTU to Modbus TCP)
- **VPN Tunnel**: IPsec/PPTP/L2TP/GRE/OpenVPN
- **Firewall**: ACL/DMZ/Port Mapping/MAC Binding
- **Management**: Web, CLI, SMS, Cloud DMP (Device Management Platform)
- **Reliability**: WWAN and WAN Failover, Dual SIM Backup and Load Balance, Hardware & Software Watchdog
- **Secondary Development**: OpenWrt based Linux OS, support C/C++ Python, LUA and SDK

Physical Characteristics

- **Ingress Protection**: IP30
- **Housing & Weight**: Metal, 630g(1.39lbs), without accessories
- **Dimensions**: 145 x 114 x 45mm (5.71 x 4.49 x 1.77in)
- **Mounting**: Desktop, DIN-Rail

Environmental

- **Operating Temperature**: -35°C to +75°C (-31℉ to +167℉)
- **Storage Temperature**: -40°C to +80°C (-40℉ to +176℉)
- **Relative Humidity**: 5% to 95% (non-condensing)
- **Ethernet Isolation**: 1.5 kV RMS

Others

- **Reset Button**: 1
- **LED Indicators**: Power, WIFI, System, Alarm, Online, Signal Strength
- **Built-in**: Watchdog, RTC, Timer
- **Approvals**[5]: CE, RCM, FCC*, NBTC
- **Warranty Period**[6]: Standard: 12 Months
Extended: 2-5 Years

Standard Package Content

1.	TG451 Gateway	1 PCS
2.	Power Adapter(DC 12V/1.5A, EU/US/UK/AU plug optional)	1 PCS
3.	RP-SMA WIFI Antenna (19.5cm, 5dBi)	1 PCS
4.	Mag-mount Cellular Antenna (SMA Male, 1 meter, 5dBi)	2 PCS
5.	RS232 Cable (DB9 Female, 1 meter)	1 PCS
6.	Ethernet Cable(1 meter)	1 PCS
7.	6-Pin Terminal Block	2 PCS
8.	2-Pin Terminal Block	1 PCS
9.	DIN-Rail mount kits	1 PCS

Order Information

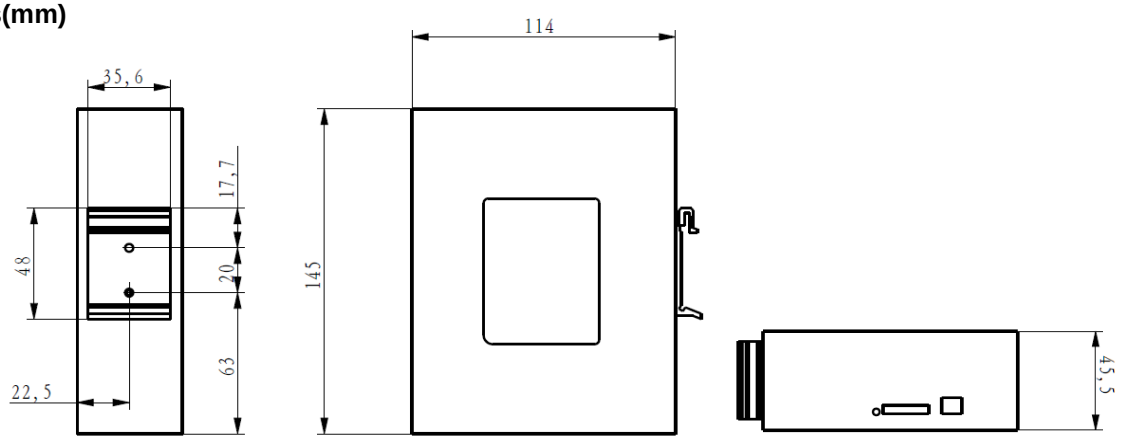
Model	Part Number	Description	Cellular Network	Frequency Band[7]
TG451-LF	TG451-L<1><2>-<3>	4G Gateway, WIFI, 1-RS232, 1-RS485, 5-RJ45, 1-USB, 2-DI, 2-DO	4G LTE 3G/WCDMA/UMTS/HSPA+ EDGE/GPRS	4G LTE CAT 4 • EMEA/Asia: B1/B3/B5/B7/B8/B20/B38/B40/B41 • ANZ/LATAM: B1/B3/B5/B7/B8/B28 • NA: B2/B4/B5/B12/B13/B14
1. <1> means modules for different cellular network, countries and regions 2. <2> DS=dual SIM on single module, for failover only DM=dual SIM on dual module, for failover and load balance 3. <3> W=2.4G single band WIFI G=GPS, independent GPS module GN=GNSS from cellular module				
TG451-W	TG451-W<1><2>-<3>	3G Gateway, WIFI, 1-RS232, 1-RS485, 5-RJ45, 1-USB, 2-DI, 2-DO	3G/WCDMA/UMTS/HSPA+ EDGE/GPRS	Global: 800/850/900/1900/2100

Unit 1402-2, No. 39, Xixi Shanwei Rd.,
3rd Software Park, Xiamen, China 361022
www.bivocom.com

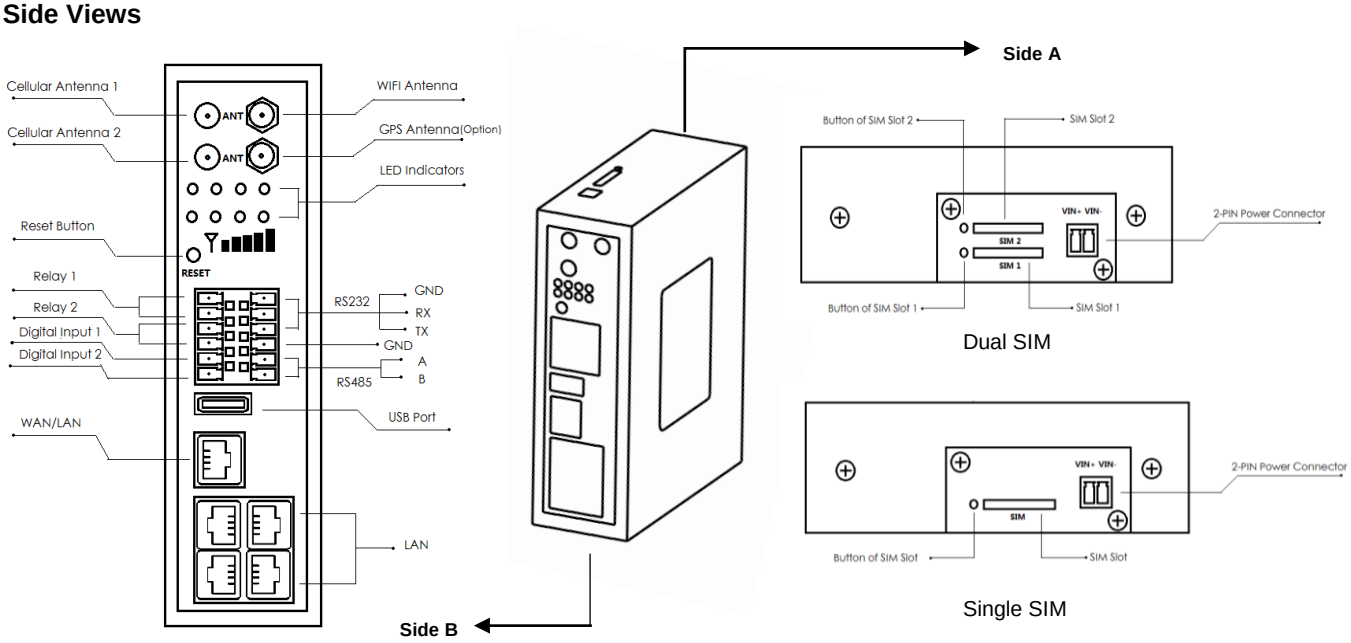
Version No.: 2.2.1 Updated: 05-06-2022

P: +86 158 8026 2905
E: sales@bivocom.com

Dimensions(mm)



Side Views

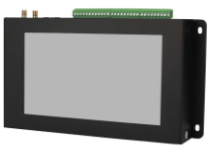


Related Products

IoT Edge Gateway
TG452 Series

- ✓ ARM based CPU
- ✓ OpenWrt based Linux OS, C/C++, Python programmable
- ✓ Edge computing, up to local 32G local data storage

Touch Screen Gateway
TG462S Series



- ✓ 7" HD Touch screen, QT programmable UI
- ✓ Rich I/O and customizable industrial protocols
- ✓ OpenWrt based Linux OS, C/C++, Python programmable
- ✓ Edge computing, up to local 32G local data storage

Note:
1. Dual SIM is optional feature, there has Dual SIM on Single Module(DSSM), Dual SIM on dual module(DSDM) to choose, DSSM mode supports failover, while DSDM supports load balance
2. Available on customized firmware
3. There has a license fee for DMP
4. Python, LUA requires customized hardware and firmware, please contact Bivocom to discuss your application
5. * Under progress
6. Price of the extended warranty will be different.
7. If you couldn't find the frequency band for your regions or have any questions, please contact Bivocom sales representatives for more information.
8. To save the earth, Bivocom doesn't print the user guide, if you need it, please go to Bivocom website to download.