Bivocom

TG451 Series

Cellular IoT Gateways with I/O

Introduction

TG451 is a programmable industrial IoT gateway that unifies legacy and modern sensors, meters and controllers into one integrated system. It features a full set of hardware interfaces, including RS232/RS485 serial ports, digital inputs, relay outputs, RJ45 Ethernet, USB, Wi-Fi and GNSS (Optional), serving as a cost-effective solution for BESS, HVAC, building automation, water and wastewater treatment, telecom sites, industrial automation and solar power plants.

TG451 offers optional dual-SIM/dual-module support for network failover and load balancing, as well as WAN/WWAN automatic failover, ensuring continuous and stable connectivity for mission-critical industrial applications.

Powered by Bivocom OS, TG451 supports mainstream protocols including Modbus RTU/TCP, JSON and TCP/UDP, with customizable industrial protocol stacks such as OPC UA*, IEC101/104/61850* and BACnet IP/MSTP*, etc. It also integrates multiple VPN modes covering Wireguard, OpenVPN and IPsec. Additionally, it supports secondary development via C/C++, optional Python and Lua, with dedicated Bivocom SDK and APIs to accelerate IoT project deployment and implementation.

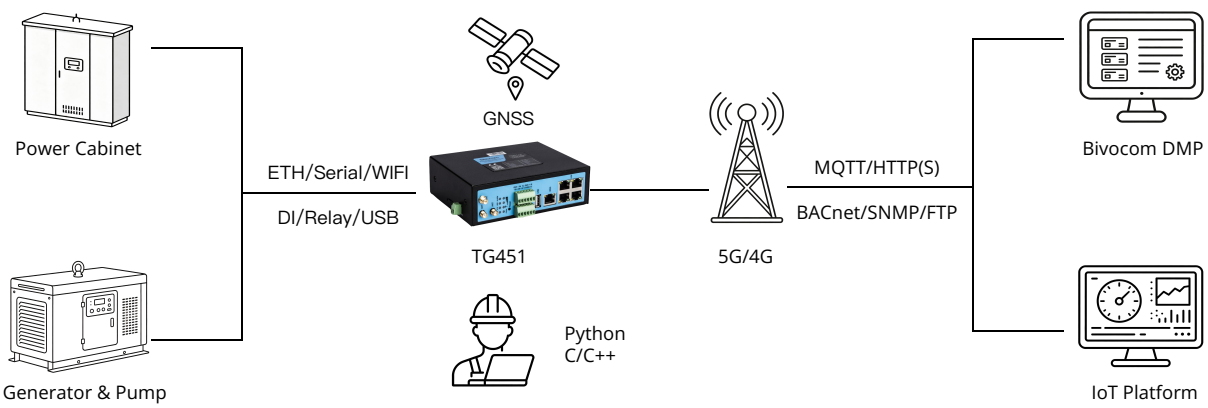
Key Features

- 4G LTE, or 5G RedCap (Optional)
- 5-ETH, 1-RS232, 2-RS485, 2-DI, 2-Relay, 1-USB, 2.4G WIFI, GNSS (Optional)
- Programming Bivocom OS: C/C++, Python (Optional)
- Modbus RTU/TCP, JSON, BACnet IP/MSTP*, OPC UA*, IEC 101/104/61850*, and customized industrial protocols
- MQTT, FTP*, HTTP(S), Wireguard VPN, SNMP*, Telnet, SSH
- Remote configuration and management by Bivocom DMP*

Applications

- HVAC
- Solar Panel
- BESS
- Industry 4.0
- Water & Waste Water
- Oil & Gas
- Power
- Weather Station

Diagram



Specifications

Systems

CPU	32-bit MIPS
Flash	16MB (32MB Optional)
RAM	128MB (256MB Optional)

Cellular

Antenna	2 x 50 Ω SMA-K
SIM Slot	1 Mini SIM(2FF), or 2(DSSM, DSDM, Optional)

Ethernet

Ports	5 x 10/100 Mbps 1 x WAN, 4 x LAN, or 5 x LAN Configurable

Serial

Ports	1 x RS232, 1 x RS485
Baud Rate	1200bps to 230400bps

I/O

Digital Input	2-DI(Isolation, Dry contact), Optional Wet contact (Status "1": 0-3V, Status "0": 5-30V)
Relay Output	2-Relay (Up to 5A, 30VDC/250VAC switch)

Wi-Fi

Antenna	1 x 50 Ω RP-SMA-J
Standard	IEEE 802.11b/g/n, AP/Client modes
Bands	2.4GHz
Security	Open, WPA, WPA2, Radius

GNSS / GPS (Optional)

Module	GNSS from cellular module, or independent GPS Module
Antenna	1 x 50 Ω SMA-J

External Storage

USB	1 x USB 2.0
Usage	User Program and Data Storage

Power

Input	5-35VDC
Standard Power	12VDC/1.5A
Idle Mode	190 ~ 240mA@12VDC
Working Mode	280 ~ 330mA@12VDC

Physical Characteristics

IP Rating	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 Temp.	-35° C to +75° C (-31°F to +167°F)
Storage Temp.	-40° C to +80° C (-40°F to +176°F)
Relative Humidity	5% to 95% (non-condensing)

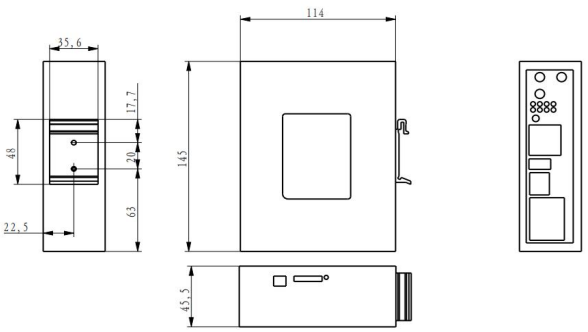
Others

Reset Button	1
LED Indicators	Power, WIFI, System, Alarm, Online, Signal
Built-in	Watchdog, RTC, Timer
Approvals	CE, RCM, NBTC, FCC*
Warranty Period	Standard: 2-Year limited warranty Extended: 3-5 Years

Software

Programming	Bivocom OS (OpenWrt based Linux OS) C/C++, Python*, LUA* and SDK
Data Protocols	Modbus RTU/TCP, SMS, SNMP*, IEC101/104*, IEC61850*, BACnet IP/MSTP*, OPC UA*, etc.
Network Protocols	VXLAN, GNSS, IPV6*, DDNS, DNS, ARP, Static Routing, NAT, Firewall, Telnet/SSH, PPP, PPPoE, DHCP, ICMP, NTP, etc.
Server Supported	MQTT, HTTP(S), Transparent TCP/UDP, FTP*
VPN	Wireguard/OpenVPN/IPsec/PPTP/L2TP
Firewall	ACL/DMZ/Port Mapping/MAC Binding
Management	Web, CLI, SMS, Bivocom DMP (Device Management Platform)*
Reliability	Dual SIM*, WWAN and WAN Failover, Hardware & Software Watchdog

Dimensions



Ordering Information

Model	Part Number	Cellular	Frequency Bands	Package Contents
TG451-LF	TG451 - L <1><>2 - <3>	4G LTE	**4G LTE CAT 4*** **(Optional Global or Regional Version)** • 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. TG451 x 1 2. Cellular Antenna x 2 3. WIFI Antenna x 1 4. Ethernet Cable x 1 5. 6-Pin Terminal Block x 2 6. 2-Pin Terminal Block x 1 7. DIN-Rail Mount Kit x 1 8. Power Adapter x 1 (Optional EU/UK/AU/US/CN Type)
TG451-RC	TG451 - RC <1><2> - <3>	5G RedCap	**5G NR Sub-6 SA*** **(Optional Global or Regional Version)** • n1/2/3/5/7/8/12/13/14/18/20/25/26/28/30/38/40/41/48/66/70/71/77/78/79 • LTE FDD B1/2/3/4/5/7/8/12/13/14/17/18/19/20/25/26/28/30/66/70/71 • LTE TDD B34/38/39/40/41/42/43/48	

Part Number:
<1>: 5G or 4G module for different countries and regions
<2>: DS=Dual SIM Single Module
DM=Dual SIM Dual Module
<3>: W=2.4G WIFI
G=GPS (Standalone GPS)
GN=GNSS from cellular module

Note:

1. Region-specific cellular modules are available; consult Bivocom sales for details.
2. Compiler & SDK are provided for secondary development. Python require dedicated hardware&firmware (32MB Flash version, optional)
3. DSSM: Dual-SIM single-module design with automatic network failover; DSDM: Dual-SIM dual-module design supporting load balancing.
4. Bivocom DMP (Device Management Platform) requires a license fee.
5. *Optional functions rely on matching hardware/firmware versions; not all features supported on one device.
6. Power consumption is measured under laboratory conditions and is for reference only.
7. *Listed certifications are pending.
8. Extended warranty pricing varies.
9. Digital user manuals are free to download from Bivocom official website for environmental protection.

About Bivocom

Founded in 2014, Bivocom specializes in industrial IoT communication technology. Our comprehensive product portfolio covers IoT sensors, cellular gateways, industrial routers, RTUs, modems, as well as self-developed IoT cloud management platforms. We deliver ruggedized industrial wireless hardware, full-lifecycle OEM/ODM customization services and end-to-end IoT connectivity one-stop solutions to industrial partners worldwide.

HQ: 27–28/F, Building F14, Software Park Phase III, Xiamen, 361022, China

W: www.bivocom.com P: +86 158 8026 2905

E: sales@bivocom.com E: support@bivocom.com

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